

# IONOSPHERIC DATA IN JAPAN

FOR March 2021

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## CONTENTS

Preface

Introduction . . . . . 1

### A. Ionosphere

#### A1. Automatic Scaling

Hourly Values at Wakkanai ( $foF2$ ,  $fEs$  and  $fmin$ ) . . . . . 4

Hourly Values at Kokubunji ( $foF2$ ,  $fEs$  and  $fmin$ ) . . . . . 7

Hourly Values at Yamagawa ( $foF2$ ,  $fEs$  and  $fmin$ ) . . . . . 10

Hourly Values at Okinawa ( $foF2$ ,  $fEs$  and  $fmin$ ) . . . . . 13

Summary Plots at Wakkanai . . . . . 16

Summary Plots at Kokubunji . . . . . 24

Summary Plots at Yamagawa . . . . . 32

Summary Plots at Okinawa . . . . . 40

Monthly Medians  $h'F$  and  $h'Es$  . . . . . 48

Monthly Medians Plot of  $foF2$  . . . . . 50

#### A2. Manual Scaling

Hourly Values at Wakkanai . . . . . 51

Hourly Values at Kokubunji . . . . . 65

Hourly Values at Yamagawa . . . . . 79

Hourly Values at Okinawa . . . . . 93

$f$ -plot at Wakkanai . . . . . 108

$f$ -plot at Kokubunji . . . . . 139

$f$ -plot at Yamagawa . . . . . 170

$f$ -plot at Okinawa . . . . . 201

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



NATIONAL INSTITUTE OF INFORMATION  
AND COMMUNICATIONS TECHNOLOGY  
TOKYO, JAPAN

# INTRODUCTION

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

National Institute of Information and Communications Technology, Japan.

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

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

## IONOSPHERE

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

### A1. Automatic Scaling

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

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

#### a. Characteristics of Ionosphere

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

#### b. Descriptive Letters

The following descriptive letters are used in the tables.

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

C Impossible measurement because of any failure in observation.

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

N Impossible automatic scaling because of complex echoes.

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

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

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

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

of values.

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

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

#### d. Reliability of Automatic Scaling

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

#### e. Summary Plot

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

### A2. Manual Scaling

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

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

#### a. Characteristics of Ionosphere

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

## b. Symbols

## (i) Descriptive Letters

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

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

## (ii) Qualifying Letters

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

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

extraordinary component.

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

(iii) Description of Types of *Es*

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

The types are:

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

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

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

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

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



HOURLY VALUES OF fof2                      AT Wakkanai

MAR. 2021

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	30	31	30	31	29	31	34	47	53	51	55	62	63	65	62	64	74	77	63	26	30	32	34	35	
2	34	35	29	29	29	29	32	45	57	63	59	62	61	61	57	52	59	57	45	51	37	35	37	35	
3	35	35	35	33	37	23	33	48	56	55	72	73	62	64	66	61	73	57	48	48	33	34	35	36	
4	37	39	40	40	39	34	39	58	66	61	62	72	73	65	59	65	53	54	50	43	44	37	39	40	
5	41	40	40	43	42	39	40	55	58	62	68	75	67	71	66	57	57	59	45	38	39	39	37	37	
6	39	39	37	37	35	35	41	55	64	60	<sup>N</sup> 72	65	71	66	64	59	59	60	48	39	39	38	39	39	
7	38	39	38	33	29	31	38	54	53	57	64	72	65	60	63	63	55	54	47	38	35	34	35	35	
8	36	35	33	31	30	31	35	47	50	55	59	57	59	60	60	60	59	56	40	32	31	33	33	35	
9	35	35	38	35	37	31	39	45	54	63	54	65	60	54	64	55	50	50	49	41	34	33	34	37	
10	39	38	37	38	38	32	37	49	50	52	60	67	55	55	65	54	53	49	35	39	35	35	35	35	
11	35	35	35	35	36	34	43	47	55	60	57	59	60	62	60	57	50	47	43	33	34	33	34	34	
12	35	34	33	33	33	32	40	47	49	53	58	63	64	63	63	59	53	48	50	51	51	47	39	39	
13	41	39	41	38	33	29	33	37	44	47	51	55	64	67	65	62	61	65	65	56	38	41	35	37	
14	38	43	40	37	38	37	45	50	51	55	63	68	77	77	67	65	63	56	41	43	43	37	36	38	
15	37	39	42	36	36	35	41	49	57	68	75	62	60	59	53	58	52	53	42	40	<sup>A</sup>	43	41	39	
16	39	39	38	34	35	35	42	51	51	62	67	77	68	56	57	62	54	50	41	38	39	37	38	37	
17	38	37	43	39	37	37	45	53	54	58	61	63	67	62	68	64	53	50	48	45	46	47	43	44	
18	41	41	41	41	41	42	46	53	51	56	59	62	68	62	57	60	53	51	53	39	38	38	38	37	
19	39	39	40	39	42	32	41	45	48	52	59	59	65	63	58	61	52	54	63	55	51	41	41	39	
20	41	41	43	43	40	40	50	52	55	62	65	59	61	65	64	56	57	45	65	63	59	58	43	45	
21	40	41	37	34	33	32	33	39	41	41	51	51	59	54	55	53	55	51	41	41	39	35	34	33	
22	31	32	31	35	31	31	39	48	49	45	54	60	62	67	67	59	53	57	48	46	41	36	41	45	
23	41	47	42	54	53	35	37	45	49	55	61	64	71	65	56	58	55	54	54	53	35	30	31	31	
24	31	30	30	31	34	25	43	47	52	55	65	69	73	70	65	63	53	51	52	50	42	47	45	46	
25	43	42	41	39	41	31	41	48	53	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	53	57	54	51	51	40	41	39	
26	39	34	34	34	30	32	41	46	59	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	60	57	62	55	52	45	43	<sup>C</sup>	
27	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	<sup>C</sup>	63	65	55	53	50	46	46	44	43	41	
28	40	36	34	34	32	31	39	43	50	53	67	73	68	58	57	60	53	52	56	51	52	52	53	53	
29	54	50	44	49	42	39	44	45	49	56	63	62	65	57	61	62	59	53	57	52	50	43	50	49	
30	45	43	41	40	36	36	43	49	55	57	65	61	54	67	57	59	58	54	47	43	43	39	39	<sup>N</sup> 37	
31	39	37	37	37	34	32	40	49	51	55	69	61	61	61	64	65	66	61	62	63	55	53	53	54	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	30	30	30	30	30	30	30	28	28	28	28	28	28	29	29	31	31	31	31	30	31	31	30
MED	39	39	38	36	36	32	40	48	52	56	62	62	64	62	63	60	55	54	49	45	40	38	39	38	
U Q	41	41	41	39	39	35	43	51	55	60	66	68	68	65	65	63	59	57	56	51	50	44	43	41	
L Q	35	35	34	34	33	31	37	45	50	53	58	60	60	59	57	57	53	51	45	39	35	35	35	35	

## HOURLY VALUES OF fEs AT Wakkanai

MAR. 2021

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	20	47	34	36	44	43	38	38	41	34	48	G	48	G	G	G	G	G	
2	G	G	G	G	G	G	G	G	32	104	64	48	44	38	38	34	31	26	G	G	G		31	G	G
3	G	G	G	G	G	G	11	50	158	38	35	37	37	33	35	33	G	46	28	G	G	G	G	G	
4	G	G	G	G	G	G	G	49	53	41	36	43	37	38	36	32	31	27	24	G		31	G	G	G
5	G	G	G	G	G	G	11	52	32	43	37	38	38	37	45	34	31	G		23	G	G	G	G	G
6	G	G	G	G	G	G	G	27	54	34	38	38	38	37	84		36	28	11	G	G	G	G	G	G
7	G	G	G	G	G	G	G	50	35	50	34	39	38		36	35	G	G		11	G	G	G	G	G
8	G	G	G	G	G	G	29	40	39	38	36	46	37	38	37	33	31	G	11		G	G	G	G	G
9	G	G	G	G	G	G	11	32	36	41	47	39	37	36	37	35	32	G		11	11	23	G	G	G
10	G	G	G	G	G	G	32	48	34	38	132	84	47	38	36	51	31	G	G	G	G	G	G	G	G
11	G	G	G	G	G	G	G	30	90	37	38	46	36	46	37	35	30	G	G	G	G	G	G	G	G
12	G	G	G	G	G	G	G	30	35	40	154	40	38	38	39	35	30	G	G		26	G	G	G	G
13	G	G	G	G	G	G	G	112	35	48	44	42	40	36	39	36	34	G		11	20	G	G	G	G
14	G	G	G	G	G	G	32	31	33	38	45	148	36	37	36	35	31	27	G		G	G	G	G	G
15	G	G	G	G	G	G	26	32	58	37	44	39	36	34	32	39	30	G		25	G	44		28	G
16	G	G	G	G	G	G	35	30	36	35	39	39	39	45	47	35	32	G	G	G	G	G	G	G	G
17	G	G	G	G	G	G	44	32	36	164	46	49	56	60	40	40	39	G	G	G		40		36	G
18	G	G	G	G	G	G		32	48	37	102	49	38	38	38	37	32	G		11		G	G	G	24
19	G	G	G	G	G	56	41	33	43	37		48	43	54	31	36	32	26	23	33	G	24	29	G	
20	G	G		G	G	G	28	35	34	52	42	49	46	38	37	34	36	31	27	G		26	26	G	G
21	G		32	33	24	G	G		142	34	37	45	83	40	39	36	G		32	G	G	G	G	G	G
22	G	G	G		G	G	26	32	32	36	42	44	44	37	34	35	33	G		32	G	25	31	26	G
23		G	G	G	G	G	40	32	33	41	37	35	40	36	37	35	32	G	G	G	G	G	G	G	G
24	G	G	G	G	G	G	48	35	39	36	38	40	40	36	G	35	32	G		G	G	G	G	G	26
25	G		26	59	26	29	G	39	39	34	C	C	C	C	C	C	C		32	28	G	G	G	G	33
26		28	26	G	G	G	G	27	26	35	C	C	C	C	C	C	C	28	30	G	26	60	36	G	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	35		G		31	G	G	G	G	G	G
28	G	G	G	G	G	G	141	36	28	35	40	38	92	47	34	35	32	29	25	26	G	G	G	G	G
29	G	G	G	G	G	59	30	35	38	42	38	37	40	48		32	33	G	G	G	G	G	G	G	G
30	G	G	G	G	G	G	36	34	37	37	38	47	48	46	41	36	32	38	33	32	G	G	G	G	G
31	G		24	G	G	G	34	35	40	52	38	34	32	34	36	36	35	G	G	G	G	G	G	G	26
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	29	30	30	30	30	29	30	30	28	27	28	28	27	29	28	31	31	31	31	31	31	31	31	30
MED	G	G	G	G	G	G	27	34	36	38	40	42	38	38	37	35	32	G	11	G	G	G	G	G	G
U Q	G	G	G	G	G	G	35	47	40	42	45	48	43	45	39	36	33	27	24	G	G	G	G	G	G
L Q	G	G	G	G	G	G	G	32	34	37	38	38	37	36	35	34	31	G	G	G	G	G	G	G	G

HOURLY VALUES OF fmin AT Wakkanai

MAR. 2021

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	14		14	14	15	15	15	13	16	14	14	15	18	15	15	16	15	18	14	14	14	16	14	14	
2	14	16	15	15	15	14	14	14	15	13	15	14	15	15	14	16	15	16	14	14	14	15	14	16	
3	14	14	15	14	17	16	14	15	16	14	14	15	15	16	15	16	15	14	16	15	14	14	14	14	
4	16	16	15	16	15	15	14	14	14	14	15	13	15	14	16	15	13	15	16	15	16	16	16	14	
5	15	14	14	14	14	14	14	15	15	16	14	15	14	15	14	14	15	17	14	14	14	14	14	26	
6	15	14	14	14	14	15	14	14	15	14	14	15	14	15	14	16	16	15	14	14	14	15	14	15	
7	14	14	14	14	14	14	14	15	16	16	14	14	15	14	15	16	15	16	14	14	17	14	14	14	
8	15	15	14	14	14	14	15	15	14	15	15	17	15	15	17	15	13	15	14	15	14	14	14	14	
9	14	14	14	14	15	14	14	16	15	15	13	14	15	15	13	14	15	15	14	16	16	14	15	15	
10	15	15	15	15	15	15	15	15	14	13	15	14	13	14	14	16	17	18	14	14	14	14	14	14	
11	14	15	14	14	15	15	16	15	16	16	15	15	15	17	14	16	15	20	14	16	14	14	14	14	
12	15	14	14	14	14	14	15	15	16	15	15	15	14	14	14	13	15	18	14	15	14	15	15	16	
13	14	14	15	15	14	14	14	16	14	14	14	14	15	14	15	14	16	17	14	15	15	14	14	15	
14	15	15	15	15	15	14	16	15	14	13	14	15	14	15	15	14	15	15	17	14	14	14	14	14	
15	14	14	16	14	14	14	16	15	13	15	13	15	15	15	16	13	14	15	17	15	15	16	16	17	
16	15	14	14	14	14	14	15	15	16	15	14	15	15	15	14	15	15	14	14	15	15	15	16	14	
17	14	15	16	15	16	14	18	15	15	15	14	14	15	17	15	14	14	15	14	14	16	15	15	15	
18	15	16	14	15	15	14		16	14	14	15	15	15	16	15	15	16	14	14	14	14	17	15	16	
19	16	15	15	14	14	15	15	16	15	15	15	16	14	15	17	15	16	14	15	16	16	16	16	15	
20	16	16	15	14	16	15	14	16	15	14	15	16	15	16	13	15	13	15	16	16	16	16	16	15	
21	15	15	16	16	16	15	15	15	16	15	15	15	15	15	14	13	16	20	14	15	15	15	14	14	
22	16	15	15	40	14	15	18	16	16	13	14	14	15	15	17	15	15	16	15	17	16	16	16	15	
23	16	16	17	14	16	14	14	15	16	15	15	15	15	15	16	14	14	20	15	15	14	14	14	14	
24	14	14	14	15	16	15	15	15	17	14	14	14	15	15	16	14	12	13	15	14	15	15	15	16	
25	16	16	15	16	15	16	15	15	16	C	C	C	C	C	C	C		14	15	16	16	15	15	15	17
26	16	16	16	16	16	16	16	15	13	C	C	C	C	C	C	C		14	15	14	16	16	15	15	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C		17	15	15	15	14	14	15	14	14	15
28	14	14	14	14	15	15	14	17	16	15	14	15	5	15	15	16	13	15	16	16	15	14	14	15	
29	14	16	15	186	15	16	14	16	16	14	15	15	15	15	16	16	15	15	15	15	14	15	15	16	
30	15	14	16	14	14	14	14	17	17	14	16	15	17	17	15	11	15	15	16	16	15	14	14	14	
31	15	17	14	14	14	14	15	16	15	15	15	15	16	15	16	16	16	15	14	14	14	14	14	15	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	29	30	30	30	30	29	30	30	28	28	28	28	28	28	29	29	31	31	31	31	31	31	30	
MED	15	15	15	14	15	14	15	15	15	14	14	15	15	15	15	15	15	15	14	15	15	15	14	15	
U Q	15	16	15	15	15	15	15	16	16	15	15	15	15	15	16	16	15	17	16	16	16	15	15	16	
L Q	14	14	14	14	14	14	14	15	14	14	14	14	14	15	14	14	14	15	14	14	14	14	14	14	

HOURLY VALUES OF fof2 AT Kokubunji

MAR. 2021

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

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



HOURLY VALUES OF fEs AT Kokubunji

MAR. 2021

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	G	G	G	G					G	C	G		G				G	G	G
2	G	G	G	G	G	G	G	G		30	33	33	41			G	34	G	22	22		G		G
3		G	G	G	G	G	G	G		47	34	131	34	38	34	31		G		G	G	G	G	G
4	G	G	G	G		G	G		29	34	31	56	40	51	42	32	31		G	11	G	G	G	G
5	G	G	G	G	11	G	G	180	45	33	35		37	39	G	34	G	33	G	G	30	G	G	G
6	G	G	G	G	G	G	G		33	54	40	40	36		G	G	G		G		G	G	G	G
7	G	G	G	G	G		G		G	G		G	G				G	34	47		G	G	G	G
8	G	G	G	G	G	G	G	32			36			37	39	33	33	G	11	43		G	G	G
9	G	G	G	G	G	G	G		32	40	37	33	32	37	65	38	33	G	11		G	G	G	G
10		G	G	G	G		G	29	33	34	36	37	39	G		38	34	33		11	40	G	G	G
11	27	G	G	G	G	G	G	31	36	37	32	39	39		37	41	40	29	33	11		G	G	G
12	G	G	G	G	G	G		G	29	37	36		41	40	35	34	31	31	25		G		G	G
13		G	G	G	G	G	35		29	41	34	41	34	39	37	35	34	47	G	G		11	G	27
14	31	G	G	G	G	G	G	31	34	46	31	41	39	43	33	33		G	G	47	23		G	25
15	G	G	G	G	G	G	G	G		35	37	39	40	40	33	32	34	33		G	G	G	G	G
16	G	G	G	G	G	G	G	32	31		G	40		38		G	G		G	G	G	G	G	G
17	G	G	G	G	G		49	112		G	G		39	42	37			G	G	G	G	G	G	G
18		G	G		G	G	33	50	42		G	40	36	35	34	41	33	G	G	G	G	G	G	G
19	35	26	47	27		G	47	47	40		39	39		40		G	41			24		G	G	G
20	G	G		G	G	G	40	34	34	G	38	N	G	G		31	G	G	G		11	11	28	31
21	G	G	G	G	G	G	39	49	38	36	36	41	39	55	55	40	33	47	28		G	G	40	37
22	26	53	29	26	29	27	G	52	33	37		49	39	40	36	33	33	G	G	G	G	G	G	G
23	G		G	G	G	G	26	28	34	35	39	40	60	34	55	39	27	34	60	27			25	G
24	G	24	30	29		G	33	27	34	38	39	40	50	40	33	37		G	G	G	92	60	36	G
25		G	G	G		G	G	28		34	40	61	40	40	50	47	40		G	26		G	G	G
26	34				29		41		31	36	37		37	38		30	34	28		G	G	G	G	G
27	G	31	G	34	32	G	G	30	35	G	41	37	42	G	G		38	36	34	26	G	43	G	36
28		G	26	28		G	26	34	32	43	37	40	50	38	31	29	29	G	G	G	G	G	G	G
29	G	G	G	G	G	G	28	37	34	42		G	40		31	37		G	G	G	G	G	G	G
30	G	G	G	G	G	G	37	35	33	41	34	40	38	33	32	40	29	31	27	11		G	G	G
31	G	G	G	G			31	35	32	43	46		41	40	G	37	39	28	26	11	G	G	G	G
							31	29	32	35	39	39	40		33	33		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	30	31	30	31	30	27	31	30	30	31	31	30	31	31	30	31	30	31	31	31	30	30	31	31
MED	G	G	G	G	G	G	G	30	34	36	36	40	39	37	32	34	33	G	G	G	G	G	G	G
U Q	G	G	G	G	G	G	33	35	36	41	39	40	41	40	37	38	34	31	26	11	11	G	G	G
L Q	G	G	G	G	G	G	G	G	32	30	32	33	36	G	G	29	G	G	G	G	G	G	G	G

HOURLY VALUES OF fmin                      AT Kokubunji

MAR. 2021

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	13	15	18	15	14	13	15	15	17	15	17	15	16	C	16	15	18	15	15		13	14	13
2	14	14	14	13	14	14	13	15	15	15	15	15	17	16	15	15	15	16	15	15	15	14	15	16
3	15	15	15	14	14	14	13	13	15	17	17	17	19	17	15	15	15	20	14	14	15	15	15	15
4	14	17	13	15	13	18	13	22	17	17	16	16	17	39	31	17	15	16	15	16	15	17	15	15
5	14	15	17	13	13	15	15	15	16	14	15	15	15	15	35	15	15	17	14	13	18	13	14	17
6	14	14	17	15	14	14	14	15	16	14	16	17	15	17	15	17	15	16	14	14	15	17	15	15
7	13	17	14	17	14		14	15	15	15	16	17	15	42	14	15	15	15	13	14	13	14	14	14
8	13	15	14	15	14	20	13	15	15	15	15	17	15	15	17	15	15	15	14	16	14	15	13	14
9	14	14	14	14	17	15	14	15	16	16	17	46	33	43	17	16	17	15	15	15	14	17	21	15
10	15	15	15	15	14		14	15	14	14	15	18	17	15	17	17	15	15	16	15	15	14	14	14
11	14	17	14	17	15	14	13	15	16	15	16	17	17	18	15	15	15	15	15	15	15		18	14
12	15	14	13	13	13	14	14	25	16	15	15	17	17	25	16	16	16	15	14	18	15	16	16	15
13	15	15	15	15	13	14	15	16	17	16	17	16	17	16	43	17	15	15	13	14	13	17	15	16
14	15	21	15	14	13	15	15	15	15	15	16	18	16	17	15	16	15	15	14	13	15	13	14	15
15	14	14	15	14	15	14	18	15	16	15	33	19	15	16	15	15	16	15	14	16	20	15	17	13
16	18	18	14	14	17	15	14	15	16	16	40	16	45	17	42	33	16	14	14	14	14	14	21	15
17	14	14	14	14	17		17	15	15	15	15	17	17	17	15	16	15	15	15	17	14	14	17	14
18	14	15	15	15	15	14	17	16	17	16	17	43	16	20	17	16	15	15	14	16	15	17	15	14
19	14	15		14	14	17	13	16	17	15	42	16	16	17	16	17	15	15	14	14	14	16	15	14
20	18	15	15	15	18	13	18	15	15	15	15	17	20	23	17	17	17	14	15	16	14	13	15	15
21	16	15	16	15	15	16	16	17	17	16	17	21	15	20	17	15	16	15	15	14	13	17	13	14
22	15	14	13	14	13	15	17	16	16	16	15	19	21	17	17	19	15	16	16	15	15	15	16	14
23	13	15	16	16	14	14	13	15	15	16	18	20	20	46	19	15	15	14	15	15	17	17	15	17
24	15	15	15	15	15	14	18	16	17	15	16	17	20	17	16	16	14	15	15	16	14	13	14	18
25	15	15	15	14	15	16	18	16	15	14	19	43	16	18	22	16	17	15	14	14	14	14	15	15
26	18	15	15	15	15	15	15	16	15	15	16	17	19	17	16	15	17	14	15	15	14	17	17	15
27	16	15	15	15	16	14	20	16	15	17	18	16	21	21	17	17	17	15	17	14	17	14	14	14
28	18	17	18	14	14	14	18	15	15	17	17	17	17	41	24	16	15	15	20	15	15	17	23	15
29	14	13	14	14	14	14	15	17	17	16	15	17	25	17	17	18	16	15	15	14	15	15	14	14
30	13	14	14	13	13	14	15	16	17	15	18	42	34	34	34	16	15	16	15	14	14	17	14	13
31	21	15	15	15	15	14	13	16	17	16	20	23	23	45	16	17	31	15	18	14	16	20	17	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	30	31	31	28	31	31	31	31	31	31	31	31	30	31	31	31	31	31	30	30	31	31
MED	15	15	15	15	14	14	15	15	16	15	16	17	17	17	17	16	15	15	15	15	15	15	15	15
U Q	15	15	15	15	15	15	17	16	17	16	18	19	20	25	19	17	16	16	15	16	15	17	17	15
L Q	14	14	14	14	14	14	13	15	15	15	15	17	16	17	15	15	15	15	14	14	14	14	14	14

## HOURLY VALUES OF fof2 AT Yamagawa

MAR. 2021

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	B	B	B	B	B	B		
2	B	B	B	B	B	B	B	B	B	B	B	69	61	73	79	94	70	63	61	51	53	N	35	33	A	
3	32	34	31	33	35	A	B	41	50	66	69	97	60	69	84	105	93	79	61	50	39	40	33	B	31	
4	B	31	34	31	34	41	A	B	47	61	54	74	73	77	78	87	87	66	57	61	58	40	36	34	A	
5	34	33	33	33	36	32	28	47	55	52	75	63	78	80	85	71	66	63	51	51	44	36	37	34		
6	35	34	35	33	33	32	B	27	49	64	59	66	71	73	92	76	75	67	63	65	45	39	40	41	39	
7	39	39	37	38	40	32	27	46	55	54	62	60	79	84	78	75	72	68	72	60	33	31	A	A		
8	31	33	33	32	31	31	32	48	54	55	65	77	83	71	68	79	77	61	63	45	33	33	33	B	33	
9	33	33	32	32	32	B	B	43	56	61	64	58	69	76	87	75	70	64	69	58	34	32	31	33		
10	31	32	31	32	35	B	B	45	57	54	65	60	77	83	70	62	56	64	73	54	A	A	31	31		
11	32	33	33	32	31	32	32	47	49	53	58	73	73	85	64	58	60	59	65	47	35	B	31	33	33	
12	34	34	31	33	33	B	B	44	51	57	58	61	69	77	71	65	64	61	62	55	54	58	38	35		
13	39	39	35	37	38	37	32	57	53	58	56	65	79	76	68	66	73	78	83	55	N	34	31	A	A	
14	36	35	35	35	36	B	B	41	53	55	68	83	89	92	103	92	69	57	63	55	46	38	35	35		
15	35	33	34	37	33	B	B	52	70	69	72	66	68	91	79	57	55	57	65	61	51	45	50	46		
16	35	34	31	31	33	31	B	29	48	59	62	66	59	65	89	87	61	55	51	61	52	39	37	34	33	
17	33	B	32	31	31	33	32	26	47	55	57	62	64	66	75	80	86	71	61	60	54	51	38	35	35	
18	33	32	32	33	32	32	33	N	47	52	59	64	64	79	92	104	95	74	61	55	56	45	34	36	37	
19	36	35	33	35	36	B	B	43	55	64	59	60	66	84	81	79	73	63	65	68	59	34	34	34		
20	35	35	34	33	33	33	32	49	59	63	69	76	74	73	74	61	65	67	64	83	77	42	41	37		
21	39	41	38	33	A	34	39	56	61	77	73	88	86	84	80	65	60	65	75	65	51	39	40	39		
22	B	36	36	35	35	28	B	32	49	63	65	62	77	77	85	100	96	76	65	73	65	50	40	33	34	
23	A	34	33	35	34	B	30	46	55	63	66	71	83	87	85	79	69	67	71	61	49	34	33	A		
24	33	33	34	33	34	26	31	49	55	60	56	63	83	79	77	78	75	67	60	59	54	47	39	37		
25	37	36	35	37	31	B	25	31	47	60	63	77	88	79	93	90	88	83	69	71	65	56	47	31	34	
26	34	35	32	33	33	27	33	59	65	79	69	64	74	85	82	71	69	69	88	99	48	B	32	B	30	33
27	B	A	32	A	31	A	32	56	65	62	64	72	75	85	71	67	65	65	66	62	57	43	43	41		
28	41	38	38	35	35	30	33	51	64	73	62	73	80	90	76	60	56	58	61	60	58	A	38	38		
29	37	39	39	37	34	33	32	49	54	61	65	74	86	89	73	64	63	73	71	57	45	39	41	40		
30	40	41	41	37	34	33	37	57	66	61	63	65	78	95	98	72	69	69	79	59	40	35	34	35		
31	35	B	35	33	39	32	B	35	44	61	59	61	67	83	92	83	68	57	59	61	61	57	49	46	45	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	28	28	29	28	28	23	26	29	29	29	29	30	30	30	30	30	30	30	30	30	29	28	28	25		
MED	35	34	33	33	33	31	32	47	56	61	65	68	77	84	80	74	69	64	65	58	48	38	34	35		
U Q	36	36	35	36	35	32	32	50	62	63	69	74	80	90	87	86	73	67	71	61	54	41	39	38		
L Q	33	33	32	33	32	26	28	45	54	56	62	63	69	77	74	65	63	61	61	54	39	34	33	33		

## HOURLY VALUES OF fEs AT Yamagawa

MAR. 2021

LAT. 31°12.0'N LON. 130°37.0'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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	B	B	B	B	B	B
2	B	B	B	B	B	B	B	B	B	B	B	34	41	46	45	52	49	35	34	30	G	G	G	43
3	32	G	G	G	G	33	B	34	G	36	44	49	39	41	44	60	40	40	G	G	G	G	B	
4	B	G	G	G	G	24	B	G	53	46	47	38	45	44	39	40	36	31	G	11	36	G	34	
5	G	G	G	G	G	G	G	G	29	37	40	44	48	40	34	32	35	48		G	G	G	G	
6	G	G	G	G	G	G	B	G	29	53	37	47	46	52	36	36	32	34	G	11	G	24	G	
7	G	G	G	G	G	G	G	G	32	37	43	48	44	41	40	37	35	32	G	21	32	G	41	
8	G	G	G	G	G	G	G	G	33	36	44	38	45	41	43	40	38	34	G	23	G	G	B	
9	G	G	G	G	G	B	B	G	G	38	37	46	44	41	46	38	36	32	G	11	G	G	G	
10	G	G	G	G	11	B	B	48	34	38	39	54	43	46	60	48	40	36	42	53	58	54	G	
11	G	G	G	G	G	G	G	G	34	36	47	39	50	52	54	43	50	50	45	24	G	B	G	
12	G	G	G	G	G	B	B	43	32	39	42	51	45	44	51	43	40	45	38	28	35	11	G	
13	G	33	G	G	G	G	G	G	32	34	42	44	50	47	51	43	38	31	G	48	G	B	40	
14	G	G	G	G	G	B	B	G	35	44	45	45	43	45	39	35	35	38	G	36	G	G	G	
15	G	G	G	G	G	B	B	30	36	38	36	46	46	45	42	32	38	40	34	G	G	G	G	
16	G	G	G	G	G	G	B	G	36	39	35	34	46	46	44	32	36	38	31	G	G	G	G	
17	G	B	G	G	G	G	G	29	54	40	44	47	49	50	46	45	43	35	G	G	G	G	G	
18	G	27	36	34	G	G	G	45	49	38	38	40	40	45	46	45	36	31	29	34	G	G	G	
19	G	G	G	G	G	B	B	36	48	36	40	39	47	40	45	38	58	32	30	G	11	G	G	
20	G	G	G	G	G	G	G	G	35	36	38	40	49	46	39	48	44	50	38	50	23	G	G	
21	G	G	38	24	24	G	G	28	35	44	47	49	40	33	39	41	44	31	G	G	G	G	G	
22	B	G	G	G	G	B	G	48	32	38	39	40	46	43	50	42	39	35	G	49	G	G	G	
23	46	G	G	G	G	B	G	G	32	36	36	40	44	46	41	42	37	39	G	G	45	G	56	
24	G	G	G	G	G	G	G	39	39	40	41	43	46	44	42	41	39	37	G	32	G	G	G	
25	G	G	30	31	31	B	G	46	40	40	44	47	54	50	38	38	38	33	G	G	11	G	G	
26	G	G	G	G	31	32	35	33	38	42	43	50	41	40	49	48	45	44	41	23	44	B	B	
27	B	86	G	34	G	32	G	G	28	36	40	53	49	59	50	38	40	44	51	40	33	G	G	
28	G	G	G	G	G	G	G	33	38	35	38	44	44	41	47	43	39	33	G	G	G	36	G	
29	G	G	G	G	G	G	G	45	39	37	38	46	49	45	55	51	49	35	28	36	G	G	G	
30	G	G	G	G	G	G	G	G	36	38	40	44	48	42	43	38	36	G	G	11	G	G	G	
31	G	B	G	G	32	B	G	36	40	37	44	52	48	47	44	53	60	31	G	40	G	G	G	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	27	29	29	29	19	19	29	29	29	29	30	30	30	30	30	30	30	29	30	30	27	29	28
MED	G	G	G	G	G	G	G	28	35	38	40	44	46	45	44	42	39	35	G	22	G	G	G	G
U Q	G	G	G	G	G	G	G	37	39	40	44	48	48	46	49	45	44	40	34	36	23	G	G	G
L Q	G	G	G	G	G	G	G	32	36	38	40	44	44	41	40	38	36	32	G	G	G	G	G	G

## HOURLY VALUES OF fmin AT Yamagawa

MAR. 2021

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	B	B	B	B	B	B
2	B	B	B	B	B	B	B	B	B	B	B	21	20	22	18	15	14	17	16	16	16	22	15	15
3	16	15	15	14	16	15	$\begin{matrix} B \\ 16 \end{matrix}$	15	14	14	20	15	20	22	19	20	14	15	15	15	14	14	15	$\begin{matrix} B \\ 15 \end{matrix}$
4	$\begin{matrix} B \\ 15 \end{matrix}$	15	14	15	15	15	$\begin{matrix} B \\ 22 \end{matrix}$	15	16	17	17	17	17	19	16	16	15	15	15	14	15	24	16	15
5	15	14	15	22	14	23	18	27	15	15	15	20	17	38	24	23	23	15		15	16	15	24	15
6	14	14	15	15	24	18	$\begin{matrix} B \\ 20 \end{matrix}$	15	13	16	17	17	17	16	17	17	16	17	22	14	14	15	15	15
7	15	24	15	17	14	15	14	15	17	16	17	19	20	18	22	15	15	15	17	15	14	15	16	15
8	71	27	23	14	14	15	15	22	15	15	17	18	22	16	22	18	16	16	15	15	15	22	17	$\begin{matrix} B \\ 15 \end{matrix}$
9	15	15	16	15	15	$\begin{matrix} B \\ 22 \end{matrix}$	$\begin{matrix} B \\ 22 \end{matrix}$	15	17	20	16	23	22	19	20	16	15	22	14	14	14	15	15	66
10	15	26	15	15	15	$\begin{matrix} B \\ 15 \end{matrix}$	$\begin{matrix} B \\ 15 \end{matrix}$	15	17	15	19	22	20	19	18	18	15	14	14	15	17	15	26	15
11	71	15	15	15	14	71	15	15	14	14	15	17	18	24	21	23	20	15	14	16	14	$\begin{matrix} B \\ 15 \end{matrix}$	15	15
12	15	15	15	18	15	$\begin{matrix} B \\ 15 \end{matrix}$	$\begin{matrix} B \\ 15 \end{matrix}$	15	15	16	17	17	21	19	21	19	16	15	14	15	15	15	15	15
13	15	15	15	15	15	15	15	15	16	14	15	22	22	22	19	24	24	17	17	14	26	$\begin{matrix} B \\ 15 \end{matrix}$	15	16
14	15	15	14	15	15	$\begin{matrix} B \\ 22 \end{matrix}$	$\begin{matrix} B \\ 22 \end{matrix}$	22	15	17	18	19	22	20	19	18	16	14	15	15	15	15	23	15
15	15	15	23	15	16	$\begin{matrix} B \\ 15 \end{matrix}$	$\begin{matrix} B \\ 15 \end{matrix}$	15	15	17	18	33	17	27	35	18	19	15	17	15	16	23	15	28
16	15	15	15	15	14	15	$\begin{matrix} B \\ 15 \end{matrix}$	15	15	16	15	17	21	17	34	23	16	16	14	14	14	14	14	14
17	15	$\begin{matrix} B \\ 15 \end{matrix}$	15	15	18	15	17	14	16	17	20	21	22	20	23	19	21	17	15	16	17	16	15	15
18	15	16	16	16	16	15	15	15	16	15	19	22	22	23	19	17	16	15	15	15	15	14	15	15
19	14	16	26	15	14	$\begin{matrix} B \\ 16 \end{matrix}$	$\begin{matrix} B \\ 16 \end{matrix}$	16	16	14	19	19	19	33	23	17	16	15	16	15	14	16	24	16
20	15	15	15	15	15	66	14	15	15	17	18	19	21	22	17	19	21	15	15	15	15	15	24	15
21	14	14	16	15	15	15	15	15	17	14	20	20	21	19	19	32	15	14	22	15	16	15	23	15
22	$\begin{matrix} B \\ 15 \end{matrix}$	15	15	24	15	$\begin{matrix} B \\ 15 \end{matrix}$	14	15	14	15	16	21	20	22	22	18	20	15	22	15	15	15	30	15
23	15	15	23	14	15	$\begin{matrix} B \\ 16 \end{matrix}$	15	15	15	15	18	18	23	23	19	24	16	15	14	14	15	16	15	15
24	15	14	15	15	15	22	15	18	15	15	15	21	17	21	23	18	19	16	16	16	16	26	15	15
25	15	15	15	16	16	$\begin{matrix} B \\ 15 \end{matrix}$	23	16	15	15	20	19	21	23	26	18	17	17	14	15	14	15	15	16
26	21	15	15	15	15	16	15	16	16	17	14	18	23	19	22	19	19	15	14	16	18	$\begin{matrix} B \\ 15 \end{matrix}$	$\begin{matrix} B \\ 15 \end{matrix}$	14
27	$\begin{matrix} B \\ 16 \end{matrix}$	16	15	15	16	16	16	14	16	15	17	18	18	21	22	19	19	15	16	15	16	23	26	15
28	23	22	15	14	14	15	14	16	15	15	20	21	21	19	20	19	18	16	21	14	15	15	15	15
29	16	23	14	14	16	15	15	15	17	17	15	21	21	20	21	21	17	14	15	15	15	28	24	28
30	14	14	14	14	14	15	23	15	17	15	20	17	21	19	19	19	15	15	23	15	23	15	15	15
31	15	$\begin{matrix} B \\ 30 \end{matrix}$	30	23	15	$\begin{matrix} B \\ 14 \end{matrix}$	17	15	15	15	21	22	21	21	19	21	18	16	15	15	15	26	24	23
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	27	29	29	29	21	20	29	29	29	29	30	30	30	30	30	30	30	29	30	30	28	29	29
MED	15	15	15	15	15	15	15	15	15	15	18	19	21	21	20	19	16	15	15	15	15	15	15	15
U Q	15	16	16	15	16	17	16	17	16	16	20	21	22	22	22	21	19	16	17	15	16	22	24	15
L Q	15	15	15	15	14	15	14	15	15	15	15	17	19	19	19	18	16	15	14	15	14	15	15	15

## HOURLY VALUES OF fof2 AT Okinawa

MAR. 2021

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	31	A	31	30	27	24	N 23	39	55	59	58	68	71	90	108	119	117	133	96	84	47	B 24	N 31	31
2	34	32	33	32	38	31	B	43	54	57	68	76	72	79	88	97	91	72	61	60	51	34	N 24	30
3	A	A	30	30	34	35	B	38	49	70	73	87	72	72	93	118	111	94	69	56	38	35	33	N 28
4	30	30	33	33	41	N 23	B 23	42	61	67	68	89	82	89	91	116	96	89	77	74	43	37	35	35
5	34	34	33	32	39	N 24	A	43	56	67	69	86	76	97	97	89	71	70	67	54	53	36	33	35
6	34	35	34	33	35	29	N 24	45	56	59	65	84	85	108	108	96	90	69	61	56	41	42	43	37
7	39	38	35	37	37	31	N 23	41	57	63	63	69	75	91	96	90	90	83	91	73	39	30	33	33
8	35	36	35	34	31	31	31	47	58	55	68	85	101	94	93	97	104	94	83	76	68	55	54	47
9	41	52	45	34	31	27	B 23	42	53	60	63	73	77	84	87	92	89	90	81	66	50	41	34	35
10	32	B 33	33	34	37	B	B	42	56	57	65	64	83	98	85	66	62	A	A	A	A	A	A	31
11	31	31	32	31	30	30	N 23	45	54	50	57	85	99	100	113	89	70	70	73	A	47	A	31	A
12	31	N 30	33	32	39	N 24	N	45	51	56	62	76	90	90	88	89	87	88	75	67	59	62	45	34
13	34	35	35	36	35	33	28	55	54	55	61	81	89	83	78	85	84	85	85	66	44	A	31	34
14	B 31	32	31	33	37	B	B	44	54	62	76	90	104	116	139	135	114	99	95	87	84	54	34	A
15	31	35	33	36	N 23	25	23	47	64	75	74	78	87	110	101	91	62	61	67	72	64	51	56	43
16	35	A	34	32	33	N 24	B 23	51	54	63	71	69	83	110	99	81	62	61	61	63	51	34	N 31	32
17	31	N 31	N 30	31	30	34	23	44	55	58	64	76	84	85	92	100	102	84	83	89	62	37	N 30	31
18	31	30	31	A	31	31	24	43	49	57	65	76	87	106	120	116	115	91	91	62	58	57	53	58
19	53	50	43	49	51	N 25	B 23	47	53	59	69	72	79	97	109	108	93	87	74	76	63	43	31	34
20	34	33	34	B 33	38	25	B 24	48	55	64	77	90	91	93	111	84	76	86	95	94	97	41	46	44
21	39	36	37	35	32	32	38	55	60	77	84	86	90	86	97	83	69	75	80	74	58	41	41	41
22	38	37	37	41	25	A	N 25	51	58	71	74	79	91	94	110	115	113	110	93	91	59	41	37	33
23	33	31	B 33	37	A	A	A	49	59	68	65	72	88	97	107	109	101	99	91	77	60	40	33	31
24	32	A	35	37	37	34	32	50	62	65	63	65	79	93	91	107	105	93	91	82	71	53	39	34
25	35	35	50	51	30	B 23	B 23	52	57	69	76	91	89	106	112	115	113	93	94	88	73	57	31	27
26	31	33	30	30	30	25	28	57	69	75	70	84	91	114	122	120	116	116	133	115	63	48	N 32	33
27	33	A	A	34	A	25	31	54	66	66	70	73	93	101	99	92	91	91	89	92	69	49	42	41
28	38	34	N 35	33	32	B 24	27	54	63	77	76	75	89	98	99	80	66	65	65	61	57	41	34	35
29	33	35	35	36	31	30	30	48	55	65	72	82	87	101	107	81	71	80	81	60	48	39	38	38
30	38	38	38	39	B 23	B 23	28	55	58	73	66	75	89	108	124	112	101	101	98	73	54	33	33	33
31	34	33	34	36	B	B	23	47	55	67	67	83	100	113	102	75	61	64	65	69	61	55	49	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	26	30	30	28	26	24	31	31	31	31	31	31	31	31	31	31	30	30	29	30	28	30	28
MED	34	34	34	34	32	26	24	47	56	64	68	78	87	97	99	96	91	88	82	73	58	41	34	34
U Q	35	36	35	36	37	31	28	51	59	69	73	85	91	106	110	115	105	94	91	85	63	52	42	37
L Q	31	32	33	32	30	24	23	43	54	58	64	73	79	90	92	85	71	72	69	62	48	36	31	31

## HOURLY VALUES OF fEs AT Okinawa

MAR. 2021

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	G		G	G	G	G	G	G	G													B	G	G	
2	G	39	G	G	G	G	B	G		50	36	46	46	46	41	38	36	32	28	48	36		G	G	
3			G	G	G		B	G		29	34	43	38	41	38	37	40	41	29	25	G	G		G	
4	G	40	39	G	G	39			33	34	37	38	38	48	44	36	G	60	34	29	G	G	24	G	
5	G	G	G	G	G		B		119	48	38	35	37	39	50	51	35	40	35	28	11	G	G	G	
6	G	G	G	G	G	29	60	32	28	34	43	46	48	51	N	48	41	31		G		26	112		
7	G	G	G	G	G		G		29	35	46	48	48	52	45	48	44	39	26	11	G	G	G	G	
8		G	G	G	G	11		32	178	39	46	44	57	60	35	40	36	34	25	48		G	G	G	
9	29	G	G	G	G	G		48	G	33	36	32	45	50	42	43	41	54	36	11	26	G	G	25	
10	G	B	G	G		B	B		24	28	33	36	35	54	49	45	44	32		42	48				
11	G	G	G	G	38			152	28	39	38	37	45	52	54	54	43	78	82	63	144	54	66	27	
12	G	G	G	G	G		G		33	60	44	49	46	41	51	51	53	53	35	93	G	27	G	28	
13	G	G	G	G	G	11			29	44	34	46	48	45	46	48	40	36	35	28	G	G	G	G	
14	B		G	G	G	B	B		29	35	39	44	45	46	56	45	34	35	G	11	G	35	31	39	
15	G	24	G	G	G	G		30	35	37	40	45	46	44	44	41	34	60	35	28		46	24	39	
16	G	G	G	G	G	G		29	36	33	36		47	61	38	41	39	32	30	23	28	G	G	G	
17	G	44	28	G	G	G	B		31	35	39	35	47	40	40	48	49	45	56	34	29	40		26	
18	G	G	G	G	G		G		28	35	40	44	47	51	54	55	53	44	38	37	49	27	20	23	
19	G	G	G	G	40	26	25		39	40	37	44	40	40	39	43	43	39	32	28	22	G	G	G	
20	G	G	B	G	G	G	B		27	30	35	37	43	46	48	48	44	42	40	37	32	35	38	G	
21	G	G	G	G	G	G		27	112	37	38	40	40	46	48	46	56	42	35		11	G	G	G	
22	G		G	G	G		G		29	29	41	46	46	46	40	40	G	G	39	24	24	11	G	G	
23	G	29	B	G		72	58	28	34	36	39	55	48	48	46	47	36	36	28	19	11		25	G	
24	28	36	27	G	60	33	27		32	35	38	48	44	40	36	42	40	35	26	11	22	28	G	32	
25	G	G	G	G	G	B	B		27	32	37	39	47	39	38	44	35	41	38	33	33	26	11	G	
26	G	G	G	G	G	G		23	38	35	38	47	49	43	N	32	39	35	32	21	G	11	G	G	
27	G	G	G	G	G	G		27	30	40	49	50	41	52	48	44	42	38	32	24	48	33	G	G	
28	G	27	28	72	46		G		29	35	41	44	49	50	88	46	43	48	50	32	52	33	G	G	
29	G	G	G	G	G	B	G		30	34	40	45	47	48	57	53	42	40	36	G	25	G	G	31	
30	G	G	G	G	G	G		40	38	38	41	45	47	56	54	59	61	32	44	37	25	G	G	G	
31	G	G	G	B	B	G		29	31	36	47	48	47	46	46	36	40	32	G	11	19	G	G	G	
			36					31	39	37	42	48	48	67	88	57	43	62	61	59	70		G	38	
CNT	30	30	30	30	29	25	21	30	31	31	31	31	31	31	29	31	31	31	31	31	31	31	30	31	30
MED	G	G	G	G	G	G	G	28	33	37	39	46	46	48	46	43	40	38	32	25	11	G	G	G	
U Q	G	G	G	G	G	18	G	31	36	40	44	48	48	52	51	48	43	50	35	48	28	27	G	26	
L Q	G	G	G	G	G	G	G	23	29	35	37	40	41	43	42	38	36	34	26	11	G	G	G	G	

HOURLY VALUES OF fmin AT Okinawa

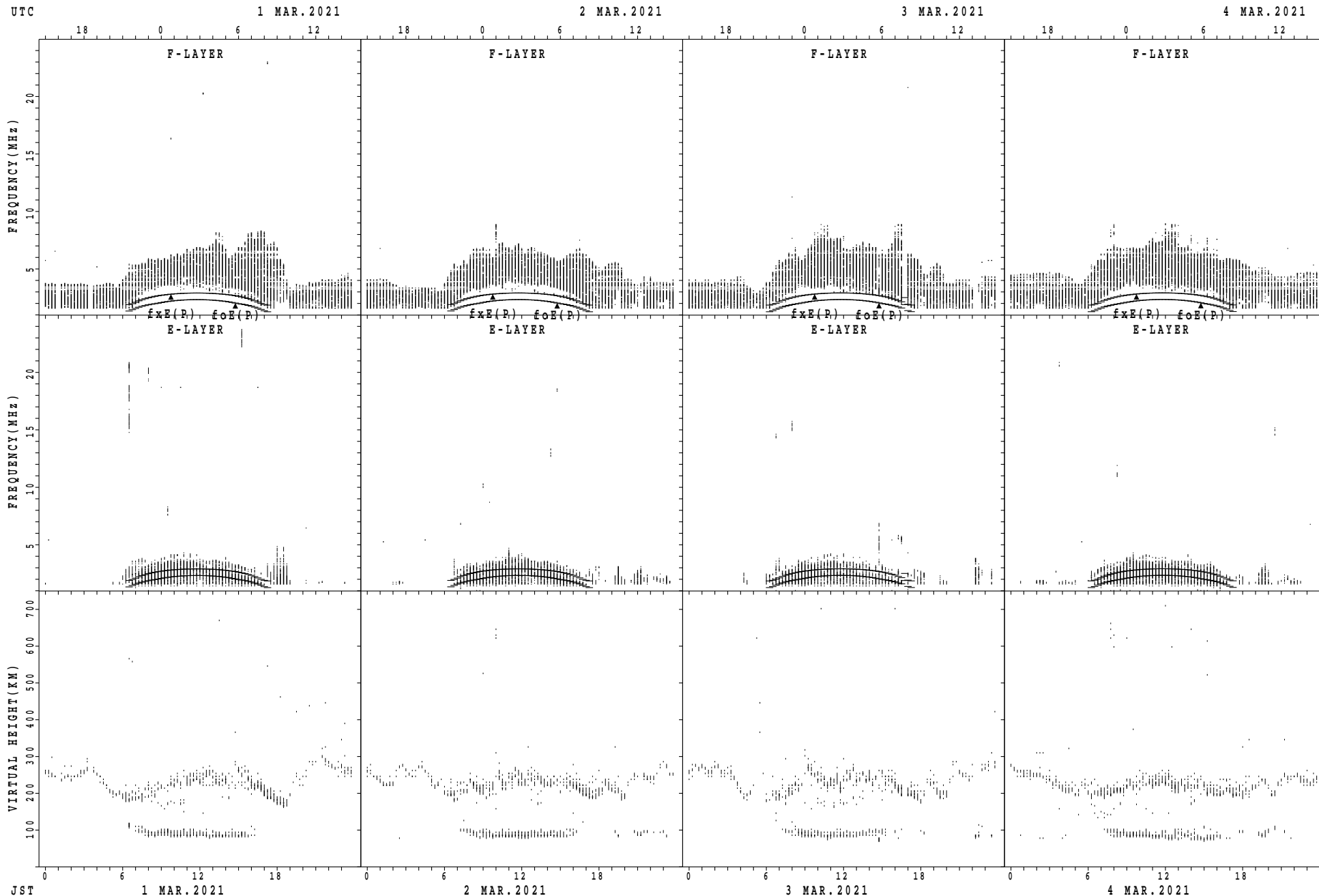
MAR. 2021

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	14	15	14	14	16	15	15	16	15	16	15	17	15	16	14	16	15	15	B	66	14
2	14	15	15	15	15	14	B	15	15	15	17	15	17	17	17	15	14	13	15	15	15	15	15	15
3	15	15	15	14	15	14	B	16	15	17	15	16	16	17	17	15	15	14	16	15	15	15	15	17
4	16	15	15	16	14	14	B	17	14	15	16	16	16	15	14	15	15	16	15	14	14	16	14	17
5	15	15	14	14	14	15	16	17	15	14	15	15	16	16	16	15	17	15	17	14	14	15	15	124
6	14	15	15	16	14	15	15	16	16	15	17	17	16	19	16	15	14	14	15	14	14	14	15	14
7	14	15	15	14	14	15	15	14	15	15	15	15	16	17	17	14	16	14	15	14	16	18	16	14
8	16	15	15	15	14	15	14	18	16	15	16	17	19	16	17	16	17	15	15	14	15	17	16	15
9	14	B	14	14	14	15	B	18	15	15	15	16	15	17	19	16	15	16	15	14	14	14	15	15
10	15	B	18	14	14	19	B	15	16	16	16	17	18	21	17	17	15	16	13	15	17	15	15	15
11	15	15	14	14	15	14	14	17	16	15	16	18	20	17	16	15	14	14	16	15	16	15	14	16
12	14	15	17	15	15	15	66		15	15	16	17	17	16	18	15	14	15	16	15	15	16	14	15
13	15	15	15	15	15	15	16	15	17	15	15	15	16	18	17	17	17	16	17	16	17	16	16	15
14	B	15	15	16	14	15	B	B	14	15	14	14	16	17	20	17	16	15	15	15	15	15	15	16
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16	14	15	16	14	16	15	B	15	13	15	15	16	15	16	17	14	17	15	17	15	15	14	15	16
17	14	18	15	16	15	16	15	15	16	13	15	16	14	19	16	15	14	14	14	17	15	15	15	15
18	16	14	15	15	16	15	15	14	15	16	17	17	20	19	18	16	13	14	15	16	16	15	16	17
19	15	15	15	15	14	15	B	15	15	15	15	16	19	16	17	16	14	14	16	16	15	14	16	15
20	14	15	16	B	17	15	B	15	12	15	15	15	16	16	17	16	15	15	16	16	15	15	15	14
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22	15	16	15	14	15	16	15	15	15	15	16	18	19	18	17	16	14	14	15	17	15	14	15	20
23	15	15	B	16	15	15	16	16	16	17	15	15	18	15	15	16	13	16	15	14	16	14	15	15
24	16	15	16	16	16	15	14	15	15	15	16	17	16	18	18	16	14	13	16	15	16	14	14	15
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27	15	15	15	16	15	15	14	15	15	14	15	16	16	19	17	19	15	14	15	15	16	15	14	15
28	14	15	15	15	15	B	14	15	15	14	15	15	15	17	17	17	15	15	14	15	14	14	15	15
29	15	15	15	15	14	14	14	15	16	13	17	17	19	21	15	16	13	13	14	15	16	15	15	14
30	15	15	15	15	B	B	18	15	16	14	16	17	22	17	17	15	13	13	20	14	15	15	21	15
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	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	30	30	29	27	21	30	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31
MED	15	15	15	15	15	15	15	15	15	15	16	16	17	17	17	16	15	14	15	15	15	15	15	15
U Q	15	15	15	16	15	15	16	16	16	15	16	17	19	19	17	16	16	15	16	15	16	15	15	16
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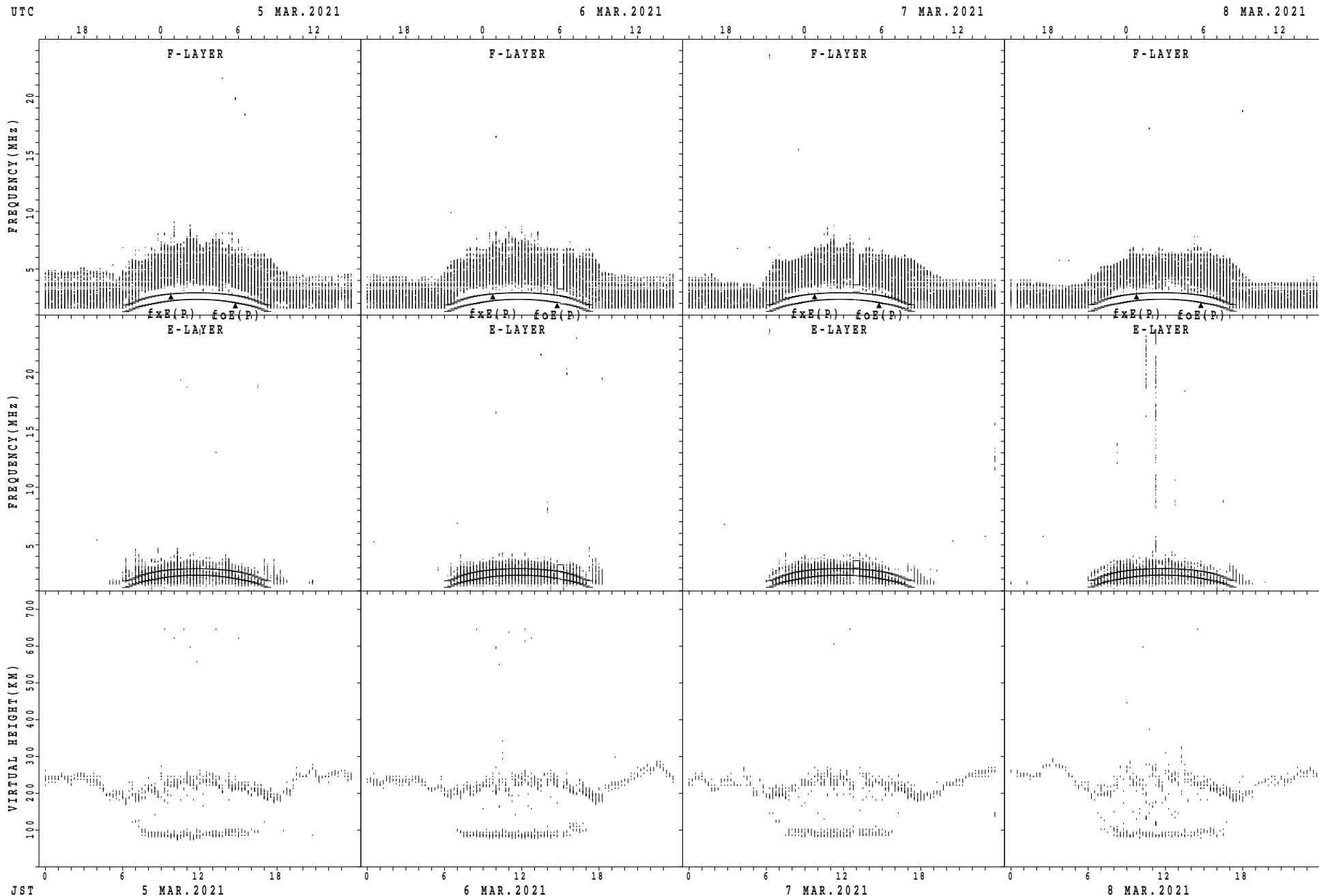


SUMMARY PLOTS AT Wakkanai



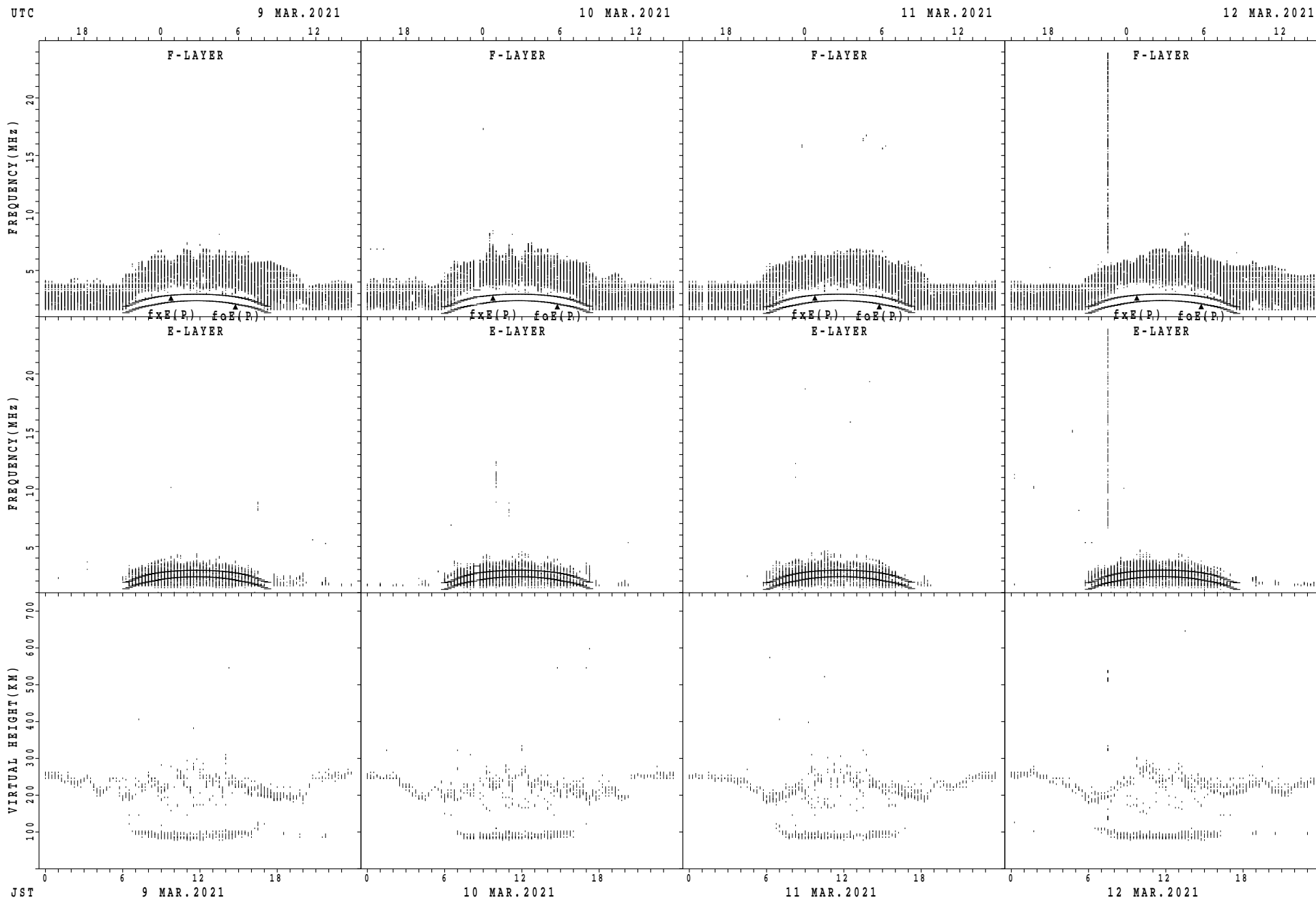
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



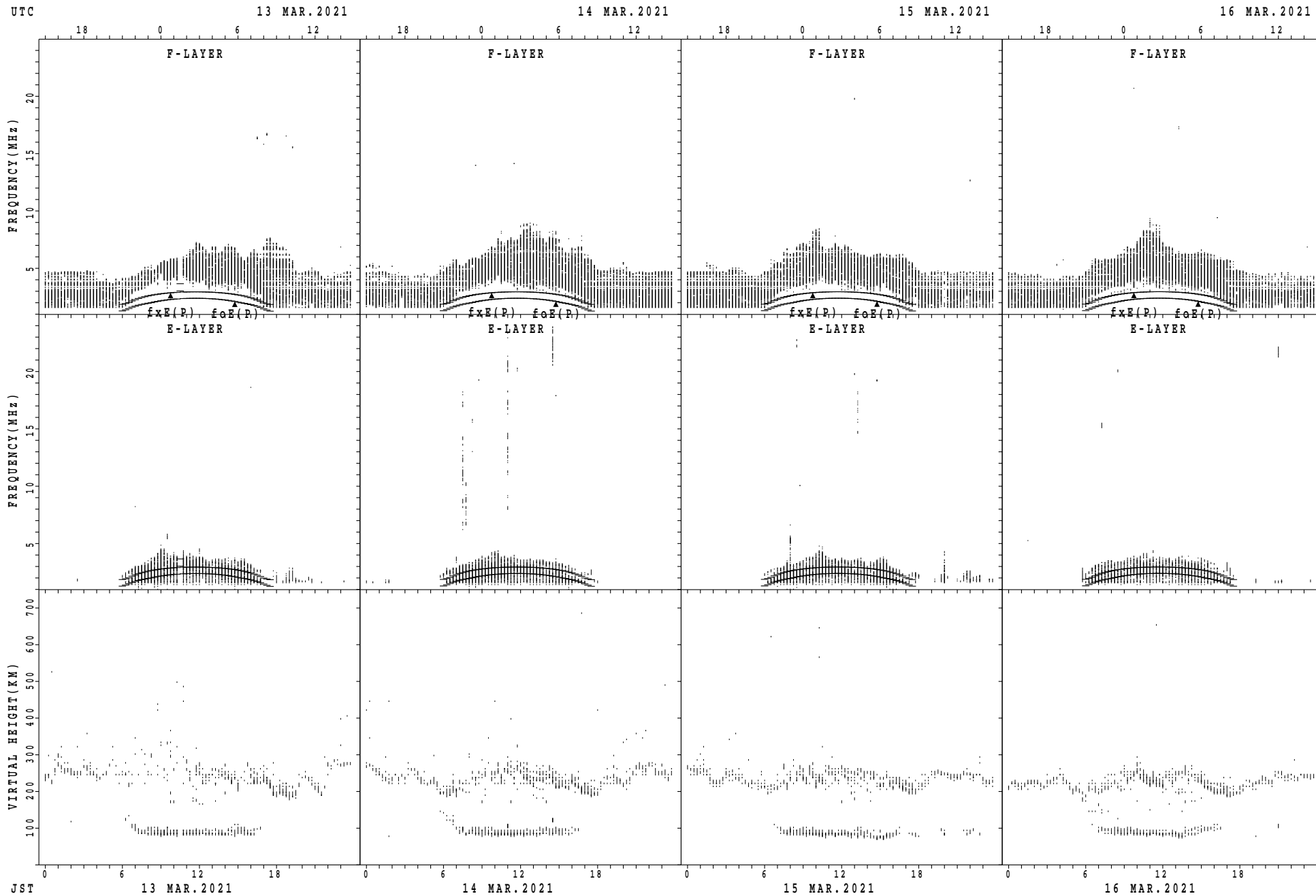
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



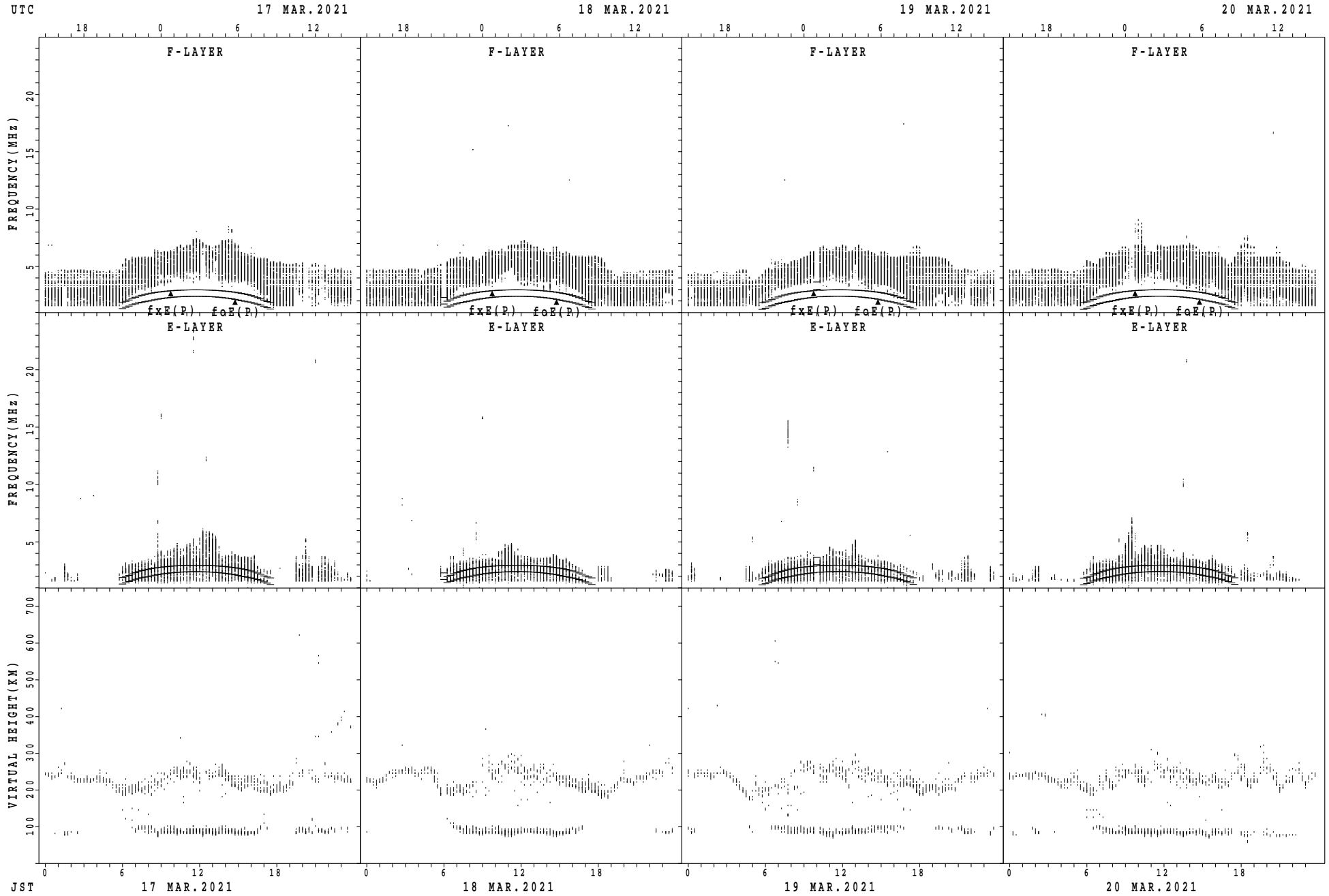
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Wakkanai



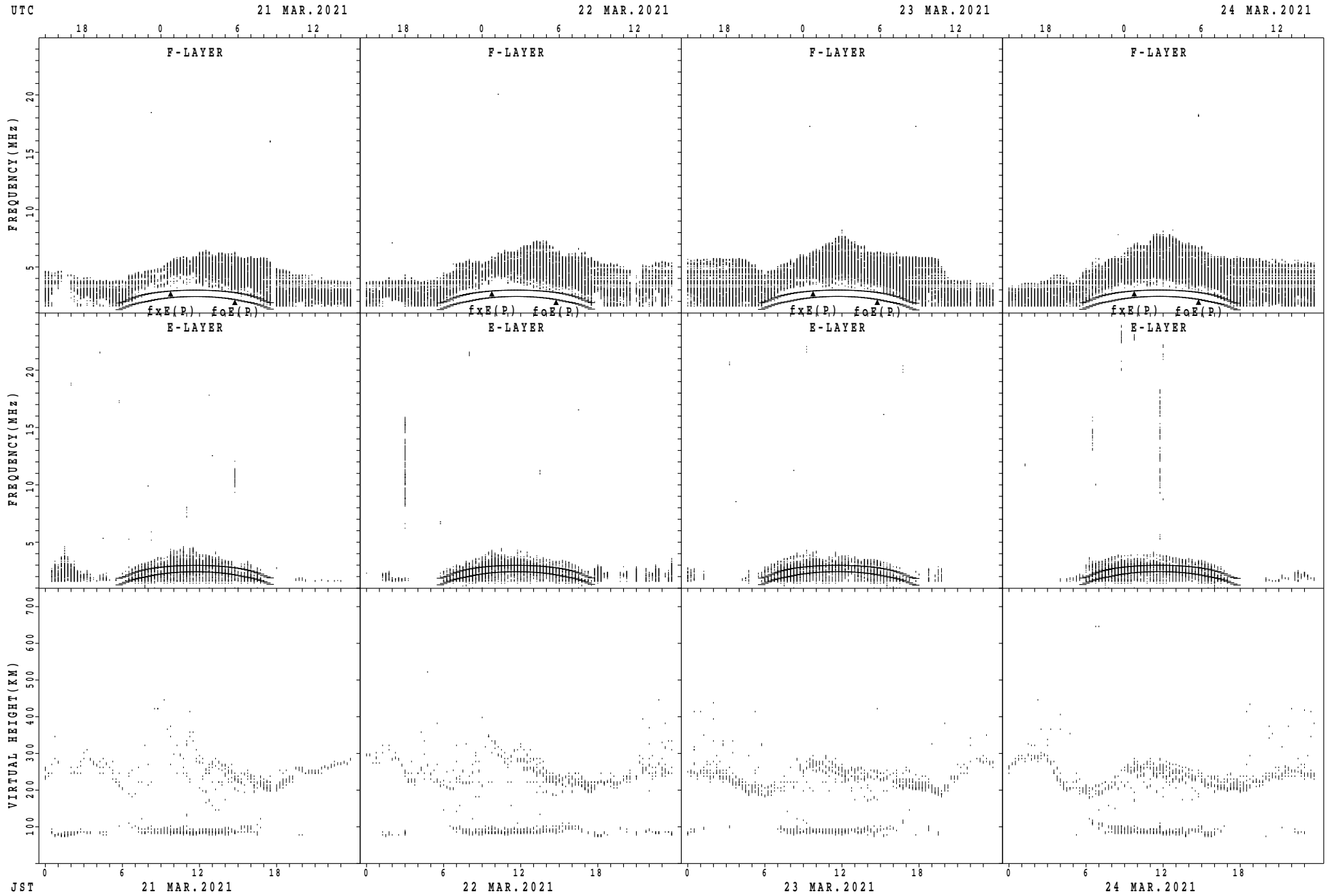
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



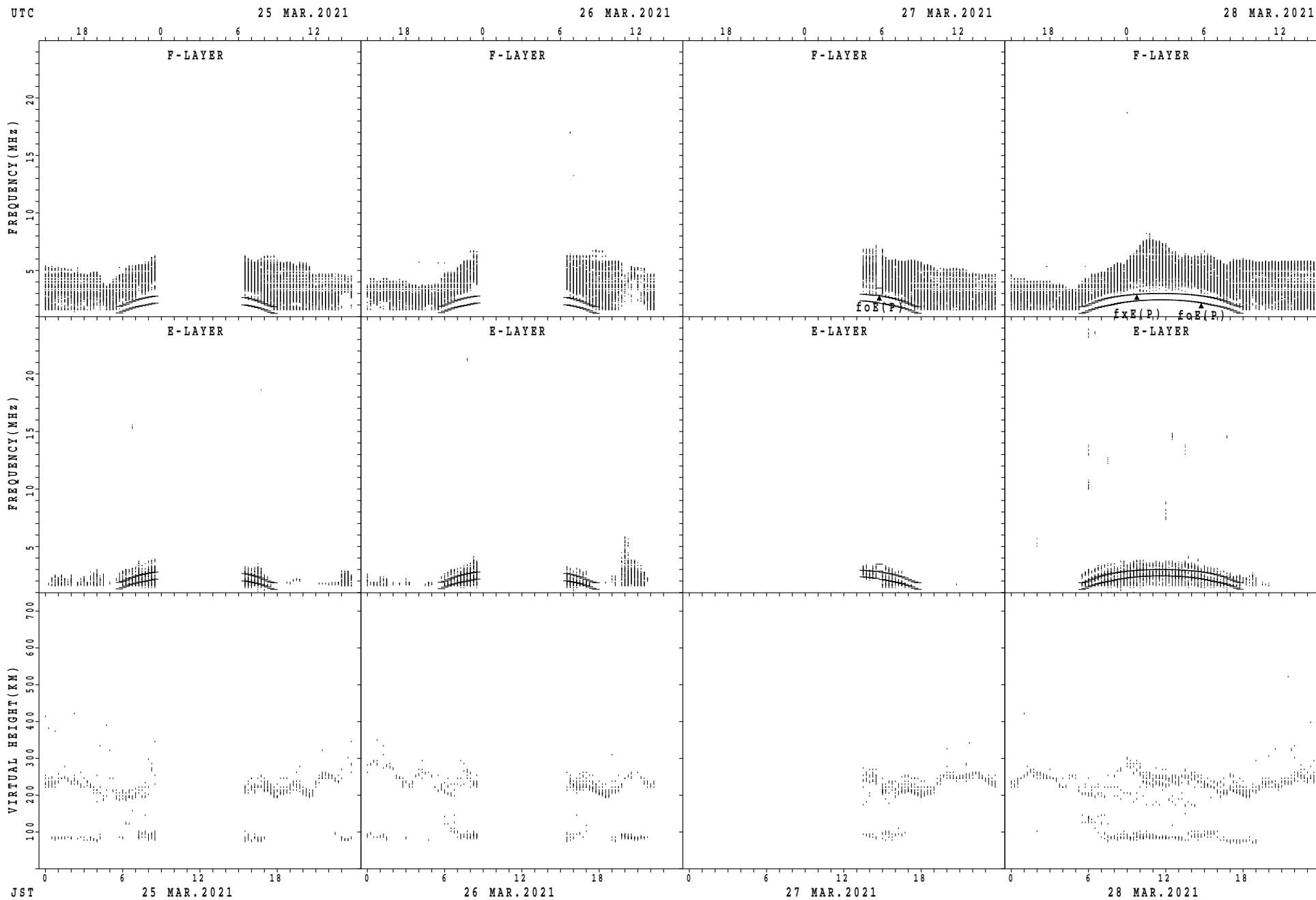
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



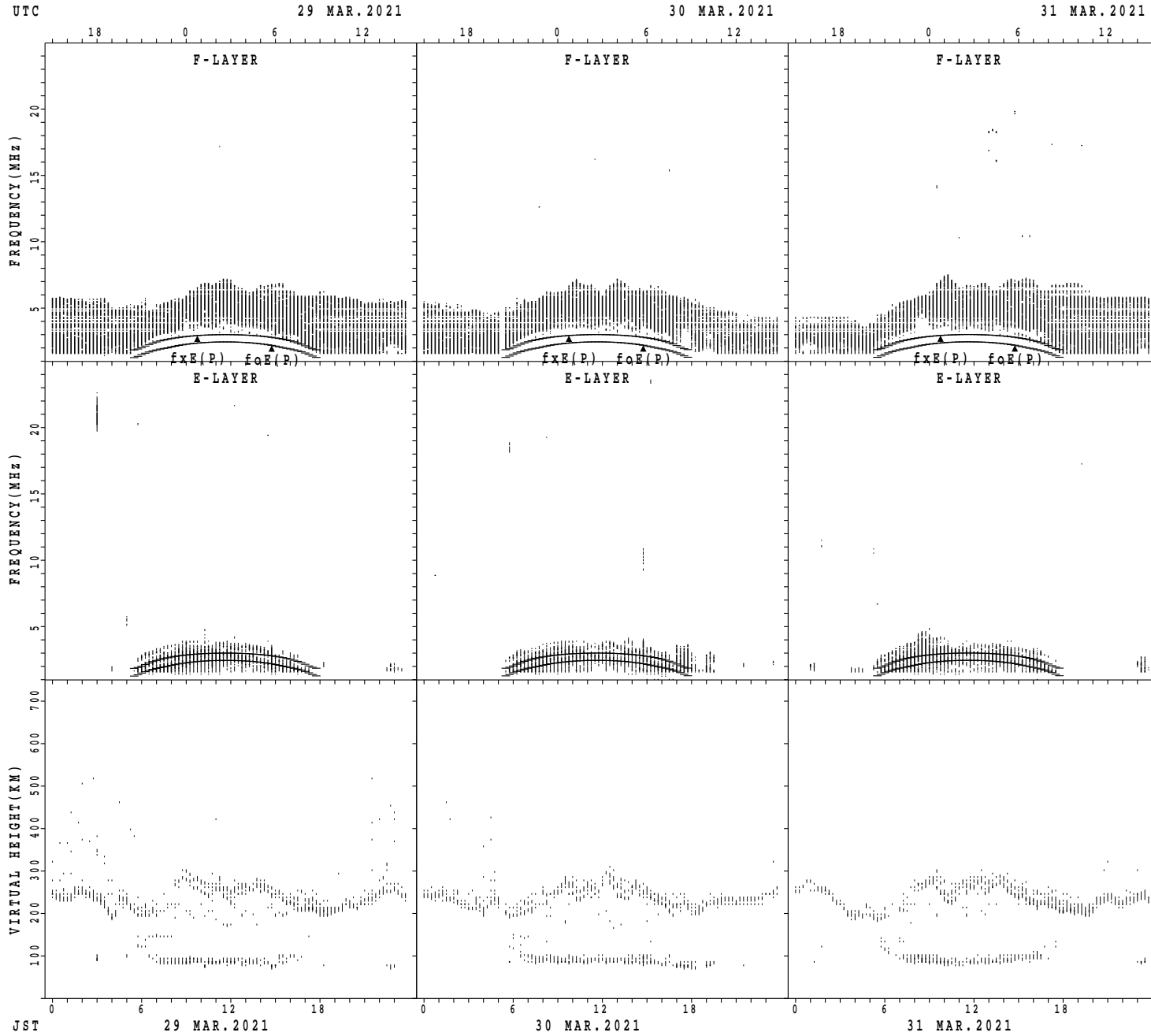
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



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

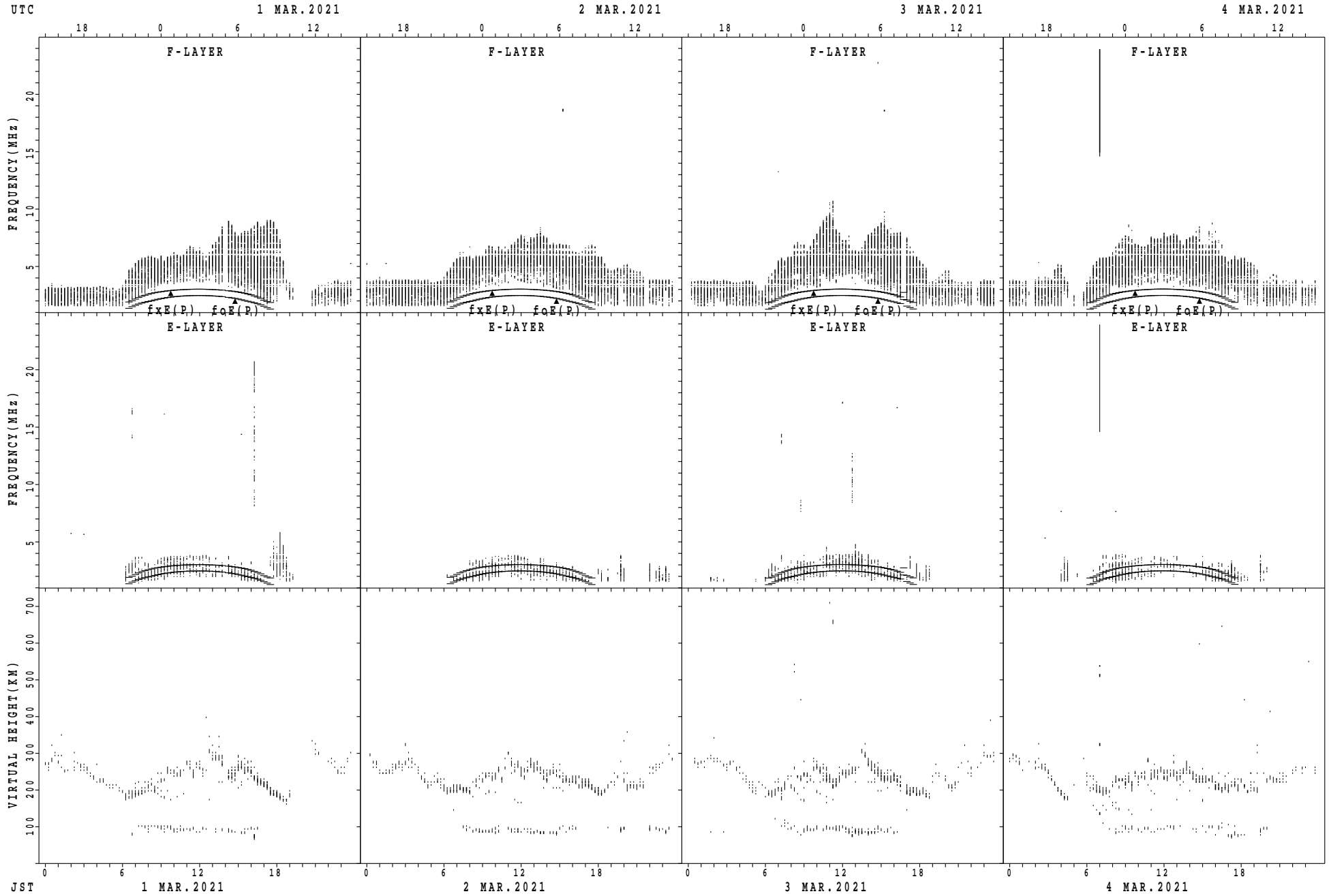
SUMMARY PLOTS AT Wakkanai



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

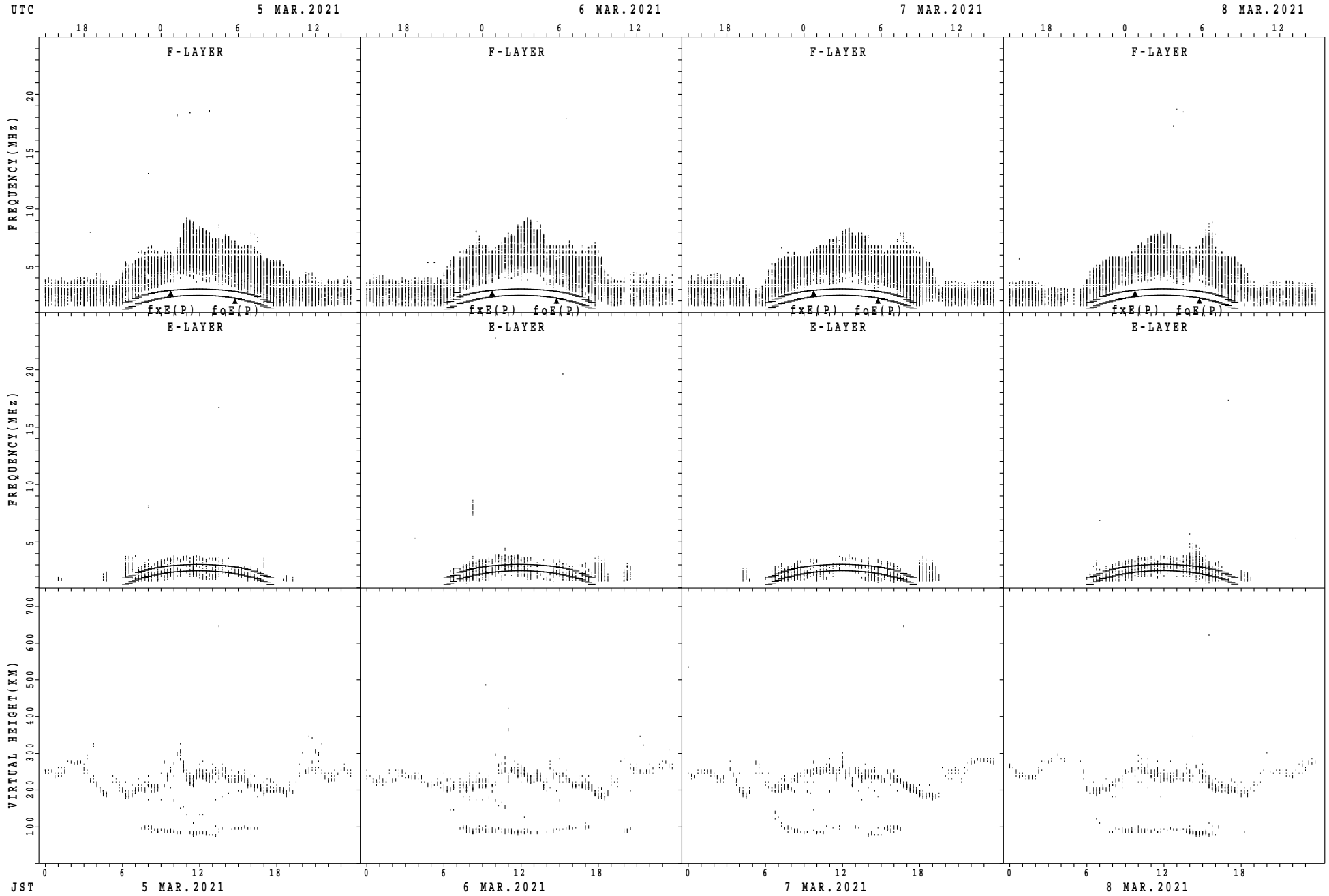


SUMMARY PLOTS AT Kokubunji



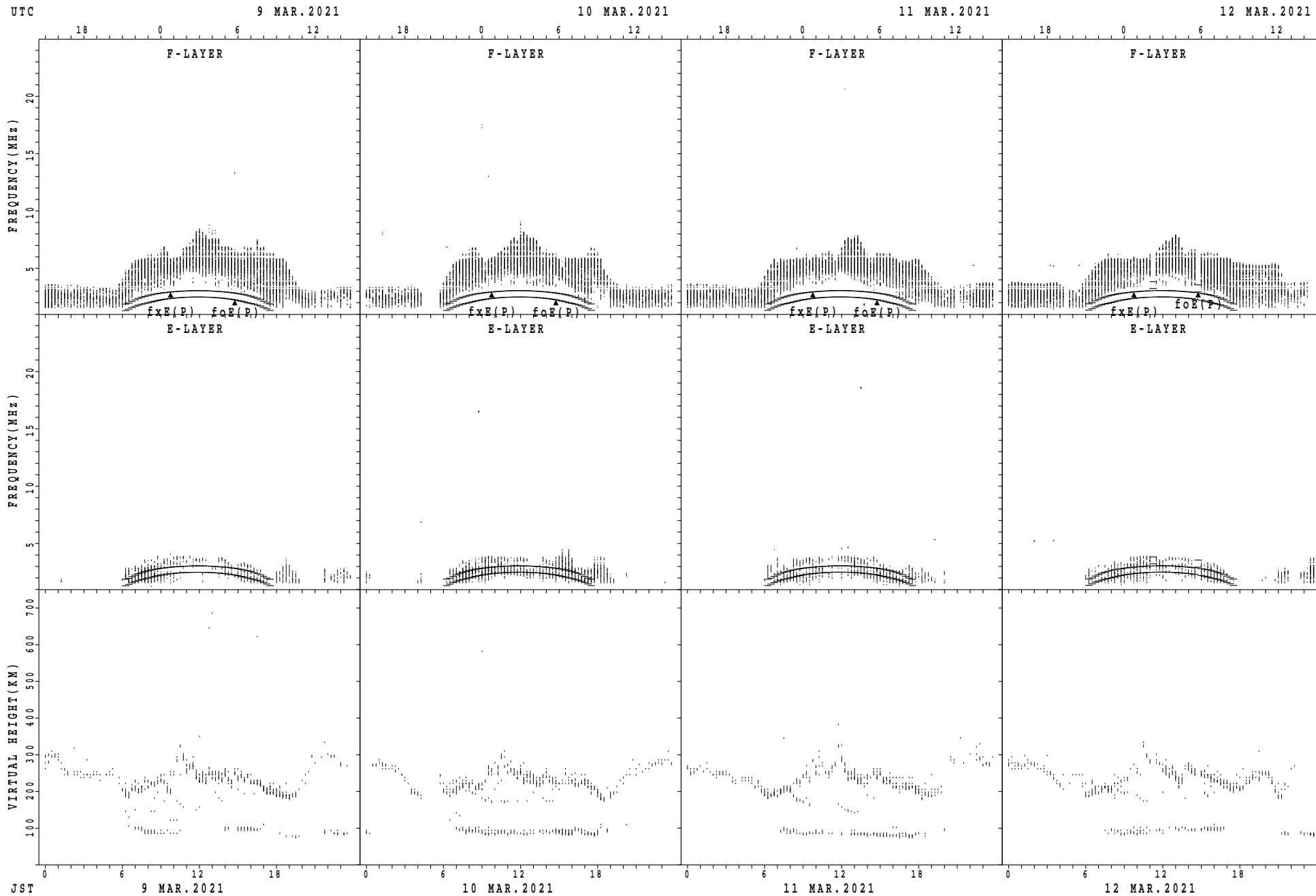
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



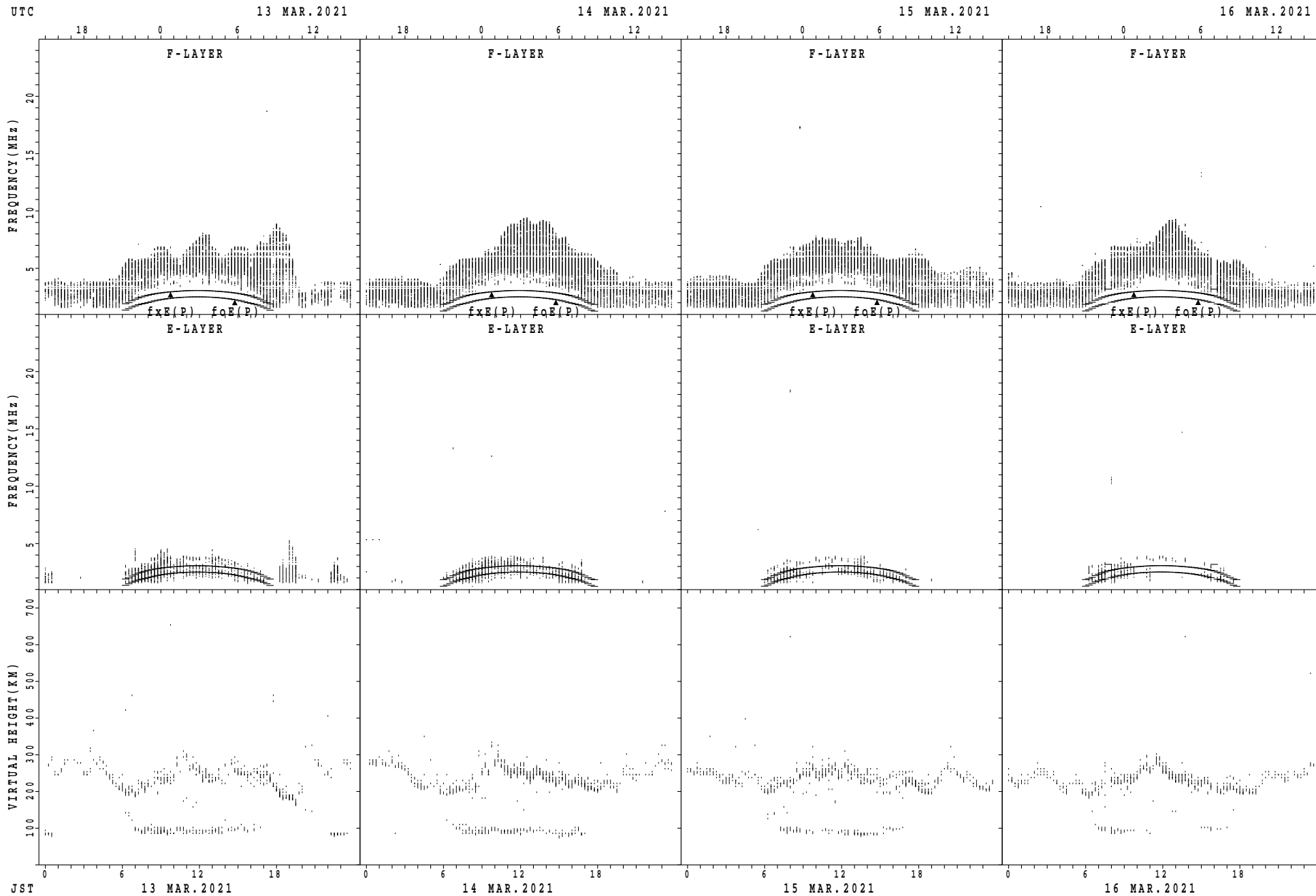
$fxE(P)$ ; PREDICTED VALUE FOR  $fxE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



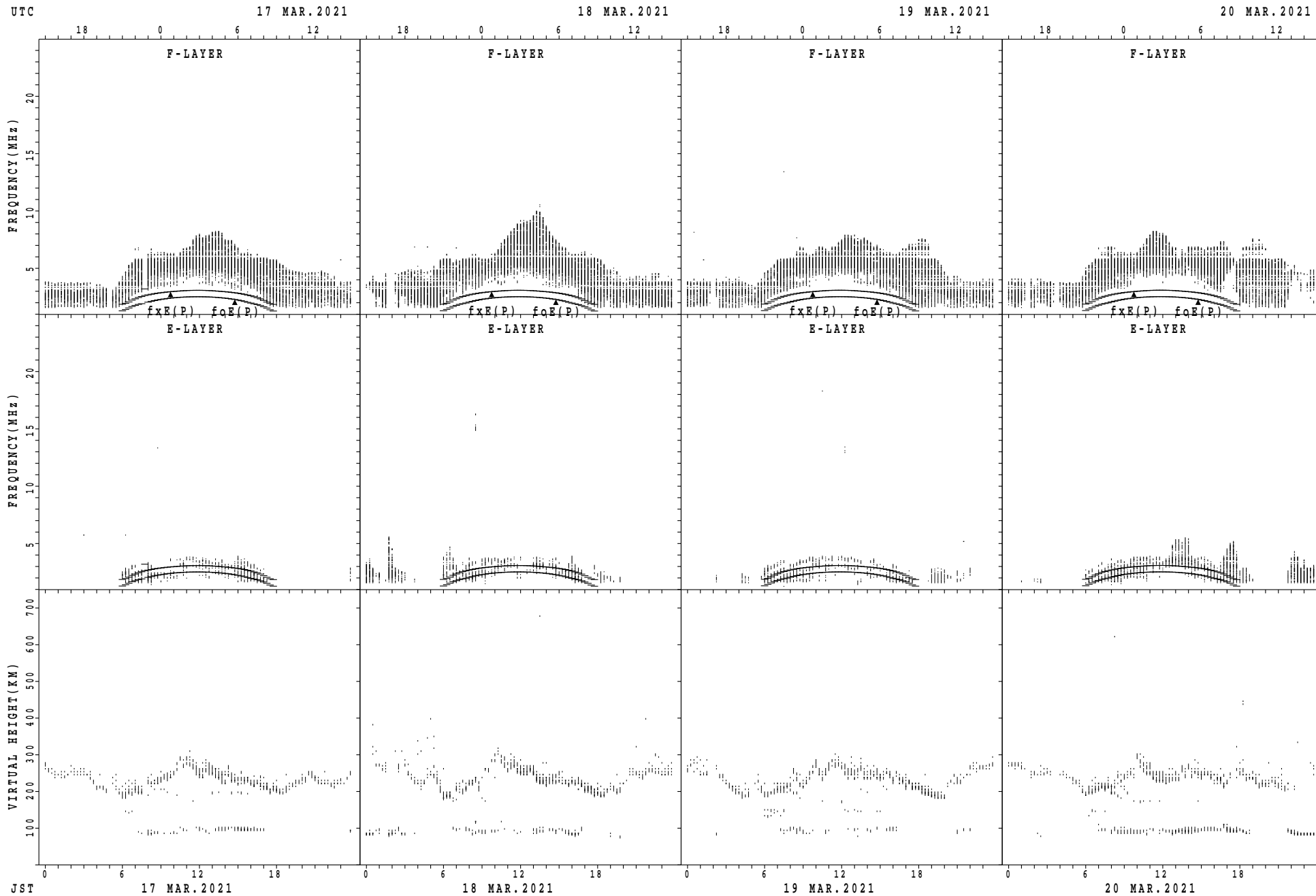
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



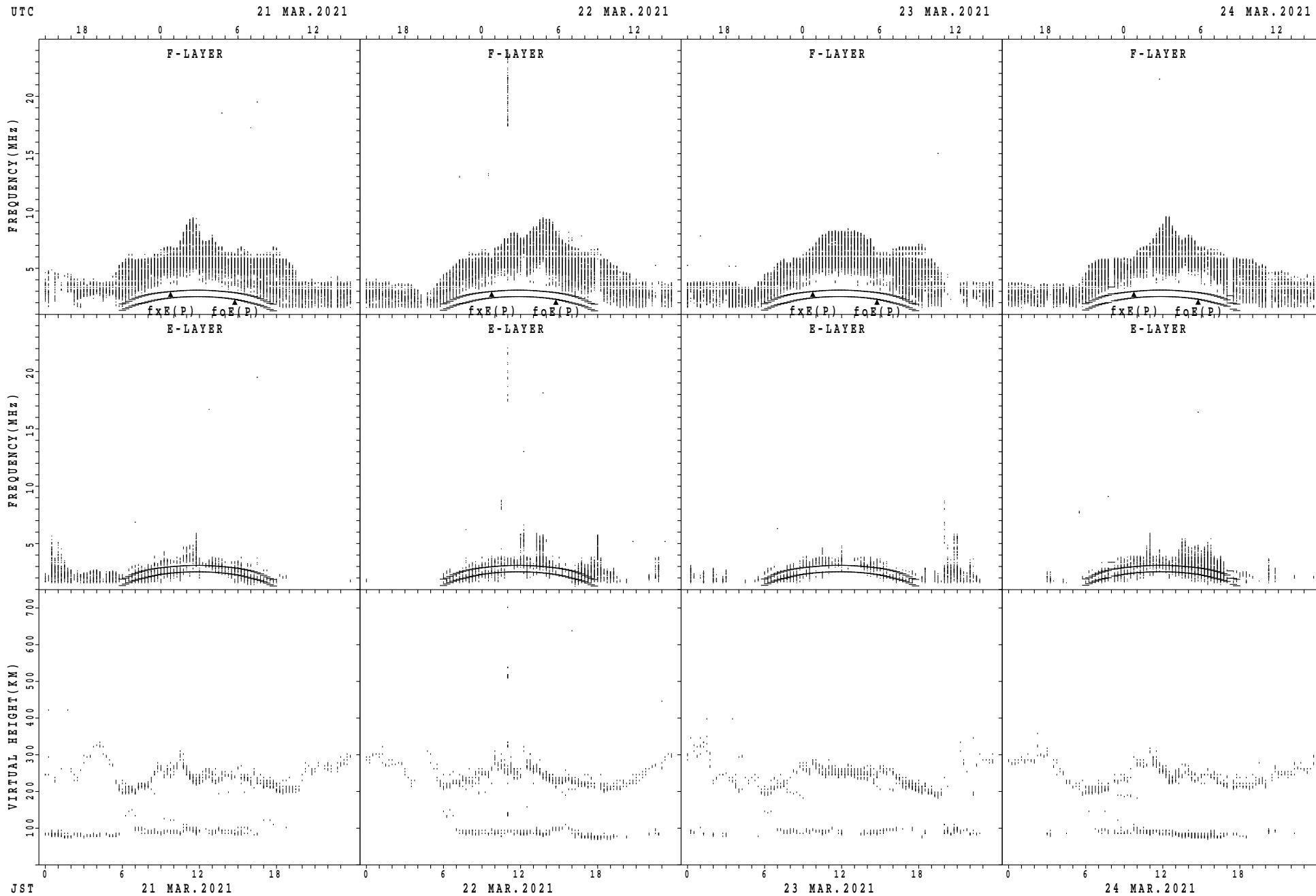
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



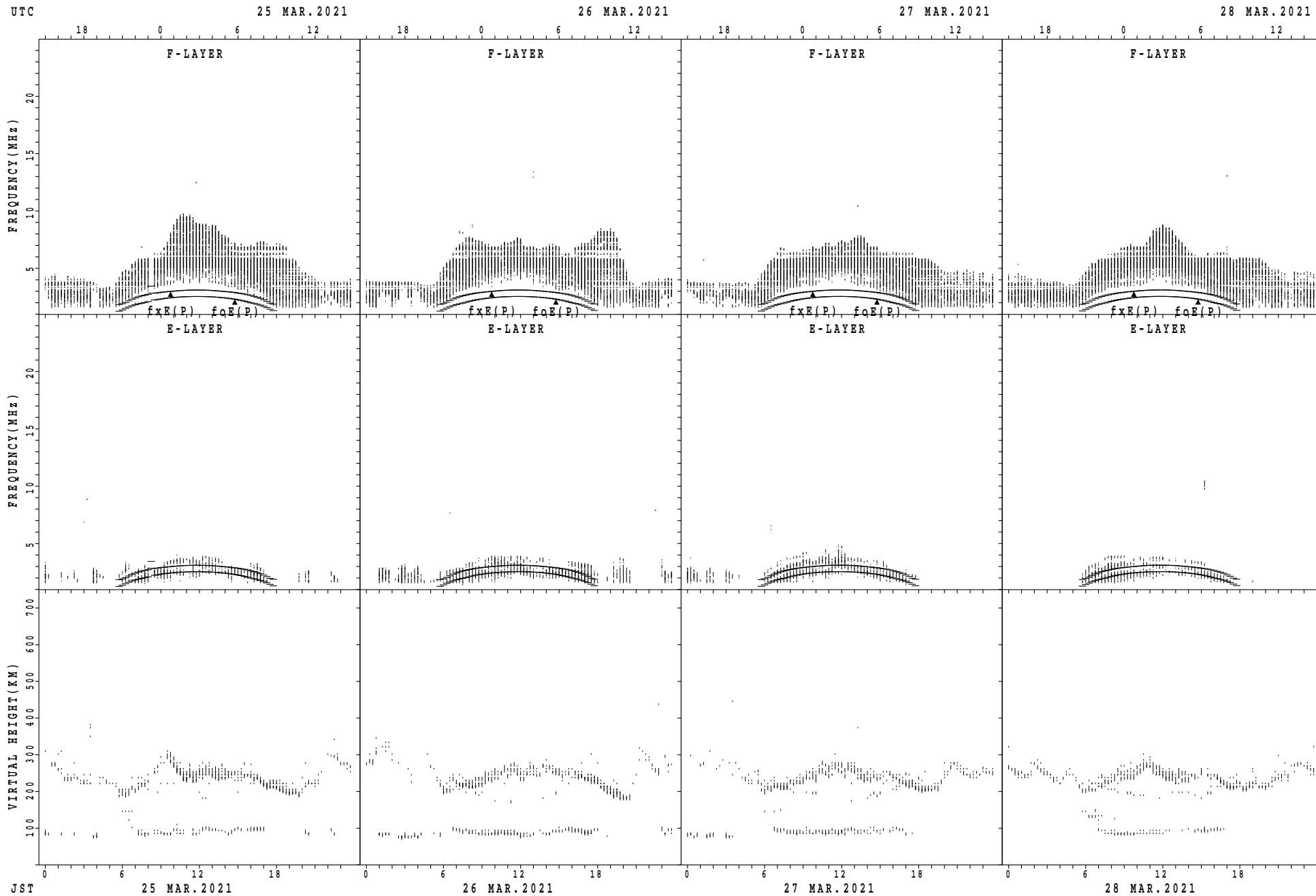
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



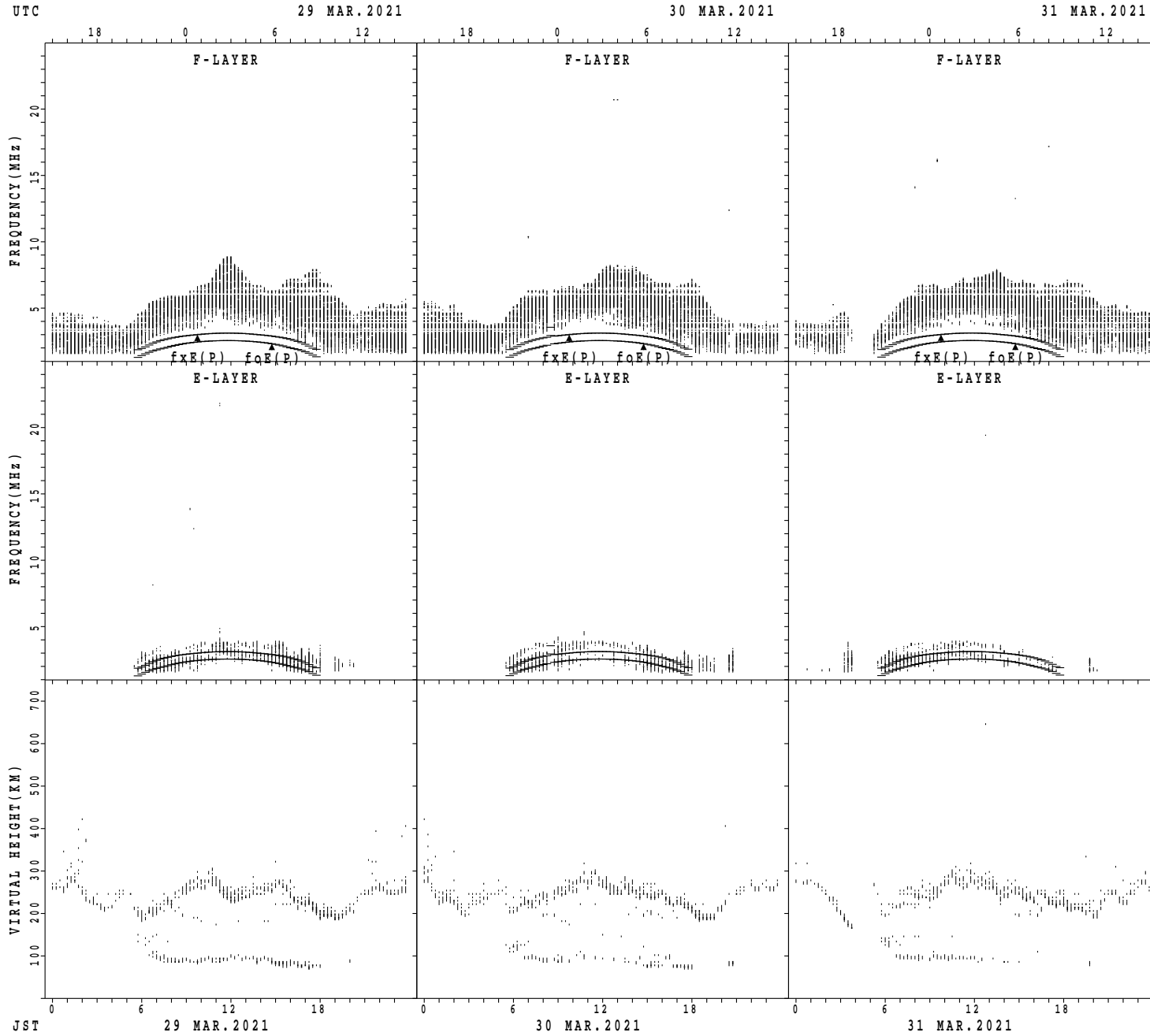
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



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

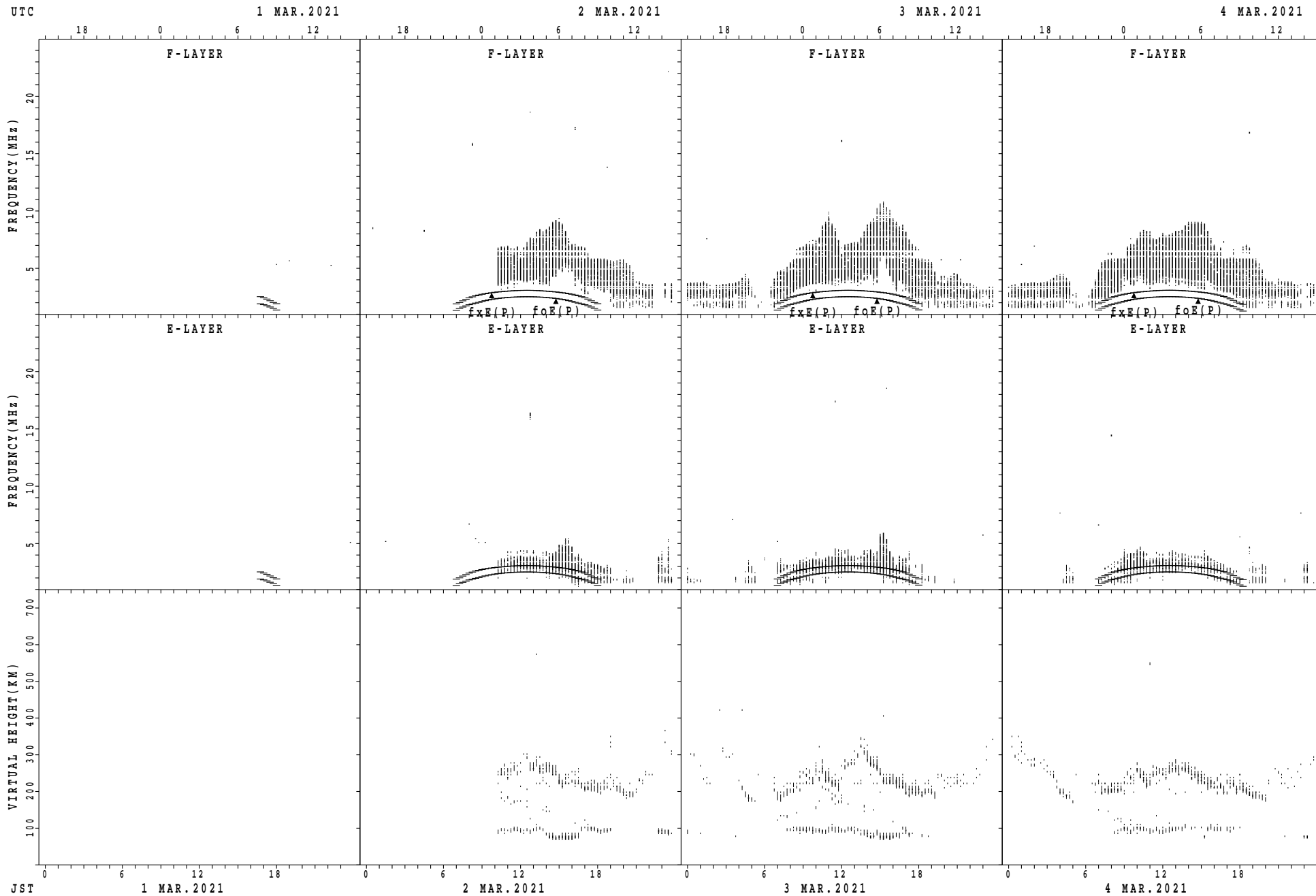
SUMMARY PLOTS AT Kokubunji



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

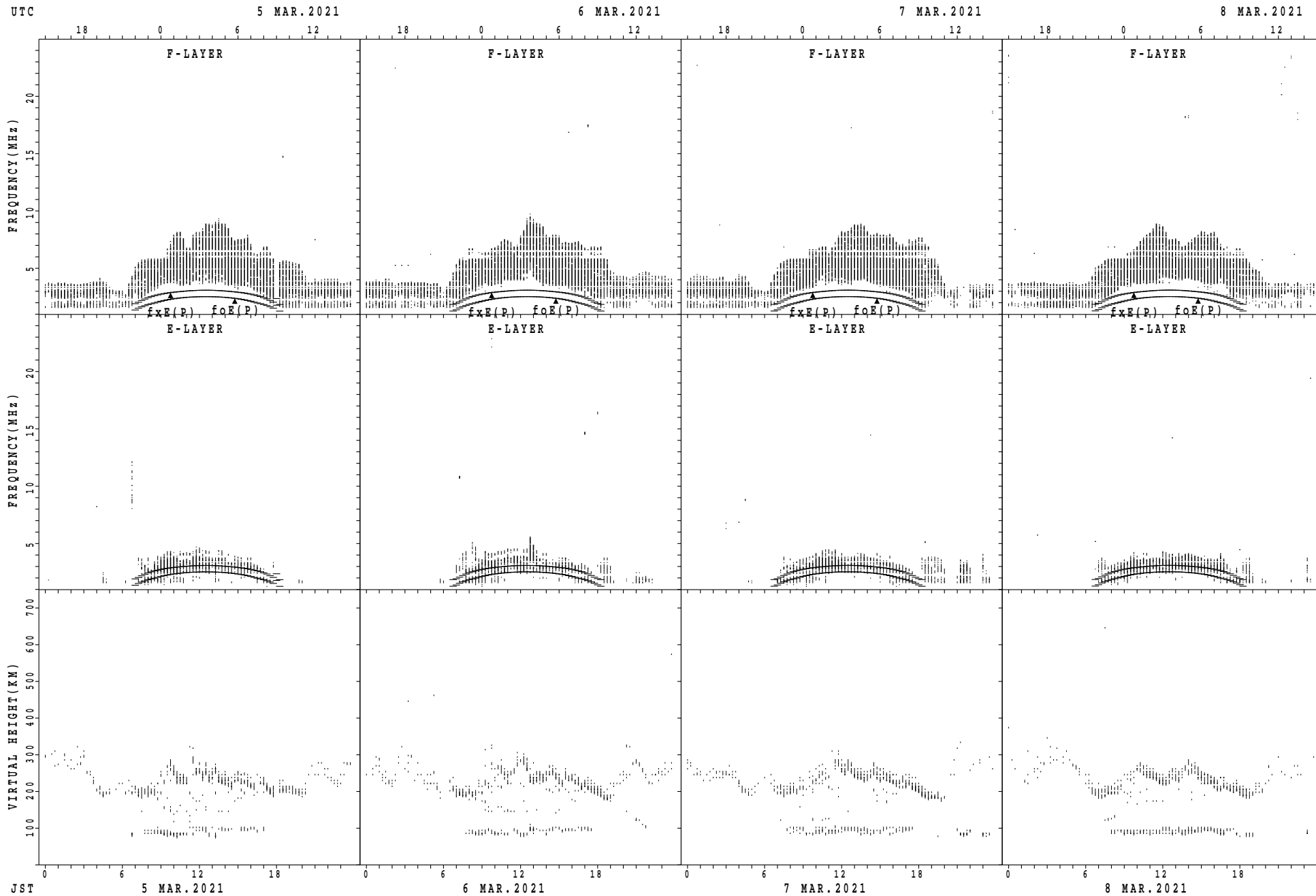


SUMMARY PLOTS AT Yamagawa



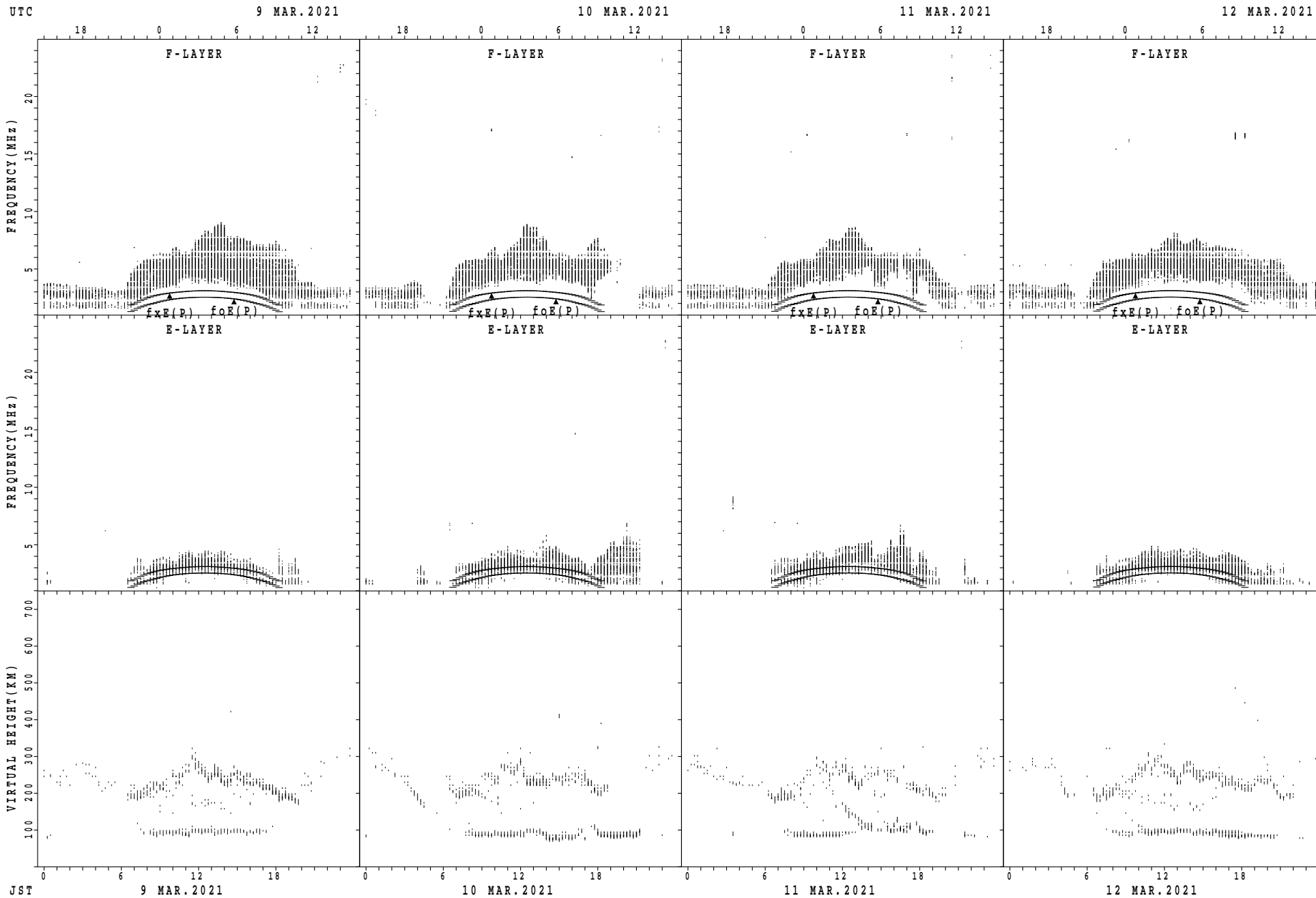
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



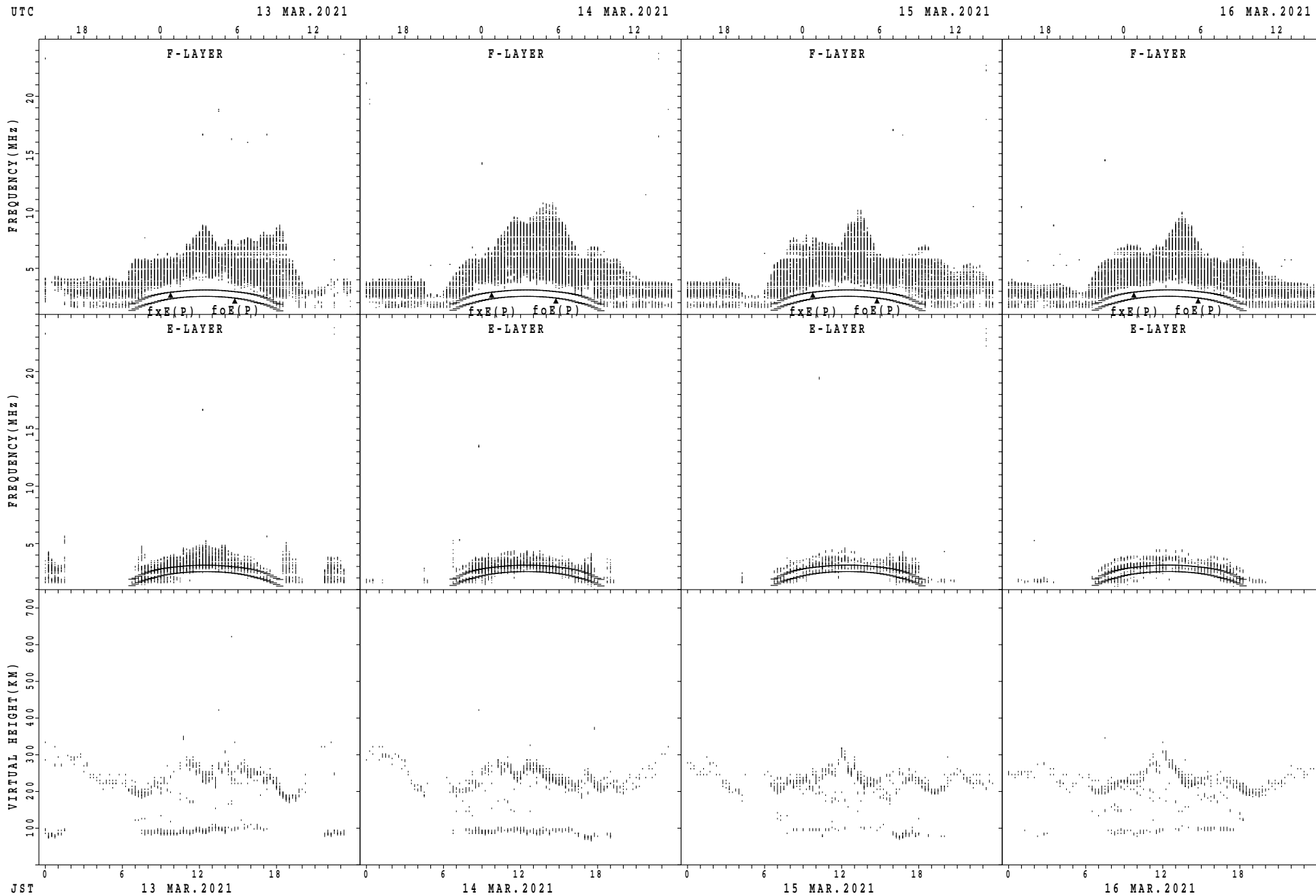
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



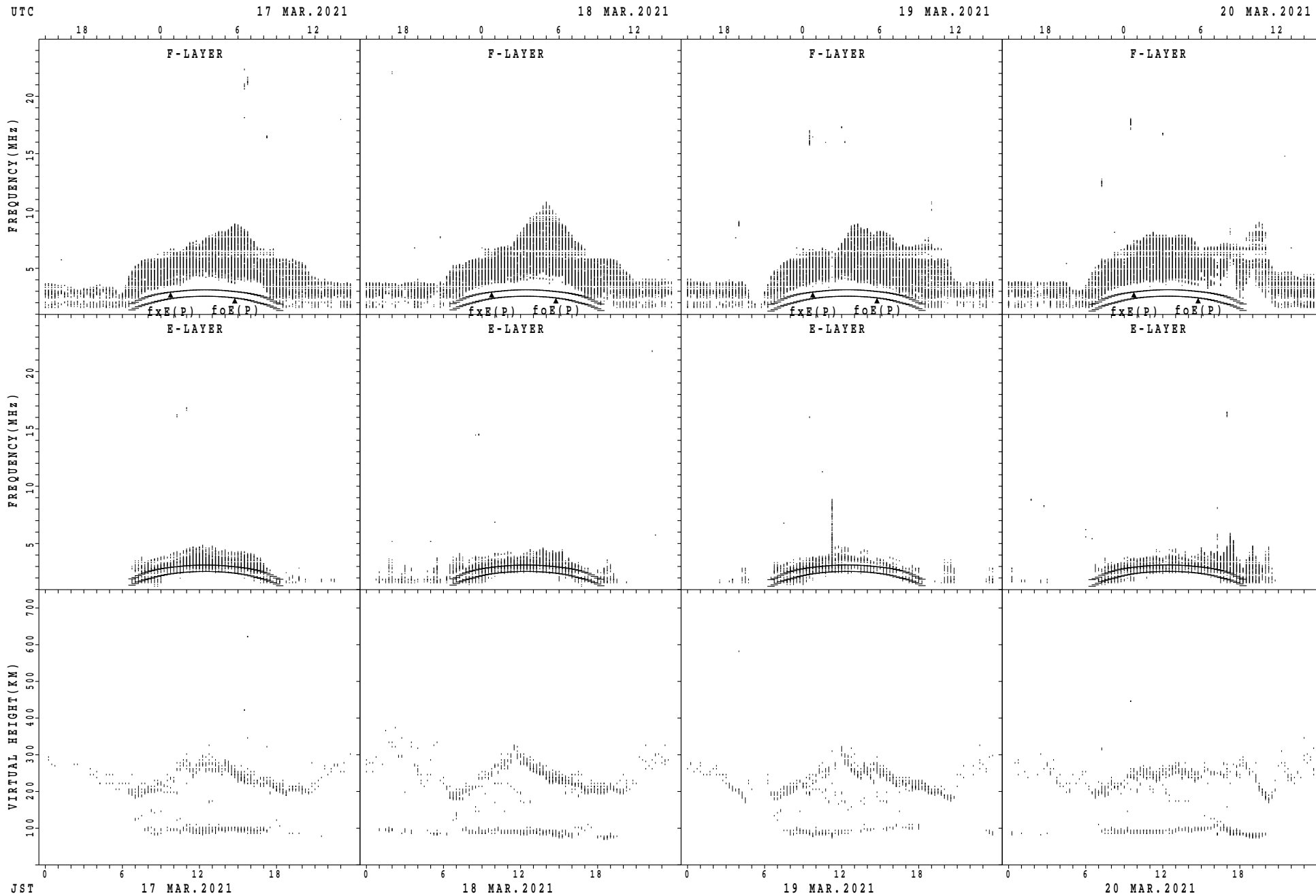
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Yamagawa



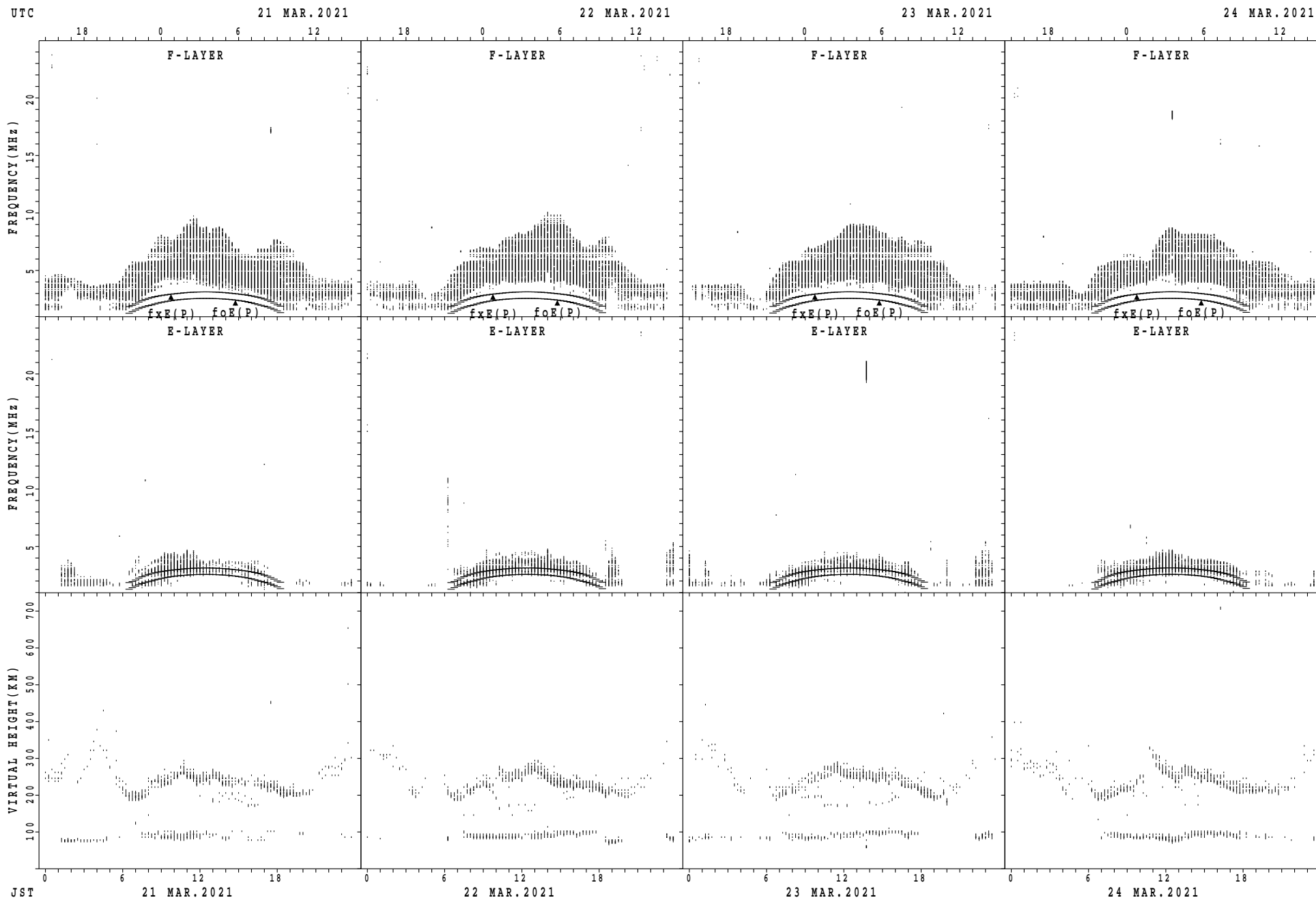
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



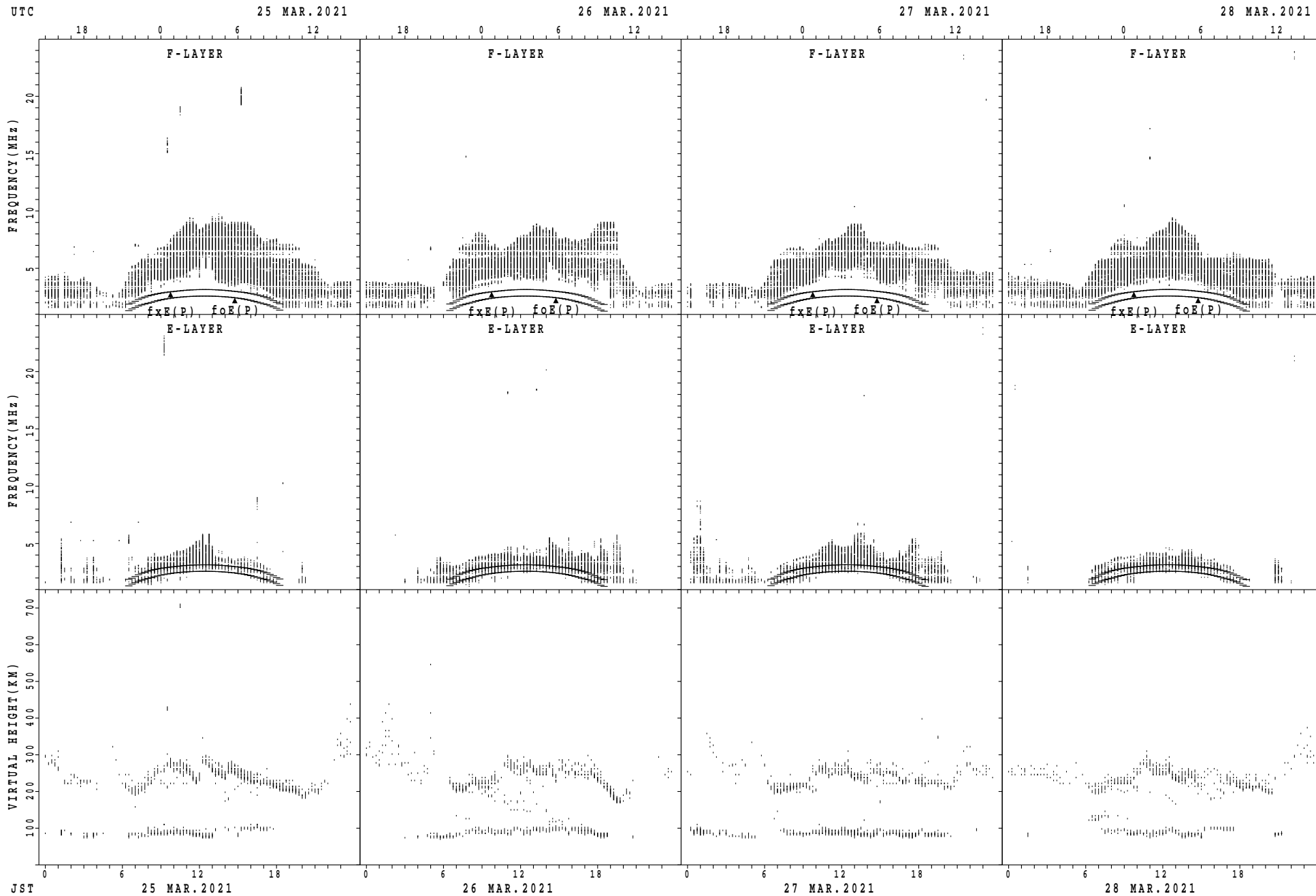
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

## SUMMARY PLOTS AT Yamagawa



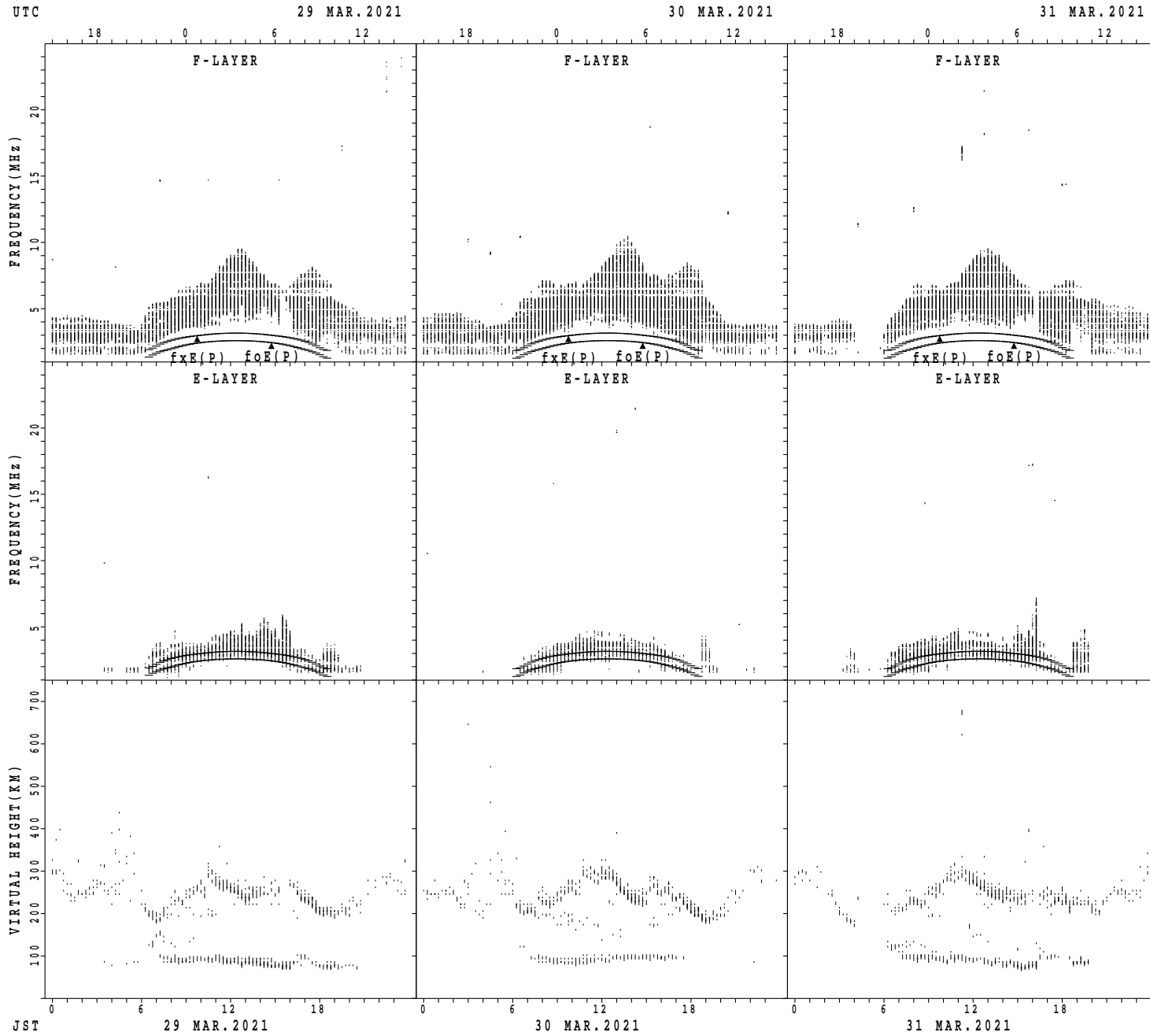
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Yamagawa



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

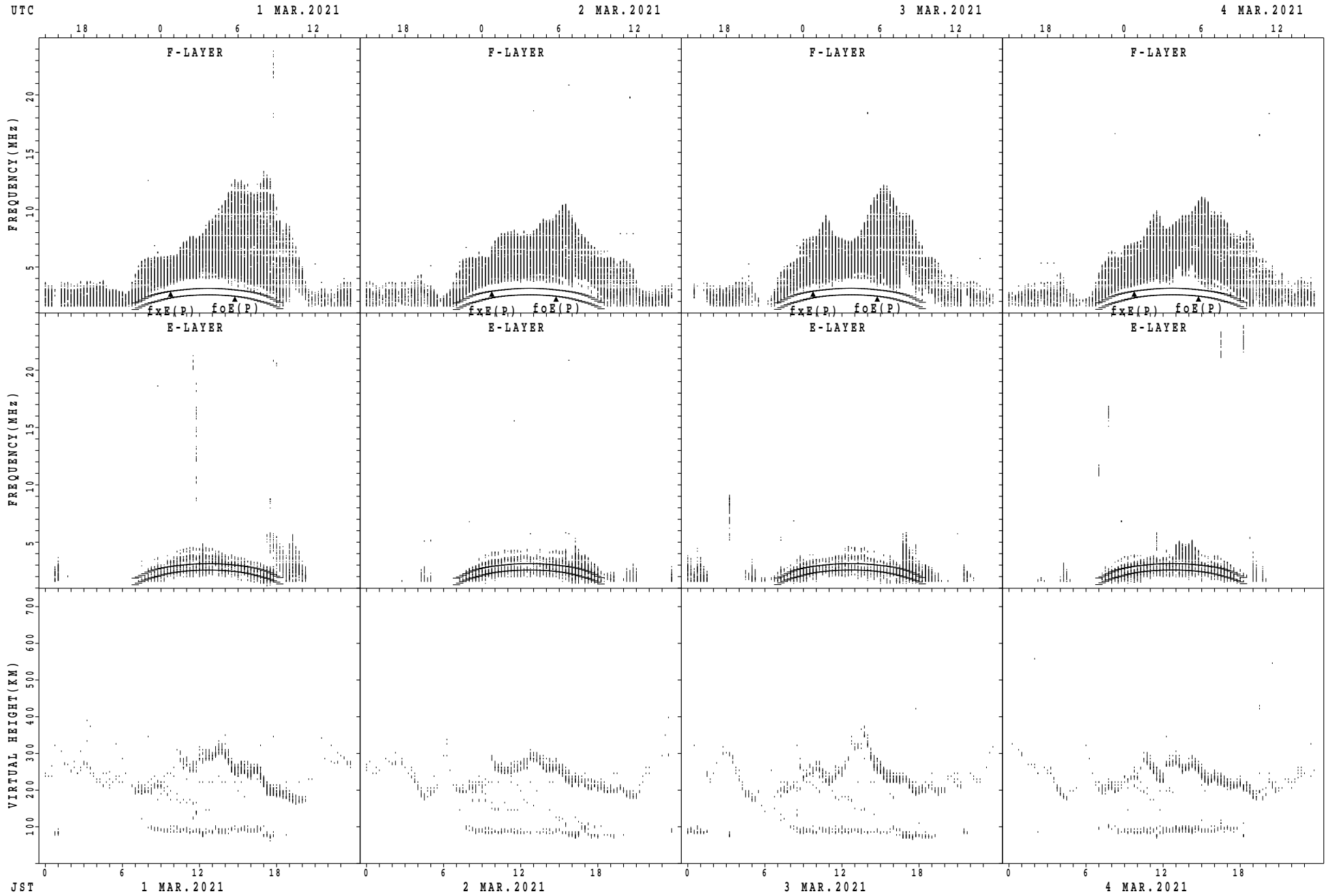
SUMMARY PLOTS AT Yamagawa



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

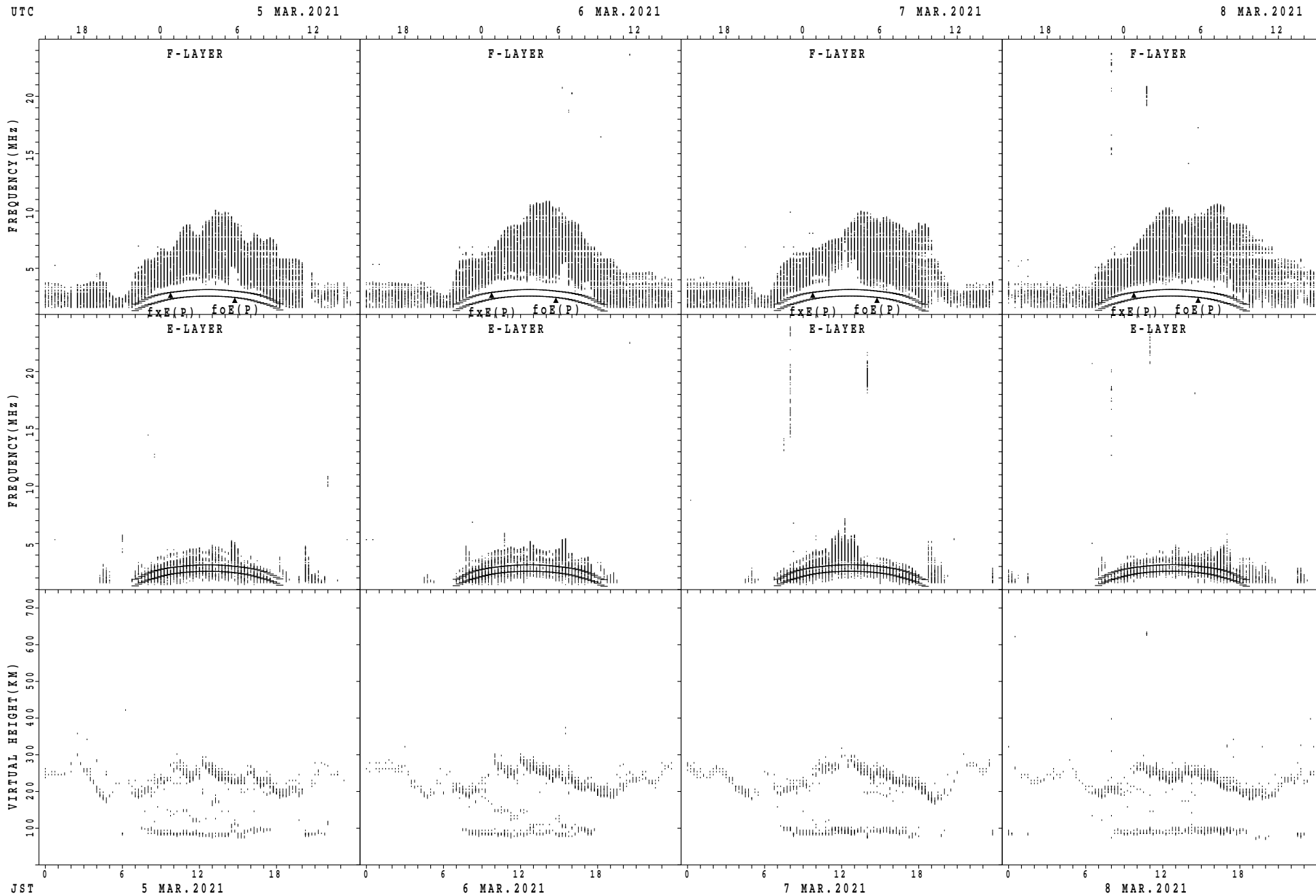


SUMMARY PLOTS AT Okinawa



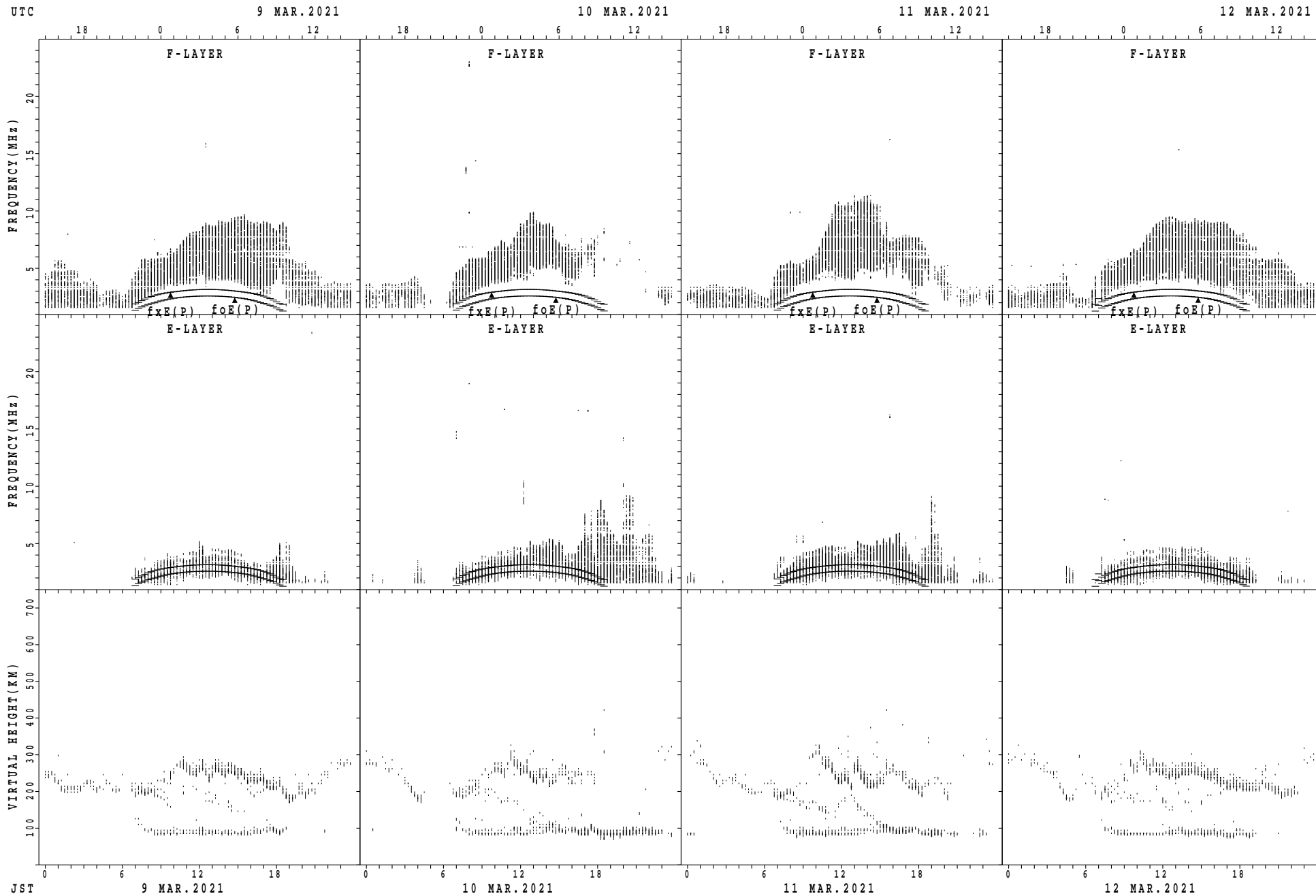
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Okinawa



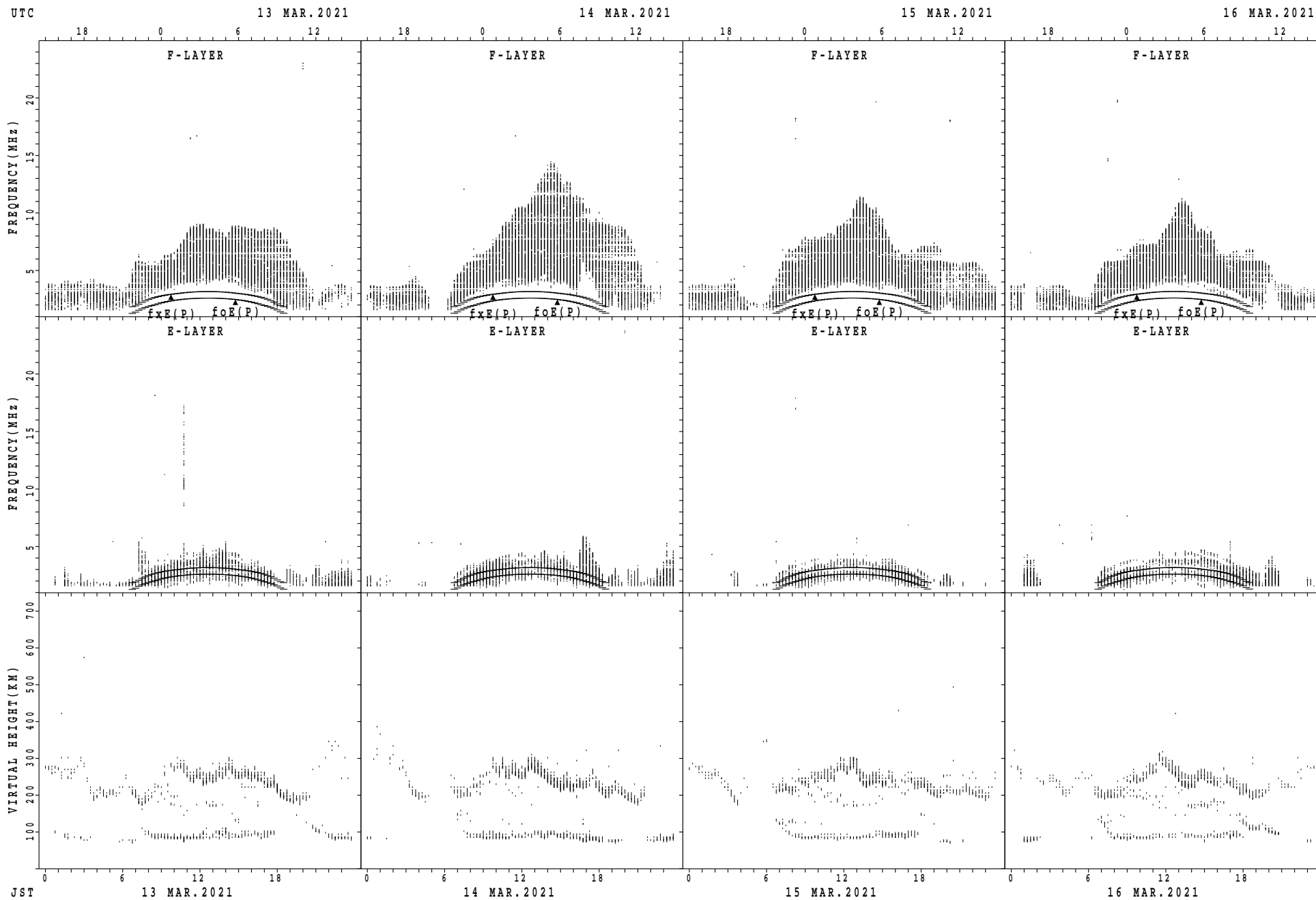
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Okinawa



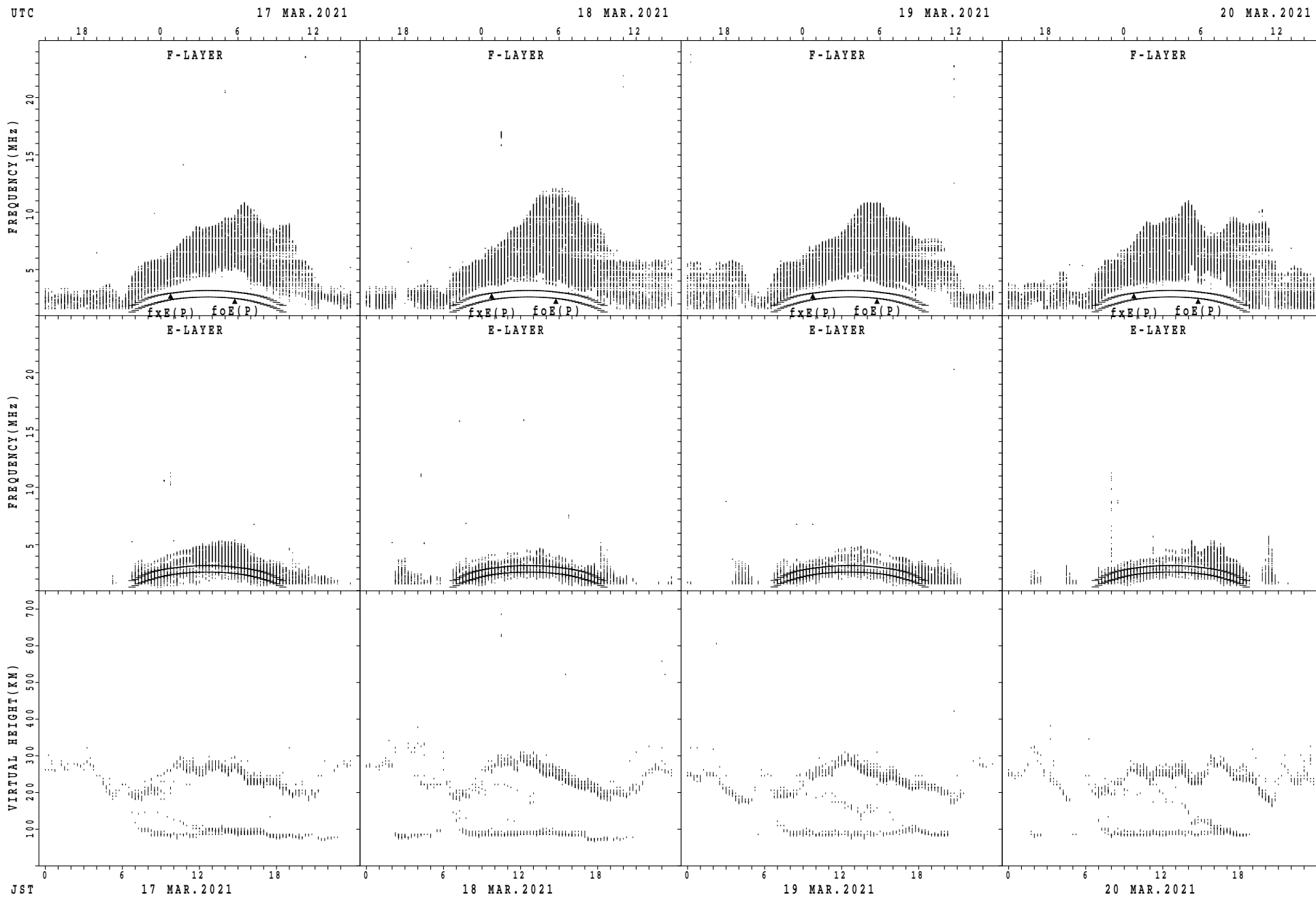
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



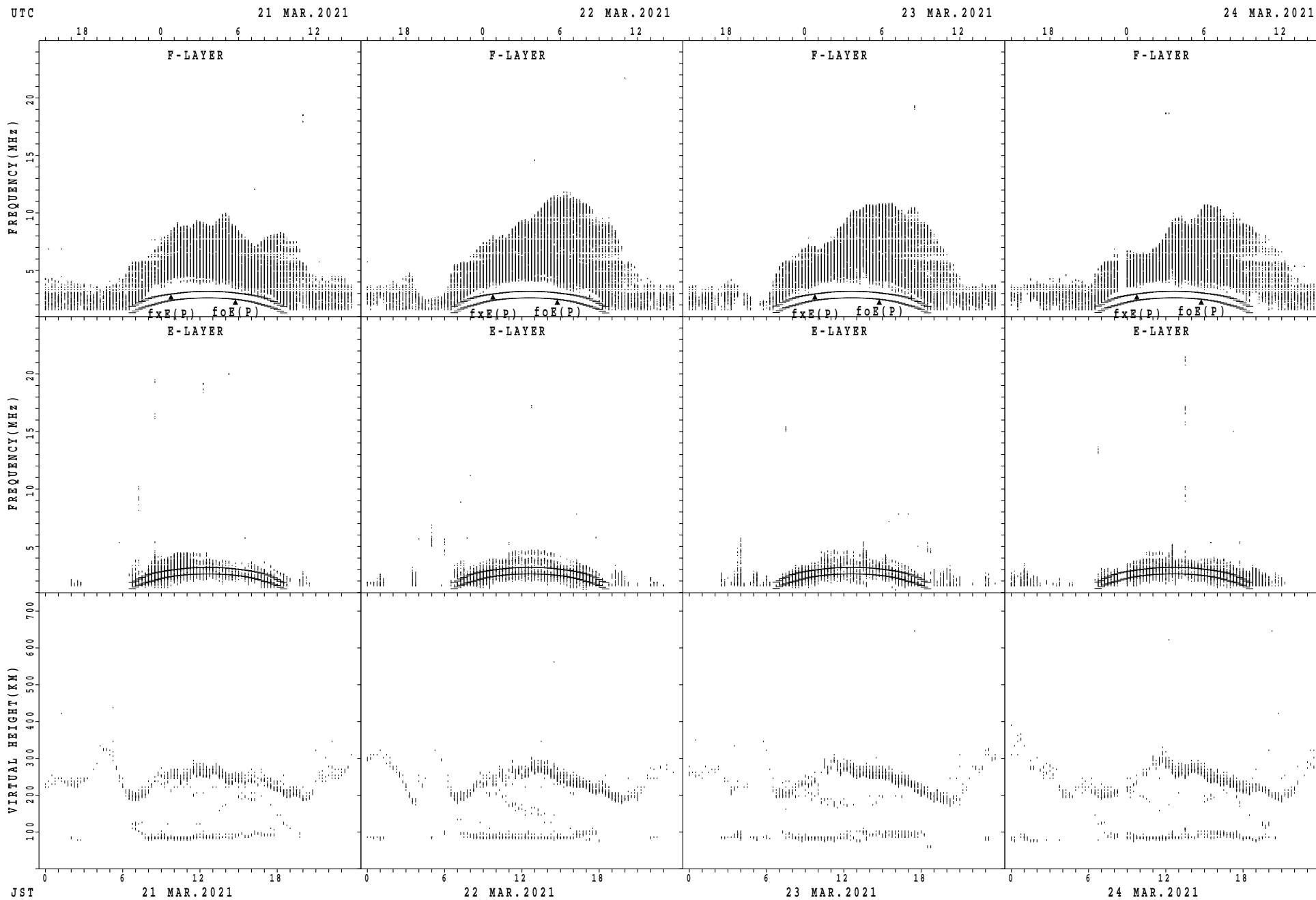
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



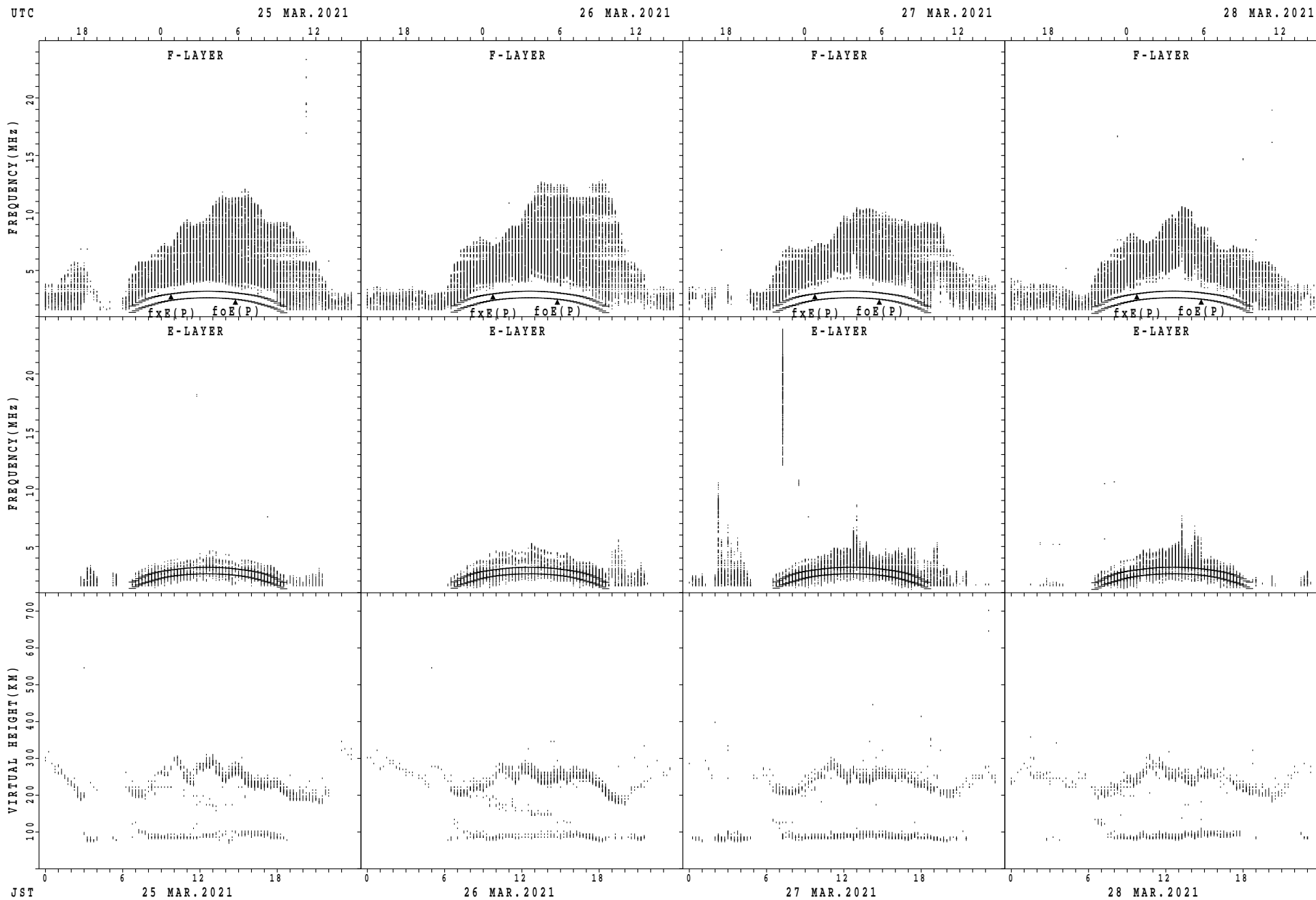
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



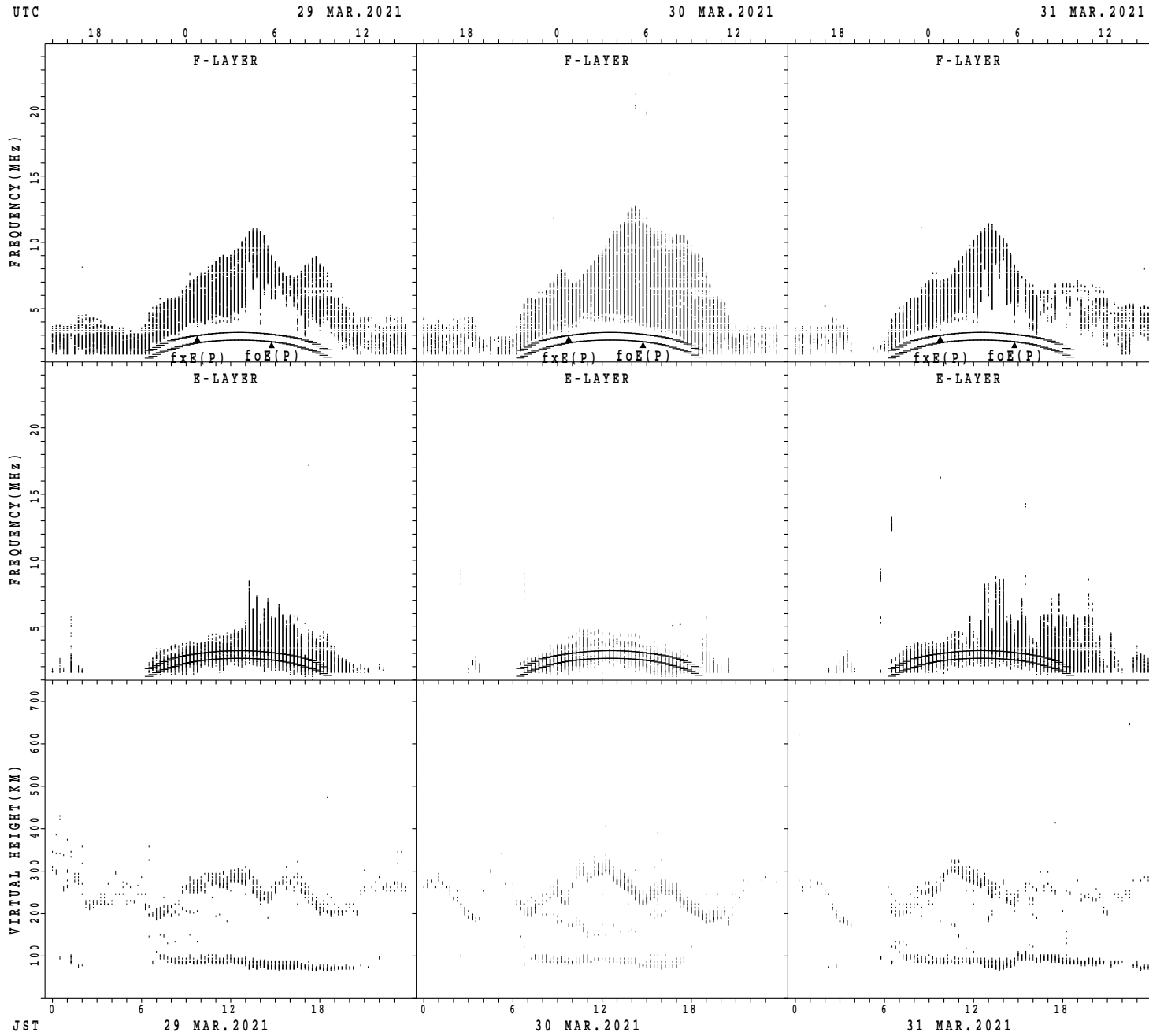
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Okinawa



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

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. 2021 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	3	3						12	6	2	2					
MED								216	232	240						241	249	241	277					
U Q								108	266	242						249	254	266	296					
L Q								108	210	226						234	240	216	258					

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	17	14	15	12	14	12	20	30	30	28	28	28	28	28	29	29	31	22	14	18	16	15	15	14
MED	98	98	98	98	97	98	145	98	100	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98
U Q	98	98	98	98	98	98	156	100	100	100	100	98	100	100	100	100	100	98	98	98	98	98	98	100
L Q	97	96	96	96	96	96	98	98	98	98	98	97	98	98	98	98	98	96	96	96	96	96	98	98

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	5	1						7	14	9	5	2				
MED								326	232	248						248	247	230	226	220				
U Q								163	241	124						264	264	252	237	224				
L Q								163	219	124						242	232	219	212	216				

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	12	11	8	7	4	16	29	31	31	29	29	31	28	25	30	30	28	16	16	14	5	7	7
MED	98	98	98	96	98	96	144	98	98	98	98	98	98	98	96	98	98	98	98	98	98	98	98	98
U Q	98	98	98	98	98	97	156	98	100	100	100	101	102	101	98	98	100	98	98	98	98	98	98	98
L Q	96	97	96	95	96	96	118	98	98	98	98	98	96	96	91	96	98	98	96	98	98	90	96	96

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									3	4							17	9	11	2				
MED									242	234							242	240	232	217				
U Q									258	247							258	250	242	224				
L Q									236	225							230	234	216	210				

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	10	8	9	11	10	6	22	29	29	29	30	30	30	30	30	30	30	21	21	17	8	10	13
MED	96	97	96	96	96	98	96	98	98	98	98	98	98	98	98	100	99	98	98	98	98	97	98	96
U Q	98	98	97	98	98	98	98	98	100	100	100	98	98	98	100	100	100	98	98	98	98	98	98	98
L Q	96	96	94	96	96	96	94	98	98	98	98	98	98	98	96	98	96	98	96	94	95	96	98	95

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

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1	16							19	26	24	14	2			
MED									224	256							234	229	231	223	234			
U Q									112	259							244	240	240	250	236			
L Q									112	244							224	222	210	206	232			

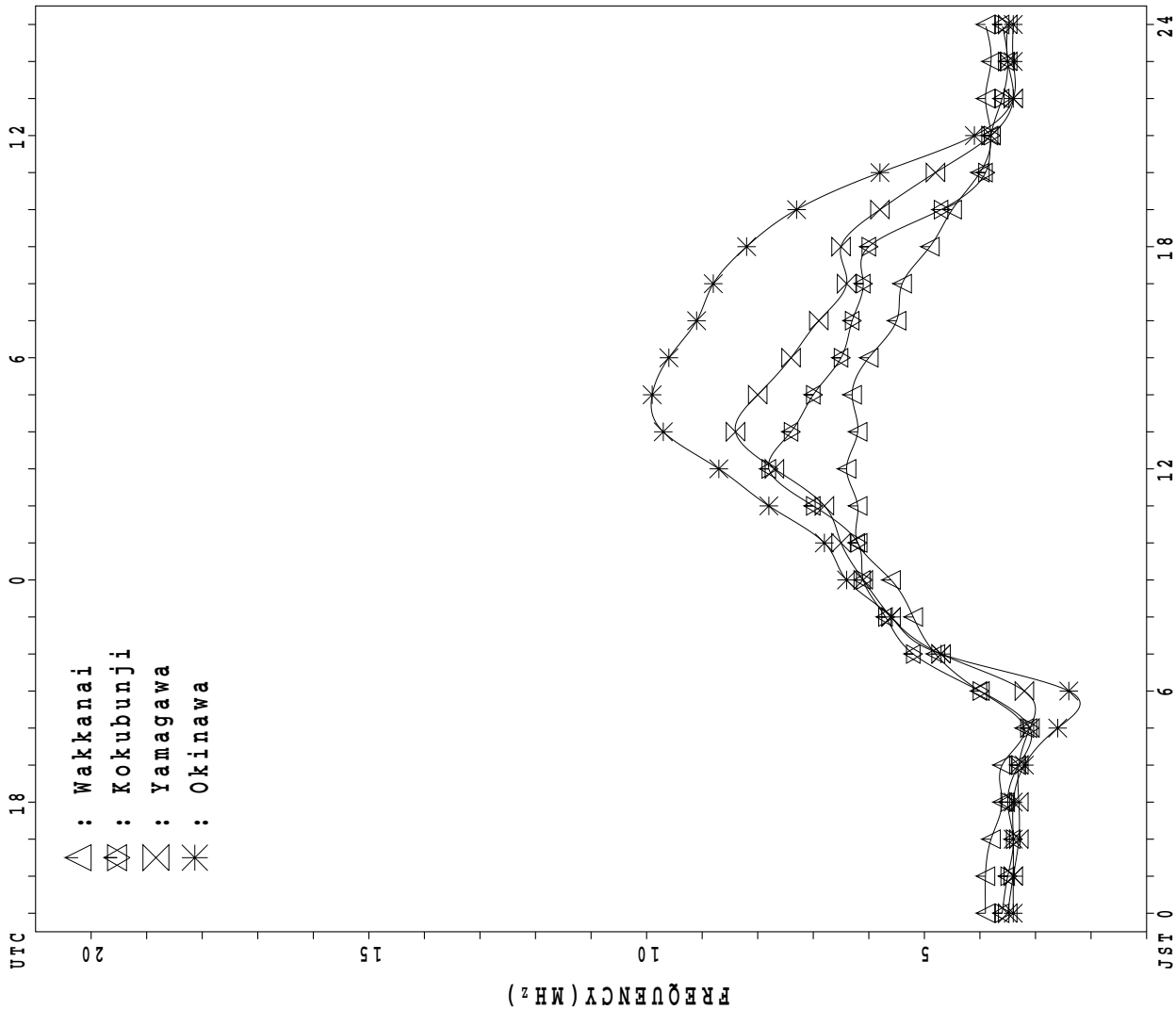
h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	11	13	11	7	12	11	5	25	31	31	31	31	31	31	31	31	31	31	28	24	21	14	14	14
MED	98	96	98	96	96	98	96	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	96
U Q	98	98	98	98	98	175	97	116	100	100	98	100	98	98	100	98	100	98	98	98	98	181	98	98
L Q	96	96	96	94	95	96	94	98	98	98	98	96	96	96	98	96	98	96	96	94	96	96	96	94

MONTHLY MEDIANS PLOT OF fOF2

MAR. 2021

AUTOMATIC SCALING



UTC

18

0

6

12

18

24

JST

0

6

12

18

24

0

6

12

18

20

FREQUENCY (MHz)

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2021 f<sub>XI</sub> (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 38	X 38	X 38	X 38	X 36	X 38														X 34	X 38	X 40	X 42	X 44
2	X 44	X 43	X 37	X 36	X 35	X 36														X 58	X 45	X 43	X 45	X 44
3	X 43	X 43	X 43	X 43	X 44	X 33														X 55	X 42	X 43	X 43	X 45
4	X 46	X 47	X 49	X 49	X 47	X 41														X 52	X 52	X 45	X 47	X 48
5	X 49	X 49	X 49	X 51	X 48	X 48														X 46	X 46	X 46	X 45	X 47
6	X 47	X 46	X 46	X 46	X 44															X 48	X 47	X 46	X 46	X 46
7	X 46	X 46	X 45	X 40	X 37															X 47	X 44	X 43	X 43	X 44
8	X 44	X 44	X 41	X 38	X 37															X 40	X 40	X 41	X 40	X 43
9	X 43	X 45	X 45	X 43	X 45															X 51	X 41	X 41	X 43	X 44
10	X 46	X 46	X 44	X 46	X 46		X 45													X 48	X 44	X 44	X 44	X 44
11	X 45	X 43	X 43	X 45	X 44		X 51													X 39	X 41	X 41	X 41	X 42
12	X 43	X 42	X 41	X 41	X 40															X 59	X 58	X 54	X 48	X 46
13	X 49	X 46	X 49	X 47	X 49	40														X 63	X 46	X 49	X 44	X 44
14	X 53	X 48	X 46	X 44	X 45															X 51	X 51	X 46	X 48	X 54
15	X 54	X 54	X 54	X 54	X 54	45														X 49	X 50	X 50	X 49	X 49
16	X 48	X 47	X 46	X 44	X 44															X 48	X 45	X 45	X 45	X 45
17	X 45	X 45	X 49	X 48	X 45															X 54	X 55	X 54	X 51	X 51
18	X 51	X 49	X 49	X 48	X 48															X 47	X 47	X 47	X 45	X 46
19	X 46	X 46	X 46	X 46	X 49															X 63	X 59	X 51	X 49	X 47
20	X 48	X 49	X 49	X 51	X 49															X 70	X 66	X 65	X 52	X 52
21	X 48	X 47	X 45	X 42	X 41															X 47	X 46	X 45	X 43	X 41
22	X 39	X 39	X 40	X 43	X 37															X 55	X 50	X 47	X 54	X 57
23	X 56	X 56	X 58	X 58	X 58	53														X 61	X 44	X 38	X 38	X 37
24	X 37	X 37	X 37	X 42	X 48	38														X 58	X 58	X 55	X 54	X 51
25	X 56	X 51	X 56	X 47	X 49															X 59	X 59	X 49	X 50	X 49
26	X 46	X 44	X 43	X 41	X 37															X 63	X 57	X 55	X 51	X C
27	C	C	C	C	C															X 54	X 53	X 52	X 49	X 49
28	X 47	X 44	X 44	X 41	X 40															X 58	X 58	X 58	X 58	X 58
29	X 59	X 59	X 59	X 59	X 54	54														X 57	X 54	X 54	X 54	X 54
30	X 52	X 55	X 50	X 48	X 49	49														X 51	X 48	X 46	X 46	X 46
31	X 46	X 45	X 45	X 45	X 42															X 63	X 61	X 62	X 62	X 60
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	11	2													28	31	31	31	30
MED	X 46	X 46	X 46	X 45	X 45	41	X 48													X 53	X 50	X 47	X 46	X 46
U Q	X 49	X 49	X 49	X 48	X 49	49														X 58	X 57	X 54	X 51	X 51
L Q	X 44	X 44	X 43	X 42	X 40	X 38														X 48	X 44	X 43	X 43	X 44

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

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2021 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1	31	31	31	31	29	31	34	47	54	51	56	62	64	68	62	64	77	76	62	27	31	33	35	37			
2	37	36	30	29	28	29	32	46	57	62	68 <sup>R</sup>	62	60	61	56	52	59	57	46	51	38	36	38	37			
3	36	36	36	36	37	26	34	49	58	58	73	73	59	63	66	61	74	57	48	48	35	36	36	38			
4	39	40	42	42	40	34	39	58	65	61	62	71	73	65	61	63	53	54	50	45	45	38	40	41			
5	42	42	42	44	41	41	44	57	59	69	68	72	64	70	64	56	56	59	45	39	39	39	38	40			
6	40 <sup>R</sup>	39	39	39	37	37	42	54	64	58	68	68	70	66	63	59	59	59	50	41	40	39	39	39			
7	39	39	38	33	30	30	38	53	53	57	62	71	64	60	62	61	57	54	48	40	37	36	36	37 <sup>R</sup>			
8	37	37	34	31	30	31	34	46	48	55	58	56	58	58	60	60	58	54	42	33	33	34	33	36			
9	36	38	38	36	38	32	38	45	54	54	56 <sup>V</sup>	59	60	56	61	56	51	52	50	44	34 <sup>U R</sup>	34	36	37			
10	39	39	37	39	39	31	38	49	52	52	60	66	56	58	62	54	53	50	38	41	37	37	37	37			
11	38	36	36	38	37	35	44	49	56	60	55	58	60	64	60	57	51	48	44	32	34	34	34	35			
12	36	35	34	34	33	33	39	46	48	53	58	62	64	64	62	58	53	49	50	52	51	47	41	39			
13	42	39	42	40	42	28 <sup>Z F</sup>	32	38	44	48	52	57	66	63	63	61	59	63	66	56	39	42	37	37 <sup>F</sup>			
14	45 <sup>Z</sup>	41	39	37	38	38	44	52	52	55	62	69	76	76	68	65	63	56	43	44	44	39	37				
15	41 <sup>F</sup>	41 <sup>F</sup>	41 <sup>F</sup>	41 <sup>F</sup>	37	34 <sup>F</sup>	40	49	58	67	73	61	60	60	55	57	53	54	42	42	43	43	42	42			
16	41	40	39	37	37	37	42	51	51	60	68	77	67	57	57	61	54	51	41	41	38	38	38	38			
17	38	38	42	41	38	38	46	51	52	59	60	63	68	61	68	62	54	51	48	47	48	47	44	44			
18	44	42	42	41	41	42	50	50	50	55	58	63	67	62	58	59	54	53	54	40	40	40	38	39			
19	39	39	39	39	42	32	40	46	48	53	59	59	62	63	59	59	54	56	61	56	52	44	42	40			
20	41	42	42	44	42	39	49	51	57	60	64	58	61	62	65	58	58	47	63	63	59	58	45	45			
21	41	40	38	35	34	32	33	39	42	42	51	52	56	54	56	54	55	52	43	40	39	38	36	34			
22	32	32	33	36	30	33	39	48	52	47	56	60	61	66	67	58	55	58	50	48	43	40	47	50			
23	43 <sup>F</sup>			47 <sup>F</sup>			38	45	49	56	60	64	70	66	58	58	56	54	54	54	37	31	31	30			
24	30	30	30	30		26 <sup>F</sup>	42	46	51	56	66	68	72	69	66	62	55	51	53	48	43 <sup>F</sup>	48	47	44			
25	44 <sup>F</sup>	44	41	40	42	30	42	49	54		C	C	C	C	C	C		54	58	55	52	52	42	43	42		
26	39	37	36	34	30	32	42	47	59		C	C	C	C	C	C		59	57	60	56	50	48	44	C		
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		65 <sup>R</sup>	62	55	54	51	47	46	45	42	42
28	40	37	37	34	33	31	39	44	50	54	66	72	68	59	58	60	54	52	56	51	51	51	51	51	51		
29	52	46 <sup>F</sup>	44 <sup>F</sup>	44 <sup>F</sup>	41	37 <sup>F</sup>	44	45	50	55	62	61	64	59	61	61	58	53	57	52	50	47	47	47			
30	45	42	43	41		37 <sup>F</sup>	44	48	56	57	64	61	56	66	58	59	58	53	48	45	44	41	39	39			
31	39	38	38	38	35	32	39	49	52	56	69	60	61	61	64	65	65	60	61	63	56	54	55	53			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	29	28	29	29	27	29	30	30	30	28	28	28	28	28	29	29	31	31	31	31	31	31	31	29			
MED	39	39	38	38	37	32	40	48	52	56	62	62	64	62	62	59	55	54	50	47	43	40	39	39			
U Q	42	40	42	41	41	37	44	51	57	60	67	68	68	66	64	62	59	57	56	52	50	47	44	43			
L Q	37	36	36	34	33	31	38	46	50	54	58	60	60	60	58	58	54	52	45	41	37	36	36	37			

MAR. 2021 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1								L	L																
2								L	L	384	L	424	L	424											
3												L	L	L	376										
4										420	408	L	404	L	380	384									
5								L	L				L	L	L	L									
6									L	L	L		L	L	L	L	L								
7									L	L		L	L	L	L	L	L								
8										396		L	432	L	420	388									
9								L	L	392	392	L	L	L	420		L	L							
10									L	L	L		L	L	L	L									
11								L	L		L	L	L	L	L	L	L								
12									L	L	420	L	440	L	L	L									
13								316	L	L		432	L	L	392		L	L	L						
14									L	L	424	428	L	436	392	392									
15									L	412	L	432	L	L	L	L	L								
16							L		L	L	L		L	L	L	L	L								
17									L	L	L	L	L	L	L	L									
18							L	L	L		L	L	L	L	L	L	L	344							
19									L	400	L	436	L	L	400		L	L							
20								L	L	404	L	440	428	L	L	L	L	348							
21								L	L	L	392	L	408	L	L	L	L	L	L						
22								L	388	L	L	L	L	L	408	400									
23								L	380	L	424	440	L	L	L	L	L								
24									L	424	L	L	L	L	424	404									
25									L	C	C	C	C	C	C	C	L								
26									396	C	C	C	C	C	C	C	L								
27						C	C	C	C	C	C	C	C	C	416	404									
28						A	364	388	420	420	432	432	L	L	L	388									
29								L	416	432	L	L	L	L	408	404									
30								408	428	428	L	428	432	432	400										
31								L	L	408	L	L	440	L	440	412									
	00	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	5	14	12	12	9	3	14	11	2								
MED								340	388	410	420	432	428	432	408	400	346								
U Q								402	420	424	438	436	436	420	404										
L Q								384	400	406	424	416	424	392	388										

MAR. 2021 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							B	192	248	288	304	312	308	316	280	252	220	B	B					
2							B	180	232	272	296	A	A	296	288	260	216	176	B					
3							B	192	244	276	296	292	296	296	284	260	200	180	A					
4							B	180	236	244	280	296	300	300	284	264	232	168	A					
5							B	196	248	268	288	288	300	288	288	256	192	164	B					
6						B	B	192	236	276	288	308	304	300	300	260	240	A	B					
7						B	B	204	244	276	296	296	300	300	288	272	220	B	B					
8						B	B	192	244	292	292	324	308	308	296	260	228	188	B					
9						B	B	192	244	288	276	296	296	308	288	272	228	184	B					
10						B		208	268	280	300	312	308	300	300	256	216	184	B					
11						B		220	264	304	308	296	300	300	296	272	220	164	B					
12						B	B	212	260	A	A	308	308	308	292	276	228	160	B					
13						B	B	216	252	268	288	308	288	272	296	272	A	A	B					
14						B		180	228	252	276	288	312	312	304	284	264	220	188	A				
15						B		224	208	244	268	A	300	312	300	300	276	236	188	A				
16						B		184	220	248	284	296	296	300	300	292	272	236	180	B				
17						B		188	216	260	296	304	304	280	280	A	A	A	184	B				
18						B	B	224	260	296	304	284	312	312	A	A	A	188	B					
19						B		180	224	268	292	300	312	288	296	316	280	244	180	B				
20						B		200	224	260	308	304	A	332	312	308	284	248	184	A				
21					200		B	224	224	260	280	300	300	A	284	284	264	236	180	B				
22						B		180	216	256	284	284	276	320	320	300	276	260	180	A				
23						B		188	220	248	288	304	300	308	312	292	272	240	204	268	B			
24						B		208	228	264	288	304	296	312	320	320	288	248	184	B				
25						B		208	256	256	C	C	C	C	C	C	C	244	184	B				
26						B		196	232	284	C	C	C	C	C	C	C	204	204	B				
27						C	C	C	C	C	C	C	C	C	C	300	276	244	192	B				
28						B	A	224	252	284	288	308	320	304	292	268	220	188	B					
29						B		220	212	252	280	316	292	288	312	296	284	244	188	B	B			
30						B		244	232	264	284	284	284	308	280	280	240	256	A	244	B			
31						B		212	256	288	296	324	320	288	320	300	284	248	204	B	B			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	15	30	30	27	26	26	26	28	27	27	28	26	2					
MED					200	200	216	252	284	296	300	306	300	292	272	234	184	256						
U Q						220	224	260	292	304	308	312	312	300	276	244	188							
L Q						184	196	244	276	288	296	296	296	288	260	220	180							

MAR. 2021 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2021 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	J A	J A	J A	J A	J A	J A	J A			J A		E B	E B	E B		20	25	18	E B	
2	E B	J A		19	20	22	18	E B	22	28	J A	J A	J A	40	38	J A	24	J A	E B	E B	E B	16	J A	E B	25	
3	E B	E B		20	16	20	E B	E B	23	27	J A	J A				J A		J A		J A	E B	E B	E B	E B		
4	27	23	J A	23	21	21	J A	E B	25	J A	J A	J A	34	34	35	34	32	33	25	20	J A	E B	J A	E B		
5	E B	E B	E B	E B	E B	E B	E B	E B	25	28	32	37	33	34	31	33	26	35	19	16	16	16	16	16	16	
6	E B	E B	E B	E B	E B	E B	E B	E B	24	29	33	34	J A	G		G			J A	E B	E B	E B	E B	E B	E B	
7	E B	E B	E B	E B	E B	E B	E B	E B	24	28	34	35	35	35	35	32	32	25	18	16	16	16	16	16	16	
8	20	19	E B	E B	E B	E B	E B	E B	J A	25	32	32	34	83	34	34	33	28	24	23	15	20	E B	E B	E B	
9	E B	E B	E B	E B	E B	E B	E B	E B	25	29	35	51	35	31	34	J A	J A			E B	E B	E B	22	19	20	20
10	21	J A	21	20	21	E B	E B	J A	25	30	38	135	38	39	31	30	29	26	18	16	16	16	16	16	16	
11	E B	E B	E B	J A	E B	J A	26	27	31	32	34	33	35	37	32	30	27	19	16	16	E B	E B	E B	E B	E B	
12	E B	E B	E B	E B	E B	E B	E B	E B	J A	30	33	43	36	31	32	32	31	26	20	16	25	19	16	19	19	
13	E B	E B	21	20	E B	E B	E B	E B	25	J A	J A	J A	J A	J A	J A	J A	J A	27	24	16	21	20	20	16	19	
14	19	E B	J A	19	22	E B	J A	24	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	E B		E B	E B	E B	
15	E B	E B	19	19	E B	E B		26	24	J A	J A	J A	34	32	29	30	33	24	31	23	20	J A	37	22	28	24
16	24	E B	27	E B	E B	E B		19	27	29	31	37	37	33	42	34	28	27	20	16	16	20	28	16	16	
17	E B	23	20	E B	E B	E B	G J A	19	30	31	36	41	46	59	59	J A	J A	J A	32	20	16	16	40	22	30	21
18	J A	E B	E B	E B	E B	E B	J A	17	26	28	33	34	41	36	35	31	31	25	20	16	16	16	16	24	24	
19	J A	22	18	20	18	J A	20	27	31	32	87	40	36	J A	G			33	25	21	16	22	22	23	J A	20
20	23	J A	25	21	22	20	G		28	30	45	45	43	45	38	35		G J A	J A	J A		30	28	25	19	
21	21	J A	J A	32	26	22	22		25	27	31	42	41	36	32	32	27	26		E B	19	19	19	19	18	
22	J A	E B		J A	E B	18	22	24	28	34	36	37	37	37	38		G J A	J A	J A		25	30	23	25		
23	29	J A	27	24	E B	E B	20	28	31	34	34	33	J A	34	34	32	28		G		E B	E B	E B	E B	E B	
24	E B	E B	E B	E B	E B	19	22		28	32	33	38	35	33		G	G	G	G		E B	E B	E B	E B	E B	
25	21	J A	J A	86	26	29	20	22	27	32	C	C	C	C	C	C	C	G		E B	E B	E B	E B	E B	32	
26	J A	25	21	24	E B	J A	20	26	31	C	C	C	C	C	C	C	C	26	22	15	30	J A	J A	E B	C	
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	G	G	G	E B	E B	E B	E B	E B	E B
28	E B	E B	E B	E B	E B	E B	24	28	30	32	34		G J A	G	G			G J A	E B	J A		E B	E B	E B	E B	
29	E B	E B	E B	E B	E B	J A	22	27	30	35	33	33	33	26	30	29	27	22	16	16	16	16	16	23	20	
30	30	E B	33	E B	E B	E B	G	24	28	30	33	34	33	35	32	34	30	G J A	J A	J A	E B	E B	E B	E B	E B	
31	E B	24	16	16	16	16	22	29	35	51	37	35	35	38	38	33	28	22	16	16	16	16	16	16	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	30	30	30	30	30	30	30	30	30	28	28	28	28	28	29	29	31	31	31	31	31	31	31	30		
MED	18	E B	19	E B	E B	E B	20	25	30	33	37	37	35	34	32	29		G		E B	E B		E B	E B	17	
U Q	23	23	23	21	21	21	24	27	31	36	42	41	36	38	34	32	27	J A		G		22	22	22	21	
L Q	E B	E B	E B	E B	E B	E B	E B	24	29	32	34	34	33	31	30		G	G	G		E B	E B	E B	E B	E B	

MAR. 2021 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Wakkanai

MAR. 2021 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

MAR. 2021 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2021 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

MAR. 2021 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	306	321	303	303	303	343	352	392	372	371	352	352	347	334	344	327	347	358	363	363	319	290	290	289		
2	289	313	313	312	304	340	374	359	349	383	271 <sup>R</sup>	322	349	349	351	340	339	356	326	332	358	307	307	296		
3	305	302		304	349	339	375	402	346	299	326	344	326	345	345	331	349	365	345	329	359	307	307	295		
4	295	325	316	315	345	332	352	378	377	371	342	353	353	366	359	344	379	355	344	317	346	330	313	312		
5	316	315	315	312	327	336	375	381	380	365	347	365	356	352	333	359	338	372	358	336	314	313	313	312		
6	328 <sup>R</sup>	328	312	312	311	330	360	389	389	343	376	335	348	347	347	346	374	365	363	324	324	318	313	307		
7	317	316	334	333	327	350	349	384	357	352	338	338	352	370	357	357	352	371	360	330	330	329	313	312 <sup>R</sup>		
8	311	311	311	306	305	342	356	378	351	331	365	349	326	362	328	357	356	384	344	343	320	320	318	315		
9	308	307	324	323	336	322	372	358	348	367	305 <sup>V</sup>	345	344	300	348	348	365	364	359	356	367	299 <sup>U R</sup>	298	300		
10	299	316	316	334	350	319	362	361	334	356	366	366	319	351	360	373	372	371	334	331	342	307	307	306		
11	306	305	311	311	311	333	377	373	372	371	346	375	344	371	352	354	354	354	350	334	326	319	318	317		
12	312	311	311	310	330	339	391	375	375	374	324	334	359	331	350	360	359	358	330	323	310	330	327	327		
13	324	291	311	281	301	299 <sup>Z</sup>	328	331	326	325	347	320	330	348	348	367	339	333	322	347	310	334	292	292 <sup>F</sup>		
14	289 <sup>Z</sup>	313	312	311	311	328	336	365	313	327	318	337	332	331	321	362	351	356	329	301	322	295	286			
15																										
16	327	334	333	317	317	322	354	373	357	351	331	360	362	349	349	348	369	369	352	336	335	316	316	315		
17	314	314	318	318	321	332	365	365	364	364	345	344	355	348	348	376	361	361	341	325	322	319	329	327		
18	324	321	311	302	316	316	352	370	358	333	350	344	329	340	340	351	351	350	355	343	321	321	320	319		
19	318	318	318	318	337	337	363	375	366	340	352	340	357	313	351	332	344	343	347	326	329	315	315	327		
20	324	321	318	322	334	333	376	376	365	349	361	327	344	343	361	343	343	340	314	313	293	353	296	316		
21	315	314	314	297	297	314	351	329	326	302	307	293	327	332	350	363	356	354	344	317	315	308	307	298		
22	298	298	297	297	300	294	346	328	359	282	292	336	324	335	364	359	351	350	333	313	311	321	279	253		
23	301 <sup>F</sup>			277 <sup>F</sup>			369	369	354	340	339	339	339	363	339	338	338	337	339	338	338	298	280	293		
24	308	307	289	283			387	386	342	328	348	327	340	347	340	362	349	347	341	311 <sup>F</sup>	310 <sup>F</sup>	298	280	313		
25	310	307	308	307	342	286	370	360	307								346	338	338	319 <sup>R</sup>	331	313	307	307 <sup>C</sup>		
26	306	286	285	318	299	328	362	332	347								346	343	339	329	326	305	307			
27																	341 <sup>R</sup>	374	359	343	342	319	299	298	298	312
28	311	311	299	306	334	324	368	377	355	326	342	348	363	363	338	356	355	349	349	320	310	307	293	310		
29	280	298	303	303	326	292	362	370	342	320	346	330	366	343	330	346	345	343	342	330	320	298	295	292		
30	292	313	312	312			311	374	374	348	348	348	347	320	338	335	343	355	354	346	328	317	316	316	308	
31	308	307	307	327	349	348	365	365	333	324	352	342	332	338	319	335	349	337	336	323	320	295	313	312		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	29	28	28	29	27	29	30	30	30	28	28	28	28	28	29	29	31	31	31	31	31	31	31	29		
MED	308	313	312	311	321	328	364	372	352	342	346	341	344	347	347	354	351	354	342	328	321	313	307	312		
U Q	316	317	317	318	336	338	374	378	365	364	351	348	354	355	351	361	359	364	350	336	331	320	315	316		
L Q	300	307	308	303	305	318	352	361	342	326	328	334	330	336	338	343	346	343	335	319	311	299	295	297		

MAR. 2021 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1								L	L		L		L		L	L	L								
2								L	L	412	L	L	L	L		412	L	L							
3										347	385	L	L	L	L	380	381	L	L						
4										L	L	L	L	L	L	L	393								
5								L	L		364	381	389	L	L	L	L								
6									L	L	L	L	L	L	L	L	L								
7									L	L		L	L	L	L	L	L								
8										371		L	L	L	L	370	380	L							
9								L	L		405	403	L	L	L	374	L	L							
10									L	L	L	L	L	L	L	L	L								
11								L	L		399	L	L	L	L	L	L	L							
12									L	L		L	L	L	L	L	L								
13								361	L	L		L	L	L	L	L	L	L	L						
14									L	L		382	370	L	394	387	378	L	L						
15									L		353	L	L	L	L	L	L	L							
16							L		L	L	L	L	L	L	L	L	L	L							
17									L	L	L	L	L	L	L	L	L	L							
18							L	L	L		386	L	L	L	L	L	L	398							
19									L		395	L	L	L	L	L	L	L							
20								L	L		387	L	L	L	L	L	L	379							
21								L	L	L		L	L	L	L	L	L	L	L						
22								L		L	L	L	L	L	L	L	L	L	L						
23								L		L		L	L	L	L	L	L	L	L						
24										L		364	L	L	L	373	361	L							
25									L	C	C	C	C	C	C	C	C	L							
26										C	C	C	C	C	C	C	C	L							
27						C	C	C	C	C	C	C	C	C	C	C	L								
28							A	394	377	372	387	386	382	L	L	379	L	L							
29									L		364	368	L	L	L	388	371	L	L						
30									367	376	372	L	L	L	395	370	367	363	L	L					
31								L	L		L	L	L	L	L	344	356	L	L						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								2	5	14	12	12	9	3	14	11	2								
MED								378	374	381	378	376	385	370	378	378	388								
U Q									392	395	386	388	392	394	387	381									
L Q									362	364	369	371	380	369	371	363									

MAR. 2021 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2021 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1								220	224	232	242	250	254	276	260	288	238								
2								238	260	228	312	268	258	246	252	256	250								
3										324	262	246	268	252	260	274	252	234							
4										246	246	244	244	242	244	244									
5								202	228	260	242	250	256	246	262	238									
6									216	234	224	224	248	248	252	236	230								
7									230	248	264	242	252	240	238	238	238								
8										280	246	274	280	254	264	246	238								
9								252	260	236	278	256	268	254	276	250	232								
10									232	238	238	248	336	248	250	234									
11								224	234	224	266	244	264	244	244	244	236								
12									236	240	278	278	252	298	240	244									
13								310	282	302	266	272	282	266	262	240	270	270							
14									286	286	262	268	268	242	272	230	244	222							
15									254	256	236	268	266	252	266	238	248								
16							242		242	264	268	252	236	252	262	248	228								
17									240	274	262	242	256	256	230										
18							240	224	220	294	248	268	268	268	252	240	240								
19									254	270	264	274	254	274	264	270	254								
20							248	234	246	248	306	260	276	248	248	254									
21								284	270	366	318	338	296	280	266	240	252	226							
22								264	254	356	332	286	302	274	254	254	246	228							
23								234	254	258	268	268	268	248	246	256	256								
24									274	266	284	270	258	258	254	252									
25									306		C	C	C	C	C	C	246								
26									256	C	C	C	C	C	C	C	238								
27					C	C	C	C	C	C	C	C	C	C	250	240	244								
28							218	242	274	304	280	252	252	252	258	258	240	240							
29								268	300	276	278	252	262	272	268	250	250								
30								270	270	270	270	284	264	268	268	246	252								
31								242	272	284	260	260	284	284	286	262	246	258							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT							3	13	25	28	28	28	28	28	29	29	26	9							
MED							240	242	254	262	265	268	265	254	258	246	246	240							
U Q							242	258	270	290	275	274	275	271	265	257	252	255							
L Q							218	224	233	240	247	250	252	248	250	239	238	227							

MAR. 2021 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2021 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	262 <sup>Q</sup>	244	230 <sup>Q</sup>	256	256	216	202	202	192	188	176	202	224	198	236	210	216	216	198	196	244	272	292 <sup>Q</sup>	274 <sup>Q</sup>
2	262	242	230	260	272	236	228	196	218	202	198	202	198	198	198	190	206	218	222	230	200	258	250	284
3	266	274	264	266	210	200	200	204	222	194	194	178	186	192	194	206	214	202	208	246	208	268	264	272
4	278	266	266	252	226	202	218	218	220	194	194	212	212	194	198	198	216	228	214	224	208	238	258	244
5	256	256	234	256	230	196	206	196	196	198	186	200	200	200	192	192	220	210	198	210	242	250	240	252
6	232	226	242	250	240	218	218	218	200	190	200	192	194	194	194	204	204	212	198	220	236	254	256	256
7	244	256	214	240	234	216	208	208	198	202	202	204	204	190	200	194	208	208	208	208	230	226	250	250
8	266	266	248	280	272	234	234	220	220	198	198	186	198	214	222	194	210	210	226	226	236	242	242	264
9	260	262	240	246	216	242	208	206	202	200	174	198	174	200	194	204	200	218	218	208	200	256	268	262
10	262	266	248	224	202	238	198	198	200	186	212	192	224	196	192	208	224	206	218	222	204	264	252	262
11	250	254	248	252	238	214	206	182	200	198	192	186	210	184	172	194	190	224	216	228	228	238	254	254
12	270	264	264	246	240	230	198	216	202	196	182	214	200	192	218	198	234	222	224	234	244	220	224	240
13	242	282 <sup>Q</sup>	256	274 <sup>Q</sup>	246 <sup>Q</sup>	270 <sup>Q</sup>	244	250	220	196	196	202	184	200	190	214	212	228	214	210	236	232	246	292 <sup>Q</sup>
14	278	262	242	242	262	234	210	210	202	218	208	202	196	202	196	196	202	194	220	244	224	270	270	250 <sup>Q</sup>
15	270 <sup>Q</sup>	258 <sup>Q</sup>	226 <sup>Q</sup>	262 <sup>Q</sup>	242 <sup>Q</sup>	230	240	234	214	202	214	198	198	202	202	190	214	242	220	262	262	250	250	250
16	220	224	232	232	252	216	198	222	196	196	208	216	198	194	218	196	202	208	218	220	238	250	250	250
17	246	246	246	230	232	232	212	214	220	202	198	208	200	A	200	200	232	224	224	236	244	242	242	242
18	242	240	250	262	246	270	192	198	192	208	204	196	212	198	198	202	202	218	216	202	234	246	246	246
19	254	254	254	250	224	192	210	210	194	194	194	202	198	202	202	216	204	240	214	228	214	240	240	250
20	250	250	264	238	218	256	218	210	210	200	208	198	188	196	208	200	208	236	258	242	278	212	242	226
21	252	268	254	288	272	262	236	202	198	200	248	234	206	202	192	204	220	196	230	238	258	262	262	274
22	288	288	288	256	246	248	242	212	212	200	194	194	222	198	204	204	202	202	236	238	238	246	246	246
23	252 <sup>Q</sup>	252 <sup>Q</sup>	252 <sup>Q</sup>	240 <sup>Q</sup>	224 <sup>Q</sup>	208	208	202	202	202	188	192	196	198	184	198	200	246	236	216	216	232	258	280
24	268	288	288	288	224	198	206	212	222	204	202	220	200	200	200	200	204	228	228	228	240	256	256	248
25	234 <sup>Q</sup>	250 <sup>Q</sup>	256	242 <sup>Q</sup>	212 <sup>Q</sup>	264	214	222	210	C	C	C	C	C	C	C	210	246	222	222	E B	222	256	256
26	282	286	276	246	260	248	228	236	202	C	C	C	C	C	C	C	202	242	226	226	232	252	234	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	200	200	200	236	220	224	260	258	274	244
28	244	244	244	244	214	232	A	206	204	198	194	202	192	192	194	206	198	198	230	230	250	250	254	258
29	258 <sup>Q</sup>	242 <sup>Q</sup>	262	240	198	252 <sup>Q</sup>	224	222	200	200	204	200	188	188	188	218	212	208	224	222	228	228	256 <sup>Q</sup>	256 <sup>Q</sup>
30	256	256	248	224	212 <sup>Q</sup>	240	220	228	210	202	196	194	188	188	192	202	206	218	218	236	236	236	238	252
31	252	270	256	226	198	218	214	198	200	204	208	208	198	194	190	212	216	228	228	228	220	246	232	252
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	29	30	30	28	28	28	28	27	29	29	31	31	31	31	31	31	31	30
MED	256	256	249	248	233	232	212	210	202	200	198	201	198	198	198	200	208	218	220	226	236	246	250	252
U Q	266	266	262	260	246	248	226	220	214	202	206	206	205	200	202	206	216	228	226	236	244	256	258	262
L Q	246	246	242	240	216	216	206	202	200	196	194	194	193	192	192	196	202	208	214	220	220	236	242	248

MAR. 2021 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2021 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							B	106	114	114	106	104	104	104	104	104	112		B	B				
2							B	116	104	98	102	A	A	102	108	108	98		B	B				
3							B	98	98	98	104	102	102	102	104	104	104	114		A				
4							B	98	100	100	100	100	100	94	94	94	94	100		A				
5							B	100	100	100	100	100	100	100	108	100	86	106		B				
6						B	B	106	106	106	106	106	106	100	100	100	100		A	B				
7						B	B	102	102	102	102	102	102	102	102	102	102		B	B				
8						B	B	86	94	94	94	94	98	98	98	98	98	108		B				
9						B	B	108	108	98	98	98	98	98	98	98	100	94		B				
10						B		108	104	104	104	104	92	100	100	100	100	106		B				
11						B		110	100	100	100	98	98	98	98	98	104	104		B				
12						B	B	118	100		A	A	112	106	106	94	94	102		B	B			
13						B	B	102	106	96	96	96	96	96	100	110		A	A	B				
14						B	B	116	102	102	102	104	104	104	104	104	94	118		A				
15						B	B	102	102	98		A	98	98	98	104	98	98		A				
16						B	B	98	98	98	102	102	102	102	102	102	102	102		B				
17						B	B	102	102	102	102	96	96	96		A	A	A	96		B			
18						B	B	106	92	98	106	98	98	102		A	A	A	102		B			
19						B	B	102	102	102	98	98	98	98	106	106	106	110		B				
20						B	B	106	106	102	102		A	102	102	102	102	102		A				
21						90	90	106	100	100	100	100		A	90	98	98	106	96		B			
22						B	B	98	98	94	94	94	98	108	108	104	104	98		A				
23						B	B	98	106	106	106	106	98	98	96	96	96	100	86		B			
24						B	B	102	102	102	102	102	102	102	96	96	100	100		B				
25						B		100	100	100		C	C	C	C	C		100	100		B			
26						B	B	100	100		C	C	C	C	C	C		96	96		B			
27						C	C	C	C	C	C	C	C	C		100	100	100	100		B			
28						B	A	102	96	104	104	104	104	94	96	96	96	96		B				
29						B	B	96	96	96	100	100	100	100	100	100	100	100		B	B			
30						B		120	100	100	100	100	100	100	100	96	96		A		B			
31						B	B	106	106	106	102	102	104	104	104	104	104	104		B	B			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	3	30	30	27	26	26	26	28	27	27	28	23	2					
MED						90	100	102	101	100	102	100	100	100	100	100	100	100	88					
U Q							120	106	104	102	104	104	102	102	104	104	103	106						
L Q							90	100	100	98	100	98	98	98	98	98	97	98						

MAR. 2021 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

MAR. 2021 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	92	B	B	B	B	B	92	148	124	124	178	100	106	102	168	98	126	B	B	B	92	92	92	B
2	B	90	94	94	94	98	B	168	160	110	104	104	100	102	104	100	154	130	B	B	B	104	B	104
3	B	B	104	B	98	B	B	138	156	108	108	104	104	G	174	110	132	120	110	110	B	B	B	B
4	96	96	96	96	96	96	B	146	102	102	164	154	154	144	160	118	120	162	104	B	104	B	96	B
5	B	B	B	B	B	B	B	142	100	150	166	138	162	110	146	104	86	118	B	B	B	B	B	B
6	B	B	B	B	B	B	B	162	148	110	154	104	G	164	G	110	116	108	B	B	B	B	B	B
7	B	B	B	B	B	B	B	128	142	162	162	138	120	112	112	148	128	B	B	B	B	B	B	B
8	100	100	B	B	B	B	B	144	116	114	148	90	138	158	158	124	110	100	B	106	B	B	B	B
9	B	B	B	B	92	B	B	132	144	114	92	140	116	174	96	110	132	G	B	B	100	102	102	102
10	102	92	92	90	B	98	B	154	108	108	114	102	158	100	112	162	144	132	B	B	B	B	B	B
11	B	B	B	98	B	98	98	156	156	142	154	142	162	172	160	158	182	166	B	B	B	B	B	B
12	B	B	B	B	B	B	B	116	110	110	110	170	104	104	108	186	160	160	B	106	106	B	106	106
13	B	B	102	102	B	B	B	120	102	102	106	106	106	120	112	124	98	102	B	100	108	108	B	98
14	98	B	94	94	94	B	B	94	124	134	118	108	104	100	152	104	104	110	128	98	B	104	B	B
15	B	B	92	92	B	B	B	150	150	108	108	102	170	176	112	120	88	120	94	94	104	104	104	104
16	104	B	92	B	B	B	B	92	150	150	124	178	156	162	96	168	132	156	144	B	B	90	90	B
17	B	90	90	B	B	B	B	144	98	134	108	108	108	102	102	104	106	106	120	B	B	106	106	102
18	100	94	B	B	B	B	B	146	156	156	140	166	102	176	164	102	102	102	116	B	B	B	B	102
19	102	108	108	108	108	92	156	156	156	134	116	108	108	104	G	174	108	146	B	108	112	112	100	100
20	100	100	106	106	96	96	G	146	158	114	106	102	104	104	150	G	106	98	94	94	94	94	96	96
21	100	100	100	100	100	100	G	130	122	118	108	108	108	92	98	110	104	G	B	90	90	90	90	90
22	90	B	96	96	B	100	110	146	126	110	106	102	160	188	100	G	110	144	94	94	102	102	102	106
23	102	98	98	B	98	B	140	140	124	116	116	156	98	166	166	110	G	160	G	108	B	B	B	B
24	B	B	B	B	94	96	G	140	140	126	110	110	104	G	G	112	108	G	B	B	90	90	102	102
25	102	102	102	92	92	92	134	134	134	C	C	C	C	C	C	C	94	94	B	B	B	B	B	96
26	104	104	104	100	B	100	128	128	138	C	C	C	C	C	C	C	160	120	B	96	104	104	B	C
27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	96	G	G	G	B	B	B	B	B
28	B	B	B	B	B	B	148	138	130	122	106	G	100	G	G	150	136	88	B	B	88	88	B	B
29	B	B	B	B	B	110	148	146	142	110	116	102	102	92	120	110	G	168	B	B	B	B	90	90
30	90	B	94	B	B	B	152	146	142	116	116	108	110	110	110	110	92	92	92	94	B	B	94	B
31	B	98	B	B	B	B	132	150	120	116	106	150	112	112	112	138	168	144	B	B	B	B	B	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	15	13	17	13	11	12	16	30	30	28	28	27	27	25	25	26	28	25	7	13	16	13	14	15
MED	100	98	96	96	96	98	137	145	134	115	112	108	108	112	112	110	118	120	94	100	103	102	101	102
U Q	102	101	103	101	98	100	148	150	148	124	154	142	158	161	159	138	140	145	104	107	105	105	102	104
L Q	96	93	93	93	94	96	104	132	120	110	106	102	104	102	104	106	106	101	94	94	91	91	94	96

MAR. 2021 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Wakkanai

MAR. 2021 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	F1						L1	HL11	HL21	HL21	HL22	LH11	LH11	LH21	HL11	LQ21	CL22				F1	F1	F1		
2		F1	F1	F1	F1	F1		H1	HL22	C1	LH11	L1	L3	LC21	LC21	LC22	HL21	H1				F4		F2	
3			F1		F1			H2	HL21	L2	CL21	LC11	CL11		C1	C2	C2	LC11	L3	F1					
4	F1	F1	F2	F1	F2	F1		HL21	LC11	C2	H1	HL21	HL21	HL21	HL22	HL22	CL22	H2	L1		F1		F1		
5								H2	LC22	HL21	HL21	HL21	H1	C2	H2	C2	LC11	C1							
6								H2	HL22	HL22	HL21	LC11		HL22		C2	C3	L3							
7								C2	H2	H2	H2	H2	C2	C2	C2	H2	C2								
8	F1	F1						C2	LC11	CL21	HL11	LH21	HL21	HL21	HL21	CL21	CL21	LC11		F1					
9					F1			H2	H2	C2	LC11	CL11	CL11	HL11	LC11	CL21	C2					F1	F1	F1	F1
10	F1	F2	F1	F1		L1		H2	C2	C2	LC22	LC22	HL22	C2	C2	H2	H2	H1							
11				F1		L1	L1	H2	H2	H2	H2	H1	HL11	HL11	HL11	HL21	HL11	H2							
12								LH21	C2	C2	L2	HL11	LC21	C1	LC11	HL11	HL22	H2		F1	F1		F1	F1	
13			F1	F1				C2	LC21	C3	C3	C2	C2	C2	CL21	C2	L2	L1		F1	F1	F1		F1	
14	F1		F1	F1	F1		LC11	CL21	CL21	CL21	C2	L2	LC11	HL11	L1	C2	C2	C2	L1		F1				
15			F1	F1				H1	H2	LC21	C2	L2	HL11	HL11	HL11	CL21	LC21	C2	LC11	F1	F4	F1	F2	F1	
16	F1		F1				L1	H2	CL22	CL21	HL11	HL11	HL11	LC21	H2	C1	H2	H1			F1	F1			
17		F1	F2					H1	LC11	C2	C2	C2	C2	C3	L2	L2	L2	C2			F3	F1	F3	F2	
18	F3	F1					H1	H1	HL21	HL21	HL11	C3	H1	H1	L2	L3	L2	C2					F1	F2	
19	F3	F2	F1	F1	F1	L1	H2	HL21	C2	C2	C2	C3	C2	C2		H1	C2	H2		F1	F1	F2	F2	F1	
20	F1	F2	F3	F1	F1	L1		HL21	H2	C2	C2	L3	C2	C2	HL22		C2	C3	L2	F1	FQ21	F2	F2	F1	
21	F1	F4	FQ21	F2	F1	F1		C2	C2	C2	C2	C2	L2	C2	C2	C2	C2			F1	F1	F1	F1	F1	
22	F1		F2	F1		L1	C1	H2	CL21	CL21	C2	C2	HL11	HL11	C2		C2	H2	L4	F1	F2	F3	F2	F1	
23	F2	F1	F1		F1		C1	H2	C2	C2	C2	H1	LC11	H1	HL11	C1		H1		F1					
24					F1	L1		H2	HL11	CL21	C1	C2	C1			C2	C2				F2	F2	F1	F2	
25	F1	F3	F2	F2	F3	L2	HL22	H2	H2								LC22	LC31						F3	
26	F2	F2	F1	F2		L1	C1	C2	C2								H2	C2		F1	F4	F3			
27															LC11										
28							H2	C2	C2	C2	C2		C2			H1	C1	LC11		F1	F1				
29					L1		H2	H2	H2	C2	C2	C2	C2	LC21	CL11	CL21	C1	H1					F1	F2	
30	F1		F1				H2	H2	H2	C2	C1	C2	C1	C2	C2	C2	LC21	L2	C1	L3			F1		
31		F1					C2	HL21	C2	C2	C2	HL11	C1	C1	C1	H1	HL21	H1						F2	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT																									
MED																									
U Q																									
L Q																									

MAR. 2021 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

MAR. 2021 f<sub>XI</sub> (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	X 34	X 33	X 34	X 34	X 33	X 32														X 38	X 32	X 36	X 38	X 40	
2	X 40	X 43	X 42	X 39	X 39	X 38															X 52	X 53	X 47	X 41	X 41
3	X 41	X 40	X 40	X 39	X 38	X 38															X 41	X 49	X 38	X 39	X 38
4	X 39	X 42	X 42	X 44	X 52	X 27															X 53	X 45	X 44	X 43	X 42
5	X 42	X 43	X 43	X 43	X 46	X 38															X 50	X 46	X 44	X 45	X 43
6	X 45	X 45	X 44	X 44	X 43	X 43															X 45	X 44	X 46	X 46	X 46
7	X 46	X 45	X 45	X 42	X 46	X 34															X 50	X 40	X 39	X 39	X 40
8	X 38	X 41	X 38	X 35	X 34	X 33															X 40	X 38	X 38	X 39	X 38
9	X 38	X 37	X 37	X 37	X 35	X 34															X 51	X 35	X 32	X 35	X 36
10	X 36	X 36	X 36	X 36	X 33	X 24															X 44	X 37	X 37	X 37	X 37
11	X 38	X 38	X 38	X 38	X 35	X 35															X 46	X 34	X 37	X 37	X 38
12	X 38	X 38	X 37	X 37	X 37	X 32															X 57	X 54	X 54	X 38	X 41
13	X 42	X 43	X 41	X 44	X 41	X 42															X 74	X 33	X 40	X 44	X 43
14	X 45	X 44	X 44	X 44	X 42	X 38															X 52	X 46	X 44	X 44	X 43
15	X 44	X 45	X 46	X 46	X 42	X 37															X 55	X 52	X 52	X 53	X 52
16	X 47	X 43	X 40	X 41	X 41	X 38															X 48	X 43	X 44	X 42	X 42
17	X 41	X 41	X 39	X 40	X 40	X 34															X 51	X 48	X 50	X 48	X 43
18	X 43	X 46	X 46	X 52	X 54	X 54	64														X 52	X 45	X 45	X 45	X 45
19	X 45	X 45	X 45	X 46	X 45	X 36															X 67	X 50	X 46	X 44	X 44
20	X 45	X 43	X 43	X 41	X 39	X 39															X 78	X 68	X 64	X 50	X 50
21	X 50	X 47	X 48	X 43	X 42	X 44															X 58	X 46	X 46	X 46	X 45
22	X 43	X 43	X 40	X 39	X 33	X 33															X 58	X 49	X 46	X 42	X 41
23	X 38	X 39	X 39	X 39	X 36	X 35															X 63	X 46		X 40	X 39
24	X 40	X 39	X 38	X 37	X 37	X 37															X 60	X 55	X 51	X 48	X 48
25	X 46	X 45	X 45	X 42	X 38	X 35															X 63	X 50	X 45	X 41	X 43
26	X 42	X 40	X 40	X 41	X 38	X 37															X 86	X 60	X 39	X 41	X 41
27	X 42	X 40	X 40	X 39	X 39	X 37													X 65	X 58	X 50	X 50	X 50	X 50	X 47
28	X 47	X 47	X 44	X 43	X 40	X 38															X 63	X 56	X 52	X 48	X 48
29	X 49	X 45	X 46	X 46	X 40	X 38															X 65	X 52	X 50	X 58	X 56
30	X 57	X 54	X 57	X 46	X 42	X 41															X 56	X 45	X 43	X 43	X 43
31	X 43	X 43	X 43	X 48	X 28	X 29															X 70	X 61	X 53	X 52	X 48
	00	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	1												1	31	31	30	31	31	
MED	X 42	X 43	X 42	X 41	X 39	X 37	64												65	X 55	X 46	X 45	X 43	X 43	
U Q	X 45	X 45	X 45	X 44	X 42	X 38															X 63	X 52	X 50	X 48	X 46
L Q	X 39	X 40	X 39	X 39	X 36	X 34															X 50	X 43	X 39	X 39	X 40

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

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

MAR. 2021 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

MAR. 2021 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1										L	L	456	448	432	U L		L	L							
2										L	408	476	428	440	U L	432	L	L							
3										L	L	U L	A	L	U L	L	L								
4										L	L	440	440	A	L	A	A								
5									L		U L	448	440	L	436	448	L								
6									L	400	468	444	440	A	440	A	356								
7										L	L	440	436	L	L	L		L							
8									L	L	444	444	444	L	L	L									
9									L	L	L	444	452	452	A	L	L								
10									L	L	U L	448	456	436	448	428	L	A							
11								L	L	L	448	448	452	432	L	U L	408								
12									L	L	L	440	440	440	440	380	L	L							
13									L	A	L	452	452	L	L	A	L	L							
14								L		L	U L	428	432	444	436	436	L	L							
15										432	A	436	436	444	424	L	L								
16									L	420	424	456	A	440	A	L	U L	268							
17									L	L	452	456	444	448	L	L	L								
18								L	L	L	444	440	440	444	420	416	A								
19										420	U L	444	464	452	A	448	L								
20										L	464	440	460	A	A	L	L	A							
21									A	440	448	A	U L	L	L	L									
22									L	L	472	464	A	L	L	A	L		A						
23								A		420	448	456	A	452	424	L	L								
24										L	444	A	424	440	L	L	L								
25										L	456	456	L	452	436	L	L								
26								L	L	L	448	464	456	476	U L	L	L	L	L						
27									L	L	440	456	456	464	L	L	L								
28									L	L	440	456	452	448	L	416	L								
29									L	L	424	440	460	452	428	428	L	L							
30									L		428	440	452	452	444	436	420	L	L						
31									L	L	U L	456	452	444	440	L	U L	L							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT										7	23	28	25	21	14	8									
MED										420	448	450	448	444	436	414		U L							
U Q										432	452	456	452	452	440	418									
L Q										420	440	440	440	440	428	394									

MAR. 2021 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							B	U	U	U	U	U	U		U	A	U	B						
2							B	U		A	A	U	A	U	U	U	U	U	B					
3							B	U	A	U	U	U	U	A	A	U	R	B						
4							B	U	U	U	U	U	U	U	U	U	U	A	B					
5							B	U	U	U	U	U	U	U	U	U	U	U	B					
6							B	U	U	U	U	U	U	U	U	U	U	U	B					
7							B	U	A	R		A	U	R		A	U	U	B					
8							B	U	U	U	U	U	U	U	A	A	U	U	B					
9							B	U	A	U	U	U	U	U	U	U	U	U	B					
10							B	U	U	U	U	U	U	U	U	U	U	U	B					
11							B	U	U	U	U	U	U	U	U	U	U	U	B					
12							B	U	U	U	U	U	U	U	U	U	U	U	B					
13							B	U	U	U	U	U	U	U	U	U	U	U	B					
14							B	U	U	U	U	U	U	U	U	U	U	U	B					
15							B	U	U	U	U	U	U	U	U	U	U	U	B					
16							B	U	U	U	U	U	U	U	U	U	U	U	B					
17							B	U	U	U	U	U	U	U	U	U	U	U	B					
18							B	U	U	U	U	U	U	U	U	U	U	U	B					
19							B	U	U	U	U	U	U	U	U	U	U	U	B					
20							B	U	U	U	U	U	U	U	U	U	U	U	B					
21							U	U	U	U	U	U	U	U	U	U	U	U	B					
22							B	U	U	U	U	U	U	U	U	U	U	U	B					
23							U	U	U	U	U	U	U	U	U	U	U	U	B					
24							U	U	U	U	U	U	U	U	U	U	U	U	B					
25							U	U	U	U	U	U	U	U	U	U	U	U	B					
26							U	U	U	U	U	U	U	U	U	U	U	U	B					
27							U	U	U	U	U	U	U	U	U	U	U	U	B					
28							U	U	U	U	U	U	U	U	U	U	U	U	B					
29							B	U	U	U	U	U	U	U	U	U	U	U	B					
30							B	U	U	U	U	U	U	U	U	U	U	U	B					
31							B	U	U	U	U	U	U	U	U	U	U	U	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							7	31	27	19	13	15	18	17	18	19	23	22						
MED							U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
U Q							204	232	284	312	328	352	348	336	328	304	280	216						
L Q							U	U	U	U	U	U	U	U	U	U	U	U						

MAR. 2021 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

MAR. 2021 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	E 16	B 15	E 16	B 16	E 16	B 17	E 16	B 23	G	G	G	G	G	G	C	G	J 30	A	G	23	23	E 15	B 15	E 15	B 15	
2	E 20	B 16	E 16	B 16	E 16	B 14	E 16	B 16	G	G	35	34	G	35	G	G	G	J 18	A 23	J 24	A 16	B 16	J 36	A 26	B 26	
3	E 22	B 22	E 22	B 16	E 16	B 16	E 22	G	28	34	G	G	41	46	42	G	G	E 22	B 15	E 15	B 15	E 15	B 15	E 15	B 15	
4	E 16	B 16	E 16	B 20	E 16	B 16	E 16	B 23	34	34	35	35	36	39	G	34	28	26	J 25	A 28	J 25	A 28	E 16	B 15	E 15	B 15
5	E 16	B 21	E 16	B 16	E 16	B 15	E 21	G	G	G	G	41	41	G	G	G	G	E 15	B 15	E 15	B 15	E 15	B 16	E 16	B 16	
6	E 16	B 16	E 16	B 16	E 16	B 16	E 15	G	G	G	G	39	38	37	34	G	J 30	A 15	E 15	B 15	J 26	A 16	B 16	E 16	B 16	
7	E 16	B 16	E 16	B 16	E 16	B 15	E 15	G	G	32	36	G	G	G	37	34	G	E 15	B 15	E 15	B 15	E 15	B 15	E 15	B 15	
8	E 16	B 16	E 16	B 15	E 15	B 16	E 16	G	G	G	G	36	G	J 65	A 33	A	30	G	E 16	B 21	E 15	B 15	E 16	B 16	B 16	
9	E 16	B 16	E 16	B 16	E 16	B 16	E 16	26	32	34	36	38	39	36	36	G	G	E 23	B 15	E 23	20	E 16	B 16	E 16	B 29	
10	J 22	A 22	E 20	B 16	E 16	B 16	E 16	G	J 36	A	G	G	G	G	G	J 38	A 34	A 24	J 28	A 28	J 21	A 15	E 15	B 15	E 15	
11	E 16	B 16	E 16	B 16	E 16	B 16	E 16	G	G	G	36	40	G	37	G	36	31	J 28	A 23	E 16	B 23	A 15	E 15	B 15	E 15	
12	E 16	B 16	E 16	B 16	E 16	B 16	E 16	G	G	G	35	34	G	37	G	G	G	E 16	B 16	E 23	B 23	E 23	B 24	J 24	A	
13	J 34	A 16	E 16	B 22	E 16	B 15	E 16	G	J 42	A 34	G	G	J 43	A 38	36	G	G	E 15	B 16	E 16	22	E 16	B 24	J 24	A	
14	E 16	B 16	E 22	B 16	E 16	B 16	E 16	G	G	J 36	A 39	35	G	34	G	G	G	E 16	B 16	E 22	B 16	E 16	B 16	E 16	B 16	
15	E 16	B 16	E 16	B 16	E 16	B 16	E 20	26	30	32	40	G	G	G	G	G	G	E 15	B 20	E 16	B 16	E 16	B 16	E 16	B 16	
16	E 16	B 16	E 16	B 16	E 16	B 16	E 16	26	G	G	G	42	G	38	36	32	G	E 16	B 15	E 16	B 16	E 16	B 16	E 16	B 16	
17	E 16	B 16	E 16	B 16	E 16	B 16	E 16	26	32	G	34	G	38	39	36	J 37	A 32	E 16	B 16	E 16	B 16	E 16	B 16	E 16	B 15	
18	J 32	A 32	J 43	A 27	E 21	B 16	E 18	26	33	34	36	40	G	40	G	36	J 36	A 36	E 16	B 24	20	E 16	B 16	E 16	B 16	
19	E 16	B 16	E 16	B 16	E 16	B 16	E 21	28	31	G	35	36	G	38	G	34	G	E 24	B 16	E 16	B 16	E 16	B 24	E 26	B 22	
20	E 16	B 20	E 20	B 16	E 16	B 16	E 26	32	G	G	37	37	J 52	A 52	33	G	J 42	A 32	E 24	B 16	E 16	B 36	A 34	E 36	B 34	
21	J 23	A 49	J 24	A 22	E 27	B 23	22	26	32	36	38	J 44	A 38	38	G	35	G	23	21	21	E 15	B 17	E 16	B 16	E 16	
22	E 21	B 16	E 16	B 16	E 16	B 20	19	25	G	J 35	A 40	J 37	A 56	40	J 50	A 37	G	J 32	A 58	E 24	23	20	E 23	B 16	E 16	
23	J 27	A 23	J 25	A 25	E 16	B 16	E 27	G	33	39	40	J 46	A	G	34	J 33	31	E 16	B 16	E 26	B 58	E 36	A 16	E 16	B 16	
24	E 16	B 22	E 16	B 25	E 21	B 16	E 28	30	33	J 40	A 56	41	J 39	A 48	44	J 35	G	E 25	B 24	E 16	B 16	E 16	B 16	E 16	B 16	
25	J 33	A 21	E 22	B 20	J 23	A 22	G	G	32	G	37	40	J 37	A 36	G	G	G	E 15	B 16	E 16	B 16	E 20	B 16	E 16	B 16	
26	E 16	B 27	J 27	A 34	J 28	A 19	G	G	G	G	40	37	J 37	A	G	G	G	J 29	A 19	E 16	B 16	E 16	B 16	E 16	B 42	
27	J 32	A 21	J 27	A 26	E 24	B 16	G	28	32	37	38	J 42	A 45	G	G	G	G	E 16	B 16	E 16	B 16	E 16	B 16	E 16	B 16	
28	E 16	B 16	E 16	B 16	E 16	B 16	E 31	36	37	36	G	G	G	G	G	G	G	E 16	B 21	E 16	B 16	E 16	B 16	E 16	B 16	
29	E 16	B 16	E 16	B 16	E 16	B 16	E 24	28	31	G	36	38	39	G	J 39	A	G	J 32	A 26	E 16	B 24	E 16	B 20	E 16	B 16	
30	E 16	B 16	E 16	B 16	E 16	B 16	E 24	28	32	36	37	38	42	G	J 34	A	G	J 30	A 22	E 16	B 16	E 23	B 16	E 16	B 16	
31	E 16	B 22	E 22	B 16	E 20	B 20	E 24	29	32	36	38	39	G	G	G	34	G	E 16	B 16	E 24	B 15	E 15	B 15	E 15	B 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	30	31	31	31	31	31	31	31	31	31	31	
MED	E 16	B 16	E 16	B 16	E 16	B 16	E 16	G	26	28	32	36	37	37	35	G	33	G	E 16	B 16	E 16	B 16	E 16	B 16	E 16	B 16
UQ	J 22	A 22	J 22	A 20	E 16	B 16	E 20	27	32	35	38	40	39	39	J 36	A 36	J 30	A 26	J 23	A 23	J 23	A 16	E 20	B 16	E 16	B 16
LQ	E 16	B 16	E 16	B 16	E 16	B 16	E 16	G	G	G	G	G	G	G	G	G	G	G	E 15	B 16	E 16	B 15	E 16	B 15	E 16	B 15

MAR. 2021 foEs (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

MAR. 2021 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

MAR. 2021 fbEs (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

MAR. 2021 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

MAR. 2021 fmin (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

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

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

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	335	296	330	309	337	353	352	387	385	377	375	348	349	323	C	324	321	345	379	384	297	300	301	321	
2	304	320	319	306	327	344	374	373	388	336	357	334	349	338	357	357	360	360	367	314	345	351	312	296	
3	304	311	311	322	330	382	368	368	353	359	323	339	347	352	327	349	353	389	366	311	342	311	315	307	
4	303	318	311	327	384	405	360	381	364	351	371	365	364	355	336	354	369	354	348	356	316	316	313	313	
5	316	319	300	315	356	310	367	373	371	346	317	360	354	343	357	357	375	367	358	334	303	300	341	323	
6	329	329	324	325	329	333	362	365	368	368	333	343	340	358	362	362	371	356	373	330	305	313	313	294	
7	322	323	331	311	361	290	368	364	361	363	349	347	336	341	348	359	365	375	375	386	316	325	307	302	
8	321	327	320	308	299	311	359	381	372	369	340	352	356	361	373	357	389	384	360	327	303	326	335	321	
9	304	316	323	323	323	330	372	383	373	361	351	350	316	V	345	366	353	364	383	369	378	337	313	297	311
10	312	301	301	340	370	328	374	381	375	398	323	352	352	364	370	374	367	354	389	361	326	320	316	316	
11	313	316	320	324	337	337	378	379	378	354	355	364	334	355	367	354	362	367	366	369	308	310	310	286	
12	315	316	314	328	340	339	382	387	378	383	365	347	352	369	341	350	357	361	345	325	312	376	308	300	
13	306	315	303	332	288	336	350	346	367	357	363	339	336	365	334	340	339	330	363	407	342	300	329	296	
14	288	289	289	289	331	F	353	383	377	329	319	335	335	336	347	338	352	358	345	330	308	318	306	293	
15	310	318	F	330	318	333	357	365	349	326	355	343	348	333	363	371	342	349	355	331	303	317	325	334	
16	325	335	311	333	351	329	380	381	373	367	347	316	334	340	369	363	361	349	351	344	324	327	328	323	
17	316	322	326	321	339	332	394	383	373	374	351	331	343	352	355	378	371	360	359	327	328	325	336	327	
18	316	F	F	F	F	F	F	F	393	377	344	329	329	329	343	359	357	360	360	378	339	328	325	325	327
19	324	305	311	340	356	349	394	385	373	383	343	334	330	342	344	353	367	344	351	364	346	331	317	314	
20	296	308	324	324	336	336	372	380	390	358	332	340	359	364	346	341	343	356	289	325	324	328	305	304	
21	324	335	333	304	291	320	355	377	376	344	345	353	369	360	339	335	355	362	356	355	315	309	316	305	
22	310	292	300	307	331	306	354	362	366	355	347	342	337	340	345	347	360	356	350	347	332	315	311	312	
23	282	281	350	339	364	F	372	364	338	348	342	334	346	347	355	345	338	357	353	358	350	A	314	305	
24	306	310	303	315	315	348	379	372	372	383	348	325	331	354	353	339	357	366	347	333	329	308	311	313	
25	310	295	327	340	340	353	377	363	357	305	318	340	330	336	346	339	344	357	350	365	345	336	298	308	
26	302	300	301	327	339	319	382	368	371	375	359	351	370	355	337	357	341	342	337	360	364	290	305	315	
27	309	300	301	308	320	316	365	353	377	370	367	354	352	345	358	354	355	354	348	345	312	303	315	303	
28	312	318	307	317	327	335	365	374	359	362	354	321	344	362	364	348	350	363	345	333	349	310	304	304	
29	304	290	314	333	328	326	384	386	379	362	343	331	356	368	358	330	345	347	366	352	331	299	F	F	
30	F	F	F	F	F	F	362	379	370	356	353	343	330	335	341	350	347	347	360	368	336	318	303	303	
31	299	305	333	360	364	308	356	354	361	362	345	337	331	337	342	351	357	345	342	330	340	311	319	303	
	00	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	29	28	29	29	27	30	31	31	31	31	31	31	31	30	31	31	31	31	31	31	30	30	30	
MED	310	315	314	324	336	333	368	377	372	361	347	342	344	347	354	353	357	357	356	345	328	316	313	308	
U Q	316	320	325	332	354	344	378	383	377	370	355	351	352	360	362	357	365	363	366	364	342	325	319	316	
L Q	304	300	303	310	325	319	359	365	364	348	333	334	334	340	342	341	345	349	348	330	312	309	306	303	

MAR. 2021 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1										L	L	382	389	409	U L	L	L								
2										L	433	361	413	368	U L	L	L								
3										L	U L	402	A	L	U L	L	L								
4										L	L	394	382	A	L	A	A								
5									L		U L	389	410	L	U L	L									
6									L	417	378	398	A	388	A	466									
7									L	L	L	402	407	L	L	L		L							
8									L	L	399	399	399	L	L	L									
9									L	L	L	399	392	381	A	L	L								
10									L	L	U L	398	392	410	399	400	L	A							
11								L	L	L	397	398	423	443	L	U L	L								
12									L	L	L	403	403	404	399	412	L	L							
13									L	A	L	398	399	L	L	A	L	L							
14								L		L	U L	394	411	U L	U L	390	382	L	L						
15										388	A	399	426	394	378	L	L								
16									L	403	425	A	417	A	391	A	L	U L	L						
17									L	L	392	389	399	396	L	L	L								
18								L	L	L	399	403	414	381	U L	404	397	A							
19										397	U L	404	398	410	A	386	A	L							
20										L	393	418	398	A	A	L	L	A							
21									A	389	402	A	U L	L	L	L									
22									L	L	376	382	A	L	L	A	L		A						
23								A		411	385	391	A	400	U L	L	L								
24										L	405	A	426	410	L	L	L								
25										L	374	386	L	393	386	L	L								
26								L	L	L	414	400	407	U L	L	L	L	L							
27									L	L	411	409	394	378	L	L	L								
28									L	L	399	395	399	407	L	401	L								
29									L	L	415	412	394	401	420	384	L	L							
30									L	409	416	406	384	400	408	392	L	L							
31									L	L	U L	381	385	391	395	L	U L	L							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT										7	23	28	25	21	14	8									
MED										403	399	398	399	395	388	402		U L							
U Q										411	411	403	414	402	400	410									
L Q										389	389	392	393	384	U L	378	394								

MAR. 2021 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

MAR. 2021 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										236	244	272	268	292		272	272							
2										236	236	296	254	254	238	254	242							
3										254	266	236	246	258	272	242	242							
4										240	226	236	236	238	252	232	216							
5									224		272	238	238	238	238	234								
6									228	216	298	236	250	234	224	224								
7										244	244	244	270	260	252		236							
8									236	246	264	242	234	234	234	236								
9									236	236	254	254	238	238	248	248	234							
10									236	220	282	262	262	230	250	232	232							
11								208	220	252	252	248	286	244	234	254								
12									224	240	256	282	264	250	264	252	252	230						
13									230	226	238	286	264	238	272	260	260	264						
14								222		260	276	264	264	250	240	248	238							
15										244	246	246	246	246	246	242	246							
16									232	232	246	258	258	232	226	230	234	220						
17									240	236	254	278	246	256	244	234	234							
18								222	222	246	280	264	264	258	232	232	236							
19									222	270	270	270	246	246	246	246								
20									246	296	262	240	240	266	246	252	226							
21									226	268	254	254	230	232	262	268								
22									232	246	280	254	244	260	244	232	242		238					
23								222		262	266	256	244	244	234	264	264							
24										246	276	288	266	242	250	250	250							
25										288	278	246	246	246	246	246	260							
26								234	226	226	242	242	242	248	254	254	272	256						
27									244	244	244	244	256	256	240	248	258							
28									258	244	252	278	250	232	232	250	262							
29									232	252	268	268	236	242	250	266	248	248						
30									248	258	258	266	266	256	256	252	252	246						
31									248	248	262	264	270	270	248	248	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								5	19	30	31	31	31	31	30	30	26	7	1					
MED								222	232	244	258	258	250	246	246	248	247	246	238					
U Q								228	240	252	276	270	264	256	252	254	258	256						
L Q								215	226	236	246	244	242	238	238	234	236	226						

MAR. 2021 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

MAR. 2021 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23						
1	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	C	200	214	214	194	E	B	E	B	E	B	E	B	E	B
2	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	200	192	196	196	E	B	E	B	E	B	E	B	E	B
3	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	200	192	192	192	E	B	E	B	E	B	E	B	E	B
4	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	200	A	A	200	E	B	E	B	E	B	E	B	E	B
5	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	190	190	196	196	E	B	E	B	E	B	E	B	E	B
6	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	206	A	178	202	E	B	E	B	E	B	E	B	E	B
7	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	200	200	212	194	E	B	E	B	E	B	E	B	E	B
8	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	188	204	204	192	E	B	E	B	E	B	E	B	E	B
9	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	194	194	204	194	E	B	E	B	E	B	E	B	E	B
10	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	190	A	220	194	E	B	E	B	E	B	E	B	E	B
11	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	190	212	212	202	E	B	E	B	E	B	E	B	E	B
12	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	186	190	190	210	E	B	E	B	E	B	E	B	E	B
13	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	204	220	220	206	E	B	E	B	E	B	E	B	E	B
14	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	188	186	210	210	E	B	E	B	E	B	E	B	E	B
15	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	188	188	212	212	E	B	E	B	E	B	E	B	E	B
16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	200	186	176	200	E	B	E	B	E	B	E	B	E	B
17	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	200	200	212	202	E	B	E	B	E	B	E	B	E	B
18	E	A	E	B	E	B	E	B	E	B	E	B	E	B	E	A	184	A	202	202	E	B	E	B	E	B	E	B	E	B
19	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	184	A	202	202	E	B	E	B	E	B	E	B	E	B
20	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	198	212	242	234	E	B	E	B	E	B	E	B	E	B
21	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	188	212	212	212	E	B	E	B	E	B	E	B	E	B
22	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	204	204	204	214	E	B	E	B	E	B	E	B	E	B
23	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	188	188	198	204	E	B	E	B	E	B	E	B	E	B
24	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	200	200	200	210	E	B	E	B	E	B	E	B	E	B
25	E	A	E	B	E	B	E	B	E	B	E	B	E	B	E	A	190	190	192	198	E	B	E	B	E	B	E	B	E	B
26	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	172	176	176	184	E	B	E	B	E	B	E	B	E	B
27	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	188	188	188	188	E	B	E	B	E	B	E	B	E	B
28	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	184	186	186	196	E	B	E	B	E	B	E	B	E	B
29	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	182	182	182	194	E	B	E	B	E	B	E	B	E	B
30	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	226	176	186	180	E	B	E	B	E	B	E	B	E	B
31	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	204	204	212	210	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	30	30	30	30	28	27	27	27	26	28	30	30	31	31	30	31	31						
MED	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	193	201	211	204	E	B	E	B	E	B	E	B	E	B
UQ	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	198	206	214	212	E	B	E	B	E	B	E	B	E	B
LQ	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	A	188	193	200	194	E	B	E	B	E	B	E	B	E	B

MAR. 2021 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

MAR. 2021 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

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

MAR. 2021 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

MAR. 2021 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	B	B	B	B	B	B	154	G	G	G	G	G	G	C	G	104	G	88	88	B	B	B	B
2	88	B	B	B	B	B	B	158	G	G	96	96	G	96	G	G	G	G	90	96	96	B	96	96
3	96	96	96	B	B	B	120	G	120	154	G	G	154	96	94	G	G	138	B	B	B	B	B	B
4	B	B	B	86	B	B	B	142	150	148	134	134	134	158	G	164	140	114	86	86	94	B	B	B
5	B	94	B	B	B	B	94	G	G	G	G	130	130	G	G	G	G	G	B	B	B	B	B	B
6	B	B	B	B	B	B	B	G	G	G	G	144	144	144	144	G	G	104	B	B	102	B	B	B
7	B	B	B	B	B	B	B	122	G	148	126	G	G	G	86	162	G	G	B	B	B	B	B	B
8	B	B	B	B	B	B	B	G	G	G	G	102	G	G	100	90	112	G	B	92	B	B	B	B
9	B	B	B	B	B	B	B	150	158	146	128	142	158	158	154	G	G	144	B	86	86	B	B	98
10	98	98	98	B	B	B	B	G	G	98	G	G	G	G	G	98	98	98	98	102	102	B	B	B
11	B	B	B	B	B	B	B	G	G	G	150	150	G	94	G	152	146	86	86	B	92	B	B	B
12	B	B	B	B	B	B	G	G	G	154	98	G	144	G	G	G	G	G	B	B	110	102	96	96
13	96	B	B	82	B	B	B	G	G	94	112	G	G	106	154	154	G	G	B	B	B	130	B	88
14	B	B	88	B	B	B	B	G	G	G	98	98	98	G	136	G	G	G	B	B	92	B	B	B
15	B	B	B	B	B	B	116	130	130	130	150	G	G	G	G	G	G	G	B	102	B	B	B	B
16	B	B	B	B	B	B	B	148	G	G	G	160	G	148	148	164	G	G	B	B	B	B	B	B
17	B	B	B	B	B	B	B	152	152	G	136	G	100	100	100	100	100	G	B	B	B	B	B	B
18	94	94	94	94	94	B	B	144	130	130	120	168	G	102	G	102	92	G	B	92	92	B	B	B
19	B	B	B	B	B	B	134	144	140	G	114	98	G	138	G	138	G	132	B	B	B	94	94	94
20	B	94	94	B	B	B	G	148	136	G	G	102	102	102	102	102	G	102	102	100	B	B	100	94
21	94	94	90	90	90	90	90	142	142	126	126	104	100	100	G	100	G	118	118	112	B	B	B	B
22	102	B	B	B	B	96	130	130	G	120	98	96	96	144	100	100	G	90	86	86	86	86	86	B
23	112	106	90	90	B	B	G	134	G	116	98	98	98	G	98	98	98	G	B	B	98	98	98	B
24	B	98	B	92	92	B	G	148	140	128	106	100	100	96	94	92	92	G	92	88	B	B	B	B
25	88	88	88	88	88	90	G	G	108	G	110	104	96	96	G	G	G	G	B	B	B	B	96	B
26	B	94	94	94	90	90	G	G	G	G	90	92	90	G	G	G	G	96	96	B	B	B	B	96
27	90	90	90	90	90	B	G	140	132	110	98	94	94	G	G	G	G	G	B	B	B	B	B	B
28	B	B	B	B	B	B	G	120	120	118	114	G	G	G	G	G	G	G	B	86	B	B	B	B
29	B	B	B	B	B	B	130	130	130	G	98	98	110	G	G	92	G	92	92	B	92	92	92	B
30	B	B	B	B	B	B	116	124	124	104	112	112	154	G	G	86	G	86	86	B	B	90	B	B
31	B	90	90	B	90	90	132	132	132	124	112	144	G	G	G	130	G	G	B	B	96	B	B	B
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	10	12	11	9	7	5	9	20	16	17	23	22	18	16	13	18	9	13	12	13	13	6	8	7
MED	95	94	90	90	90	90	120	142	132	126	112	103	101	102	100	101	100	102	91	92	94	96	96	96
U Q	98	97	94	93	92	93	131	148	141	147	126	142	144	144	146	152	126	125	97	101	100	102	97	96
L Q	90	92	90	87	90	90	105	130	127	113	98	98	98	96	96	98	95	91	86	86	92	90	93	94

MAR. 2021 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

MAR. 2021 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

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

MAR. 2021 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2021 f<sub>XI</sub> (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
2	C	C	C	C	C	C	C	C	C	C	C								X	X	X	X	X	X	X
3	X	X	X	X	X	X													67	59	60	43	36	37	
4	X	X	X	X	X	X													68	58	48	46	39	36	
5	X	X	X	X	X	X													X	X	X	X	X	X	
6	X	X	X	X	X	X													X	X	X	X	X	X	
7	X	X	X	X	X	X													80	66	38	36	37	38	
8	X	X	X	X	X	X													X	X	X	X	X	X	
9	X	X	X	X	X	X													69	53	42	39	40	38	
10	X	X	X	X	X	X													X	X	X	X	X	X	
11	X	X	X	X	X	X													76	66	42	38	37	37	
12	X	X	X	X	X	X													X	X	A	A	X	X	
13	X	X	X	X	X	X													78	60			37	37	
14	X	X	X	X	X	X													69	54	41	36	37	38	
15	X	X	X	X	X	X													X	X	X	X	X	X	
16	X	X	X	X	X	X													66	62	62	62	44	40	
17	X	X	X	X	X	X													88	62	40	37	40	42	
18	X	X	X	X	X	X													X	X	X	X	X	X	
19	X	X	X	X	X	X													69	62	53	46	42	40	
20	X	X	X	X	X	X													X	X	X	X	X	X	
21	X	X	X	X	X	X													70	68	58	53	58	52	
22	X	X	X	X	X	X													X	X	X	X	X	X	
23	X	X	X	X	X	X													67	59	46	44	40	39	
24	X	X	X	X	X	X													X	X	X	X	X	X	
25	X	X	X	X	X	X													67	61	58	45	42	40	
26	X	X	X	X	X	X													X	X	X	X	X	X	
27	X	X	X	X	X	X													62	62	51	41	43	43	
28	X	X	X	X	X	X													X	X	X	X	X	X	
29	X	X	X	X	X	X													72	74	65	41	41	41	
30	X	X	X	X	X	X													X	X	X	X	X	X	
31	X	X	X	X	X	X													74	88	83	49	49	49	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	28	29	29	29	29	29	4												25	30	29	29	30	30	
MED	X	X	X	X	X	X													X	X	X	X	X	X	
U Q	44	44	42	43	41	37	48												70	66	54	45	41	40	
L Q	X	X	X	X	X	X													X	X	X	X	X	X	
	39	39	38	38	37	30	39												67	60	46	40	39	38	

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

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

MAR. 2021 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	65	60	72	80	91	68	63	61	53	54	37	32	31
3	34	34	32	32	35	30	A	44	50	66	70	96	62	70	84	106	91	78	62	52	42	40	33	30
4	31	34	34	34	42	25	24	47	60	57	74	70	76	79	85	85	67	59	61	58	40	37	35	33
5	33	32	32	32	36	30	27	48	57	53	76	64	79	83	84	71	67	64	52	52	45	37	38	35
6	35	F	34	31	33	32	26	50	61	60	66	70	71	91	76	75	68	64	66	46	40	41	43	40
7	39	40	38	38	42	31	26	46	56	56	63	61	78	83	78	75	73	68	74	59	32	30	31	32
8	33	33	33	32	31	31	31	48	54	56	66	77	82	70	67	78	76	61	63	47	36	33	34	32
9	33	33	32	30	30	28	26	47	58	60	63	59	71	77	83	74	70	67	70	60	36	32	31	31
10	31	31	30	30	35	19	18	47	56	54	64	62	73	85	69	62	56	59	72	54	A	A	31	31
11	32	32	32	31	30	28	28	47	49	53	60	72	73	82	64	58	59	60	63	48	35	30	31	32
12	32	34	32	30	32	24	24	45	53	59	59	63	69	76	70	66	65	60	60	55	56	56	38	34
13	36	38	36	38	38	38	33	56	54	59	57	66	78	76	66	68	70	77	82	56	34	31	34	36
14	37	37	F	F	35	22	22	42	54	58	64	82	88	92	102	91	70	58	63	56	47	40	36	34
15	35	35	34	38	32	24	28	52	70	68	73	67	68	90	79	58	56	56	64	62	52	46	52	46
16	36	34	31	31	32	27	25	47	58	63	65	60	66	87	84	62	56	53	60	53	40	38	34	33
17	33	32	30	30	30	29	25	47	56	58	62	64	66	74	78	84	72	62	61	55	52	39	36	34
18	33	32	32	32	31	30	F	49	53	59	62	65	78	92	105	91	74	61	56	56	45	35	37	37
19	37	36	35	35	35	22	25	44	55	62	61	61	68	84	81	79	73	64	66	68	58	35	35	35
20	35	36	36	35	34	28	30	50	59	63	70	76	74	74	74	61	66	68	68	82	77	43	43	F
21	F	42	39	34	F	F	39	57	60	77	73	88	83	83	78	64	60	65	72	66	53	41	40	40
22	38	37	36	36	32	26	31	50	62	65	64	75	76	85	98	96	76	66	72	66	50	42	35	34
23	A	34	32	32	32	22	28	48	56	63	67	72	82	86	85	78	71	69	71	62	48	33	33	32
24	33	F	34	34	35	25	30	50	56	60	57	64	82	79	78	77	73	66	59	60	55	47	40	38
25	38	38	35	37	29	24	29	49	59	65	76	87	81	92	88	87	82	71	71	68	58	48	32	34
26	F	F	F	33	33	F	F	58	68	76	68	65	73	83	81	72	69	71	86	95	50	31	31	33
27	31	31	31	F	29	28	30	58	63	63	64	71	75	84	72	69	67	66	65	67	59	45	45	45
28	42	42	38	37	34	30	32	52	64	71	66	74	79	90	76	60	57	59	62	62	59	39	38	38
29	F	38	39	37	F	F	33	50	55	61	65	73	87	90	72	64	63	72	70	56	48	40	41	41
30	41	41	F	36	35	F	F	56	66	62	65	65	77	94	96	73	70	70	79	61	42	35	35	35
31	35	35	35	39	29	20	28	46	62	61	61	68	82	93	81	68	58	59	64	64	58	49	48	47
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	26	26	27	27	25	25	29	29	29	29	30	30	30	30	30	30	30	30	30	29	29	30	29
MED	35	34	34	34	33	28	28	48	57	61	65	68	76	84	80	74	68	64	64	58	48	39	35	34
U Q	37	38	36	37	35	30	30	51	62	64	69	74	81	90	84	84	73	68	71	64	56	42	40	38
L Q	33	33	32	31	31	24	25	47	54	58	62	64	71	77	74	64	63	60	61	54	40	34	33	32

MAR. 2021 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1							C	C	C	C	C	C	C	C	C	C	C	C							
2							C	C	C	C	C	436	444	U L	456	432	380	A							
3							A			L	L	444		U L	492	420	A	L							
4							244				L	L	436	U L	460	472	L	L	L						
5								L	U L	L	L	L	436	U L	452	452	416		L	L					
6								L	L	L	L	A	U L	A	L		436	L	L						
7									L	L	L	L	440		A	L	L	L	L						
8								L		L	L	448	448	448	452	432	U L	400	L						
9								L	L	L	L	456	456	448	420	440	408	L	L						
10										L	L	448	460	456	444	428	L	L							
11									L	L	436	448	464		A	A	L	A	A						
12								L	L	L	436	448	452	440	408		A	A							
13									L	L	L	452	452		A	444	424	L	L						
14								L	U L	L	408	464	448	452	468	440	432	L							
15								L	L	L	424	456	460	460	436		L	U L	296						
16								A	L	L	436	452	U L	504	444	444	416	L	L						
17									L	L	L	448	448	444	468	432	L	L							
18									L	U L	L	444	448	436	440	440	428	L	L						
19									L	L	L	456	480	448	440	424	L	L							
20								L	L	L	440	456	456	456	440		A	L							
21								L	L	L	464		456	480	452		L	L	L						
22								L	L	L	464	472	468	464		U L	L	L	L						
23								A	L	L	436	464	U L	476	460	456	440	L	L						
24									L	L	L	464	464	456	460		L	L	L						
25									L	U L	L	460	472		A	468	448	452	L	L					
26								L	L	U L	L	448	460	448	456	456	A	A	A						
27								L	L	L	436		A	A	456	456	432	L	A						
28								L	L	L	U L	460	460	460	456		L	L	L						
29								L	L	L	440	452	452	460	456		L	A							
30									L	L	L	424	448	468	452	448	436	428	L	L					
31									L	U L	L	472	456	456	440	456	A	A	A						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								1		3	15	24	27	26	27	16	3	1							
MED							244		420	440	454	456	456	448	430	400	U L	296							
U Q									424	460	460	464	460	456	434	408									
L Q									408	436	448	448	448	440	424	380									

MAR. 2021 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

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

MAR. 2021 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2021 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
2	C	C	C	C	C	C	C	C	C	C	C	35	G	39	38	J A	J A	J A	J A	J A	J A	22	E B	E B	J A
3	J A	22	22	E B	E B	J A	J A	G	G	G	38	G	J A	J A	J A	J A	J A	J A	J A	J A	23	23	16	15	
4	E B	16	15	15	15	15	15	15	15	15	15	42	43	35	39	39	36	34	32	G	22	E B	E B	J A	
5	22	E B	E B	E B	E B	E B	E B	E B	E B	E B	G J A	35	39	39	37	36	36	34	32	G	15	15	15	15	
6	E B	16	16	16	16	16	15	15	15	17	G	G	36	40	37	J A	50	37	G	J A	E B	E B	E B	E B	
7	E B	16	16	16	16	16	16	16	14	G	G	31	38	40	G	39	37	G	G	E B	16	22	16	27	
8	E B	16	16	16	16	16	15	15	16	G	G	G	J A	42	G	G	G	G	J A	31	23	27	22	15	
9	22	E B	E B	E B	E B	E B	E B	E B	G	G	G	J A	47	39	G	G	G	G	G	E B	16	15	15	20	
10	23	E B	E B	E B	E B	E B	E B	E B	G	G	32	G	J A	54	G	J A	J A	J A	J A	J A	J A	J A	J A	E B	
11	E B	16	16	16	16	15	16	15	16	G	G	G	37	G	J A	43	50	36	J A	J A	J A	J A	E B	E B	
12	20	E B	E B	E B	E B	E B	E B	E B	G	G	33	36	52	42	40	38	40	40	41	38	25	34	14	15	
13	J A	46	J A	J A	21	22	22	E B	G	G	J A	38	38	52	42	45	38	34	G	E B	16	16	16	15	
14	22	E B	E B	E B	E B	E B	E B	E B	E B	E B	29	33	35	38	G	J A	45	G	J A	J A	J A	J A	E B	E B	
15	E B	16	15	15	15	15	15	15	G	G	30	G	35	34	39	39	38	G	J A	J A	J A	36	44	36	
16	21	21	21	21	E B	E B	E B	E B	G	G	30	34	34	35	G	G	G	G	G	G	31	24	15	15	
17	E B	16	16	16	16	15	15	15	22	G	G	33	37	40	42	J A	J A	J A	J A	J A	J A	J A	J A	E B	
18	E B	16	26	33	32	J A	J A	21	24	29	34	35	37	37	J A	J A	J A	J A	J A	J A	G	J A	J A	E B	
19	E B	16	16	15	15	E B	E B	E B	24	30	32	G	G	G	G	G	G	G	G	33	27	24	16	16	
20	22	22	22	24	E B	E B	E B	E B	G	G	33	G	36	38	36	36	40	37	J A	J A	J A	J A	E B	E B	
21	E B	16	16	J A	J A	23	21	20	G	29	37	J A	J A	44	39	G	G	34	G	28	20	E B	14	27	
22	24	20	16	E B	E B	E B	E B	E B	G	G	J A	40	G	J A	J A	J A	J A	J A	J A	J A	J A	E B	E B	E B	
23	J A	44	J A	E B	J A	E B	E B	E B	G	29	32	34	G	J A	44	G	J A	J A	J A	J A	E B	E B	E B	J A	
24	21	E B	E B	E B	E B	E B	E B	E B	23	30	33	45	42	44	42	G	J A	J A	J A	J A	J A	J A	J A	E B	
25	J A	22	20	J A	J A	J A	E B	E B	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	E B	
26	E B	16	16	16	20	J A	J A	J A	27	32	34	J A	J A	39	G	G	42	41	38	J A	J A	J A	E B		
27	E B	16	86	31	35	J A	J A	24	G	G	34	36	48	45	54	46	G	G	J A	J A	J A	J A	E B		
28	E B	16	15	16	16	E B	E B	E B	19	26	31	32	35	40	J A	J A	J A	J A	J A	J A	J A	J A	E B		
29	E B	16	16	16	20	E B	E B	E B	24	30	33	37	39	44	41	53	46	43	30	30	38	21	16		
30	E B	16	16	15	16	E B	E B	E B	G	29	32	35	39	41	38	G	G	G	G	G	26	26	16	16	
31	E B	16	16	16	16	E B	E B	E B	G	28	34	37	36	J A	50	42	39	37	J A	J A	J A	J A	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	29	29	29	29	29	29	29	29	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	
MED	E B	E B	E B	E B	E B	E B	E B	E B	G	G	33	36	39	38	39	38	35	33	30	24	24	E B	E B	E B	
U Q	22	22	J A	22	21	22	18	20	G	30	34	38	42	42	43	43	40	38	35	32	36	23	19	22	
L Q	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	G	G	G	G	G	E B	E B	E B	E B	

MAR. 2021 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2021 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

MAR. 2021 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2021 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

MAR. 2021 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
2	C	C	C	C	C	C	C	C	C	C	C	367	350	328	322	372	354	358	371	324	356	344	318	307	
3	296	321	303	303	346	424	A	377	366	340	339	360	326	310	301	347	344	382	377	372	319	340	328	297	
4	295	297	297	309	373	386	R	356	347	374	365	342	352	360	333	338	363	348	341	353	369	349	335	334	312
5	315	303	313	314	349	386	366	366	385	347	347	352	351	327	372	356	376	362	357	351	356	309	323	336	
6	319	F	339	345	334	352	364	373	383	394	359	353	310	357	351	363	354	367	367	368	312	310	338	310	
7	296	333	314	322	346	374	306	370	390	375	353	348	343	344	350	356	358	363	370	390	380	297	319	315	
8	318	318	330	309	285	309	332	388	392	357	341	354	368	364	347	364	374	367	355	351	311	307	322	318	
9	320	332	340	314	334	352	349	373	375	367	361	345	338	342	371	345	362	372	377	364	318	A	A	308	313
10	309	309	319	344	409	371	293	380	393	351	369	342	333	353	378	371	349	350	386	380			324	301	
11	315	315	322	329	351	343	358	385	400	370	343	340	324	364	368	340	350	382	388	368	355	325	320	312	
12	313	322	308	333	354	386	333	378	383	365	364	365	342	366	330	358	352	362	374	327	323	370	341	308	
13	297	320	292	288	316	330	334	391	380	368	342	341	331	353	348	342	351	345	357	369	377	280	299	301	
14	295	283	F	F	349	373	349	369	362	361	316	336	342	318	338	344	360	339	352	330	341	323	316	292	
15	303	328	320	351	391	312	311	367	357	338	360	343	315	327	368	362	343	345	350	351	336	318	336	362	
16	320	339	321	321	355	346	342	375	358	358	367	346	309	338	356	378	349	340	360	372	357	345	313	329	
17	312	320	328	312	335	368	342	389	378	361	368	344	341	341	332	351	352	349	343	341	354	344	314	320	
18	324	310	299	312	325	329	F	390	364	360	341	343	316	325	339	354	359	389	346	350	351	322	308	308	
19	310	317	315	349	364	376	330	386	374	386	362	339	317	337	344	339	362	356	352	365	371	328	319	328	
20	310	321	307	311	336	338	F	F	338	376	370	348	355	344	342	341	346	337	335	339	297	316	380	298	336
21	F	329	330	300	F	F	347	381	350	364	328	328	349	334	354	349	333	365	372	354	348	309	309	294	
22	294	296	288	321	347	296	331	375	372	362	333	339	341	327	336	341	350	344	357	358	342	318	307	311	
23	A	297	303	303	374	326	327	362	364	343	350	340	332	334	332	340	327	356	370	361	400	331	324	303	
24	298	F	297	271	341	355	337	384	376	383	354	324	326	334	339	334	353	346	354	344	339	323	325	294	
25	295	297	334	357	370	314	333	372	361	343	329	332	314	328	330	347	344	346	345	345	354	341	320	280	
26	F	F	F	306	313	F	F	371	361	366	362	339	346	335	344	337	339	334	328	371	344	335	286	311	
27	333	325	284	F	330	318	322	361	372	374	347	352	344	349	363	342	345	346	337	339	337	314	300	303	
28	324	310	320	323	335	323	343	372	355	359	342	330	334	347	355	370	341	338	340	342	345	329	309	309	
29	F	339	331	307	F	F	345	378	359	359	366	332	327	362	351	350	334	349	366	359	327	300	300	305	
30	317	323	F	319	357	F	F	364	372	367	350	331	316	324	352	352	333	334	370	370	342	323	298	304	
31	311	312	313	370	403	310	323	357	366	346	331	320	321	340	351	359	358	344	324	326	344	330	313	313	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	25	26	26	27	27	25	25	29	29	29	29	30	30	30	30	30	30	30	30	30	29	29	30	29	
MED	311	319	314	314	347	346	337	375	372	361	350	342	334	338	348	350	350	349	357	356	345	323	318	309	
U Q	318	325	328	333	364	374	348	382	382	368	362	352	343	349	355	362	358	363	370	369	356	335	324	314	
L Q	296	309	303	307	334	320	328	368	362	350	341	336	321	328	338	342	343	344	346	342	336	310	308	302	

MAR. 2021 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1							C	C	C	C	C	C	C	C	C	C	C	C							
2							C	C	C	C	C	400	415	397	411	413		A							
3							A			L	L	399		U L	365	413		A	L						
4							422				L	L	393	U L	U L	378		L	L	L					
5								L	U L	L	L	L	405	U L	U L	411			L						
6								L	L	L	L	A	U L	A	L		377	L	L						
7									L	L	L	L	392		A	L	L	L	L						
8									L		L	390	390	396	400	381	U L	L							
9								L	L	L	L	396	406	413	450	376	405		L						
10										L	L	400	411	416	425	421		L	L						
11									L	L	418	407	393		A	A	L	A	A						
12								L	L	L	413	402	404	415	406		A		A						
13									L	L	L	420	420		A		436	L	L						
14								L	U L	L	414	383	397	393	386	395	374		L						
15								L	L	L	397	403	403	403	425		L	U L	L						
16								A	L	L	401	404	364	413	381	409		L							
17										L	L	397	398	427	396	387		L	L						
18									L	U L	L	378	389	411	403	389	386		L	L					
19									L	L	L	414	402	432	421	417		L	L						
20								L	L	L	387	390	398	416	419		A	L							
21								L	L	L	383		390	378	388		L	L	L						
22								L	L	L	L	400	416	417	373		L	L	L						
23								A	L	L	398	395	386	399	402	389		L	L						
24									L	L	L	413	405	385	382		L	L	L						
25									L	U L	L	362	384		A		U L	L	L						
26								L	U L	L	397	429	441	423	378		A	A	A						
27								L	L	L	407		A	A	416	378	407		L	A					
28								L	L	L	U L	401	401	401	392		L	L	L						
29								L	L	L	406	413	394	385	389		L	A							
30								L	L	L	397	405	421	420	412	406	423		L	L					
31								L	U L	L	382	407	361	407	381		A	A	A						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								1		3	15	24	27	26	27	16	3	1							
MED							422		405	397	400	401	403	396	398	405	452								
U Q									414	406	410	411	416	411	415	436									
L Q										U L	397	383	396	393	388	382	379	393							

MAR. 2021 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

MAR. 2021 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							C	C	C	C	C	C	C	C	C	C	C	C						
2							C	C	C	C	C	246	272	272	262	232	236							
3							A			260	260	232	232	278	288	254	234							
4								234			260	242	246	260	260	238	238	248						
5									218	254	254	238	264	250	230	238		238						
6									218	218	252	232	288	234	246	232	246	240						
7										240	240	242	256	250	250	250	242	232						
8									224		270	242	230	240	258	242	234	234						
9									226	240	248	270	270	254	224	256	238	226						
10											232	266	288	240	230	242	254	258						
11										250	278	244	268	236	242	258	248	228						
12									214	246	254	254	262	238	262	242	246	232						
13										234	260	272	264	252	274	274	252	246						
14									230	252	296	272	244	258	246	236	236							
15									242	242	242	260	296	276	236	242	254	258						
16									220	246	236	278	314	268	230	230	262							
17										250	274	274	274	274	246	246	246							
18										260	272	272	278	266	242	234	234	224						
19										224	242	270	306	256	254	254	242	242						
20									242	252	240	240	252	254	250	256	266							
21									254	246	256	256	240	260	240	246	258	236						
22									236	242	248	248	248	274	254	240	234	234						
23									220	254	248	270	260	246	250	252	268	236						
24										236	262	306	268	246	260	260	244	244						
25										268	268	268	242	260	250	250	244	236						
26									230	224	228	272	246	260	252	264	268	254						
27									236	236	254	240	248	234	234	252	252	238						
28									248	234	250	264	254	244	244	244	256	260						
29									252	260	260	272	264	234	246	246	266							
30									244	244	260	282	286	278	236	232	264	258						
31										266	284	284	284	254	238	230	236	236						
	00	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	17	25	29	30	30	30	30	30	29	24						
MED								234	230	246	254	265	264	254	248	245	246	238						
U Q									243	254	261	272	278	266	258	254	257	247						
L Q									220	236	245	242	248	244	238	238	237	234						

MAR. 2021 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2021 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
2	C	C	C	C	C	C	C	C	C	C	C	194	194	194	202	186	A	202	202	210	E B	E B	E B	E B	E B
3	E B	E B	E B	E B	E B	E B	A	186	196	190	206	182	182	182	182	A	188	196	196	198	E B	E B	E B	E B	E B
4	E B	E B	E B	E B	E B	E B	184	152	200	200	192	192	192	192	196	196	196	208	196	182	E B	E B	E B	E B	E B
5	E B	E B	E B	E B	E B	E B	200	200	200	188	184	184	198	194	194	188	210	192	198	198	E B	E B	E B	E B	E B
6	E B	E B	E B	E B	E B	E B	192	192	186	178	194	A	184	A	200	202	188	188	194	186	222	E B	E B	E B	E B
7	E B	E B	E B	E B	E B	E B	194	232	206	206	190	202	202	A	202	192	192	194	200	192	188	254	254	274	274
8	E B	E B	E B	E B	E B	E B	254	218	190	190	190	180	180	186	186	186	186	196	198	198	E B	E B	E B	E B	E B
9	E B	E B	E B	E B	E B	E B	222	192	188	180	180	182	178	178	170	198	182	182	198	190	194	200	256	262	262
10	E B	E B	E B	E B	E B	E B	182	276	194	202	182	182	182	182	182	194	186	182	190	202	218	A	A	E B	E B
11	E B	E B	E B	E B	E B	E B	208	192	192	182	182	194	186	A	A	186	A	A	202	202	E B	E B	E B	E B	E B
12	E B	E B	E B	E B	E B	E B	198	232	190	182	188	188	188	188	188	A	188	A	210	210	222	194	194	254	254
13	E B	E B	E B	E B	E B	E B	220	220	196	196	196	196	192	192	208	200	222	210	210	188	188	264	304	266	266
14	E B	E B	E B	E B	E B	E B	210	208	212	196	192	192	192	192	194	194	194	194	198	204	E B	E B	E B	E B	E B
15	E B	E B	E B	E B	E B	E B	198	246	238	210	210	190	190	190	194	200	200	188	186	178	218	200	200	230	224
16	E B	E B	E B	E B	E B	E B	218	198	A	208	194	194	194	194	E A	184	184	204	204	198	E B	E B	E B	E B	E B
17	E B	E B	E B	E B	E B	E B	216	186	196	204	204	200	200	188	194	204	206	196	200	204	E B	E B	E B	E B	E B
18	E B	E B	E B	E B	E B	E B	238	236	220	186	194	194	194	194	194	194	208	192	192	200	202	202	210	252	270
19	E B	E B	E B	E B	E B	E B	202	202	228	192	196	196	194	182	172	172	172	204	200	212	200	E B	E B	E B	E B
20	E B	E B	E B	E B	E B	E B	220	194	194	194	188	198	192	186	186	A	224	240	234	254	198	218	218	242	242
21	E B	E B	E B	E B	E B	E B	254	216	198	198	208	200	206	192	192	192	184	184	206	212	E B	E B	E B	E B	E B
22	E B	E B	E B	E B	E B	E B	206	298	226	198	190	190	190	190	164	168	198	198	194	194	E A	E A	204	204	244
23	A	E B	E B	E B	E B	E B	204	248	230	202	194	194	184	184	184	194	180	194	200	208	E B	E B	E B	E B	E B
24	E B	E B	E B	E B	E B	E B	208	208	228	186	200	196	196	196	178	190	186	186	186	194	218	214	214	214	256
25	E B	E B	E B	E B	E B	E B	206	264	218	204	204	204	204	A	204	178	186	200	196	214	E B	E B	E B	E B	E B
26	E B	E B	E B	E B	E B	E B	274	236	274	236	208	198	198	186	186	E A	A	A	E A	228	204	180	242	278	252
27	E B	E B	E B	E B	E B	E B	234	254	242	206	200	194	190	A	A	188	188	188	188	A	216	212	202	222	250
28	E B	E B	E B	E B	E B	E B	218	218	206	206	202	202	190	184	184	184	184	184	192	216	210	E B	E B	E B	E B
29	E B	E B	E B	E B	E B	E B	216	226	220	190	190	194	188	200	200	200	200	200	A	208	208	196	196	202	252
30	E B	E B	E B	E B	E B	E B	204	232	220	202	200	186	186	186	196	178	192	192	190	190	E B	E B	E B	E B	E B
31	E B	E B	E B	E B	E B	E B	186	344	216	210	216	200	200	200	208	206	196	A	A	A	218	218	216	212	234
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	28	29	29	29	29	29	28	29	27	29	29	28	28	26	29	25	25	25	30	30	29	29	30	30	
MED	E B	E B	E B	E B	E B	E B	218	196	196	194	192	192	192	188	193	188	189	196	206	200	E B	E B	E B	E B	E B
U Q	E B	E B	E B	E B	E B	E B	251	229	203	200	199	198	198	194	194	200	198	198	201	216	210	204	235	252	266
L Q	E B	E B	E B	E B	E B	E B	216	190	190	189	187	186	183	184	186	186	186	186	192	200	198	192	202	222	242

MAR. 2021 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2021 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							C	C	C	C	C	C	C	C	C	C	C	C						
2							C	C	C	C	C	110	110	110	110	A	A	110						
3							B	122	108	108	108	108	114	A	A	A	A	A						
4							B	B	108	108	108	108	108	108	110	110	110	110						
5							B	B	110	A	110	114	114	114	114	112	112	112						
6							B	B	108	108	108	108	108	A	108	108	108	A	B					
7							B	B	108	108	108	108	112	118	A	118	112	112						
8							B	B	112	112	112	108	108	108	110	110	110	A						
9							B	116	116	116	116	A	116	116	116	116	116	116						
10							B	116	112	A	112	A	112	112	A	A	A	112						
11							B	B	112	112	112	112	112	108	108	108	108	108						
12							B	120	116	116	116	A	A	A	A	116	A	A						
13							B	116	110	110	110	A	A	120	A	120	120	112						
14							B	B	114	114	114	114	114	A	114	114	A	B						
15							B	118	118	118	112	112	112	112	112	112	112	A						
16							B	130	108	108	108	108	108	108	108	112	112	112						
17							B	118	116	114	114	114	114	A	A	A	A	114						
18							B	B	114	114	114	114	114	A	A	A	A	110						
19							B	110	110	108	108	104	102	102	102	114	108	108						
20							B	118	118	118	112	112	108	108	108	108	108	A						
21							B	116	116	116	116	A	116	116	116	116	116	114						
22							B	120	120	120	A	110	110	A	110	110	116	A						
23							B	122	116	110	110	110	A	A	110	A	A	A						
24							B	112	112	112	A	A	A	A	112	112	A	A						
25							B	108	108	A	A	A	A	A	108	108	108	108						
26							B	108	108	108	A	A	108	108	108	108	108	108						
27							B	112	116	116	116	A	A	A	A	116	116	B						
28							B	124	110	110	110	A	A	A	A	110	110	124						
29							B	120	116	116	110	108	A	A	A	A	A	B	B					
30							B	108	108	108	108	A	108	A	110	110	110	110						
31							B	110	110	110	110	A	110	110	110	A	A	110	116					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								21	29	26	25	18	22	16	20	22	19	17	3					
MED								116	112	112	110	110	111	110	110	112	110	110	116					
U Q								120	116	116	114	112	114	115	112	116	116	112	124					
L Q								111	108	108	108	108	108	108	108	110	108	109	110					

MAR. 2021 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2021 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	114	G	144	144	80	80	112	102	102	96	B	B	96
3	96	96	96	B	96	B	92	G	G	G	156	G	G	102	96	86	86	92	92	92	B	B	B	B
4	B	B	B	B	B	B	B	B	G	112	114	124	114	114	114	114	114	G	114	B	B	B	92	86
5	86	B	B	B	B	B	B	B	G	98	140	130	138	138	132	132	126	G	B	B	B	B	B	B
6	B	B	B	B	B	B	B	B	G	G	144	144	134	104	112	G	G	112	B	B	B	124	116	B
7	B	B	B	B	B	B	B	B	G	132	132	120	G	158	102	G	G	G	B	B	B	88	88	88
8	B	B	B	B	B	B	B	B	G	G	G	G	108	G	G	G	G	102	96	96	88	B	88	98
9	98	B	B	B	B	B	B	G	G	G	126	104	110	G	G	G	G	G	B	B	B	100	B	B
10	94	B	B	B	B	B	132	G	G	96	G	98	G	G	98	86	86	112	104	90	90	90	B	90
11	B	B	B	B	B	B	B	B	G	G	G	138	G	138	118	128	120	120	112	102	B	B	94	B
12	94	B	B	B	B	B	B	G	G	136	116	102	102	102	102	162	106	100	100	96	92	B	B	84
13	90	90	90	90	90	90	B	G	G	128	116	104	104	158	102	138	146	G	B	B	B	B	88	88
14	88	88	B	B	B	B	B	B	150	150	156	156	G	98	G	G	98	88	88	88	B	B	B	B
15	B	B	B	B	B	B	B	G	146	G	120	120	162	162	162	G	100	100	100	88	88	B	B	B
16	88	88	88	88	B	B	B	G	142	142	142	136	G	G	150	G	G	154	146	B	B	100	B	B
17	B	B	B	B	B	B	B	120	G	124	124	124	118	102	102	102	102	G	122	90	90	90	90	B
18	B	96	96	96	96	96	96	134	134	144	126	124	120	106	102	96	96	G	90	90	90	B	B	B
19	B	B	B	B	90	B	B	144	136	136	G	G	G	G	G	G	148	138	114	B	B	B	B	B
20	104	92	92	92	B	B	B	G	G	144	G	128	158	114	114	122	122	100	100	90	90	B	B	B
21	B	B	88	84	84	84	88	G	130	120	116	94	110	G	152	G	152	126	B	100	B	100	100	
22	92	92	B	B	92	92	B	G	G	G	92	G	G	92	112	G	G	102	102	88	B	B	B	88
23	84	84	B	88	94	B	94	G	130	108	112	G	104	104	G	104	104	104	104	B	B	B	B	104
24	98	B	B	92	B	B	B	146	146	146	90	96	96	92	G	G	96	96	96	96	96	96	96	96
25	92	92	92	92	92	92	B	G	112	104	102	102	92	92	G	G	G	G	B	B	B	B	B	B
26	B	B	B	88	88	88	88	130	130	120	104	102	G	G	140	120	120	120	100	100	B	94	B	B
27	B	94	94	94	90	90	90	G	G	116	116	98	98	96	96	G	G	96	96	94	90	B	B	94
28	B	B	B	B	B	B	124	134	134	128	118	94	94	94	94	94	G	98	G	B	B	98	98	98
29	B	B	B	98	92	B	92	130	130	130	120	110	98	98	98	88	88	92	92	92	86	B	B	B
30	B	B	B	B	B	B	B	G	130	118	118	96	140	106	G	152	G	G	152	82	B	B	90	B
31	B	B	B	B	B	B	132	126	126	126	120	106	158	138	132	90	90	154	G	88	B	B	B	B
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	13	10	8	11	11	7	10	8	14	22	24	25	20	23	21	18	19	21	22	20	12	8	11	13
MED	92	92	92	92	92	90	93	132	132	127	119	110	110	104	112	109	102	102	101	90	90	96	92	94
U Q	97	94	95	94	94	92	124	139	142	136	129	126	136	138	132	132	120	120	114	96	94	100	98	98
L Q	88	88	89	88	90	88	90	128	130	116	115	100	100	98	100	90	90	97	96	88	89	90	88	88

MAR. 2021 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

MAR. 2021 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1																									
2											C 2		H 1	H 1	L 2	L 7	C 3	F 3	F 5	F 1				F 3	
3	F 2	F 2	F 1	F 1		L 2				H 2			L 2	L 2	L 3	L 2	L 3	F 1	F 2						
4									C 2	C 2	C 1	C 1	C 1	C 1	C 1	C 1	C 1	F 2				F 1	F 3		
5	F 1								L 1	HL 22	H 1	H 1	H 1	H 1	H 1	C 2									
6										H 2	H 2	H 1	L 3	C 1			L 1				F 1	F 1			
7									H 2	H 2	C 2		H 1	L 2					F 1		F 4	F 3	F 2		
8												C 2					L 2	F 2	F 2	F 1		F 2	F 2		
9	F 1									C 1	L 1	C 1									F 1				
10	F 7					C 1		L 2			L 2			L 3	L 3	L 2	C 3	F 3	F 9	F 5	F 4		F 3		
11											H 1		H 2	C 3	C 2	C 3	C 3	F 6	F 4			F 2			
12	F 2								H 1	C 1	L 2	L 2	L 1	L 2	H 2	L 2	L 6	F 8	F 5	F 5			F 1		
13	F 3	F 4	F 2	F 2	F 1	F 2			C 1	C 1	L 1	L 1	L 2	H 2	L 2	H 1						F 6	F 3		
14	F 4	F 2							H 1	H 2	H 1	H 2		L 2			L 2	L 2	F 1	F 3					
15									H 2		C 1	C 1	H 1	H 1	H 1		L 1	L 1	F 1	F 1	F 2				
16	F 2	F 1	F 3	F 2					H 1	H 2	H 1	H 1		H 1			H 2	F 3			F 1				
17							C 2		C 2	C 2	C 2	C 2	L 2	L 1	L 2	L 3		F 1	F 4	F 1	F 1	F 1			
18		F 4	F 3	F 7	F 2	F 4	L 1	H 2	H 2	H 2	C 1	C 2	C 1	L 2	L 2	L 3	L 2		F 2	F 3	F 1				
19				F 1				H 1	H 1	H 1							H 1	H 1	F 1						
20	F 2	F 2	F 2	F 2					H 1		C 1	H 1	C 1	C 1	C 2	C 2	C 2	L 8	F 4	F 5	F 7				
21			F 6	F 5	F 2	F 2	L 1	H 2	C 3	C 3	L 2	C 1				H 1		H 1	F 1		F 2		F 2	F 2	
22	F 2	F 2		F 1	F 2						L 2			L 1	C 2			L 1	F 2	F 6				F 1	
23	F 7	F 2		F 1	F 1		L 2	H 3	C 1	C 1			L 2	L 1		L 2	L 1	L 3	F 2					F 3	
24	F 1			F 1				H 1	H 1	H 1	L 2	L 1	L 2	L 2			L 1	L 1	F 2	F 3	F 3		F 1	F 1	
25	F 2	F 2	F 3	F 2	F 2	F 1			C 2	L 1	L 2	L 3	L 3	L 2						F 1					
26				F 2	F 3	F 3	L 4	HL 23	HL 22	C 2	L 2	L 1		H 2	C 2	C 2	C 4	F 4	F 4		F 1				
27		F 2	F 3	F 2	F 3	F 2			C 2	C 2	L 3	L 2	L 3	L 2	L 2		L 5	F 2	F 3	F 6				F 1	
28							C 1	C 2	H 1	C 1	C 1	L 2	L 2	L 1	L 1	L 2		L 1				F 4	F 2	F 1	
29			F 1	F 2			L 1	H 2	H 1	H 2	C 1	C 2	L 2	L 1	L 3	L 4	L 5	L 2	L 2	F 2	F 2				
30									H 2	C 1	C 1	L 2	H 2	L 1		H 1			H 1	F 1			F 1		
31						C 1	C 3	C 3	C 2	C 2	L 2	H 1	H 2	H 2	L 4	L 5	H 2		F 5						
	00	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. 2021 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

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

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	X 37	X 32	39	39	38	31	31														X 53	X 35	X 37	X 38	
2	X 39	X 38	38	38	44	34	27															X 58	X 41	X 33	X 35
3	X 36	X 37	X 35	X 35	X 40	X 39	A															X 47	X 43	X 40	X 35
4	X 35	X 36	X 38	X 38	X 46	X 28	X 24															X 50	X 47	X 42	X 39
5	X 40	X 40	X 37	X 38	X 45	X 30	X 26															X 58	X 46	X 40	X 42
6	X 41	X 40	X 40	X 38	X 40	X 34	X 28															X 50	X 49	X 50	X 45
7	X 44	X 44	X 41	X 43	X 42	X 37	X 29															X 46	X 36	X 38	X 40
8	X 40	X 43	X 42	X 40	X 37	X 38	X 37															X 87	X 66	X 61	X 58
9	X 48	X 58	X 54	X 42	X 37	X 34	X 28															X 59	X 50	X 42	X 40
10	X 39	X 39	X 38	X 40	X 42	X 24	X 22															X 50	A	X 36	X 36
11	X 35	X 35	X 38	X 36	X 35	X 33	X 28															X 53	X 37	X 36	X 36
12	X 37	X 37	X 38	X 37	X 45	X 29	X 25															X 66	X 67	X 51	X 39
13	X 41	X 42	X 41	X 44	X 41	X 38	X 34															X 52	A	X 37	X 39
14	X 38	X 38	X 38	X 39	X 43	X 25	X 23															X 90	X 61	X 40	X 40
15	X 40	X 40	X 40	X 43	X 30	X 25	X 26															X 67	X 59	X 62	X 49
16	X 39	X 40	X 39	X 38	X 39	X 30	X 29															X 56	X 43	X 37	X 38
17	X 36	X 36	X 35	X 34	X 35	X 38	X 27															X 68	X 45	X 37	X 37
18	X 37	X 36	X 36	X 35	X 38	X 37	X 31															X 69	X 64	X 59	X 64
19	X 59	X 58	X 50	X 57	X 62	X 33	X 30															X 71	X 50	X 38	X 40
20	X 41	X 40	X 39	X 40	X 43	X 32	X 31															X 100	X 53	X 54	X 51
21	X 45	X 44	X 44	X 41	X 38	X 39	X 43															X 64	X 49	X 47	X 47
22	X 44	X 44	X 44	X 48	X 32	X 28	X 33															X 66	X 48	X 43	X 40
23	X 39	X 38	X 40	X 43	X 34	X 28																X 69	X 48	X 40	X 38
24	X 39	X 39	X 42	X 44	X 44	X 42																X 81	X 67	X 47	X 41
25	X 40	X 43	X 58	X 58	X 33	X 27																X 78	X 64	X 36	X 34
26	X 36	X 38	X 37	X 36	X 36	X 32																X 73	X 57	X 38	X 39
27	X 39	X 38	X 38	X 39	X 36	X 34																X 75	X 56	X 48	X 47
28	X 45	X 42	X 42	X 40	X 38	X 32																X 63	X 48	X 43	X 43
29	X 40	X 47	X 47	X 43	X 37	X 35																X 54	X 45	X 44	X 44
30	X 44	X 43	X 44	X 45	X 29	X 30																X 59	X 40	X 39	X 40
31	X 40	X 40	X 40	X 42	X 22	X 24																X 70	X 62	X 54	X 54
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	21														31	29	31	31	
MED	X 40	X 40	X 40	X 40	X 38	X 32	X 28														X 64	X 49	X 40	X 40	
U Q	X 41	X 43	X 42	X 43	X 43	X 37	X 31														X 71	X 60	X 48	X 45	
L Q	X 37	X 38	X 38	X 38	X 35	X 28	X 26														X 53	X 44	X 37	X 38	

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

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2021 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	31	26	F 30	F 26	F 28	25	F 22	40	54	57	55	68	72	92	104	120	115	130	96	82	47	29	31	32
2	33	32	32	32	38	28	F 18	40	55	55	68	76	74	78	88	96	90	71	62	59	52	35	27	29
3	30	31	29	29	34	33	A	38	49	70	73	86	70	71	91	114	106	92	69	56	41	37	34	29
4	29	30	32	32	40	22	18	42	59	64	68	86	82	86	91	107	94	83	74	72	44	41	36	33
5	34	34	31	32	39	24	20	42	54	63	66	84	76	92	95	84	70	69	66	54	52	40	34	36
6	35	34	34	32	34	28	22	44	56	60	65	82	84	101	105	H 98	88	71	61	56	44	43	44	39
7	38	38	35	37	36	31	23	41	56	60	62	70	74	90	94	88	88	79	85	70	40	30	32	34
8	34	37	36	34	31	32	31	47	57	55	68	83	96	91	93	94	101	91	85	78	J R 81	60	55	J R 52
9	42	52	48	36	31	28	22	42	54	58	60	73	79	82	85	90	86	88	78	64	53	44	36	34
10	33	33	32	34	36	18	J B 16	42	54	55	64	65	84	95	84	H 70	62	62	76	A	44	A	30	30
11	29	29	32	30	29	27	22	44	51	51	59	84	100	107	110	87	70	74	72	A	47	31	30	30
12	31	31	32	31	39	23	19	44	51	55	62	76	88	90	85	87	85	84	75	67	60	61	45	33
13	35	36	35	38	35	33	28	55	50	54	61	79	86	83	76	85	82	82	82	66	46	A	31	33
14	32	32	32	33	37	R 19	17	43	54	61	74	89	101	115	138	133	120	101	97	88	84	55	34	34
15	34	34	34	37	24	19	20	48	63	74	74	77	87	108	102	R 94	62	60	66	70	61	53	56	43
16	33	34	33	32	33	24	23	50	52	63	68	70	82	H 107	96	82	62	61	60	61	50	37	31	32
17	30	30	29	28	29	32	21	44	53	57	63	75	83	84	91	98	98	83	80	86	62	39	31	31
18	31	30	30	F 26	F 30	31	25	44	49	57	64	76	85	103	115	115	110	94	88	66	63	58	53	58
19	53	52	44	51	H 56	27	24	47	52	58	66	72	80	94	104	105	91	85	73	74	65	44	31	34
20	35	34	33	34	37	26	25	47	55	63	76	87	88	94	106	88	77	87	91	91	94	47	48	45
21	39	38	38	35	32	33	37	55	59	74	84	84	88	85	95	81	70	74	77	73	58	43	41	41
22	38	38	38	42	H 26	22	27	50	58	70	72	78	89	95	107	112	112	105	91	87	60	42	37	34
23	33	32	34	37	28	22	21	49	58	66	65	72	87	97	102	105	102	R 99	91	77	63	42	34	32
24	F 31	33	36	38	38	36	33	50	60	63	61	64	78	92	91	103	101	92	91	81	75	R 61	41	35
25	34	37	52	52	27	21	23	50	56	68	73	90	89	102	110	113	111	94	94	88	72	58	30	28
26	30	32	31	30	30	26	29	57	66	73	68	82	95	118	121	121	117	119	126	109	67	51	32	33
27	33	32	32	33	F 28	28	29	56	66	65	69	72	92	100	99	95	89	90	89	90	69	50	42	41
28	39	36	36	34	32	26	28	52	64	75	74	73	90	97	96	83	68	65	65	61	57	42	37	37
29	34	F 34	F 38	37	31	29	30	47	53	62	72	81	87	100	103	84	71	78	80	60	48	39	38	38
30	38	37	38	39	23	24	29	53	58	71	65	76	90	107	122	J R 119	J R 109	102	96	73	53	34	33	34
31	34	34	34	36	16	18	23	46	55	67	68	82	98	110	99	75	62	62	66	68	64	56	48	48
	00	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	30	31	31	31	31	31	31	31	31	31	31	31	31	29	31	29	31	31
MED	34	34	34	34	32	26	23	47	55	63	68	77	87	95	99	95	89	84	80	72	58	43	34	34
U Q	35	37	36	37	37	31	28	50	58	68	72	84	90	103	106	112	106	94	91	84	65	54	42	39
L Q	31	32	32	32	28	22	21	42	53	57	63	72	80	90	91	85	70	71	69	62	47	38	31	32

MAR. 2021 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

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

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

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

MAR. 2021 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								B	232	276	308	312	340	A	A	320	292	244	B	B				
2								B	220	268	296	316	328	332	320	316	288	236	228		B			
3								A	216	276	304	316	332	332	324	312	292		A	B	A			
4								B	236	276	292	312	336	324	316	304	280	U A	A	A	B			
5								A	224	272	304		A	A	332	328	312	288	240	180				
6								A	224	268	304	324	336	344	328	328	292	244	184		B			
7								A	228	276	300	308	336	320	320		A	A	A	180		B		
8								B	212	280	304	320	336	324		A	A	A	A	A	B			
9								A	216	276	304	332		A	332	316	316	288	236		A	B		
10								A	204	264	300	308	316		A	340	312	296		A	A	A		
11								B	224	272		A	320	332		A	332	320	296	260	A	A		
12								A	248	272	316	328	340	332		A	A	A	A	A	B			
13								A	224	276	304	324	340	336		A	320	300	248	168		B		
14								A	224	280	316	324	332	320		A	292	292		A	A	A		
15								A	212	272	304	316	328	316	296	280		A	248		A	B		
16								A	236	280	308	312	336	344	332	308	292		A	A	A			
17								A	232	284	300	324	340	348	336	316		A	A	A	B			
18								A	236	288	320	336	336	324	320	288		A U	A	A	B			
19								196	256	A	316		A	332		A	320	312	296	256	176			A
20								196	248	288	324	332	344	336	320	320	296	260		A	B			
21								A	A	288	A	A	A	A		A	324	304	284	256	184			B
22								204	232	288	324		A	344	336	328	316	288	240		A	B		
23								B	196	232	288	308	320	332	336	316	324	284		A	A	A		
24								B	184	240	292	316		A	316		A	304	280		A	A	A	
25								B	188	248	300	308	324	332		A	336	324	288	U A	A	A	B	
26								B	208	232	296	312	332	344	340	340	320	300		A	A	B		
27								B	220	248	288	316	336	340	U A	A	A	A	A	A	B			
28								B	232	236	288	308	332	340	316		A	A	288		A	B		
29								B	A	252	288	324		A	336	316		A	A	A	256			A
30								B	180	260	300	312	316	340	344	332	320	292	248	188				B
31								B	184	256	296	A	332	340		A	A	324	300	260				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								11	30	30	28	25	27	24	21	25	23	18	10					
MED								196	232	280	308	324	336	332	324	316	292	248	184					
U Q								208	248	288	316	332	340	336	332	320	296	256	188					
L Q								184	224	276	304	316	332	322	320	306	288	240	180					

MAR. 2021 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2021 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

MAR. 2021 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2021 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

MAR. 2021 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2021 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

MAR. 2021 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	L	L	L	L	L	L	L	L	L						
2									L	L	L	L	L	L	L	L	L	L						
3									U	L	L	L	L	L	L	L	L	L	L					
4									L	L	L	L	L	A	A	L	L	L	L					
5									L	U	L	U	L	L	L	L	L	L	L					
6									L	L	L	L	L	L	L	L	L	L	L					
7									L	L	L	L	U	L	A	L	L	L	L	L	L			
8									L	L	L	L	L	L	L	L	L	L	L	L				
9									L	L	L	L	L	L	L	L	L	L	L	L				
10									L	L	L	L	L	A	A	A	L	A			A			
11									L	U	L	L	L	A	A	A	L			A				
12									L	U	L	L	L	L	L	L	L	L	L					
13									L	U	L	L	L	L	L	L	L	L	L	L	L			
14									L	L	L	L	L	L	L	L	L	L	L	L	L			
15									L	L	L	L	L	L	L	L	L	L	L	L	L			
16									L	L	L	L	L	L	L	L	L	L	L	L	L			
17									L	U	L	U	L	A	A	A	A	L			L			
18									L	L	L	L	L	L	L	L	L	L	L	L	L			
19									L	L	L	L	L	L	L	L	L	L	L	L	L			
20									L	L	L	L	L	L	L	L	L	L	L	L	L			
21									L	L	L	L	L	L	L	L	L	L	L	L	L			
22									L	L	L	L	L	L	L	L	L	L	L	L	L			
23									L	U	L	L	L	L	L	L	L	L	L	L	L			
24									L	L	U	L	L	L	L	L	L	L	L	L	L			
25									L	U	L	L	L	L	L	L	L	L	L	L	L			
26									L	L	U	L	L	A	L	L	L	L	L	L	L			
27									L	L	L	L	L	L	L	L	L	L	L	L	L			
28									L	L	L	L	L	L	L	L	L	L	L	L	L			
29									U	L	L	L	L	L	L	L	L	L	L	L	L			
30									L	L	L	L	L	L	L	L	L	L	L	L	L			
31									L	U	L	L	L	A	A	A	L	A						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										11	27	31	30	25	26	23	23	9	2					
MED										U	L	L	L	L	L	L	L	L	L	L	L			
U Q										386	383	385	392	392	384	376	380	377	422					
L Q										U	L	L	L	L	L	L	L	L	L	L	L			
										411	394	395	405	401	391	382	387	398						
										L	L	L	L	L	L	L	L	L	L	L	L			
										373	374	374	383	382	377	369	373	374						

MAR. 2021 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2021 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1									208	226	256	282	300	298	304	254	256	230							
2									218	224	272	264	272	294	264	260	230								
3									250	276	232	258	328	334	262	236	238								
4									254	246	274	236	292	274	250	248	228								
5									218	250	274	256	254	262	250	238	266	234							
6									238	290	258	294	272	260	258	238									
7									236	262	272	306	280	258	256	236	232	222							
8									274	256	252	246	258	250	244	220									
9									226	268	274	270	258	258	246	242									
10									238	274	278	270	246	254	262	234	256			A					
11									210	262	316	280	238	272	232	238	270			A					
12									214	246	272	264	262	256	264	258	250	224							
13									218	282	268	260	250	276	258	256	250	224							
14									272	280	260	258	280	254	230	232	238								
15									232	248	252	262	282	276	246	242	242	256							
16									256	256	276	292	256	238	260	244	254								
17									222	244	290	272	258	274	274	238	234								
18									266	288	294	304	288	258	252	232	224								
19									238	258	266	292	290	264	250	254	238								
20									252	268	238	258	260	246	242	282	276	252							
21									270	260	254	268	280	250	252	252	262								
22									222	246	246	264	258	274	274	250	240	234	226						
23									222	244	246	288	280	260	264	260	246	242							
24									220	236	266	302	294	268	280	264	252	238	226						
25									274	312	252	286	296	252	272	238	232								
26									232	228	268	268	290	262	250	258	264	260							
27									244	260	288	258	258	248	260	254	252	246							
28									238	250	248	290	266	270	242	262	270	262							
29									278	272	284	288	286	248	260	272	254								
30									240	258	276	292	306	288	262	244	274	252							
31									266	294	310	288	264	264	244	248	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									13	30	31	31	31	31	31	30	31	28	6						
MED									222	247	272	272	270	272	258	257	248	240	226						
U Q									232	258	280	284	292	288	264	260	256	255	246						
L Q									216	238	258	260	258	260	250	250	238	233	224						

MAR. 2021 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2021 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	242	290	254	276	230	206	230	208	190	204	204	224	208	214	190	212	196	214	198	186	176	244	282	282		
2	262	256	272	256	210	196	280	212	174	190	214	242	192	210	206	218	226	228	216	204	204	186	250	288		
3	320	268	242	300	238	184		A	206	216	192	192	200	194	196	248	222	194	218	206	206	204	216	244	230	
4	296	294	266	252	198	204	314	214	220	206	216	186	222	E A	E A	222	202	214	226	196	196	196	220	240		
5	242	248	262	256	206	186	260	198	200	216	222	222	E A	H	222	E A	212	206	208	204	206	204	262	238		
6	256	256	262	258	212	194	202	216	202	204	244	254	204	232	206	224	E A	220	220	206	198	212	232	230	254	
7	264	246	248	244	208	186	240	210	218	218	220	192	232	A	202	202	184	202	202	186	188	232	260	254		
8	288	240	224	250	244	256	206	202	212	176	196	198	188	188	172	206	194	206	210	196	190	206	234	232		
9	244	226	210	222	204	216	260	202	206	196	198	206	200	182	170	252	208	218	222	186	202	194	240	274		
10	278	272	256	228	184	214		B	204	204	186	194	184	222	A	A	230	A	252	A	E A	E A	A	288	280	
11	264	274	244	220	216	196	222	198	188	186	170	268	228	192	A	A	A	234	214	A	198	226	274	286		
12	286	288	270	258	218	182	242	196	188	180	196	166	182	214	A	A	204	196	222	210	220	204	198	280		
13	280	268	254	256	194	208	218	208	190	184	192	232	252	242	234	232	230	216	216	196	202	A	302	256		
14	262	302	288	254	200	224	436	214	212	208	224	204	212	182	188	198	198	A	230	216	202	188	250	E A	284	
15	270	256	260	222	210	274	320	228	218	204	212	190	186	172	178	186	196	180	238	212	222	212	212	202		
16	256	258	238	246	212	230	252	212	214	218	206	186	178	180	E A	A	A	240	224	206	212	224	226	258		
17	254	268	262	264	252	202	220	200	200	198	204	E A	E A	E A	A	E A	252	226	218	232	204	196	196	254	266	
18	270	270	272	298	240	212	232	200	202	226	216	214	194	178	178	184	216	196	208	192	198	200	260	260		
19	246	242	250	212	180	184	242	200	208	192	198	190	174	160	254	238	220	224	228	216	202	188	278	276		
20	250	246	286	244	216	204	240	204	208	208	198	184	190	224	E A	A	234	230	238	266	236	242	188	208	236	252
21	222	242	236	240	292	316	226	N	204	212	226	204	232	196	184	216	210	200	228	230	214	196	224	254	256	
22	286	292	274	224	216	328	256	198	208	210	200	182	244	214	204	214	216	210	220	206	194	202	252	272	Q	
23	250	246	266	232	200	234	310	208	212	208	188	186	186	232	194	190	200	214	216	196	190	188	268	290		
24	286	284	260	250	206	208	216	206	212	208	198	172	174	192	188	190	200	H	210	178	222	204	194	212	274	
25	290	264	232	194	196	280	270	212	206	206	212	188	190	178	172	232	214	198	234	206	198	196	202	324		
26	298	274	282	260	254	254	242	214	212	204	184	172	168	A	232	212	216	220	238	200	182	208	240	258		
27	264	282	246	234	292	242	252	218	218	204	200	234	184	216	200	178	212	222	224	216	200	200	236	268		
28	236	266	246	238	228	230	242	216	218	218	206	196	190	198	172	188	188	188	228	216	210	208	254	E A	286	
29	294	Q	Q	246	230	224	230	238	204	208	212	194	198	188	210	230	A	A	206	214	212	212	246	266	262	
30	262	284	238	200	240	278	248	212	208	194	184	166	224	182	172	236	206	216	220	194	198	228	288	278		
31	270	266	248	188		B	B	262	212	212	210	198	264	234	A	A	208	A	E A	E A	E A	218	198	236	254	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	31	31	31	31	30	30	29	31	31	31	31	31	31	27	26	25	28	28	31	29	31	29	31	31		
MED	264	268	254	244	214	213	242	208	208	204	200	195	192	194	198	213	208	215	221	205	201	204	250	263		
U Q	286	282	266	256	238	242	261	212	212	210	212	224	222	216	230	231	218	221	230	215	210	224	266	280		
L Q	250	248	244	224	204	196	228	202	202	192	194	186	186	182	178	194	199	206	210	196	196	196	234	254		

MAR. 2021 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN





## IONOSPHERIC DATA STATION Okinawa

MAR. 2021 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	98	98	114	B	B	B	B	B	G	178	182	176	104	146	102	G	G	86	92	88	B	B	B	B
2	B	B	B	84	B	B	B	B	G	G	158	148	140	156	144	126	134	108	88	86	84	B	B	B
3	98	98	98	B	B	B	148	134	136	140	G	G	G	158	148	156	G	94	88	86	86	B	96	B
4	B	B	B	B	B	B	B	B	172	156	144	G	130	112	108	110	112	108	128	B	B	B	B	92
5	B	B	B	B	B	B	96	144	G	166	152	138	118	92	154	122	118	G	G	B	B	96	96	B
6	B	B	B	B	B	B	B	170	158	172	154	150	154	116	116	132	114	110	G	B	B	B	B	B
7	B	B	B	B	B	B	B	150	166	148	126	122	110	104	G	104	102	108	88	B	B	B	B	B
8	98	98	B	B	B	B	B	B	130	100	158	146	124	112	108	110	114	108	102	B	84	B	B	92
9	B	B	B	B	B	B	B	B	130	136	146	142	126	112	118	112	158	142	136	106	110	108	106	102
10	B	B	B	B	B	B	B	140	142	134	164	118	160	126	132	114	110	106	106	100	106	102	102	102
11	94	B	B	B	B	B	B	B	118	110	110	140	168	108	136	122	114	108	108	98	100	96	B	96
12	B	92	B	B	B	B	B	132	G	G	G	116	98	152	196	174	112	94	102	94	92	92	B	90
13	B	98	92	92	92	86	88	88	132	G	164	182	194	186	114	136	160	G	G	B	134	118	98	98
14	94	92	B	B	92	B	B	150	144	158	172	116	120	108	104	104	G	98	94	90	90	B	90	94
15	B	B	B	B	B	B	B	B	130	132	136	130	122	128	126	118	104	106	G	162	130	86	B	B
16	B	94	96	B	B	B	B	B	144	94	134	132	136	164	142	174	174	180	154	138	124	118	B	88
17	B	B	B	B	B	B	B	132	140	146	132	120	116	112	108	106	106	144	94	94	92	88	86	86
18	84	B	104	92	92	96	B	140	154	174	150	130	126	116	112	102	102	102	88	88	86	86	B	B
19	86	B	B	B	B	B	B	G	134	136	128	106	G	98	160	160	138	120	110	102	98	B	B	B
20	98	B	94	B	B	96	B	G	G	G	160	146	G	158	148	134	122	110	102	100	B	128	B	B
21	B	B	92	B	B	B	B	124	144	126	114	118	120	126	G	G	G	180	154	122	B	B	B	B
22	96	96	B	B	94	96	G	140	126	G	106	172	158	140	96	116	112	108	84	B	B	98	96	
23	B	96	B	94	100	96	96	G	186	178	128	114	110	110	122	G	108	104	G	B	96	B	90	94
24	94	96	88	88	88	86	B	142	132	150	96	108	108	122	118	112	108	106	98	98	98	B	B	B
25	B	B	B	100	90	98	98	138	156	G	120	116	108	108	G	164	110	110	102	86	B	B	B	B
26	B	B	B	B	B	B	B	92	128	110	G	G	G	154	150	140	128	100	96	96	102	94	88	B
27	94	88	96	104	92	B	B	G	138	124	120	180	106	102	108	108	102	96	96	94	94	B	B	88
28	B	98	92	92	88	B	B	G	154	136	112	108	104	102	108	114	G	104	G	98	B	B	104	96
29	98	122	92	B	B	92	98	146	132	154	128	110	104	100	96	94	90	90	88	84	84	84	102	B
30	B	84	B	B	B	B	B	136	166	G	G	110	170	G	G	158	164	156	G	B	86	B	B	B
31	B	B	B	82	B	B	B	144	130	136	104	158	114	96	92	118	126	110	102	100	100	98	96	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	12	14	11	9	9	7	7	20	26	25	26	28	27	30	27	28	26	28	25	23	22	12	14	14
MED	95	96	94	92	92	96	96	139	139	140	132	122	120	116	118	120	114	108	102	96	95	96	97	93
U Q	98	98	98	97	93	96	98	144	154	157	158	146	154	146	148	148	128	111	108	100	100	104	102	96
L Q	94	92	92	86	89	86	96	131	132	130	120	115	108	108	108	107	108	101	93	88	86	90	90	90

MAR. 2021 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

MAR. 2021 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F1	F2	F1							H1	H1	HL11	CH11	HL11	C1			L1	L1	L1				
2				F1							H1	H1	H1	HL11	H1	C1	HL11	C2	L2	L1	F1			
3	F2	F3	F2				F1	H1	H1	H1				H1	H1	H1		L2	L2	L3	F1		F1	
4									H1	H1	H1		H1	C2	C2	C1	C1	C2	C2					F1
5							F1	H1		H1	H1	HL11	CL11	L1	HL11	CL11	C1					F2	F1	
6								H1	H1	HC11	H1	H1	H1	C1	C1	HL11	C2	C4					F1	
7								H1	H1	H1	C1	C1	C2	C2		C1	C1	C1	L1		F1			
8	F2	F1							H1	L1	H1	H1	C1	C1	C1	C1	C1	C2	C2		F2			F2
9								H1	H1	H1	H1	C1	C1	C1	C1	H1	H1	H1	C1	C1	F1	F1	F1	
10								H1	HC11	HL11	HC11	C1	HC11	C1	HC21	C1	C1	C1	C1	L5	F3	F3	F3	F1
11	F2							C1	C1	C1	H1	HC11	C1	H1	C1	C1	C1	C1	C1	L8	F3	F1		F2
12		F1						H1				C1	L1	HC11	HL11	H1	C1	L2	C1	L1	F1	F1		F1
13		F1	F1	F1	F1	F1	F1	L1	H1		H1	HL11	HC11	HC11	CH11	H1	H1				F1	F7	F4	F3
14	F2	F1			F1			H2	H1	H1	H1	C1	C1	C1	C1	C1		L5	L3	L4	F1		F1	F3
15								H1	H2	H1	H1	C1	C1	C1	C1	C1			HC21	H1	F2			
16		F3	F2					H2	LH11	H1	H1	H1	H1	H1	H1	H1	H1	HC11	HC42	C5	F8			F2
17								H2	H1	H1	H1	C1	C1	C2	C2	C1	C1	HC1	L4	L5	F3	F1	F2	F1
18	F2		F1	F4	F2	F1		H2	H1	H1	H1	H1	C1	C1	C1	C1	C1	C1	L3	L1	F1	F1		
19	F1								H1	H1	C1	C1		L1	H1	H1	H1	C1	C1	C3	F4			
20	F1		F2			F2					H1	H1		HC11	H1	H1	C1	C1	C1	L4		F1		
21			F1					C2	HL12	CL11	CL12	CL11	CL11	CL11				H1	H1	C1				
22	F1	F4			F1		F1		H1	C1		C1	H1	H1	HL11	LH11	C1	C1	CL11	L1			F2	F1
23		F1		F2	F3	F2	L1		H1	HL11	CL11	CL11	C1	C1	C1		C1	C1			F1		F1	F2
24	F2	F3	F2	F1	F1	F1		H1	H1	H1	L1	CL11	CL11	CL11	C1	C1	C1	L2	L2	L7	FF11			
25				F1	F1	F1	L1	H1	H1		H1	C1	C1	C1		H1	C1	C1	C1	L1				
26								L1	C1	C1				H1	H1	H1	C1	C1	L3	L1	F1	F3	F1	
27	F2	F3	F3	F2	F3				H1	C1	C1	HC11	C1	C1	C1	C1	C1	L2	L3	L4	L3	F6		F1
28		F1	F1	F1	F1				H1	H1	C1	C1	C1	C2	C1	C1		C2		L1			F1	F3
29	F1	FF21	F2			F1	L1	H1	H1	H1	C1	C1	C1	C2	L3	L3	L6	L2	L5	L6	F4	F2	F1	
30		F1						H2	H1			C1	H1			HL11	HL11	HL11			F1			
31				F1				H1	H1	H1	C1	HC11	C1	L3	L5	C2	C1	C5	C8	C5	F3	F1	F1	F2
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

MAR. 2021 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## f-PLOTS OF IONOSPHERIC DATA

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

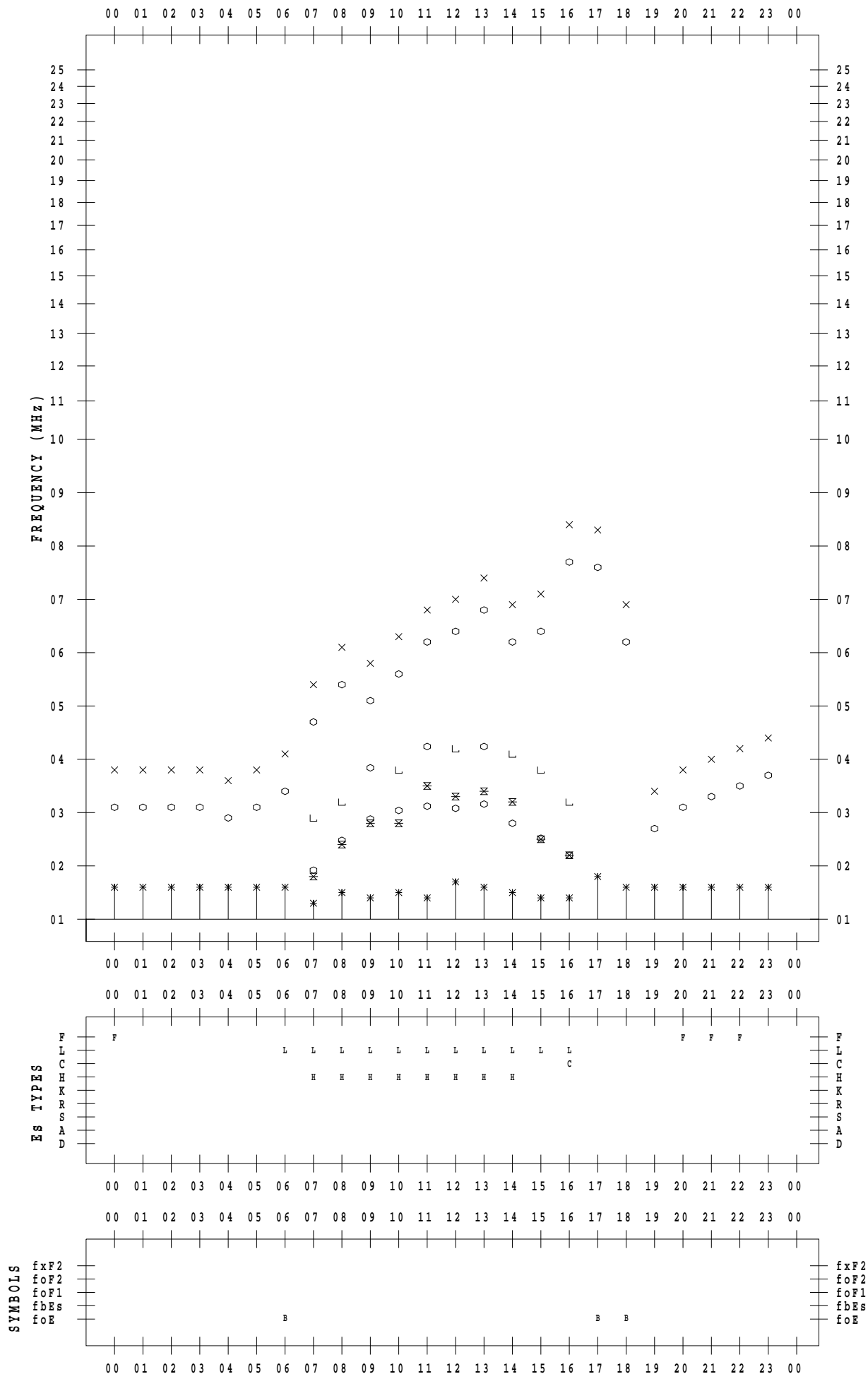
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 1

135 ° E MEAN TIME



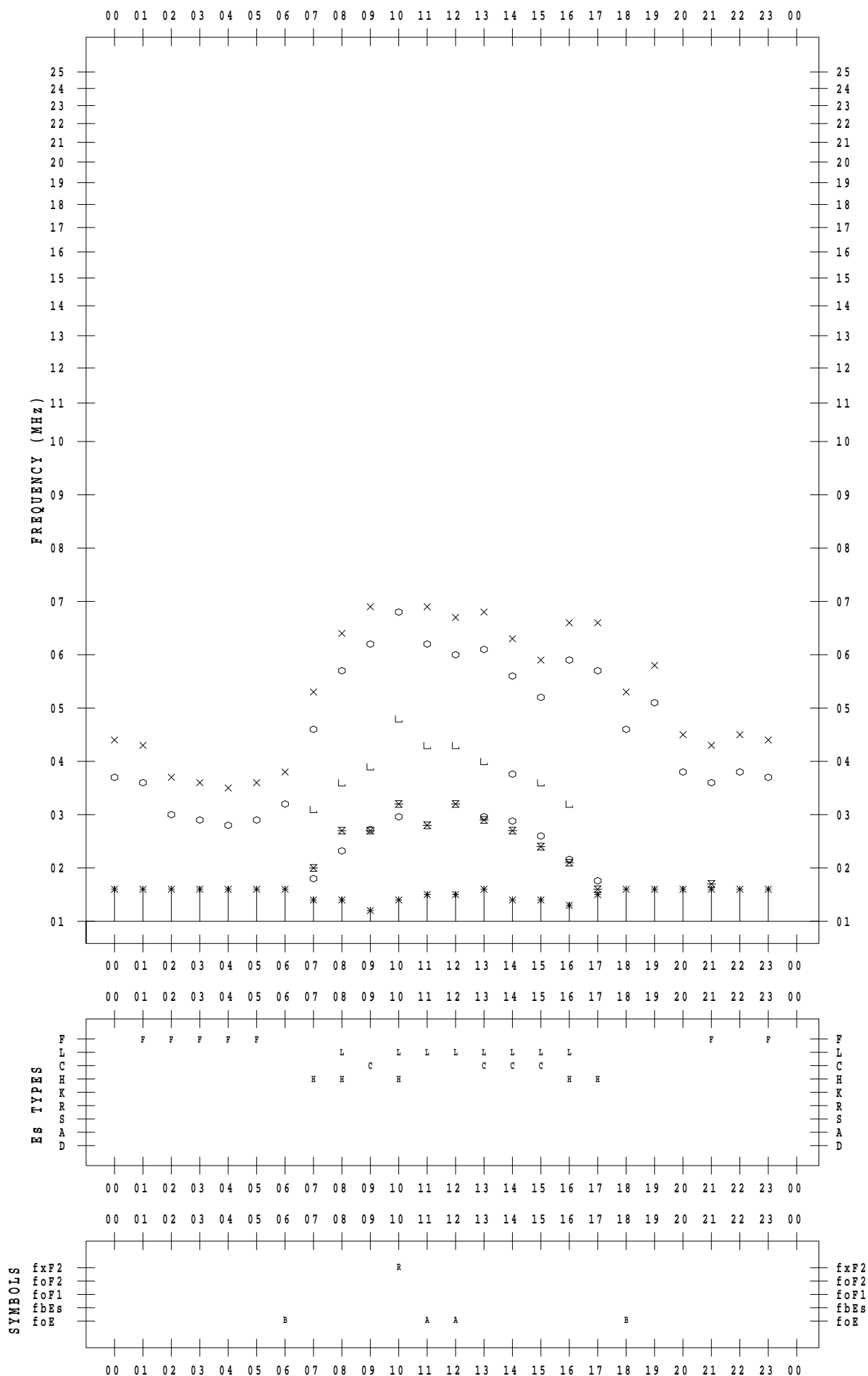
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 2

135 ° E MEAN TIME



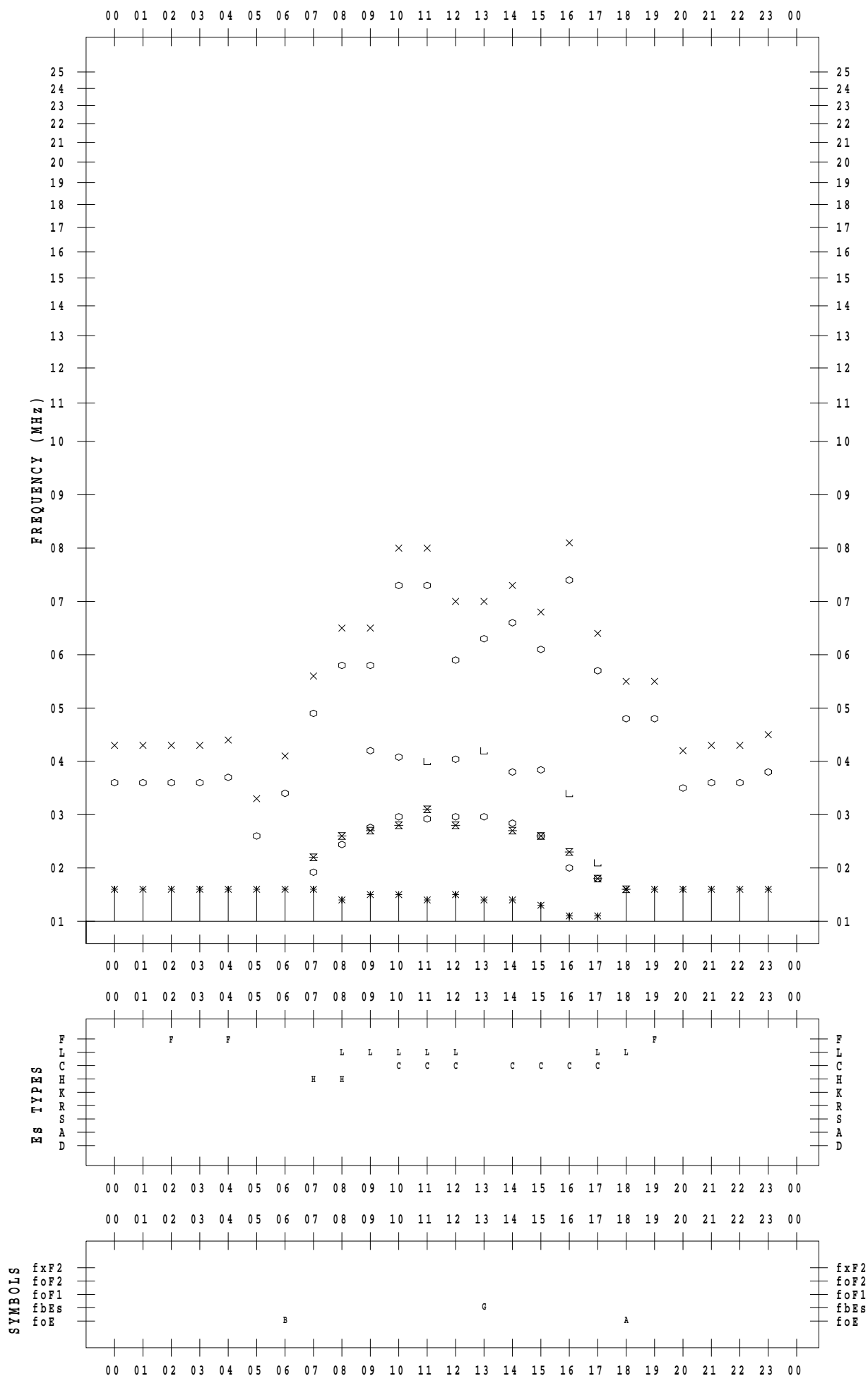
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 3

135 ° E MEAN TIME



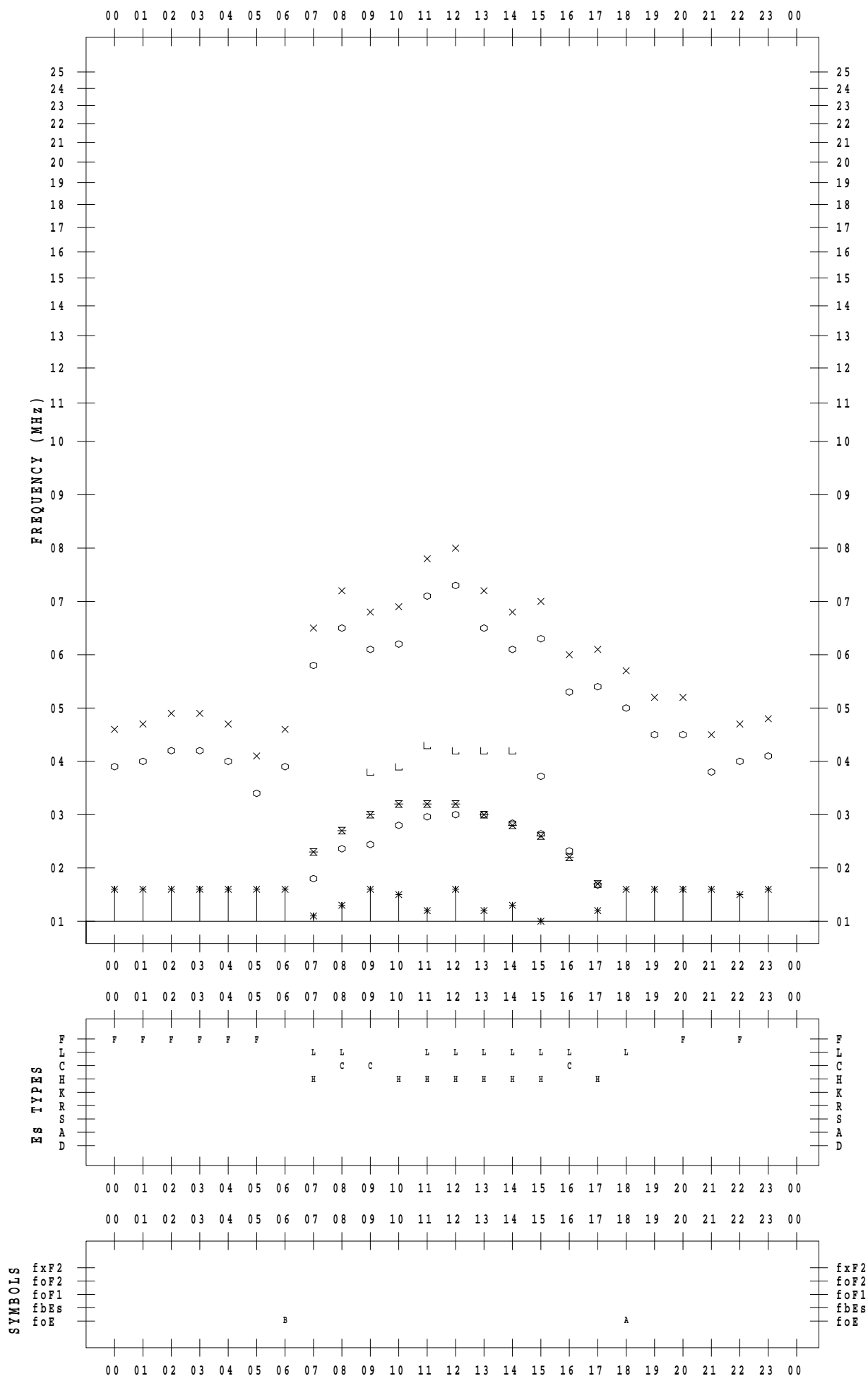
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 4

135 ° E MEAN TIME





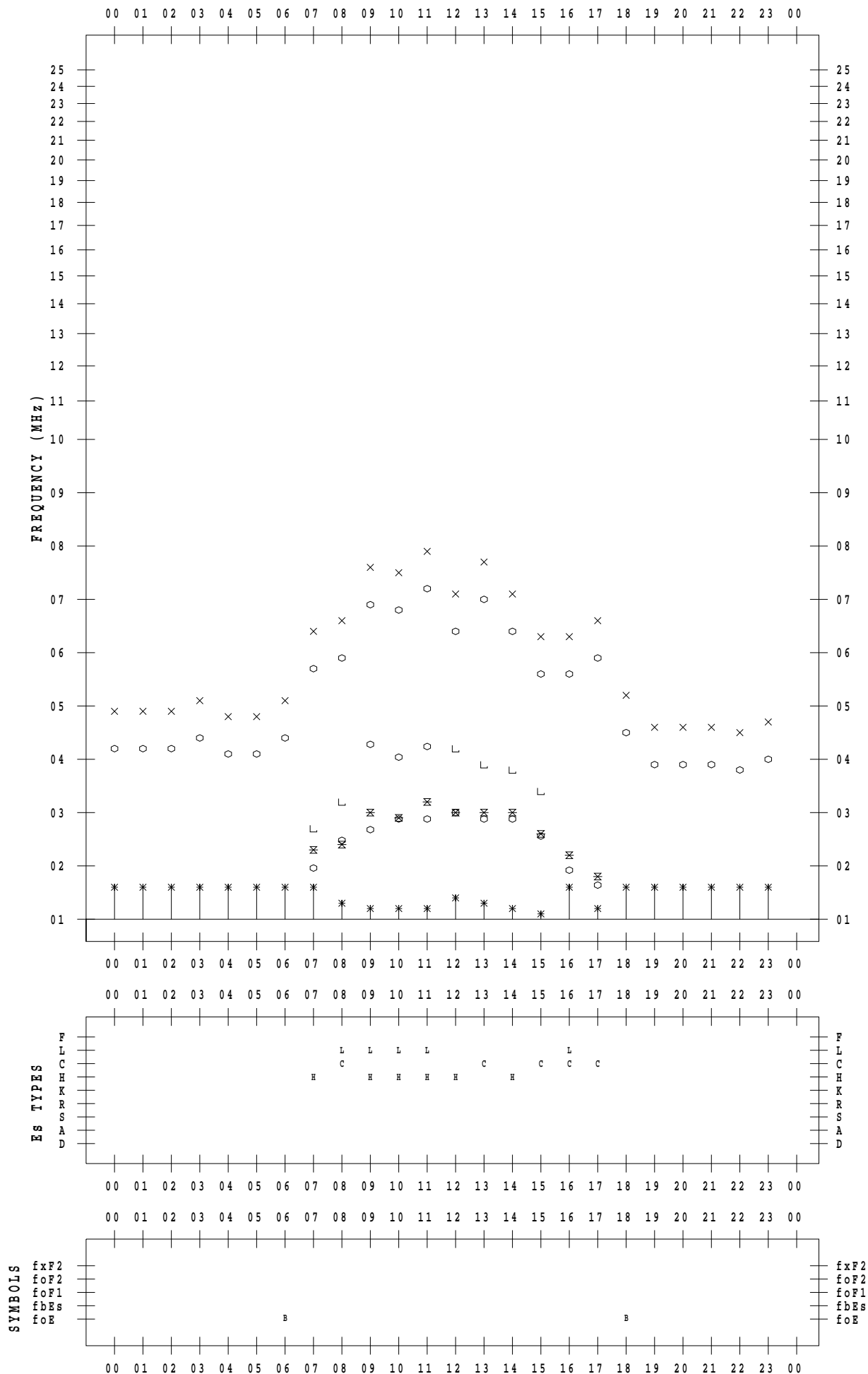
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 5

135 ° E MEAN TIME



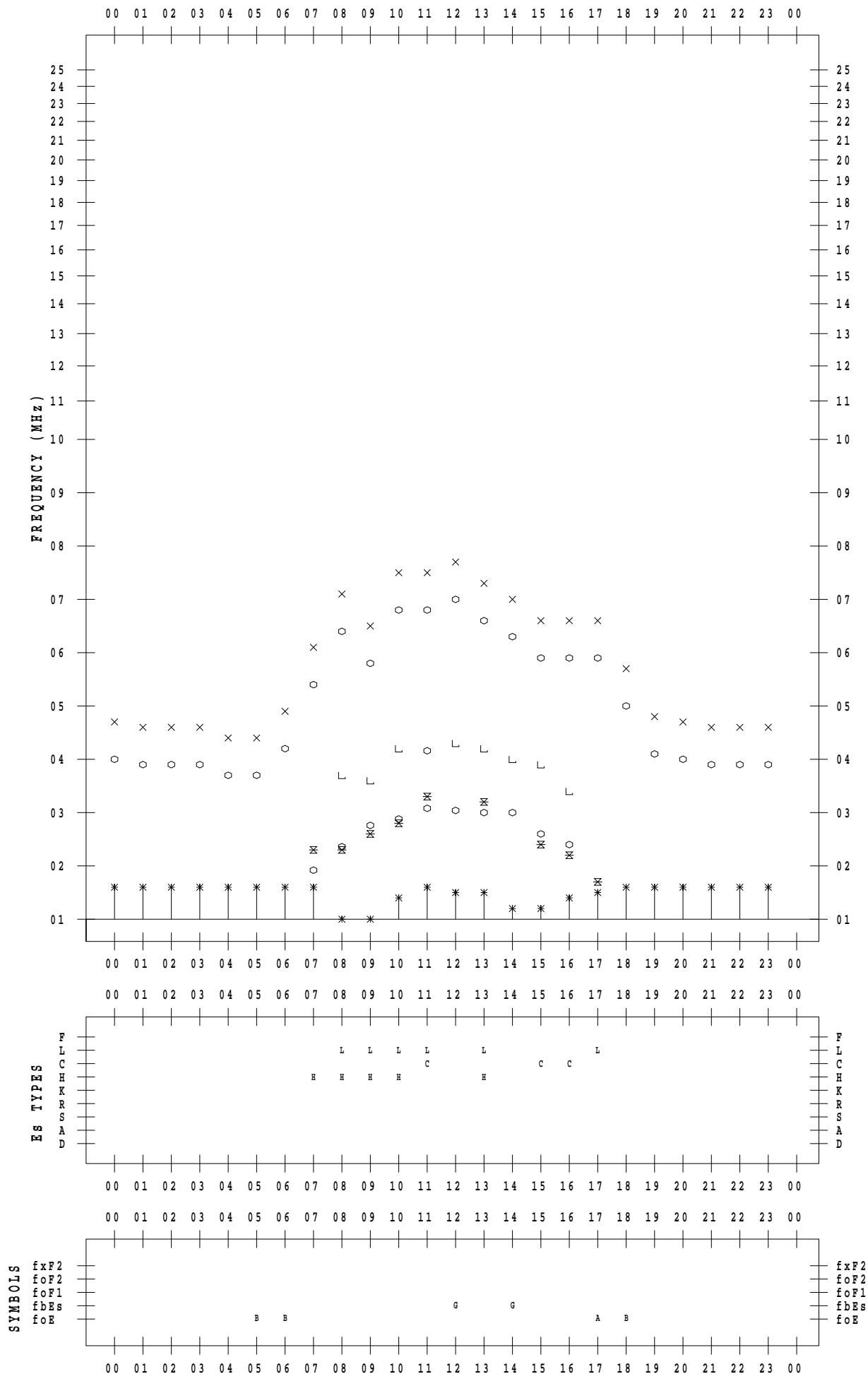
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 6

135 ° E MEAN TIME



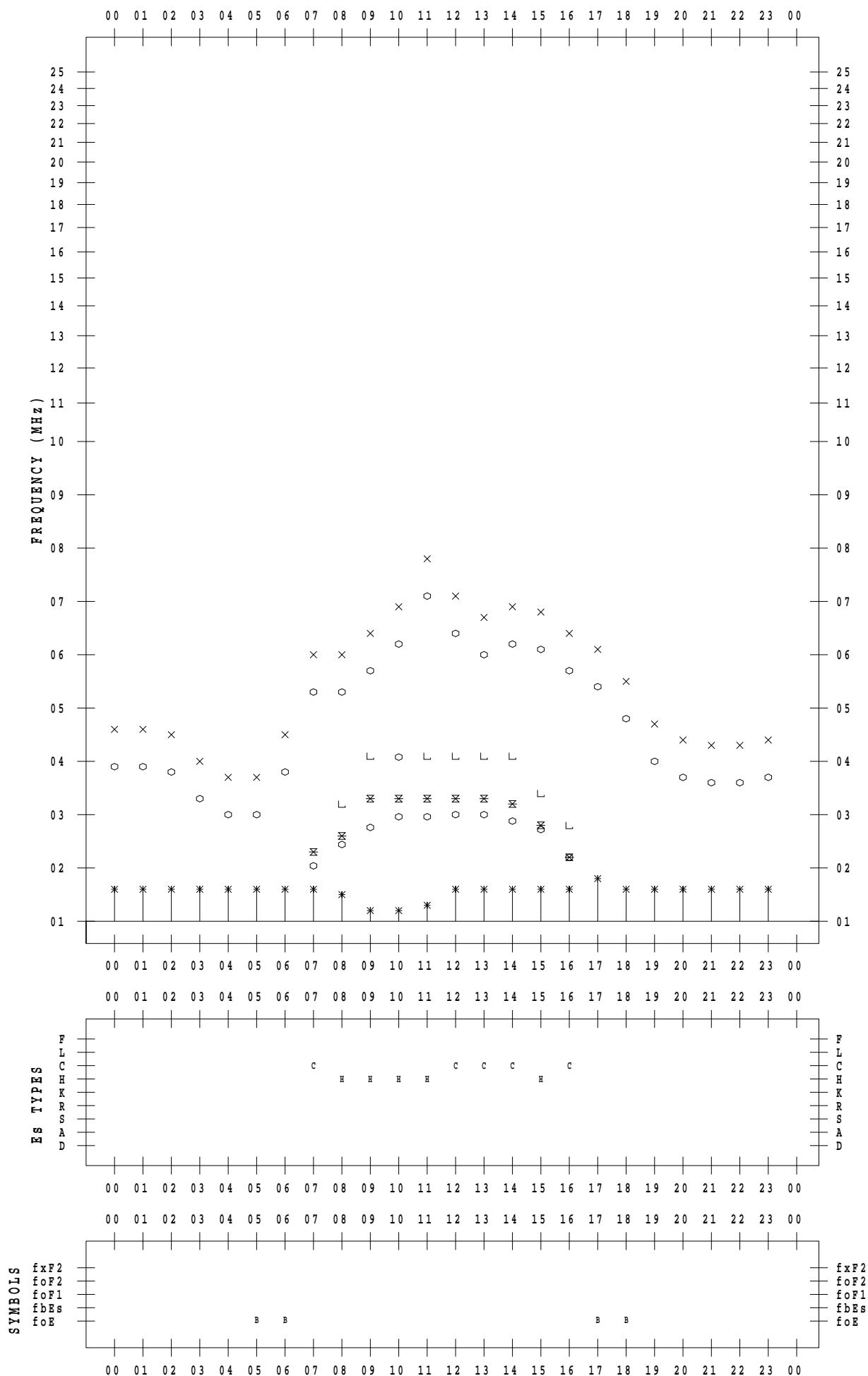
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 7

135 ° E MEAN TIME



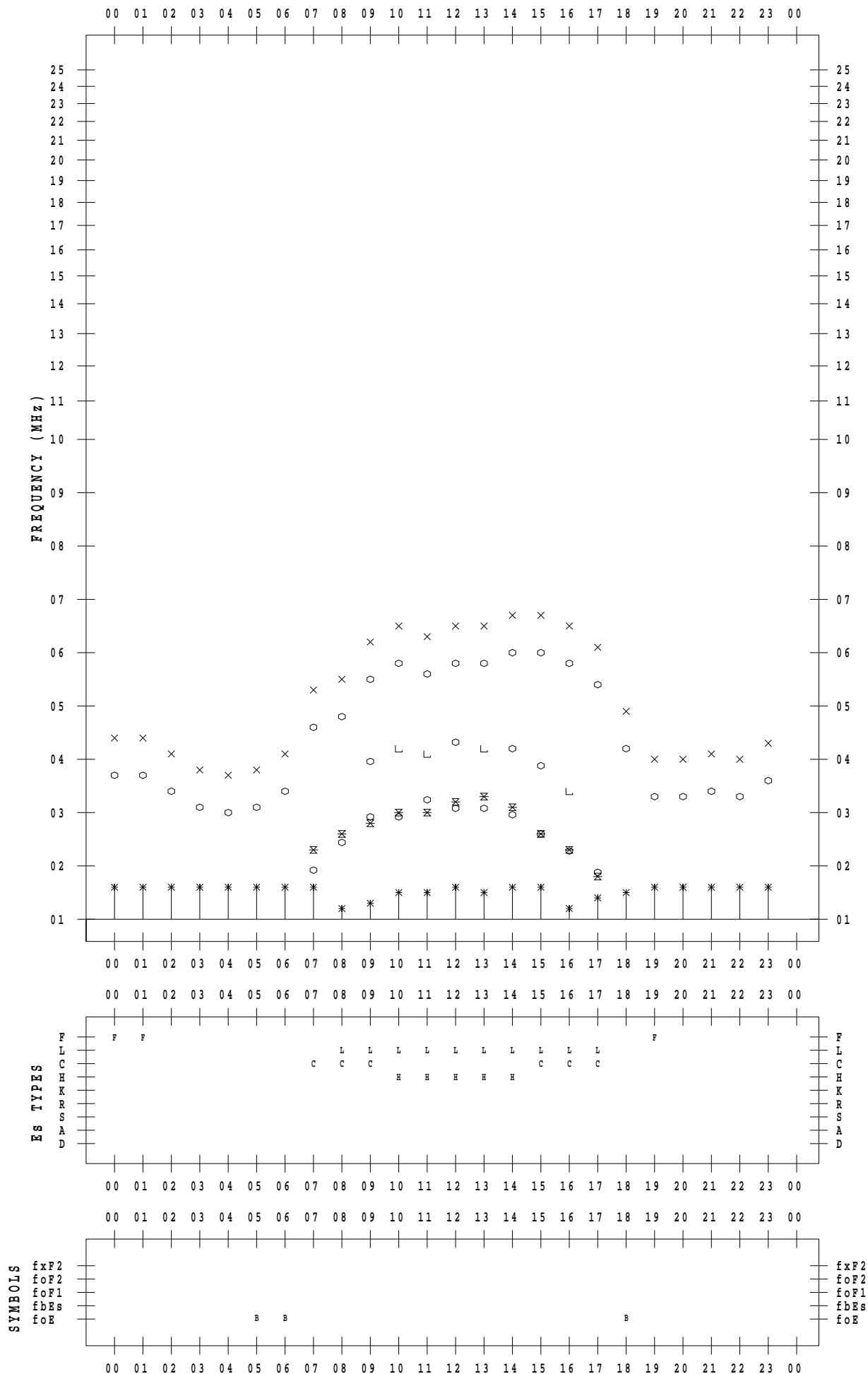
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 8

135 ° E MEAN TIME



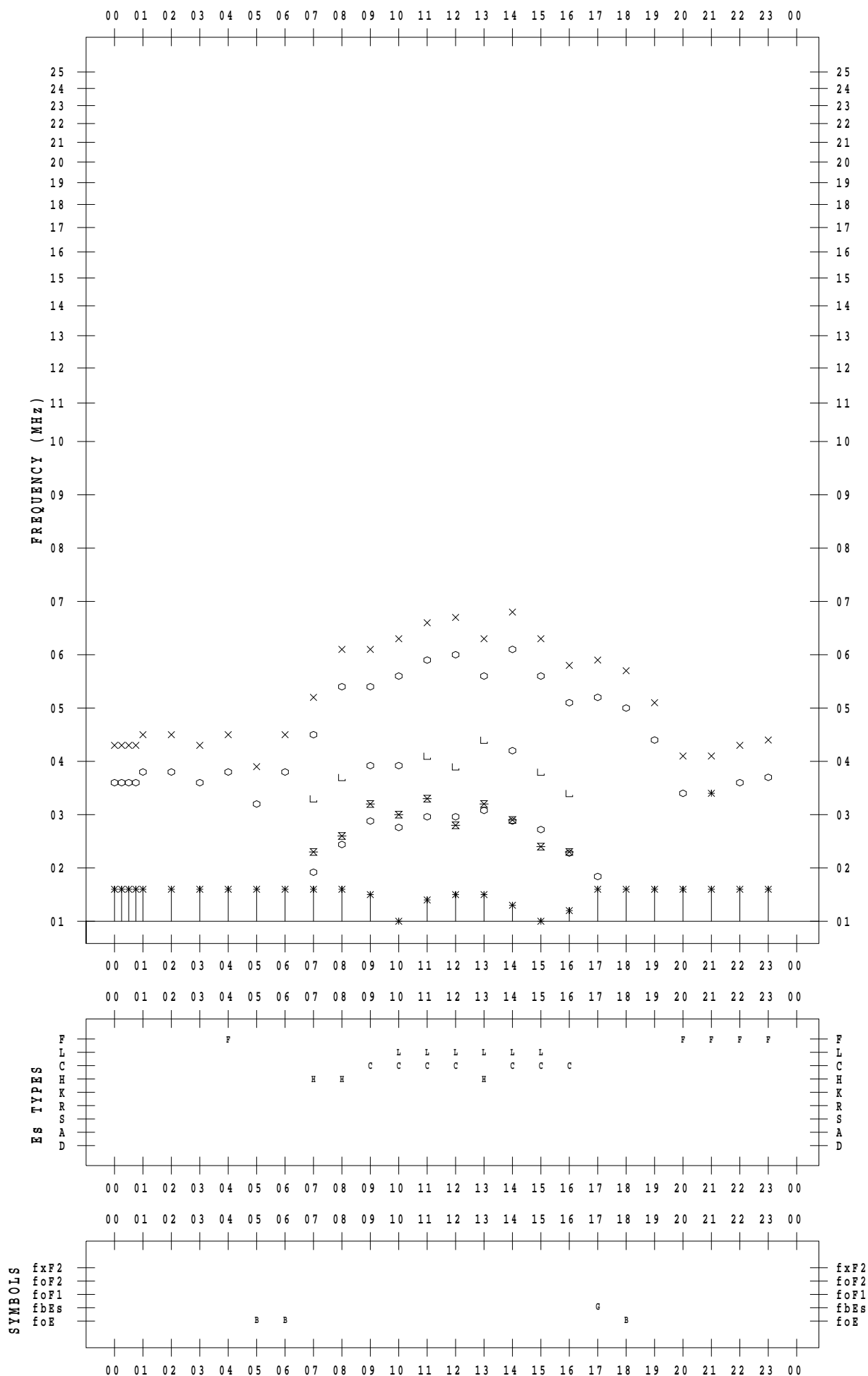
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 9

135 ° E MEAN TIME



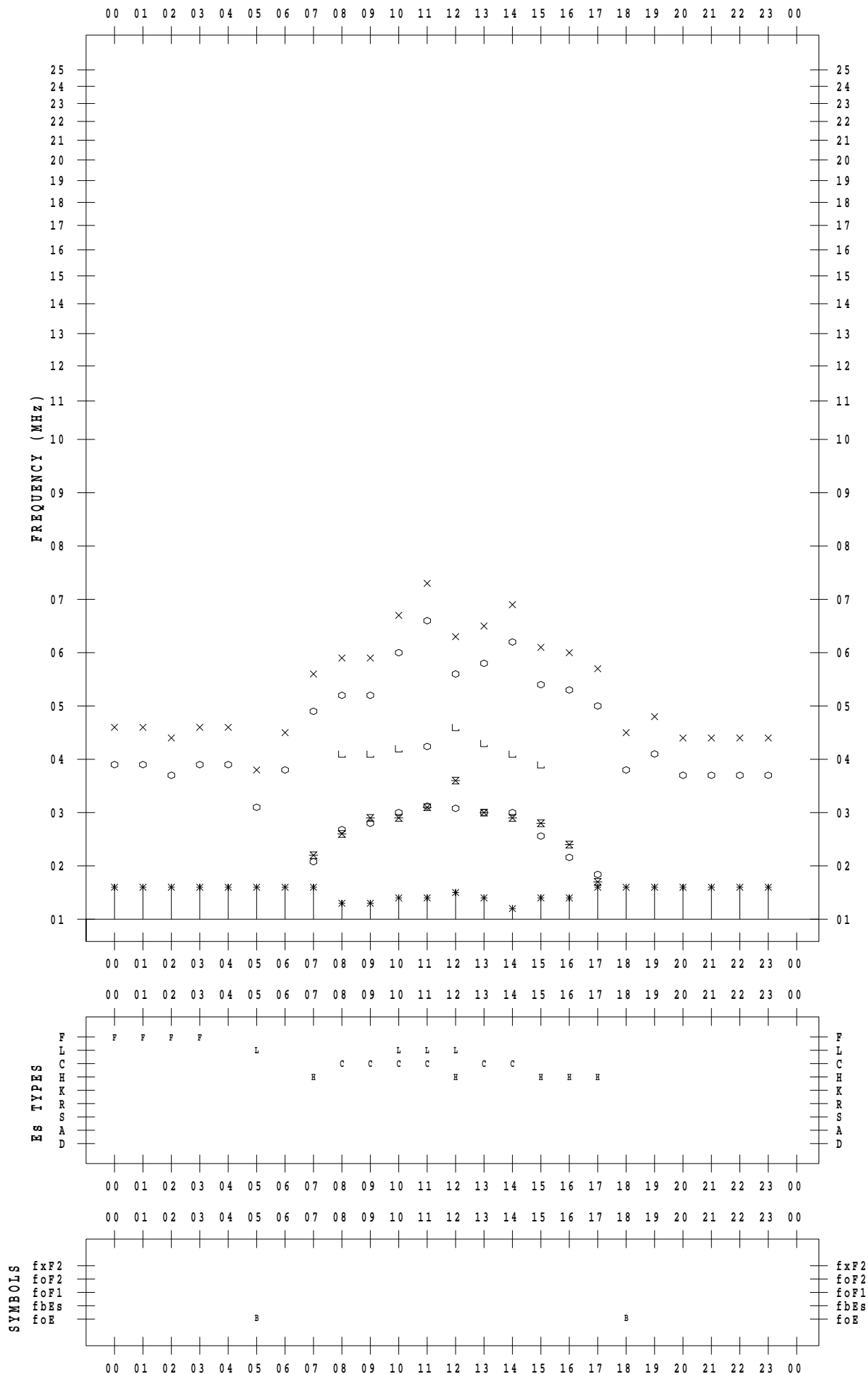
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 10

135 ° E MEAN TIME



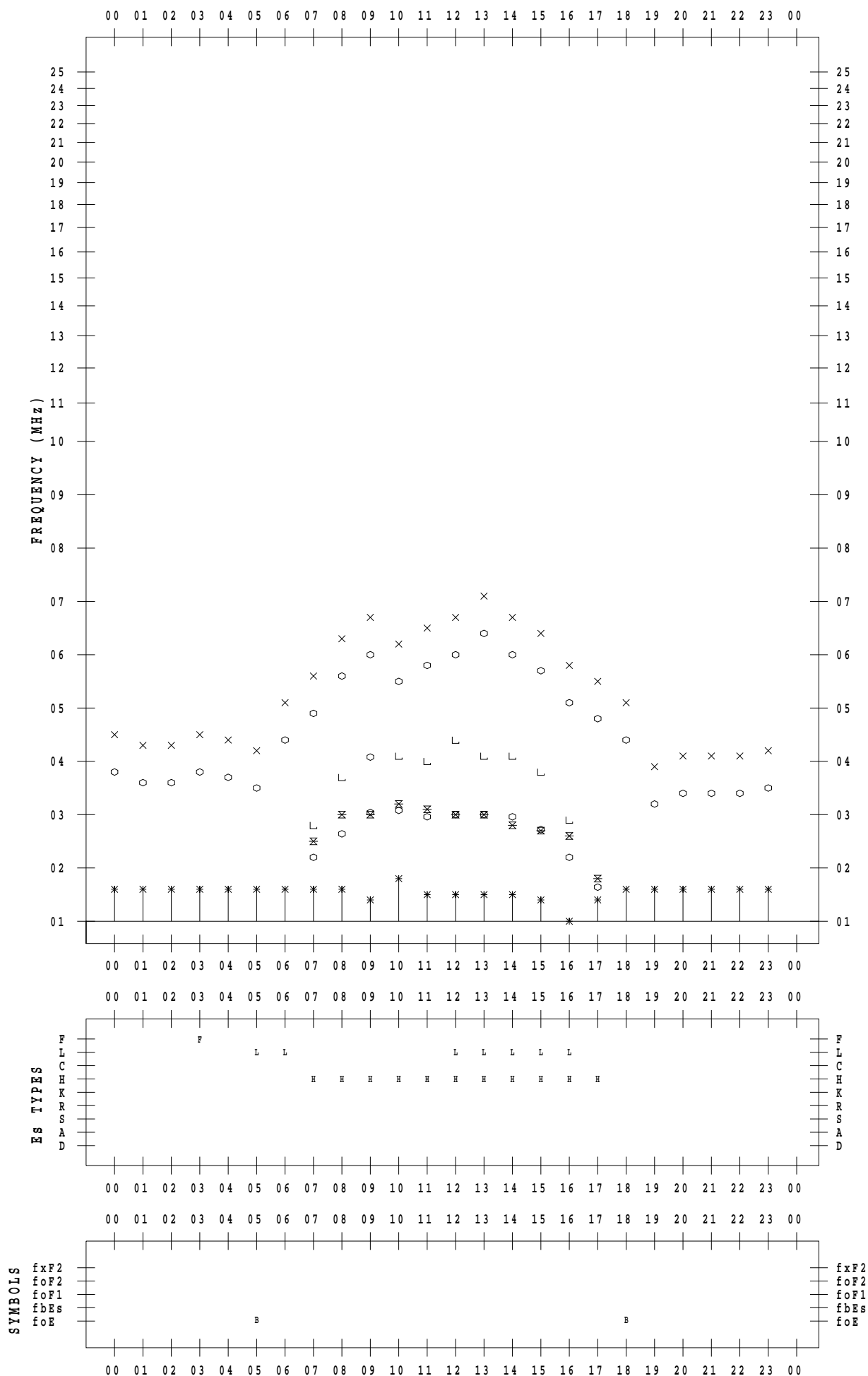
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 11

135 ° E MEAN TIME



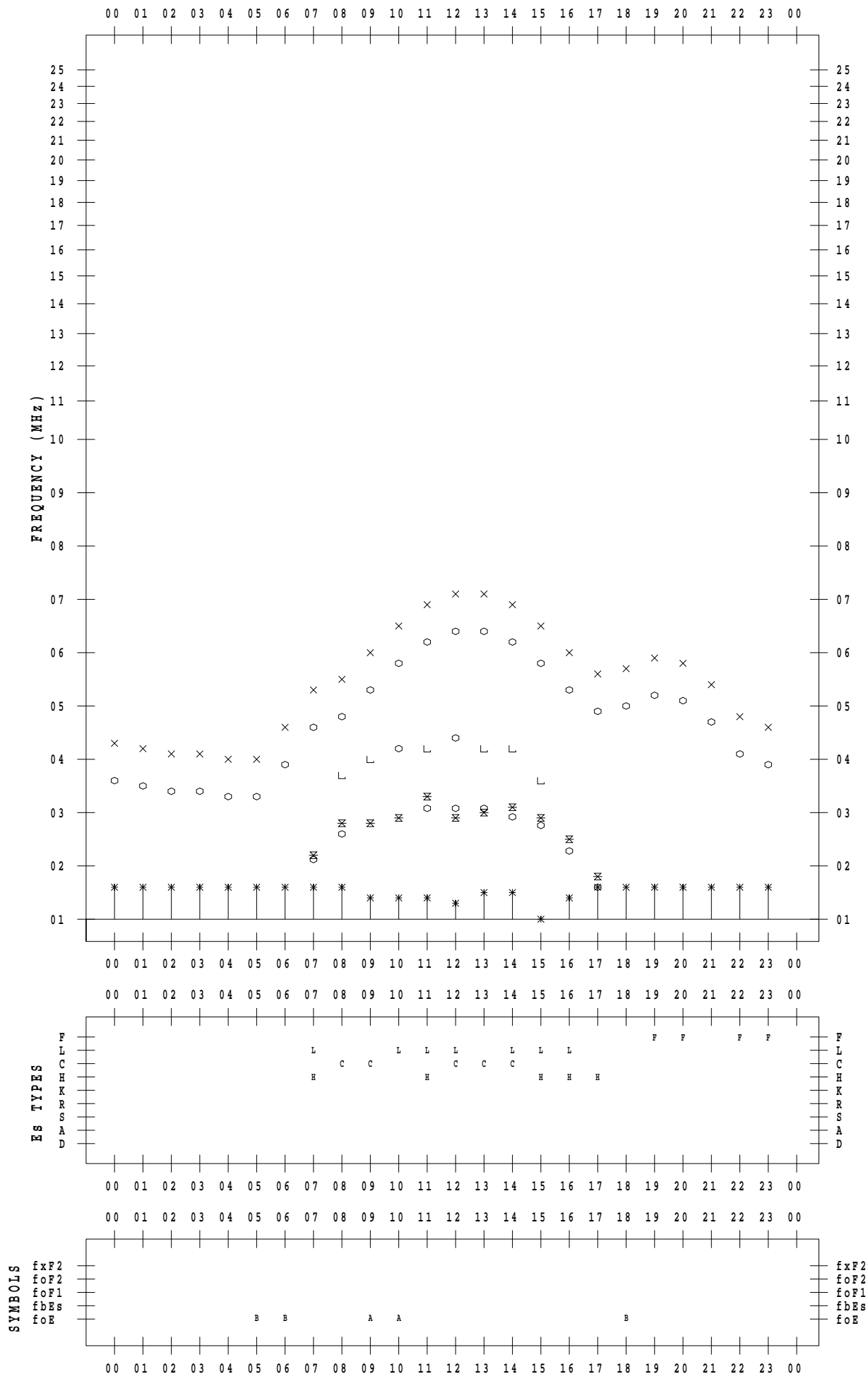
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 12

135 ° E MEAN TIME





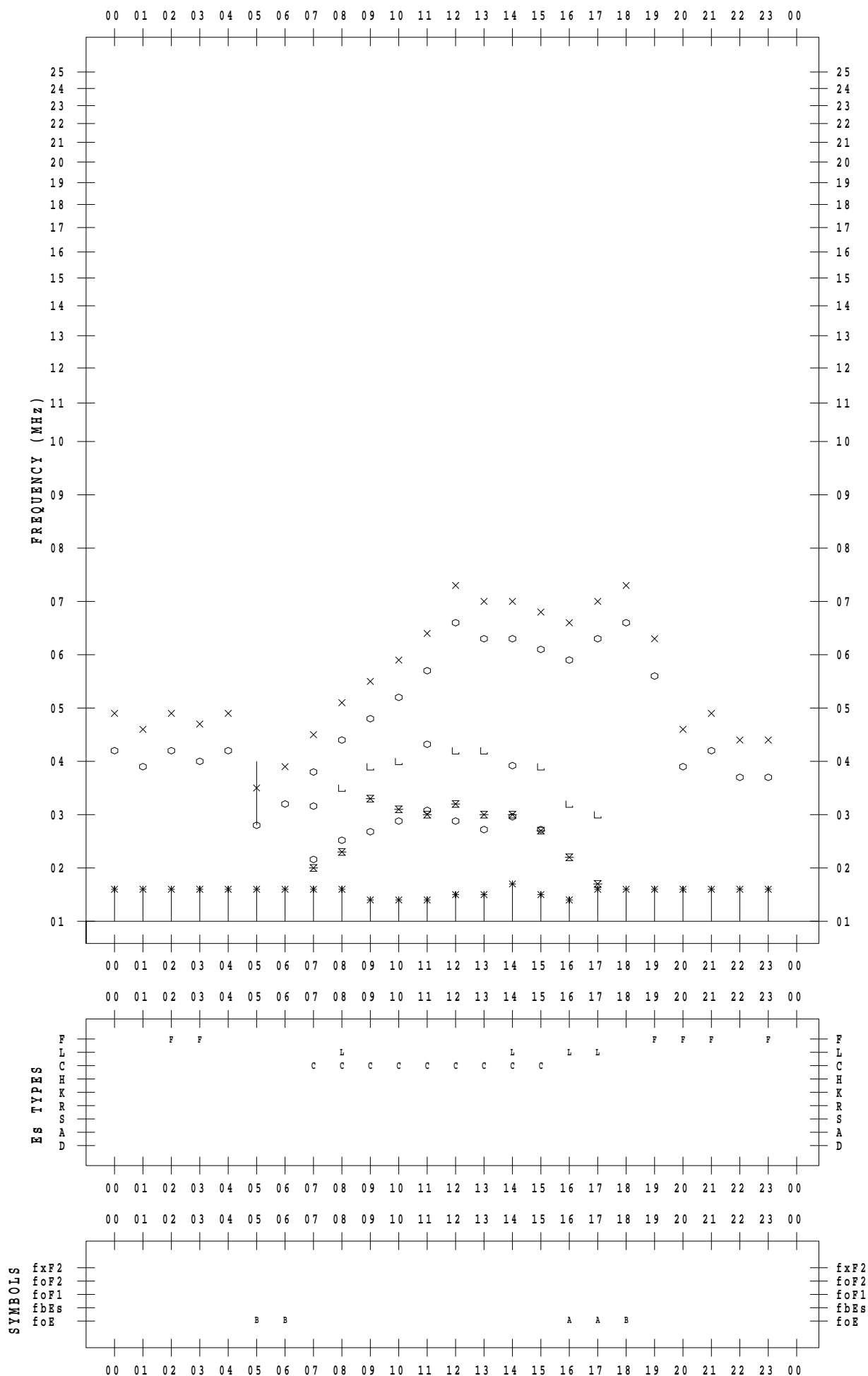
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 13

135 ° E MEAN TIME



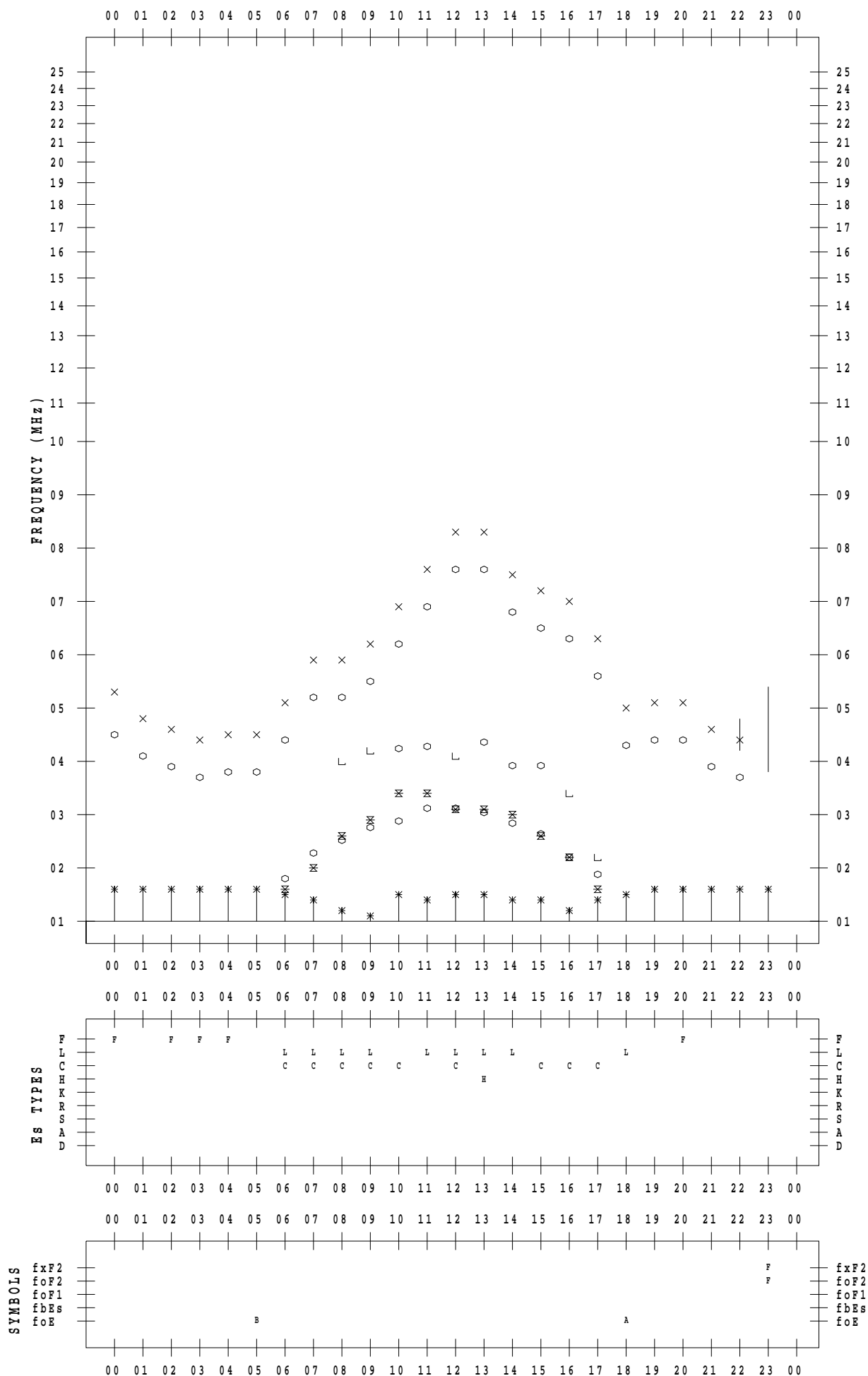
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 14

135 ° E MEAN TIME



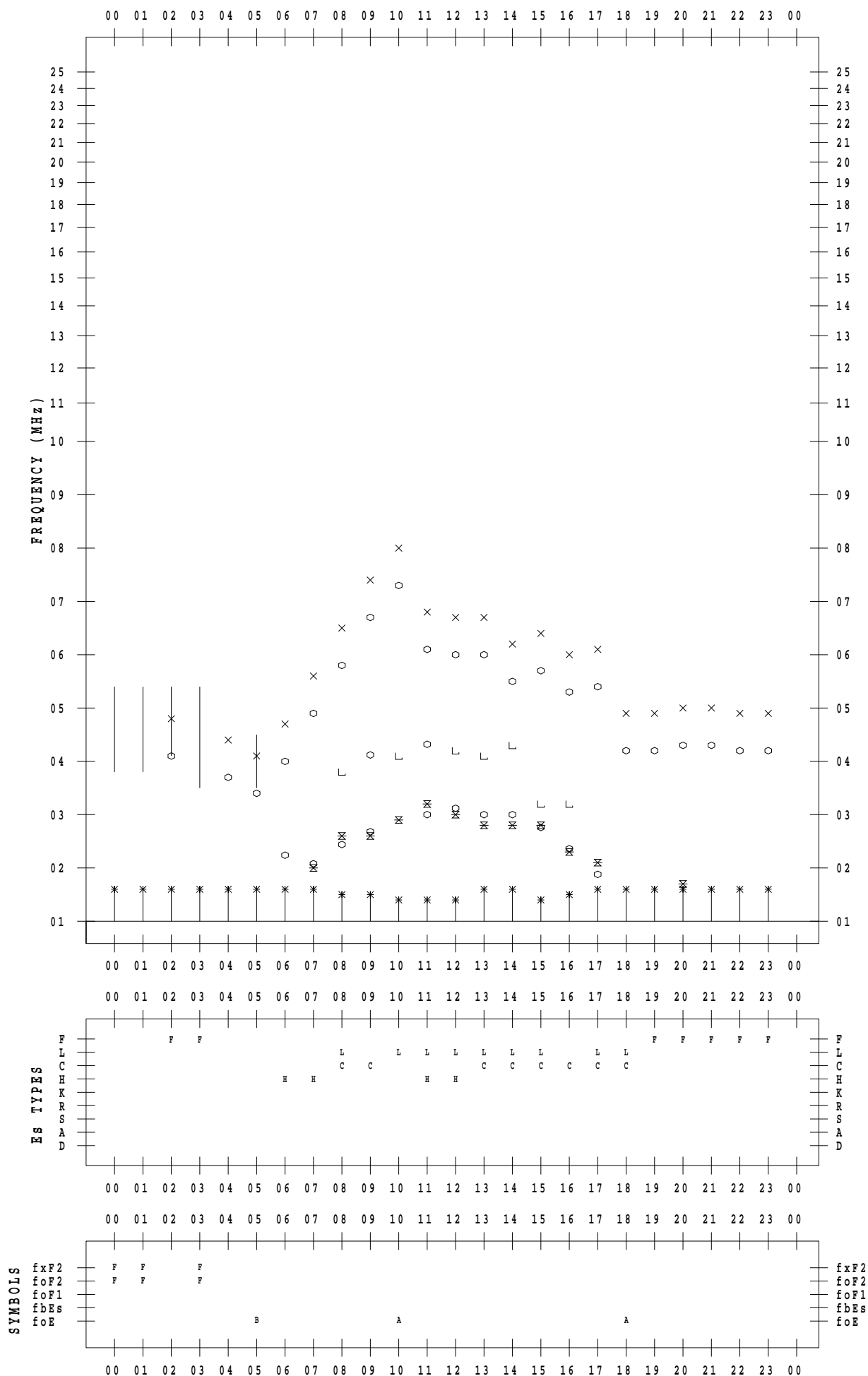
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 15

135 ° E MEAN TIME



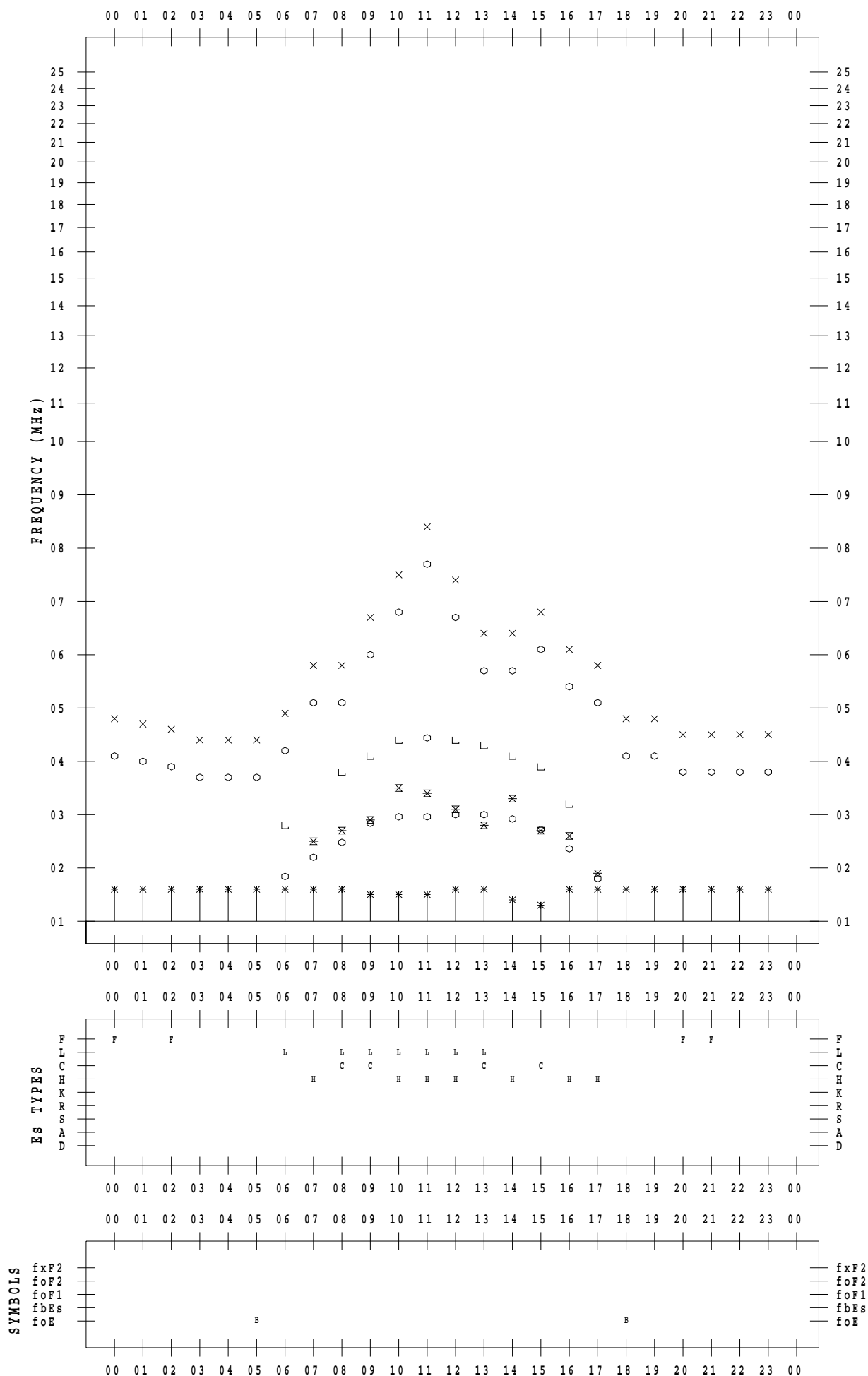
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 16

135 ° E MEAN TIME



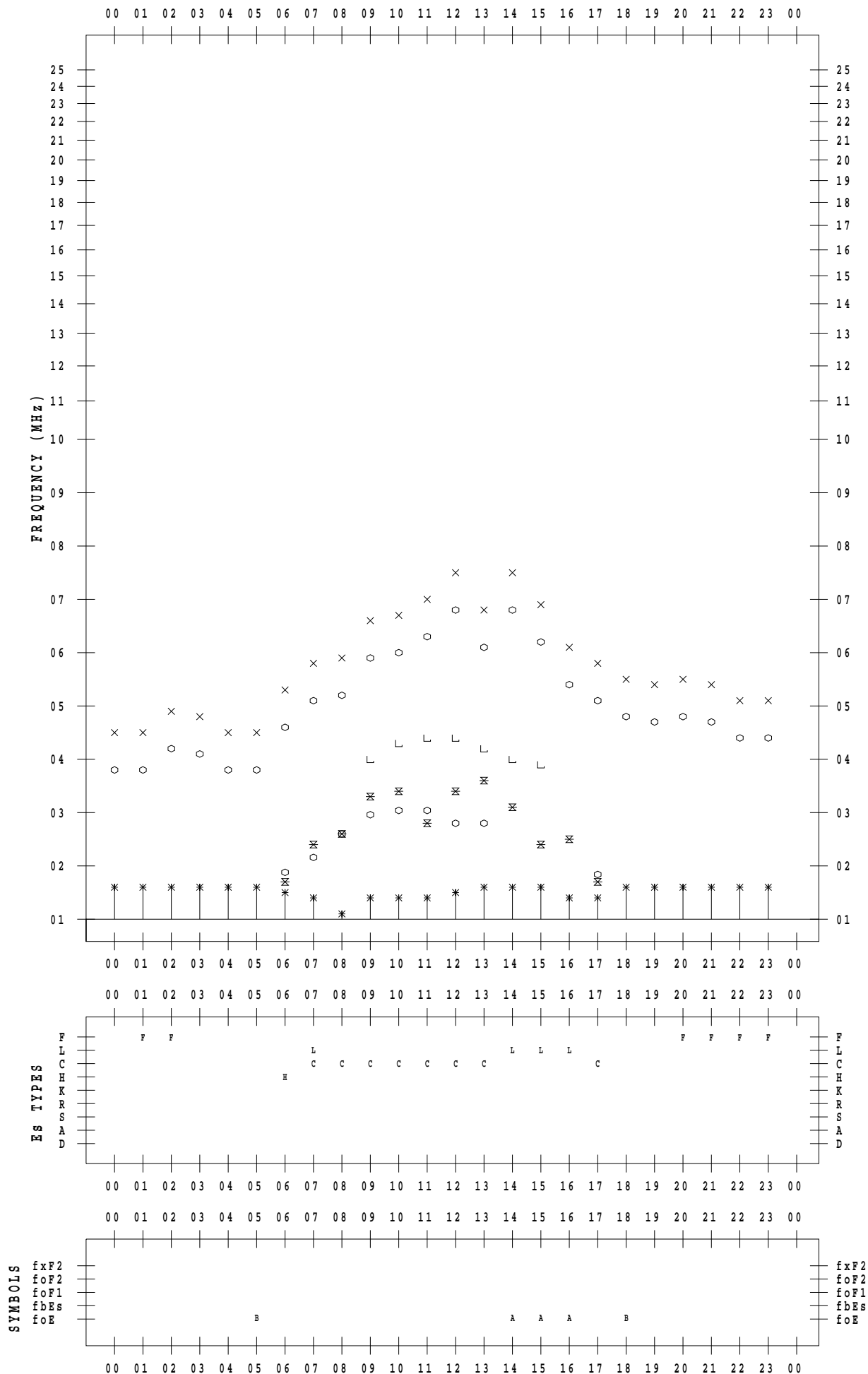
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 17

135 ° E MEAN TIME



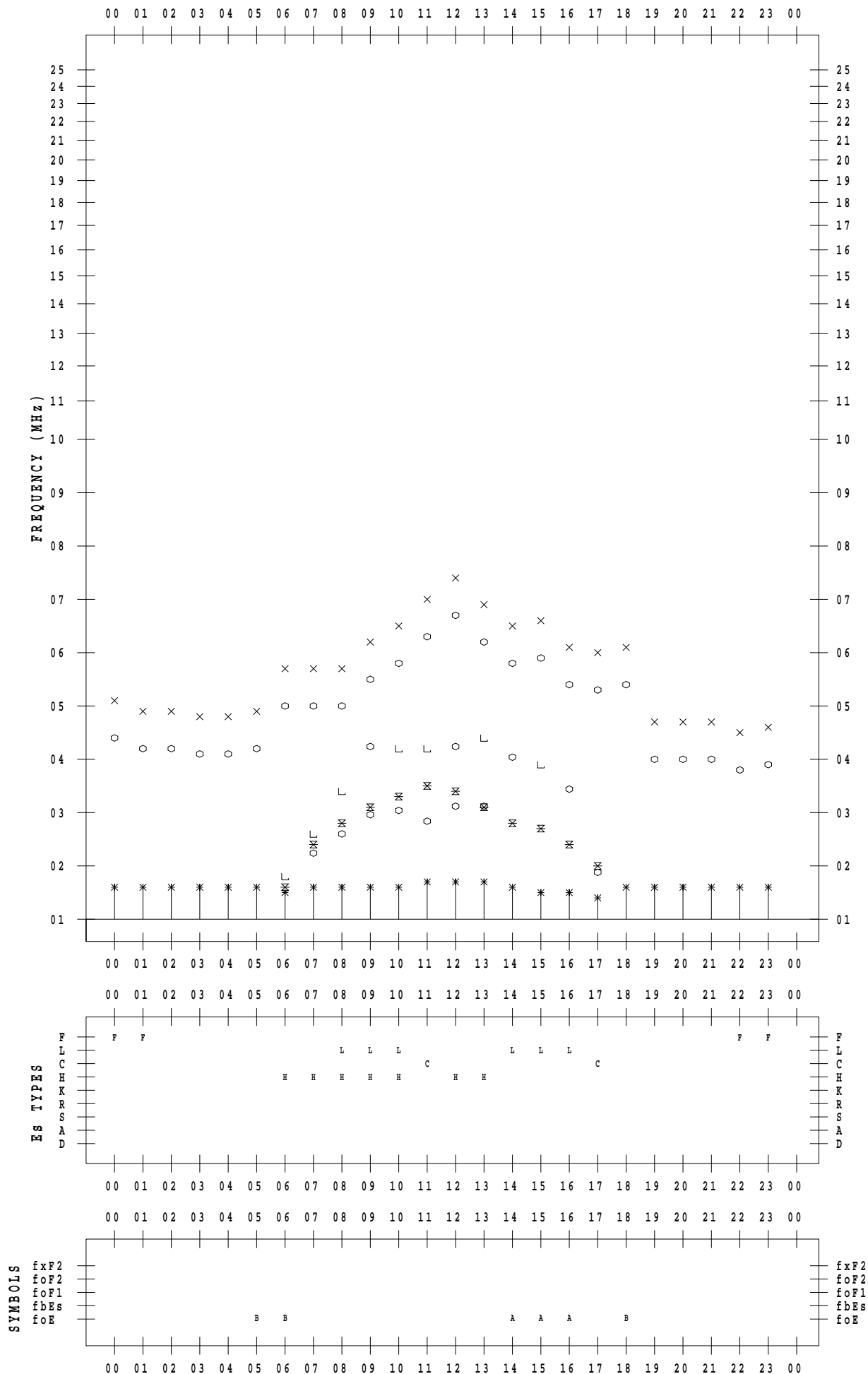
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 18

135 ° E MEAN TIME



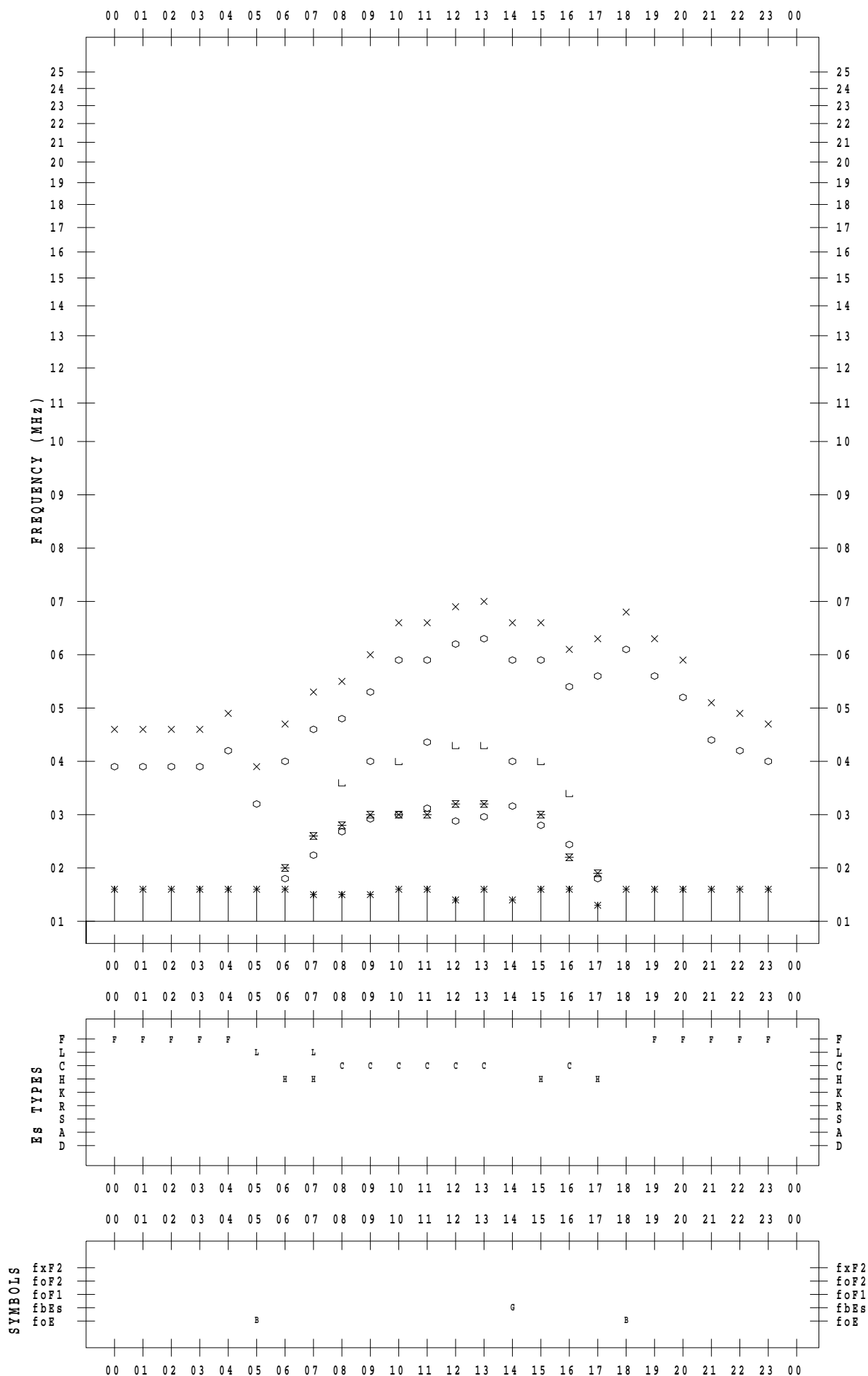
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/ 3/19

135 ° E MEAN TIME



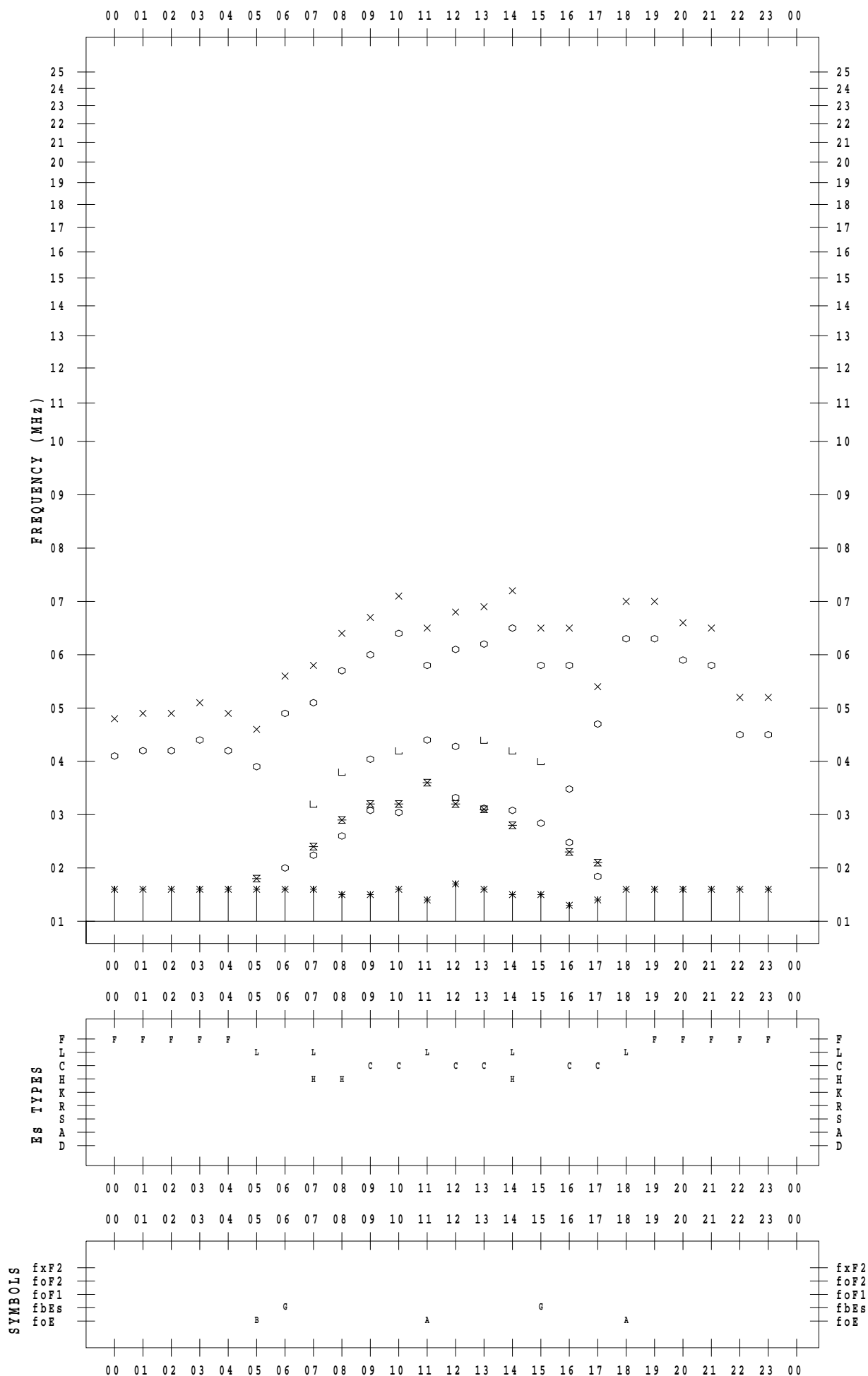
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 20

135 ° E MEAN TIME





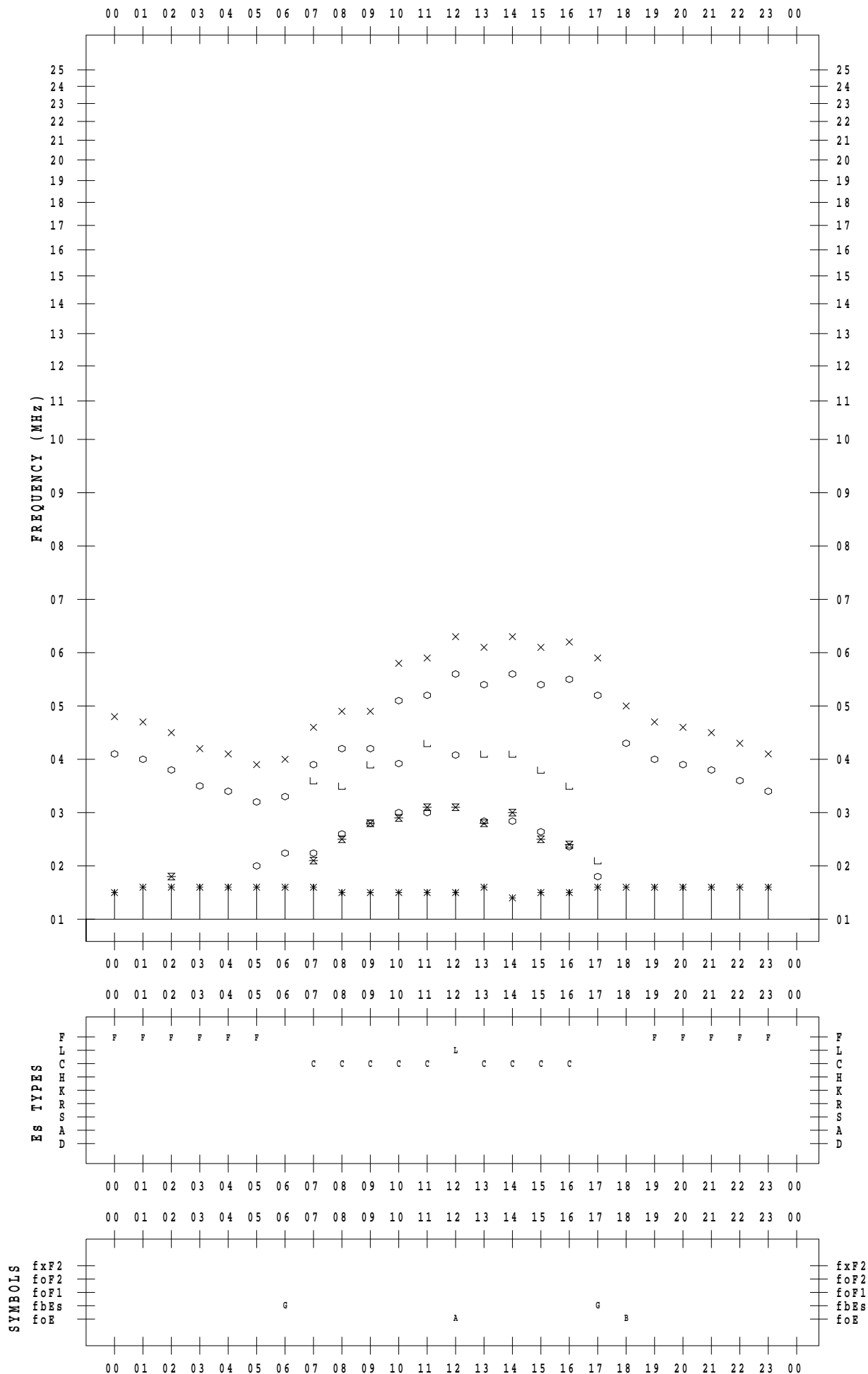
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 21

135 ° E MEAN TIME



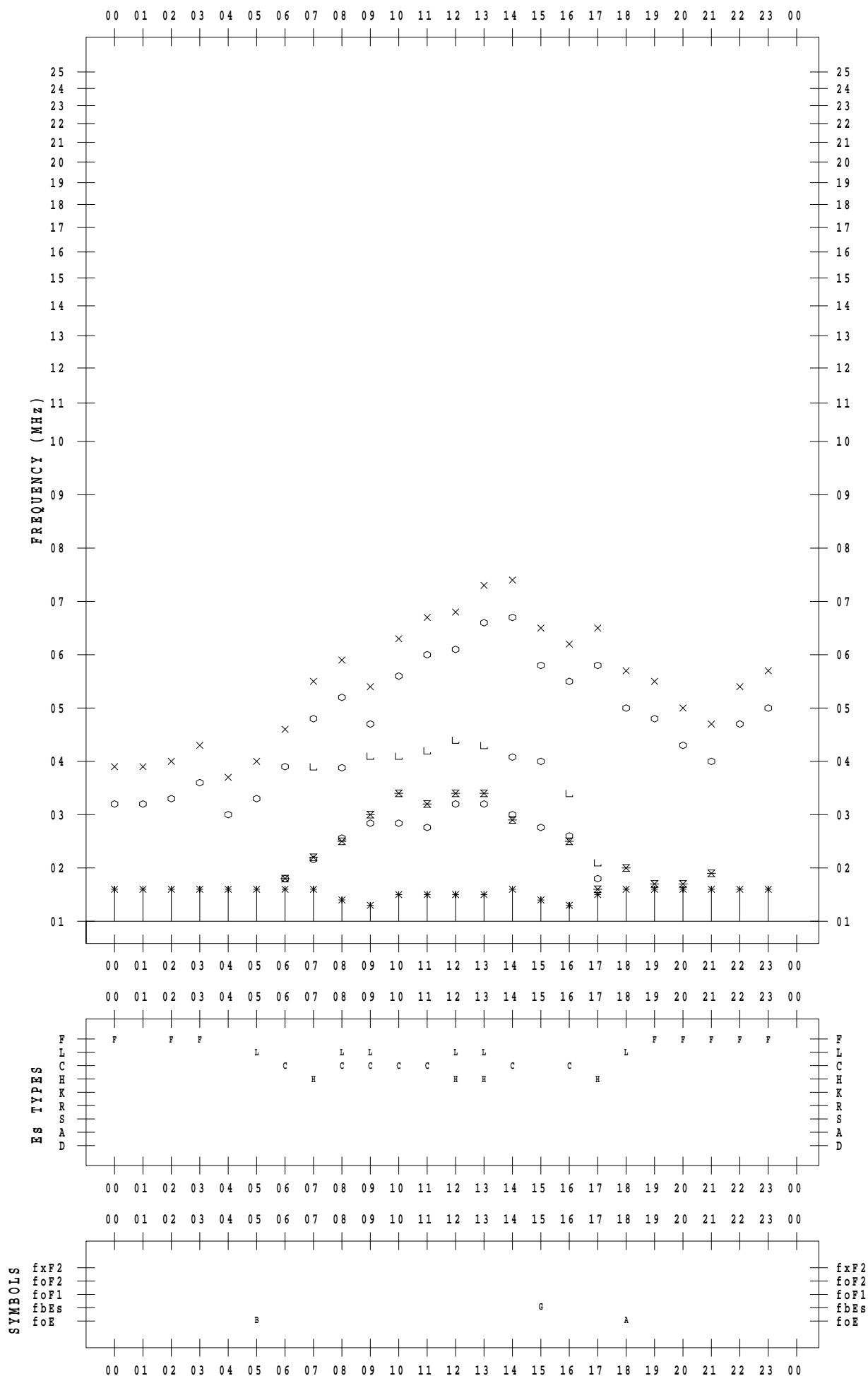
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 22

135 ° E MEAN TIME



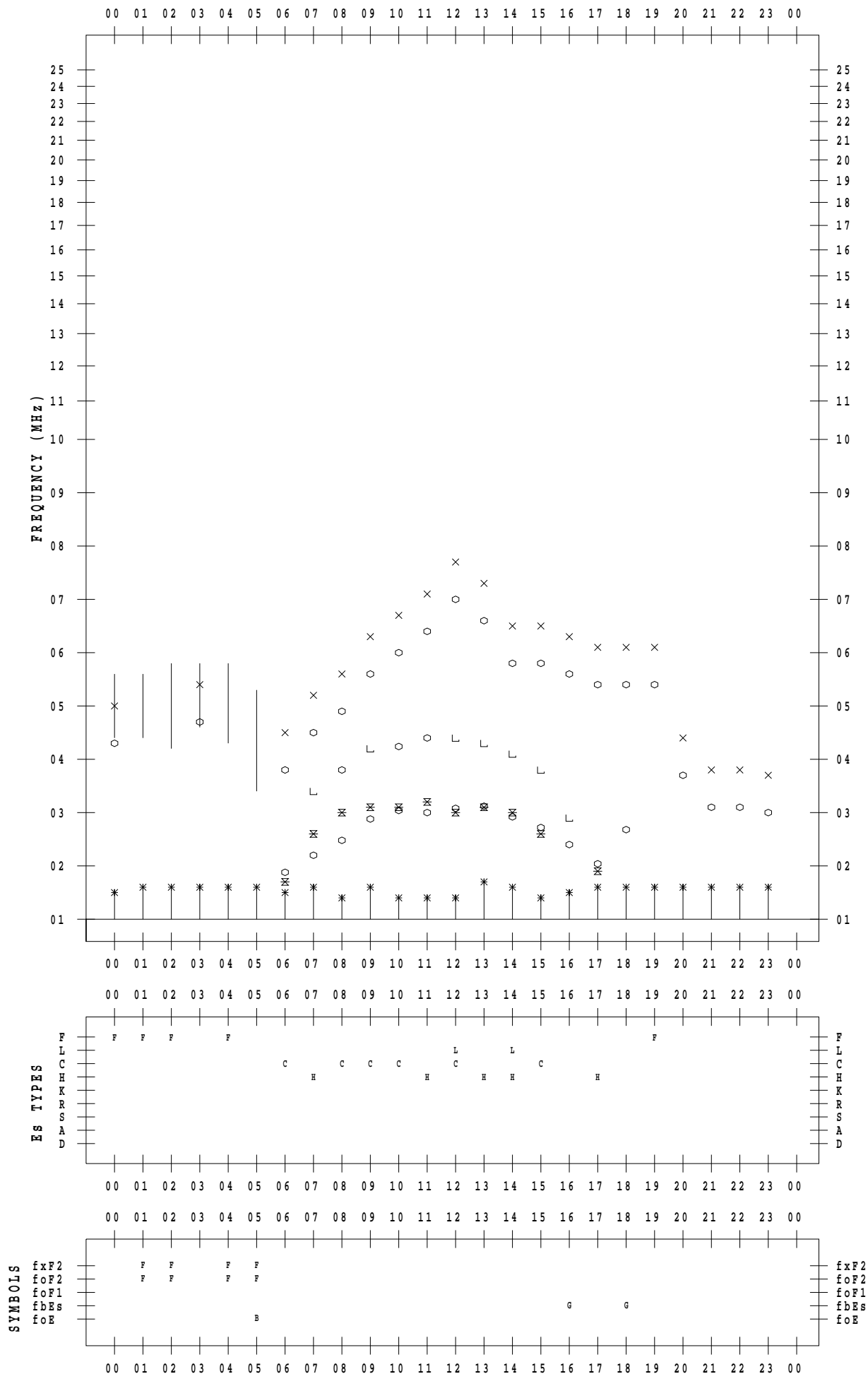
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 23

135 ° E MEAN TIME



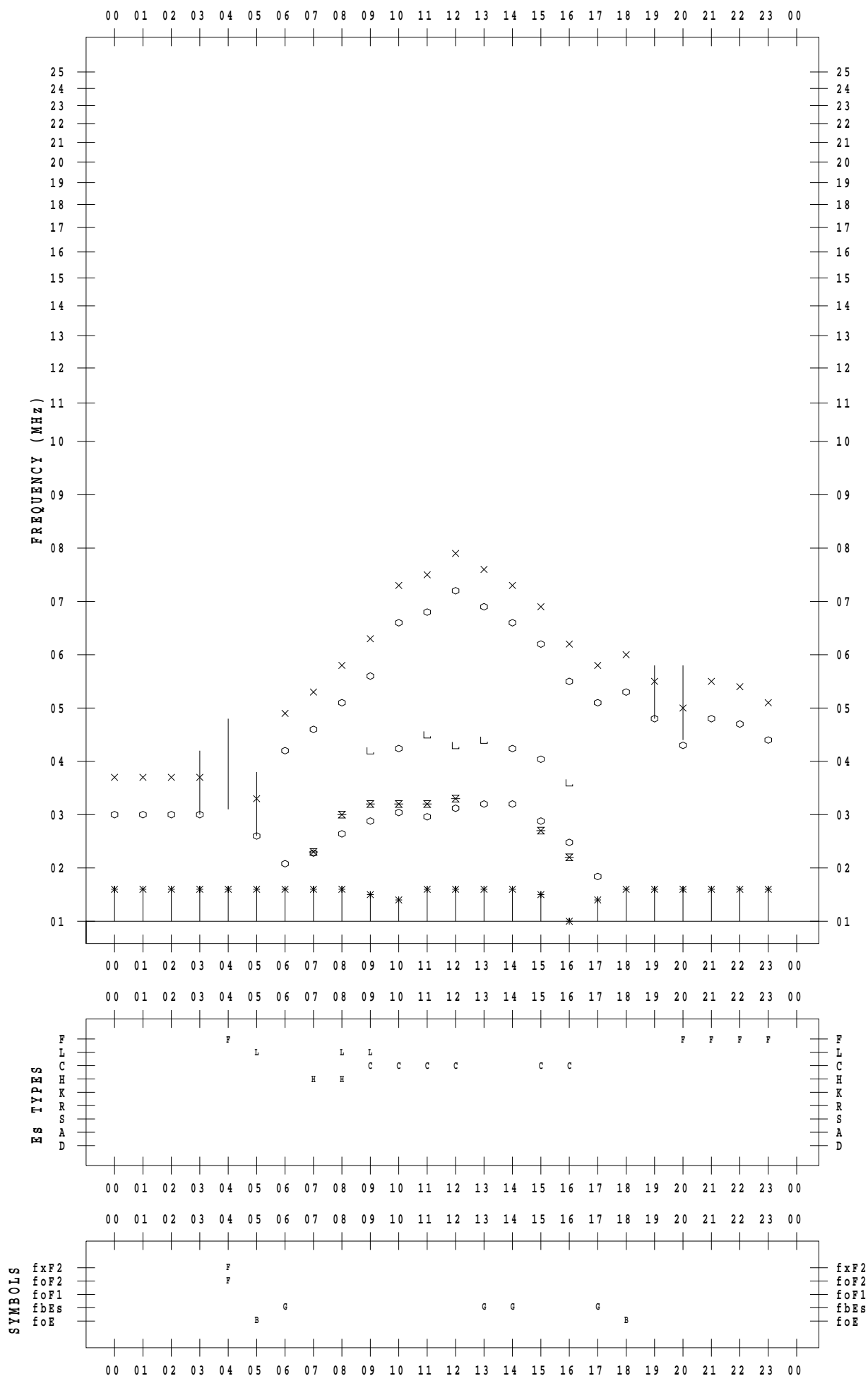
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 24

135 ° E MEAN TIME



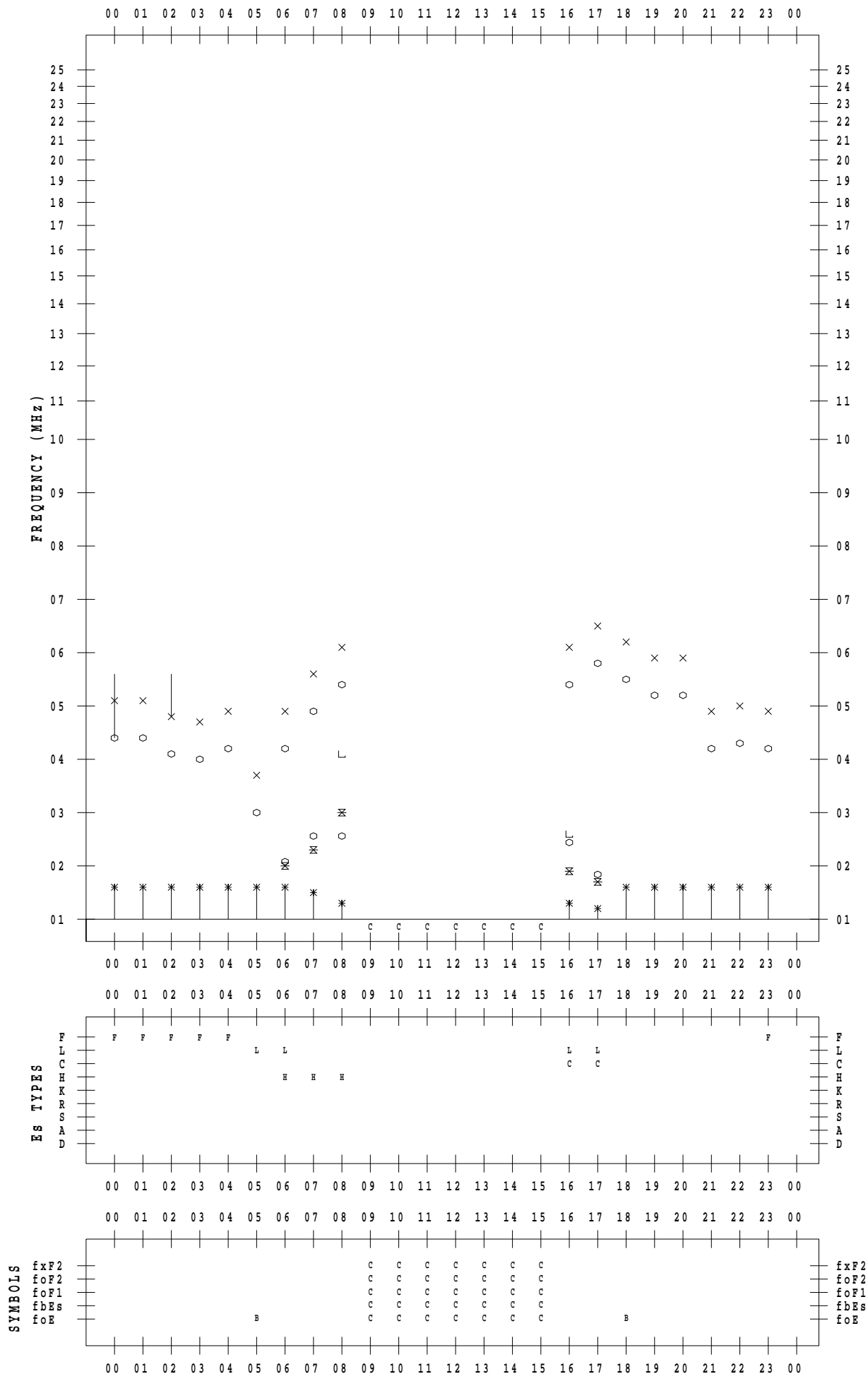
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 25

135 ° E MEAN TIME



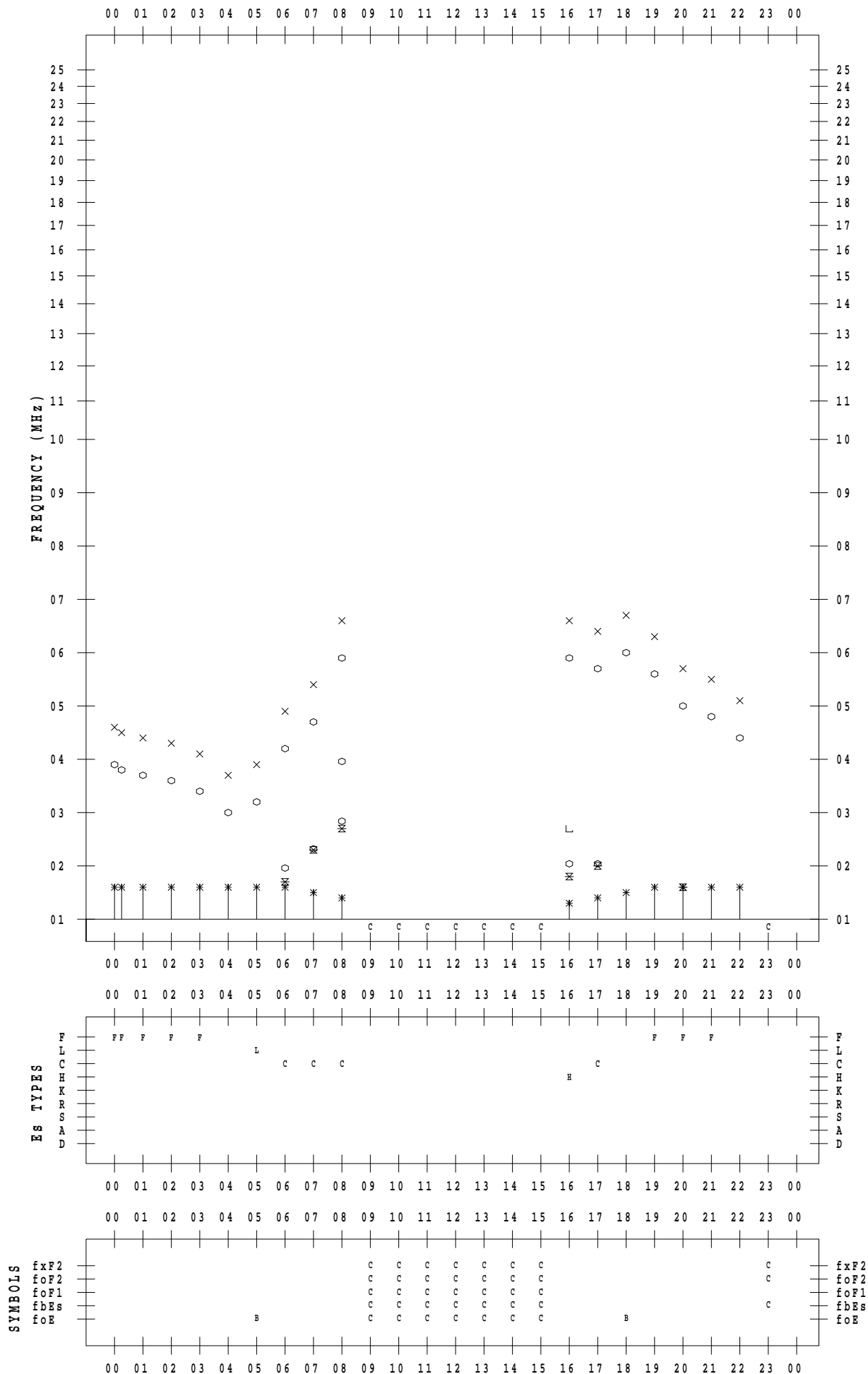
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 26

135 ° E MEAN TIME



Es TYPES

SYMBOLS

fxF2  
foF2  
foF1  
fbEs  
foE

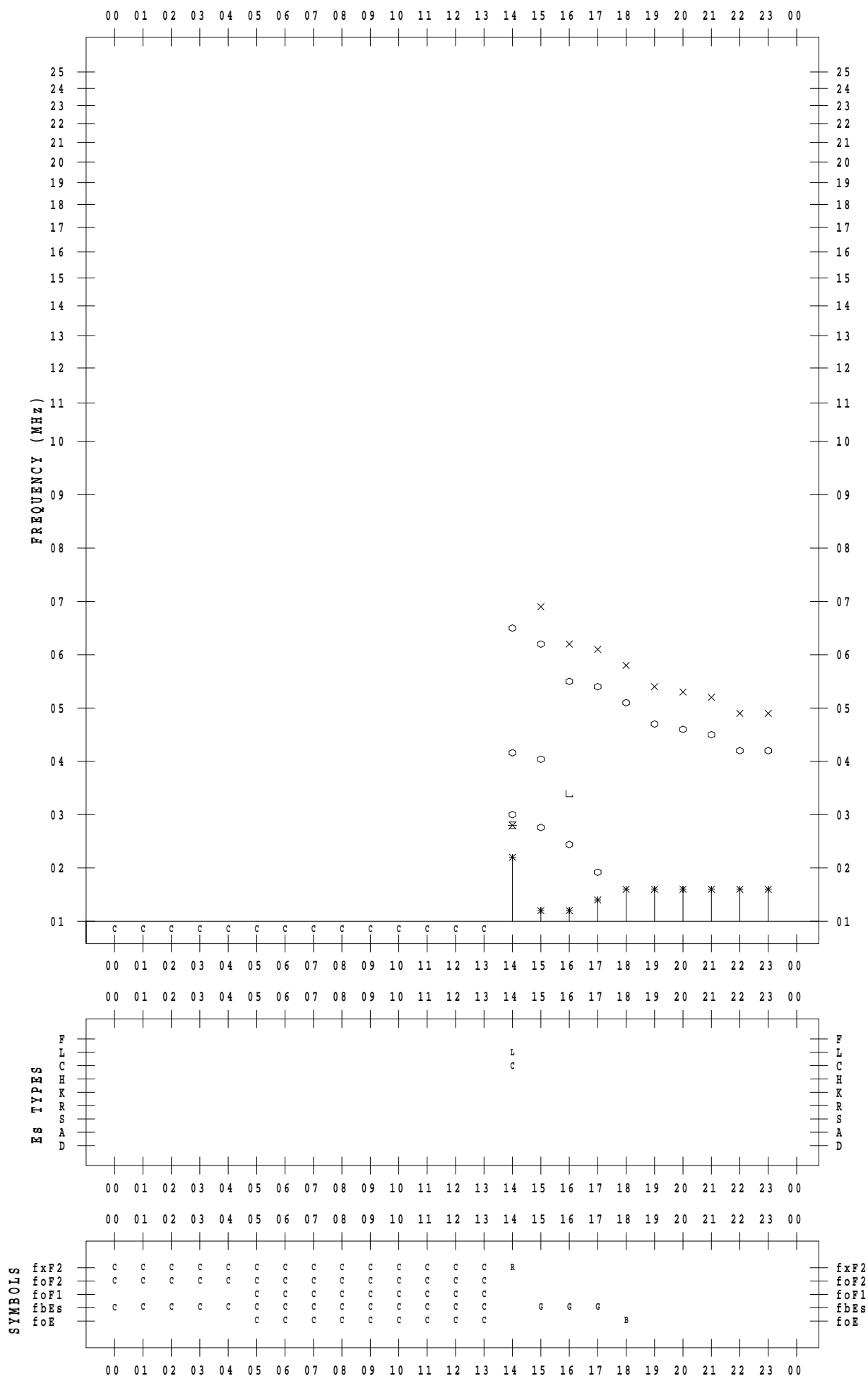
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 27

135 ° E MEAN TIME



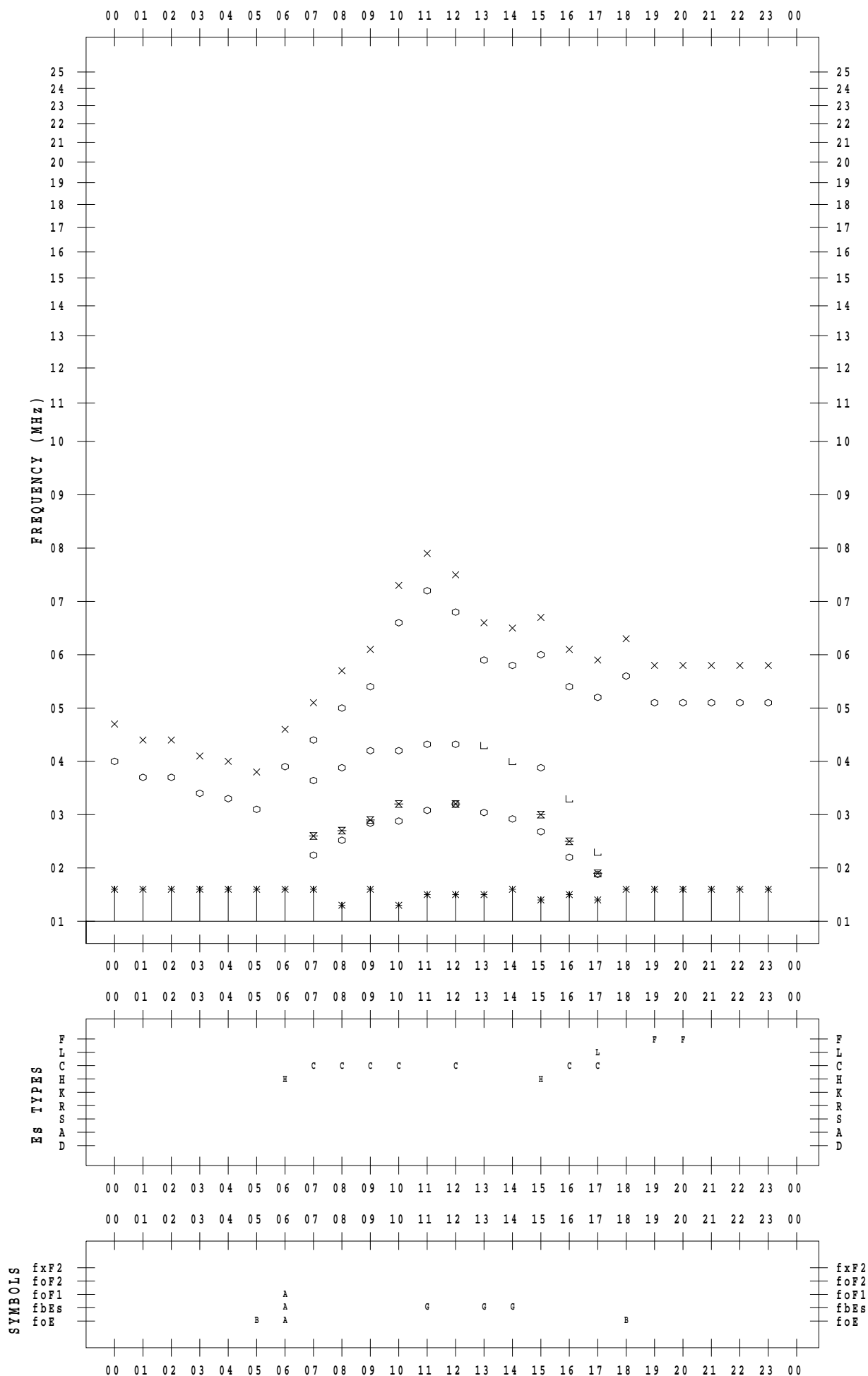
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 28

135 ° E MEAN TIME





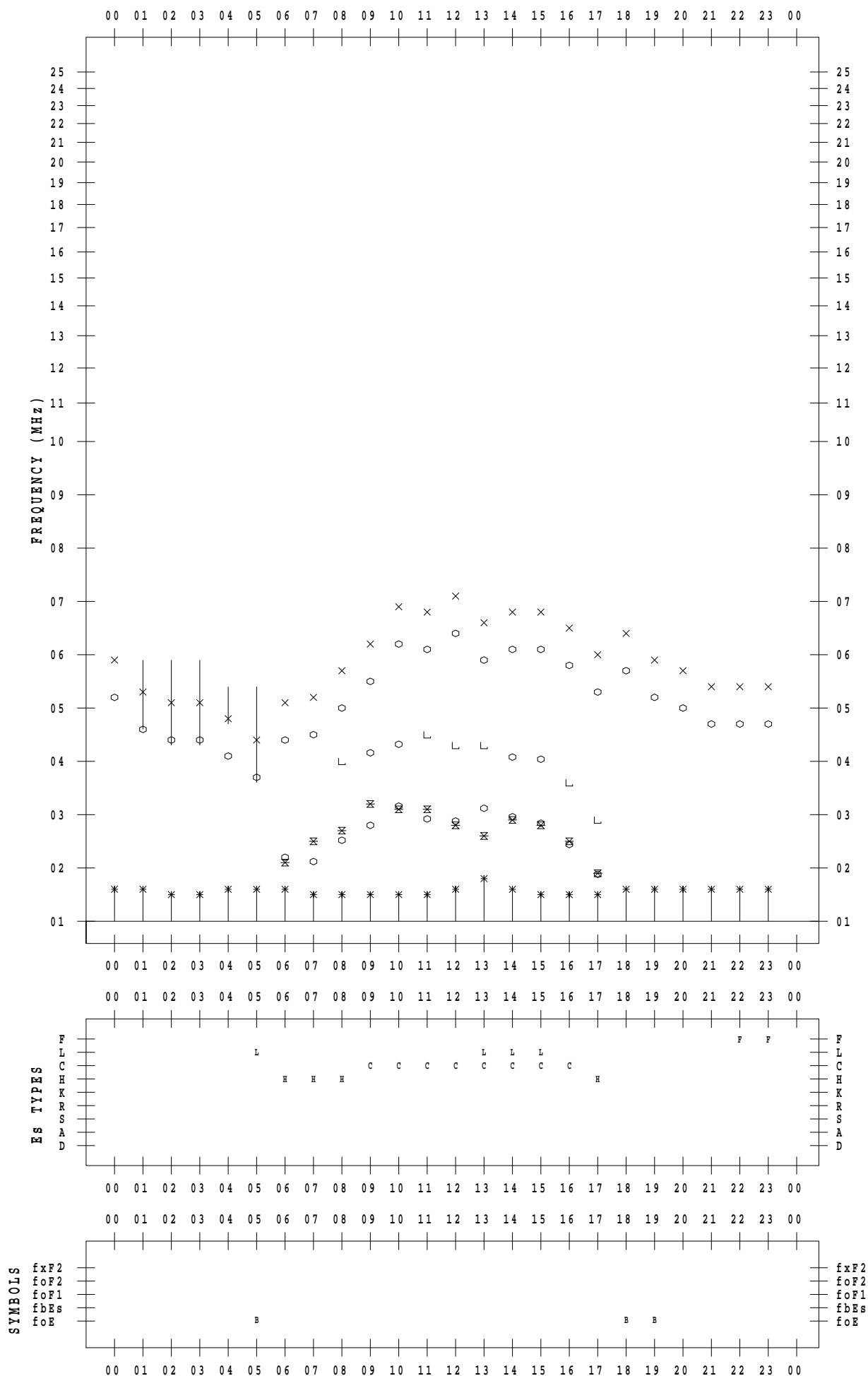
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 29

135 ° E MEAN TIME



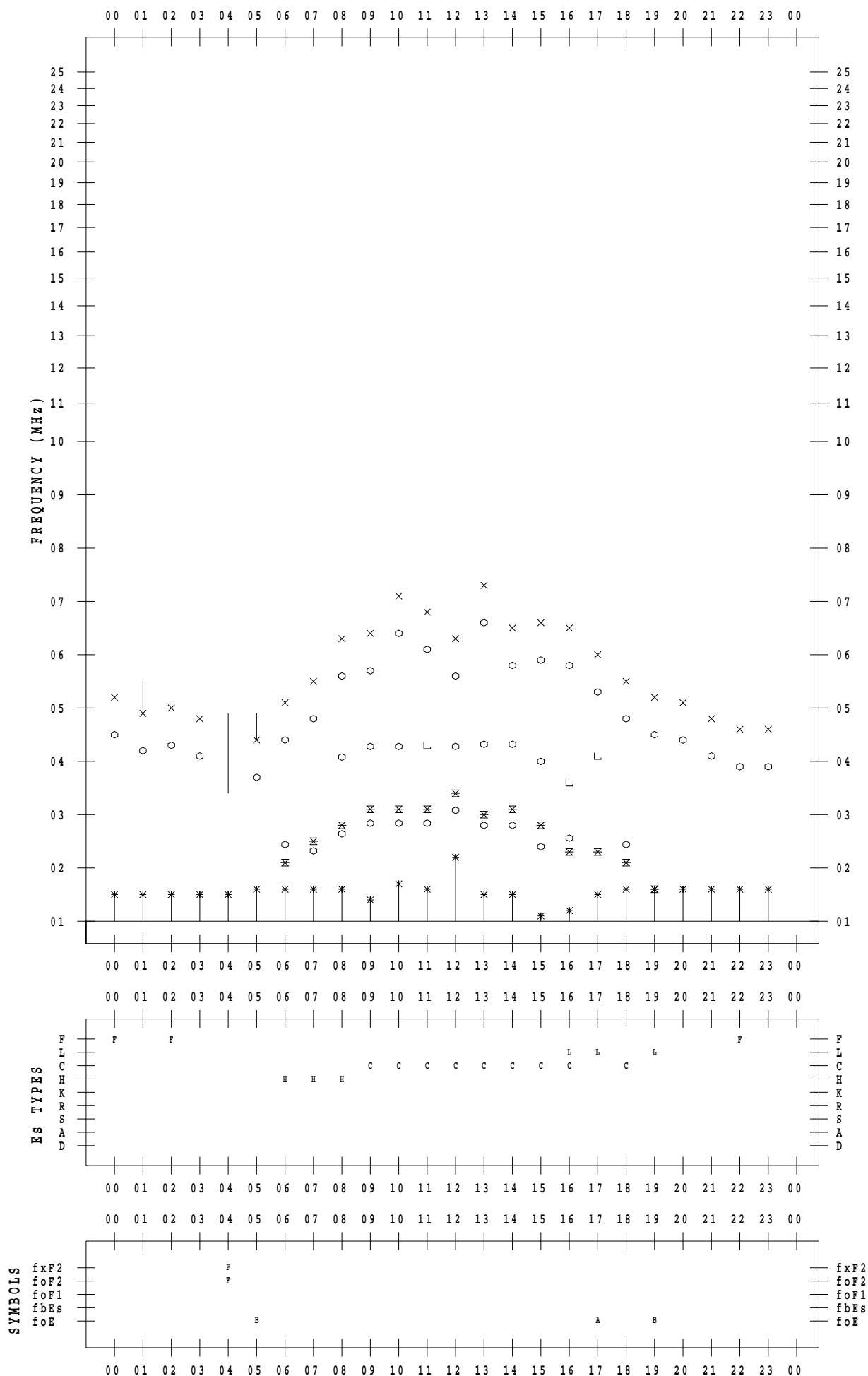
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 30

135 ° E MEAN TIME



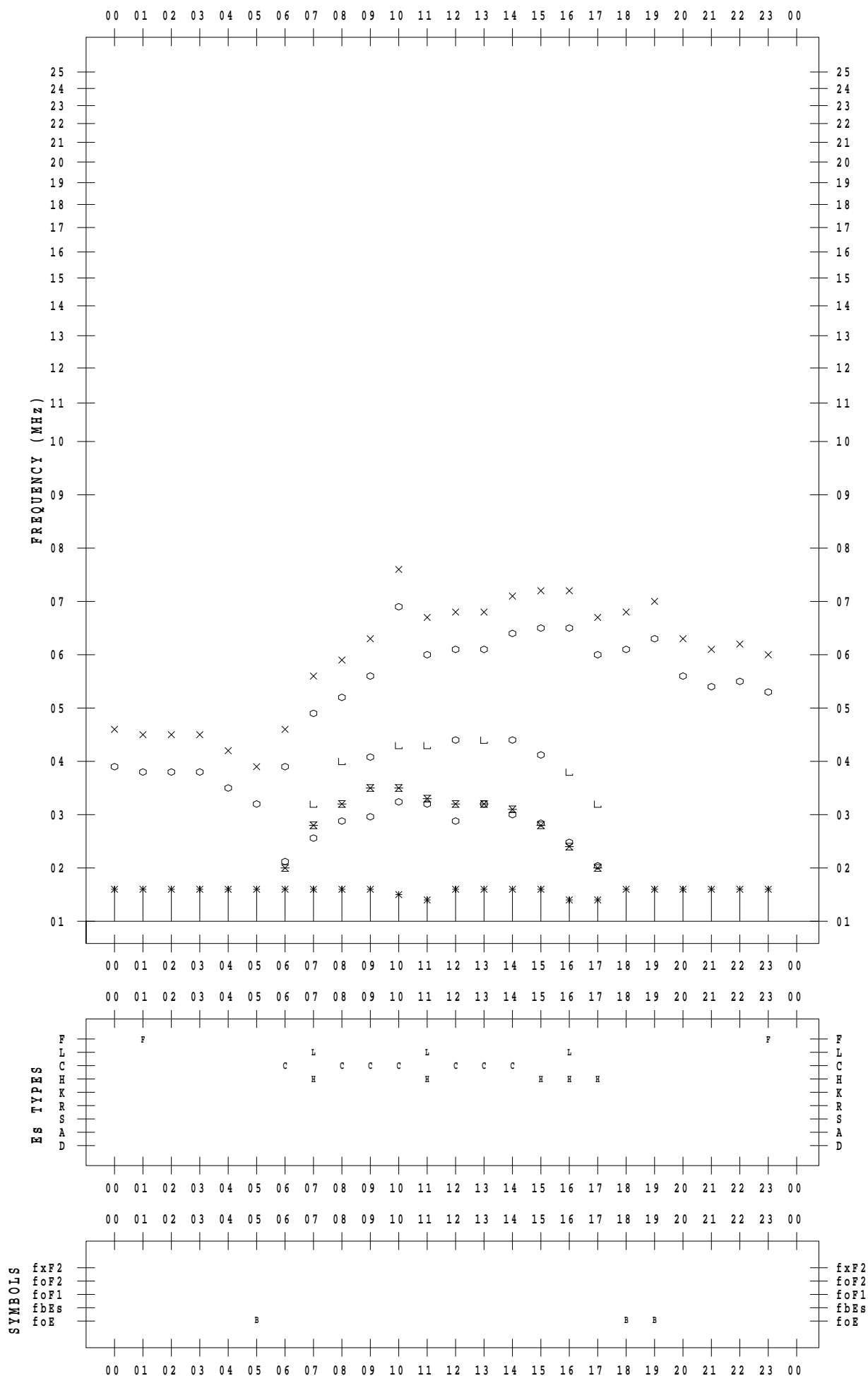
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 3 / 31

135 ° E MEAN TIME



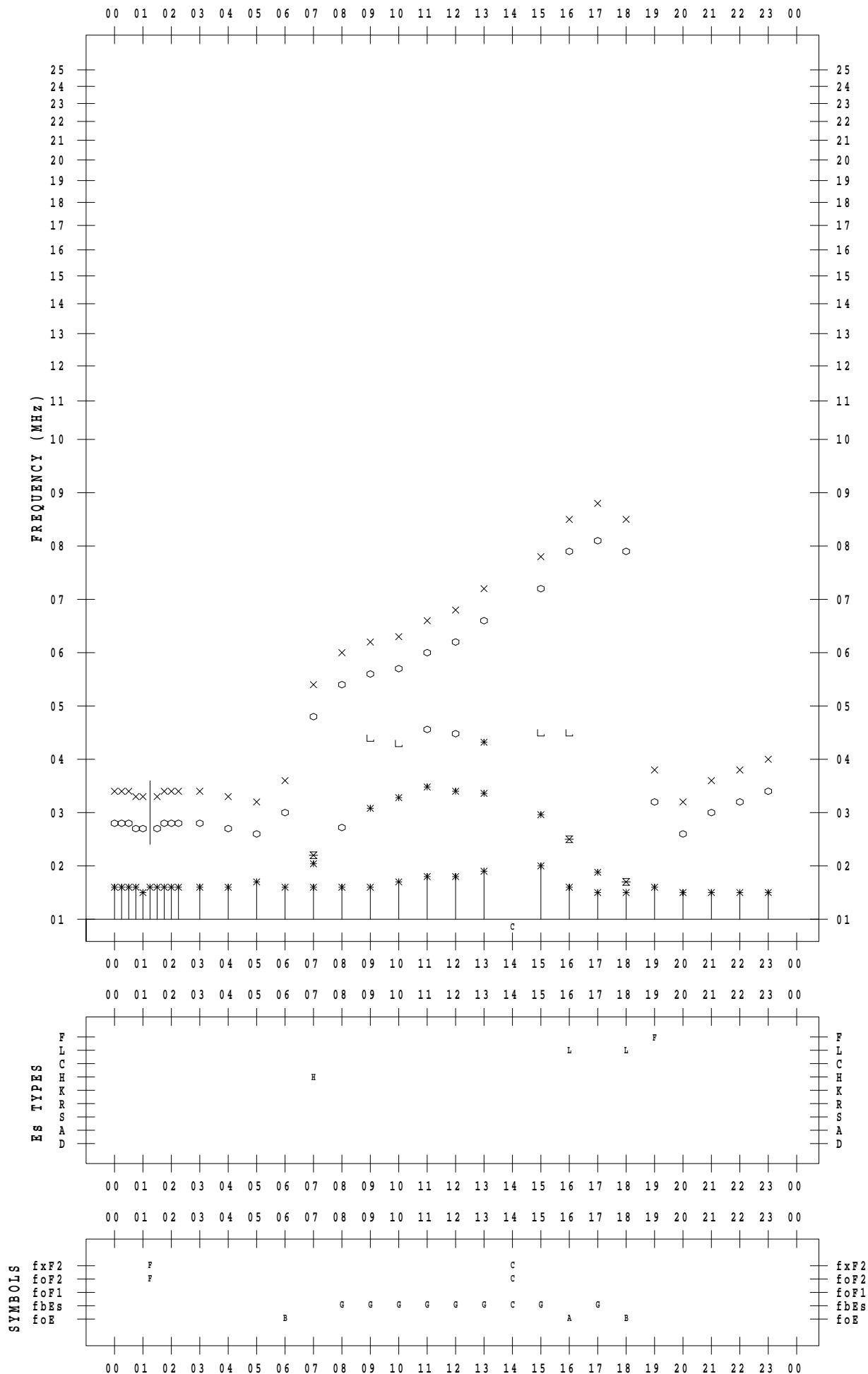
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 1

135 ° E MEAN TIME



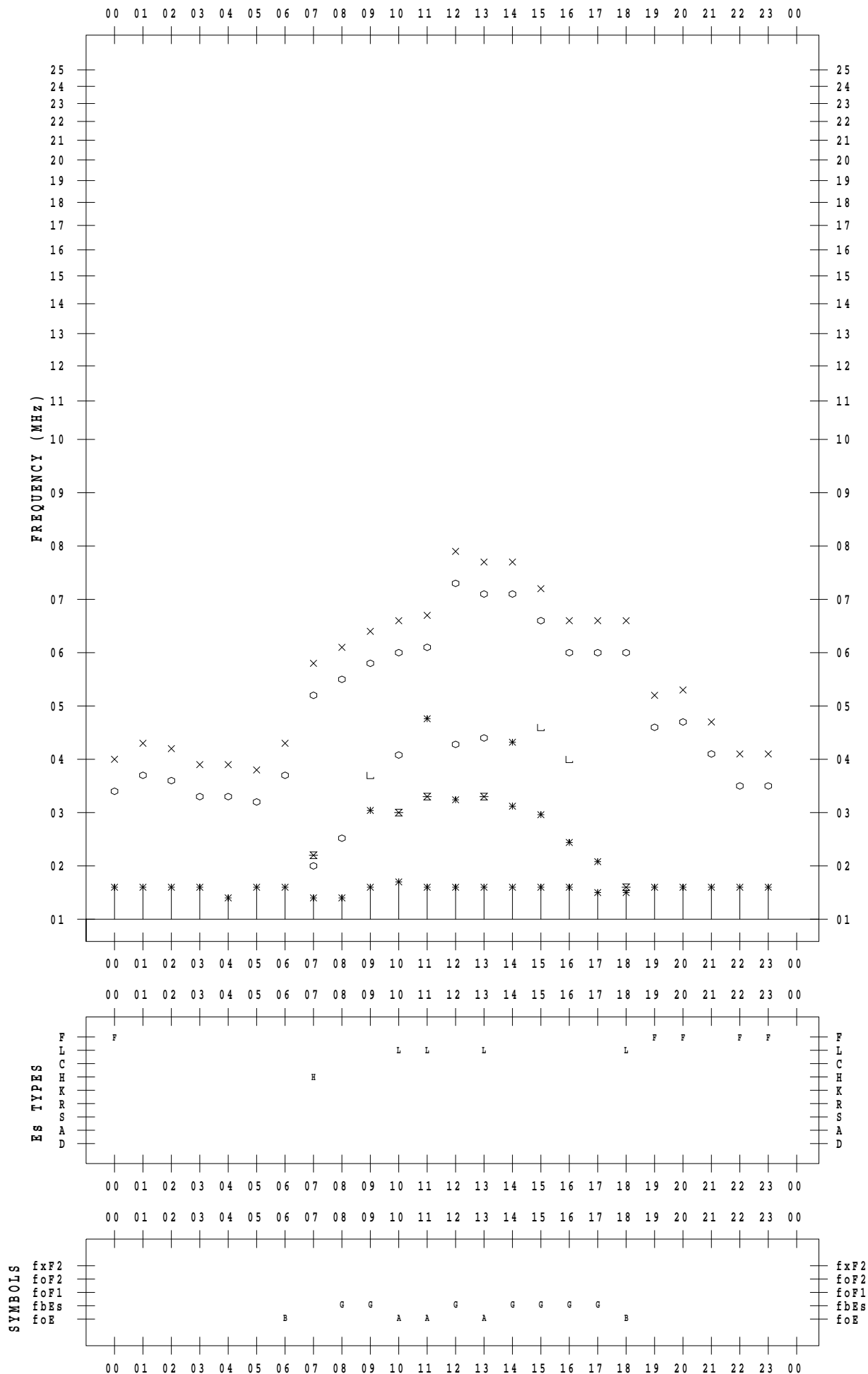
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 2

135 ° E MEAN TIME



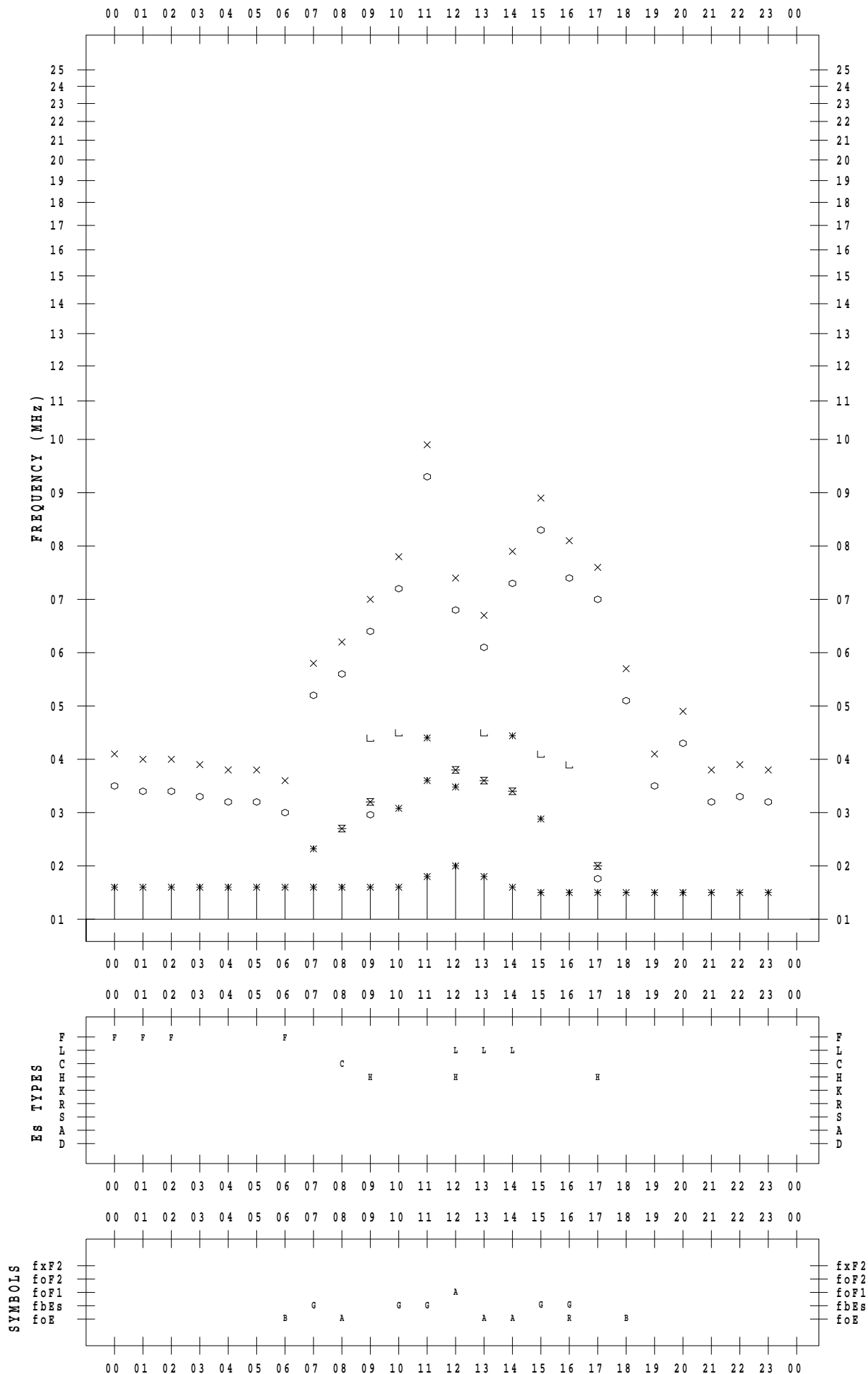
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 3

135 ° E MEAN TIME



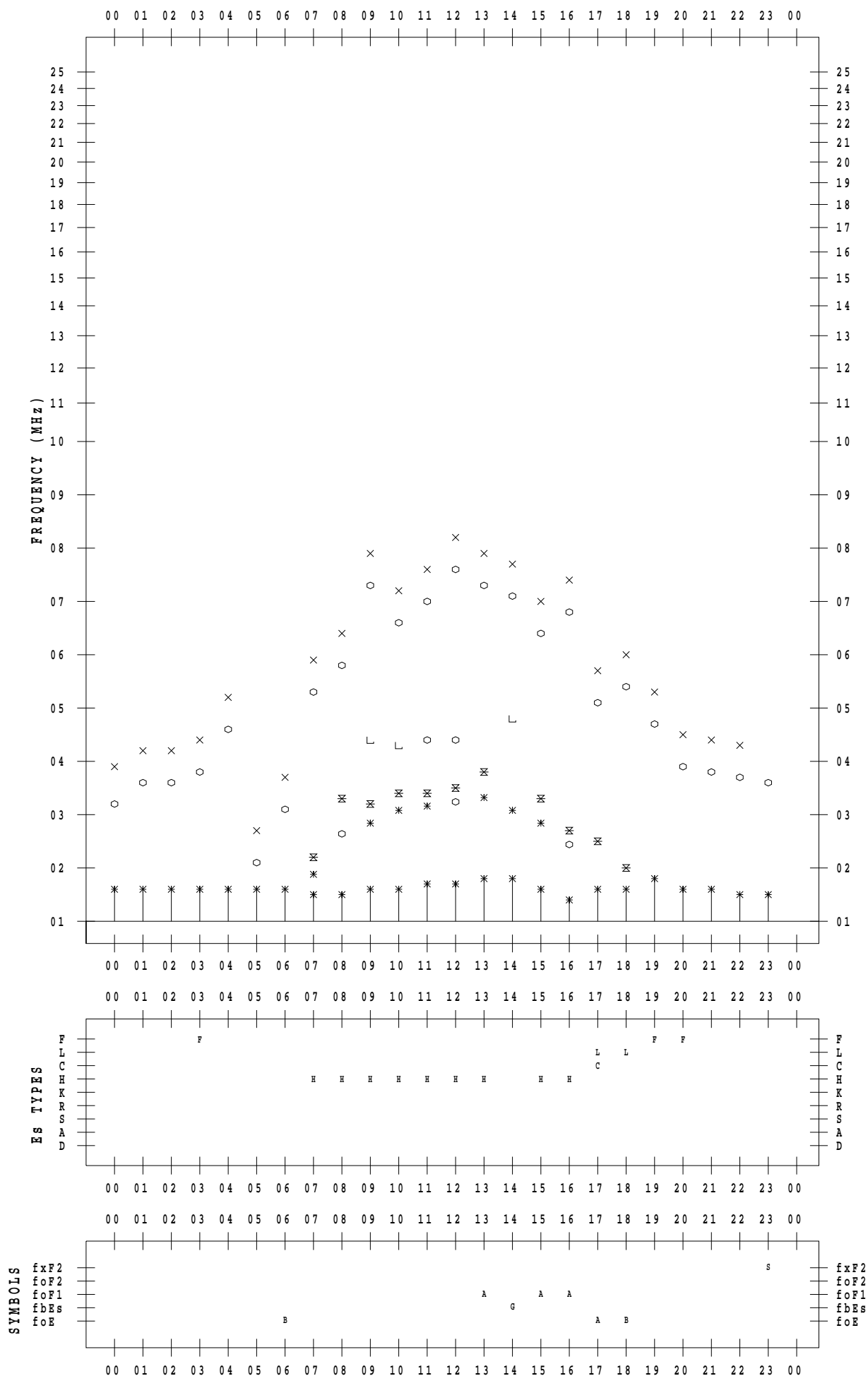
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 4

135 ° E MEAN TIME



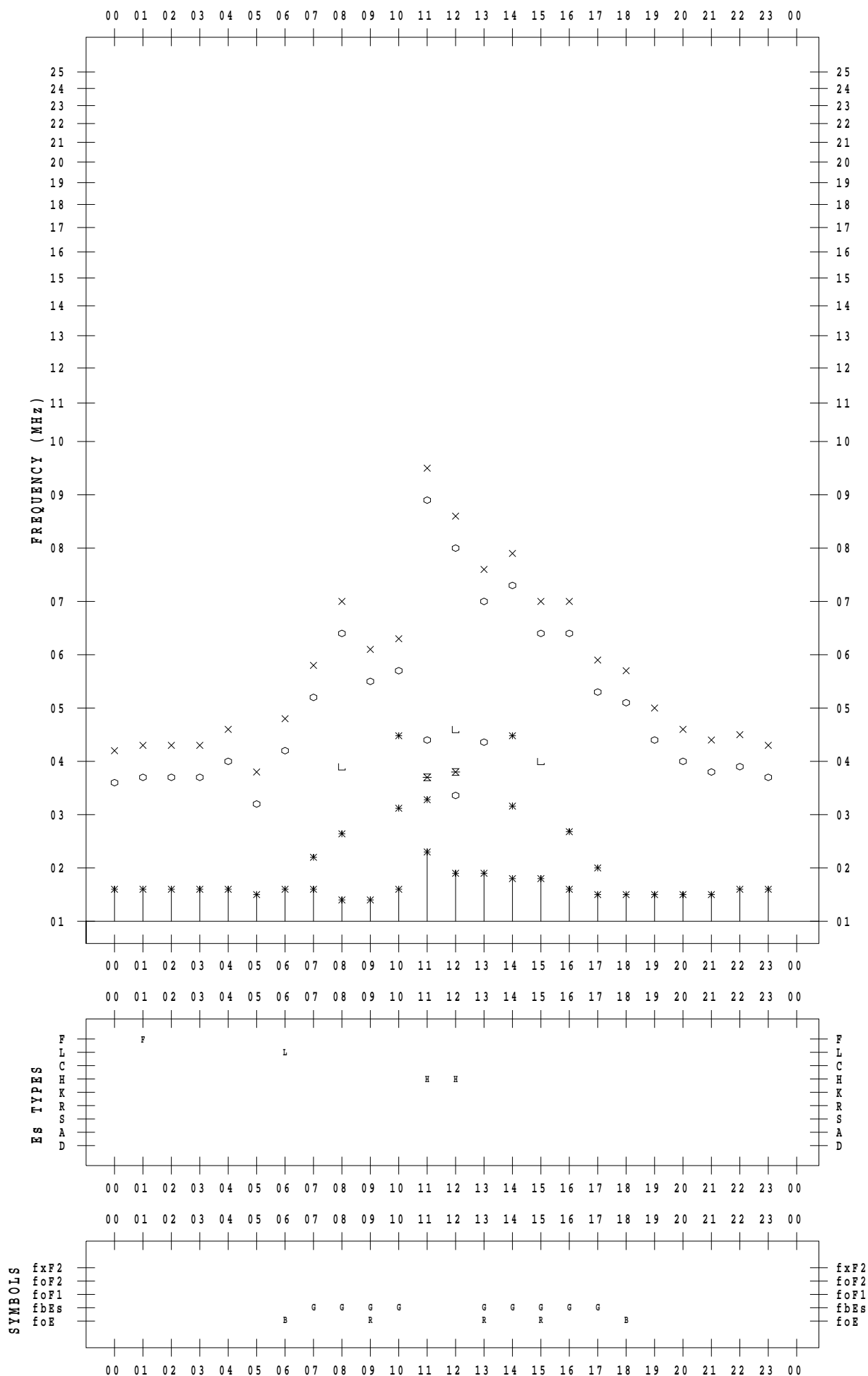
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 5

135 ° E MEAN TIME





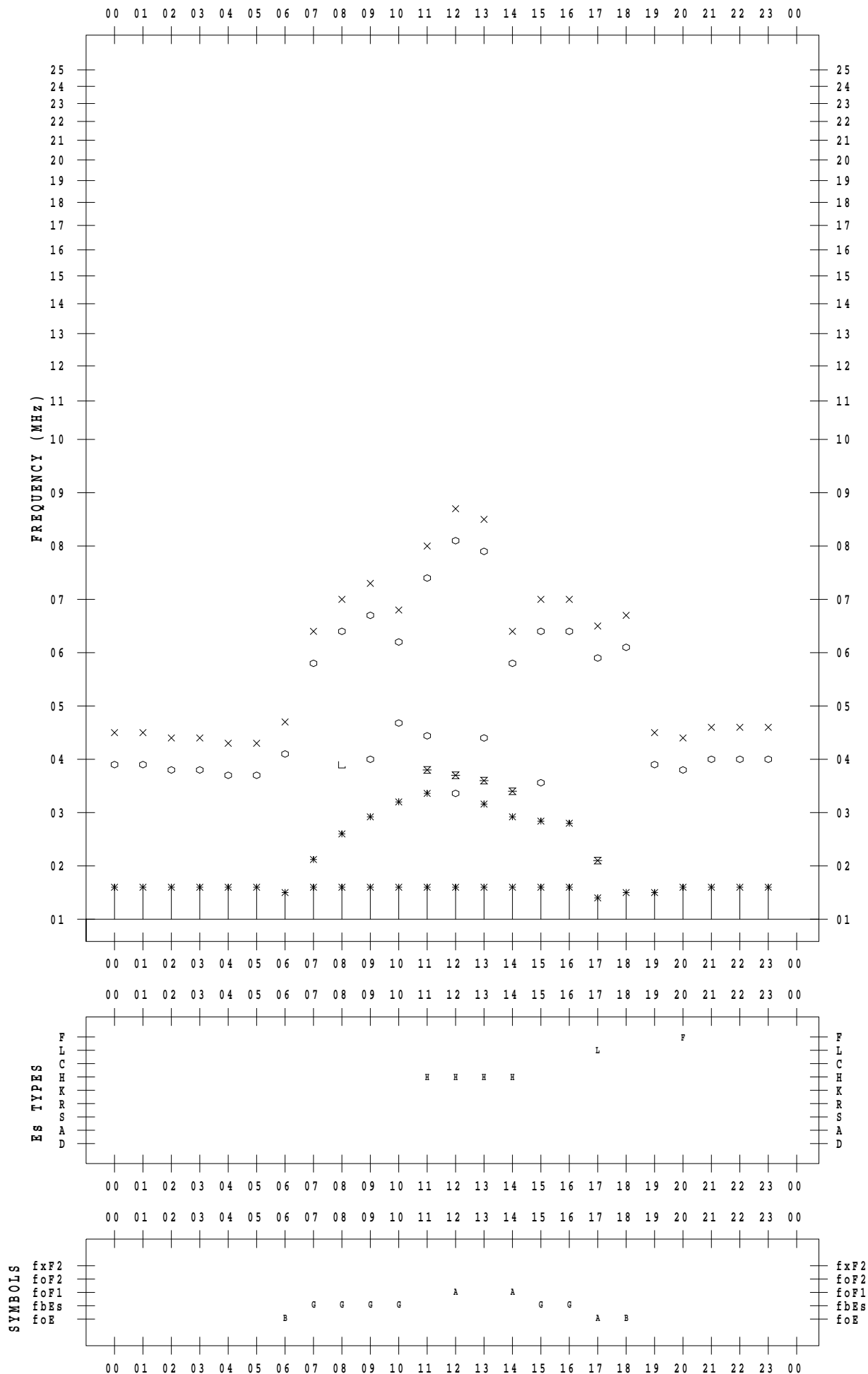
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 6

135 ° E MEAN TIME



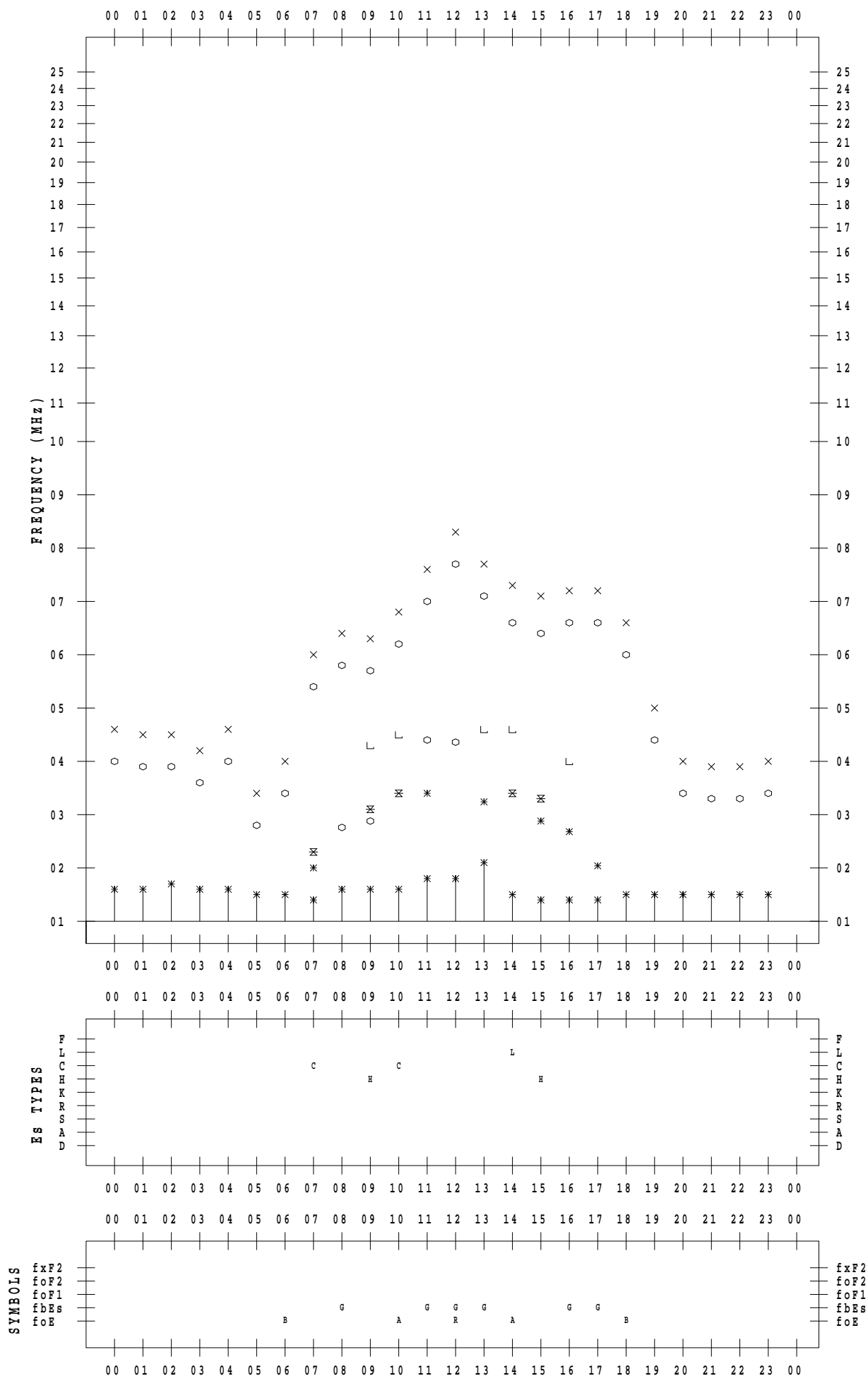
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 7

135 ° E MEAN TIME



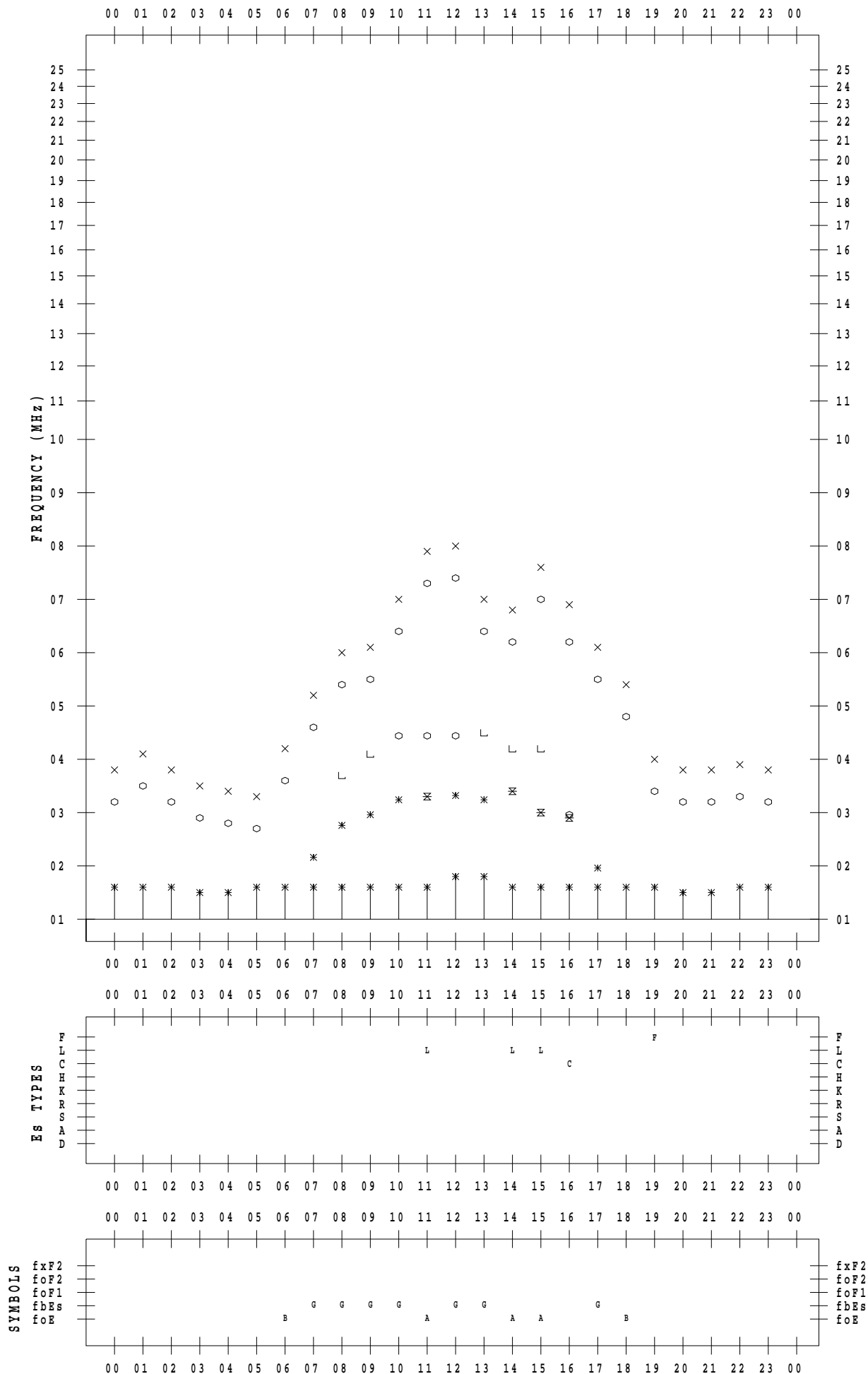
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 8

135 ° E MEAN TIME



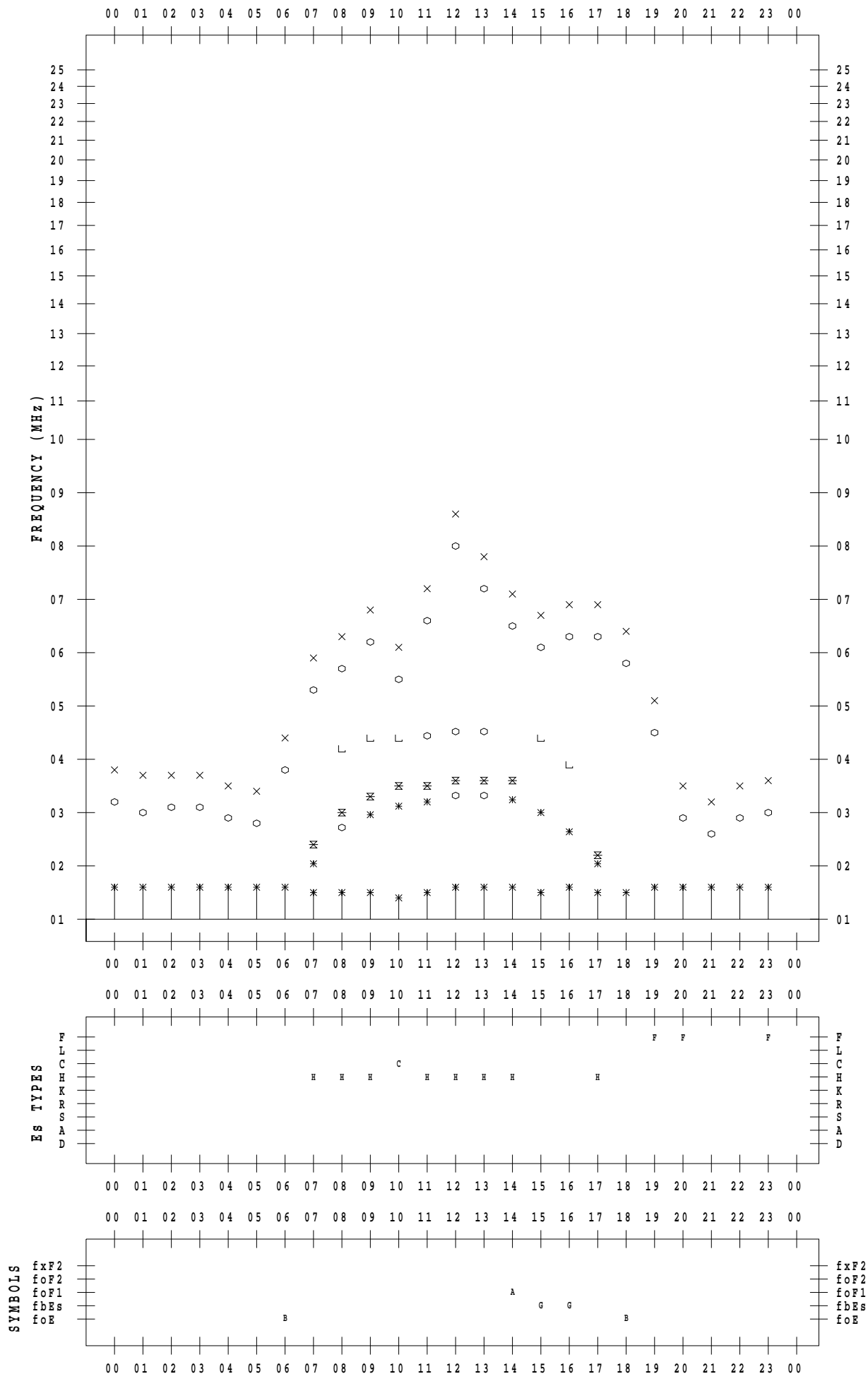
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 9

135 ° E MEAN TIME



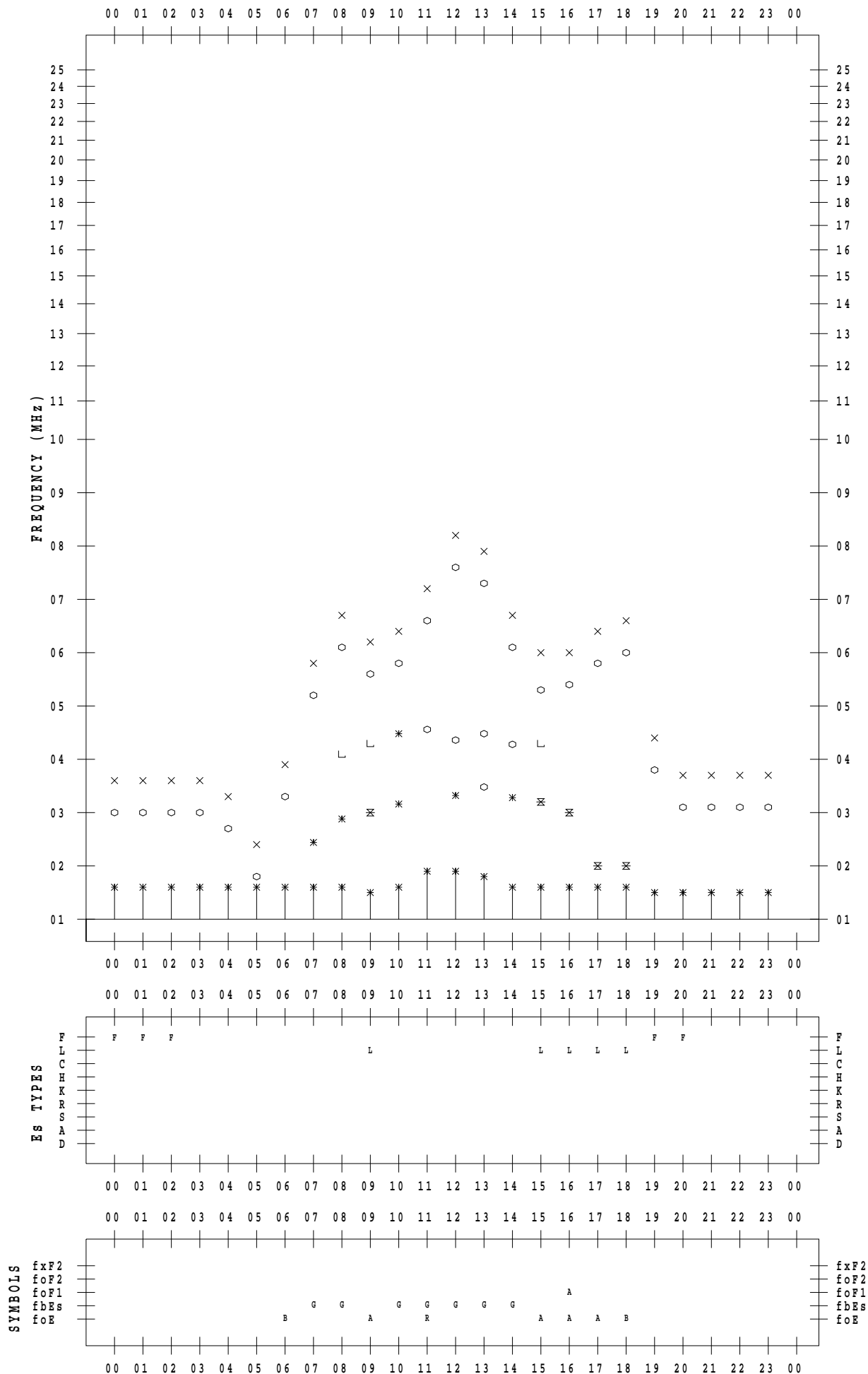
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 3/10

135 ° E MEAN TIME



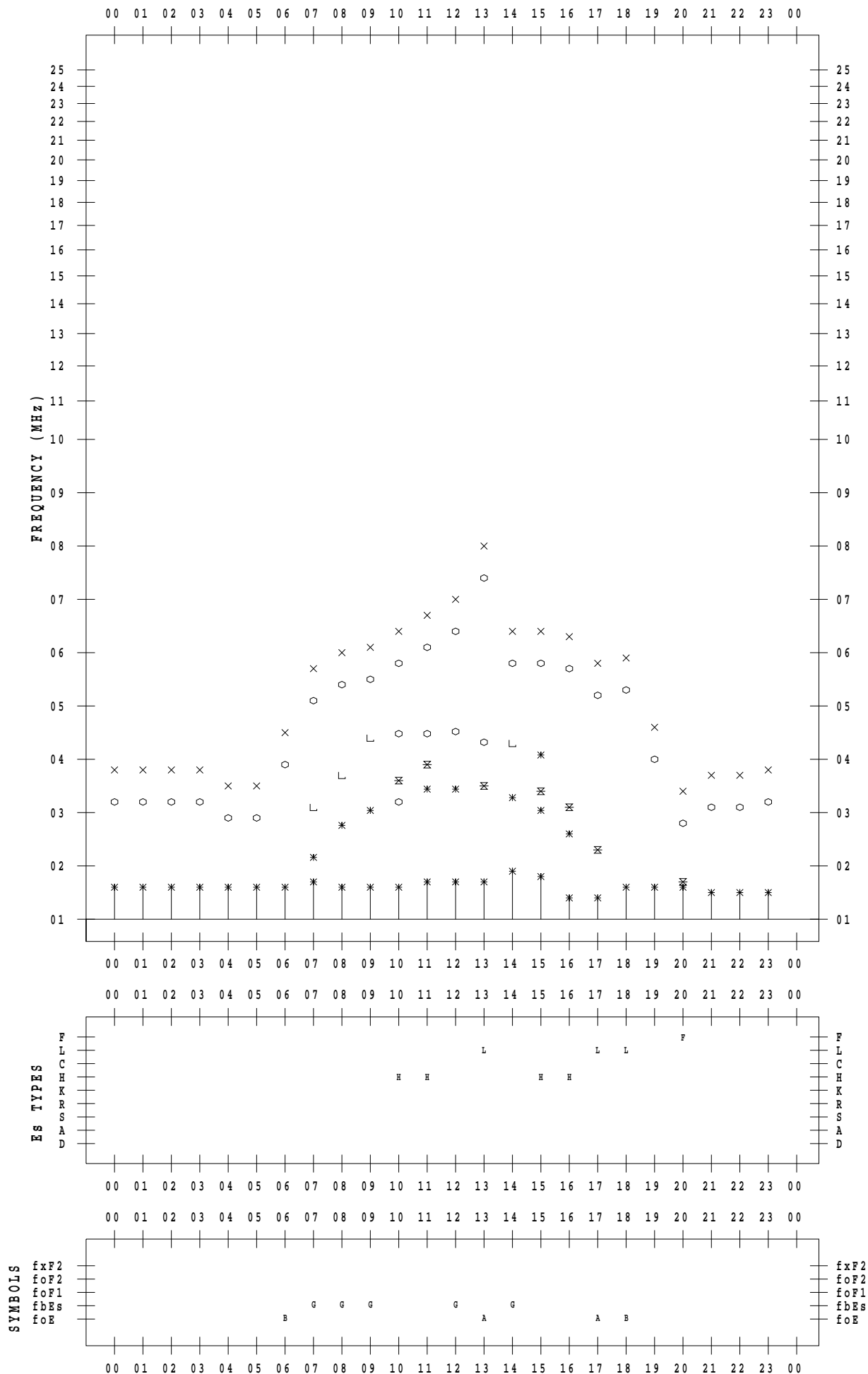
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 11

135 ° E MEAN TIME



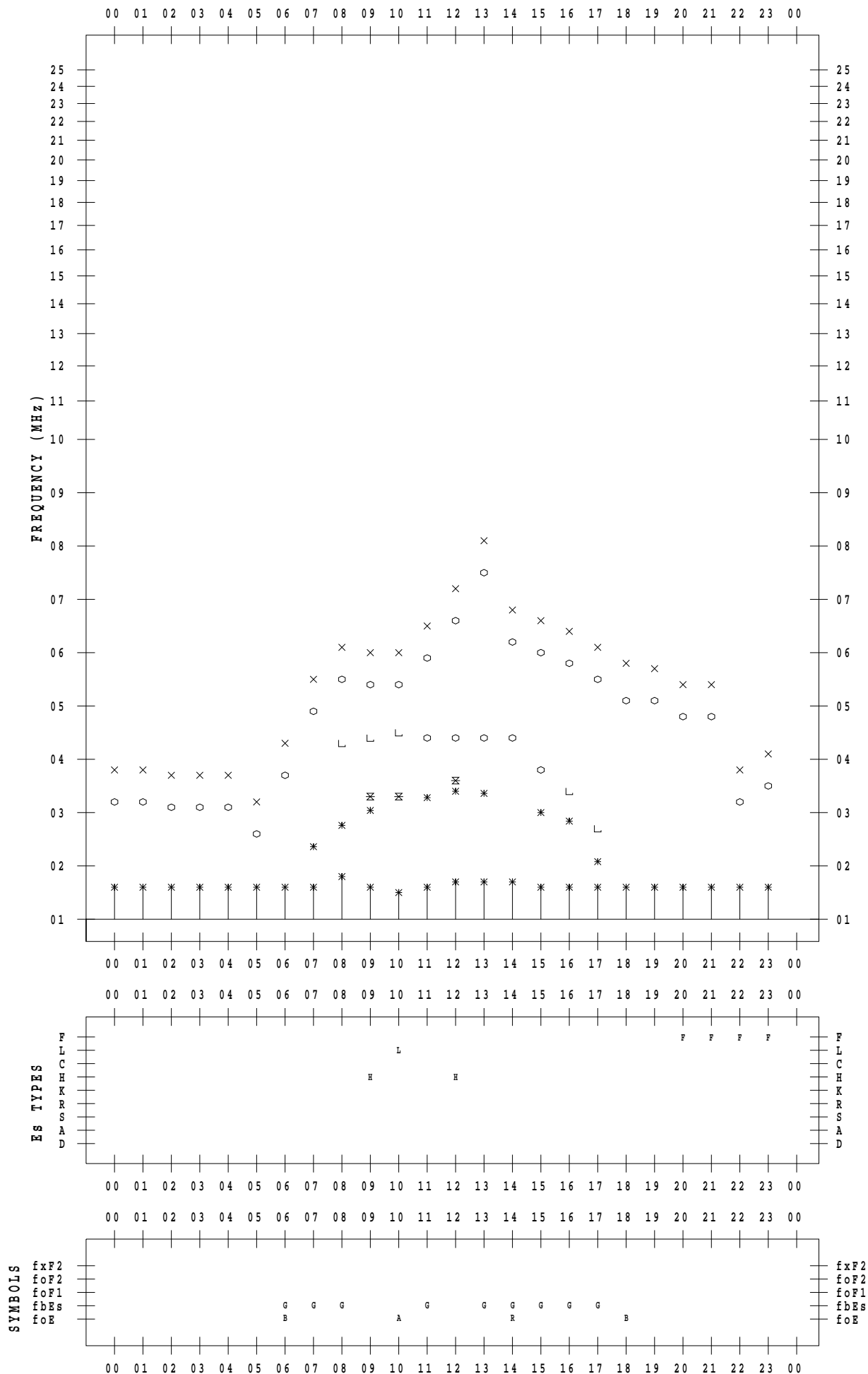
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 3/12

135 ° E MEAN TIME



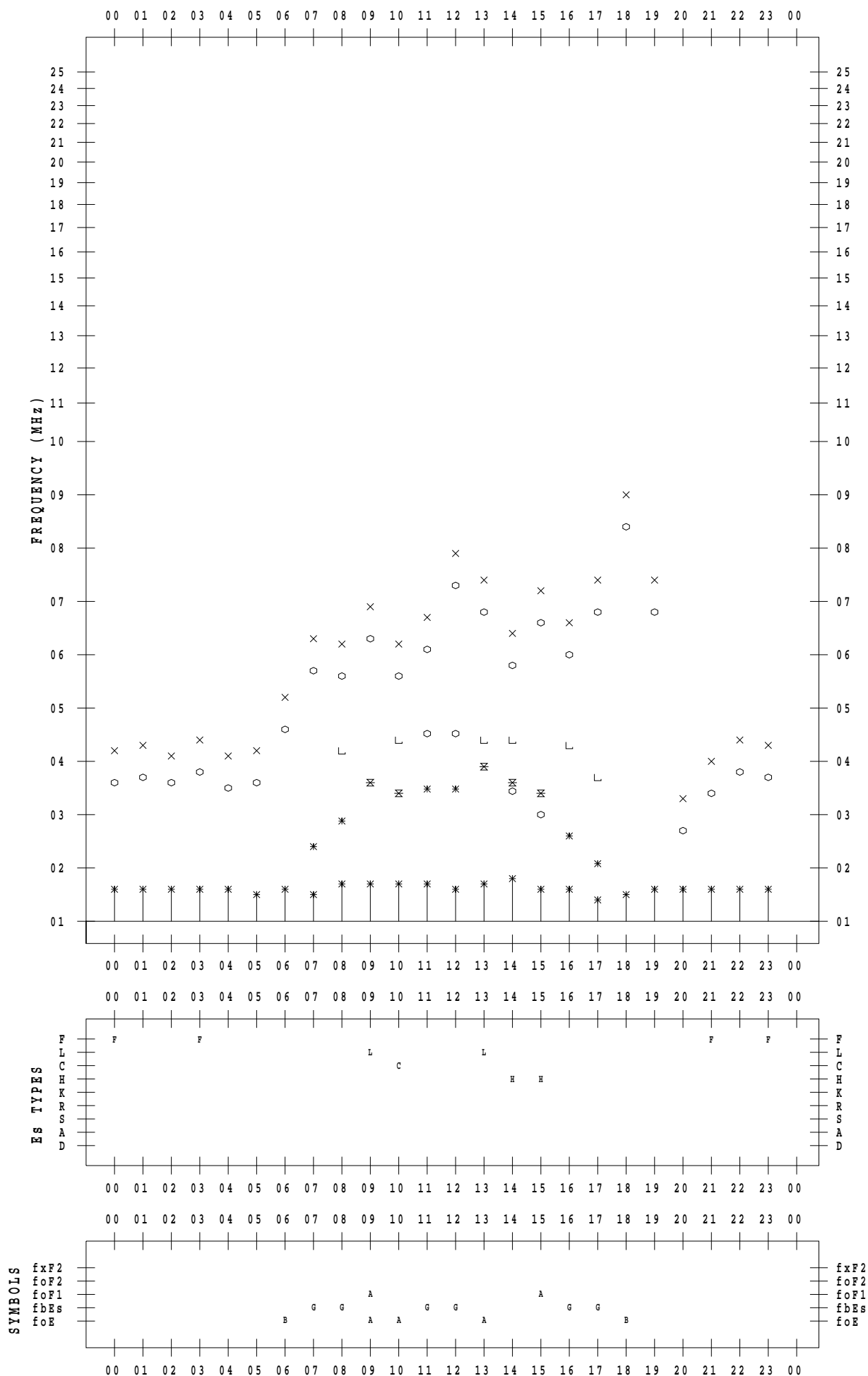
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 3/13

135 ° E MEAN TIME





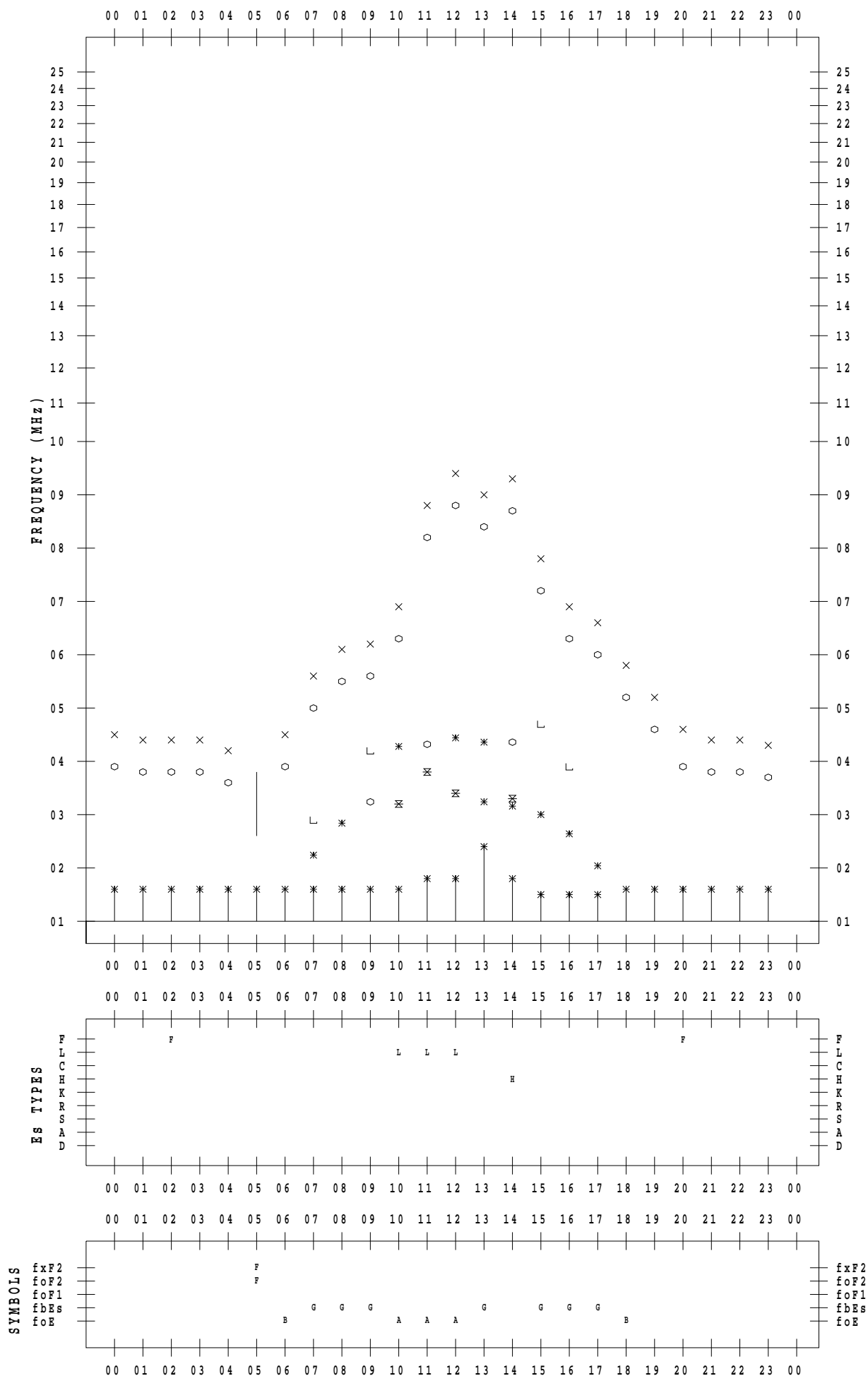
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 14

135 ° E MEAN TIME



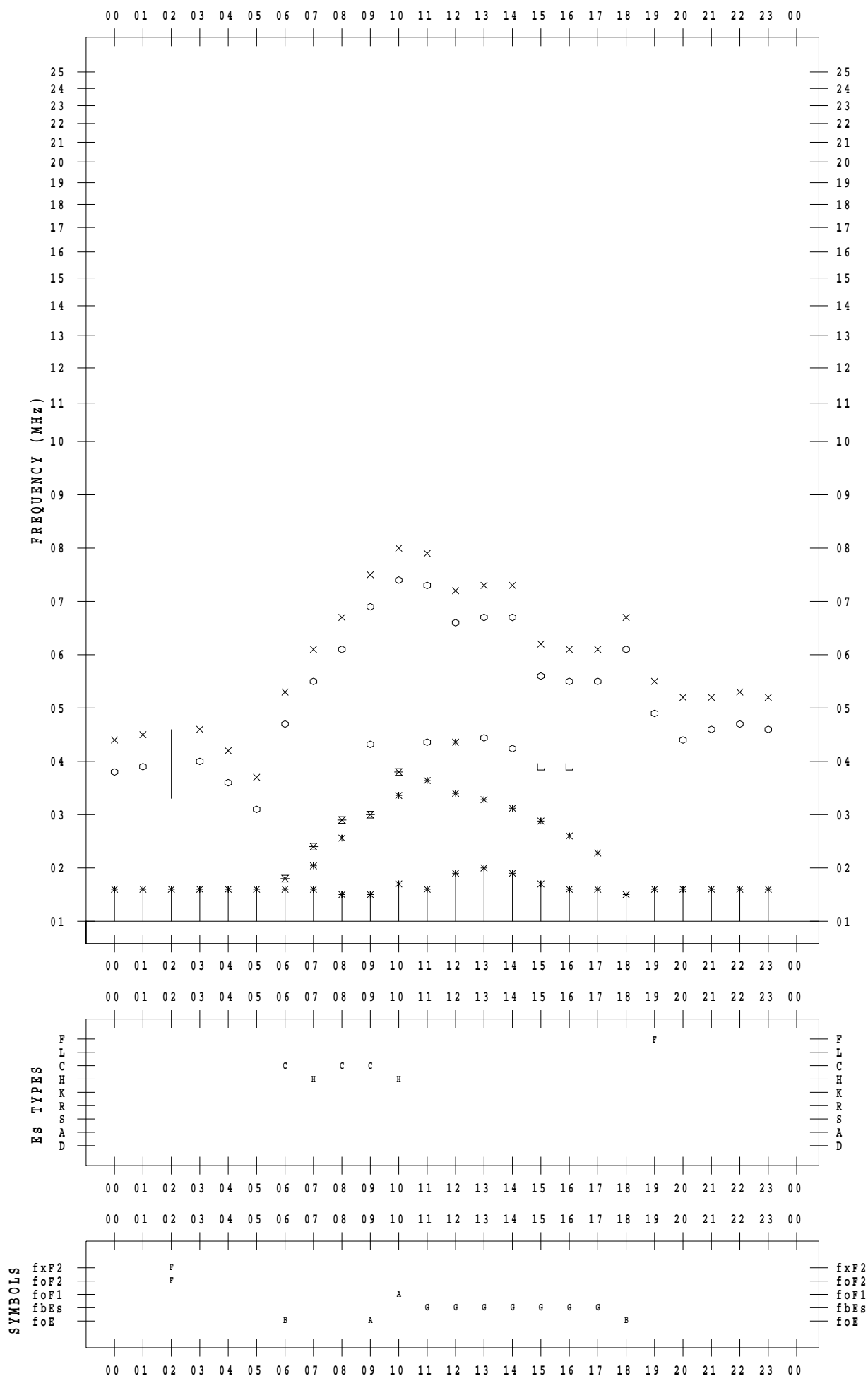
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 15

135 ° E MEAN TIME



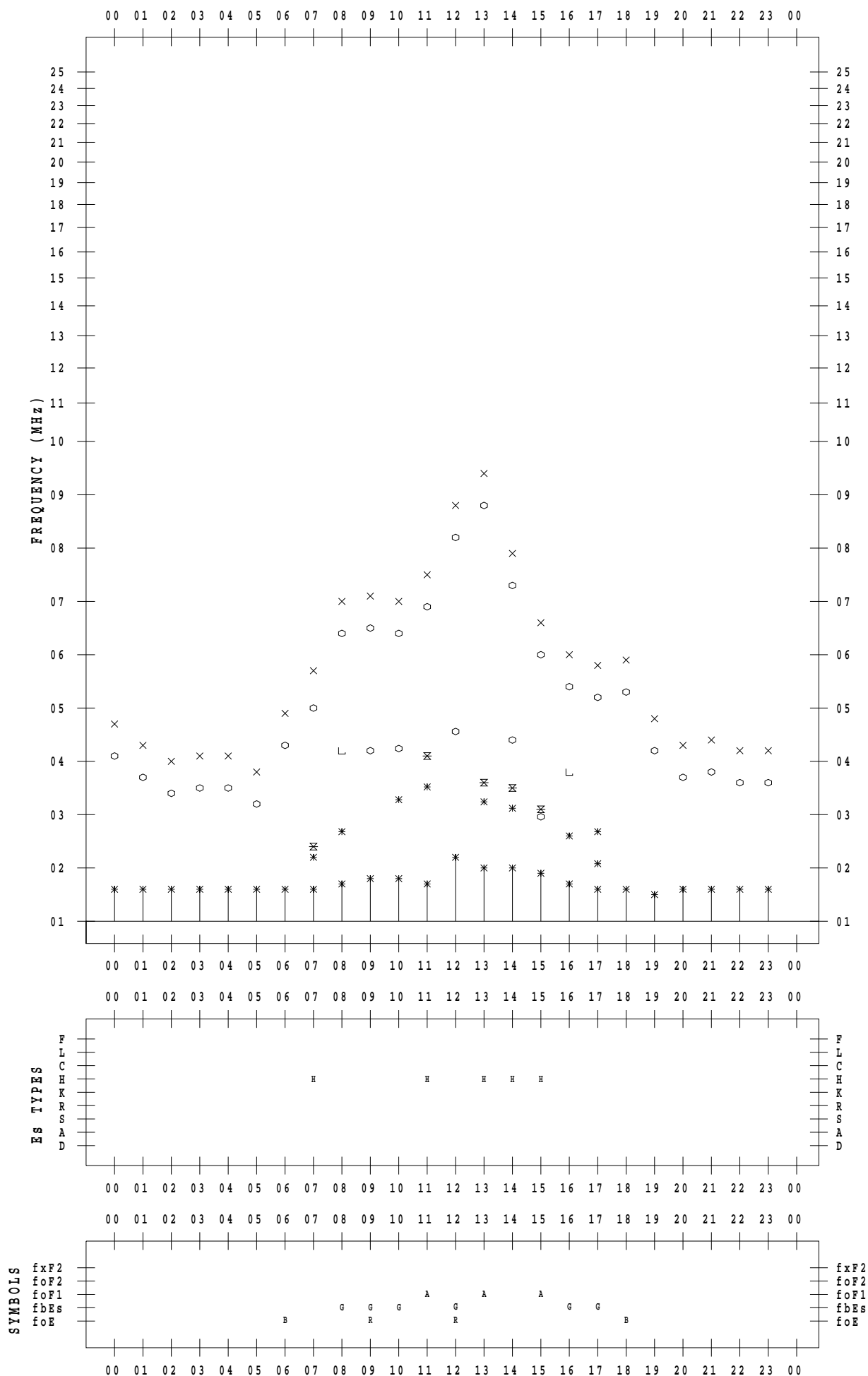
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 16

135 ° E MEAN TIME



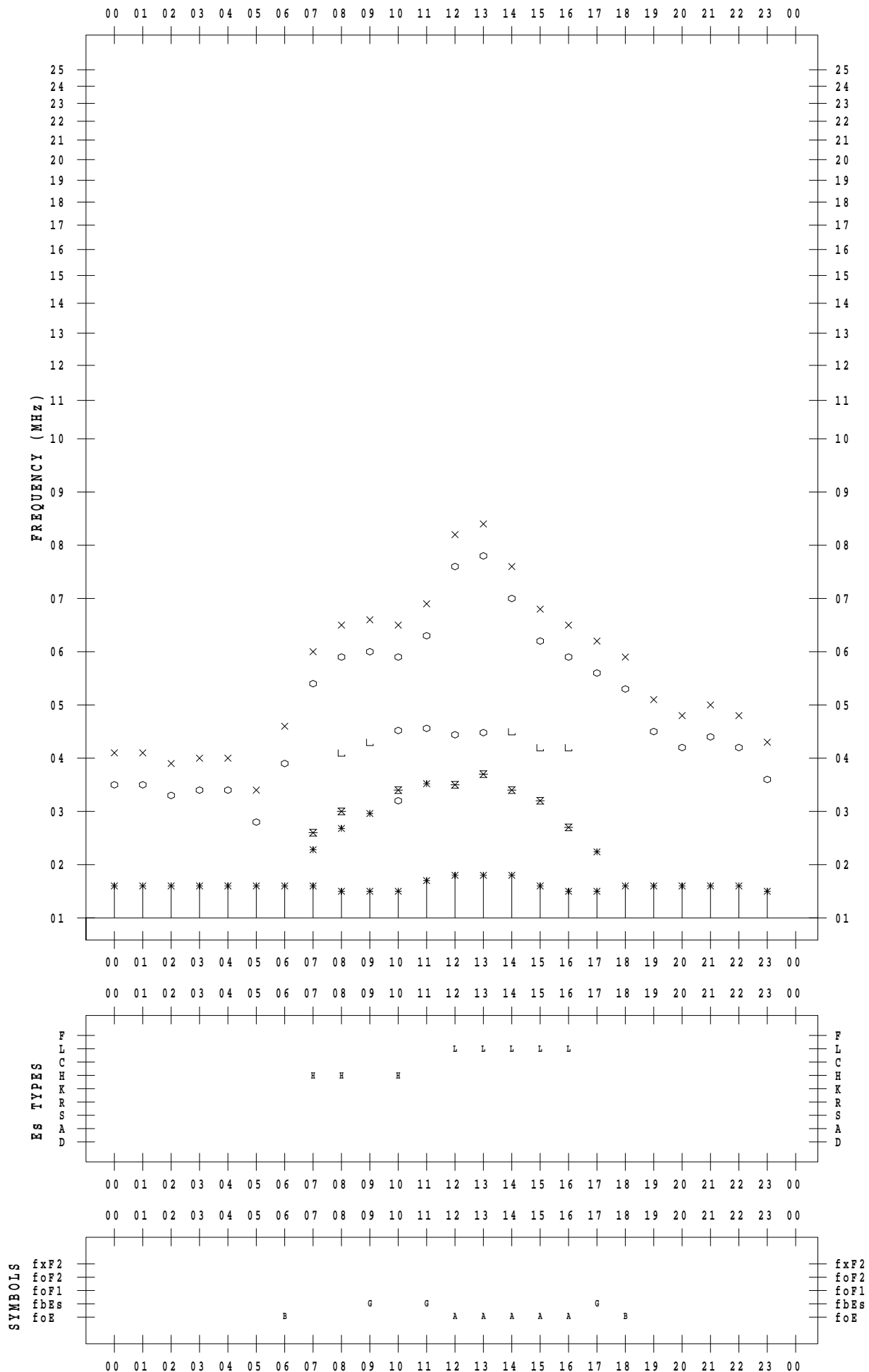
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 17

135 ° E MEAN TIME



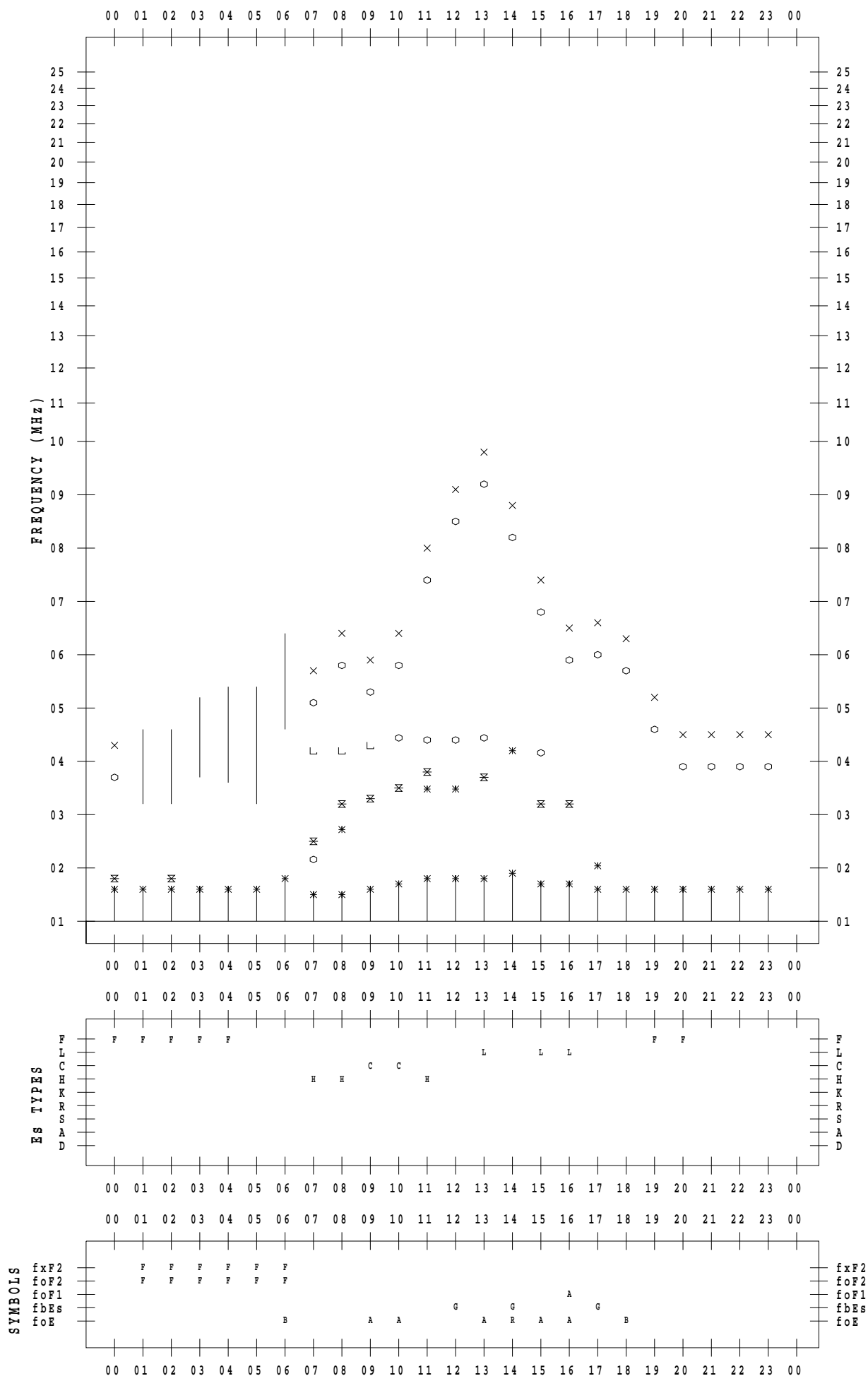
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 3/18

135 ° E MEAN TIME



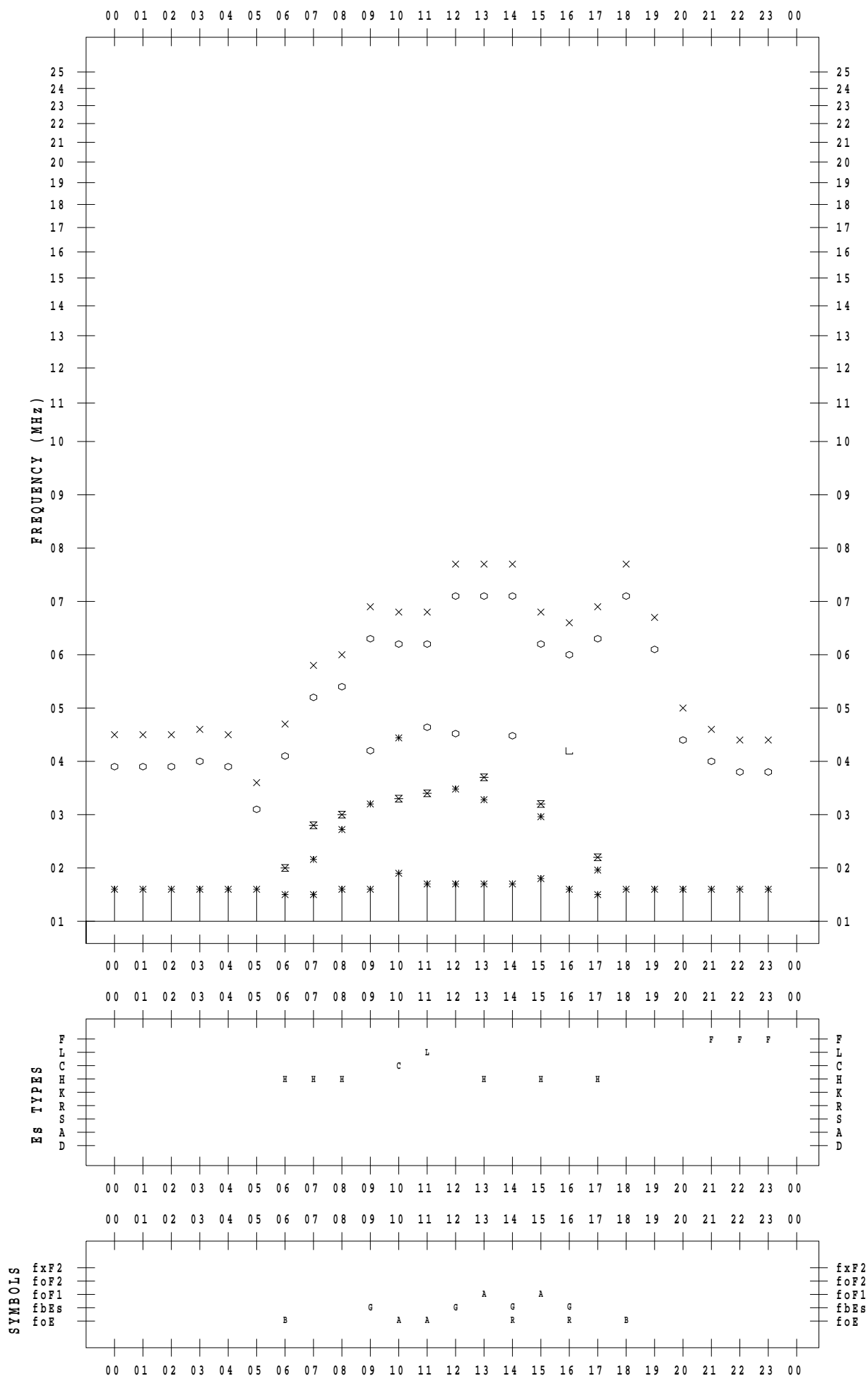
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 3/19

135 ° E MEAN TIME



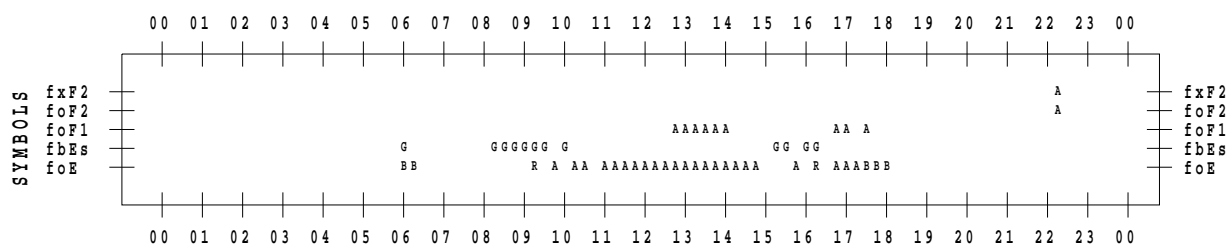
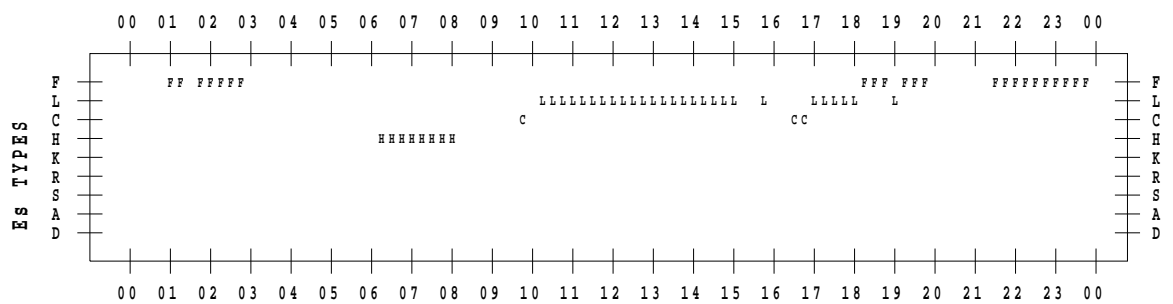
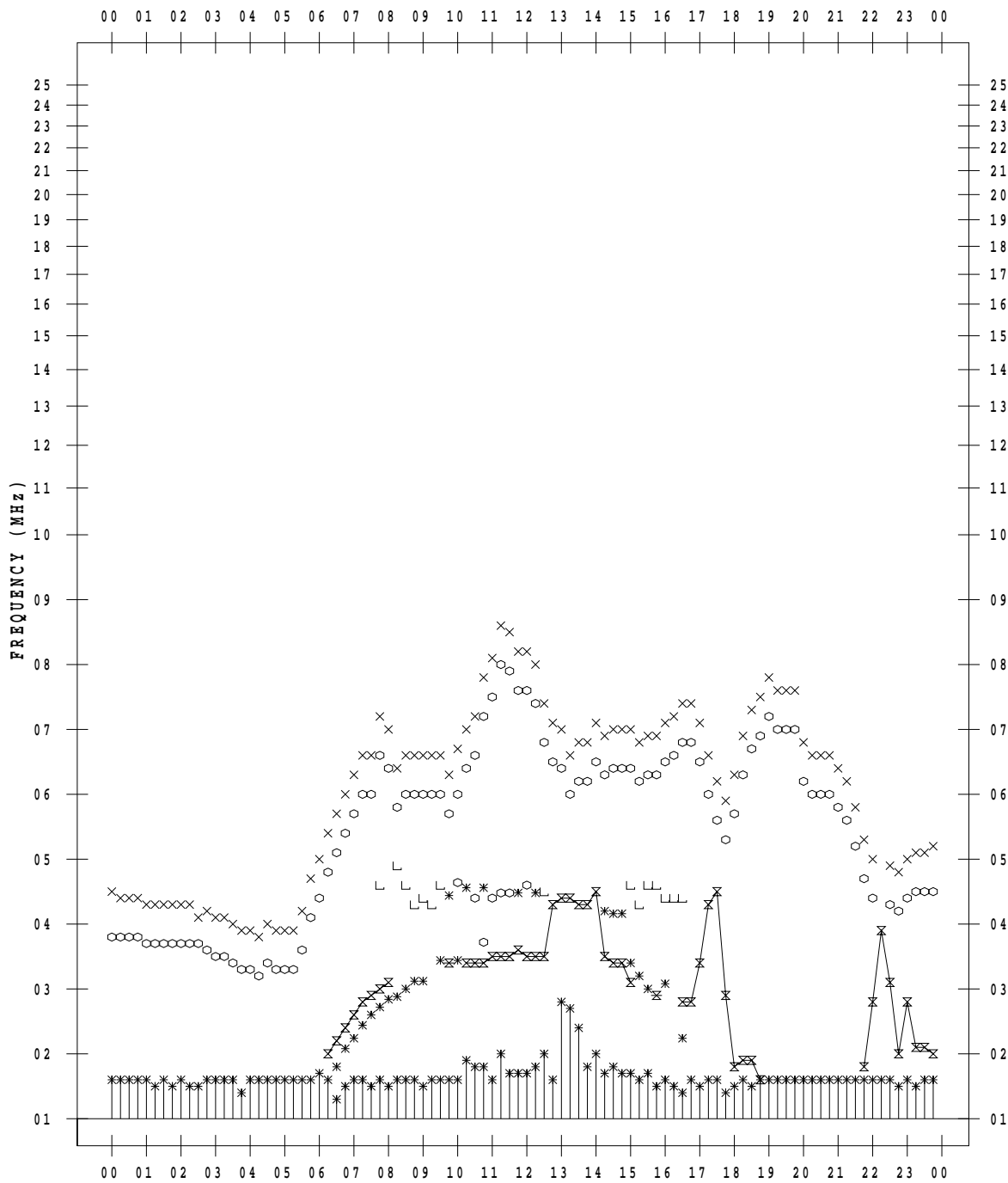
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 20

135 ° E MEAN TIME



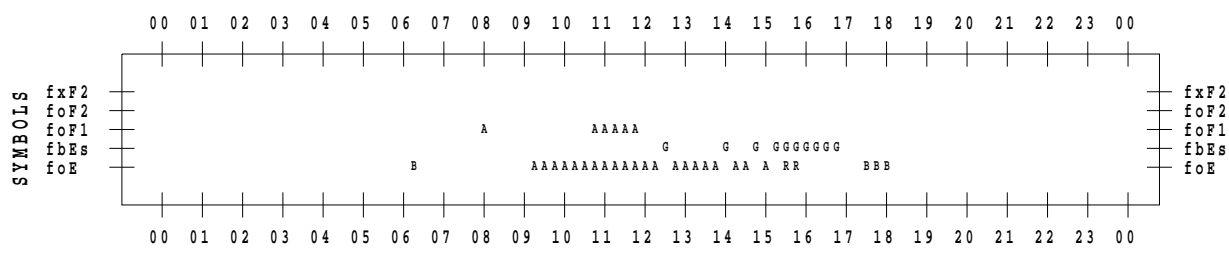
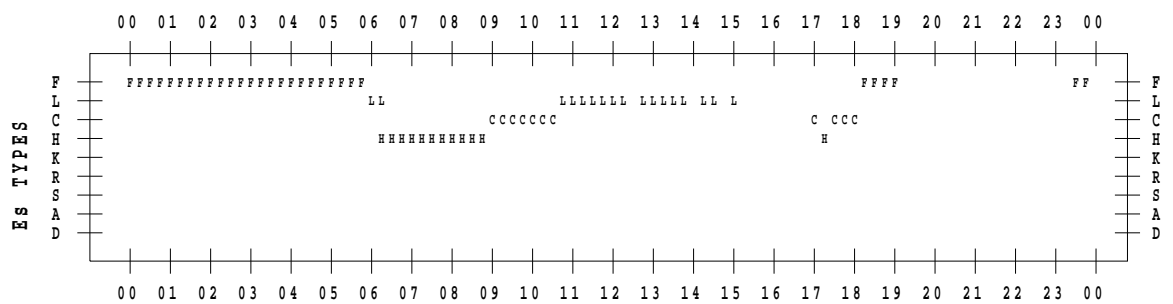
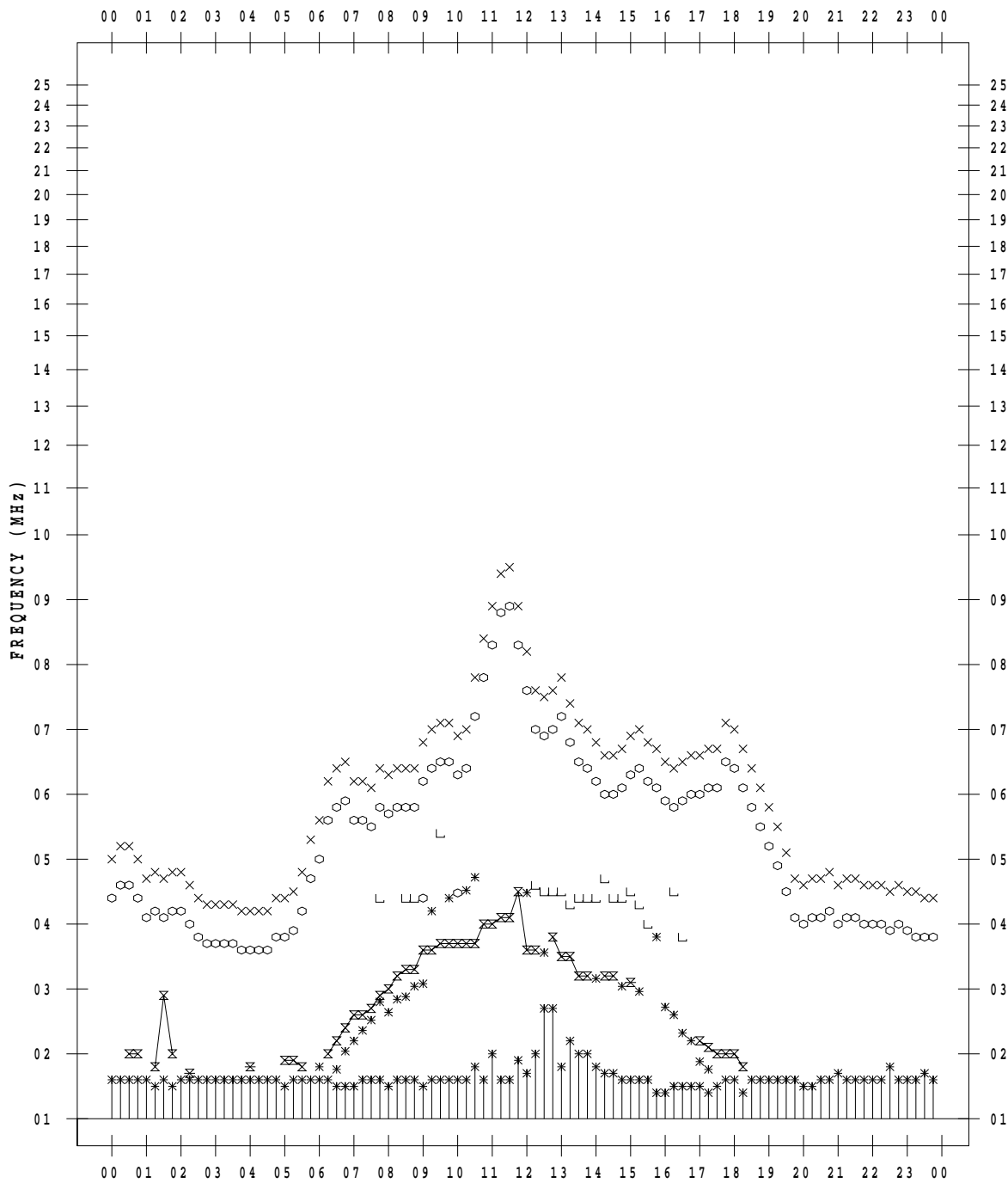
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 3/21

135 ° E MEAN TIME





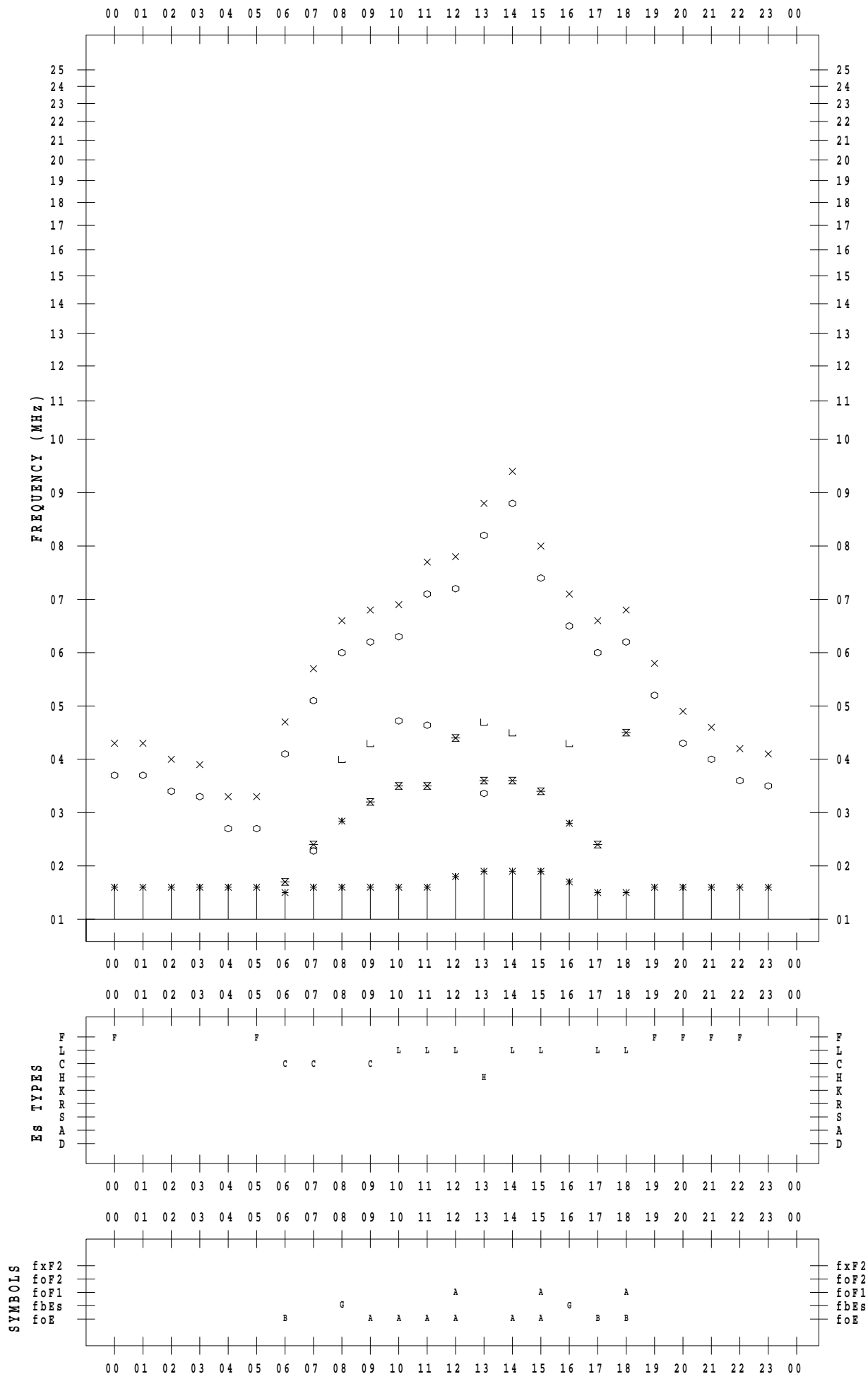
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 22

135 ° E MEAN TIME



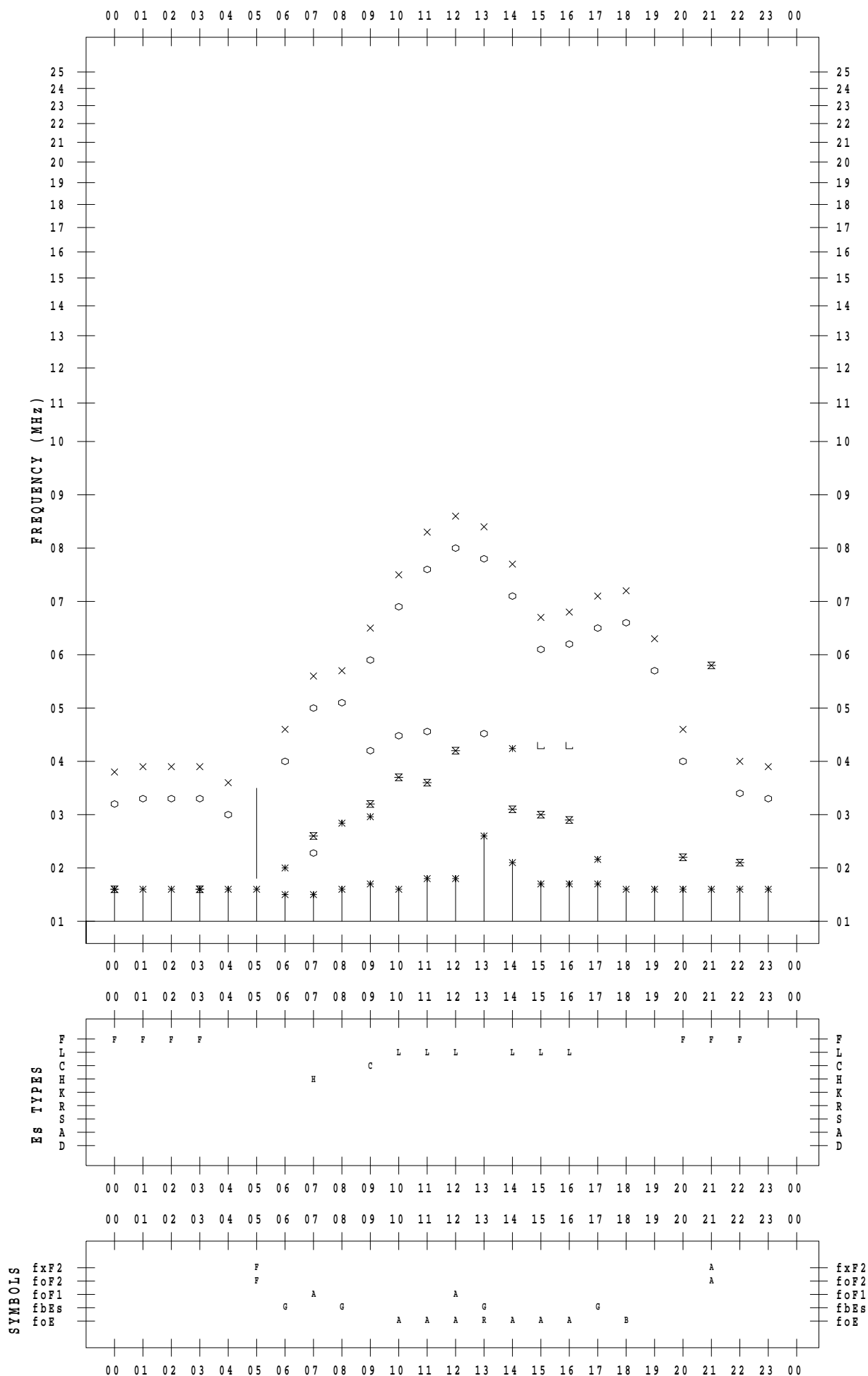
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 23

135 ° E MEAN TIME



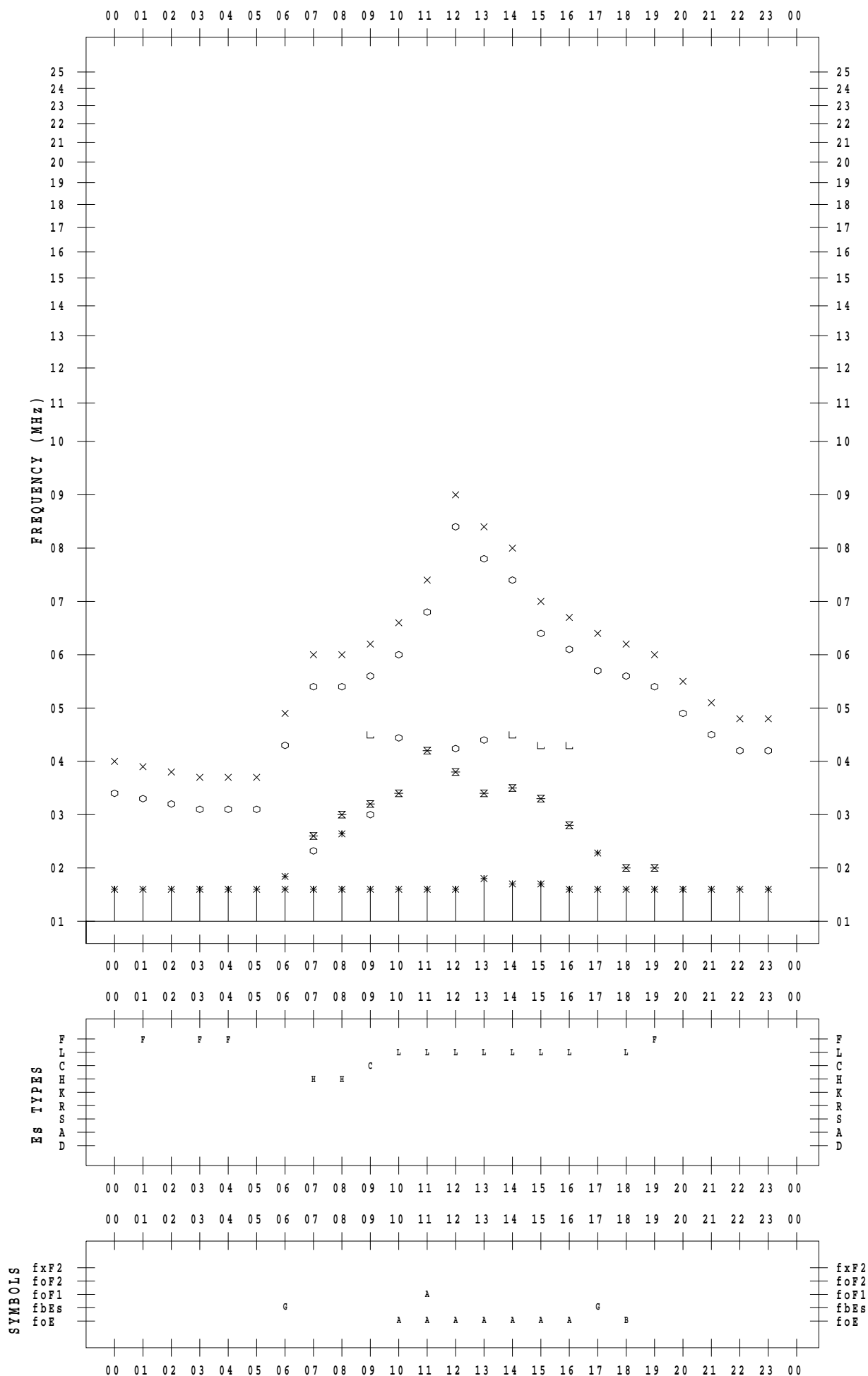
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 24

135 ° E MEAN TIME



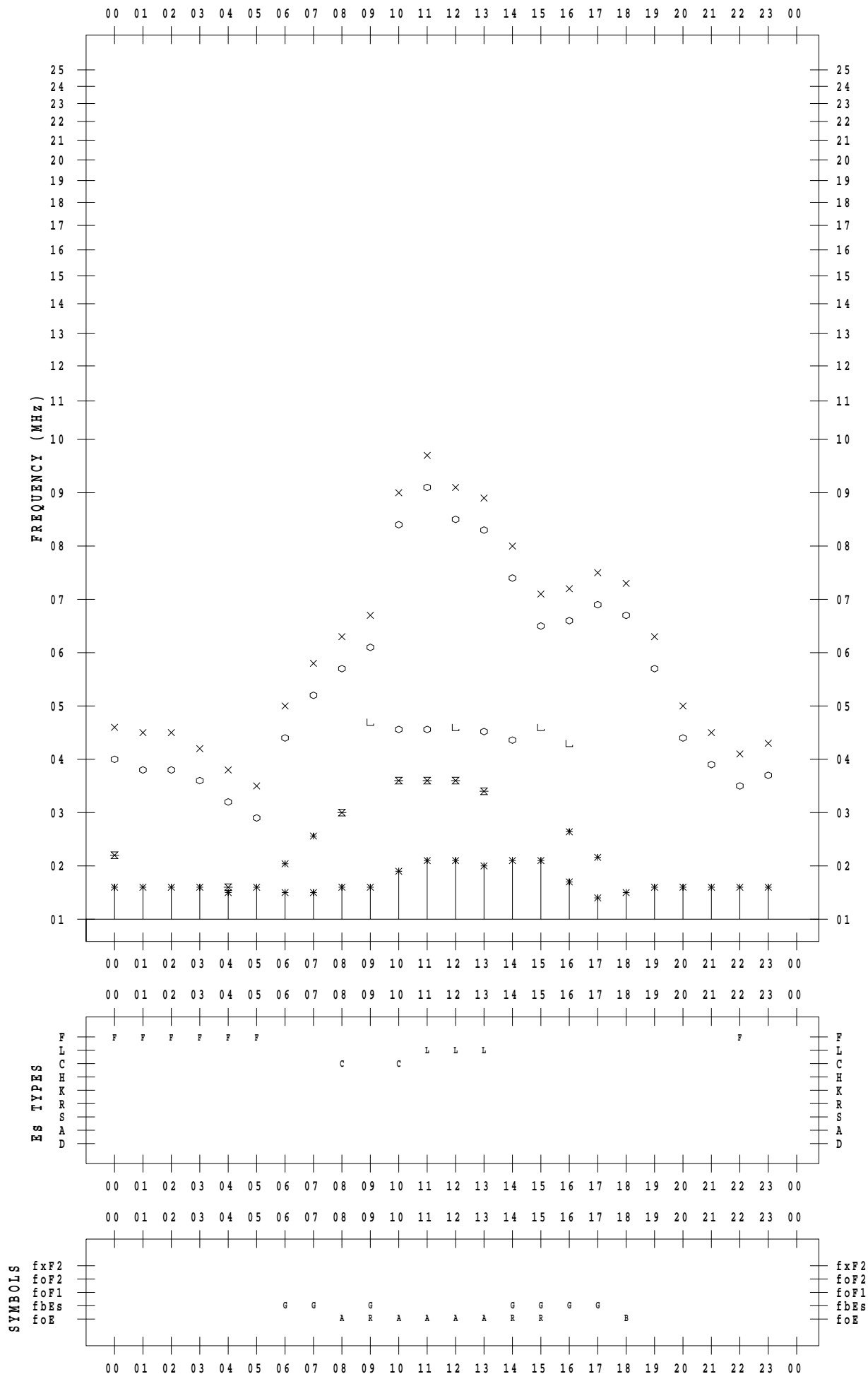
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 25

135 ° E MEAN TIME



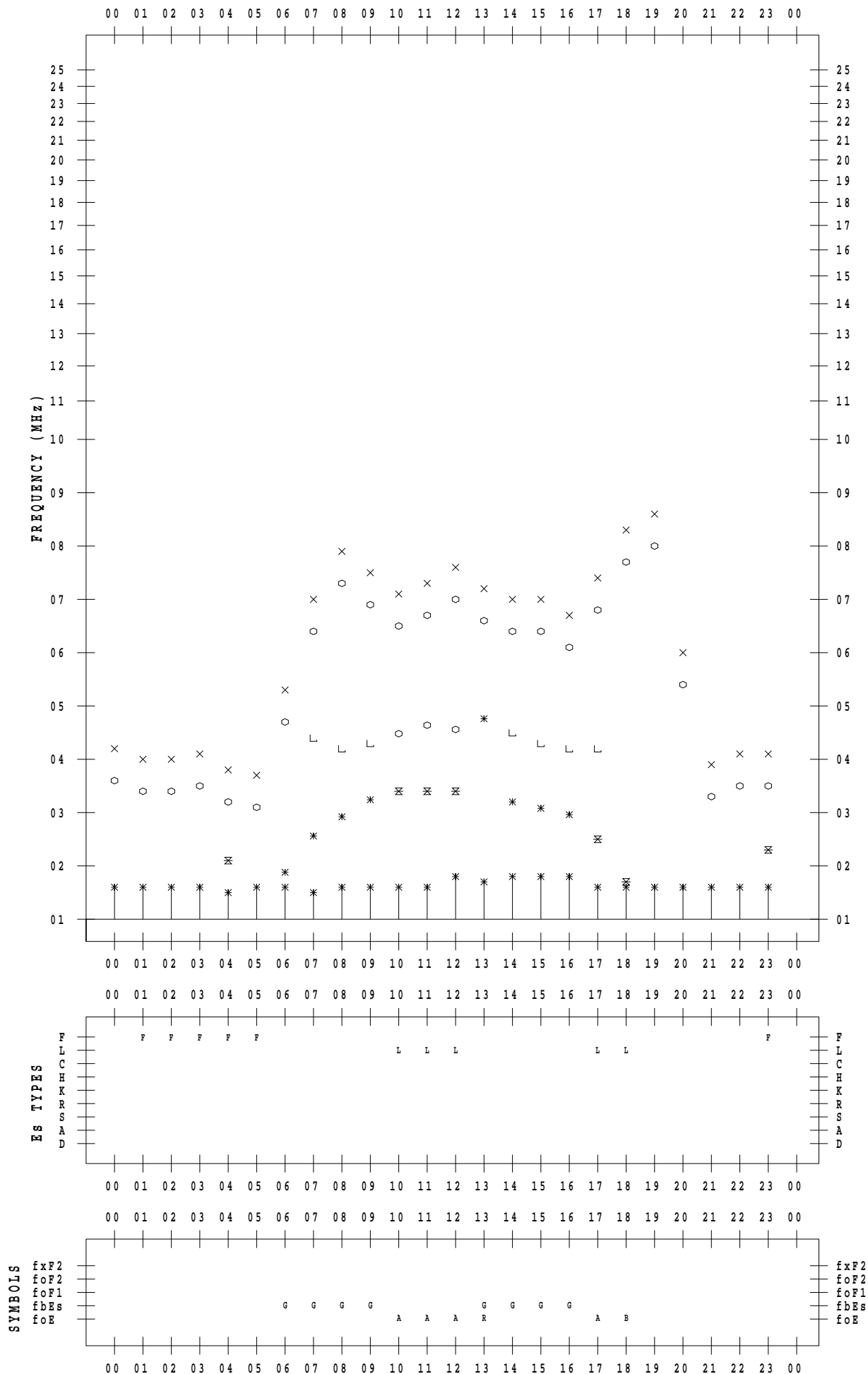
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 26

135 ° E MEAN TIME



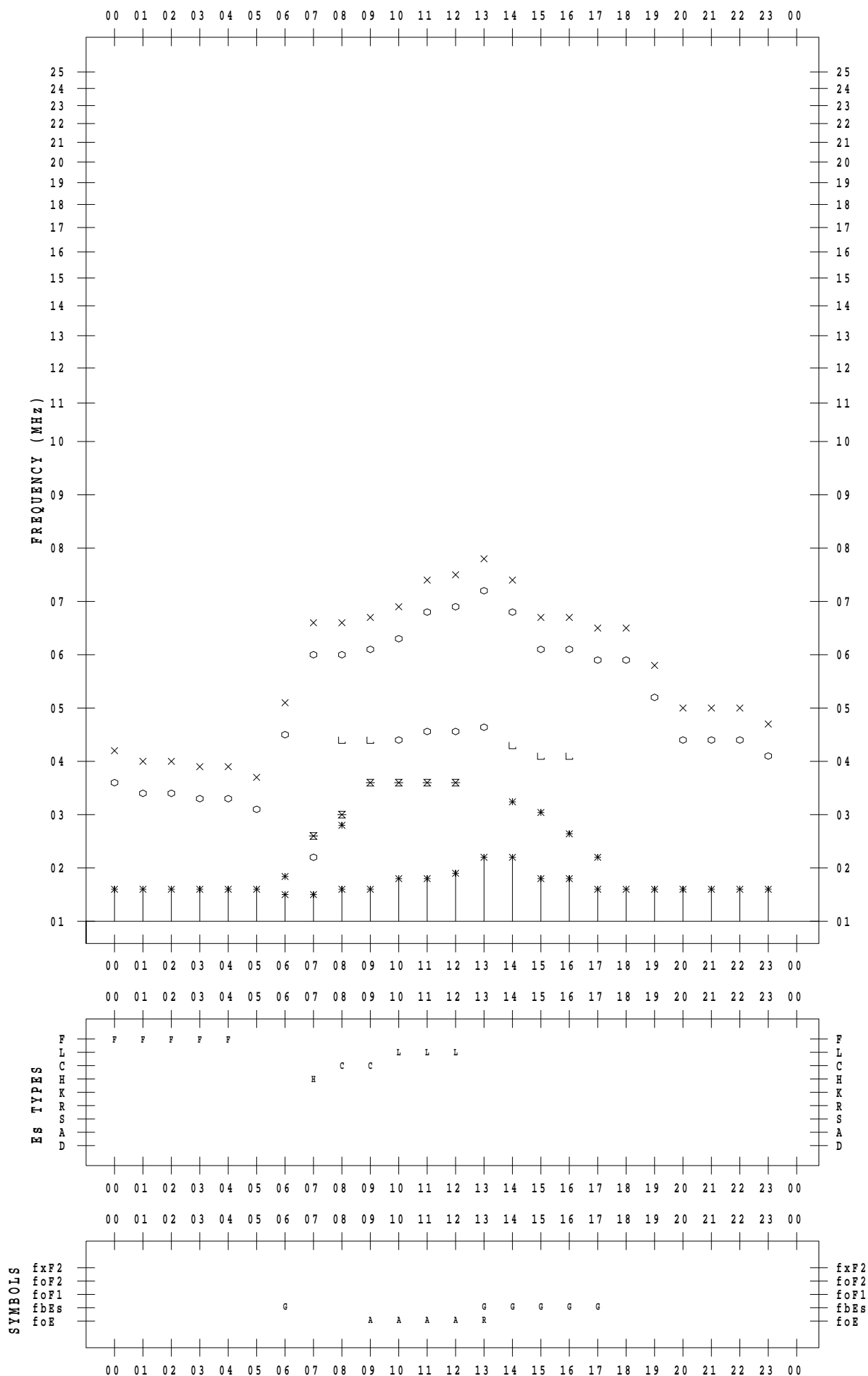
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 27

135 ° E MEAN TIME



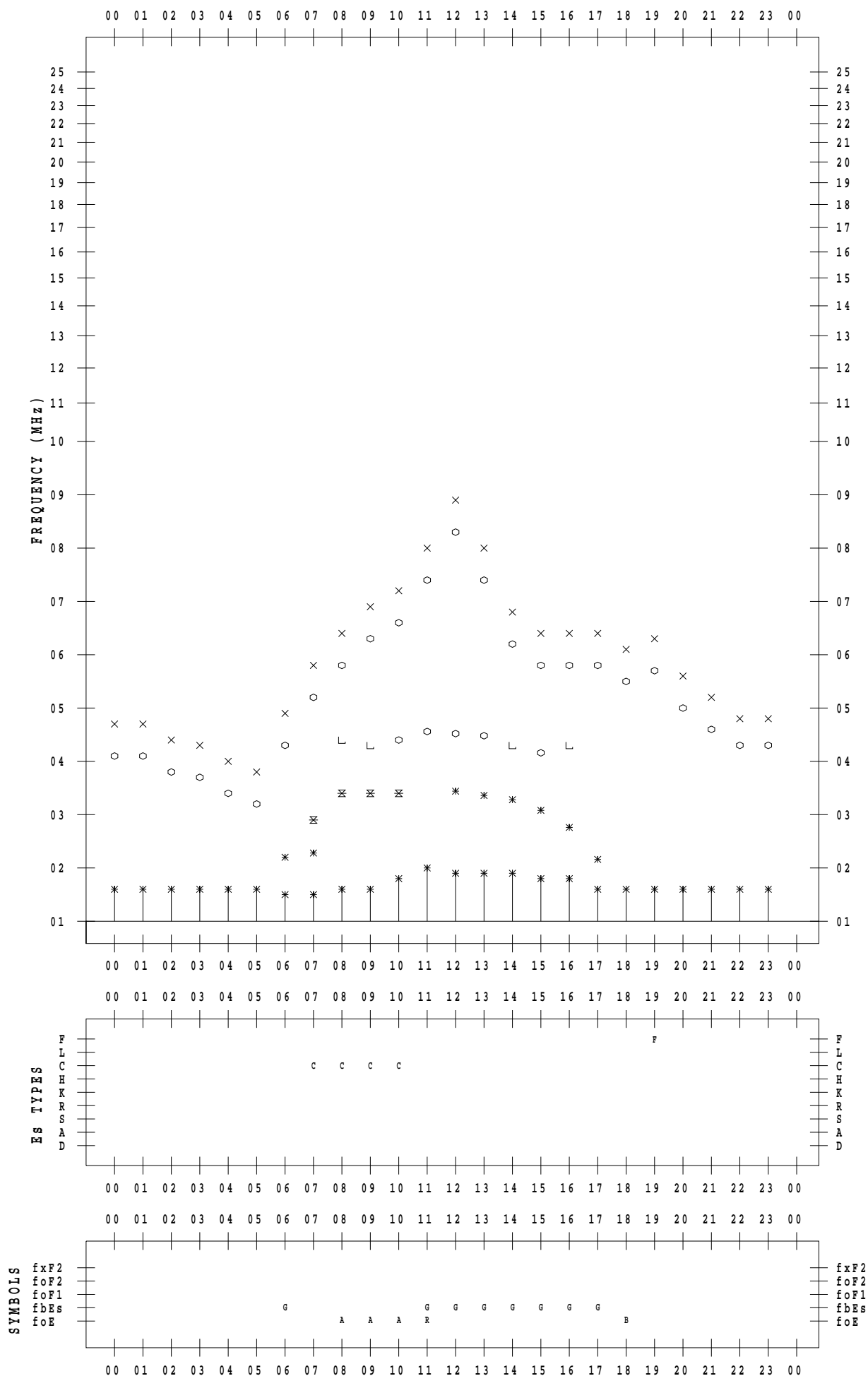
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 28

135 ° E MEAN TIME



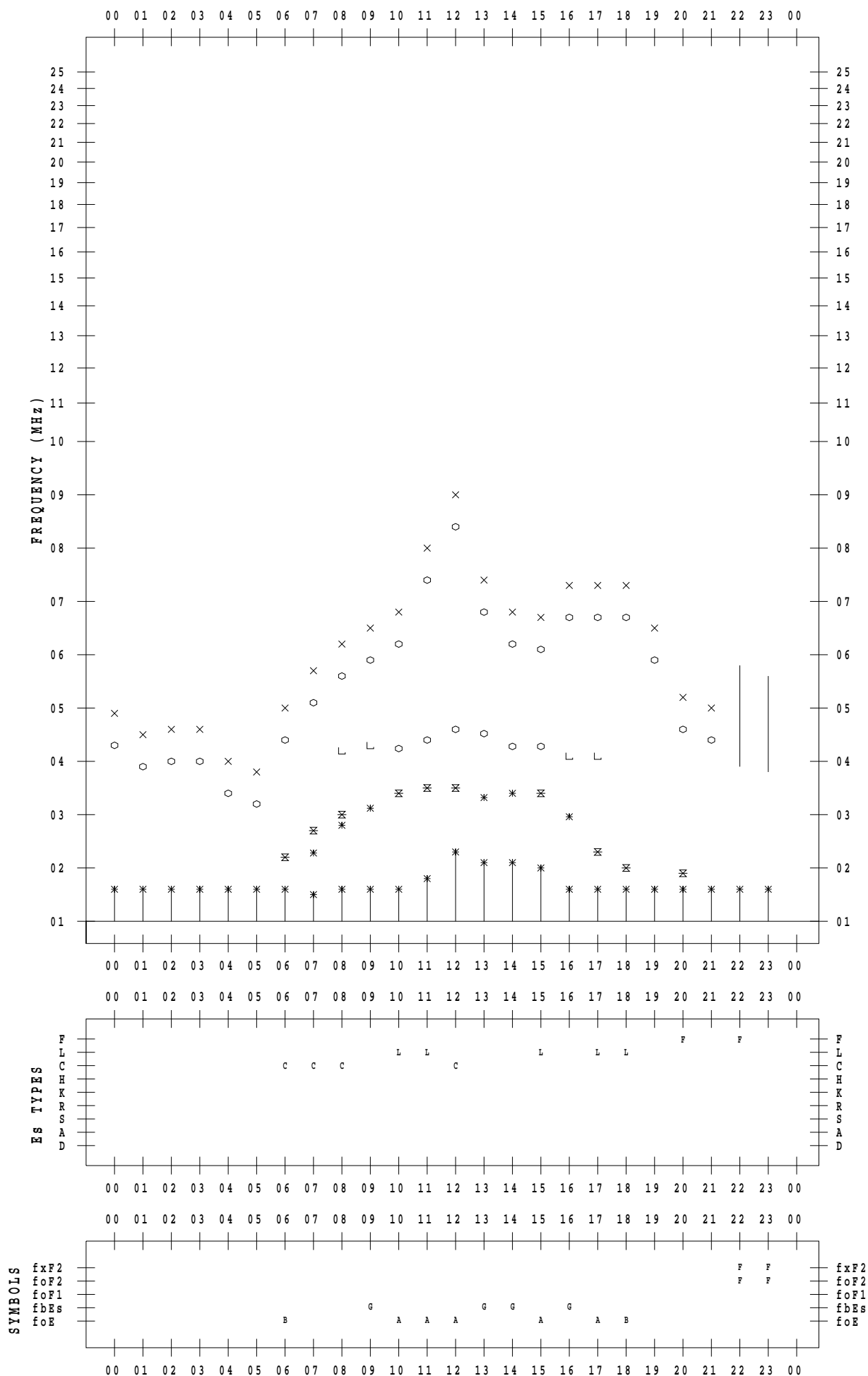
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 29

135 ° E MEAN TIME





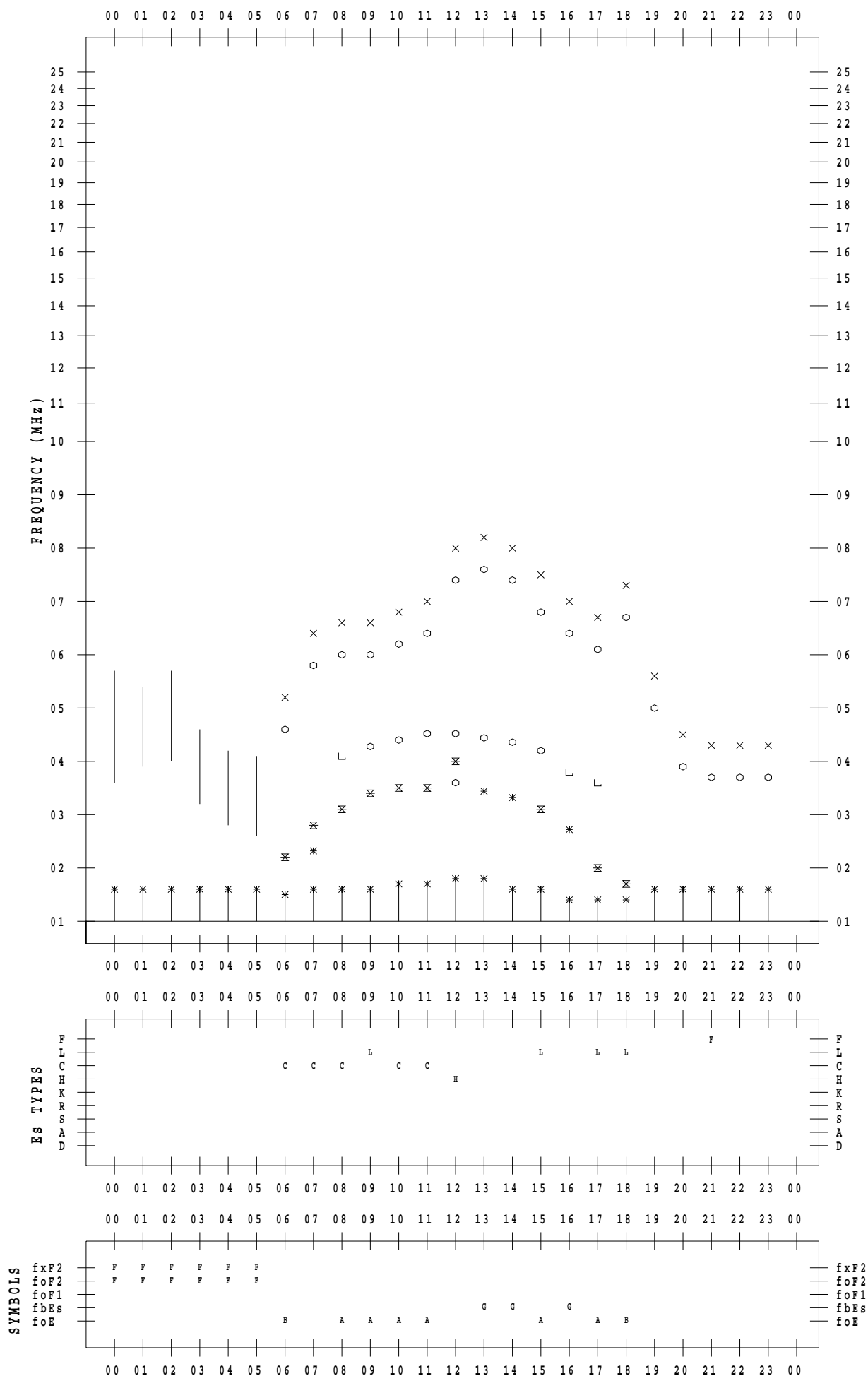
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 30

135 ° E MEAN TIME



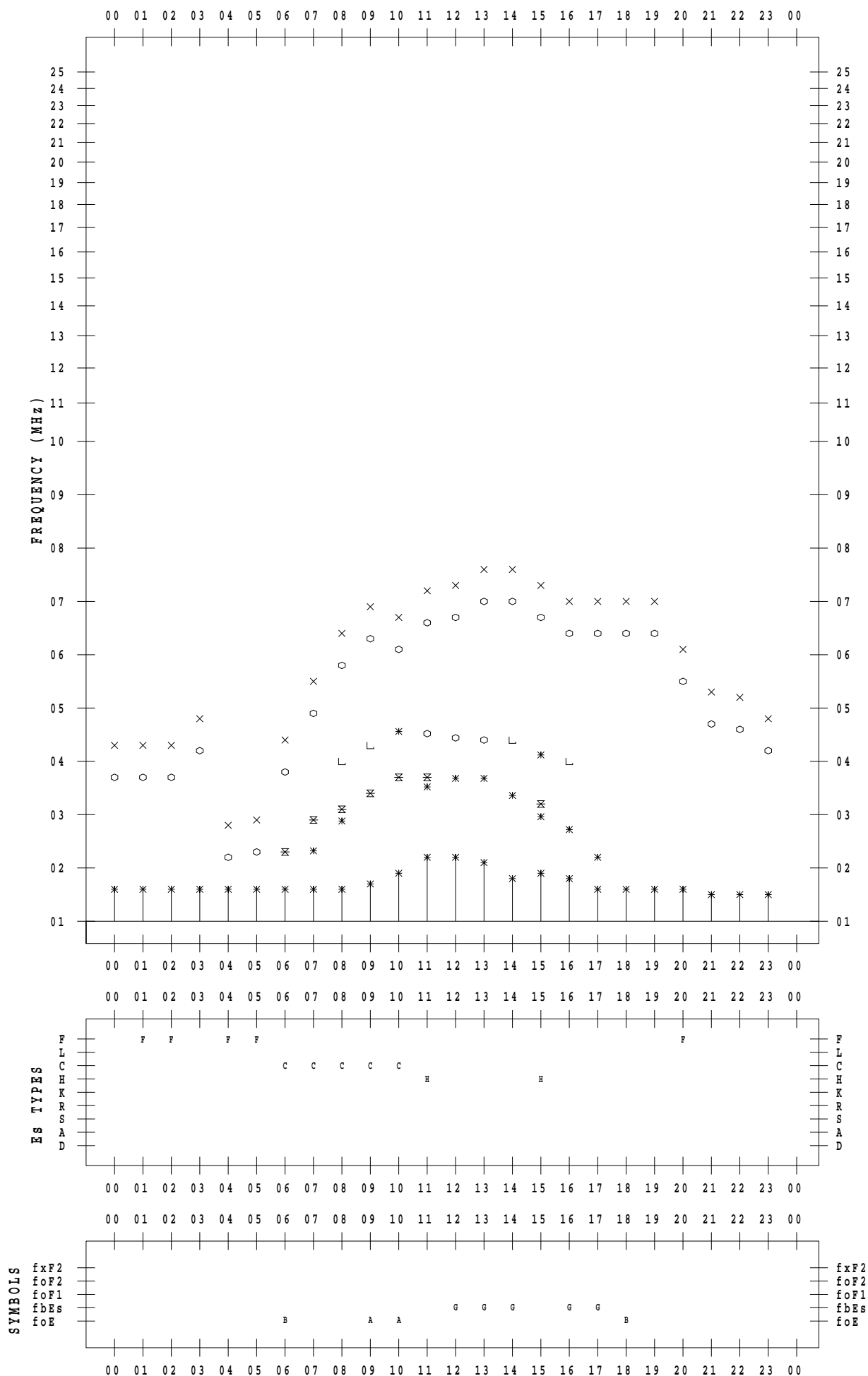
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 3 / 31

135 ° E MEAN TIME



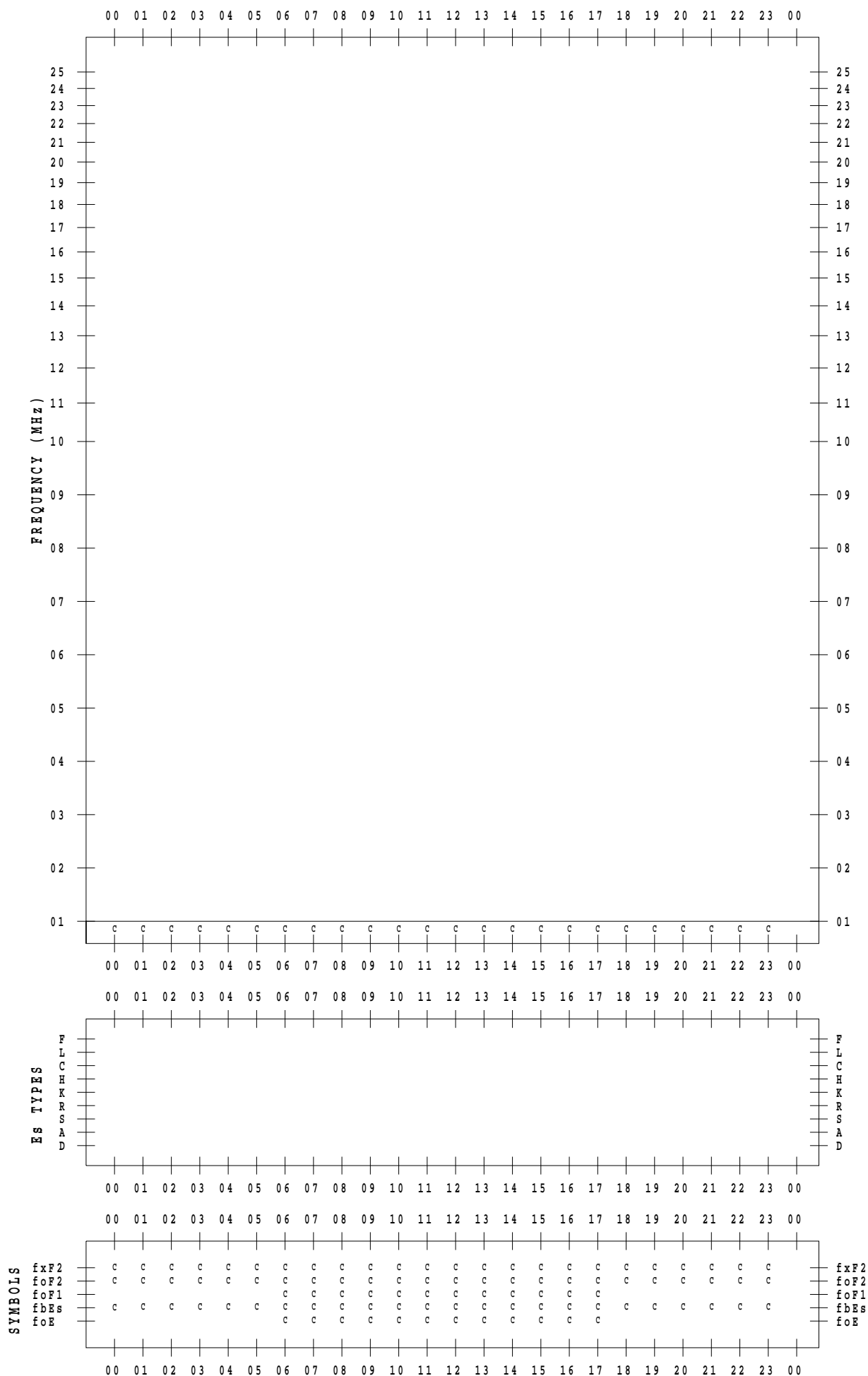
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 1

135 ° E MEAN TIME



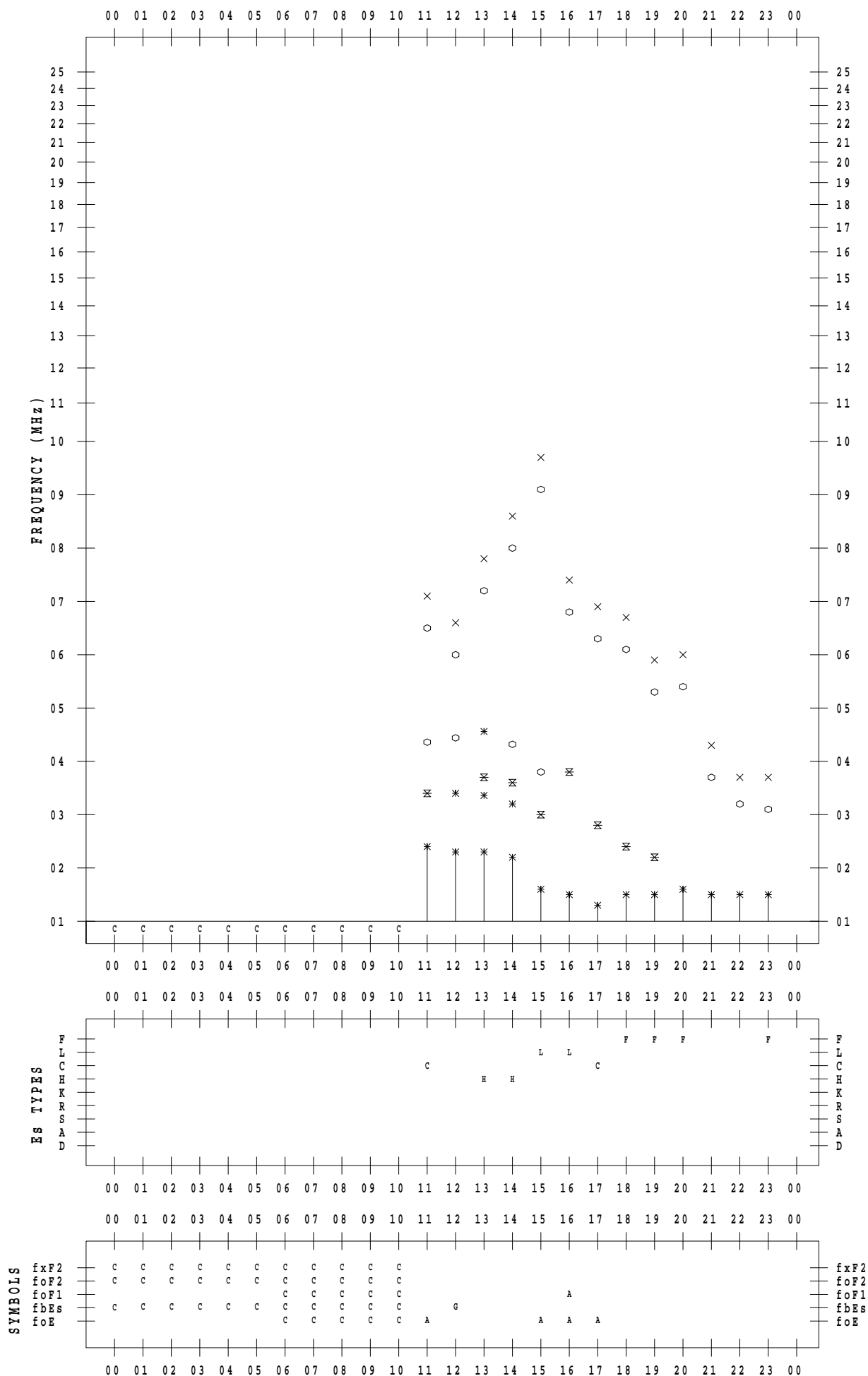
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 2

135 ° E MEAN TIME



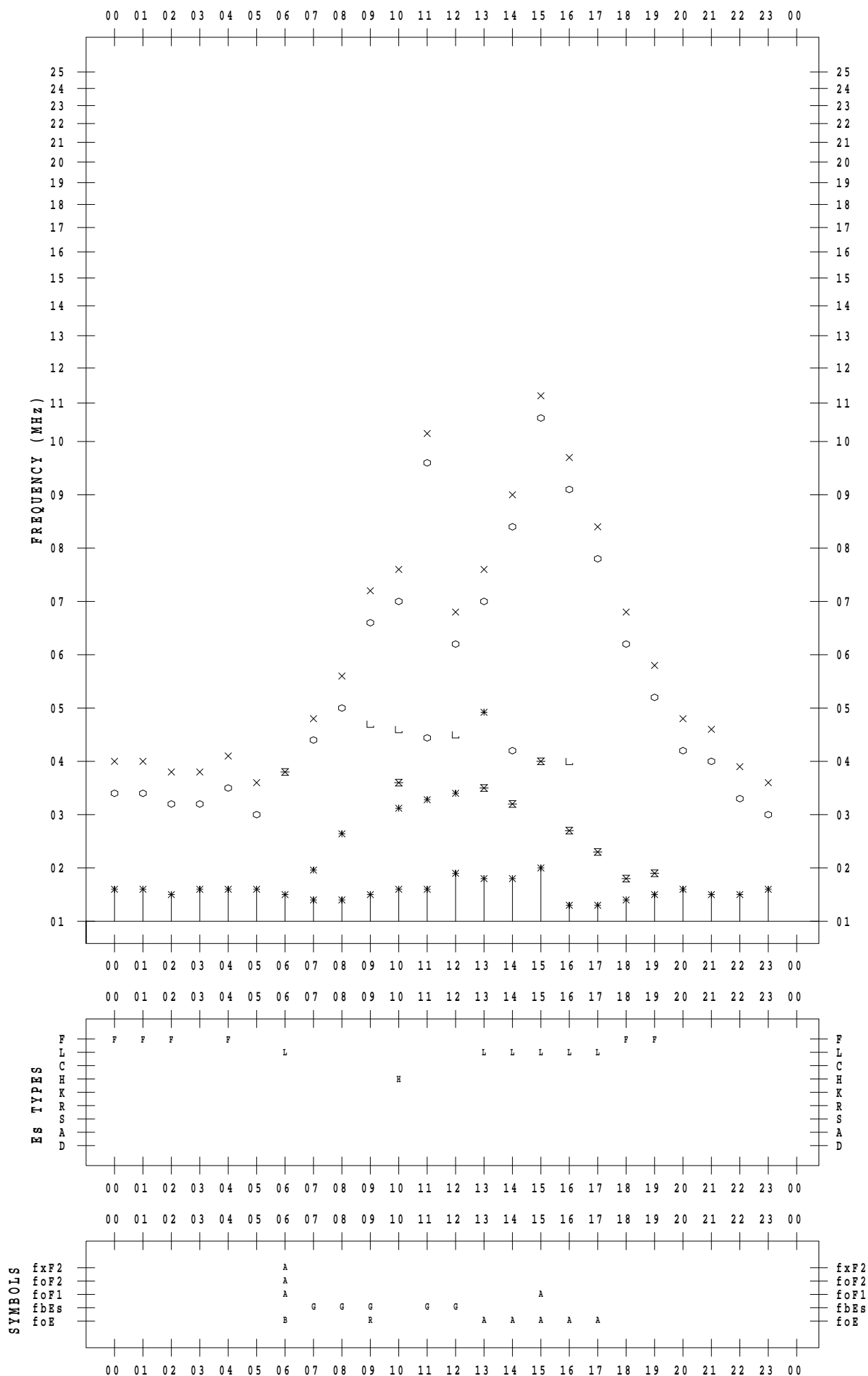
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 3

135 ° E MEAN TIME



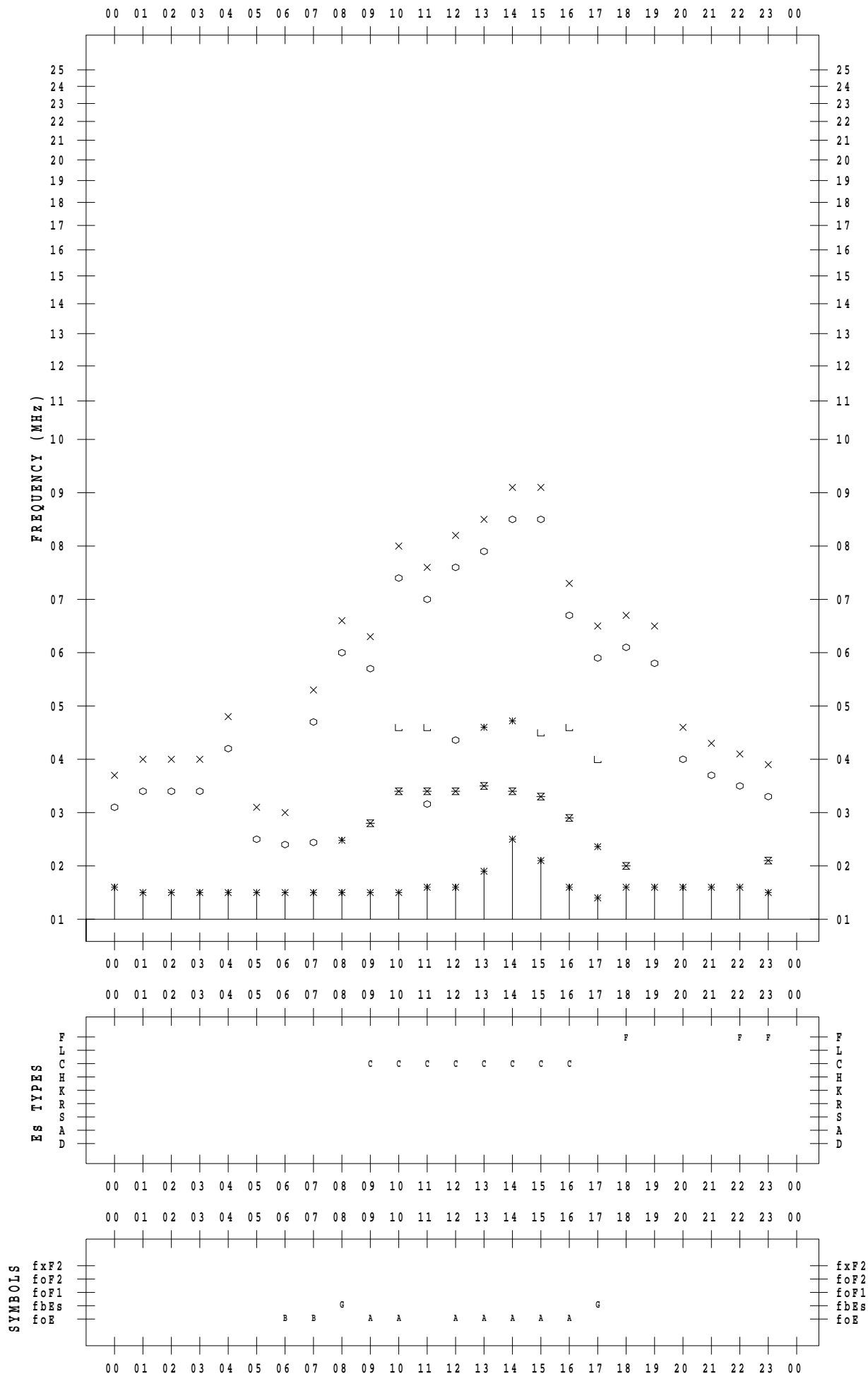
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 4

135 ° E MEAN TIME



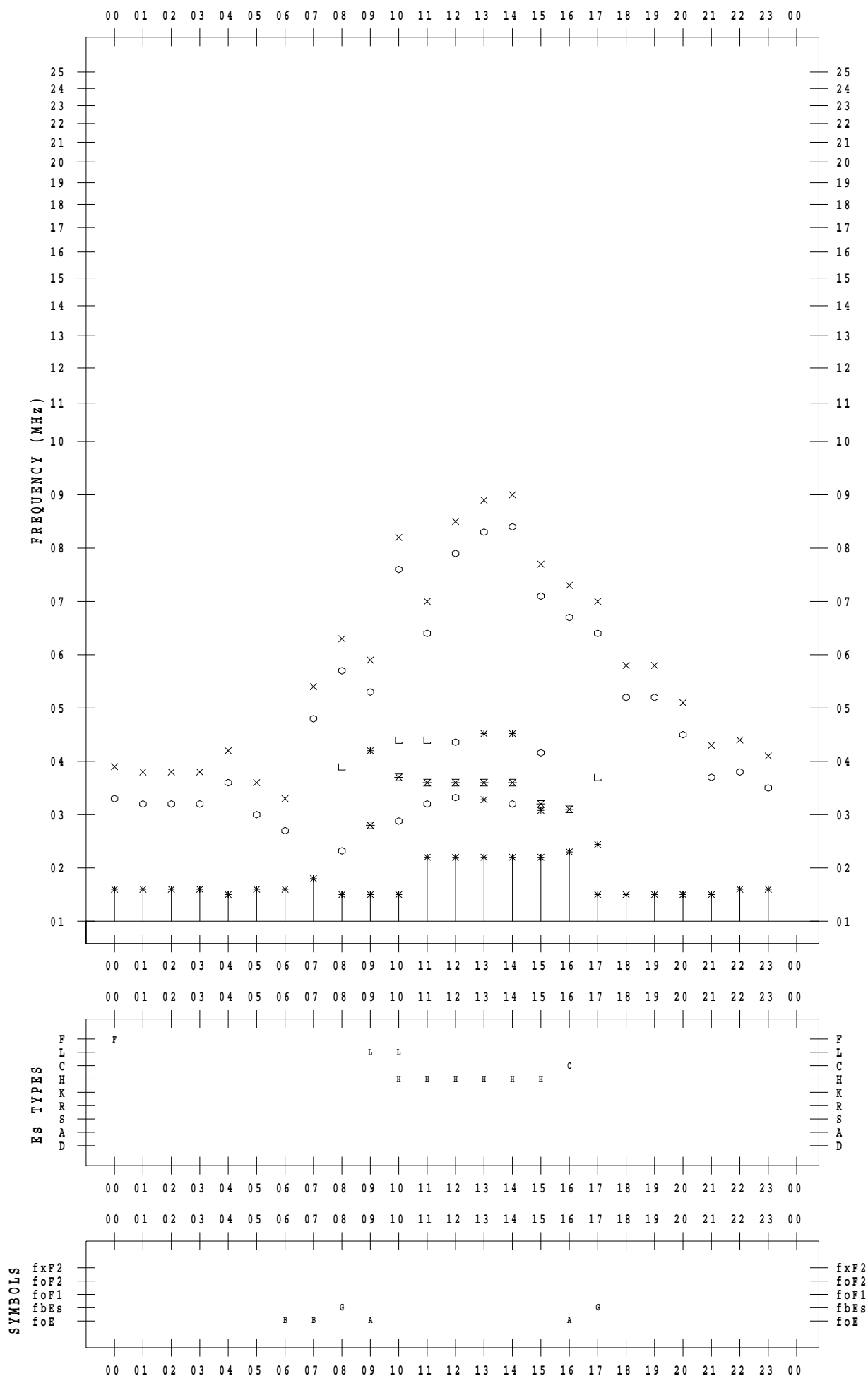
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 5

135 ° E MEAN TIME



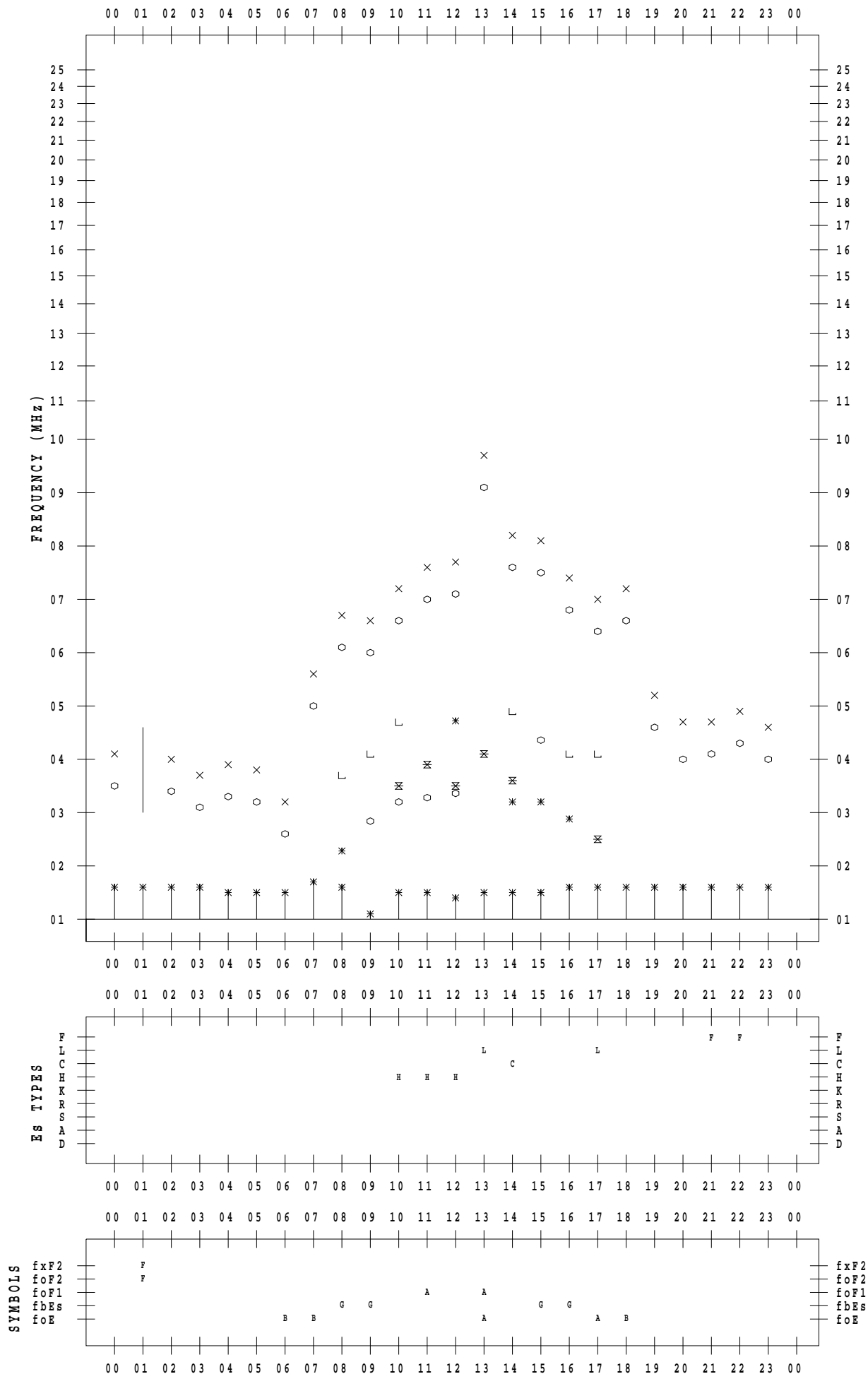
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/ 3/ 6

135 ° E MEAN TIME





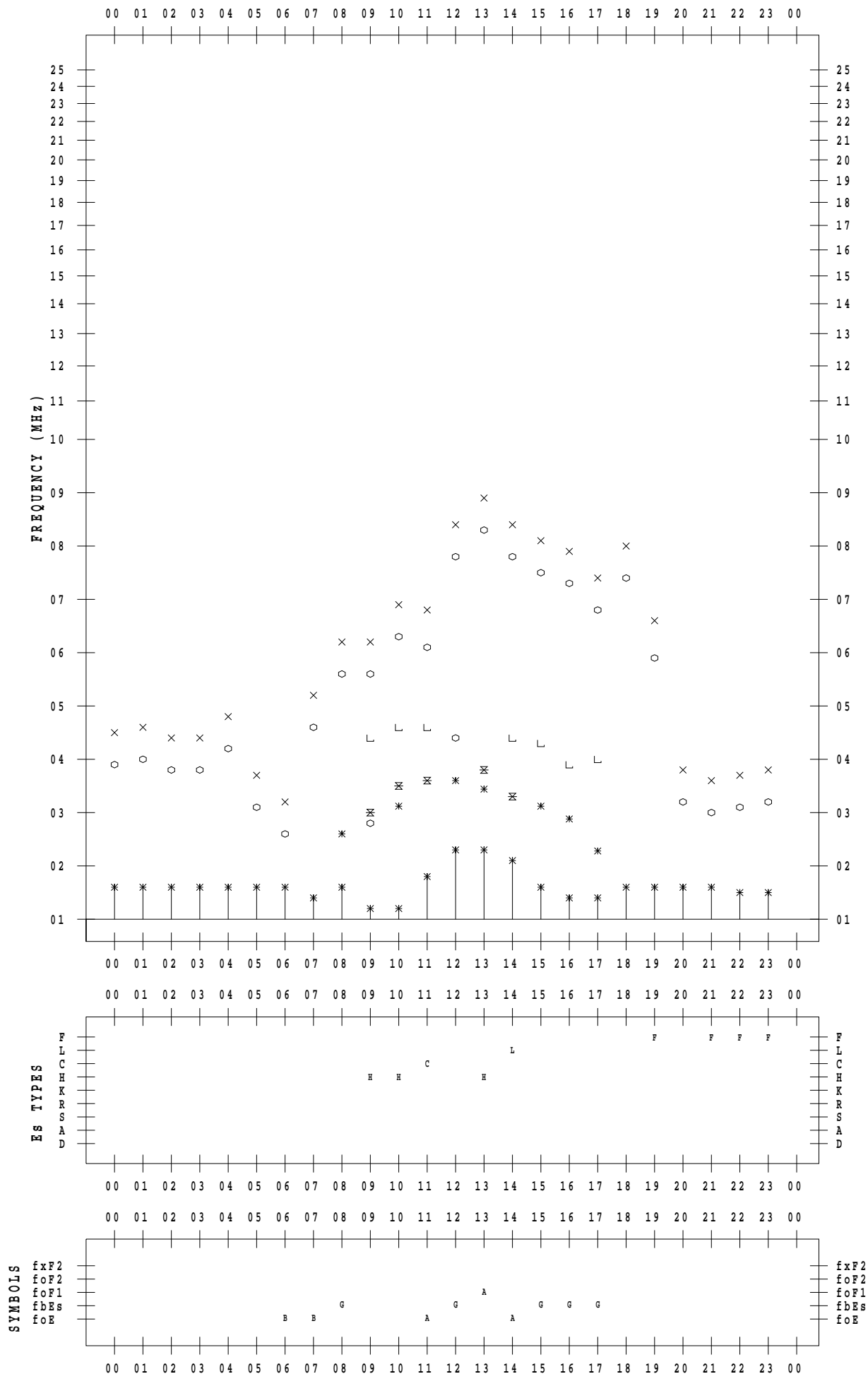
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 7

135 ° E MEAN TIME



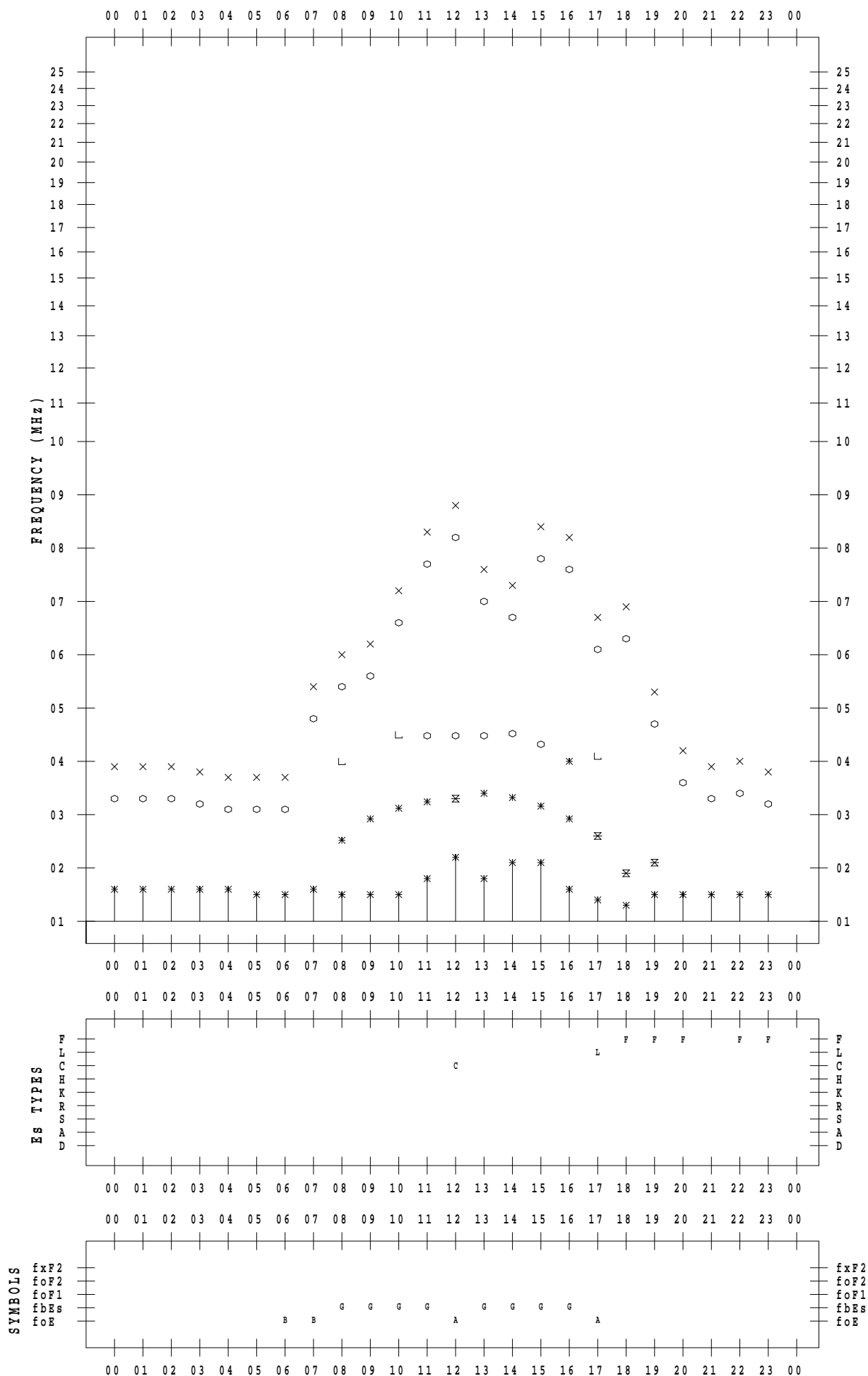
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 8

135 ° E MEAN TIME



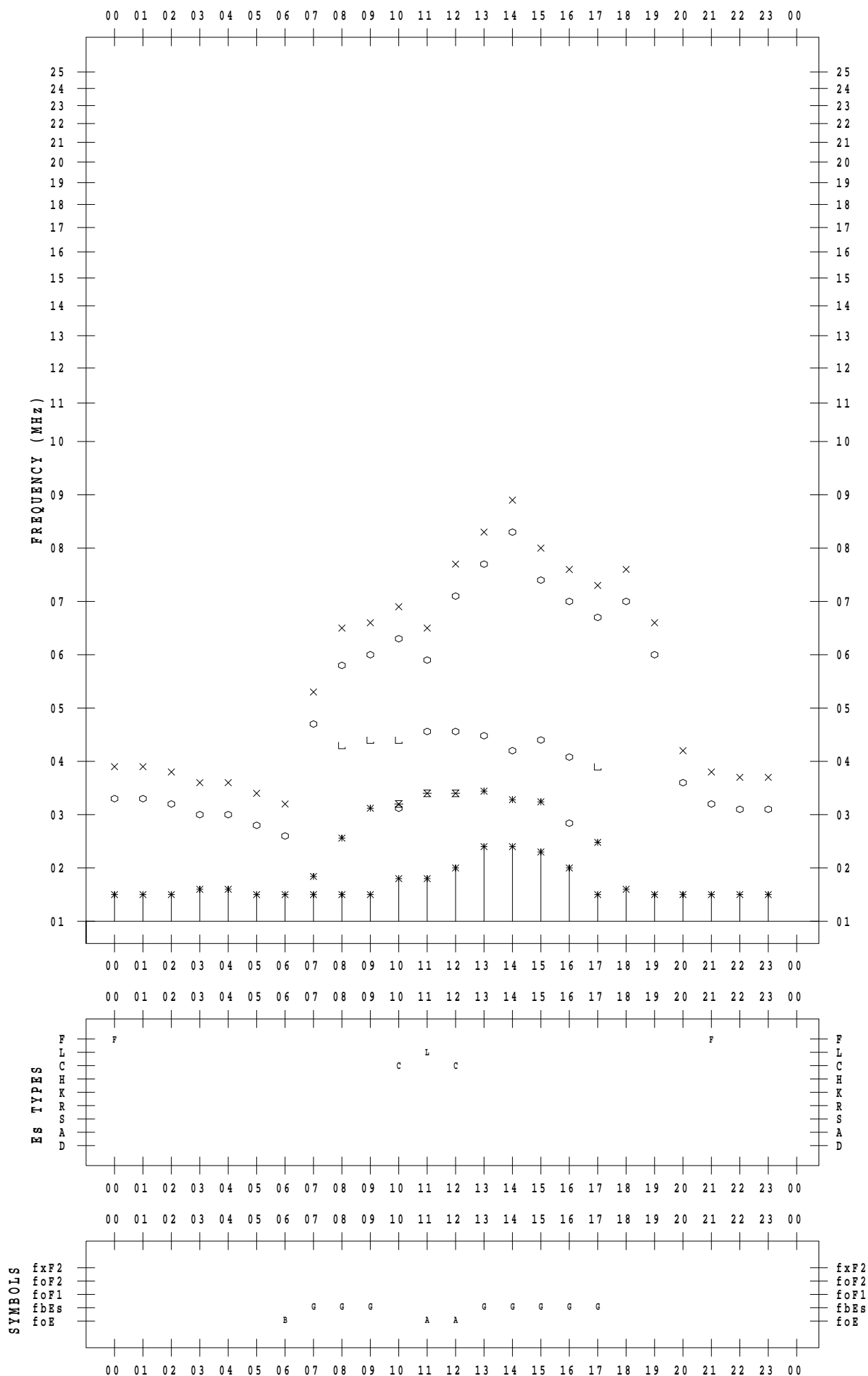
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 9

135 ° E MEAN TIME



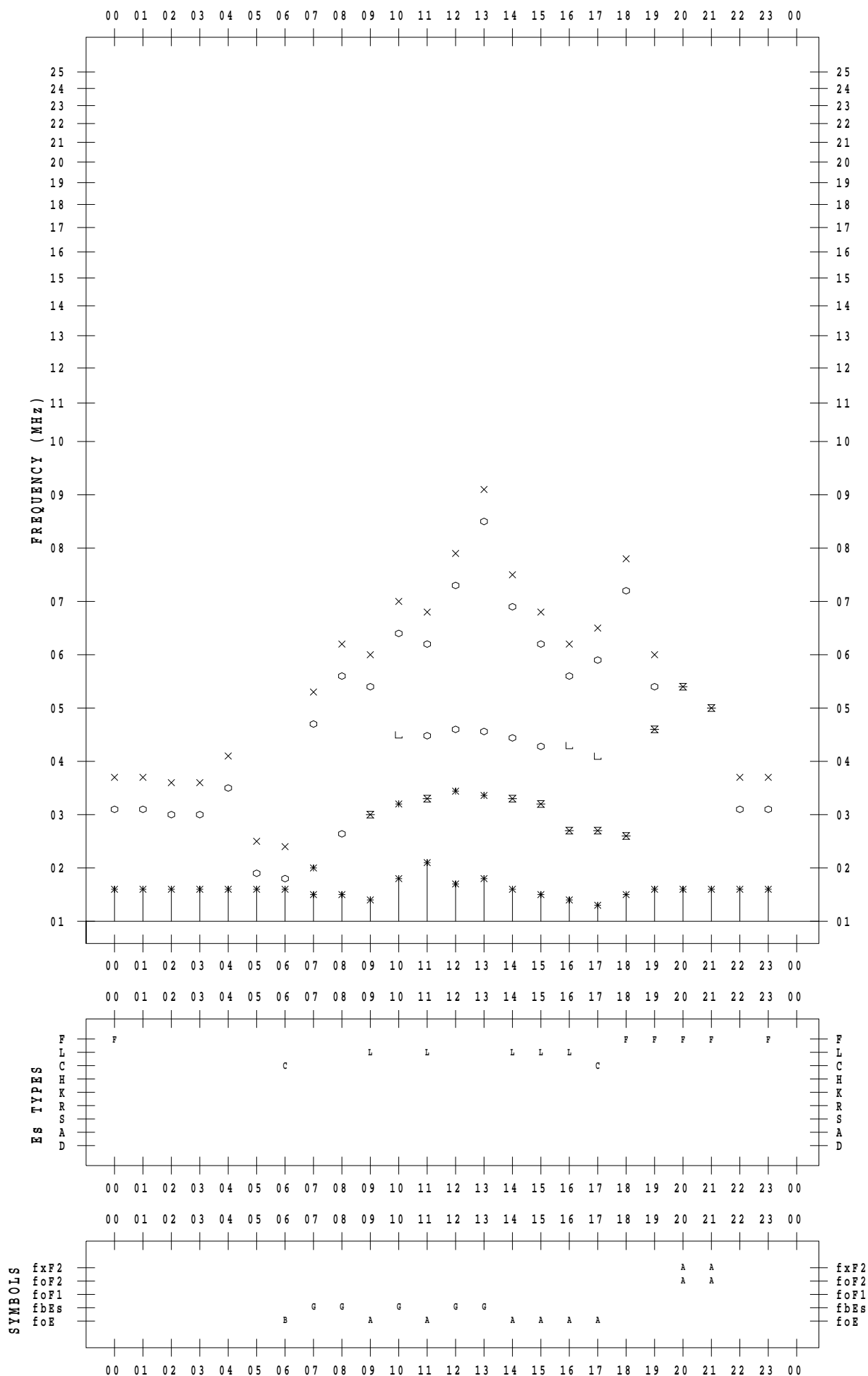
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/ 3/10

135 ° E MEAN TIME



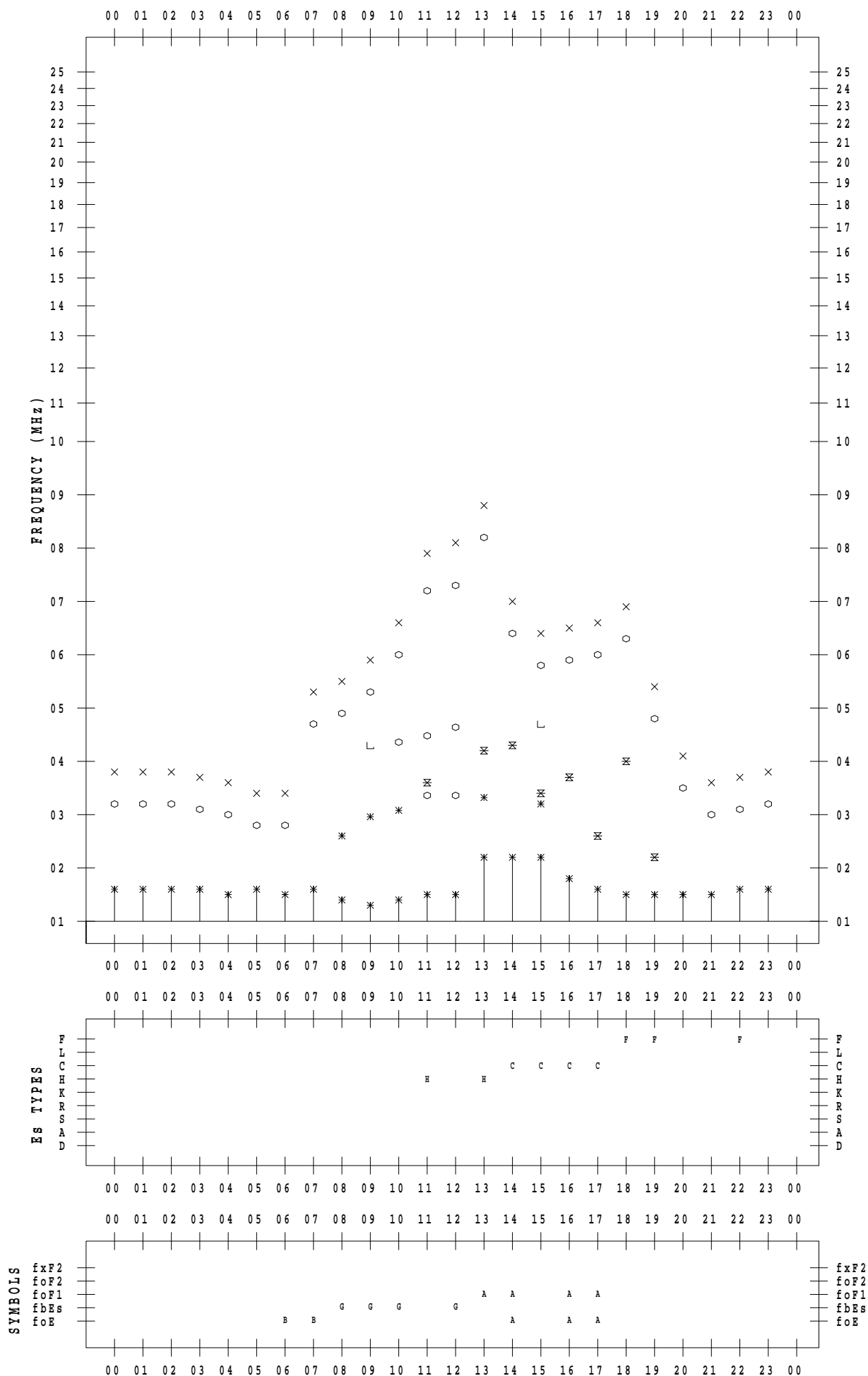
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 11

135 ° E MEAN TIME



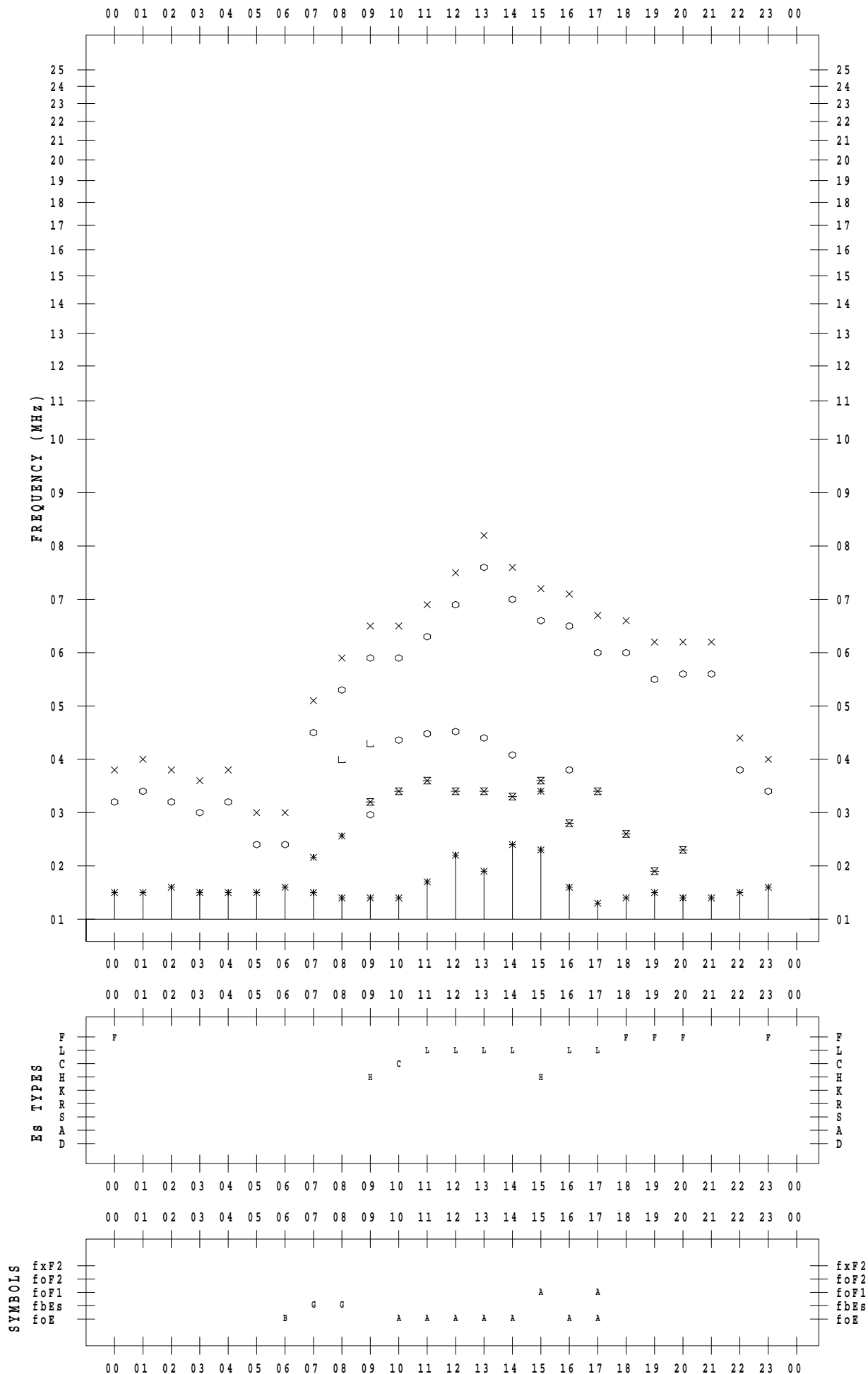
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 12

135 ° E MEAN TIME



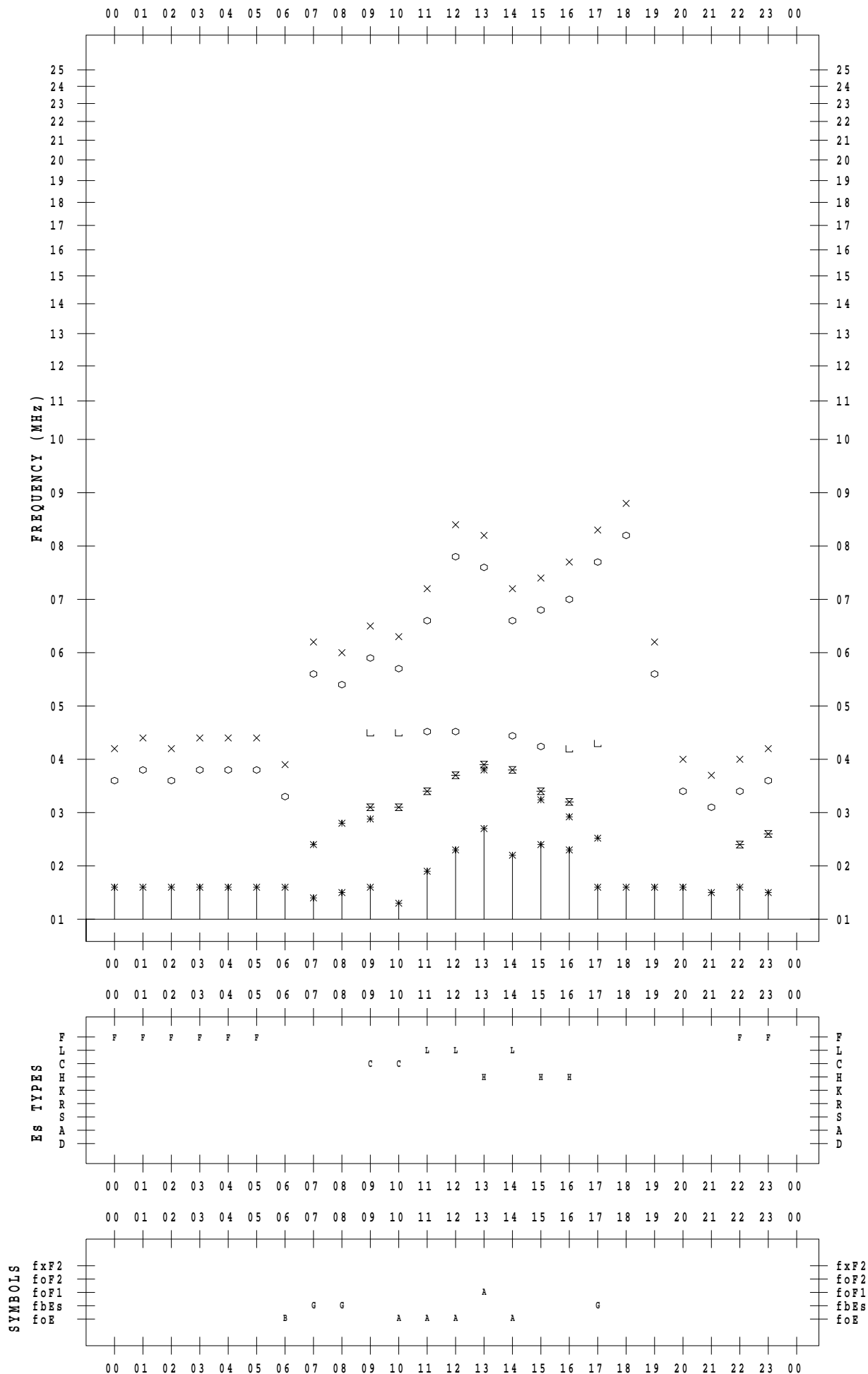
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/ 3/13

135 ° E MEAN TIME



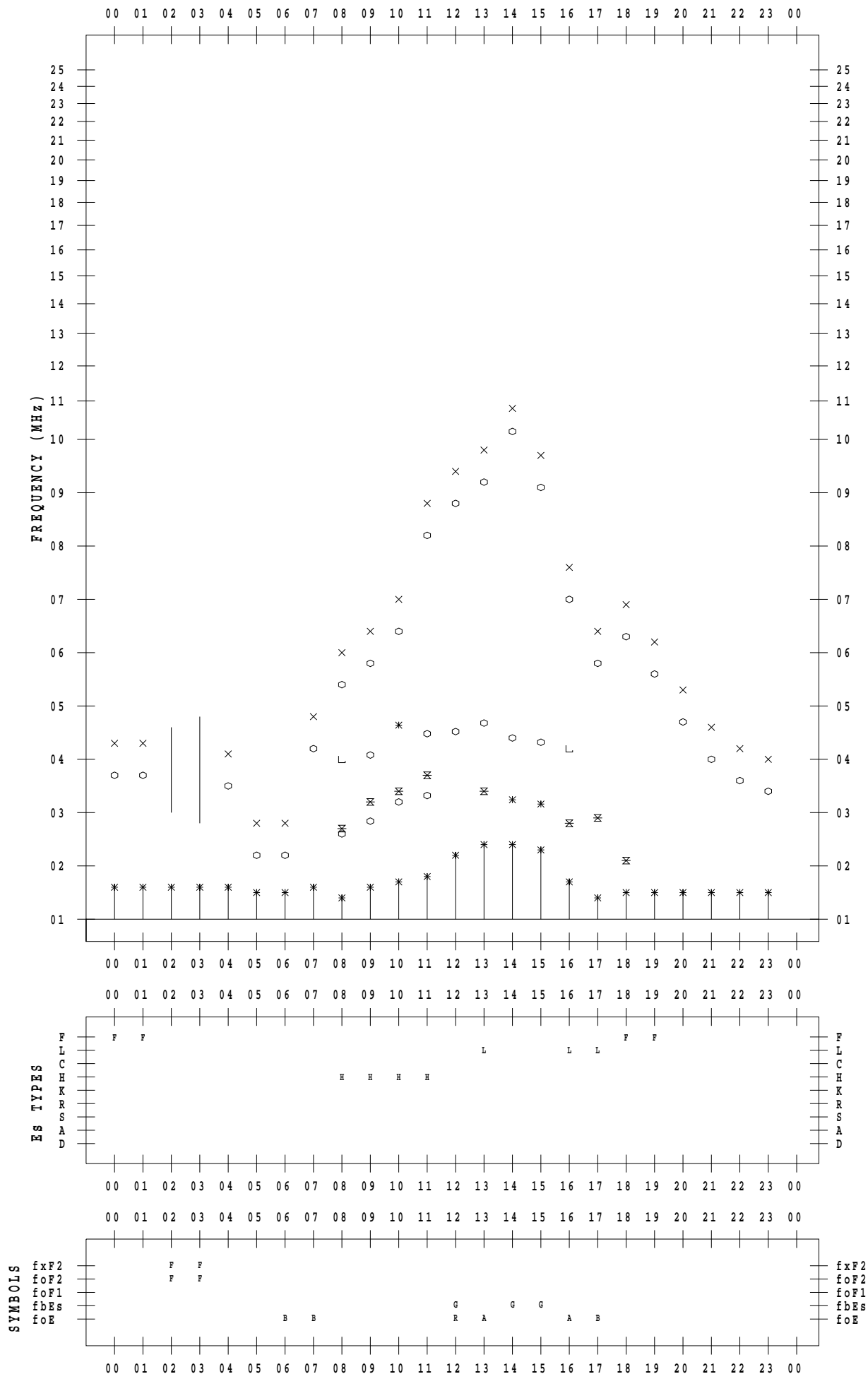
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 14

135 ° E MEAN TIME





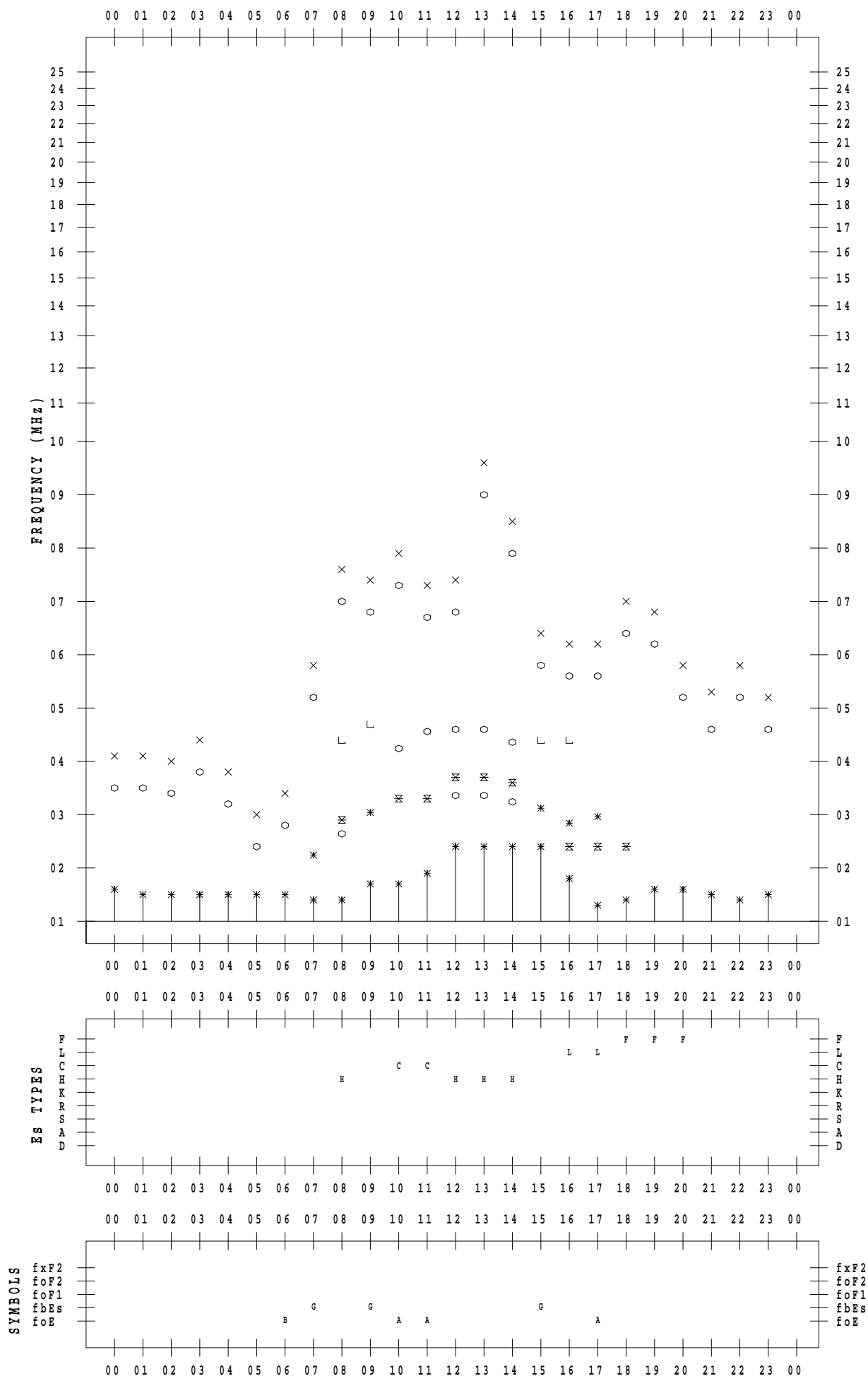
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 15

135 ° E MEAN TIME



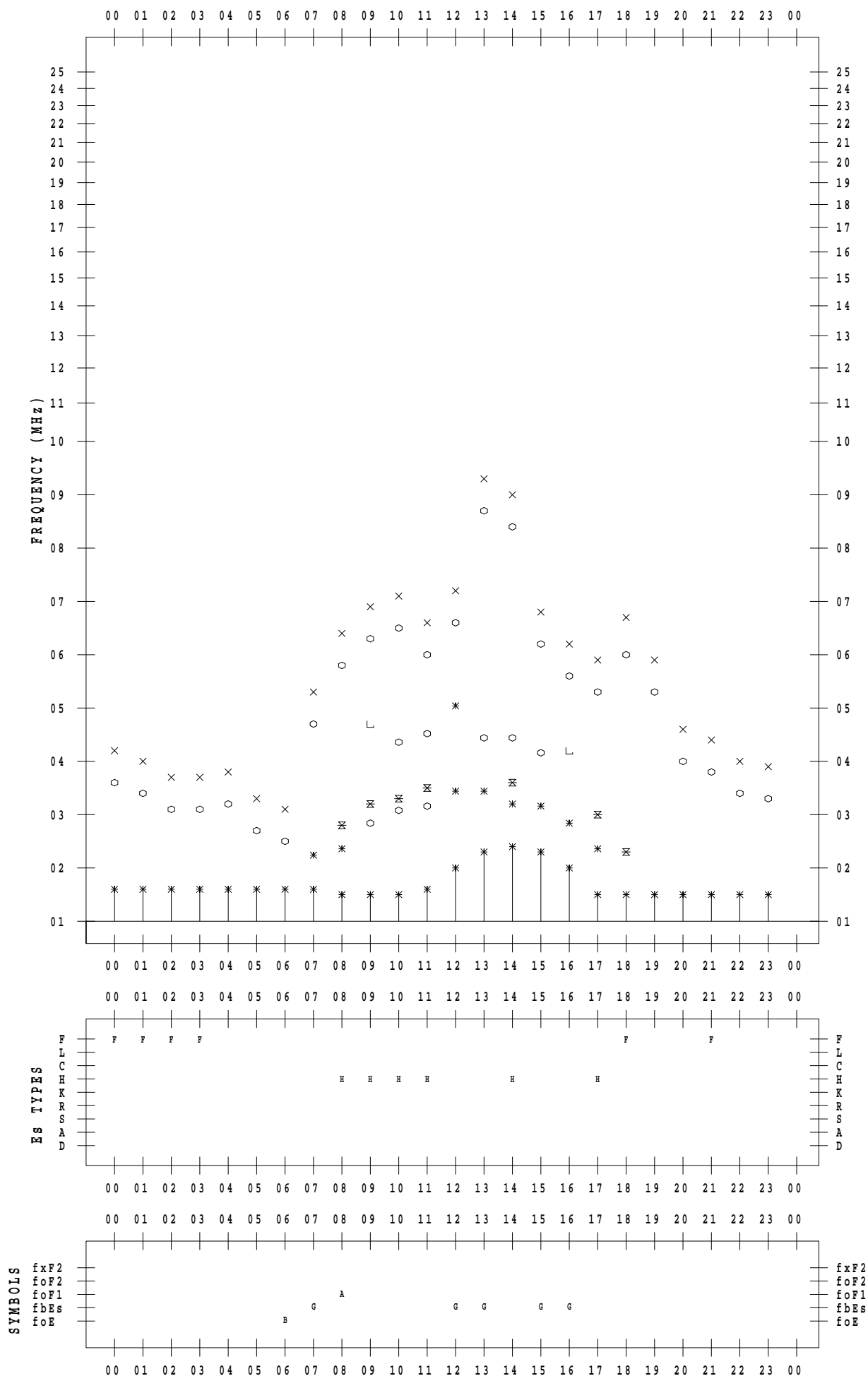
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 16

135 ° E MEAN TIME



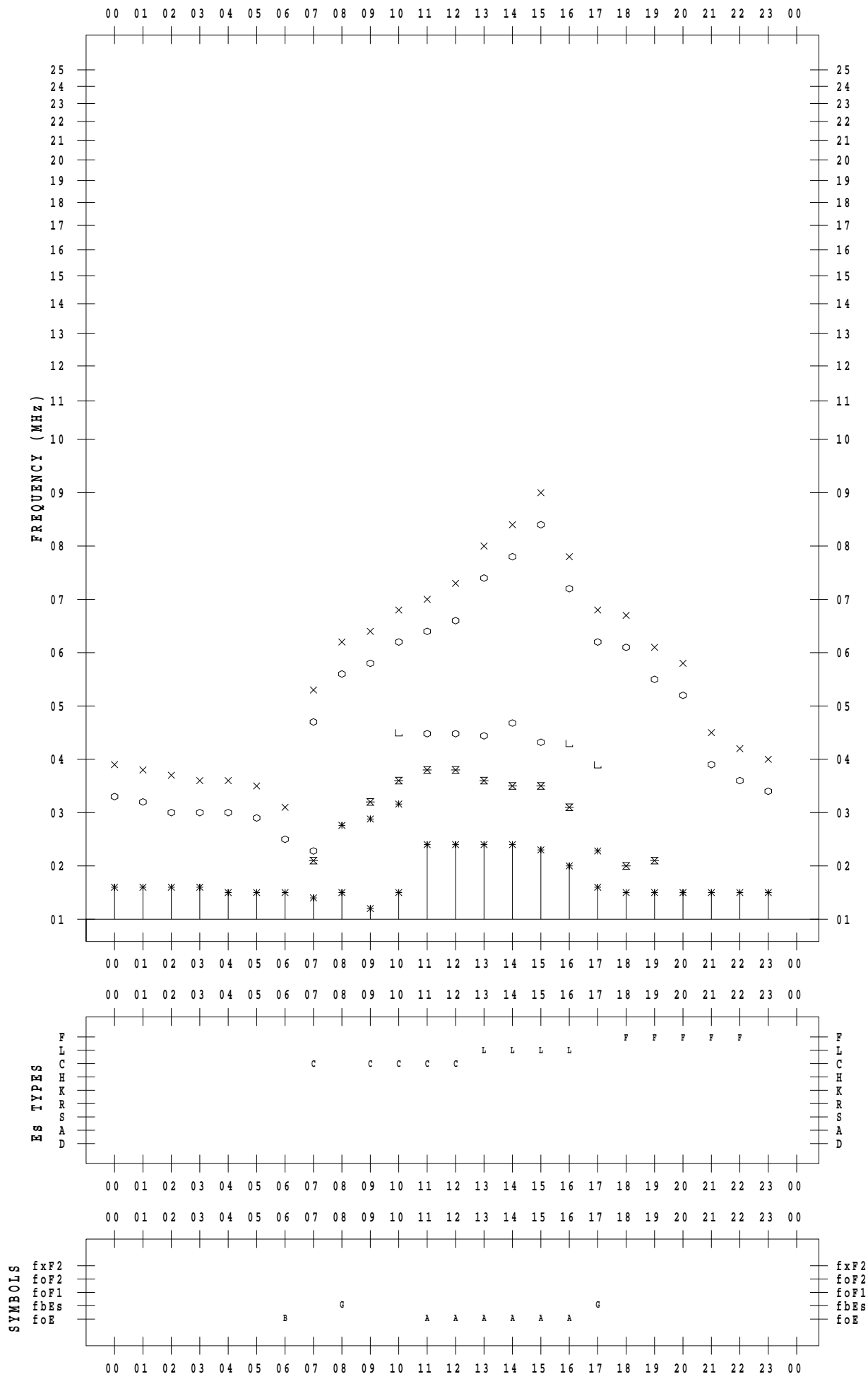
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 17

135 ° E MEAN TIME



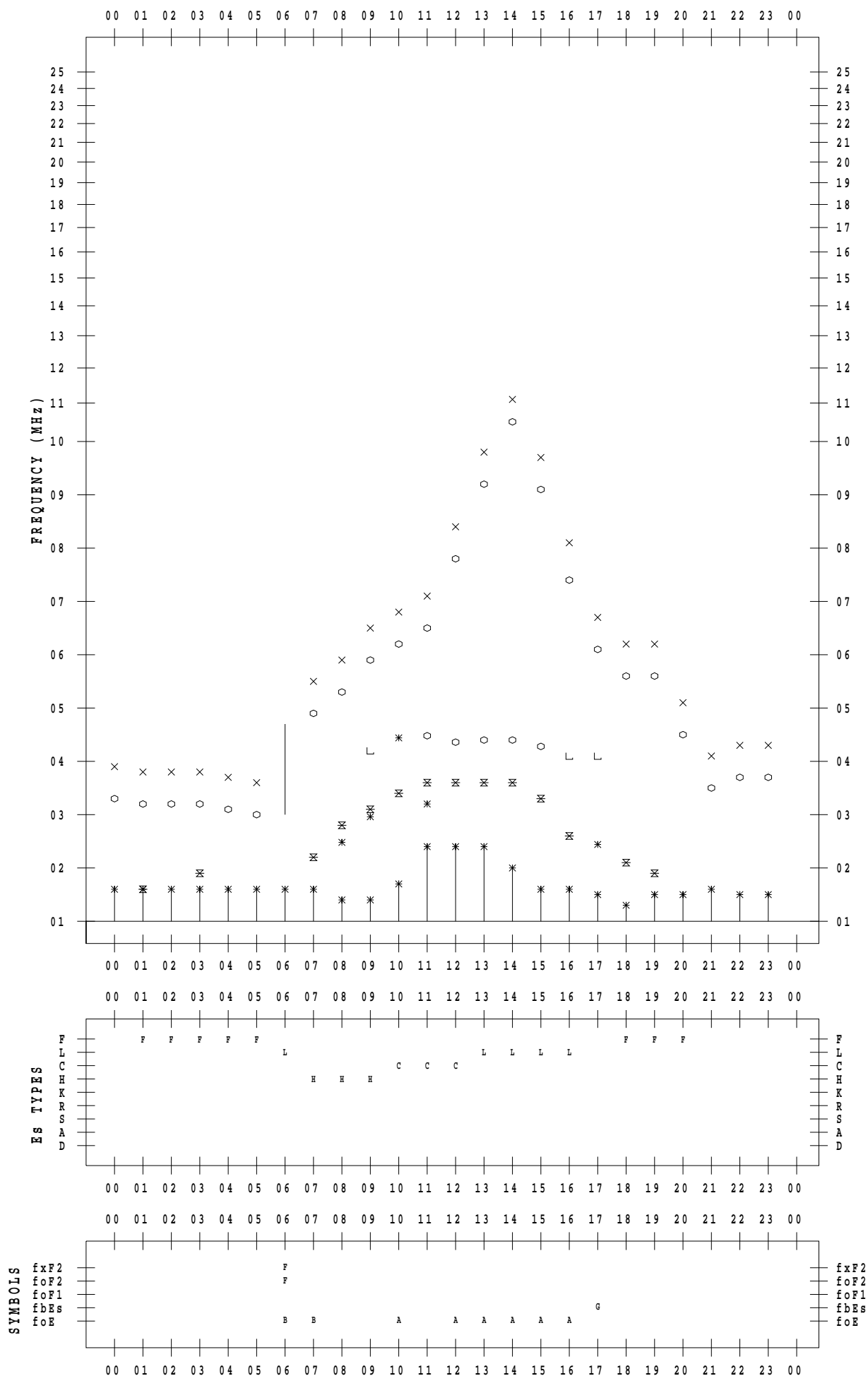
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 18

135 ° E MEAN TIME



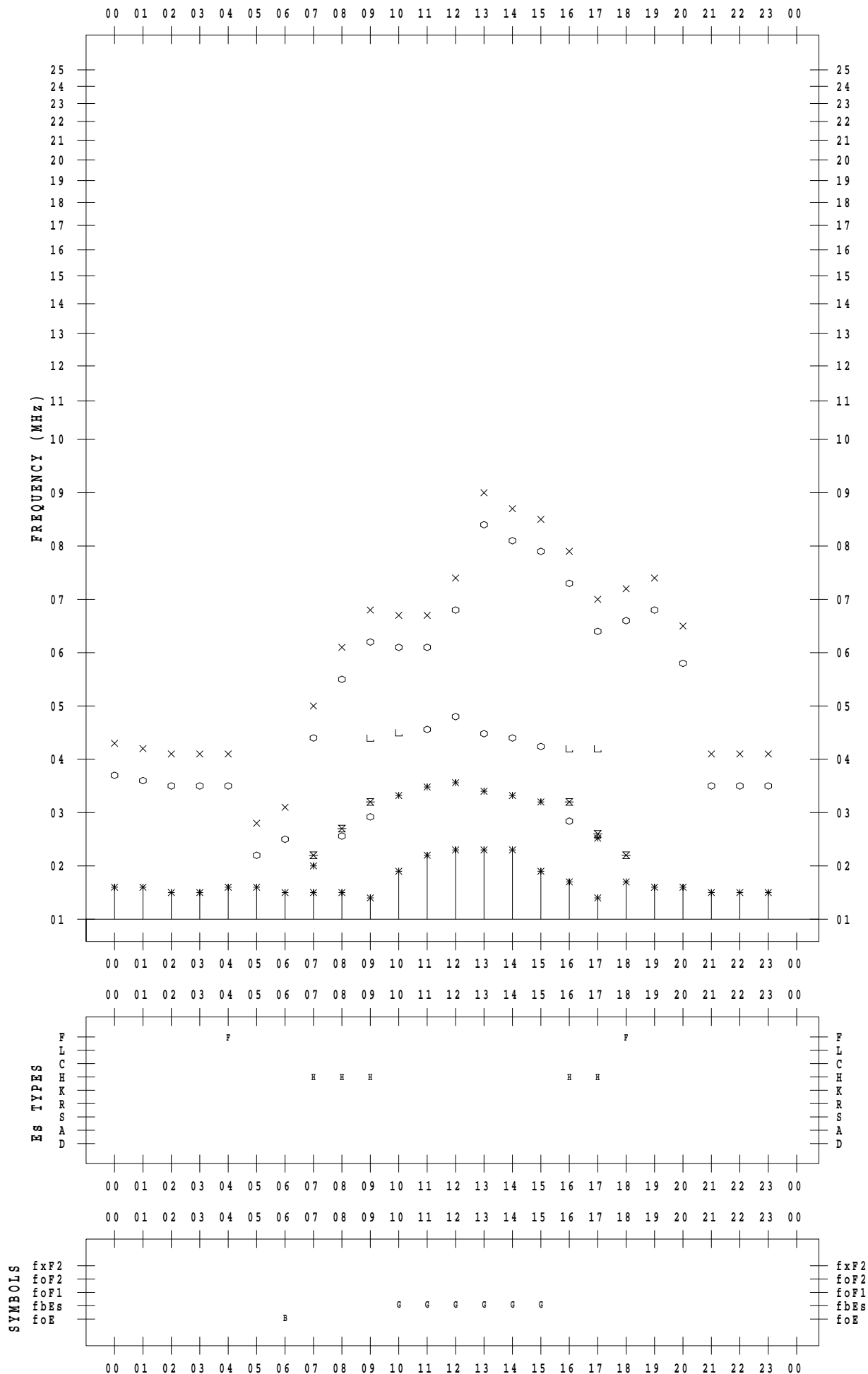
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 19

135 ° E MEAN TIME



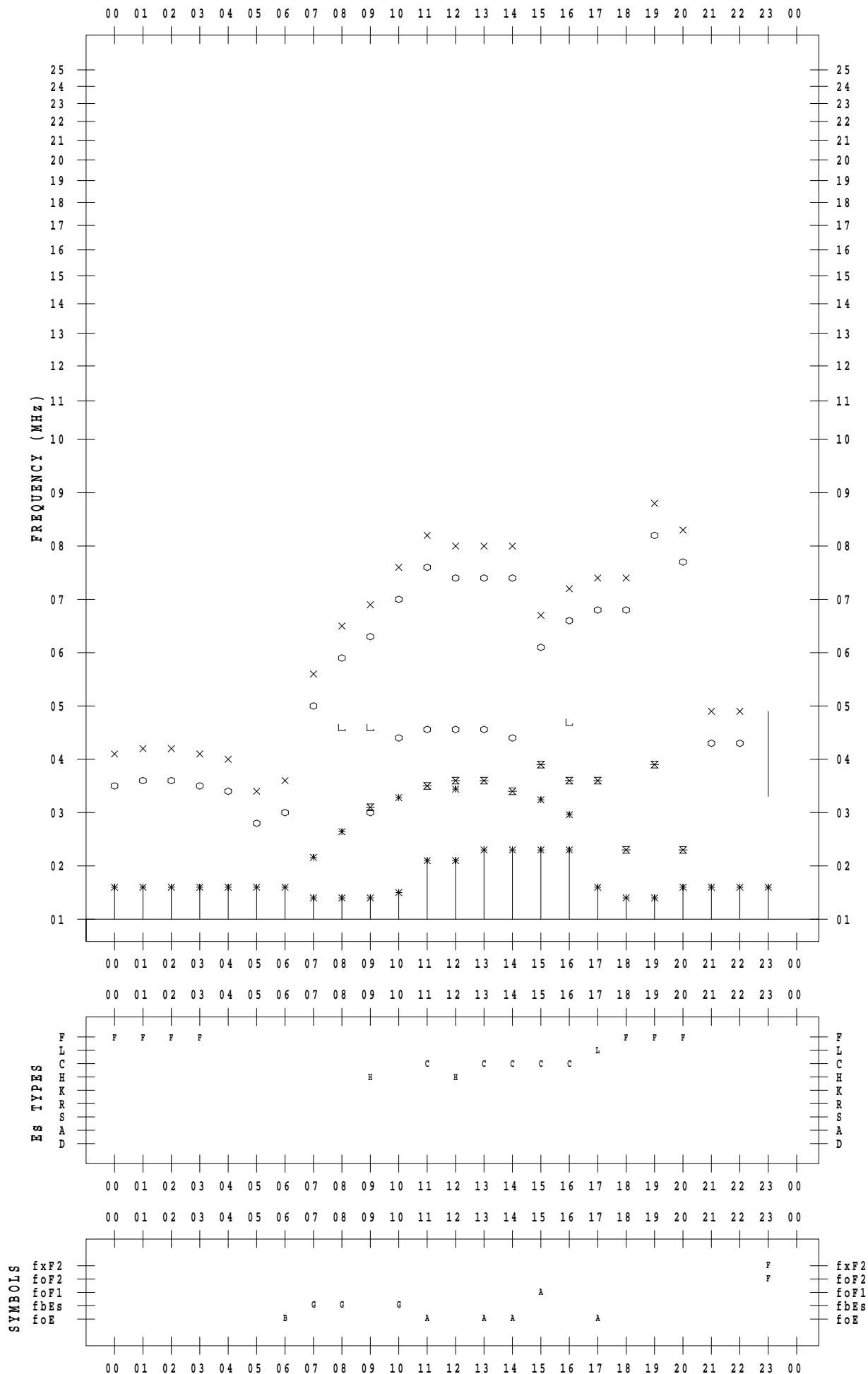
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 20

135 ° E MEAN TIME



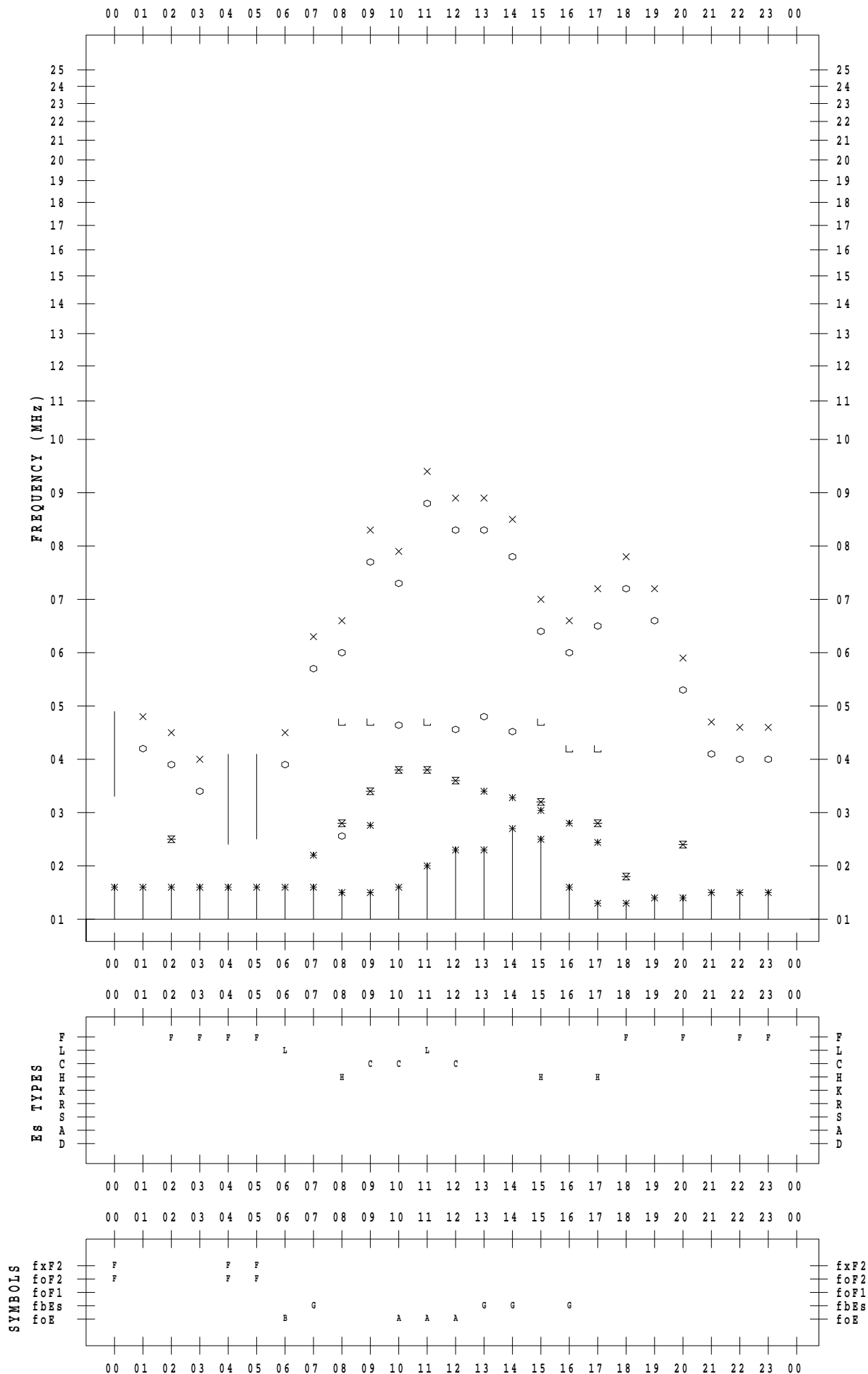
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 21

135 ° E MEAN TIME



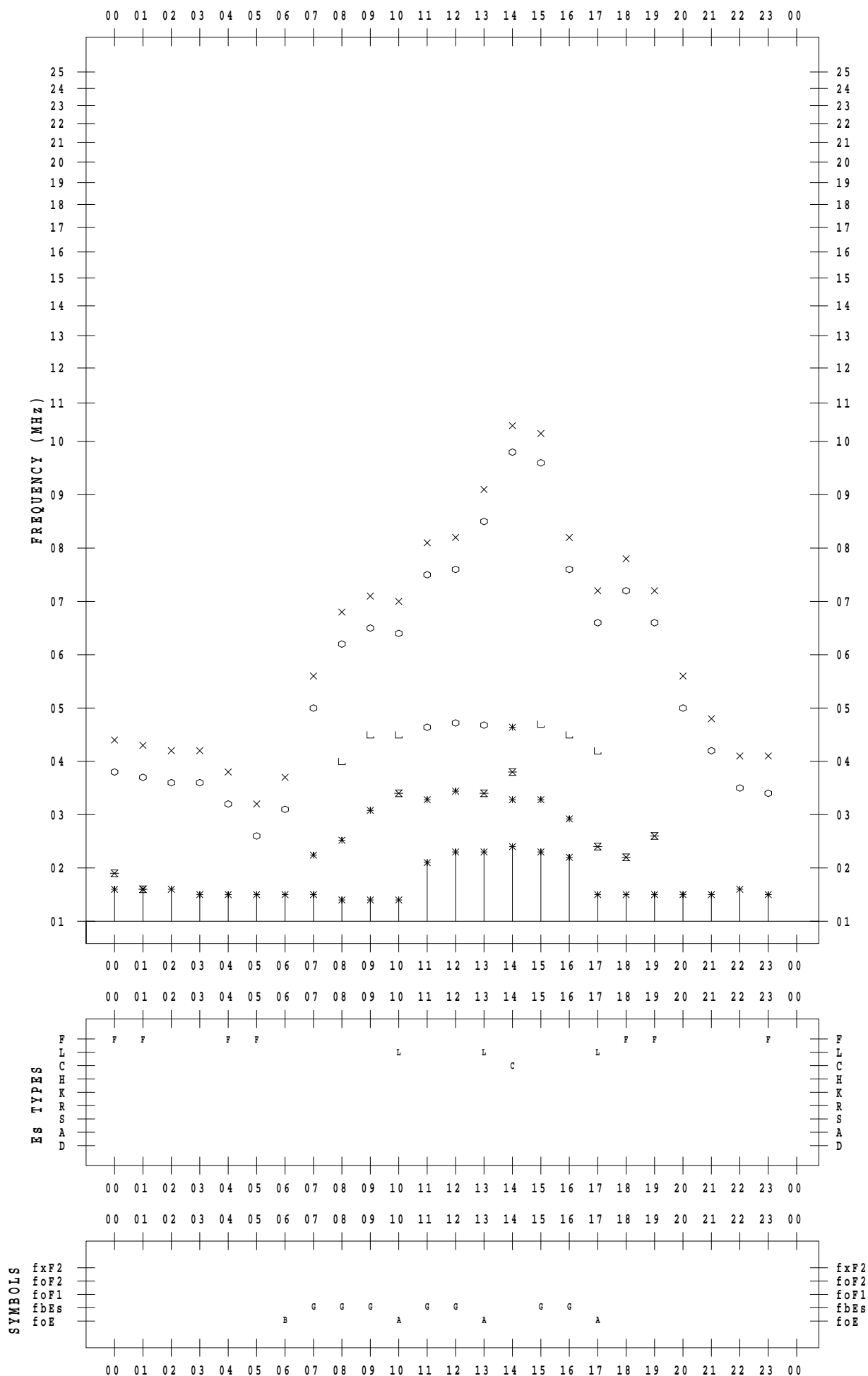
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 22

135 ° E MEAN TIME





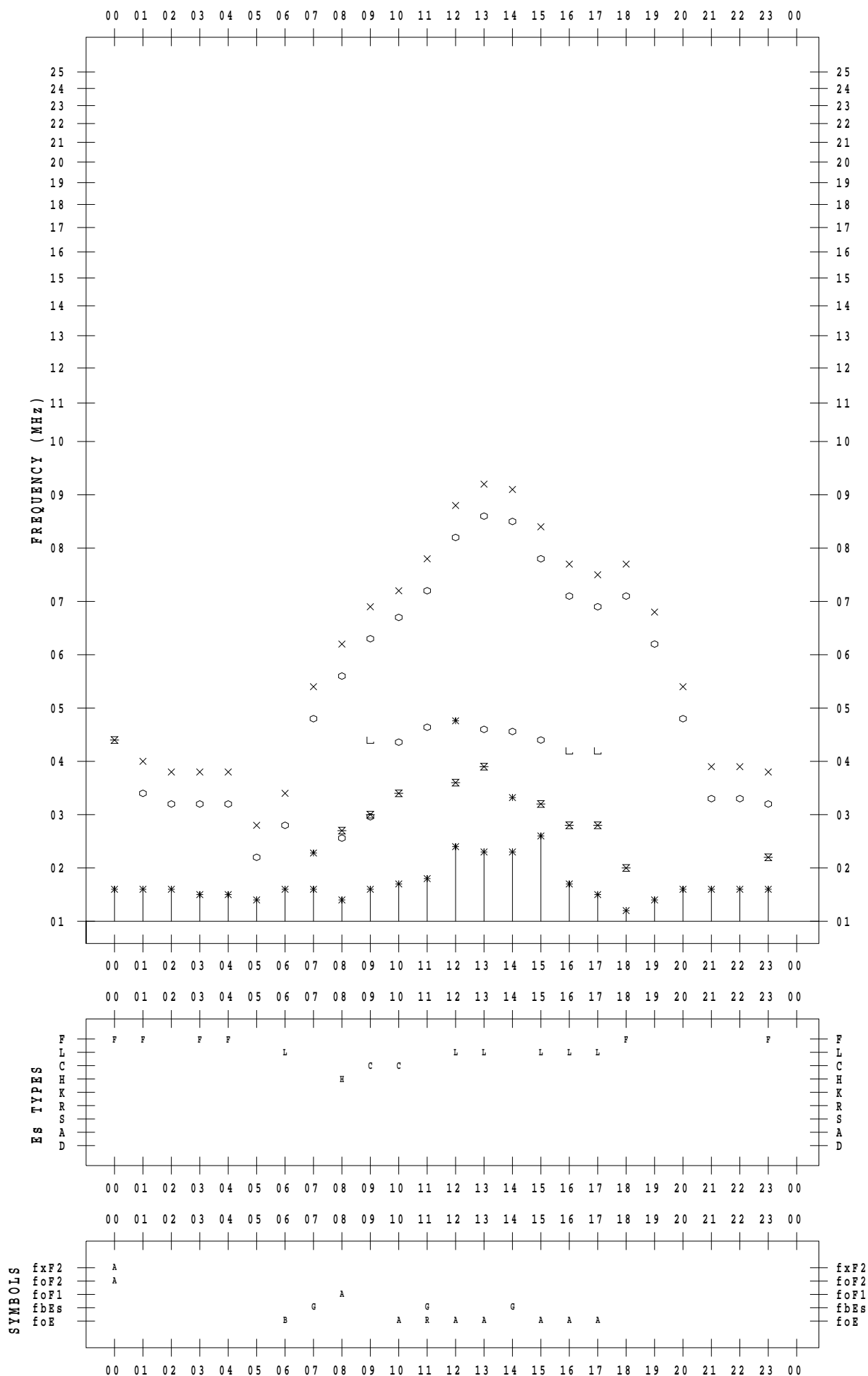
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 23

135 ° E MEAN TIME



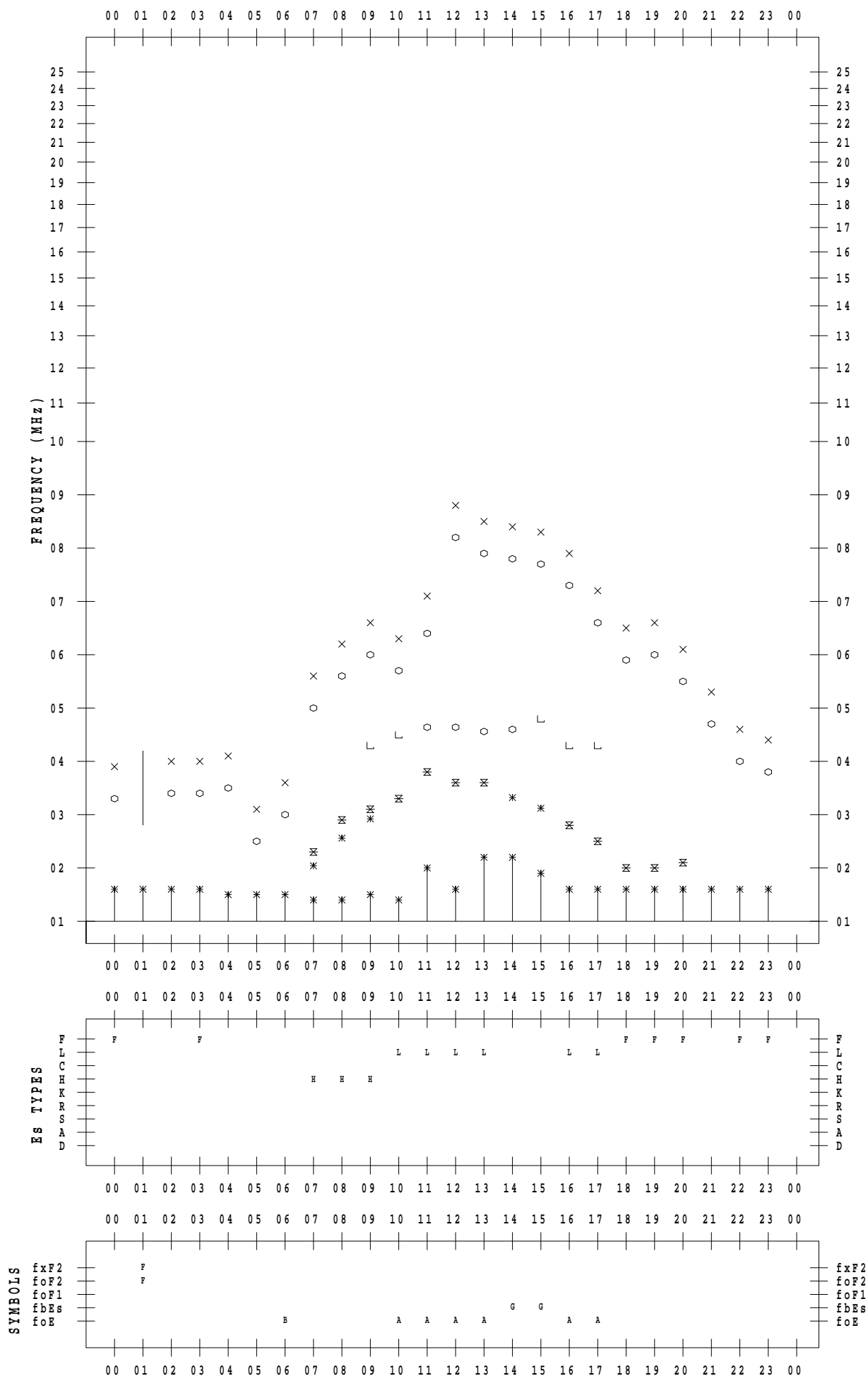
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 24

135 ° E MEAN TIME



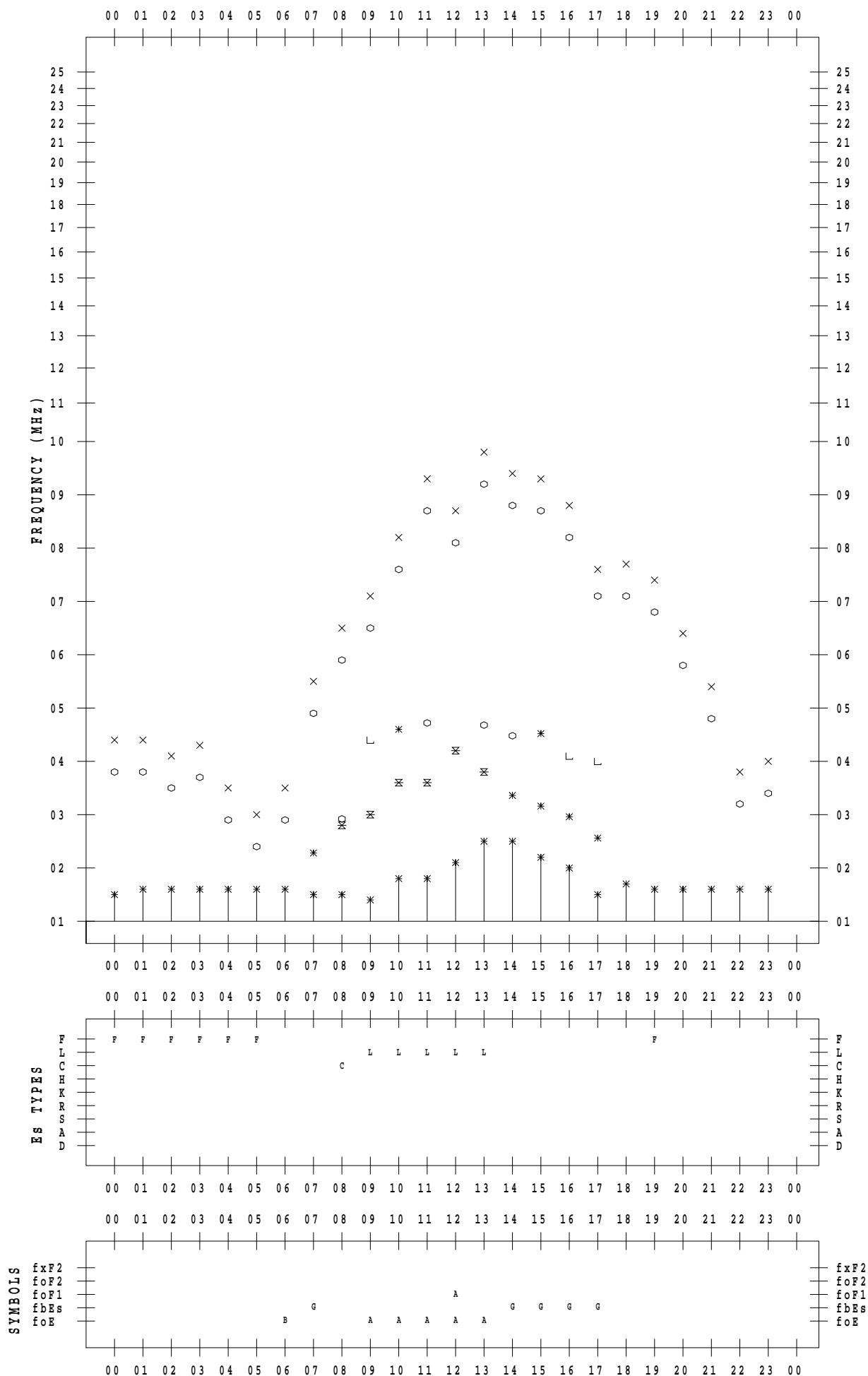
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 25

135 ° E MEAN TIME



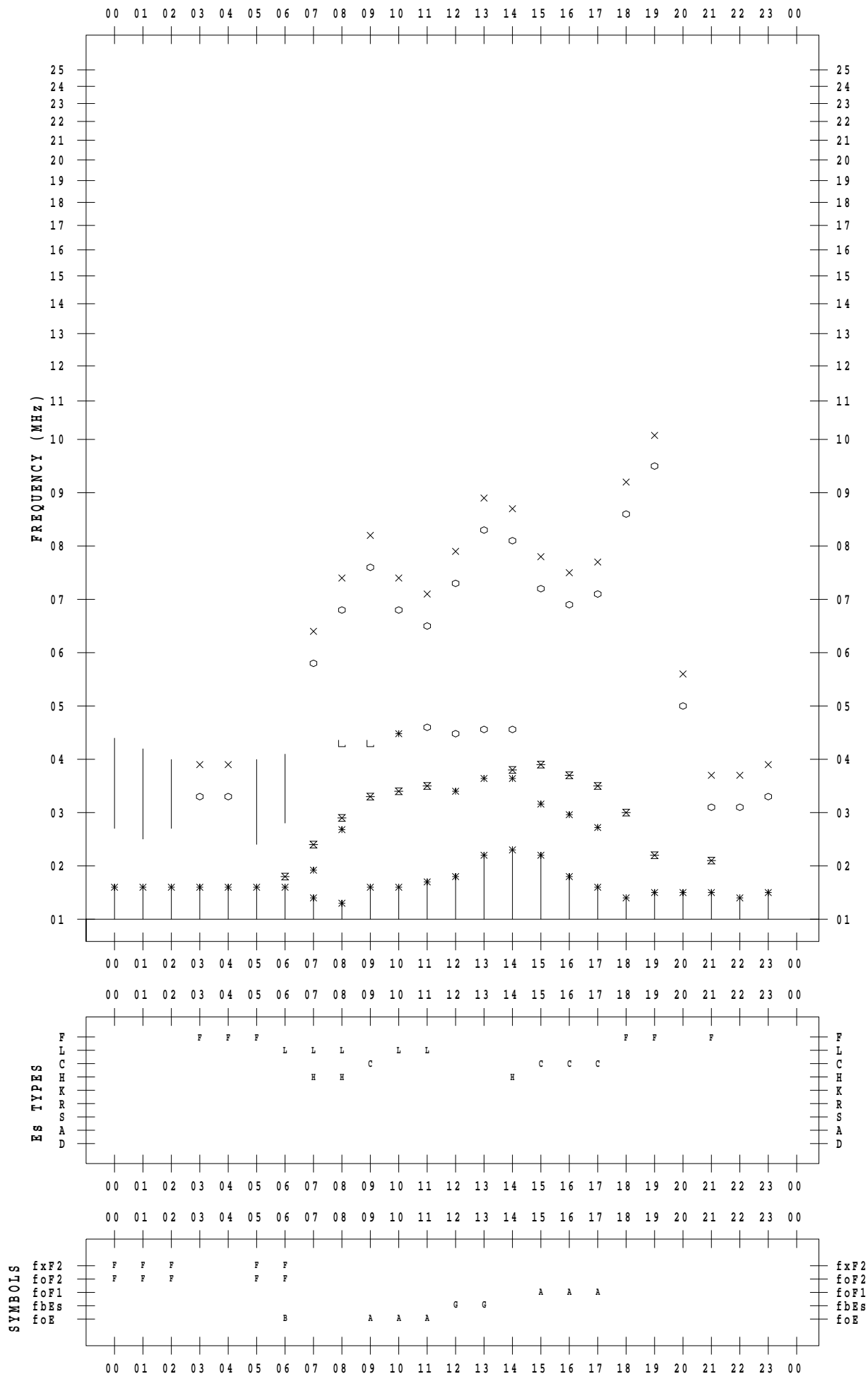
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 26

135 ° E MEAN TIME



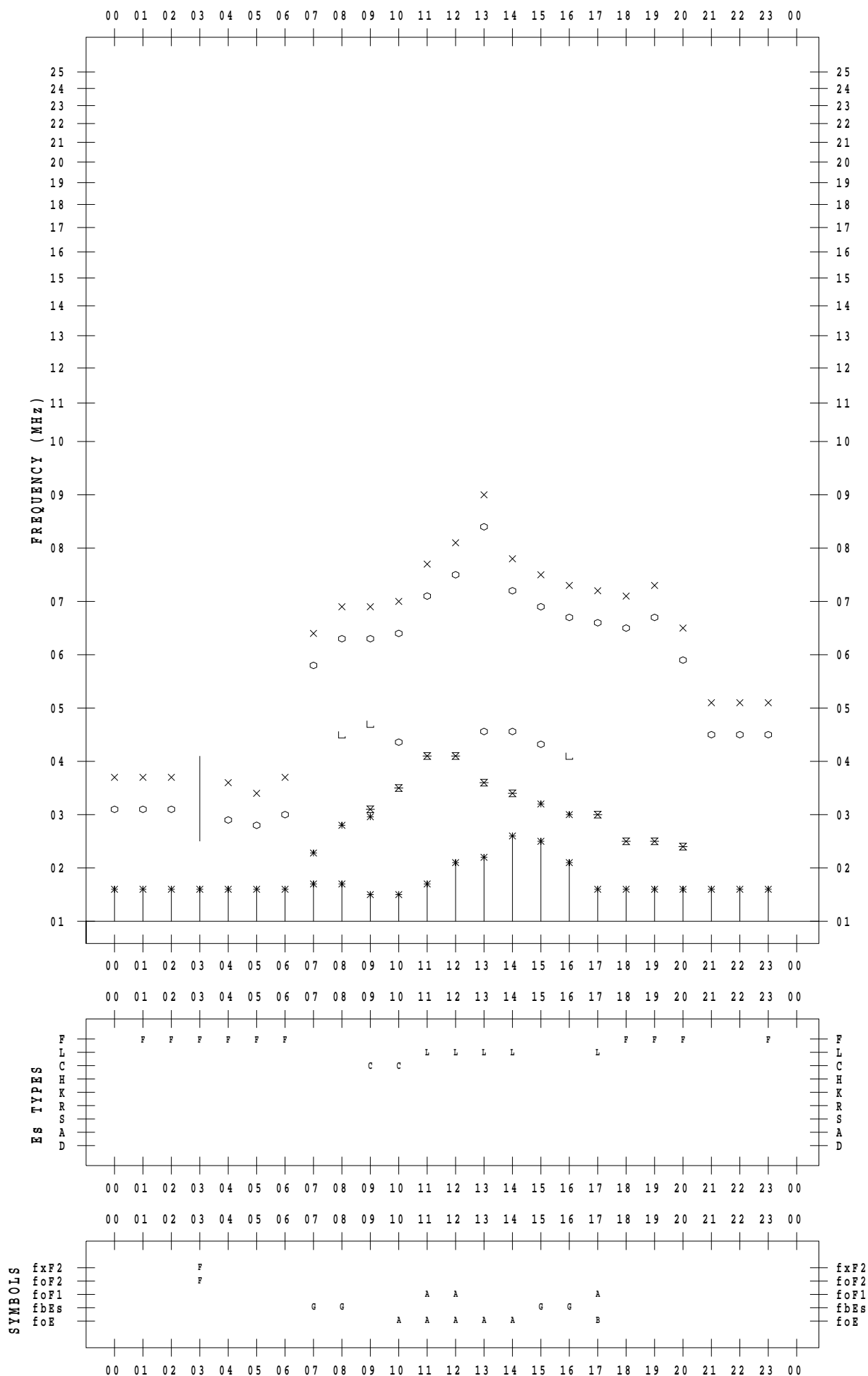
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 27

135 ° E MEAN TIME



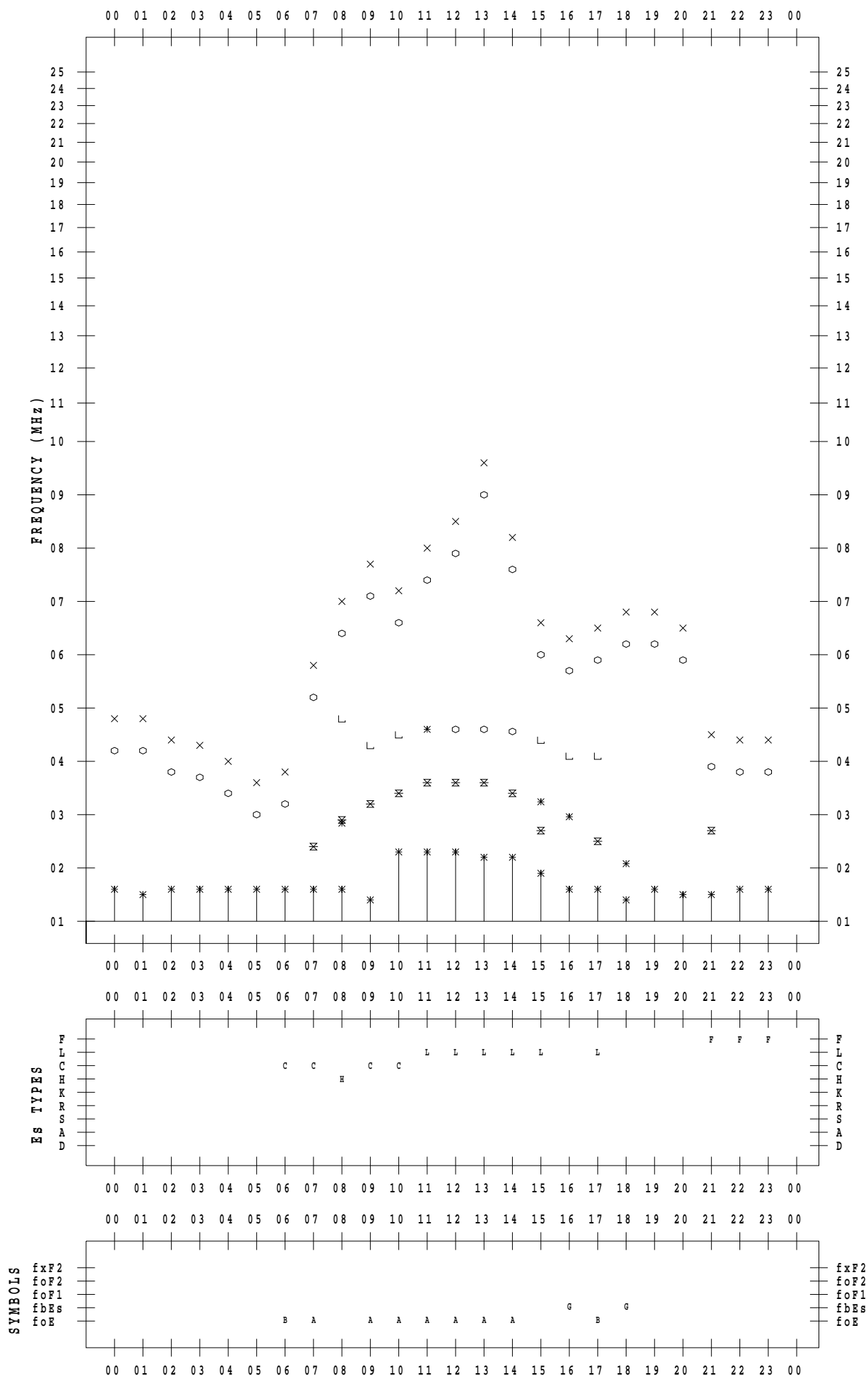
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 28

135 ° E MEAN TIME



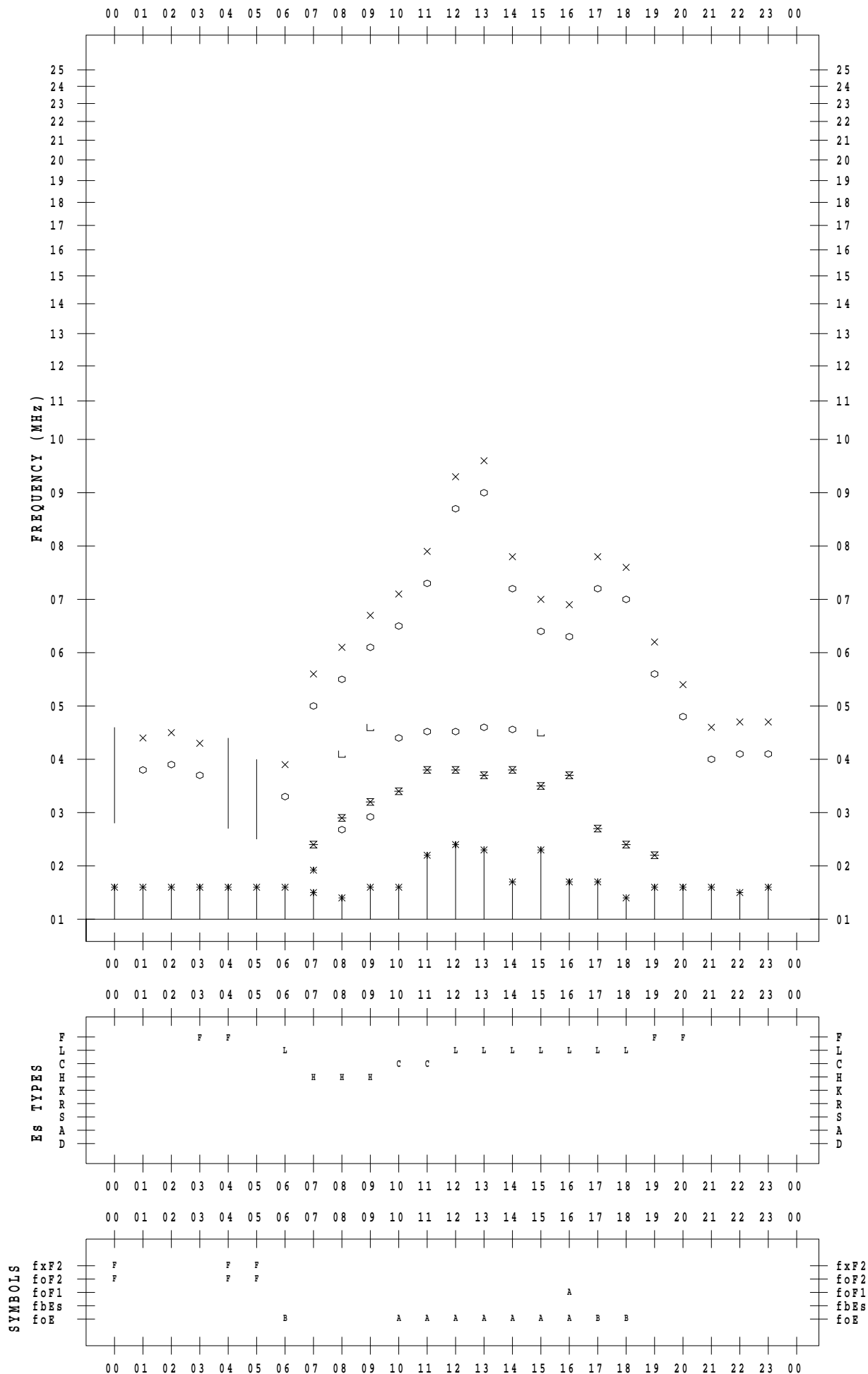
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 29

135 ° E MEAN TIME



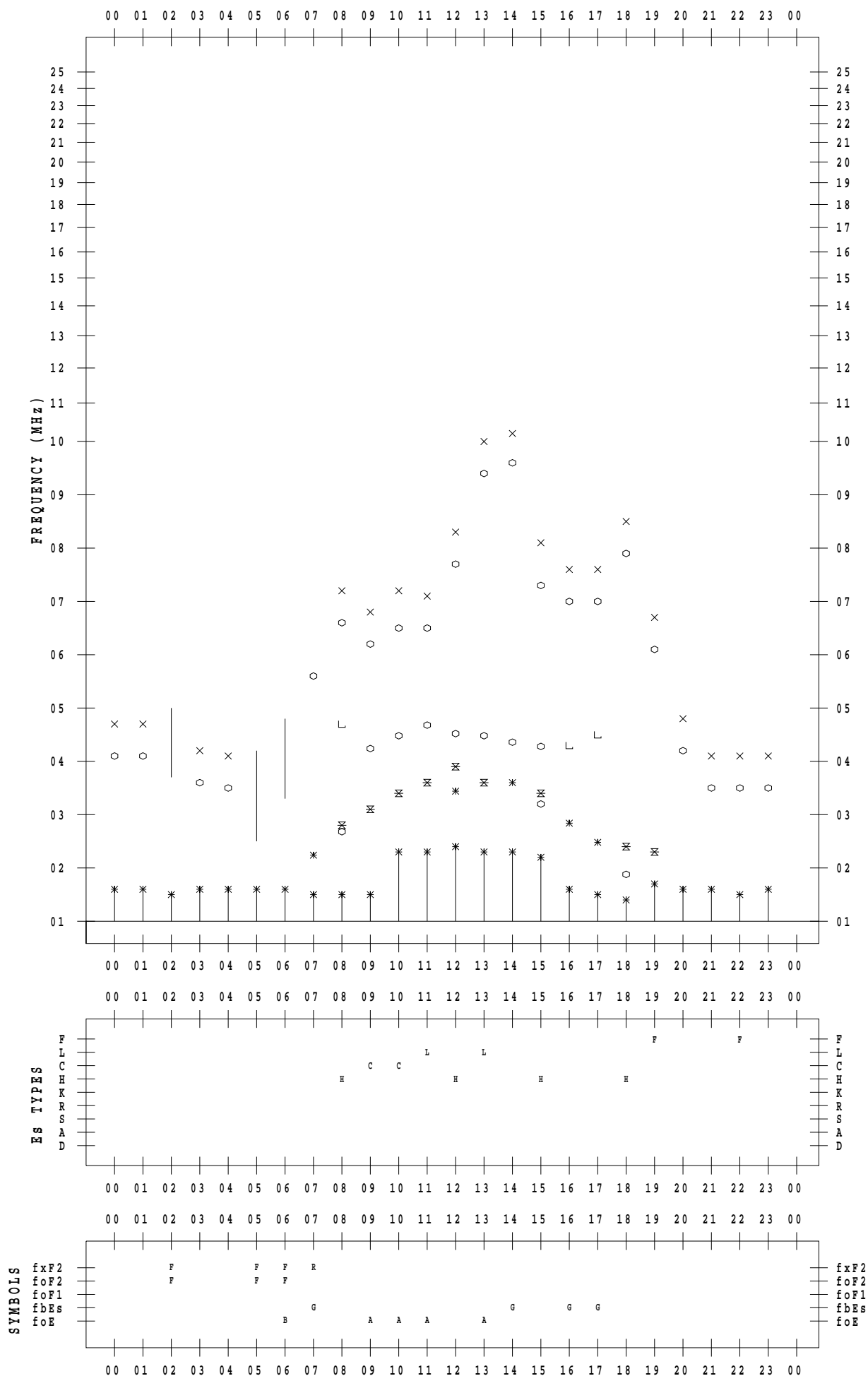
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 30

135 ° E MEAN TIME





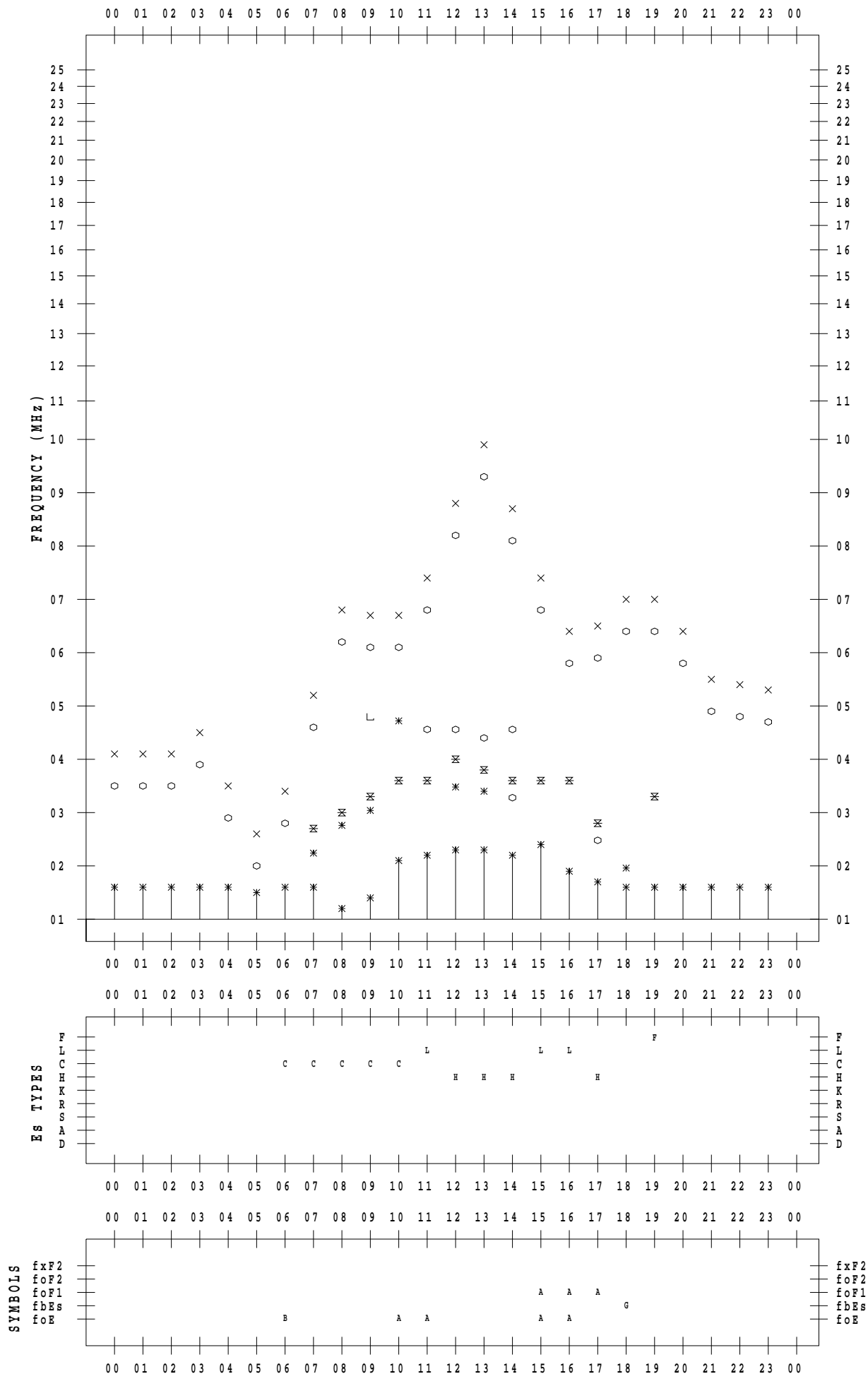
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 3 / 31

135 ° E MEAN TIME



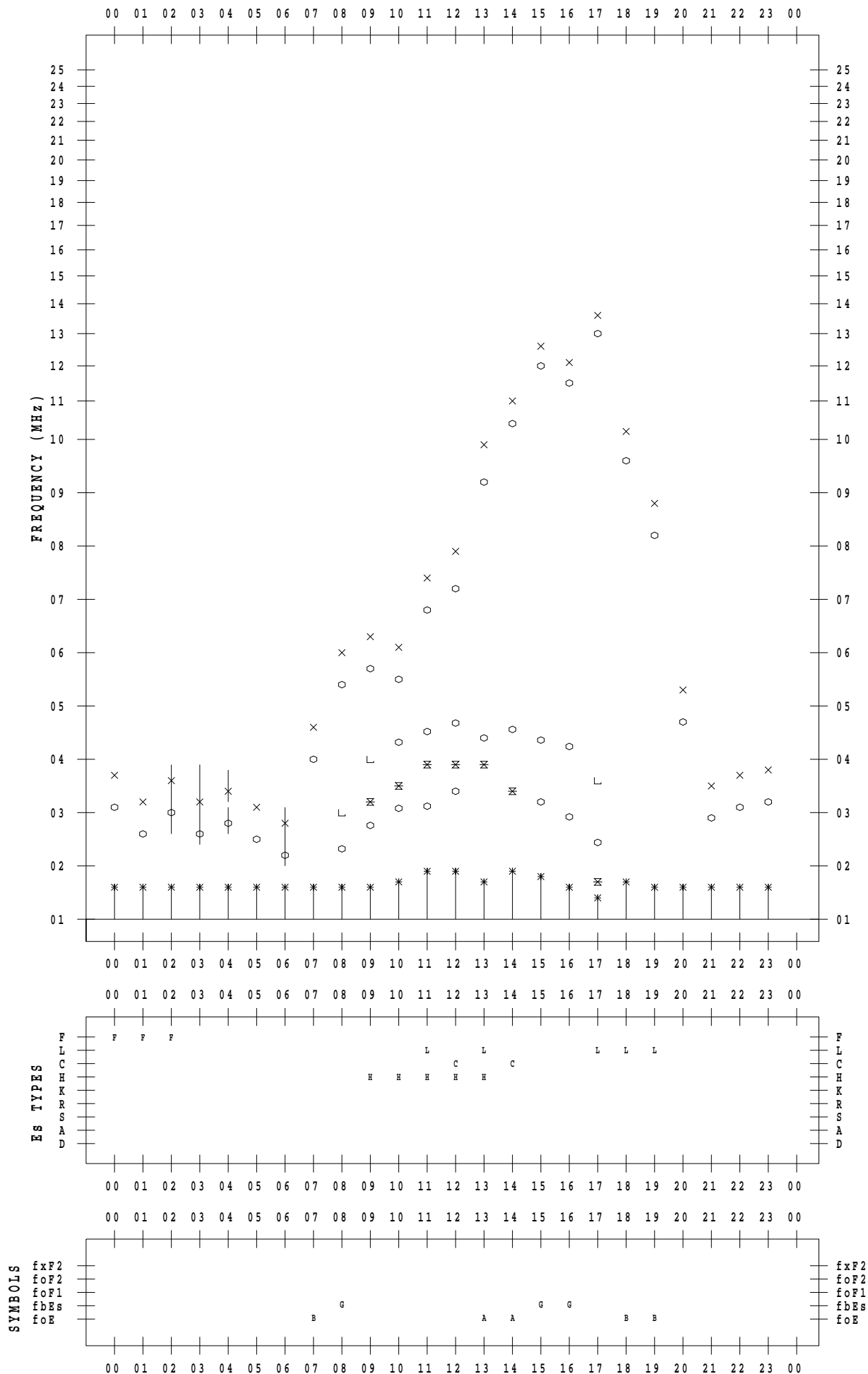
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 1

135 ° E MEAN TIME



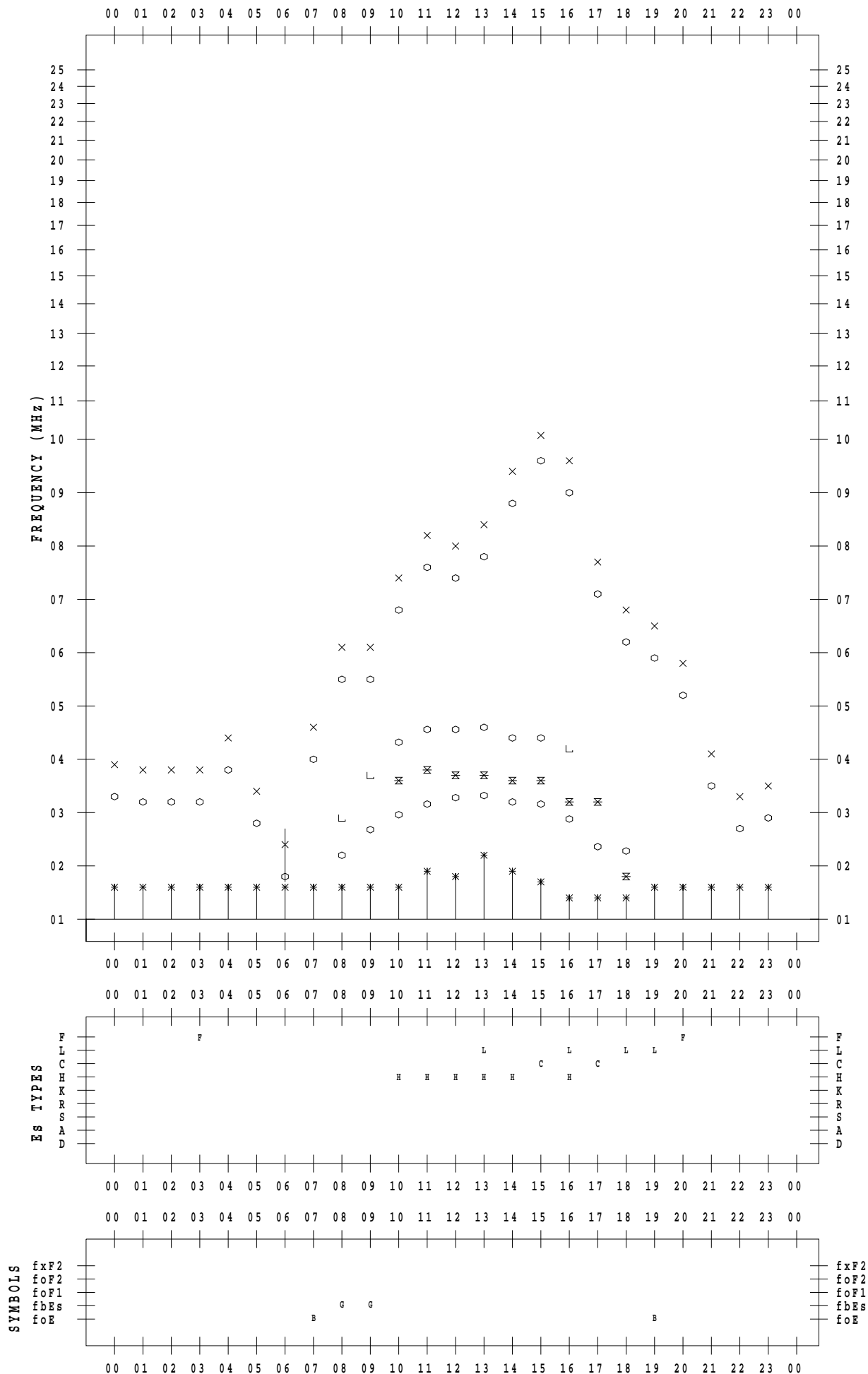
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 2

135 ° E MEAN TIME



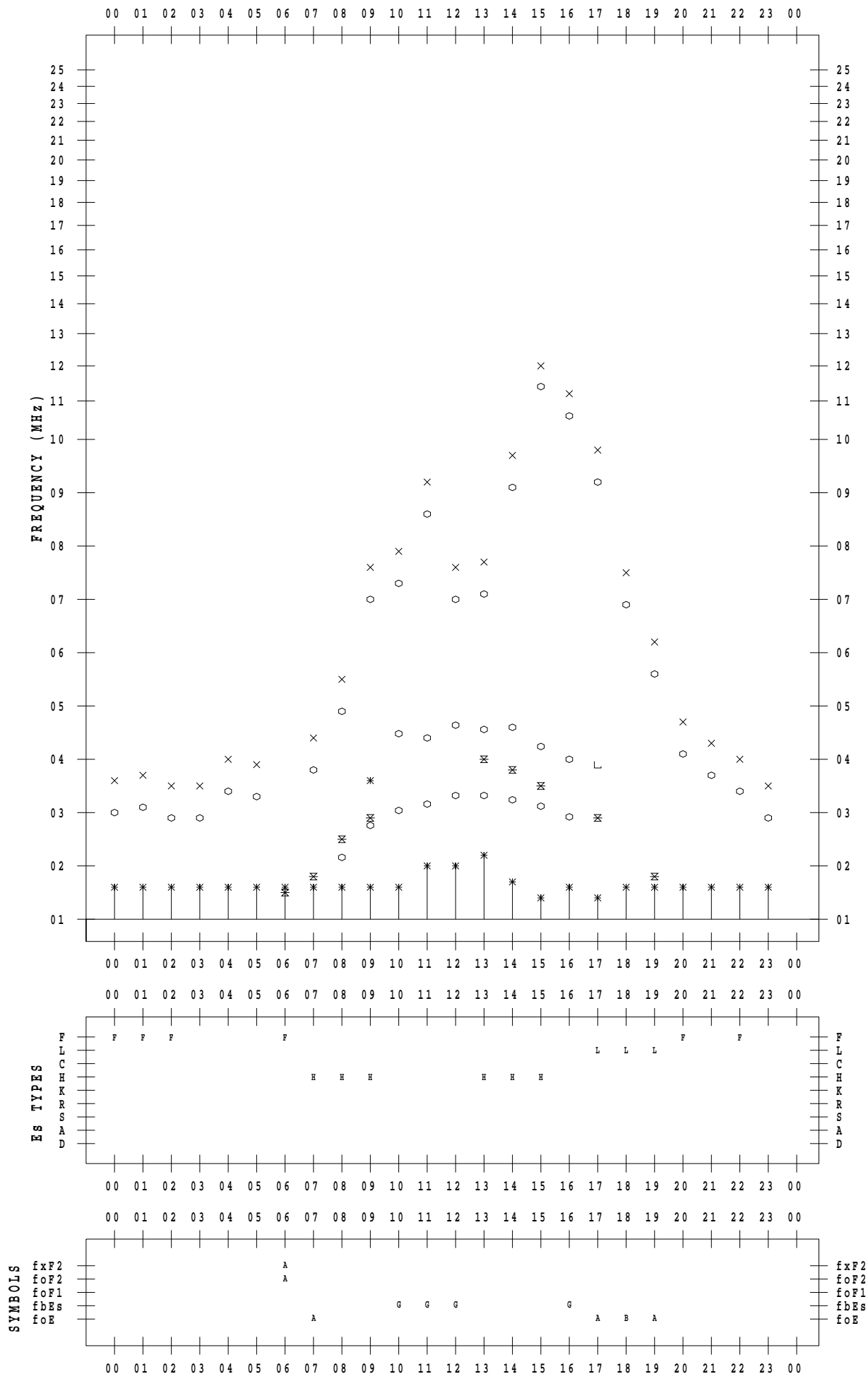
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 3

135 ° E MEAN TIME



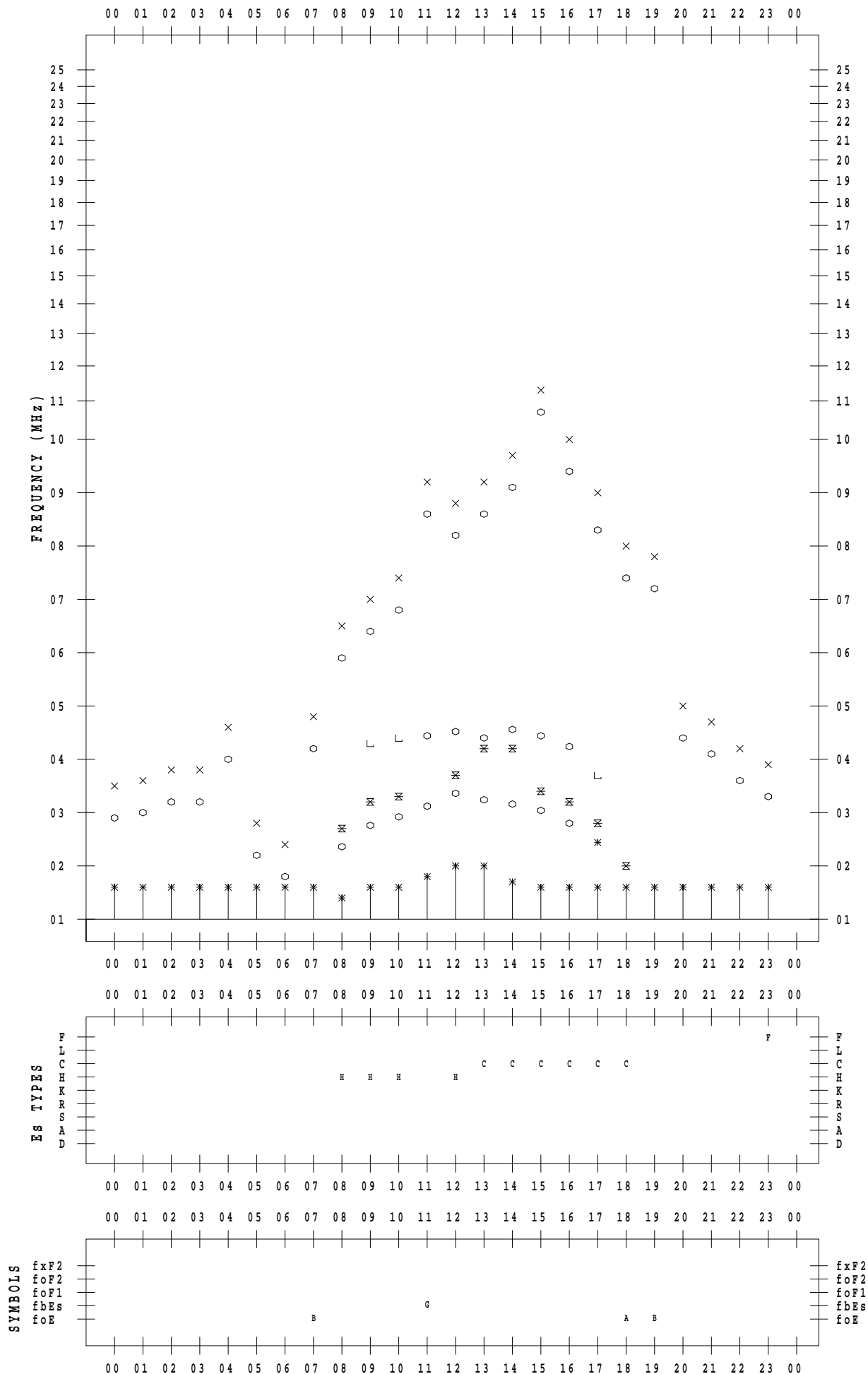
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 4

135 ° E MEAN TIME



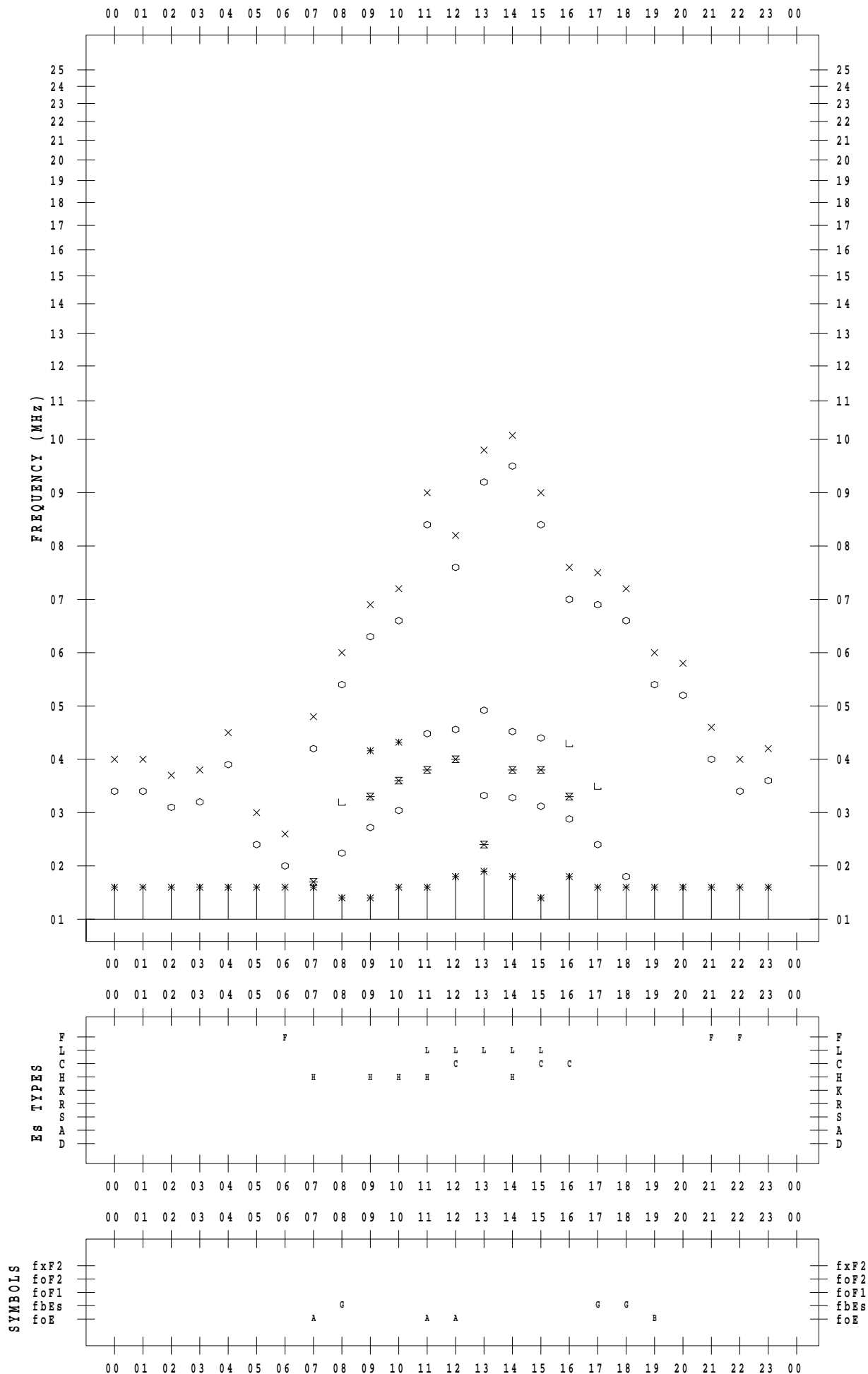
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 5

135 ° E MEAN TIME



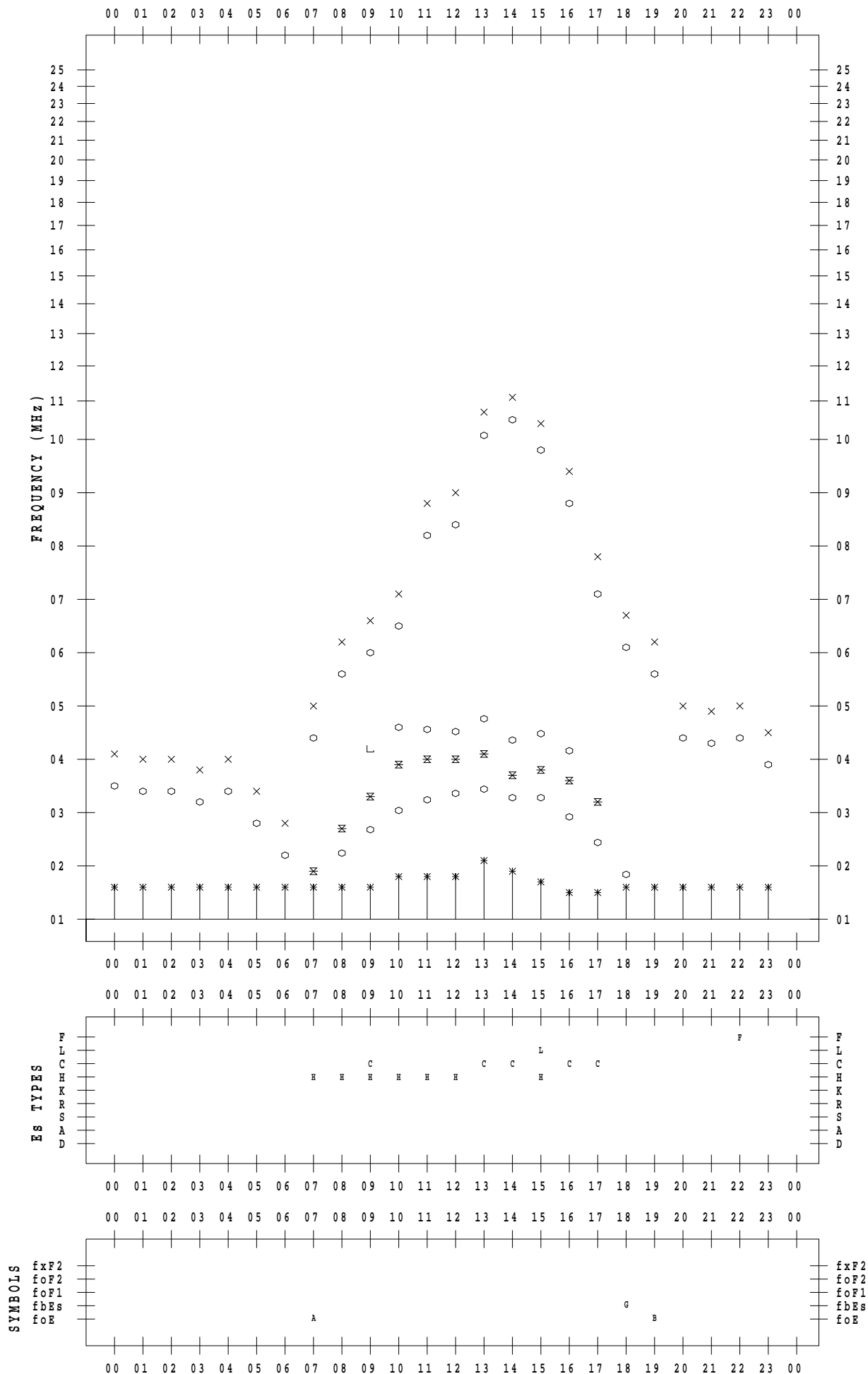
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 6

135 ° E MEAN TIME



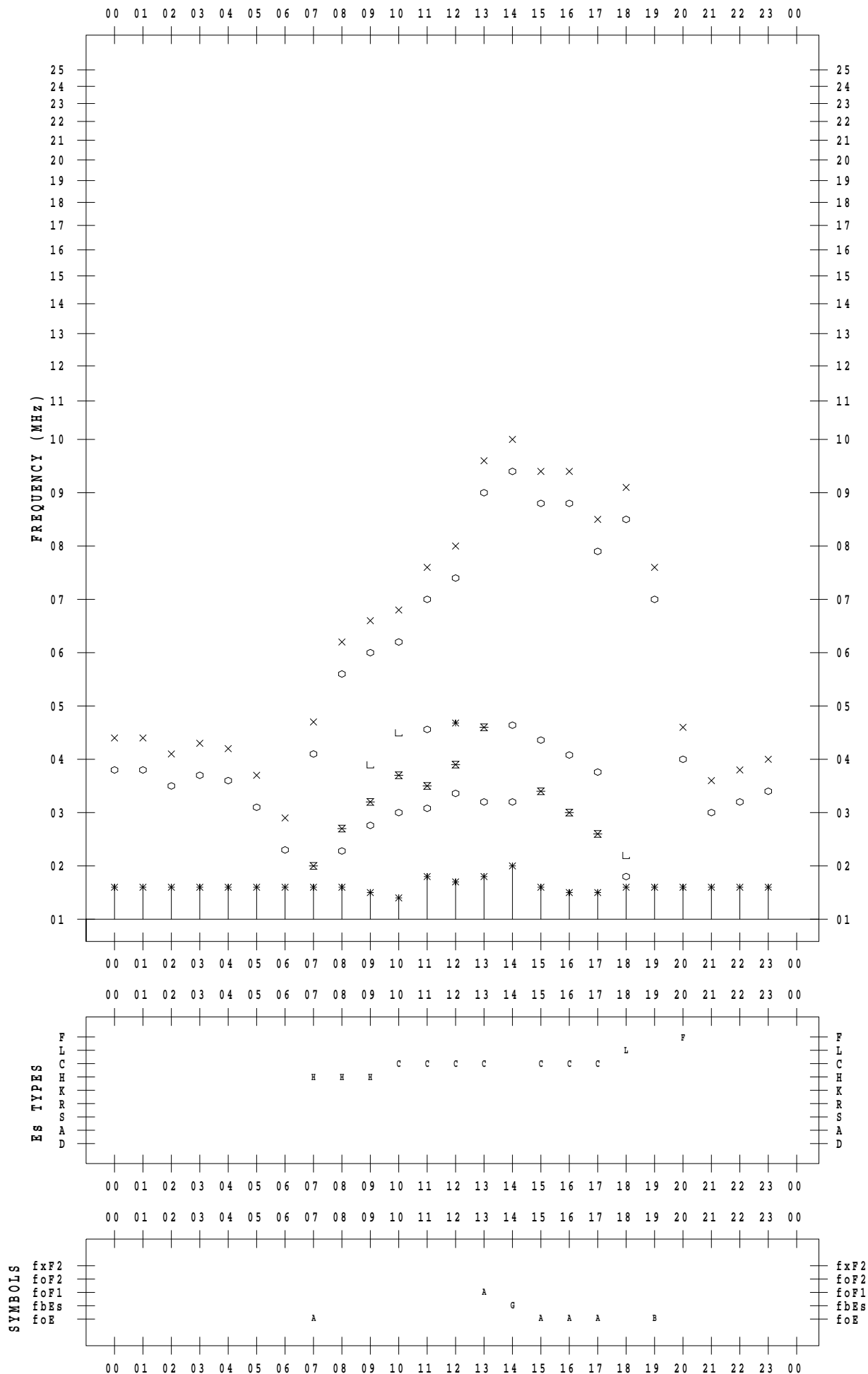
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 7

135 ° E MEAN TIME





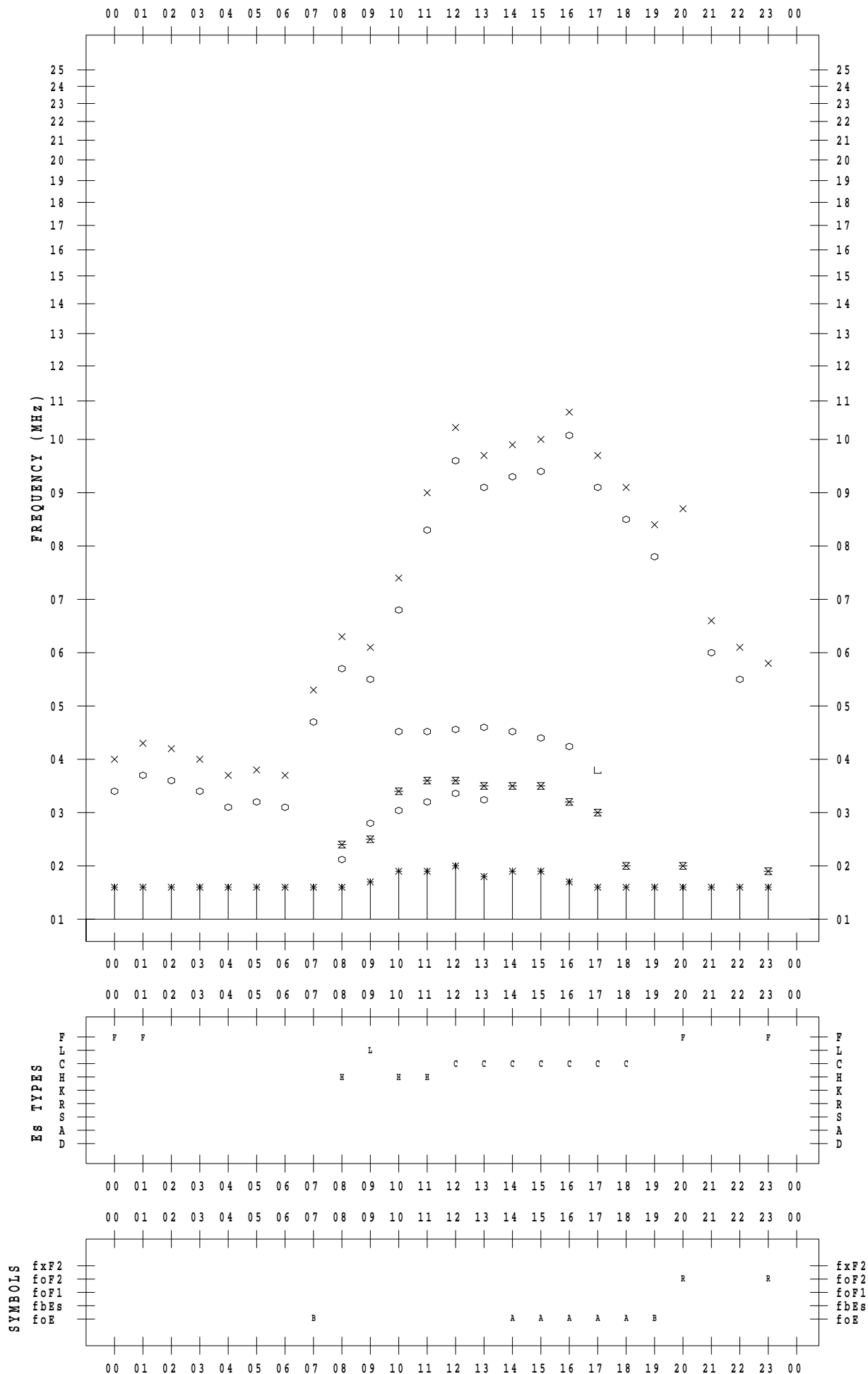
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 8

135 ° E MEAN TIME



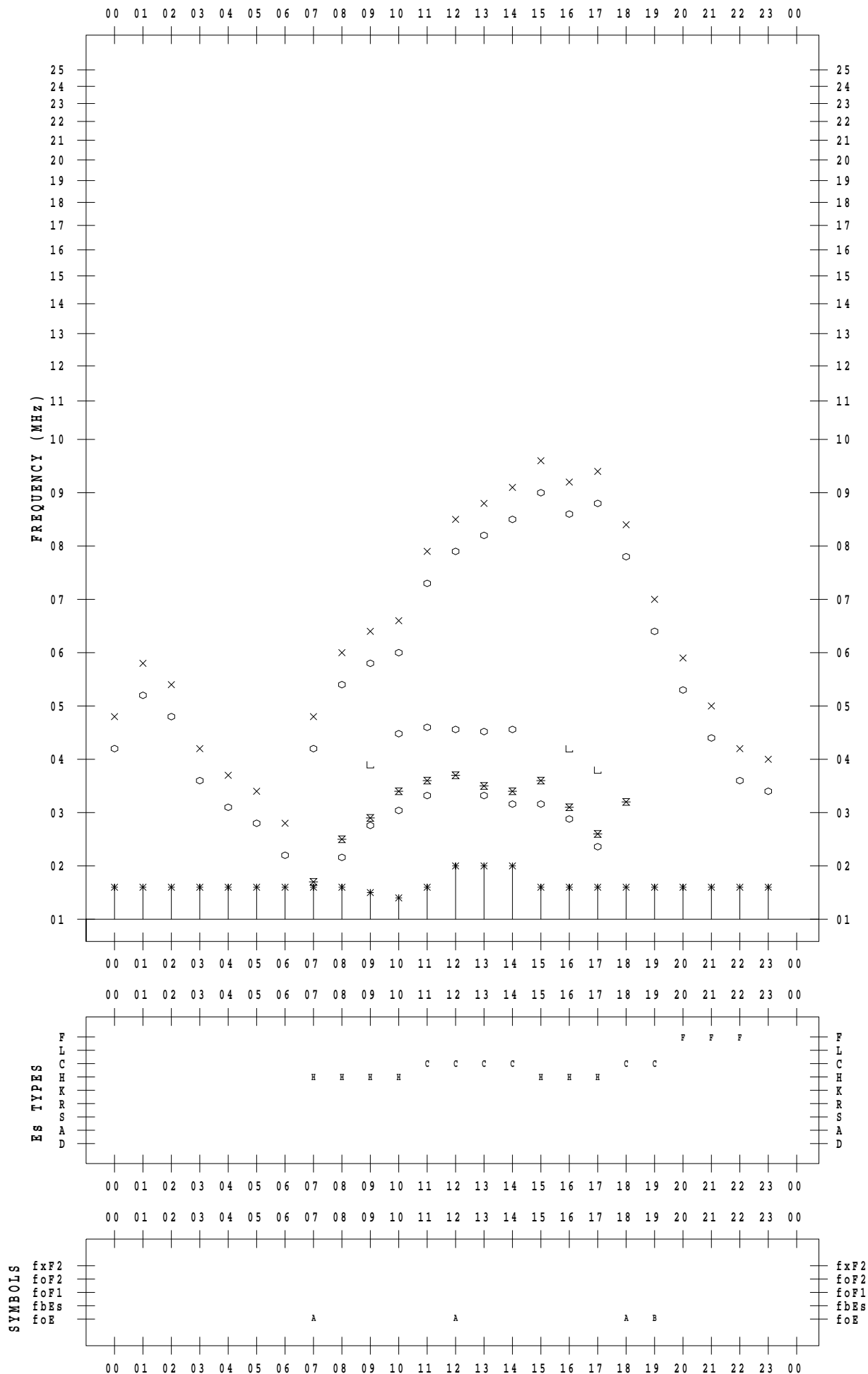
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 9

135 ° E MEAN TIME



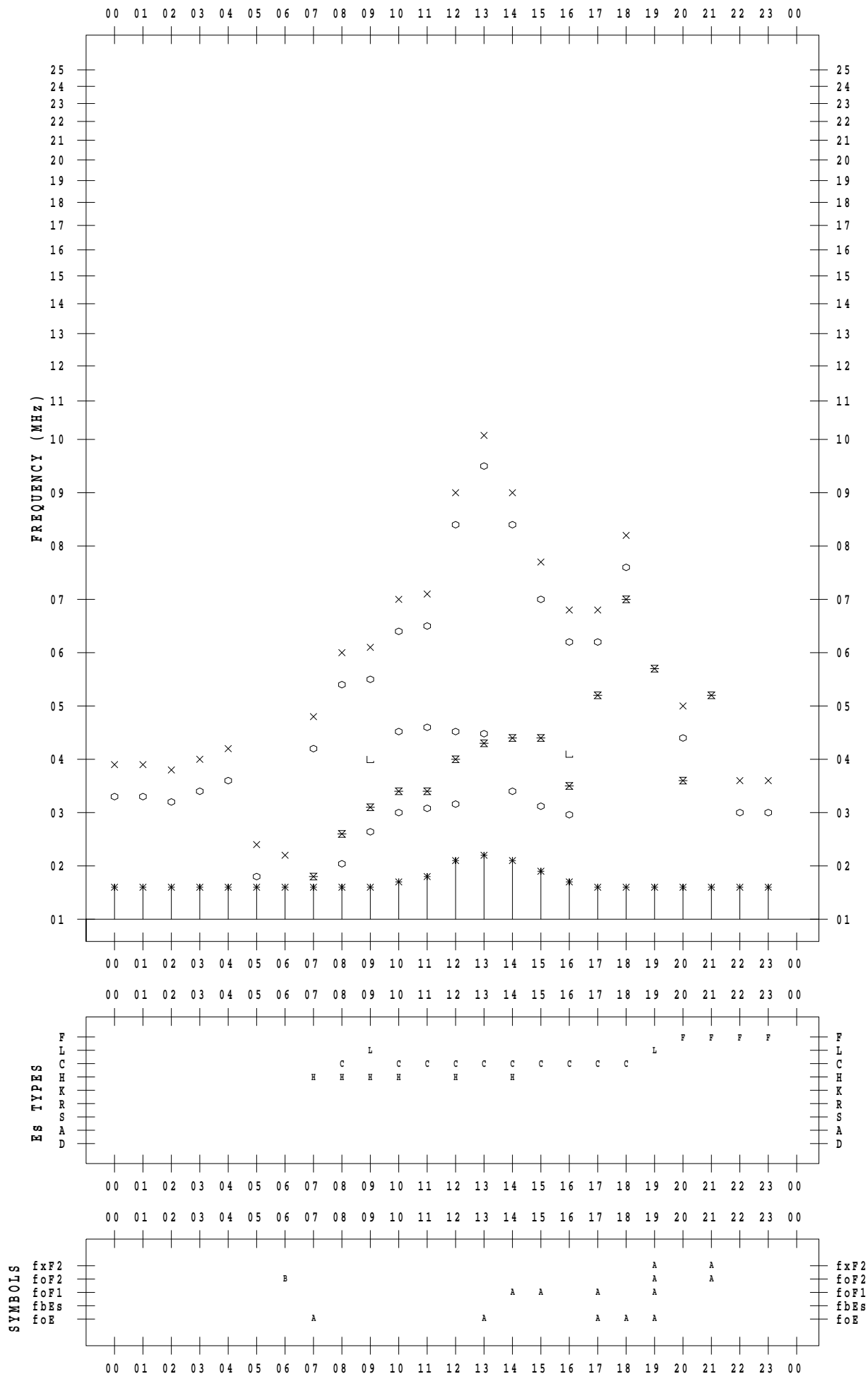
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 3/10

135 ° E MEAN TIME



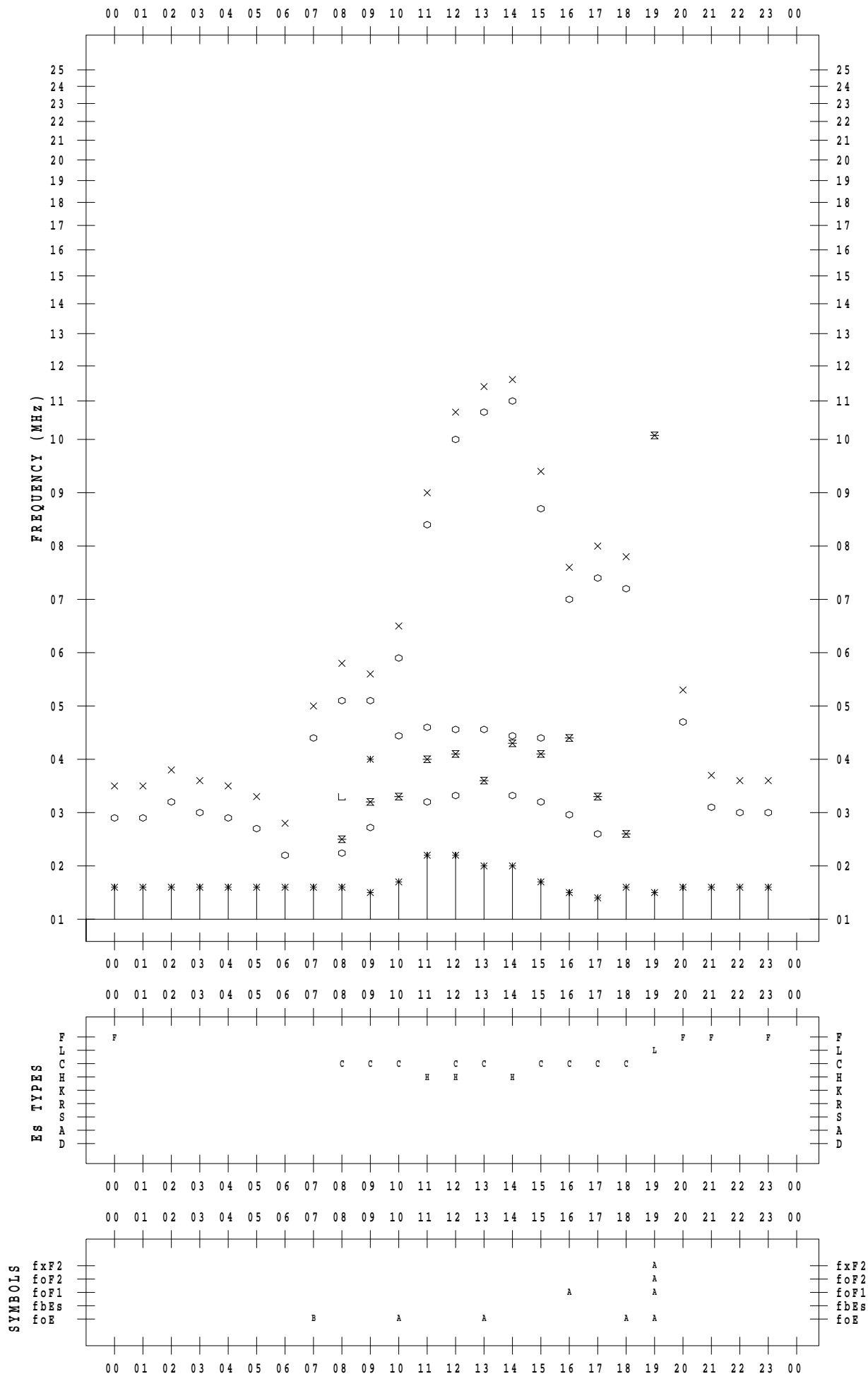
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 3/11

135 ° E MEAN TIME



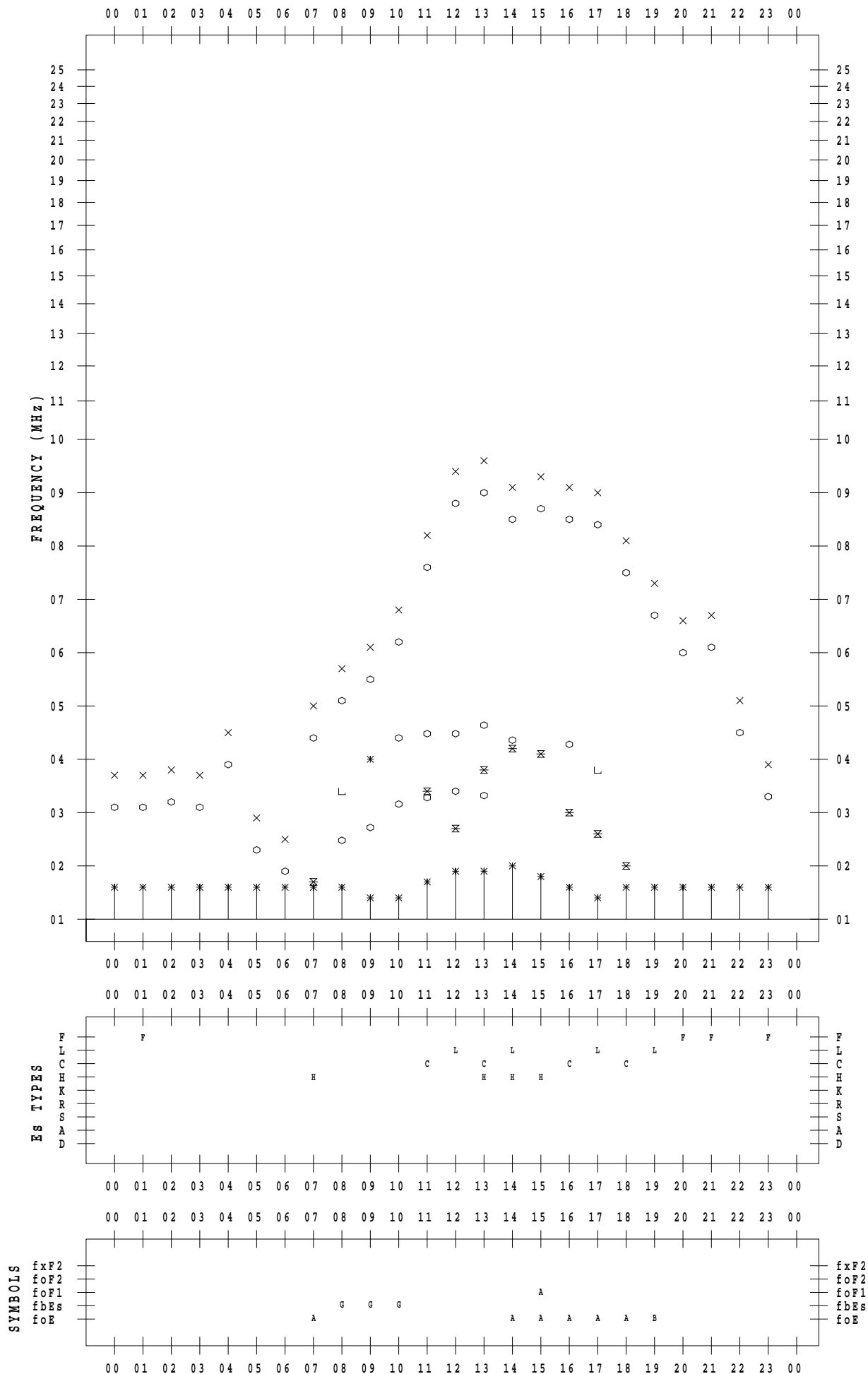
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 3/12

135 ° E MEAN TIME



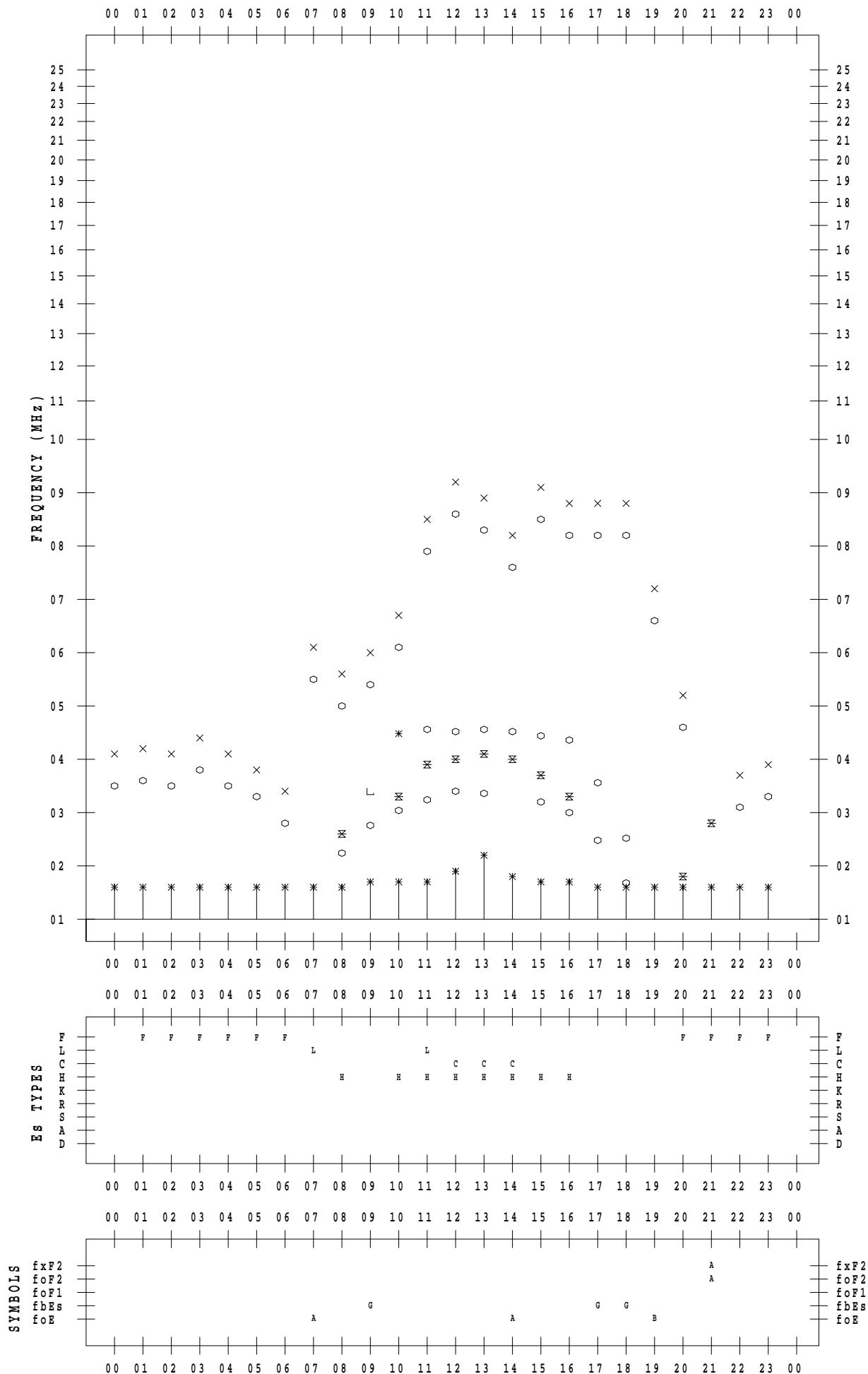
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 3/13

135 ° E MEAN TIME



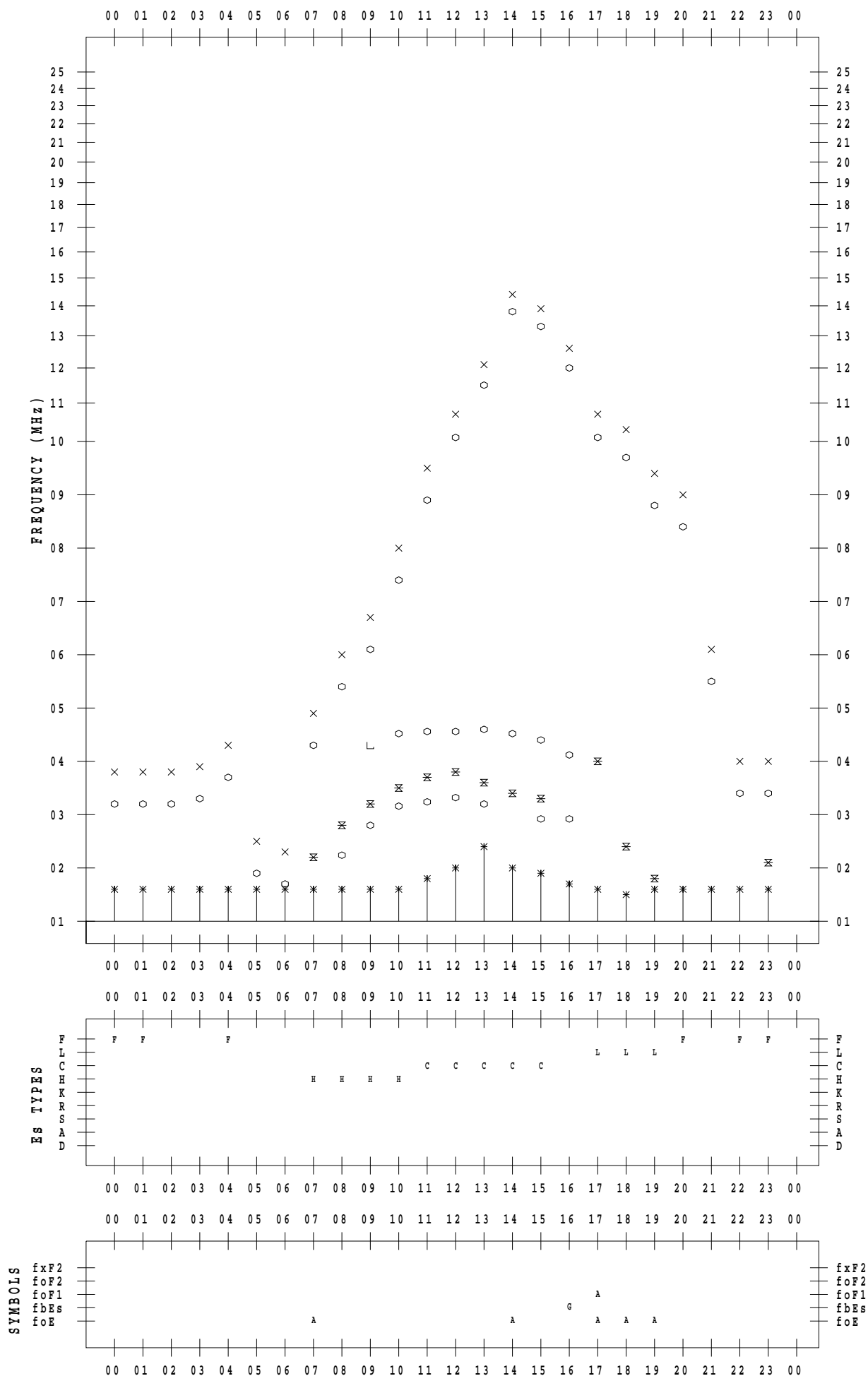
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 3/14

135 ° E MEAN TIME



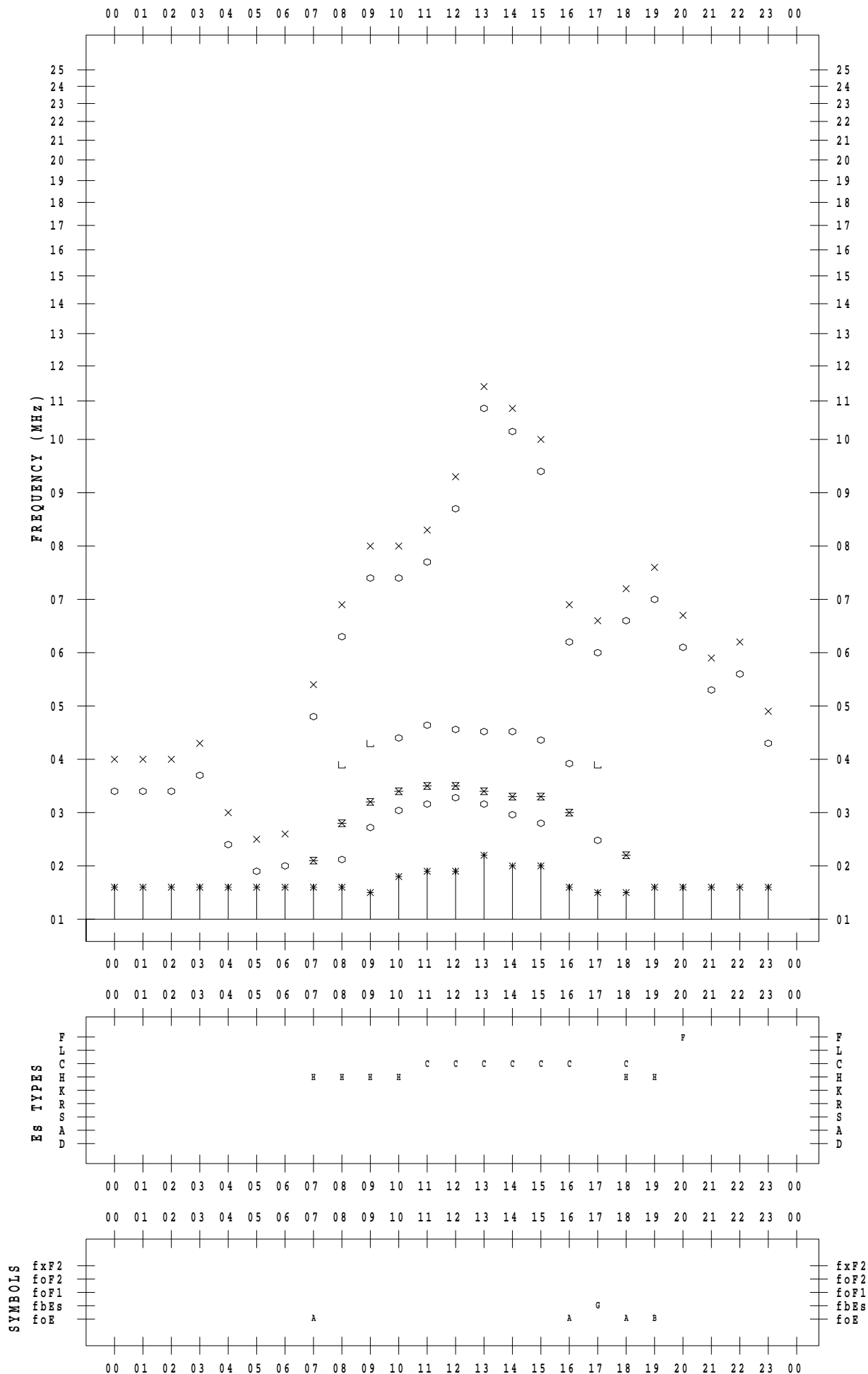
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 3/15

135 ° E MEAN TIME





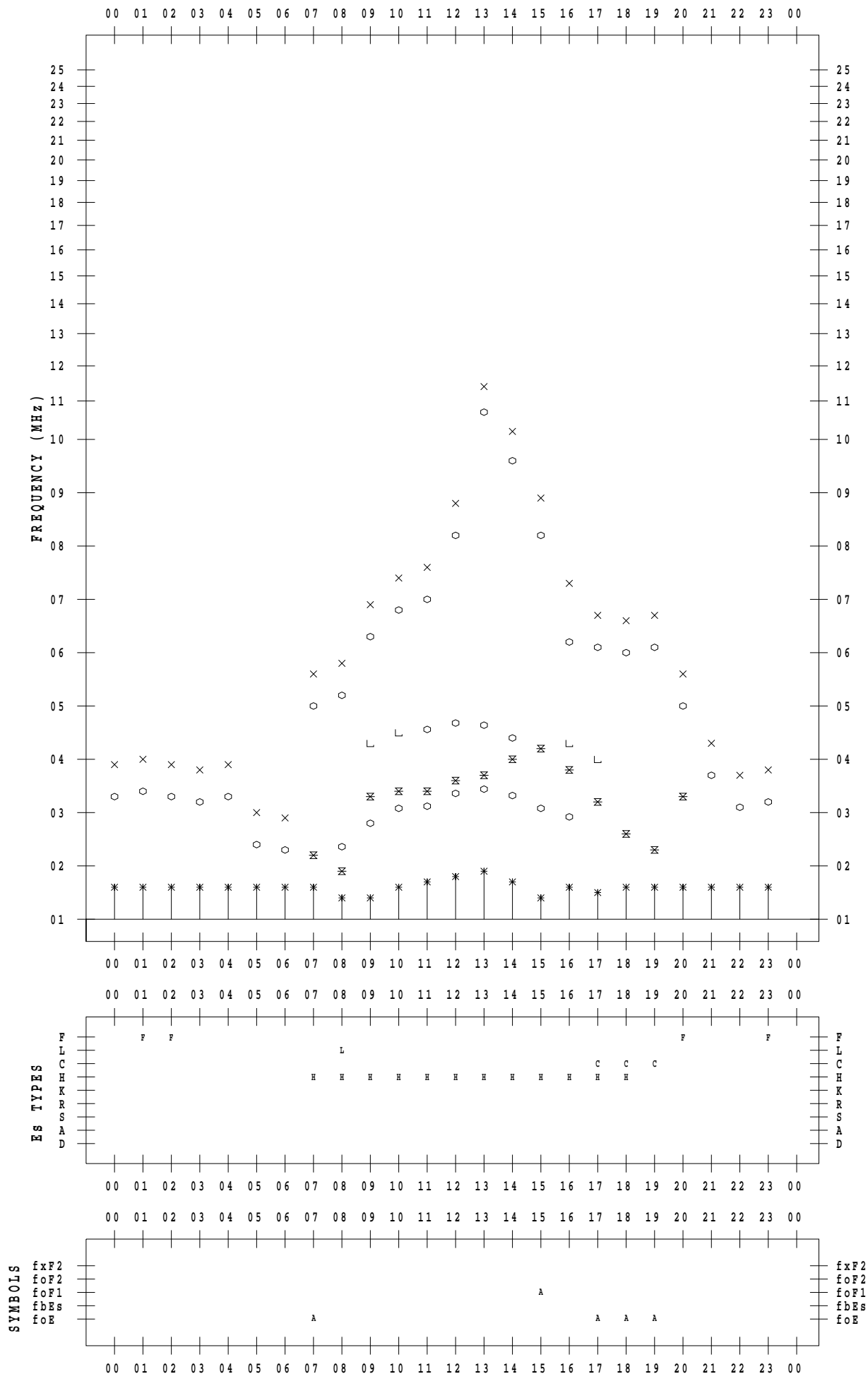
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 16

135 ° E MEAN TIME



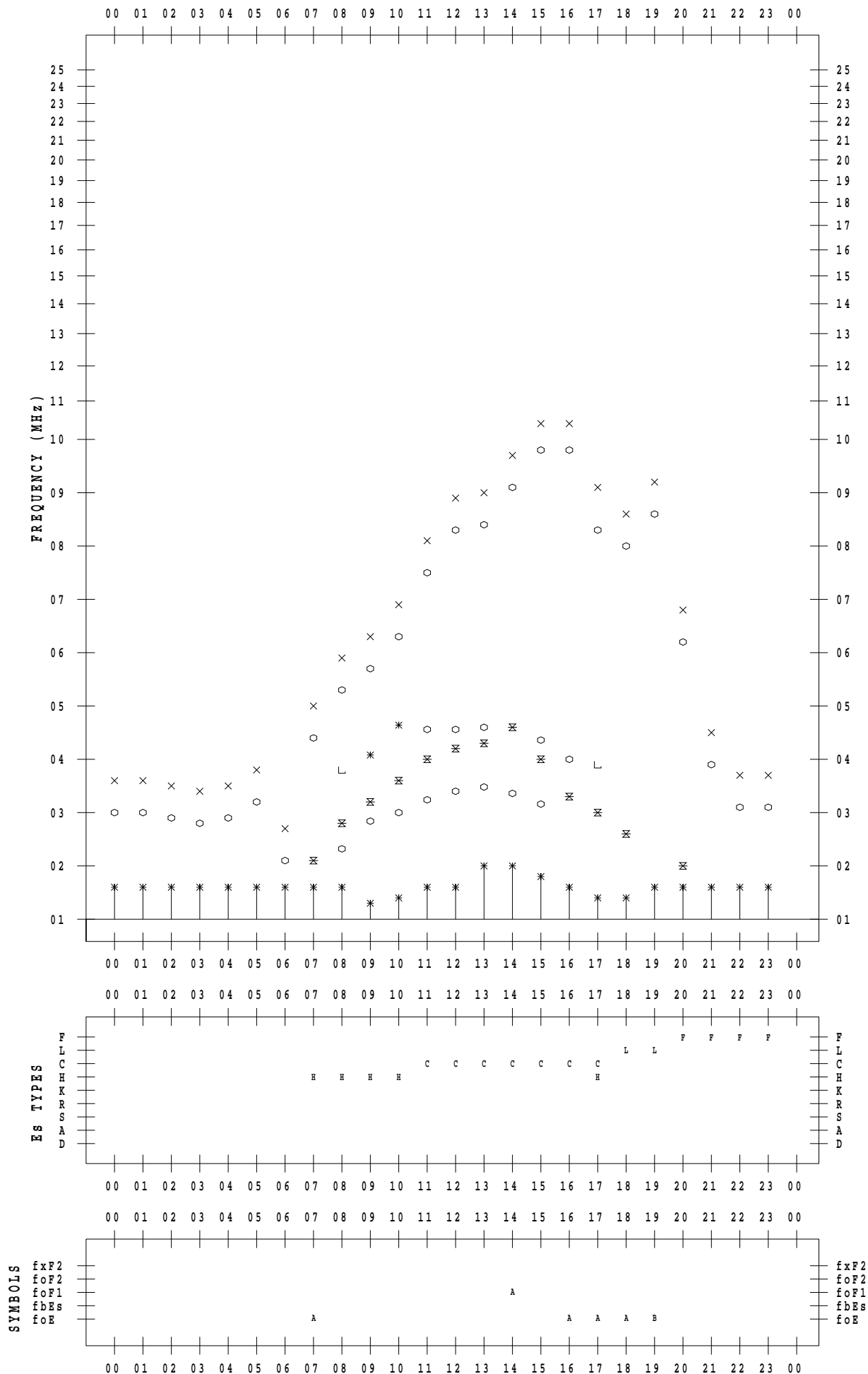
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 3/17

135 ° E MEAN TIME



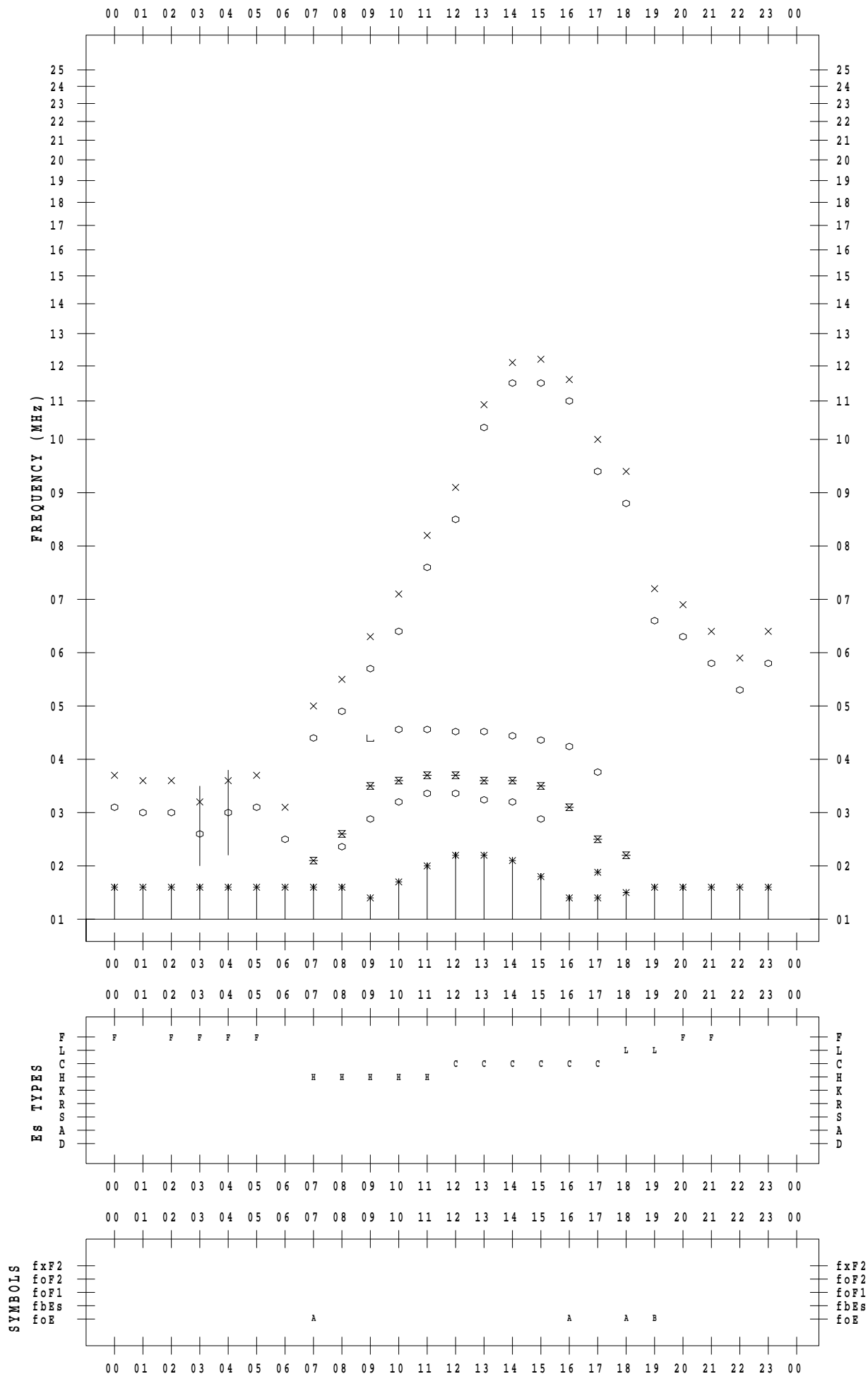
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 18

135 ° E MEAN TIME



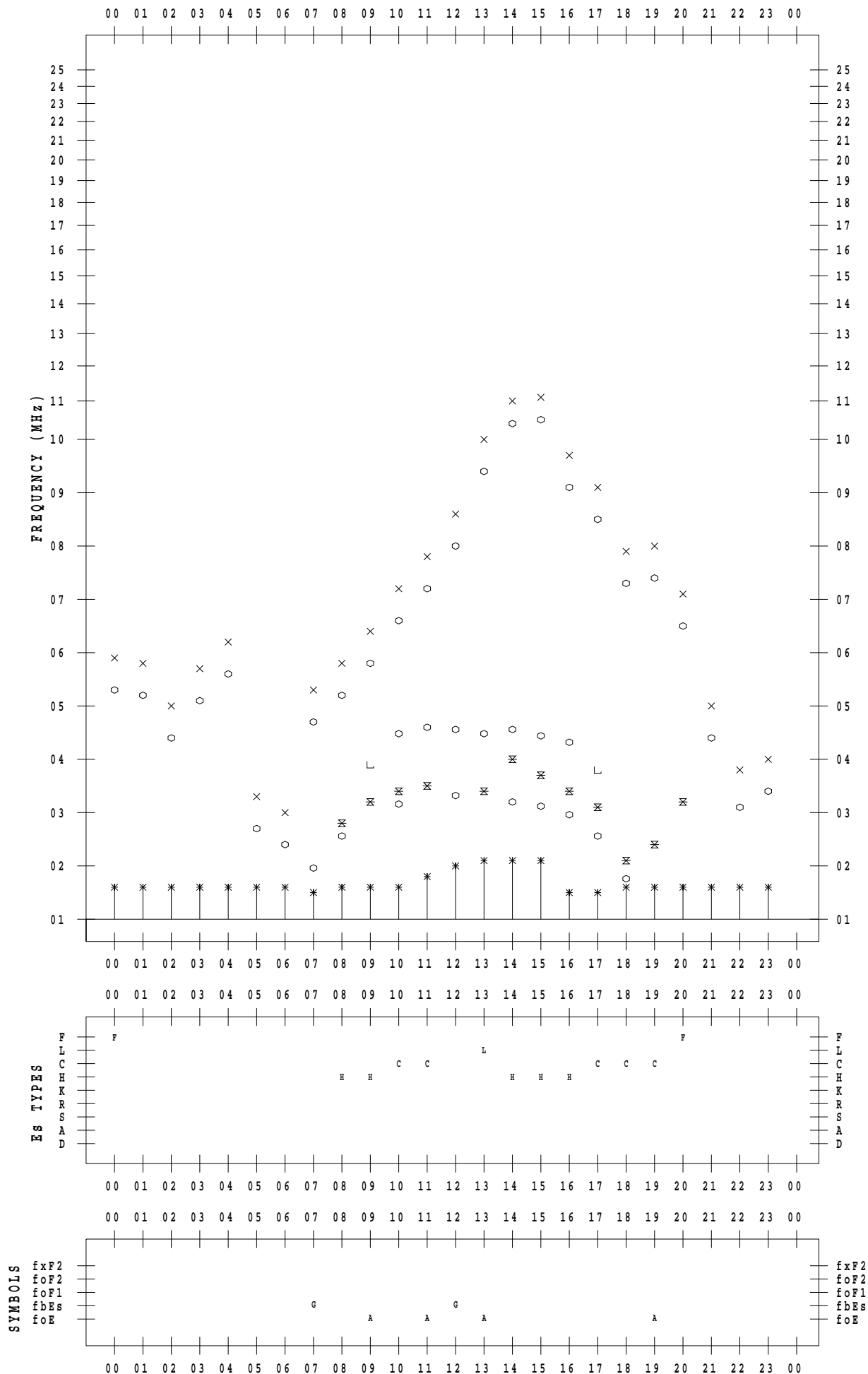
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 19

135 ° E MEAN TIME



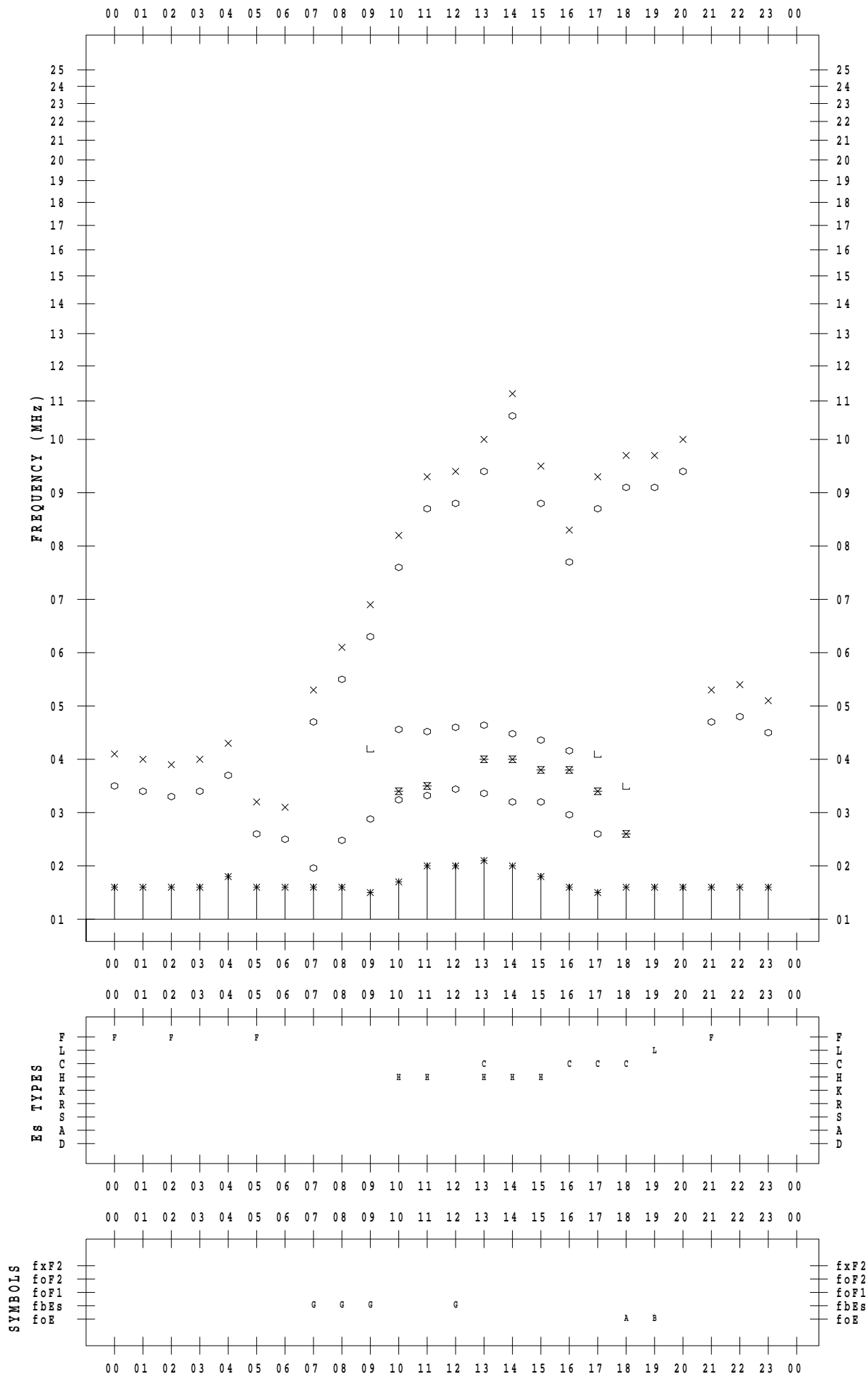
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 3/20

135 ° E MEAN TIME



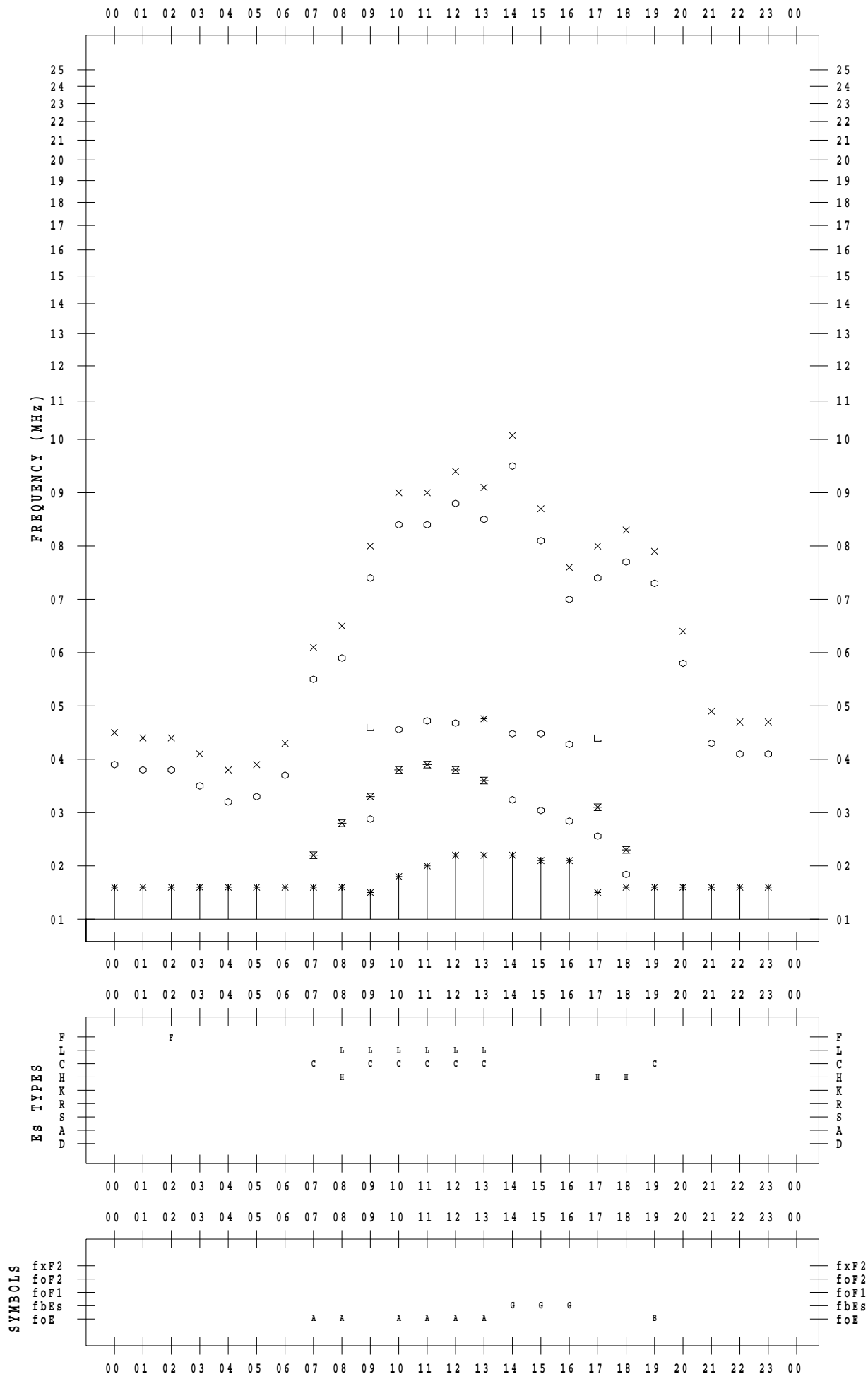
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 21

135 ° E MEAN TIME



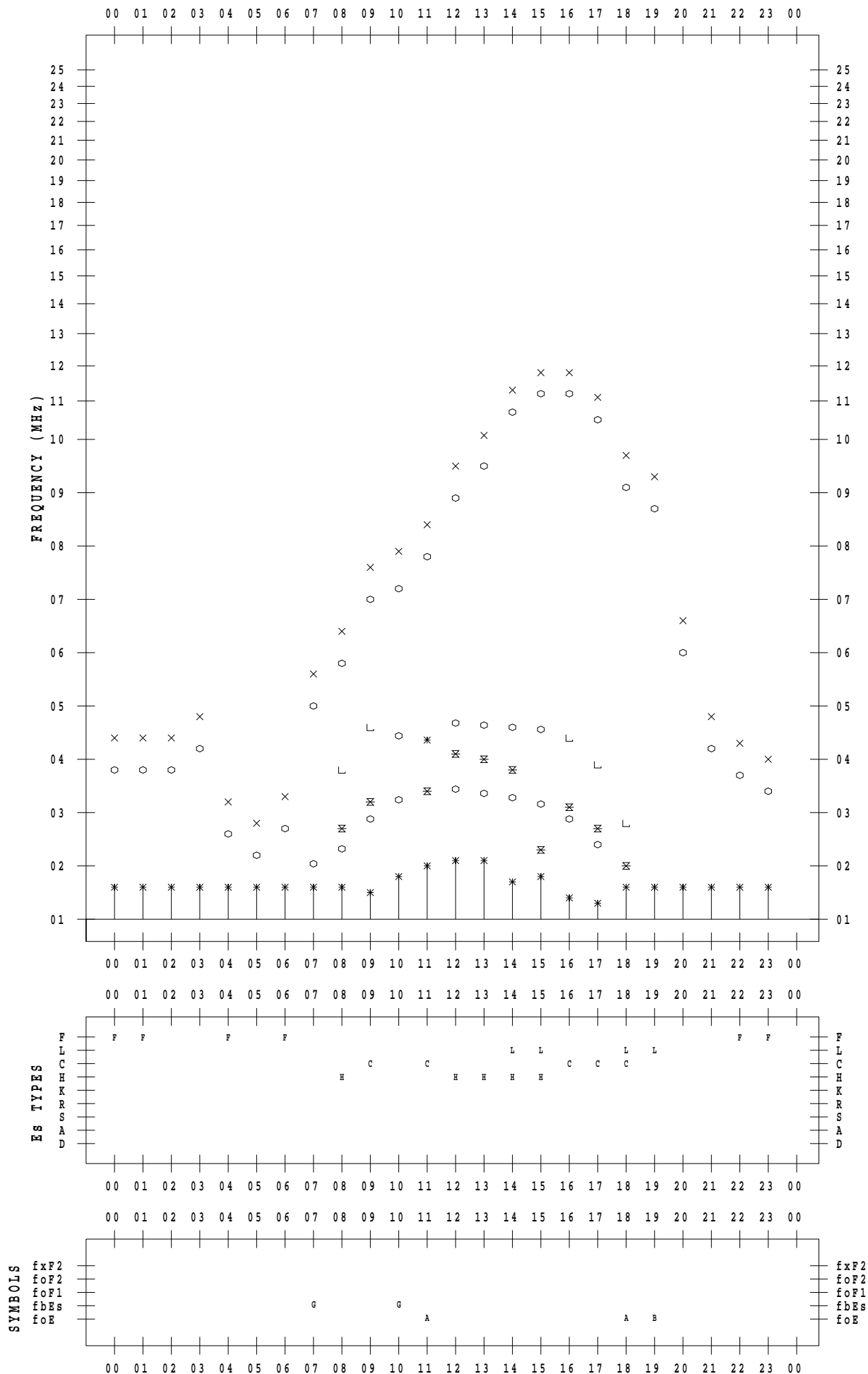
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 22

135 ° E MEAN TIME



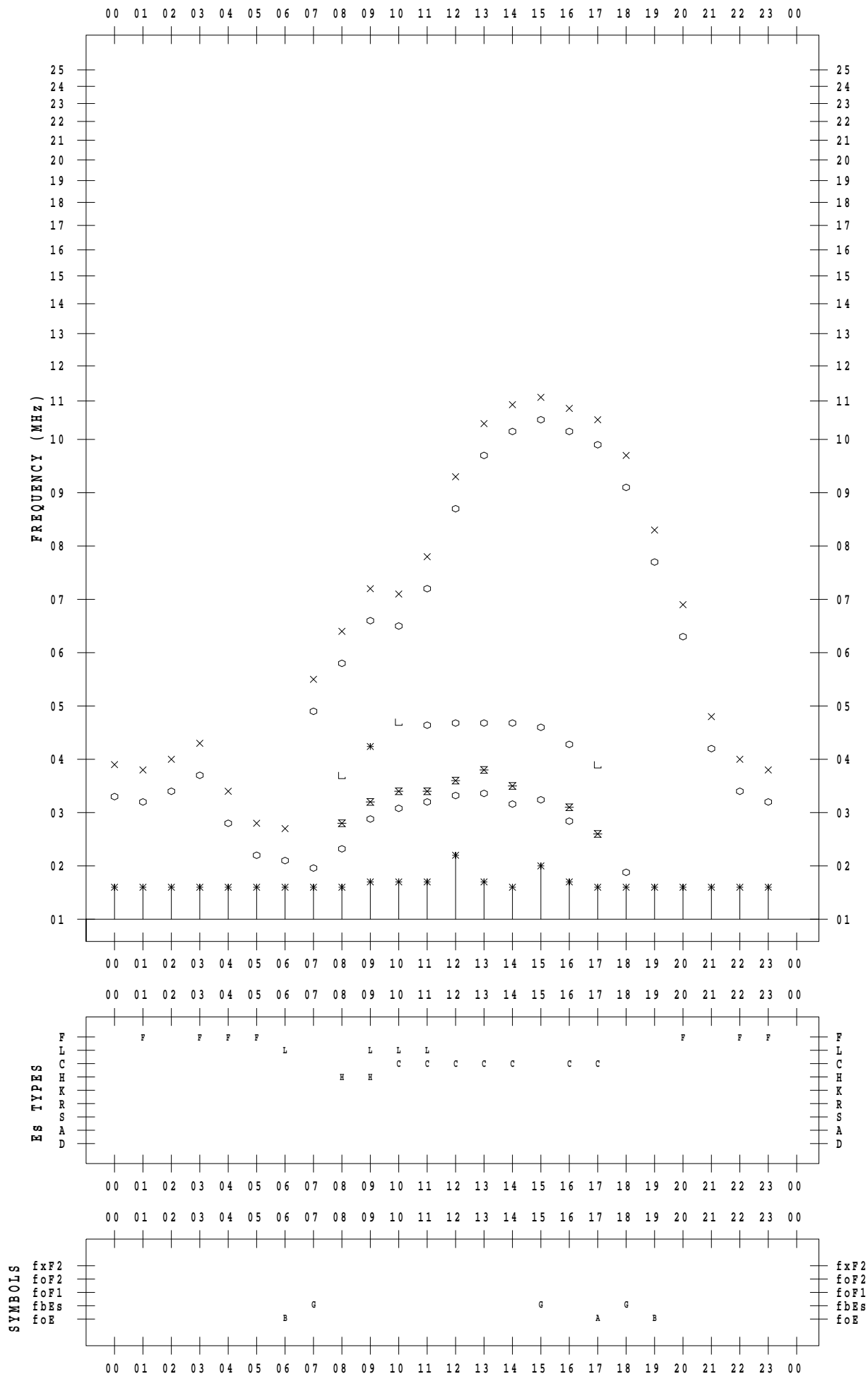
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 23

135 ° E MEAN TIME





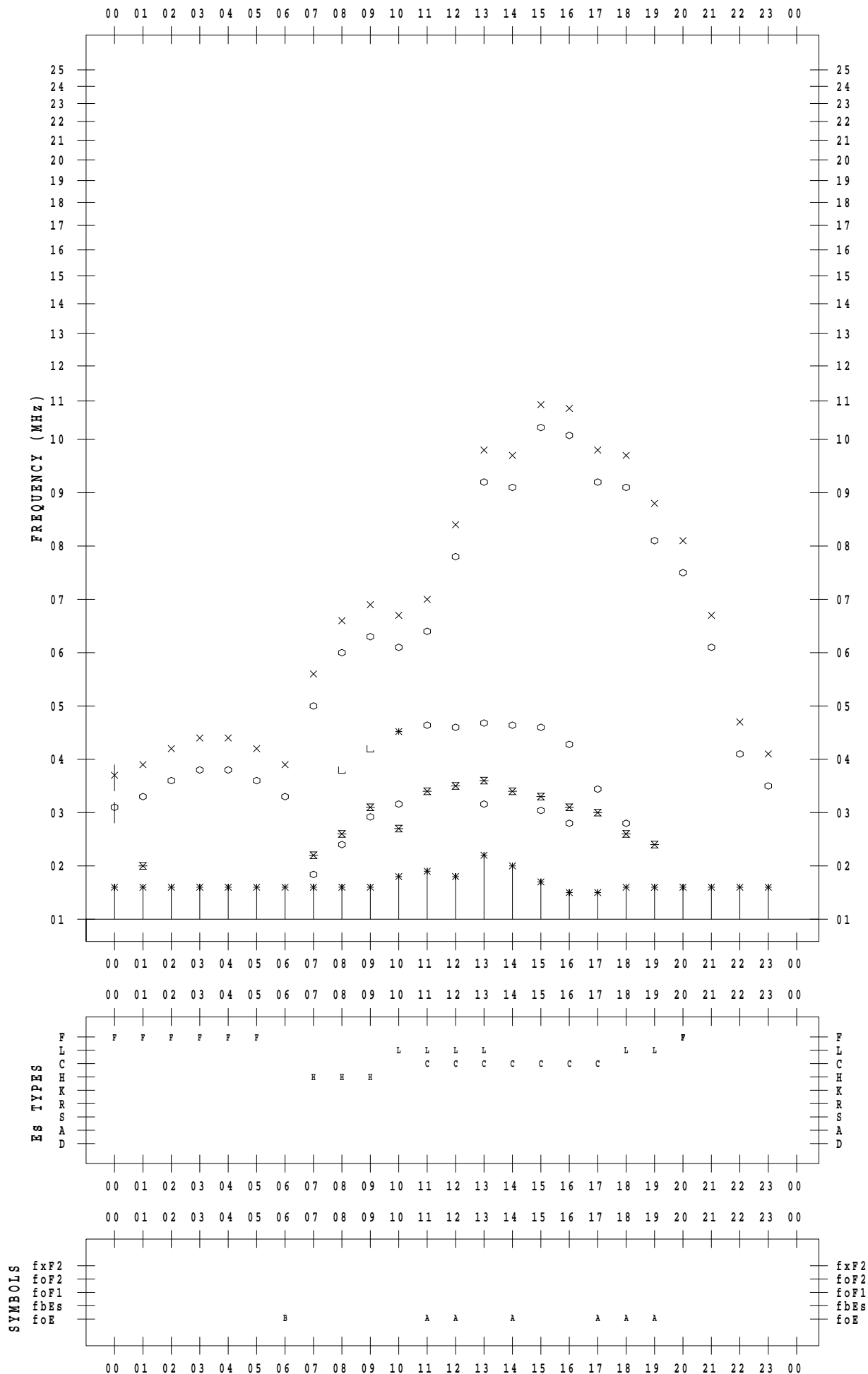
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 24

135 ° E MEAN TIME



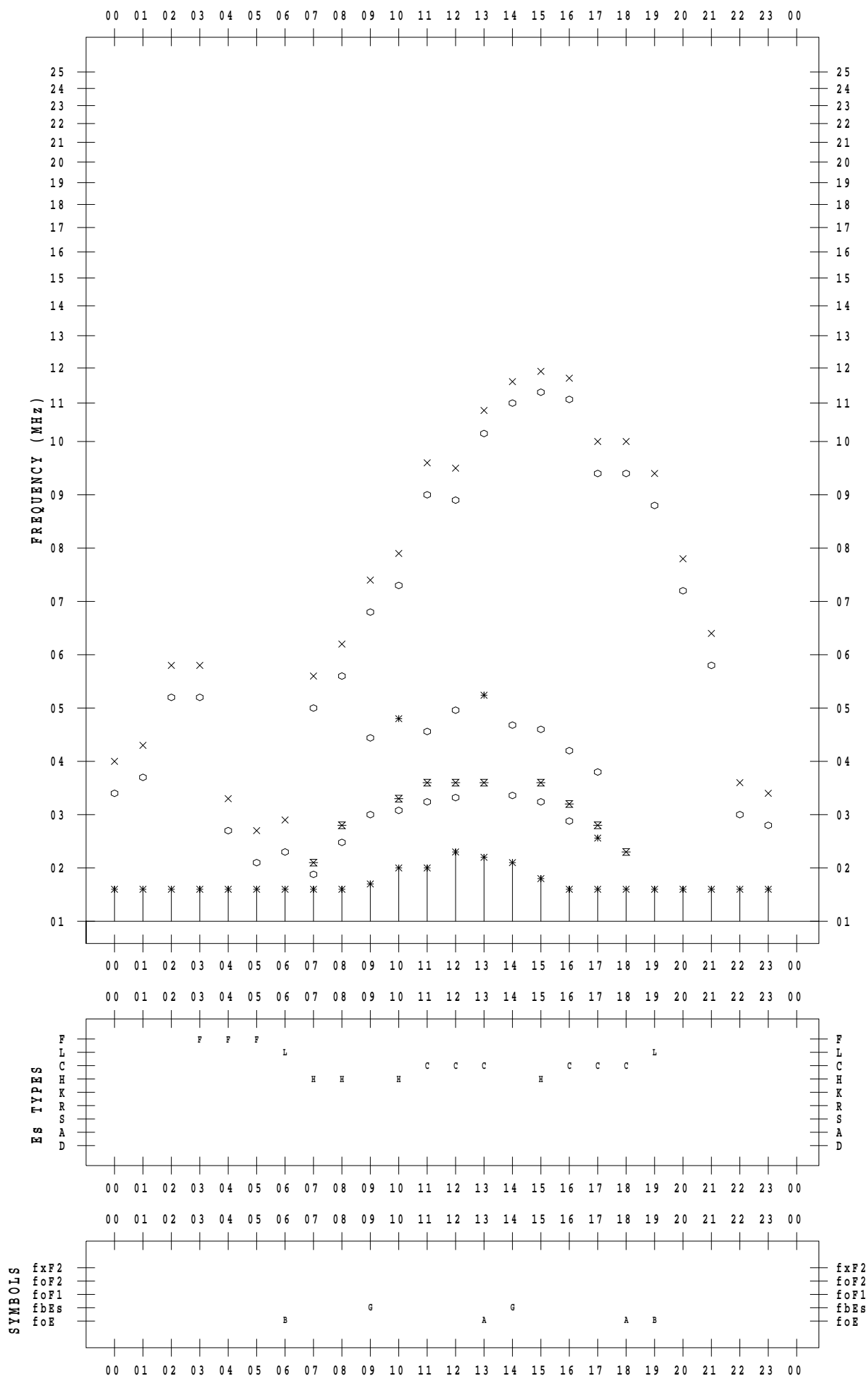
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 25

135 ° E MEAN TIME



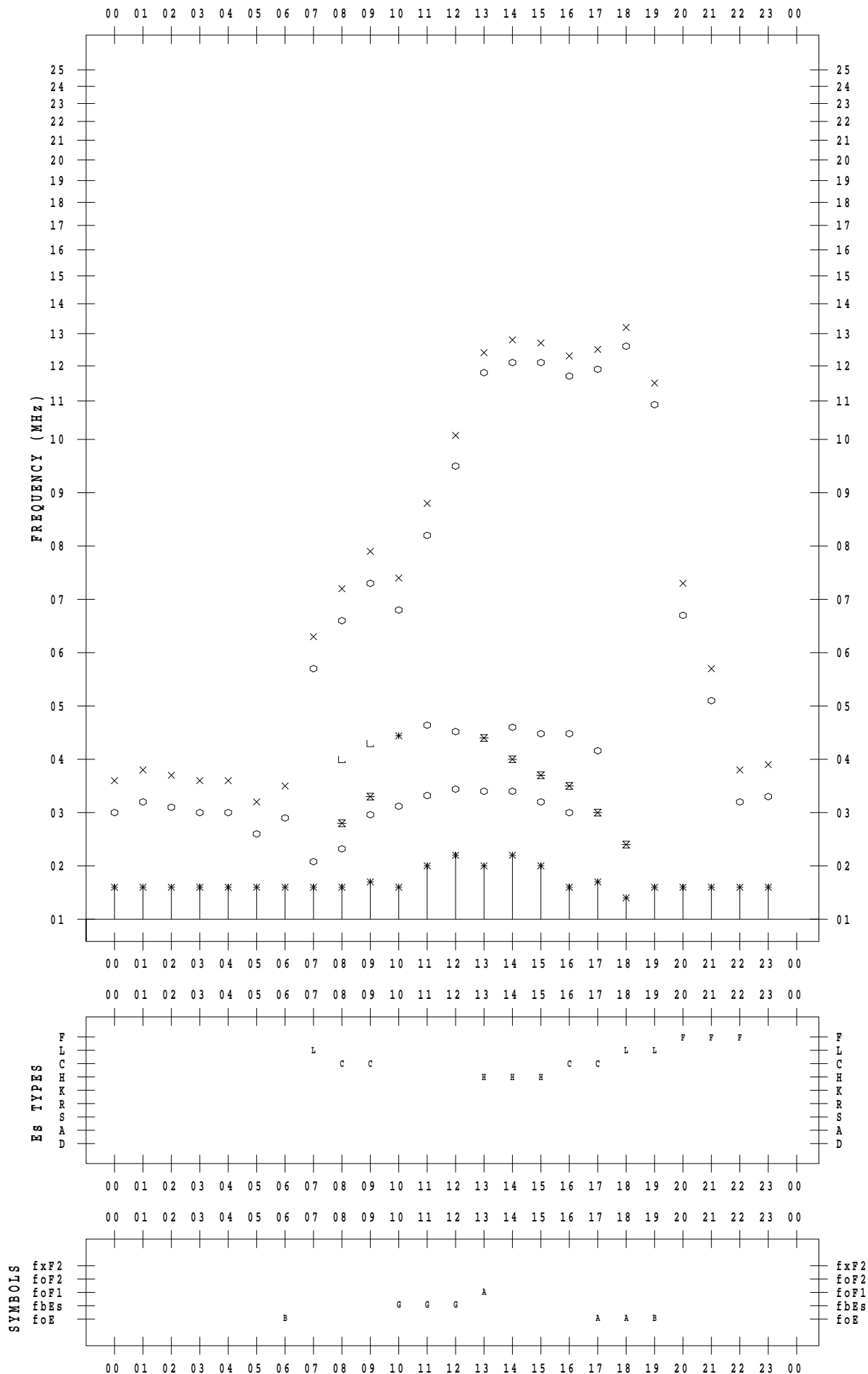
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 26

135 ° E MEAN TIME



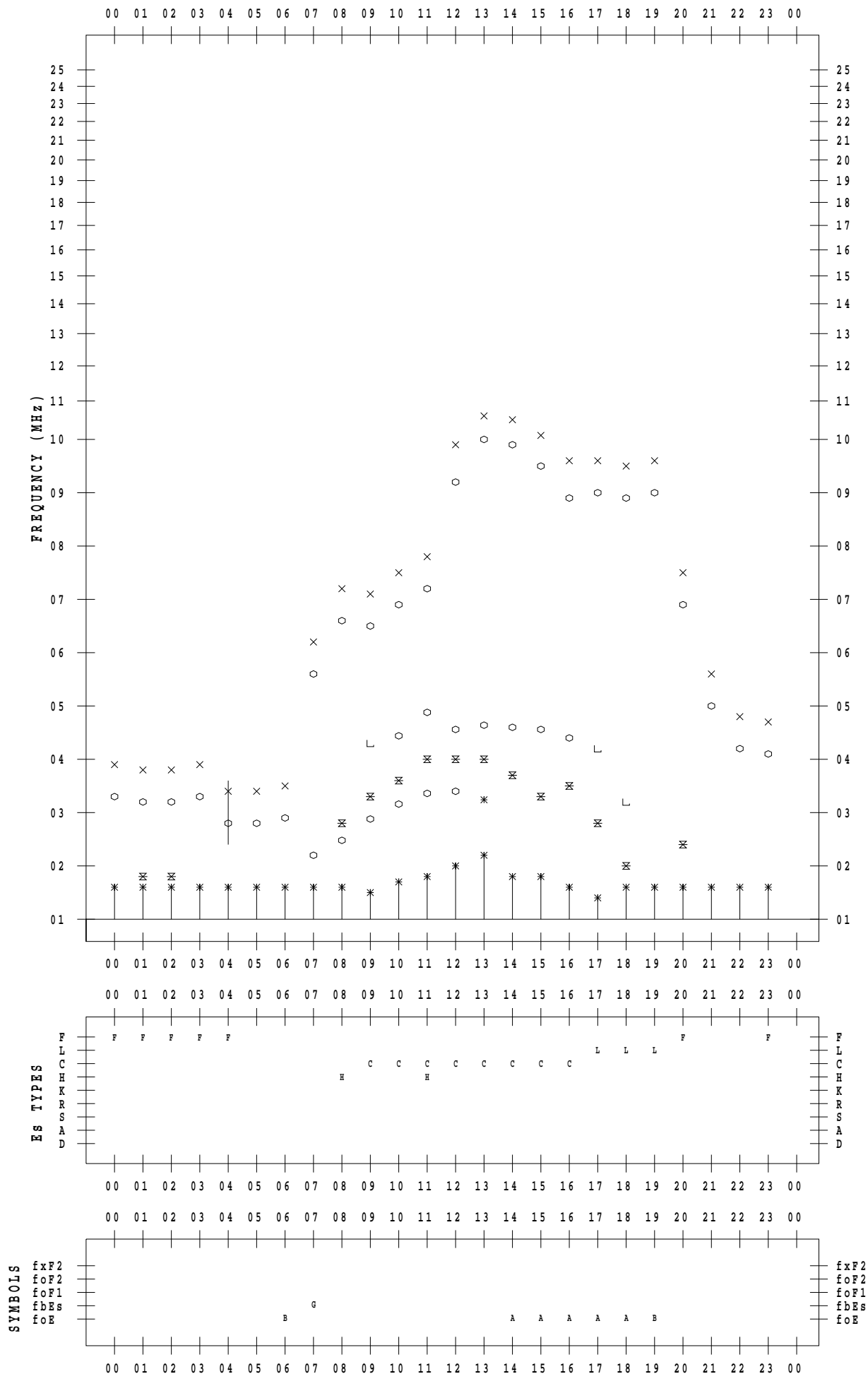
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 27

135 ° E MEAN TIME



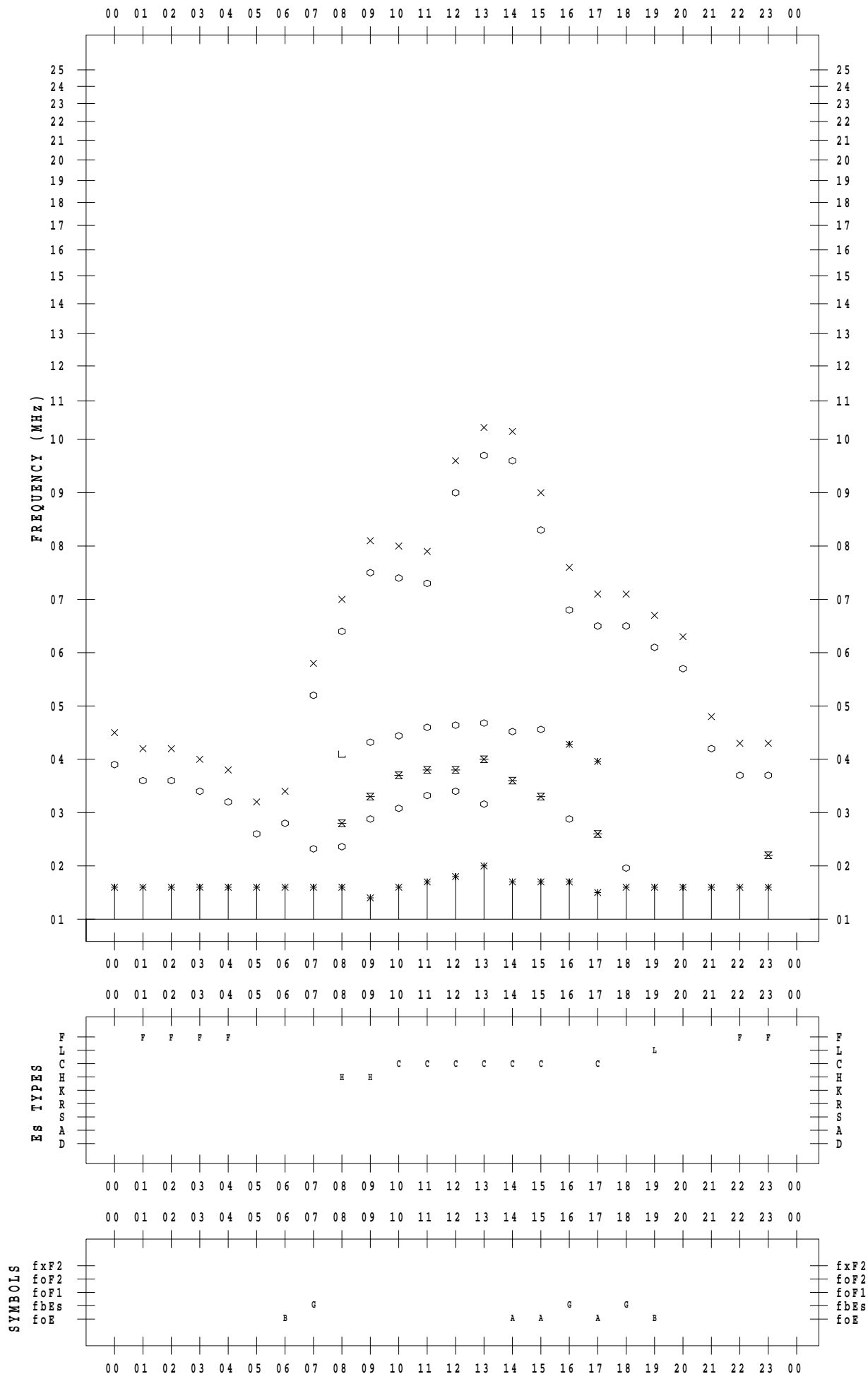
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 28

135 ° E MEAN TIME



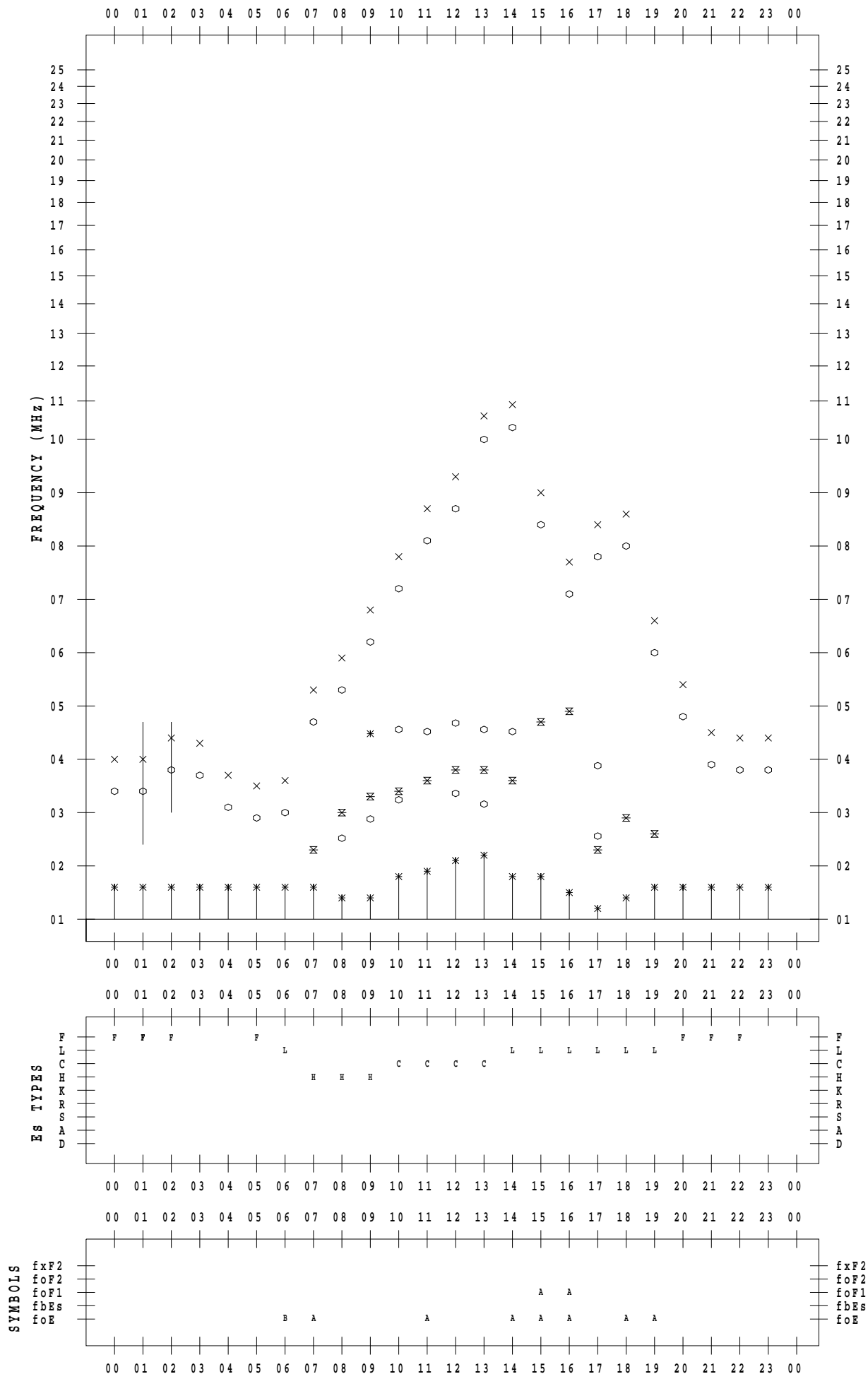
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 3/29

135 ° E MEAN TIME



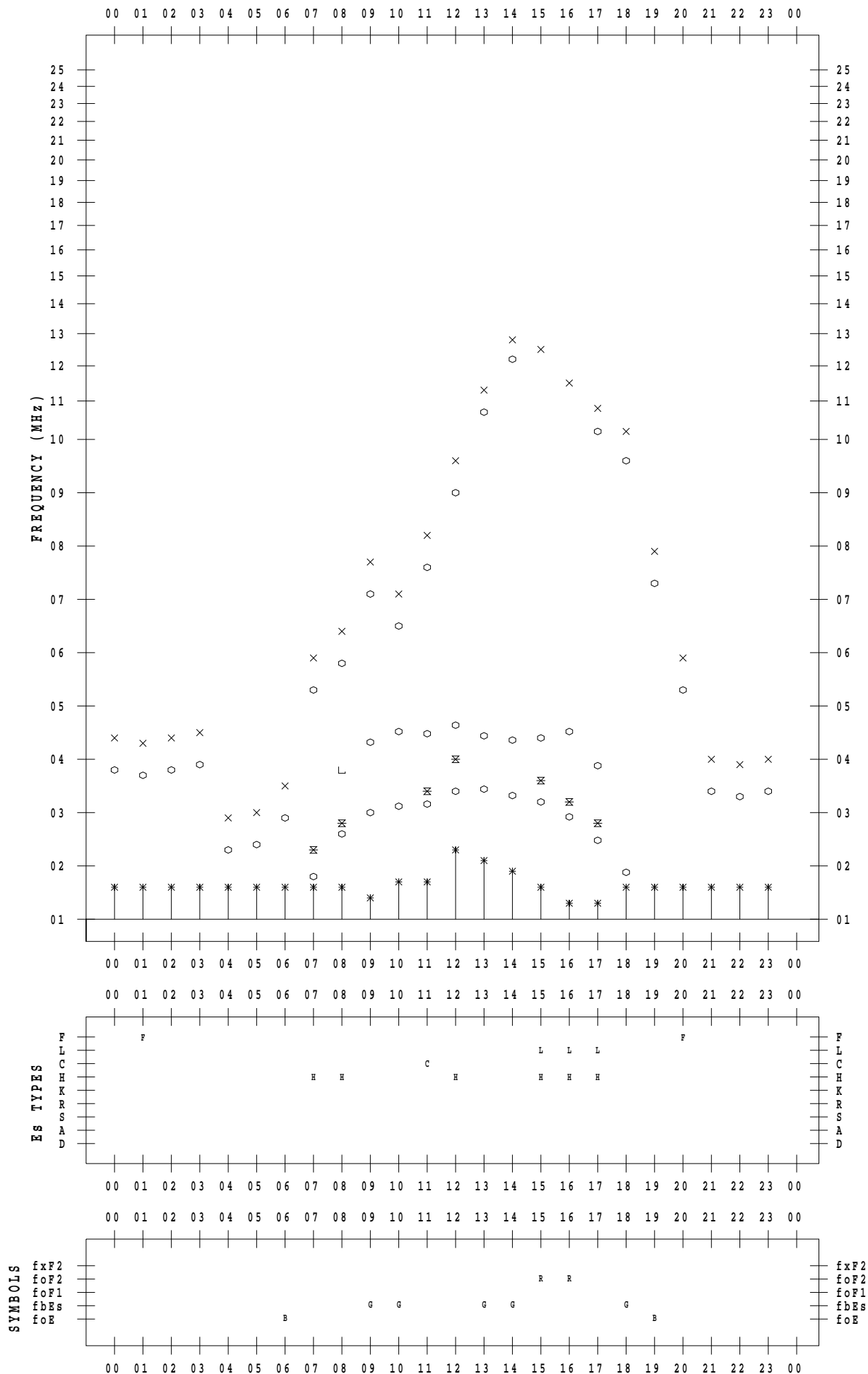
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 3 / 30

135 ° E MEAN TIME



# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 3/31

135 ° E MEAN TIME

