

# IONOSPHERIC DATA IN JAPAN

FOR March 2023

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NATIONAL INSTITUTE OF INFORMATION  
AND COMMUNICATIONS TECHNOLOGY  
TOKYO, JAPAN

# INTRODUCTION

This Series contains data on ionosphere obtained at the following stations under the National Institute of Information

and Communications Technology, Japan.

Stations	Geographic (WGS84)		Geomagnetic (IGRF-13 (2022))		Technical Method
	Latitude	Longitude	Latitude	Longitude	
*Wakkanai/Sarobetsu	45°10'N	141°45'E	37.1°N	149.9°W	Vertical Sounding
Kokubunji	35°43'N	139°29'E	27.5°N	150.8°W	Vertical Sounding
Yamagawa	31°12'N	130°37'E	22.4°N	158.5°W	Vertical Sounding
Okinawa	26°41'N	128°09'E	17.8°N	160.5°W	Vertical Sounding

\*We moved the observation facilities at Wakkanai to Sarobetsu in 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.

### 1. 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></b> <b><math>h'F</math></b>	Minimum virtual height on the ordinary wave for the <b><math>Es</math></b> and <b><math>F</math></b> layers, respectively

#### b. Descriptive Letters

The following descriptive letters are used in the tables.

- A Impossible measurement because of the presence of a lower thin layer, for example  $Es$  ( for  $foF2$  ).
- C Impossible measurement because of any failure in observation.
- G Impossible automatic scaling because of very small ionization density of the layer ( for  $fEs$  ).
- N Impossible automatic scaling because of complex echoes.
- Blank No digital record because of problems occurring in the automatic data processing system, but existence of film record.

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

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

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

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

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

#### d. Reliability of Automatic Scaling

The results of the comparison between automatically-scaled values and manually-scaled ones showed that hourly values of  $foF2$ ,  $fEs$  and  $fmin$  were scaled within a difference of 1 MHz from about 90, 90 and 99%, respectively of the test ionograms.

#### e. Summary Plot

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

### 2. 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></b> <b><math>foF1</math></b> <b><math>foE</math></b> <b><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></b> <b><math>M(3000)F1</math></b>	Maximum usable frequency factor for a path of 3000 km for transmission by the <b><math>F2</math></b> and <b><math>F1</math></b> layers, respectively
<b><math>h'F2</math></b> <b><math>h'F</math></b> <b><math>h'E</math></b> <b><math>h'Es</math></b>	Minimum virtual height on the ordinary wave for the <b><math>F2</math></b> , whole <b><math>F</math></b> , <b><math>E</math></b> and <b><math>Es</math></b> layers, respectively
<b>Types of <math>Es</math></b>	See below b. (iii)

#### b. Symbols

## (i) Descriptive Letters

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

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

## (ii) Qualifying Letters

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

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

**M** Mode interpretation uncertain.

**O** Extraordinary component characteristic deduced from the ordinary component. ( Used for x-characteristics only.)

**T** Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.

**U** Uncertain or doubtful numerical value.

**Z** Measurement deduced from the third magneto-electronic component.

(iii) Description of Types of *Es*

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

The types are:

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

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

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

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

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



HOURLY VALUES OF fof2                      AT Wakkanai

MAR. 2023

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	41	43	41	44	42	36	40	67	80	91	103	108	108	106	103	102	100	88	71	61	51	47	45	41
2	43	44	44	45	47	49	59	81	95	97	104	117	112	121	113	110	101	101	94	68	60	52	52	51
3	49	49	45	48	49	49	65	77	83	110	108	120	118	121	119	112	101	100	84	79	69	67	66	63
4	63	66	61	63	57	52	54	74	109	127	120	124	121	117	108	113	103	101	94	A	75	67	58	54
5	53	55	59	59	51	53	62	86	98	112	126	123	136	121	119	109	113	106	94	73	71	64	62	60
6	58	52	57	53	52	45	53	83	102	108	116	113	116	112	107	101	102	99	86	73	70	68	64	58
7	57	52	51	52	55	48	67	102	116	105	113	121	136	133	113	116	106	100	96	82	73	71	69	63
8	63	61	60	60	56	58	75	101	110	136	125	126	125	118	112	111	108	106	107	88	67	66	67	65
9	62	58	57	55	54	53	75	113	118	123	123	129	136	121	122	123	119	103	106	90	76	73	65	60
10	61	58	58	57	61	51	77	99	127	127	125	135	129	139	117	103	113	108	101	95	83	75	65	58
11	55	54	53	52	52	54	71	94	111	115	113	121	131	122	119	123	115	104	98	82	75	75	68	66
12	65	63	61	57	56	51	67	94	117	125	113	121	120	119	126	110	105	110	92	76	76	73	75	N 73
13	62	61	60	63	61	59	74	97	103	102	118	122	118	115	112	110	109	103	99	83	75	71	65	63
14	60	60	59	58	36	55	75	91	113	119	118	122	115	122	115	118	112	107	103	81	84	77	68	71
15	70	70	66	66	56	55	73	96	118	122	135	111	126	120	123	112	107	106	101	83	75	67	64	67
16	65	63	61	62	60	57	71	106	118	124	132	135	116	121	104	109	105	100	96	79	68	66	59	59
17	58	58	57	57	57	53	69	86	90	109	113	111	118	115	108	103	105	107	101	85	73	62	58	55
18	53	59	57	51	52	53	69	85	96	106	113	122	117	113	109	107	103	104	101	81	66	65	55	55
19	57	58	51	51	41	40	64	89	100	106	101	111	99	108	116	102	103	105	97	75	65	63	64	61
20	59	59	59	57	54	56	77	93	106	108	114	111	127	125	116	109	102	99	90	75	79	74	60	58
21	58	59	55	52	53	61	63	78	86	100	131	A	139	113	103	101	103	103	94	77	77	67	63	58
22	56	56	52	53	54	55	71	89	108	120	111	106	120	121	109	101	100	102	101	75	66	63	64	61
23	61	55	55	53	51	53	74	89	104	112	116	110	111	114	107	103	97	90	85	69	69	61	56	51
24	44	43	36	40	38	32	31	38	41	42	45	A	A	47	64	69	66	65	65	51	52	59	48	58
25	61	63	65	61	55	50	68	71	106	117	111	97	107	115	101	108	109	100	99	75	77	61	62	57
26	60	58	53	51	52	54	75	95	94	104	109	112	113	117	108	99	94	88	85	77	75	68	65	60
27	57	57	55	51	49	49	62	78	85	100	103	104	105	108	103	99	96	94	92	75	77	70	65	65
28	65	65	61	60	53	59	79	83	91	109	113	114	116	119	114	108	104	99	93	76	73	72	68	67
29	67	63	61	61	57	61	67	73	79	92	103	110	113	112	109	101	95	94	89	79	73	69	67	66
30	67	63	61	54	54	57	62	67	79	96	102	109	111	113	108	107	105	97	91	77	72	73	72	69
31	72	69	62	59	50	53	50	61	72	84	89	101	109	111	111	105	99	95	95	81	82	73	62	65
	00	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	29	30	31	31	31	31	31	31	30	31	31	31	31
MED	60	58	57	55	53	53	68	86	102	109	113	114	118	117	111	108	103	101	94	77	73	67	64	60
U Q	63	63	61	60	56	56	74	95	111	120	120	122	126	121	116	111	108	105	101	82	76	73	67	65
L Q	56	55	53	51	50	49	62	77	86	100	104	110	112	113	107	102	100	97	90	75	68	63	59	58

HOURLY VALUES OF fEs                      AT Wakkanai

MAR. 2023

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

$\frac{H}{D}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	G	G	G	G	G	G	G													G	G	G	G	G	
2	G	G	G	G	G	G	G	G														G	G	G	G
3	G	G	G	G	G	G	G																		G
4	27	G	G	G	G	G	G																		G
5	24	G	G	G	G	G	G																		G
6	G	G	G	31	G	26	G																		G
7	29	G	G	G	G	G	G																		G
8	G	G	G	G	G	G	G																		G
9	G	G	G	G	G	G	G																		G
10	G	G	G	G	G	G	G																		G
11	G	G	G	G	G	G	G																		G
12	G	G	G	G	G	G	G																		G
13	G	G	G	G	G	G	G																		G
14	G	G	G	G	G	G	G																		G
15	G	G	G	G	G	G	G																		G
16	G	G	G	G	G	G	G																		G
17	G	G	G	G	G	G	G																		G
18	G	G	G	G	G	G	G																		G
19	G	G	G	G	G	G	G																		G
20	G	G	G	G	G	G	G																		G
21	34	G	G	G	30	G	G																		G
22	G	G	G	G	G	G	G																		G
23	G	G	32	29	G	G	G																		G
24	G	G	G	G	G	G	G																		G
25	29	30	25	30	G	G	G																		G
26	G	G	29	25	G	G	G																		G
27	G	G	G	G	G	G	G																		G
28	G	G	G	G	G	G	G																		G
29	G	G	G	G	G	G	G																		G
30	G	G	G	G	G	G	G																		G
31	G	G	G	G	G	G	G																		G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	30	31	31	30	31	31	30	31	31	31	31	31	31	31	31	31	31	
MED	G	G	G	G	G	G	11	32	36	38	38	37	37	36	35	34	34	30	27	G	G	G	G	G	
U Q	G	G	G	G	G	G	28	34	38	40	49	49	48	38	39	39	36	35	32	29	25	G	G	G	
L Q	G	G	G	G	G	G	G	28	33	34	35	36	36	35	34	32	32	G	G	G	G	G	G	G	

HOURLY VALUES OF fmin AT Wakkanai

MAR. 2023

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	17	14	14	14	16	14	17	15	16	15	15	16	16	17	15	13	13	17	15	17	14	14	15	16
2	14	14	14	15	14	14	14	15	15	17	18	17	15	15	15	15	15	20	16	14	14	14	14	14
3	14	14	15	14	15	14	17	14	16	16	16	18	19	19	16	16	13	14	16	16	16	16	16	15
4	16	15	16	14	14	14	15	15	15	15	15	15	17	14	15	14	15	15	15	15	14	15	15	14
5	17	14	15	14	16	15	16	15	14	15	15	16	33	19	17	15	16	21	14	16	16	17	16	16
6	15	17	14	17	14	15	16	16	16	14	18	16	20	16	15	15	15	15	15	15	16	17	16	16
7	15	16	14	15	14	14	17	15	15	14	17	15	15	17	17	15	16	15	16	15	14	14	14	14
8	16	16	16	15	14	17	16	16	14	15	17	16	17	17	16	16	16	15	14	15	16	15	16	16
9	15	15	14	14	14	14	17	15	14	15	16	16	17	15	17	16	16	14	14	16	16	15	15	15
10	16	20	14	16	16	14	15	16	15	15	17	17	17	15	17	16	17	16	14	15	17	14	16	15
11	15	15	14	15	15	14	18	17	17	16	18	20	17	16	17	17	16	14	16	16	16	14	15	14
12	15	14	16	14	14	16	18	15	15	17	17	17	18	18	16	15	16	16	15	15	16	16	15	15
13	14	14	14	14	14	14	14	15	17	16	17	17	17	15	17	15	15	14	16	17	15	16	16	15
14	15	14	14	14	17	14	18	17	16	15	17	19	17	17	16	16	16	15	16	15	14	16	16	16
15	15	16	16	16	15	14	18	17	17	17	17	17	17	17	16	15	14	14	16	16	15	14	14	14
16	16	16	14	14	14	14	18	15	13	15	15	17	16	16	17	16	14	14	14	16	16	16	14	14
17	14	14	14	14	14	14	15	16	16	14	15	17	15	16	15	16	15	15	14	14	14	14	14	14
18	14	17	14	14	15	14	20	16	15	15	17	17	17	16	15	14	13	15	15	17	14	14	14	14
19	14	15	16	16	14	14	14	15	14	15	15	18	15	17	15	15	17	13	17	14	14	15	14	15
20	15	14	14	14	14	14	14	16	15	14	17	19	18	18	17	14	16	15	15	16	14	15	14	16
21	16	16	14	14	17	14	20	17	15	16	16	17	18	15	15	14	15	16	15	16	15	17	14	16
22	15	14	14	15	14	14	56	16	16	17	15	17	18	17	16	14	16	16	16	14	18	16	15	14
23	14	16	16	16	16	15	16	15	15	16	14	17	15	19	15	16	14	14	16	18	17	14	14	14
24	14	20	15	27	14	14	15	16	14	15	16	16	17	17	17	16	15	15	15	16	15	14	14	16
25	16	16	16	15	15	15	16	15	15	15	15	17	17	15	14	15	14	14	15	14	16	14	14	15
26	15	15	16	16	15	14	17	15	15	15	15	16	19	16	15	15	15	14	15	16	16	15	16	14
27	14	15	14	15	15	14	14	16	16	17	17	18	19	17	16	16	15	15	15	16	16	15	14	14
28	14	17	14	15	14	14	15	16	15	15	17	20	20	18	17	15	16	15	16	15	14	14	14	14
29	14	14	18	14	14	14	17	16	15	15	18	21	29	22	17	15	14	15	15	16	16	15	14	14
30	15	14	15	14	14	15	15	17	15	20	15	17	21	15	15	15	16	13	15	16	15	15	15	15
31	14	15	15	14	16	14	15	16	15	14	15	20	19	18	16	14	16	13	15	15	15	16	14	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	15	14	14	14	14	16	16	15	15	16	17	17	17	16	15	15	15	15	16	15	15	14	15
U Q	16	16	16	15	15	14	18	16	16	16	17	18	19	18	17	16	16	15	16	16	16	16	16	16
L Q	14	14	14	14	14	14	15	15	15	15	15	16	17	15	15	15	14	14	15	15	14	14	14	14

HOURLY VALUES OF fof2                      AT Kokubunji

MAR. 2023

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	A	42	40	43	42	39	48	75	95	92	97	112	129	129	121	115	105	101	85	64	59	55	50	53
2	53	50	49	49	52	50	55	85	93	103	114	120	129	118	117	124	114	108	95	81	71	66	58	54
3	54	55	54	55	50	48	54	83	110	109	115	108	114	121	123	114	103	97	95	85	163	71	67	59
4	59	59	59	61	57	56	70	96	126	136	117	121	137	139	123	120	112	103	99	86	83	73	59	56
5	56	57	57	55	54	55	65	95	111	117	129	139	247	135	132	129	121	119	112	91	81	81	69	60
6	59	59	59	59	59	59	76	107	125	115	116	124	131	122	117	108	108	107	103	86	84	73	70	71
7	69	59	58	59	60	59	69	95	129	121	117	132	137	136	131	124	116	117	109	90	86	80	72	71
8	64	59	60	58	56	55	71	110	120	119	128	127	135	127	122	120	117	114	105	91	81	73	70	70
9	71	70	65	59	57	56	71	109	117	121	127	149	152	143	133	133	127	115	106	93	84	80	72	64
10	60	65	59	59	57	56	70	112	128	125	127	132	128	128	123	115	112	117	104	95	94	76	65	64
11	59	59	57	56	58	57	73	102	111	120	130	135	131	132	133	128	124	117	105	93	87	82	82	80
12	75	71	70	70	59	54	67	91	111	111	125	124	123	120	117	115	109	107	110	83	163	81	81	83
13	70	60	65	64	60	55	69	89	106	109	113	124	125	123	125	206	117	121	113	87	79	77	73	70
14	66	64	64	64	59	56	71	96	112	104	114	121	130	132	126	127	127	124	112	91	89	92	81	79
15	91	86	84	177	62	59	76	102	115	111	115	121	124	125	116	117	112	120	112	84	73	71	72	73
16	78	68	65	64	63	59	75	151	105	117	127	141	133	128	129	124	111	107	101	81	70	68	65	60
17	60	60	59	60	58	57	72	95	104	100	111	126	126	126	122	120	117	121	116	94	59	64	66	59
18	59	59	66	59	45	45	67	88	88	93	111	120	129	128	117	113	117	116	115	87	59	65	60	59
19	59	65	67	56	44	40	59	89	108	101	103	124	136	124	117	121	113	115	113	83	59	66	66	68
20	60	59	59	58	56	54	71	99	112	117	114	120	136	137	128	120	113	119	114	89	71	73	72	69
21	59	68	59	59	63	67	85	99	104	109	122	129	137	138	120	107	106	113	115	94	69	72	73	66
22	63	59	59	59	60	61	75	93	109	115	121	124	126	123	121	111	111	117	115	93	71	73	69	69
23	65	64	59	59	55	59	82	93	109	112	118	128	127	124	117	107	107	105	97	77	71	71	71	60
24	60	59	49	50	50	39	39	36	57	65		66	71	81	82	93	87	77	72	63	59	59	59	59
25	59	59	67	58	50	35	68	89	100	116	119	121	116	118	121	109	115	125	127	105	72	77	72	72
26	68	73	71	65	69	71	91	110	108	110	115	125	127	122	122	119	114	116	117	91	71	75	73	71
27	68	67	64	61	56	55	72	91	94	220	109	124	121	123	124	121	109	104	101	88	71	69	66	69
28	69	67	65	61	59	53	72	94	100	110	115	121	133	135	133	127	116	112	109	87	69	73	81	73
29	72	68	65	59	63	65	82	213	97	104	117	130	130	129	124	115	105	108	110	88	73	73	A	73
30	70	72	70	67	64	65	87	98	100	110	117	130	136	138	131	123	225	113	108	80	78	75	77	73
31	78	80	70	69	66	64	73	83	95	109	121	130	133	134	129	127	115	116	110	97	73	69	69	69
	00	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	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	30	31
MED	64	60	60	59	58	56	71	95	108	111	117	124	130	128	123	120	113	115	109	88	73	73	70	69
U Q	70	68	66	64	60	59	75	102	112	117	122	130	136	135	129	124	117	117	113	93	84	77	73	72
L Q	59	59	59	58	54	53	67	89	100	104	114	121	126	123	117	114	109	107	101	83	70	69	66	60



HOURLY VALUES OF fEs AT Kokubunji

MAR. 2023

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	39	G	39	41	32	G	G	G	G	39	G	G	G	50	33	49	56	50	40	G	G	G	G	G
2	G	G	G	G	G	G	G	30	32	36	31	G	G	G	40	39	40	42	42	G	G	G	G	G
3	G	G	G	G	G	G	G	G	33	36	39	G	G	41	54	51	55	60	31	G	27	36	59	G
4	G	33	G	G	27	G	G	23	G	33	31	G	G	G	38	45	39	39	36	G	G	G	G	G
5	51	34	32	G	G	G	G	G	31	34	38	39	G	39	37	47	47	G	G	G	G	45	G	G
6	G	24	26	39	33	G	G	25	39	47	37	39	G	G	G	G	30	31	25	G	G	G	G	G
7	G	G	G	G	G	G	G	33	38	41	51	36	G	39	51	34	37	G	G	G	G	G	G	G
8	G	G	G	G	G	G	G	31	35	35	36	34	63	37	37	36	41	N 29	G	33	G	G	G	G
9	38	38	32	35	G	G	G	31	39	42	38	41	39	G	37	30	29	36	32	54	35	39	70	38
10	G	G	G	G	G	G	G	24	39	39	46	81	65	63	36	39	29	39	G	G	27	27	26	G
11	G	G	G	G	G	G	G	31	35	39	G	G	G	G	55	G	28	32	G	G	G	G	G	G
12	G	G	G	G	G	G	G	24	35	33	35	34	G	G	G	G	31	35	G	G	G	G	G	G
13	G	G	G	G	G	G	G	G	33	37	37	46	G	48	G	39	32	75	63	39	41	34	G	21
14	G	G	G	G	G	G	G	N 23	34	31	54	G	35	37	52	G	33	28	35	30	G	G	G	G
15	G	G	G	G	G	G	G	G	28	31	G	G	39	G	G	32	27	G	G	G	G	G	G	G
16	G	G	G	G	G	G	G	31	30	33	36	G	G	35	G	G	34	38	26	G	G	G	G	G
17	G	G	G	G	G	G	G	31	37	33	G	37	46	G	39	31	29	34	G	20	22	G	G	G
18	27	G	G	G	G	G	G	32	31	33	35	46	32	G	31	32	40	40	31	26	G	G	G	G
19	G	G	G	G	G	G	G	N 23	37	33	35	33	G	G	G	49	42	36	50	31	G	59	39	32
20	G	G	G	G	G	G	G	G	37	31	G	G	G	33	39	G	40	37	G	78	41	G	28	G
21	G	G	G	G	G	G	G	31	38	35	44	36	G	G	G	33	33	30	G	24	G	G	G	G
22	G	G	G	G	G	G	G	32	32	41	39	G	43	G	33	31	29	39	40	27	G	G	G	G
23	G	G	G	G	G	G	G	32	38	35	36	G	45	G	47	39	35	29	23	G	G	G	G	G
24	G	G	G	G	G	G	G	31	37	39	37	47	36	37	G	44	27	26	27	28	G	G	42	G
25	G	G	G	G	G	G	G	32	39	36	56	47	66	51	39	37	37	40	33	32	39	27	70	48
26	G	G	G	G	G	G	G	31	31	37	48	53	45	34	67	35	30	31	G	23	G	G	G	G
27	G	G	G	G	G	G	G	33	38	33	37	63	45	38	37	38	37	37	G	G	31	G	G	G
28	G	G	G	G	G	G	G	32	41	34	G	49	62	68	49	34	37	G	34	G	G	G	G	G
29	G	G	G	G	G	G	G	26	37	34	34	40	G	49	38	31	31	35	26	31	29	68	104	32
30	39	38	G	G	G	G	G	34	39	37	38	39	39	37	46	39	35	G	G	23	38	32	G	G
31	G	G	G	G	G	G	G	G	37	38	48	53	48	39	38	40	30	37	G	29	32	59	59	59
	00	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	G	G	G	G	G	G	G	31	37	35	37	36	32	35	37	35	34	35	25	G	G	G	G	G
U Q	G	G	G	G	G	G	G	32	38	39	39	46	45	39	46	39	40	39	34	30	29	32	28	G
L Q	G	G	G	G	G	G	G	23	32	33	31	G	G	G	G	31	30	29	G	G	G	G	G	G

HOURLY VALUES OF fmin AT Kokubunji

MAR. 2023

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	17	17	16	17	17	16	16	17	17	18	20	22	49	19	19	15	17	17	17	16	16	16	16	16
2	16	16	16	17	16	16	17	16	19	20	24	18	27	23	29	22	15	17	19	16	17	17	17	16
3	16	17	17	14	16	16	16	17	17	20	23	21	48	28	29	20	16	17	17	17	17	17	17	16
4	16	17	16	16	16	16	18	17	19	19	23	53	46	21	24	19	21	21	17	16	16	16	16	16
5	17	17	15	16	16	16	18	17	17	18	21	30	49	33	24	18	16	16	16	12	16	17	16	16
6	16	17	17	17	15	16	17	17	18	19	21	28	53	49	30	23	20	17	17	16	16	16	16	16
7	17	15	17	16	17	16	17	16	17	18	20	21	23	33	23	24	17	17	17	16	16	16	16	16
8	16	16	16	15	16	16	18	17	17	19	19	21	57	23	32	19	18	18	17	16	16	16	16	16
9	17	16	15	16	16	17	19	17	17	19	24	21	27	23	22	17	18	15	17	17	17	17	17	17
10	16	16	16	16	16	16	19	17	21	19	26	27	29	30	23	26	23	18	17	16	16	16	17	16
11	16	16	16	17	16	16	17	15	19	19	23	23	26	19	17	24	19	17	17	17	17	16	17	16
12	16	16	16	16	16	16	19	17	17	20	22	23	21	47	30	26	22	17	19	16	16	17	16	17
13	17	16	16	16	16	16	19	16	17	19	23	29	46	21	45	20	19	15	17	16	17	16	17	16
14	16	16	16	16	16	16	20	17	16	21	48	45	29	30	29	28	17	16	15	16	17	16	16	16
15	17	16	16	16	16	16	19	16	17	20	20	28	25	23	20	19	17	17	15	16	16	16	16	16
16	16	16	16	16	16	16	17	17	19	21	22	25	50	21	23	18	17	15	15	17	16	16	17	16
17	16	16	16	16	16	16	17	17	17	18	23	23	24	23	19	17	17	17	16	16	16	16	17	16
18	17	17	16	16	16	16	19	16	17	18	22	23	23	45	23	18	16	17	17	15	16	16	16	16
19	16	16	16	16	16	16	16	16	16	21	24	31	25	47	45	19	17	16	15	17	16	16	17	16
20	16	16	16	15	17	16	17	17	21	25	25	47	51	25	20	27	16	16	16	16	17	16	16	16
21	16	16	16	17	17	16	15	17	18	22	23	23	29	50	27	18	17	17	15	15	16	17	16	17
22	16	16	16	16	17	16	16	17	19	21	26	23	32	48	23	18	19	17	15	16	16	17	16	16
23	17	16	18	16	16	17	17	17	19	23	25	27	25	23	23	19	16	16	18	16	16	16	16	16
24	17	17	16	16	15	16	17	17	17	19	21	21	28	21	21	18	19	17	17	17	16	16	17	16
25	17	17	17	16	17	16	21	16	17	21	33	24	25	25	22	21	17	17	17	16	17	16	17	16
26	16	16	16	16	16	17	17	17	19	20	20	47	26	25	21	18	15	15	17	16	16	17	16	17
27	16	16	17	17	16	16	19	16	18	20	27	26	28	25	21	19	20	15	17	16	17	16	15	17
28	16	16	16	17	17	16	18	17	19	21	48	31	34	29	23	20	17	17	16	17	17	17	17	17
29	17	16	16	15	16	17	18	17	18	21	27	23	53	32	27	21	19	17	16	17	17	16	17	17
30	17	17	16	16	16	16	19	17	18	27	27	29	35	33	26	21	20	17	17	17	17	17	16	17
31	17	16	16	16	16	16	17	17	18	19	28	30	36	31	29	27	19	16	17	16	17	17	17	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	17	17	18	20	23	25	29	25	23	19	17	17	17	16	16	16	16	16
U Q	17	17	16	16	16	16	19	17	19	21	26	30	48	33	29	23	19	17	17	17	17	17	17	17
L Q	16	16	16	16	16	16	17	16	17	19	21	23	25	23	21	18	17	16	16	16	16	16	16	16

HOURLY VALUES OF fof2                      AT Yamagawa

MAR. 2023

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	56	49	51	45	43	35	35	67	98	97	99	114	147	153	133	132	125	120	111	97	77	69	64	68
2	69	64	55	53	53	51	43	74	87	109	118	125	136	131	143	138	131	111	116	101	93	96	83	59
3	61	63	61	57	55	A	41	67	99	110	120	105	114	125	128	113	109	100	107	98	88	83	71	72
4	70	64	61	57	49	47	50	85	138	113	111	111	153	153	144	137	129	142	127	141	120	109	109	72
5	68	67	65	56	52	49	49	80	99	109	121	144	127	142	149	144	137	141	130	94	102	100	81	67
6	66	63	62	66	60	61	64	100	119	99	109	121	137	148	132	127	122	120	124	106	98	95	81	82
7	77	58	55	57	56	56	53	79	115	109	119	145	127	152	145	149	133	124	132	119	97	97	92	74
8	72	63	62	61	49	45	52	93	117	116	117	125	145	137	132	134	124	117	121	99	97	87	76	78
9	80	76	71	62	55	52	46	84	103	120	135	162	177	145	167	169	104	128	127	104	97	88	84	A
10	69	70	75	A	54	53	53	87	121	117	135	144	152	149	146	131	121	129	121	109	99	91	81	75
11	76	69	66	70	61	63	63	84	102	121	138	156	160	158	158	145	136	130	127	119	102	99	97	97
12	97	81	75	71	57	48	49	81	97	105	110	124	134	131	120	117	115	113	107	101	89	96	92	87
13	77	64	62	67	63	59	42	71	97	109	117	104	123	134	131	129	123	127	119	110	97	89	88	84
14	79	77	70	70	61	54	51	83	108	103	115	124	141	142	151	142	149	143	120	113	117	105	99	95
15	97	91	86	71	64	62	61	97	102	105	109	119	122	124	121	113	114	118	122	99	85	73	77	84
16	89	65	63	65	62	60	61	81	95	112	121	144	138	137	138	138	125	117	107	104	87	77	79	76
17	75	69	66	71	65	55	51	79	98	108	105	129	122	137	136	143	136	138	144	106	80	73	81	79
18	70	69	77	79	47	39	42	79	93	107	103	125	135	142	134	128	126	145	123	112	83	75	83	74
19	79	75	76	60	43	33	35	79	97	105	106	124	150	163	158	158	137	125	99	117	94	79	83	87
20	87	80	67	65	55	49	51	91	117	110	97	111	134	138	137	130	125	128	137	123	84	89	97	90
21	80	90	82	65	64	61	57	80	97	109	105	125	143	150	137	125	121	125	119	115	79	80	83	81
22	78	71	69	64	65	54	58	85	99	108	109	117	132	138	136	130	124	131	132	121	92	75	81	74
23	72	67	63	64	55	53	62	83	96	115	109	127	149	155	141	125	118	117	108	99	81	92	95	83
24	84	77	62	65	65	43	35	34	65	63	51	69	80	90	A	90	90	78	82	68	61	52	57	57
25	57	59	61	60	44	39	44	77	100	111	120	134	130	148	123	121	117	136	113	116	81	83	78	69
26	66	73	69	69	68	70	77	97	98	101	111	122	136	134	132	146	141	135	125	139	98	85	83	83
27	79	73	72	68	52	52	55	81	97	95	100	119	130	138	140	134	123	117	117	107	80	74	79	73
28	82	77	76	75	58	50	56	83	103	108	114	117	138	156	146	134	131	132	127	113	84	84	87	85
29	85	87	78	70	62	59	69	90	103	109	120	127	136	140	135	128	121	118	118	102	80	81	82	81
30	77	73	71	64	63	58	71	96	104	102	114	128	143	161	161	137	132	127	117	98	94	93	92	91
31	85	88	79	79	73	58	70	91	103	101	113	131	141	147	138	141	137	128	133	115	80	67	77	74
	00	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	30	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	30
MED	77	70	67	65	57	53	52	83	99	109	113	125	136	142	138	134	125	127	121	107	89	85	83	78
U Q	82	77	75	70	63	59	61	90	104	111	120	131	145	152	146	142	133	132	127	116	97	95	92	84
L Q	69	64	62	60	52	48	44	79	97	103	106	117	130	137	132	127	121	117	113	99	81	75	79	73

HOURLY VALUES OF fEs AT Yamagawa

MAR. 2023

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	27	G	33	56	34	50	51	53	54	52	47	60	58	28	G	G	G	G
2	G	G	G	G	G	G	G	G	32	55	41	40	54	46	50	46	46	40	G	22	G	G	29	G
3	G	G	G	G	G	39	G	48	31	36	43	53	43	53	61	55	67	44	30	25	25	25	G	40
4	35	33	G	G	G	G	G	G	34	36	40	36	36	37	45	46	44	37	G	G	G	G	G	G
5	28	G	G	G	G	G	G		36	40	46	44	G	45	47	43	40	33	G	G	G	G	G	54
6	24	G	G	G	26	23	G	G	34	40	43	52	G	43	37	37	41	35	23	G	G	G	G	G
7	G	G	24	40	35	26	G	27	38	40	40	52	54	69	45	44	41	34	31	36	G	G	G	G
8	G	G	G	G	G	G	G	G	50	40	43	33	54	51	35	42	58	34	G	31	G	30	G	G
9	G	G	G	G	G	G	G	G	34	40	61	49	52	45	43	41	38	35	41	35	31	30	33	90
10	36	29	35	69	53	39	G	G	34	44	41	46	43	40	43	43	N	34	29	G	G	G	G	G
11	G	G	G	G	G	G	G	G	34	43	40	60	56	35	42	40	47	45	43	27	G	G	G	G
12	G	G	G	G	G	G	G	30	33	38	41	36	35	51	53	50	40	33	37	G	G	G	G	G
13	G	G	G	G	G	G	G	40	34	36	40	44	54	59	56	41	38	36	32	30	60	41	29	G
14	25	26	G	G	G	G	G	G	32	36	42	46	47	44	N	48	44	42	38	26	G	G	G	G
15	G	G	G	G	G	G	G	G	34	36	34	33	36	33	34	36	38	38	32	G	G	G	G	G
16	G	G	G	G	G	G	G	G	33	40	50	43	49	44	33	40	39	48	30	29	21	G	G	G
17	G	G	G	G	G	33	G	G	34	39	42	55	N	39	46	41	32	82	24	38	21	G	G	G
18	G	G	G	G	11	G	G	28	34	36	41	36	56	N	34	41	38	34	38	49	53	G	G	G
19	G	G	G	G	G	G	G	32	35	40	42	44	46	50	42	36	38	42	36	34	24	31	157	30
20	28	G	G	G	G	G	G	32	34	70	40	G	47	44	53	52	50	80	32	28	28	G	G	G
21	G	G	G	G	G	G	G	31	36	40	44	53	46	38	35	40	38	32	42	31	11	G	G	G
22	G	G	G	G	G	G	G	G	36	41	44	46	48	46	50	38	38	53	40	40	38	38	32	G
23	G	G	G	G	G	G	G	49	35	43	46	44	45	44	52	36	40	48	32	32	28	G	G	G
24	G	G	G	G	G	G	G	133	32	40	40	46	54	55	95	71	51	31	29	G	24	28	26	35
25	G	24	G	G	G	G	G	31	36	40	44	44	60	41	45	34	42	45	42	31	32	34	24	46
26	45	29	45	G	G	G	G	G	36	41	42	60	55	36	54	38	39	49	39	24	11	G	G	G
27	G	G	G	G	G	G	G	50	36	40	43	48	40	54	59	78	54	36	33	36	38	29	G	29
28	G	G	G	G	G	G	G	52	36	40	45	46	58	44	50	44	41	38	35	G	G	G	G	G
29	G	G	G	G	G	G	G	28	38	41	45	44	G	38	36	34	40	37	39	32	G	G	30	41
30	33	28	G	G	G	G	24	34	37	43	46	47	52	51	43	34	69	47	39	38	27	G	28	G
31	G	G	G	G	G	G	G	23	36	41	43	38	38	42	35	34	46	42	42	54	24	28	26	69
	00	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	31	31	31	30	30	30	31	30	31	31	31	31	31	31	31
MED	G	G	G	G	G	G	G	25	34	40	42	46	48	44	45	41	41	38	33	29	11	G	G	G
U Q	24	G	G	G	G	G	G	32	36	41	44	50	54	51	53	46	47	47	39	35	28	28	26	30
L Q	G	G	G	G	G	G	G	G	34	39	40	40	40	40	37	37	38	34	29	G	G	G	G	G

HOURLY VALUES OF fmin AT Yamagawa

MAR. 2023

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	15	15	14	15	15	17	16	16	15	17	18	24	17	17	16	19	15	15	15	15	16	14	15
2	14	14	14	14	14	15	14	20	15	17	17	17	19	18	21	16	15	15	15	15	14	15	15	15
3	15	15	14	16	14	15	14	21	15	16	17	18	19	19	19	17	16	15	15	16	16	16	16	15
4	15	16	15	14	14	15	14	20	15	15	17	17	18	17	20	18	17	14	21	14	14	15	14	15
5	16	15	15	15	15	15	16	16	16	15	19	20	40	21	21	21	15	16	20	15	16	15	17	15
6	16	15	15	16	16	16	14	15	17	15	17	20	18	23	17	19	17	15	14	15	14	15	15	15
7	15	14	16	15	16	16	15	16	15	15	17	17	20	21	18	16	17	17	15	15	15	16	14	15
8	14	14	16	17	16	15	15	15	14	15	17	17	20	19	19	16	17	15	16	15	16	16	15	15
9	15	15	15	16	16	14	15	15	14	15	17	17	19	20	15	17	16	17	14	15	15	16	16	16
10	15	16	15	15	14	15	16	15	16	17	19	22	18	21	20	16	19	15	15	15	14	15	14	14
11	14	14	15	16	15	14	14	15	16	16	19	16	19	19	18	17	18	14	15	15	15	15	14	15
12	15	14	14	14	14	14	15	15	15	15	17	16	19	17	17	21	19	16	15	15	16	17	14	14
13	16	14	14	14	14	14	14	18	15	16	16	21	18	22	19	18	18	17	15	16	14	15	16	15
14	16	16	16	17	17	15	15	21	17	15	18	21	21	20	21	19	16	16	14	15	14	15	14	15
15	15	15	14	14	14	14	14	15	14	15	19	17	19	18	17	15	17	16	16	14	15	14	14	14
16	14	14	14	15	15	14	14	21	15	17	20	18	17	17	16	21	15	15	15	15	16	14	15	14
17	14	14	14	15	17	16	14	15	15	15	17	18	21	19	20	15	17	16	14	15	16	14	14	16
18	15	14	16	14	14	14	14	15	16	15	16	19	17	20	17	16	16	17	16	15	15	15	15	14
19	14	14	14	14	14	15	14	15	15	16	17	17	19	19	18	18	17	15	14	16	16	15	15	16
20	16	14	15	15	14	14	15	16	17	16	17	40	22	20	20	18	16	15	15	15	16	15	14	14
21	15	14	14	14	15	16	17	15	15	15	17	18	19	21	18	17	15	17	14	15	14	15	14	15
22	14	14	14	14	14	15	14	15	15	18	22	19	19	19	16	16	16	14	15	15	15	15	15	18
23	15	15	15	17	15	21	28	15	15	19	16	19	21	22	21	17	15	17	16	15	15	14	14	21
24	15	15	15	16	16	15	14	16	16	16	18	20	17	20	18	16	15	16	15	17	17	15	16	16
25	15	16	15	15	14	15	14	15	14	15	18	19	21	17	20	17	18	15	14	15	16	16	16	15
26	15	16	16	15	14	14	15	15	15	15	17	19	18	19	20	19	15	15	15	17	15	14	14	14
27	15	15	15	14	15	15	15	15	16	17	17	20	21	15	20	18	17	16	16	15	15	15	15	16
28	14	15	15	14	16	14	14	15	15	15	19	20	22	20	19	19	14	16	15	16	14	14	14	15
29	15	15	15	14	14	14	15	15	14	15	19	19	47	19	19	17	17	15	14	16	16	16	15	15
30	17	16	14	14	14	15	16	16	15	18	18	19	17	17	17	17	17	15	15	15	15	17	15	16
31	15	14	17	14	16	15	15	15	15	16	19	21	21	17	18	16	17	15	14	15	16	16	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	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	17	19	19	19	19	17	17	15	15	15	15	15	15	15
U Q	15	15	15	16	16	15	15	16	16	16	19	20	21	20	20	18	17	16	15	15	16	16	15	16
L Q	14	14	14	14	14	14	14	15	15	15	17	17	18	17	17	16	15	15	14	15	14	15	14	15

## HOURLY VALUES OF fof2 AT Okinawa

MAR. 2023

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	69	60	61	55	45	31	31	61	109	105	98	130	153	160	143	147	149	142	141	135	132	103	99	102
2	106	93	87	67	61	51	43	68	99	112	130	143	149	172	173	175	150	151	152	154	146	144	123	98
3	89	83	80	73	65	38	34	68	99	115	123	114	121	129	138	131	122	121	125	129	110	95	88	85
4	79	73	69	58	45	41	43	81	145	109	110	123	157	169	177	179	179	184	76	179	174	116	166	136
5	129	122	110	85	68	62	51	71	107	125	126	147	161	163	170	170	181	183	181	179	169	157	136	107
6	102	88	85	86	73	73	71	104	113	99	119	139	156	180	164	156	160	154	157	161	130	148	127	114
7	109	85	69	57	57	54	42	73	113	119	138	155	168	175	185	181	175	166	121	161	152	148	136	117
8	99	96	81	77	51	43	43	81	116	119	132	137	156	161	157	153	141	139	140	129	130	103	97	97
9	96	90	83	67	55	43	41	70	113	119	151	162	182	195	194	74	185	175	165	166	157	141	128	118
10	105	99	102	93	75	57	56	90	105	129	151	158	168	179	180	173	170	159	155	149	157	143	126	103
11	103	94	80	84	70	69	59	78	107	134	151	155	164	181	176	171	164	163	157	164	171	168	157	149
12	148	122	108	98	68	60	47	77	91	113	127	133	145	144	132	131	126	118	125	123	111	103	106	87
13	83	72	69	76	68	54	36	66	93	115	129	135	135	152	150	161	157	146	145	150	124	128	149	133
14	126	123	87	84	67	51	43	72	109	114	124	139	148	162	166	149	181	175	129	177	180	115	153	131
15	130	119	108	96	64	69	55	83	106	116	125	127	131	132	133	135	129	125	137	120	105	87	91	95
16	96	75	65	69	61	60	52	69	99	111	130	147	143	150	166	160	149	150	142	134	142	131	142	131
17	109	127	101	104	96	69	53	75	95	103	121	131	145	147	150	162	154	157	147	131	116	97	104	112
18	58	67	97	100	45	35	38	71	94	109	113	131	148	154	159	157	155	159	147	142	116	100	105	97
19	98	100	89	62	34	N 26	31	75	110	113	126	136	162	188	194	196	183	175	171	172	156	149	151	162
20	133	131	129	99	68	57	53	87	106	116	113	132	143	153	153	159	150	147	150	147	127	110	147	34
21	107	111	109	91	90	73	51	79	94	110	118	135	154	166	157	153	153	149	148	137	131	119	123	119
22	122	111	115	98	81	70	58	90	104	111	117	132	147	160	162	165	166	158	154	149	138	103	105	102
23	104	102	99	94	76	61	66	78	93	110	122	130	159	166	131	150	168	141	138	138	118	126	131	116
24	104	94	99	76	72	57	49	57	75	70	74	85	97	127	100	115	119	99	99	81	77	35	54	51
25	54	56	55	50	46	35	37	79	95	112	136	144	159	175	167	163	147	145	149	140	104	87	91	87
26	66	70	70	69	61	67	70	86	107	120	119	128	147	155	164	170	169	169	172	161	155	146	141	144
27	155	123	116	99	68	56	54	86	98	110	107	123	153	164	160	161	159	150	147	146	113	111	119	122
28	121	119	116	111	74	51	49	81	98	124	129	129	150	164	177	163	170	171	161	127	133	125	N 123	129
29	129	148	130	99	84	75	68	92	111	121	135	137	142	162	159	154	146	139	135	131	102	104	102	103
30	97	95	84	76	74	63	66	94	110	116	125	137	153	171	175	179	166	144	147	137	142	135	117	114
31	111	98	93	82	80	60	69	90	98	107	123	135	139	151	151	154	155	155	149	128	101	85	93	91
	00	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	104	96	89	84	68	57	51	78	105	113	125	135	150	162	162	160	157	151	147	142	131	116	123	112
U Q	122	119	108	98	74	67	58	86	110	119	130	143	159	172	175	170	170	166	155	161	155	143	141	129
L Q	96	83	80	69	57	43	42	71	95	110	118	130	143	152	150	150	149	142	137	131	113	103	102	97

HOURLY VALUES OF fEs                      AT Okinawa

MAR. 2023

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	11	G	G	G	30	39	38	49	53	52	54	48	60	53	51	33	G	G	G	G
2	G	G	G	G	G	G	G	G	34	37	40	41	54	55	53	50	48	40	37	76	29	G	11	G
3	G	G	G	G	11	G	G	27	48	N	49	50	51	55	56	54	54	50	37	26	24	G	G	G
4	G	G	G	G	G	G	G	G	32	35	37	37	40	54	38	42	45	40	G	G	G	G	11	G
5	G	G	G	G	G	G	G	G	35	40	41	45	39	41	46	46	42	36	G	G	G	G	G	G
6	36	G	25	G	G	G	G	G	33	39	42	44	G	54	43	38	41	37	G	36	G	G	G	G
7	G	G	G	G	G	24	117	35	36	38	42	55	51	61	46	45	52	51	40	43	25	25	28	G
8	G	G	24	G	G	G	G	G	32	39	43	39	55	54	44	48	44	106	28	30	28	G	G	G
9	G	G	G	G	G	G	G	G	32	36	49	44	49	48	53	44	39	36	G	23	G	82	G	G
10	G	G	G	G	G	G	G	33	31	36	41	44	44	46	44	43	40	29	38	36	G	G	G	G
11	G	G	G	G	G	G	G	G	34	40	42	42	56	52	38	N	38	41	35	30	G	G	G	G
12	G	G	G	G	11	G	G	29	32	36	40	51	52	55	52	57	62	64	106	37	G	G	G	G
13	G	G	G	G	G	G	G	G	149	34	41	53	52	55	54	51	45	43	34	25	G	G	G	28
14	G	G	G	G	G	G	G	G	34	38	58	46	48	50	44	47	40	35	34	G	G	G	G	G
15	G	G	G	11	G	G	G	G	36	38	40	38	38	55	37	35	37	34	36	27	G	G	G	G
16	60	G	G	G	G	G	G	G	34	38	42	44	39	52	42	34	33	41	34	G	G	G	G	G
17	G	G	G	G	11	G	33	G	35	58	42	56	52	45	45	51	34	33	35	26	21	G	G	G
18	32	G	G	11	40	G	G	26	34	40	39	58	54	55	36	N	74	36	32	26	22	32	30	41
19	G	G	11	11	G	G	G	29	37	40	43	51	56	53	50	40	67	36	34	G	G	G	G	G
20	G	G	G	G	G	G	G	G	34	37	40	G	48	55	52	41	41	45	42	29	G	G	G	G
21	G	G	G	G	G	43	28	G	35	40	44	54	54	54	45	40	40	36	49	81	22	32	G	G
22	G	G	G	G	G	G	G	G	34	40	43	54	55	54	50	40	40	35	35	38	28	G	G	G
23	G	G	G	G	G	G	G	G	35	38	42	45	54	45	36	40	41	36	30	34	33	G	26	G
24	G	G	G	G	26	25	G	29	38	42	47	46	45	37	36	38	35	36	46	40	38	G	25	30
25	G	G	G	G	G	G	G	24	35	41	44	50	54	53	38	44	40	40	36	25	29	38	26	43
26	58	33	29	G	G	G	G	G	36	41	88	65	55	56	35	53	40	32	38	88	24	11	G	G
27	G	G	G	G	38	G	G	27	36	40	37	53	54	51	44	36	40	36	30	28	G	34	G	24
28	G	G	G	G	11	G	G	44	35	41	44	44	53	56	43	40	39	61	38	34	G	G	G	G
29	G	G	G	G	G	G	G	G	37	46	47	45	53	G	G	40	40	36	44	42	G	G	G	G
30	G	G	G	G	G	G	G	23	40	45	46	47	47	51	51	36	39	36	48	40	25	G	G	G
31	G	G	G	G	G	G	G	G	36	41	44	45	52	52	38	36	37	37	35	60	41	32	32	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	30	31	31	31	31	31	29	31	31	31	31	31	31	31	31
MED	G	G	G	G	G	G	G	G	35	40	42	46	52	53	44	42	40	36	35	30	G	G	G	G
U Q	G	G	G	G	11	G	G	27	36	41	44	53	54	55	51	48	45	43	40	40	25	25	11	G
L Q	G	G	G	G	G	G	G	G	34	38	40	44	47	50	38	39	39	36	32	25	G	G	G	G

HOURLY VALUES OF fmin AT Okinawa

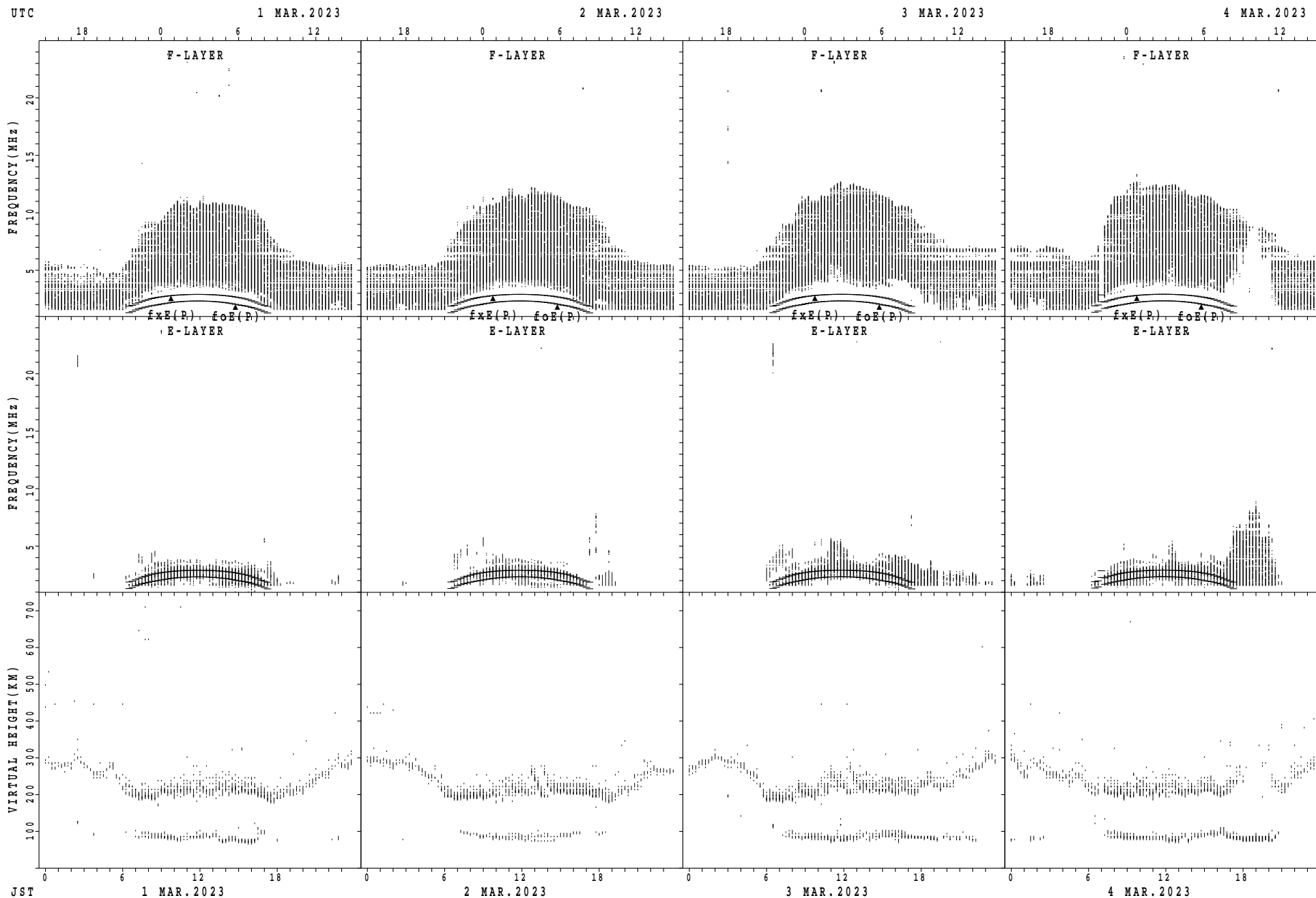
MAR. 2023

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	14	14	15	14	14	14	14	15	15	14	15	17	21	19	18	15	17	14	15	16	15	14	15	14
2	14	14	14	14	14	18	14	18	17	15	19	17	19	21	20	20	15	15	16	17	16	16	15	15
3	15	14	14	14	14	14	15	16	15	14	15	16	18	17	18	20	18	16	16	15	15	15	14	14
4	15	14	14	14	14	15	15	18	15	15	15	19	20	21	18	17	19	15	15	15	15	14	14	15
5	14	14	14	14	14	14	15	14	17	13	17	19	21	23	20	17	15	15	14	16	15	14	14	14
6	15	15	15	15	15	15	15	20	17	14	17	17	43	20	21	19	17	16	14	15	15	14	14	14
7	16	14	15	16	14	15	12	15	15	15	15	18	20	19	21	16	16	17	15	15	15	15	15	15
8	14	15	16	15	14	15	14	16	16	15	16	15	18	18	20	18	15	15	15	15	15	14	15	14
9	14	19	14	14	14	15	15	16	15	15	16	18	21	17	19	19	15	14	15	16	15	14	15	15
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11	15	14	14	14	15	15	14	18	15	13	17	17	17	19	16	17	16	14	15	16	14	14	14	14
12	15	14	14	14	14	14	14	16	17	15	16	16	20	18	17	16	14	13	14	16	15	15	15	15
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19	15	15	14	14	14	17	15	16	15	15	15	16	20	18	17	19	16	14	16	15	15	14	15	15
20	14	14	14	14	14	14	17	15	14	14	16	44	17	20	19	17	15	14	13	15	14	14	15	14
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23	29	24	15	21	15	15	15	14	15	16	18	17	19	19	17	16	16	16	15	15	15	15	15	14
24	26	14	15	16	15	15	15	15	14	17	19	17	19	18	17	16	15	14	15	15	15	15	15	15
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26	16	16	16	16	14	15	16	22	15	15	17	21	21	17	19	18	15	15	14	14	15	15	15	15
27	15	14	16	15	14	15	15	15	15	14	18	20	20	17	17	17	18	15	14	15	15	14	15	16
28	15	14	14	14	14	15	14	15	16	15	17	18	18	22	19	17	15	13	15	16	14	15	15	16
29	14	14	14	14	14	15	15	15	16	17	18	18	46	43	43	18	17	17	14	15	16	15	15	14
30	15	15	15	15	15	14	14	14	14	21	17	21	20	20	20	15	16	17	14	17	15	15	15	15
31	14	14	15	14	15	14	15	15	15	18	17	17	19	17	17	15	16	15	16	15	15	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	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	14	14	14	14	15	15	15	15	15	17	18	20	19	18	17	16	15	15	15	15	15	15	15
U Q	15	15	15	15	15	15	15	16	16	15	17	19	20	20	20	19	17	16	16	16	15	15	15	15
L Q	14	14	14	14	14	14	14	15	15	14	16	17	19	18	17	16	15	14	14	15	15	14	15	14

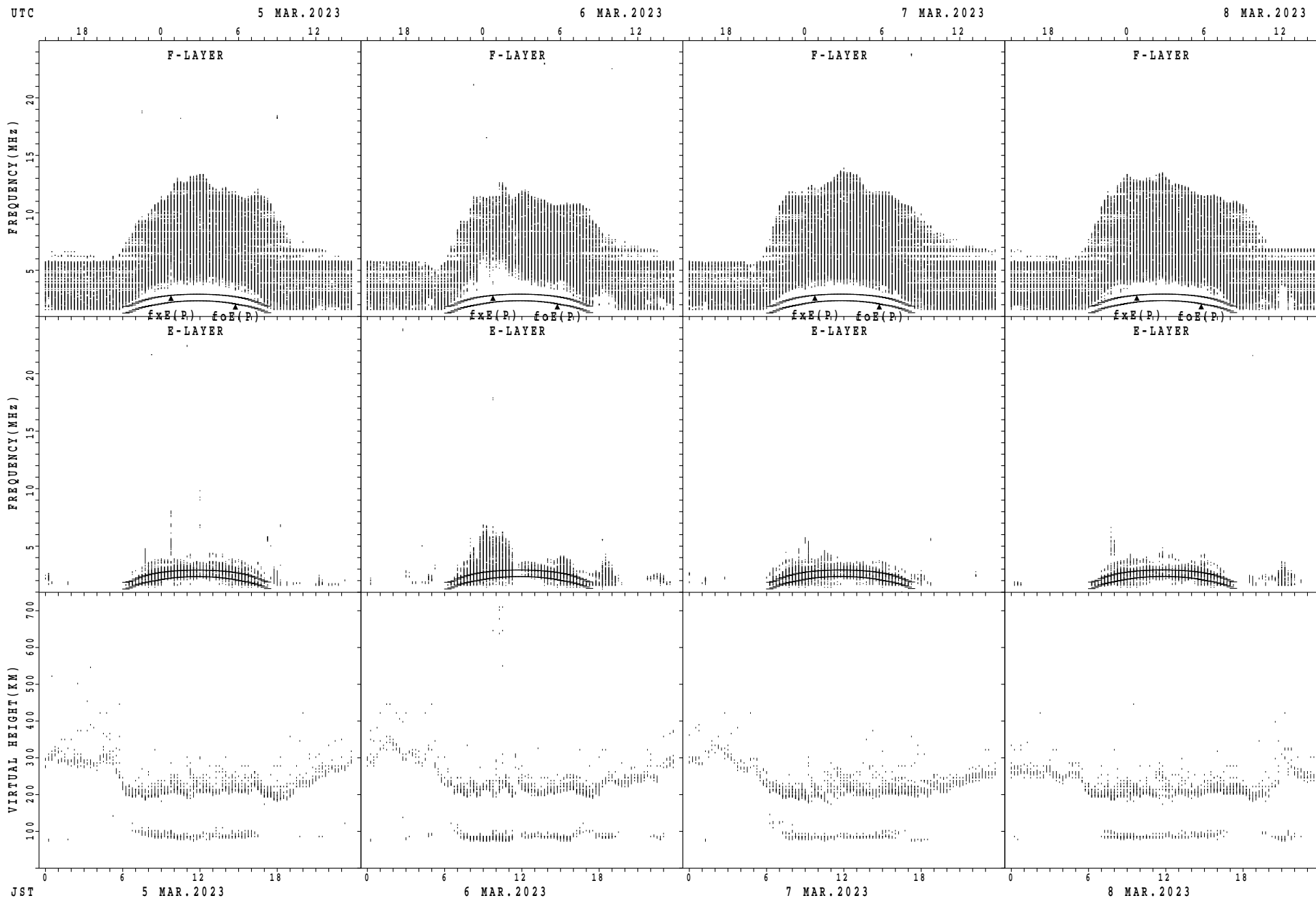


SUMMARY PLOTS AT Wakkanai



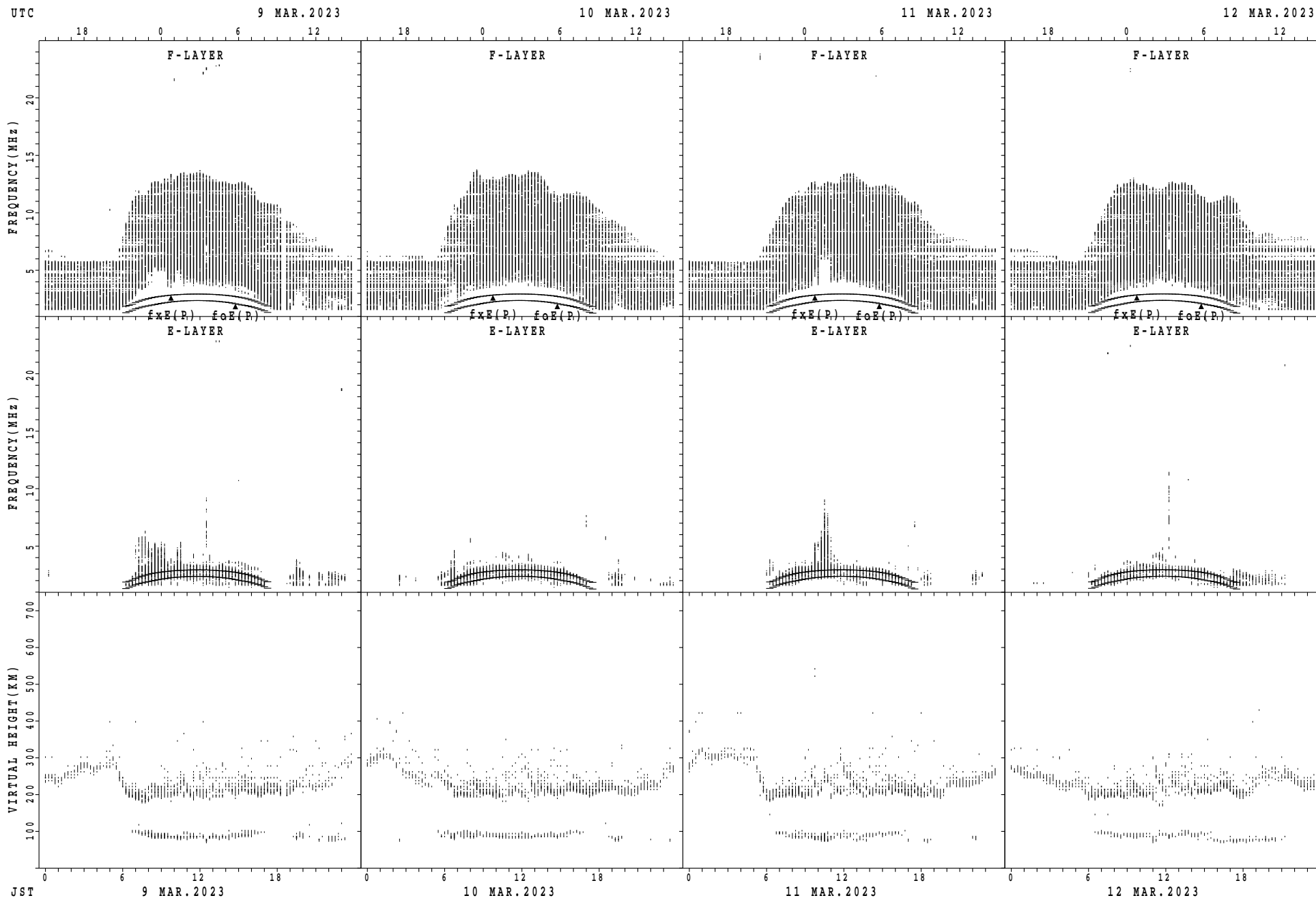
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



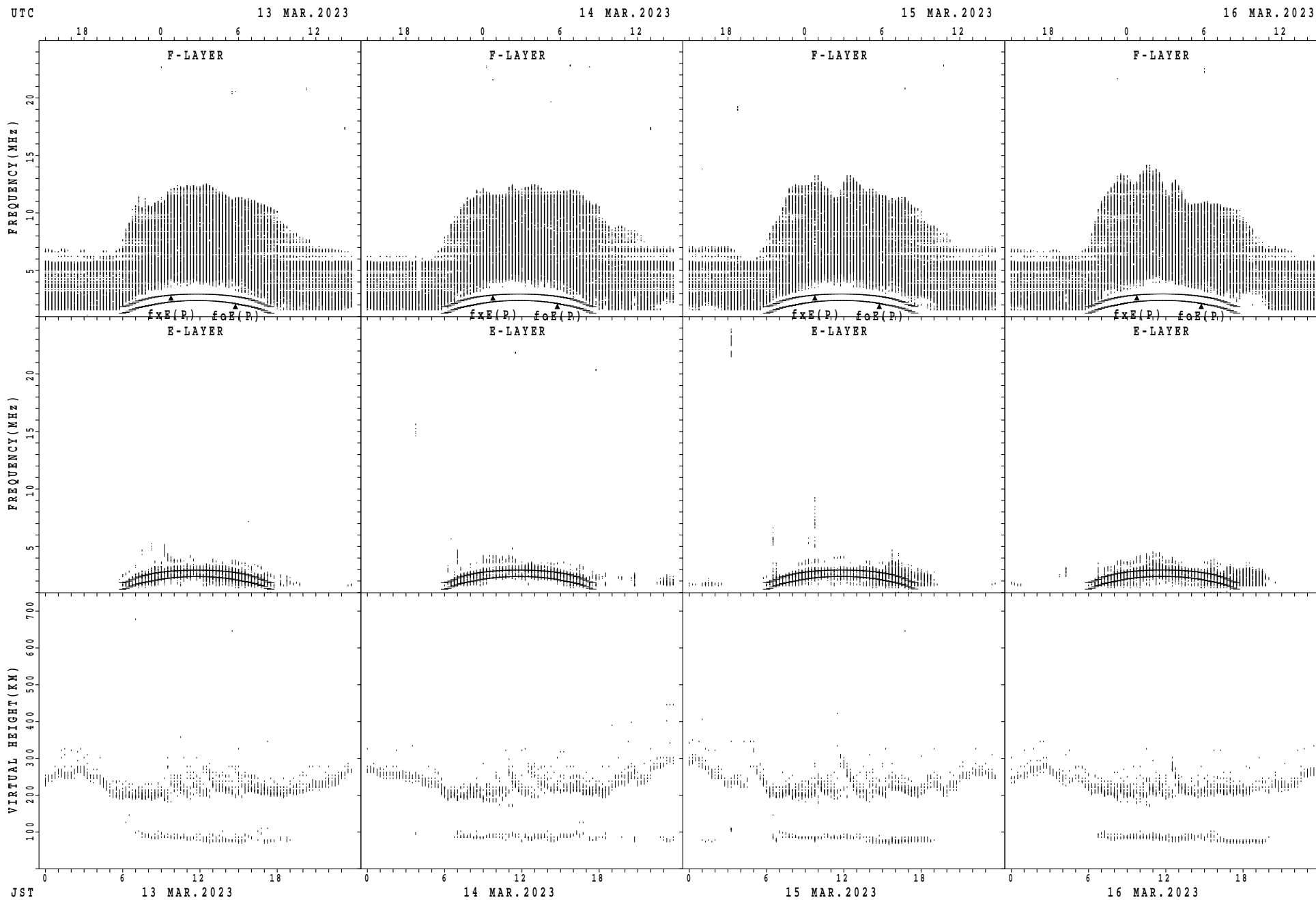
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Wakkanai



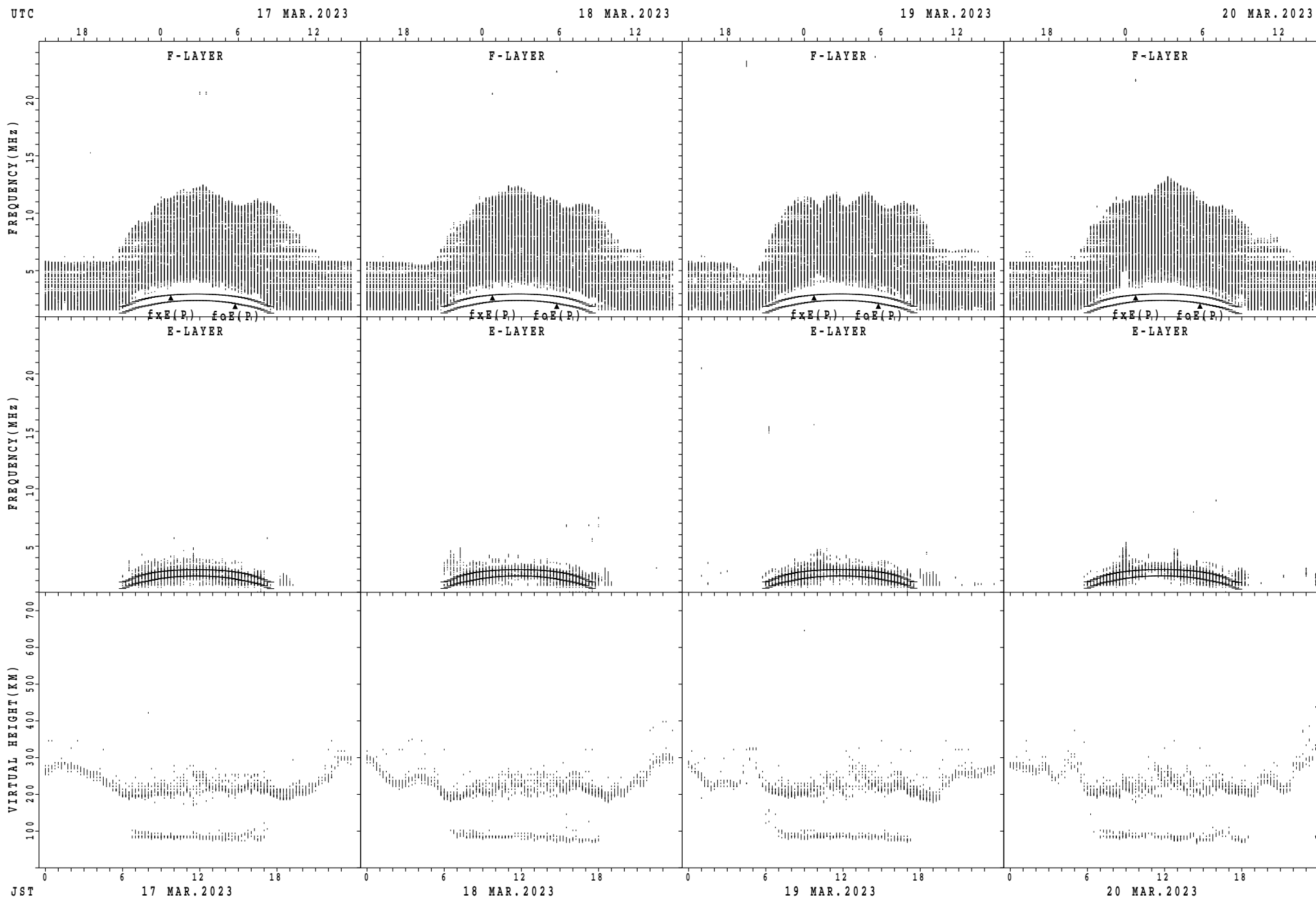
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Wakkanai



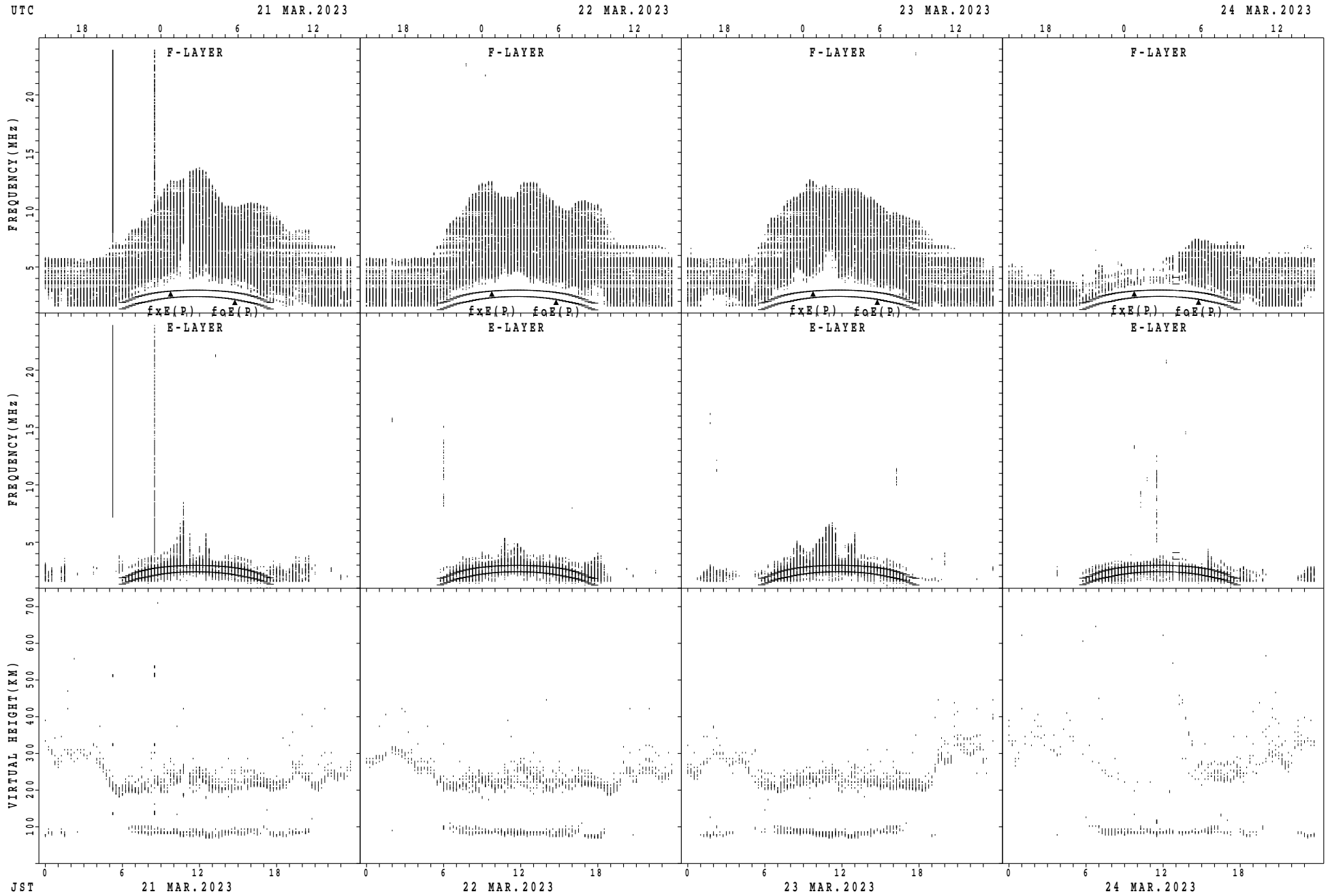
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

## SUMMARY PLOTS AT Wakkanai



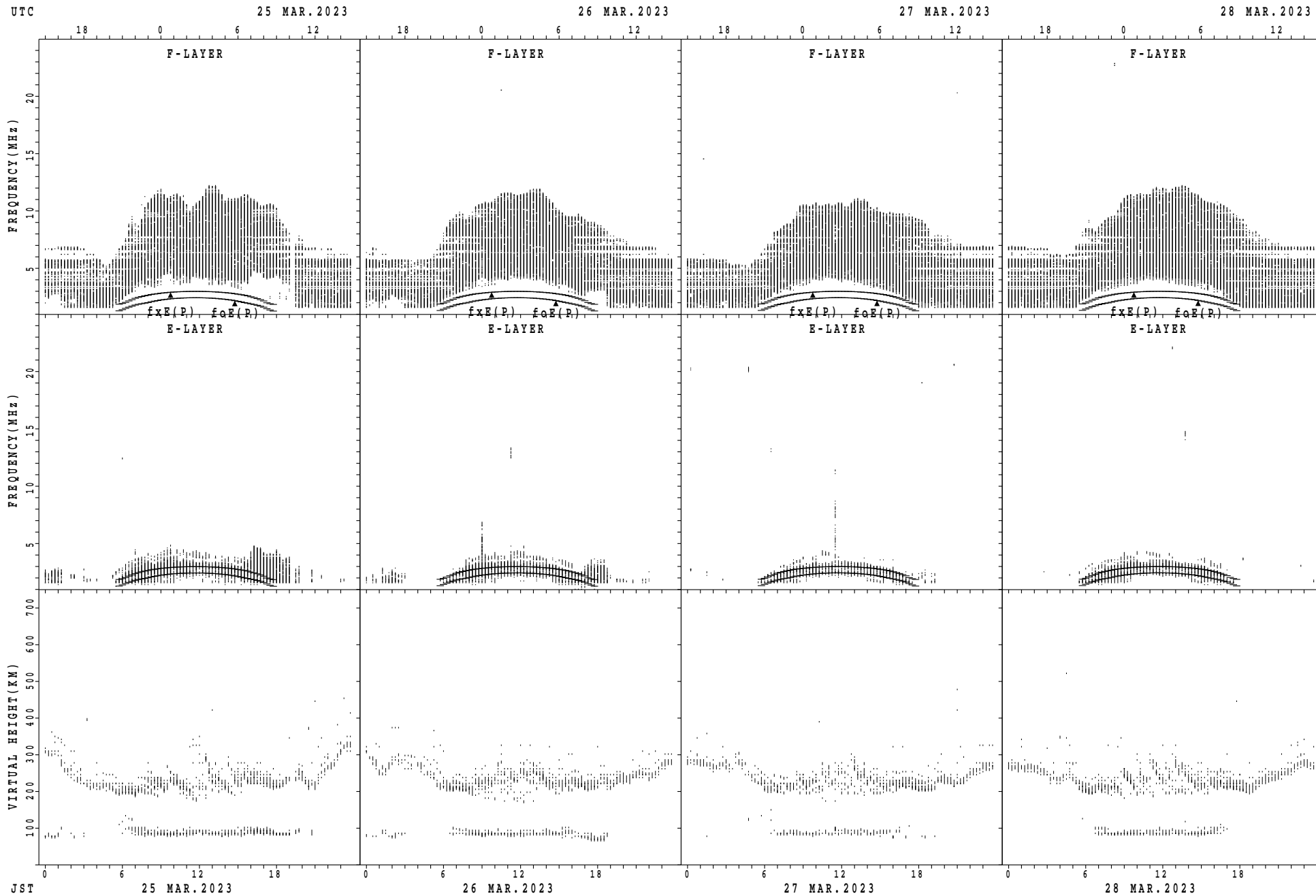
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Wakkanai



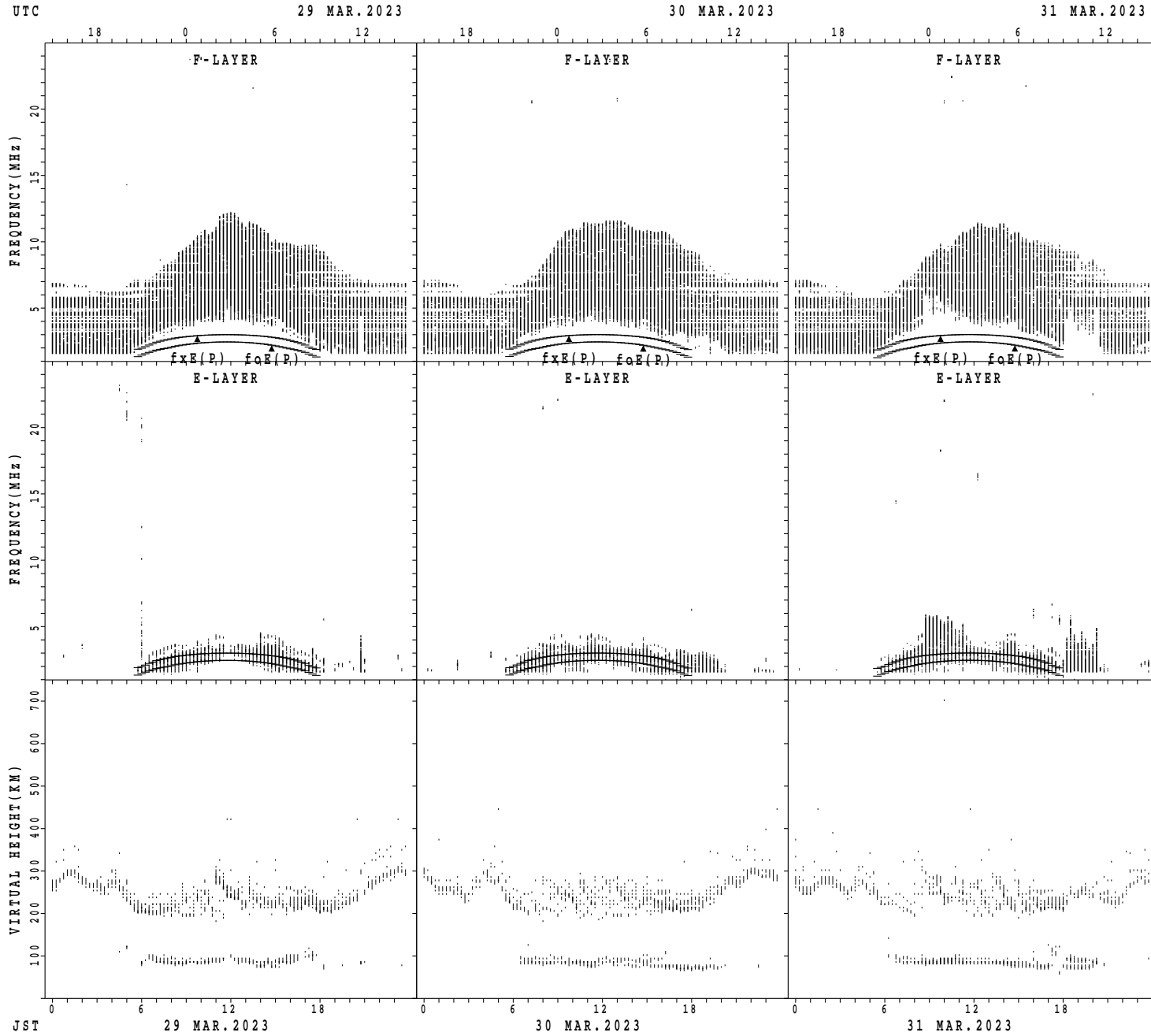
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



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

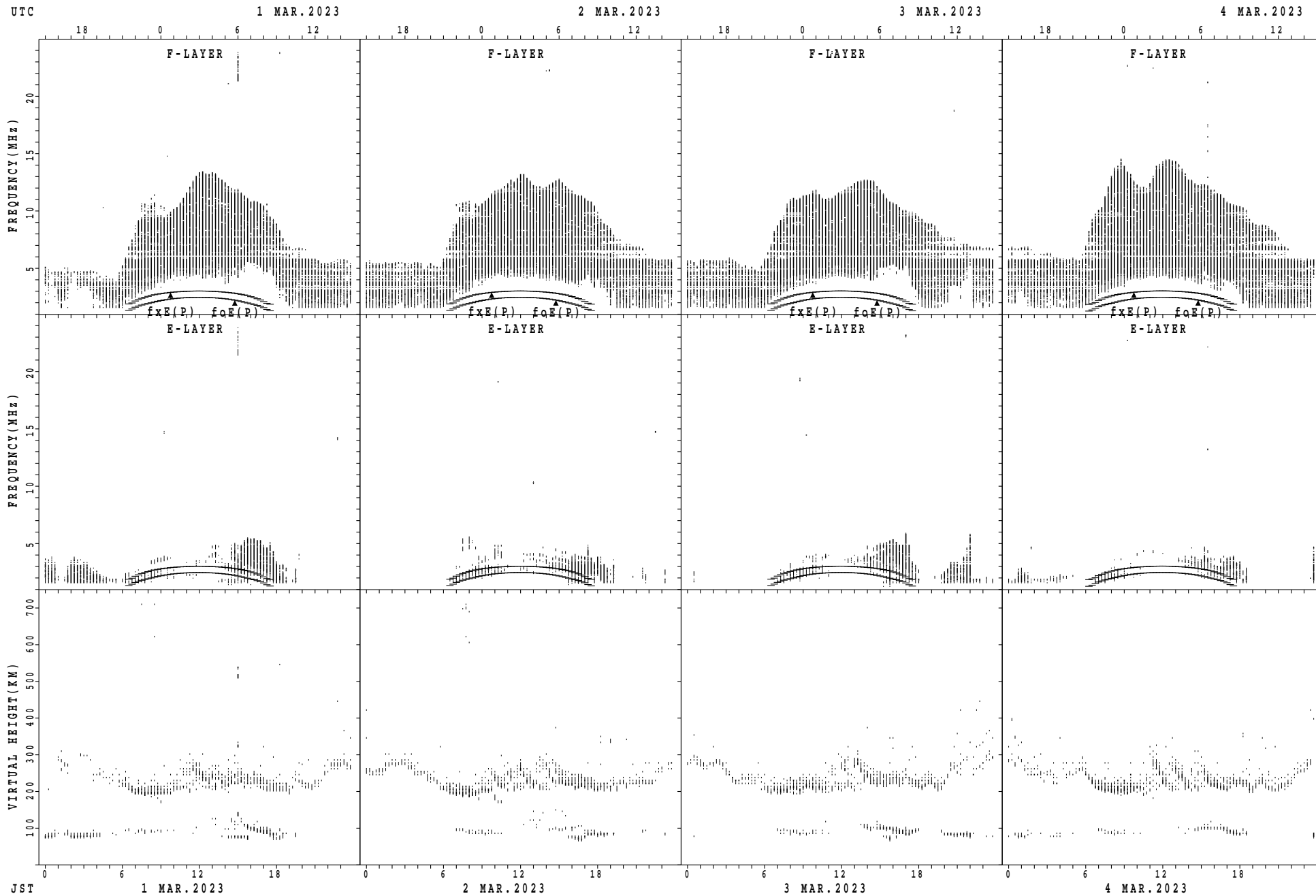
SUMMARY PLOTS AT Wakkanai



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

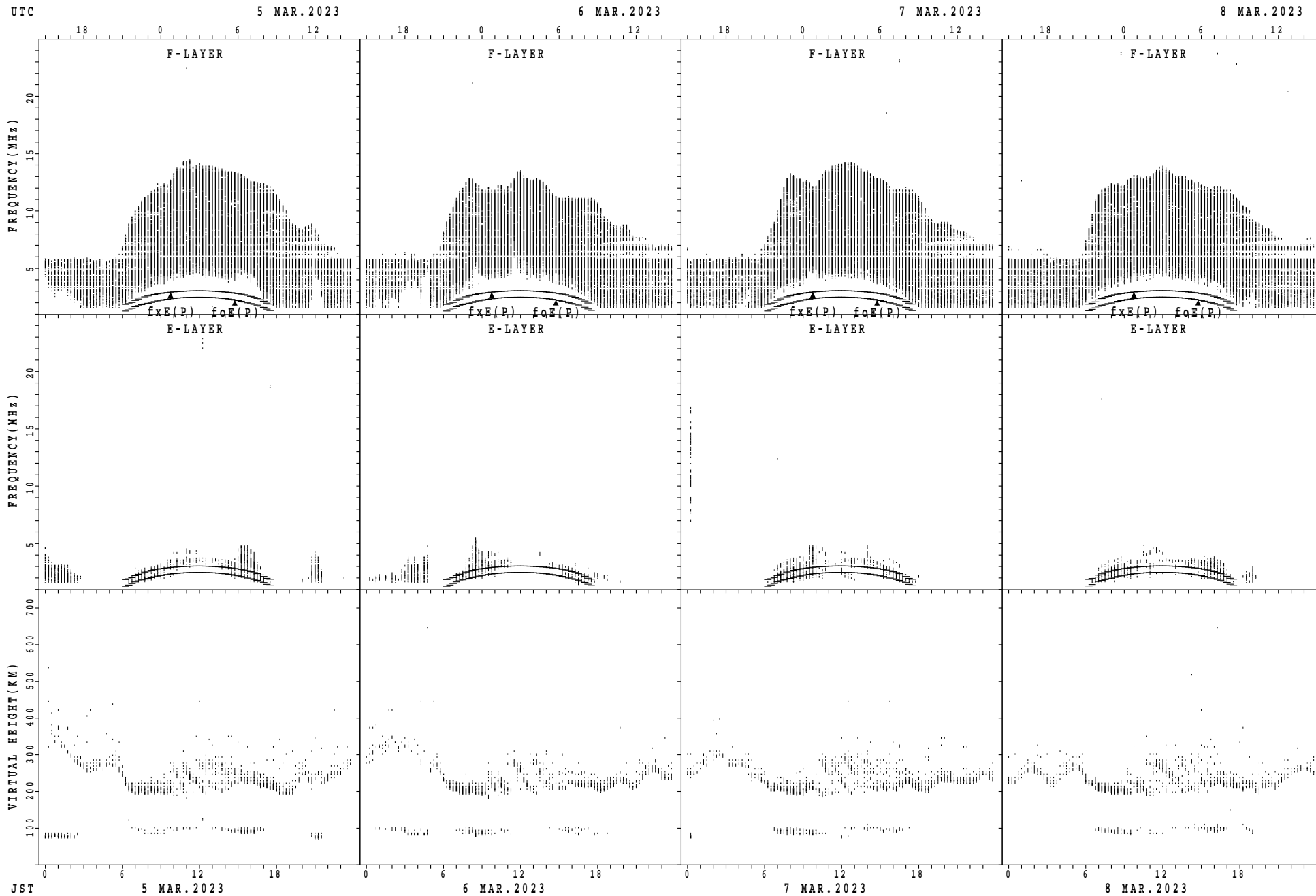


SUMMARY PLOTS AT Kokubunji



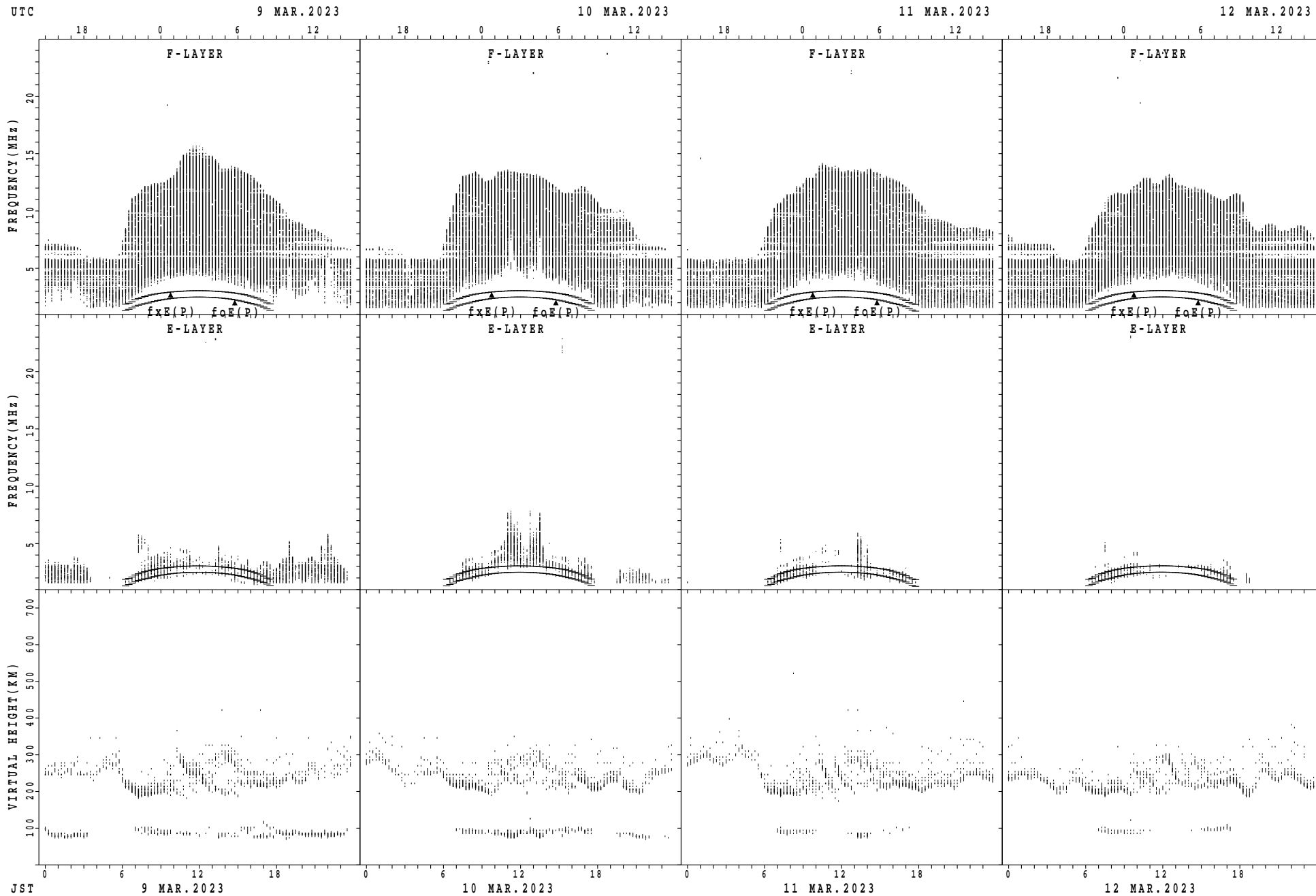
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



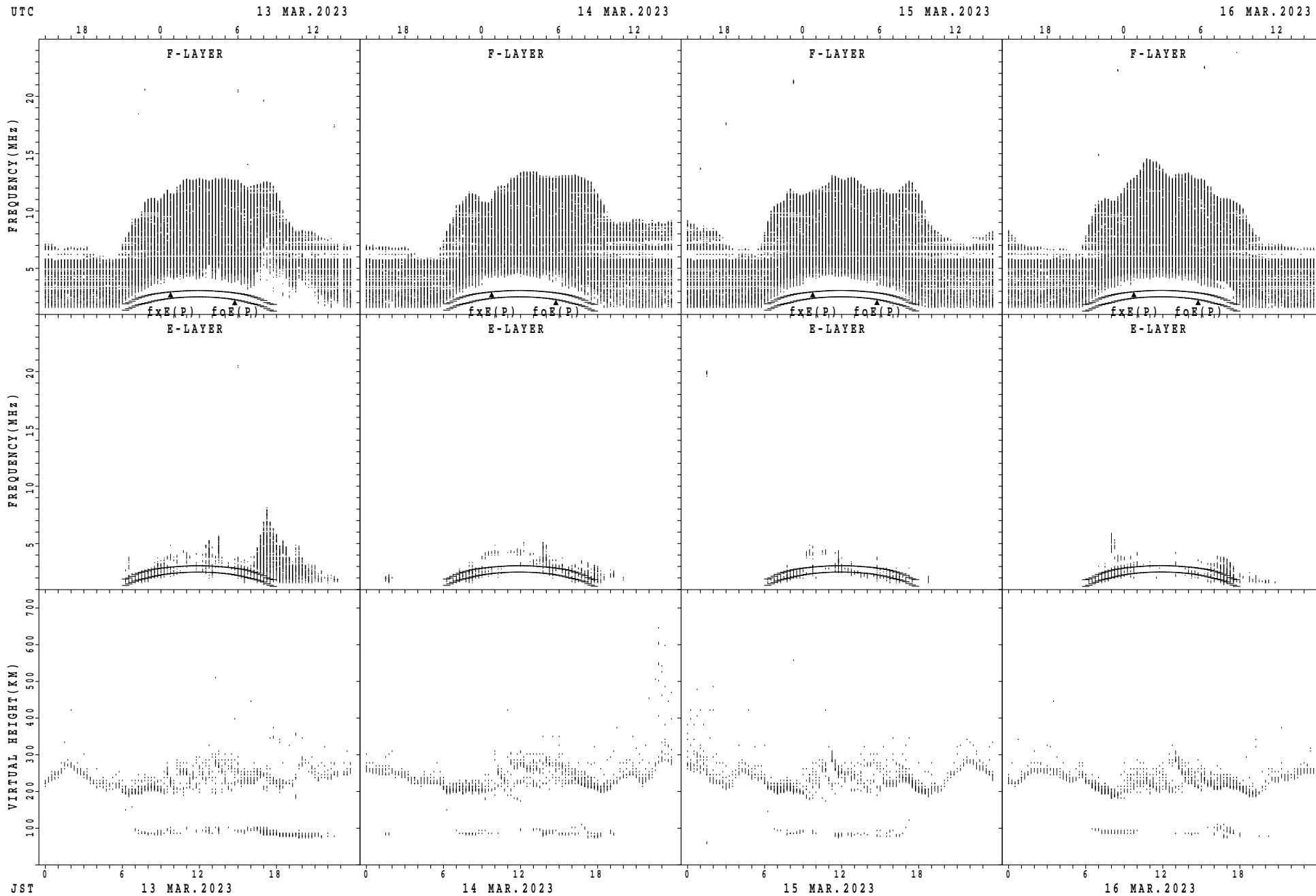
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



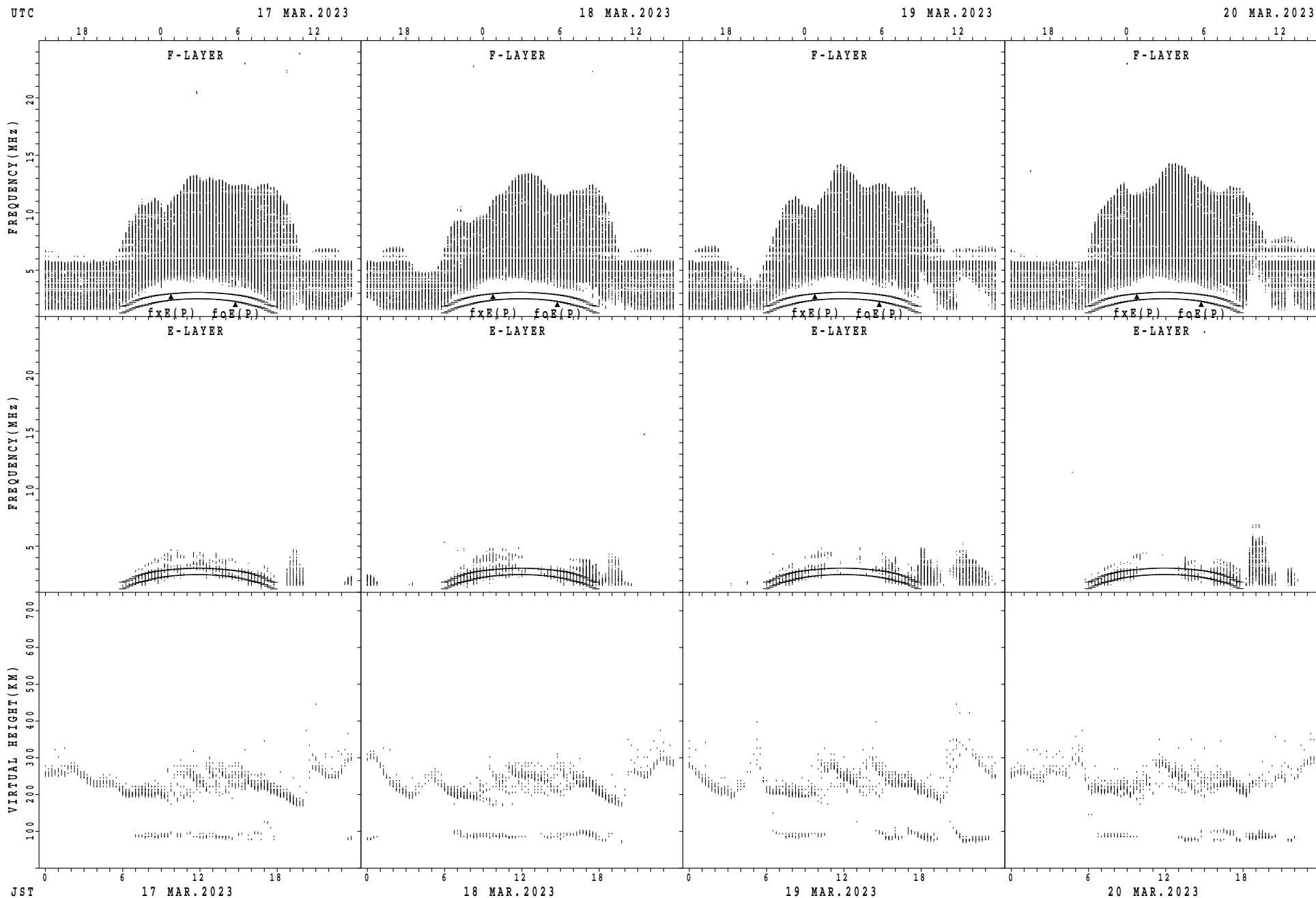
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



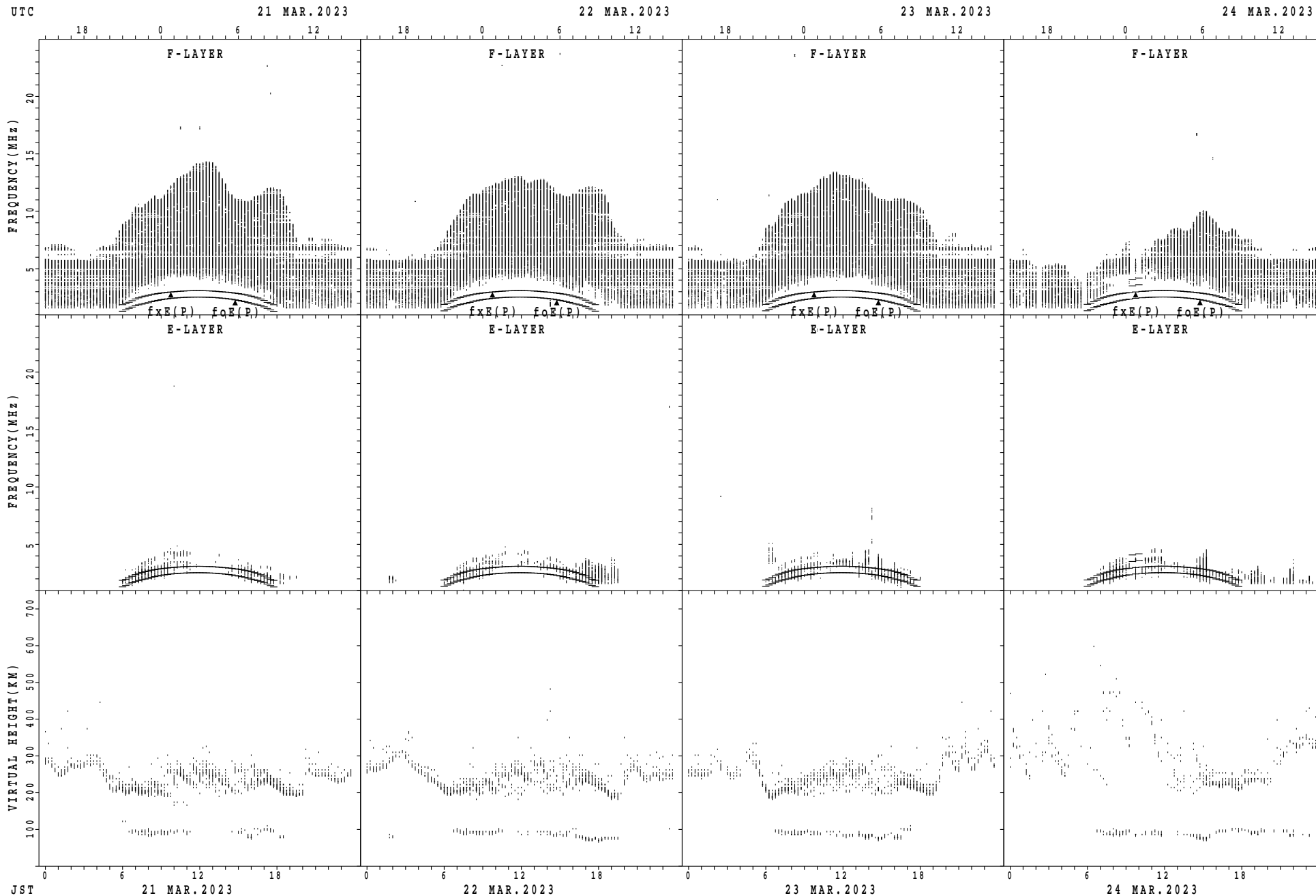
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



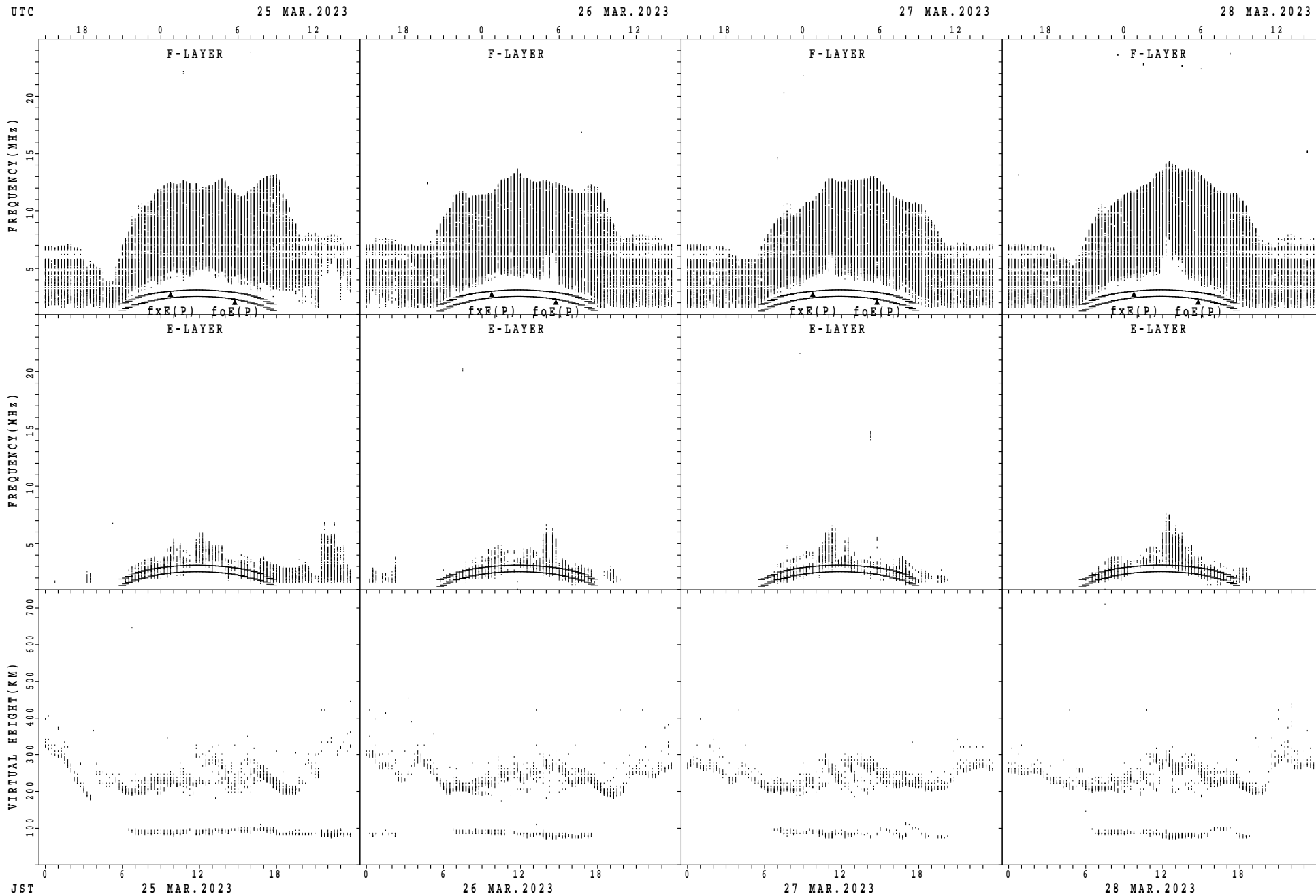
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



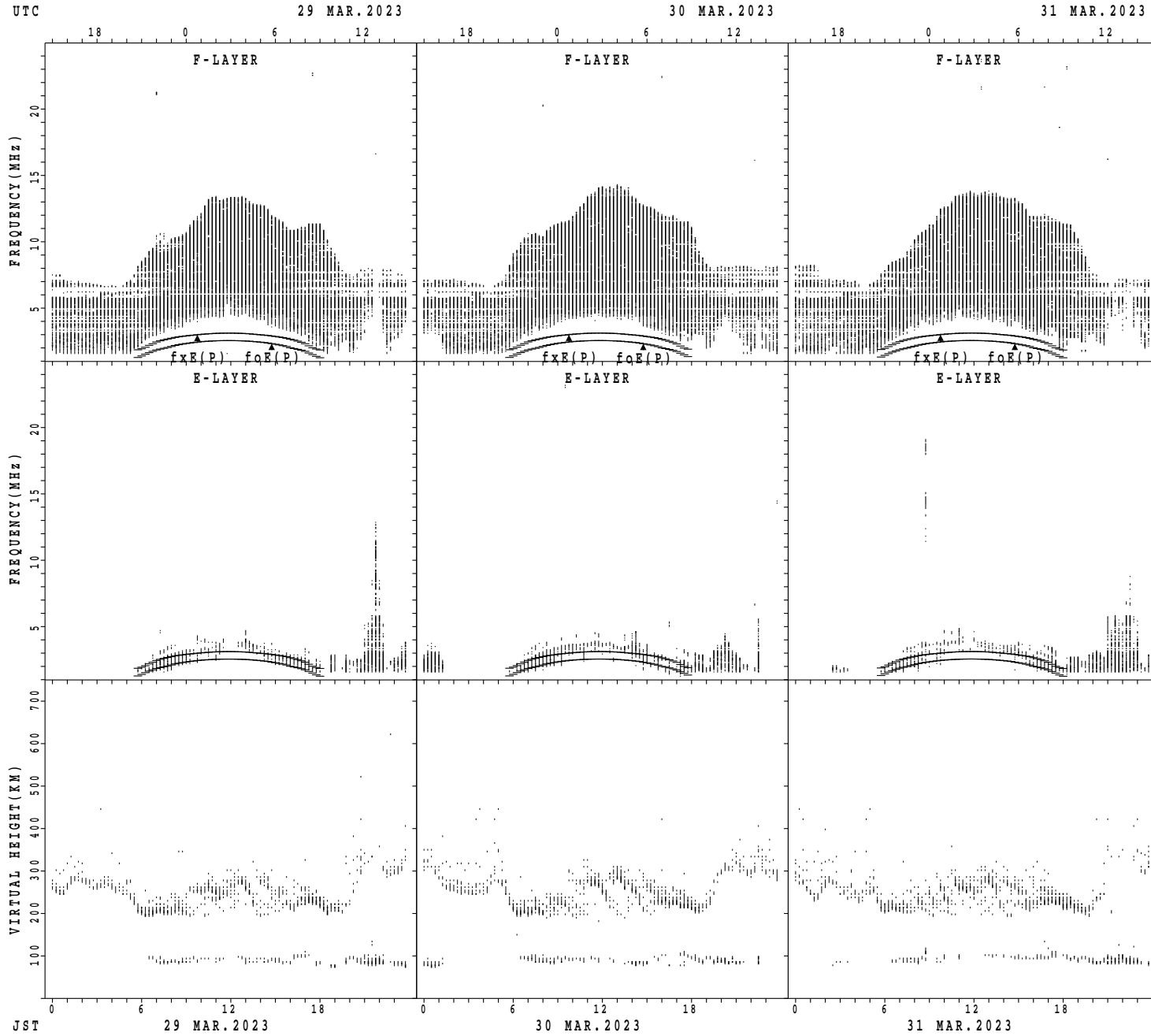
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



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

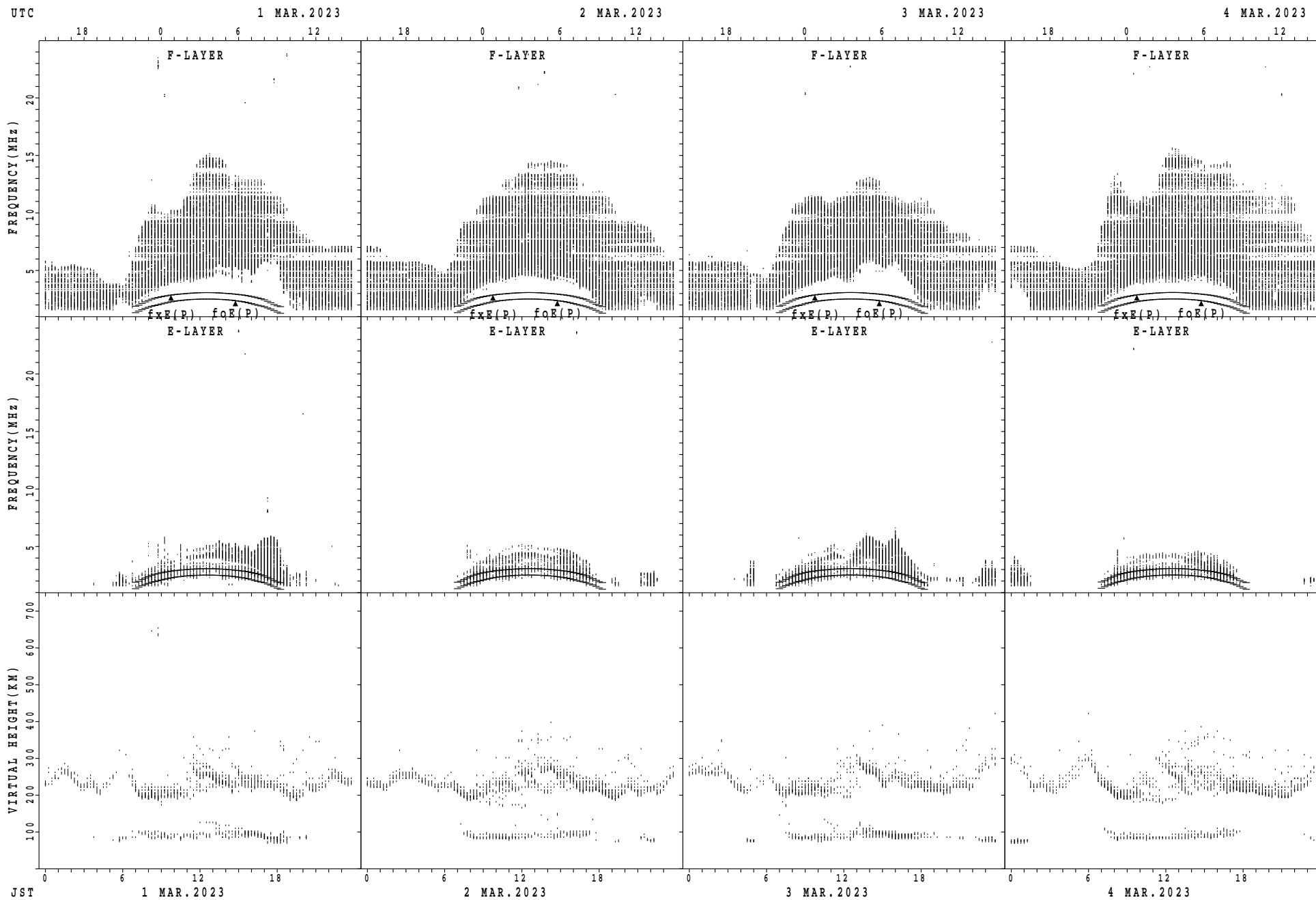
SUMMARY PLOTS AT Kokubunji



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

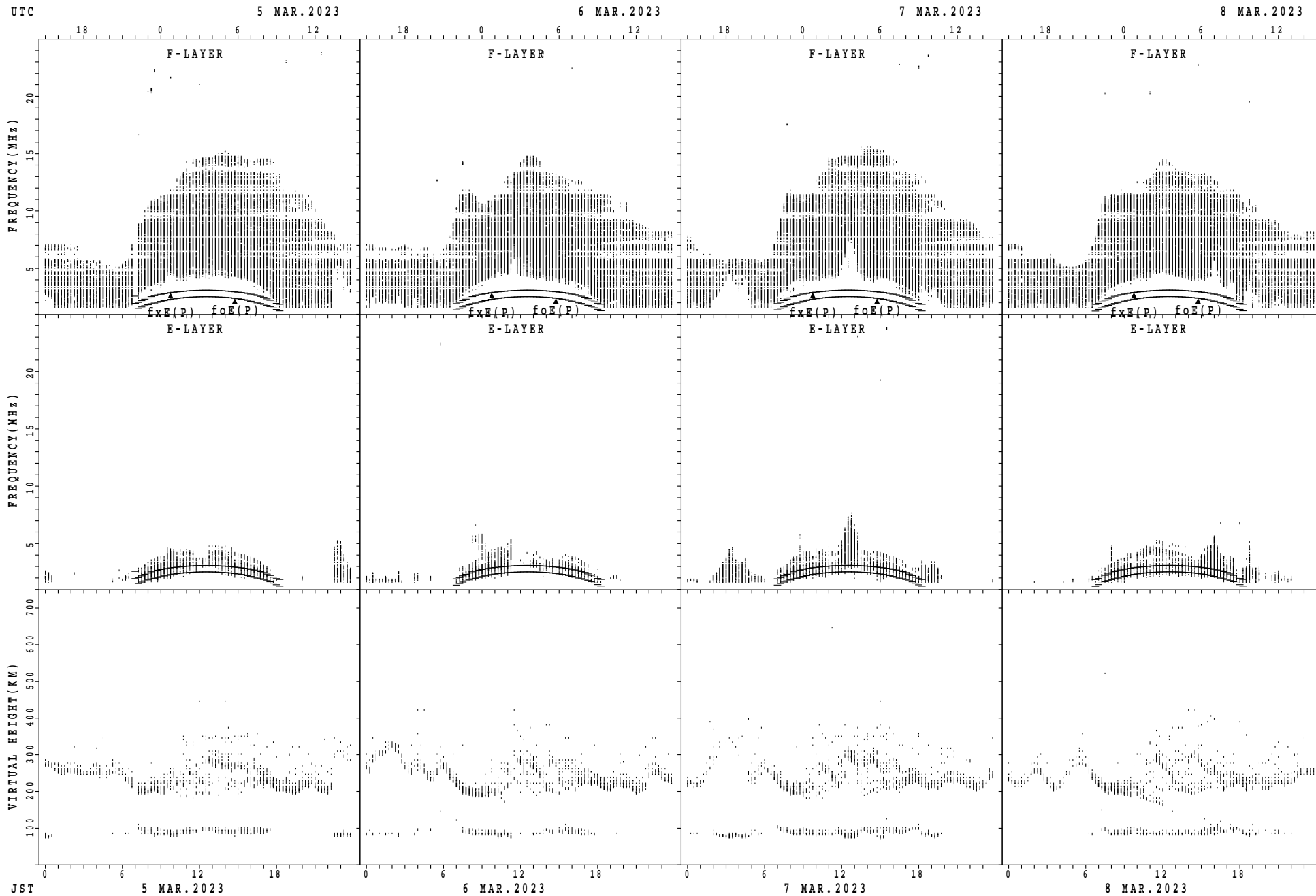


## SUMMARY PLOTS AT Yamagawa



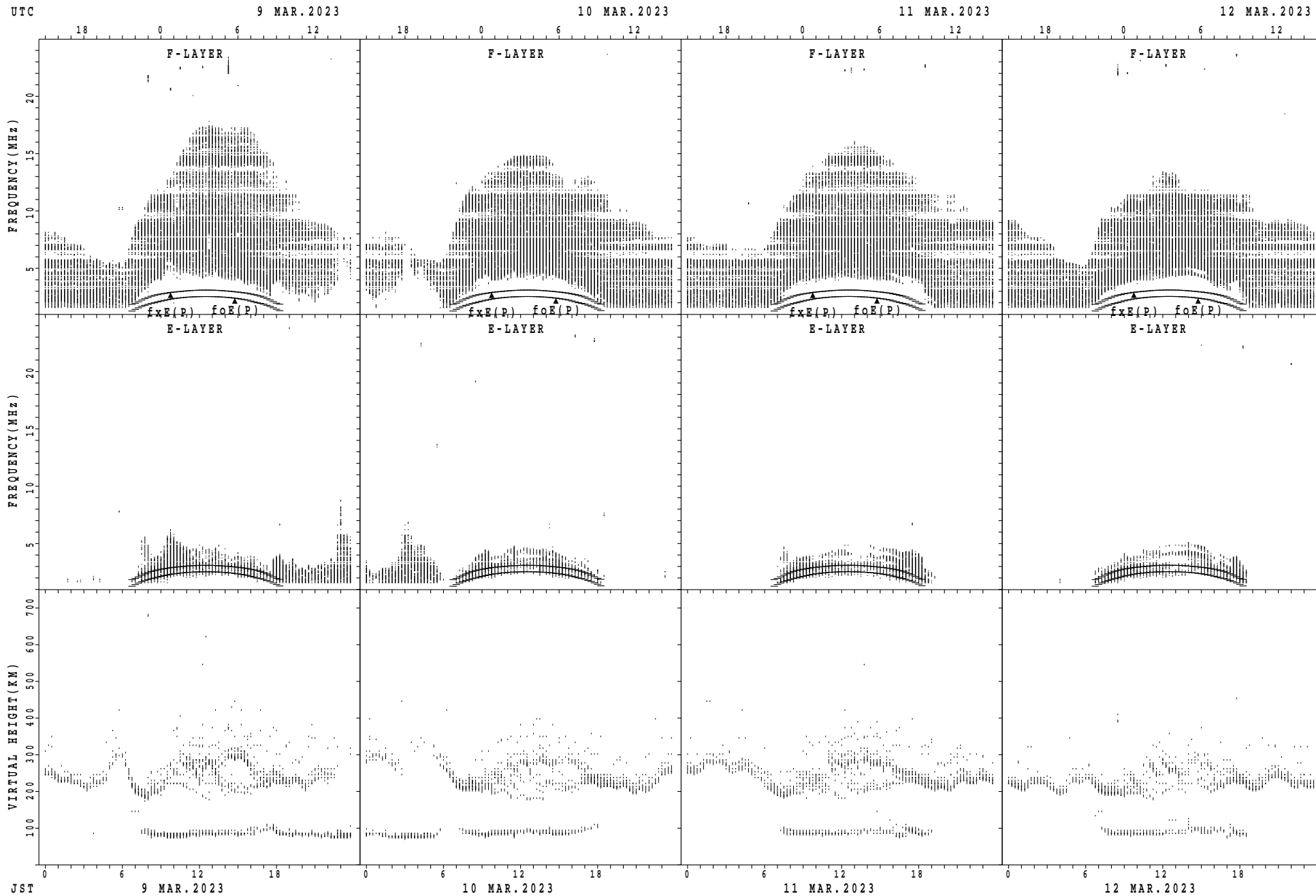
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Yamagawa



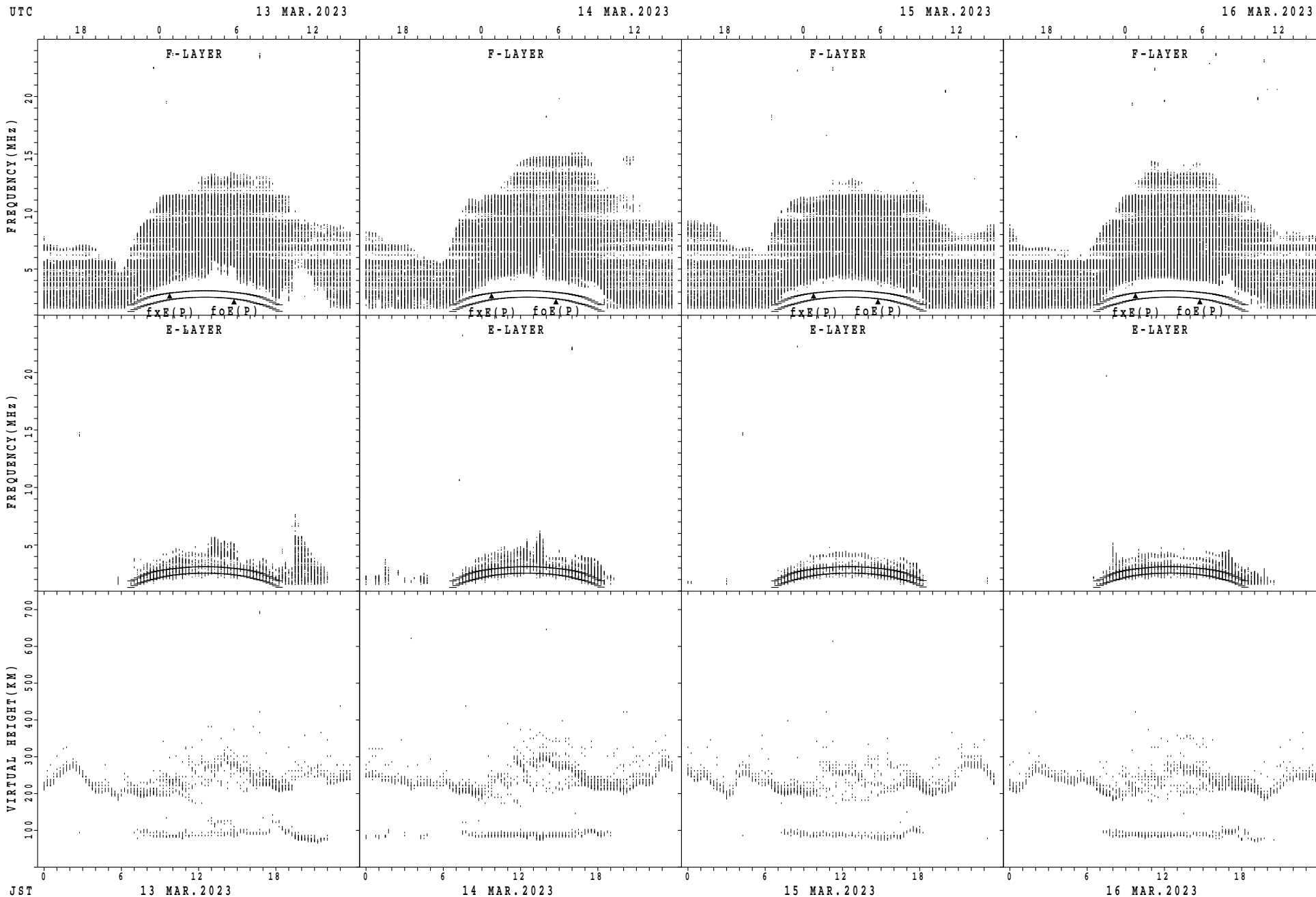
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Yamagawa



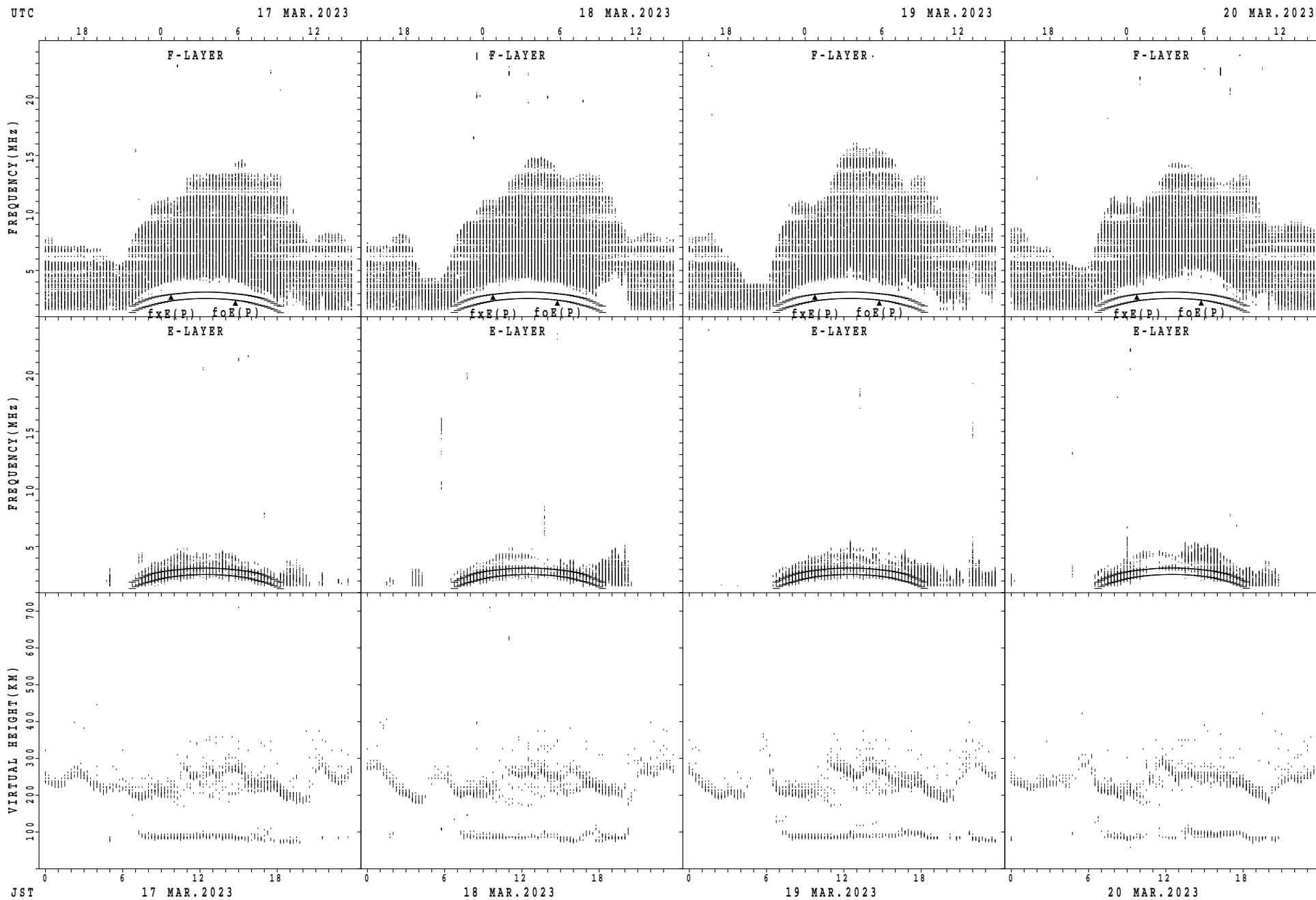
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



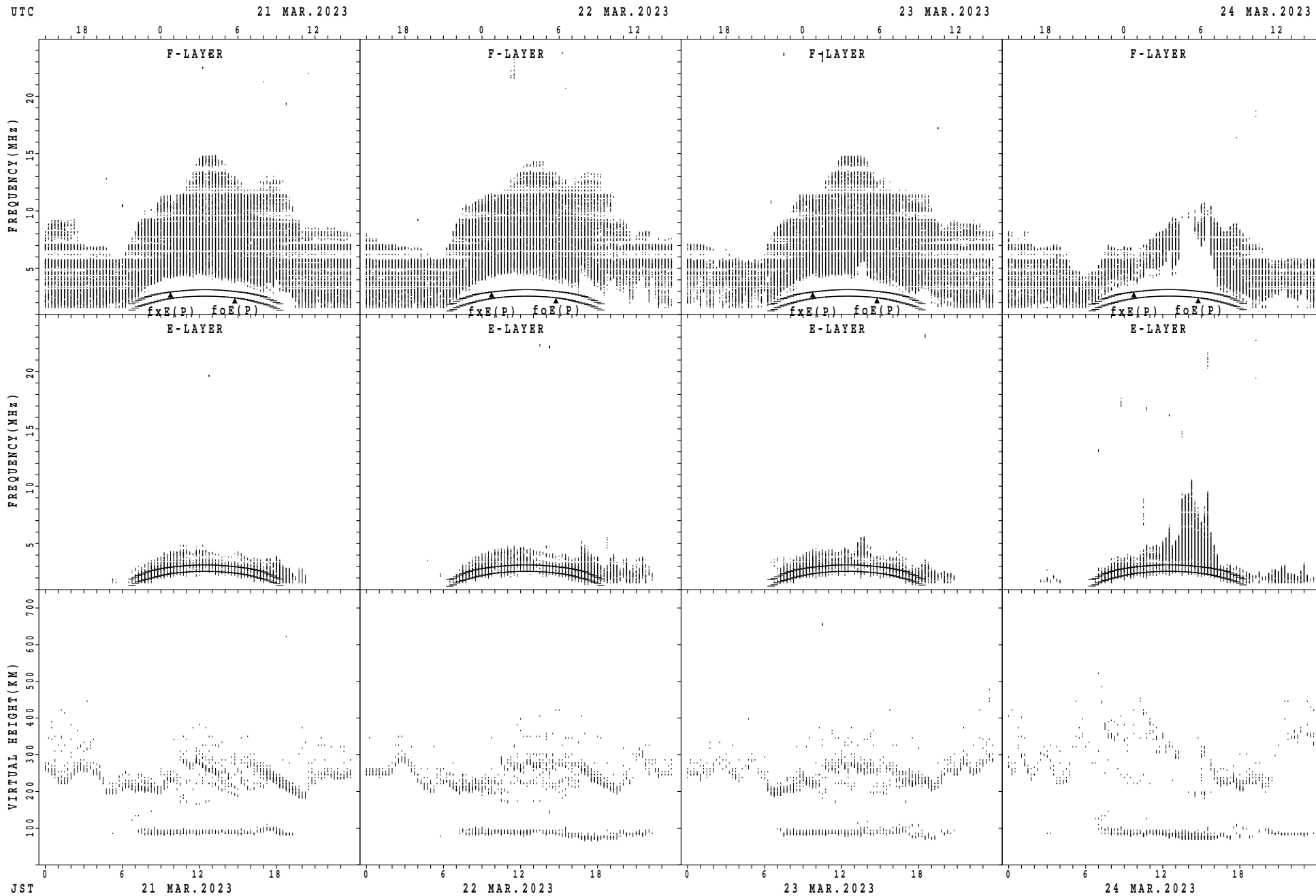
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Yamagawa



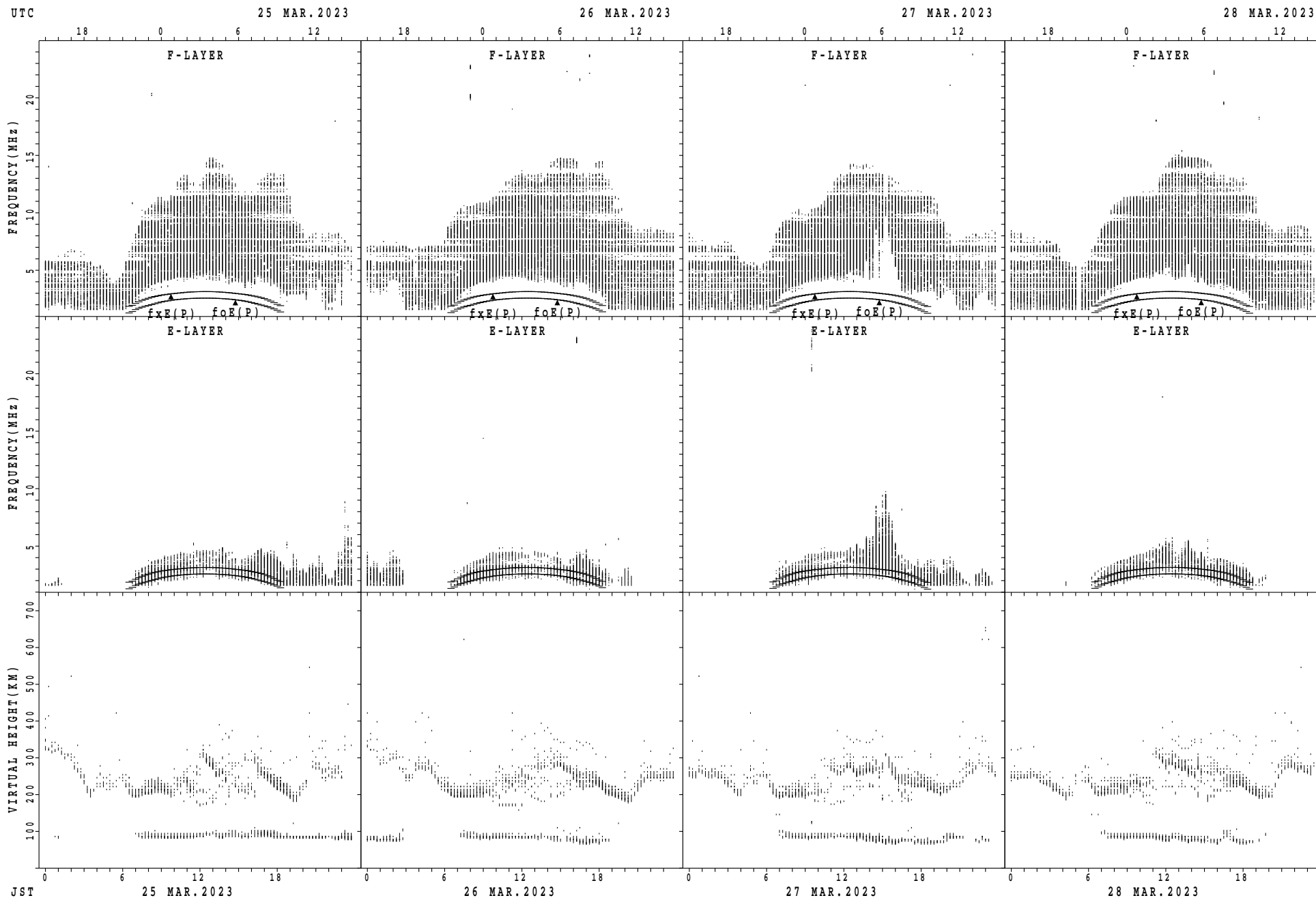
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Yamagawa



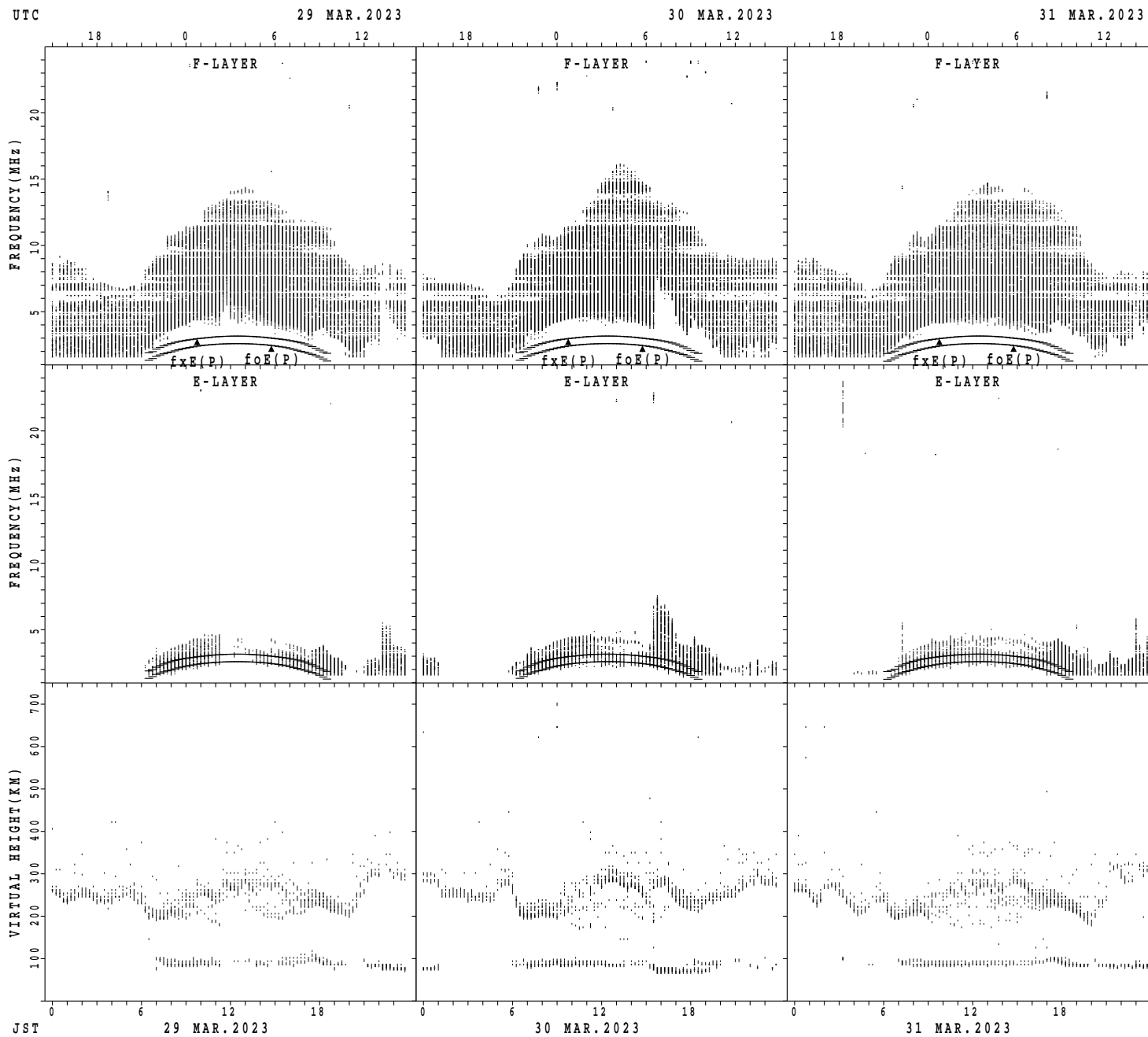
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



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

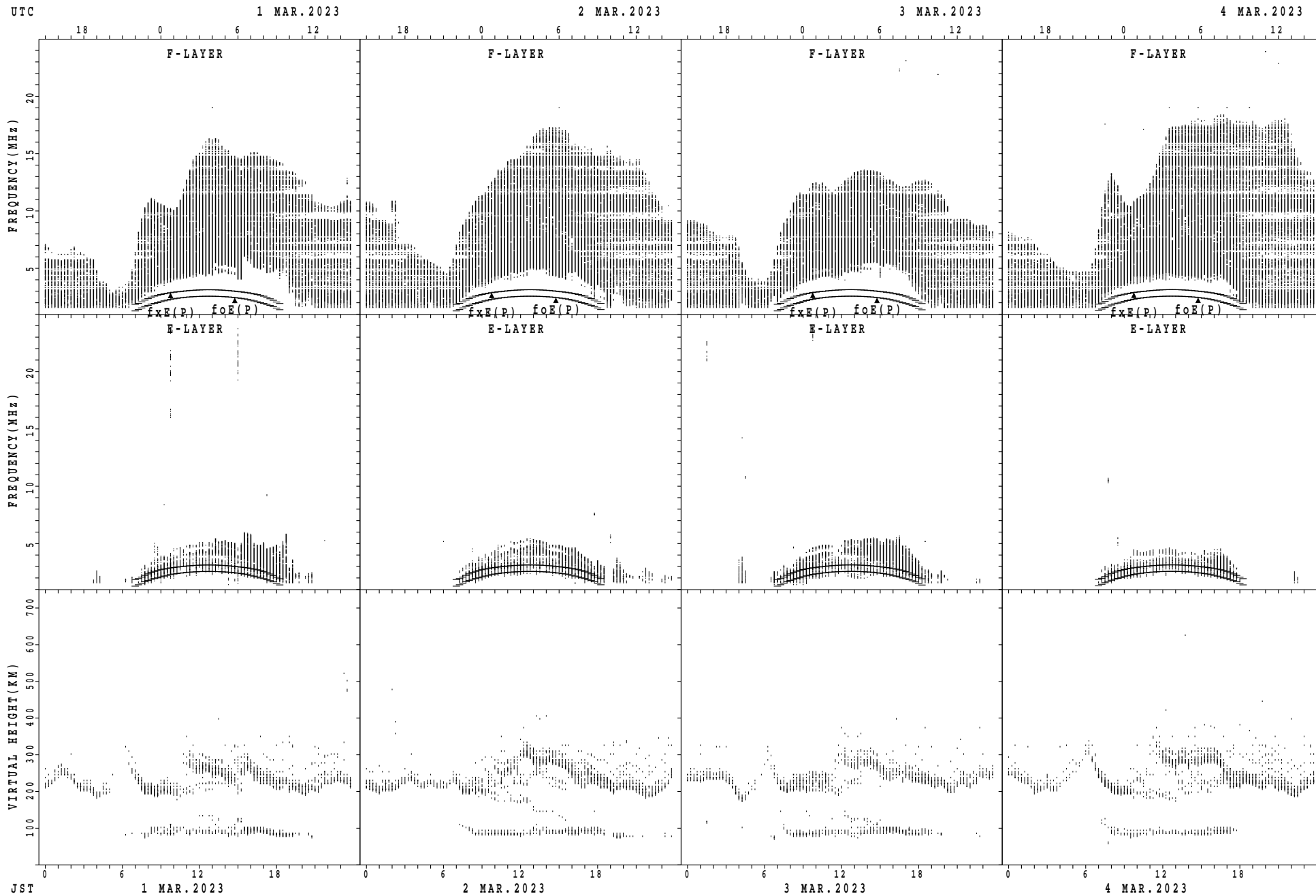
SUMMARY PLOTS AT Yamagawa



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

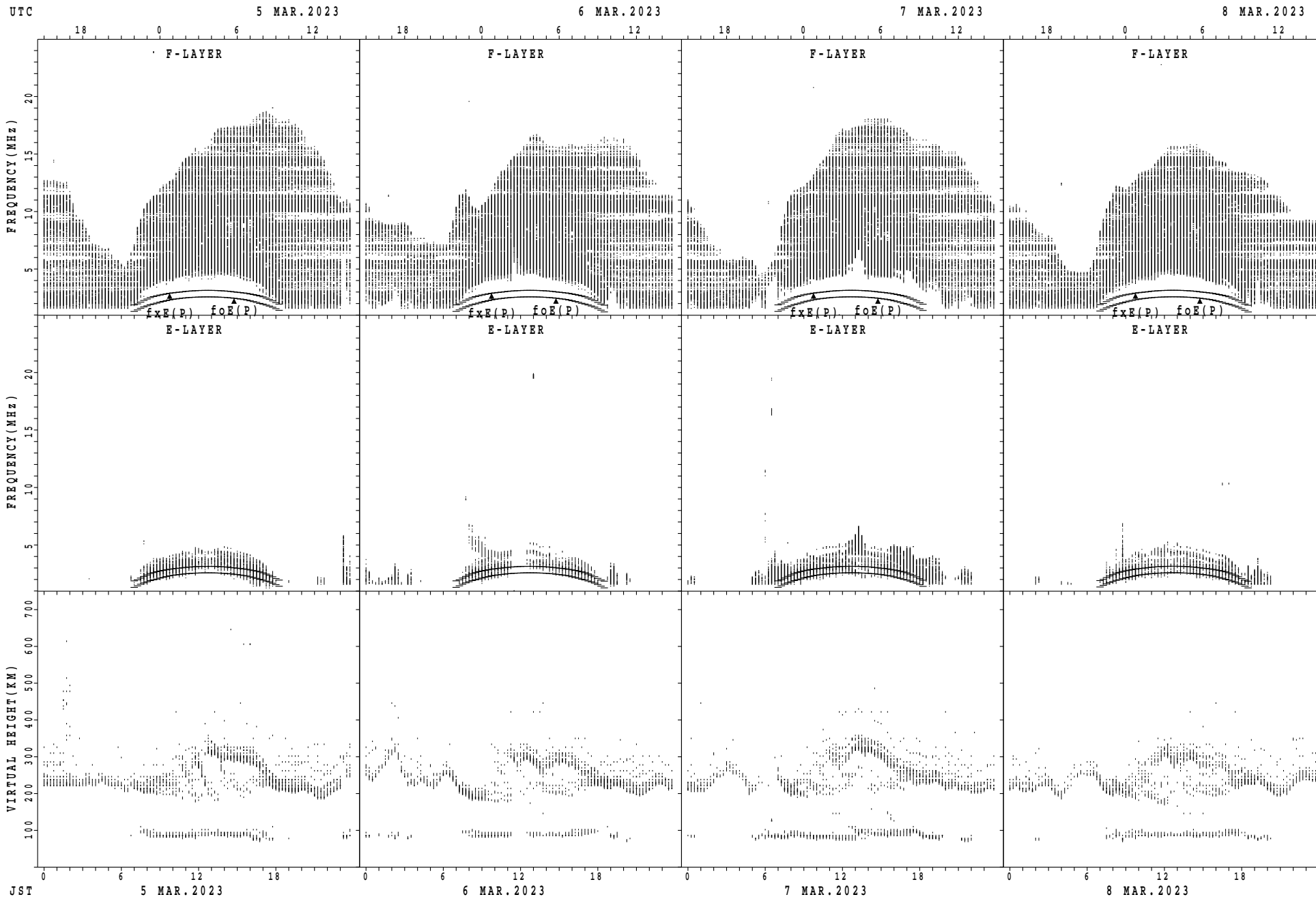


SUMMARY PLOTS AT Okinawa



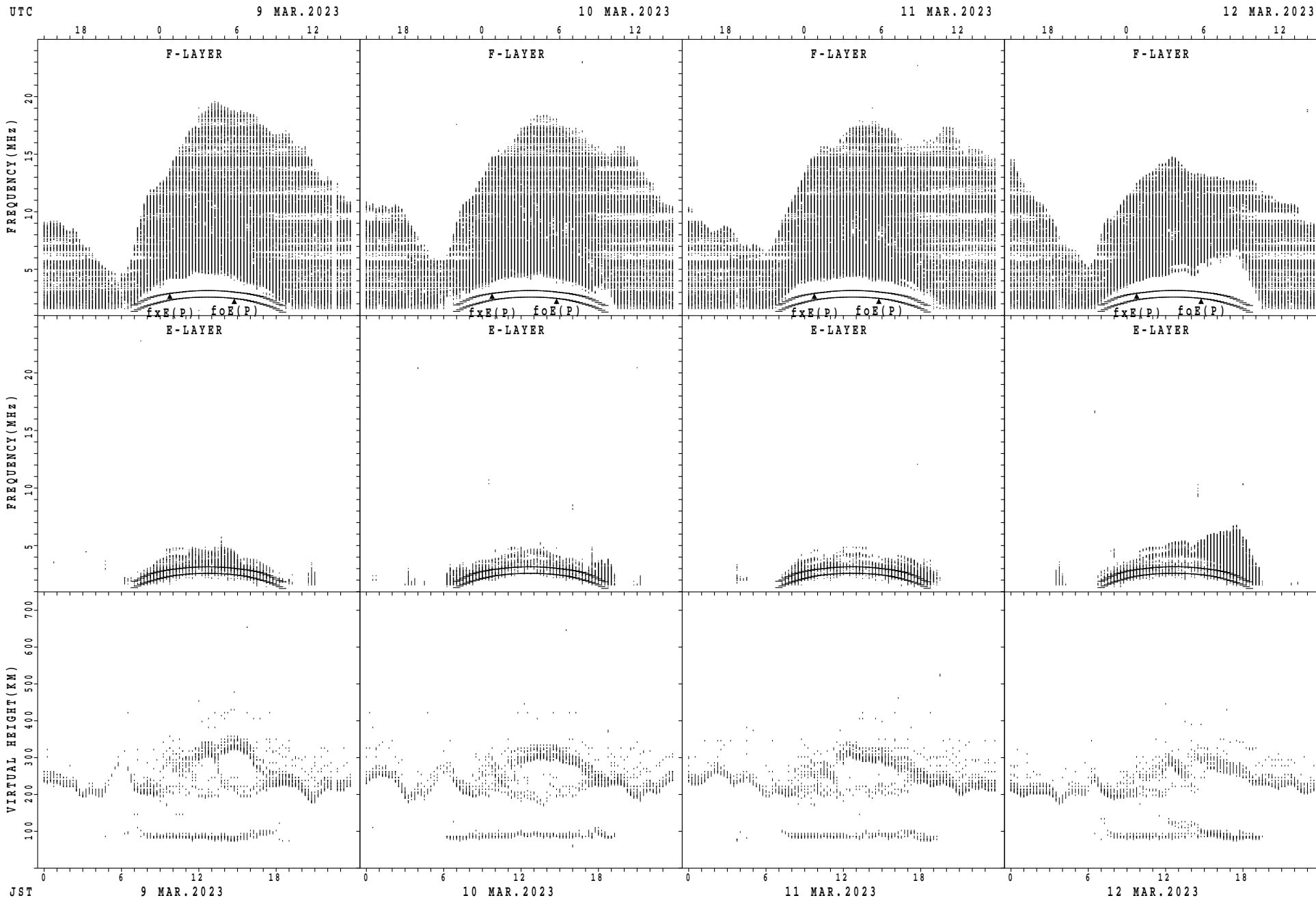
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Okinawa



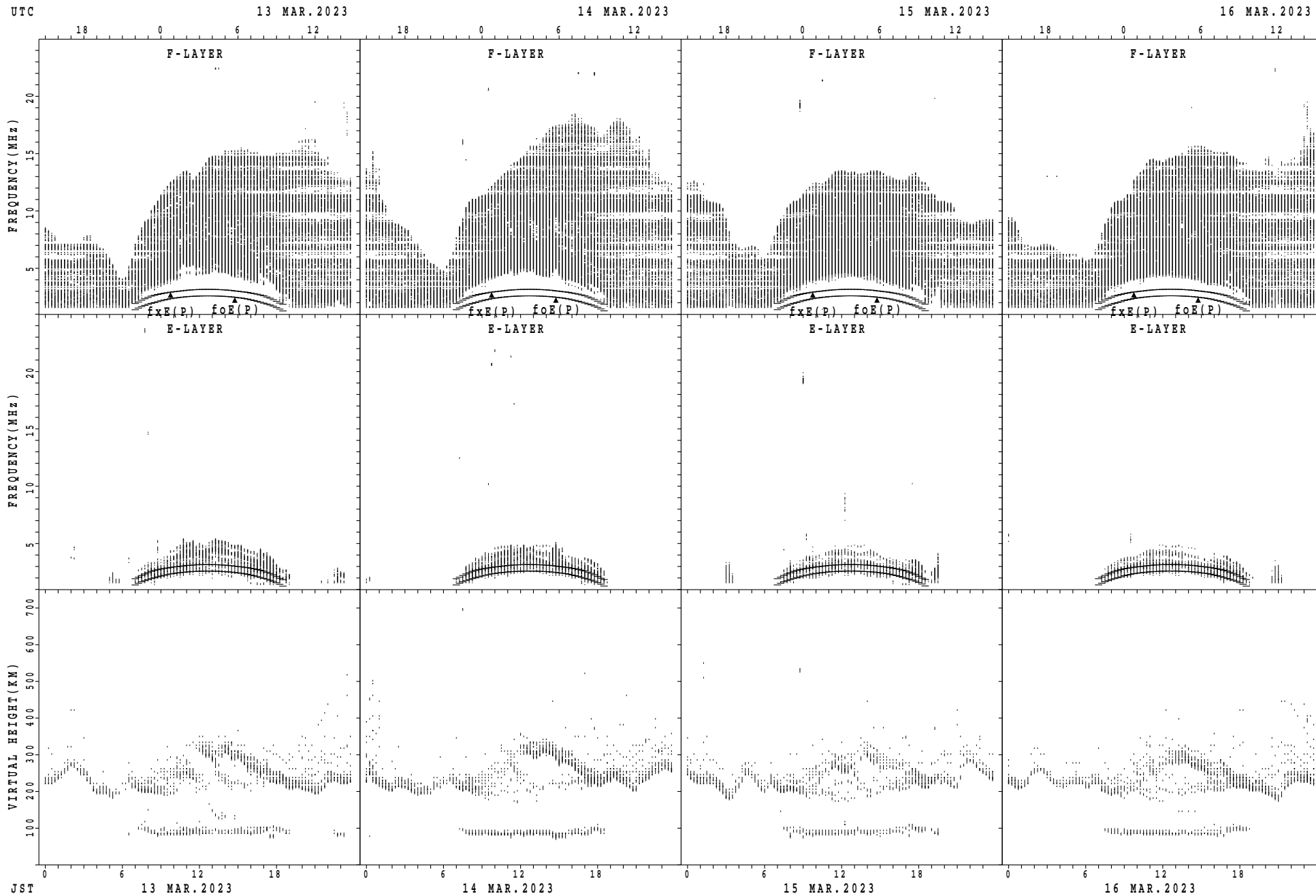
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Okinawa



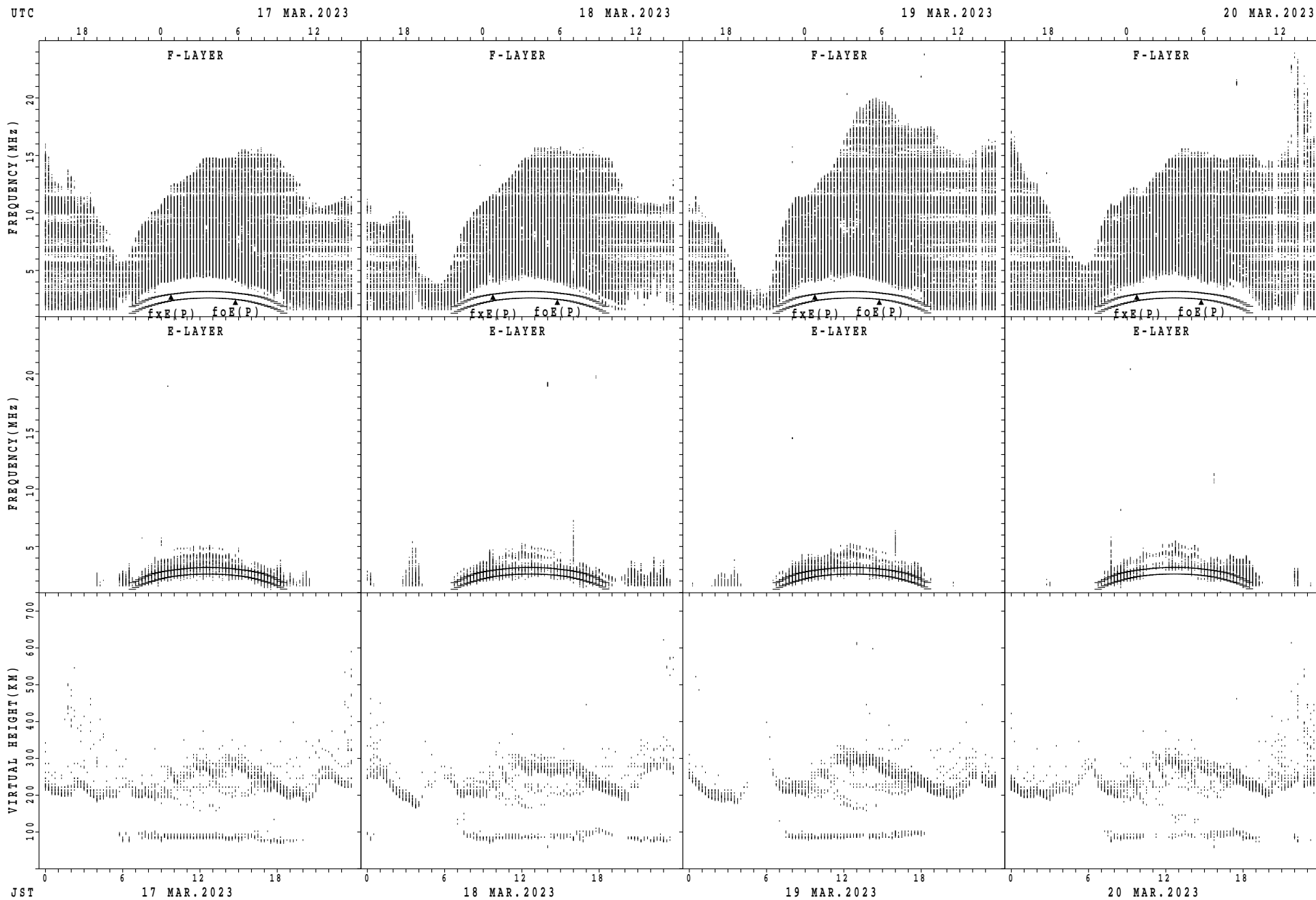
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



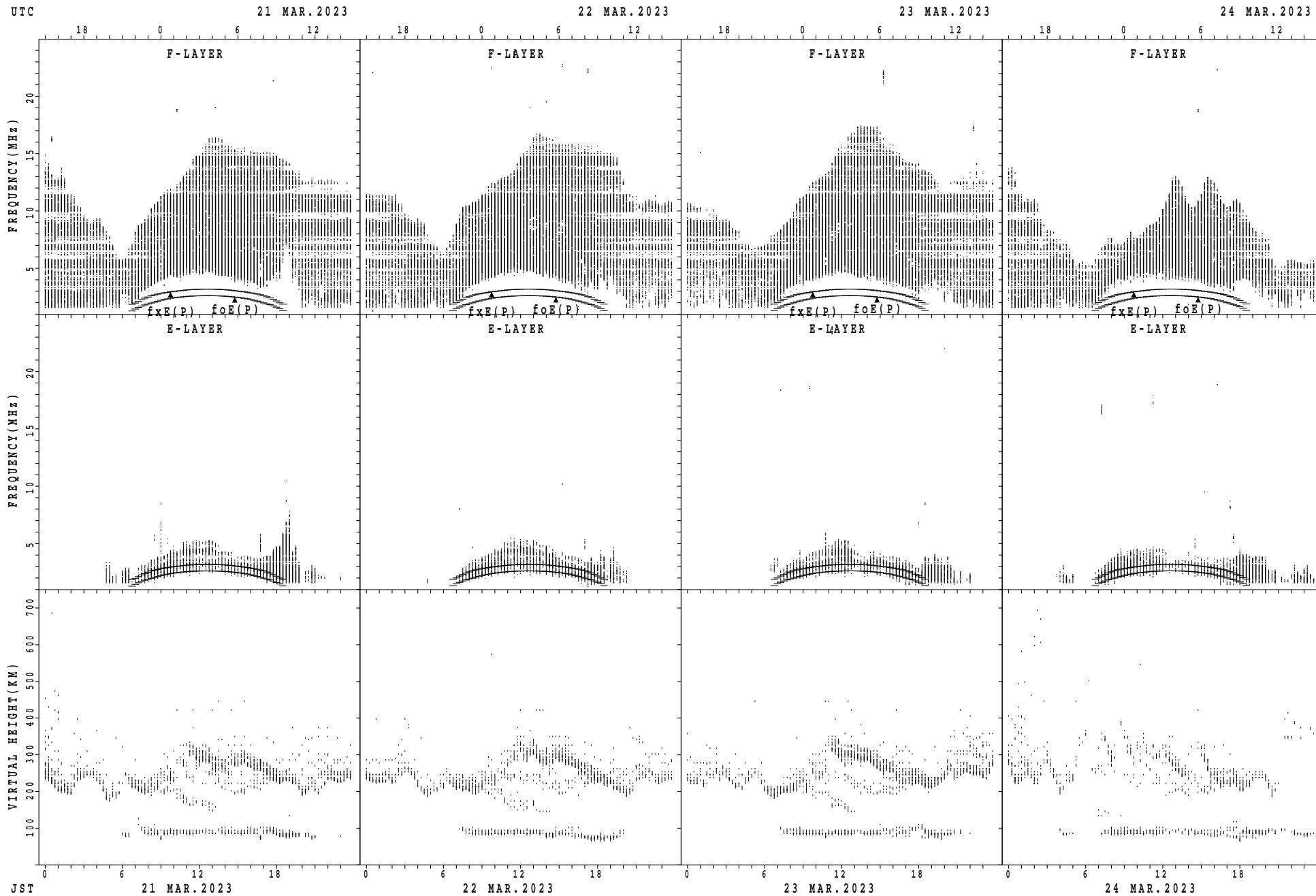
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

## SUMMARY PLOTS AT Okinawa



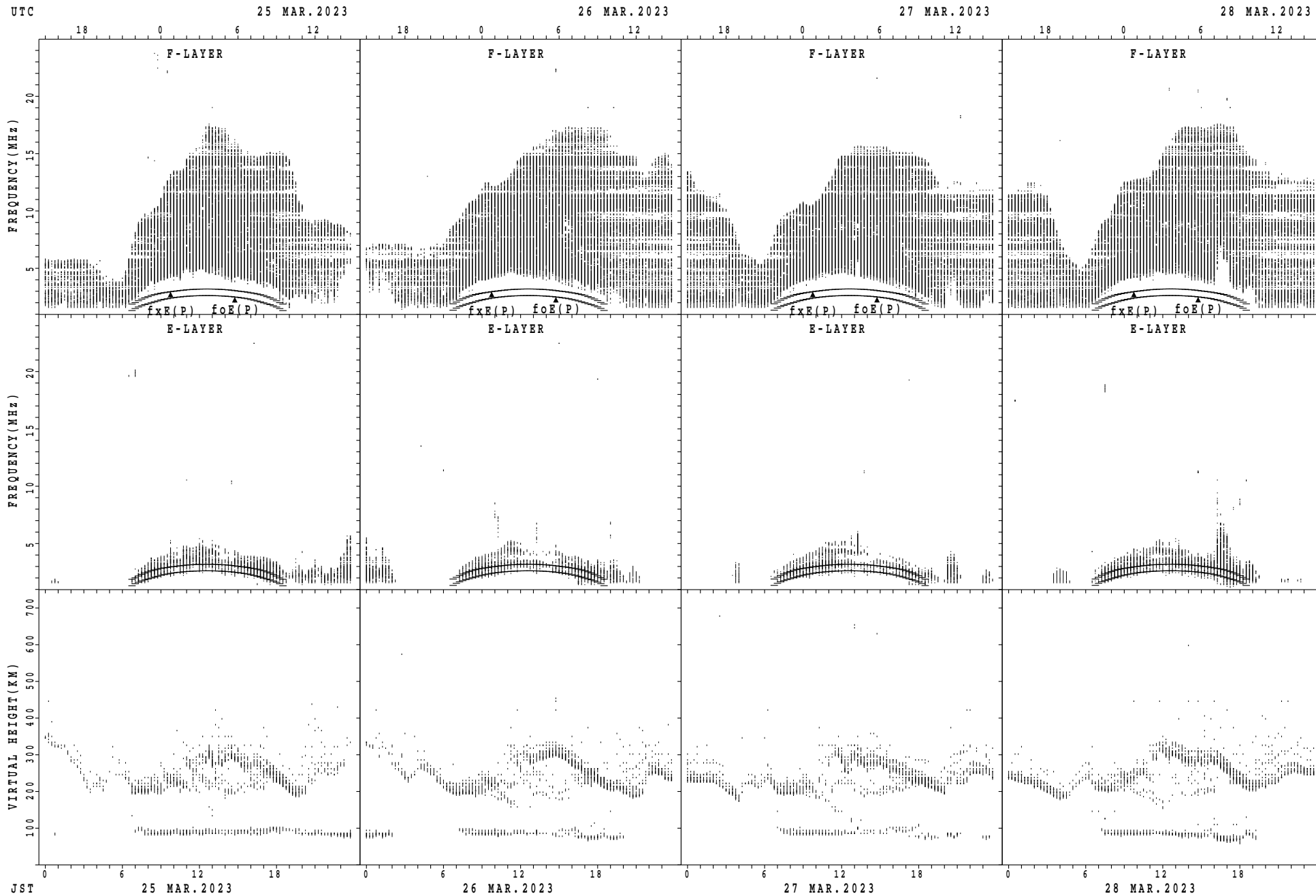
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



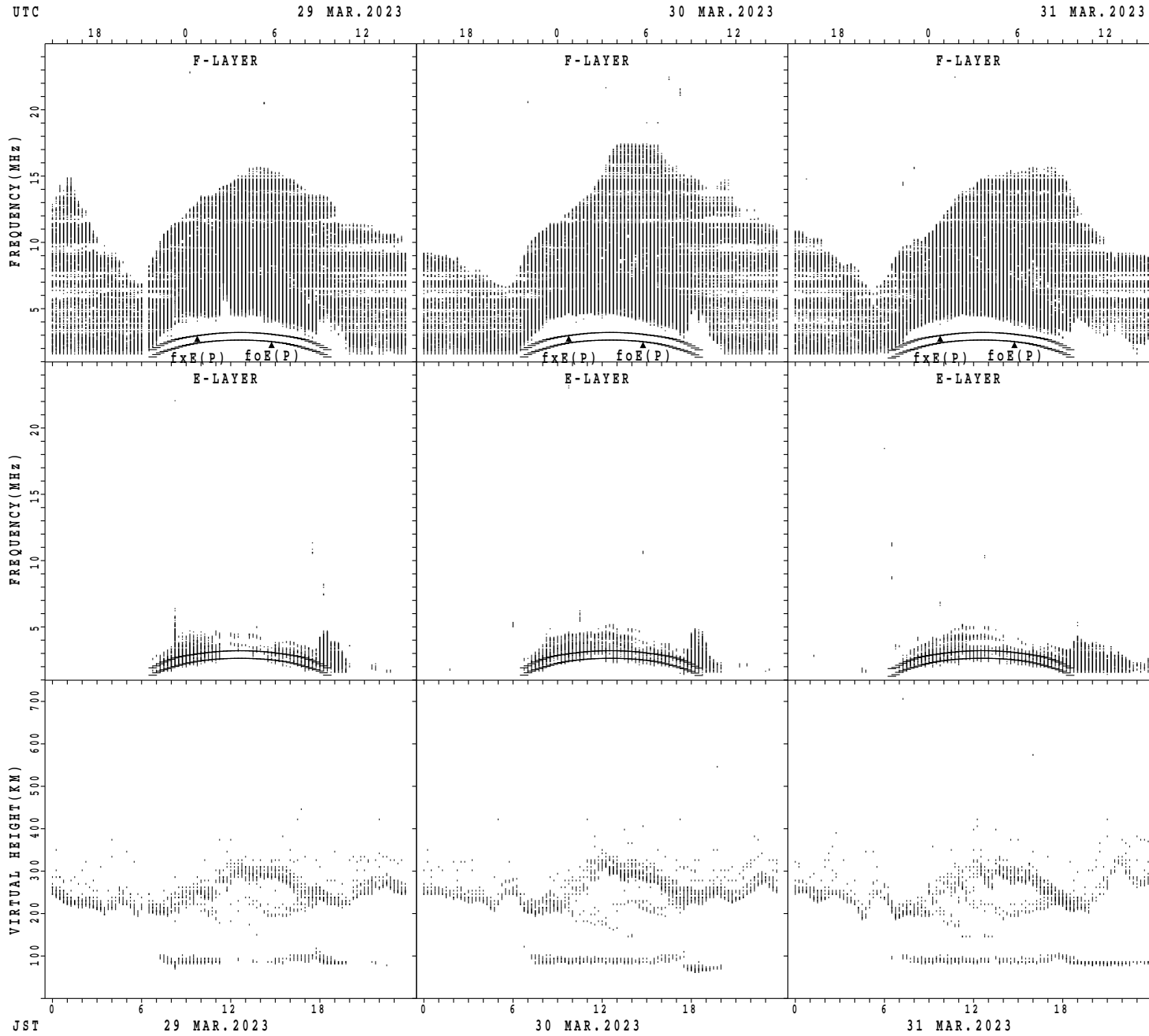
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

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  
 MAR. 2023 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							11	26	30	9						21	30	30	28	10	5	1		
MED							234	219	216	212						234	236	230	232	257	276	288		
U Q							252	226	232	225						240	250	238	241	288	301	144		
L Q							224	212	206	200						224	224	224	227	242	273	144		

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	18	15	10	12	15	6	19	31	31	31	31	31	31	31	31	31	31	29	25	27	22	19	14	17
MED	96	98	96	96	96	97	98	100	98	100	98	98	98	98	98	98	98	96	96	96	96	98	98	96
U Q	96	98	96	96	98	98	137	100	100	100	100	100	100	100	100	100	100	98	98	98	98	98	98	98
L Q	96	96	96	96	96	96	98	98	96	98	96	96	98	98	98	96	96	94	93	94	96	96	96	96

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	30	31
MED	266	256	262	244	242	244	214	208	210	210	214	220	230	226	228	228	226	226	210	202	214	244	246	258
U Q	276	272	274	260	254	268	230	212	216	218	224	230	242	230	236	236	228	230	218	214	230	264	276	280
L Q	248	244	252	232	222	226	208	202	204	202	206	212	220	220	222	222	222	222	206	196	210	224	238	244

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	8	9	8	7	9	6	2	31	31	31	30	26	17	23	25	26	31	31	26	23	18	15	12	11
MED	97	98	96	98	98	98	99	98	98	98	96	98	98	98	96	98	96	98	98	98	98	96	96	96
U Q	98	98	98	98	98	98	100	98	100	98	98	98	98	98	98	98	100	98	98	98	100	98	98	98
L Q	92	95	94	96	98	98	98	98	96	96	96	94	92	96	95	94	96	94	96	96	96	94	94	96

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	10	4	6	2				26	30	23							31	30	31	30	17	11	14	11
MED	302	282	284	274				225	217	220							256	244	232	232	258	296	292	298
U Q	320	291	348	298				234	230	234							264	248	238	236	272	298	300	316
L Q	268	273	266	250				218	208	216							242	238	224	222	245	256	258	282

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	15	8	11	12	11	11	7	26	31	31	31	30	29	31	31	31	31	31	29	27	20	15	14	16
MED	96	98	98	97	98	98	98	98	98	98	98	98	98	98	98	98	98	100	98	98	98	98	98	96
U Q	98	98	98	98	98	98	98	98	100	100	98	98	98	98	98	98	100	100	98	98	98	98	98	97
L Q	94	95	96	95	96	96	96	96	98	98	98	96	96	96	96	96	96	98	94	94	96	96	96	92

MONTHLY MEDIANS OF h'F AND h'Es  
 MAR. 2023 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	28	25	17	16	7	2	1	19	31	31							20	31	31	30	29	29	29	29
MED	273	266	264	252	284	291	258	236	220	230							272	250	232	240	248	256	272	272
U Q	286	281	281	295	348	300	129	250	232	250							280	264	232	250	263	283	288	295
L Q	259	248	244	234	248	282	129	232	208	216							251	240	224	226	232	237	244	253

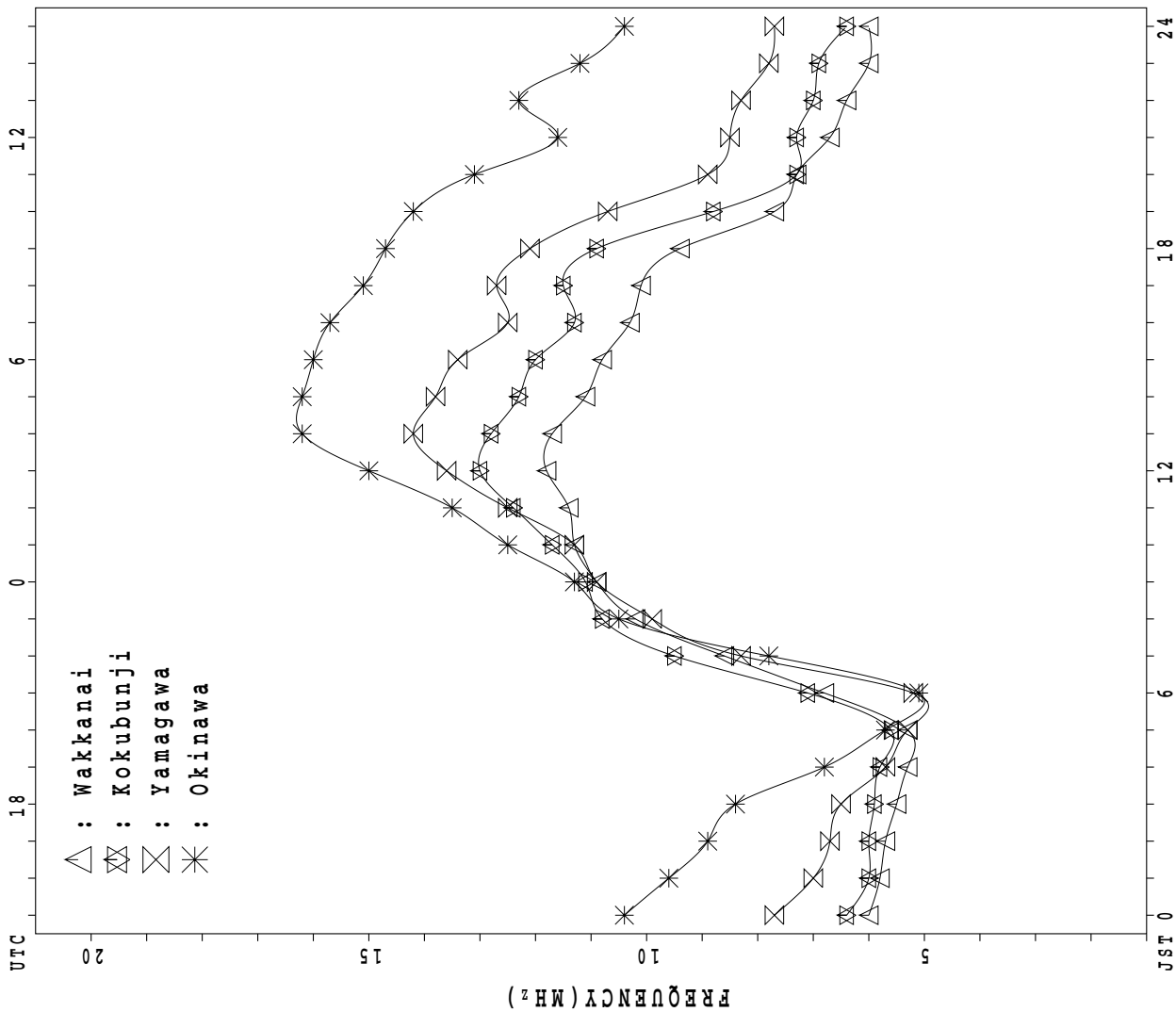
h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	13	5	4	2	6	6	7	24	31	31	31	30	30	30	30	31	31	31	31	30	19	14	14	10
MED	98	96	98	98	98	98	98	96	98	98	98	98	96	96	98	98	98	100	98	98	98	98	98	97
U Q	98	97	98	98	171	98	98	98	100	98	98	98	98	98	98	98	100	100	98	98	98	98	98	98
L Q	96	79	91	98	98	98	96	96	96	98	96	96	92	82	95	96	98	98	94	96	96	96	96	96

MONTHLY MEDIANS PLOT OF fOF2

MAR. 2023

AUTOMATIC SCALING



## IONOSPHERIC DATA STATION Wakkanai

MAR. 2023 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 pSWEEP 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	59	X	X	X	X	52	56												X	X	X	X	58	60
2	57	58	56	56	56	56													98	79	70	61	59	58
3	X	X	X	X	X	X													X	X	X	X	X	X
4	X	X	X	X	X	X													X	X	X	X	X	X
5	X	X	X	X	X	X													X	X	X	X	X	X
6	66	64	64	63	60	57													X	X	X	X	X	X
7	X	X	X	X	X	X													X	X	X	X	X	X
8	X	X	X	X	X	X													X	X	X	X	X	X
9	X	X	X	X	X	X													X	X	X	X	X	X
10	X	X	X	X	X	X													X	X	X	X	X	X
11	X	X	X	X	X	X													X	X	X	X	X	X
12	X	X	X	X	X	X													X	X	X	X	X	X
13	X	X	X	X	X	X													X	X	X	X	X	X
14	X	X	X	X	C	X													X	X	X	X	X	X
15	X	X	X	X	X	X													X	X	X	X	X	X
16	X	X	X	X	X	X													X	X	X	X	X	X
17	X	X	X	X	X	X													X	X	X	X	X	X
18	X	X	X	X	X	X													X	X	X	X	X	X
19	X	X	X	X	X	X													X	X	X	X	X	X
20	X	X	X	X	X	X													X	X	X	X	X	X
21	X	X	X	X	X	X													X	X	X	X	X	X
22	X	X	X	X	X	X													X	X	X	X	X	X
23	X	X	X	X	X	X													X	X	X	X	X	X
24	X	X	X	X	X	X													X	X	X	X	X	X
25	X	X	X	X	X	X													X	X	X	X	X	X
26	X	X	X	X	X	X													X	X	X	X	X	X
27	X	X	X	X	X	X													X	X	X	X	X	X
28	X	X	X	X	X	X													X	X	X	X	X	X
29	X	X	X	X	X	X													X	X	X	X	X	X
30	X	X	X	X	X	X													X	X	X	X	X	X
31	X	X	X	X	X	X													X	X	X	X	X	X
	00	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	29	1												17	31	31	31	31	31
MED	X	X	X	X	X	X													X	X	X	X	X	X
U Q	72	70	69	68	65	64													102	86	81	77	72	68
L Q	X	X	X	X	X	X													X	X	X	X	X	X
	64	64	61	60	59	57													98	83	77	72	67	65

MAR. 2023 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2023 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

$\begin{matrix} H \\ D \end{matrix}$	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	<sup>F</sup> 45	45	43	44	42	<sup>F</sup>	43	67	80	90	100	105	105	104	102	102	98	88	70	62	53	48	<sup>F</sup> 47	<sup>F</sup> 46
2	<sup>F</sup>	47	49	49	49	49	59	79	92	97	104	116	111	116	113	109	101	100	91	72	63	54	52	51
3	50	49	48	48	50	49	64	79	84	108	108	116	117	118	116	110	102	98	83	79	72	70	65	63
4	64	66	63	65	<sup>V</sup> 62	54	56	75	106	116	116	119	119	116	110	110	103	98	94	82	79	67	60	57
5	57	57	58	58	52	54	64	84	94	107	121	123	129	117	117	111	112	109	94	75	71	65	61	60
6	59	57	57	56	53	50	56	80	99	108	104	113	114	109	104	102	104	99	84	75	72	70	65	59
7	58	55	53	53	55	52	67	102	113	114	116	123	134	129	115	115	108	102	95	82	76	72	70	65
8	64	62	60	61	58	58	75	99	112	129	124	124	127	121	116	110	110	106	103	85	70	66	68	66
9	63	59	58	56	55	54	75	<sup>H</sup> 110	116	120	127	129	132	125	122	122	116	105	103	90	78	76	67	61
10	62	59	59	60	62	54	76	101	125	125	124	130	128	131	119	111	113	110	99	94	83	74	67	59
11	56	55	55	53	54	55	73	94	111	115	119	121	130	126	118	119	116	105	98	84	76	75	70	67
12	65	63	62	59	58	53	68	92	115	122	119	117	118	120	119	108	105	111	92	77	78	75	76	74
13	65	63	61	63	62	61	72	97	101	105	116	119	118	118	111	109	107	103	97	83	76	72	67	63
14	61	60	60	59	<sup>C</sup>	<sup>J</sup> 56	<sup>R</sup> 74	92	109	117	112	117	115	120	114	116	115	108	101	83	83	79	72	72
15	72	71	69	68	60	56	73	94	121	119	128	113	123	123	116	110	108	106	96	85	78	69	67	69
16	67	64	63	63	60	58	72	105	123	126	131	134	115	119	102	106	103	100	94	79	72	68	60	60
17	59	58	59	58	57	56	70	86	<sup>H</sup> 93	106	111	115	118	114	107	102	104	106	98	84	72	63	59	56
18	56	58	58	53	52	52	70	83	94	105	111	118	117	112	108	104	101	103	98	80	69	65	56	56
19	58	60	54	52	44	43	64	88	101	107	104	112	105	107	113	102	102	104	95	73	65	64	64	61
20	59	59	59	58	56	57	79	89	104	108	112	113	124	123	116	105	101	97	90	76	78	73	60	58
21	59	61	54	53	55	61	65	82	88	108	120	<sup>C</sup>	133	116	99	99	101	98	91	78	81	70	64	59
22	57	56	53	53	55	56	72	89	105	118	112	108	116	119	108	98	98	103	99	77	70	66	65	63
23	61	57	56	54	53	56	75	90	<sup>V</sup> 104	112	116	114	112	114	106	99	92	89	85	72	70	62	58	54
24	48	46	40	43	42	34	38	47	<sup>E</sup> 39	<sup>G</sup> 43	<sup>E</sup> 44	<sup>G</sup> 45	<sup>G</sup> 50	57	65	69	66	65	64	53	<sup>F</sup> 49	<sup>F</sup> 59	58	60
25	63	65	65	63	56	49	68	76	102	115	109	103	105	118	107	108	107	100	98	79	79	64	63	58
26	59	59	56	54	54	56	76	94	92	102	107	112	110	114	108	98	91	89	83	77	76	70	67	61
27	58	58	56	52	50	50	63	77	85	101	102	101	101	105	103	95	93	91	90	77	76	70	66	65
28	65	63	62	61	56	60	79	82	91	108	111	113	115	116	115	107	102	98	91	79	74	72	70	67
29	68	63	62	61	58	62	69	73	79	92	101	107	116	109	106	97	94	94	90	78	74	70	70	67
30	69	66	62	56	56	58	62	69	78	96	105	109	109	112	107	103	103	94	88	77	74	74	73	71
31	72	70	63	60	54	55	56	63	72	84	91	100	106	105	108	102	96	94	94	86	81	76	66	68
	00	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	30	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31
MED	60	59	58	56	55	55	69	86	101	108	112	114	116	116	110	106	103	100	94	79	74	70	65	61
U Q	65	63	62	61	58	57	74	94	111	117	119	119	124	120	116	110	108	105	98	83	78	73	68	67
L Q	58	57	54	53	52	52	63	77	88	102	104	109	110	112	106	102	98	94	90	76	70	65	60	58

MAR. 2023 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2023 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 348	L 376			L		L									
2									U L 356	U L 436	L	L	L	L	U L 480									
3									L U L 420	L	L	L	L	L										
4									L			L	L											
5								304		L	L	L	L		L									
6										L	L	U L 488	L	L										
7										L	U L 464	L	L	L	L	L								
8										L			L	U L 400	U L 420									
9											L		L	L	L									
10										L	U L 460	U L 452	L	L	L									
11											L	L	L	L	L									
12										L	L	L	L	L	L	L								
13										U L 420	L			L	U L 468			L						
14									U L 388	L	L	L	L	L	L	L		L						
15										L	U L 512	U L 484	U L 462	L	L									
16										L	L	L	U L 432	L			U L 380							
17										L	U L 472	U L 520	U L 452	L			L							
18										L	U L 424	L	L	U L 432	L	L	L	L						
19										L	L	A	L	L	U L 504	L								
20										L	L	L		U L 456	L	L	L							
21										L	L	C	U L 540	L	L	U L 372	L							
22										L	U L 472	L	U L 520	L	U L 444	L	L							
23										L	L	L	L	L	L	L		L						
24							312	364	388	432	440	448	448	468	476	436	L	U L						
25									L	L	U L 476	L	L	L	L	L		L						
26									L	L	U L 484	L	U L 556	U L 552	L	L								
27										U L 436	L	U L 532	L	U L 544	L	L	L	L						
28										L	U L 516	L	L	L	L	L	L	L						
29									L	L	U L 492	L	L	U L 588	U L 520	L	A	L	L					
30									U L 484	U L 496	L	L	L	L	L	L	L							
31									U L 484	L	U L 492	L	L		L	U L 508	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							1	3	6	8	7	8	10	9	3	4								
MED							312	364	388	434	476	478	504	468	476	408								
U Q							U L 484	U L 484	U L 482	U L 492	U L 526	U L 540	U L 524	U L 480	U L 472									
L Q							304	356	420	436	462	452	438	420	376									

MAR. 2023 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2023 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.45°10.0'N LON.141°45.0'E PSWEEP 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	216	280	312	336	348	348	348	328	304	264	A							
2							B	216	276	316	340	348	348	352	344	312	256	A							
3							B	216	276	316	340		A	A	356	352	312	260	A						
4							B	208	280	A	340	348	360	360	352	320	256	A							
5							B	236	300	A	348	368	380		A	360	324	260	A						
6							B	A	A	A	A	A	A		368	340		272	A						
7							B	212	288	332	356	364	368	364	340	300	276	A							
8							B	236		A	324	344	348	368	364	348	320	272	A						
9							B	240	300		A		360	364	360	352	304	276	196						
10							A	244		A	344	352	364	364	356	344	316	272	A						
11							A	256	300	332	356	368	360	348	332	312	272	196							
12							A	236	292	324	364	364	360	348	344	324	264	236							
13								188	240	292	A	344	360	356	352	348	308	264	A						
14								180	244	292	328	336	352	356	348	340	316	264	A						
15								188	244	296	328	344	364	360	348	328	308		232						
16							A	248	292	316	340				A	336	320	280	A						
17							A	236	292	328	344	352	356	348	328	304	276	204							
18							A	256	304	328	344	360	360	356	340	316	276	196	B						
19								196	236	284	324		A	364	356	344	324	272	A	B					
20							A	248	300	320	344	372	380		A	344	320	272	A	B					
21							A	256	304		A	A	A		A	360		324	284	220	B				
22							A	252	312	U A	288	352	368		A	356	344	324	276	A	A				
23							A	252	300	312			A	364	360	340	312	272	212	B					
24								200	248	U A	284	332	348	352	348	332	300	260	A	A					
25							A	A	A	A	A	A	A		348	340	324	272	204	A					
26								196	264	312	A	352	356	360	356	340	316	272	224	A					
27								180	252	A	336	360	364	360	360	344	312	280	220	B					
28								200	264	316	328	356	380	380	356	340	320	264	212	B					
29								184	268	312	344	364	368	380	G	A	A	A	228	A					
30							B	A	244	280	332		A	376	356	344	U A	308	284	A	A				
31							B	A	272	308	336	A	A	364	352	364	332	284	A	196					
	00	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	29	26	23	23	22	25	28	29	29	29	13	1						
MED							188	244	294	328	344	362	360	356	344	316	272	212	196						
U Q							198	254	304	332	356	368	368	360	346	322	276	226							
L Q							182	236	284	316	340	352	358	348	340	308	264	200							

MAR. 2023 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2023 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23											
1	E	B	E	B	E	B	E	B	E	B	G	G	G	G	G	J	A	J	A	J	A	J	A	J	A										
2	E	B	E	B	E	B	E	B	E	B	G	G	G	G	G	J	A	J	A	J	A	J	A	J	A										
3	E	B	E	B	E	B	E	B	E	B	G	G	J	A	J	A	J	A	J	A	J	A	J	A	J	A									
4	J	A	24	18	20	E	B	E	B	E	B	E	B	E	B	G	G	J	A	J	A	J	A	J	A	J	A								
5	J	A	E	B	E	B	E	B	E	B	E	B	E	B	E	B	G	G	G	G	E	B	E	B	E	B	E	B							
6	J	A	15	20	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B						
7	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					
8	J	A	24	22	25	20	16	16	21	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	16	20	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B				
10	E	B	16	16	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B				
11	J	A	20	20	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B				
12	E	B	16	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				
13	E	B	16	16	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B				
14	E	B	16	16	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B				
15	J	A	19	19	21	19	20	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B			
16	J	A	19	20	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B				
17	E	B	16	16	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B				
18	E	B	16	29	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B				
19	E	B	16	16	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B				
20	E	B	16	16	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B				
21	J	A	27	23	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B				
22	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			
23	E	B	16	17	25	23	18	18	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B			
24	E	B	16	16	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B				
25	J	A	22	24	18	27	19	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B			
26	J	A	15	20	27	19	16	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B			
27	E	B	16	19	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
28	E	B	16	16	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
29	E	B	16	16	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
30	E	B	16	16	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
31	E	B	16	15	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23											
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31			
MED	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	
UQ	J	A	19	20	16	19	18	16	22	27	32	37	38	40	36	G	G	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A		
LQ	E	B	16	16	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B

MAR. 2023 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Wakkanai

MAR. 2023 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	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
2	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	G	G	G	40	38	20	19	17	28	20	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	G	G	41	39	28	23	37	36	29	23	21	E 16	E 16	E 16	E 16
4	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	30	32	21	G	G	G	G	G	34	32	28	44	75	22	E 16	E 16
5	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	G	G	G	G	G	22	E 16	E 16	E 16	E 16	E 16	E 16
6	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26	32	34	36	39	U 38	G	G	G	34	G	21	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	26	32	G	G	G	G	G	G	G	G	20	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	G	30	G	39	38	G	G	G	G	36	29	20	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	18	28	36	42	38	38	G	G	G	G	G	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	20	26	31	G	G	G	G	G	G	G	20	E 16	E 16	E 16	E 16	E 16	E 16
11	E 16	E 16	E 16	E 16	E 16	E 16	E 16	17	19	G	G	30	G	G	G	G	G	22	E 16	E 16	E 16	E 16	E 16	E 16
12	E 16	E 16	E 16	E 16	E 16	E 16	E 16	18	26	31	G	G	30	40	G	G	G	23	23	E 16	E 16	E 16	E 16	E 16
13	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	26	31	34	G	28	26	G	G	24	22	29	24	E 16	E 16	E 16	E 16
14	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	G	G	G	G	G	28	24	E 16	E 16	E 16	E 16	E 16
15	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26	G	G	G	G	G	G	G	G	22	22	28	17	E 16	E 16	E 16	E 16
16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	18	G	G	G	G	38	36	37	G	G	22	20	24	E 16	E 16	E 16	E 16
17	E 16	E 16	E 16	E 16	E 16	E 16	E 16	19	27	G	35	G	G	G	G	G	21	G	22	E 16	E 16	E 16	E 16	E 16
18	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	G	G	G	G	G	23	21	17	22	E 16	E 16	E 16
19	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	26	30	35	40	38	G	G	G	G	21	23	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	20	26	G	43	G	G	28	40	G	G	G	23	E 16	E 16	E 16	E 16	E 16
21	E 20	E 16	E 16	E 16	E 16	E 16	E 16	19	G	G	34	35	D 31	C 37	G 28	G 35	G 26	G	24	E 16	E 16	E 16	E 16	E 16
22	E 16	E 16	E 16	E 16	E 16	E 16	E 16	21	28	G	34	G	32	40	31	24	24	20	23	E 16	E 16	E 16	E 16	E 16
23	E 16	E 16	E 20	E 16	E 16	E 16	E 16	21	28	32	38	41	43	G	G	G	G	G	22	E 16	E 16	E 16	E 16	E 16
24	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	30	32	23	G	G	G	G	35	32	G	23	E 16	E 16	E 16	E 16
25	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	25	32	34	35	37	37	29	24	37	30	29	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	22	G	G	34	G	39	G	G	G	37	G	18	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	22	28	33	35	38	G	G	G	G	G	18	17	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	23	28	G	35	G	G	G	G	G	G	28	23	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	22	G	G	G	38	G	G	G	G	34	40	38	30	E 16	E 16	E 16	E 16
30	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	27	32	36	36	39	G	G	G	38	34	19	E 16	E 16	E 16	E 16	E 16
31	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	G	34	40	42	40	G	G	G	G	20	27	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	18	25	G	33	G	G	G	G	G	G	G	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	21	26	32	35	36	38	G	G	G	32	28	24	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	17	G	G	G	G	G	G	G	G	G	G	E 16	E 16	E 16	E 16	E 16	E 16

MAR. 2023 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2023 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	16	18	18	16	13	13	10	16	16	16	16	16	16	16
2	16	16	16	16	16	16	16	16	16	16	17	17	16	14	16	13	16	16	16	16	16	16	16	16
3	16	16	16	16	16	16	16	16	16	16	18	18	21	21	18	16	16	16	16	16	16	16	16	16
4	16	16	16	16	16	16	16	16	16	16	16	17	20	16	16	14	16	16	16	16	16	16	16	16
5	16	16	16	16	16	16	16	16	14	16	16	16	23	23	17	13	15	16	16	16	16	16	16	16
6	16	16	16	16	16	16	16	16	16	15	16	16	25	17	16	16	16	16	16	16	16	16	16	16
7	16	16	16	16	16	16	17	16	16	14	15	14	16	17	16	16	16	16	16	16	16	16	16	16
8	16	16	16	16	16	16	16	16	16	14	16	21	17	18	17	16	16	16	16	16	16	16	16	16
9	16	16	16	16	16	16	18	16	16	16	16	17	18	16	15	16	14	14	16	16	16	16	16	16
10	16	16	16	16	16	16	16	16	16	17	17	17	22	20	19	16	16	16	16	16	16	16	16	16
11	16	16	16	16	16	16	16	16	16	18	20	22	17	16	17	16	16	16	16	16	16	16	16	16
12	16	16	16	16	16	16	16	16	16	17	18	21	22	21	16	16	14	14	16	16	16	16	16	16
13	16	16	16	16	16	16	16	16	16	16	22	20	22	17	16	14	13	12	16	16	16	16	16	16
14	16	16	16	16	16	16	16	16	17	16	22	21	21	21	18	19	14	16	16	16	16	16	16	16
15	16	16	16	16	16	16	16	16	16	18	17	17	17	17	16	16	15	13	16	16	16	16	16	16
16	16	16	16	16	16	16	16	16	15	15	16	19	18	17	15	15	13	12	16	16	16	16	16	16
17	16	16	16	16	16	16	16	16	15	15	16	17	16	15	16	13	16	16	16	16	16	16	16	16
18	16	16	16	16	16	16	16	16	16	16	16	16	17	21	16	14	10	14	16	16	16	16	16	16
19	16	16	16	16	16	16	16	16	16	16	17	21	18	22	16	16	16	10	14	14	16	16	16	16
20	16	16	16	16	16	16	16	16	16	16	17	24	22	17	16	14	14	16	16	16	16	16	16	16
21	16	16	16	16	16	16	16	16	16	18	18	17	22	17	17	15	16	16	16	16	16	16	16	16
22	16	16	16	16	16	16	16	16	14	16	16	17	18	18	15	14	14	16	16	16	16	16	16	16
23	16	16	16	16	16	16	16	16	15	16	16	17	17	22	15	12	14	15	16	16	16	16	16	16
24	16	16	16	16	16	16	16	16	15	14	16	17	16	16	16	15	16	16	16	16	16	16	16	16
25	16	16	16	16	16	16	16	16	15	16	16	18	16	16	14	16	15	16	16	16	16	16	16	16
26	16	16	16	16	16	16	16	16	16	16	16	16	17	18	17	14	12	12	16	16	16	16	16	16
27	16	16	16	16	16	16	16	16	17	20	22	22	22	18	17	16	16	16	16	16	16	16	16	16
28	16	16	16	16	16	16	16	16	16	16	16	23	22	19	20	15	16	16	16	16	16	16	16	16
29	16	16	16	16	16	16	16	16	16	16	19	24	29	23	18	17	16	16	16	16	16	16	16	16
30	16	16	16	16	16	16	16	16	15	22	17	16	23	18	16	16	14	10	14	16	16	16	16	16
31	16	16	16	16	16	16	16	16	16	16	16	18	20	21	16	14	14	14	12	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	16	16	17	18	18	16	15	15	16	16	16	16	16	16	16
U Q	16	16	16	16	16	16	16	16	16	16	18	21	22	21	17	16	16	16	16	16	16	16	16	16
L Q	16	16	16	16	16	16	16	16	15	16	16	17	17	16	16	14	14	14	16	16	16	16	16	16

MAR. 2023 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2023 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	F	272	283	276	284	302	F	310	356	353	336	323	330	319	314	316	322	329	341	316	309	305	305	288	F	F	
2	F	286	278	281	283	295	339	355	351	337	321	314	305	322	309	316	314	325	319	308	296	293	283	281			
3		279	278	266	274	279	288	353	357	327	333	315	305	312	303	302	314	311	320	296	304	282	279	286	255		
4		261	286	265	274	276	V	271	321	321	332	342	328	315	313	316	314	315	322	313	317	287	302	304	276	263	
5		268	268	264	275	270	264	311	328	336	331	317	303	303	305	306	306	300	312	306	298	283	282	275	268		
6		262	248	250	250	263	254	308	337	334	339	310	336	314	309	309	307	310	318	303	295	289	293	278	269		
7		265	260	251	261	274	273	312	335	346	322	310	300	304	302	295	296	305	302	298	292	294	293	288	277		
8		275	275	275	277	277	279	327	336	327	331	307	301	307	292	289	299	306	304	311	307	292	278	278	281		
9		284	283	280	268	270	268	313	H	340	324	312	308	307	307	294	296	292	305	298	304	291	287	286	288	276	
10		270	255	261	275	281	268	315	313	314	322	313	301	294	299	303	292	302	310	300	306	304	299	302	282		
11		269	254	260	258	259	261	325	335	332	307	310	303	293	299	291	298	307	307	309	294	286	298	292	286		
12		281	284	282	291	293	285	315	346	324	322	306	307	292	296	304	306	293	319	308	285	283	275	289	303		
13		288	273	287	285	282	306	329	347	337	317	316	308	296	298	301	301	303	314	319	298	296	301	297	287		
14		277	286	286	288	C	296	J	R	342	338	344	320	324	309	294	298	291	297	303	310	314	281	285	291	265	264
15		263	264	271	286	276	265	327	323	319	328	331	305	295	305	296	300	305	316	315	292	290	271	267	275		
16		283	273	269	277	286	276	303	325	311	313	302	314	313	329	313	308	323	324	325	307	289	299	300	281		
17		282	272	273	285	288	297	338	345	H	326	335	322	307	308	314	307	312	309	319	323	322	318	291	287	269	
18		265	289	301	295	297	302	343	353	329	325	313	314	311	309	310	312	308	318	328	316	298	296	271	262		
19		275	298	297	306	297	271	322	328	338	334	322	318	299	304	313	309	313	324	333	324	290	280	289	282		
20		274	278	285	282	277	272	315	329	331	330	324	293	297	310	312	316	315	327	319	297	296	311	277	265		
21		262	280	260	258	270	317	336	338	317	300	320	C	320	314	308	306	317	324	318	291	301	301	283	288		
22		273	273	259	264	281	280	320	318	322	332	323	314	302	306	303	305	300	316	322	304	273	280	277	284		
23		286	280	270	280	266	287	317	318	V	330	316	325	309	305	309	306	318	315	325	323	288	271	250	248	268	
24		242	245	236	254	246	261	251	262	G	G	G	G	229	237	274	303	297	311	298	271	F	F	246	255	243	254
25		260	268	282	287	301	316	351	346	333	334	321	H	312	298	301	294	295	310	313	320	286	287	278	271	257	
26		270	298	273	268	270	284	325	347	330	322	297	309	303	309	307	308	314	316	312	305	299	285	288	276		
27		272	277	277	287	269	290	334	329	331	329	321	317	313	312	311	316	314	319	313	298	295	292	284	278		
28		273	279	274	290	280	297	342	339	320	318	302	295	296	297	302	304	305	313	316	293	289	284	275	271		
29		280	264	267	277	264	292	335	332	326	324	306	303	306	299	308	305	310	313	314	302	287	275	268	256		
30		264	277	267	271	264	277	322	310	311	314	313	307	296	304	299	304	310	321	312	293	276	272	262	267		
31		273	277	266	282	265	286	292	293	310	313	327	305	304	295	312	313	308	312	314	301	292	292	265	268		
		00	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	30	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED		272	277	271	277	276	282	322	335	329	324	316	307	304	304	306	306	309	316	314	298	290	291	278	275		
U Q		279	283	280	286	283	295	336	346	334	333	323	314	311	310	310	313	314	321	319	306	296	298	288	282		
L Q		265	268	264	268	269	271	313	323	320	316	308	303	296	298	296	300	305	312	308	291	285	278	271	265		

MAR. 2023 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2023 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 413	L 438			L		L									
2									U L 429	L 435	U L	L	L	L	U L 389									
3									L U L 413	L	L	L	L	L										
4									L			L	L											
5							416			L	L	L	L		L									
6										L	L	U L 401	L	L										
7										L	U L 417	L	L	L	L	L								
8									L				L	U L 443	U L 413									
9										L			L	L	L									
10										L	U L 426	U L 420	L	L	L									
11											L	L	L	L	L									
12										L	L	L	L	L	L	L								
13										U L 415	L			L	U L 394									
14									U L 417	L	L	L	L	L	L	L		L						
15										L	U L 391	U L 404	U L 362	L										
16										L	L	L	U L 417	L			U L 423							
17										L	U L 407	U L 383	U L 409	L										
18										L	U L 443	L	L	U L 416	L	L	L	L						
19									L	L	A	L	L	U L 385	L									
20									L	L	L		U L 416	L	L	L								
21										L	L	C	U L 386	L	L	U L 435	L							
22										L	U L 401	L	U L 398	L	U L 417	L	L							
23										L	L	L	L	L	L	L		L						
24							300	332	363	368	379	373	400	366	325	372	L	U L						
25									L	L	U L 401	L	L	L	L	L		L						
26									L	L	U L 409	L	U L 385	U L 369	L	L	L							
27										U L 413	L	U L 389	L	U L 363	L	L	L	L						
28										L	U L 374	L	L	L	L	L	L	L						
29								L	L	U L 388	L	L	U L 363	U L 376	L	A	L	L	L					
30								U L	U L	L	L	L	L	L	L	L	L							
31								354	371	L	L	L	L	L	L	L	L	L						
									U L	L	U L	L	L		L	U L	L	L						
								377	393	L	U 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							1	3	6	8	7	8	10	9	3	4								
MED							300	354	395	407	401	401	393	394	389	398								
U Q								416	417	414	435	412	416	416	413	429								
L Q									U L	L	L	L	U L	U L	L	L	L							
							332	371	381	391	381	383	368	325	372									

MAR. 2023 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2023 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									208	220	228		248		232									
2									208		212	246	238	256	242									
3									202	220	226	230	242	252										
4									216			222	236											
5								210		222	244	216	224		234									
6											210	228	234	224										
7											216	220	244	224	218	218								
8										226			230	216	222									
9											222		244	234	256									
10											218	220	220	222	228									
11											214	212	266	232										
12											232	214	214	230	244	252	220							
13											210	224		228	236		252							
14											216	202	250	266	210	264	230		228					
15											212	240	222	288	222									
16											210	214	224	204	236		222							
17											222	244	220	240	230		224							
18											216	214	252	236	218	238	232	240						
19											208	212	210	228	216	254	248							
20											210	222	228		234	240	232	250						
21												206	244	C	244	218	216	212	226					
22												230	232	214	232	268	234	216	224					
23												222	230	224	228	232	248	228		218				
24												G	G	G	G									
24							496	452						620	524	362	268							
25												222	224	232	214	290	234	218		230				
26												218	228	236	238	260	260	236	228					
27												232	236	254	262	272	232	234	228					
28												222	250	236	274	242	276	248	232	224				
29												210	224	240	246	282	250	232	214	224	232			
30												294	278	264	240	248	254	266	262	238				
31													272	264	232	256	270		254	256	242			
	00	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	4	16	25	29	25	31	27	23	16	9							
MED							496	252	220	222	228	228	242	236	232	230	228							
U Q								373	227	232	240	253	260	256	248	244	236							
L Q								210	209	214	214	220	230	224	222	223	225							

MAR. 2023 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2023 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'E OSWEEP 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	278	274	274	274	254	264 <sup>O</sup>	230	212	196	186	202	216	202	212	212	218	224	210	198	208	214	238	256	276
2	286	280	274	278	262	244	214	202	198	204	192	210	214	202	200	222	216	220	206	194	216	222	262	258
3	260	280	302	278	276	244	200	200	196	204	190	210	216	216	226	226	216	216	226	226	220	244	254	286
4	284	254	274	254	240	248	224	232	210	210	212	200	208	214	224	224	218	224	230	398 <sup>E A</sup>	230	212	252	270
5	278	286	286	282	272	294	234	204	206	194	214	204	210	206	220	222	222	208	198	204	232	244	266	266
6	286	312	330	296	280	290	240	220	212	204	188	210	200	202	210	212	228	212	208	236	230	242	252	260
7	286	272	318	294	268	268	234	218	212	204	190	186	202	208	208	212	216	216	212	222	216	232	244	252
8	262	252	256	264	236	252	218	208	206	192	210	208	196	192	198	214	222	222	214	196	198	252	266	246
9	246	234	250	272	256	280	234	204	200	200	210	224	206	198	206	212	218	214	222	214	212	218	230	256
10	282	288	288	254	236	224	236	210	210	204	200	186	196	202	210	218	224	216	222	224	202	212	224	238
11	270	306	292	300	292	288	202	206	210	196	206	188	194	208	214	212	222	208	208	206	220	230	234	250
12	264	256	246	236	220	226	200	210	204	198	206	194	202	208	210	208	220	222	202	228	232	244	240	220
13	232	258	248	260	238	208	200	204	208	194	180	208	208	194	212	212	224	218	210	210	214	224	234	250
14	264	254	252	246	242	228	206	196	198	192	186	178	184	200	208	208	220	210	210	222	234	234	264	270
15	280	274	242	228	224	268	218	208	202	190	186	196	194	210	196	212	218	214	208	230	208	242	254	258
16	242	250	262	266	240	236	224	216	210	190	188	176	182	218	212	196	220	216	212	214	210	218	230	256
17	260	278	268	258	244	220	202	202	204	202	186	180	186	196	216	200	216	216	202	196	208	214	236	288
18	288	264	230	218	238	234	198	200	208	202	184	194	204	192	220	214	216	216	206	196	202	234	256	288
19	278	240	222	228	220	278	222	212	202	196	A	186	204	190	206	220	222	216	198	186	224	254	254	256
20	270	266	258	260	242	272	210	206	200	214 <sup>E A</sup>	184	208	194	212	202	200	222	212	204	200	238	216	252	288
21	324	260	290	286	278	218	194	206	202	190	184	C	190	202	202	192	210	220	208	222	238	210	236	232
22	266	280	302	288	250	246	208	208	204	186	196	192	198	196	208	190	210	226	212	196	240	222	252	230
23	246	242	278	260	270	238	212	204	200	202	216	218	196	192	218	210	206	212	212	220	276	320	296	278
24	338	298	344	314	284	338	282	260	240	228	204	216	186	200	250	220	234	236	242	250	264 <sup>O</sup>	282 <sup>O</sup>	268 <sup>O</sup>	314
25	294	276	244	222	206	208	204	200	196	200	190	190	182	208	204	222	222	220	216	210	240	212	258	298
26	300	248	254	266	268	242	218	218	204	196	184	202	180	180	224	196	210	216	210	212	230	242	238	270
27	274	270	256	258	278	234	214	208	206	180	208	180	202	200	226	200	206	218	210	210	226	216	244	260
28	268	256	254	244	224	240	210	216	196	192	196	188	188	200	198	208	216	218	212	208	226	240	254	274
29	258	288	274	258	266	240	204	198	198	192	190	186	196	218	A	208	206	230	210	218	230	256	280	292
30	290	252	248	232	284	280	218	208	192	190	198	196	196	198	222	206	212	222	220	220	246	268	300	288
31	268	248	272	256	258	252	228	222	202	236 <sup>E A</sup>	218	190	194	206	216	198	212	224	216	240	246	236	228	270
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	30	31	31	30	31	31	31	31	31	31	31	31	31
MED	274	266	268	260	254	244	214	208	204	196	192	195	196	202	211	212	218	216	210	213	226	234	252	266
U Q	286	280	288	278	272	272	228	216	208	204	206	208	204	208	220	218	222	222	216	224	238	244	262	286
L Q	262	252	250	246	238	234	204	204	198	192	186	186	190	196	206	200	212	214	206	204	214	218	236	252

MAR. 2023 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2023 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'E OSWEEP 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							
								100	100	104	100	102	102	102	108	106	108								
2							B											A							
								108	100	100	100	96	102	102	102	102	102								
3							B											A							
								106	100	98	106			A	104	104	104	98							
4							B											A							
								102	98		A	98	98	98	98	102	102	104							
5							B											A							
								108	98		A	100	100	100		A	100	100	100						
6							B	A	A	A	A	A	A				A								
														100	98		98								
7							B											A							
								100	102	100	100	100	98	100	100	100	102								
8							B											A							
								102		A	100	100	98	100	100	100	102	102							
9							B											A							
								108	106		A		102	100	100	100	100	102	108						
10							A											A							
								108		A	104	102	100	100	100	100	100	104							
11							A											A							
								108	102	102	104	100	100	100	100	100	104	110							
12							A											A							
								102	100	100	100	106	102	102	102	102	102	108							
13																		A							
							134	94	96		A	96	106	102	102	100	102	100							
14																		A							
							150	96	96	98	98	100	98	98	100	102	102								
15																		A							
							136	100	100	100	100	98	96	96	100	102		114							
16							A											A							
								98	94	98	98				A	100	102	102							
17							A											A							
								98	96	96	94	96	100	98	100	100	100	110							
18							A											A							
								100	98	98	100	100	100	98	98	98	104	106							
19																		A							
							128	94	94	96		A	98	102	102	98	104								
20							A											A							
								102	102	96	96	102	102			A	96	98	102						
21							A											A							
								100	92		A	A	A		100		A	104	96	104					
22							A											A							
								102	96	96	100	104		A	108	104	104	102							
23							A											A							
								102	96	96					94	102	100	100	96	100					
24																		A							
							114	100	96	96	102	100	98	96	96	96	96								
25							A	A	A	A	A	A	A					A							
															102	104	104	102	98						
26																		A							
							106	100	96		A	98	98	98	100	98	98	104							
27																		A							
							104	100		100	98	96	96	96	98	98	100	110							
28																		A							
							114	98	94	92	96	100	100	100	98	96	96	104							
29																		A							
							106	102	96	96	98	98	100	106			A	A	A						
30							B	A										A							
								98	96	96		A	A	98	98	98	96	102							
31							B	A										A							
								100	98	98		A	A	98	98		A	100	104						
	00	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	29	26	23	23	22	25	28	28	29	29	12	1						
MED							114	100	97	98	100	100	100	100	100	100	102	105	126						
U Q							135	102	100	100	100	102	100	102	102	102	104	110							
L Q							106	99	96	96	98	98	98	98	99	98	99	104							

MAR. 2023 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2023 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	B	B	B	B	B	B	G	G	96	G	194	G	G	86	84	88	106	86	84	B	B	B	98
2	B	B	B	92	B	B	B	194	G	G	G	188	182	88	84	84	164	134	100	B	B	B	B	B
3	B	B	B	B	96	B	B	G	G	96	96	90	92	94	94	116	104	100	96	94	100	92	92	92
4	92	94	92	B	B	B	B	162	134	98	94	G	G	88	G	118	116	102	94	92	92	92	B	B
5	94	B	B	B	B	B	B	G	G	100	G	G	G	G	G	G	178	B	B	90	86	88	90	
6	136	94	B	90	106	102	B	110	100	94	94	92	96	G	G	96	G	110	102	100	100	96	96	94
7	94	94	B	B	B	B	B	132	116	G	G	G	G	G	G	G	G	118	86	B	B	B	B	B
8	92	92	94	92	B	B	96	104	G	184	180	G	G	G	G	112	170	134	B	102	98	92	96	98
9	B	90	B	B	B	B	B	138	108	100	184	190	G	G	G	G	G	G	B	114	100	90	90	92
10	B	B	B	B	94	B	98	132	104	G	G	G	G	G	G	G	G	126	B	94	B	B	90	84
11	84	86	B	B	B	B	158	98	G	G	94	G	G	90	G	G	G	156	86	86	B	B	94	B
12	90	B	86	B	B	B	150	168	140	G	G	88	186	G	G	G	88	88	88	88	86	86	B	B
13	B	B	B	B	B	B	G	166	128	102	G	94	90	G	88	86	124	108	88	86	86	94	B	B
14	90	B	B	B	96	B	G	G	G	G	G	G	G	G	G	G	170	108	92	B	B	94	B	88
15	86	86	86	86	92	B	150	G	G	G	G	G	G	G	86	86	86	86	90	86	B	B	B	B
16	90	92	B	B	B	B	130	G	G	G	G	94	94	94	G	92	88	82	82	84	90	B	B	B
17	B	B	B	B	B	B	134	140	G	190	G	G	G	G	G	88	130	90	B	B	B	B	B	B
18	B	88	B	B	B	B	138	G	G	G	G	G	G	G	86	86	86	158	86	B	B	B	B	B
19	B	B	B	86	B	B	G	166	160	114	100	98	G	90	92	G	86	86	B	B	B	88	B	B
20	B	B	B	B	B	B	142	166	G	98	G	G	92	88	G	84	G	102	82	B	B	86	B	100
21	88	94	B	B	B	B	172	G	G	98	96	C	88	84	100	92	G	170	86	92	94	84	B	84
22	88	B	B	94	B	B	164	152	G	134	G	96	92	88	88	88	86	84	82	B	90	88	84	B
23	B	90	88	88	94	94	152	166	118	100	94	84	G	86	186	G	176	90	84	88	B	B	B	B
24	B	B	B	B	B	B	G	G	218	108	92	G	G	G	162	148	G	134	98	88	110	B	B	88
25	84	90	90	88	86	B	120	118	100	100	96	96	100	94	90	180	102	98	94	94	104	B	B	86
26	88	94	86	86	B	B	160	G	G	90	G	182	G	G	180	G	86	86	82	84	84	84	88	B
27	B	88	B	86	90	B	148	162	188	148	174	G	G	90	206	G	86	84	86	86	86	B	B	B
28	B	B	B	B	B	B	134	158	G	108	G	G	G	G	G	G	140	162	B	B	B	B	B	B
29	B	B	B	B	B	B	144	G	G	G	120	G	G	94	86	100	156	132	110	102	102	96	B	B
30	B	B	B	B	B	B	156	124	130	104	102	90	G	G	182	104	84	84	82	82	82	84	84	82
31	B	96	B	B	92	B	148	G	106	98	96	98	G	G	96	G	88	118	84	98	98	86	B	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	14	15	7	10	9	2	18	19	15	20	15	16	10	14	17	18	20	30	24	22	19	16	11	14
MED	90	92	88	88	94	98	146	152	118	100	96	96	93	90	92	92	88	109	87	89	92	88	90	91
U Q	92	94	92	92	96		156	166	140	108	120	181	100	94	171	112	132	134	94	94	100	92	94	96
L Q	88	88	86	86	91		134	132	104	98	94	91	92	88	86	86	86	88	85	86	86	86	88	86

MAR. 2023 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Wakkanai

MAR. 2023 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 45°10.0'N LON. 141°45.0'E PSWEEP 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										L3		H1			L1	L2	L2	C2	F1	F1				F1
2			F1					H1				H1	H1	L1	L1	L1	H1	H1	F3					
3				F1						L2	L2	L2	L2	L2	L2	C2	C4	C3	F4	F3	F1	F3	F3	F2
4	F3	F1	F1					H1	H1	C2	L2			L1		C1	C2	C3	F4	F5	F7	F1		
5	F2									C1				C1				H1			F1	F1	F1	FF11
6	FF11	F1		F1	F1	F1		C1	C2	L2	L2	C2	L1			L2		C2	F1	F2	F1	F1	F1	F2
7	F1	F1						H2	C3									C1	F1					
8	F1	F1	F1	F1			L1		C2		H1	H1				C1	H1	H1		F1	F1	F3	F1	F1
9		F1						H2	C2	C2	HC11	H1								FF11	FF11	F1	F3	F2
10				F1			L2	H1	C2									CL11		F2			F1	F1
11	F1	F1					H1	L1			L2			L2				H1	F1	F1			F1	
12	F1		F1				H1	H1	H1			L1	H1				L1	L2	F2	F1	F1	F1		
13								H1	C1	C1		L1	L1		L1	L2	C1	CL22	FF21	F1	F1		F1	
14	F1			F1													H1	C1	F1			F1		F1
15	F1	F2	F1	F1	F1			H1						L1	L1	L2	L2	L2	F1	F1				
16	F1	F1					H1					L2	L2	L2		L1	L3	L3	F3	F2	F1			
17							H2	H1		H1						L2		H1		F1				
18		F1					H1							L2	L2	L2	L2	HL12	L2					
19			F1					H1	H1	C1	C2	C1		L1	L2		L2	L3				F1		
20							H1	H1		C2			L1	L2		L2		C2	L3			F1		F1
21	F3	F1					H1			L1	L1	L1	L2	L2	CL22	L2		H1	L1	F3	F2	F1		F1
22	F1		F1				H1	H1		HC11		L2	L2	L2	L2	L2	L2	L4		F1	F1	F1		
23		F1	F3	F2	F1	F1	HL11	H1	C1	C3	L2	L4		L2	HL11			H1	L1	F1	F1			
24								H1	C1	L1					H1	H1		HL12	L4	F1	F1			F2
25	F3	F2	F1	F2	F1		C1	CL11	C2	C1	L1	L1	C1	L1	L1	H1	C2	C4	L5	F6	F1			F1
26	F1	F1	F1	F1			H1			L2		H1			H1		L1	L1	L3	F1	F1	F1	F1	
27		F1		F1	F1		H1	H1	HC11	H1	H1			L1	H1		L1	L1	L1	F1	F1			
28							H1	H1		C1							H1	H1						
29							H1				C1			L1	L2	CL22	HC11	H1	C1	F1	F1	F2		
30							HC11	C1	H1	C1	C1	L2			HL11	C1	L2	L2	L2	F2	F2	F1	F1	F2
31		F1		F1			HC11		C1	C2	C2	L1			L2		L2	CL22	L2	FF83	F5	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																								

MAR. 2023 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

MAR. 2023 f<sub>XI</sub> (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 54	X 53	X 52	X 50	X 48	X 45													X 91	X 72	X 70	X 61	X 58	X 59
2	X 58	X 57	X 56	X 57	X 57	X 56													X 101	X 86	X 77	X 72	X 64	X 60
3	X 60	X 61	X 60	X 61	X 56	X 54													X 100	X 91	X 80	X 78	X 72	X 70
4	X 70	X 71	X 68	X 68	X 63	X 63													X 106	X 92	X 89	X 80	X 67	X 63
5	X 62	X 62	X 63	X 61	X 60	X 59														X 97	X 87	X 87	X 75	X 68
6	X 67	X 66	X 66	X 67	X 66	X 66														X 92	X 90	X 80	X 76	X 76
7	X 70	X 67	X 64	X 64	X 65	X 65														X 96	X 92	X 86	X 82	X 77
8	X 71	X 67	X 68	X 67	X 62	X 62														X 97	X 88	X 79	X 76	X 77
9	X 78	X 76	X 72	X 66	X 63	X 62														X 99	X 91	X 86	X 80	X 71
10	X 70	X 71	X 69	X 66	X 63	X 62														X 104	X 102	X 82	X 72	X 72
11	X 69	X 66	X 66	X 63	X 64	X 63														X 98	X 94	X 88	X 88	X 86
12	X 82	X 77	X 75	X 75	X 65	X 59														X 89	X 90	X 86	X 88	X 88
13	X 75	X 70	X 70	X 70	X 66	X 61														X 94	X 85	X 83	X 79	X 76
14	X 72	X 71	X 70	X 70	X 64	X 62														X 97	X 95	X 98	X 90	X 93
15	X 93	X 91	X 87	X 74	X 68	X 66														X 90	X 81	X 78	X 79	X 80
16	X 84	X 74	X 71	X 70	X 69	X 66														X 88	X 76	X 74	X 71	X 70
17	X 69	X 67	X 67	X 68	X 64	X 62														X 101	X 66	X 70	X 72	X 67
18	X 66	X 68	X 72	X 67	X 52	X 52														X 94	X 67	X 71	X 70	X 68
19	X 68	X 72	X 73	X 61	X 50	X 46														X 90	X 69	X 72	X 72	X 74
20	X 70	X 68	X 65	X 63	X 62	X 60														X 96	X 78	X 82	X 79	X 74
21	X 72	X 74	X 71	X 67	X 69	X 73														X 102	X 75	X 78	X 79	X 72
22	X 70	X 68	X 65	X 65	X 66	X 67														X 98	X 79	X 80	X 75	X 74
23	X 72	X 70	X 65	X 65	X 61	X 64														X 85	X 78	X 79	X 77	X 70
24	X 67	X 70	X 56	X 57	X 57	X 46														X 72	X 65	X 65	X 67	X 68
25	X 70	X 70	X 74	X 64	X 56	X 41														X 106	X 80	X 82	X 80	X 78
26	X 74	X 78	X 76	X 71	X 73	X 76														X 98	X 79	X 82	X 81	X 78
27	X 75	X 74	X 70	X 70	X 62	X 62														X 94	X 76	X 75	X 74	X 75
28	X 75	X 74	X 72	X 72	X 67	X 60														X 93	X 76	X 78	X 81	X 80
29	X 79	X 74	X 72	X 70	X 69	X 71														X 94	X 79	X 82	X 82	X 80
30	X 76	X 78	X 75	X 72	X 69	X 72														X 87	X 84	X 84	X 83	X 84
31	X 84	X 86	X 76	X 75	X 73	X 71														X 104	X 80	X 75	X 75	X 75
	00	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	31	31	31	31
MED	X 70	X 70	X 70	X 67	X 64	X 62													X 100	X 94	X 80	X 80	X 76	X 74
U Q	X 75	X 74	X 72	X 70	X 67	X 66													X 104	X 98	X 89	X 83	X 81	X 78
L Q	X 68	X 67	X 65	X 63	X 60	X 59													X 96	X 90	X 76	X 75	X 72	X 70

MAR. 2023 f<sub>XI</sub> (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

MAR. 2023 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	48	47	46	44	42	39	48	78	95	91	97	112	129	129	120	114	105	101	85	66	64	55	52	53
2	52	50	50	51	51	50	55	85	92	102	113	120	128	118	117	123	113	107	95	80	71	66	58	54
3	54	55	54	55	50	48	54	83	105	109	114	108	114	121	122	114	102	96	94	85	74	72	66	64
4	64	65	62	62	57	57	70	97	127	136	118	121	137	139	122	119	112	104	100	86	83	74	61	57
5	56	56	57	55	54	53	66	96	110	117	129	140	137	135	133	129	122	120	112	91	81	81	69	62
6	61	60	60	60	60	60	78	106	124	115	116	117	131	122	118	108	108	107	102	86	84	74	70	70
7	64	61	58	58	59	59	69	96	128	121	118	132	137	137	131	124	116	117	108	90	86	80	76	71
8	65	62	62	61	56	56	72	110	119	119	127	127	135	127	123	119	117	114	104	91	82	73	70	71
9	72	70	66	60	57	56	72	108	118	120	128	150	154	146	134	134	128	116	107	93	85	80	74	65
10	64	65	63	60	57	56	70	112	128	125	127	132	130	128	123	115	112	116	105	98	96	76	66	66
11	63	59	60	57	58	57	74	103	110	120	130	135	131	133	133	128	124	116	105	92	88	82	82	80
12	76	71	69	69	59	53	68	92	111	110	119	124	123	121	116	115	109	107	110	83	84	80	82	82
13	69	64	64	64	60	55	68	89	106	108	112	124	125	123	124	123	118	121	112	88	79	77	73	70
14	66	65	64	64	58	56	71	96	112	104	114	121	130	132	126	127	127	124	112	91	89	92	84	78
15	$F^F$ 81	$F^F$ 79	$F^F$ 76	68	62	60	78	102	115	111	114	121	124	125	116	116	111	120	112	84	75	72	73	74
16	78	68	65	64	63	60	75	102	105	116	128	141	133	128	129	124	110	106	101	82	70	68	65	64
17	63	61	61	63	58	56	72	95	104	102	110	126	126	126	122	120	118	121	115	95	60	64	66	61
18	60	62	66	61	46	46	67	90	88	93	110	119	129	128	116	112	116	117	115	88	61	65	63	62
19	62	66	67	55	44	40	60	89	108	101	103	124	137	125	118	122	114	114	113	84	63	66	66	68
20	64	62	59	57	56	54	70	100	112	118	114	120	136	137	128	120	113	119	114	90	72	76	72	68
21	66	68	65	61	63	67	86	99	104	108	122	129	137	138	119	106	106	113	116	96	69	72	73	66
22	64	62	59	59	60	61	75	93	109	114	121	123	127	122	122	111	111	116	115	92	73	74	69	68
23	66	64	59	59	55	58	82	92	106	112	119	128	128	124	116	108	106	105	99	79	72	73	71	64
24	61	64	50	51	51	40	44	52	59	67	57	66	74	82	82	94	86	78	72	66	59	59	61	62
25	64	64	68	58	50	35	68	89	101	116	120	122	116	118	122	110	114	125	128	100	74	76	74	72
26	68	72	70	65	67	70	91	110	108	110	115	125	128	122	122	120	114	116	117	92	73	76	76	72
27	69	68	64	64	56	56	72	90	94	100	109	124	121	122	124	121	109	104	102	88	70	69	68	69
28	69	68	66	66	61	54	73	94	100	110	115	121	132	136	132	127	117	112	108	87	70	72	75	74
29	73	68	66	64	63	65	82	94	97	103	118	130	130	129	124	114	106	108	110	88	72	76	76	74
30	70	72	69	66	63	66	87	100	101	110	116	130	138	138	132	123	116	114	107	81	78	78	77	78
31	78	80	70	69	67	65	76	83	99	108	122	132	133	134	130	126	116	116	110	98	74	69	69	69
	00	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	64	64	64	61	58	56	72	95	106	110	116	124	130	128	122	120	113	114	108	88	74	74	70	68
U Q	69	68	66	64	61	60	76	102	112	117	122	130	136	135	129	124	117	117	113	92	83	77	75	72
L Q	62	61	59	57	54	53	68	89	100	103	113	121	126	122	118	114	109	107	102	84	70	69	66	64

MAR. 2023 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

MAR. 2023 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E PSWEEP 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										LU L 428		L L	L L											
2										LU L 524		L L			L L	L								
3									L			L L	LU L 580	L										
4										L L	L L	L L	L L			L								
5										L L	LU L 608	L L	L L	L L				L						
6										LU L 460		L L	L L	L L										
7										L		U L 592	U L 516	L L	L L									
8											L	L L	L L	L L	L L	L								
9												U L 536	U L 568	U L 504	U L 644	L								
10										L L	L	A U 520	U L 568	L L	L									
11										L L	L L	U L 496	L L	L L	L L	L								
12											U L 552	L L	U L 512	L L	L L	L L								
13											U L 468	L L	L L	L L	L L	L L	L							
14										L L	L L	L L	L L	U L 660	L L	L L								
15											L L	L L	L L	L L	L L	L L								
16										L L	L L	U L 480	L L	U L 628	L L	L L								
17										L L	L L	L L	U L 572	U L 536	L L	L L								
18										L L	L L	L L	L L	U L 540	L L	L L	L							
19									L L	L L	L L	U L 604	L L		U L 472	L L								
20										L L	U L 468		U L 612	L L	L L	L L								
21										L L	L L	U L 468	U L 520	L L	L L									
22										L L	L L	L L	L L	L L	U L 504							L		
23										L L	U L 512	U L 508	U L 580	U L 536	L L	L L	L L	L L						
24							U L 336	372	412	440	468	488	552	596	600	L								
25										L L	L L	U L 508	L L	L L	U L 492	U L 488	U L 424	L				L		
26									L L	L L	U L 508	U L 512	U L 532	U L 512	U L 576	L L								
27									L L	L L	L L	L L	L L	U L 480	U L 532	L L								
28										L L	L L	L L	L L	A U 496	L L	L L	L							
29										L L	U L 560	L L	L L	U L 584	U L 608	L L								
30										L L	L L	L L	U L 560	U L 620	U L 544	L L								
31									L L	U L 508	L L	L L	U L 552	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							1	1	1	4	9	12	12	12	10	2	1							
MED							U L 336	372	412	474	508	530	544	554	560	492	424							
U Q										U L 510	U L 538	U L 586	U L 564	U L 590	U L 608									
L Q										U L 434	U L 468	U L 498	U L 520	U L 512	U L 504									

MAR. 2023 foF1 (0.01MHz)

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## IONOSPHERIC DATA STATION Kokubunji

MAR. 2023 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E 0SWEEP 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	224	288	320	360	376	388	372	352	328	284	A							
2							B	228	284	328	332	364	380	384	376	344	308	A							
3							B	240	296	332	348	364	388	392	360	344	304	196							
4							B	248	308	336	368	U G	B	412	384	380	360	312	A						
5							B	252	316	352	404	404	428	412	G	372	344	296	224	B					
6							B	220	A	A	372	388	B	392	U G	368	344	308	212	B					
7							B	A	A	A	A	G	384	392	400	376	352	300	224	B					
8							B	248	320	352	380	U G	U G	400	380	348		A	232	B					
9							B	260	316	A	U G	384	400	380	388	376	340	292	220	A					
10							B	A	A	A	A	A	388	A	364	348	308	A	B						
11							B	252	312	340	364	376	U G	376	A	328	292	224	B						
12							B	256	308	348	364	376	396	B	U G	376	340	304	228	B					
13							B	256	312	344	344	368	388	388	360	336	296	224	A						
14							B	236	300	320	336	G	B	392	392	A	U G	360	296	220	A				
15							B	244	300	332	352	U G	U G	412	A	U G	U G	344	332	328	300	224	A		
16							B	248	308	332	360	376	384	U G	A	G	332	296	228	A					
17							A	240	304	344	372	U G	A	R	380	360	340	304	220	B					
18							A	252	312	344	360	A	U G	392	B	U G	364	336	296	224	A				
19							188	232	316	352	364	U G	384	372	384	372	340	320	236	A					
20							192	248	308	344	364	U G	B	B	384	368	344	308	228	B					
21							196	244	312	356	364	372	384	388	364	336	312	236	A						
22							192	248	316	352	368	U G	A	388	372	360	328	304	A	A					
23							A	260	320	348	376	A	A	A	A	A	304	240	B						
24							188	248	296	352	A	U A	U A	352	316	364	364	A	284	228	A				
25							B	260	A	348	A	A	U A	356	U A	344	336	300	224	A					
26							A	264	316	332	A	372	A	380	A	348	304	248	B						
27							200	264	312	336	376	A	A	384	372	348	308	A	A						
28							A	280	A	352	392	G	A	A	A	A	348	300	244	A					
29							224	268	316	344	356	392	A	A	384	344	312	252	A						
30							224	280	332	372	A	348	344	R	A	A	340	304	256	A					
31							216	268	320	344	360	G	364	376	388	372	352	304	248	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							9	29	26	27	25	22	20	23	24	29	30	25							
MED							196	248	312	344	364	376	388	384	368	344	304	228							
U Q							220	260	316	352	374	388	392	392	376	348	308	238							
L Q							190	242	304	332	358	364	378	376	360	336	296	224							

MAR. 2023 foE (0.01MHz)

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## IONOSPHERIC DATA STATION Kokubunji

MAR. 2023 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	J 33	AJ 19	AJ 32	AJ 35	AJ 26	AJ 16	A	G	G	G	39	42	43	43	G	43	J 50	AJ 44	AJ 30	19	E 16	E 16	E 16	E 16	
2	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	BE 16	25	G	G	G	41	43	43	40	39	34	J 36	AJ 36	AJ 30	E 16	E 16	E 16	E 16	
3	E 16	BJ 15	AE 16	BE 16	BE 16	BE 16	BE 16	G	G	G	39	42	42	42	44	45	J 49	AJ 54	AJ 22	16	22	30	62	16	
4	J 15	AJ 27	AJ 16	AJ 16	AJ 21	AJ 18	AE 16	G	G	G	GE 42	B 43	42	G	G	G	GJ 33	AJ 30	AE 16	BE 16	BE 16	BE 16	BE 16	BE 16	
5	J 44	AJ 28	AJ 26	AJ 18	AE 16	BE 16	BJ 17	G	G	G	G	G	G	G	G	40	J 41	GE 16	BE 16	BE 16	20	40	16	16	
6	E 16	BJ 18	AJ 20	AJ 32	AJ 27	AJ 34	AE 16	26	33	J 41	G	GE 46	B 42	G	G	G	G	25	J 25	AJ 20	16	18	16	16	
7	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	BJ 15	26	32	J 35	AJ 45	G	G	G	G	G	G	25	J 18	AE 16	BE 16	BE 16	BE 16	BE 16	
8	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	BE 16	G	G	G	G	G	G	G	G	G	36	26	E 16	BJ 26	AE 16	BE 16	BE 16	BE 16	
9	E 16	BJ 32	AJ 26	AJ 26	AJ 17	AJ 17	AE 16	G	33	38	G	46	34	GJ 31	40	G	G	29	J 27	AE 48	29	33	63	28	
10	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	BE 16	26	33	38	41	J 75	AJ 67	AJ 57	G	G	GJ 33	AE 16	BE 16	BE 16	22	22	20	19	
11	19	E 16	BE 16	BE 16	BE 16	BJ 14	AE 16	G	G	G	G	G	G	GJ 58	A	G	G	26	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	
12	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	BE 16	G	G	G	G	G	GE 42	B	G	G	G	29	E 15	BE 16	BE 16	BE 16	BE 16	BE 16	
13	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	BE 16	G	G	G	38	38	44	G	43	G	40	34	J 70	AJ 57	AJ 34	42	28	18	18
14	E 16	BE 16	BJ 17	AE 16	BJ 16	AE 16	BE 16	26	G	G	GE 41	B 46	43	J 47	32	32	28	J 28	AE 24	BE 16	BE 16	BE 16	BE 16	19	
15	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	BE 16	G	G	G	G	G	31	40	G 28	24	G	25	J 23	AE 16	BE 16	BE 16	BE 16	BE 16	
16	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	17	G	G	G	G	G	G	41	29	36	34	31	J 20	20	19	16	16	16	
17	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	18	26	G	G	G	G	40	J 34	AJ 34	G	G	24	J 27	20	20	16	16	16	19
18	J 21	A	E 19	BE 16	BE 16	BE 16	BE 19	28	G	G	G	46	43	E 42	B 31	G	34	J 35	22	21	20	19	16	16	
19	E 16	BE 16	BE 16	BE 16	BE 16	BJ 15	A	G	G	G	G	G	41	42	GJ 44	AJ 40	AJ 29	J 44	AE 25	16	49	35	26	26	
20	E 16	BE 16	BE 16	BE 16	BE 17	BE 16	G	G	G	G	GE 43	BE 44	B 33	GJ 33	A	G	35	30	J 20	53	35	24	22	16	
21	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	G	27	G	G	45	G	G	42	G	GJ 26	AJ 26	17	J 18	13	19	16	16	16	
22	E 16	BE 16	BJ 19	AE 16	BE 16	BE 16	G	G	G	39	42	G	40	G	G	G	GJ 40	AJ 34	AJ 21	19	E 16	BE 16	BE 16	BE 16	
23	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	19	G	G	G	G	37	41	GJ 32	AJ 42	AJ 33	29	G	J 17	16	16	16	16	16	
24	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	G	G	G	G	38	40	36	G	39	38	G	26	J 21	22	20	18	36	20	
25	E 16	BE 18	BE 16	BE 17	BE 16	BE 17	GJ 34	A	GJ 50	AJ 42	AJ 60	AJ 45	AJ 38	AJ 36	G	33	J 27	26	27	21	62	46			
26	20	J 17	AJ 31	AE 16	BJ 18	AE 16	22	G	G	J 36	AJ 42	G	42	GJ 34	AJ 61	AJ 29	AJ 24	AE 26	BE 16	BE 16	BE 16	BE 16	BE 16	BE 16	
27	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	G	G	G	G	42	58	42	J 32	AJ 38	34	34	29	J 22	21	25	16	16	16	
28	E 16	BE 16	BE 16	BE 16	BJ 25	AE 16	J 22	26	35	G	G	42	56	J 63	AJ 44	AJ 29	G	GJ 29	16	16	16	16	16	16	
29	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	G	G	G	G	42	G	40	44	34	31	25	28	J 20	26	22	62	87	27	
30	J 26	AJ 32	AE 16	BE 16	BE 16	BE 16	G	G	G	G	40	39	40	38	40	32	35	29	J 22	22	32	26	19	16	
31	E 16	BE 16	BE 16	20	19	20	G	G	G	38	42	J 51	43	G	G	39	G	30	J 20	24	26	53	54	52	
	00	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	BE 16	BE 16	BE 16	BE 16	BE 16	16	G	G	G	G	G	E 40	G 41	G	G	G	29	J 22	20	16	16	16	16	
U Q	16	J 18	AJ 16	AJ 16	AJ 17	AJ 16	17	26	G	36	42	42	43	43	J 40	39	34	J 33	AJ 28	AJ 25	22	26	22	19	
L Q	E 16	BE 16	BE 16	BE 16	BE 16	BE 16	G	G	G	G	G	G	G	G	G	G	G	26	E 17	BE 16	BE 16	BE 16	BE 16	BE 16	

MAR. 2023 foEs (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

MAR. 2023 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	16	16	16	16	16	16	19	21	28	19	18	15	14	16	16	16	16	16	16	16
2	16	16	16	16	16	16	16	15	16	20	24	26	27	24	29	22	15	16	19	16	16	16	16	16
3	16	16	16	16	16	16	16	16	16	19	23	21	32	26	25	19	18	17	16	16	16	16	16	16
4	16	16	16	16	16	16	16	16	16	18	22	42	40	21	23	18	21	21	16	16	16	16	16	16
5	16	16	16	16	16	16	16	16	16	18	21	22	35	33	22	17	16	16	16	16	16	16	16	16
6	16	16	16	16	16	16	16	16	18	19	19	27	46	31	22	19	20	16	17	16	16	16	16	16
7	16	16	16	16	16	16	16	15	16	17	19	20	23	19	22	22	17	16	16	16	16	16	16	16
8	16	16	16	14	16	16	16	16	16	18	18	20	24	20	24	18	17	18	16	16	16	16	16	16
9	16	16	16	16	16	16	16	16	17	18	23	20	24	22	22	16	16	16	16	16	16	16	16	16
10	16	16	16	16	16	16	16	16	16	18	22	26	29	30	21	20	21	18	16	16	16	16	16	16
11	16	16	16	16	16	16	16	14	19	18	22	19	21	19	19	17	17	15	16	16	16	16	16	16
12	16	16	16	16	16	16	16	16	16	18	22	22	20	42	27	24	21	15	15	16	16	16	16	16
13	16	16	16	16	16	16	16	16	16	18	22	24	24	20	25	19	19	15	16	16	16	16	16	16
14	16	16	16	16	16	16	16	16	16	20	24	41	29	30	28	28	16	14	14	16	16	16	16	16
15	16	16	16	16	16	16	16	16	17	20	20	23	23	23	20	19	16	16	14	16	16	16	16	16
16	16	16	16	16	16	16	16	16	18	18	22	24	30	20	23	18	16	15	16	16	16	16	16	16
17	16	16	16	16	16	16	16	16	16	16	22	22	24	22	19	17	16	16	16	16	16	16	16	16
18	16	16	16	16	16	16	16	16	17	19	21	18	23	42	23	18	16	16	16	16	16	16	16	16
19	16	16	16	16	16	16	16	16	15	19	22	29	24	34	30	18	16	16	16	16	16	16	16	16
20	16	16	16	16	17	16	16	17	21	20	20	43	44	24	20	25	16	15	16	16	16	16	16	16
21	16	16	16	16	16	16	16	16	18	21	22	22	24	35	27	17	17	16	14	16	16	16	16	16
22	16	16	16	16	16	16	16	16	18	21	22	23	23	30	23	25	19	16	16	16	16	16	16	16
23	16	16	16	16	16	16	16	16	18	22	20	26	25	23	22	18	16	16	16	16	16	16	16	16
24	16	16	16	16	16	16	16	16	16	18	21	18	28	21	21	18	18	16	16	16	16	16	16	16
25	16	16	16	16	17	16	17	16	16	20	28	22	20	24	22	20	17	16	16	16	16	16	16	16
26	16	16	16	16	16	16	16	16	20	20	20	24	25	23	21	18	16	15	16	16	16	16	16	16
27	16	16	16	16	16	16	18	14	17	20	21	25	28	25	21	18	20	14	16	16	16	16	16	16
28	16	16	16	16	16	16	18	16	18	21	25	25	31	28	22	19	16	16	16	16	16	16	16	16
29	16	16	16	16	16	16	17	17	17	20	26	22	35	32	26	21	18	17	16	16	16	16	16	16
30	16	16	16	16	16	16	16	16	17	25	27	27	22	32	23	21	17	16	16	16	16	16	16	16
31	16	16	16	16	16	16	16	16	18	18	27	29	32	32	28	21	19	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	17	19	22	23	25	24	22	19	17	16	16	16	16	16	16	16
U Q	16	16	16	16	16	16	16	16	18	20	23	26	31	32	25	21	19	16	16	16	16	16	16	16
L Q	16	16	16	16	16	16	16	16	16	18	20	21	23	21	21	18	16	15	16	16	16	16	16	16

MAR. 2023 fmin (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

MAR. 2023 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	290	282	296	295	308	299	319	340	356	349	322	309	311	310	308	318	310	325	321	298	305	300	280	285
2	295	291	283	284	300	307	324	355	358	329	329	308	309	298	295	310	312	322	318	311	296	303	302	277
3	277	285	286	297	302	298	318	348	336	333	328	298	294	289	299	309	309	311	310	303	277	283	289	270
4	268	280	281	294	277	283	297	328	326	337	320	290	296	302	292	297	304	305	301	294	297	302	282	273
5	247	250	271	281	277	266	299	339	334	319	303	309	296	290	290	294	297	304	312	298	278	306	281	273
6	262	257	244	269	270	283	308	341	340	330	317	297	310	293	300	292	299	310	313	305	293	282	284	300
7	291	272	258	265	272	295	309	322	338	319	290	292	286	287	285	288	285	299	305	293	292	296	297	292
8	291	277	283	303	278	275	316	352	338	309	309	293	299	285	281	290	293	301	309	305	292	291	274	278
9	296	303	295	299	280	279	310	350	329	310	287	298	294	278	275	283	287	298	295	290	285	293	297	276
10	266	264	268	277	265	287	296	326	323	312	294	291	285	282	287	289	288	309	296	293	311	307	289	286
11	278	267	273	267	254	263	305	339	326	301	291	296	283	282	288	290	293	307	295	289	286	285	291	297
12	303	290	287	311	300	295	324	339	326	317	304	301	285	292	287	293	297	289	316	283	274	283	289	317
13	303	285	284	292	306	300	333	347	334	309	292	303	290	284	291	296	292	305	328	304	281	297	296	299
14	284	290	295	304	300	304	331	344	342	327	296	284	289	289	284	286	292	305	311	291	276	285	267	260
15	$\begin{matrix} F \\ 276 \end{matrix}$	$\begin{matrix} F \\ 266 \end{matrix}$	$\begin{matrix} F \\ 287 \end{matrix}$	294	274	284	307	339	333	308	302	286	299	293	287	293	290	304	321	289	271	269	268	279
16	312	291	280	279	289	291	313	338	328	298	299	305	301	296	307	310	317	319	320	311	283	285	294	284
17	288	280	280	297	300	299	338	342	333	334	307	303	302	302	297	299	305	319	335	348	283	273	291	276
18	271	281	315	338	292	292	333	354	332	314	306	296	303	303	302	294	308	310	329	331	271	278	283	267
19	274	299	330	335	318	270	318	332	337	322	297	292	310	296	284	301	302	310	334	321	270	274	278	294
20	290	281	286	275	285	264	302	328	323	332	300	286	295	300	295	302	302	319	337	318	279	288	291	269
21	265	289	271	260	267	298	338	349	327	306	295	292	298	304	305	294	295	310	325	336	257	285	296	293
22	279	280	274	266	279	295	333	328	327	317	307	302	307	291	291	289	296	309	317	326	282	280	276	288
23	285	288	285	290	274	273	348	329	331	321	298	301	298	293	297	292	306	320	323	303	260	265	275	252
24	237	270	242	248	285	237	240	239	234	274	252	269	283	294	281	304	314	308	300	298	267	256	252	245
25	253	261	288	326	288	304	346	343	329	323	315	311	295	287	304	288	292	304	320	316	266	281	272	274
26	260	280	291	277	269	285	329	338	333	320	296	297	306	293	292	290	293	306	320	320	274	283	290	281
27	275	283	285	302	275	285	332	344	331	311	300	306	294	289	297	307	308	308	313	313	289	274	275	279
28	286	292	286	294	308	278	330	338	322	311	298	287	289	290	290	296	298	302	320	307	261	267	274	280
29	283	277	274	271	276	282	330	339	327	300	298	307	292	292	292	296	294	305	323	309	263	269	270	276
30	266	274	278	280	274	265	331	323	311	312	289	293	289	289	293	290	299	313	328	287	271	266	262	266
31	272	299	271	269	285	273	313	322	299	310	303	298	290	290	286	295	295	310	316	321	285	266	270	268
	00	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	278	281	283	290	280	285	319	339	331	317	300	297	295	292	292	294	297	308	318	305	279	283	282	278
U Q	290	290	287	299	300	298	332	344	336	327	307	303	302	296	297	301	306	311	323	318	289	293	291	288
L Q	266	272	273	271	274	273	308	328	326	309	295	292	289	289	287	290	293	304	310	293	271	273	274	270

MAR. 2023 M(3000)F2 (0.01)

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## IONOSPHERIC DATA STATION Kokubunji

MAR. 2023 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 421	L	L	L	L										
2										L 396	L	L			L	L								
3									L		L	L	L	L	L									
4										L	L	L	L	L		L								
5										L	L	L	L	L	L			L						
6										L 418	L	L	L	L										
7										L	L	L	L	L	L									
8											L	L	L	L	L	L								
9											L	L	L	L	L	L								
10											L	L	L	L	L	L								
11											L	L	L	L	L	L								
12											L	L	L	L	L	L								
13											L	L	L	L	L	L	L							
14											L	L	L	L	L	L	L							
15											L	L	L	L	L	L	L							
16											L	L	L	L	L	L	L							
17											L	L	L	L	L	L	L							
18											L	L	L	L	L	L	L	L						
19											L	L	L	L	L	L	L	L						
20											L	L	L	L	L	L	L	L						
21											L	L	L	L	L	L	L	L						
22											L	L	L	L	L	L	L	L						
23											L	L	L	L	L	L	L	L						
24											L	L	L	L	L	L	L	L						
25											L	L	L	L	L	L	L	L						
26											L	L	L	L	L	L	L	L						
27											L	L	L	L	L	L	L	L						
28											L	L	L	L	L	L	L	L						
29											L	L	L	L	L	L	L	L						
30											L	L	L	L	L	L	L	L						
31											L	L	L	L	L	L	L	L						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	1	1	4	9	12	12	12	10	2	1							
MED							U 291	L 337	366	390	401	387	384	376	368	382	393							
U Q										U 408	L 418	U 396	L 394	U 389	L 384									
L Q											U 372	L 377	U 376	L 367	U 364	L 353								

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## IONOSPHERIC DATA STATION Kokubunji

MAR. 2023 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									212	208		262	262	254	236										
2									224	242	258	278		280	260										
3									228			228	282	286	260										
4									220	226	238	248	270		274										
5									224	270	262	272	282	262			230								
6									210	220	220	274	292												
7									220		258	242	262	278											
8										232	266	278	230	242	240										
9											266	260	240	302	280										
10									220	246	238	238	270	274											
11									228	226	232	248	294	296	256										
12										256	240	292	252	256	268										
13										222	262	278	278	286	266	256									
14									216	284	290	286	280	296	276										
15										248	246	264	252	286	274										
16									220	248	230	258	304	268	260										
17									216	224	272	248	264	262	250										
18									226	258	282	268	258	248	280	266									
19									216	210	296	290	254		246	272									
20									222	224		292	258	236	248										
21									222	220		242	246	252	234										
22									226	238	264	250	270	286	254		272								
23									230	240	238	256	252	254	244	250	250								
24							460	496	490	360	476	394	338	306	344	246									
25									238	240	236	230	272	252	242	258	252								
26									220	238	236	250	246	256	274	272									
27									216	224	234	272	244	246	276	248									
28									244	236	284	286	260	280	256	244									
29									230	266	264	280	274	288											
30									238	294	292	270	300	274	282										
31									256	258	254	274	260	292	288	266									
	00	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	10	25	26	30	31	29	29	22	6	2							
MED							460	496	224	224	244	260	264	270	274	263	257	241							
U Q									230	238	264	272	278	286	286	274	266								
L Q									216	220	232	240	248	254	250	250	250								

MAR. 2023 h'F2 (KM)

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## IONOSPHERIC DATA STATION Kokubunji

MAR. 2023 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 A 286	276	262	E A 264	238	226	228	210	202	178	216	218	222	218	208	230	222	218	208	202	224	218	262	280
2	256	252	274	276	246	236	216	208	204	204	190	216	218	226	216	238	228	224	212	208	230	224	226	260
3	272	276	270	258	228	226	216	212	210	218	218	204	214	212	242	236	222	234	224	230	214	244	248	264
4	276	268	246	238	236	252	256	220	216	202	194	210	234	204	228	206	228	218	228	206	222	214	224	262
5	E A 332	E A 320	284	264	264	280	252	212	214	204	196	194	226	220	206	228	234	226	218	202	246	244	238	256
6	282	312	336	302	282	258	246	222	210	202	190	196	218	204	224	216	232	230	220	222	232	216	256	246
7	246	258	286	276	264	242	238	222	214	202	206	188	192	212	224	220	220	238	218	222	236	232	230	250
8	232	244	258	230	242	264	238	218	212	208	202	194	188	210	212	214	224	226	222	216	220	224	250	266
9	106	244	244	236	246	278	244	208	204	202	218	210	192	204	204	236	228	230	226	258	224	248	238	250
10	282	292	254	220	234	254	252	228	218	210	196	A 202	198	206	230	224	236	220	240	226	202	232	254	
11	272	300	286	276	304	284	228	206	210	210	200	202	180	206	220	224	232	232	214	218	220	218	250	246
12	242	250	244	226	202	236	220	210	214	212	188	210	192	212	214	220	224	230	224	210	264	238	246	226
13	220	248	272	250	222	212	212	214	216	208	186	222	210	212	202	224	230	242	220	216	248	238	244	248
14	262	256	254	242	228	226	222	214	220	194	180	196	224	228	234	220	230	230	216	210	240	244	242	292
15	274	262	228	212	252	246	232	212	216	204	198	234	222	204	212	214	230	242	214	208	222	258	286	266
16	234	234	256	256	246	234	238	218	200	194	188	196	188	198	230	214	224	228	220	198	214	234	248	258
17	258	264	270	248	226	230	216	214	210	202	186	206	206	204	216	218	236	234	216	194	180	274	250	270
18	294	278	228	206	214	250	226	206	208	192	178	200	222	218	202	208	228	242	214	190	210	262	262	296
19	284	244	220	208	222	278	220	220	208	198	186	172	236	234	204	216	226	240	216	196	214	276	298	262
20	254	266	238	266	256	292	226	222	220	210	186	214	212	222	204	208	226	238	216	220	222	248	248	288
21	286	256	272	278	284	218	222	220	204	198	238	170	200	220	210	200	230	236	228	204	204	248	248	234
22	262	266	284	298	256	236	216	214	208	202	212	204	202	184	200	218	224	240	226	194	230	268	242	242
23	248	244	270	254	250	286	218	210	212	202	188	202	206	198	208	204	222	232	220	206	312	270	268	316
24	272	276	300	336	258	374	288	260	216	218	220	212	210	208	220	224	232	234	226	232	220	282	322	336
25	318	300	260	208	254	218	216	212	210	208	224	192	210	194	198	204	200	242	224	204	214	248	300	270
26	302	266	262	238	290	264	220	220	208	198	192	182	214	188	240	208	228	234	222	196	206	256	248	262
27	274	270	264	244	246	232	222	212	206	194	206	182	218	198	200	238	224	234	228	214	220	250	262	274
28	260	256	256	240	228	214	222	220	216	202	198	190	240	A 214	200	224	236	224	208	204	278	278	268	
29	266	266	280	262	266	250	212	218	210	206	210	232	222	214	204	210	222	236	232	220	220	292	294	290
30	292	270	262	252	254	282	222	214	214	204	202	202	188	210	196	210	232	234	226	216	284	302	288	294
31	282	248	270	246	246	256	218	218	208	208	208	202	208	200	214	228	226	232	226	216	204	E A 286	274	E A 306
	00	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	30	31	30	31	31	31	31	31	31	31	31	31	31
MED	272	265	262	249	246	250	222	214	210	202	198	202	210	209	212	218	226	234	220	210	222	248	250	263
U Q	284	276	274	266	258	278	238	220	216	208	210	210	222	218	220	228	230	238	226	220	232	270	274	288
L Q	254	250	254	236	228	230	218	212	208	198	188	194	200	200	204	208	224	230	216	202	214	232	242	250

MAR. 2023 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

MAR. 2023 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT.35°43.0'N LON.139°29.0'E pSWEEP 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	100	100	100	100	100	106	106	102	108	104	A						
2							B	104	100	100	100	100	100	100	108	106	106	A						
3							B	106	100	100	100	100	104	104	108	108	108	104						
4							B	106	100	96	96	B	E	B	172	106	102	102	108	A				
5							B	112	104	102	102	106	110	106	106	102	102	106		B				
6							B	106	A	A	100	100	B	110	106	104	104	104		B				
7							B	100	A	A	A	100	104	104	104	104	104	110		B				
8							B	106	106	100	100	100	98	98	98	102		110		B				
9							B	106	102	A	102	102	102	102	102	100	100	100		A				
10							B	A	A	A	A	A	104	A	102	102	106	A		B				
11							B	106	102	102	100	100	100	100	A	100	100	108		B				
12							B	106	102	100	100	100	100	B	100	106	104	110		B				
13							B	104	102	100	100	100	100	100	100	100	104	104		A				
14							B	102	98	98	98	B	104	108	A	A	104	106		A				
15							B	102	102	102	98	A	A	A	A	100	100	108		A				
16							B	104	100	100	100	100	100	A	A	100	100	100		A				
17							A	100	100	100	100	100	A	100	100	100	102	102		B				
18							A	102	102	100	100	A	100	B	100	102	102	106		A				
19							140	104	102	102	102	98	98	118	112	106	106	106		A				
20							148	110	100	100	98	B	B	102	A	106	106	106		B				
21							126	104	100	100	100	100	100	114	108	100	102	108		A				
22							138	102	102	102	102	102	A	102	104	100	106		A		A			
23							A	104	104	104	102	A	A	A	A	A	106	108		B				
24							136	102	100	102	A	102	100	100	102	A	102	104		A				
25							B	104	A	100	A	A	A	100	100	102	102	106		A				
26							A	102	100	100	A	100	A	110	A	106	106	110		B				
27							144	100	100	100	100	A	A	100	100	104	104		A		A			
28							A	114	A	100	98	A	A	A	A	102	102	108		A				
29							158	100	100	100	100	100	A	A	104	104	108	108		A				
30							146	102	102	102	A	100	100	A	A	110	106	106		A				
31							128	100	100	100	100	102	102	104	106	106	102	104		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							9	30	26	27	25	21	20	22	22	28	30	25						
MED							140	104	100	100	100	100	100	103	102	102	104	106						
U Q							147	106	102	102	100	101	104	106	106	106	106	108						
L Q							132	102	100	100	100	100	100	100	100	100	102	104						

MAR. 2023 h'E (KM)

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## IONOSPHERIC DATA STATION Kokubunji

MAR. 2023 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	94	92	92	94	94		G	G	G	174	164	140	130		120	114	104	100	84		B	B	B	B				
2	B	B	B	B	B	B	B	150		G	G		160	152	142	138	144	136	106	96	96		B	B	B	96				
3	B	92		B	B	B	B	B	G	G		202	180	116	156	130	112	112	106	100	102		B			B				
4	90	90	94	90	90	94		B	G	G	G	B	180	132		G	G	G	106	98		B	B	B	B	B				
5	92	92	94	102		B	94		G	G	G	G	G	G		G	106	104			B	B			B	B				
6	B	108	108	104	100	102		B	158	102	98		G	G	B	138		G	G		118	92	94	94	94	B	B			
7	B	B	B	B	B	B		120	102	100	104	98		G		G		G	G			B	B	B	B	B	B			
8	B	B	B	B	B	B		B	G	G	G	G	G	G	G		G		104	172		100		B	B	B	B			
9	B	94	92	90	102	96		B	G		114	100		188	94		90	198		G	122	104	100	98	96	94	96			
10	B	B	B	B	B	B		B		104	102	100	98	96	98	108		G	G	G		B	B		98	90	88	86		
11	86		B	B	B	B	100		B	G	G	G	G	G	G		94		G	G		B	B	B	B	B	B			
12	B	B	B	B	B	B	B	B	G	G	G	G	G	G	B	G	G	G			110		B	B	B	B	B	B		
13	B	B	B	B	B	B	B	B	G	G		130	114	192		114		126	144	104	96	96	94	90	88	88				
14	B	B	94		94		B	B	B		166			190	164	96	96	166	112	92	100		B	B	B	B	92			
15	B	B	B	B	B	B	B	B	G	G	G	G		94	92	92	92		G	G		146	110		B	B	B	B		
16	B	B	B	B	B	B		136		G	G	G	G	G	G		98	96	132	120	104	88	88	86		B	B	B		
17	B	B	B	B	B	B		160	166		G	G	G	G		98	96	96		G	92	122	90	88		B	B	94		
18	94	98		B	B	B	B	194	178		G	G	G	G		96	184		94		122	106	104	102	86	86		B	B	
19	B	B	B	B	B	B	98		G	G	G	G	G		124	126		98	108	112	100	98		B	96	92	92	B		
20	B	B	B	B	B	B		G	194		G	G	G	B		92	90		G		112	106	88	98	98	112	92		B	
21	B	B	B	B	B	B		G	142		G	G	178		G	194		G		G	92	130	106	102	90	88		B	B	
22	B	B	94		B	B	B	G	G		G		176	94	98	96		182	146	120	108	86	86		B	B	B	B		
23	B	B	B	B	B	B		152		G	G	G		100	96	96	94	90	90		G		90		B	B	B	B	B	
24	B	B	B	B	B	B		B	G	G	G	G		108	102	100		G		204	90		126	108	104	108	108	98	98	
25	B	96		B	B	B	B	B	G		104		100	100	100	102	108	110		G		106	104	98	100	100	96	98		B
26	98	104	96		B	B	B	146		G	G	108	100		96	94	90	90	90	90		B	B	B	B	B	B	B	B	
27	B	B	B	B	B	B		B	G	G	G	G		176	94	98	96		182	146	120	108	86	86		B	B	B	B	
28	B	B	B	B	84		B	150	98	98		G	G		98	92	92	92	90		G	G		92	94		B	B	B	B
29	B	B	B	B	B	B		G	G	G	G		120		104	98	98	98	96	118	90	86	102	98	98	98	98		B	
30	92	94		B	B	B	B	G	G	G	G		100	104	100	100	94	96	206	118	110	104	100	98	102					
31	B	B	B		96	96	94		G	G	G		118	108	108	112		G		192		120	110	102	100	96	102	98		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23						
CNT	7	10	8	6	8	7	9	10	6	9	14	15	22	21	19	18	18	28	25	21	17	15	11	11						
MED	92	94	94	94	95	96	146	154	102	108	111	102	100	102	96	108	110	112	100	98	98	96	96	96						
U Q	94	98	95	102	98	100	156	166	104	157	174	160	140	131	108	132	136	121	105	101	100	98	98	98						
L Q	90	92	94	90	91	94	107	104	100	100	100	96	96	96	92	96	96	105	91	88	88	90	92	92						

MAR. 2023 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

MAR. 2023 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

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

MAR. 2023 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2023 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 64	X 56	X 58	X 54	X 50	X 44	X 44													X 106	X 86	X 78	X 72	X 76
2	X 76	X 72	X 62	X 59	X 60	X 56	X 52													X 114	X 99	X 99	X 89	X 71
3	X 67	X 68	X 67	X 64	X 62	X 51	X 48													X 108	X 93	X 88	X 80	X 78
4	X 77	X 73	X 70	X 65	X 58	X 56	X 57													X 141	X 135	X 136	X 120	X 91
5	X 80	X 79	X 72	X 66	X 59	X 57	X 56													X 133	X 118	X 118	X 91	X 78
6	X 75	X 72	X 70	X 72	X 68	X 68	X 69													X 116	X 113	X 100	X 88	X 87
7	X 82	X 67	X 62	X 63	X 63	X 63	X 61													X 126	X 111	X 106	X 96	X 82
8	X 78	X 71	X 68	X 67	X 56	X 52	X 58													X 114	X 109	X 92	X 84	X 85
9	X 84	X 83	X 77	X 70	X 62	X 58	X 58													X 132	X 115	X 96	X 91	X 81
10	X 77	X 78	X 82	X 74	X 64	X 60	X 60													X 116	X 110	X 98	X 89	X 82
11	X 81	X 75	X 72	X 74	X 68	X 69	X 70													X 128	X 121	X 118	X 112	X 106
12	X 104	X 88	X 80	X 77	X 64	X 56	X 56													X 114	X 97	X 100	X 97	X 91
13	X 81	X 72	X 70	X 73	X 70	X 65	X 51													X 119	X 106	X 95	X 93	X 90
14	X 87	X 83	X 75	X 75	X 68	X 63	X 60													X 139	X 140	X 121	X 110	X 99
15	X 104	X 96	X 92	X 80	X 70	X 70	X 67													X 105	X 92	X 83	X 84	X 89
16	X 91	X 73	X 72	X 71	X 69	X 67	X 67													X 114	X 94	X 86	X 85	X 83
17	X 85	X 78	X 73	X 72	X 70	X 63	X 58													X 117	X 90	X 81	X 87	X 83
18	X 77	X 74	X 82	X 83	X 54	X 46	X 50													X 120	X 90	X 83	X 88	X 79
19	X 82	X 82	X 80	X 66	X 50	X 43	X 44													X 125	X 105	X 95	X 92	X 91
20	X 92	X 86	X 76	X 70	X 63	X 56	X 59													X 125	X 98	X 96	X 102	X 92
21	X 89	X 98	X 82	X 72	X 71	X 67	X 65													X 121	X 90	X 89	X 89	X 86
22	X 83	X 78	X 75	X 71	X 71	X 64	X 64													X 126	X 98	X 83	X 86	X 81
23	X 79	X 74	X 69	X 68	X 64	X 60	X 69													X 111	X 90	X 96	X 98	X 94
24	X 91	X 83	X 72	X 72	X 71	X 53	X 47													X 77	X 71	X 61	X 66	X 65
25	X 65	X 65	X 69	X 68	X 57	X 47														X 121	X 90	X 88	X 85	X 82
26	X 75	X 78	X 76	X 74	X 72	X 74														X 137	X 106	X 92	X 90	X 89
27	X 84	X 79	X 77	X 76	X 63	X 59														X 116	X 90	X 82	X 85	X 86
28	X 87	X 81	X 79	X 80	X 66	X 56														X 120	X 94	X 89	X 92	X 90
29	X 92	X 92	X 84	X 77	X 72	X 71														X 112	X 91	X 87	X 88	X 88
30	X 83	X 79	X 78	X 73	X 70	X 66														X 108	X 102	X 97	X 96	X 95
31	X 92	X 93	X 86	X 83	X 79	X 69														X 122	X 90	X 81	X 84	X 82
	00	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	24													31	31	31	31	31
MED	X	X	X	X	X	X	X													X	X	X	X	X
U Q	X 89	X 83	X 80	X 75	X 70	X 67	X 64													X 126	X 110	X 99	X 96	X 91
L Q	X 77	X 72	X 70	X 67	X 60	X 56	X 52													X 114	X 90	X 83	X 85	X 81

MAR. 2023 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

MAR. 2023 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	58	50	52	48	44	38	38	66	98	96	99	116	142	151	138	129	125	122	114	100	80	72	66	70	
2	70	66	56	53	54	50	46	72	89	108	120	126	136	139	140	141	134	120	119	108	94	93	83	64	
3	61	62	61	58	56	45	42	69	102	110	118	107	114	125	130	118	112	106	109	102	87	82	74	72	
4	71	67	64	58	52	50	52	86	128	113	109	115	146	152	147	140	140	140	131	135	129	J R	R	R	
5	R	74	73	65	60	53	51	50	78	101	110	124	142	141	144	150	146	141	142	137	127	112	112	85	72
6	69	66	64	66	62	62	63	100	119	103	112	125	140	145	134	129	125	124	122	110	107	94	82	81	
7	76	61	56	57	57	57	55	80	116	112	124	143	146	153	154	155	144	137	131	120	105	100	90	76	
8	72	65	62	61	50	48	52	92	114	117	123	127	141	136	133	132	126	119	118	108	103	86	78	79	
9	78	77	71	64	56	52	52	87	105	119	133	156	170	178	168	168	R	169	155	142	126	109	90	85	R
10	72	72	76	68	58	54	54	88	121	122	135	141	148	148	144	131	124	128	121	110	104	92	83	76	
11	75	69	66	68	62	63	64	87	105	125	139	146	152	159	155	147	141	133	128	122	115	U R	R	R	
12	98	82	74	71	58	50	50	82	99	108	113	124	134	130	119	119	116	115	116	108	91	94	91	85	
13	75	66	64	67	64	59	45	72	93	110	118	116	126	130	131	132	128	127	122	113	100	89	87	84	
14	81	77	69	69	62	57	54	82	108	108	117	126	140	144	146	146	150	146	R	136	R	R	R	93	
15	R	98	90	86	74	64	64	61	92	104	108	110	120	124	128	123	118	114	119	120	99	86	77	78	83
16	85	67	66	65	63	61	61	80	96	114	124	140	137	136	138	138	127	117	112	108	87	80	79	77	
17	79	72	67	66	64	57	52	79	97	108	107	126	129	137	134	142	133	133	136	111	84	75	81	77	
18	71	68	76	77	48	40	44	78	92	107	107	125	135	144	142	131	129	134	132	114	84	77	82	73	
19	76	76	74	59	44	37	38	78	102	105	108	124	149	156	153	151	140	125	133	119	J R	99	89	86	85
20	86	80	70	64	57	50	53	90	114	111	102	116	135	140	137	130	126	126	132	119	92	90	96	86	
21	83	92	R	66	65	61	59	80	98	108	109	125	142	148	138	126	121	125	127	115	84	83	83	80	
22	77	72	69	65	65	58	58	86	102	108	113	120	133	140	138	130	127	131	132	120	92	77	80	75	
23	73	68	63	62	58	54	63	82	96	114	115	130	145	146	140	127	121	116	111	105	84	90	92	88	
24	85	77	66	66	65	47	41	50	66	66	J R	64	72	80	89	80	92	90	79	82	71	65	55	60	59
25	59	59	63	62	51	41	45	78	100	109	120	131	128	145	133	119	116	131	133	115	84	83	79	76	
26	69	72	70	68	66	68	78	98	102	106	113	126	134	132	138	145	143	137	141	131	100	85	84	83	
27	78	72	71	69	57	53	57	83	96	95	102	120	132	136	139	134	125	117	120	110	84	76	79	80	
28	81	75	73	72	60	50	56	83	104	110	117	117	139	152	147	142	135	130	131	114	88	83	86	84	
29	86	86	78	71	66	65	70	90	104	111	122	130	138	140	135	128	121	118	119	106	85	81	82	82	
30	76	73	72	67	63	60	71	97	105	104	115	129	144	157	156	142	130	128	117	102	96	91	90	89	
31	86	87	80	77	73	63	70	89	105	103	118	131	138	143	140	139	137	133	127	116	84	75	78	76	
	00	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	76	72	69	66	58	54	54	82	102	108	115	126	138	144	138	132	127	127	127	113	92	86	83	80	
U Q	83	77	74	69	64	61	61	89	105	112	122	131	144	151	147	142	140	133	132	120	104	93	90	85	
L Q	71	66	64	61	54	50	46	78	97	106	109	120	133	136	134	128	121	119	118	108	84	77	79	75	

MAR. 2023 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2023 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									336	412	L	L	L	L	L	L								
2										L	L	L	U L 556	L	L	L	L							
3											L	L	U L 656	L										
4											L	L	L	L	L	L	L							
5											L	L	U L 520	L	L	L		L						
6												L	U L 640	L	L	U L 488	L	L						
7											L	L	L	U L 680	L	L	L	L						
8											L	L	U L 616	L	L	L	L	L						
9											L	L	L	L	L	U L 696	L	L						
10											L	L	L	L	L	L	L	L						
11										U L 400	L	L	L	L	L	L	L	L						
12											L	U L 636	L	L	L	L	L	L						
13										L	L	L	L	L	L	L	L	L	L					
14											L	L	U L 588	U L 624	U L 588	L	L	L						
15										L	L	L	U L 560	L	L	L	L	L						
16										L	L	L	L	L	L	L	L	L						
17											L	U L 624	U L 524	L	L	L	L	L						
18										L	L	L	L	L	U L 476	L	L	L	L					
19											L	U L 604	U L 552	L	L	L	L	L						
20										L	L	U L 504	U L 576	L	L	L	L	L	L					
21											L	U L 492	L	L	L	L	L	L	L					
22											L	U L 544	L	L	U L 572	L	L	L	L					
23											L	L	L	U L 676	U L 616	L	L	L	L					
24									372	388	448	496	512	560	588	L	L	A	A	A				
25										L	L	L	L	U L 612	U L 544	L	L	L	L					
26									L	L	L	U L 484	L	U L 528	L	L	L	U L 484	L					
27											L	U L 636	L	L	U L 628	L	L	L						
28										L	U L 540	L	L	U L 616	L	L	L	L	L					
29									L	L	L	U L 516	U L 576	L	L	L	U L 652	L						
30										L	L	L	U L 604	U L 640	L	L	U L 476	A						
31									L	L	L	U L 524	U L 596	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								1	2	3	4	9	15	9	4	4	1							
MED								372	362	412	518	524	576	616	566	570	484							
U Q									448	542	630	616	632	608	674									
L Q									U L 400	494	508	556	580	510	482									

MAR. 2023 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2023 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								A	272	324	356	384	384	380	372	352	324	260		A				
2								A	264	316	352	364	372	392	388	356	328	276		A				
3								A	228	324	356	372	384	380	384	364	336		A	A				
4								A	284	328	352	372	380	380	392	384		A	A		192			
5								A	284	336		A	392	400	396	404	380	336	272		A			
6								A	284	332	360		A	R	A	388	376	344	280	188				
7								196		A	328	A	376	400		A	388	364	344	276				
8								176	272	320	352	U	R	376	392	392	388	364	332	280	204			
9								B	276		A	A	A	A		396	364	332	280		A			
10								200	284		A	A	A		396	400		364	336	272				
11								212	276	332	360	372	372	392	392	364	332	284		A				
12								A	276	320	344	360	R	R	380	388	376	368	336	284				
13								204	280	340	352	372	392	396	372	360	332	276	184					
14								196	280		360	A	A	A		380	368	324	268		A			
15								200	280	320	356	R	364	380	384	368	344	316	276		A			
16								204	276	324	356	368	376	368	364	352	324	276		A				
17								196	276	316	360	A	380		A	A	352	320	276	164				
18								188	280	320	348	364	R	R	372	372		A	332	276				
19								188	268	328	352	368	380	380	380	360	328	284	192					
20								200	264	324	364	B	404	396	380	364	336	284		A				
21								236	288	332	360	380	384	384	372	356	332	288	192					
22								216	280	332	364	A	A		388	388	364	332		A				
23								208	284		A	A	400		A	384	376	356	328	280				
24								184	292	324	348	356	U	A	A	A	A	A		272				
25								B	200	284	328	A	388		A	384	368	336	292		A			
26								B	220	300	336	360	R	380	388	376	356	332		A				
27								B	220	296	332	352	A	A	A	A	A		288		A			
28								B	212	292	340	380	A	A	A	A	372	348	292					
29								B	228	296	340	364	392	B	U	G	404	392	372	348	300	204		
30								B	A	300	A	A	A	G	U	G	400	380	384	372		A	A	A
31								B	236	292	340	368	376	368	368	376	356	328	288	204				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								22	30	26	24	22	22	22	26	28	27	26	9					
MED								202	280	328	356	372	382	386	382	364	332	280	192					
U Q								216	288	332	360	380	392	392	388	368	336	284	204					
L Q								196	276	324	352	368	376	380	376	356	328	276	186					

MAR. 2023 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2023 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	E 16	E 16	E 16	E 16		18	19	J A 21	20	G	G	39	43	45	46	46	45	41	53	51	22	16	18	16	16	
2	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	20	G	G	G	44	46	46	44	43	39	32	19	J A 16	E 16	E 16	E 16	E 16	
3	E 16	E 16	E 16	E 16	E 16	J A 34	E 16	20	26	36	40	45	42	48	54	47	62	35	23	19	J A 18	J A 19	J A 20	J A 33		
4	J A 32	J A 31	E 16	E 16	E 16	E 16	E 16	18		G	G	G	G	43		G	J A 38	J A 31		G	E 16	E 16	E 16	E 16	20	
5	J A 22	E 16	E 16	20	E 16	20	J A 17	20	24	29	39			44	42					20	E 16	J A 17	E 16	J A 14	J A 48	
6	J A 18	J A 17	E 16	J A 20	E 16	J A 21	J A 20	16	20		G	G	G	46	37	42		40	39	31	22	J A 16	E 16	E 16	E 16	16
7	20	E 16	J A 18	J A 34	J A 31	J A 21	J A 16		30		G	G	37	42	48	65		J A 28			J A 24	J A 31	15	16	16	16
8	E 16	E 16	E 18	20	J A 19	E 15	E 16		47	J A	G	G	G	47	44	42	40	50	33		G 26	J A 22	E 16	J A 17	J A 16	
9	E 16	19	J A 17	19	J A 18	E 16	E 16	20	30	J A 34	J A 58	J A 43	44	45	36	36	28		J A 35	J A 29	E 25	E 24	E 28	E 85		
10	J A 32	J A 28	J A 30	J A 74	J A 46	J A 34	J A 18	19	27	37	38	40	J A	G	G	45	40	37	31	22	E 16	E 16	E 16	E 16	16	
11	E 16	E 16	E 16	30	E 16	E 16	E 16		G	G	G	G	G	G	G			J A 41	J A 40	J A 40	J A 40	J A 37	E 21	E 16	E 16	E 16
12	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23		G	G	G	G	42	44	45	44		34	31	21	16	16	16	16	
13	E 16	E 16	E 16	E 16	E 16	E 16	E 16		G	G	G	41	G	J A 53	49	42	38	33	24	24	53	J A 36	E 26	E 16	16	
14	J A 19	J A 20	J A 20	J A 19	J A 16	J A 16	E 16		G	G	J A 34	J A 36	J A 41	J A 41	43	42	40	36	34	J A 31	J A 19	E 16	E 16	E 16	E 16	
15	19	E 16	E 16	E 16	E 16	E 16	E 16	23	31		G	G	44	G	G	G	J A 38	J A 42	30	J A 26	E 16	E 16	E 16	E 16	16	
16	E 16	E 16	E 16	E 16	E 16	E 16	E 16		G	G	G	G	G	42	42	40	40	36	42	J A 26	J A 25	E 18	E 19	E 16	E 16	
17	E 16	E 16	E 16	E 16	E 16	E 16	J A 27	16	22		G	G	43	42	40	40	40	34	22	20	J A 34	E 21	E 16	E 16	20	
18	E 16	E 16	J A 18	E 16	E 16	E 16	E 16	23		G	G	G	G	44	42	41	38	J A 32	30	J A 32	J A 42	47	E 16	E 16	E 16	
19	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	30		G	39	40	43	44	42	38	37	35	J A 30	J A 27	17	26	53	J A 26	
20	J A 22	E 16	E 16	E 16	E 16	E 16	E 16	25	29		G	E 41	E 36	43	47	45	43	33	24	22	J A 20	E 16	E 16	E 16	16	
21	E 16	E 16	E 16	E 16	E 16	J A 18	18		G	G	G	G	G	45	43	41		37		J A 36	J A 24	E 16	E 16	E 16	19	
22	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	31		G	G	40	44	45	43		38	46	36	34	33	31	35	E 16	
23	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24		J A 38	J A 46	G	J A 39	J A 43	J A 46	38	39	32	26	J A 25	J A 21	E 16	E 16	E 16	16	
24	E 16	E 16	18	J A 16	E 19	E 16	E 16	24	31		G	37	43	47	48	90	66	46	24	24	18	18	22	19	29	
25	19	J A 17	18	19	E 16	E 16	E 16	24	30		G	38	G	42	42		38	J A 40	J A 39	J A 24	26	28	18	49		
26	J A 42	J A 22	J A 41	J A 16	E 16	E 16	E 16	24		G	G	G	G	G	G	G	30	32	J A 47	J A 33	J A 20	E 16	E 16	E 16	16	
27	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26		G	G	G	G	J A 41	J A 48	J A 53	J A 74	J A 48	39	J A 31	J A 33	41	23	16	23	
28	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26	32		G	G	40	J A 56	J A 41	J A 44	J A 34	J A 34	20	J A 31	J A 24	E 16	E 16	E 16	16	
29	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26	32		G	40	G	E 44						J A 33	J A 27	E 16	18	36	39	
30	J A 28	J A 22	E 16	E 16	E 16	E 16	J A 19	28	31	36	39	41		43	43	40	J A 64	J A 42	J A 34	J A 32	21	17	22	24		
31	19	E 16	E 16	E 16	20	20	E 16		G	G	G	G	G	40	40	40	45	44	39	36	J A 36	J A 30	17	22	19	75
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	E 16	E 16	E 16	E 16	E 16	E 16	E 16	20		G	G	G	40	42	43	42	40	38	33	J A 30	J A 24	E 17	E 16	E 16	E 16	
U Q	J A 19	J A 17	J A 18	19	18	19	16	24	30		G	39	43	44	45	45	43	J A 41	J A 39	J A 34	J A 29	21	22	20	26	
L Q	E 16	E 16	E 16	E 16	E 16	E 16	E 16		G	G	G	G	G	G	G	G	G	G	G			E 23	E 19	E 16	E 16	E 16

MAR. 2023 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2023 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'E 0SWEEP 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	20	G	G	38	42	42	44	44	44	40	50	36	19	E 16	E 16	E 16	E 16
2	E 16	E 16	E 16	E 16	E 16	E 16	E 16	20	G	G	G	42	46	45	43	42	38	31	18	E 16	E 16	E 16	E 16	E 16
3	E 16	E 16	E 16	E 16	E 16	E 23	E 16	18	26	36	38	44	41	43	52	45	52	34	20	E 16	E 16	E 16	E 16	E 28
4	E 16	22	E 16	E 16	E 16	E 16	E 16	18	G	G	G	G	G	43	G	G	34	28	G	E 16	E 16	E 16	E 16	E 16
5	20	E 16	E 16	E 16	E 16	E 16	E 16	19	21	26	39	G	G	42	41	G	G	G	20	E 16	E 16	E 16	E 16	40
6	E 16	E 16	E 16	E 16	E 16	E 16	E 16	19	G	G	G	45	U 37	42	G	40	38	31	22	E 16	E 16	E 16	E 16	E 16
7	E 16	E 16	E 16	22	23	E 16	E 16	G	29	G	36	42	44	49	G	25	G	G	22	23	E 16	E 16	E 16	E 16
8	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	46	43	41	38	38	30	G	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	19	30	34	40	40	43	41	G 33	G 31	25	G	28	22	20	19	23	64
10	E 16	E 16	19	21	30	22	E 16	G 12	20	35	38	40	G	G	44	40	36	30	20	E 16	E 16	E 16	E 16	E 16
11	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	G	G	41	39	39	35	28	17	E 16	E 16	E 16	E 16
12	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	G	G	G	G	42	44	45	42	G	32	27	E 16	E 16	E 16	E 16	E 16
13	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	38	G	G	47	46	38	37	33	23	E 16	23	24	18	E 16
14	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	33	33	40	39	42	40	40	35	34	25	E 16	E 16	E 16	E 16
15	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	30	G	G	G	43	G	G	G	37	21	29	23	E 16	E 16	E 16	E 16
16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	42	42	40	39	36	37	22	19	E 16	E 16	E 16	E 16
17	E 16	E 16	E 16	E 16	E 16	E 18	E 16	22	G	G	G	G	42	41	40	39	40	34	20	20	21	E 16	E 16	E 16
18	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	G	G	G	G	44	42	41	37	28	29	29	28	E 31	E 16	E 16	E 16
19	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	29	G	38	39	41	43	41	38	36	34	25	21	E 16	20	25	22
20	20	E 16	E 16	E 16	E 16	E 16	E 16	24	29	G	G	E 41	B 31	G 43	42	41	41	32	24	18	E 16	E 16	E 16	E 16
21	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	45	43	41	G	37	G	30	20	E 16	E 16	E 16	E 16
22	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	31	G	G	38	44	45	41	G	37	30	28	29	E 16	26	18	E 16
23	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	G	33	36	G	38	42	43	37	38	30	23	19	E 19	E 16	E 16	E 16
24	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	30	G	36	39	45	45	76	57	42	22	22	16	E 16	18	18	23
25	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	30	G	37	G	40	40	G	G	35	36	28	21	21	23	E 16	E 16
26	20	17	29	E 16	E 16	E 16	E 16	24	G	G	G	G	G	G	G	G	29	26	29	25	E 16	E 16	E 16	E 16
27	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	G	G	G	G	40	41	42	42	45	39	25	20	E 20	E 16	E 16	19
28	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26	32	G	G	40	44	39	41	30	24	19	21	16	E 16	E 16	E 16	E 16
29	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	32	G	39	G	E 44	B	G	G	G	G	27	20	E 16	E 16	E 16	28
30	19	18	E 16	E 16	E 16	E 16	E 16	25	27	36	39	40	G	42	42	38	57	38	26	21	E 17	E 16	E 16	E 16
31	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	40	40	40	45	44	38	34	32	20	E 16	18	E 16	22
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	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	20	G	G	G	38	40	42	41	38	36	30	24	18	E 16	E 16	E 16	E 16
U Q	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	29	G	38	41	44	43	43	41	38	34	28	21	E 16	E 16	E 16	19
L Q	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	G	G	G	G	G	G	G	21	E 16	E 16	E 16	E 16

MAR. 2023 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2023 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	16	16	17	22	20	23	23	21	20	20	17	16	16	16	16	16	16
2	16	16	16	16	16	16	16	16	16	18	21	21	22	22	24	21	18	16	16	16	16	16	16	16
3	16	16	16	16	16	16	16	16	15	18	19	21	21	24	22	22	18	20	16	16	16	16	16	16
4	16	16	16	16	16	16	16	17	16	17	21	21	22	20	24	20	18	18	16	16	16	16	16	16
5	16	16	16	16	16	16	16	16	16	18	20	21	31	30	23	21	19	17	17	16	16	16	16	16
6	16	16	16	16	16	16	16	16	16	19	19	22	29	24	26	23	20	19	16	16	16	16	16	16
7	16	16	16	16	16	16	16	16	16	18	19	20	24	20	20	16	21	20	16	16	16	16	16	16
8	16	16	16	16	16	16	16	16	17	17	18	20	22	23	23	20	20	19	16	16	16	16	16	16
9	16	16	16	16	16	16	16	16	16	16	21	19	22	20	23	20	17	17	16	16	16	16	16	16
10	16	16	16	16	16	16	16	16	16	19	21	24	19	23	23	20	22	21	16	16	16	16	16	16
11	16	16	16	16	16	16	16	16	16	19	20	19	22	22	23	18	17	17	16	16	16	16	16	16
12	16	16	16	16	16	16	16	16	16	16	20	19	20	22	26	22	22	17	16	16	16	16	16	16
13	16	16	16	16	16	16	16	16	16	19	19	24	22	21	21	19	20	20	16	16	16	16	16	16
14	16	16	16	16	16	16	16	16	18	19	22	23	22	22	24	22	21	16	16	16	16	16	16	16
15	16	16	16	16	16	16	16	16	16	19	21	22	23	23	20	20	18	16	16	16	16	16	16	16
16	16	16	16	16	16	16	16	16	17	18	21	22	21	21	22	22	20	17	16	16	16	16	16	16
17	16	16	16	16	16	16	16	16	16	17	18	19	23	23	23	19	19	15	14	16	16	16	16	16
18	16	16	16	16	16	16	16	16	16	16	19	21	22	22	20	20	17	17	16	16	16	16	16	16
19	16	16	16	16	16	16	16	16	16	20	22	21	24	23	22	21	20	18	16	16	16	16	16	16
20	16	16	16	16	16	16	16	16	16	18	21	41	25	24	24	20	20	18	16	16	16	16	16	16
21	16	16	16	16	16	16	16	16	16	18	18	21	22	25	22	19	18	16	16	16	16	16	16	16
22	16	16	16	16	16	16	16	16	16	21	26	22	24	27	21	21	17	15	16	16	16	16	16	16
23	16	16	16	16	16	16	16	16	16	21	19	22	23	23	23	20	17	16	16	16	16	16	16	16
24	16	16	16	16	16	16	16	15	16	18	18	21	22	24	23	22	18	16	16	16	16	16	16	16
25	16	16	16	16	16	16	16	16	16	18	20	22	23	25	23	20	20	16	16	16	16	16	16	16
26	16	16	16	16	16	16	16	16	17	17	20	21	22	24	24	22	16	15	16	16	16	16	16	16
27	16	16	16	16	16	16	16	16	17	19	19	24	24	23	21	21	18	16	16	16	16	16	16	16
28	16	16	16	16	16	16	16	16	16	16	22	22	25	22	21	21	16	14	16	16	16	16	16	16
29	16	16	16	16	16	16	16	16	15	16	21	22	44	26	22	22	20	18	16	16	16	16	16	16
30	16	16	16	16	16	16	16	16	19	22	22	22	22	22	23	22	21	18	16	16	16	16	16	16
31	16	16	16	16	16	16	16	16	18	19	21	24	22	22	23	21	20	16	16	16	16	16	16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	16	16	16	16	16	16	16	16	16	18	20	21	22	23	23	21	19	17	16	16	16	16	16	16
U Q	16	16	16	16	16	16	16	16	16	19	21	22	24	24	23	22	20	18	16	16	16	16	16	16
L Q	16	16	16	16	16	16	16	16	16	17	19	21	22	22	21	20	18	16	16	16	16	16	16	16

MAR. 2023 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2023 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

$\begin{matrix} H \\ D \end{matrix}$	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	306	286	296	309	326	301	276	342	352	349	333	293	309	315	306	303	303	316	320	311	285	290	283	304	
2	307	307	298	300	302	315	311	341	345	331	312	309	301	288	295	293	303	309	311	308	288	322	303	283	
3	286	285	294	292	330	293	278	342	337	332	329	299	290	283	293	303	297	300	310	314	305	291	281	289	
4	279	282	297	303	293	270	267	317	364	336	308	282	293	300	290	283	289	292	293	298	J R	R	R	R	
5	256 <sup>R</sup>	262	278	280	297	285	292	339	335	320	305	301	291	284	286	286	281	295	297	309	286	292	287	275	
6	268	254	252	272	272	299	289	335	357	334	308	299	288	298	284	290	288	293	315	309	287	295	280	294	
7	312	281	271	267	278	296	274	313	351	316	295	302	283	286	275	273	273	278	299	298	280	294	314	290	
8	301	288	285	313	296	274	281	332	349	322	310	293	300	284	283	286	290	297	308	298	285	298	281	283	
9	295	301	312	322	300	276	270	335	323	310	298	296	292	277	269	269	268 <sup>R</sup>	269	279 <sup>R</sup>	274	278	283	295	283 <sup>R</sup>	
10	271	272	271	303	282	285	281	327	327	305	301	289	286	283	281	279	279	295	305	308	294	294	286	281	
11	288	284	266	281	270	276	286	325	316	308	308	292	290	276	283	284	283	293	298	297	283	272 <sup>U R</sup>	293 <sup>R</sup>	301 <sup>R</sup>	
12	311	317	298	314	309	298	296	340	343	316	303	294	295	301	283	287	288	292	299	301	272	291	298	313	
13	309	289	277	293	311	324	301	340	332	320	319	295	286	291	284	292	293	300	315	313	287	287	292	294	
14	290	297	301	307	314	316	297	343	344	313	304	293	291	282	282	285	290	302	299 <sup>R</sup>	297	278 <sup>R</sup>	290 <sup>R</sup>	285 <sup>R</sup>	265 <sup>R</sup>	
15	281 <sup>R</sup>	287	301	297	281	296	290	331	332	321	306	296	295	296	281	291	292	295	321	301	283	258	267	284	
16	328	301	277	286	291	299	302	324	326	309	300	301	293	293	293	299	306	311	317	316	297	278	284	286	
17	292	294	288	295	305	309	305	352	328	326	302	305	299	300	289	299	304	311	327	322	294	267	288	296	
18	275	279	314	342	360	287	299	351	339	323	308	298	299	299	299	296	296	313	320	330	314	264	285	276	
19	280	313	341	339	347	263	268	341	337	334	305	290	300	298	287	297	297	301	323	323	J R	296	244	275	295
20	306	311	291	303	288	278	280	336	350	327	293	287	298	298	296	295	303	305	326	334	291	272	292	287	
21	270	275	281 <sup>R</sup>	271	275	315	305	326	331	317	301	296	297	302	295	293	290	306	324	331	292	280	289	297	
22	288	294	280	272	291	302	303 <sup>A</sup>	344	342	323	308	293	292	289	288	289	285	299	314	326	296	265	287	289	
23	292	299	281	287	287	278	306	351	328	330	304	292	296	298	291	289	299	311	319	325	281	290	284	261	
24	269	263	262	256	293	250	236	229	277	278	239 <sup>J R</sup>	267	274	295	266	292	313	302	318	296	295	242	240	246	
25	253	264	269	302	283	313	299	341	336	338	306	317	283	299	293	290	281	304	320	335	290	274	281	290	
26	265	275	283	290	276	282	313	352	340	330	305	304	301	291	278	288	293	297	319	328	327	280	285	287	
27	288	280	293	306	280	292	292	342	338	328	301	292	295	298	293	295	303	306	315	326	311	268	277	284	
28	298	297	298	312	324	288	303	332	330	318	308	284	288	294	288	287	290	299	312	324	277	266	279	282	
29	284	304	285	290	282	266	294	324	331	313	301	294	293	288	284	287	293	294	312	316	283	266	272	284	
30	278	280	287	284	285	266	284	346	336	308	294	291	288	290	292	282	286	303	315	298	276	273	272	271	
31	276	291	275	277	295	268	297	333	322	303	299	291	296	292	287	287	296	302	316	329	286	255	271	265	
	00	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	288	287	285	295	293	288	292	339	336	321	305	294	293	293	287	289	292	300	315	313	287	280	284	284	
U Q	301	299	298	307	309	301	302	342	344	330	308	299	298	298	293	295	299	306	320	326	295	291	289	294	
L Q	275	279	277	281	282	276	280	327	328	313	301	291	288	286	283	286	286	295	305	298	283	266	277	276	

MAR. 2023 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2023 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									408	419	L	L	L	L	L	L									
2										L	L	L	U L 377	L	L	L	L								
3											L	L	U L 354	L											
4											L	L	L	L	L	L	L								
5											L	L	U L 400	L	L	L		L							
6												L	U L 354	L	L	U L 395	L	L							
7											L	L	L	U L 343	L	L	L	L							
8											L	L	U L 354	L	L	L	L	L							
9											L	L	L	L	L	U L 333	L	L							
10											L	L	L	L	L	L	L	L							
11										U L 425	L	L	L	L	L	L	L	L							
12											L	U L 356	L	L	L	L	L	L							
13										L	L	L	L	L	L	L	L	L	L						
14											L	L	U L 361	U L 360	U L 353	L	L	L							
15										L	L	L	U L 375	L	L	L	L	L							
16										L	L	L	L	L	L	L	L	L							
17											L	U L 357	U L 389	L	L	L	L	L							
18										L	L	L	L	L	U L 406	L	L	L	L	L					
19											L	U L 352	U L 379	L	L	L	L	L							
20										L	L	U L 409	U L 363	L	L	L	L	L	L	L					
21											L	U L 401	L	L	L	L	L	L	L	L					
22											L	U L 388	L	L	U L 361	L	L	L	L	L					
23											L	L	L	U L 340	U L 351	L	L	L	L	L					
24									282	333	349	356	367	328	337	U L 358	U L 371	A	A	A					
25										L	L	L	L	U L 358	U L 371	L	L	L	L						
26									L	L	L	U L 423	L	U L 407	L	L	U L 380	L	L						
27											L	U L 359	L	L	U L 349	L	L	L							
28										L	U L 391	L	L	U L 347	L	L	L	L	L						
29									L	L	L	U L 400	U L 367	L	L	U L 354	L	L							
30										L	L	L	U L 361	U L 345	L	U L 393	L	A							
31									L	L	L	U L 382	U L 360	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								1	2	3	4	9	15	9	4	4	1								
MED								282	370	419	390	367	361	351	362	374	380								
U Q									U L	U L	U L	U L	U L	U L	U L	U L	U L								
L Q									425	396	404	377	360	388	394										
										349	372	356	354	344	351	344									

MAR. 2023 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

MAR. 2023 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									208	208	222	258	272	260	246	272								
2										212	246	244	272	252	288	272	258							
3											240		290	306										
4											224	240	294	258	278	266	276							
5											258	278	242	296	284	288		244						
6												278	296	284	306	250	282	240						
7											276	278	276	298	294	282	278							
8											224	260	280	296	300	284	276							
9											276	284	292	282	302	312	278							
10											260	282	292	294	296	294	302	262						
11										222	250	292	292	300	306	294	284							
12											240	290	296	278	298	284	240							
13										244	242	232	246	290	308	290	270	248						
14											242	266	294	292	304	278	280	252						
15											226	262	290	266	274	296	266	282						
16											256	230	260	234	282	278	268	248						
17											228	284	244	284	290	284	250							
18											240	228	276	262	266	256	258	278	254					
19											228	298	282	260	294	282	256							
20											222	228	250	290	266	274	274	266	262					
21											242	292	294	276	270	272	290	266						
22											236	240	272	274	286	282	292	276	272					
23											250	236	270	296	284	278	268	274	256					
24								522	366	356	462	396	352	308	490	292	242							
25											234	264	250	302	288	258	258	306	274					
26										216	224	244	234	266	242	290	298	264	252					
27											224	284	282	276	284	272								
28											230	244	286	306	292	276	266	280	256					
29											228	244	268	246	278	298	294	286						
30											220	242	294	288	300	288	246	266						
31											230	214	258	248	292	290	278	300	270	248				
	00	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	17	30	30	31	31	30	30	26	14						
MED								522	228	230	242	277	288	284	288	280	276	255						
U Q									298	244	258	286	294	296	298	290	280	262						
L Q									212	221	228	250	272	274	278	268	264	248						

MAR. 2023 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2023 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	234	246	254	226	218	232	276	228	200	186	210	212	222	214	218	224	224	232	218	202	202	220	246	244
2	234	228	246	252	248	234	228	224	204	194	194	214	218	234	222	232	224	230	228	204	214	208	218	220
3	264	268	266	252	222	E A 230	238	220	226	218	216	216	208	218	276	244	250	234	236	224	214	232	228	270
4	282	256	226	220	222	254	304	242	216	208	198	198	196	222	218	222	218	222	228	218	208	208	220	238
5	266	256	258	244	252	248	246	218	212	208	206	204	206	204	220	208	228	224	220	214	220	220	208	E A 302
6	266	296	320	272	266	240	276	230	210	204	198	222	204	208	214	214	232	224	234	216	222	204	248	246
7	224	222	272	312	E A 276	228	262	232	210	204	204	196	218	232	200	216	210	234	236	226	236	236	222	220
8	242	224	258	232	222	262	274	228	216	208	204	188	214	220	214	220	226	228	236	222	214	222	228	258
9	254	240	238	220	222	258	298	212	200	210	214	208	238	194	204	206	210	228	236	220	222	236	244	E A 344
10	270	284	266	222	E A 266	E A 276	268	232	224	212	208	210	202	192	224	220	214	234	234	230	224	204	212	250
11	260	258	282	272	264	254	222	206	206	192	202	192	192	210	218	220	228	236	240	214	218	230	230	244
12	232	216	230	224	196	236	242	216	212	200	204	196	198	220	214	228	216	232	236	220	228	246	222	222
13	222	250	272	254	214	216	202	212	210	210	210	194	188	248	240	212	222	234	228	220	236	240	240	244
14	252	250	240	238	220	232	228	224	216	206	186	186	180	210	216	224	224	236	230	224	208	236	232	286
15	264	248	226	200	254	246	232	218	218	208	194	212	192	192	196	218	218	236	228	208	208	240	280	270
16	222	222	266	250	238	230	234	222	200	202	202	192	202	208	220	220	224	232	228	216	192	224	248	246
17	244	230	254	254	226	216	218	210	208	206	196	202	214	206	208	222	222	226	230	196	190	270	256	240
18	274	274	234	208	190	234	252	218	220	208	194	186	216	212	208	216	212	232	226	214	208	256	264	284
19	268	230	208	212	202	282	310	218	214	206	194	180	186	226	220	218	220	232	238	208	196	250	284	262
20	244	230	224	234	236	250	294	222	222	202	196	198	186	240	214	224	234	226	236	212	190	242	252	252
21	268	232	242	262	252	198	218	218	218	204	188	240	226	226	220	202	218	228	238	212	194	228	252	246
22	252	250	262	290	236	208	236	218	218	204	190	186	230	228	216	224	230	228	238	208	206	E A 272	254	242
23	246	238	260	270	232	264	234	208	220	210	194	182	180	210	224	210	226	226	232	216	250	254	260	270
24	272	298	246	286	212	290	318	280	258	236	216	216	244	238	A	A	A	234	224	230	210	E A 290	E A 334	E A 364
25	328	308	288	238	216	226	252	210	218	216	202	196	184	196	188	220	210	248	232	204	216	270	260	246
26	298	276	280	252	278	268	228	208	208	204	190	186	178	198	192	202	214	226	242	216	198	218	254	252
27	260	266	258	232	206	240	260	208	212	206	192	184	194	200	220	208	258	246	240	222	202	232	272	270
28	252	252	252	232	206	234	248	218	222	210	202	190	228	194	208	202	214	226	240	216	202	264	282	262
29	268	244	258	244	238	246	238	210	214	210	198	200	198	216	220	196	224	226	242	220	210	264	286	290
30	282	270	258	244	240	258	272	212	218	204	196	184	180	192	226	200	A	244	224	234	250	256	278	284
31	270	254	264	260	220	224	250	208	218	200	200	198	194	188	242	240	236	234	236	224	190	242	296	300
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	29	31	31	31	31	31	31	31
MED	260	250	258	244	224	238	248	218	216	206	198	196	202	210	218	219	224	232	234	216	210	236	250	249
U Q	270	268	266	260	252	258	274	224	218	210	204	210	218	226	220	224	228	234	238	222	222	256	272	284
L Q	244	230	240	226	216	230	232	210	210	204	194	186	188	198	208	208	215	226	228	212	202	222	228	244

MAR. 2023 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2023 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								A	104	102	102	102	100	100	100	100	104	104	A						
2								A	98	98	98	98	98	98	98	98	104	104	A						
3								A	100	100	100	100	100	100	104	104	102		A	A					
4								A	102	102	100	100	100	100	100	104		A	A						
5								A	104	106		104	104	104	104	104	104	104		A					
6								A	104	102	102		A	A	A		102	104	104	104	124				
7								110	A	104		A		A		104	104	104	104		A				
8								106	102	102	100	98	98	98	98	100	102	106	100						
9								B	104		A	A	A	A		110	112	108	108		A				
10								116	116		A	A	A		106	104		104	104	104					
11								104	104	100	102	100	100	100	102	102	106	104		A					
12								A	102	100	100	100	100	100	100	100	102	108		A					
13								116	102	102	102	100	100	100	100	104	104	108	108						
14								120	102		A	A	A	A		104	102	102	102		A				
15								110	104	102	100	100	100	100	102	102	102	106		A					
16								108	102	102	102	100	100	100	100	102	102	104		A					
17								104	100	100	100		100		A	A	106	106	110	92					
18								108	102	100	100	100	100	100	100		104	104		A					
19								106	102	102	102	102	102	102	102	102	102	106	106						
20								114	102	102	100		B	104	104	104	104	104	104		A				
21								104	102	102	100	100	100	100	100	102	102	104	110						
22								100	100	104	104		A	A	104	104	104	104		A	A				
23								104	104		A	A		A	104	100	102	104	108		A				
24								104	102	100	100	100	100		A	A	A	A		112		A			
25								B	98	100	100		100		A	A	100	100	104	104		A			
26								B	104	100	100	100	100	100	100	100	100		A	A					
27								B	104	102	102	102	100		A	A	A	A		A		A			
28								B	106	100	98	100		A	A	A		108	108	104		A			
29								B	110	102	102	102	102		B	102	102	102	102	104	110				
30								B	A	106		A	A		100	98	98	98		A	A	A			
31								B	104	102	102	102	102	102	100	102	102	102	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								22	30	26	23	22	22	22	26	28	27	26	9						
MED								106	102	102	100	100	100	100	101	102	104	104	108						
U Q								110	104	102	102	102	102	102	104	104	104	108	116						
L Q								104	102	100	100	100	100	100	100	101	102	104	103						

MAR. 2023 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2023 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	B	B	B	90	90	98	108	G	G	164	146	136	128	120	116	116	102	96	100	B	92	B	B
2	B	B	B	B	B	B	B	182	G	G	G	174	168	142	146	144	132	132	104	84	B	B	94	B
3	B	B	B	B	B	90	B	150	124	158	154	120	132	114	118	116	102	104	102	100	98	96	94	94
4	88	90	B	B	B	B	B	128	G	G	G	G	G	186	G	G	120	112	G	B	B	B	B	102
5	90	B	B	B	B	102	98	144	94	96	188	G	G	116	118	G	G	G	144	B	98	B	94	98
6	98	98	98	B	98	102	B	130	G	G	G	174	96	96	G	194	190	170	150	104	B	B	B	B
7	100	B	98	94	94	98	100	G	100	G	98	168	112	96	G	88	G	G	112	98	100	B	B	B
8	B	B	92	94	88	88	B	G	94	G	G	G	174	152	148	152	112	122	G	106	98	98	94	88
9	B	92	94	94	96	B	B	148	180	98	96	96	176	96	98	96	98	G	106	98	96	96	96	96
10	96	96	94	90	92	92	100	86	100	98	98	96	G	G	190	176	186	152	116	B	B	B	B	B
11	B	B	B	84	B	B	B	G	G	G	G	G	G	G	152	142	118	112	102	96	B	B	B	B
12	B	B	B	B	B	B	B	152	G	G	G	G	142	128	118	112	G	116	106	104	B	B	B	B
13	B	B	B	B	B	B	B	G	G	G	122	G	G	132	122	126	144	138	132	106	92	86	86	B
14	94	94	100	98	94	98	B	G	G	130	100	98	104	160	164	156	164	124	106	100	B	B	B	B
15	110	B	B	B	B	B	B	172	182	G	G	G	G	G	G	180	94	148	110	B	B	B	B	B
16	B	B	B	B	B	B	B	G	G	G	G	G	164	154	150	130	130	108	114	104	88	86	B	B
17	B	B	B	B	B	90	B	192	G	G	G	172	180	104	98	180	182	92	136	88	88	B	B	94
18	B	B	104	B	B	B	B	164	G	G	G	G	188	166	172	176	88	150	110	100	98	B	B	B
19	B	B	B	B	B	B	B	146	166	G	136	134	118	144	156	172	128	112	108	98	100	98	98	92
20	90	B	B	B	B	B	B	144	130	G	G	B	98	182	110	108	108	110	104	98	88	B	B	B
21	B	B	B	B	B	96	96	G	G	G	G	G	182	176	190	G	184	G	106	100	B	B	B	90
22	B	B	B	B	B	B	B	178	140	G	G	100	168	182	148	G	192	88	86	102	96	100	100	B
23	B	B	B	B	B	B	B	168	G	102	102	G	100	122	118	142	186	172	116	86	102	B	B	B
24	B	B	96	98	98	B	B	136	146	G	120	104	100	96	94	92	92	92	114	104	106	102	98	96
25	98	96	96	102	B	B	B	142	152	G	104	G	106	104	G	G	126	108	102	102	102	98	100	98
26	94	92	92	102	B	B	B	170	G	G	G	G	G	G	G	92	90	88	86	86	B	B	B	B
27	B	B	B	B	B	B	B	150	G	G	G	G	102	98	94	92	88	200	86	86	98	98	B	92
28	B	B	B	B	B	B	B	162	164	G	G	100	96	94	92	90	84	88	86	100	B	B	B	B
29	B	B	B	B	B	B	B	178	184	G	122	G	G	B	G	G	G	G	108	108	104	98	96	92
30	88	90	B	B	B	B	100	100	98	104	104	102	G	164	138	144	90	86	106	104	104	100	98	102
31	94	B	B	B	94	94	B	G	G	G	G	114	122	118	190	200	172	132	108	102	100	98	98	98
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	12	8	10	10	9	11	6	23	15	7	14	16	22	26	24	25	27	26	29	27	19	14	13	14
MED	94	93	96	94	94	94	99	150	140	102	112	117	127	128	130	142	120	112	106	100	98	98	96	95
U Q	98	96	98	98	97	98	100	170	166	130	136	170	168	160	154	174	172	138	114	104	102	98	98	98
L Q	90	91	94	94	91	90	98	136	100	98	100	100	102	104	114	102	94	102	102	98	96	96	94	92

MAR. 2023 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2023 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 31°12.0'N LON. 130°37.0'E 0SWEEP 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	F2	C1			H1	H1	H1	C1	C1	C2	C2	C6	CL53	F2		F1				
2							H1				H1	H1	H1	H1	HC11	HC11	H2	CL11	F1			F3			
3				F5			H1	C1	H1	H1	C1	H1	C1	C2	C2	C4	C3	C2	F1	F1	F2	F1	F8	F8	
4	F6	F5					C1						H1			C1	C1							F1	
5	F1			F1	F1	F1	H1	L1	L1	HL13			C1	C1				H1		F1		F1	F8	F8	
6	F4	F2	F2	F2	F1		H1				HL11	L1	L1		H1	H1	H1	H1	F1						
7	F1		F3	F8	F7	F3	F1		C2		L1	H1	C1	L2		L2		C3	F7	F1					
8			F1	F1	F1	F1		LH11				H1	H1	H1	H1	C2	C2		F1	F1	F1	F1	F1	F1	
9		F1	F1	F1	F1		H1	H1	L2	L3	C2	HC11	L1	L1	L2	L1		C6	F5	F4	F5	F3	F6	F6	
10	F2	F3	F3	FQ41	FQ51	FQ41	F1	L1	L2	L2	L1	L1		HC11	H1	H1	H1	C1							
11				F1										H1	H1	C2	C2	C6	F3						
12							H1						H1	H1	C1	C1		CL11	CL31	F1					
13											C1			H1	C2	C1	H1	H2	H2	FF31	F6	F3	F1		
14	F2	F4	F1	F1	F1	F1				HL11	L1	L1	C1	HC11	HL11	H1	H1	C2	C4	F2					
15	F1						H1	H1			H1					H1	LH11	H1	C2						
16												H1	H1	H1	H1	HL11	C3	CL22	FF13	F1	F1				
17					F4		H1				HC11	H1	C1	L1	HL11	HL11	L1	H1	F4	F1			F1		
18			F1				H1					H1	H1	H1	HL11	L2	H1	CL42	F9	F4					
19							H1	H1		H1	H1	CL11	HL11	H1	H1	C1	C1	C4	F5	F1	F4	F3	F3		
20	F3						H2	H1				L1	HL11	C1	C1	C2	C1	C2	F2	F1					
21					F1	F1						H1	H1	H1		H1		C5	F3					F1	
22							H1	H1			C1	HL11	H1	H2		HL11	LL61	L4	FF32	F3	F3	F2			
23							H1		C1	C1		C1	C1	C1	C1	C1	H1	CL1	F2	F4					
24			F1	F2	F1		H1	H1		C1	C1	C2	L2	L5	L5	L3	L2	CL11	FF11	F1	F5	F3	F7		
25	F1	F2	F1	F1			H1	H1		C1		C1	C1			C1	C3	C6	F3	F6	F5	F2	F3		
26	F6	F6	F5	F1			H1								L2	L2	L2	L4	F1						
27							H2					C1	L1	LH21	L4	L4	HL11	L2	F3	F2	F2		F4		
28							H1	H1			C1	L3	L1	L2	L2	L3	L1	L4	F2						
29							H1	H1		C1								C3	FF41	F1	F2	F2	F5		
30	F5	F3				C1	C3	L1	C1	C1	C1		H1	H1	H1	L6	L5	CL15	FF32	F2	F1	F2	F2		
31	F1			F1	F1						F1	H1	C1	H1	H1	H1	H2	C5	F4	F1	F6	F2	F4		
	00	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																									

MAR. 2023 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2023 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 75	X 67	X 71	X 65	X 52	X 38	X 39													X 142	X 138	X 125	X 111	X 116
2	X 117	X 108	X 97	X 75	X 68	X 58	X 50													X 164	X 156	X 153	X 131	X 116
3	X 108	X 96	X 86	X 79	X 70	X 46	X 44													X 126	X 114	X 100	X 95	X 90
4	X 84	X 79	X 76	X 65	X 54	X 51	X 51													X 183	X 181	X 192	X 172	X 144
5	X 135	X 134	X 125	X 102	X 74	X 70	X 58													X 184	X 177	X 164	X 146	X 124
6	X 114	X 99	X 94	X 93	X 80	X 78	X 76													X 170	X 169	X 157	X 138	X 124
7	X 115	X 94	X 76	X 65	X 63	X 61	X 52													X 166	X 157	X 156	X 137	X 127
8	X 111	X 108	X 95	X 84	X 60	X 51	X 51													X 134	X 133	X 116	X 106	X 102
9	X 98	X 95	X 87	X 74	X 62	X 52	X 50													X 172	X 162	X 144	X 134	X 125
10	X 115	X 110	X 108	X 102	X 82	X 65	X 61													X 158	X 163	X 151	X 138	X 117
11	X 108	X 97	X 87	X 91	X 77	X 77	X 69													X 171	X 180	X 177	X 166	X 155
12	X 151	X 132	X 115	X 104	X 78	X 68	X 55													X 126	X 118	X 111	X 108	X 94
13	X 88	X 78	X 75	X 80	X 73	X 61	X 44													X 157	X 185	X 180	X 166	X 145
14	X 130	X 96	X 88	X 74	X 58	X 51	X 51													X 178	X 184	X 176	X 167	X 134
15	X 128	X 121	X 110	X 97	X 71	X 72	X 63													X 111	X 101	X 94	X 97	
16	X 101	X 79	X 72	X 74	X 67	X 65	X 60													X 162	X 154	X 158		
17	X 157	X 132	X 148	X 112	X 102	X 74	X 60													X 128	X 114	X 111	X 114	
18	X 115	X 104	X 99	X 100	X 54	X 44	X 45													X 125	X 120	X 113	X 108	
19	X 103	X 103	X 90	X 69	X 42	X 38	X 38													X 163	X 158	X 159	X 171	
20	X 174	X 140	X 130	X 105	X 78	X 65	X 59													X 153	X 174	X 159	X 238	
21	X 161	X 149	X 126	X 107	X 102	X 83	X 59													X 137	X 139	X 140	X 133	
22	X 128	X 121	X 120	X 108	X 97	X 85	X 67													X 139	X 121	X 114	X 114	
23	X 115	X 107	X 107	X 98	X 84	X 72	X 74													X 127	X 138	X 132	X 133	
24	X 150	X 116	X 118	X 86	X 80	X 64	X 57													X 82	X 54	X 60	X 59	
25	X 60	X 62	X 62	X 63	X 55	X 45	X 45													X 110	X 97	X 96	X 90	
26	X 78	X 76	X 76	X 74	X 69	X 70	X 75													X 167	X 158	X 150	X 166	
27	X 153	X 140	X 130	X 114	X 75	X 63	X 60													X 130	X 137	X 138	X 128	
28	X 125	X 124	X 127	X 116	X 78	X 58	X 56													X 154	X 149	X 145	X 136	
29	X 139	X 157	X 132	X 109	X 102	X 83	X 77													X 120	X 124	X 120	X 110	
30	X 106	X 99	X 93	X 83	X 80	X 71														X 154	X 150	X 133	X 120	
31	X 117	X 107	X 102	X 89	X 85	X 68														X 116	X 107	X 97	X 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	30	31	31	31	31	31	29													14	31	31	31	30
MED	X 115	X 107	X 97	X 89	X 74	X 65	X 57													X 165	X 153	X 144	X 134	X 122
U Q	X 135	X 130	X 120	X 104	X 80	X 72	X 62													X 172	X 163	X 158	X 150	X 134
L Q	X 103	X 95	X 86	X 74	X 63	X 52	X 50													X 142	X 125	X 116	X 111	X 108

MAR. 2023 f<sub>XI</sub> (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2023 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E OSWEEP 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	69	61	65	59	46	32	33	61	102	101	97	125	150	159	152	142	148	144	140	136	132	119	105	110	
2	111	J R	H	69	62	52	44	68	96	110	126	139	144	163	169	169	161	157	152	158	150	147	125	110	
3	U R	102	90	80	73	64	40	38	67	96	112	120	114	119	130	132	130	122	118	122	120	108	94	89	84
4	78	73	70	59	48	45	45	82	129	104	108	121	154	171	178	178	179	178	175	177	175	186	166	138	
5	129	128	R	96	68	64	52	72	104	119	125	142	152	160	R	R	176	184	180	178	171	158	140	118	
6	108	93	88	87	74	72	70	101	109	102	121	136	151	163	158	154	155	157	160	164	163	151	132	118	
7	109	88	70	59	57	55	46	72	111	118	134	152	168	172	177	179	174	165	159	160	151	150	131	121	
8	105	102	R	78	54	45	45	81	113	116	128	134	149	153	156	152	142	135	130	128	126	110	100	96	
9	92	89	81	68	56	46	44	72	110	121	141	163	180	194	R	R	184	174	165	166	156	138	128	119	
10	108	104	102	96	76	59	55	87	107	126	149	154	168	181	181	178	169	167	158	152	157	145	132	111	
11	102	91	81	84	71	70	63	81	106	130	149	153	162	176	177	173	165	159	159	165	174	171	160	149	
12	145	126	109	98	72	62	49	78	92	110	124	132	138	140	129	129	127	124	124	120	112	105	102	88	
13	82	72	69	74	67	55	38	67	92	110	124	131	130	145	149	152	150	146	146	151	179	174	160	139	
14	R	U R	124	90	82	68	52	45	73	104	110	121	134	143	159	166	172	R	176	168	172	178	170	161	128
15	122	115	104	91	65	66	57	84	102	112	121	125	132	130	130	130	126	124	126	115	105	95	88	91	
16	95	73	66	68	61	59	54	70	99	109	128	142	139	144	153	155	149	148	140	134	J R	148	152	R	
17	151	R	F	128	106	92	68	54	74	94	104	122	127	139	145	145	151	152	151	145	131	122	108	105	108
18	U F	U F	93	94	48	38	39	71	92	106	115	127	142	155	157	155	152	153	148	142	119	114	107	102	
19	97	97	84	63	36	32	32	74	105	111	122	134	160	186	194	195	182	176	175	168	157	152	153	165	
20	168	134	124	99	72	58	53	85	102	113	115	126	140	151	152	150	146	145	148	146	147	159	153	F	
21	F	U F	130	119	101	96	77	53	78	94	109	116	130	150	162	156	151	150	148	146	139	131	133	134	R
22	R	122	115	114	102	91	79	61	85	101	110	120	128	144	160	164	160	159	155	152	149	133	115	110	108
23	109	101	101	92	78	66	68	77	91	110	122	131	154	168	R	170	158	142	136	129	121	132	126	127	
24	U F	U F	U F	80	74	58	51	58	72	69	75	86	99	128	104	113	120	100	103	82	76	48	54	53	
25	54	56	56	57	49	39	39	78	94	108	131	142	159	175	168	161	146	146	148	142	104	90	90	84	
26	72	70	70	68	63	64	69	88	102	116	119	126	143	152	163	168	170	169	171	164	161	152	144	160	
27	147	134	U R	R	69	57	54	84	96	104	104	122	146	152	153	152	150	149	144	135	122	131	132	122	
28	119	118	H	110	72	52	50	79	96	121	124	128	147	166	169	170	174	173	162	144	148	143	139	130	
29	133	R	150	126	103	96	77	71	91	108	118	132	134	142	152	153	151	146	137	134	125	114	118	114	104
30	R	100	93	87	77	74	65	67	94	105	112	122	132	150	169	172	172	167	153	152	141	R	J R	127	114
31	111	101	96	83	79	62	68	92	97	104	117	132	138	148	150	152	153	154	148	125	110	101	91	90	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29	
MED	108	101	91	83	68	58	52	78	102	110	122	132	146	159	158	155	153	153	148	142	147	138	130	114	
U Q	125	124	114	98	74	66	61	85	106	116	128	139	154	169	173	172	170	167	160	164	157	152	144	128	
L Q	96	88	80	68	57	46	44	72	94	106	117	126	139	148	152	151	146	144	140	129	119	110	105	99	

MAR. 2023 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2023 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1										L		L	L	L	L	L	L								
2										L	L	L	L	U L 628	L	L	L	L							
3											L	L	L	L	L	L		L							
4										L	L	L	U L 676	L	U L 596	L	L	L							
5										L	L	L	U L 608	U L 660	L	L	U L 652	L							
6												L	L	L	L	L	L	L							
7										L	L	L	L	U L 768	L	L	L	L							
8										L	L	L	U L 780	L	L	L	L	L							
9											L	L	L	U L 780	U L 812	U L 756	U L 672	U L 636	L						
10											L	L	L	L	U L 720	U L 644	U L 616	L							
11										L	L	L	U L 680	L	L	L	L	L							
12										L	L	L	L	L	L	L	L	L							
13											L	L	L	U L 620	U L 720	U L 692	L	L							
14											L	L	L	L	U L 688	U L 552	L	L							
15											L	L	L	U L 540	U L 660	L	L	L							
16										L	L	L	L	L	U L 668	L	L	L							
17											U L 572	L	L	U L 536	L	L	L	L							
18											L	U L 476	U L 640	L	L	L	L	L							
19											L	L	L	U L 728	U L 680	U L 664	L	L	L						
20										L	L	L	L	U L 572	L	L	L	L							
21											L	U L 500	U L 488	U L 612	L	L	L	L	L						
22												U L 504	L	L	U L 672	L	U L 652	L	L						
23											L	U L 524	L	U L 624	L	U L 644	L	L	L						
24									420	480	U L 528	U L 564	U L 512	U L 580	U L 520	L	L	L							
25											L	L	L	L	U L 568	U L 728	U L 676	L	L						
26										L	U L 496	U L 504	U L 568	L	L	U L 628	U L 580	L	L		L				
27											L	U L 624	U L 592	U L 680	L	L	L	L							
28										L	L	L	U L 720	L	L	L	L	L							
29								L			L	U L 564	L	L	L	L	L	L							
30											L	U L 560	U L 540	U L 732	U L 620	L	L	L	L						
31										U L 584	U L 564	L	L	L	U L 656	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									1	2	8	7	14	14	12	7	5								
MED									420	532	526	540	658	624	666	652	616								
U Q											562	564	728	680	720	676	644								
L Q											502	488	608	572	650	628	558								

MAR. 2023 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Okinawa

MAR. 2023 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E PSWEEP 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	272	324	352	384	392	388	384	364	336	288	A						
2								B	272	320	352	372	388	388	388	368	324	292	A						
3								B	264	328	356	376	392	396	396	388	356	280	U A	A					
4								A	276	324	352	372	392	384	388	360	348	264	U A	A					
5								A	280	336	368	388	408	408	400	364	348	292	208						
6							180	280	324	360	396		B R	412	396	384	348	300	216						
7							A	276	332		A	396	408	404	400	376	348	300	196						
8							A	284	320	364	384	396	404	392	368	340	288		A						
9							A	284	328		A	A	A	A	A	A		340	296	200					
10							A	276	328	368	396	396		A	A		372	344	288	200					
11							200	264	340	372	388	384	396	396	368	340	300		A						
12							216	288	324	352	384	392	392	392	368	344	300		A						
13							196	280	328	352	368	376	408	384	368	340	284	196	U A						
14							A	276	316		A	A	A	A		384		336	284	204					
15							204	272	316	352	368	384	388	364	352	336	284	200		A					
16							B	276	320	356	372	384	388	384	364	328	292	200		B					
17							172	276	324	348	372		A	396	376	364	340	284	A	B					
18							220	272	328	348	368	380	388	380	356	336	288	212	A						
19							232	276	A	368		A	388		376	364	344	300	A	B					
20							200	284	324	352	400	R	416	408	396	380	348	300	208	A					
21							A	280	340	360	388	400	392	400	364	336	292		A	A					
22							188	288	340	368		A	A	A		360	348	300		A	A				
23							192	284	332	360		A	A	404	376	348	332	300	232	A					
24							180	296	340	356	404	400	380	364	352	328	280		A	A					
25							224	284	340		A	A	A	404	396	372	344	296		A	B				
26							216	284	332	372	380		A	A	R	392	376	336	292	A	A				
27							240	288	336	356	388	392	396	388	376	344	300	232	A						
28							220	284	336	360	392	R	392		A	396	376	348		A	A				
29							224	300	348	376	388		A	A		388	376	348	308	228					
30							B	232	296	A	A	A	A	A		376	372	336	308	A	A				
31							B	224	288	340	376	400	400	392	376	356	332	292	216	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								19	31	29	26	24	21	22	28	29	31	30	15						
MED								216	280	328	358	386	392	396	388	368	340	292	208						
U Q								224	284	338	368	394	400	404	396	376	348	300	216						
L Q								192	276	324	352	372	386	388	378	362	336	288	200						

MAR. 2023 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2023 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
1	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	J 19	A	G	G	40	42	46	46	48	41	J 53	A 47	J 44	J 30	J 17	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	G	G	44	47	49	46	44	41	34	30	E 16	J 22	J 18	E 16	E 16	20		
3	J 17	A 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	30	38	42	44	44	48	50	47	J 48	A 43	J 30	J 19	J 18	E 16	E 16	E 16	E 16	
4	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	G	41	G	J 35	22	E 16	E 16	E 16	E 16	E 16	E 16	E 16	
5	E 16	E 16	E 16	E 16	E 16	E 16	E 16	20	19		G	G	G	G	G	44	40		G	G	G	J 18	E 16	E 16	E 16	E 16	19	
6	J 36	A 18	J 20	A 16		J 19	A 18	E 16	B 16	G	G	G	46	45	46	43		G	G	G	G	J 30	E 16	E 16	E 16	E 16	E 16	
7	J 15	A 16	E 16	E 16	E 16	J 18	A 18	J 19	A 33	G	G	41	44	45	55		42	45	48	34	37	18	25	28	16			
8	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	46	44	42	37	34	22	J 24	J 22	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	G	39	43	43	J 42	J 42	50	43		G	J 23	17	16	16	16	16	16	
10	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	41	43	45	40	41	42		G	J 32	J 29	E 16	E 16	E 16	E 16	E 16	
11		E 18	E 16	E 16	E 16	J 22	A 15	E 16		G	28	40	42	43	45	42	40	37	35	29	31	16	16	16	16	16		
12	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	40	44	46	48	45	51	J 55	A 60	J 53	J 32	E 16	E 16	E 16	E 16	18	
13	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	40	46	46	48	47	44	38	37	27	J 19	16	21	25	23		
14	20	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	37	J 41	J 42	44	44	41		G	33	28	22	16	16	20	E 16	
15	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	44	45	40		G	31	29	J 21	16	16	16	16	
16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	G		G	36	34	27	J 16	22	16	16	16	E 16	
17	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	44	46	44	42	47	J 24	G	J 32	20	17	16	16	16	E 16	
18	J 30	A 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	J 32	31	47	44	42	40		G	G	J 26	20	21	28	24	42		
19	20	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	J 34	J 34	G	47	46	43	40		G	G	E 16	E 16	E 16	E 16	E 16	16	
20	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	39	44	48	47	45	40		G	38	J 36	24	16	16	38	16		
21	J 17	A 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	47	48	43		G	G	J 33	J 43	85	22	26	16	19		
22	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	50	50	48	43		G	28	J 25	J 30	J 39	24	17	16	18	
23	E 17	E 17	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	41	47	45	42	39		G	32	J 29	26	19	20	16		
24	E 17	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	42	G	G	G	G	32	28	32	J 34	J 34	37	17	19	24		
25	19	19	E 16	E 16	E 16	E 16	E 16	18		G	G	G	J 38	J 48	J 65	47		G	G	G	33	30	20	23	39	20	36	
26	J 52	A 42	A 24	20	18	J 18	A 18	E 16	B 16	G	G	G	G	42	43	34	30	37	26	26	35	26	21	16	16	16		
27	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	47	44	43		G	G	G	J 54	23	21	32	16	20		
28	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	32	37	40	G	J 46	J 49	38	34	26	55	34	28	16	16	19	16	
29	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	44	41	44		G	G	J 38	J 36	19	16	18	16		
30	20	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	37	40	41	50	44		G	G	J 42	34	24	20	16	19		
31	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	45	45		G	G	G	33	28	39	38	25	26	19	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	41	45	45	43	40		G	33	J 30	J 24	18	16	16	16	E 16	
U Q	18	E 16	E 16	E 16	E 16	J 16	A 16	A 16	21		G	G	40	44	47	48	45	42	37	J 35	J 35	J 32	22	20	20	19		
L Q	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	42	43	41		G	G	G	J 27	J 19	16	16	16	16	E 16

MAR. 2023 foEs (0.1MHz)

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## IONOSPHERIC DATA STATION Okinawa

MAR. 2023 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E pSWEEP 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	E 18	G	G	40	42	45	44	46	40	50	43	33	24	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	G	G	G	44	47	48	45	42	40	32	22	E 16	19	E 16	E 16	E 16	
3	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 20	30	35	40	42	43	46	48	41	41	38	26	E 16	E 16	E 16	E 16	E 16	
4	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 19	G	G	G	G	G	G	G	39	G	30	21	E 16	E 16	E 16	E 16	E 16	
5	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 18	G	G	G	G	G	G	G	44	39	G	G	E 16	E 16	E 16	E 16	E 16	
6	20	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	46	45	46	42	G	G	G	G	E 26	E 16	E 16	E 16	
7	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 23	G	G	40	43	44	49	G	41	44	40	32	32	E 16	E 16	E 17	E 16	
8	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 20	G	G	G	G	G	46	42	40	37	31	22	19	E 16	E 16	E 16	E 16	
9	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 19	G	39	42	42	40	40	38	37	G	G	E 23	E 16	E 16	E 16	E 16		
10	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 22	G	G	40	42	42	40	40	41	G	31	28	26	E 16	E 16	E 16	E 16	
11	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	28	G	40	42	43	44	42	39	36	33	26	E 16	E 16	E 16	E 16	
12	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 13	G	G	40	44	44	47	44	48	53	55	43	26	E 16	E 16	E 16	E 16	
13	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 21	G	G	39	42	44	47	46	42	36	34	24	16	E 16	E 16	E 16	E 18	
14	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 18	G	G	36	39	40	44	43	37	G	31	26	16	E 16	E 16	E 16	E 16	
15	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	G	44	44	40	G	30	28	19	E 16	E 16	E 16	E 16	
16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 20	G	G	G	G	G	43	42	41	G	36	32	26	E 16	E 16	E 16	E 16	
17	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 20	G	G	G	43	44	44	42	32	G	G	21	23	14	E 16	E 16	E 16	
18	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	47	43	41	39	G	G	24	18	E 16	22	23	27	
19	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	20	34	G	40	G	45	43	40	G	G	E 25	E 16	E 16	E 16	E 16	
20	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 22	G	39	G	44	47	46	44	39	G	G	36	33	20	E 16	E 16	E 16	
21	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 20	30	G	G	G	46	47	43	G	G	G	33	39	57	E 16	E 16	E 16	
22	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	50	48	47	42	G	G	26	21	26	29	20	E 17	E 18	
23	E 17	E 17	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	40	47	44	41	38	G	32	G	26	20	E 16	E 19	E 16	
24	E 17	E 16	E 16	E 16	E 14	E 16	E 16	E 22	G	G	38	G	G	G	G	30	26	31	28	28	29	E 16	E 18	E 20	
25	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	37	48	43	46	G	G	G	31	26	16	E 19	24	E 33	
26	30	24	20	E 16	E 16	E 16	E 16	E 16	G	G	G	G	42	42	32	28	37	23	25	20	E 18	E 16	E 16	E 16	
27	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	46	44	42	G	G	G	18	18	E 16	22	E 16	E 16	
28	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 24	31	36	39	G	46	45	34	30	23	38	24	26	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	G	G	G	G	43	41	43	G	G	G	35	33	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	G	G	36	39	40	40	44	44	G	G	G	34	24	E 16	E 16	E 16	
31	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	G	G	44	44	G	G	G	G	31	27	34	28	21	E 21	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 17	G	G	G	40	43	44	42	38	G	31	26	19	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 20	G	G	39	43	46	46	44	40	36	33	28	26	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	G	G	G	G	40	42	38	G	G	G	G	23	16	E 16	E 16	E 16	

MAR. 2023 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2023 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	16	16	16	16	16	16	16	16	16	19	20	25	22	24	16	20	17	17	16	16	16	16	16
2	16	16	16	16	16	16	16	16	17	17	22	22	22	27	23	24	18	16	16	16	16	16	16	16
3	16	16	16	16	16	16	16	16	16	14	18	20	23	20	18	23	21	21	16	16	16	16	16	16
4	16	16	16	16	16	16	16	16	16	20	21	26	26	23	26	20	20	18	17	16	16	16	16	16
5	16	16	16	16	16	16	16	16	16	16	21	21	29	31	21	21	16	16	18	16	16	16	16	16
6	16	16	16	16	16	16	16	16	18	18	20	22	43	26	28	23	22	18	16	14	16	16	16	16
7	16	16	16	16	16	16	16	16	16	18	21	23	24	22	24	20	18	20	16	16	16	16	16	16
8	16	16	16	16	16	16	16	16	16	16	20	22	23	26	24	22	21	16	16	16	16	16	16	16
9	16	16	16	16	16	16	16	16	16	16	22	22	24	22	22	24	18	18	16	16	16	16	16	16
10	16	16	16	16	16	16	16	16	16	17	20	25	24	26	22	21	20	20	16	16	16	16	16	16
11	16	16	16	16	16	16	16	16	16	18	21	21	23	22	22	22	20	17	16	16	16	16	16	16
12	16	16	16	16	16	16	16	16	16	17	20	20	22	22	22	21	20	20	16	16	16	16	16	16
13	16	16	16	16	16	16	16	16	16	19	20	24	22	22	21	20	15	14	16	16	16	16	16	16
14	16	16	16	16	16	16	16	16	16	19	20	21	23	26	23	22	19	16	15	16	16	16	16	16
15	16	16	16	16	16	16	16	16	16	18	20	20	20	23	21	21	14	14	16	16	16	16	16	16
16	16	16	16	16	16	16	16	20	17	21	24	24	24	22	25	21	20	17	15	16	16	16	16	16
17	16	16	16	16	16	16	16	16	17	20	21	22	24	20	24	21	21	14	14	14	16	16	16	16
18	16	16	16	16	16	16	16	16	16	19	22	22	22	24	26	20	18	16	16	16	16	16	16	16
19	16	16	16	16	16	16	16	16	16	18	21	21	23	23	22	24	22	17	16	16	16	16	16	16
20	16	16	16	16	16	16	16	16	16	19	20	32	26	28	23	23	20	17	14	16	16	16	16	16
21	16	16	16	16	16	16	16	16	17	20	20	24	24	24	23	21	21	18	16	16	16	16	16	16
22	16	16	16	16	16	16	16	16	16	20	24	25	24	26	22	20	19	14	15	16	16	17	16	18
23	17	17	16	16	16	16	16	16	18	20	21	22	25	28	23	21	20	14	16	14	16	16	16	16
24	17	16	16	16	14	16	16	16	16	21	22	22	25	25	24	22	20	14	16	16	16	16	16	16
25	16	16	16	16	16	16	16	16	16	19	21	24	25	23	21	24	21	17	16	16	16	16	16	16
26	16	17	16	16	16	16	16	18	19	20	20	25	26	25	28	24	21	14	15	16	16	16	16	16
27	16	16	16	16	16	16	16	16	17	20	22	22	25	22	23	22	22	20	15	16	16	16	16	16
28	16	16	16	16	16	16	16	16	18	22	23	24	24	24	24	20	18	13	16	17	16	16	16	16
29	16	16	16	16	16	16	16	16	16	21	22	22	35	35	28	19	20	16	16	16	16	16	16	16
30	16	16	16	16	16	16	16	16	17	24	24	28	25	22	22	21	21	21	16	16	16	16	16	16
31	16	16	16	16	16	16	16	16	17	22	22	22	24	23	24	22	18	16	16	16	16	16	16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	16	16	16	16	16	16	16	16	16	19	21	22	24	23	23	21	20	17	16	16	16	16	16	16
U Q	16	16	16	16	16	16	16	16	17	20	22	24	25	26	24	23	21	18	16	16	16	16	16	16
L Q	16	16	16	16	16	16	16	16	16	17	20	21	23	22	22	20	18	14	16	16	16	16	16	16

MAR. 2023 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2023 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'E PSWEEP 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	316	281	301	320	370	315	264	324	360	346	315	288	302	304	301	292	300	303	306	298	288	254 <sup>R</sup>	277	278	
2	294	280 <sup>J R</sup>	286 <sup>H</sup>	290	322	326	328	324	345	322	308	304	286	290	284	287	294	283	301	304	290	289	309	266 <sup>R</sup>	
3	255 <sup>U R</sup>	272	294	302	381	302	271	324	331	337	323	305	284	287	289	292	292	291	306	305	315	283	292	292	
4	289	296	302	310	281	276	268	311	364	346	307	272	288	286	281	277	282	289	286	294	281	284	309	293	
5	277	282	270 <sup>R</sup>	260	290	305	323	319	335	312	294	295	298	278	274	277 <sup>R</sup>	281	290	291	292	290	295	288	265	
6	268	256	246	283	281	306	307	336	374	303	285	283	284	289	283	281	284	289	297	297	294	295	279	285	
7	304	296	277	272	283	331	269	308	336	307	290	285	279	271	270	273	278	285	288	294	289	298	296	284	
8	276	273	263 <sup>R</sup>	303	316	292	291	332	340	326	304	290	284	286	279	280	277	289	293	297	296	281	263	283	
9	300	309	307	327	337	298	259	303	323	300	288	288	279	271	257 <sup>R</sup>	256 <sup>R</sup>	269	274	277	294	293	291	296	290	
10	273	278	284	293	299	299	287	325	319	298	303	288	282	274	276	275	273	280	289	285	297	288	285	272	
11	294	289	274	294	287	282	279	303	303	299	295	291	277	274	277	276	282	282	293	287	289	284	292	302	
12	312	295	299	306	298	309	298	337	331	314	306	295	291	296	282	284	283	289	292	297	284	289	309	307	
13	311	298	282	296	326	344	314	329	332	312	306	308	277	288	278	286	290	290	295	299	266 <sup>R</sup>	269	245 <sup>R</sup>	274 <sup>R</sup>	
14	<sup>R</sup>	<sup>U R</sup>	294	299	316	332	307	307	327	339	322	296	291	278	283	279	282	285 <sup>R</sup>	294	289	284	288	274	261 <sup>R</sup>	271
15	290	305	307	325	288	301	302	331	330	305	307	291	298	289	282	290	290	288	310	300	282	264	266	289	
16	323	320	286 <sup>R</sup>	307	309	317	314	316	318	297	299	297	290	288	292	296	293	302	300	302	267 <sup>J R</sup>	256 <sup>U R</sup>	256 <sup>R</sup>		
17	294	304 <sup>R</sup>	249 <sup>F</sup>	297	298	330	319	343	322	305	317	299	300	297	285	294	295	310	313	302	288	261	284	313	
18	288 <sup>U F</sup>	285 <sup>U F</sup>	321	363	345	297	296	344	337	314	298	291	300	299	295	292	292	304	315	313	296	255	276	270	
19	299	317	351	343	331	261	258	327	340	320	302	289	292	288	285	288	291	291	304	313	294	278	283	298	
20	317	319	313	302	278	288	276	329	339	317	294	288	284	296	291	294	295	303	316	325	280	270	277		
21	<sup>F</sup>	<sup>U F</sup>	294	266	254	262	286	307	337	326	304	294	282	289	288	290	282	289	299	312	310	284	256	251 <sup>R</sup>	268 <sup>R</sup>
22	285 <sup>R</sup>	278	283	256	263	269 <sup>R</sup>	299	330	333	314	300	290	280	287	283 <sup>R</sup>	281	284	296	305	309	288	246	280	273	
23	281	304	283	286	284	271	319	339	322	308	295	278	291	283	282	285	292	289	310	317	278	262	272	277	
24	291 <sup>U F</sup>	261 <sup>U F</sup>	283 <sup>U F</sup>	249	286	298	240	271	317	283	276	273	264	290	278	274	305	293	311	292	305	230	251	247	
25	253	257	264	293	308	271	292	339	341	302	320	292	285	296	281	283	282	295	318	328	290	262	279	294	
26	278	271	281	298	277	294	321	343	340	323	315	287	292	291	277	280	287	298	313	320	293	285	273	279	
27	289	261	262 <sup>U R</sup>	279 <sup>R</sup>	312	304	291	341	340	332	294	283	300	292	288	291	295	303	309	320	264	251 <sup>U R</sup>	238 <sup>U R</sup>	269 <sup>R</sup>	
28	283	305	289 <sup>H</sup>	308	333	303	293	332	318	318	305	284	284	285	287	280	277	290	306	291	260 <sup>R</sup>	254 <sup>U R</sup>	243 <sup>R</sup>	282 <sup>R</sup>	
29	276	302 <sup>R</sup>	296	294	251	283	280	311	323	308	308	292	282	283	282	285	291	292	305	307	256	254	248	281	
30	267 <sup>R</sup>	277	276	289	294	284	285	331	325	310	294	284	281	286	282	284	283	291	284	283	269 <sup>R</sup>	256 <sup>J R</sup>	255	267	
31	272	283	287	278	305	279	298	331	320	308	292	291	283	289	283	285	294	300	317	309	266	247	263	274	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29	
MED	289	289	284	296	298	298	293	329	332	312	300	290	284	288	282	284	289	291	305	300	288	269	277	279	
U Q	300	304	299	308	326	307	307	337	340	322	307	292	292	291	287	290	293	299	311	310	293	285	288	291	
L Q	276	277	274	283	283	283	276	319	322	304	294	284	281	283	278	280	282	289	292	294	278	255	256	270 <sup>R</sup>	

MAR. 2023 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2023 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

LAT.26°41.0'N LON.128°09.0'E 0SWEEP 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										L	L	L	L	U L 350	L	L	L	L							
3											L	L	L	L	L	L		L							
4										L	L	L	U L 344	U L 369	L	L	L	L							
5										L	L	L	U L 362	U L 342	L	L	U L 328	L							
6												L	L	L	L	L	L	L							
7										L	L	L	L	U L 332	L	L	L	L							
8										L	L	L	U L 329	L	L	L	L	L							
9											L	L	U L 334	U L 318	U L 331	U L 342	U L 333	L							
10											L	L	L	L	U L 341	U L 342	U L 340	L							
11										L	L	L	U L 332	L	L	L	L	L							
12										L	L	L	L	L	L	L	L								
13											L	L	L	U L 335	U L 341	U L 332	L	L							
14											L	L	L	L	U L 321	U L 359	L	L							
15											L	L	L	U L 377	U L 347	L	L	L							
16										L	L	L	L	L	U L 331	L	L	L							
17											U L 368	L	L	U L 373	L	L	L	L							
18											L	U L 421	U L 345	L	L	L	L	L							
19											L	L	U L 331	U L 344	U L 330	L	L	L							
20										L	L	L	L	U L 361	L	L	L	L							
21											L	U L 405	U L 430	U L 340	L	L	L	L							
22												U L 407	L	L	U L 333	L	U L 343	L	L						
23											L	U L 391	L	U L 345	L	U L 340	L	L	L						
24												U L 343	U L 341	U L 378	U L 361	U L 388	L	L							
25												L	L	L	U L 383	U L 339	U L 335	L	L						
26											L	U L 402	U L 427	U L 379	L	L	U L 343	U L 347	L	L					
27												L	U L 373	U L 356	U L 346	L	L	L	L						
28											L	L	L	U L 318	L	L	L	L							
29										L		L	U L 383	L	L	L	L	L							
30											L	U L 383	U L 391	U L 331	U L 339	L	L	L	L						
31											U L 375	U L 370	L	L	L	U L 341	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									1	2	8	7	14	14	12	7	5								
MED									332	354	387	391	342	345	340	342	340								
U Q											404	427	356	361	344	343	354								
L Q											369	373	331	335	331	335	330								

MAR. 2023 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2023 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

LAT. 26°41.0'N LON. 128°09.0'E PSWEEP 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										216		284	280	264	254	282	270							
2										224	270	278	308	300	298	290	268	274						
3											250	242	304	298	302	274		280						
4										216	256	260	308	286	288	298	306	258						
5										250	252	272	288	328	318	310	308	282						
6												304	314	300	294	304	296	272						
7										246	298	318	316	340	334	320	290							
8										216	260	298	328	310	314	302	292	280						
9											292	302	314	328	340	342	318	286						
10											270	294	308	316	320	314	304	278						
11										262	256	266	308	320	312	308	292	288						
12										250	268	272	286	280	300	312	298							
13											256	276	326	308	328	308	286	270						
14											258	278	318	316	330	292	292	258						
15											274	270	278	256	316	284	280							
16										224	266	278	268	302	298	284	262	260						
17											256	280	288	264	298	292	266	250						
18											240	230	294	292	286	286	282	254						
19											268	286	316	310	304	284	266	260						
20										246	238		306	294	278	286	274	270						
21										246	246	254	290	280	276	292	288	268						
22											236	288	332	322	296	306	292	270						
23										242	254	324	308	314	304	282	276	250						
24									300	362	338	310	288	276	252	310	260							
25											252	290	302	288	302	302	282	272						
26										240	230	230	266	290	312	314	290	266	244					
27											218	284	298	310	290	296	280	258						
28										254	264	252	328	320	298	294	292	268						
29									222		260	254	308	308	310	308	286	266						
30										232	262	256	330	316	310	296	280	262						
31										264	270	284	308	300	308	300	288	264						
	00	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	17	29	30	31	31	31	31	30	26	1					
MED									261	246	258	278	308	302	302	298	287	268	244					
U Q										252	269	290	316	316	314	308	292	274						
L Q										224	251	260	288	288	294	286	276	260						

MAR. 2023 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2023 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	224	244	244	212	196	202	312	250	214	204	204	206	224	220	232	206	E A 254	232	222	212	206	212	228	238
2	222	208	214	230	222	226	216	236	212	206	192	214	230	248	234	222	236	220	234	220	220	212	200	210
3	242	238	242	240	194	210	266	234	220	224	220	212	210	228	246	226	230	234	242	230	224	222	222	250
4	252	234	206	218	208	256	306	254	218	206	192	198	202	188	206	222	214	224	232	234	220	214	202	220
5	232	228	234	232	228	230	224	232	220	218	212	206	194	198	214	222	202	234	228	220	224	206	208	226
6	258	268	304	252	230	220	260	236	206	206	194	218	218	222	218	216	210	224	242	228	228	210	220	236
7	222	220	236	266	256	210	266	256	214	194	218	210	214	240	200	222	234	244	242	244	226	220	214	218
8	218	216	216	230	198	250	256	240	216	200	190	204	184	216	212	218	210	222	238	242	226	208	228	252
9	246	242	230	202	208	236	292	230	214	214	218	206	194	192	232	204	204	232	240	236	220	190	230	224
10	238	266	250	202	202	222	262	238	222	198	226	214	194	200	190	214	214	232	240	234	230	204	222	226
11	246	242	266	252	244	236	202	216	206	190	218	208	200	212	206	224	214	224	244	240	240	210	226	230
12	220	208	216	212	186	212	218	224	208	204	204	212	206	240	220	240	268	268	254	236	234	230	234	216
13	230	240	274	250	204	196	214	228	216	204	204	208	216	234	240	224	218	232	238	226	222	204	240	234
14	240	228	210	222	202	198	224	228	218	200	184	180	176	218	206	204	224	224	236	246	232	212	248	268
15	252	230	226	194	218	246	208	220	222	208	210	192	224	210	226	214	220	222	236	232	238	216	294	262
16	234	216	260	248	222	228	218	236	206	194	204	194	204	200	204	220	222	226	232	212	204	188	236	236
17	228	212	208	226	196	208	222	214	208	192	196	214	234	204	220	212	220	226	228	206	198	226	256	238
18	250	266 <sup>Q</sup>	222	198	176	228	250	220	218	212	200	188	228	204	206	218	216	224	234	218	196	214	274	288
19	254	220	200	198	196	260	352	232	222	210	198	212	188	218	218	228	216	226	240	218	206	212	252	240
20	230 <sup>Q</sup>	206	216	202	220	222	274	232	216	210	206	228	238	230	232	216	208	234	246	228	212	218 <sup>Q</sup>	244	244 <sup>Q</sup>
21	248 <sup>Q</sup>	212	202	246	236	182	206	224	216	214	204	186	220	252	222	202	212	232	246	242	202	214	244	238
22	246	234	230	264	220	196	222	226	220	220	198	252	248	248	216	210	204	228	244	222	202	234	240	236
23	232	228	242	248	216	244	216	206	214	208	198	188	220	226	212	208	208	222	238	220	246	244	262	250
24	280 <sup>Q</sup>	238 <sup>Q</sup>	230 <sup>Q</sup>	280	206	246	362	278	252	236	214	220	202	210	202	218	214	230	222	234	244	214	354	368
25	344	324	290	238	220	230	246	210	216	208	194	224	196	222	196	208	220	224	244	214	198	252	252	266
26	298	300	276	244	262	256	224	208	210	204	198	180	172	206	208	198	216	232	238	222	210	198	254	256
27	238	234	236	214	186	226	234	214	212	210	198	172	226	220	204	204	214	222	238	224	206	230	252	258
28	248	238	226	210	190	218	246	220	220	212	208	194	216	238	192	206	214	236	240	218	224	236	264	258
29	254	234	220	224	224	226	216	214	202	212	202	204	188	196	224	210	210	222	250	234	226	258	270	260
30	254	254	240	238	234	222	256	218	216	208	202	194	186	208	220	224	212	228	242	238	250	236	266	282
31	262	250	244	250	224	220	246	210	214	208	196	184	206	218	202	204	218	230	236	226	E A 214	256	298	270
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	246	234	230	230	216	226	246	228	216	208	202	206	206	218	214	216	214	228	238	228	222	214	244	240
U Q	254	244	244	248	224	236	266	236	220	212	210	214	224	230	224	222	220	232	242	236	230	230	262	260
L Q	230	220	216	212	196	210	218	216	212	204	196	192	194	204	204	206	210	224	234	220	206	210	226	230

MAR. 2023 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Okinawa

MAR. 2023 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								A											A					
2								B	98	100	100	98	98	100	100	100	104	106	A					
3								B	102	102	100	100	100	100	100	100	100	100	A					
4								A	102	100	100	100	100	100	100	104	104	102	A					
5								A	102	100	100	100	100	100	100	100	100	100	A					
6								E B	100	100	100	100	100	102	102	102	102	102	122					
7								138	104	102	100	100	B	102	100	100	100	102	108					
8								A	102	100	A	110	110	106	104	104	102	102	106	A				
9								A	106	104	100	100	100	100	100	100	100	100	A					
10								A	100	100	A	A	A	A	A	A	100	104	114					
11								A	100	100	100	104	104	A	A	102	102	102	108	A				
12								136	102	102	102	102	100	100	100	100	102	102	A					
13								142	104	104	102	100	100	100	100	100	100	106	A					
14								126	104	100	100	100	100	100	102	102	100	102	108					
15								A	102	100	A	A	A	A	A	A	100	100	110					
16								148	102	100	100	100	100	100	100	100	98	98	114	A				
17								B	102	98	98	98	98	98	100	100	100	106	112	B				
18								114	102	100	100	100	A	100	104	104	104	110	A	B				
19								130	98	106	106	100	100	100	98	98	102	104	108	A				
20								138	118	A	100	A	100	A	100	100	100	104	A	B				
21								114	104	98	100	102	102	102	102	100	100	104	104	A	A			
22								A	100	100	100	98	98	98	100	102	102	102	A	A				
23								102	102	102	102	A	A	A	A	102	102	100	A	A				
24								110	100	100	100	A	A	108	104	100	102	102	110	A	A			
25								110	104	104	104	102	102	102	102	106	106	104	A	B				
26								110	102	100	A	A	A	102	100	104	100	102	A	A				
27								102	102	100	98	98	A	A	104	104	104	104	A	A				
28								108	100	100	100	100	100	100	100	100	104	104	114	A	A			
29								106	102	100	100	100	100	A	A	104	106	106	A	A				
30								106	100	100	100	100	A	A	98	104	104	104	108	A	A			
31								B	108	100	A	A	A	A	98	100	106	108	A	A				
								B	108	102	102	102	100	100	100	100	100	100	104	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								19	31	29	26	24	21	22	28	29	31	30	15					
MED								110	102	100	100	100	100	100	100	100	102	102	108					
U Q								136	102	102	100	100	100	102	102	104	104	104	114					
L Q								108	100	100	100	100	100	100	100	100	100	102	108					

MAR. 2023 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2023 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	B	B	B	B	B	B	B	110	G	G	180	154	134	132	118	124	114	106	100	96	102	B	B	B	
2	B	B	B	B	B	B	B	B	G	G	G	182	178	160	146	142	106	132	108	B	92	92	B	90	
3	92	B	B	B	B	B	B	152	182	156	128	130	160	136	124	126	110	102	102	100	96	B	B	B	
4	B	B	B	B	B	B	B	128	G	98	G	G	G	G	G	110	G	106	112	B	B	B	B	B	
5	B	B	B	B	B	B	98	150	G	G	G	G	G	G	178	118	G	G	G	B	B	B	B	104	
6	98	98	98	100	100	102	B	G	G	G	G	190	174	166	154	G	G	G	G	102	B	B	B	B	
7	98	B	B	B	112	96	114	100	G	G	188	162	144	116	G	182	132	122	104	96	96	94	88	B	
8	B	B	88	B	B	B	B	190	G	G	G	G	G	164	146	142	134	110	126	96	90	B	B	B	
9	B	B	B	B	B	B	110	154	G	192	154	156	96	96	96	96	G	G	142	82	B	B	B	B	
10	B	B	B	B	B	B	96	92	G	G	144	130	118	106	102	186	G	166	108	92	B	B	B	B	
11	96	B	B	B	98	98	B	G	G	G	168	178	176	156	160	168	136	114	104	92	B	B	B	B	
12	B	B	B	B	B	B	B	86	G	G	180	144	136	128	126	116	106	104	102	98	B	B	B	86	
13	B	B	B	B	B	B	B	202	G	G	122	114	112	148	140	134	136	120	110	102	B	86	86	96	
14	90	B	B	B	B	B	B	136	156	G	100	100	98	98	174	96	G	136	106	90	B	B	96	B	
15	B	B	B	B	B	B	B	B	G	G	G	G	G	188	202	188	G	156	110	104	B	B	B	B	
16	B	B	B	B	B	B	B	B	G	G	G	G	176	158	150	G	144	118	108	86	90	B	B	B	
17	B	B	B	B	B	B	92	146	G	G	G	184	158	178	196	94	G	88	108	88	86	B	B	B	
18	104	B	B	B	B	B	B	B	G	G	98	94	G	184	172	174	160	G	G	116	104	100	94	94	90
19	90	B	B	B	B	B	B	B	G	98	102	G	102	G	180	170	150	G	G	110	B	B	B	B	
20	B	B	B	B	B	B	B	B	G	186	192	G	180	162	148	142	162	G	G	124	104	102	B	B	B
21	88	B	B	B	B	B	96	118	150	G	G	G	178	158	174	G	G	132	102	98	98	86	B	86	
22	B	B	B	B	B	B	B	B	G	G	G	196	186	180	150	G	94	92	88	86	100	B	B	B	
23	B	B	B	B	B	B	B	B	G	G	G	102	172	154	138	116	G	204	G	102	98	82	100	B	
24	B	B	B	B	100	96	B	144	G	G	110	G	G	G	G	96	94	138	112	104	102	104	100	96	
25	98	98	B	B	B	B	102	G	G	G	102	100	98	142	G	G	G	122	108	102	100	98	98	94	
26	94	96	94	94	94	96	B	G	G	G	G	G	100	100	94	92	194	90	88	86	86	B	B	B	
27	B	B	B	B	B	B	B	B	G	G	G	G	146	140	136	G	G	G	86	86	84	96	B	90	
28	B	B	B	B	B	B	B	156	152	130	118	G	170	94	94	92	90	84	84	100	B	B	96	B	
29	B	B	B	B	B	B	B	B	G	G	G	G	136	100	170	G	G	G	108	100	102	94	90	B	
30	88	B	B	B	B	B	B	B	G	G	102	102	102	102	152	G	G	G	84	82	82	124	104	104	
31	B	B	B	B	B	B	B	B	G	G	G	G	158	148	G	G	G	136	112	100	98	98	96	98	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	11	3	3	2	5	6	7	16	5	8	14	18	25	28	26	22	13	23	28	28	18	12	12	11	
MED	94	98	94	97	100	97	98	148	152	116	125	149	158	148	148	125	114	120	108	97	97	94	96	94	
U Q	98	98	98	106	102	110	156	170	174	168	180	175	162	170	160	136	136	110	102	100	98	99	98	98	
L Q	90	96	88	96	96	96	114	124	100	102	102	102	115	111	126	96	100	104	102	87	90	89	92	90	

MAR. 2023 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2023 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								C 1			H 1	H 1	H 1	H 1	C 1	C 1	C 4	C 5	C 6	C 5	F 1				
2												H 1	H 1	HC 11	HC 11	H 1	C 1	HC 11	C 1		F 4	F 1		F 1	
3	F 1							H 1	H 1	H 1	C 1	H 1	H 1	H 1	C 1	C 1	C 2	C 3	C 2	F 1	F 1				
4								C 1		L 1						C 1		C 2	C 1						
5						F 1	H 1								H 1	C 1				F 1				F 1	
6	F 4	F 3	F 2	F 1	F 1	F 1						H 1	H 1	H 1	H 1					F 5					
7	F 1				F 1	F 2	F 1	C 3			HL 11	HL 11	HL 11	CL 11		H 1	H 2	C 3	C 4	F 8	F 1	F 1	F 1		
8			F 1					H 1						H 1	H 1	H 1	H 1	C 1	C 1	F 2	F 2				
9						F 1	H 1		H 1	HL 11	HL 11	CL 11	L 1	L 1	L 1				H 1	F 1					
10						F 1	F 2				H 1	HL 11	C 1	C 1	C 1	H 1		H 1	C 3	F 3					
11	F 1				F 1	F 2			H 1		H 1	H 1	H 1	H 1	H 1	H 1	H 1	C 1	C 3	F 1					
12								L 1			H 1	H 1	H 1	C 1	C 1	C 3	C 3	C 4	C 6	F 6				F 1	
13								H 1			C 1	C 2	C 1	C 1	C 1	H 1	H 1	C 1	C 1			F 1	F 1	F 1	
14	F 1				F 1			H 1			C 1	C 1	C 1	L 2	H 1	L 2		H 2	C 2	F 1			F 1		
15														H 1	H 1	H 1		H 1	H 1	C 1					
16													H 1	H 1	H 1		HL 11	C 1	C 2	L 1	F 1				
17						F 3	H 1				H 1	HC 11	H 1	H 1	H 1	H 1		L 2	CL 12	L 1	F 1				
18	F 2								L 1	L 1		H 1	H 1	H 1	H 1	H 1			H 2	C 1	F 1	F 5	F 5	F 5	
19	F 1								L 1	C 1		C 1		HC 11	H 1	H 1			C 2						
20								H 1		H 1		H 1	H 1	H 1	H 1	H 1		C 1	C 5	C 5			F 2		
21	F 1					F 1	C 1	H 1					H 1	H 1	H 1			H 1	C 5	L 9	F 1	F 1		F 1	
22												HC 11	HC 11	HC 11	HC 11		L 1	L 1	L 2	L 3	F 3				
23												C 1	HC 11	H 1	H 1	H 1		H 1		C 5	F 2	F 1	F 4		
24					F 1	F 3		H 1			C 1					L 1	L 1	HL 11	CL 23	CL 72	F 9	F 1	F 2	F 7	
25	F 1	F 1					F 1				C 1	C 2	L 1	H 1				C 1	C 3	C 1	F 3	F 3	F 2	F 9	
26	F 6	F 4	F 4	F 1	F 1	F 1						C 1	C 1	L 1	L 1	H 1	L 1	L 2	L 4	F 2					
27												H 1	H 1	H 1				L 1	L 1	F 1	F 4			F 2	
28								H 1	H 1	H 1	C 1		H 1	LH 11	L 1	L 2	L 1	L 4	L 4	CL 21			F 1		
29												HC 11	C 1	H 1				C 3	C 9	F 1	F 1	F 1			
30	F 1								C 1	C 1	C 1	C 1	CH 11	H 1				L 5	L 5	F 1	F 1	F 1	F 1	F 1	
31												H 1	H 1					H 1	C 2	C 4	F 9	F 8	F 7	F 2	
	00	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																									

MAR. 2023 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## f-PLOTS OF IONOSPHERIC DATA

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

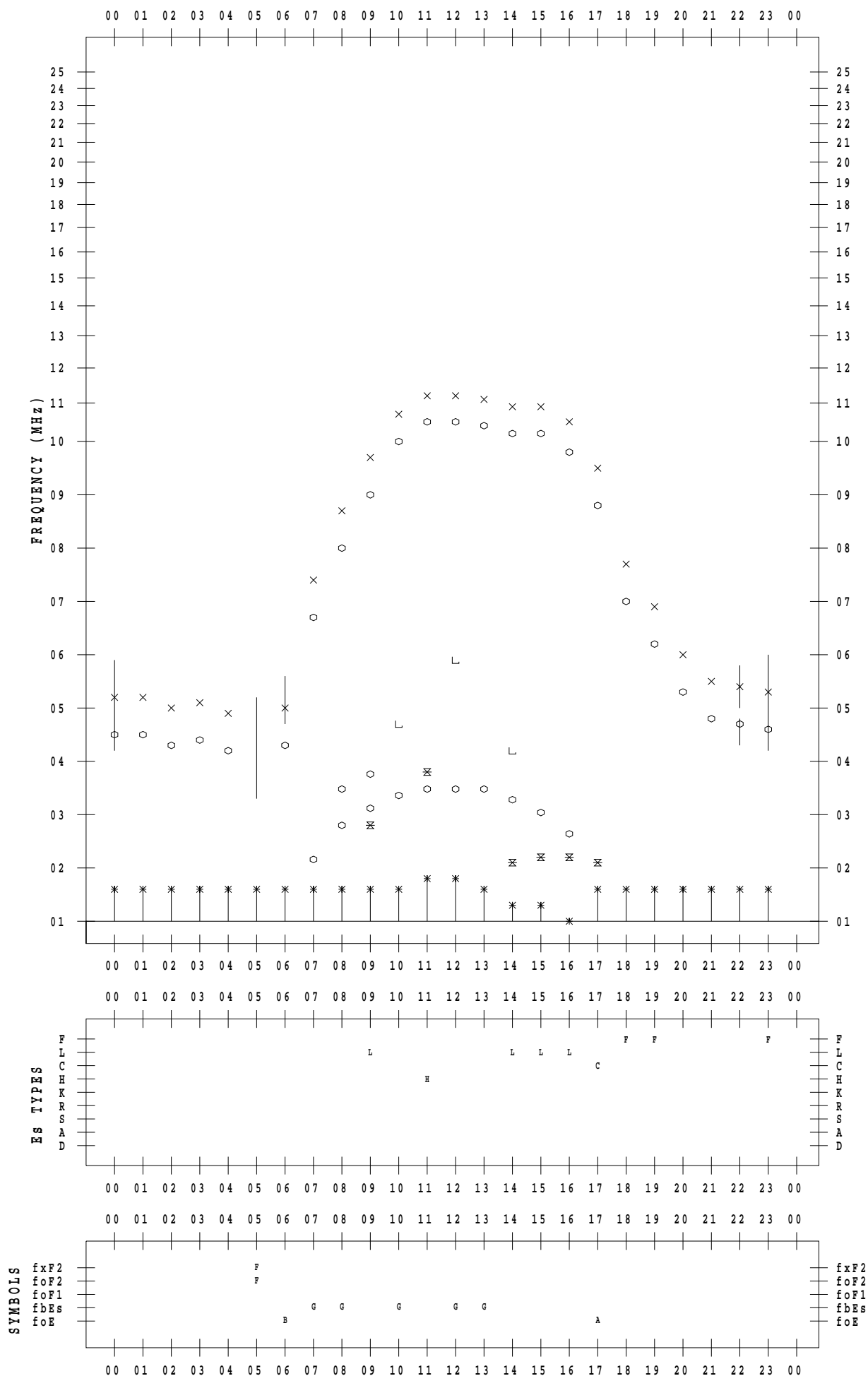
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 1

135 ° E MEAN TIME



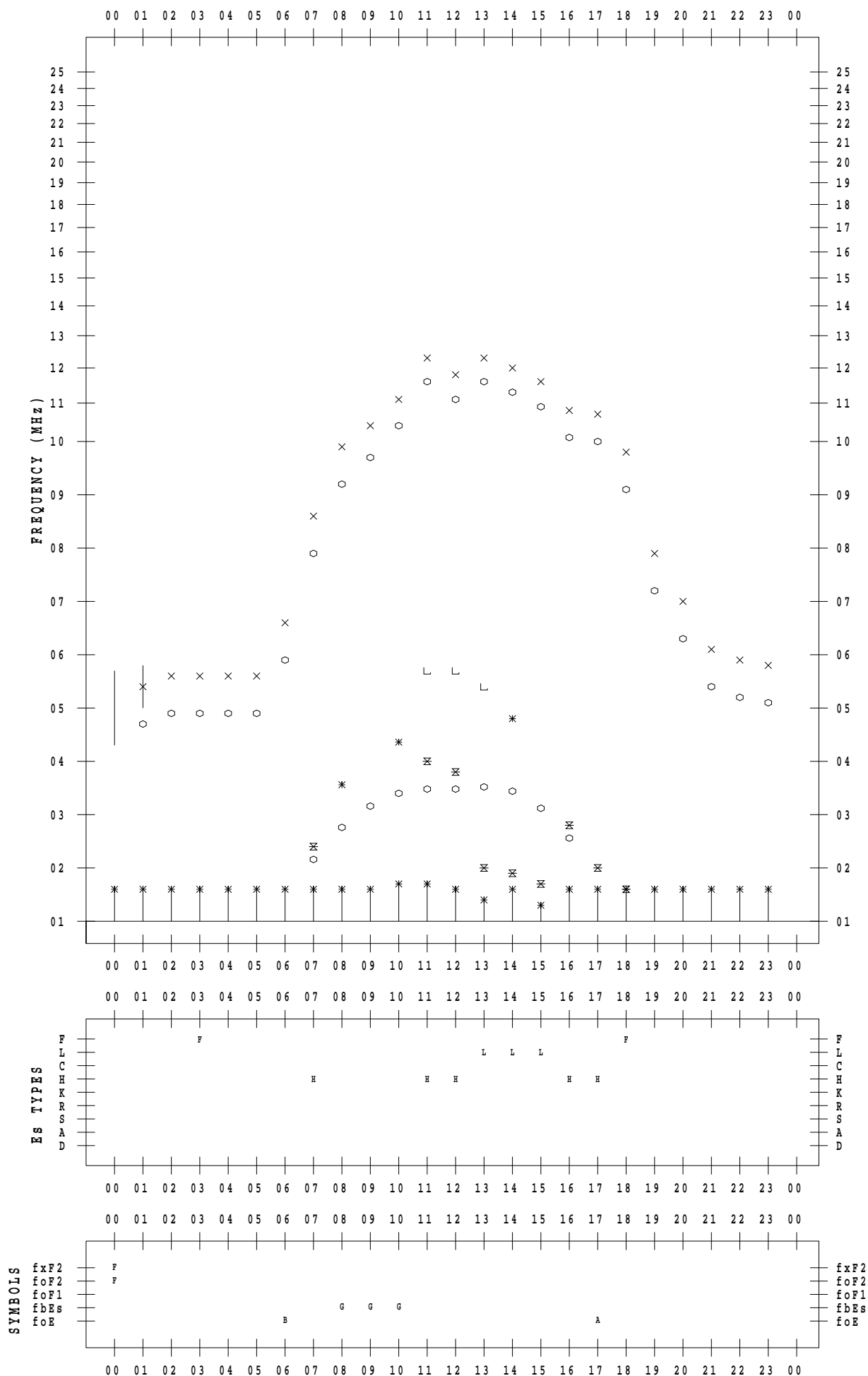
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 2

135 ° E MEAN TIME



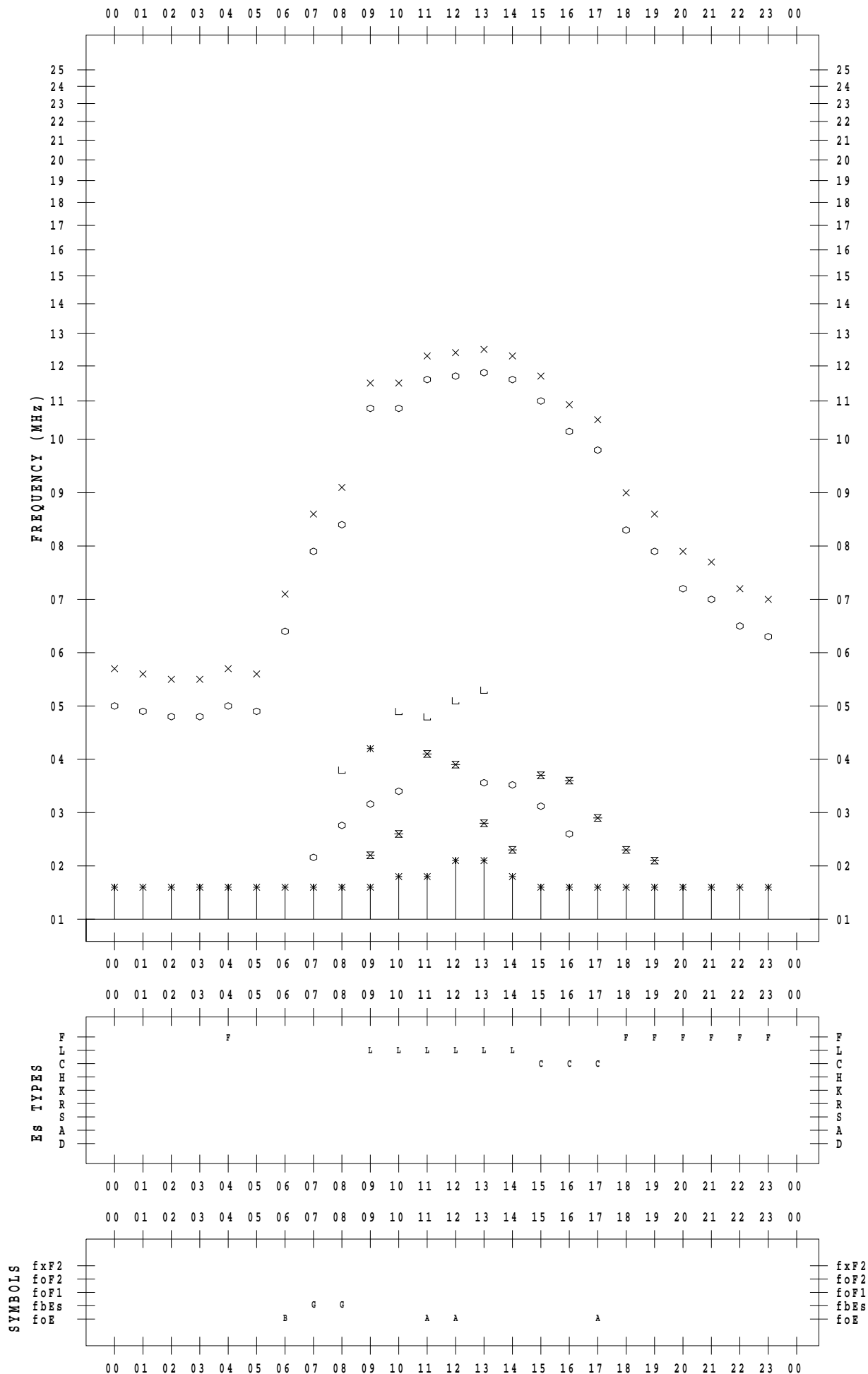
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 3

135 ° E MEAN TIME



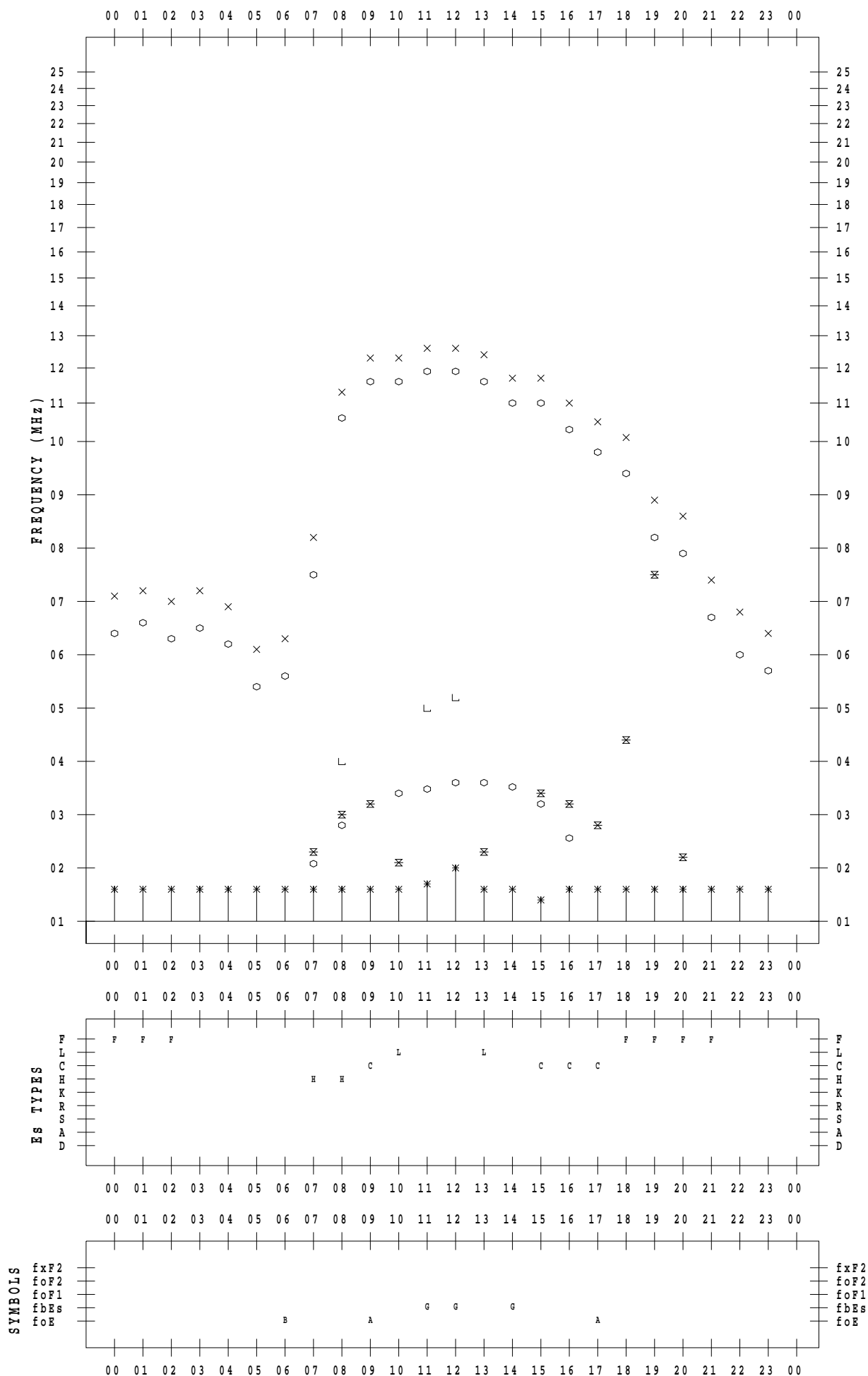
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 4

135 ° E MEAN TIME





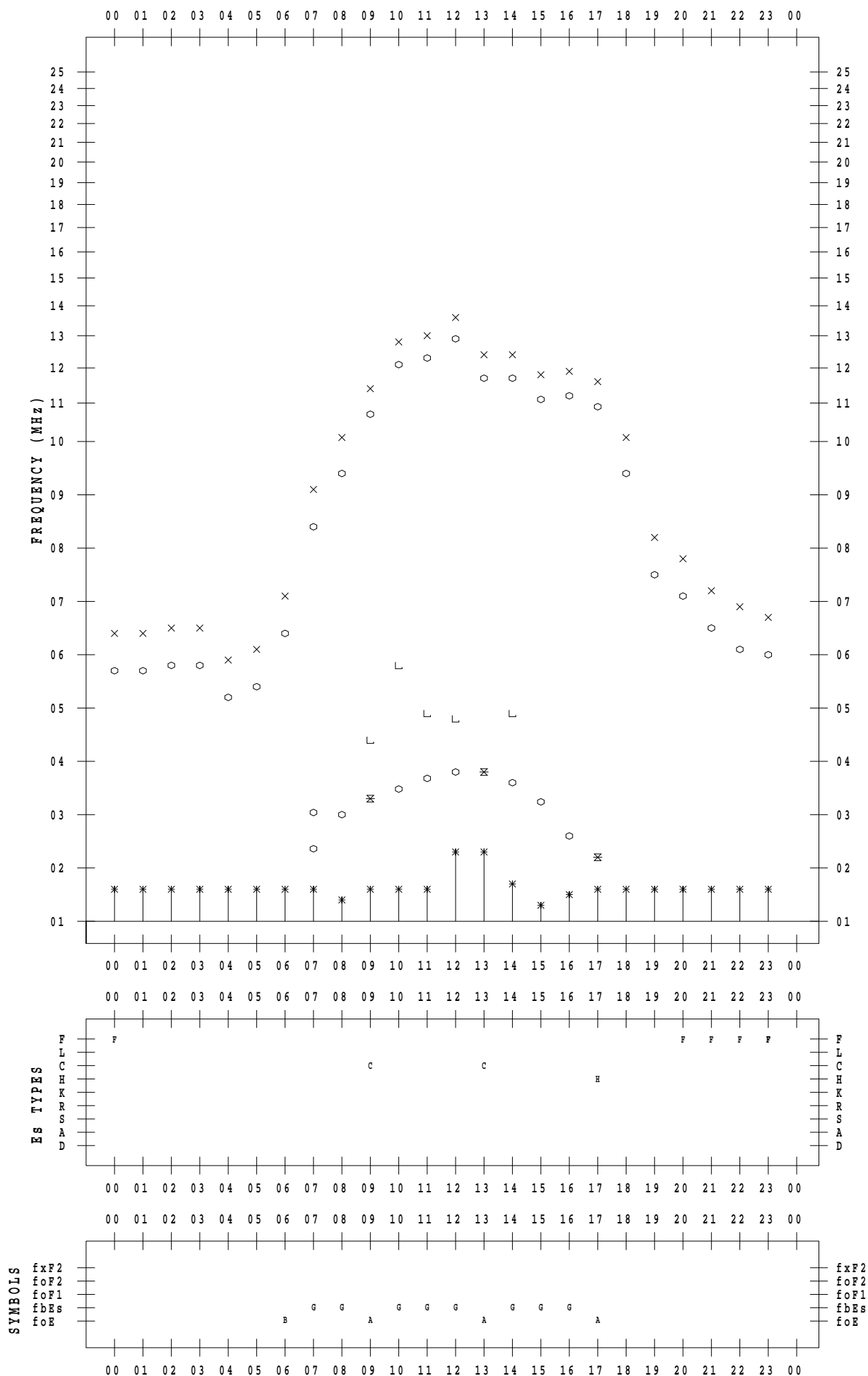
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 5

135 ° E MEAN TIME



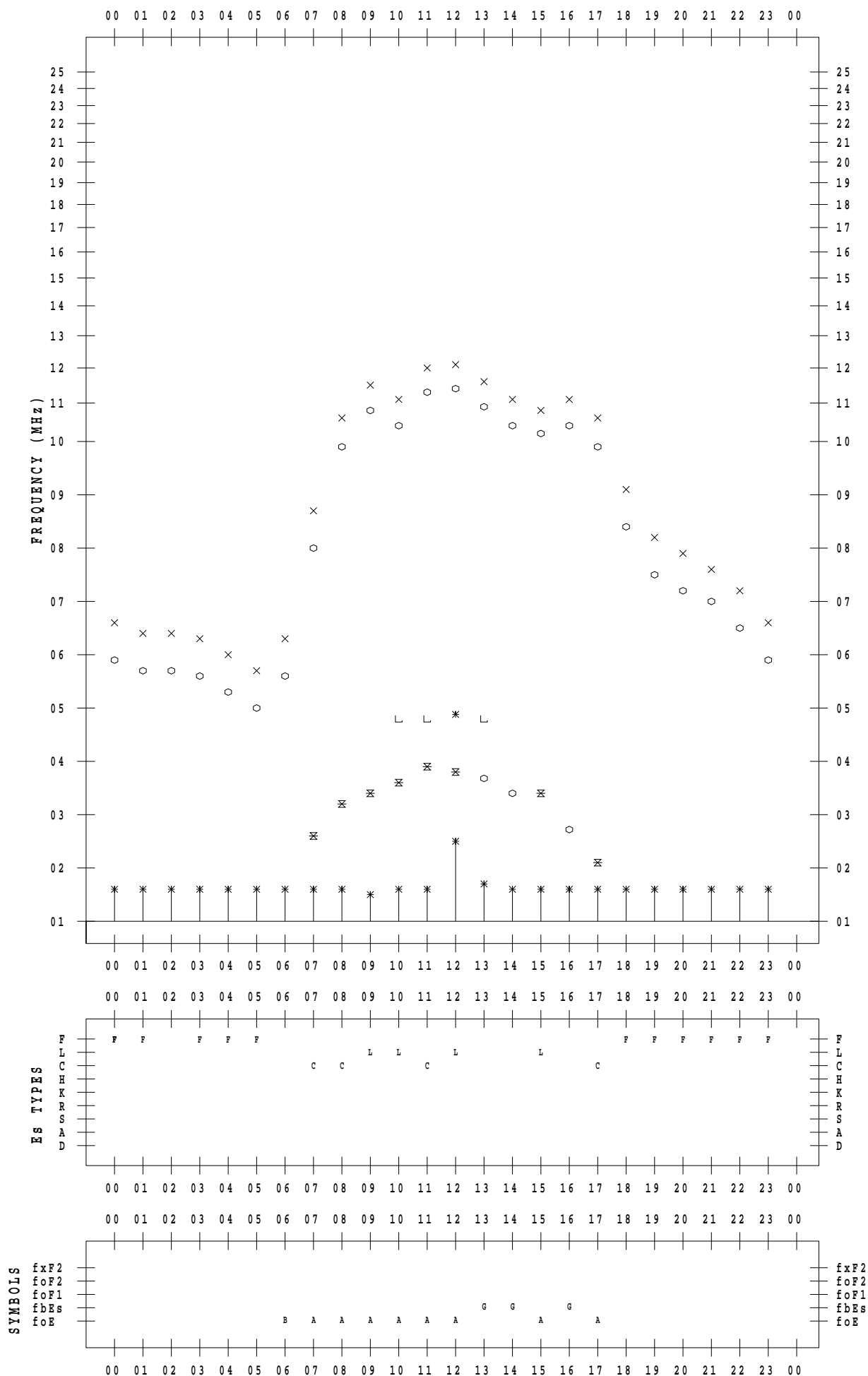
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 6

135 ° E MEAN TIME



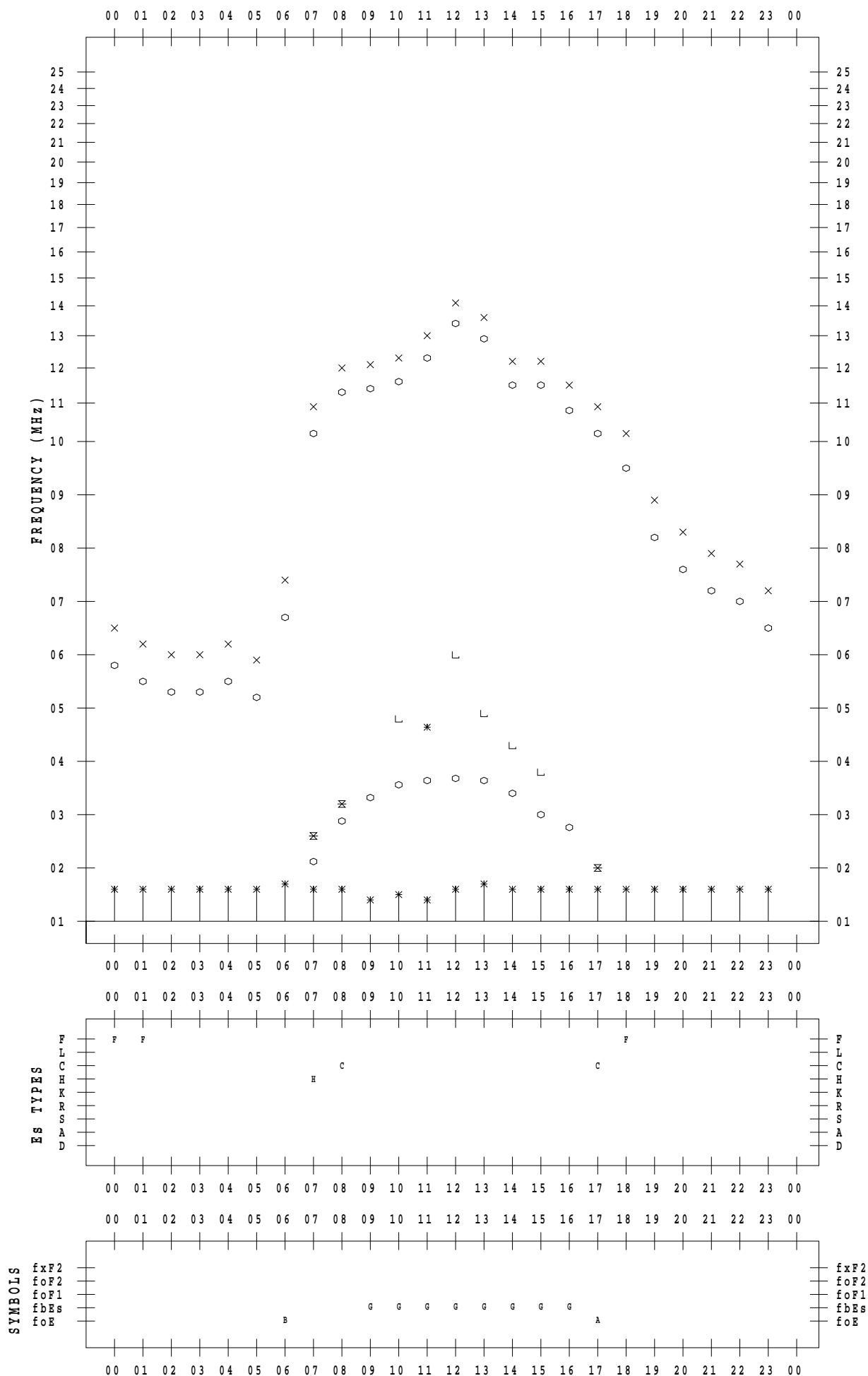
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 7

135 ° E MEAN TIME



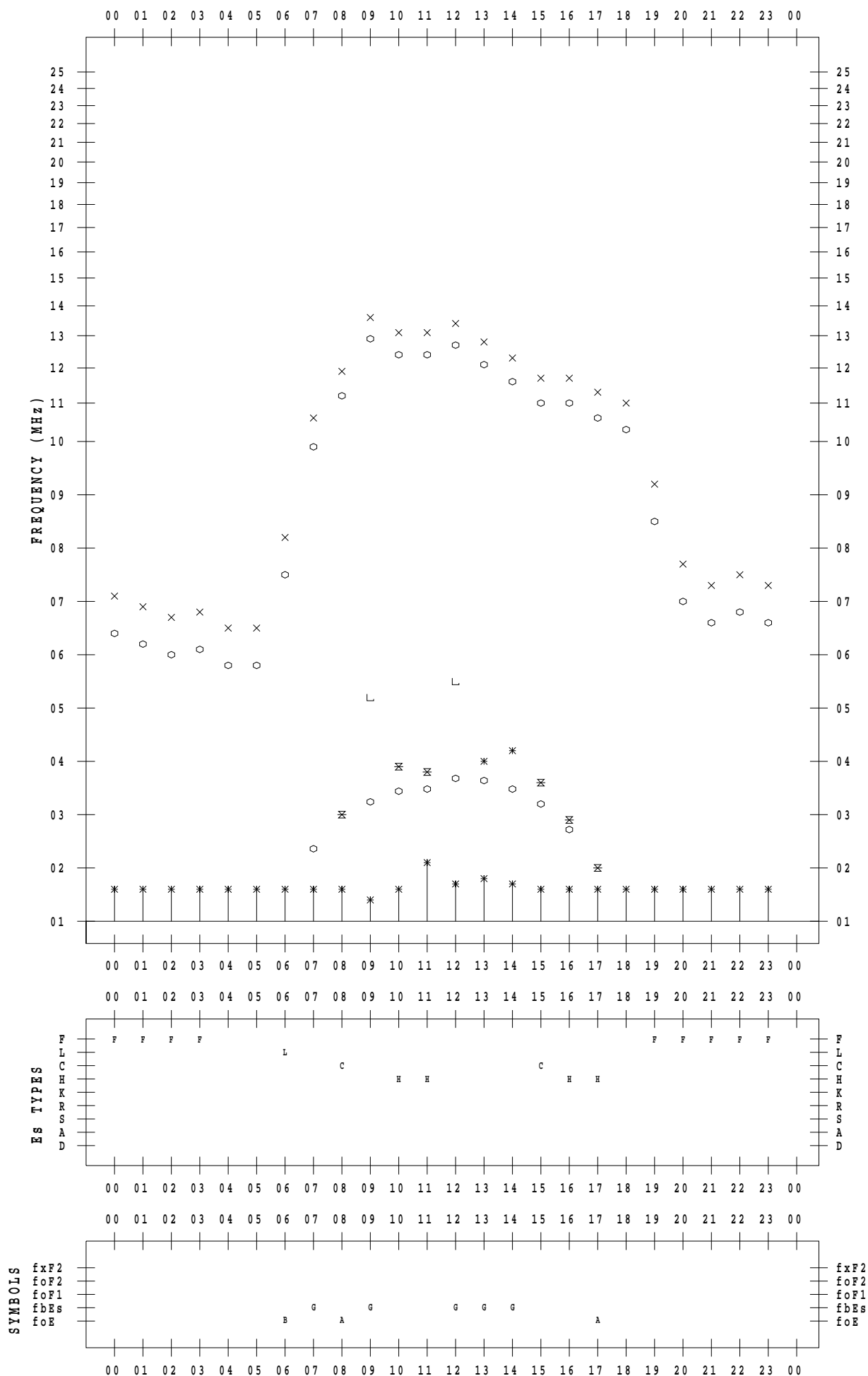
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 8

135 ° E MEAN TIME



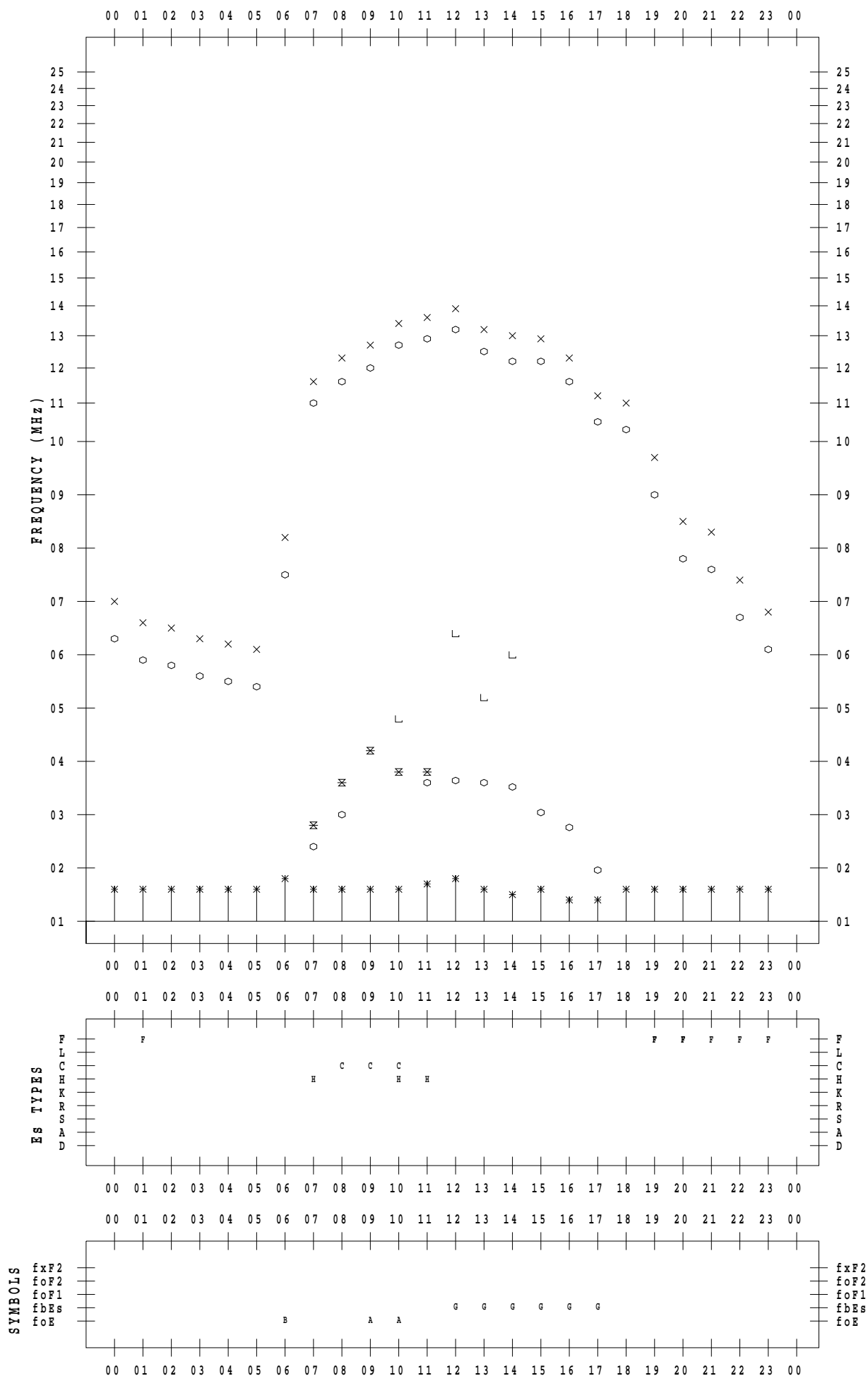
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 9

135 ° E MEAN TIME



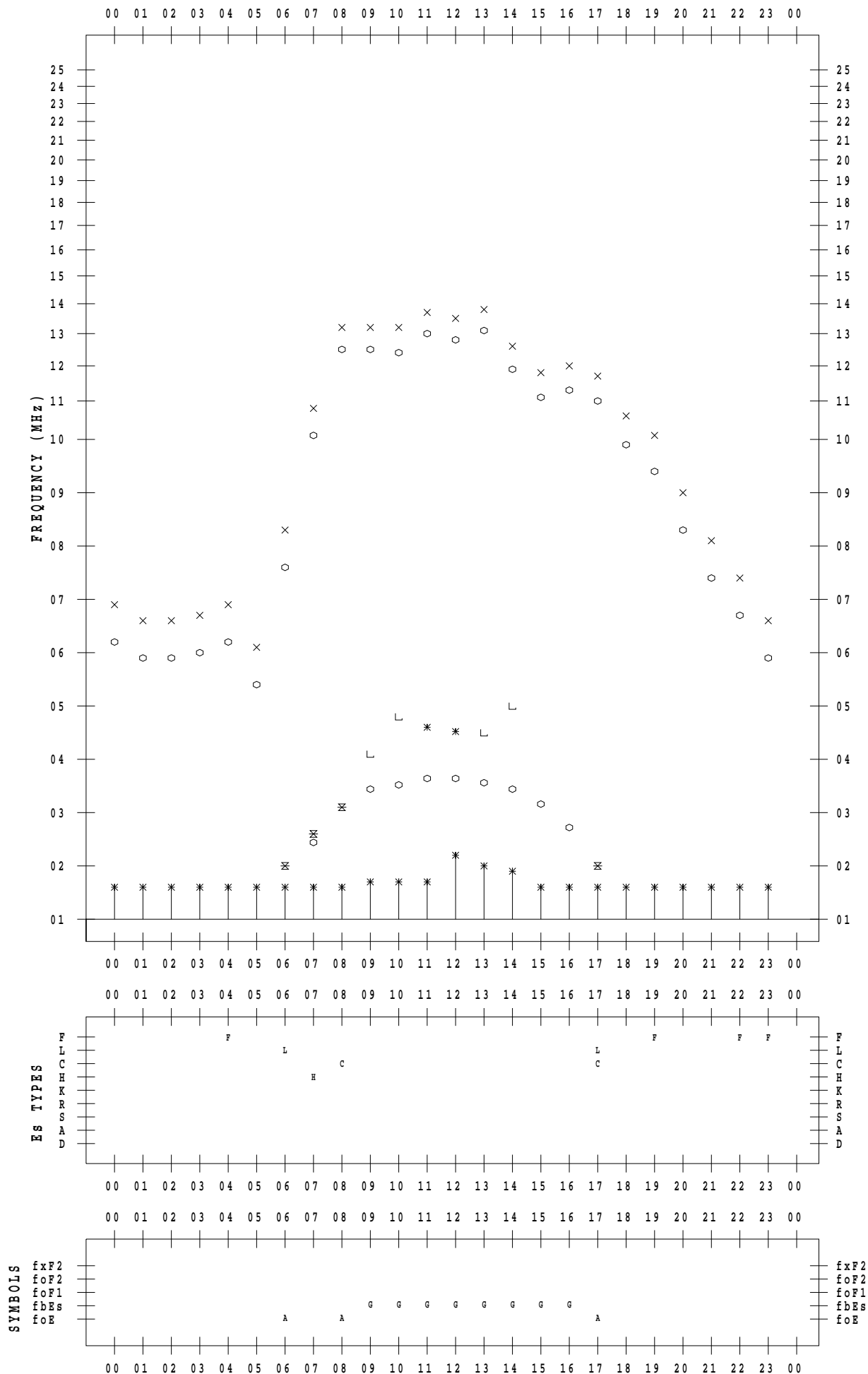
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 10

135 ° E MEAN TIME



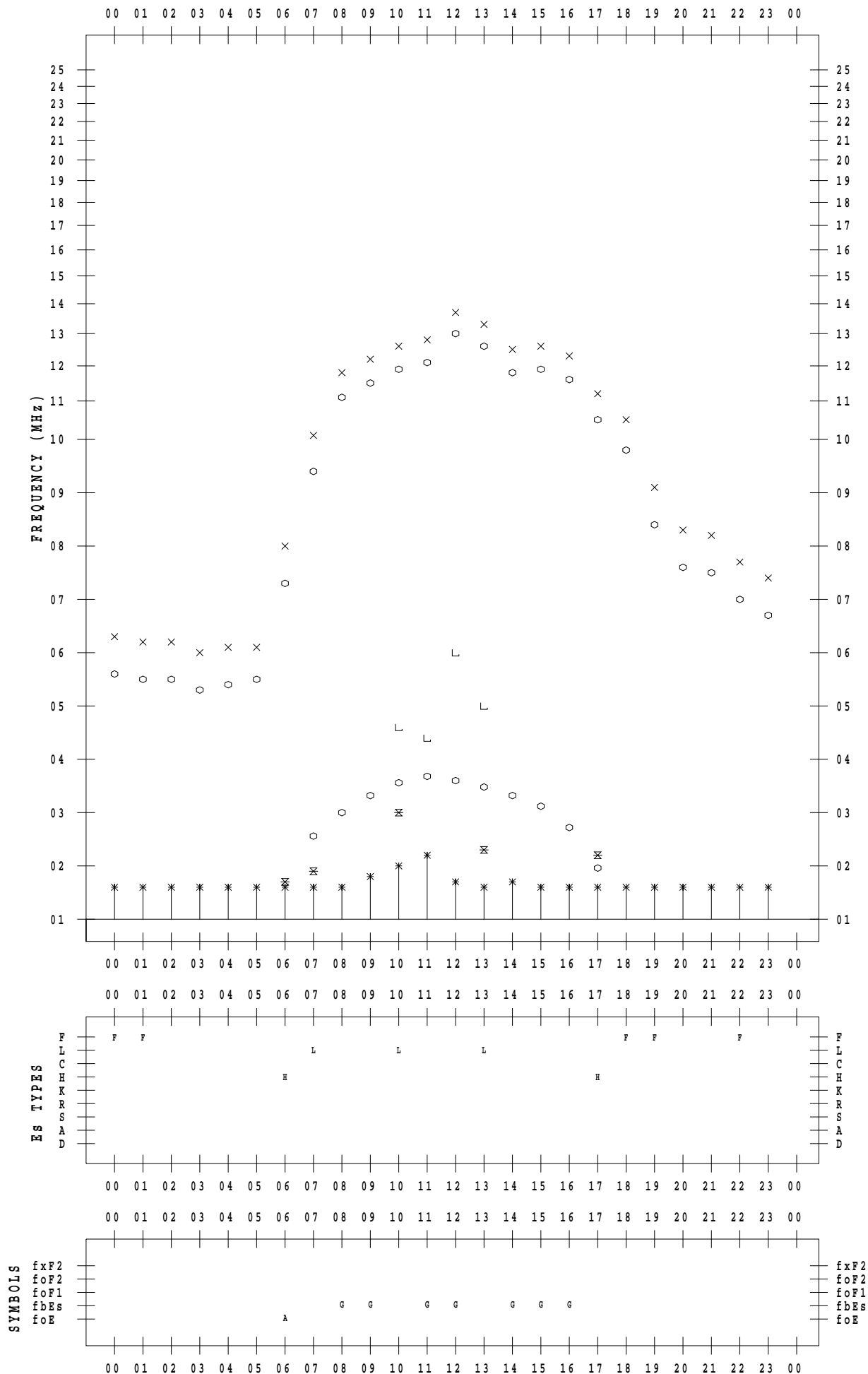
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 11

135 ° E MEAN TIME



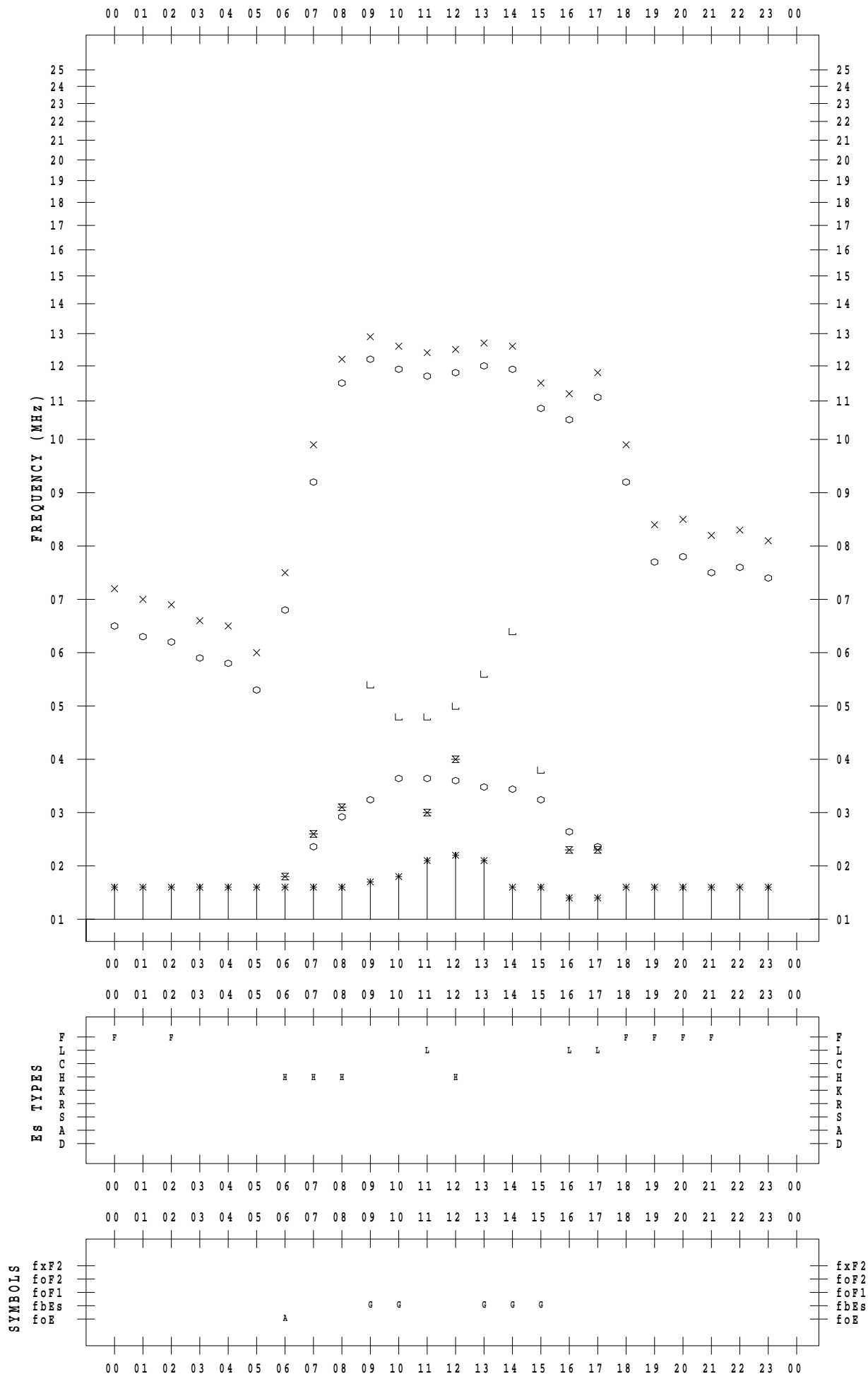
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023/ 3/12

135 ° E MEAN TIME





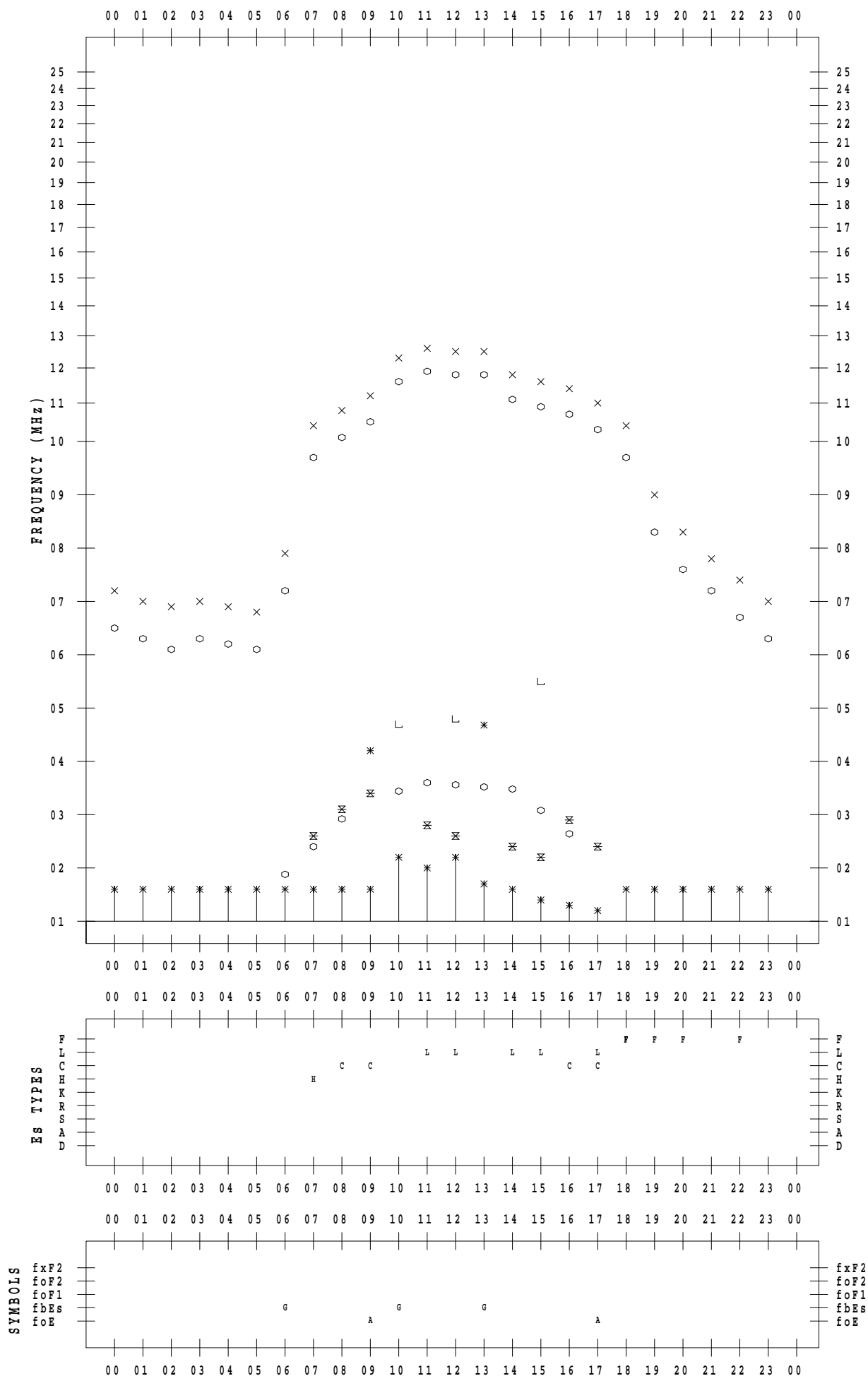
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 13

135 ° E MEAN TIME



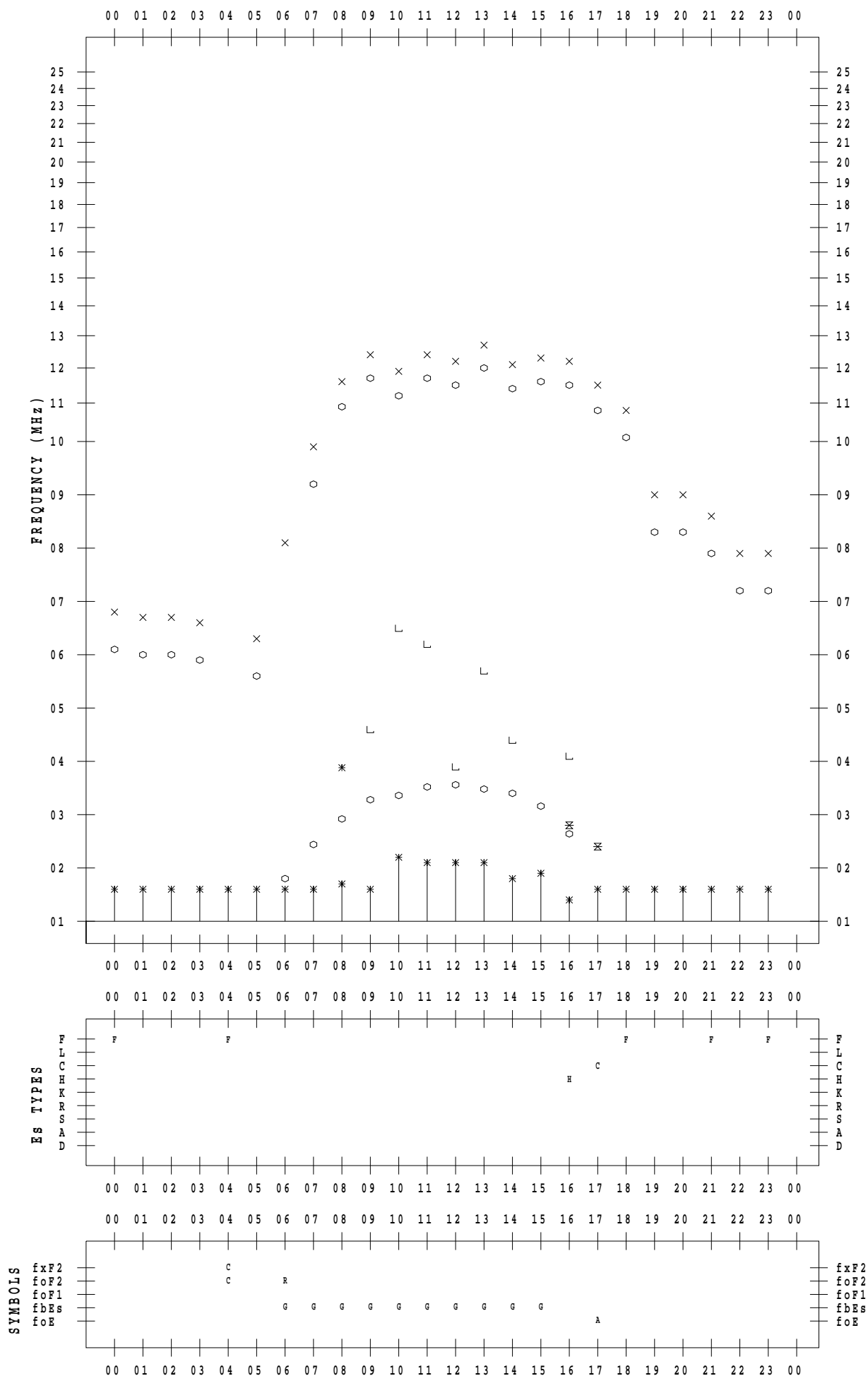
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023/ 3/14

135 ° E MEAN TIME



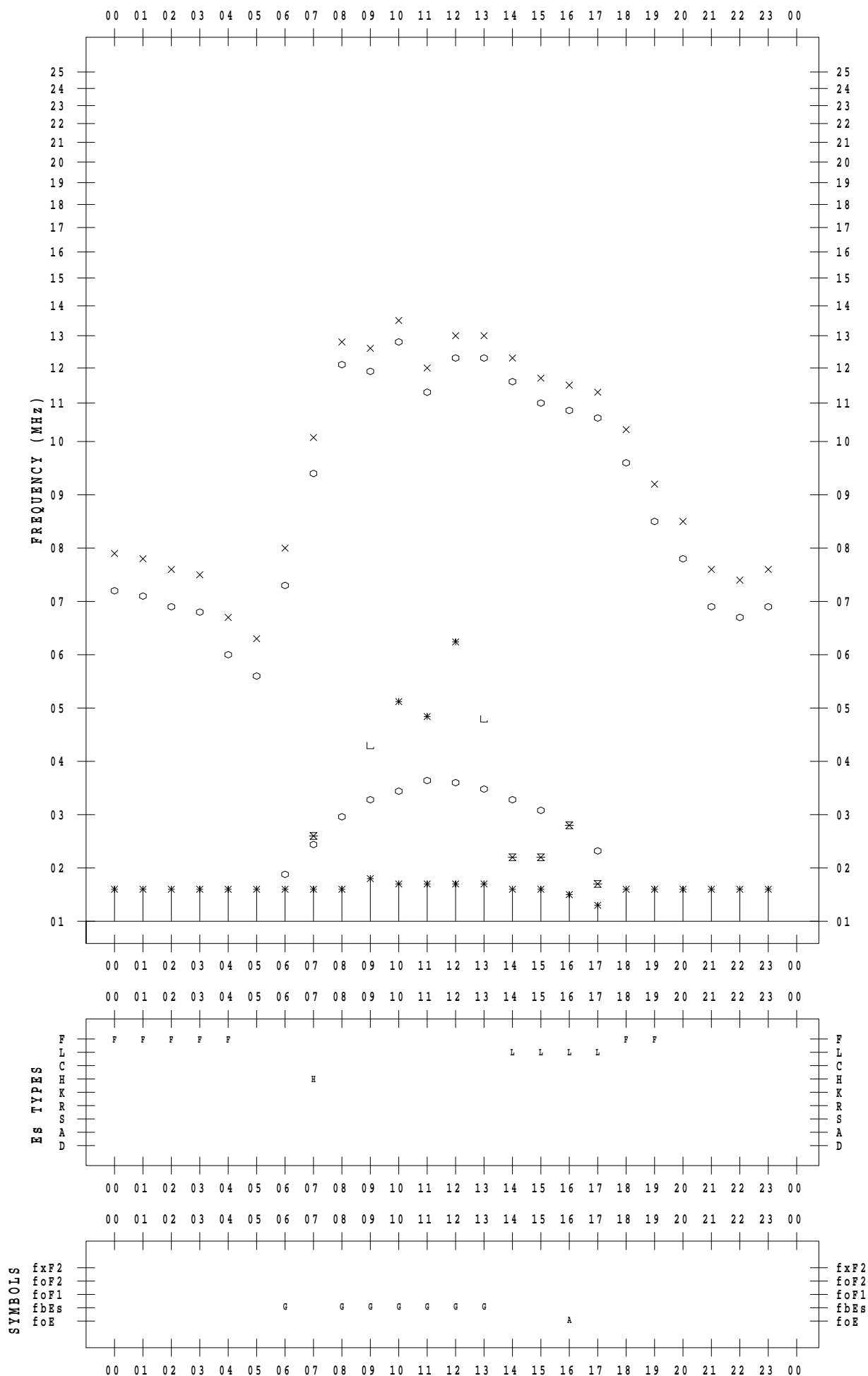
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 15

135 ° E MEAN TIME



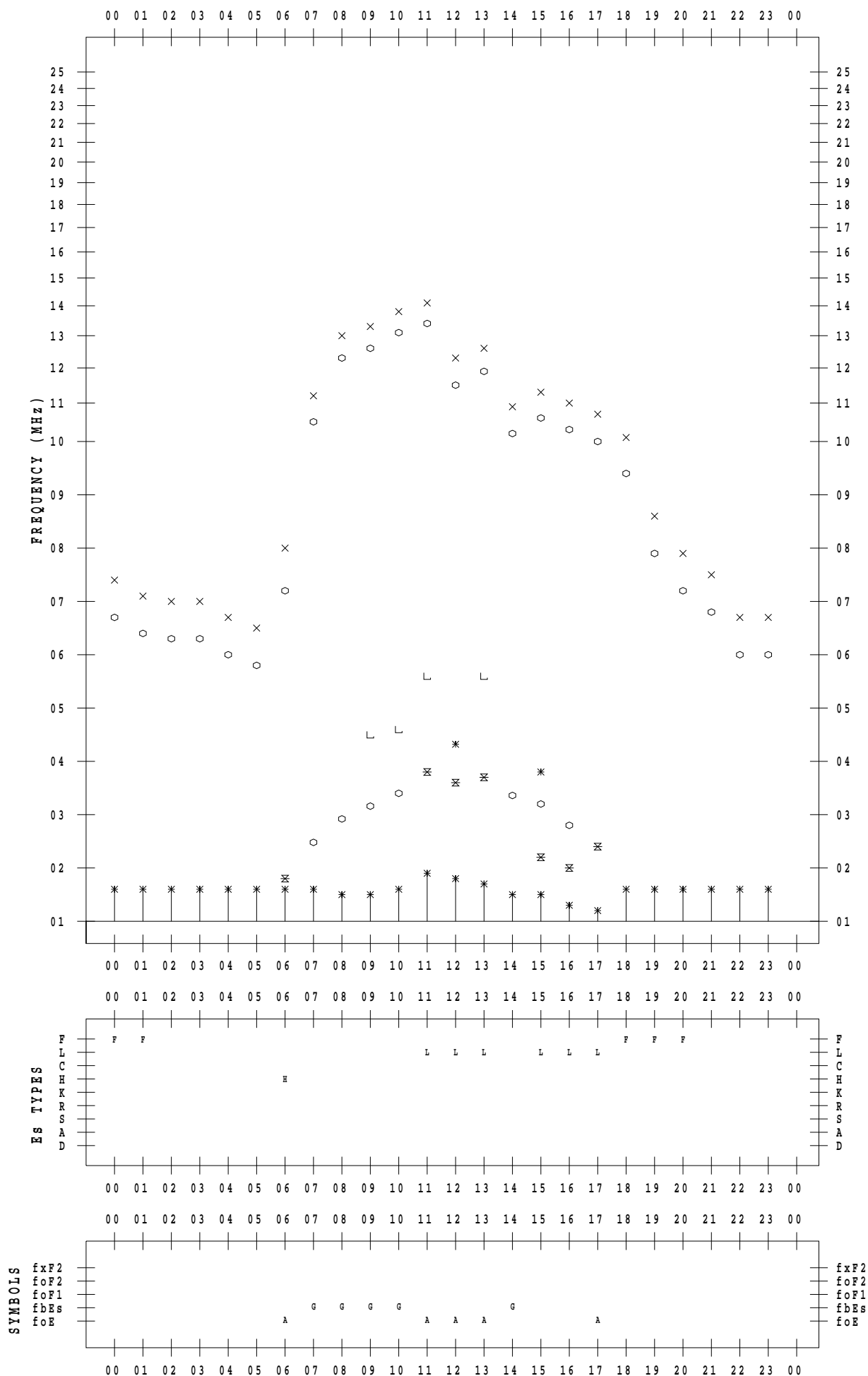
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 16

135 ° E MEAN TIME



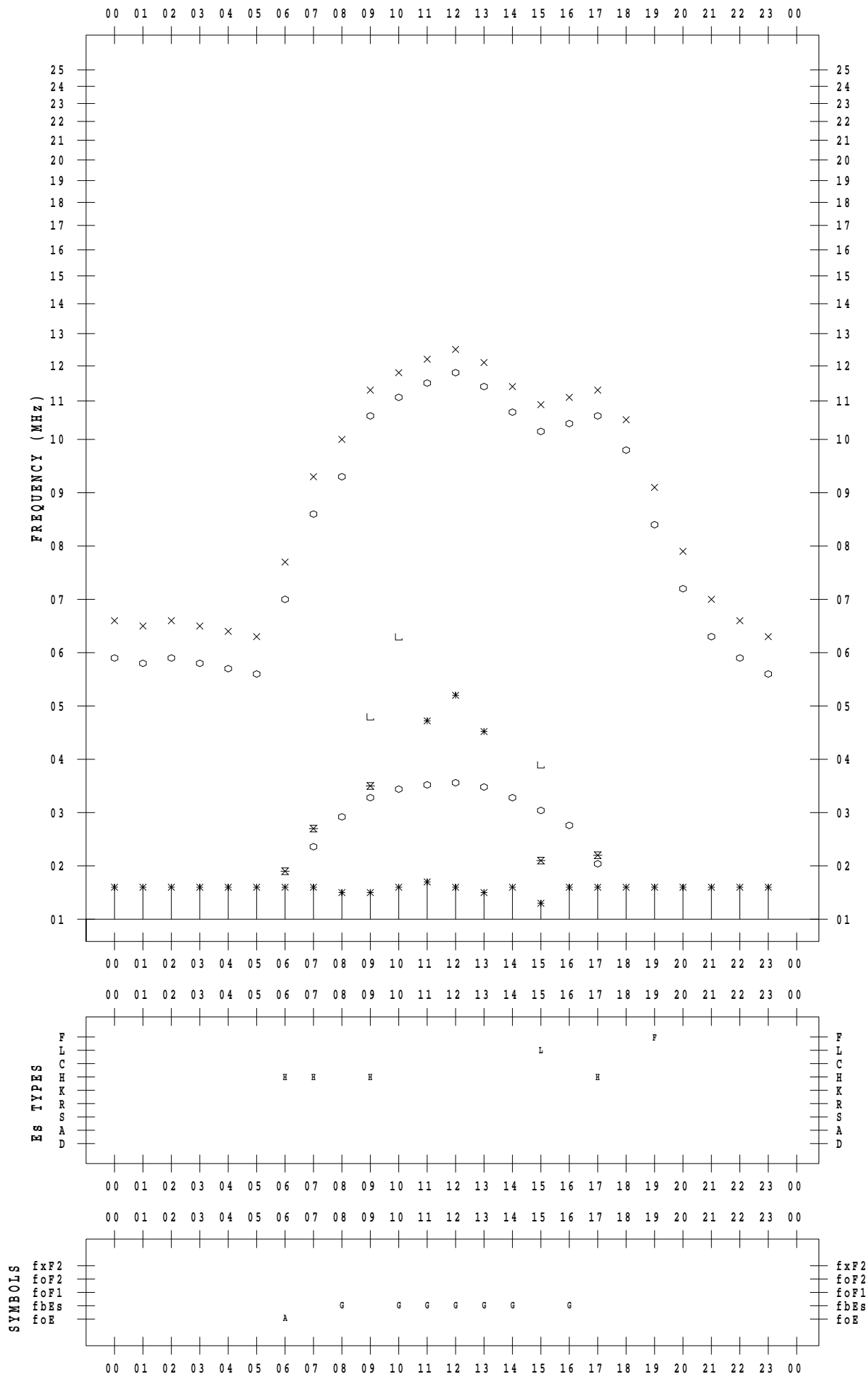
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 17

135 ° E MEAN TIME



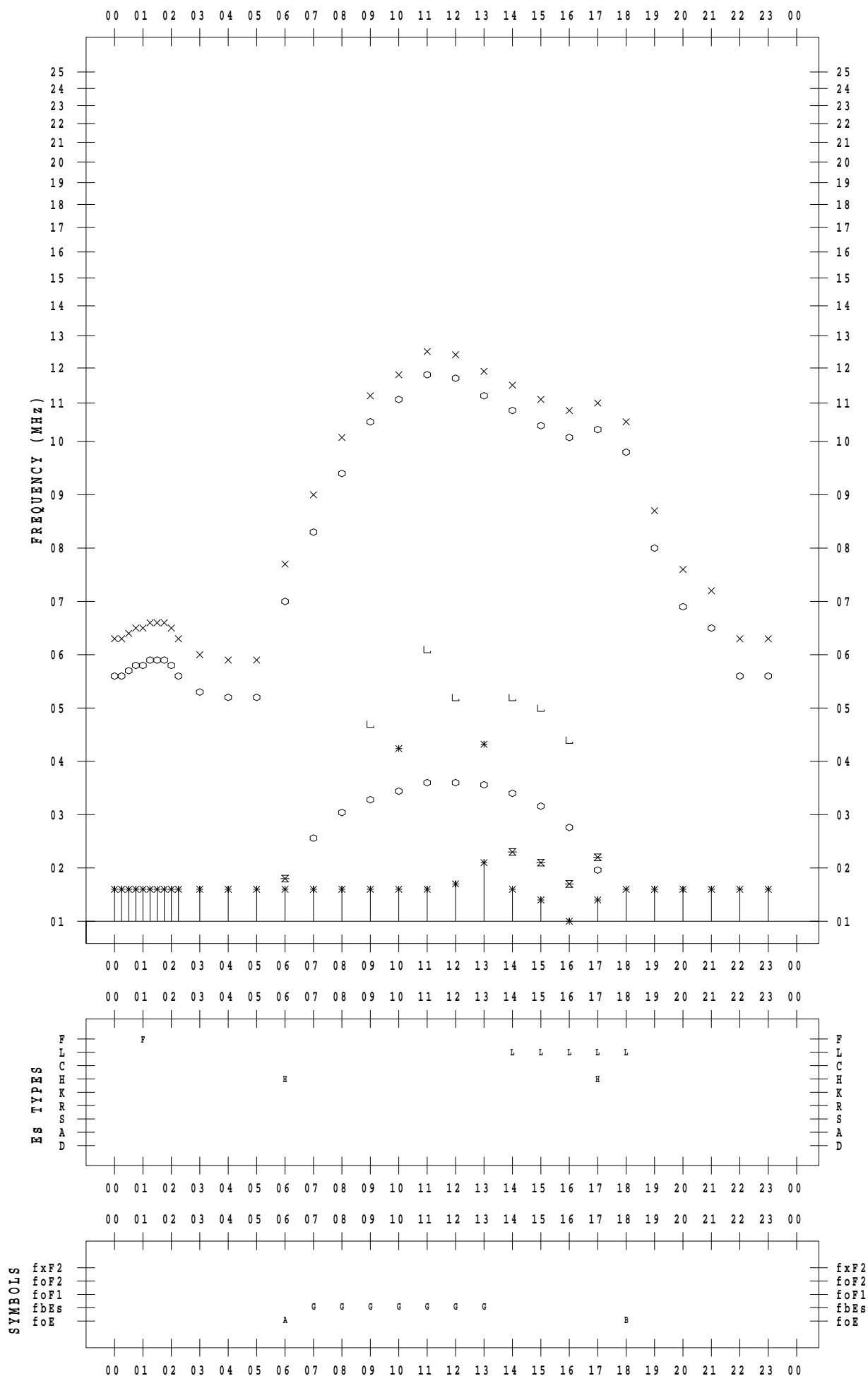
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 18

135 ° E MEAN TIME



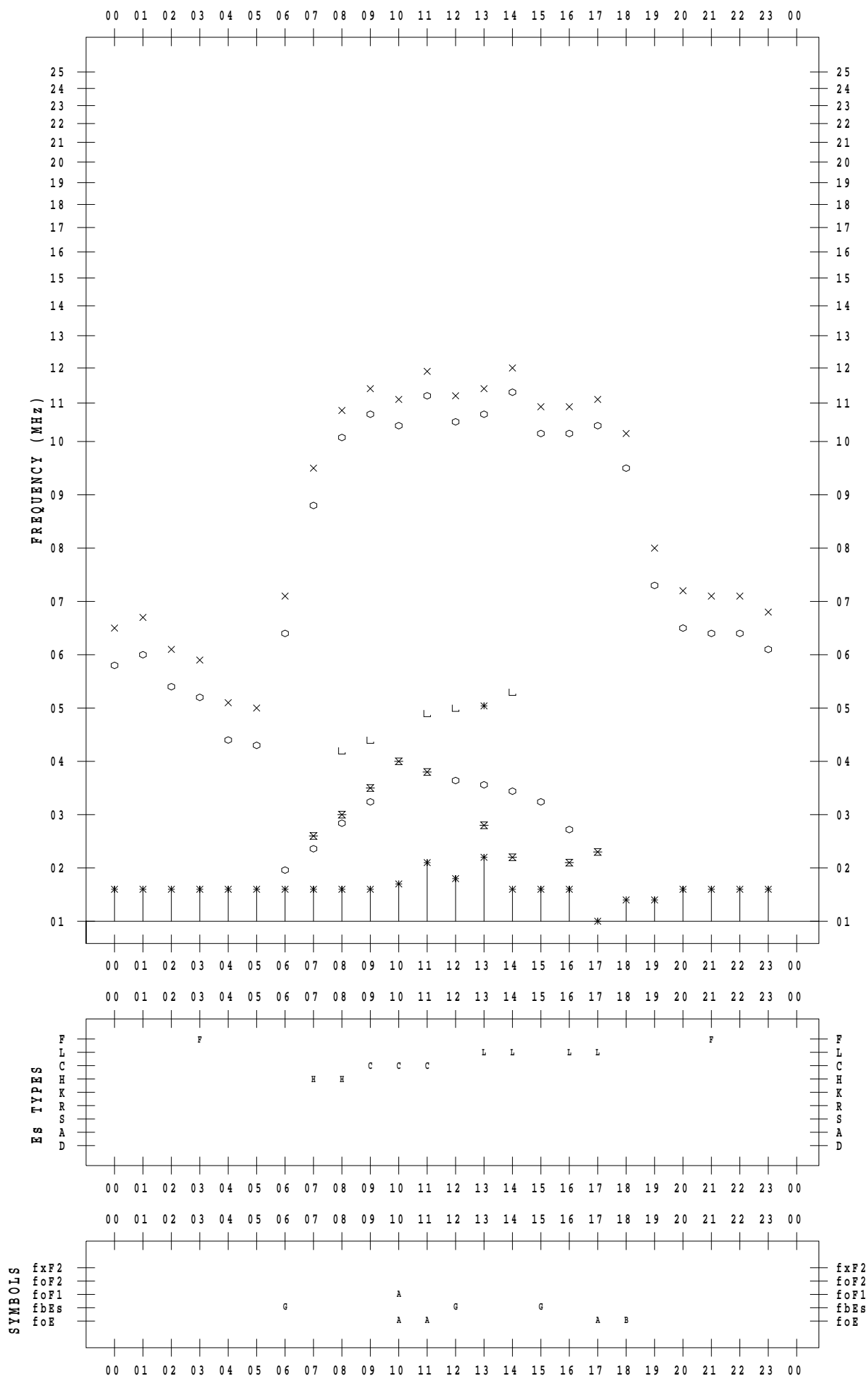
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 19

135 ° E MEAN TIME



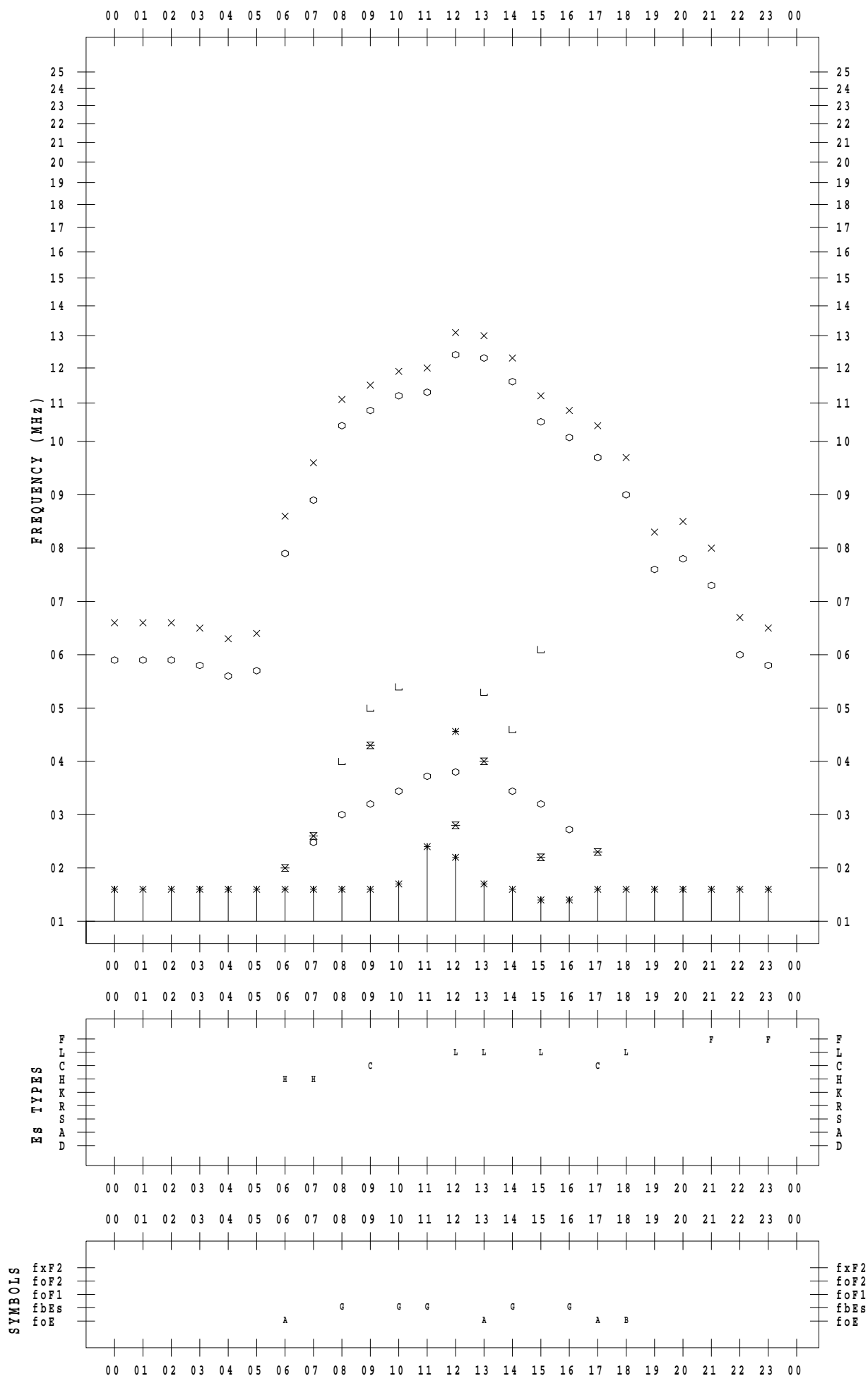
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023/ 3/20

135 ° E MEAN TIME





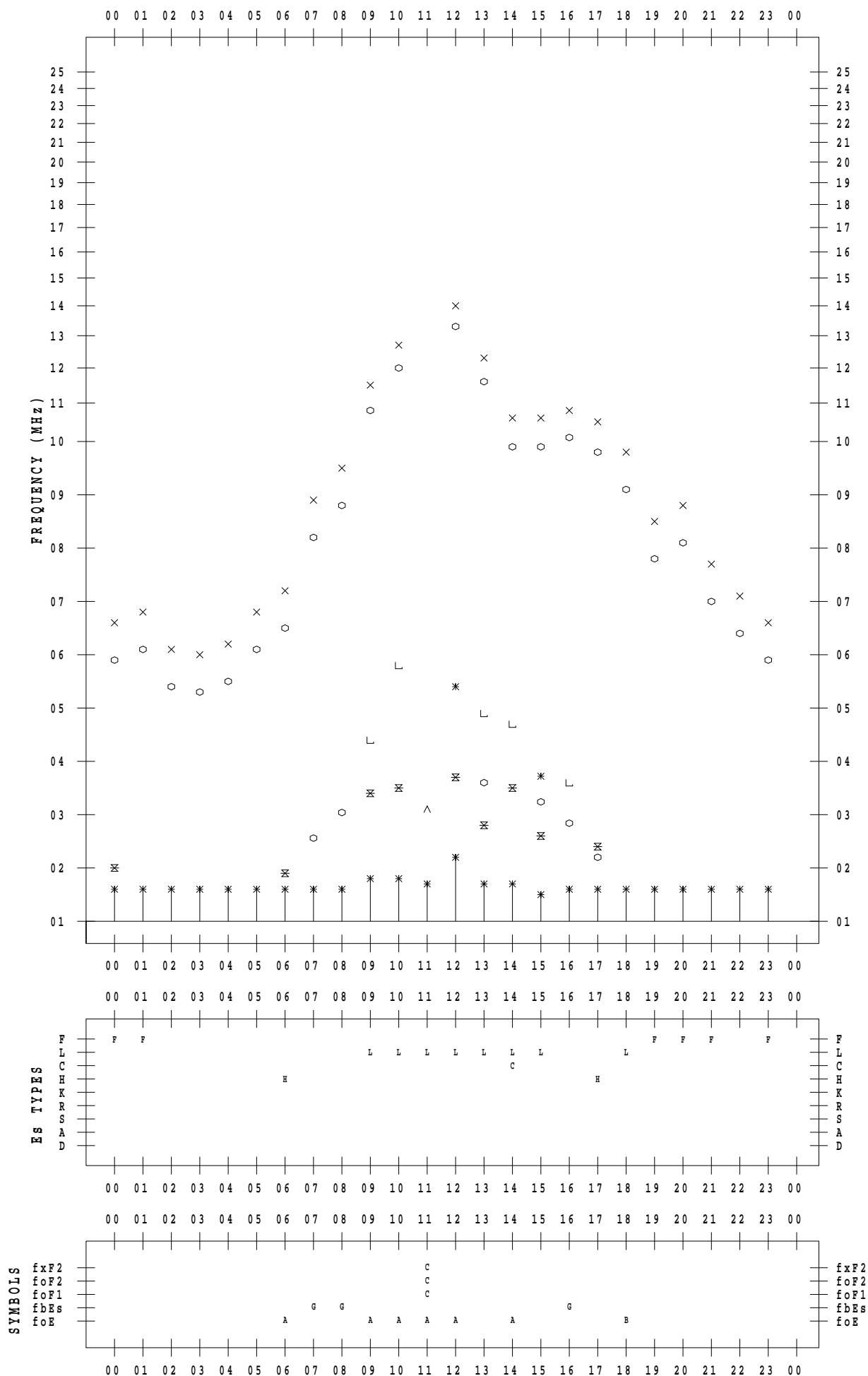
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 21

135 ° E MEAN TIME



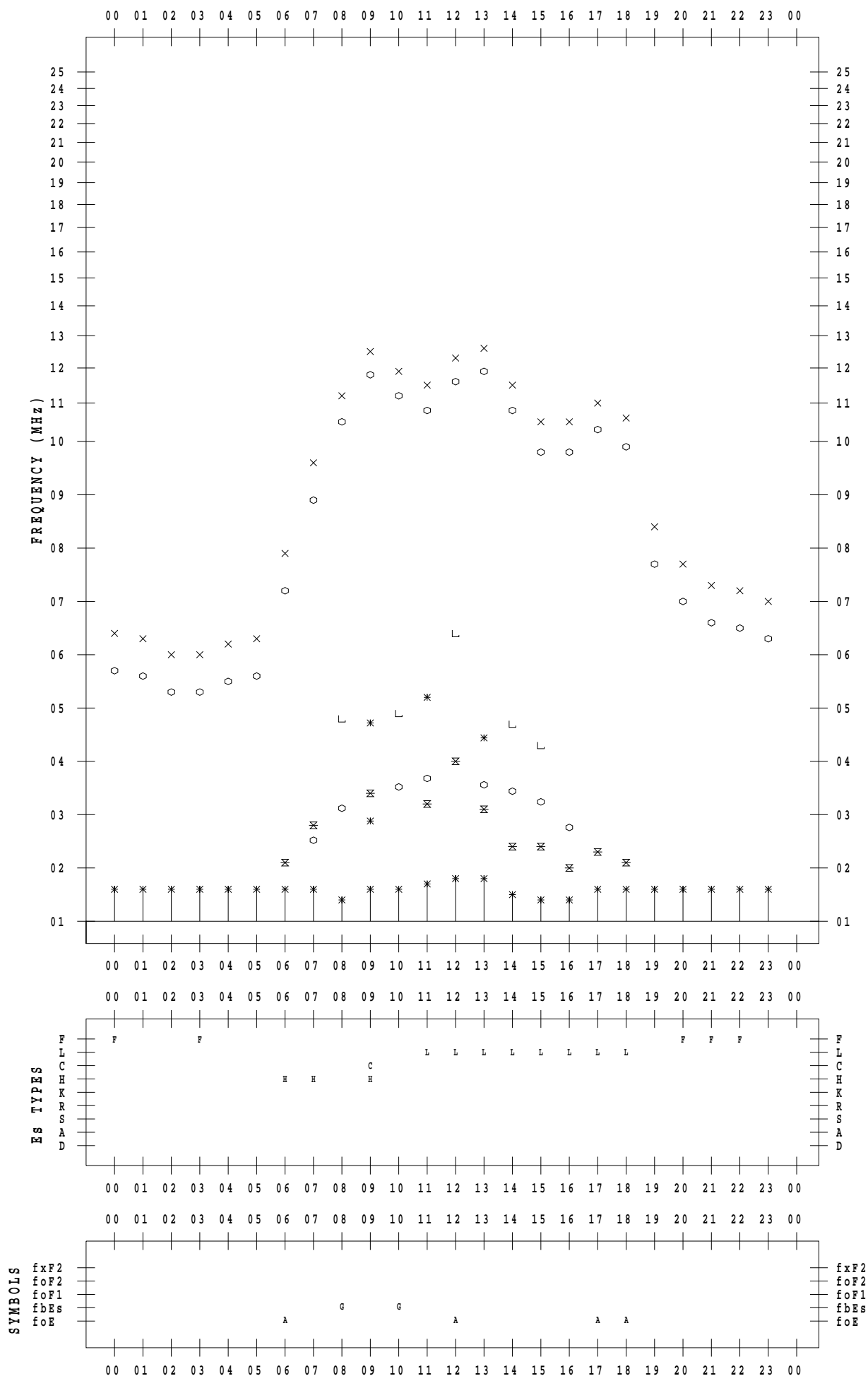
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 22

135 ° E MEAN TIME



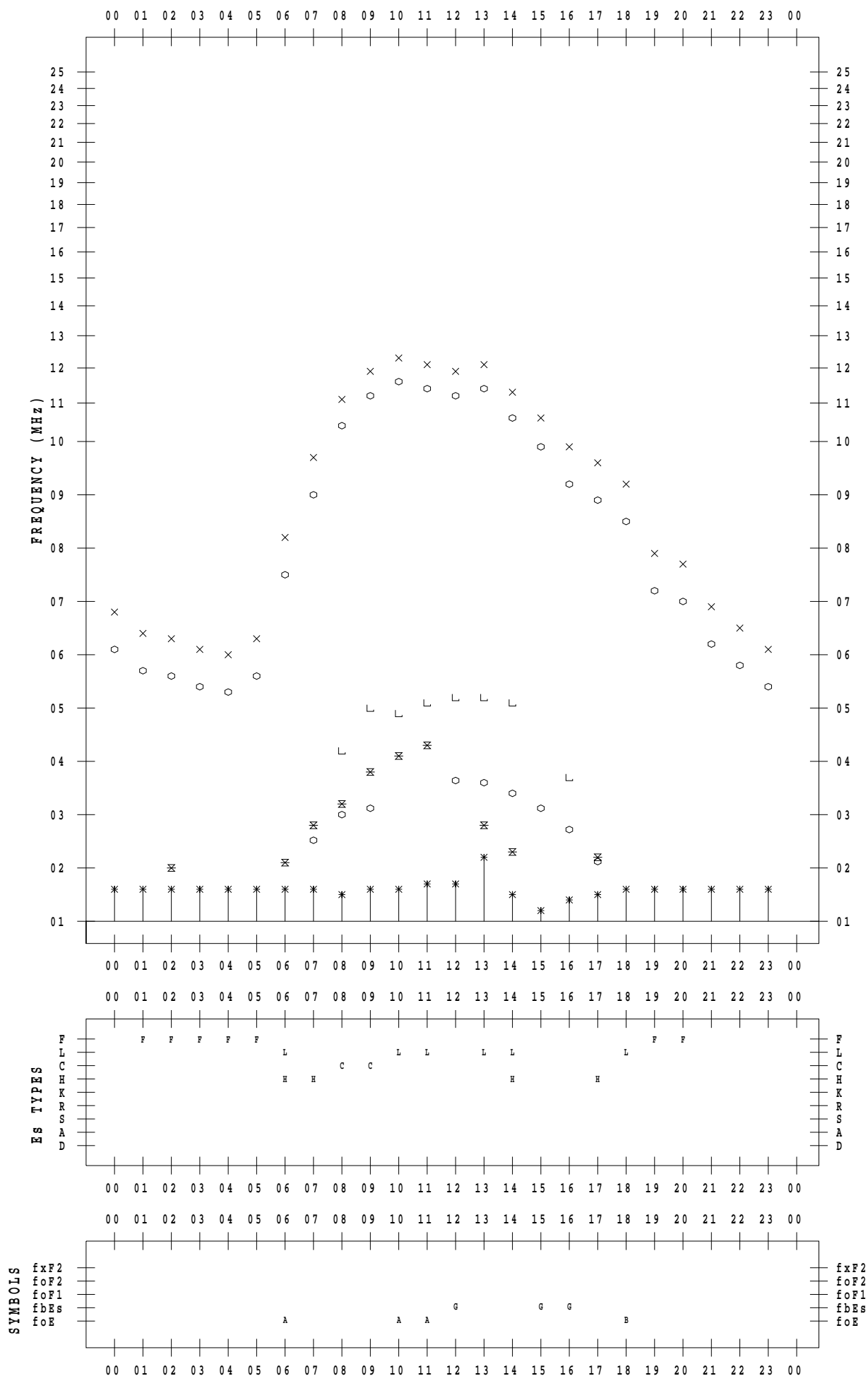
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 23

135 ° E MEAN TIME



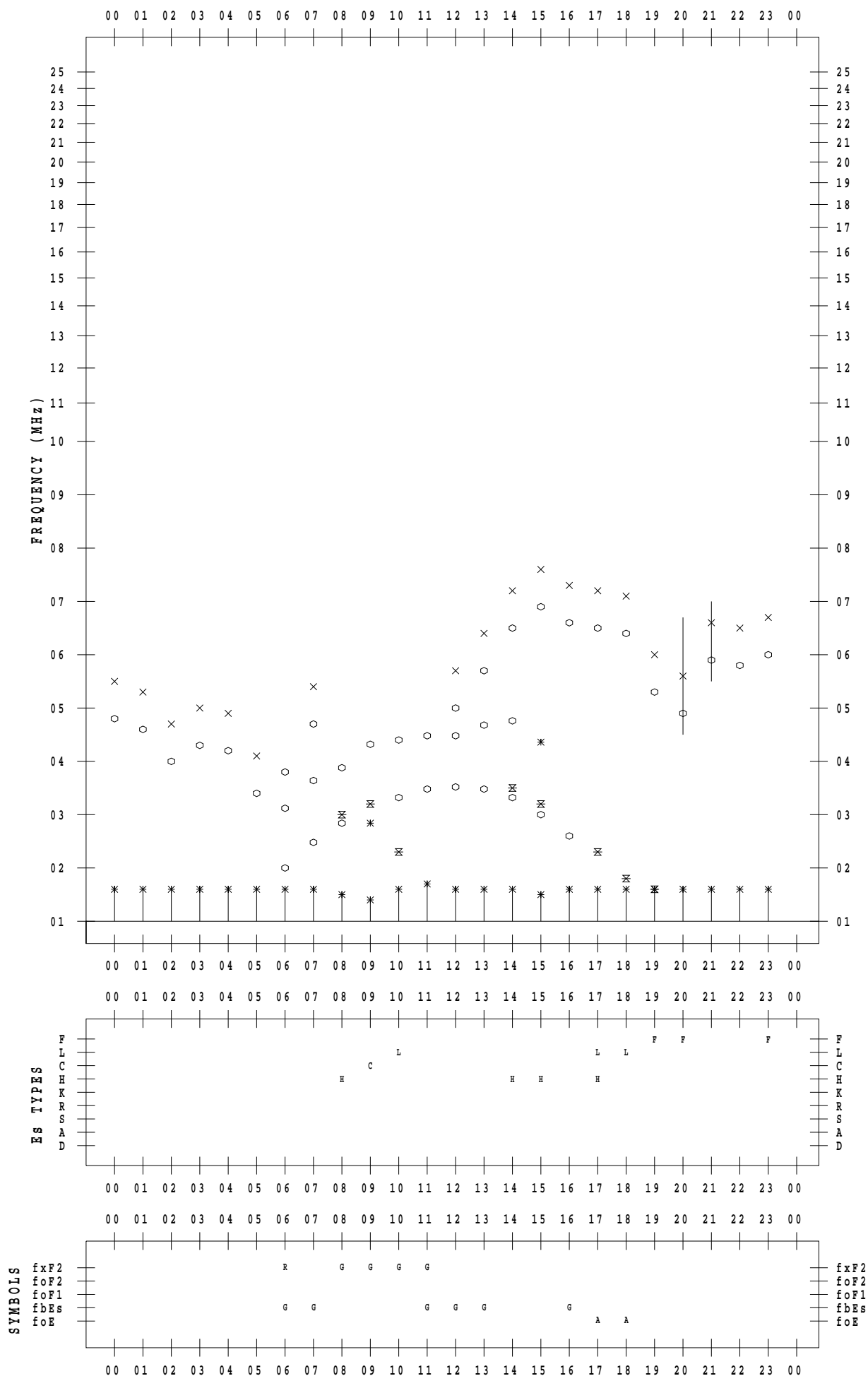
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 24

135 ° E MEAN TIME



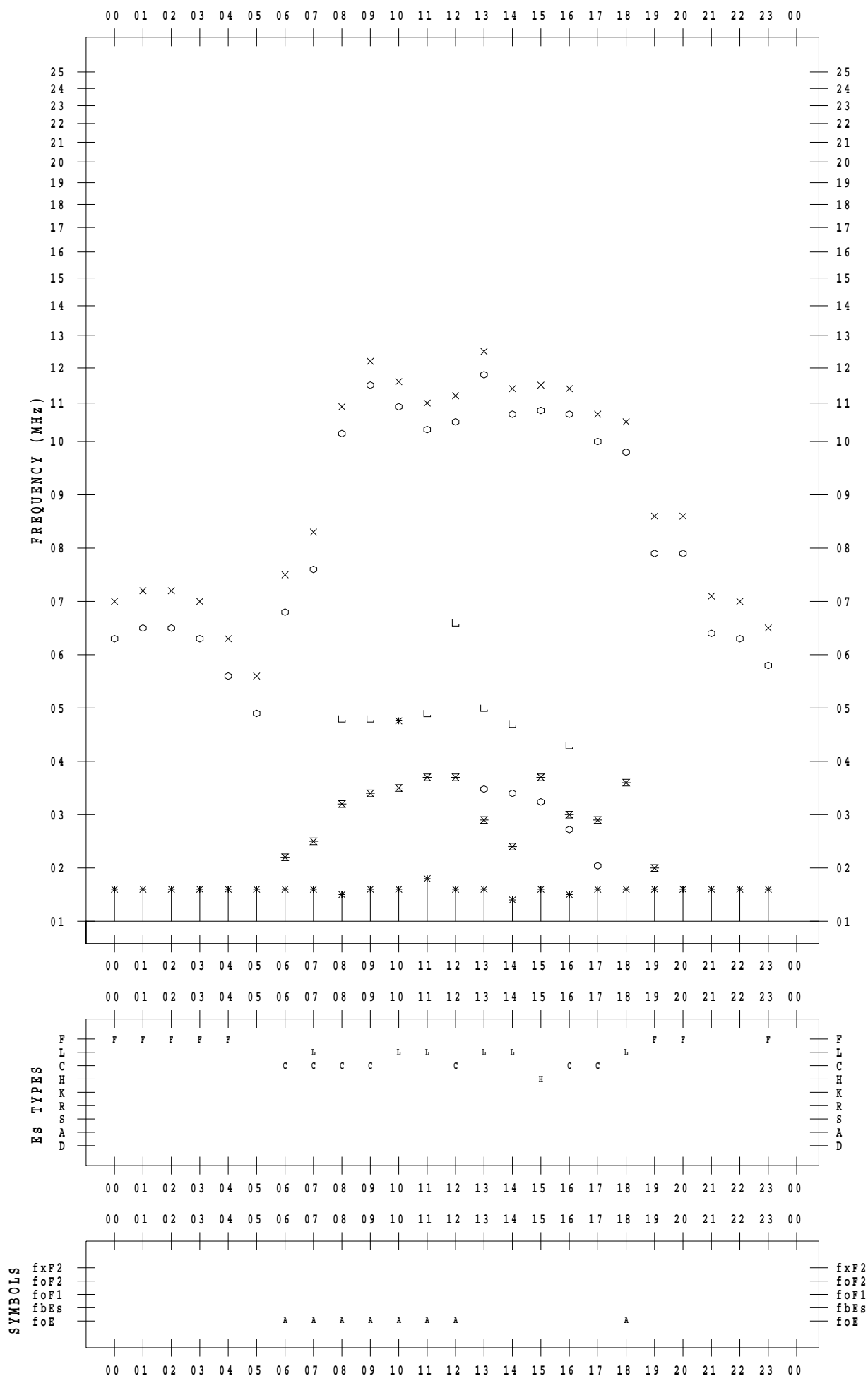
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 25

135 ° E MEAN TIME



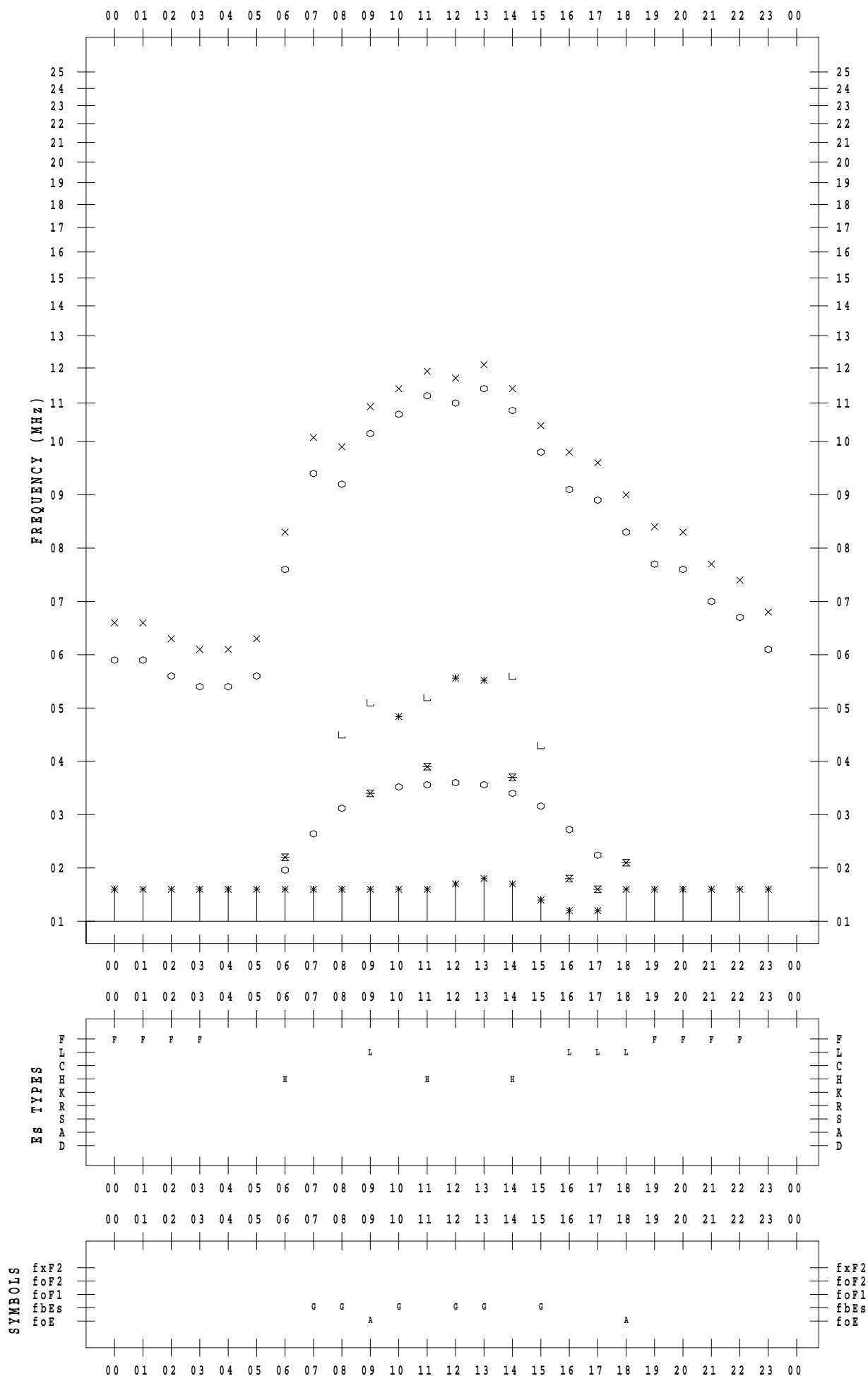
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 26

135 ° E MEAN TIME



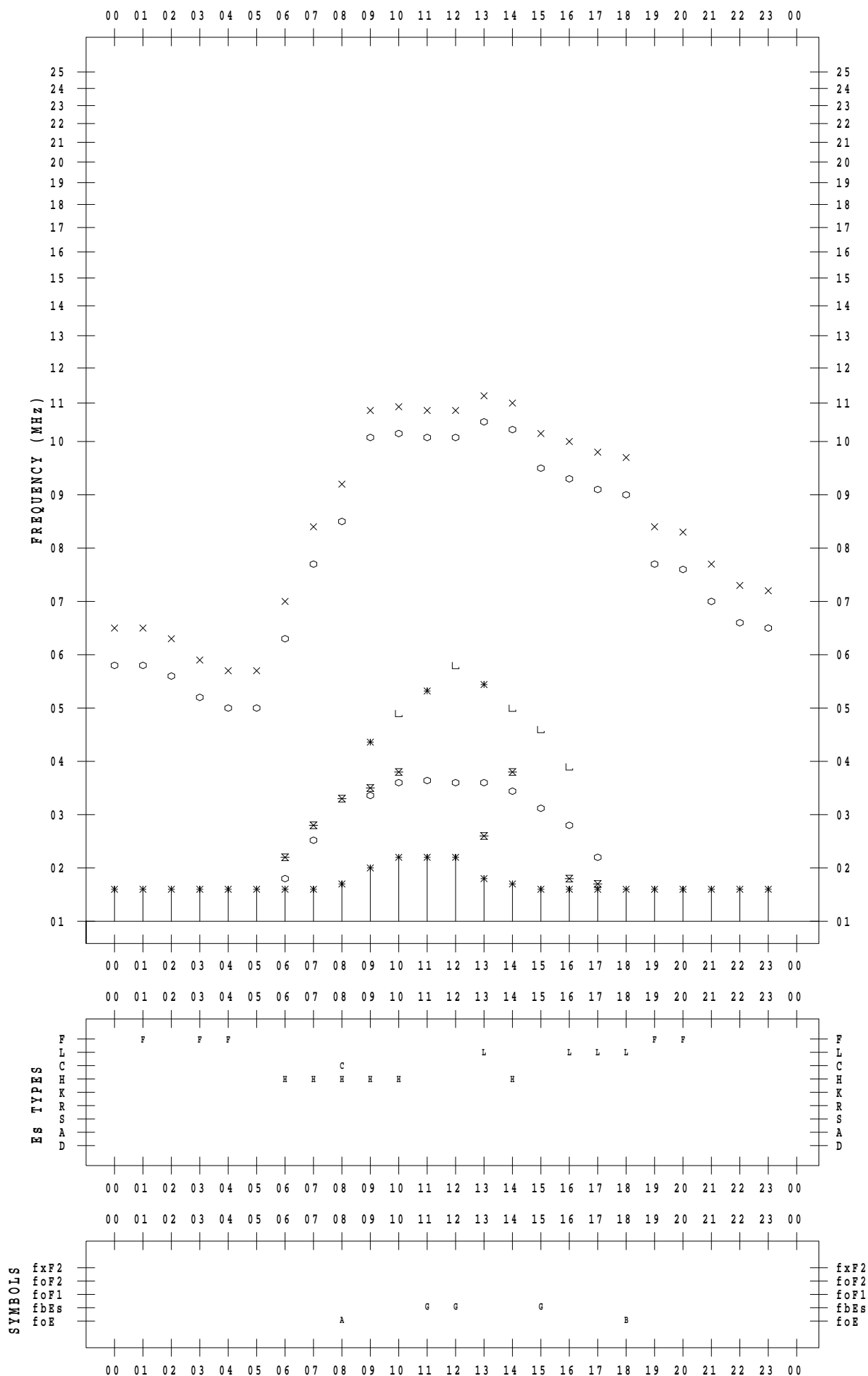
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 27

135 ° E MEAN TIME



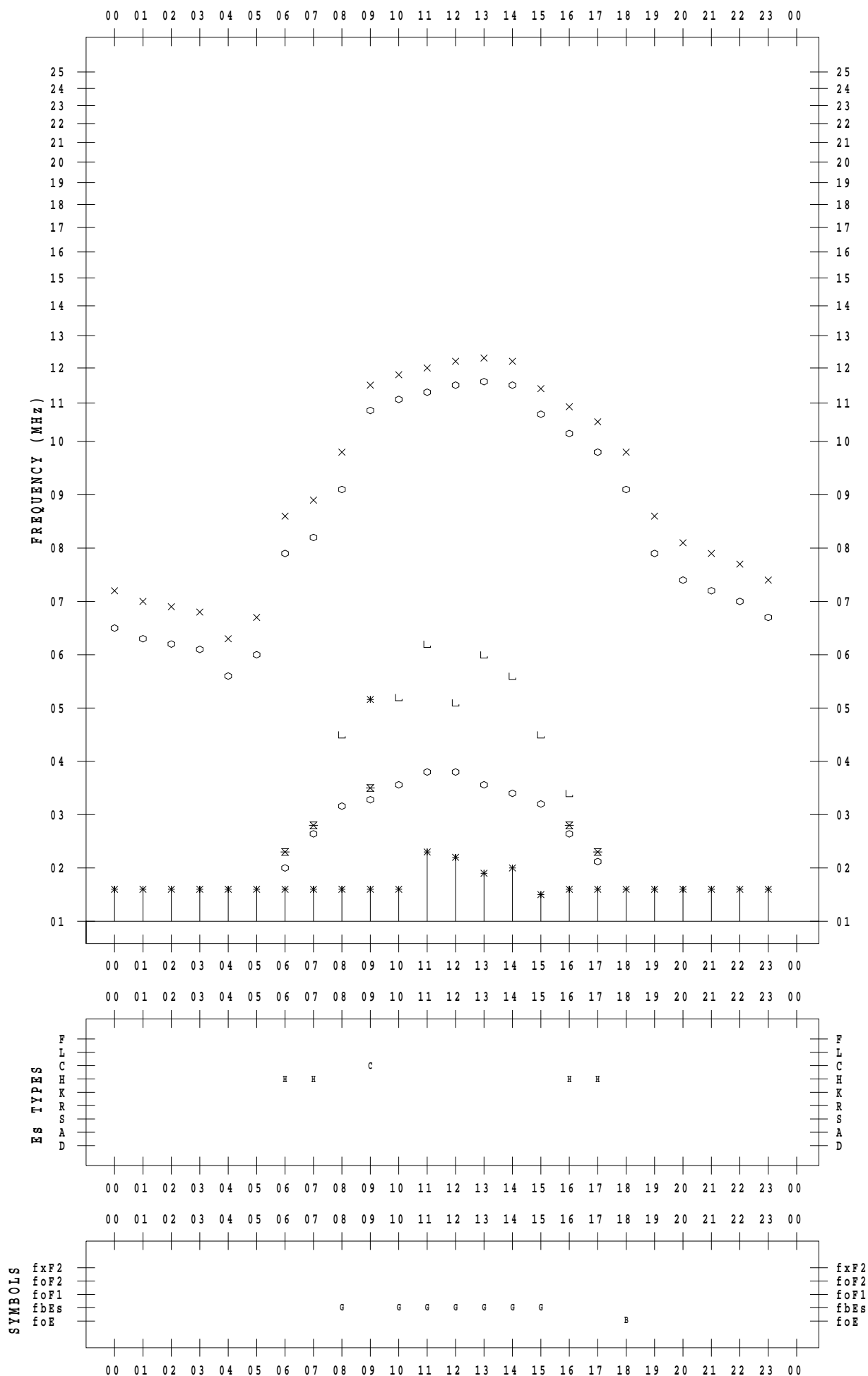
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 28

135 ° E MEAN TIME





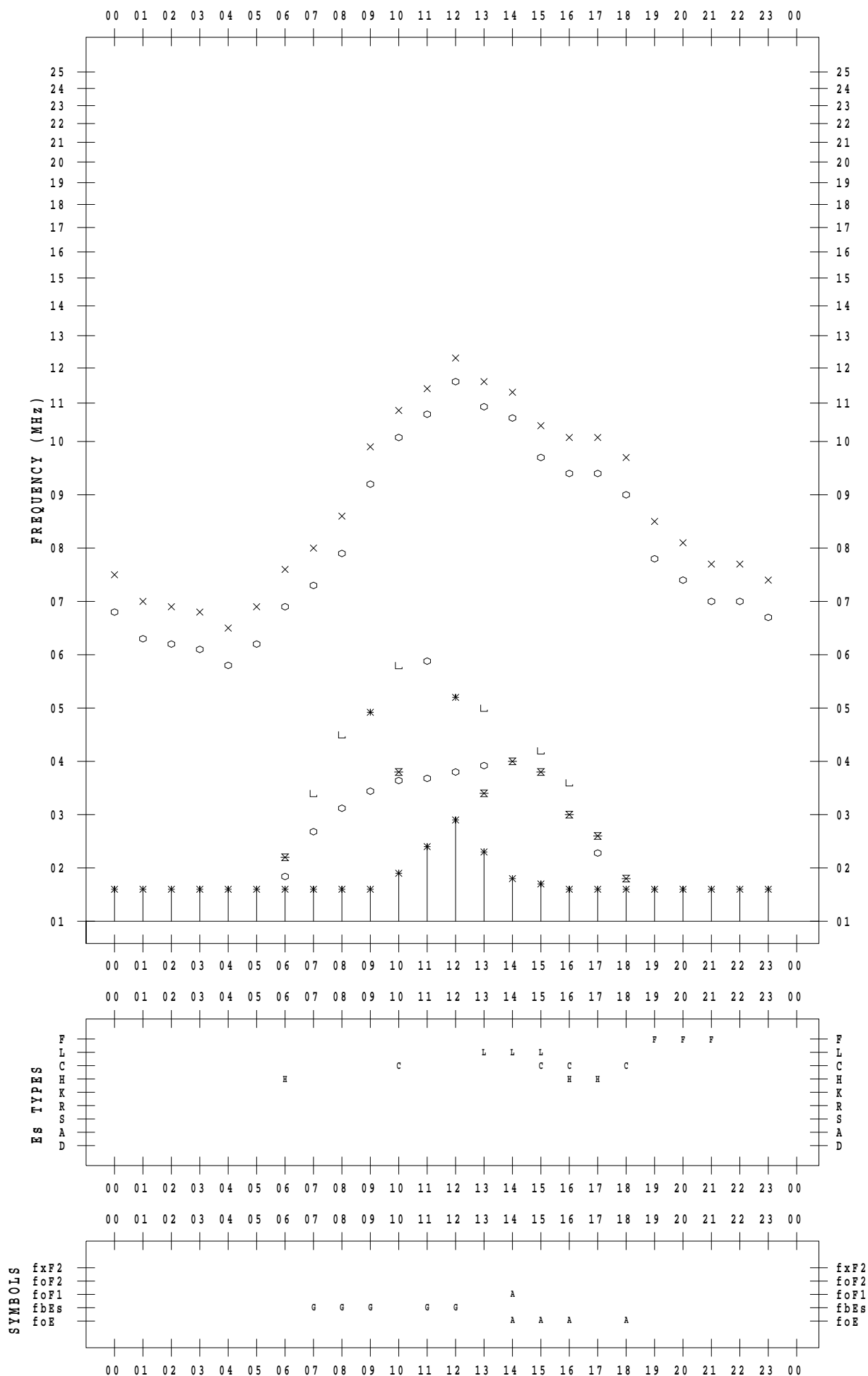
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 29

135 ° E MEAN TIME



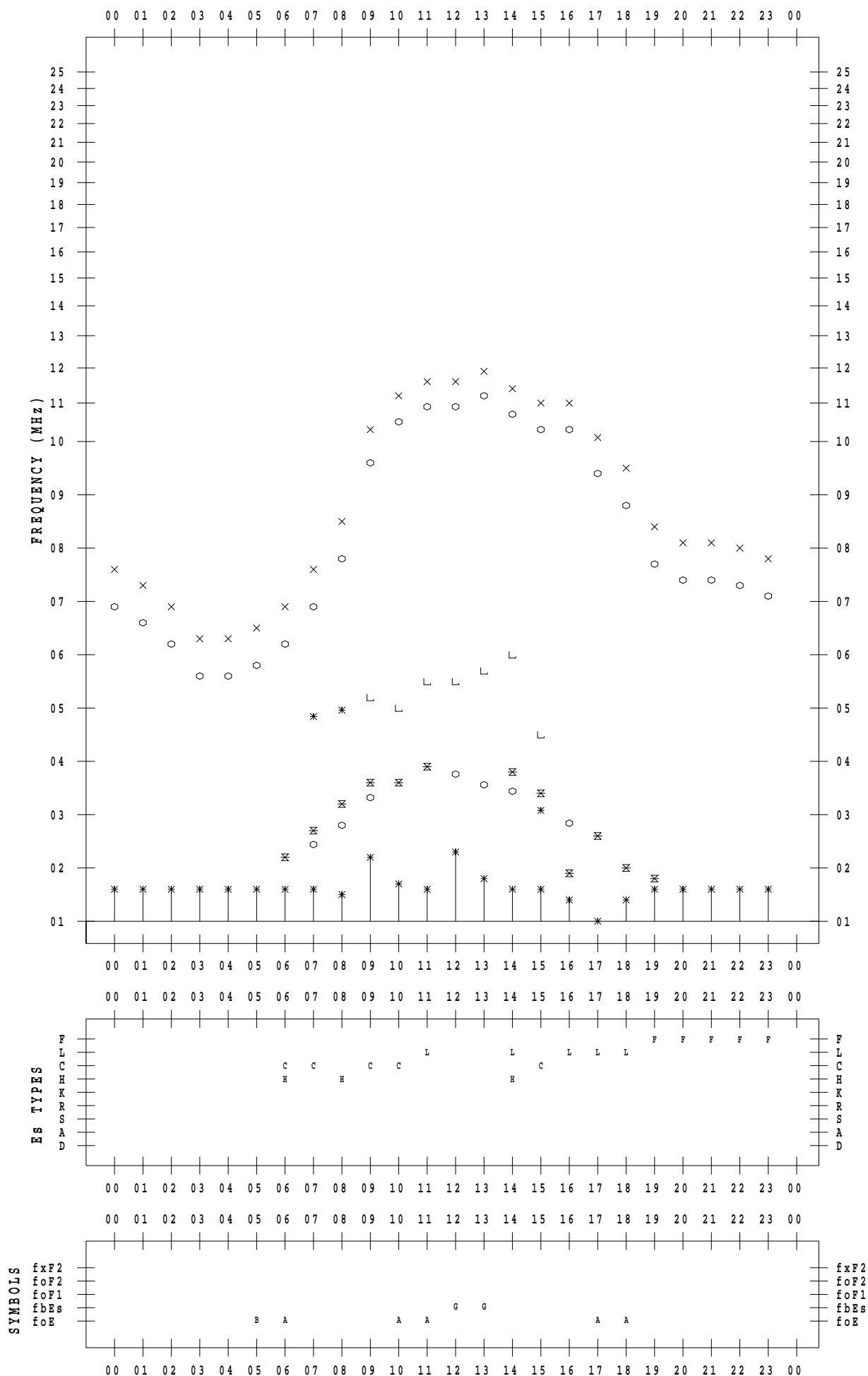
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023 / 3 / 30

135 ° E MEAN TIME



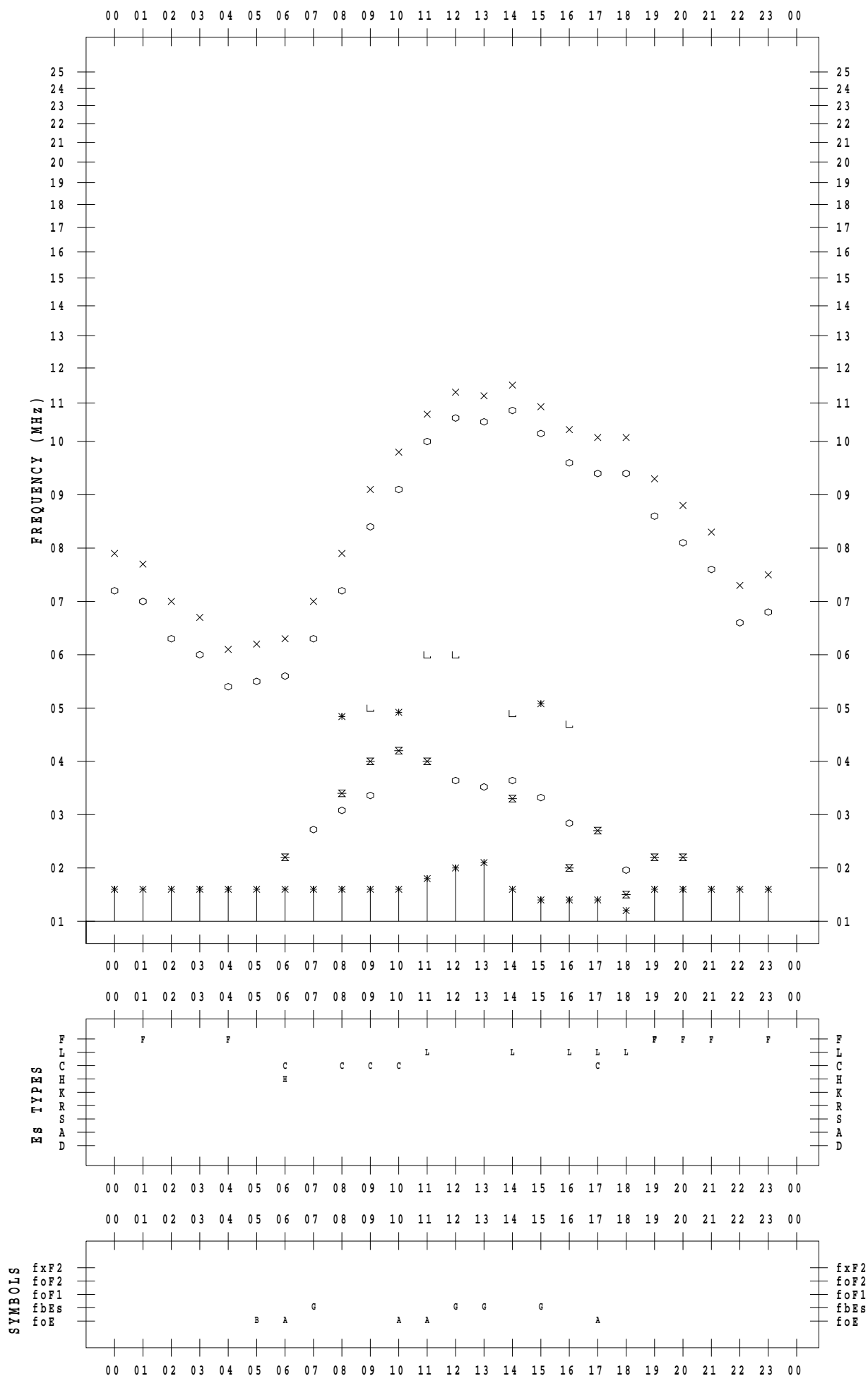
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Wakkanai

DATE : 2023/ 3/31

135 ° E MEAN TIME



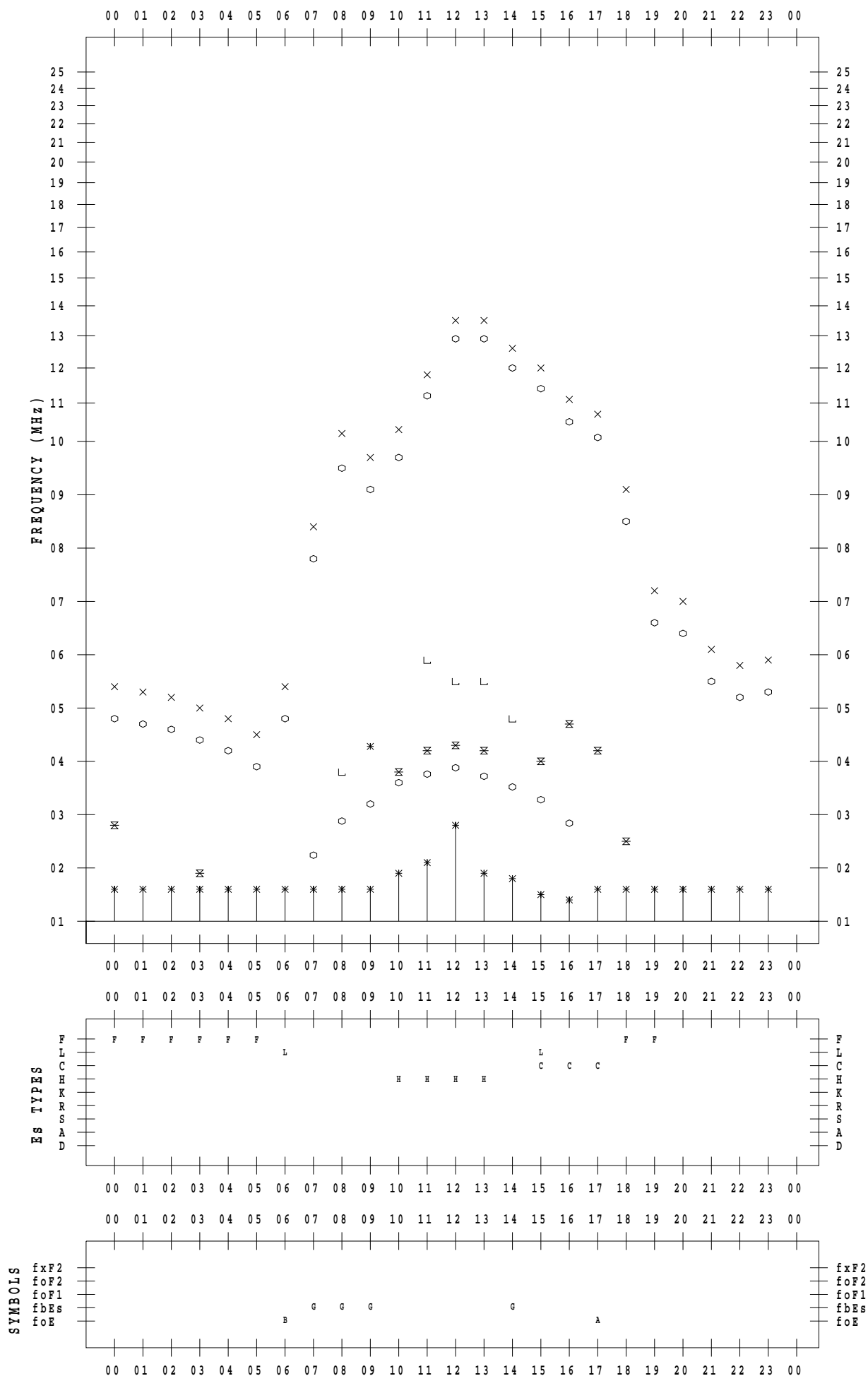
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/ 1

135 ° E MEAN TIME



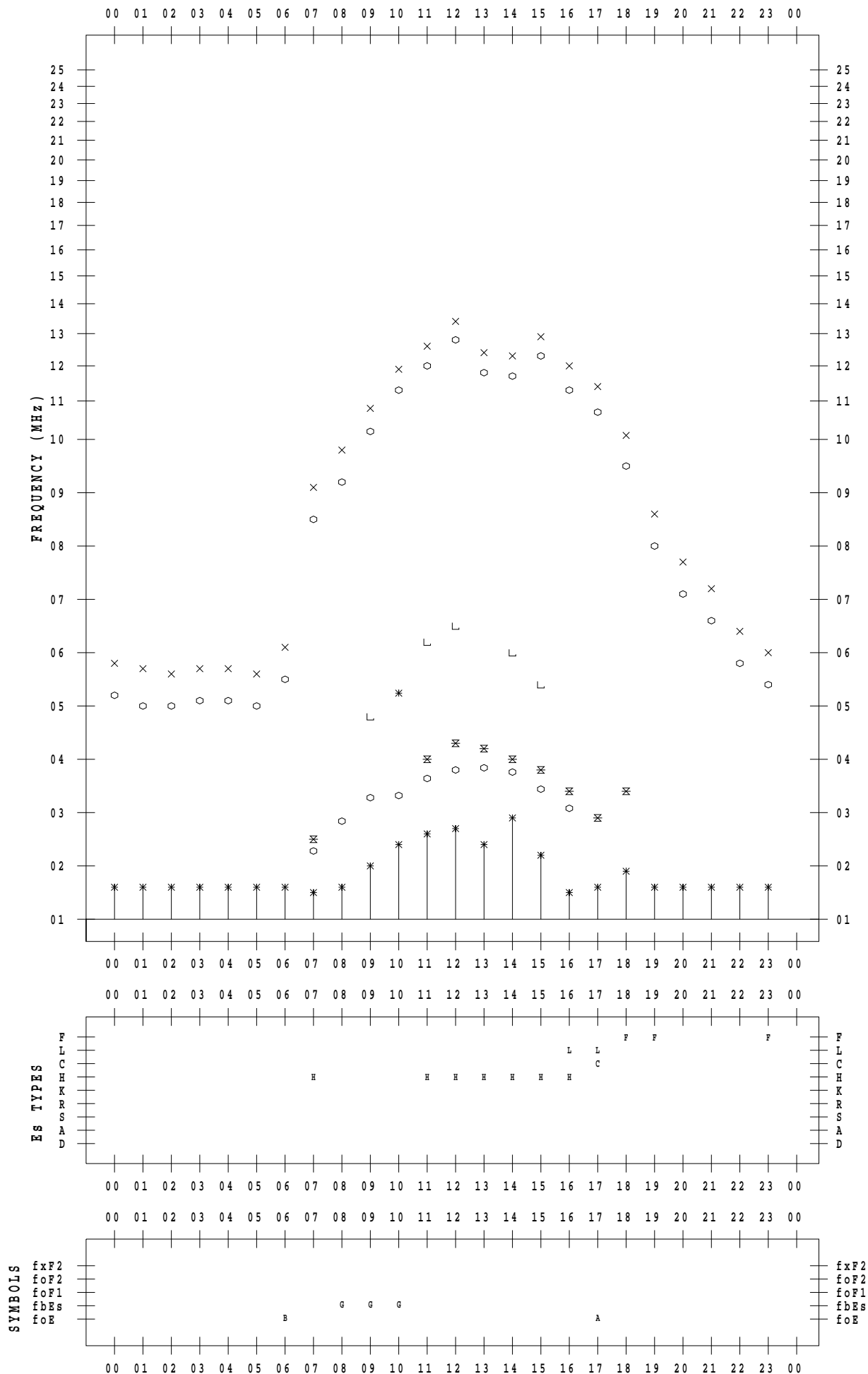
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023 / 3 / 2

135 ° E MEAN TIME



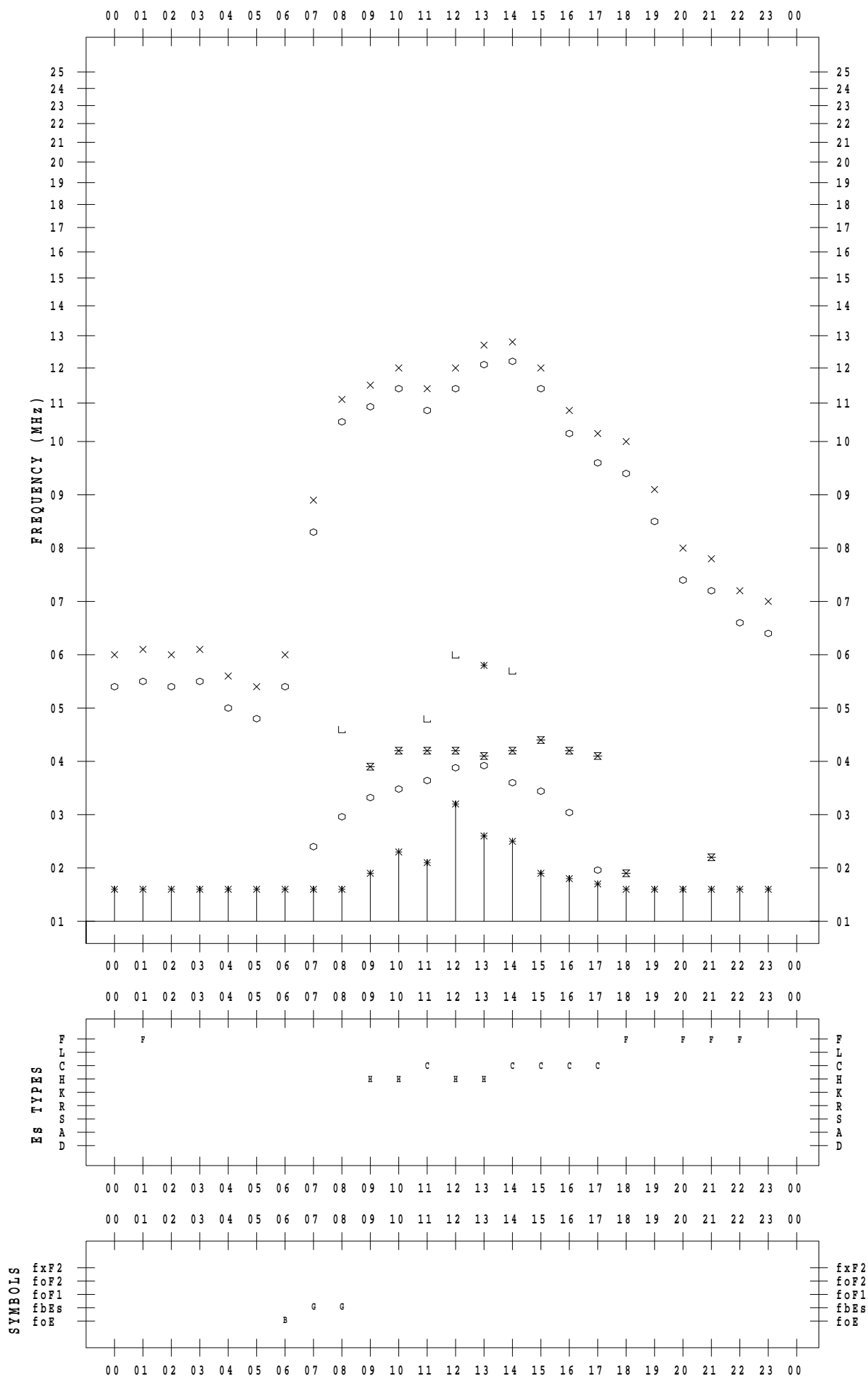
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023 / 3 / 3

135 ° E MEAN TIME



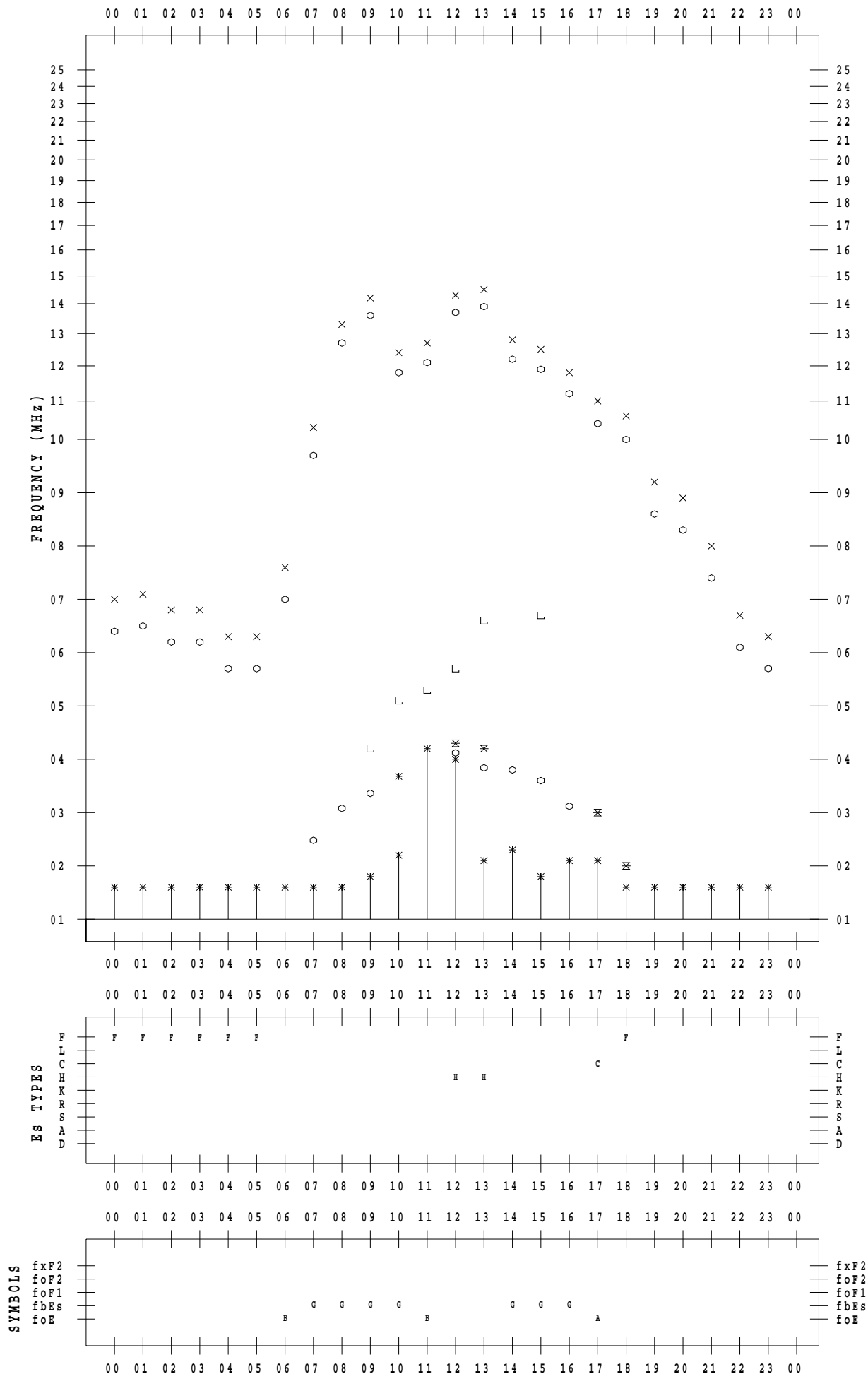
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023 / 3 / 4

135 ° E MEAN TIME



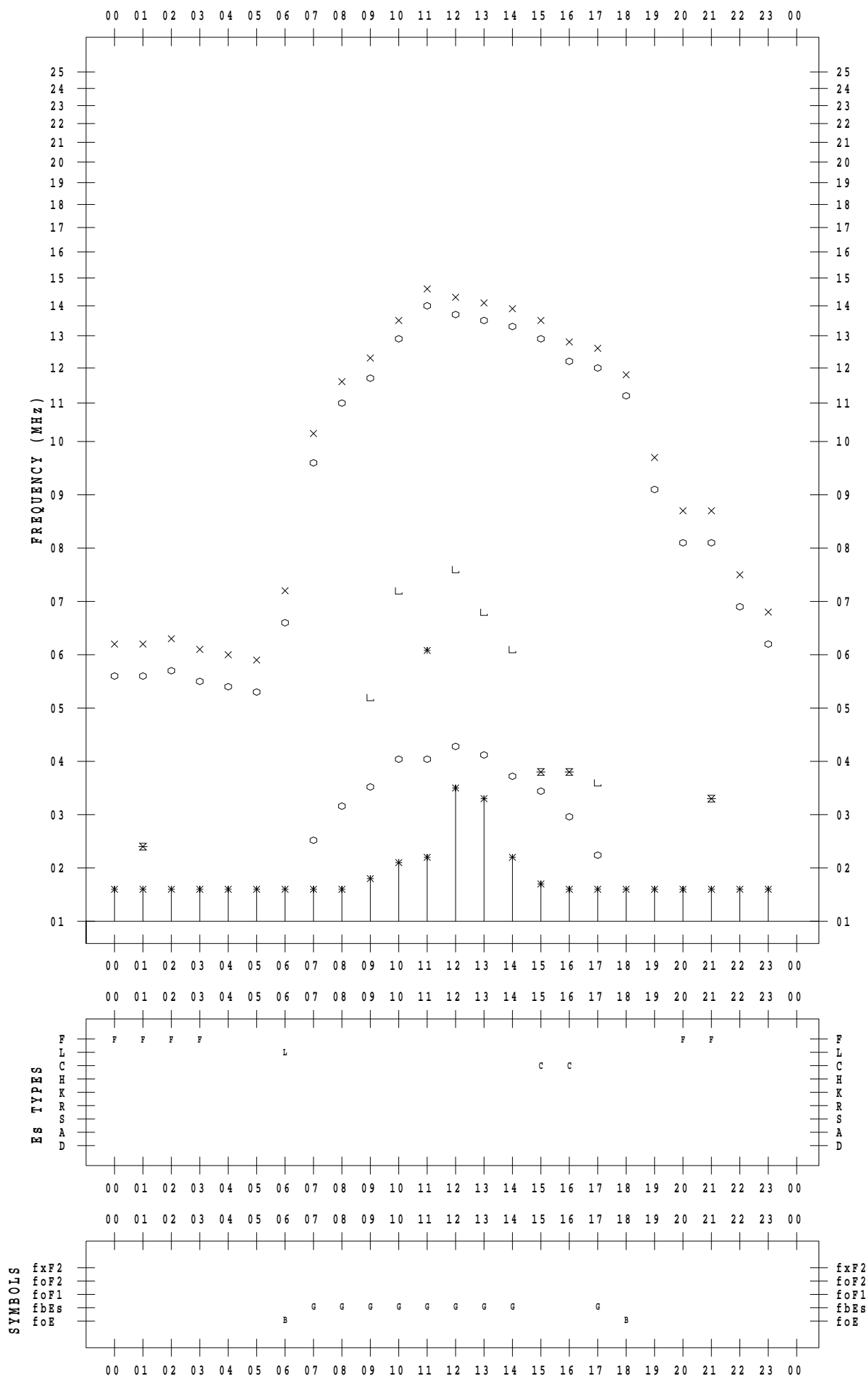
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/ 5

135 ° E MEAN TIME





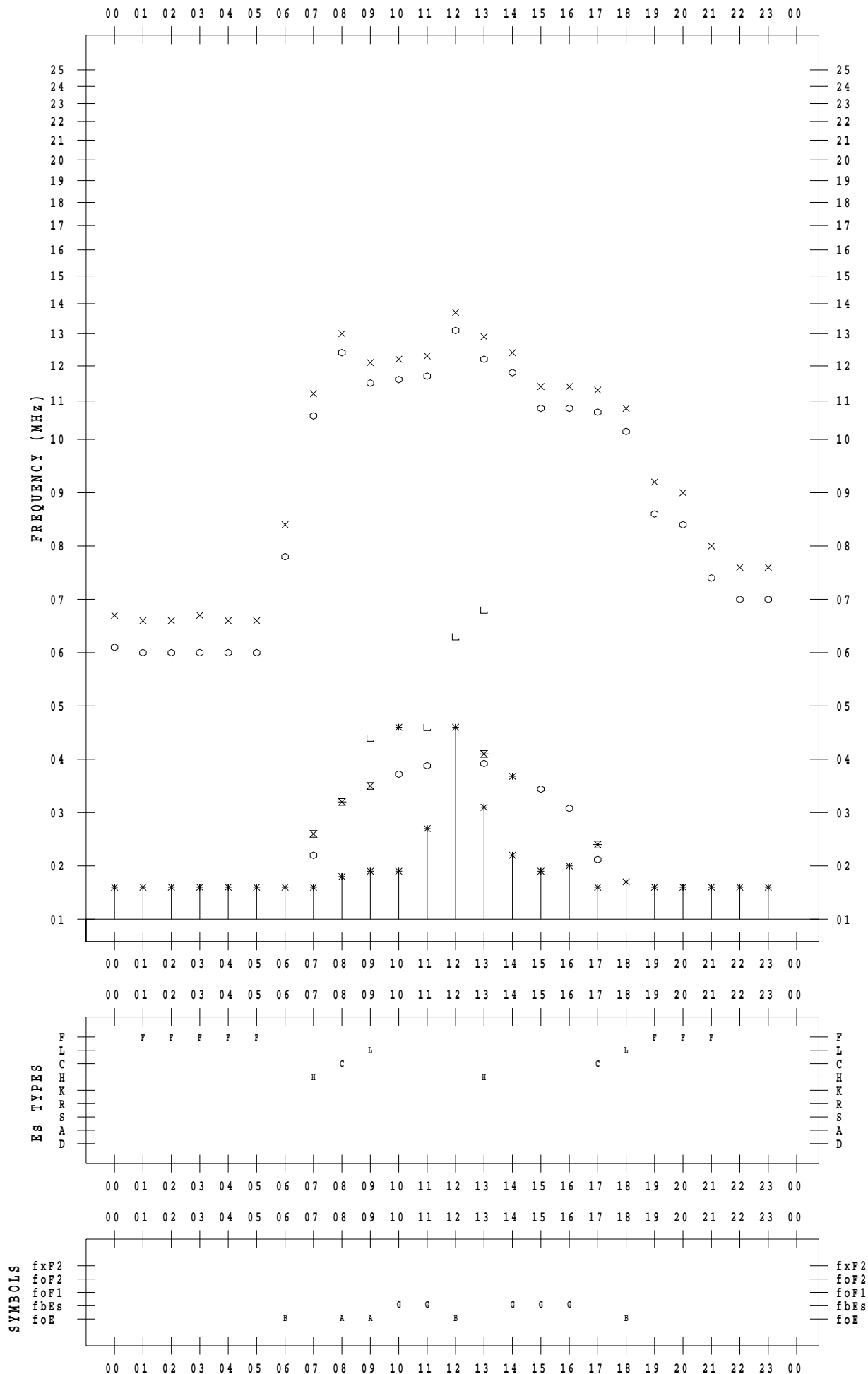
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/ 6

135 ° E MEAN TIME



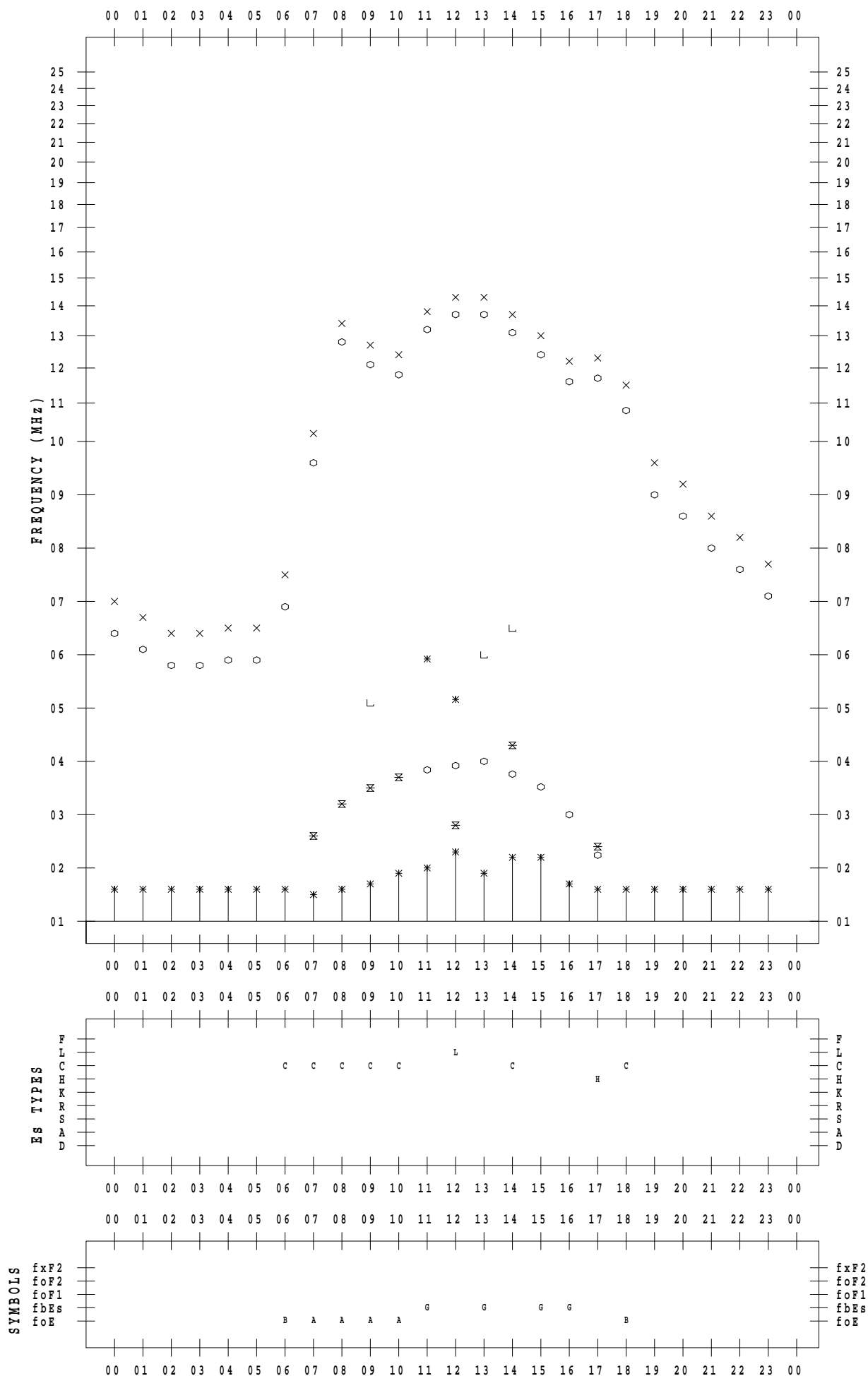
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023 / 3 / 7

135 ° E MEAN TIME



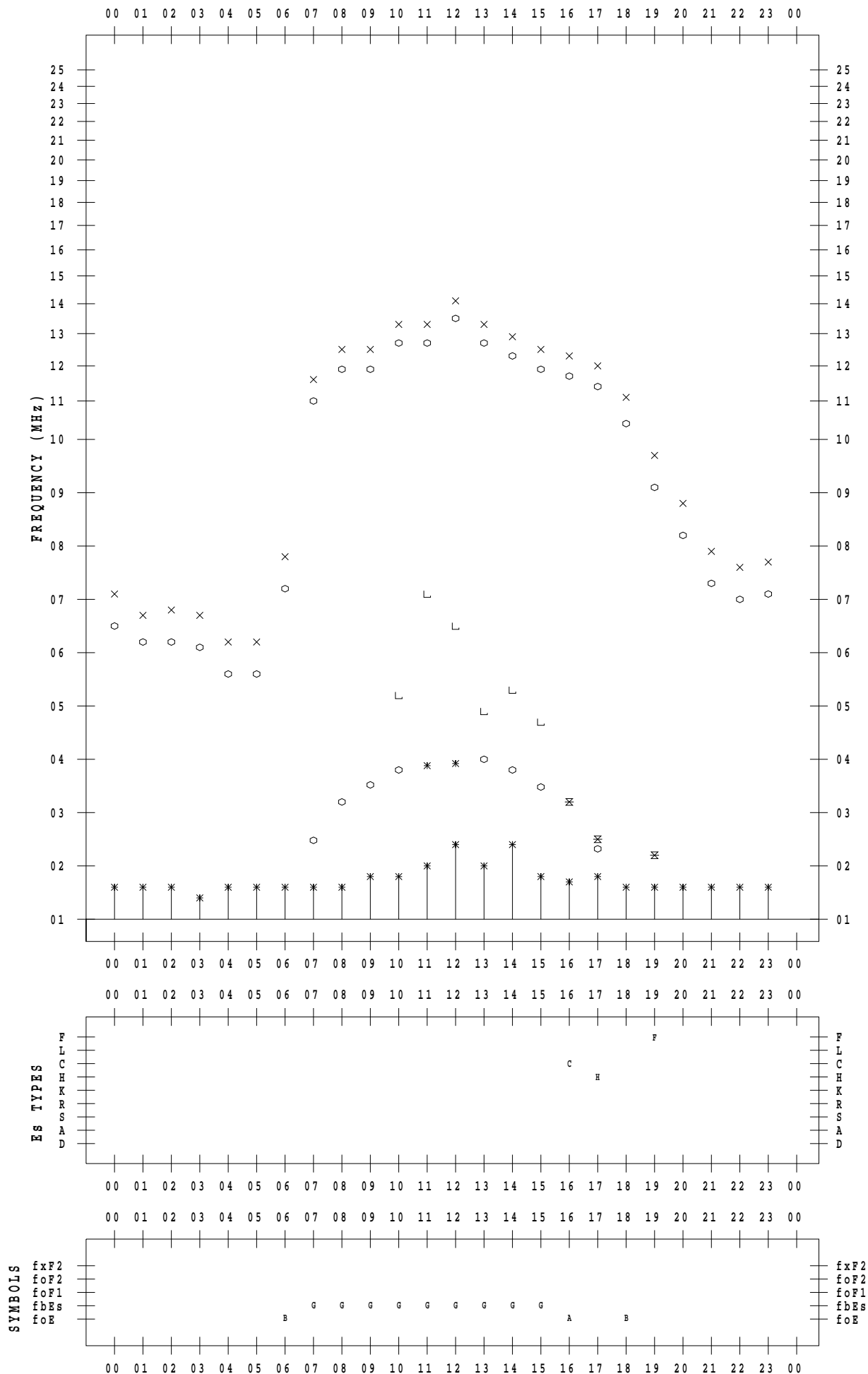
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023 / 3 / 8

135 ° E MEAN TIME



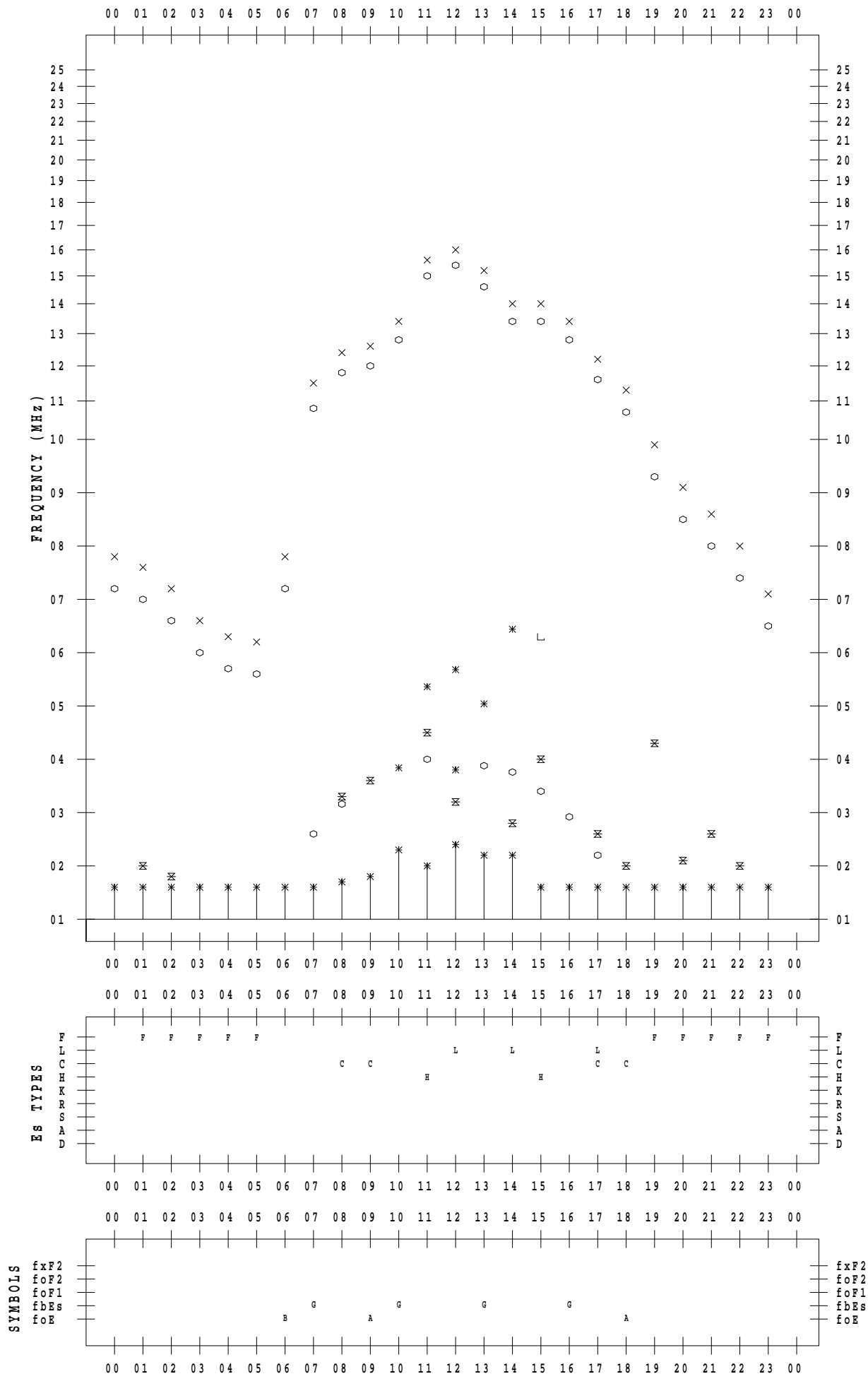
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023 / 3 / 9

135 ° E MEAN TIME



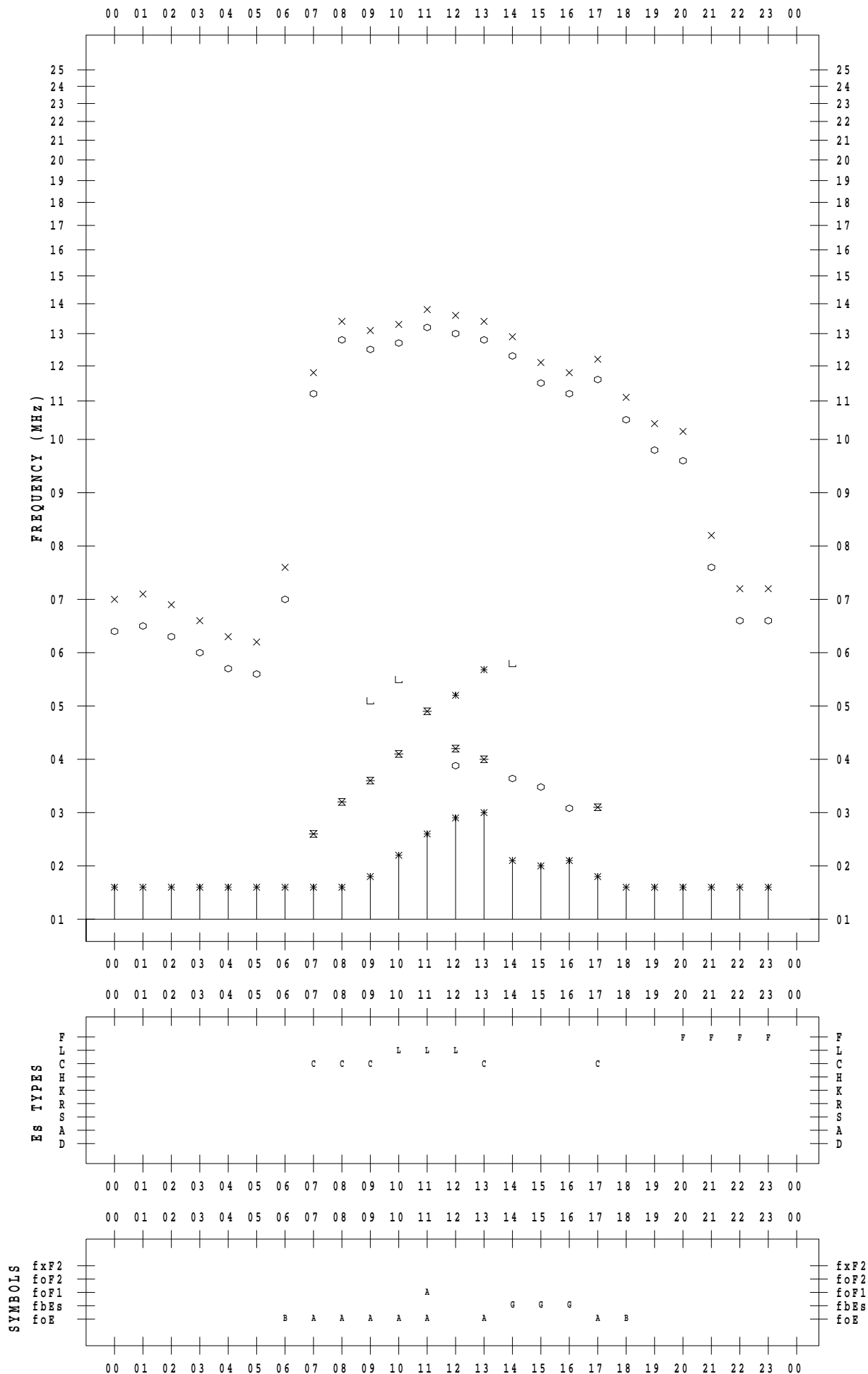
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/10

135 ° E MEAN TIME



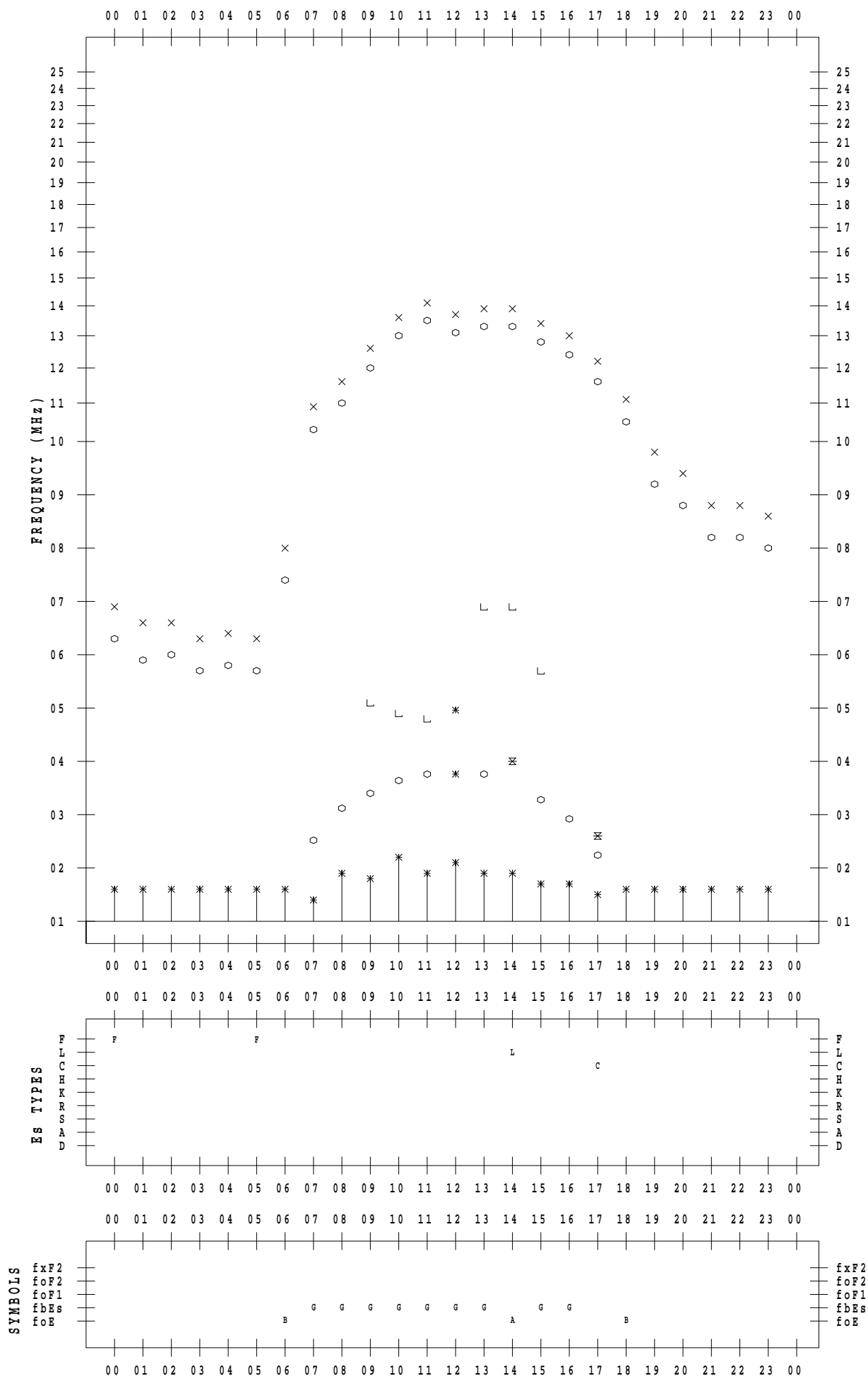
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/11

135 ° E MEAN TIME



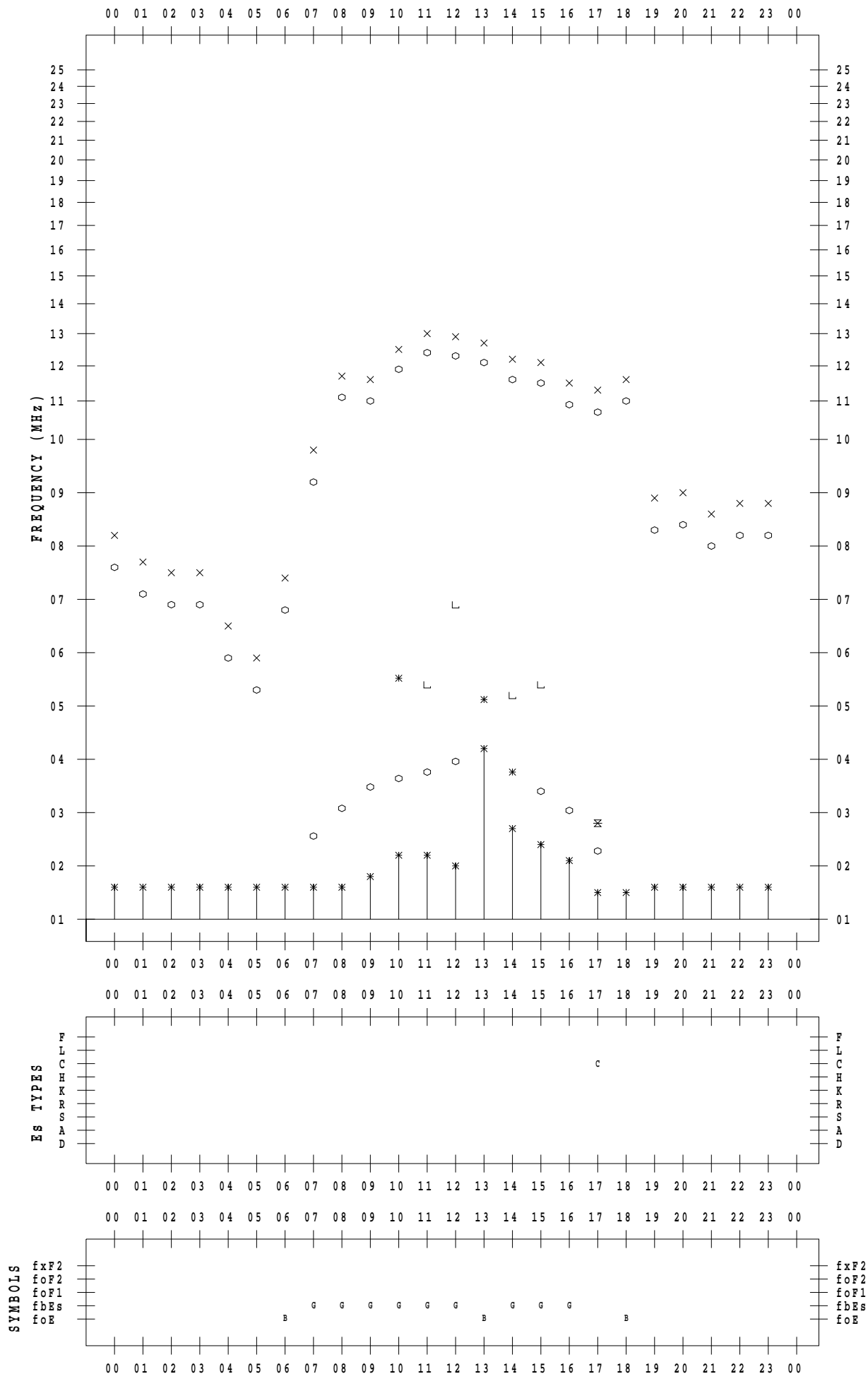
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/12

135 ° E MEAN TIME



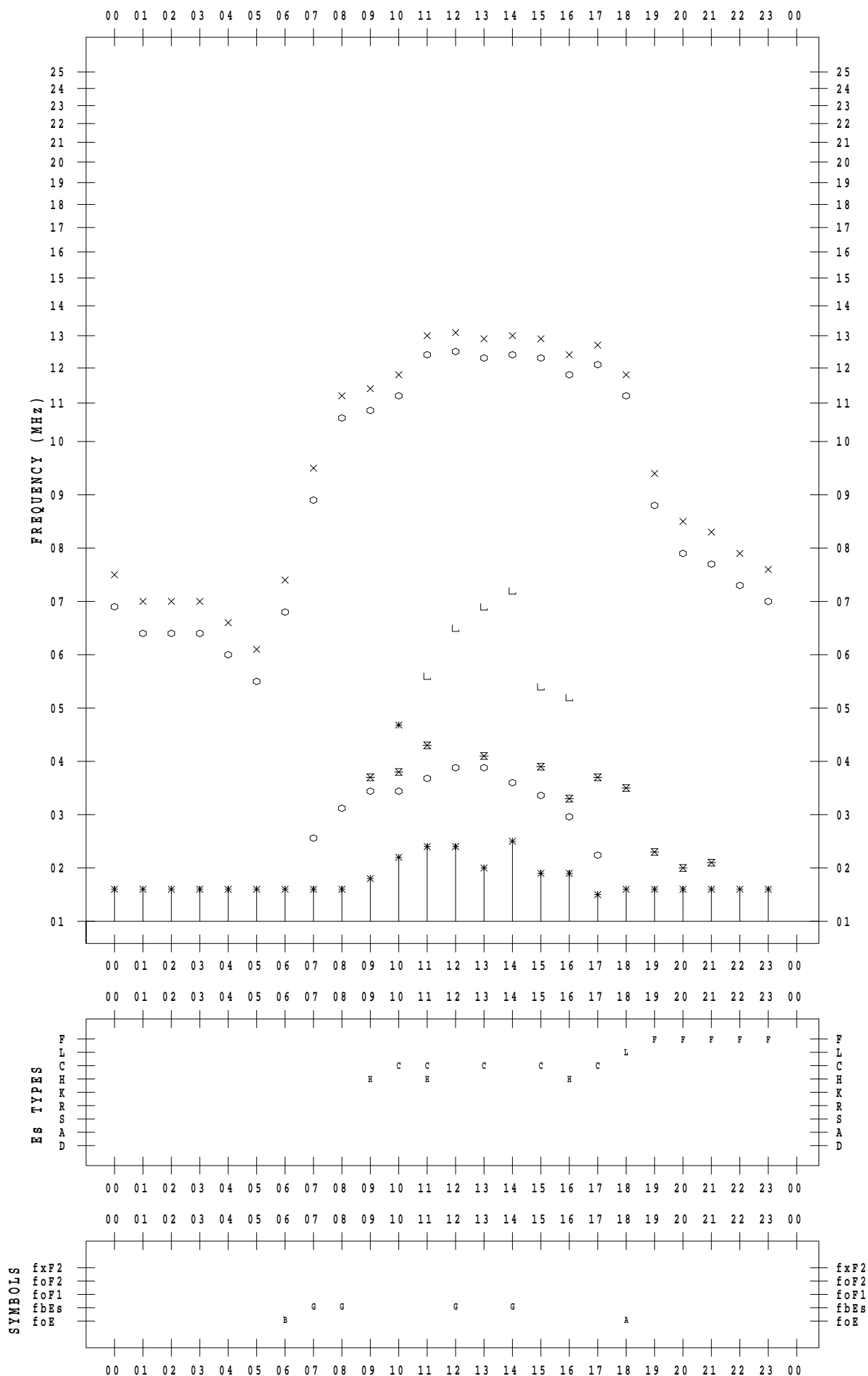
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/13

135 ° E MEAN TIME





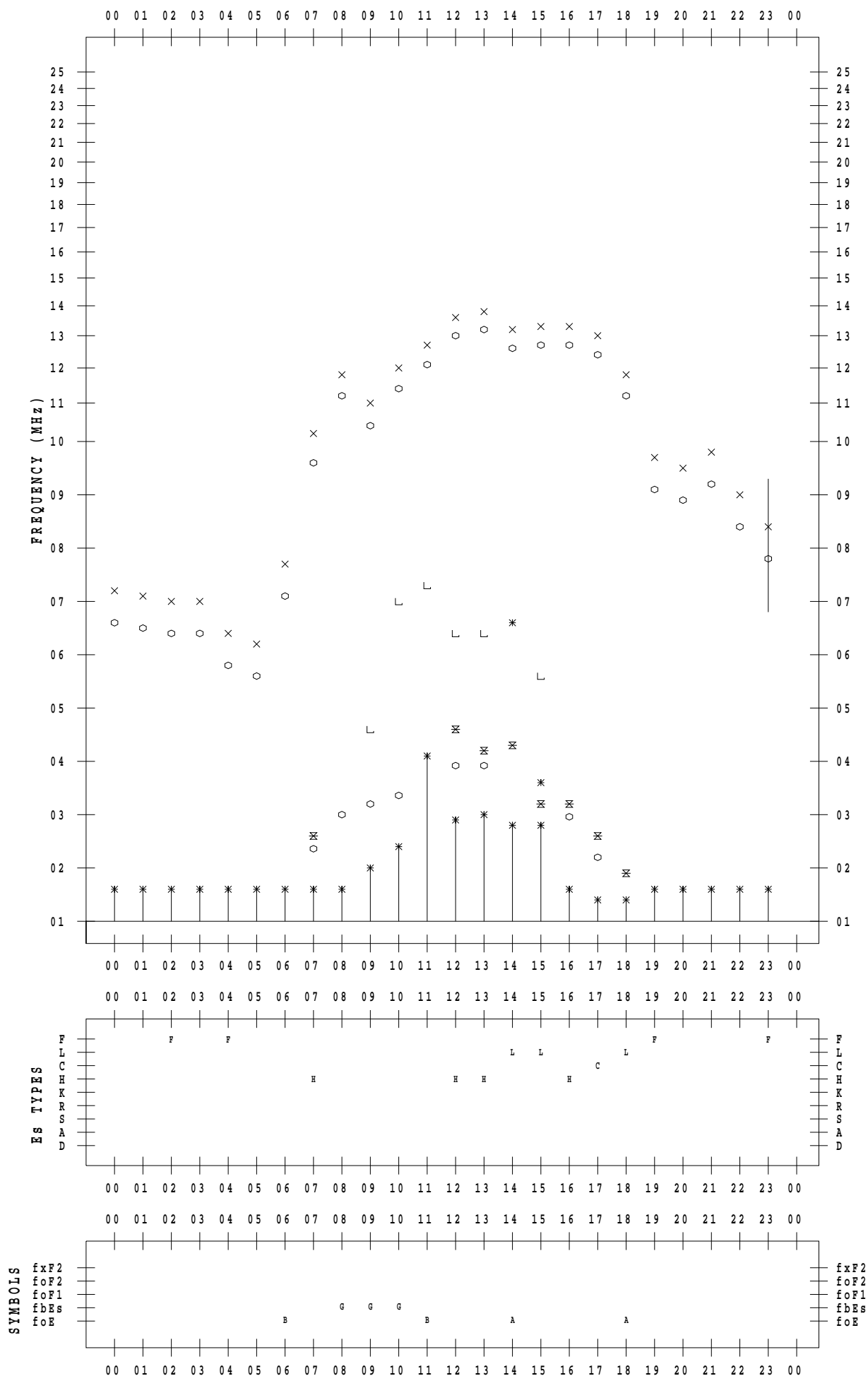
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023 / 3 / 14

135 ° E MEAN TIME



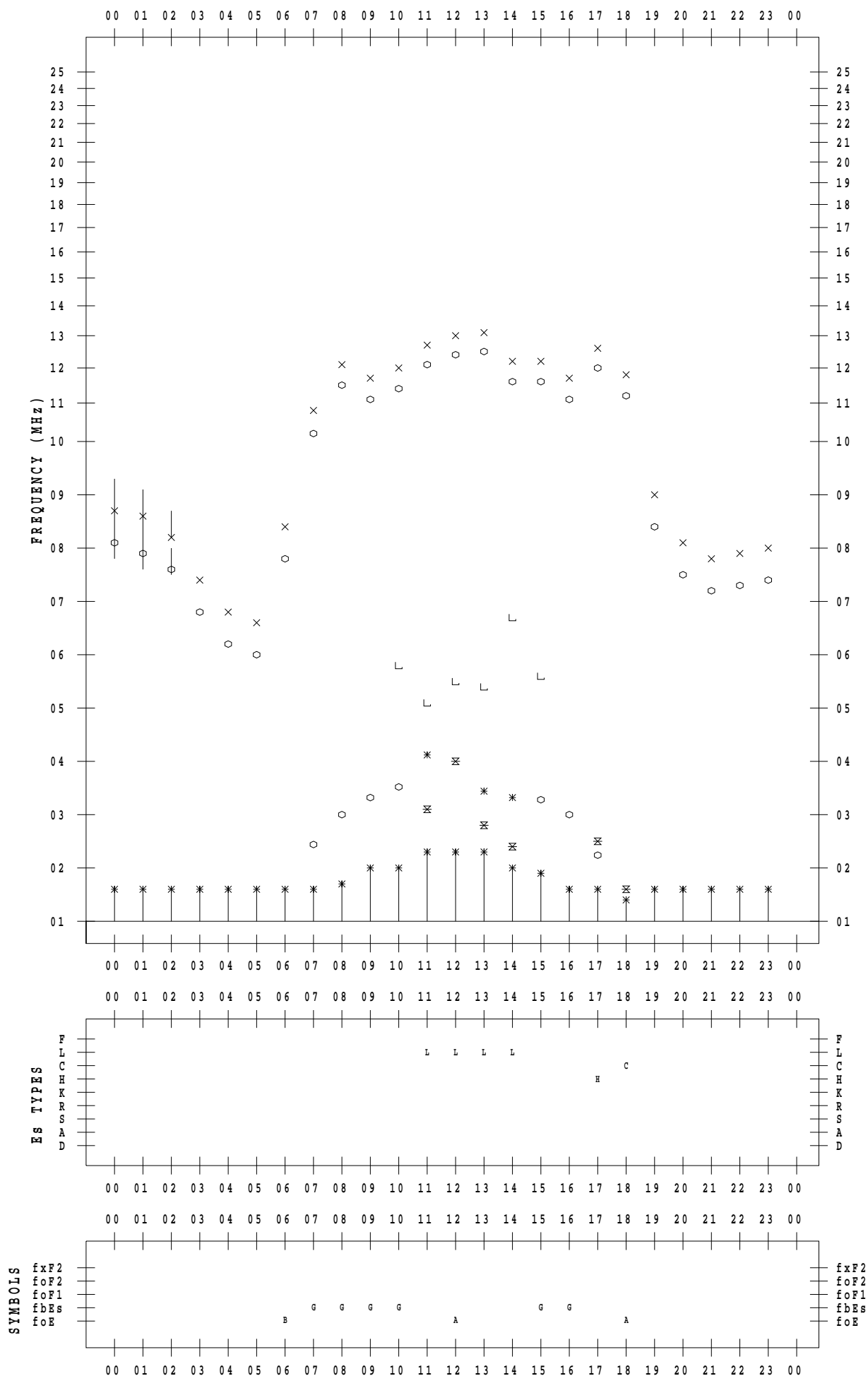
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/15

135 ° E MEAN TIME



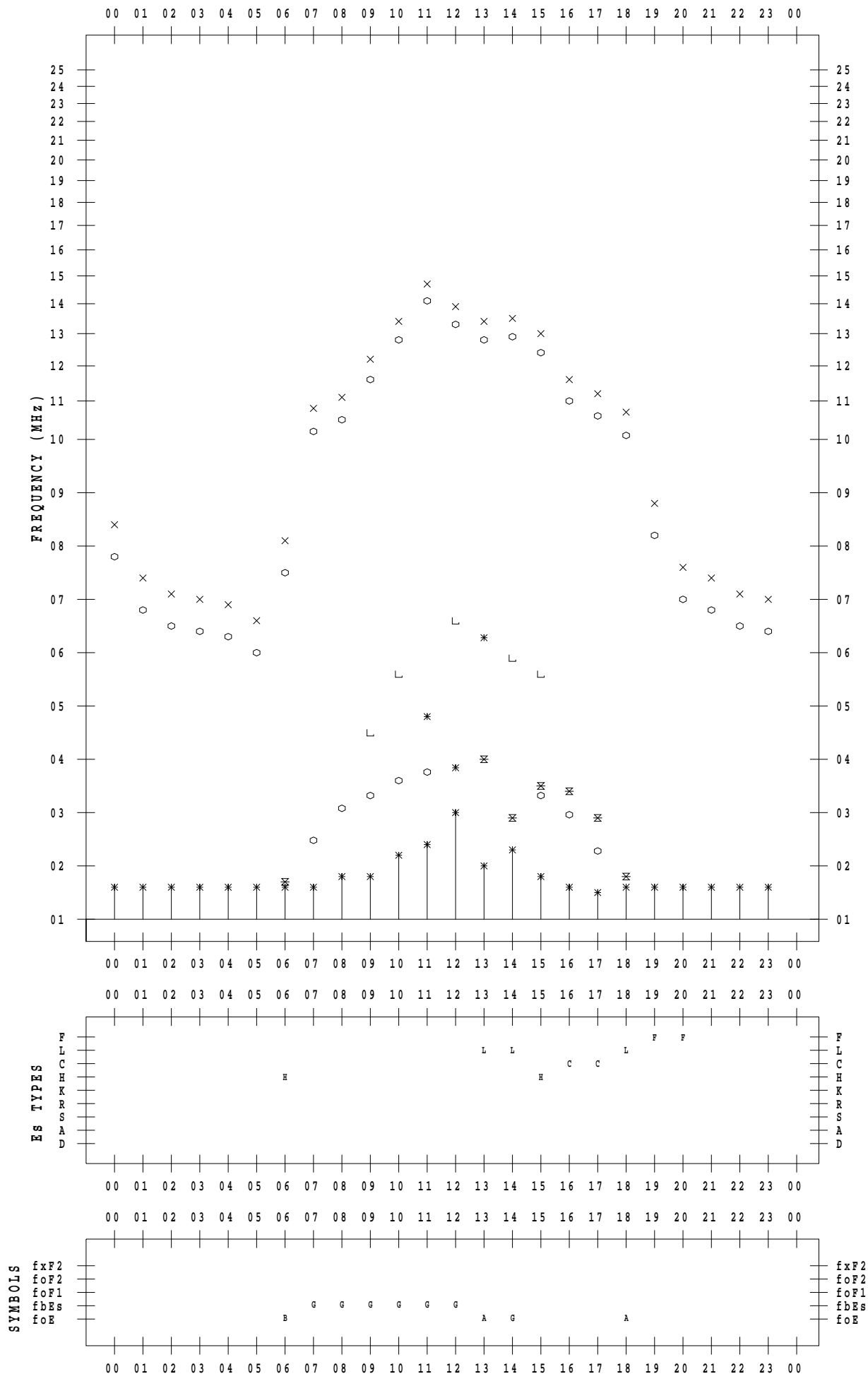
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/16

135 ° E MEAN TIME



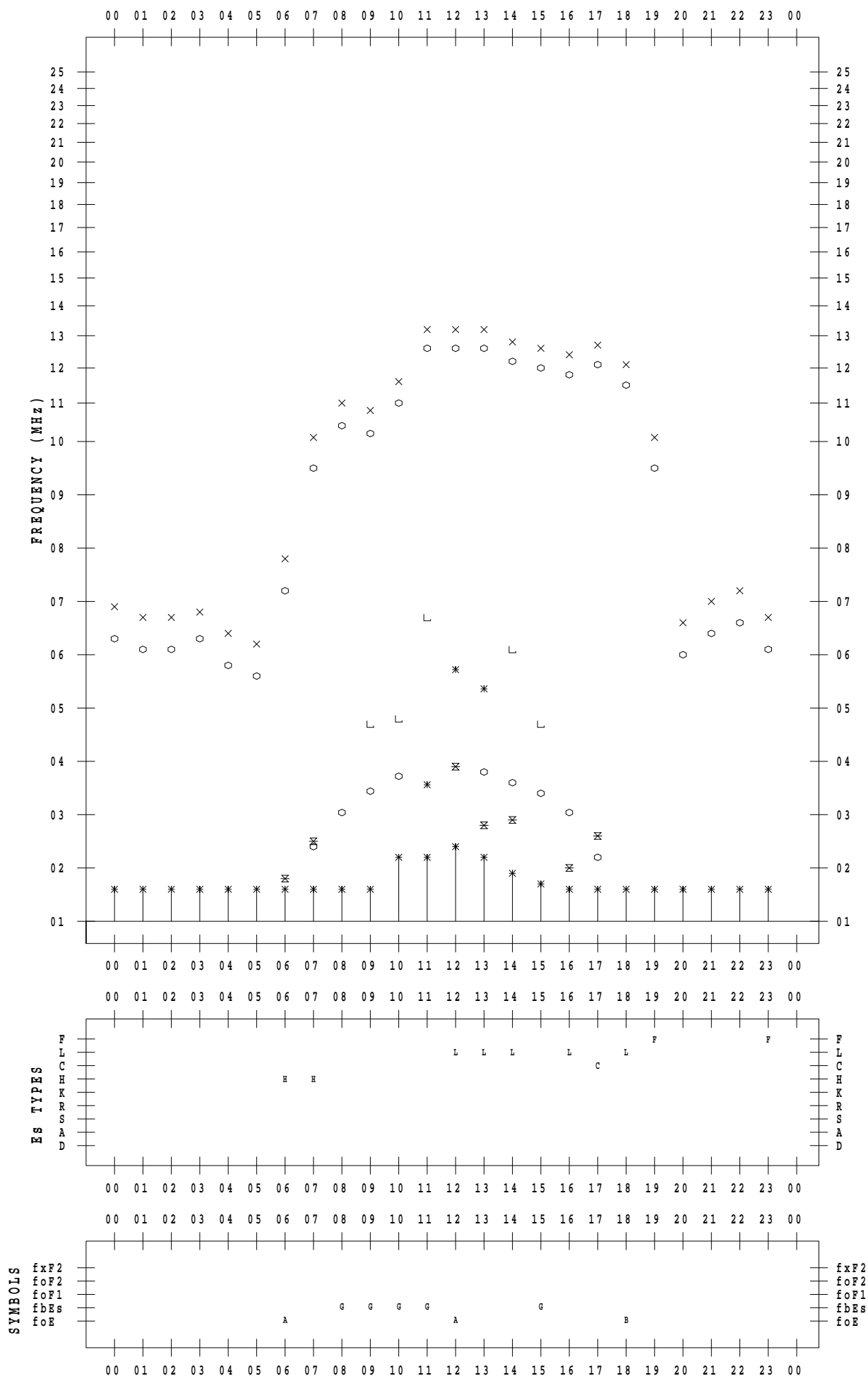
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/17

135 ° E MEAN TIME



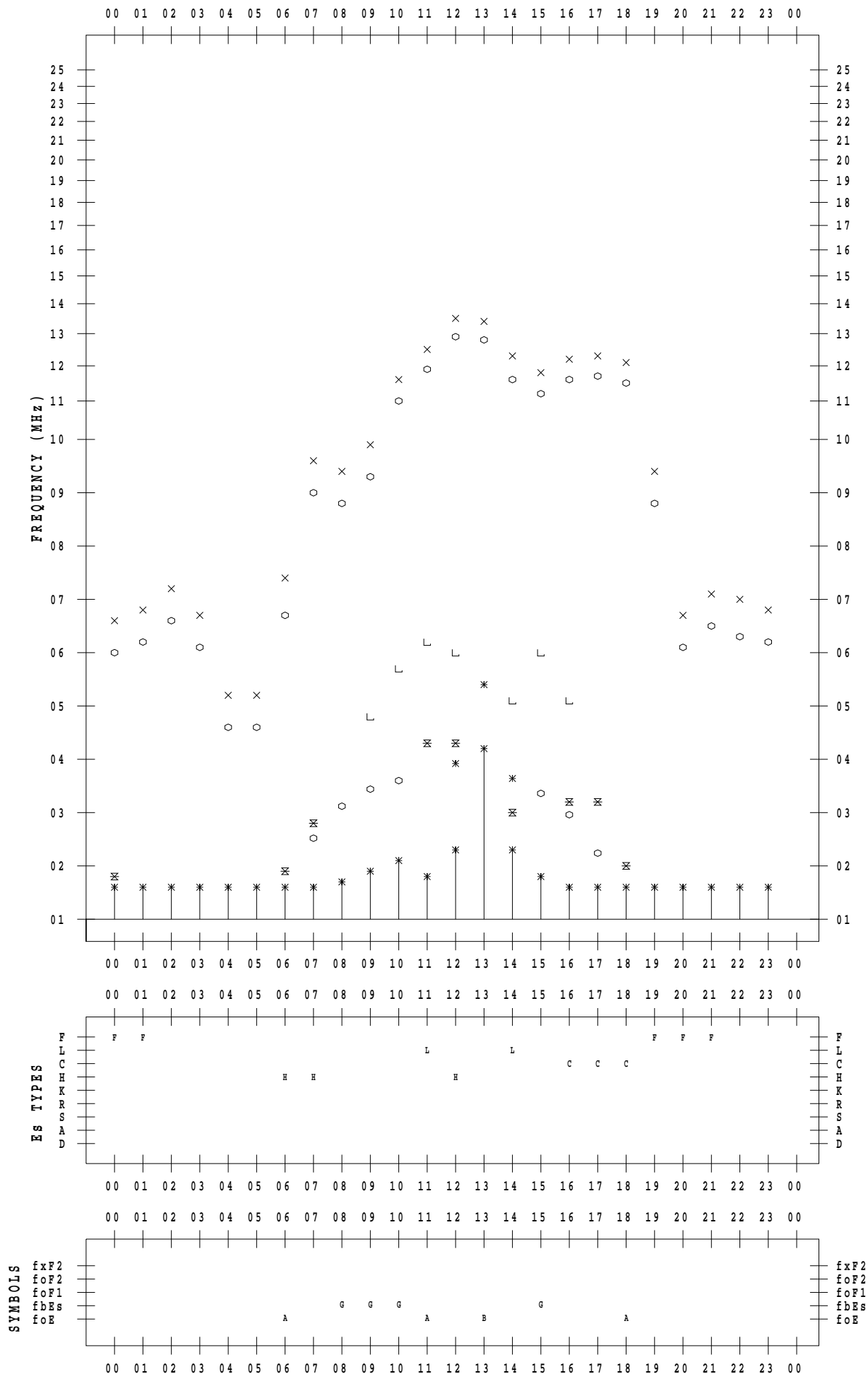
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/18

135 ° E MEAN TIME



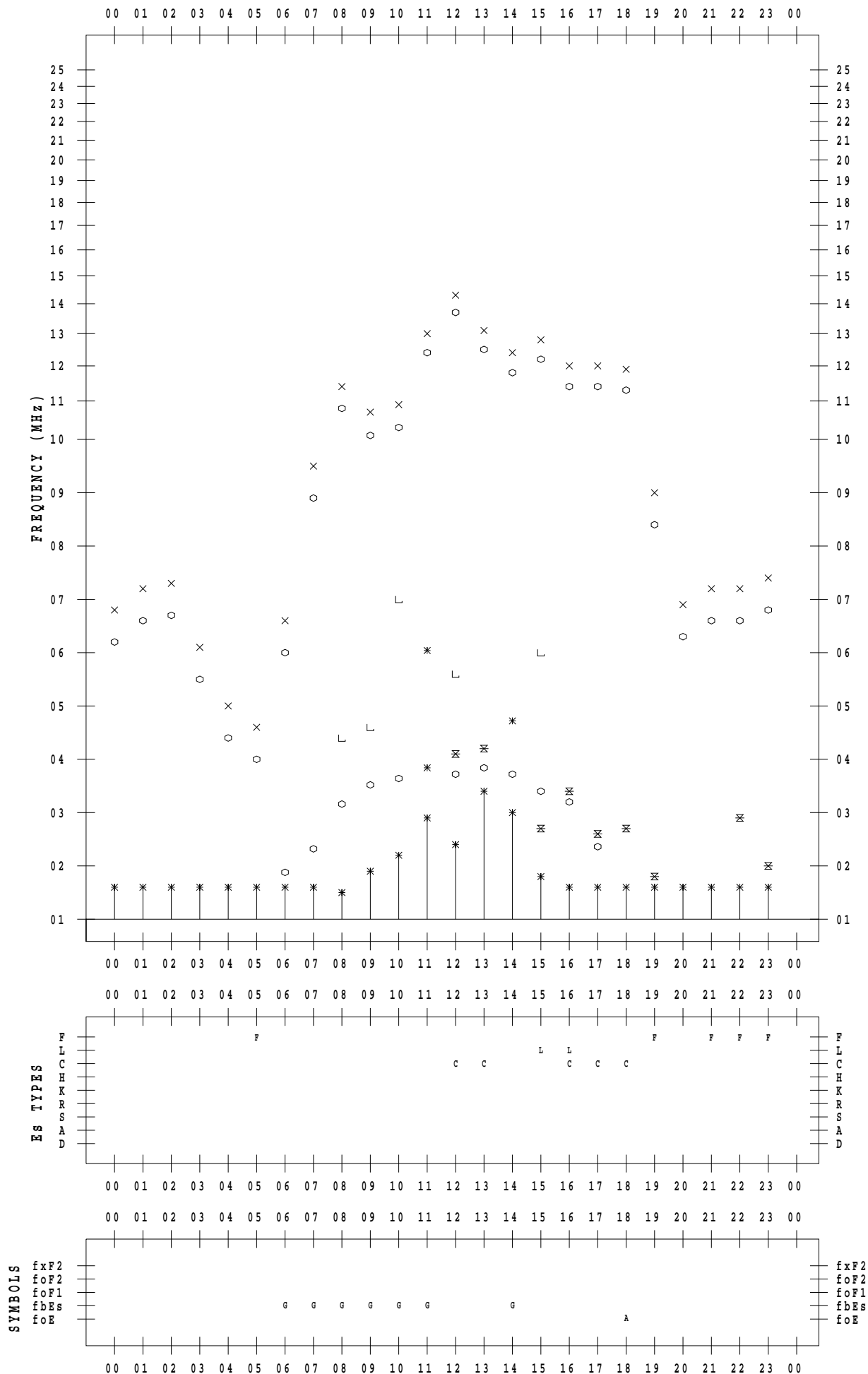
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/19

135 ° E MEAN TIME



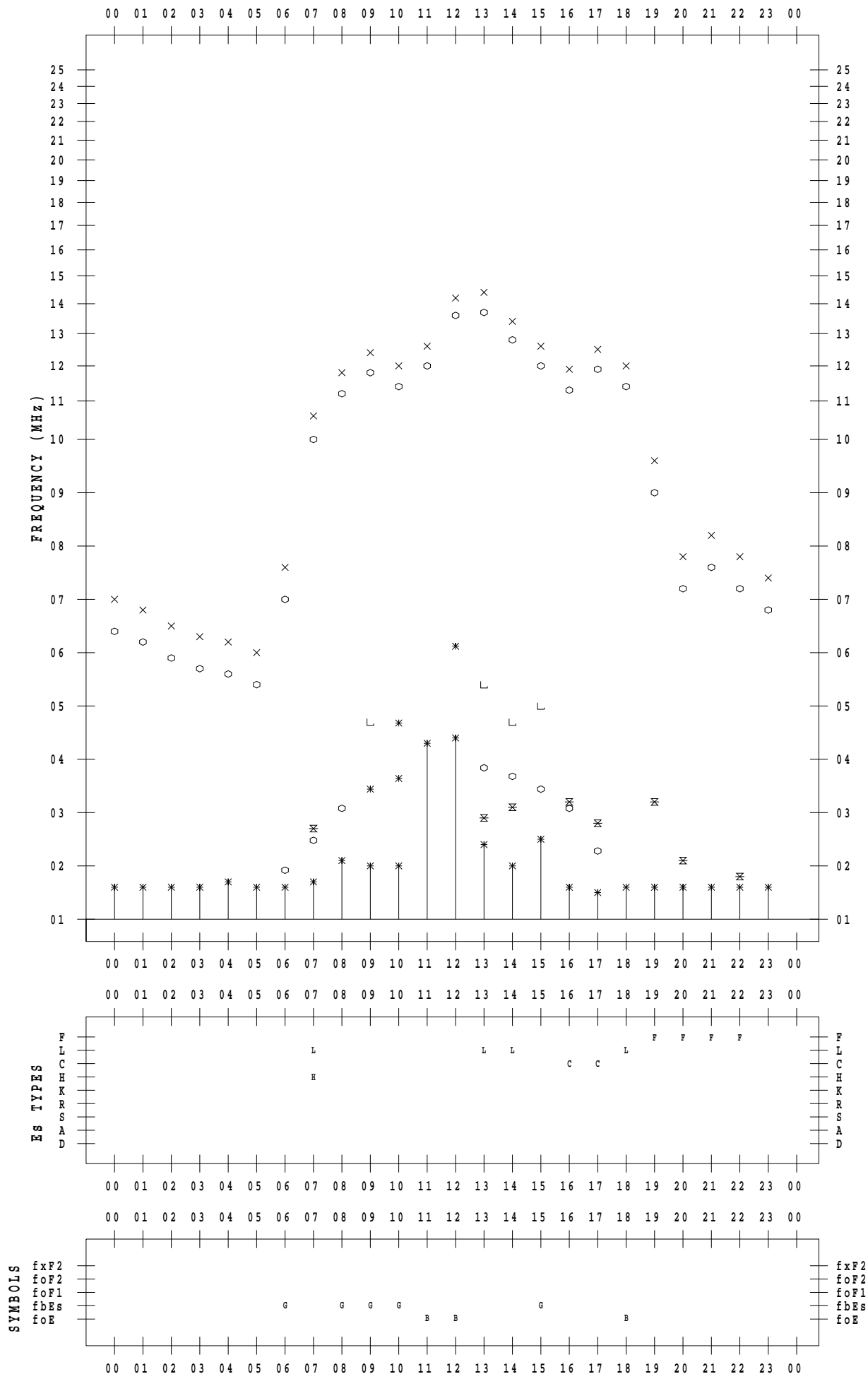
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/20

135 ° E MEAN TIME



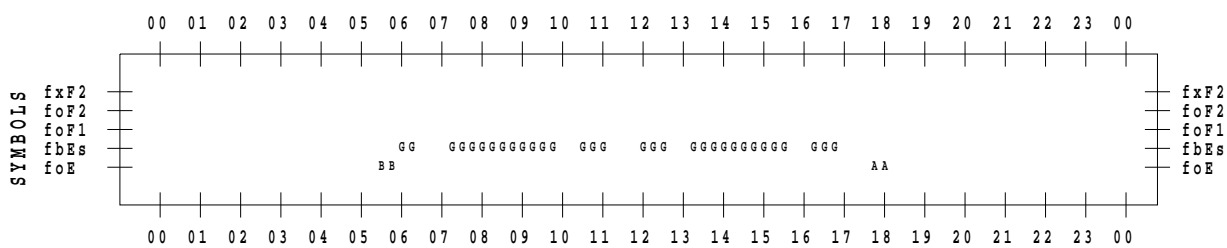
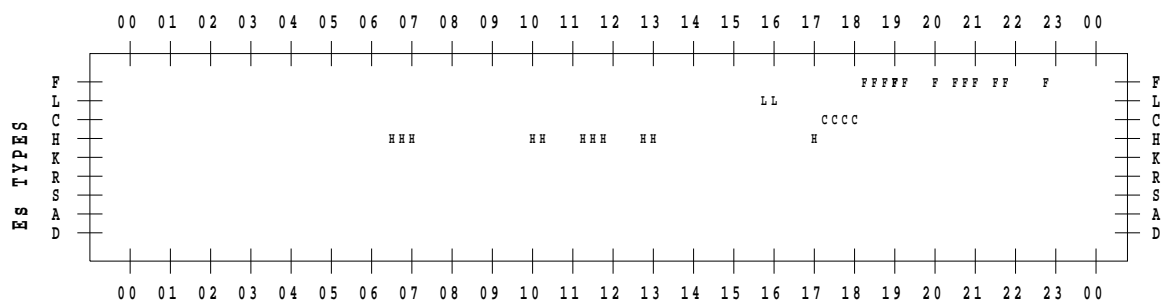
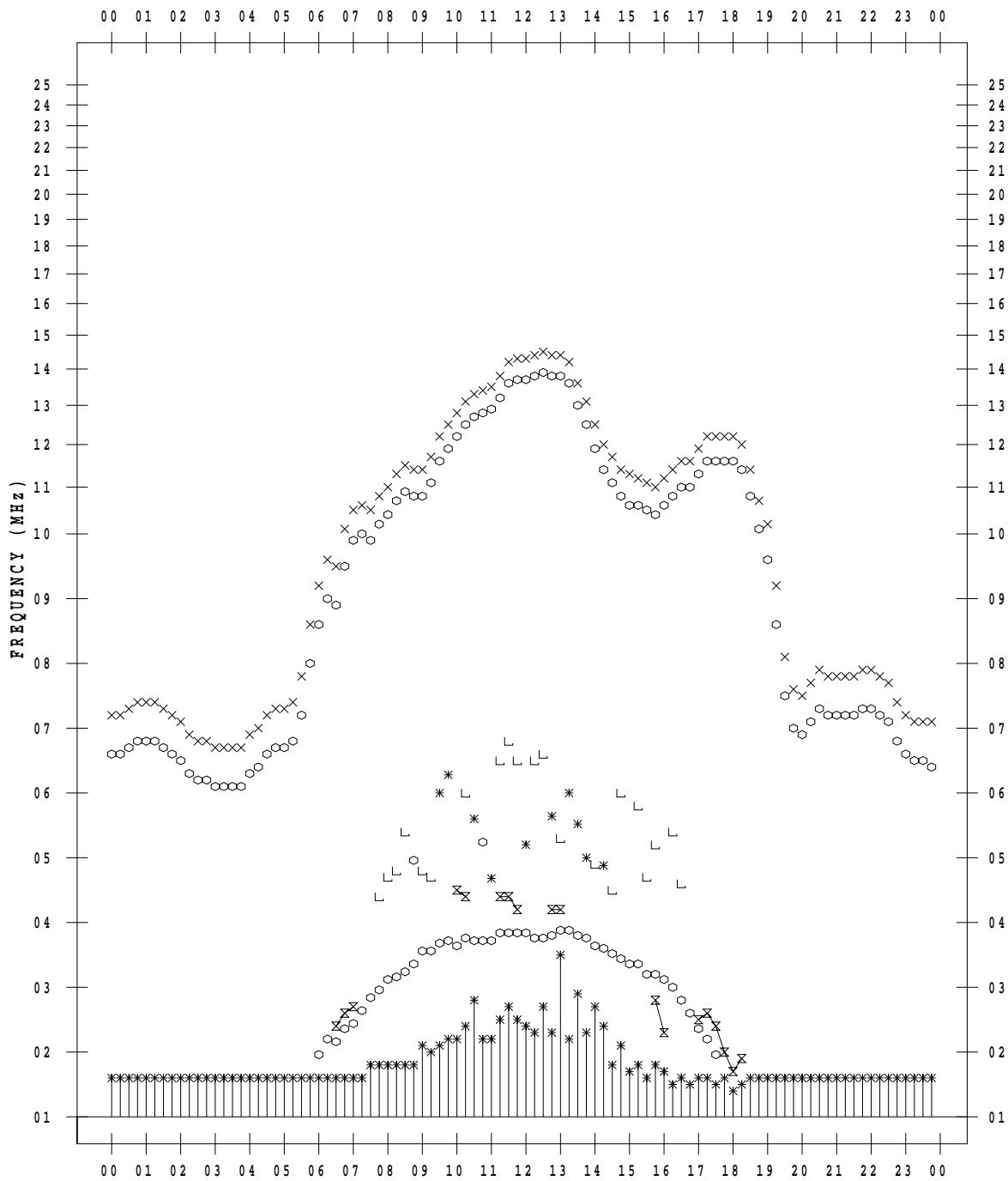
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/21

135 ° E MEAN TIME





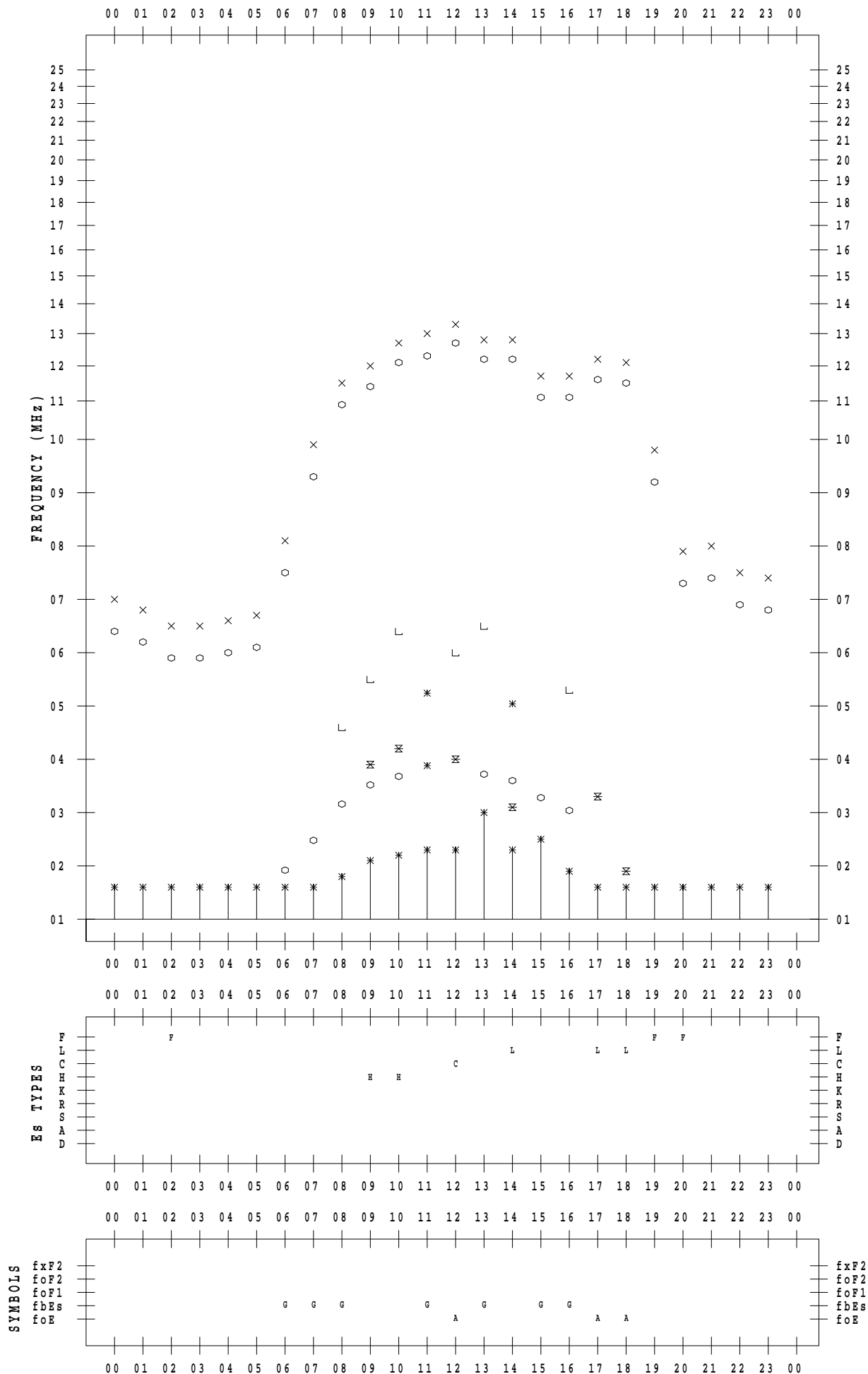
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/22

135 ° E MEAN TIME



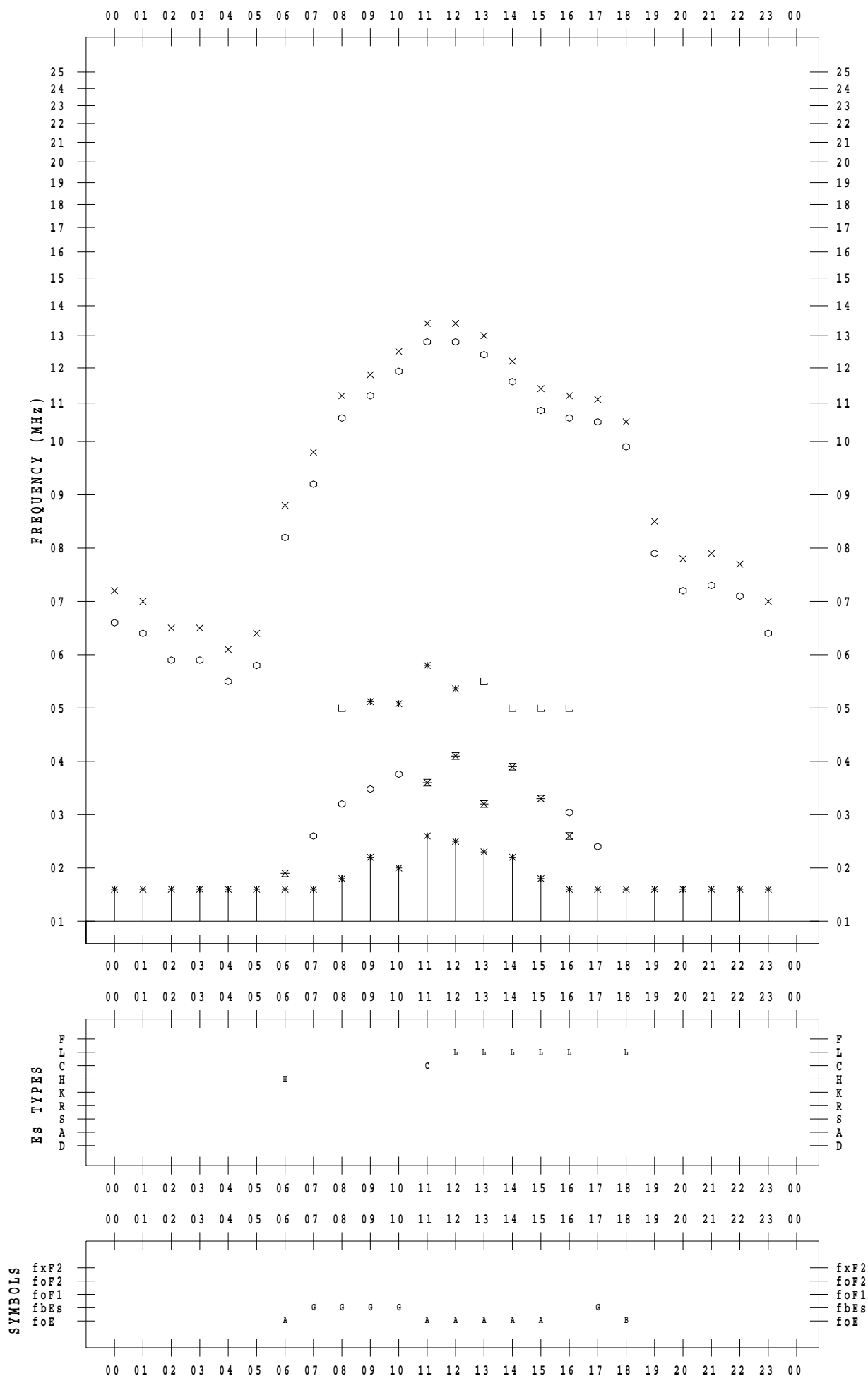
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023 / 3 / 23

135 ° E MEAN TIME



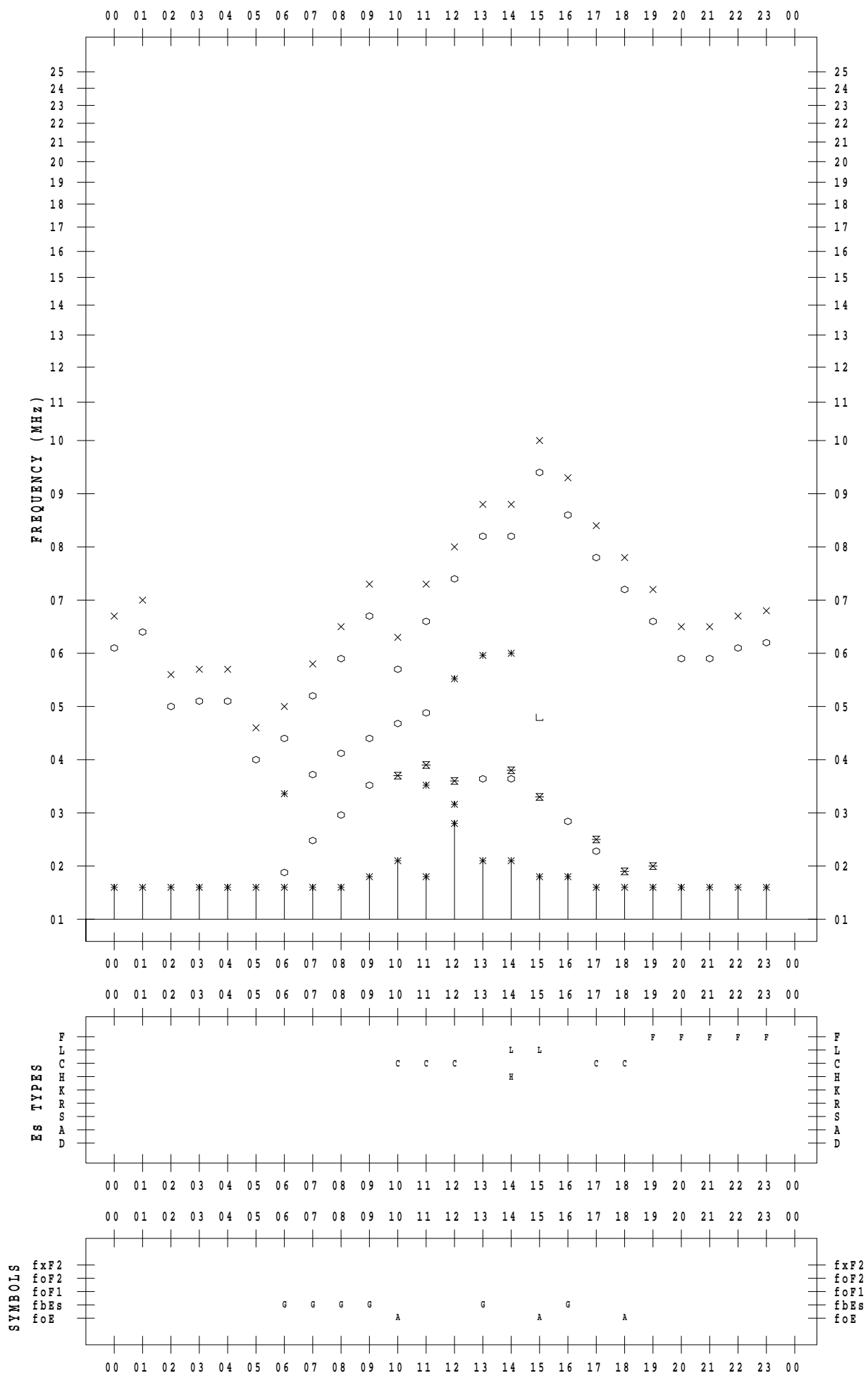
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/24

135 ° E MEAN TIME



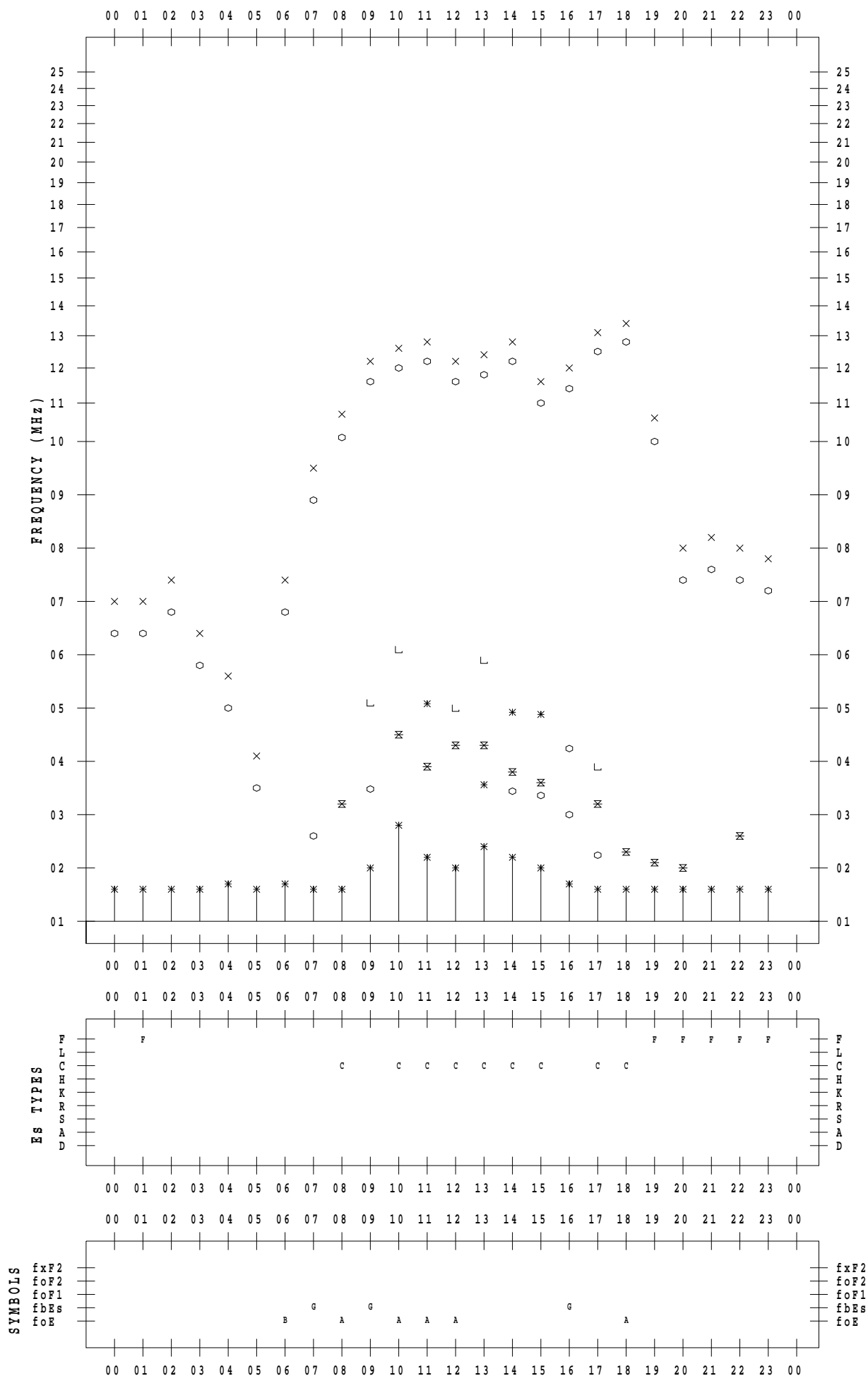
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/25

135 °E MEAN TIME



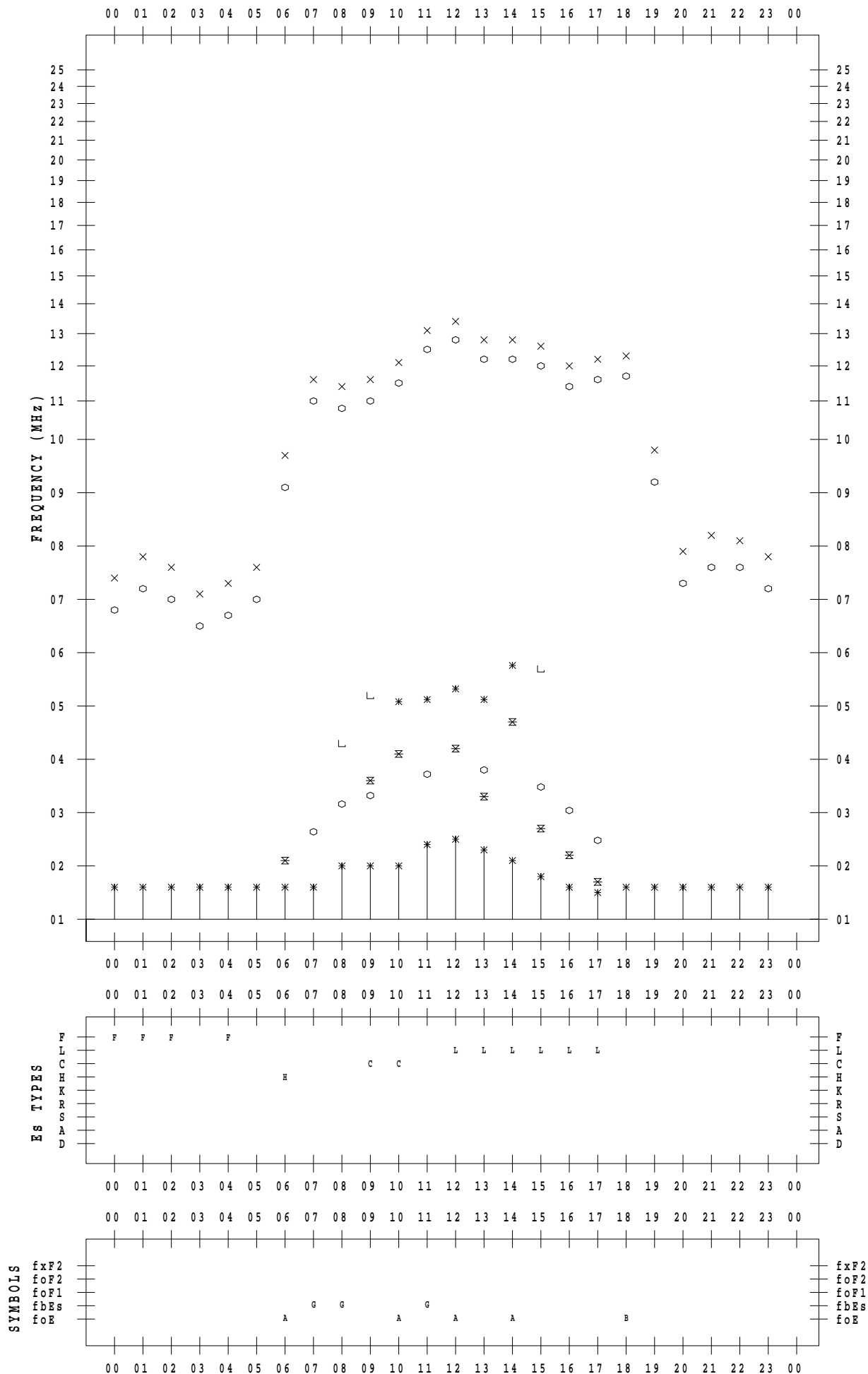
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/26

135 ° E MEAN TIME



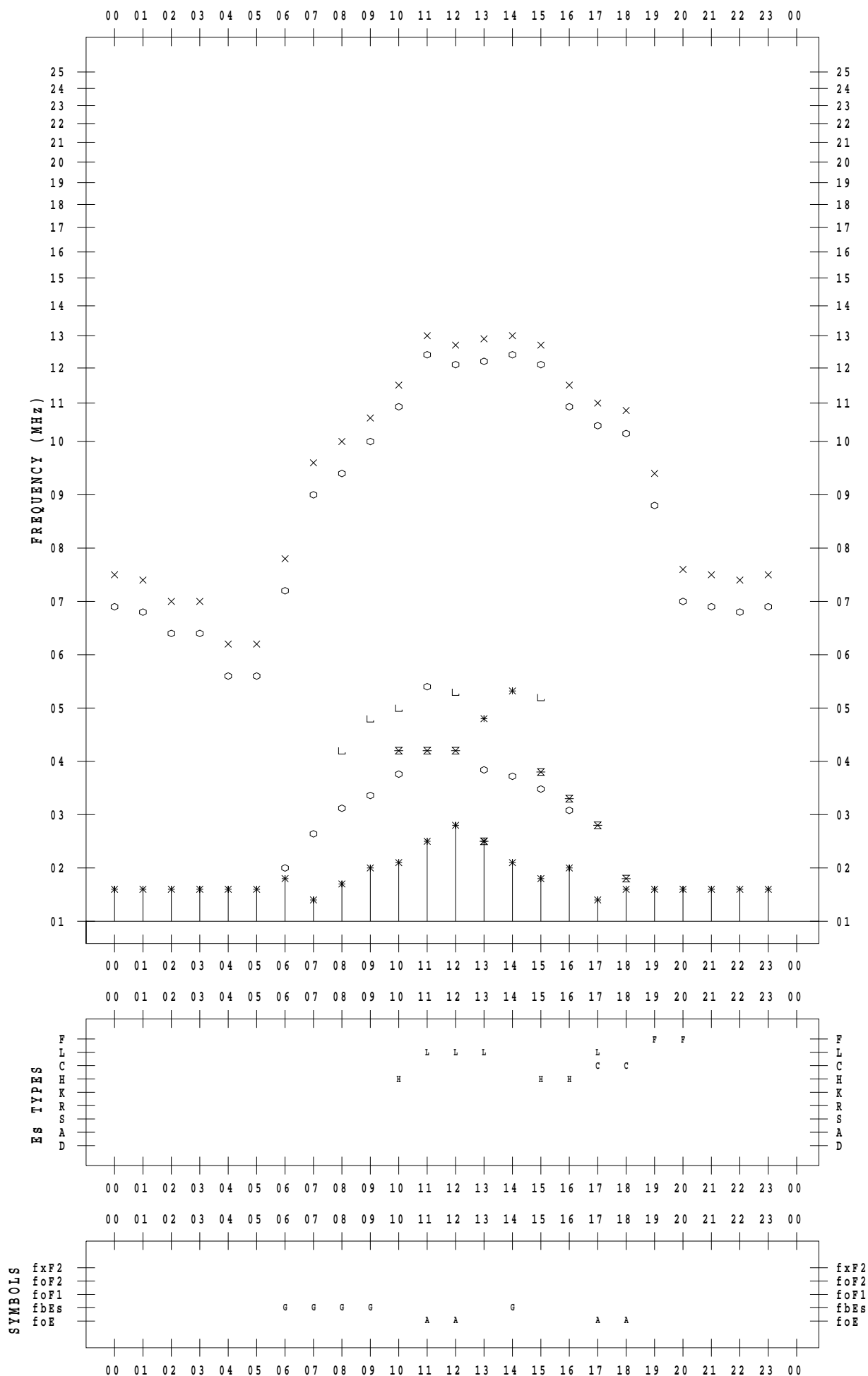
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023 / 3 / 27

135 ° E MEAN TIME



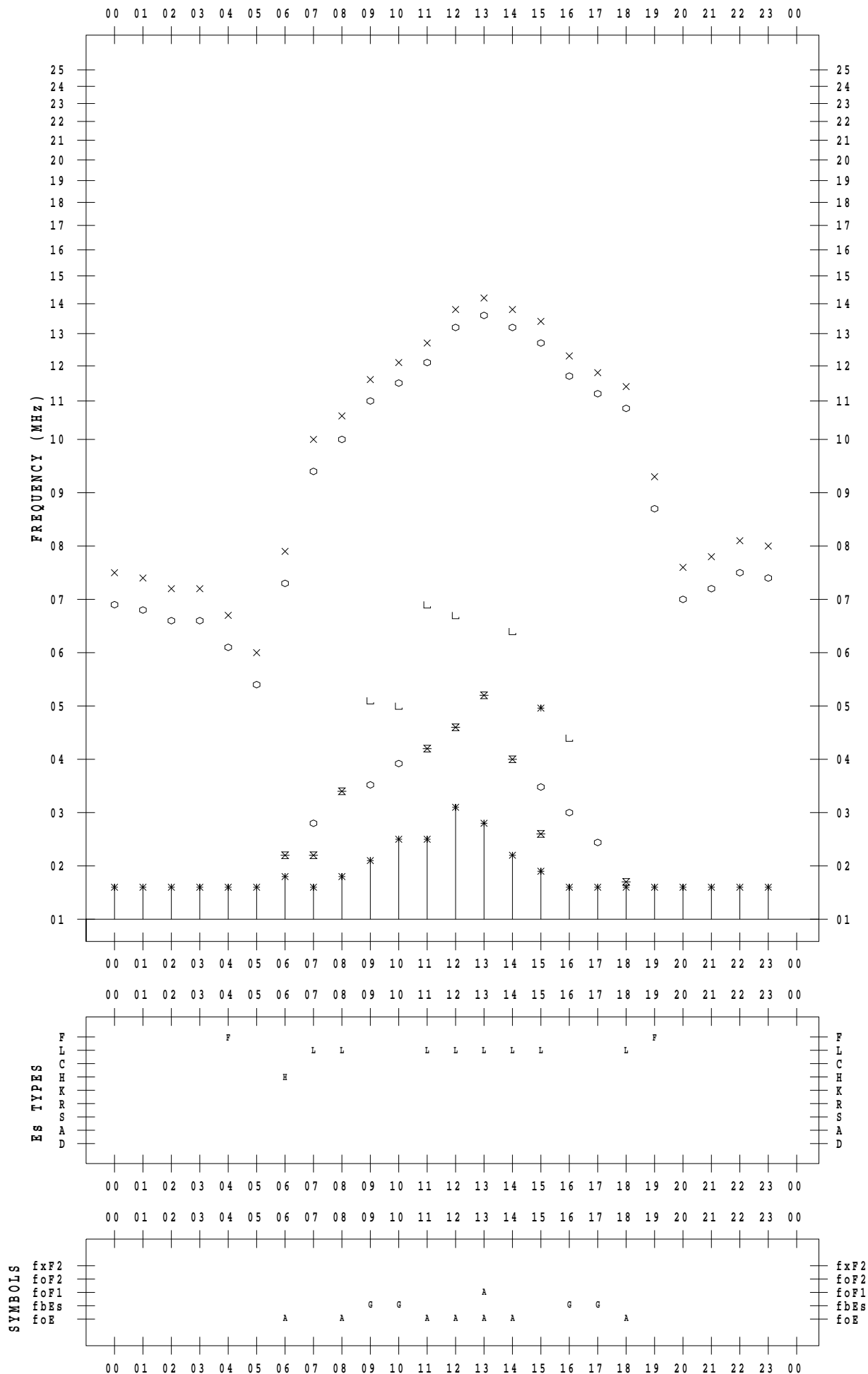
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/28

135 ° E MEAN TIME



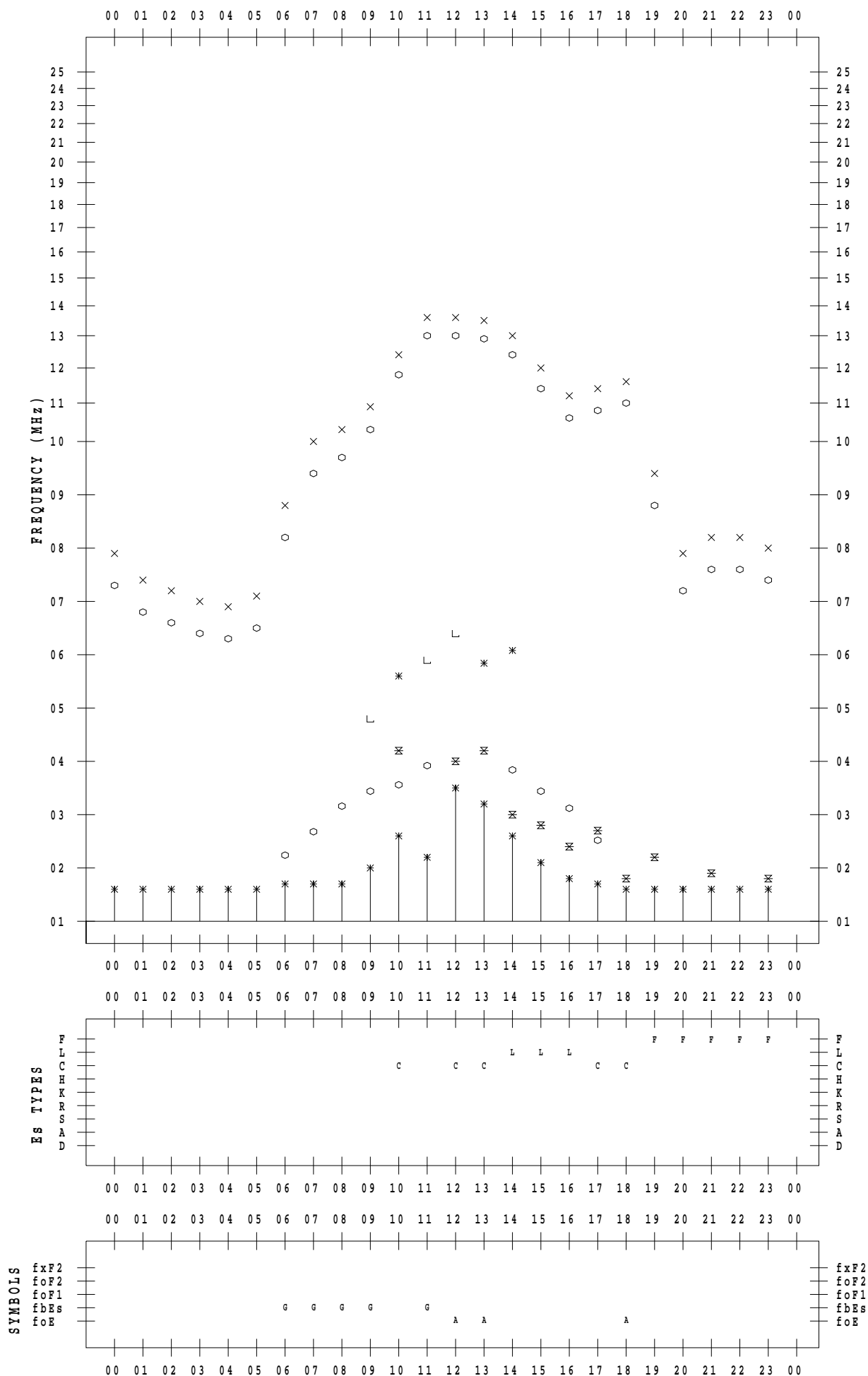
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023 / 3 / 29

135 ° E MEAN TIME





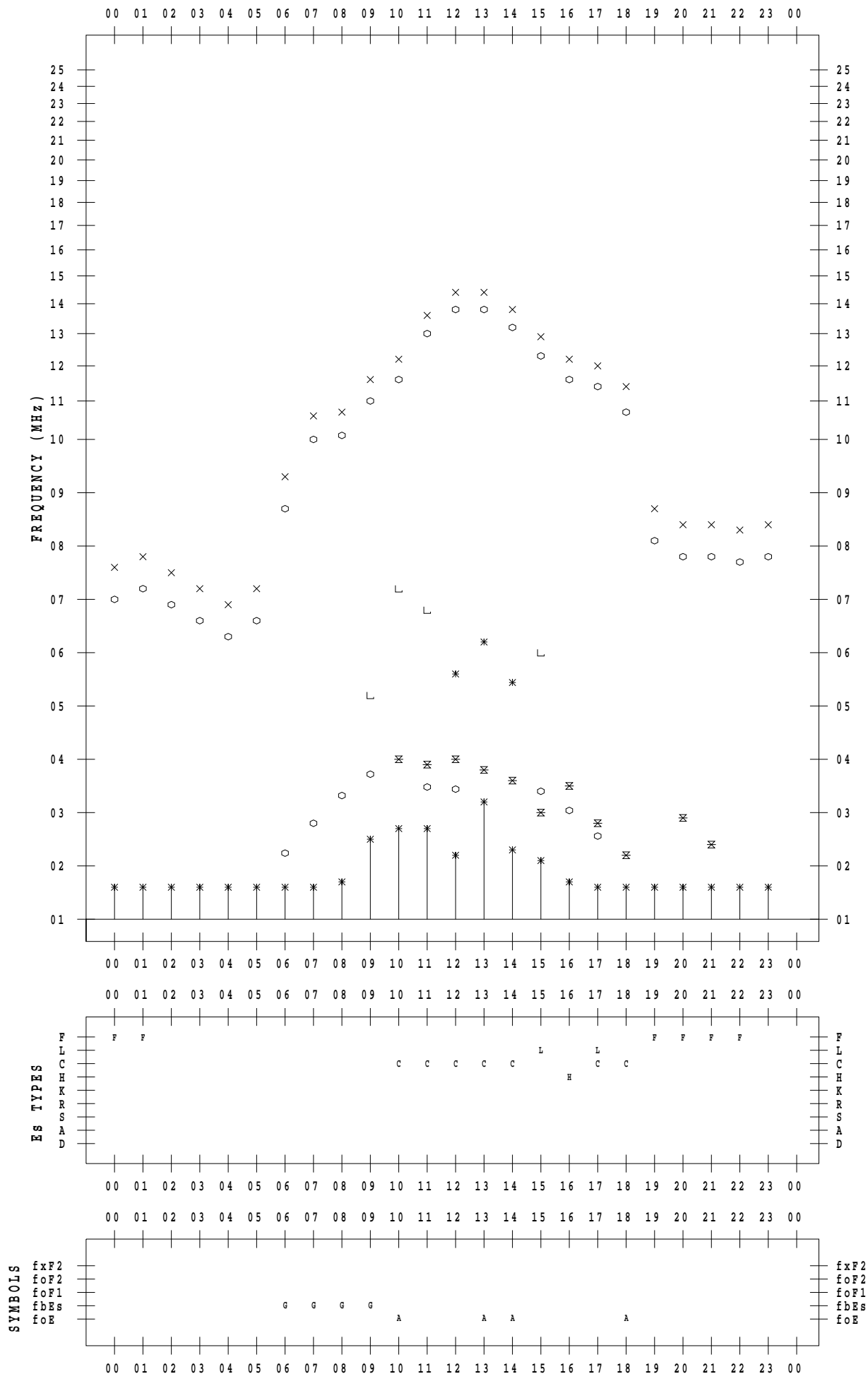
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023/ 3/30

135 ° E MEAN TIME



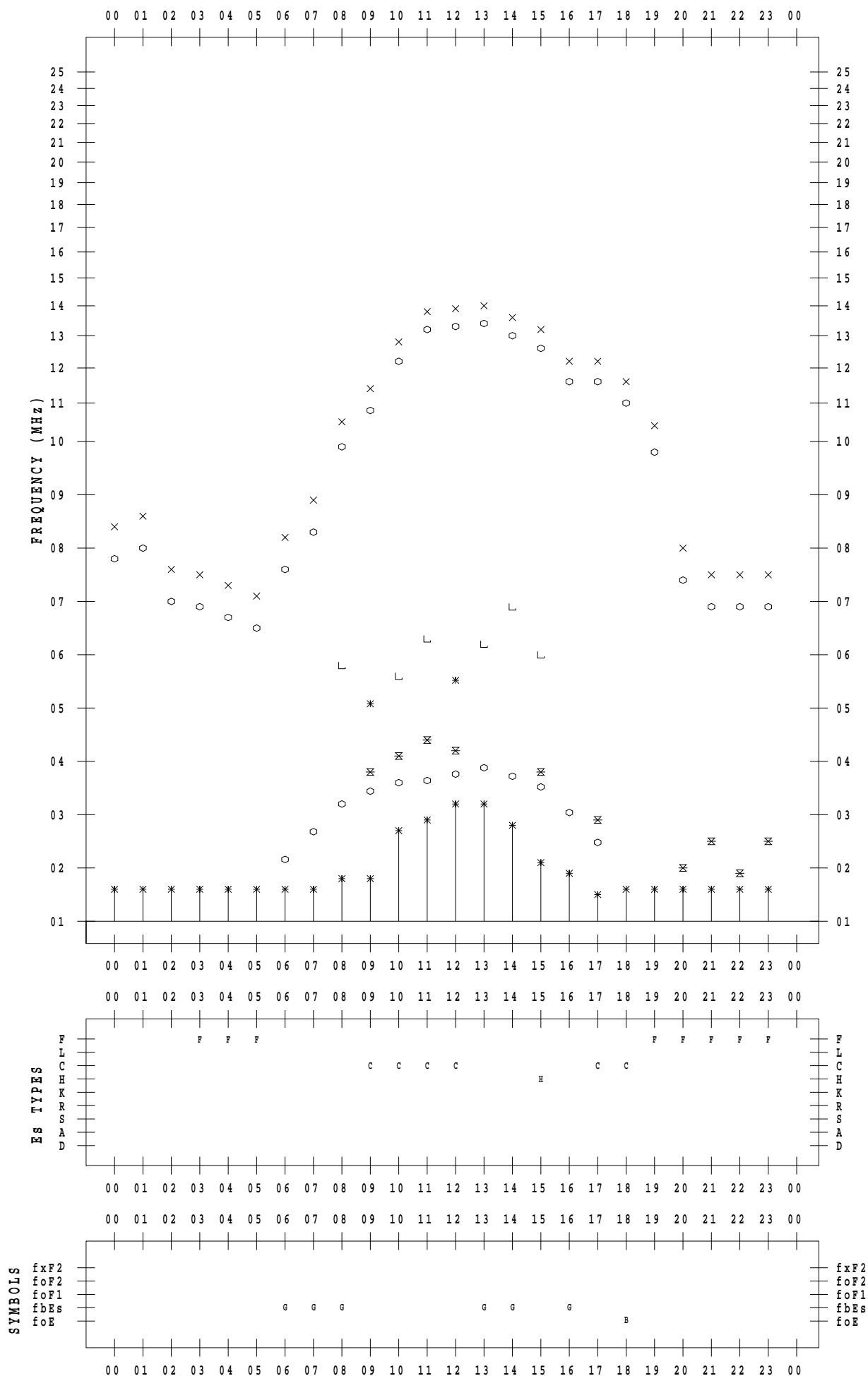
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Kokubunji

DATE : 2023 / 3 / 31

135 ° E MEAN TIME



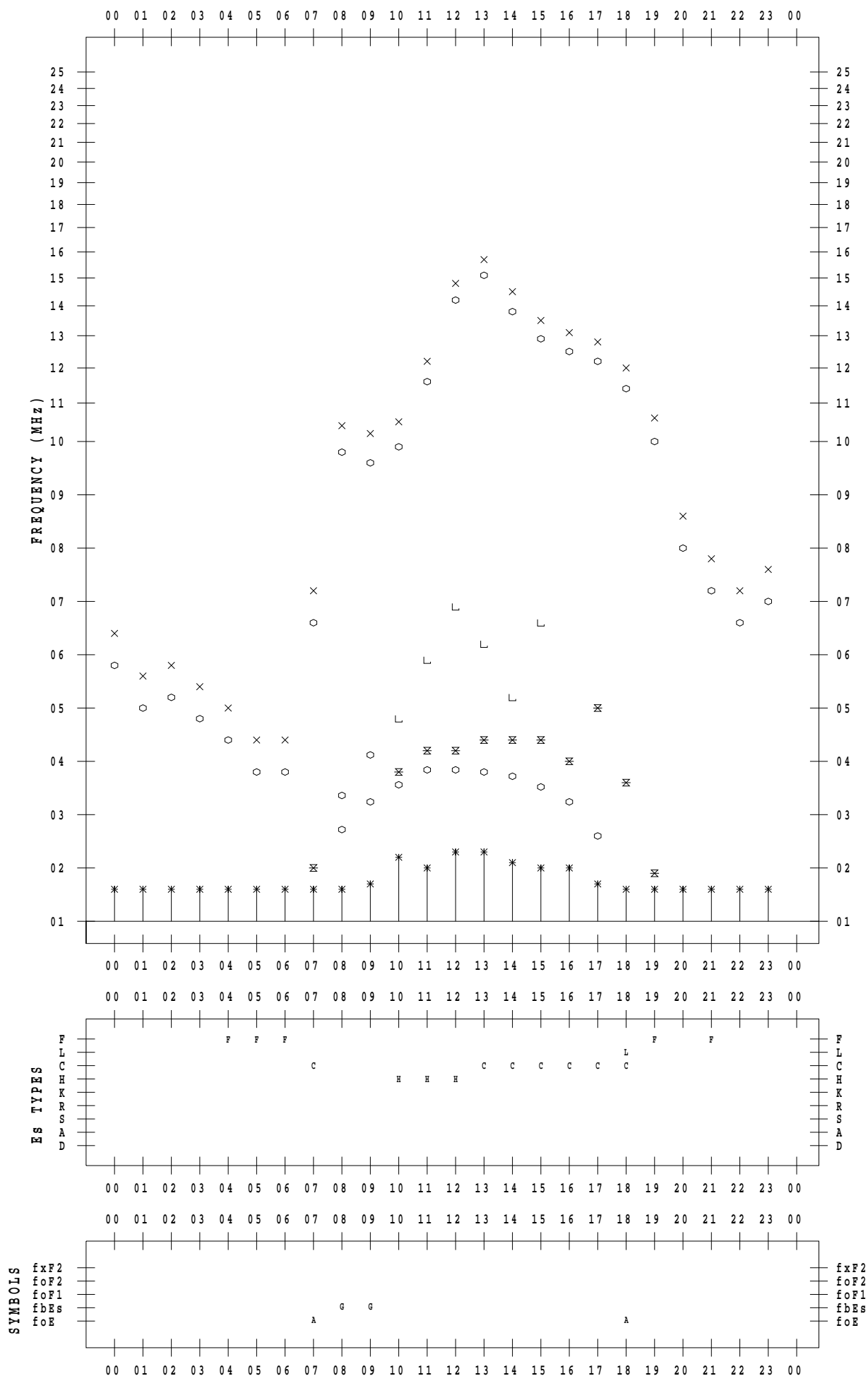
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 1

135 ° E MEAN TIME



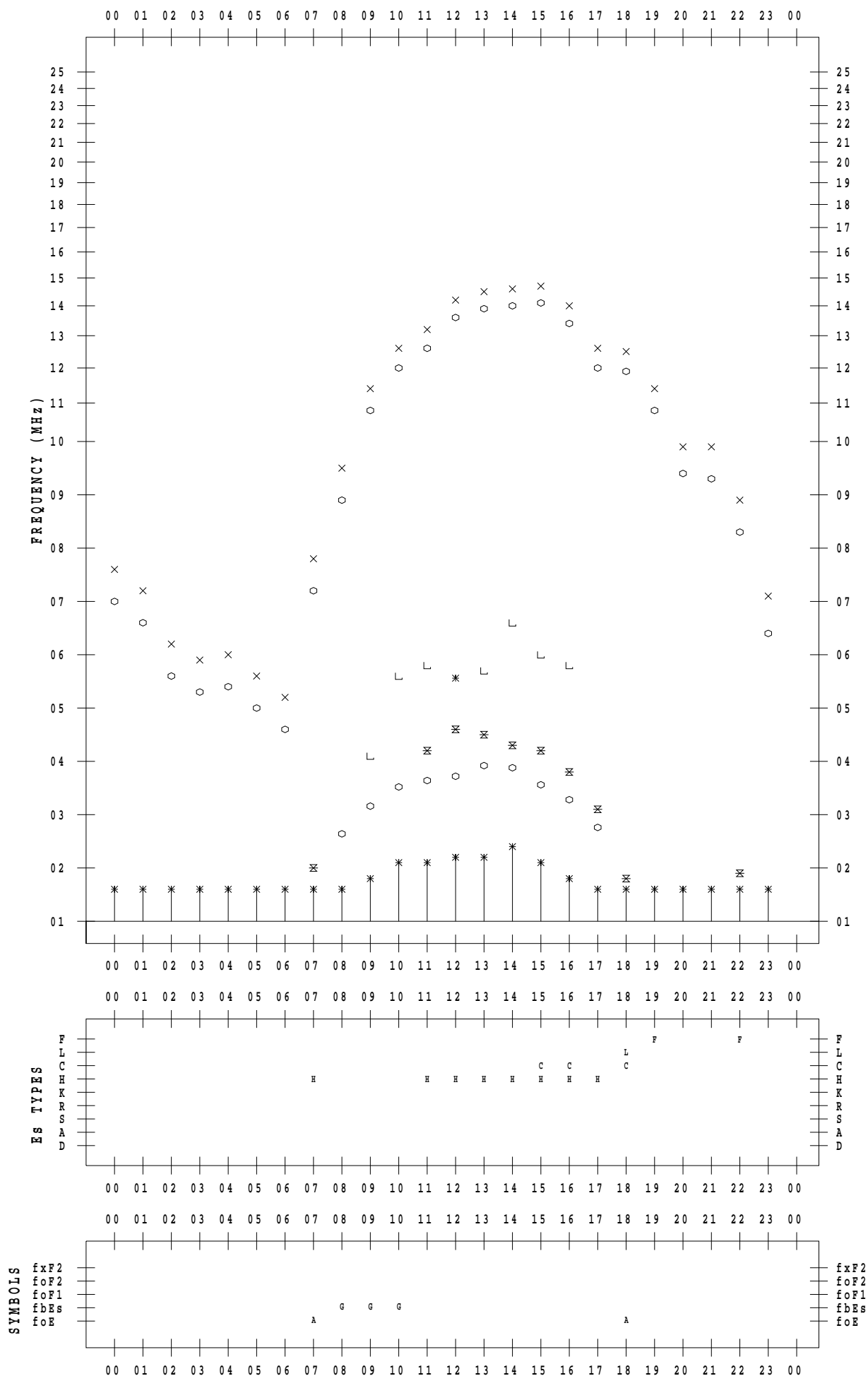
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 2

135 ° E MEAN TIME



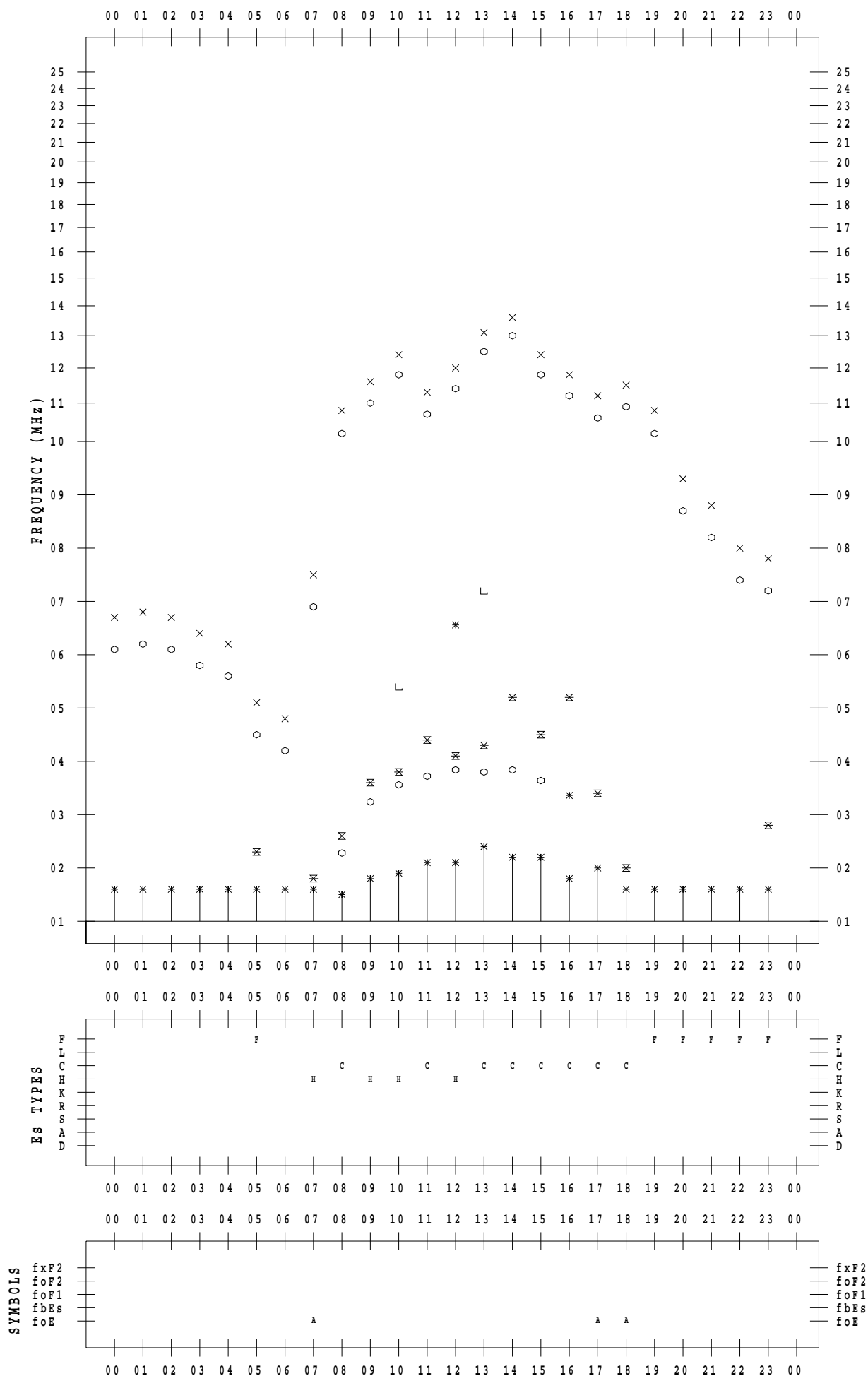
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 3

135 ° E MEAN TIME



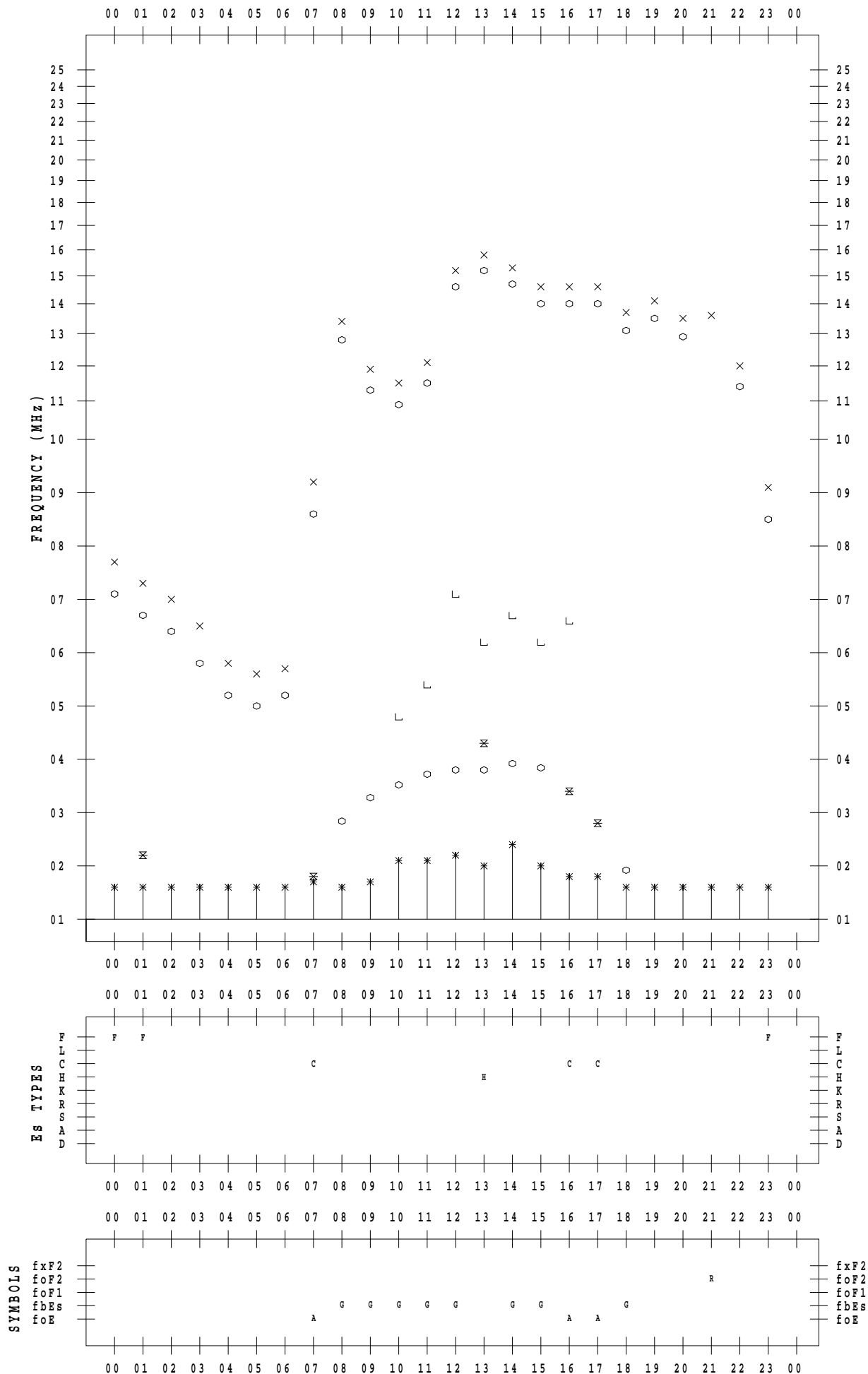
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 4

135 ° E MEAN TIME



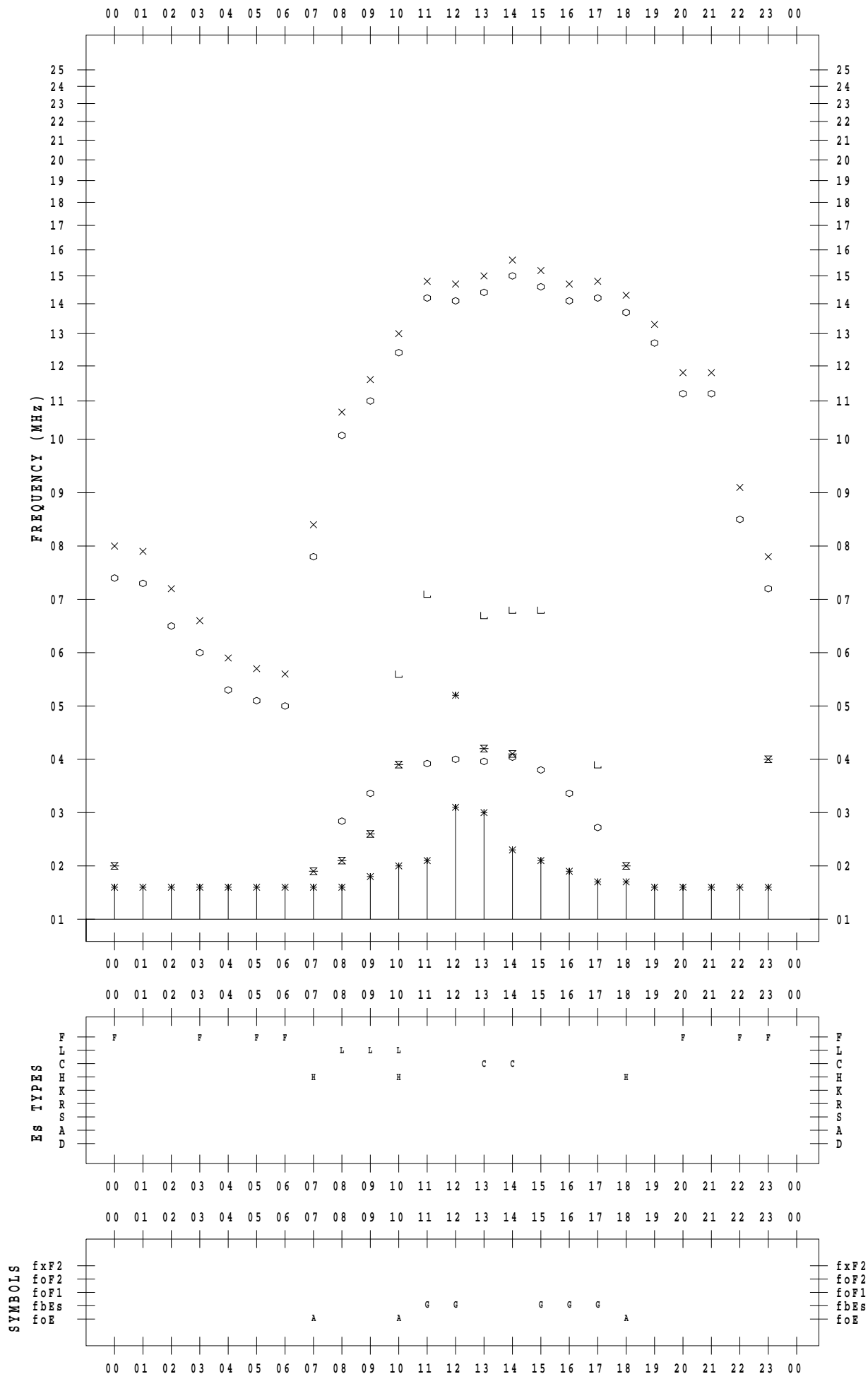
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 5

135 ° E MEAN TIME



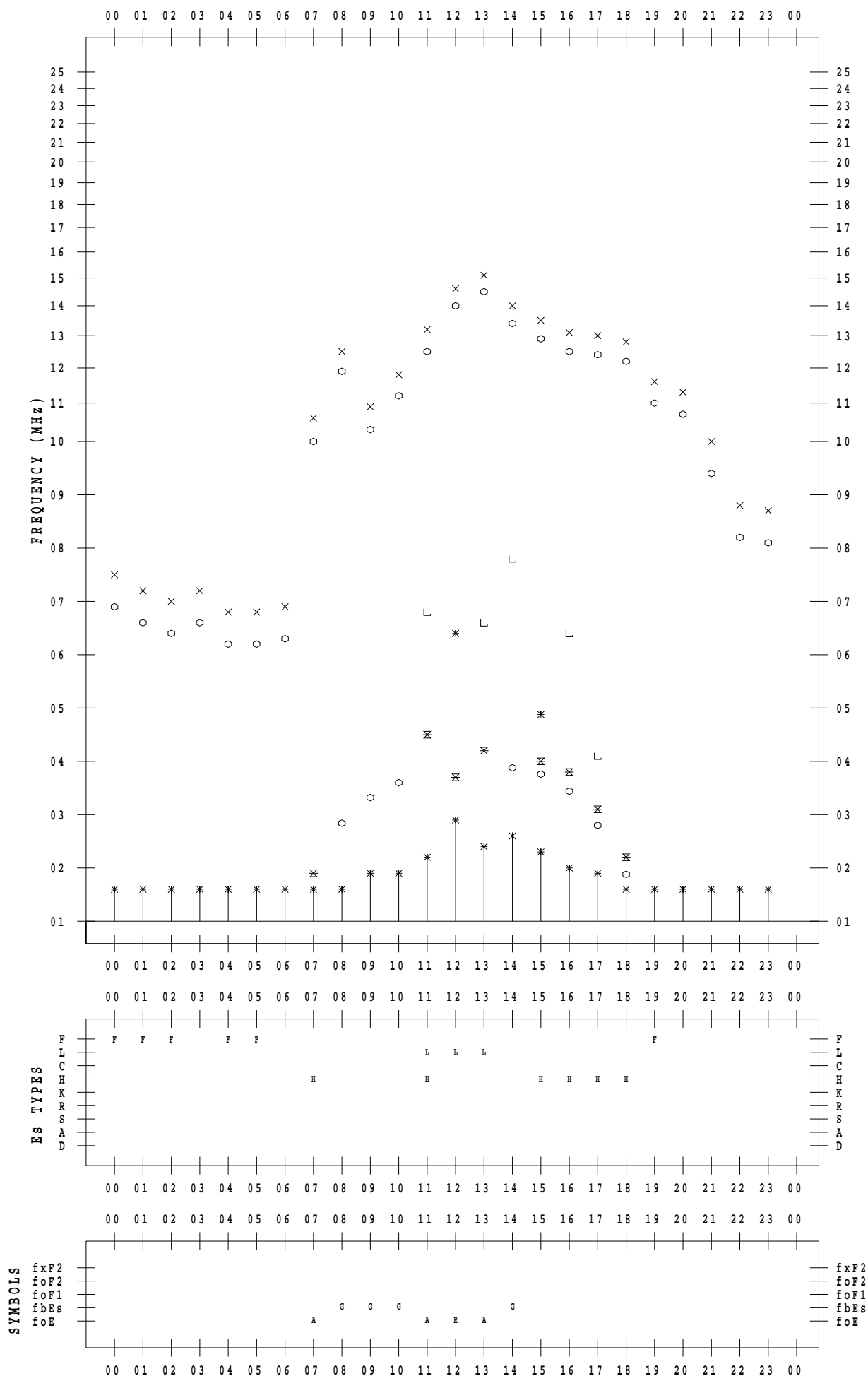
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 6

135 ° E MEAN TIME





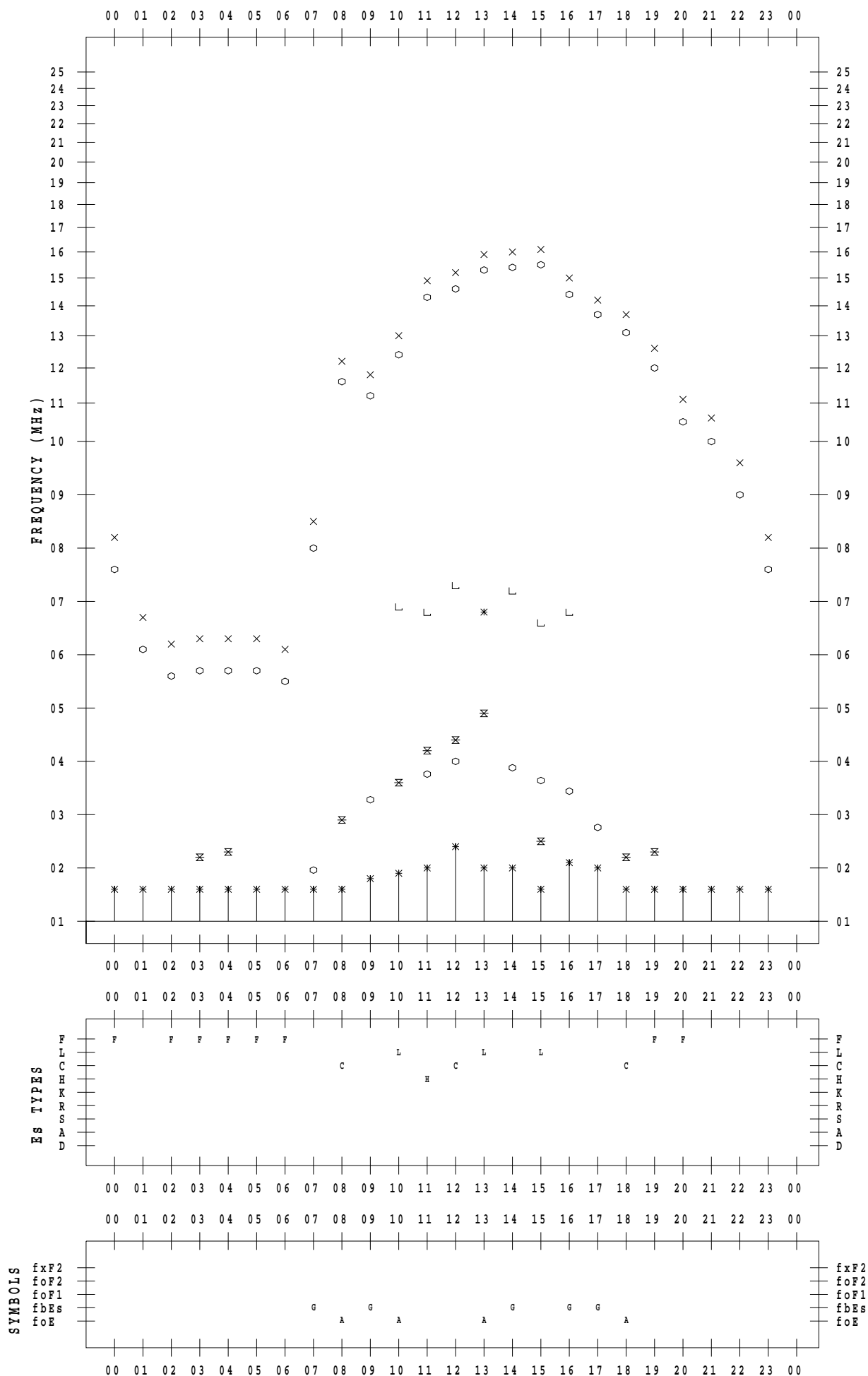
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 7

135 ° E MEAN TIME



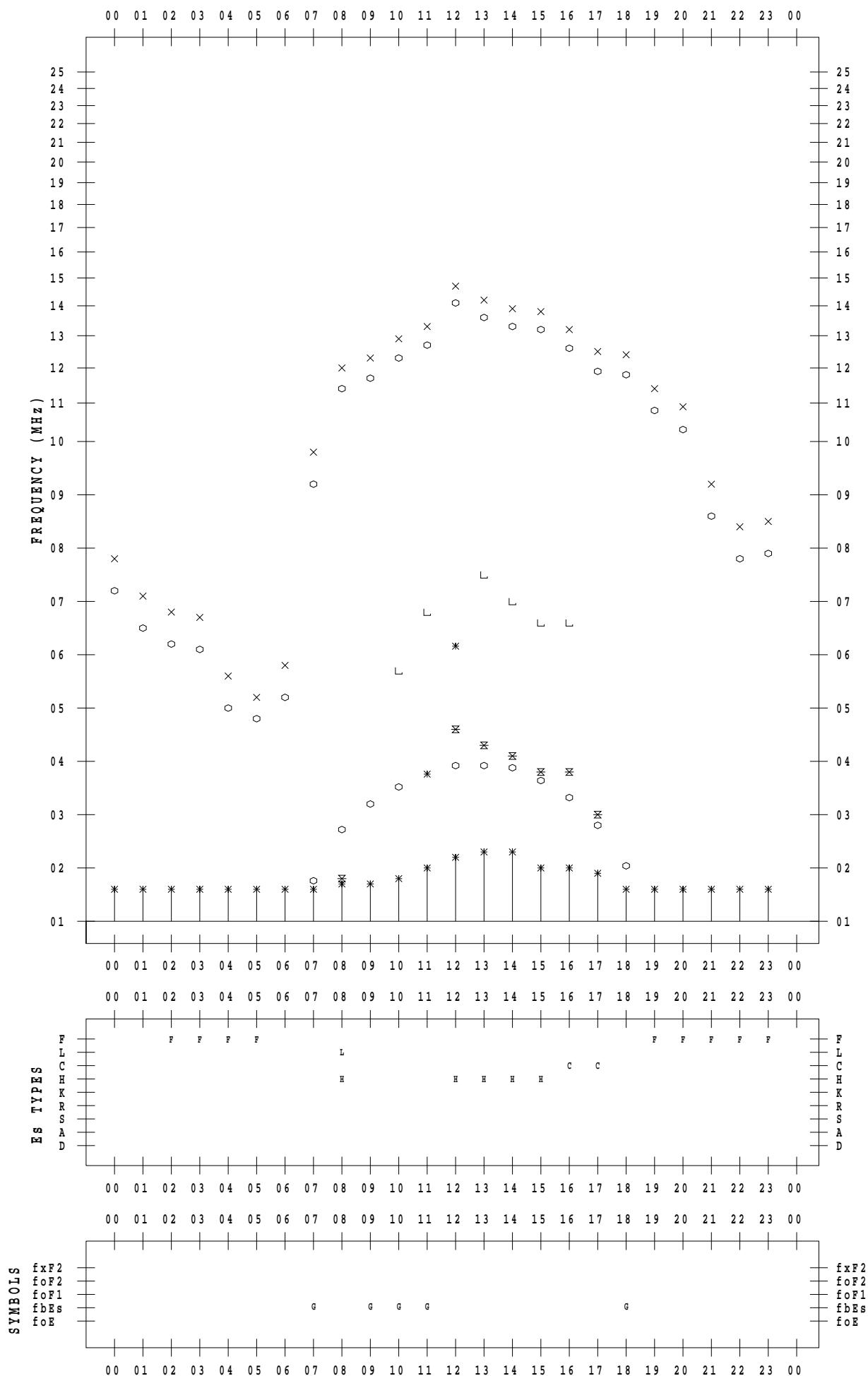
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 8

135 ° E MEAN TIME



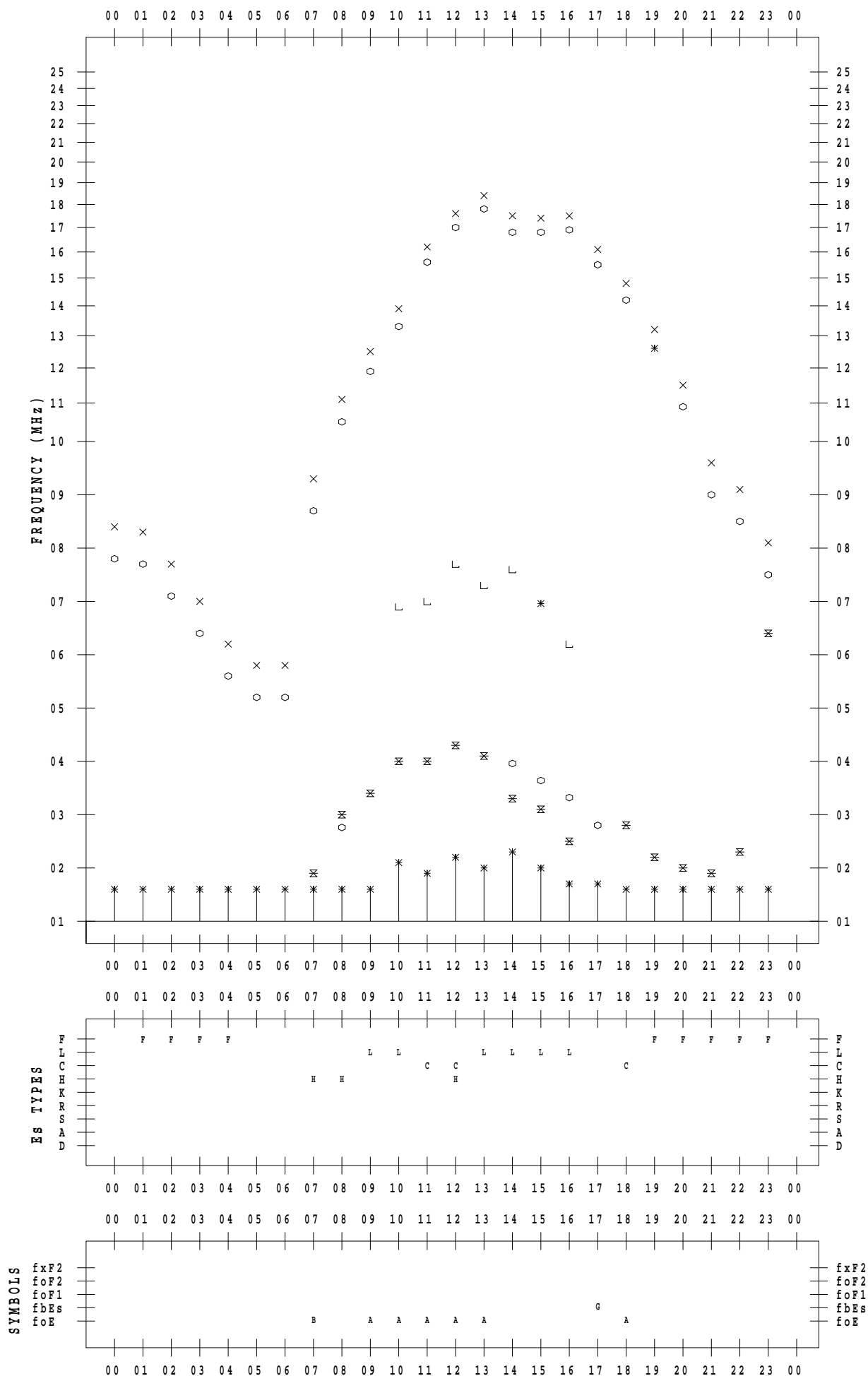
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 9

135 ° E MEAN TIME



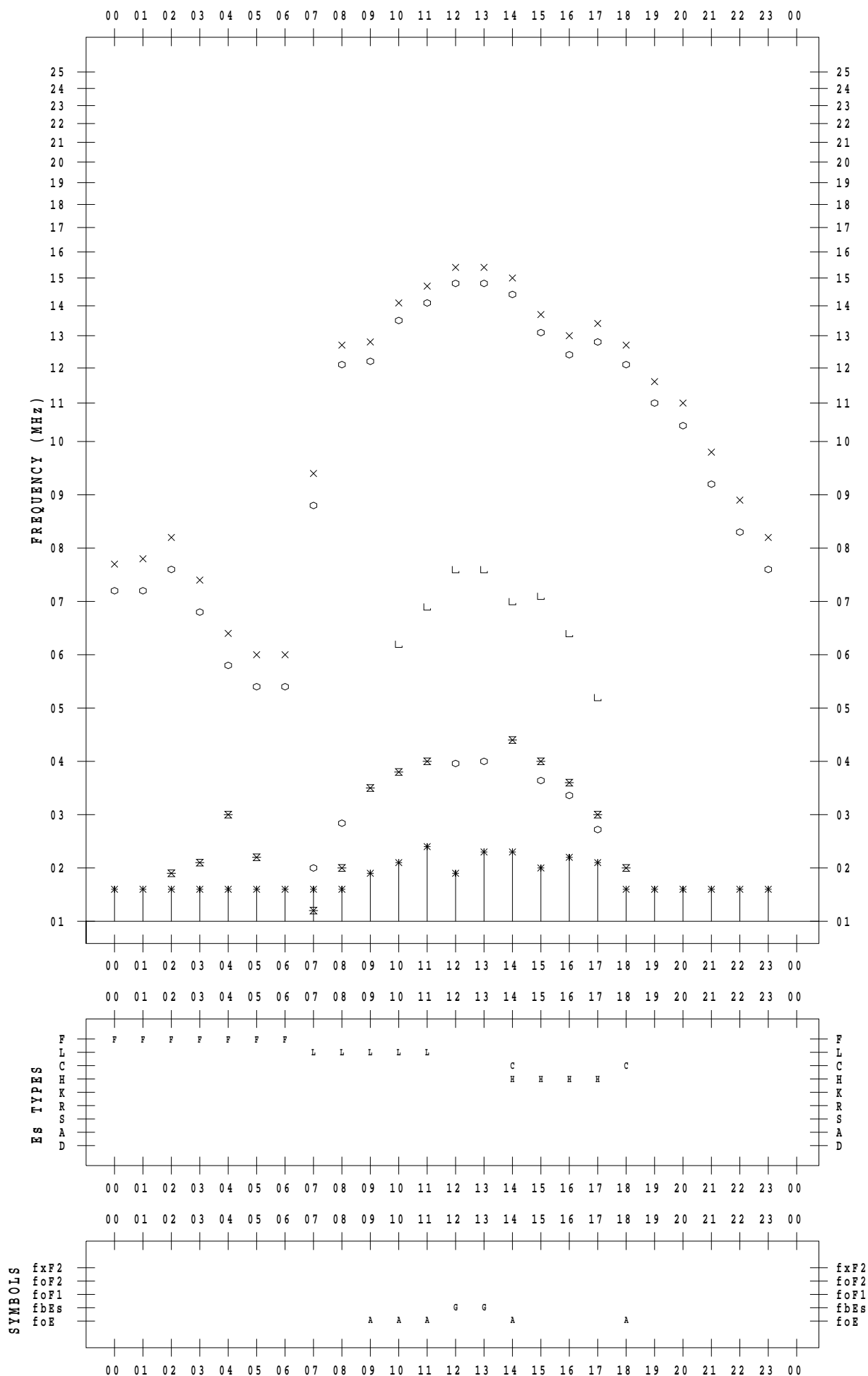
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023/ 3/10

135 ° E MEAN TIME



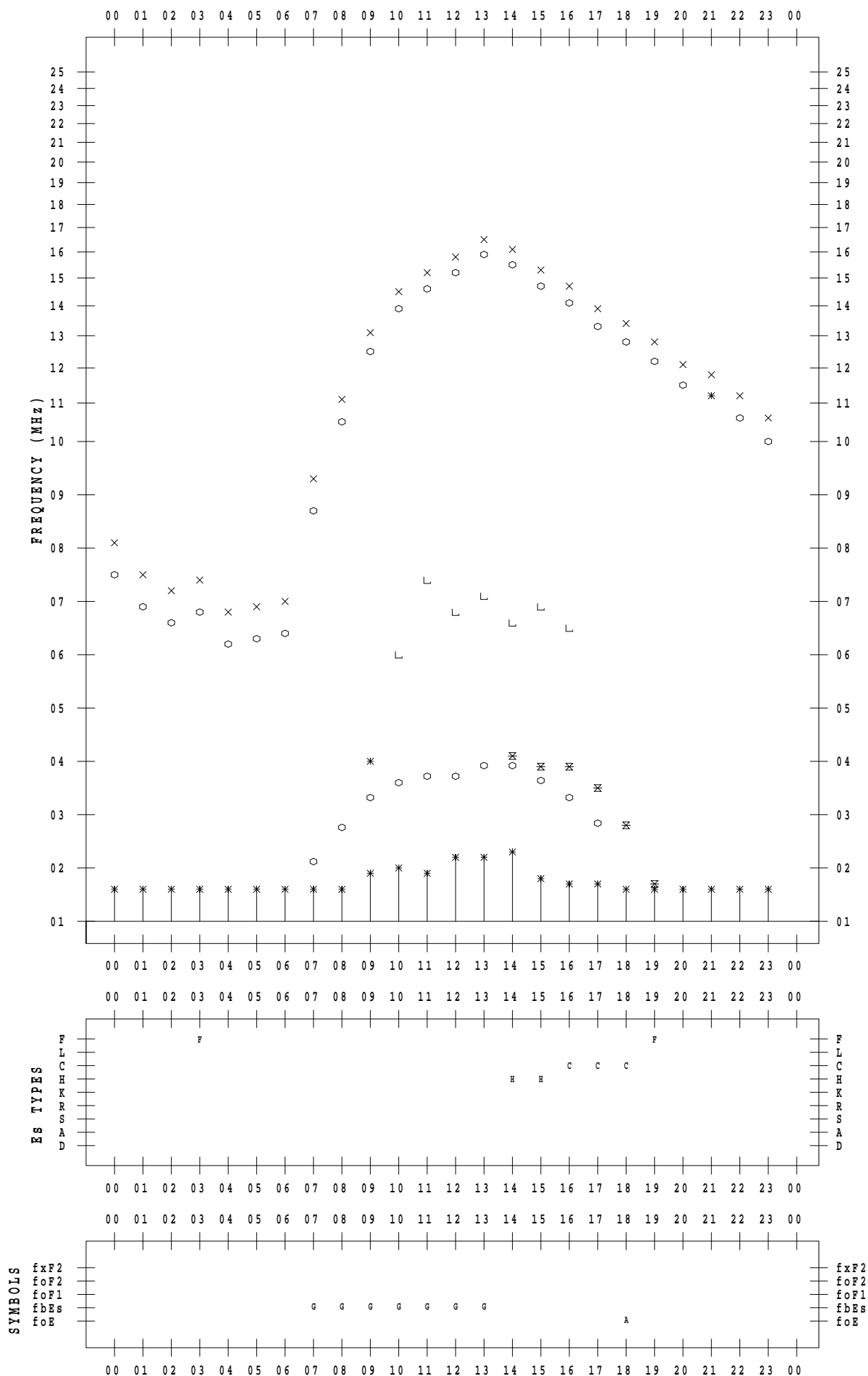
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 11

135 ° E MEAN TIME



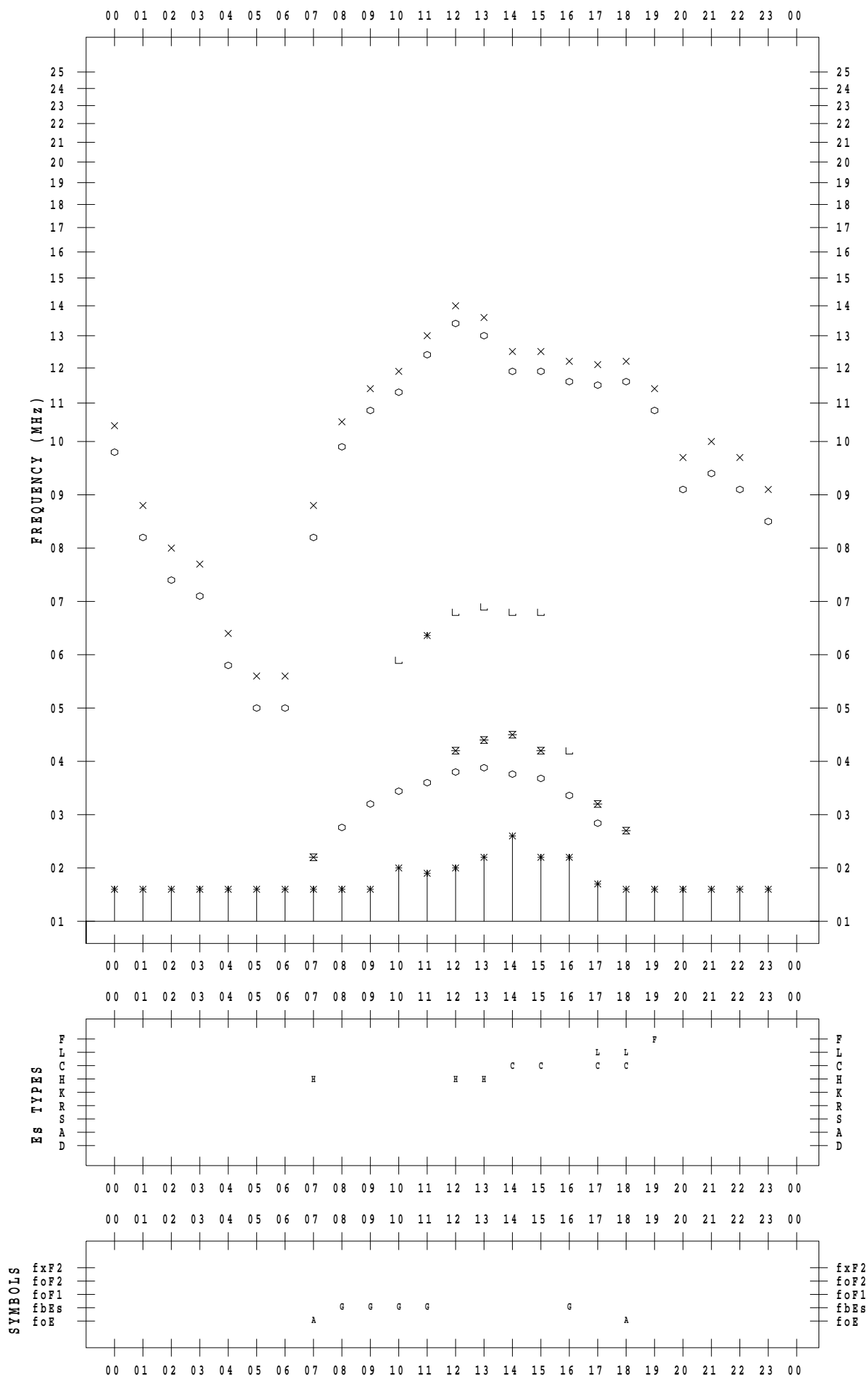
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023/ 3/12

135 ° E MEAN TIME



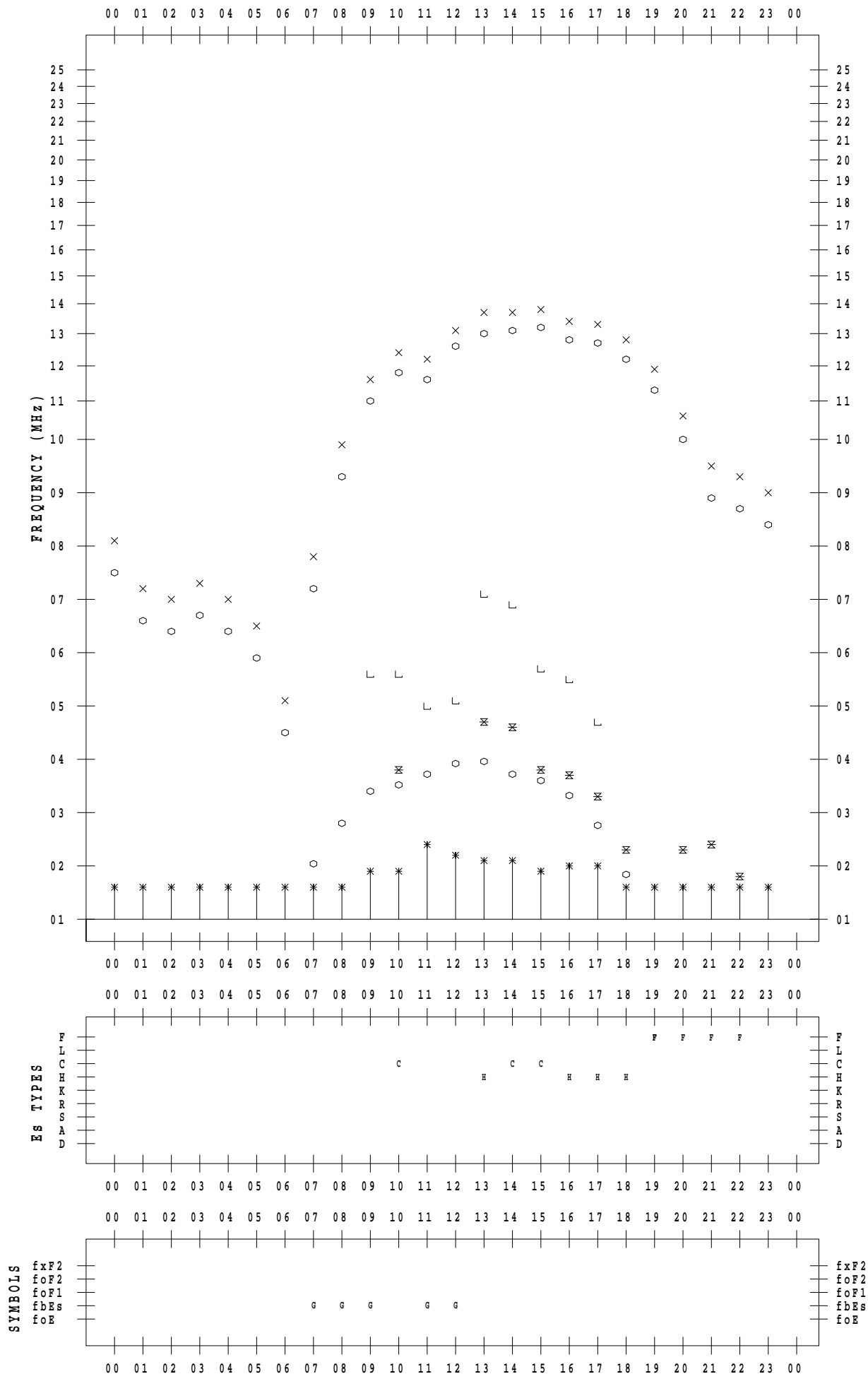
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 13

135 ° E MEAN TIME



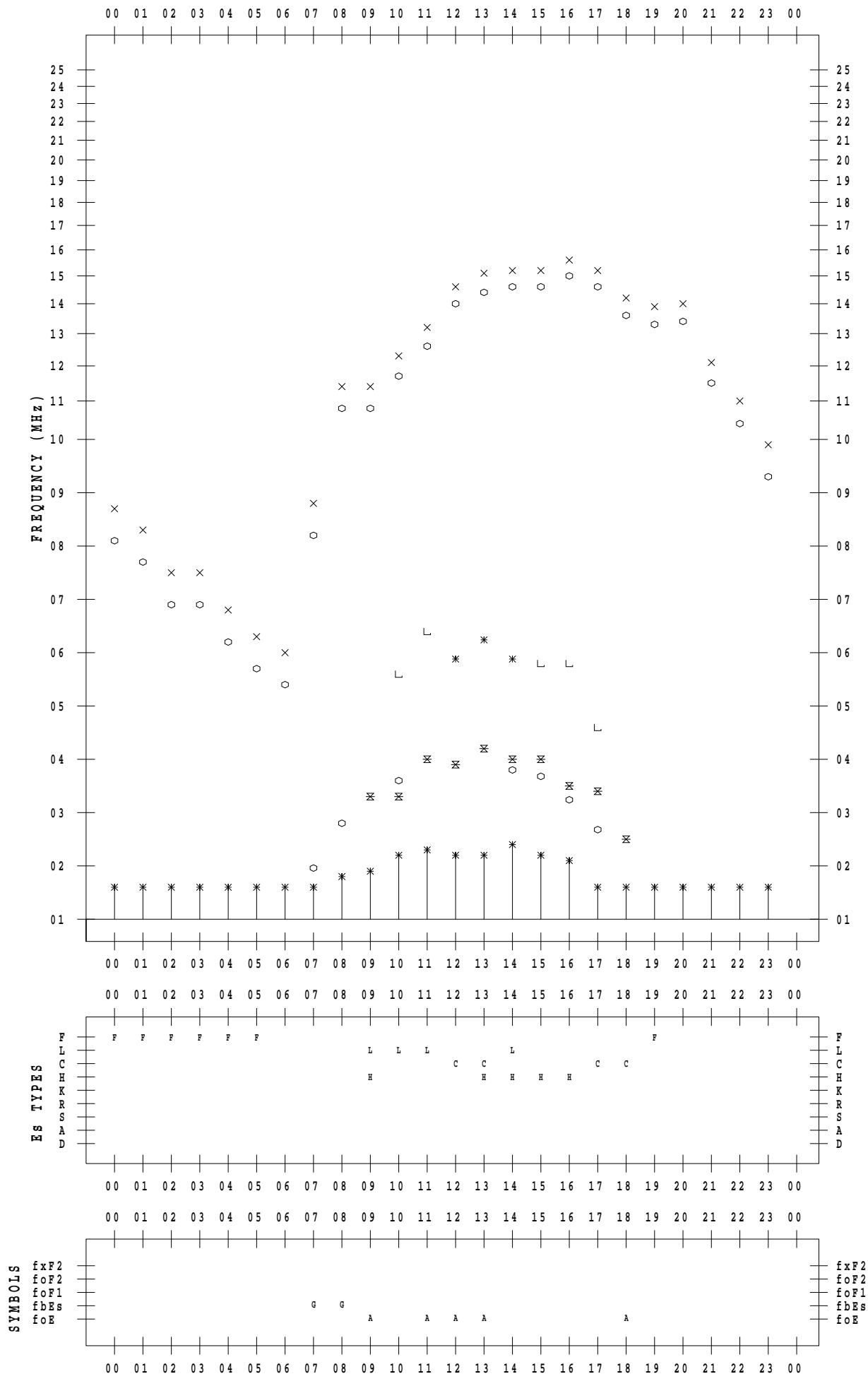
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SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023/ 3/14

135 ° E MEAN TIME





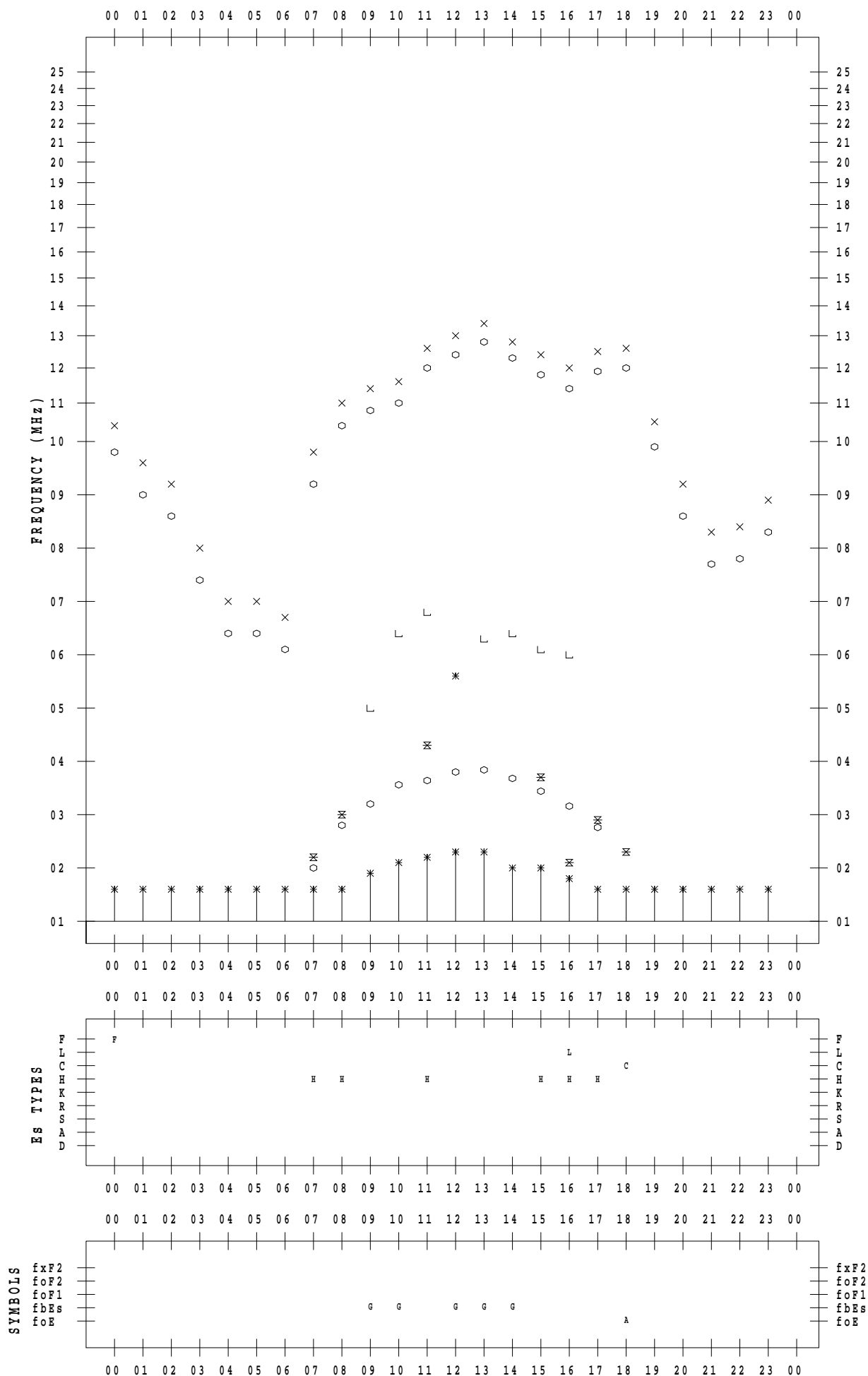
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SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 15

135 ° E MEAN TIME



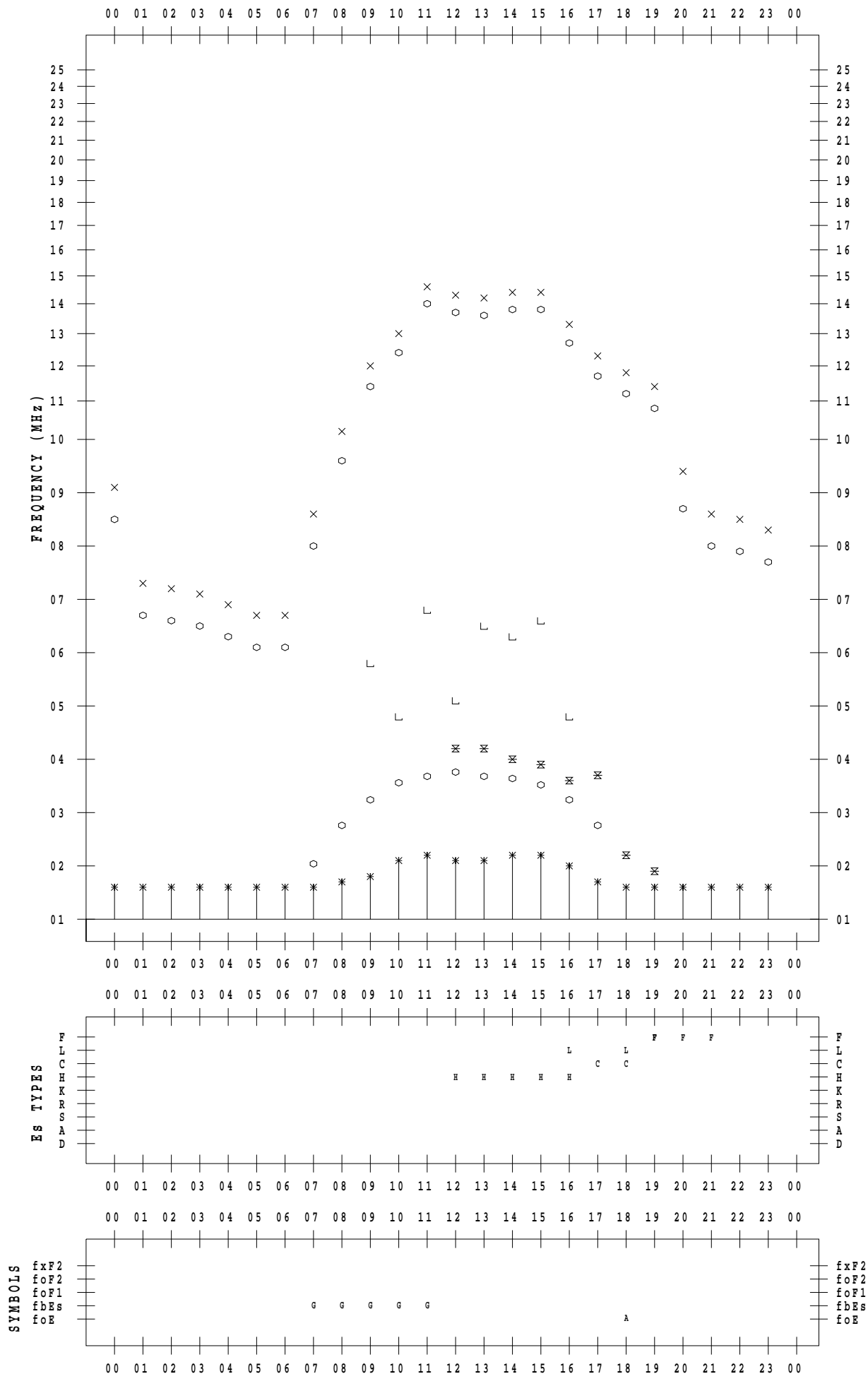
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023/ 3/16

135 ° E MEAN TIME



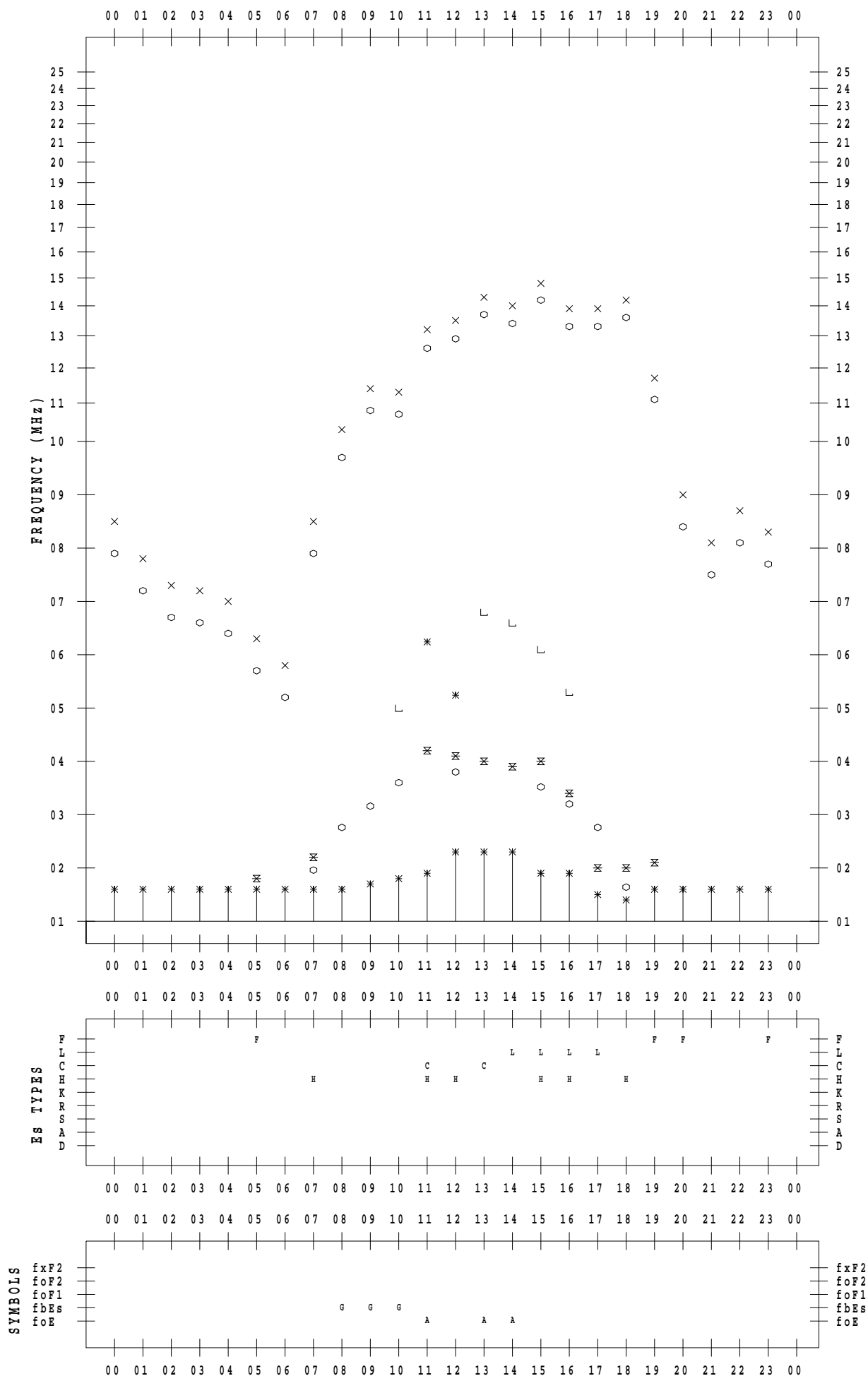
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 17

135 ° E MEAN TIME



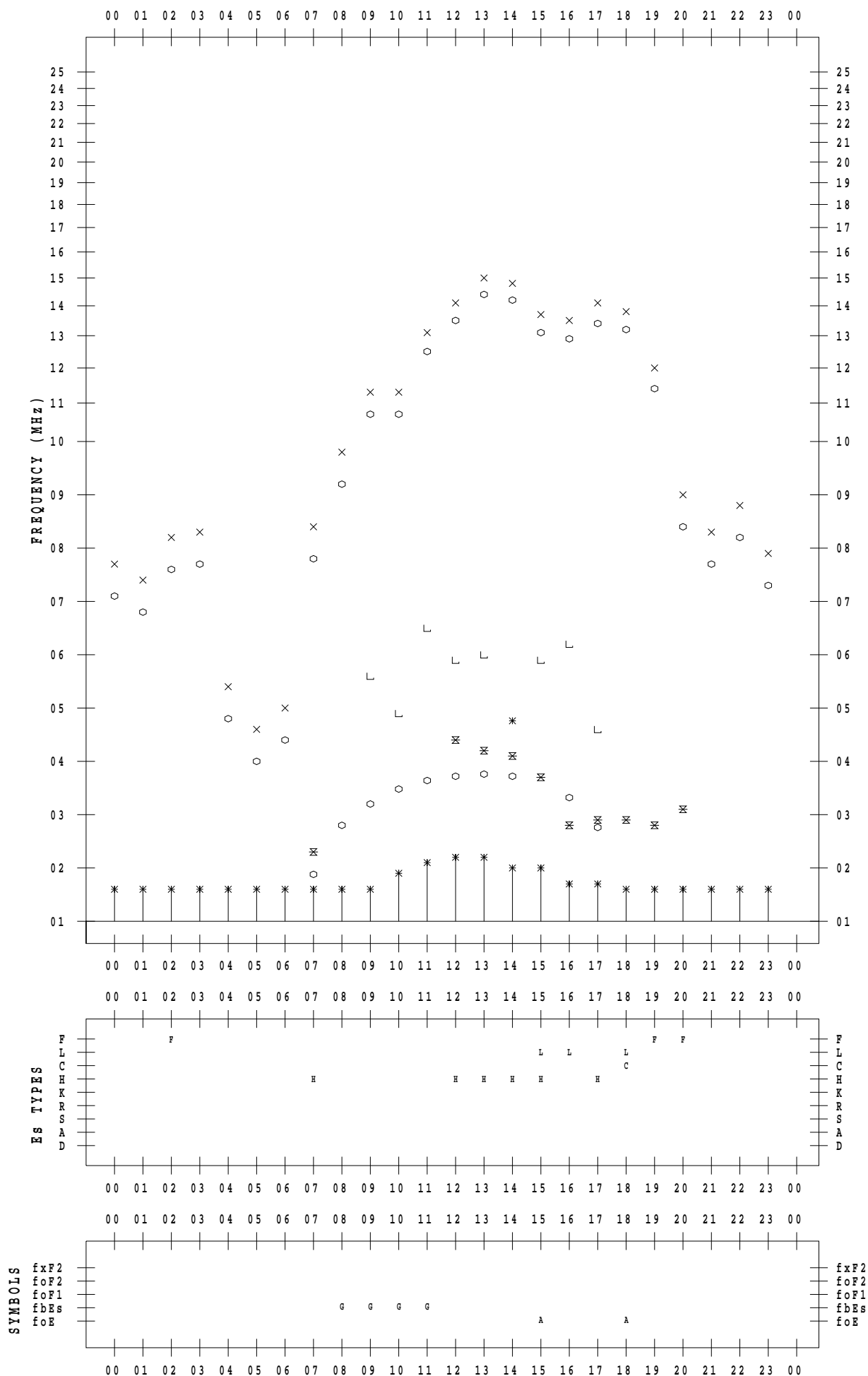
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023/ 3/18

135 ° E MEAN TIME



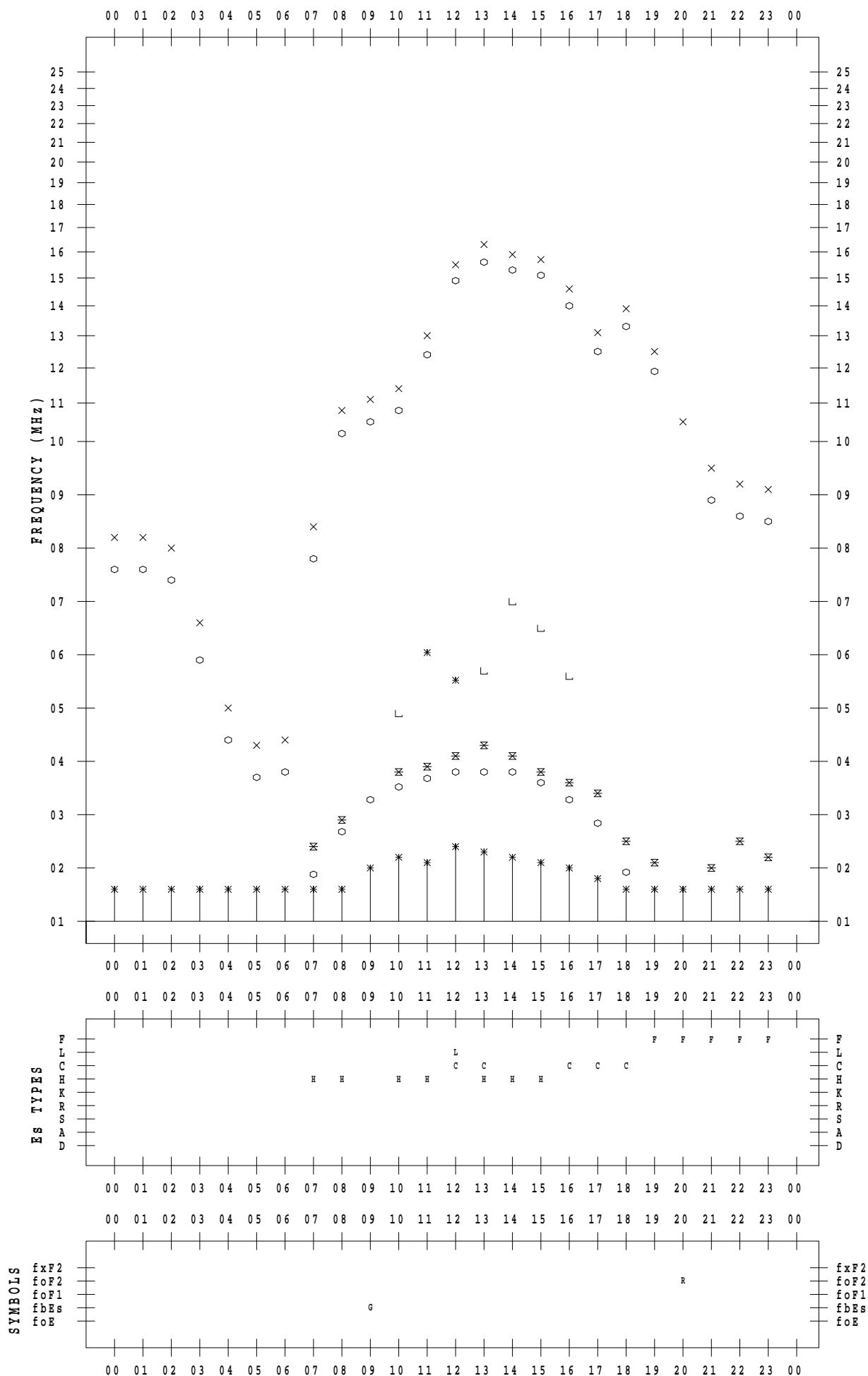
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 19

135 ° E MEAN TIME



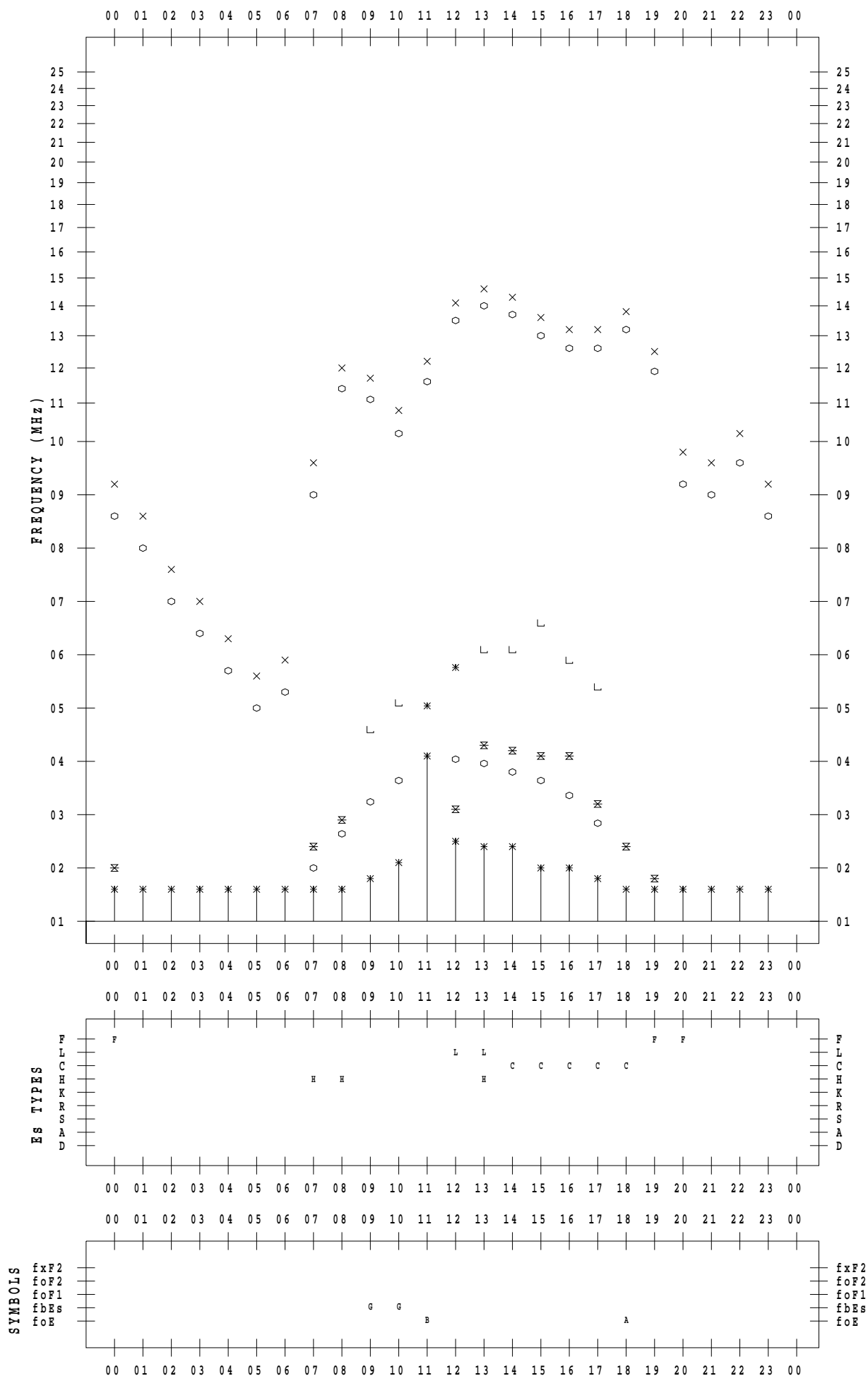
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 20

135 ° E MEAN TIME



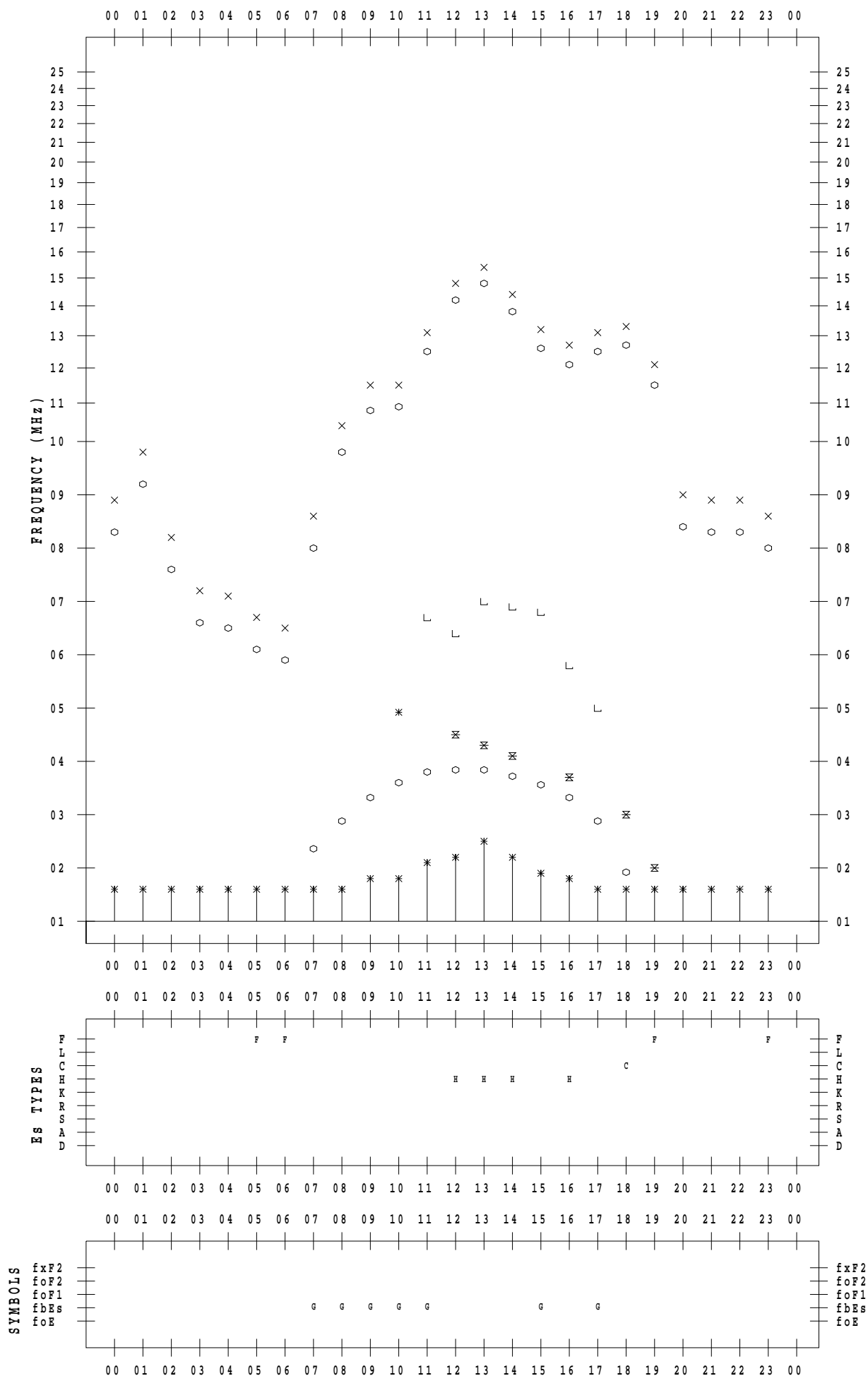
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SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 21

135 ° E MEAN TIME



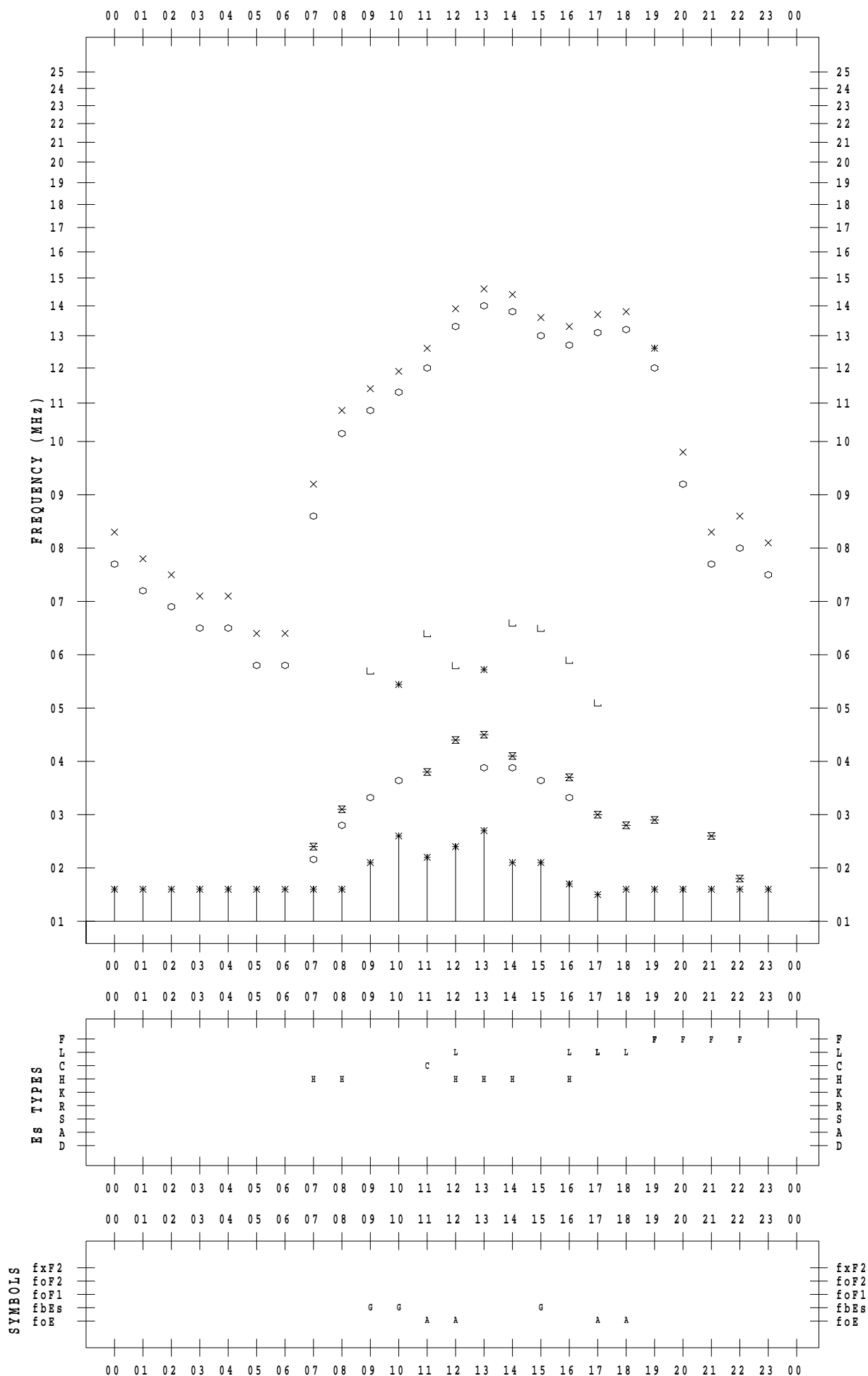
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 22

135 ° E MEAN TIME





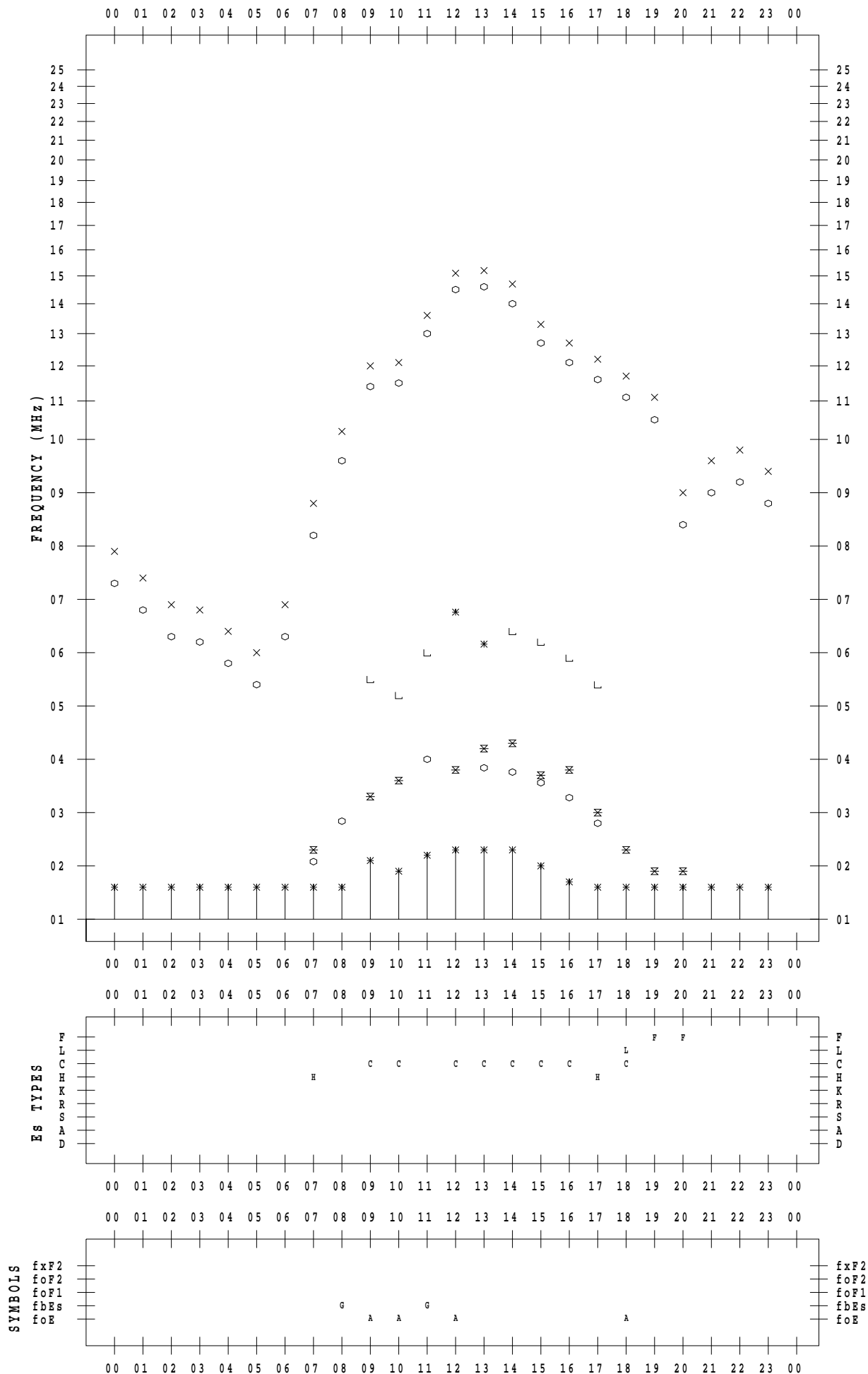
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 23

135 ° E MEAN TIME



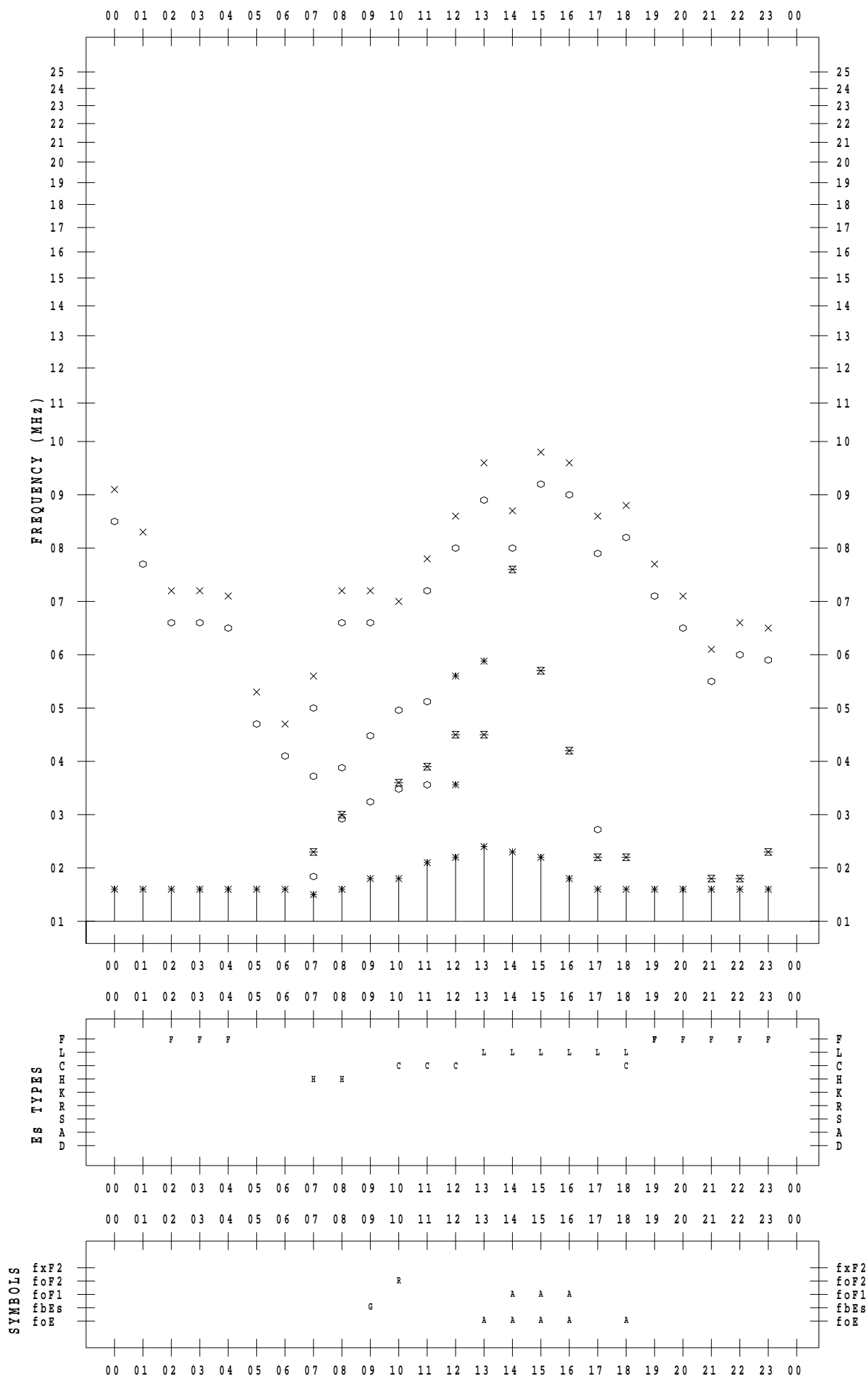
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 24

135 ° E MEAN TIME



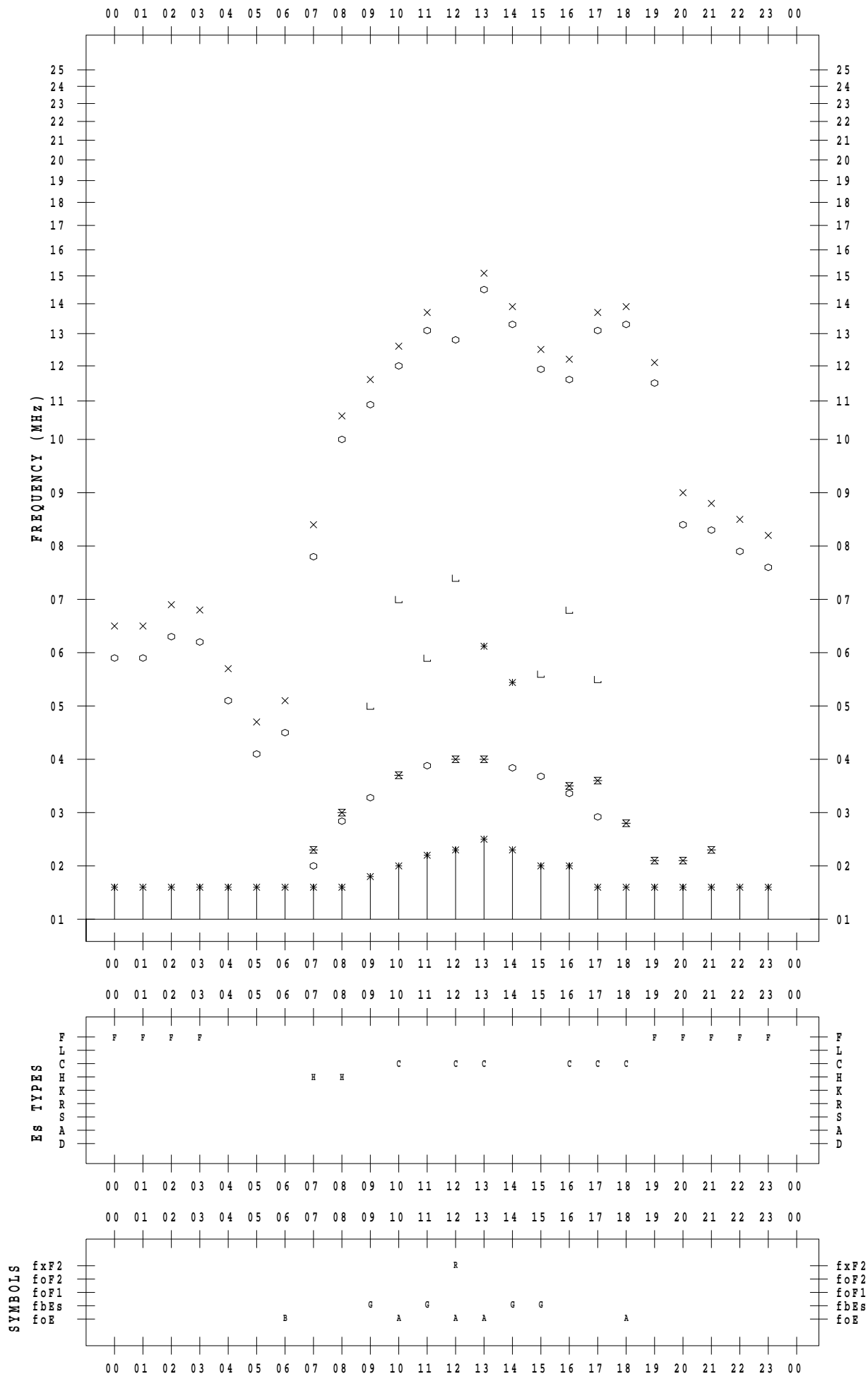
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 25

135 ° E MEAN TIME



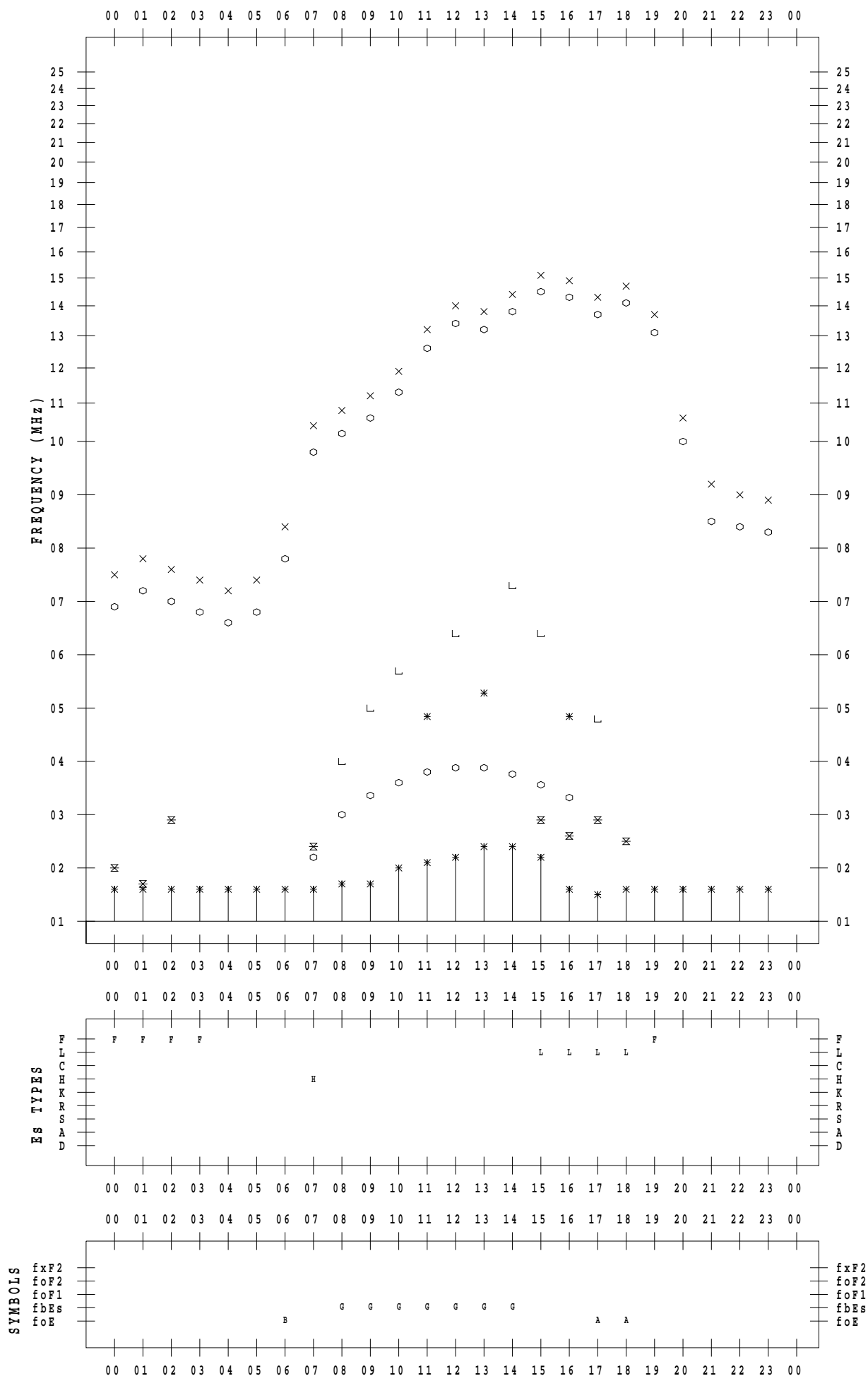
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SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 26

135 ° E MEAN TIME



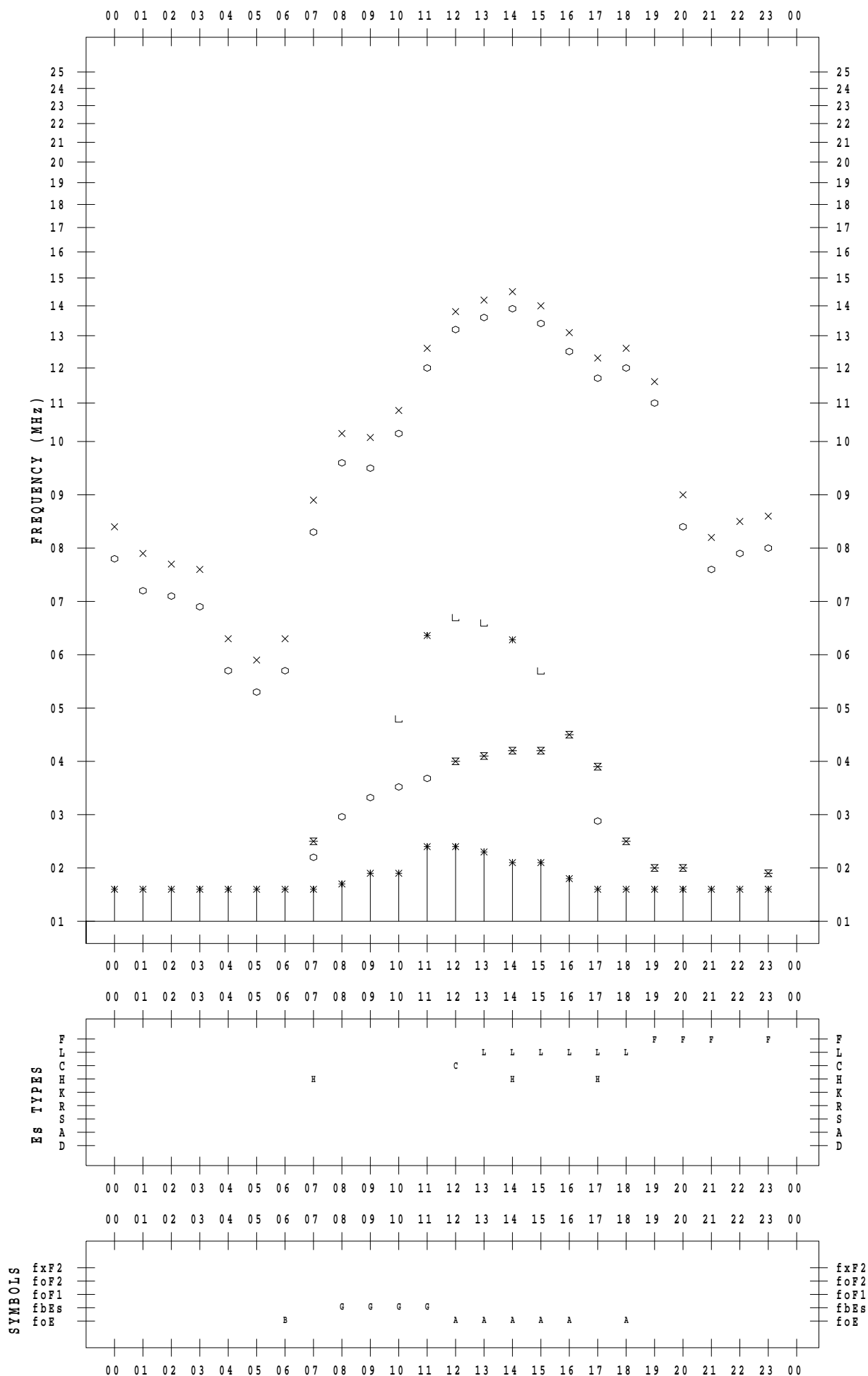
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023/ 3/27

135 ° E MEAN TIME



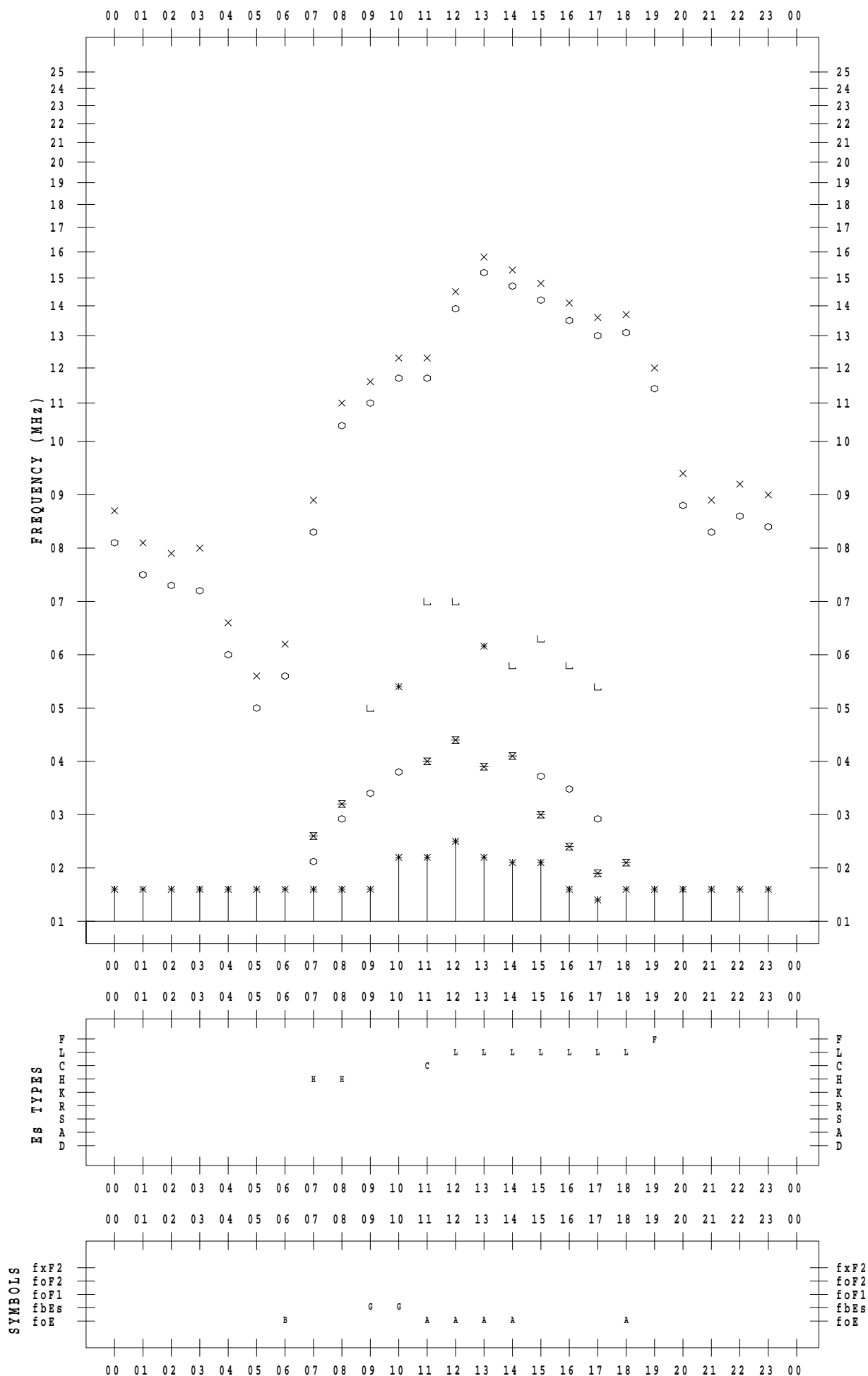
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SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 28

135 ° E MEAN TIME



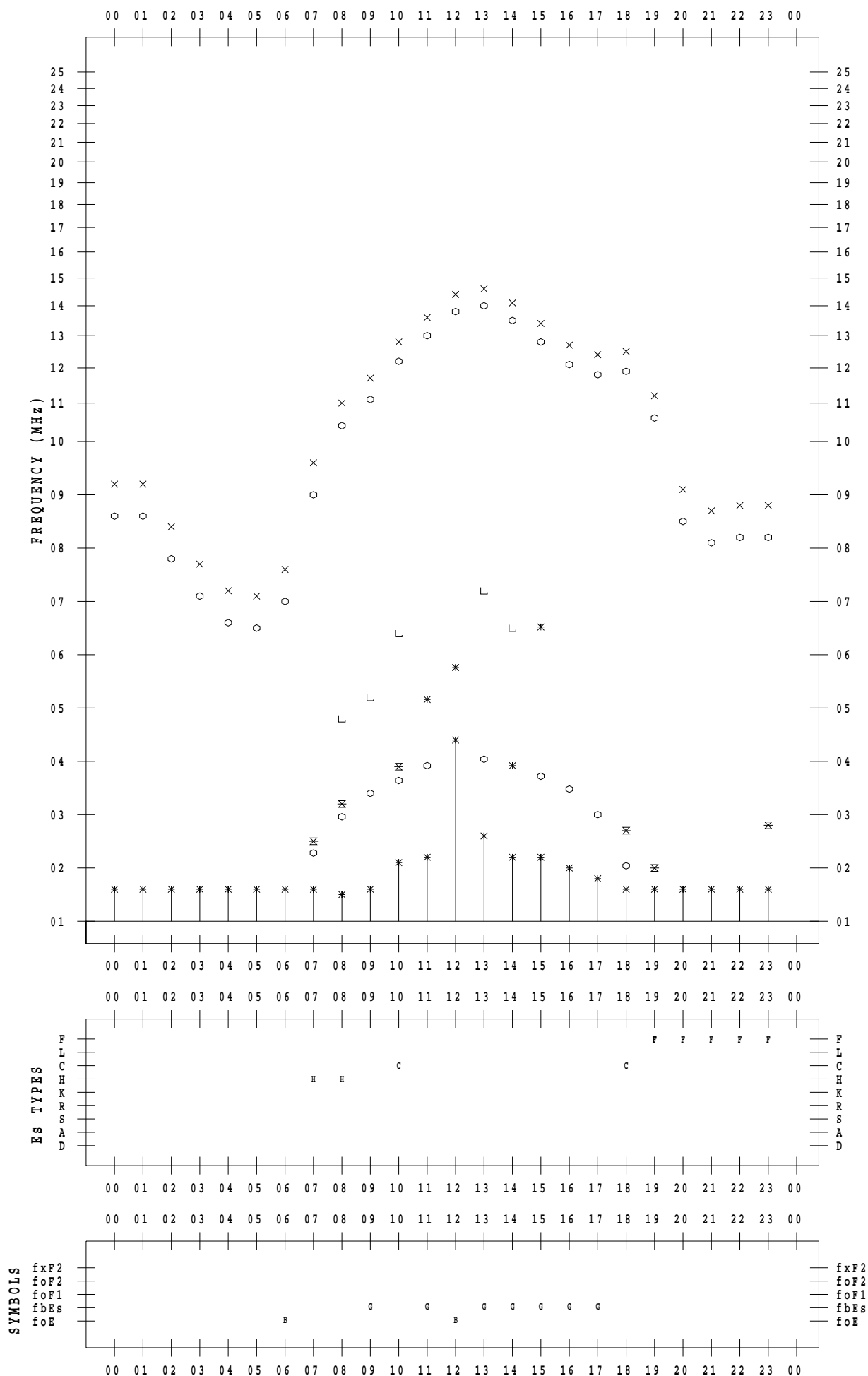
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SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 29

135 ° E MEAN TIME



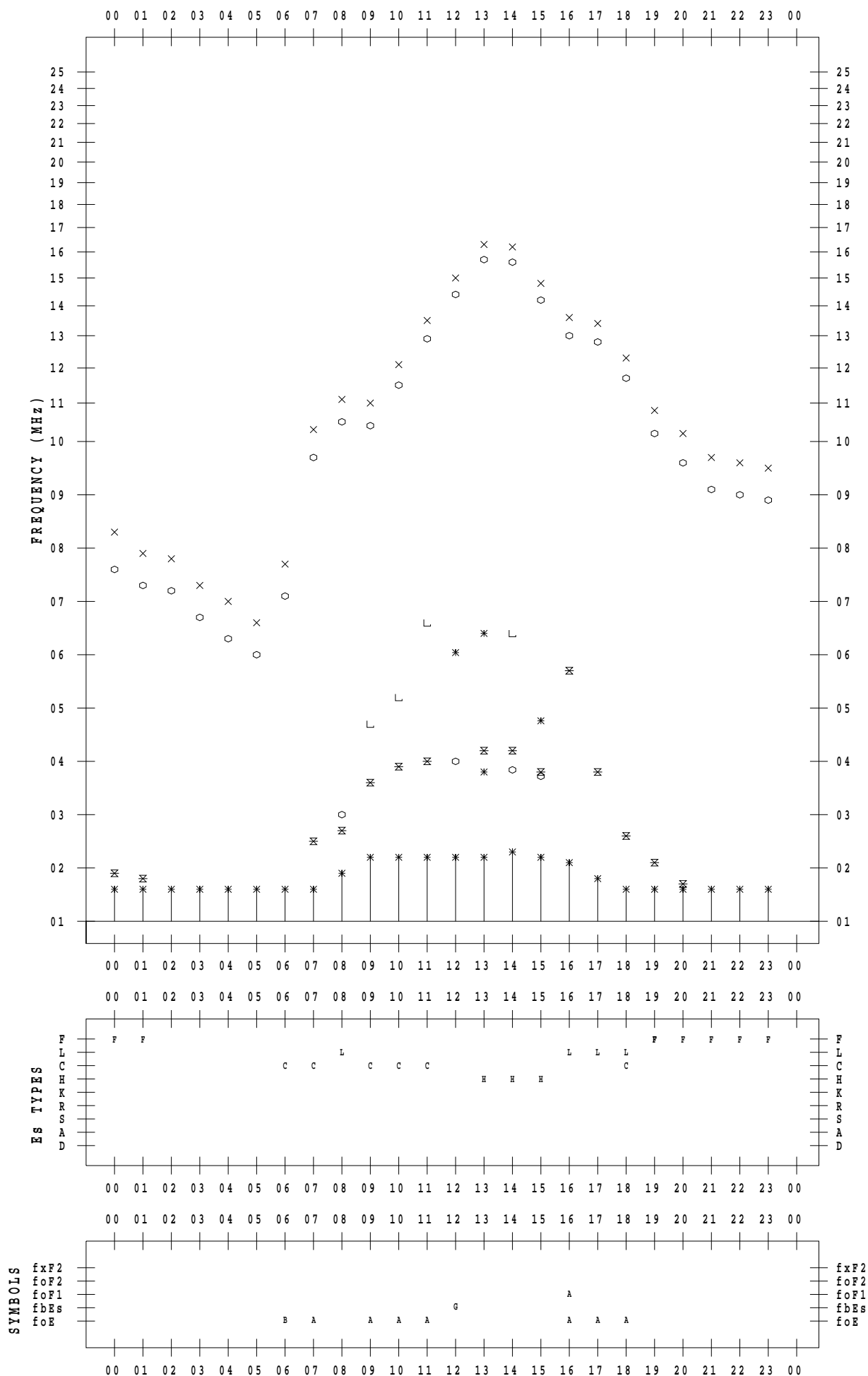
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 30

135 ° E MEAN TIME





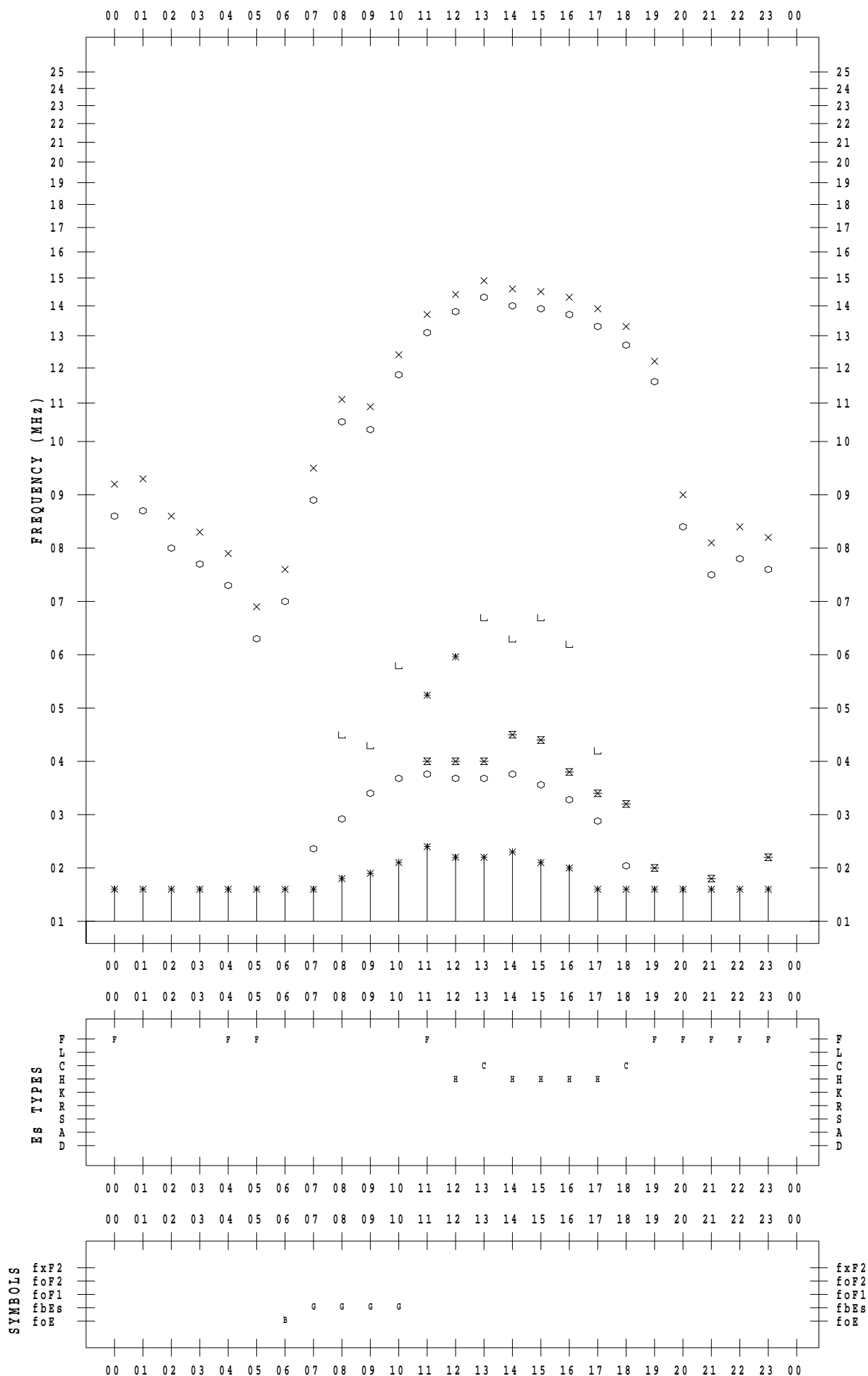
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Yamagawa

DATE : 2023 / 3 / 31

135 ° E MEAN TIME



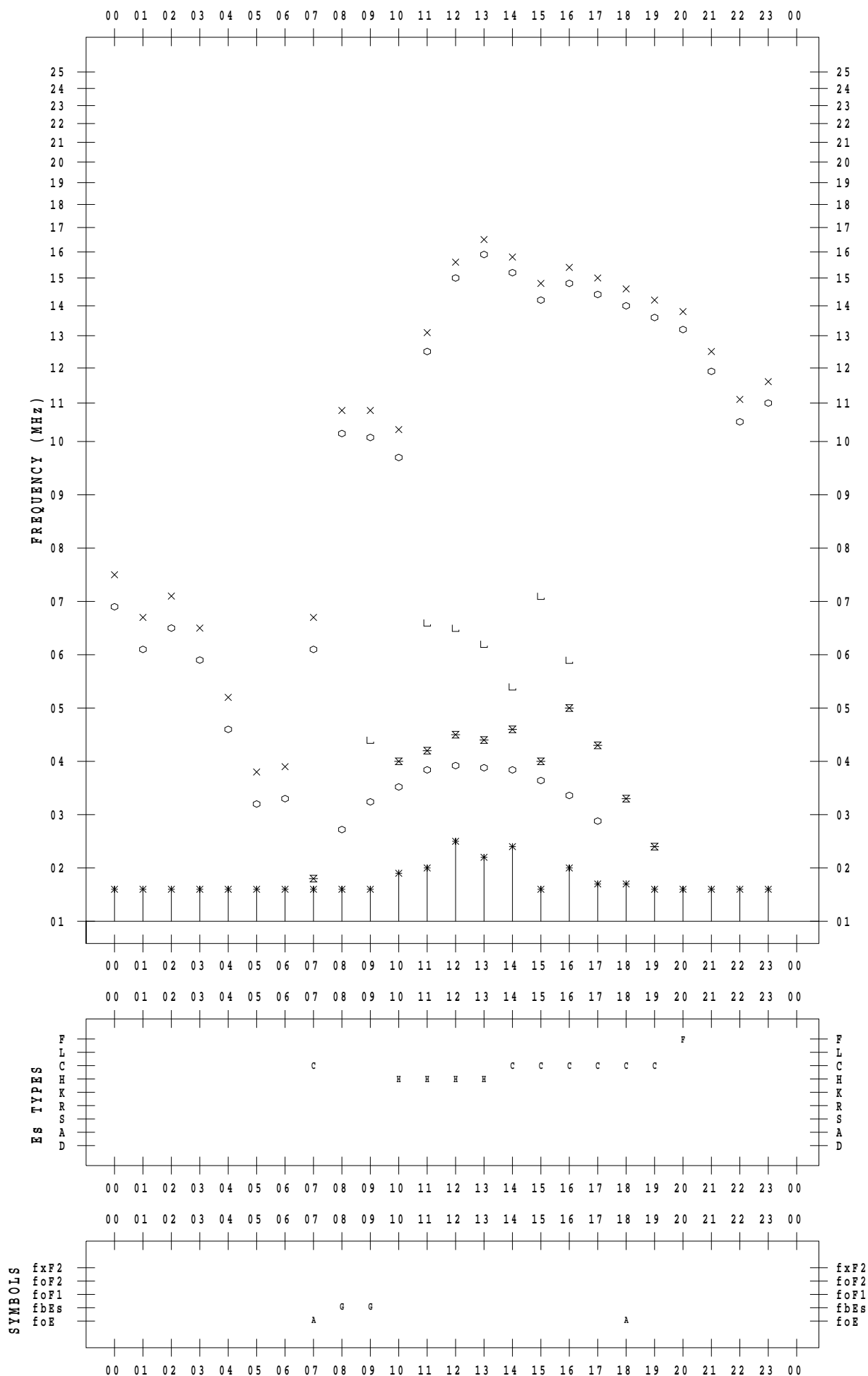
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 1

135 ° E MEAN TIME



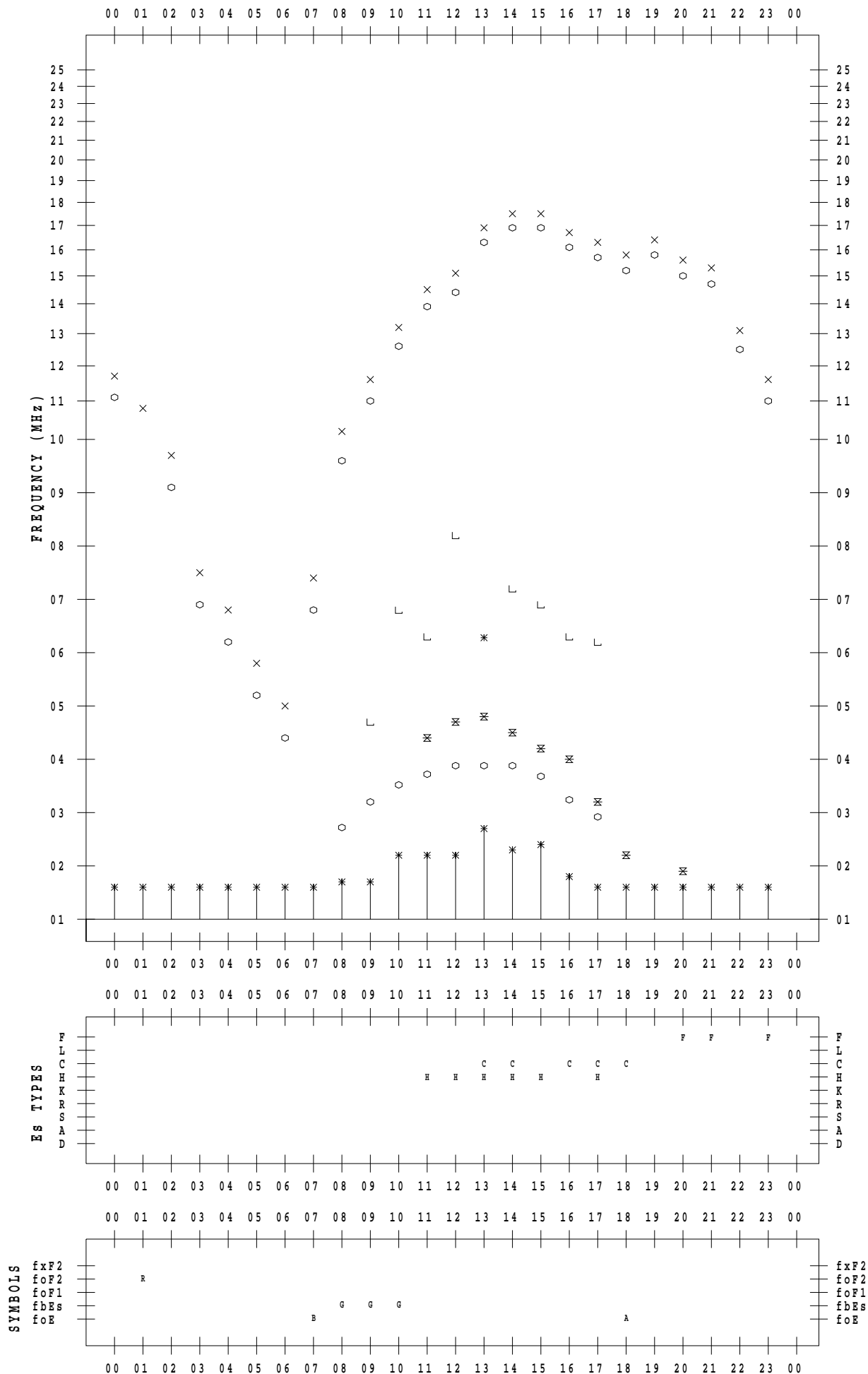
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 2

135 ° E MEAN TIME



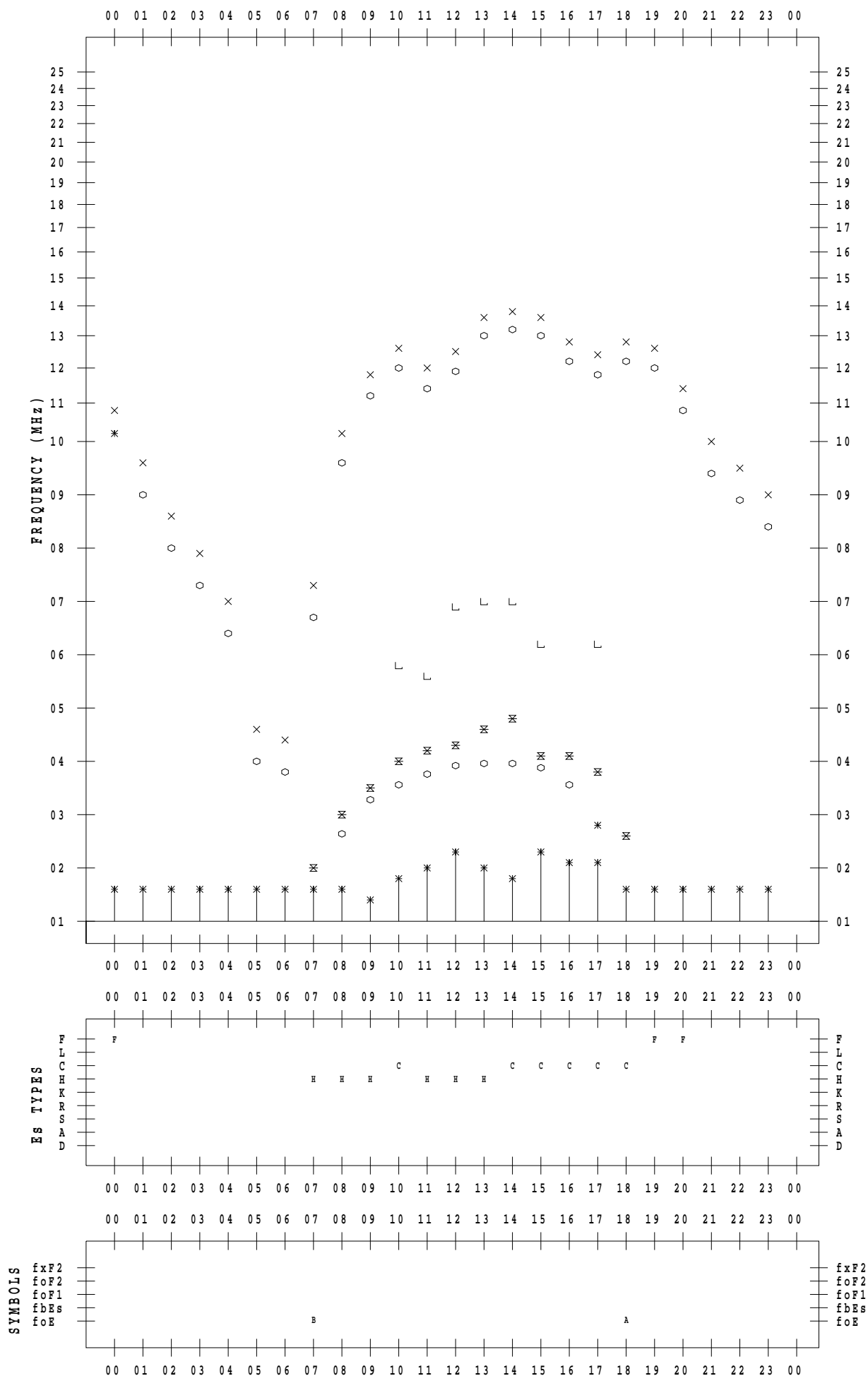
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 3

135 ° E MEAN TIME



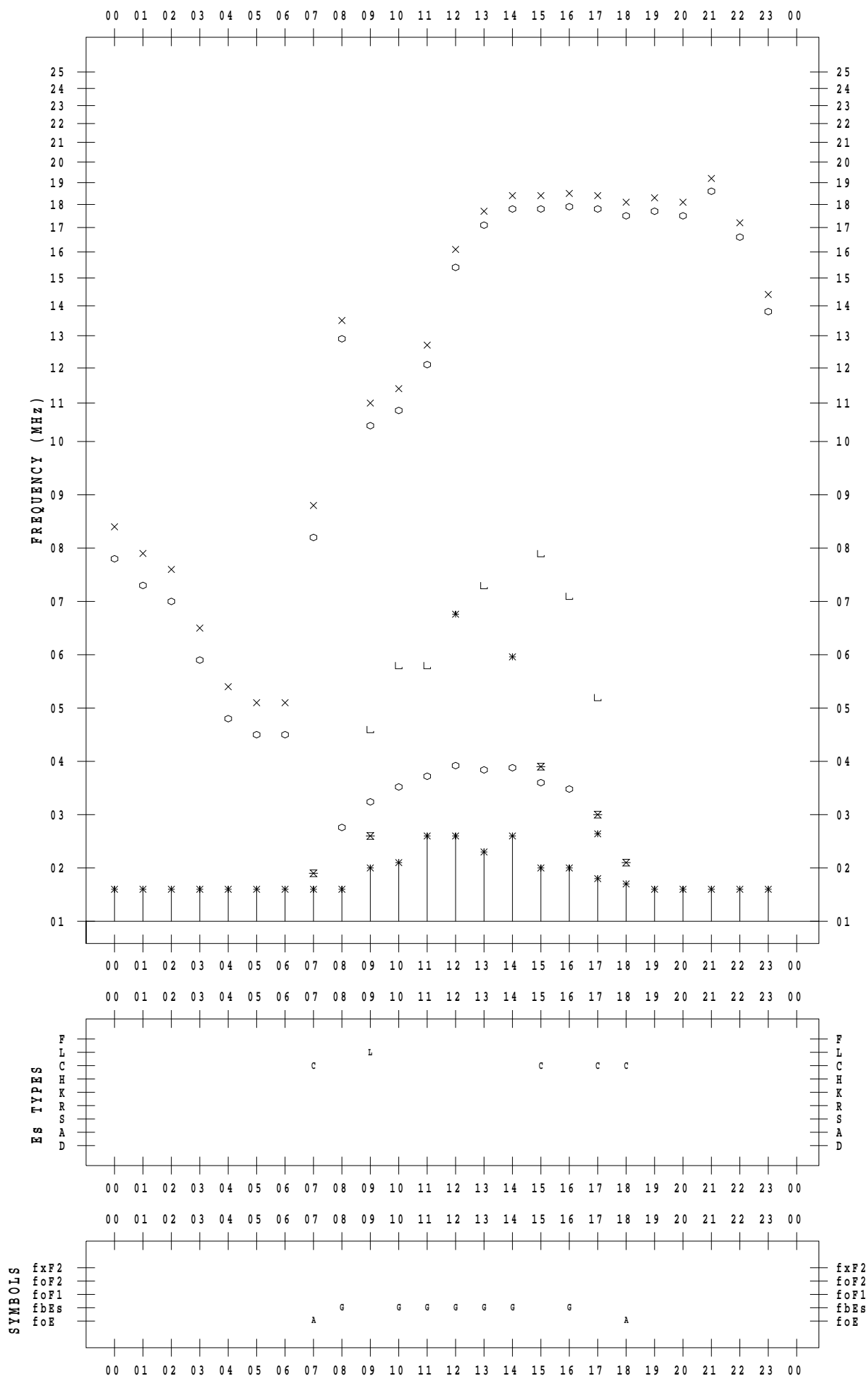
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/ 4

135 ° E MEAN TIME



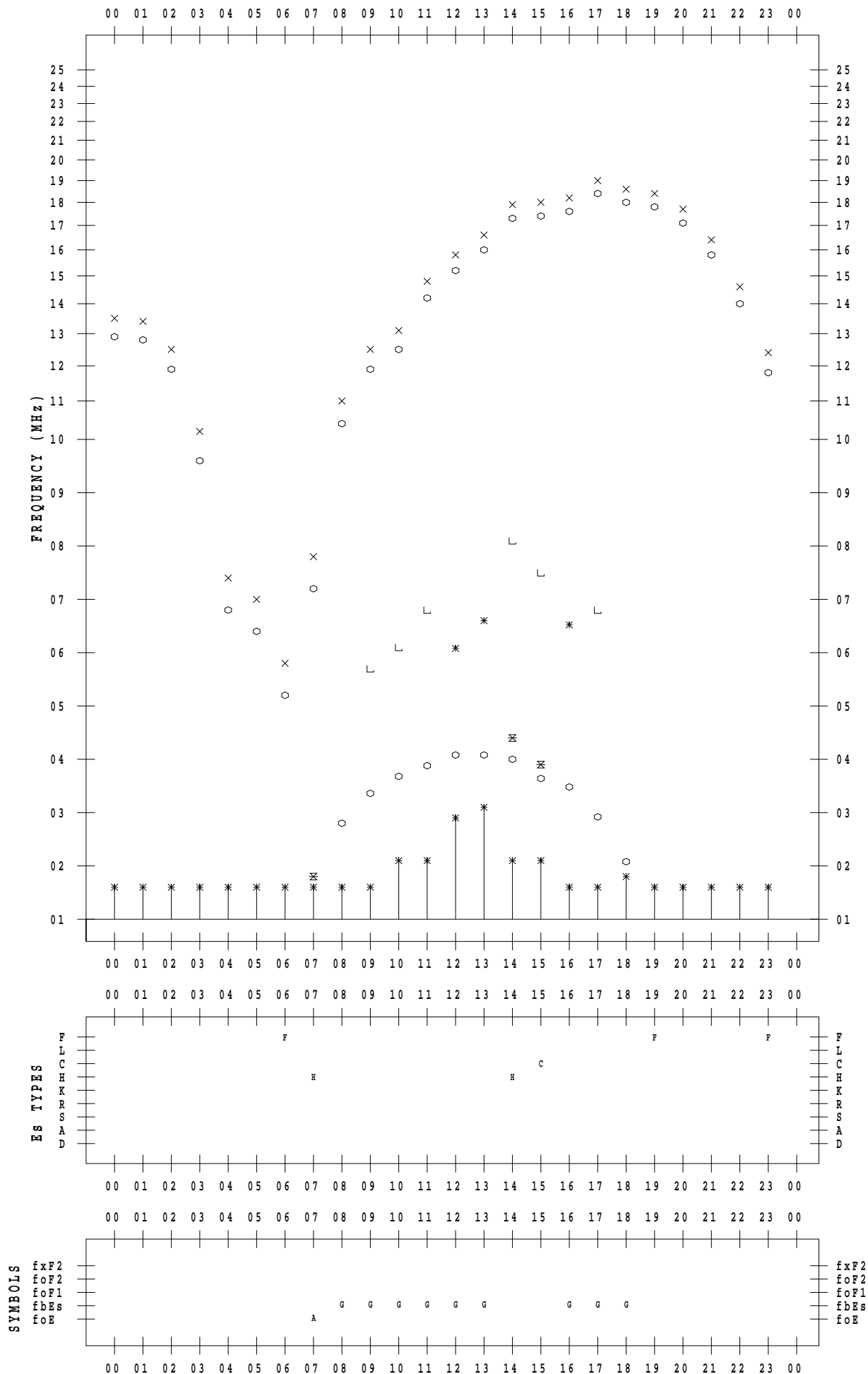
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/ 5

135 ° E MEAN TIME



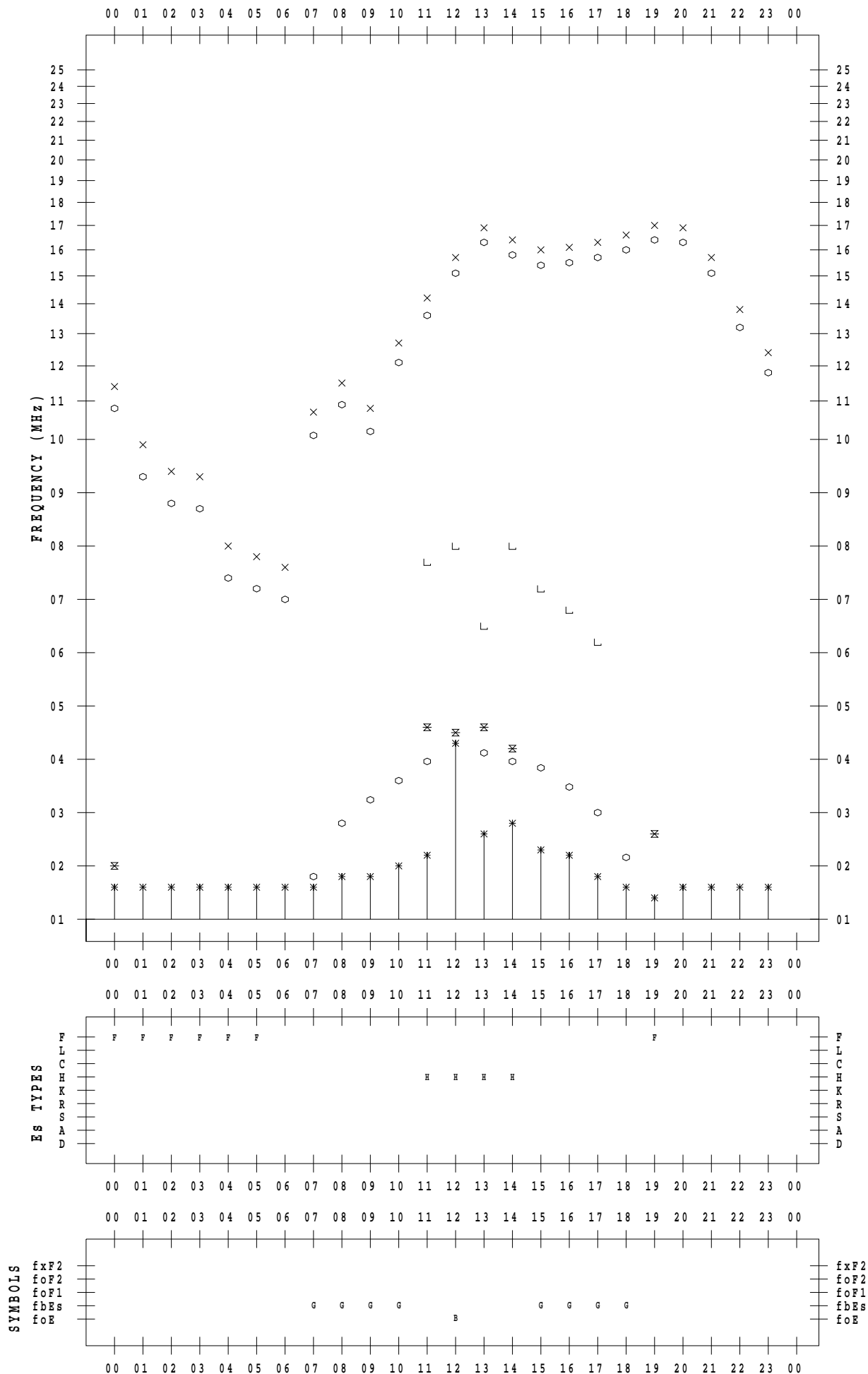
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 6

135 ° E MEAN TIME



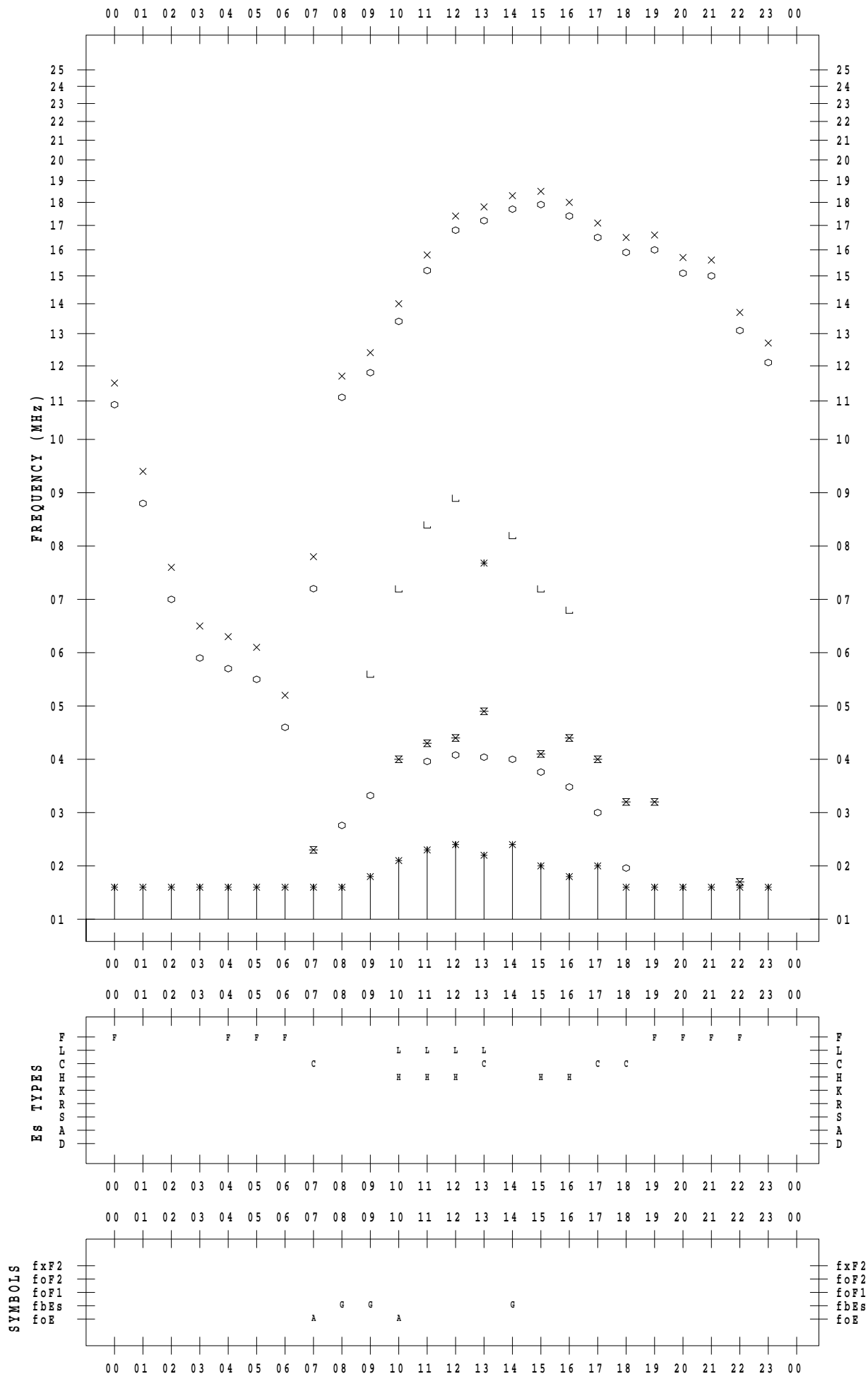
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 7

135 ° E MEAN TIME





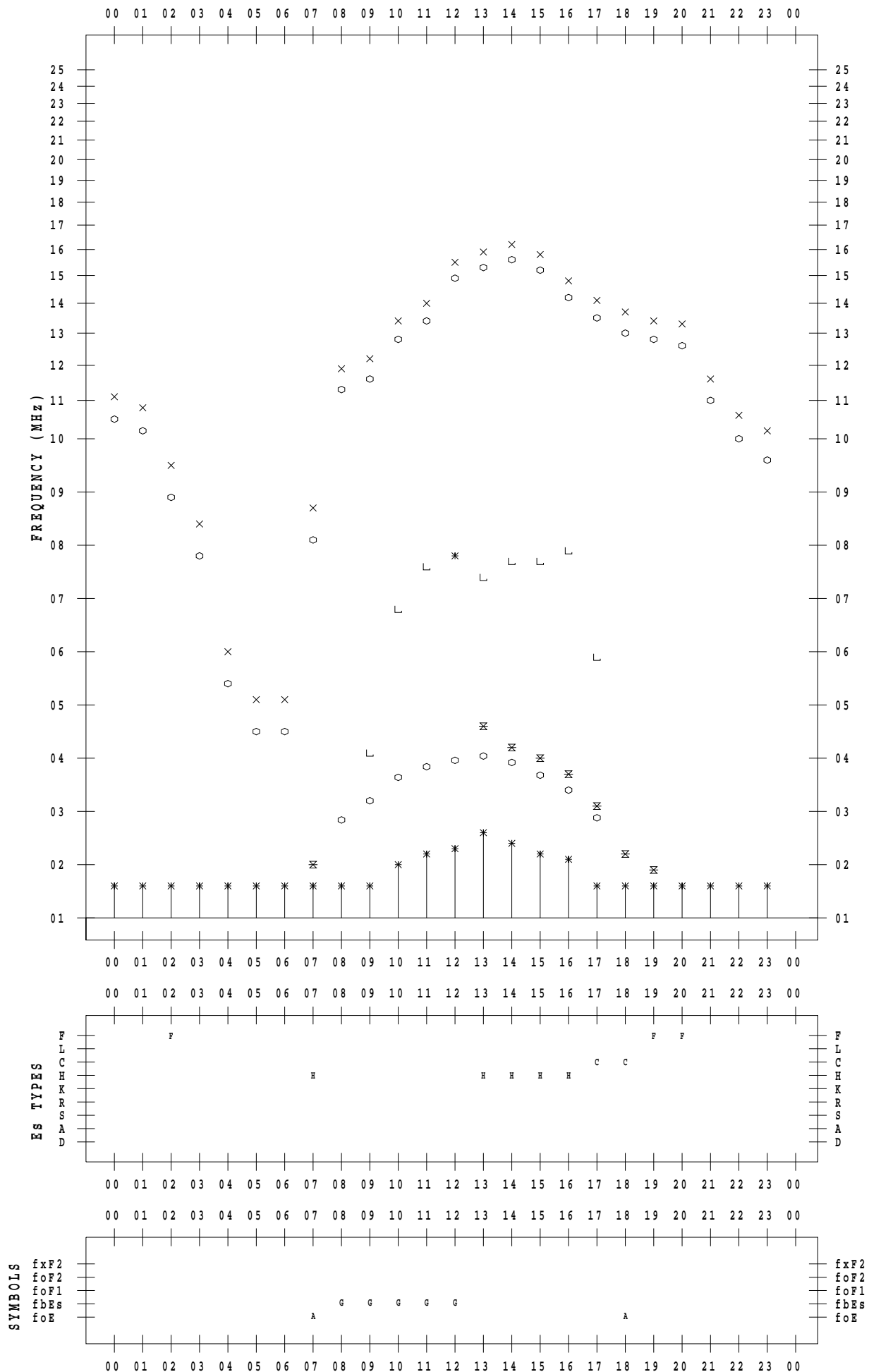
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 8

135 ° E MEAN TIME



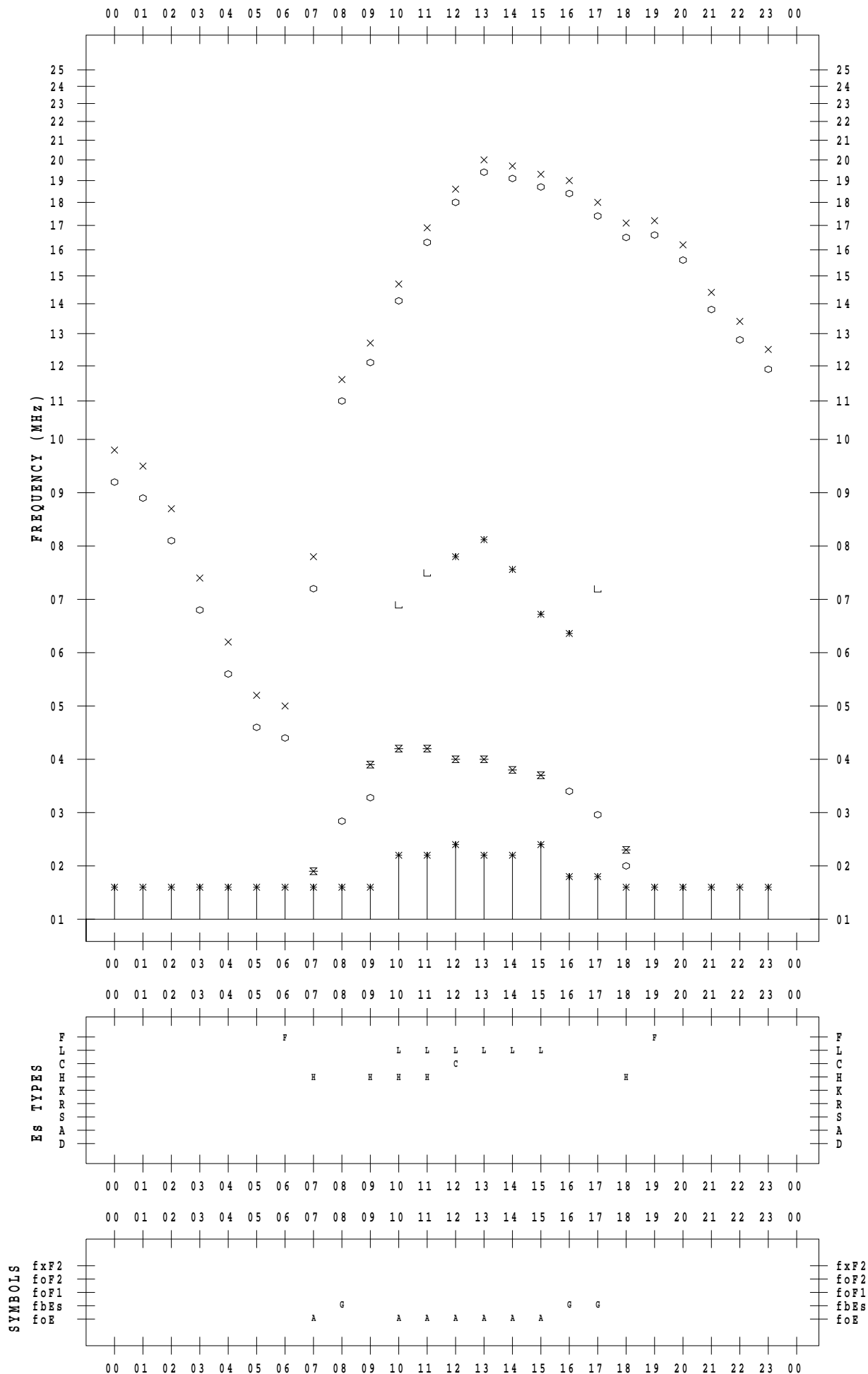
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 9

135 ° E MEAN TIME



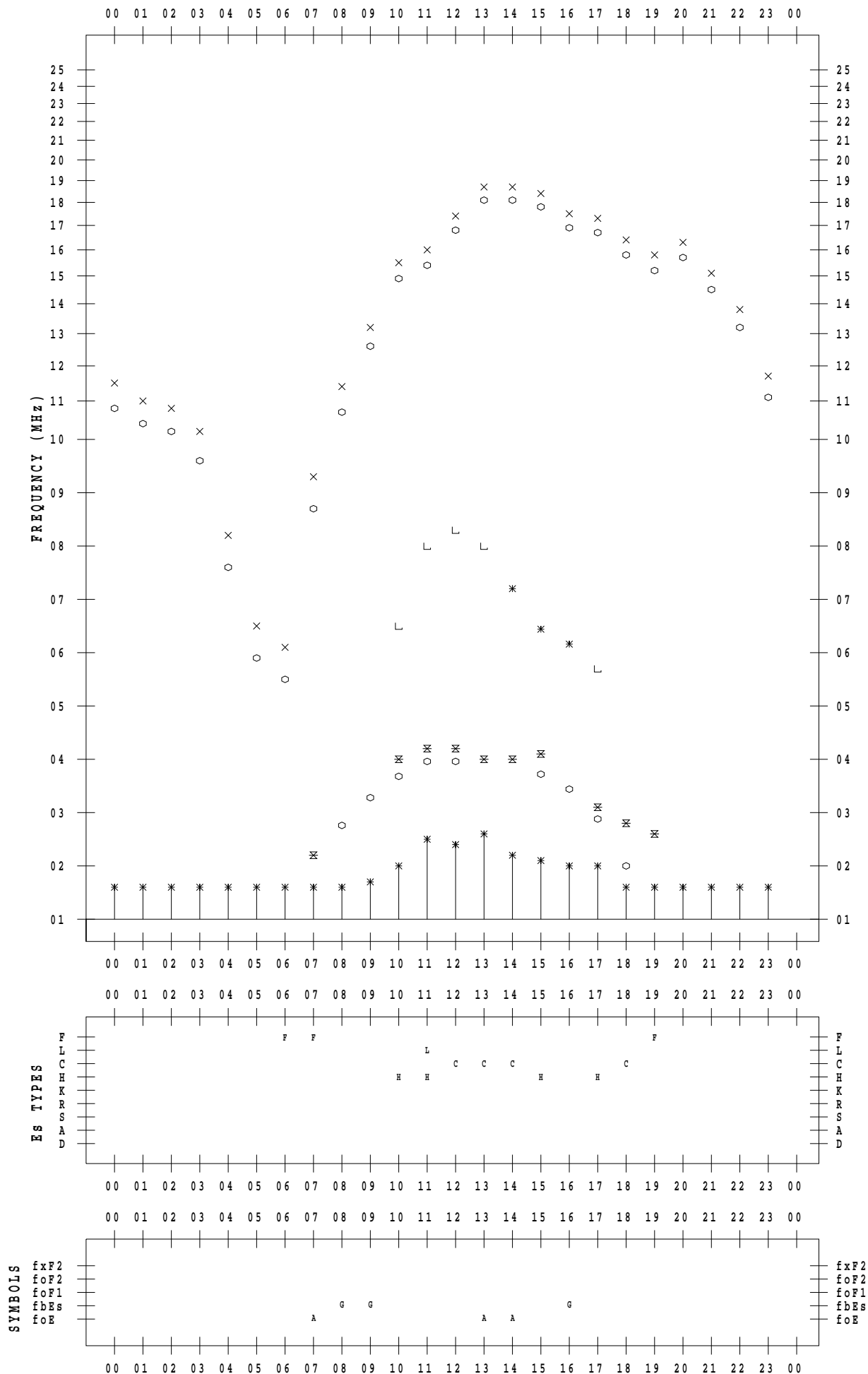
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/10

135 ° E MEAN TIME



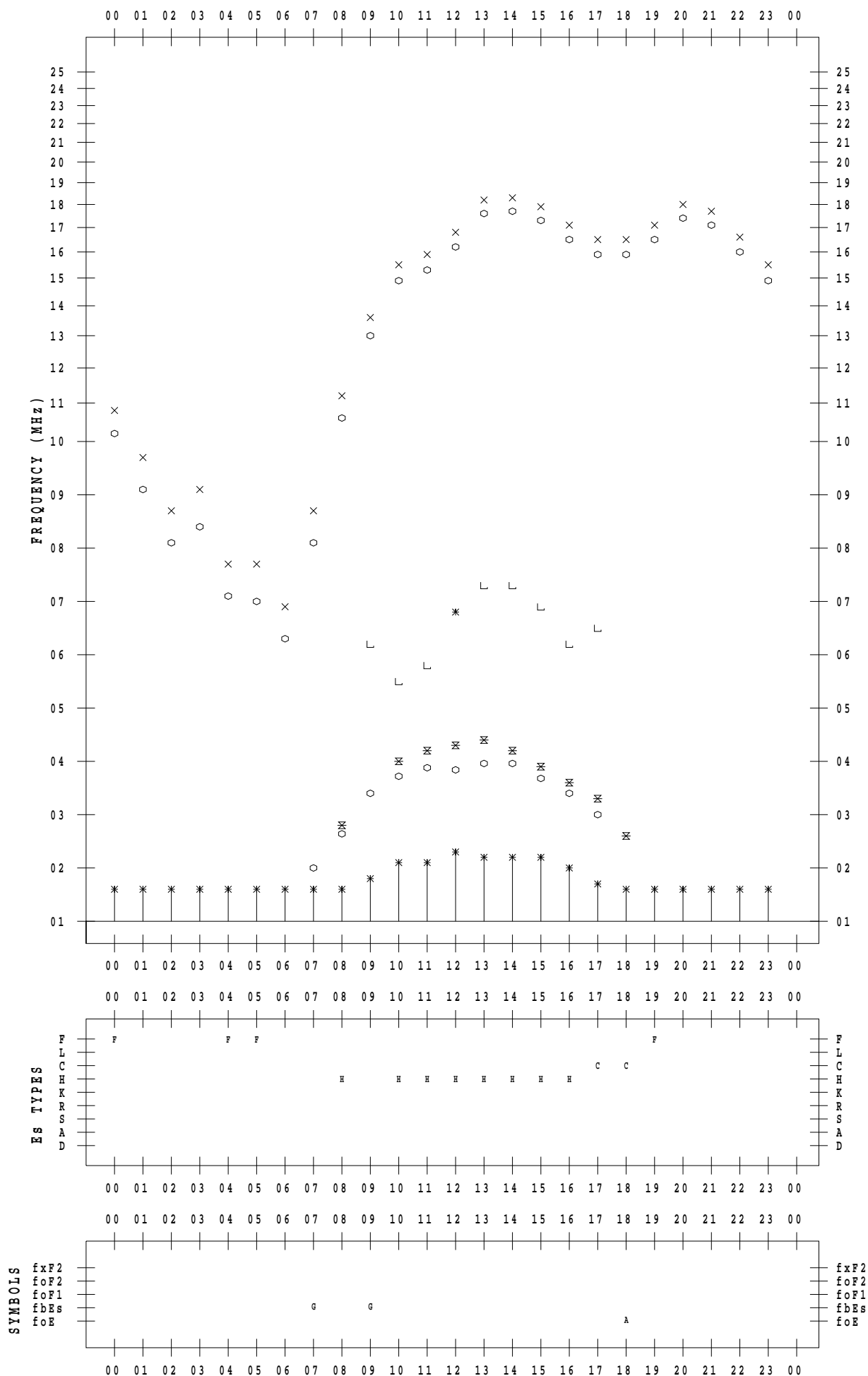
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/11

135 ° E MEAN TIME



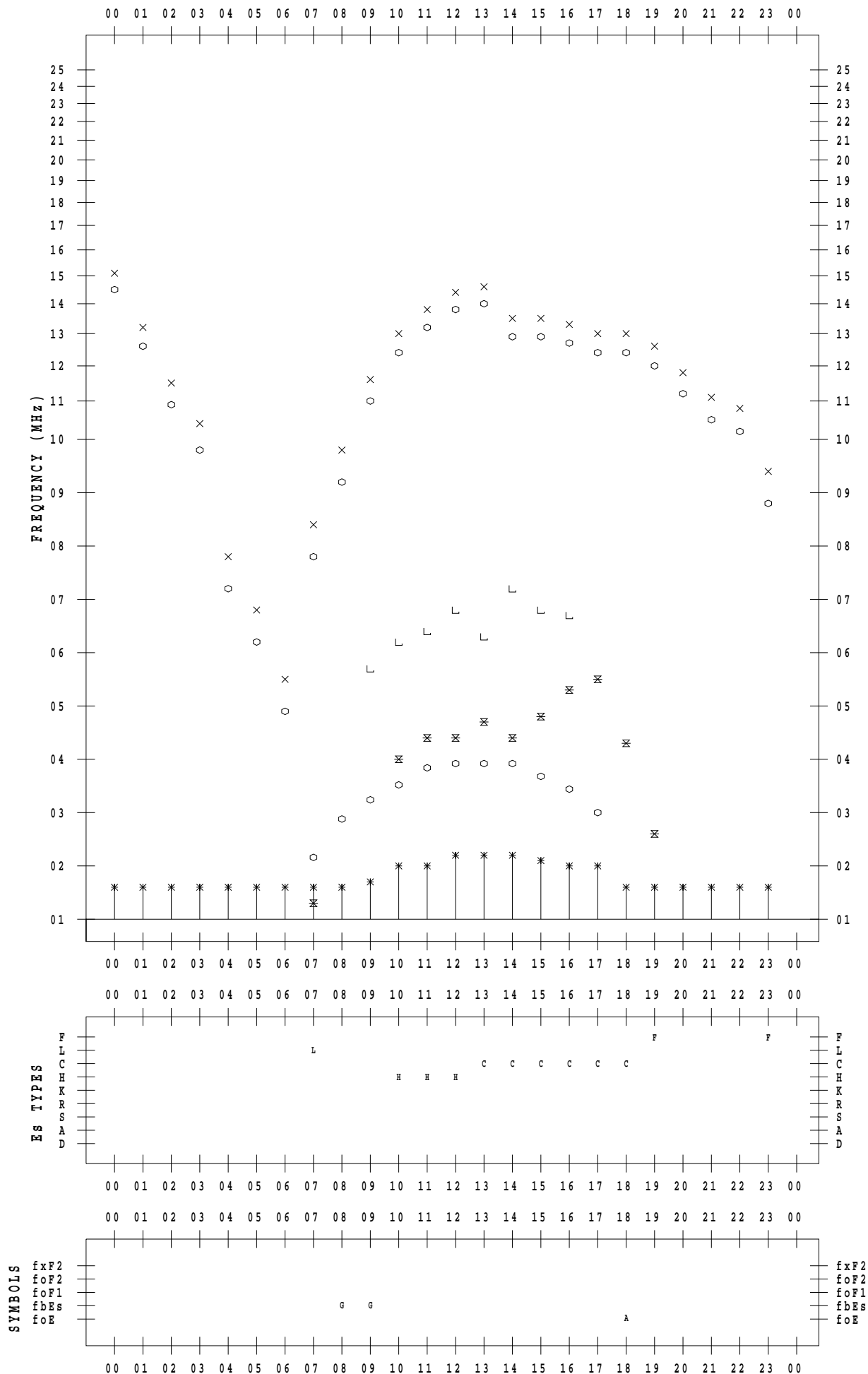
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/12

135 ° E MEAN TIME



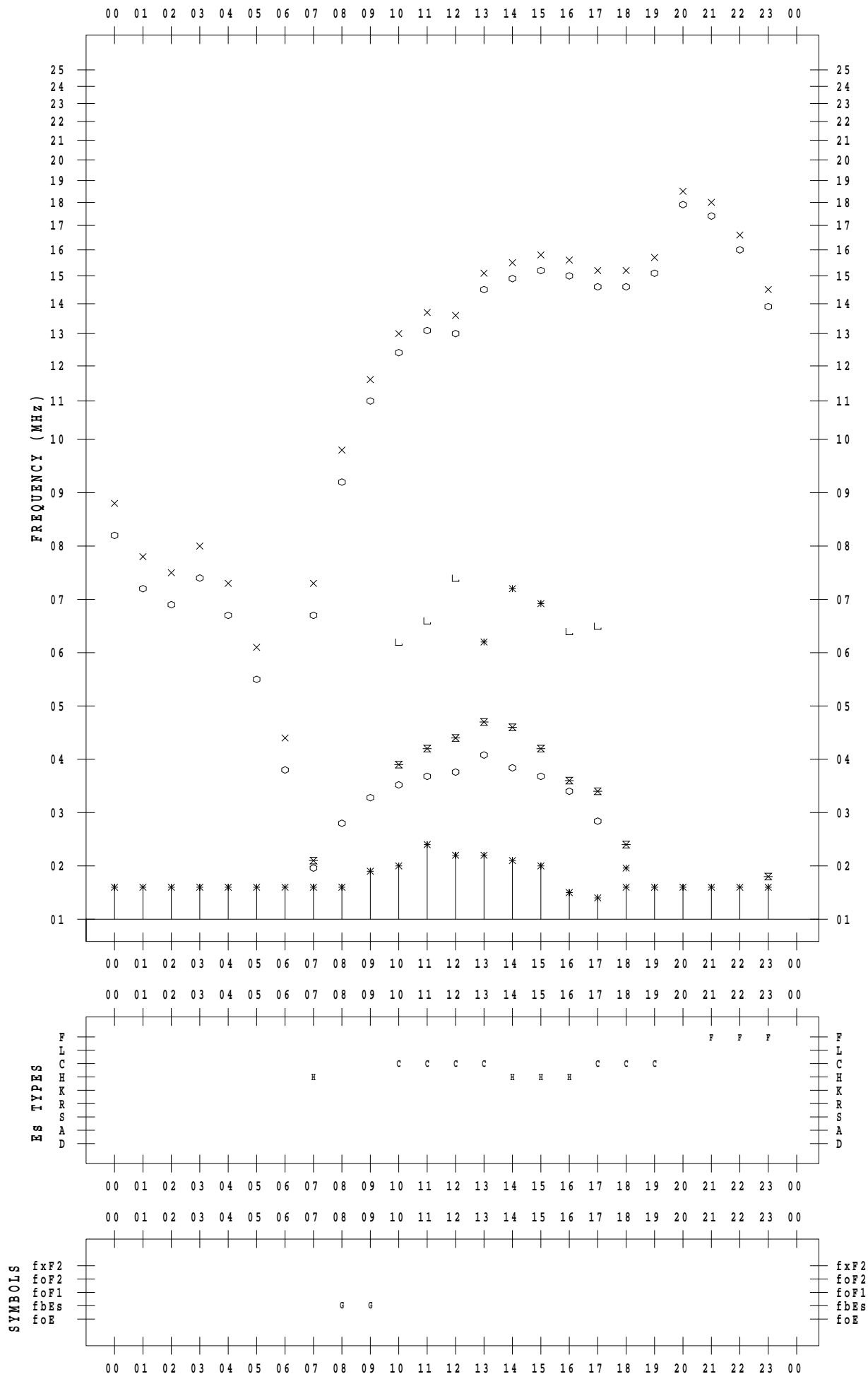
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/13

135 ° E MEAN TIME



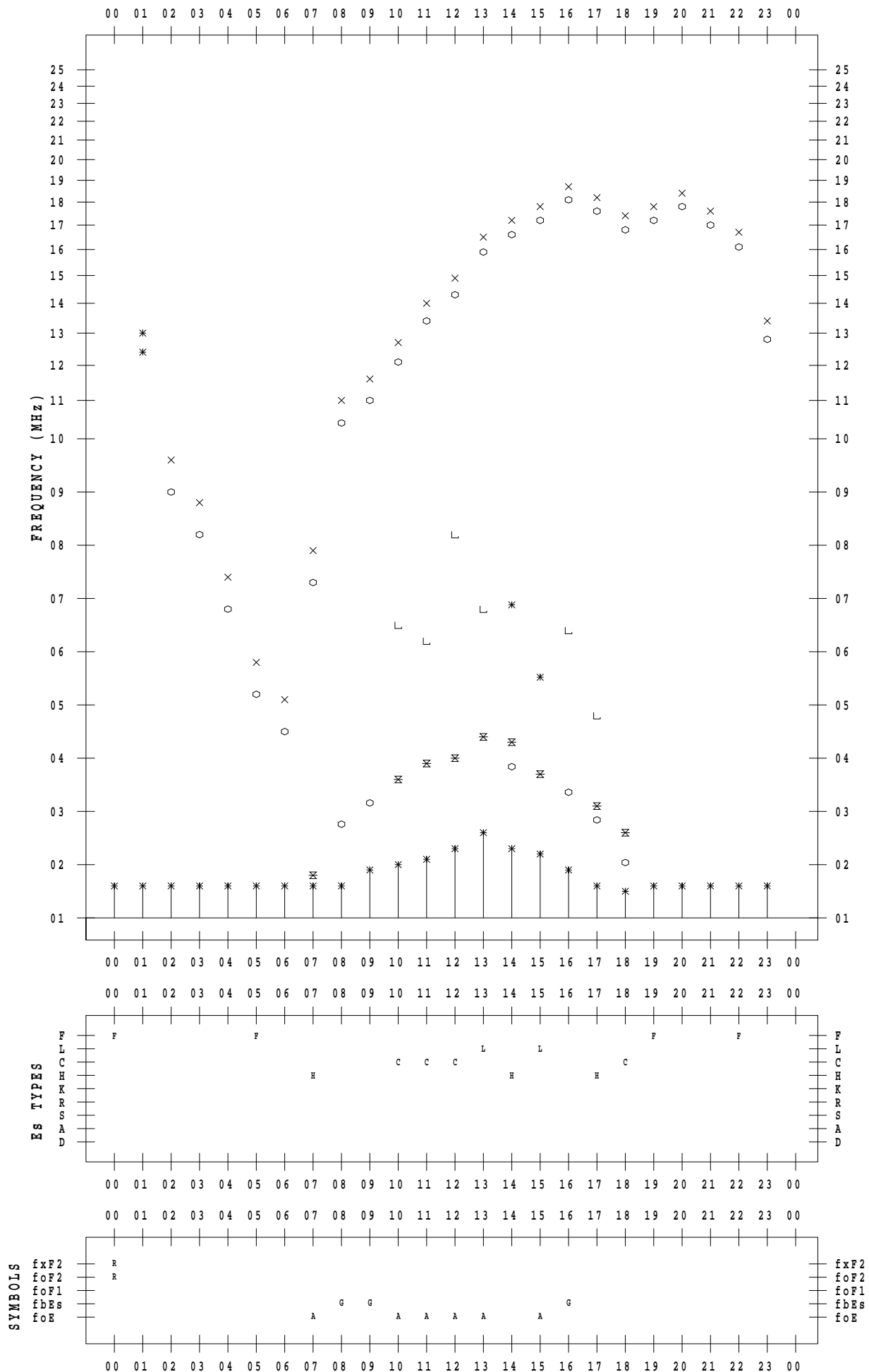
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/14

135 ° E MEAN TIME



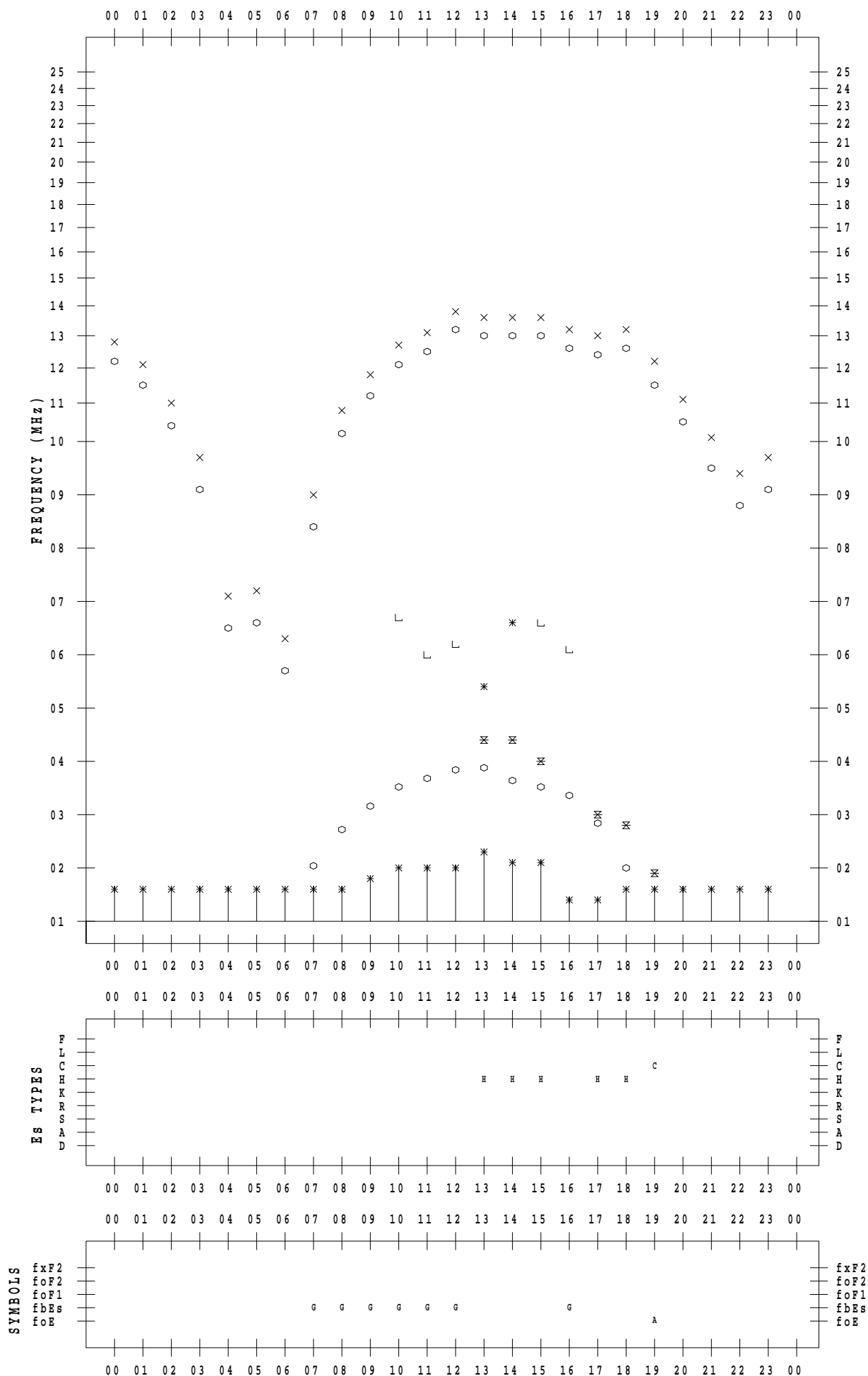
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/15

135 °E MEAN TIME





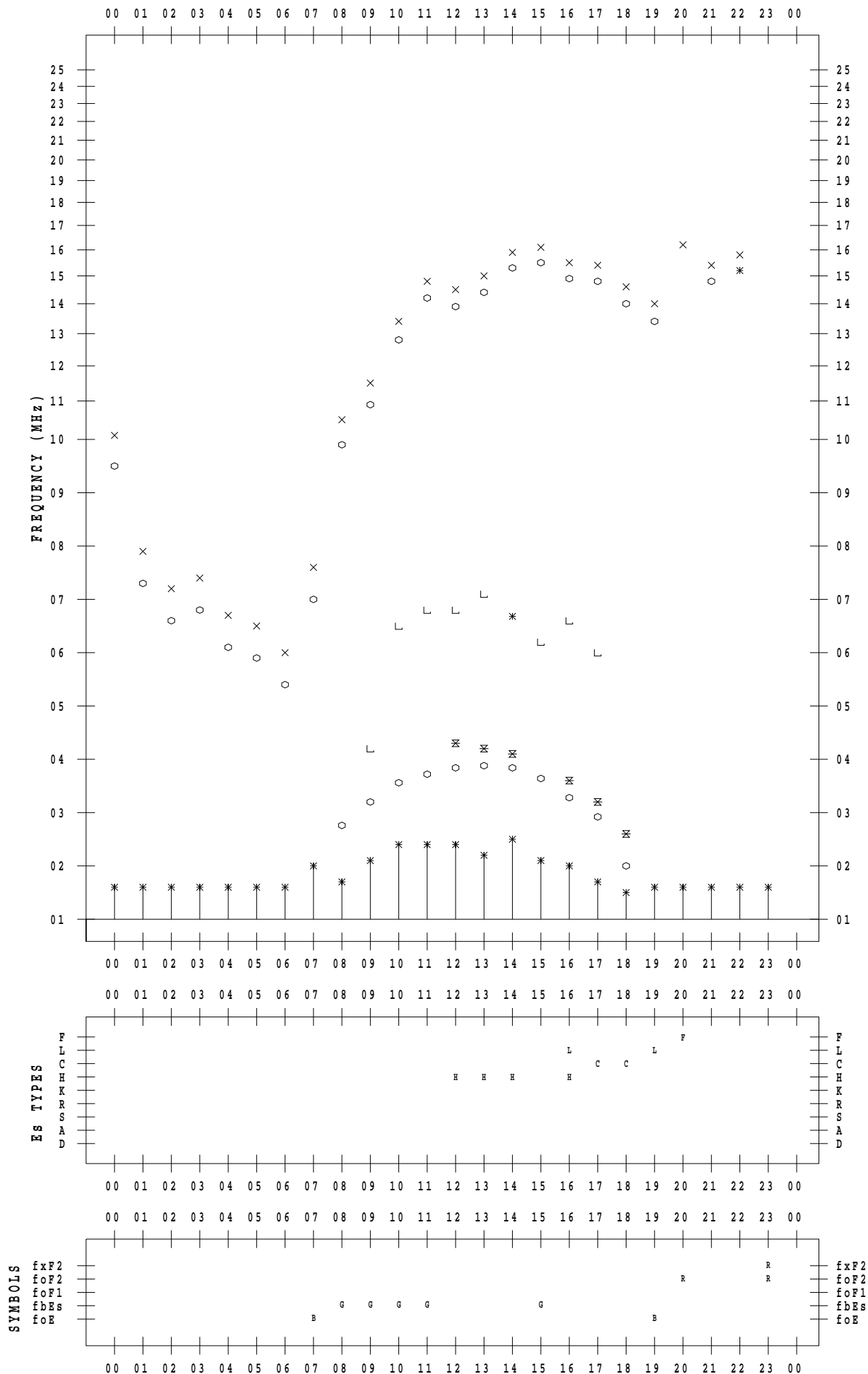
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/16

135 ° E MEAN TIME



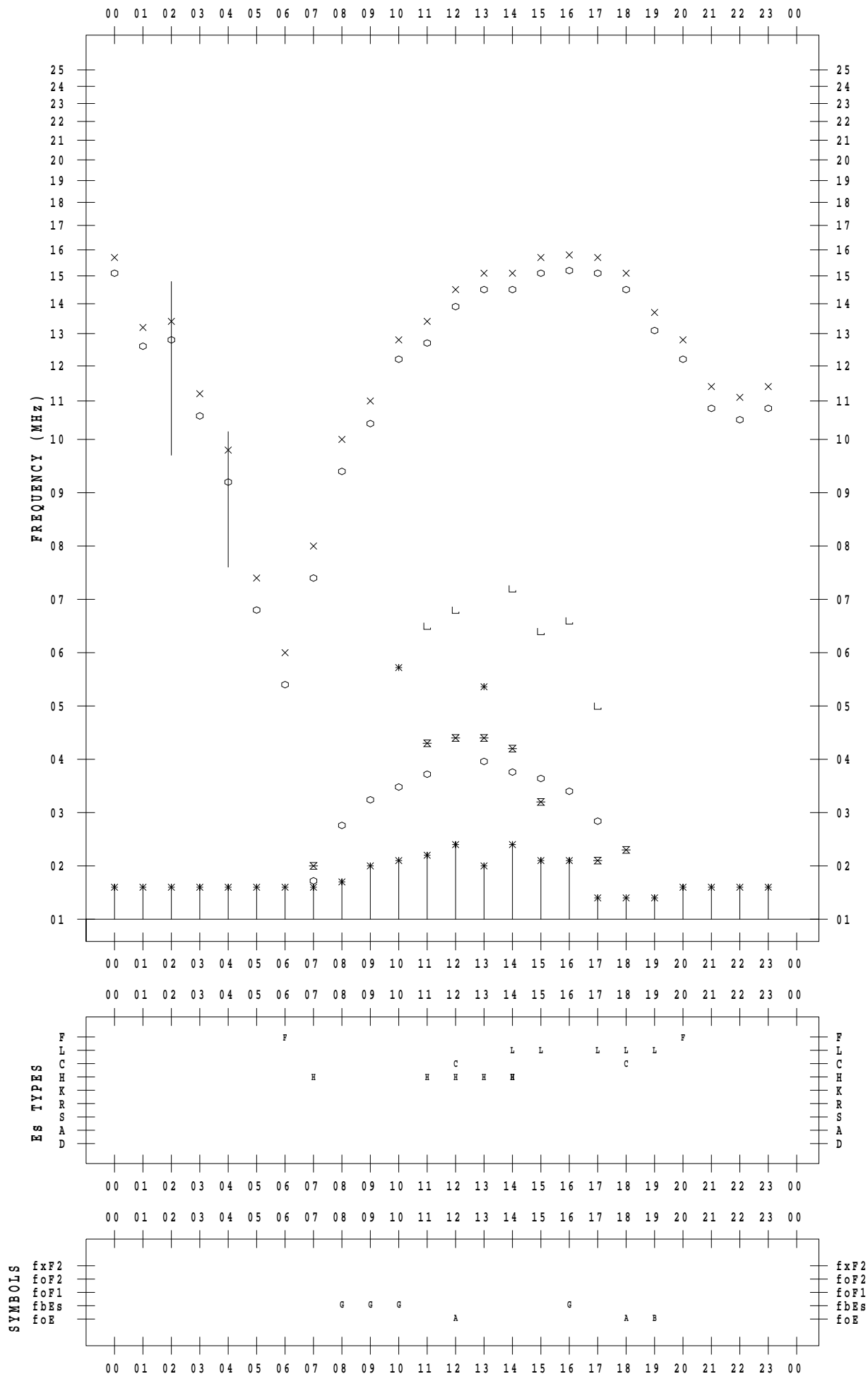
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/17

135 ° E MEAN TIME



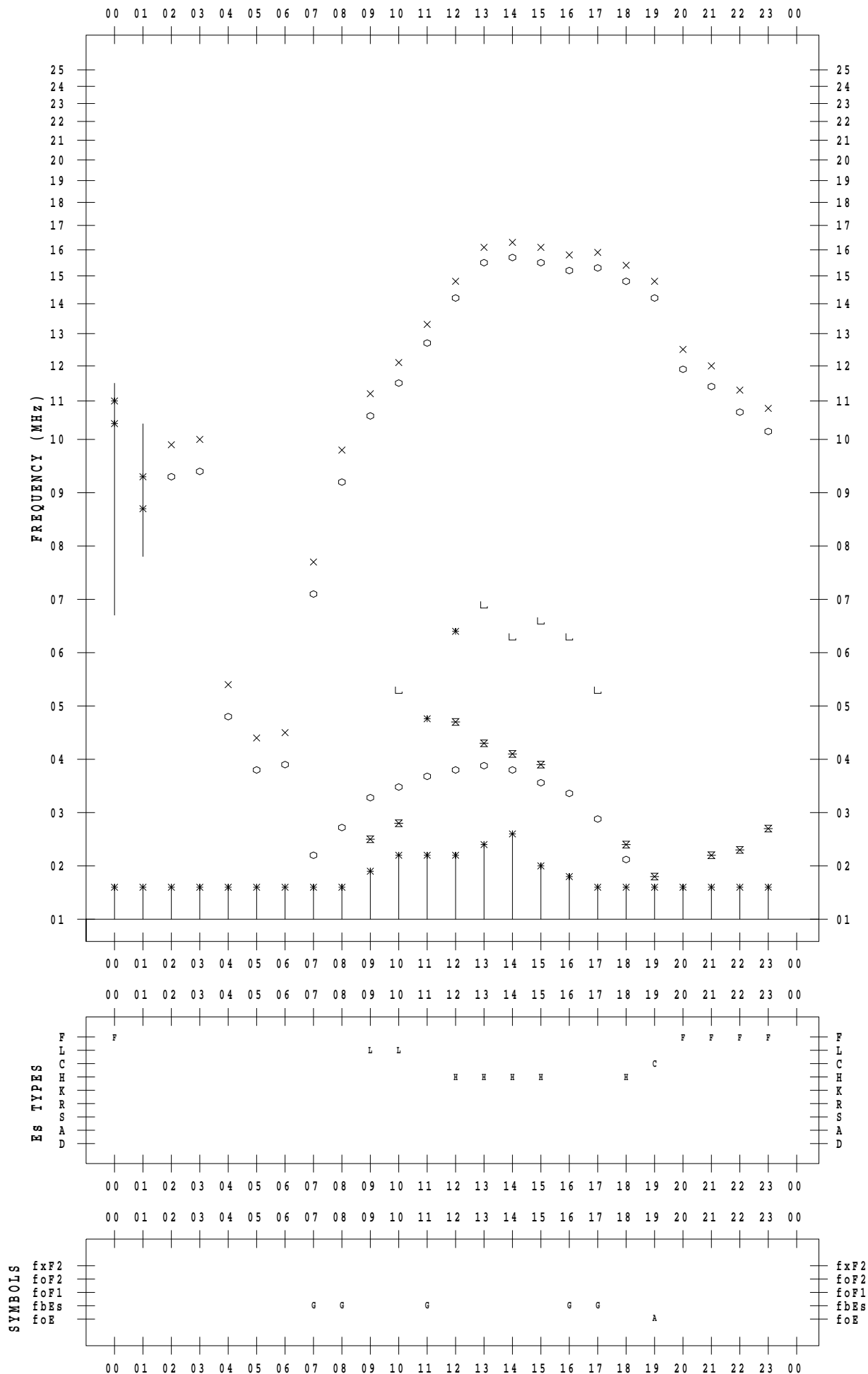
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/18

135 ° E MEAN TIME



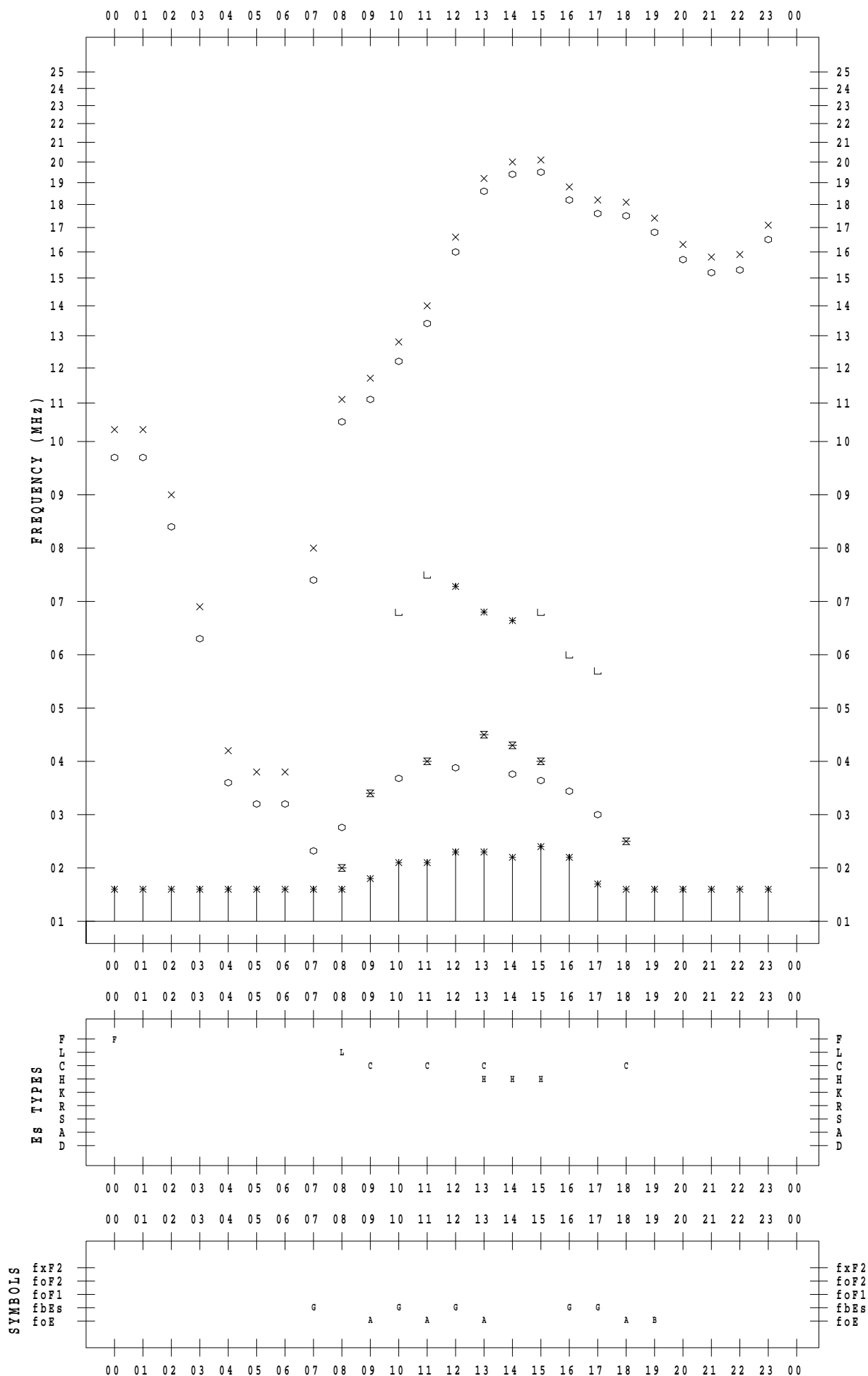
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/19

135 ° E MEAN TIME



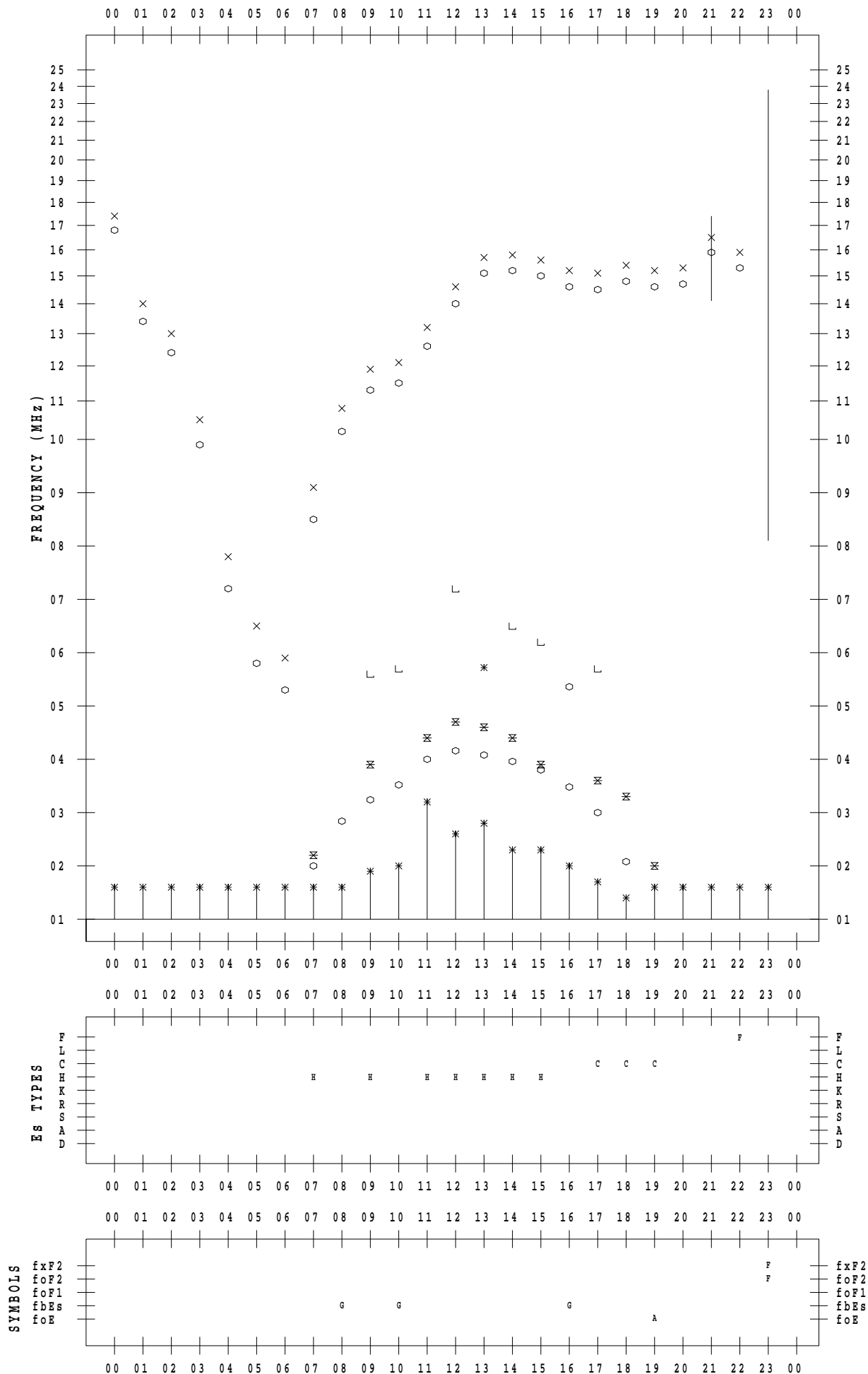
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 20

135 ° E MEAN TIME



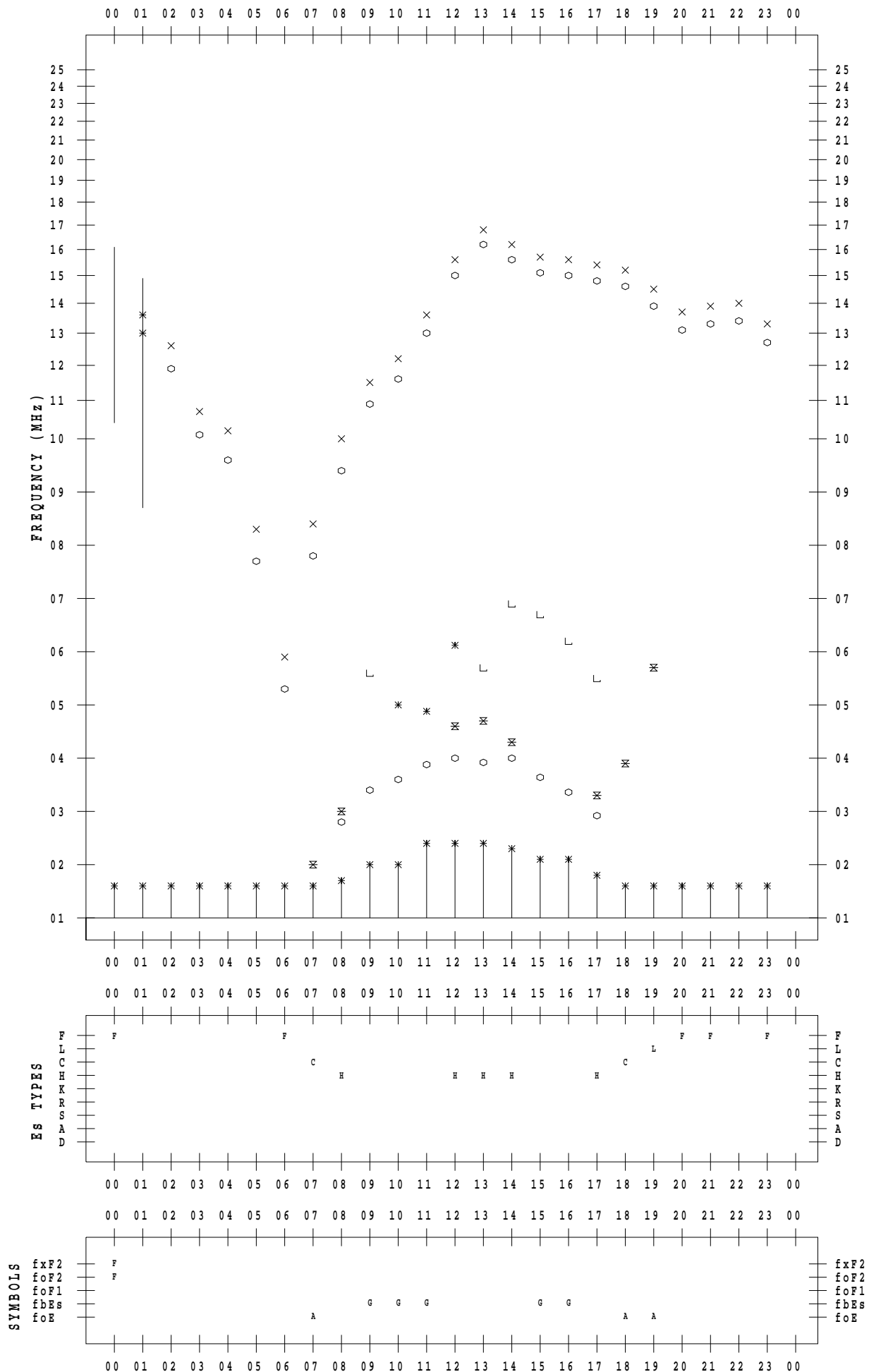
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/21

135 ° E MEAN TIME



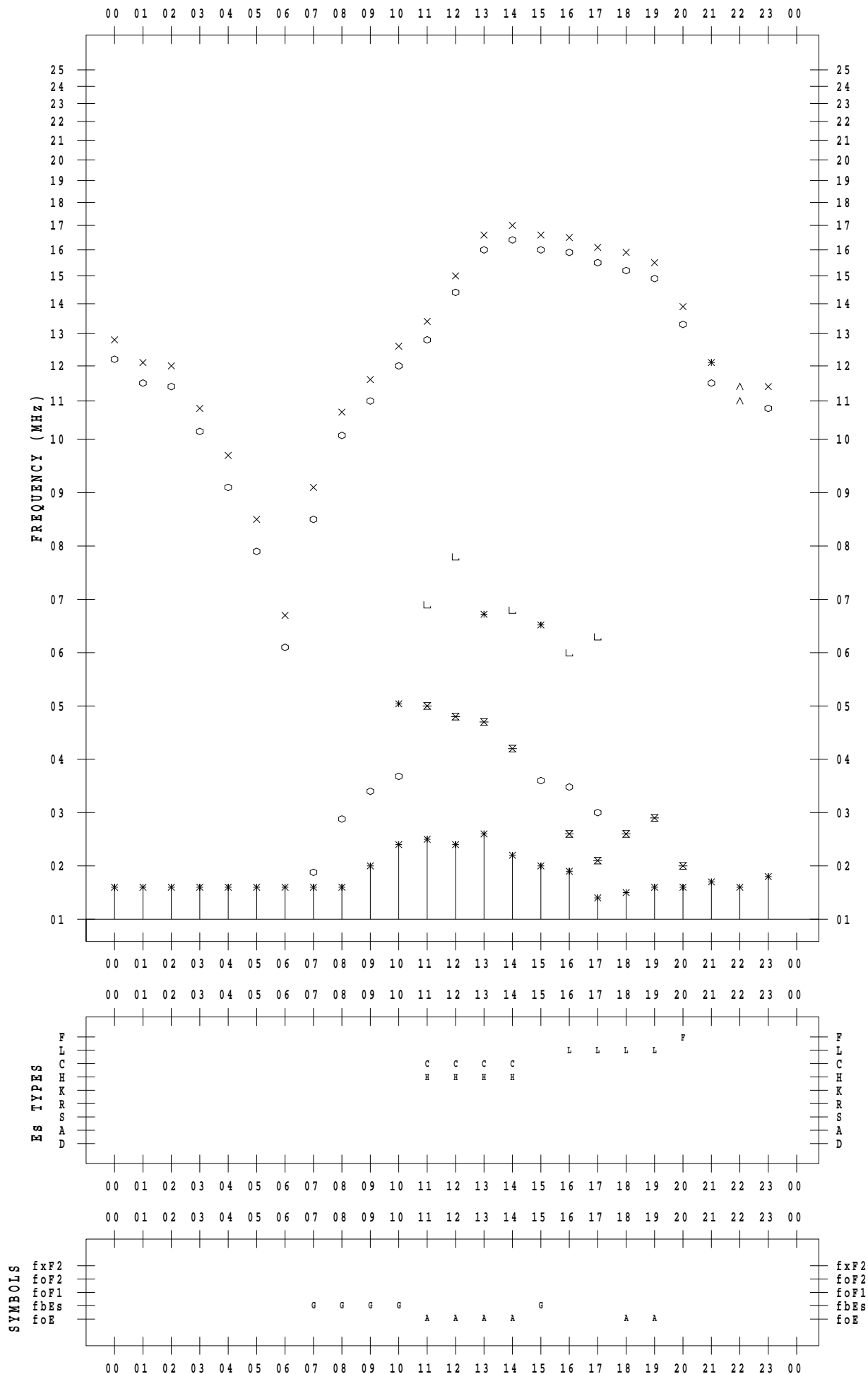
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/22

135 °E MEAN TIME



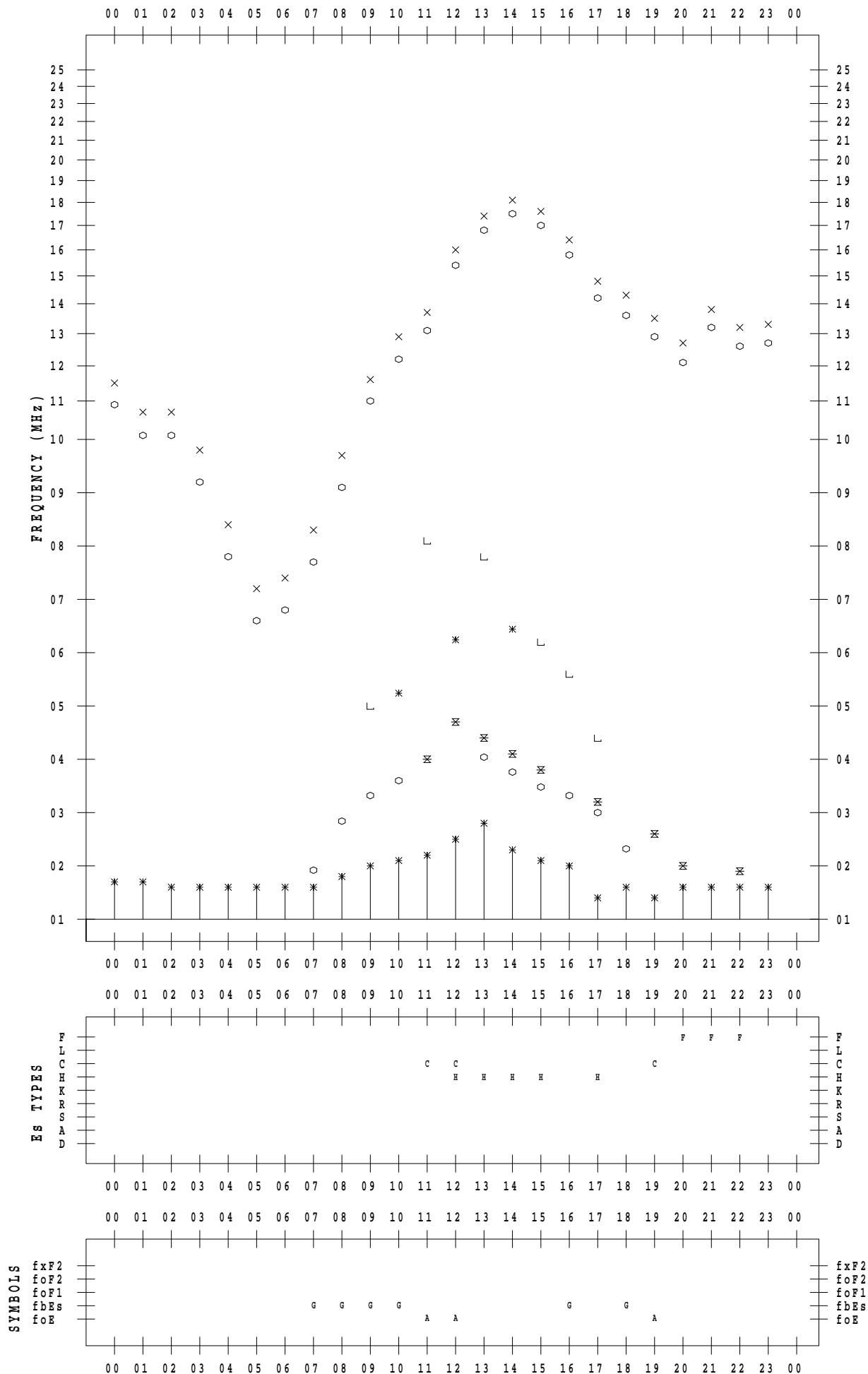
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/23

135 ° E MEAN TIME





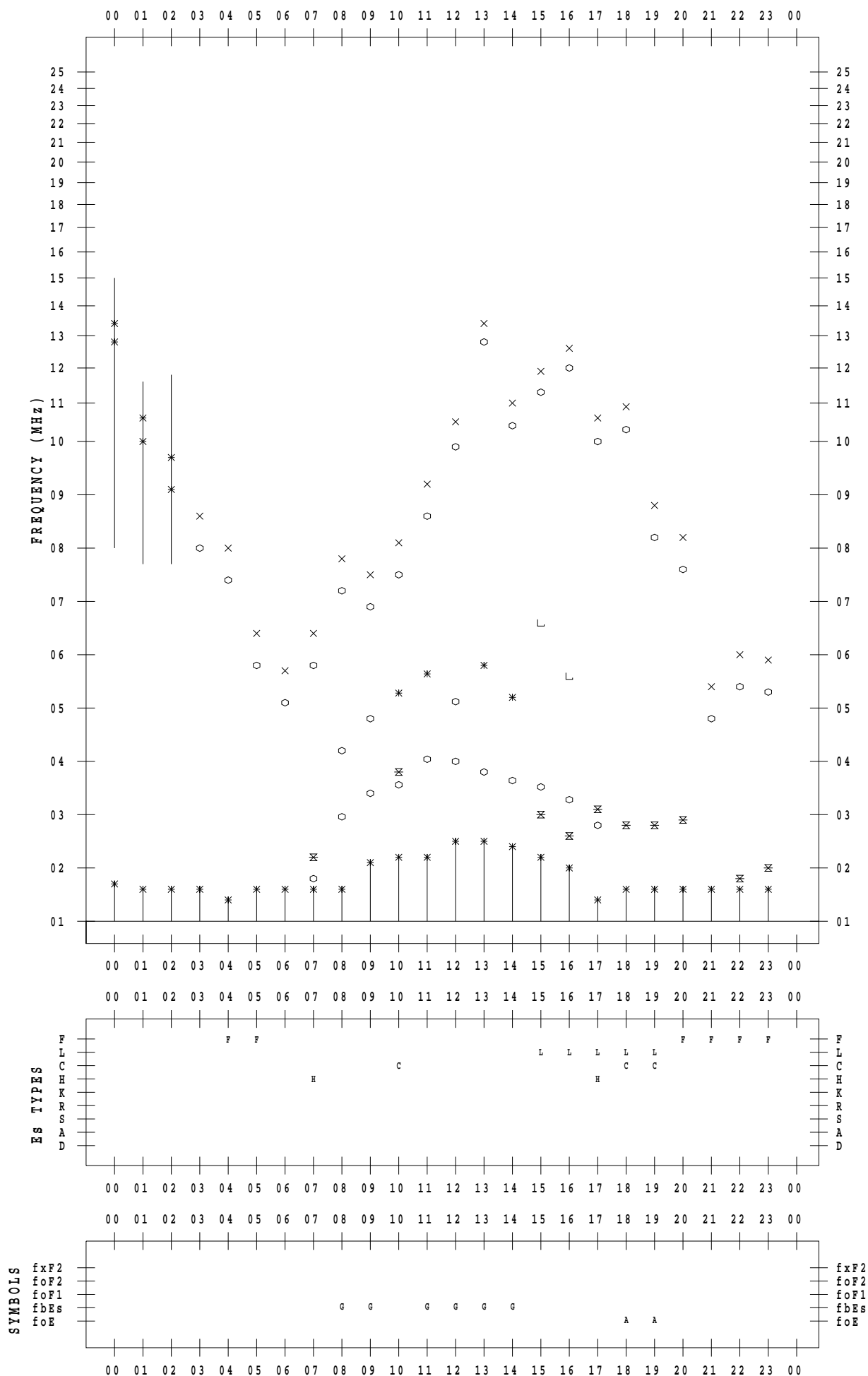
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 24

135 ° E MEAN TIME



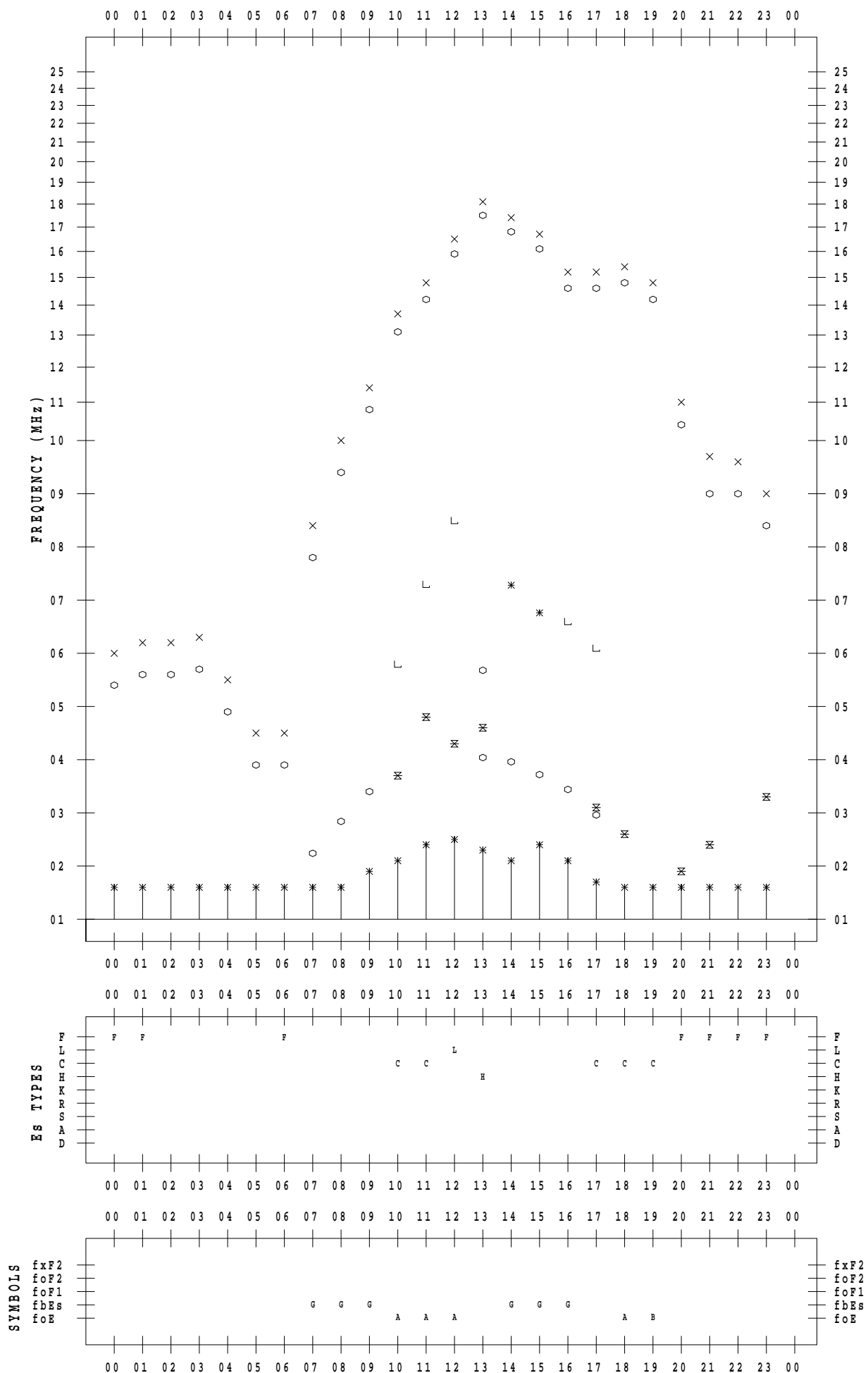
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 25

135 ° E MEAN TIME



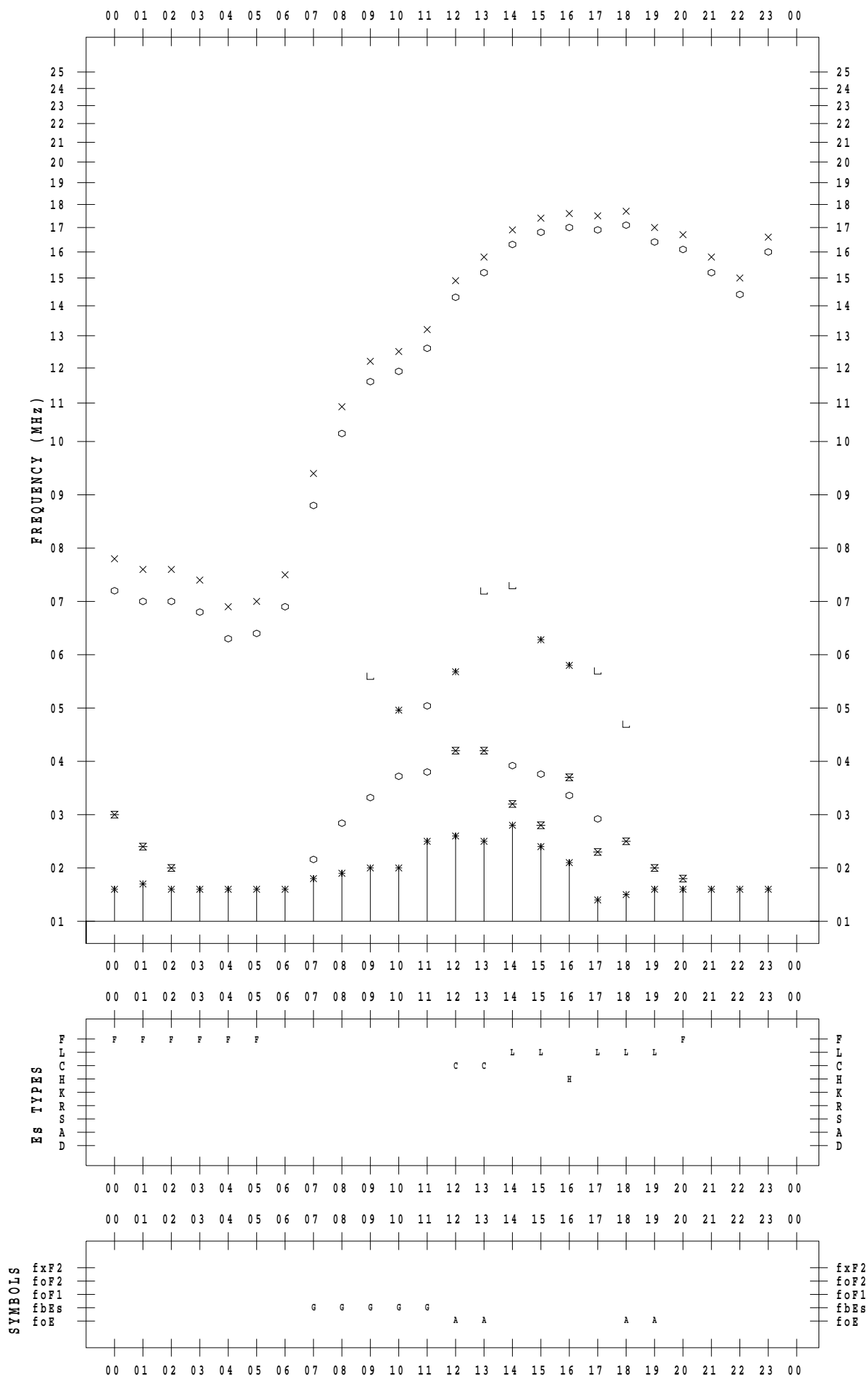
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 26

135 ° E MEAN TIME



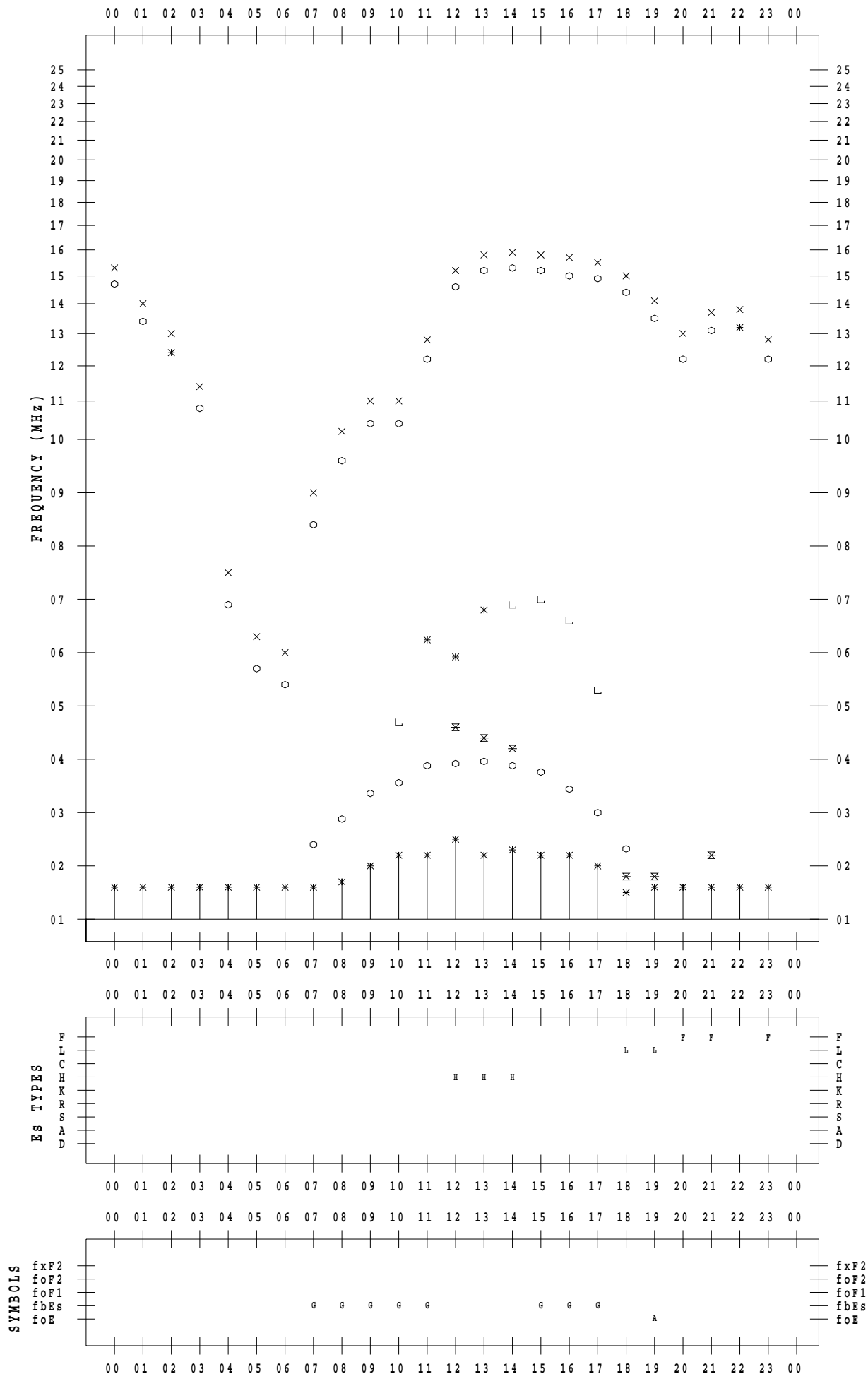
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 27

135 ° E MEAN TIME



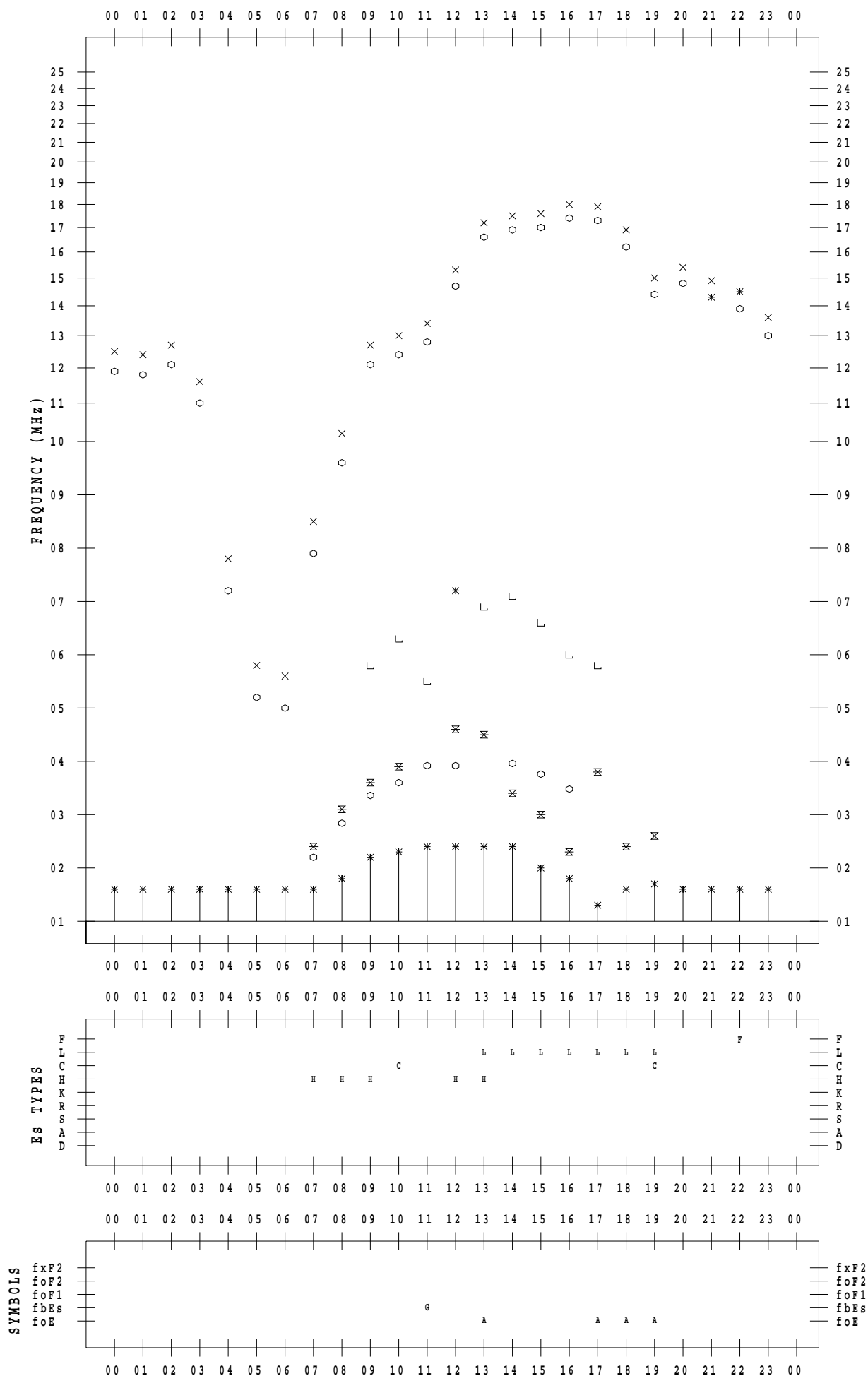
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 28

135 ° E MEAN TIME



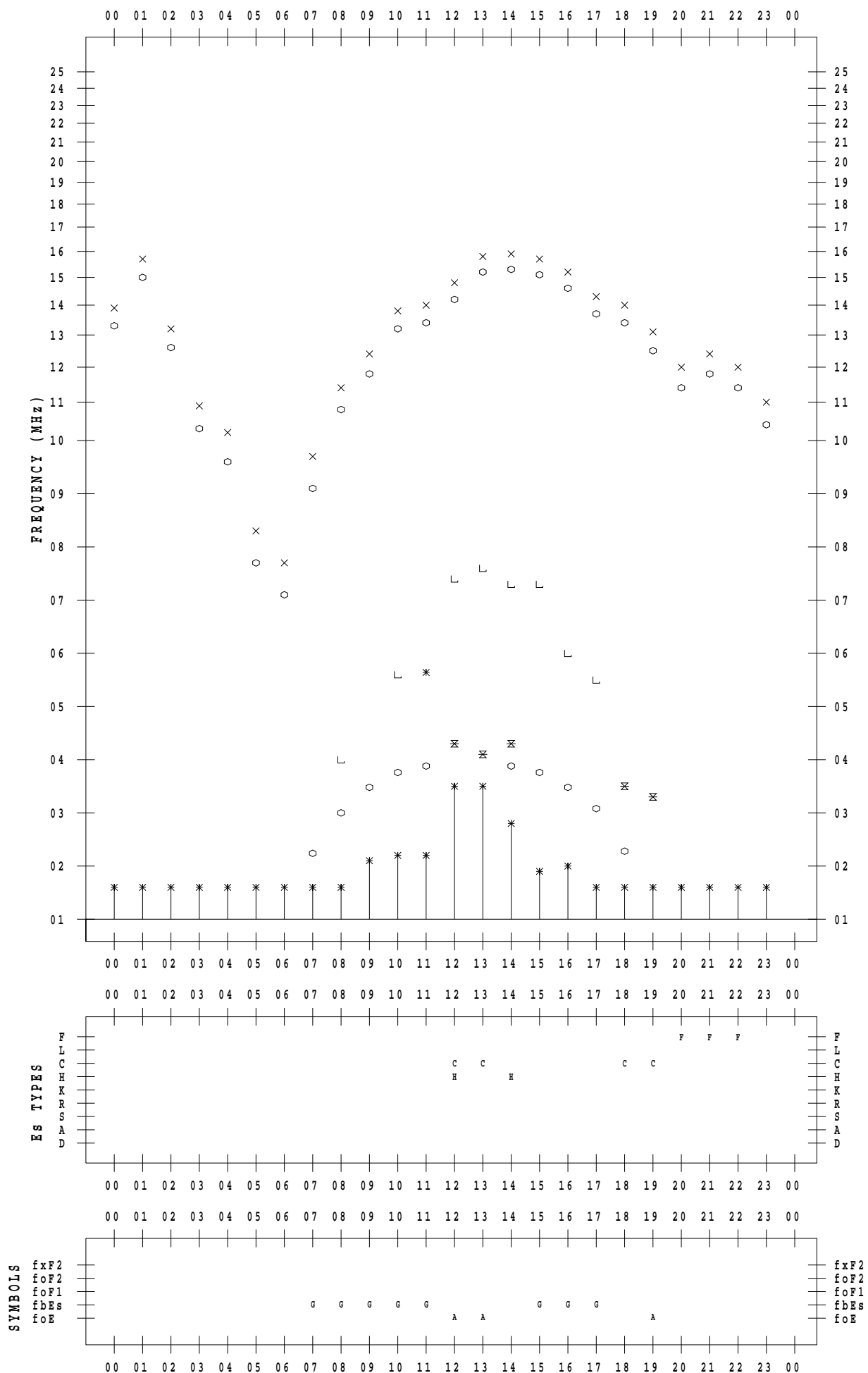
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 29

135 ° E MEAN TIME



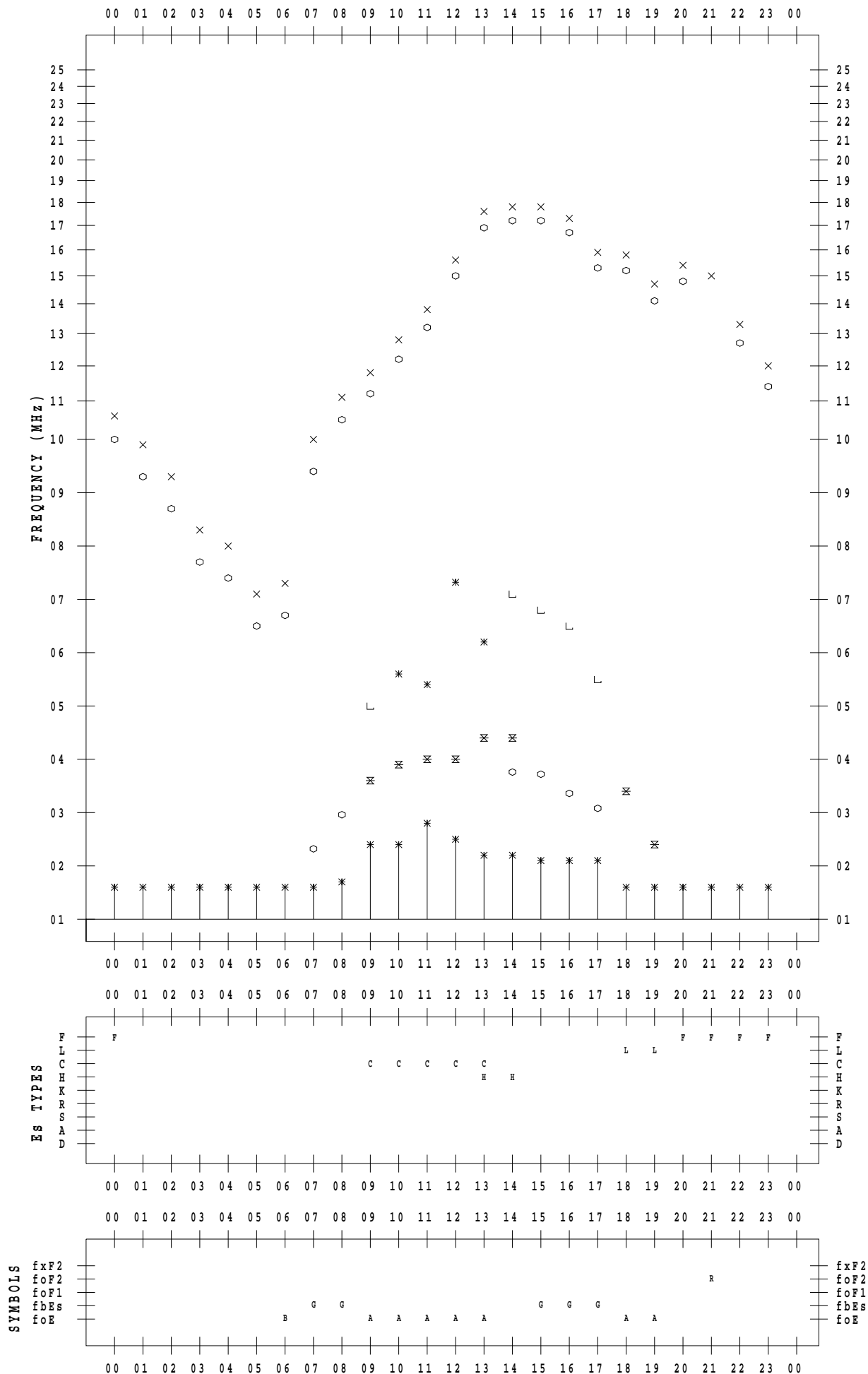
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023 / 3 / 30

135 ° E MEAN TIME



# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2023/ 3/31

135 °E MEAN TIME

