

# IONOSPHERIC DATA IN JAPAN

FOR October 2021

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«WDC for Ionosphere and Space Weather ... <https://wdc.nict.go.jp/IONO/wdc/index.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><math>F2</math></b> layer
<b><math>fEs</math></b>	Highest frequency of the <b><math>Es</math></b> layer whether it may be ordinary or extraordinary
<b><math>fmin</math></b>	Lowest frequency which shows vertical iono-spheric reflections
<b><math>h'Es</math> <math>h'F</math></b>	Minimum virtual height on the ordinary wave for the <b><math>Es</math></b> and <b><math>F</math></b> layers, respectively

#### b. Descriptive Letters

The following descriptive letters are used in the tables.

- A Impossible measurement because of the presence of a lower thin layer, for example  $Es$  ( for  $foF2$  ).
- 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 auto matic data processing system, but existence of film record.

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

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

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

of values.

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

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

#### d. Reliability of Automatic Scaling

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

## b. Symbols

## (i) Descriptive Letters

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

- A** Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example *Es*.
- B** Measurement influenced by, or impossible because of, absorption in the vicinity of *fmin*.
- C** Measurement influenced by, or impossible because of, any non-ionospheric reason.
- D** Measurement influenced by, or impossible because of, the upper limit of the normal frequency range in use.
- E** Measurement influenced by, or impossible because of, the lower limit of the normal frequency range in use.
- F** Measurement influenced by, or impossible because of, the presence of spread echoes.
- G** Measurement influenced by, or impossible because the ionization density of the layer is too small to enable it to be made accurately.
- H** Measurement influenced by, or impossible because of, the presence of a stratification.
- K** Presence of particle *E* layer.
- L** Measurement influenced or impossible because the trace has no sufficiently definite cusp between layers.
- M** Interpretation of measurement questionable because the ordinary and extraordinary components are not distinguishable.
- N** Conditions are such that the measurement cannot be interpreted.
- O** Measurement refers to the ordinary component.
- P** Man-made perturbations of the observed parameter; or spur type spread *F* present.
- Q** Range spread present.
- R** Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.
- S** Measurement influenced by, or impossible because of, interference or atmospheric.
- T** Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
- V** Forked trace which may influence the measurement.
- W** Measurement influenced or impossible because the echo lies outside the height range recorded.
- X** Measurement refers to the extraordinary component.
- Y** Lacuna phenomena, severe layer tilt.
- Z** Third magneto-electronic component present.

## (ii) Qualifying Letters

The following letters are entered in the first column before a numerical value on the monthly tabulation sheets, if necessary.

- A** Less than. Used only when *fbEs* is deduced from *foEs* because total blanketing of higher layer is present.
- D** Greater than.
- E** Less than.
- I** Missing value has been replaced by an interpolated value.
- J** Ordinary component characteristic deduced from the

extraordinary component.

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

(iii) Description of Types of *Es*

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

The types are:

- f** An *Es* trace which shows no appreciable increase of height with frequency.
- l** A flat *Es* trace at or below the normal *E* layer minimum virtual height or below the part *E* layer minimum virtual height.
- c** An *Es* trace showing a relatively symmetrical cusp at or below *foE*. ( Usually a daytime type. )
- h** An *Es* trace showing a discontinuity in height with the normal *E* layer trace at or above *foE*. The cusp is not symmetrical, the low frequency end of the *Es* trace lying clearly above the high frequency end of the normal *E* trace. ( Usually a daytime type. )
- q** An *Es* trace which is diffuse and non-blanketing over a wide frequency range.
- r** An *Es* trace showing an increase in virtual height at the high frequency end similar to group retardation.
- a** An *Es* trace having a well-defined flat or gradually rising lower edge with stratified and diffuse traces present above it.
- s** A diffuse *Es* trace which rises steadily with frequency and usually emerges from another type *Es* trace.
- d** A weak diffuse trace at heights below 95 km 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

OCT. 2021

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

HOURLY VALUES OF fEs                      AT Wakkanai

OCT. 2021

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	G	G	G	G	20	G	32	34	50	48	49	56	40	34	32	31	34	29	59	33	31	G	G		
2	G	G		G	24	24	33	37	57	54	78	58	34	84	40	40	47	33	29	32	25	32	31	G		
3	G		26	34	34	39	32	G	32	41	83	53	46	108	40	37	36	G	G	G	G		48	35	32	28
4	33	G	25	33	59	40	30	38	41	47	36	38	35	39	39	34	32	G	G	G	G	G	G	G	G	
5	30	G	G	G	G	G	G		32	49	40	31	48	37	35	41	45	39	31	G	G	G	G	G	28	
6	30	26		G		G	30	59	32	41	146	48	46	46	42	33	29	26	G	G	G	G	G	G	G	
7	G	G	G	G		G	G		34	40	49	45	41	40	41	41	35	34	50	38	30	32	G	G	G	
8	G		G	G	G	G	G		34	38	36	41	34	40	38	37	38	29	26	24	24	29	31	G	G	
9	G	G	G	G	G	G		38	36	39	34	46	91	37	37	38	39	57	38	46	30	39	49	32	G	
10	G	G		G	G	27	G		32		57	53	111	50	38	36	34	35	39	28	43	31	28	31	37	
11	32	30	25	G	G	G	32	43	40	33	43	41	47	35	32	36	29	20	G	G	G		31	26	28	
12	G	G	G	G	G	G	30	50	33	34	55	60	33	45	53	36	28	26	57	43	G	G	G	G	G	
13	26	G	G	G		29	48	49	58	32	34	47	36	35	40	79	28	40	34	40	30	G	24	26	25	
14	G	G	G	G		27	39	32	41	66	72	63	73	83	49	51	71	43	33	55	32	36	32	25	G	
15	G		24	28	28	32	G	29	41	55	72	47	34	40	41	36	31	42	29	31	G	28	32		G	
16	G		31	32		26	G	39	32	40	55	59	40	39	50	39	50	41	45	34	27	28	G	38	31	
17	163	G	G		28	29	175	G	52	30	38	37	34	52	41	41	69	91	92	30	32	32	G	G	28	
18	28	G	26	39	32	32	30	G		38	41	42	39	37	35	33	32	39	32	49	38	39	34	28	26	
19	G	G	G	G	G	G	G		40	59	35	60	34	41	36	41	44	41	91	91	29	G	G	28	G	
20	G	G	G	G	G		11	24	35	34	39	37	34	31	57	34	32	195	11	26	32	39	36	33	32	
21	G	G		G	140	G	29	50	36	40	47	41	37	54	38	37	39	36	40	38	25	30	G	G	G	
22	G		24	24	G	126	11	G		50	43	46	62	54	37	33	52	G	38	G	G	G	26		32	
23	G	G	G	G	G		26	G	50	35	38	38	36	39	39	41	40	31	11	G	31	29	30	27	25	
24	G	G	G	G	180	G	G	G	49	34	40	59	31	35	35	29	34	32	56	59	33	30	32	34	30	
25	G	G	G	G	G	G	G	G		33	48	53	38	32	50	49	25	28	G	G	G	37	G	G	26	
26	G	G	G	G	G		11	158	48	34	31	30	35	35	44	39	35	G	G		29	G	G	G	G	
27	G	G	G	G	G		113	33	49	54	34	36	39	39	58	49	36	56	49	30	G	G	23	26	29	G
28	G	G	G	G	G	G	G		46	35	40	38	34	39	38	33	55	30	41	G	G	G	24	26	26	G
29	30	G	G	G	G		11	G	174	34	41	80	50	50	33	39	33	28	11	G	G	G	31	33	39	G
30	32	59	37	30	32	31	27	31	36	46	56	71	43	46	34	32	28	33	32	G	G	29	26	G	G	
31	31	G	G	G	G	G	G		32	55	41	47	59	42	58	56	36	G	39	29	G	G	24	G	G	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	31	30	29	30	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31		
MED	G	G	G	G	G	G	24	37	38	41	47	41	39	40	39	36	32	33	29	27	28	26	26	G		
U Q	30	G	25	G	32	31	32	49	41	49	56	58	47	50	41	40	41	41	38	32	32	32	31	28		
L Q	G	G	G	G	G	G	G	32	34	36	38	35	35	37	34	33	28	20	G	G	G	G	G	G		

HOURLY VALUES OF fmin AT Wakkanai

OCT. 2021

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	14	15	14	16	16	15	16	15	15	15	15	16	15	15	17	15	16	16	15	15	16	15	15
2	15	16	15	16	17	15	16	14	15	14	17	16	15	16	15	15	14	16	16	15	16	16	15	15
3	15	15	16	14	16	16	20	15	15	18	15	17	15	16	15	15	15	17	14	14	15	17	16	16
4	16	27	15	16	15	15	15	15	15	16	13	15	14	16	17	14	16	16	14	15	15	16	16	16
5	16	16	15	14	14	15	18	16	15	15	17	17	16	15	14	15	15	16	16	14	15	15	14	17
6	16	16	16	16	16	15	15	13	17	16	15	16	15	14	14	14	15	15	16	16	17	16	16	15
7	14	16	15	16	16	15	16	16	15	14	15	15	18	19	15	16	16	15	16	16	16	15	16	16
8	15		15	15	16	16	20	16	17	15	15	17	16	15	15	15	16	16	15	16	16	15	16	16
9	16	15	15	14	16	15	18	17	15	15	15	17	15	15	12	17	14	15	15	17	16	16	17	15
10	17	15	15	16	16	16	17	16	15	16	13	14	15	15	15	16	16	15	16	16	16	15	16	15
11	16	16	16	15	16	15	16	15	15	15	15	16	15	15	13	14	15	15	16	14	15	16	15	16
12	15	15	14	14	15	14	16	16	16	17	15	15	15	14	13	15	15	17	16	14	15	15	15	16
13	16	15	15	16	16	15	15	15	16	15	17	15	16	15	14	16	14	15	15	16	16	16	16	16
14	16	16	15	15	16	16	15	15	16	14	14	15	15	16	14	15	16	16	16	16	16	16	16	17
15	15	15	15	16	16	15	14	15	15	16	14	15	15	15	15	16	14	16	16	14	16	16	16	15
16	15	15	16	16	15	15	16	16	15	15	15	18	15	15	13	15	15	14	17	15	16	17	15	16
17	15	14	16	15	16	35	16	16	16	15	16	16	15	15	15	16	15	15	17	16	17	16	16	16
18	17	15	17	15	16	16	16	15	15	15	15	15	15	15	15	17	15	15	15	16	15	16	16	15
19	15	16	15	16	16	14	15	15	15	15	15	17	14	14	15	14	15	15	17	16	16	15	15	16
20	16	16	22	15	16	15	17	14	16	15	15	15	15	12	16	17	17	15	16	16	15	15	16	16
21	15	17	16	15	15	15	17	15	17	15	14	16	15	15	13	16	15	16	16	16	16	15	15	15
22	14	16	16	15	16	16	15	15	17	15	15	17	16	17	16	16	15	17	16	16	16	16	15	16
23	14	15	16	15	16	16	16	16	16	15	15	15	15	16	15	14	17	15	15	16	15	15	15	16
24	15	15	14	16	16	16	14	15	17	16	16	17	17	16	17	16	16	17	15	17	16	15	17	16
25	15	15	15	14	14	14	14	15	17	17	15	15	16	16	16	15	15	16	16	21	15	16	15	16
26	15	15	15	16	14	14	17	15	17	15	17	15	18	16	15	15	18	17	16	15	15	15	15	16
27	15	15	15	15	15	15	15	15	16	13	16	15	17	15	15	14	14	16	15	16	16	16	16	16
28	15	17	15	14	14	15	16	14	15	15	15	15	15	15	14	16	16	15	14	14	16	16	16	15
29	16	15	14	14	14	15	15	15	16	15	15	15	19	15	13	16	16	14	15	15	17	16	16	15
30	17	16	15	16	17	16	16	16	15	14	14	15	15	15	17	15	15	16	16	14	15	16	15	17
31	17	16	14	94	16	14	14	17	15	15	15	17	15	15	15	14	18	16	16	16	16	16	14	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	15	15	15	16	15	16	15	15	15	15	15	15	15	15	15	15	16	16	16	16	16	16	16
U Q	16	16	16	16	16	16	17	16	16	16	15	17	16	16	15	16	16	16	16	16	16	16	16	16
L Q	15	15	15	14	15	15	15	15	15	15	15	15	15	15	15	14	15	15	15	15	15	15	15	15

HOURLY VALUES OF fof2 AT Kokubunji

OCT. 2021

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	43	43	41	39	35	35	48	73	55	85	86	80	84	80	79	83	79	77	88	61	53	48	45	51	
2	51	44	45	A	A	A	63	76	72	71	65	91	80	84	77	69	69	74	81	64	53	49	48	47	
3	44	45	44	46	A	33	51	80	68	68	78	80	88	82	73	71	73	59	61	54	40	43	44	39	
4	A	38	A	A	33	30	49	67	73	76	83	78	83	92	68	58	65	77	75	60	51	47	35	40	
5	40	40	39	40	33	25	49	69	78	80	69	76	82	82	68	68	67	65	53	46	37	37	37	37	
6	37	35	35	32	33	30	48	56	76	71	83	81	78	82	66	60	65	66	57	45	43	42	43	42	
7	42	41	39	33	35	33	54	71	73	79	80	75	83	85	73	63	73	66	54	51	49	42	39	40	
8	38	39	38	39	33	33	45	59	65	69	81	85	84	79	65	65	72	76	61	51	51	38	39	39	
9	38	40	39	39	37	34	44	55	67	65	63	71	73	80	68	65	81	81	61	43	47	40	A	36	
10	36	36	35	34	35	33	49	67	71	65	66	77	81	87	78	65	65	63	65	60	53	42	35	37	
11	37	36	37	35	37	32	44	59	68	89		81	71	70	69	75	76	75	64	46	35	36	34	35	
12	38	37	36	35	34	34	54	70	72	73	71	91	67	89	82	85	105	73	57	35	39	37	34	36	
13	35	35	34	34	37	A	42	60	109	91	77	72	92	71	77	80	74	62	48	A	44	38	36	35	
14	A	A	A		37	40	33	49	62	69	67	75	83	89	68	71	86	80	70	51	36	A	33	31	28
15	34	34	33	33	30	30	49	67	75	76	76	99	88	79	72	78	79	70	42	39	39	41	43	39	
16	34	35	31	35	39	25	44	55	67	68	77	77	75	57	64	90	74	67	36	A	36	34	38	34	
17	35	35	35	36	36	27	43	59	65	65	67	75	76	67	67	64	65	81	A	A	34	35	34	34	
18	35	35	32	35	33	32	40	68	87	87	89	104	97	78	70	63	67	59	40	43	43	41	41	41	
19	39	37	39	39	39	36	46	70	77	79	87	89	88	75	67	83	84	73	58	32	31	36	35	37	
20	35	32	33	35	37	25	49	55	65	66	71	90	80	78	91	78	63	65	53	36	34	34	34	32	
21	32	32	31	31	31	30	38	49	69	65	59	A	75	62	72	79	68	68	41	A	34	33	34	34	
22	A	31	34	33	33	32	47	59	66	68	71	64	89	81	63	65	67	55	A	A	34	29	31	31	
23	32	35	33	34	37	24	39	50	63	68	65	67	69	65	68	61	56	61	39	36	35	33	34	34	
24	33	34	34	34	33	31	44	65	72	76	71	71	73	65	68	70	65	56	39	36	38	36	36	35	
25	34	34	33	31	34	31	45	72	72	80	69	85	83	70	79	80	63	62	36	39	34	35	37	38	
26	37	36	34	35	34	33	45	66	66	86	74	72	83	76	73	82	73	54	46	39	39	38	39	37	
27	37	36	36	36	39	31	42	61	71	84	75	75	75	72	80	83	85	65	47	34	36	36	34	34	
28	35	36	36	35	35	35	44	71	76	69	80	88	79	76	73	81	82	64	42	37	28	26	33	35	
29	A	34	36	34	37	27	39	62	69	77	94	81	93	83	79	85	77	59	34	37	34	A	31	34	
30	39	37	39	38	46	A	36	58	74	84	81	86	71	77	79	83	75	53	A	A	A	A	A	A	
31	37	37	35	36	37	32	46	65	75	83	A	93	99	79	75	78	83	69	45	43	A	A	36	32	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	27	30	29	29	29	28	31	31	31	31	29	30	31	31	31	31	31	31	28	25	28	28	29	30	
MED	37	36	35	35	35	32	45	65	71	76	75	80	82	78	72	78	73	66	52	43	38	37	36	36	
U Q	39	38	39	37	37	33	49	70	75	83	81	88	88	82	78	83	79	73	61	51	45	41	39	39	
L Q	35	35	33	34	33	30	43	59	67	68	69	75	75	70	68	65	65	61	41	36	34	34	34	34	



HOURLY VALUES OF fEs                      AT Kokubunji

OCT. 2021

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1	G	G	G	G	G	G	G																				
2	G	G		40	72	58	72	56	52	36	41	33	41	41	45	60	42	49	54	38	45	50	33	33	40		
3	37	27	29	26	26	26	G	35	47	57	41	55	40	40	G	31	G	28	G	G		31	32	38	31		
4	37	28	43	34	26	G	G	37	43	52	61	45	39	41	46	34	29	31	G		32	G	34	G	G		
5	G	G	G		G	G		31	53	37	42	32	48	40	37	35	28	34	G		G		27	33	29	G	
6	G	G	G	G	G	G		29	40	41	44	42	57	49	45	34	39	35	29	26	31	G		26	32	32	
7	G	G	G	G	G	G	134	36	43	55	54	66	48	46	40	45	38	27	40	24	31	40	G	G	G		
8	G	G	G	G	G	G		28	41	32	47	53	57	55	52	57	36	32	32	33	32	26		G	G	G	
9	G	G	G	G	G	G		43	37	53	51	52	49	47	43	36	34	33	33	38	29	70	29	40	G		
10	G	G	G		G	G		47	39	36	34	39	45	42	106	G	34	G		28	38	36	40	G	26	G	
11	G	G	G	G	G	G		33	48	50	45		33	41	41	29	39	37	33	20	26	25	30	G	G		
12	G	G	G	G	G	G		27	36	40	34	37	43	37	45	36	33	35	36	G		27	G	G	G	G	
13		G	G	G	G			50	49	56	51	55	70	49	40	33	35	35	59	28	45	49	40	116	G	G	
14	107	50	53	49	52	27	47	36	42	42	59	46	37	54	43	47	36	55	33	27	60	33	G	32	G		
15	G	58	28	29	23	G	25	40	47	52	45	45	53	39	39	40	31	24	G	G		28	29	G	G		
16	G	G	G	G	G	G	G		32	33	35	37	57	35	53	37	35	45	40	34	36	33	32	24	23	G	
17	G	G	G	G	G	117	G	G	G		163	35	47	G	39	39	40	39	41	58	32	25	26	23	G		
18	G	G	G	G		G		29	29	33	37	35	33	36	54	34	40	42	40	G	G	G	G	G	G	G	
19	G	G	G	G	G	G		26	37	34	43	47	47	50	42	50	33	34	11	19	G	G		26	32	32	
20		G	G	G	G	G		26	92	42	47	36	51	34	46	48	40	34	11	24	28	27	27	32	G		
21	23	25	G	G	G	G	G			40	46	47	109	96	80	92	37	39	31	25	37	27	59	34	G	G	
22	41	G	G	G	G	G	G		29	36	41	36	58	40	46	36	G	G		11	41	56	29	24	G	G	
23	G	G	G	G	G	G	G		48	36	31	40	35	65	37	35	50	51	47	26	29	G	G	G	G	G	
24	G	G	G	G	G	G	G		49	37	42	42	43	40	41	42	G	G		11	G	G	G	G	G	G	
25	G	G	G	G	G	G	G		36	36	32	114	G	48	36	34	31	50	26	22	33	24	G	28	G		
26	G	G	G	G	G	G	G		40	57	37	31	33	G	41	38	33	32	26	G	G	G	G	G	G	G	
27	G	G	G	G	G	G		24	48	39	35	36	38	33	31	34	43	29	11	G	G		G	G	G	G	
28	G	G	G	G	G	G		11	35	40	34	47	34	G	G		35	31	32	11	G		34	31	24	G	33
29	60	31	G		G	G		25	34	35	40	48	78	40	60	37	39	29	11	32	G		29	27	27	G	
30	33	35	36	39	39	41	32	33	46	43	46	60	83	68	42	49	84	33	50	60	54	55	71	54			
31	29	G	G	G	G	G	G		47	51	53	136	34	52	71	42	40	37	11	27	30	38	41	31	24		
00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	31	31	31	30	31	31	31	30	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	G	G	G	G	G	G	25	37	40	42	42	47	40	45	37	36	34	28	25	29	27	27	G	G			
U Q	27	G	G	23	G	G	32	48	46	51	52	57	49	53	42	40	39	33	38	34	33	33	32	24			
L Q	G	G	G	G	G	G	G	35	36	37	36	38	37	39	35	33	29	11	G	G	G	G	G	G	G		

HOURLY VALUES OF fmin                      AT Kokubunji

OCT. 2021

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	13	13	13	15	21	15	15	15	15	17	17	16	17	15	15	18	13	13	16	16	15	13
2	14	13	15	17	15	16	15	16	15	14	15	29	26	15	14	14	14	15	15	15	16	16	16	16
3	15	16	15	15	15	16	18	17	15	14	15	17	23	33	15	15	15	15	15	15	16	16	15	17
4	15	16	15	15	15	16	13	16	15	14	15	13	15	15	22	17	15	16	14	16	16	15	16	13
5	13	16	13	15	16	15	15	15	15	15	15	15	15	15	13	15	16	18	15	15	16	16	15	15
6	15	15	13	15	15	14	13	15	15	15	16	15	16	15	14	15	15	15	15	15	16	16	16	16
7	15	15	13	15	14	14	16	17	14	15	15	17	19	18	16	13	14	14	15	16	15	15	15	15
8	13	13	14	14	13	13	13	16	14	14	15	14	18	15	14	14	14	15	16	16	15	15	15	13
9	14	15	13	13	13	13	13	16	15	14	15	15	15	17	17	15	15	16	14	15	14	16	15	15
10	15	14	15	15	13	15	17	15	14	15	17	14	15	18	17	15	15	15	15	15	16	14	15	15
11	14	14	15	15	14	16	16	14	13	15		16	17	16	15	17	17	16	15	15	15	15	17	13
12	15	13	15	13	14	14	13	16	14	15	14	15	14	16	16	15	16	16	15	15	13	15	15	15
13	15	15	15	15	15	13	15	14	14	15	15	17	17	14	14	17	13	15	14	14	17	5	14	15
14	15	15	15	15	15	15	13	16	15	15	16	17	14	16	15	13	16	14	16	15	15	15	13	16
15	13	13	15	15	16	13	15	15	14	15	15	16	15	15	15	14	16	15	13	14	15	15	16	16
16	14	15	15	15	13	13	17	16	17	17	15	17	17	16	15	16	15	15	15	15	16	16	15	16
17	15	15	14	13	15	39	15	15	15	17	16	17	16	17	15	15	17	15	15	16	17	16	15	16
18	14	15	14	15	15	15	14	15	16	17	15	14	17	16	14	15	15	15	15	14	15	14	15	14
19	14	13	13	14	13	20	17	15	17	15	15	16	14	14	14	16	16	15	15	13	14	15	16	16
20	15	14	15	14	13	13	17	14	15	13	15	15	16	14	14	15	17	14	16	15	16	15	15	15
21	15	16	16	15	15	15	13	16	14	14	14	14	15	17	17	14	14	15	16	15	16	15	15	16
22	16	15	15	13	14	13	14	15	14	13	16	15	15	15	16	15	15	13	15	16	16	15	15	13
23	13	13	14	13	13	14	15	16	15	15	15	15	15	17	15	17	16	14	15	15	16	13	15	15
24	15	15	15	15	13	15	14	16	14	14	17	15	14	14	14	14	15	15	16	15	15	14	15	13
25	13	15	13	14	13	13	15	17	14	14	13	15	15	15	16	17	15	15	15	15	16	29	15	13
26	14	13	14	14	15	13	14	14	16	16	17	17	15	17	14	14	15	15	16	13	13	13	13	13
27	13	13	13	13	13	13	15	15	16	17	14	15	15	14	14	14	15	13	18	16	15	13	15	14
28	15	15	13	13	13	13	14	15	15	15	14	15	15	15	17	15	15	14	16	15	16	16	14	16
29	14	15	16	15	16	13	15	16	15	14	14	15	15	15	17	15	14	13	16	16	16	15	15	15
30	16	14	14	15	15	15	16	16	15	17	19	18	17	17	17	14	14	16	15	16	17	15	15	15
31	16	15	13	14	16	15	16	15	15	14	7	15	15	14	15	14	15	15	15	16	16	15	16	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	15	14	15	14	14	15	15	15	15	15	15	15	15	15	15	15	15	15	15	16	15	15	15
U Q	15	15	15	15	15	15	16	16	15	15	16	17	17	17	17	15	16	15	16	16	16	16	15	16
L Q	14	13	13	13	13	13	14	15	14	14	15	15	15	15	14	14	15	14	15	15	15	15	15	13

HOURLY VALUES OF fof2 AT Yamagawa

OCT. 2021

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	41	A	43	38	34	40	41	59	74	89	83	72	81	91	97	88	79	80	90	73	52	53	49	45
2	45	45	42	43	38	41	45	68	70	71	62	77	92	84	76	78	82	82	87	83	57	48	48	51
3	48	50	45	47	42	27	33	61	67	77	78	81	89	101	87	87	81	80	62	61	53	45	45	43
4	45	42	39	32	N 24	N 29	32	62	67	90	91	80	92	113	81	57	66	82	99	74	40	38	36	38
5	36	38	41	36	32	N 23	32	61	67	77	90	97	101	113	95	84	82	66	71	51	37	39	42	38
6	37	37	37	36	32	31	33	56	75	77	96	85	85	97	87	67	65	66	67	63	45	44	49	45
7	43	40	41	37	35	34	36	68	88	85	80	78	83	90	91	77	79	77	72	55	43	A	45	42
8	39	38	38	37	37	29	34	59	64	71	85	87	87	89	94	76	75	80	73	61	46	35	36	37
9	36	36	37	35	35	32	32	52	63	73	69	67	77	89	83	79	89	91	87	49	48	47	35	31
10	33	34	35	34	33	33	35	58	73	65	66	77	89	93	91	82	73	66	78	67	42	35	38	37
11	38	37	36	37	38	24	27	59	73	89	81	76	80	81	83	89	81	69	66	52	A	40	38	38
12	38	39	34	35	35	35	38	59	66	83	82	85	85	79	98	113	114	94	70	52	53	A	44	45
13	39	41	41	38	41	35	33	59	107	100	76	76	A	90	99	90	85	80	69	52	40	41	39	41
14	40	38	38	37	39	30	37	58	62	80	76	78	83	79	77	91	93	87	76	A	A	A	A	A
15	36	35	37	35	37	31	31	56	67	77	85	87	100	87	77	105	113	90	56	45	47	50	47	38
16	36	34	33	33	34	32	25	49	61	81	85	78	73	81	78	97	95	82	47	A	A	A	37	37
17	39	37	37	35	41	30	29	52	64	78	82	67	75	73	81	74	71	87	63	35	A	33	35	37
18	36	37	34	35	34	30	34	62	72	N 96	75	97	114	86	83	76	65	75	49	41	49	42	42	43
19	41	39	37	37	37	42	34	55	65	86	83	87	104	93	90	85	92	87	70	42	A	32	35	33
20	33	34	35	37	35	23	29	49	51	63	73	85	73	74	94	104	84	67	56	A	31	A	A	A
21	31	32	31	30	32	35	25	47	64	69	62	62	70	66	81	97	88	65	55	A	A	A	32	32
22	33	32	31	33	32	32	32	55	65	65	77	69	89	86	81	69	67	76	A	A	36	36	A	31
23	31	32	31	34	35	31	24	51	64	63	75	69	A	79	65	67	68	66	A	A	39	38	37	37
24	37	37	34	33	37	30	31	61	66	77	76	77	70	72	65	82	82	69	51	A	43	40	37	37
25	36	35	31	33	35	33	35	66	69	75	79	81	92	95	87	81	67	66	56	35	35	36	34	34
26	35	35	35	33	32	31	29	55	66	81	80	73	85	79	75	83	79	72	61	39	37	39	38	37
27	35	35	34	34	35	30	32	64	68	65	83	94	78	70	73	94	93	81	68	A	36	A	35	35
28	35	34	36	36	37	36	36	55	68	64	82	87	76	78	85	89	99	86	56	39	38	33	32	35
29	37	37	A	A	38	33	32	52	66	68	91	96	79	80	79	101	81	77	46	33	32	40	38	35
30	34	37	37	39	45	A	24	52	67	77	95	85	76	82	96	91	85	67	47	41	43	41	A	34
31	A	36	A	36	39	A	32	57	66	79	89	99	106	79	83	83	93	78	70	53	49	46	46	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	29	30	31	29	31	31	31	31	31	31	29	31	31	31	31	31	29	23	25	24	26	28
MED	36	37	37	36	35	31	32	58	67	77	81	80	85	84	83	84	82	78	67	52	43	40	38	37
U Q	39	38	38	37	38	34	35	61	70	83	85	87	92	91	91	91	92	82	72	61	48	44	45	41
L Q	35	35	34	34	34	30	29	52	64	69	76	76	76	79	78	77	73	67	56	41	37	36	36	35



HOURLY VALUES OF fmin AT Yamagawa

OCT. 2021

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	16	15	14	15	14	15	16	14	15	17	19	17	17	17	15	16	15	15	15	15	16	15
2	16	14	15	15	15	17	15	15	13	13	15	15	17	16	16	17	14	16	16	15	15	16	16	16
3	16	15	15	16	15	15	17	15	14	15	15	15	16	19	17	14	15	14	16	16	17	15	18	16
4	15	15	16	14	99	15	15	14	16	15	16	17	18	15	15	17	15	16	14	15	14	14	15	15
5	16	15	15	14	14	15	14	15	14	15	15	17	16	17	21	16	17	16	17	16	16	15	14	14
6	15	14	14	14	15	15	14	15	15	14	15	17	17	19	15	15	17	15	14	16	16	15	16	15
7	15	14	14	14	16	14	14	16	14	14	14	15	18	17	17	14	15	15	14	14	15	15	15	15
8	15	14	15	14	14	14	14	15	14	15	15	17	19	17	15	13	13	13	15	16	16	16	16	15
9	16	16	16	15	15	14	14	15	16	15	14	15	18	15	14	15	15	15	17	15	15	16	16	15
10	14	16	14	14	15	15		15	14	14	15	16	17	17	17	16	14	15	15	15	15	16	16	16
11	16	16	14	14	15	15	14	15	14	14	18	17	15	16	16	16	16	15	15	16	15	15	15	16
12	15	15	15	8	16	14	14	15	15	14	15	16	22	17	19	17	14	16	16	16	15	15	15	14
13	15	15	15	15	15	16	15	15	14	14	15	13	16	15	14	17	15	16	15	15	15	16	14	16
14	15	15	15	16	16	16	16	16	14	14	14	16	17	15	18	15	12	15	15	15	15	15	15	15
15	15	16	16	15	16	14	14	15	14	14	14	17	17	16	17	16	14	15	15	15	16	15	15	16
16	16	16	15	17	15	16	15	16	15	15	14	17	18	19	18	15	15	15	16	15	15	16	14	15
17	15	16	14	14	14	15	15	15	16	14	18	17	15	13	17	17	17	15	15	14	15	15	15	14
18	17	15	16	15	16	15	14	17	15	14	16	16	19	17	17	14	13	15	15	15	15	15	15	15
19	14	15	14	15	15	15	14	15	13	15	17	16	17	16	15	15	15	16	15	16	16	15	16	16
20	16	14	16	15	15	14	15	15	15	15	15	16	17	18	15	15	15	14	15	15	15	15	15	14
21	16	16	15	15	16	15	16	15	14	13	15	18	17	19	14	15	15	14	15	15	15	15	15	15
22	14	15	15	14	15	14	14	15	16	15	15	16	16	17	15	15	14	14	14	16	16	16	15	16
23	16	16	17	15	15	15	15	15	15	14	13	15	15	16	18	17	15	16	15	14	16	15	16	16
24	15	15	15	15	15	15	14	15	16	15	15	17	16	20	18	17	15	16	15	16	16	16	15	15
25	14	15	14	14	14	14	14	15	16	14	15	17	15	16	17	17	15	14	15	15	16	15	14	15
26	15	16	14	14	15		14	17	16	14	16	18	20	17	16	15	17	15	15	16	16	16	16	14
27	14	18	14	14	15	14	14	14	13	14	15	16	18	17	14	18	17	17	16	16	15	15	15	15
28	15	14	15	14	15	14	15	16	13	14	17	15	17	15	15	15	17	16	15	14	16	15	15	15
29	15	16	16	15	15	15	15	15	15	15	14	15	21	17	17	14	14	15	16	15	16	16	15	15
30	14	17	16	15	16	15	16	15	15	15	15	16	17	17	18	15	14	16	15	14	16	15	15	16
31	16	15	15	15	16	15	16	15	16	16	15	16	18	19	19	16	15	14	16	16	15	14	10	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	15	15	15	15	15	14	15	15	14	15	16	17	17	17	15	15	15	15	15	15	15	15	15
U Q	16	16	16	15	16	15	15	15	16	15	15	17	18	17	18	17	15	16	16	16	16	16	16	16
L Q	15	15	14	14	15	14	14	15	14	14	15	15	16	16	15	15	14	15	15	15	15	15	15	15

HOURLY VALUES OF fof2                      AT Okinawa

OCT. 2021

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	41	40	43	36	<sup>B</sup> 30	31	35	53	79	90	81	73	92	114	111	103	99	107	104	70	55	54	51	52
2	50	50	44	42	40	40	35	61	70	77	<sup>A</sup>	80	94	89	84	92	106	105	103	105	75	59	60	69
3	61	58	45	51	57	<sup>B</sup>	30	61	67	81	92	89	101	120	107	110	119	118	87	76	81	69	58	61
4	59	61	58	46	<sup>B</sup> 24	<sup>B</sup> 30	31	63	66	81	104	103	125	112	96	89	83	96	115	93	45	32	33	35
5	33	33	38	35	36	<sup>B</sup>	<sup>N</sup> 24	56	67	80	99	117	155	147	134	137	150	123	89	70	47	43	45	47
6	35	35	35	35	32	26	31	60	69	81	99	123	106	115	124	124	105	84	84	83	57	46	49	52
7	54	48	42	41	33	33	36	75	88	99	96	91	100	115	119	117	122	118	105	75	68	67	65	58
8	56	56	53	53	52	32	31	57	64	72	86	93	90	107	125	121	115	111	95	71	50	32	32	35
9	34	34	34	34	39	25	25	56	67	72	77	77	78	85	93	109	121	118	110	65	56	51	41	36
10	35	33	35	35	36	33	37	57	75	69	65	85	107	122	151	153	149	134	112	93	67	56	58	59
11	56	55	49	56	44	38	25	57	69	75	95	89	100	101	115	100	91	82	67	55	46	<sup>A</sup>	42	41
12	37	38	37	36	33	33	33	55	69	80	91	93	93	97	127	139	144	135	96	79	62	56	55	<sup>A</sup>
13	49	52	43	45	41	35	36	65	95	105	105	101	88	101	124	132	118	115	113	81	76	71	79	73
14	67	70	60	63	72	45	36	56	65	73	82	93	81	82	83	95	113	131	83	<sup>A</sup>	38	<sup>A</sup>	<sup>A</sup>	<sup>A</sup>
15	35	<sup>A</sup>	<sup>A</sup>	35	35	<sup>N</sup> 25	<sup>N</sup> 25	55	67	71	85	105	116	96	113	147	157	157	136	107	93	98	73	61
16	48	48	42	41	45	35	<sup>N</sup> 22	48	67	77	93	109	93	91	101	115	123	97	66	40	37	<sup>A</sup>	<sup>A</sup>	40
17	41	40	41	42	48	<sup>B</sup> 25	26	53	77	81	89	89	91	88	110	124	107	87	84	60	<sup>A</sup>	<sup>A</sup>	43	42
18	41	43	<sup>A</sup>	41	40	29	32	59	91	83	79	114	127	92	102	102	76	81	68	42	43	<sup>A</sup>	42	43
19	41	38	37	35	37	38	<sup>N</sup> 25	53	68	91	90	101	111	112	116	118	125	110	87	64	31	30	<sup>A</sup>	30
20	<sup>A</sup>	<sup>A</sup>	33	37	33	<sup>B</sup> 22	<sup>N</sup> 23	51	55	62	75	89	85	69	97	112	118	90	63	41	<sup>A</sup>	35	<sup>A</sup>	<sup>A</sup>
21	<sup>A</sup>	<sup>A</sup>	26	30	36	30	<sup>A</sup>	50	56	64	71	66	65	75	103	118	127	123	119	113	63	61	60	55
22	51	42	37	36	33	<sup>N</sup> 31	31	53	71	66	81	87	101	100	113	113	105	92	67	<sup>A</sup>	37	50	43	30
23	32	32	31	35	41	<sup>N</sup> 24	<sup>N</sup> 23	55	67	71	68	94	87	79	109	75	69	76	74	42	<sup>A</sup>	44	47	42
24	41	40	38	36	37	25	24	54	75	64	86	103	83	69	93	89	89	93	74	58	52	55	50	37
25	39	35	35	33	32	35	32	60	76	71	85	106	115	127	117	97	88	77	64	41	37	40	38	37
26	39	35	34	34	31	30	27	57	68	80	96	79	86	103	105	94	103	95	74	69	51	53	48	43
27	39	39	35	36	38	33	32	61	64	70	74	109	81	87	<sup>A</sup>	111	111	113	85	65	45	44	<sup>A</sup>	<sup>A</sup>
28	42	45	44	43	48	38	32	55	68	76	79	99	90	83	89	108	116	112	79	65	63	55	51	45
29	44	44	51	48	42	35	33	54	67	74	87	110	101	88	100	101	104	89	56	45	45	51	43	41
30	43	40	39	43	43	31	<sup>A</sup>	52	71	78	91	97	83	89	112	107	116	89	74	55	59	74	55	43
31	38	39	37	<sup>A</sup>	43	27	<sup>A</sup>	55	71	72	89	100	103	88	88	89	101	107	103	95	82	75	63	55
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	28	29	30	31	29	28	31	31	31	30	31	31	31	30	31	31	31	31	29	28	26	26	27
MED	41	40	38	36	38	31	31	56	68	76	86	94	93	96	110	110	113	107	85	69	54	54	50	43
U Q	50	49	44	43	43	35	33	60	75	81	93	105	106	112	117	121	122	118	104	82	65	61	58	55
L Q	37	36	35	35	33	26	25	53	67	71	79	89	86	87	97	97	101	89	74	55	45	44	43	37

HOURLY VALUES OF fEs                      AT Okinawa

OCT. 2021

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	B	G	G	48	33	36	40	44	47	46	43	40	46	48	58	27	24	G	G	G
2	G	G	G	G	G	G	G	40	43	38	72	106	56	54	43	49	40	41	G	31	21	26	59	26
3	G	G	26	28	48	B	G	36	39	47	46	36	46	83	50	41	34	84	G	G	G	G	G	G
4	G	33	24	21	B	B	G	33	42	36	43	43	89	50	62	42	164	45	49	54	39	26	G	G
5	G	G	G	G	11	B	G	34	38	38	41	47	43	50	46	43	G	31	23	23	G	G	G	G
6	G	G	G	G	G	G	G	28	34	43	54	57	57	56	46	40	36	29	29	28	26	32	33	28
7	G	G	G	G	G	G	G	117	40	41	45	50	72	54	54	60	96	58	36	36	35	34	40	27
8	G	G	G	G	11	G	G	27	38	45	50	55	53	58	46	39	41	44	33	25	28	G	G	G
9	G	G	25	24	G	26	G	32	41	43	51	53	58	54	52	43	29	33	26	19	34	29	G	24
10	28	G	G	93	G	G	G	G	37	40	38	49	50	46	36	43	38	34	25	48	G	G	G	30
11	32	G	27	G	G	G	G	27	43	46	42	59	50	48	50	52	44	36	33	38	28	58	49	31
12	30	G	G	G	G	G	G	G	36	42	45	47	45	40	49	41	107	31	G	11	G	G	G	59
13	G	G	113	G	26	35	34	35	43	54	76	60	56	56	115	50	163	78	59	78	46	30	26	34
14	25	30	23	G	G	23	G	27	38	45	62	52	45	111	47	56	96	46	36	44	38	91	113	54
15	39	47	31	24	G	G	G	36	44	60	60	48	75	56	69	36	42	46	61	44	31	G	G	G
16	28	38	28	G	G	11	G	47	40	40	46	54	83	68	48	52	61	47	25	25	24	37	38	28
17	G	G	27	G	11	B	109	48	142	40	43	44	45	45	47	44	56	40	37	48	33	46	G	G
18	26	33	40	28	24	23	G	48	28	36	37	39	44	45	40	40	36	26	11	G	25	40	G	G
19	G	G	G	G	27	G	11	22	38	44	41	49	54	48	50	42	34	26	33	48	G	26	32	G
20	36	36	G	G	G	B	G	46	48	46	49	49	52	67	81	66	83	40	30	36	48	26	58	44
21	56	36	25	G	G	32	25	31	40	44	44	49	55	48	46	44	45	41	25	72	26	29	28	24
22	31	28	G	G	G	G	G	G	34	40	43	46	45	49	44	44	38	32	24	32	G	33	27	G
23	G	G	G	G	G	G	G	154	38	44	91	65	96	64	64	60	45	42	46	34	60	40	39	G
24	29	29	G	G	G	G	G	G	38	58	49	48	46	57	52	60	39	26	51	45	26	33	G	G
25	G	G	G	G	G	G	G	G	31	36	37	45	50	47	39	44	40	33	24	33	23	G	G	G
26	G	G	G	26	G	G	G	28	33	47	48	38	50	40	38	38	39	47	26	25	G	G	G	G
27	G	G	G	G	G	G	G	34	54	48	45	54	41	44	123	63	50	39	34	28	32	G	47	59
28	130	G	G	27	G	11	33	29	48	52	44	36	41	51	46	36	N	28	11	22	G	G	G	G
29	G	25	G	G	G	G	G	22	33	38	41	41	47	52	45	53	28	29	11	G	G	G	G	27
30	G	G	27	G	G	170	G	49	59	46	39	46	42	54	68	39	32	39	G	G	G	11	G	G
31	G	28	27	35	G	G	32	29	56	N	46	46	53	58	63	45	59	34	31	39	26	33	27	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	30	30	29	26	31	31	31	30	31	31	31	31	31	31	30	31	31	31	31	31	31	31
MED	G	G	G	G	G	G	G	31	39	44	45	48	50	51	48	44	42	39	30	32	26	26	G	G
U Q	29	29	26	24	6	11	G	40	43	47	50	54	56	57	54	53	59	46	37	44	33	33	38	28
L Q	G	G	G	G	G	G	G	22	36	40	42	44	45	46	45	41	38	31	24	23	G	G	G	G

HOURLY VALUES OF fmin AT Okinawa

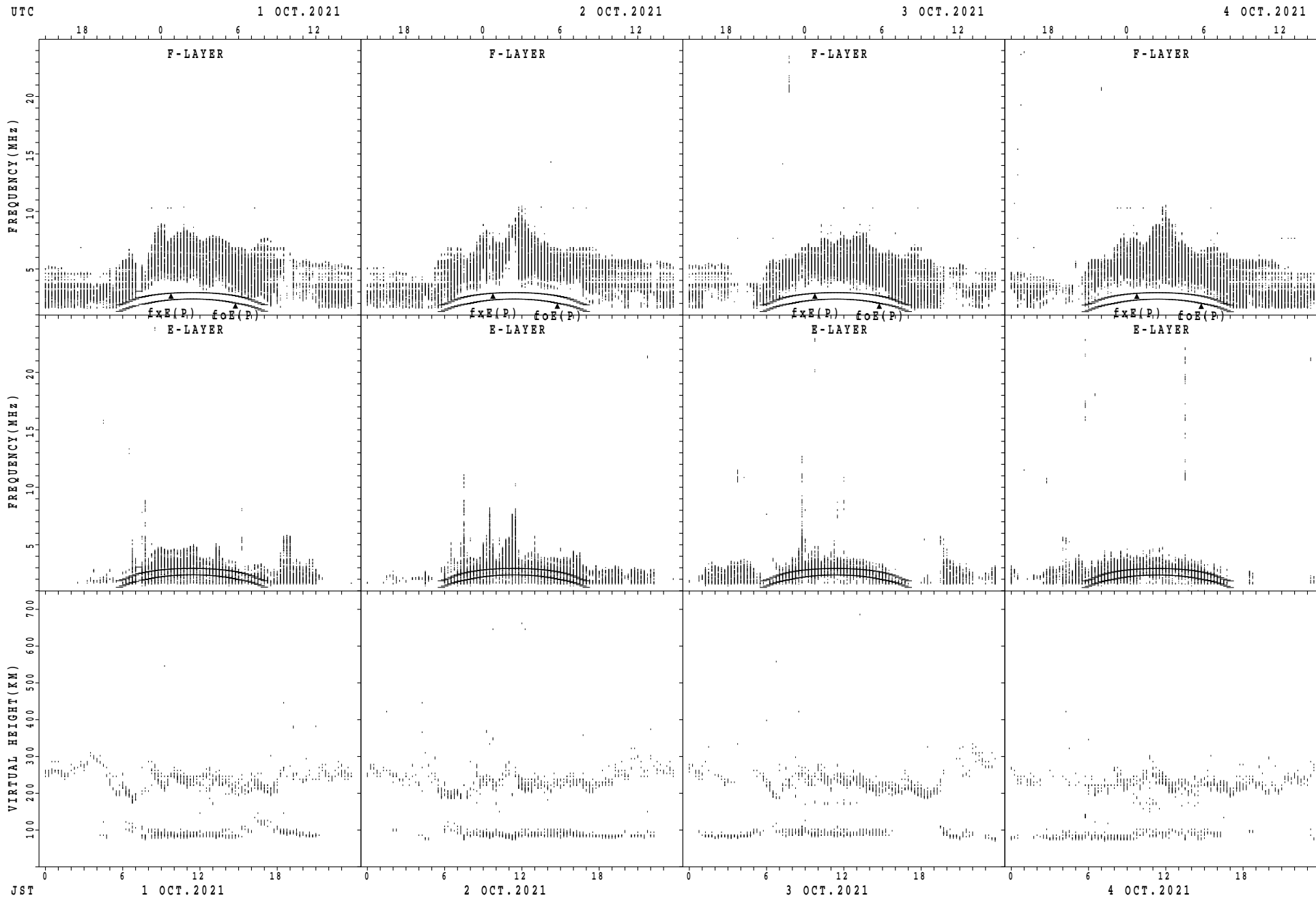
OCT. 2021

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	15	17	15	15	B	15	14	16	15	15	15	17	18	18	15	13	12	13	16	16	16	16	16	14
2	15	14	14	14	14	15	14	15	17	15	15	12	16	15	27	21	17	14	14	15	15	16	16	16
3	15	15	16	15	15	B	14	17	15	15	19	16	18	22	23	17	17	15	14	15	15	15	17	20
4	15	16	16	16	B	B	14	15	15	15	15	22	19	27	18	13	15	15	15	15	15	16	17	15
5	15	16	15	16	16	B	14	14	16	15	15	13	15	19	19	19	17	17	14	15	16	14	15	14
6	14	14	14	14	14	15	14	15	15	15	14	15	14	19	17	14	14	15	15	16	16	17	15	16
7	15	15	14	14	15	14	14	61	15	14	16	17	21	18	16	15	13	15	14	15	16	15	15	15
8	16	14	14	14	15	16	14	15	15	15	16	16	17	16	15	15	14	15	15	16	15	15	16	15
9	15	14	15	16	14	16	15	16	15	15	15	19	16	16	14	13	14	14	16	15	15	15	16	15
10	16	16	15	15	14	15	15	14	16	16	15	16	16	14	14	17	16	15	14	15	15	17	16	16
11	16	15	15	15	15	14	15	15	15	13	18	17	20	17	13	15	14	17	16	14	15	16	15	16
12	15	16	17	15	14	14	14	15	17	14	15	16	17	18	18	15	16	15	15	14	14	14	15	16
13	16	15	15	15	16	16	16	16	15	14	15	15	17	17	11	16	13	15	15	15	16	16	15	16
14	15	16	16	17	14	15	14	15	15	15	17	16	18	18	16	15	14	14	15	16	15	14	13	16
15	15	16	16	15	15	15	16	15	15	14	14	17	20	19	17	15	14	15	15	17	16	15	14	14
16	16	15	16	16	14	14	16	16	15	14	16	19	17	17	17	16	16	16	16	15	16	16	15	16
17	15	15	16	14	14	B	73	15	15	14	17	18	19	21	19	17	15	15	15	15	16	15	15	15
18	15	16	15	15	16	15	14	16	15	17	17	19	21	19	17	17	15	14	14	15	15	15	16	16
19	16	14	14	15	16	15	14	15	17	14	14	15	17	16	14	13	13	14	16	15	15	16	15	14
20	15	16	15	16	16	B	15	15	16	14	15	15	14	16	17	13	14	15	15	15	15	15	14	15
21	15	15	15	15	15	14	15	15	17	14	15	19	20	18	18	17	14	15	15	15	15	15	15	16
22	16	15	15	15	14	16	14	15	14	15	17	16	19	18	16	15	16	16	15	15	16	16	16	15
23	15	14	15	14	14	18	15	14	15	14	15	14	17	17	20	13	14	15	15	16	14	14	15	15
24	15	15	15	14	15	15	15	15	15	14	15	16	20	17	18	14	15	16	15	15	16	15	15	15
25	15	14	14	15	14	15	14	15	15	14	17	17	17	16	15	17	17	15	15	15	15	15	15	15
26	14	14	14	16	16	14	15	15	17	15	21	17	20	21	17	15	14	15	15	16	15	15	14	17
27	14	14	14	14	14	14	15	16	16	15	14	13	17	17	17	19	15	14	15	16	16	14	15	16
28	57	15	15	16	15	14	14	15	14	14	17	18	18	17	14	14	13	15	15	16	14	15	17	14
29	16	15	15		16	16	15	15	16	14	15	19	19	17	15	19	16	15	16	15	22	15	14	16
30	16	15	15	15	14	15	95	15	16	16	17	16	18	18	17	17	16	14	14	15	15	15	14	15
31	14	15	15	16	15	15	16	15	16	16	16	18	17	16	15	17	16	16	15	15	15	16	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	30	27	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	15	15	15	15	15	15	15	15	15	15	16	18	17	17	15	15	15	15	15	15	15	15	15
U Q	16	16	15	16	16	15	15	16	16	15	17	18	19	19	18	17	16	15	15	16	16	16	16	16
L Q	15	14	14	14	14	14	14	15	15	14	15	15	17	16	15	14	14	14	15	15	15	15	15	15

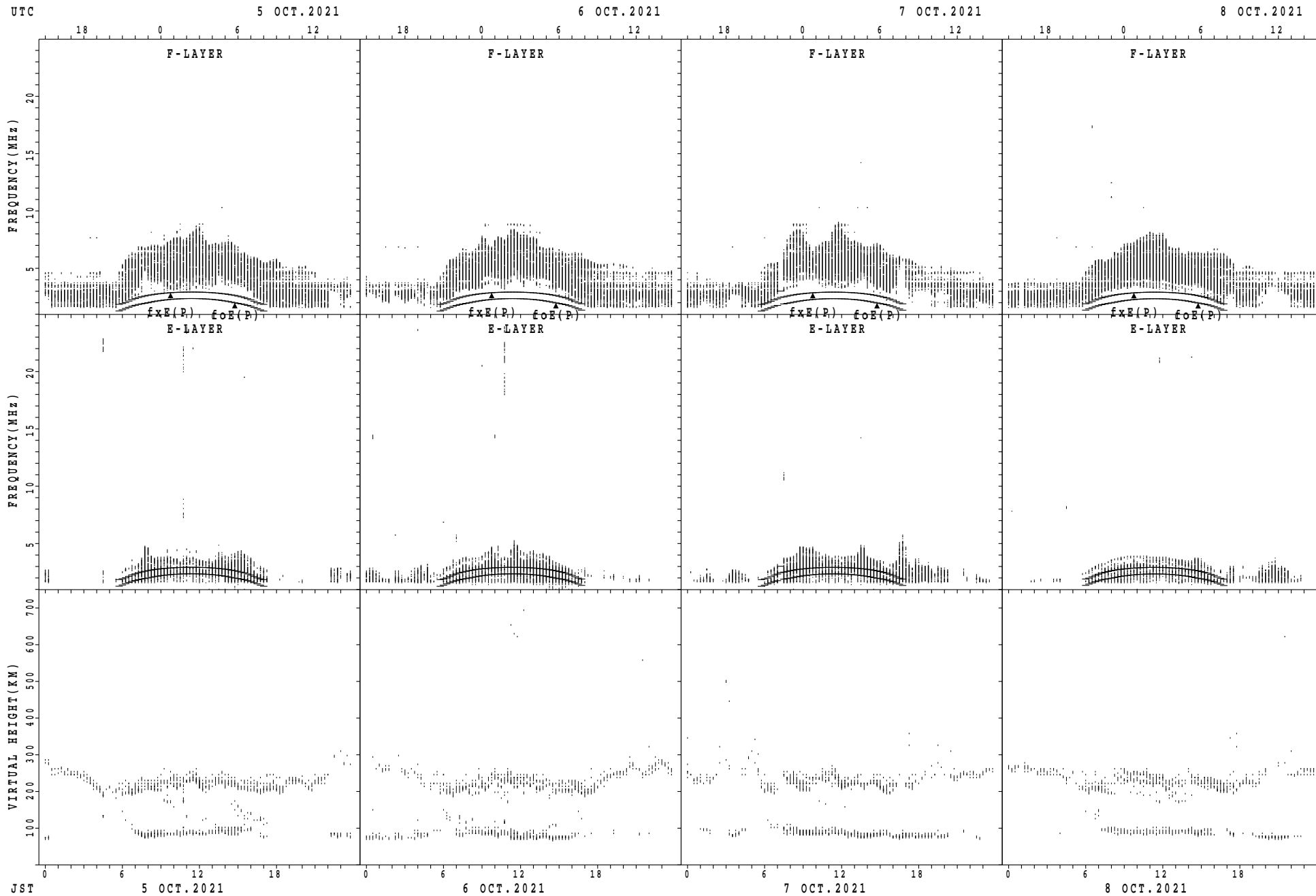


SUMMARY PLOTS AT Wakkanai



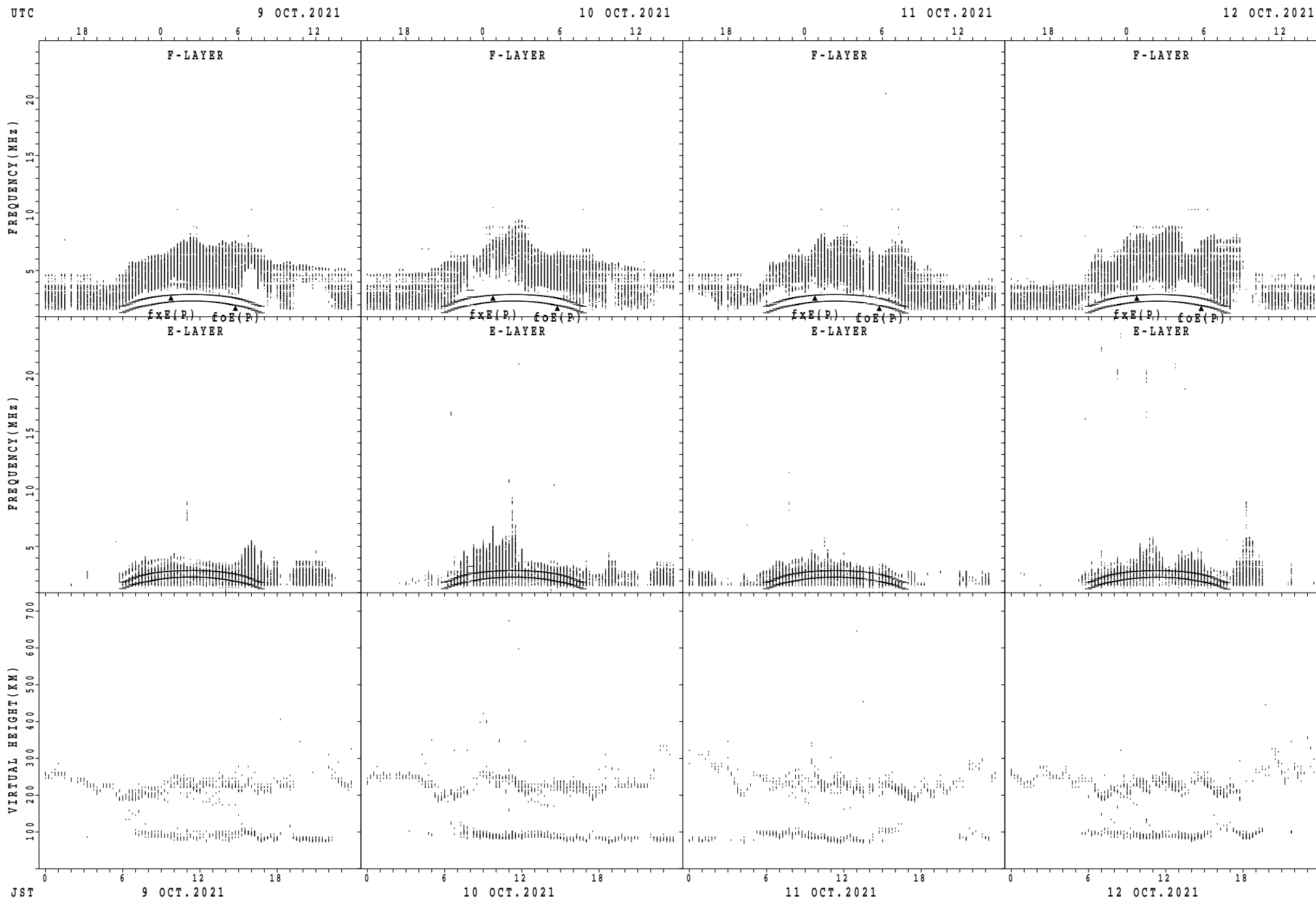
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



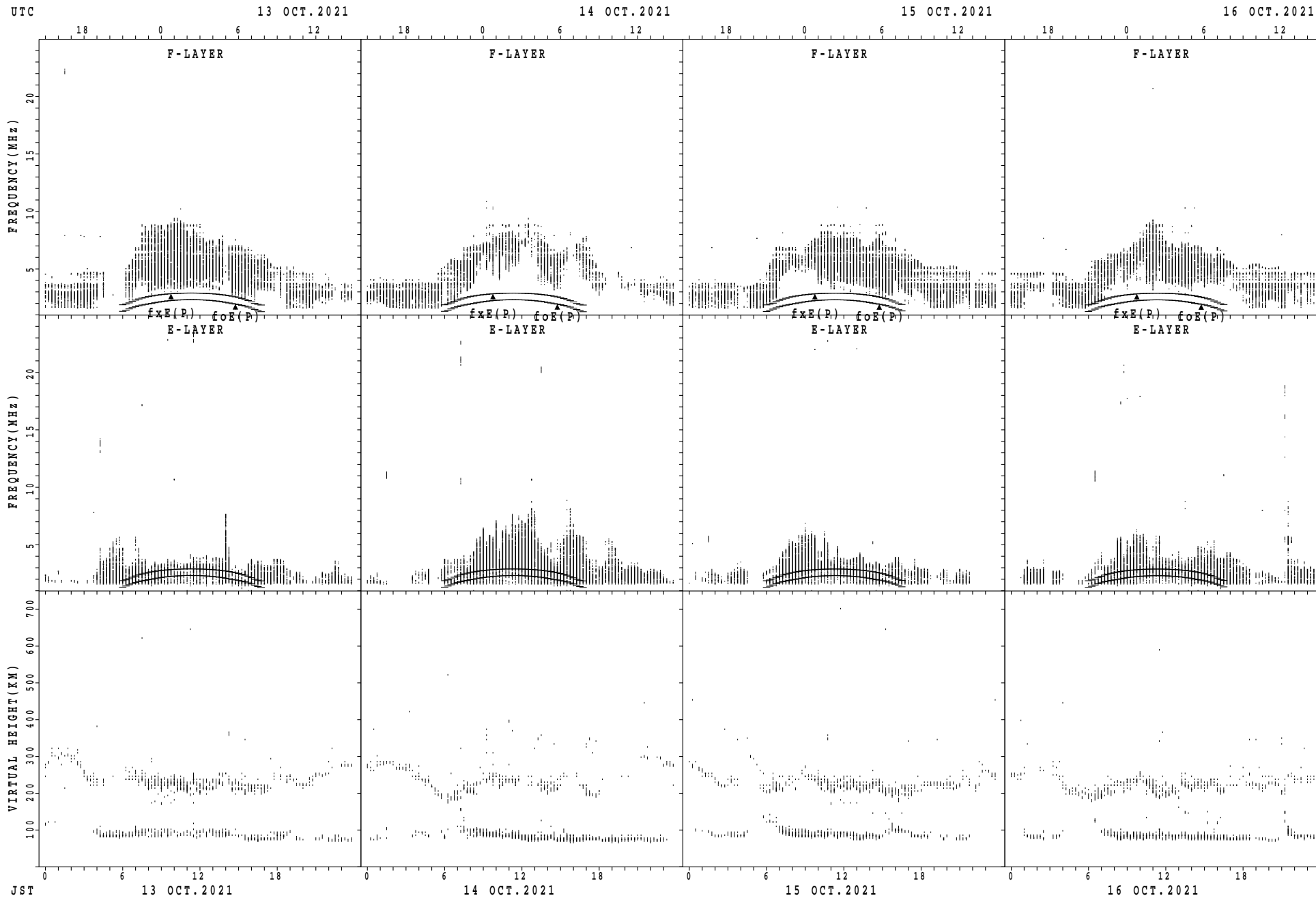
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



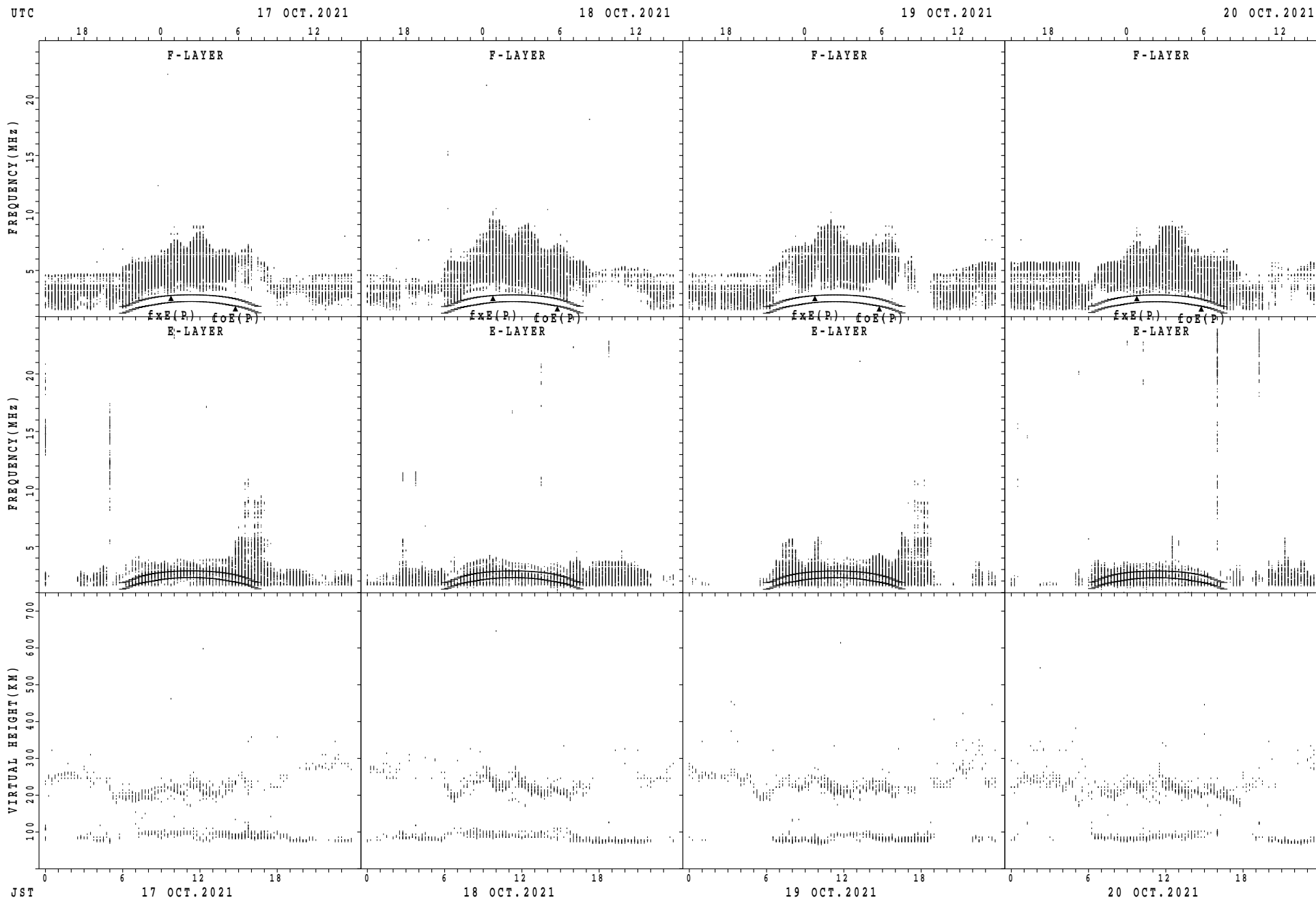
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



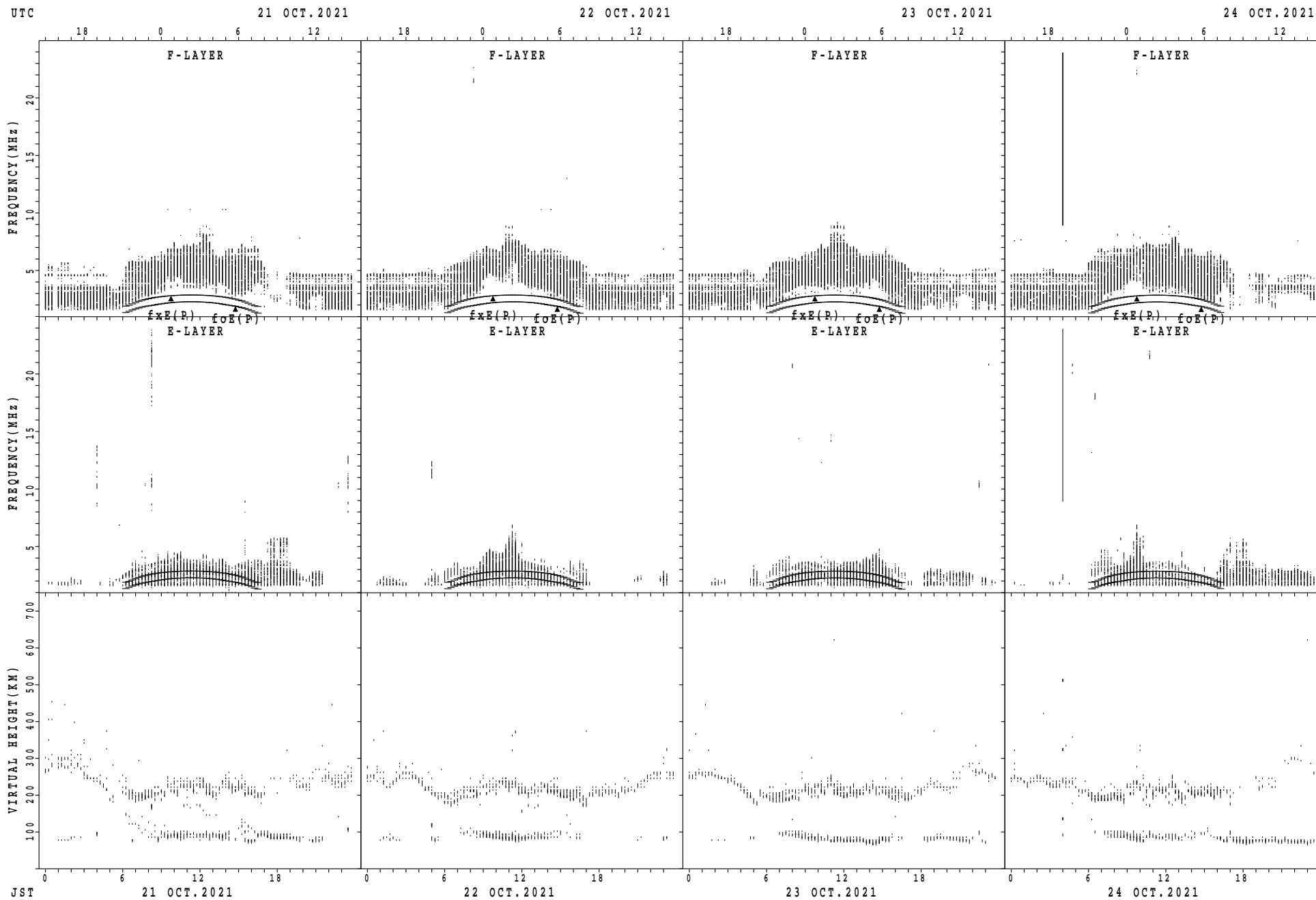
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



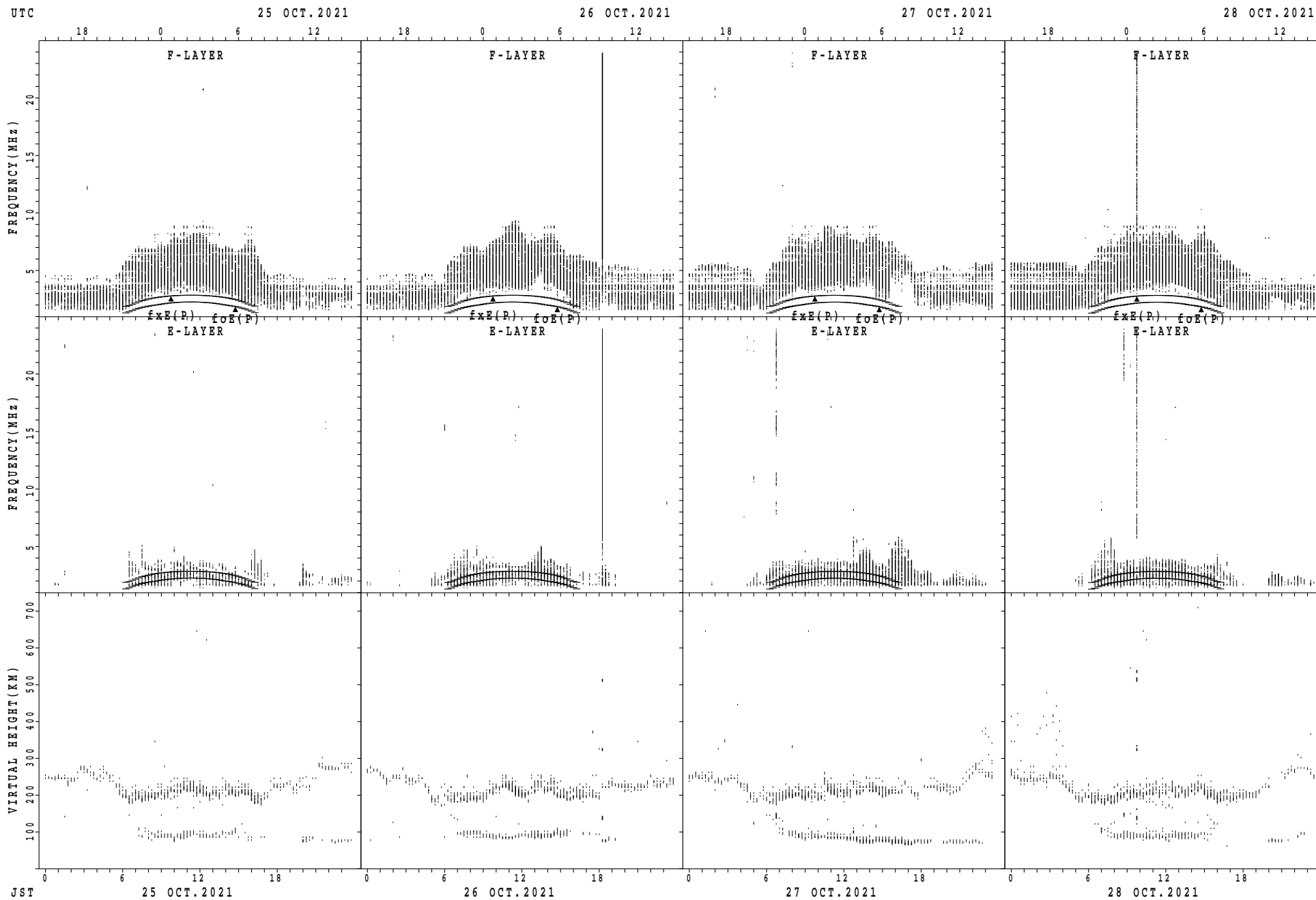
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



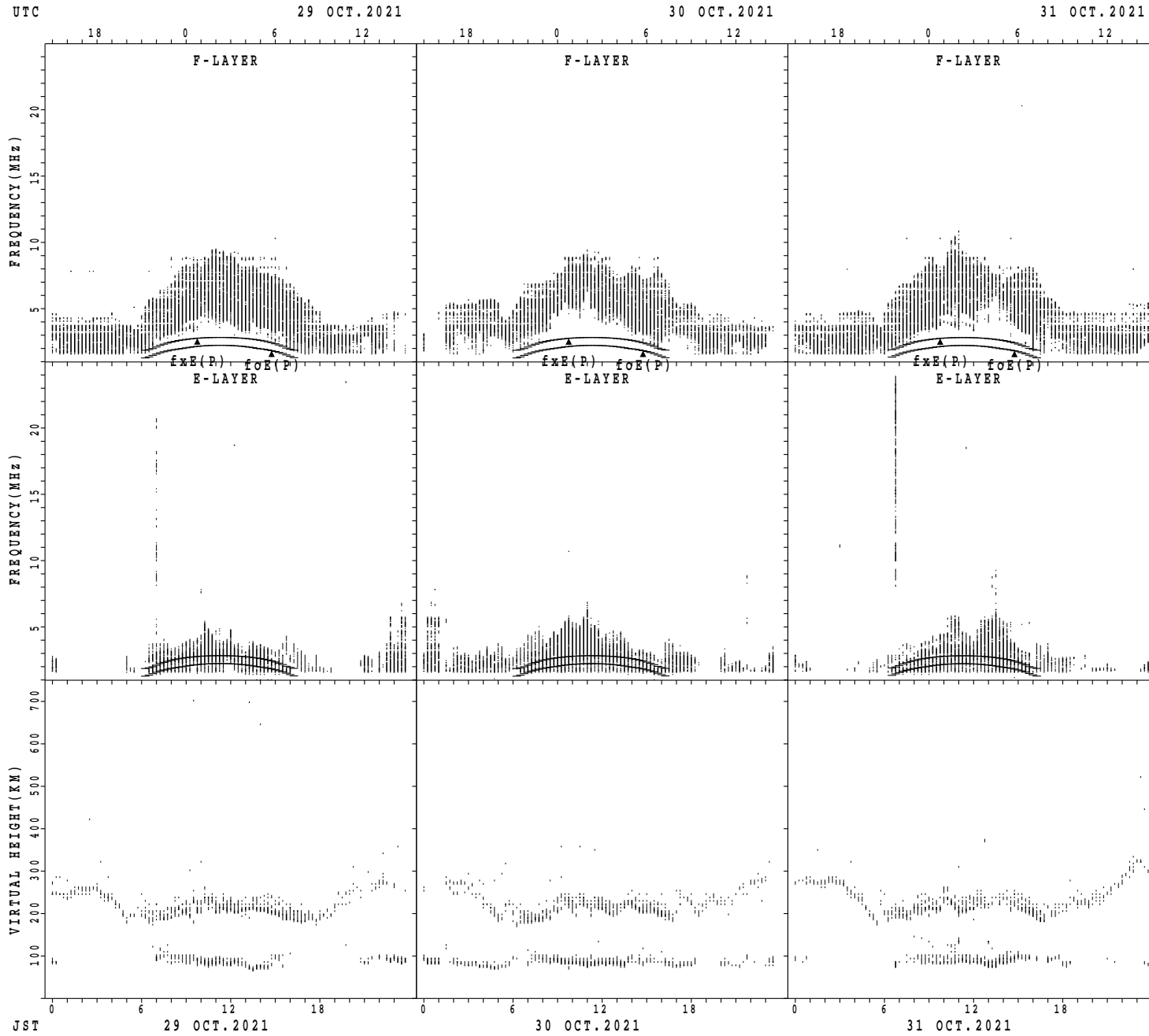
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

## SUMMARY PLOTS AT Wakkanai



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

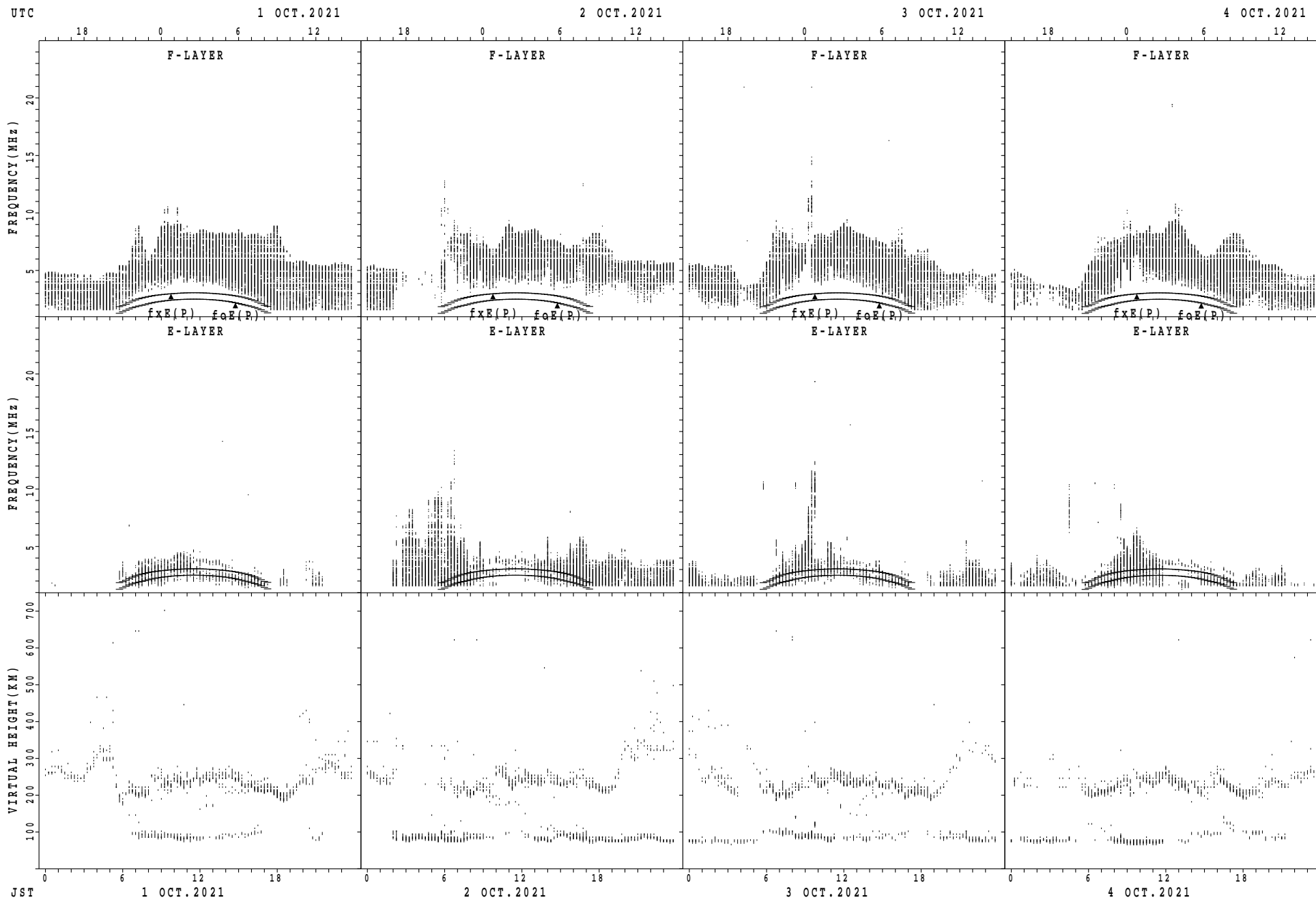
SUMMARY PLOTS AT Wakkanai



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

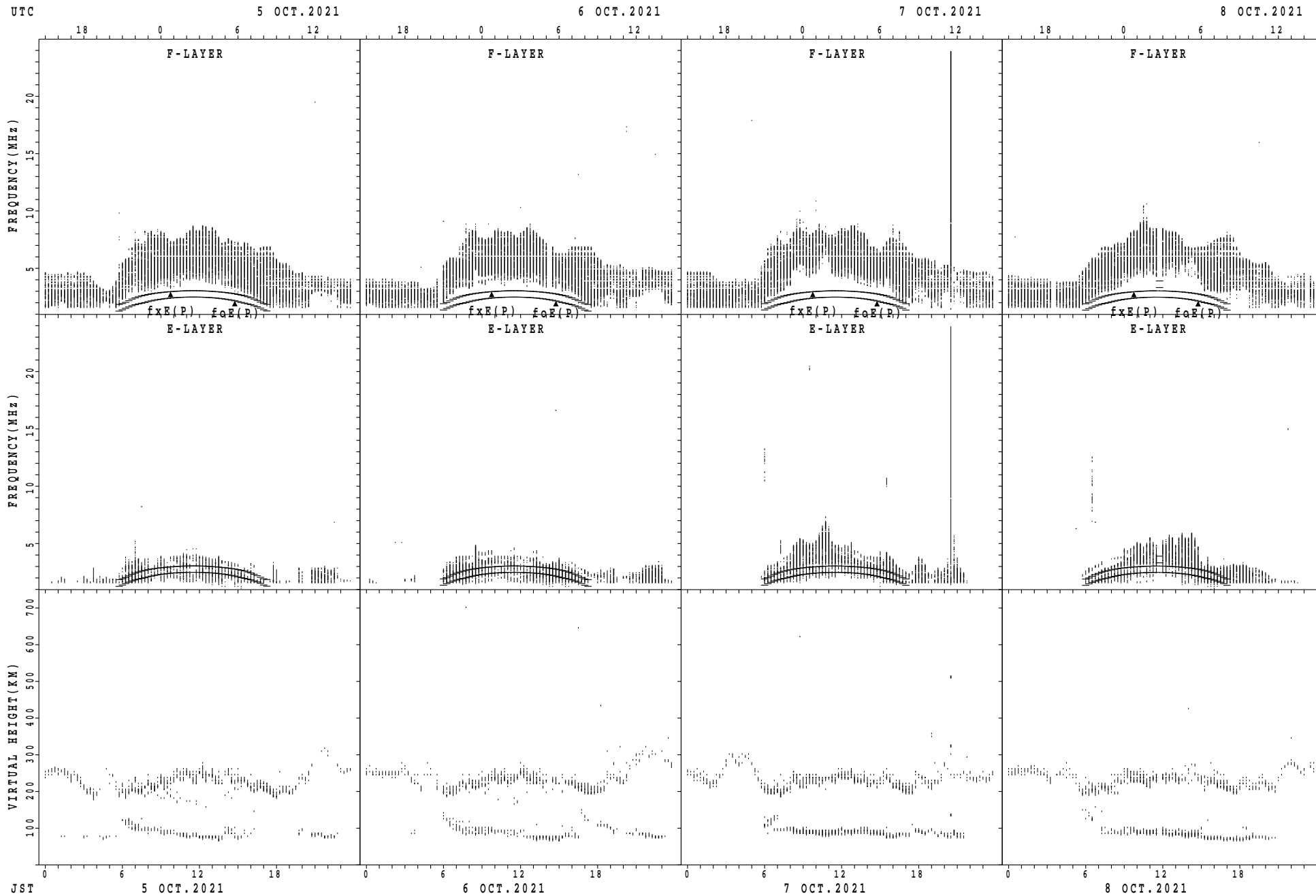


## SUMMARY PLOTS AT Kokubunji



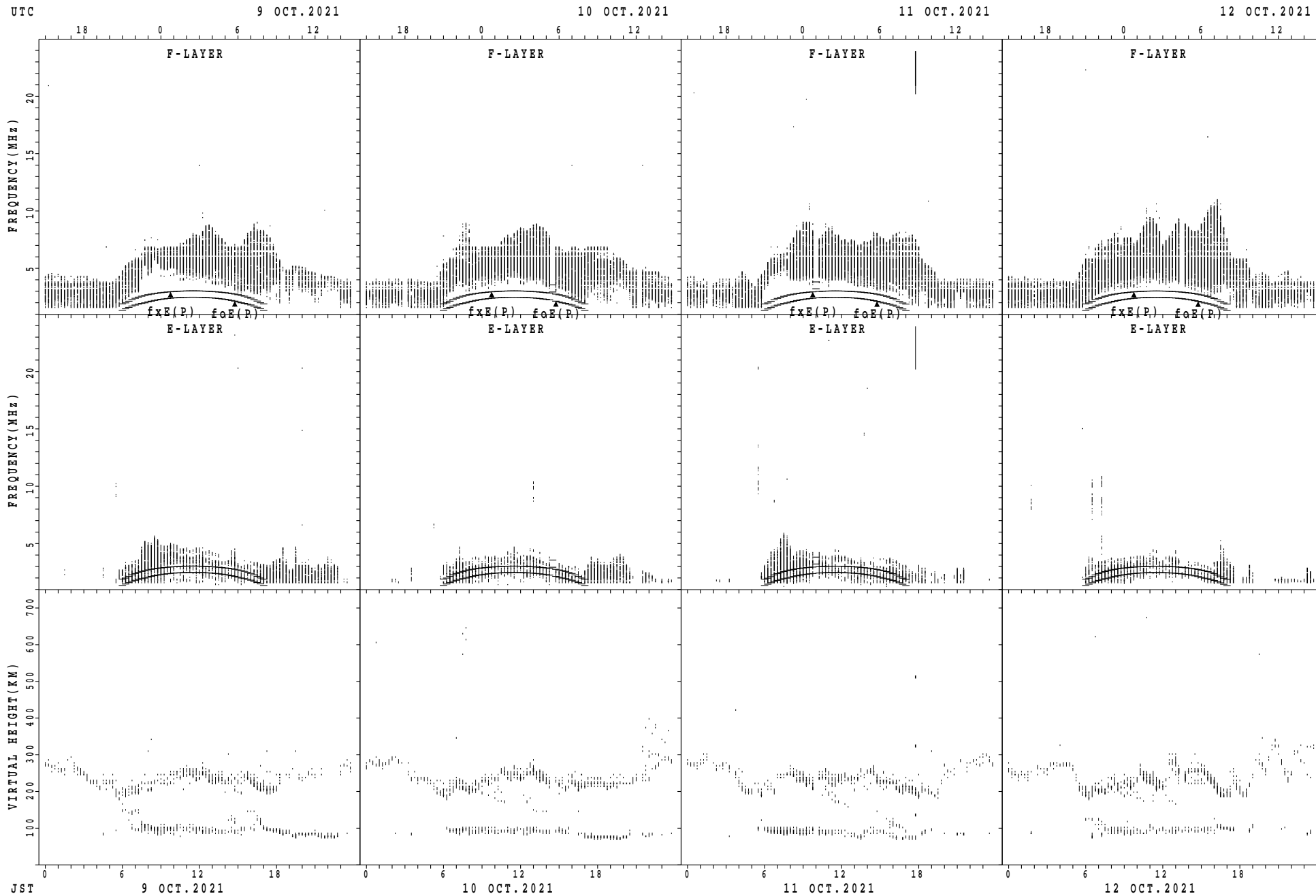
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



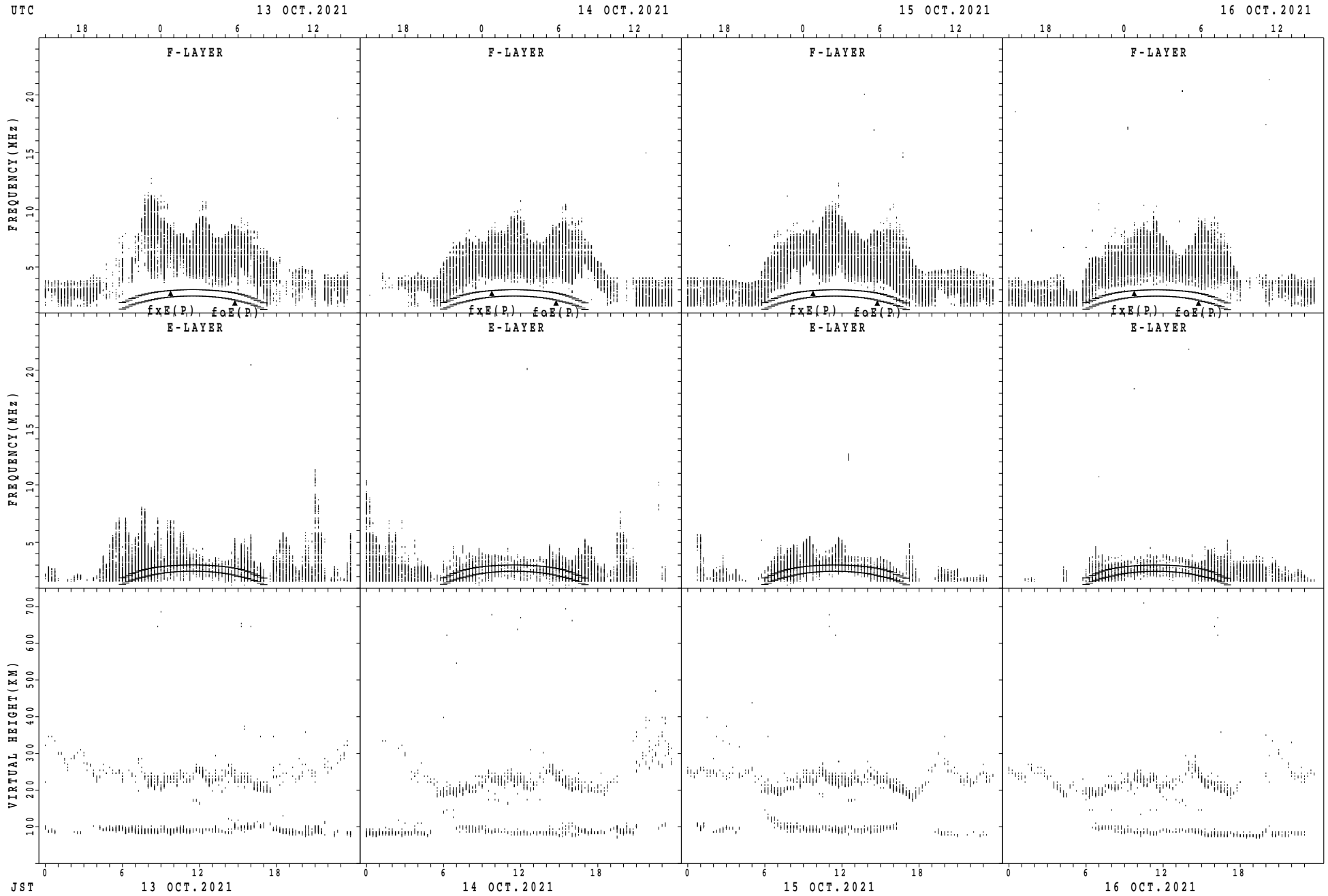
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



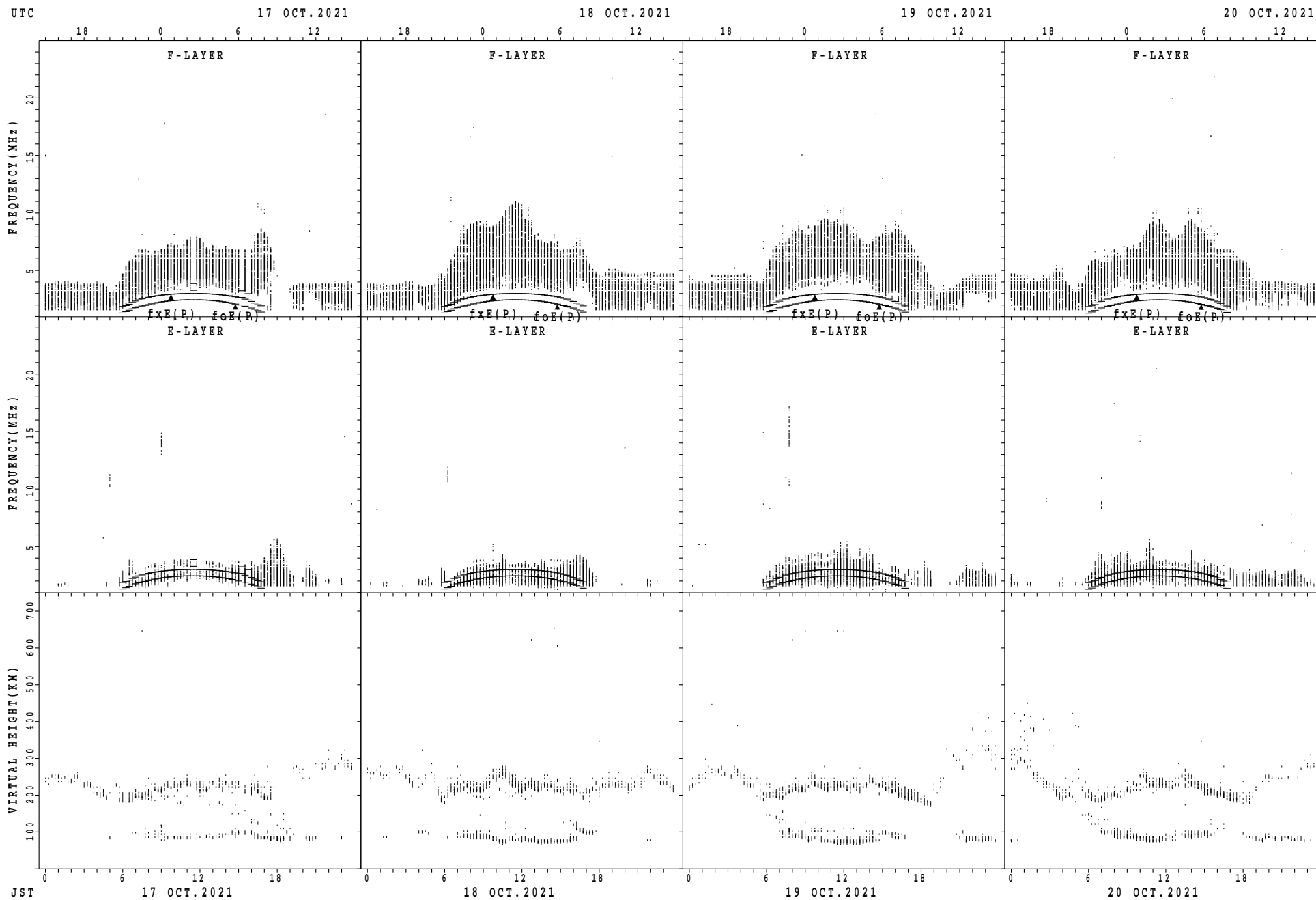
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



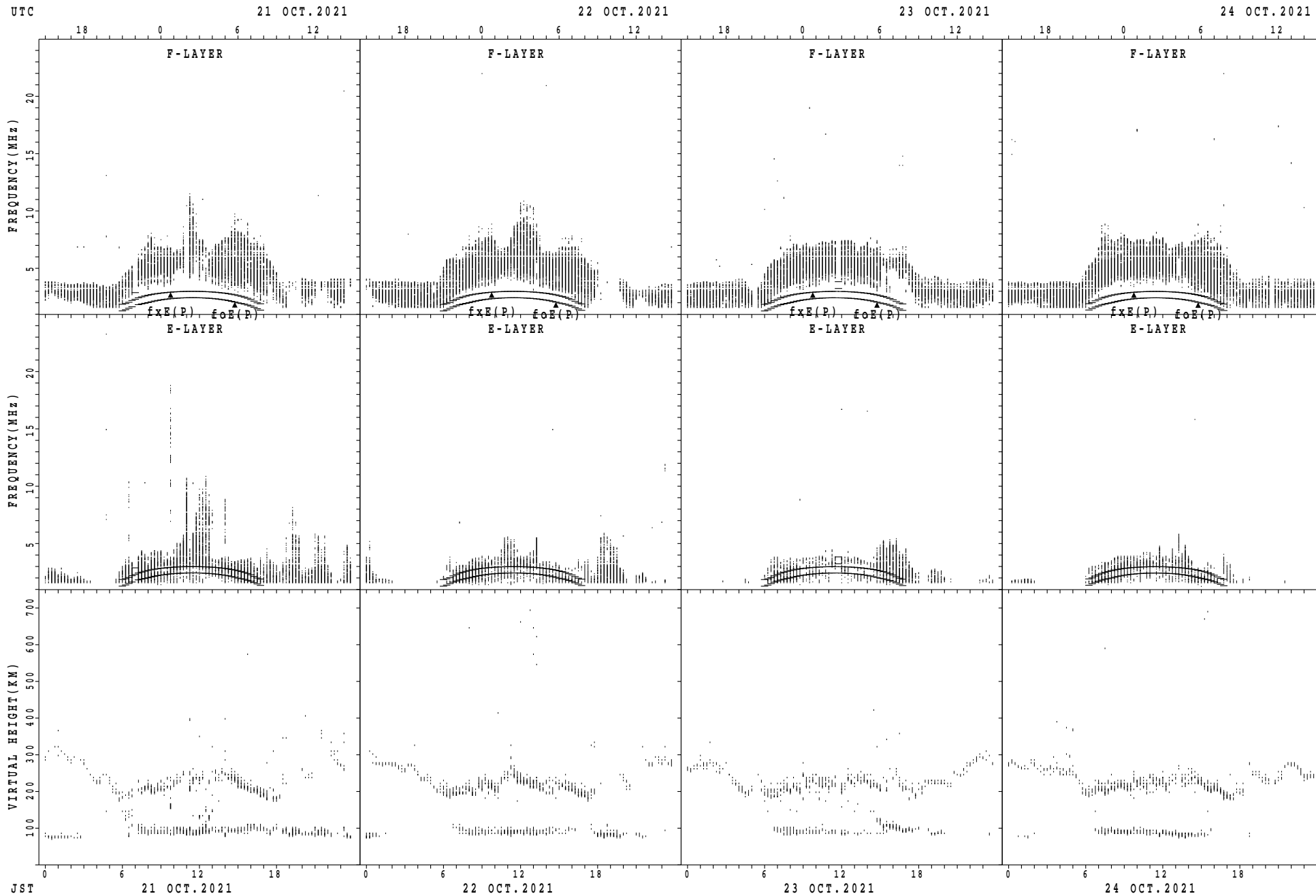
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



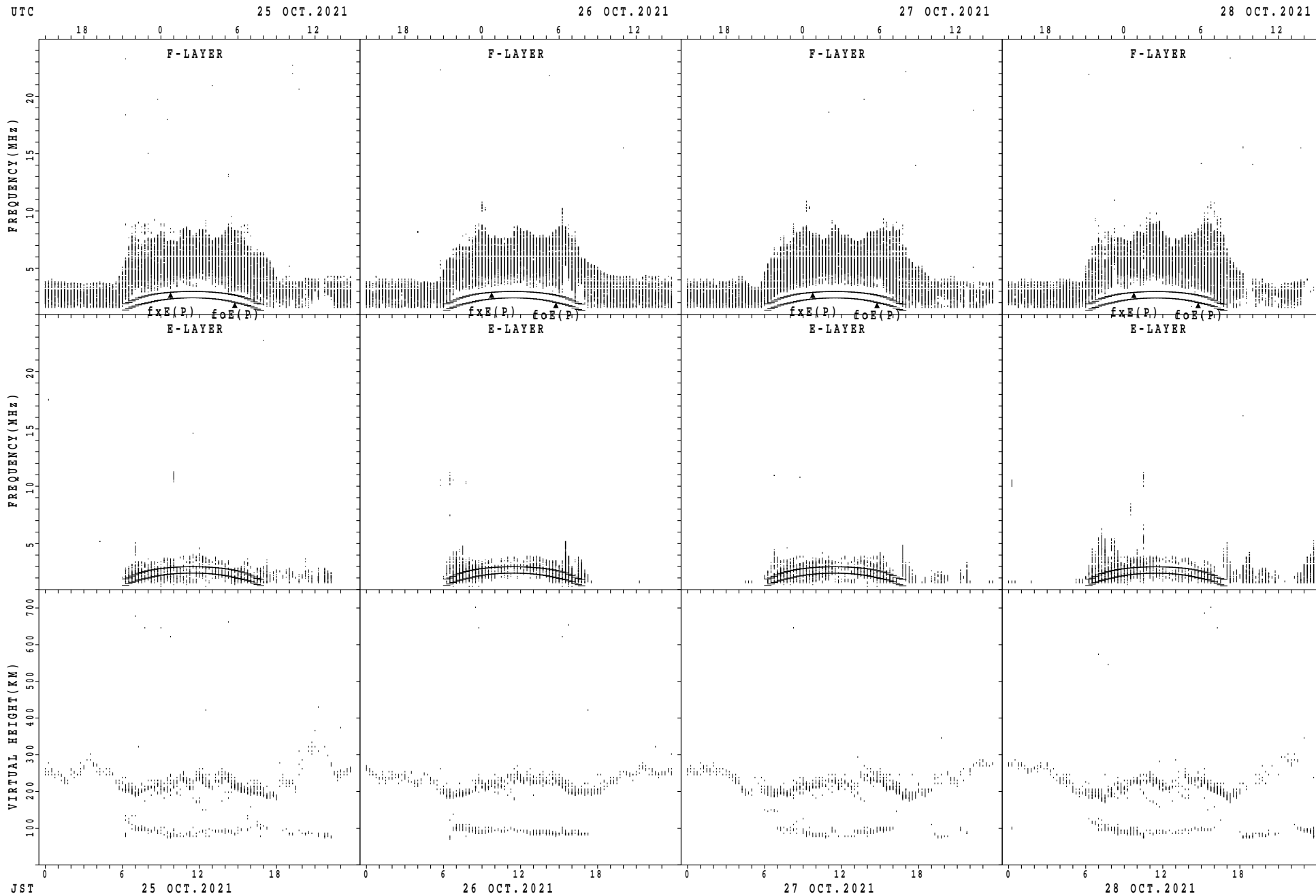
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



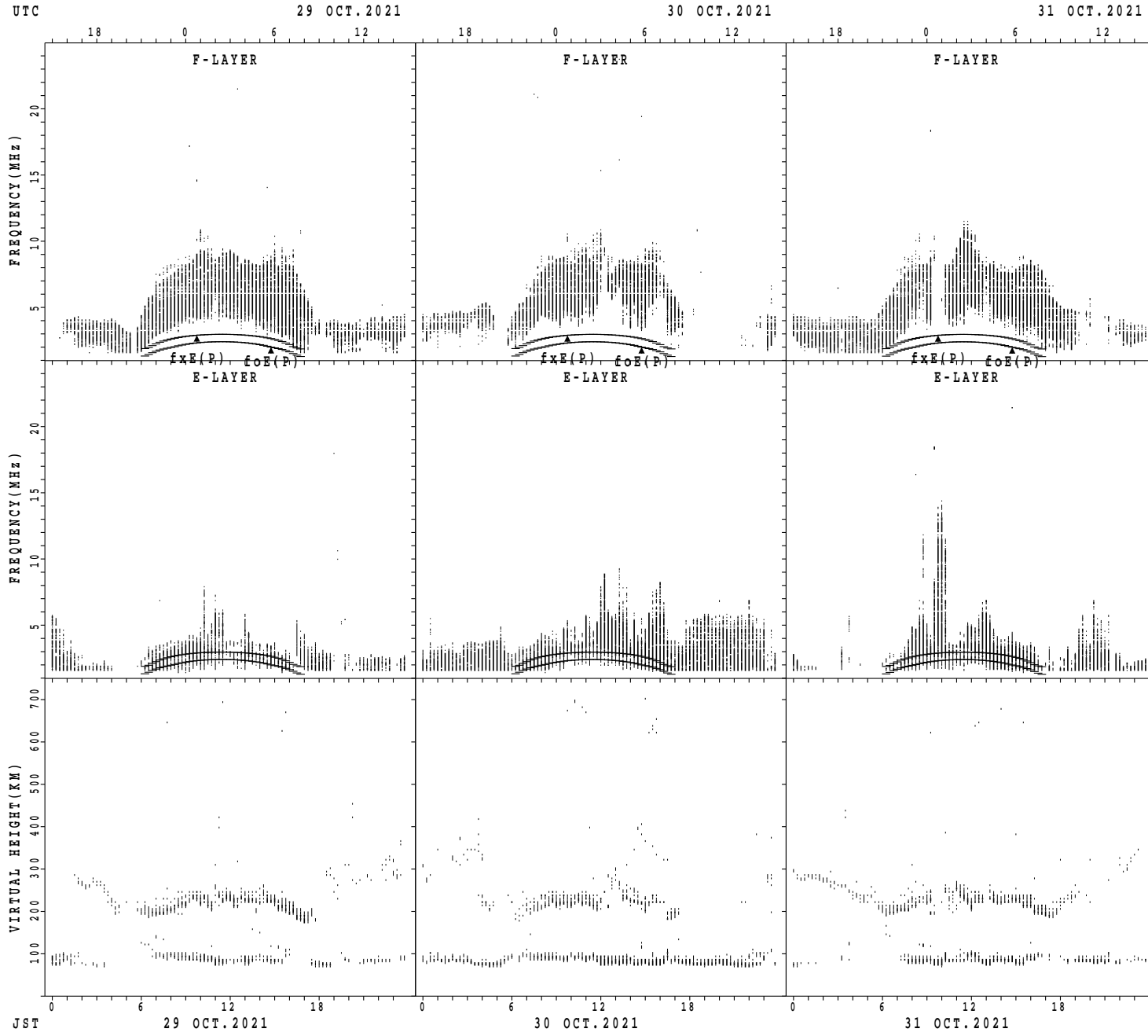
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



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

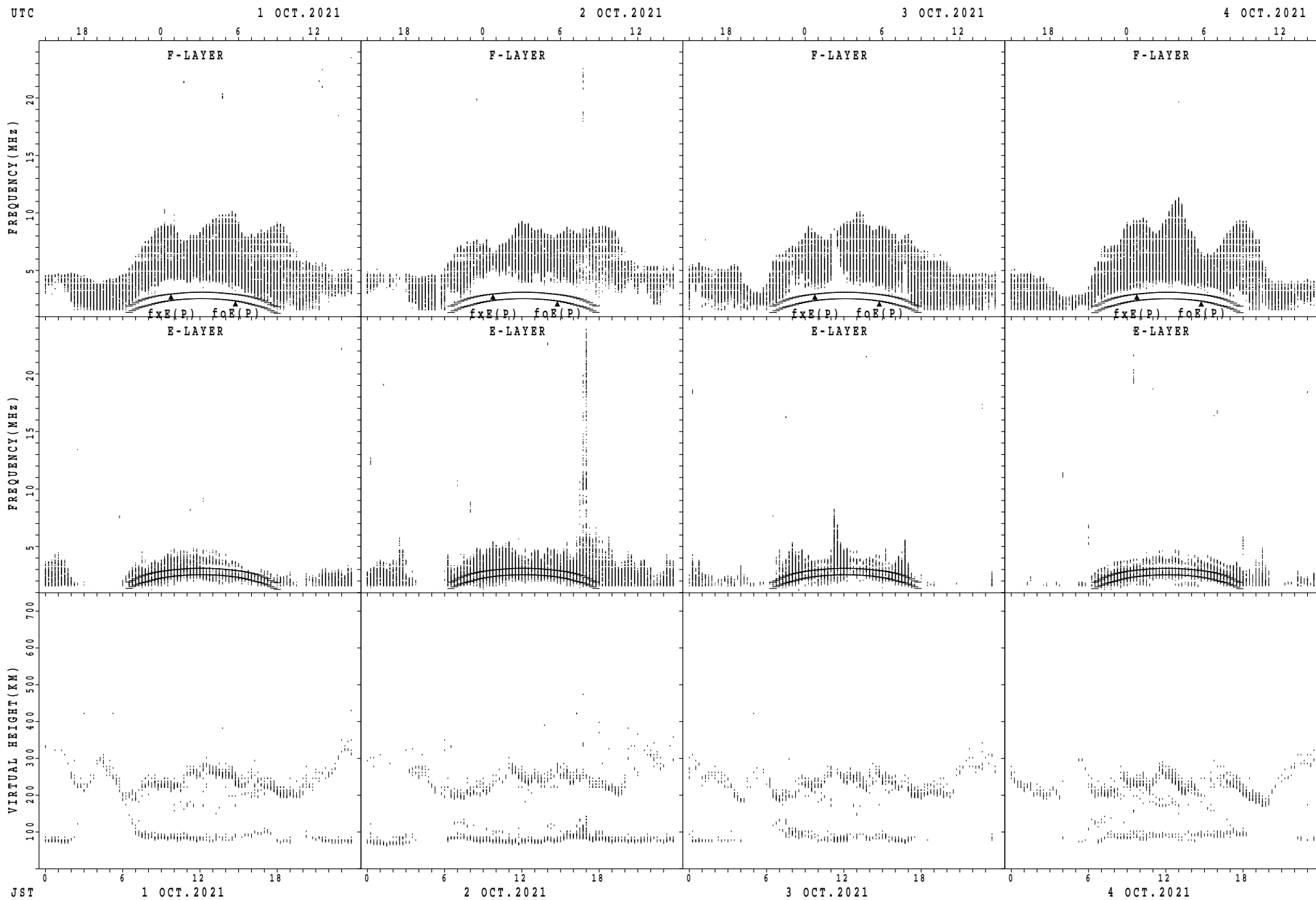
SUMMARY PLOTS AT Kokubunji



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

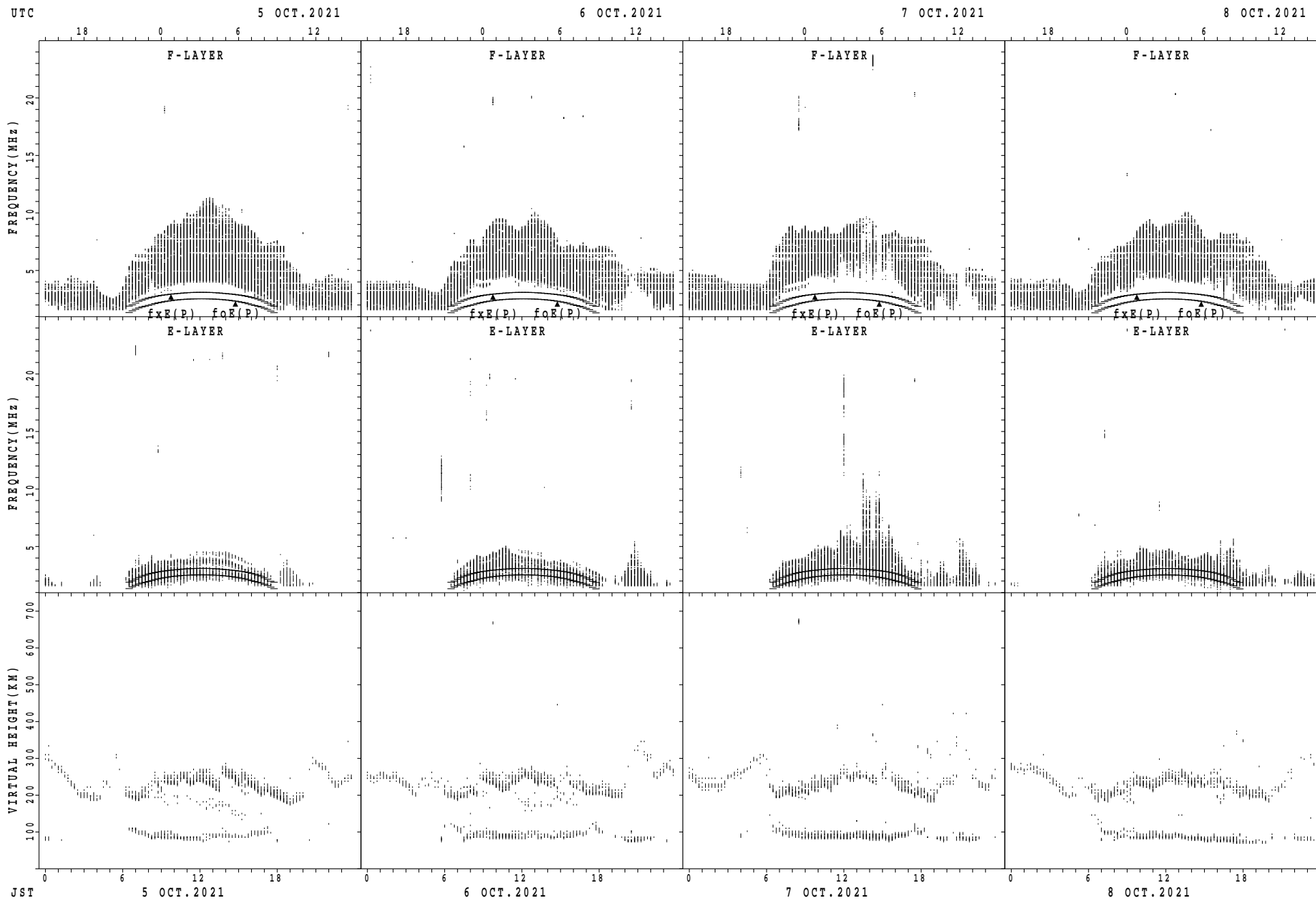


SUMMARY PLOTS AT Yamagawa



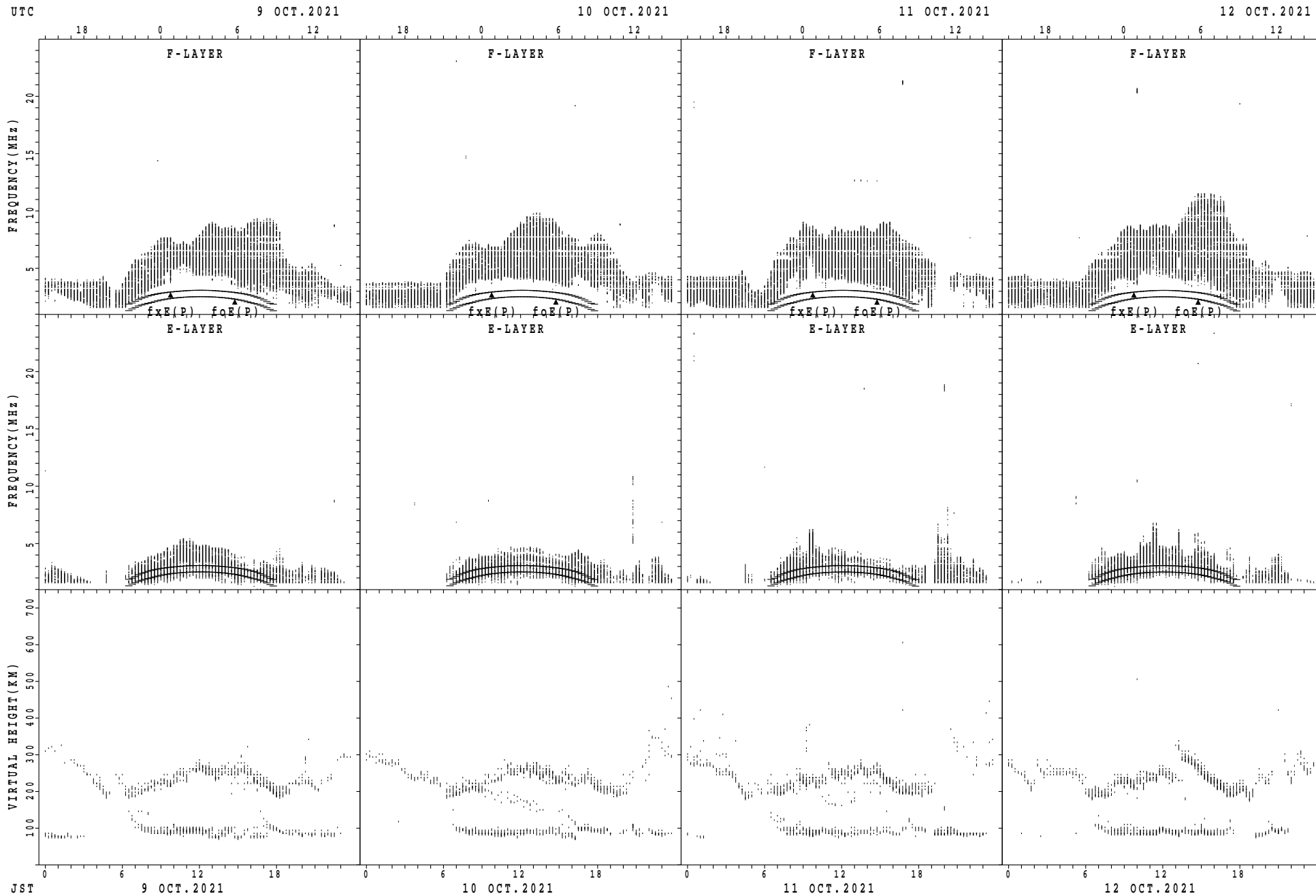
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

## SUMMARY PLOTS AT Yamagawa



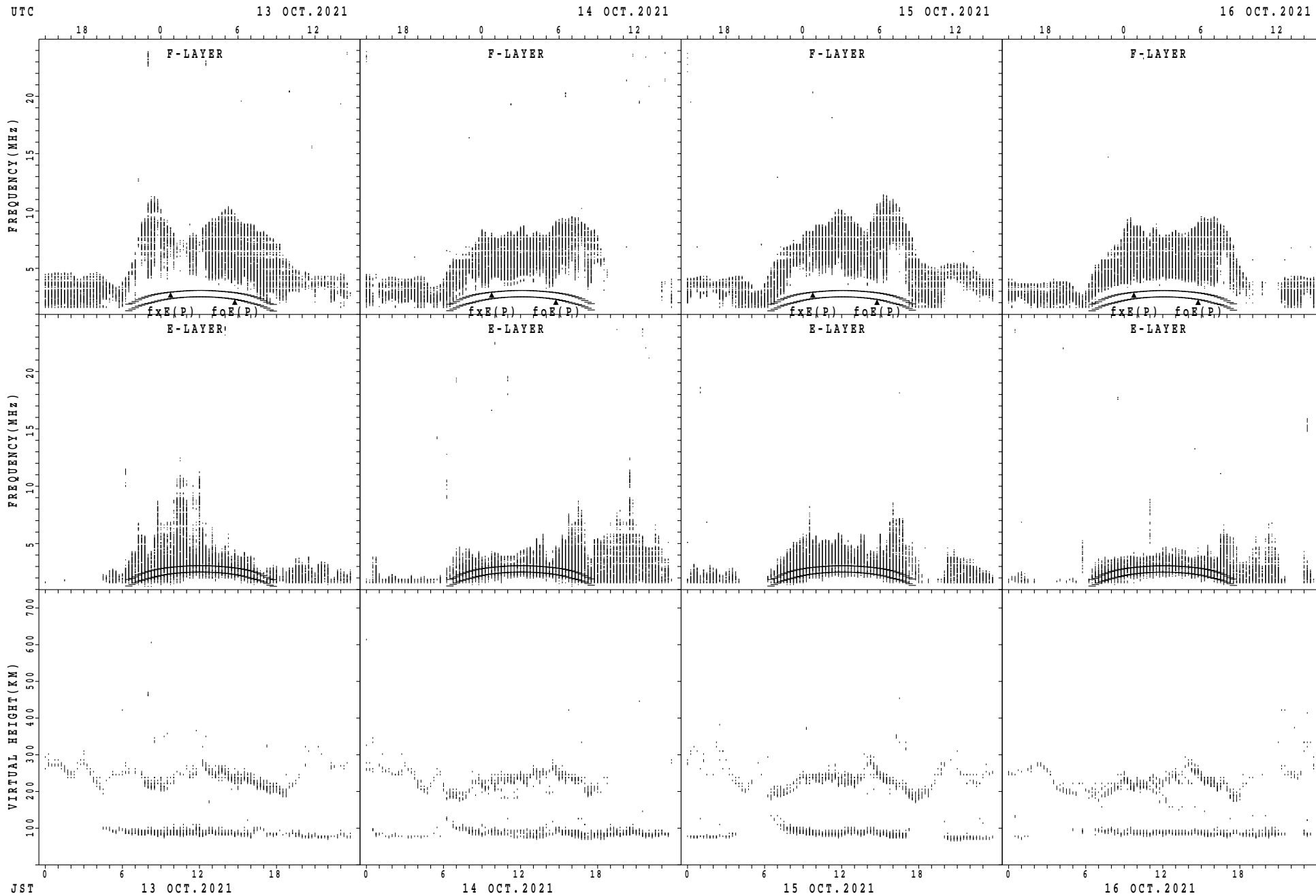
$fxE(P)$ ; PREDICTED VALUE FOR  $fxE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



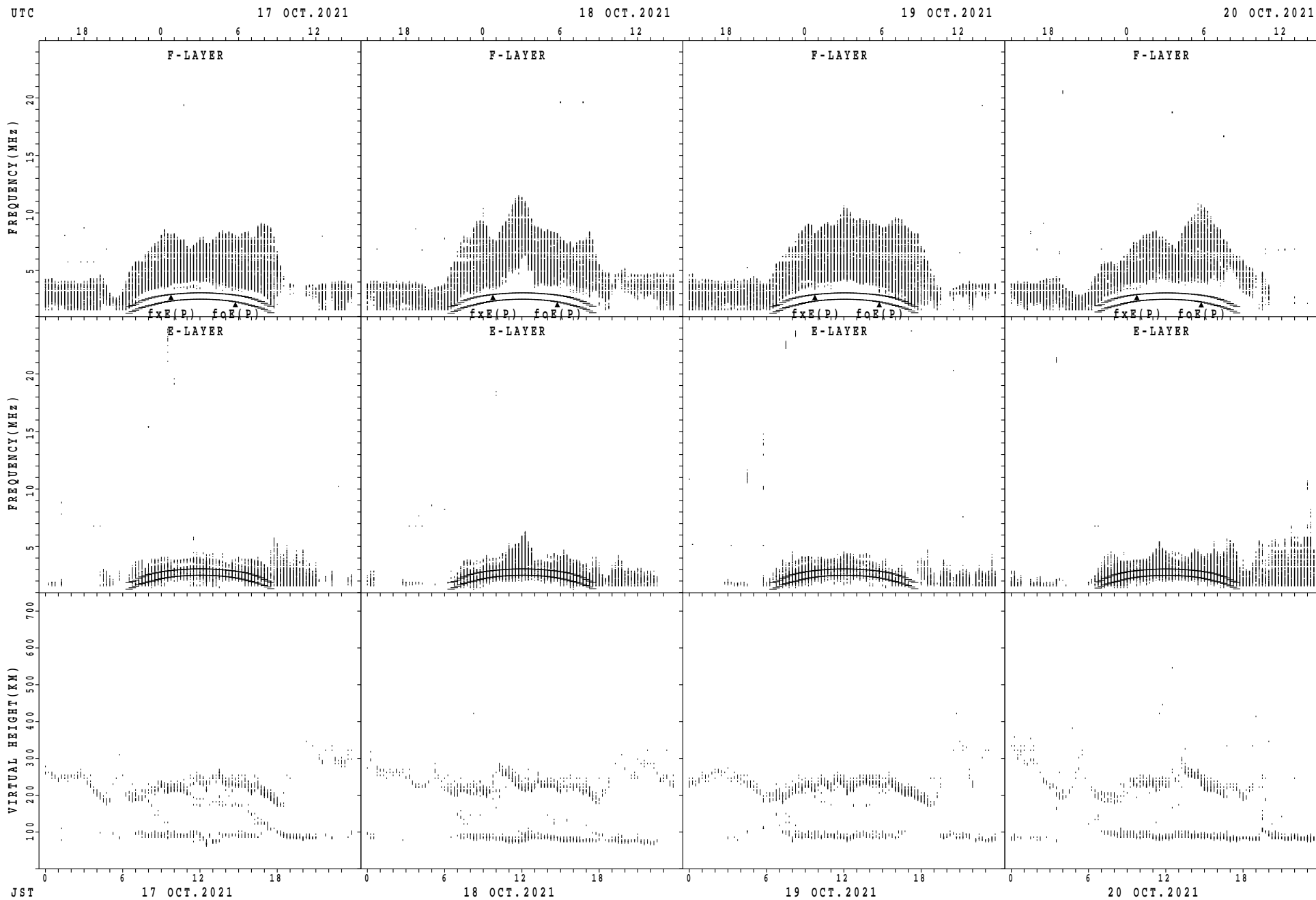
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



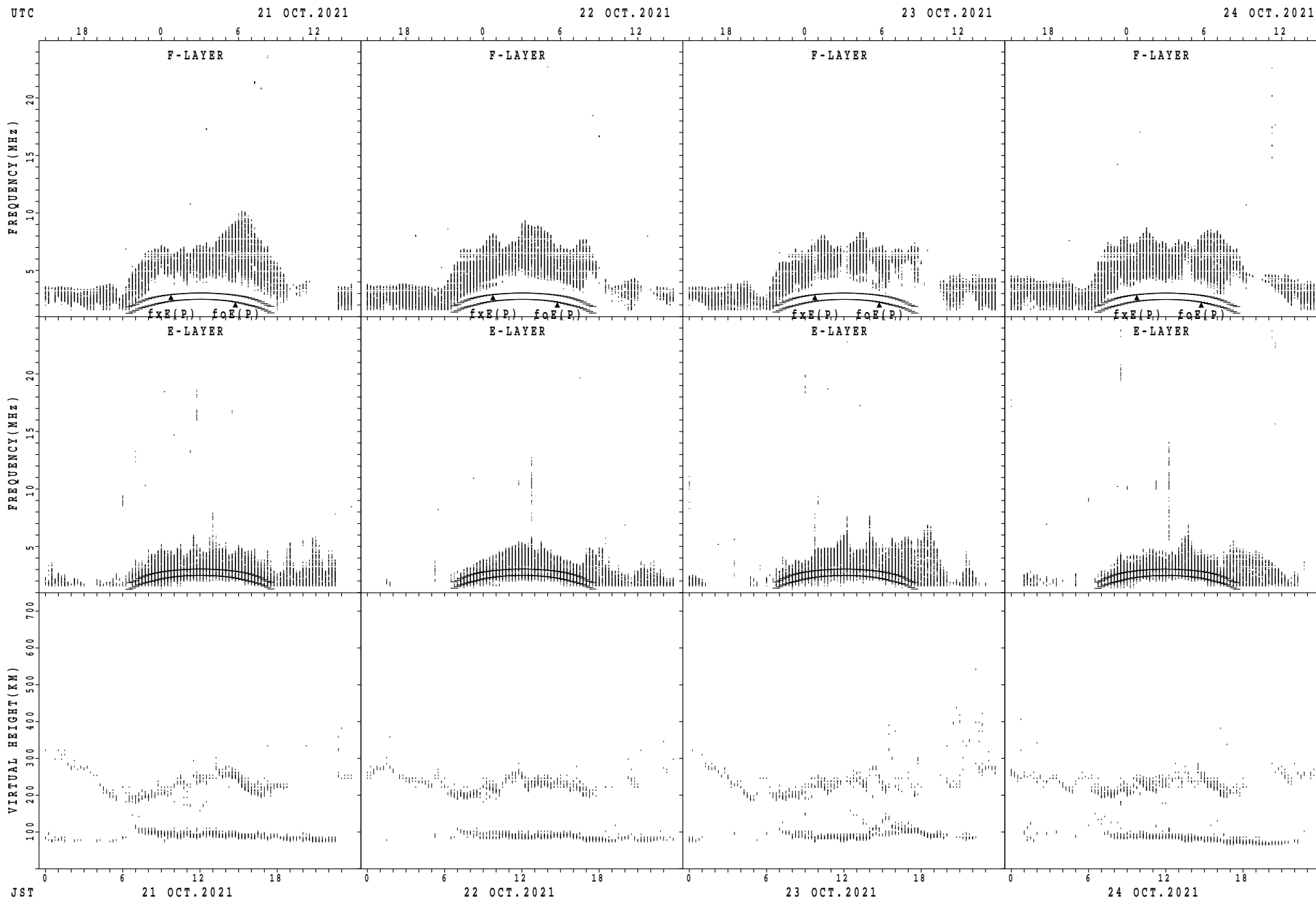
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Yamagawa

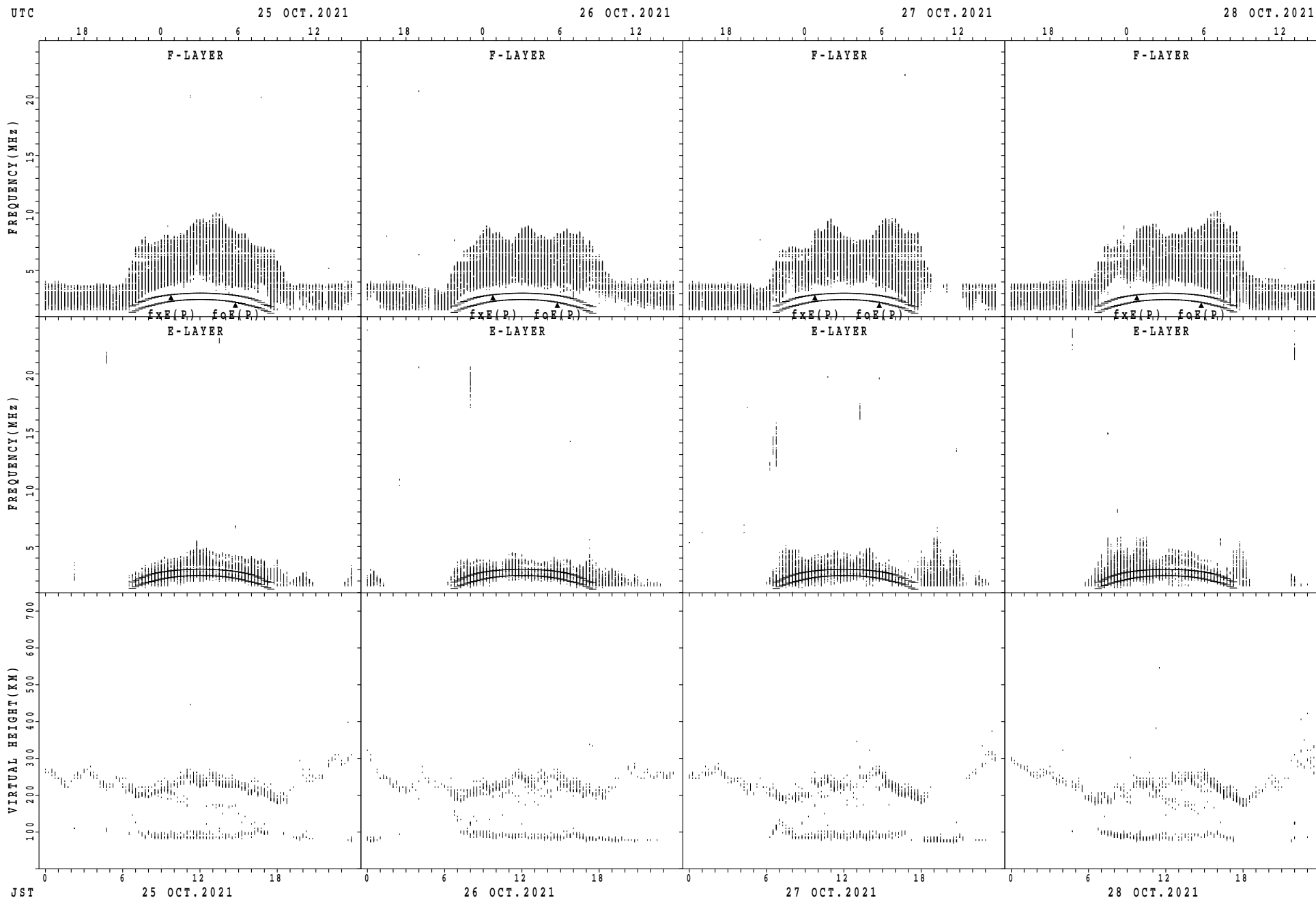


$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

## SUMMARY PLOTS AT Yamagawa

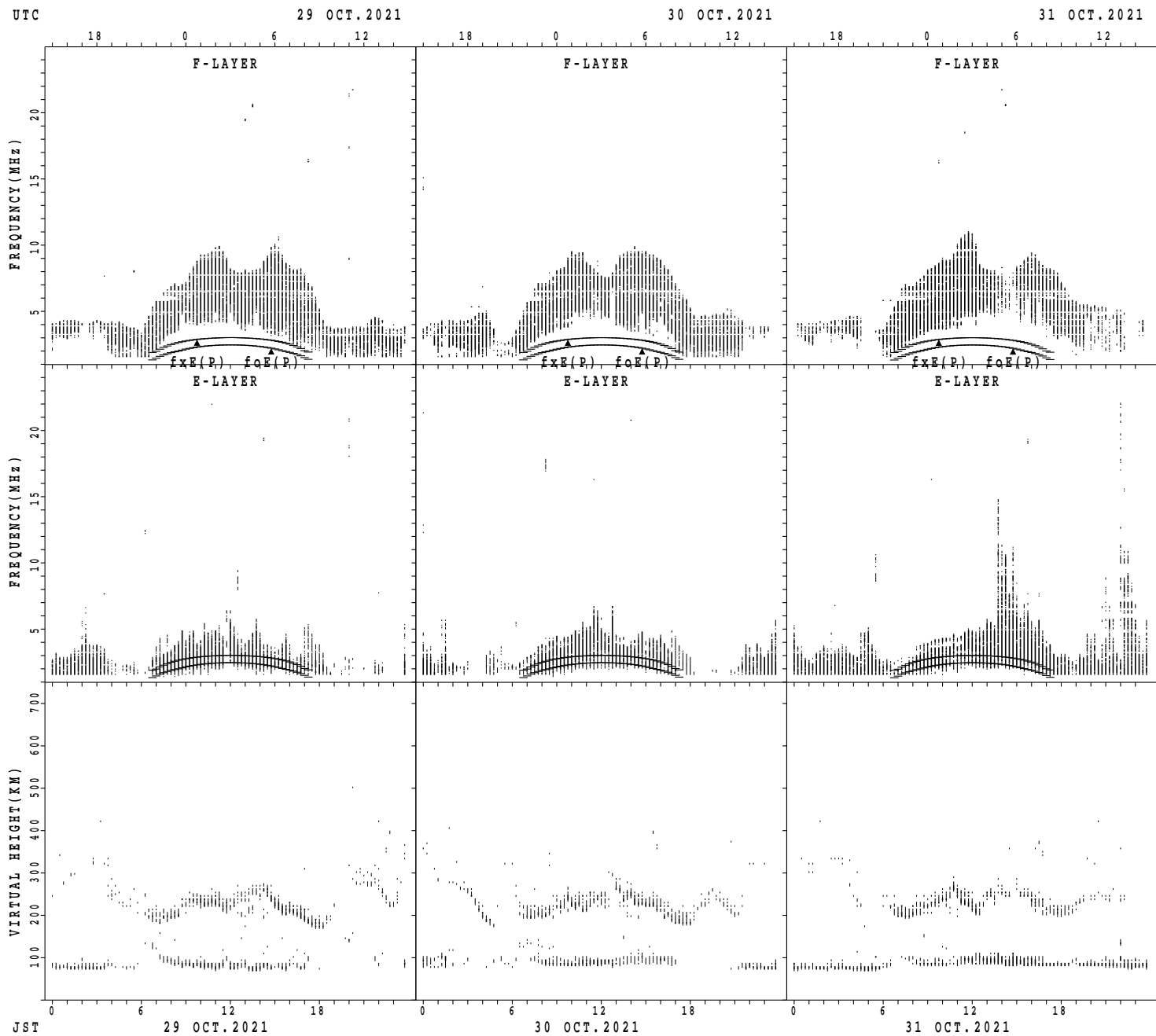


SUMMARY PLOTS AT Yamagawa



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

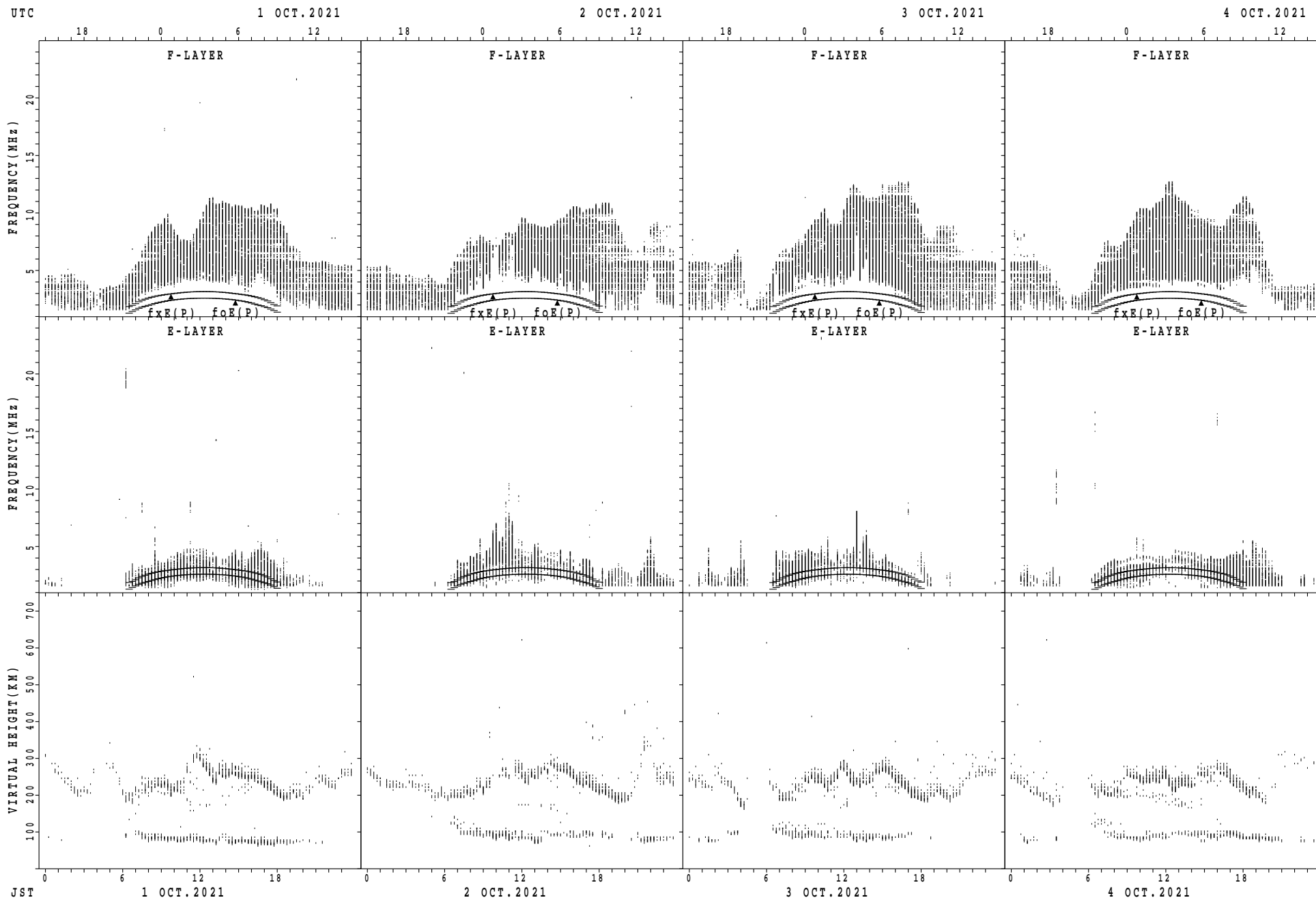
## SUMMARY PLOTS AT Yamagawa



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

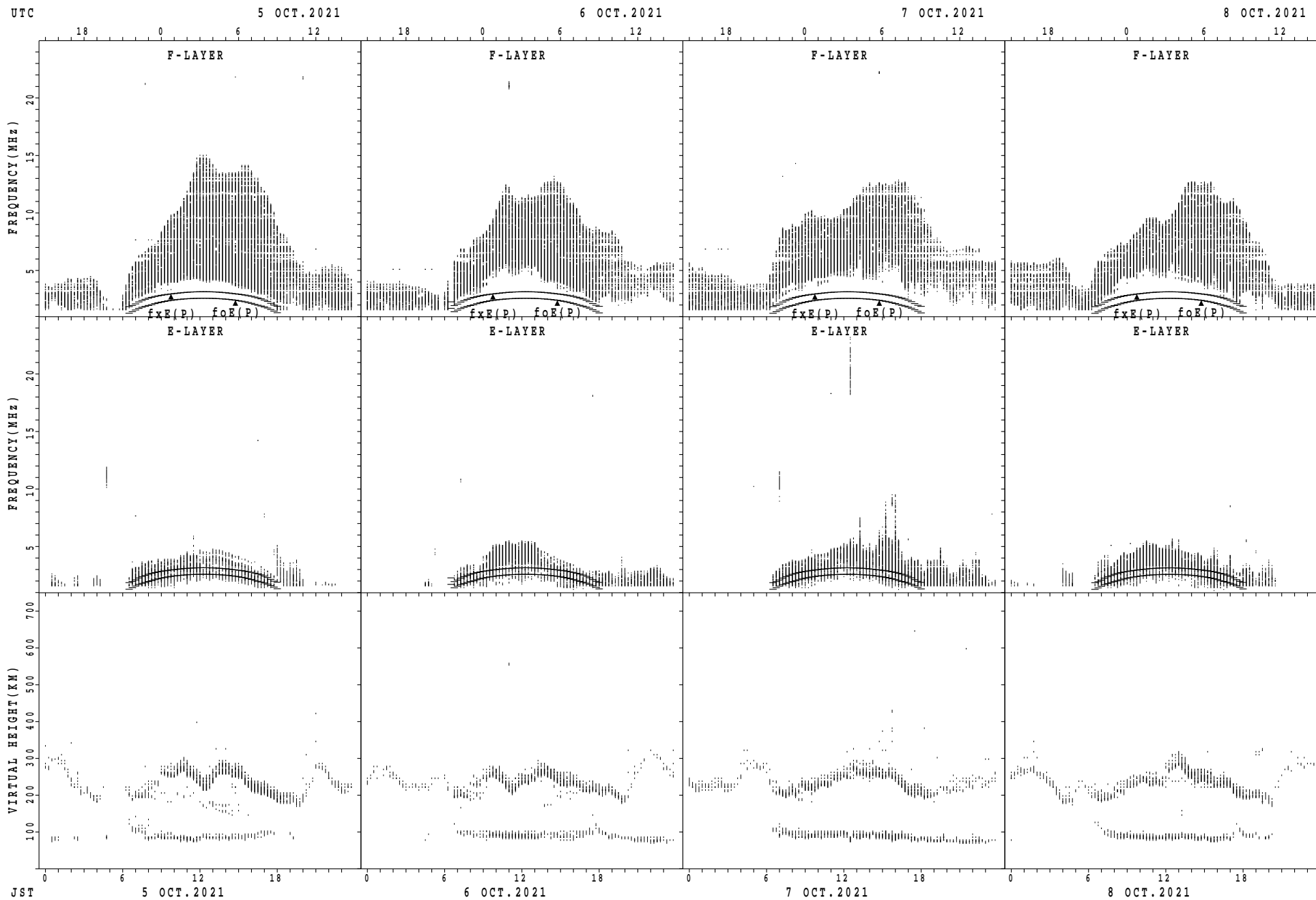


SUMMARY PLOTS AT Okinawa



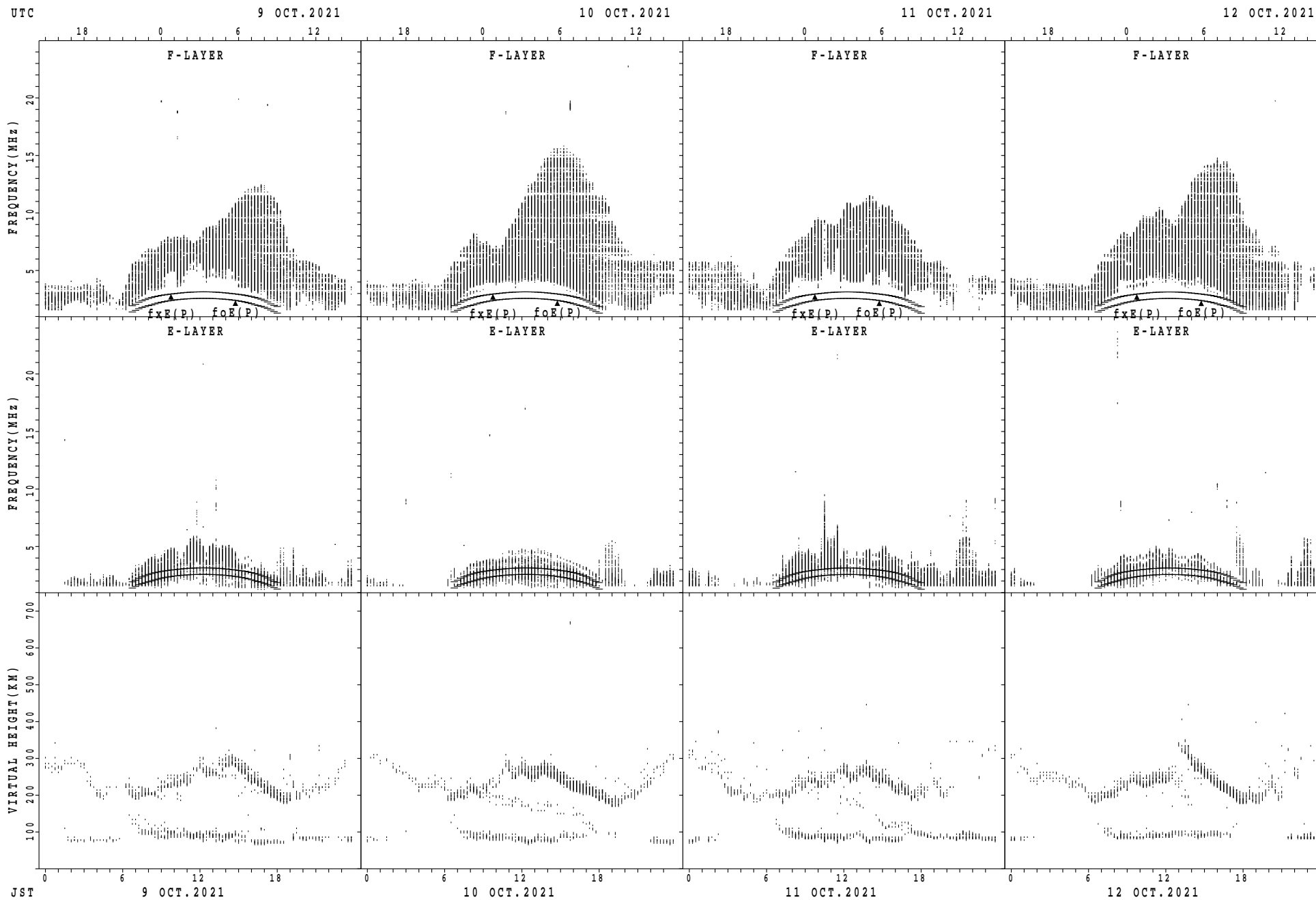
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



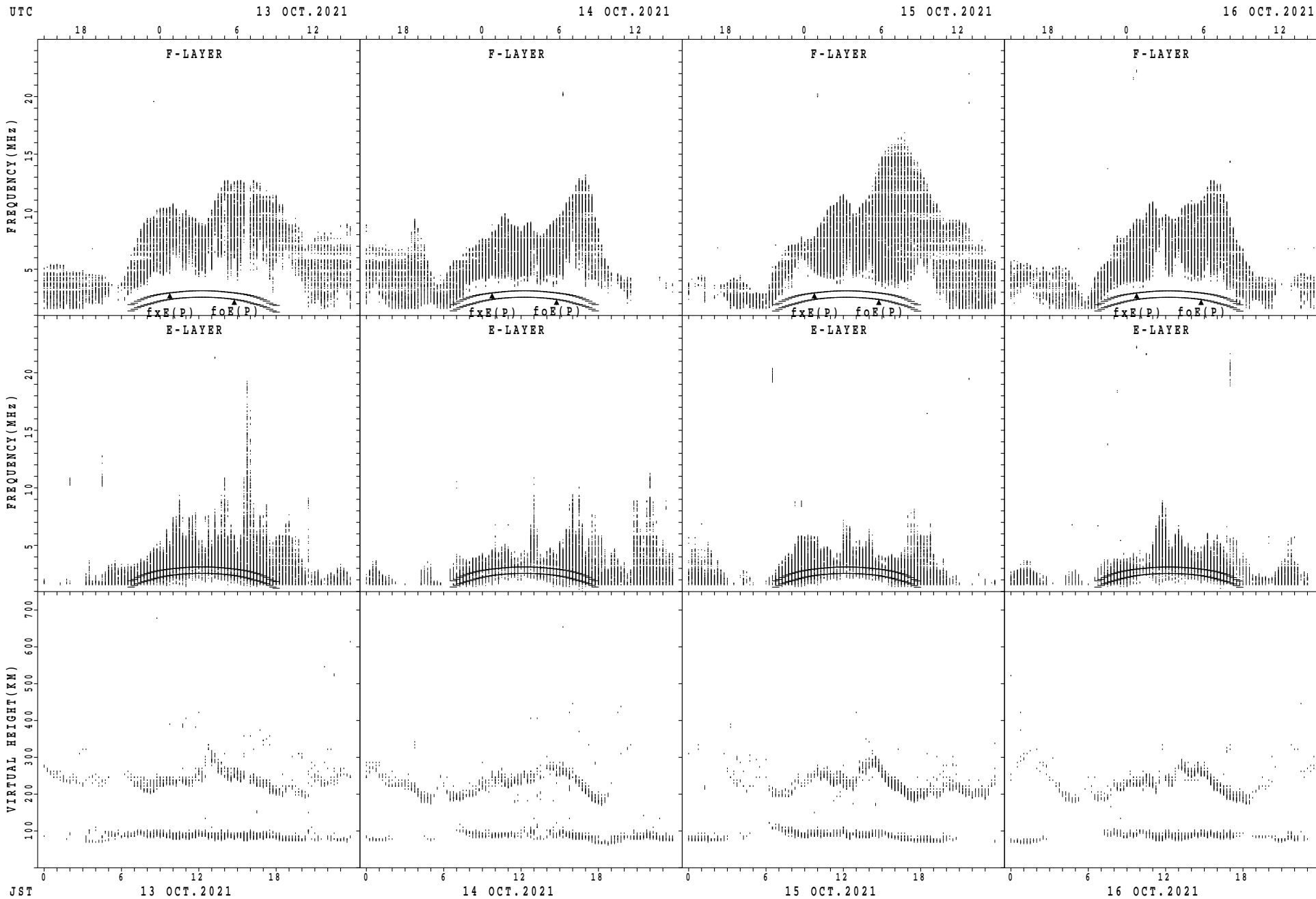
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



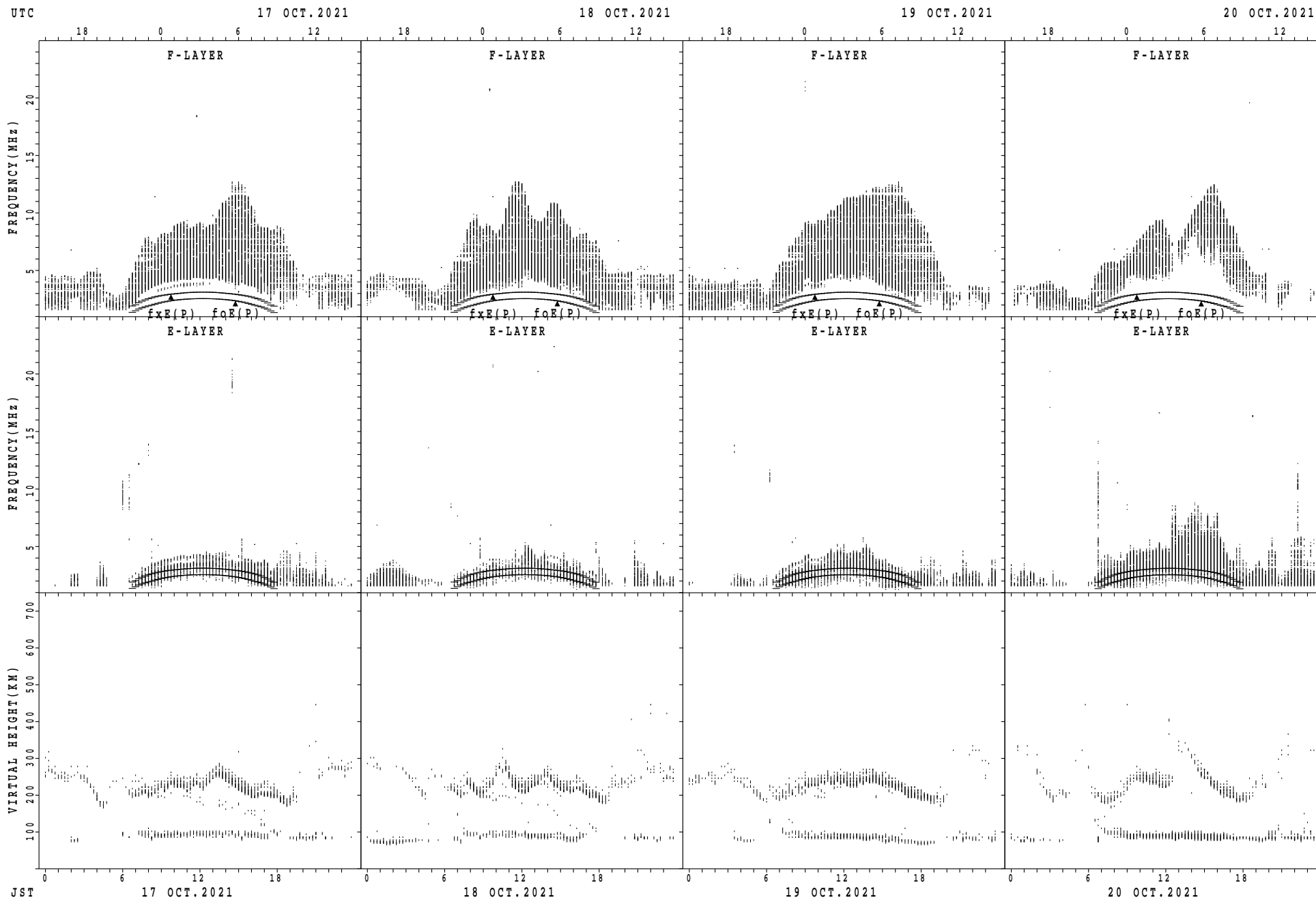
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



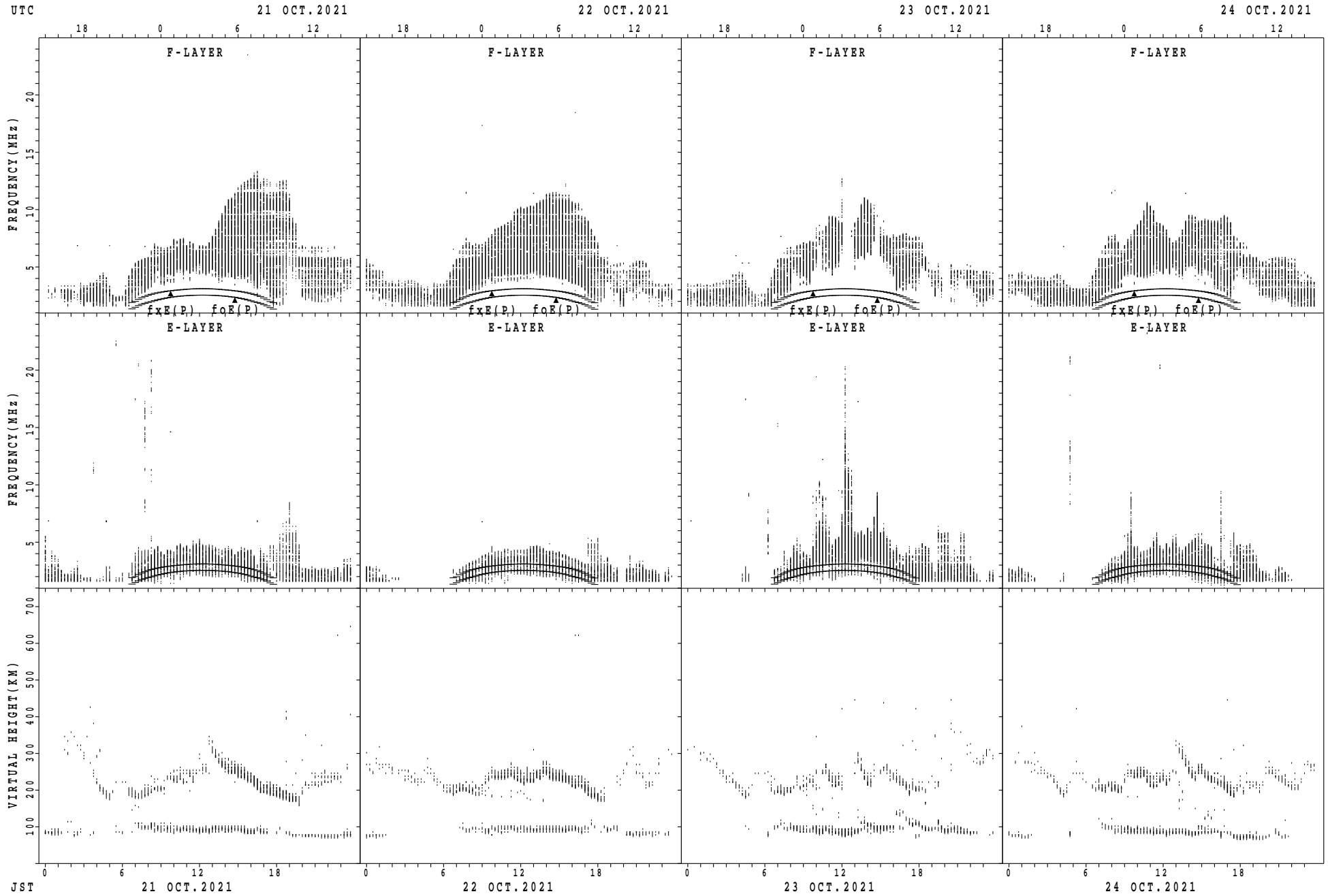
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

## SUMMARY PLOTS AT Okinawa



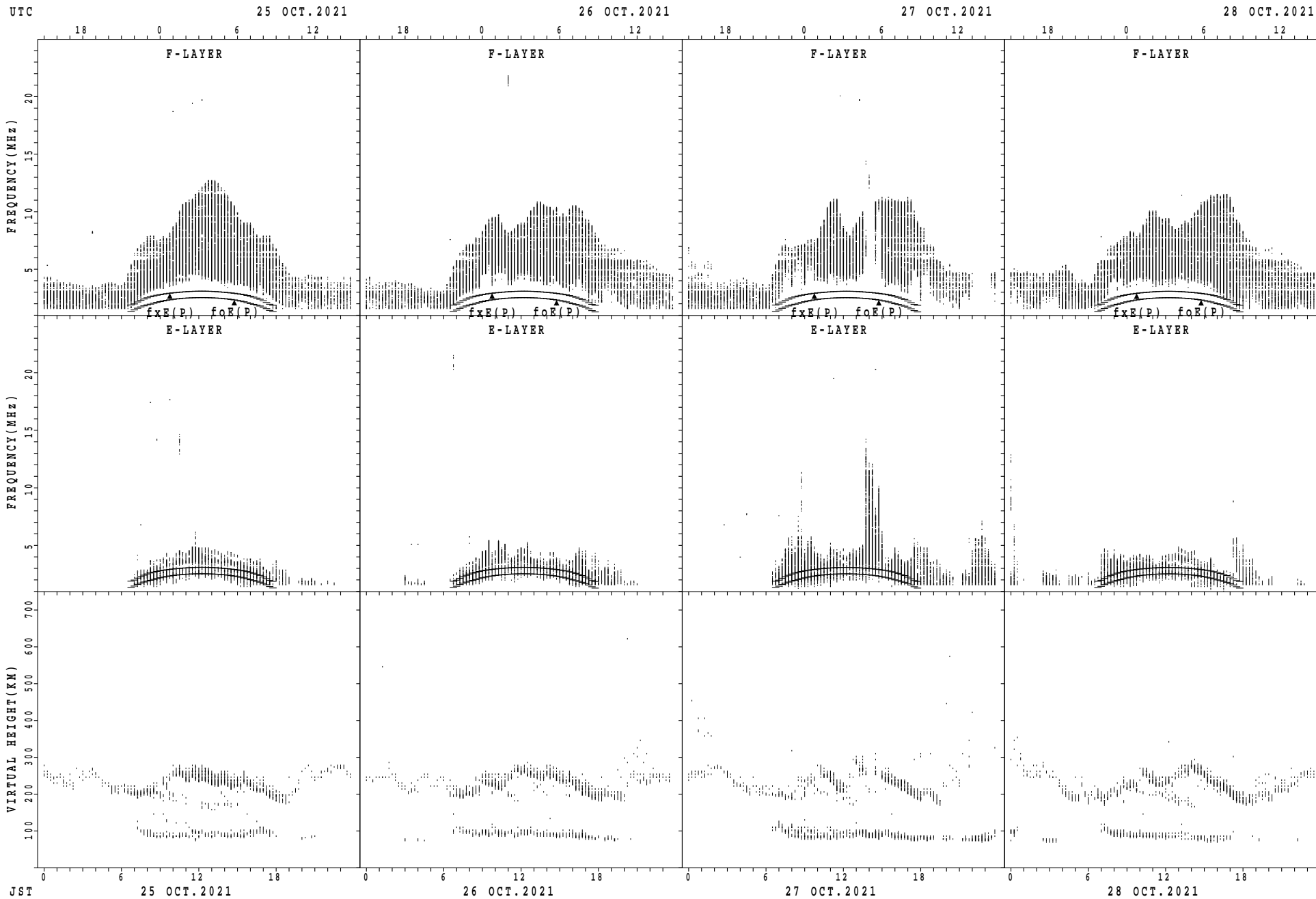
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



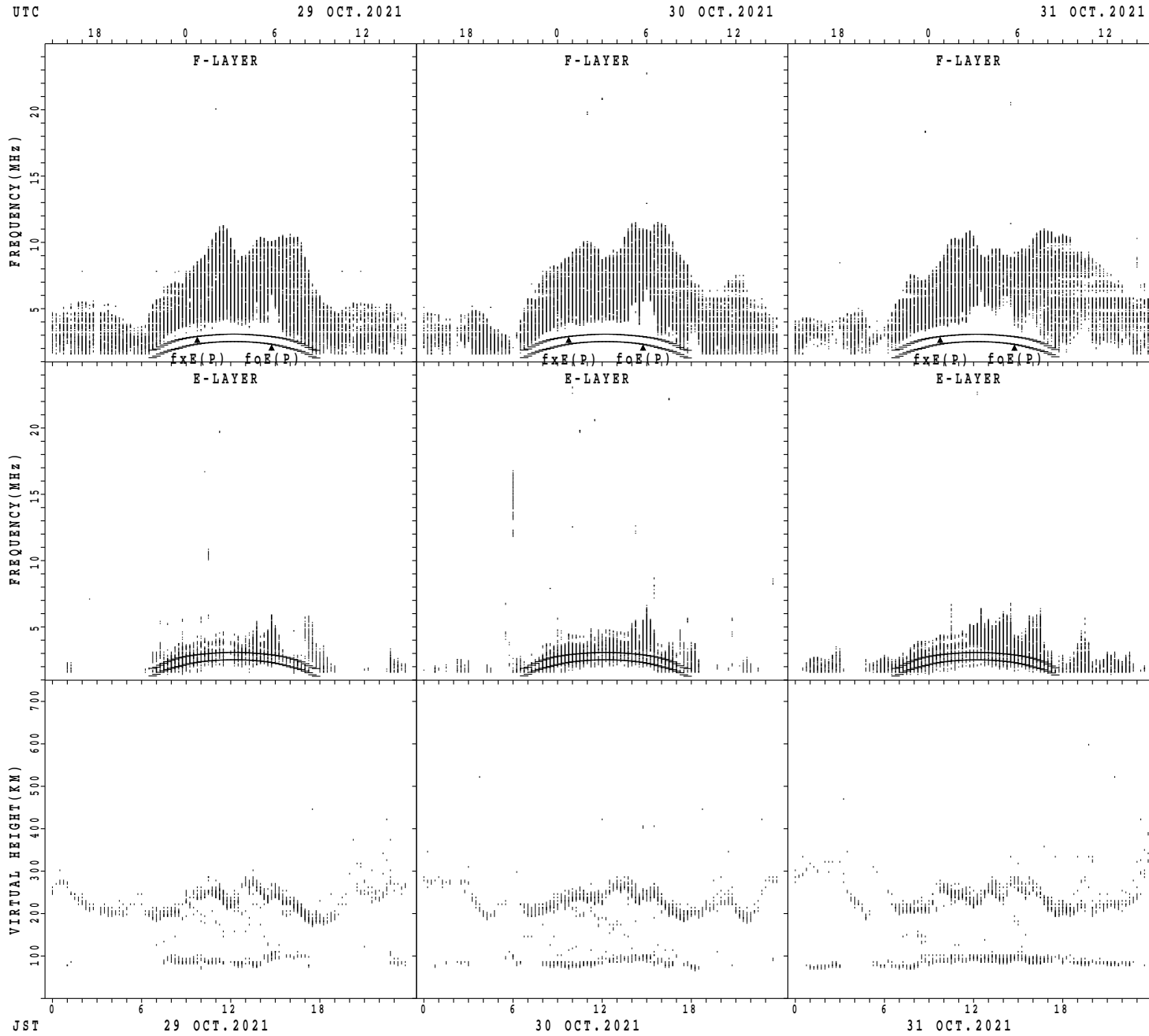
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

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



MONTHLY MEDIANS OF h'F AND h'Es  
 OCT.2021 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT					1		1	6	13	13				5	13	16	17	3						
MED					326		232	223	234	234				224	238	239	228	242						
U Q					163		116	234	243	245				227	244	246	232	244						
L Q					163		116	216	224	218				219	225	230	224	202						

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	23	21	20	24	26	22	21	31	31	31	31	31	31	31	31	31	29	27	26	23	28	28	27	27
MED	98	98	98	98	98	98	98	98	100	98	98	98	100	98	98	98	98	96	97	98	97	97	96	98
U Q	98	98	98	98	98	98	113	100	102	100	100	100	100	100	100	100	98	98	98	98	98	98	98	98
L Q	96	96	98	96	98	96	98	98	98	96	94	94	98	96	94	98	96	94	96	96	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							2	14	26	7					9	22	22	14	3	1				
MED							271	217	218	214					246	226	223	220	216	250				
U Q							304	232	232	222					254	242	234	232	258	125				
L Q							238	208	214	214					233	222	214	208	214	125				

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	20	16	17	15	15	19	31	31	31	30	31	31	31	31	31	31	24	28	26	28	24	28	21
MED	96	96	96	98	96	98	102	98	98	98	98	98	96	98	98	98	98	98	98	96	96	97	96	98
U Q	96	98	98	98	98	98	149	100	100	100	98	98	98	100	100	98	100	98	98	98	98	98	98	98
L Q	94	96	96	95	94	94	98	98	98	96	96	94	94	94	94	96	96	98	96	96	96	95	95	97

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								2	16	22						18	27	27	10	2				
MED								212	224	224						234	224	220	227	217				
U Q								214	234	240						242	234	228	234	226				
L Q								210	216	214						226	218	210	222	208				

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	23	23	21	17	17	14	13	31	31	31	31	31	31	31	31	31	31	31	31	28	30	29	26	22
MED	96	96	96	98	98	96	98	98	98	98	98	98	98	98	98	98	98	96	98	97	96	96	96	97
U Q	98	98	98	98	98	98	98	98	100	100	98	98	98	98	100	100	98	98	98	98	98	98	98	98
L Q	96	96	96	96	96	96	97	98	98	98	96	92	94	96	96	96	96	94	94	93	94	95	94	96

MONTHLY MEDIANS OF h'F AND h'Es  
 OCT. 2021 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

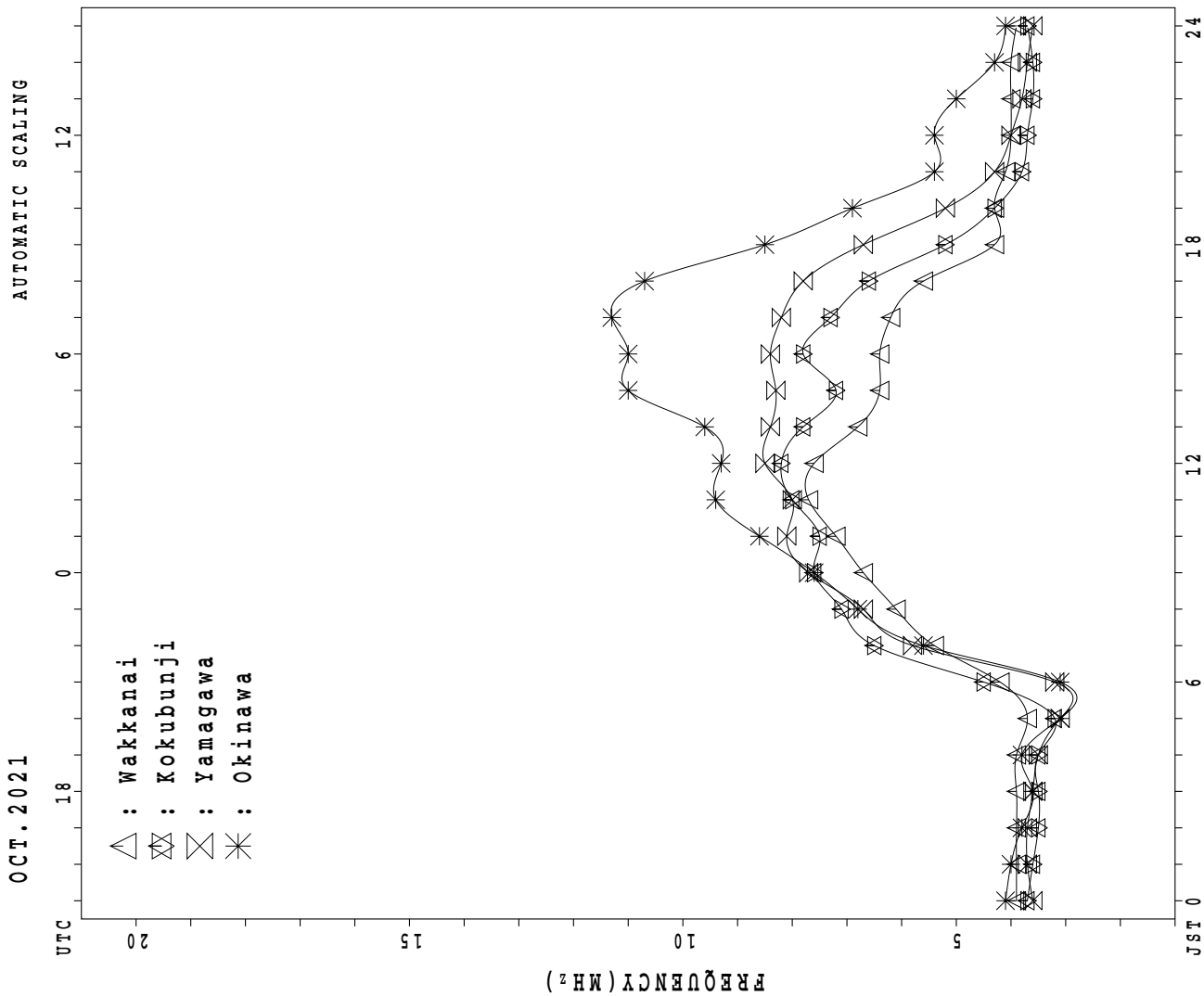
h'F STATION Okinawa LAT. 26°41.0'N LON. 128°09.0'E

	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					2			1	23	29						8	31	31	26	15	4	3	2	1
MED					217			226	224	230						240	224	208	208	218	235	252	253	286
U Q					238			113	232	241						248	238	224	218	224	289	252	272	143
L Q					196			113	208	224						229	214	202	204	206	218	240	234	143

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	23	21	21	20	15	12	10	31	31	31	31	31	31	31	31	31	31	31	28	29	25	28	24	21
MED	96	96	96	96	98	98	97	98	100	98	98	96	96	96	98	98	98	96	97	96	98	97	96	96
U Q	98	97	98	98	98	98	98	98	102	100	98	98	98	98	98	100	100	98	98	98	98	98	98	98
L Q	96	95	95	96	96	96	96	98	98	98	96	94	94	96	96	96	94	94	94	94	96	95	94	94

MONTHLY MEDIANS PLOT OF fOF2



## IONOSPHERIC DATA STATION Wakkanai

OCT. 2021 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 55	X 54	X 51	X 49	X 47															X 66	X 62	X 57	X 57	X 55
2	X 51	X 51	X 51	X 48	X 45															X 66	X 62	X 60	X 55	X 55
3	X 54	X 54	X 55	X 53	C															X 57	X 51	X 53	X 47	X 51
4	X 50	X 46	X 43	X 44	X 41															X 65	X 59	X 53	X 51	X 48
5	X 48	X 46	X 48	X 46	X 48															X 54	X 54	X 48	X 45	X 44
6	X 44	X 43	X 43	X 43	X 43															X 55	X 55	X 54	X 51	X 49
7	X 49	X 49	X 43	X 42	X 41															X 53	X 51	X 50	X 49	X 47
8	X 45	X 45	X 45	X 43	X 43															X 54	X 51	X 48	X 51	X 50
9	X 48	X 47	X 49	X 47	X 46															X 57	X 55	X 53	X 53	X 54
10	X 48	X 49	X 50	X 48	X 48															X 58	X 55	X 54	X 51	X 49
11	X 50	X 50	X 49	X 46	X 48														X 51	X 49	X 49	X 45	X 45	X 45
12	X 45	X 45	X 43	X 45	X 41															X 59	X 53	X 45	X 46	X 45
13	X 46	X 45	X 45	X 49	X 47															X 53	X 54	X 50	X 45	X 45
14	X 44	X 44	X 43	X 43	X 43															X 50	X 48	X 46	X 35	X 37
15	X 38	X 44	X 45	X 42	X 37															X 55	X 52	X 53	X 49	X 50
16	X 47	X 45	X 45	X 46	X 45															X 51	X 54	X 51	X 49	X 48
17	X 45	X 45	X 47	X 47	X 47															X 43	X 45	X 45	X 46	X 47
18	X 47	X 45	X 45	X 43	X 45															X 52	X 52	X 54	X 54	X 49
19	X 51	X 49	X 49	X 45	X 46															X 59	X 48	X 49	X 51	X 55
20	X 59	X 57	X 56	X 58	X 58															X 43	X 39	X 47	X 54	X 59
21	X 58	X 58	X 58	X 57	X 54															X 41	X 51	X 45	X 48	X 52
22	X 46	X 48	X 48	X 55	X 55															X 48	X 48	X 47	X 45	X 47
23	X 48	X 48	X 47	X 45	X 51															X 48	X 48	X 48	X 48	X 51
24	X 49	X 49	X 49	X 51	X 49															X 45	X 51	X 48	X 46	X 46
25	X 46	X 46	X 46	X 45	X 45															X 46	X 47	X 45	X 43	X 45
26	X 45	X 46	X 46	X 48	X 45															X 55	X 56	X 55	X 53	X 52
27	X 51	X 54	X 60	X 58	X 53	X 48														X 51	X 53	X 54	X 50	X 55
28	X 58	X 58	X 58	X 58	X 58	X 54														X 51	X 45	X 43	X 43	X 45
29	X 45	X 45	X 43	X 45	X 45	X 41														X 48	X 37	X 40	X 41	X 47
30	C	X 50	X 55	X 53	X 55	X 54														X 57	X 45	X 45	X 43	X 43
31	X 45	X 45	X 45	X 45	X 50	X 45														X 49	X 51	X 49	X 49	X 51
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	31	30	5													21	31	31	31	31	31
MED	X 48	X 47	X 47	X 46	X 46	X 48													X 51	X 52	X 50	X 49	X 49	X 48
U Q	X 51	X 50	X 51	X 51	X 50	X 54													X 54	X 55	X 54	X 53	X 51	X 52
L Q	X 45	X 45	X 45	X 45	X 45	X 43													X 47	X 48	X 46	X 45	X 45	X 45

OCT. 2021 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

OCT.2021 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	48	47	44	42	40	46	54	50	62	85	74	79	70	74	70	64	61	72	63	59	55	50	50	48
2	44	44	44	41	38	38	56	63	60	76	67	78	92	74	67	61	63	66	59	59	55	53	48	48
3	47	47	48	46	C	C	C	C	C	C	68	C	C	73	65	60	57	61	64	50	44	46	40	44
4	43	39	36	37	34	30	48	52	64	68	68	82	95	69	61	61	64	56	54	58	J <sup>R</sup> 52	46	44	41
5	41	39	41	39	41	32	48	60	64	62	71	72	81	67	68	64	55	50	54	47	47	41	38	37
6	37	36	36	36	36	30	41	56	60	73	70	75	75	72	62	62	59	54	48	48	48	47	44	42
7	42	42	36	35	34	33	45	51	72	74	64	70	80	69	63	65	56	56	47	46	44	43	42	40
8	38	38	38	36	36	32	42	54	55	66	69	76	75	62	60	59	62	57	44	47	44	41	44	43
9	41	40	41	40	39	36	42	51	57	58	66	72	69	67	70	69	67	60	48	50	48	46	46	47
10	41	42	43	43	41	46	53	58	60	64	75	79	79	64	58	60	60	65	54	51	48	47	44	42
11	44	43	42	39	41	28	42	52	61	59	72	69	73	66	64	60	69	63	44	42	42	38	38	38
12	38	38	36	38	34	35	44	60	61	74	77	74	82	80	62	73	72	60	52	46	38	J <sup>R</sup> 39	42	38
13	39	38 <sup>R</sup>	38 <sup>R</sup>	42	40	A	A	65	78	82	90	78	73	70	64	65	61	58	46	47	43	38 <sup>R</sup>	38	38
14	37 <sup>R</sup>	37	36	36	36	37	39	53	65	68 <sup>R</sup>	73	77	69	76	66	52	63	73	43	41	39	J <sup>R</sup> 28	28	J <sup>R</sup> 30
15	31	37	38	35	30	30	42	64	64	64	71	77	78	72	66	68	64	60	48	45	46	42	43	38
16	40	38	38	39	38	34	42	54	58	61	70	89	70	62	64	59	64	50	44	47	44	42	42	41
17	38	38	40	40	40	41	46	54	55	62	71	65	78	64	64	59	62	52	36	38	38	39	41	40
18	40	38	38	36	38	34	46	49	60	77	90	76	83	76	63	66	57	50	45	45	47	47	43	42
19	44	42	42	38	39	39	39	54	64	68	77	88	74	68	68	68	68	60	52	41	42	44	48	50
20	F <sup>F</sup> 47	F <sup>F</sup> 50	F <sup>F</sup> 49	F <sup>F</sup> 51	F <sup>F</sup> 51	F <sup>F</sup> 51	33	49	52	61	69	64	82	77	61	57	58	56	36	32	40	47	F <sup>F</sup> 42	F <sup>F</sup> 30
21	F <sup>F</sup> 29	F <sup>F</sup> 29	F <sup>F</sup>	F <sup>F</sup> 32	F <sup>F</sup> 31	31	36	54	54	61	68	67	70	63	63	63	65	46	34	44	38	41	39	F <sup>F</sup> 36
22	39	41	41	48	48	44	44	50	60	63	62	75	66	62	62	62	56	41	41	41	40	38	38	40
23	41	41	40	38	44	42	41	54	56	60	64	75	72	63	58	59	55	46	41	41	41	41	44	44
24	42	42	42	44	42	39	51	65	66	64	64	66	69	68	63	58	57	46	38	44	41	39	39	39
25	39	39	39	38	38	38	47	63	65	69	74	74	77	68	66	62	71	45	39	40	38	36	38	38
26	38	39	39	41	38	39	40	57	69	63	72	84	77	71	74	67	58	56	48	49	48	46	46	45
27	44	47	53	51	46	41	41	59	72	70	70	82	75	72	75	69	66	58	44	46	47	43	46	48
28	F <sup>F</sup> 46	F <sup>F</sup> 46	F <sup>F</sup> 46	F <sup>F</sup> 46	F <sup>F</sup> 47	47	48	67	65	78	73	78	72	73	70	79	62	55	44	38	36	36	37	38
29	38	38	36	38	38	34	38	55	64	79	76	90	88	76	72	70	63	50	41	30	33	34	38	40
30	C	43	48	46	48	47	41	62	64	70	82	87	83	68	74	67	72	50	50	38	38	36	36	36
31	38	38	38	38	43	38	41	61	70	82	77	93	80	76	67	73	76	56	42	44	42	42	43	44
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	30	31	30	29	29	30	30	30	31	30	30	31	31	31	31	31	31	31	31	31	31	31
MED	40	39	40	39	39	38	42	54	63	68	71	76	76	69	64	63	62	56	45	45	43	42	42	40
U Q	44	43	43	43	42	42	48	61	65	74	75	82	81	74	68	68	66	60	52	48	47	46	44	44
L Q	38	38	38	37	36	32	41	52	60	62	68	72	72	66	62	60	58	50	41	41	39	38	38	38

OCT.2021 foF2 (0.1MHz)

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## IONOSPHERIC DATA STATION Wakkanai

OCT.2021 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								320	436	440	444	456	436	408		L	L	L						
3						C	C	C	C	C	L	C	C	L	L	L	L							
4					A			L	L	L	L	L	L	L	L	L								
5								444	428	424	440	480	436	368										
6									L	L	L	L	L	L			L							
7								424	424	432	416													
8								L	L	L	L	L	L	L	L	L	L							
9								408	436		432	444	412		L	L	L							
10								L	L	L	L	L	L	L	L	L	L							
11								420	436	436	432	412			L	L	L							
12								412	428	444	432	424	412		L	L	L							
13								L	L	L	L	L	L	L	L	L	L							
14								420	436	444	440	412			L	L	L							
15								L	L	L	L	L	L	L	L	L	L							
16								392	408	396	508	392			L	L	L							
17								L	L	L	L	L	L	L	L	L	L							
18								392	388		432	460	428											
19								A	A	L	L	L	L	L	L	L	L							
20								L	L	L	L	L	L	L	L	L	L							
21								376	352	412	432	380			L	L	L							
22								L	L	L	L	L	L	L	L	L	L							
23								260			L	A			L	L	L							
24								L	L	A	432	440	436	428	360									
25									L	L	L	L	L	L	L	L	L							
26								312	360	420	420	424	564											
27								L	L	L	L	L	L	L	L	L	L							
28								408		432	448	428			L	L	L							
29								L	L	L	L	L	L	L	L	L	L							
30								L	L	L	L	L	L	L	L	L	L							
31								L	L	L	L	L	L	L	L	L	L							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								3	8	15	20	24	28	16	8	4								
MED								L	L	L	L	L	L	L	L	L	L							
U Q								272	392	412	424	432	428	412	364	312								
L Q								L	L	L	L	L	L	L	L	L	L							
								320	422	424	432	440	442	428	404	330								
								260	368	392	416	426	414	410	342	292								

OCT.2021 foF1 (0.01MHz)

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## IONOSPHERIC DATA STATION Wakkanai

OCT.2021 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						A	192	240	276	308	308	308	292	316	288	260	232	256							B
2						A	A	244	280	292	320	304	292	292	292	260	236		A	A					
3						C	C	C	C	C	324		C	C	316	284	268	224	176						B
4						A	172	244		A	296	296	312	328	308	276		A							B
5						B	176	236		A	300	312	312	308	284	292	268	224	U	A				B	
6						A	176	232	280	292	296	312	296	300	288	260	208	176							B
7						B	164	228	272	284	292	296	292		A	A		A	A						A
8						200	184	224	260	284	296	296	288	292	244	232	224	200							A
9						B	184	220	264	292	304	304	304	304	280	256	204		A	A					A
10						A	B	236	280	296	296	304	300	304	280	248		A	A	A					A
11						A	204	216	268	296	296		A	292	292	276	244	196							B
12						204	176	208	256	280	292	288	292	288	240		192		B						B
13						B	A	272	256	276	260	288	292	288	232	232		A	A						A
14						B	A	208	268	280	304	288	288		A	268	280		A	A					A
15						A	B	224	240	272	284	284		A	A	A		232	184						A
16						A	196	180	228	276	300		A	292	288	192	264		A	A					A
17						A	A	212	268	296	304	300	292	292	280	276		A	A						A
18						A	A	220	252	288	292		A	292	272	260	232	236	216						A
19						B	228	A	A	272		A	296	296	276	276	228		A	A					A
20						B	A	A	248	264	284	300	300	276	276	228	164	196							A
21						B	172	232	252	272	288	296	284	336	240	240	232		A						A
22						A	A	204	252	276	296	288	296		A	272	232	196							A
23						A	A	232	A	256		A	316	304	288		260	224							B
24						B	B	204	264	284		A	304	304	284	268	252		A	A					A
25						B	B	216	264	284	312		A	312	292	284	248	192							A
26						B	164	200	264	284	312	300	316	296	268	236	176		B						B
27							200	212	256	292	300	320	300	300		A	A	A	A						A
28							212	212	276	288	300	288	272	304	276	248	200	184							B
29						B	232	236	284	292		A	A	300	264	244	220		A						B
30						A	220	264	292	292	292	292	256	300	268	244	200		A						A
31						B	212	252	292	292	292	316	296	228	300	236		A	A						A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT						4	14	28	26	30	27	25	28	27	27	28	21	9							
MED						202	178	222	264	286	296	300	294	292	276	248	208	196							
U Q						204	192	232	272	292	304	310	302	304	284	260	226	232							
L Q						198	172	212	252	280	292	290	292	288	264	234	194	178							

OCT.2021 foE (0.01MHz)

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## IONOSPHERIC DATA STATION Wakkanai

OCT.2021 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 16	E 16	E 16	E 16	E 16	E 16	G 19	26	32	36	37	37	34	G 30	32	26	25	G 24	E 17	B 26	17	17	E 16	E 16
2	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26	28	32	42	33	49	33	34	29	G 27	G 23	19	20	16	E 16	E 16	16
3	E 16	E 16	17	23		C	C	C	C	C	G 32	C	C	32	28	26	G 22	G 16	E 16	E 16	19	19	17	E 16
4	21	E 18	E 22	18	20	21	18	25	31	30	32	32	36	34	28	29	G 23	G 17	E 16	E 16	E 16	E 16	E 16	16
5	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	32	29	34	34	33	32	32	34	28	19	E 16	E 16	E 16	E 16	E 16	16
6	E 16	E 16	E 16	E 16	E 16	E 16	E 16	21	26	29	32	34	34	34	33	28	G 26	G 24	17	E 16	E 16	E 16	E 16	16
7	E 16	E 16	E 16	E 16	E 16	E 16	E 16	18	G 22	G 27	38	36	31	G 29	31	31	28	24	21	18	E 16	17	E 16	E 16
8	E 16	E 16	E 16	E 16	E 16	E 16	E 16	17	G 24	29	31	32	32	32	31	28	28	G 22	G 18	E 16	E 16	18	E 16	E 16
9	E 16	E 16	E 16	E 16	E 16	E 16	E 16	19	26	30	31	36	32	32	G 30	G 28	29	39	20	19	19	24	20	E 16
10	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G 25	G 27	37	36	29	G 36	G 28	G 24	G 22	22	19	21	17	E 16	E 16	20
11	17	16	16	E 16	E 16	E 16	E 16	16	30	31	31	33	31	30	33	G 28	G 28	20	E 16	E 16	E 16	E 16	E 16	16
12	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G 17	G 22	27	29	41	28	31	30	36	24	22	E 16	34	28	E 16	E 16	E 16
13	E 16	E 16	E 16	E 16	E 16	BA 39	AA 41	G 24	G 25	G 27	28	34	34	33	22	G 24	24	24	20	19	16	E 16	E 16	E 16
14	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	22	32	39	38	45	45	32	29	26	G 35	24	22	20	20	19	E 16
15	E 16	E 16	E 16	E 16	E 16	E 16	E 16	20	31	39	30	35	29	30	31	27	25	28	17	17	E 16	E 16	E 16	E 16
16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G 16	G 20	G 28	G 32	G 33	30	30	30	30	28	G 25	24	24	16	16	E 16	E 16
17	E 16	E 16	E 16	E 16	E 16	E 16	E 16	17	E 16	E 16	24	28	29	G 31	32	31	31	32	28	31	22	E 16	E 16	E 16
18	E 16	E 16	E 16	E 16	17	17	17	G 22	G 28	G 27	33	30	29	G 28	28	26	23	G 21	G 23	24	21	21	E 16	E 16
19	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	24	28	31	32	34	32	27	G 29	22	21	22	16	E 16	E 16	E 16	E 16
20	E 16	E 16	E 16	E 16	E 16	E 16	E 16	17	16	21	26	28	28	30	30	29	26	G 23	20	16	E 16	E 16	E 16	17
21	E 16	E 16	E 16	E 16	E 16	E 16	E 16	17	24	26	30	32	30	30	33	G 27	27	26	20	E 16	E 16	E 16	E 16	16
22	E 16	E 16	E 16	E 16	E 16	E 16	E 16	16	22	28	32	35	43	31	28	G 26	25	18	E 16	E 16	E 16	E 16	E 16	16
23	E 16	E 16	E 16	E 16	E 16	E 16	E 16	16	G 23	27	29	30	32	G 32	32	31	26	G 20	E 16	17	17	17	E 16	E 16
24	E 16	E 16	E 16	E 16	E 16	E 16	E 16	16	23	28	29	32	G 32	G 30	29	G 24	G 22	E 16	16	22	21	20	E 16	E 16
25	E 16	E 17	E 16	E 16	E 16	E 16	E 16	16	22	27	31	31	31	31	30	G 27	G 24	20	E 16	E 16	E 16	19	E 16	E 16
26	E 16	E 16	E 16	E 16	E 16	E 16	E 16	17	G 23	G 25	29	30	G 33	32	31	G 27	G 25	18	E 16	E 16	E 16	E 16	E 16	E 16
27	E 16	E 16	E 16	E 16	E 16	E 16	E 16	16	24	27	30	32	31	G 32	32	33	25	24	24	E 16	E 16	E 16	E 16	E 16
28	E 16	E 16	E 16	E 16	E 16	E 16	E 16	17	G 24	G 26	G 28	31	31	G 27	33	29	27	G 20	E 16	17	15	16	E 16	E 16
29	E 17	E 16	E 17	E 16	E 16	E 16	E 16	16	G 23	25	31	33	33	38	30	29	G 24	G 21	E 16	E 16	E 16	E 16	E 16	17
30	E 17	E 17	E 17	E 17	E 17	E 19	E 16	G 21	34	35	43	40	33	33	30	G 24	G 22	19	E 16	E 16	E 16	E 16	E 16	16
31	E 16	E 16	E 16	E 16	E 16	E 16	E 16	16	24	27	32	36	32	32	32	30	24	18	20	E 16	E 16	E 16	E 16	E 16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	30	30	30	30	30	31	30	30	31	31	31	31	31	31	31	31	31	31	31
MED	E 16	E 16	E 16	E 16	E 16	E 16	E 16	16	24	28	30	33	32	32	32	28	26	22	19	E 16	E 16	E 16	E 16	E 16
U Q	E 16	E 16	E 16	E 16	E 16	G	18	25	31	32	36	34	34	G	30	28	24	22	19	19	17	17	17	16
L Q	E 16	E 16	E 16	E 16	E 16	E 16	E 16	16	G 22	27	29	31	31	30	30	G 27	G 24	20	E 16	E 16	E 16	E 16	E 16	E 16

OCT.2021 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

OCT.2021 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	16	16	16	16	16	16	16	16	17	16	17	16	16	16	16	17	17	16	16	16	16	16
2	16	16	16	16	16	16	16	16	16	16	16	17	17	17	15	16	14	16	16	15	16	16	16	16
3	16	15	16	14	C	C	C	C	C	C	16	C	C	16	16	16	15	15	16	16	16	16	16	16
4	16	18	20	16	15	16	13	15	17	17	16	16	16	16	16	16	16	16	16	16	16	16	16	16
5	16	16	16	16	16	16	16	16	16	16	16	18	16	16	16	16	16	16	16	16	16	16	16	16
6	16	16	16	16	16	16	12	16	16	16	16	16	16	16	15	12	10	12	16	16	16	16	16	16
7	16	16	16	16	16	16	12	16	17	16	16	16	17	18	16	16	15	16	16	16	16	16	16	16
8	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	16	16	16	16	16	16	16	16	16
9	16	16	16	16	16	16	16	16	16	16	16	16	16	15	10	14	14	16	16	16	16	16	16	16
10	16	16	16	16	16	16	16	16	16	16	16	13	16	16	16	14	16	16	16	16	16	16	16	16
11	16	16	16	16	16	16	16	16	16	16	16	16	16	15	11	16	15	16	16	16	16	16	16	16
12	16	16	16	16	16	16	16	15	14	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
13	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	13	16	16	16	16	16	16	16	16
14	16	16	16	16	16	16	16	15	15	15	16	16	16	16	11	10	17	16	16	16	16	16	16	16
15	16	16	14	16	16	16	16	15	16	16	16	16	16	16	16	15	15	16	16	16	16	16	16	16
16	16	16	16	16	16	16	16	16	16	16	18	17	16	16	13	16	14	16	16	16	16	16	16	16
17	16	16	16	16	16	16	16	16	16	16	16	17	17	17	16	16	16	16	17	16	16	16	17	17
18	16	16	16	16	16	16	16	14	15	16	16	16	17	16	16	16	14	16	16	16	16	16	17	17
19	17	16	16	16	16	16	16	14	16	16	15	16	16	15	16	15	16	16	16	16	17	16	16	16
20	16	16	16	16	16	17	16	15	15	15	15	15	16	15	16	16	16	16	16	16	16	16	16	16
21	16	16	16	16	16	16	15	16	16	16	13	16	16	14	14	11	14	16	17	16	16	16	16	16
22	16	16	16	16	16	16	16	15	15	17	17	16	16	16	16	15	13	16	16	16	16	16	16	16
23	16	16	16	16	16	16	16	16	17	16	17	17	17	17	16	15	16	16	16	16	16	16	16	16
24	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	17	16	16	16	16	16	16	16	16
25	16	16	16	16	16	16	16	16	16	16	18	18	17	16	16	16	16	16	16	16	16	16	16	16
26	17	16	16	16	16	16	15	16	16	16	16	16	20	17	16	14	14	16	17	16	16	16	16	16
27	16	16	16	16	16	16	16	16	15	14	16	16	16	16	16	16	15	16	16	16	16	16	16	16
28	16	16	16	16	16	16	16	16	16	15	17	16	16	16	16	13	15	15	15	16	16	16	16	16
29	17	16	16	16	16	16	16	16	16	16	18	15	21	15	13	15	15	16	16	16	16	16	16	16
30	17	16	16	16	16	16	16	16	16	17	16	16	16	16	16	16	15	15	17	16	16	16	16	16
31	16	16	16	16	16	16	16	16	16	15	16	15	17	15	16	15	16	16	16	16	16	16	16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	30	30	30	30	30	31	30	30	31	31	31	31	31	31	31	31	31	31	31
MED	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15	16	16	16	16	16	16	16
U Q	16	16	16	16	16	16	16	16	16	16	16	16	17	16	16	16	16	16	16	16	16	16	16	16
L Q	16	16	16	16	16	16	16	15	16	16	16	16	16	15	15	14	14	16	16	16	16	16	16	16

OCT.2021 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

OCT. 2021 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	304	301	300	299	299	318	357	376	305	358	325	357	344	330	346	346	334	333	321	320	319	306	303	300
2	297	305	310	310	328	321	351	373	327	323	365	320	362	334	366	348	348	337	322	318	293	287	305	303
3	299	296	317	332		C	C	C	C	C	318	C	C	342	373	336	352	336	341	340	314	285	285	285
4	304	331	329	326	341	333	366	357	325	353	353	334	359	359	358	345	351	349	317	316	R	307	304	310
5	309	308	314	308	344	347	360	359	374	347	356	333	372	342	347	356	345	344	332	312	313	316	307	307
6	307	307	307	307	320	343	350	359	358	374	346	339	352	352	349	352	349	348	324	314	310	300	299	299
7	321	328	318	301	295	283	340	339	353	368	347	331	357	356	346	358	357	352	333	310	316	313	299	302
8	317	296	295	301	317	318	358	370	341	343	343	350	358	347	340	340	340	352	327	315	312	329	299	304
9	304	312	321	320	327	326	354	381	367	367	347	338	365	339	346	345	345	345	331	330	312	309	306	322
10	321	310	309	308	309	306	369	368	368	340	344	344	362	356	345	345	344	347	322	314	318	315	312	306
11	306	287	294	302	351	316	341	322	345	340	340	336	336	357	354	323	352	359	324	321	333	324	296	295
12	300	326	304	303	303	316	356	396	361	360	360	336	335	354	312	324	339	316	406	324	306	R	297	267
13	302	302	293	311	352	A	A	331	352	374	362	355	368	345	364	347	355	355	304	301	335	R	R	305
14	R	283	296	295	294	312	330	R	372	370	369	351	343	342	342	357	355	355	366	351	309	R	R	R
15	317	303	325	318	306	306	343	368	378	339	359	359	359	358	330	358	366	363	337	316	320	317	325	303
16	302	302	311	311	317	325	362	383	373	363	337	362	362	330	344	371	362	344	320	323	324	334	317	316
17	328	313	303	303	312	336	357	371	372	357	361	352	354	367	357	346	366	365	324	323	323	306	306	306
18	305	305	305	305	304	315	336	339	321	321	341	332	343	356	337	367	365	350	310	307	315	319	319	318
19	298	309	308	308	307	326	342	342	358	348	335	361	355	355	329	344	362	368	361	313	313	264	280	297
20	F	318	303	312	289	320	343	365	364	371	354	367	347	338	355	354	346	370	370	314	314	328	318	F
21	F	F	F	F	F	341	363	380	379	357	372	352	347	363	329	342	353	362	321	318	318	286	276	F
22	315	302	307	304	326	337	359	359	358	365	364	371	351	357	356	355	355	343	340	337	337	317	312	311
23	310	291	316	328	324	370	364	377	376	361	352	352	377	357	335	360	361	361	358	337	333	317	297	305
24	304	324	315	322	321	321	340	386	372	356	379	355	342	384	367	333	356	355	354	331	319	317	313	313
25	313	312	312	303	320	320	372	372	371	369	357	351	351	350	343	342	377	351	348	338	338	296	295	295
26	306	321	313	312	313	363	359	381	381	361	349	348	366	356	338	360	347	348	349	323	320	317	313	311
27	308	304	309	289	311	341	375	364	373	372	339	368	367	343	350	358	371	365	314	323	343	327	296	298
28	F	F	F	F	F	352	351	377	376	376	365	363	357	357	341	367	366	333	357	350	325	317	295	295
29	302	302	306	306	323	322	351	371	354	354	327	364	350	349	349	367	368	350	363	342	305	320	293	298
30	C	301	299	296	333	354	346	368	358	365	354	353	352	351	332	347	369	339	338	329	306	306	293	293
31	292	292	292	292	323	350	343	373	349	349	328	340	340	339	317	331	360	352	340	327	319	307	290	263
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	29	29	28	29	28	30	30	30	31	30	30	31	31	31	31	31	31	31	30	29	30	29
MED	306	304	309	306	320	326	356	370	364	358	351	350	354	354	346	347	355	350	332	321	319	315	299	303
U Q	314	312	314	312	326	343	362	377	373	367	361	357	362	357	356	358	366	361	349	330	328	318	312	310
L Q	302	301	302	301	310	318	344	359	352	348	340	338	344	342	337	342	348	344	321	314	313	306	295	296

OCT. 2021 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

OCT. 2021 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	L									
2								439	369	368	392	380	389	397	L	L	L	L						
3						C	C	C	C	C	L	C	C	L	L	L	L							
4					A				L	L														
5								363	399	406	413	354	393	412										
6									L	L	L	L	L	L										
7								358	387		L	L	L	L	L	L	L							
8								L	367	369	388	388	391											
9									U	L	L	L	L	L	L	L	L							
10									399	394	374	398	390	358										
11									L		379	374	363	406										
12								L	L	L	404	H	L	L	L	L	L							
13						A	A	L	372	401	404	371	432											
14									L	398	395	396	363	395										
15									L	386	430	380	422	L	L	L	L							
16									L	412		L	A	L										
17								L		L	A			L	L	L	L							
18									L			368	376	385	389	407								
19									441	405	396	388	412	328										
20									L	398		L	L	L	L	L	L							
21									L	L	L	L	L	L	L	L	L							
22									L	L	L	L	L	L	L	L	L							
23									L	L	L	L	L	L	L	L	L							
24									L	L	L	L	L	L	L	L	L							
25									L	L	L	L	L	L	L	L	L							
26									L	L	L	L	L	L	L	L	L							
27									L	L	L	L	L	L	L	L	L							
28									L	L	L	L	L	L	L	L	L							
29									L	L	L	L	L	L	L	L	L							
30									L	L	L	L	L	L	L	L	L							
31									L	L	L	L	L	L	L	L	L							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								3	8	15	20	24	28	16	8	4								
MED								412	378	396	394	391	390	393	400	400								
U Q								L	439	392	401	402	396	398	398	410	408							
L Q								408	366	379	372	380	380	390	390	396								

OCT. 2021 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

OCT. 2021 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								224	314	244	272	252	262	252	260	260									
2									224		236		228	238	238	238	250								
3						C	C	C	C	C	294	C	C	246	238	238	238								
4					256			294	234	234	272	252	246	234											
5									246	240	256	244	264												
6									238	260	264	258	250		240										
7									260	234	256	256	240	252	250	250									
8									256	254	256	250	244	250	268	242									
9									242	262	258	248	268	256	256										
10									272		262	248	244	236											
11								304	256	256	262	304	266	250	250	252									
12									234	234		256	258	242		270									
13						A	A	266	234	234	250	226	228	236	234	246									
14								224	226			302	264	242											
15							250		236	264	250	238	246	238	258	242									
16									232	226	262	240	236	290											
17									250	248	260	246	244	254											
18									254	290	244	278	248	248	238										
19									254	254	242	238	256	264	264										
20								226		246	242	264	258	246	252	250									
21									248	238	244	256	230	272											
22									236	258	236		236	242											
23								218		250	248	254	226	242	228										
24									250	228	240	248	228												
25									228	238	252	252	244	240	270										
26									234	268	254	238	246	262											
27									232	228		242	236	250											
28									246	228	242	234		252											
29									230	256	242		250		244										
30													246	234											
31									250	276	240	246													
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT						1	1	6	15	27	26	27	29	29	20	14	2								
MED					256	250	225	236	246	251	254	246	246	252	248	244									
U Q								266	256	254	262	262	254	250	261	256									
L Q								224	232	234	240	242	237	241	238	242									

OCT. 2021 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

OCT. 2021 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	278	286	286	294	294	254	242	202	208	220	214	216	194	196	200	194	244	238	224	A	224	256	262	266	
2	262	262	260	250	224	256	216	222	198	242	184	284	218	192	192	206	206	228	232	236	256	302	290	278	
3	284	266	252	240		C	C	C	C	C	204	C	C	196	208	196	206	252	218	212	248	272	280	280	
4	260	242	232	238	238	A	234	210	206	210	186	194	236	194	188	244	230	214	250	244	222	222	248	254	
5	278	274	262	254	228	214	224	230	230	198	192	182	218	194	244	230	230	238	238	250	246	246	254	296	
6	288	272	270	258	252	212	242	232	224	202	194	190	190	202	230	194	240	226	252	254	272	278	280	286	
7	268	248	248	284	274	314	240	236	220	A	204	194	200	202	194	210	A	224	214	240	260	260	254	282	264
8	272	282	286	270	266	256	242	234	198	208	210	200	192	192	196		240	226	242	248	260	270	268	280	
9	280	268	266	262	232	260	226	210	232	196	204	204	204	194	194	216	246	230	260	262	250	290	284	254	
10	264	272	272	280	282	248	222	222	244	226	250	220	218	194	182	242	244	232	240	262	246	240	248	310	
11	286	298	290	296	224	276	242	232	212	204	190	216	190	204	194	198	244	218	236	214	226	256	290	298	
12	278	242	278	256	274	254	230	208	204	200	246	200	206	206	244	218	224	238	210	284	270	268	292	322	
13	264	E 286	B 272	E 272	B 236	A	A	212	196	194	200	216	194	A	208	208	202	226	226	226	256	240	262	272	268
14	282	294	306	286	264	240	202	194	206	240	242	226		A	196	230	230	230	218	214	250	248	266	288	290
15	260	278	254	252	252	312	210	234	210	A	210	188	188	198	194	200	226	214	228	238	238	248	244	286	
16	254	264	276	276	248	212	230	206	170	200	192	204	178	186	234	240	240	248	252	258	248	240	256	256	
17	260	260	282	284	262	238	228	208	218	196	214	188	198	198	214	234	224	224	224	262	256	288	282	294	
18	274	262	270	278	266	262	270	228	200	216	216	198	204	204	198	236	226	228	268	280	254	254	248	254	
19	282	270	274	272	264	246	220	246	234	214	208	218	188	188	208	216	224	214	234	256	254	288	284	266	
20	250	276	256	258	264	242	230	188	214	192	200	206	198	202	198	188	218	218	236	236	244	244	270	296	
21	268	282	288	280	260	196	248	218	222	200	198	194	188	202	188	248	220	214	242	274	250	258	270	236	
22	268	274	250	282	270	242	214	218	198	198	198	234	186	182	238	230	218	230	230	230	238	238	276	284	
23	260	270	270	244	248	194	228	198	220	192	182	182	182	190	192	228	230	230	230	246	220	268	290	278	
24	256	256	268	238	260	252	240	214	236	192	206	206	206	186	232	246	240	220	246	246	252	278	294	284	
25	266	266	258	278	258	280	230	228	194	194	200	200	200	196	186	244	220	230	250	250	250	274	306	282	
26	276	274	268	268	268	232	232	210	226	192	182	214	206	206	208	234	234	236	216	252	252	248	272	266	
27	258	258	258	276	258	204	220	224	204	204	228	200	188	194	248	238	226	220	258	246	238	238	298	272	
28	270	258	272	276	252	220	244	216	220	200	198	194	182	226	204	238	214	226	232	232	234	278	290	288	
29	272	254	274	272	246	198	248	220	226	218	194	194	242	206	252	206	240	228	220	228	258	282	280	284	
30	272	252	288	278	266	198	230	212	226	242	242	234	198	188	270	244	228	230	242	242	258	258	290	312	
31	286	292	292	292	260	220	242	220	244	204	210	202	194	246	240	252	228	222	232	248	266	272	312	352	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	30	28	29	30	30	28	31	30	29	31	31	30	31	31	31	30	31	31	31	31	
MED	270	269	270	272	260	242	230	218	216	201	204	201	198	196	208	230	228	226	236	249	250	262	280	282	
U Q	278	278	282	280	266	256	242	228	226	215	214	216	206	204	234	240	240	230	246	258	256	278	290	294	
L Q	260	258	258	256	248	213	223	210	204	196	194	194	188	192	194	206	224	218	226	238	238	248	268	266	

OCT. 2021 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

OCT.2021 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						A	106	98	100	100	100	100	100	106	106	106	114	142		B				
2						A	A											A	A					
3						C	C	C	C	C		C	C		104	104	104	104	E B	B				
4						A	114	102	A	102	102	102	102	106	116		A	110	100		B			
5						B E B	136	112	A	110	110	110	112	112	112	112	120	138		B				
6						A	A													B				
7						B	130	100	112	110	110	104	100	100	100	100	98	90		A	A			
8							104	104	104	98	100	100	100		A	A		A	A		A			
9						B E B	134	112	106	106	98	98	98	104	104	104	104		A	A				
10						A	B											A	A	A				
11							A													B				
12						94	106	116	112	112			98	110	102	102	102			B				
13						B	A													B				
14							120	108	108	102	102	102	98	108	108				A	A				
15						B	A													A	A			
16						A	B													A	A			
17							110	106	106	106	106									A	A			
18						B	114	114	114				102	102	94	100			A	A				
19						A	A													A	A			
20						B	114	A												A	A			
21							86																	
22						B	A													A	A			
23							118	118	118	110	110	108	108	110	110					A	A			
24						A	A													A	A			
25						B	112	112	108	108										A	A			
26							114	A												A	A			
27						B	114	A												A	A			
28							114													A	A			
29						B	114	A												A	A			
30							114	A												A	A			
31						B	114	A												A	A			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						4	9	28	26	30	27	25	28	27	27	28	21	8						
MED						93	110	109	107	108	106	104	102	104	106	106	108	104						
U Q						E B	99	132	112	112	110	110	106	105	106	108	110	116	138					
L Q						89	105	106	104	104	102	102	100	100	102	104	104	95						

OCT.2021 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

OCT.2021 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	96	B	B	96	96	92	96	124	112	106	106	108	108	108	108	98	172	138	116	102	102	102	98	90	
2	88	88	106	104	100	94	116	112	92	106	106	98	108	100	106	106	106	102	102	102	106	104	100	104	
3	110	104	94	100	C	C	C	C	C	C	108	C	C	106	110	106	148	G	B	B	104	98	98	92	
4	92	B	98	90	96	96	98	98	98	94	108	178	178	144	96	176	102	102	B	104	B	B	B	96	
5	90	96	B	B	B	B	B	160	102	100	108	150	124	116	112	152	140	88	116	B	82	88	116	92	
6	90	90	90	94	96	94	144	98	120	110	100	110	106	106	106	106	86	94	B	96	98	98	98	98	
7	98	104	104	104	98	102	98	124	106	106	106	190	106	98	98	162	92	94	96	92	92	B	94	94	
8	94	B	100	100	100	96	134	144	130	124	108	104	104	150	100	104	104	104	96	96	92	90	90	96	
9	90	94	88	B	94	88	156	140	132	120	110	110	110	110	142	112	96	96	124	100	96	96	96	96	
10	90	B	98	108	102	102	B	142	126	110	110	120	104	G	108	102	96	96	96	96	96	96	102	98	
11	98	96	100	98	96	114	108	104	110	110	102	92	116	92	120	128	120	86	90	B	B	92	100	100	
12	B	B	90	B	100	G	112	112	126	116	106	106	106	106	98	104	124	122	106	116	B	B	B	160	
13	B	B	B	B	108	108	104	106	114	96	108	108	108	108	104	122	90	92	108	108	90	94	94	94	
14	94	94	B	B	110	B	100	110	128	110	104	104	92	92	94	96	96	96	90	90	B	90	90	90	
15	B	148	100	102	102	96	126	112	100	100	100	100	100	100	100	152	118	100	100	B	100	94	94	B	
16	B	102	102	102	100	G	134	104	104	100	104	94	96	96	96	96	96	96	96	96	96	86	86	100	100
17	100	B	100	100	94	86	102	150	146	110	110	110	110	110	102	106	106	112	112	100	98	98	98	90	
18	94	94	104	104	102	98	102	126	116	108	106	100	100	162	148	122	104	96	92	92	92	92	92	92	
19	92	92	94	94	100	B	100	96	96	126	96	116	116	116	106	98	98	98	100	100	100	100	90	98	
20	92	102	94	94	94	B	102	102	134	100	102	122	122	98	110	110	154	90	98	98	98	92	92	92	
21	92	92	92	102	102	B	158	160	120	116	108	108	108	150	94	128	110	110	106	106	96	96	96	96	
22	96	96	96	96	96	96	96	160	160	110	110	96	104	98	116	154	94	94	96	86	86	92	B	92	
23	B	B	92	92	92	98	98	106	104	102	100	98	90	92	92	98	98	B	98	98	98	98	98	90	
24	B	90	B	98	98	98	B	152	130	106	102	G	102	92	108	130	100	110	92	92	92	92	92	92	
25	B	92	B	B	B	B	B	110	116	154	88	104	110	102	118	100	90	94	94	B	94	94	92	92	
26	92	B	92	90	B	B	168	140	112	112	128	150	134	104	114	110	102	102	102	98	98	98	88	B	
27	B	104	B	B	96	B	154	154	156	134	124	104	104	94	92	92	90	86	86	94	86	86	86	86	
28	B	86	B	98	B	90	98	118	118	118	118	106	102	156	154	154	136	158	B	B	98	98	92	102	
29	102	B	102	B	B	92	B	100	128	118	108	104	104	94	94	156	96	B	B	B	96	96	110	110	
30	110	110	104	100	96	96	100	96	110	110	104	98	106	104	176	96	98	98	98	B	98	98	98	98	
31	108	108	B	108	98	B	B	98	98	138	116	116	102	94	108	114	112	106	96	102	100	100	100	114	
	00	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	21	22	23	25	19	24	30	30	30	31	29	30	30	31	31	31	28	26	23	28	28	28	29	
MED	94	96	98	100	98	96	103	112	116	110	106	106	106	104	106	110	102	97	97	98	97	96	96	96	
U Q	98	104	102	102	101	98	134	142	128	118	110	116	110	110	112	142	118	105	102	102	99	98	99	99	
L Q	92	92	92	94	96	92	99	104	104	106	102	100	102	96	98	100	96	94	96	94	92	92	92	92	

OCT.2021 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Wakkanai

OCT.2021 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	F1			F1	F1	L2	LC11	C2	C2	C3	C2	C2	C2	C2	LC21	H3	C3	C3	F7	F6	F3	F1	F1	
2	F1	F1	F1	F1	F1	L2	C2	C3	LC12	C2	C1	C3	C2	C2	C1	C3	C3	L2	L3	F4	F1	F2	F2	F1
3	F2	F3	F4	F5							C2			C1	C2	C1	H2				F4	F4	F3	F2
4	F4		F1	F3	F4	L3	LC21	LC22	L3	C2	C2	H1	H1	H1	LC11	H1	C2	LC11		F1				F1
5	F2	F1						HL11	L4	C2	C1	H1	C2	C1	C1	H2	H2	LC11	C1		F1	F1	F1	F2
6	F2	F2	F2	F2	F2	L1	CL11	LC32	C2	C2	C2	C2	CL22	CL22	C3	CL21	LH21	L1		F1	F1	F2	F1	F1
7	F1	F1	F2	F2	F3	L1	LC11	CL21	C2	C3	C3	C2	C2	L3	L4	HL22	L5	L4	LQ31	F3	F2		F1	F3
8	F1		F1	F1	F1	LC11	HL21	H2	CL21	CL31	C2	C2	C2	CL21	C3	C3	LC21	LC11	L1	F1	F4	F4	F2	F1
9	F1	F1	F1		F1	L1	H2	HL21	H2	C2	C2	C2	C1	CL11	C2	HL21	CL51	LL81	L3	F3	F4	F4	F4	F1
10	F1		F1	F1	F1	L2		H2	C3	C3	C3	C3	C3		C2	LC22	L3	L3	L2	F4	F2	F1	FQ11	FQ41
11	FQ41	FQ41	F2	F1	F2	C1	C2	C3	C2	C2	C3	L3	CL21	LC11	CL22	CL21	C2	C1	F2			F2	F1	F2
12			F1		F1		LC21	LC21	C2	C3	C2	C3	C1	C3	C4	LC21	C2	C2	F5	F5				FF11
13				F1	L9	L6	LC32	C2	LC11	C2	C2	C2	C2	C3	C2	C4	LQ31	F4	F3	F1	F1	F4	F1	F1
14	F1	F1		F1		L4	C2	C3	C4	C4	C3	C5	LQ41	CL22	CL33	CL33	L5	L3	F4	F4	F4	F3	F2	F1
15		F2	F2	FQ11	FQ21	L1	C2	C3	C4	C3	C2	L2	L4	L2	HL11	C6	L1	FF32		F1	F1	F1	F1	
16		FQ21	FQ21	FQ31	FQ11		C1	LH21	LC21	CH31	C3	L3	LC21	LH21	C3	C4	L5	L5	F4	F2	F2	F2	F2	F2
17	F4		F1	F3	F5	LL11	L1	H2	CL11	LC11	LC11	C1	C2	C3	C3	LC32	L3	L3	FF11	F3	FQ21	F1	F1	F2
18	F1	FF11	F1	FQ31	FQ31	L2	F2	C2	C2	C3	C2	L2	C2	HL11	H1	C2	C3	C3	F4	FQ31	FQ31	FQ31	F2	F1
19	F1	F1	F1	F1	F1		LC11	L3	LQ41	CL21	L4	C2	C2	C3	C3	C5	L4	L4	F4	FF11	F1	F1	F2	F2
20	F2	F1	F1	F1	F1		F2	LQ31	H2	LC21	C2	C2	C2	LC11	C2	C2	H2	L1	FF11	F2	F4	F5	F3	F2
21	F1	F1	F2	F1	F1		H2	H2	C2	C3	C3	C2	C2	HC22	C3	CL21	CL31	L5	F3	F3	F1	FQ21	F1	F1
22	F1	F2	F2	F1	F1	L1	L1	HL11	H1	C2	C3	C4	C3	C2	C2	LC11	L1	L1	F1	F1	F1	F1		F2
23			F2	F1	F1	F1	L1	L2	L21	LC21	LC21	LC21	LC21	LC21	L3	LC11	LL21		F1	FQ21	F2	F2	F2	F2
24		F1		F1	F1	L1		HC11	CL21	C3	C3		C2	C1	LC11	C1	L2	L1	F3	F2	F2	F2	F2	F3
25		F1						LC11	C1	H1	LC11	L2	C1	C1	C1	LC11	LC11	L1	F1		F4	F2	F1	F1
26	F1		F1	F1			H1	HL21	LC11	C1	CL11	HL11	H1	LC11	C1	C2	L1	L1	FF31	F1	F1	F1	F1	
27		F1		F1			H1	HL21		HL21	CL11	CL21	LC21	LC21	L4	L2	L4	L5	F3	F2	F2	F2	F2	F2
28		F1		F1		F1	LC11	LC11	CL21	CL21	CL21	C2	C2	HL21	HL21	HL21	H2	H1			F2	F2	FF22	F2
29	F3		F1		F1		L1	CL21	C2	C2	L2	L2	L2	LC21	LC21	CL21	LC11				L1	F2	F3	F4
30	F2	F6	F2	F4	F4	F4	L1	LC22	C2	C3	C4	C2	C3	C3	HL11	LC11	LC11	L4	F2		F2	F2	F1	F2
31	F2	F1		F1	F1			LC11	LH21	CL21	CL21	C2	C2	C3	C3	C2	L1	L5	F2	F1	F1	F1	F1	F1
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

OCT.2021 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

OCT.2021 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

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

OCT.2021 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

OCT.2021 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

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	44	44	43	41	38	F	49	72	57	84	85	79	81	78	78	81	78	74	84	60	53	49	49	50
2	50	47	47	45	40	44	63	74	74	70	66	87	79	83	73	69	68	74	77	64	55	F	F	F
3	F	F	F	F	33	33	53	79	68	69	76	78	87	80	74	70	70	60	62	55	42	44	47	39
4	44	42	38	32	34	29	51	66	72	75	79	79	83	91	67	58	65	76	73	60	52	48	42	41
5	42	41	42	42	34	28	50	68	77	77	70	76	80	81	69	68	64	64	54	48	41	39	39	38
6	39	37	37	34	34	28	49	57	74	72	78	79	77	80	67	60	65	66	58	49	48	46	46	44
7	45	44	40	35	37	37	54	71	71	78	79	74	81	83	70	61	72	66	54	53	48	47	44	44
8	41	39	39	39	35	34	46	59	64	68	80	82	81	77	64	64	70	75	61	52	52	38	40	40
9	40	41	39	40	38	33	45	55	65	63	63	71	74	80	68	64	80	80	61	47	47	42	39	38
10	37	37	37	36	36	34	50	64	72	65	65	74	82	83	78	64	64	63	66	62	53	46	F	40
11	39	38	38	38	38	32	44	57	68	87	C	81	71	70	69	73	74	74	64	46	38	36	37	37
12	39	38	37	37	36	36	54	68	70	71	71	88	68	86	82	85	101	71	57	39	41	40	37	38
13	36	36	36	36	37	34	46	62	105	90	76	71	89	74	74	79	72	61	50	44	44	40	38	38
14	38	38	37	38	39	34	48	61	70	68	74	80	86	68	71	83	78	70	51	38	38	34	F	F
15	F	36	35	32	31	28	49	68	72	73	73	94	87	77	70	76	77	70	44	42	44	46	44	39
16	37	36	32	35	39	28	44	55	66	68	76	76	73	58	64	86	72	66	37	35	38	38	39	36
17	36	36	36	36	36	29	44	59	63	65	67	72	73	68	67	63	64	78	43	31	34	34	35	35
18	35	36	34	36	34	33	42	68	86	86	86	101	96	77	69	62	65	60	42	47	45	43	43	45
19	42	38	41	41	40	38	46	70	75	77	85	88	86	74	70	78	80	71	58	32	31	37	F	F
20	F	F	F	F	F	F	48	56	63	67	70	88	78	76	88	76	64	64	54	36	36	36	35	34
21	34	33	32	32	32	30	38	52	69	65	60	68	72	62	72	77	66	68	42	34	F	35	F	F
22	36	35	33	34	33	33	46	58	67	69	70	64	88	80	61	64	66	55	39	36	35	28	30	32
23	33	34	34	34	37	27	41	53	64	66	66	67	70	67	70	60	56	60	41	39	37	34	35	36
24	35	35	33	33	F	32	45	64	71	74	71	70	72	66	68	70	64	56	40	38	38	38	37	37
25	36	36	34	32	34	33	47	71	72	78	70	82	80	70	78	79	63	61	38	40	38	37	37	39
26	38	38	38	38	35	34	47	64	66	83	73	71	80	77	72	81	71	55	46	42	40	39	40	38
27	37	37	37	37	39	32	42	60	70	82	76	75	74	70	77	82	82	64	47	37	37	37	35	35
28	36	36	36	36	36	36	45	71	74	70	78	86	78	70	74	79	79	63	44	37	34	32	32	35
29	A	36	37	35	37	29	40	62	69	77	90	80	89	82	78	83	74	59	36	36	A	36	37	37
30	39	40	40	40	48	30	38	58	72	80	80	84	73	76	78	78	76	55	38		44	43	38	38
31	38	38	38	38	38	36	45	65	74	79	83	92	95	77	73	74	81	69	48	46	42	40	38	36
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	29	29	29	29	29	31	31	31	31	30	31	31	31	31	31	31	31	31	30	30	30	26	27
MED	38	37	37	36	36	33	46	64	70	73	75	79	80	77	71	74	71	66	50	42	41	38	38	38
U Q	41	40	39	38	38	34	49	68	74	79	79	86	86	80	77	79	78	71	61	49	47	43	42	40
L Q	36	36	34	34	34	29	44	58	66	68	70	72	73	70	68	64	65	60	42	37	37	36	36	36

OCT.2021 foF2 (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

OCT.2021 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	L	L	L	LU	L	L	L								
2										L	488	464	A	L	A	L	A							
3											428			L		L								
4									L	L	460	476	504		L	L	L							
5									L	L	L	476	480	L	L	L								
6									L	L	464	LU	L	L	L									
7										A		A	L	L	L									
8										A	A	A	A	A	A	L								
9											A	L	L	L	L									
10										L	L	456	L	448	L	L	L							
11									A	L	C	460	436	U	L	L	L							
12										L	L	L			L	L								
13								A		L	L	L	A	L	L	L								
14										L	L		L	L	436	L								
15										A	LU	L	A	L	L	L								
16										L	L	L			416	L	L							
17										L	L	L	L	L	L	L								
18										L	L	L	L	392	A									
19									L	L	A	L	L	L	L	L								
20										L	448	L	L	A										
21										L	A	A		L										
22										L	L	L	A			L								
23										L	L	L		L			A							
24										L	L	L	L	L	L									
25									L	L	L	L	456		L									
26										L	L	L	L	L	L	L								
27										L	L	L	L	L	L	A								
28										L	L	L	L	L	L	L								
29									L		L	A	L	L										
30										L		A	A	A		A	A							
31									A	L	A	L	A	A	L		A							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT											4	7	5	4	2									
MED											462	464	476	428	426									
U Q											476	476	492	470										
L Q											444	456	446	400										

OCT.2021 foF1 (0.01MHz)

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## IONOSPHERIC DATA STATION Kokubunji

OCT.2021 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 244	A 328	U A	R A	A A	A 340	U 336	R 312	U 280	A 264	U 188	R 188	B					
2							B		A	A	U 348	R A	U 356	A	A	A	A	A	A	B				
3							U 188	R A	A	A	A	A 352	U 340	U 324	A 292	U 256	R 200	U 200	B					
4							U 200	R 232	A	A	A	A 344	U 344	U 316	A 288	U 260	R A	B						
5							B	A 288	U A	A 336	U 348	R A	U 324	R A	U 280	R 228	A	B						
6							B 252	A 304	U A	A A	A	A 348	U A	R 312	A	U 232	A 172	A						
7							B	A	A	A	A	A	A	A	A	A	A	A	B					
8							B 232	U 272	A A	A	A	A	A	A	A	A	A	A	B					
9							B 228	U 288	A	A	A	A	A	A	U 316	U 272	A 248	A	B					
10							B	U 288	R A	A	A	A	A	A	U 304	U 284	R 232	B						
11							B	A	A	A	C 340	U 340	R 316	U 308	U 276	A 236	A	B						
12							B 228	U 320	A 340	U A	R A	U A	R 320	U 288	R 220	A	A							
13							B	A	A	A	A	U 328	U 336	R 300	A	A	A	B						
14							B 224	U 224	A	A	A	U 336	A	U 324	R A	A	A	A	B					
15							U 180	R 224	A	A	A	A	A	U 308	R A	A	A	B						
16							B	A	A	A	A	A	A	U 292	R A	A	A	B						
17							B 248	U 284	R 304	U 328	R A	U 340	R 316	U 316	U 272	A	A	B						
18							B 224	U 264	R 296	U 312	A	A	A	R 308	A	A	B							
19							B 212	U 260	A 292	U 308	A	A	A	A	R	B	B							
20							B 232	U A	A	A	308	U 340	U 324	A	A	U 196	A	B						
21							B 228	U 292	A	A	A	A	A	A	U 308	R 292	A	B						
22							B 232	U 280	R A	A	A	A	A	U 312	R 212	U 224	A	B						
23							B 232	U 280	R A	A	U 344	A	U 324	U 312	U 276	A	B							
24							B 256	U A	R A	A	A	A	A	A	U 272	R 216	A	B						
25							B 228	U 288	R 308	U 332	U 332	A	312	300	U 268	U 220	A	B						
26							B 268	U 340	R 340	U 364	U 376	U A	U A	A	U 276	R 232	A							
27							B 216	U A	A	A	A	A	U 336	U 296	A	U 220	A	B						
28							B	A 292	U A	A	A	U 316	U 316	U 296	U 280	A 212	A	B						
29							B 216	U 280	A	A	A	A	336	A	308	A 216	A	B						
30							B 224	U A	A	A	A	A	A	A	A	A	A	B						
31							B 212	U A	A	A	A	A	A	A	A	A	A	B						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							3	22	13	9	11	5	12	13	20	16	17	3						
MED							U 188	R 228	U 284	U 304	U 332	U 340	U 340	U 324	U 308	U 278	U 228	U 188						
U Q							U 200	R 232	U 288	U 316	U 340	U 356	U 350	U 336	U 314	U 286	U 242	U 200						
L Q							U 180	R 224	U 276	U 294	U 312	U 334	U 338	U 316	U 302	U 272	U 218	U 172						

OCT.2021 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

OCT.2021 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	22	22	E B	E B	E B	E B	E B		G	J	A	J	A	J	A	G	G	G		G	E	B	E	B	E	B								
2	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						
3	J	A	J	A	J	A	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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A						
5	E	B	22	18	22	22	20	24	53	35	42		G	G	G	G		G	G	28	21	21	21	J	A	J	A	J	A					
6	20	20	E	B	16	20	20	16	22	34	34	38	38	39		G	G	J	A	35	31	23	J	A	J	A	J	A	J	A				
7	J	A		E	B	16	22	16	16	23	28	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A			
8	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
9	E	B	J	A	E	B	E	B	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	24	E	B	16	21	20	20	20	E	B	J	A	16	40	32	36	38	40	36	39	35		G	G	J	A	J	A	J	A	J	A		
11	19	20	20	20	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
12	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
13	23	21	20	20	24	47	46	53	48	53	65	46	40		G	36	34	54	26	40	45	34	124	20	20									
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		
15	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	
16	E	B	15	22	22	22	16	16	16	30	33	35	36	37	35		G	J	A	J	A	J	A	J	A	J	A	J	A	J	A			
17	E	B	16	20	20	16	16	16	16	16		G	G	G	G		G	33	33	36	65	25	26	26	22	24								
18	E	B	16	23	22	22	22	20	16		G	30	33	36	36	36	36	35	33	34	35	25	16	16	16	22	16							
19	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
20	J	A	E	B	20	19	16	16	21	28	37	41		G	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A		
21	22	23	23	23	23	23	20	31	34	38	40	J	A	J	A	102	78	38		G	J	A	J	A	J	A	J	A	J	A	J	A		
22	J	A	38	24	23	15	16	16	15		G	36	36	53	41	41		G		J	A	J	A	J	A	J	A	J	A	J	A			
23	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
24	23	23	22	16	22	22	20		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	
25	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
26	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
27	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
28	21	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	
29	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
30	J	A	J	A	J	A	J	A	J	A	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	J	A	25	21	21	16	27	23	22	25	46	48	142	38	48	65	41	40	34	20	26	26	33	44	28	25								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23										
CNT	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31			
MED	20	21	20	20	20	20	20	29	34	38	38	39	38	37	35	33	29	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	
UQ	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
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	E	B	E	B	E	B	E	B	E	B

OCT.2021 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

OCT.2021 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 16	E 16	E 16	E 16	E 15	E 16	E 15	28	G	33	38	38	G	G	G	30	G	G	E 16	E 16	E 16	E 16	E 16	E 15
2	E 15	E 15	E 15	16	27	22	22	28	28	32	G	36	40	41	52	31	28	21	24	27	24	17	E 16	20
3	20	E 16	E 16	E 16	18	E 16	G	28	31	48	38	44	40	38	G	G	G	G	E 16	E 16	E 16	E 16	23	20
4	21	20	18	18	18	E 16	G	28	30	36	39	40	G	G	34	G	G	22	17	E 16	E 16	E 16	E 16	15
5	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	52	30	34	G	G	G	G	G	26	18	16	16	16	16	16	16
6	E 16	E 16	E 16	E 16	E 16	E 16	E 16	16	32	32	36	35	35	G	G	G	29	28	20	18	E 16	E 16	E 16	18
7	E 16	E 16	E 16	E 16	E 16	E 16	E 16	20	27	34	44	43	51	39	36	31	28	28	18	29	E 16	E 16	E 16	16
8	E 16	E 16	E 15	E 16	E 16	E 16	E 16	20	26	30	39	45	45	43	42	44	29	23	22	24	16	E 16	E 16	E 15
9	E 16	E 16	E 16	E 16	E 16	E 16	E 16	20	28	40	39	41	39	38	36	34	31	28	28	28	21	E 16	E 16	19
10	E 16	E 16	E 15	E 15	E 16	E 16	E 16	16	22	30	33	35	36	35	35	34	G	G	G	20	23	20	E 16	E 16
11	E 16	E 16	E 16	E 16	E 16	E 15	20	34	40	34	G	G	G	G	34	30	28	22	16	17	17	24	E 16	16
12	E 16	E 16	E 16	E 16	E 16	E 16	E 16	18	28	30	G	G	36	36	34	G	G	26	26	E 16	E 16	E 16	E 16	16
13	E 16	E 16	E 16	E 16	E 16	E 16	E 16	16	40	39	34	34	35	39	G	33	30	23	19	29	31	E 16	E 16	16
14	20	21	24	E 16	E 16	E 16	E 16	21	27	33	34	34	39	36	G	35	32	25	41	22	E 16	E 16	E 16	15
15	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	30	34	43	35	36	44	32	G	28	24	17	E 16	E 16	17	E 16	16
16	E 15	E 16	E 16	E 16	E 16	E 16	E 16	25	31	33	34	35	35	G	G	G	29	28	28	23	16	E 16	E 16	16
17	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	33	G	G	33	G	31	29	32	34	18	E 16	E 16	16
18	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	28	32	34	34	34	G	G	33	31	31	31	E 16	E 16	E 16	E 16	16
19	E 16	E 15	E 15	E 15	E 16	E 18	18	28	32	35	38	38	34	34	33	G	24	E 16	E 16	E 16	E 16	E 16	E 16	19
20	E 15	E 16	E 16	E 15	E 16	E 16	18	25	34	34	G	34	G	G	34	29	25	16	16	16	16	16	16	16
21	E 16	E 16	E 16	E 16	E 16	E 16	E 16	18	28	29	36	36	61	35	34	G	G	25	E 16	E 16	E 16	E 16	E 16	16
22	19	E 16	E 16	E 15	E 16	E 16	E 15	G	G	30	33	39	38	35	G	G	G	E 16	E 16	E 16	E 16	E 16	E 16	16
23	E 16	E 16	E 16	E 16	E 16	E 16	E 16	16	25	31	G	36	36	36	35	34	40	33	E 16	15	17	19	E 16	15
24	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	28	33	34	35	37	33	33	G	G	E 16	E 16	E 16	E 16	E 16	E 16	16
25	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	27	G	G	G	36	37	35	33	30	24	18	E 16	E 16	E 16	E 16	16
26	E 16	E 16	E 16	E 17	E 16	E 16	E 16	26	30	G	G	G	G	G	32	28	G	E 16	E 16	E 16	E 16	E 16	E 16	16
27	E 16	E 16	E 15	E 15	E 15	E 16	17	26	30	33	34	35	35	G	G	32	34	G	E 16	E 16	E 16	E 16	E 16	16
28	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26	31	32	33	35	G	G	G	30	24	E 16	E 16	E 16	E 16	E 16	E 16	19
29	A 53	E 16	E 16	E 16	E 16	E 16	E 16	26	31	32	34	42	G	36	35	30	G	E 15	E 16	E 16	E 16	E 16	E 16	16
30	E 16	E 16	E 16	E 16	20	20	22	16	26	28	33	35	45	55	43	33	32	42	21	27	A 68	27	35	E 16
31	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	40	33	39	36	40	40	33	27	27	E 16	E 16	E 16	21	21	20	E 16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	27	30	33	34	36	35	34	33	29	25	18	16	16	E 16	E 16	E 16
U Q	E 16	E 16	E 16	E 16	E 16	E 16	18	28	33	36	38	39	39	36	34	31	28	22	23	17	17	16	16	16
L Q	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	G	G	G	G	G	E 16	E 16	E 16	E 16	E 16	E 16	E 16

OCT.2021 fbEs (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

OCT.2021 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	16	16	16	15	15	15	15	15	15	16	18	18	18	18	17	17	15	16	16	16	16	16	16
2	15	15	15	15	15	16	16	16	16	16	16	17	21	14	15	16	16	16	16	16	16	16	16	16
3	16	16	16	16	16	16	14	16	16	16	16	18	20	20	16	16	16	13	16	16	16	16	16	16
4	16	16	16	16	17	16	16	15	14	16	16	15	15	18	18	18	16	16	14	16	16	16	16	15
5	16	16	16	16	16	16	16	16	16	16	15	15	15	16	15	14	16	16	16	16	16	16	16	16
6	16	16	16	16	16	16	16	16	15	15	15	15	14	16	15	14	15	13	17	16	16	16	16	16
7	16	16	16	16	16	16	16	16	16	16	18	18	20	18	16	15	13	14	14	16	16	15	16	16
8	16	16	15	16	16	16	16	16	16	16	16	20	21	21	16	16	15	14	15	16	16	17	16	15
9	16	16	16	16	16	16	16	16	16	16	17	17	15	17	17	16	15	16	15	16	16	16	16	16
10	16	16	15	15	16	16	16	16	16	17	18	18	16	16	16	16	14	14	16	15	15	16	15	16
11	16	16	16	16	16	15	16	16	16	17	C	16	16	16	16	16	15	16	16	17	16	16	16	16
12	16	16	16	16	16	16	16	16	16	16	19	19	24	16	18	12	14	15	16	16	16	16	16	16
13	16	16	16	16	16	16	16	16	15	15	16	17	15	16	14	14	15	16	16	16	16	16	16	16
14	16	16	16	16	16	16	15	16	16	16	18	15	17	17	17	16	16	16	16	17	17	16	16	15
15	16	16	16	16	16	16	16	16	15	15	16	16	16	16	16	16	15	13	16	16	16	16	16	16
16	15	16	16	16	16	16	16	16	16	16	17	21	20	19	18	15	16	16	16	17	17	16	16	16
17	16	16	16	16	16	16	16	16	15	16	20	19	21	23	19	18	16	15	16	16	17	16	16	16
18	16	16	16	16	16	16	16	16	16	16	17	16	16	16	13	17	17	16	16	16	16	16	16	16
19	16	15	15	15	16	18	18	16	16	17	17	15	15	15	15	16	16	16	16	16	16	16	16	15
20	16	16	16	15	16	16	16	16	16	14	15	17	16	16	16	14	15	16	16	16	16	16	16	16
21	16	16	16	16	16	16	15	15	14	14	15	17	16	18	16	13	15	15	16	16	16	16	16	16
22	16	16	16	15	16	16	15	15	15	12	15	16	16	16	16	16	16	16	16	16	16	16	16	16
23	16	16	16	16	16	16	16	16	16	16	16	16	13	15	15	16	16	16	15	15	16	16	15	16
24	16	16	16	16	16	16	16	14	15	17	17	17	13	16	14	14	15	16	15	16	16	16	16	16
25	16	16	16	16	16	15	15	16	15	15	15	15	15	15	15	15	15	15	16	16	16	16	16	16
26	16	16	16	17	16	16	16	15	16	16	18	18	19	14	15	15	16	16	16	16	16	16	16	16
27	16	16	15	15	15	16	14	14	15	16	16	16	16	17	15	15	15	16	16	16	16	16	16	16
28	16	16	16	16	16	16	16	15	17	17	17	17	17	17	17	17	16	16	16	16	16	16	16	16
29	16	16	16	16	16	15	16	16	16	14	16	16	22	18	18	18	14	15	16	16	16	16	16	16
30	16	16	16	16	16	16	16	16	16	18	18	18	18	18	16	15	15	16	16	16	16	16	16	16
31	16	16	16	16	16	16	16	16	16	16	17	17	17	17	15	15	15	16	16	16	16	16	16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	16	16	16	16	16	16	16	16	16	16	16	17	16	16	16	16	15	16	16	16	16	16	16	16
U Q	16	16	16	16	16	16	16	16	16	16	17	18	20	18	17	16	16	16	16	16	16	16	16	16
L Q	16	16	16	16	16	16	16	15	15	15	16	16	15	16	15	15	15	15	16	16	16	16	16	16

OCT.2021 fmin (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

OCT. 2021 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

$\begin{matrix} H \\ D \end{matrix}$	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	311	304	314	300	268	F	385	368	374	324	343	340	333	336	340	335	350	343	365	343	314	296	279	305
2	303	316	309	309	332	307	354	365	372	383	344	352	347	331	335	353	348	336	355	344	273	F	F	F
3	F	F	F	F	331	314	343	357	361	358	369	337	360	338	349	354	368	343	336	339	304	293	304	281
4	316	316	316	322	344	316	353	374	380	363	364	364	333	335	358	363	323	345	355	355	317	325	303	304
5	313	312	323	339	339	339	375	374	373	372	342	338	338	348	329	357	357	358	357	356	330	303	301	300
6	307	324	323	320	331	330	369	368	375	368	367	367	340	351	337	341	351	350	352	316	311	285	294	295
7	306	317	327	291	305	313	350	382	357	371	354	353	340	352	364	331	364	364	337	337	298	330	327	328
8	308	308	302	321	312	320	361	362	363	350	350	357	350	353	355	354	355	359	332	334	346	318	311	311
9	299	299	299	320	329	329	358	386	385	360	370	340	340	352	356	324	344	354	366	315	343	313	322	305
10	305	304	294	298	337	336	379	359	380	361	342	351	336	342	341	365	333	333	344	343	343	301	F	293
11	300	292	302	307	320	340	362	350	350	358	C	358	357	347	336	352	351	350	360	360	292	305	305	294
12	304	304	303	303	296	308	386	386	375	358	321	361	352	317	315	314	352	363	334	298	300	286	314	307
13	288	298	286	296	342	331	364	295	351	364	363	354	337	343	337	353	376	359	339	314	330	306	308	284
14	300	286	292	300	335	334	379	367	380	370	369	323	351	351	338	354	366	365	365	329	289	289	F	F
15	F	299	313	311	299	308	357	375	379	361	360	360	348	347	337	356	378	378	339	294	305	314	331	330
16	310	324	311	336	366	337	368	372	384	360	360	360	359	358	338	364	364	398	360	342	328	305	311	321
17	321	322	313	332	345	312	373	380	375	366	366	367	368	347	347	337	339	391	366	306	310	312	307	311
18	311	316	299	326	326	313	356	341	349	346	327	337	346	357	354	353	346	363	321	323	321	303	312	309
19	328	292	293	304	310	324	354	387	366	361	348	353	359	368	339	350	360	359	365	365	289	297	F	F
20	F	F	F	F	F	F	354	385	385	378	337	351	356	320	355	373	363	362	362	362	317	316	325	299
21	298	298	305	309	337	335	399	387	378	378	377	352	374	333	339	359	358	385	385	311	F	311	F	F
22	311	310	294	302	302	329	350	391	382	382	383	337	348	360	364	352	359	376	372	331	330	330	314	302
23	310	294	303	311	359	339	352	371	371	362	365	366	378	348	353	382	381	383	342	330	330	316	316	296
24	295	302	306	312	F	299	339	359	381	380	378	340	362	340	329		357	357	353	314	341	314	308	312
25	305	316	314	298	309	305	364	374	370	380	354	357	343	337	337	362	372	370	364	341	291	281	318	308
26	310	321	312	312	335	335	348	379	371	374	357	344	344	338	337	360	359	349	345	316	316	316	316	315
27	310	307	307	307	356	343	357	372	354	362	366	350	354	359	339	339	361	362	350	317	321	327	318	296
28	305	312	318	306	334	334	354	401	386	367	373	358	353	334	335	345	376	393	368	337	322	302	316	300
29	A	299	310	291	345	321	347	396	368	343	347	340	348	329	350	354	366	375	312	312	301	314	274	281
30	313	297	298	298	346	419	342	365	364	368	368	362	354	331	337	350	370	381	285	A	304	315	301	298
31	290	293	293	296	312	315	349	363	359	354	344	319	358	321	350	345	352	370	322	321	314	322	298	279
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	29	29	29	29	29	31	31	31	31	30	31	31	31	31	30	31	31	31	30	30	30	26	27
MED	307	304	306	307	332	329	357	372	373	363	360	352	350	343	339	353	359	362	353	330	315	312	311	302
U Q	311	316	314	320	343	336	369	385	380	372	368	360	358	352	353	359	366	376	365	343	330	316	316	311
L Q	300	298	298	299	311	313	350	363	363	358	344	340	340	334	337	345	351	350	337	315	301	301	303	295

OCT. 2021 M(3000)F2 (0.01)

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## IONOSPHERIC DATA STATION Kokubunji

OCT.2021 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	L	L	L	LU	L	L	L								
2										L	396	397	A	L	A	L	A							
3											430			L		L								
4									L	L	432	394	361		L	L	L							
5									L	L	L	401	401	L	L	L								
6									L	L	385	LU	L	L	L									
7										A		A	L	L	L									
8										A	A	A	A	A	A	L								
9											A	L	L	L	L									
10										L	L	391	L	409	L	L	L							
11									A	L	C	409	430	U	L	L	L							
12										L	L	L		433	L	L								
13								A		L	L	L	A	L	L	L								
14										L	L		L	L	396	L								
15										A	LU	L	A	L	L	L								
16										L	L	L			395	L	L							
17										L	L	L	L	L	L	L								
18										L	L	L	L	418	A									
19									L	L	A	L	L	L	L	L								
20											L	396	L	L	A									
21											L	A	A		L									
22										L	L	L	A			L								
23										L	L	L		L			A							
24										L	L	L	L	L	L									
25									L	L	L	L	435		L									
26										L	L	L	L	L	L	L								
27										L	L	L	L	L	L	A								
28										L	L	L	L	L	L	L								
29									L		L	A	L	L										
30										L		A	A	A		A	A							
31									A	L	A	L	A	A	L		A							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT											4	7	5	4	2									
MED											413	396	401	414	396									
U Q											431	401	432	426										
L Q											390	391	380	392										

OCT.2021 M(3000)F1 (0.01)

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## IONOSPHERIC DATA STATION Kokubunji

OCT. 2021 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									232	262	256	248	248	252	252	250								
2										222	268	244	244	254	254	254	248							
3											240	248		248		248								
4									234	248	238	238	270		262	254	282							
5									242	238	238	258	276	252	258	244								
6									234	234	242	242	264	246	256									
7										224		236	270	244	244									
8										244	238	232	246	246	246	246								
9											230	258	258	248	240									
10										242	248	248	248	256	240	240	254							
11										254	254	C	242	242	262	274	252							
12											248	254	240		288	288	288							
13								E A		288	230	230	234	254	242	270	254							
14											240	240		240	240	252	252							
15											242	250	242	234	244	272	254							
16											248	234	238			270								
17											240	240	240	234	242	252	252							
18											240	262	240	240	240	234								
19									230	240	228	244	238	230	254	242								
20											262	242	242	272	238									
21											E A	238	274	228		262								
22											234	220	258	248		252								
23											252	244	244		244		234							
24											234	234	252	240	262	262								
25										236	230	232	232	244		248								
26											234	234	264	248	242	250	234							
27											238	238	250	238	252	252	244							
28											234	232	232	232	284	242	242							
29										238		238	218	232	242									
30											234		230	230	266		228	222						
31											224	244	234	268	216	236	250		224					
	00	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	9	26	28	30	27	26	26	19	6							
MED								E A	234	240	238	242	242	247	252	250	241							
U Q									240	244	246	250	248	256	262	254	254							
L Q									231	234	234	238	234	242	246	242	224							

OCT. 2021 h'F2 (KM)

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## IONOSPHERIC DATA STATION Kokubunji

OCT. 2021 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	250	250	238	238	302	284	184	202	194	194	194	198	194	180	190	202	212	212	200	200	E	B	E	B
3	E	A	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
4	246	232	238	238	288	276	200	200	200	192	186	194	A	194	A	196	A	224	212	212	E	A	E	B
5	E	A	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
6	270	238	238	216	212	256	216	206	202	202	196	A	220	204	204	204	204	204	204	198	228	270	278	304
7	E	A	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
8	248	220	220	270	224	244	214	214	206	208	192	192	192	220	198	188	204	214	204	204	226	226	236	244
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	236	240	232	216	194	220	204	224	200	190	190	190	182	182	186	204	204	212	188	202	226	258	264	260
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	246	240	240	250	212	236	200	200	200	198	198	186	186	192	196	206	212	208	208	214	218	270	270	270
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	246	238	218	262	270	270	208	208	198	A	E	A	A	194	194	194	208	218	206	226	210	E	B	E
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	244	244	244	244	244	238	202	202	202	A	A	A	A	A	A	194	228	210	208	208	220	220	268	246
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	266	258	258	236	216	216	200	200	210	210	A	204	204	204	194	202	220	210	200	226	226	238	238	238
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	262	262	262	260	234	218	194	214	208	192	192	192	182	182	198	198	198	218	218	218	218	218	230	230
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	266	268	254	254	222	202	202	202	A	202	C	202	182	182	206	206	216	214	196	196	242	288	258	274
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	260	242	252	252	262	262	202	202	208	196	196	190	208	194	216	224	218	200	200	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	284	284	266	266	228	228	206	A	216	192	192	192	A	196	204	204	214	206	218	272	218	218	242	264
27	E	A	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
28	294	300	300	254	228	212	198	198	198	196	194	214	206	188	196	210	210	208	200	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	244	252	246	212	220	234	206	196	212	A	202	194	A	186	212	212	208	200	200	E	B	E	B	
31	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
32	250	232	240	230	204	204	204	204	204	204	188	188	188	188	220	206	202	202	202	E	B	E	B	
33	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
34	228	232	232	232	218	212	198	198	200	200	192	194	194	184	184	196	206	200	200	E	B	E	B	
35	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
36	272	256	256	254	220	258	194	202	216	196	196	200	200	200	A	214	210	206	206	E	B	E	B	
37	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
38	220	234	254	246	246	212	190	190	200	200	A	196	196	194	188	202	214	204	194	E	B	E	B	
39	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
40	252	272	242	226	200	200	200	192	202	212	200	190	190	186	A	210	210	202	192	196	220	228	234	
41	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
42	266	284	268	268	226	226	192	196	208	208	194	A	A	194	204	224	216	206	194	E	B	E	B	
43	E	A	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
44	276	258	258	258	244	222	200	200	206	202	190	196	A	220	210	192	206	196	194	220	220	236	248	
45	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
46	262	262	262	244	214	214	200	200	206	190	190	190	200	198	214	214	A	214	202	212	212	222	252	
47	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
48	272	262	262	254	250	250	198	202	208	204	192	192	192	192	198	216	216	190	190	E	B	E	B	
49	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
50	240	240	240	258	258	240	204	196	196	190	186	186	186	198	198	206	200	200	194	212	248	272	268	
51	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
52	260	230	230	230	210	210	204	194	202	204	202	196	196	196	196	200	200	194	194	214	232	236	248	
53	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
54	242	242	248	248	222	198	198	198	198	194	188	188	188	188	A	210	198	198	200	E	B	E	B	
55	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
56	258	258	258	258	224	208	198	196	196	196	192	188	176	172	182	204	204	194	194	E	B	E	B	
57	A	E	A	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	E	B	E	B
58	258	258	244	218	218	202	202	200	200	200	A	176	186	216	216	204	192	204	222	242	242	250	270	
59	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
60	266	266	266	286	212	194	194	202	202	202	202	A	A	A	206	A	A	E	A	E	A	E	A	
61	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
62	266	266	266	254	232	214	214	208	A	202	A	206	A	A	202	202	A	200	200	E	B	E	B	
63	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	31	31	31	31	30	29	28	26	25	23	28	27	29	27	31	31	30	31	31	31	31
MED	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
UQ	259	252	252	250	224	220	200	201	202	200	194	192	192	193	198	204	210	204	200	206	228	240	252	
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
266	262	262	262	258	244	244	204	202	208	203	200	197	200	197	206	213	216	210	206	222	242	270	268	
E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E
246	238	238	236	214	212	198	198	200	194	192	190	186	186	190	201	204	200	194	202	220	228	242	246	

OCT. 2021 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

OCT.2021 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	112	112		A	A	A												
2							B		A	A	108	108	108		A	A	A	A	A	B					
3							108	108		A	A	A		108	108	108	108	108	108	B					
4							118	118		A	A	A	A	110	116	116	116	116							
5							B	A		A		112	112		A					B					
6							B	116	106	106			A	A											
7							B	118		A	A	A	A		A	A	A	A	A	B					
8							B	118	110		A	A	A		A	A	A	A	A	B					
9							B	110	110	110		A	A	A		A				B					
10							B		110		A	A	A		A					B					
11							B	A	A	A	C		108	108	108	108	108	108							
12							B	118	112	112	112	112		A	A					A					
13							B	A	A	A	A			114	114	108	108								
14							B	118	118		A	A		A						B					
15							120	120	120		A	A	C	A	A										
16							B	A																	
17							B	114	114	114	114	114	114	114	114	114	114	122							
18							B	118	118	118	118	114	114	114	114	108	114								
19							B	114	114	114	114	114		A	A	A				B					
20							B	110	112		A	A								B					
21							B	114	114	114		A	A	A						B					
22							B	114	114		A	A	A	A						B					
23							B	114	114		A		A							B					
24							B	114		A	A	A	A	A	A					B					
25							B	114	114	114	114	110	110	108	108	108	108								
26							B	120	120	120	116	114	114		A	A									
27							B	114	116	110	110	110	110	110	110										
28							B	114	114	114		A		108	108	108	108	108							
29							B	114	114		A	A	A		A					B					
30							B	122		A	A	A	A	A	A	A	A	A		B					
31							B		A	A	A	A	A	A	A					B					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT							3	25	22	12	12	13	16	15	22	20	20	3							
MED							118	114	114	114	114	114	111	112	111	110	111	108							
U Q							120	118	116	115	114	114	114	114	114	114	114	124							
L Q							108	114	112	111	112	110	108	108	108	108	108	108							

OCT.2021 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

OCT.2021 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	90	90	B	B	B	102	B	130	G	104	94	92	G	G	G	132	G	G	B	B	102	98	98	B
2	B	B	98	90	90	90	90	88	88	88	G	114	148	90	112	104	100	100	92	88	88	88	88	88
3	88	88	88	88	88	88	G	116	110	102	100	86	152	142	G	G	G	G	98	98	98	98	90	90
4	80	86	86	82	82	82	G	112	90	88	80	80	G	G	154	G	G	130	106	106	100	92	92	B
5	B	90	90	90	90	90	120	104	118	106	G	G	G	G	G	G	128	120	82	82	98	90	88	88
6	86	86	B	86	86	B	138	116	116	116	98	98	G	100	G	84	150	128	124	116	102	102	98	88
7	126	90	B	90	B	B	126	126	104	100	100	94	92	92	92	92	92	92	94	94	94	94	B	94
8	B	B	B	94	B	B	126	150	124	104	102	102	102	96	94	94	88	88	84	84	84	84	84	B
9	B	92	B	B	B	B	136	130	122	118	102	102	100	100	122	122	134	112	102	102	102	102	90	90
10	90	B	90	90	104	104	B	104	138	96	96	96	96	96	134	G	G	84	84	84	84	B	84	84
11	90	84	84	84	B	B	P	102	102	102	102	C	G	G	G	144	132	116	102	80	98	98	98	B
12	B	B	B	B	B	B	112	126	126	G	G	G	G	G	G	G	120	108	108	108	118	118	110	106
13	100	100	100	100	110	104	104	100	100	100	100	100	162	G	132	126	106	106	106	98	98	98	98	94
14	88	88	88	88	88	88	142	130	122	98	98	164	100	G	120	106	114	104	98	98	96	104	B	104
15	108	104	100	100	100	B	G	116	116	102	102	102	102	102	G	G	102	102	102	B	B	96	90	90
16	B	98	94	94	B	B	B	98	134	134	144	132	132	G	G	98	98	92	92	92	92	92	92	92
17	B	92	90	B	B	B	B	G	G	G	G	118	G	118	G	146	134	98	94	94	94	94	94	94
18	B	94	108	108	108	108	B	G	160	140	134	128	122	G	152	130	130	106	106	B	B	B	B	84
19	B	B	B	B	B	B	134	134	126	120	112	108	82	82	82	G	104	104	94	B	B	94	94	94
20	90	B	90	90	B	B	134	136	120	106	G	96	G	G	96	118	120	B	96	96	96	96	96	96
21	94	94	94	94	94	94	140	132	126	118	112	94	94	104	G	G	104	104	110	98	98	98	98	98
22	92	92	92	B	B	B	B	G	G	98	98	98	98	98	G	G	G	B	92	92	92	92	92	B
23	B	B	92	B	B	92	B	136	G	106	G	104	104	140	140	126	106	106	106	98	98	B	98	98
24	98	98	98	B	104	94	88	G	94	96	96	96	96	96	96	G	G	B	96	92	92	92	92	B
25	B	B	B	B	B	108	G	120	G	G	G	120	114	150	148	148	148	110	100	100	100	100	94	B
26	B	B	B	B	98	98	B	124	132	G	G	G	G	100	100	G	G	100	100	100	B	B	B	B
27	B	B	B	B	B	B	134	134	122	112	112	112	112	112	G	126	110	G	B	B	110	92	100	B
28	86	B	B	B	B	B	B	112	112	112	98	110	G	G	G	160	160	B	90	90	90	90	100	100
29	92	92	92	92	92	92	120	126	126	104	100	88	G	88	148	94	G	B	94	94	94	94	94	94
30	94	94	94	94	94	94	94	126	96	96	96	96	94	94	94	90	90	90	90	84	84	84	84	92
31	86	86	86	B	96	96	96	146	94	94	88	92	104	90	90	90	94	94	94	94	94	92	92	92
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	18	20	20	18	16	17	18	27	26	27	22	28	22	20	20	21	22	23	28	27	28	26	28	21
MED	90	92	92	90	94	94	123	126	119	104	100	101	102	99	121	110	110	104	95	96	96	94	93	94
U Q	94	94	96	94	102	103	134	132	126	112	102	113	114	104	142	131	130	108	104	100	98	98	98	97
L Q	88	88	89	88	89	90	102	112	102	98	96	95	96	93	95	94	100	94	92	92	92	92	90	90

OCT.2021 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

OCT.2021 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	F2	F2				F1		H1		L2	L2	L2				H1					F1	F1	F2	
2			F2	F3	F5	F5	L3	L3	L2	L1		C1	H1	L2	CL22	L2	L2	L2	L2	F5	F5	F2	F2	F5
3	F3	F2	F2	F2	F3	F2		C2	L2	L3	L1	L2	H1	H1				L1	F2	F2	F2	F3	F3	
4	F3	F4	F4	F2	F3	F2		C2	L3	L3	L3	L2			H1			C2	F2	F2	F2	F2	F1	
5		F2	F2	F2	F2	F3	C3	L3	C1	L1			L2				C1	C1	F2	F2	F2	F2	F2	F1
6	F2	F2		F2	F2		C3	C3	C3	C2	L1	L1		L2		L3	H2	C2	F6	F5	F6	F2	F4	F4
7	F1	F1		F1			C3	C2	L3	L3	L2	L4	L2	L2	L1	L3	L4	L3	F7	F1	F3	F3		F1
8				F1			C2	H2	C1	L3	L2	L3	L2	L2	L4	L3	L3	L4	L5	L2	F2	F2	F1	
9		F1					C3	C2	C3	C2	L3	L2	L2	L2	C2	C2	C2	C4	F7	F3	F2	F2	F5	F5
10	F1		F2	F2	F1	F1		F3	C1	L2	L1	L1	L1	L1	H1			L3	F7	F6	F5		F2	F2
11	F1	F1	F1	F2			L5	L5	L4	L2					H1	H1	C3	L2	F2	F2	F2	F4	F2	
12							C2	C2	C1			C1	L1	L1			C2	L6	F1	F1	F1	F3	F3	F3
13	F3	F2	F2	F2	F2	F7	L2	L6	L3	L2	L1	L1	H1		H1	C2	L3	L2	F3	F6	F5	F3	F1	F1
14	F4	F3	F5	F2	F3	F1	H1	H2	C2	L2	L2	H1	L1		C2	C2	C2	L4	F3	F2	F3	F2		F1
15	F1	F3	F4	F4	F3			C3	C3	L2	L2	L1	L2	L2		L1	L2	L1			F2	F4	F2	F3
16		F1	F1	F1			L2	C1	H1	H1	C1	C1				L2	L5	L3	F5	F4	F2	F2	F2	F3
17		F2	F1									C1		C1		H1	C2	L5	F3	F2	F2	F1	F2	
18		F1	F2	F2	F1	F1		H1	H1	H1	C1	C1		HL22	CL22	CL32	CL6	F2				F1		
19							C2	C2	C2	C2	C2	C2	L2	L3	L2		F2	F1	F1			F2	F4	F3
20	F2		F1	F1			H2	H2	C3	L1		L2			L3	C1	C3		F1	F3	F2	F4	F3	F2
21	F2	F2	F2	F1	F1	F1	H2	C3	C2	C2	C2	L3	L3	L2			L2	L2	F2	F3	F2	F3	F2	F2
22	F3	F1	F1							L1	L1	L2	L1	L2					F2	F3	F5	F2	F2	
23			F1			F1		C2		L1		L1	L2	H1	H2	C3	L3	L3	F2	F7	F3		F1	F1
24	F1	F1	F1		F1	F1	L2		L2	L1	L2	L1	L2	L1	L2				F1	F1	F1	F1	F2	
25					F1		C2					C1	C2	H1	H1	H2	H1	C3	F3	F3	F2	F1	F2	
26				F1	F1		C3	C2						L2	L2			F2	F1	F1				
27						H2	H2	C2	C1	C1	C1	C1			C1	C3				F1	F2		F4	
28	F2						C2	C2	C1	L2	C1				H1	H1		L2	F4	F3	F3	F2	F1	F5
29	F2	F2	F2	F2	F2	F2	C1	C2	C2	L2	L2	L4		L2	H2	L2		L2	F2	F1	F2	F2	F2	F2
30	F3	F3	F3	F5	F4	F4	L2	C2	L2	L2	L1	L2	L5	L3	L2	L2	L3	L5	F5	F5	F5	F5	F5	F3
31	F5	F2	F2		F2	F2	L1	H1	L2	L2	L3	L1	L2	L2	L2	L2	L2	L2	F1	F3	F3	F5	F6	F2
	00	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																								

OCT.2021 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

OCT.2021 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 48	X 49	X 49	X 46	X 42	X 49													X 94	X 77	X 62	X 59	X 56	X 52
2	X 53	X 52	X 50	X 48	X 46	X 47	X 52												X 91	X 88	X 68	X 54	X 54	X 54
3	X 59	X 54	X 52	X 52	X 50	X 36													X 68	X 68	X 61	X 51	X 52	X 50
4	X 52	X 50	X 46	X 37	X 30	X 30													X 100	X 78	X 48	X 45	X 43	X 43
5	X 43	X 44	X 47	X 44	X 37	X 27													X 78	X 58	X 44	X 44	X 48	X 46
6	X 44	X 44	X 42	X 43	X 37	X 35														X 69	X 54	X 52	X 53	X 52
7	X 52	X 49	X 48	X 44	X 41	X 41													X 79	X 62	X 51	X 48	X 53	X 50
8	X 46	X 44	X 44	X 44	X 44	X 35													X 78	X 67	X 54	X 44	X 43	X 44
9	X 44	X 44	X 42	X 42	X 43	X 36													X 91	X 56	X 52	X 52	X 41	X 38
10	X 39	X 39	X 40	X 40	X 40	X 40													X 83	X 70	X 49	X 43	X 51	X 43
11	X 44	X 44	X 44	X 44	X 45	X 32													X 70	X 58	A	X 46	X 46	X 46
12	X 44	X 44	X 41	X 41	X 41	X 41													X 76	X 59	X 59	X 49	X 52	X 52
13	X 46	X 48	X 48	X 45	X 48	X 39													X 76	X 59	X 49	X 47	X 47	X 46
14	X 46	X 45	X 45	X 43	X 46	X 37													X 80	A	X 40	X 42	A	X 42
15	X 43	X 45	X 43	X 42	X 45	X 37	X 36												X 63	X 54	X 54	X 56	X 52	X 45
16	X 43	X 39	X 39	X 39	X 41	X 36													X 55	X 46	X 40	X 41	X 44	X 43
17	X 43	X 44	X 43	X 44	X 47	X 32														X 40	X 37	X 39	X 40	X 41
18	X 42	X 42	X 42	X 42	X 41	X 36	X 40												X 58	X 50	X 54	X 48	X 48	X 50
19	X 48	X 46	X 44	X 44	X 44	X 46													X 76	X 48	X 34	X 38	X 42	X 42
20	X 40	X 41	X 41	X 45	X 41	X 32													X 63	X 51	X 37	X 39	X 36	A
21	X 36	X 36	X 36	X 36	X 37	X 41	X 30												X 61	X 39	X 40	X 40	X 38	X 38
22	X 39	X 37	X 37	X 39	X 39	X 38													X 55	X 38	X 42	X 41	X 36	X 36
23	X 37	X 37	X 37	X 41	X 41	X 35													X 62	A	X 47	X 47	X 55	X 50
24	X 46	X 45	X 43	X 41	X 41	X 37	X 37												X 57	X 45	X 49	X 48	X 45	X 43
25	X 42	X 42	X 40	X 39	X 40	X 40	X 42												X 65	X 41	X 42	X 42	X 41	X 43
26	X 43	X 42	X 42	X 42	X 38	X 36													X 66	X 45	X 44	X 45	X 45	X 45
27	X 43	X 41	X 40	X 41	X 42	X 38													X 73	X 46	X 43	X 41	X 41	X 40
28	X 42	X 42	X 42	X 43	X 44	X 44	X 43												X 63	X 47	X 46	X 42	X 41	X 42
29	X 42	X 43	X 43	X 44	X 44	X 40													X 53	X 40	X 42	X 44	X 46	X 42
30	X 42	X 42	X 43	X 45	X 52	X 28													X 54	X 50	X 51	X 51	X 43	X 41
31	X 43	X 43	X 44	X 44	X 51	X 38													X 76	X 60	X 58	X 55	X 54	X 46
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	7												29	29	30	31	30	30
MED	X	X	X	X	X	X	X												X	X	X	X	X	X
U Q	46	45	45	44	45	40	43												78	64	54	51	52	50
L Q	X	X	X	X	X	X	X												X	X	X	X	X	X
	42	42	41	41	40	35	36												62	46	42	42	41	42

OCT.2021 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

OCT.2021 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

$\begin{matrix} H \\ D \end{matrix}$	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	42	43	43	40	36	F	40	58	70	86	83	74	79	91	95	88	77	79	88	70	56	53	50	46
2	47	46	44	42	40	41	46	68	70	70	63	73	88	80	78	78	80	82	85	82	62	48	48	48
3	F	48	46	46	44	30	35	58	68	78	78	78	87	98	83	83	78	78	62	62	55	45	46	44
4	46	44	40	31	24	24	32	63	68	89	89	80	91	110	80	58	65	82	94	72	42	39	37	37
5	37	38	41	38	31	21	31	60	64	75	89	96	104	110	97	91	82	66	72	52	38	38	42	40
6	38	38	36	37	31	28	35	57	74	76	94	85	84	96	85	67	67	67	67	63	48	46	47	46
7	46	43	42	38	35	35	37	69	84	84	78	77	82	90	92	76	81	76	73	56	45	42	47	44
8	40	38	38	38	38	29	34	58	64	70	83	87	86	90	94	75	73	77	72	60	48	38	37	38
9	38	38	36	36	37	30	33	53	60	72	69	67	76	88	81	78	87	90	85	50	46	46	35	32
10	33	33	34	34	34	34	36	58	69	63	66	72	86	94	91	82	72	64	77	63	43	37	F	37
11	38	38	38	38	39	26	30	59	72	88	80	76	80	79	80	85	80	70	63	52	A	40	40	40
12	38	38	35	35	35	35	39	58	65	82	80	83	83	80	98	112	112	95	70	53	53	43	46	46
13	40	42	42	39	42	33	34	59	103	97	76	73	78	89	97	90	84	78	70	53	43	41	41	42
14	40	39	39	37	40	31	36	59	62	80	74	77	81	77	74	89	91	84	74	A	34	36	A	36
15	37	39	37	36	39	30	30	57	66	74	84	87	96	86	78	106	107	85	57	48	48	50	46	39
16	37	33	33	33	35	30	27	49	62	81	82	78	74	78	78	92	92	78	48	40	34	35	38	37
17	37	38	37	38	41	26	30	55	62	78	78	67	74	73	79	74	74	86	62	34	31	33	34	35
18	36	36	36	36	35	30	34	62	73	94	73	96	111	84	82	74	67	74	52	44	48	42	42	44
19	42	40	38	38	38	40	35	57	66	84	80	86	103	90	90	83	92	82	70	42	28	32	36	35
20	34	35	35	F	35	F	28	52	51	62	72	80	70	73	92	101	81	65	57	45	31	33	30	A
21	30	30	30	30	31	35	24	47	61	68	60	60	67	67	81	95	88	66	55	33	34	34	32	32
22	33	31	31	33	33	32	32	56	64	68	76	68	86	86	79	68	66	73	49	32	36	35	30	30
23	31	31	31	35	35	29	27	52	60	62	74	68	64	77	65	67	66	66	56	A	41	41	F	F
24	40	39	37	35	35	31	31	59	65	75	75	75	69	72	64	79	82	68	51	39	44	42	39	37
25	36	36	34	33	34	34	36	66	69	73	76	80	90	94	88	78	70	66	59	35	36	36	35	37
26	37	36	36	36	32	30	29	56	66	81	78	72	82	78	74	77	78	70	60	39	38	39	39	38
27	37	35	34	35	36	32	32	60	66	66	82	92	76	70	72	91	91	81	67	40	37	35	35	34
28	36	36	36	37	38	37	37	57	67	66	82	86	74	77	83	87	97	84	57	41	40	36	35	36
29	36	37	37	38	38	34	30	54	65	70	89	94	79	77	78	96	80	76	47	34	36	38	40	36
30	36	36	37	39	46	22	26	53	68	76	92	83	73	82	93	91	85	67	48	44	45	45	37	35
31	37	37	38	38	F	32	32	59	66	76	85	97	104	77	79	80	92	78	70	54	52	49	48	40
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	30	30	29	31	31	31	31	31	31	31	31	31	31	31	31	31	29	30	31	28	29
MED	37	38	37	37	36	31	32	58	66	76	78	78	82	82	81	83	81	77	63	48	42	39	39	37
U Q	40	39	39	38	39	34	36	59	69	82	83	86	88	90	92	91	91	82	72	58	48	45	46	43
L Q	36	36	35	35	34	29	30	55	64	70	74	73	74	77	78	76	73	67	56	40	36	36	35	36

OCT.2021 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

OCT.2021 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		U L 484	U L 484	U L 464		L U L 428	L	L							
2											L		512	480	480	A	L	L	L						
3											L		464	460	444	484		L	L	A					
4										L	L	L	L			L		L							
5											L	L					A	L	L						
6										L	L	L	L				L	L							
7											L	L	L	A	L	L	L	L							
8											L	A	U L 460	L	L	L	L	A	A						
9											L	L	A		U L 468	U L 468	L	L							
10											L	L				L	L	A							
11										L	L	L	U L 460	L	L	L	L								
12											L	L	A	L		L	L	A							
13									A			L	L	U L 404	L	L	L								
14											L	L	L	L	L	L	A	A							
15												A	A	A	L	L	L								
16											L	L	L	L		L	A	L							
17											L	L	L		448	L	L	L	A						
18											A	L	L	A	L	A	L								
19											L	L	L		L		L								
20												L	L	L		U L 432	U L 464	L	A						
21											L	L	L		U L 436	U L 496	L	A	L						
22											L	L	L		A	U L 456	L	L							
23												A	A	A	L	A	A	A	A						
24										L		L	L		L	A	L								
25											L	L	L	L	L	L		A							
26											L	L	L	L	L	L	L	L							
27											L	L	L	L	L	L	L	L							
28												L	L	L		A	L								
29											L	L	A	L	L	L	L	L							
30											L	L		A	L		L	A							
31										L		L		A	L	L	A	A							
												492													
	00	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	6	14	14	6	3	1								
MED											464	476	464	466	464	428	292								
U Q												492	480	480	464	456									
L Q												460	460	456	424	428									

OCT.2021 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

OCT.2021 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							B	U	A	U	A	A	U	A	U	R	U	A	U	R	U	R	U	R	
2							216	276			352	360	356	340	328	308	288	244							
3							U	A	A	A	A	A	A	A	A	A	A	A							
4							224	280	304						332										
5							B	A	A	U	A	U	R	U	R	A	A	A							
6							196	264	324		A	344	340	340	328	308	272								
7							B	U	A	A	A	A	U	R	U	R	U	A							
8							236	280		A	344	348	348	332	324	300	272								
9							B	U	R	A	A	A	U	R	U	R	U	U	A		B				
10							224						368		336	312	276	216							
11							B	U	R	A	A	A	A	A	A	A	A	U	R						
12							232	272																	
13							B	A	A	A	A	A	A	A	A	A	A	A							
14							260																		
15							B	U	A	U	A	A	A	A	A	U	R	U	R						
16							204	288	304		A	A	A	A	A	304	280	216							
17							B	U	R	A	A	A	U	R	U	R	U	U	A						
18							216		316				336	328	320	300	248	196							
19							B	U	A	A	A	A	A	A	A	A	A	U	A						
20							220							344	320	292	256	196							
21							B	U	A	A	A	A	A	A	A	A	A	U	A						
22							208											188							
23							B	A	A	A	A	A	A	A	A	U	A	U	A						
24							312				U	R	A	U	A	A	A	A							
25							208	268			A	A	A	A	A	A	A	B							
26							B	U	A	A	U	R	A	U	A	U	U	R	B						
27							256	292	348					336		292	276								
28							B	U	R	U	A	A	A	U	R	U	U	U	A		B				
29							192	256	296	320				344	328	288	244	204							
30							A	U	U	R	U	A	A	U	R	A	A	A							
31							252	288	312					316	308										
32							B	U	A	U	A	A	A	U	R	U	U	U	R						
33							172	248	292		A	A	U	R	U	U	U	U	R						
34							B	U	A	R	A	A	A	U	R	A	A	A							
35							192	272						336											
36							U	R	A	A	A	A	A	A	A	A	A	A							
37							B	U	R	U	A	A	A	A	A	A	A	A							
38							188	264	300																
39							B	U	A	A	A	A	A	A	A	U	U	U	A		B				
40							196	280								316	256								
41							U	A	U	R	A	A	U	R	A	A	U	A							
42							188	280	304		A	A	U	R		A	252								
43							192	264	300	320		A	U	A	U	U	A	A							
44							B	U	R	U	A	U	R	U	A	U	U	U	R		B				
45							192	268	308	344	336			332	320	308	264								
46							B	U	R	U	A	A	A	A	A	U	U	U	R		B				
47							224	260	300	332						316	268								
48							B	A	A	A	U	R	U	A	U	U	U	A			B				
49							316				A	U	R	U	A	U	U	R							
50							B	204	280	312	324			360		320	268								
51							B	U	A	U	A	U	R	A	U	U	U	A			B				
52							248	300	316					348	336										
53							B	U	R	U	A	U	R	A	A	A	A	A			B				
54							208	264	296	320	332														
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								23	22	19	12	8	7	16	15	18	16	10							
MED								U	U	A	U	A	U	U	R	U	U	U	A						
U Q								U	U	A	U	U	R	U	U	R	U	U	R						
L Q								U	A	U	A	U	U	R	U	U	U	U	A						
								192	260	296	320	338	340	330	316	292	252	196							

OCT.2021 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

OCT. 2021 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	J A	J A	25	21	E B	E B		J A		G		G		G	G		G	J A	J A		J A	J A	J A	J A
2	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	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	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
4	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
5	J A	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
6	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
7	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
8	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
9	J A	J A	25	20	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
10	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
11	J A	23	19	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
12	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
13	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
14	J A	J A	24	20	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
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	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	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	E B	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	J A	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
19	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
20	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	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	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	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	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	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	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	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	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	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	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
28	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
29	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
30	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	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	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	23	22	21	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
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	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B

OCT. 2021 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

OCT.2021 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	18	26	E B	E B	E B	E B	E B	23	30	32	42	G	38	G	38	G	G	E B	E B	E B	E B	E B	18	E B
2	20	21	21	21	E B	E B	E B	24	30	34	38	40	39	39	42	32	29	22	19	19	19	20	20	20
3	E B	E B	E B	E B	E B	E B	E B	24	42	35	G	G	38	40	34	G	30	29	15	16	E B	E B	E B	E B
4	E B	E B	E B	E B	E B	E B	E B	24	30	G	34	G	G	G	G	32	32	26	19	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	G	29	30	G	G	G	G	G	35	29	24	16	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	G	30	35	37	38	G	34	G	G	31	24	18	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	G	30	33	38	39	49	41	38	33	31	G	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	25	32	32	40	38	38	38	34	34	34	42	16	E B	E B	E B	E B	E B
9	E B	20	E B	E B	E B	E B	E B	24	30	34	38	45	40	40	36	G	30	28	21	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	G	G	G	G	G	G	G	G	35	35	34	29	26	22	E B	E B	E B
11	E B	E B	E B	E B	E B	E B	E B	23	30	32	35	36	34	G	G	31	28	22	E B	E B	A A	E B	E B	E B
12	E B	E B	E B	E B	E B	E B	E B	22	31	33	34	43	37	36	33	33	33	24	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	33	24	26	30	36	36	34	34	31	29	21	16	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	22	34	32	33	G	38	38	34	36	55	20	A A	A A	21	21	A A	E B
15	E B	E B	18	18	E B	E B	E B	23	33	32	48	44	45	36	36	33	52	30	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	19	28	31	G	34	34	29	32	33	G	24	19	20	E B	E B	E B	E B
17	E B	E B	E B	E B	E B	E B	E B	G	G	34	34	34	34	G	G	G	33	27	19	19	18	E B	E B	E B
18	E B	E B	E B	E B	E B	E B	E B	21	29	32	34	38	52	35	36	30	28	25	20	18	18	18	18	E B
19	E B	E B	E B	E B	E B	E B	E B	21	30	33	34	34	35	G	G	G	G	G	E B	E B	E B	E B	E B	E B
20	E B	E B	E B	E B	E B	E B	E B	G	30	31	34	34	G	G	34	32	32	41	23	34	20	20	E B	A A
21	E B	E B	E B	E B	E B	E B	E B	G	31	34	34	34	35	37	37	41	25	19	E B	E B	E B	E B	E B	E B
22	E B	E B	E B	E B	E B	E B	E B	G	G	32	34	39	39	37	35	33	27	24	41	22	15	15	15	15
23	E B	17	E B	E B	E B	E B	E B	22	30	32	39	40	41	39	51	36	44	41	A A	A A	E B	E B	E B	E B
24	E B	E B	E B	E B	E B	E B	E B	G	32	37	37	G	37	38	31	27	30	22	30	29	20	18	E B	E B
25	E B	E B	E B	E B	E B	E B	E B	21	G	32	34	35	39	36	35	35	34	29	E B	E B	E B	E B	E B	E B
26	23	E B	E B	E B	E B	E B	E B	24	G	32	G	36	37	G	34	G	G	28	20	21	E B	E B	E B	E B
27	E B	E B	E B	E B	E B	E B	E B	G	33	33	34	36	36	36	36	35	G	19	E B	E B	21	23	23	E B
28	E B	15	15	15	E B	E B	E B	20	20	32	34	G	35	35	40	33	29	20	E B	E B	E B	E B	E B	E B
29	E B	16	19	22	E B	E B	E B	G	G	32	35	35	40	G	36	G	G	22	E B	E B	17	17	E B	E B
30	E B	E B	E B	E B	E B	E B	E B	22	31	37	37	36	43	38	34	34	39	19	E B	E B	E B	E B	E B	E B
31	21	18	24	24	19	23	16	G	G	34	36	37	44	37	36	40	37	33	E B	E B	20	20	20	20
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E B	E B	E B	E B	E B	E B	E B	G	30	32	34	36	37	36	35	33	30	24	E B	E B	E B	E B	E B	E B
U Q	16	16	16	16	E B	E B	E B	23	31	34	37	38	40	38	36	35	34	29	21	21	20	20	18	16
L Q	E B	E B	E B	E B	E B	E B	E B	G	G	32	33	34	34	G	G	G	G	G	E B	E B	E B	E B	E B	E B

OCT.2021 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

OCT.2021 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	16	16	16	16	16	16	15	15	16	16	17	20	20	18	18	17	15	15	16	16	16	15	15
2	16	16	16	16	15	15	15	14	16	15	16	18	18	18	18	15	14	16	16	16	16	16	16	16
3	16	16	16	16	16	16	16	16	16	17	17	17	17	20	22	18	17	13	15	16	16	16	16	16
4	16	16	16	16	16	16	16	15	15	15	16	18	19	20	16	18	18	14	14	16	16	16	16	16
5	16	16	16	16	15	15	16	15	15	15	18	18	19	19	21	16	16	16	16	16	16	16	15	16
6	16	16	16	16	17	16	16	14	15	15	18	19	20	21	14	16	16	15	13	16	16	16	16	16
7	16	16	16	16	16	16	16	16	16	16	17	17	18	18	18	16	15	15	15	16	15	15	15	16
8	16	14	15	16	16	16	16	15	15	17	18	18	18	18	16	14	12	12	16	16	16	16	16	16
9	16	16	16	16	15	15	16	12	14	15	16	17	18	18	17	14	14	15	15	16	16	16	16	16
10	16	15	15	15	15	15	15	15	15	16	16	16	16	18	18	20	14	15	15	15	16	16	16	16
11	16	16	16	16	16	16	16	13	15	15	21	18	18	21	20	20	16	15	15	15	15	16	16	16
12	16	16	16	16	16	16	16	14	14	16	16	18	20	20	20	18	17	15	15	16	16	16	16	16
13	16	16	16	16	16	16	16	16	16	15	15	16	18	17	15	17	15	14	16	16	16	16	16	16
14	16	16	16	16	16	16	16	16	14	14	16	16	19	17	17	15	14	15	16	16	16	16	16	16
15	16	16	15	15	16	16	16	15	15	15	15	19	19	19	19	18	14	15	16	16	16	16	16	16
16	16	16	16	16	16	16	16	16	16	16	16	16	18	18	18	18	16	16	16	16	16	16	16	16
17	16	16	16	16	16	16	16	15	14	15	17	18	17	15	18	16	16	14	16	16	16	16	16	16
18	16	16	16	16	16	16	16	15	14	14	18	19	19	19	18	15	13	13	16	15	15	15	16	16
19	16	16	16	16	16	16	16	15	14	14	17	17	17	20	18	18	16	16	16	16	16	16	16	16
20	16	16	16	16	16	15	16	15	15	15	15	16	16	16	16	16	16	16	16	16	16	16	16	16
21	16	16	16	16	16	16	16	15	15	15	16	17	17	18	18	18	14	14	16	16	16	16	16	16
22	16	16	16	16	16	16	15	14	16	16	16	19	19	19	19	14	15	15	15	15	15	15	15	15
23	16	16	16	16	16	16	16	16	14	14	16	16	16	16	15	17	16	16	15	15	16	16	16	16
24	16	16	16	16	16	16	15	14	14	16	16	18	18	18	18	18	16	16	16	16	16	16	16	16
25	16	16	16	16	16	16	16	13	16	16	16	17	17	17	18	20	15	13	16	16	16	16	16	16
26	16	16	16	16	16	16	16	14	16	16	18	20	20	19	19	18	18	15	16	16	16	16	16	16
27	16	16	15	15	15	15	16	16	16	16	16	16	20	20	18	19	18	16	16	16	15	15	15	16
28	15	15	15	15	15	15	15	16	14	14	15	16	18	16	18	18	16	16	16	16	16	16	16	16
29	16	16	16	16	16	15	16	15	16	16	15	16	23	18	16	16	16	16	16	16	16	16	16	16
30	16	16	16	16	16	16	16	16	14	16	17	18	18	18	19	14	15	15	15	15	16	16	16	16
31	16	16	16	16	16	16	16	16	16	16	16	16	18	18	18	18	18	12	15	15	15	16	16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	16	16	16	16	16	16	16	15	15	15	16	17	18	18	18	18	16	15	16	16	16	16	16	16
U Q	16	16	16	16	16	16	16	16	16	16	17	18	19	20	19	18	16	16	16	16	16	16	16	16
L Q	16	16	16	16	16	15	16	14	14	15	16	16	17	18	17	16	14	14	15	16	16	16	16	16

OCT.2021 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

OCT. 2021 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	282	296	316	322	274	F	349	350	353	352	366	320	328	316	332	351	339	349	339	359	317	300	317	283
2	301	311	315	325	279	327	358	364	379	374	326	325	344	339	334	327	332	340	329	346	325	290	281	307
3	F	319	312	319	386	280	315	408	372	365	369	344	336	345	335	337	354	355	343	339	345	291	294	279
4	318	332	334	348	312	313	330	350	365	354	354	339	324	356	353	344	324	333	353	376	362	295	302	303
5	293	298	343	355	369	382	355	388	367	331	347	338	316	346	307	299	346	357	363	359	327	300	311	322
6	310	314	315	329	331	333	363	391	373	339	357	339	330	344	339	331	334	361	348	348	322	298	296	301
7	301	318	333	317	315	284	308	373	380	379	357	361	326	329	345	326	342	357	365	355	314	313	322	331
8	304	317	314	322	351	320	329	378	372	363	356	362	334	325	345	337	331	355	351	354	377	320	303	294
9	297	298	306	312	346	345	340	372	367	370	365	377	330	341	319	331	335	342	367	354	317	364	350	297
10	295	309	299	305	312	324	358	383	377	385	368	348	335	323	331	323	352	343	354	369	354	317	F	311
11	296	294	297	297	345	404	314	364	383	365	365	332	342	326	344	345	367	360	358	345	A	309	316	300
12	313	319	302	305	313	321	364	384	354	353	354	358	342	279	311	332	346	350	325	356	331	273	320	311
13	297	296	311	301	341	348	324	324	359	382	359	334	322	341	338	347	354	359	348	352	318	307	302	301
14	301	311	319	300	361	326	362	396	367	374	378	356	357	338	319	333	356	374	376	A	306	302	A	307
15	304	305	329	319	351	345	342	379	367	366	353	343	350	342	298	336	350	376	373	323	315	325	346	325
16	312	323	303	314	360	389	353	379	370	354	371	341	345	354	317	352	370	379	369	331	307	347	319	292
17	308	323	315	317	356	369	331	374	363	369	377	379	361	346	358	339	355	378	385	349	276	299	298	300
18	305	313	313	319	339	305	328	361	335	372	314	321	354	343	351	349	347	362	350	314	314	309	312	310
19	323	314	303	308	322	344	328	381	359	362	347	342	351	337	339	331	350	375	362	360	283	287	322	281
20	291	284	292	F	391	F	321	372	387	338	350	353	354	297	336	353	369	374	371	364	339	337	353	A
21	292	297	304	312	346	379	357	407	397	389	379	381	355	320	328	341	369	349	324	385	310	330	301	309
22	311	295	310	323	323	339	345	369	383	368	378	344	344	345	355	346	346	366	370	344	310	348	293	350
23	309	310	310	327	345	385	327	369	381	364	353	384	359	333	350	371	367	355	396	A	313	305	F	F
24	297	317	319	306	351	329	340	374	370	383	362	370	376	349	340	353	362	367	352	329	306	320	309	304
25	311	319	318	318	328	331	340	354	394	375	362	344	344	337	344	343	366	372	372	328	321	321	287	298
26	303	318	339	344	310	322	325	386	364	361	374	348	343	336	326	349	355	355	364	356	305	330	317	311
27	306	310	314	322	344	338	334	389	381	362	358	365	348	319	316	340	358	353	388	349	315	333	311	300
28	286	294	303	311	318	331	373	379	383	341	354	371	341	333	335	332	357	359	384	339	313	304	289	278
29	344	326	306	319	294	328	336	369	380	333	348	349	342	343	322	347	364	367	396	321	286	310	298	325
30	294	291	309	311	359	419	307	359	372	355	356	349	346	323	330	345	352	372	348	298	306	323	296	297
31	285	294	284	284	F	333	329	354	353	351	346	339	359	334	347	320	338	342	345	324	305	310	312	272
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	30	30	29	31	31	31	31	31	31	31	31	31	31	31	31	31	29	30	31	28	29
MED	302	311	312	318	342	333	336	374	372	364	357	348	344	337	335	340	352	359	362	349	314	310	310	301
U Q	310	318	318	322	351	358	355	384	381	374	368	362	354	344	345	347	362	372	372	358	325	325	318	311
L Q	295	296	303	308	315	323	327	364	364	353	353	339	334	325	322	331	342	350	348	330	306	300	297	296

OCT. 2021 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

OCT.2021 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		U L 415	U L 405	423		L U L 420	L	L							
2										L		399	392	392		A L	L	L							
3										L		398	429	445	389		L	L	A						
4									L	L	L	L				L	L								
5										L	L	397	397	402	408		A	L	L						
6									L	L	L	L				L	L								
7										L	L	L	A	L	L	L	L								
8										L	A	U L 425	L	L	L	L	A	A							
9										L	L	A			U L 415	L	L								
10										L	L	422	419	419		L	L	A							
11									L	L	L	U L 416	L	L	L	L									
12										L	L	A	L		L	L	A								
13								A			L	L	U L 447	L	L	L									
14										L	L	L	L	L	L	A	A								
15											A	A	A	L	L	L									
16										L	L	L	L		L	A	L								
17										L	L	L		436	L	L	L	A							
18										A	L	L	A	L	A	L									
19										L	L	L		L		L									
20											L	L	L		U L 412	L	L	A							
21										L	L	L	U L 450	365	L	A	L								
22										L	L	L	A	U L 412	L	L									
23											A	A	A	L	A	A	A	A							
24									L		L	L		L	A	L									
25										L	L	L	L	L	L			A							
26										L	L	L	L	L	L	L	L								
27										L	L	L	L	L	L	L	L								
28											L	L	L		A	L									
29											L	L	A	L	L	L	L								
30										L	L		A	L		L	A								
31									L		L		A	L	417	L	A	A							
												358													
	00	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	6	14	14	6	3	1								
MED											398	407	414	410	400	380	480								
U Q											422	419	423	417	420										
L Q											397	405	392	383	375										

OCT.2021 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

OCT.2021 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										232		280	280	266	266	244	264	242						
2										242		274	256	256	250	270	262	244						
3										244	230	264	250	250	270	254	250	236						
4									236	236	236	236	246	230	238	248	288							
5										242	242	242	242	236	262	242	242	242						
6									242	254	238	238	262	250	250	262	248							
7										224	232	232	260	260	254	262	246							
8										246	236	226	256	256	246	246	242	228						
9										240	240	232	272	258	274	254	254							
10										218	238	260	260	260	260	250	240							
11									232	232	232	284	260	260	260	248								
12										234	248	244	244		290	264	230							
13								E A 244			234	268	268	248	248	238								
14										228	222	234	240	252	268	242	240							
15											242	246	236	236	290	252								
16										240	232	244	244	244	272	244	236							
17										242	232	226	238	260	242	242	218							
18										218	268	268	230	236	238	238								
19										238	244	230	230	236	236	246	246							
20											246	238	238	304	258	230	218							
21										224	234	234	254	292	292	244	226							
22										246	226	266	248	248	248	266								
23											232	218	232	272	E A 238	222	232	224						
24									224		254	226	238	256	244	244								
25										240	246	254	238	242	234		222							
26										228	228	240	256	248	258	258	224							
27										224	238	232	232	260	262	262	242							
28											242	230	238	246	246	254								
29											234	234	226	248	254	238	238							
30										242	234		234	266	256	254	226							
31											238		252	224	248	252	262	246						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	5	23	29	30	31	30	31	30	24	6						
MED								E A 244	236	238	236	239	244	251	254	248	241	239						
U Q									240	242	243	260	256	260	266	258	247	242						
L Q									228	228	232	232	236	246	246	242	228	228						

OCT.2021 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

OCT. 2021 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

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 308	A 304	E 240	E 220	E 260	E 260	B 196	B 196	B 208	B 198	B 218	B 188	B 188	B 186	B 210	B 192	B 192	B 198	B 206	B 206	E 206	E 234	E 234	E 278
2	E 278	A 256	E 256	E 256	E 252	B 218	B 204	B 204	B 198	B 198	B 202	B 194	B 194	B 200	A	B 194	B 194	B 204	B 212	B 204	E 204	E 232	E 272	E 268
3	E 240	E 236	E 236	E 222	B 194	E 226	E 226	B 198	B 198	B 198	B 190	B 190	B 190	B 212	B 196	B 182	B 202	A	B 198	B 204	E 204	E 256	E 270	E 278
4	E 250	E 218	E 208	E 204	B 218	E 266	E 218	B 204	B 202	B 202	B 200	B 190	B 188	B 188	B 182	B 182	B 206	E 232	B 214	B 190	B 188	E 224	E 256	E 264
5	E 272	E 258	E 226	E 204	B 192	E 210	B 210	B 196	B 194	B 192	B 186	B 186	B 178	B 178	B 178	A	B 190	B 198	B 198	B 186	B 188	E 270	E 256	E 236
6	E 238	E 242	E 242	E 230	B 214	E 224	B 208	B 200	B 200	B 198	B 204	B 198	B 192	B 192	B 192	B 192	B 198	B 206	B 206	B 206	E 206	E 264	E 264	E 264
7	E 248	E 220	E 220	E 230	B 244	E 278	B 250	B 194	B 208	B 196	B 196	B 196	A	B 200	B 208	B 200	B 204	B 212	B 200	B 194	E 220	E 252	E 228	E 220
8	E 264	E 264	E 264	E 240	B 212	B 208	B 208	B 198	B 198	B 192	A	B 192	B 186	B 208	B 204	B 182	A	A	B 190	B 190	B 188	E 208	E 240	E 266
9	E 266	E 266	E 266	E 254	B 212	B 202	B 206	B 194	B 202	B 202	B 202	A	B 200	B 200	B 194	B 202	B 208	B 214	B 200	B 200	E 230	B 190	B 206	E 258
10	E 272	E 272	E 272	E 250	B 240	E 228	B 200	B 200	B 200	B 194	B 194	B 194	B 180	B 188	B 204	B 206	A	B 206	B 206	B 202	E 202	E 218	E 280	E 266
11	E 266	E 264	E 258	E 242	B 208	E 184	B 200	B 200	B 200	B 200	B 190	B 186	B 186	B 186	B 182	B 194	B 210	B 210	B 210	B 200	A	E 268	E 252	E 252
12	E 262	E 248	E 222	E 234	B 242	E 242	B 194	B 194	B 194	B 200	B 194	A	B 194	B 194	B 184	B 218	A	B 204	B 204	B 196	E 212	E 366	E 220	E 254
13	E 254	E 270	E 238	E 266	B 216	E 216	B 232	A	B 206	B 206	B 196	B 184	B 184	B 182	B 190	B 190	B 224	B 214	B 202	B 200	E 226	E 226	E 250	E 250
14	E 250	E 250	E 242	E 252	B 218	E 210	B 210	B 192	B 192	B 188	B 186	B 186	B 190	B 190	B 190	A	A	B 190	B 198	A	E 250	E 266	A	E 266
15	E 266	E 260	E 234	E 232	B 226	E 226	B 226	B 200	B 200	B 206	A	A	A	B 198	B 198	B 210	B 222	B 206	B 190	B 198	E 242	E 240	E 222	E 222
16	E 232	E 238	E 246	E 246	B 208	B 202	B 202	B 188	B 194	B 204	B 204	B 194	B 186	B 176	B 168	A	B 190	B 196	B 196	B 232	E 232	E 258	E 244	E 256
17	E 256	E 238	E 238	E 238	B 204	B 190	B 218	B 190	B 188	B 216	B 200	B 200	B 194	B 188	B 186	B 176	A	B 204	B 190	B 202	E 318	E 290	E 290	E 274
18	E 274	E 262	E 262	E 248	B 216	E 248	B 216	B 202	B 202	A	B 202	B 208	A	B 194	A	B 194	B 210	B 210	B 192	B 218	E 242	E 242	E 254	E 234
19	E 228	E 242	E 242	E 242	B 212	E 196	B 196	B 206	B 206	B 194	B 184	B 184	B 190	B 184	B 174	B 174	B 202	B 192	B 186	A	E 288	E 288	E 218	E 262
20	E 292	E 276	E 276	E 218	B 196	E 218	B 208	B 190	B 190	B 190	B 188	B 188	B 188	B 178	B 184	B 204	A	B 202	B 192	B 234	E 224	E 248	E 222	A
21	E 270	E 270	E 270	E 260	B 236	B 202	B 202	B 186	B 198	B 198	B 186	B 186	B 186	B 186	B 200	A	B 200	B 200	E 208	E 208	E 236	E 236	E 252	E 246
22	E 246	E 264	E 264	E 236	B 236	E 228	B 212	B 204	B 204	B 192	B 192	B 200	A	B 186	B 194	B 204	B 204	B 196	B 238	B 230	E 246	E 206	E 282	E 258
23	E 278	E 282	E 268	E 246	B 218	B 196	B 208	B 204	B 204	B 204	A	A	A	A	A	A	A	A	A	A	E 214	E 214	E 280	E 250
24	E 252	E 236	E 228	E 236	B 226	E 224	B 224	B 196	B 196	B 196	B 196	B 196	B 178	B 190	A	B 190	B 214	B 206	B 196	B 230	E 276	E 242	E 236	E 244
25	E 244	E 234	E 224	E 252	B 242	E 216	B 216	B 194	B 194	B 194	B 188	B 186	B 188	B 188	B 184	B 224	A	B 204	B 186	B 190	E 252	E 242	E 272	E 278
26	E 288	E 238	E 226	E 212	B 220	E 220	B 208	B 192	B 202	B 202	B 198	B 194	B 194	B 186	B 194	B 194	B 194	B 194	B 194	B 194	E 254	E 240	E 240	E 240
27	E 244	E 244	E 258	E 236	B 224	B 208	B 208	B 196	B 196	B 184	B 204	B 186	B 186	B 180	B 192	B 208	B 202	B 202	B 188	B 212	E 250	E 250	E 250	E 268
28	E 284	E 268	E 248	E 248	B 236	B 218	B 198	B 198	B 198	B 194	B 194	B 196	B 182	B 170	A	B 208	B 214	B 200	B 174	B 192	E 224	E 224	E 258	E 278
29	E 240	E 240	E 248	E 266	B 228	B 218	B 204	B 200	B 200	B 200	B 194	B 194	A	B 190	B 186	B 186	B 198	B 198	B 188	B 214	E 264	E 264	E 260	E 214
30	E 302	E 264	E 264	E 258	B 214	B 200	E 250	B 192	B 202	B 202	B 202	B 202	A	B 202	B 202	B 202	A	B 194	B 194	B 210	E 228	E 214	E 238	E 284
31	E 304	E 296	E 316	E 316	B 230	B 236	B 214	B 204	B 182	B 204	B 204	B 198	A	B 200	B 200	A	A	B 208	B 208	B 208	E 226	E 226	E 226	E 292
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	30	31	30	28	27	23	31	26	25	21	28	31	29	30	31	30	30
MED	E 264	E 258	E 246	E 242	B 220	E 218	B 205	B 196	B 200	B 198	B 196	B 194	B 188	B 190	B 192	B 194	B 202	B 204	B 197	B 199	E 227	E 242	E 251	E 260
U Q	E 278	E 268	E 264	E 252	B 236	E 228	B 218	B 200	B 202	B 202	B 202	B 196	B 192	B 200	B 200	B 205	B 210	B 207	B 206	B 211	E 250	E 264	E 264	E 268
L Q	E 246	E 238	E 234	E 230	B 212	B 208	B 202	B 194	B 194	B 194	B 191	B 186	B 184	B 186	B 184	B 188	B 194	B 198	B 192	B 194	E 206	E 224	E 234	E 246

OCT. 2021 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

OCT.2021 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	122	122	A	116	112	112	106	114	112	110	110							
2								108	108	108	A	A	A	A	108	A	A	A							
3							B	110	110	110	110	106	A	112	A	112	A	A							
4							B	110	110	110	A	110	110	110	110	110	110	110							
5							B	114	114	114	114	114	110	110	110	110	110	110							
6							B	110	110	110	A	A	112	A	110	110	110	110	B						
7							B	116	116	A	A	A	A	A	A	A	A	A							
8							B	116	116	116	A	A	A	A	A	A	A	A	B						
9							B	116	116	116	116	A	A	A	A	110	110	110							
10							B	110	A	110	A	A	110	110	110	110	110	110							
11							B	122	120	A	A	A	A	112	112	112	112	112							
12							B	118	118	118	114	A	A	A	A	A	A	A							
13							B	A	A	A	A	A	A	A	A	114	A	A							
14							B	A	A	A	A	A	A	A	A	A	A	A							
15								110	110	A	A	A	A	A	A	A	A	A	B						
16							B	A	110	110	110	A	A	108	A	108	108	B							
17							B	110	110	110	110	A	A	110	110	110	110	110	B						
18								A	110	110	110	A	A	110	110	A	A	A							
19							B	110	110	110	110	A	A	110	110	110	110	110							
20							B	116	116	A	A	A	A	116	A	A	A	A							
21								116	116	116	116	116	A	A	A	A	A	A							
22							B	114	114	114	114	A	A	A	A	A	A	A							
23							B	112	112	112	A	A	A	A	A	112	112	B							
24								112	112	112	A	A	112	A	A	A	112	A							
25								112	112	112	112	114	114	114	114	114	114	108							
26							B	108	108	108	108	108	108	108	108	108	108	B							
27							B	108	108	108	108	108	A	A	A	112	112	B							
28								B	A	112	A	112	112	110	110	110	110	B							
29							B	110	110	110	110	A	A	110	A	110	110	A							
30							B	B	110	110	110	110	A	110	110	110	A	B							
31							B	112	110	110	108	108	A	A	A	A	A	B							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								25	27	25	17	12	9	17	15	19	17	13							
MED								112	110	110	110	110	112	110	110	110	110	110							
U Q								116	116	113	114	113	112	111	110	112	112	113							
L Q								110	110	110	110	108	110	110	110	110	110	110							

OCT.2021 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

OCT.2021 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	88	88	88	88	B	88	B	122	122	102	156	G	144	G	144	G	G	G	82	82	96	96	94	94
2	88	88	88	88	88	88	94	128	128	124	94	94	90	84	116	98	98	98	98	92	92	92	92	90
3	90	88	88	86	86	86	86	122	122	122	G	G	88	138	94	G	92	92	92	92	92	92	B	B
4	B	92	B	B	B	92	90	120	120	G	102	G	G	G	G	144	136	116	108	B	B	B	104	92
5	90	96	B	96	B	B	B	114	132	122	G	G	G	G	G	140	140	126	106	106	86	86	B	B
6	B	B	B	B	B	B	B	G	116	116	102	100	G	100	G	G	152	152	126	102	96	96	94	94
7	B	B	B	B	B	B	B	G	122	106	102	96	96	96	94	94	94	G	96	96	96	96	96	94
8	96	B	B	B	B	B	B	116	118	118	92	92	92	144	96	90	90	90	90	90	90	90	90	90
9	90	90	86	86	B	B	B	136	136	124	118	102	100	100	98	G	154	118	112	90	90	90	90	90
10	90	B	B	B	B	B	B	G	90	G	90	90	G	G	148	140	118	118	110	102	100	100	100	100
11	96	88	88	B	B	B	B	126	112	106	98	96	96	G	G	136	130	130	110	B	100	94	94	94
12	94	94	94	B	B	B	B	126	126	110	116	94	96	96	96	96	96	112	B	96	96	96	96	102
13	102	102	B	B	108	108	108	100	100	100	100	100	G	96	96	96	114	90	130	86	86	86	86	86
14	86	86	86	86	86	86	94	102	96	150	96	G	94	106	106	98	90	90	92	92	92	92	92	92
15	92	88	88	88	B	B	B	120	120	104	98	92	92	92	90	90	90	90	90	90	88	88	86	86
16	84	84	84	B	94	94	102	102	136	136	G	96	96	96	96	138	G	94	94	86	86	90	B	90
17	90	90	90	B	B	90	90	G	G	138	130	100	100	G	G	G	132	118	106	106	100	100	100	B
18	100	B	100	90	90	B	B	90	148	134	128	84	102	132	142	90	90	110	110	90	90	90	82	B
19	B	B	B	88	88	B	B	120	120	118	118	96	94	G	G	G	G	G	92	92	92	92	92	92
20	92	92	92	92	92	B	120	128	G	100	100	98	98	G	98	98	98	94	94	94	94	94	94	94
21	94	94	94	94	86	86	88	G	114	114	114	118	102	102	98	98	98	98	98	86	86	86	86	B
22	B	B	B	B	B	B	B	G	108	112	98	98	98	98	98	98	98	92	92	88	88	88	88	88
23	88	88	88	B	B	88	100	140	114	114	98	98	94	94	100	132	124	120	110	100	100	100	100	100
24	B	100	100	76	88	88	B	136	G	126	96	96	G	96	96	90	134	82	82	82	82	80	80	B
25	B	B	B	B	80	B	B	126	G	132	132	132	114	114	144	144	124	116	98	96	96	96	B	B
26	88	88	B	B	B	B	B	132	G	132	G	126	122	G	140	G	G	90	90	90	90	90	90	B
27	B	B	B	B	B	B	B	G	124	118	118	118	118	96	96	96	166	G	124	84	84	84	96	92
28	B	B	92	B	B	B	B	100	100	108	102	G	132	124	160	160	142	96	96	B	B	B	96	96
29	96	96	96	90	90	90	90	G	G	116	116	88	88	G	88	G	G	88	84	84	138	112	90	B
30	90	96	96	96	96	96	96	126	126	122	122	112	98	144	144	128	100	100	B	B	92	92	92	88
31	88	88	88	90	82	82	82	G	G	136	124	124	98	98	98	98	98	98	98	98	98	98	94	94
	00	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	21	19	15	15	14	14	22	23	29	27	25	26	21	25	23	25	28	29	27	29	29	26	22
MED	90	90	88	88	88	88	94	122	120	118	102	98	96	98	98	98	98	99	96	92	92	92	92	92
U Q	94	95	94	92	92	92	102	128	126	129	118	107	100	119	141	140	133	118	107	96	96	96	96	94
L Q	88	88	88	86	86	86	90	114	114	108	98	94	94	96	96	96	93	92	90	86	88	90	90	90

OCT.2021 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

OCT.2021 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	F8	F6	F3	F2		F1		C3	C2	L2	H2		H1		H1				F1	F2	F1	F2	F2	F2	
2	F2	F3	F5	F3	F2	F2	F2	C2	C2	C2	L2	L2	L2	L3	C2	L2	L2	L4	L4	L4	F3	F2	F3	F3	
3	F3	F3	F2	F1	F2	F1	L1	C2	C6	C2			L2	H1	L2		L3	L3	F1	F2	F1	F2			
4		F1				F1	F2	C2	C2		L1					H1	H2	C3	F3				F1	F2	
5	F2	F1		F2				C3	C2	C2						H1	H1	C2	F1	F1	F1	F1			
6								C2	C2	L2	L2			L2			H1	H2	F3	F1	F4	F4	F2	F2	
7								C3	L3	L3	L3	L3	L3	L2	L4	L3	L4		F2	F2	F3	F4	F4	F1	
8	F2							C4	C2	C2	L3	L2	L3	H13	L2	L4	L4	L9	F3	F3	F2	F2	F3	F3	
9	F3	F7	F5	F3				H2	H2	C2	C3	L3	L3	L3	L3		H1	CL42	F6	F3	F4	F1	F3	F1	
10	F1								L2		L2	L2			H1	H1	CL32	C6	F8	F3	F2	F4	F4	F2	
11	F2	F2	F1					C2	C3	L3	L4	L2	L1			C1	C1	C2	F3		F9	F6	F5	F2	
12	F2	F1	F1					C3	C2	C2	L1	L2	L2	L2	L2	L2	L3	C2		F1	F3	F8	F1	F1	
13	F1	F2			F1	F3	L3	L7	L3	L4	L2	L2	L3	L2	L2	C2	L3	C3	F3	F4	F6	F7	F2	F4	
14	F2	F5	F3	F2	F4	F4	L2	L3	L5	L2	L2		L3	CL22	C1	L3	L4	L3	F8	F9	F8	F6	F6	F3	
15	F2	F3	F8	F5	F1			C3	C3	L3	L3	L3	L3	L2	L1	L2	L9	L7	F1	F1	F3	F6	F6	F4	
16	F2	F5	F2		F1	F1	L2	L3	H2	H2		L2	L2	L2	L2	HL22		L4	F5	F7	F4	F5		F2	
17	F2	F1	F1			F1	L1			C2	C2	L2	L1				H2	C7	L5	F4	F3	F2			
18	F1		F1	F2	F2			L2	HL22	HL22	C2	L3	LL33	C2	H2	L5	L4	CL45	F7	F4	F3	F2	F2		
19				F2	F4			C2	CL32	CL32	C2	C1	L1						F1	F1	F2	F2	F2	F6	
20	F2	F1	F2	F2	F1		C1	C3		L2	L2	L3	L2		L3	L3	L5	L7	F6	F9	F6	F8	F5	F8	
21	F2	F2	F2	F2	F3	F3	F3		C2	C3	C2	C2	L2	L2	L3	L3	L3	L3	F2	F7	F3	F5	F4		
22									C3	C2	L3	L3	L4	L3	L3	L2	L3	L5	F9	F8	F2	F4	F5	F4	
23	F2	F2	F1			F1	L1	H2	C2	C2	L3	L3	L4	L2	L3	L2	C3	C7	F8	F8	F3	F2	F2	F1	
24		F5	F2	F2	F1	F2		H2		C3	L2	L3		L2	L3	L3	CL23	L7	F6	F5	F8	F4	F2		
25					F2			C2		C2	C2	C2	C2	C2	H1	H2	C4	C3	F1	F1	F4	F2			
26	F3	F2						H3		C1		C1	C1		H1			L6	F3	F6	F2	F2	F1		
27							C1		C5	C2	C2	C1	L1	L2	L2	H1		C2	F1	F4	F9	F3		F2	
28			F1					L3	L3	C3	L2		C1	C1	H1	H1	H1	L2	F1				F2	F1	
29	F4	F3	F3	F4	F1	F2	L1			C3	C1	L2	L3		L3			L2	F1	F2	F1	F1	F2		
30	F2	F2	F2	F1	F1	F2	L2	C2	C3	C2	C2	C3	L2	H1	H1	C1	L2	L2			F1	F1	F3	F8	
31	F6	F2	F9	F9	F8	F7	L2			H1	C2	C1	L3	L3	L2	L4	L4	L4	F3	F2	F5	F4	F3	F6	
	00	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																									

OCT.2021 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

OCT.2021 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 46	X 47	X 49	X 42	X 36	X 38														X 78	X 63	X 60	X 60	X 58
2	X 56	X 56	X 51	X 47	X 47	X 47														X 106	X 79	X 66	X 94	X 77
3	X 70	X 69	X 54	X 57	X 64	X 25														X 86	X 92	X 82	X 66	X 69
4	X 65	X 69	X 63	X 54	X 30	X 31														X 95	X 53	X 39	X 41	X 42
5	X 41	X 42	X 44	X 44	X 42	X 26														X 75	X 56	X 54	X 58	X 55
6	X 42	X 42	X 42	X 41	X 38	X 34														X 86	X 66	X 57	X 56	X 58
7	X 59	X 53	X 47	X 48	X 40	X 40														X 88	X 82	X 76	X 73	X 64
8	X 62	X 60	X 59	X 59	X 58	X 38														X 77	X 58	X 40	X 40	X 40
9	X 41	X 41	X 40	X 40	X 44	X 31														X 76	X 68	X 58	X 49	X 44
10	X 43	X 40	X 41	X 42	X 42	X 40														X 95	X 74	X 65	X 68	X 65
11	X 62	X 63	X 58	X 69	X 53	X 45														X 60	X 54	X 45	X 48	X 47
12	X 44	X 44	X 44	X 41	X 40	X 39														X 91	X 73	X 86	X 59	X A
13	X 54	X 60	X 52	X 52	X 47	X 42														X 106	X 88	X 79	X 90	X 80
14	X 75	X 76	X 71	X 72	X 76	X 51														X 49	X 45	X 42	X A	X 44
15	X 43	X 47	X 37	X 40	X 41	X 34														X 114	X 97	X 100	X 85	X 71
16	X 55	X 54	X 52	X 50	X 54	X 42														X 48	X 46	X 44	X 47	X 47
17	X 47	X 46	X 47	X 47	X 54	X 32														X 68	X 50	X 47	X 50	X 49
18	X 47	X 50	X 47	X 46	X 46	X 36														X 50	X 52	X 48	X 48	X 49
19	X 48	X 45	X 44	X 42	X 43	X 44														X 72	X 39	X 35	X 37	X 37
20	X 37	X 38	X 38	X 42	X 36	X 26														X 49	X A	X 40	X 41	X 34
21	X 36	X 36	X 32	X 33	X 41	X 35														X 115	X 72	X 73	X 72	X 68
22	X 59	X 54	X 44	X 42	X 39	X 37														X 59	X 57	X 58	X 51	X 37
23	X 37	X 37	X 37	X 41	X 46	X 30														X 50	X 47	X 52	X 54	X 47
24	X 47	X 45	X 44	X 42	X 44	X 31														X 64	X 58	X 62	X 57	X 45
25	X 47	X 42	X 41	X 39	X 39	X 41														X 49	X 47	X 47	X 45	X 44
26	X 45	X 42	X 41	X 42	X 36	X 34														X 84	X 70	X 64	X 59	X 49
27	X 47	X 44	X 41	X 43	X 43	X 40														X 74	X 56	X 52	X 50	X 52
28	X 49	X 53	X 50	X 50	X 53	X 43	X 39													X 76	X 86	X 66	X 58	X 53
29	X 50	X 54	X 58	X 55	X 51	X 41	X 39													X 52	X 54	X 56	X 51	X 52
30	X 52	X 47	X 46	X 51	X 50	X 36	X 31													X 65	X 70	X 78	X 65	X 52
31	X 44	X 44	X 44	X 46	X 48	X 36	X 39													X 102	X 100	X 90	X 71	X 60
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	4													31	30	31	30	30
MED	X 47	X 47	X 44	X 44	X 44	X 37	X 39													X 76	X 60	X 58	X 56	X 50
U Q	X 56	X 54	X 52	X 51	X 51	X 41	X 39													X 91	X 74	X 73	X 66	X 60
L Q	X 43	X 42	X 41	X 42	X 40	X 32	X 35													X 59	X 53	X 47	X 48	X 44

OCT.2021 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

OCT.2021 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	40	41	43	36	30	32	36	51	76	87	80	71	90	109	105	103	102 <sup>R</sup>	103	99	72	57	54	54	52	
2	50	50	45	41	41	41	36	59	70	75	65	78	92	87	82	91	101	99	100	100	73	60	87 <sup>F</sup>	71	
3	64	63	48	51	58	19	26	60	66	78	91	87	98	117	109	120 <sup>R</sup>	122	125	86	80	86	76 <sup>R</sup>	60	63	
4	59	63	57	48	24	25	30	61	68	78	100	101	120	109	96	95	88	95	110	89	47	33	35	36	
5	35	36	38	38	36	20	26	56	65	80	96	115	150	140	132	133	132	115	84	69	50	48	52	48	
6	36	36	36	35	32	28	30	59	66	78	98	119	108	116	125	127	108	88	82	80	60	51	50	52	
7	53	47	41	42	34	34	37	74	85	95	93	90	99	111	121	124	127	120	103	82 <sup>R</sup>	76	70	67	58	
8	56	54	53	53	52	32	32	56	63	70	83	91	89	106	124	123	115	109	95	71	52	34	34	34	
9	35	35	34	34	38	25	27	55	66	71	74	74	75	84	94	109	118	115	105	70	62 <sup>V</sup>	52	43	38	
10	37	34	35	36	36	34	38	57	74	69	66	83	106	126	151	154	154 <sup>R</sup>	130	111	89	68	59	61	59	
11	56	57	52	63	47	39	29	56	67	75	92	87	99	103	110	103	89	80	65	54	48	39	42	41	
12	38	38	38	35	34	33	36	55	68	77	89	92	92	97	125	137	145	134	100 <sup>RJ R</sup>	86	67 <sup>J R</sup>	80	53 <sup>A</sup>		
13	48	54	46	46	41	36	36	66	92	99	104	96	87	98	123	126	118	114	112	100	82	73	84 <sup>R</sup>	74	
14	69	70	65	66	70	45	38	56	64	72	80	90	79	81	81	94	111	128	81	43	39	36	38 <sup>A</sup>		
15	37	41	31	34	34	28	26	52	68	69	81	100	111	94	111	144	158	157	136	108	91	94	79	65	
16	49	48	46	44	48	36	24	48	67	75	89	105	94	95 <sup>H</sup>	104	111	121	91	64	42	40	38	41	41	
17	41	40	41	41	48	26	26	52	76	77	84	88	89	93	109	128	102	83	84	62	44	41	44	43	
18	41	44	41	40	40	30	33	59	88	82	78	111	121	90	97	99	75	78	65	44	46	42	42	43	
19	42	39	38	36	37	38	24	51	70	88	90	98	108	109	114	117	118	106	84	66	33	29	31	30	
20	31	32	32	36	30	20	24	50	52	60	72	85	83	72	94	110	116	85	62	43	34	35	28		
21	30	30	26	27	34	29	20	48	56	63	69	65	63	74	101	115	126	125	126 <sup>J R</sup>	109	66	67	66	62	
22	53	48	38	36	33	31	31	53	69	66	79	84	98	100	110	116	105	90	69	53	51	52	45	31	
23	31	31	31	36	40	24	24	53	62	66	66	90	84	84 <sup>H</sup>	107	79	76	77	71	44	41	46	48	41	
24	41	39	38	36	38	25	26	54	72	65	82	101	84	68	91	88	87	90	71	58	52	56	51	39	
25	41	36	35	33	33	35	32	60	74	71	83	103	114	126	115	96	86	76	64	43	41	41	39	38	
26	39	36	35	36	30	28	28	57	68	79	92	78	86	102	102	95	101	92	72 <sup>J R</sup>	78	63	58	53	43	
27	41	38	35	37	37	34	32	58	63	68	74	104	83	89	103 <sup>R</sup>	108	107	110	82	68	50	46	44	46	
28	43	47	44	44	47	37	33	56	67	74	79 <sup>H</sup>	96	89	82	91	105	111	108	79	70	80 <sup>H</sup>	60	52	47	
29	44	48	52	49	45	35	33	52	64	72	84	103	99	86	100	97	104	85	56	46	48	50	44	46	
30	46	41	40	45	44	30	25	52	70	78	88	95	85	90	111	106	110	95	74	58	64	72	59	46	
31	38	38	38	40	42	30	33	56	71	70	86	98	100	86	85	90	99	104	102	96	94 <sup>J R</sup>	84 <sup>J R</sup>	65	54	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	30	30
MED	41	41	38	38	38	31	30	56	68	75	83	92	92	95	107	109	110	103	84	70	54	52	50	44	
U Q	50	48	46	45	45	35	33	59	72	78	91	101	106	109	115	124	121	115	102	86	68	67	60	54	
L Q	37	36	35	36	34	26	26	52	65	69	78	85	85	86	96	96	101	88	71	53	47	41	42	38	

OCT.2021 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

OCT.2021 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								L	L	L	L	U L	L			L	L	L						
2										448	488	500	476	448	488	448		L						
3										L	A	L	L	A	U L	U L	L							
4										424	468	484	524		464	472								
5										L	L	L	L			U L	U L	A						
6										456	464	492	480	464	484	460	452							
7										U L	L	L	L	U L	L	L								
8										464	464	480	476	480	468	452								
9										U L	L	A	A	L	L		L	L						
10										464	468			488	480	460	420							
11									L	L	L	L	U L	L	L	L	L							
12										472	488	496	464	492	444									
13										L	L	L	L		460	456								
14										L	L	L	L	L	L	L	L	A						
15										468	468			496	524	452								
16										L	L	L	L	L	L	L	L							
17										440	468	476	492	468										
18										L	L	L	L	L	L	L	L							
19										472	488	496	464	492	444									
20										L	L	L	L		460	456								
21										L	L	L	L	L	L	L	L	A						
22										U L	L	L	L	U L	L	A	A	A						
23										436	464	464	460	468	480									
24										L	A	L	L	U L	U L	L	L							
25										468	452	472	444	492	452									
26										L	L	L	L	U L	L	L	L							
27										468	476	476	464	460	460									
28										L	L	L	L	L	L	L	L							
29										428	456	460	460	464	444	436								
30										L	U L	L	L	L	L	L	L							
31										468	492	448	448											
										L	L	L	U L	L	L	L	L							
										476	460	448	456	436	A	A	A							
										L	L	L	U L	L	L	L	L							
										448	448	476	488	476	448									
										L	L	L	L	L	L	L	L							
										456	468	476	460	472	440									
										L	L	A		A	A	A	A	A						
										L	L	L	L	A										
										464	472	480	552		460									
										L	U L	L	L	U L	L	L	L							
										480	480	468	476	480	420									
										L	L	L	U L	L	L	L	L							
										L	L	L	L	L	A	L	L							
										U L	L	L	U L	L	L	L	L							
										412	468	504	476	500	460									
										U L	L	L	U L	L	L	L	L							
										400	468	492	472	508	472									
										L	L	L	L	L	A	L	L							
										484	480	484	480	480										
										L	L	A	L	A	U L	L	L							
										480	476				448									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										9	22	30	27	27	25	20	3							
MED										U L	L	L	L	L	L	L	L							
U Q										436	468	474	476	480	472	452	448							
L Q										U L	L	L	L	L	L	L	L							
										460	468	484	496	492	488	460	452							
										U L	L	L	L	L	L	L	L							
										418	464	468	460	464	466	446	420							

OCT.2021 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Okinawa

OCT.2021 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							B		A		A	A	A	A		A	A	A	A						
								172		304						336									
2							B							A					A						
								188	276	304	332	348	348		340	316	284	228							
3							B							A	A	A			B						
								188	256	300	328	344	352					272	232						
4							B						A		A	A			A						
								216	256	296	316	320		340		320	288	224							
5							B						A						B						
								192	264	304	324	344		344	324	304	280	228							
6							B												A						
								192	264	300	328	336	340	336	328	296	284	224							
7							B											A	A						
								192	256	292	316	348	356	344	328	304	268								
8							B						A	A	A	A	A	A	A						
								192	252	292	316	328													
9							B												A						
								180	260	300	324	336	340	340	320	304	292	228							
10							B		A		A			A	A			A							
								184		268		336	344				312	272	216						
11							B					A	A		A		A	A							
								192	264	284	304			340		312		224							
12							B	A										A	B						
									248	280	312	332	336	324	320	300	280								
13							A	A					A	A	A	A	A	A	A						
									232	280	304	324													
14							B					A						A	A						
								188	240	272	300		328	340	328	312	272								
15							B								A		A	A	A						
								192	248	284	320	332	340	324		300									
16							B		A	A	A	A	A	A	A	A	A	A	B						
								172																	
17							B	A	A	A	A	U	A		U	A		A	A	A	A				
												312	328		320	308									
18							B	A						A	A		A	A	B						
									256	304	320	336	336			292		216							
19							B					A	A	A	A	A		A	A						
								180	244	284	304							268							
20							B	A		A	A	A	A	A			A	A	A						
									248						316	300									
21							B						A	A	A	A	A	A	B						
								176	256	296	312	324													
22							B											A	B						
								188	256	300	320	328	336	332	320	300	264								
23							B	A						A				A							
									260	296	324	332	332		324	304	276	220							
24							B						A	A	A	A			A						
								192	268	292	304	324						272	208						
25							B												B						
								196	252	292	320	332	336	328	320	304	280	212							
26							B									A	A	A	B						
								172	264	304	340	348	360	348	336										
27							B	A										A	A	A					
									260	292	328	344	344	348	332	320									
28								A					A					B							
									244	304	300	336		344	320	304	272	224							
29								A			A	A	A	A				B							
									256	292					332	324	276	220							
30								A										A	A						
									256	304	332	344	352	348	336	304	260								
31								A										A	A						
									256	296	320	340	348	340	320	308	272								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								20	27	28	25	24	18	17	19	21	19	14							
MED								188	256	296	320	336	340	340	324	304	272	224							
U Q								192	260	302	326	344	348	344	332	312	280	228							
L Q								180	248	288	308	328	336	330	320	300	272	216							

OCT.2021 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

OCT.2021 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	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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
4	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A
5	J	A	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A	E	B	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	E	B
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
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
9	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A
10	J	A	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A
11	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	J	A	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A
13	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	E	B	J	A	J	A	E	B	J	A	J	A	E	B	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
16	J	A	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A	E	B	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
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
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
20	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	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A
22	J	A	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A
23	J	A	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A
24	J	A	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A
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	J	A	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A
29	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A
30	J	A	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A
31	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	J	A	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A	E	B	J	A	J	A
UQ	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
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

OCT.2021 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

OCT.2021 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 16	E 16	E 16	E 16	E 16	E 16	E 16			G					G						E 16	E 16	E 16	E 16
2	E 16	E 16	E 16	E 16	E 16	E 16	E 16													E 16	E 16	E 16	E 16	E 16
3	E 16	E 16	E 16	E 16	E 16	E 16	E 16							G					G	E 16	E 16	E 16	E 16	E 16
4	E 16	E 19	E 16	E 16	E 16	E 16	E 16							G								E 16	E 16	E 16
5	E 16	E 16	E 16	E 16	E 16	E 16	E 16			G				G	G	G				E 16	E 16	E 16	E 16	E 16
6	E 16	E 16	E 16	E 16	E 16	E 16	E 16															E 16	E 16	E 16
7	E 16	E 16	E 16	E 16	E 16	E 16	E 16															E 16	E 16	E 16
8	E 16	E 16	E 16	E 16	E 16	E 16	E 16														E 16	E 16	E 16	E 16
9	E 16	E 16	E 16	E 16	E 16	E 16	E 16														E 16	E 16	E 16	E 16
10	E 16	E 16	E 16	E 16	E 16	E 16	E 16							G	G						E 16	E 16	E 16	E 16
11		E 20	E 16	E 16	E 16	E 16	E 16								G						E 16	E 16	E 16	E 16
12	E 16	E 16	E 16	E 16	E 16	E 16	E 16													E 16	E 16	E 16	E 16	E 16
13	E 16	E 16	E 16	E 16	E 16	E 20	E 23															E 16	E 16	E 16
14	E 16	E 20	E 16	E 16	E 16	E 16	E 16																E 16	E 16
15	E 19	E 19	E 18	E 16	E 16	E 16	E 16															E 16	E 16	E 16
16	E 17	E 16	E 16	E 16	E 16	E 16	E 16														E 16	E 16	E 16	E 16
17	E 16	E 16	E 16	E 16	E 16	E 16	E 16														E 16	E 16	E 16	E 16
18	E 16	E 21	E 24	E 18	E 16	E 16	E 16			G	G										E 16	E 16	E 16	E 16
19	E 16	E 16	E 16	E 16	E 16	E 16	E 16														E 16	E 16	E 16	E 16
20	E 16	E 16	E 16	E 16	E 16	E 16	E 16															E 16	E 16	E 16
21	E 16	E 16	E 16	E 16	E 16	E 16	E 16														E 16	E 16	E 16	E 16
22	E 22	E 20	E 16	E 16	E 16	E 16	E 16														E 16	E 16	E 16	E 16
23	E 16	E 16	E 16	E 16	E 16	E 16	E 16															E 16	E 16	E 16
24	E 16	E 19	E 16	E 16	E 16	E 16	E 16															E 16	E 16	E 16
25	E 16	E 16	E 16	E 16	E 16	E 16	E 16															E 16	E 16	E 16
26	E 16	E 16	E 16	E 16	E 16	E 16	E 16															E 16	E 16	E 16
27	E 16	E 16	E 16	E 16	E 16	E 16	E 16															E 16	E 16	E 16
28	E 16	E 16	E 16	E 16	E 16	E 16	E 16															E 16	E 16	E 16
29	E 16	E 16	E 16	E 16	E 16	E 16	E 16															E 16	E 16	E 16
30	E 16	E 16	E 16	E 16	E 16	E 16	E 16															E 16	E 16	E 16
31	E 16	E 20	E 20	E 22	E 16	E 16	E 16															E 16	E 16	E 16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E 16	E 16	E 16	E 16	E 16	E 16	E 16														E 16	E 16	E 16	E 16
U Q	E 16	E 16	E 16	E 16	E 16	E 16	E 16															E 16	E 16	E 16
L Q	E 16	E 16	E 16	E 16	E 16	E 16	E 16															E 16	E 16	E 16

OCT.2021 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

OCT.2021 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	14	16	16	20	20	21	19	15	14	13	16	16	16	16	16	16
2	16	16	16	16	16	16	16	16	15	16	16	16	19	18	23	23	17	14	16	16	16	16	16	16
3	16	16	16	16	16	16	16	16	15	16	21	17	20	23	25	20	18	17	16	16	16	16	16	18
4	16	16	16	16	16	16	16	16	16	15	14	24	22	27	21	14	17	14	16	16	16	16	16	16
5	16	16	16	16	16	16	16	16	16	15	15	18	21	22	20	17	17	14	16	16	16	16	16	16
6	16	16	16	16	16	16	16	16	16	14	16	18	18	23	20	15	14	15	14	16	16	16	16	16
7	16	16	16	16	16	16	16	16	14	14	18	19	24	21	18	17	16	16	16	16	16	16	16	16
8	16	16	16	16	16	16	16	16	16	18	16	21	18	16	16	14	14	16	16	16	16	16	16	16
9	16	16	16	16	16	16	16	16	16	14	18	20	18	17	15	14	15	13	16	16	16	16	16	16
10	16	16	16	16	16	16	16	16	16	17	16	17	18	15	14	15	15	16	16	16	16	16	16	16
11	16	16	16	16	16	16	16	16	16	14	19	19	23	26	14	15	14	16	16	16	16	16	16	16
12	16	16	16	16	16	16	16	16	16	16	15	18	21	20	18	16	16	16	16	16	16	16	16	16
13	16	16	16	16	16	16	16	16	16	16	17	14	16	17	17	18	15	16	16	16	16	16	16	16
14	16	16	16	16	16	16	16	16	16	16	18	18	19	21	18	16	16	16	16	16	16	16	16	16
15	16	16	16	16	16	16	16	16	16	15	15	20	25	22	21	16	14	15	16	16	16	16	16	16
16	16	16	16	16	16	16	16	16	16	14	18	20	19	19	18	17	16	16	16	16	16	16	16	16
17	16	16	16	16	16	16	16	16	16	15	19	21	21	24	22	18	16	16	16	16	16	16	16	16
18	16	16	16	16	16	16	16	16	15	17	19	23	22	21	19	20	15	16	16	16	16	16	16	16
19	16	16	16	16	16	16	16	16	16	14	15	17	20	18	16	15	13	15	16	16	16	16	16	16
20	16	16	16	16	16	16	16	16	15	15	17	17	16	19	17	16	15	16	16	16	16	16	16	16
21	16	16	16	16	16	16	16	16	16	14	14	22	22	20	19	20	16	16	16	16	16	16	16	16
22	16	16	16	16	16	16	16	16	16	16	18	17	22	21	20	18	16	16	16	16	16	16	16	16
23	16	16	16	16	16	16	16	16	17	16	21	20	20	21	21	14	16	15	16	16	16	16	16	16
24	16	16	16	16	16	16	16	16	15	17	18	18	21	20	20	14	15	16	16	16	16	16	16	16
25	16	16	16	16	16	16	16	16	16	16	17	20	22	20	20	16	15	16	16	16	16	16	16	16
26	16	16	16	16	16	16	16	16	16	17	24	22	22	24	19	16	15	16	16	16	16	16	16	16
27	16	16	16	16	16	16	16	16	16	15	15	14	19	20	19	20	17	16	16	16	16	16	16	16
28	16	16	16	16	16	16	16	16	15	15	18	20	20	22	14	14	13	14	16	16	16	16	16	16
29	16	16	16	16	16	16	16	16	16	15	17	20	29	20	21	23	19	16	16	16	20	16	16	16
30	16	16	16	16	16	16	16	16	16	16	18	21	18	21	20	18	16	16	16	16	16	16	16	16
31	16	16	16	16	16	16	16	16	16	15	17	18	20	18	17	18	16	15	16	16	16	16	16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	16	16	16	16	16	16	16	16	16	15	17	19	20	21	19	16	16	16	16	16	16	16	16	16
U Q	16	16	16	16	16	16	16	16	16	16	18	20	22	22	20	18	16	16	16	16	16	16	16	16
L Q	16	16	16	16	16	16	16	16	15	15	16	17	19	19	17	15	15	15	16	16	16	16	16	16

OCT.2021 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

OCT. 2021 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

$\begin{matrix} H \\ D \end{matrix}$	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	295	313	349	351	312	305	341	363	354	356	348	327	298	339	327	318	312 <sup>R</sup>	342	361	340	335	302	312	286
2	296	322	330	314	317	352	347	377	381	376	340	340	338	329	314	314	330	335	347	362	348	288	274 <sup>F</sup>	298
3	299	277	301	340	406	295	314	383	354	351	352	344	315	351	305	277 <sup>R</sup>	317	327	345	292	317	278 <sup>R</sup>	268	288
4	291	298	352	347	357	297	316	372	364	333	344	329	334	333	327	286	284	333	351	379	383	290	297	299
5	311	296	323	328	395	345	307	364	358	327	327	322	332	315	308	322	345	363	377	365	318	273	276	342
6	318	311	316	337	337	331	328	370	349	339	333	365	315	303	315	315	307	312	351	357	330	294	279	299
7	319	326	328	340	302	299	304	363	364	365	356	333	309	317	299	294	314	337	345	314 <sup>R</sup>	300	329	325	318
8	310	300	298	319	377	330	322	378	369	358	340	347	310	303	327	316	319	341	353	360	371	298	306	300
9	299	309	302	315	370	377	303	378	377	365	362	358	318	319	301	310	322 <sup>R</sup>	354	353	325	312 <sup>V</sup>	324	327	302
10	278	302	310	315	349	329	353	376	372	370	343	321	308	313	311	324	311 <sup>R</sup>	329	337	357	336	301	290	282
11	283	276	280	301	346	346	297	373	363	348	362	338	321	302	325	313	359	367	358	338	350	307	304	307
12	295	308	320	316	321	333	330	368	368	362	351	339	333	267	302	322	335	357	306 <sup>R</sup>	304 <sup>J R</sup>	287 <sup>J R</sup>	227 <sup>J R</sup>	301 <sup>A</sup>	
13	288	291	300	287	324	340	314	330	361	346	345	353	321	305	328	326	331	343	360	299	306	292	276 <sup>R</sup>	298
14	292	298	298	298	339	350	313	391	372	360	354	363	342	360	307	316	343	373	382	352	295	294 <sup>A</sup>		313
15	305	333	295	315	321	326	321	371	376	371	341	352	354	313	295	336	342	357	352	326	304	315	323	325
16	319	301	301	296	350	389	304	376	354	355	358	357	327	294	311	326	355	382	378	330	298	305	296	315
17	310	311	317	321	390	317	323	371	381	363	357	356	338	291 <sup>H</sup>	321	318	349	357	357	357	264	303	291	301
18	296	308	311	326	357	337	331	360	354	353	322	333	356	330	324	349	347	370	386	301	312	308	307	320
19	317	311	318	305	346	361	416	351	360	356	353	345	339	335	329	329	341	345	363	368	321 <sup>A</sup>	291	296	313
20	296	299	322	378	381	309	335	390	394	365	344	348	358	291	315	336	360	378	378	336	293 <sup>A</sup>	311	321	
21	284	306	318	310	349	418	388	396	381	373	366	366	330	299	311	330	338	331	316 <sup>J R</sup>	380	295	294	289	275
22	292	273	312	332	352	330	367	362	390	364	354	349	344	323	324	317	329	370	364	307	265	292	344	308
23	290	303	308	342	362	381	331	374	403	372	342	363	354	288 <sup>H</sup>	345	312	306	357	370	332	272	287	301	293
24	310	307	319	316	372	342	348	365	381	352	346	355	324	305	327	325	337	381	355	341	296	319	338	290
25	303	323	340	321	304	355	337	372	371	346	326	331	328	335	334	330	342	352	377	347	281	309	307	304
26	327	324	317	350	339	329	337	367	375	348	359	332	317	313	309	311	334	346	359	284 <sup>J R</sup>	267	271	278	310
27	296	305	305	313	337	344	364	379	376	363	315	356	353	290	312 <sup>R</sup>	322	335	333	364	346	298	307	281	267
28	286	300	305	315	355	385	373	388	372	365	322 <sup>H</sup>	353	339	313	310	332	341	375	366	309	260 <sup>H</sup>	294	302	294
29	313	286	315	324	341	362	343	366	381	353	342	341	359	305	328	328	330	389	356	314	274	307	328	313
30	293	300	296	318	354	334	324	359	364	358	349	342	344	314	328	330	346	325	346	309	291	340	320	270
31	298	294	294	291	320	340	292	359	372	340	335	343	350	329	344	304	313	337	327	314 <sup>J R</sup>	275 <sup>J R</sup>	283 <sup>J R</sup>	319	302
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	30	30
MED	296	303	312	318	349	340	330	371	372	358	345	345	333	313	315	322	335	352	357	336	299	294	302	302
U Q	310	311	320	337	362	355	347	378	381	365	354	356	344	329	327	329	343	370	366	357	321	307	319	313
L Q	292	298	301	313	324	329	314	363	361	348	340	333	318	302	309	313	317	335	347	309	281	290	289	293

OCT. 2021 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

OCT.2021 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								L	L	L	L	U L	L	L	412	L	L	L						
2										L	A	L	L	420	404	A	A	L	L					
3										L	L	L	L	A	U L	U L	L	L						
4										L	U L	L	L	L	418	397	378	370	A					
5										U L	L	L	U L	L	L	L	L	L						
6										U L	A	A	A	A	L	L	L	L	L					
7									L	L	L	L	U L	L	L	L	L	L						
8										L	L	A	U L	L	L	L	L	L	A					
9										L	L	A	L	L	L	L	L	L						
10									L	L	L	L	L	L	L	L	L	L						
11										L	L	L	L	L	L	A	A	L						
12										L	L	L	L	L	L	L	L	L						
13										L	L	L	L	L	L	L	L	L	A					
14										U L	L	L	L	U L	L	A	A	A						
15										L	A	L	L	U L	U L	L	L	L						
16										L	L	L	U L	L	L	A	L	L						
17										L	L	L	L	L	L	L	L	L						
18									L	L	U L	L	L	L	L	L	L	L						
19										L	L	U L	L	L	L	L	L	L						
20										L	L	L	L	L	L	A	A	A						
21										L	L	U L	L	L	L	L	L	L						
22										L	L	L	L	L	L	L	L	L						
23										L	L	A	L	L	L	L	L	L	A					
24										L	L	L	L	U L	L	A	L	L						
25										L	U L	L	L	L	L	U L	L	L						
26										L	L	U L	U L	L	L	L	L	L						
27											L	L	L	L	A	L	L	L						
28										U L	L	L	U L	L	L	L	L	L						
29										U L	L	L	U L	L	L	L	L	L						
30										L	L	L	L	L	L	A	L	L						
31										L	L	L	L	L	L	U L	L	L						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										9	21	28	27	25	23	17	3							
MED										U L	L	L	L	L	L	L	L	L						
U Q										389	385	387	400	397	381	373	372							
L Q										U L	L	L	L	L	L	L	L	L						
										377	381	378	386	382	367	364	370							

OCT.2021 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

OCT.2021 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								222	240	234	230	284	310	258	264	270	262	240							
2									224	256	258	268	260	278	282	262	252								
3									256	252	248	290	244	252	284	254									
4								230	274	254	260	268	238	242	272	290	258								
5									278	268	272	242	252	276	268										
6									264	266	230	250	262	268	246	246	234								
7								226	234	236	248	270	276	272	264	258									
8									240	254	246	258	298	262	258	244	238								
9									236	246	242		278	300	284	258									
10								228	232	242	282	278	262	272	250	234									
11									242	236	256	278	258	268	252	226									
12								228	236	248	250	252	352	300	270	244									
13								224	240	242	246	270	306	264	258	238	228								
14									234	250	234	246	232	290	272	254	220								
15								218	224	270	250	238	246	288	262	230									
16									244	240	236	246	260	264	268	226									
17									236	246	228	236	262	254	232										
18								244	226	276	268	228	242	272	232	232									
19									250	246	248	254	242	254	248	234									
20										256	250	238	290	296	266	232									
21									224	242	236	282	322	278	254	238									
22									232	248	252	242	242	260	244	228									
23								212	228	246	246	236	256	234	240	242	220								
24									242	258	230	248	328	264	264	236									
25								232		270	254	252	244	246	240	238									
26								222	254	236	258	272	260	268	258	242									
27									234	250	250	224	298	270	262	240									
28									234	278	250	246	262	286	260	240									
29									248	248	258	234	282	262		236									
30									230	248	244	236	276	258	248	236									
31									266	252	232	270	236	274	276										
	00	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	28	31	31	30	31	31	30	29	8							
MED								222	228	236	248	250	249	262	268	261	240	236							
U Q								232	246	258	258	270	282	278	270	254	246								
L Q								222	232	242	244	238	246	258	248	234	224								

OCT.2021 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

OCT. 2021 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	294	256	218	210	266	274	214	198	210	194	204	184	180	170	180	194	210	226	218	204	196	234	236	260
2	268	238	222	232	222	206	202	214	218	210	A	198	176	186	E A 246	E A 246	226	232	220	202	194	240	296	232
3	242	234	238	226	186	348	264	206	204	186	204	194	194	A	212	190	196	228	204	204	202	214	264	268
4	252	234	212	190	202	292	246	228	212	206	210	200	190	186	178	176	218	A	230	202	188	276	292	278
5	270	276	240	204	192	248	260	212	214	196	200	200	182	180	168	170	232	222	200	190	190	260	254	216
6	238	256	250	222	220	226	246	212	206	196	264	A	A	A	166	210	220	214	220	212	186	246	284	266
7	238	220	224	216	250	278	260	224	214	202	196	194	204	E A 226	218	202	228	222	216	200	204	218	226	230
8	244	266	258	236	190	202	208	202	208	206	216	A	186	168	214	226	222	A	208	202	192	238	260	280
9	282	266	274	256	208	202	260	206	220	206	212	A	292	A	E A 226	212	226	226	208	198	196	216	226	256
10	294	284	268	248	218	218	222	212	212	204	190	186	182	164	224	234	226	224	204	184	194	208	234	258
11	282	272	264	220	210	192	214	212	220	210	196	190	204	178	A	A	A	218	216	234	198	252	256	266
12	282	260	242	246	238	226	204	208	210	218	208	198	178	220	186	204	222	218	194	192	218	204	266	A
13	262	254	238	226	230	224	E A 276	226	216	202	222	E A 216	194	254	226	214	222	A	212	208	184	234	236	252
14	254	248	226	226	206	186	226	200	208	204	192	186	190	198	194	A	A	A	194	188	E A 272	E A 282	E A 324	A
15	286	240	E A 262	252	246	224	250	206	212	A	E A 210	E A 212	190	204	182	244	222	206	204	200	210	214	202	198
16	238	264	240	238	204	188	248	202	214	222	212	218	192	202	170	A	A	206	198	196	224	E A 284	268	252
17	256	252	244	246	198	214	250	216	214	192	210	206	196	178	174	214	212	218	212	186	242	264	272	270
18	278	256	262	240	224	234	210	220	204	212	198	200	192	194	240	210	218	220	200	218	232	234	258	246
19	242	240	238	264	228	218	182	206	220	220	208	208	182	204	186	194	202	214	202	188	194	296	282	250
20	280	300	256	206	212	290	240	202	202	218	206	202	208	190	A	A	A	214	198	210	A	244	240	254
21	270	294	292	282	220	186	214	194	204	210	194	E A 212	200	168	198	200	A	210	200	180	180	222	228	232
22	260	260	250	232	222	250	210	208	210	202	196	192	186	190	174	228	220	212	192	198	230	242	210	260
23	302	284	280	230	206	198	248	210	206	206	A	186	A	A	A	A	A	A	208	222	266	256	260	274
24	268	262	250	242	202	230	226	220	216	202	194	210	204	176	H A	218	220	212	222	212	240	236	210	252
25	258	238	234	244	248	222	214	212	216	208	198	190	196	174	178	216	224	226	198	188	236	242	258	272
26	240	238	256	218	208	228	228	212	216	224	220	198	200	226	210	206	204	216	198	194	188	244	240	242
27	242	252	264	248	218	214	204	208	204	202	208	190	190	180	A	A	232	218	202	192	204	230	278	E A 296
28	280	258	254	246	212	190	188	196	206	184	202	196	200	182	172	216	220	212	192	180	192	216	230	254
29	254	260	230	210	204	208	214	202	214	192	190	194	214	200	220	254	210	204	194	194	268	248	238	254
30	260	272	266	254	206	204	260	214	214	212	208	192	182	168	236	A	218	208	198	224	230	216	196	266
31	276	288	290	286	222	190	252	216	222	220	212	210	A	256	A	184	242	226	216	212	198	218	214	246
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	30	29	28	28	27	25	24	25	26	31	31	30	31	30	30
MED	262	258	250	236	212	218	226	210	212	206	206	196	192	186	190	210	220	218	204	200	199	236	247	254
U Q	280	272	264	248	224	234	250	214	216	212	211	207	200	204	222	222	226	224	216	210	230	252	266	268
L Q	244	240	238	220	204	202	210	202	206	202	196	191	184	176	176	197	215	212	198	190	192	218	228	246

OCT. 2021 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Okinawa

OCT.2021 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							B		A		A	A	A	A		A	A	A	A						
								104		100					102										
2							B							A					A						
								108	108	104	102	102	102		102	104	104	104							
3							B							A	A	A			B						
								108	104	104	104	102	102				102	104							
4							B						A		A				A						
								114	104	104	104	102		106		102	102	102							
5							B						A						B						
								110	102	104	102	102		102	102	102	102	102							
6							B												A						
								106	106	106	106	100	100	100	100	100	100	104							
7							B											A		A					
								112	104	104	104	104	104	104	104	104	104	104							
8							B						A	A	A	A	A	A	A						
								104	104	102	102	102													
9							B												A						
								120	108	104	104	104	104	104	102	102	106	112							
10							B		A		A			A	A				A						
								110		102		100	100			104	104	102							
11							B					A	A		A		A		A						
								108	106	102	102			106		106		110							
12							B	A						A	A	A	A	A	A		B				
								100	102	100	102	102	102	100	102	104									
13							A	A						A	A	A	A	A	A						
								102	102	100	100														
14							B					A							A		A				
								108	106	102	100		102	104	104	104	102								
15							B							A			A	A	A						
								116	102	104	104	102	102	102		102									
16							B		A	A	A	A	A	A	A	A	A	A	B						
								108																	
17							B	A	A	A	A					A	A	A	A						
								104	104	104	102														
18							B	A						A	A		A		B						
								106	102	102	102	102	102			106		124							
19							B					A	A	A	A	A		A	A						
								126	104	104	104						104								
20							B	A		A	A	A	A	A			A	A	A						
								106							106	104									
21							B						A	A	A	A	A	A	B						
								116	110	106	106	104													
22							B												A		B				
								116	102	102	102	102	100	106	106	104	104								
23							B	A						A					A						
								104	104	102	102	102			104	104	104	112							
24							B						A	A	A	A			A						
								122	104	104	102	102					102	106							
25							B												B						
								122	104	104	104	102	102	102	102	102	104	106							
26							B									A	A	A	B						
								112	104	102	106	102	102	102	102										
27							B	A										A	A	A					
								102	100	102	102	100	104	104	102										
28								A					A						B						
								102	102	102	102			100	102	102	102	100							
29								A			A	A	A	A					B						
								104	104						108	108	110	108							
30								A										A	A						
								106	104	104	104	106	102	102	104	108									
31								A											A	A					
								108	102	104	104	104	104	104	104	104	106								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								20	27	28	25	24	18	17	19	21	19	14							
MED								111	104	104	102	102	102	104	102	104	104	105							
U Q								116	106	104	104	103	104	104	104	104	104	110							
L Q								108	102	102	102	102	102	102	102	102	102	102							

OCT.2021 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

OCT.2021 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	90	B	B	B	B	B	B	166	108	G	96	92	96	90	G	90	90	90	88	82	82	82	86	B
2	B	B	B	B	B	B	B	126	120	124	106	106	112	94	174	128	128	112	108	100	102	98	92	94
3	90	98	88	112	112	B	B	122	128	128	120	120	G	96	98	100	G	G	B	B	B	90	B	B
4	B	90	88	90	90	B	B	134	118	130	114	104	98	G	110	106	140	112	102	100	94	92	B	96
5	94	88	92	100	B	98	B	116	118	G	132	94	96	96	96	G	150	122	110	98	B	90	86	B
6	B	B	B	B	B	94	B	136	132	118	106	106	106	104	110	108	182	162	118	100	98	94	90	94
7	88	86	B	B	B	B	B	122	112	108	112	110	108	104	106	104	100	100	98	92	92	88	92	84
8	88	88	B	B	B	B	B	138	108	102	106	102	102	100	102	160	96	96	112	102	96	100	88	B
9	B	94	90	90	90	92	94	152	124	128	116	112	108	108	106	116	164	202	86	82	96	96	92	92
10	90	90	90	90	B	B	B	168	108	106	106	G	G	88	176	160	156	132	110	102	B	98	110	88
11	86	96	92	86	92	92	92	124	112	104	106	100	96	G	94	134	128	126	112	100	100	96	98	92
12	92	96	92	B	B	B	B	120	120	106	110	106	108	158	108	104	G	98	B	B	B	114	104	100
13	100	100	90	B	112	104	104	104	106	108	102	102	104	102	98	100	102	102	98	92	92	96	92	92
14	90	92	88	92	B	88	B	G	110	106	102	106	106	108	118	112	102	100	100	82	94	94	98	92
15	92	90	90	90	98	92	138	122	118	108	112	106	116	104	102	108	100	92	90	90	92	90	B	B
16	84	82	86	88	B	B	B	112	180	114	156	104	102	102	98	100	106	102	100	98	100	96	90	92
17	96	B	88	96	B	B	B	108	162	106	102	104	104	104	102	104	180	152	122	108	96	102	96	94
18	94	86	84	88	88	88	92	90	G	G	112	G	114	102	182	150	174	178	B	108	100	96	100	96
19	96	B	B	B	90	90	94	164	130	114	114	102	102	102	98	100	96	152	102	84	96	114	94	96
20	100	92	100	98	92	B	136	146	146	110	108	104	110	104	104	102	100	102	98	96	108	102	96	96
21	96	96	126	126	96	B	92	146	138	120	110	108	106	104	106	114	102	104	98	94	92	92	88	88
22	90	86	88	B	B	B	B	G	G	118	114	110	112	106	106	106	108	148	120	104	108	92	100	94
23	92	B	B	B	B	B	B	112	126	110	106	104	100	100	124	116	112	132	122	108	106	102	98	88
24	94	88	88	B	90	B	B	G	138	106	102	100	100	100	96	116	146	150	88	84	84	94	86	B
25	B	B	B	B	B	B	B	G	160	136	134	120	108	G	G	164	144	118	100	100	94	96	94	B
26	B	B	B	88	88	B	B	126	162	114	114	124	112	168	158	122	108	100	96	94	92	86	B	B
27	B	B	B	B	B	B	B	126	124	122	114	110	G	120	104	102	100	98	94	94	92	B	90	92
28	108	86	104	84	B	B	B	116	104	98	150	G	104	G	G	180	160	94	B	94	B	B	B	B
29	B	92	B	B	92	B	94	128	152	100	106	102	156	170	164	124	G	G	B	B	B	122	B	94
30	90	92	94	90	B	B	98	152	170	144	128	130	116	G	128	116	122	108	90	B	84	90	B	B
31	B	86	86	88	B	96	92	88	158	158	132	128	112	108	106	116	104	104	100	98	96	96	98	96
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	22	22	20	17	13	10	13	27	29	28	31	28	28	26	28	30	28	29	26	28	25	29	24	21
MED	92	90	90	90	92	92	94	126	120	112	110	106	106	103	106	115	110	108	100	96	96	96	93	92
U Q	96	94	92	97	97	96	110	152	138	126	114	110	112	108	121	128	148	132	110	100	100	98	98	96
L Q	90	86	88	88	90	90	92	120	111	106	106	102	102	100	101	104	101	100	96	91	92	90	90	91

OCT.2021 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

OCT.2021 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

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							H2	C1		L1	L1	L1	L1		L2	L2	L3	L2	F1	F1	F2	F1		
2								C4	C3	C1	C3	C2	C1	L1	H1	C1	C1	C2	C1	F3	F1	F1	F3	F1	
3	F1	F1	F2	F3	F1			C3	C1	C2	C1	C1		L3	L1	L1						F1			
4		F2	F1	F1	F1			H4	C3	H1	C1	C1	C1		C1	C1	H1	C3	C3	F6	F4	F2		F1	
5	F1	F1	F1	F1		F1		C3	C2		H1	L1	L1	L1	L1		H1	C1	C1	F1		F2	F1		
6						F1		H1	H1	C1	C2	C2	C2	C2	C1	C1	H1	H1	C3	F7	F3	F3	F2	F2	
7	F1	F1						C3	C3	C1	C1	C1	C1	C2	C2	C2	C3	C3	L4	F8	F5	F5	F3	F2	
8	F1	F1						H1	C1	C2	C2	C2	C2	C2	C2	HL11	L2	L4	C5	F1	F3	F1	F1		
9		F1	F2	F2	F2	F2	L1	H2	C2	C1	C1	C2	C2	C2	C2	C1	H1	HL14	L2	F1	F2	F3	F1	F2	
10	F2	F4	F2	F1				H1	C1	C1	C1			L1	HC11	H1	H1	H1	C1	F1		F1	F2	F2	
11	F3	F1	F1	F1	F1	F1	L1	C2	C2	C2	C1	C2	L2		L2	H2	CL23	C1	C3	F9	F3	F3	F3	F4	
12	F3	F2	F1					C1	C1	C1	C1	C1	C1	HC11	C1	C1		LH11				F1	F1	F7	
13	F3	F1	F1		FF12	FF31	CL41	C3	C1	C2	C3	C3	C1	CH21	L3	C1	C2	C3	L4	F9	F8	F3	F3	F5	
14	F2	F6	F1	F1		F3		C1	C2	C1	C1	C1	C1	C2	C2	C3	C3	CL44	F5	F5	F6	F4	F5	F5	
15	F5	F6	F4	F2	F2	F1		H1	C3	C3	C4	C2	C1	C1	C2	C1	C3	L5	F5	F9	F2	F1			
16	F3	F4	F2	F1			C1	HC11	CH11	HC11	CH11	C3	C2	L3	L2	C2	C4	L3	L1	F3	F1	F7	F3	F2	
17	F1		F2	F1			C1	HC11	C1	C1	C1	C1	C1	C1	C1	HC11	HC11	CL22	C2	F3	F3	F2	F1	F1	
18	F1	F2	F2	F2	F1	F1	L1	LH11			C1		C1	C1	HC11	HC11	HL12	HL11		F1	F1	F3	F1	F2	
19	F1				F2	F2	L1	H1	H1	C2	C1	C2	C2	CH11	L1	C2	L1	HCL12	CL12	F2	F1	F2	F3	F1	
20	F2	F3	F1	F1	F2		H1	HC21	H1	C1	C2	C2	C2	C5	C5	C5	C3	L2	F4	FF58	F2	F4	F4	F2	
21	F3	F2	FF22	FF11	F1		L1	H2	H2	C2	C2	C1	C2	C1	C1	C1	C2	L1	F2	F2	F4	F3	F1	F1	
22	F3	F1	F1							C1	C1	C1	C1	C1	C1	C1	C1	HC12	C1	FF12	F3	F3	F1	F1	
23	F1							C1	C1	C1	C4	C2	C3	L2	L2	C3	C1	H4	CL71	F4	F3	F2	F3	F1	
24	F2	F3	F1		F1			H2	C2	C1	C1	C2	L2	L1	C2	CH11	H1	HC21	L8	F5	F2	F3	F1		
25								H1	H1	H1	C1	C1				H1	H1	C3	C1	F1	F3	F1	F1		
26				F5	F2			C2	H1	C1	C1	C1	C1	HC11	H1	CL11	C1	C2	L3	F8	F1	F1			
27								C3	C3	CL21	C1	C1		C1	C3	C2	C3	L3	L5	F5	F4		F4	F3	
28	FF31	FF11	F1	F2				C2	C2	L1	HC11		C1			H1	H1	L1		F3					
29		F1			F1		F1	H1	H1	LH11	C1	C1	HL11	HC11	HL11	C2				F1		F1		F2	
30	F1	F1	F1	F1			F1	HL11	H1	HL12	CL11	HL11	CL11		C2	C3	C1	L3			F1	F1			
31		F2	F2	F2		F1	F4	L2	HL11	H1	H1	C1	C1	C2	C2	C1	C3	CH21	C2	F4	F2	F6	F3	F1	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT																									
MED																									
U Q																									
L Q																									

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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

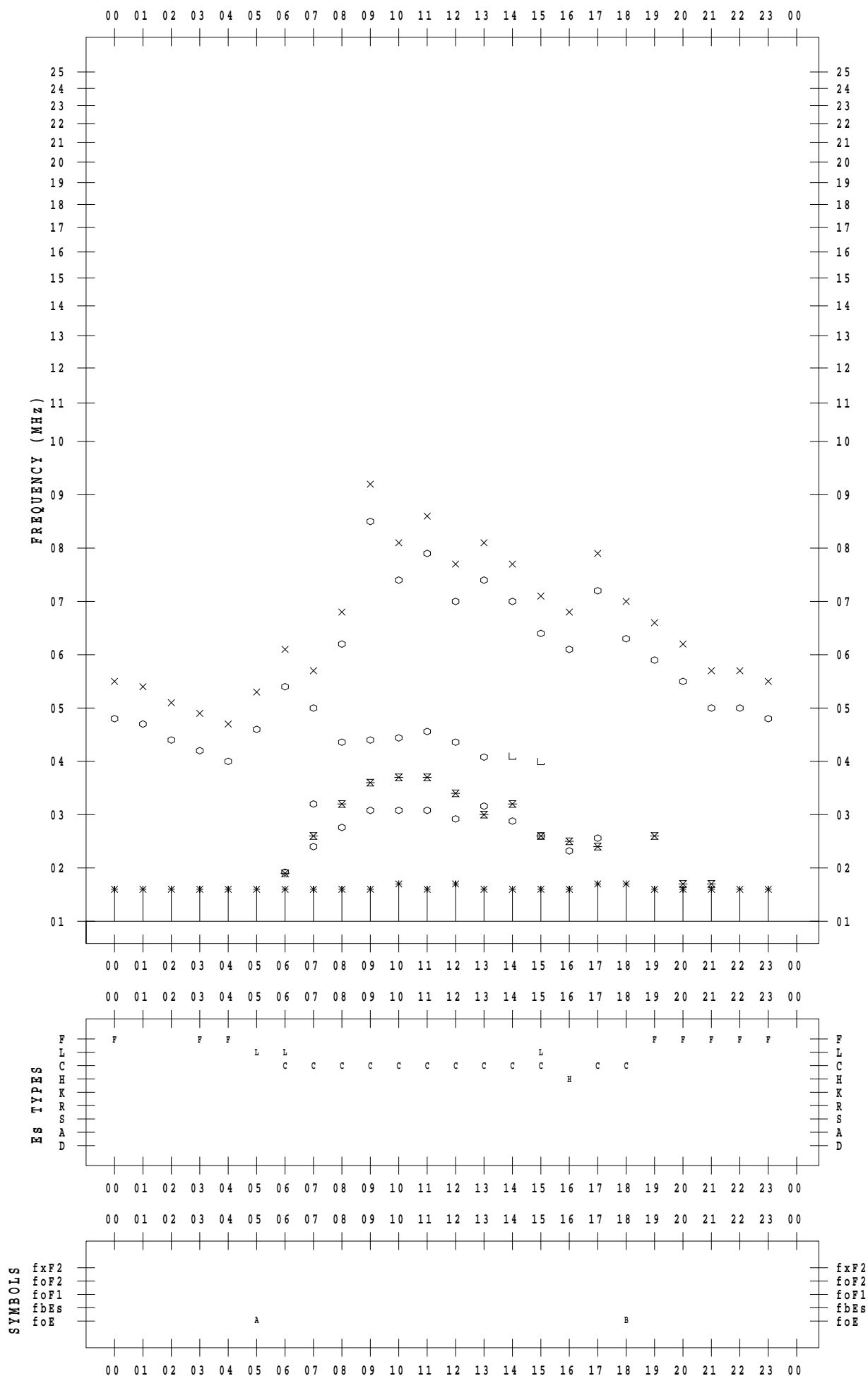
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/ 1

135 ° E MEAN TIME



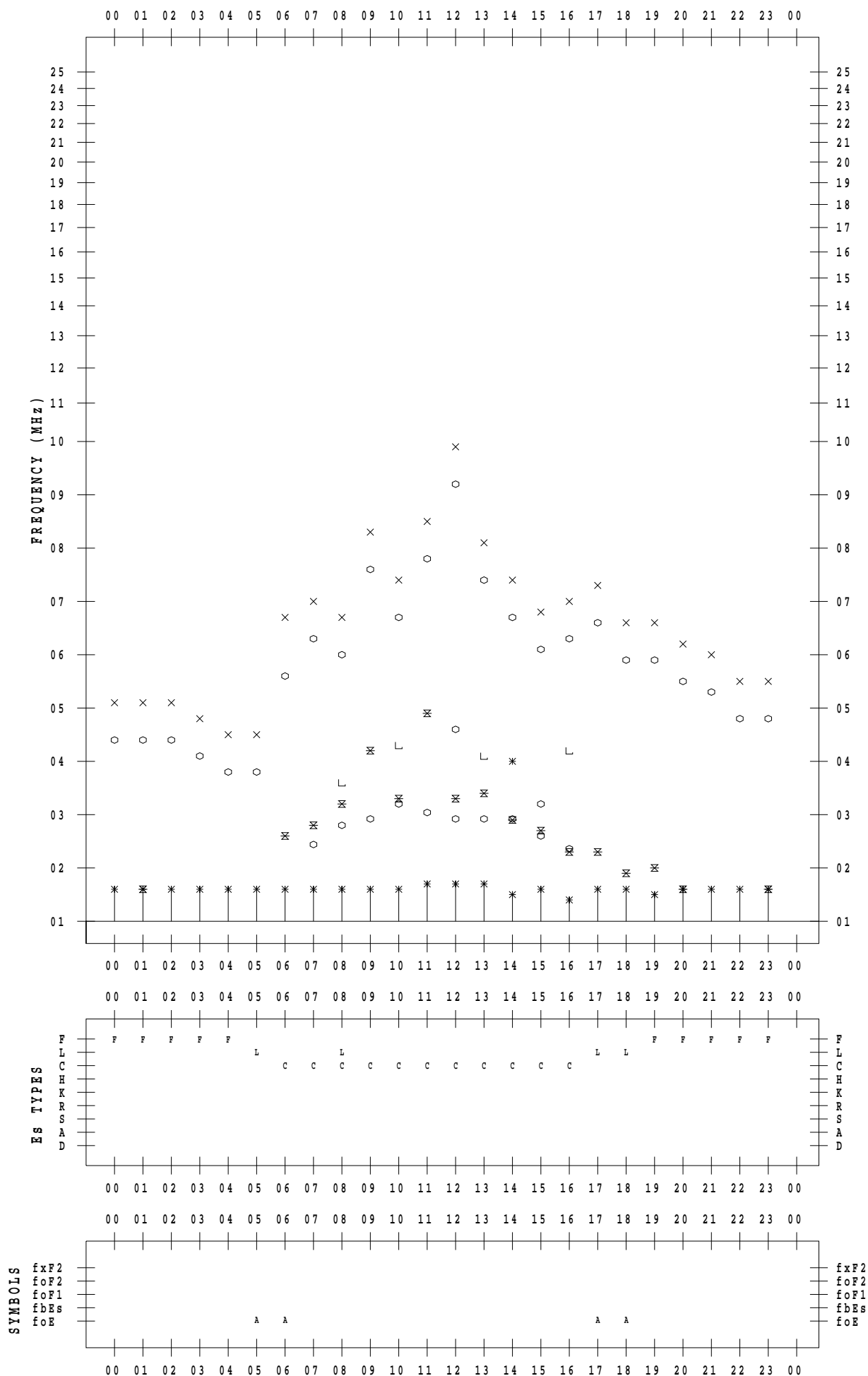
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/ 2

135 ° E MEAN TIME



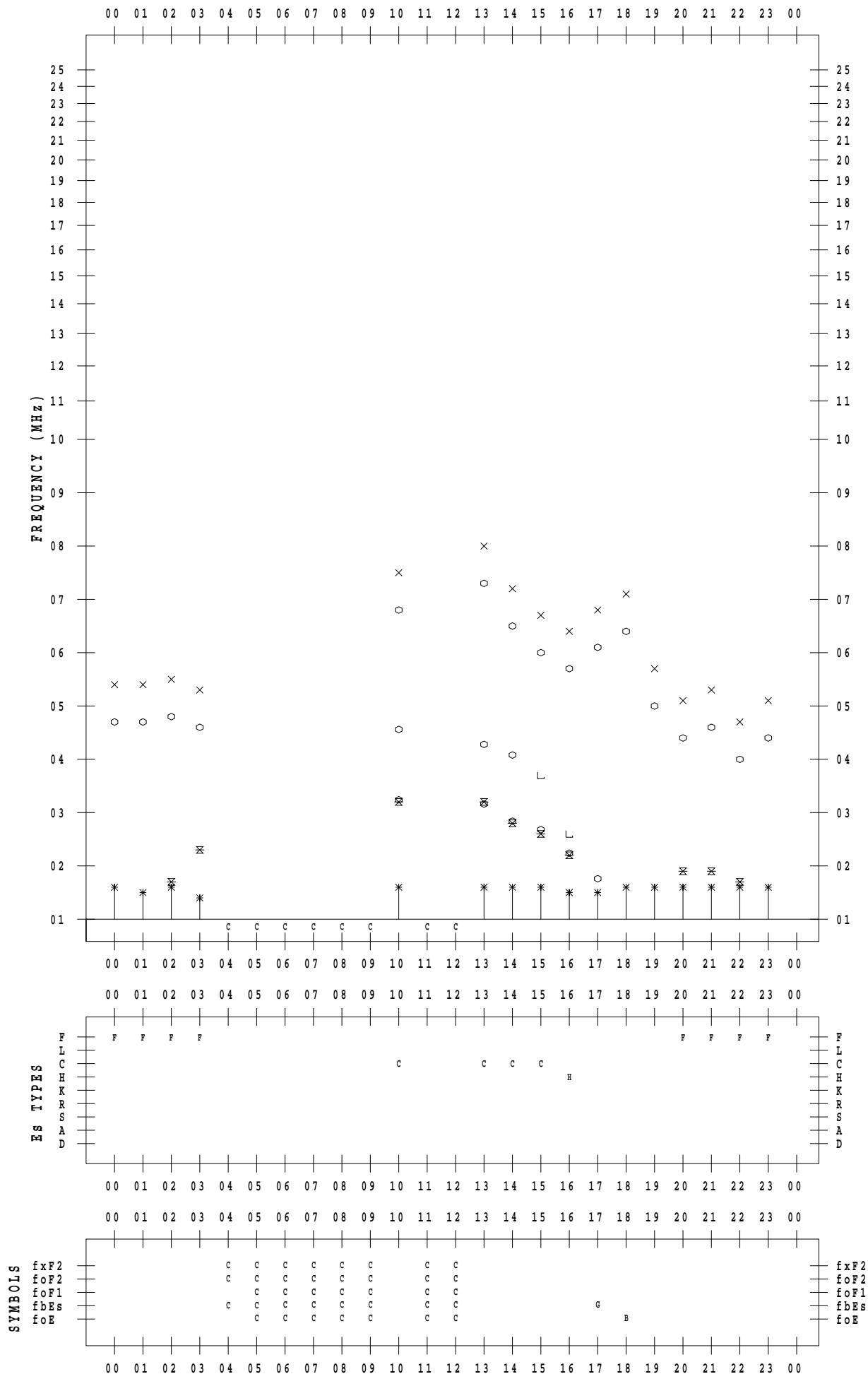
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/ 3

135 ° E MEAN TIME



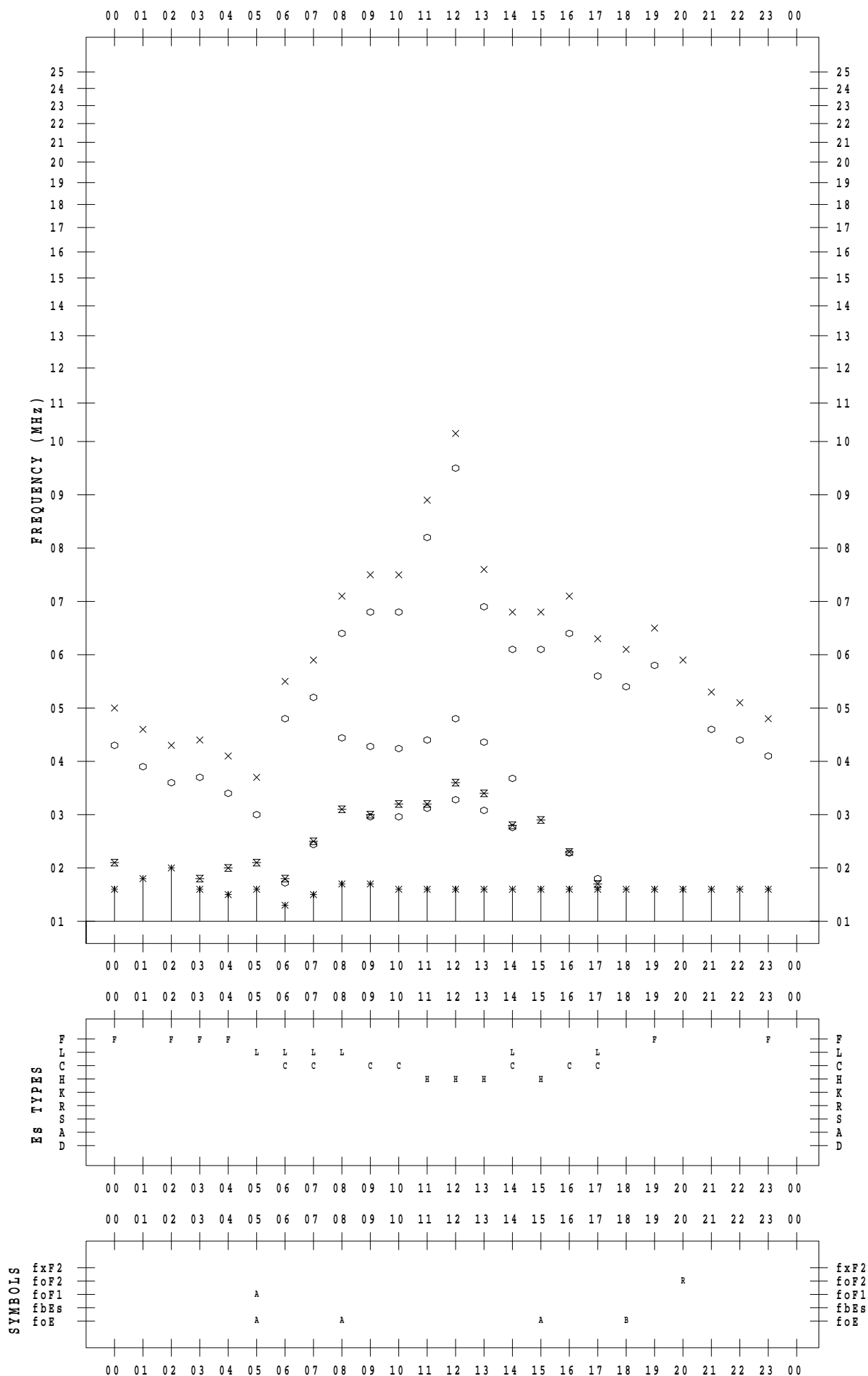
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/ 4

135 ° E MEAN TIME





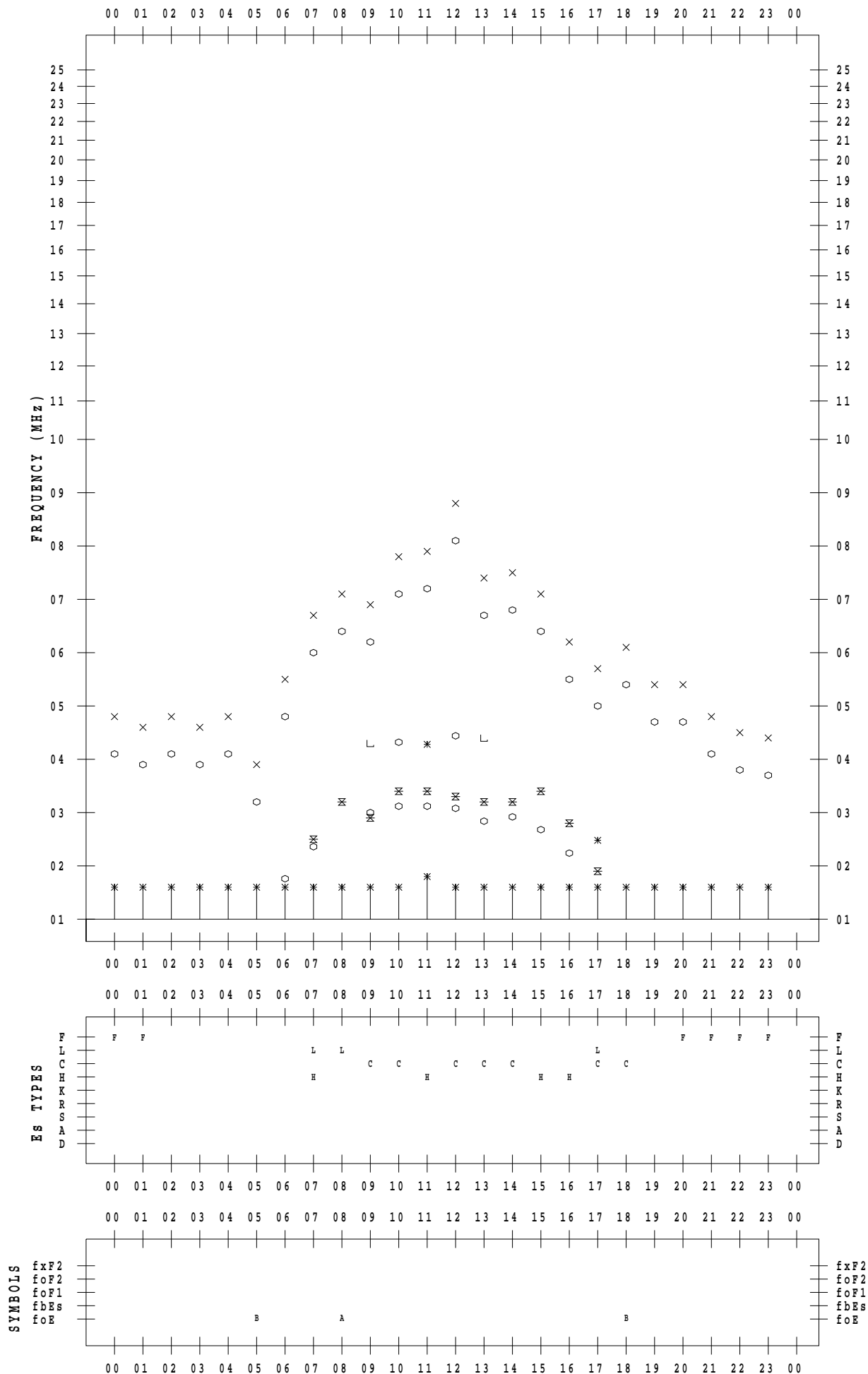
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/ 5

135 ° E MEAN TIME



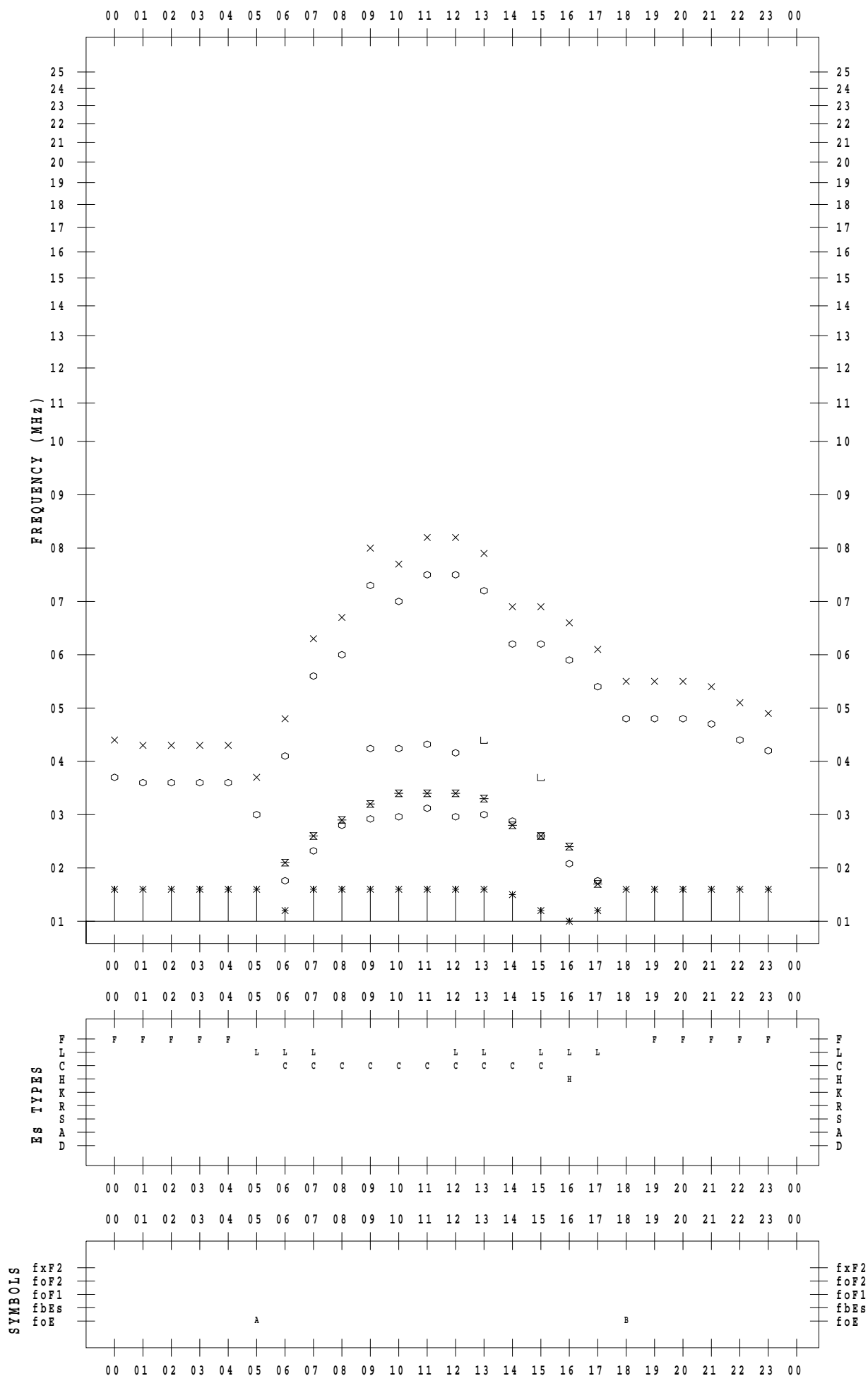
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/ 6

135 ° E MEAN TIME



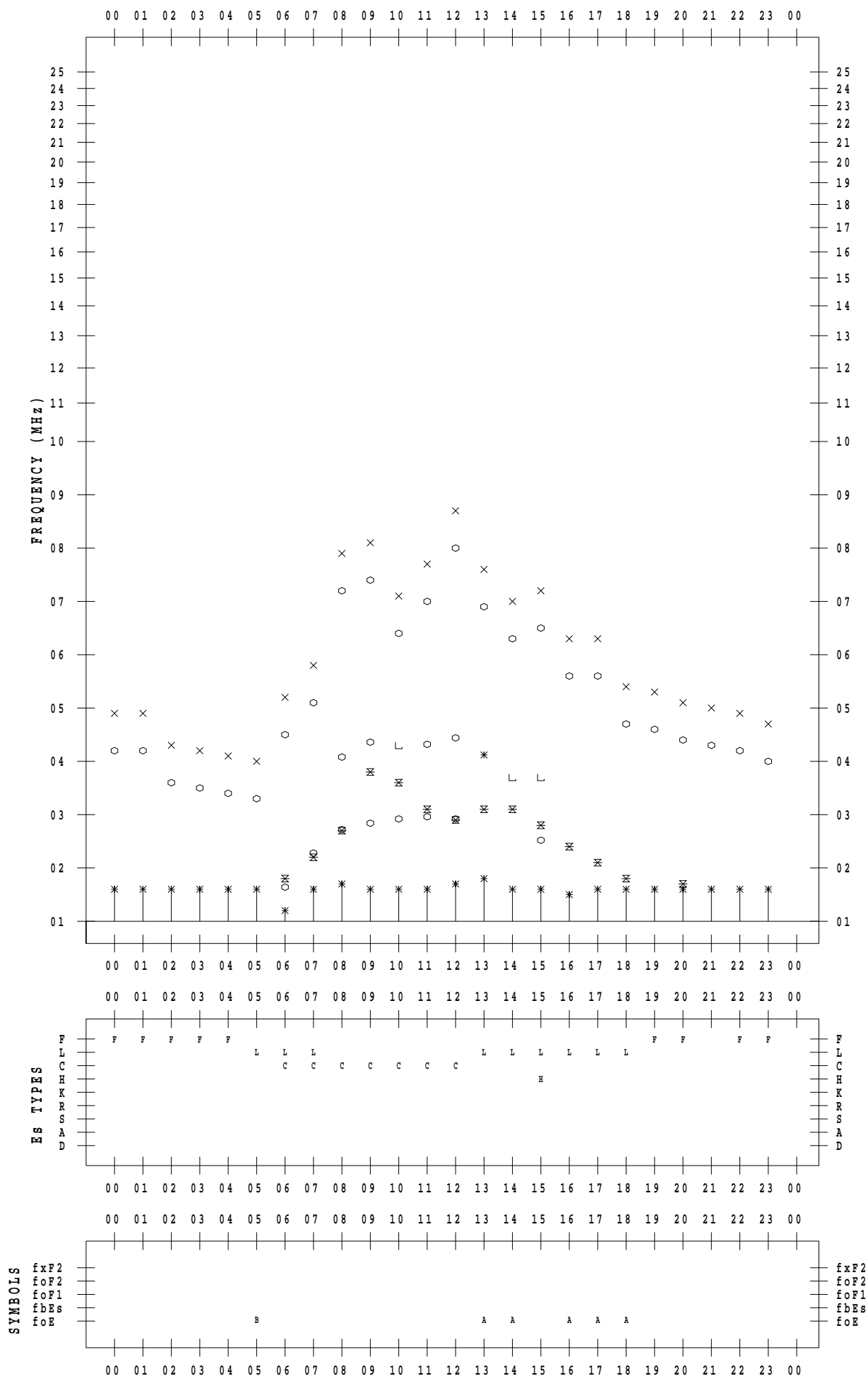
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/ 7

135 ° E MEAN TIME



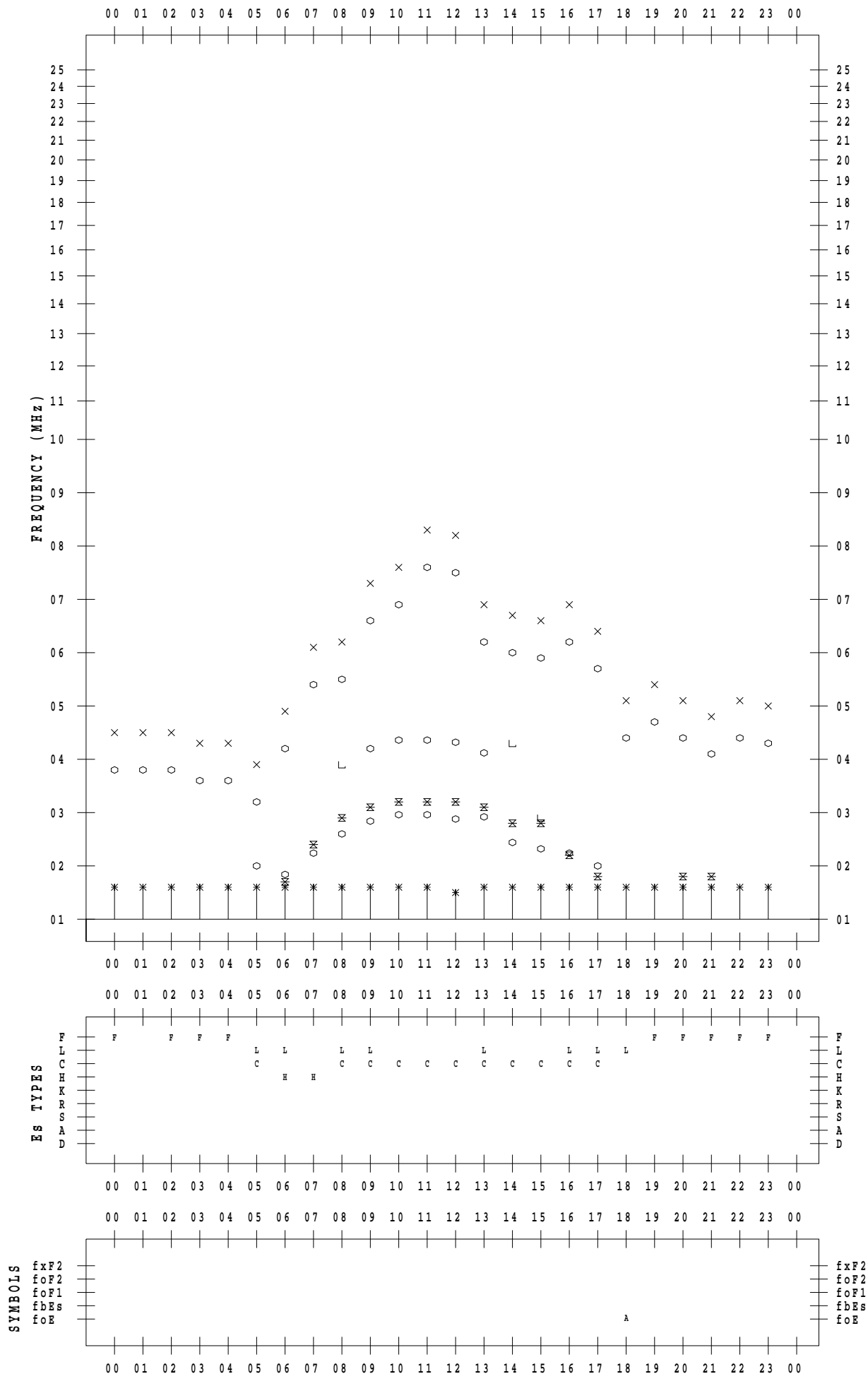
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/ 8

135 ° E MEAN TIME



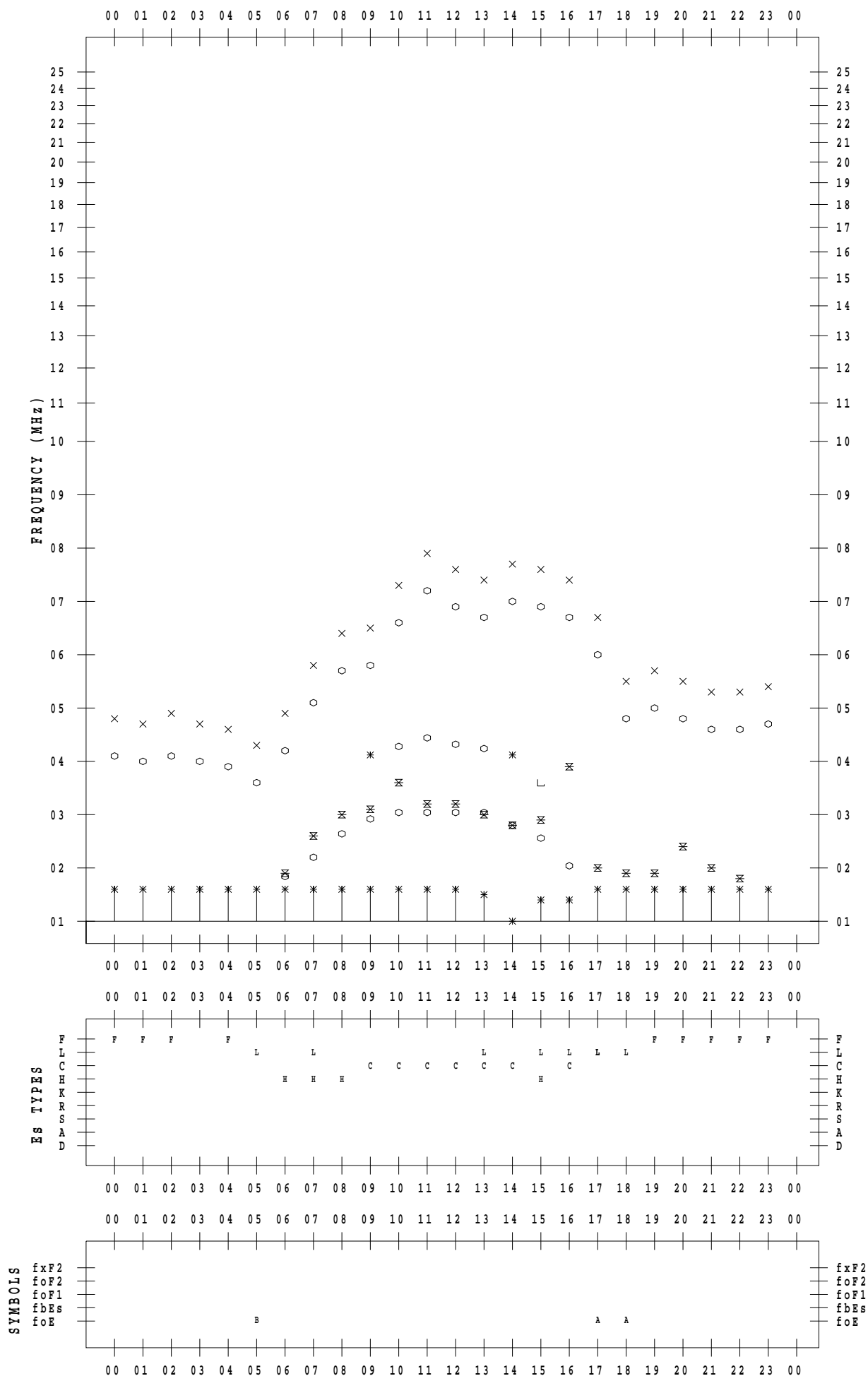
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/9

135 ° E MEAN TIME



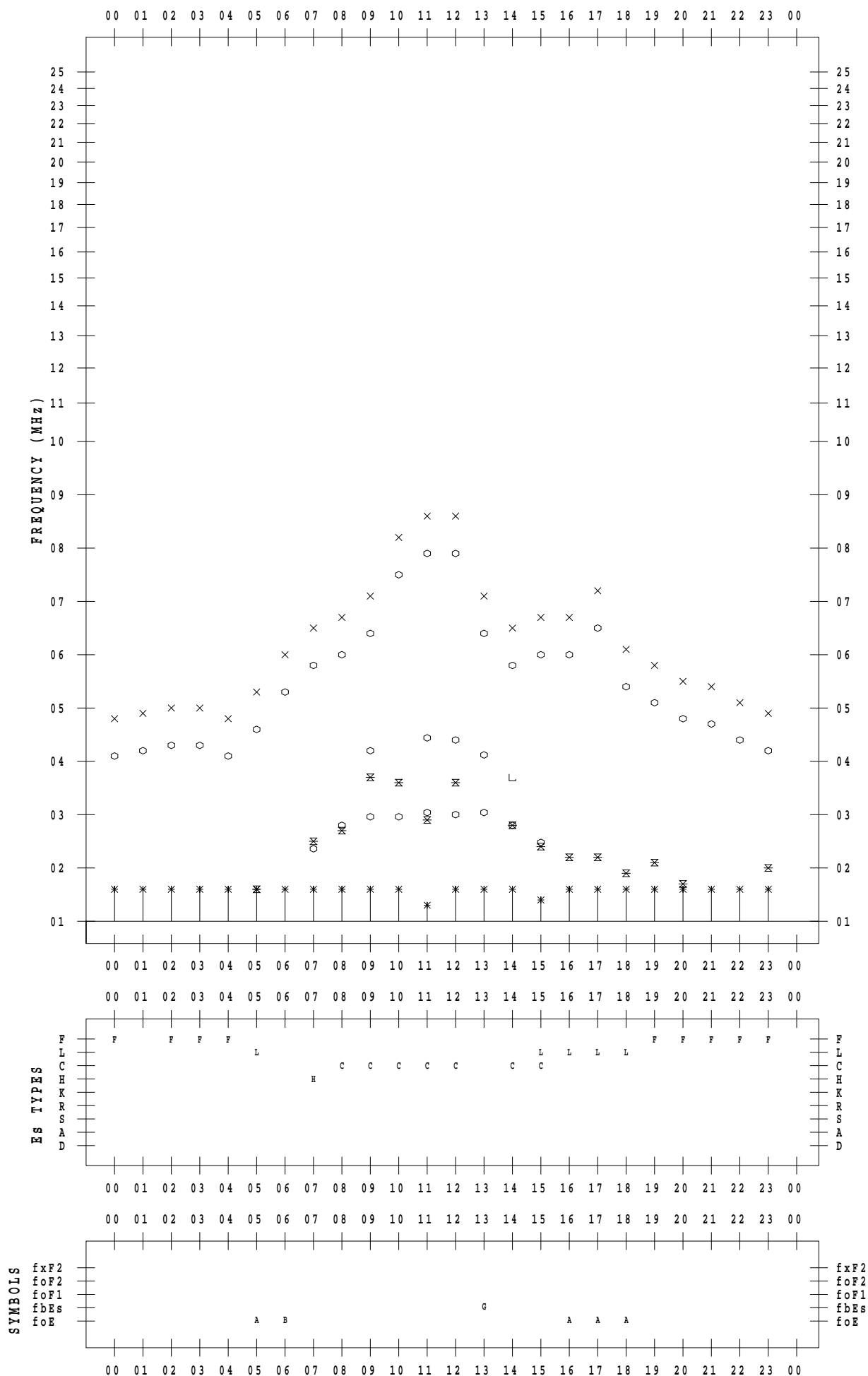
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/10

135 ° E MEAN TIME



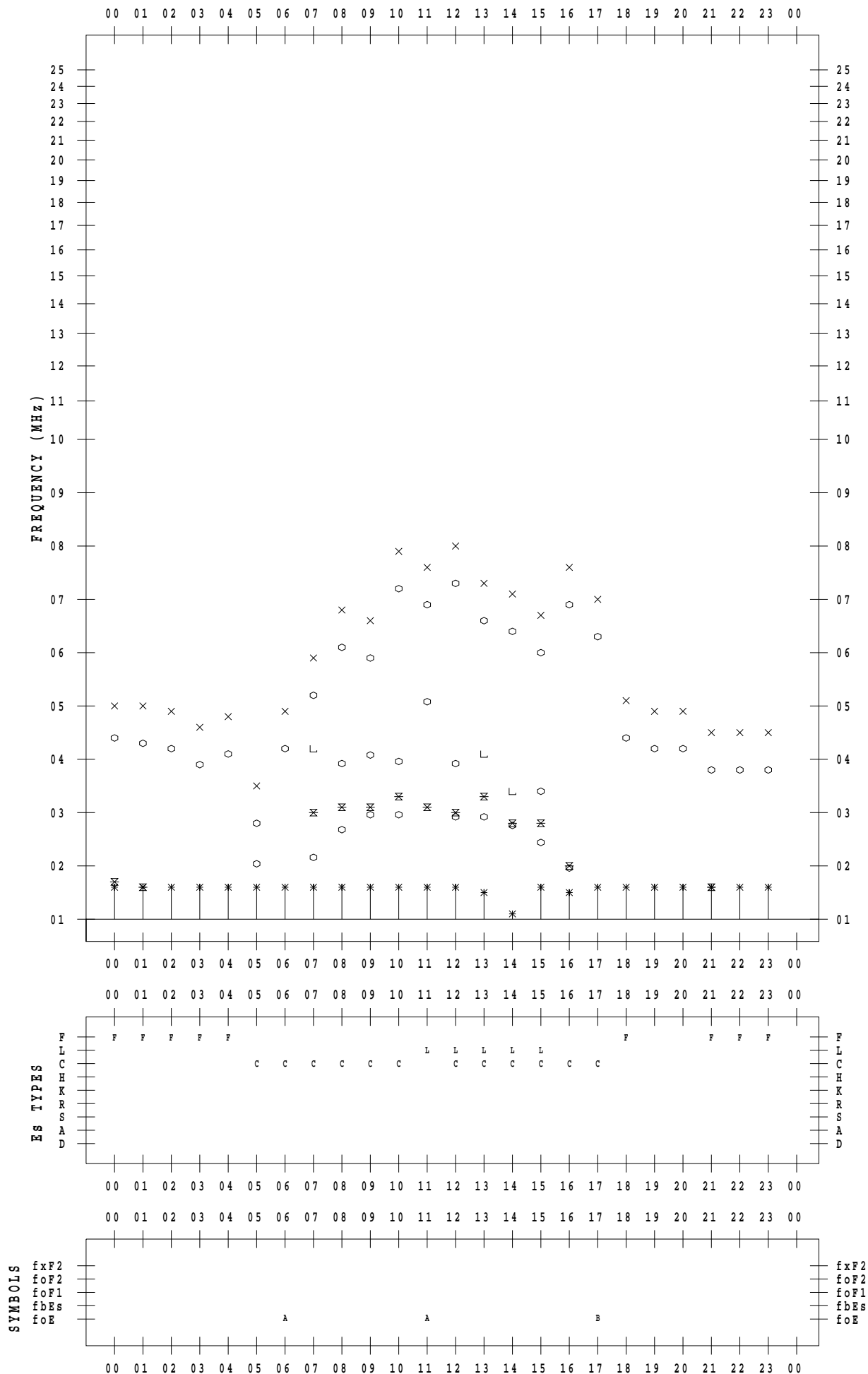
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/11

135 ° E MEAN TIME



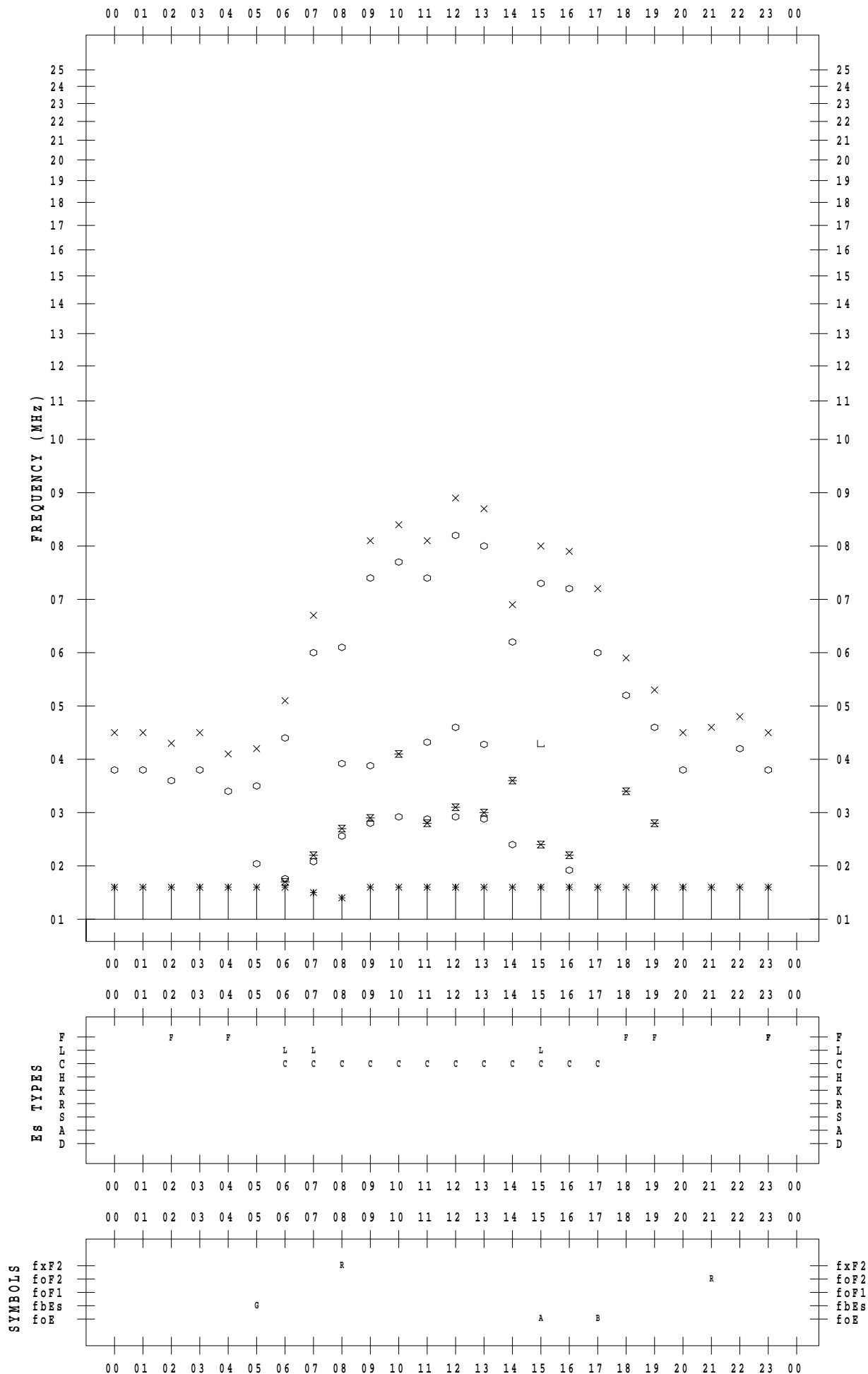
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/12

135 ° E MEAN TIME





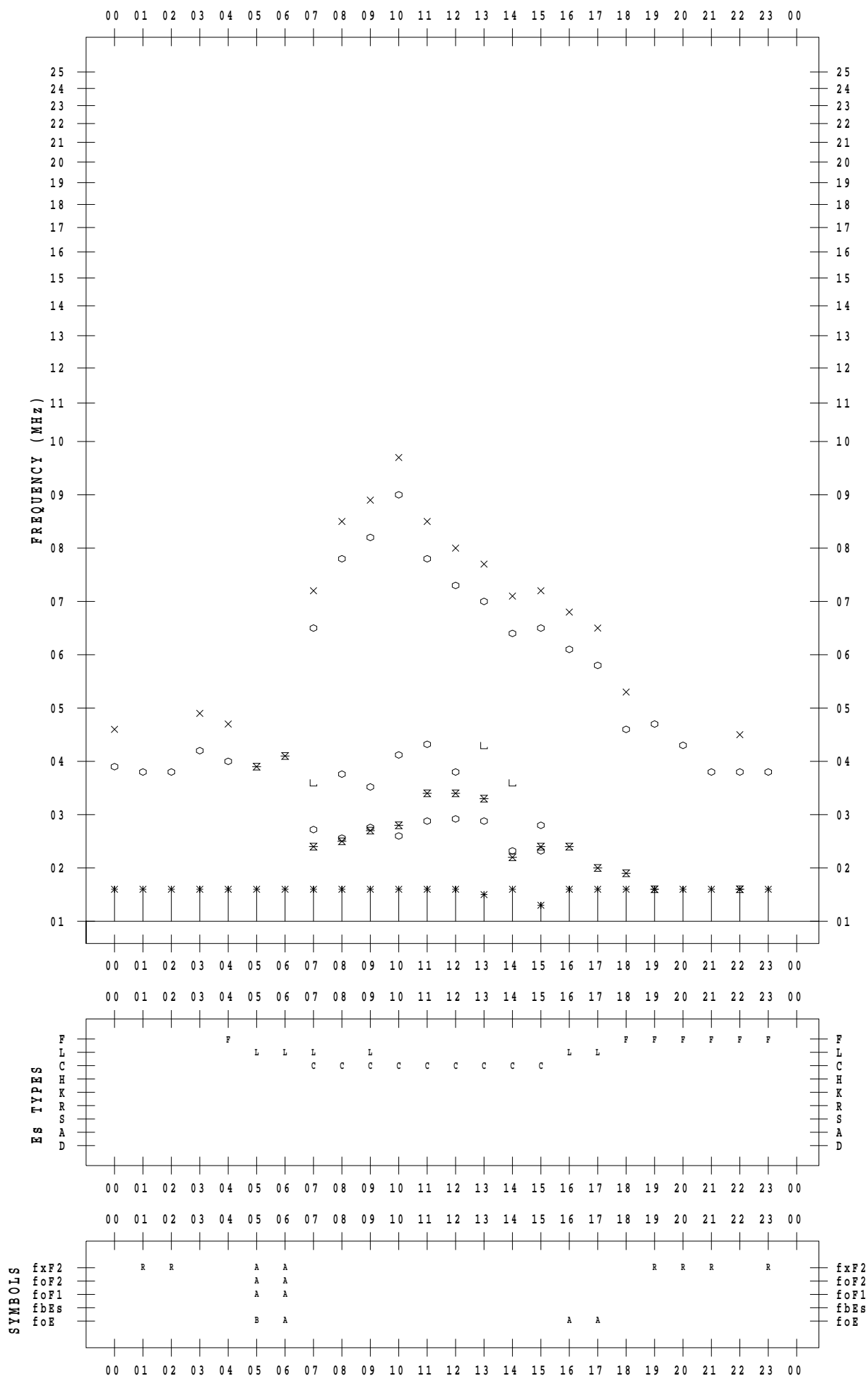
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/13

135 ° E MEAN TIME



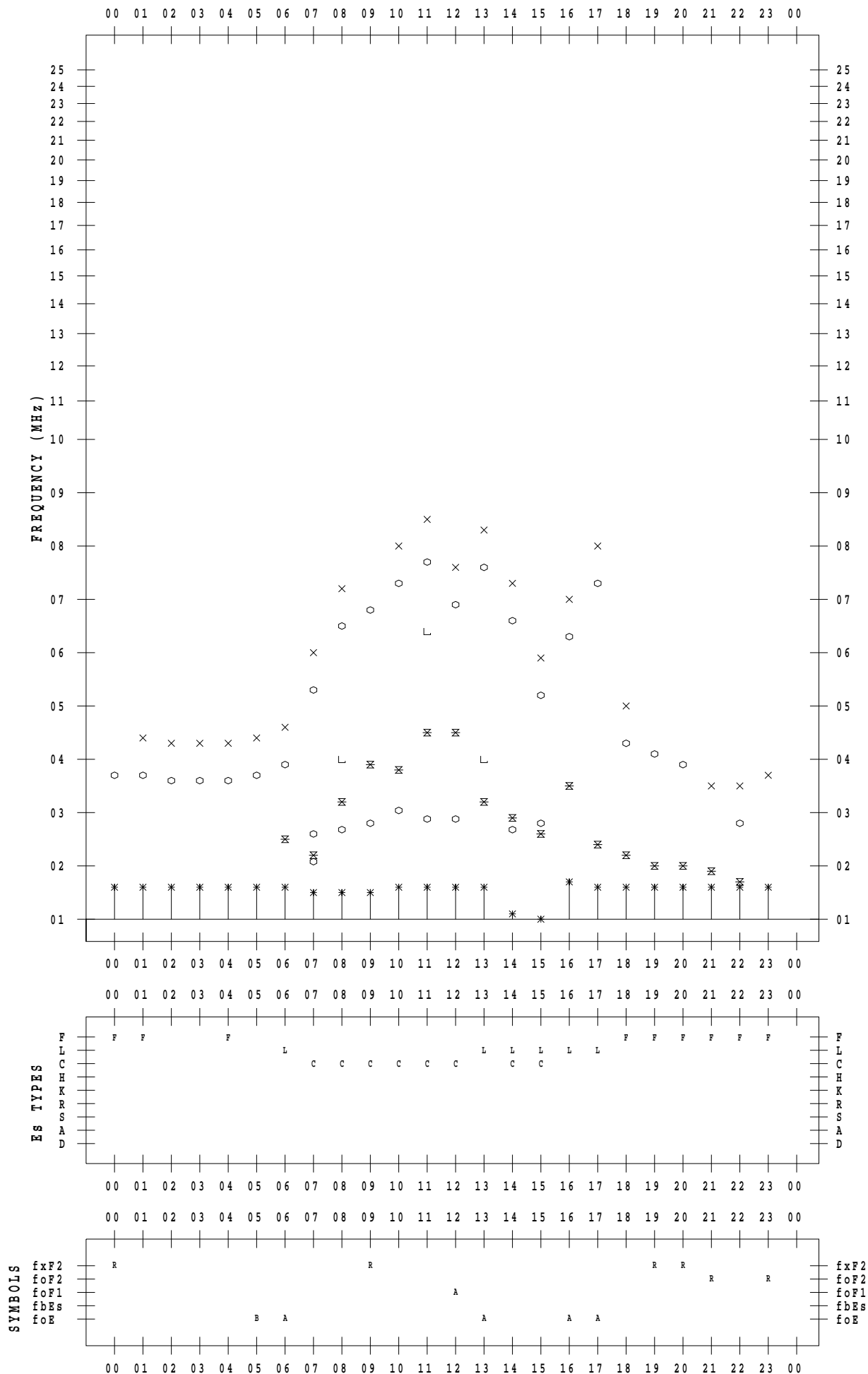
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/14

135 ° E MEAN TIME



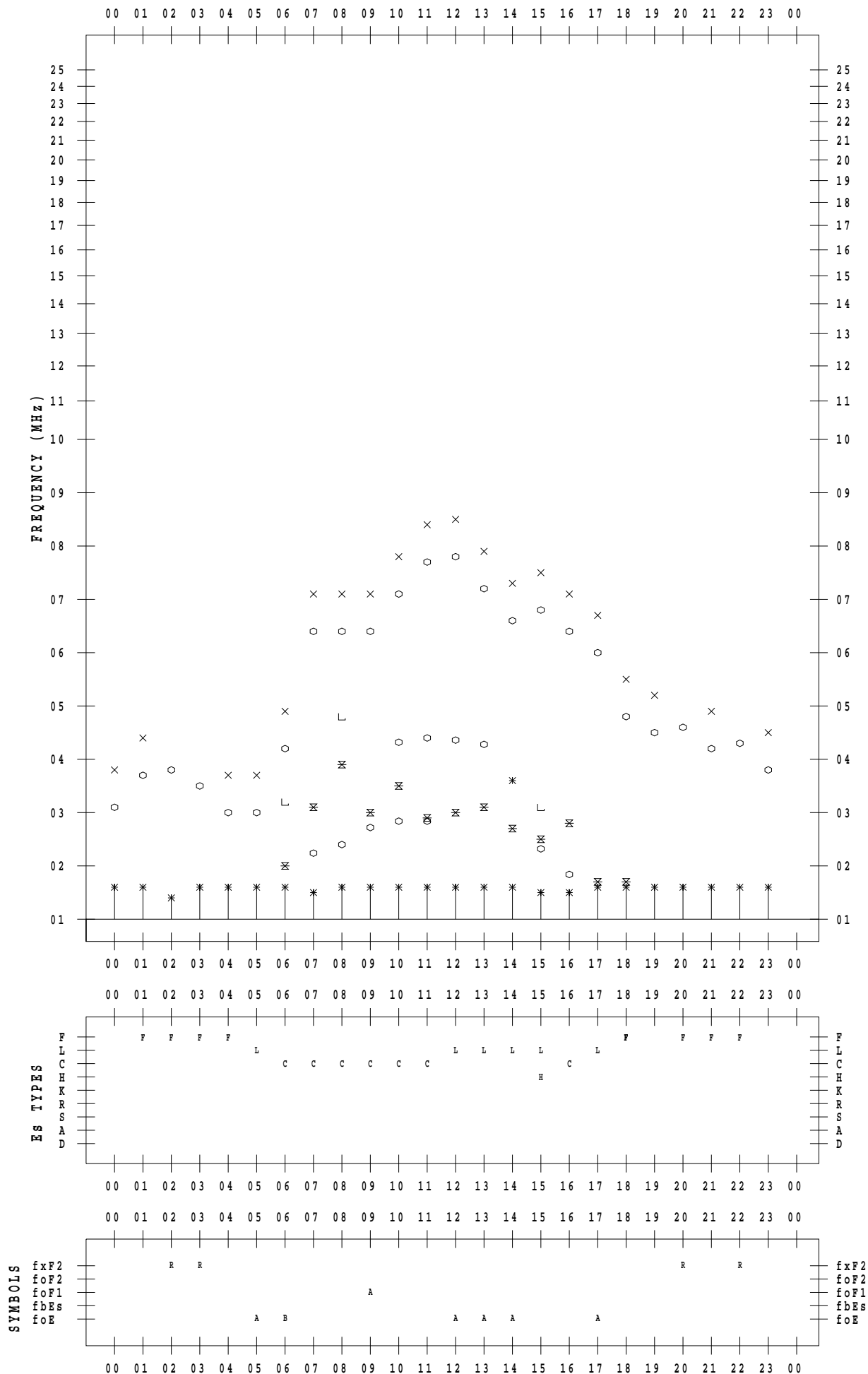
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/15

135 ° E MEAN TIME



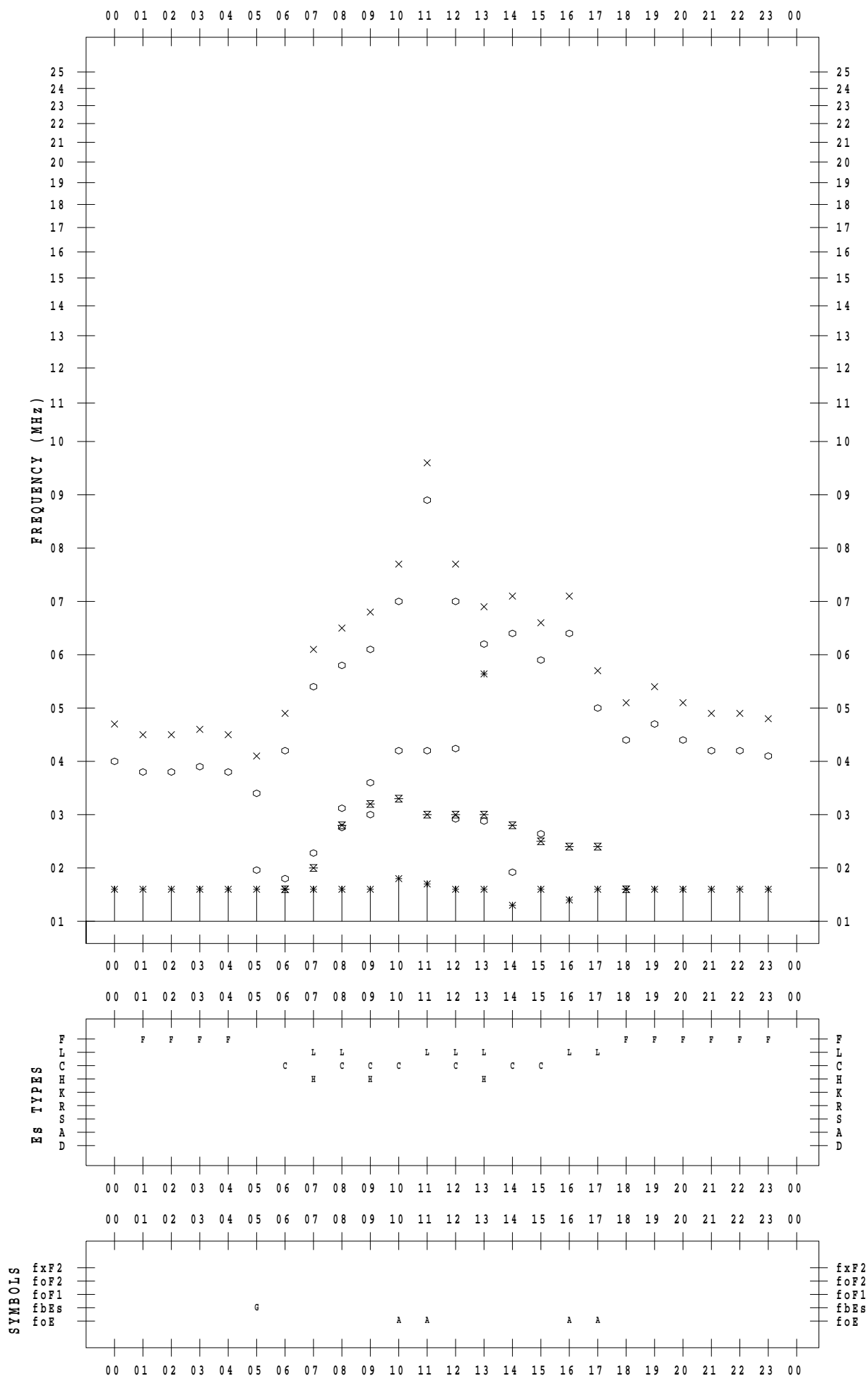
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/16

135 ° E MEAN TIME



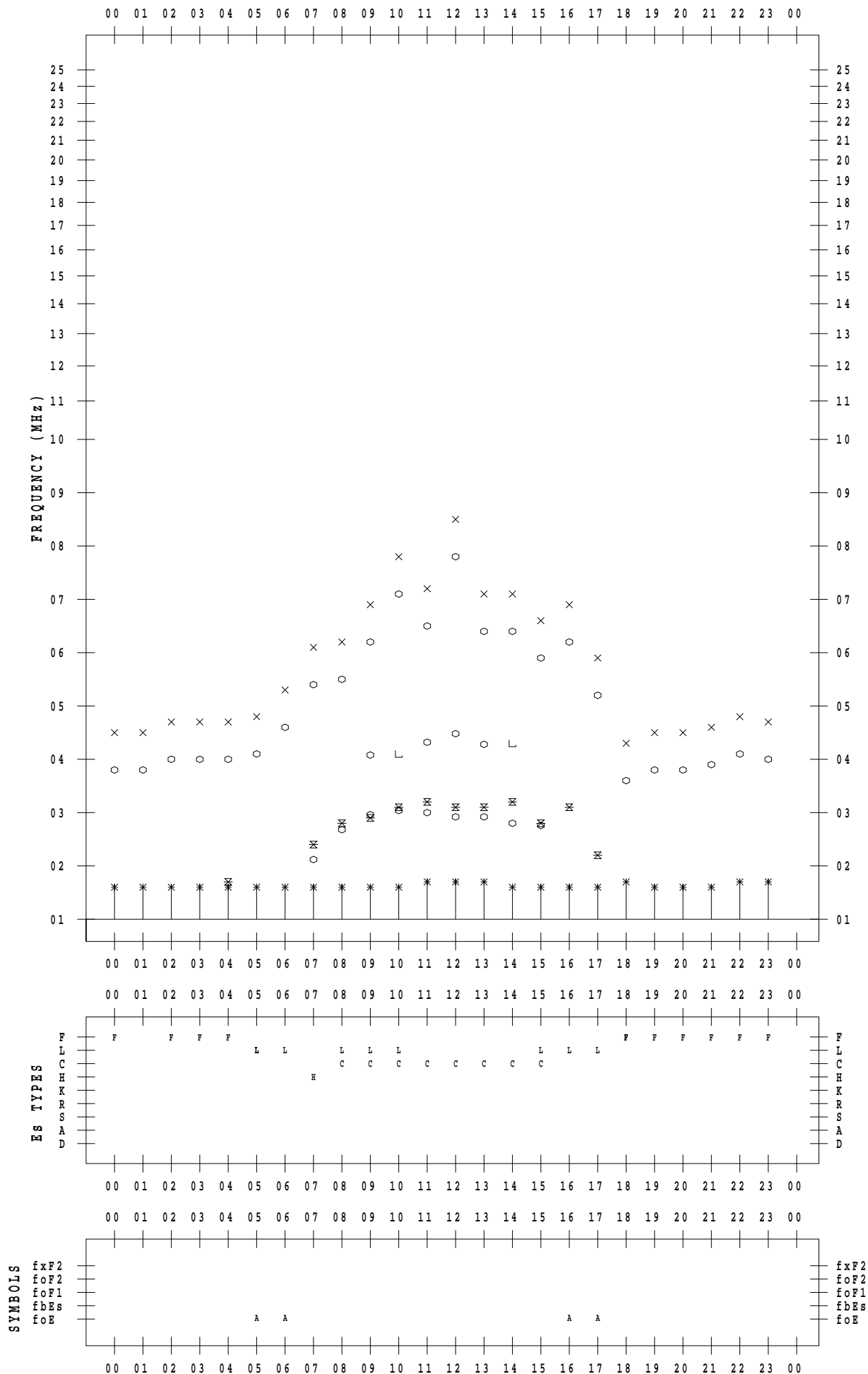
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/17

135 ° E MEAN TIME



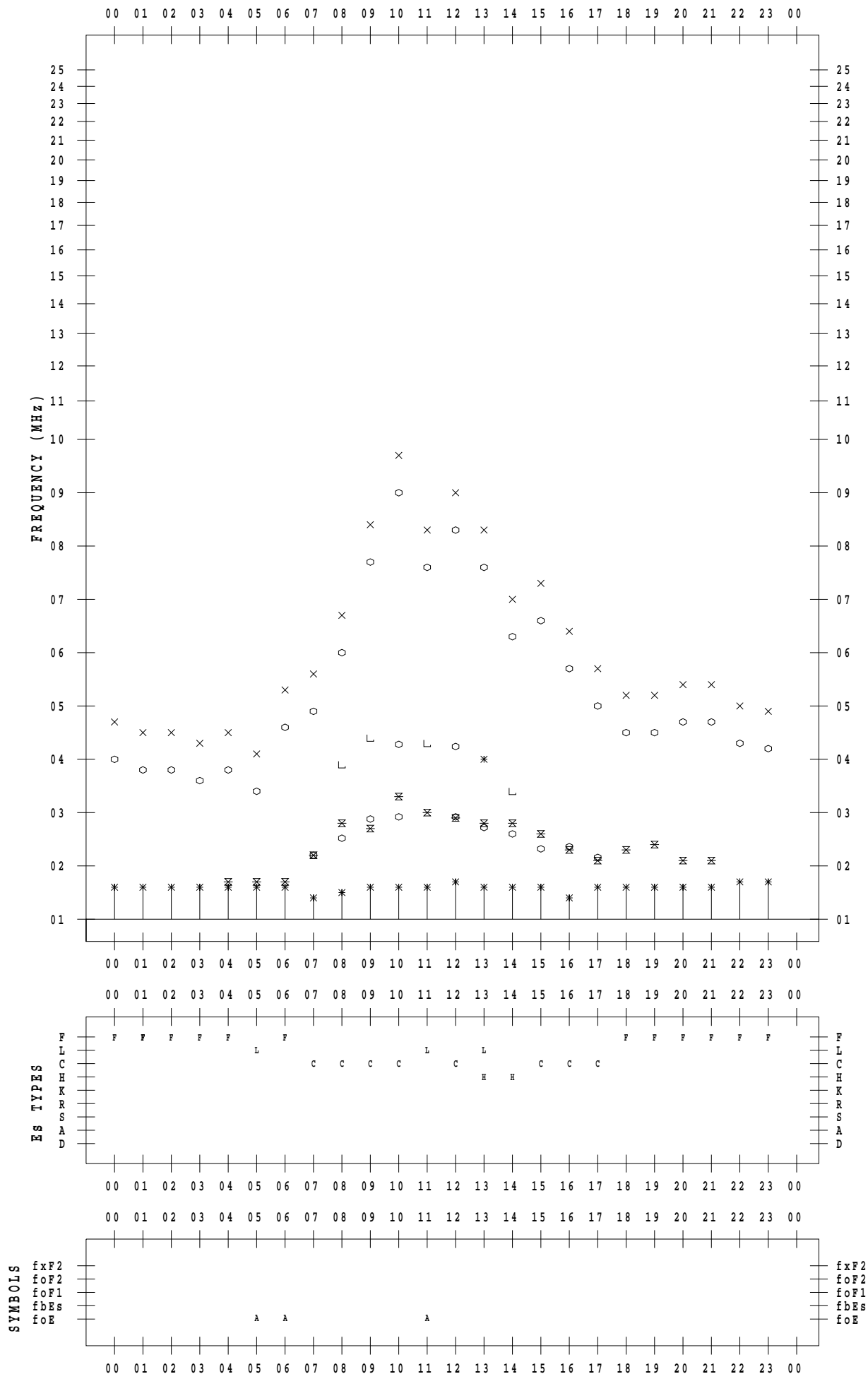
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/18

135 ° E MEAN TIME



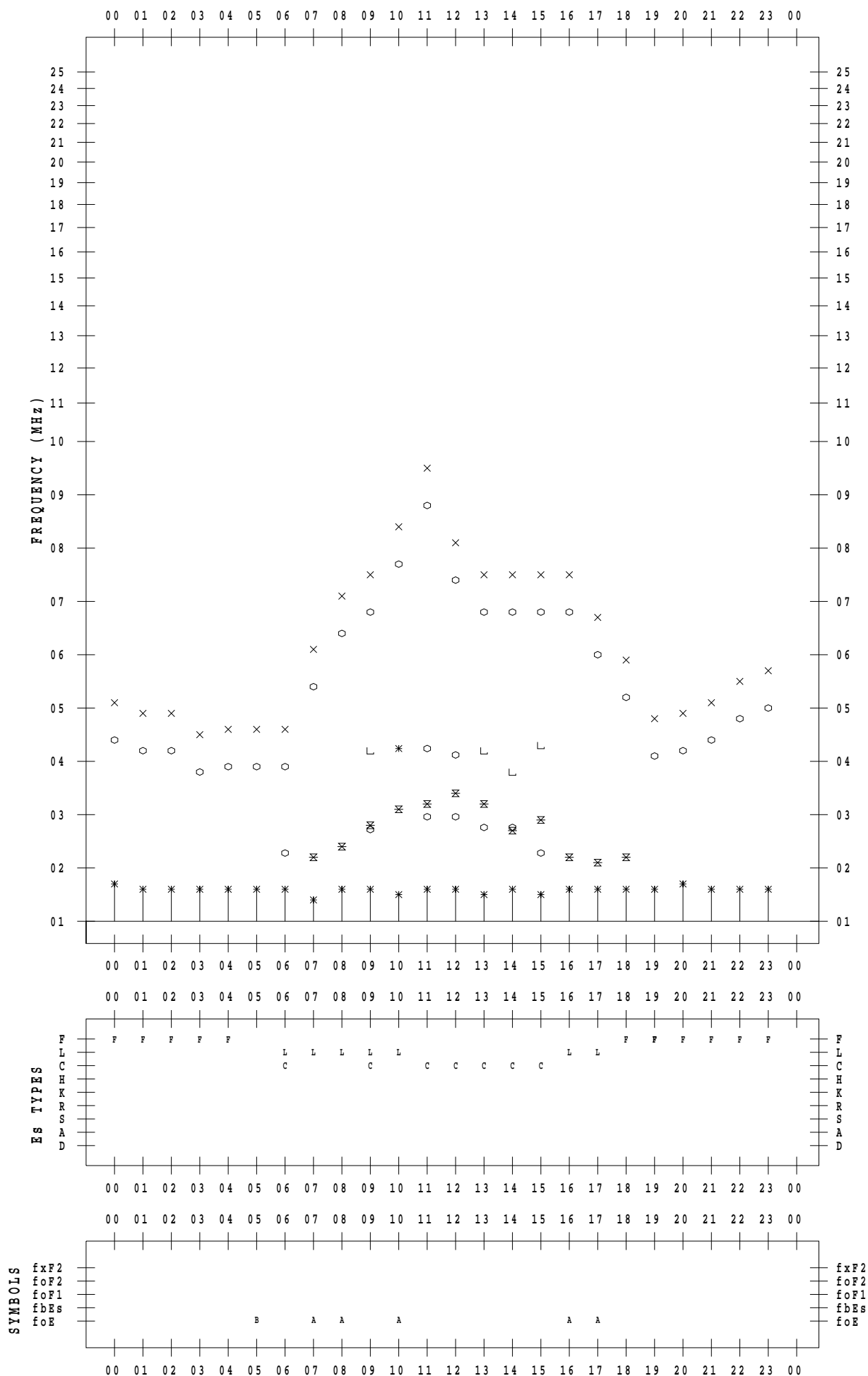
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/19

135 ° E MEAN TIME



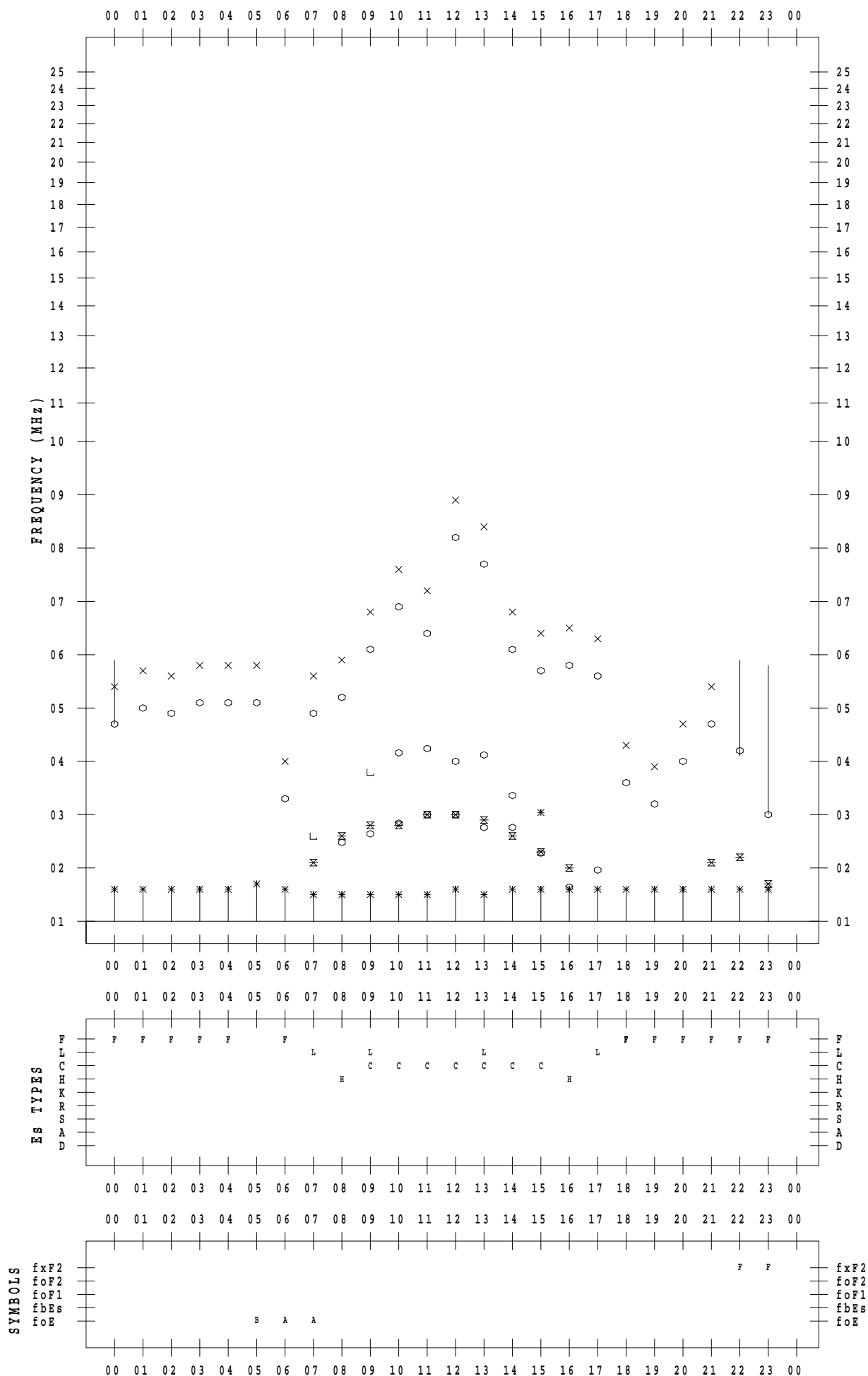
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/20

135 ° E MEAN TIME





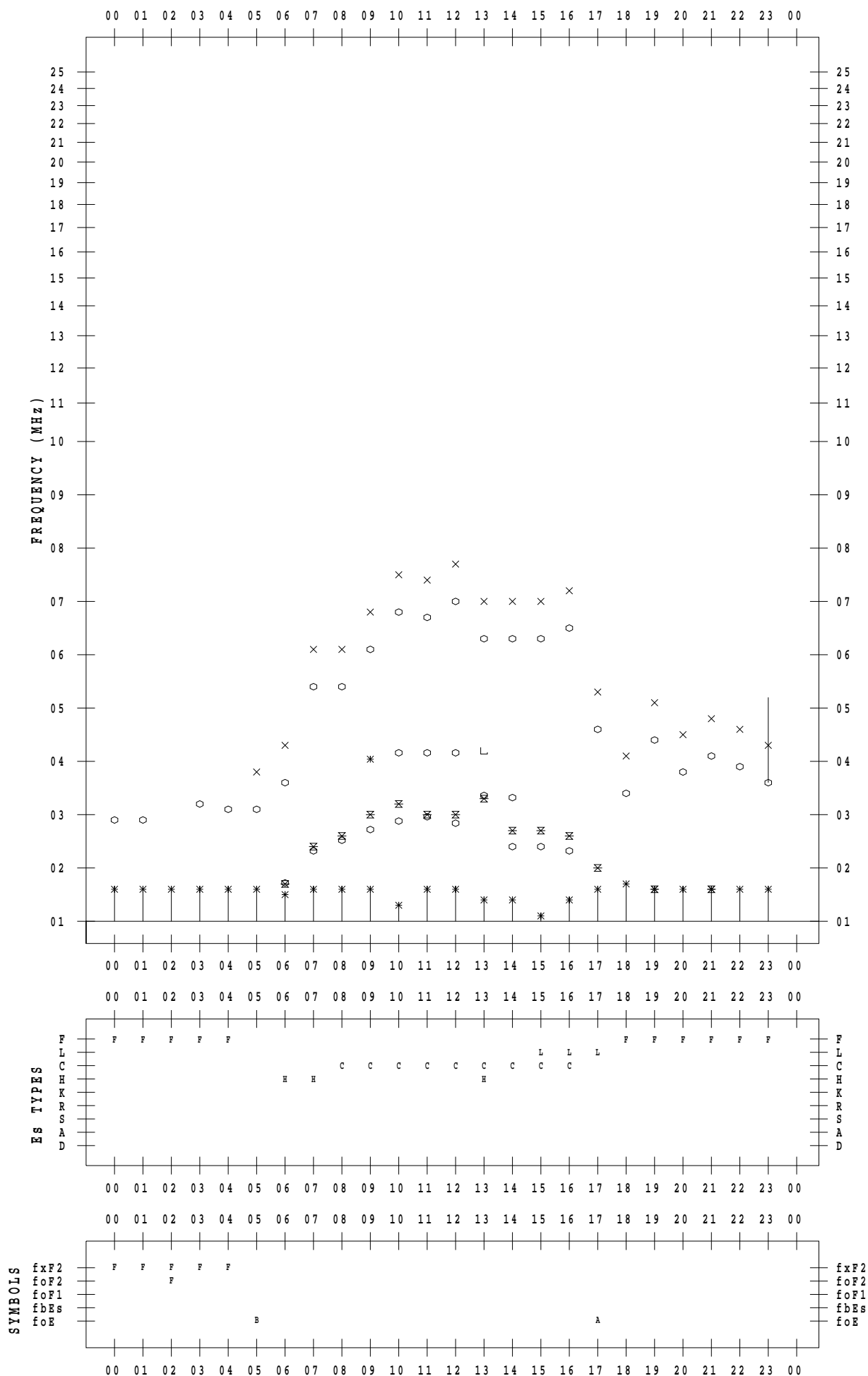
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/21

135 ° E MEAN TIME



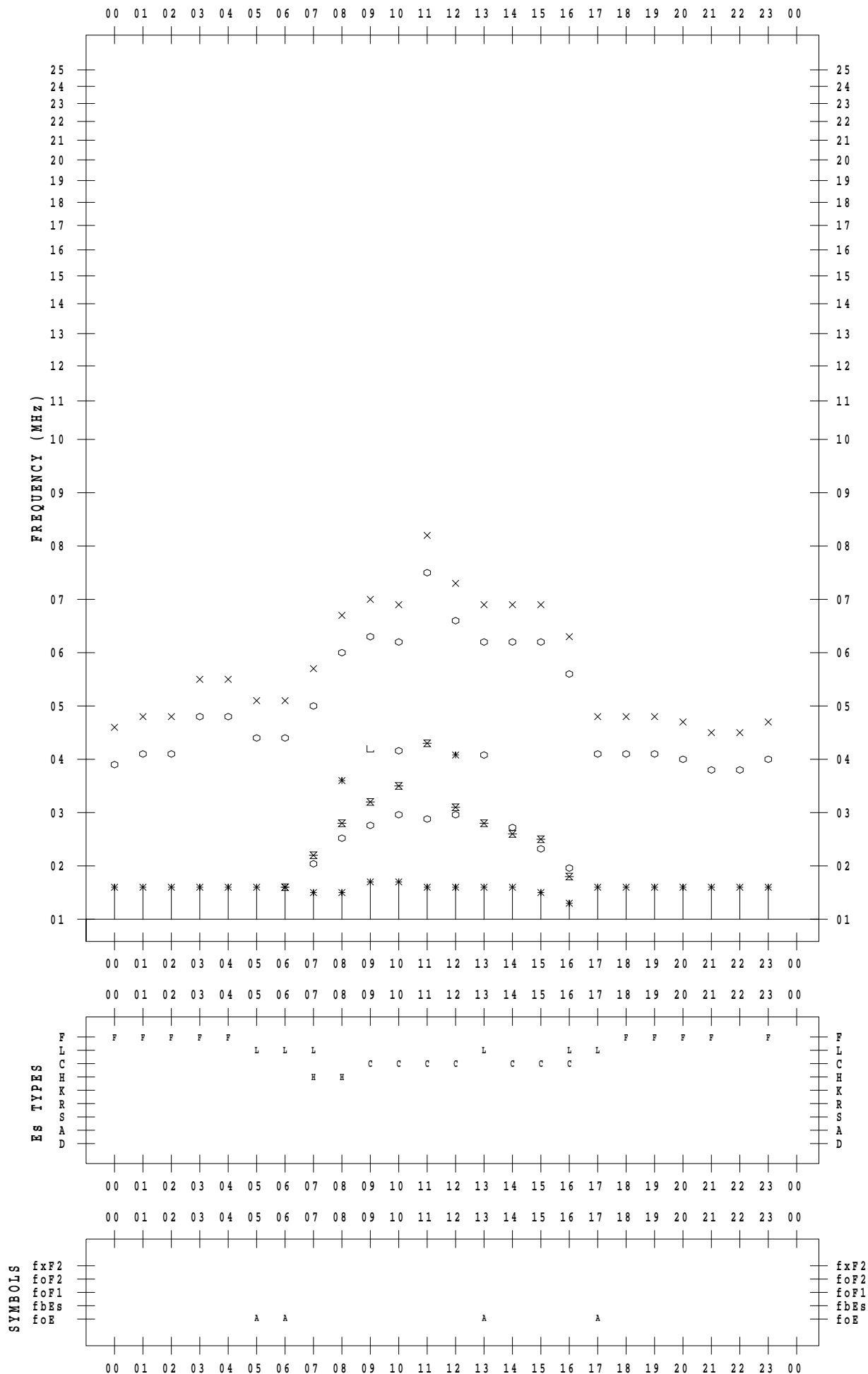
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/22

135 ° E MEAN TIME



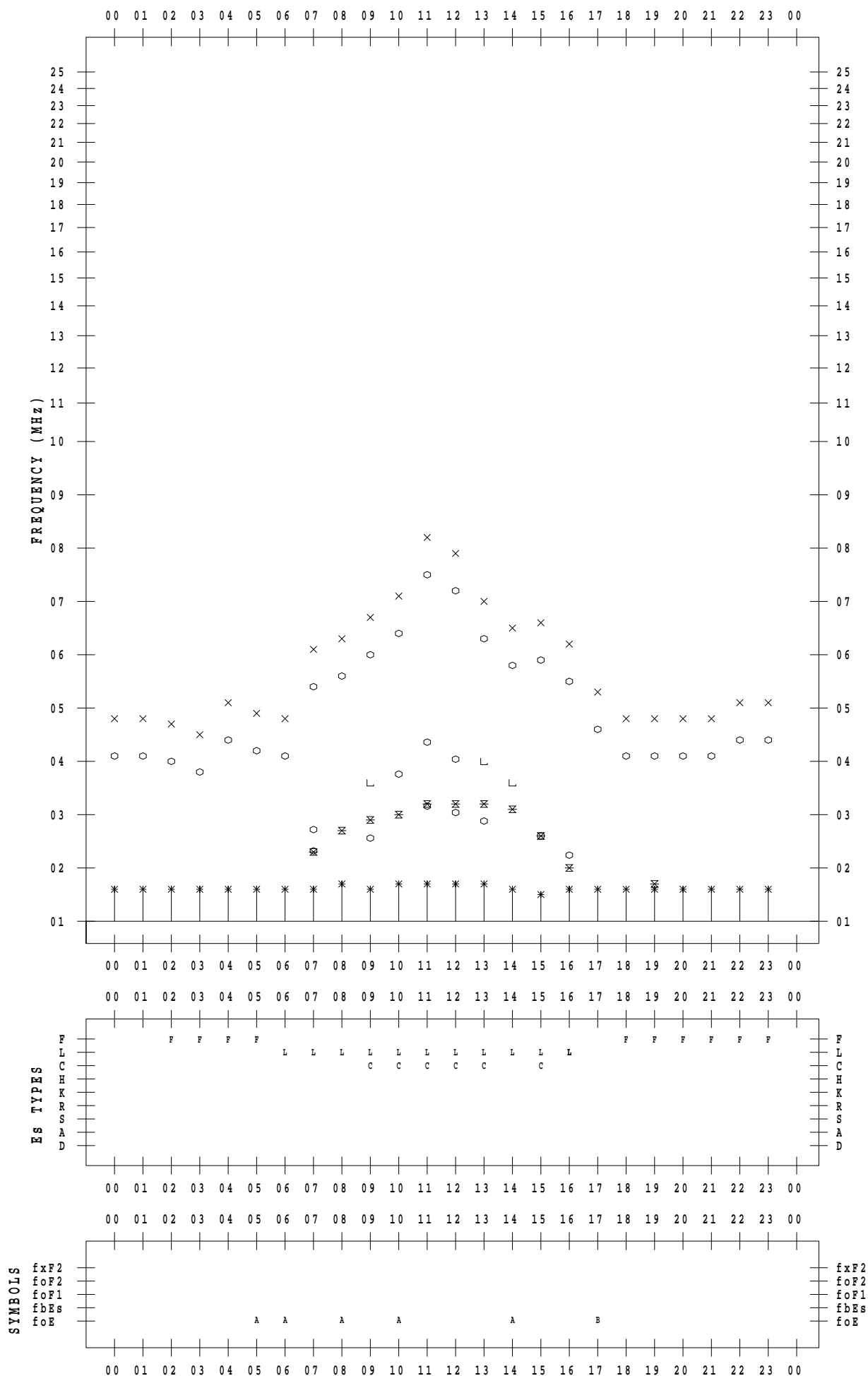
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/23

135 ° E MEAN TIME



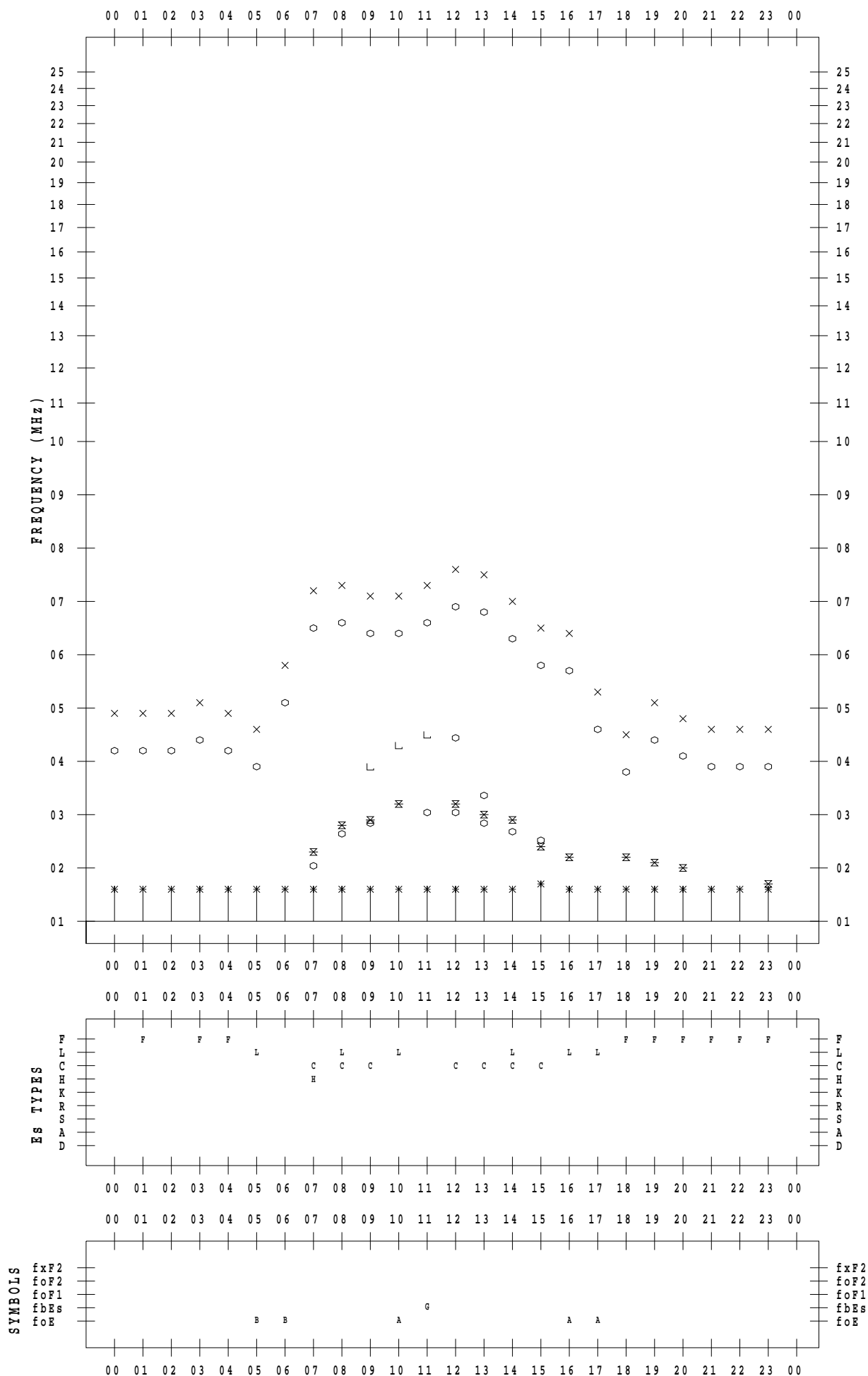
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/24

135 ° E MEAN TIME



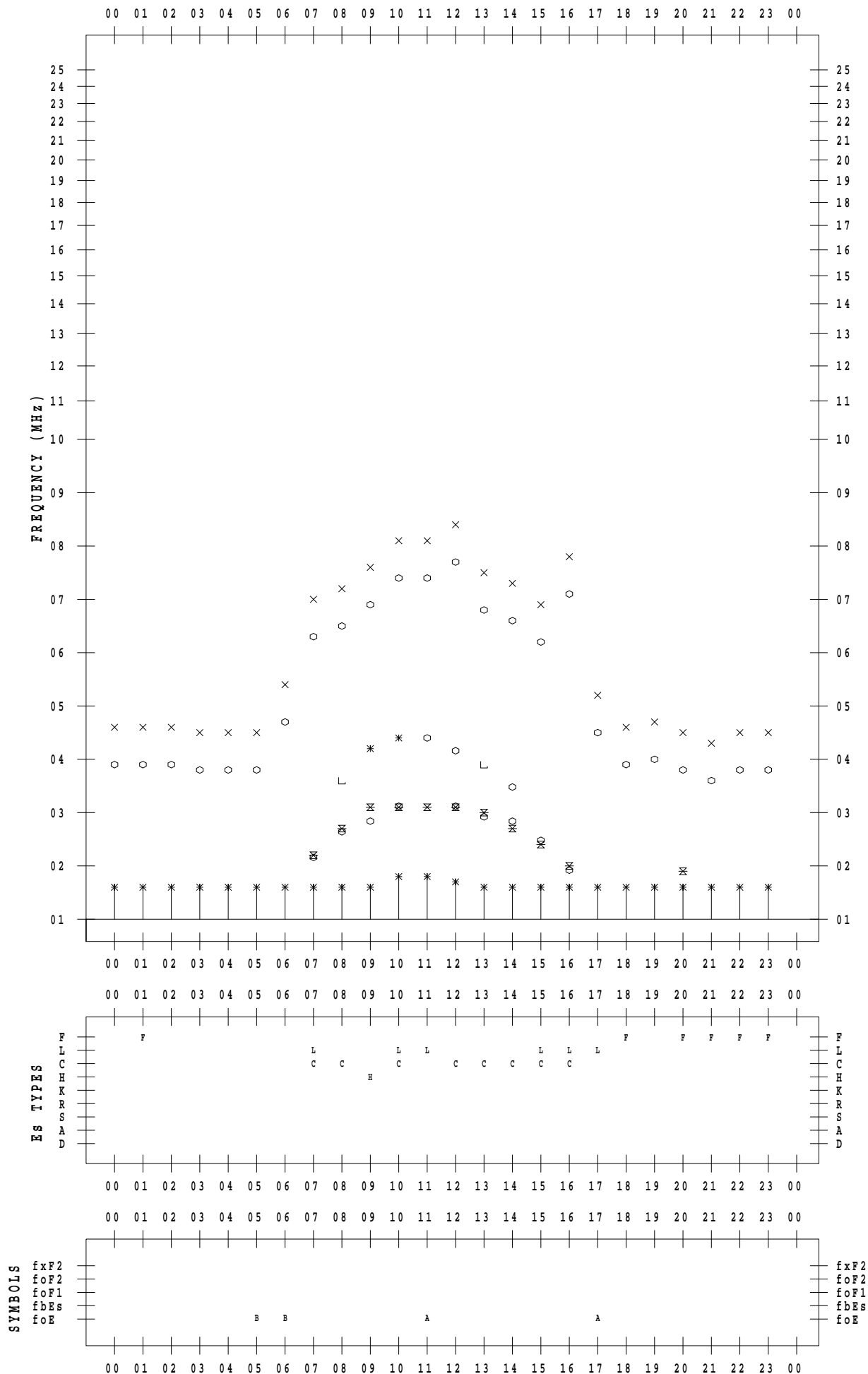
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/25

135 ° E MEAN TIME



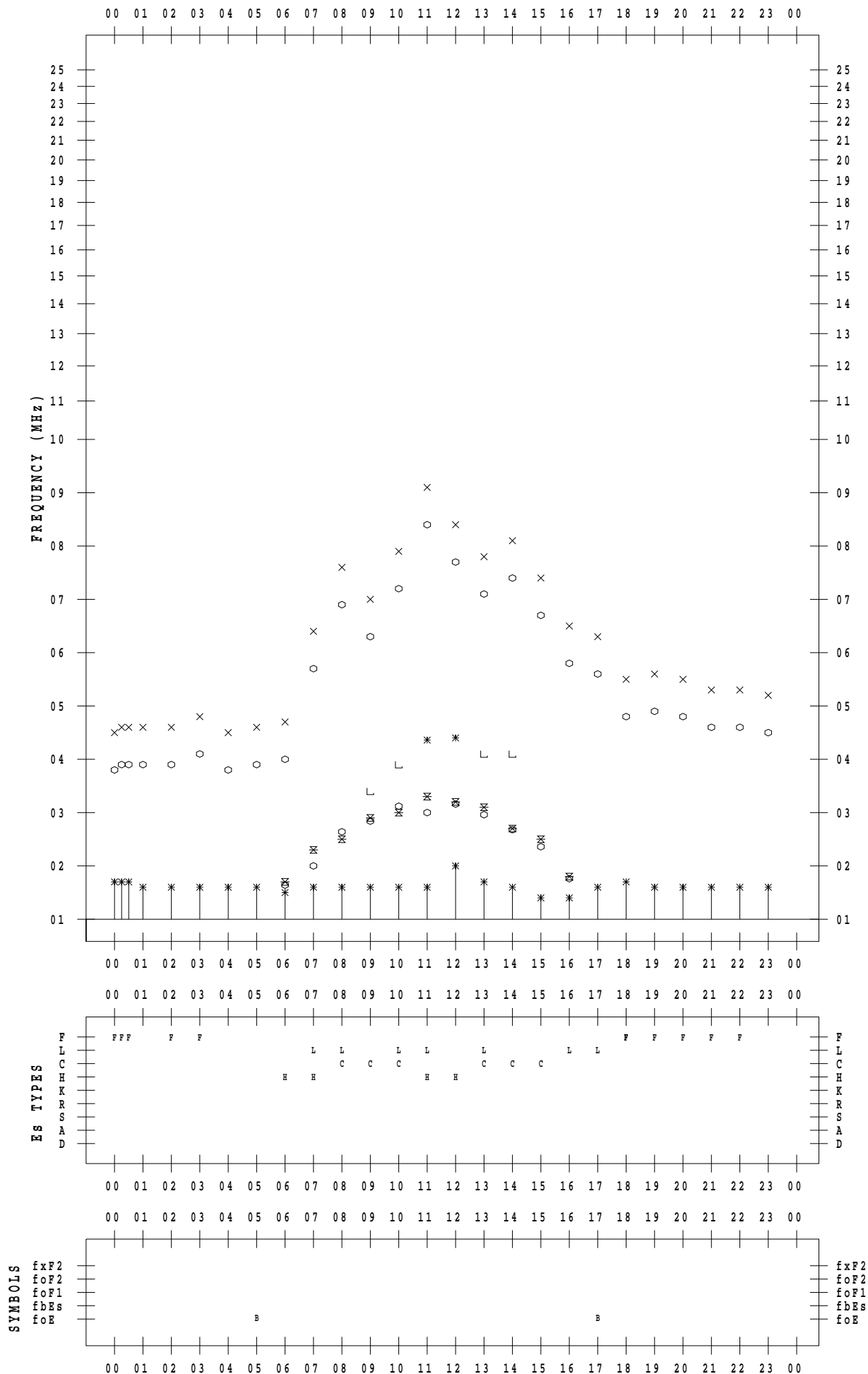
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/26

135 ° E MEAN TIME



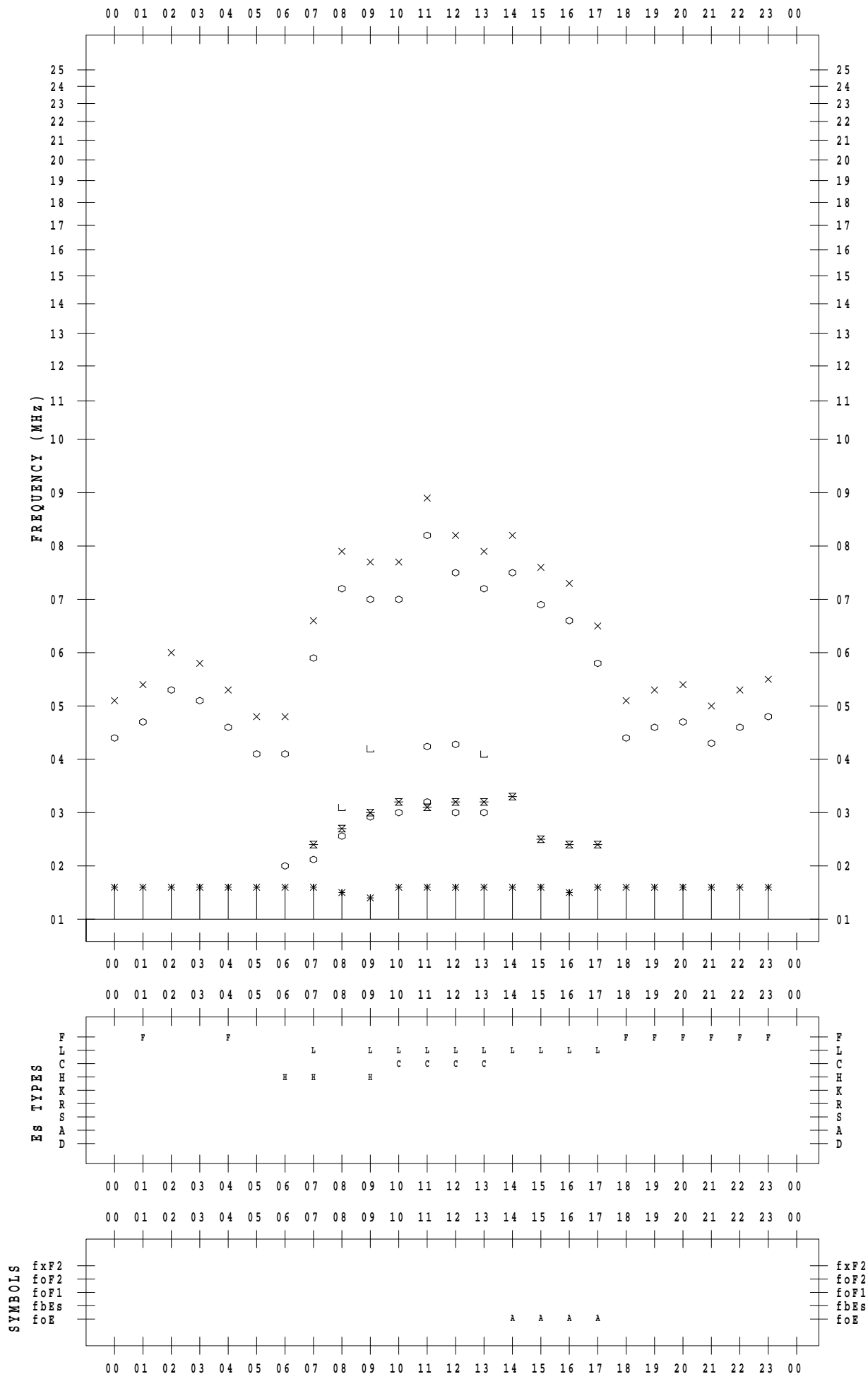
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/27

135 ° E MEAN TIME



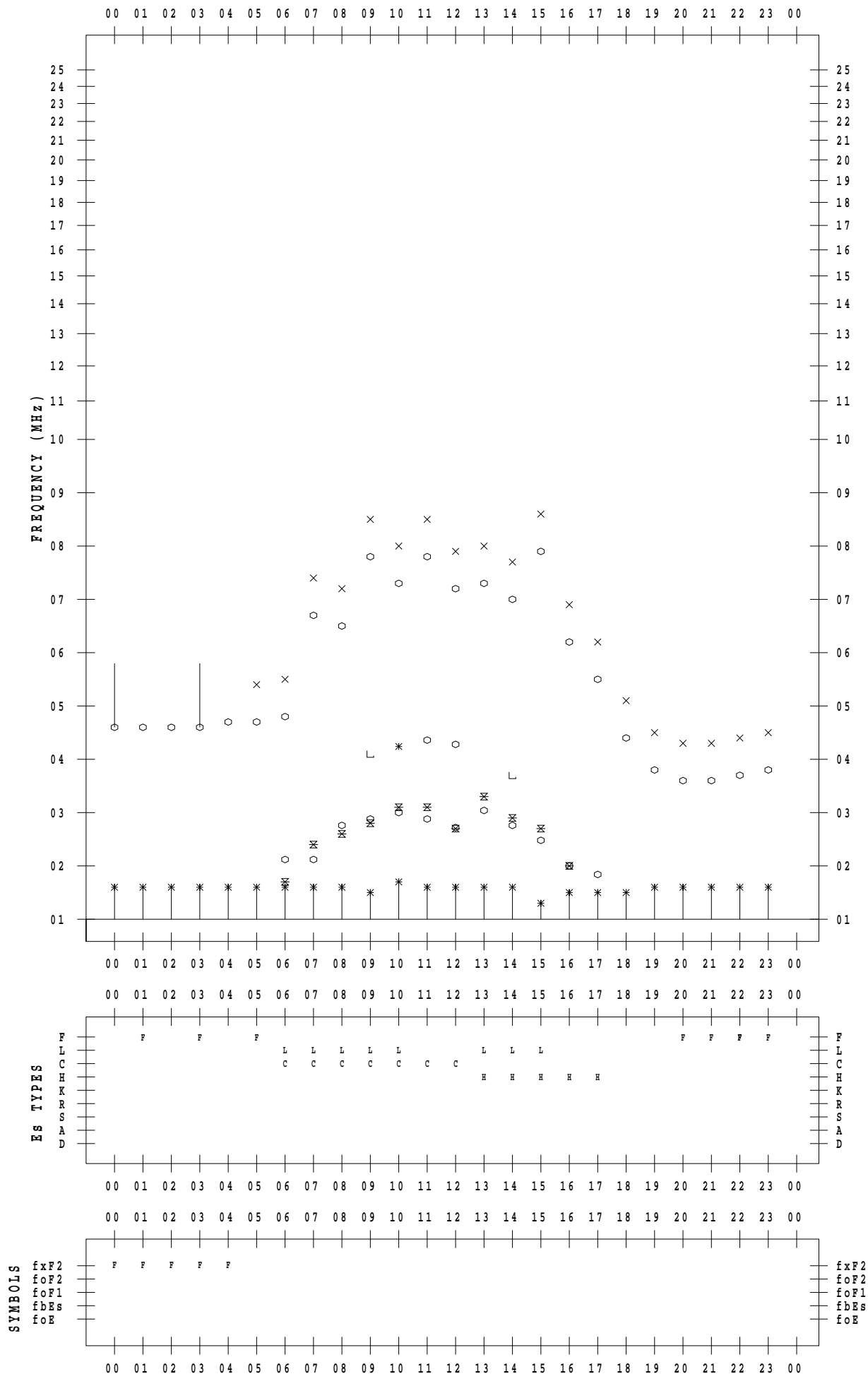
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/28

135 ° E MEAN TIME





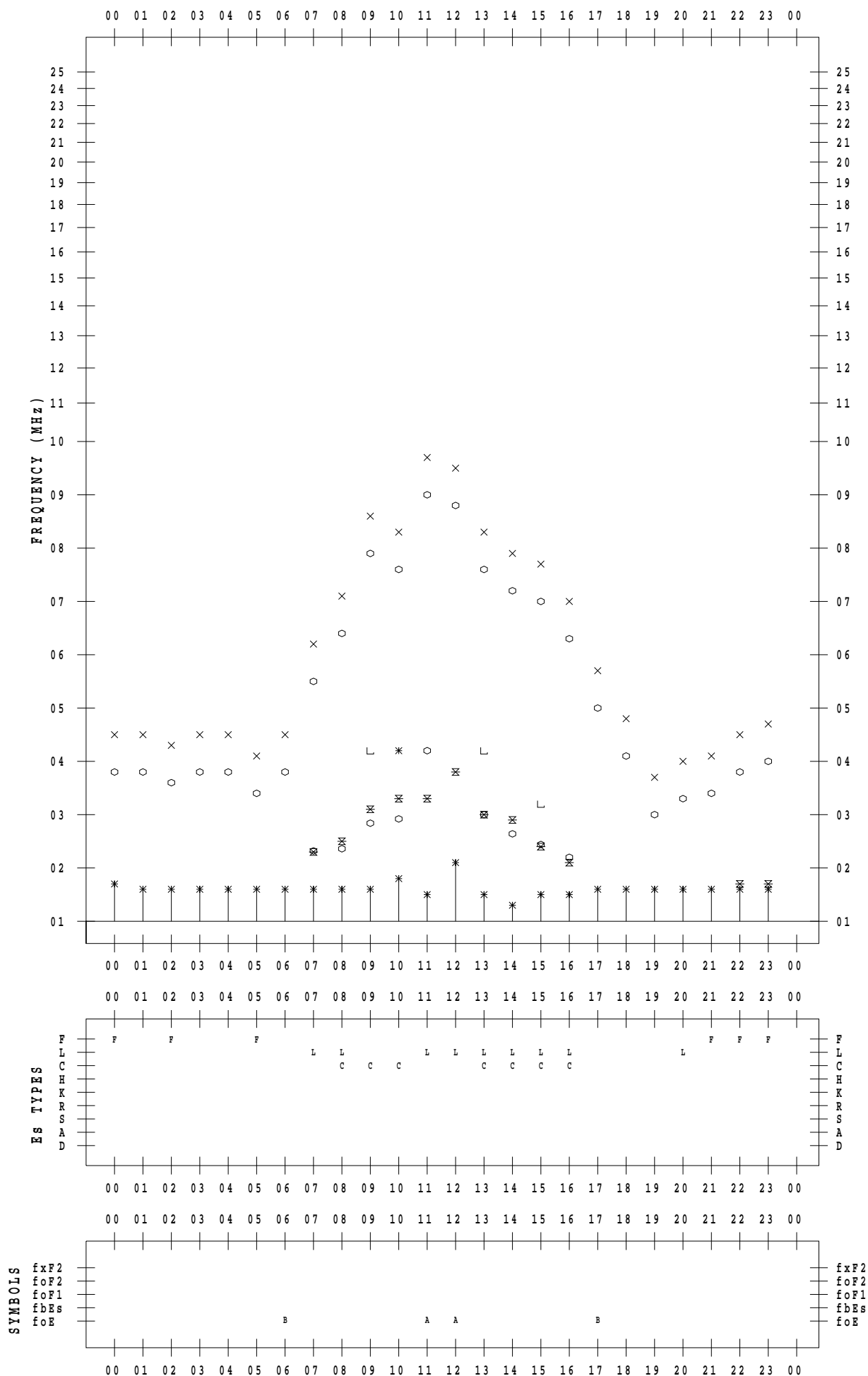
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/29

135 ° E MEAN TIME



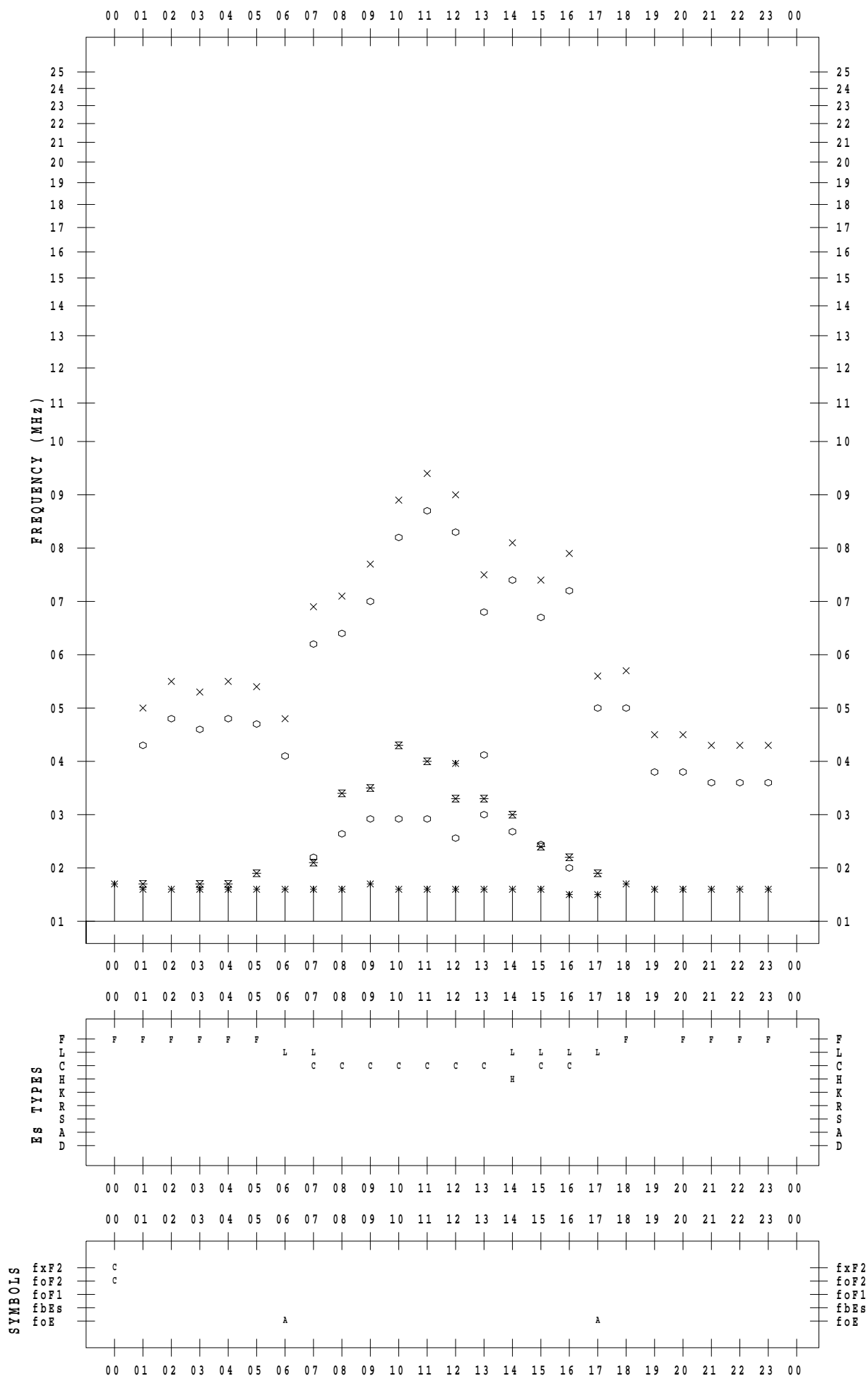
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/30

135 ° E MEAN TIME



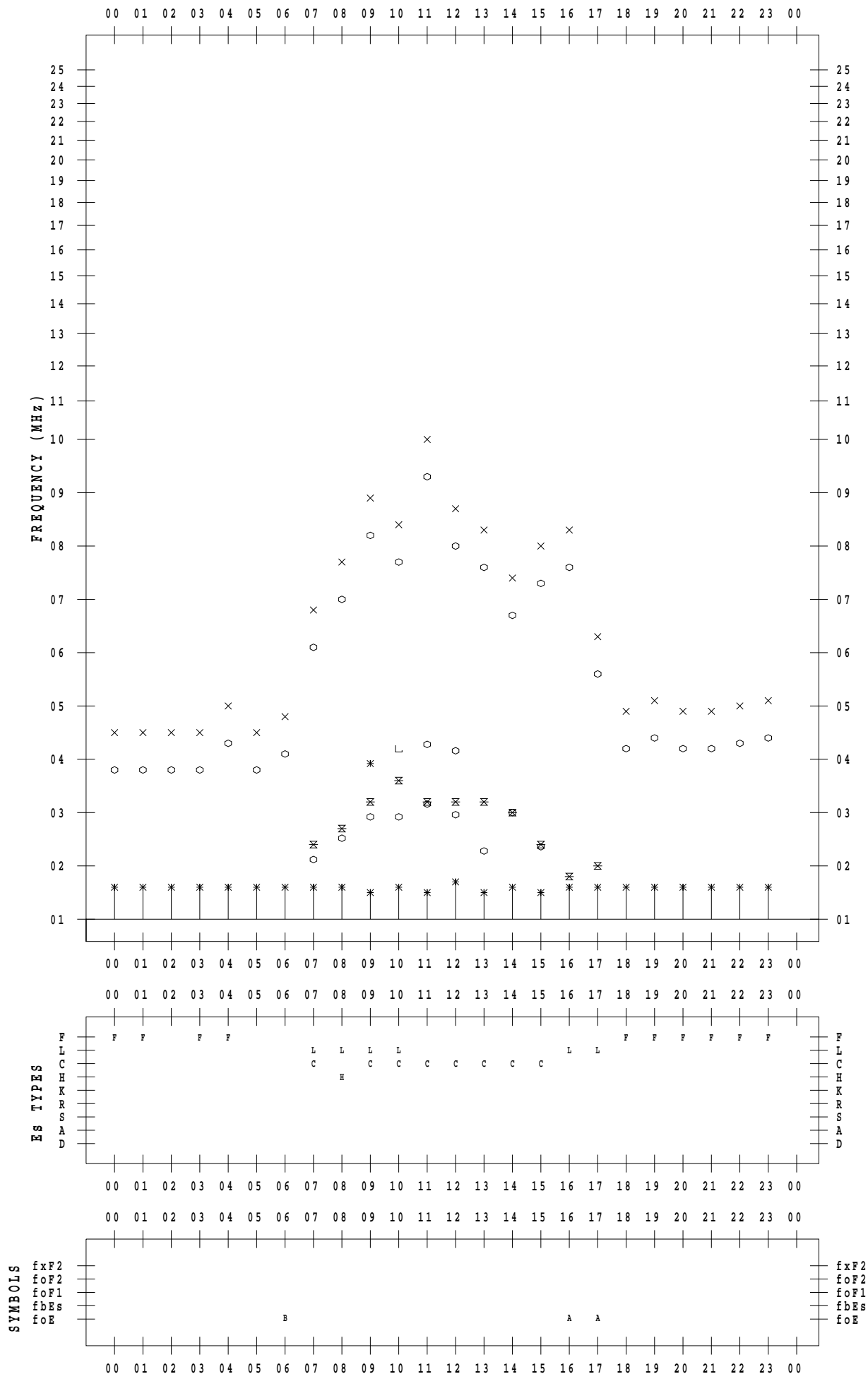
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/10/31

135 ° E MEAN TIME



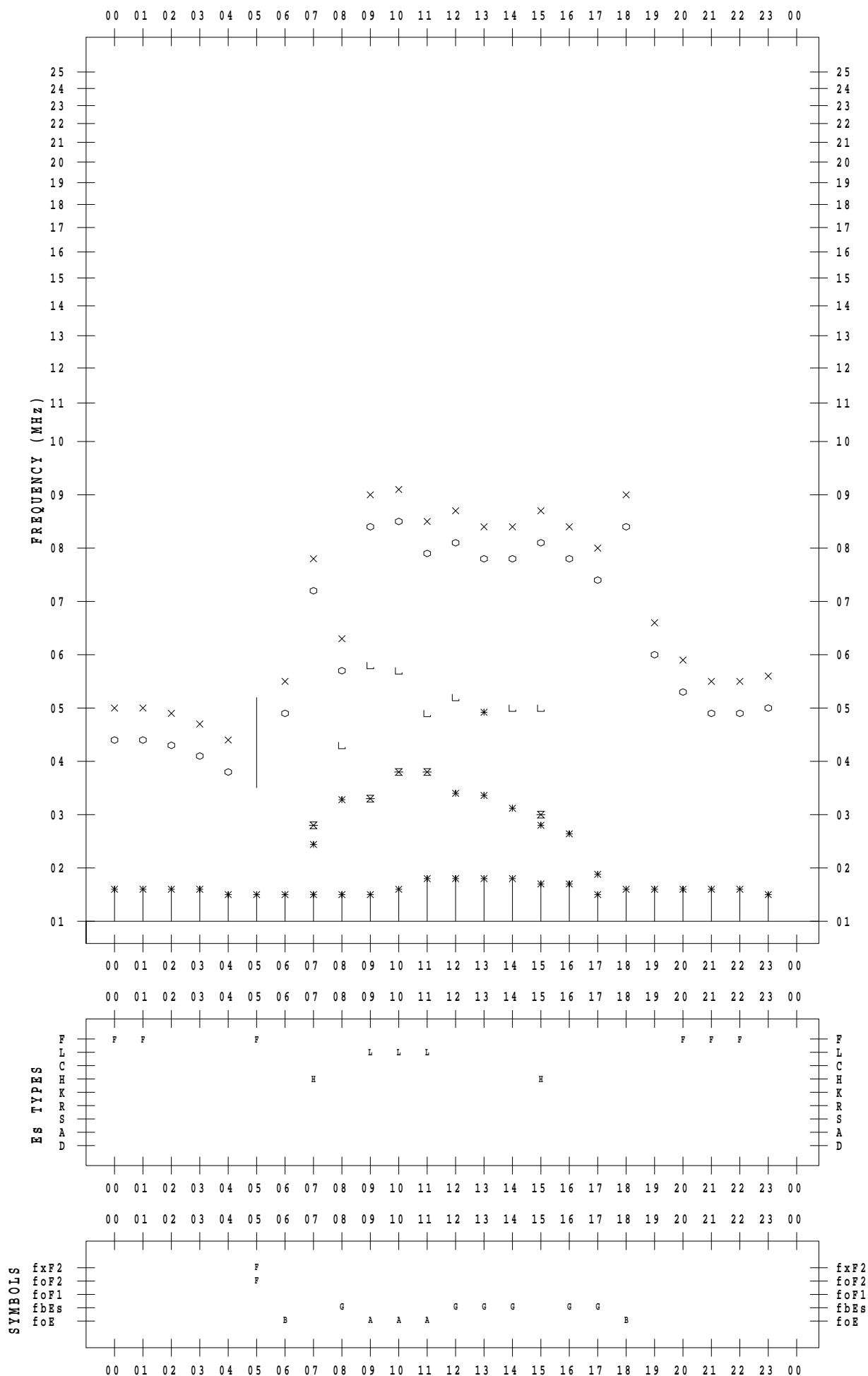
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/ 1

135 ° E MEAN TIME



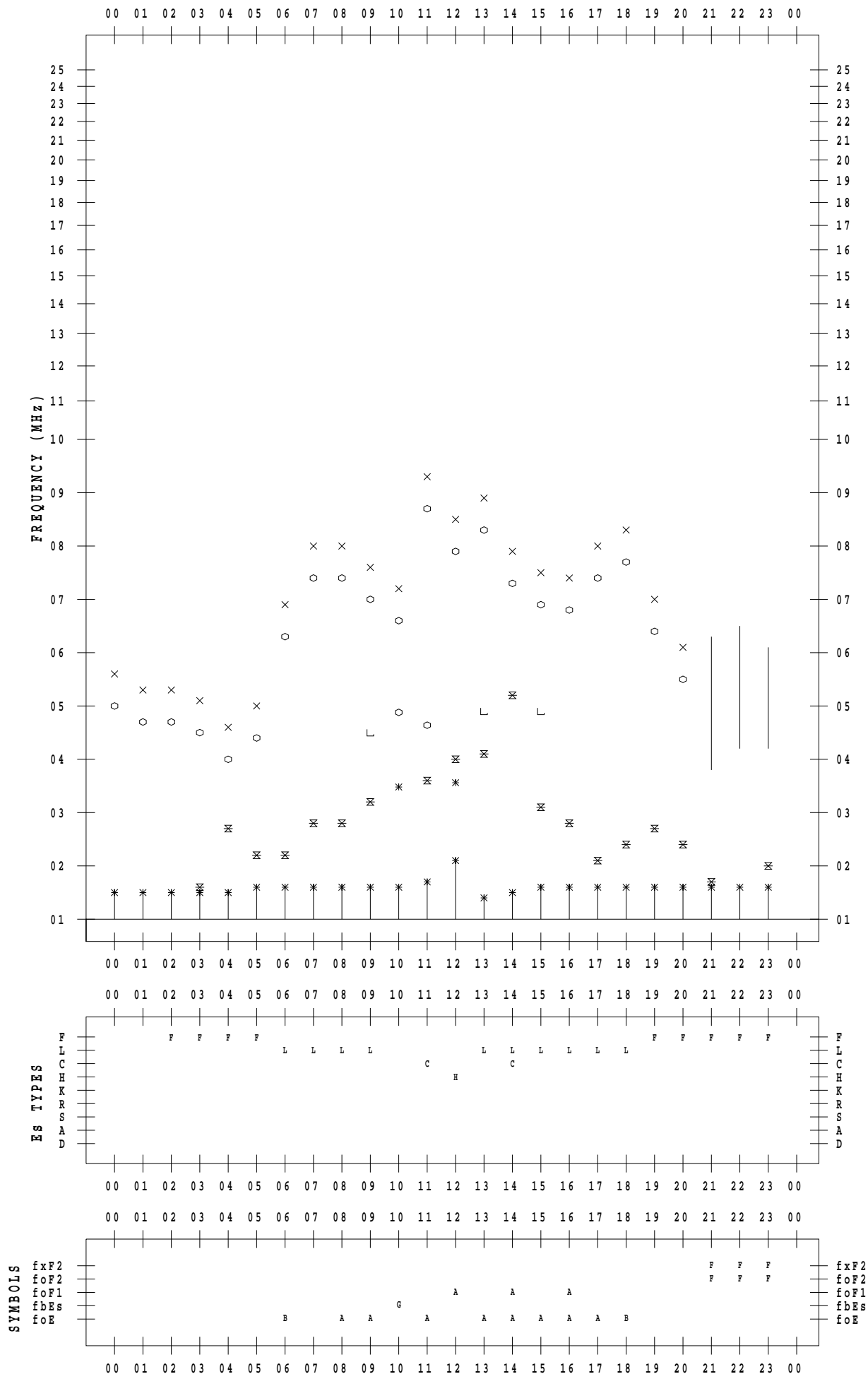
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/ 2

135 ° E MEAN TIME



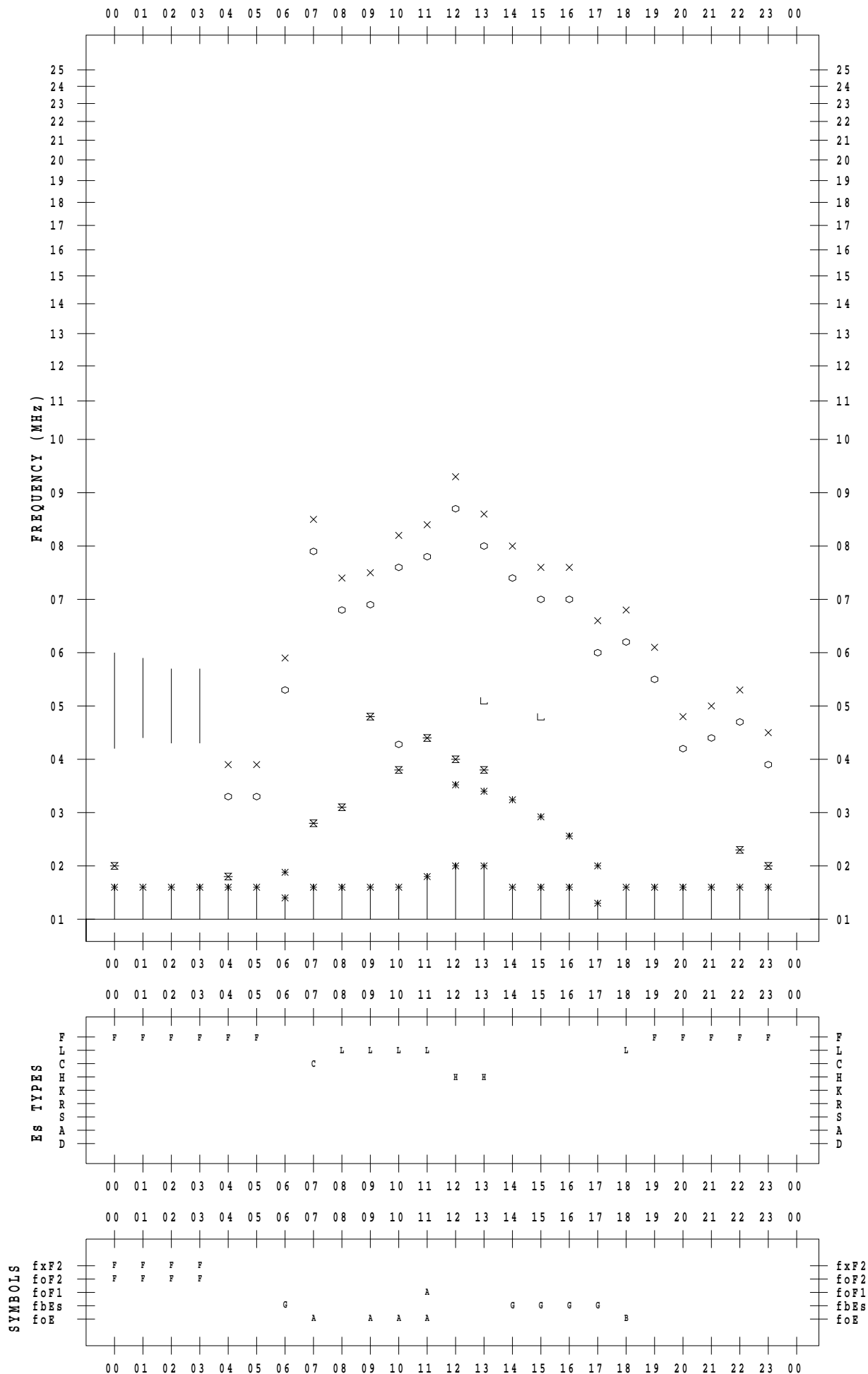
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/ 3

135 ° E MEAN TIME



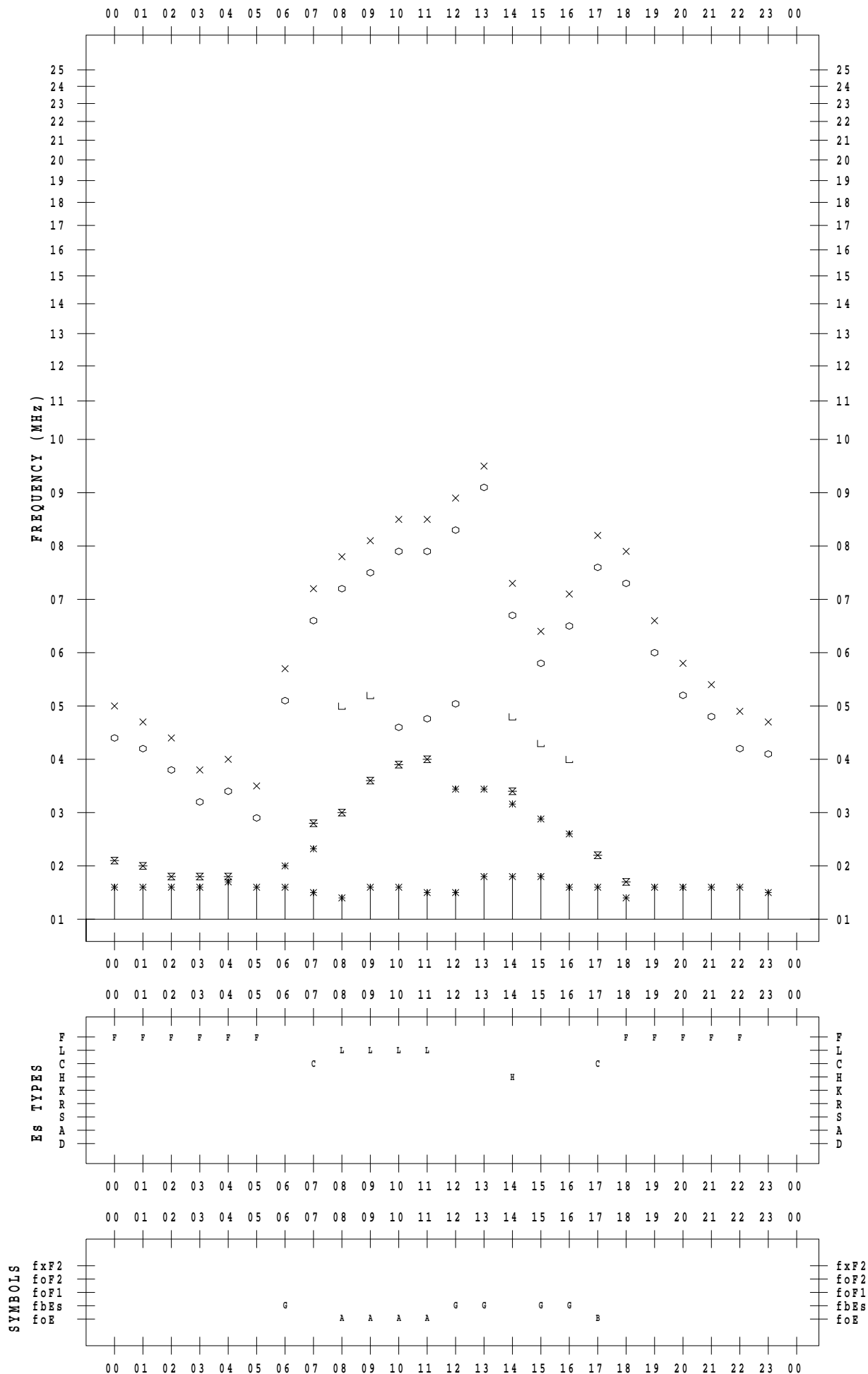
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/ 4

135 ° E MEAN TIME



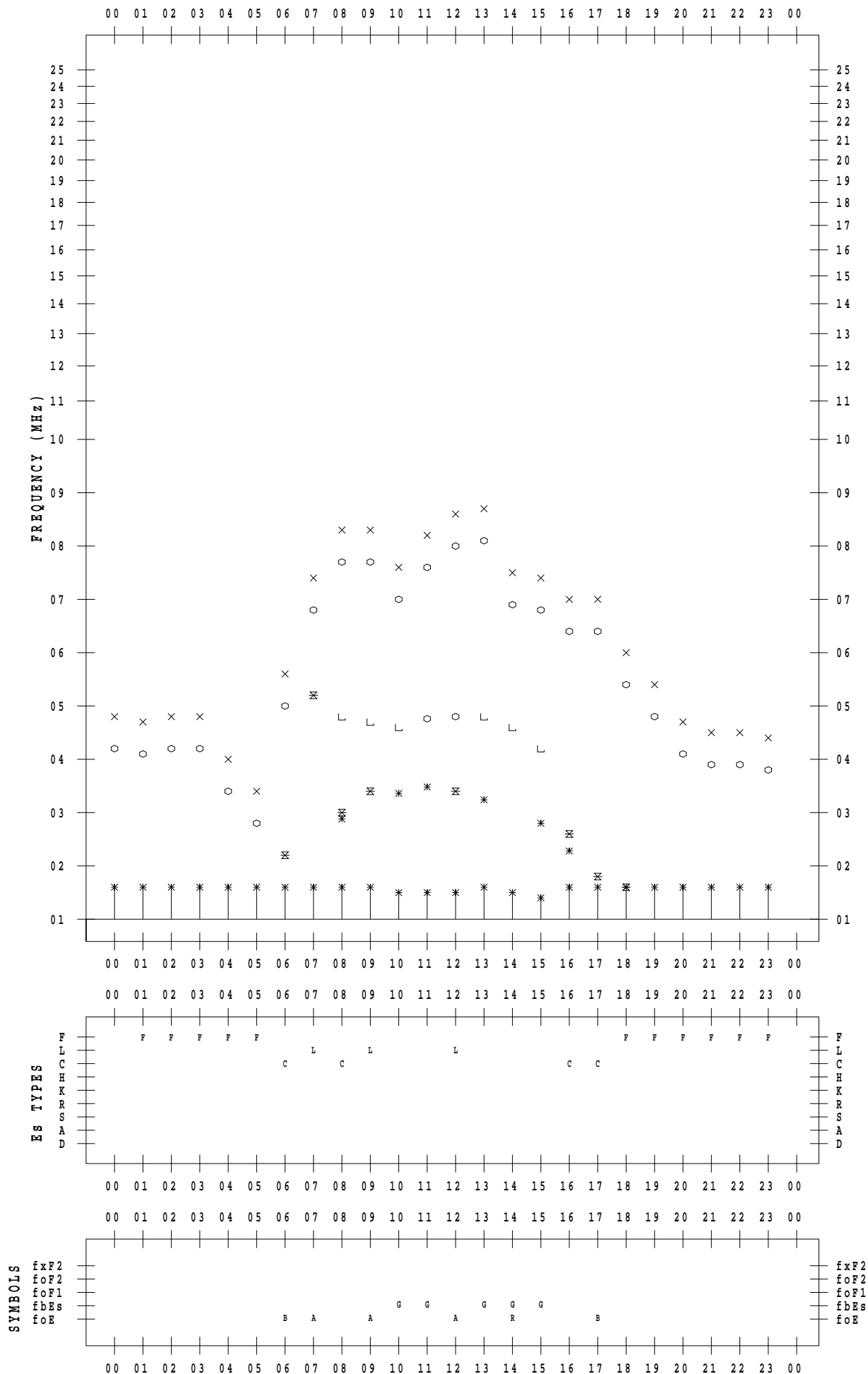
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/ 5

135 ° E MEAN TIME





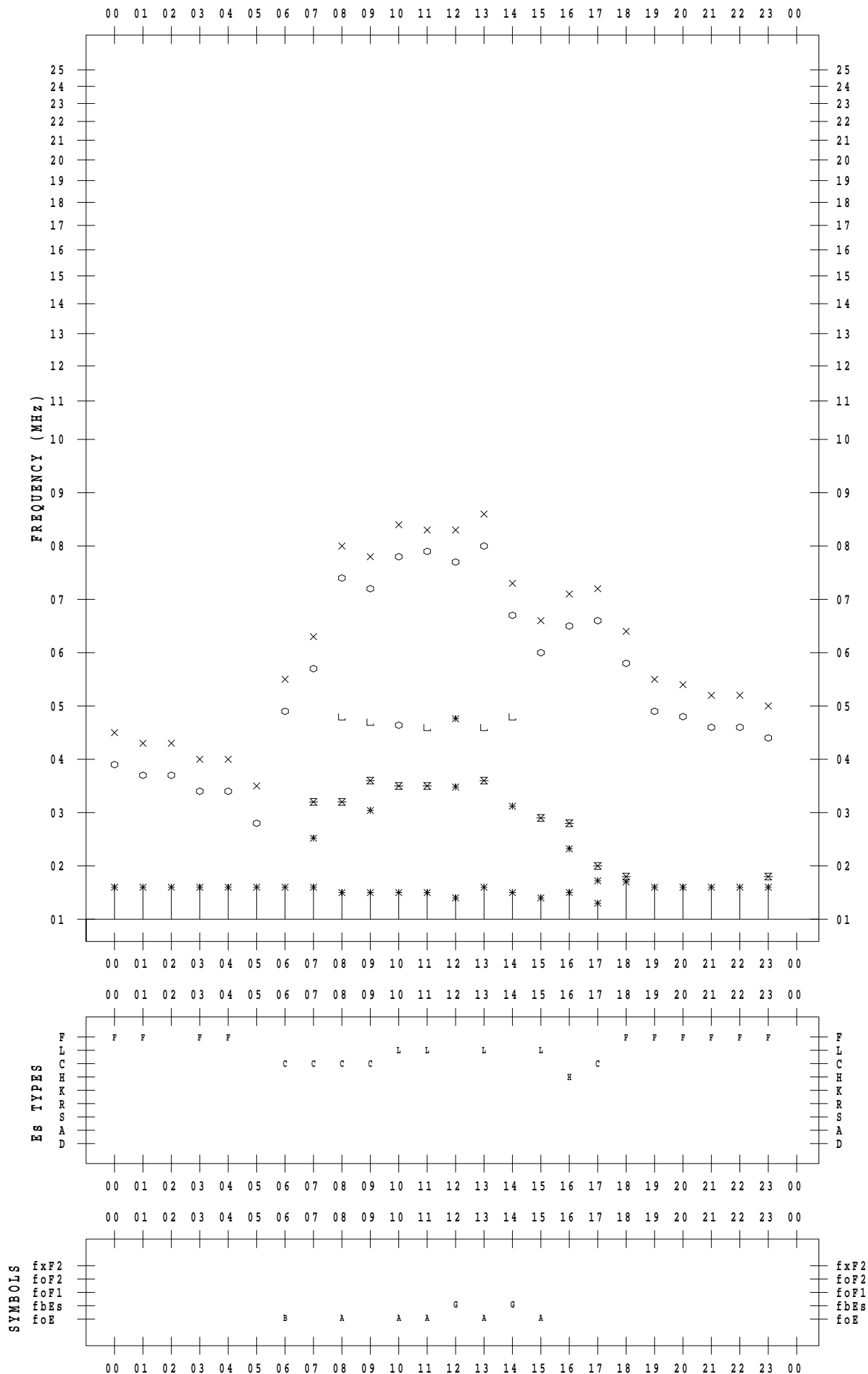
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/ 6

135 ° E MEAN TIME



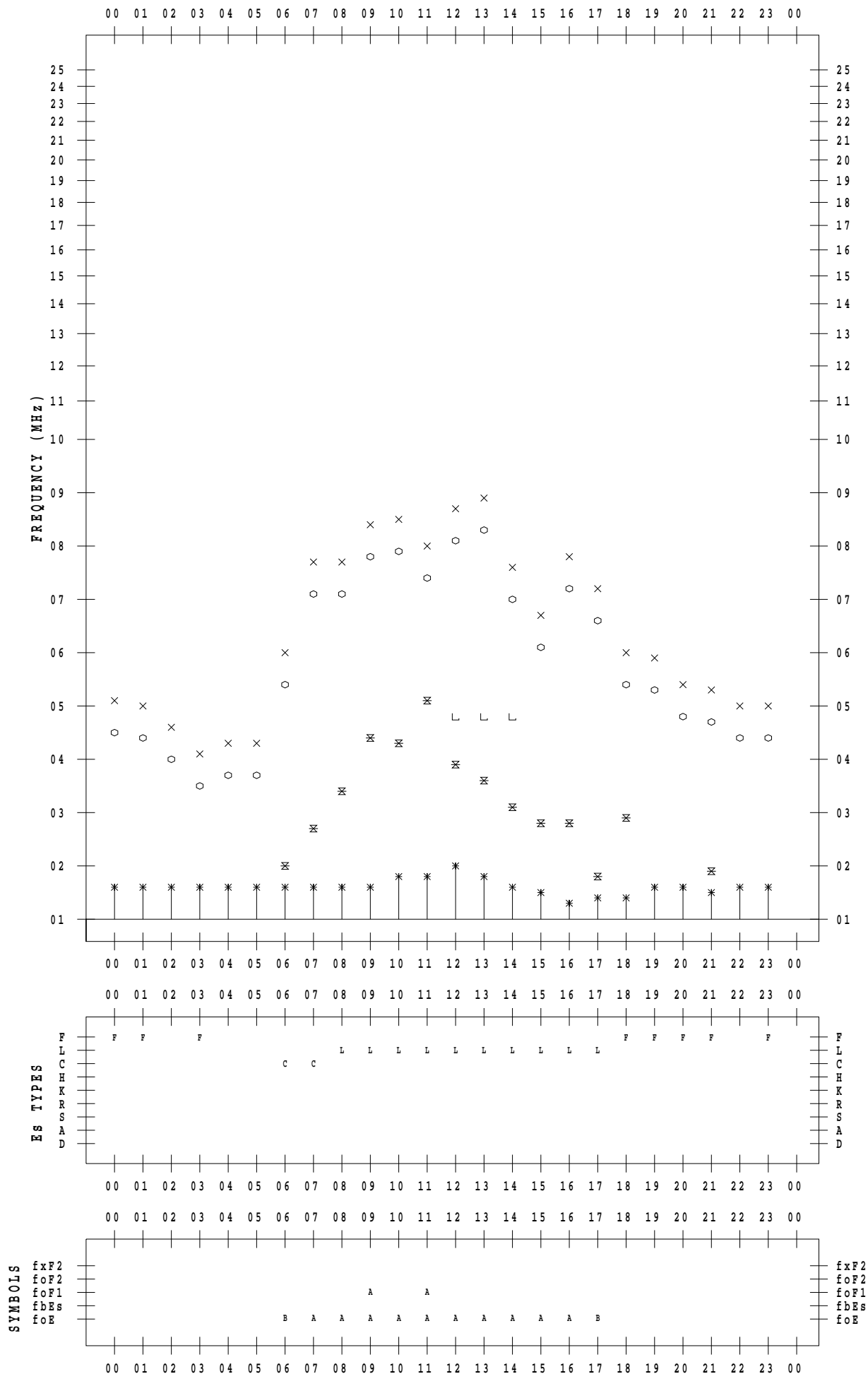
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/ 7

135 ° E MEAN TIME



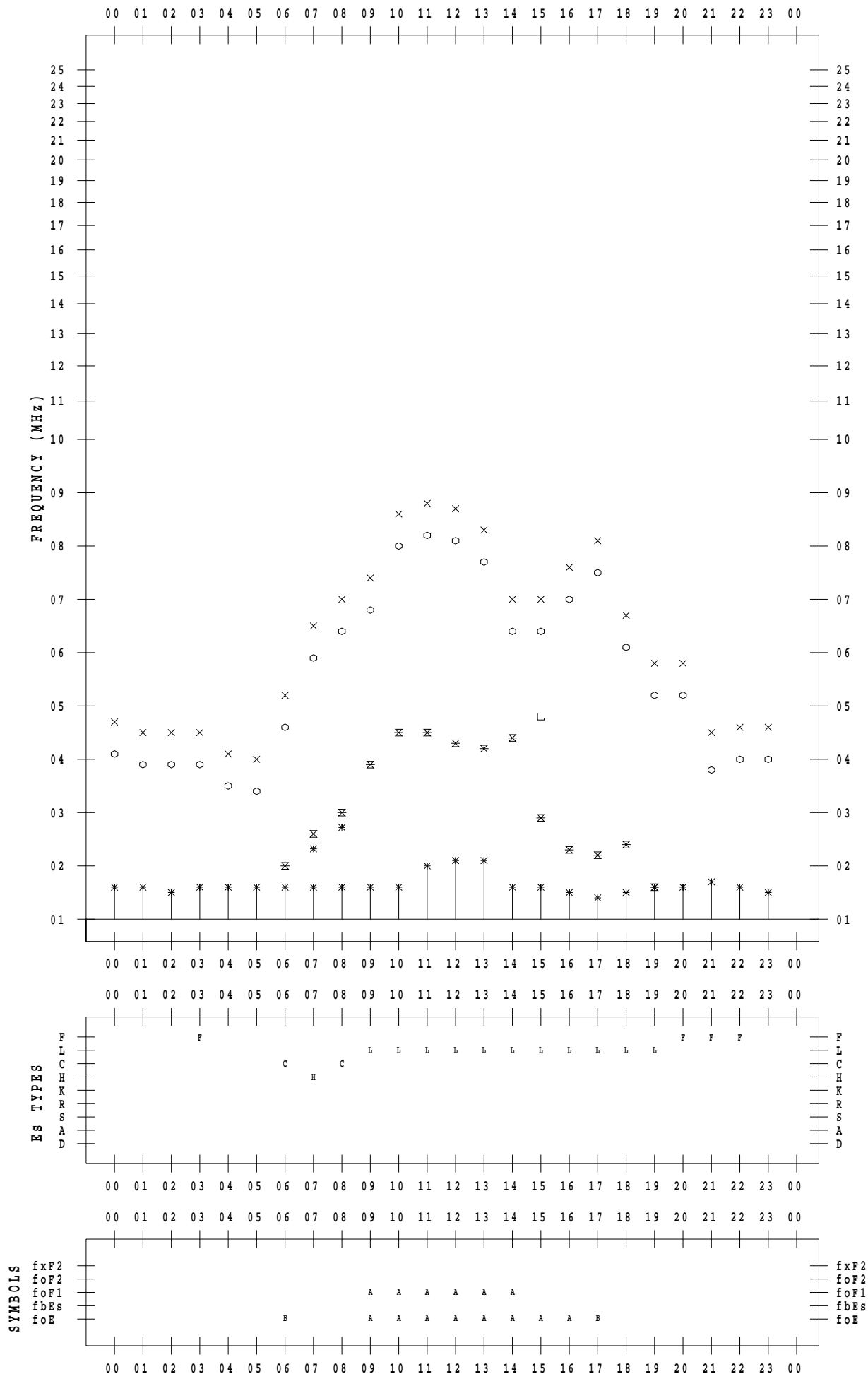
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/ 8

135 ° E MEAN TIME



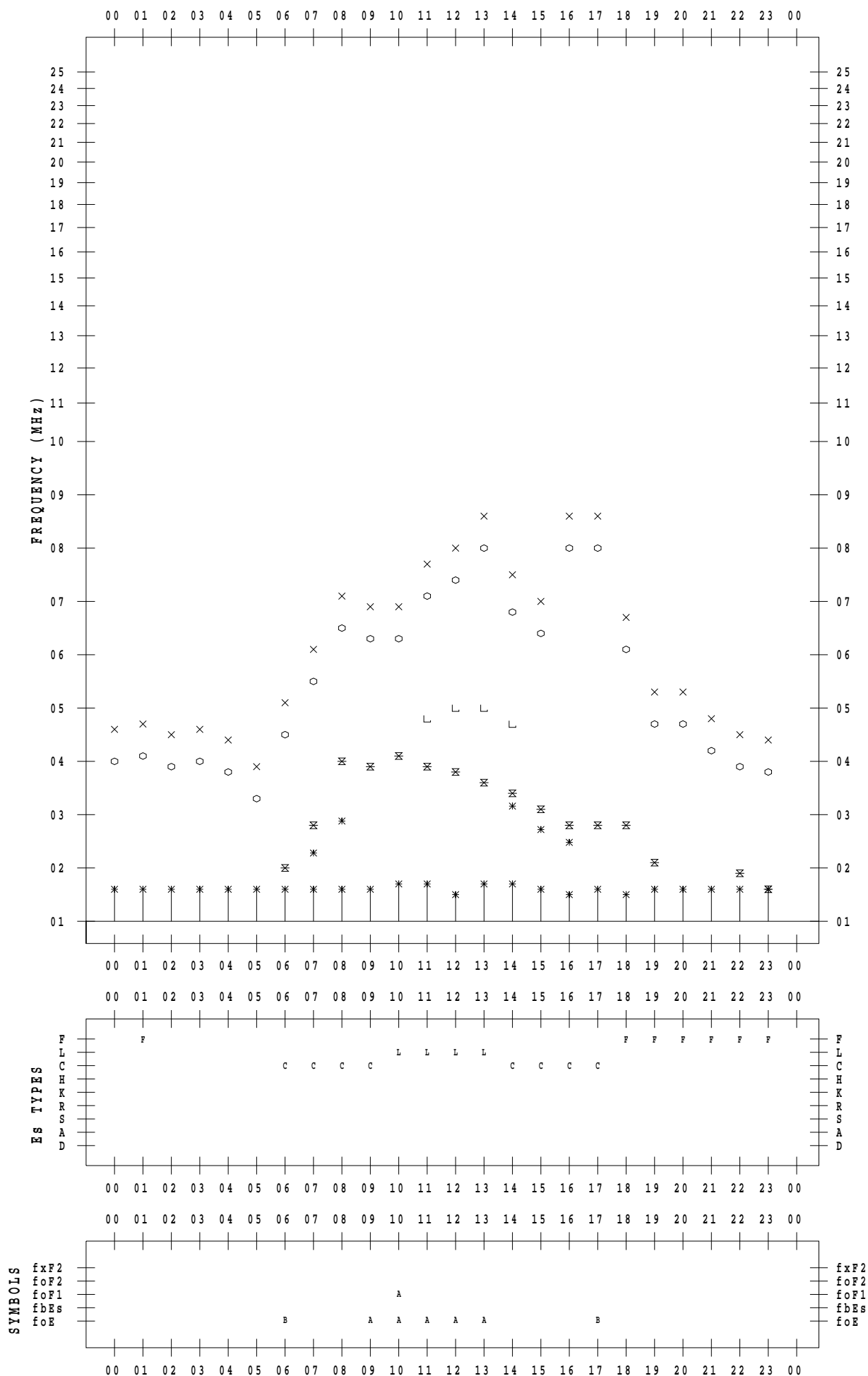
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/ 9

135 ° E MEAN TIME



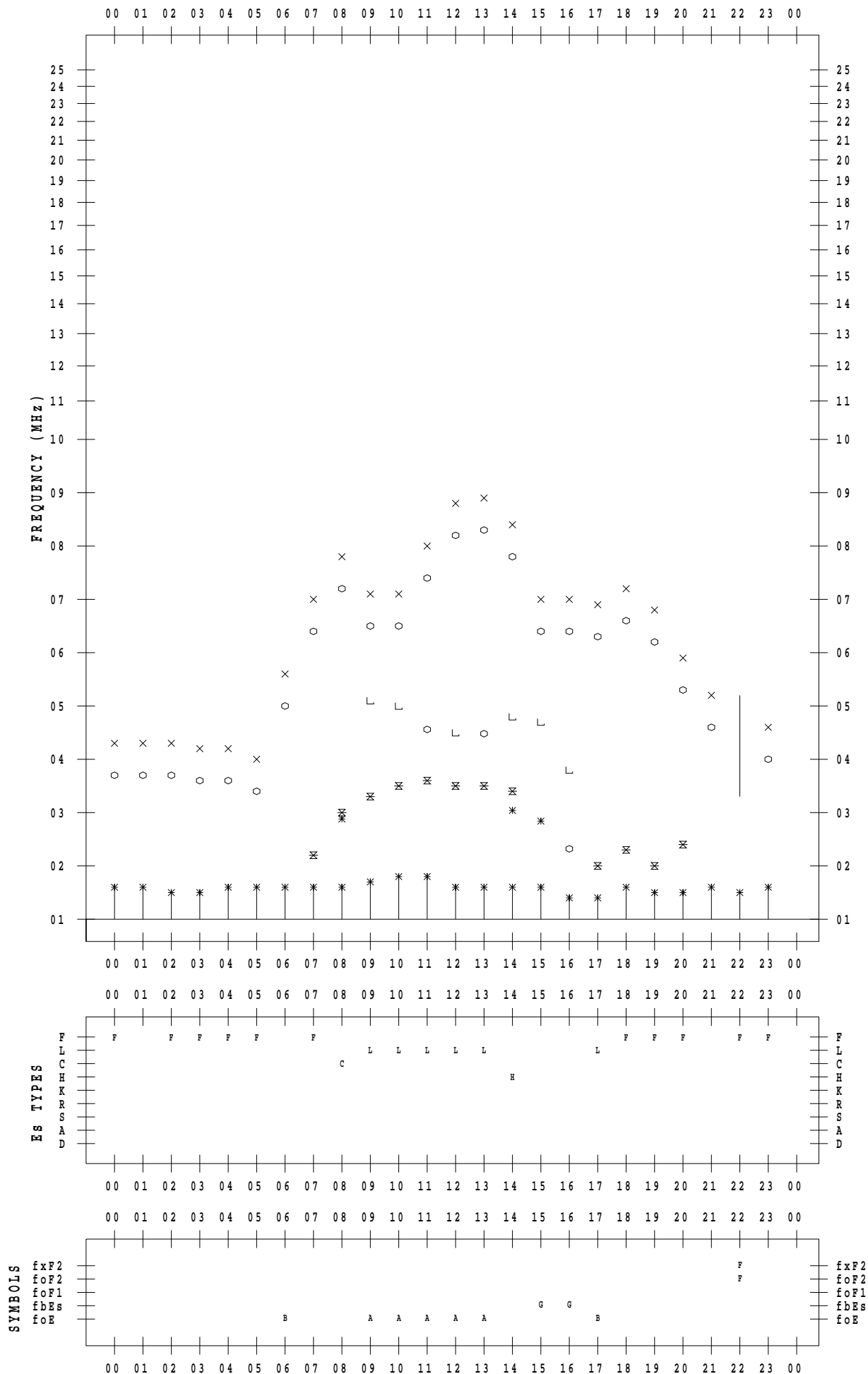
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/10

135 ° E MEAN TIME



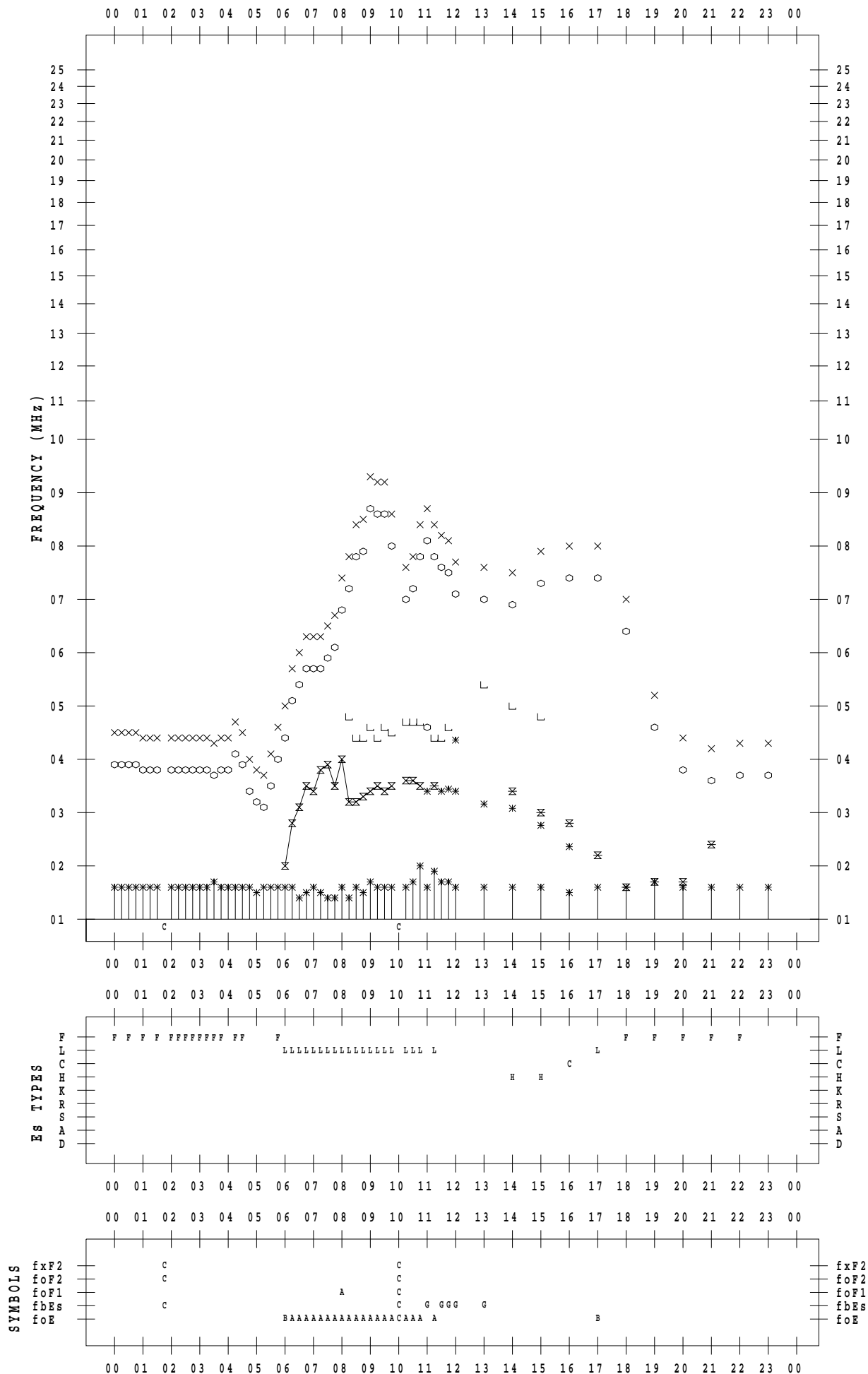
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/11

135 ° E MEAN TIME



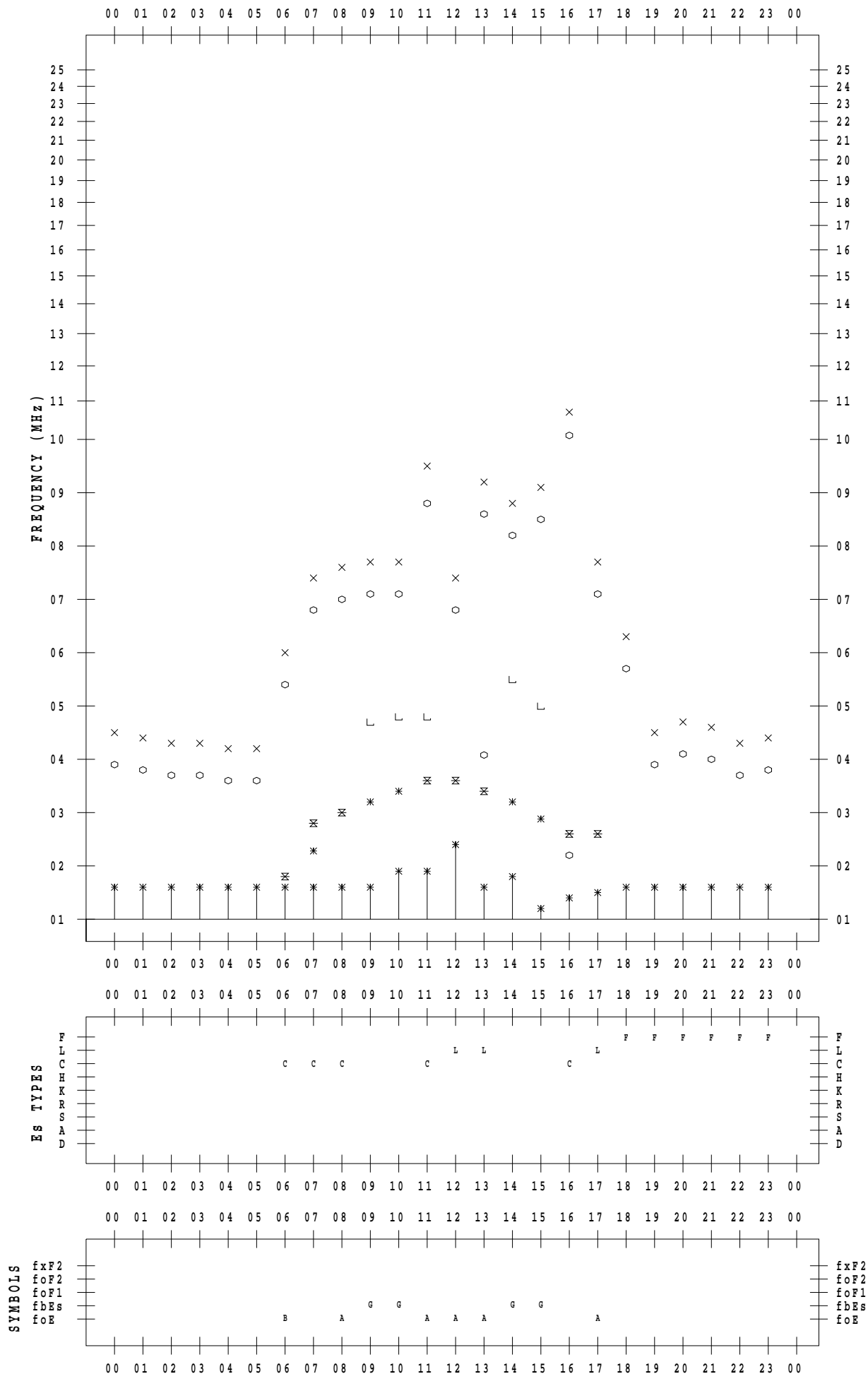
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/12

135 ° E MEAN TIME



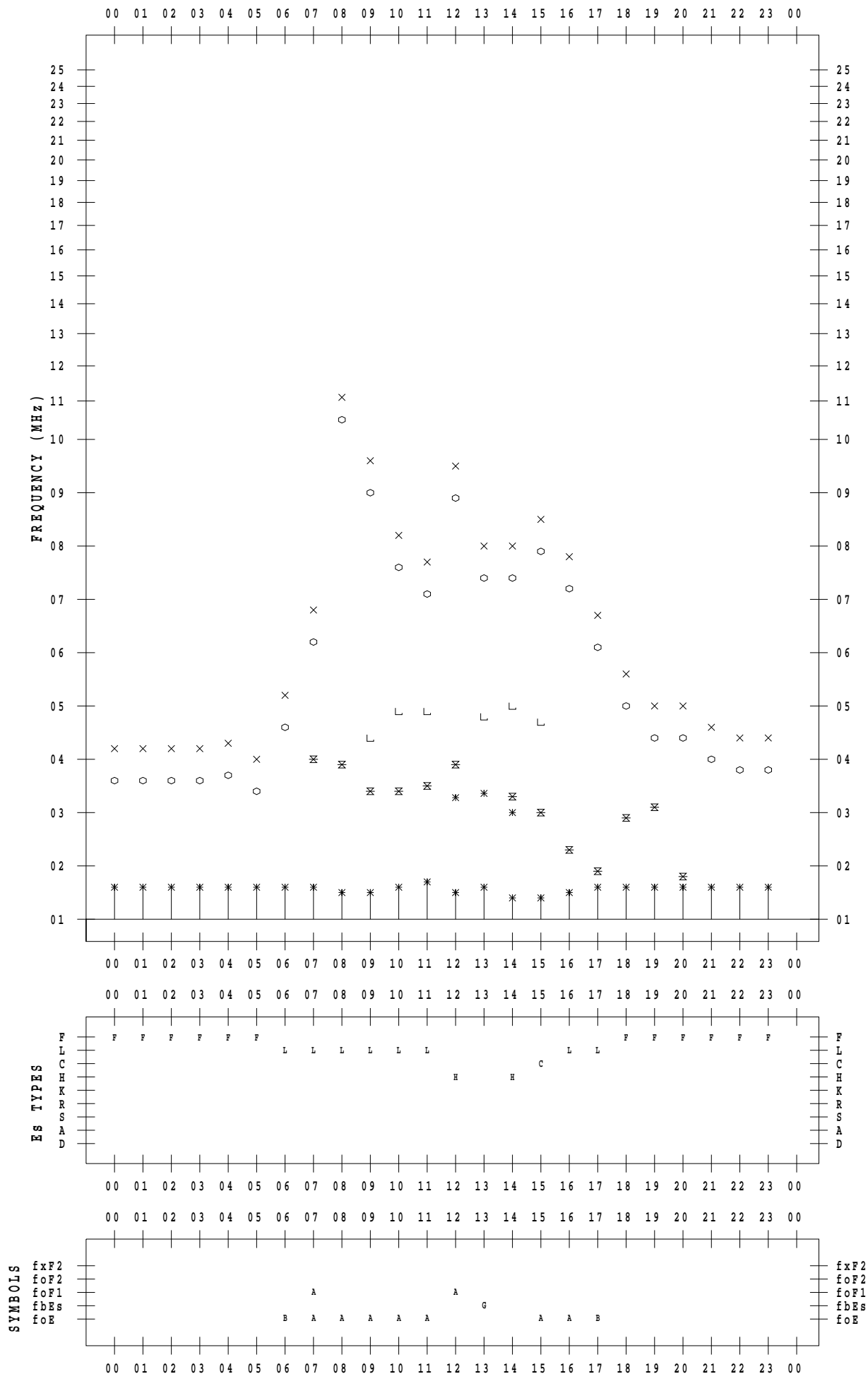
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/13

135 ° E MEAN TIME





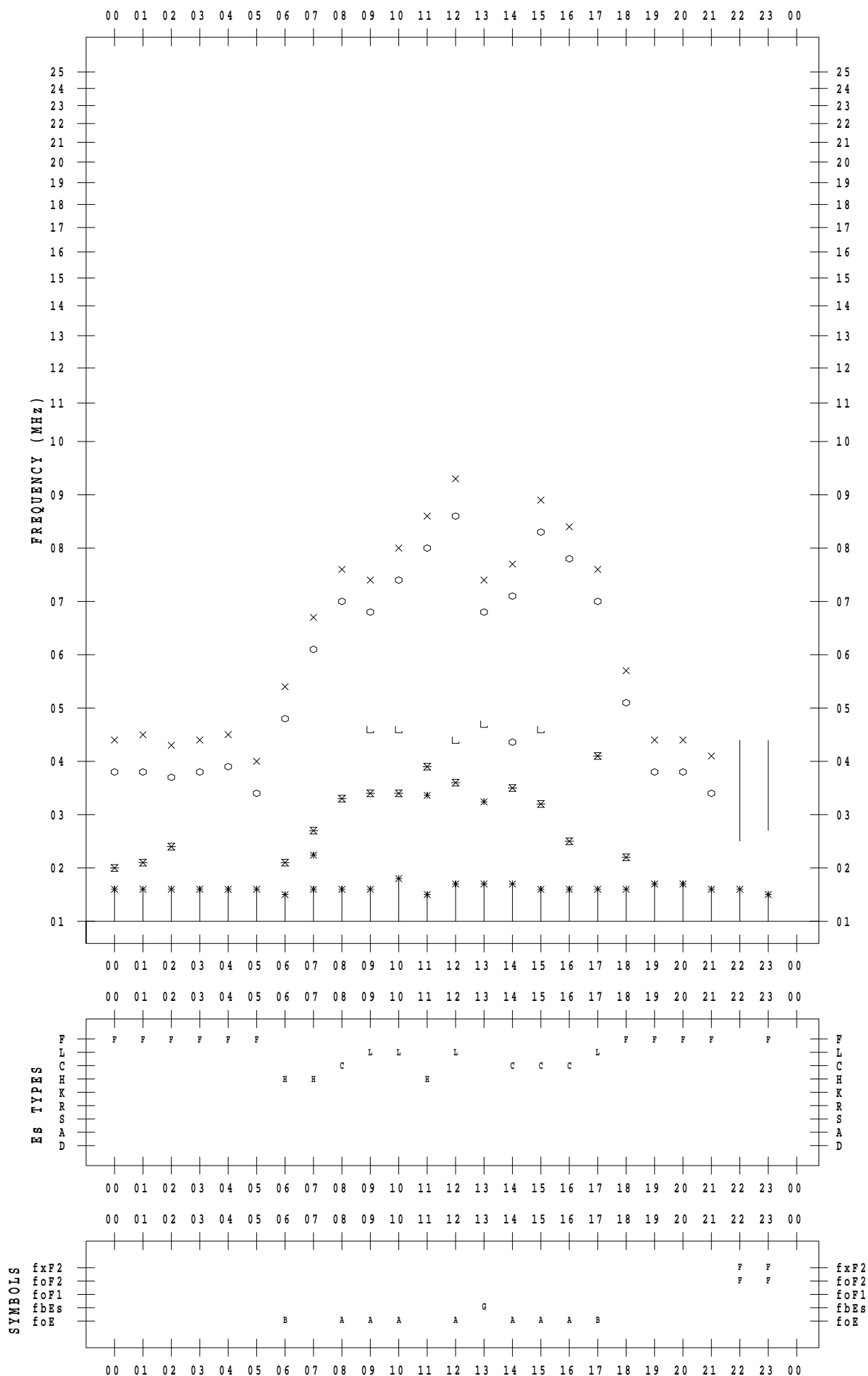
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/14

135 ° E MEAN TIME



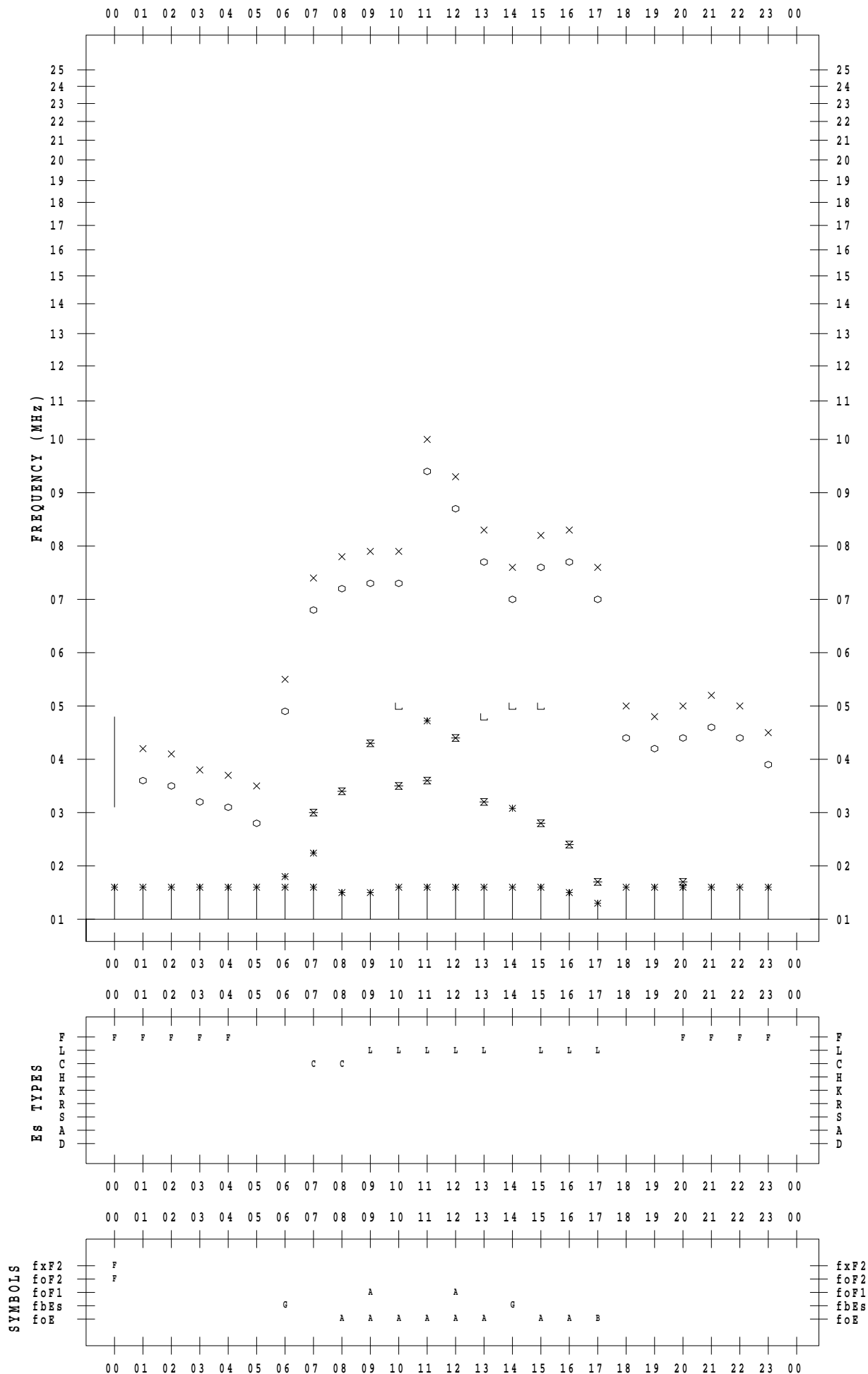
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/15

135 ° E MEAN TIME



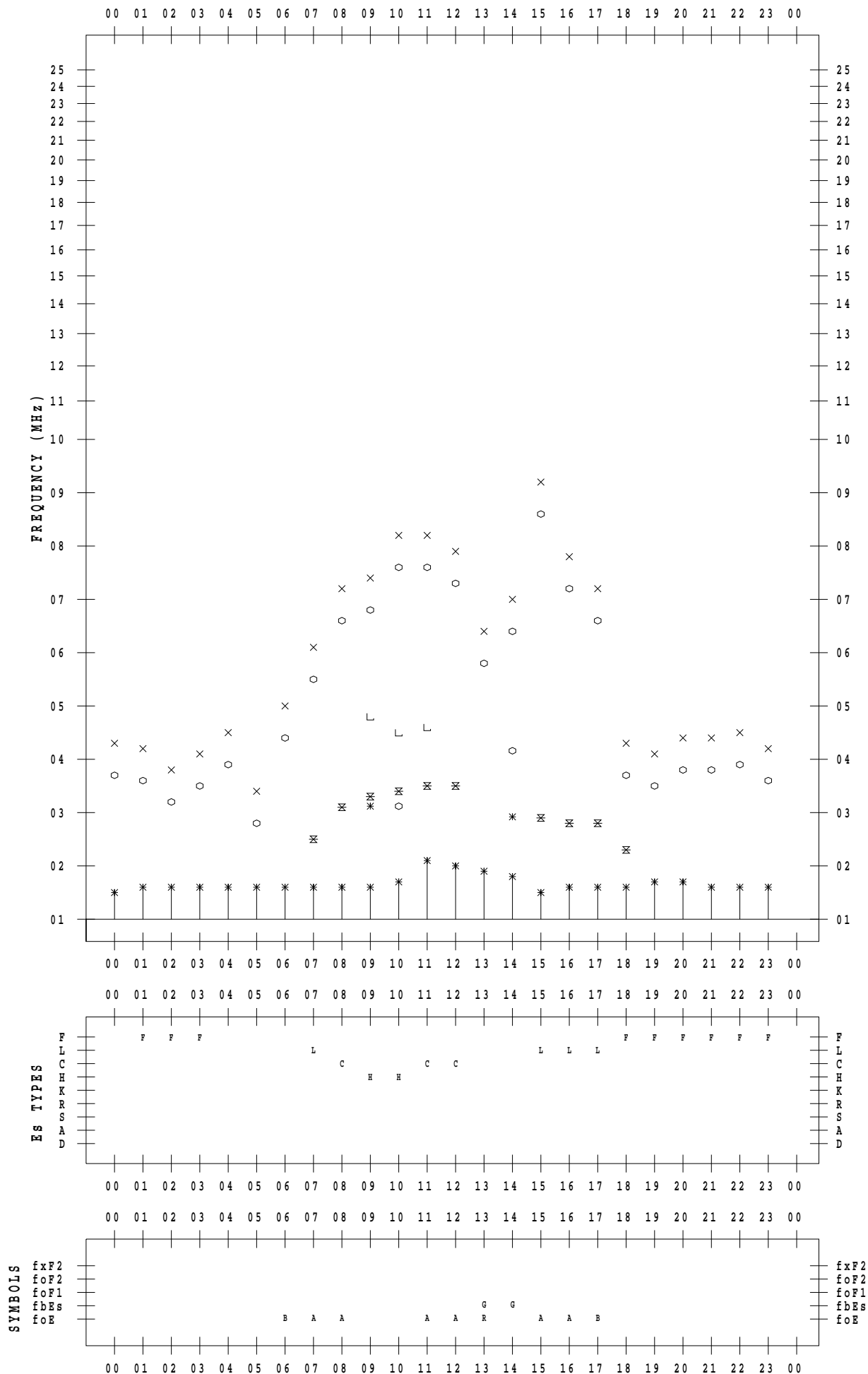
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/16

135 ° E MEAN TIME



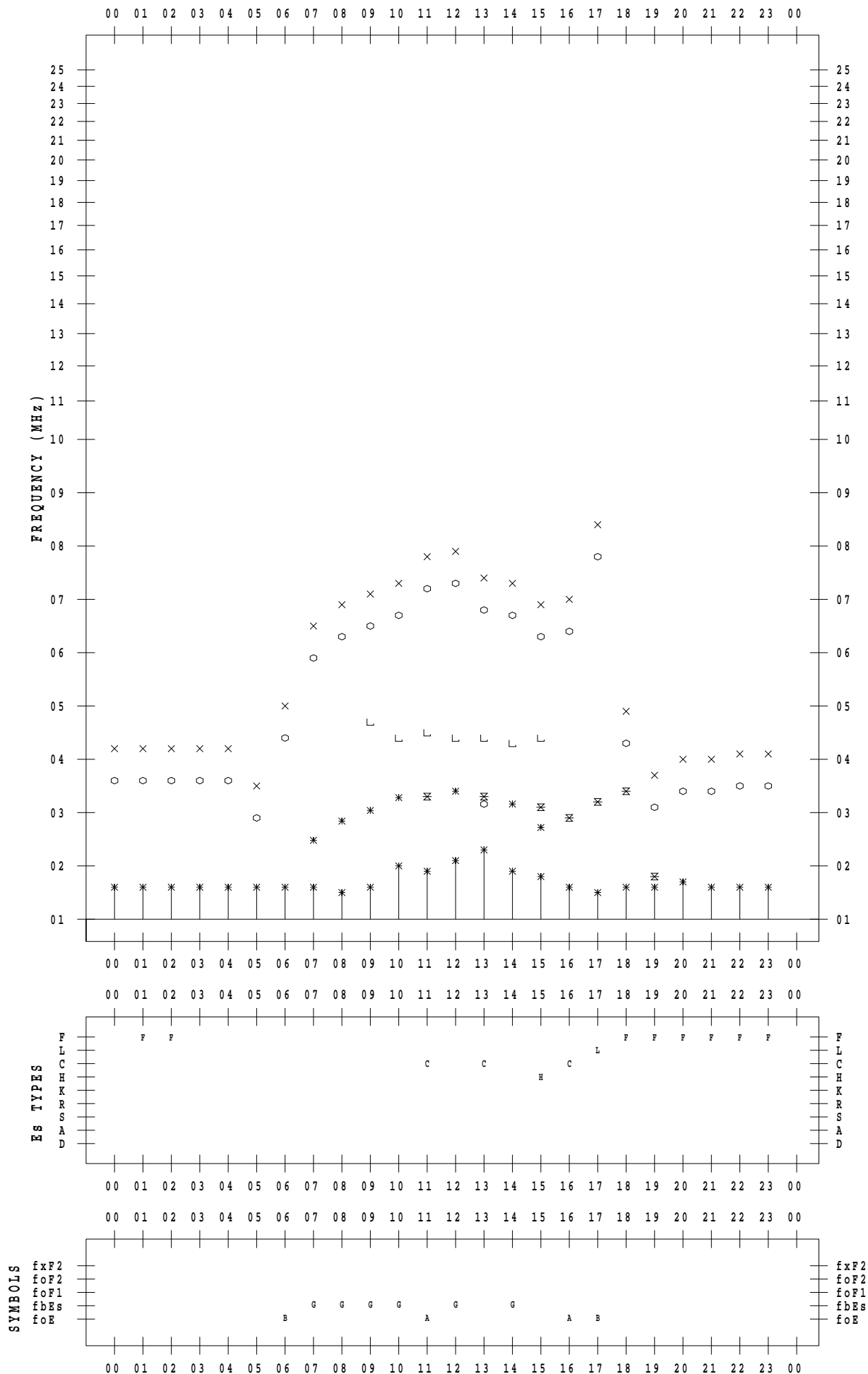
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/17

135 ° E MEAN TIME



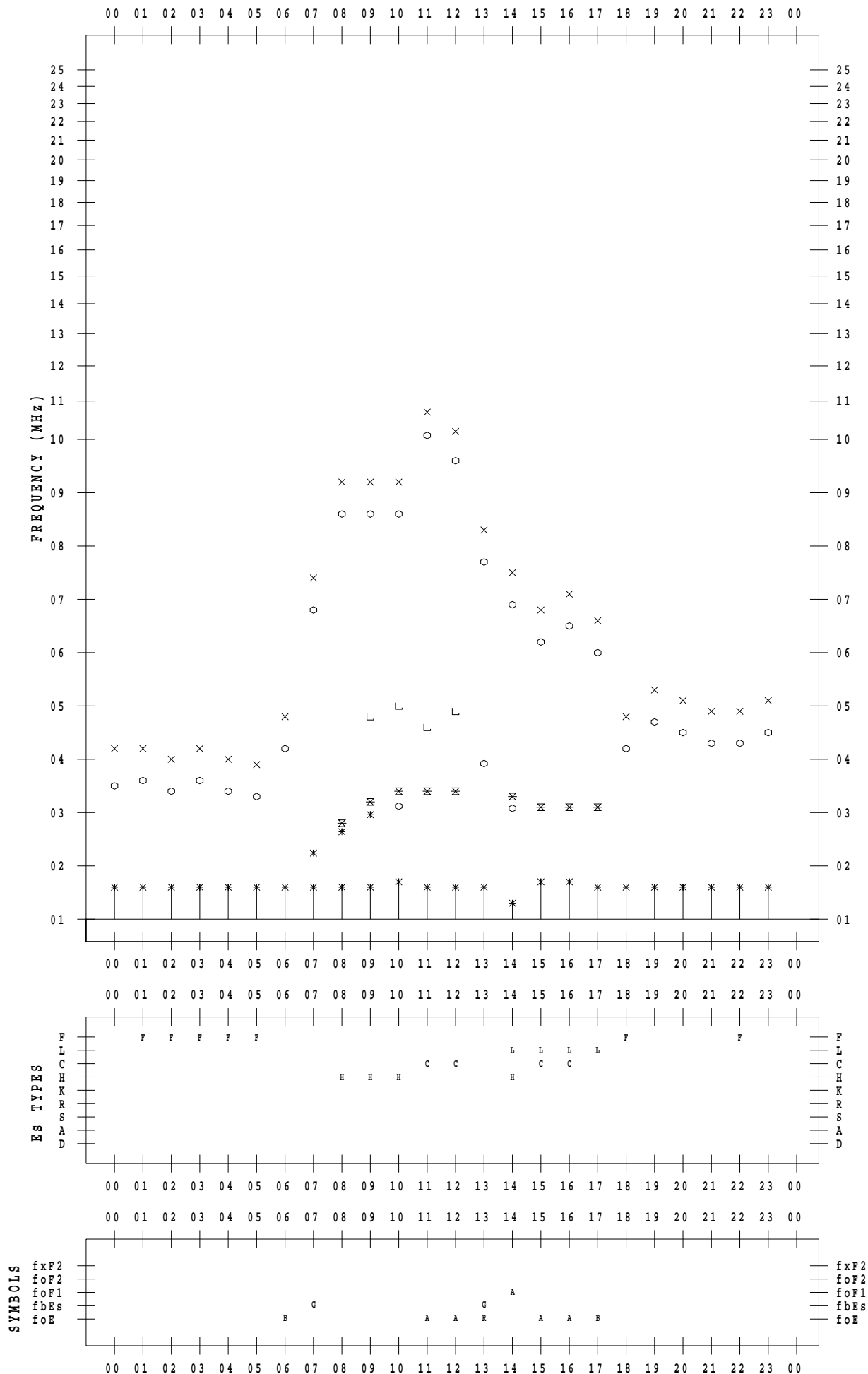
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/18

135 ° E MEAN TIME



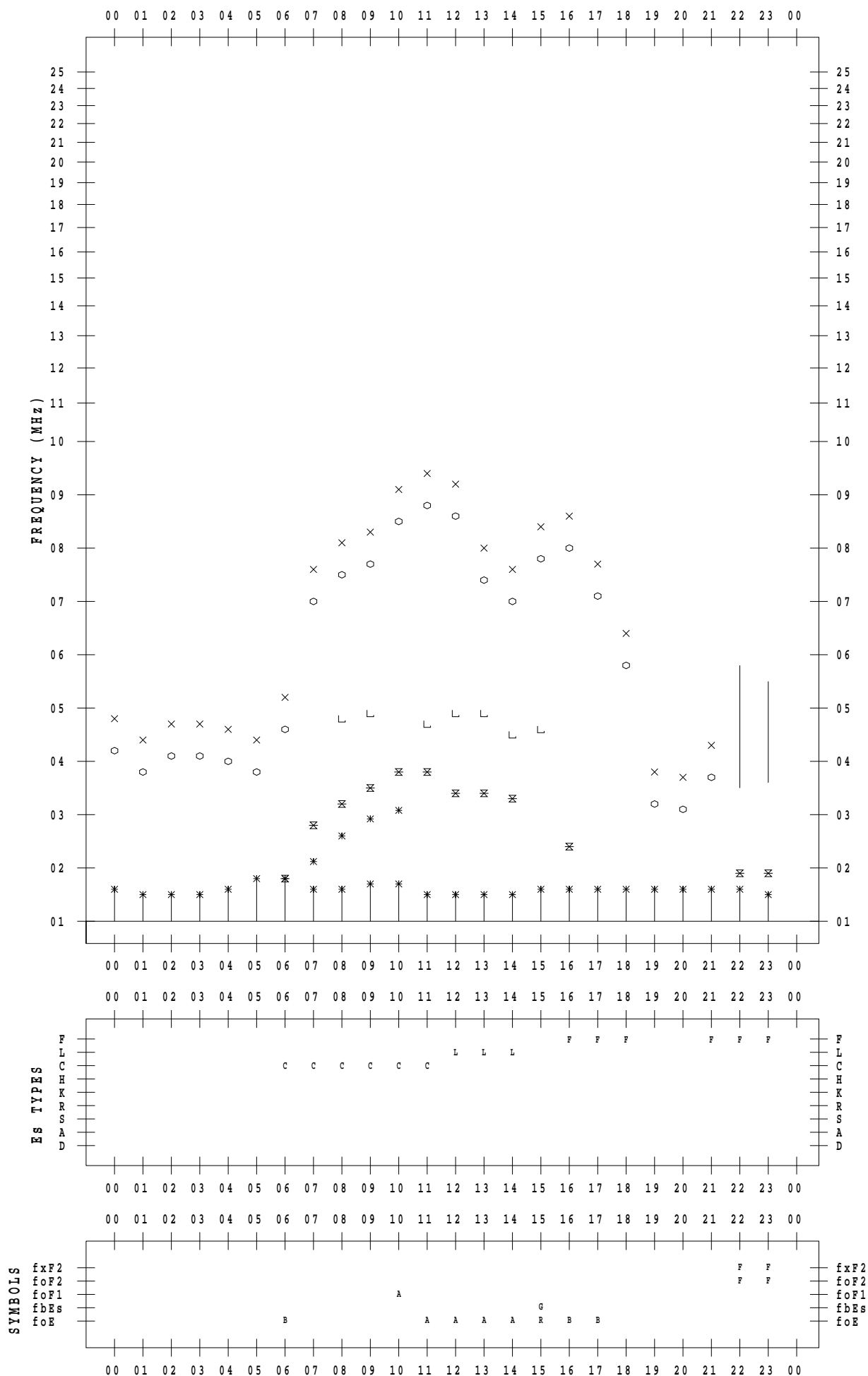
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/19

135 ° E MEAN TIME



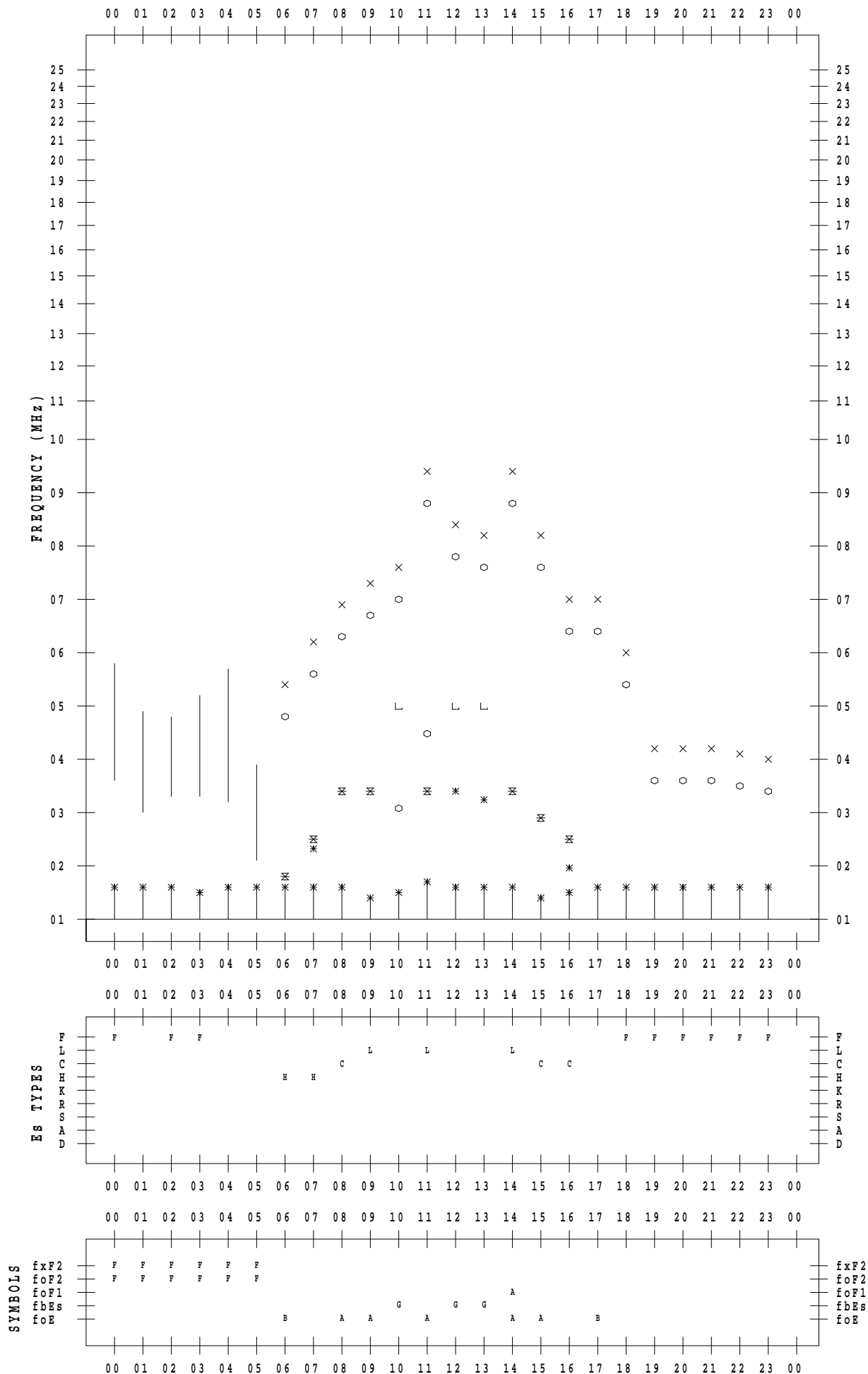
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/20

135 ° E MEAN TIME



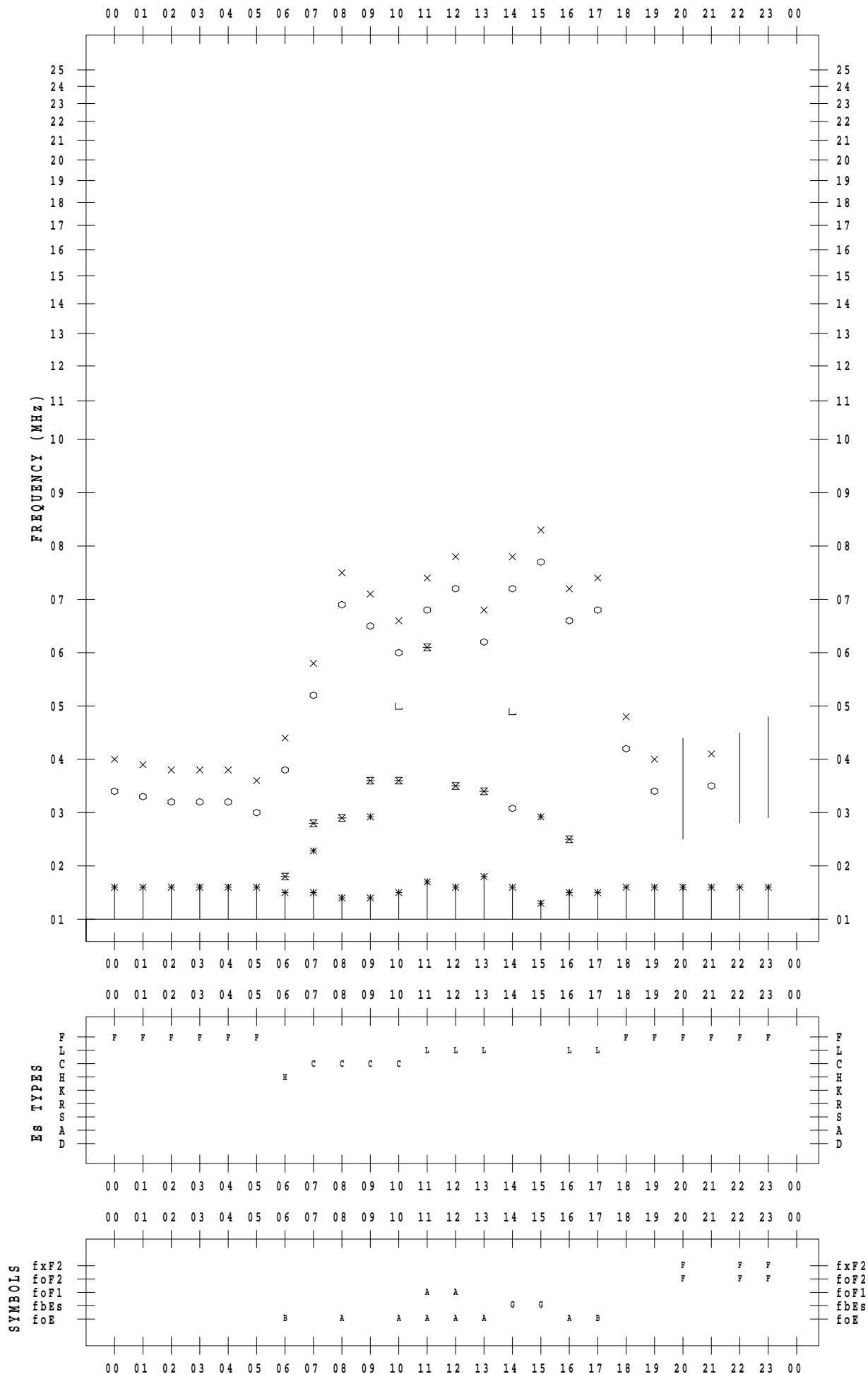
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/21

135 ° E MEAN TIME





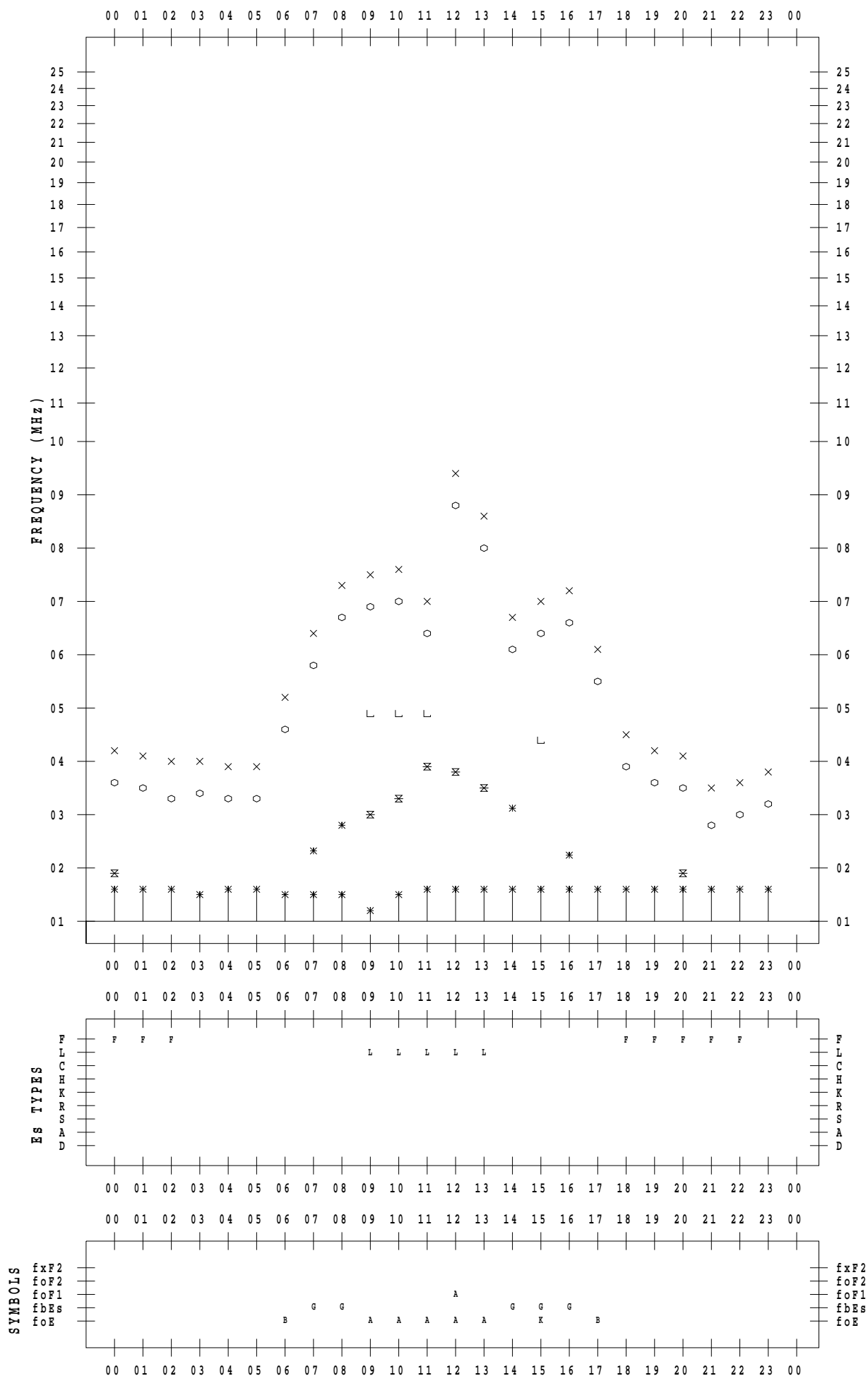
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/22

135 ° E MEAN TIME



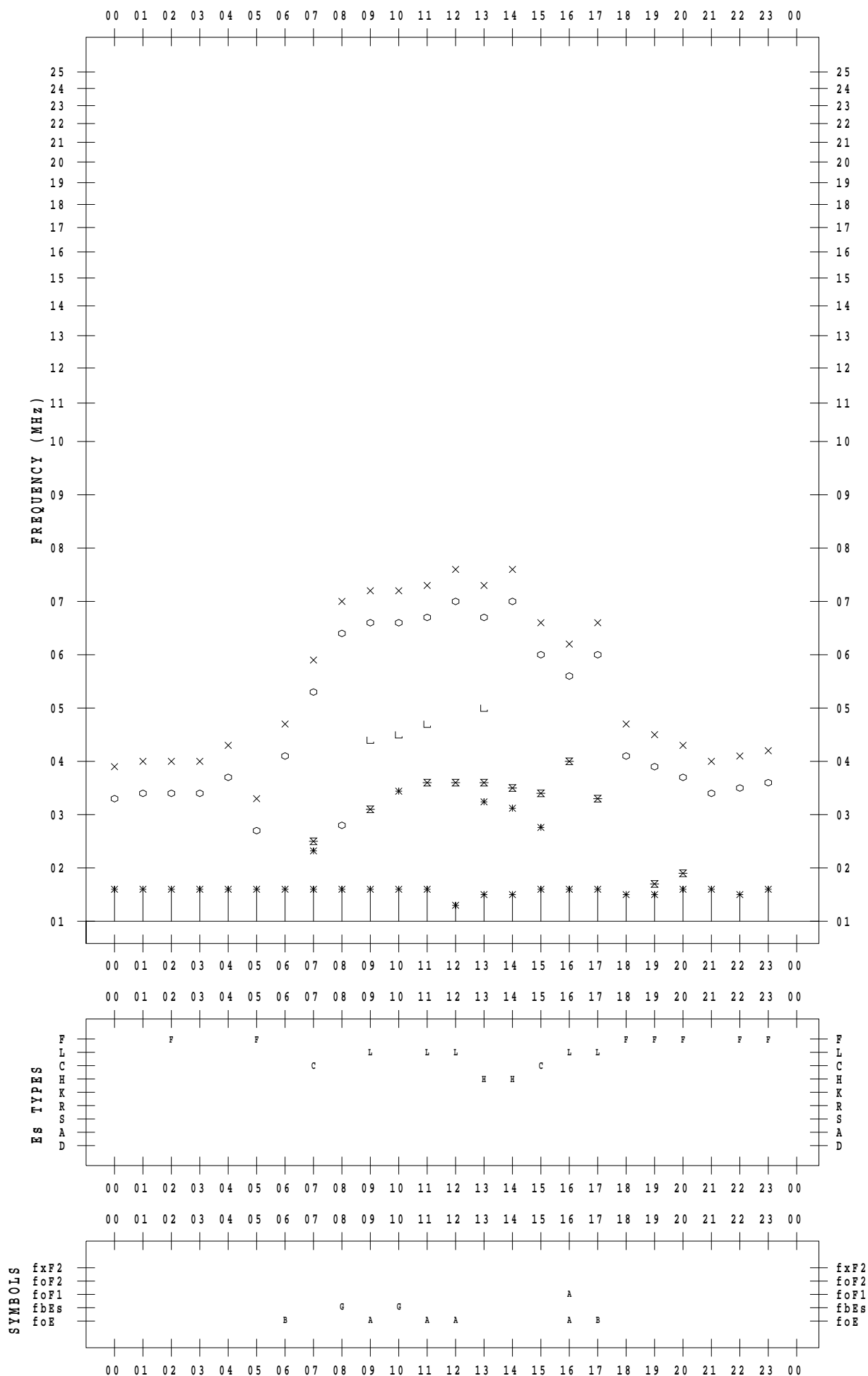
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/23

135 ° E MEAN TIME



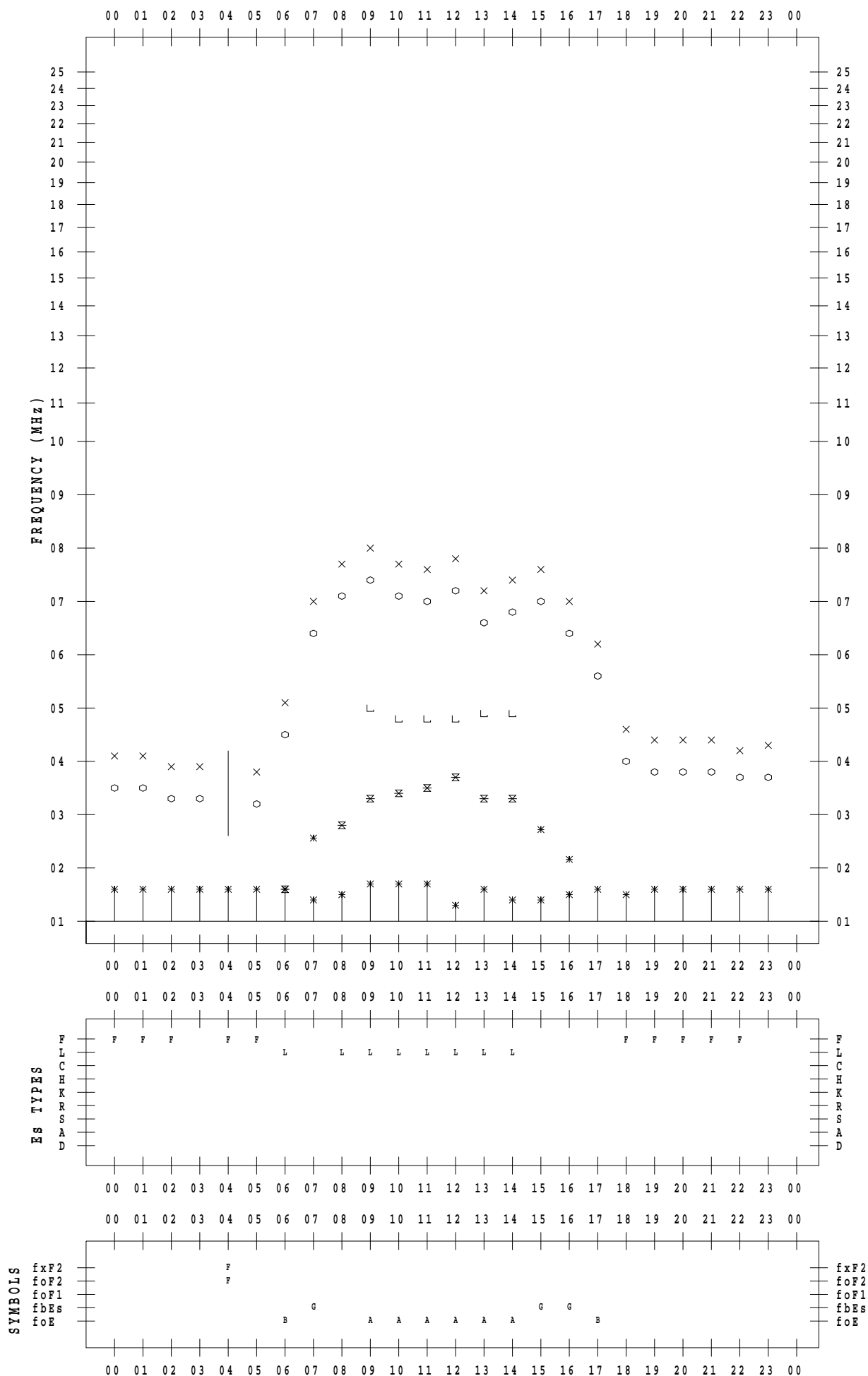
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/24

135 ° E MEAN TIME



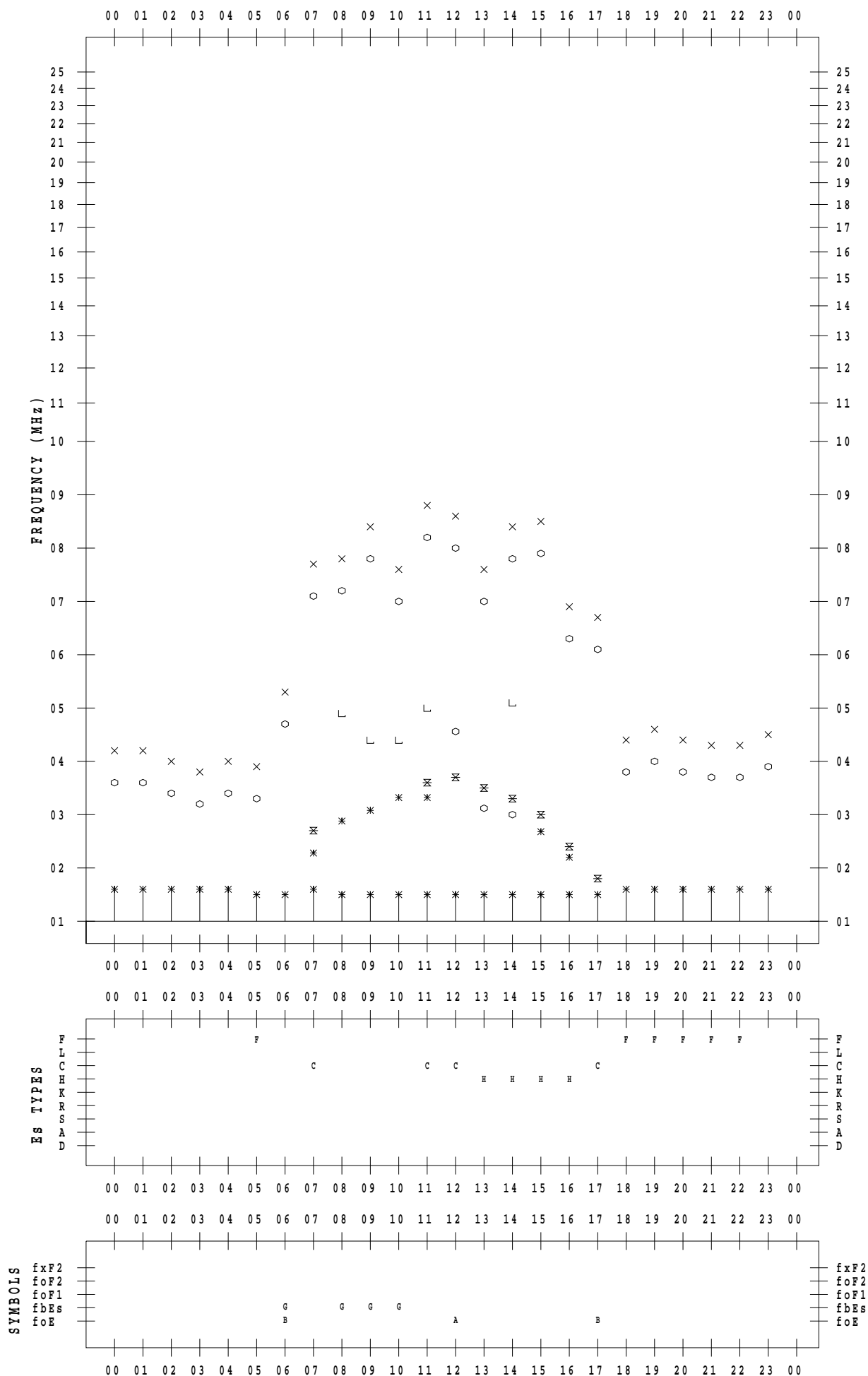
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/25

135 ° E MEAN TIME



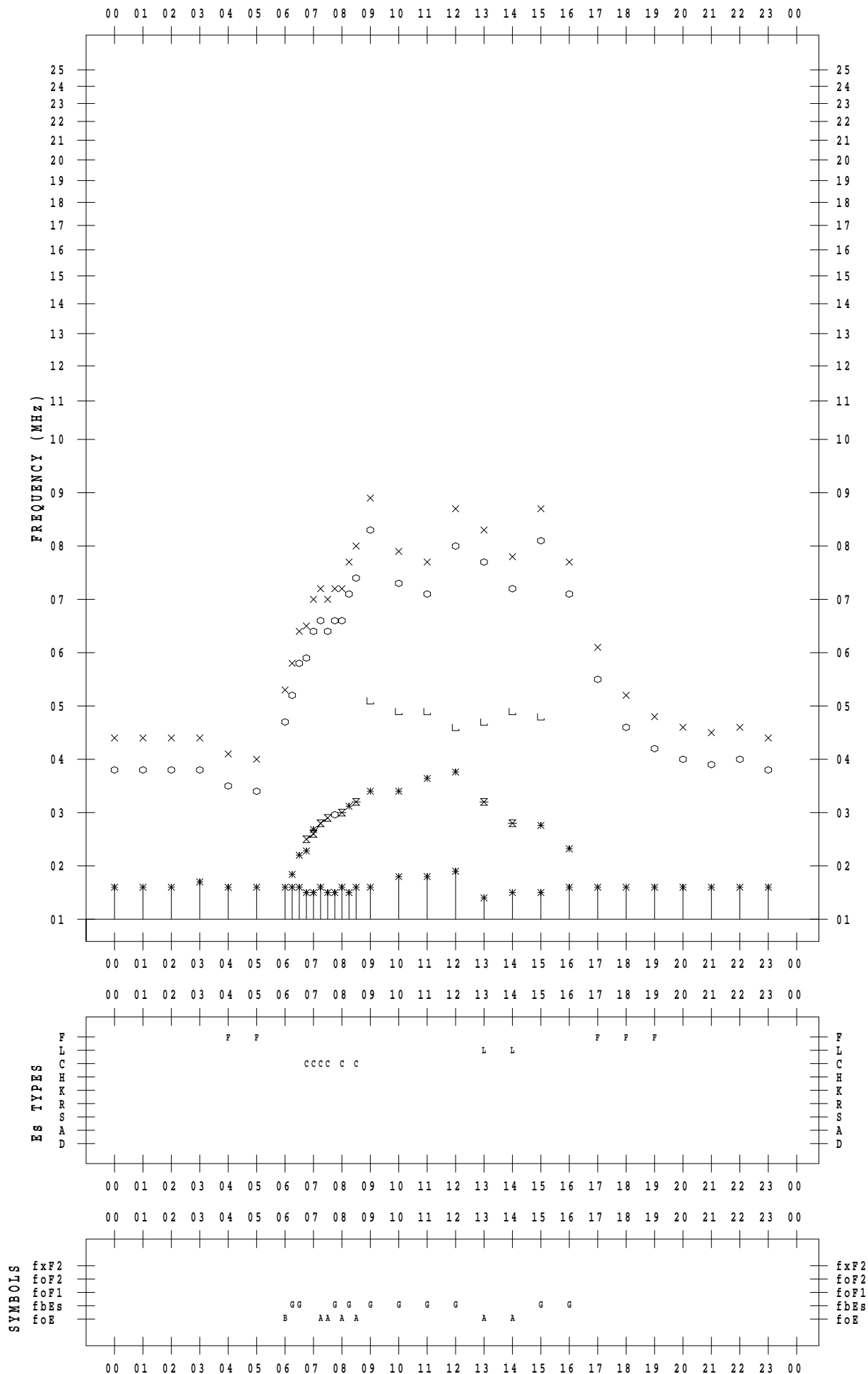
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/26

135 ° E MEAN TIME



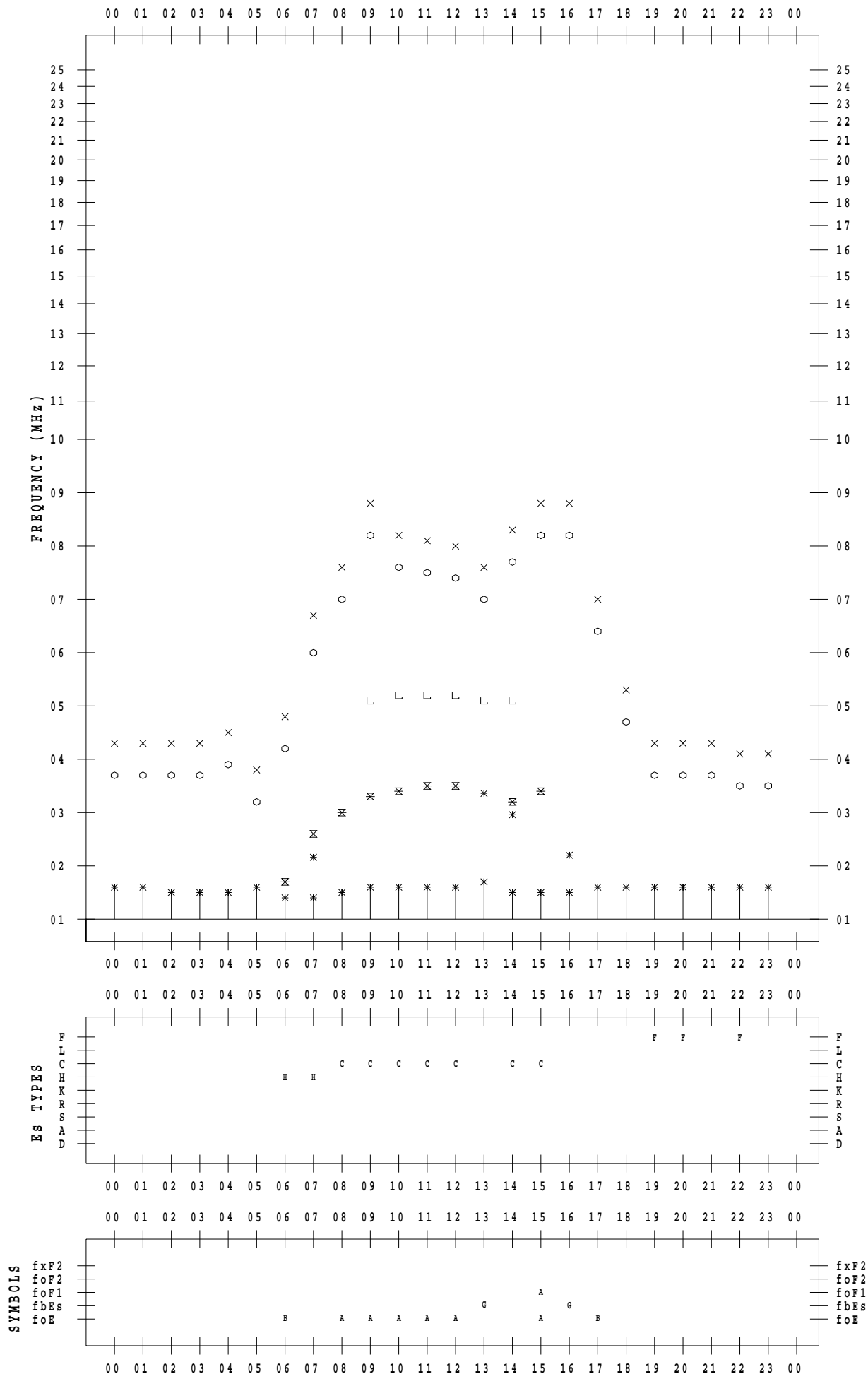
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/27

135 ° E MEAN TIME



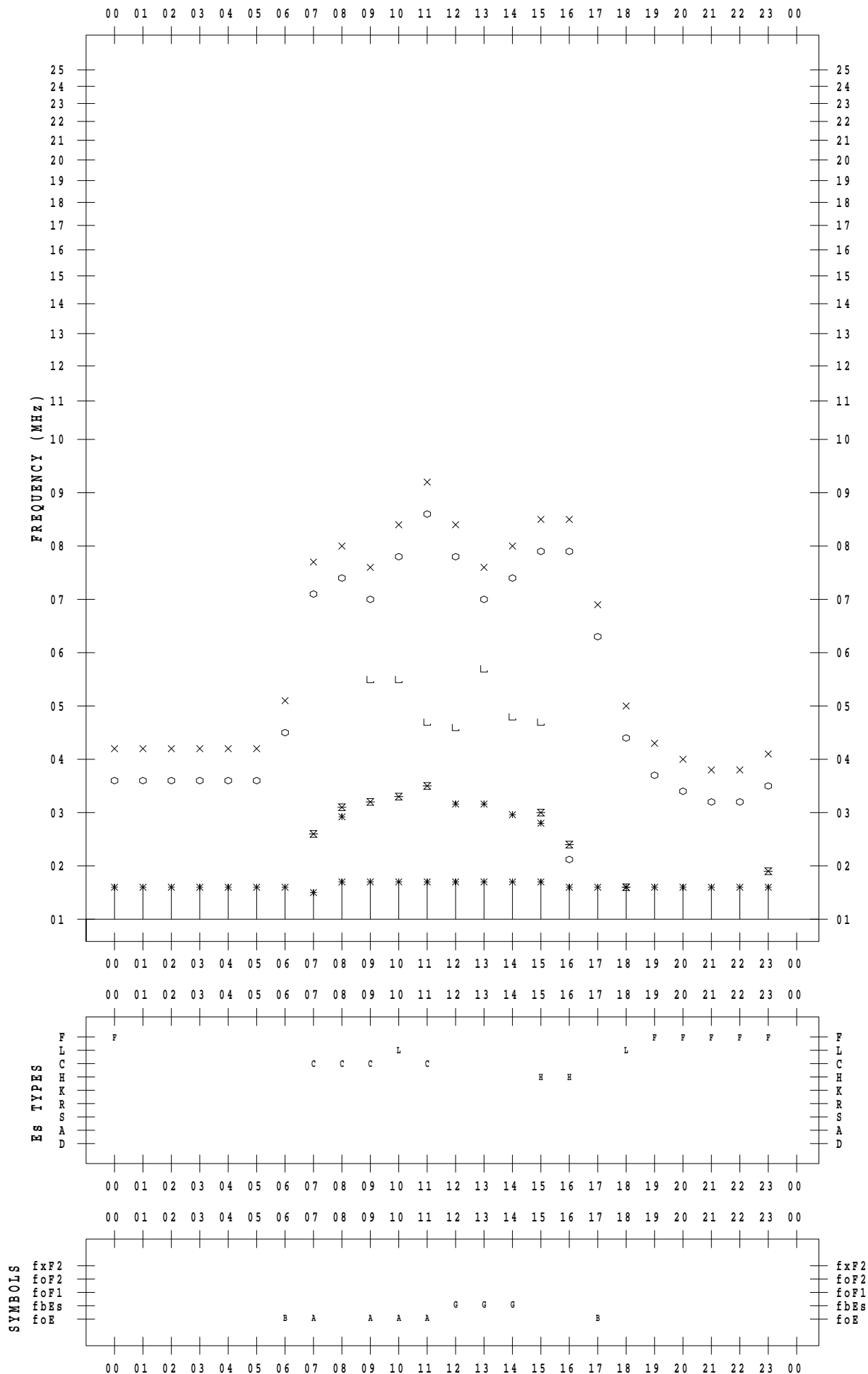
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/28

135 ° E MEAN TIME



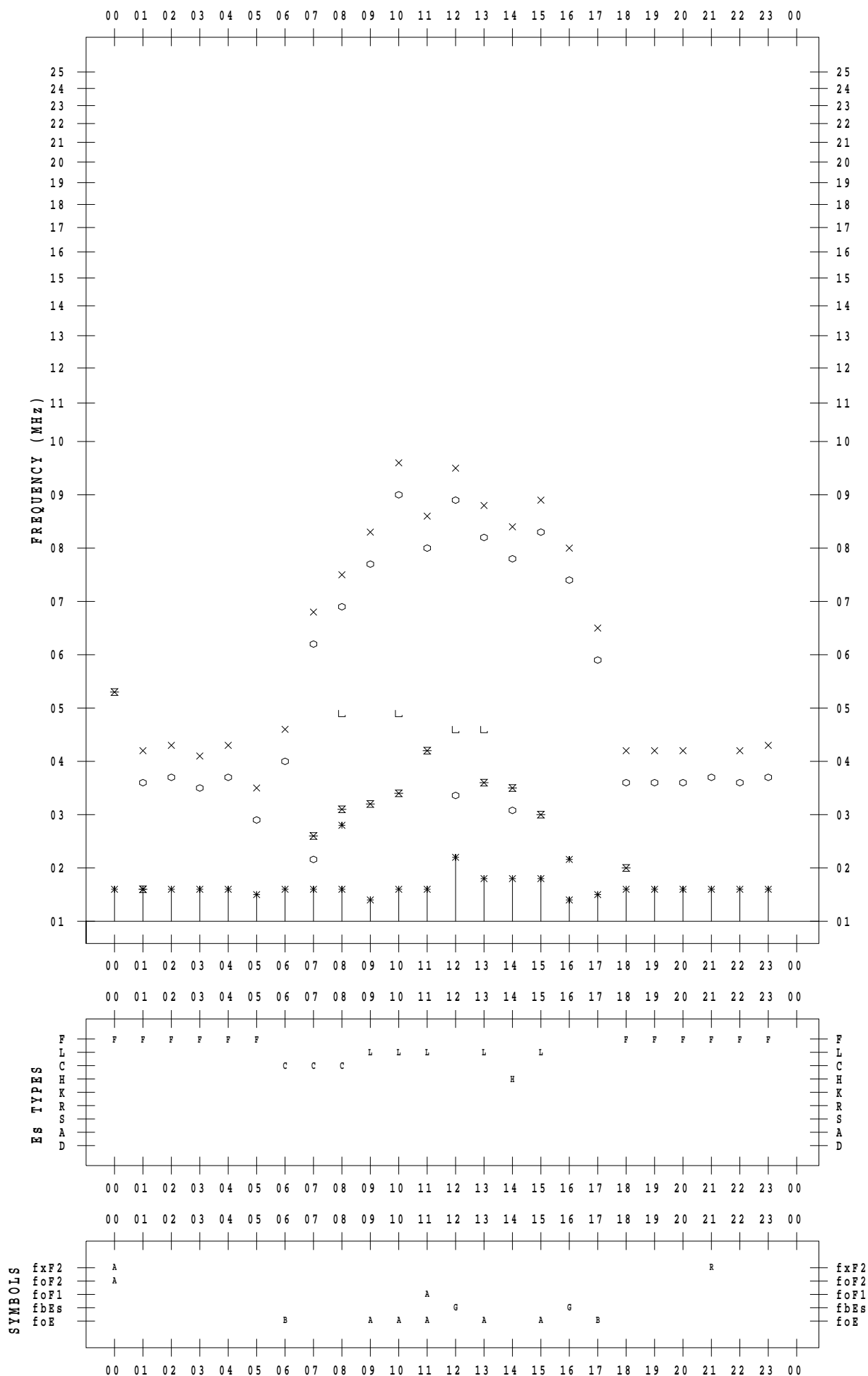
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/29

135 ° E MEAN TIME





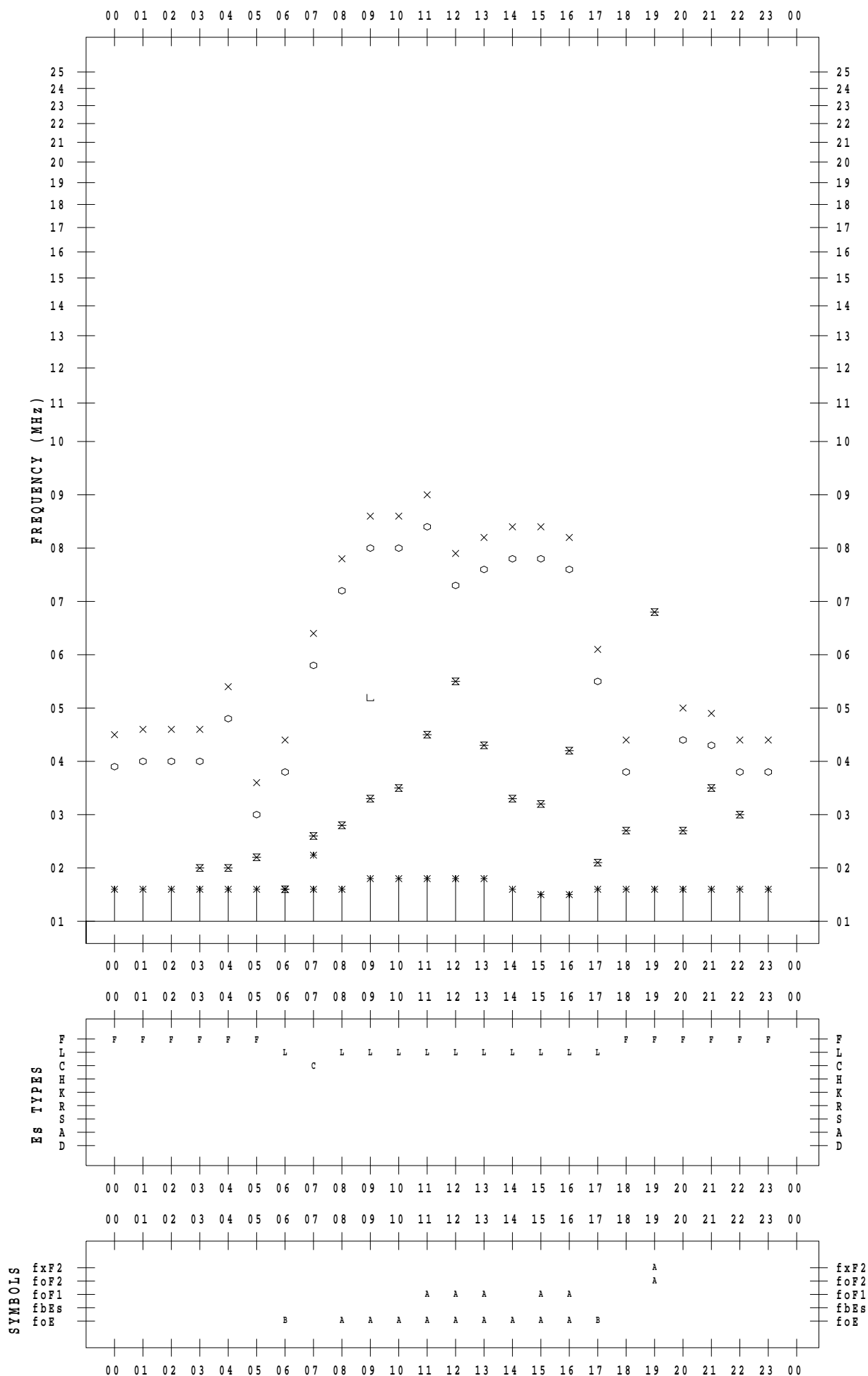
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/30

135 ° E MEAN TIME



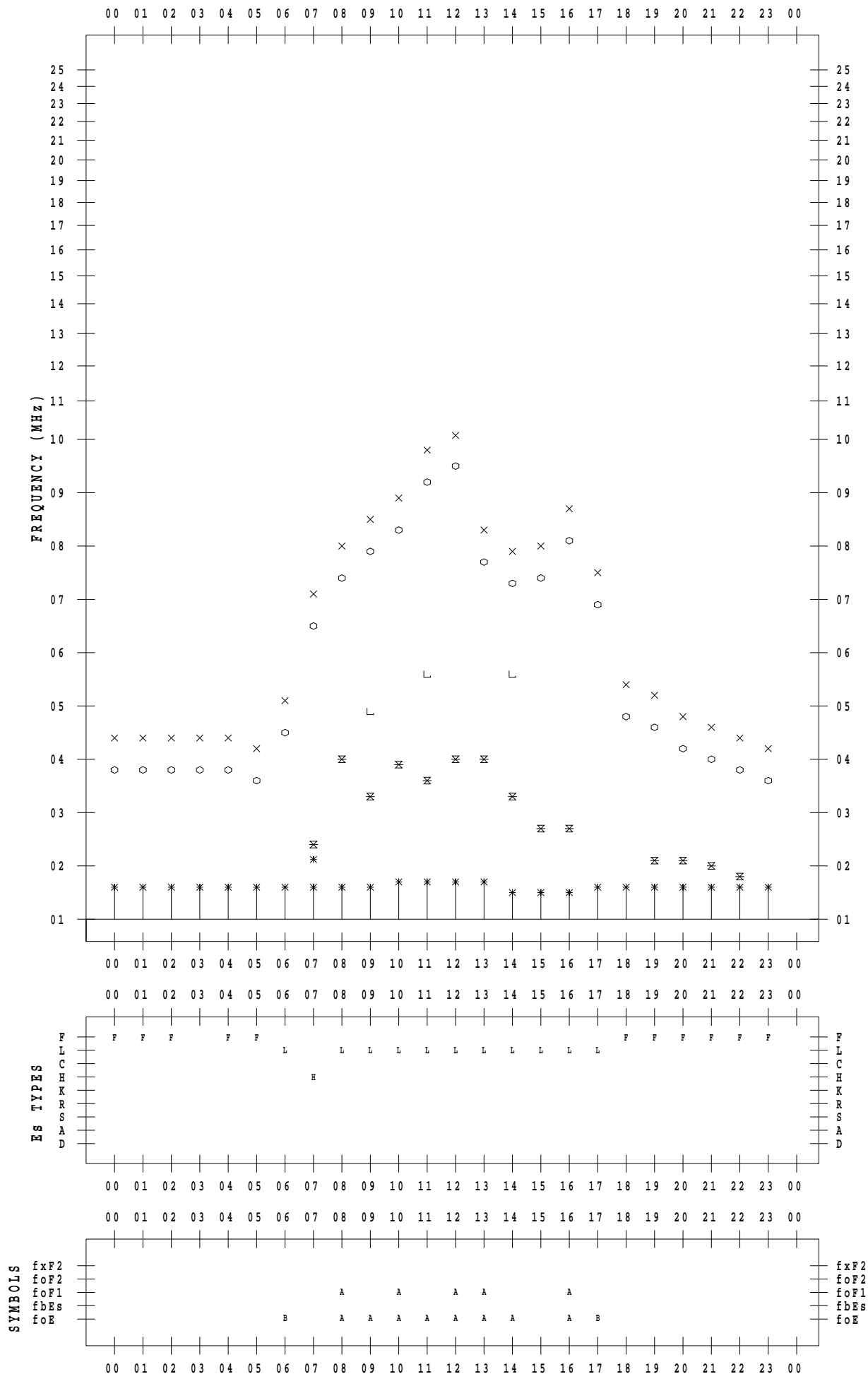
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/10/31

135 ° E MEAN TIME



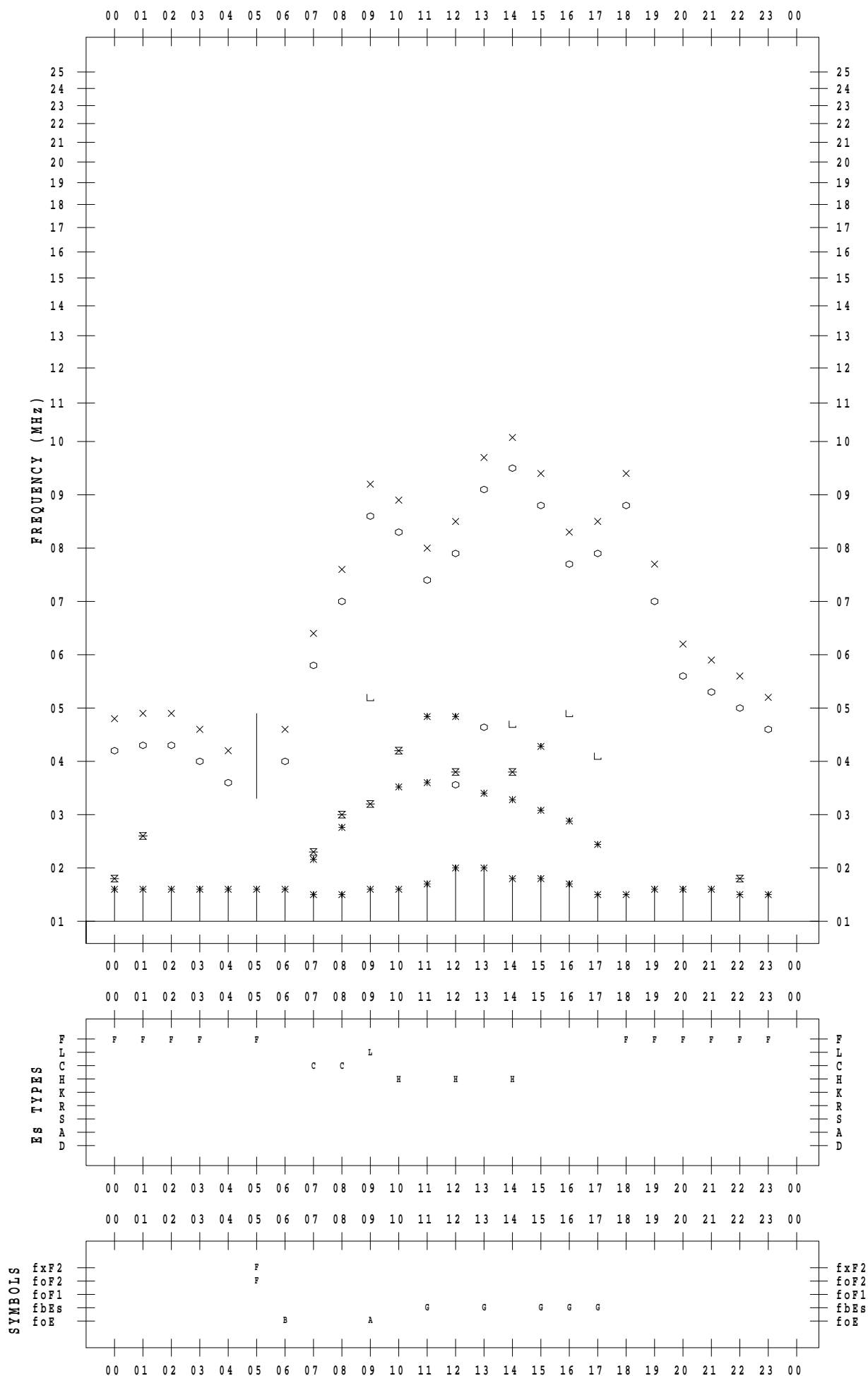
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/ 1

135 ° E MEAN TIME



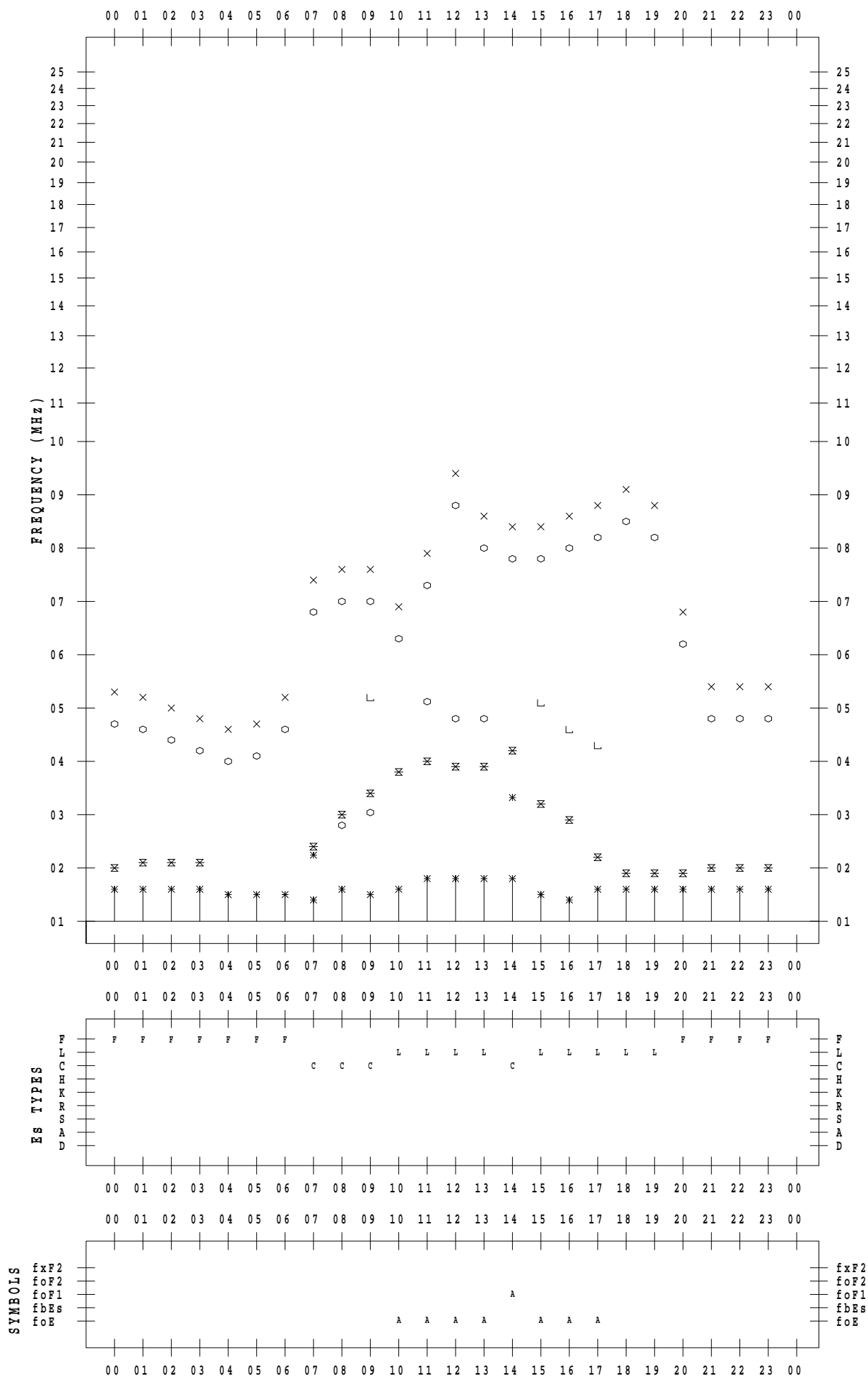
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/ 2

135 ° E MEAN TIME



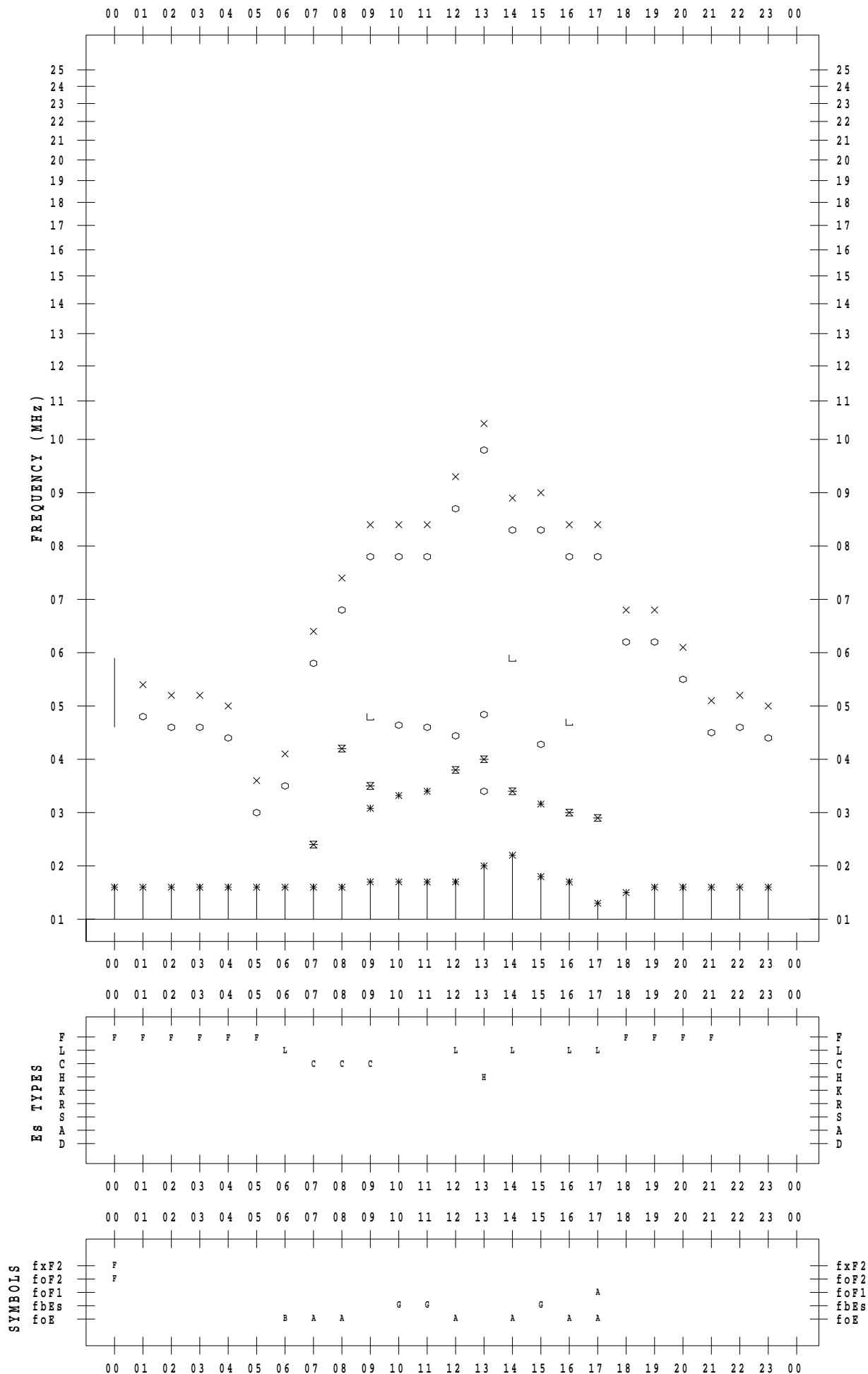
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/ 3

135 ° E MEAN TIME



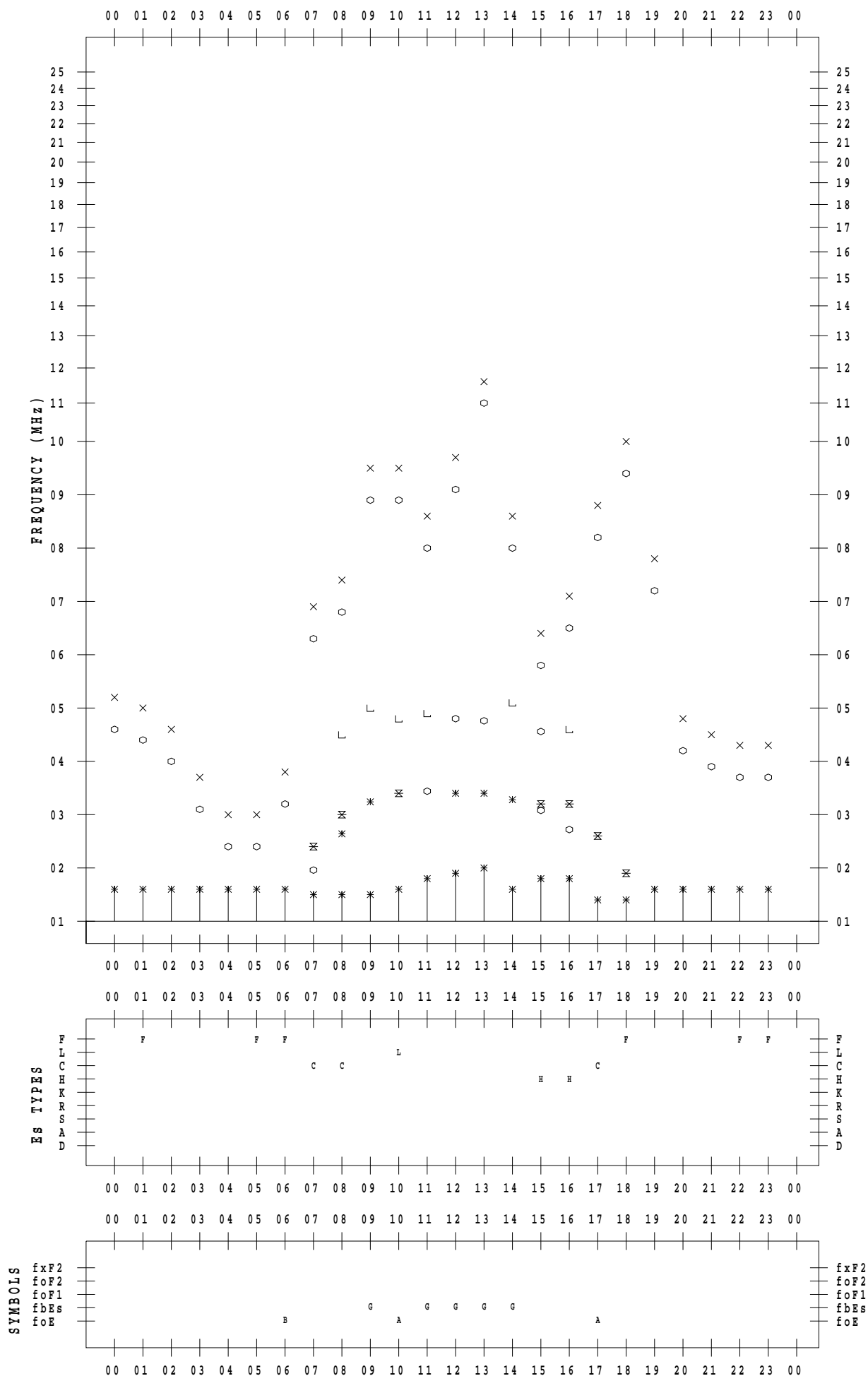
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/ 4

135 ° E MEAN TIME



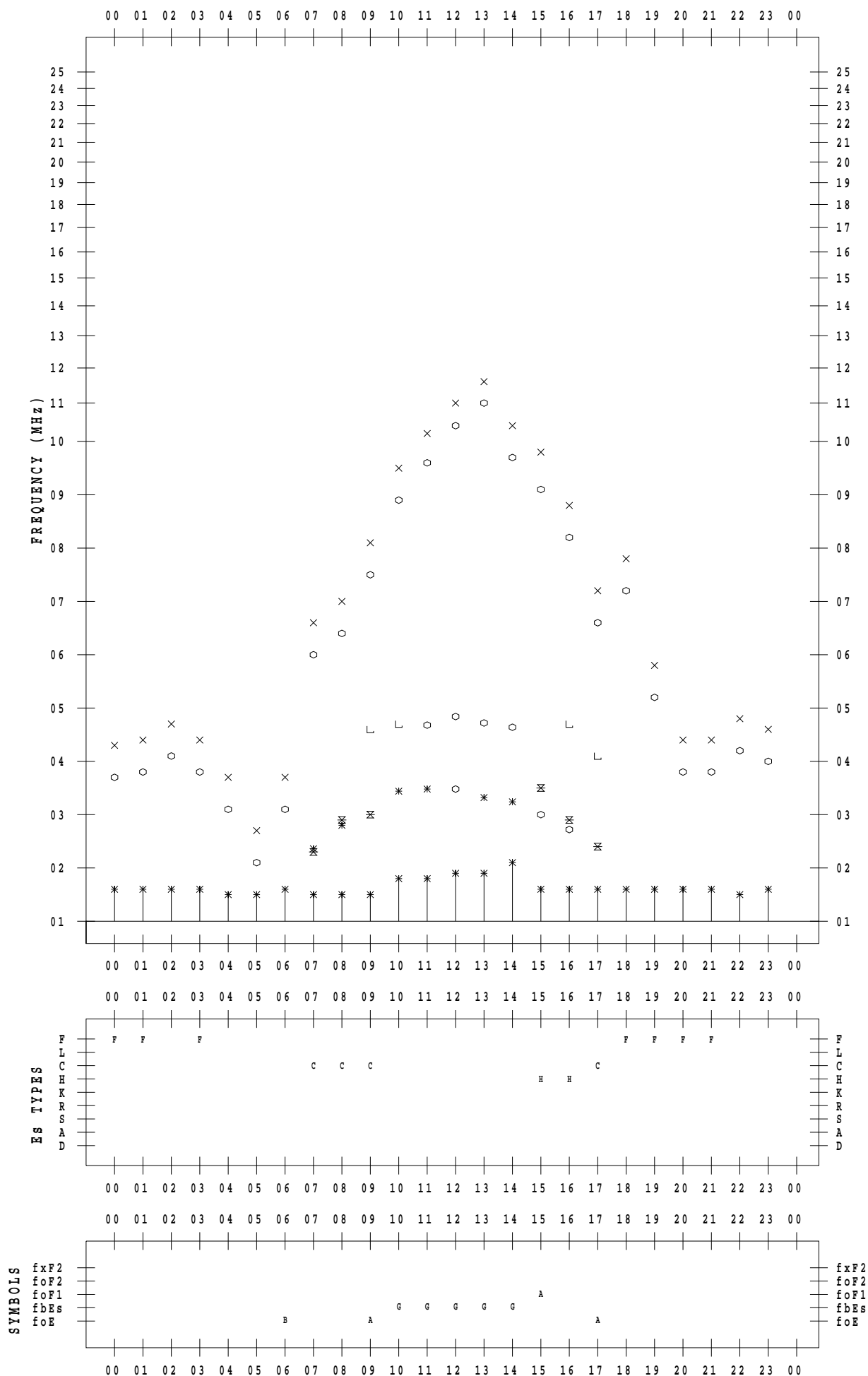
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/ 5

135 ° E MEAN TIME



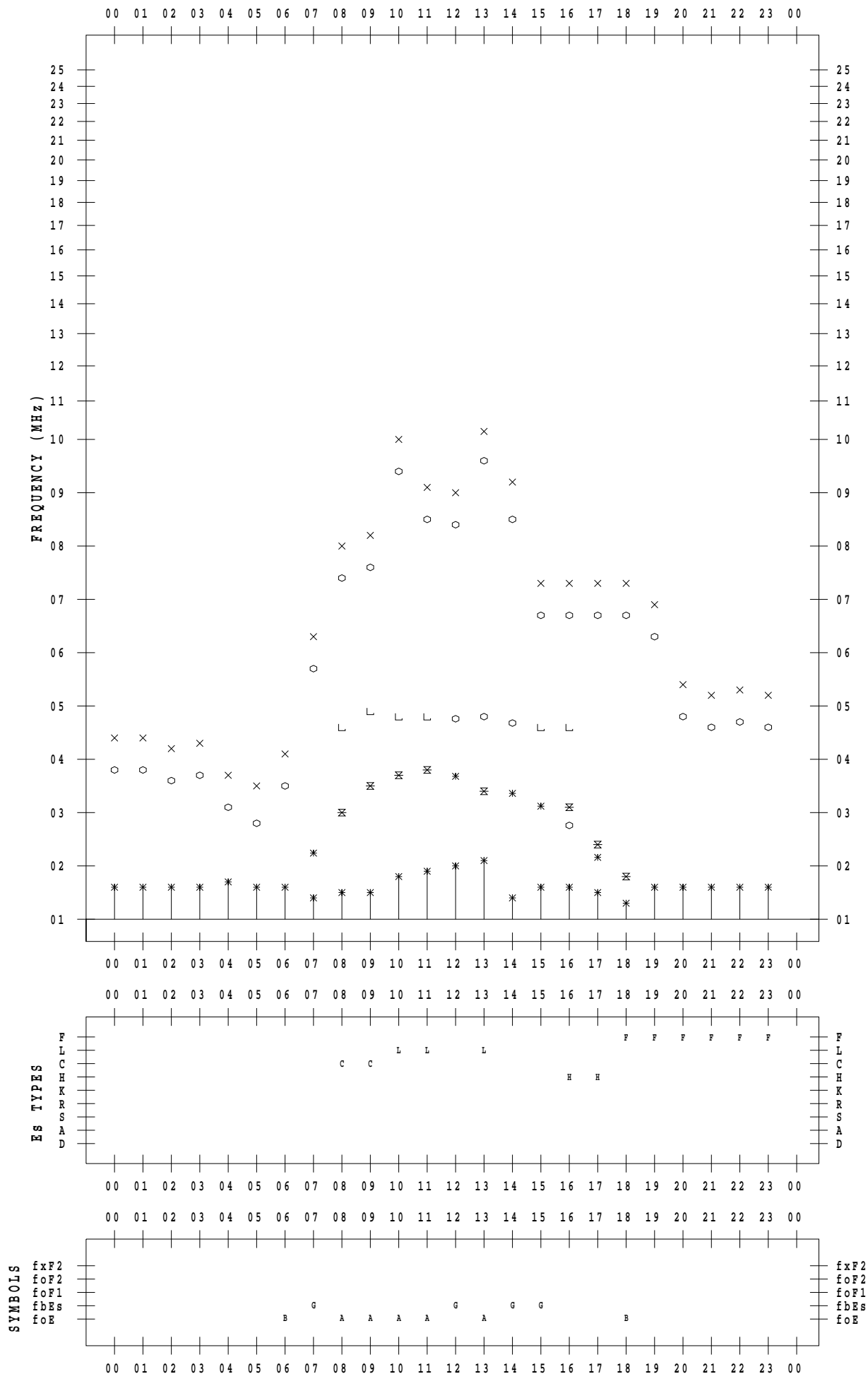
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/ 6

135 ° E MEAN TIME





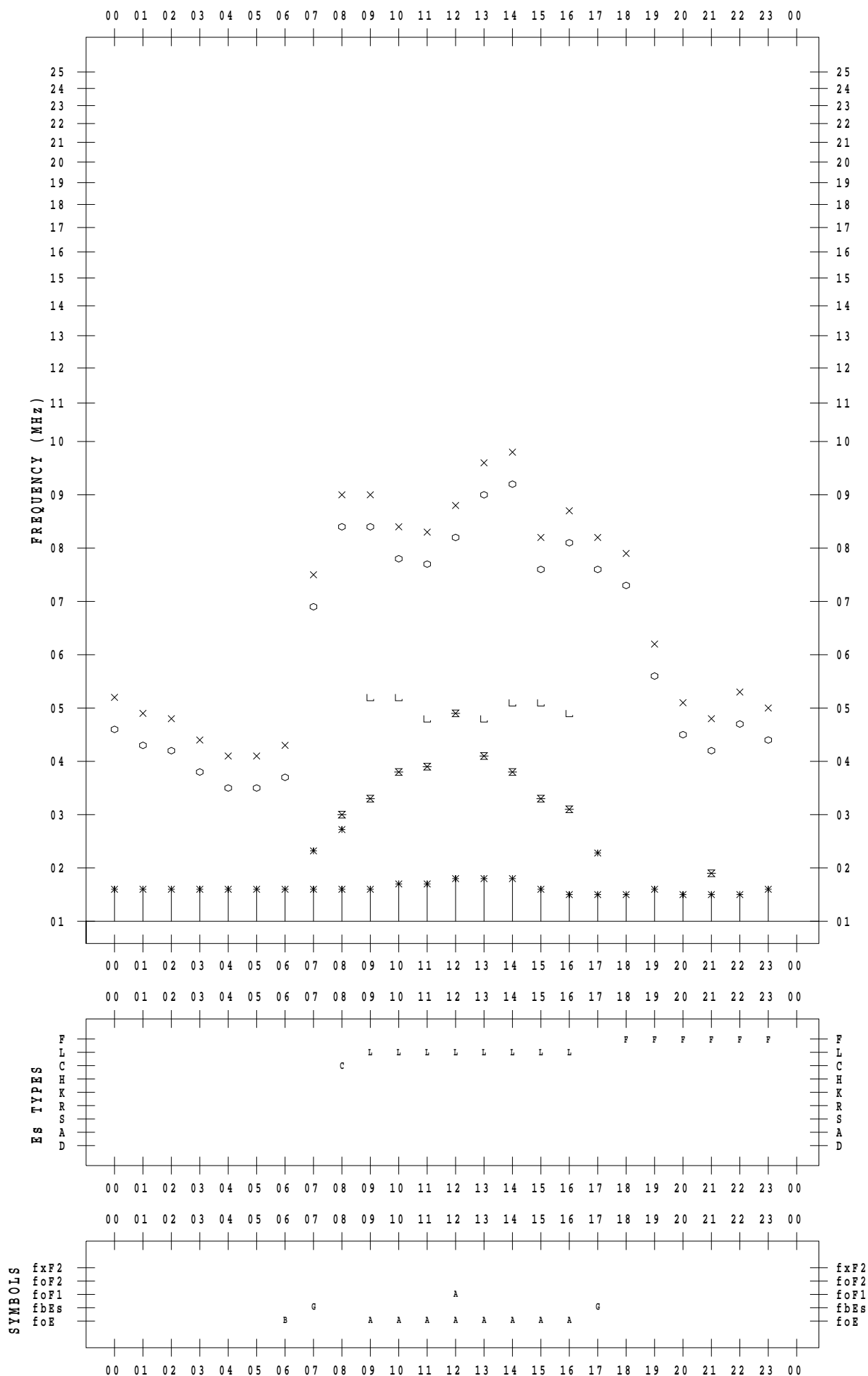
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/7

135 ° E MEAN TIME



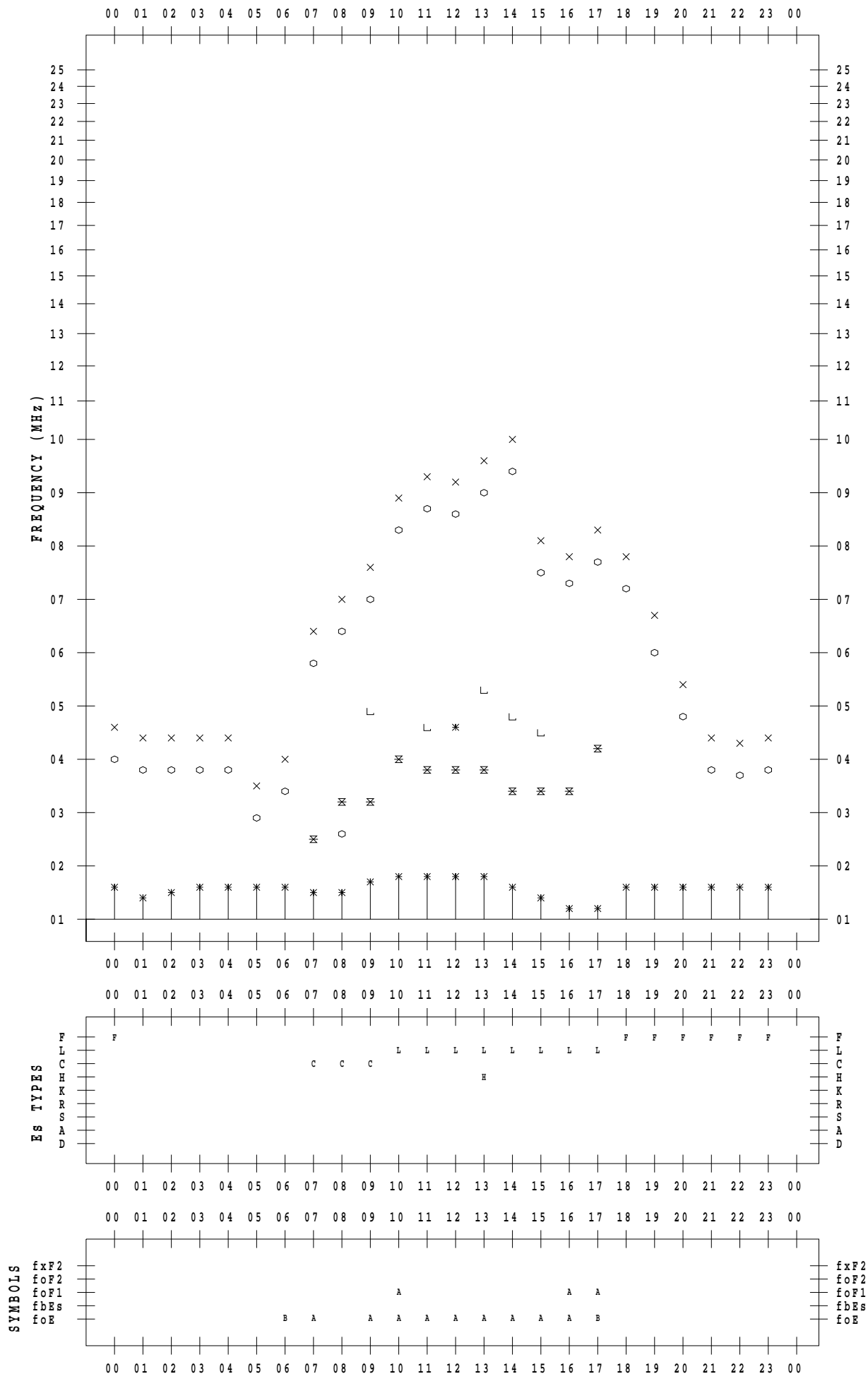
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/ 8

135 ° E MEAN TIME



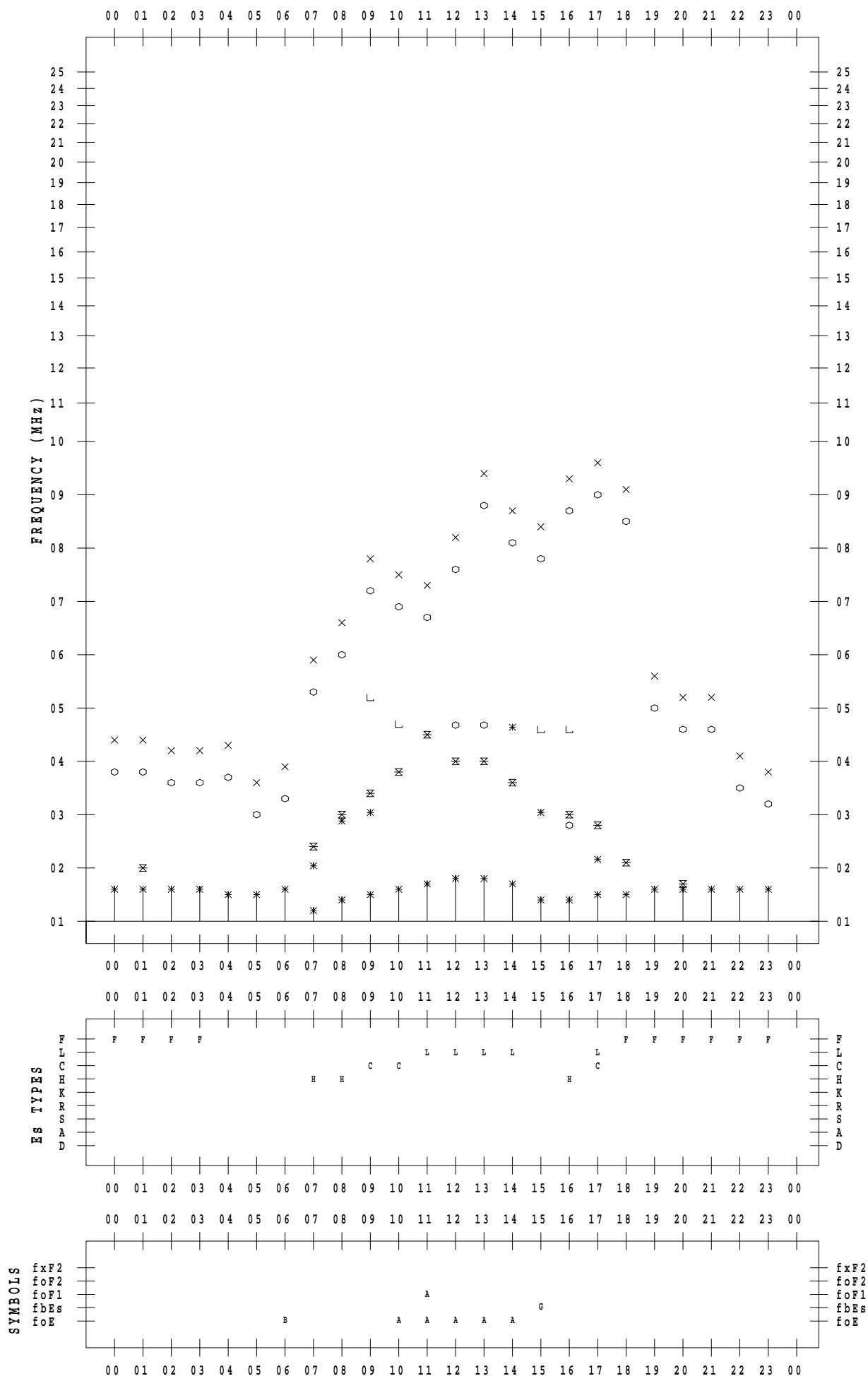
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/ 9

135 ° E MEAN TIME



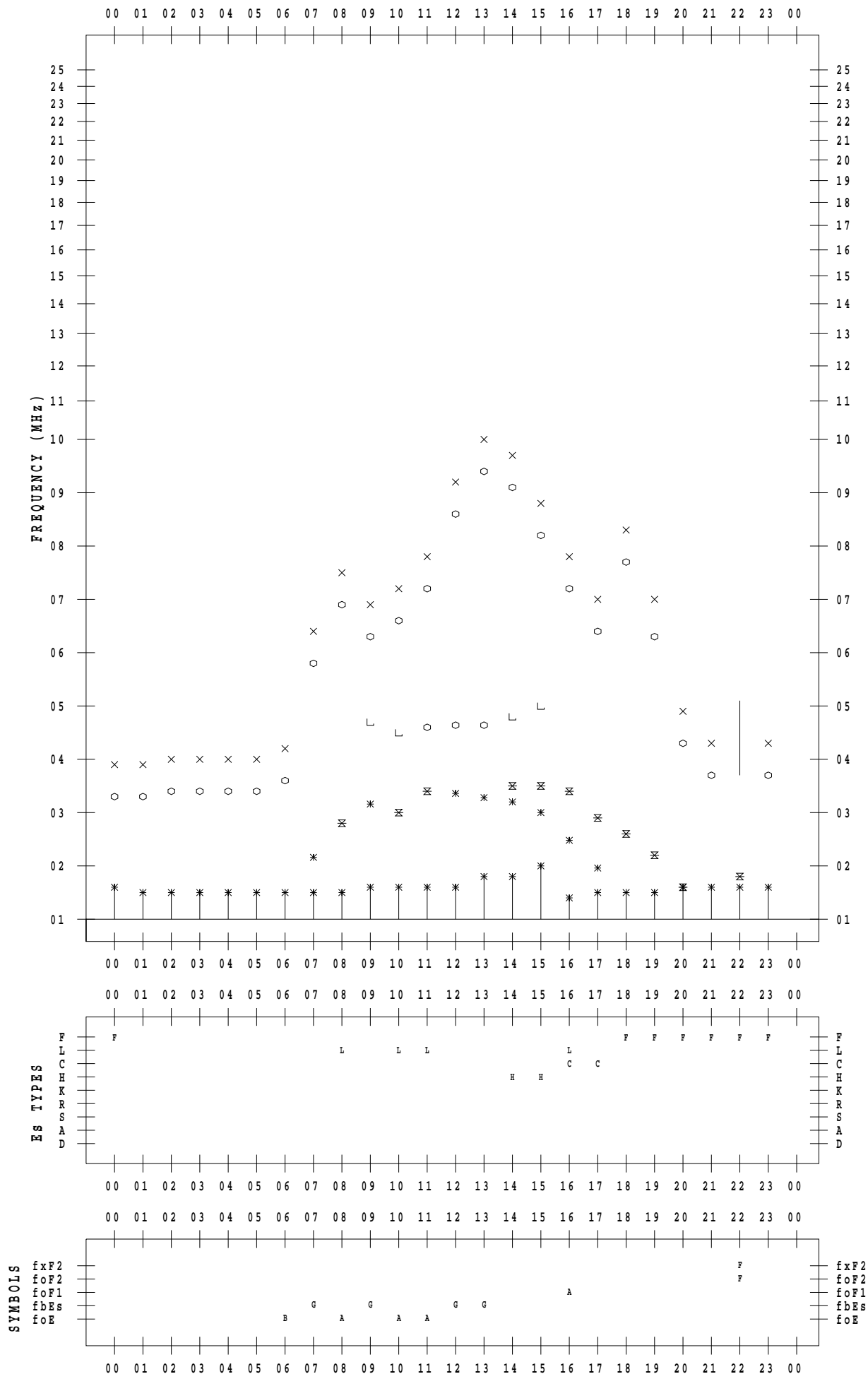
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/10

135 ° E MEAN TIME



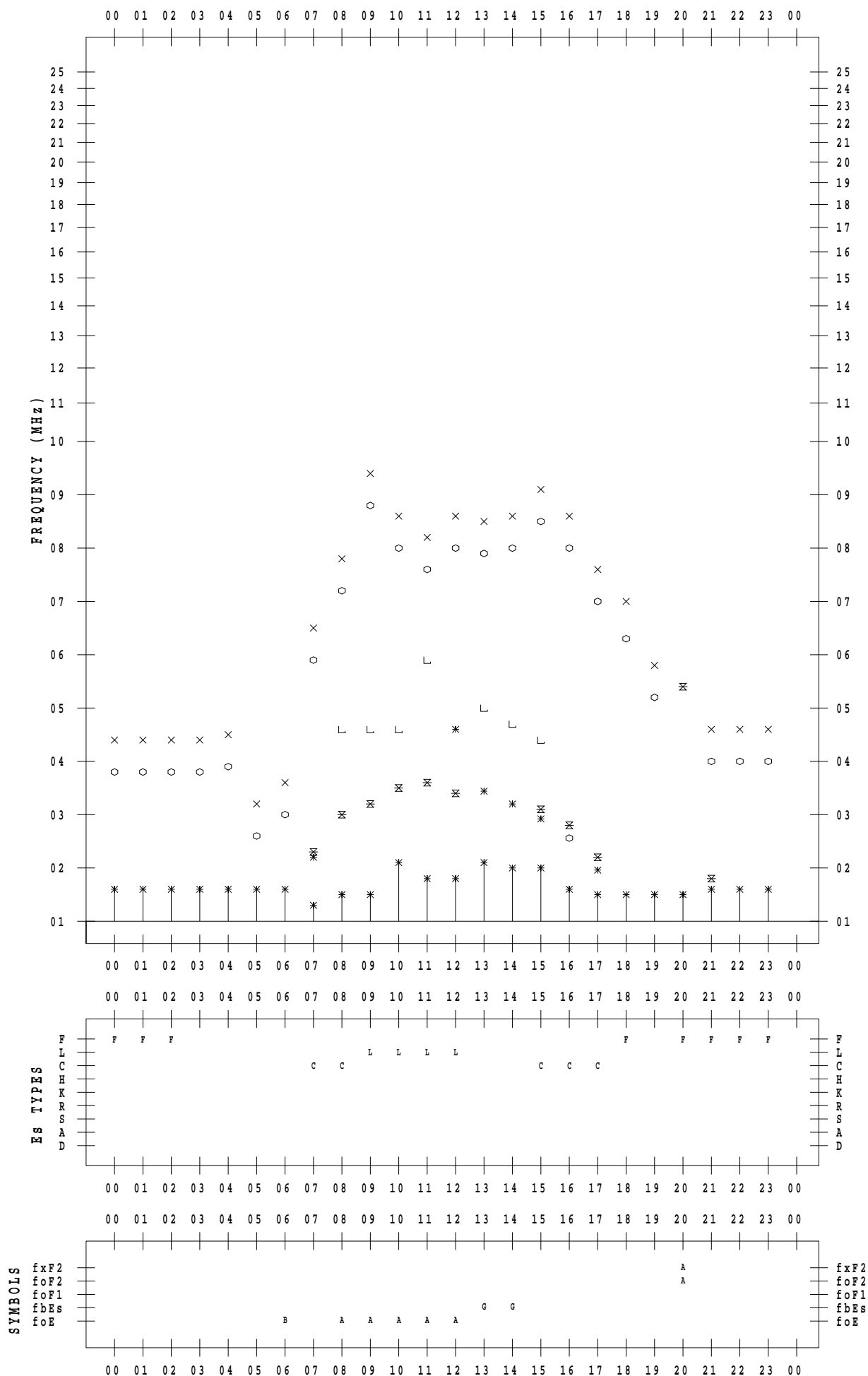
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/11

135 ° E MEAN TIME



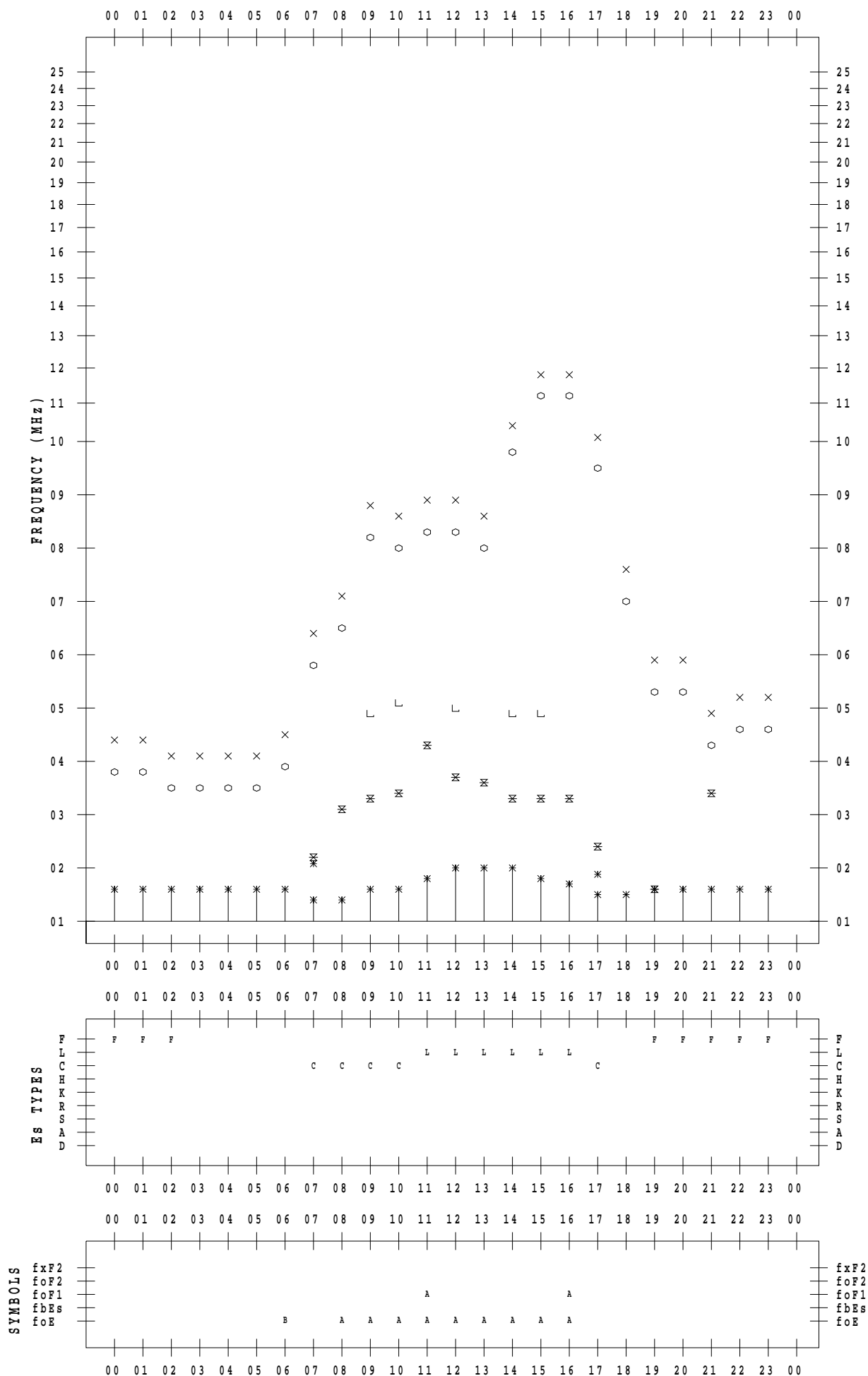
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/12

135 ° E MEAN TIME



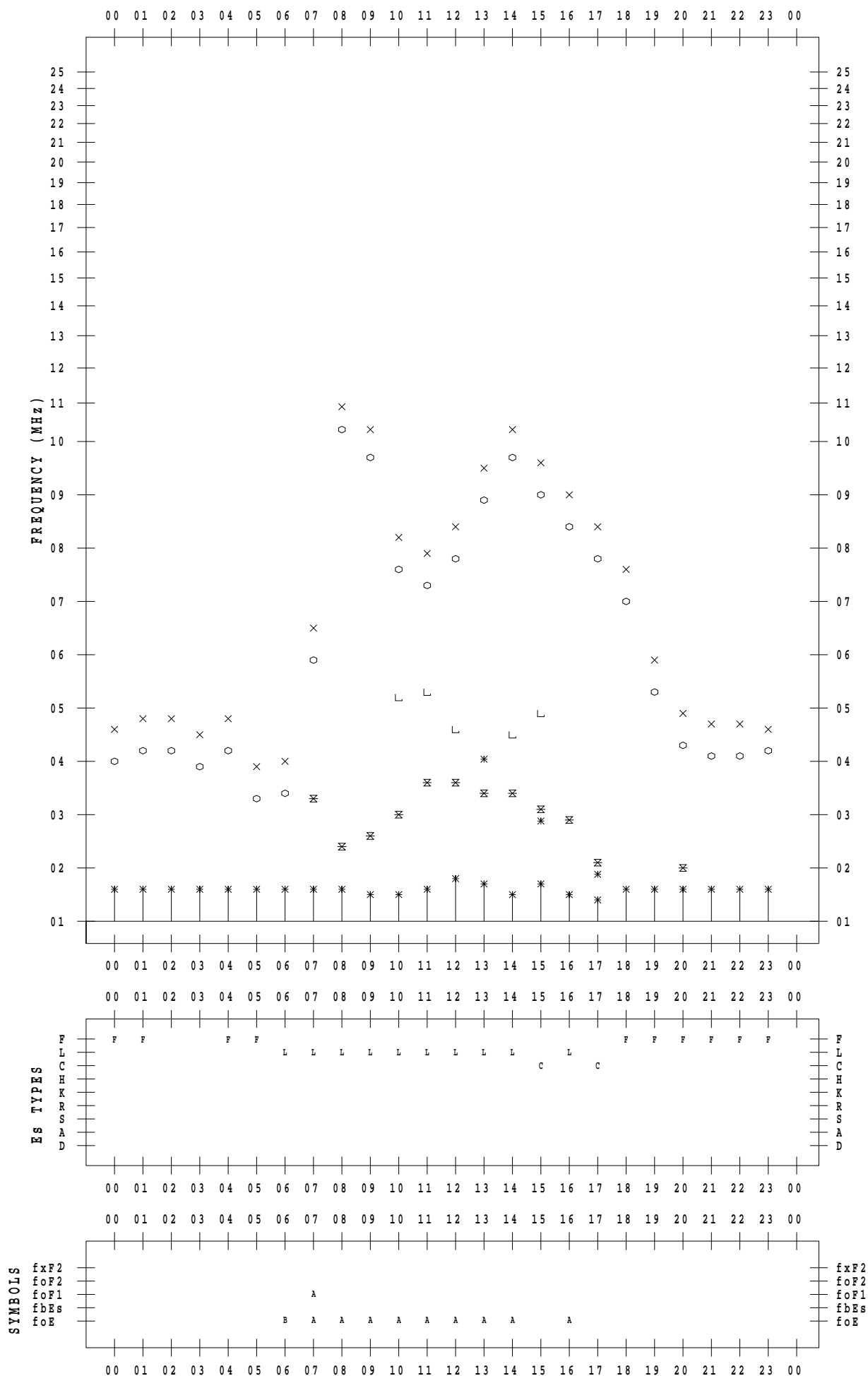
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/13

135 ° E MEAN TIME



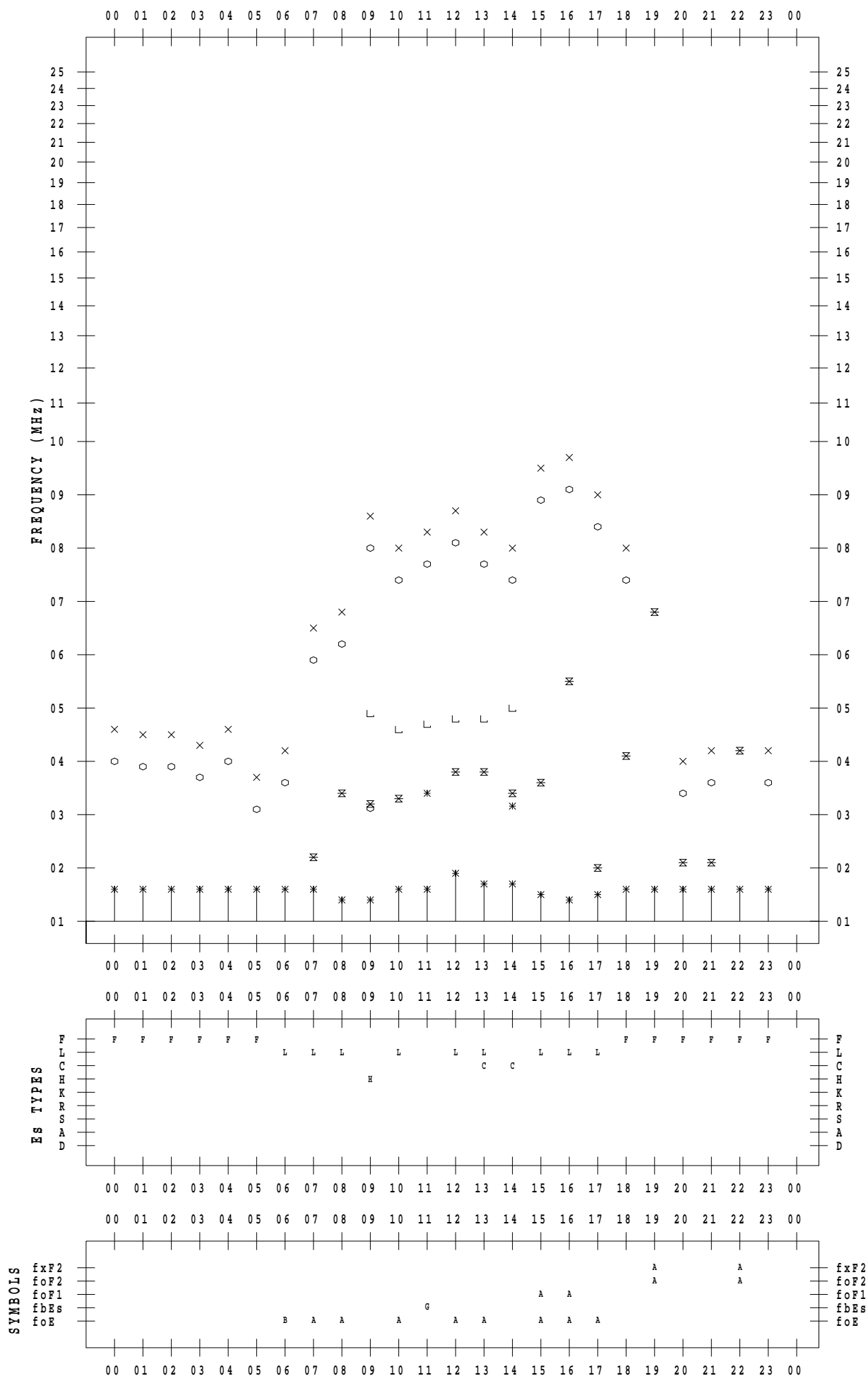
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/14

135 ° E MEAN TIME





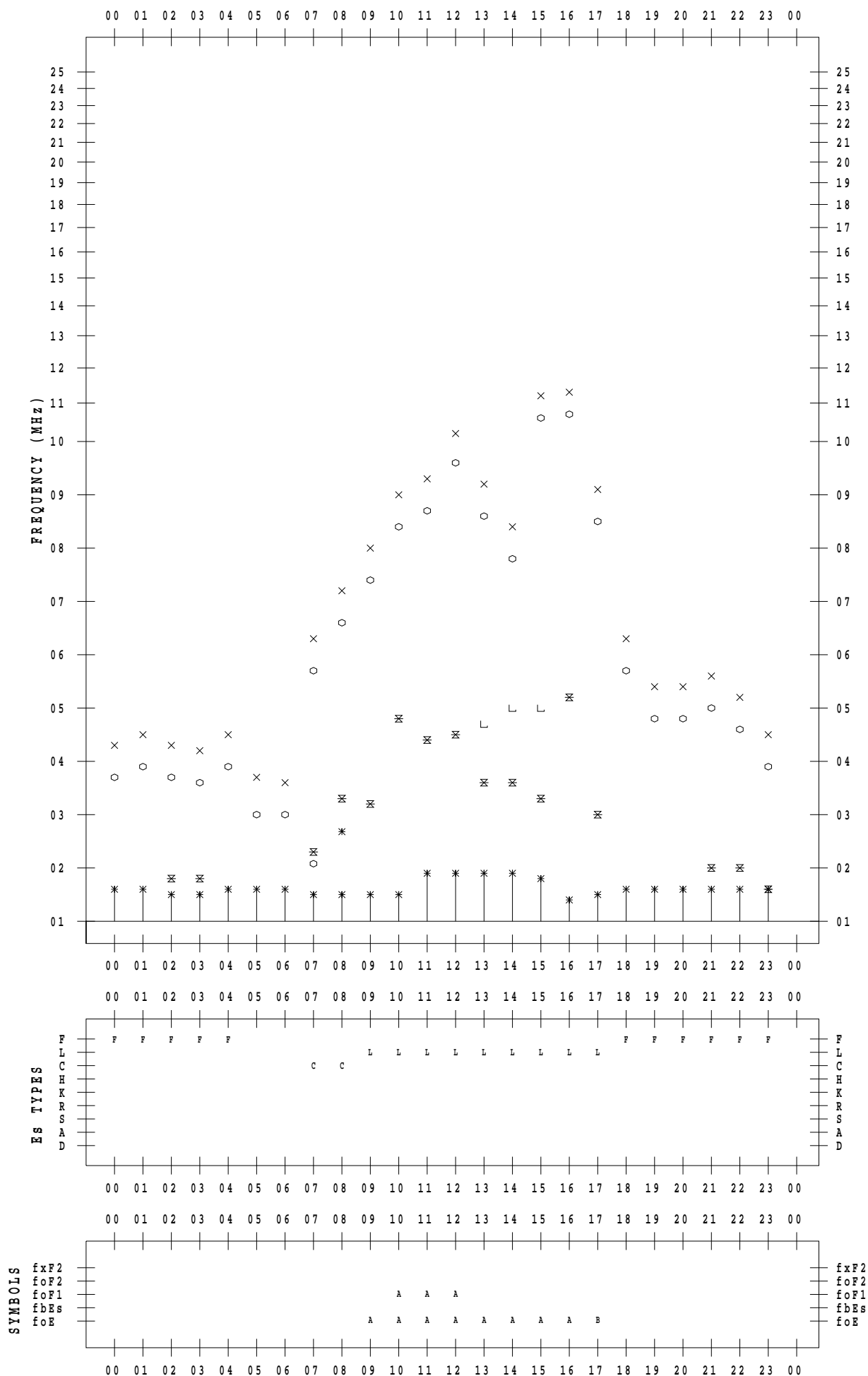
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/15

135 ° E MEAN TIME



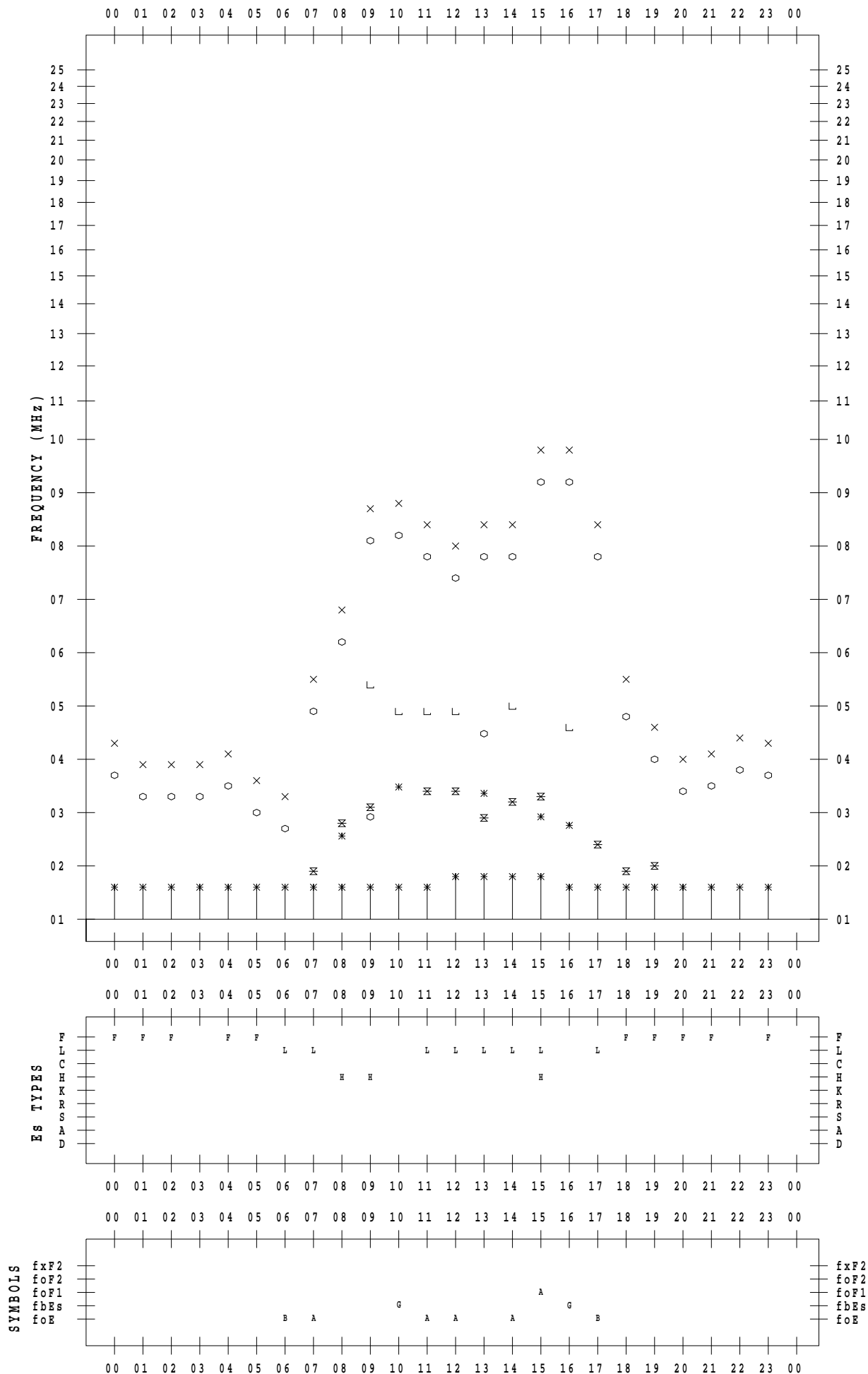
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/16

135 ° E MEAN TIME



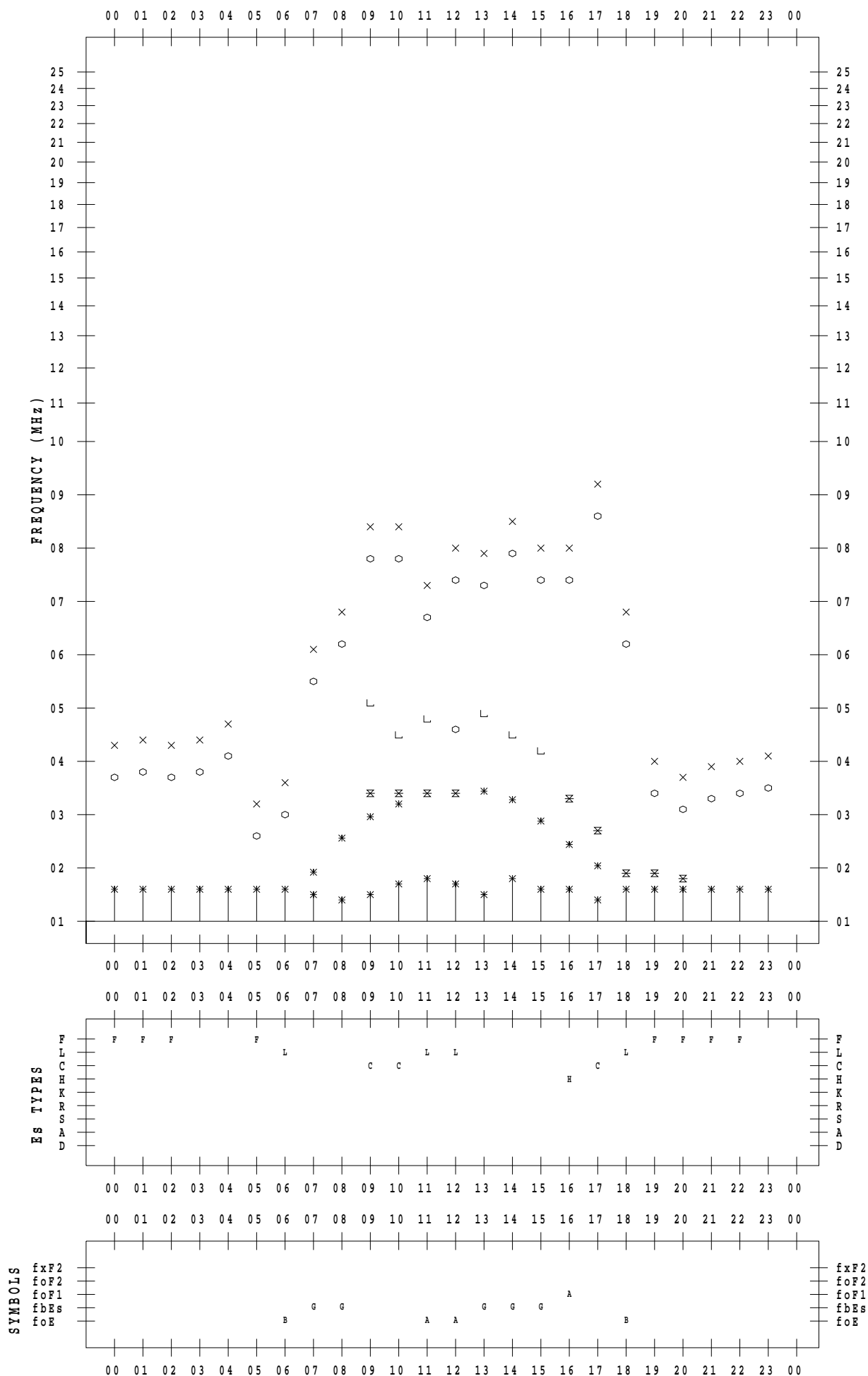
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/17

135 ° E MEAN TIME



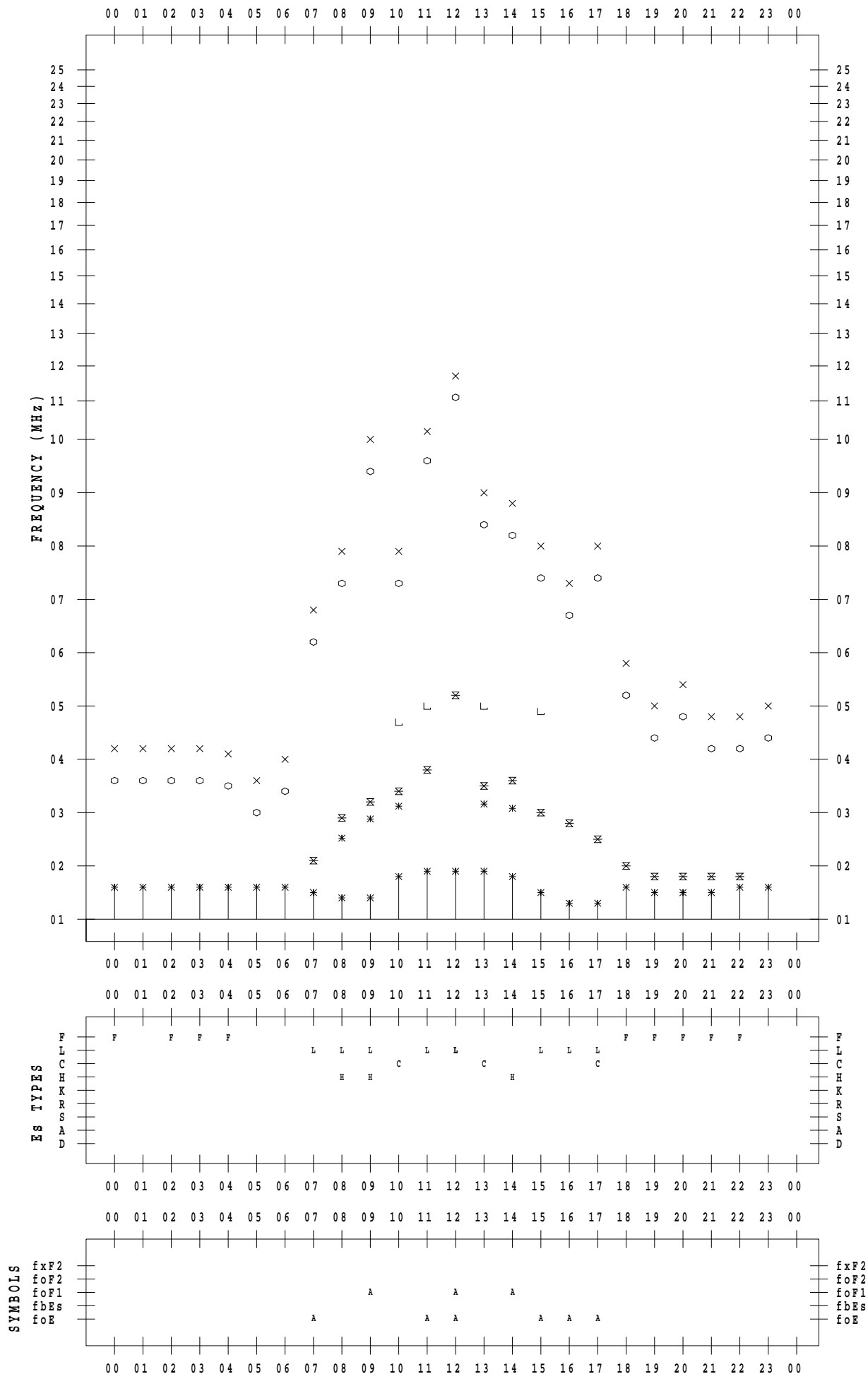
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/18

135 ° E MEAN TIME



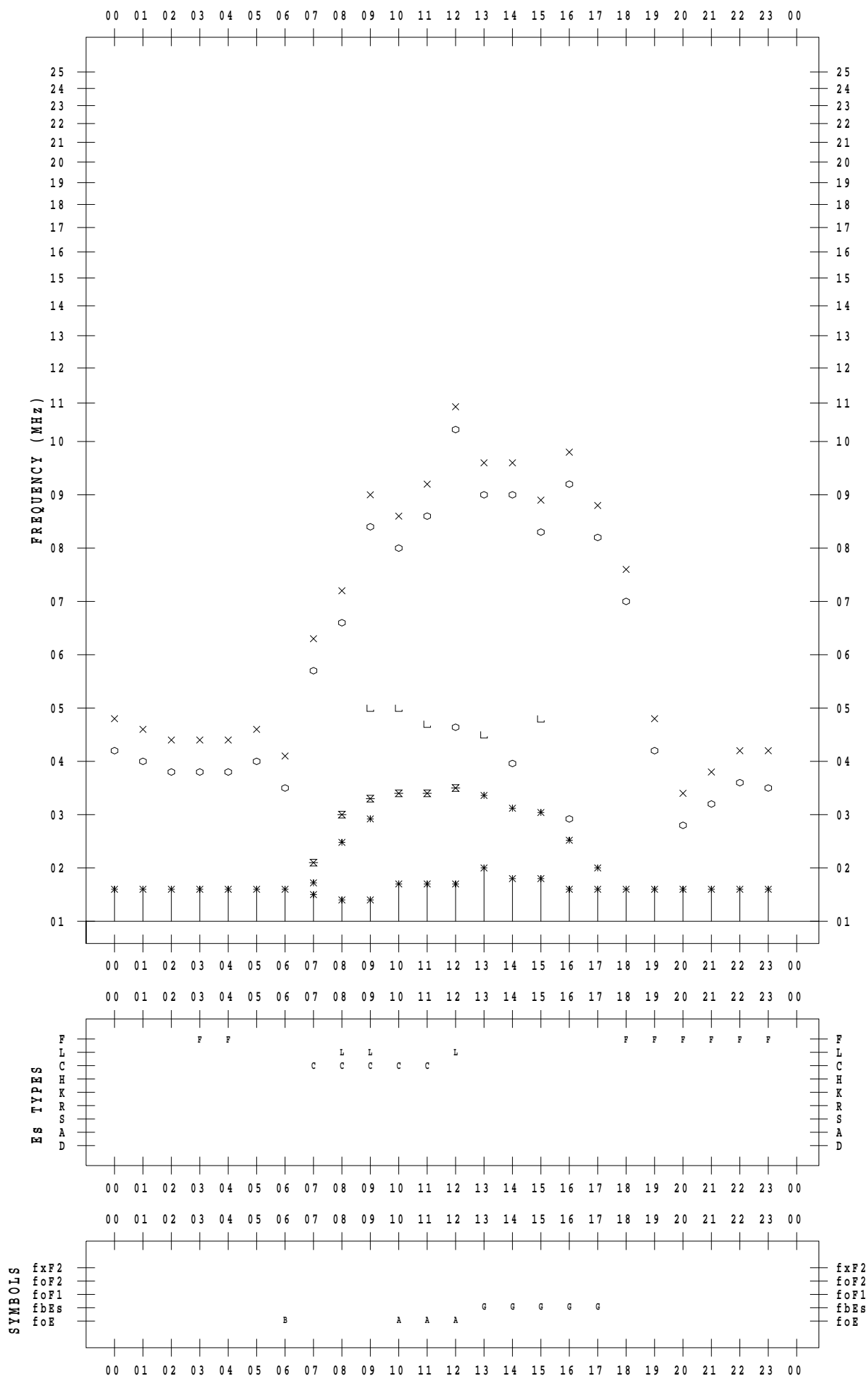
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/19

135 ° E MEAN TIME



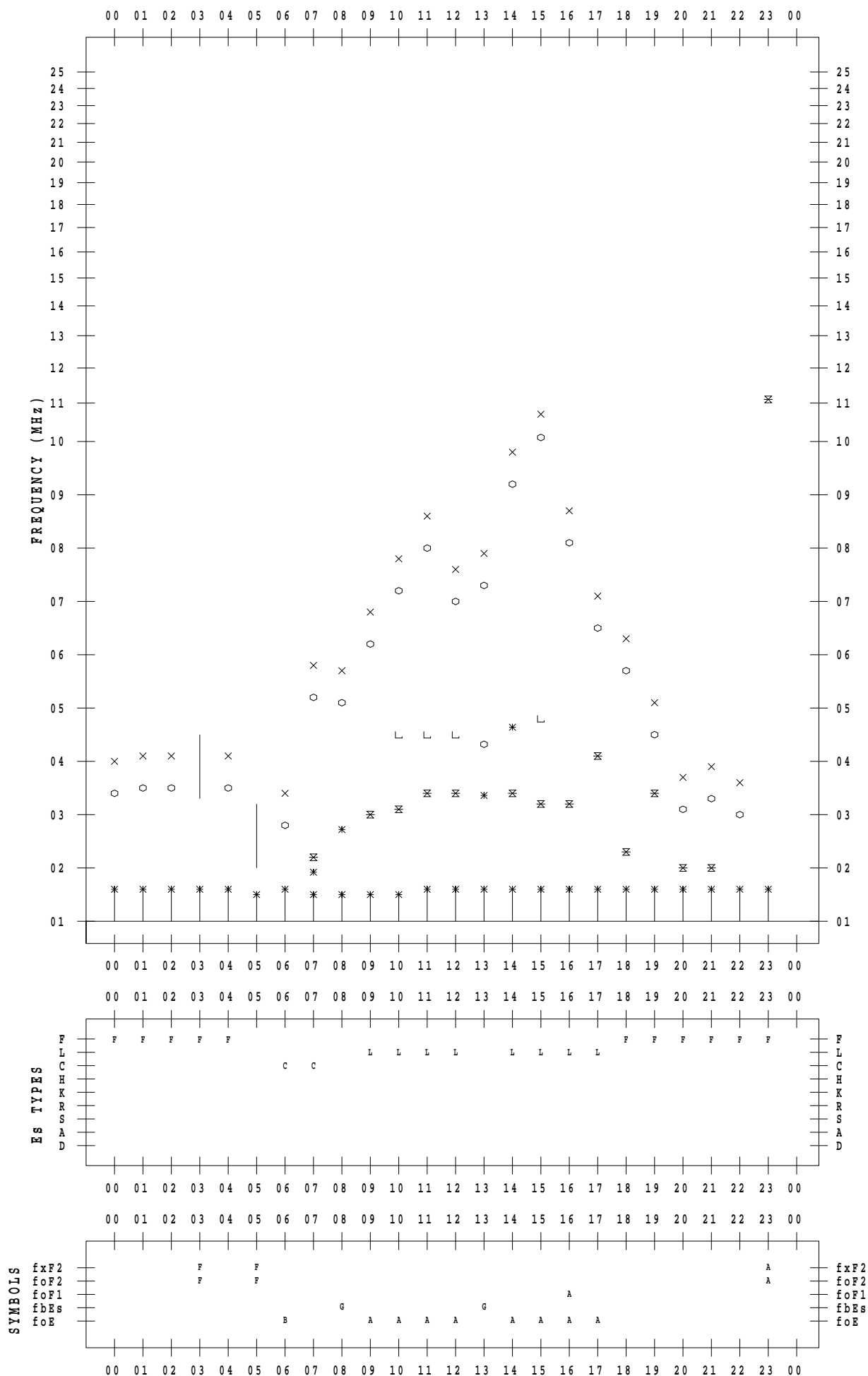
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/20

135 ° E MEAN TIME



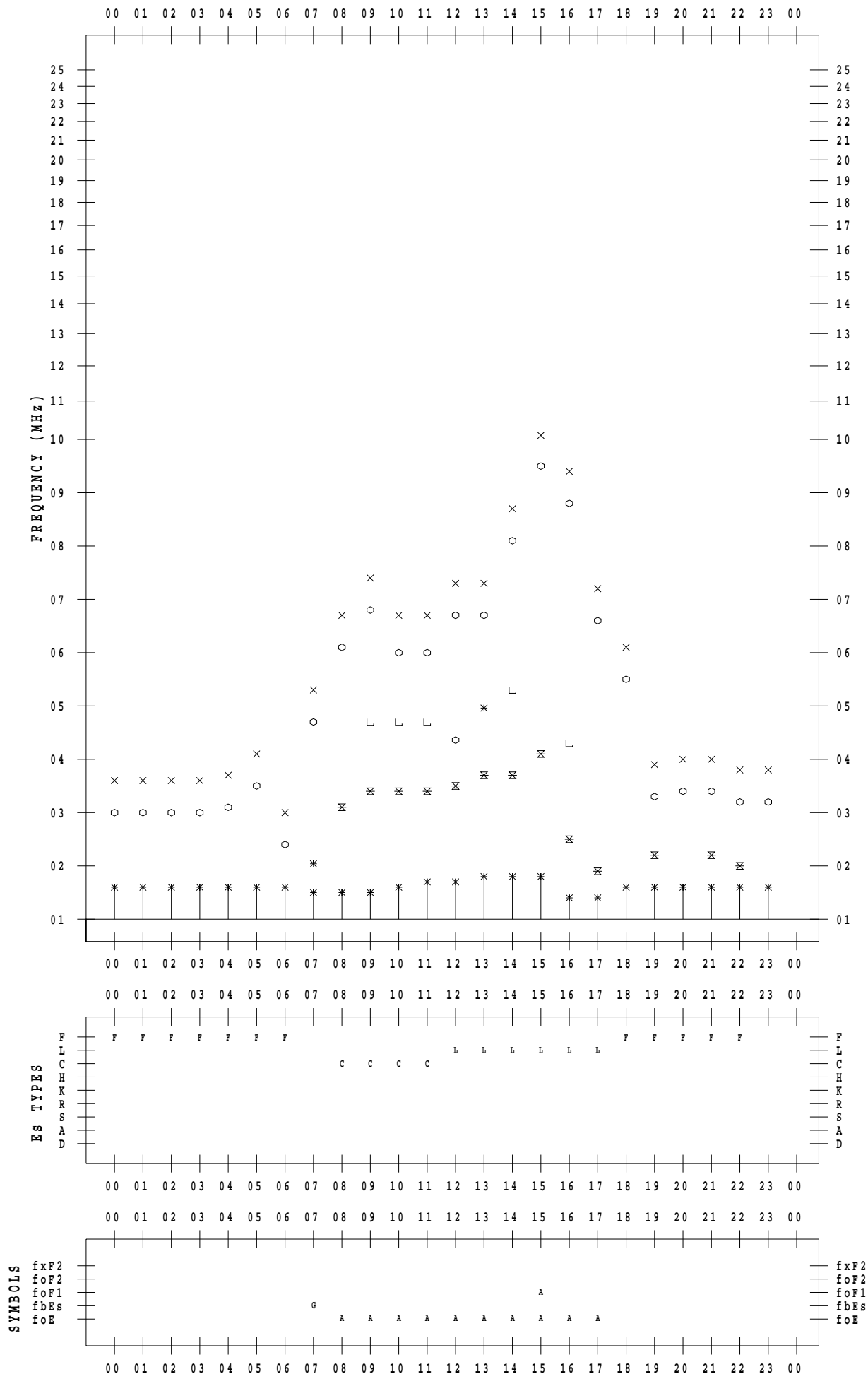
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/21

135 ° E MEAN TIME



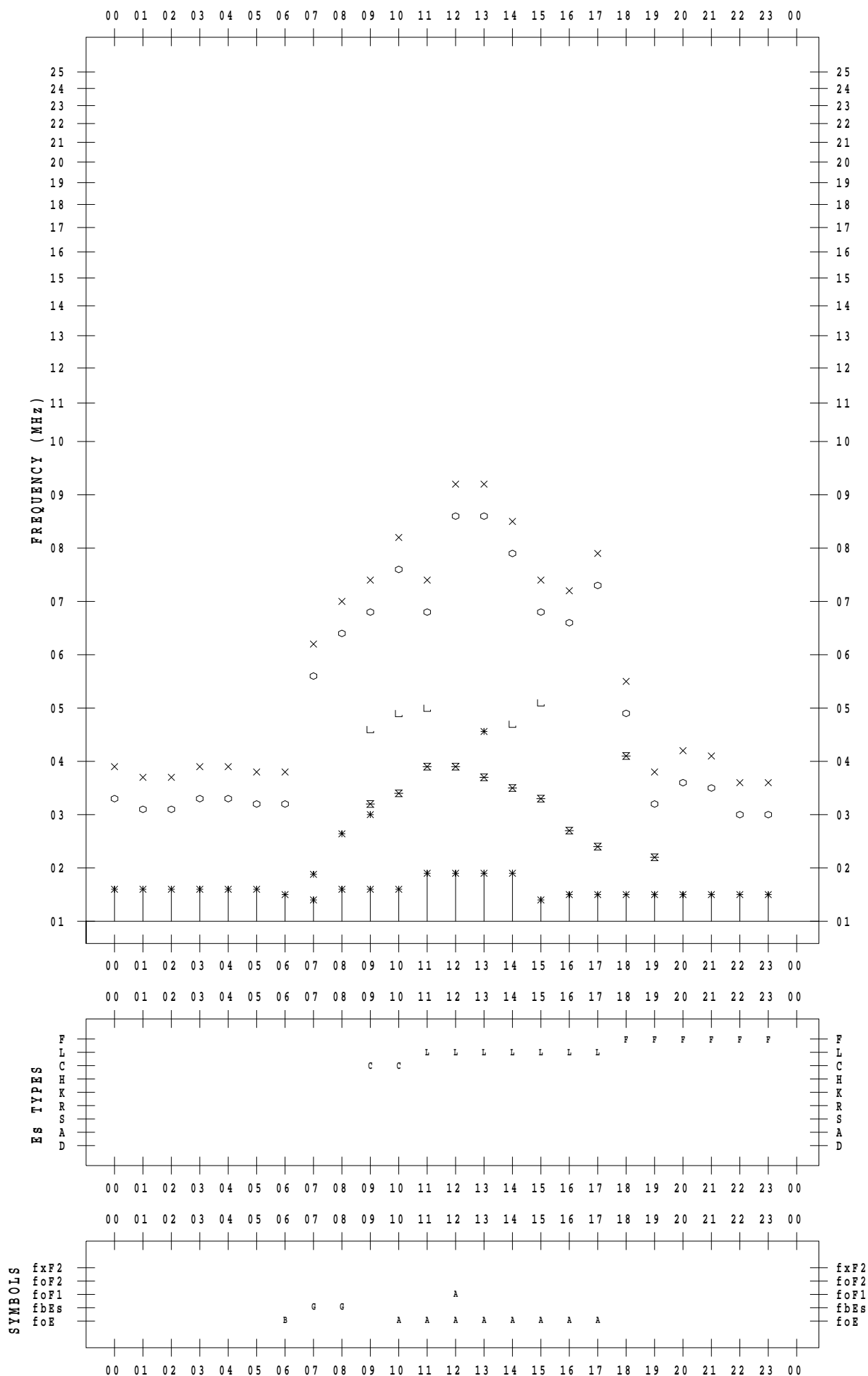
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/22

135 ° E MEAN TIME





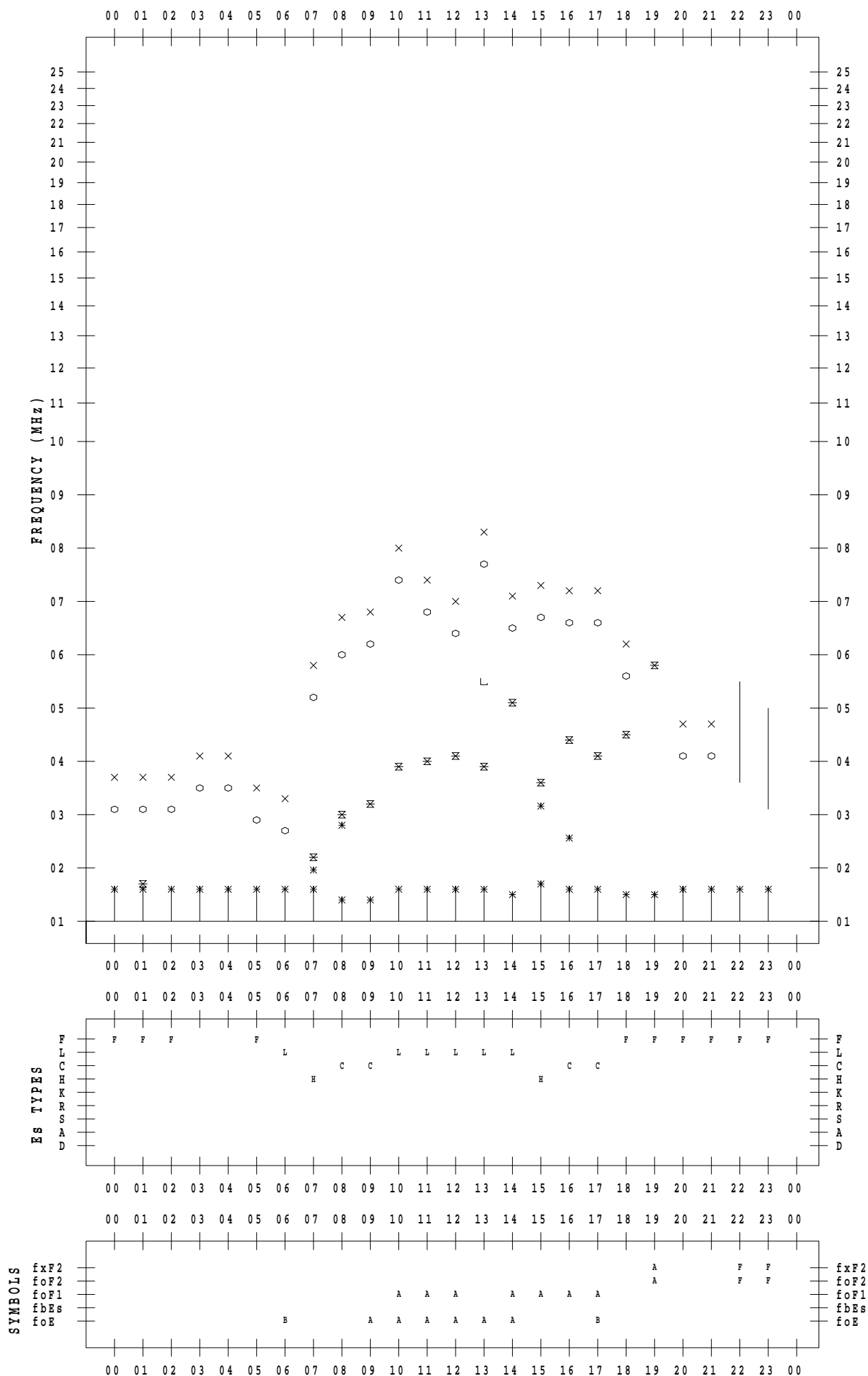
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/23

135 ° E MEAN TIME



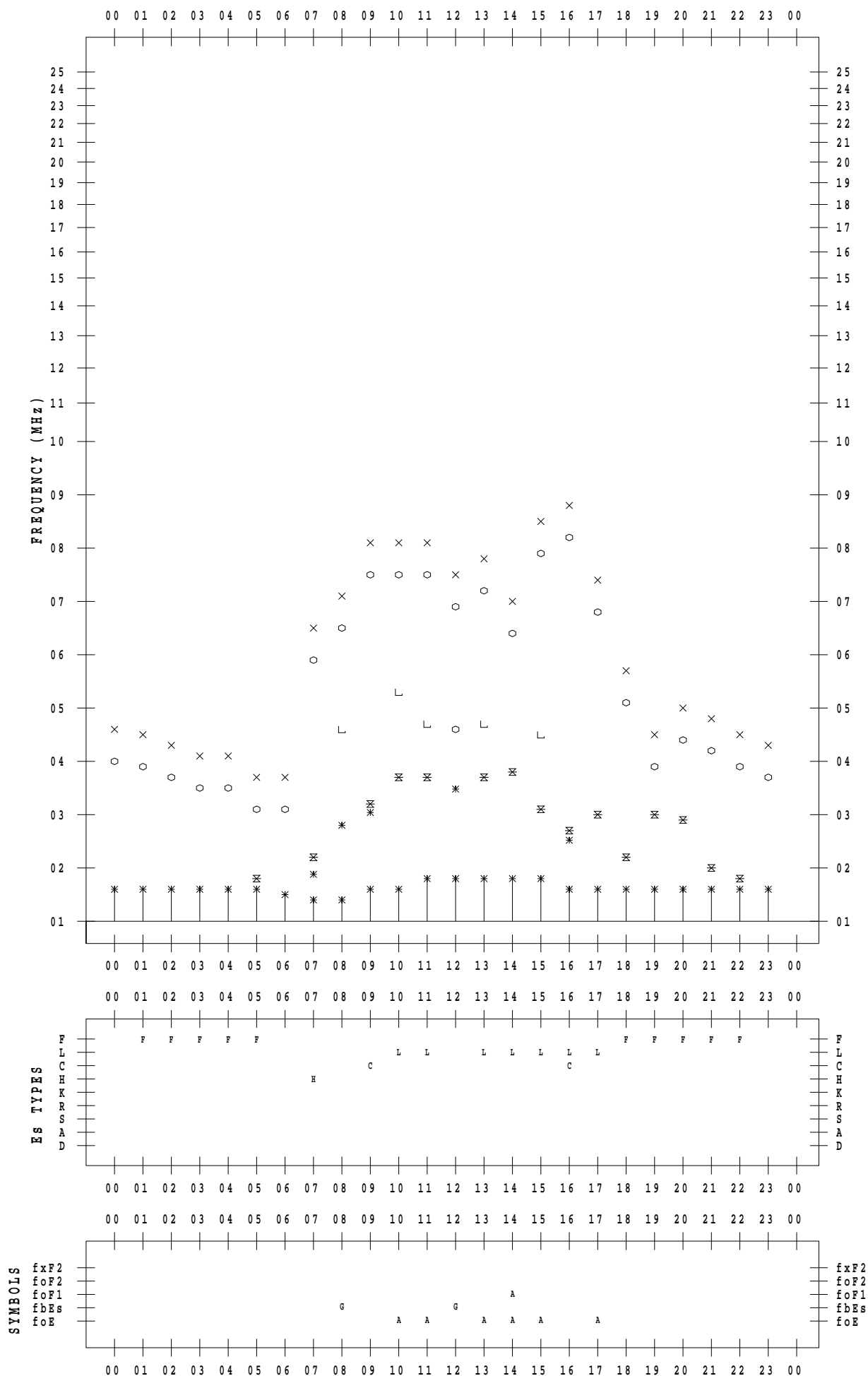
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/24

135 ° E MEAN TIME



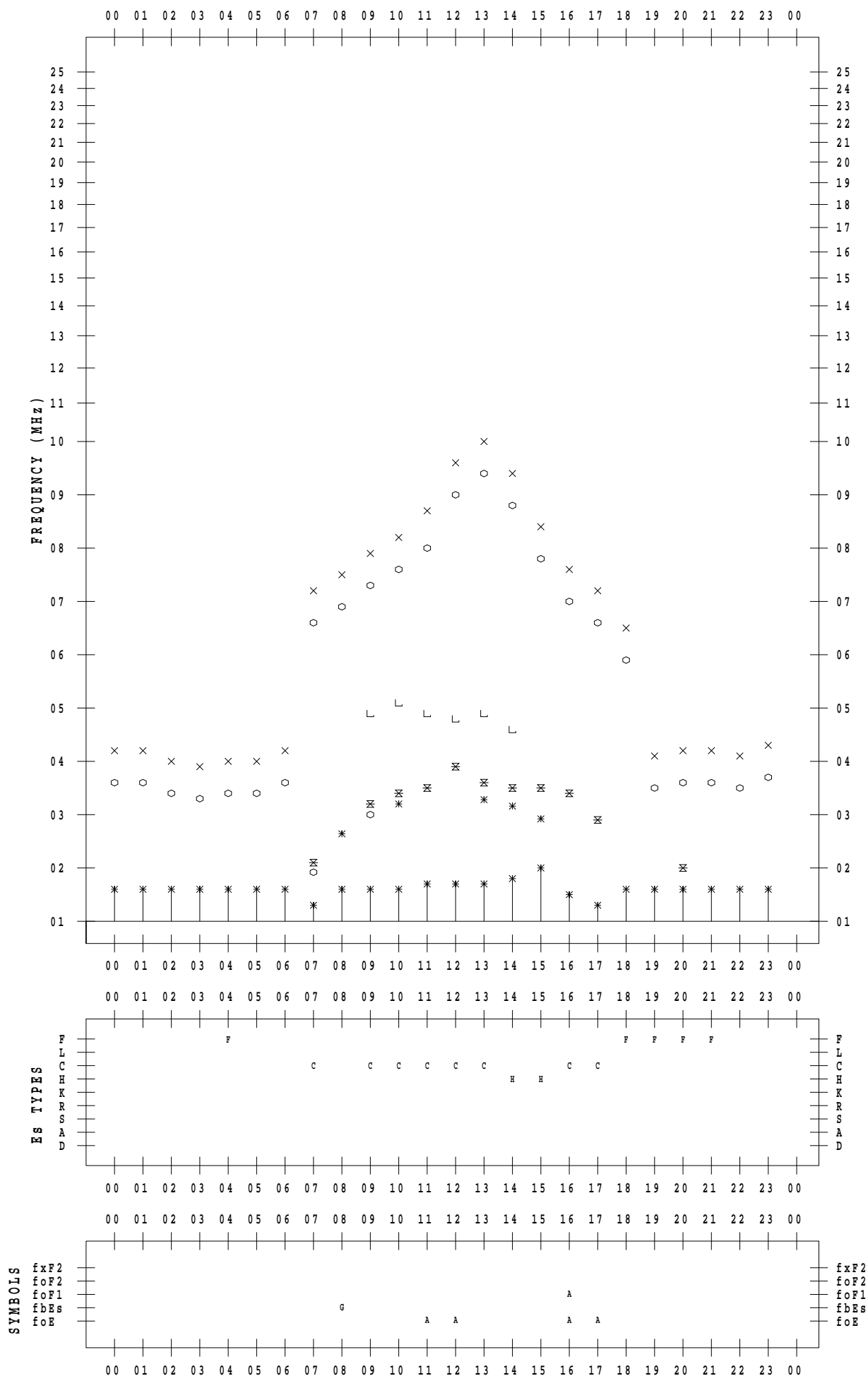
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/25

135 ° E MEAN TIME



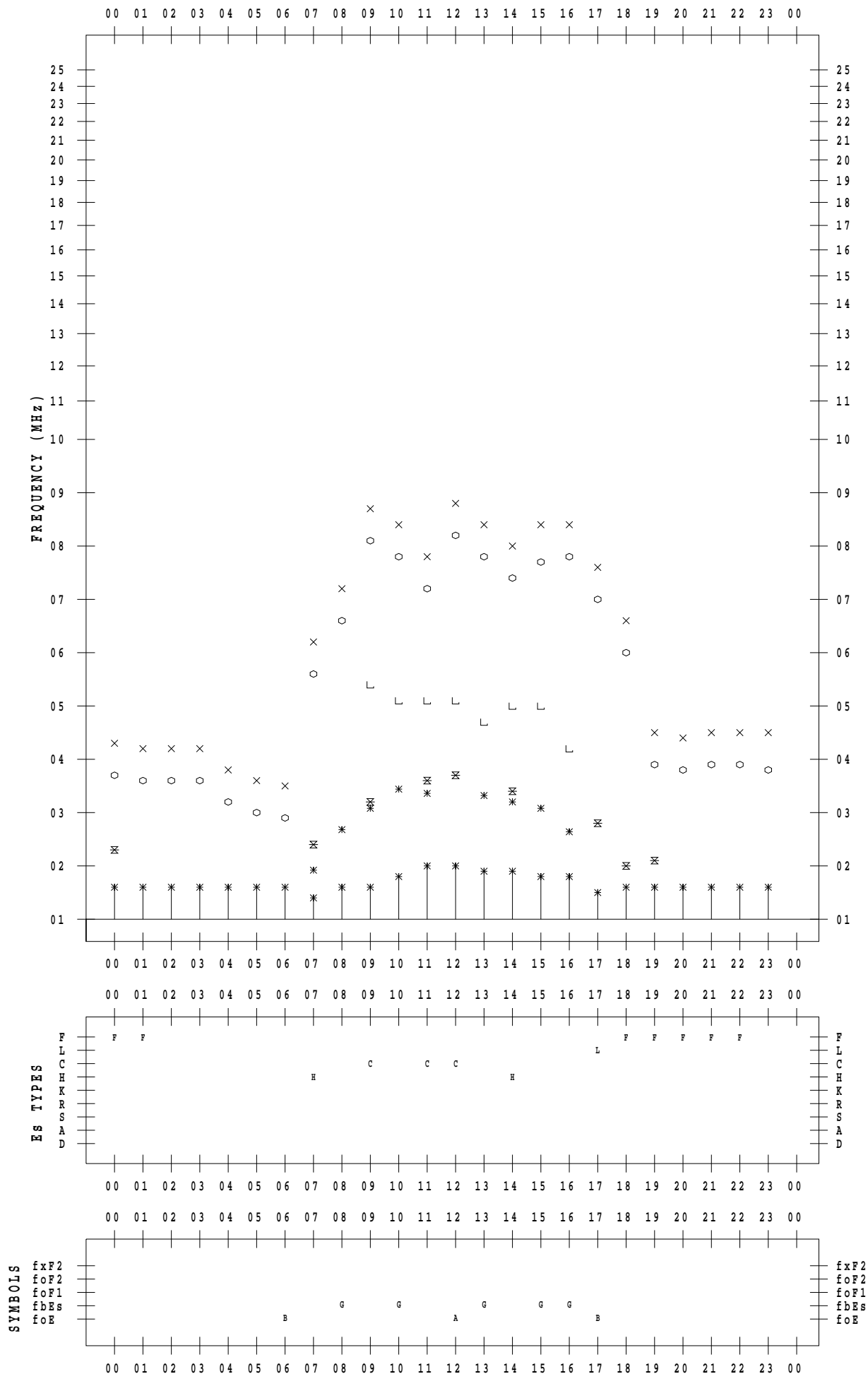
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/26

135 ° E MEAN TIME



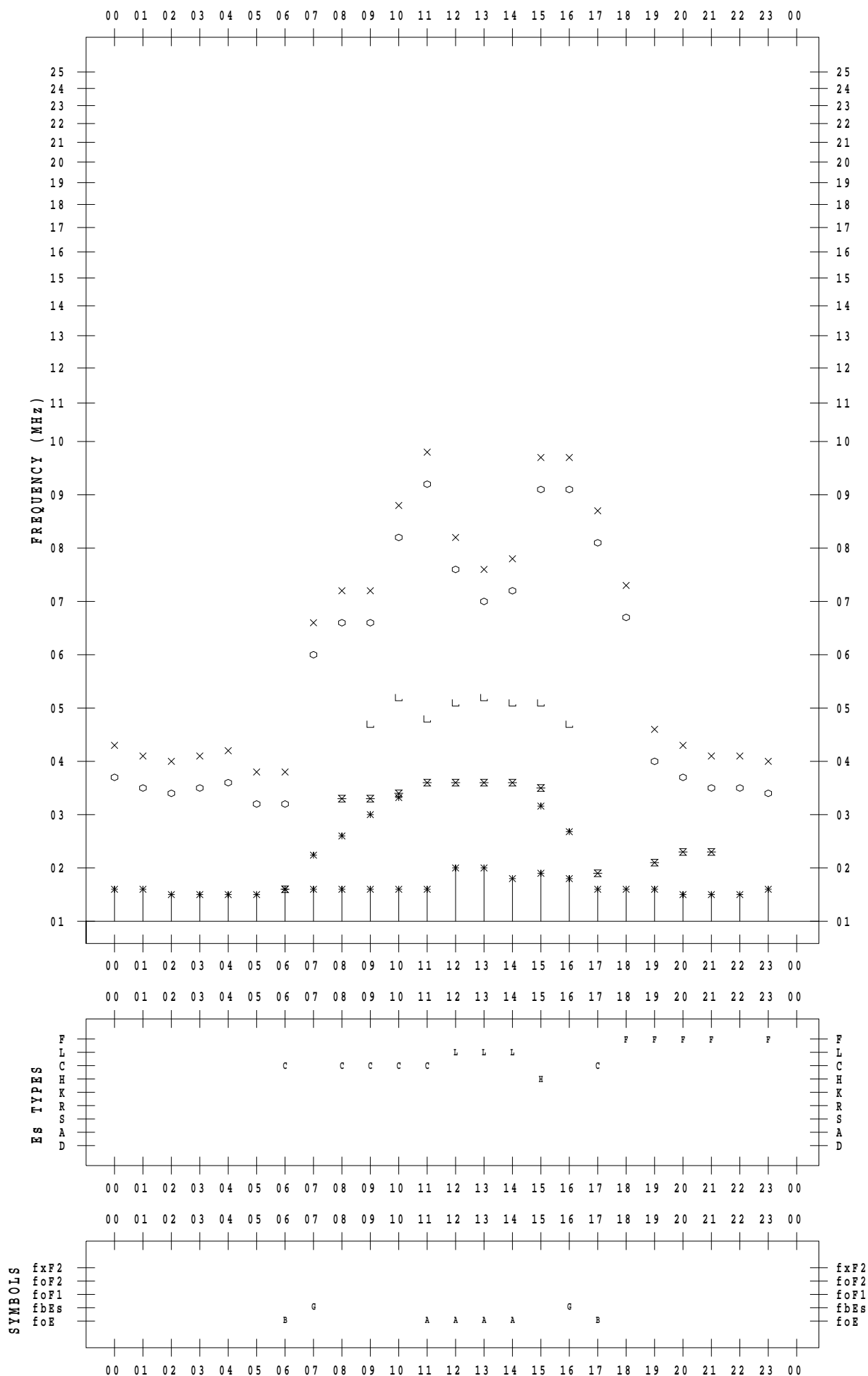
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/27

135 ° E MEAN TIME



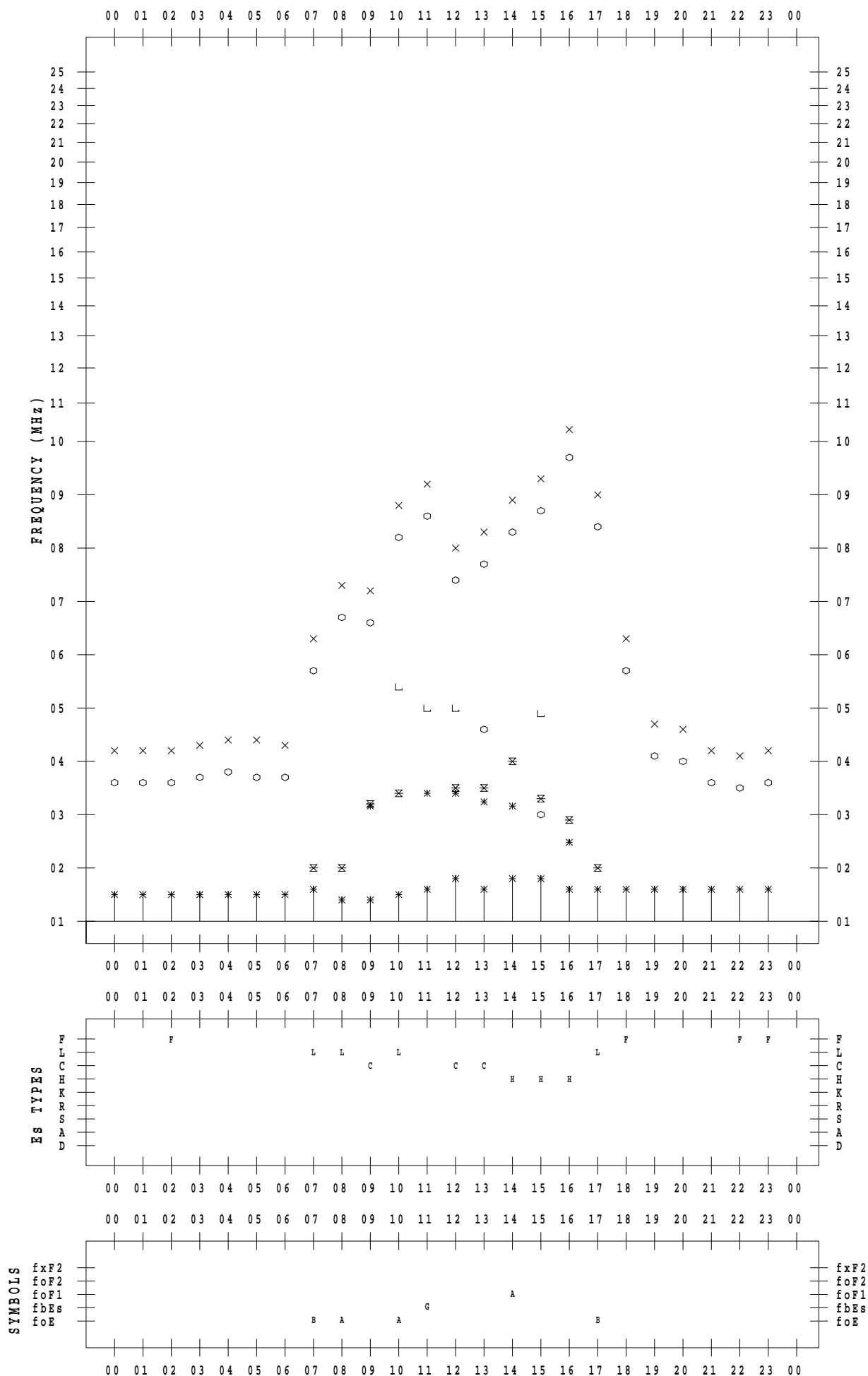
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/28

135 ° E MEAN TIME



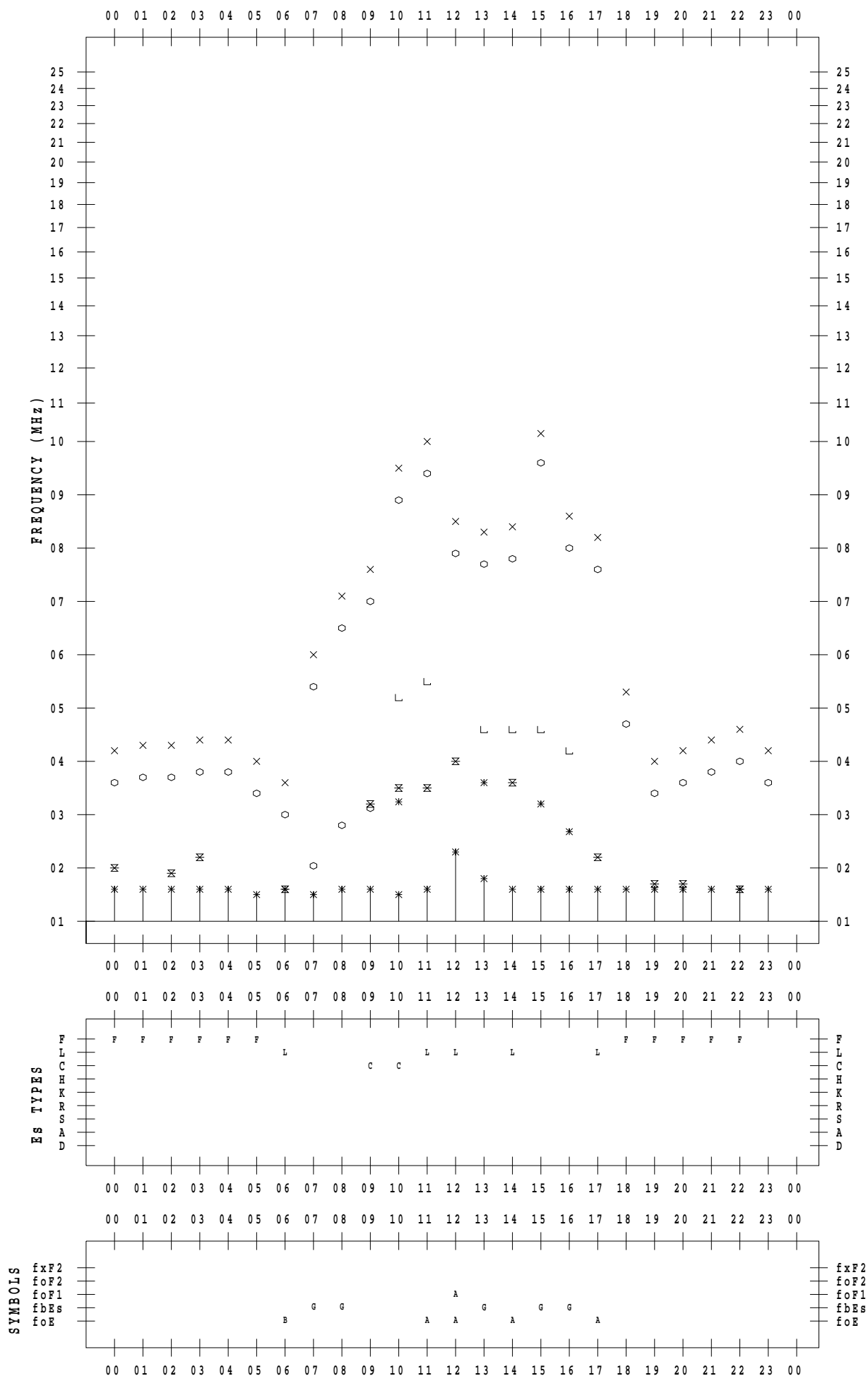
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/29

135 ° E MEAN TIME



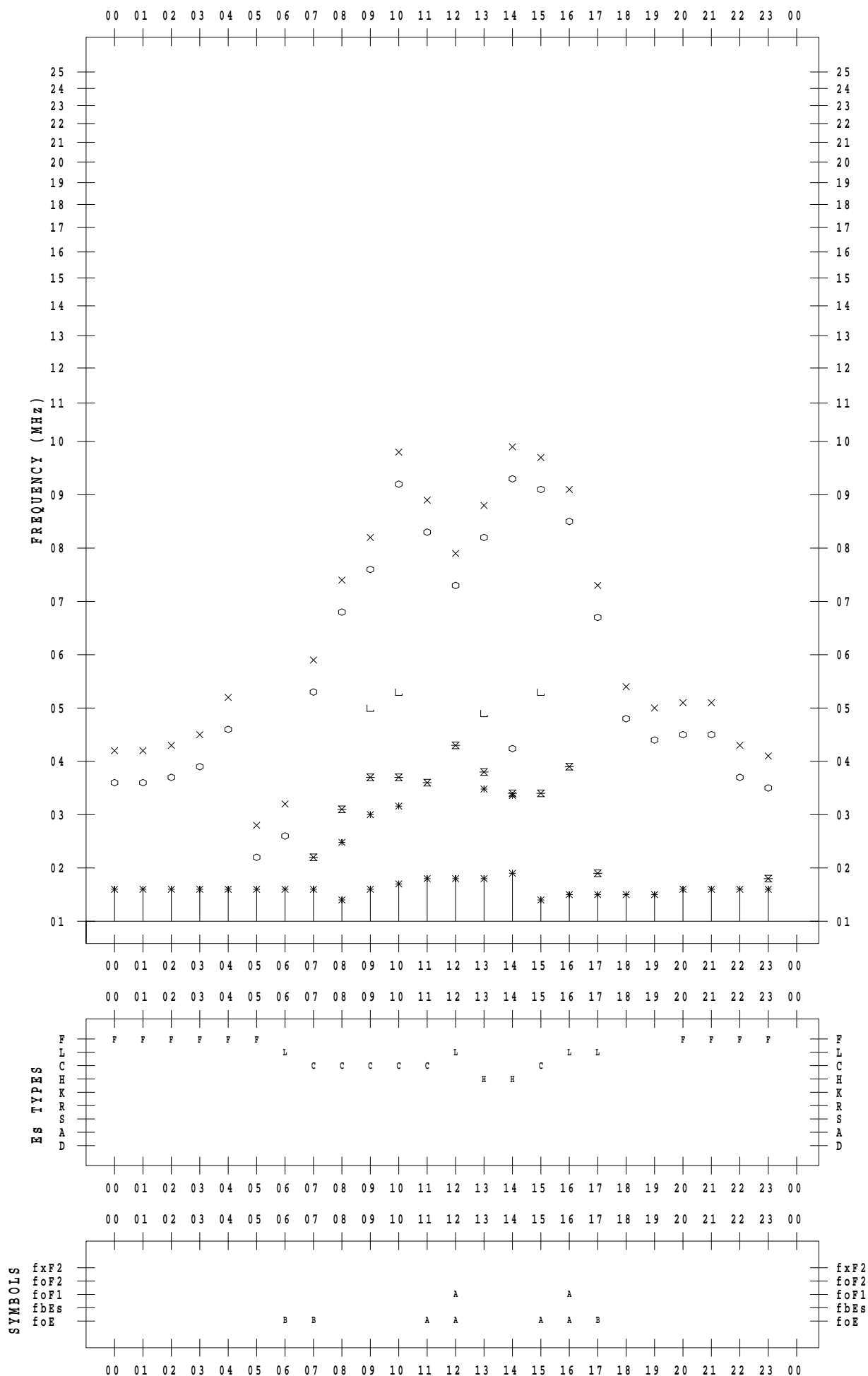
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/30

135 ° E MEAN TIME





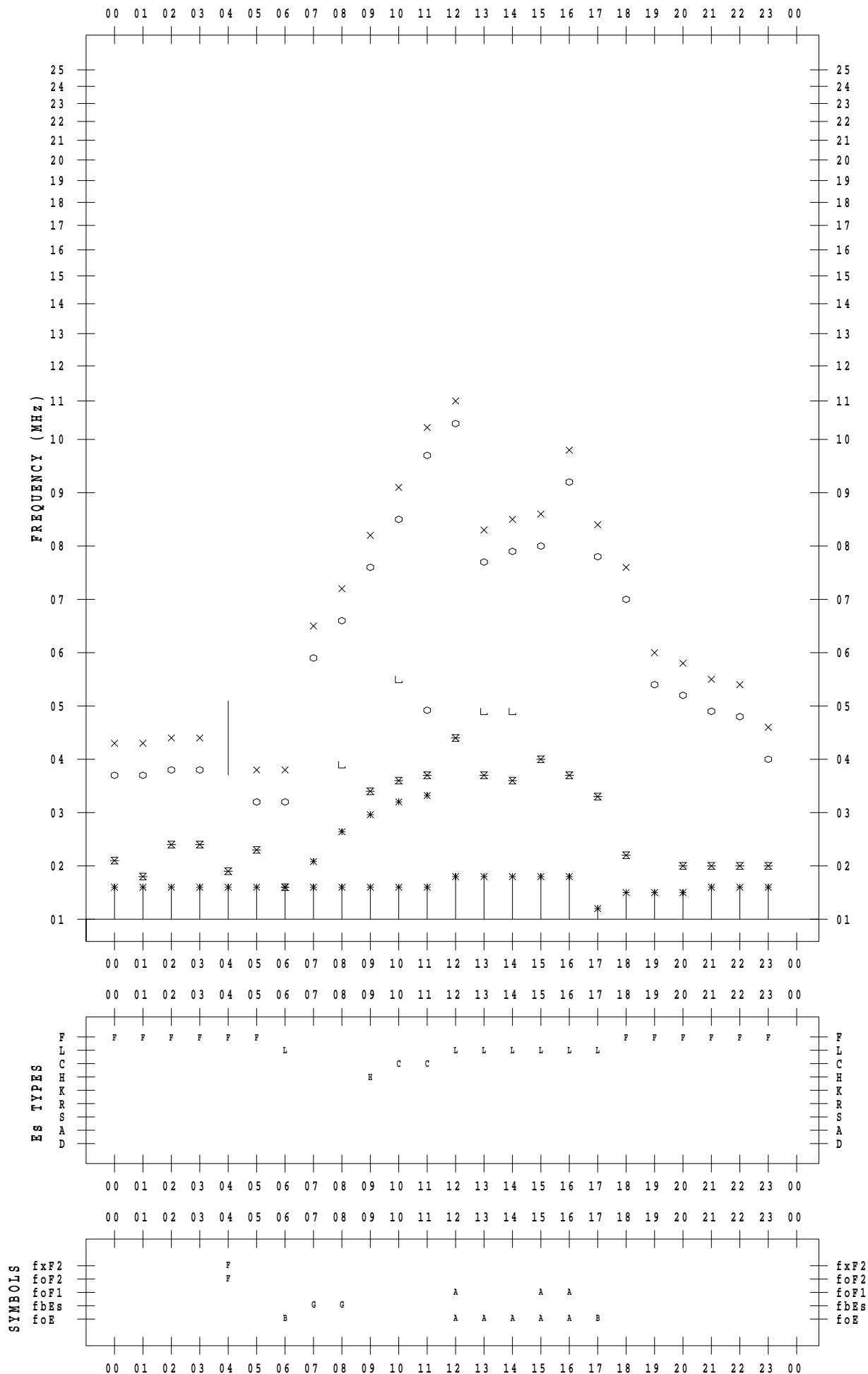
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/10/31

135 ° E MEAN TIME





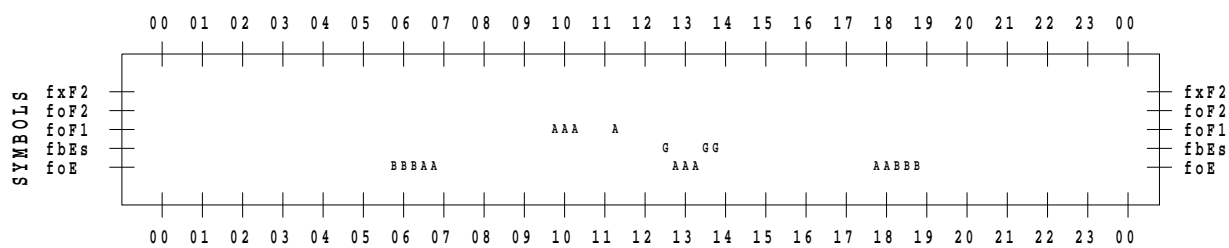
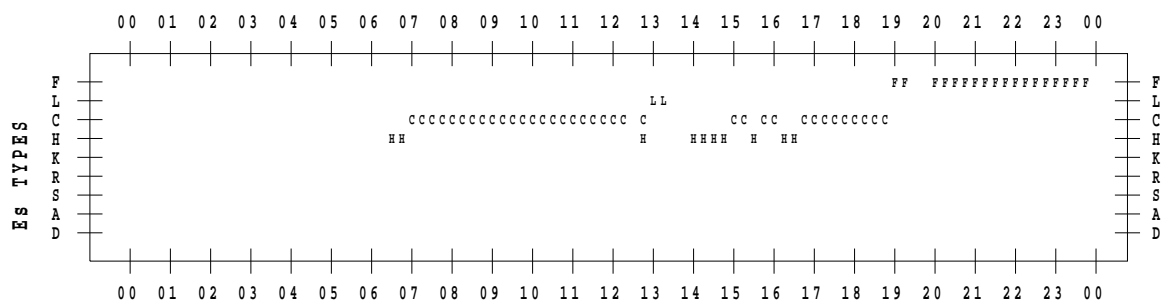
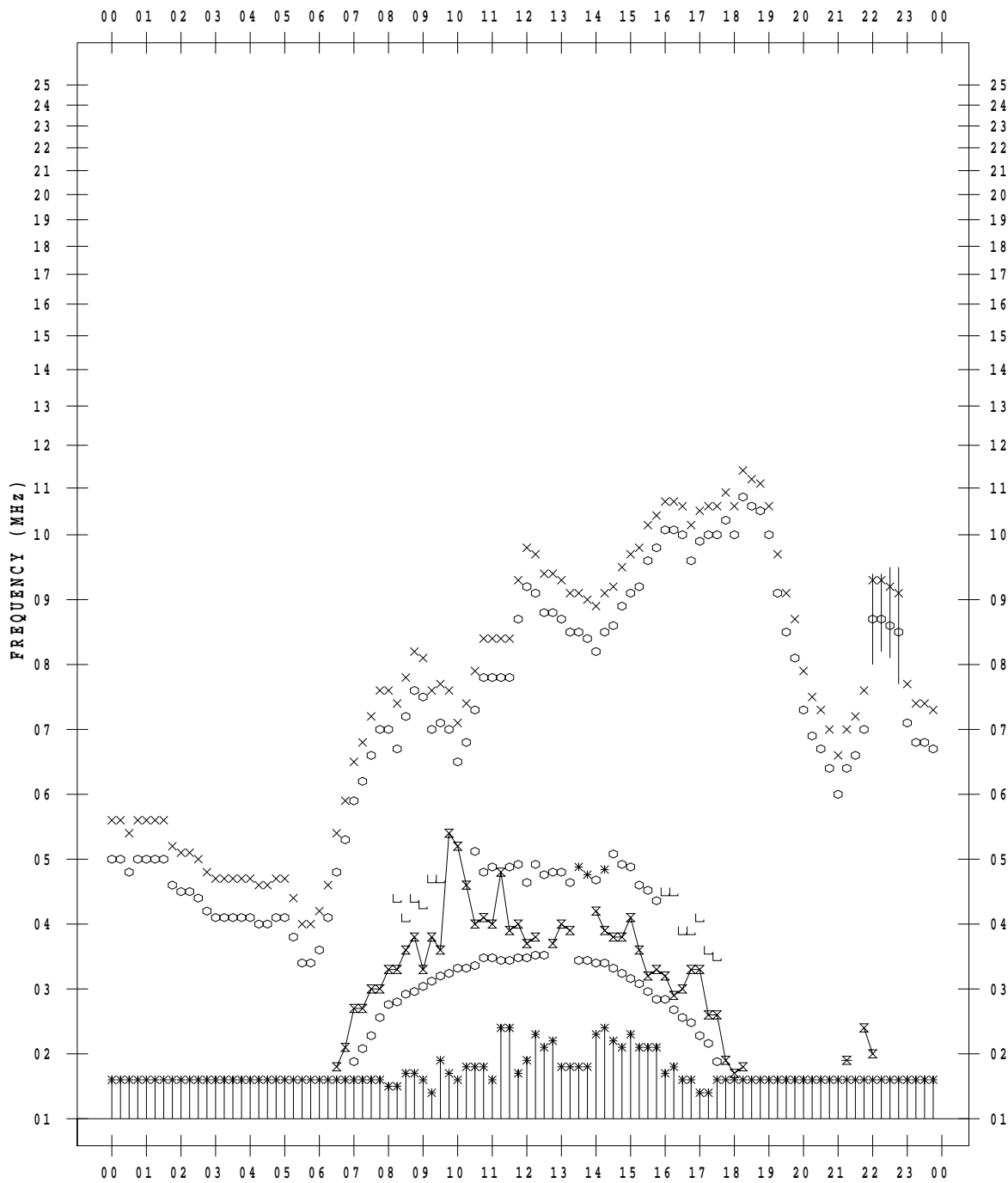
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/ 2

135 ° E MEAN TIME



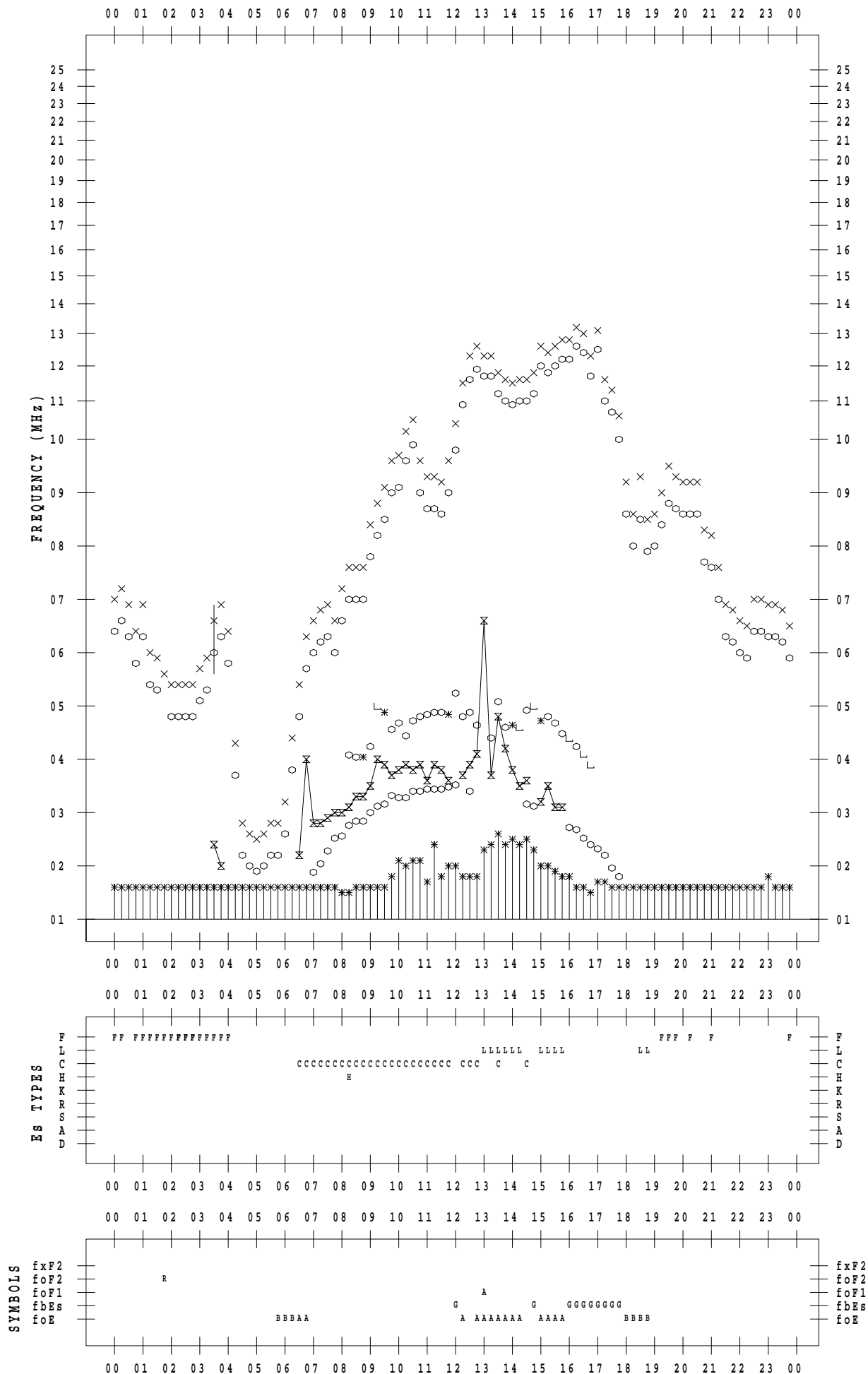
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/ 3

135 ° E MEAN TIME



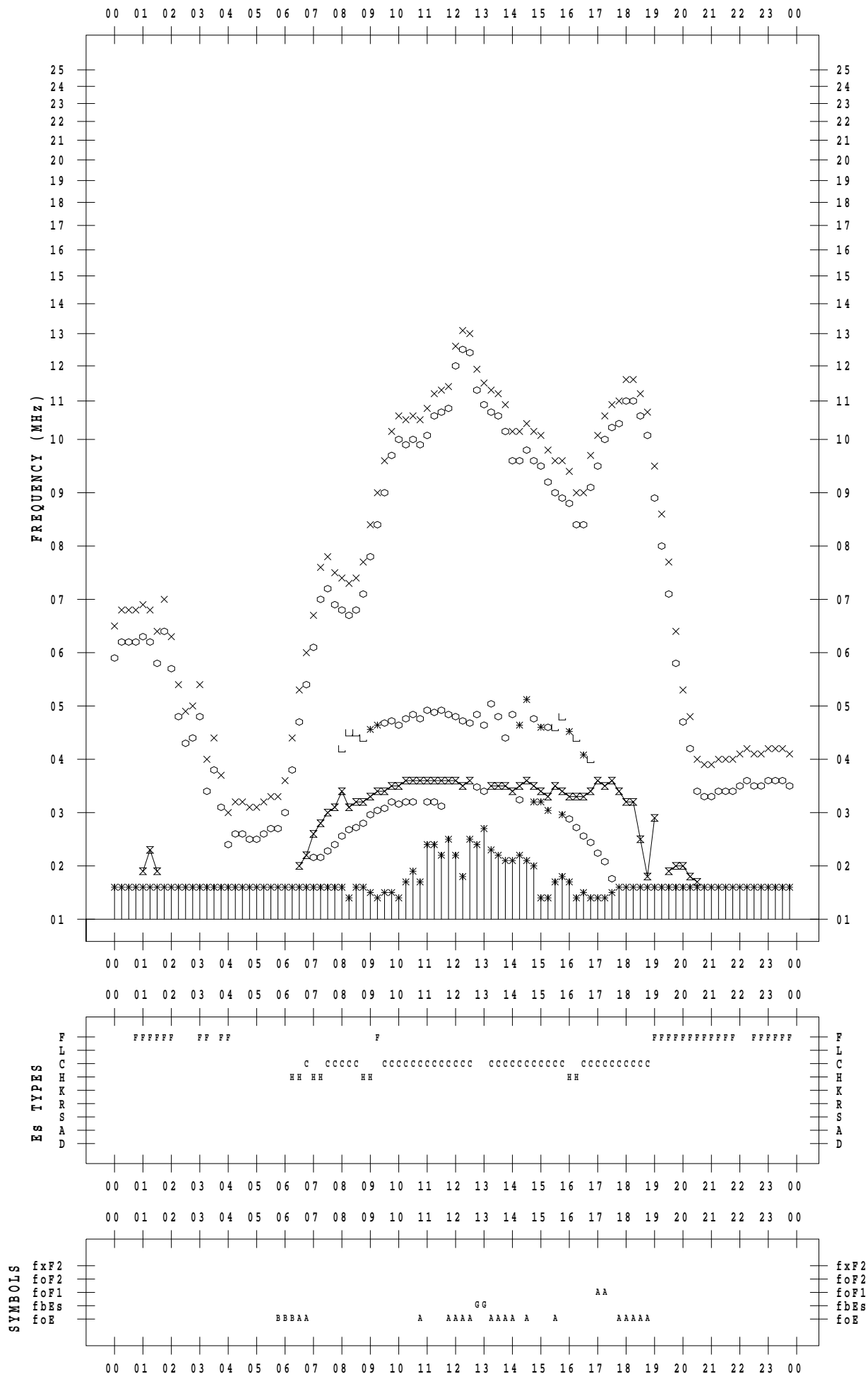
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/ 4

135 ° E MEAN TIME





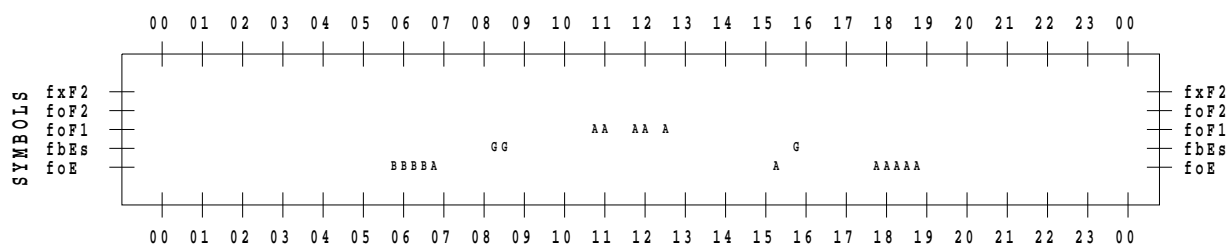
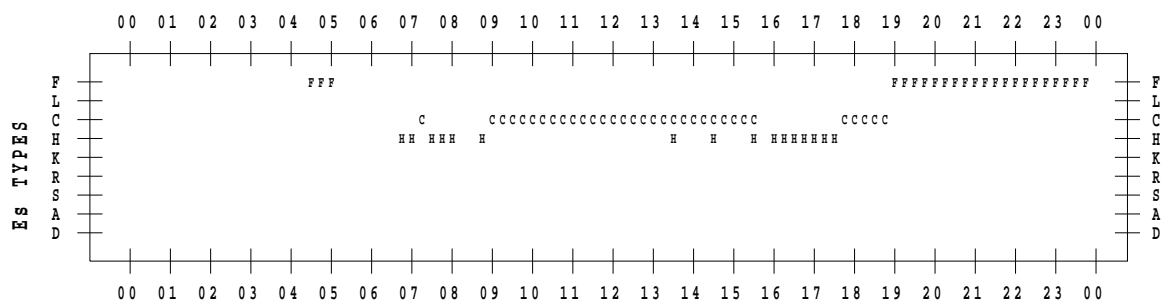
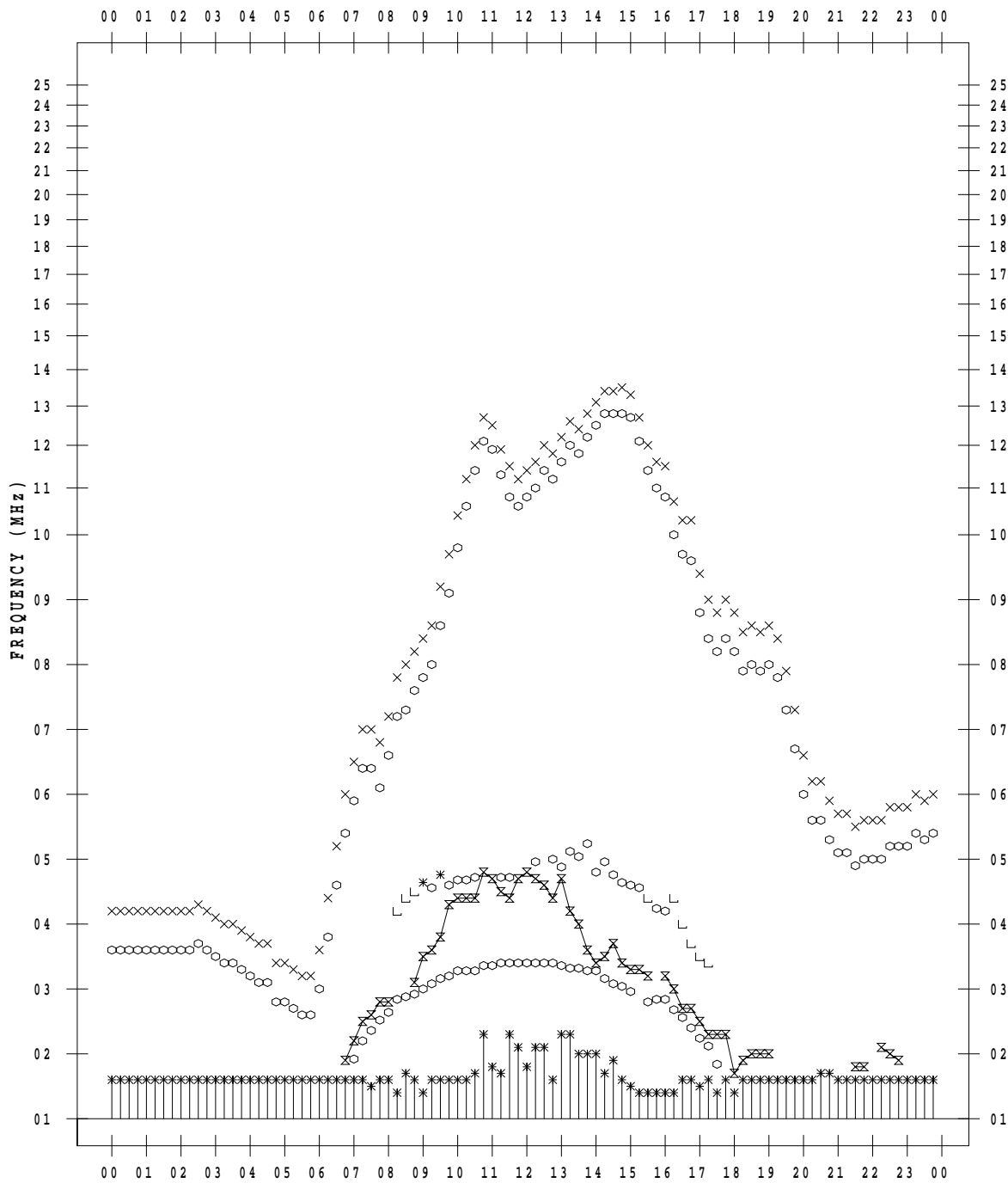
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/ 6

135 ° E MEAN TIME



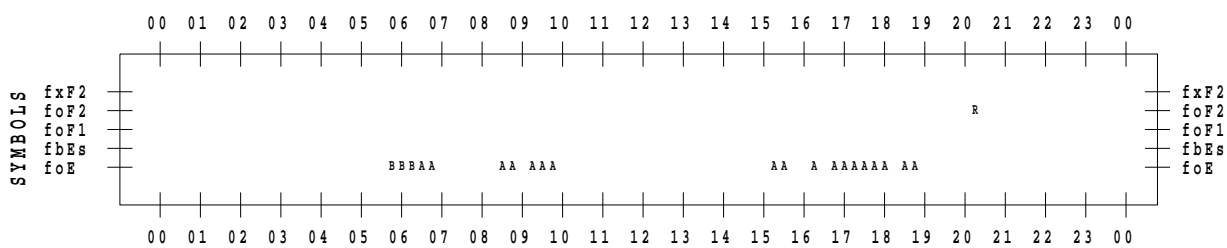
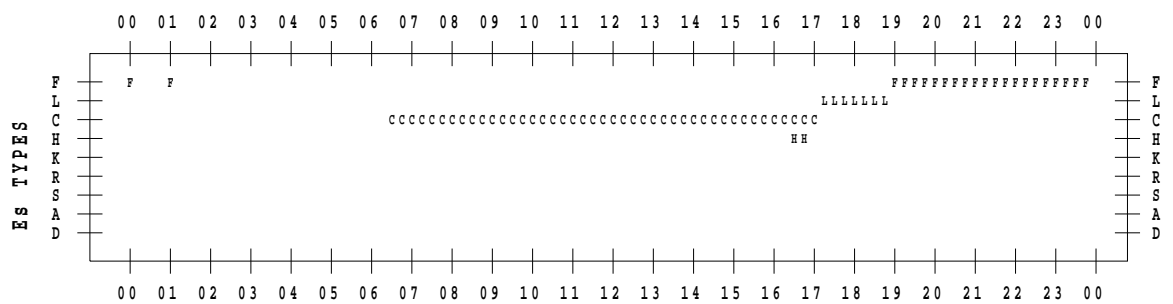
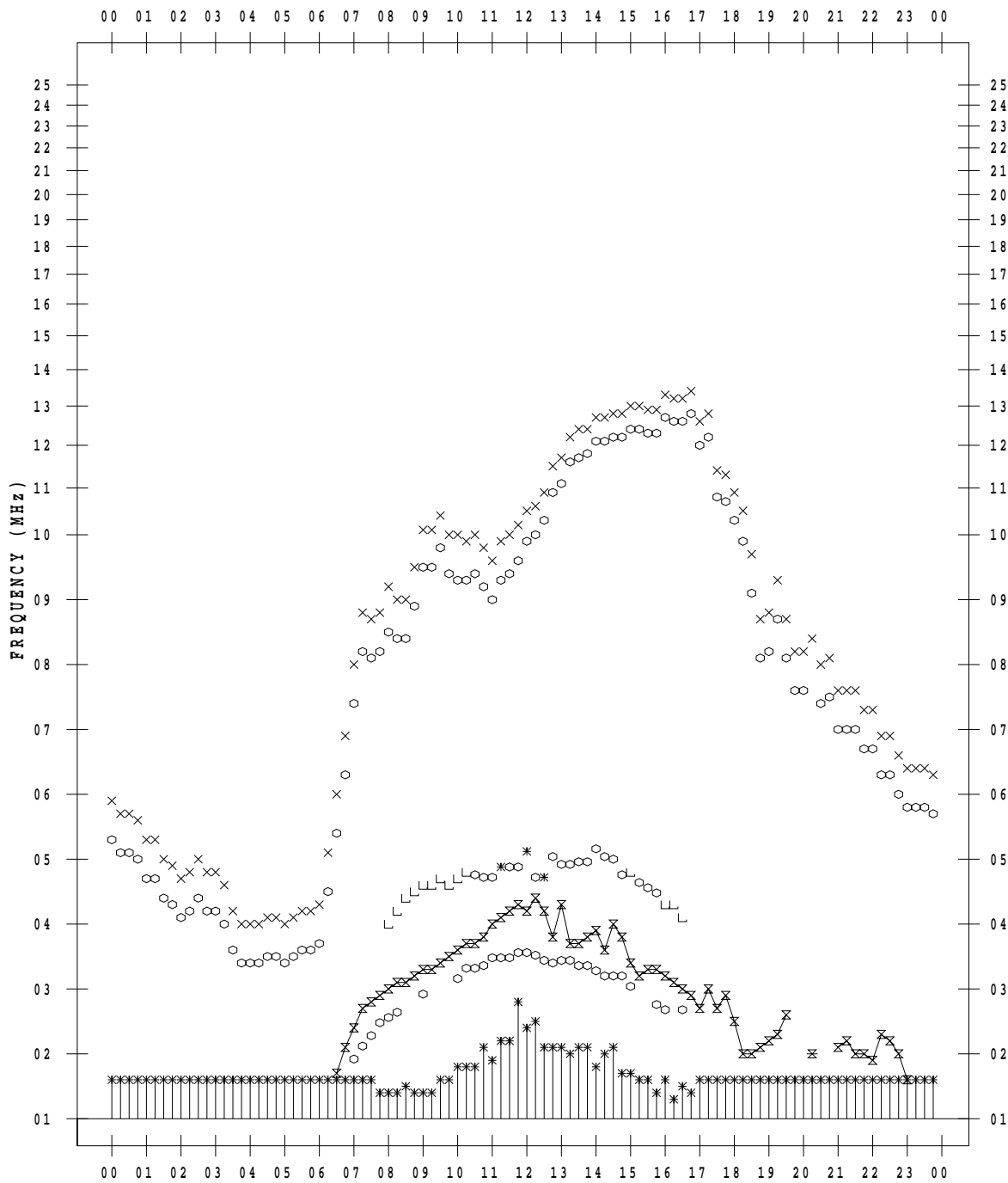
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/ 7

135 ° E MEAN TIME





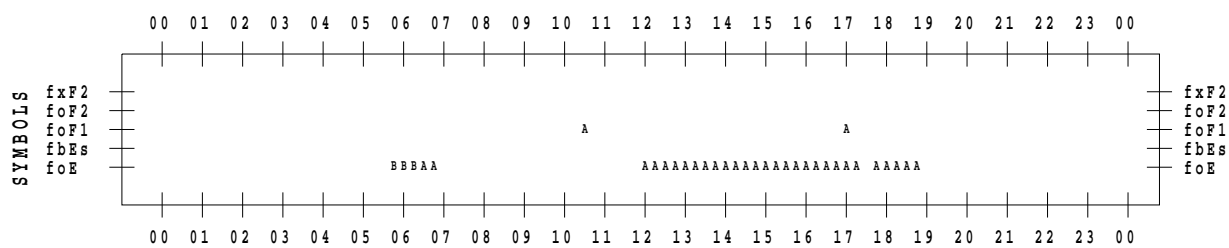
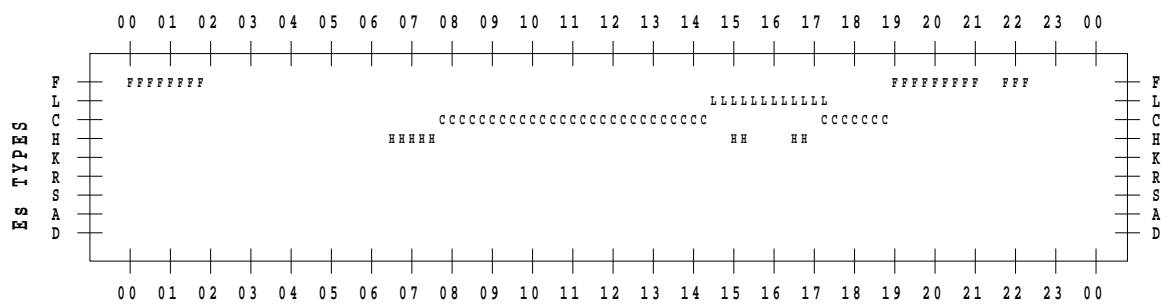
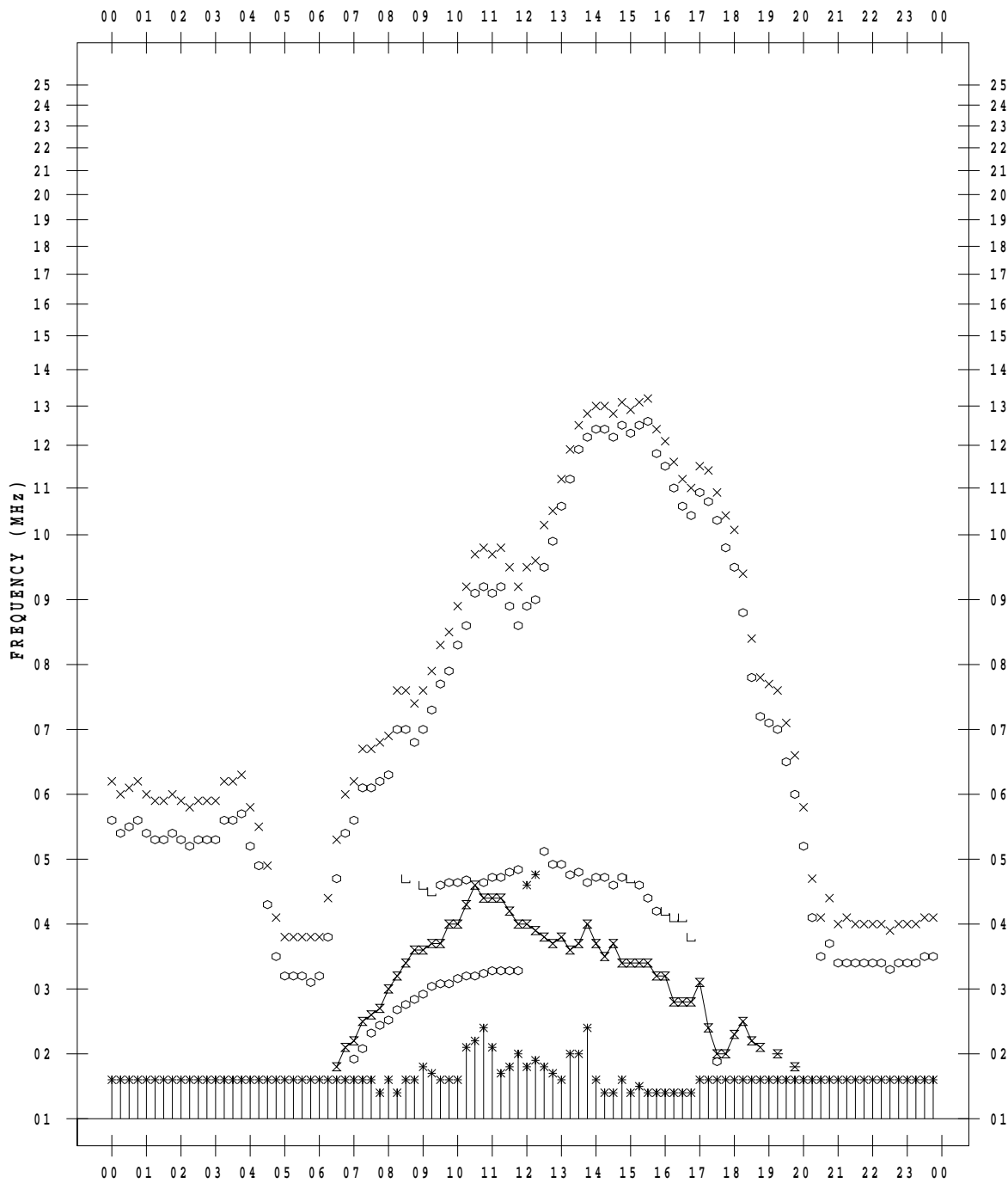
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/ 8

135 ° E MEAN TIME



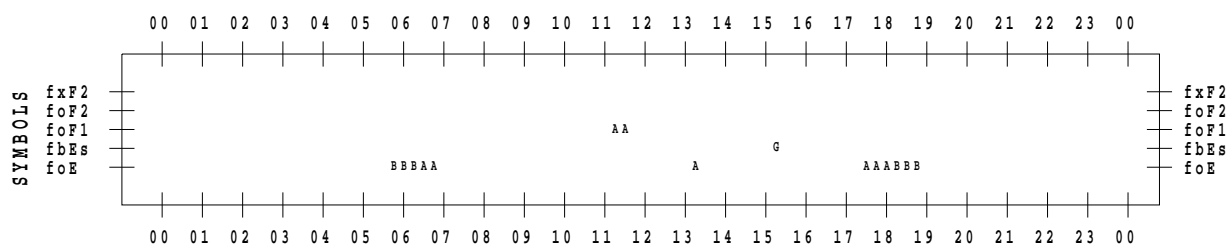
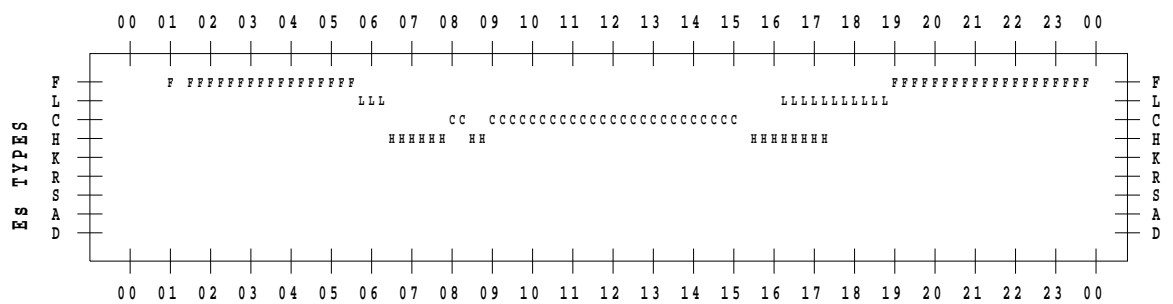
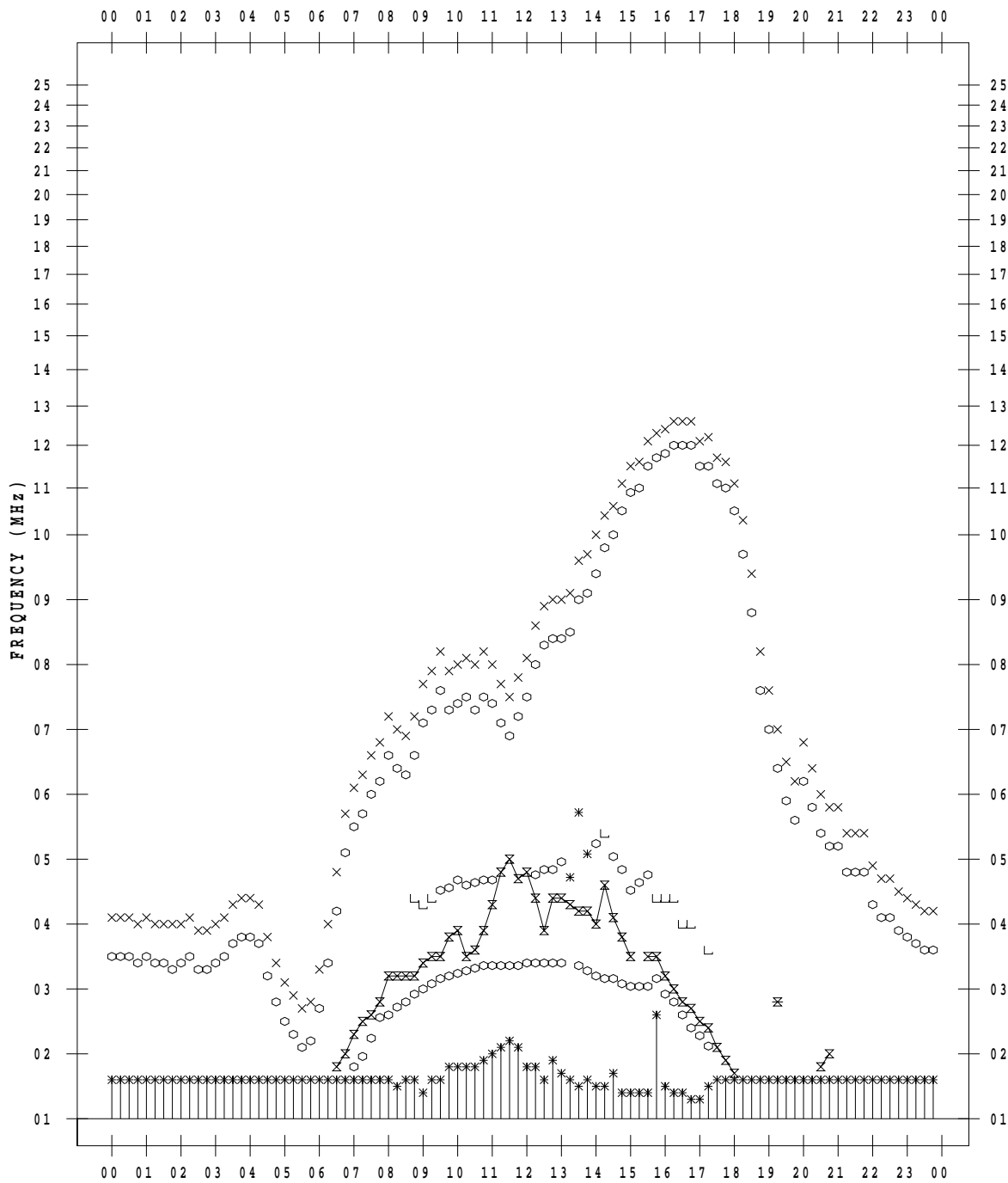
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/ 9

135 ° E MEAN TIME



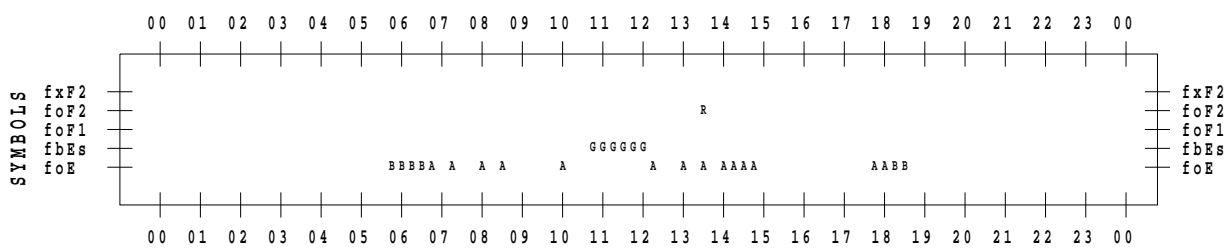
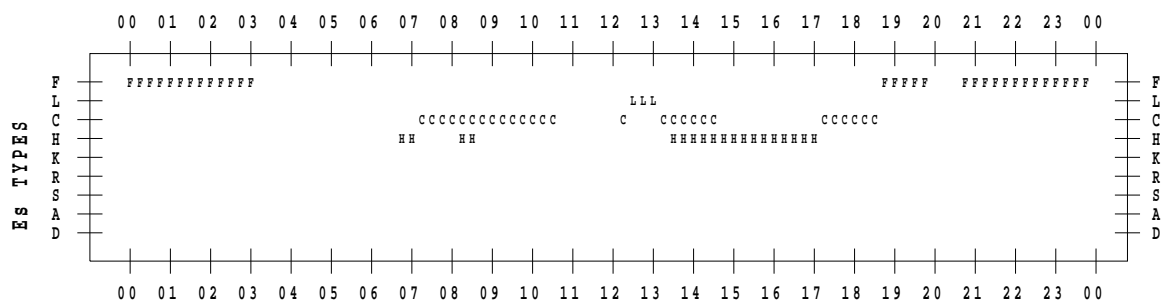
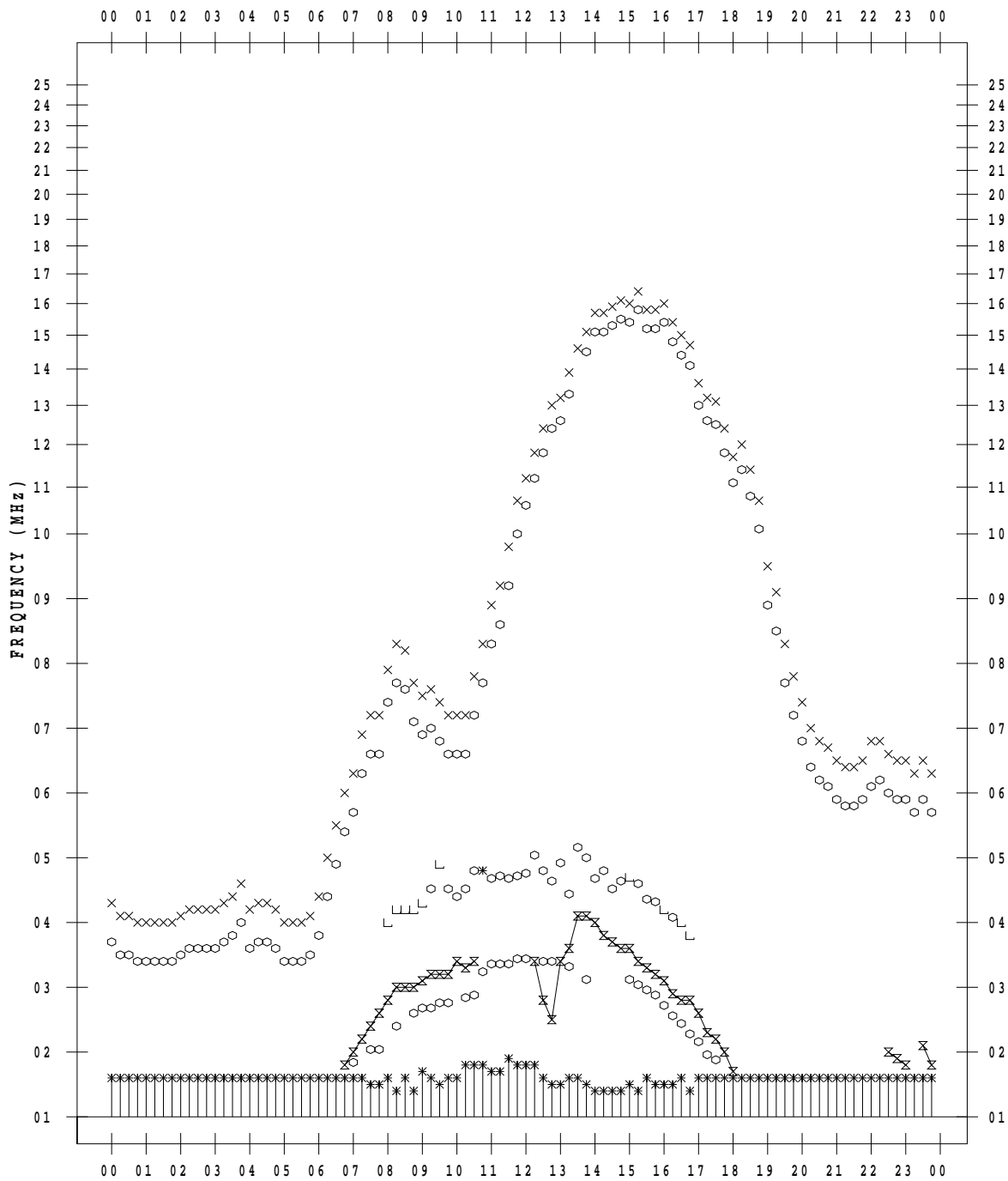
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/10

135 ° E MEAN TIME



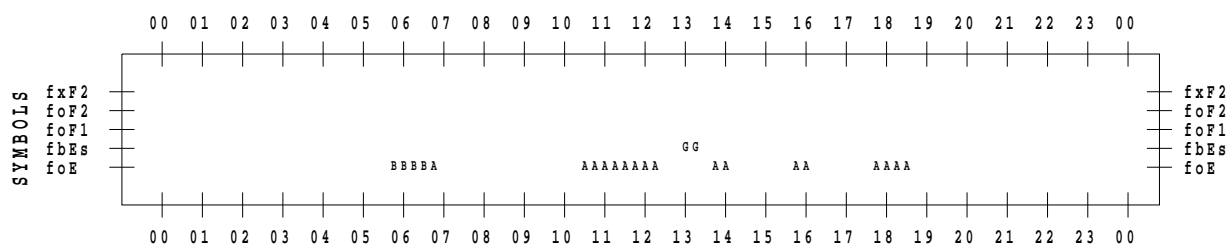
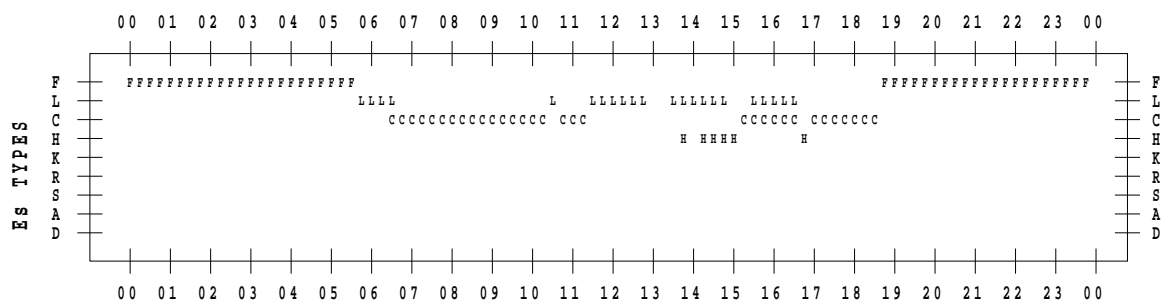
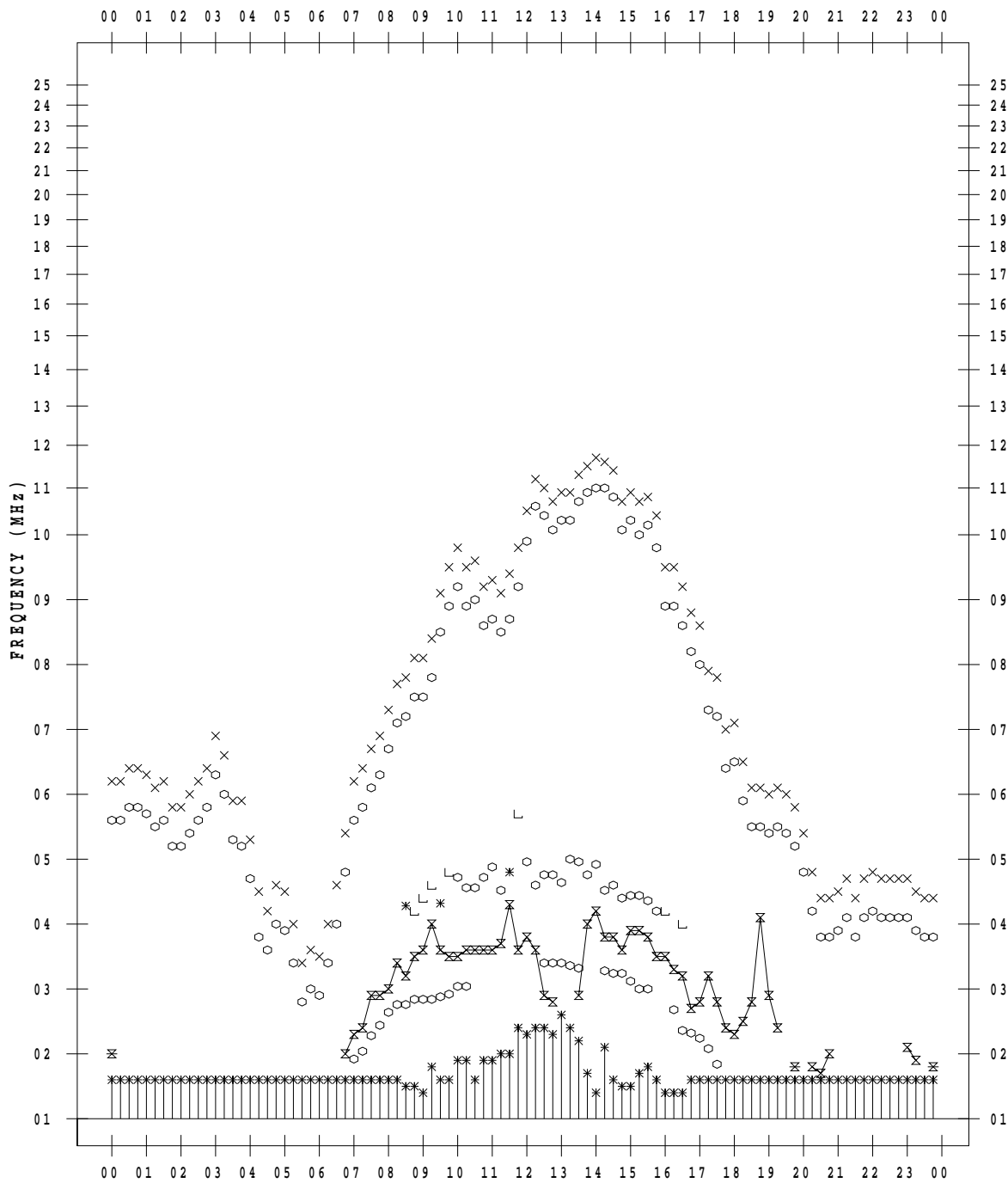
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/11

135 ° E MEAN TIME



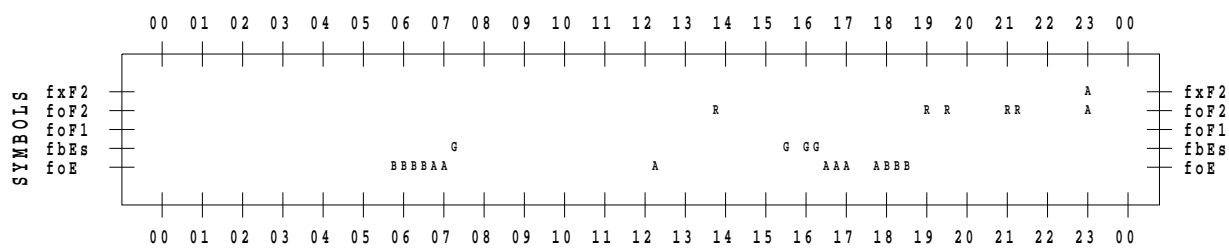
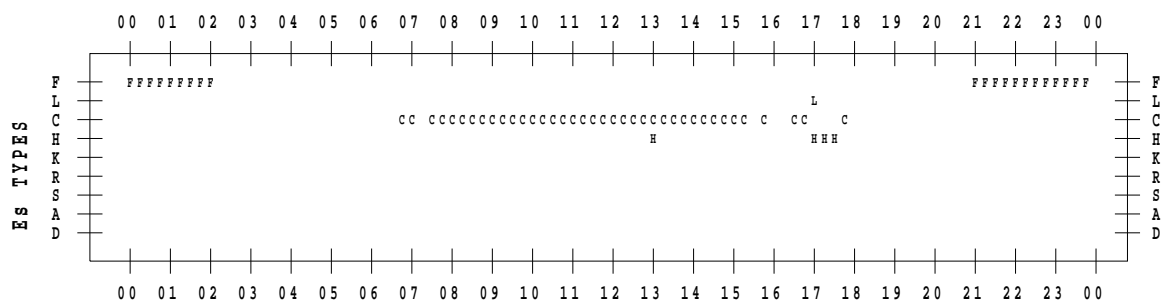
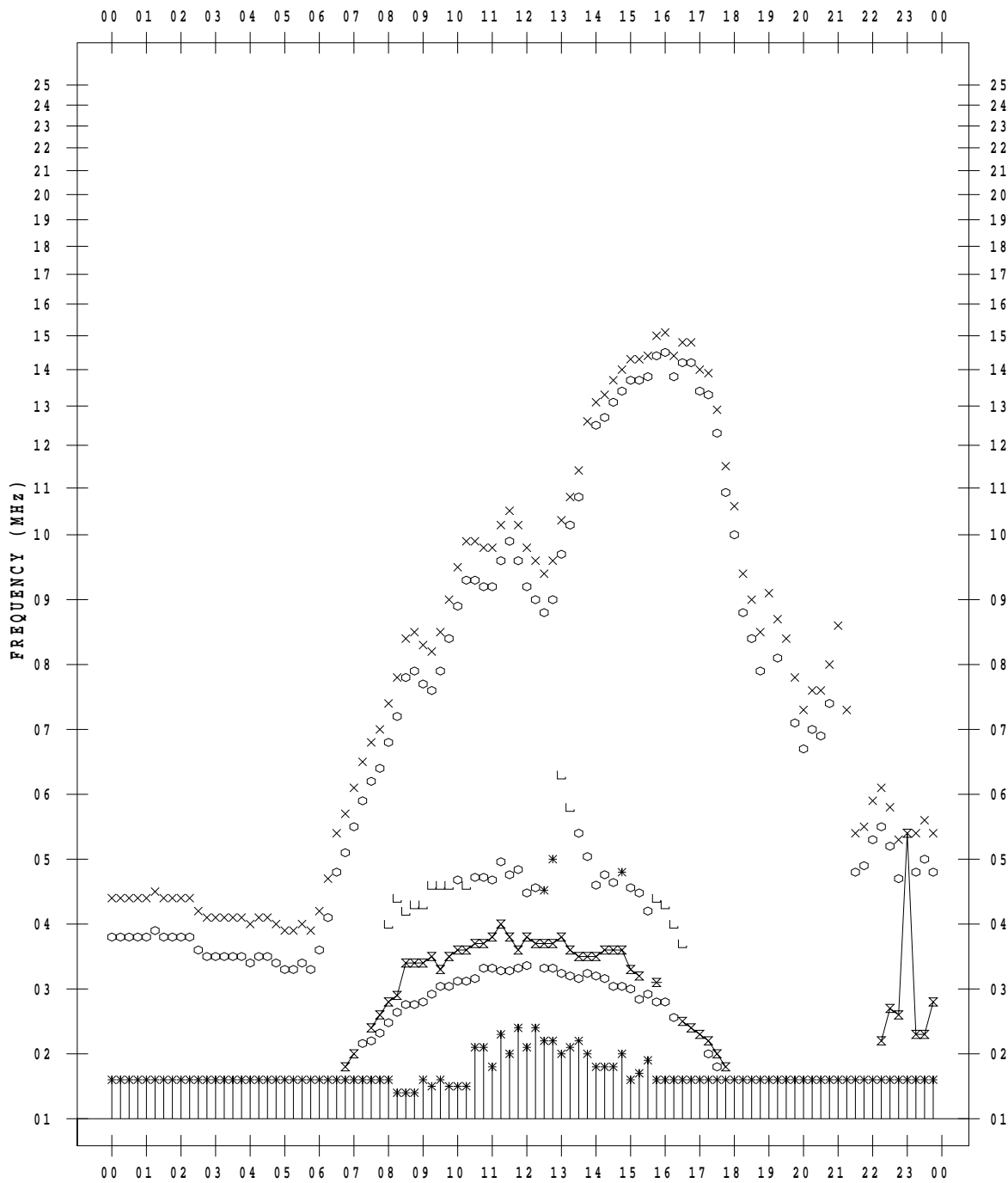
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/12

135 ° E MEAN TIME



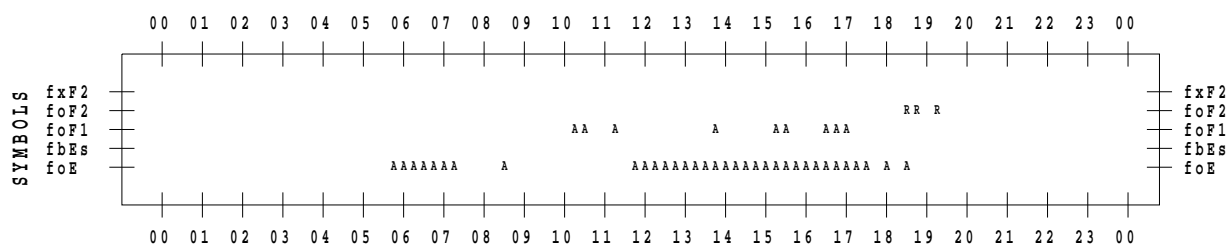
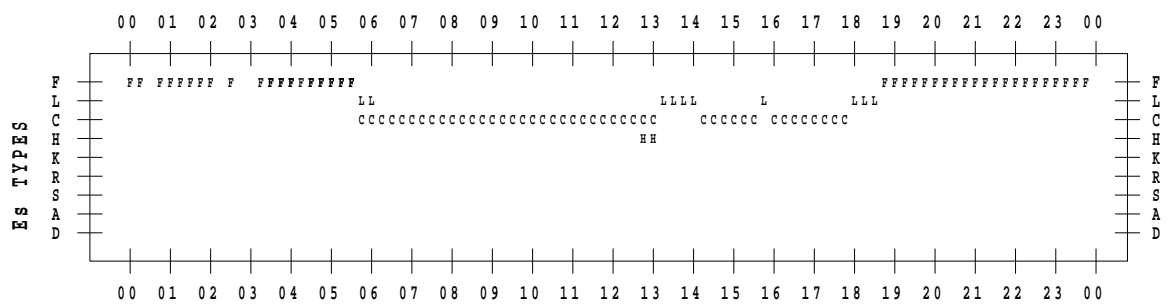
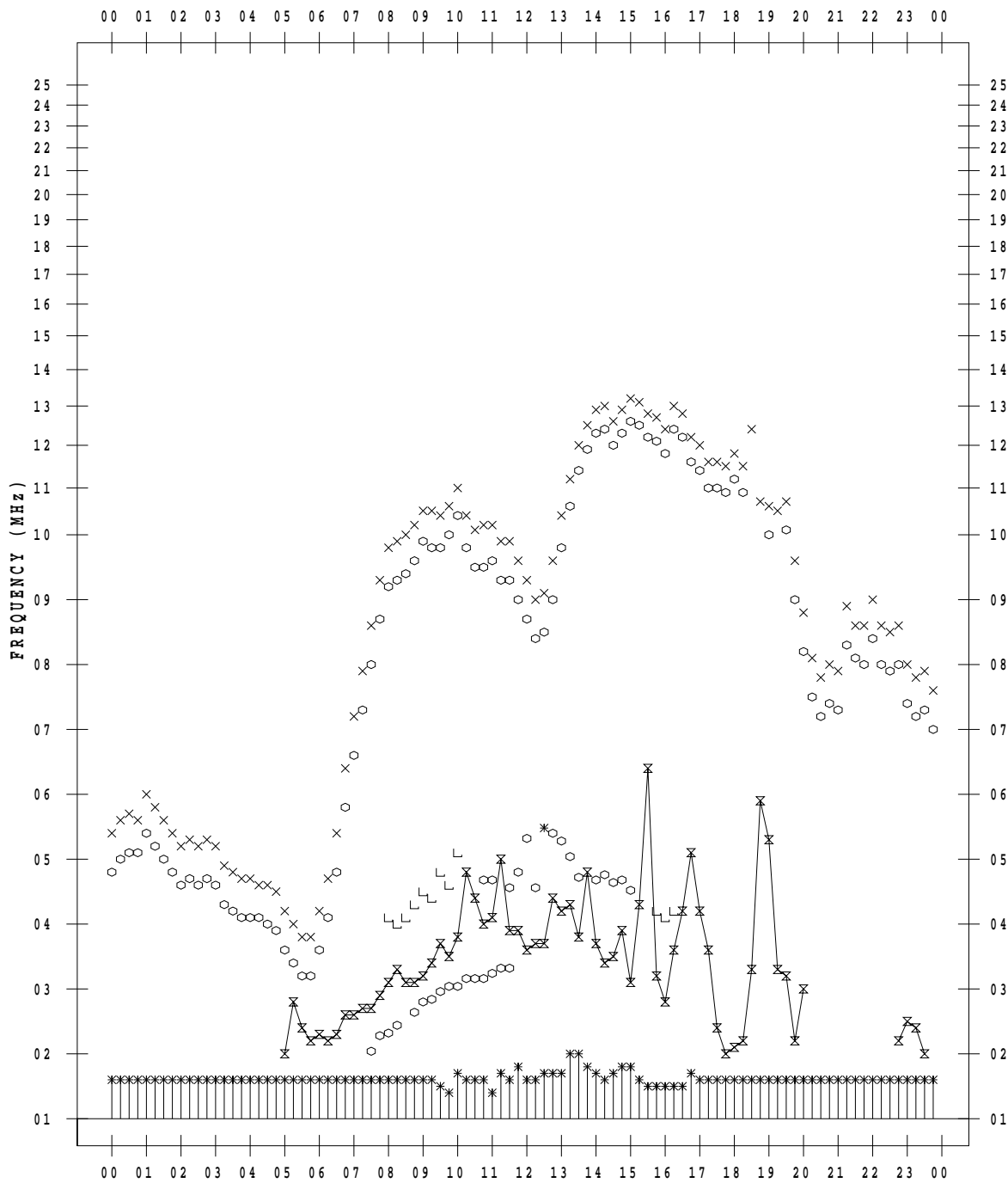
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/13

135 ° E MEAN TIME



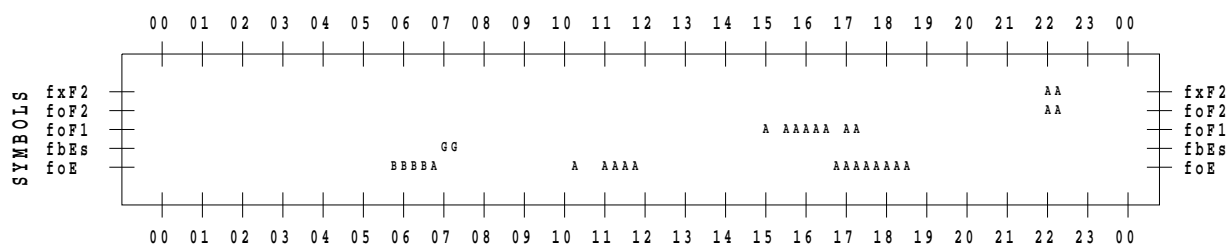
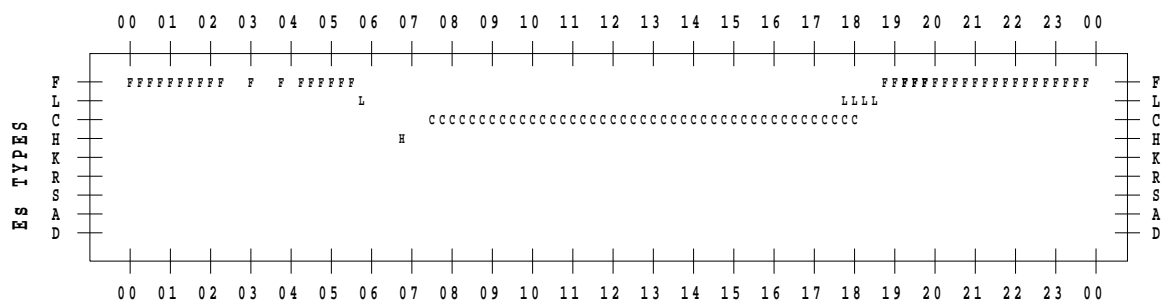
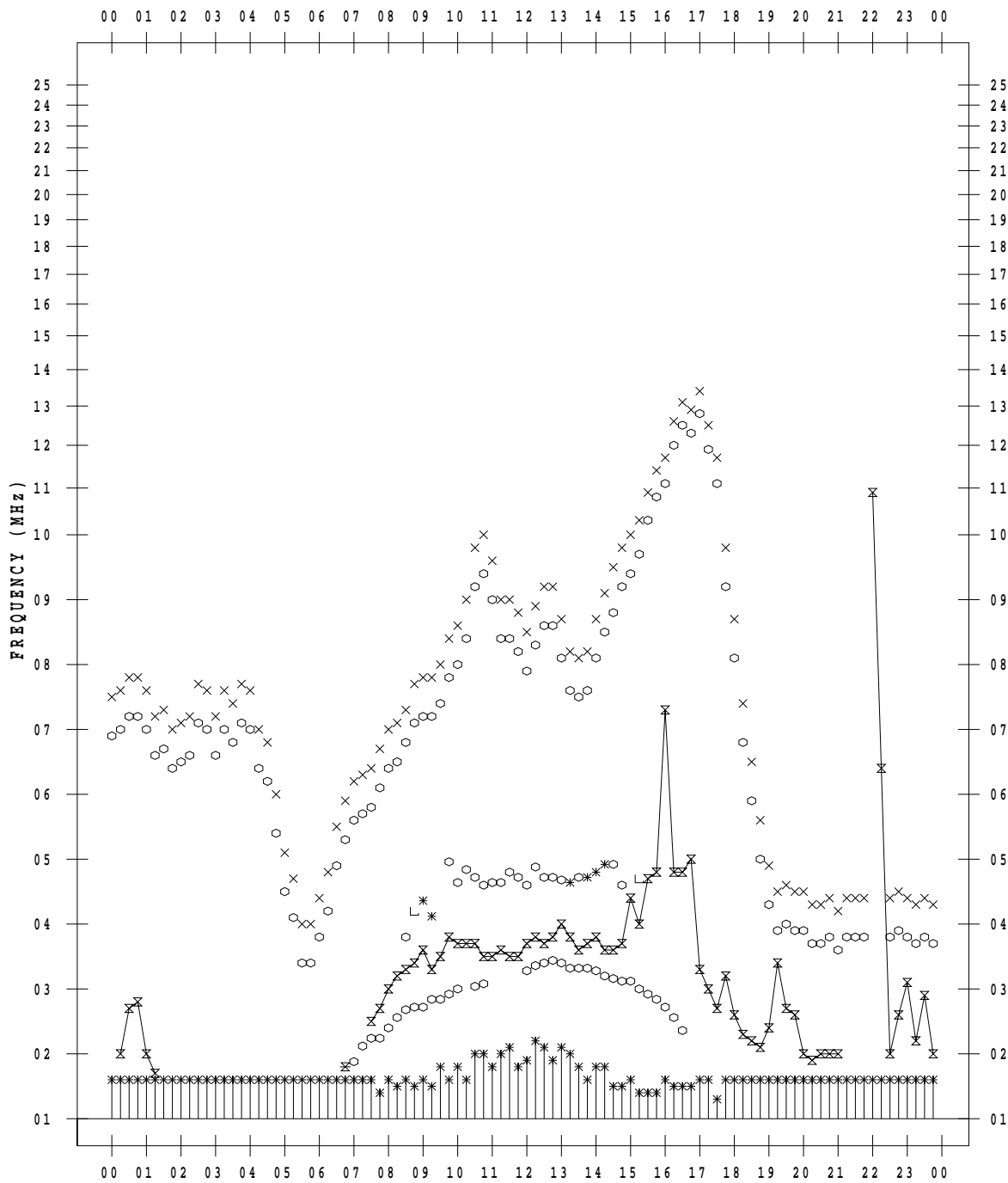
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/14

135 ° E MEAN TIME



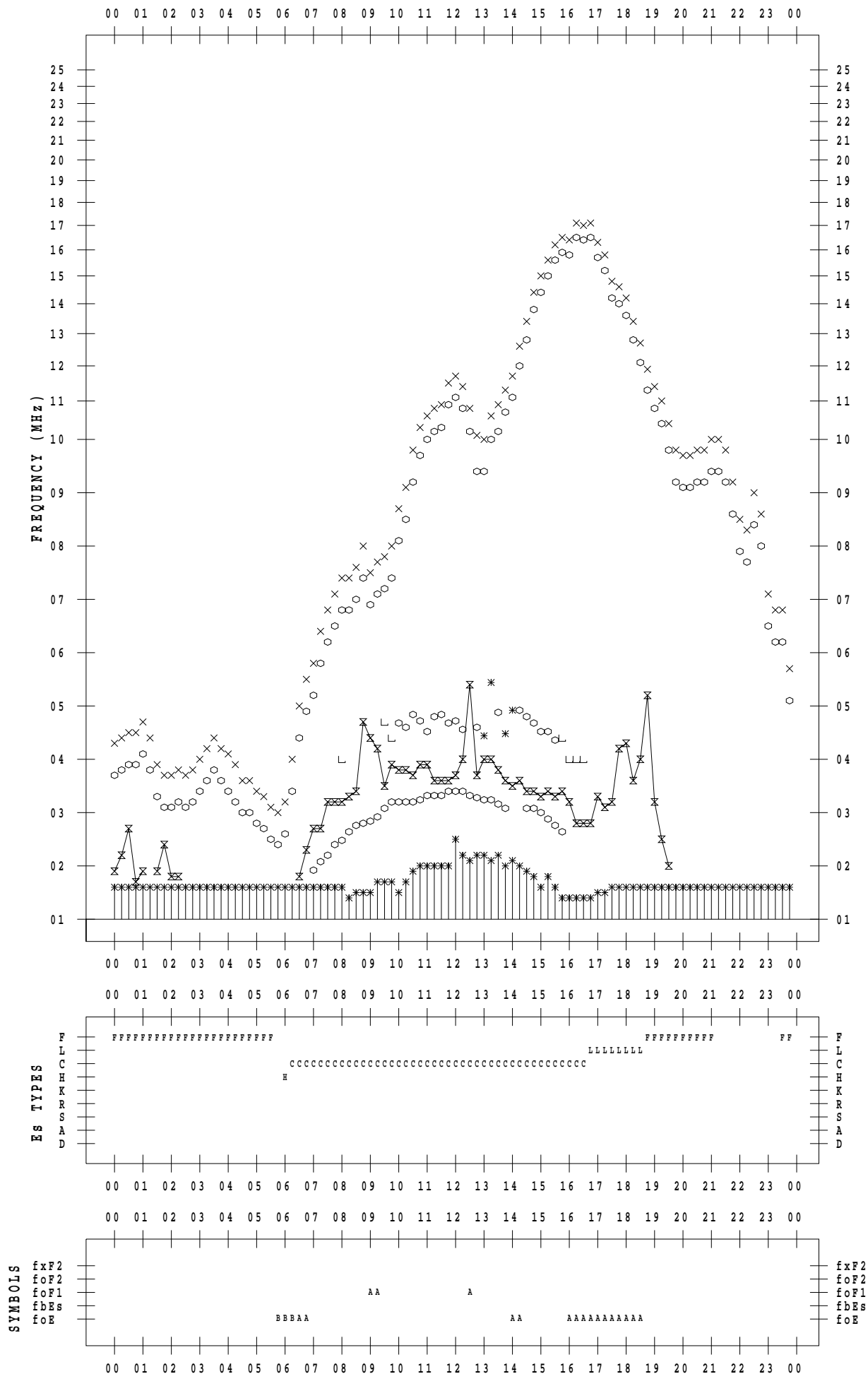
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/15

135 ° E MEAN TIME









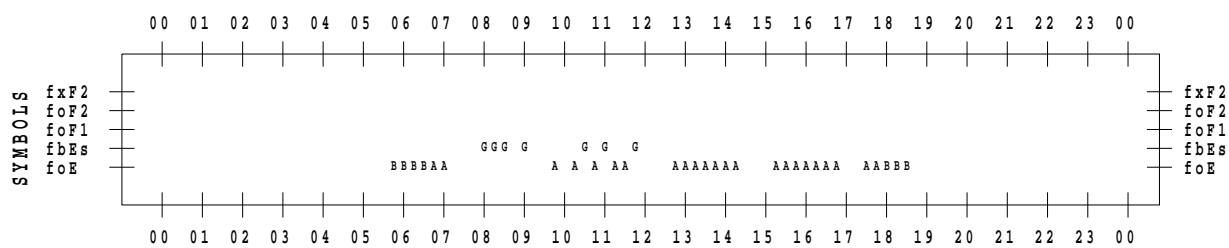
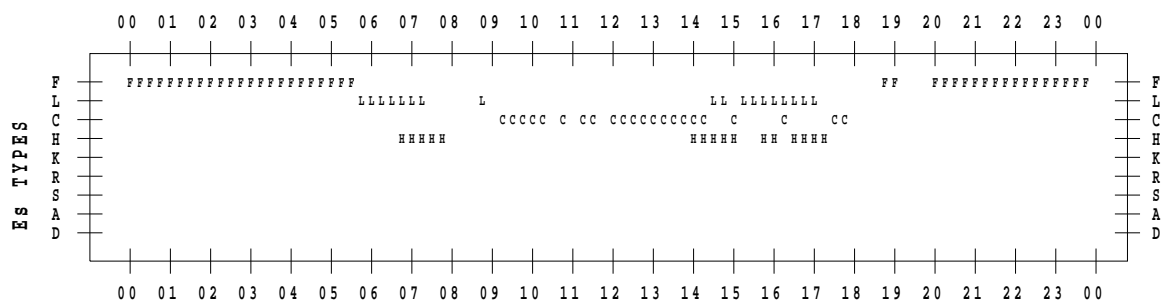
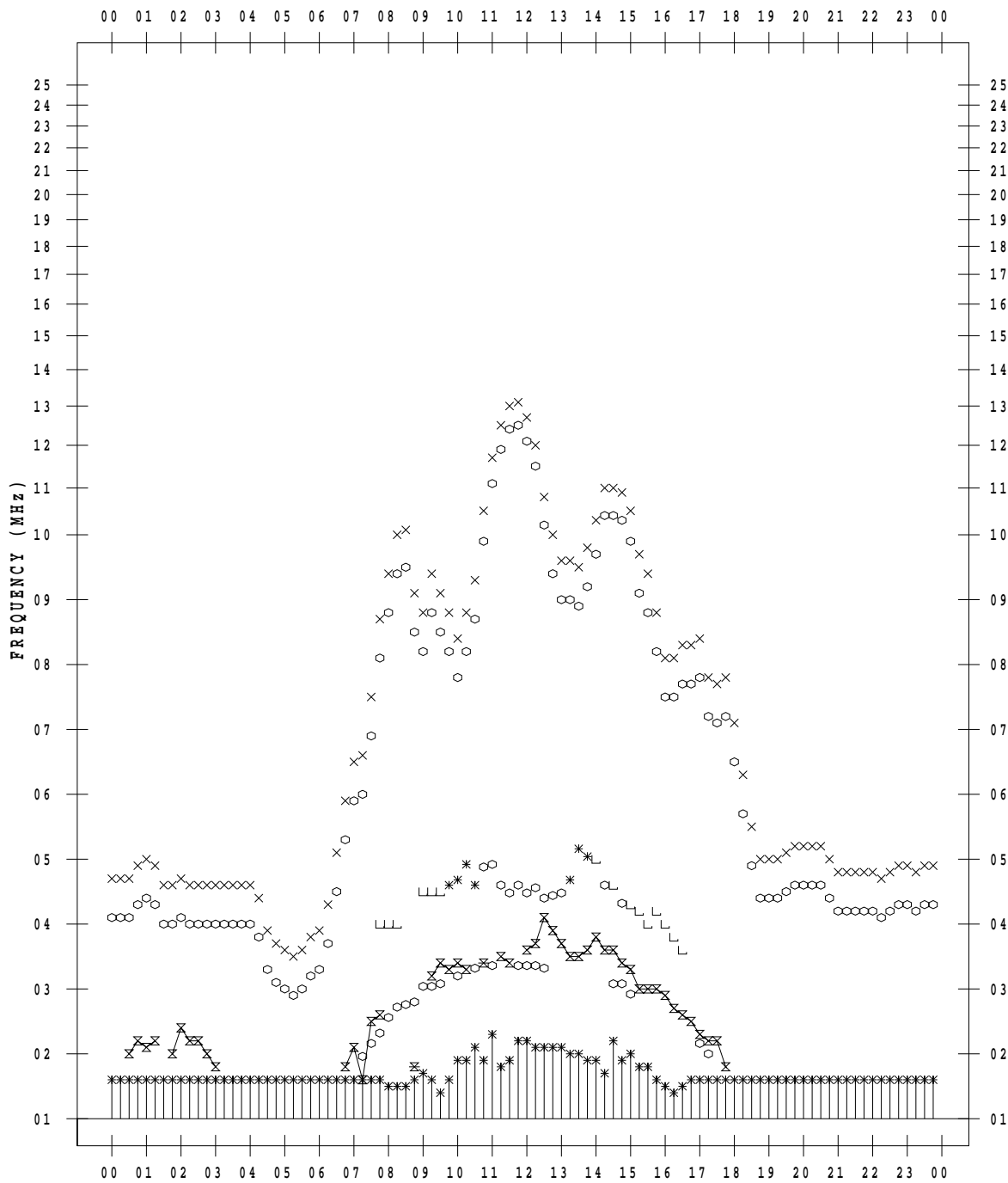
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/18

135 ° E MEAN TIME



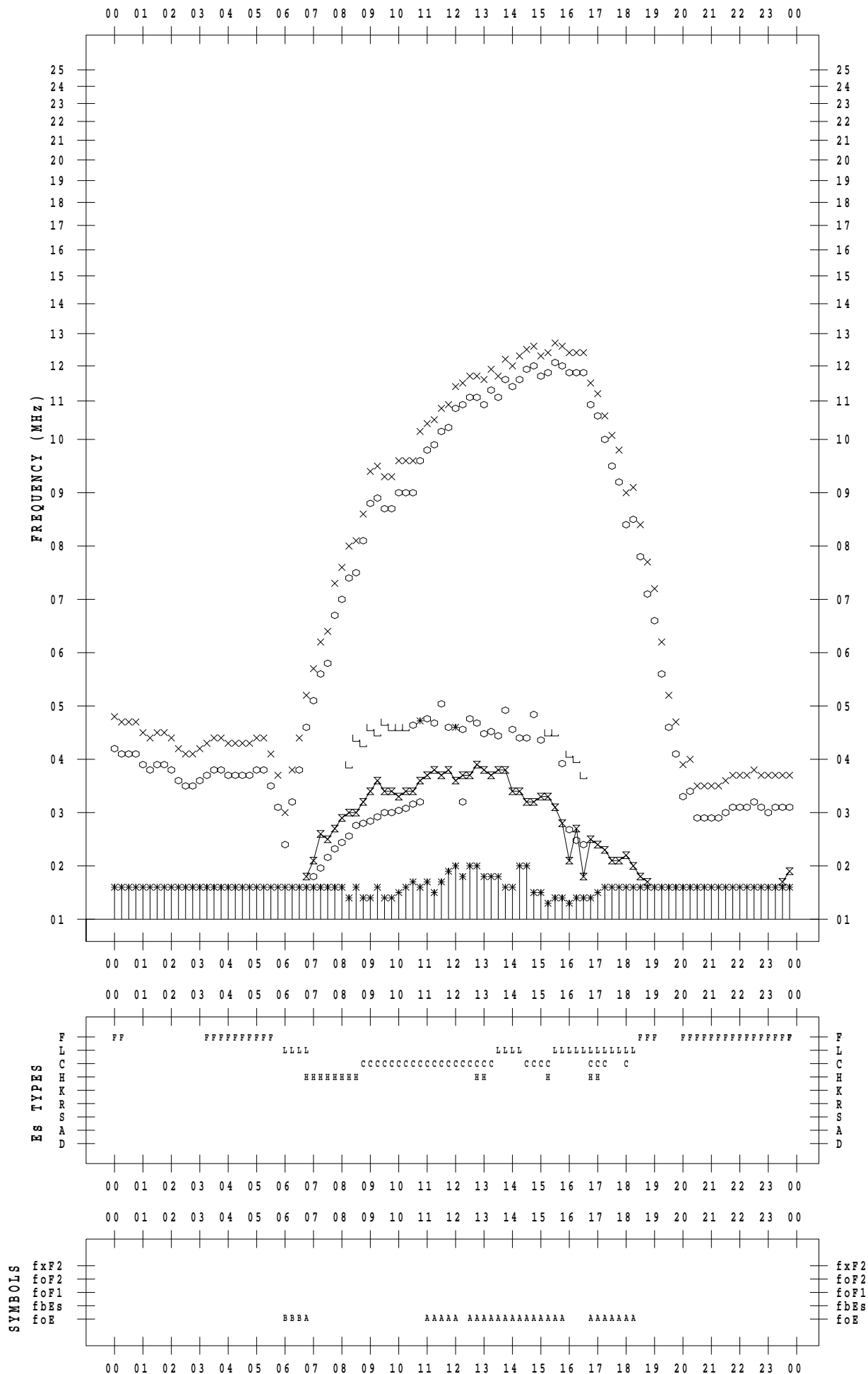
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/19

135 ° E MEAN TIME





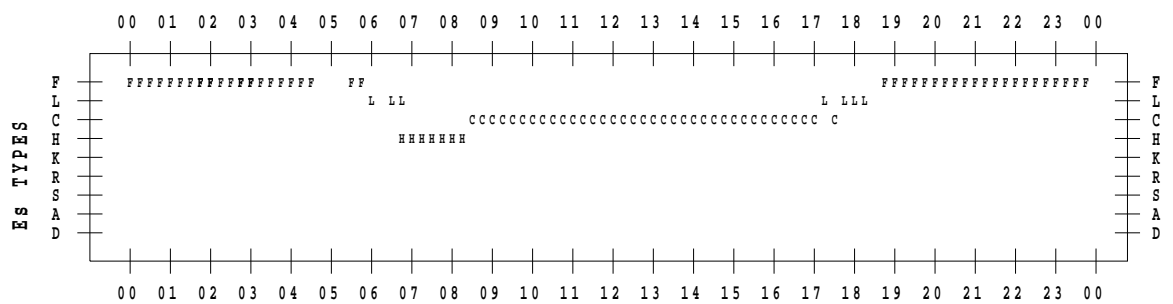
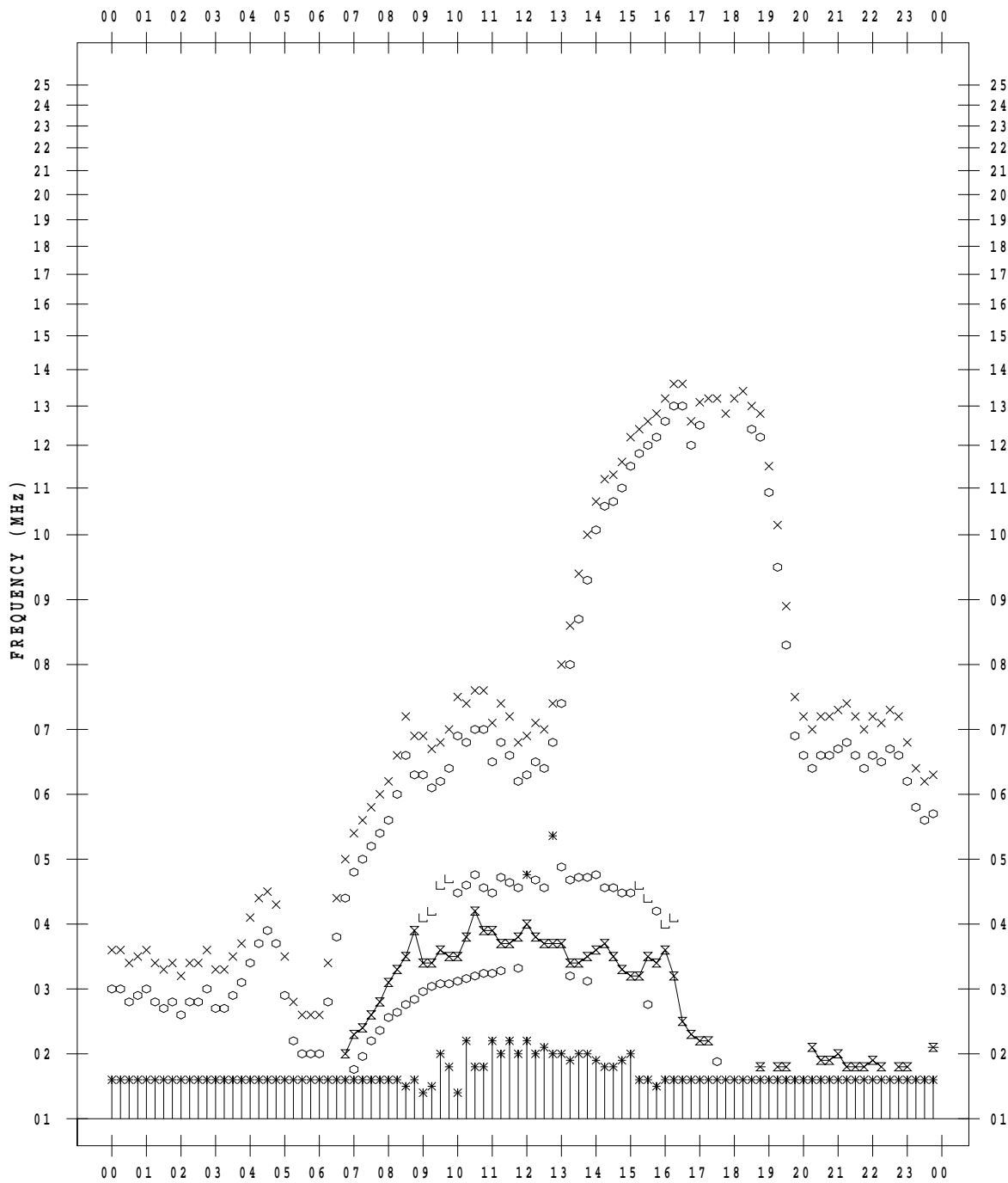
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/21

135 ° E MEAN TIME



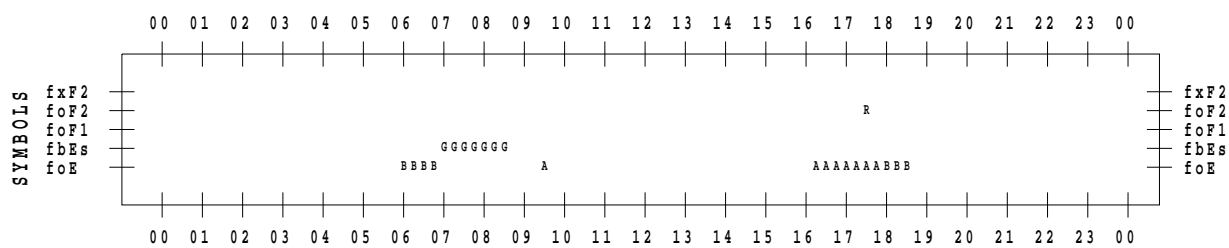
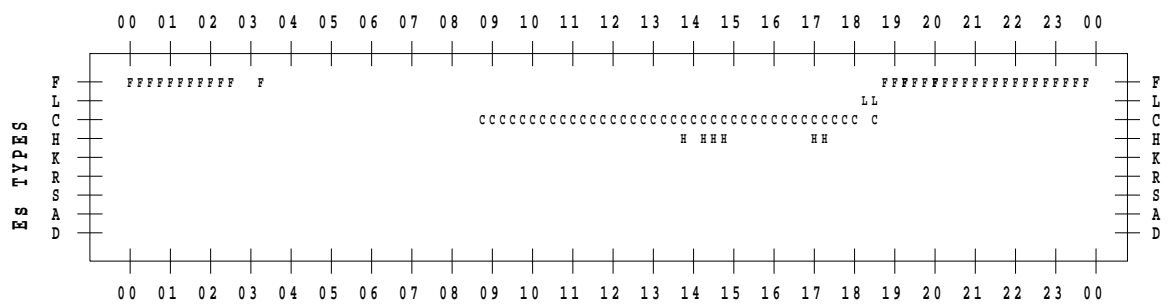
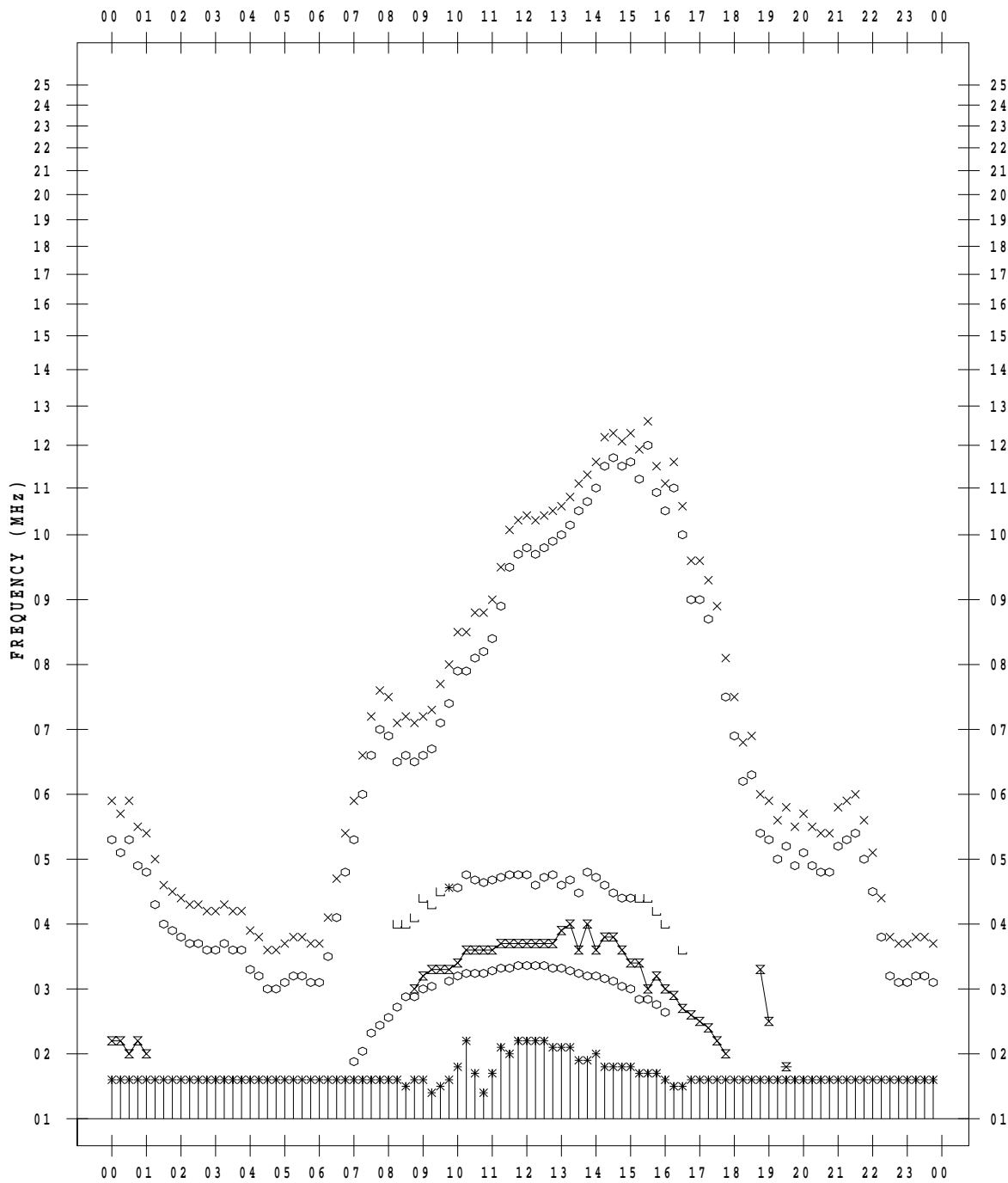
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/22

135 ° E MEAN TIME



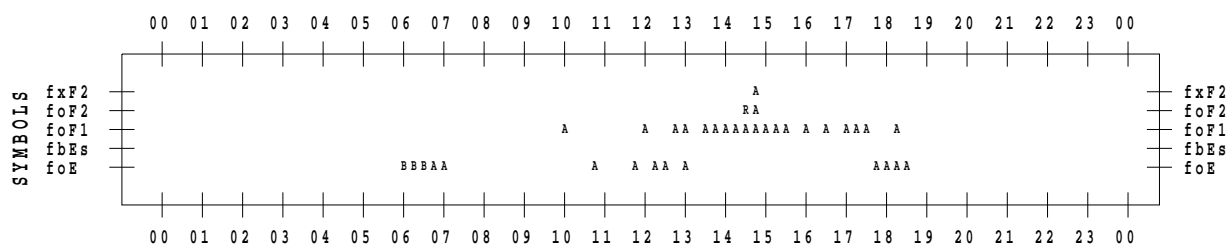
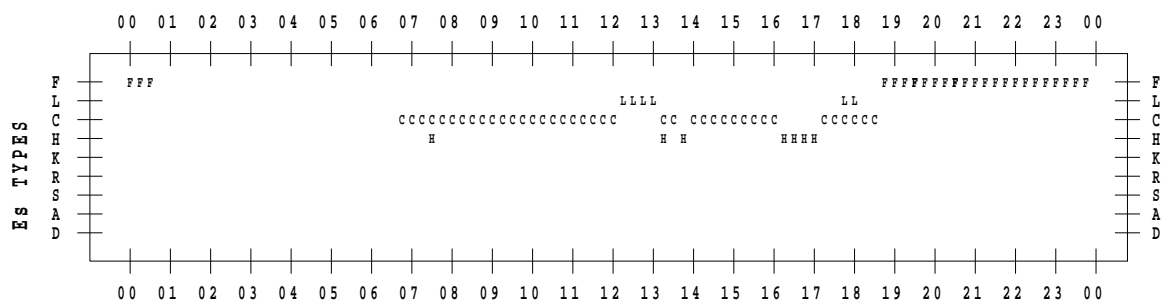
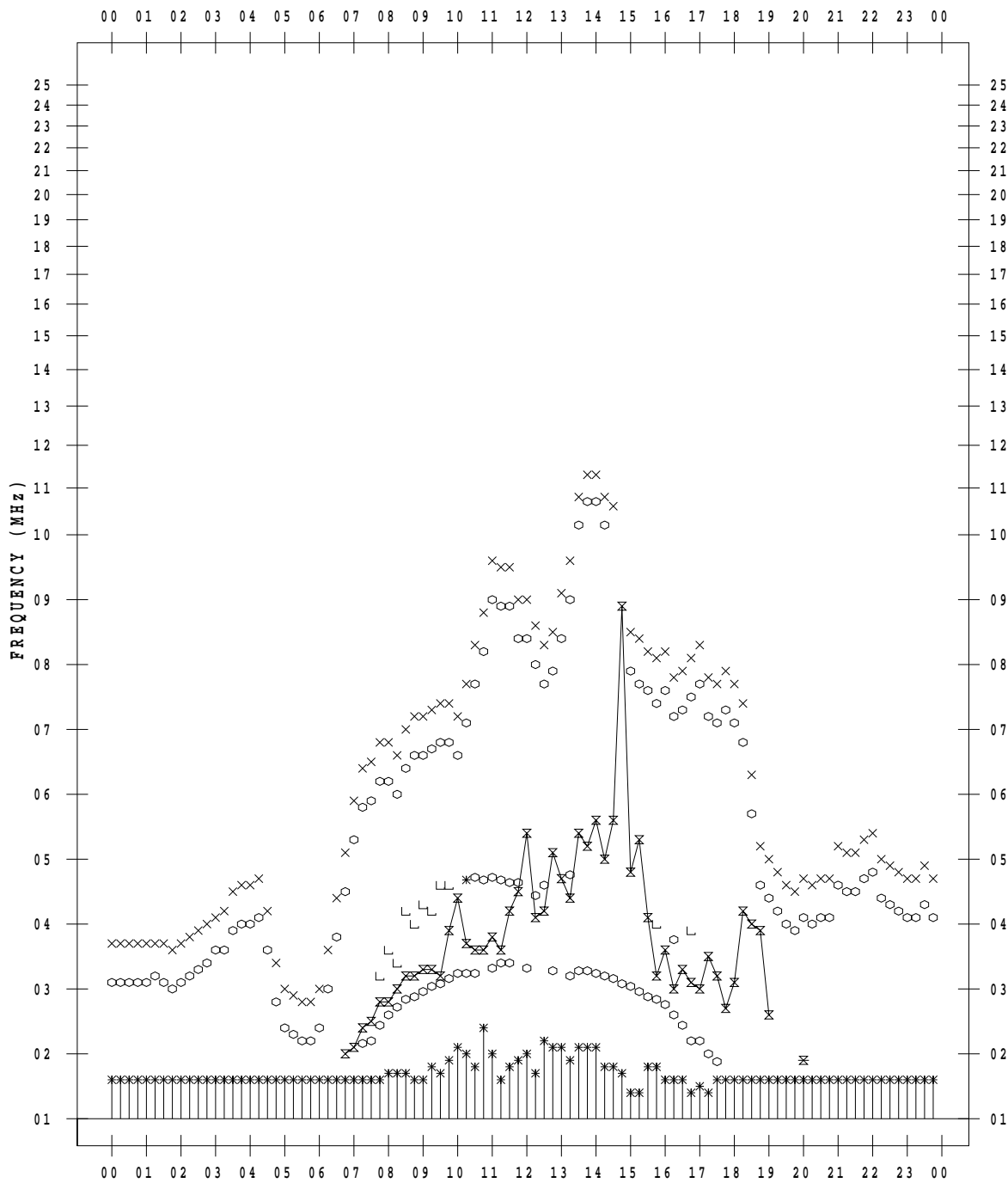
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/23

135 ° E MEAN TIME





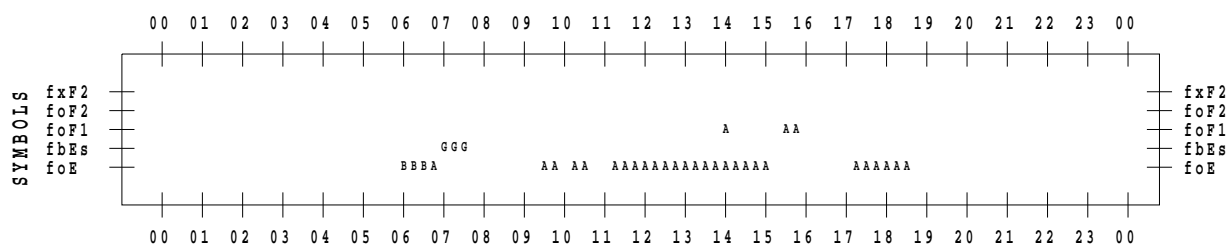
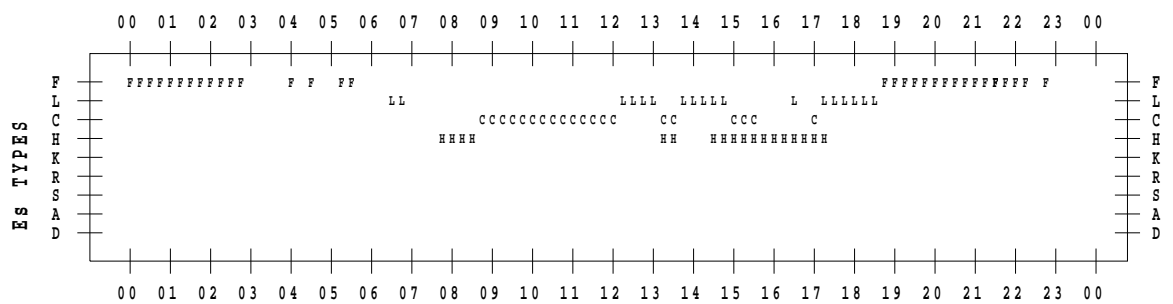
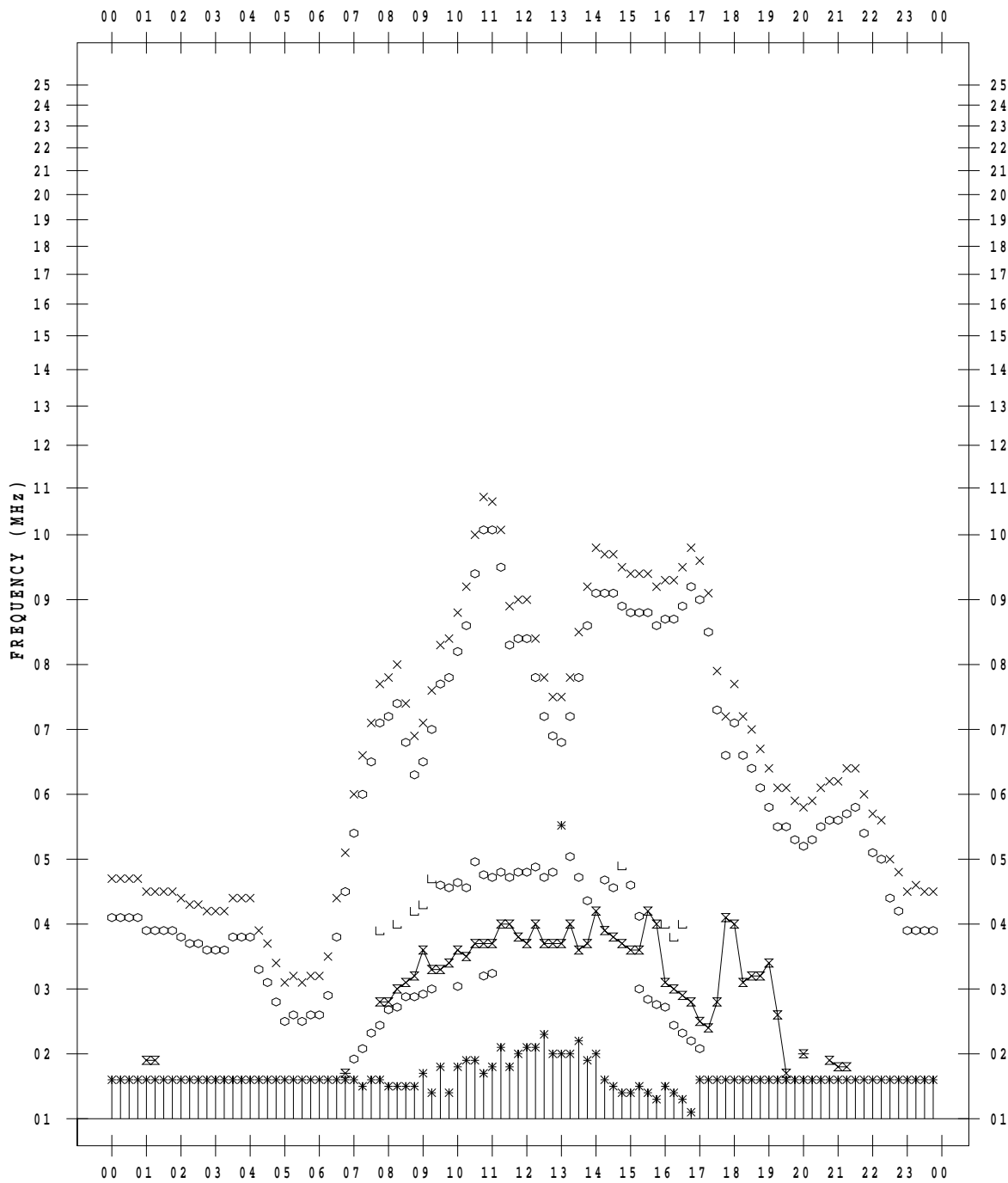
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/24

135 ° E MEAN TIME



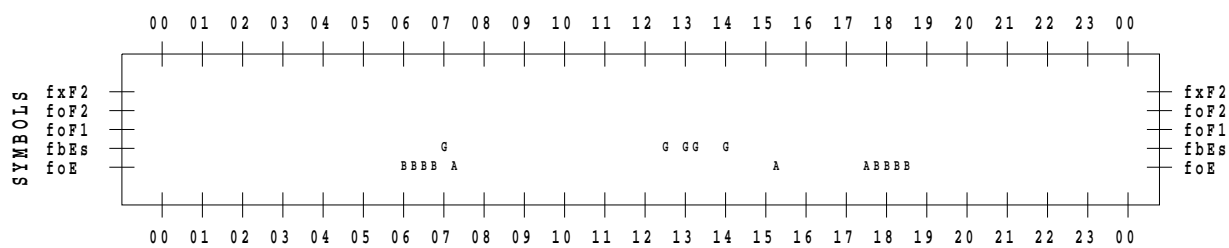
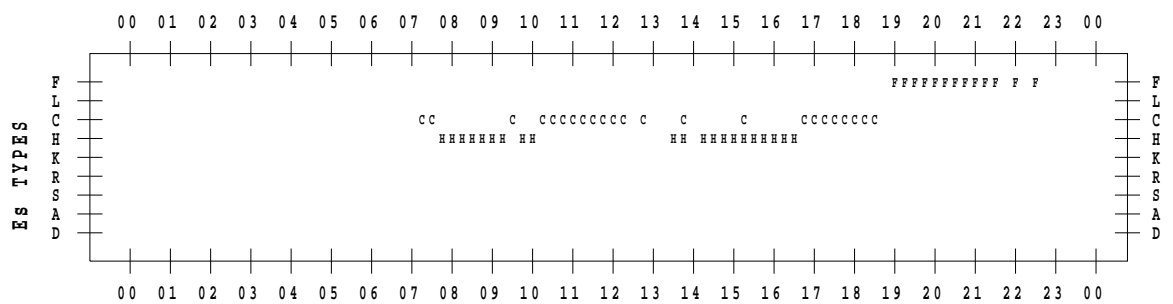
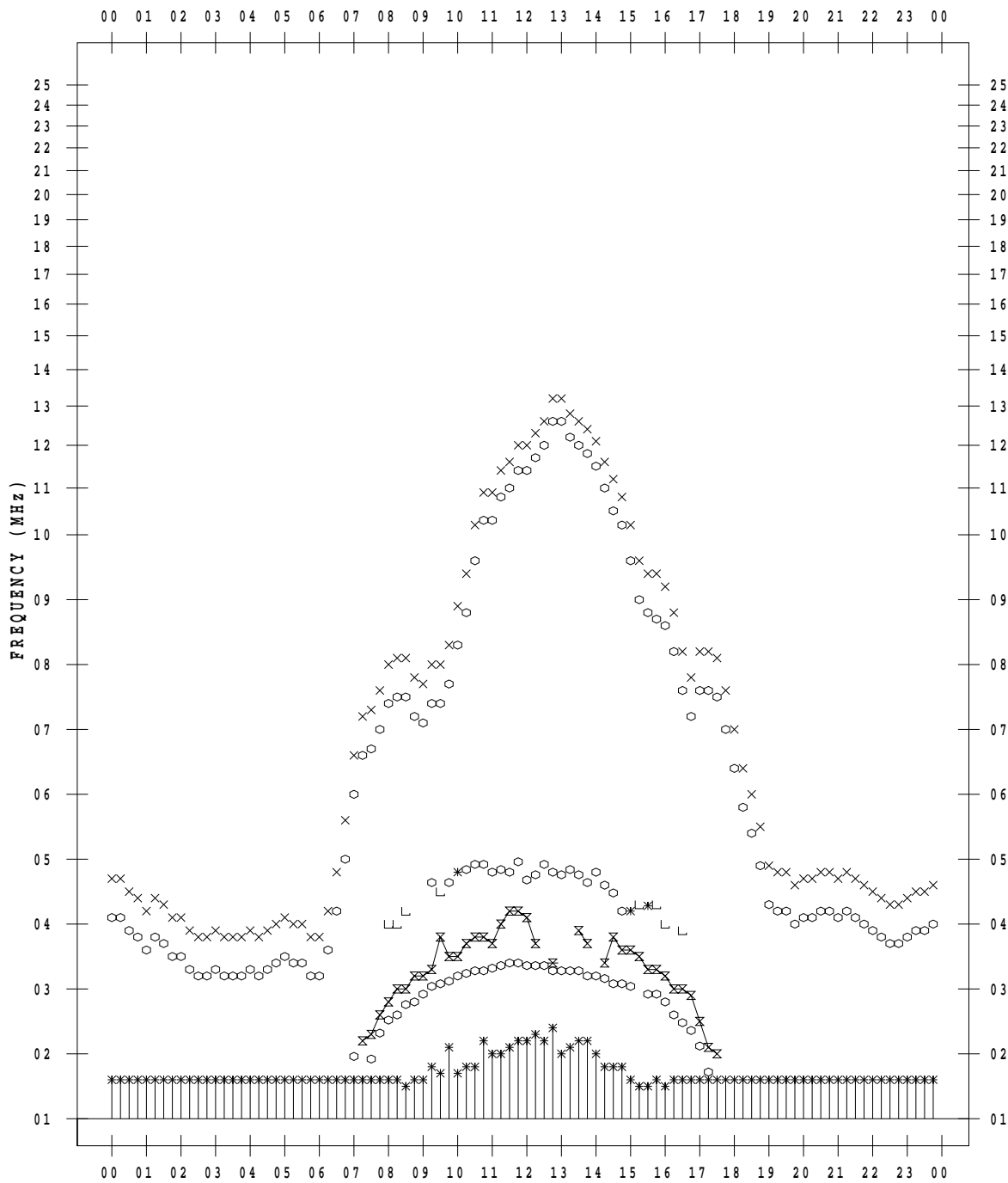
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/25

135 ° E MEAN TIME



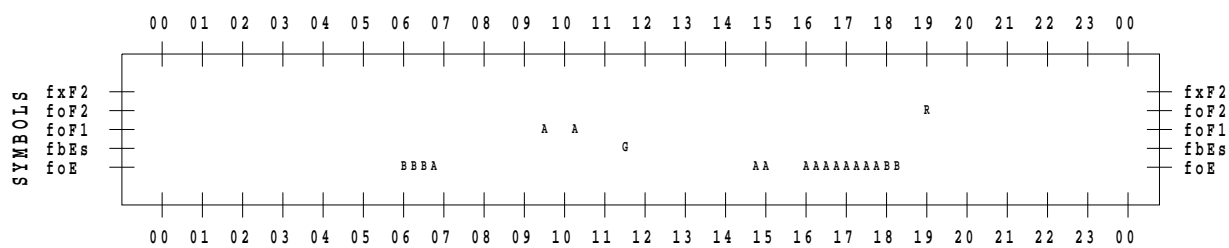
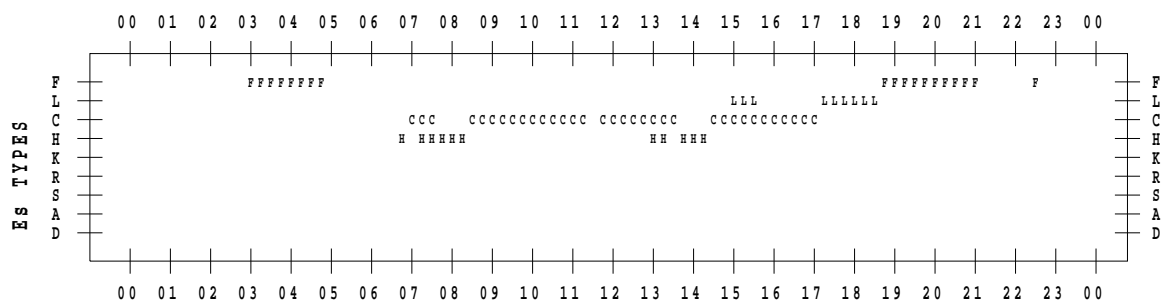
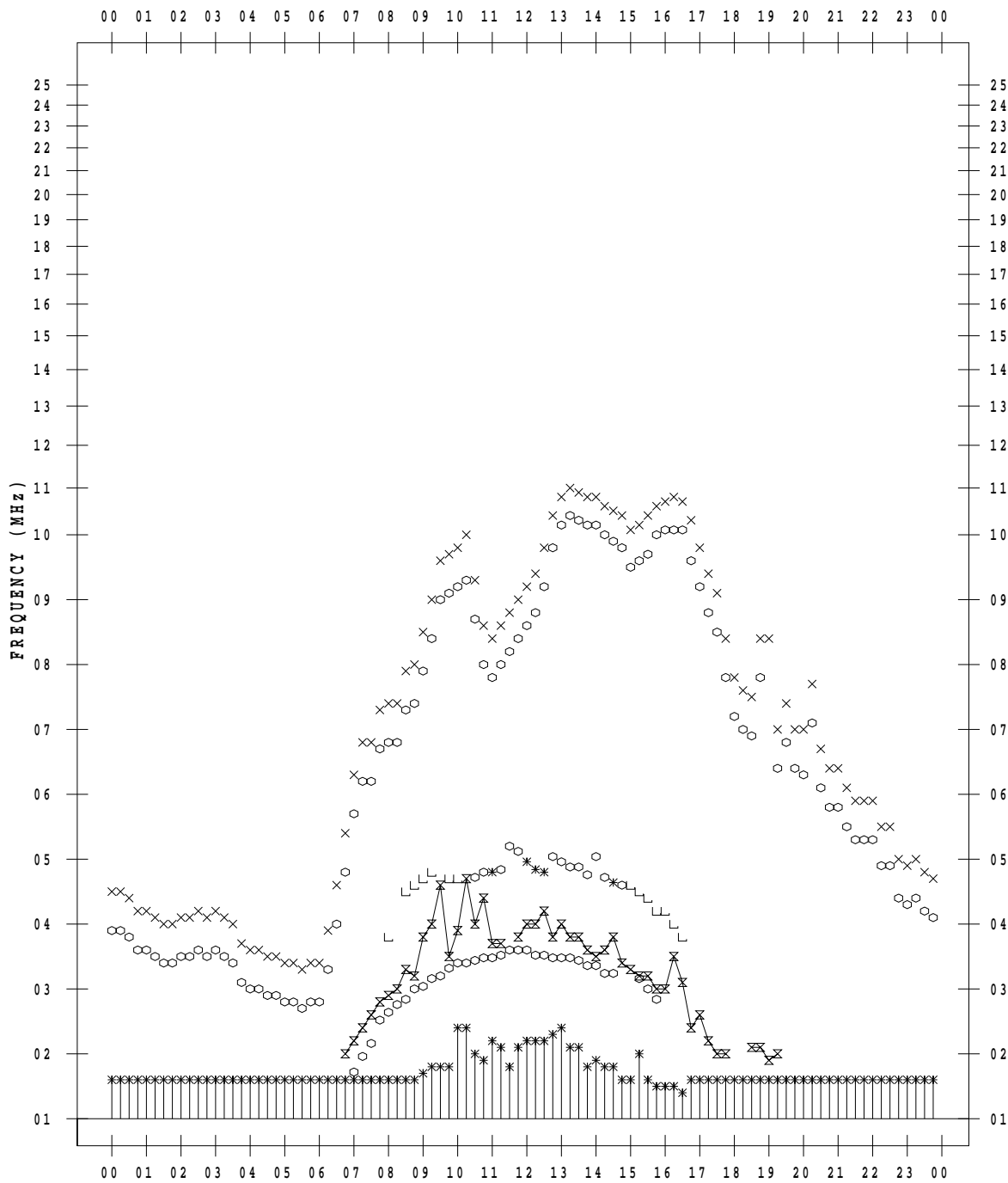
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/26

135 ° E MEAN TIME



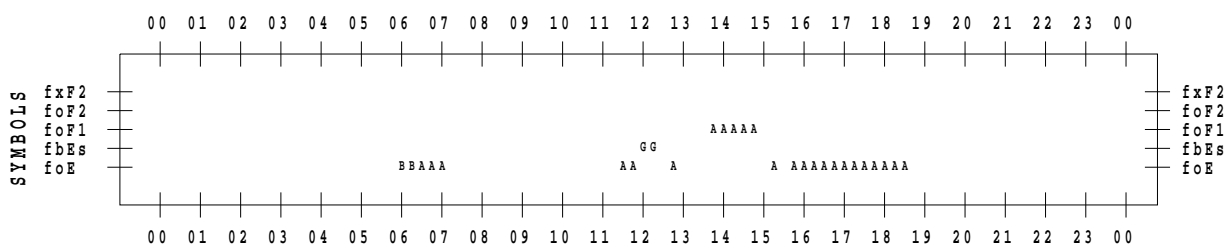
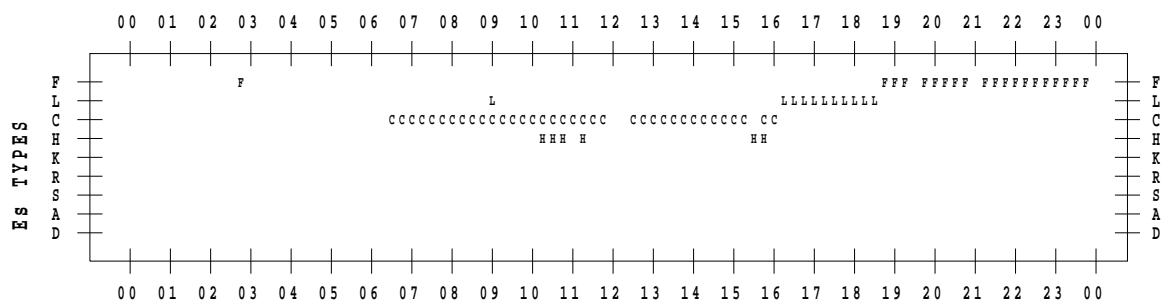
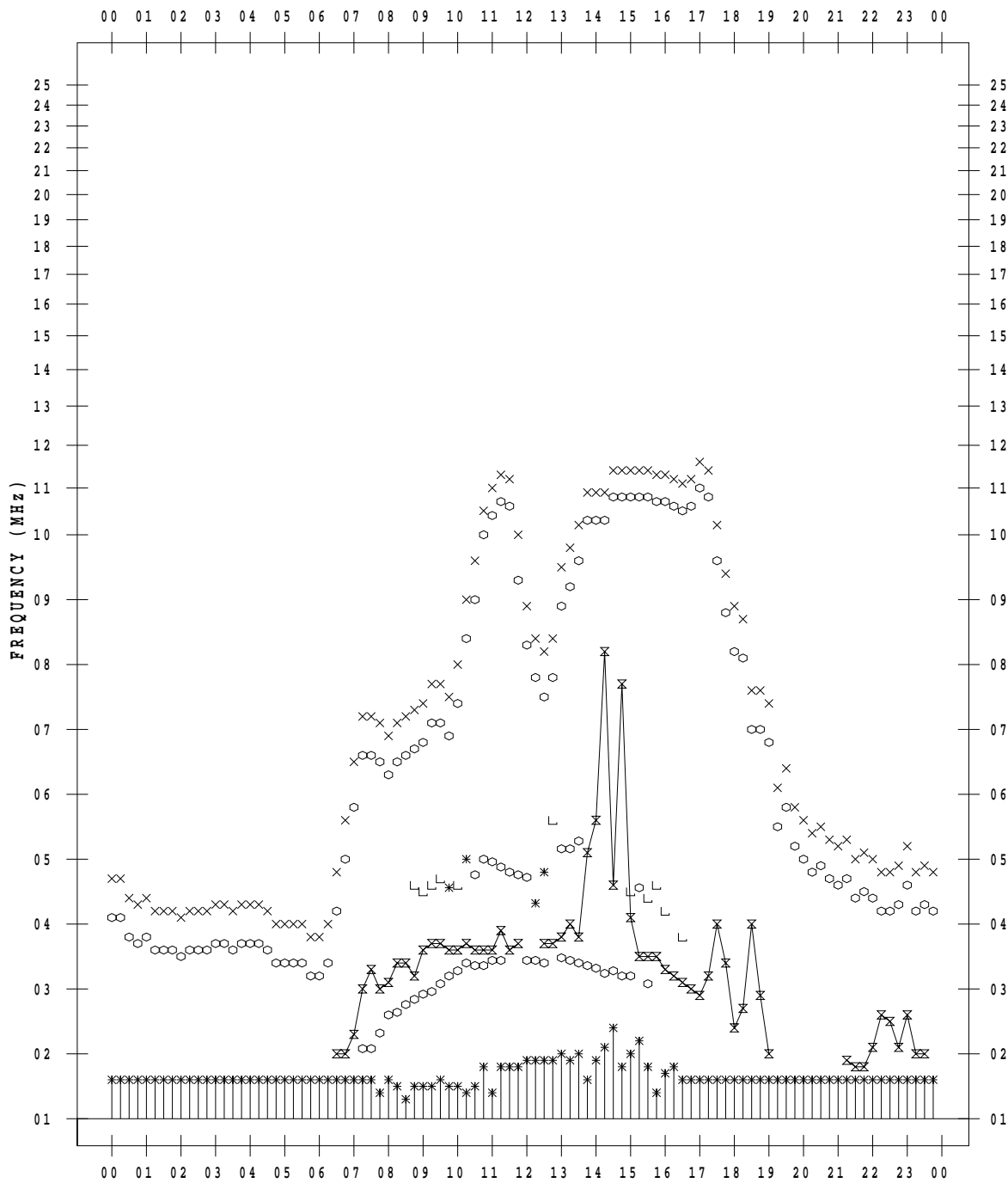
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/27

135 ° E MEAN TIME



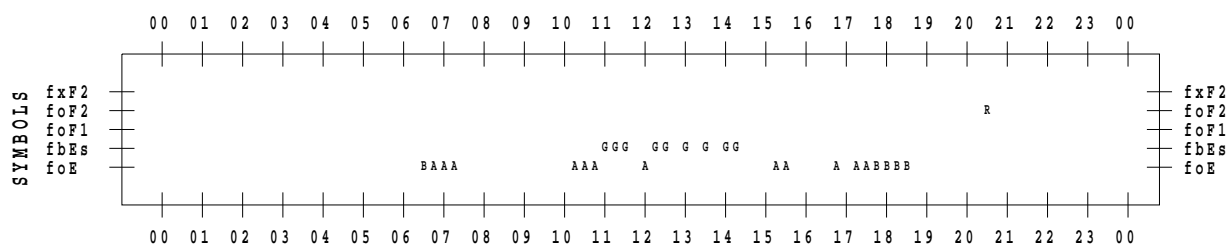
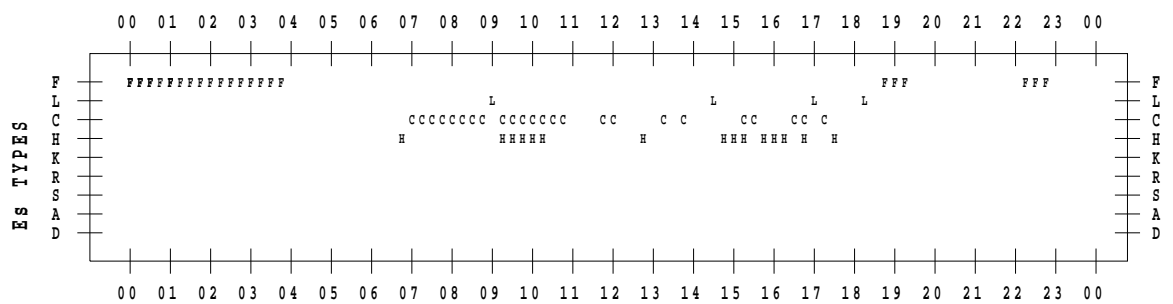
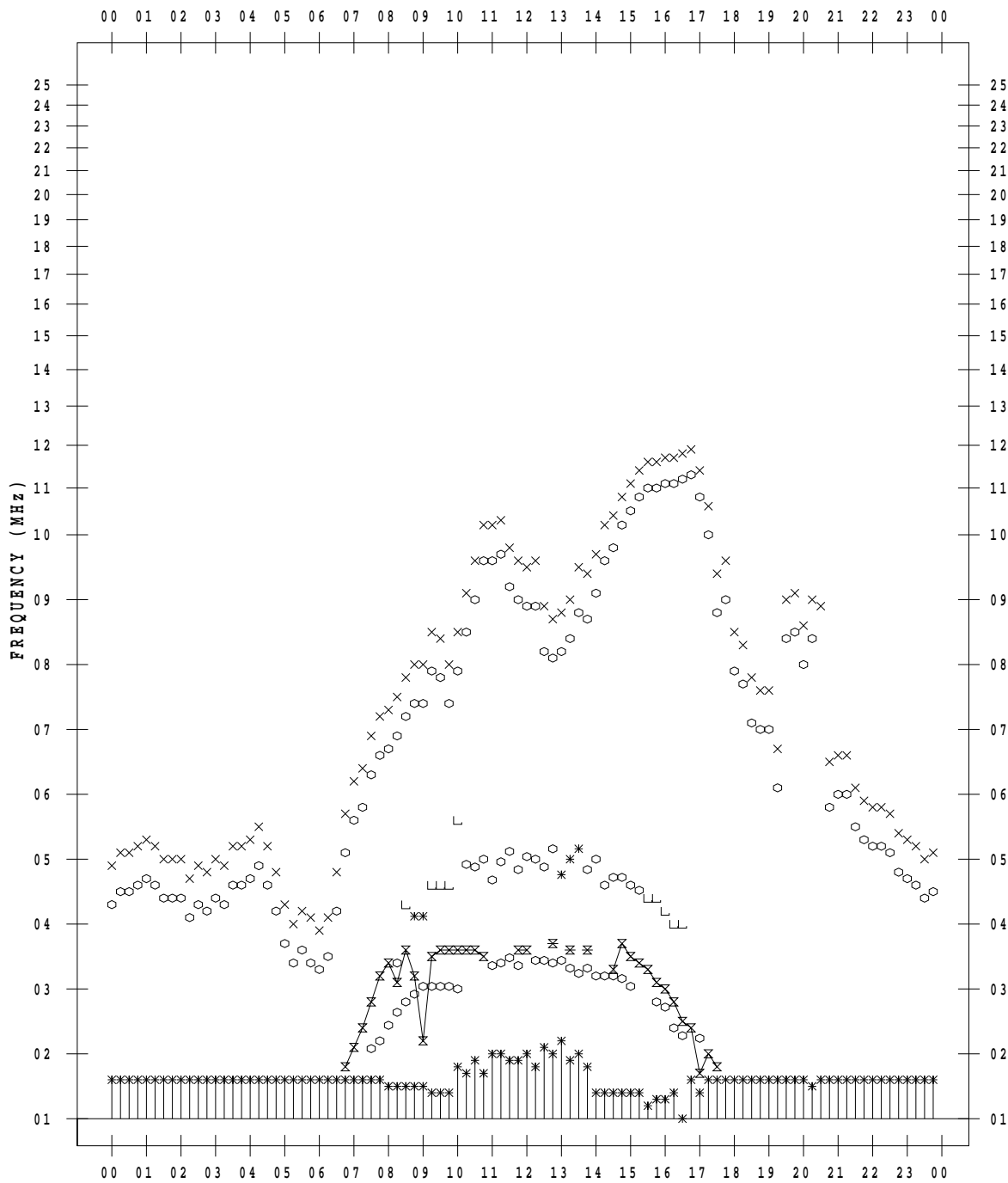
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/28

135 ° E MEAN TIME



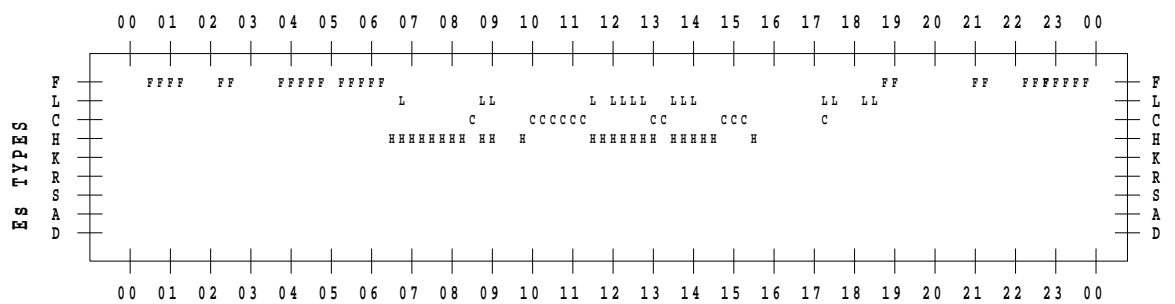
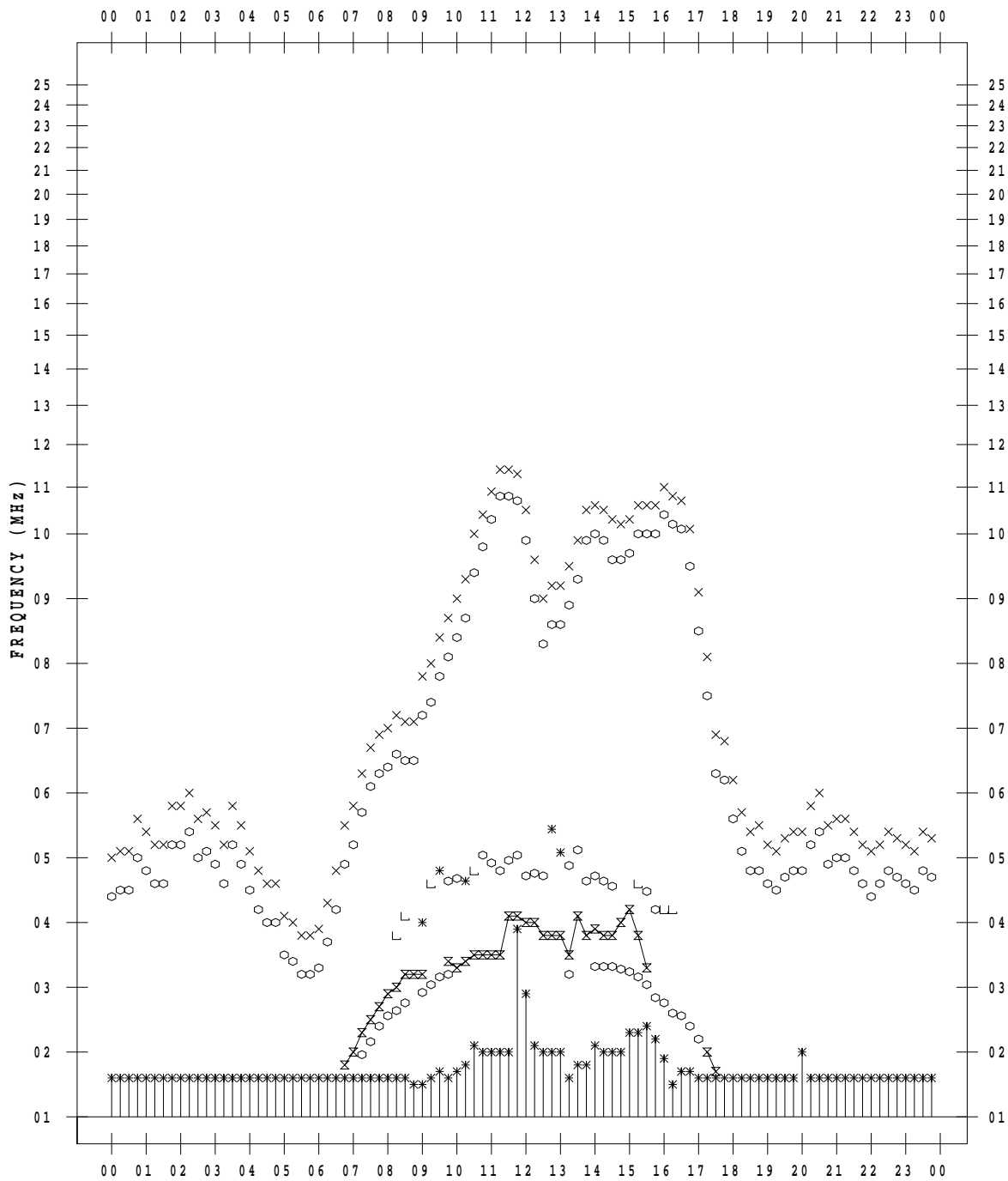
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/29

135 ° E MEAN TIME



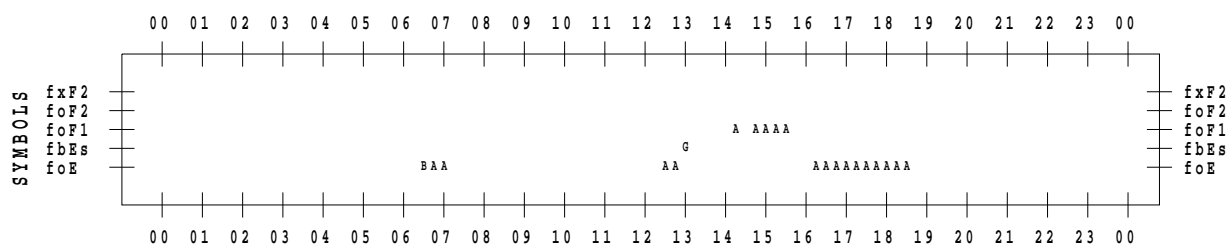
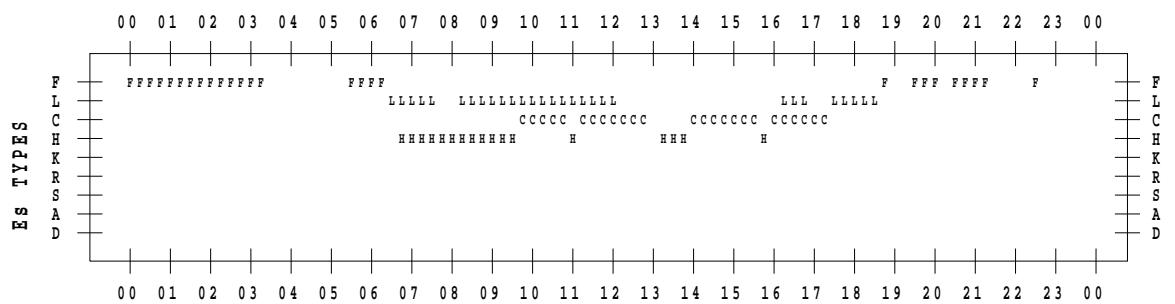
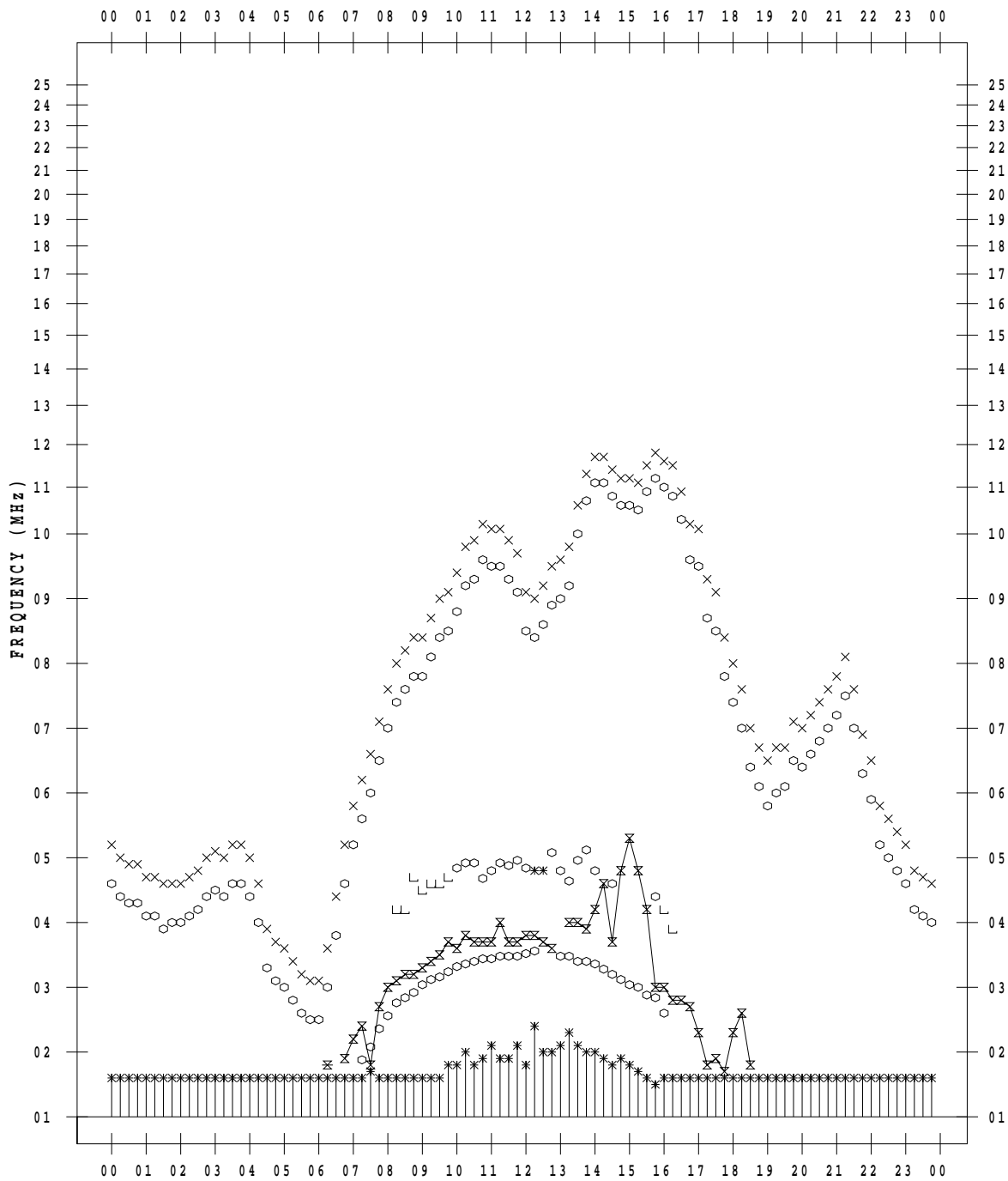
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/30

135 ° E MEAN TIME



# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/10/31

135 ° E MEAN TIME

