

# IONOSPHERIC DATA IN JAPAN

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



NATIONAL INSTITUTE OF INFORMATION  
AND COMMUNICATIONS TECHNOLOGY  
TOKYO, JAPAN

# INTRODUCTION

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

National Institute of Information and Communications Technology, Japan.

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

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

## IONOSPHERE

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

### A1. Automatic Scaling

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

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

#### a. Characteristics of Ionosphere

<b><math>f_oF2</math></b>	Ordinary wave critical frequency for the <b>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 iono-spheric 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 auto matic data processing system, but existence of film record.

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

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

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

of values.

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

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

#### d. Reliability of Automatic Scaling

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

#### e. Summary Plot

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

### A2. Manual Scaling

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

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

#### a. Characteristics of Ionosphere

<b><math>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

FEB. 2020

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

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

HOURLY VALUES OF fEs                      AT Wakkanai

FEB. 2020

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	27	25	G	G	G	G	G	25	32	G	39	45	91	36	G	31	40	35	26	28	26	25	G	G
2	G	G	G	G	G	G	G	G	41	42	34	43	45	36	48	34	37	11	G	G	G	27	29	G
3	G	G	G	G	G	G	G	38	G	46	160	G	G	34	G	31	G	34	G	G	30	G	26	G
4	G	G	G	G	G	G		26	38	44	43	G	49	46	43	33	28	36	G	G	G	32	G	G
5	26	28	G	26	27	24	G	G	124	32	51	G	48	39	34	36	32	31	28	G	26	G	28	34
6	34	G	24	26	28	G	G	27	146	148	52	39	42	40	37	106	G	11	G	G	35	11	G	G
7	27	24	G	G	G	G	G	G	G	42	34	58	38	35	36	35	29	11	G	40	G	G	G	G
8	G	G	G	G	G	20		25	49	32	36	38	40	38	40	41	51	59	28	G	G	G	35	G
9	26	25	G	G	28	G	G		33	39	38	37	G	56	34	36	28	27	39	56	28	43	G	G
10	G	G	G	G	G	G	34	33	38	40	G	49	G	G	49	G	G	44	38	57	G	G	G	G
11	G	G	G	G	G	G	G	27	52	34	G	G		35	38	32	30	11		G	G	G	G	G
12	G	G	G	G	G	G	G	48	40	35	G	41	58	35	G	46	38	113	118	115	26	38	28	24
13	G	G	140	G	G	28	G	34	44	172	35	40	39	36	36	36	32	28	26	33	35	G	G	30
14	G	25	G	26	G	G	G	37	31	43	54	47	37	35	G	36	G	43	G	31	26	26	G	G
15	G	G	G	G	G	G	G	44	34	35	41	44	40	37	69	33	70	40	60		G	G	G	G
16	G	G	G	G	G	34	G	36	34	34	46	145	37	36	35	34	28	11	G	G	G	G	G	32
17	25	G	G	G	G	G	G	41	30	49	42	44	37	37	41	38	32	34	G	G	G	G	G	G
18	G	G	G	G	G	24		26	44	34	35	36	43	37	41	43	35	51	34	26	G	G	G	27
19	G	23	G	G	G		G	29	35	40	36	36	58	G	38	38	28	G	G	26	G	G	G	G
20	G	G	G	G	G	G	G	48	35	35	52	36	46		54	91	33	27	24	G	G	G	G	G
21	G	G	G	G	G	38	G	34	32	33	56	36	40	38	35	36	38	29	G	G	34	G	G	G
22	G	G	G	G	G	41	G	48	36	35	38	37	37	36	44	48	29	40	G	G	G	G	67	G
23	G	G	G	26	G	G	11	40	32	106	45	52	40	42	60	40	36	27	35	24	G	G	33	G
24	G	G	G	23	G	34	G	32	40	41	40	G	49	48	54	33	53	50	60	34	84	G	27	28
25	G	G	G	G	G	38	G	41	34	69	40	116	54	G		33	31	25	32	34	27	33	G	G
26	G	G	G	G	G	11	36	36	31	36	134	113	38	37	G	36	G	G	G	G	38	29	G	G
27	G	G	G	G	G	G	35	30	160	35	51	43	37	G	50	34	G	G	G	G	G	G	G	G
28	G	G	G	G	G	G	G	32	34	35	38		G	84	43	G	34	G	G	G	G	G	G	32
29	G	G	G	G	G	G	G	38	45	43	40	41	44	39	50	33	G	41	24	26	G	G	G	25
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	28	29	29	28	26	28	29	29	29	28	29	28	28	29	29	29	28	28	29	29	29	29
MED	G	G	G	G	G	G	G	34	35	39	40	40	40	36	39	36	31	29	12	12	G	G	G	G
U Q	G	G	G	G	G	24	G	39	44	43	51	46	47	39	48	39	36	40	33	32	26	26	14	24
L Q	G	G	G	G	G	G	G	26	32	34	35	36	37	35	34	33	14	11	G	G	G	G	G	G

HOURLY VALUES OF fmin AT Wakkanai

FEB. 2020

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	16	16	16	16	14	15	16	15	15	14	16	15	13	14	14	14	15	15	16	16	16	15	17
2	15	15	16	14	15	15	16	16	15	14	13	14	14	15	16	16	15	15	15	16	15	16	16	15
3	15	16	14	14	14	14	15	15	16	15	15	16	14	16	14	15	18	15	16	16	16	16	15	15
4	14	15	14	14	14	14		16	15	17	15	14	14	14	15	15	15	15	14	14	15	15	15	14
5	16	16	15	16	16	16	15	14	15	16	17	17	16	16	16	14	15	16	16	16	15	14	16	17
6	16	16	16	16	16	16	14	16	15	16	14	15	15	13	13	16	16	16	15	14	15	15	15	15
7	15	16	15	15	14	14	14	16	15	14	14	16	15	14	14	15	15	16	16	16	15	16	14	14
8	15	15	14	14	14	15	16	15	15	15	13	14	14	14	14	13	15	16	16	14	15	16	16	15
9	16	16	16	14	16	16	14		16	15	14	15	17	16	16	13	14	16	15	15	16	15	16	15
10	16	14	16	14	15	14	14	15	16	16	16	17	17	16	16	16	15	15	15	17	15	15	16	14
11	14	14	15	14	14	14	16	16	15	17	17	17	17	17	17	16	15	14	16	14	16	14	15	14
12	15	14	15	15	14	14	14	17	15	16	16	14	16	13	15	15	14	8	7	14	16	15	16	16
13	15	14	14	14	14	15	16	15	15	15	16	15	14	12	14	14	16	16	15	15	16	16	15	16
14	14	16	14	16	15	15	15	14	14	14	14	16	14	15	13	15	16	14	16	16	15	16	14	15
15	15	14	14	14	14	15	18	15	14	13	14	15	15	13	15	16	15	16	16	15	17	16	15	16
16	13	14	14	14	14	14	15	17	16	14	14	14	14	15	16	16	15	14	15	15	14	15	15	16
17	16	15	14	14	14	14	16	15	14	16	15	14	15	14	12	14	16	16	16	15	14	14	15	14
18	15	14	15	14	15	16	15	17	15	16	16	16	15	14	15	13	16	16	16	16	15	15	15	15
19	15	17	14	16	14		14	15	16	14	14	15	15	14	13	12	15	14	15	16	15	15	14	15
20	14	15	16	15	16	14	15	16	14	14	15	14	15	12	15	14	13	15	16	17	15	15	14	14
21	15	14	14	15	15	16	14	16	16	16	15	13	14	15	14	14	15	16	16	15	15	14	16	15
22	14	14	107	15	14	14	14	15	16	16	15	14	15	14	14	16	15	17	14	17	16	14	16	14
23	14	15	14	16	16	16	15	16	15	15	15	14	15	14	15	14	15	16	16	16	15	16	16	14
24	13	15	15	16	15	15	14	14	14	14	15	14	15	15	13	15	16	15	17	17	15	16	16	16
25	15	15	15	14	15	14	14	15	13	13	15	15	14	15	16	15	15	16	14	14	15	14	14	14
26	14	14	14	14	14	14	14	16	14	14	14	15	15	15	14	14	14	14	14	14	14	15	14	14
27	14	14	14	14	14	14	14	14	14	14	14	14	14	16	15	14	15	17	15	14	14	14	14	16
28	15	16	16	16	14	14	14	15	16	16	15	15	14	15	15	16	16	15	14	14	14	14	16	16
29	16	15	14	15	16	14	14	16	17	17	15	14	14	15	15	16	15	17	16	16	16	16	16	16
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	28	28	28	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
MED	15	15	15	14	14	14	14	16	15	15	15	15	15	15	15	15	15	16	15	15	15	15	15	15
U Q	15	16	16	16	15	15	15	16	16	16	15	16	15	15	15	16	16	16	16	16	16	16	16	16
L Q	14	14	14	14	14	14	14	15	14	14	14	14	14	14	14	14	15	15	15	14	15	14	14	14

HOURLY VALUES OF fof2 AT Kokubunji

FEB. 2020

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

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



HOURLY VALUES OF fEs                      AT Kokubunji

FEB. 2020

LAT. 35°43.0'N LON. 139°29.0'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	32	G	G	G	G	G	G	49	50	G	G	56	49	G	41	29	G	G	G	G	30	27	G	
2	G	40	26	G	26	G	G	29	33	49	G	G	43	G	44	41	38	32	40	93	80	G	G	G	
3	G	G	G	G	G	G	G	G	G	37	40	43	G	G	G	G		G	G	G		25	24	32	32
4		G	G	G	G	G	G	37	34	44		51	54	G	G	G	31	G	32	G	G	G	G	G	
5	29	G	G	G	G	G	G	G	47	49	44	45	37	G	40	G	31	26	26	28		G	G	28	
6	G	32	33	G	G		G	43	47	G	45	G	G	G	37	41	40	40	G	G	G	G	G	G	
7	G	G	G	G	G		G	26	G	40	39	43	40	40	G	G	G	G	G	G	G		26	G	G
8	G	G	G	G	40			28	32	36	37	40	39	52	40	37	40	34	22	31	26	G	G	G	
9	G	G	G	G	G	G		27	33	41	49	40	43	47	36	G	33	32		G	G	G	G	G	
10	G	G	26	G	G		G	G	G	35	G	G	G	G	G	G	32	36	11	G		G	G	G	
11	G	G	G	G	G	G	G	G	G	36	38	39	G	40	36	G	43	29	30	G	G			G	
12	G	G	G	G	G		G	40	G	34	37		G	G	G	G	31	G	G	G	G	26	25	G	
13	G	G	G	G	G	G		47	G	34	G	44	41	39	G	G	34	G	G	G	G		G	G	
14	G	G	G	G	G			33	G	G	G	39	G	46	39	G	40	43		G	G	G	G	53	G
15	26	G	G	G	G	G	G	36	52		37	38	39	45	G	41	34	G	33	G	G	G	G	G	
16	G	G	G	G	G	G	G	25	G	G		G	G	G	G	G	31	41	11	G	G	G	G	G	
17	G	G	G	G	G	G	G	47	31	46	45	48	49	G		G	31	G	33	G	G	G	G	G	
18	G	G	G	G	G	G		33	38	37	41		G	G	G	40	35		45	G	G	G	G	G	
19	G	23	G	G	G	G	G	32	90	41	47	50	47	42	40	35	34	33	G	G	G	G	G	25	
20	29	33	G	G		G		34	41	38	39	G	40	46	57	41	40	29	31	G	G	G	28	40	
21	59	37	55	34	29		G	G	G	G	G	G	44	44	39	52	33	26	G	G	G	G	G	G	
22	G	G	G	G	G	G		47	34			G	40	39	38	64	47	G	47	G	G	G	G	G	
23	G	G	G	G	G	G		26	48	42	43		39	38	40	G	G	G	G	G	31	G		24	
24	G	G	G		G		G	28	G	G	G	47	45	51	55	G	G	G	40	G	G			33	
25	G	G	24	G	G	G	G	44	40		43	38	39	38	47	43	36	27	29	24	31	33	G	38	
26	38	G	G	G	34	22	G	40	48	41		39	39	G	G	39	37	56	35	29	G	G	G	G	
27	G	G	G	G	G	G		46	G	G	42	40		G	46	38	42	34	47	36	G	G	G	G	
28	G	G	G	G	G		G	30	G	G	G	39	39	G	G	G	G	G	36	22	G	G	G	29	
29	G	23	29	G	G	G	G	29	G	40		G	G	49	49	42	46	34	G	G	29	G	G	G	
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	28	29	29	28	28	20	25	29	29	27	26	29	29	29	28	29	28	29	29	29	29	29	28	26	27
MED	G	G	G	G	G	G	G	30	32	37	38	39	39	38	38	G	33	27	11	G	G	G	G	G	
U Q	G	12	G	G	G	G	G	40	44	41	43	43	43	46	40	41	36	36	32	G	G	11	G	24	
L Q	G	G	G	G	G	G	G	25	G	G	G	G	G	G	G	G	30	G	G	G	G	G	G	G	

HOURLY VALUES OF fmin                      AT Kokubunji

FEB. 2020

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

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

HOURLY VALUES OF foF2 AT Yamagawa

FEB. 2020

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	27	32	31	26	28	B 26	30	33	53	55	52	63	64	66	52	50	50	53	44	32	A	31	31	25
2	27	26	A	A	A	A	B 25	31	50	53	55	65	54	56	50	54	48	54	54	42	A	A	A	B 26
3	30	30	30	30	26	27	25	31	56	50	53	57	71	65	73	63	56	57	50	N 31	34	40	38	40
4	B 41	43	45	33	31	B	B	35	51	46	58	A	A	A	71	53	A	60	51	35	35	B	33	31
5	28	B	A	25	27	33	24	31	51	51	53	60	56	56	59	56	56	53	52	39	27	31	31	31
6	31	30	31	31	31	23	23	33	45	56	49	55	57	58	61	65	65	46	43	37	37	37	25	26
7	31	31	31	31	34	33	N 23	33	58	49	52	60	82	82	58	66	65	53	40	40	36	32	31	30
8	30	30	31	34	39	23	N 23	32	53	55	58	68	55	63	64	56	67	54	47	33	31	34	30	31
9	31	31	30	30	31	24	23	37	56	57	51	54	61	61	79	67	55	51	52	43	25	29	33	A
10	30	30	30	30	32	A	B	35	47	50	55	67	58	75	69	58	53	49	45	31	30	31	28	30
11	31	29	24	30	25	N 29	N 24	31	47	50	C	C	C	C	C	C	C	C	50	38	25	N 24	B 24	29
12	23	30	25	25	N 24	N 24	N 23	31	43	49	C	C	C	C	C	C	C	C	33	A	27	32	33	
13	31	32	27	27	29	32	23	33	45	50	C	C	C	C	C	C	C	C	45	42	31	35	33	34
14	33	32	31	N 28	N 30	26	N 24	33	50	53	C	C	57	61	56	54	61	53	41	33	31	B 30	33	33
15	33	33	32	30	33	31	23	35	50	C	C	52	B	61	79	78	58	55	55	38	37	31	N 27	29
16	31	31	N 27	31	32	31	N 29	35	51	49	49	55	53	52	57	65	58	50	51	33	33	33	31	B 33
17	34	33	32	32	33	N 30	N 26	40	49	47	48	57	55	A	66	68	56	56	50	32	32	33	33	N 25
18	30	33	31	31	35	26	24	34	44	48	56	58	51	55	71	58	61	60	57	47	35	33	27	31
19	30	32	35	35	31	N 29	B 25	45	44	B	B	B	B	B	B	B	B	B	47	31	33	A	A	A
20	37	33	34	35	33	30	B 23	36	49	56	63	75	61	70	96	61	57	58	50	36	33	33	31	A
21	A	33	32	33	35	A	A	39	59	61	63	62	55	77	85	61	55	55	54	41	33	35	33	35
22	35	34	34	35	35	32	N 26	40	57	55	67	70	61	56	58	83	67	57	45	41	39	35	30	30
23	33	31	N 30	31	31	N 30	B 29	42	50	51	47	74	73	70	60	78	68	57	47	41	34	31	31	A
24	B 27	31	30	N 29	A	35	27	41	47	48	52	57	53	78	57	66	68	87	56	47	32	34	38	31
25	30	32	31	31	31	N 31	N 29	38	46	51	59	53	57	55	79	92	69	55	51	40	N	28	28	N
26	26	28	26	28	31	26	B	34	50	50	50	57	55	51	71	57	46	58	50	29	26	29	31	29
27	119	30	28	A	31	28	N	44	47	48	53	54	47	59	64	70	59	47	54	37	32	33	34	34
28	38	33	33	33	35	N 26	N 25	41	51	54	55	69	63	49	61	61	56	53	56	39	35	38	B 33	33
29	32	32	33	33	33	N 25	25	39	58	58	59	63	58	66	68	77	62	49	47	38	37	39	35	33
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	27	27	27	25	24	29	29	27	23	24	23	24	26	25	24	25	28	29	25	26	27	24
MED	31	32	31	31	31	29	24	35	50	51	53	59	57	61	64	63	58	54	50	38	33	33	31	31
U Q	33	33	32	33	33	31	26	39	53	55	58	66	61	68	71	69	65	57	53	41	35	35	33	33
L Q	30	30	30	29	30	26	23	33	47	49	51	56	55	55	58	56	55	52	46	33	31	31	30	29

HOURLY VALUES OF fEs                      AT Yamagawa

FEB. 2020

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	B	G	G	48	49	G	39	42	G	39	37	34	G	11	G	37	G	G	G
2	G	G	32	28	36	27	B	G	G	33	42	38	39	46	44	40	43	33	24	34	40	47	41	B
3	G	G	G	G	G	G	G	G	G	34	85	44	46	43	37	G	33	33	26	G	G	G	G	G
4	B	G	G	G	G	B	B	G	29	42	54	59	149	60	63	57	78	37	29	G	G	B	39	29
5	G	B	29	G	G	G	G	G	32	G	G	44	49	43	G	37	33	G	11	G	G	G	G	G
6	G	G	G	G	38	G	G	G	48	40	42	45	59	G	48	45	34	G	G	G	G	20	G	G
7	G	G	G	G	G	37	G	G	G	G	43	39	51	46	40	G	35	G	20	G	G	G	G	G
8	G	G	G	G	44	G	G	G	32	33	G	38	45	46	46	56	36	34	26	G	G	G	G	G
9	116	G	105	G	G	G	G	G	30	37	53	50	49	44	42	37	33	G	32	11	G	G	G	30
10	26	G	G	G	G	29	B	G	39	G	41	39	42	46	46	43	34	36	11	26	G	G	G	G
11	G	G	G	G	G	G	G	G	G	36	C	C	C	C	C	C	C	C	29	26	G	G	B	G
12	G	G	G	G	G	G	G	31	49	G	C	C	C	C	C	C	C	C	28	32	G	G	26	G
13	G	G	G	G	G	G	G	G	G	48	C	C	C	C	C	C	C	C	28	22	G	G	40	G
14	G	G	G	G	G	G	104	G	28	49	C	C	42	44	41	43	39	41	26	G	G	B	G	26
15	29	28	26	26	G	G	G	G	49	C	C	44	B	50	48	115	45	48	G	G	G	G	G	G
16	G	G	G	G	G	G	G	G	29	40	44	40	46	44	41	G	34	48	G	G	G	24	G	B
17	G	G	G	G	G	G	G	G	49	49	43	48	46	48	40	48	35	32	G	G	G	G	G	G
18	G	G	G	G	G	G	G	31	32	G	41	46	49	45	40	G	G	31	G	11	G	G	G	G
19	G	G	G	G	11	G	B	27	34	B	B	B	B	B	B	B	B	B	G	G	G	55	41	50
20	32	G	32	34	G	G	B	11	32	G	G	40	45	G	G	49	47	42	38	26	G	G	G	40
21	60	35	G	G	G	40	27	G	G	35	44	43	46	G	45	48	42	38	25	39	36	26	G	G
22	G	G	G	G	29	28	G	25	G	35	45	39	46	40	G	G	40	41	38	29	25	G	G	G
23	G	G	G	G	G	G	B	G	G	44	45	45	46	62	46	56	35	G	G	11	G	G	23	24
24	B	G	G	G	31	24	11	40	70	48	43	46	46	52	44	G	G	32	G	11	G	G	G	G
25	G	G	G	G	G	G	G	29	40	35	43	41	40	46	47	41	34	G	G	40	G	G	G	G
26	G	180	G	G	G	11	B	28	44	40	40	44	47	44	44	42	G	G	G	32	G	G	G	G
27	G	G	G	28	G	G	G	40	30	42	43	G	41	41	44	38	36	33	26	35	25	G	G	G
28	G	G	25	27	G	26	G	26	32	G	43	45	62	47	39	39	39	35	G	21	G	G	B	G
29	G	G	G	26	G	G	G	26	48	40	44	44	46	50	40	39	34	G	47	G	G	G	G	G
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	28	29	29	29	27	22	29	29	27	23	25	24	26	26	25	25	25	28	29	29	27	27	27
MED	G	G	G	G	G	G	G	G	32	36	43	44	46	44	43	40	35	33	16	11	G	G	G	G
U Q	G	G	G	G	G	24	G	26	46	42	44	45	49	47	46	47	39	37	26	27	G	G	G	G
L Q	G	G	G	G	G	G	G	G	G	G	41	39	42	43	40	19	33	G	G	G	G	G	G	G

HOURLY VALUES OF fmin AT Yamagawa

FEB. 2020

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	18	15	15	15	17	B	17	18	16	16	16	16	16	17	16	17	16	15	18	17	15	15	21	21	
2	20	16	17	15	15	16	B	15	15	16	17	17	17	18	17	16	16	16	16	16	15	16	16	B	16
3	15	16	16	17	16	18	66	18	15	17	16	16	17	17	17	16	16	16	15	16	20	21	16	16	
4	B	18	26	15	17	B	B	16	15	16	16	13	16	17	16	15	17	15	16	16	15	B	16	15	
5	22	B	16	66	15	16	18	15	16	15	16	17	16	16	16	15	17	15	15	14	15	14	15	15	
6	15	15	14	16	15	16	15	15	15	17	15	18	15	16	16	14	16	15	14	16	14	15	14	15	
7	15	14	15	15	14	15	16	14	15	16	14	15	14	14	17	15	15	16	16	15	16	14	15	16	
8	16	14	14	16	16	66	15	15	15	16	16	14	15	15	14	16	16	16	15	16	15	16	16	14	
9	17	16	14	15	14	15	14	14	16	14	15	15	16	15	15	15	15	15	15	17	16	14	15	16	
10	16	15	14	16	14	16	B	17	15	15	15	15	13	15	15	16	15	15	14	15	16	15	15	14	14
11	15	17	14	14	16	16	15	16	15	16	C	C	C	C	C	C	C	C	15	16	16	15	B	14	
12	14	14	14	14	14	15	14	17	15	15	C	15	C	15	15	C	C	C	C	16	16	16	16	15	
13	15	14	14	15	14	14	15	14	15	16	C	C	C	C	C	C	C	C	16	16	15	14	15	16	
14	15	15	15	14	14	15	13	16	16	16	C	C	16	15	18	15	15	14	15	14	15	B	15	16	
15	16	16	16	16	15	14	15	14	15	C	C	21	B	16	16	17	15	15	15	15	14	16	16	16	16
16	15	15	16	14	14	15	17	15	15	16	15	16	15	16	17	15	15	15	15	14	15	15	17	B	15
17	15	14	14	14	15	15	14	14	16	16	15	15	15	16	16	16	17	16	14	16	17	14	15	18	
18	15	14	14	14	15	15	15	16	15	16	16	15	15	14	15	16	16	15	16	14	15	15	15	15	
19	15	15	15	14	15	16	B	16	16	B	B	B	B	B	B	B	B	B	14	14	14	15	15	15	
20	16	14	16	16	16	15	B	14	16	15	15	15	17	17	17	15	15	15	15	16	15	16	15	15	
21	15	15	15	15	15	15	15	17	14	16	15	14	15	16	15	16	15	15	16	15	15	16	16	14	
22	14	14	16	16	16	16	14	15	15	15	15	15	15	17	17	17	16	15	15	16	16	17	15	15	
23	14	15	15	14	14	14	B	15	16	16	16	18	17	16	18	14	15	16	16	15	14	14	16	16	
24	B	16	16	15	15	16	16	14	17	16	16	15	16	17	15	16	15	16	16	16	18	15	15	15	
25	16	15	15	15	15	15	14	16	15	16	15	17	17	17	18	15	16	16	15	14	15	18	14	15	
26	14	15	15	15	14	14	B	16	14	15	15	15	17	17	18	15	14	14	14	14	14	17	14	16	
27	17	16	15	14	14	14	15	15	14	15	16	21	17	17	18	16	15	16	15	14	16	16	16	16	
28	15	14	16	15	16	16	15	16	15	17	14	14	14	17	15	17	15	17	17	16	14	14	B	15	16
29	15	15	16	16	15	15	15	15	15	16	16	15	16	16	17	16	16	16	17	16	14	15	14	16	
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	28	28	29	29	29	27	25	29	29	27	23	25	24	26	26	25	25	25	28	29	29	28	28	29	
MED	15	15	15	15	15	15	15	15	15	16	15	15	16	16	16	15	16	15	15	16	15	15	15	15	
U Q	16	16	16	16	16	16	16	16	16	16	16	17	17	17	17	16	16	16	16	16	16	16	16	16	
L Q	15	14	14	14	14	15	14	15	15	15	15	15	15	15	16	15	15	15	15	14	14	14	15	15	

HOURLY VALUES OF foF2 AT Okinawa

FEB. 2020

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	33	31	30	26	26	25	25	32	59	54	53	63	78	A	54	55	55	49	54	45	34	34	26	29
2	B 23	23	A	A	A	A	A	A	55	56	55	63	58	55	51	53	51	52	62	65	31	A	25	A
3	29	25	27	31	31	30	B 22	26	59	53	57	55	75	88	101	96	93	92	86	47	41	45	49	46
4	45	58	57	42	34	32	31	33	51	54	50	C	C	C	C	C	C	C	C	A	A	35	A	A
5	A	29	29	29	30	32	B 23	27	49	B	C	C	C	C	C	C	C	C	54	44	34	32	33	33
6	26	30	29	30	29	23	A	33	46	45	C	C	54	69	C	C	57	56	49	51	38	41	36	B 23
7	28	29	29	28	33	A	B 22	33	52	62	52	67	79	78	73	93	89	71	59	A	51	36	A	30
8	30	31	36	39	A	B	B	30	50	65	76	56	71	63	82	79	75	61	53	37	B	30	27	25
9	24	B 23	23	N 23	N 23	N 23	B 23	31	58	57	53	53	70	88	108	110	66	64	73	47	32	B 25	28	30
10	28	30	29	27	33	B	B	30	48	50	61	63	79	65	77	70	59	50	51	37	26	25	31	N 23
11	24	25	30	24	30	24	25	31	44	52	B	B	B	B	B	B	B	B	B	B	B	B	B	B
12	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	87	61		B	B	B	B
14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	45	35	35	31	25	24
15	N 25	25	25	29	26	N 23	B	31	47	B	B	B	B	B	B	B	91	69	73	50	38	31	27	N 24
16	29	31	31	31	33	30	27	36	46	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
17	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	60	76	47	33	33	34	27
18	26	26	30	30	33	B 22	B	32	42	B	B	B	B	B	B	B	67	58	58	49	35	30	26	29
19	30	29	29	37	A	N 22	N 22	43	49	B	B	B	B	B	B	B	B	B	47	34	A	A	35	37
20	35	32	A	A	31	A	B	32	B	B	B	B	B	B	B	B	B	65	57	38	32	30	30	29
21	30	35	33	33	36	B 23	A	35	B	B	B	B	B	B	B	B	61	55	51	40	33	29	33	27
22	30	N 29	N 29	29	31	24	A	32	50	B	B	B	B	B	B	B	78	59	54	39	34	32	25	N 24
23	29	29	25	N 23	33	23	B	37	49	49	49	56	88	92	75	77	95	93	81	61	A	A	45	32
24	31	31	29	29	31	39	29	36	B	B	B	149	B	B	B	B	B	80	72	61	50	33	35	30
25	26	29	29	25	26	N 25	N 23	32	44	B	B	B	B	B	B	B	112	96	70	58	32	N 24	27	N 24
26	N 24	28	N 24	27	30	N 25	B	33	42	B	B	B	B	B	B	B	B	67	57	40	A	N 25	29	B 23
27	25	29	29	25	31	24	N 23	35	B	B	B	B	B	B	B	91	68	49	48	48	30	30	31	32
28	31	32	N 23	25	25	N 23	B	34	51	B	B	B	B	B	B	61	65	56	52	A	A	31	31	30
29	28	29	N 31	A	26	N 23	23	35	55	56	55	73	72	62	65	75	73	51	52	41	34	37	38	32
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	25	23	22	22	20	13	24	21	12	10	10	10	9	9	11	17	22	24	23	20	22	23	23
MED	28	29	29	29	31	24	23	32	49	54	54	63	74	69	75	77	68	60	56	47	34	31	31	29
U Q	30	31	30	31	33	27	26	35	53	56	57	67	79	88	91	93	90	71	71	51	36	34	35	32
L Q	25	27	27	25	26	23	22	31	46	51	52	56	70	62	59	61	60	55	51	39	32	30	27	24

HOURLY VALUES OF fEs AT Okinawa

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
1	G	G	G	G	G	G	G	G	32	G	40	47	50	116	50	40	35	32	29	44	32	G	G	24					
2	B	G		27	28	56	55	44	53	38	40	40	43	52	54	51	46	40	36	G	48	26	29	28	28				
3				G	G	G	B		24	48	G	148	42	43	40	44	44	G	51	G	29	29	29	G					
4	G		39	28	11	G		26	24	G		29	35	G	C	C	C	C	C	C		59	69	32	90	60			
5		G	G	G			B	G	G	B	C	C	C	C	C	C	C	C	C		35	38							
6	G	G		G	G	G					C	C			C	C				G	G				B				
7	G	G	G		G		B	G	G	G		49	46				74	38	G	G		20	25	19	24				
8	G	G	G		146		27	B	B	G	G	N	G		48	47	53	44	47	39		36	55	33	29	25	24		
9	G	B	G		11	24	B	B	G	G	N	G		86		44	47	42	40	36	25	35		25	35	G			
10	G			25	G	G	B	G		29	36	43	58	50	48	46	43	36	52	41	32	27		G	G	G			
11	G		24	29	24	23	B	B	G		31		G	42	44	49	50	46	40	45	G	48	22	26		G	G	G	
12	G	G	G	G	G	G	G					B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
15	G	G	G	G		G	B	G			B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
16	G	G	G	G	G	G	G	G	G	G	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
17	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
18	G	G	G	G		B	B	G		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
19	G	G	G	G	11	G	G		32	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
20	G	G			11	G	G		32	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
21	G	G	56	58	60	27	B	G	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
22	G	G			G	B				B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
23	G	G	28	27	G		31	28		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
24	G	G	G	G	G		34	33	29	34																			
25	G	G	G	G	G	G	B	G	G																				
26	G	G	G	G	G	G	B	G	G																				
27	G	G	G	G	G																								
28	G	G	G	G	G	G	B																						
29	G	G			G	G	G	G	G																				
30			26	29	G	G	G	G	G																				
31																													
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
CNT	24	24	25	25	25	21	13	25	21	11	10	10	10	10	9	11	17	22	24	26	24	24	24	22					
MED	G	G	G	G	G	G	G	G	G	32	36	41	46	49	47	47	42	38	35	27	38	23	G	G	G				
U Q	G	G	26	24	23	26	30	28	42	40	44	48	50	54	50	44	43	42	36	48	30	27	26	G					
L Q	G	G	G	G	G	G	G	G	G	G	40	43	45	44	45	40	18	G	G	27	G	G	G	G					

HOURLY VALUES OF fmin AT Okinawa

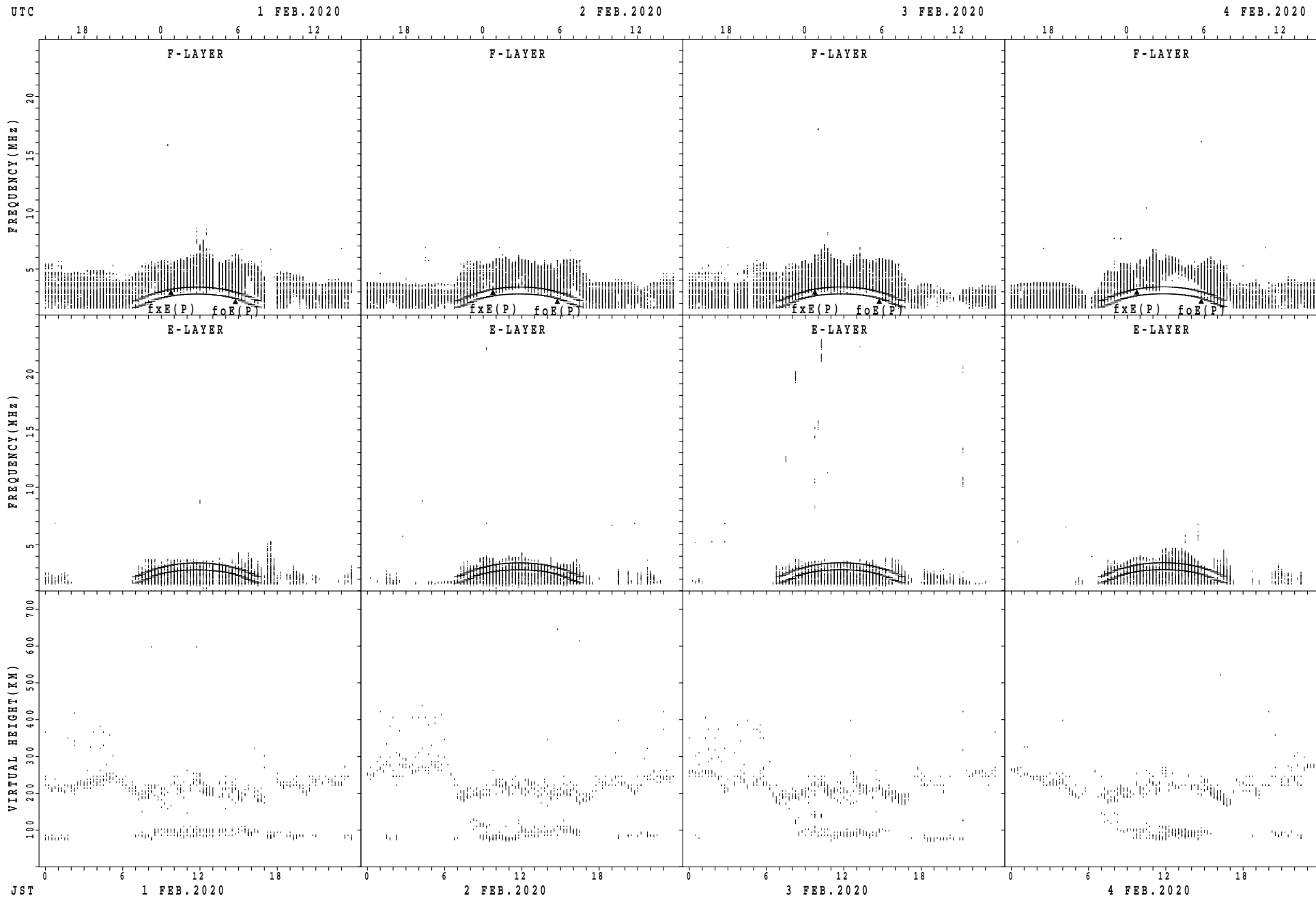
FEB. 2020

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	14	14	16	16	14	17	15	15	15	16	16	14	13	18	15	15	14	15	15	16	16	16	15	16		
2	B	16	15	15	17	15	15	15	14	14	14	15	14	13	13	13	15	16	16	15	15	16	16	15		
3	15	15	16	15	15	15	B	15	16	15	15	14	15	15	15	15	15	16	15	15	15	16	93	14		
4	15	14	15	14	15	16	15	14	15	13	14	C	C	C	C	C	C	C	C		16	16	15	15	16	
5	16	15	15	15	15	16	B		14	15	B	C	C	C	C	C	C	C		15	14	14	14	14	14	
6	14	14	16	15	14	57	16	15	15	16	C	C			C	C				15	14	14	14	B	16	
7	16	14	15	29	14	14	B		14	15	15	13	14	13	14	14	14	16	14	15	15	16	15	16	16	
8	15	15	17	14	66		B	14	14	16	16	16	15	15	13	13	14	14	15	15	15	B	15	16	15	
9	14	B	15	16	14	14	B		14	15	16	15	14	14	15	15	15	14	15	14	15	15	B	15	14	14
10	15	16	17	16	15	B	B		16	15	15	15	15	16	16	14	15	14	13	17	16	15	14	14	14	
11	15	15	15	14	14	14	15	14	15	14		B	B	B	B	B	B	B	B	B	B	B	B	B	B	
12	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B		15		15		B	B	B	B
14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			15	16	16	15	15	15
15	15	15	16	16	16	14	B		15	15	B	B	B	B	B	B	B	15	14	15	14	14	14	14	15	
16	15	15	14	15	16	14	15	14	16		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
17	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			16	15	119	15	14	15	15
18	14	15	15	14	14	B	B		15	15	B	B	B	B	B	B	B	14	15	15	14	14	14	15	14	
19	15	16	16	14	14	15	15	15	15		B	B	B	B	B	B	B	B	B		15	16	16	15	15	15
20	15	14	14	16	15	15	B		14	B	B	B	B	B	B	B	B			14	15	16	15	15	15	17
21	14	14	16	15	16		16	16		B	B	B	B	B	B	B	B	15	16	15	16	16	15	15	14	
22	14	16	14	14	15	15	16	16	16		B	B	B	B	B	B	B	16	15	15	16	15	14	13	15	
23	14	14	15	14	14	15	B		14	15	15	15	16	15	15	14	15	13	14	15	15	15	15	15	14	
24	14	14	15	14	16	15	16	14		B	B	B	181	B	B	B	B	B		15	15	15	15	15	15	14
25	14	14	14	14	15	15	14	16	15		B	B	B	B	B	B	B	14	14	15	15	15	15	14	14	
26	15	14	14	15	15	14	B		15	15	B	B	B	B	B	B	B	B		15	15	16	15	15	15	B
27	14	15	14	15	15	15	15	15		B	B	B	B	B	B	B		15	15	15	15	15	14	15	15	15
28	14	14	14	14	14	16	B		16	15	B	B	B	B	B	B		15	13	15	16	15	16	14	15	15
29	15	15	15	15	14	15	15	16	15	15	16	15	15	15	15	17	15	16	14	16	14	15	14			
30																										
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	24	24	25	25	25	23	17	25	21	12	10	10	10	10	9	11	17	22	24	26	25	25	25	23		
MED	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	15	14	15	15	15	15	15	15	15	15	
U Q	15	15	16	15	15	15	15	16	15	16	16	15	15	16	15	15	15	15	15	16	16	15	15	15	15	
L Q	14	14	14	14	14	14	15	14	15	14	14	14	14	14	14	13	14	14	14	15	15	15	14	14	14	

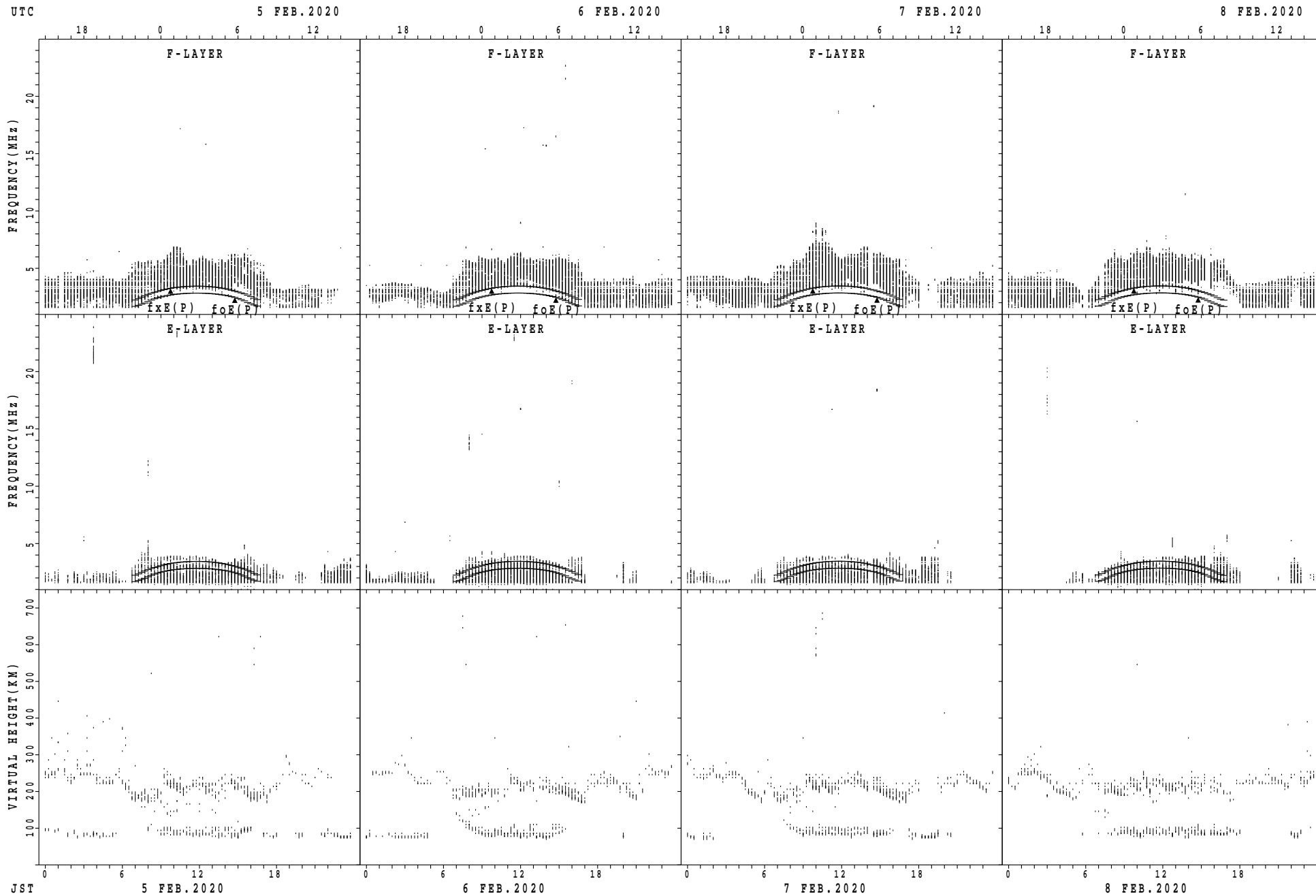


SUMMARY PLOTS AT Wakkanai



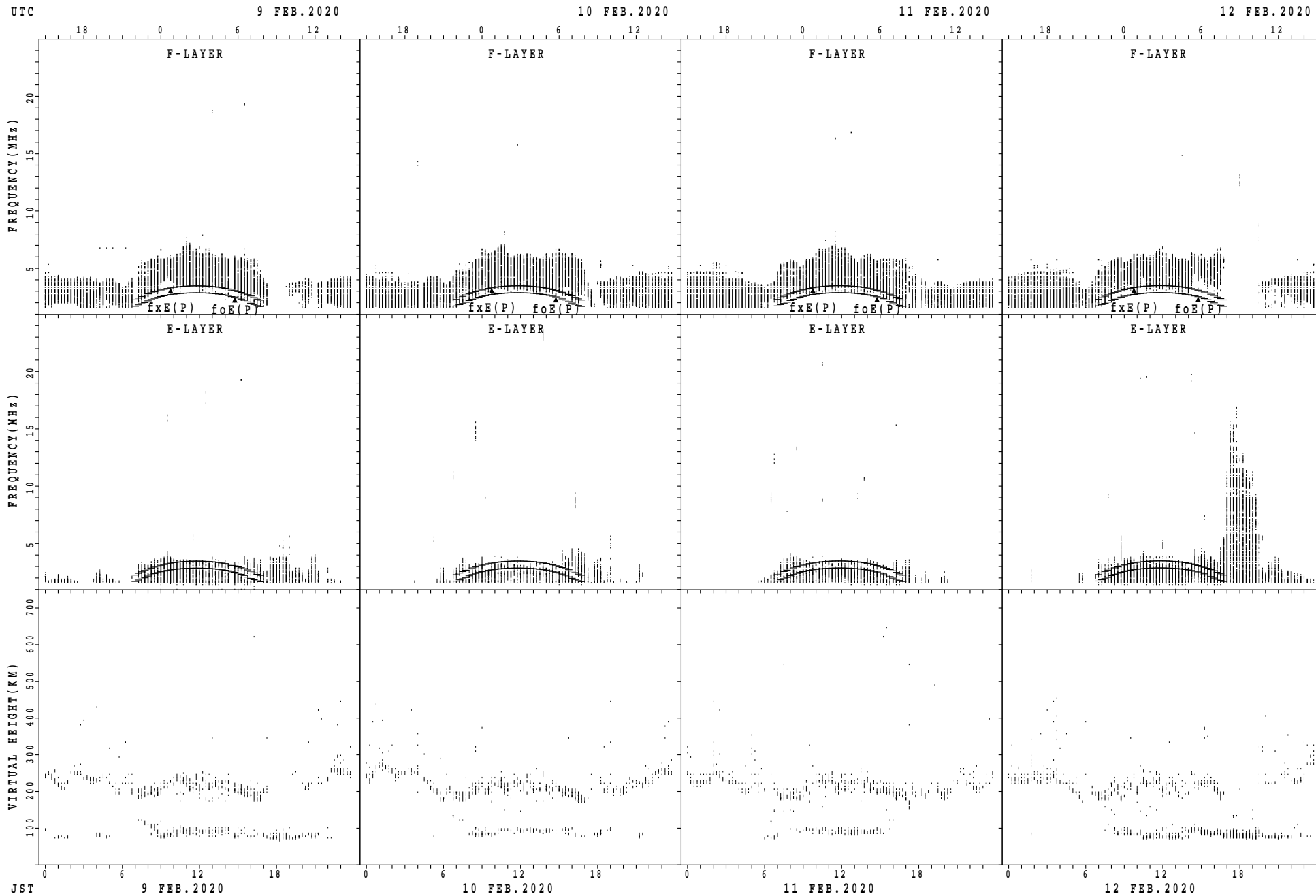
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Wakkanai



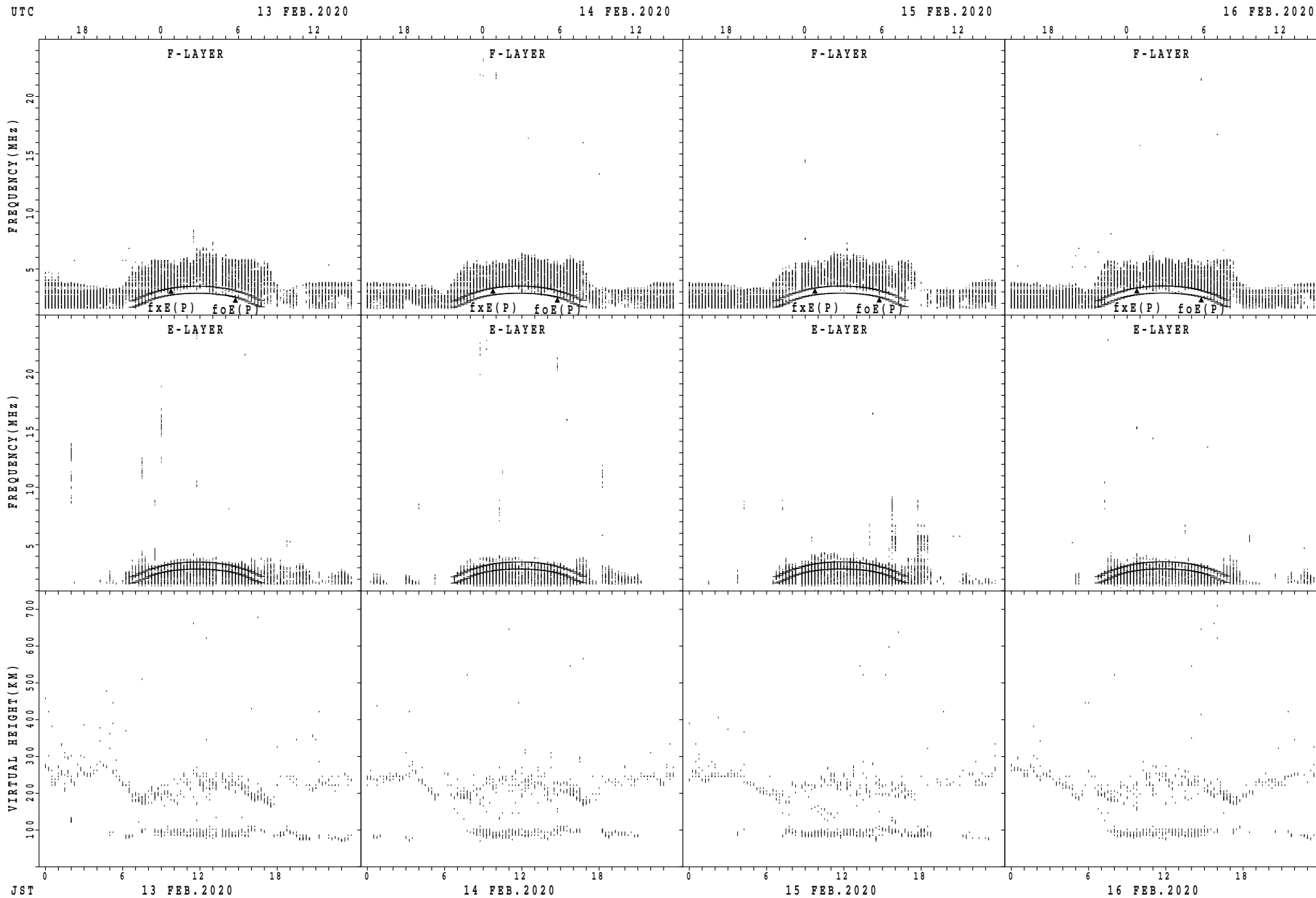
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



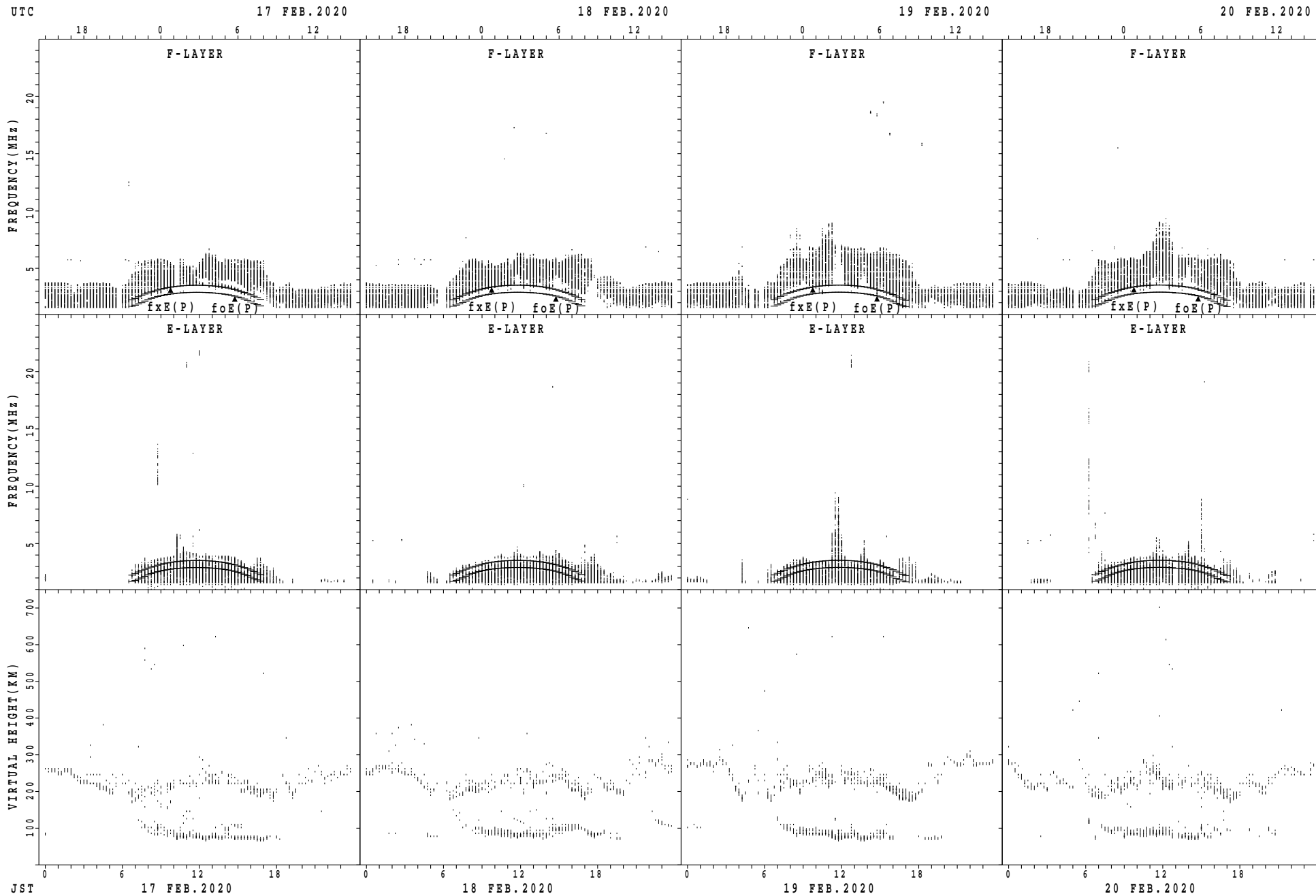
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



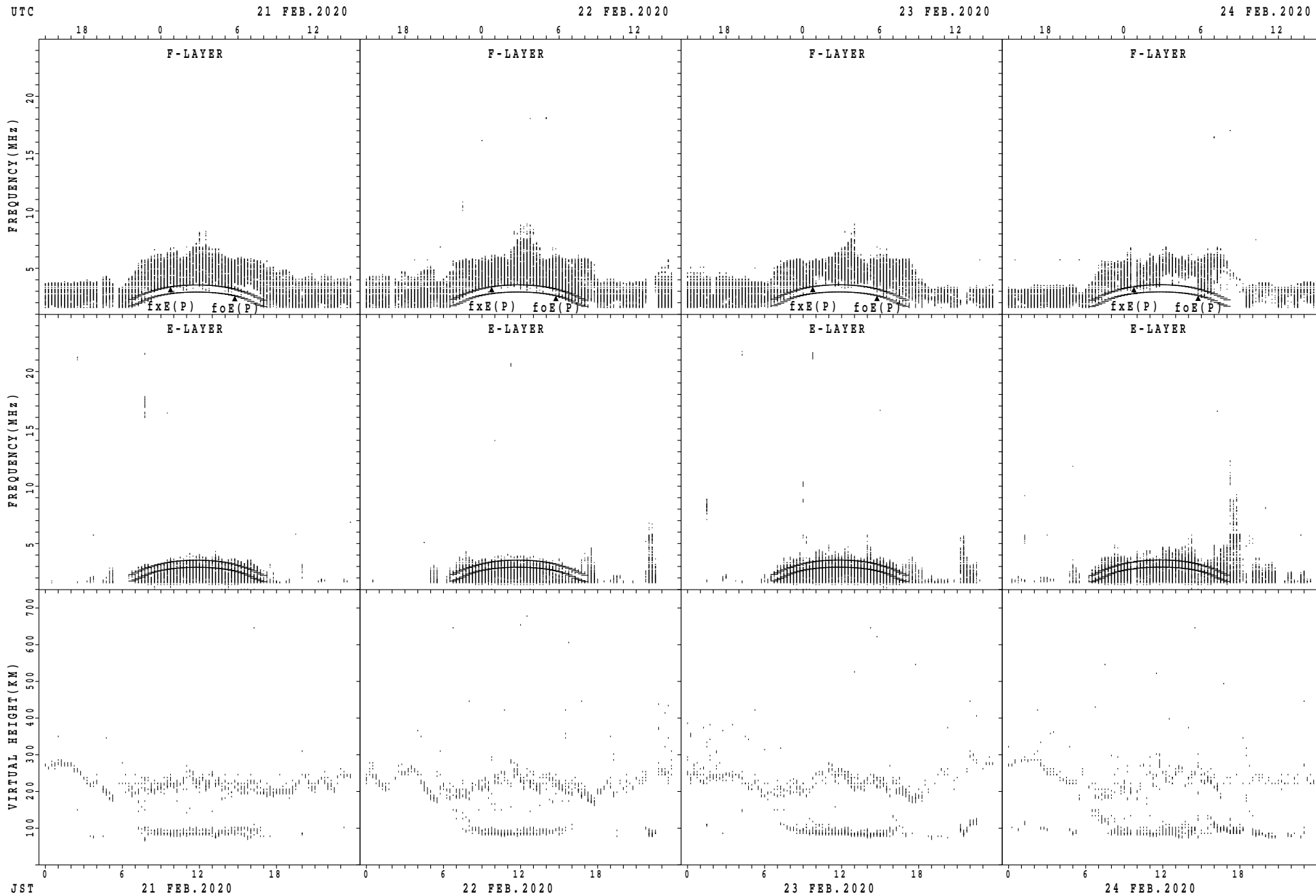
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Wakkanai



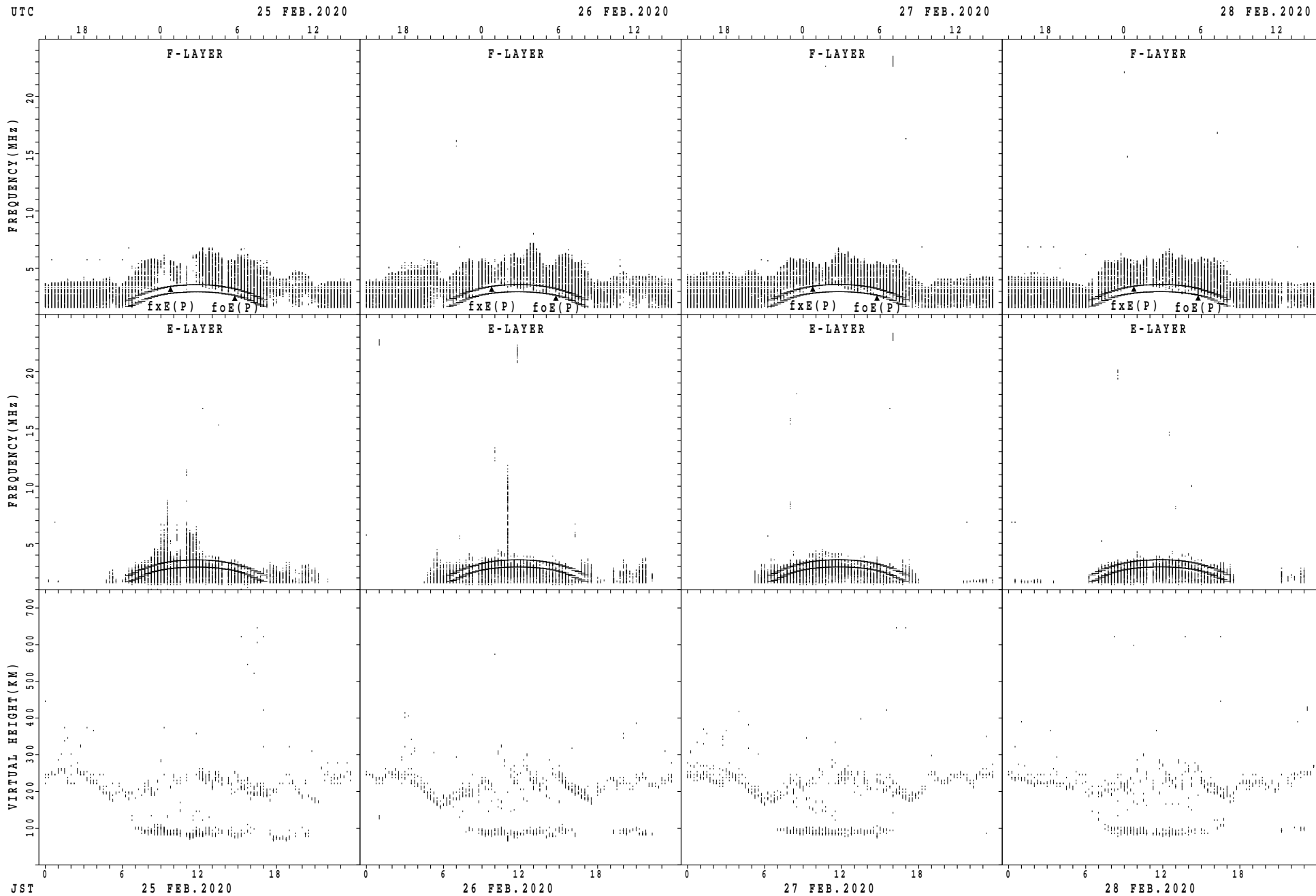
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Wakkanai



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

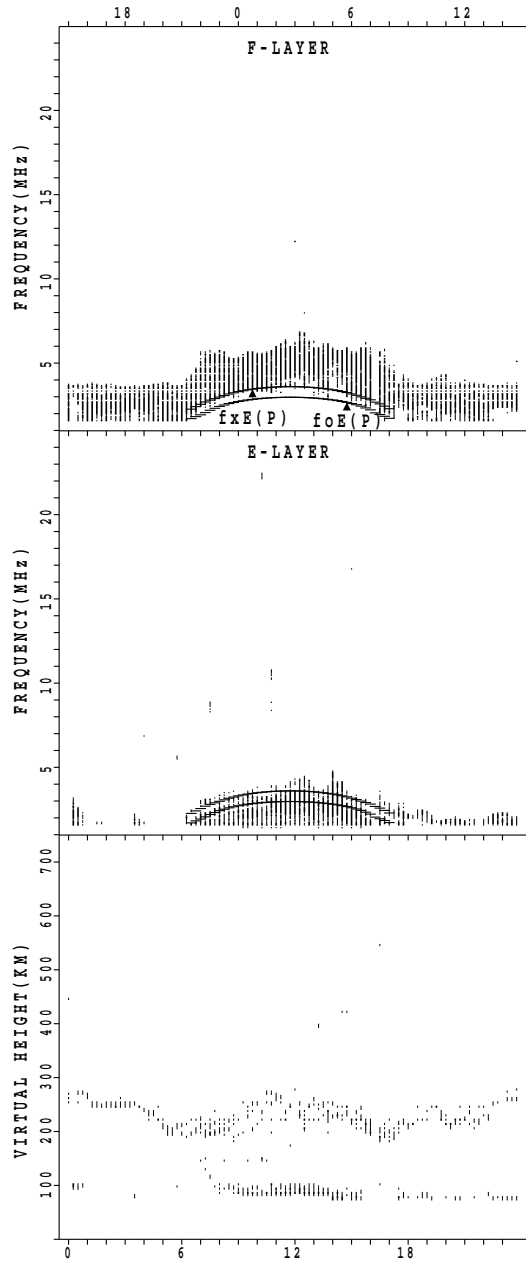
SUMMARY PLOTS AT Wakkanai



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

SUMMARY PLOTS AT Wakkanai

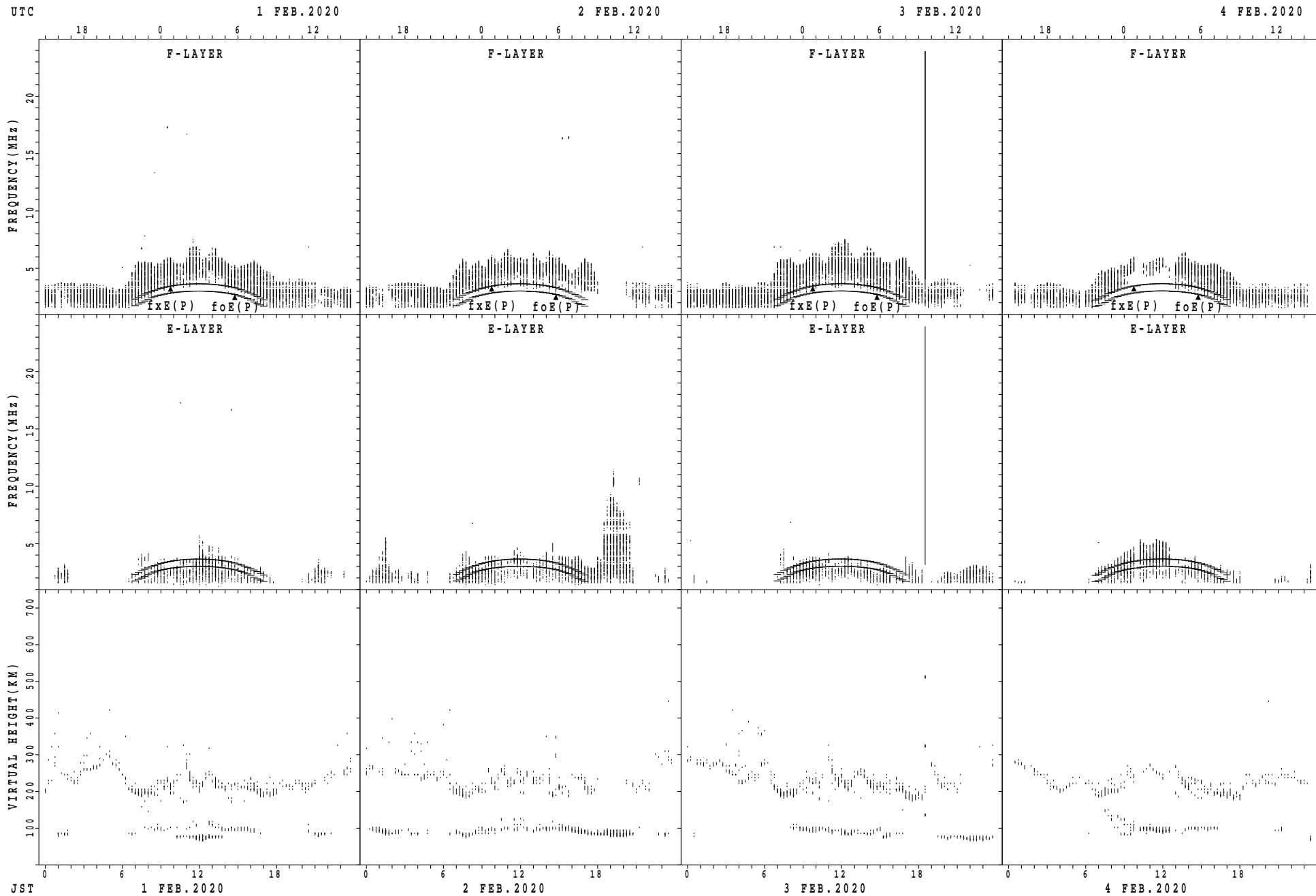
UTC 29 FEB. 2020



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

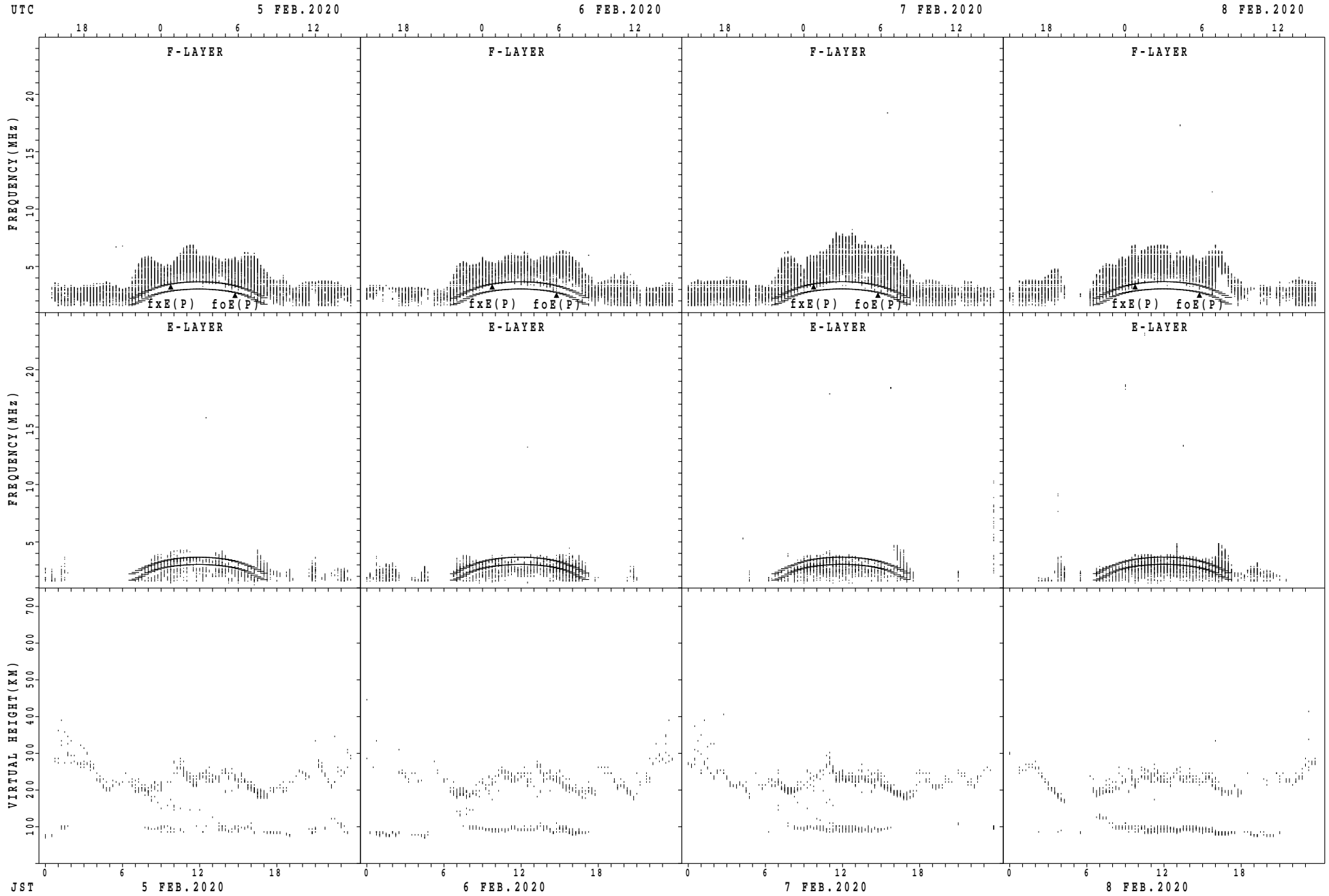


SUMMARY PLOTS AT Kokubunji



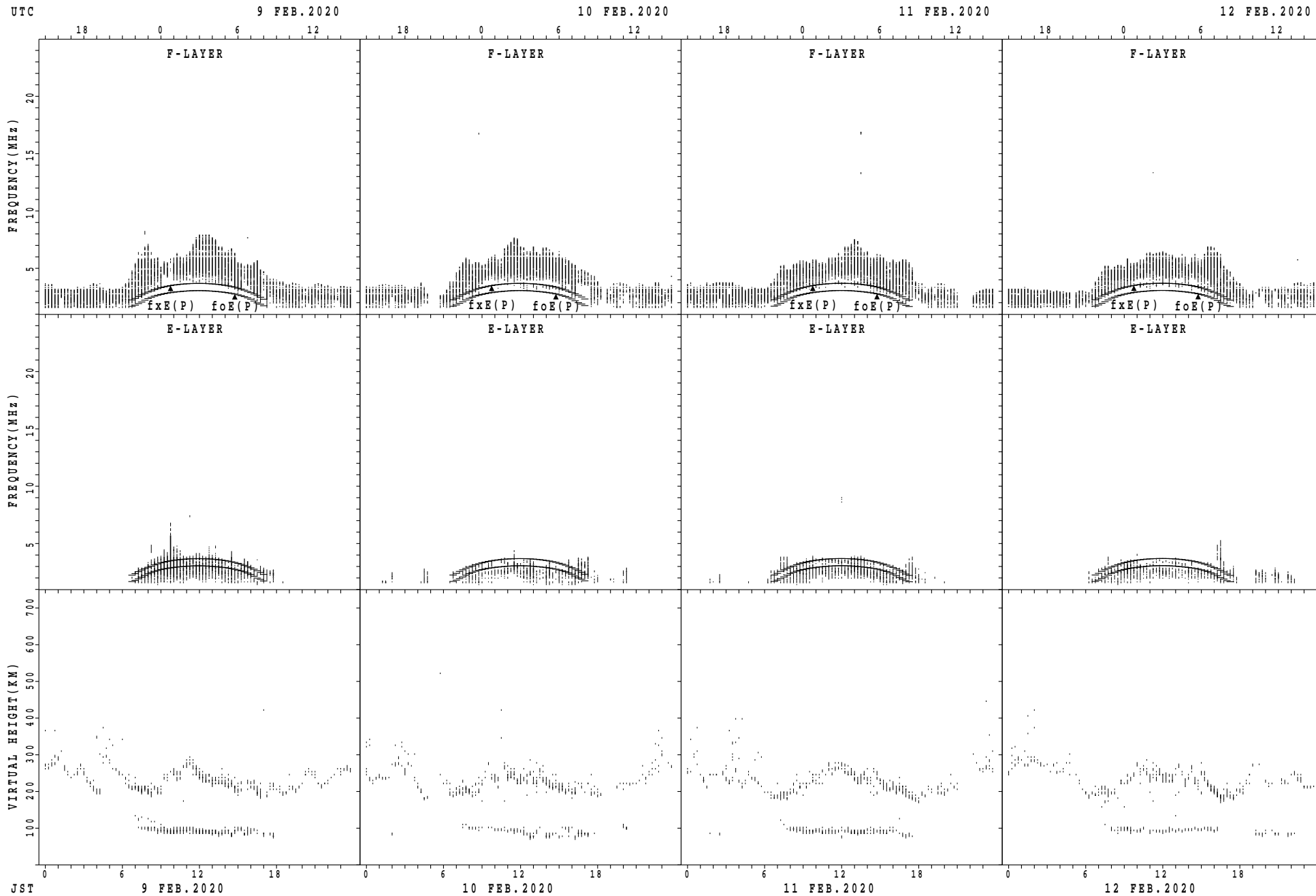
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



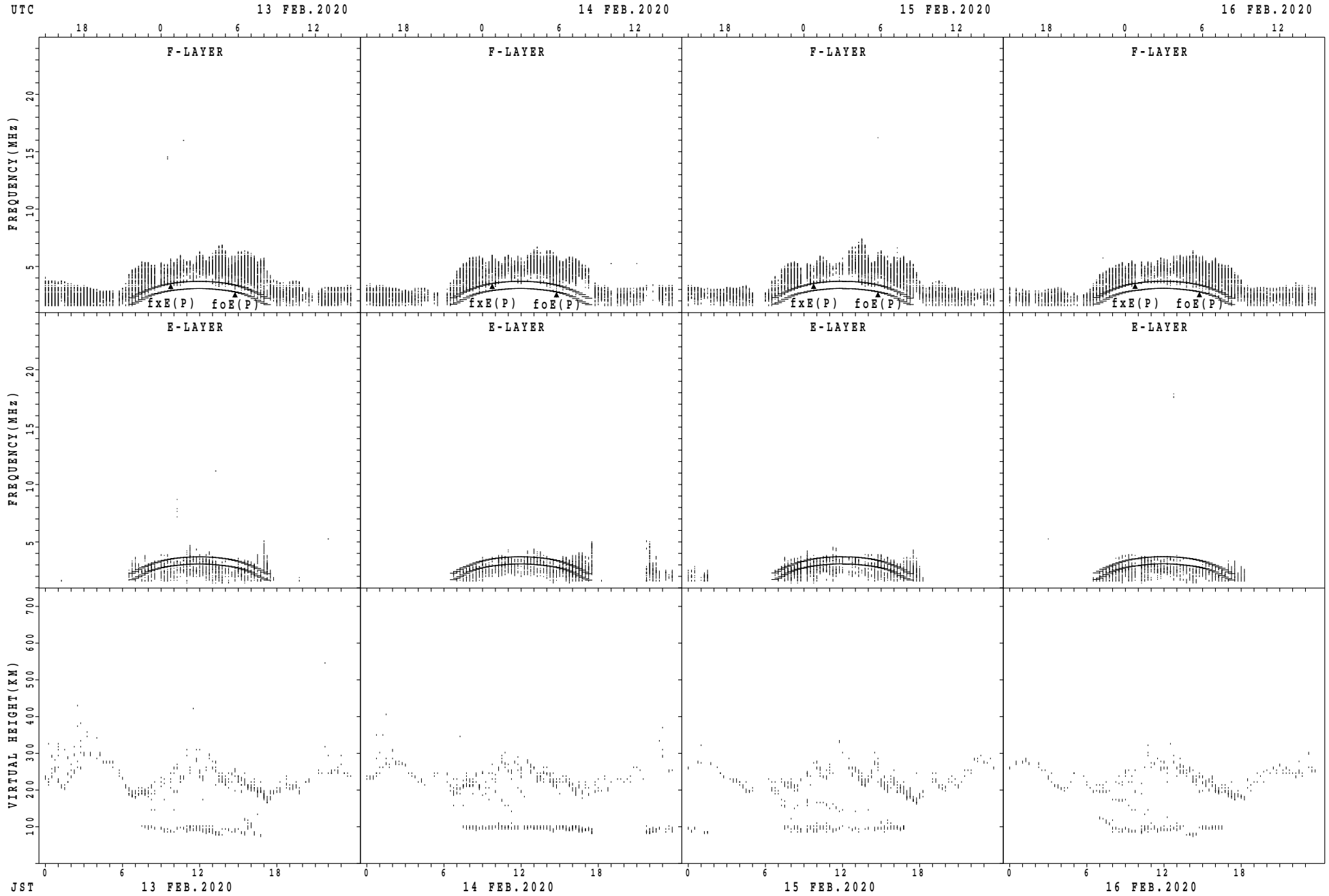
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



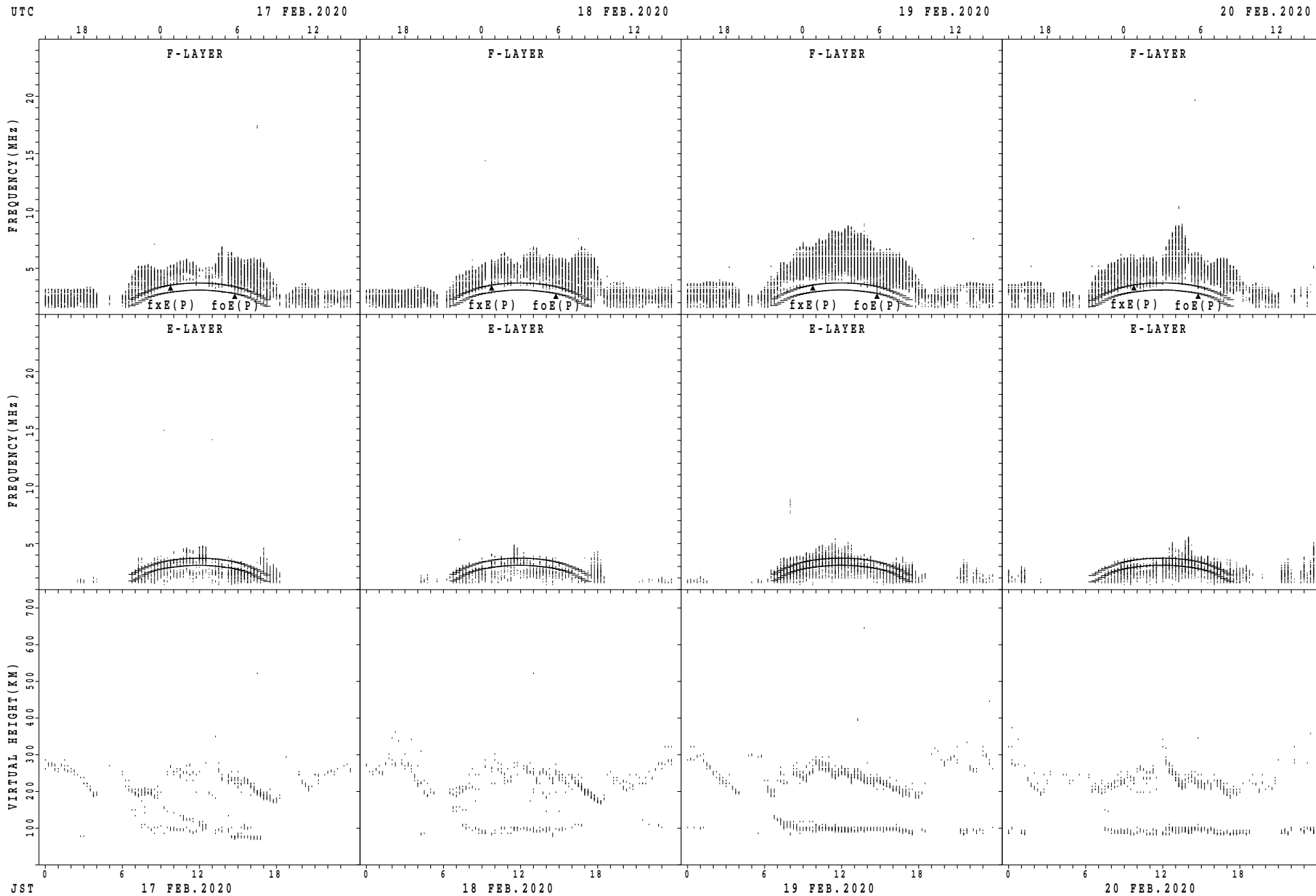
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



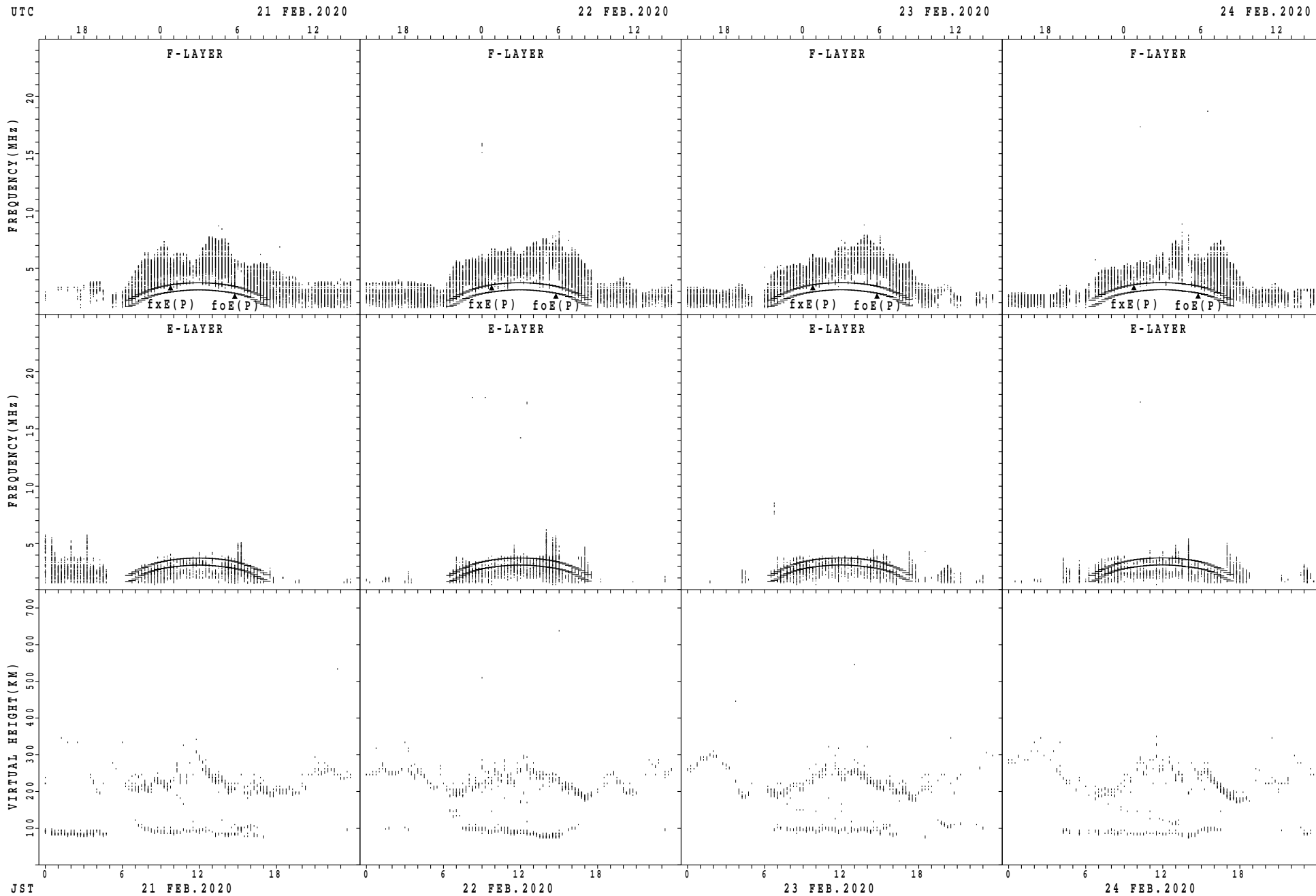
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



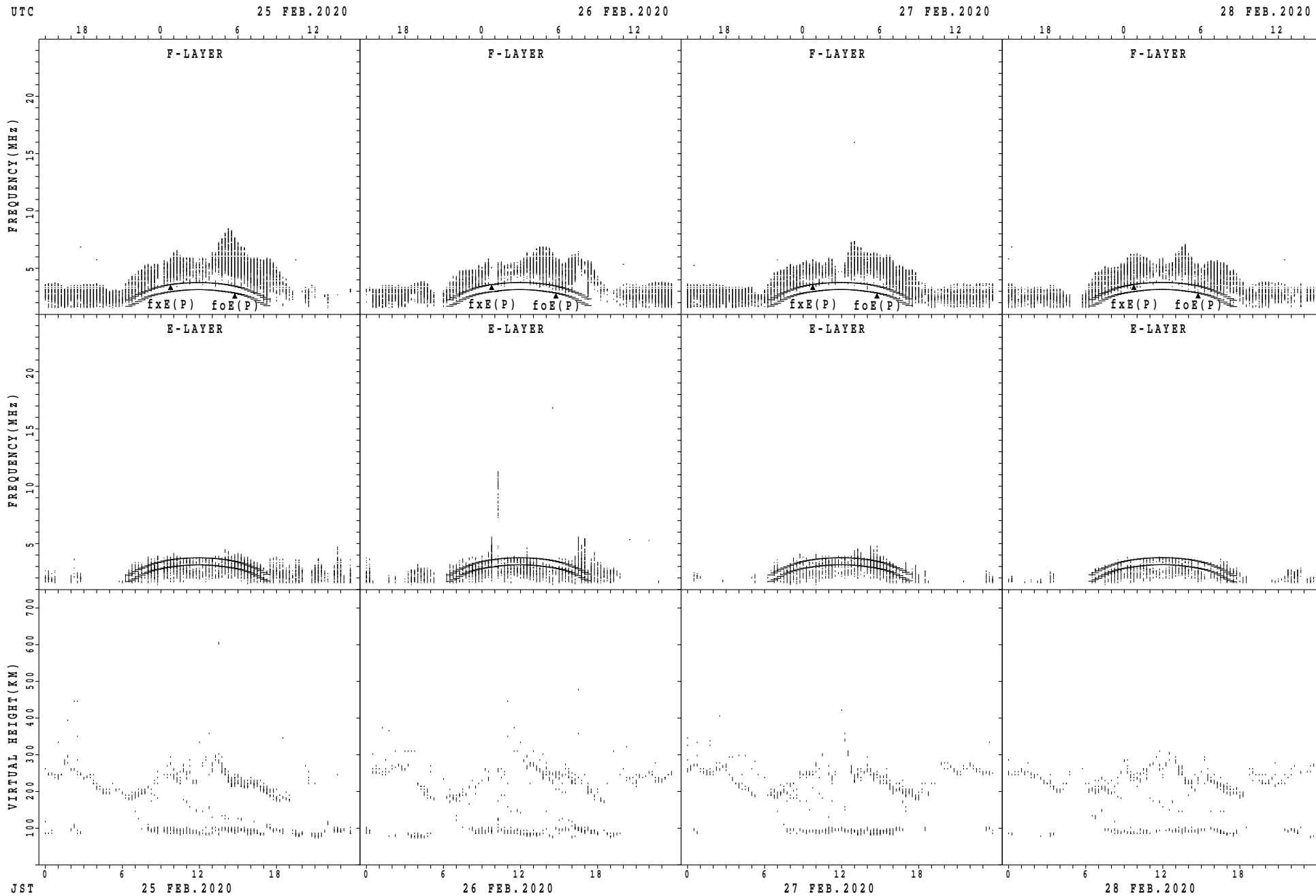
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



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

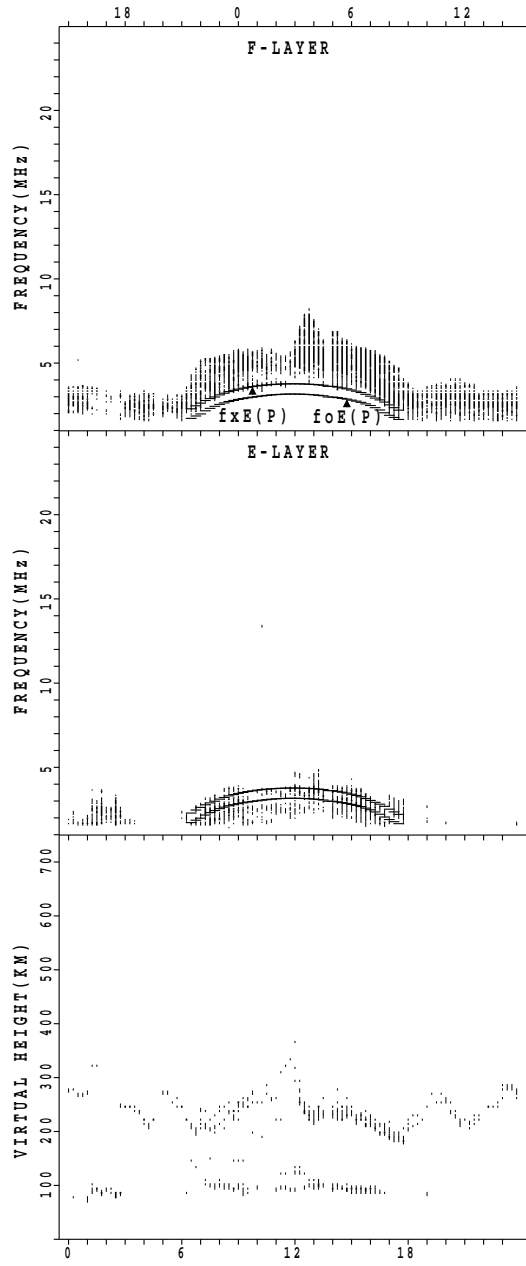
SUMMARY PLOTS AT Kokubunji



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

# SUMMARY PLOTS AT Kokubunji

UTC 29 FEB. 2020

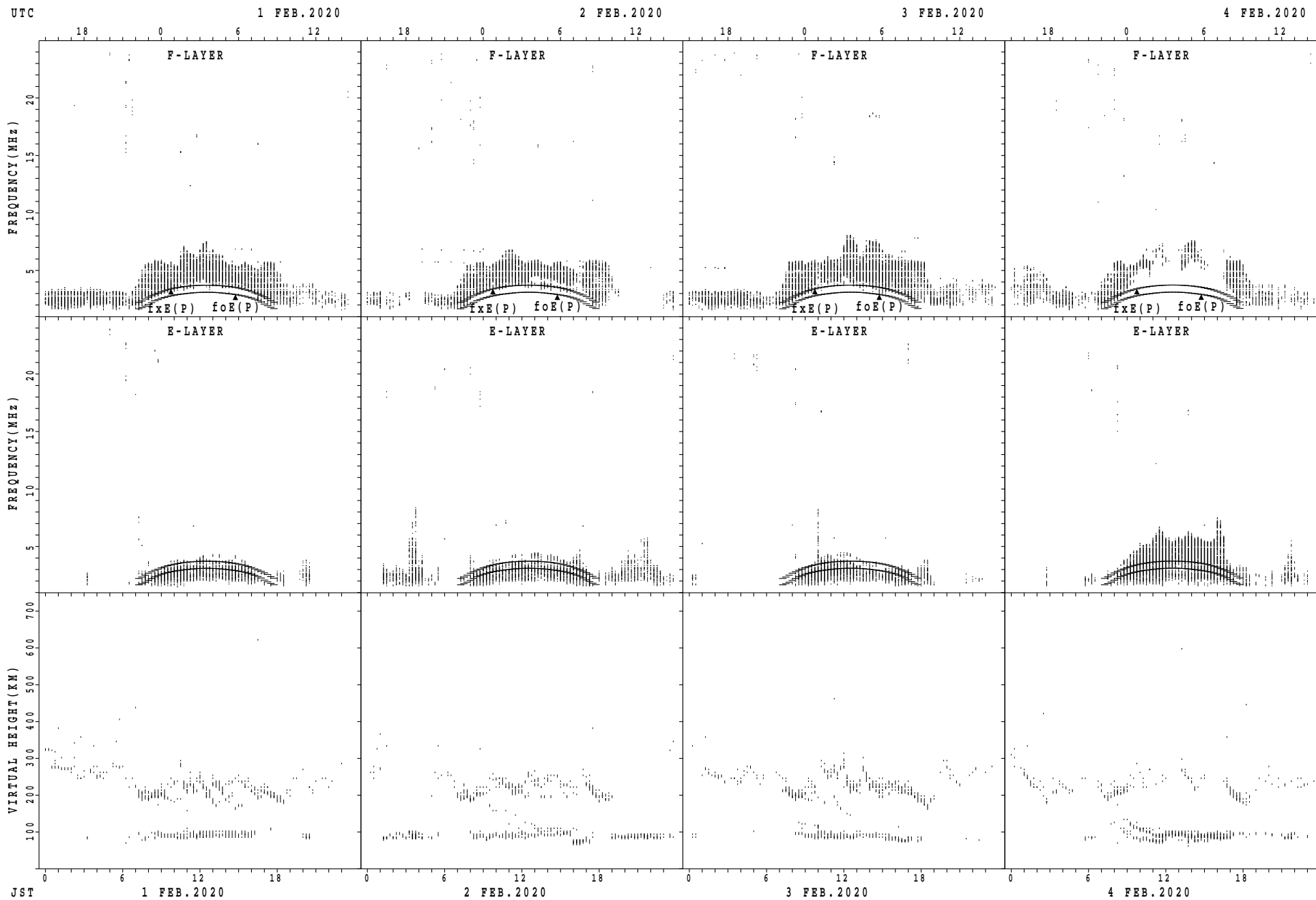


JST 29 FEB. 2020

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

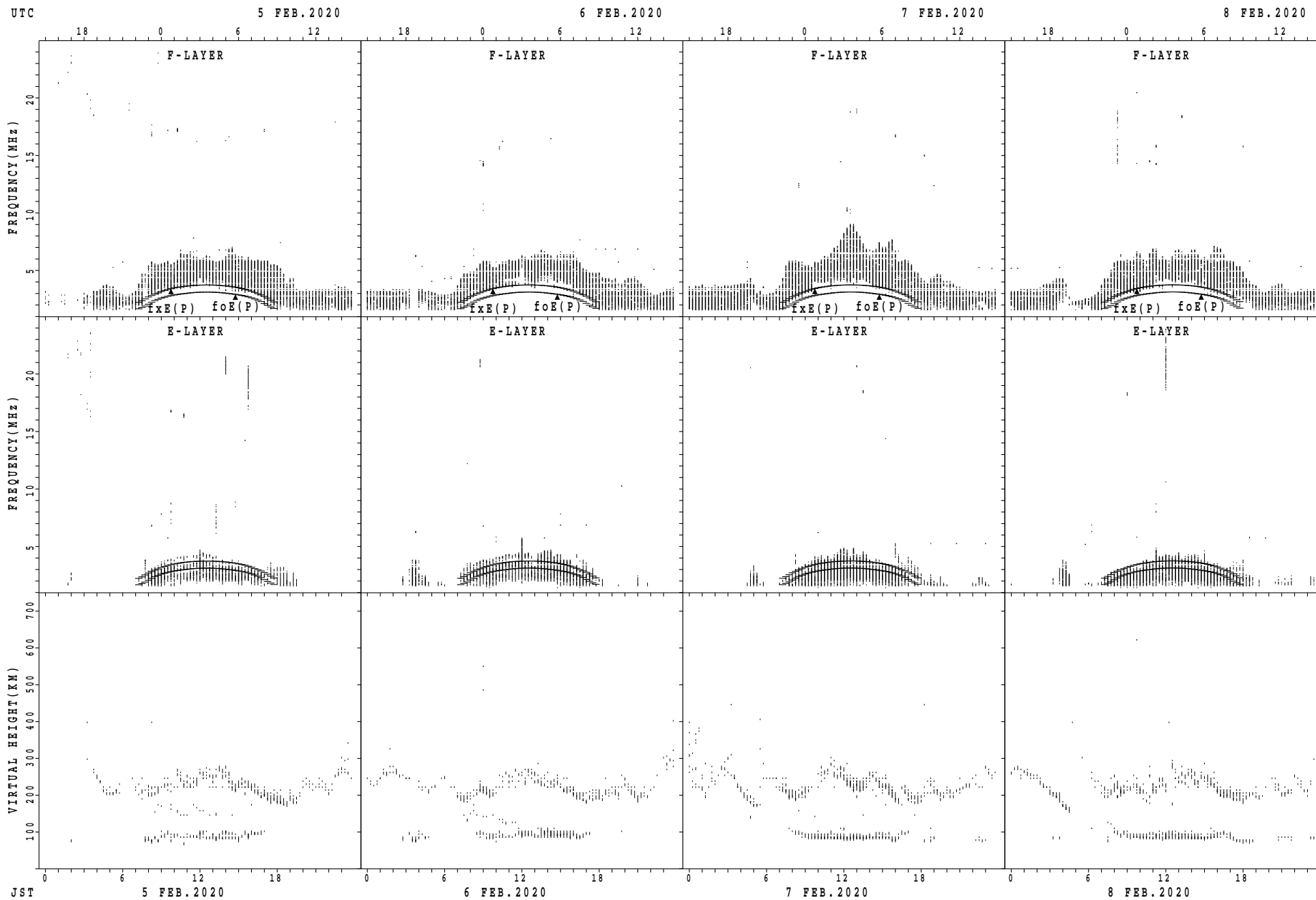


SUMMARY PLOTS AT Yamagawa



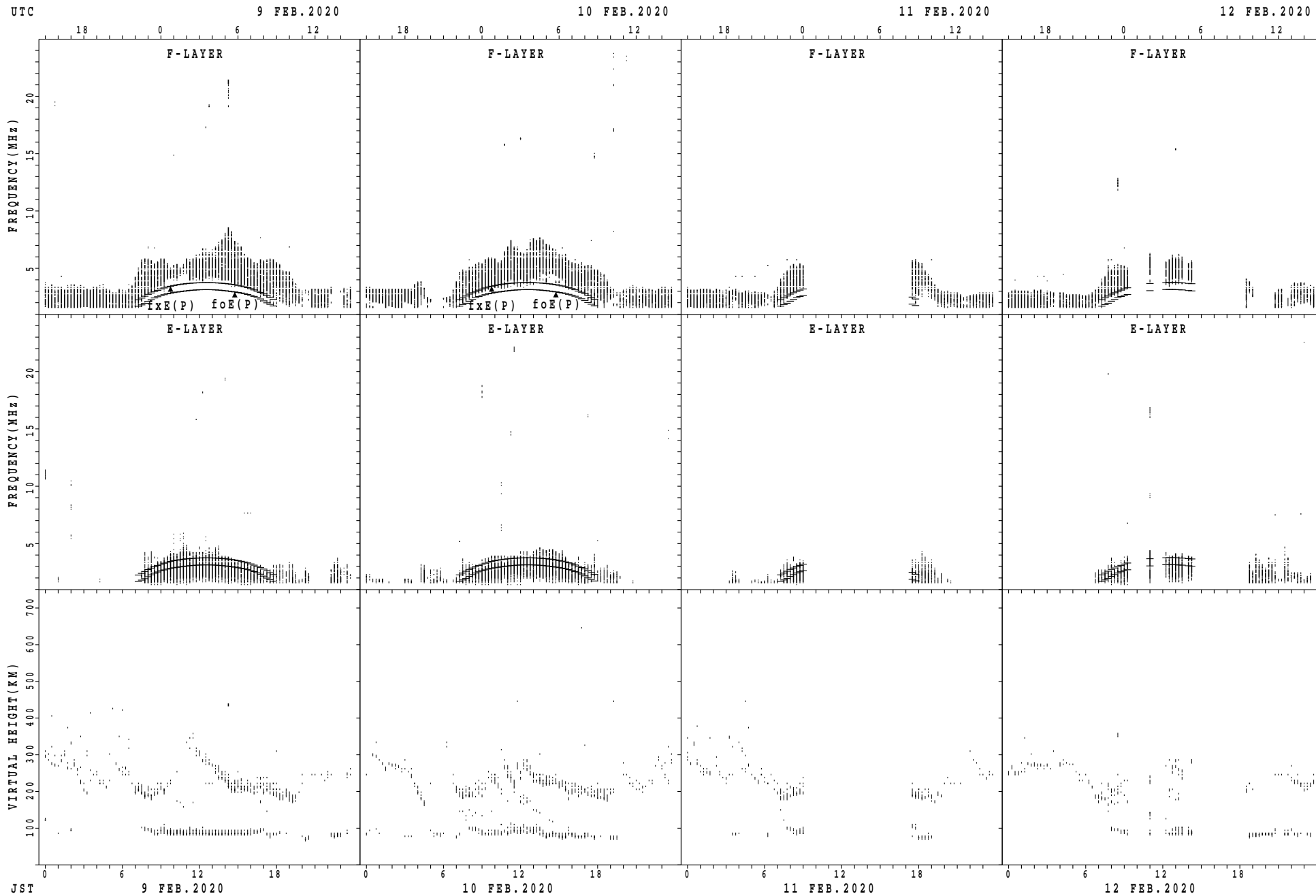
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



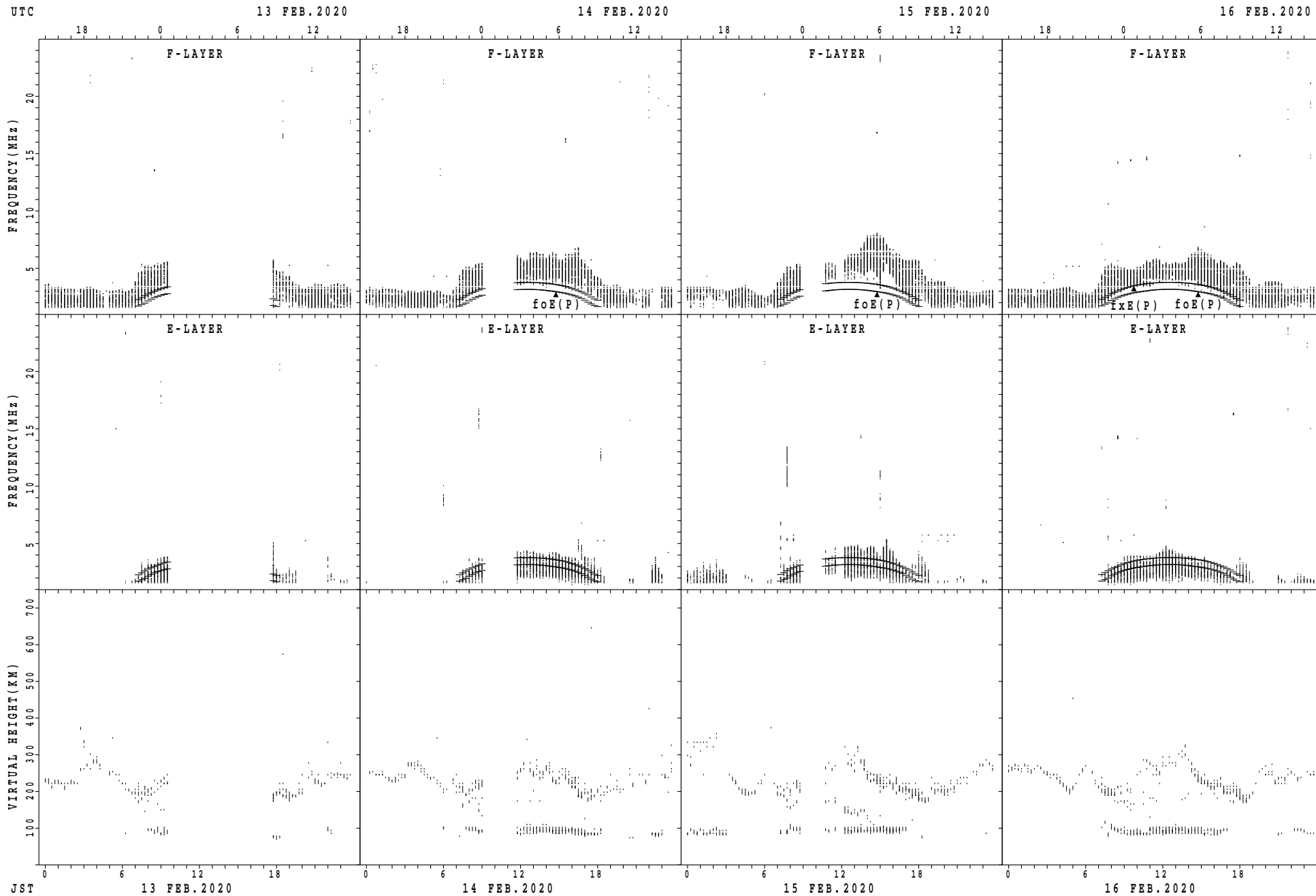
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



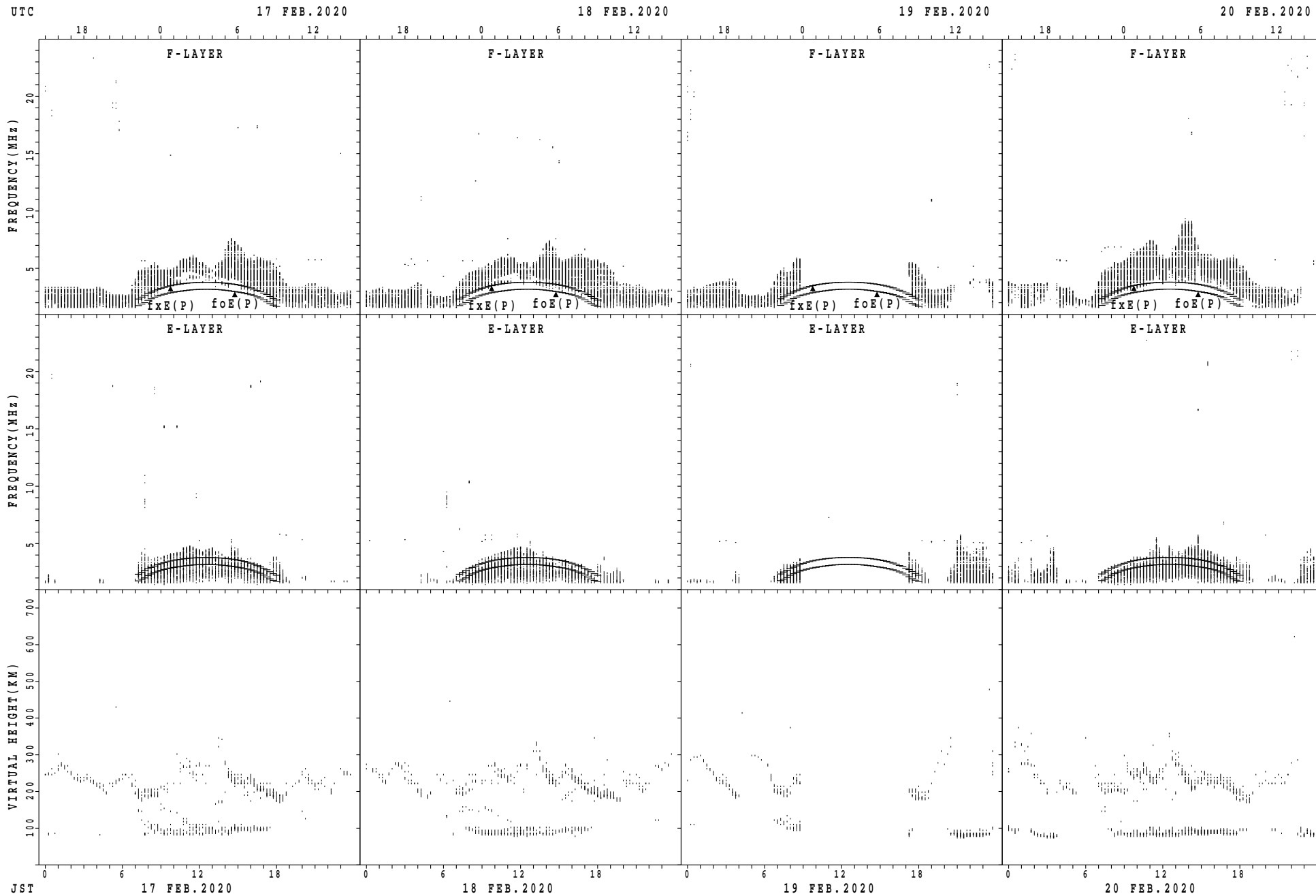
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



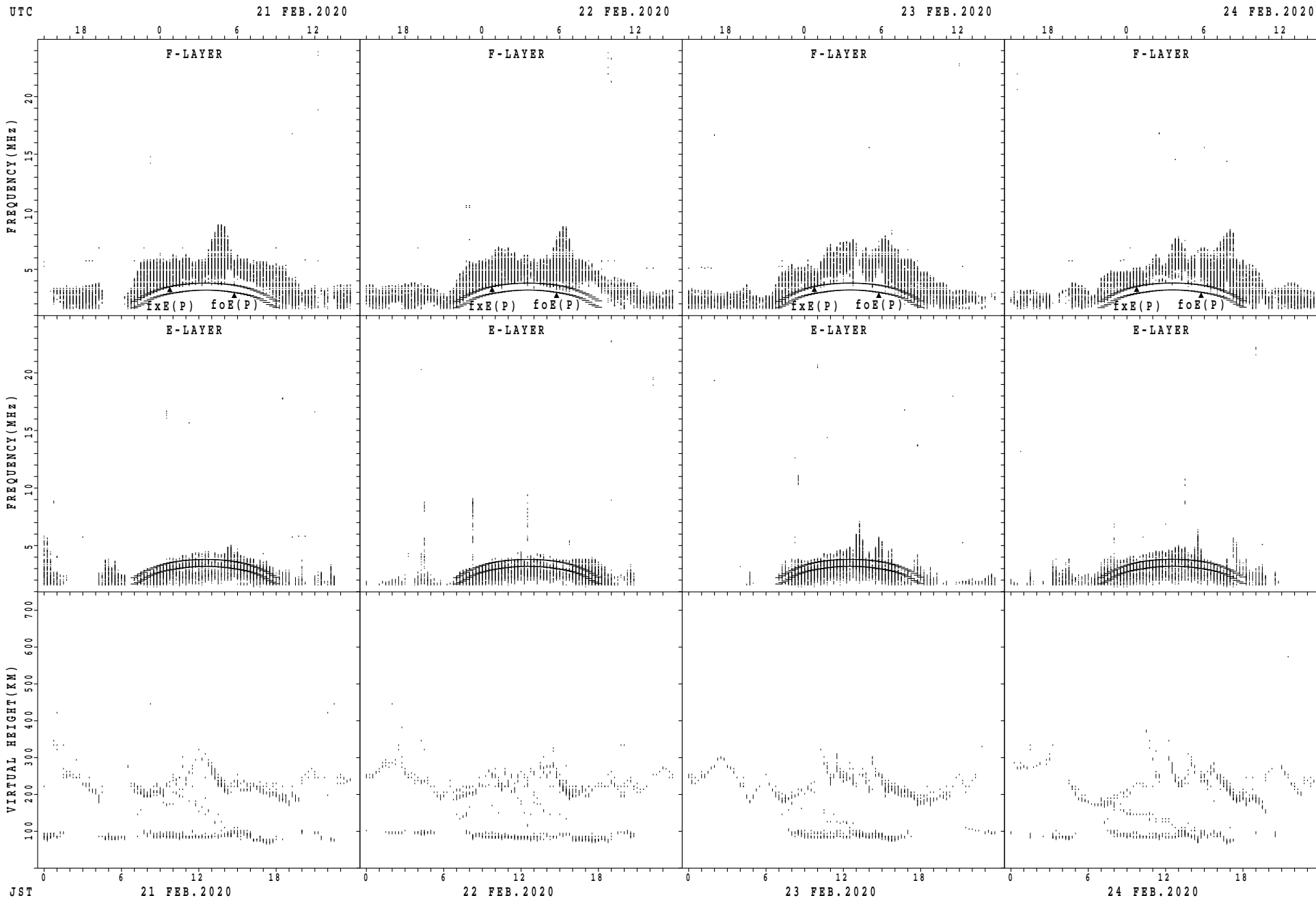
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



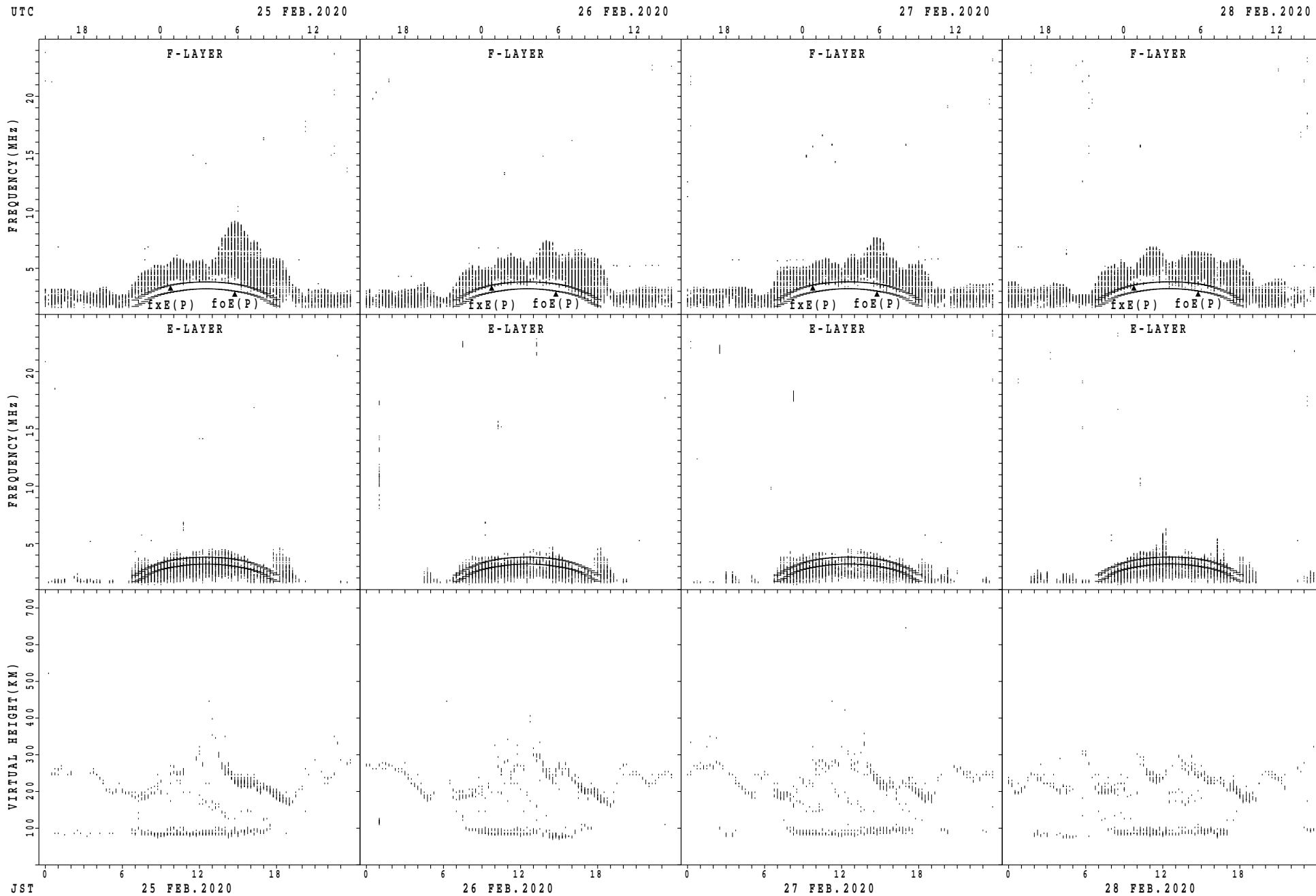
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



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

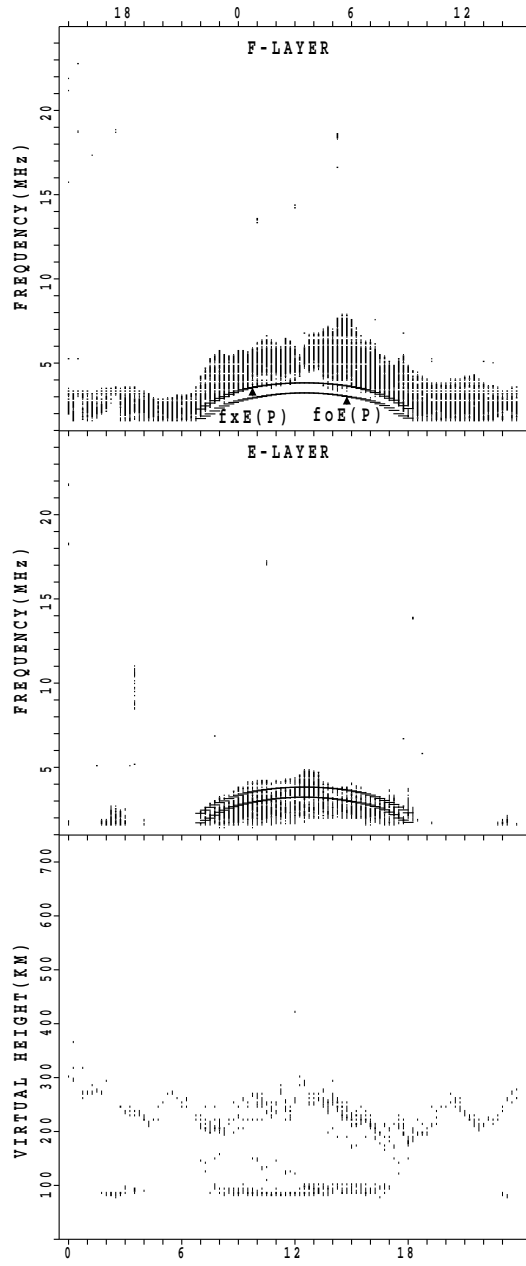
SUMMARY PLOTS AT Yamagawa



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

### SUMMARY PLOTS AT Yamagawa

UTC 29 FEB. 2020

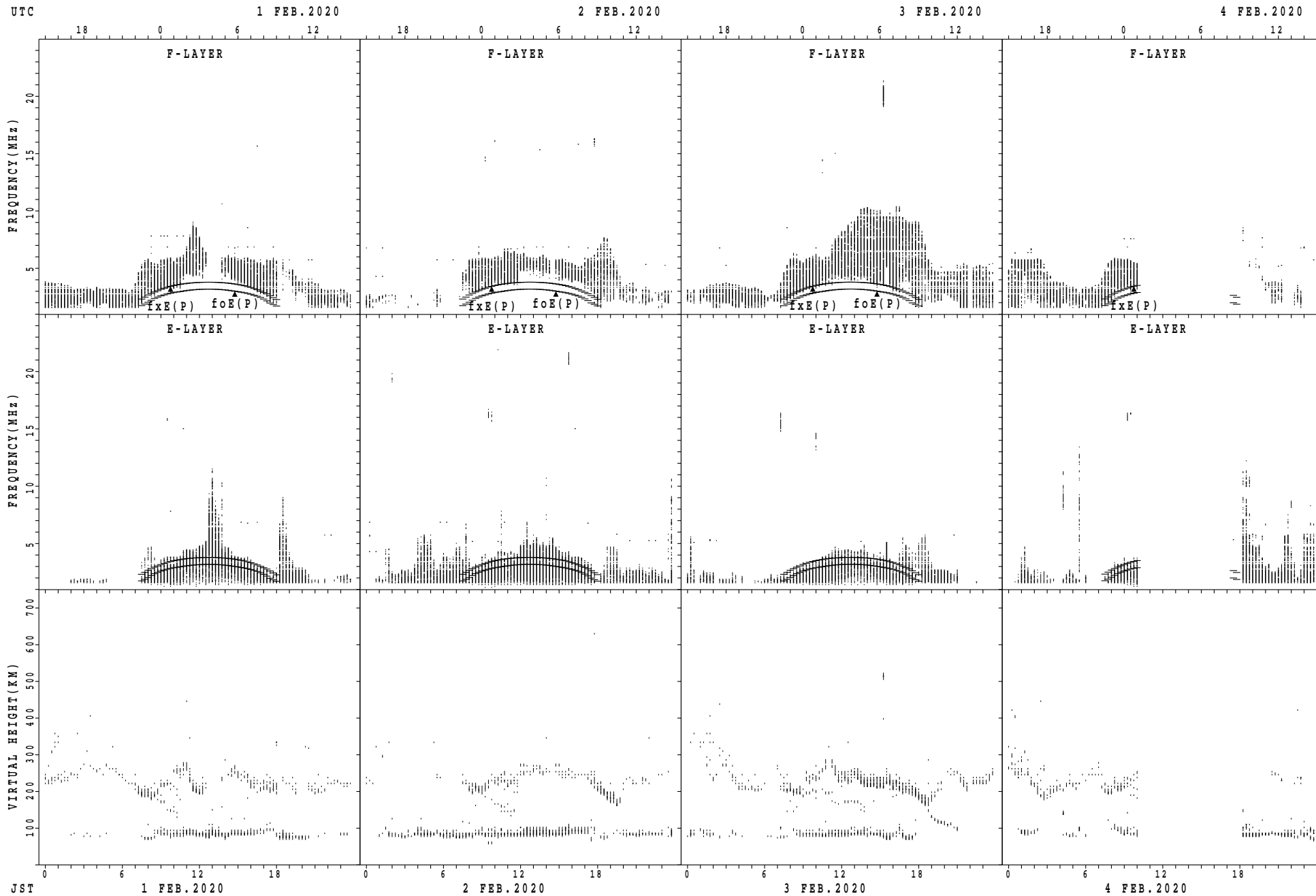


JST 29 FEB. 2020

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

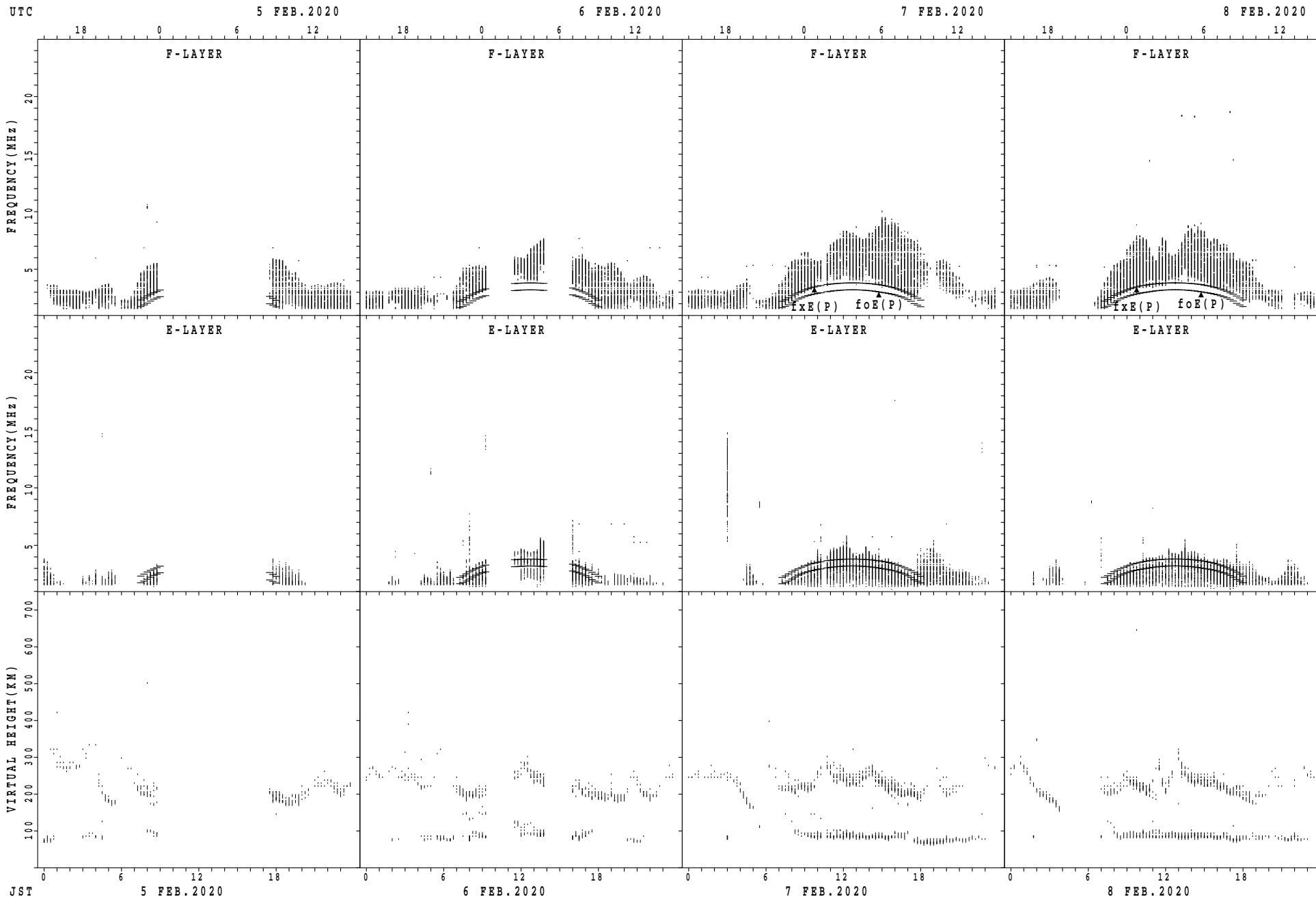


SUMMARY PLOTS AT Okinawa



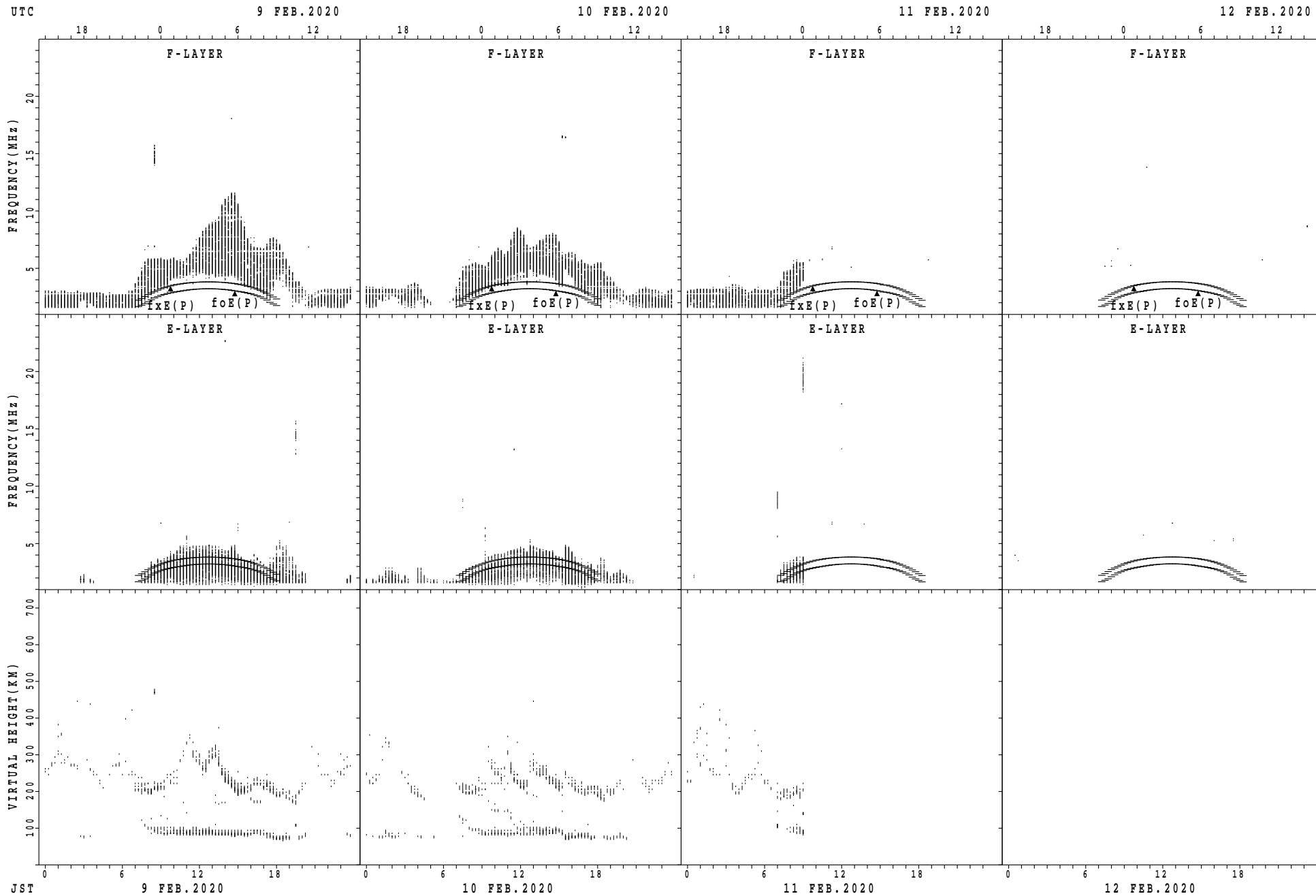
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Okinawa



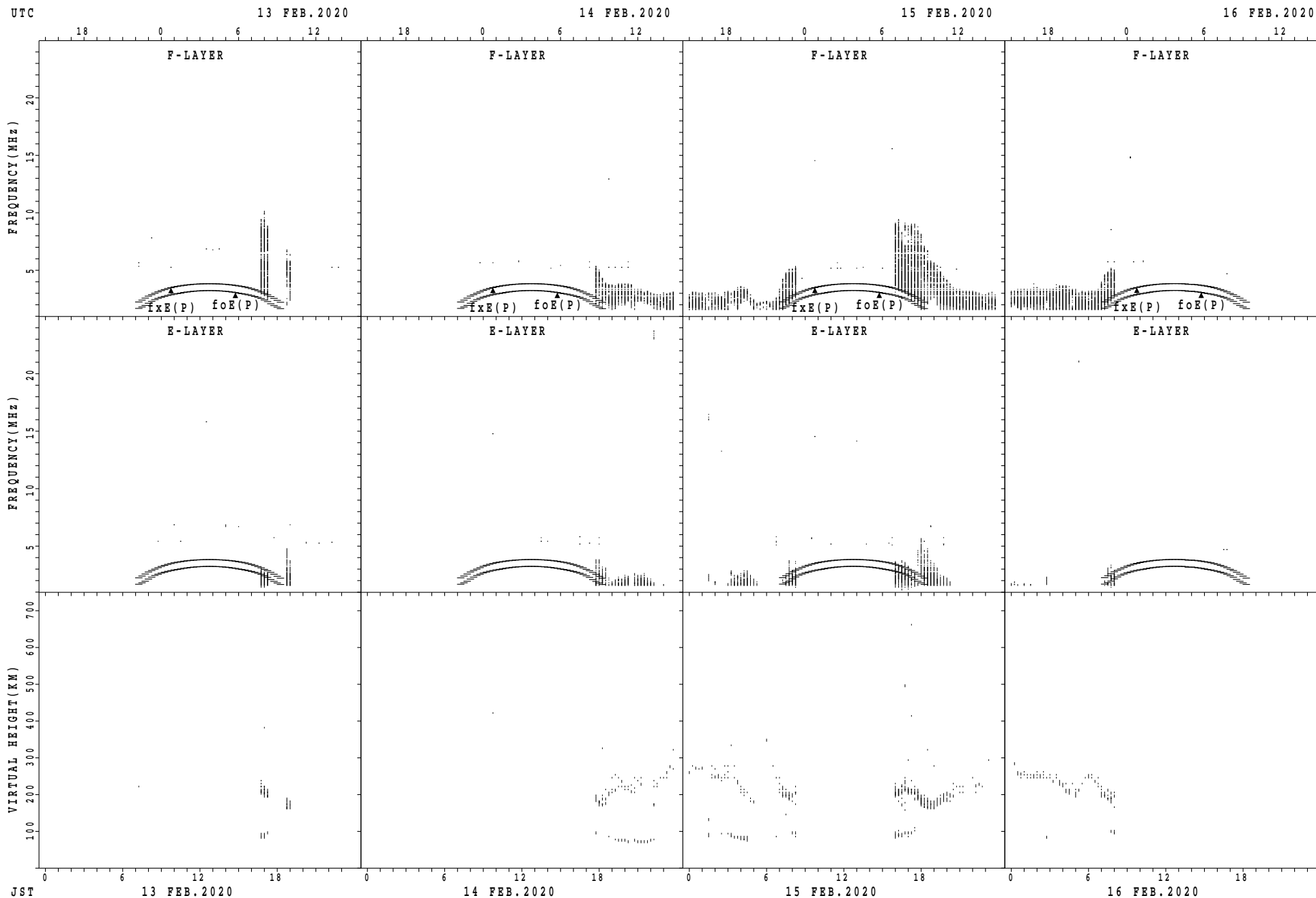
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Okinawa



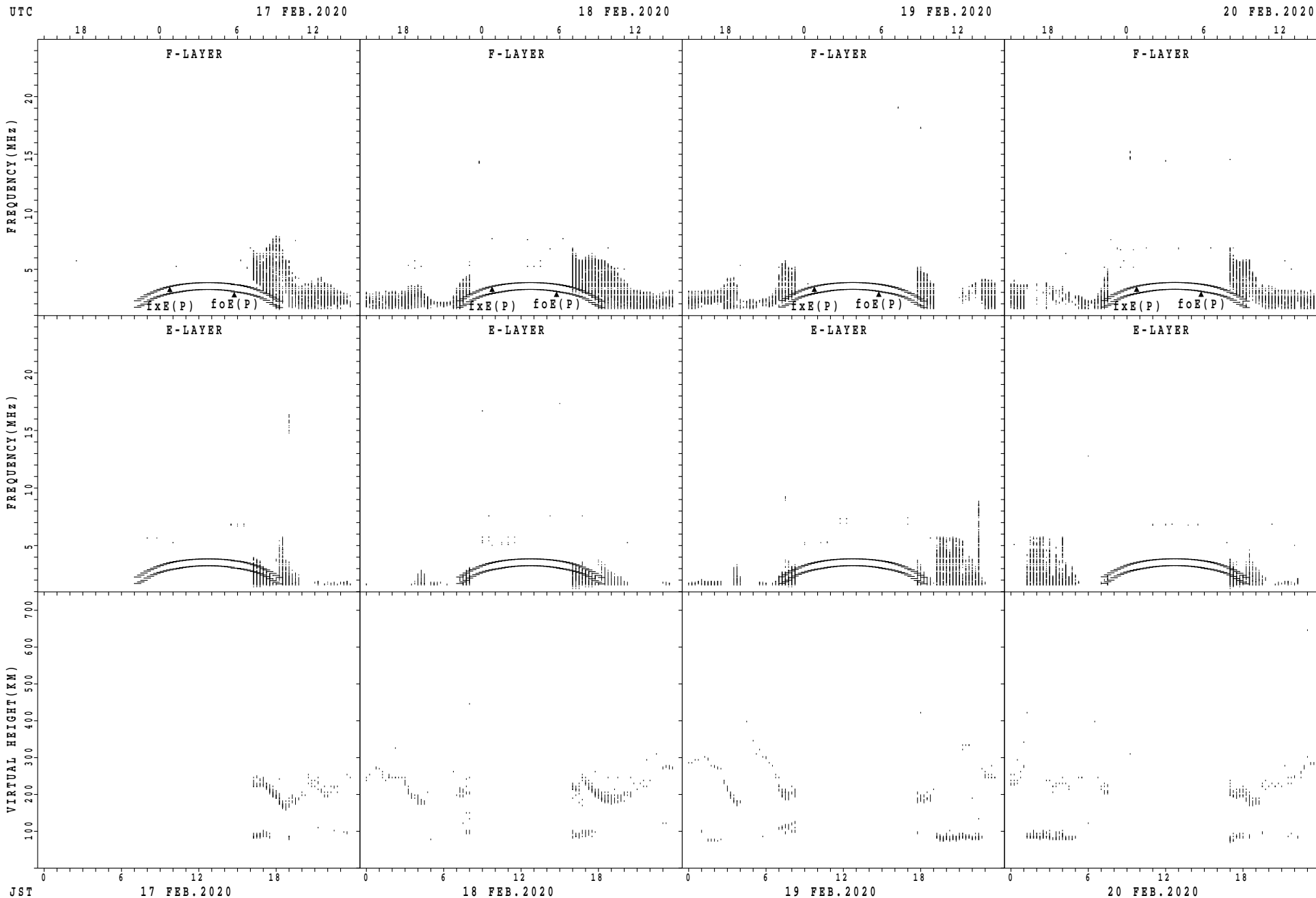
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Okinawa



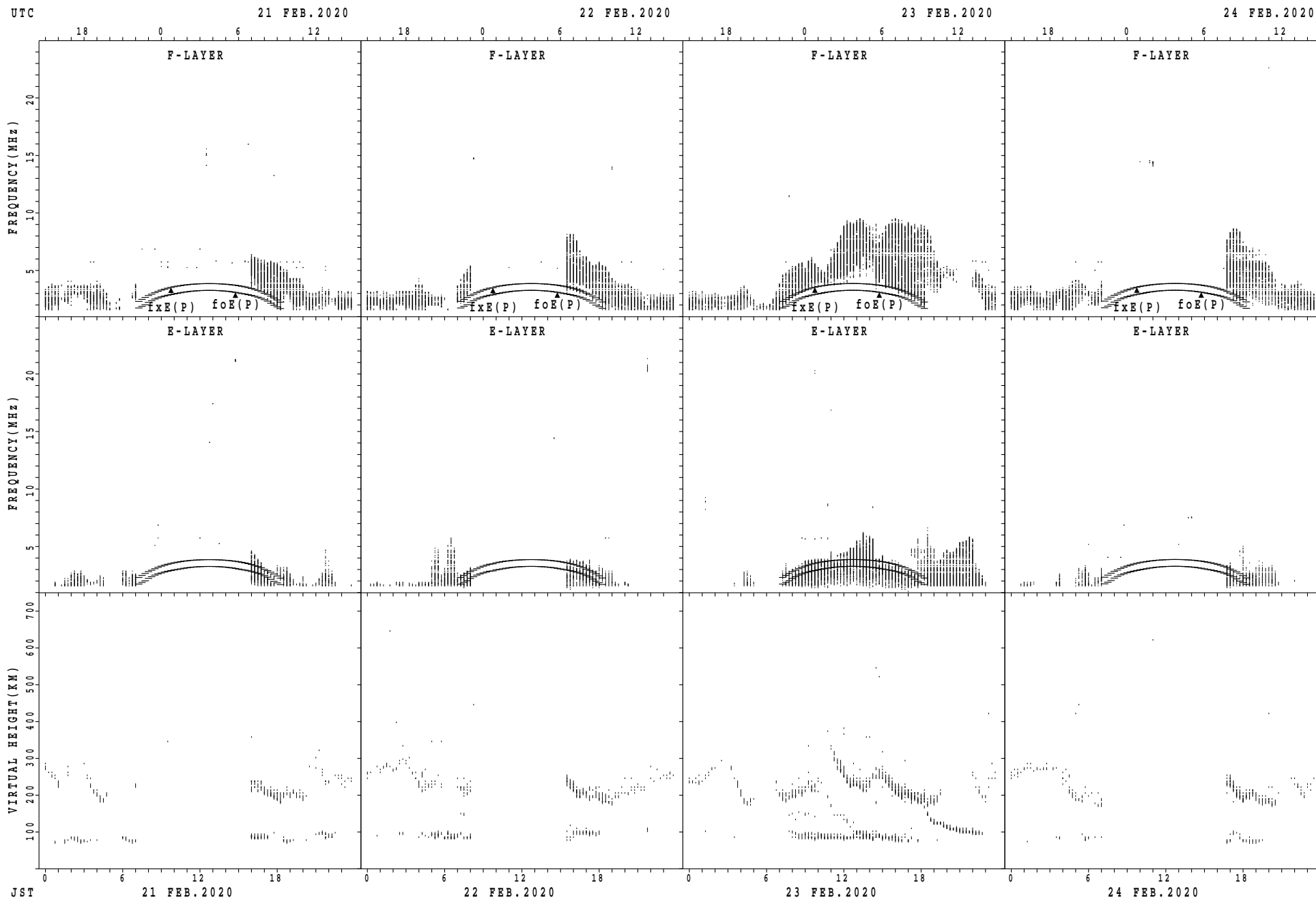
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Okinawa



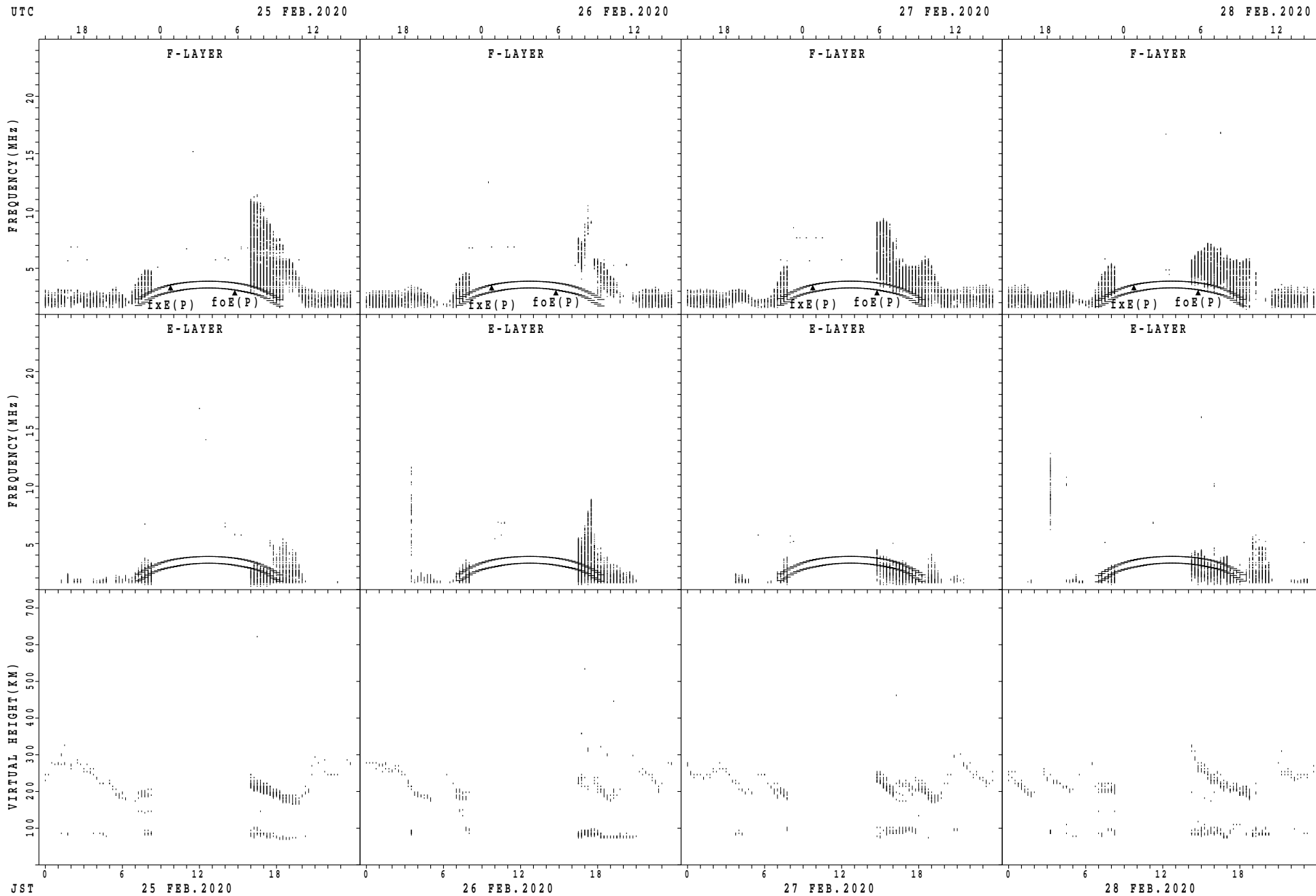
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



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

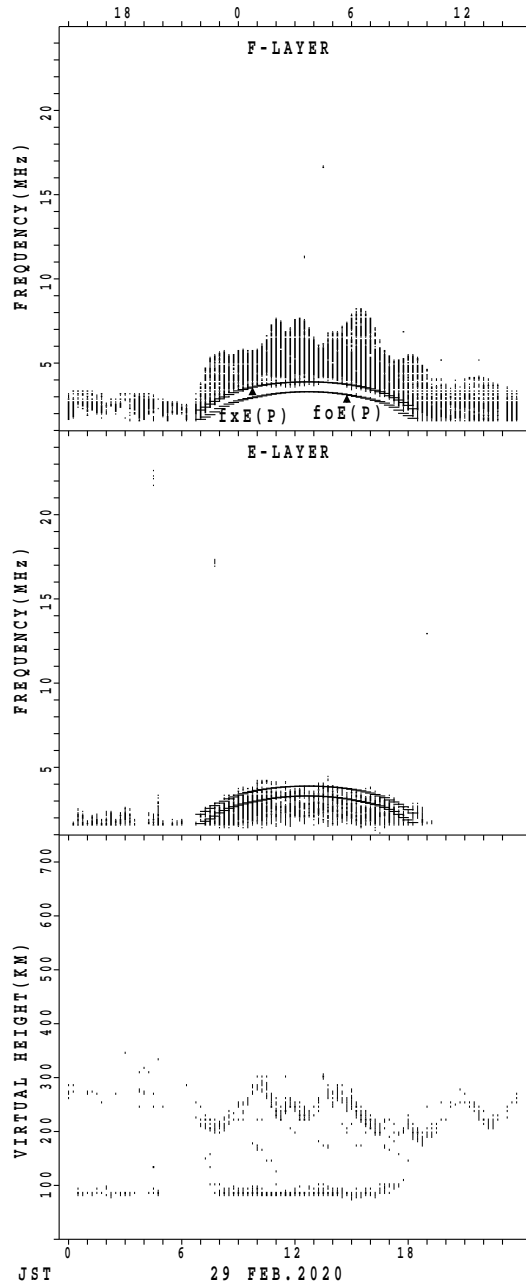
SUMMARY PLOTS AT Okinawa



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

### SUMMARY PLOTS AT Okinawa

UTC 29 FEB. 2020



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



MONTHLY MEDIANS OF h'F AND h'Es  
 FEB. 2020 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										1	4	2		2	4	5	1		1					
MED										224	233	232		250	237	244	204		290					
U Q										112	242	248		252	252	262	102		145					
L Q										112	226	216		248	225	223	102		145					

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	16	17	13	13	14	14	26	29	29	29	29	29	28	28	29	27	23	24	22	23	21	20	17
MED	98	98	98	96	98	98	98	99	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98
U Q	98	98	98	98	98	98	100	143	100	100	100	100	100	100	99	100	100	98	98	98	98	98	98	98
L Q	96	96	96	96	98	98	98	98	98	97	98	96	98	97	96	98	98	96	96	94	96	96	97	96

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									3	1					2	12	4							
MED									212	256					233	234	228							
U Q									212	128					234	241	239							
L Q									208	128					232	225	218							

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	14	13	13	12	8	6	5	25	28	27	28	29	28	28	27	29	27	21	19	12	10	14	10	12
MED	98	98	98	98	98	98	98	139	98	98	98	98	98	98	100	98	98	98	98	98	97	98	98	97
U Q	98	98	98	98	98	98	98	162	98	100	99	100	100	100	100	100	100	100	175	98	98	98	98	98
L Q	96	96	97	98	98	96	98	98	98	98	96	98	98	96	96	96	98	98	98	96	96	96	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											2					2	5	1						
MED											245					240	222	214						
U Q											264					250	231	107						
L Q											226					230	203	107						

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	11	12	15	12	12	12	17	29	27	23	24	24	26	26	25	24	24	16	20	14	16	15	16
MED	98	98	98	98	98	98	98	98	98	100	98	98	98	98	100	98	98	98	97	98	98	96	98	98
U Q	98	98	98	98	98	98	98	98	99	102	100	98	98	100	100	100	100	98	98	98	98	98	98	98
L Q	98	96	97	98	97	96	96	97	98	98	96	98	98	98	98	96	98	97	96	96	96	96	94	96

MONTHLY MEDIANS OF h'F AND h'Es  
 FEB. 2020 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1	1	1						13	8	7					
MED									206	234	214						220	216	208					
U Q									103	117	107						234	224	214					
L Q									103	117	107						211	204	202					

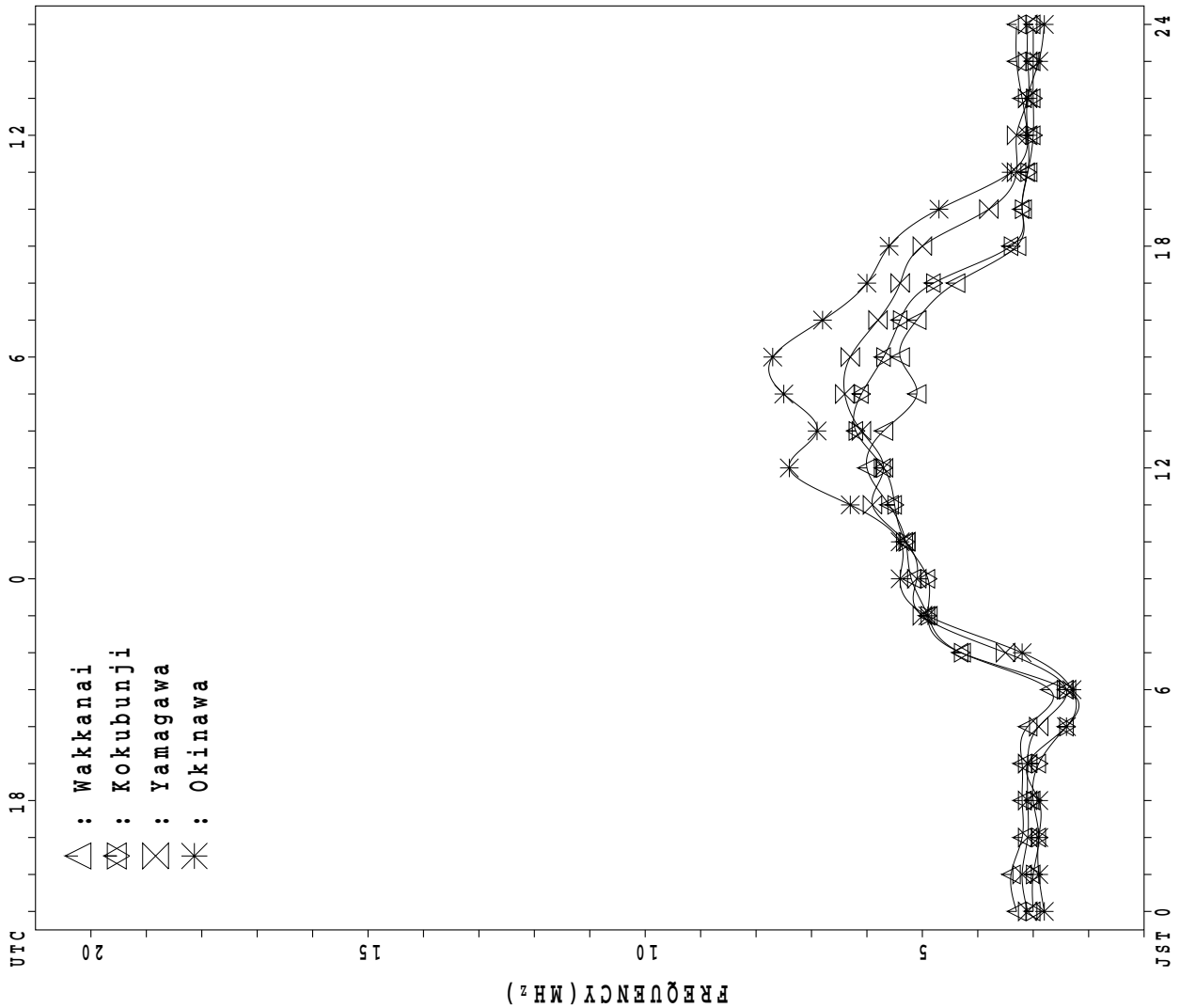
h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	7	11	16	12	14	16	15	16	21	12	10	9	10	10	9	11	17	22	20	25	19	17	17	9
MED	98	98	98	98	98	98	98	98	98	98	98	96	96	96	98	98	96	98	98	96	98	98	98	98
U Q	98	98	98	98	98	98	98	103	98	100	98	98	98	98	98	98	98	98	100	98	98	98	98	98
L Q	96	96	96	96	96	97	96	96	98	98	96	96	96	96	96	98	93	94	97	94	96	96	96	97

MONTHLY MEDIANS PLOT OF fOF2

FEB. 2020

AUTOMATIC SCALING



## IONOSPHERIC DATA STATION Wakkanai

FEB. 2020 f<sub>XI</sub> (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	57	X 55	54	52	50	52												X 45	X 47	X 45	X 39	X 40	X 38		
2	X 37	X 39	39	40	38	38	33												X 39	X 39	X 39	X 35	X 37	X 47	
3	48	X 45	52	X 39	41	58	58												X 39	X 35	X 30	X 29	X 35	X 37	
4	X 35	X 37	X 39	X 38	X 37	X 33													X 38	X 41	X 35	X 38	42	42	
5	44	45	54	47	46	42													X 34	X 34	X 37	X 34	X 35	X 33	
6	X 36	X 35	X 38	X 37	X 35	X 33													X 41	X 43	X 43	X 37	X 38	X 41	
7	X 43	X 45	X 45	X 43	X 40	X 43													X 41	X 39	X 40	X 40	X 45	X 45	
8	X 46	X 43	47	44	42	39													X 37	X 37	X 37	X 39	X 43	X 43	
9	46	45	40	44	X 39	X 41													X 34	X 38	X 41	X 39	X 40	X 44	
10	51	56	X 39	X 44	X 38	50	38												X 39	X 41	X 44	X 45	X 44	X 51	
11	47	54	56	54	48	38													X 43	X 35	X 37	X 32	X 38	X 38	
12	44	X 44	56	57	52	55	33												X 32	X 34	X 40	X 41	X 45	X 44	
13	56	47	X 37	X 38	36	33														X 33	X 37	X 37	X 39	X 39	
14	X 39	X 39	X 38	X 38	X 36	X 35														X 32	X 33	X 35	X 38	X 38	
15	X 38	X 38	X 38	X 35	X 35	X 34														X 33	X 33	X 34	X 39	X 39	
16	X 39	X 38	38	37	38	38														X 34	X 36	X 37	X 37	X 38	
17	X 39	X 39	X 36	X 37	X 38	X 35														X 39	X 33	X 33	X 35	X 37	
18	X 38	X 37	X 37	X 36	X 35	X 36														X 45	X 34	X 34	X 37	X 39	
19	X 37	X 37	X 38	X 39	X 54	X 32														X 35	X 35	X 38	X 38	X 38	
20	X 38	X 39	X 38	X 33	X 33	X 31														X 38	X 37	X 35	X 36	X 39	
21	X 38	X 38	X 37	X 41	X 41	X 40														X 47	X 44	X 44	X 47	X 43	
22	X 43	X 47	X 44	X 47	X 44	X 54														X 45	X 37	X 39	X 39	X 59	
23	58	48	C	46	41	41	38													X 34	X 34	X 34	X 34	X 34	
24	X 34	X 32	38	38	38	35														X 37	X 37	X 33	X 35	X 39	
25	X 37	X 38	X 38	X 39	40	41														X 45	X 46	X 36	X 39	X 41	
26	44	X 40	52	54	54	56														X 41	X 48	X 45	X 45	X 44	
27	X 45	X 47	52	47	47	50														X 39	X 41	X 43	X 45	X 44	
28	X 45	X 46	48	46	X 38	X 36														X 41	X 42	X 39	X 39	X 38	
29	X 39	X 39	X 39	X 38	X 38	X 40														X 41	X 44	X 40	X 40	X 40	
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	29	28	29	29	29	5												12	29	29	29	29	29	
MED	X 43	X 40	X 39	40	X 39	X 39	38												X 39	X 39	X 37	X 37	X 39	X 39	
U Q	46	46	50	46	45	46	48												X 41	X 41	X 42	X 40	X 42	X 44	
L Q	X 38	X 38	X 38	X 38	X 38	X 35	33												X 36	X 34	X 35	X 34	X 37	X 38	

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

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	F 42	F 48	F 35	F 35	F 33	F 34	F 32	F 39	F 47	F 51	F 50	F 54	F 65	F 54	F 52	F 56	F 46	F 36	F 38	F 40	F 38	F 32	F 33	F 31	
2	F 31	F 32	F 29	F 25	F 25	F 23	F 20	F 37	F 44	F 48	F 54	F 54	F 52	F 51	F 47	F 50	F 51	F 38	F 32	F 32	F 32	F 28	F 30	F 32	
3	F 33	F 30	F 32	F 32	F 29	F 36	F 37	F 37	F 46	F 51	F 57	F 57	F 48	F 57	F 50	F 55	F 50	F 32	F 32	F 28	F 23	F 22	F 28	F 30	
4	F 28	F 30	F 32	F 31	F 30	F 26	R 24	F 34	F 43	F 48	F 52	F 62	F 56	F 49	F 48	F 52	F 49	F 36	F 31	F 34	F 28	F 31	F 31	F 31	
5	F 30	F 31	F 35	F 29	F 30	F 30	F 32	V 45	F 50	F 44	F 62	F 51	F 53	F 49	F 49	F 54	F 48	F 41	F 27	F 27	F 30	F 27	F 28	F 26	
6	F 29	F 28	F 31	F 30	F 28	F 26	F 22	F 35	F 50	F 54	F 50	F 53	F 58	F 51	F 52	F 54	F 49	F 34	F 34	F 36	F 36	F 30	F 31	F 34	
7	F 36	F 38	F 38	F 36	F 33	F 36	F 28	F 46	F 45	F 50	F 69	F 64	F 53	F 56	F 62	F 59	F 50	F 40	F 34	F 32	F 33	F 33	F 38	F 38	
8	F 39	F 36	F 32	F 27	F 31	F 32	F 22	F 38	F 55	F 49	F 59	F 62	F 58	F 56	F 53	F 55	F 51	F 43	F 30	F 30	F 30	F 33	F 36	F 36	
9	F 32	F 38	F 33	F 32	F 32	F 34	F 27	F 44	F 50	F 54	F 55	F 66	F 59	F 57	F 55	F 51	F 47	F 37	F 27	F 31	F 34	F 32	F 33	F 37	
10	F 34	F 34	F 32	F 27	F 31	F 27	F 27	F 42	F 45	F 58	F 60	F 58	F 56	F 53	F 57	F 63	F 58	F 42	F 32	F 34	F 37	F 37	F 37	F 34	
11	F 34	F 34	F 36	F 30	F 32	F 27	F 27	F 40	F 50	F 46	F 56	F 62	F 62	F 53	F 57	F 49	F 49	F 48	F 36	F 28	F 30	F 25	F 31	F 29	
12	F 30	F 37	F 38	F 30	F 30	F 23	F 44	F 50	F 48	V 58	V 55	F 59	F 53	F 51	V 52	F 58	F 49	F 25	F 27	F 33	F 34	F 38	F 37	F 37	
13	F 30	F 30	F 25	F 24	F 26	F 28	F 43	F 46	F 48	F 48	F 55	F 60	F 56	F 54	F 49	F 50	F 48	F 31	F 26	F 30	F 30	F 32	F 32	F 32	
14	F 32	F 32	F 31	F 31	F 29	F 28	F 22	F 40	F 45	F 46	F 49	F 50	F 59	F 55	F 50	F 48	F 53	F 41	F 27	F 25	F 26	F 28	F 31	F 31	
15	F 31	F 31	F 31	F 28	F 27	F 27	F 24	F 39	F 44	F 49	F 49	F 56	F 54	F 54	F 47	F 48	F 47	F 51	F 33	F 26	F 26	F 27	F 32	F 32	
16	F 32	F 31	F 27	F 25	F 26	F 26	F 25	F 44	F 45	F 47	R 46	F 55	F 56	F 52	F 48	F 46	F 45	F 48	F 31	F 27	F 29	F 30	F 30	F 31	
17	F 32	F 32	F 29	F 30	F 31	F 28	F 26	F 40	F 44	F 49	F 46	F 46	F 51	F 55	F 48	F 49	F 51	F 42	F 28	F 32	F 26	F 26	F 28	F 30	
18	F 31	F 30	F 30	F 29	F 28	F 26	F 23	F 39	F 52	F 48	F 46	F 50	F 57	F 54	F 51	F 49	F 56	F 54	F 35	F 38	F 27	F 27	F 30	F 32	
19	F 30	F 30	F 31	F 32	F 47	F 25	F 27	F 41	F 58	F 52	F 62	F 77	F 64	F 62	F 58	F 58	F 58	F 51	F 32	F 28	F 28	F 31	F 31	F 31	
20	F 31	F 33	F 31	F 26	F 27	F 24	F 27	F 47	F 49	F 54	F 50	F 60	F 78	F 56	R 57	F 51	F 54	F 52	F 33	F 31	F 30	F 28	F 29	F 32	
21	F 31	F 31	F 30	F 34	F 34	F 33	F 27	F 43	F 53	F 57	F 60	F 55	F 67	F 60	F 54	F 54	F 48	F 49	F 42	F 40	F 37	F 37	F 40	F 36	
22	F 36	F 40	F 37	F 40	F 37	F 34	F 34	F 48	F 46	F 52	F 57	F 51	F 69	F 66	F 51	F 56	F 46	F 55	F 37	F 38	F 30	F 32	F 32	F 32	
23	F 27	F 25	F 25	F 27	F 26	F 28	F 24	F 42	F 44	F 50	F 49	F 56	F 58	F 54	F 56	F 53	F 56	V 48	F 34	F 30	F 30	F 26	F 28	F 32	
24	F 27	F 25	F 25	F 27	F 26	F 28	F 24	F 42	F 44	F 50	F 49	F 56	F 58	F 54	F 56	F 53	F 56	F 48	F 34	F 30	F 30	F 26	F 28	F 32	
25	F 30	F 31	F 31	F 32	F 29	F 34	F 30	F 41	F 52	F 53	F 50	F 47	F 60	F 60	F 53	F 57	F 50	F 45	F 34	F 38	F 39	F 29	F 32	F 34	
26	F 32	F 33	F 33	F 32	F 32	F 33	F 30	F 44	F 51	F 54	F 43	F 58	F 51	F 66	F 48	F 55	F 52	F 43	F 34	F 34	F 41	F 38	F 38	F 37	
27	F 38	F 32	F 32	F 31	F 29	F 28	F 40	F 49	F 56	F 50	F 54	F 56	F 49	F 51	F 54	F 50	F 42	F 34	F 34	F 35	F 32	F 32	F 33	F 31	
28	F 38	F 32	F 32	F 31	F 31	F 33	F 32	F 46	F 50	F 47	F 51	F 55	F 57	F 54	F 52	F 51	F 50	F 41	F 36	F 34	F 37	F 33	F 33	F 33	
29																									
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	27	27	26	26	26	24	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	
MED	32	32	32	30	30	28	27	41	49	50	51	55	58	55	51	52	50	43	33	32	30	30	32	32	
U Q	34	34	33	32	32	33	30	44	51	54	58	59	60	57	54	55	52	49	34	34	36	33	34	35	
L Q	30	30	30	27	28	26	24	39	45	48	49	52	55	53	48	49	48	40	31	28	28	27	30	31	

FEB. 2020 foF2 (0.1MHz)

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## IONOSPHERIC DATA STATION Wakkanai

FEB. 2020 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	L	L	L	L	L	L	L								
2											L	L	L	368	L	L								
3							L	L	L	L	L	L	L	L	L	L	L							
4							L					L	L	L	L	L	L							
5							L			L		L	L	L	L	L								
6										L	L	L	L	L	L	L	L							
7										L	L	L	L	L	L	L								
8									L	L	L	L	L	L	L									
9										L	372	396		L	L	L	L							
10									L	L	L	L	L	L	L	L								
11										L	L	L	L	L	L		L							
12											L	L	L	L	L		L	A						
13									L	L	L	392	L	L	L	L	L							
14									L	L	L	L	L	L	L	L	L							
15								L	L	L	L	412	404		L	L		L						
16							L			L	L	L	L	408		L	L							
17									L	L			400	400		L	356							
18										L	L	396	L	L	L	L								
19								L		L	336	L	408	396		L	356	L						
20										L	L	408	L	L	L	L	L							
21									L	L	408	L	428		L	L	L							
22										L	L	L	L	L	L	L								
23								L				L	L	L	L	L	L							
24										380	L	L	L	L		L	L							
25									L		396	L	L	L	L	L	L							
26										L	L	L	396	L	L	L	L							
27								L	L	L			L	L	L	L								
28										388	L	L	L	L		L								
29									L	L	L	400	L	L	L	L		L						
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										2	4	6	5	4		2								
MED										384	384	398	404	398		356								
U Q										402	408	418	404											
L Q										354	396	398	382											

FEB. 2020 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							B	B									B	A						
2							192	B	176	228	248	252	264	264	240	220	B	B						
3							200	212	196	240	252	268	268	268	252	224	B	B						
4							B	168	212	244	260	284	284	268	256	220	196	B						
5							A	B	196	236	256	272	280	268	260	236	176	188						
6							B	188	200	228	260	280	280	280	264	232	180	A						
7							B	B	208	248	264	272	280	280	264	208	208	A						
8							A	184	192	248	264	276	276	276	264	216	A	A						
9							B	212	208	200	264	280	284	284	260	244	188	A						
10							B	184	212	248	276	276	276	276	296	240	204	A						
11							A	180	208	232	268	304	284	284	260	232	184	B						
12							180	172	212	252	252	292	288	272	288	228	A	A						
13							B	232	200	236	272	272	292	292	272	252	224	A	A					
14							B	188	220	240	276	276	280	284	256	248	216	B	B					
15							B	176	204	252	276	276	276	276	264	236	A	A	B					
16							B	176	220	252	280	276	288	276	268	240	188	B	196					
17							B	192	188	260	272	292	292	280	272	252	220	A	B					
18							B	176	216	260	260	280	296	280	264	248	200	A	A					
19							B	184	224	240	276	276	276	284	272	208	196	B	B					
20							B	196	248	260	284	284	284	284	A	236	180	A	196					
21							B	172	228	248	268	280	292	280	264	244	204	184	B					
22							B	220	220	244	280	312	288	276	260	248	204	188	B					
23							B	212	232	268	288	308	292	292	284	256	220	196	B					
24							B	212	228	264	276	296	296	280	280	248	228	A <sup>4</sup>	132					
25							B	208	228	284	284	304	296	296	284	256	216	184	B	B				
26							B	216	232	264	284	304	304	292	284	244	208	B	B					
27							B	192	272	272	288	288	288	292	272	252	216	B	B					
28							B	200	260	280	288	296	300	300	276	248	212	B	B					
29							B	180	236	268	288	288	296	A	A	248	224	B	B					
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							3	25	29	29	29	29	29	28	27	29	23	5	3					
MED							192	188	212	248	272	280	284	280	264	240	204	188	196					
U Q							200	212	228	262	282	294	292	284	276	248	216	192	196					
L Q							180	178	202	240	262	276	278	276	260	228	188	184	132					

FEB. 2020 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

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

FEB. 2020 foEs (0.1MHz)

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## IONOSPHERIC DATA STATION Wakkanai

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

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

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

FEB. 2020 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	16	17	16	16	17	16	16	12	12	12	11	14	12	10	10	16	12	15	16	16	16	16	16
2	16	16	16	16	16	16	16	16	15	15	10	12	12	16	16	14	16	16	16	16	16	16	16	16
3	16	17	16	16	16	16	16	16	16	16	16	13	16	14	14	14	18	16	16	15	15	16	16	16
4	16	16	16	16	16	16	16	11	16	15	14	14	14	14	15	16	16	16	16	16	16	16	16	16
5	16	16	16	16	16	16	15	16	16	16	16	16	16	16	13	13	13	16	16	16	16	16	16	16
6	16	16	16	16	16	16	16	16	16	14	10	12	12	11	10	15	16	16	16	16	16	16	16	16
7	16	16	16	16	16	16	16	17	11	11	16	16	12	13	16	16	16	16	16	16	16	16	16	16
8	16	16	16	16	16	16	16	16	16	14	14	15	13	13	16	15	15	16	16	16	16	16	16	16
9	16	16	16	16	16	16	16	16	16	16	15	15	15	15	12	11	10	16	16	16	16	16	16	16
10	16	16	16	14	16	16	16	16	16	16	16	16	16	16	26	16	16	16	16	16	16	16	16	16
11	16	16	16	16	16	16	16	16	16	15	15	15	15	14	16	15	16	16	16	16	16	16	16	16
12	16	16	16	16	16	16	15	15	16	15	15	14	16	11	15	16	15	16	16	16	16	16	16	16
13	16	16	16	16	16	16	16	16	16	13	16	14	14	11	16	14	16	16	16	16	16	16	16	16
14	16	16	16	16	16	16	15	15	14	13	12	12	15	15	12	14	16	16	16	16	16	16	16	16
15	16	16	16	16	16	16	16	16	13	13	13	16	16	12	12	14	14	15	15	16	16	16	16	16
16	16	15	16	16	16	16	16	13	15	11	11	15	15	14	14	16	14	16	16	16	16	16	16	16
17	16	16	16	16	16	16	16	15	10	13	12	13	14	12	12	11	14	16	16	16	16	16	16	16
18	16	16	16	16	16	16	16	15	15	15	16	14	17	15	14	13	15	15	15	15	15	16	16	16
19	16	16	16	16	16	16	16	16	14	10	14	14	14	14	15	10	14	16	16	16	16	16	16	16
20	16	16	16	16	16	16	16	16	10	10	16	14	13	12	16	15	16	16	16	15	16	16	16	16
21	132	16	16	16	16	16	16	11	13	12	12	12	13	13	10	14	12	16	16	16	16	16	16	16
22	16	16	16	16	16	16	16	16	16	14	15	15	14	13	15	15	12	15	16	16	16	16	16	16
23	16	16	16	16	16	16	16	16	15	10	16	16	15	14	15	13	14	16	16	16	16	16	17	17
24	16	16	16	16	16	16	16	15	13	13	14	13	13	16	15	15	15	16	16	16	16	16	16	16
25	16	16	16	16	16	16	16	16	8	15	13	15	16	16	16	14	16	16	16	16	16	16	16	16
26	16	16	16	16	16	16	16	16	15	15	16	16	16	16	16	16	14	16	16	16	16	16	16	16
27	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	12	16	16	16	16	16	16	16
28	16	16	16	15	16	16	16	16	14	14	16	15	16	16	16	16	16	16	16	16	16	16	16	16
29	17	16	16	16	16	16	16	16	16	16	16	16	18	16	16	16	16	16	16	16	16	16	16	16
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
MED	16	16	16	16	16	16	16	16	15	14	15	15	15	14	15	15	15	16	16	16	16	16	16	16
U Q	16	16	16	16	16	16	16	16	16	15	16	16	16	16	16	16	16	16	16	16	16	16	16	16
L Q	16	16	16	16	16	16	16	15	13	12	12	13	14	12	12	14	14	16	16	16	16	16	16	16

FEB. 2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
1	F	311	304	328	F	F	F	331	383	403	399	355	341	369	377	354	369	346	364	326	341	349	313	335	302				
2	F	306	264	304	F	F	F	F	348	382	395	372	372	384	393	373	326	383	359	323	311	325	363	323	303				
3	F	289	312	283	F	F	F	F	374	379	384	358	379	378	372	354	356	394	368	330	379	334	306	330	312				
4	F	322	307	302	F	F	F	R	360	396	387	395	351	351	385	381	346	380	363	341	366	326	338	279	279				
5	F	304	281	305	F	F	F	V	364	424	383	353	366	371	384	356	363	387	378	370	306	351	316	331	346				
6	F	317	321	329	F	F	F	F	389	393	400	356	337	389	373	365	378	396	349	350	330	351	350	310	323				
7	F	302	324	312	F	F	F	F	377	363	338	374	380	352	365	367	369	379	364	334	344	328	341	346	348				
8	F	345	300	287	F	F	F	F	342	309	356	379	381	377	375	351	364	326	379	366	383	326	327	327	342	336	313		
9	F	299	333	302	F	F	F	F	371	387	366	358	362	357	370	357	370	370	370	327	324	343	366	324	293				
10	F	272	286	312	F	F	F	F	340	393	365	361	346	378	374	383	381	378	390	419	352	346	320	333	281	277			
11	F	295	311	F	F	F	F	F	370	394	377	359	348	349	354	378	358	376	394	380	335	364	337	341	303				
12	F	289	284	F	F	F	F	F	300	396	382	361	317	332	410	379	338	373	359	404	238	240	321	298	308	298			
13	F	297	287	292	F	F	F	F	293	331	399	365	391	387	363	376	367	361	366	393	374	367	350	335	341	316	316		
14	F	316	316	327	F	F	F	F	334	312	378	390	383	378	341	339	364	380	380	390	396	353	365	326	337	299	329		
15	F	329	305	305	F	F	F	F	337	390	397	364	363	334	369	350	408	391	369	371	395	384	334	339	329	319	327		
16	F	299	311	298	F	F	F	F	320	328	332	377	378	382	234	372	368	343	327	364	363	406	362	333	321	339	334	326	
17	F	318	306	311	F	F	F	F	310	316	383	393	375	377	377	341	366	347	358	365	389	335	359	329	330	343	316		
18	F	301	304	304	F	F	F	F	330	342	359	378	380	378	362	367	383	326	348	369	375	345	347	357	346	301	305		
19	F	308	304	296	F	F	F	F	289	312	309	354	367	328	365	346	348	363	354	358	367	352	319	315	313	286	286		
20	F	303	315	339	F	F	F	F	337	358	321	383	383	362	356	332	367	357	333	372	355	387	330	346	355	298	323	309	
21	F	289	290	305	F	F	F	F	360	323	346	356	367	361	334	354	333	370	370	358	355	341	348	313	327	332	314		
22	F	314	333	338	F	F	F	F	339	F	324	385	402	377	368	341	343	356	374	377	366	364	343	340	347	310	330		
23	F	F	F	C	F	F	F	F	300	307	337	350	386	378	379	373	353	330	375	367	381	360	365	360	318	313	318	297	297
24	F	293	321	267	F	F	F	F	266	301	359	333	400	400	355	396	343	336	370	367	358	348	394	388	338	339	314	330	297
25	F	315	302	308	F	F	F	F	300	334	348	346	407	366	362	367	386	350	367	368	358	366	348	379	324	371	382	321	296
26	F	318	310	F	F	F	F	F	F	F	384	385	400	357	405	367	342	378	369	347	366	398	352	352	345	332	333	340	V
27	F	324	F	F	F	F	F	F	F	F	337	377	383	384	388	319	358	379	385	372	374	385	371	307	328	307	308	312	
28	F	306	306	F	F	F	F	F	F	318	345	355	376	381	385	359	392	322	368	351	378	373	381	340	332	331	337	326	315
29	F	307	311	311	F	F	F	F	319	347	350	371	387	354	355	334	320	330	372	358	367	365	358	327	340	329	329	329	
30																													
31																													
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT		25	27	24	24	25	23	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28			
MED		307	306	304	312	318	334	332	377	382	377	361	362	352	370	367	369	369	375	350	335	334	332	324	312				
U Q		318	315	312	321	336	348	347	388	394	384	378	374	370	379	374	375	382	394	364	348	348	341	332	324				
L Q		300	300	292	300	306	308	316	367	372	362	355	341	342	360	352	358	362	364	332	324	326	314	308	298				

FEB. 2020 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

FEB. 2020 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	L	L	L	L	L	L	L								
2											L	L	L	390	L	L								
3							L	L	L	L	L	L	L	L	L	L	L							
4							L					L	L	L	L	L	L							
5							L			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									L	L	L	L	L	L	L									
9										L	409	381	L	L	L	L								
10									L	L	L	L	L	L	L	L								
11										L	L	L	L	L	L		L							
12											L	L	L	L	L		L	A						
13									L	L	L	402	L	L	L	L	L							
14									L	L	L	L	L	L	L	L	L							
15								417	L	L	L	375	379	L	L		L							
16							L			L	L	L	L	379	L	L								
17								L	L				384	378	L	389								
18									L	L	382	L	L	L	L									
19								L		L	414	358	378	L	L	392	L							
20										L	L	381	L	L	L	L	L							
21									L	L	395	L	375	L	L	L								
22										L	L	L	L	L	L	L								
23								L				L	L	L	L	L	L							
24										393	L	L	L	L		L	L							
25									L		407	L	L	L	L	L	L							
26										L	L	L	411	L	L	L	L							
27								L	L	L			L	L	L	L								
28									385	L	L	L	L	L		L								
29								L	L	L	397	L	L	L	L			L						
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1		2	4	6	5	4		2								
MED								417		389	408	382	379	378		390								
U Q											412	397	398	384										
L Q											401	381	366	378										

FEB. 2020 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

FEB. 2020 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1									214	216	252	268	256	218	232	224									
2											244	230	226	236	224	254									
3							242	206	232	222	240	222	222	242	228	228	218								
4							E A 456					244	262	226	220	238	204								
5							254			198		218	242	238	224	224									
6										218	218	282	224	230	240	234	198								
7										222	230	234	244	244	230	230									
8									222	216	224	224	240	240	330										
9										222	244	240	236	236	236	226									
10										228	230	246	226	242	218	226	226								
11										214	248	248	248	230	246		226								
12											218	250	216	230	248		224	208							
13									220	220	244	240	240	240	240	240	210								
14									214	226	222	228	276	234	220	226	226								
15								216	230	230	246	258	266	214	214		226								
16							274			218	268	234	254	292	240	240									
17									218	218			296	250	250	238									
18										238	238	260	246	228	256										
19								300		234	248	238	256	254	242	240	218								
20										236	226	272	240	244	252	228	228								
21										228	228	228	290	240	264	234	234								
22										236	242	240	244	244	232	232									
23								226				270	270	238	240	230	242								
24										220	200	264	256	256		240	240								
25										232		236	242	252	234	248	248	220							
26											244	200	252	260	230	230	268	230							
27									202	240	222			252	234	226	252								
28										222	268	236	278	232		238									
29										232	242	252	270	302	278	254	232		204						
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT							4	5	12	24	24	27	29	29	27	24	14	2							
MED							256	216	228	222	241	242	248	236	236	234	225	206							
U Q							365	263	232	232	247	264	261	244	248	240	228								
L Q							248	204	219	218	225	234	240	230	226	228	218								

FEB. 2020 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

FEB. 2020 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	242	220	220	226	236	244	244	218	198	186	202	196	196	196	178	196	208	208	250	230	212	240	240	238
2	248	260	244	280	260	270	270	212	214	202	202	202	202	194	186	208	218	198	236	236	236	220	250	250
3	258	268	254	208	242	230	216	182	200	200	200	200	196	192	192	202	198	198	246	222	222	266	246	246
4	258	244	250	230	230	194	218	224	200	214	220	214	248	214	214	194	194	184	214	208	212	212	98	264
5	252	258	228	246	242	234	212	200	192	178	232	194	194	200	196	212	200	200	208	270	232	236	236	224
6	258	248	250	262	216	216	252	200	210	198	182	196	202	202	202	204	204	200	234	232	210	192	264	254
7	280	250	262	252	252	202	202	196	222	192	202	202	202	202	222	204	204	194	208	200	252	222	238	216
8	238	256	256	234	204	186	230	236	178	198	198	198	182	212	214	228	222	204	204	216	226	226	220	Q
9	242	220	260	248	238	236	224	216	216	190	190	196	196	198	184	202	210	204	A	234	226	196	242	254
10	246	268	266	260	260	212	190	208	192	198	184	194	208	188	194	212	212	192	A	234	222	230	230	256
11	244	228	246	236	230	206	202	216	194	170	198	184	196	194	210	222	196	194	200	222	202	228	214	214
12	244	238	238	238	232	212	238	196	214	214	198	212	212	196	206	222	204	A	A	A	236	228	238	246
13	270	250	236	250	258	278	236	198	192	190	186	186	196	218	206	206	198	202	220	238	238	222	248	248
14	248	248	250	250	240	216	234	216	186	186	166	170	200	196	196	198	216	202	214	224	262	242	250	240
15	238	238	252	258	244	242	206	206	184	184	184	214	214	202	190	224	200	200	200	226	230	240	250	234
16	278	252	254	244	220	190	224	216	198	178	194	198	192	198	200	200	220	194	212	226	240	240	250	252
17	268	262	258	236	220	200	240	202	180	180	224	232	192	212	212	212	212	202	202	216	240	224	240	250
18	250	260	260	250	238	200	212	212	226	194	194	188	220	206	202	238	226	212	214	214	198	260	260	276
19	260	280	266	274	214	236	246	222	230	204	202	204	190	190	200	200	200	208	208	252	272	E B	292	278
20	278	246	214	208	226	208	246	202	224	194	192	198	200	194	194	184	210	202	196	222	210	244	244	244
21	266	280	270	248	230	198	226	222	204	200	200	198	206	194	194	200	234	220	212	212	248	226	236	260
22	232	226	228	254	248	196	222	212	200	200	224	206	206	200	184	210	224	210	216	216	216	236	202	258
23	246	228	246	246	246	206	194	194	208	210	242	194	200	200	182	198	212	212	196	210	210	236	A	244
24	260	274	274	256	238	202	220	204	204	204	182	192	222	234	234	214	214	200	196	224	202	234	250	258
25	236	262	218	250	224	190	212	198	198	238	182	158	148	214	196	192	194	208	208	238	194	194	228	240
26	240	238	256	236	220	188	188	192	206	208	166	188	200	220	196	206	206	196	216	230	220	234	214	232
27	244	244	226	224	224	192	188	172	198	198	224	240	224	200	190	220	220	204	204	254	232	242	230	254
28	254	242	222	222	222	212	232	208	210	194	186	190	190	208	260	208	220	202	220	216	222	222	222	252
29	264	264	246	246	246	212	212	220	200	200	200	200	176	204	234	206	224	178	206	232	218	234	234	258
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	26	28	29	29	28	28
MED	250	250	250	246	236	208	221	208	200	198	198	198	200	200	196	206	210	202	210	225	222	232	239	250
U Q	262	262	259	253	245	232	237	216	212	203	202	203	207	210	211	213	220	206	216	234	237	240	250	257
L Q	243	238	232	235	223	197	209	198	193	188	185	191	193	195	191	200	200	197	204	216	211	222	229	240

FEB. 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

FEB. 2020 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1							B	B									B	A							
2							102	B	106	106	112	112	106	106	106	106		B	B						
3							90	96	114	114	106	100	110	110	100	102		B	B						
4							B	B	98	86	98	106	106	106	106	106	86		B						
5							A	B	112	112	112	112	112	100	102	102	112	96							
6							B	B	112	114	100	112	112	112	110	102	96	A							
7							B	B	108	108	108	108	108	108	108	102	102	A							
8							A	A	112	112	112	112	112	106	106	106		A	A						
9							B	B	114	98	110	100	102	102	102	102	102		A						
10							B	B	116	116	112	112	108	110	110	104	104		A						
11							A	B	128	128	112	112	112	112	112	112	112	B							
12							92	110	112	112	112	112	100	100	100	100		A	A						
13							B	B	120	112	112	112	112	112	104	108	108	108	A	A					
14							B	B	136	112	112	112	112	112	100	100	116	110	B	B					
15							B	B	134	110	110	110	110	110	100	106	106		A	A	B				
16							B	B	110	94	110	104	110	110	110	110	110	B	100						
17							B	E B	140	102	108	108	108	108	102	104	104	98	A	B					
18							B	B	120	106	106	106	106	106	106	98	98	108	A	A					
19							B	B	106	108	106	106	106	106	106	102	94	94	B	B					
20							B	B	124	128	112	124	124	112	104		118	120	A						
21							B	B	106	106	106	106	106	106	106	106	88		B	B					
22							B	B	120	106	106	106	112	112	112	112	112	106	106						
23							B	B	120	120	106	118	118	116	116	118	104	92		B					
24							B	B	112	112	112	106	106	104	104	94	106	108	A	B					
25							B	B	92	102	102	102	106	106	106	106	106	106	100						
26							B	B	104	104	104	104	104	104	104	104	104		B	B					
27							B	B	100	100	110	100	100	100	100	102	102	102		B	B				
28							B	B	104	104	108	108	100	106	106	110	110	110		B	B				
29							B	B	114	114	114	104	104	106		A	A		B	B					
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT							3	20	29	29	29	29	29	28	27	29	23	4	2						
MED							92	112	112	110	108	108	108	106	106	106	106	98	90						
U Q							102	122	114	112	112	112	112	109	110	110	110	103							
L Q							90	106	105	106	106	106	106	103	102	102	102	94							

FEB. 2020 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

FEB. 2020 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	86	86	86	86	86	B	92	90	98	92	152	148	102	126	134	126	110	110	96	96	96	96	96	96
2	104	94	96	B	94	86	92	92	130	114	92	128	112	112	152	118	106	106	106	100	100	92	94	94
3	90	94	B	B	98	B	G	98	98	132	148	148	170	90	96	122	B	90	90	90	90	92	90	90
4	B	B	B	B	B	B	B	126	132	120	110	118	116	106	106	106	84	B	B	B	B	98	B	B
5	106	102	102	90	92	98	98	B	108	146	156	168	156	132	132	96	114	96	96	96	96	B	100	98
6	98	98	98	98	94	94	B	138	142	142	142	142	116	106	90	104	90	88	B	B	94	B	94	90
7	90	90	86	86	86	B	B	B	144	100	152	152	152	120	114	102	102	88	98	98	96	B	B	B
8	96	B	B	B	B	108	96	102	142	158	148	114	110	110	90	106	106	108	104	B	90	90	102	102
9	102	86	86	86	98	98	B	154	124	94	116	G	G	162	116	86	98	88	88	98	98	98	92	86
10	86	B	86	B	88	B	B	G	94	112	164	144	144	142	156	108	108	90	94	106	86	86	86	B
11	B	B	B	B	B	B	86	94	134	122	154	170	110	110	164	136	120	B	86	B	108	B	B	92
12	92	B	96	96	B	B	148	142	154	104	140	100	130	88	88	108	104	100	100	94	94	92	92	90
13	100	B	B	92	102	102	100	100	B	G	G	158	130	122	100	112	170	106	152	118	108	102	102	88
14	88	90	90	90	90	90	B	G	146	156	102	150	150	110	110	144	B	96	100	100	100	B	100	100
15	B	B	B	100	100	108	108	G	108	108	160	136	144	126	92	140	124	108	108	106	B	98	98	90
16	B	104	B	B	B	B	B	G	110	110	140	142	128	142	132	G	120	B	90	78	B	B	100	94
17	94	94	B	98	B	B	B	G	106	114	98	146	140	128	116	108	90	90	86	B	B	B	126	126
18	B	B	98	B	98	98	98	142	146	134	154	150	122	158	122	112	114	114	96	96	84	86	B	120
19	118	118	B	92	B	B	128	128	118	108	102	102	100	92	92	100	122	B	88	88	88	88	B	B
20	B	90	90	92	B	B	102	106	152	92	148	108	106	116	92	108	114	100	98	94	90	98	B	B
21	98	98	98	100	88	94	B	158	118	154	154	150	116	146	136	108	110	94	80	82	92	112	112	112
22	B	112	110	B	B	B	B	144	130	130	150	138	96	134	140	108	110	G	B	88	88	102	B	B
23	B	B	B	96	96	96	B	150	138	96	110	106	106	106	106	100	130	88	88	88	88	120	120	B
24	104	106	114	106	106	106	158	146	124	124	112	120	120	118	110	136	120	110	104	118	112	106	96	100
25	B	108	94	B	B	B	B	142	142	110	104	98	98	84	140	126	124	92	92	92	92	92	96	B
26	B	B	96	B	94	B	B	144	156	142	94	84	130	134	150	168	G	B	94	94	102	102	102	96
27	B	B	B	B	B	B	B	104	96	106	158	146	164	150	162	168	160	B	B	B	B	B	100	100
28	96	96	96	96	B	B	B	134	146	138	178	158	130	104	166	154	132	128	B	B	B	B	112	112
29	130	118	88	B	88	B	B	168	150	140	128	98	114	106	96	136	150	B	92	92	92	92	92	92
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	18	17	18	16	18	12	12	22	28	29	29	28	28	29	29	28	27	20	24	22	23	20	22	21
MED	97	98	96	94	94	98	99	136	131	120	148	137	118	120	116	109	114	98	95	95	92	94	97	96
U Q	104	107	98	98	98	104	118	144	145	139	154	148	142	142	140	136	124	108	99	100	98	99	102	101
L Q	90	92	88	90	88	94	94	102	109	107	111	104	110	106	96	106	106	90	89	90	90	92	92	90

FEB. 2020 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Wakkanai

FEB. 2020 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	F2	F2	F1	F1	F1		L1	L1	LC21	LC22	HL21	HL21	LC11	C2	C2	C2	L3	L2	F2	F2	F2	F2	F1	F1	
2	F1	F1	F2		F1	F2	L1	L1	C2	C4	LC21	CL21	C3	C2	H2	C2	C5	L1	F1	F1	F1	F2	F2	F1	
3	F1	F1			F1			C1	LC11	CL21	CL21	CL11	CL11	LC12	LC21	C2		L1	F1	F2	F1	F2	F1	F1	
4								C1	C2	C2	C3	C2	C3	C3	C3	C2	LC12						L2		
5	F2	F2	FF11	F2	F2	F2	L1		LC12	HL21	HL21	HL11	HL22	C2	C2	LC32	CL31	CL31	F2	F1	F2		FF11	F4	
6	FQ21	FQ21	FQ21	FQ21	F2	F2		H2	H3	HL22	HL22	HL21	CL22	C2	LC11	C2	LC11	L1			F4		F1	F1	
7	F1	F1	F2	F2	F1				C2	LC11	HL21	HL21	HL21	CL21	CL21	C3	C3	L2	F1	F4	F1				
8	F1					F1	L1	LC11	LC11	C2	C2	C2	C2	C2	C3	C3	L3	L4	F1		F1	F1	FQ21	F1	
9	L2	F2	F2	F1	F2	F2		H1	C2	L3	C2			HL21	CL21	LC11	C2	L3	F4	FF13	F2	F2	F1	F1	
10	F1		F1		F1				LC21	LL21	HL11	H1	H1	H1	H1	C1	C2	L1	F5	F2	F1	F1	F1		
11							L2	LC21	C2	C1	H1	H1	CL21	CL11	H1	CL21	C2		F1		F1			F1	
12	F1		F1	F1			H1	H1	H1	LC11	HL22	LC21	C1	LC11	LC11	C4	L3	L4	F5	F8	F2	F2	F2	FF21	
13	F1			F1	F1	F2	C2	LC11	C2	C2	C2	C2	C2	H2	C2	CL22	C3	L3	L1	F2	F3	F1	F2	F2	
14	F1	F1	F1	F2	F2	F1				C2	H2	C2	H2	H2	C2	C2	C1		L1	F2	F1	F2		F1	
15				F1	F1	F1	L1		LC11	LC21	HL11	CL21	HL22	C2	LC12	CL21	CL31	L3	L3	FF11		F1	F2	F2	
16		F1							C2	C2	H2	HL11	C1	H2	C2		C2		L1	F1			F1	F3	
17	F2	F1		F1					C2	C2	LC21	HL22	HL22	CL22	CL32	CL22	LL21	L2	L1				F1	F1	
18			F1		F1	F1	L1	H1	H2	C2	H1	HL21	CL21	HL21	CL21	C7	C3	C3	L5	F1	F1	F1		F2	
19	F2	F2		F1			C1	C1	C3	C4	C2	C2	L3	L2	L3	C4	CL22		L1	F3	F2	F1			
20			F1	F1	F1		L1	LC11	HL21	LC12	CL21	C2	LC22	C3	L4	C2	C2	L1	L1	F1	F1	F1			
21	F1	F1	F1	F1	F1	F1		HL11	CL11	HL21	H2	HL22	C2	HL22	C2	C2	C5	LL11	L2	F1	F1	F1	F1	F1	
22		F1	F1					HL21	CL21	CL21	HL22	CL22	LC11	C2	H2	C2	C2			F1	F1		F3		
23				F1	F1	F1		H2	C2	LC12	C2	C2	LC21	LC21	LC31	LC2	C2	L2	F2	F2	FF11	FF11	F3		
24	F1	F2	F1	F1	F1	F2	H1	H2	CL22	CL21	C2	C2	C2	C2	21	C2	C4	L3	L3	FF12	FF12	F2	F3	F2	
25		F2	F1					L1	LC12	C2	C2	LC21	LC21	LC11	H2	CL21	C2	LC11	L2	F2	FF11	F1	F1		
26			F1		F1			H1	HL11	HL21	C2	LC11	C1	CL11	H2	H2		L1	F1	F1	F1	F1	F1	F1	
27								C1	LC21	C2	HL21	HL22	HL11	H1	H1	H2							F1	F1	
28	F2	F2	F1	F1				C2	H2	C2	C2	C2	C1	LC21	HL11	HL22	C1						F1	F2	
29	F1	F1	F1		F2			C1	C2	CL21	CL11	LC11	C2	L2	L3	CL12	C1		L2	F2	F2	F2	F2	F3	
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT																									
MED																									
U Q																									
L Q																									

FEB. 2020 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

FEB. 2020 f<sub>XI</sub> (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

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

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## IONOSPHERIC DATA STATION Kokubunji

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

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

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

FEB. 2020 foF2 (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

FEB.2020 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	LU	L	A	A										
2										L	L	L	L	L	A									
3										L	LU	L	L	L	L	L	C							
4											A	A	L			L								
5								L			A	A	L	L	L									
6										L	LU	L	U	L		L								
7								L	L	L	LU	L	L	L	L	L								
8										L	LU	L	L	L	L									
9											LU	L	U	L	L	L	L	A						
10											L		LU	LU	L									
11										L	LU	L	L	L	L	L								
12								L	L	LU	L	L	A	L		L	L	L						
13											LU	L		LU	L	A								
14									L	L	L	412	416	412	396		L							
15								L	L	C	408	432	420	416		L		U	L					
16								L		L	LU	L	U	L	U	L	L	L						
17											U	L	A	A	U	L		L	L					
18										L	LU	L	L	U	L	U	L	L						
19										L	LU	L	U	L	U	L	L							
20											L	L	U	L										
21									L		LU	L	396		396									
22										L	412	L	U	L	U	L	A	A	L					
23											L	U	L	U	L	L		A	L					
24								L			U	L	A	A	A	A	L	L						
25										U	LU	L	A	U	LU	L	A	A	L					
26								L	L	A	U	L	U	L	U	L	L			A				
27								L	A	U	L	U	L	A	U	L	A	L						
28										L	U	L	U	L	U	L		L						
29										L	U	L	A	A		A	L							
30											416	424			396									
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT											1	11	18	16	13	10	1	1						
MED											U	L	U	L	U	L	U	L	U	L	U	L	U	L
U Q											420	432	428	424	400									
L Q											U	L	U	L	U	L								

FEB.2020 foF1 (0.01MHz)

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## IONOSPHERIC DATA STATION Kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1								B	U	A	U	A	R	A	A	A	A	A	B						
2								B	U	R	U	R	A	A	A	A	A	A	A	B					
3								B	U	R	U	R	U	R	R	A	U	R	U	R	C	B			
4								B	U	A	U	A	A	A	A	R	A	A	A	A	B				
5								B	U	R	U	R	U	A	U	A	A	A	U	R	U	R	B		
6								B	U	A	U	R	U	A	U	A	A	A	A	A	B				
7								B	U	R	U	R	U	R	U	R	A	R	U	R	R	B			
8								B	U	A	U	A	A	A	A	A	A	A	A	A	B				
9								B	U	A	A	A	A	A	A	U	R	U	R	A	A				
10								B	U	A	R	A	U	A	A	A	A	U	A	A	A	B			
11								B	U	R	A	A	A	A	A	U	R	U	R	A	B				
12								B	U	R	A	U	R	U	A	A	R	U	R	U	R	B			
13								B	U	R	U	A	U	A	A	A	U	R	U	A	A	B			
14								U	R	U	R	U	A	R	U	A	A	A	R	A	B				
15								B	U	R	C	U	A	R	U	A	A	A	A	B					
16								B	U	R	U	A	U	A	U	A	A	R	U	R	U	R	B		
17								B	U	A	U	A	U	A	A	R	U	R	U	R	A				
18								B	U	A	U	A	A	A	A	U	A	A	U	R	U	R			
19								B	A	A	A	A	A	A	A	U	R	A	A	B					
20								B	U	A	A	A	A	A	A	A	A	A	A	B					
21								U	A	U	R	U	A	U	A	A	A	A	A	A	B				
22								B	A	A	A	A	A	A	U	A	A	A	U	A	U	R			
23								U	R	U	A	U	A	R	U	A	A	A	U	R	B				
24								B	U	A	U	A	U	A	A	A	U	R	A	B					
25								B	U	A	A	A	U	A	U	A	A	A	U	R	B				
26								B	A	U	A	A	U	A	A	A	A	A	A	B					
27								U	A	U	R	U	A	A	U	A	A	A	A	A	B				
28								U	A	U	R	R	A	A	R	A	U	R	U	R	A	A			
29								U	A	U	A	A	R	U	A	U	A	A	A	A	B				
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								6	26	22	14	14	10	4	8	16	8	2							
MED								U	A	U	A	U	A	U	A	U	R	U	R	U	R	U	R	U	R
U Q								186	240	278	308	326	322	316	298	274	244	186							
L Q								U	U	R	U	A	U	A	U	U	R	U	R	U	R	U	R	U	R
								192	244	292	316	332	324	320	312	288	244								
								U	A	U	A	U	A	U	A	U	A	U	R						
								180	228	268	296	316	316	312	296	266	232								

FEB. 2020 foE (0.01MHz)

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## IONOSPHERIC DATA STATION Kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	E 16	J 27	A 21	E 15	E 14	E 16	E 16	E 16	25	28	G	31	J 51	J 47	A 34	32	24	22	E 16	J 22	J 23	J 27	J 26	J 26	
2	22	J 42	A 24	J 28	J 22	A 21	22	J 30	J 30	G	36	36	38	34	J 40	34	J 34	J 27	J 34	J 91	J 86	E 16	E 15	E 26	
3	E 16	E 16	E 16	E 16	E 16	E 15	E 15	E 16	G	G	G	G	32	G	G	G	C 17	E 21	19	J 26	J 24	J 30	J 30		
4	21	20	E 15	19	E 16	E 16	20	G	29	37	J 49	J 47	J 48	G	33	31	J 29	A 16	E 16	E 16	E 16	23	19	E 16	
5	J 29	A 21	E 16	23	E 16	E 15	E 16	E 15	G	33	38	38	38	36	34	G	G	19	J 24	J 25	E 16	J 34	21	J 24	
6	24	J 34	J 34	A 20	22	22	E 15	21	27	30	G	36	37	37	35	J 39	J 35	J 26	20	E 16	E 16	20	22	E 16	
7	E 17	E 17	E 16	E 16	E 16	E 17	20	20	G	32	G	37	J 37	J 38	J 38	G	G	E 14	22	22	E 16	J 24	E 16	E 16	
8	E 16	18	22	22	22	E 16	18	21	25	30	36	J 37	J 35	J 46	J 34	J 35	J 30	22	J 26	J 25	23	21	20		
9	E 16	E 16	E 16	E 16	E 16	E 16	E 16	J 20	28	34	44	40	39	43	G	G	J 32	33	23	16	E 16	E 16	E 16	E 16	
10	E 16	E 16	J 23	A 20	20	E 16	E 15	18	27	36	37	36	35	34	33	31	26	J 34	J 28	23	J 23	E 16	E 16	E 16	
11	23	E 16	22	19	E 16	E 16	E 16	E 16	G	30	32	33	34	34	G	G	26	J 22	E 16	J 22	22	E 16	E 16	E 16	
12	E 16	E 16	E 16	E 16	22	E 16	E 16	E 16	G	J 32	35	G	37	37	G	G	G	E 16	15	20	J 25	23	J 24	E 16	
13	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 15	G	34	34	38	J 40	35	G	32	28	17	24	E 16	16	22	E 16	E 16	
14	E 16	E 16	E 16	E 16	E 15	E 15	E 15	G	G	35	G	38	38	41	36	G	J 36	J 40	E 16	E 16	E 16	22	J 47	E 16	
15	J 33	A 24	E 16	E 16	E 16	E 16	E 16	20	G	C	37	G	38	38	34	34	29	E 17	E 16	E 16	E 16	E 16	E 16	E 16	
16	E 16	E 16	E 16	E 15	E 16	18	E 16	18	20	33	33	38	36	36	G	G	G	E 16	E 16	E 16	E 16	E 16	E 16	E 18	
17	E 16	E 16	E 16	22	E 15	E 15	E 15	21	25	34	38	41	42	G	G	G	J 34	21	E 15	E 15	E 16	E 16	E 16	E 16	
18	E 15	E 15	E 15	E 15	E 16	20	E 16	22	28	33	37	38	36	35	33	30	G	G	E 16	E 16	15	21	21	22	
19	20	23	20	E 16	E 16	20	20	J 27	32	34	39	J 47	J 45	J 48	J 39	G	J 31	J 28	E 15	E 15	21	22	23	22	
20	J 25	J 27	A 16	E 21	E 16	E 16	E 16	E 16	30	33	35	35	39	39	J 52	42	J 36	28	J 26	J 23	E 16	E 15	E 26	J 35	
21	J 54	J 36	J 50	J 36	J 32	E 15	E 15	22	G	34	35	37	J 43	40	36	J 48	26	22	E 15	E 16	E 15	E 15	E 16	E 16	
22	22	E 16	22	22	E 15	E 15	E 15	25	31	32	35	34	37	37	64	48	G	G	21	E 16	E 16	E 16	E 15	20	
23	23	23	22	E 16	E 16	E 16	E 16	G	30	34	36	G	38	39	J 37	34	G	E 18	E 16	E 16	E 28	23	20	23	
24	E 16	19	20	E 16	E 16	22	J 22	J 24	29	35	36	41	40	J 48	J 51	G	27	19	E 14	E 16	E 16	21	21	J 31	
25	24	21	25	J 24	E 23	E 17	E 16	22	30	J 38	J 38	40	40	38	38	36	J 32	24	J 27	J 27	J 34	J 28	J 28	J 33	
26	J 36	A 15	22	J 29	J 29	22	19	21	29	35	J 48	40	38	36	36	31	J 31	J 51	J 34	J 24	E 15	22	20	20	
27	E 16	24	20	19	E 16	E 16	19	23	G	35	36	38	38	41	37	39	J 31	23	23	E 16	E 16	E 16	19	E 16	
28	19	19	20	22	E 16	E 15	E 15	24	G	G	33	36	G	34	G	G	28	J 35	J 30	E 16	E 16	E 21	J 26	19	
29	23	24	J 35	22	E 16	E 16	25	25	31	34	G	37	42	J 44	36	J 44	J 30	19	E 15	E 25	20	E 16	E 16	E 16	
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	29	29	29	29	29	29	29	29	28	29	29	29	29	29	29	28	29	29	29	29	29	29	29	
MED	19	19	20	19	E 16	E 16	E 16	20	25	34	36	37	38	37	34	31	28	22	20	E 16	E 16	21	20	E 18	
UQ	J 24	J 24	22	22	21	18	19	22	30	34	38	39	40	41	37	36	32	28	24	23	23	23	24	24	
LQ	E 16	E 16	E 16	E 16	E 16	E 16	E 15	G	G	31	32	34	36	34	G	G	G	E 18	E 16	E 16	E 16	E 16	E 16	E 16	

FEB. 2020 foEs (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

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

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

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

FEB. 2020 fmin (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

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

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		382	F	350	320	F	F	F	401	405	379	372	352	402	383	396	381	375	368	346	355	348	351	334	304
2		F	314	F	F	F	F	F	395	406	392	394	388	384	387	339	390	361	363	341	A	A	366	376	320
3		F	312	302	F	F	308	F	368	408	372	375	323	353	354	378	379	C	384	361	317	355	351	317	332
4		315	308	308	349	354	334	339	389	385	380	405	342	381	339	398	376	365	368	378	339	338	325	319	339
5		313	F	297	297	321	377	323	367	382	400	345	368	362	376	366	373	378	380	349	341	321	294	F	327
6		F	329	326	339	353	319	356	405	406	373	374	361	355	365	360	373	395	377	311	336	346	349	322	F
7		296	F	313	349	343	311	350	354	402	386	365	348	356	375	367	383	391	398	320	360	337	341	357	316
8		298	319	324	358	402	310	333	384	372	366	352	369	372	339	359	350	382	400	385	326	339	332	359	F
9		316	300	332	322	F	F	333	368	391	400	368	333	349	377	369	380	363	385	371	334	344	335	335	317
10		307	330	331	318	379	361	357	386	382	363	366	355	368	374	384	399	401	388	387	326	362	341	315	F
11		316	F	F	F	F	338	355	382	374	367	374	348	338	360	379	363	380	385	342	374	388	359	313	334
12		317	323	314	333	335	335	388	390	395	340	352	363	376	364	355	347	388	377	368	345	349	329	332	353
13		331	F	F	F	F	308	357	393	400	390	368	340	369	349	396	381	350	415	352	369	356	324	332	331
14		311	F	285	325	362	350	355	362	372	372	376	369	374	352	359	372	381	400	372	354	329	334	A	F
15		334	311	323	352	354	353	342	385	395	C	364	381	330	344	368	391	366	377	374	351	378	372	328	320
16		314	324	329	350	370	357	373	385	378	368	392	359	361	375	365	381	394	386	390	323	324	322	317	321
17		316	330	314	345	393	331	347	389	405	394	376	391	366	299	373	375	390	398	384	310	344	323	342	323
18		327	331	F	F	F	369	370	395	359	352	348	377	362	349	372	373	362	384	401	313	365	330	331	300
19		303	303	318	343	337	326	356	319	328	358	322	338	341	344	371	357	380	394	369	301	318	319	319	300
20		301	317	363	351	348	361	325	369	372	379	344	369	314	351	368	382	344	386	382	336	345	302	319	306
21		A	309	326	F	392	308	312	369	390	373	338	362	335	357	377	385	380	378	346	344	336	306	316	332
22		327	302	333	297	324	349	343	405	369	340	357	363	360	349	366	371	383	396	333	316	357	387	330	313
23		319	304	298	315	380	375	357	402	382	399	341	317	367	348	369	390	374	374	346	369	365	287	324	338
24		321	304	301	290	337	354	F	391	406	385	371	343	341	354	354	347	373	407	385	323	339	378	316	313
25		315	301	279	340	341	356	368	409	398	352	368	364	303	361	354	360	361	377	397	420	316	375	345	327
26		301	311	319	F	F	F	F	399	398	349	368	313	312	333	337	368	367	382	389	316	326	336	337	342
27		303	316	291	F	F	F	364	396	393	360	372	372	292	376	345	389	383	396	379	348	320	332	307	319
28		308	317	321	344	368	337	364	382	390	332	372	365	390	347	392	357	365	383	371	329	330	338	317	324
29		308	308	311	332	333	319	354	371	378	371	367	354	329	377	361	368	367	387	352	303	319	350	331	305
30																									
31																									
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		25	23	25	21	20	24	24	29	29	28	29	29	29	29	29	29	28	29	29	28	28	29	27	25
MED		315	312	318	339	354	338	355	386	390	372	368	361	360	354	368	375	376	385	371	336	342	335	328	321
U Q		320	323	328	349	374	356	360	396	401	386	374	369	370	375	378	382	383	396	384	352	356	351	335	332
L Q		305	304	302	319	337	319	340	369	376	359	352	342	336	348	359	366	365	377	346	320	328	324	317	313

FEB. 2020 M(3000)F2 (0.01)

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## IONOSPHERIC DATA STATION Kokubunji

FEB. 2020 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1										L	U L	L A	A												
2										L	L	L	L	L	A										
3										L	U L	L	L	L	L	C									
4											A	A	L		L										
5								L			A	A	L	L	L										
6										L	U L	U L	U L		L										
7								L	L	L	U L	L	L	L	L	L									
8										L	U L	L	L	L	L										
9											U L	U L	L	L	L	A									
10											L		U L	U L	L										
11									L	U L	L	L	L	L	L										
12								L	L	U L	L	A	L		L	L	L								
13											U L	L		U L	L	A									
14									L	L	L	409	422	394	410										
15								L	L	C	U L	U L	U L	U L	L		U L								
16								L		L	U L	U L	U L	U L	U L	L	L								
17											U L	A	A	U L		L	L								
18										L	U L	L	U L	U L	U L	U L	L								
19										L	U L	U L	U L	U L	U L	L									
20											L	L	L												
21									L		U L	L	444		403										
22										L	407	L	U L	U L	A	A	L								
23											U L	U L	U L	U L		A	L								
24								L			U L	A	A	A	A	L	L								
25										U L	U L	A	U L	U L	A	A	L								
26								L	L	A	U L	U L	U L	U L	L	L		A							
27								L	A	U L	U L	U L	A	U L	A	L									
28										L	U L	U L	U L	U L	L										
29										L	U L	A	A		A	L									
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT											1	11	18	16	13	10	1	1							
MED											U L	U L	U L	U L	U L	U L	U L	U L							
U Q											420	407	408	418	400	404	422	428							
L Q											U L	U L	U L	U L	U L										
											391	396	402	387	397										

FEB. 2020 M(3000)F1 (0.01)

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## IONOSPHERIC DATA STATION Kokubunji

FEB. 2020 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1										234	232	264	210	232											
2										236	236	236	234	238	238										
3										248	236	290	242	242	238	232									
4											E A 276	234	266		236										
5									208		276	238	244	236	252										
6										230	234	238	250		246										
7									208	218	244	274	244	234	230	226									
8										242	240	240	238	278	246										
9											256	272	250	242	242	220	224								
10											240		240	232	232										
11										242	246	268	270	256	238	238									
12								218	218	246	276	240	242	244		252	220	220							
13											256	300	242	262	232	232									
14										232	246	238	250	250	266	256	242								
15								220	220		C 272	266	306	262	236		232								
16								232		258	236	268	E A 268	252	252	230	216								
17										258	234	E A 242	360		234	224									
18										286	286	240	262	250	250	248	248								
19										248	280	274	260	260	238	240									
20											278	252	320	242											
21									222		240	238	280		230										
22											270	262	242	256	252	244	228	228							
23											276	296	244	264		216	228								
24								220			262	288	266	242	242	260	238								
25											266	242	238	340	258	248	230	246							
26										216	246	258	336	336	278	254	254	240							
27										230	238	260	246	406	230	260	230	222							
28										278	240	260	236	280	228	258									
29										250	258	266	290	230	230	230	230								
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								4	8	18	28	28	29	27	23	20	12	2							
MED								220	219	246	256	259	250	252	242	233	228	230							
U Q								226	226	258	267	274	275	264	250	245	235								
L Q								219	212	238	240	240	242	238	232	230	223								

FEB. 2020 h'F2 (KM)

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## IONOSPHERIC DATA STATION Kokubunji

FEB. 2020 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1	198	E B	254	E B	258	E B	282	230	202	200	180	194	188	A	A	206	216	216	198	198	198	204	204	E B	E B		
2	E B	E B	250	E B	238	E B	242	E B	194	194	198	196	196	214	A	214	204	204	202	A	A	200	200	E B	E B		
3	E B	E B	268	E B	256	E B	230	E B	206	200	190	190	188	184	186	202	202	C	192	192	E B	202	202	E A	E A		
4	E B	E B	252	E B	222	204	210	210	194	204	204	214	A	A	206	214	188	200	188	188	216	216	216	220	218		
5	E A	E B	252	E B	220	210	210	198	176	206	A	A	198	204	190	208	206	192	204	208	224	258	216	212			
6	E B	E A	254	E B	226	E B	240	218	198	198	186	172	186	182	208	202	212	212	196	E B	E B	214	202	E B	E B		
7	E B	E B	234	228	224	218	216	212	216	180	180	186	208	210	208	208	190	196	184	212	212	212	230	210	E B		
8	E B	E B	250	252	206	178	E B	E B	196	196	196	196	194	194	194	210	204	204	190	E A	272	212	216	212	252		
9	E B	E B	276	E B	240	198	E B	E B	208	208	208	208	186	186	210	206	190	A	204	202	E B	202	216	216	E B		
10	E B	E B	234	244	244	214	210	210	204	204	204	204	234	192	188	188	202	202	198	198	216	202	202	E B	E B		
11	E B	E B	242	E B	238	230	230	186	186	194	194	200	200	184	194	202	196	210	198	186	198	198	198	260	238		
12	E B	E B	270	272	258	252	252	194	182	176	176	184	200	A	196	196	196	190	172	198	E B	226	216	238	222		
13	222	216	232	E B	246	E B	258	234	184	186	198	190	190	188	200	186	A	204	190	190	202	202	E B	E B			
14	228	E B	244	E B	256	E B	224	224	204	192	192	194	202	202	206	198	198	206	206	202	202	208	230	E B	E B		
15	E B	E B	268	E B	262	232	214	204	242	184	178	C	200	174	206	204	198	218	184	180	180	210	198	198	E B		
16	E B	E B	260	E B	260	232	208	232	206	176	194	194	194	194	202	202	196	188	188	186	204	E B	E B	E B	E B		
17	E B	E B	252	E B	262	252	216	202	252	238	194	194	194	194	A	A	194	224	212	194	194	176	246	216	E B		
18	E B	E B	248	E B	248	266	262	212	198	190	188	206	200	200	200	190	190	190	190	198	184	222	214	226	E B		
19	E B	E B	270	E B	282	248	220	200	E B	E B	274	234	212	224	216	224	222	210	206	202	202	202	196	194	E B		
20	E B	E A	270	270	212	212	226	220	E B	E B	236	200	202	224	198	198	192	208	212	212	196	196	196	212	E B		
21	A	E A	292	E A	302	270	192	E B	E B	262	236	206	200	224	184	198	198	242	202	202	202	202	202	202	E B		
22	E B	E B	234	E B	248	E B	250	E B	250	208	214	192	204	200	200	200	200	A	A	194	194	194	230	204	E B		
23	E B	E B	260	E B	276	E B	288	262	200	200	E B	220	194	206	202	192	192	188	188	226	A	190	200	190	E A		
24	E B	E B	272	E B	280	E B	280	E B	238	204	204	190	190	202	196	A	A	A	A	202	200	192	182	198	E B		
25	E B	E B	242	E B	230	E B	260	244	214	200	186	192	194	192	192	A	198	212	A	A	206	202	188	188	E A		
26	E B	E B	270	E B	246	E B	246	256	220	196	202	186	174	196	A	206	206	222	222	206	212	A	206	206	E B		
27	E B	E B	250	E B	260	E B	248	248	216	200	210	188	190	A	190	190	188	A	188	A	188	192	192	202	E B		
28	E B	E B	240	E B	246	E B	232	220	200	E B	238	222	206	206	194	202	196	184	184	194	200	214	204	190	E B		
29	E B	E B	264	E B	264	E B	262	244	216	260	246	214	206	206	198	212	A	A	188	A	188	188	198	240	E B		
30																											
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	28	29	29	29	29	29	29	29	29	27	27	24	23	25	25	23	27	28	29	28	28	29	28	29			
MED	E B	E B	E B	E B	E B	E B	U	205	194	196	198	196	197	194	204	202	202	202	195	193	206	208	209	E B	E B		
U Q	270	269	266	256	228	255	236	205	204	204	200	201	200	208	209	212	206	199	202	228	223	235	245	261			
L Q	E B	E B	242	E B	246	241	228	203	206	208	188	190	192	190	190	188	194	192	196	190	190	188	202	203	203	218	232

FEB. 2020 h'F (KM)

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## IONOSPHERIC DATA STATION Kokubunji

FEB. 2020 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

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

FEB. 2020 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

FEB. 2020 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	B	88	96	B	B	B	B	B	148	146	G	108	86	114	110	144	96	96	B	96	96	96	96	96	
2	102	102	102	102	96	96	96	96	96	G	110	124	116	118	108	118	108	102	102	86	90	B	B	92	
3	B	B	B	B	B	B	B	B	G	G	G	G	92	G	G	G	C	B	92	84	84	82	80	78	
4	78	78	B	78	B	B	88	G	122	116	112	104	100	G	110	110	110	B	B	B	B	106	104	B	
5	82	82	B	90	B	B	B	B	G	150	140	140	140	122	104	G	G	90	90	90	B	B	94	94	102
6	92	92	90	90	90	88	B	138	134	140	G	128	136	120	106	104	96	96	92	B	B	92	104	B	
7	B	B	B	B	B	B	98	142	G	130	G	158	G	104	G	G	G	B	140	134	B	112	B	B	
8	B	90	92	88	88	B	90	126	134	132	116	94	94	92	94	94	92	94	92	92	92	92	92	92	
9	B	B	B	B	B	B	B	146	136	122	102	102	102	96	G	G	100	98	94	B	B	B	B	B	
10	B	B	94	94	94	B	B	148	148	168	146	146	116	96	92	126	104	102	102	84	94	B	B	B	
11	94	B	94	94	B	B	B	B	G	98	98	98	98	98	G	G	130	92	B	92	92	B	B	B	
12	B	B	B	B	96	B	B	B	B	G	100	142	G	142	126	G	G	B	B	102	102	102	100	B	
13	B	B	B	B	B	B	B	B	G	146	146	114	104	102	G	118	104	B	86	B	B	86	B	B	
14	B	B	B	B	B	B	B	G	G	164	G	158	126	106	106	G	106	100	B	B	B	92	92	B	
15	98	96	B	B	B	B	B	148	G	C	160	G	152	142	134	112	110	B	B	B	B	B	B	B	
16	B	B	B	B	B	90	B	110	94	150	140	140	140	102	G	G	G	B	B	B	B	B	B	B	
17	B	B	B	92	B	B	B	138	126	154	144	130	112	G	G	G	88	88	B	B	B	B	B	B	
18	B	B	B	B	B	98	B	138	146	146	136	118	118	108	136	136	G	G	B	B	B	138	120	110	
19	110	110	100	B	B	98	134	134	124	124	114	104	104	104	104	G	102	102	B	B	102	102	102	102	
20	102	102	B	92	B	B	B	B	150	140	130	118	118	108	100	100	100	100	100	100	B	B	100	100	
21	94	94	94	94	94	B	B	154	G	150	144	146	102	118	118	118	116	88	B	B	B	B	B	B	
22	88	B	98	98	B	B	B	134	130	144	120	104	98	140	80	82	G	G	82	B	B	B	B	112	
23	98	98	100	B	B	B	B	G	158	148	144	G	142	134	102	116	G	B	B	B	116	116	114	114	
24	B	98	98	B	B	98	98	98	144	138	138	124	124	120	90	G	90	128	B	B	B	116	108	94	
25	94	94	94	94	104	B	B	134	162	104	102	158	138	134	120	120	104	112	96	96	94	94	108	100	
26	100	B	94	94	86	86	98	126	110	132	102	160	140	130	130	124	112	92	90	90	B	B	90	96	96
27	B	96	96	96	B	B	96	146	G	152	98	134	104	100	98	92	94	140	116	B	B	B	106	B	
28	98	98	98	106	B	B	B	136	G	G	130	102	G	102	G	G	102	98	98	B	B	98	98	82	
29	82	80	92	94	B	B	94	148	148	140	G	142	134	108	102	100	100	126	B	86	86	B	B	B	
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	15	16	16	16	8	7	9	19	18	25	23	25	27	26	20	17	21	19	15	13	11	17	17	14	
MED	94	95	95	94	94	96	96	138	135	140	130	124	116	108	105	116	102	98	94	92	94	96	100	98	
U Q	100	98	98	95	96	98	98	146	148	150	144	144	138	122	114	122	109	102	102	98	102	109	107	102	
L Q	88	89	94	91	89	88	92	126	124	127	110	104	102	102	99	100	96	92	90	86	90	92	95	92	

FEB. 2020 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

FEB. 2020 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

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		F5	F3						H2	H1		C1	L3	CL22	C1	H1	L2	L2		F1	F1	F2	F2	F1	
2	F1	F2	F3	F2	F3	F2	F1	L1	L2		C1	C1	C1	C1	L1	C1	L3	L3	F3	F6	F5			F2	
3													L2						F1	F2	F3	F3	F3	F3	
4	F1	F1		F1			F1		C2	C2	C3	L2	L2		C2	C2	L2					F2	F1		
5	F2	F1		F1					H1	H1	H2	H2	C1	L1			L1	F2	F4			F4	F2	F2	
6	F2	F3	F2	F3	F2	F2		H2	H2	H2		C2	H1	C1	L2	L2	L3	L2	F1			F1	F1		
7							F1	H2		H2		H2		L1					F1	F1		F3			
8		F1	F1	F1	F2		F1	C2	H2	H1	C2	L2	L2	L2	L2	L3	L3	L3	F2	F4	F4	F2	F1	F1	
9								H1	H1	C2	L2	L2	L2	L2			L2	L2	F1						
10			F2	F1	F2			H1	H1	H1	H1	H1	C1	L2	L2	CL11	C2	L3	F1	F2	F1				
11	F2		F2	F1					L1	L1	L2	L2	L2	L2			C1	L2		F1	F1	F1			
12					F1				L2	H1		H1	C1	L1						F1	F3	F4	F2		
13									H1	H2		C1	L1	L1			C1	L3		F1		F2			
14									H1			H1	C1	L1	L2		L3	L2				F1	F4		
15	F2	F2						H1			H1		H1	H1	H2		C2	L3							
16					F1			C1	L1	L1	H2	H2	H1	L1											
17				F2				H2	C1	H1	H1	H1	C2				L2	L1							
18					F1			H2	H2	H1	H2	C2	C2	L2	H1	C1						F1	F1	F3	
19	F2	F2	F1		F2	F1		C2	C3	C2	C2	L2	L1	L2	L2		L2	L3			F2	F2	F2	F2	
20	F3	F3		F1					H2	H1	L1	C1	C1	C1	L3	L2	L3	L3	F2	F2			F2	F5	
21	F6	F2	F3	F3	F2			H1		H1	H1	H1	L2	C2	CL11	C2	L2	L2							
22	F2		F1	F2				H2	C1	L1	L2	L1	L1	HL12	L2	L2			F2					F1	
23	F1	F1	F1						H1	H1	H1		H1	C2	L2	C2						F3	F6	F2	F2
24		F2	F1		F1	F1	L2	H2	H2	L2	L1	H1	H1	C1	L3		L2	C2				F1	F1	F2	
25	F2	F2	F2	F2	F1			H2	H2	L2	L1	H1	H1	H1	C2	C2	L2	C2	F3	F2	F2	F5	F2	F4	
26	F4		F2	F2	F2	F1	F1	C1	H1	L2	HL11	HL11	H1	C2	C2	CL22	L4	F2	F3			F1	F2	F2	
27		F2	F1	F1			F1	H2		H1	L2	C1	L1	L3	L1	L2	L4	H2	F1				F1		
28	F2	F1	F1	F1				H2			H1	L1	L1	L1			L2	L2	F2			F1	F4	F2	
29	F2	F2	F2	F1		F2	H1	H2	H1		H1	H1	L2	L2	L3	L2	L2	H1		F2	F2				
30																									
31																									
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																									
MED																									
U Q																									
L Q																									

FEB. 2020 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

FEB.2020 fxI (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	36	38	38	X	37	33	32	38										54	38	44	37	35	30	X	
2	X	X	X	X	X	X	X	X										60	49	42	41	X	A	33	X
3	X	X	X	X	X	X	X	X										59	38	41	47	45	47	47	X
4	X	X	X	X	X	X	X	X										58	42	41	38	38	38	37	X
5	X	X	X	X	X	X	X	X										56	45	35	37	38	38	38	X
6	X	X	X	X	X	X	X	X										50	45	45	43	32	33	X	X
7	38	42	39	39	40	40	30											46	46	43	38	35	35	X	
8	X	X	X	X	X	X	X	X										51	38	36	40	34	35	X	X
9	X	X	X	X	X	X	X	X										57	50	33	34	35	34	X	X
10	X	X	X	X	X	X	X	X										50	36	34	36	33	35	X	X
11	X	X	X	X	X	X	X	X			C	C	C	C	C	C	C	57	43	33	31	28	31	X	X
12	X	X	X	X	X	X	X	X			C		C			C	C	C	X	X	X	X	X	X	X
13	X	X	X	X	X	X	X	X			C	C	C	C	C	C	C	49	44	33	37	36	37	X	X
14	X	X	X	X	X	X	X	X			C	C						44	37	31	33	33	35	X	X
15	X	X	X	X	X	X	X	X			C	C		C				59	42	41	34	31	31	X	X
16	X	X	X	X	X	X	X	X										55	37	38	38	36	36	X	X
17	X	X	X	X	X	X	X	X										54	36	36	38	35	31	X	X
18	X	X	X	X	X	X	X	X			C	C	C	C	C	C	C	60	52	39	38	30	34	X	X
19	X	X	X	X	X	X	X	X			C	C	C	C	C	C	C	52	34	35	38	41	40	X	X
20	X	X	X	X	X	X	X	X										55	41	36	36	33	A	X	X
21	X	X	X	X	X	X	X	X										57	46	36	38	36	38	X	X
22	X	X	X	X	X	X	X	X										48	44	42	38	31	33	X	X
23	X	X	X	X	X	X	X	X										50	45	39	34	32	30	X	X
24	X	X	X	X	X	X	X	X										60	53	36	38	41	34	X	X
25	X	X	X	X	X	X	X	X										64	46	32	33	33	31	X	X
26	X	X	X	X	X	X	X	X										60	34	33	36	37	35	X	X
27	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X
28	X	X	X	X	X	X	X	X											42	39	42	37	34	X	X
29	X	X	X	X	X	X	X	X											43	42	44	41	38	X	X
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	29	29	29	29	28	29	4										25	29	29	29	28	28	28	
MED	X	X	X	X	X	X	X	X										55	42	36	38	35	35	X	
U Q	X	X	X	X	X	X	X	X										59	46	41	38	38	38	X	
L Q	X	X	X	X	X	X	X	X										50	38	34	35	33	33	X	

FEB.2020 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

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

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

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

FEB. 2020 foF2 (0.1MHz)

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## IONOSPHERIC DATA STATION Yamagawa

FEB. 2020 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1									L	L	L	U L	U L			L	L								
2										L		L	A	L	A	L	L								
3											L	L	L	U L	A	U L	L	L							
4													A	A	A	A	A	A							
5									L		L	L	L	L	U L	L	L	A	A						
6												L	A			U L	L								
7											L			U L	U L	U L									
8											L	L	U L	U L	U L	U L									
9											L	L	U L	U L	U L	L	L								
10											L				A	A	L	L							
11											C	C	C	C	C	C	C	C							
12											C	A	C		U L	C	C	C							
13										L	A	C	C	C	C	C	C	C							
14										L		C	C		U L		L								
15										L	C	C		C	A	A	A	A	L						
16									L	L	U L	U L	U L	U L	U L	U L	L	L							
17												A				L	U L	L							
18											404	A	A		428	424	L	U L	L						
19									U L	C	C	C	C	C	C	C	C	C							
20										L	U L	U L	U L	U L	U L	L	L								
21										L	L		U L	U L	A	L	A	L							
22											408	424	448	440	420	392									
23												A		A	L	A									
24									L			420	428	A	U L	U L	U L	L							
25										L	U L	U L	U L		A	A	L	L							
26											U L	432	424	420	A	L	U L	L							
27										L	U L	U L	U L	U L	U L	U L	L								
28										L	416	420	A	U L	440	412	396	L	L						
29										L	U L	U L	U L	A	U L	L	L	L							
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT									1	1	8	16	16	17	17	9	5								
MED									U L	U L	U L	420	430	420	416	396	380								
U Q											U L	U L	U L	U L	U L	U L	U L								
L Q											406	416	420	418	410	392	374								

FEB. 2020 foF1 (0.01MHz)

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## IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1									U	R	R	A	A	U	A	U	R	U	R	U	A	A			
2									B	U	R	U	A	U	A	A	A	A	A	A					
3									B	U	R	A	A	A	U	A	A	U	R	U	R	A			
4									U	R	A	A	A	A	A	A	A	A	A	B					
5									B	U	R	A	U	A	U	A	U	R	U	A	A				
6									U	A	U	A	A	A	U	R	A	A	U	R	U	R			
7									B	U	A	U	A	U	R	A	A	U	R	U	A				
8									B	U	R	U	R	A	A	A	A	A	A	A					
9									B	U	R	A	A	U	A	A	U	R	U	A					
10									U	R	U	A	A	A	U	A	A	U	R	U	R				
11									B	U	A	C	C	C	C	C	C	C	C						
12									B	U	R	R	C	U	A	C	A	A	C	C	C				
13									B	U	R	A	C	C	C	C	C	C	C	C					
14									B	U	R	A	C	C	U	A	U	A	A	U	R	A			
15									B	U	R	C	C	U	A	U	U	A	A	U	R				
16									B	U	R	U	U	A	A	A	U	R	U	U	A				
17									B	U	A	U	U	A	A	A	A	U	R	U	R				
18									B	U	A	U	A	A	A	A	A	U	R	B					
19									B	A	C	C	C	C	C	C	C	C	C						
20									B	A	A	A	A	A	A	A	A	A	A	B					
21									B	U	R	U	U	A	U	A	A	A	A	A					
22									B	U	A	U	U	U	A	U	U	A	A	A					
23									B	U	R	U	U	A	A	A	A	U	R	U	R				
24									B	U	R	U	U	A	A	A	U	R	U	R	A				
25									B	U	A	R	A	A	U	R	U	U	A	A	A				
26									B	U	A	A	A	U	A	A	A	A	U	R					
27									B	U	R	R	U	A	U	A	U	A	A	A	B				
28									B	U	R	U	A	A	A	U	A	U	U	R	B				
29									B	U	A	U	U	U	A	A	A	U	R	B					
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT									28	23	15	14	9	10	8	11	16	13							
MED									U	R	U	A	U	A	U	A	U	R	U	R					
U Q									212	264	300	312	324	326	314	292	268	216							
L Q									U	R	U	A	U	A	U	A	U	R	U	R					
									224	276	300	324	336	332	316	300	278	226							
									U	R	U	A	U	A	U	A	U	R	U	A					
									204	256	288	308	316	324	310	288	260	202							

FEB.2020 foE (0.01MHz)

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## IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	E 16	B 16	E 20	B 26	E 16	B 16	B 16	B 16	B 16	G	G						G	31	23	E 18	B 16	B 37	E 24	B 16	B 17	
2	E 16	J 26	A 30	J 24	J 36	A 24	A 16	E 16	B 16	G	29	36	39	39	39	37	33	J 41	A 30	24	J 29	J 38	J 51	A 53	A 28	
3	22	23	E 15	B 17	E 16	B 16	B 16	B 18		G	30	44	38	39	36	34		G	J 28	A 24	E 16	B 16	B 28	J 24	24	
4	23	E 15	B 16	B 23	E 16	B 16	24	21		G	36	50	56	55	56	59	52	J 72	A 32	27	23	J 20	A 27	J 39	A 28	
5	E 15	B 15	B 30	A 15	E 15	B 15	B 15	B 15	J 30	A 30	36	38	40	37	34	32	33	28	E 16	B 16	14	15	16	16	16	
6	E 16	B 16	B 15	B 15	J 34	A 15	22	15	E 28	B 34	35	38	J 56	G 47	A 42		G	G	E 15	B 15	19	19	E 16	B 16	16	
7	E 16	B 16	22	22	E 16	B 16	17	16	23	29	34		G 46	J 43	A 40		G		26	22	J 29	21	E 16	21	21	
8	22	E 15	20	21	E 21	B 16	20	22	25	G		33	J 38	A 44	A 42	58		J 29	24	24	19	21	21	E 16	16	
9	21	23	E 16	B 16	20	E 16	B 16	16		G	J 30	A 43	40	J 51	A 42	41		G		J 24	29	20	21	E 16	B 16	26
10	J 26	A 22	E 16	B 22	E 15	B 32	A 29	22	23		35	34	J 38	37	39	37		G	J 35	A 16	24	16	E 20	B 16	16	
11	E 16	24	E 16	B 16	21	21	21	20	23	31		C	C	C	C	C	C	C	C	J 26	A 30	22	J 26	B 16	16	
12	E 16	B 16	B 16	B 15	E 15	B 15	B 15	B 16		G		40	C 39	A 39			C	C	C	C	J 28	A 29	22	J 28	23	
13	23	E 17	B 16	17	E 16	B 15	B 15	16		G	32		C	C	C	C	C	C	C	J 31	A 22	E 16	B 16	38	22	
14	20	E 16	B 16	16	E 16	B 20	20	20		G	28		C	C	J 38	A 40	38	G	J 40	A 24	16	19	E 16	22	J 32	
15	J 26	A 26	A 30	23	E 15	B 15	20	E 16		G	C		39		C	44	41	35	J 41		E 16	B 16	15	23	16	21
16	E 16	B 16	B 16	B 16	E 16	B 16	21	16		G		35	35	42	39	40		G		24	15	15	16	24	19	22
17	20	E 16	B 16	B 16	E 20	B 16	B 16	B 16	26	29	36	41	40	J 44	37	44		G		E 16	B 16	22	E 16	20	20	
18	20	E 16	B 16	B 16	E 15	B 20	19	26	25	32	35	38	46	38	34	32		G		23	14	16	20	E 16	16	20
19	20	20	20	E 16	B 16	B 16	B 15	22	28		C	C	C	C	C	C		C	C	E 16	B 16	B 16	J 16	A 50	A 46	51
20	J 33	A 22	J 30	J 32	J 25	A 20	20	20	24	29	31	J 40	J 36	36	J 45	A 47	A 40	J 35	A 25	22	20	21	20	J 34	A 34	
21	J 53	A 32	22	E 16	J 22	A 39	A 23	23		G		34	36	37	38	38	J 43	A 38	J 35	A 28	20	J 33	A 26	E 23	16	
22	20	21	22	28	J 30	A 26	15	20	28			36		G		35	32	33	J 38	A 34	28	23	27	16	15	
23	E 16	B 16	B 16	B 16	E 16	B 15	B 15	15		G	34	34	38	40	J 58	A 42	52		G		E 16	B 16	16	20	23	24
24	22	19	E 16	21	J 26	A 24	16	24		G	33	36	38	39	J 47	39		G		31	15	15	22	E 16	B 16	16
25	19	23	19	20	E 20	B 15	B 16	27	26		G	J 40	A 43	39	39	40	36	31	26	24	23	18	E 16	B 16	21	
26	E 16	B 16	B 16	B 16	E 16	B 16	B 16	20	27	33	35	35	37	36	36	34	32		G	E 15	B 15	22	E 15	20	E 16	
27	E 17	20	20	23	J 20	E 16	B 16	15		G		35	36	35	37	37	35	J 34	A 31	19	16	24	J 33	E 16	21	
28	E 16	B 16	B 23	A 24	22	22	20	20		G		36	42	57			37	34	32	27	18	20	E 16	B 16	21	23
29	21	E 16	22	23	J 20	E 16	19	18	27	33	37	38	39	J 45	34	32	30		G	E 17	B 16	16	16	16	23	
30																										
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	29	29	29	29	29	29	29	29	29	27	23	25	24	26	26	25	25	25	28	29	29	29	29	29	29	
MED	20	E 16	B 16	B 17	E 16	B 16	B 16	18	23	29	35	38	39	38	39	34	30	27	18	E 16	20	20	20	21		
UQ	22	22	J 22	A 23	J 22	A 20	20	22	26	32	36	40	44	44	41	42	34	32	24	24	22	25	23	24		
LQ	E 16	B 16	B 16	B 16	E 16	B 16	B 16	B 16	G	G	34	36	38	36	36		G	G	G	E 16	B 16	16	16	16	16	

FEB. 2020 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	29	31	G	G	G	G	29	21	E 18	E 16	20	E 16	E 16	E 17	
2	E 16	E 16	E 16	E 16	16	18	E 16	E 16	G	27	34	36	36	37	34	31	27	24	E 17	23	22	24	A 53	E 16	
3	E 16	E 16	E 15	E 17	E 16	E 16	E 16	E 18	G	25	30	32	38	34	33	G	G	24	18	E 16	E 16	E 16	21	E 16	
4	21	E 15	E 16	17	E 16	E 16	E 16	15	G	34	41	48	48	50	52	A 47	A 72	27	22	20	E 16	18	20	16	
5	E 15	E 15	E 16	E 15	E 15	E 15	E 15	E 15	G	18	30	34	35	37	34	32	31	31	27	E 16	E 16	14	15	E 16	
6	E 16	E 16	E 15	E 15	E 15	E 15	E 15	E 15	26	32	34	36	49	G	35	34	G	G	E 15	E 15	E 15	E 15	E 16	E 16	
7	E 16	E 16	E 16	E 16	E 16	E 16	E 17	E 16	22	28	32	G	34	34	32	G	G	25	15	E 16	E 16	E 16	E 16	E 16	
8	E 16	E 15	E 16	E 16	E 16	E 16	E 16	E 17	24	G	G	32	35	32	33	30	28	24	20	E 16	E 16	E 16	E 16	E 16	
9	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	27	30	36	33	33	32	G	G	22	E 16	E 16	E 16	E 16	E 16	18	
10	E 16	E 16	E 16	E 15	E 15	E 16	E 16	E 16	22	G	32	32	32	36	37	35	G	G	E 16	E 16	E 16	E 16	E 16	E 16	
11	E 16	E 16	E 16	E 16	E 15	E 15	E 15	E 15	22	28	C	C	C	C	C	C	C	C	E 16	E 16	E 16	E 16	E 16	E 16	
12	E 16	E 16	E 16	E 15	E 15	E 15	E 15	E 16	25	G	C	38	C	34	34	C	C	C	C	E 16	E 16	E 16	E 16	E 16	
13	E 16	E 17	E 16	E 17	E 16	E 15	E 15	E 16	G	30	C	C	C	C	C	C	C	C	19	E 16	E 16	E 16	E 16	E 16	
14	E 16	E 16	E 16	E 16	E 16	E 16	E 15	E 15	G	26	C	C	36	36	32	32	G	24	E 16	E 16	E 15	E 16	E 16	E 16	
15	16	E 16	E 16	E 16	E 15	E 15	E 15	E 16	G	C	C	38	C	38	39	32	34	G	E 16	E 16	E 15	E 16	E 16	15	
16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	34	34	36	34	33	G	G	22	E 15	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	E 16	24	28	34	37	37	34	34	32	G	G	E 16	E 16	E 16	E 16	E 16	E 16	
18	E 16	E 16	E 16	E 16	E 15	E 15	E 16	E 16	24	30	34	36	40	36	33	31	G	20	E 14	E 16	E 16	E 16	E 16	E 16	
19	E 16	E 16	E 16	E 16	E 16	E 16	E 15	E 18	24	C	C	C	C	C	C	C	C	C	E 16	E 16	E 16	23	23	20	
20	18	E 16	17	21	E 16	E 16	E 16	E 16	24	27	30	32	32	32	34	33	30	28	17	17	E 16	E 16	E 16	A 34	
21	24	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	33	34	36	36	36	36	30	23	E 16	E 16	E 16	E 16	E 16	E 16	
22	E 16	E 16	E 16	E 16	E 16	E 16	E 15	E 16	24	G	G	33	G	G	34	32	30	22	20	E 16	E 16	E 16	E 16	15	
23	E 16	E 16	E 16	E 16	E 16	E 15	E 15	E 15	G	30	33	37	38	52	33	42	G	G	E 16	E 16	E 16	E 16	E 16	E 16	
24	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	32	35	37	37	41	35	G	G	25	E 15	E 15	E 16	E 16	E 16	E 16	
25	16	E 16	E 16	E 15	E 15	E 15	E 16	E 17	24	G	30	32	38	38	36	35	29	25	18	E 16	E 16	E 16	E 16	E 16	
26	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 18	26	32	34	34	35	34	35	33	29	G	E 15	E 15	E 15	E 15	E 15	E 16	
27	E 17	E 15	E 15	E 15	E 15	E 16	E 16	E 15	G	G	34	35	34	36	36	33	30	26	18	E 16	E 16	E 16	E 16	E 16	
28	E 16	E 16	E 16	E 16	E 16	E 17	E 16	E 18	G	G	34	34	44	G	36	33	31	26	17	E 16	E 16	E 16	E 16	E 16	
29	E 16	E 16	E 16	E 16	E 16	E 16	E 15	E 18	26	32	35	36	37	39	33	31	30	G	E 17	E 16	E 16	E 16	E 16	E 16	
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	29	29	29	29	29	29	29	29	27	23	25	24	26	26	25	25	25	28	29	29	29	29	29	
MED	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	27	34	35	36	34	34	32	28	23	E 16	E 16	E 16	E 16	E 16	E 16	
U Q	16	16	16	16	16	16	16	16	24	30	34	36	38	37	36	34	30	25	18	16	16	16	16	16	
L Q	E 16	E 16	E 16	E 16	E 15	E 15	E 15	E 16	G	G	30	32	G	G	33	33	G	G	E 16	E 16	E 16	E 16	E 16	E 16	

FEB. 2020 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

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

FEB. 2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F	F	F	326	F	308	315	352	392	383	379	370	363	360	369	360	379	358	356	330	348	378	348	330	
2	339	318	307	307	328	337	336	350	393	385	353	379	376	383	365	381	380	354	367	396	351	374	A	327	
3	325	328	320	327	327	327	329	344	382	390	370	349	335	357	376	372	364	A	374	379	353	308	339	327	314
4	310	321	326	374	338	333	335	333	373	379	356	365	382	327	384	389					332	335	355	334	
5	319	342	325	320	328	378	364	348	368	366	349	366	349	375	351	365	378	372	386	371	320	325	366	F	
6	338	310	309	343	350	368	324	389	402	383	359	373	368	364	375	378	401	384	376	341	338	371	376	302	
7	F	F	F	F	353	F	354	353	374	375	343	342	347	367	352	368	402	385	368	348	346	351	332	314	
8	318	322	330	352	414	321	331	365	355	364	386	384	374	355	344	347	376	377	395	359	301	368	311	387	
9	F	295	288	F	F	F		354	380	400	358	320	300	338	363	366	366	361	379	381	330	337	337	344	
10	345	303	312	309	371	412	331	370	391	346	387	365	362	361	372	380	375	354	384	379	310	351	358	F	
11	279	344	F	352	294	343	347	392	380	384		C	C	C	C	C	C			382	404	342	344	320	348
12	336	306	307	341	329	343	338	363	410	384		C	377	C	341	328	C	C	C		384	310	330	346	364
13	350	341	343	F	323	F	351	363	395	374		C	C	C	C	C	C			353	389	367	330	327	313
14	316	341	341	334	311	350	376	354	392	398		C	C	C	366	373	338	367	379	395	381	352	366	352	332
15	312	F	F	316	368	385	341	379	390		C	C	375	C	362	349	364	374	375	383	341	361	346	345	329
16	329	320	337	335	360	368	332	347	392	384	365	361	343	346	331	372	373	386	390	346	323	323	336	323	
17	323	291	330	333	363	349	350	365	401	402	367	361	355	404	333	382	361	377	388	330	320	340	346	334	
18	314	331	323	318	375	394	354	364	357	363	354	377	342	324	366	370	357	385	373	363	329	340	368	322	
19	314	308	321	357	387	314	318	385	318		C	C	C	C	C	C	C			381	334	305	301	F	302
20	298	F	321	369	368	397	312	361	379	327	357	367	358	329	373	385	376	379	385	353	324	313	322	A	
21	326	F	330	330	368	A	326	356	388	387	353	378	333	342	383	384	375	378	388	355	337	304	317	319	
22	317	308	313	320	347	371	370	377	366	357	360	377	324	350	336	358	395	389	354	331	358	352	342	322	
23	332	332	317	322	352	342	342	390	398	383	355	371	355	382	400	368	375	373	368	371	365	337	344	326	
24	316	329	320	303	325	386	415	395	404	399	368	344	311	367	326	360	354	386	372	346	308	305	333	341	
25	323	318	323	325	334	375	384	406	403	377	361	356	325	310	335	363	360	362	384	392	333	319	347	326	
26	323	323	334	330	381	397	360	393	399	392	311	345	347	332	347	349	365	380	400	412	319	325	362	335	
27	324	312	316	315	355	363	368	390	397	388	346	371	333	349	348	375	372	348	379	386	315	305	326	326	
28	344	362	320	343	360	377	316	382	379	398	329	366	380	305	358	360	366	356	381	376	313	325	321	335	
29	297	310	306	322	331	309	323	360	384	369	359	364	357	352	334	384	390	383	391	358	308	339	341	328	
30																									
31																									
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		26	24	25	26	27	25	28	29	29	27	23	25	24	26	26	25	24	25	28	29	29	29	27	26
MED		323	320	321	328	352	363	340	364	390	383	358	366	352	354	352	368	375	377	381	358	329	337	342	328
U Q		332	332	330	343	368	382	357	387	398	390	367	376	364	367	372	380	379	384	386	382	347	351	352	335
L Q		314	309	312	320	328	335	328	354	376	369	353	358	334	338	336	362	366	360	372	346	312	324	327	322

FEB. 2020 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

FEB. 2020 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	L	U L	U L			L	L								
2										L	L	A	L	A	L	L								
3											L	U L	U L	A	U L	L	L							
4												A	A	A	A	A	A							
5									L		L	L	L	L	U L	L	A	A						
6												L	A		U L	L								
7											L	U L	U L	U L	U L	U L								
8										L	U L	U L	U L	U L	U L	U L								
9										L	L	U L	U L	U L	U L	L	L							
10											L	U L	U L	U L	U L	L	L							
11											C	C	C	C	C	C	C	C	C					
12											C	A	C	U L	C	C	C							
13									L	A	C	C	C	C	C	C	C	C						
14									L		C	C	U L	U L	L									
15										L	C	C	C	A	A	A	A	L						
16									L	L	U L	U L	U L	U L	U L	L	L							
17											A	U L	U L	U L	U L	L	U L	L						
18											402	A	A	409	395	U L	U L	L						
19									U L	C	C	C	C	C	C	C	C	C	C					
20										L	U L	U L	U L	U L	L	L	L							
21											L	U L	U L	U L	A	L	A	L						
22											400	393	403	411	406	397								
23												A	U L	U L	U L	A	400							
24									L			408	401	A	U L	U L	U L	U L						
25											L	U L	U L	U L	A	A	L	L						
26											U L	412	424	451	A	L	U L	U L						
27											L	U L	U L	U L	U L	U L	L							
28											L	407	390	A	U L	U L	L	L						
29											L	U L	U L	U L	U L	U L	L	L						
30												400	399	410	403	468								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1	1	8	16	16	17	17	9	5							
MED									U L	U L	U L	398	412	412	401	U L	U L	U L						
U Q											404	410	422	429	406	416	410							
L Q											U L	U L	U L	U L	U L	U L	U L							
											398	388	401	400	394	392	381							

FEB. 2020 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

FEB. 2020 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									212	224	232	224	244	240	238	248								
2									204		254	228	230	230	248	236								
3										232	242	264	274	222	226	222	244							
4											E A 260	E A 216	E A 312	230	230		A							
5									226		278	244	268	246	254	244	228	220						
6												254	248	248	234	234	222							
7											254	288	248	232	258	226								
8										242	230	226	236	244	254	254								
9										228	270	322	314	274	234	234	232							
10											244	244	244	238	238	228	226	226						
11											C	C	C	C	C	C	C	C						
12											C	234	C	280	292		C	C	C					
13									204	222	C	C	C	C	C	C	C	C						
14											C	C	244	242	262	240								
15											C	250	C	262	240	222	216	216						
16									216	226	266	264	284	284	292	232	230	218						
17												254	254		278	234	234	224						
18											262	238	268	316	250	236	242	226						
19									360	C	C	C	C	C	C	C	C	C						
20											282	262	240	240	276	228	240	236						
21											224	248	230	298	262	222	236	230	224					
22											248	224	292	250	262	232		214						
23												238	252	228	226	236	216	216						
24									204			296	346	232	286	238	244							
25											240	258	274	310	356	258	226	226	228					
26											330	292	272	300	250	268	242							
27											232	264	256	324	262	266	228	228						
28											224	306	238	230	370	250	250	244	244					
29											246	252	244	250	250	262	218	224	208					
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									9	13	18	25	24	25	26	25	18	12						
MED									212	230	256	244	253	250	250	234	230	222						
U Q									221	241	266	264	288	282	262	240	242	226						
L Q									204	224	248	236	244	239	234	228	226	216						

FEB. 2020 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

FEB. 2020 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1									112	112	108	108	108	108	108	108	108	108							
2								B	110	110	110	110	110	110	108	110		A	A						
3								B	116	110	110	112	114	114	114	114	114			A					
4									114	116	116	108		A	A	A	A	A	B						
5								B	108	108	108	108	112	112	112	108	108	108							
6									126	120	110	112		112		A	A		112	112					
7								B	110	108	108	108	108		A	A		108	112	112					
8								B	110	110	110	110		A	A	A	A			A					
9								B	110	110		A		A	A			116	116	114					
10									108	108	110	108		A	108	108	108	108	108						
11								B	108	108		C	C	C	C	C	C	C	C						
12								B	108	112		C		C	A	A	C	C	C						
13								B	116	116		C	C	C	C	C	C	C	C						
14								B	118	112		C	C			A	A			A					
15								B	118		C		C		112	112	108		A		120				
16								B	108	108	110	110		A	A	A		110	110	110					
17								B	110	110	110	104	108	108	110			A		110	110				
18								B	110	110	110	108		A	108	108	110	110			B				
19								B	108		C	C	C	C	C	C	C	C	C						
20								B	108	108	108		A	A	A	A	A	A	A	B					
21								B	108	110	108	108	108	108	108			A	A	A					
22								B	112	112	112	110	110	110	110	110	110			A					
23								B	112	112	106	106	106		A	A	A		108	108					
24								B	110	110	110	108	110	110	110	110	108			A					
25								B	110	110		A		110	110	112	112	116	116						
26								B	116	110	110	110	108	108	108	108	108	108	108						
27								B	108	110	110	110	110	106	106	112			A	A	B				
28								B	124	120	110		A	A							B				
29								B	110	110	110	110	110		A	A	A		106	106		B			
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT									29	27	21	22	15	17	15	16	19	14							
MED									110	110	110	110	110	110	110	110	110	109							
U Q									115	112	110	110	110	112	112	111	112	112							
L Q									108	110	108	108	108	108	108	108	108	108							

FEB. 2020 h'E (KM)

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## IONOSPHERIC DATA STATION Yamagawa

FEB. 2020 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	B	B	88	96	B	B	B	B	G	G	120	110	152	G	G	G	154	122	B	B	100	94	B	B	
2	B	94	94	92	92	92	B	B	G	154	146	136	118	112	106	114	76	92	94	94	94	92	92	92	
3	92	90	B	B	B	B	B	B	G	114	114	114	146	118	156	G	G	80	78	B	B	B	78	88	
4	102	B	B	90	B	B	90	90	G	124	114	108	98	96	94	94	92	92	90	90	92	92	92	92	
5	B	B	84	B	B	B	B	B	90	158	148	138	144	144	144	144	166	166	B	B	B	B	B	B	
6	B	B	B	B	90	B	90	B	144	138	138	124	104	G	100	98	G	G	B	B	122	102	B	B	
7	B	B	100	98	B	B	B	B	152	136	142	G	112	94	94	G	G	164	80	80	80	B	80	80	
8	94	B	86	86	94	B	134	134	128	G	G	120	98	94	94	94	126	108	86	86	124	86	88	B	
9	88	88	B	B	98	B	B	B	G	108	104	156	96	96	94	G	G	152	92	92	92	B	B	92	
10	92	92	B	90	B	88	88	88	136	G	136	116	100	150	124	120	G	B	B	B	B	B	B	B	
11	B	98	B	B	98	94	94	92	146	118	C	C	C	C	C	C	C	C	80	84	84	84	B	B	
12	B	B	B	B	B	B	B	B	144	G	C	C	C	C	C	C	C	C	88	88	88	92	92	92	
13	90	B	B	B	B	B	B	B	G	142	C	C	C	C	C	C	C	C	84	84	B	B	96	96	
14	84	B	B	B	B	94	90	88	G	142	C	C	140	140	114	106	G	94	94	B	B	B	102	102	
15	96	96	96	96	B	B	96	B	G	C	C	176	C	136	134	128	106	G	B	B	B	100	B	98	
16	B	B	B	B	B	B	94	B	G	G	140	128	98	104	104	G	G	156	B	B	B	90	112	100	
17	100	B	B	B	100	B	B	B	140	140	140	126	114	112	120	104	G	G	B	B	130	B	114	136	
18	116	B	B	B	B	90	88	94	134	146	140	116	104	110	110	118	G	106	B	B	94	B	B	108	
19	108	108	108	B	B	B	B	118	122	C	C	C	C	C	C	C	C	C	B	B	B	92	92	90	
20	102	102	100	92	92	92	92	92	140	130	108	100	100	98	98	98	98	98	98	98	98	96	94	94	
21	86	86	100	B	82	92	92	92	G	G	154	112	148	132	114	102	102	84	84	84	96	96	96	B	
22	108	108	98	100	100	100	B	132	110	G	G	136	G	G	136	136	116	94	90	90	90	90	B	B	
23	B	B	B	B	B	B	B	B	G	152	152	138	130	100	100	100	G	G	B	B	B	104	104	104	
24	92	92	B	92	92	92	B	B	G	150	140	140	126	114	114	G	G	90	B	B	138	B	B	B	
25	108	98	98	98	98	B	B	98	134	G	102	102	154	152	138	130	130	124	90	96	96	B	B	122	
26	B	B	B	B	B	B	B	132	144	130	124	124	138	138	122	122	122	G	B	B	104	B	100	B	
27	B	76	76	86	86	B	B	B	G	G	142	142	130	154	154	120	98	98	122	B	102	100	B	100	
28	B	B	94	92	92	92	88	132	G	G	112	96	94	G	120	138	160	122	122	88	B	B	88	102	
29	102	B	100	100	94	B	94	138	142	142	142	142	120	94	94	98	166	G	B	B	B	B	B	88	
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	17	13	14	14	14	10	13	15	15	17	21	24	23	22	25	19	14	19	15	14	19	16	16	19	
MED	96	94	97	92	93	92	92	94	140	140	140	125	118	112	114	114	119	98	90	88	96	92	93	96	
U Q	105	100	100	98	98	94	94	132	144	148	142	138	140	138	129	128	154	124	94	92	104	98	101	102	
L Q	91	89	88	90	92	92	89	90	128	127	114	113	100	98	99	98	98	92	84	84	90	89	90	92	

FEB. 2020 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION Yamagawa

FEB. 2020 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1			F1	F1							C2	C2	H1				H1	C1			F2	F1			
2		F2	F3	F2	F2	F4				H2	H2	H1	C2	C2	C2	C2	LC31	L2	F1	F3	F6	F3	F3	F2	
3	F2	F2								C1	C2	C2	H1	C2	H1			L3	F1				F2	F1	
4	F2			F1			F2	F2		C2	C3	C4	L4	L3	L6	L6	L6	L4	F3	F2	F1	F3	F2	F2	
5			F3						L2	H2	H2	H1	H2	H1	H2	H1	H2	H1							
6					F3		F2		H2	H2	H2	C1	L4		L2	L2					F1	F1			
7			F1	F1					H2	H3	H2		C2	L2	L2			H4	F2	F2	F1		F1	F5	
8	F1		F1	F1	F1		F1	H2	C3			C1	L2	L2	L2	L2	C3	L5	F3	F2	F1	F1	F1		
9	F2	F1			F2					C3	L2	HL22	L2	L2	L2			H2	F3	F1	F2			F3	
10	F2	F2		F2		F2	F1	F3	H2		H3	C1	L2	H2	C2	CL23		L2		F3		F2			
11		F2			F1	F2	F1	L1	H2	C2									F3	F1	F1	F1			
12									H3			C2		L2	L2					F3	F4	F1	F2	F1	
13	F1								H2										F1	F1			F2	F2	
14	F1				F1	F2	L1		H1				H1	H1	L1	L3		L4	F2		F3		F1	F2	
15	F2	F2	F2	F2			F2					H1		H1	C3	C2	L4					F2		F2	
16							F1				H2	H1	L2	L1	L2			H2				F3	F1	F3	
17	F4				F1				H2	H2	H2	H2	C2	C3	C2	L2					F2		F1	F1	
18	F3				F1	F1	L1	C2	H2	H2	C2	L2	C2	C2	C2		L2				F1			F2	
19	F1	F4	F4					C3	C3														F6	F4	F5
20	F4	F2	F4	F7	F3	F1	F1	L1	H3	C1	C1	L2	L1	L2	L2	L2	L4	L5	F2	F1	F1	F3	F1	F4	
21	F6	F2	F1		F2	F5	F4	L1			H2	C2	H1	H1	C1	L3	L2	L3	F2	F1	F1	F1	F3		
22	F3	F3	F3	F2	F4	F2		H2	C2			H2			H1	H1	C2	L3	F2	F2	F1	F1			
23									H2	H1	H2	C2	L3	C2								F1	F1	F4	
24	F3	F1		F1	F2	F1		L1	H2	H2	H1	C2	C2	C2			L2				F1				
25	F1	F3	F1	F2	F2			L2	H2		L2	L2	H2	H2	H1	C2	C2	C2	F1	F3	F1			F3	
26								H2	H2	H2	C1	C2	H1	C1	C2	CL12	CL12				F2		F2		
27		F2	F3	F2	F3						H2	H1	H1	H1	H1	C1	L2	L2	C1		F3	F1		F3	
28			F2	F4	F2	F5	F2	H2			C2	L2	L4		C1	H1	H2	C2	F1	F1			F1	F2	
29	F2		F3	F3	F2		F1	H2	H2	H2	H2	H2	C1	L2	L1	L1	H1							F4	
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT																									
MED																									
U Q																									
L Q																									

## IONOSPHERIC DATA STATION Okinawa

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

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	41	X	X	X	X	X	X													X	X	X	X	X
2	30	X	X	X	X	X	X													X	X	X	X	X
3	X	X	X	X	X	X	X													X	X	X	X	X
4	X	X	X	X	X	X	X					C	C	C	C	C	C	C	C	A	X	X	X	X
5	X	X	X	X	X	X	X			C	C	C	C	C	C	C	C	C		X	X	X	X	X
6	X	X	X	X	X	X	X				C	C			C	C				X	X	X	X	X
7	X	X	X	X	X	X	X													X	X	X	X	X
8	X	X	X	X	X	X	X													X	X	X	X	X
9	X	X	X	X	X	X	X													X	X	X	X	X
10	X	X	X	X	X	X	X													X	X	X	X	X
11	X	X	X	X	X	X	X				C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	70	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	X	X	X	X	X
15	X	X	X	X	X	X	X			C	C	C	C	C	C	C				40	41	36	32	31
16	X	X	X	X	X	X	X	X		C	C	C	C	C	C	C	C	C	C	61	43	36	34	31
17	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			X	X	X	X	X
18	X	X	X	X	X	X	X			C	C	C	C	C	C	C				58	44	44	40	34
19	X	X	X	X	X	X	X			C	C	C	C	C	C	C				X	X	X	X	X
20	X	X	X	X	X	X	X			C	C	C	C	C	C	C				56	43	35	32	32
21	X	X	X	X	X	X	X			C	C	C	C	C	C	C				X	A	X	X	X
22	X	X	X	X	X	X	X													39	X	40	41	42
23	X	X	X	X	X	X	X			C	C	C	C	C	C	C				X	X	X	X	X
24	X	X	X	X	X	X	X			C	C	C	C	C	C	C				X	X	X	X	X
25	X	X	X	X	X	X	X			C	C	C	C	C	C	C				X	X	X	X	X
26	X	X	X	X	X	X	X				C	C	C	C	C	C	C			40	33	33	32	32
27	X	X	X	X	X	X	X			C	C	C	C	C	C	C				X	X	X	X	X
28	X	X	X	X	X	X	X				C	C	C	C	C					30	32	34	34	31
29	X	X	X	X	X	X	X													X	X	X	X	X
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	25	25	25	25	25	25	1												19	24	24	25	25
MED	X	X	X	X	X	X	X	X												X	X	X	X	X
U Q	34	34	34	34	34	30	28	41												53	40	36	35	34
L Q	X	X	X	X	X	X	X													X	X	X	X	X
	36	36	36	37	38	34	30													59	44	42	40	37
	X	X	X	X	X	X	X													X	X	X	X	X
	32	33	32	32	32	27	24													45	36	34	33	32

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

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

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

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

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	F 32	30	29	26	27	F 26	26	32	56	52	51	62	72	56	54	55	54	49	53	47	34	34	27	28	
2	24	23	23	F 24	24	F 23	24	A	53	56	56	62	57	54	53	53	50	51	63	66	31	29	26	25	
3	26	27	F 28	F 30	30	28	22	26	57	51	57	57	76	87	100	96	92	90	86	53	44	46	49	47	
4	48	F 52	F 56	42	34	30	28	32	51	52	50	C	C	C	C	C	C	C	C	A	34	36	30	29	
5	28	28	27	26	27	31	19	28	48	C	C	C	C	C	C	C	C	C	55	46	34	33	32	34	
6	27	27	28	28	29	24	24	31	47	47	C	C	55	66	C	C	56	54	50	52	39	39	36	25	
7	29	29	28	29	32	21	19	31	52	60	52	66	78	76	77	92	86	78	62	52	53	38	27	28	
8	30	30	36	38	18	17	17	28	48	62	75	57	70	63	81	78	72	60	53	39	29	30	27	27	
9	26	25	24	24	24	23	22	32	56	55	54	54	73	86	106	102	69	63	70	47	29	26	28	28	
10	29	28	27	29	32	J 17	B 15	28	47	48	60	62	79	64	75	69	59	50	50	38	26	27	29	25	
11	26	27	28	28	27	24	26	29	44	50	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	H 96	C	64	C	C	C	C	
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	46	34	35	30	26	25
15	26	26	27	26	30	21	18	30	46	C	C	C	C	C	C	C	86	72	75	H 55	H 37	30	28	25	
16	28	30	31	30	32	29	27	35	45	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
17	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	62	75	51	38	38	34	28	
18	26	26	27	29	32	20	17	30	41	C	C	C	C	C	C	C	64	57	57	50	A	34	26	26	
19	27	27	29	37	19	21	22	41	47	C	C	C	C	C	C	C	C	C	46	33	34	35	36		
20	35	32	33	34	30	22	18	30	C	C	C	C	C	C	C	C	C	63	56	38	32	29	28	28	
21	30	34	32	32	36	21	21	34	C	C	C	C	C	C	C	C	61	55	52	41	34	28	29	28	
22	28	29	29	27	F 32	F 25	22	31	50	C	C	C	C	C	C	C	76	58	52	40	36	30	26	26	
23	28	28	26	24	31	20	18	35	49	48	48	58	84	88	J 84	R 74	91	88	85	63	52	A	45	33	
24	32	32	31	28	28	36	28	35	C	C	C	C	C	C	C	C	C	79	70	62	52	35	33	28	
25	26	27	27	26	26	25	23	32	44	C	C	C	C	C	C	C	107	94	72	58	34	27	27	26	
26	26	26	25	27	28	21	17	32	41	C	C	C	C	C	C	C	C	67	53	39	24	26	28	25	
27	27	27	26	25	27	22	20	35	C	C	C	C	C	C	C	C	87	68	48	48	48	30	28	31	32
28	30	31	24	26	26	24	19	34	49	C	C	C	C	C	C	C	61	63	56	51	A	28	30	31	30
29	30	30	29	27	26	24	22	35	52	53	53	72	71	61	65	74	72	52	50	42	37	36	38	33	
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	25	25	25	25	25	25	25	24	21	12	10	9	10	10	9	11	17	22	24	24	24	24	25	25	
MED	28	28	28	28	28	23	22	32	48	52	54	62	72	65	77	74	69	61	54	48	34	30	29	28	
U Q	30	30	30	30	32	26	24	34	52	56	57	64	78	86	92	92	86	78	70	54	38	36	34	31	
L Q	26	27	26	26	26	21	18	30	46	49	51	57	70	61	60	61	60	54	50	40	30	28	27	26	

FEB. 2020 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

FEB. 2020 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1										L	U	L		L	U	L		L	L						
2									A	U	L	L		L	L	L	U	L							
3									232	L	U	L		L	L	L	U	L			200				
4										L	L	C	C	C	C	C	C	C	C	C	C				
5									L	C	C	C	C	C	C	C	C	C	C	C					
6											C	C				C	C	L	L						
7										L	U	L	L												
8										L	404	420	428	436	424	424	384								
9										L	412	416	428	448	416	408									
10										L	416	436	420	444	420	408	380	L	L						
11											412	420	428	424	420		L	L	L						
12											C	C	C	C	C	C	C	C	C	C	C				
13									C	C	C	C	C	C	C	C	C	C	L	C					
14									C	C	C	C	C	C	C	C	C	C	C						
15										L	C	C	C	C	C	C	C		L						
16										L	C	C	C	C	C	C	C	C	C	C					
17									C	C	C	C	C	C	C	C	C	C	L	L					
18											C	C	C	C	C	C	C		L	L					
19											C	C	C	C	C	C	C	C	C		192				
20											C	C	C	C	C	C	C	C	L						
21											C	C	C	C	C	C	C	L	L						
22											C	C	C	C	C	C	C	L	L						
23											L	408	424	A	432	420	396		L	L					
24										C	C	C	C	C	C	C	C	C	L						
25									L		C	C	C	C	C	C	C	L							
26											C	C	C	C	C	C	C	C	A	L					
27									276	C	C	C	C	C	C	C	C		L						
28										C	C	C	C	C	C	C	C	L		A					
29										U	L	U	L					L							
30										388	424	420	424	428	416	416	396		212						
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT									3	1	8	9	10	9	8	10	12	1	6						
MED									248	388	412	420	426	428	420	412	394	360	196						
U Q									276		414	424	428	446	428	420	398		208						
L Q									232		408	418	424	426	416	408	384		184						

FEB. 2020 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								B	180	248	268	308	U A	A	A	A	A	A						
2								A	A	A	A	292	308	U A	U A	A	A	A	B					
3								B	176	240	284	304	U A	A	A			A	B					
4								B	212	256	280	C	C	C	C	C	C	C	C					
5								B	184	C	C	C	C	C	C	C	C	C	B					
6								B	176	240	C	C	332	324	C	C	A	A	B					
7								B	168	244	A	A	320	A	A	A	264	216	A					
8								B	176	232	280	300	312	304	A	A	A	228	A					
9								B	224	272	U A	A	A	A	A	A	276	220	A					
10								B	180	244	288	312	324	336	336	308	A	232	B					
11								B	212	U A	C	C	C	C	C	C	C	C	C					
12								C	C	C	C	C	C	C	C	C	C	C	C					
13								C	C	C	C	C	C	C	C	C	C	C	C					
14								C	C	C	C	C	C	C	C	C	C	C	C					
15								B	180	C	C	C	C	C	C	C	U A	260	236	B				
16									196	C	C	C	C	C	C	C	C	C	C					
17								C	C	C	C	C	C	C	C	C	C	A	B					
18								B	204	C	C	C	C	C	C	C	U A	268	228	B				
19								B	220	C	C	C	C	C	C	C	C	C	B					
20								B	C	C	C	C	C	C	C	C	C	A	B					
21								A	C	C	C	C	C	C	C	C	268	A	A					
22								B	216	C	C	C	C	C	C	C	268	236	A					
23								B	204	260	288	312	A	328	308	A	280	220	B					
24								B	C	C	C	C	C	C	C	C	C	U A	A	B				
25								B	212	C	C	C	C	C	C	C	276	228	B	B				
26								B	200	C	C	C	C	C	C	C	C	232	A	A				
27								B	C	C	C	C	C	C	C	300	U A	A	B	B				
28								B	204	C	C	C	C	C	C	C	A	A	A	A				
29								B	208	284	300	316	324	340	A	304	284	236	B	B				
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									20	11	8	7	8	6	4	5	11	13	1					
MED									202	248	286	308	316	326	314	300	272	228	164					
U Q									212	268	292	312	324	336	326	306	276	234						
L Q									180	240	280	300	U A	308	320	310	298	268	220					

FEB. 2020 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1	E 16	B 16	J 18	A 17		18	20		J 20	A 26	G		J 33	A 41	J 45	A 89	J 46	A 34	J 29	A 25	J 28	A 38	J 27	A 15	J 18	A 16	
2	E 16	B 16	J 22	A 23	J 46	A 49	J 37	A 48	J 33	A 37	J 36	36	J 48	A 48	J 45	A 40	J 35	A 31	J 20	A 19	J 20	A 22	J 22	A 26	J 23		
3	J 20	A 18	J 21	A 17	J 16	A 18	J 20	A 16	J 16	A 26	J 36	36	J 39	A 38	J 37	A 40	J 23	A 47	J 16	A 22	J 22	A 22	J 22	A 17	J 16		
4	J 18	A 32	J 26	A 16	J 16	A 19	J 21	A 16	J 16	A 32	J 32	32	C	C	C	C	C	C	C	C	J 53	A 26	J 25	A 42	J 34		
5	J 33	A 20	J 16	A 20	J 26	A 20	J 16	A 16	J 16	A 16	G	C	C	C	C	C	C	C	C	C	E 16	B 16	B 16	B 16	B 16		
6	E 16	B 16	J 19	A 15	J 16	A 18	J 16	A 18	J 16	A 16	23	31	C	C		C	J 32	A 33	J 16	A 16	J 20	A 21	J 19	A 19			
7	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	22	30	J 43	A 42	J 46	A 39	J 40	A 34	G	J 32	A 62	J 31	A 24	J 20	A 18		
8	J 16	A 18	J 20	A 16	J 18	A 16	J 17	A 16	J 16	A 16	22	29	J 31	A 36	J 35	A 37	J 42	A 38	J 34	A 29	J 22	A 20	J 20	A 20	J 29	A 19	
9	E 16	B 16	B 16	B 19	J 18	A 18	J 17	A 16	J 16	A 16	G	J 38	A 42	J 43	A 49	J 39	A 38	G	J 26	A 36	J 26	A 22	J 18	A 16	J 16		
10	J 20	A 19	J 30	A 22	J 19	A 19	J 16	A 16	J 16	A 16	24	27	J 35	A 37	J 41	A 47	J 40	A 34	J 38	A 22	G	J 18	A 20	J 18	A 16		
11	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	26	33	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	J 17	A 21	J 23	A 25	J 24	A 18	
15	E 16	B 16	B 21	J 21	A 22	J 16	A 18	J 16	A 21	J 16	21	C	C	C	C	C	C	C	C	31	J 27	A 16	J 16	A 16	J 16		
16	J 19	A 18	J 16	A 16	J 16	A 16	J 18	A 16	J 16	A 16	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
17	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	25	J 19	A 16	J 20	A 19		
18	J 18	A 16	J 18	A 16	J 16	A 19	J 18	A 18	J 26	A 18	26	C	C	C	C	C	C	C	C	30	J 24	A 16	J 16	A 16	J 18	A 19	
19	J 19	A 17	J 16	A 16	J 16	A 16	J 18	A 18	J 26	A 18	26	C	C	C	C	C	C	C	C	C	E 16	B 16	B 16	J 53	A 36	A 20	
20	E 16	B 16	J 52	A 52	J 53	A 20	J 16	A 16	J 16	A 16	C	C	C	C	C	C	C	C	C	J 41	A 21	J 20	A 20	J 18	A 18	J 16	
21	E 16	B 16	J 32	A 23	J 16	A 16	J 25	A 21	J 21	A 21	C	C	C	C	C	C	C	C	J 41	A 27	J 17	A 24	J 18	A 20	J 30	A 16	
22	J 17	A 20	J 16	A 19	J 20	A 32	J 28	A 24	J 28	A 28	C	C	C	C	C	C	C	C	C	34	J 29	A 21	J 19	A 15	J 18	A 16	
23	E 16	B 16	B 19	J 16	A 16	J 16	A 16	J 16	A 16	J 25	A 33	J 35	A 38	J 40	A 50	J 56	A 38	J 26	A 27	J 37	A 42	J 49	A 53	J 16	A 16		
24	J 17	A 21	J 18	A 16	J 20	A 20	J 24	A 19	J 19	A 19	C	C	C	C	C	C	C	C	C	30	J 27	A 22	J 19	A 17	J 17	A 16	
25	E 16	B 16	B 19	J 19	A 20	J 20	A 16	J 18	A 25	J 18	25	C	C	C	C	C	C	C	C	30	J 25	A 20	J 21	A 18	J 16	A 18	
26	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	B 25	A 16	25	C	C	C	C	C	C	C	C	J 61	A 50	J 21	A 20	J 19	A 16	J 16	
27	J 18	A 16	J 16	A 16	J 22	A 18	J 15	A 18	J 18	A 18	C	C	C	C	C	C	C	C	C	35	J 30	A 25	J 21	A 18	J 16	A 16	
28	E 16	B 16	B 16	B 16	B 16	B 15	J 16	A 19	J 25	A 19	25	C	C	C	C	C	C	C	C	J 39	A 30	J 19	A 51	J 53	A 20	J 19	A 21
29	J 17	A 18	J 20	A 25	J 18	A 20	J 17	A 20	J 25	A 30	J 36	J 37	J 35	J 30	J 35	J 24	G	G	G	G	J 16	A 18	J 16	A 16	J 16	A 16	
30																											
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	25	25	25	25	25	25	25	25	21	12	10	9	10	10	9	11	17	22	24	26	25	25	25	25			
MED	E 16	B 16	J 18	A 16	J 18	A 18	J 17	A 16	J 25	A 30	J 36	A 37	J 42	A 44	J 40	A 38	J 30	A 27	J 20	A 20	J 20	A 19	J 18	A 16			
U Q	J 18	A 18	J 21	A 20	J 20	A 20	J 20	A 19	J 26	A 32	J 36	A 42	J 45	A 49	J 46	A 39	J 34	A 31	J 22	A 24	J 24	A 24	J 22	A 25	J 19		
L Q	E 16	B 16	B 16	B 16	B 16	B 16	B 16	B 16	J 18	A 26	J 33	A 36	J 39	A 38	J 38	A 34	G	G	G	G	J 25	A 16	J 18	A 16	J 16	A 16	

## IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	32	37	40	36	36	31	26	23	18	20	E 16	E 16	E 16	E 16
2	E 16	E 16	E 16	E 17	E 18	E 16	E 18	A 48	A 48	20	26	36	35	35	37	34	32	28	25	E 16	E 16	E 16	E 19	E 16
3	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	26	36	34	38	38	36	33	20	31	E 16	20	20	22	E 16
4	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	20	32	C	C	C	C	C	C	CA	A	53	23	E 16
5	22	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	C	C	C	C	C	C	C	C	C	E 16	E 16	E 16	E 16	E 16
6	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	30	C	C	41	38	C	C	30	25	E 16	E 16	E 16	E 16	E 16
7	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	30	32	35	40	34	36	30	G	G	24	28	20	18	E 16
8	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	21	28	31	34	34	35	33	33	29	26	E 16	E 16	E 16	E 16	E 16
9	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	33	34	35	34	32	31	G	26	29	21	20	E 16	
10	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	27	34	35	40	36	37	33	31	20	G	E 16	E 16	E 16	E 16
11	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	31	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	E 16	E 16	E 16	E 16	E 16
15	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	20	C	C	C	C	C	C	C	C	C	C	C	C	C	C
16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C
17	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	24	E 16	E 16	E 16	E 16	E 16
18	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26	C	C	C	C	C	C	C	29	24	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	E 16	E 16	25	C	C	C	C	C	C	C	C	C	E 16	E 16	BA	AE	E 16
20	E 16	E 16	E 16	20	E 16	E 16	E 16	E 16	E 16	C	C	C	C	C	C	C	C	C	26	E 16	E 16	E 16	E 16	E 16
21	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	C	C	C	C	C	C	C	C	34	26	E 16	E 16	E 16	E 16	E 16
22	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	18	G	C	C	C	C	C	C	32	28	19	E 16	E 16	E 16	E 16
23	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	32	32	36	39	47	37	35	G	GE	B	26	A	A	E 16
24	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	C	C	C	C	C	C	C	C	C	28	18	E 16	E 16	E 16	E 16
25	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	C	C	C	C	C	C	C	30	24	19	E 16	E 16	E 16	E 16
26	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	C	C	C	C	C	C	C	C	57	18	17	E 16	E 16	E 16
27	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	C	C	C	C	C	C	C	C	35	30	24	20	E 16	E 16	E 16
28	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	C	C	C	C	C	C	C	36	29	31	18	A	51	E 16
29	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	G	20	36	36	34	27	34	22	G	GE	E 16	E 16	E 16	E 16
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	25	25	25	25	25	24	25	21	12	10	9	10	10	9	11	17	22	24	26	25	25	25	25
MED	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	22	26	32	35	38	36	36	33	29	25	E 16	E 16	E 16	E 16	E 16
U Q	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	30	36	36	40	38	36	35	30	27	18	20	20	16	E 16
L Q	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G	G	32	34	35	34	34	31	G	GE	E 16	E 16	E 16	E 16	E 16

FEB. 2020 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

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

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

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

FEB. 2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

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

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	F	323	334	317	324	319	313	340	359	411	385	365	345	406	337	333	358	380	367	372	364	331	366	334	362	
2		340	319	329	343	321	350	390	A	390	398	371	382	354	365	363	351	363	339	345	379	348	374	370	323	
3		312	291	356	309	363	379	361	324	385	365	374	301	329	336	345	343	349	339	351	311	298	312	332	335	
4	F	296	300	343	347	349	362	337	321	374	382	364	C	C	C	C	C	C	C	C	A	325	340	364	320	
5		347	305	310	308	318	407	330	329	381	C	C	C	C	C	C	C	C	C	370	356	351	331	337	374	
6		319	329	325	319	333	348	348	364	400	389	C	C	359	367	C	C	382	389	365	353	367	339	385	324	
7		334	330	323	336	361	432	338	351	363	378	359	348	351	356	306	335	360	319	358	312	355	335	320	326	
8		324	317	360	404	435	324	313	352	372	363	384	361	386	325	353	354	370	376	370	363	305	338	354	335	
9		335	308	329	317	339	347	334	357	378	392	355	303	315	297	350	380	347	347	390	389	380	305	353	335	
10		344	342	331	339	408	338	B	358	394	364	352	318	373	343	365	381	371	389	383	373	379	317	373	343	
11		354	314	335	329	362	331	362	381	389	395	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
12		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
13		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	H	C	319	332	C	C	C	
14		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
15		324	320	336	323	381	392	308	370	373	C	C	C	C	C	C	C	391	325	363	H	354	345	352	334	
16		325	330	328	333	347	363	324	362	395	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
17		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
18		338	327	328	355	406	384	333	374	363	C	C	C	C	C	C	C	380	362	380	359	349	344	338	318	
19		313	308	319	368	442	308	327	371	385	C	C	C	C	C	C	C	C	C	C	A	303	286	318		
20		338	311	331	362	364	333	345	356	C	C	C	C	C	C	C	C	C	C	385	372	386	324	319	340	304
21		304	341	316	333	363	355	322	361	C	C	C	C	C	C	C	C	377	384	371	337	372	308	357	341	
22		334	316	309	313	370	365	382	363	371	C	C	C	C	C	C	C	375	390	384	350	340	356	326	334	
23		336	338	322	318	386	392	325	377	386	371	386	311	346	J R	319	336	371	358	322	372	338	A	347	341	
24		321	322	317	314	325	406	422	395	C	C	C	C	C	C	C	C	C	C	C	C	368	282	342	358	
25		340	320	327	326	347	365	399	388	398	C	C	C	C	C	C	C	355	360	353	363	354	314	338	317	
26		323	319	334	345	393	426	354	388	391	C	C	C	C	C	C	C	C	C	382	392	384	342	317	339	327
27		322	340	329	337	386	392	366	383	C	C	C	C	C	C	C	C	363	384	370	361	400	326	317	321	349
28		334	358	331	345	358	386	312	369	391	C	C	C	C	C	C	C	349	364	375	374	A	361	322	335	325
29		315	311	313	335	329	340	325	351	378	359	336	364	354	375	350	351	377	343	367	364	321	314	348	334	
30																										
31																										
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT		25	25	25	25	25	25	24	24	21	12	10	9	10	10	9	11	17	22	24	24	24	24	25	25	
MED		325	320	328	333	362	363	338	362	385	380	364	345	354	350	350	351	371	361	370	361	348	320	342	334	
U Q		338	332	332	345	386	392	362	376	392	390	374	362	373	365	358	363	380	382	380	372	362	340	356	342	
L Q		320	311	318	318	336	339	325	354	374	364	355	307	346	336	326	343	362	343	362	340	326	314	334	322	

FEB. 2020 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

FEB. 2020 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1											L 401	L 423		A 405		398	L	L							
2									A 446	L	402	403	402	L 399	L 385	L 398	L 407								
3									439	L	392	418	414	426	410	391					460				
4										L	L	C	C	C	C	C	C	C	C	C					
5									L	C	C	C	C	C	C	C	C	C	C	C					
6											C	C	A	A	C	C	L	L			454				
7											L 408	L 385	L	A	392	407	380	388							
8											L	382	410	401	399	409	377								
9											L	L 396	L 400	L 427	L 398	L 404	L 392	L 414	L	L					
10											374	401		A	417	381		L	L	L					450
11											C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12									C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
13									C	C	C	C	C	C	C	C	C	C	C	L	C				
14									C	C	C	C	C	C	C	C	C	C	C	C					
15										L	C	C	C	C	C	C	C								
16										L	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
17									C	C	C	C	C	C	C	C	C	C	C	L	L				
18											C	C	C	C	C	C	C				L	L			
19											C	C	C	C	C	C	C	C	C			433			
20									C	C	C	C	C	C	C	C	C	C	C	L					
21										C	C	C	C	C	C	C	C	L	L						
22											C	C	C	C	C	C	C	L	L						
23											L	454		A	A	402	409	384			L	L			
24										C	C	C	C	C	C	C	C	C	L						
25									L		C	C	C	C	C	C	C								
26									460	C	C	C	C	C	C	C	C	C	A	L					
27									C	C	C	C	C	C	C	C					L				
28										C	C	C	C	C	C	C						A			
29										U 402	L 393	U 400	L 412	U 409	L 412	U 416	L 391				L		462		
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT									3	1	8	9	5	8	8	10	12	1	6						
MED									446	402	394	403	412	402	406	392	390	381	452						
U Q									460		402	420	420	413	410	398	401				460				
L Q									439		387	400	402	398	394	389	384				433				

FEB. 2020 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

FEB. 2020 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1										230	248	272	206	270		252	230	222							
2								A	214	218	242	228	250	254	256	262	244								
3									216	202	242	300	238	252	228	230	222		194						
4										228	252	C	C	C	C	C	C	C	C						
5									210	C	C	C	C	C	C	C	C	C							
6											C	C	264	246		C	218	208	202						
7										228	250	272	250	238	266	240	222	212							
8										254	224	234	220	306	246	234	226								
9										224	250	334	288	304	242	206	218	222							
10											262	318	224	272	254	224	230	212	200						
11											C	C	C	C	C	C	C	C	C						
12									C	C	C	C	C	C	C	C	C	C	C						
13									C	C	C	C	C	C	C	C	C	C	214	C					
14									C	C	C	C	C	C	C	C	C	C	C						
15										198	C	C	C	C	C	C	214	220							
16										206	C	C	C	C	C	C	C	C	C						
17									C	C	C	C	C	C	C	C	C	C	238	200					
18										C	C	C	C	C	C	C	230	244	202						
19										C	C	C	C	C	C	C	C	C	C	198					
20										C	C	C	C	C	C	C	C	C	214	208					
21										C	C	C	C	C	C	C	230	216							
22										C	C	C	C	C	C	C	224	214							
23											236	338	264	240	226	262	220	212	190						
24										C	C	C	C	C	C	C	C	C	240						
25									190		C	C	C	C	C	C	228	212							
26										196	C	C	C	C	C	C	C	C	232	196					
27										C	C	C	C	C	C	234	206	228							
28										C	C	C	C	C	C	266	238	226		A					
29											260	288	244	254	242	260	256	222	220	220					
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT									1	6	8	10	9	10	10	8	11	17	19	10					
MED									190	208	228	249	272	250	253	250	240	224	220	200					
U Q										214	242	252	326	264	272	258	262	230	228	202					
L Q										198	221	242	239	224	242	235	230	219	212	196					

FEB. 2020 h'F2 (KM)

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## IONOSPHERIC DATA STATION Okinawa

FEB. 2020 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	234 <sup>Q</sup>	234	246	264	254	256	246	214	200	178	206	184	A	182	202	192	174	198	206	186	220	194	222	212		
2	224	274	266	258	288	272	218	A	156	176	210	184	180	214	200	192	186	208	218	180	188	190	202	250		
3	268	286	236	266	206	206	214	240	152	180	230	192	206	192	202	212	198	212	184	190	228	254	214	222		
4	258	240	208	188	206	208	234	238	206	202	198	C	C	C	C	C	C	C	C	A <sup>E</sup>	A <sup>E</sup>	258	214	248	238	
5	246 <sup>E</sup>	256 <sup>A</sup>	260	282	270	186	290	234	194	C	C	C	C	C	C	C	C	C	C	196	178	192	228	230	200	
6	242	246	252	248	232	208	238	206	200	206	C	C	A	A	C	C	192	200	184	202	190	222	192	248		
7	242	244	242	238	208	172	286	218	220	220	210	198	A	200	194	204	184	176	192	228 <sup>E</sup>	A <sup>E</sup>	190	198	244	268	
8	262	272	210	190	166	362 <sup>E</sup>	390 <sup>B</sup>	222	214	224	214	200	198	184	178	218	212	208	200	174	210	222	220	240		
9	260	286	262	248	230	234	240	212	212	206	198	178	190	184	176	190	192	214	194	182	192	274	228	252		
10	240	234	272	234	184	344 <sup>E</sup>	B <sup>B</sup>	218	206	186	224	200	A	196	238	216	206	194	164	192	202	250	202	224		
11	230	264	246	262	198	240	224	190	200	208	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	182	168	C	C	C		
15	252	270	246	250	196	186	314	210	160	C	C	C	C	C	C	C	212	210	188	174	192	208	220	254		
16	266	252	248	248	224	204	244	204	172	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
17	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	184	182	176	200	224	200	208
18	234	254	248	230	184	202	344 <sup>E</sup>	206	214	C	C	C	C	C	C	C	198	180	190	186	194	218	240	264		
19	272	284	262	218	182	324	274	222	214	C	C	C	C	C	C	C	C	C	C	172	200	A	282	292	252	
20	230	256	240	204	204	244	286	220	C	C	C	C	C	C	C	C	C	202	194	182	220	222	240	280		
21	270	228	248	260	204	204	260	216	C	C	C	C	C	C	C	C	220	210	200	192	192	276	204	236		
22	250	264	272	280	224	214	222	210	216	C	C	C	C	C	C	C	200	200	200	182	210	222	250	240		
23	240	234	266	290	208	196	316 <sup>E</sup>	210	208	216	202	188	E	A	A	210	188	176	196	174	184	254 <sup>E</sup>	A <sup>A</sup>	232	190	
24	244	258	260	268	236	192	184	182	C	C	C	C	C	C	C	C	C	194	194	192	186	210	232	212		
25	234	268	262	248	232	220	208	168 <sup>E</sup>	198	C	C	C	C	C	C	C	218	202	200	176	174	246	248	254		
26	280	274	258	236	192	186	B	196	178	C	C	C	C	C	C	C	C	A	192	174	200	262	236	220		
27	266	238	252	256	204	198	244	194	C	C	C	C	C	C	C	C	222	198	178	218	184	216	266	254	228	
28	234	212	212	226	222	202	318	212	214	C	C	C	C	C	C	C	208	208	208	202	A <sup>E</sup>	A <sup>A</sup>	222	248	240	244
29	264	268	246	254	264	242	260	222	216	204	204	202	184	200	180	194	188	178	154	200	218	252	218	218		
30																										
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	25	25	25	25	25	25	23	24	21	12	10	9	6	8	9	11	17	21	24	24	24	24	25	25		
MED	246	256	248	248	208	206	243	212	206	205	208	192	190	194	200	204	198	200	193	184	197	223	229	238		
U Q	265	271	262	263	232	243	290	221	214	212	214	200	206	200	206	216	210	208	200	192	219	253	242	252		
L Q	234	239	244	232	197	197	224	205	186	183	202	184	184	184	179	192	187	183	184	177	192	213	214	219		

FEB. 2020 h'F (KM)

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## IONOSPHERIC DATA STATION Okinawa

FEB. 2020 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								B	110	102	102	102	100		A	A	A	A	A					
2								A	A	A	A	100	100	100	104		A	A	A	B				
3								B	106	102	102	102	102		A				A	B				
4								B	116	108	102		C	C	C	C	C	C	C	C				
5								B	102		C	C	C	C	C	C	C	C	C	B				
6								B	108	106		C	C	104	104		C	C	A	A	B			
7								B	104	100		A		108		A	A	A		A				
8								B	104	102	102	102	102	100		A	A	A		108	A			
9								B	104	102	102		A	A	A	A					A			
10								B	110	102	102	102	102	104	104	104		A		104	98			
11								B	104	104		C	C	C	C	C	C	C	C	C				
12								C	C	C	C	C	C	C	C	C	C	C	C	C				
13								C	C	C	C	C	C	C	C	C	C	C		102	C			
14								C	C	C	C	C	C	C	C	C	C	C	C		B			
15								B	102		C	C	C	C	C	C					B			
16									106		C	C	C	C	C	C	C	C	C					
17								C	C	C	C	C	C	C	C	C	C	C	A	B				
18								B	106		C	C	C	C	C	C				B				
19								B	116		C	C	C	C	C	C	C	C	C	B				
20								B	C	C	C	C	C	C	C	C	C	C	A	B				
21								A	C	C	C	C	C	C	C	C				A	A			
22								B	106		C	C	C	C	C	C				A				
23								B	100	104	104	102		A						B				
24								B	C	C	C	C	C	C	C	C				A	B			
25								B	106		C	C	C	C	C	C				B	B			
26								B	100		C	C	C	C	C	C				A	A			
27								B	C	C	C	C	C	C	C					B	B			
28								B	96		C	C	C	C	C					A	A			
29								B	100	110	108	102	102	102		A				B	B			
30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									20	11	8	7	8	6	4	5	11	13	1					
MED									105	102	102	102	102	102	103	104	102	104	110					
U Q									107	106	103	102	103	104	104	105	104	105						
L Q									102	102	102	102	101	100	101	99	100	102						

FEB. 2020 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

FEB. 2020 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	B	B	94	90	90	90	90	98	86	G	148	102	98	100	84	102	98	130	94	94	86	86	90	96	
2	B	92	92	88	96	94	92	92	92	106	104	158	114	106	106	106	108	92	86	98	94	94	94	B	
3	92	94	94	86	96	90	90	88	88	146	196	112	180	160	150	108	90	88	B	142	124	108	94	B	
4	102	98	98	B	B	92	92	B	G	90	176	C	C	C	C	C	C	C	C	96	96	96	94	94	
5	84	92	B	92	96	102	B	B	G	C	C	C	C	C	C	C	C	C	B	B	B	B	B	B	
6	B	B	86	108	B	88	90	94	148	158	C	C	116	118	C	C	100	100	B	B	86	84	84	80	
7	B	B	B	B	B	B	B	B	142	184	102	104	108	106	96	96	G	G	82	82	88	86	90	88	
8	104	90	92	B	84	88	88	B	126	156	140	112	110	102	106	100	96	118	90	90	94	92	92	86	
9	B	B	B	90	90	104	102	B	G	G	108	102	102	106	100	98	G	166	86	86	88	86	B	B	
10	92	88	88	92	88	88	88	G	138	168	150	134	120	120	144	140	88	88	G	86	82	82	B	B	
11	B	B	B	B	B	B	B	B	148	102	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	G	C	88	C	C	C	C	
14	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	102	86	86	86	82	80	
15	B	B	92	96	92	B	100	B	126	C	C	C	C	C	C	C	188	162	B	B	B	B	B	B	
16	82	82	B	B	B	B	92	B	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
17	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	102	108	B	B	128	118	112	
18	104	B	104	B	B	B	88	90	88	164	C	C	C	C	C	C	102	134	B	B	B	144	94	126	
19	122	110	90	B	B	B	94	116	124	C	C	C	C	C	C	C	C	C	B	B	96	96	96	94	
20	B	B	96	96	102	92	B	B	C	C	C	C	C	C	C	C	C	92	102	86	86	98	94	B	
21	B	B	108	88	86	B	96	88	C	C	C	C	C	C	C	C	100	96	88	86	86	102	98	B	
22	112	102	B	102	98	102	98	98	100	C	C	C	C	C	C	C	118	110	102	86	124	98	94	B	
23	B	B	88	B	B	B	B	B	150	148	146	162	140	114	104	98	92	88	88	136	124	116	110	B	
24	116	82	86	B	98	96	94	90	C	C	C	C	C	C	C	C	C	104	86	86	84	102	100	B	
25	B	B	98	98	94	94	100	152	C	C	C	C	C	C	C	C	154	168	124	84	84	B	B	102	
26	B	B	B	B	B	B	B	B	160	C	C	C	C	C	C	C	C	100	96	88	88	88	B	B	
27	82	B	B	B	94	94	100	92	C	C	C	C	C	C	C	C	176	160	104	150	80	104	B	B	
28	B	B	B	B	94	B	90	138	C	C	C	C	C	C	C	C	110	112	92	154	94	96	102	104	100
29	100	98	98	96	92	92	92	96	170	98	164	138	146	98	98	90	G	G	B	90	B	B	B	B	
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	12	11	16	13	15	16	17	13	17	10	10	9	10	10	9	11	14	19	16	20	19	21	17	12	
MED	101	92	93	92	94	93	92	92	138	147	147	112	115	106	104	102	101	104	95	86	88	96	94	94	
U Q	108	98	98	97	96	95	97	98	151	158	164	148	140	118	125	110	118	130	105	92	96	103	99	101	
L Q	88	88	89	89	90	90	90	89	112	102	108	103	108	102	97	98	96	92	88	86	86	86	91	87	

FEB. 2020 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

FEB. 2020 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1			F2	F2	F1	F1	F1	L1	L2		H1	C2	C2	LQ21	LC12	C1	L2	HC11	L5	FQ31	F2	F1	F1	F2		
2		F1	F3	F3	F8	F6	F5	L8	LC21	C1	CH11	HC11	CL11	C2	CQ21	C2	C2	C2	L1	F1	F1	F7	F3	F3		
3	F2	F2	F2	F2	F1	F1	F1	L3	L1	H1	H1	C1	HC11	HC11	H1	CHL11	L1	L4		F6	F7	F2	F1			
4	F1	F3	F3			F2	F2			L1	HH11									F9	F8	F8	F4	F3		
5	F4	F1		F1	F2	F1																				
6			F4	F1		F3	F2	L1	H2	H1			C1	C1			C1	C1			F1	F2	F1	F1		
7									HC11	HH11	C1	CQ11	C2	C1	L2	L1			L5	F4	FQ21	FQ31	F1	F1		
8	F1	F1	F1		F1		F1	C1	HC11	H1	C1	C1	C1	C1	CH11	L2	CL21	L1	L3	F1	F2	F2	F1	F1		
9				F2	F1	F1	F1				C1	CQ21	C2	C1	C1	L1		H1	L4	F5	F2	F1				
10	F2	F2	F2	F2	F1	F1	F1		H1	H1	H1	H1	H1	CH11	HC11	H1	L2	L1		F1	F1	F1				
11									H1	C1																
12																										
13																				F1						
14																			C1	F2	F3	F3	F2	F1		
15			F1	F2	F2		F1		C1								HC11	H1								
16	F1	F1					F1																			
17																			C2	C1			F1	F2	F1	
18	F1		F1			F1	F1	L1	H1								C1	HC11				F1	F1	F1	F1	
19	F1	FF11	F2			F1	C1	C2														FQ51	F3	F5	F1	
20			FQ31	F4	FF39	F4												LQ11	C1	F1	F1	F1	F1	F1		
21			FF31	F5	F1		F1	L4									C3	L2	L1	F3	F1	F2	F3			
22	F1	F4		F2	F3	F3	F3	L1	LH21								C1	C2	C2	F1	F2	F1	F1	F1		
23			F1						H1	H1	H1	H1	HL11	C1	C2	L2	L2	LC41	L1	FF31	FF71	FF71	F7			
24	F1	F2	F1		F1	F1	F3	L1										CL21	L1	L1	F1	F1	F1			
25			F1	F1	F1	F1		C1	H1								H1	H1	CL11	L1	F1			F1		
26									H1										C7	L1	L1	F2	F1			
27	F1				F3	F1	F1	L1									HC11	HC11	C1	H2	L1		F2			
28					F1			L1	H1								C1	C1	L3	H1	L6	F7	FF11	F1	F2	
29	F1	F3	F5	F3	F1	F1	F2	L1	H1	LH11	HL11	H1	H1	L1	L1	L1					L1					
30																										
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT																										
MED																										
U Q																										
L Q																										

FEB. 2020 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## f-PLOTS OF IONOSPHERIC DATA

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

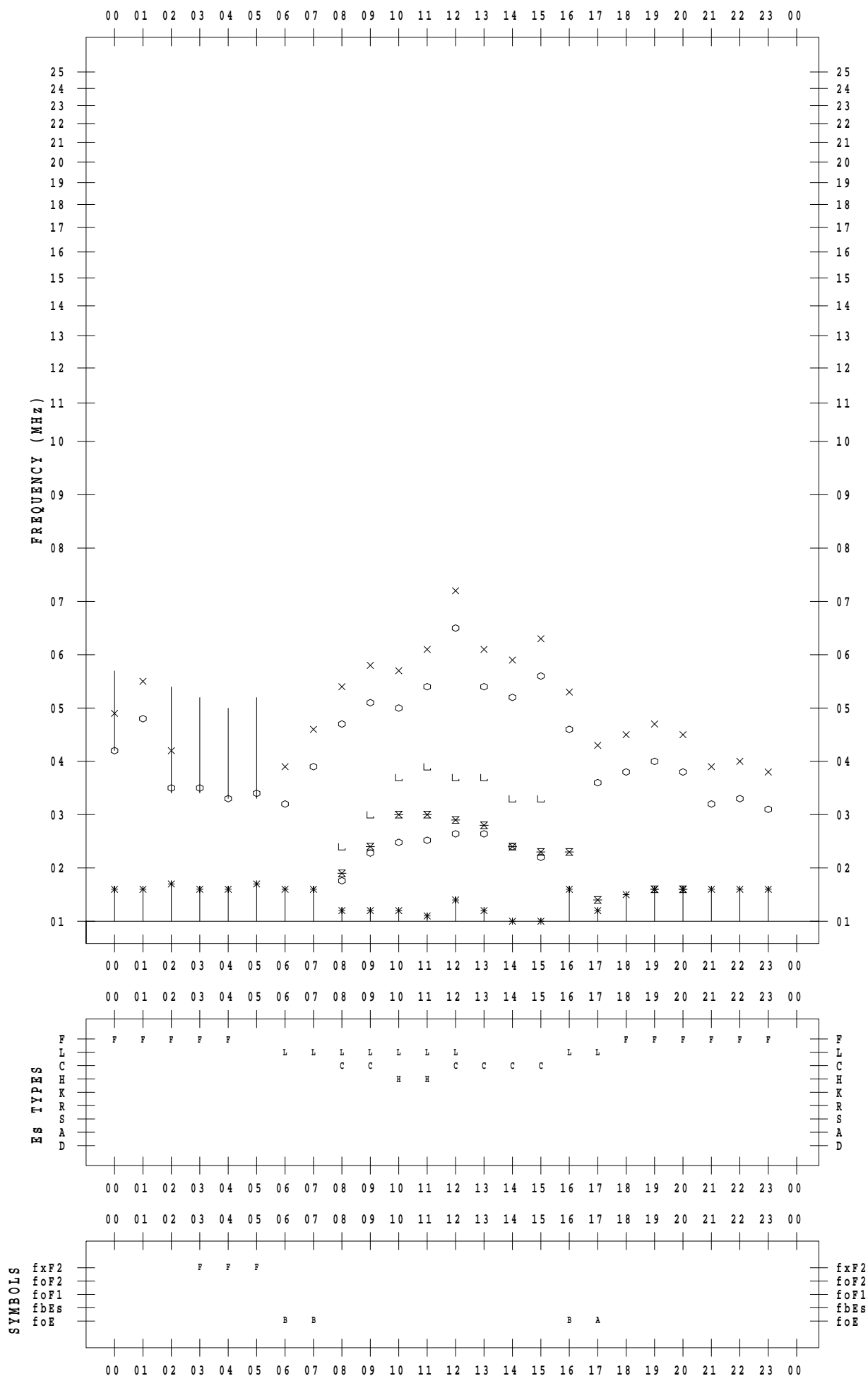
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 1

135 ° E MEAN TIME



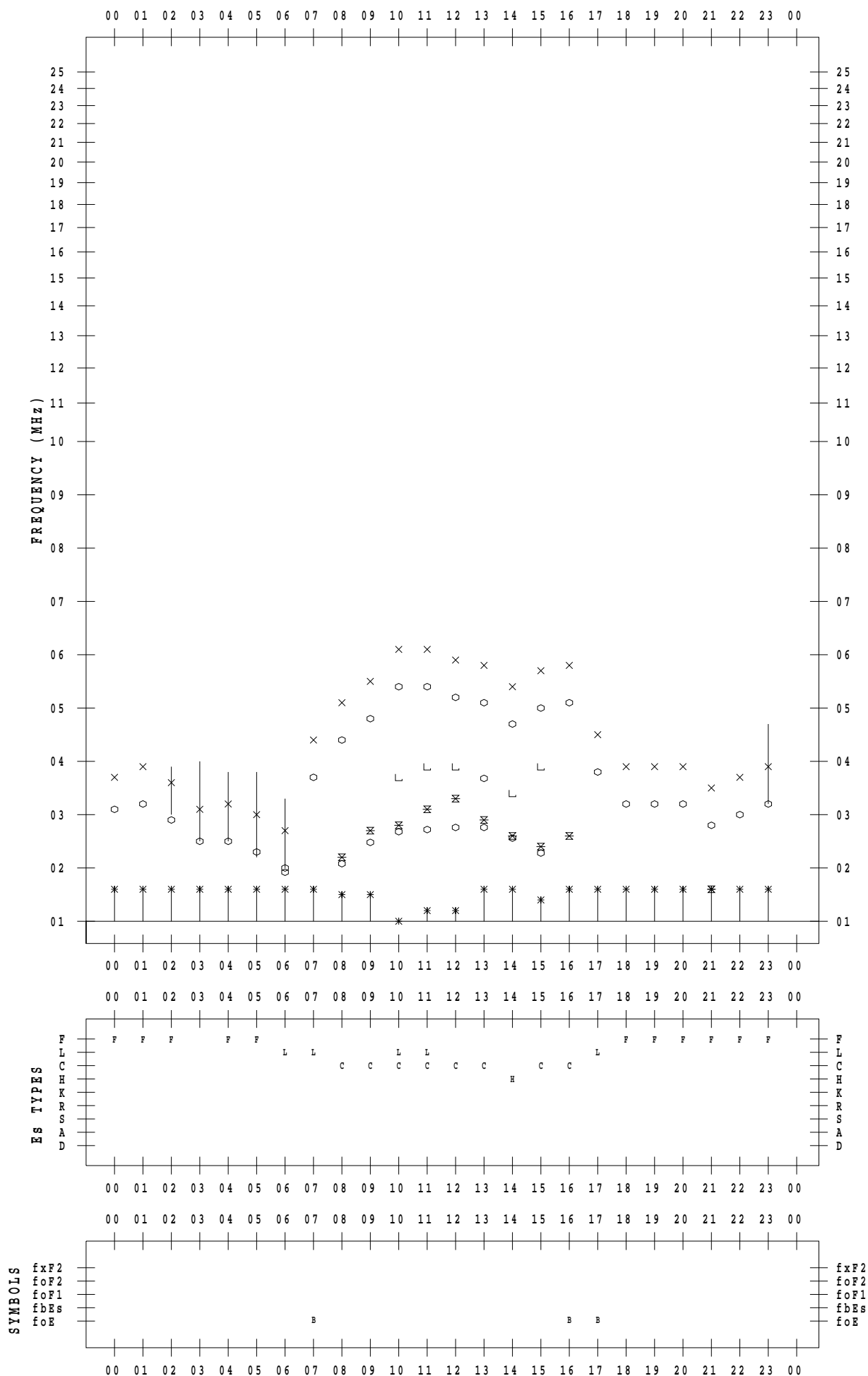
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 2

135 ° E MEAN TIME



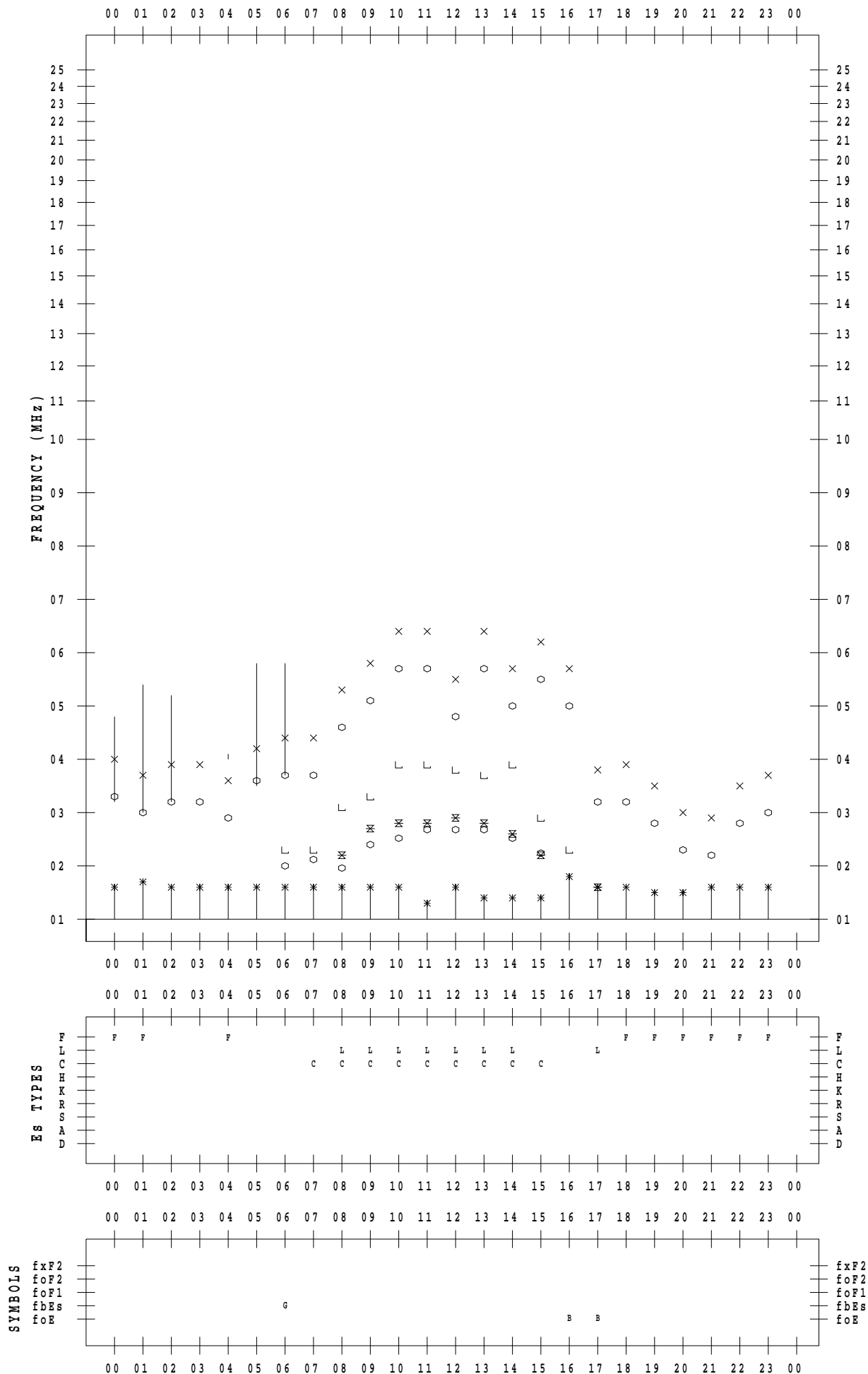
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 3

135 ° E MEAN TIME



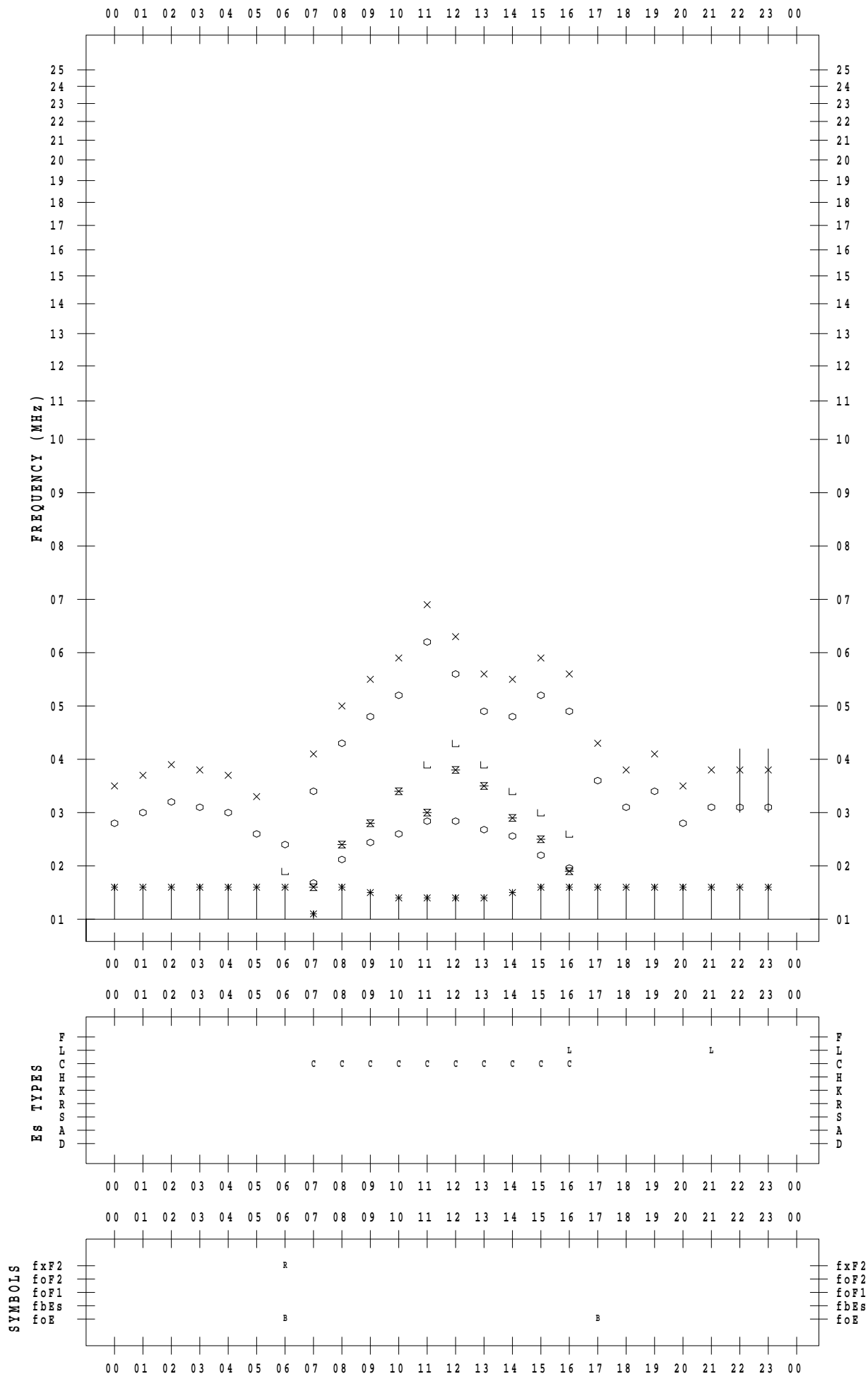
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 4

135 ° E MEAN TIME





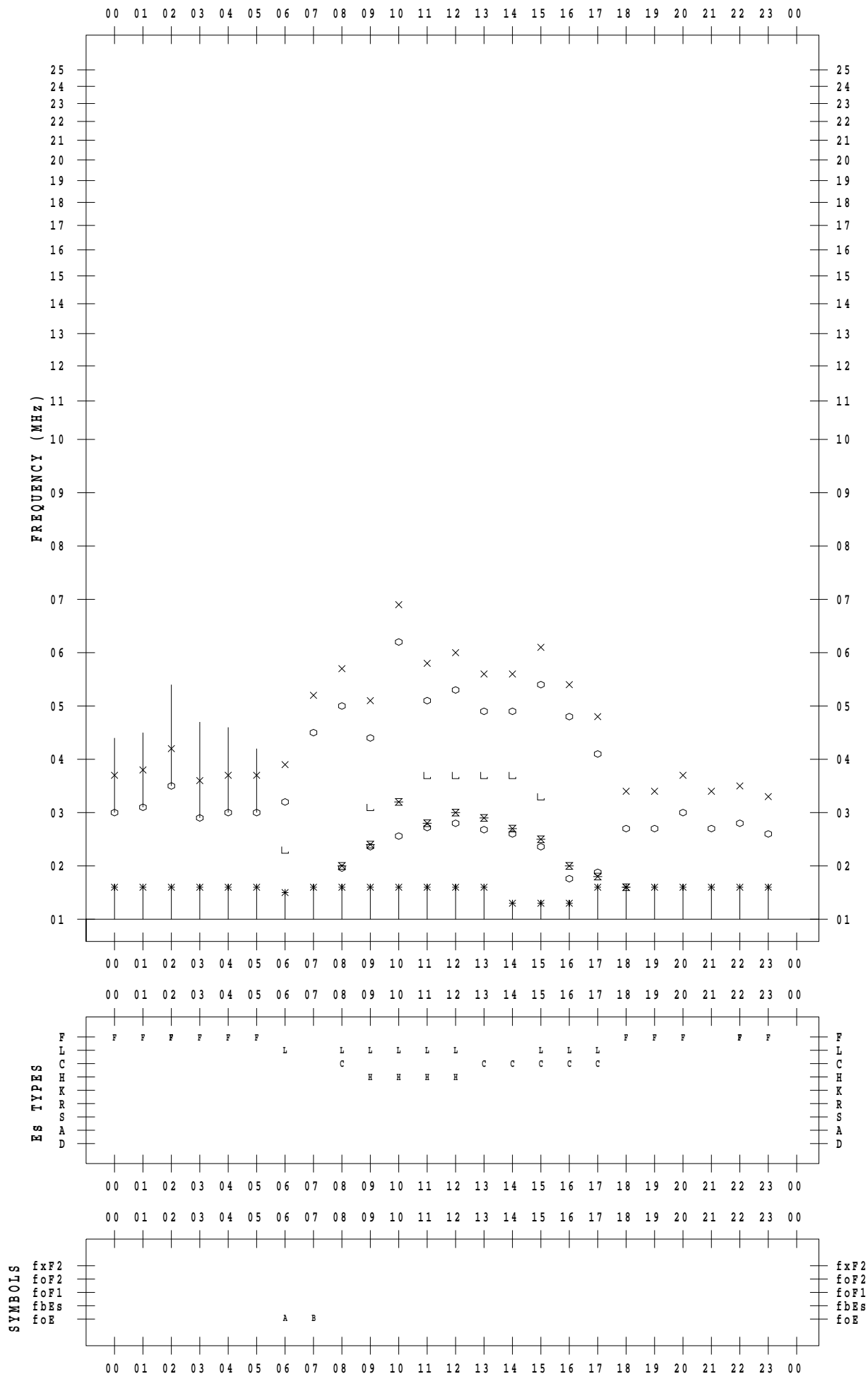
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 5

135 ° E MEAN TIME



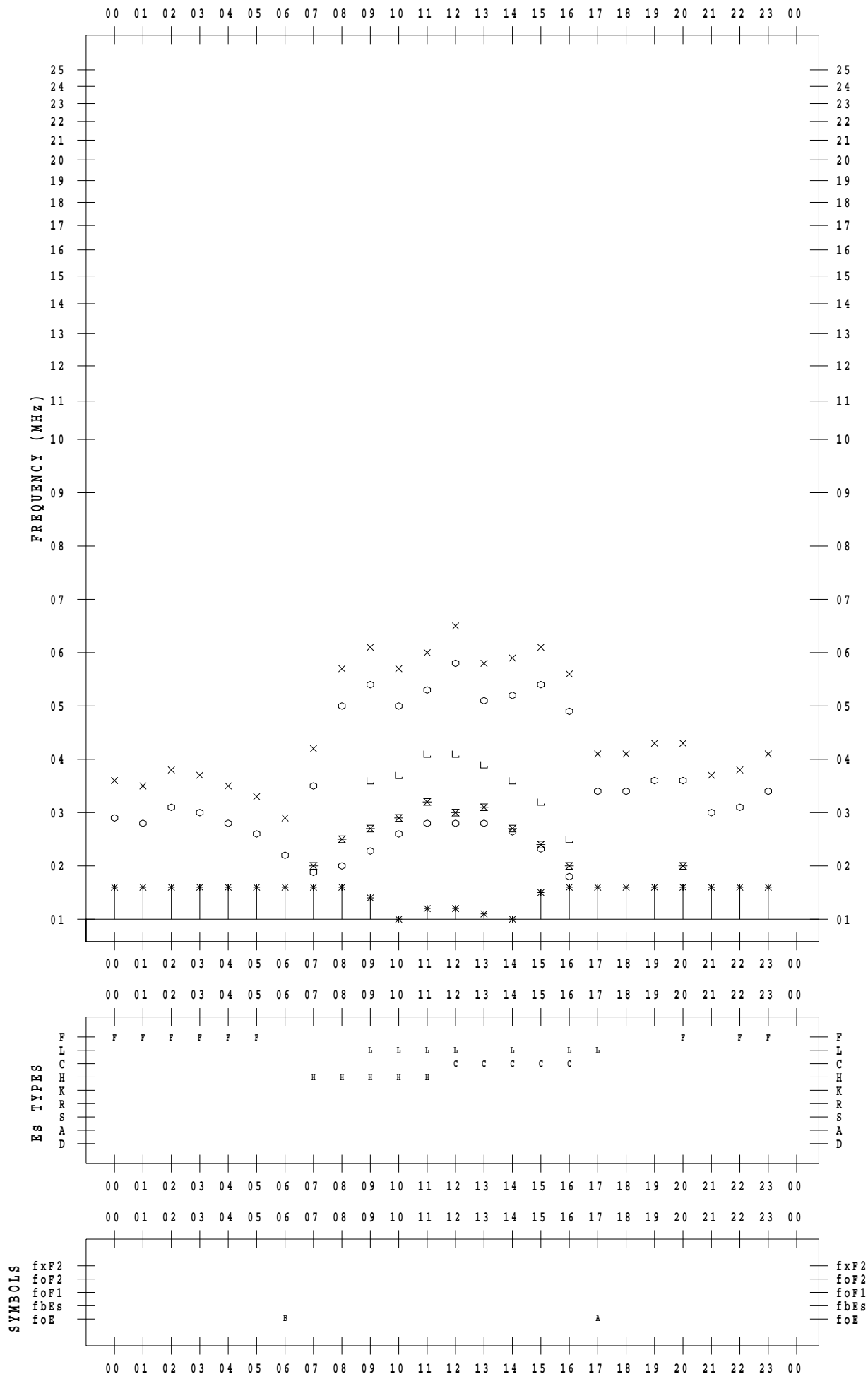
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 6

135 ° E MEAN TIME



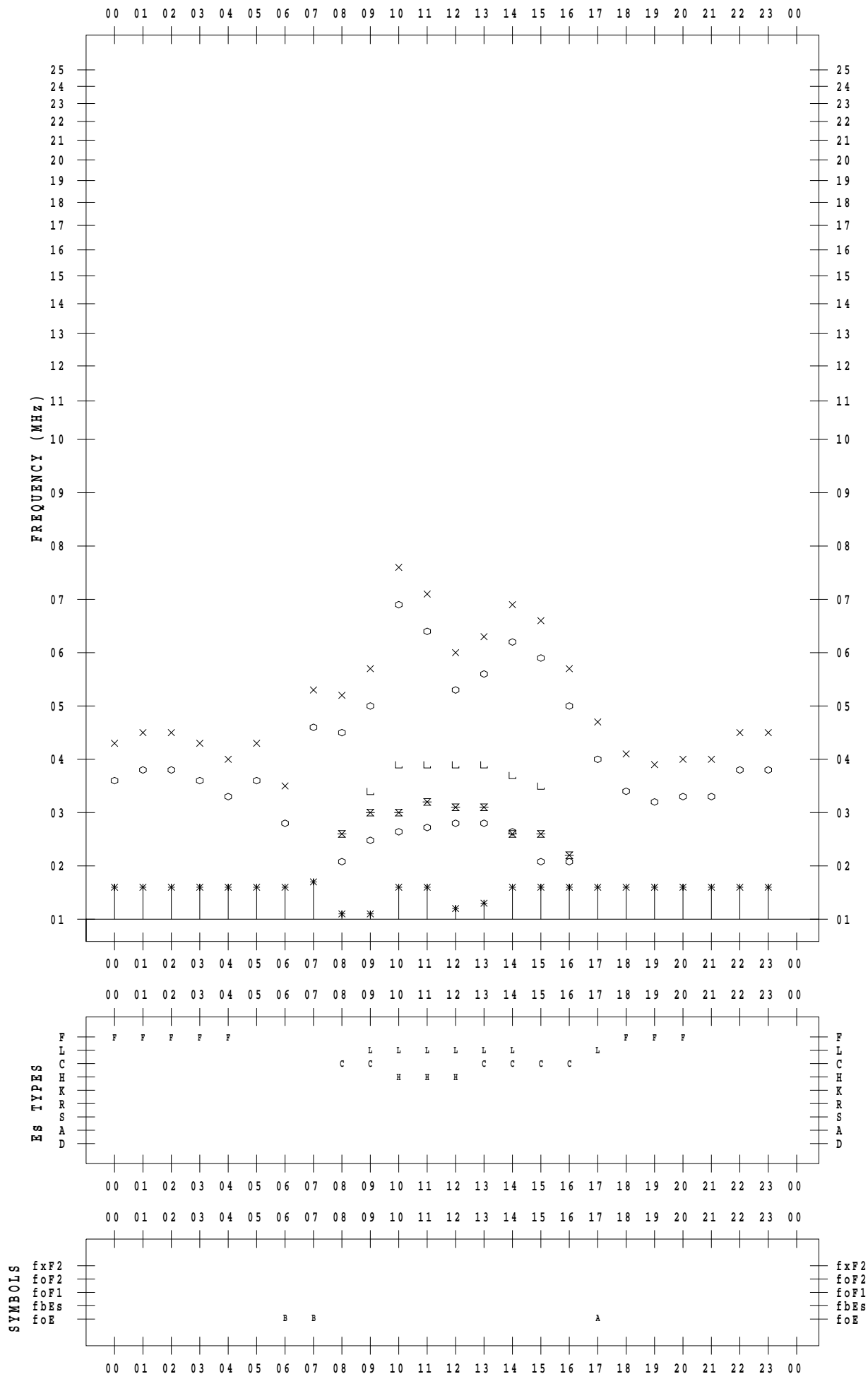
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 7

135 ° E MEAN TIME



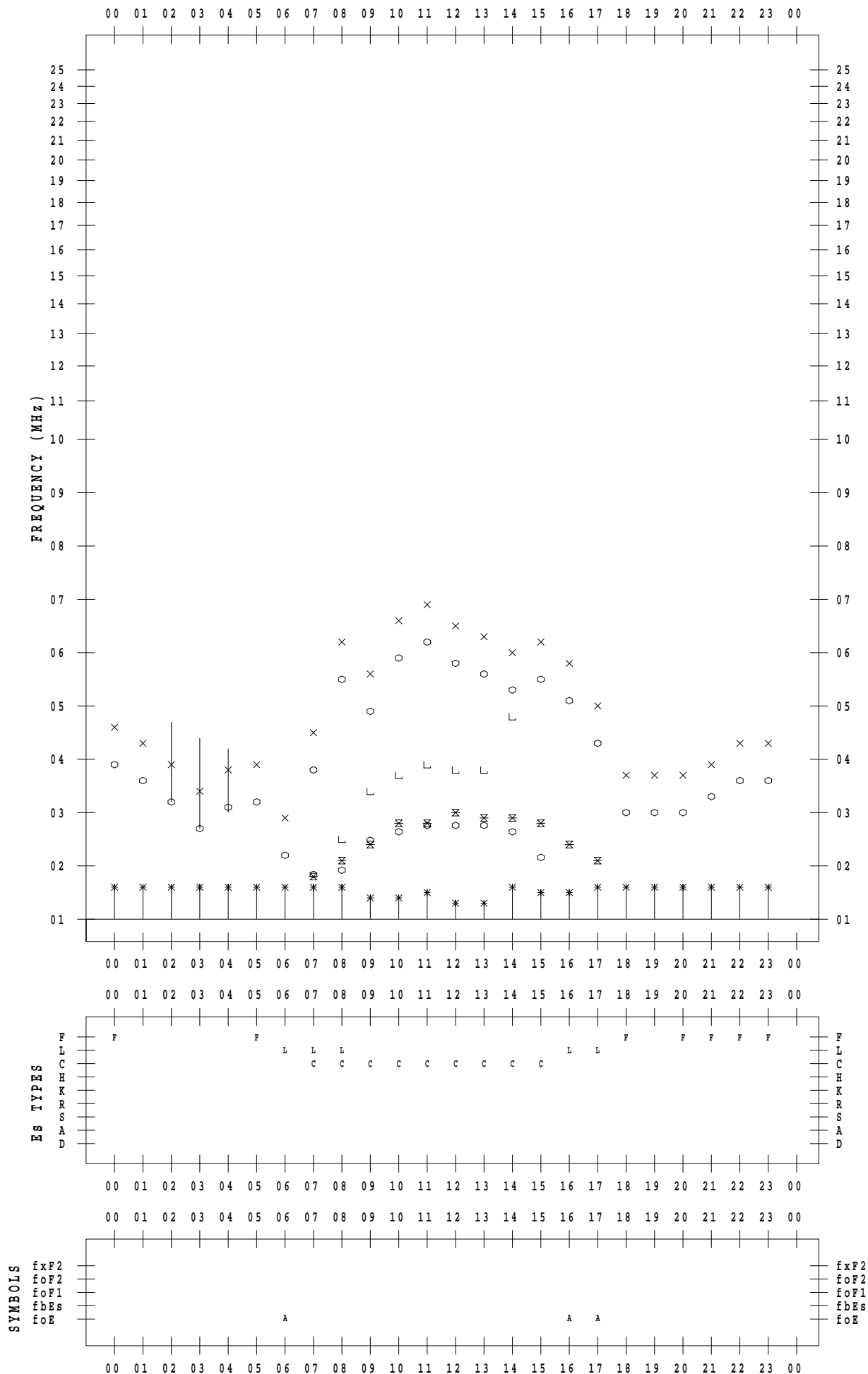
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 8

135 ° E MEAN TIME



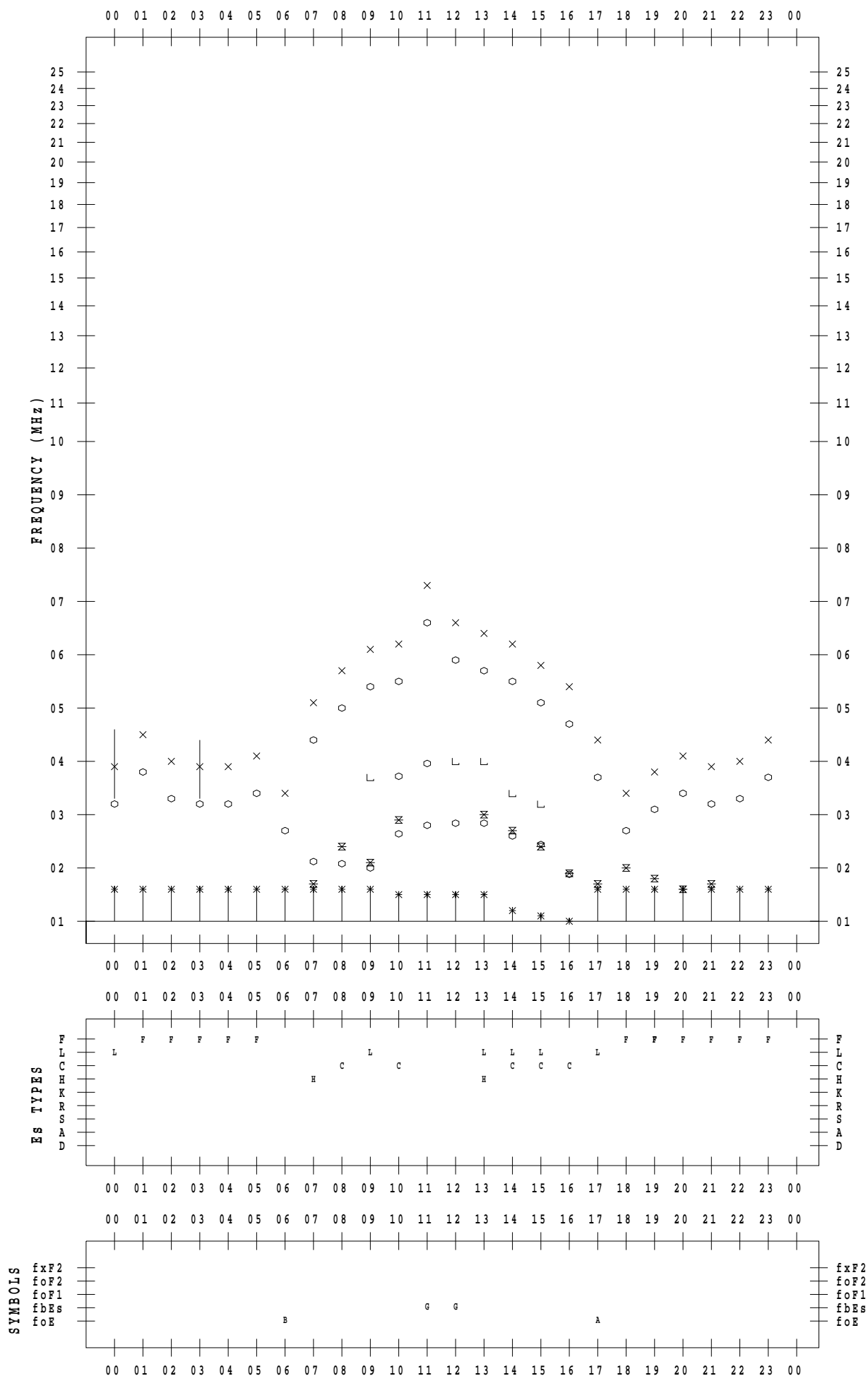
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 9

135 ° E MEAN TIME



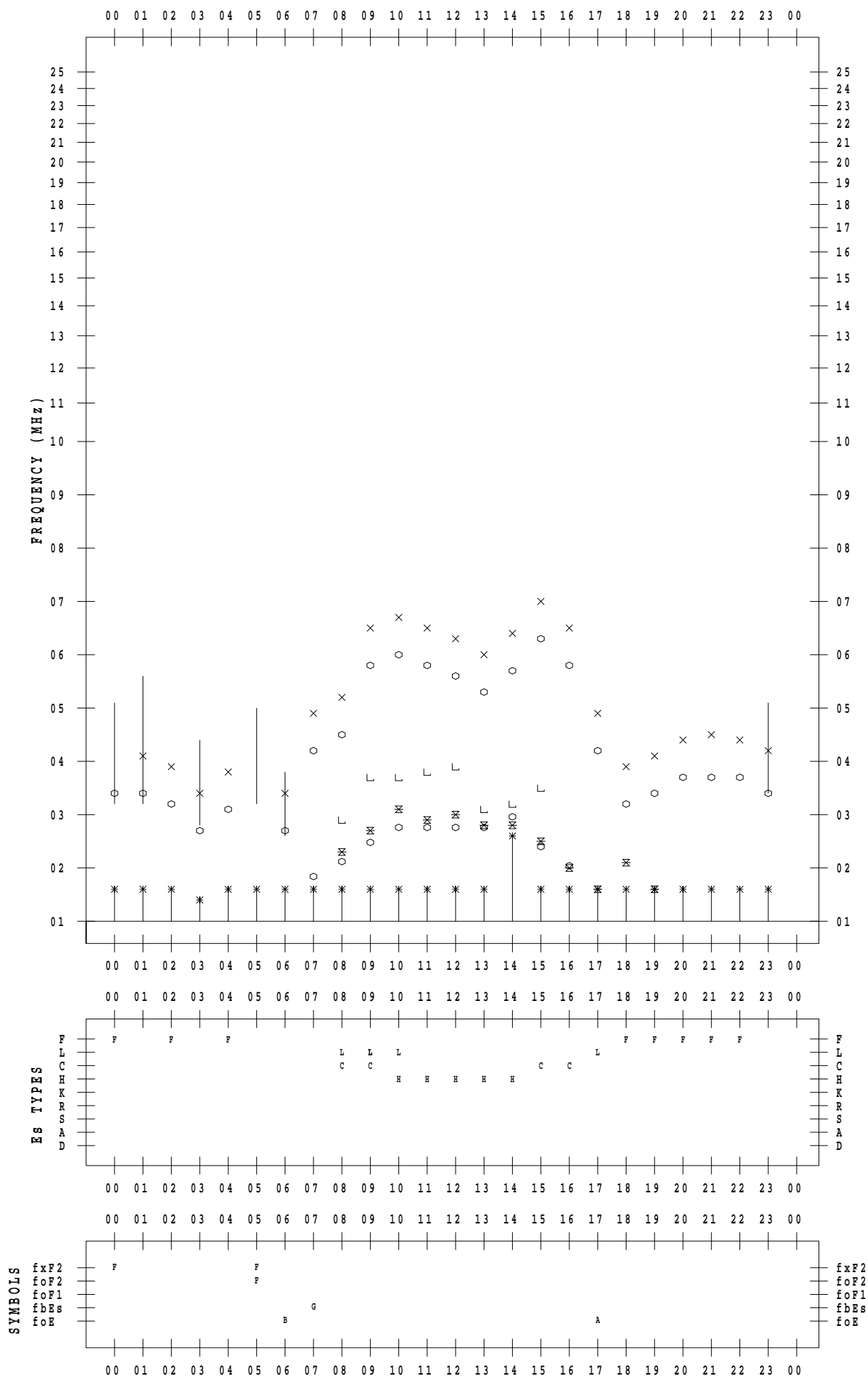
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 10

135 ° E MEAN TIME



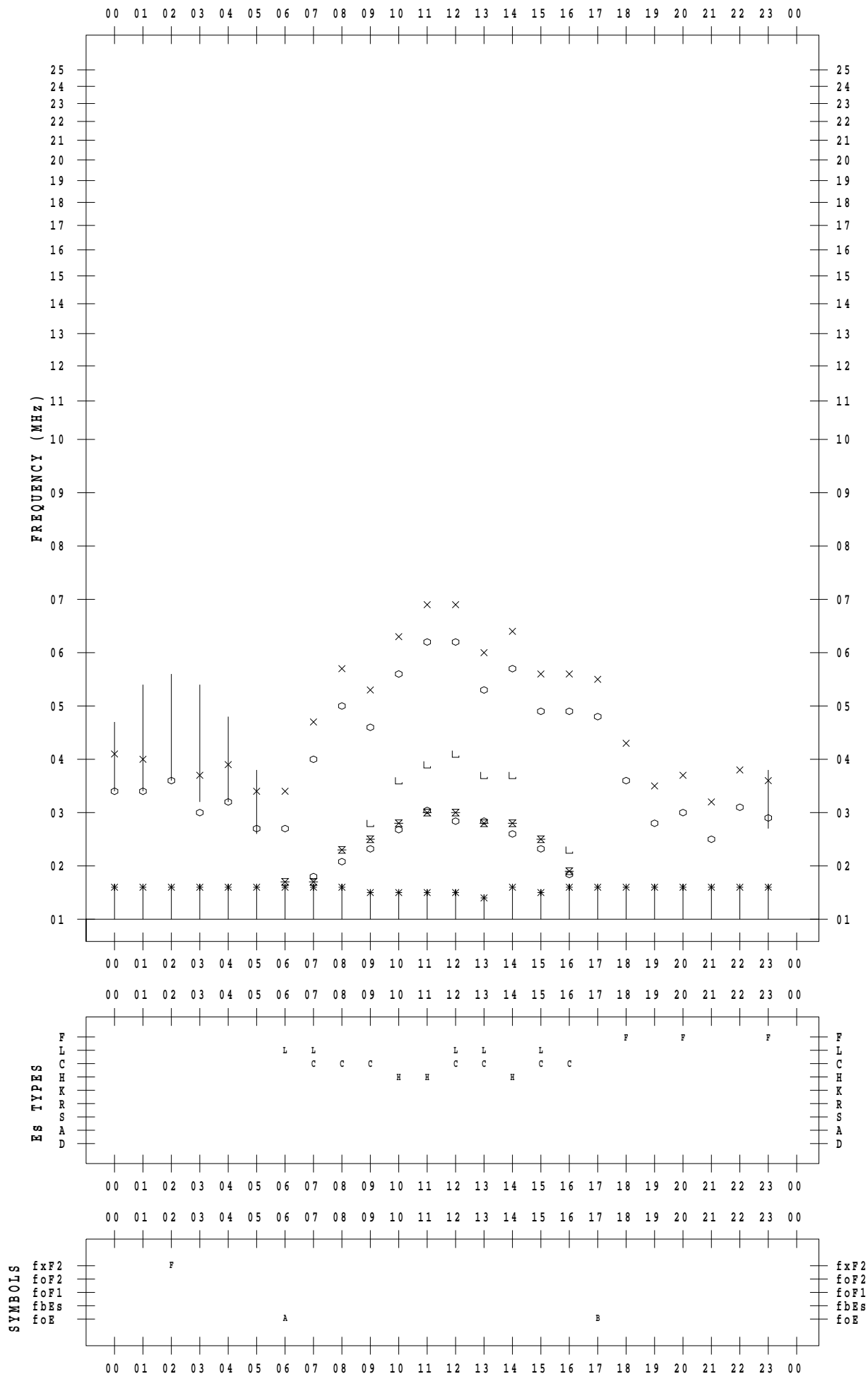
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 11

135 ° E MEAN TIME



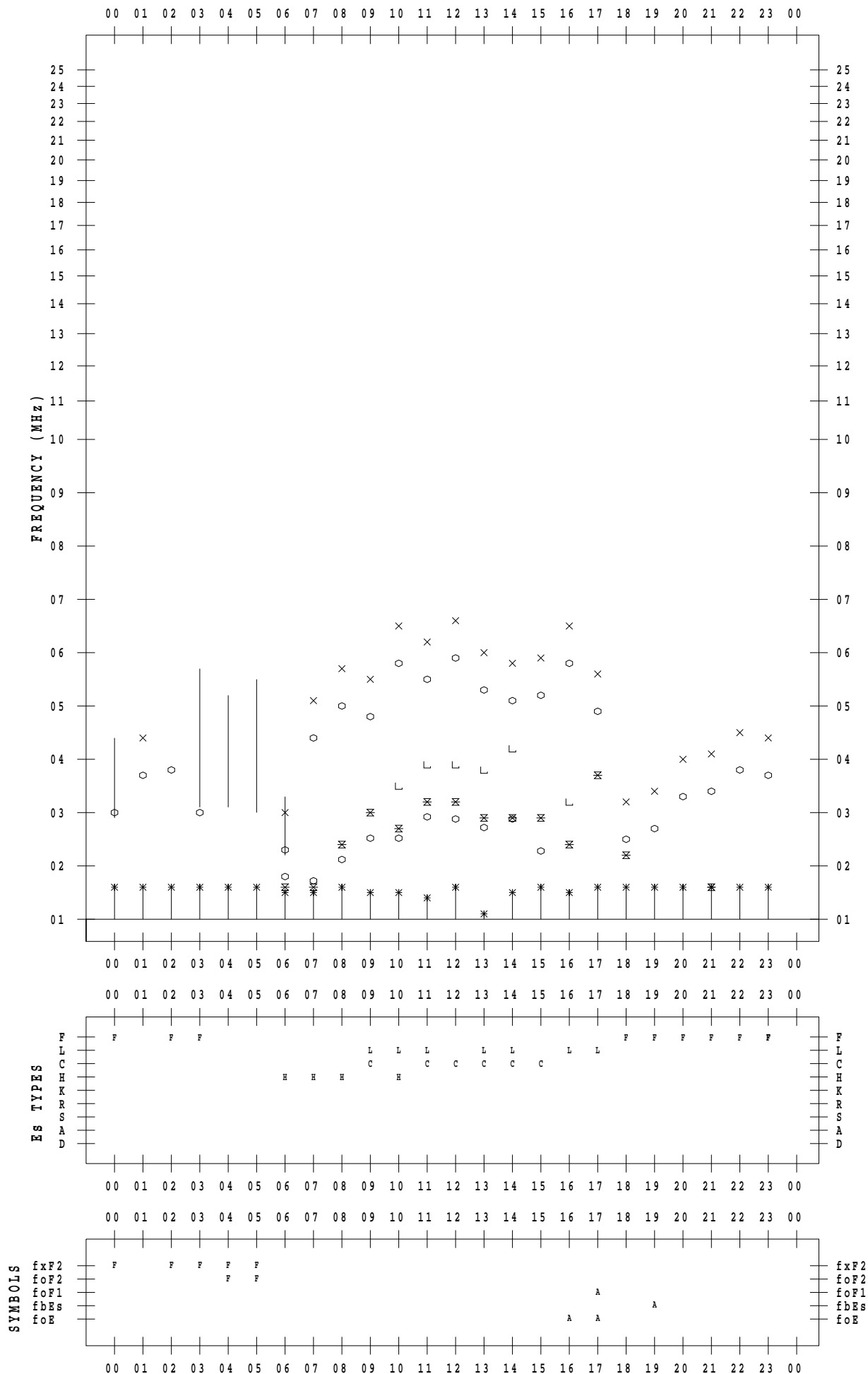
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 12

135 ° E MEAN TIME





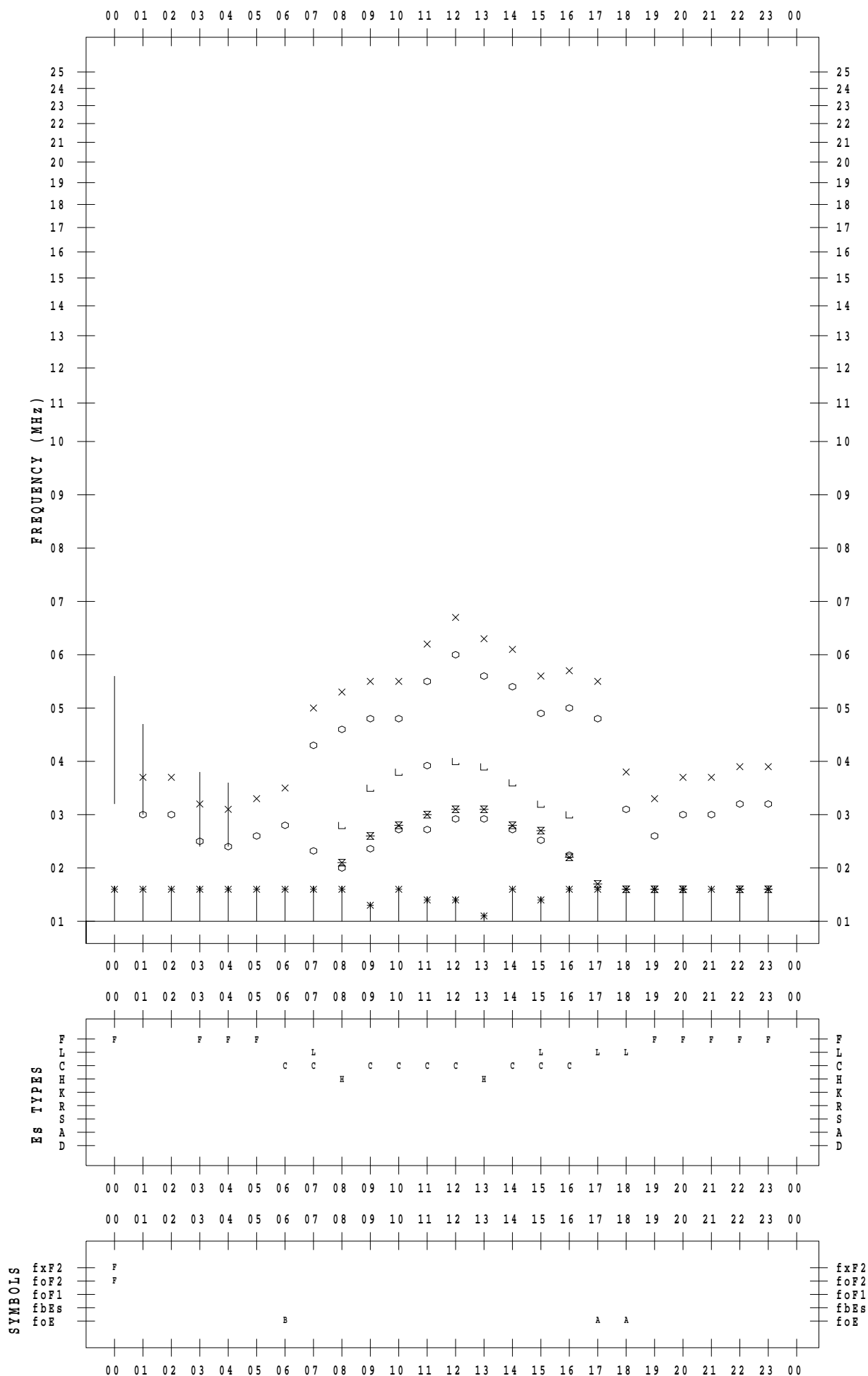
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 13

135 ° E MEAN TIME



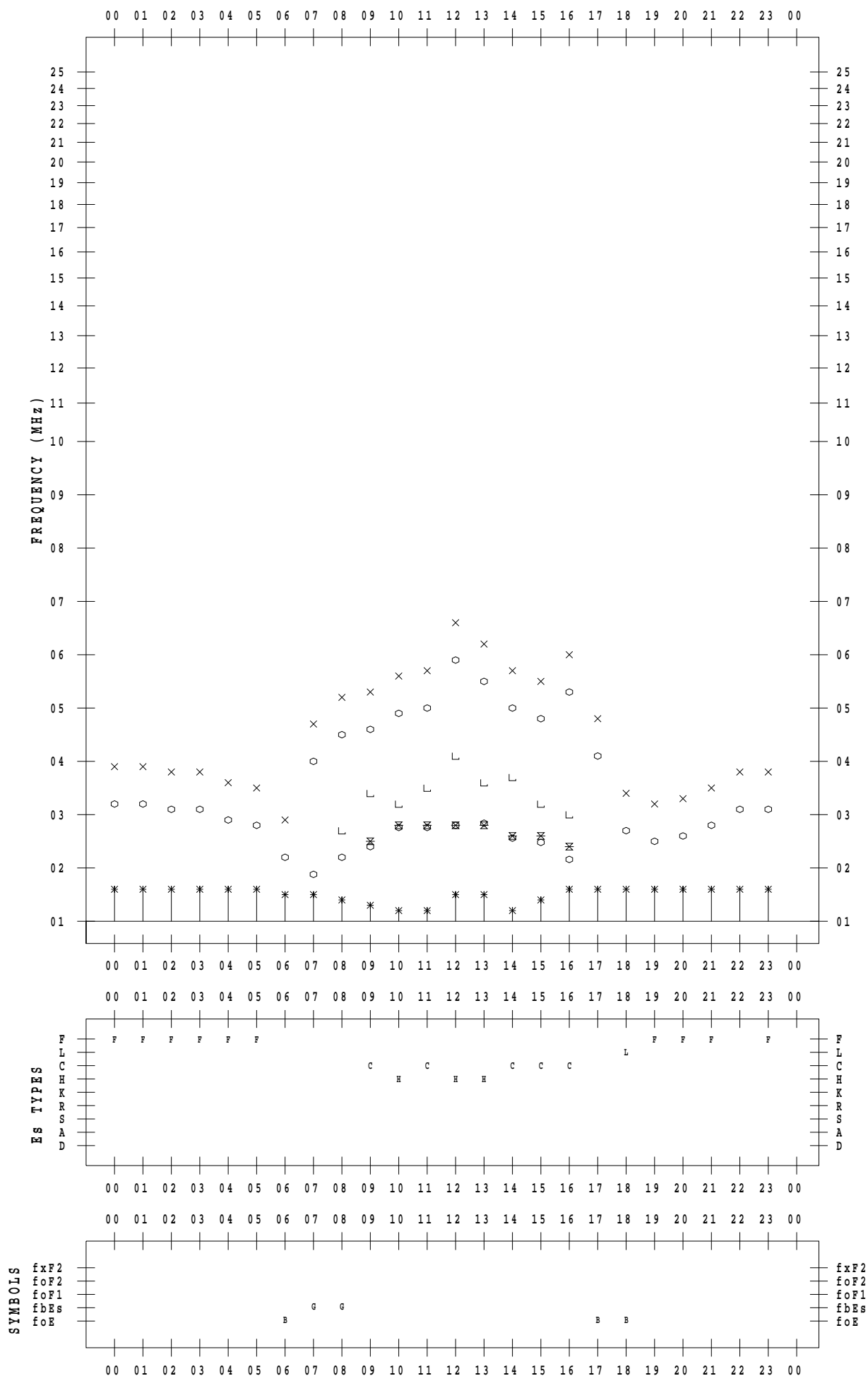
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 14

135 ° E MEAN TIME



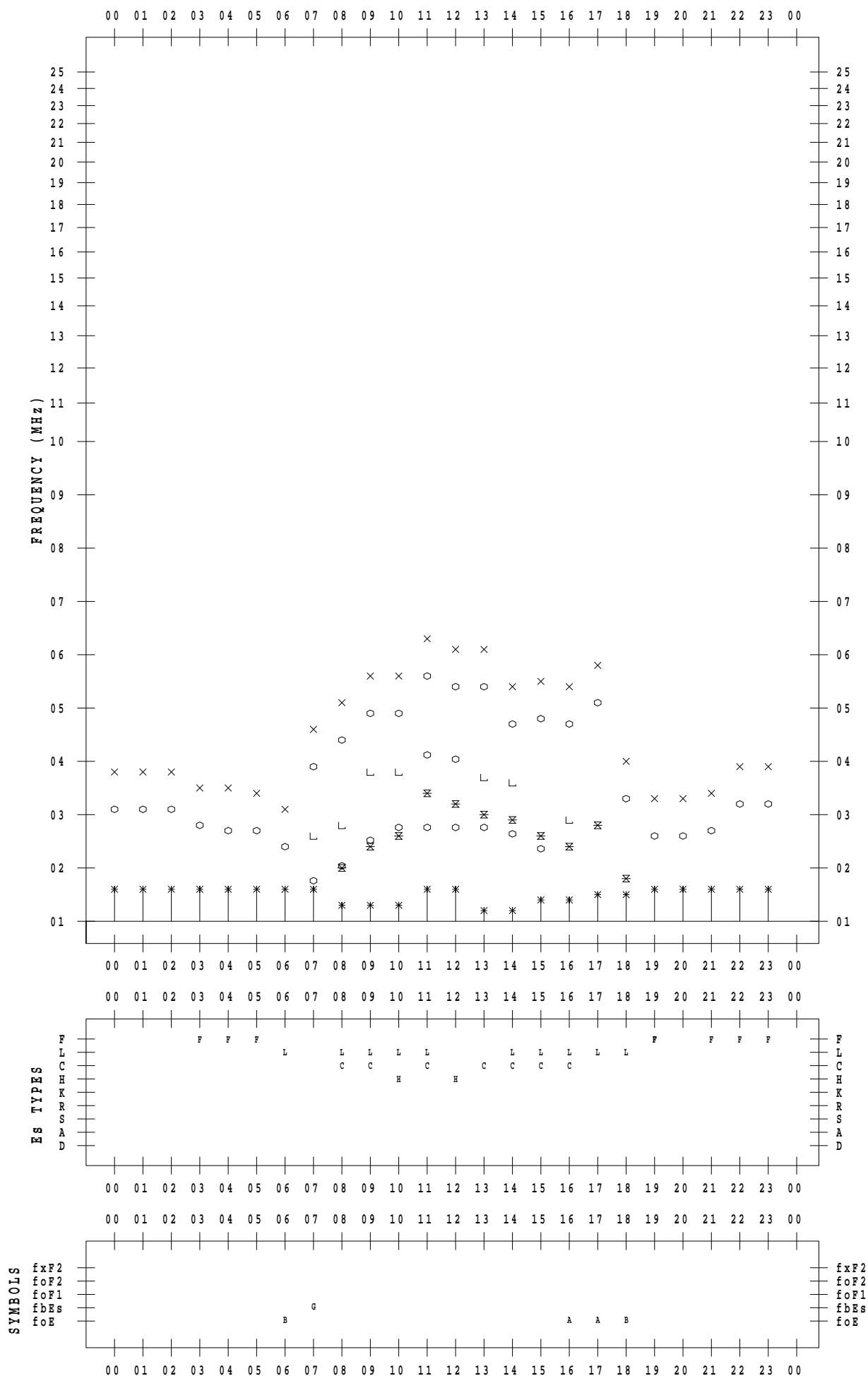
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 15

135 ° E MEAN TIME



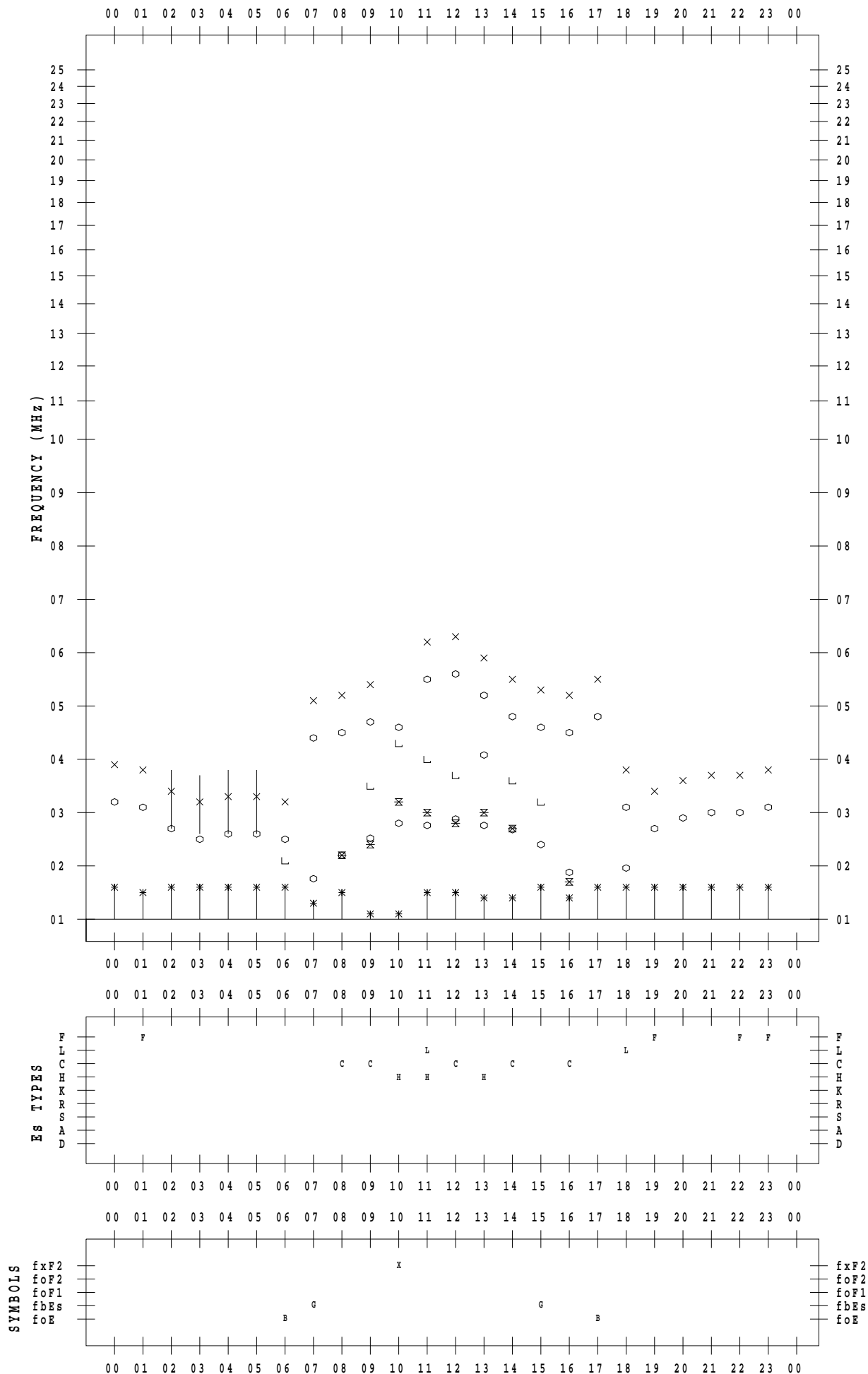
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 16

135 ° E MEAN TIME



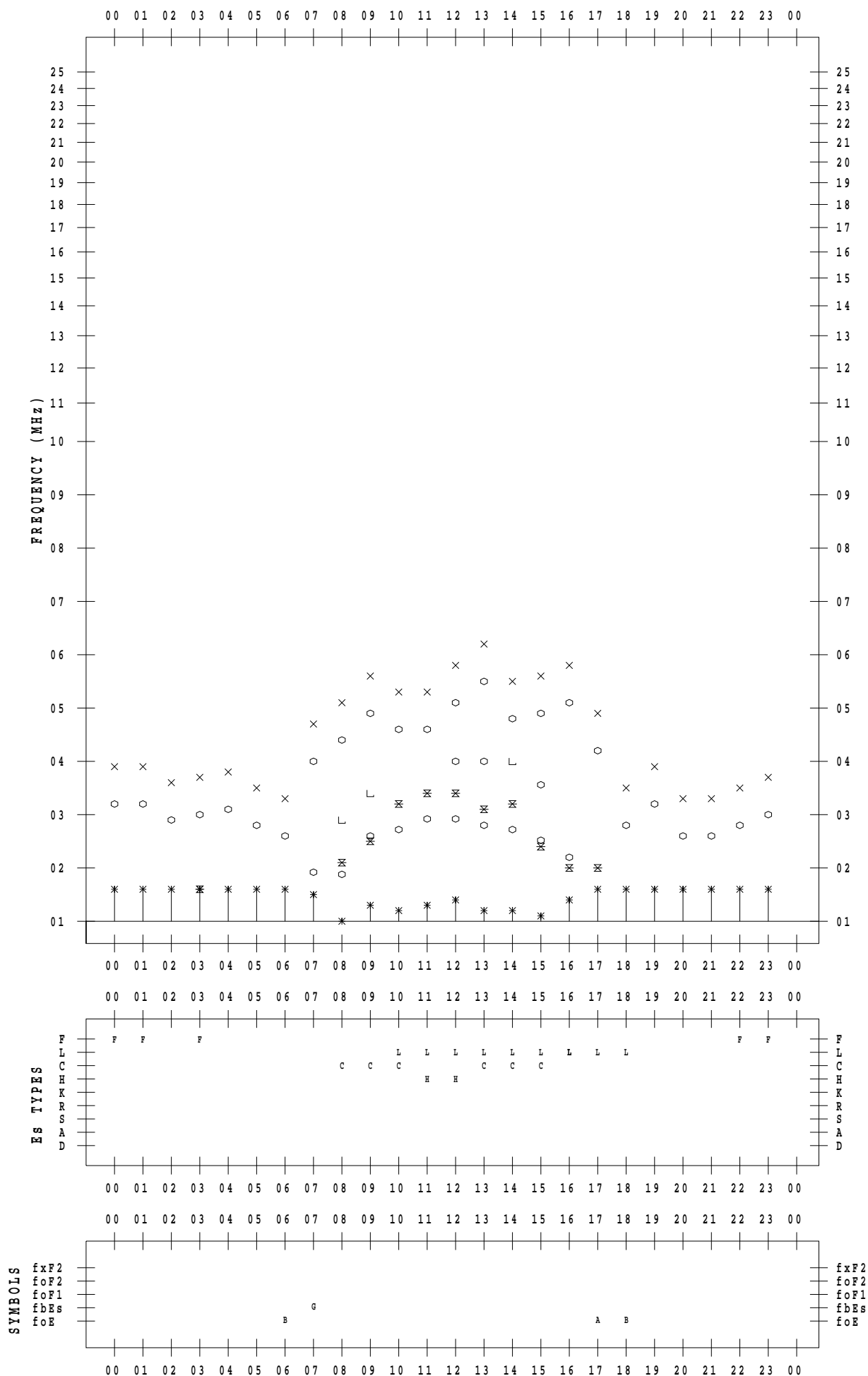
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 17

135 ° E MEAN TIME



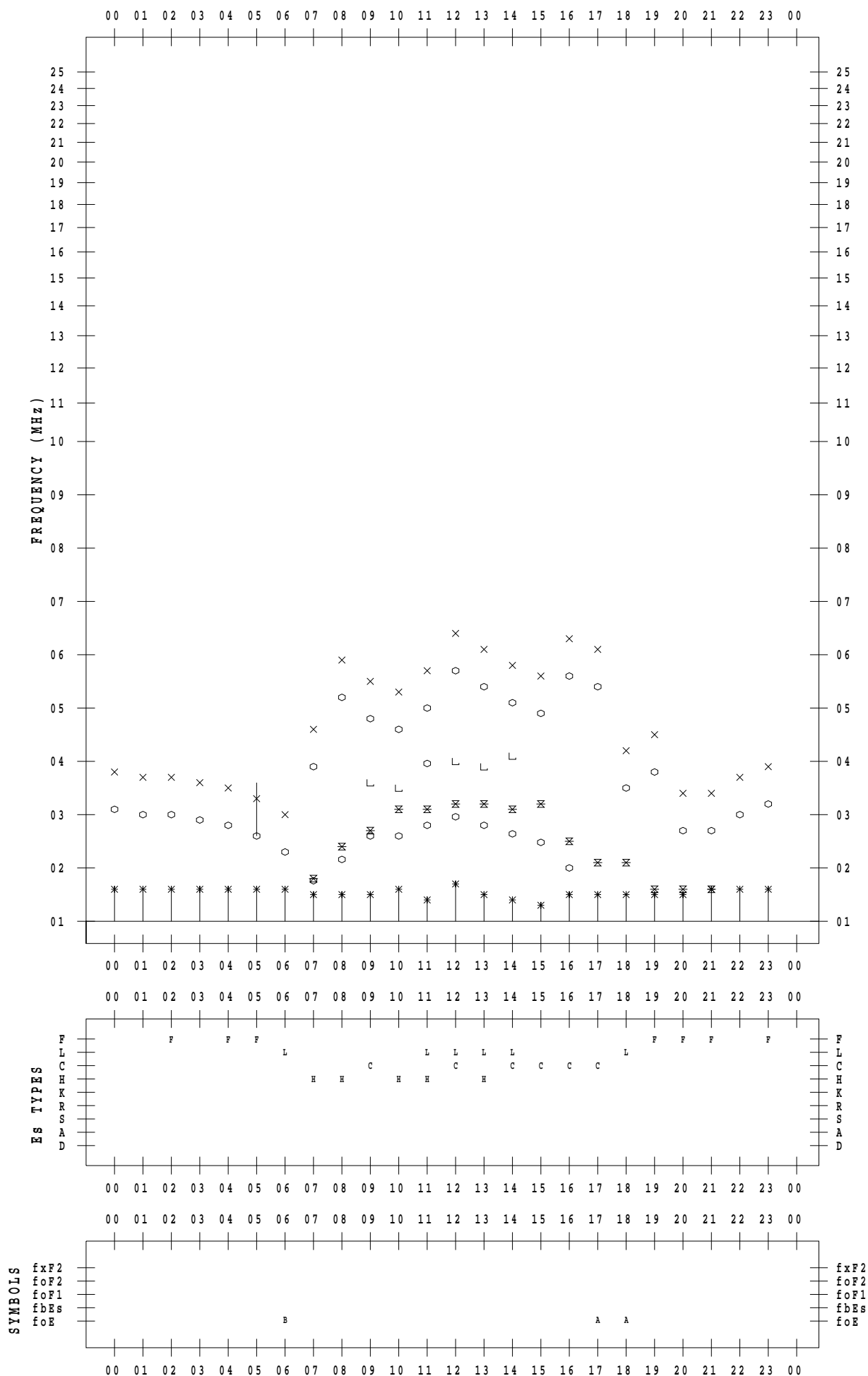
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 18

135 ° E MEAN TIME



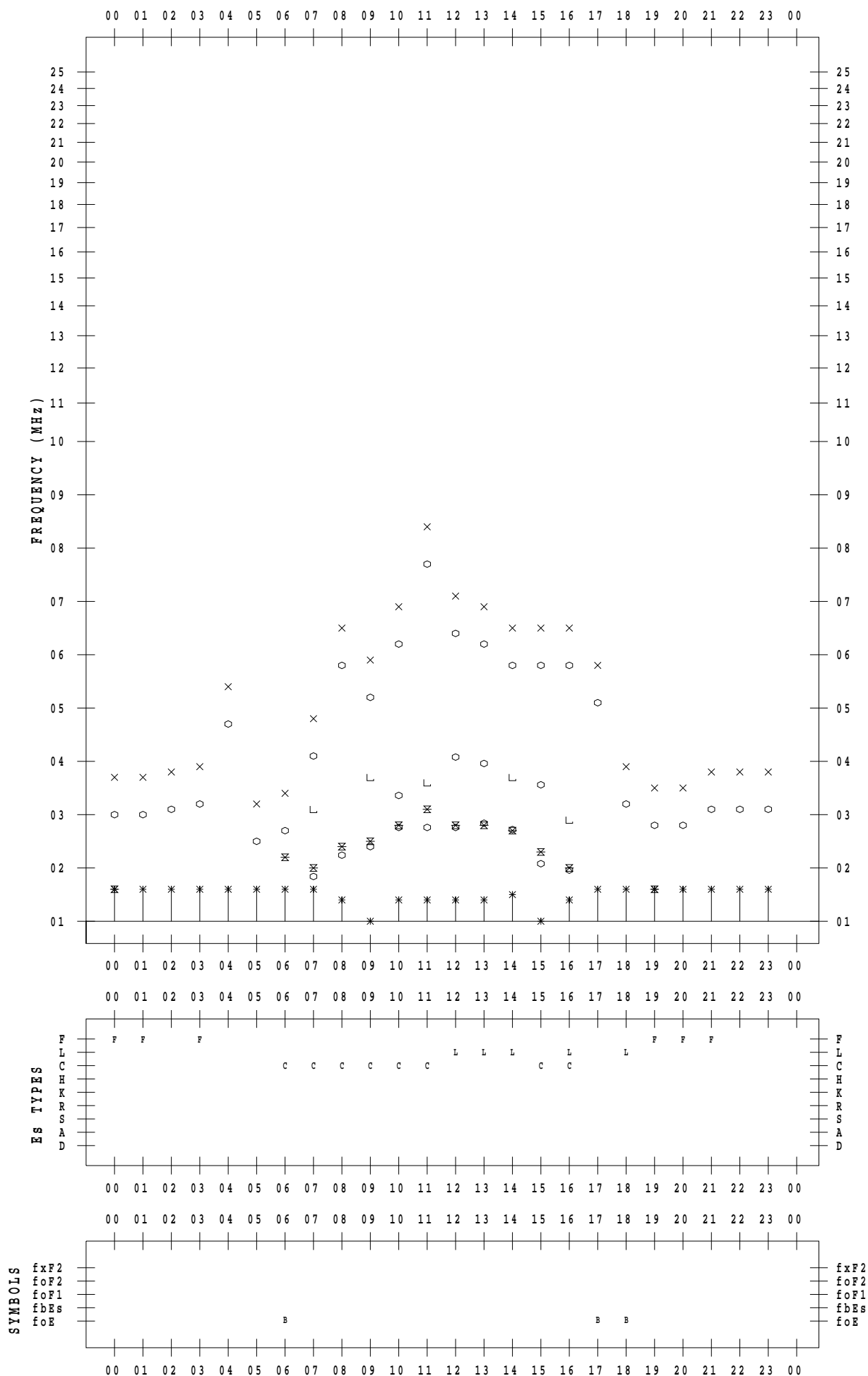
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 19

135 ° E MEAN TIME



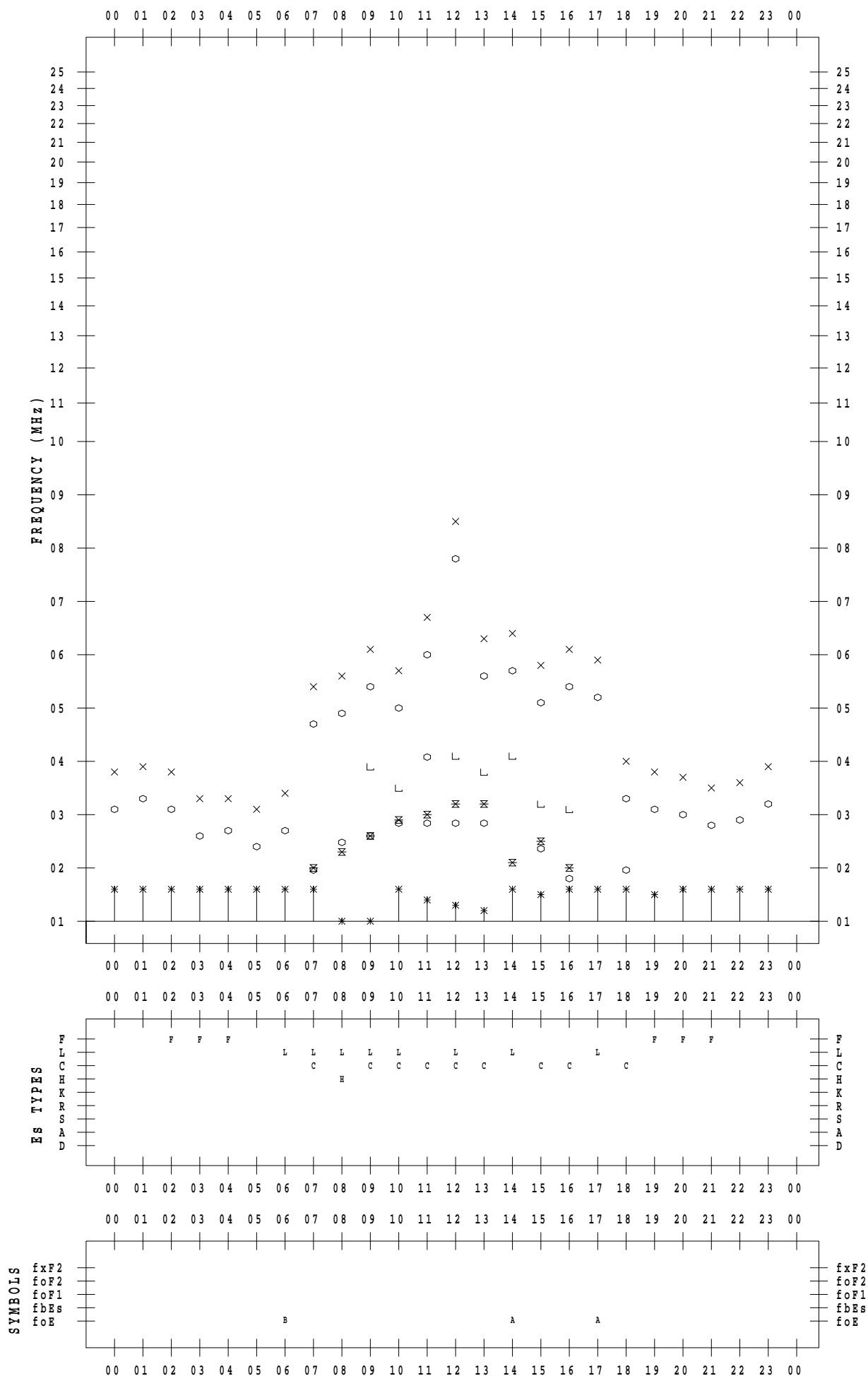
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 20

135 ° E MEAN TIME





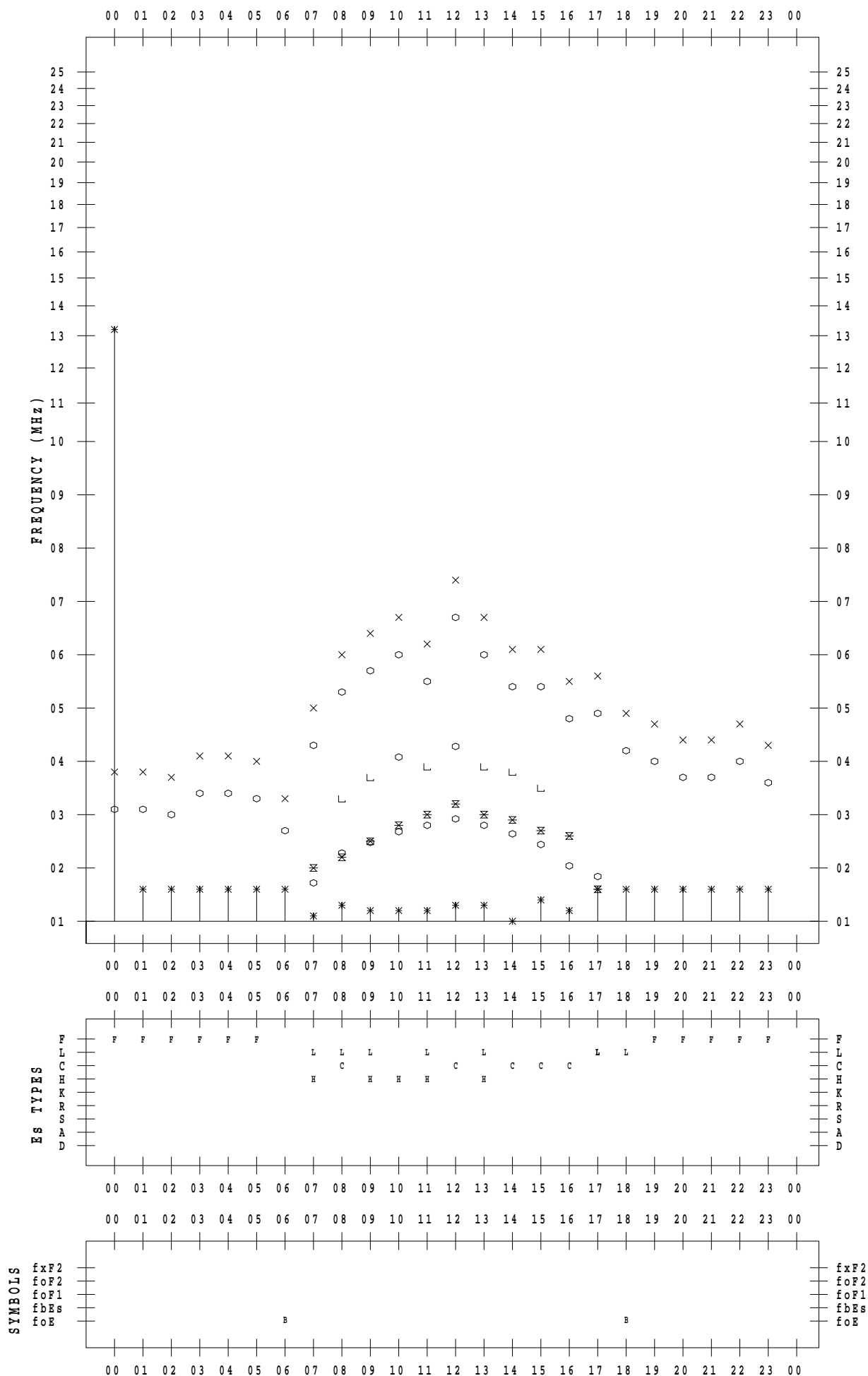
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 21

135 ° E MEAN TIME



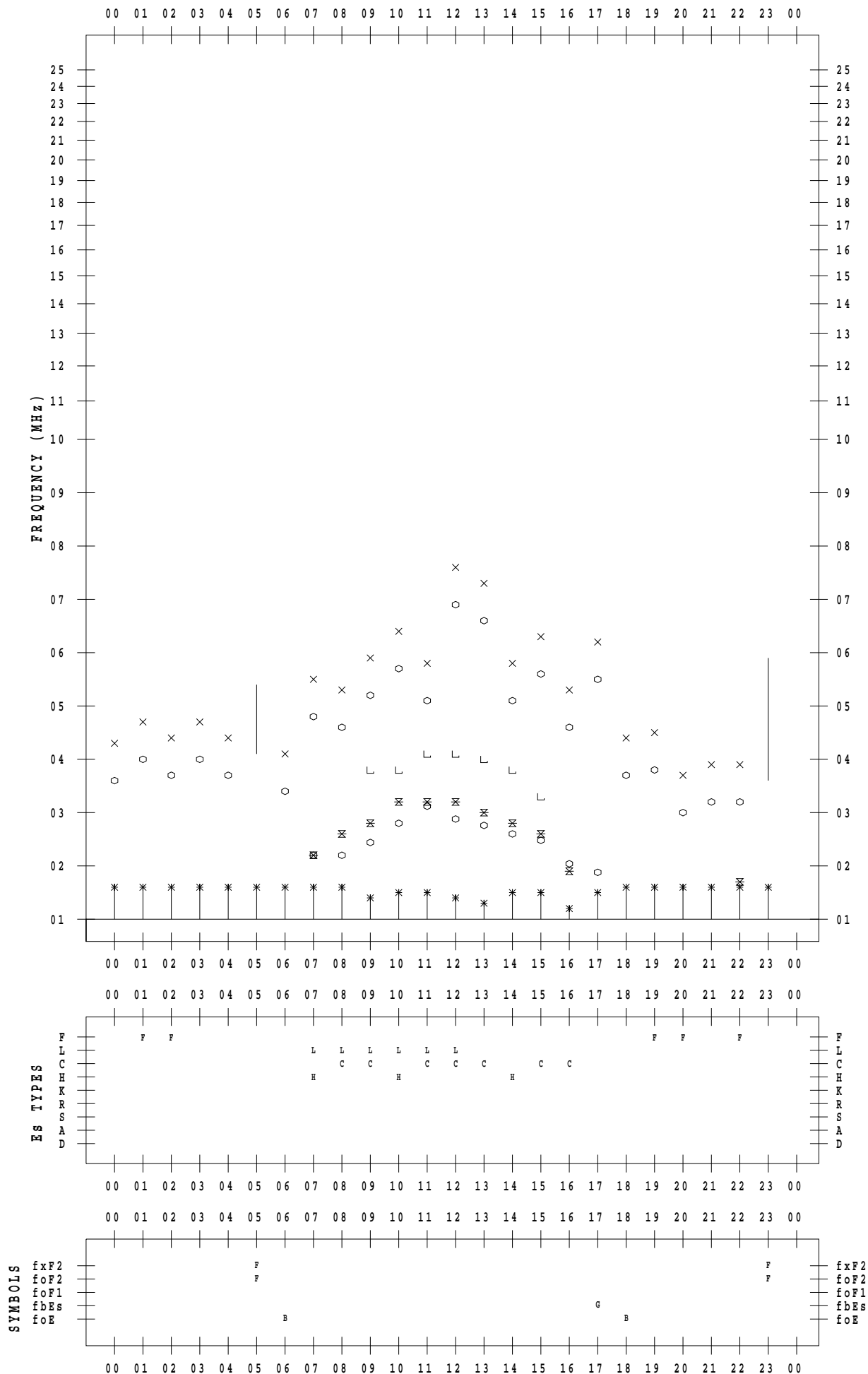
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 22

135 ° E MEAN TIME



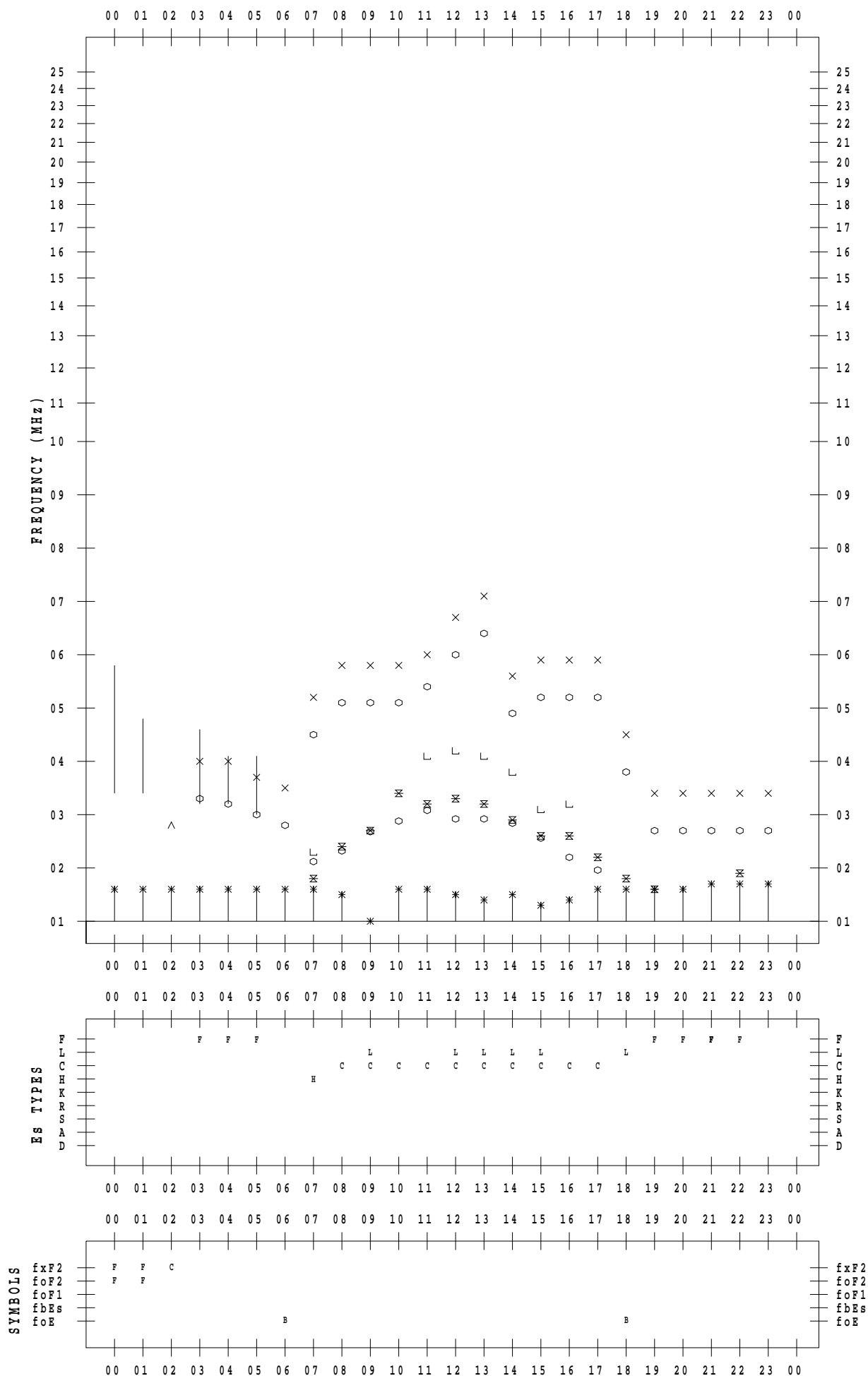
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 23

135 ° E MEAN TIME



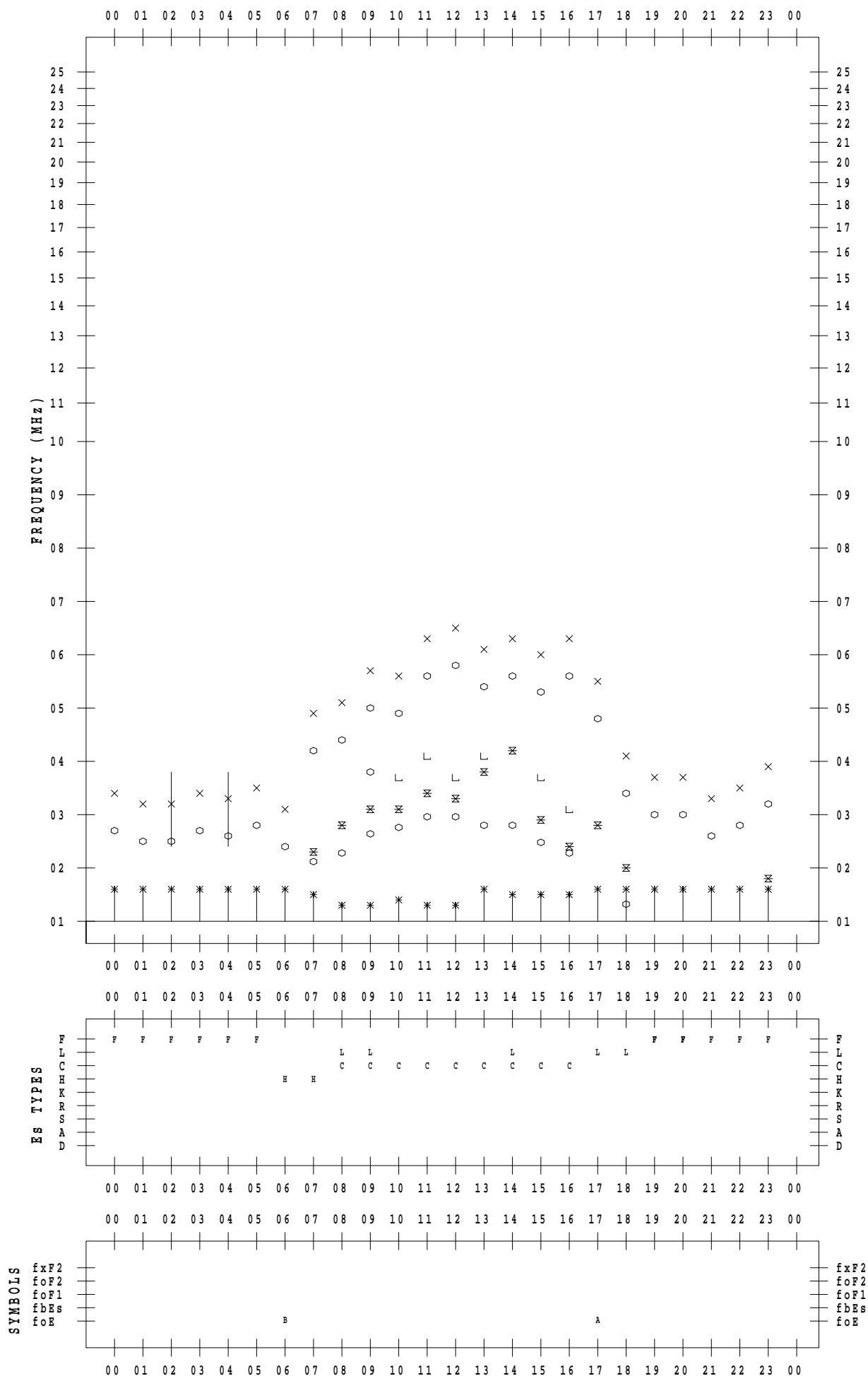
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 24

135 ° E MEAN TIME



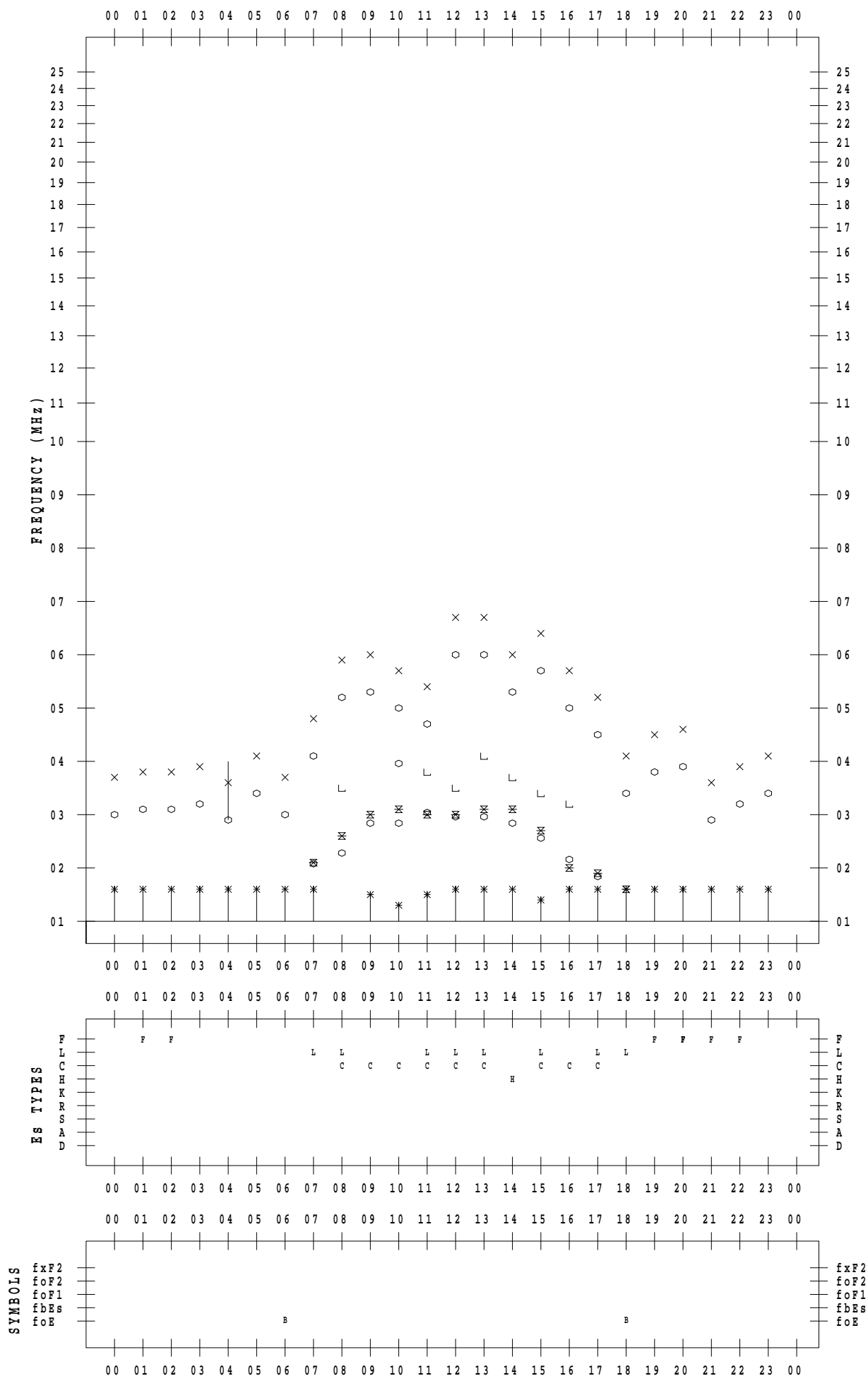
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 25

135 ° E MEAN TIME



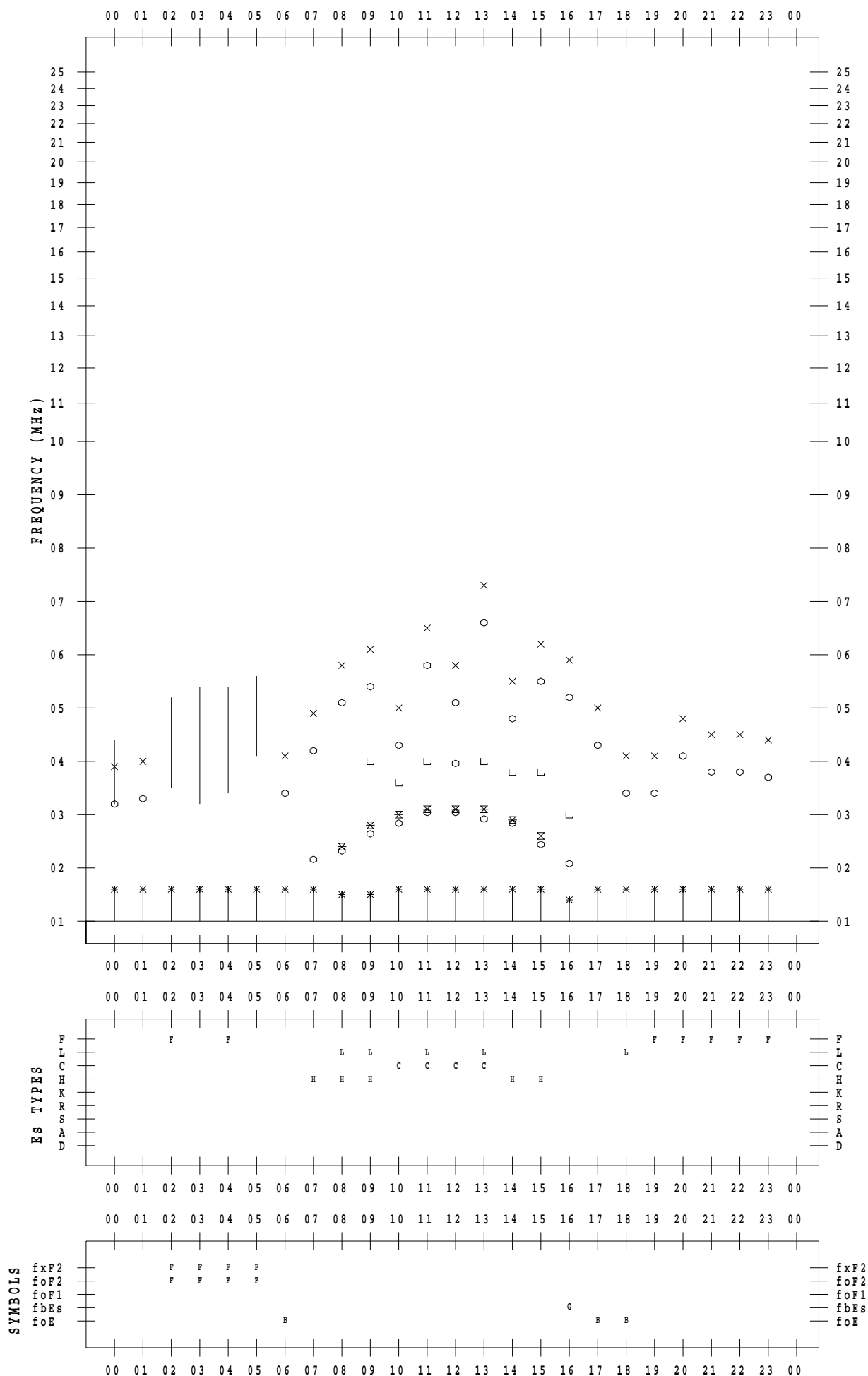
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 26

135 ° E MEAN TIME



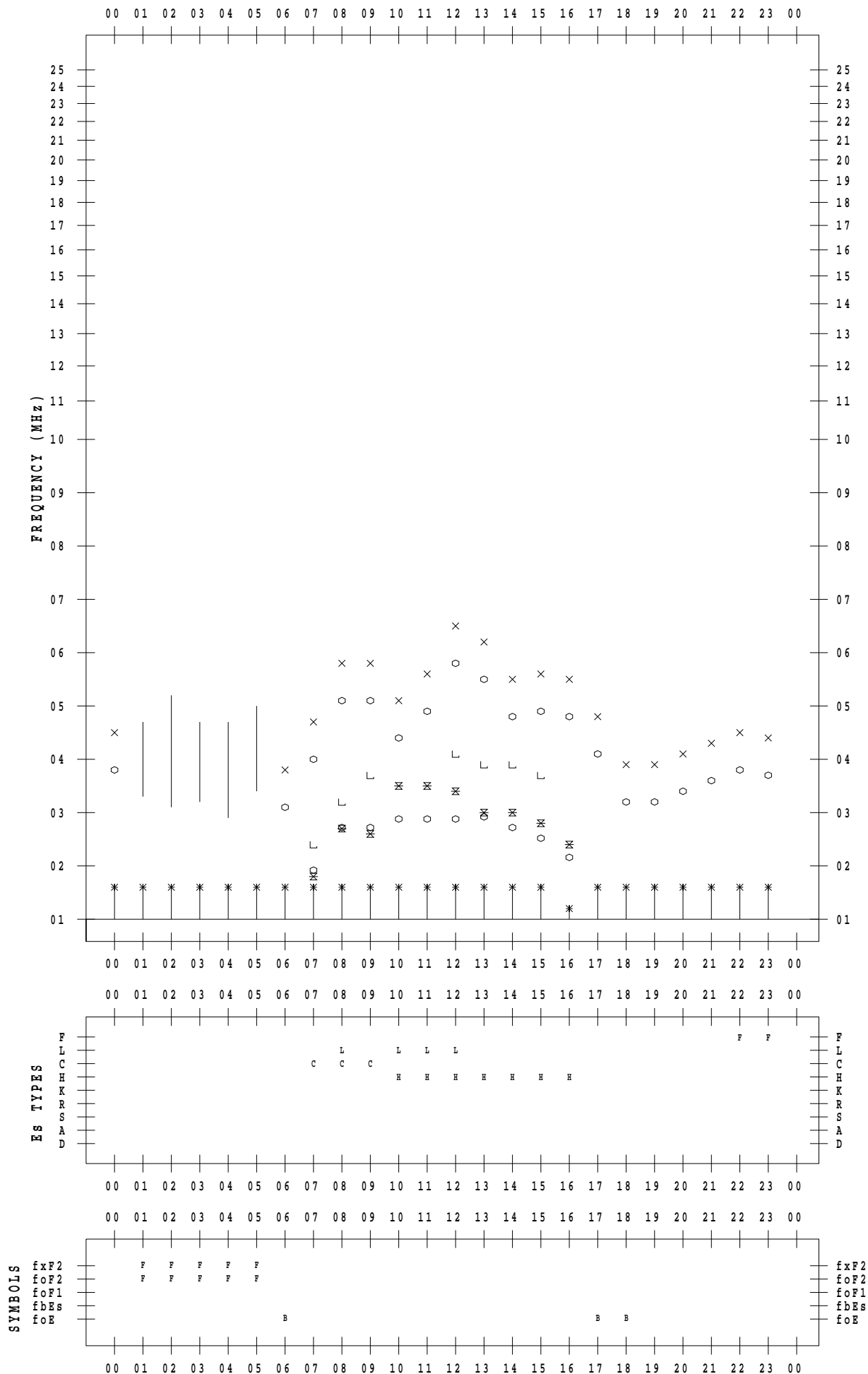
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 27

135 ° E MEAN TIME



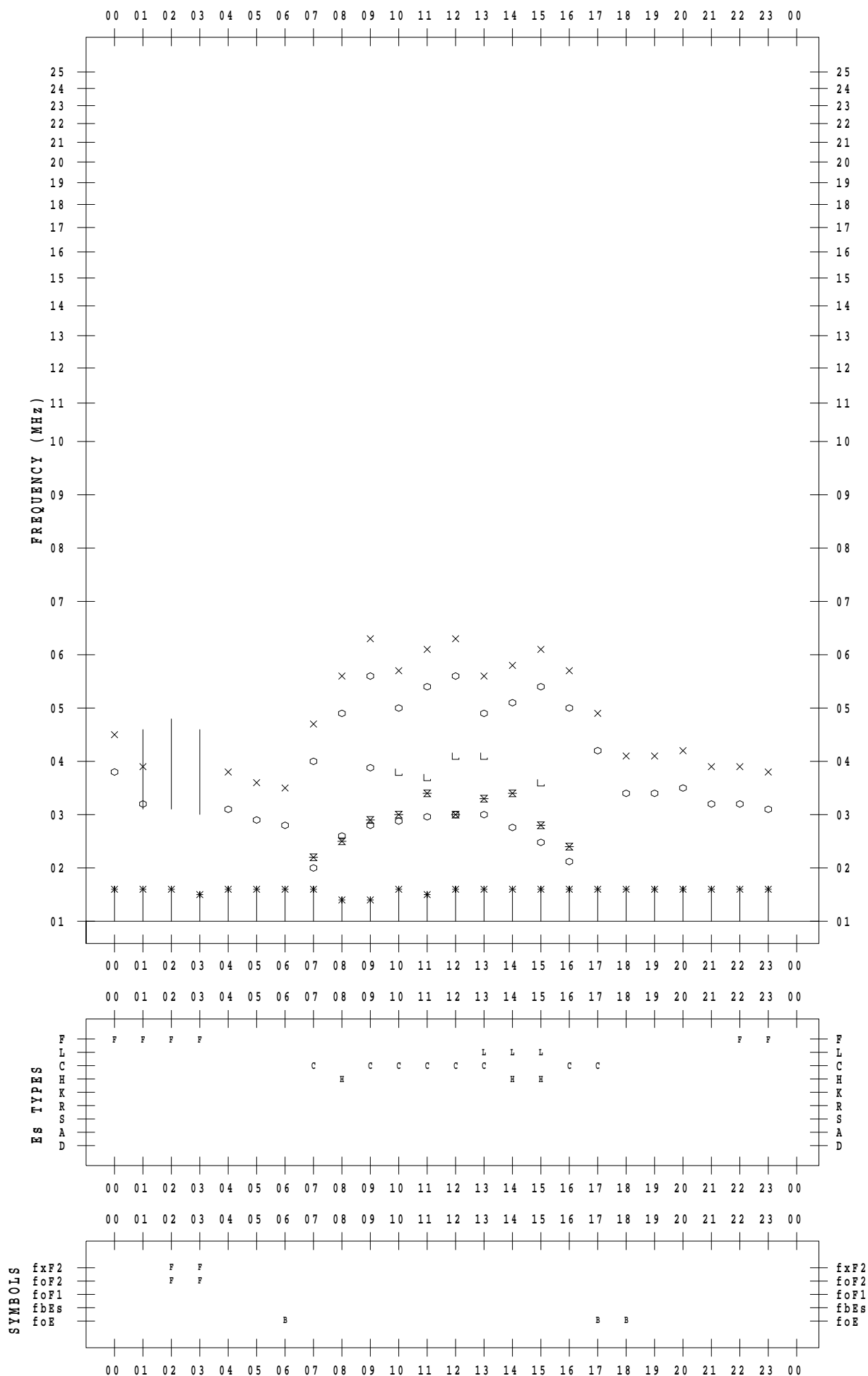
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020 / 2 / 28

135 ° E MEAN TIME





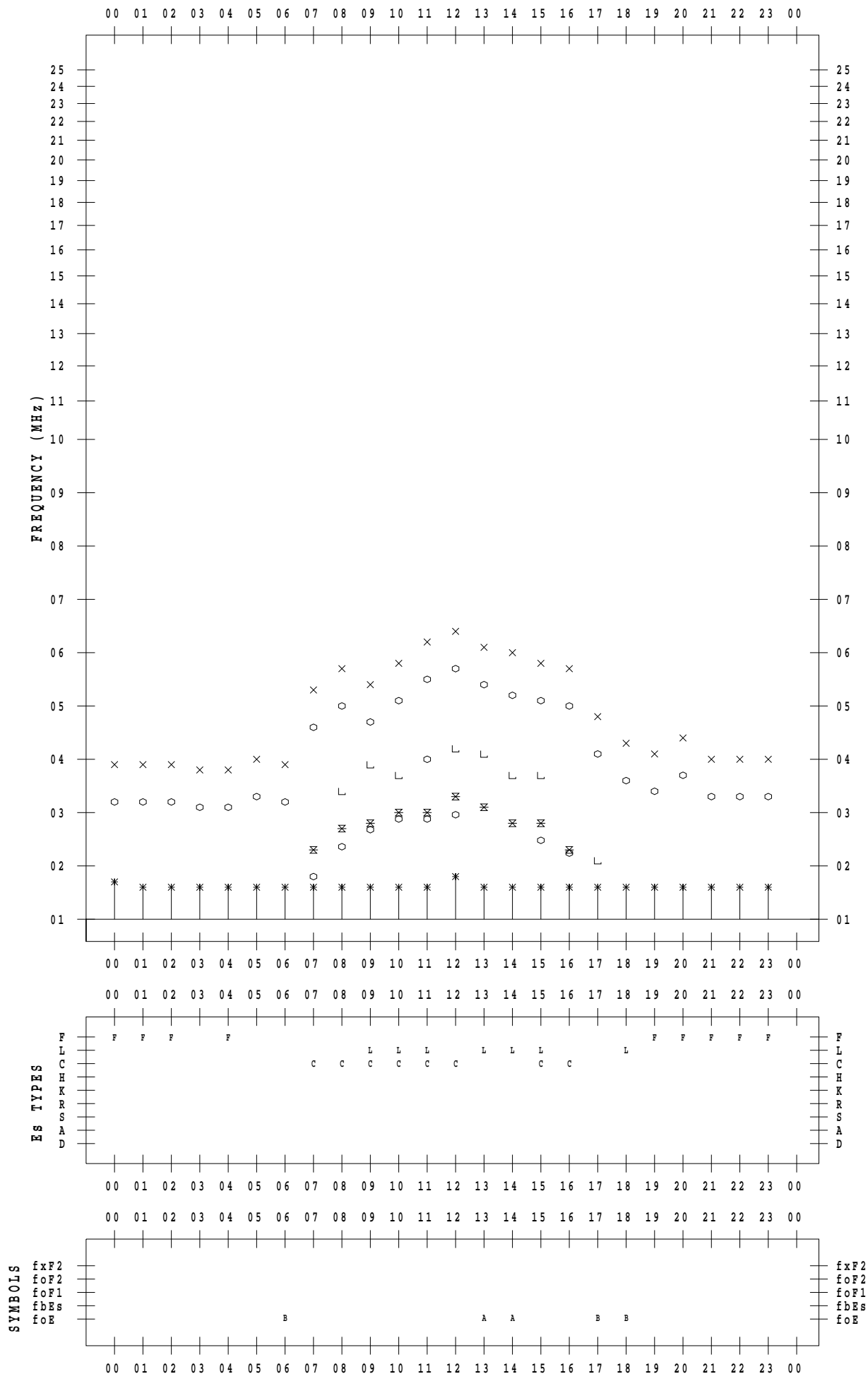
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SCALER :

STATION : Wakkanai

DATE : 2020 / 2 / 29

135 ° E MEAN TIME



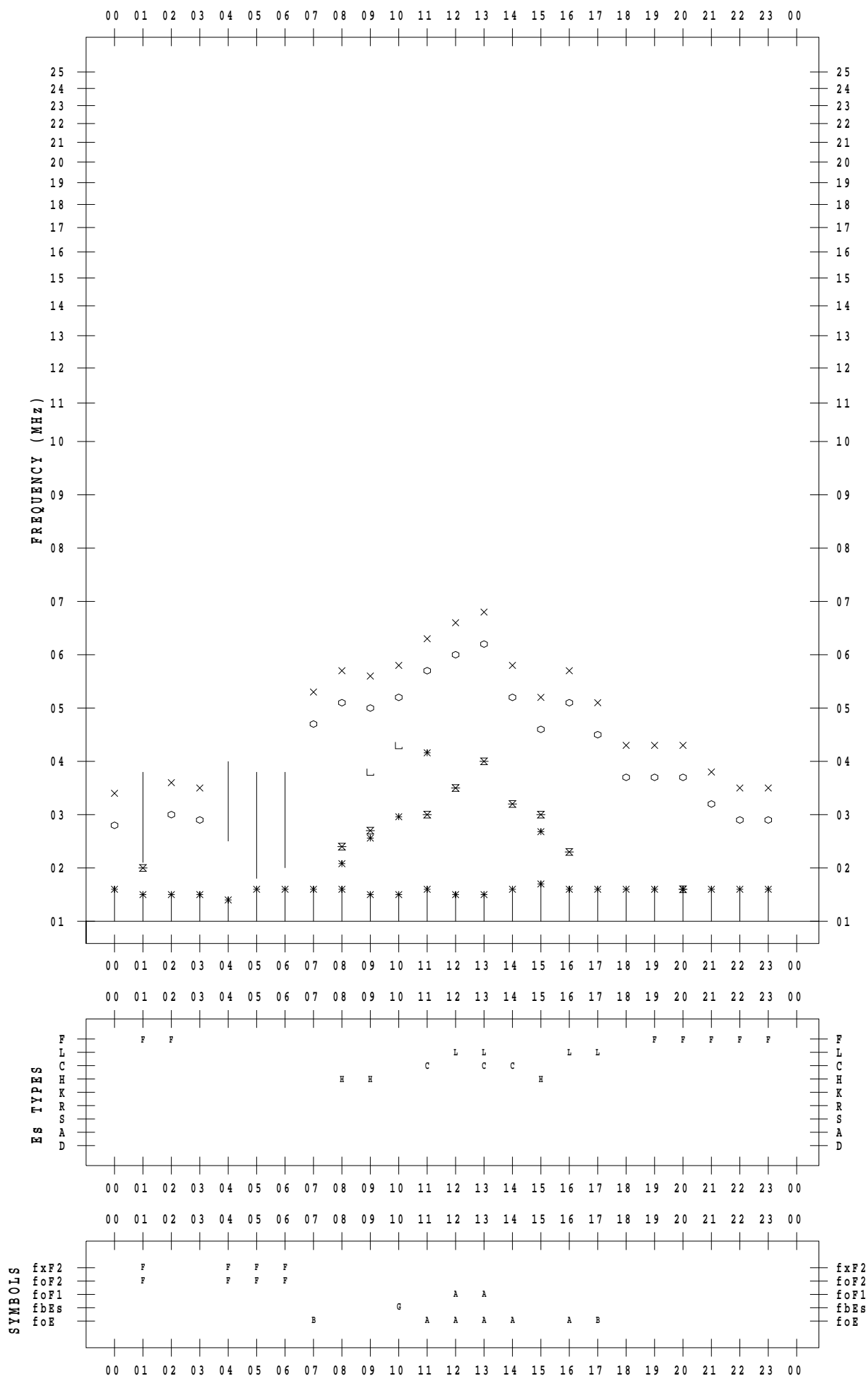
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 1

135 ° E MEAN TIME



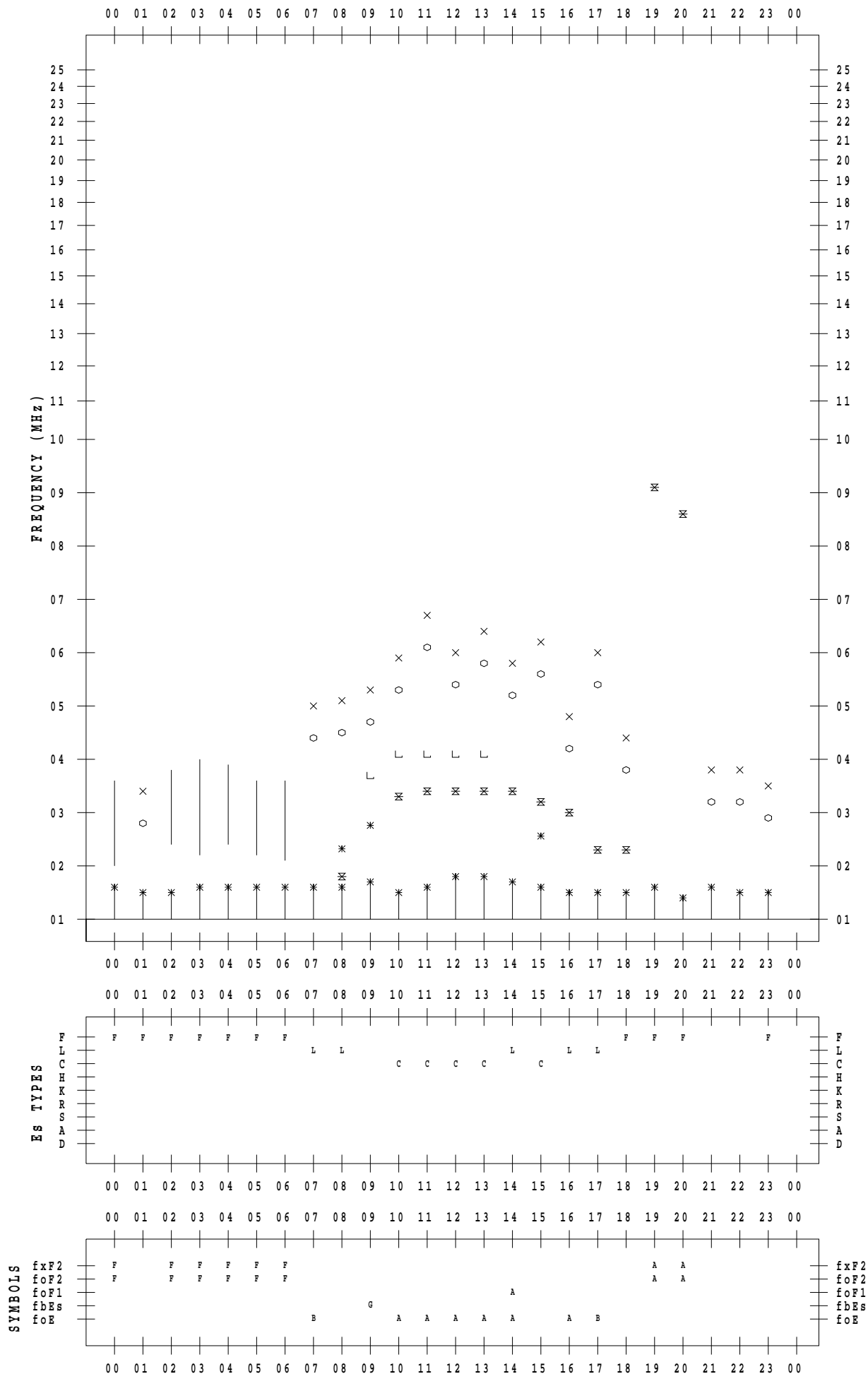
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 2

135 ° E MEAN TIME



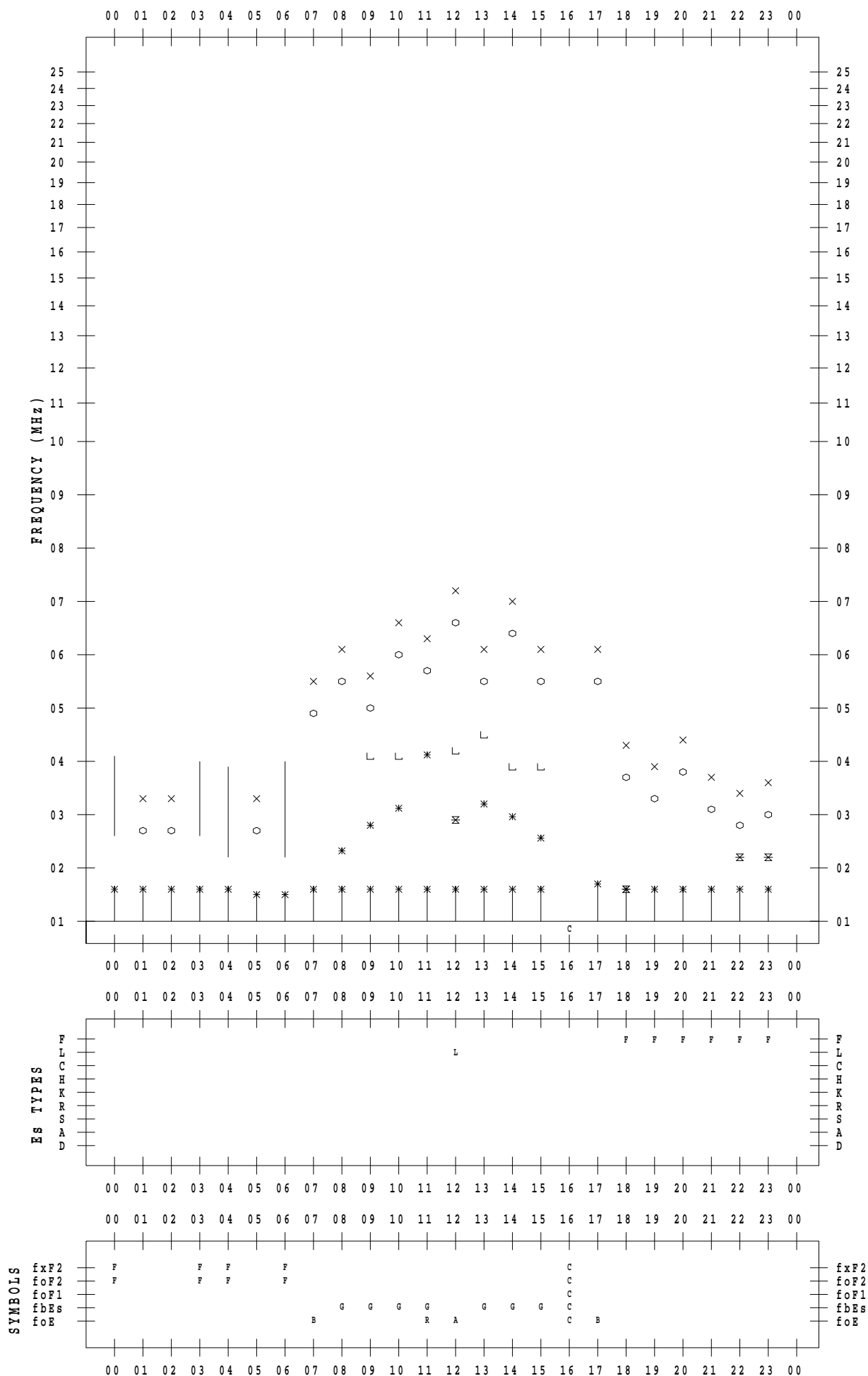
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 3

135 ° E MEAN TIME



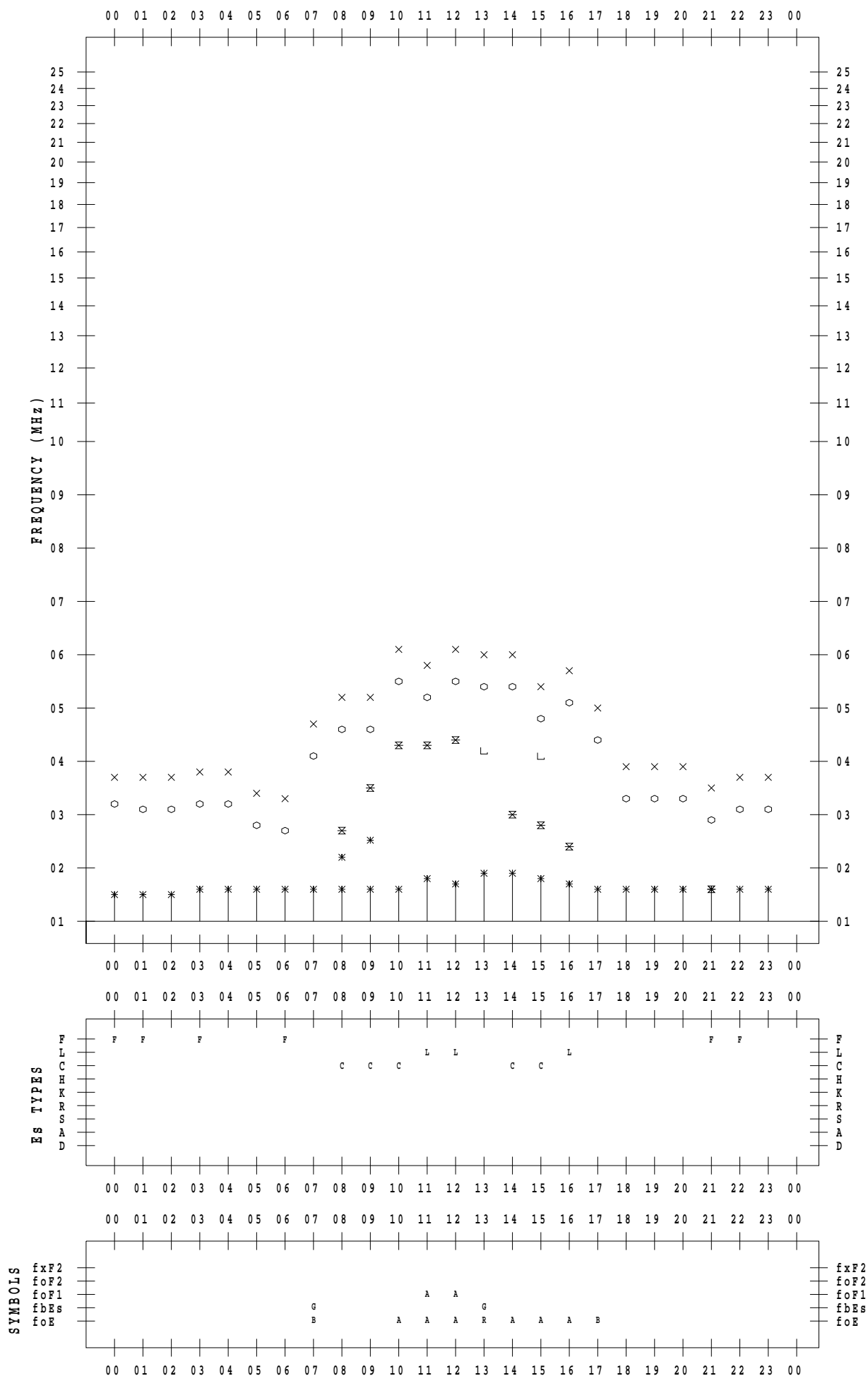
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 4

135 ° E MEAN TIME



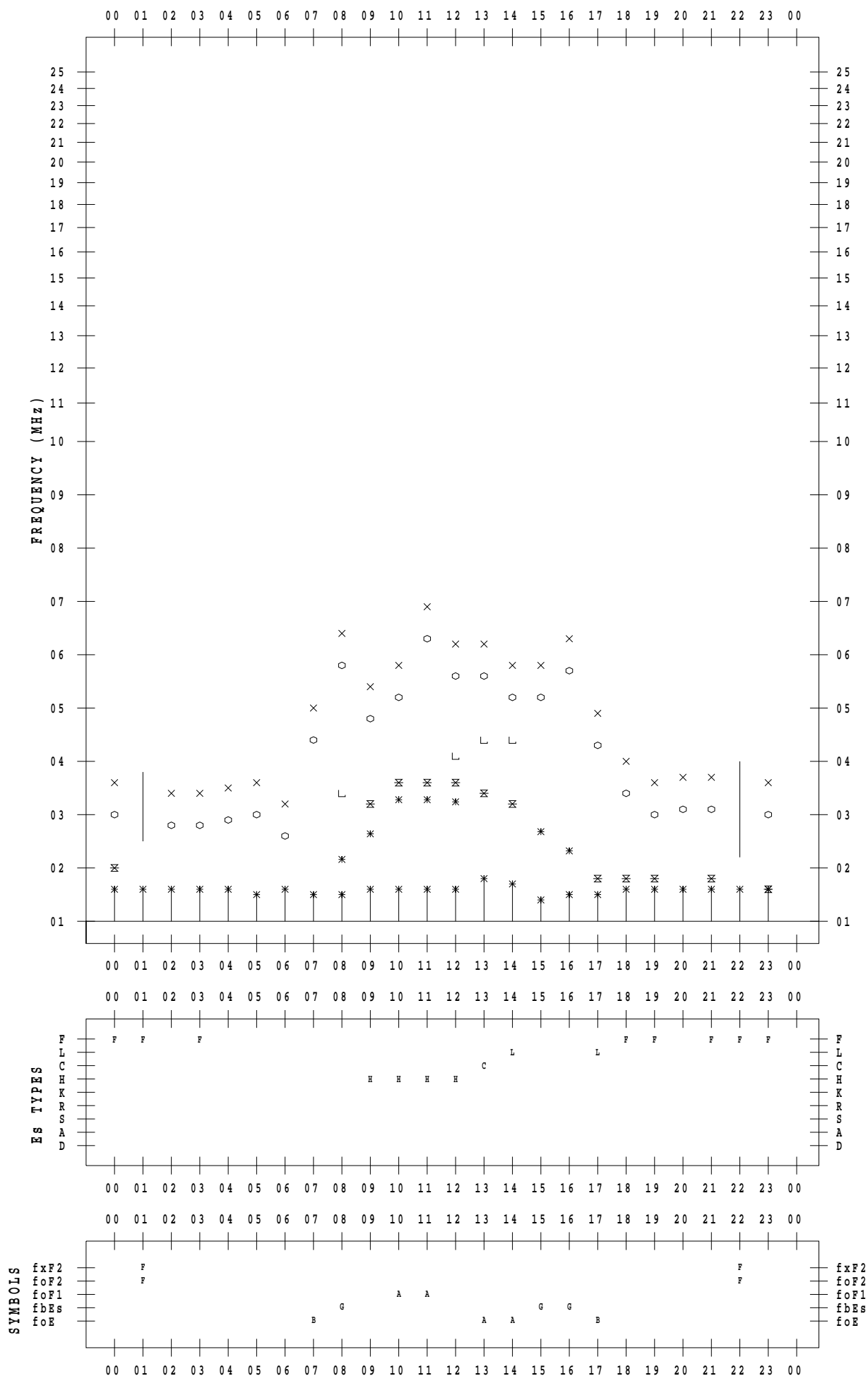
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 5

135 ° E MEAN TIME



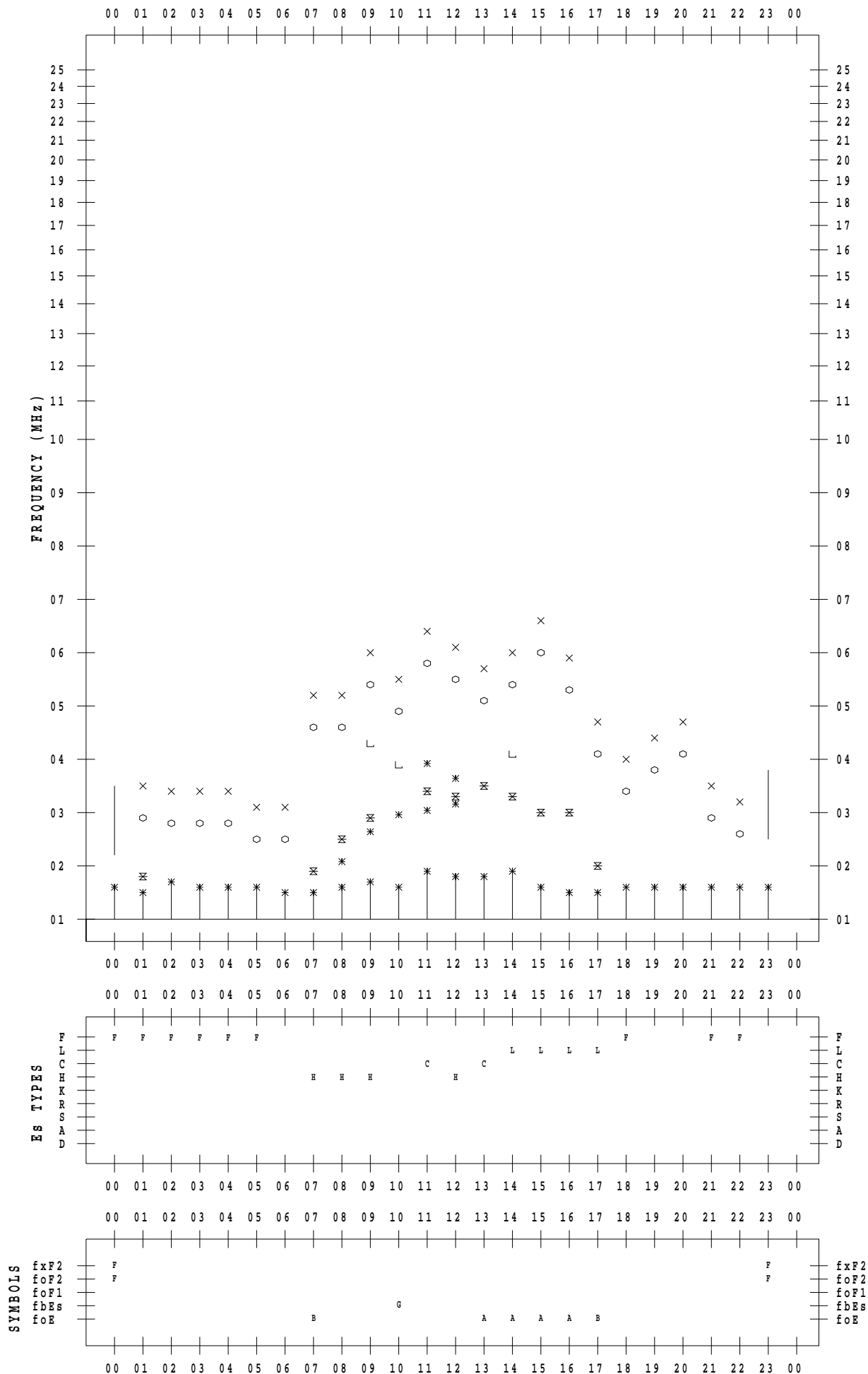
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 6

135 ° E MEAN TIME



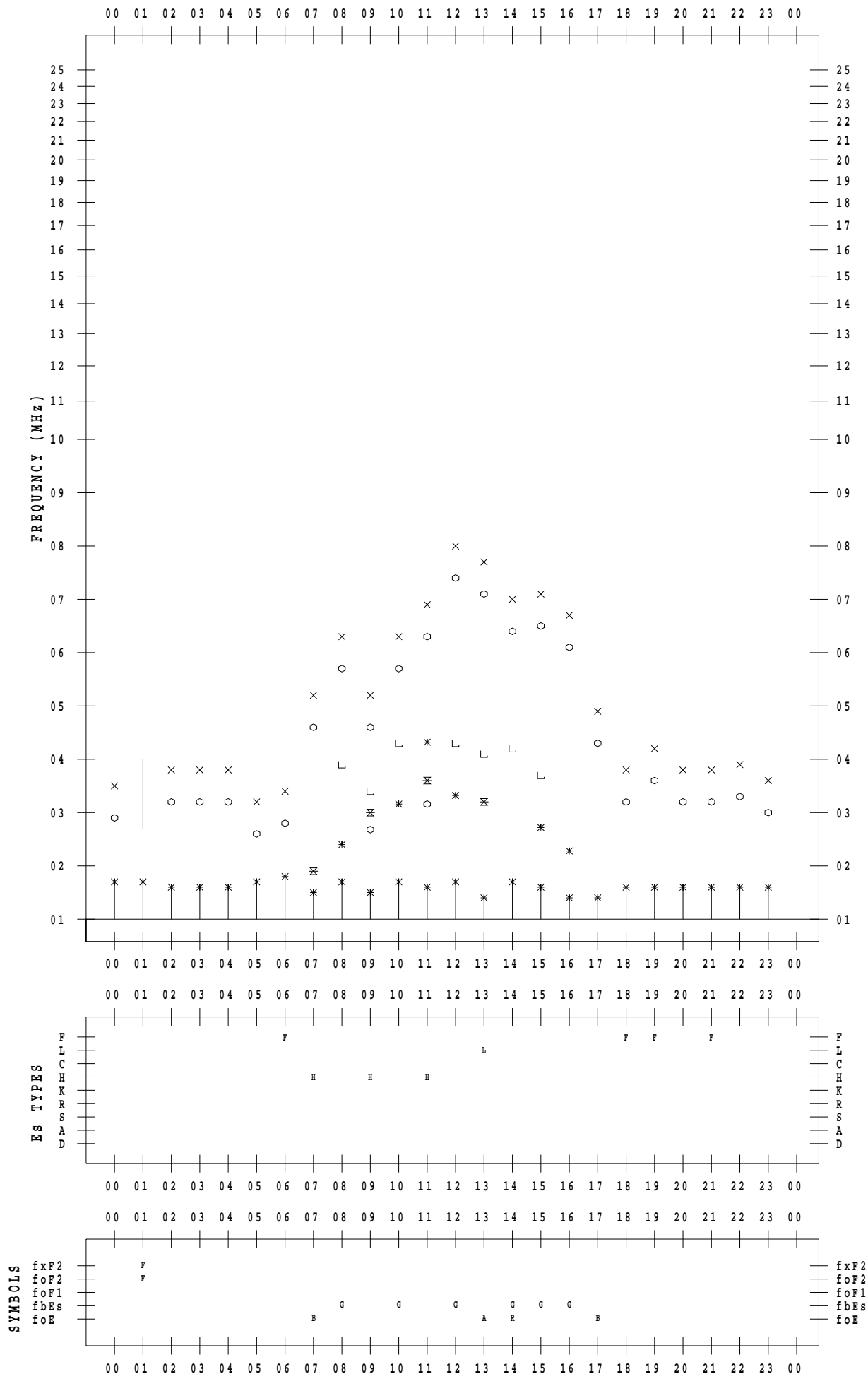
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 7

135 ° E MEAN TIME





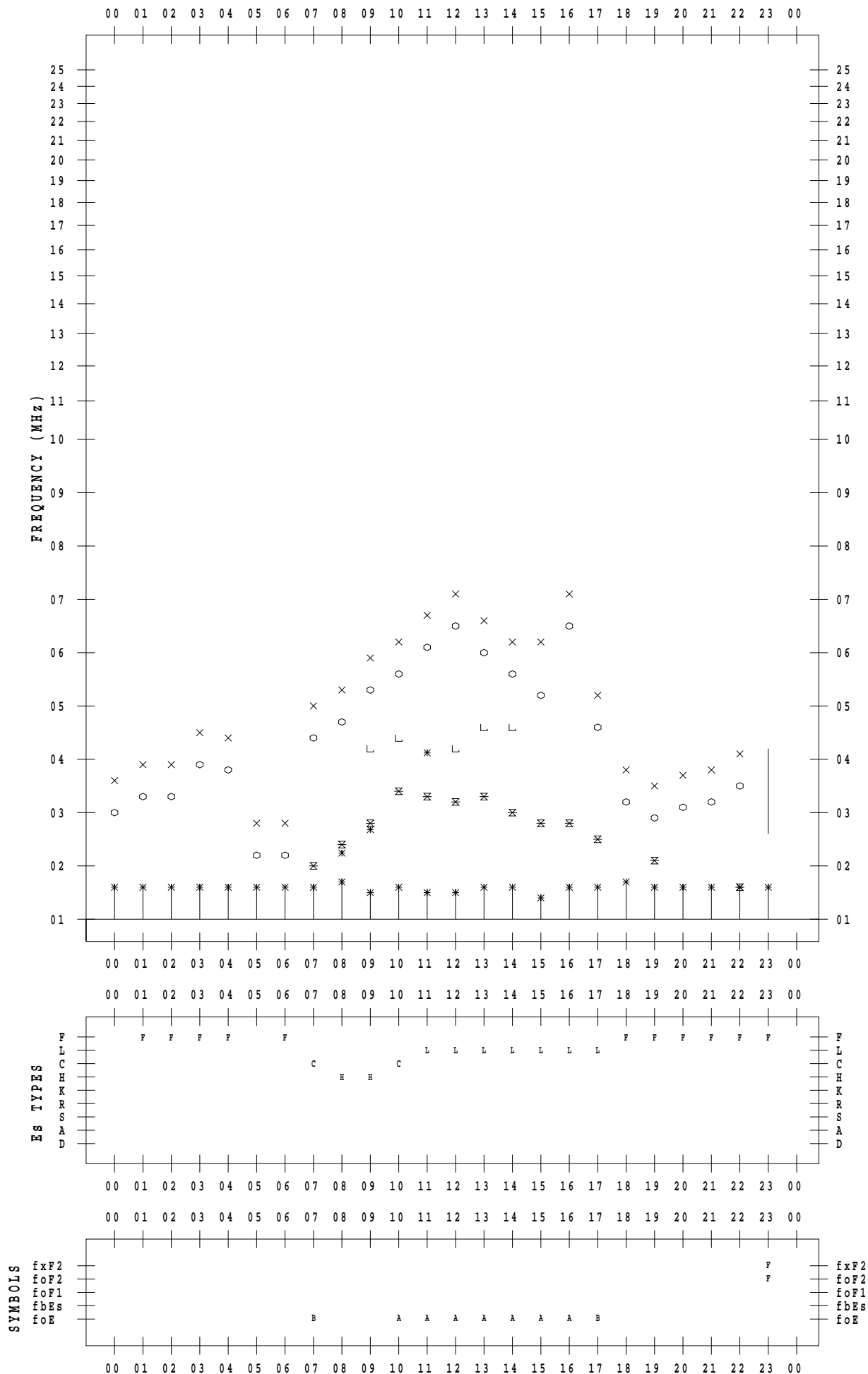
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 8

135 ° E MEAN TIME



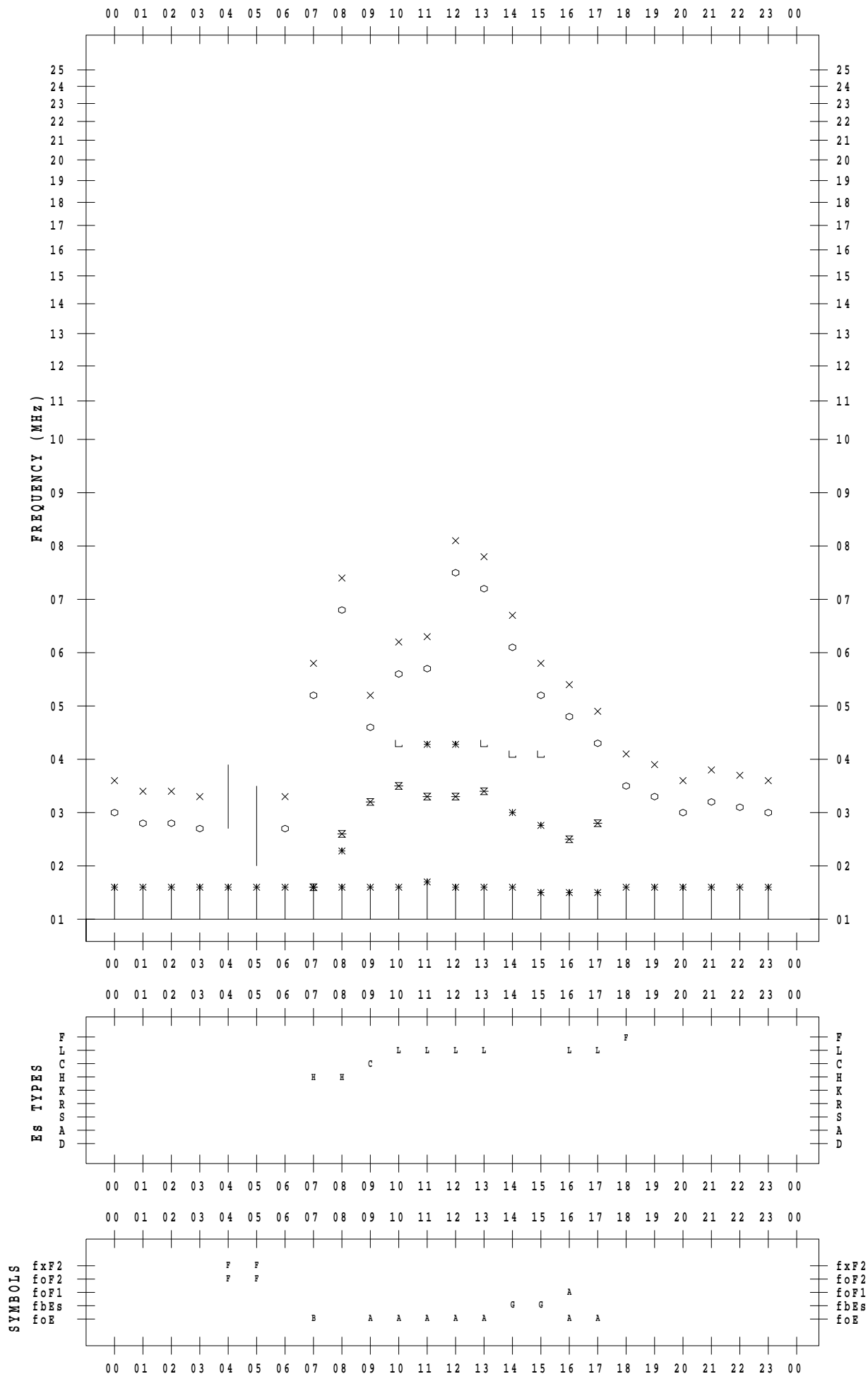
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 9

135 ° E MEAN TIME



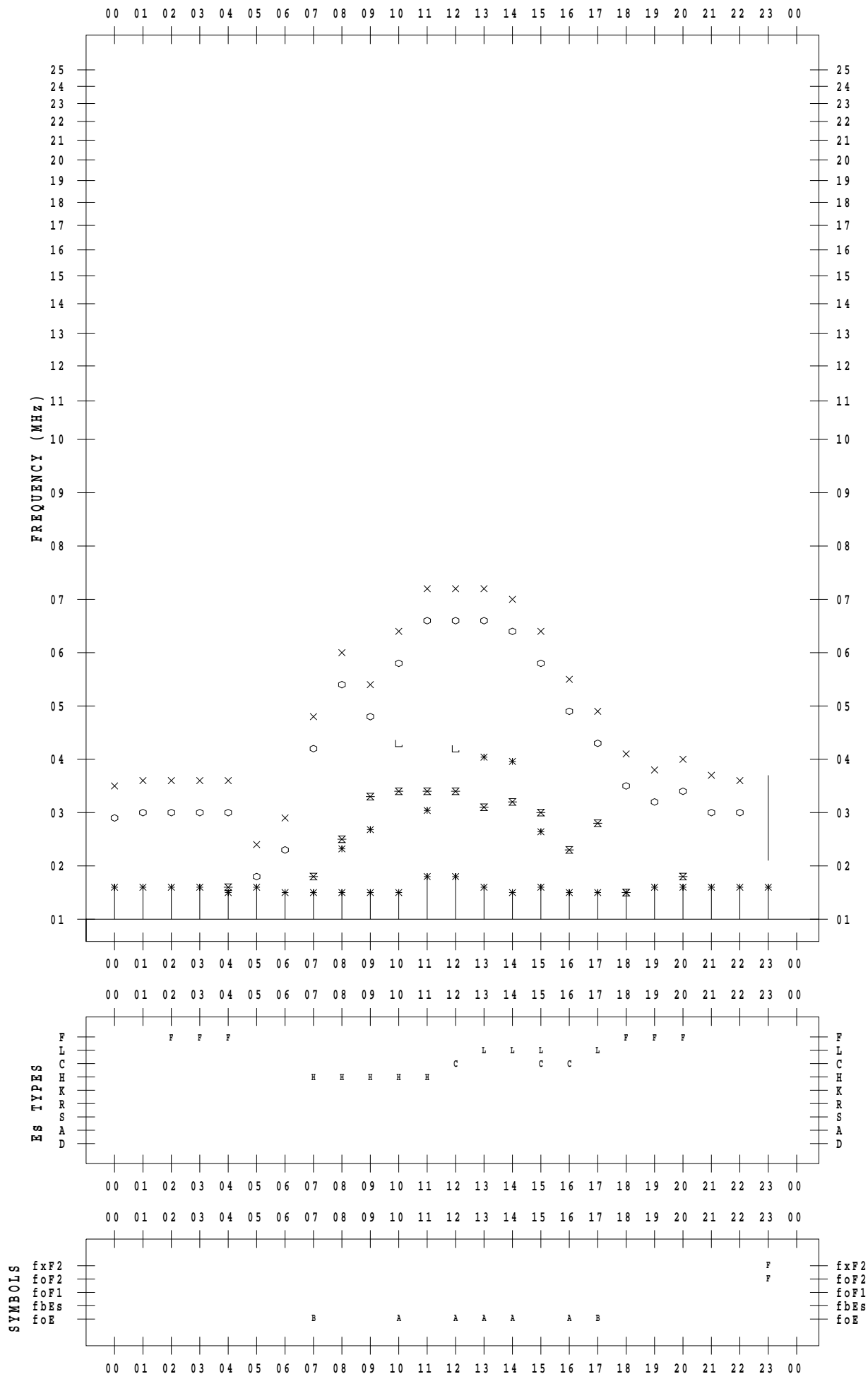
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 10

135 ° E MEAN TIME



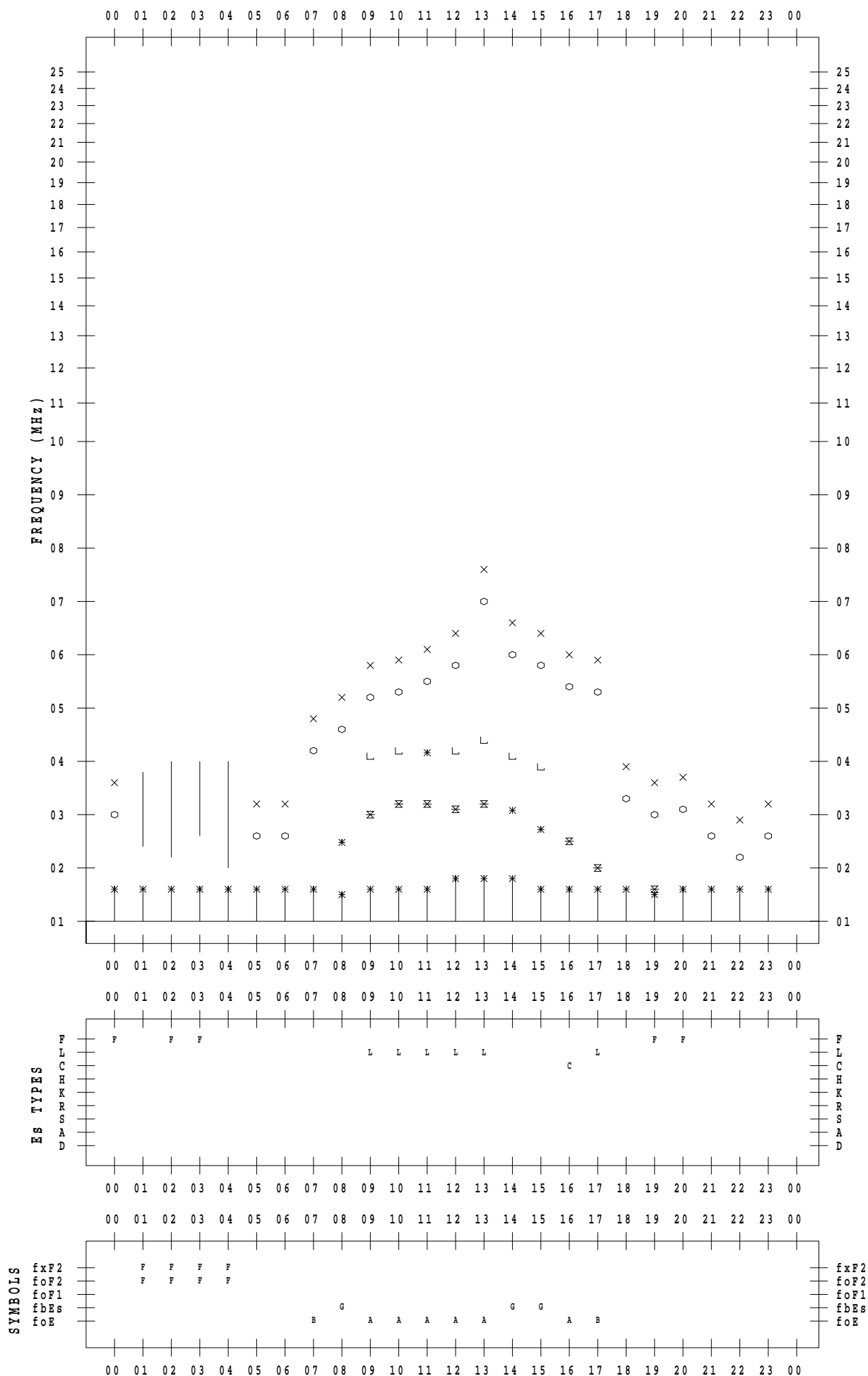
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 11

135 ° E MEAN TIME



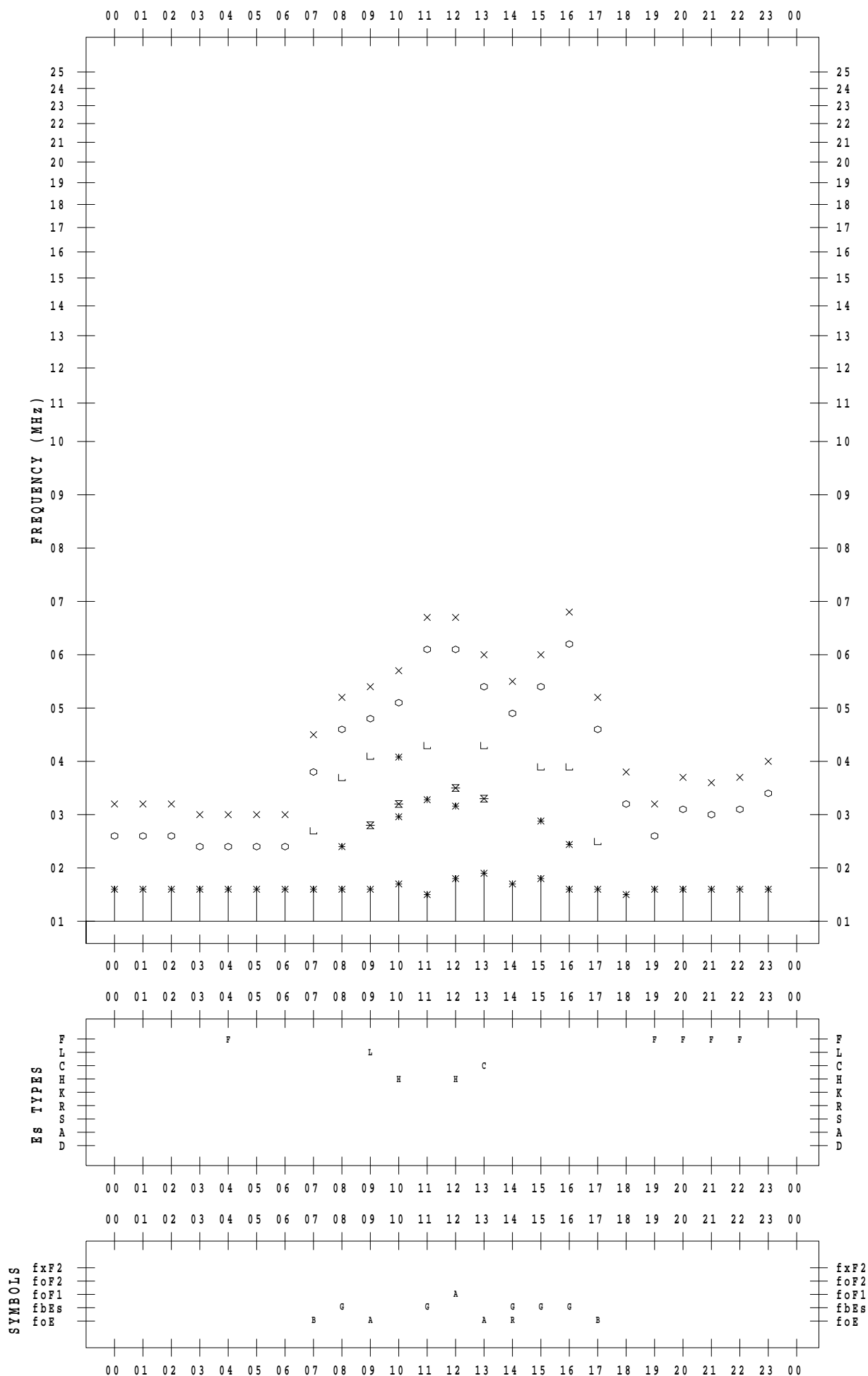
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 12

135 ° E MEAN TIME



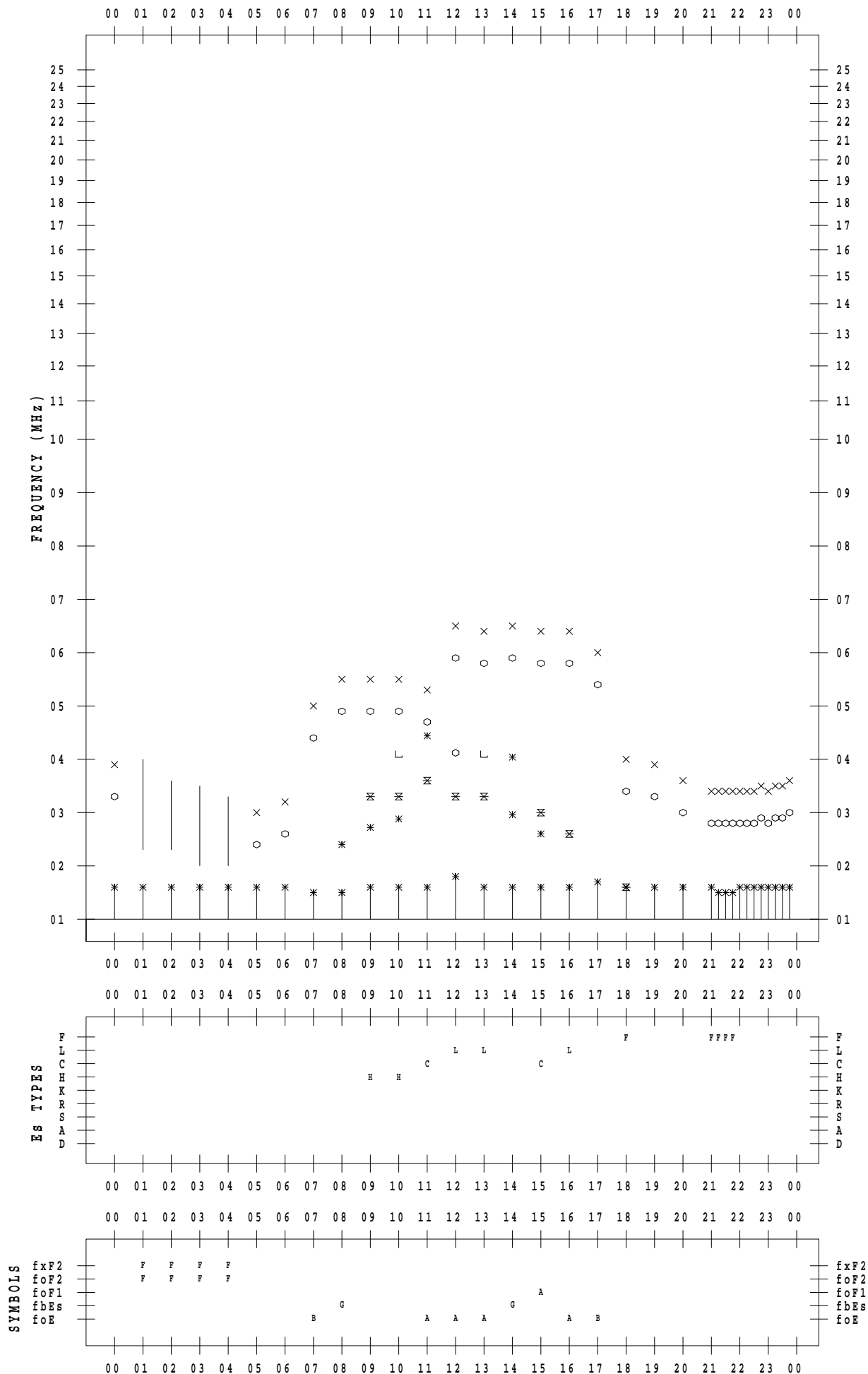
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 13

135 ° E MEAN TIME



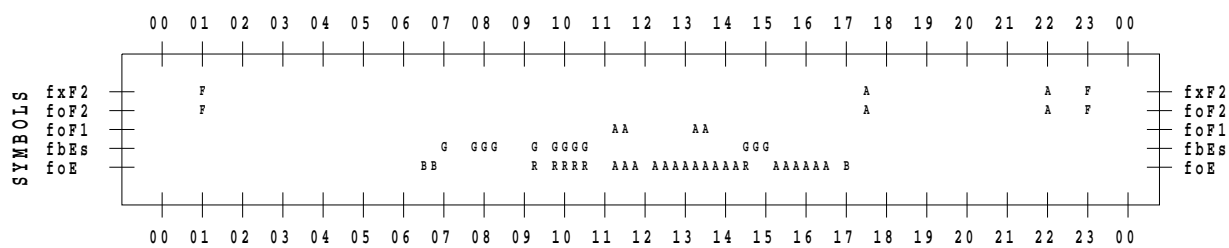
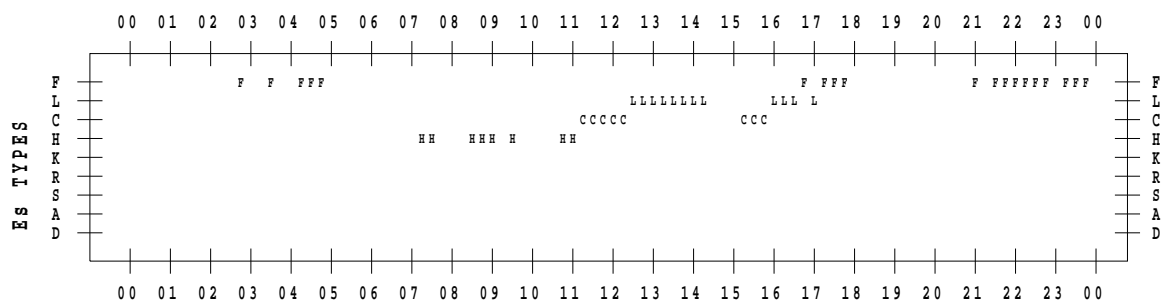
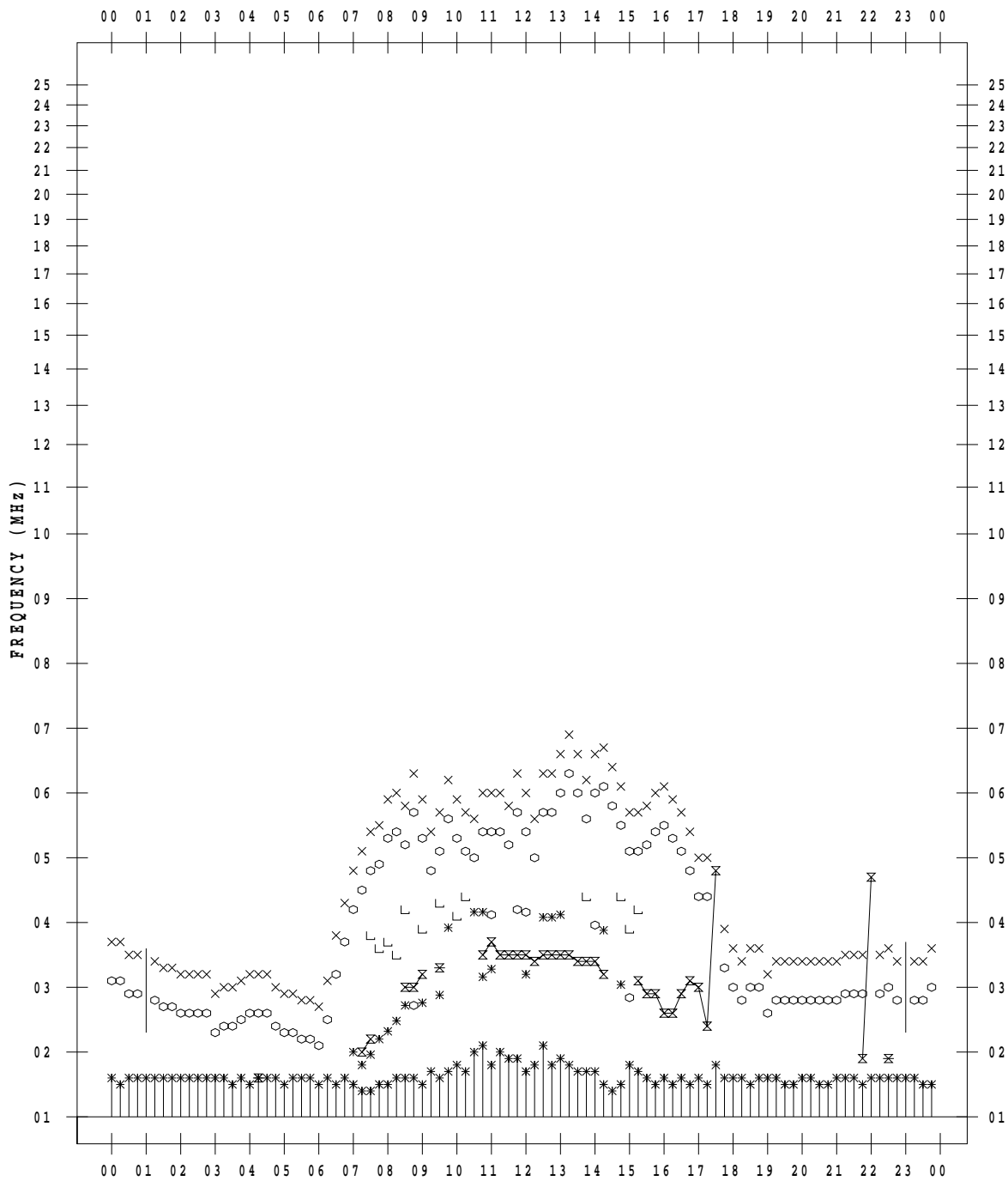
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 14

135 ° E MEAN TIME



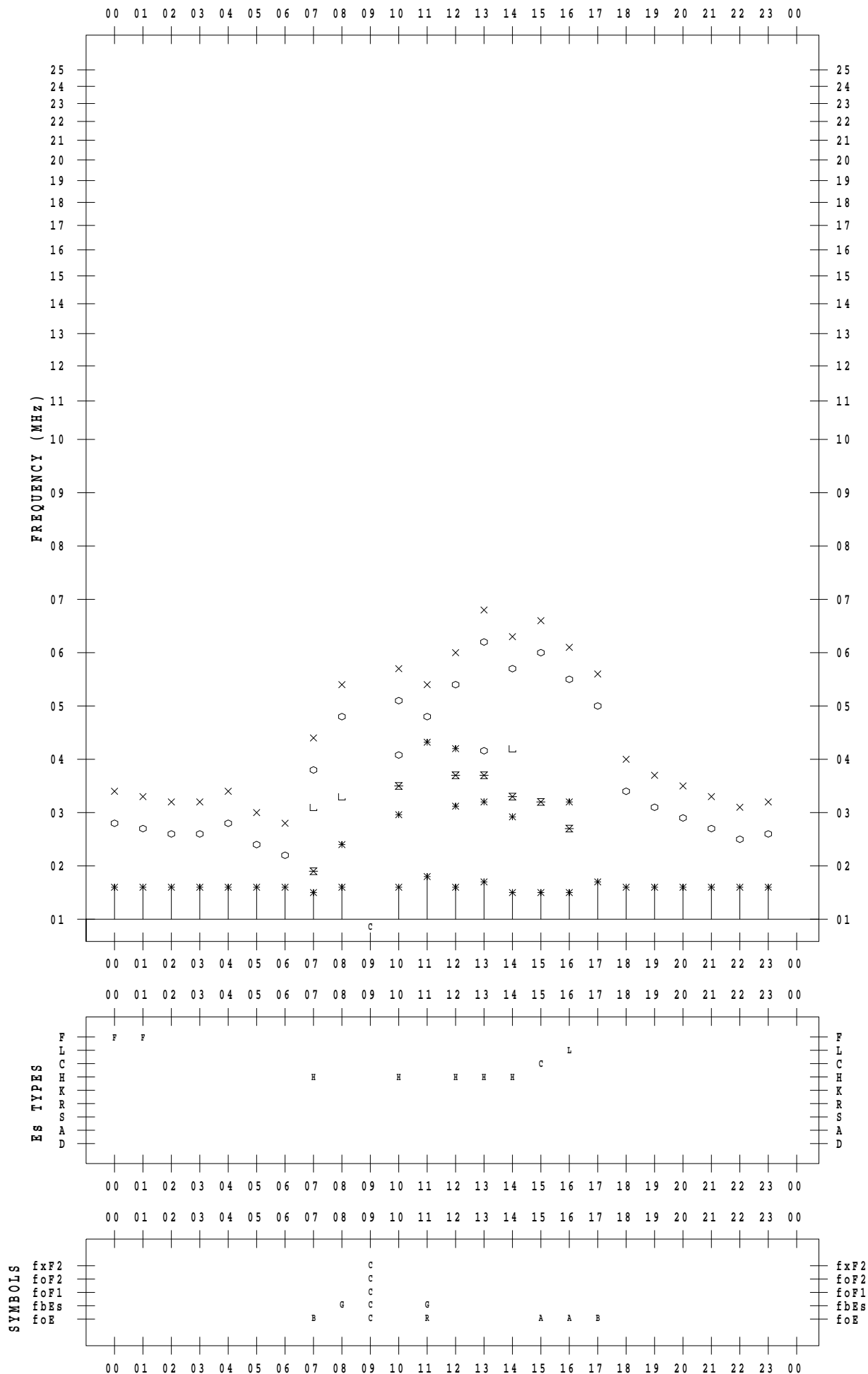
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STATION : Kokubunji

DATE : 2020 / 2 / 15

135 ° E MEAN TIME





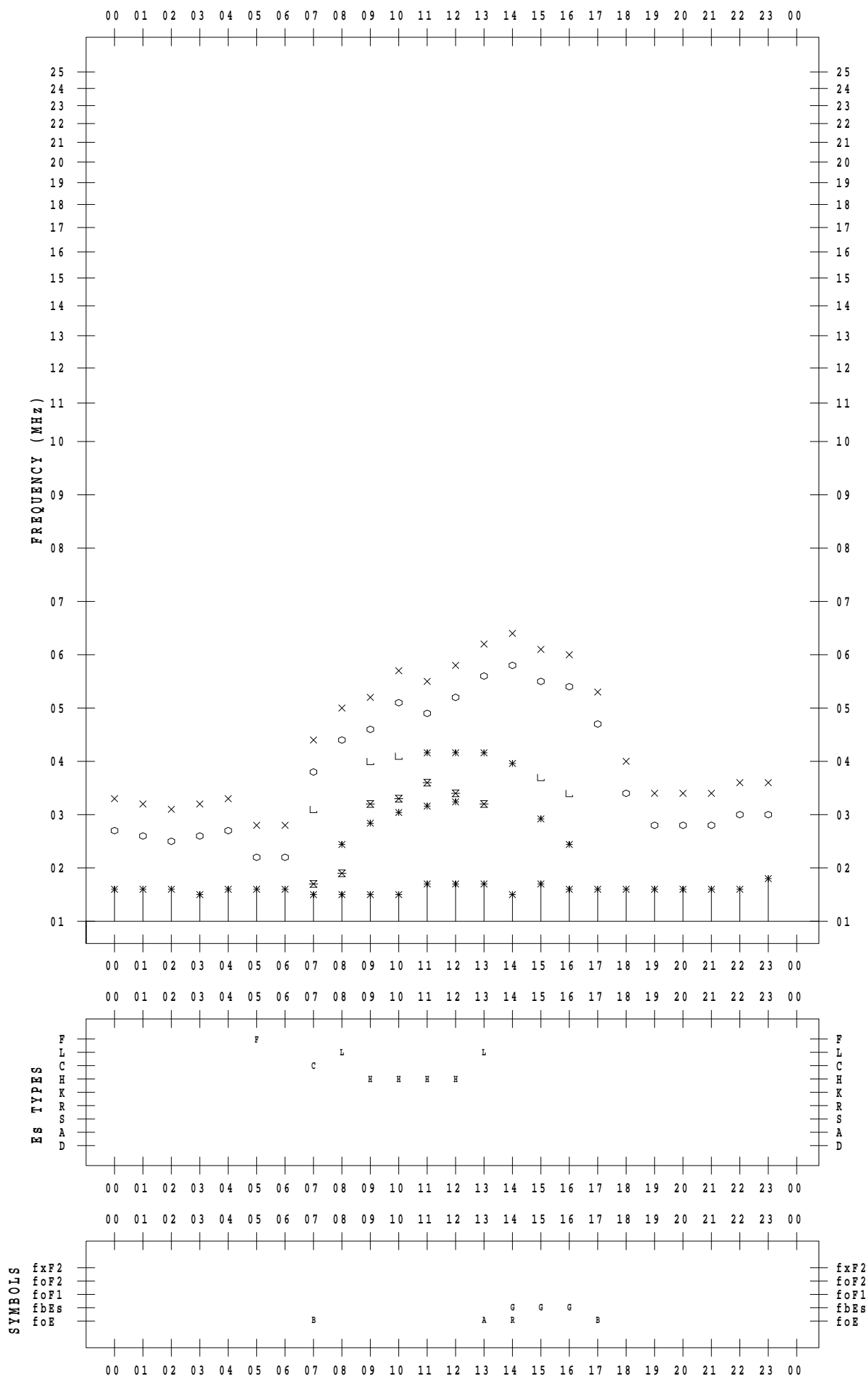
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STATION : Kokubunji

DATE : 2020 / 2 / 16

135 ° E MEAN TIME



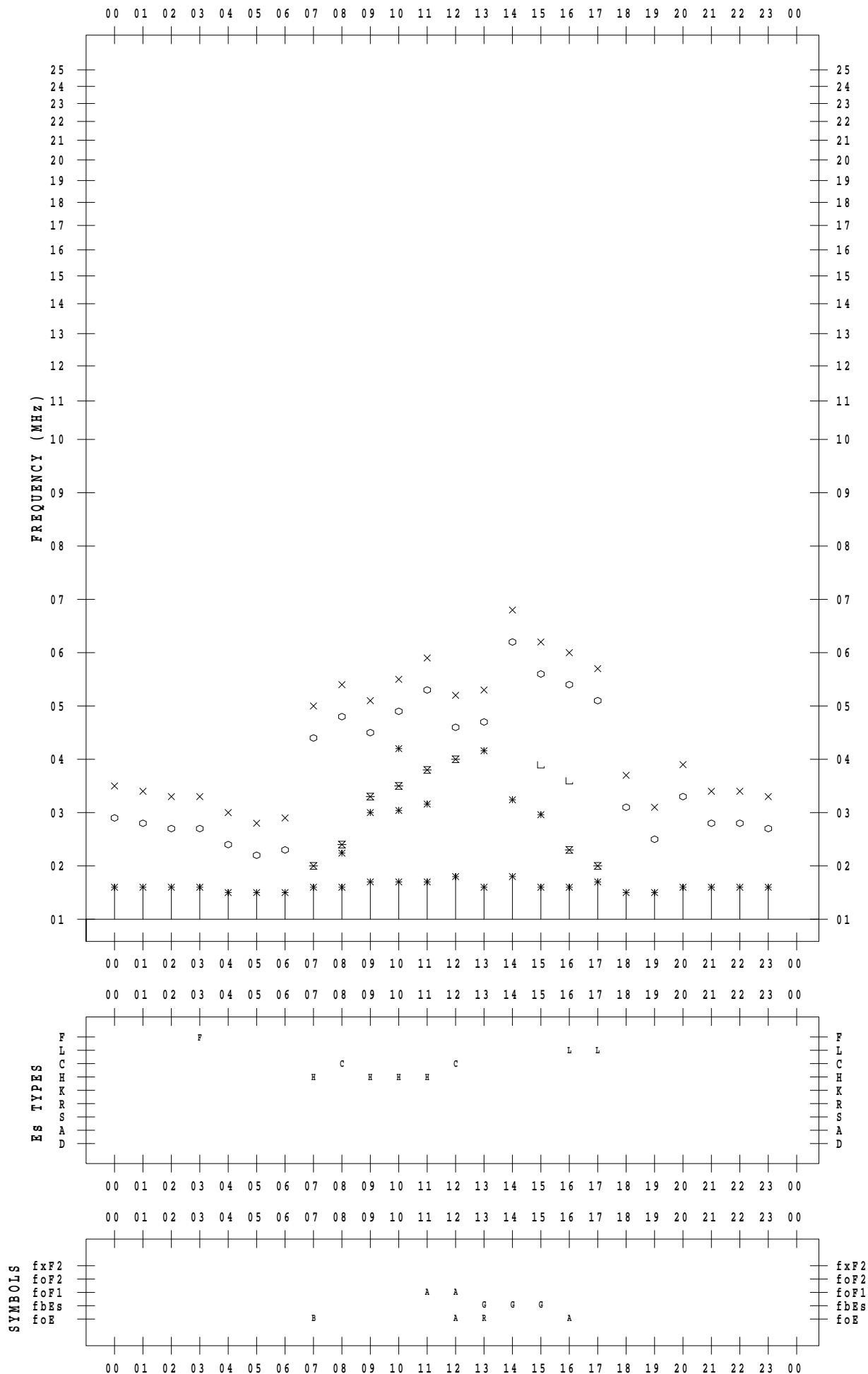
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 17

135 ° E MEAN TIME



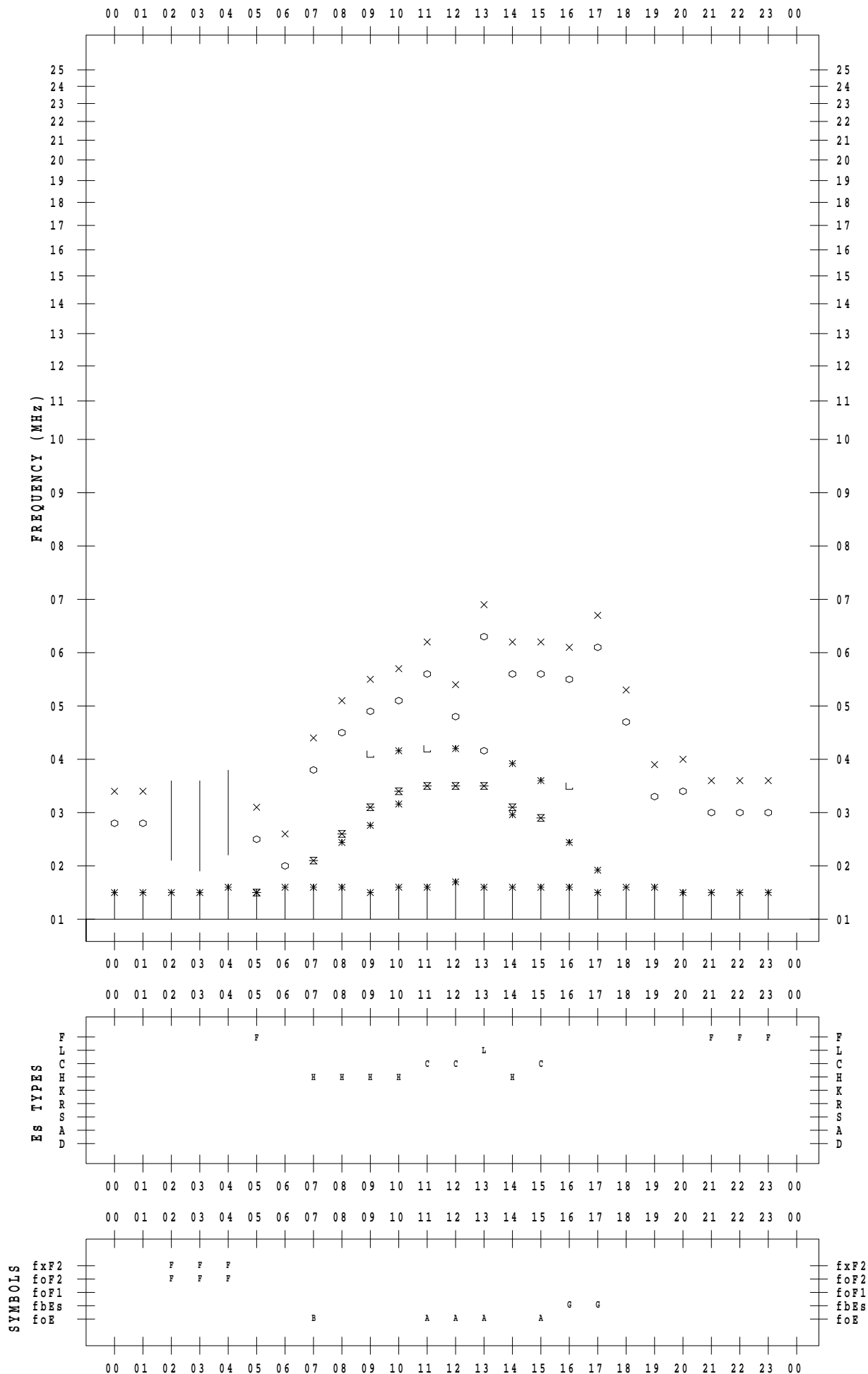
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 18

135 ° E MEAN TIME



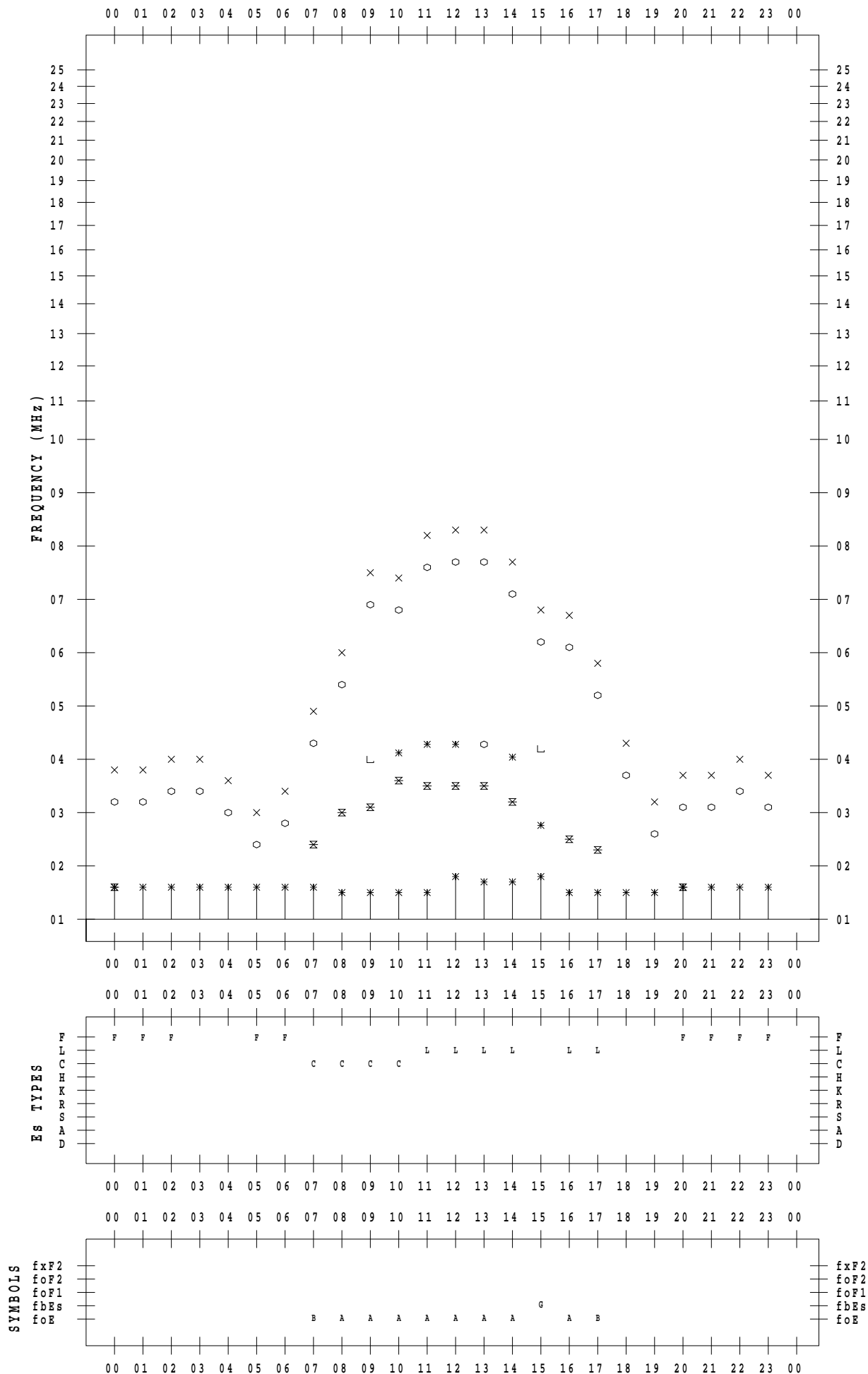
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 19

135 ° E MEAN TIME



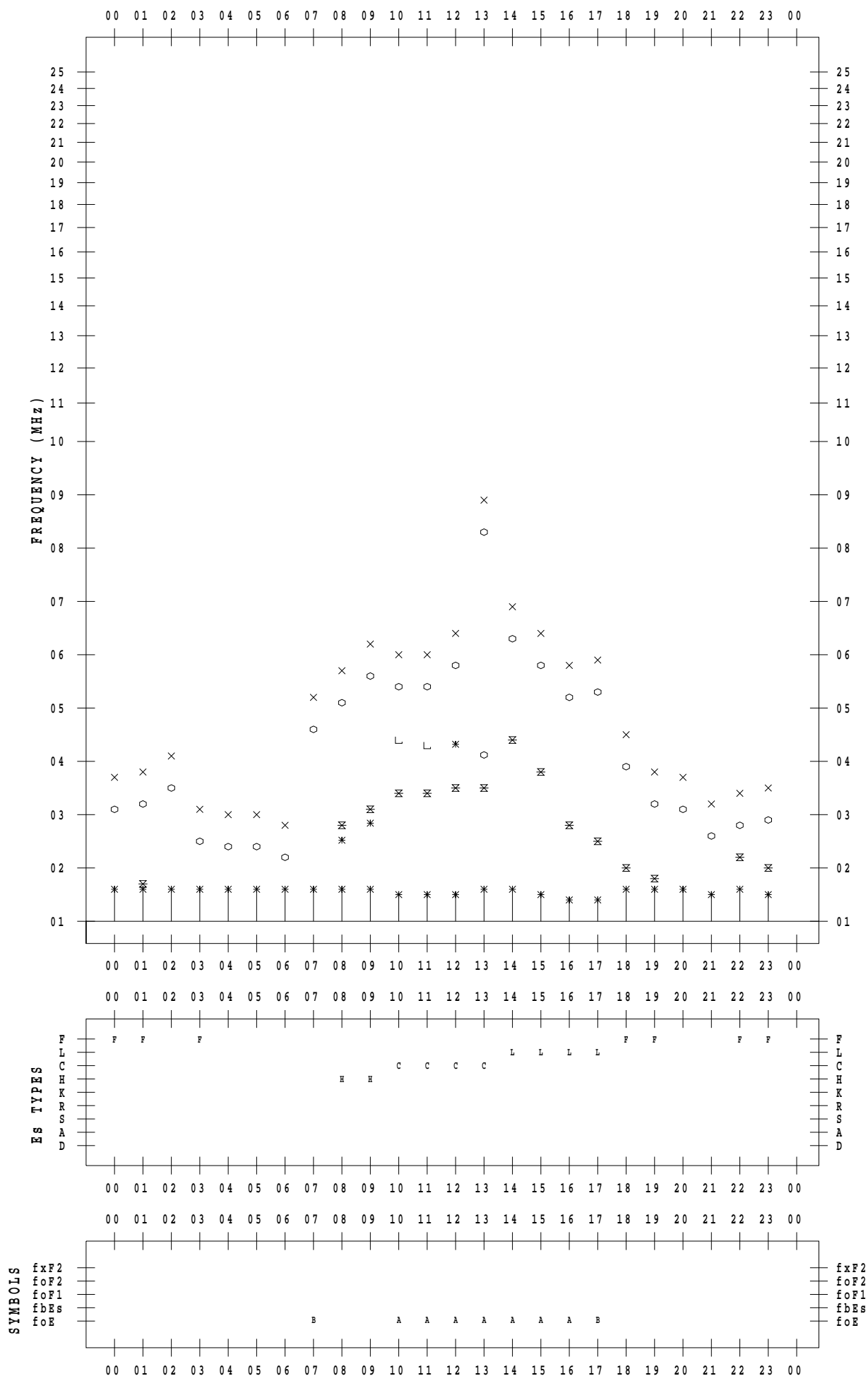
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 20

135 ° E MEAN TIME



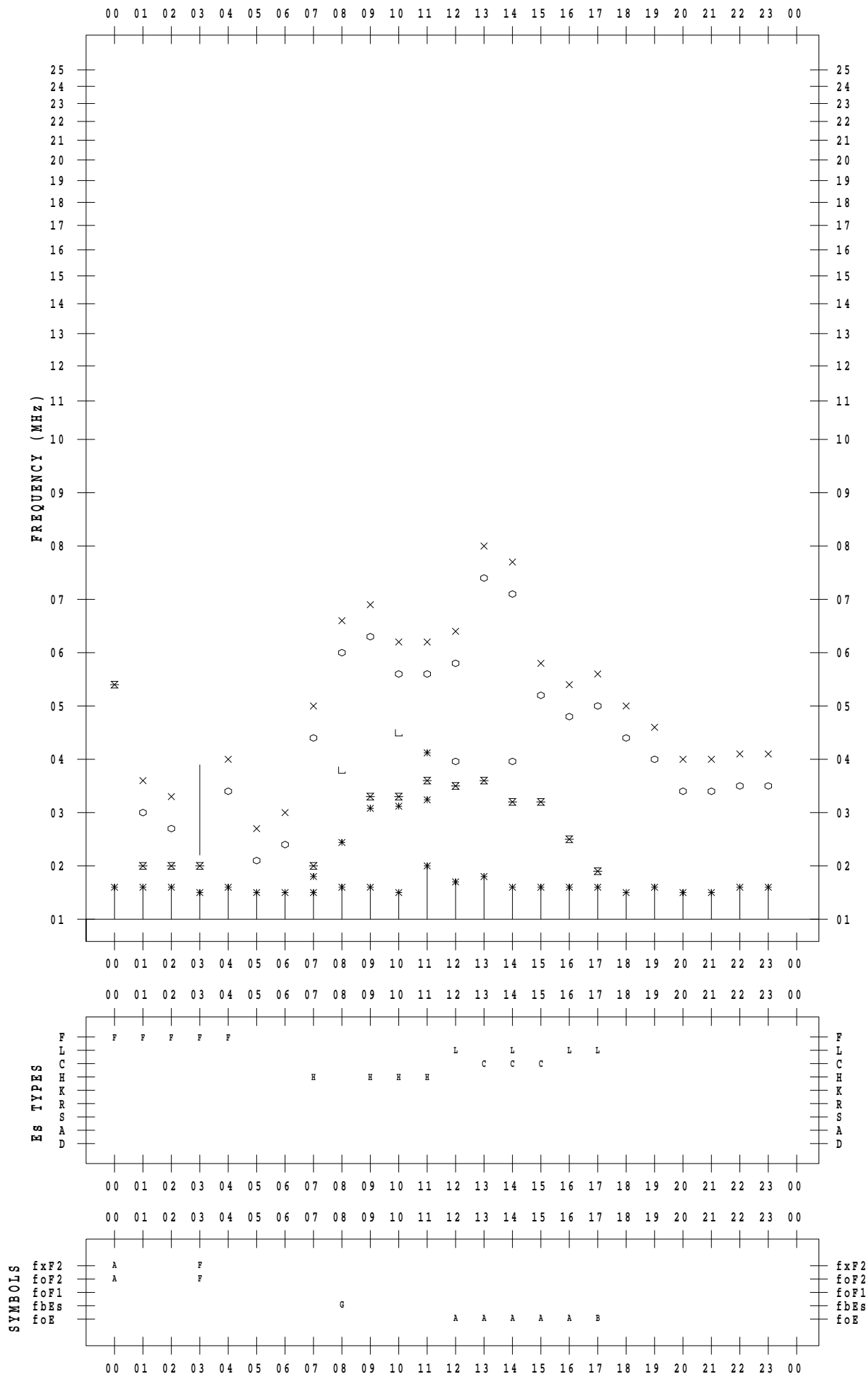
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 21

135 ° E MEAN TIME



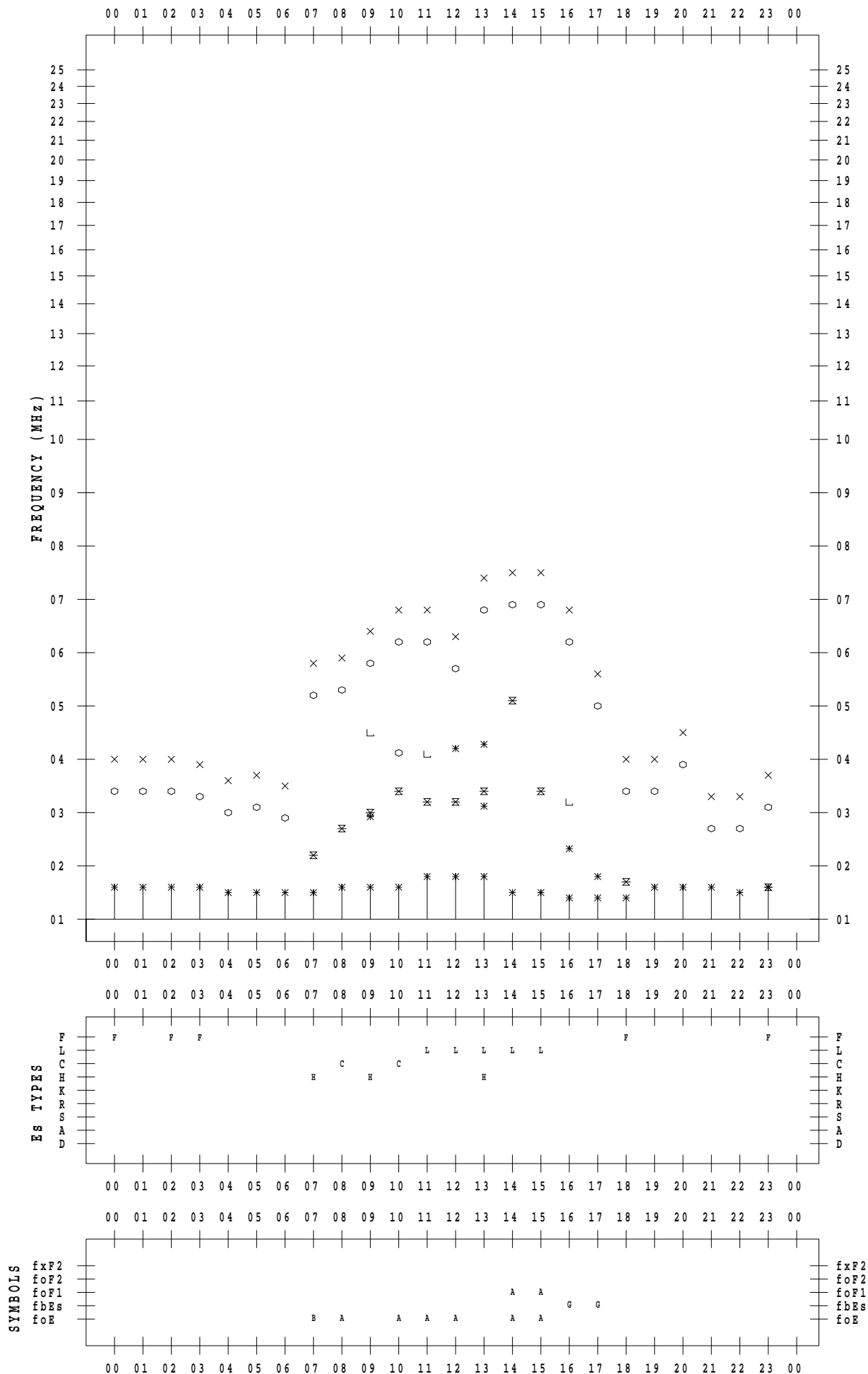
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 22

135 ° E MEAN TIME



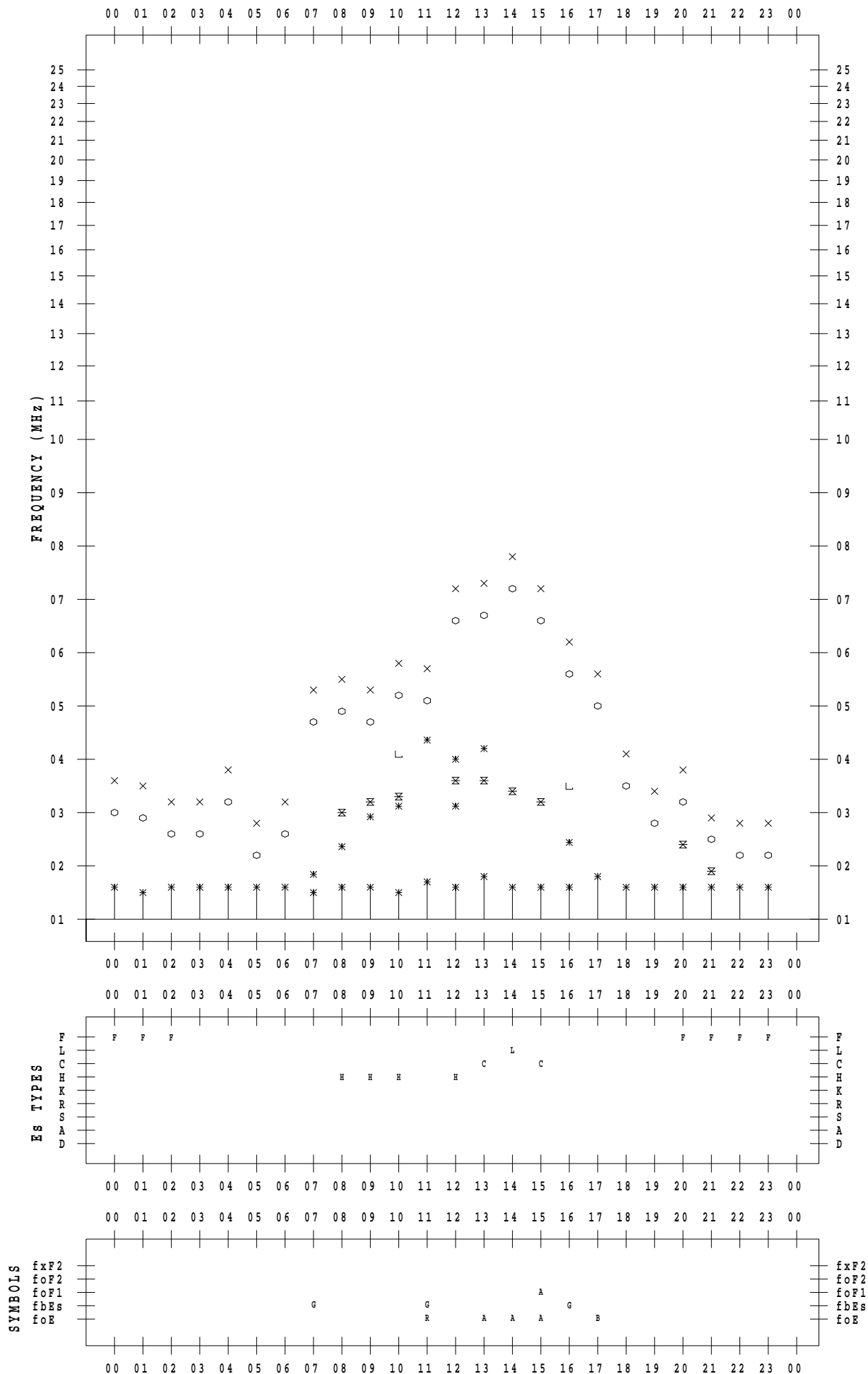
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 23

135 ° E MEAN TIME





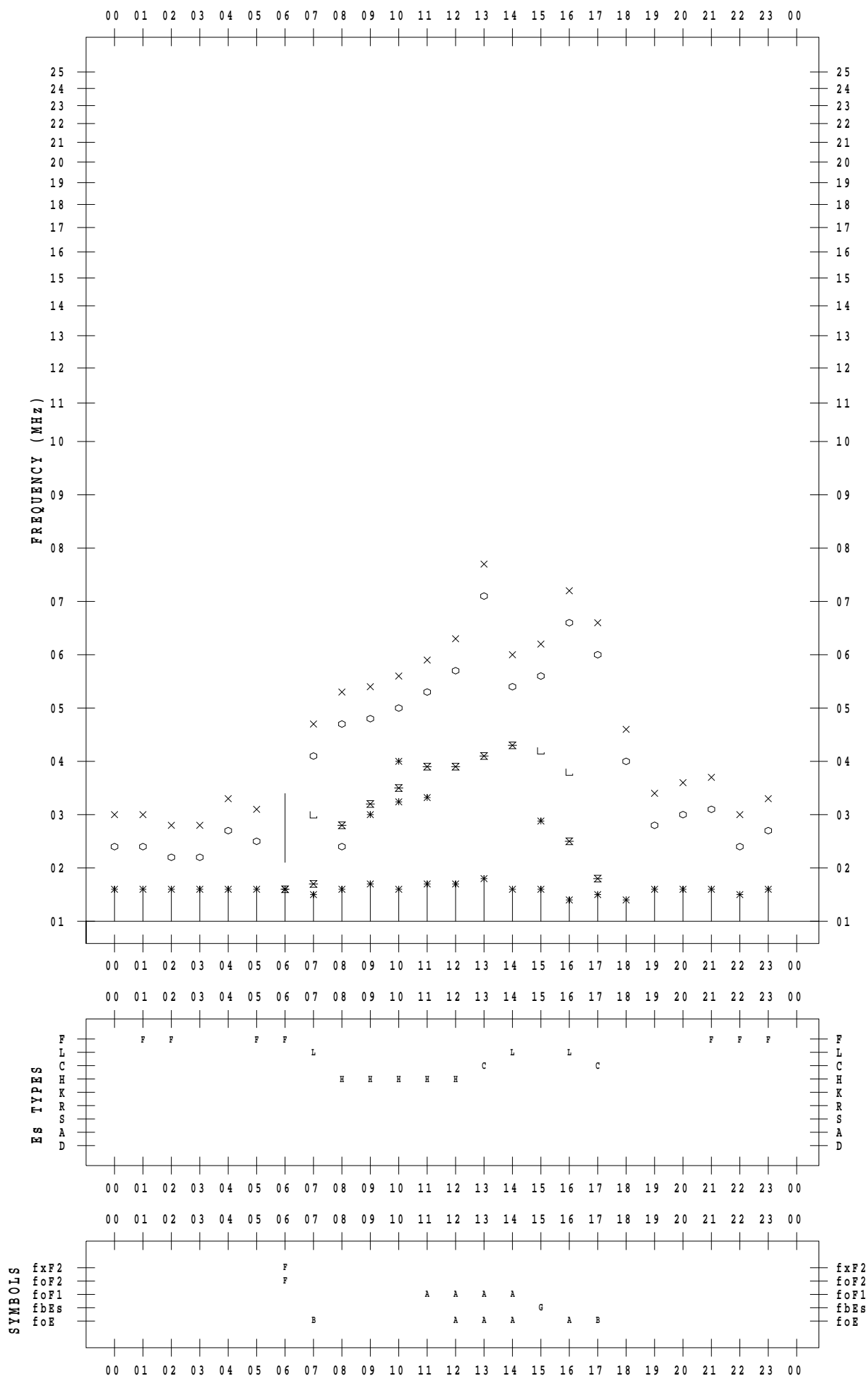
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 24

135 ° E MEAN TIME



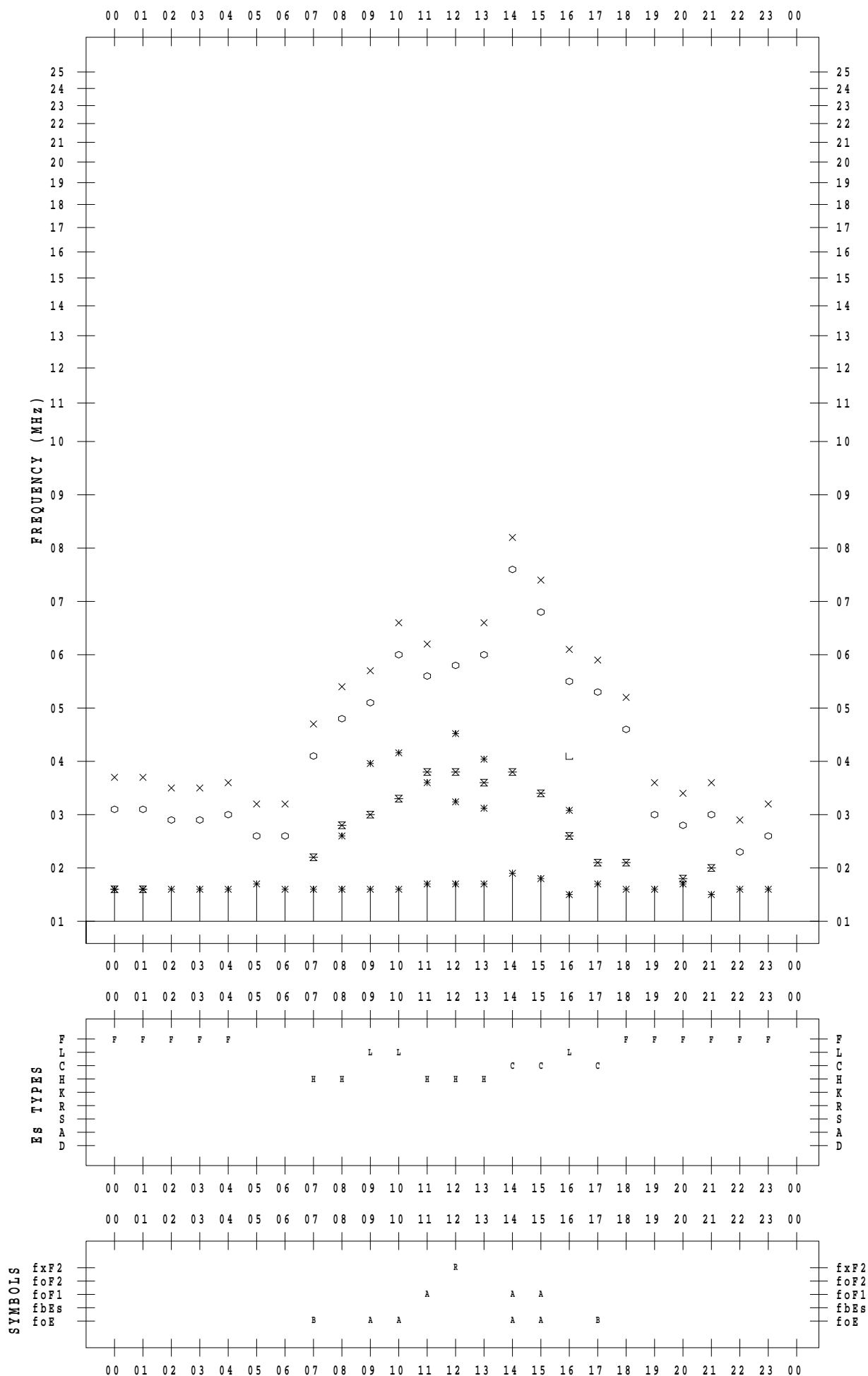
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 25

135 ° E MEAN TIME



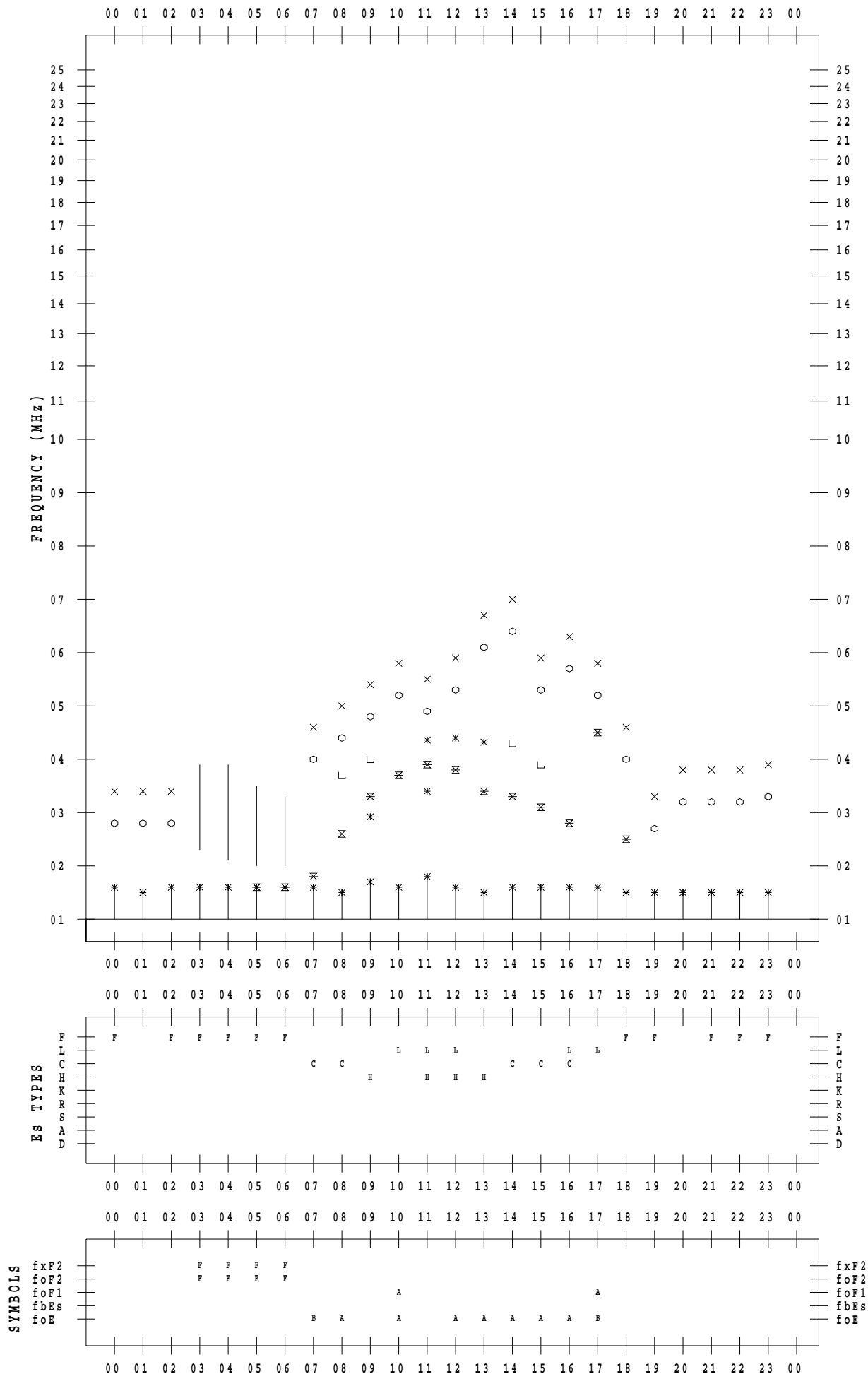
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 26

135 ° E MEAN TIME



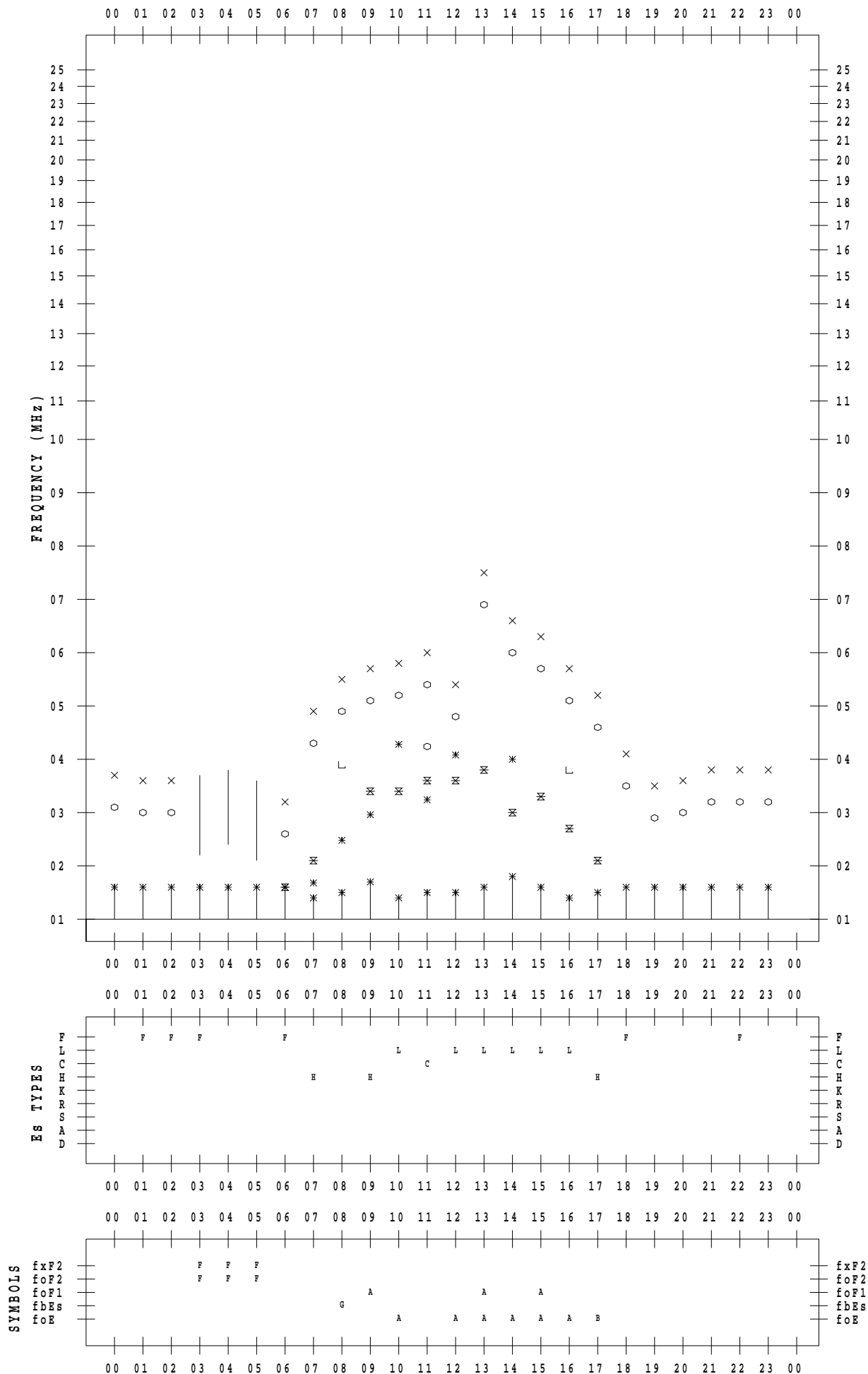
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 27

135 ° E MEAN TIME



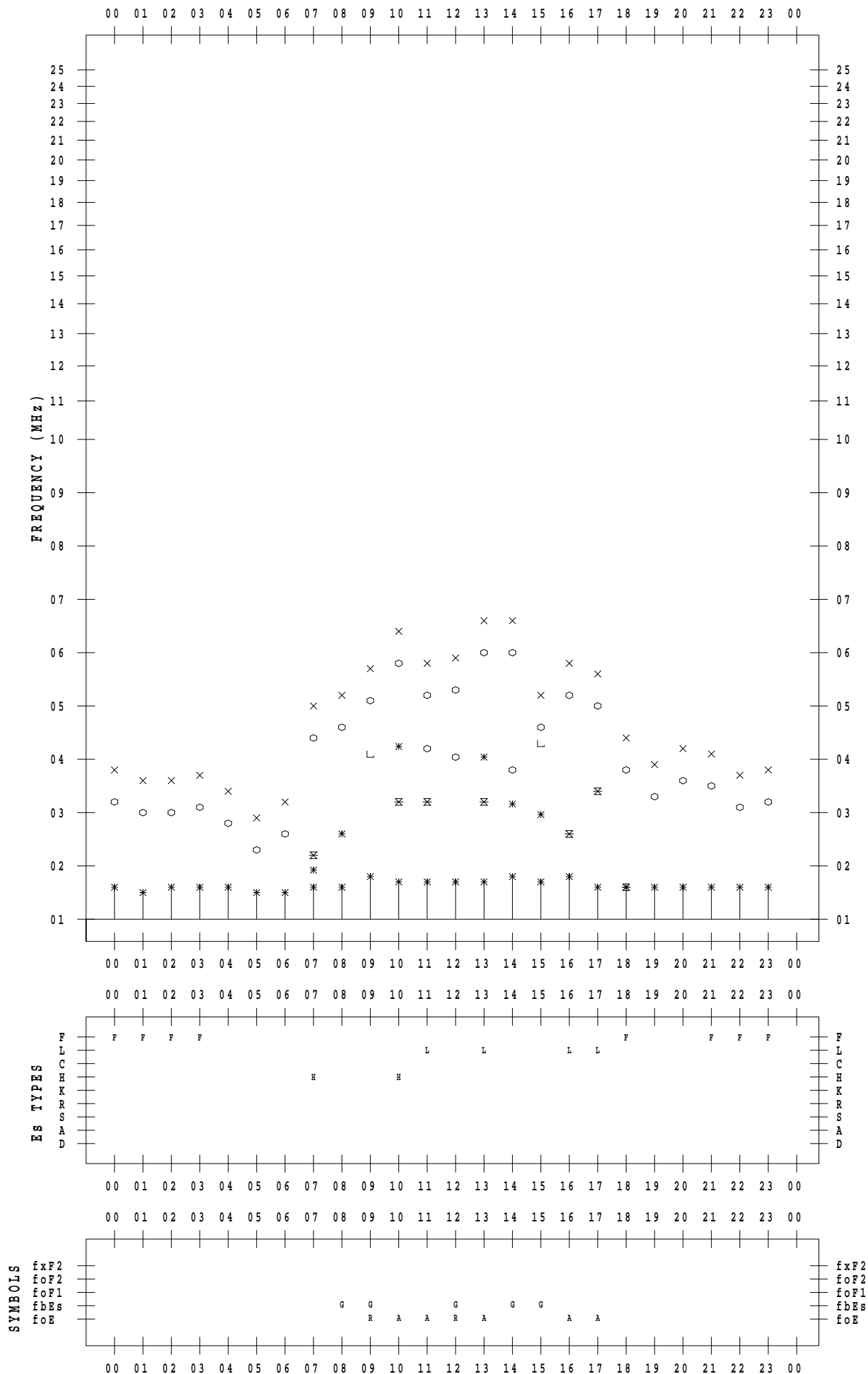
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020 / 2 / 28

135 ° E MEAN TIME



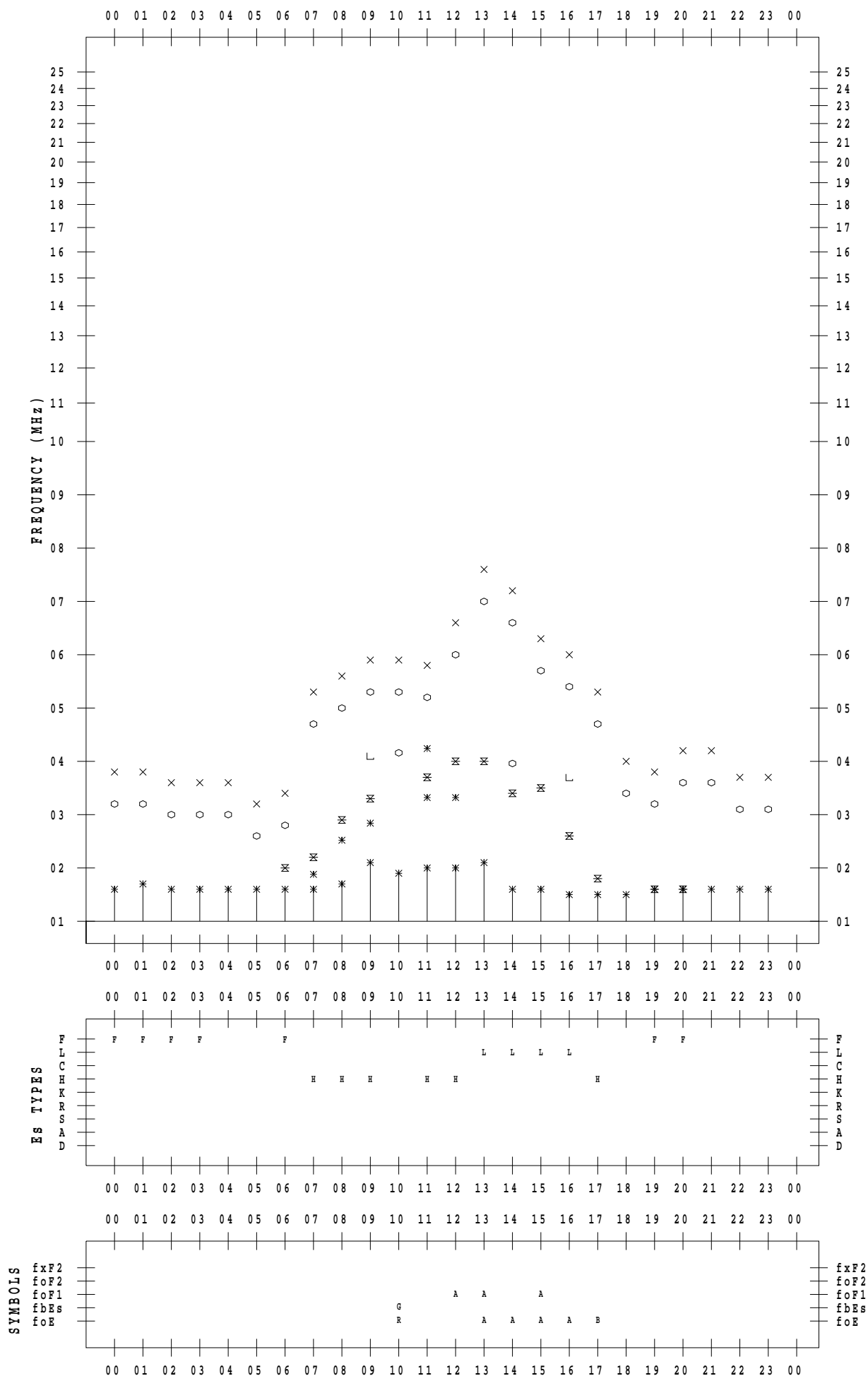
# f - PLOT DATA

SCALER :

STATION : Kokubunji

DATE : 2020 / 2 / 29

135 ° E MEAN TIME



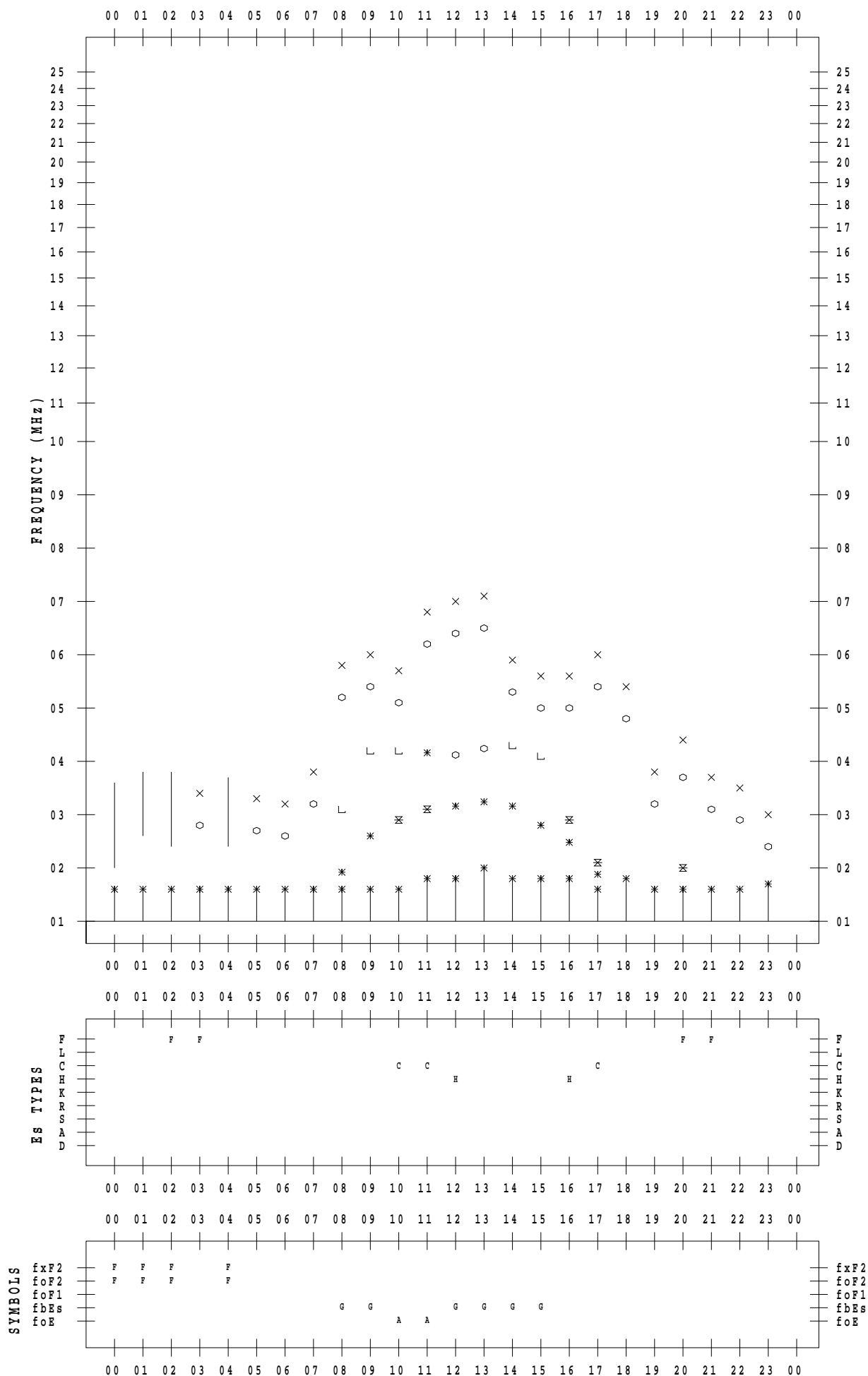
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 1

135 ° E MEAN TIME



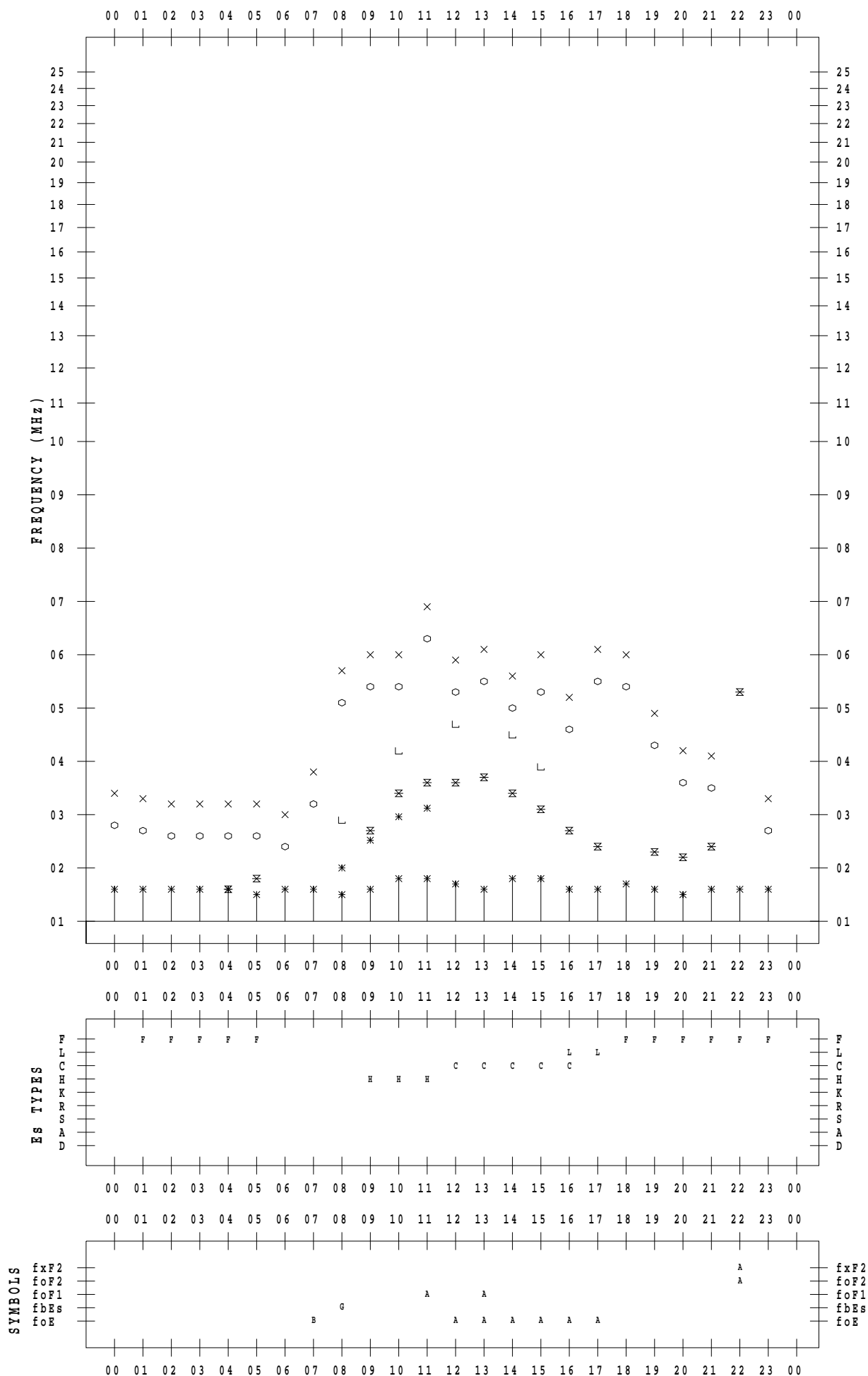
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 2

135 ° E MEAN TIME





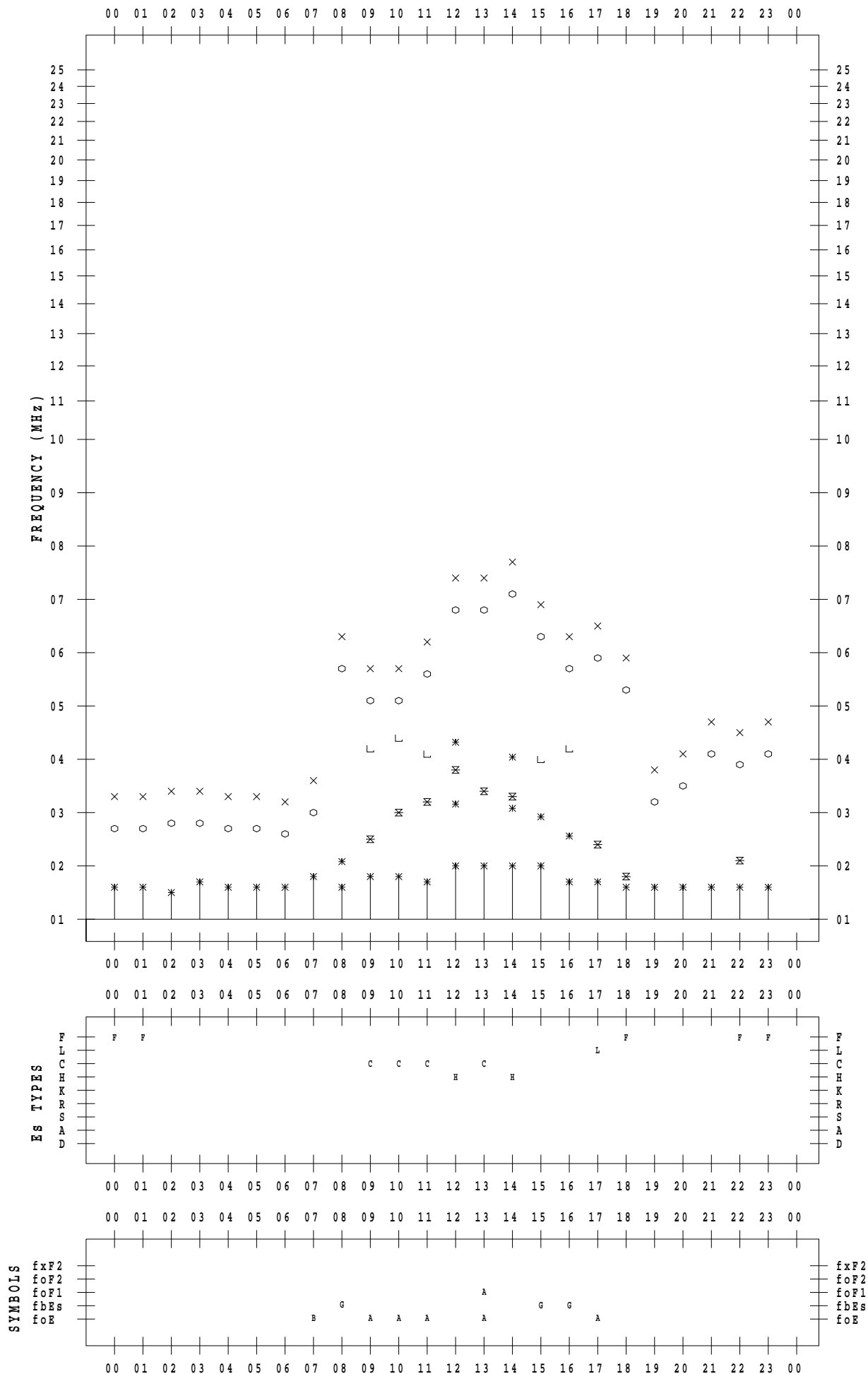
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 3

135 ° E MEAN TIME



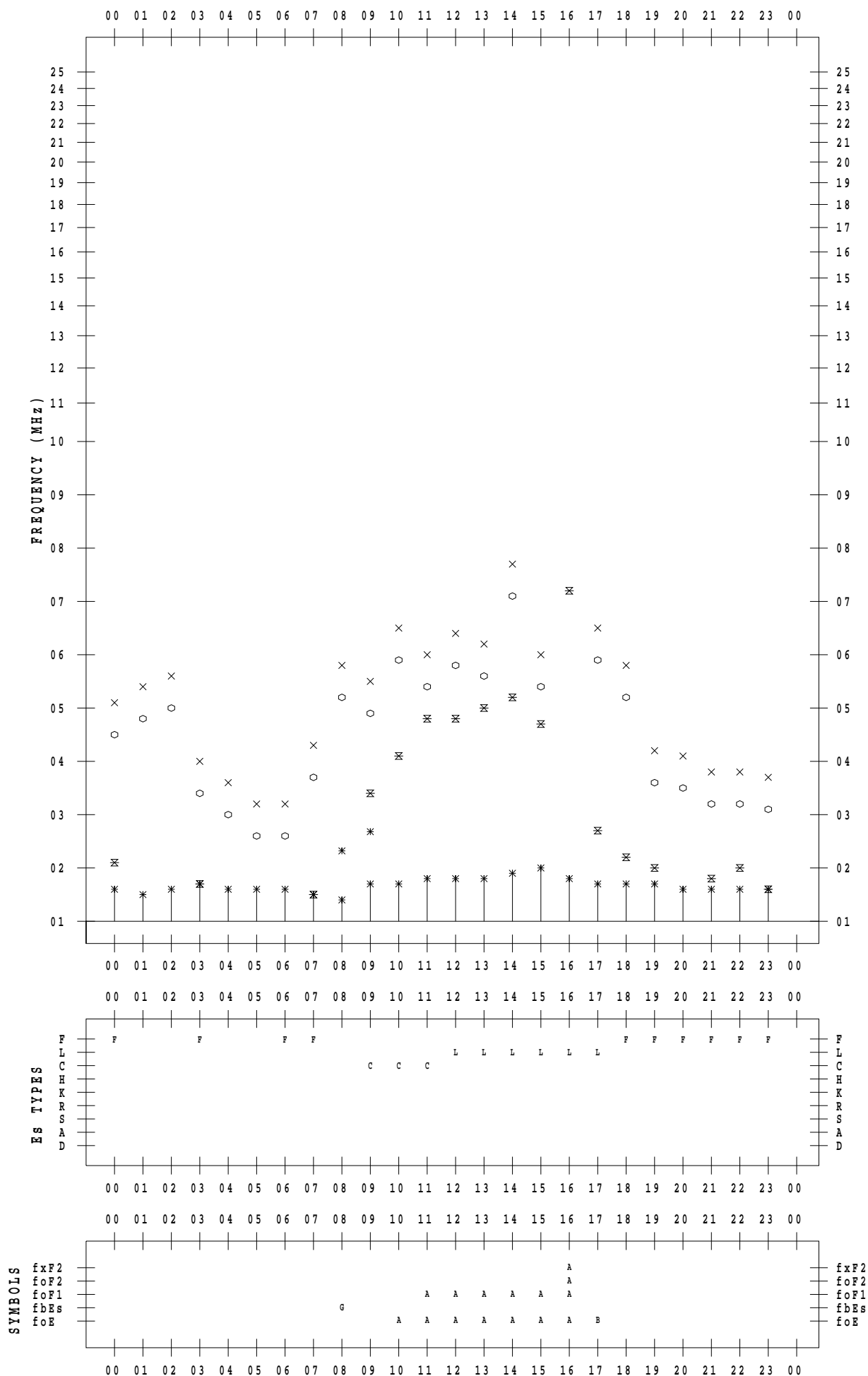
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 4

135 ° E MEAN TIME



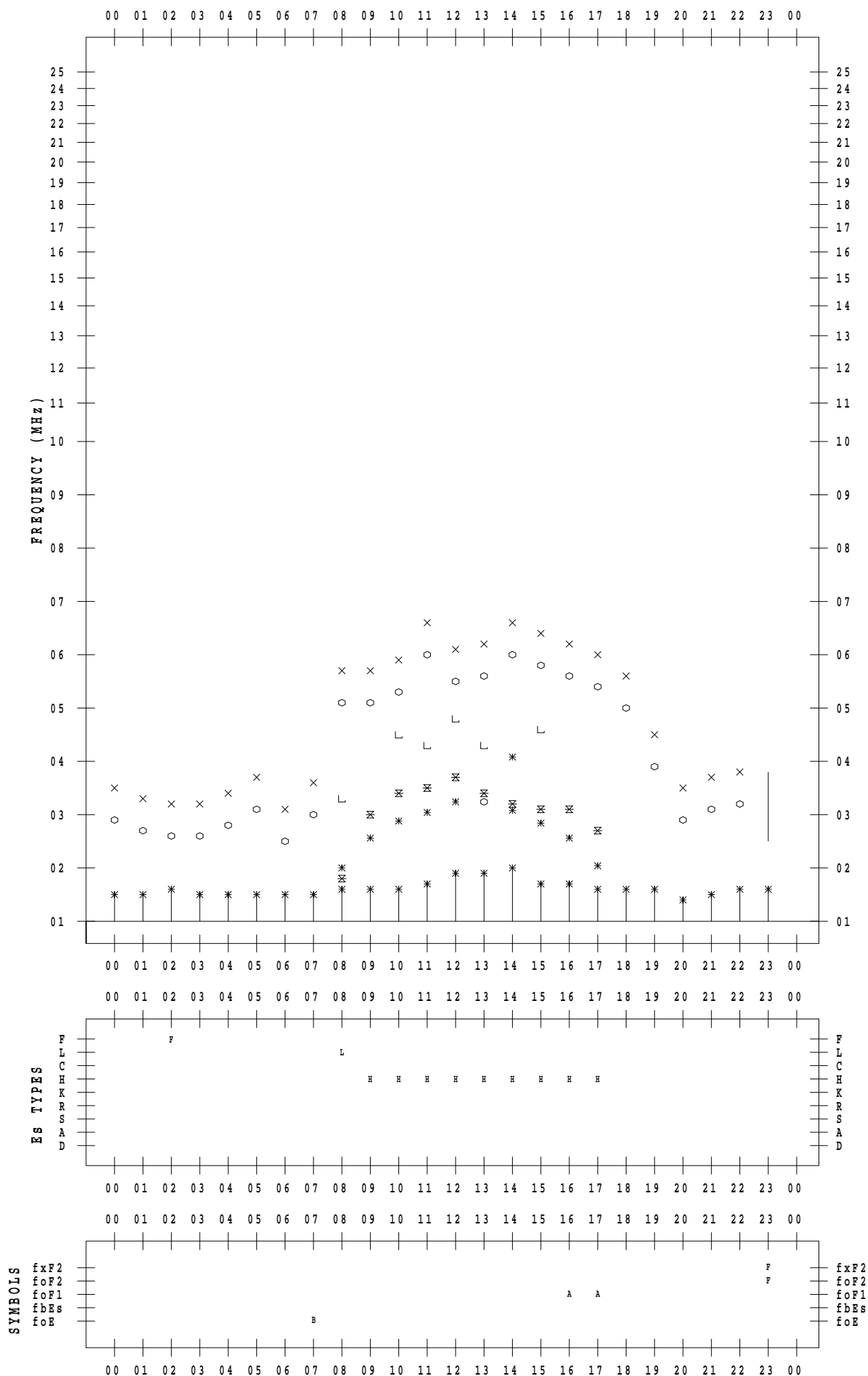
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 5

135 ° E MEAN TIME



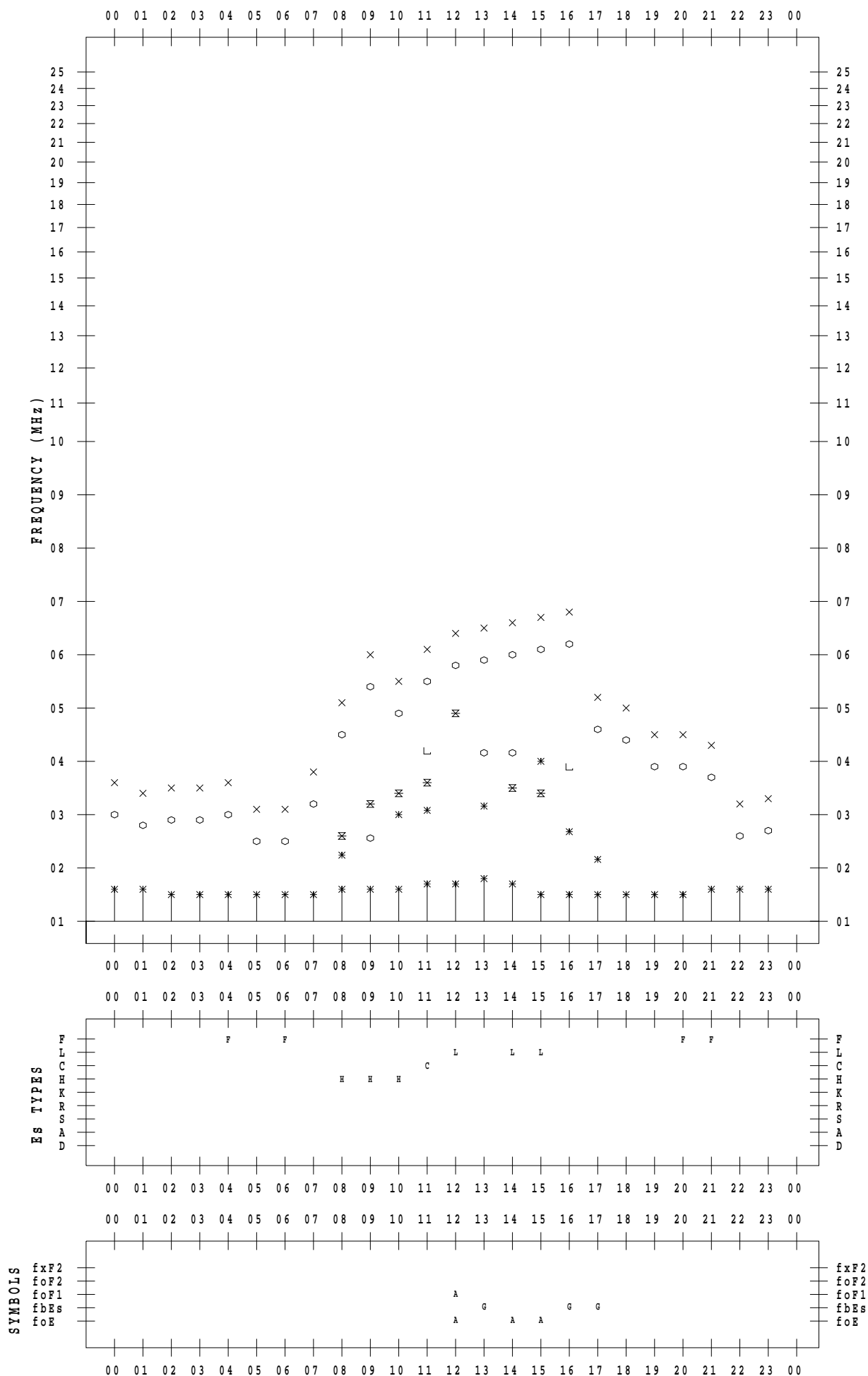
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 6

135 ° E MEAN TIME



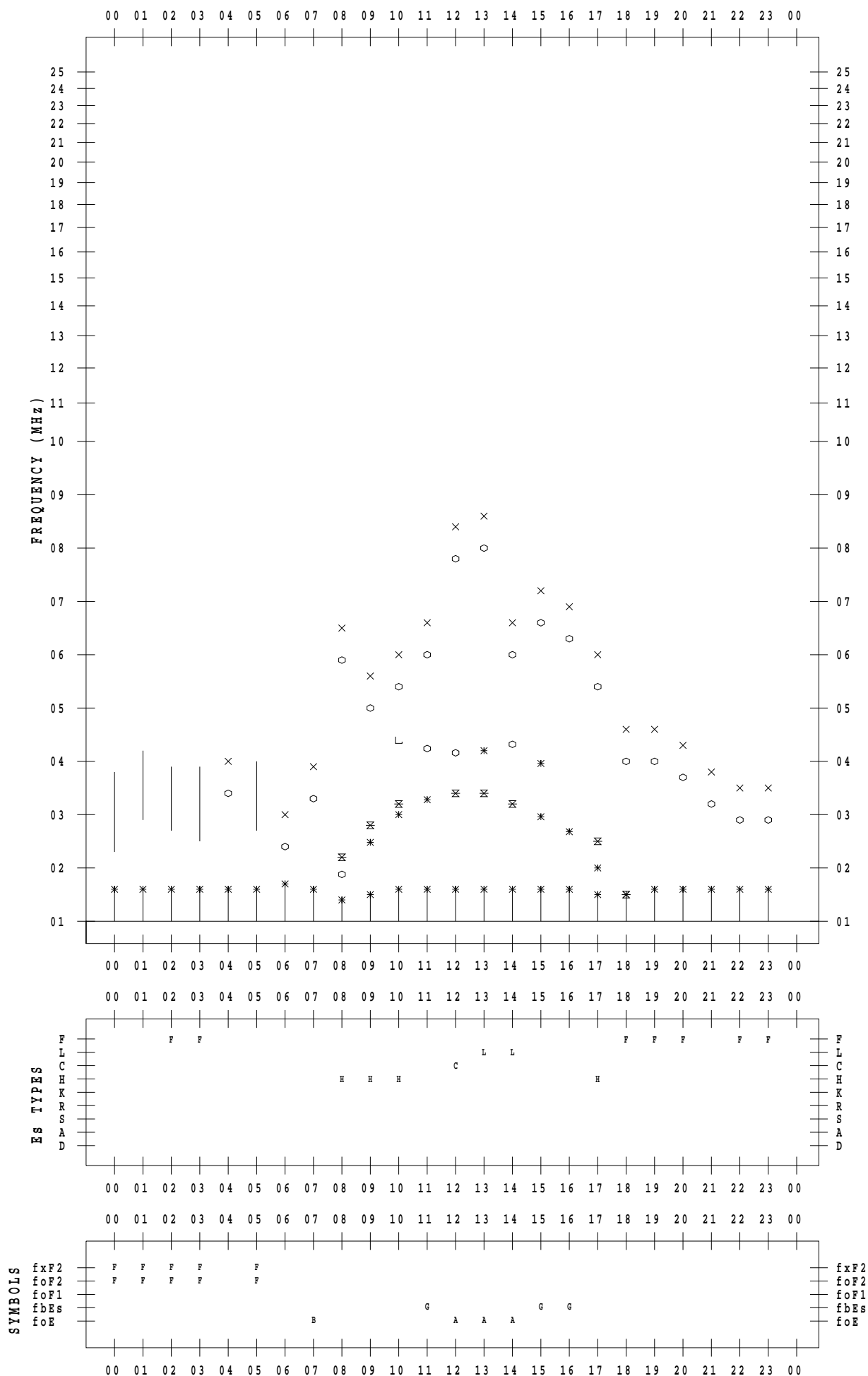
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 7

135 ° E MEAN TIME



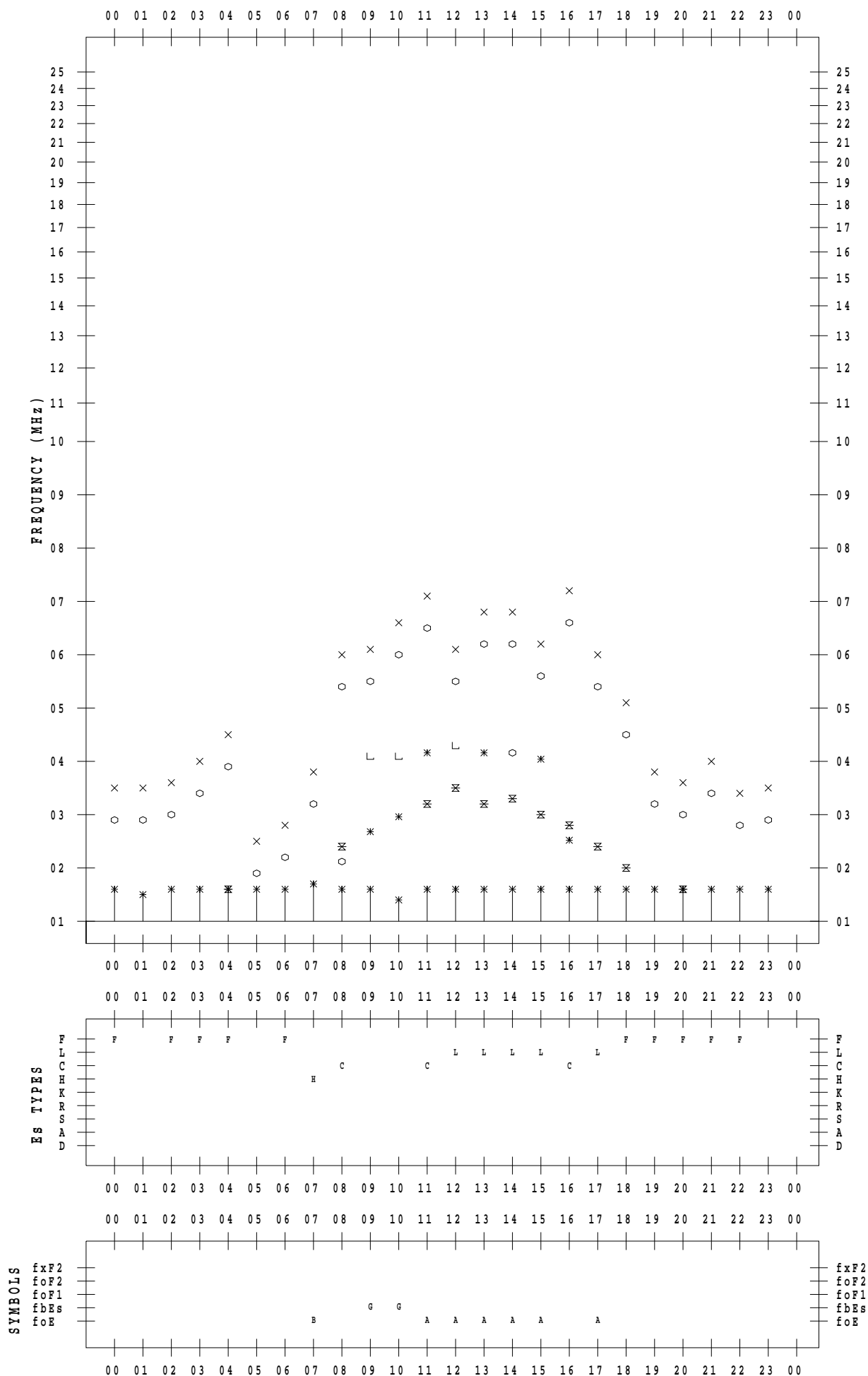
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 8

135 ° E MEAN TIME



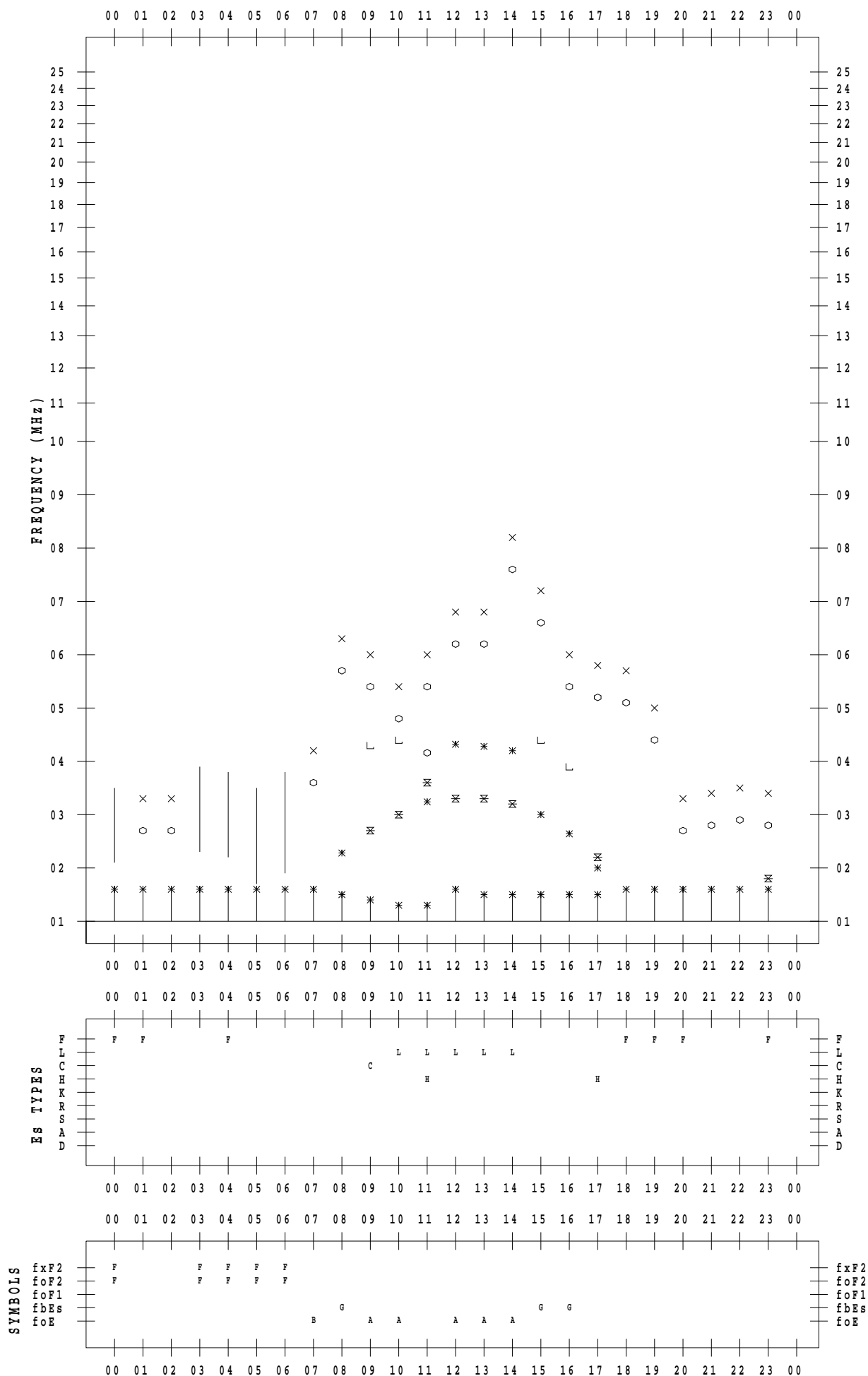
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 9

135 ° E MEAN TIME



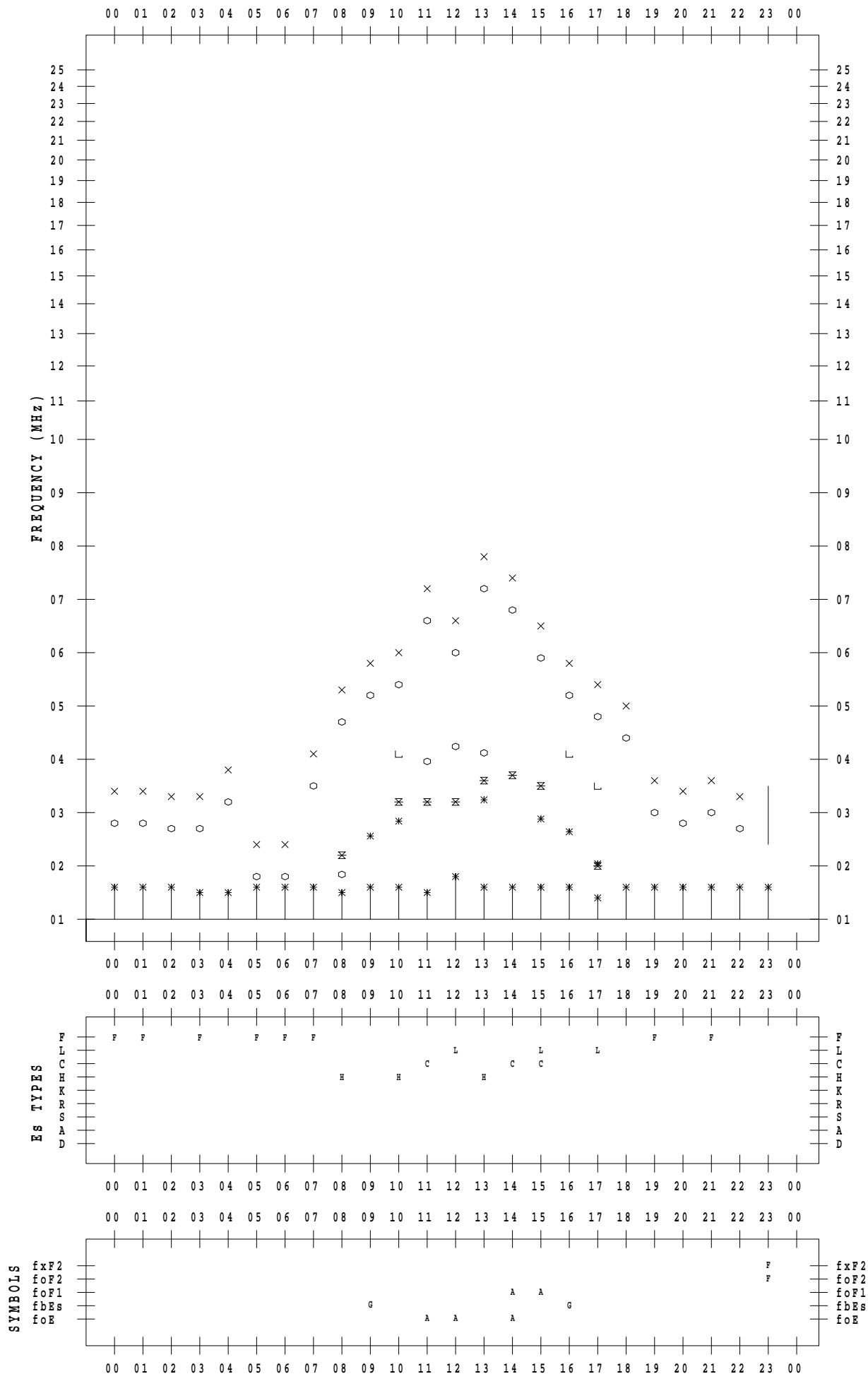
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 10

135 ° E MEAN TIME





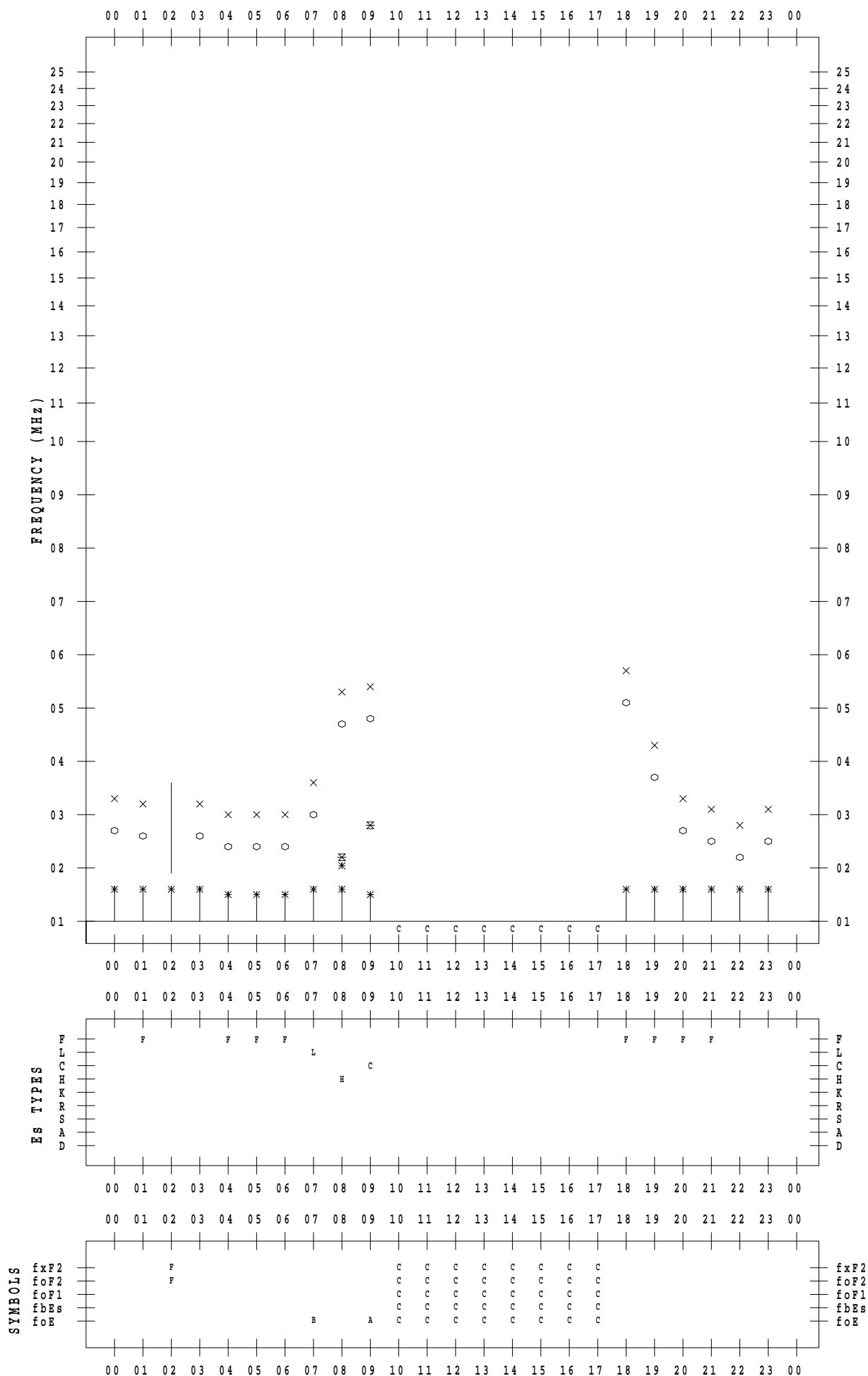
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 11

135 ° E MEAN TIME



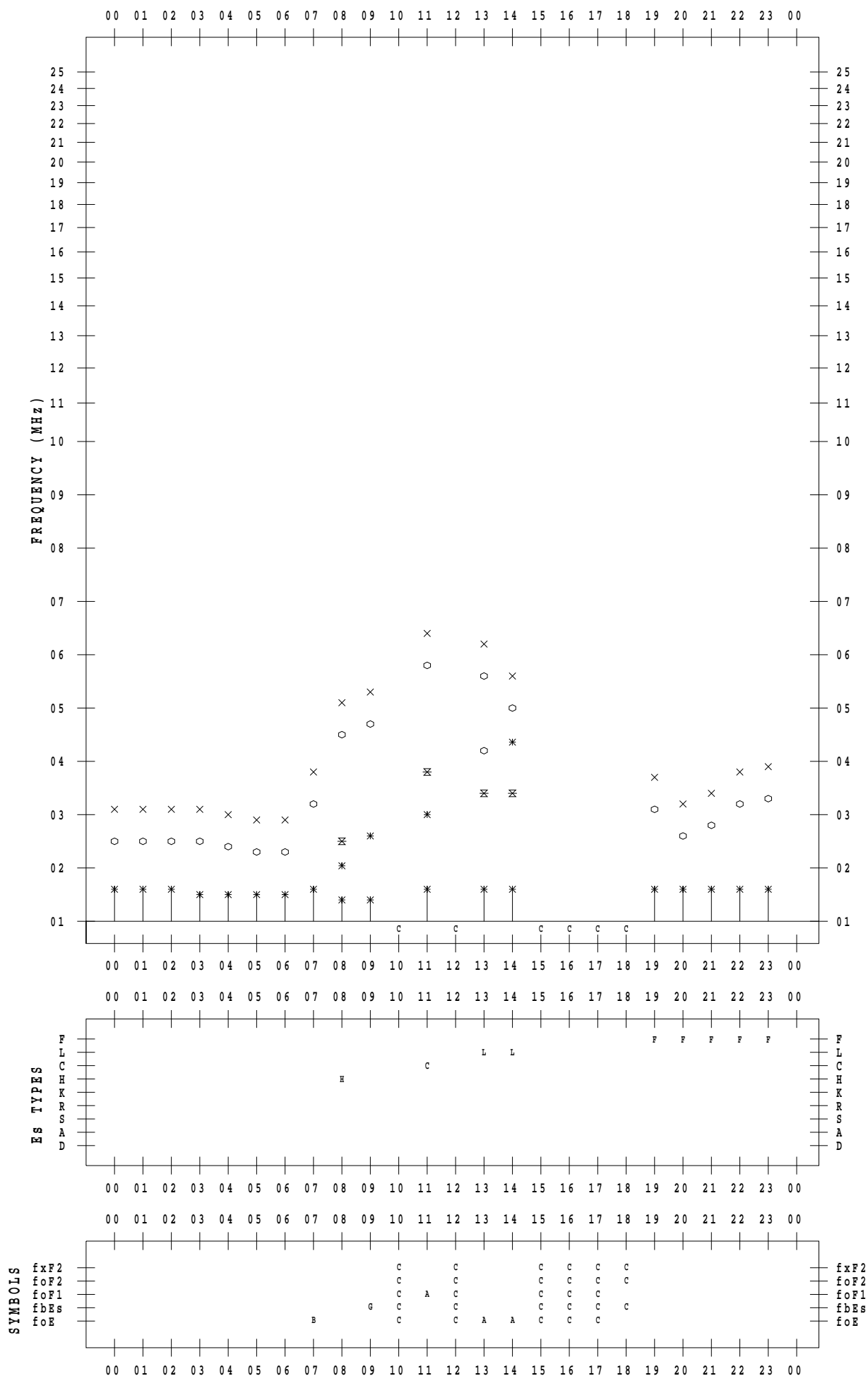
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 12

135 ° E MEAN TIME



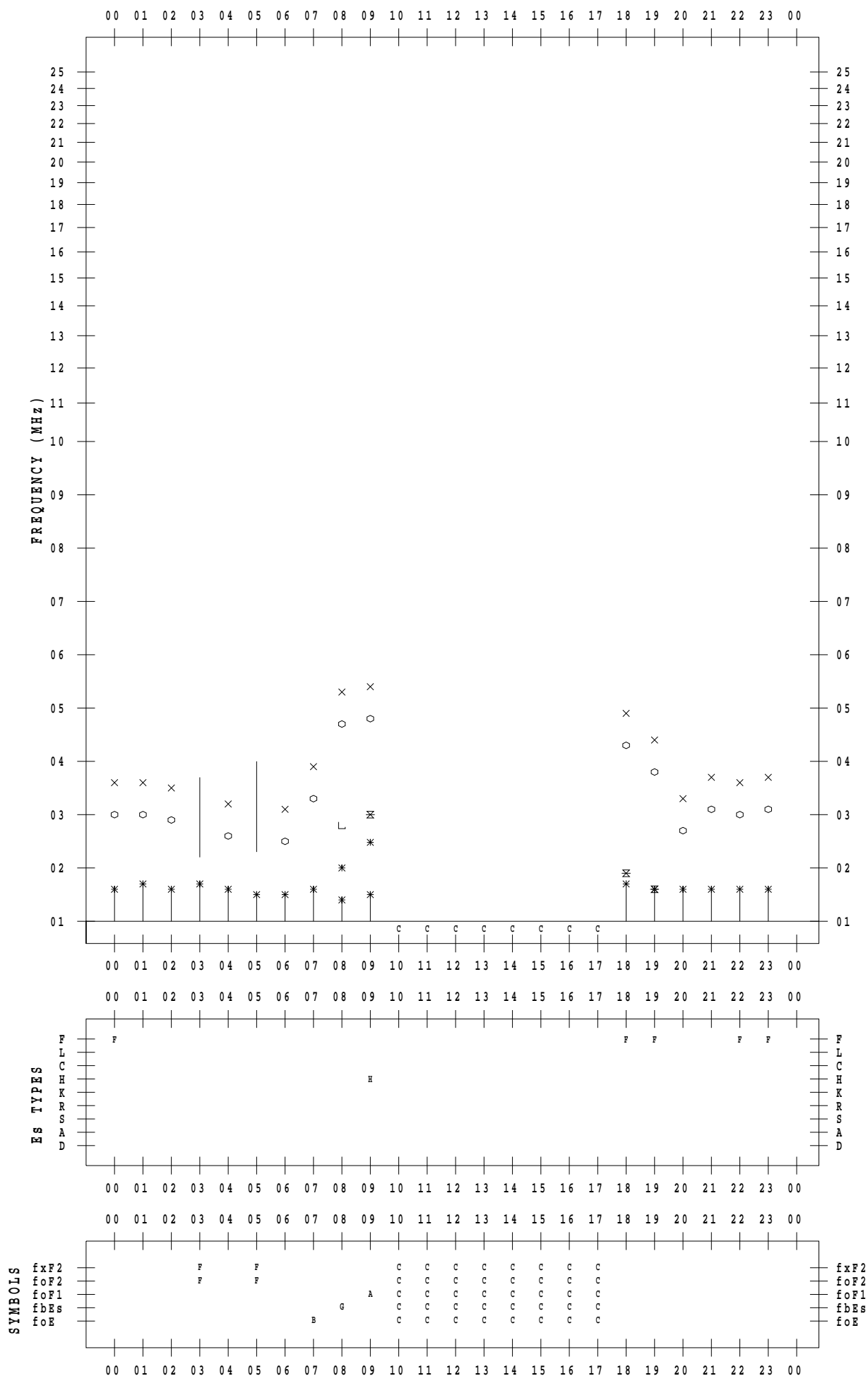
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 13

135 ° E MEAN TIME



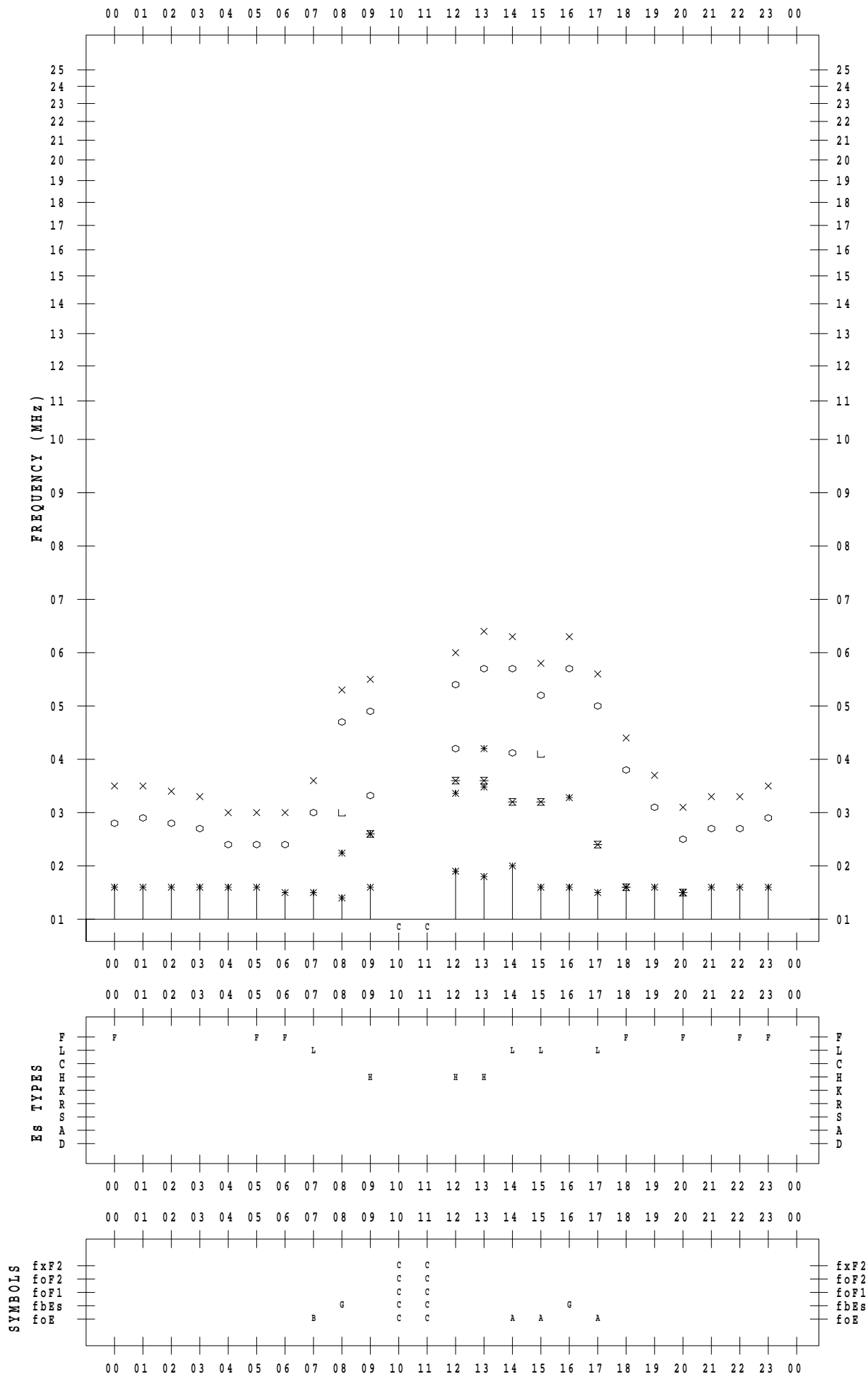
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 14

135 ° E MEAN TIME



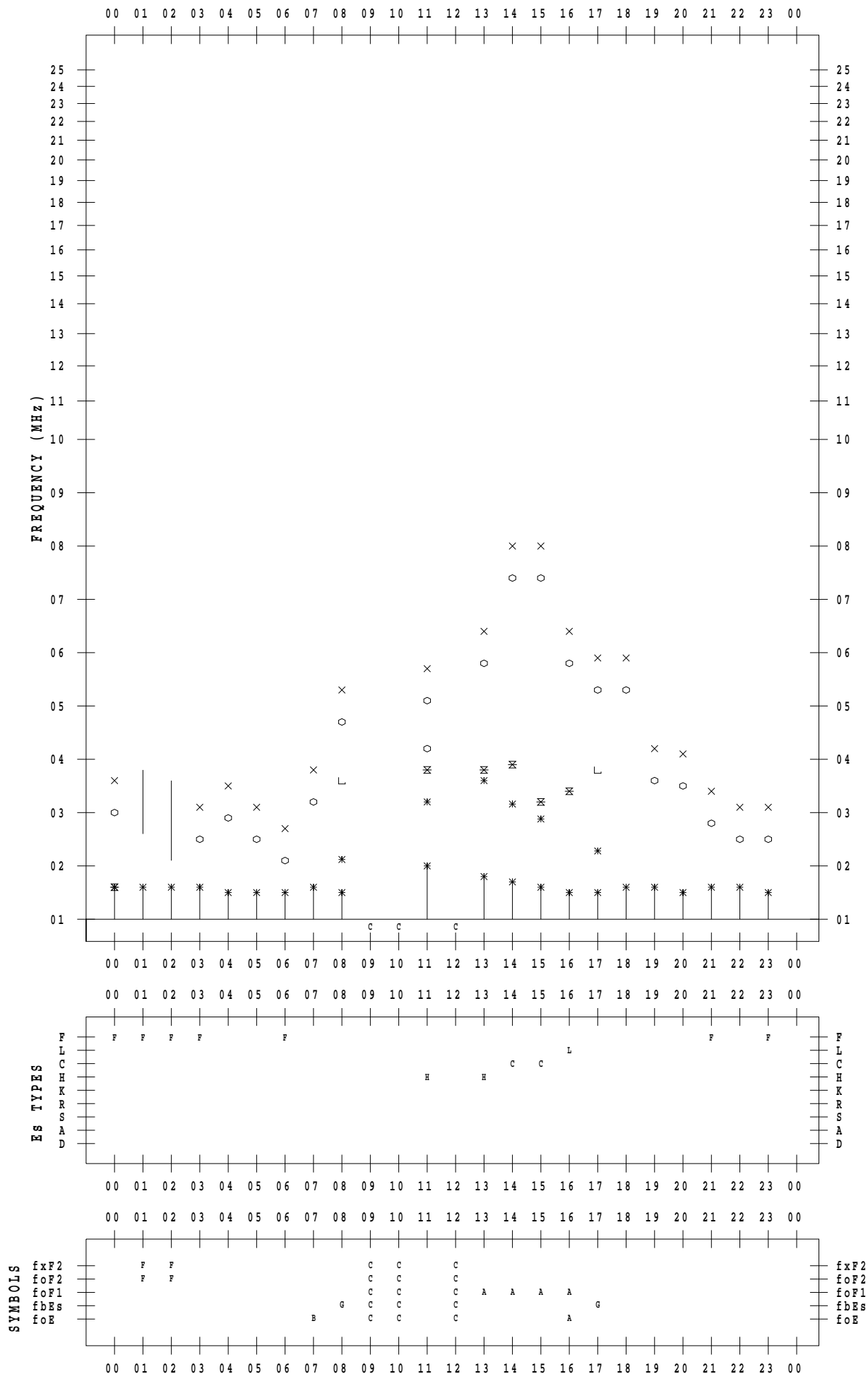
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 15

135 ° E MEAN TIME



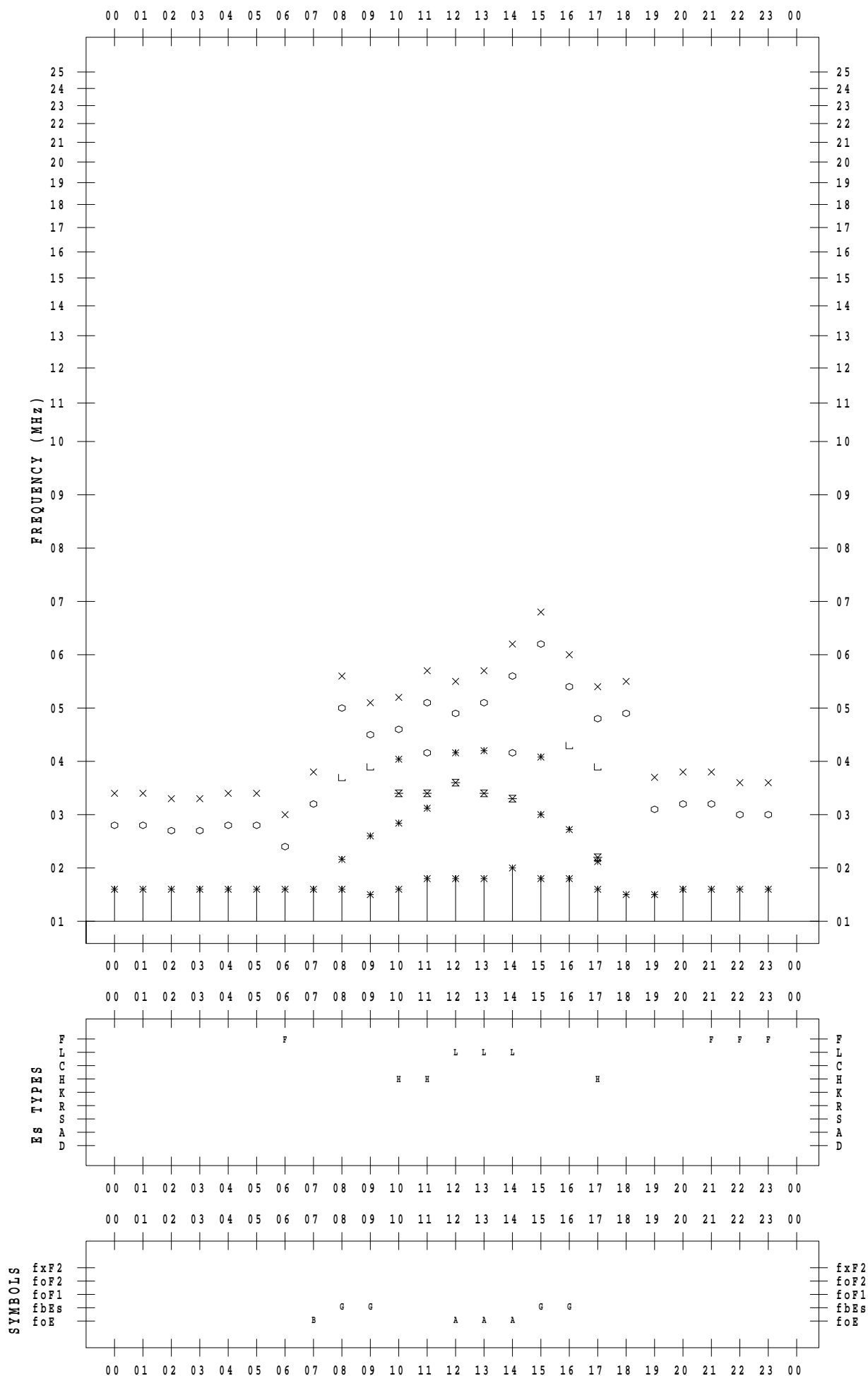
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 16

135 ° E MEAN TIME



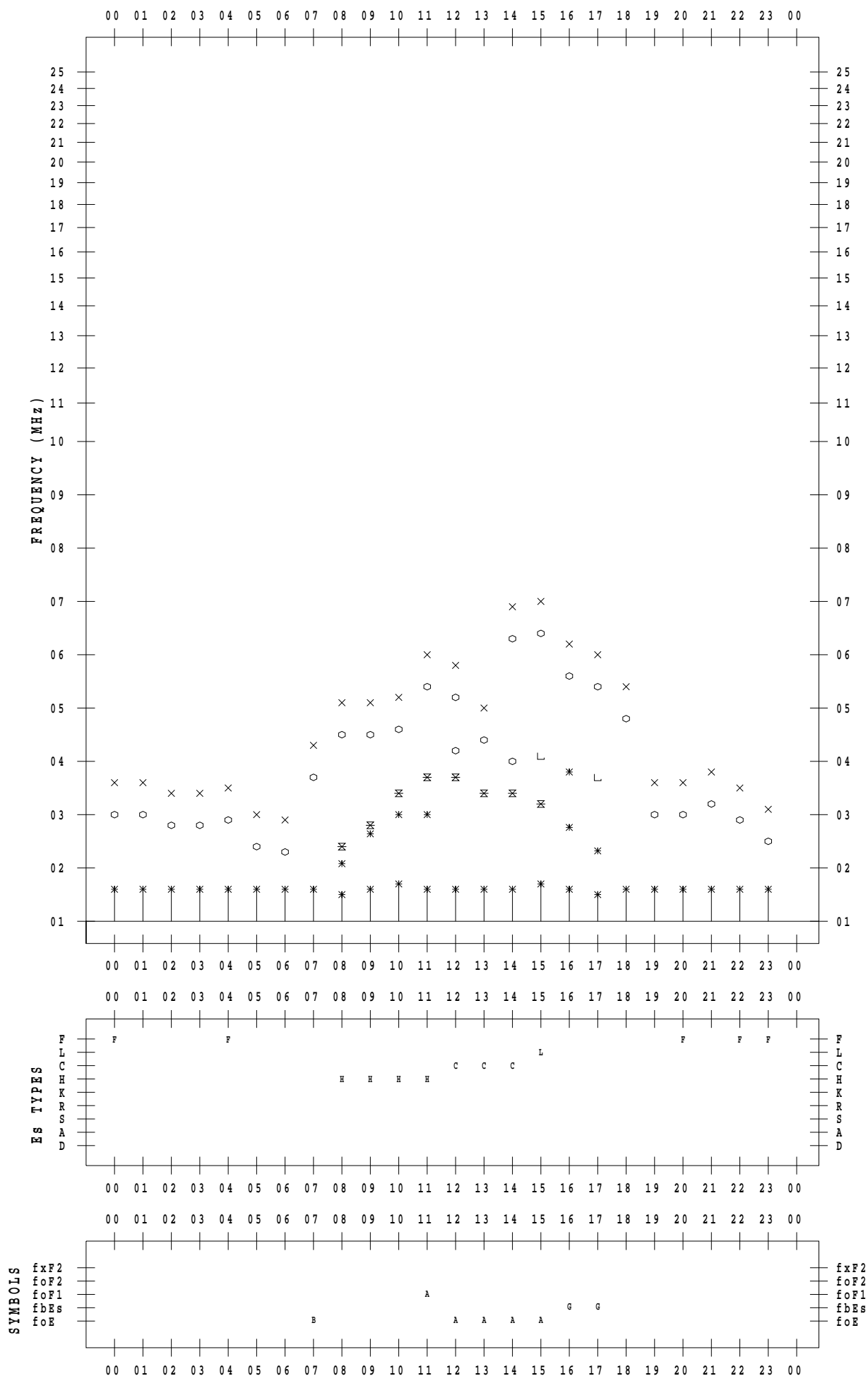
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 17

135 ° E MEAN TIME



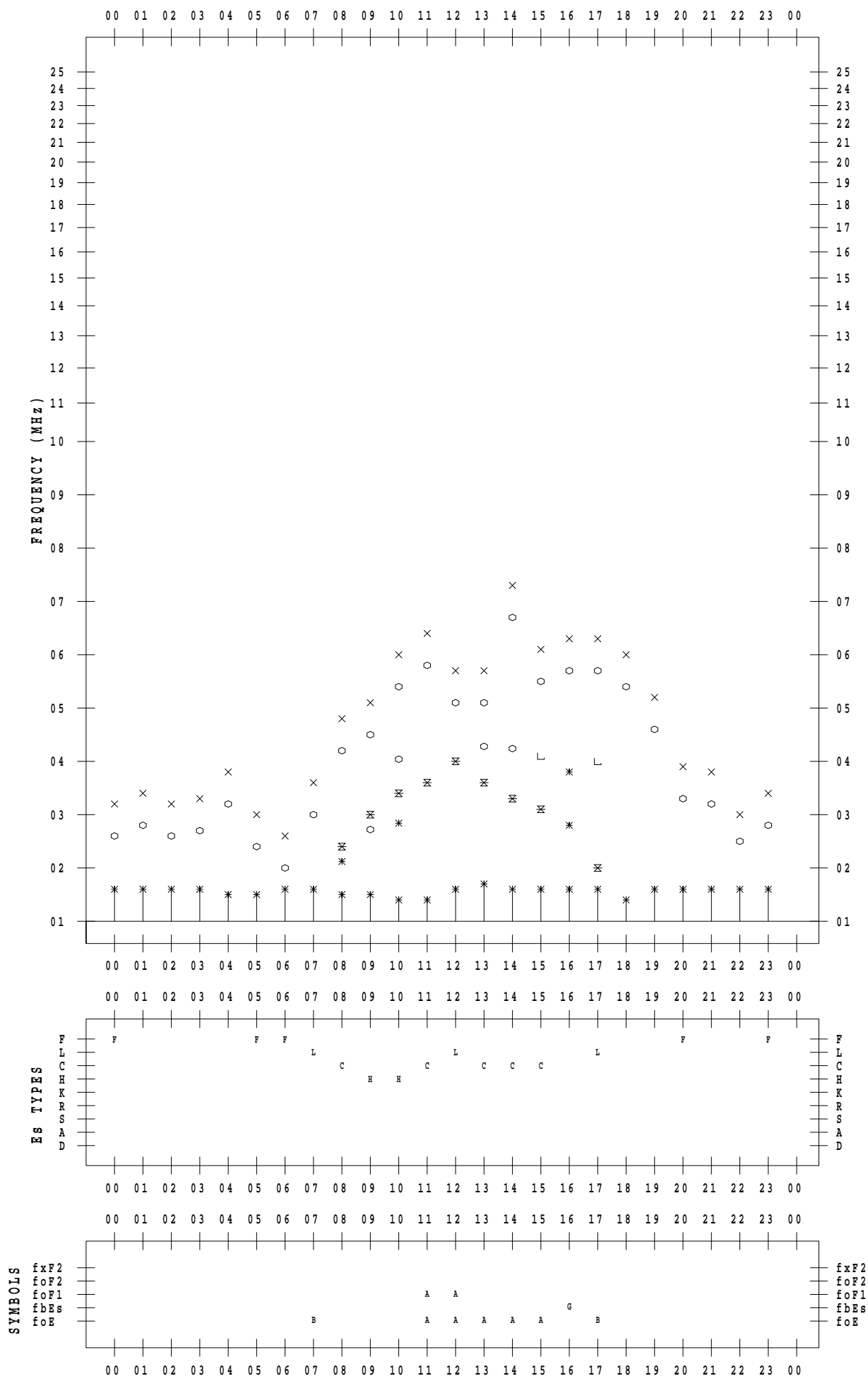
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 18

135 ° E MEAN TIME





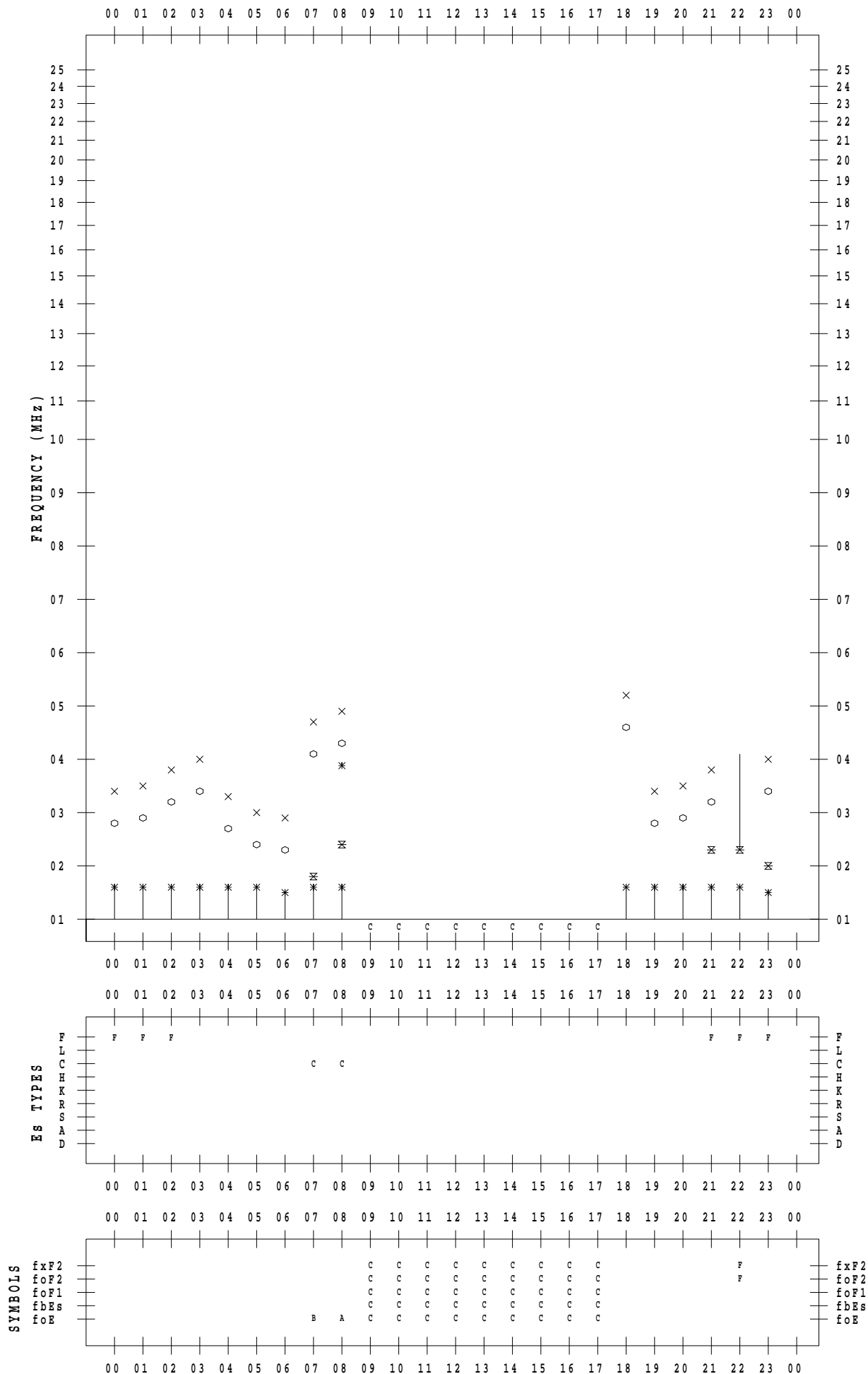
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 19

135 ° E MEAN TIME



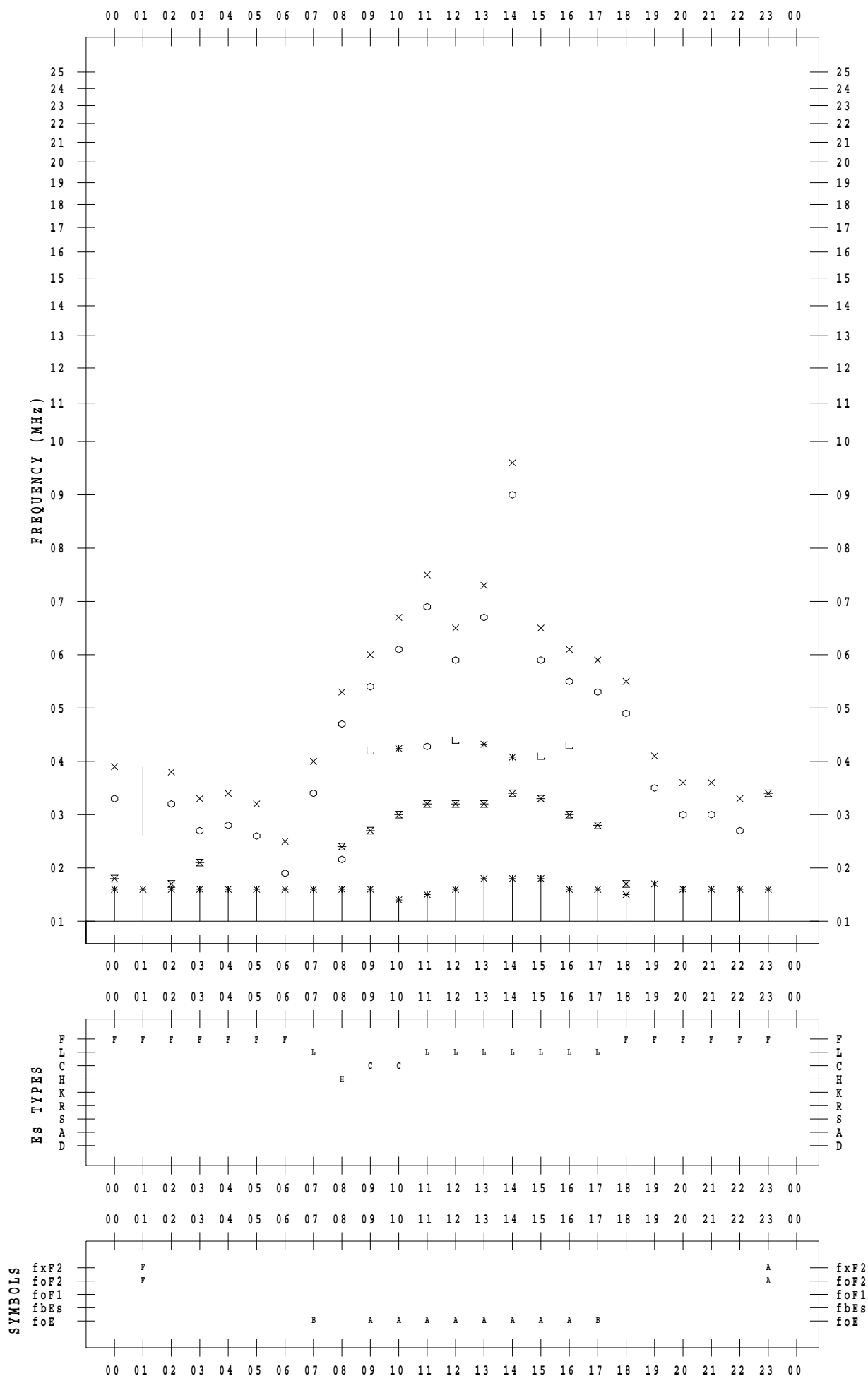
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 20

135 ° E MEAN TIME



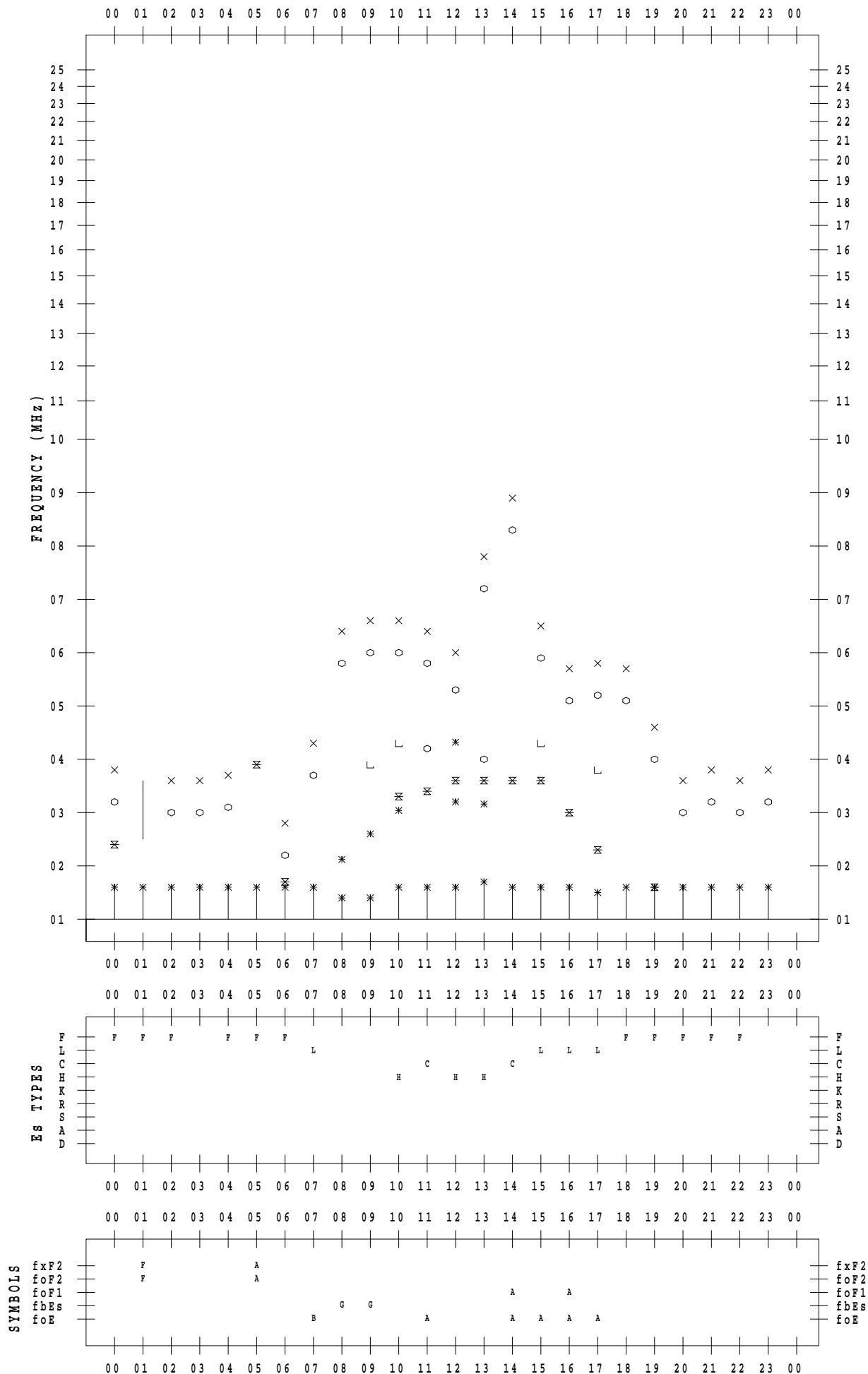
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 21

135 ° E MEAN TIME



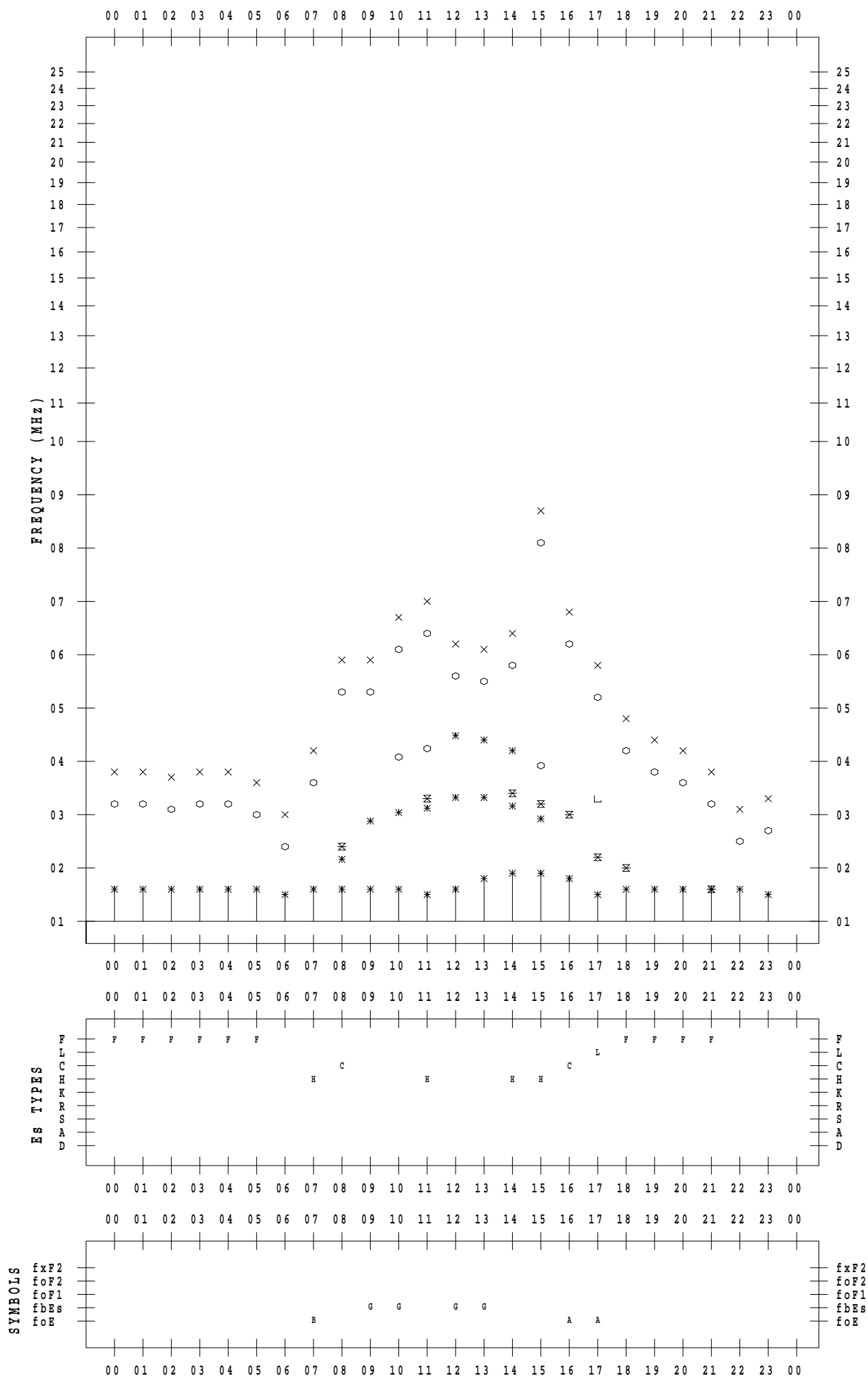
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 22

135 ° E MEAN TIME



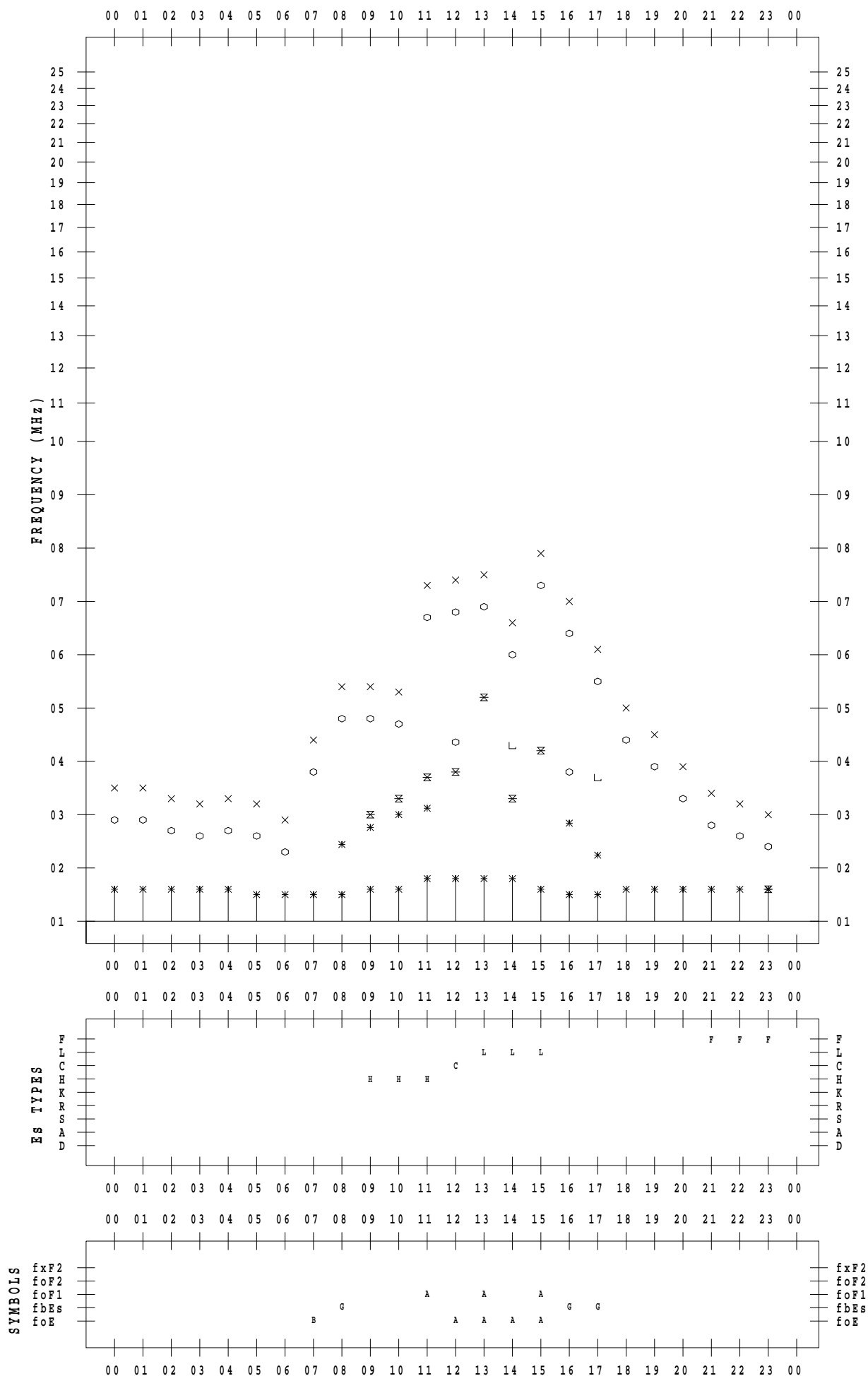
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 23

135 ° E MEAN TIME



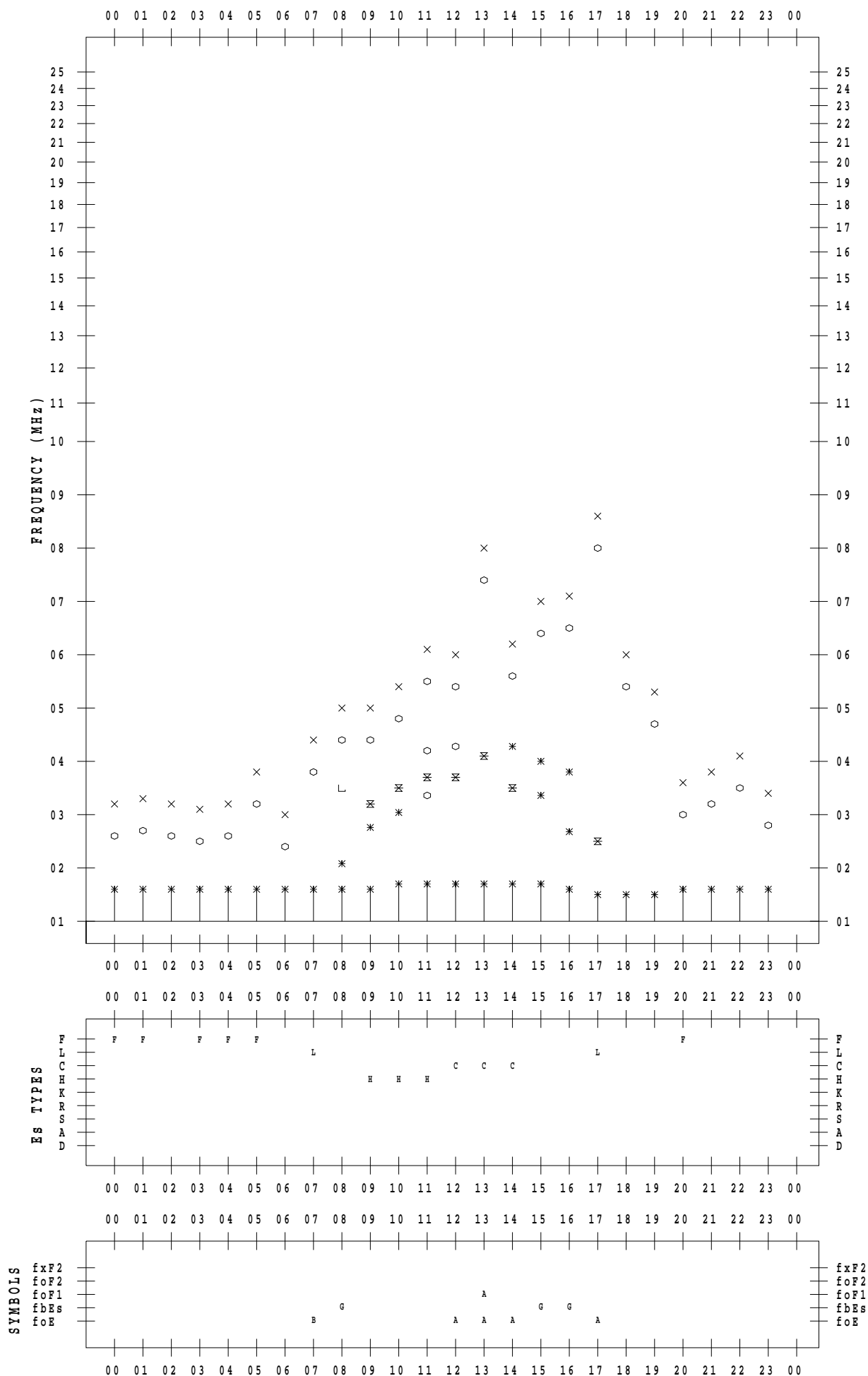
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 24

135 ° E MEAN TIME



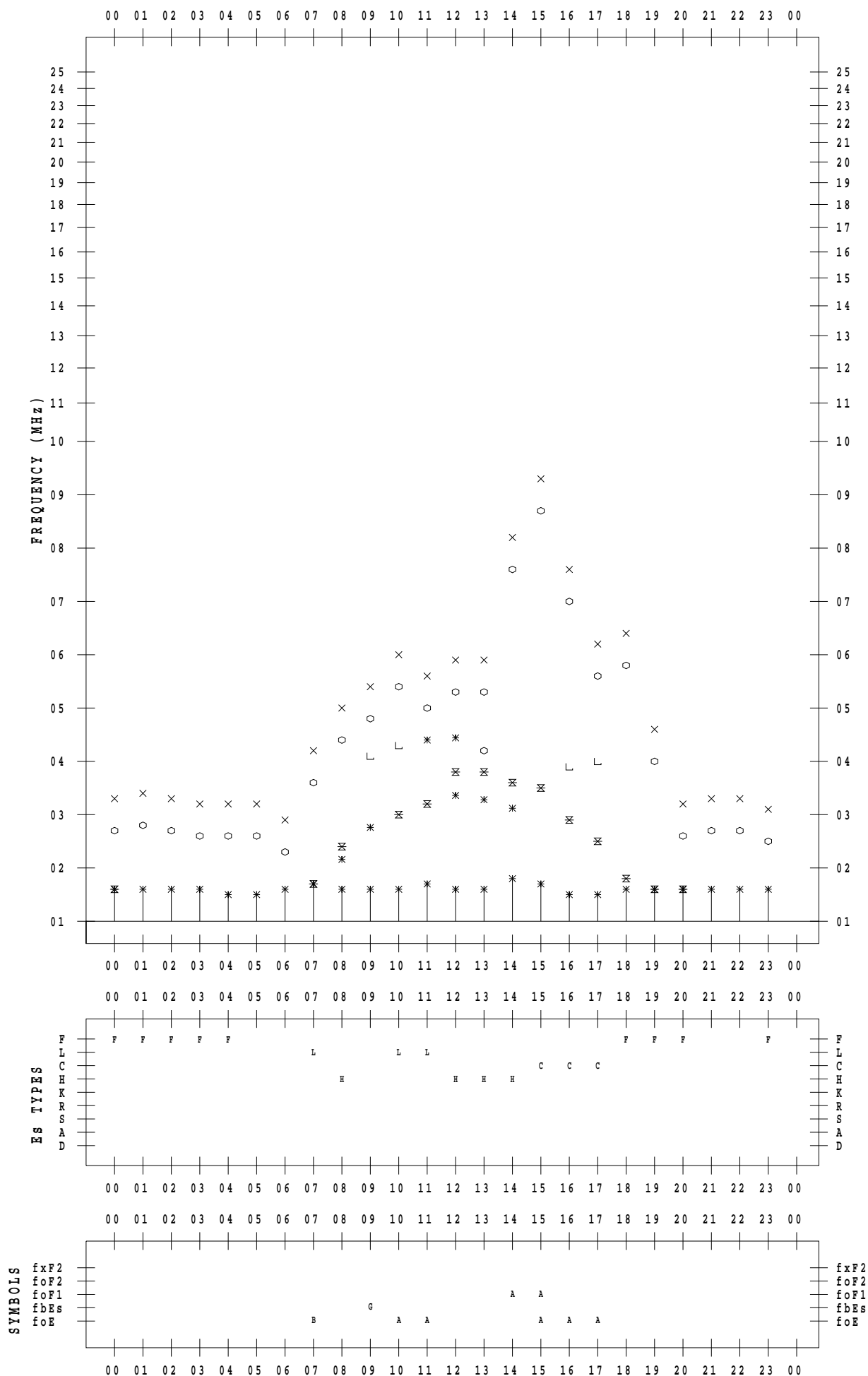
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 25

135 ° E MEAN TIME



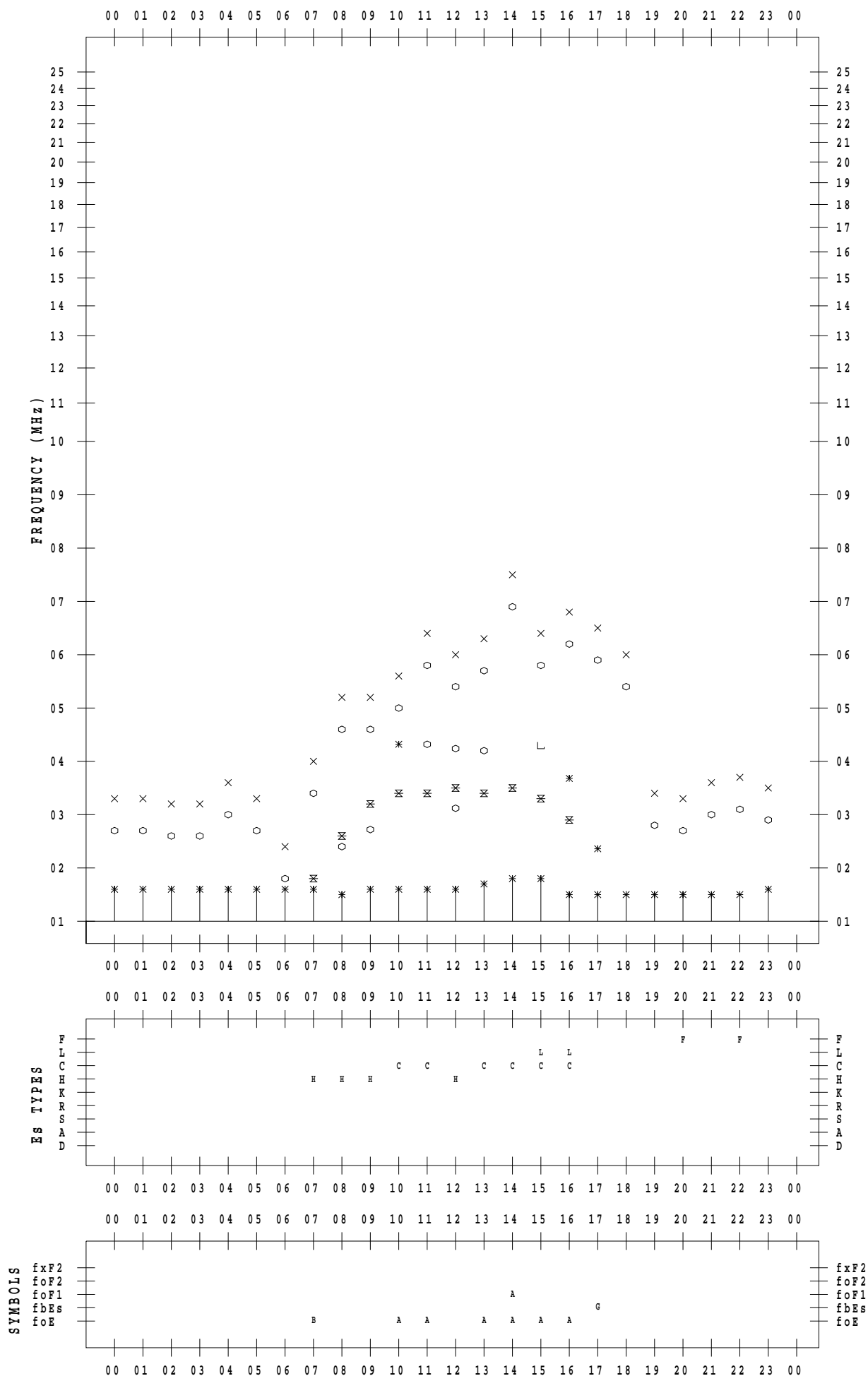
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 26

135 ° E MEAN TIME





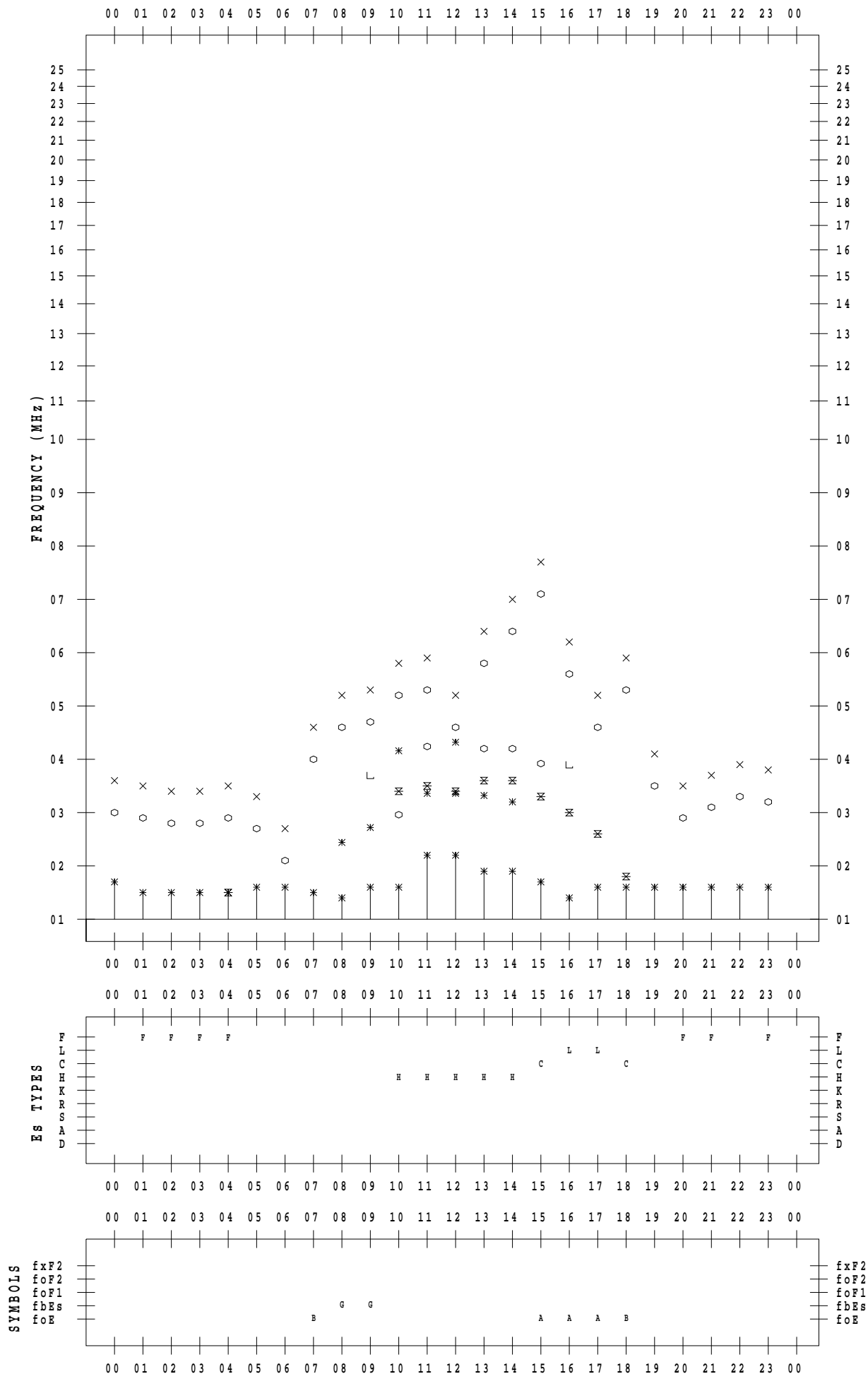
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 27

135 ° E MEAN TIME



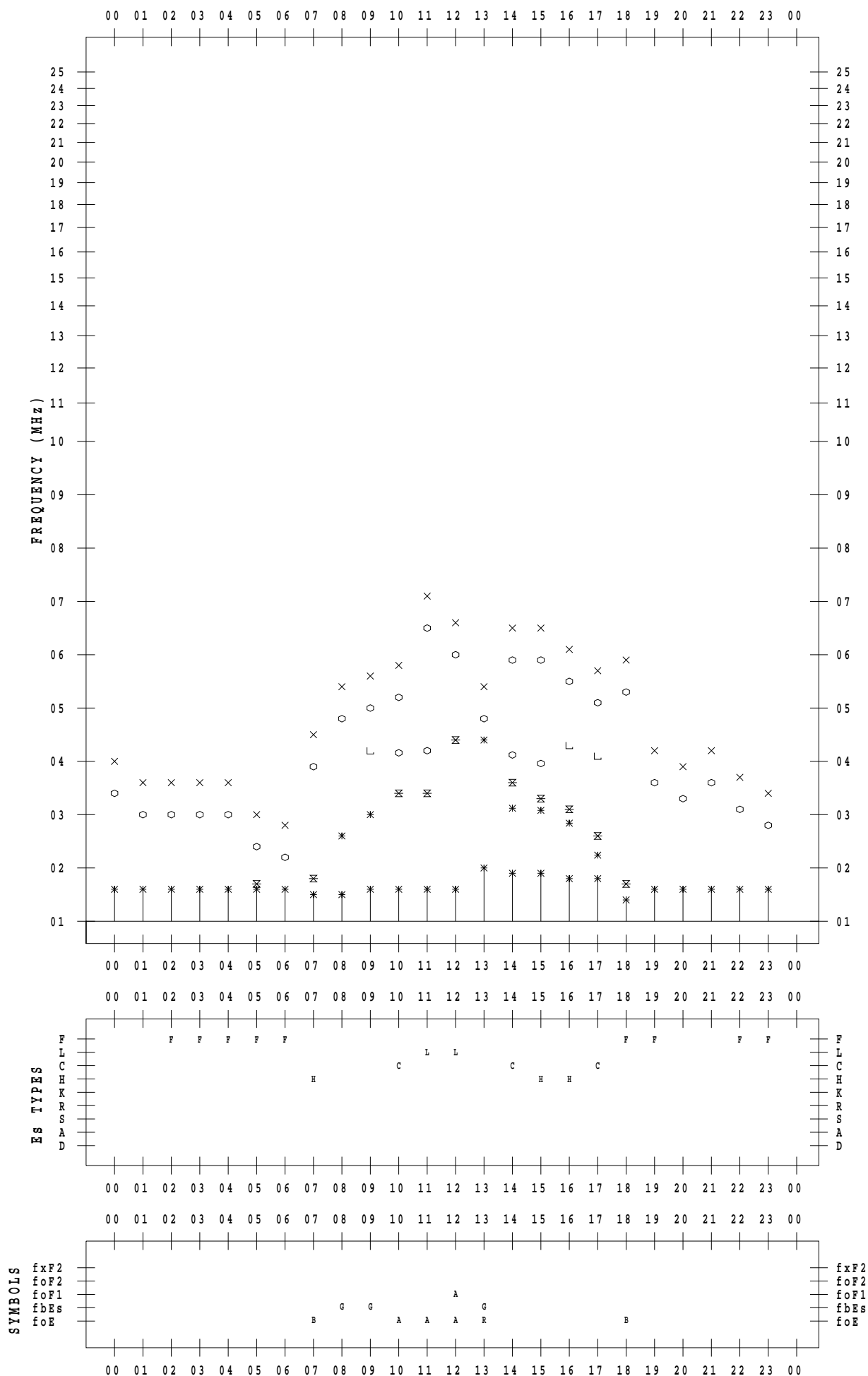
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020 / 2 / 28

135 ° E MEAN TIME



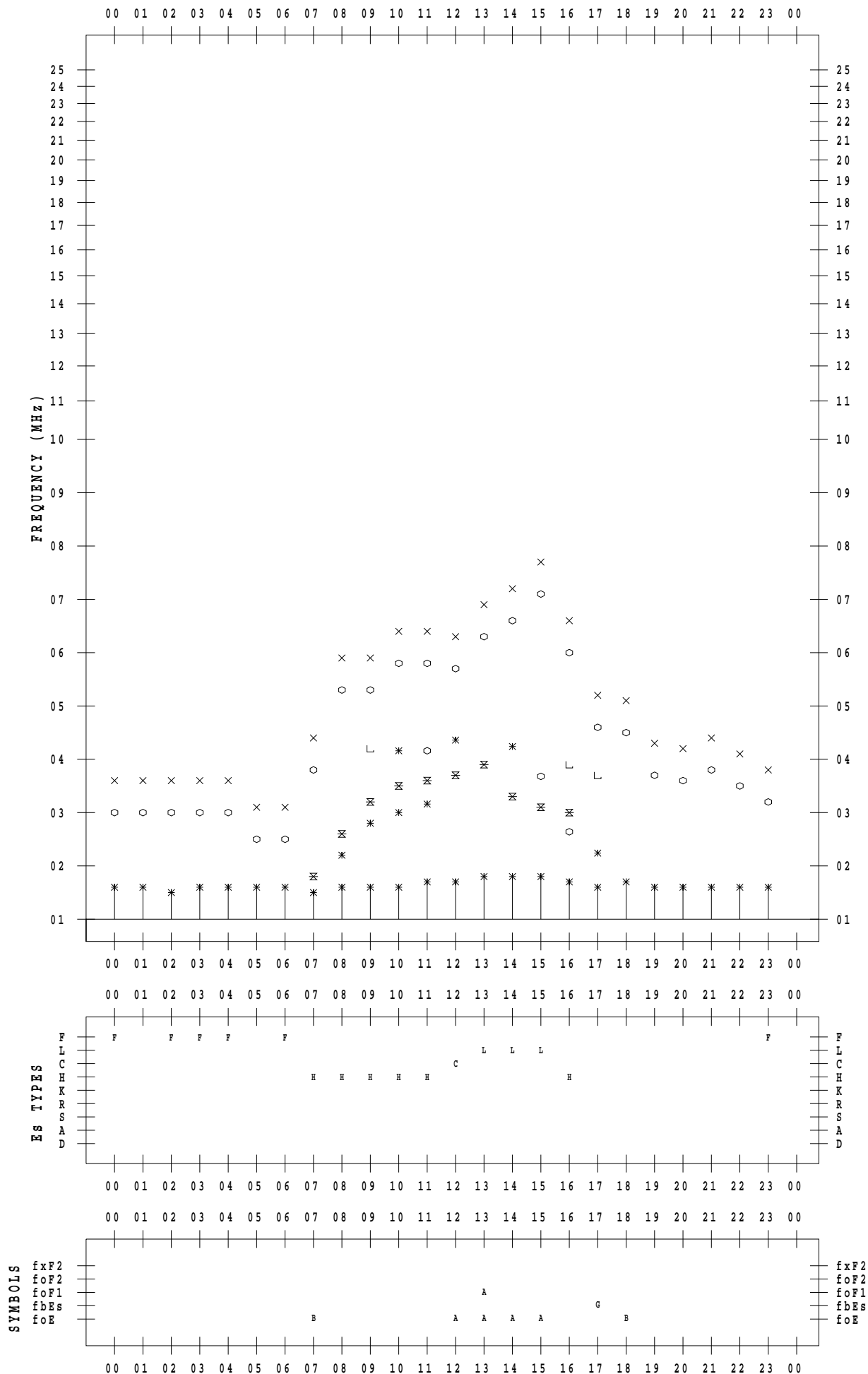
# f - PLOT DATA

SCALER :

STATION : Yamagawa

DATE : 2020 / 2 / 29

135 ° E MEAN TIME



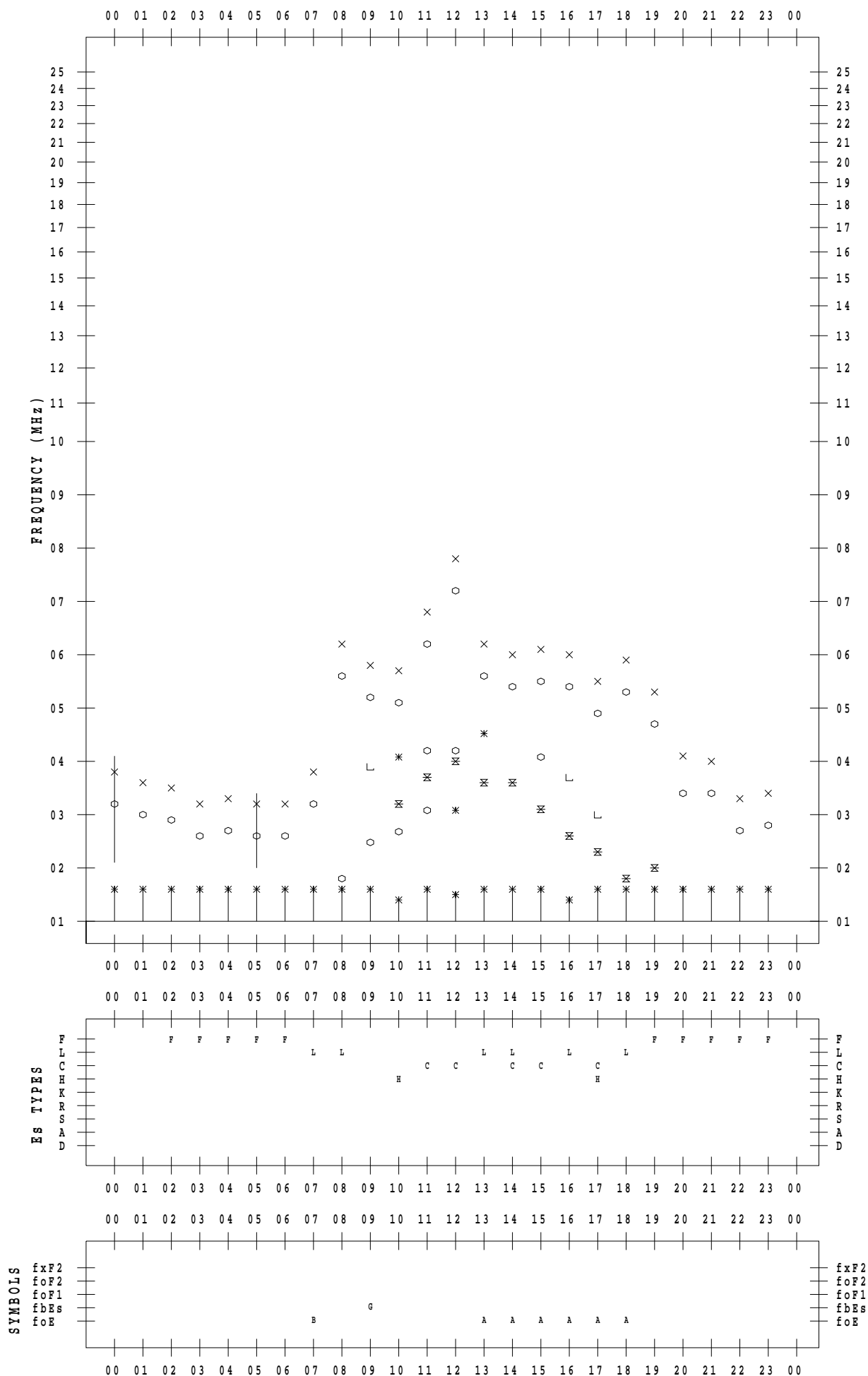
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 1

135 ° E MEAN TIME



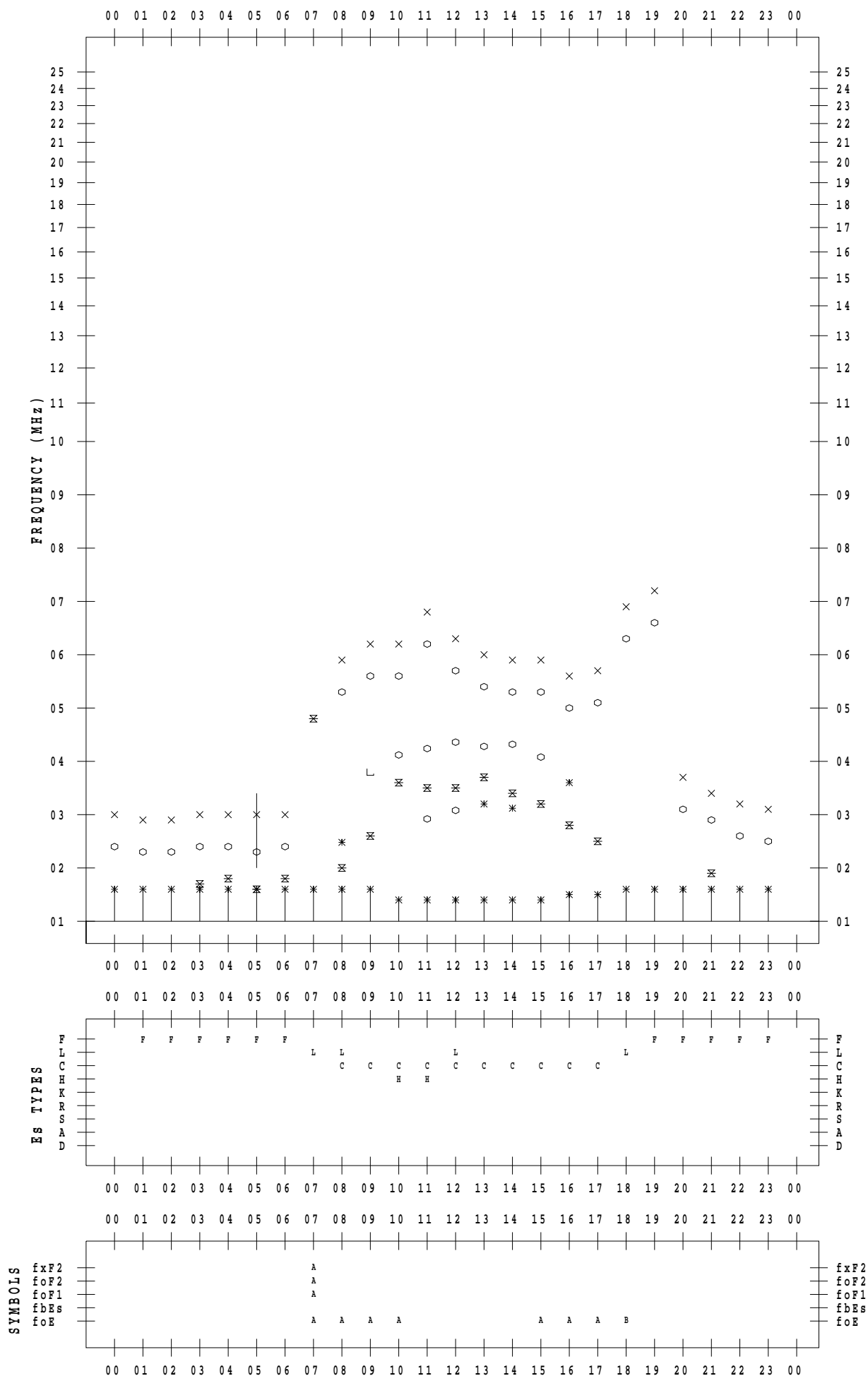
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 2

135 ° E MEAN TIME



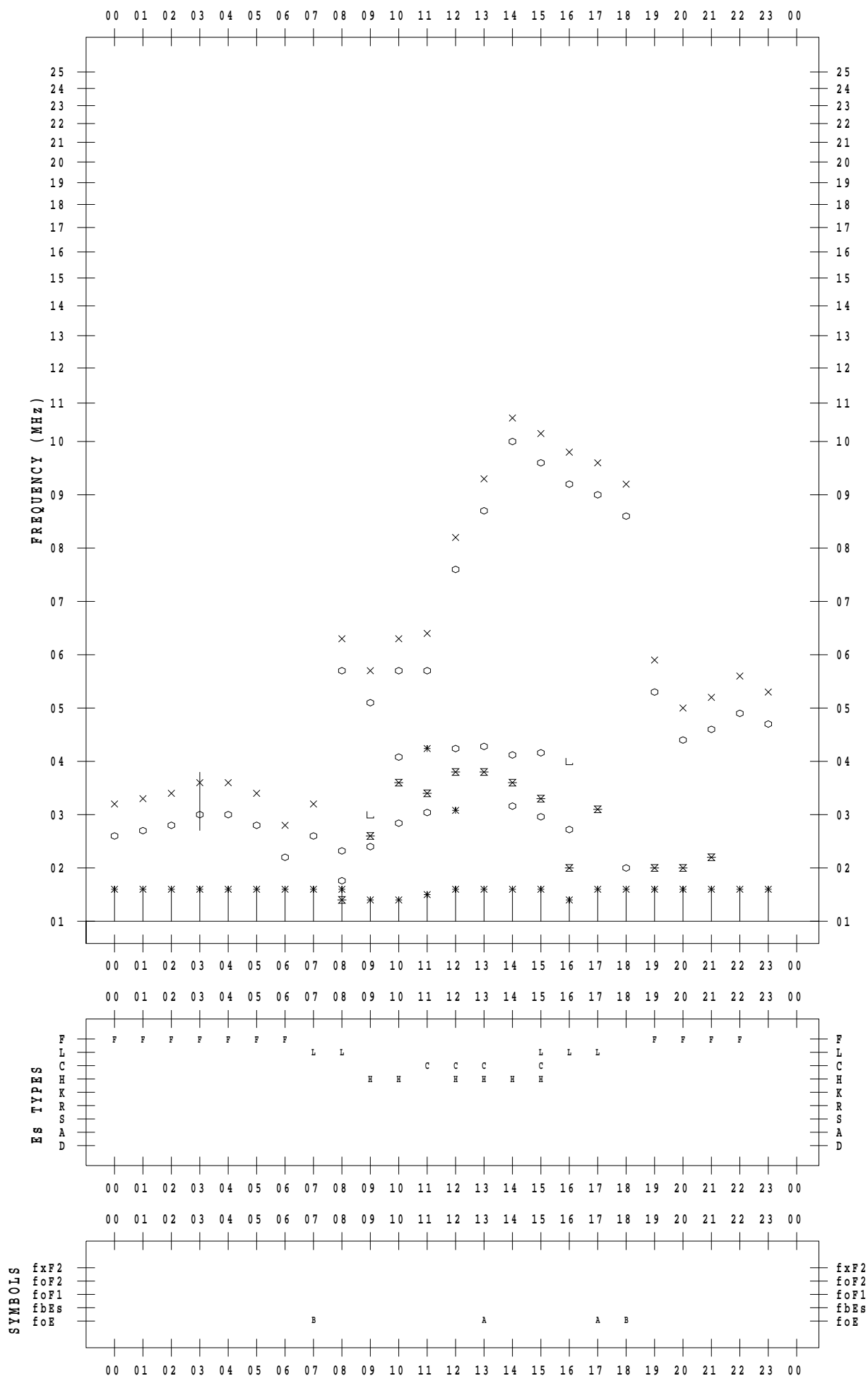
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 3

135 ° E MEAN TIME



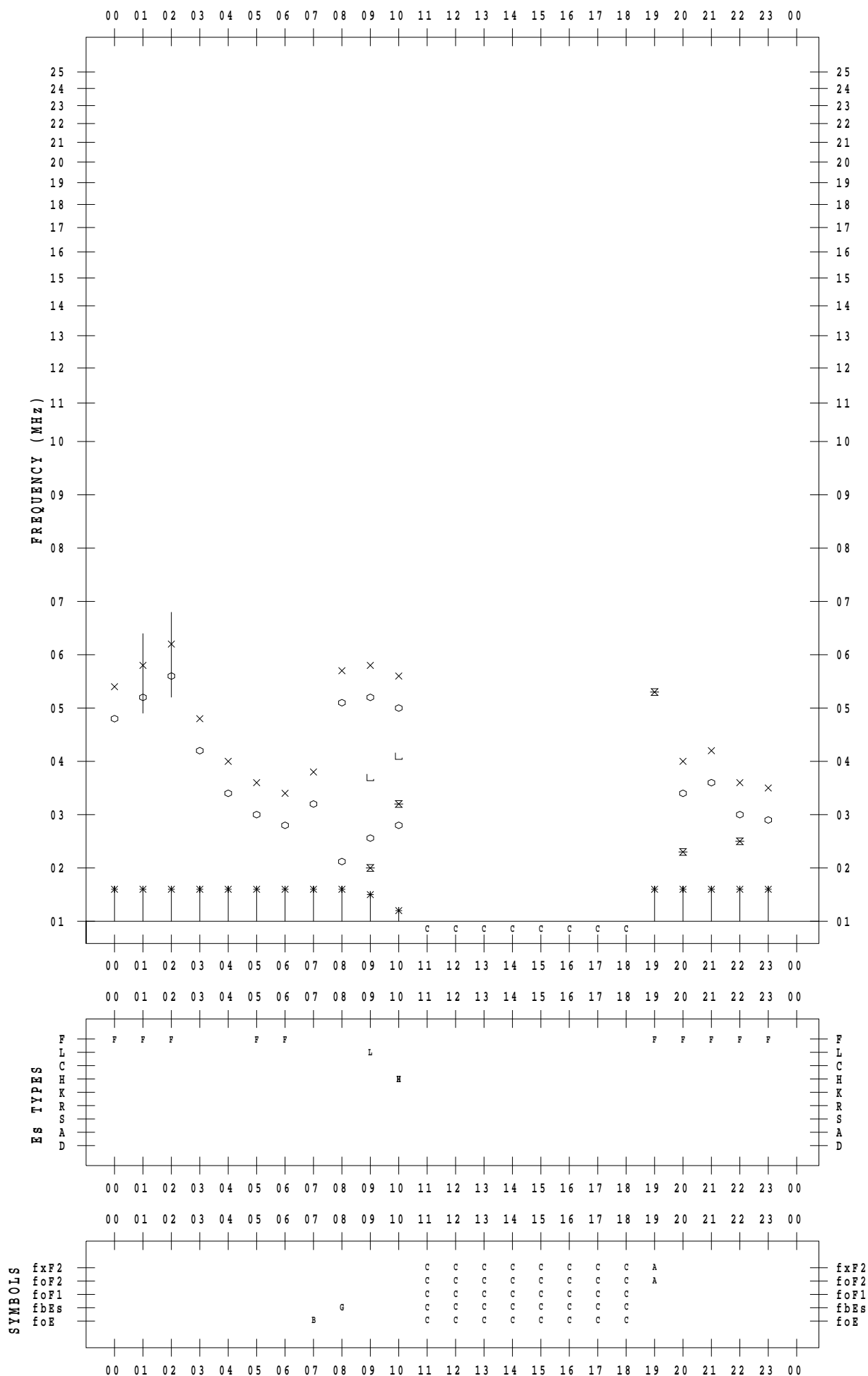
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 4

135 ° E MEAN TIME



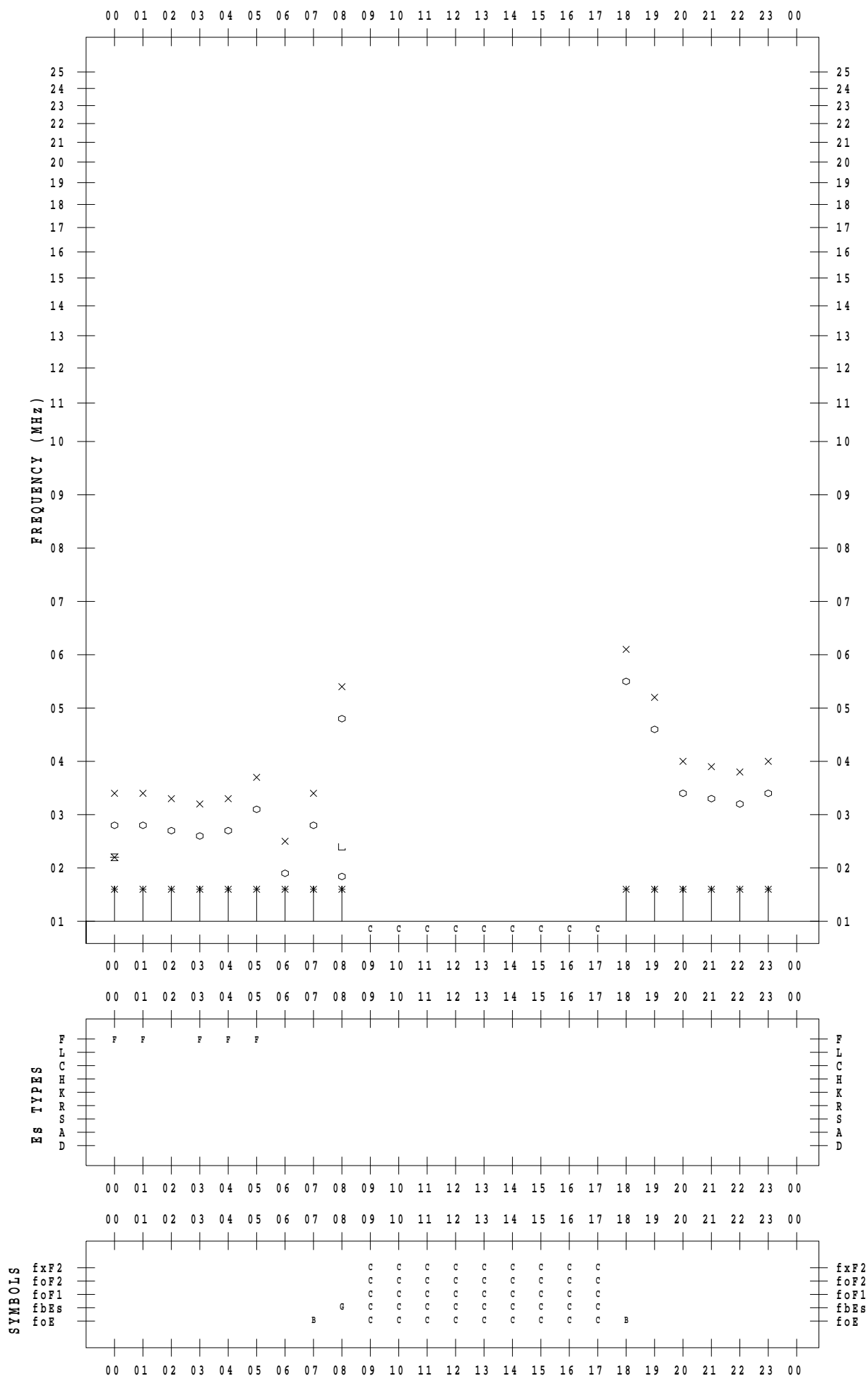
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 5

135 ° E MEAN TIME





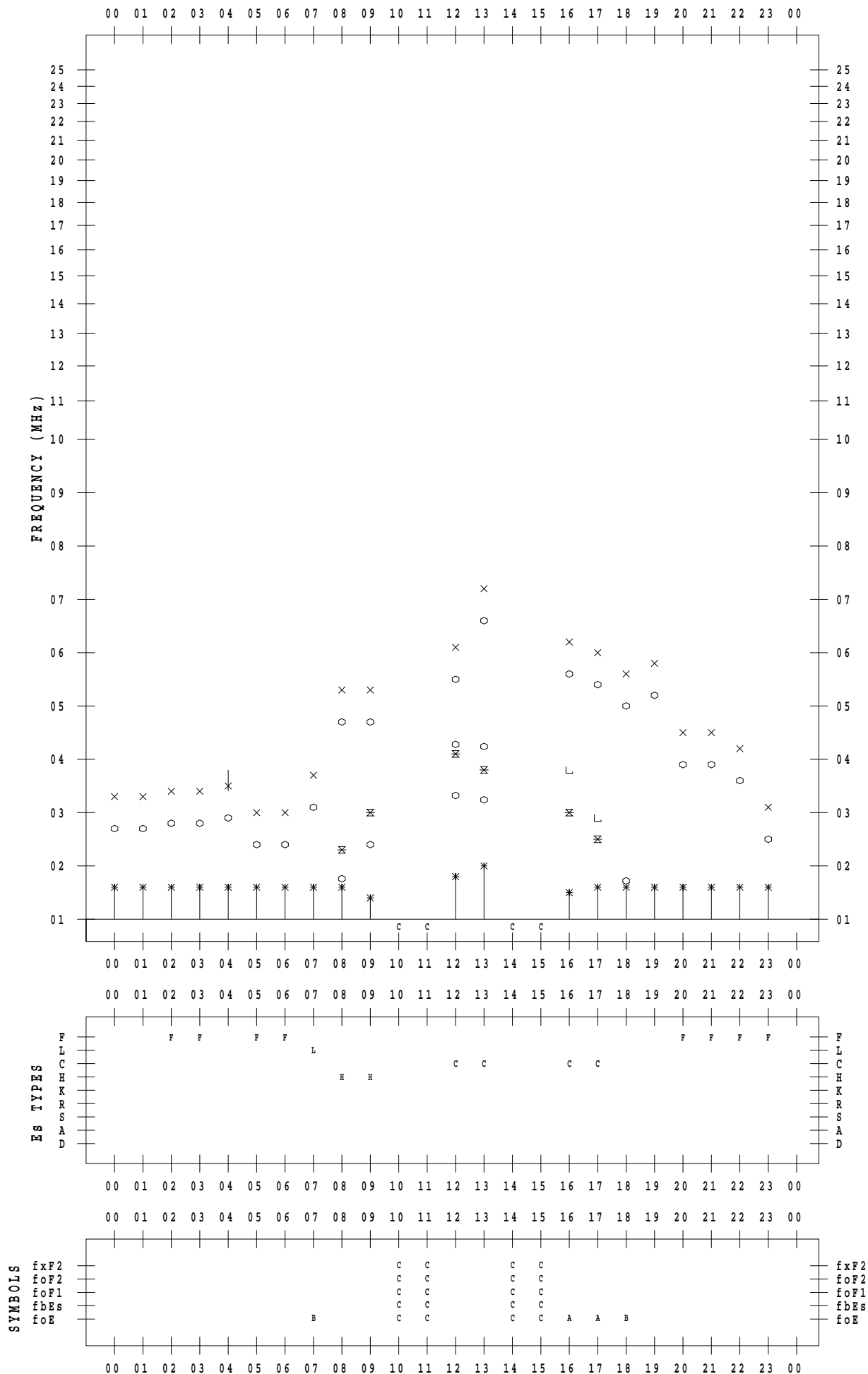
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 6

135 ° E MEAN TIME



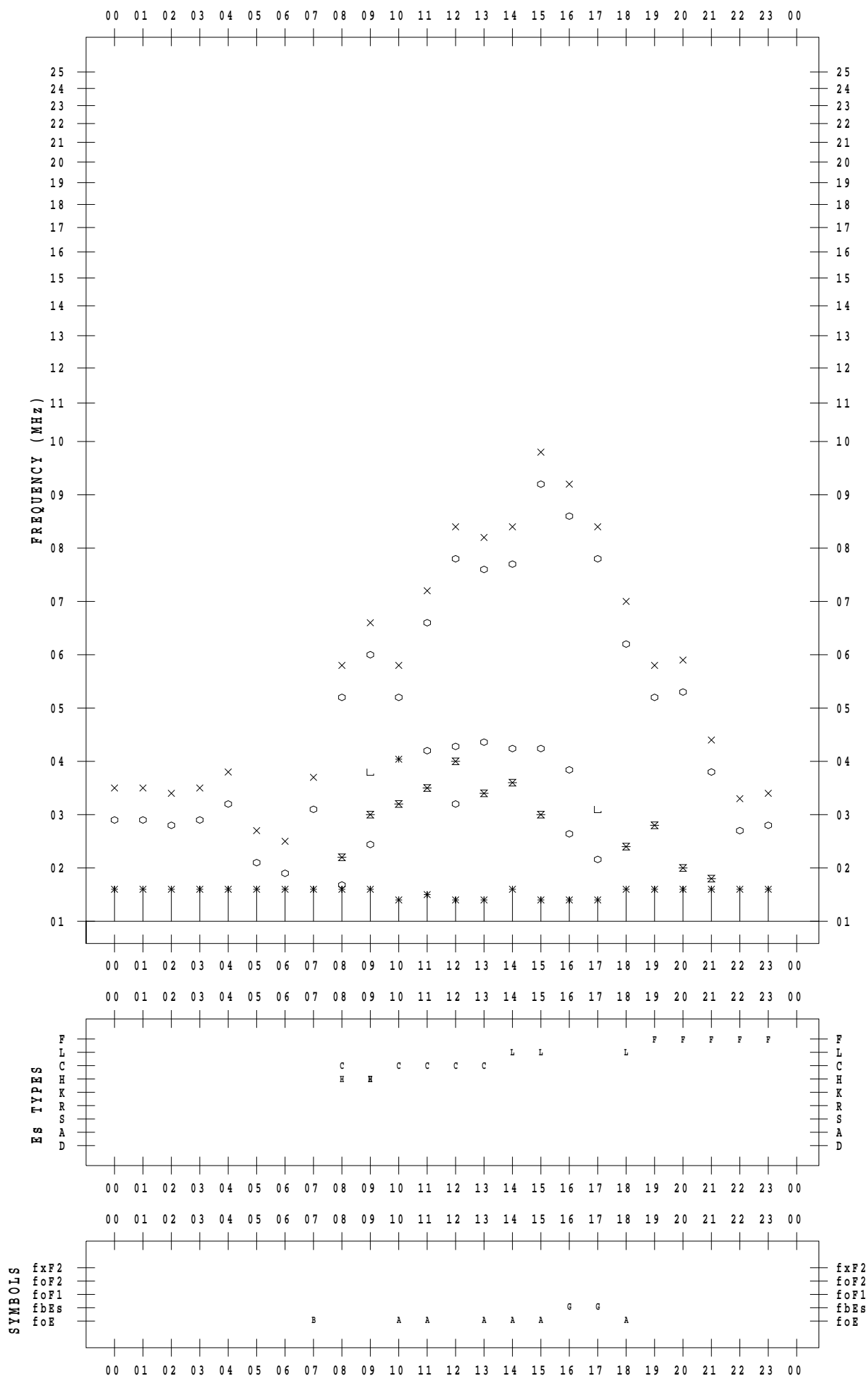
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 7

135 ° E MEAN TIME



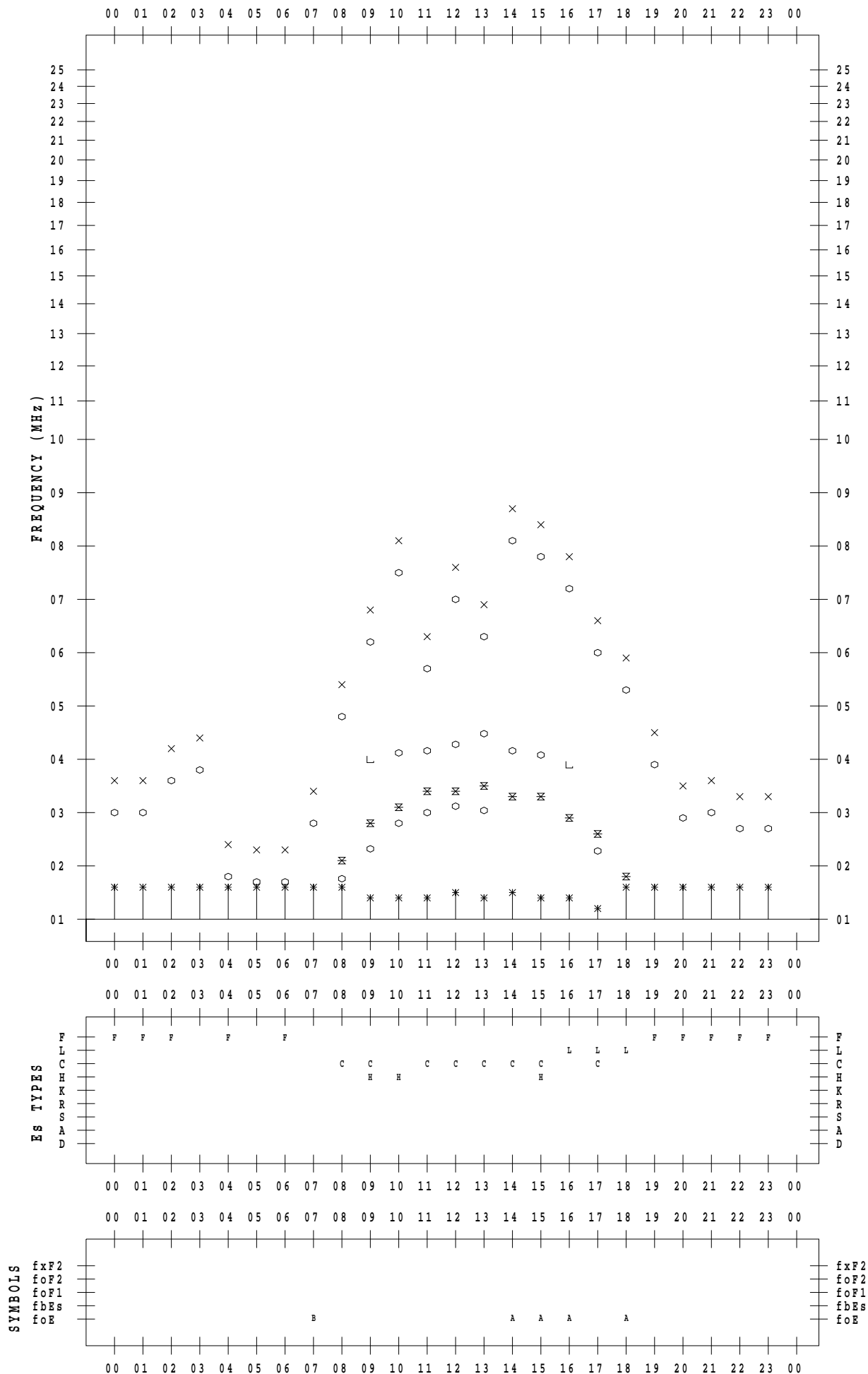
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 8

135 ° E MEAN TIME



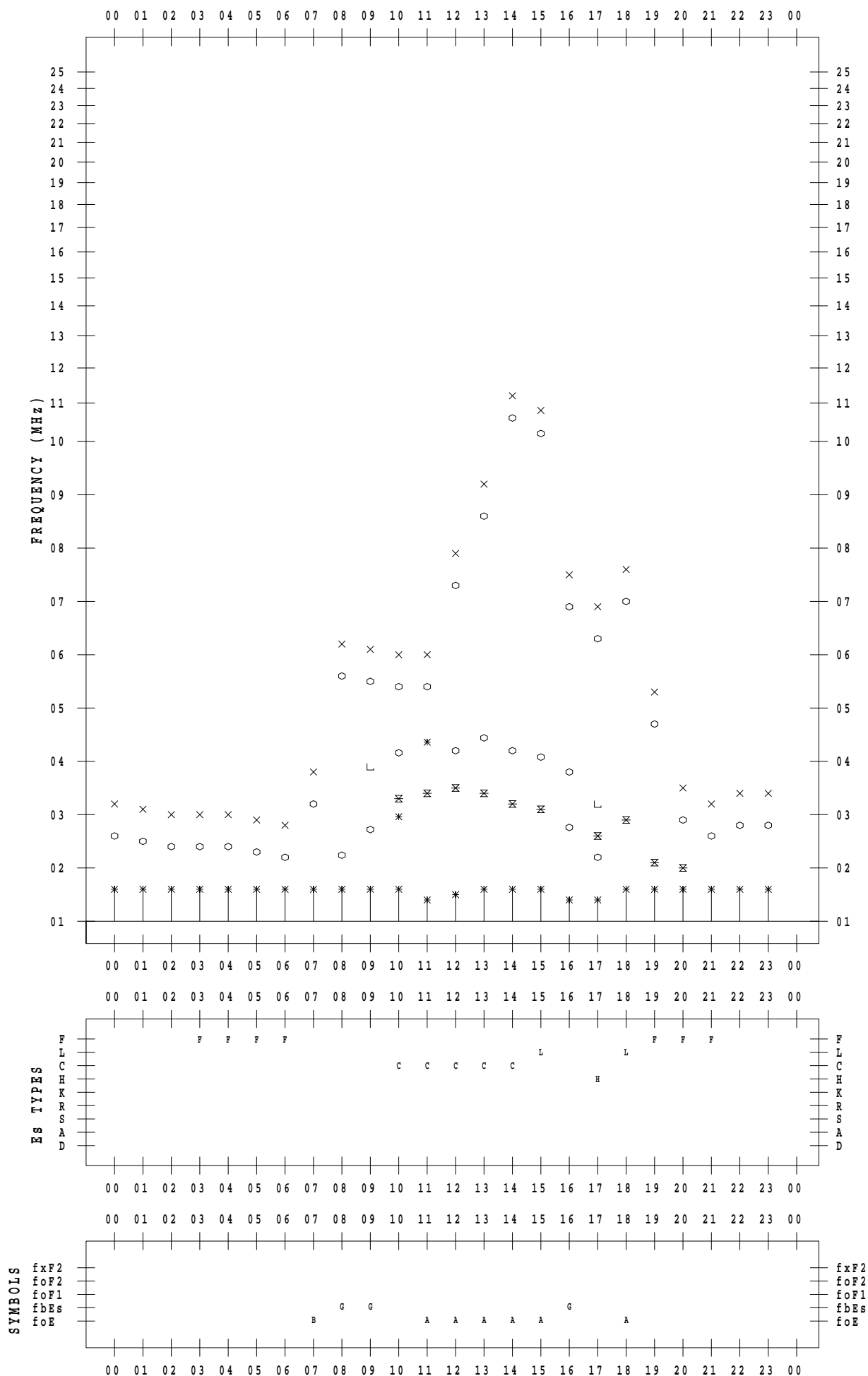
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 9

135 ° E MEAN TIME



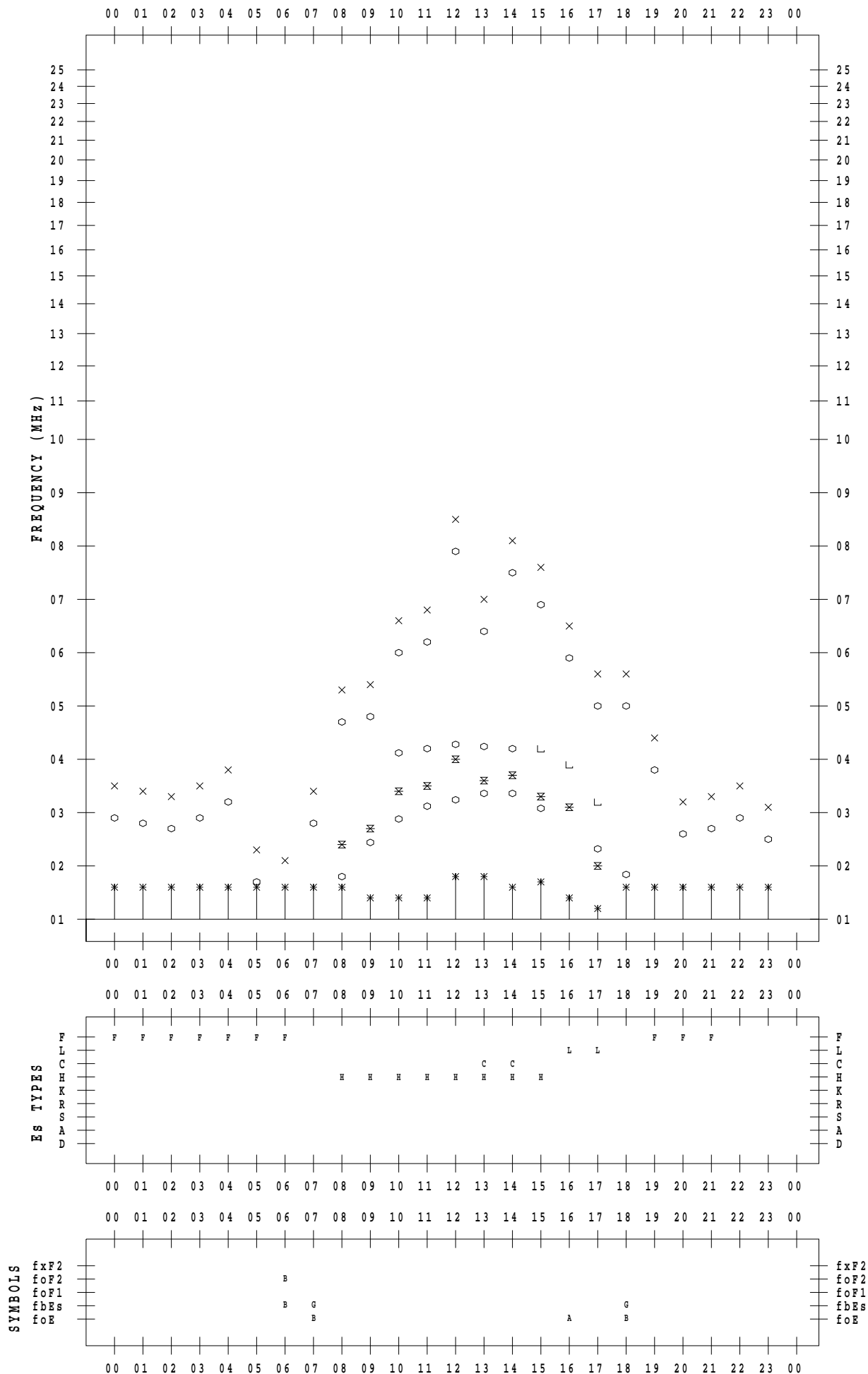
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 10

135 ° E MEAN TIME



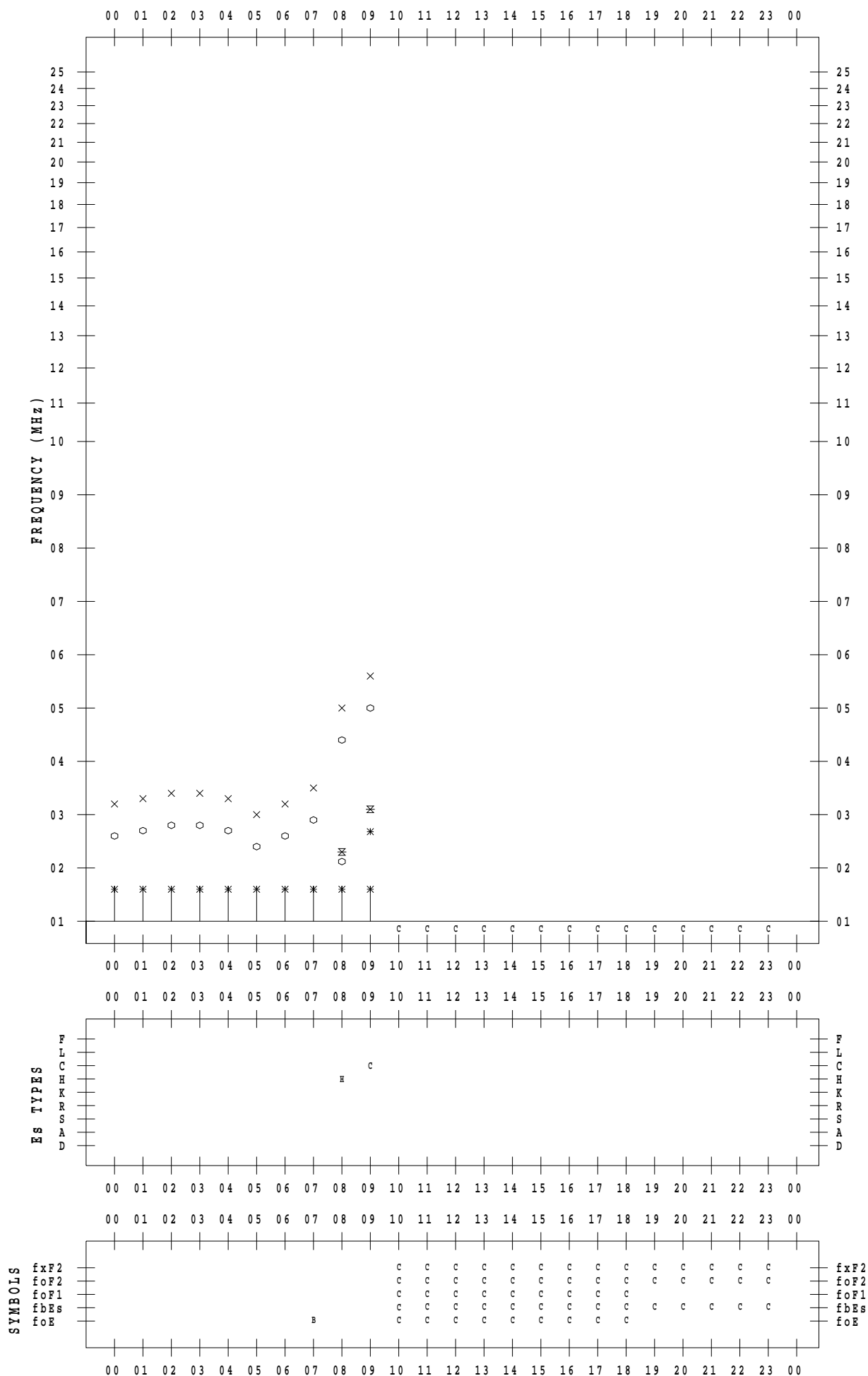
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 11

135 ° E MEAN TIME





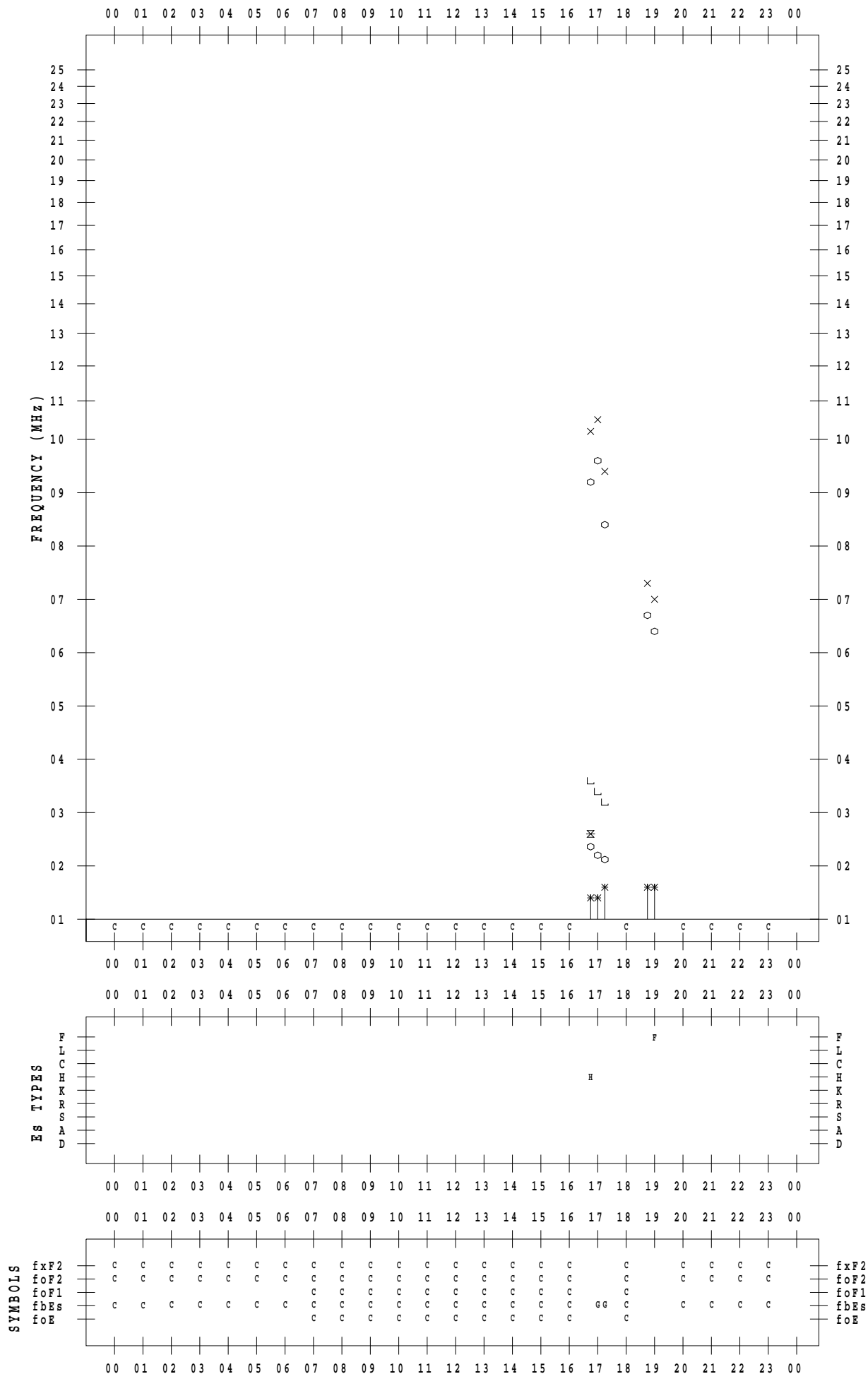
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 13

135 ° E MEAN TIME





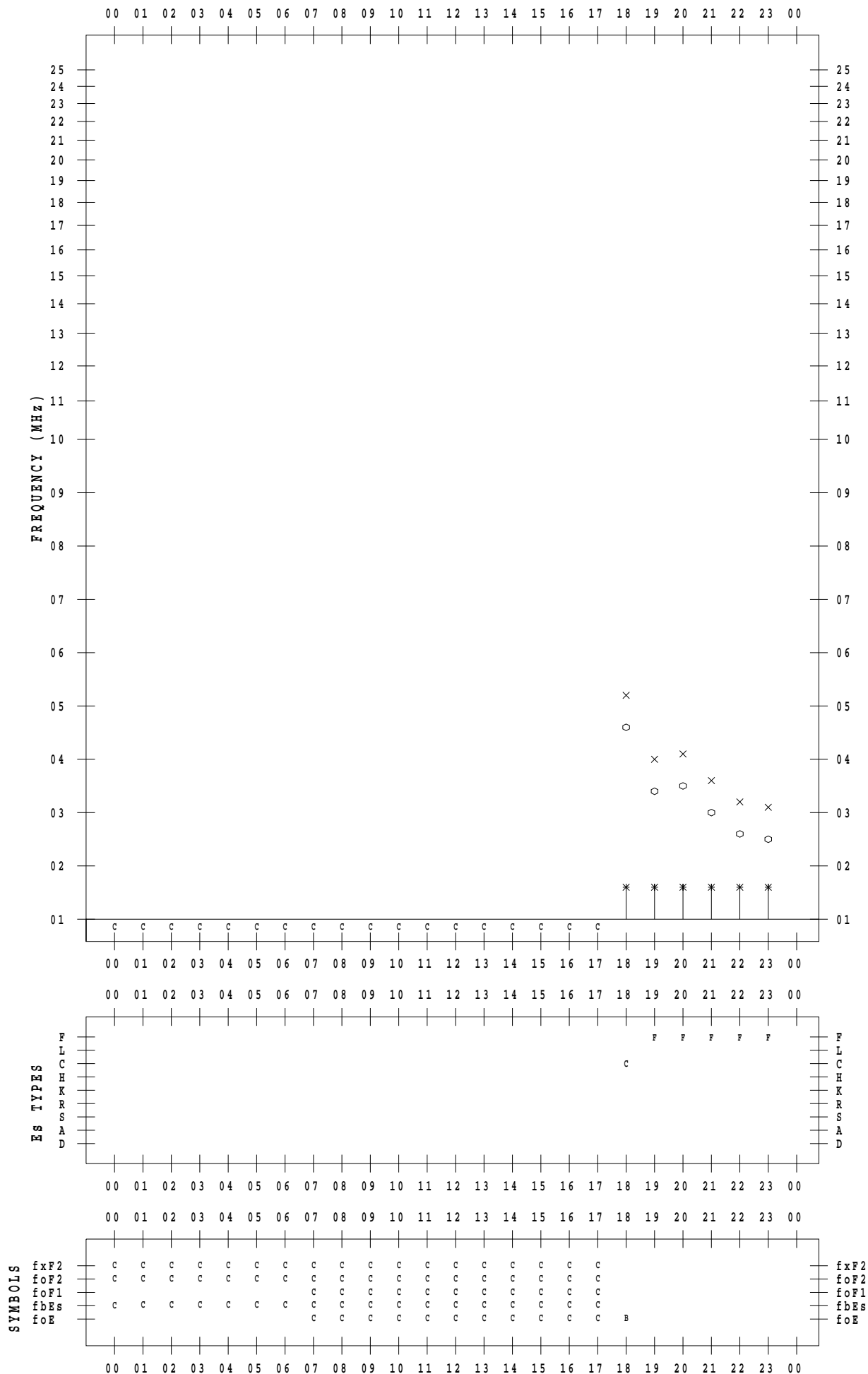
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 14

135 ° E MEAN TIME



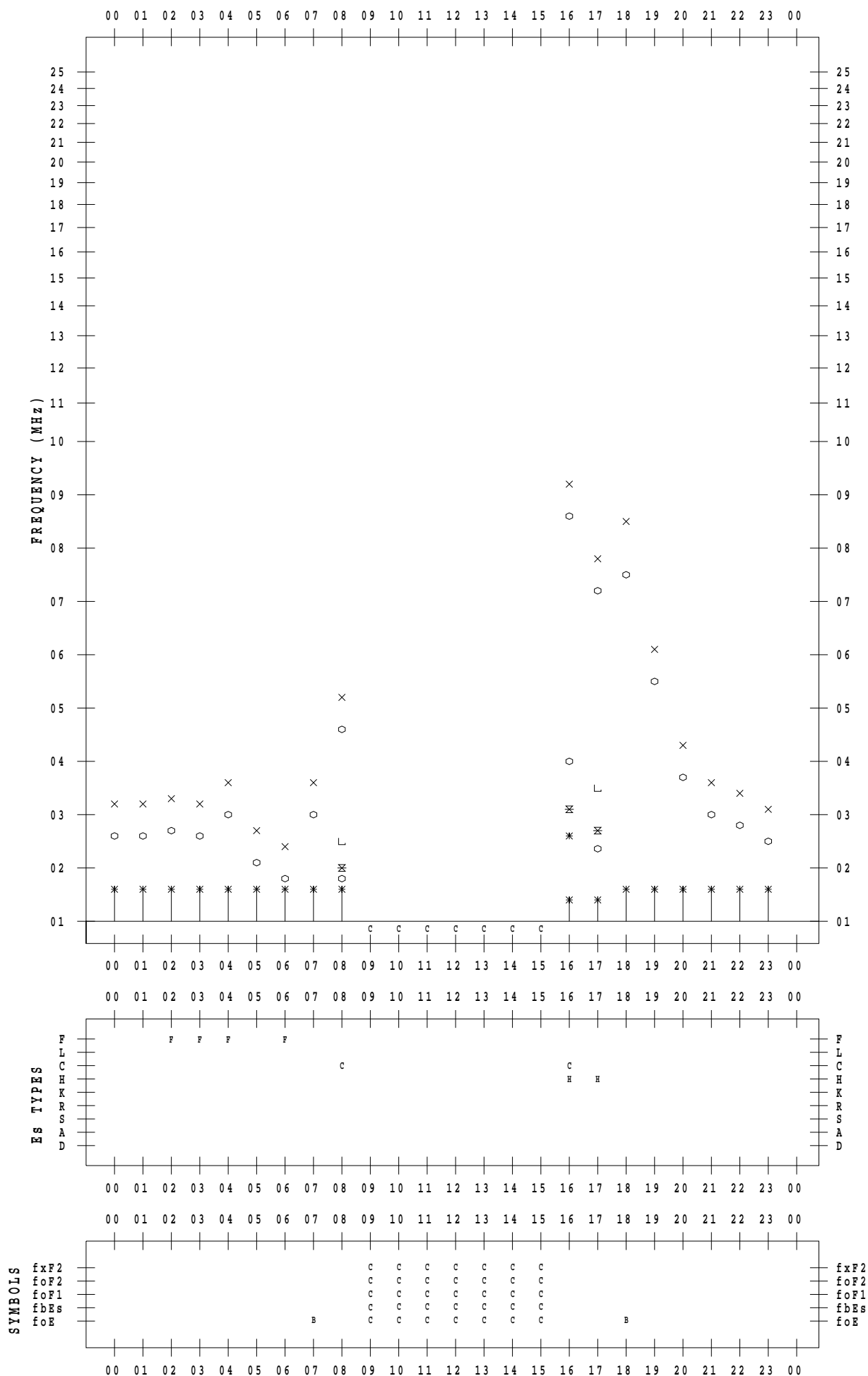
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 15

135 ° E MEAN TIME



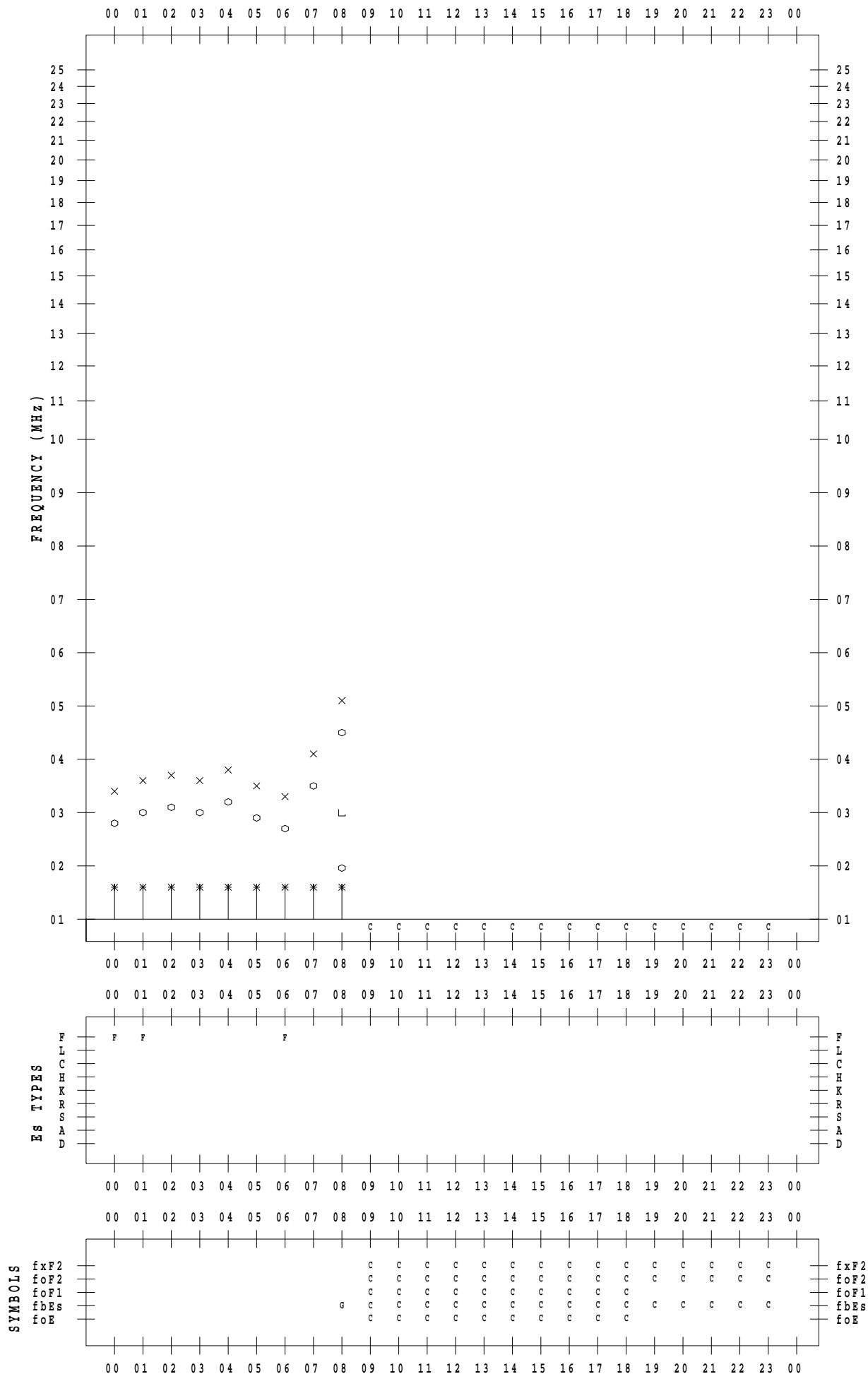
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 16

135 ° E MEAN TIME



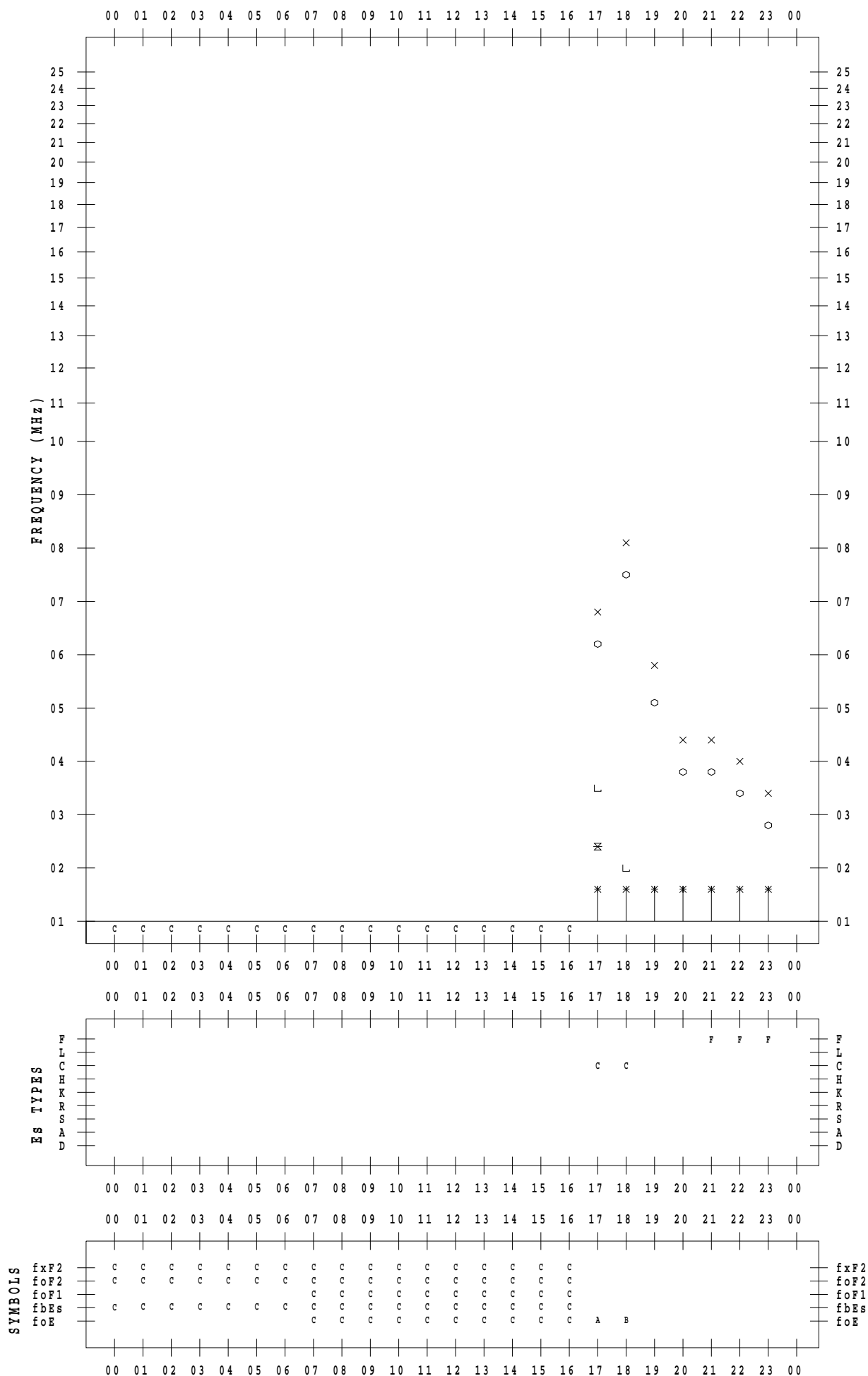
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 17

135 ° E MEAN TIME



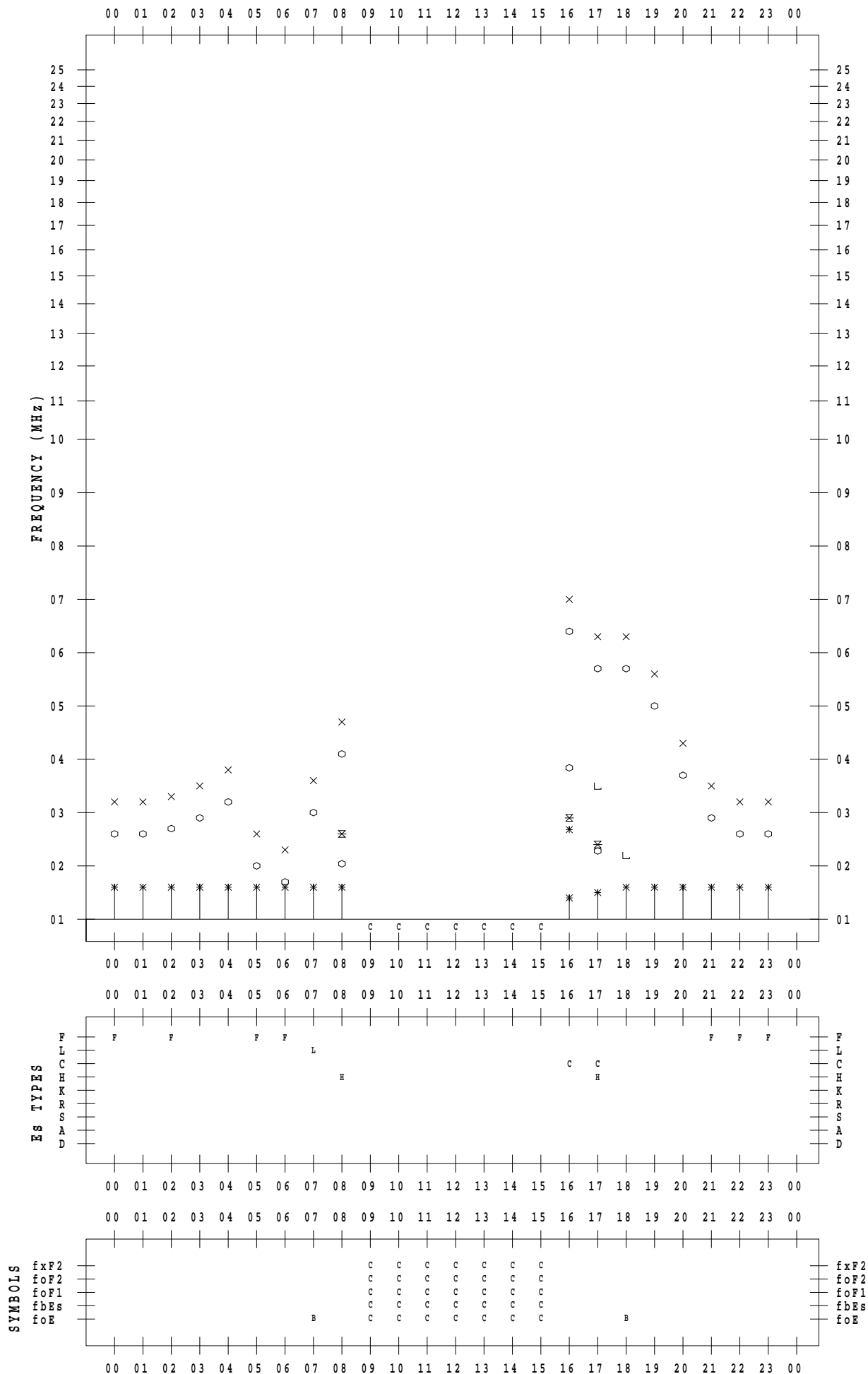
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 18

135 ° E MEAN TIME



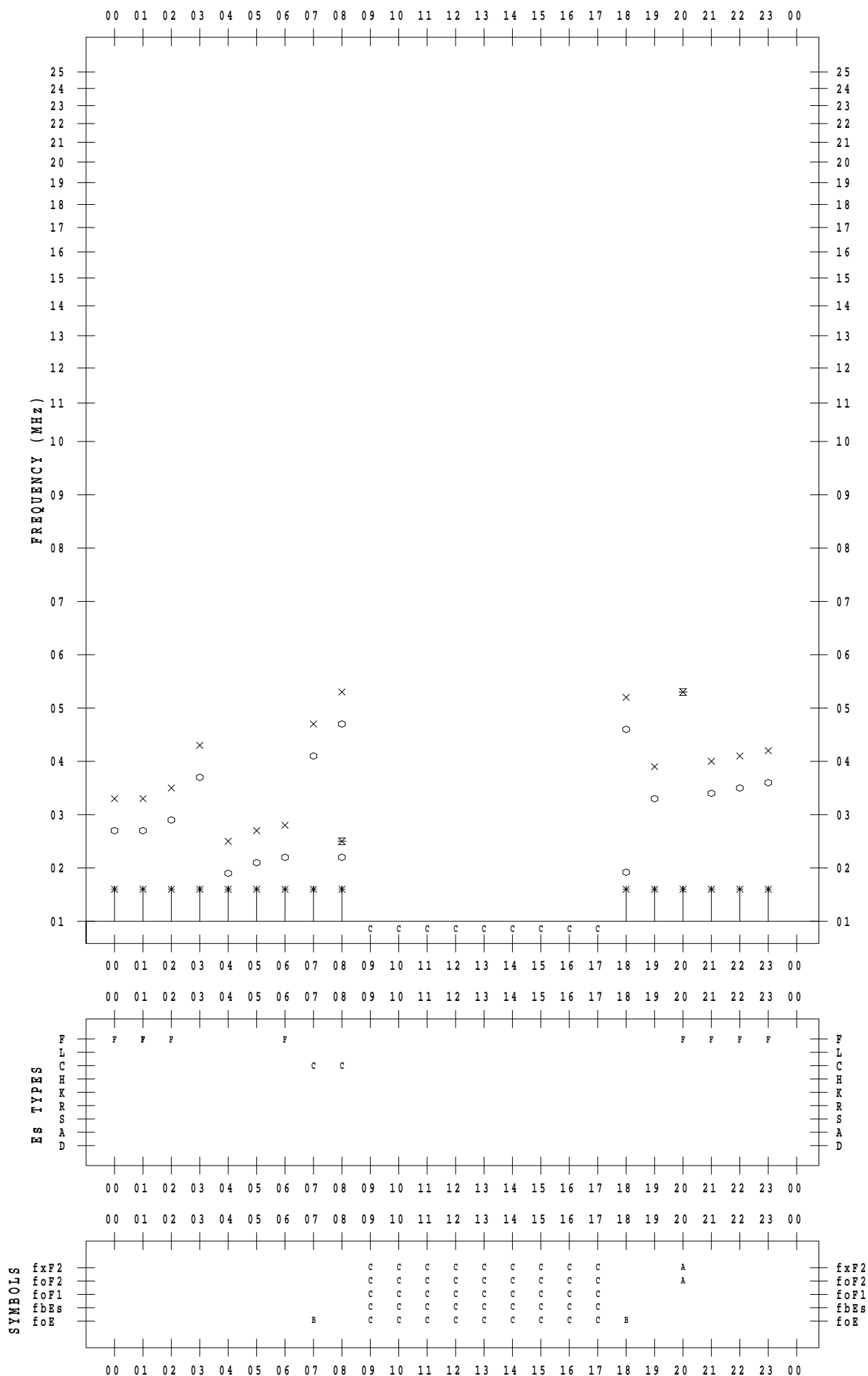
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 19

135 ° E MEAN TIME



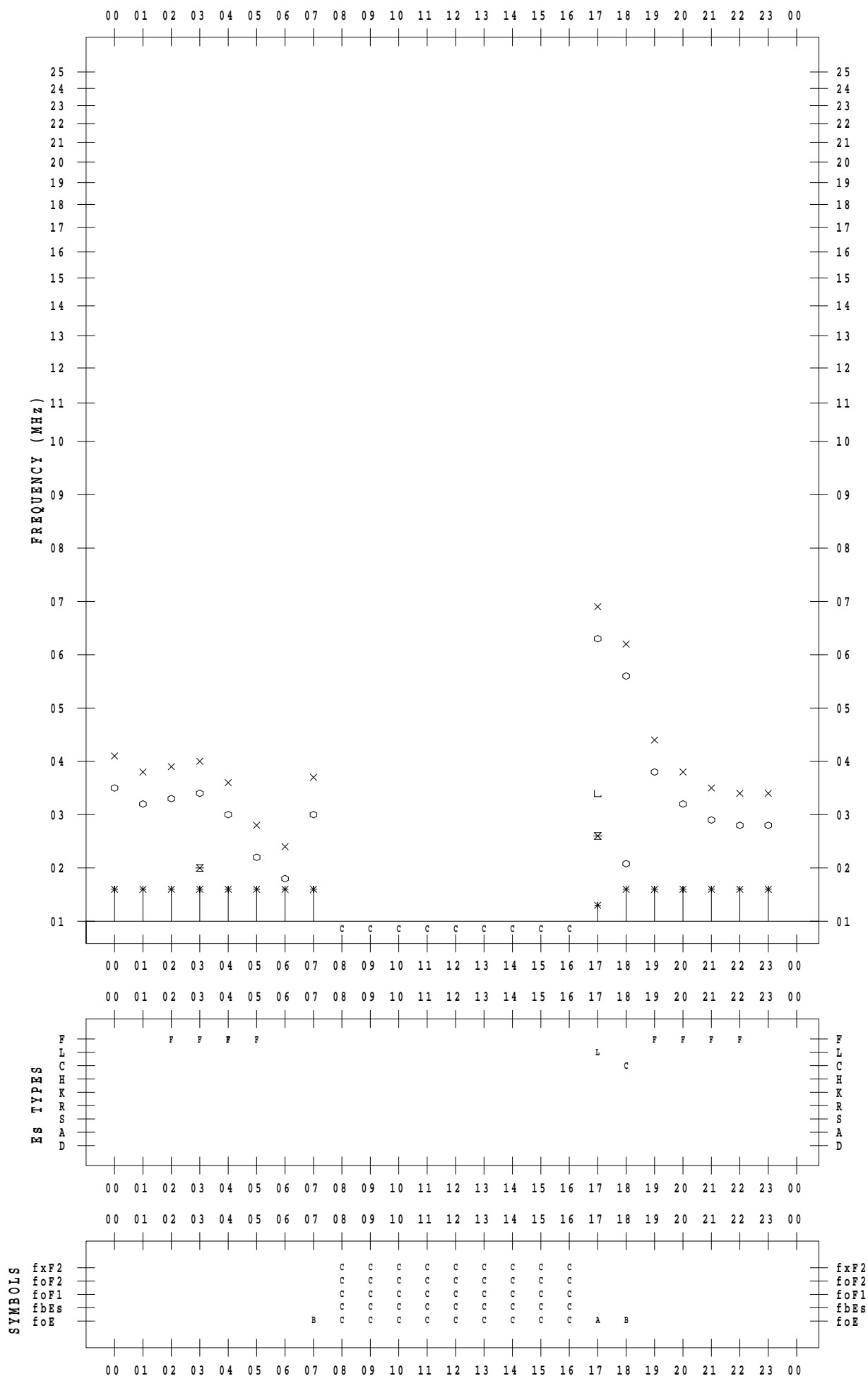
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 20

135 ° E MEAN TIME



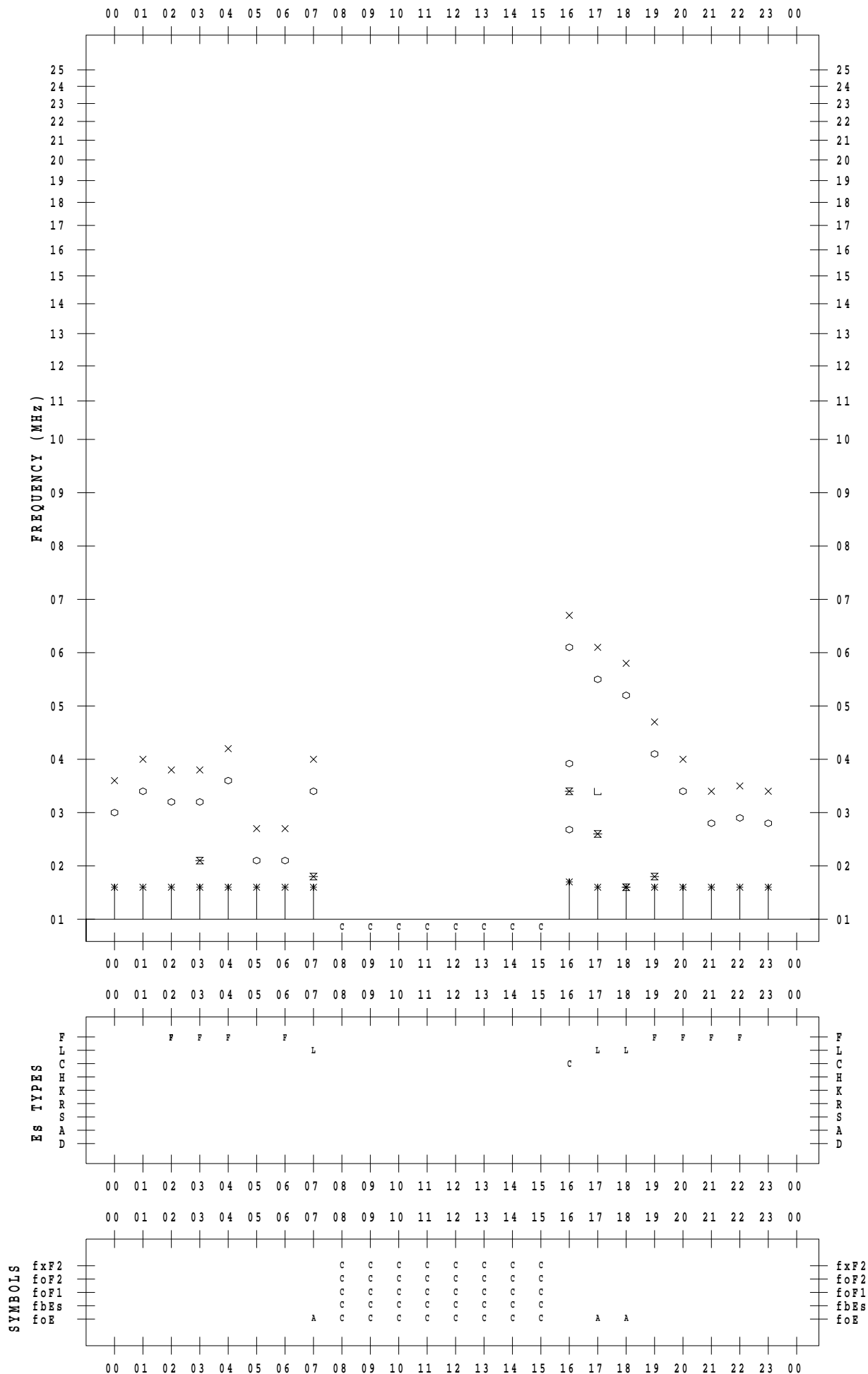
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 21

135 ° E MEAN TIME





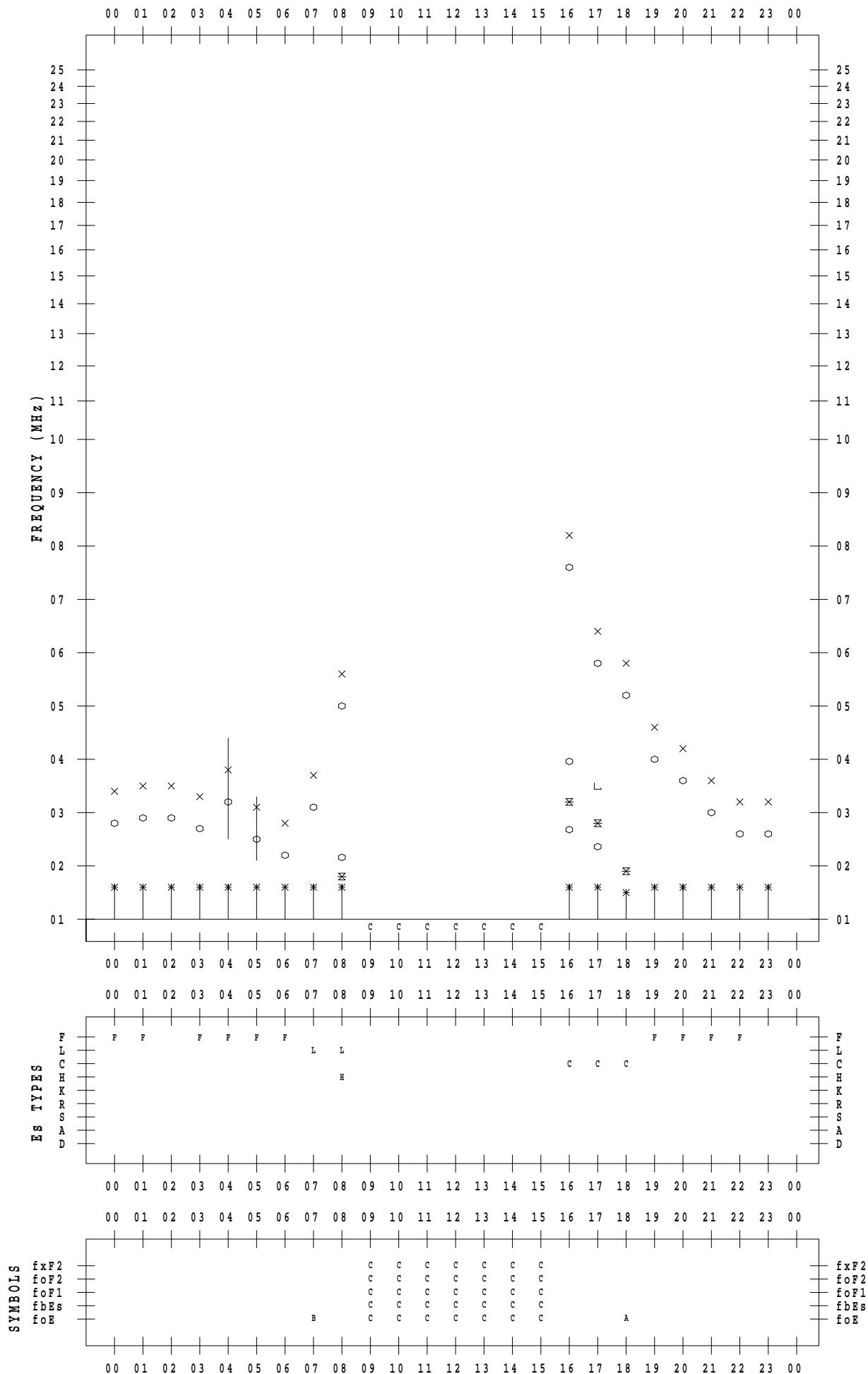
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 22

135 ° E MEAN TIME



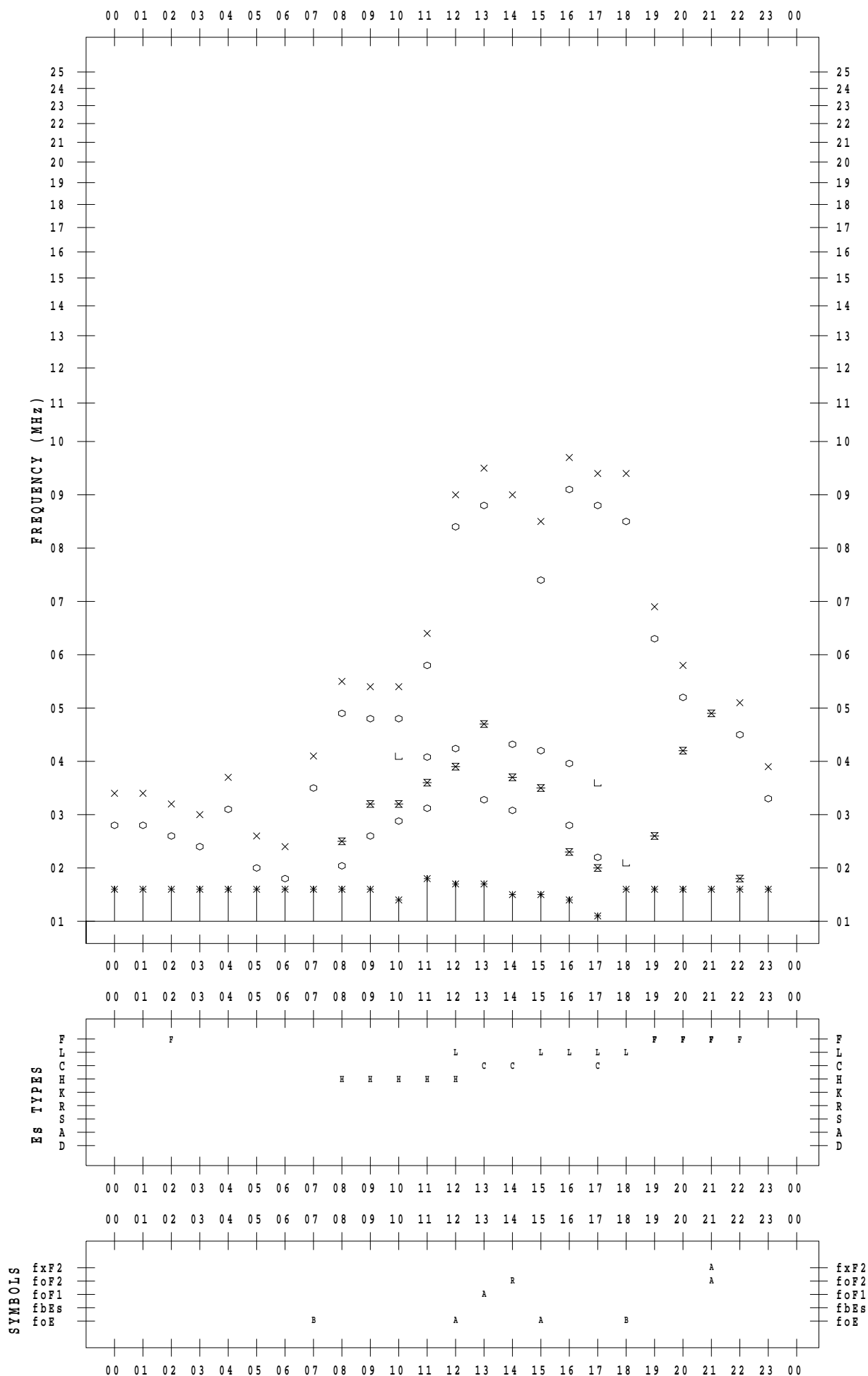
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 23

135 ° E MEAN TIME



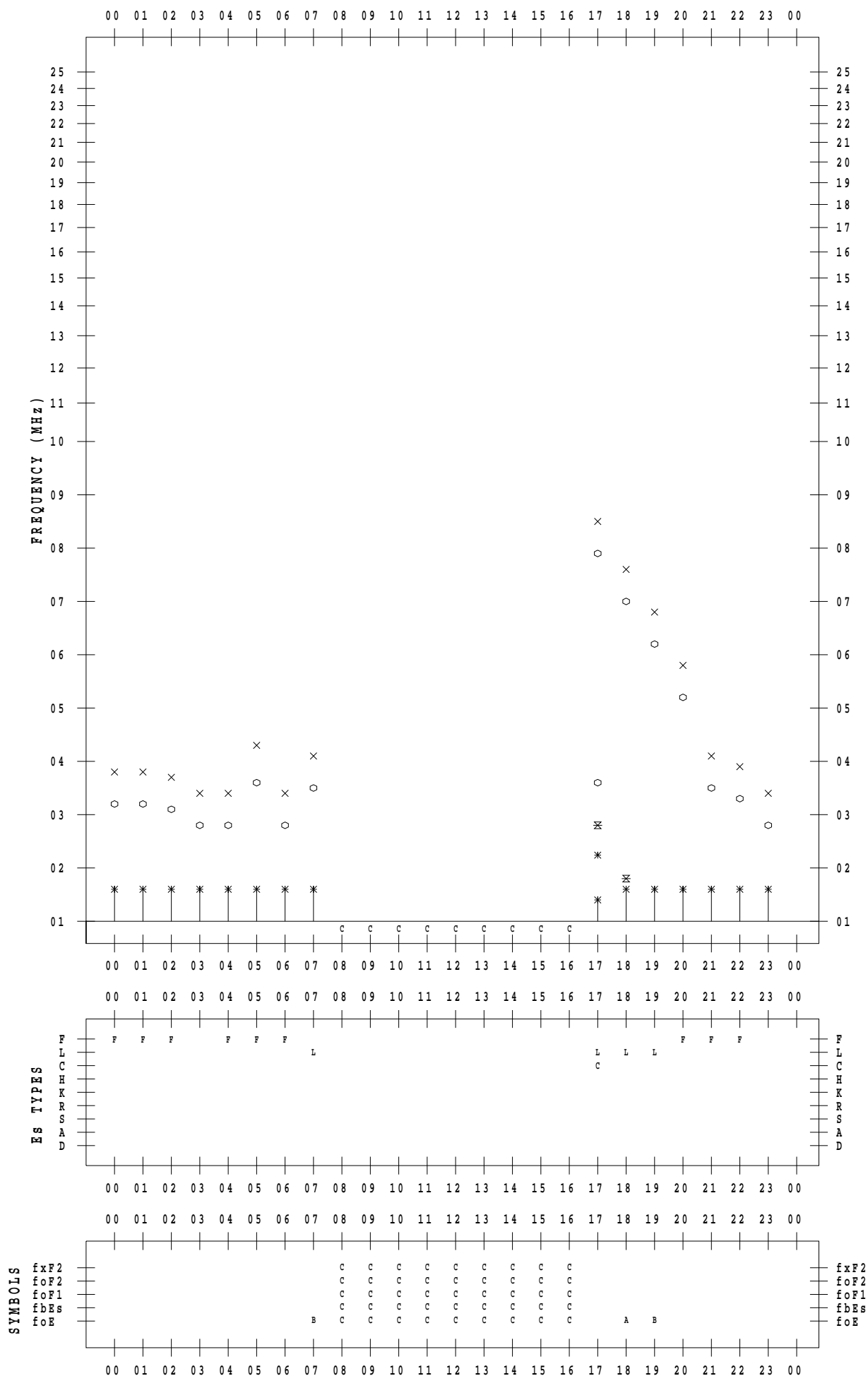
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 24

135 ° E MEAN TIME



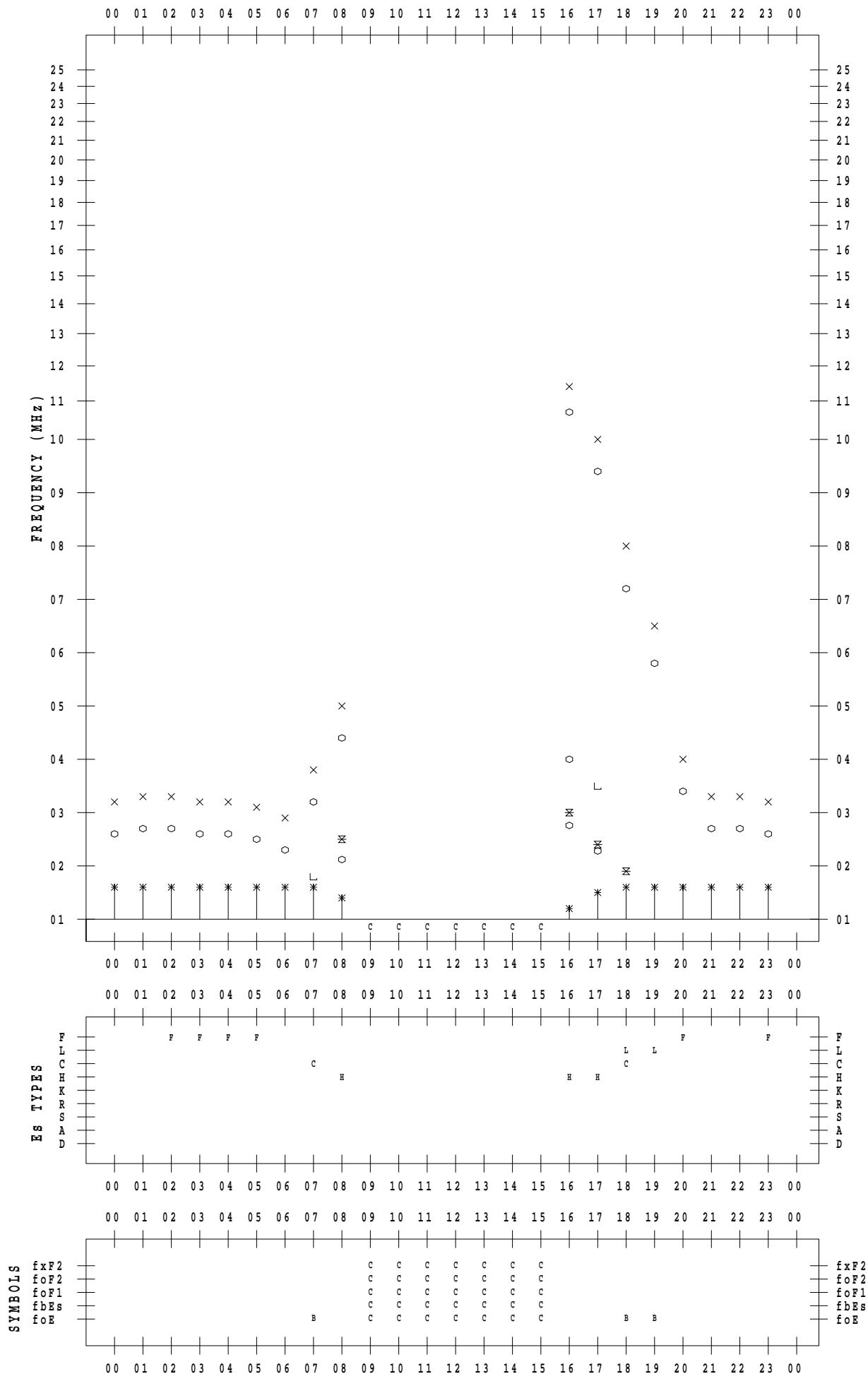
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 25

135 ° E MEAN TIME



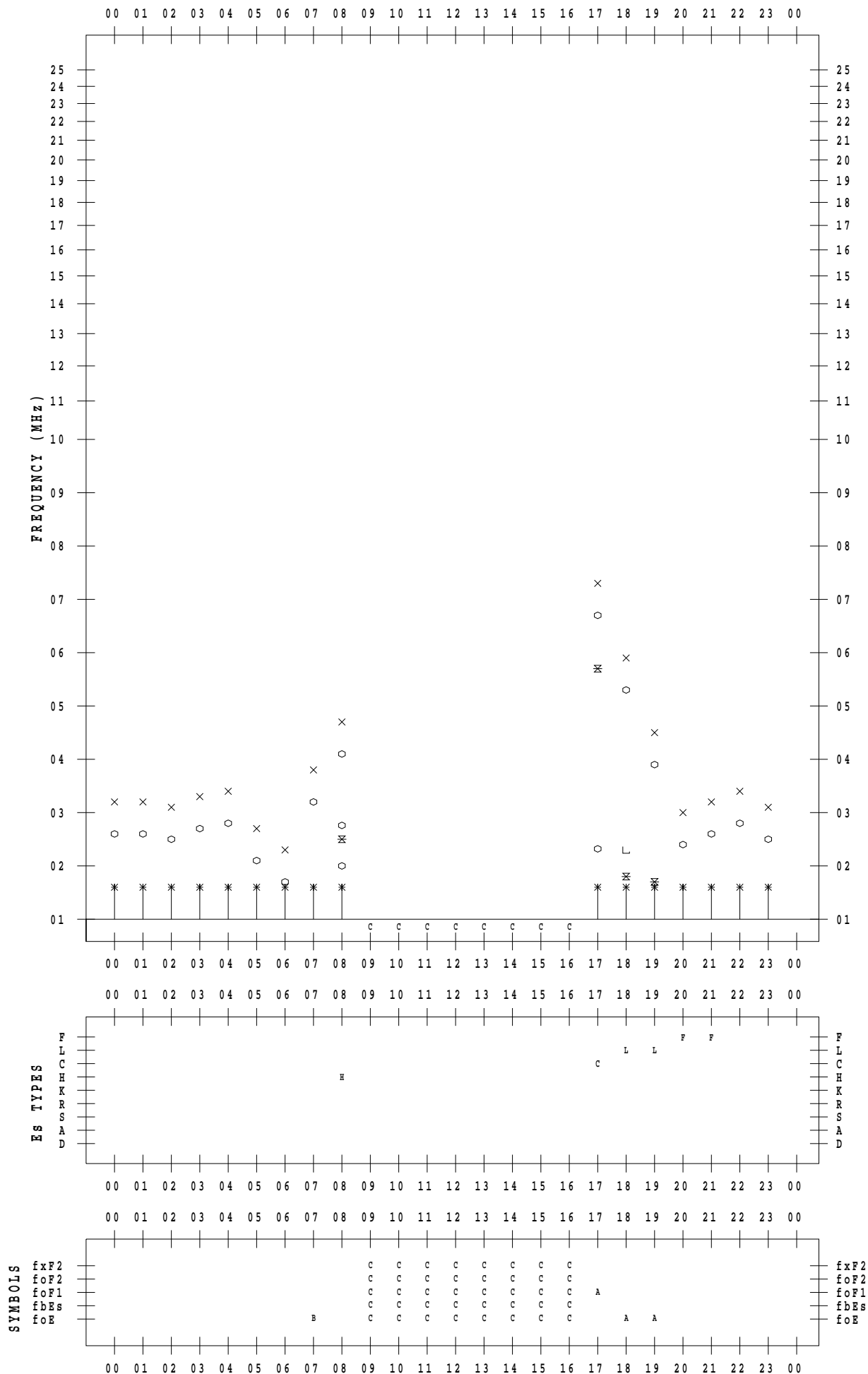
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 26

135 ° E MEAN TIME



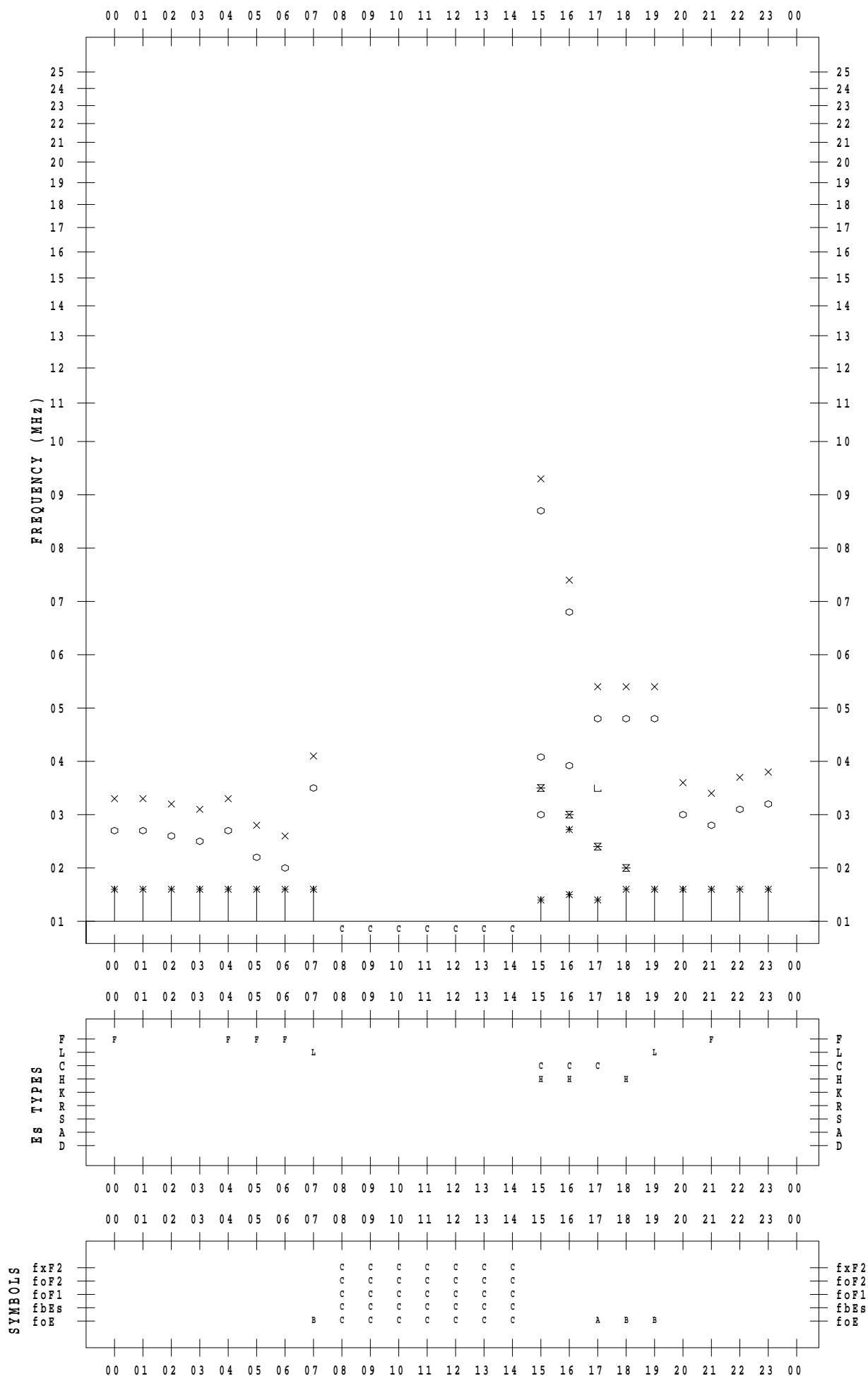
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 27

135 ° E MEAN TIME



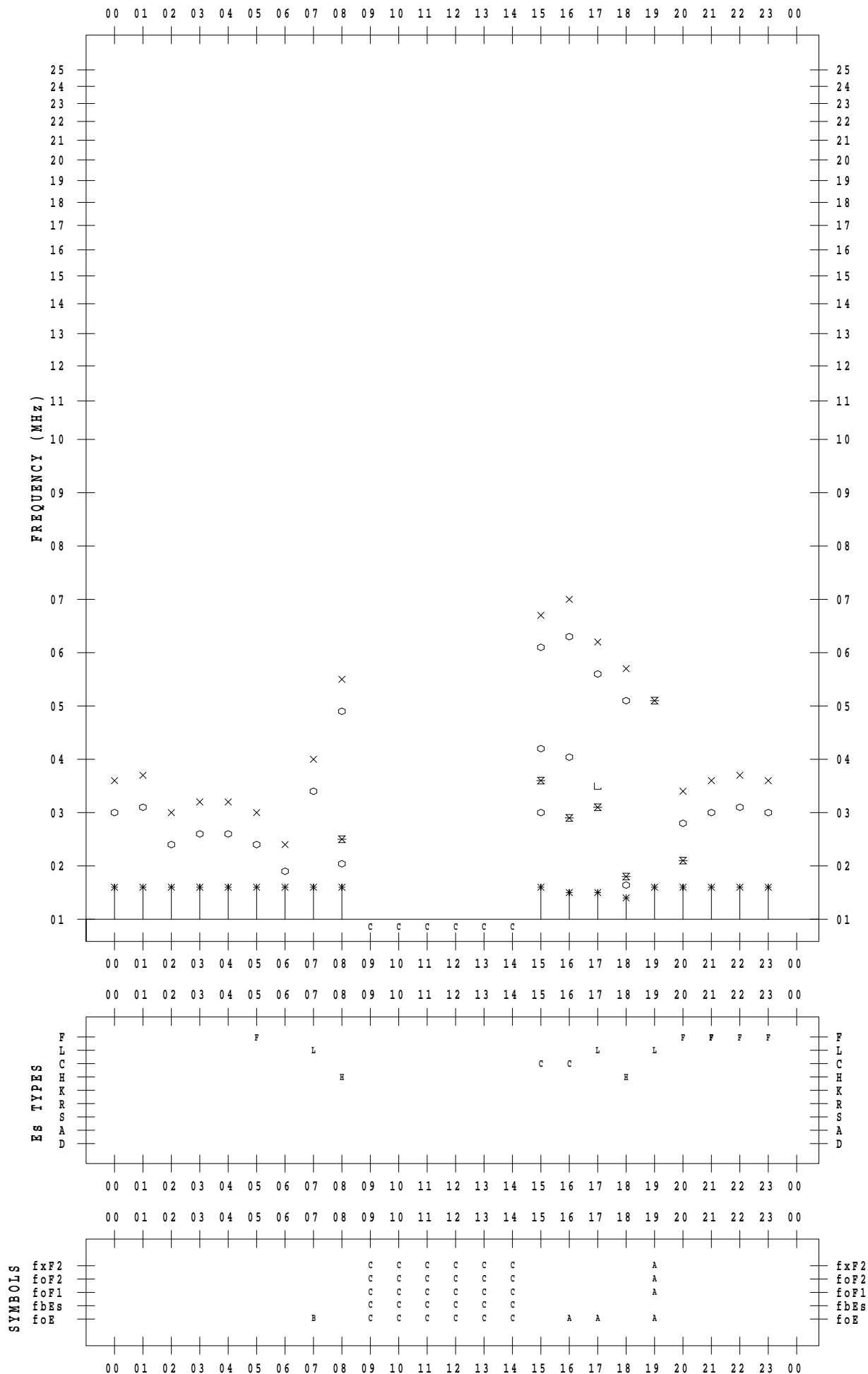
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020 / 2 / 28

135 ° E MEAN TIME



# f - PLOT DATA

SCALER :

STATION : Okinawa

DATE : 2020 / 2 / 29

135 ° E MEAN TIME

