

# IONOSPHERIC DATA IN JAPAN

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



NATIONAL INSTITUTE OF INFORMATION  
AND COMMUNICATIONS TECHNOLOGY  
TOKYO, JAPAN

# INTRODUCTION

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

National Institute of Information and Communications Technology, Japan.

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

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

## IONOSPHERE

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

### A1. Automatic Scaling

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

The published data consist of tabulations of hourly values of three factors (  $foF2$ ,  $fEs$ ,  $fmin$  ) and monthly medians of two factors (  $h'Es$ ,  $h'F$  ), daily Summary Plots and monthly medians plot of  $foF2$ .

#### a. Characteristics of Ionosphere

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

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

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

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

of values.

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

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

#### d. Reliability of Automatic Scaling

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

#### e. Summary Plot

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

### A2. Manual Scaling

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

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

#### a. Characteristics of Ionosphere

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

## b. Symbols

## (i) Descriptive Letters

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

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

## (ii) Qualifying Letters

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

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

extraordinary component.

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

(iii) Description of Types of *Es*

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

The types are:

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

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

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

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

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



HOURLY VALUES OF fof2 AT Wakkanai

SEP. 2021

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

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

HOURLY VALUES OF fEs                      AT Wakkanai

SEP. 2021

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	31	33		G	31	32	57	48	43	54	46	39	41	40	44	38	33	29	G	34	32	27	G	G
2	G	25	G	G	33	G	32	36	115	70	36	50	38	49	46	36	70	92	92	91	51	35	46	46
3	30	32	G	G	26	41	43	48	58	45	77	90	52	49	38	77	51	41	G	33	26	29	G	25
4	G	G	28	35	30	G	58	41	43	48	49	40	39	40	38	37	40	36	46	31	32	26	29	35
5	24	33	G	G	34	36	48	39	58	44	65	44	91	33	38	41	34	31	G	28	G	28	G	28
6	24	G	24	G	26	28	35	40	40	50	56	57	45	40	43	44	40	50	34	35	34	34	32	G
7	39	26	30	27	G	G	57	40	60	76	71	50	76	49	37	38	33	G	36	G	34	33	34	22
8	35	33	33	31	32	140	34	44	50	47	34	50	40	51	42	48	44	39	49	39	39	38	G	G
9	G	G	G	G	G	27	38	46	41	58	35	41	40	38	39	47	36	31	30	G	28	32	29	32
10	26	30	G	36	32	35	32	38	91	43	46	46	51	46	52	41	54	36	32	26	G	G	G	G
11	G	G	G	G	G	G	G	33	36	44	51	56	54	52	47	43	46	59	36	G	28	25	30	58
12	57	39	25	G	G	G	37	36	55	52	39	40	48	39	36	39	38	32	G	G	G	G	G	G
13	G	G	G	G	G	G	32	38	39	50	52	39	46	46	35	33	30	29	35	33	G	G	G	G
14	G	31	G	24	G	29	32	154	48	60	54	50	45	57	44	41	61	34	45	29	26	24	109	57
15	G	31	G	G	28	28	28	36	40	40	72	49	45	44	49	51	38	46	54	57	35	31	109	41
16	39	25	G	57	G	32	38	48	45	60	50	51	47	59	84	47	35	G	G	G	39	70	72	G
17	G	G	27	34	32	36	49	36	52	84	81	116	54	60	36	37	32	32	35	40	31	31	48	28
18	29	27	29	177	34	49	44	34	34	43	34	56		46	36	57	92	34	G	33	G	G	G	G
19	G	G	26	29	34	31	45	58	59	42	55	84	46	37	37	28	33	G	G	G	G	G	26	G
20	G	32	29	G	G	G		149	112	36	37	32	39	43	46	40	35	G	G	G	G	G	G	G
21	G	G	G	G	G	G	29	32	38	36	36	38	40	39	35	42	33	40	33	34	29	G	29	126
22	G	G	G	G	G	G	G	32	40	47	38	46	149	40	38	40	38	48	30	G	G	33	26	G
23	G	G	G	G	G	G	33	32	39	42	38	49	38	38	31	G	32	G	G	32	G	G	G	G
24	G	G	G	G	G	G	G	112	36	41	31	43	52	40	39	35	35	G	24	G	G	G	28	37
25	G	G	35	G	G	G	28	34	40	44	43	49	45	52	53	34	34	31	26	G	G	G	G	G
26	G	G	G	G	G	G	48	40	32	37	38	38	43	43	38	38	34	37	34	35	32	33	28	G
27	G	G	G	G	G	G	38	28	34	36	43	78	38	38	40	36	32	G	11	G	G	G	27	G
28	G	G	G	G	G	G	40	32	36	34	43	48	42	39	36	43	37	G	G	G	31	G	24	33
29	G	G	G	G	G	26	39	34	40	48	47	52	52	38	37	33	31	28	29	28	G	G	G	G
30	G	G	24	G	G	G	28	32	40	44	43	42	46	44	43	38	33	33	28	32	23	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	30	30	29	30	29	29	29	30	30	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30
MED	G	G	G	G	G	G	37	38	40	44	44	49	45	43	38	40	35	32	30	28	26	26	26	G
U Q	26	31	26	28	31	32	44	46	55	52	54	52	52	49	44	43	40	39	35	34	32	32	30	33
L Q	G	G	G	G	G	G	30	34	39	42	38	41	40	39	37	36	33	G	G	G	G	G	G	G

HOURLY VALUES OF fmin AT Wakkanai

SEP. 2021

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

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

HOURLY VALUES OF fof2                      AT Kokubunji

SEP. 2021

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	41	40	43	A	A	33	50	54	80	74	59	61	67	59	59	58	67	55	59	67	61	54	54	50
2	47	45	45	36	35	34	47	55	62	58	64	68	47	54	58	68	67	63	71	70	56	43	41	35
3	35	34	A	A	A	A	43	67	79	A	55	54	61	58	51	63	A	111	61	75	71	59	A	52
4	52	48	45	39	37	35	48	60	55	70	65	A	57	50	63	67	62	A	65	68	55	53	46	43
5	45	43	39	35	35	32	53	67	57	55	45	65	49	61	63	59	61	59	67	76	71	65	53	42
6	40	38	37	A	31	33	51	67	62	63	59	61	62	49	56	54	53	53	69	72	67	51	51	A
7	A	36	35	33	32	33	49	67	53	63	62	67	64	56	A	60	65	68	75	76	72	A	50	42
8	40	35	37	35	34	31	55	60	72	72	A	A	62	59	66	66	75	66	64	64	62	63	61	51
9	52	34	36	32	31	30	63	62	60	68	64	61	57	61	60	62	61	64	59	69	63	57	56	55
10	48	48	42	41	39	32	A	55	54	65	66	55	48	A	N 61	A	67	A	70	A	50	A	44	47
11	42	32	36	31	32	A	41	69	83	73	60	77	105	36	60	78	A	67	68	63	51	56	A	43
12	47	40	A	36	36	37	55	65	67	65	70	55	A	63	63	55	65	63	60	58	57	55	45	43
13	43	44	42	40	33	31	50	57	56	66	68	65	65	62	59	58	63	66	68	58	56	48	A	A
14	A	37	36	A	A	A	48	61	69	67	111	A	65	67	A	60	57	55	59	A	A	A	A	A
15	A	A	33	34	A	33	109	57	56	59	63	73	55	64	67	61	51	43	75	93	N 65	33	A	32
16	32	29	31	30	30	30	45	61	66	61	52	55		56	61	55	56	62	70	68	A	A	38	35
17	36	39	39	43	36	35	47	55	60	59	45	56	106	A	A	A	60	90	101	81	24	A	A	27
18	A	A	35	A	A	A	A	43	65	53	54	52	49	58	71	56	55	54	64	87	55	28	31	33
19	32	35	35	35	27	30	45	54	57	50	55	52	73	77	64	53	55	65	68	63	53	33	26	33
20	32	33			31	30	45	54	52	60	57	61	59	62	63	60	59	55	64	75		39	38	37
21	35	35	35	34	33	32	48	61	63		51	64	68	63	60	65	59	53	66	77	69	40	34	37
22	35	35	36	34	34	31	53	60	61	52	65	75	68	67	71	80	89	81	61	51	A	50	48	47
23	47	42	41	38	35	34	45	77	101	83	69	73	83	82	73	63	63	61	60	63	60	57	49	44
24	43	41	40	39	36	37	53	83	74	71	69	68	71	65	61	62	63	82	81	61	47	41	42	43
25	38	40	38	A	33	A	48	63	68	60	63	73	75	89	75	77	77	75	73	49	43	42	41	43
26	40	40	38	34	33	31	51	66	65	65	63	64	79	90	77	76	69	70	61	53	44	40	42	43
27	41	40	40	38	35	30	49	56	65	65	65	67	74	77	66	70	67	79	77	57	41	41	40	40
28	41	41	39	38	34	33	45	59	74	78	67	77	68	79	73	69	66	73	68	57	52	51	47	45
29	49	46	40	41	39	37	48	61	63	74	67	80	71	75	79	72	71	74	84	63	A	40	A	A
30	A	A	A	34	33	36	65	73	79	71	70	69	77	81	77	70	71	71	A	86	A	37	40	42
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	26	23	25	25	28	30	30	28	29	27	28	28	27	28	28	28	29	28	24	25	24	26
MED	41	40	38	35	34	33	48	61	64	65	63	65	66	62	63	62	63	66	68	68	56	48	43	43
U Q	47	42	40	39	35	34	53	67	72	71	67	73	73	76	71	69	67	73	72	75	64	55	49	45
L Q	35	35	36	34	32	31	46	56	57	59	56	56	58	58	60	58	59	57	61	59	50	40	39	37



HOURLY VALUES OF fEs                      AT Kokubunji

SEP. 2021

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	39	G	42	91	55	27	34	41	57	46	40	49	33	40	38	N	33	G	G	G	G	G	24	G	
2	31	39	G	G	G	G	26	40	66	G	42	42	43	40	37	40	33	32	G	29	11	27	G	41	
3	35	32	56	41	38	29	33	175	62	73	43	44	40	44	32	49	70	105	55	29	38	41	71	40	
4	38	32	G	G	G	G	34	42	47	47	49	42	43	42	32	37	42	71	35	48	50	58	60	41	
5	25	G	25	G	G	G	26	36	41	50	50	50	45	G	42	38	33	24	29	28	23	G	G	G	
6	G	G	G	48	G	G	31	29	34	49	33	41	53	42	42	40	34	41	37	53	27	104	57	60	
7	47	28	31	G	G	32	31	36	48	47	53	85	36	42	40	41	41	39	29	35	23	88	56	54	
8	40	34	22	G	G	G	28	78	50	57	65	117	41	41	34	36	33	28	26	31	41	57	60	33	
9	23	34	28	31	26	G	31	39	49	51	50	42	50	53	50	38	31	G	G	G	G	32	31	31	
10	73	39	29	G	25	G	46	37	39	49	53	55	57	92	108	84	76	89		91	33	50	31	36	
11	57	72	28	26	28	35	39	53	43	45	59	89	84	75	82	125	96	28	40	56	59	49	93	48	
12	44	G	61	33	26	22	29	35	41	46	50	46	60	51	42	41	39	31	28	26	G	G	G	G	
13	G	G	G	G	G	G	104	36	42	32	41	52	40	110	38	39	G	33	32	30	32	24	37	59	
14	52	27	31	39	42	35	34	55	102	103	84	82	38	78	105	54	40	46	80	65	92	109	69	126	
15	80	91	72	58	73	28	105	54	45	48	50	45	36	37	51	41	40	65	36	26	32	26	39	27	
16	G	G	G	G	G	G	27	40	44	62	83	63		55	43	37	53	46	37	56	60	48	37	36	
17	31	55	31	G	37	39	39	38	50	47	49	48	112	92	93	101	74	30	32	32	24	48	32	29	
18	31	26	G	29	45	73	39	35	39	36	40	43	50	39	49	G	G	29	28	57	48	33	G	G	
19	G	G	G	25	G	G	G	G	34	40	G	42	41	41	34	G	32	G	G	G	11	47	G	G	
20	G	G		G	G	G		34	41	48	51	55	43	41	G	33	39	32	59	29		G	G	G	
21	G	G	G	G	G	G	40	37	41		40	49	49	40	32	98	40	48	36	38	47	G	33	G	
22	G	26	G	G	G	G	31	39	52	44	38	45	46	45	46	35	39	45	30	35	57	G	G	G	
23	G	G	G	G	G	G	30	33	37	37	32	40	40	36	34	46	39	41	37	40	28	G	G	G	
24	G	G	G	G	G	G	G	34	36	33	42	40	40	38	36	33	33	33	29	28	27	26	G	G	
25	G	G	G	29	27	33	44	32	90	40	45	46	G	46	50	37	50	36	38	45	27	33	G	G	
26	G	G	G	G	G	G	33	36	52	145	39	45	49	47	46	53	45	35	33	39	35	31	29	G	
27	G	G	G	G	G	G	33	36	33	38	37	42	40	39	31	34	33	28	31	29	36	G	G	G	
28	G	G	G	G	G	G	43	40	35	40	54	50	43	48	33	33	29	34	33	G	32	G	34	41	
29	27	G	G	G	G	G	30	38	40	37	37	39	49	41		82	56	76	41	53	57	39	57	55	
30	57	70	59	26	26	G	29	37	49	46	51	47	50	60	54	66	42	134	117	82	72	32	35	G	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	29	29	29	30	30	30	30	30	29	30	30	29	30	29	29	30	30	29	30	29	30	30	30	
MED	26	G	G	G	G	G	32	37	44	46	47	46	43	42	42	40	39	34	33	34	32	32	32	28	
U Q	40	34	31	30	27	28	39	40	50	49	51	52	50	53	50	53	45	46	37	53	49	48	56	41	
L Q	G	G	G	G	G	G	29	35	39	39	40	42	40	40	34	35	33	29	28	28	23	G	G	G	

HOURLY VALUES OF fmin AT Kokubunji

SEP. 2021

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	14	15	15	17	14	13	15	16	16	15	14	15	17	16	15	15	15	13	14	15	15
2	16	15	15	15	15	14	15	15	15	17	15	15	14	16	14	15	16	16	17	15	13	15	14	15
3	16	16	16	16	15	16	16	15	15	13	16	16	26	21	41	16	13	14	15	15	14	15	15	15
4	15	16	15	14	17	17	15	14	14	16	17	18	20	15	16	15	14	15	16	15	15	14	16	17
5	16	15	16	14	15	15	15	15	14	14	16	20	21	17	14	14	13	15	15	16	16	15	14	13
6	13	13	13	15	17	15	16	15	14	16	15	15	22	16	15	14	15	15	15	15	14	13	14	16
7	15	16	16	15	15	16	15	15	12	15	16	18	43	14	20	15	14	13	15	16	16	15	14	16
8	16	15	16	16	13	14	15	13	13	15	13	10	16	15	26	15	16	14	15	16	15	15	15	15
9	16	15	15	15	16	15	15	13	13	15	15	20	16	18	17	15	16	15	17	13	14	15	16	16
10	15	15	16	15	16	15	15	15	17	17	13	16	13	17	15	14	16	12	15	15	15	16	16	17
11	16	13	15	16	16	16	15	14	13	15	15	11	17	14	17	15	7	14	15	15	14	15	14	15
12	15	16	14	16	16	16	15	13	15	15	16	17	17	15	17	15	14	15	15	15	16	15	15	14
13	14	18	14	14	13	15	16	15	15	15	16	15	14	17	15	16	15	16	15	16	17	16	16	15
14	15	15	17	15	15	16	16	14	14	17	15	18	15	15	15	14	16	14	16	15	13	9	15	5
15	16	15	16	15	15	15	18	15	14	15	14	13	14	16	14	15	14	15	15	15	16	16	15	15
16	15	14	15	15	15	13	15	13	15	14	13	17		17	14	13	14	14	15	15	15	17	16	15
17	16	15	16	16	15	15	15	15	14	15	17	18	13	13	15	16	14	16	16	16	15	15	17	15
18	16	15	16	16	16	15	15	14	15	15	17	25	23	17	16	14	16	15	16	15	15	15	15	13
19	13	13	14	16	15	13	21	16	14	15	16	17	15	15	14	14	15	15	14	13	15	17	15	15
20	14	14			13	15	20	17	14	15	14	16	13	14	17	15	17	16	15	16		17	15	15
21	13	13	15	13	14	14	13	16	17		14	14	17	15	16	17	16	15	16	15	16	13	16	14
22	15	16	16	14	13	13	15	15	13	15	15	15	14	15	15	16	17	13	15	14	15	15	15	15
23	14	13	13	18	14	13	15	17	15	15	15	17	17	17	18	14	16	14	15	15	16	15	14	13
24	13	13	14	13	14	13	14	17	15	17	14	14	15	19	14	15	15	15	15	15	15	15	15	13
25	17	14	16	15	16	16	15	16	14	14	15	19	44	19	14	14	14	14	15	16	16	16	14	15
26	13	13	14	14	14	15	14	15	16	14	15	16	15	14	15	14	15	14	15	15	15	16	16	20
27	13	13	15	14	15	14	14	16	14	14	15	17	17	13	15	14	15	16	15	15	15	17	14	13
28	15	14	14	13	13	13	15	16	14	15	15	15	15	15	15	16	15	16	14	16	16	13	14	15
29	16	13	13	13	13	13	15	15	14	14	15	17	14	16	12	13	15	14	15	15	14	15	16	15
30	16	15	15	16	16	14	15	14	14	15	16	14	16	16	15	15	14	5	6	13	17	16	15	16
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	29	29	30	30	30	30	30	29	30	30	29	30	30	30	30	30	30	30	29	30	30	30
MED	15	15	15	15	15	15	15	15	14	15	15	16	16	16	15	15	15	15	15	15	15	15	15	15
U Q	16	15	16	16	16	15	16	16	15	15	16	18	18	17	17	15	16	15	15	16	16	16	16	15
L Q	14	13	14	14	14	14	15	14	14	14	15	15	14	15	14	14	14	14	15	15	14	15	14	14

HOURLY VALUES OF fof2 AT Yamagawa

SEP. 2021

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

## HOURLY VALUES OF fEs AT Yamagawa

SEP. 2021

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	57	41	G	G	G	G	G													G	G	G	G	G	
2	G	G	G	G	G	G	G	36	41	54	50	47	51	43	41	32	41	40	28	G		G	G	G	
3	G	G	G	G	G	G	G	G													G		45	40	41
4	67	28	34	33	G	G	G	34	44	53	58	50	55	60	48	48	43	42	G	G					
5	39		34	G	G	G	G	35	50	43	47	43	41	60	34	38	31	32		G	G	G	G	G	G
6	G	G	G	G	G	G	G	36	40	43	73	48	46	46	44	43	42	96	38	G		49	57	37	G
7	G		110	50	24	G	G	39	48	89	81	92	59	56	78	64	80	60	57	70	61	60	72	88	56
8	41	G		33	G	28	G	48	28	56	54	42	44	40	33	31	40	35	29	29	40	35	84	57	
9	54	G		30	G	G	G	33	42	60	58	45	50	44	40	39	60	50	36	55	B	G		34	B
10	G	G	B	G	B	B	B	B	B	B	C	C	B	B	B	B	B	B	B	B	B	B	B	B	B
11	B	B	B	B	B	B	B																G	B	B
12	B	B	B	B	B	B	B	36	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
13	B	B	B	B	G	B	B	B	B	B	B	B	B	B	B	B	B	B	C	C	C	C	C	C	C
14	C	C	C	C	C	C	C	C	C	B										G					
15	59	40	73	26	27	G	24	36	56	70	92	81	76	57	53	46	56	48	58	71	40	28	G	31	
16	31	G	G	G	G	G	G	32	47	50	49	57	45	44	51	43	38	52	42	54	40	28	46	70	
17	72	31	G		80	32	66	45	31	80	42	47	75	51	54	54	41	109	72	116	110	72	40	38	G
18	G	26	G		25	24	27	G	35	33	48	53	59	52	G	38	35	36	32	28	11	60	40	41	36
19	G	G	G		24	35	34	28	36	40	36	39	49	48	47	44	34	32	32	28	11	41			25
20		G	G		G	B	G																		
21	33	G	G	G	G	G	G	49	35	47	49	36	46	44	47	45	42	39	28	28	32	29			G
22	G							53	50	56	71	52	44	46	43	41	41	39	44	48	48	72	39		G
23		33	40	33	36	32	24	34	43	50	57	46	50	46	48	36	34	30							
24	28	G	G	G	38	G	G	35	49	41	43	47	49	41	34	50	28	30	29	24	28	G			G
25	G	G	G	G				28	35	40	44	62	48	48	43	39	43	33	30	G	11	31	33	38	39
26	28	26	G	G	G	G	G	49	40	36	49	45	43	43	45	41	33	26	26	G	G	20	G	31	34
27	G	G	G	G	G	G	25	36	92	37	46	50	50	47	40	47	43	32	G	G		24		28	46
28	26	G		G	G	G	G	69	40	36	44	53	41	48	41	41	40	35	26	35	25	40	30	32	
29	24	30	G	G	G	G	G												G		58	72	70	142	70
30	32	G	G	G	G	G	G	48	56	71	57	72	56	58	125	43	150	59	31	28	24	39	37	38	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	26	26	24	26	27	24	25	26	25	25	26	26	26	26	26	26	26	26	26	26	26	25	27	26	25
MED	25	G	G	G	G	G	G	36	43	48	50	49	48	47	44	42	40	39	28	26	31	29	32	32	
U Q	39	28	15	25	27	14	12	48	53	56	58	57	52	57	53	46	43	49	38	48	44	44	40	45	
L Q	G	G	G	G	G	G	G	34	40	41	47	46	44	44	40	39	35	32	26	G	19	G	G	G	

HOURLY VALUES OF fmin AT Yamagawa

SEP. 2021

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

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

HOURLY VALUES OF foF2                      AT Okinawa

SEP. 2021

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	38	37	38	39	30	28	33	56	77	69	60	A	52	83	84	69	59	79	73	72	65	61	50	48		
2	45	44	40	36	33	32	34	59	78	63	66	63	59	64	75	69	67	87	102	77	78	34	A	31		
3	31	31	32	33	32	30	32	54	66	59	59	64	59	66	65	70	75	81	90	111	59	45	42	A		
4	41	41	43	45	A	35	36	56	87	76	A	A	72	93	115	A	106	95	110	79	107	45	38	41		
5	40	49	54	52	58	33	33	53	66	61	63	58	67	71	77	77	71	68	74	85	91	71	34	36		
6	36	34	34	37	33	N	26	34	77	62	59	65	A	67	77	71	62	62	66	77	91	71	A	A	42	
7	A	A	38	35	B	33	35	36	65	70	61	A	A	75	73	A	80	82	91	A	94	92	63	A	A	
8	A	49	52	52	50	44	46	65	64	61	57	63	75	85	84	87	89	96	117	93	61	65	65	59		
9	55	53	49	42	35	33	35	69	80	65	66	75	93	111	128	121	117	121	132	138	101	59	43	46		
10	48	40	50	39	41	39	36	57	64	61	61	72	71	60	A	A	A	76	88	91	83	A	A	A		
11	A	35	35	32	B	B	30	33	73	74	70	57	A	65	67	71	67	69	79	103	86	66	34	33	37	
12	39	38	38	36	37	35	34	72	78	A	A	65	78	68	66	69	65	69	77	86	81	62	35	36		
13	36	37	38	37	33	B	25	35	65	61	63	78	64	63	74	73	72	83	A	A	69	48	A	31		
14	33	32	33	33	B	B	23	24	31	71	57	60	82	117	84	83	78	84	81	81	90	89	81	38	A	32
15	A	30	A	34	39	A	A	56	57	69	A	A	A	94	76	68	71	90	102	88	A	A	A	A	30	
16	31	33	34	33	30	N	22	A	N	67	63	59	61	66	73	89	85	85	85	97	109	A	A	A	A	34
17	34	34	33	35	32	A	A	56	59	75	62	A	54	75	93	97	107	129	142	133	A	A	60	61		
18	61	76	95	55	41	42	35	56	59	71	58	70	69	97	109	80	55	66	117	116	A	A	A	30		
19	49	60	66	48	36	23	31	49	58	61	61	67	73	80	88	69	72	99	95	66	41	25	B	B	29	
20	30	A	32	29	23	B	27	51	57	70	67	64	82	87	91	73	67	85	104	84	87	53	A	34		
21	37	36	34	38	43	B	23	31	49	57	67	73	63	75	89	104	94	90	90	99	106	99	A	A	39	
22	36	35	33	33	33	29	37	47	56	61	68	87	89	88	108	122	132	119	103	69	71	56	55	55		
23	53	47	49	51	41	B	24	25	64	74	76	73	77	102	109	98	80	85	84	91	78	70	51	37	39	
24	39	40	40	38	36	N	29	33	65	65	75	76	71	71	82	86	90	105	119	114	94	80	69	43	43	
25	46	43	39	33	34	39	32	58	67	88	68	74	102	114	109	124	151	156	171	151	105	64	51	49		
26	43	45	43	41	35	30	33	57	67	73	65	72	84	105	117	119	112	91	89	84	51	36	35	33		
27	35	37	37	38	N	B	26	25	56	65	70	63	71	100	126	123	129	129	121	118	93	81	49	42	43	
28	43	41	43	49	32	A	31	52	67	86	90	81	95	97	90	91	94	86	83	61	54	49	41	42	A	
29	42	39	41	45	33	23	32	55	65	73	85	79	85	108	92	99	112	112	115	109	79	54	41	A	A	
30	40	42	41	35	39	29	32	67	77	75	68	A	82	A	87	88	100	107	101	95	66	44	A	A		
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	26	28	29	30	29	25	27	30	30	28	26	22	29	29	28	28	29	30	28	28	26	23	18	25		
MED	40	40	39	38	33	30	33	57	65	69	65	71	75	85	88	82	85	90	102	90	78	51	42	39		
U Q	45	44	46	45	39	35	35	65	74	74	68	77	84	97	106	95	106	107	114	100	87	62	50	44		
L Q	36	35	34	34	32	24	31	55	59	61	61	64	67	72	76	69	70	81	89	81	66	44	35	32		

HOURLY VALUES OF fEs                      AT Okinawa

SEP. 2021

LAT. 26°41.0'N LON. 128°09.0'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	24	28	39	40	26	G	G	38	41	49	56	65	52	50	44	56	54	50	53	45	57	G	G	G
2	112	G	G	G	G	G	G	34	41	42	40	46	49	50	49	37	43	41	32	24	48	28	38	G
3	27	G	G	G	G	11	G	29	55	43	50	60	53	41	36	34	38	32	G	G	59	25	G	54
4	41	38	40	38	40	33	32	43	41	60	96	62	63	62	70	116	57	60	29	36	90	28	G	33
5	41	40	G	27	G	G	G	34	60	58	53	57	92	49	48	34	36	31	29	G	G	48	G	G
6	G	G	G	G	G	G	G	34	38	36	44	65	50	48	44	44	57	109	50	108	46	60	92	30
7	35	38	G	G	B	G	G	36	48	76	141	141	103	70	77	61	60	70	173	80	57	34	92	70
8	58	27	G	25	G	G	30	34	57	50	44	50	51	51	35	44	54	53	36	55	48	88	59	55
9	30	47	26	30	G	G	117	32	40	52	63	45	58	52	60	56	58	57	44	G	59	11	28	27
10	36	37	30	G	G	G	27	39	41	45	46	50	49	53	83	71	116	35	28	43	92	180	93	30
11	46	G	G	G	B	B	G	34	42	38	51	85	46	35	48	41	36	31	31	11	11	32	G	G
12	G	G	G	G	27	G	28	56	45	80	78	54	62	54	45	39	37	32	27	40	48	28	G	G
13	G	G	G	G	G	B	G	34	43	93	64	51	47	49	48	42	54	67	78	70	32	11	29	G
14	G	G	G	G	B	B	G	47	38	44	51	64	37	45	46	44	34	38	25	32	32	26	26	G
15	32	26	30	24	26	32	27	32	38	67	102	108	90	84	54	40	53	51	61	67	74	48	48	26
16	G	G	G	G	G	G	26	34	42	56	47	48	55	56	49	46	40	65	90	179	124	92	34	29
17	31	29	30	G	24	31	30	32	46	40	53	66	48	56	70	43	32	48	92	81	92	53	49	57
18	34	31	30	32	34	28	28	29	32	36	44	44	42	34	34	32	36	31	28	24	26	92	31	26
19	33	33	34	33	29	29	G	32	39	39	37	48	40	48	45	43	41	44	43	40	36	G	B	B
20	G	28	G	G	G	B	G	29	36	41	43	49	38	44	51	39	45	30	39	G	25	28	39	G
21	G	G	G	G	G	B	G	31	41	48	54	54	46	50	39	47	42	40	58	116	88	40	28	G
22	G	G	B	G	G	G	G	49	50	48	45	54	55	51	47	54	32	32	48	24	G	36	G	G
23	G	G	G	G	G	B	G	35	44	45	57	47	54	44	41	48	48	43	36	56	25	28	41	G
24	G	G	G	G	G	G	G	48	34	46	45	41	52	48	41	41	38	38	52	58	48	37	25	27
25	G	G	G	G	G	G	G	34	45	58	45	60	67	43	49	40	37	35	109	20	43	34	41	41
26	35	34	28	G	G	G	G	31	39	41	36	50	43	48	46	44	42	40	33	32	32	27	G	G
27	G	G	G	G	G	B	G	33	40	42	41	48	48	49	174	39	39	31	28	26	20	G	G	G
28	G	G	27	26	G	104	G	43	42	41	42	45	51	49	39	46	45	45	35	29	31	28	29	G
29	G	G	G	G	31	G	G	36	57	91	53	62	62	62	53	52	40	39	G	31	53	27	G	46
30	30	41	G	G	G	G	G	39	53	66	106	146	66	174	61	73	40	48	78	84	41	G	38	41
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	29	30	27	23	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29
MED	27	G	G	G	G	G	G	34	42	47	50	54	52	50	48	44	42	40	38	38	47	28	29	26
U Q	35	33	29	25	26	28	27	39	46	58	57	64	62	54	54	52	54	51	58	67	59	48	41	37
L Q	G	G	G	G	G	G	G	32	39	41	44	48	47	48	44	40	37	32	29	24	31	26	G	G

HOURLY VALUES OF fmin                      AT Okinawa

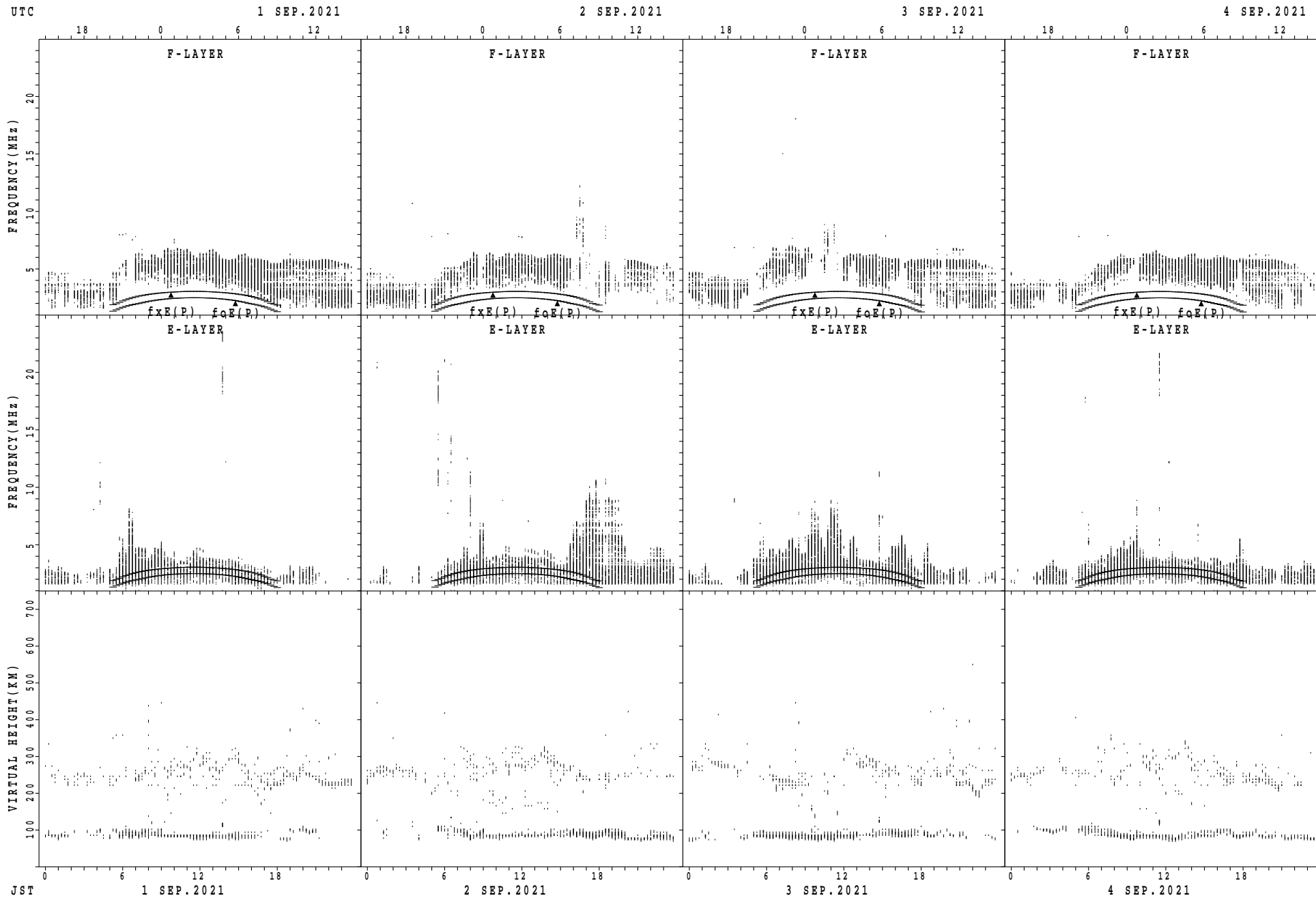
SEP. 2021

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	17	16	15	15	16	15	15	14	15	17	15	18	21	21	19	17	13	13	13	16	15	15	15	15
2	16	20	15	15	15	15	15	16	14	14	17	17	17	16	17	18	16	15	15	15	15	15	15	15
3	16	15	15	14	16	15	15	14	15	15	17	15	14	20	22	17	15	15	15	14	15	16	15	15
4	15	15	16	16	15	16	16	15	15	14	19	18	19	23	19	15	15	14	14	15	16	15	15	15
5	15	16	15	16	14	15	14	15	14	15	14	16	20	22	19	19	15	14	15	15	15	15	15	15
6	14	15	15	14	14	15	14	17	15	15	17	17	22	18	19	15	14	9	15	15	15	15	16	16
7	15	16	15	15	B	14	15	16	14	15	8	12	21	22	17	15	15	13	60	14	15	15	16	16
8	16	16	15	16	16	15	16	16	13	15	15	23	23	17	16	16	12	12	16	15	15	15	15	15
9	15	15	16	16	15	15	15	15	15	16	17	22	19	21	19	15	13	14	14	15	14	15	16	16
10	16	17	15	15	17	17	15	15	14	15	17	16	17	15	15	15	15	16	15	15	12	13	12	15
11	14	15	15	15	B	B	15	16	14	14	15	16	16	15	16	15	15	13	15	14	20	14	17	15
12	15	15	15	14	15	15	15	15	13	14	15	16	17	17	18	16	15	15	15	15	15	16	15	15
13	15	18	16	14	14	B	14	15	14	15	18	17	18	15	18	19	15	13	15	14	15	15	15	15
14	15	14	15	17	B	B	15	15	14	13	16	17	18	15	16	16	15	14	16	16	16	16	16	15
15	16	16	16	15	15	16	16	15	16	14	15	15	17	15	15	15	13	12	14	15	15	16	15	16
16	15	15	15	15	16	15	15	15	14	17	17	17	19	17	18	22	14	14	14	73	10	15	16	15
17	14	16	16	15	16	16	16	15	15	15	15	16	17	15	15	16	14	14	13	16	13	15	15	16
18	16	16	16	16	15	16	16	14	15	15	21	19	20	23	17	16	15	14	15	16	16	16	16	15
19	16	15	15	16	15	16	15	15	16	14	17	17	15	23	18	17	15	14	15	15	15	15	B	B
20	16	15	15	15	15	B	15	15	14	14	16	17	17	21	15	17	15	17	15	15	15	15	15	22
21	27	15	17	22	14	B	14	16	14	15	15	19	21	19	18	17	16	17	15	15	16	16	15	15
22		14	B	15	15	14	15	16	13	14	18	15	19	19	18	16	14	15	14	16	16	15	15	14
23	14	14	17	14	14	B	130	15	14	15	15	17	14	15	23	17	14	16	16	17	15	15	15	16
24	15	16	15	15	15	15	14	17	16	15	18	17	17	18	18	17	15	17	14	15	15	16	16	15
25	15	16	15	14	18	14	15	16	15	15	16	16	19	24	17	18	15	15	14	16	16	16	15	15
26	16	16	16	15	16	14	14	15	15	15	15	15	21	17	20	17	15	15	16	16	15	16	15	14
27	16	15	15	14	14	B	15	15	15	14	14	16	18	19	15	18	14	14	16	15	15	14	15	14
28	14	15	15	15	14	39	14	15	15	15	17	23	18	17	17	17	14	12	16	15	15	16	15	16
29	15	15	15	15	15	17	15	15	14	14	15	17	17	21	17	15	15	14	15	15	15	16	15	15
30	16	16	16	15	15	15	16	14	13	13	16	18	19	10	16	16	15	13	15	16	16	16	15	16
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	29	30	27	23	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	15	15	15	15	15	15	15	15	14	15	16	17	18	18	18	16	15	14	15	15	15	15	15	15
U Q	16	16	16	16	16	16	15	16	15	15	17	18	20	21	19	17	15	15	15	16	16	16	16	16
L Q	15	15	15	15	14	15	15	15	14	14	15	16	17	15	16	15	14	13	14	15	15	15	15	15

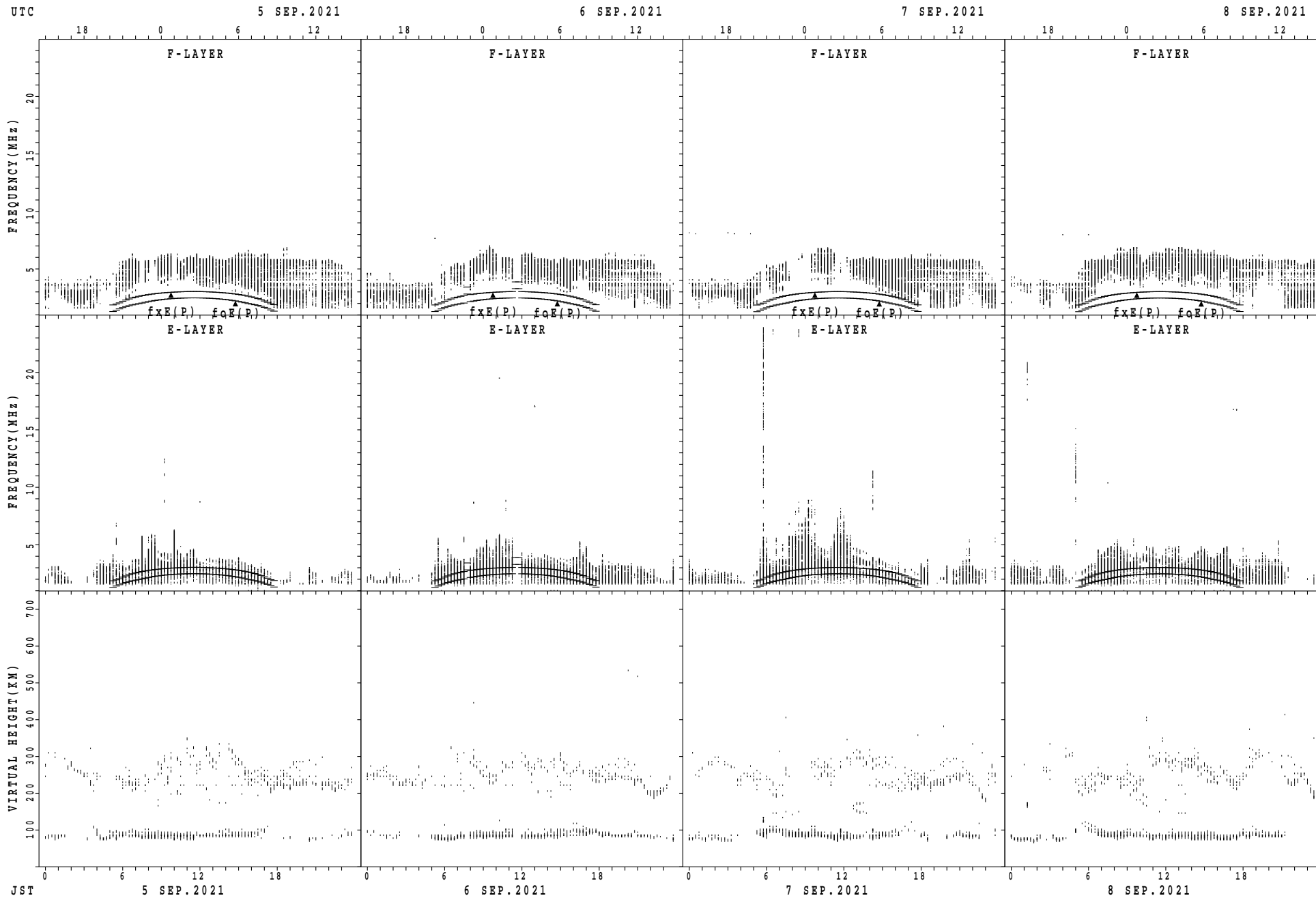


SUMMARY PLOTS AT Wakkanai



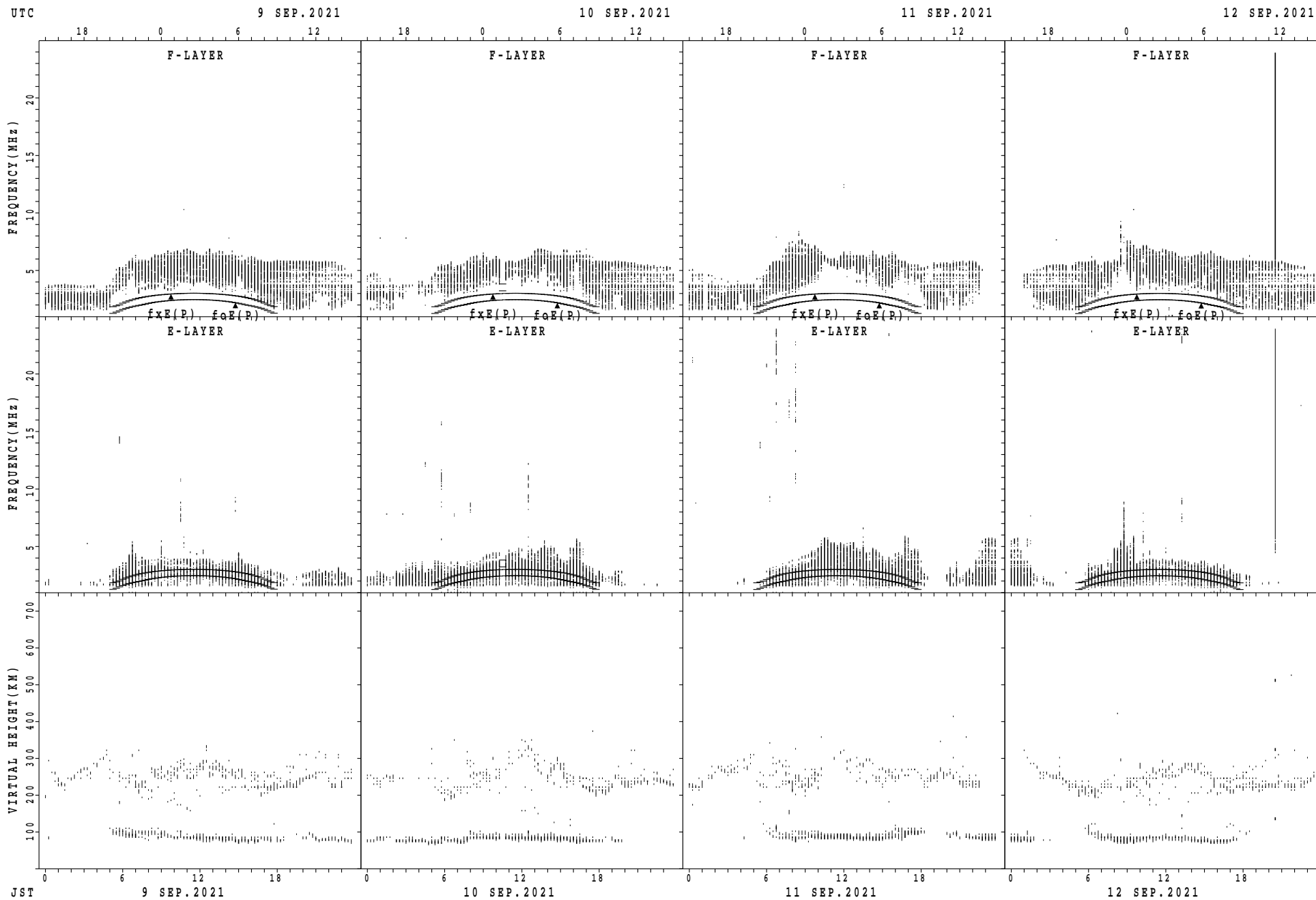
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Wakkanai



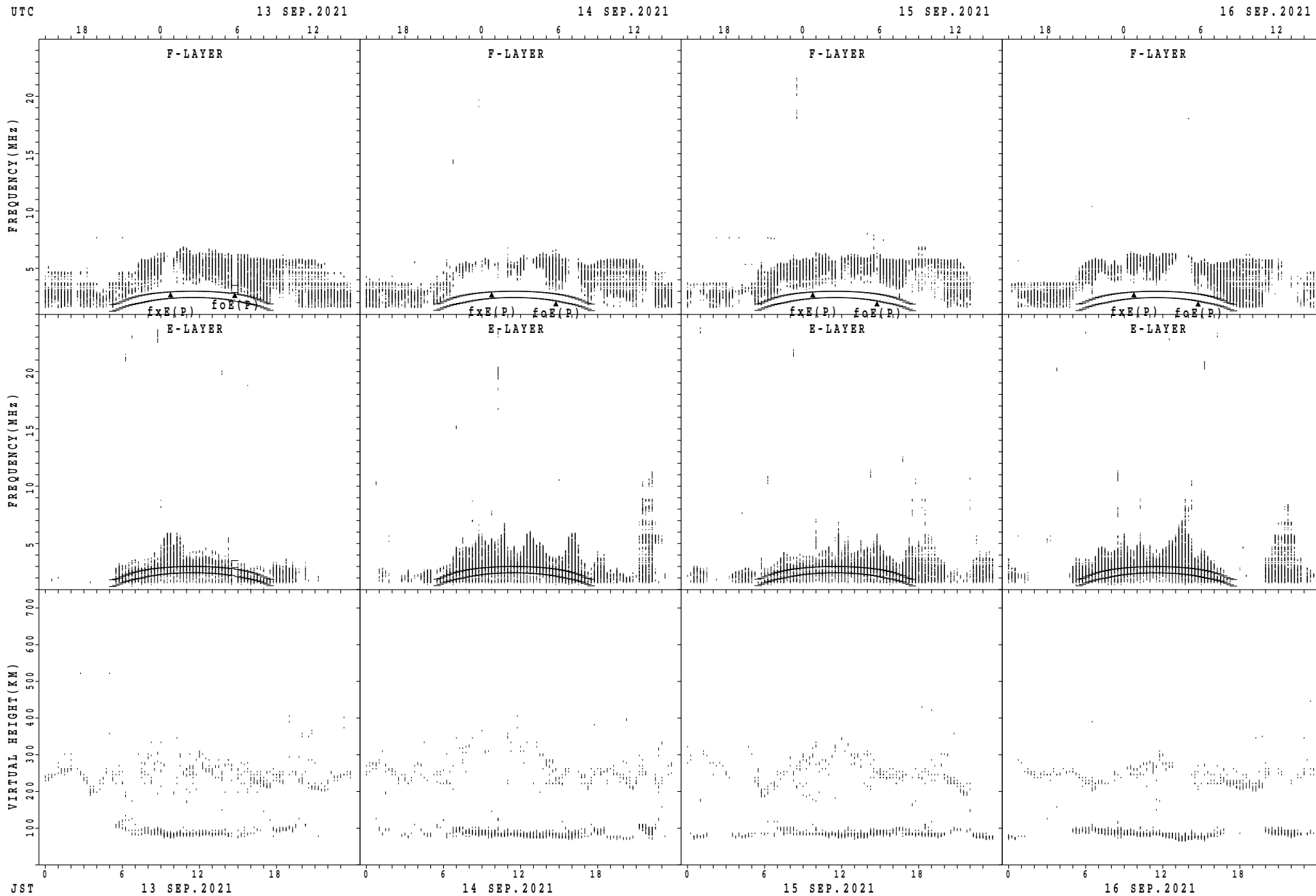
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Wakkanai



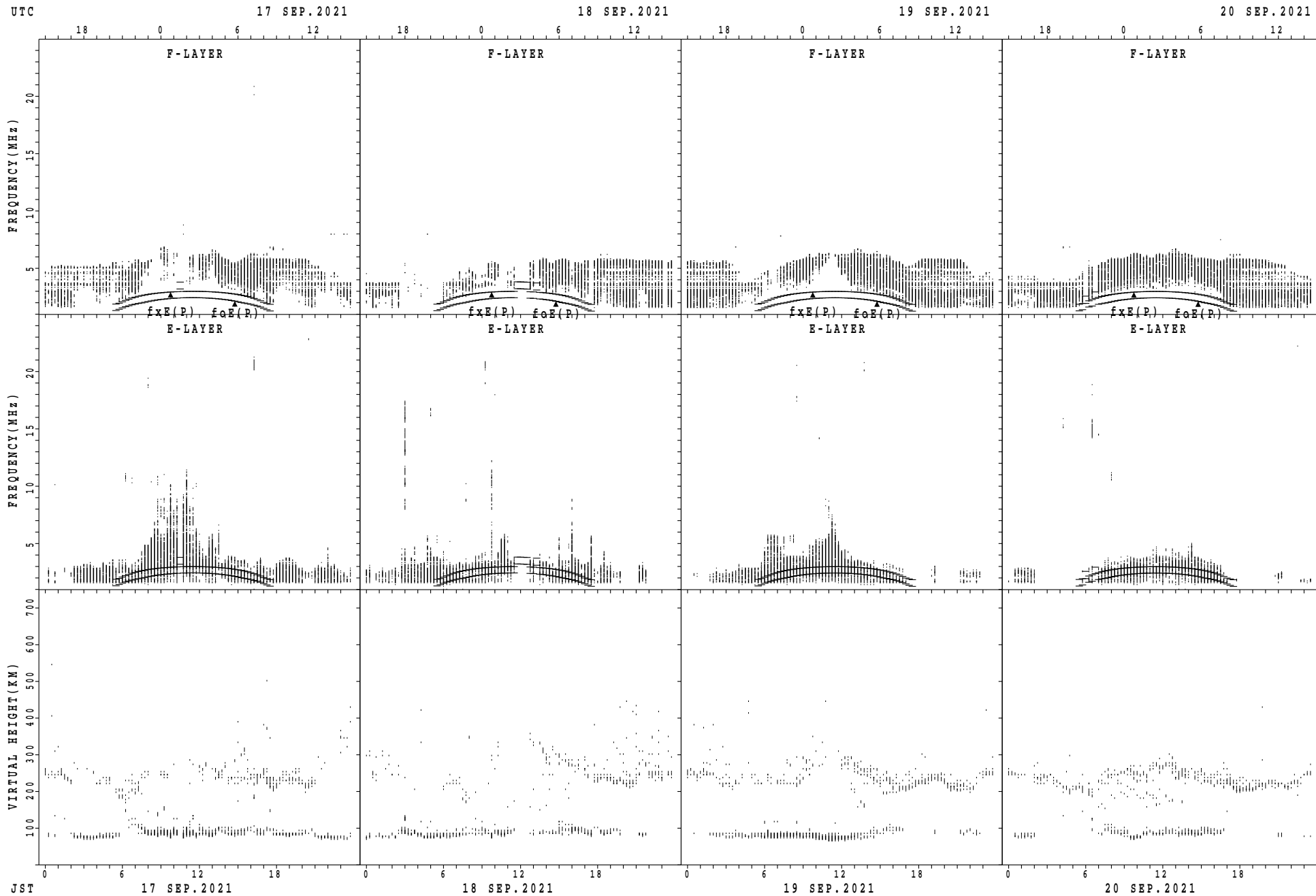
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



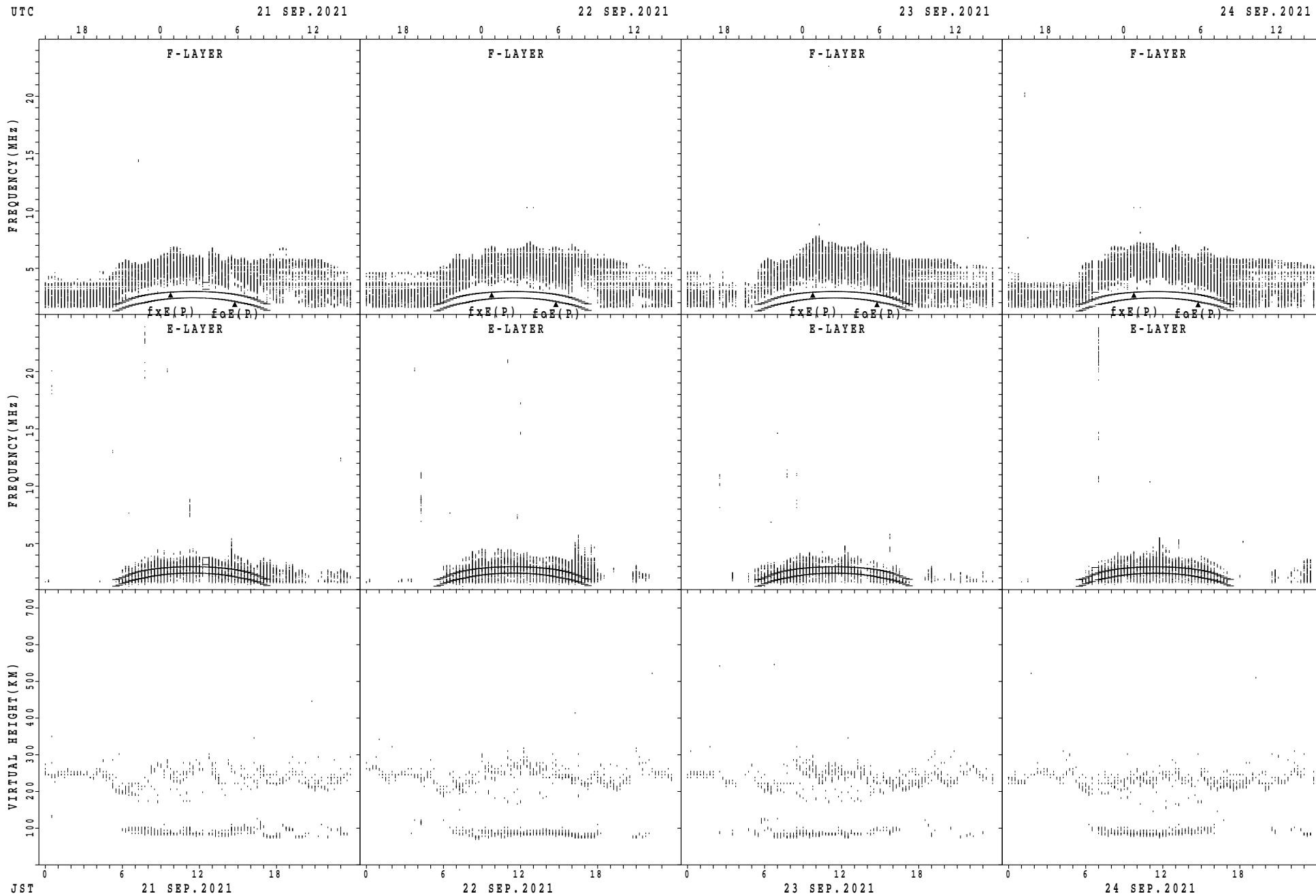
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



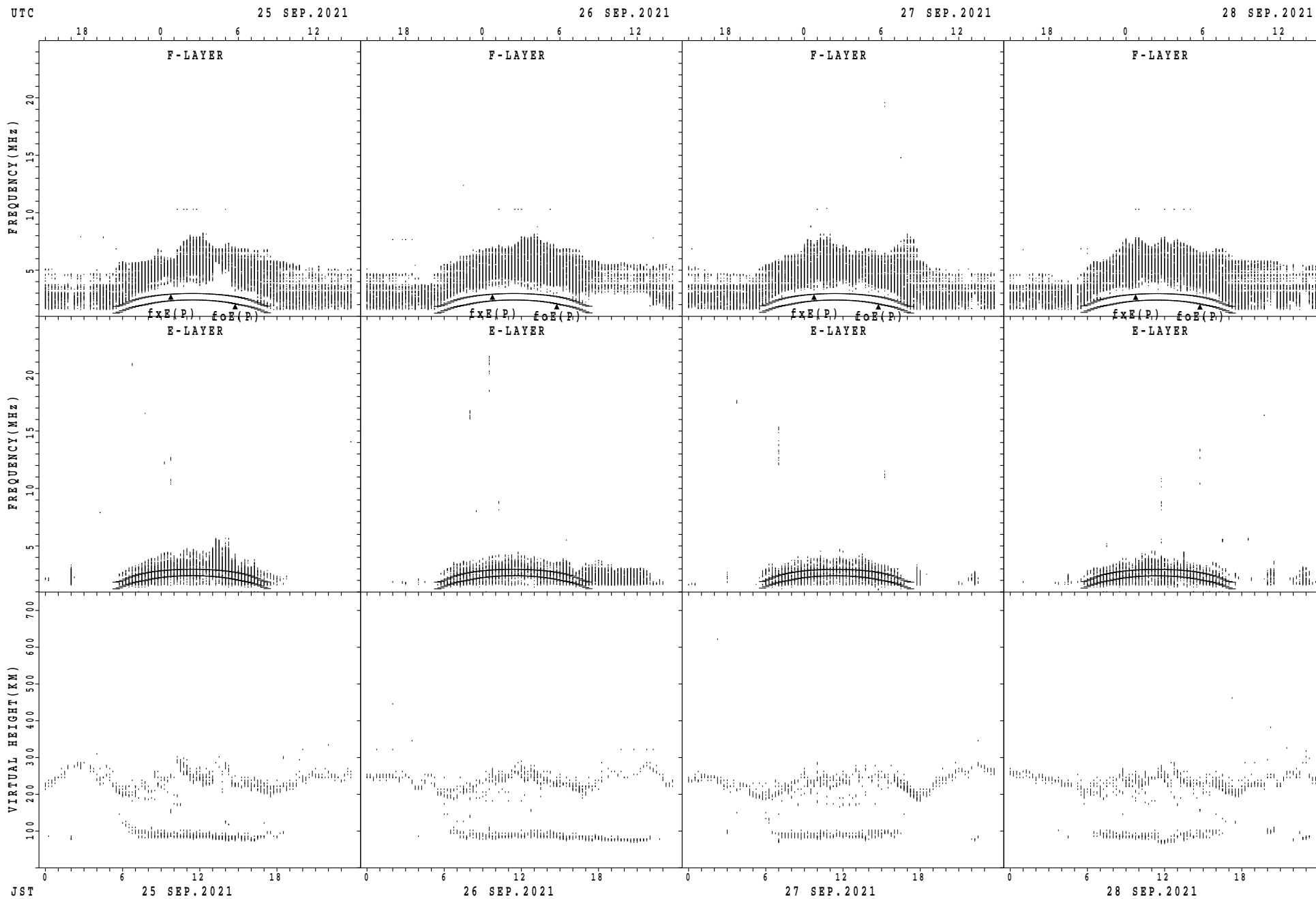
fxE(P); PREDICTED VALUE FOR fxE  
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



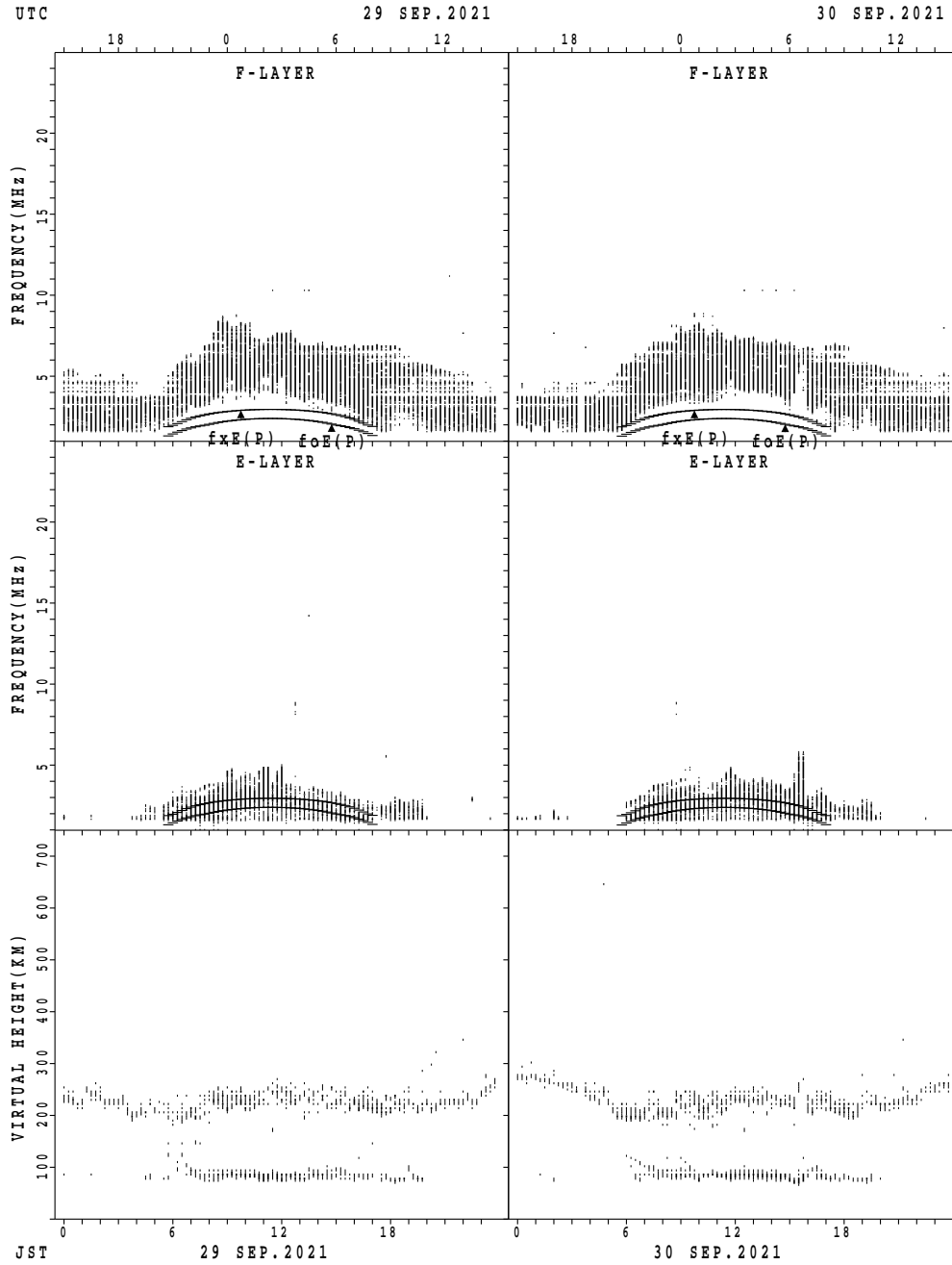
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

## SUMMARY PLOTS AT Wakkanai



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

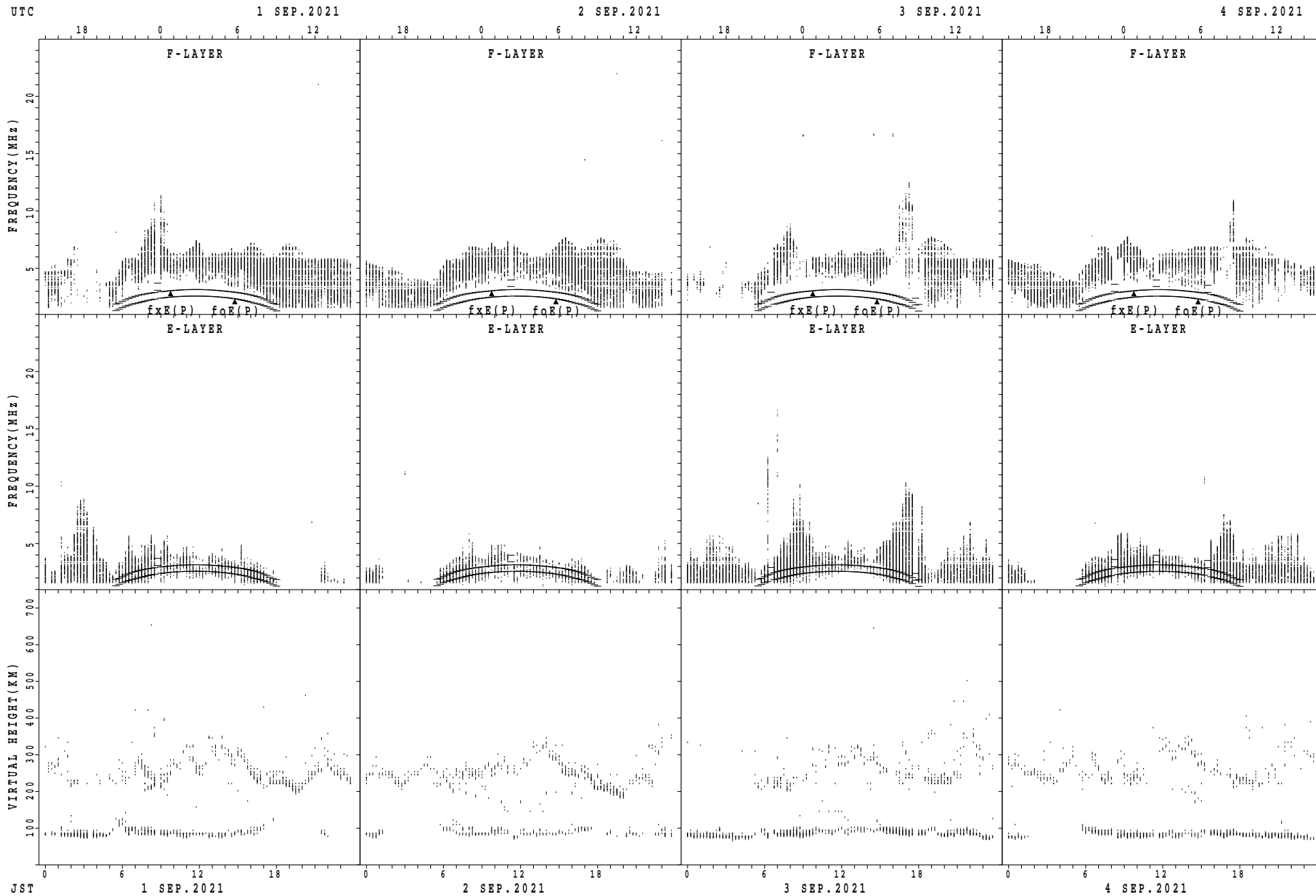
SUMMARY PLOTS AT Wakkanai



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

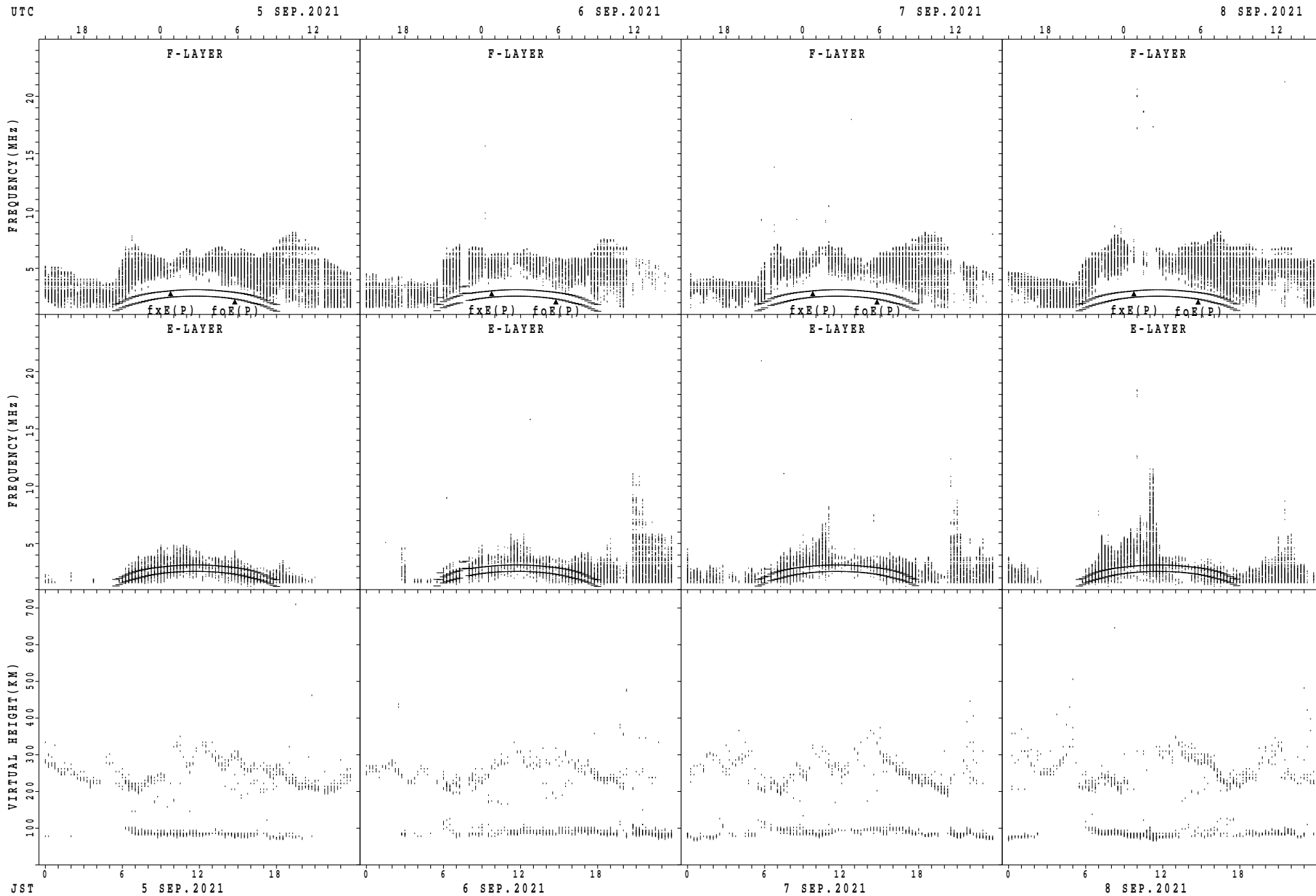


SUMMARY PLOTS AT Kokubunji



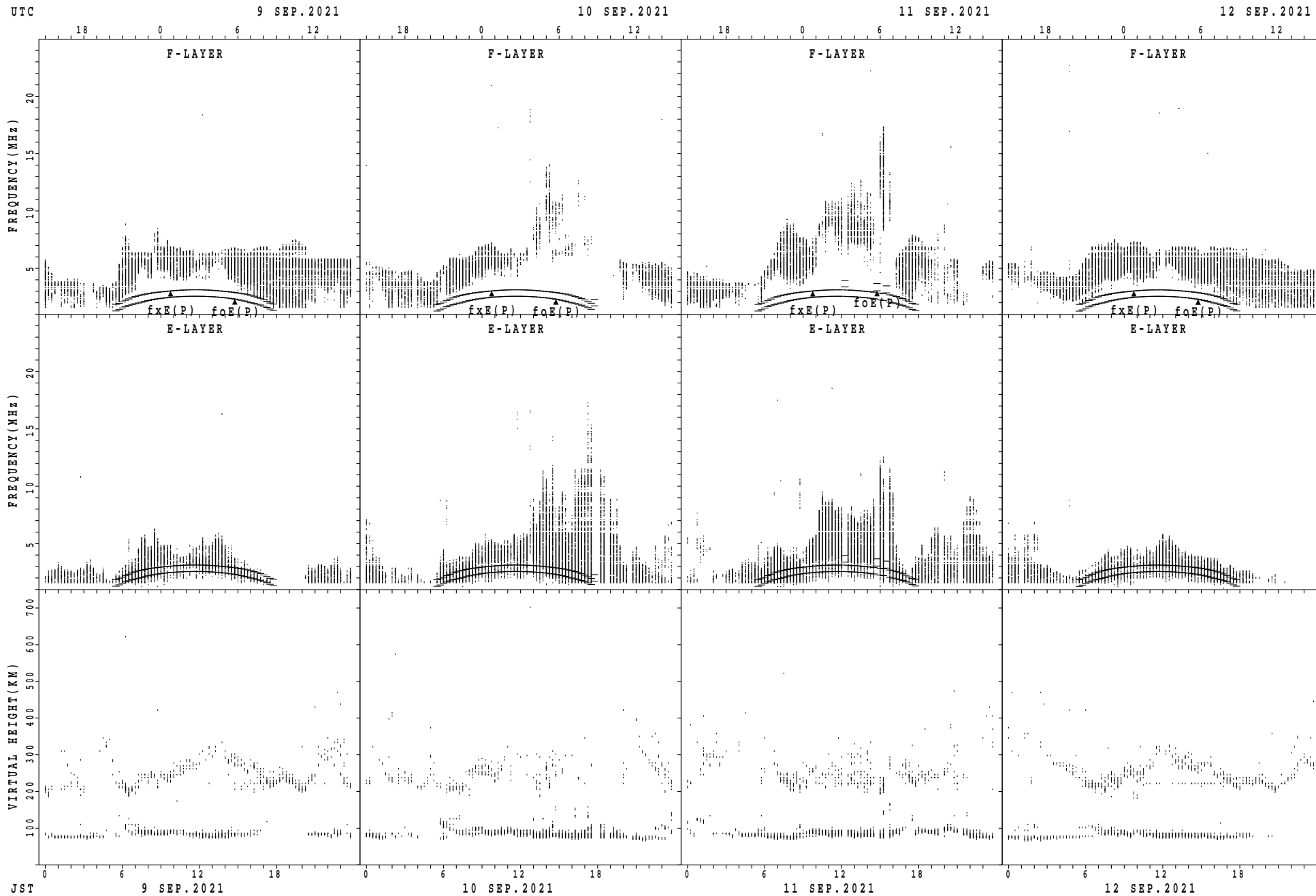
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



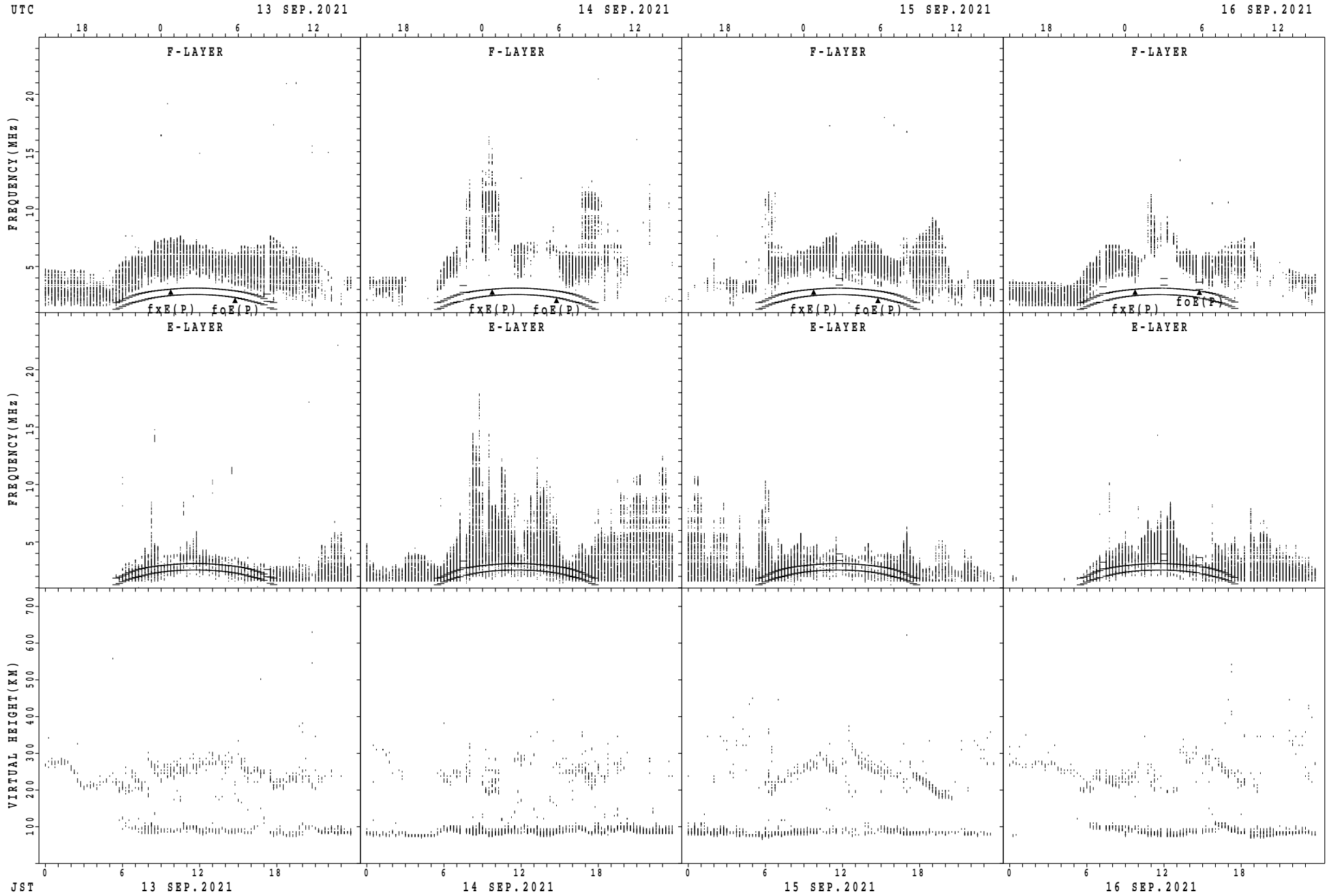
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



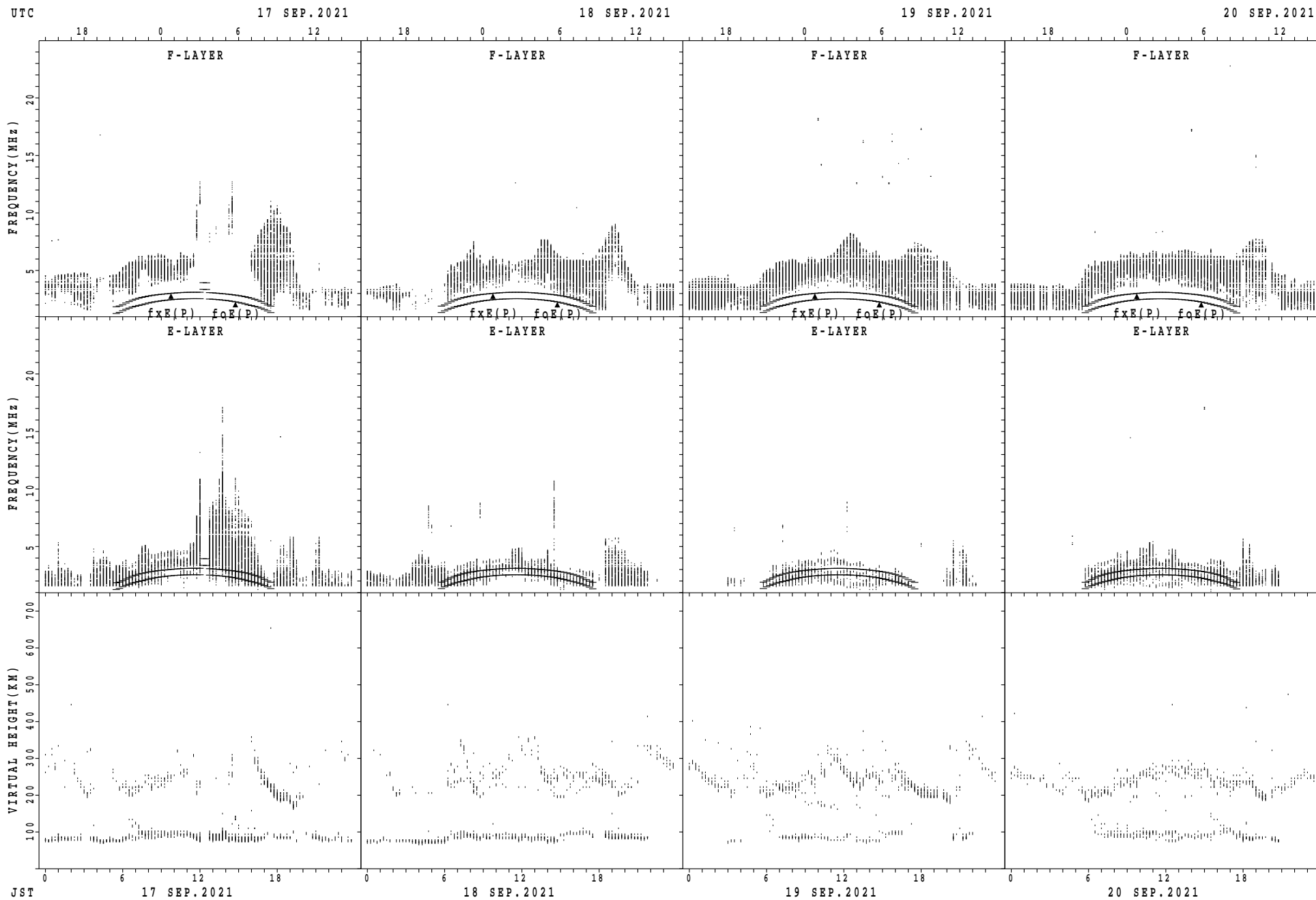
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Kokubunji



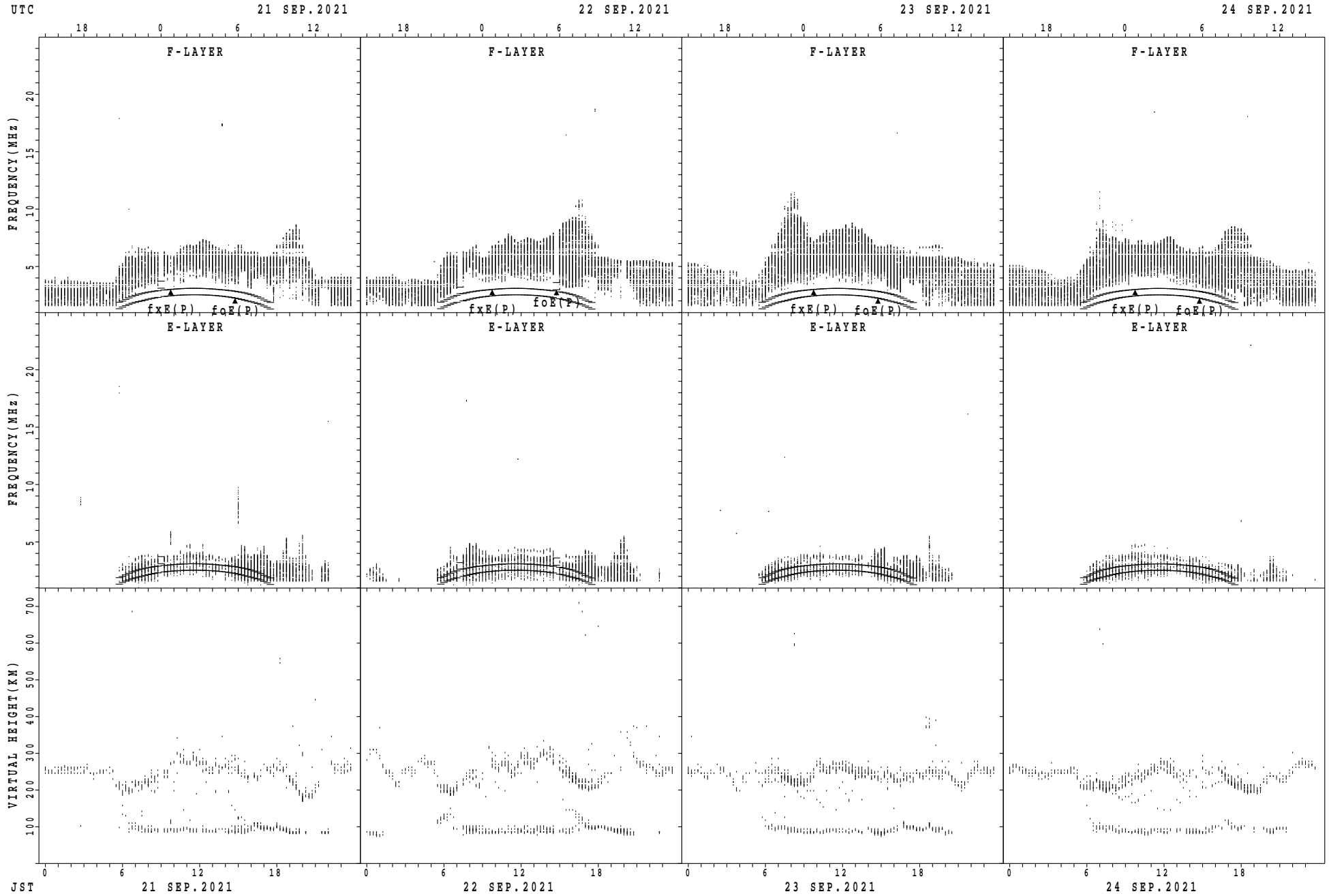
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



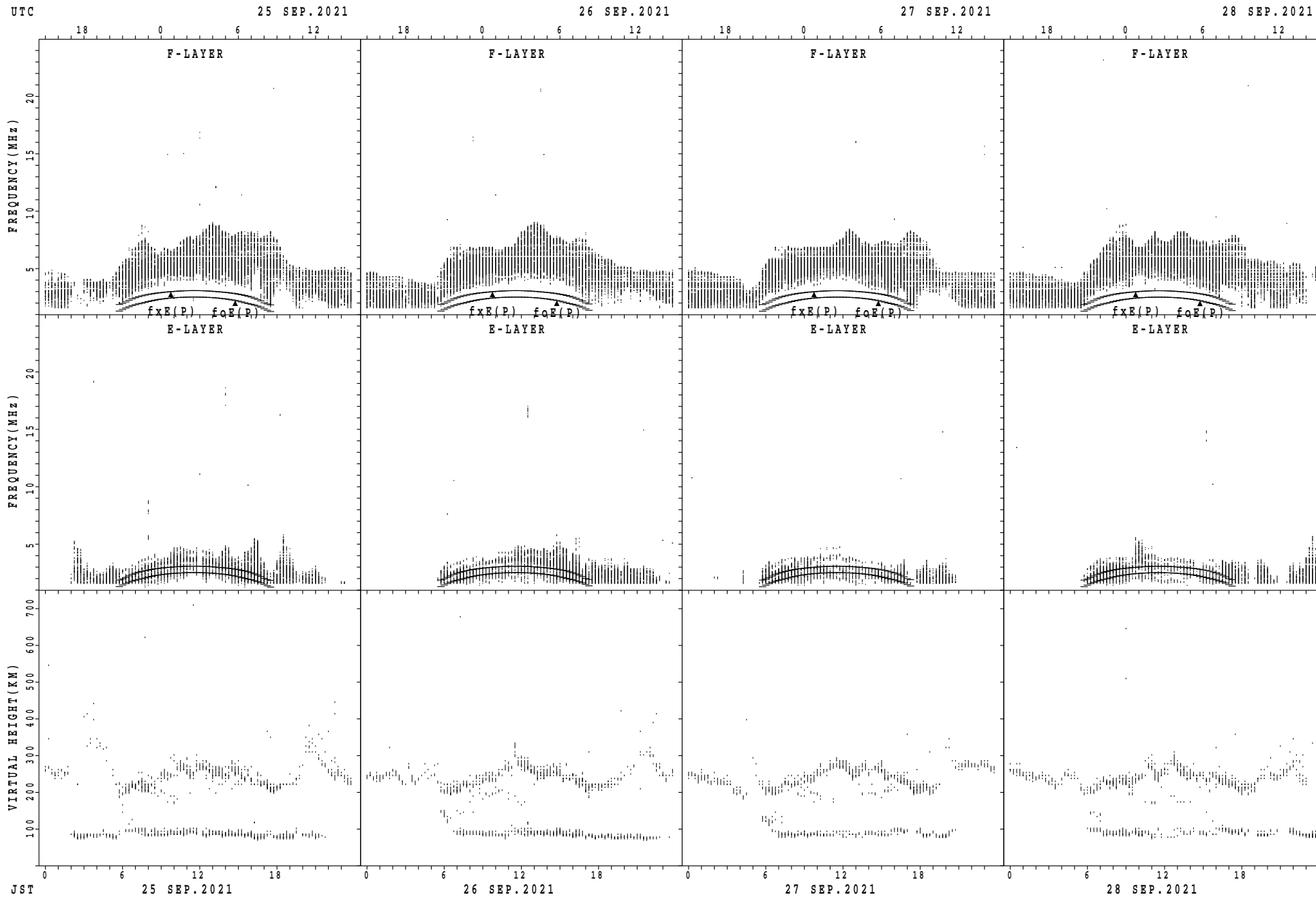
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



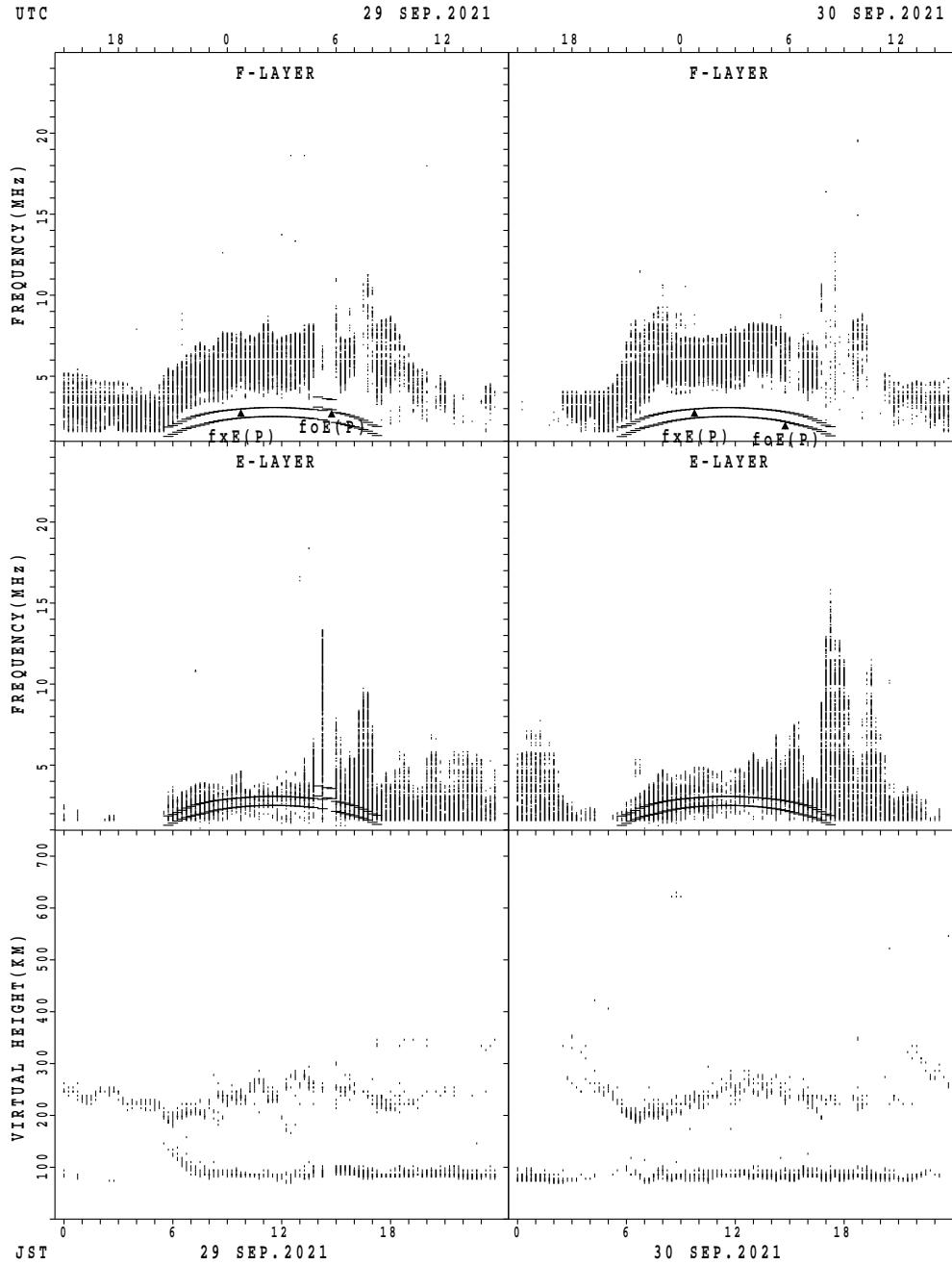
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



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

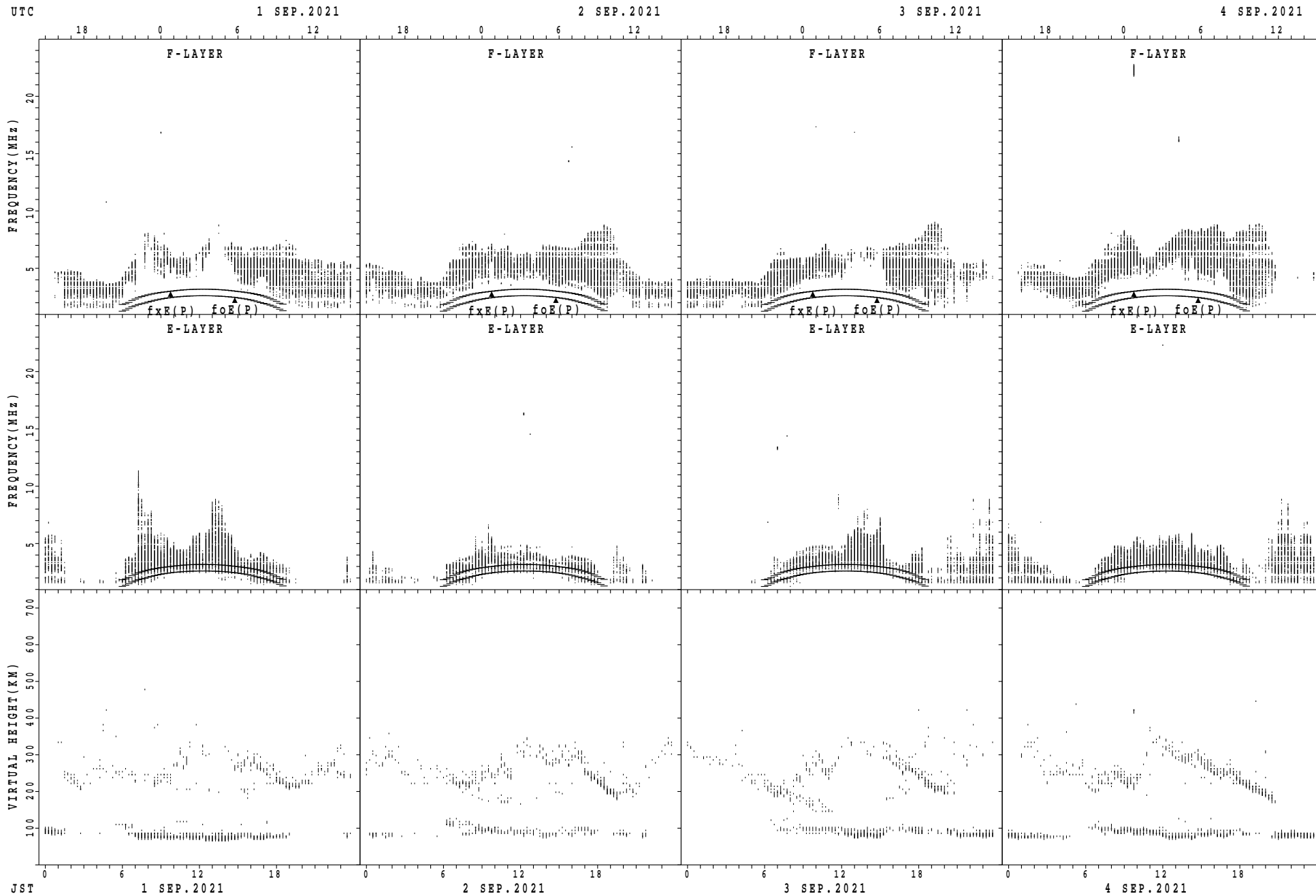
SUMMARY PLOTS AT Kokubunji



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

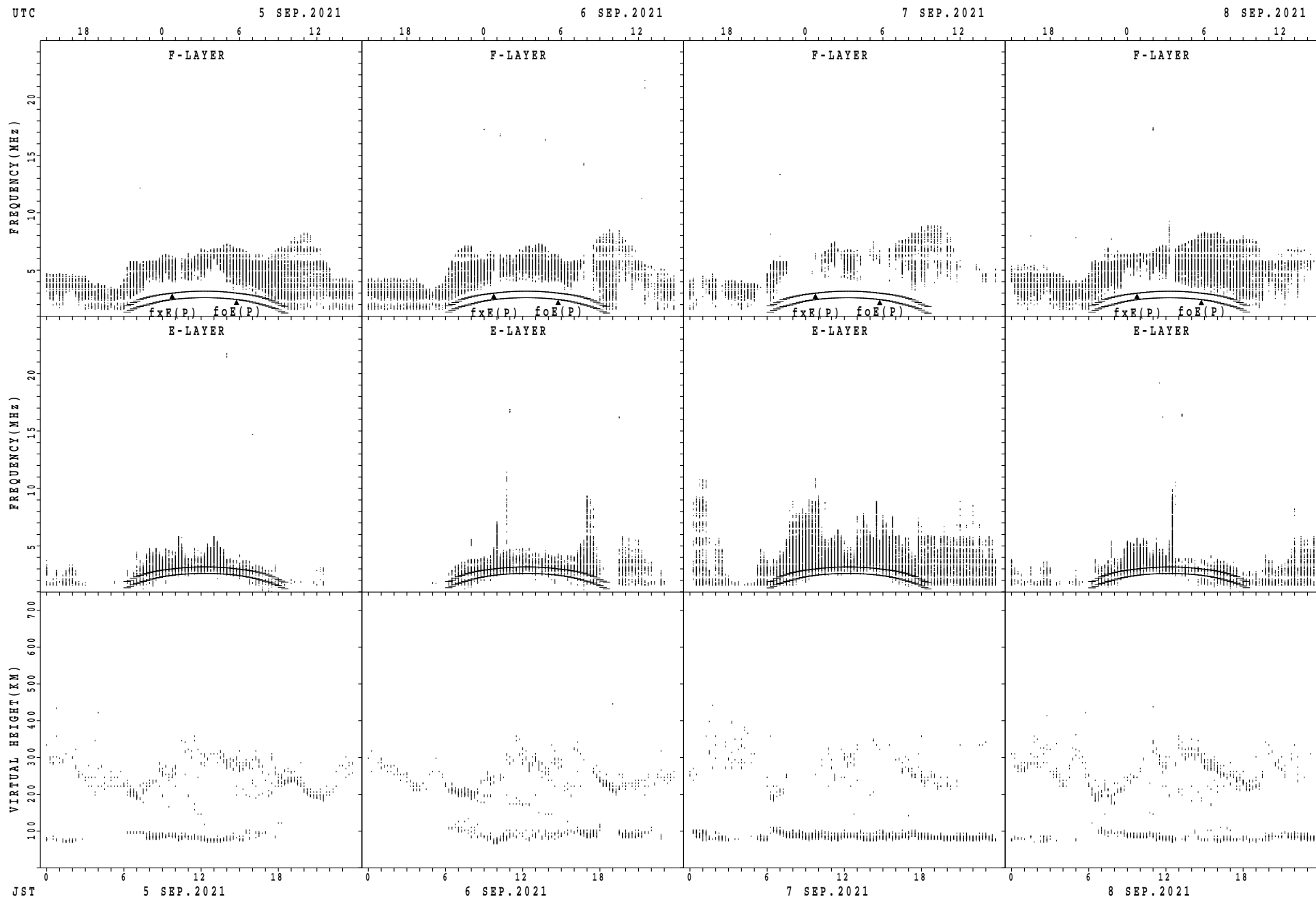


SUMMARY PLOTS AT Yamagawa



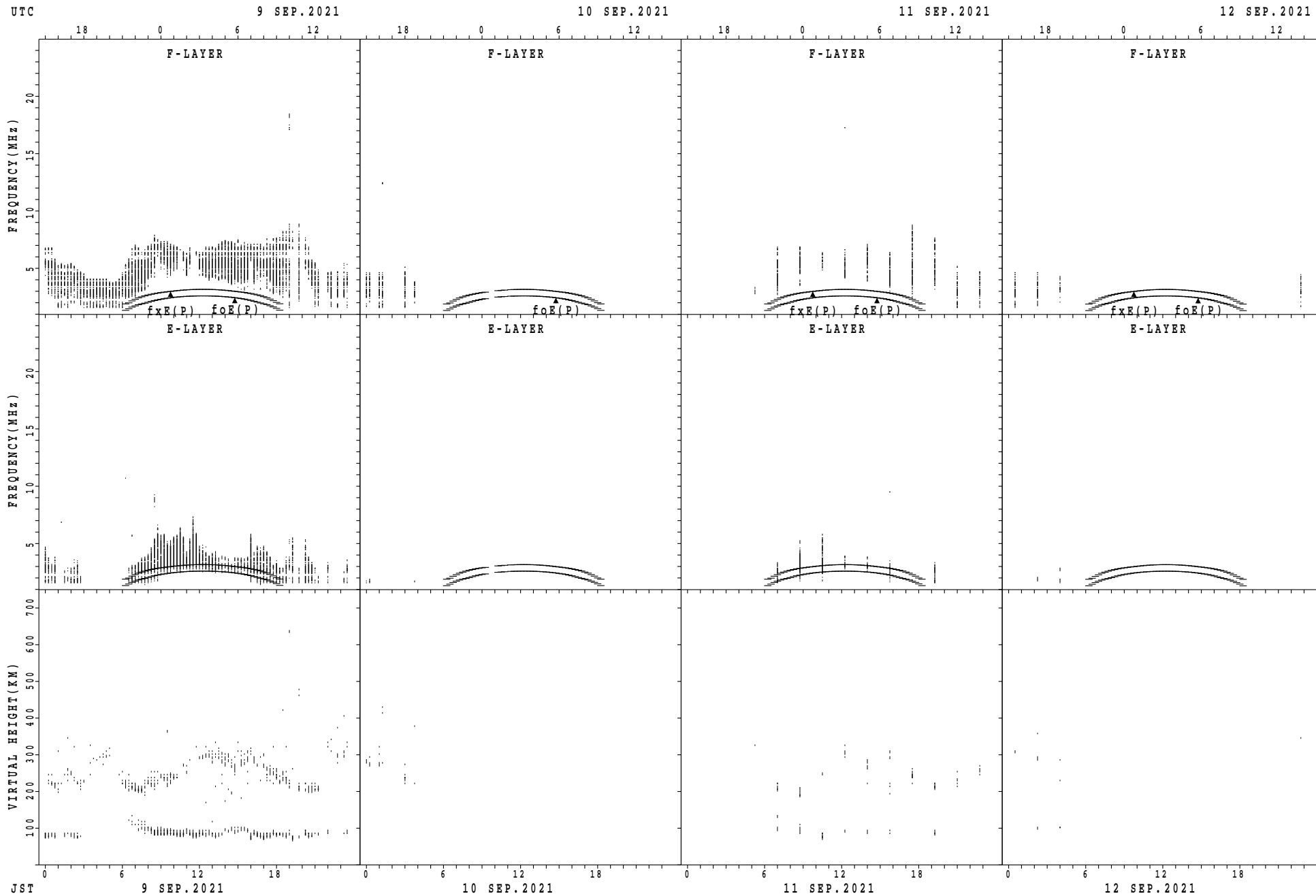
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

## SUMMARY PLOTS AT Yamagawa



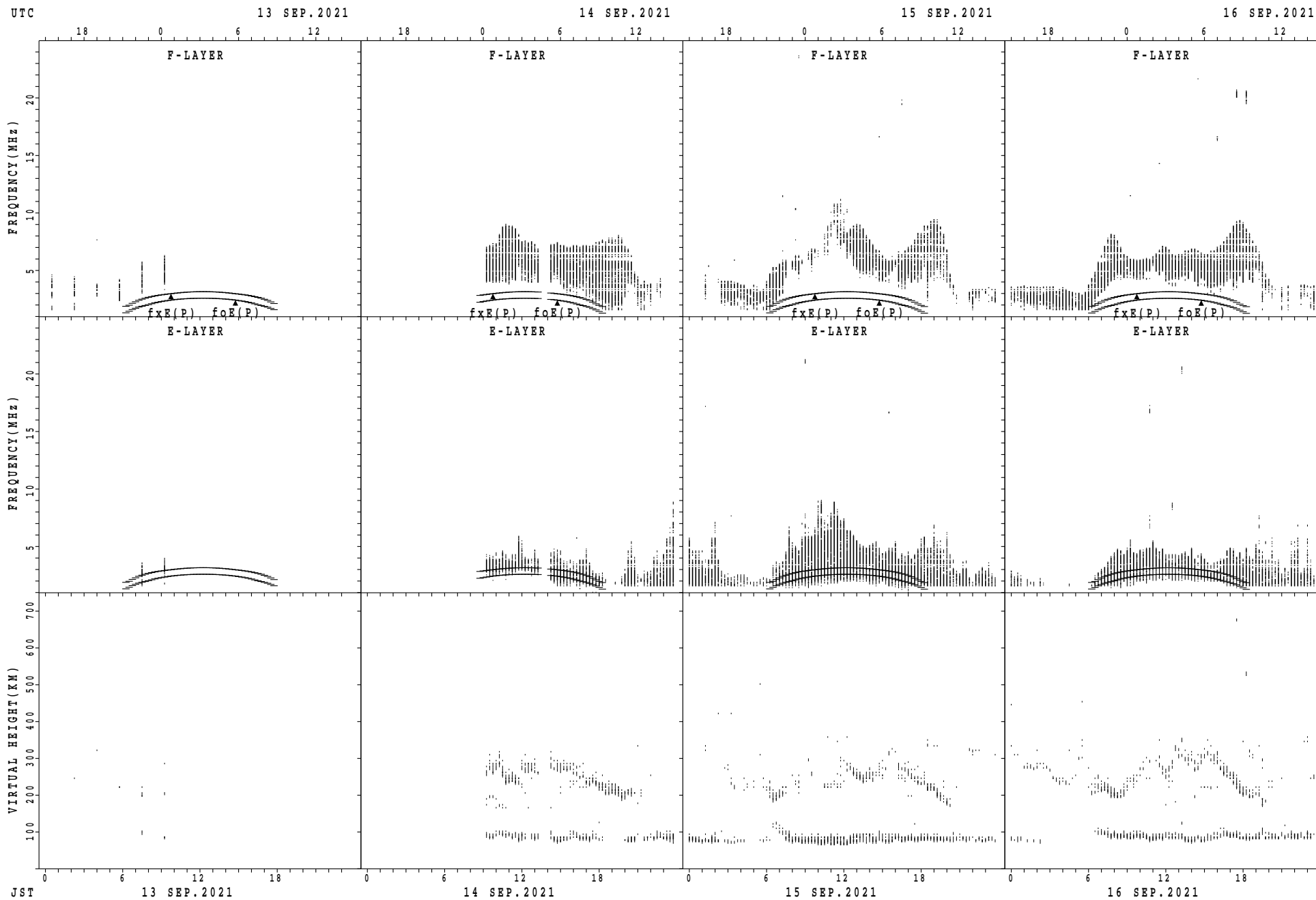
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Yamagawa



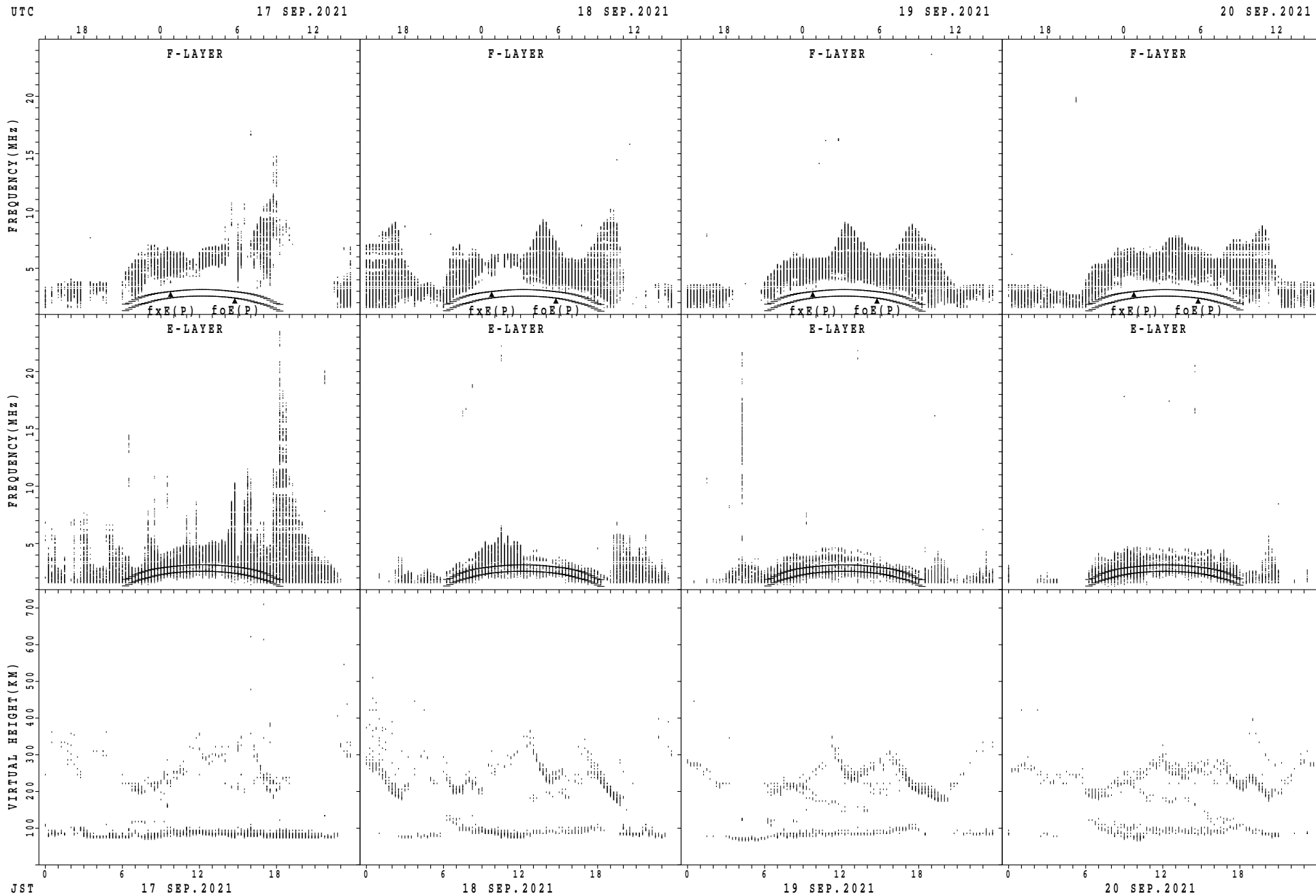
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



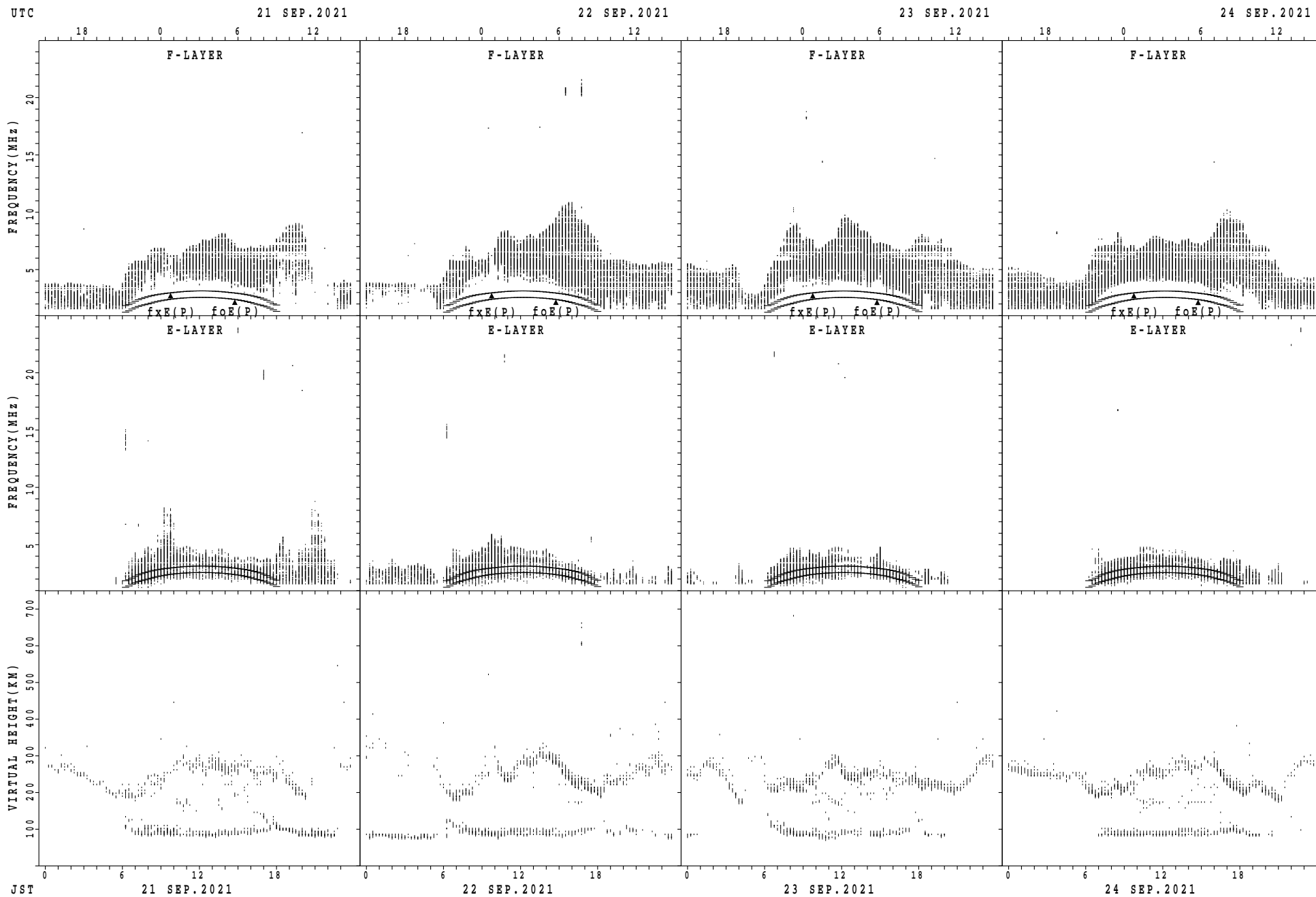
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



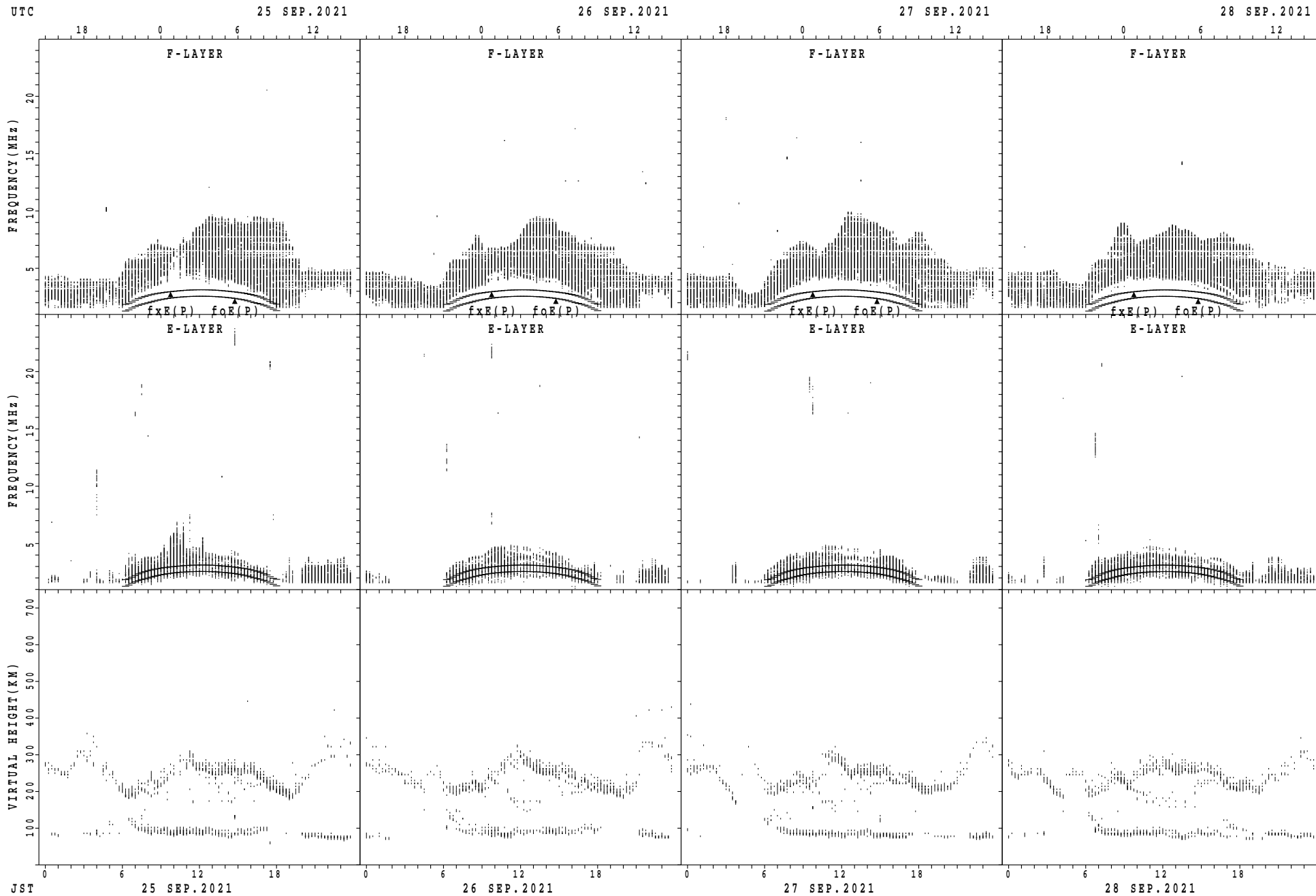
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



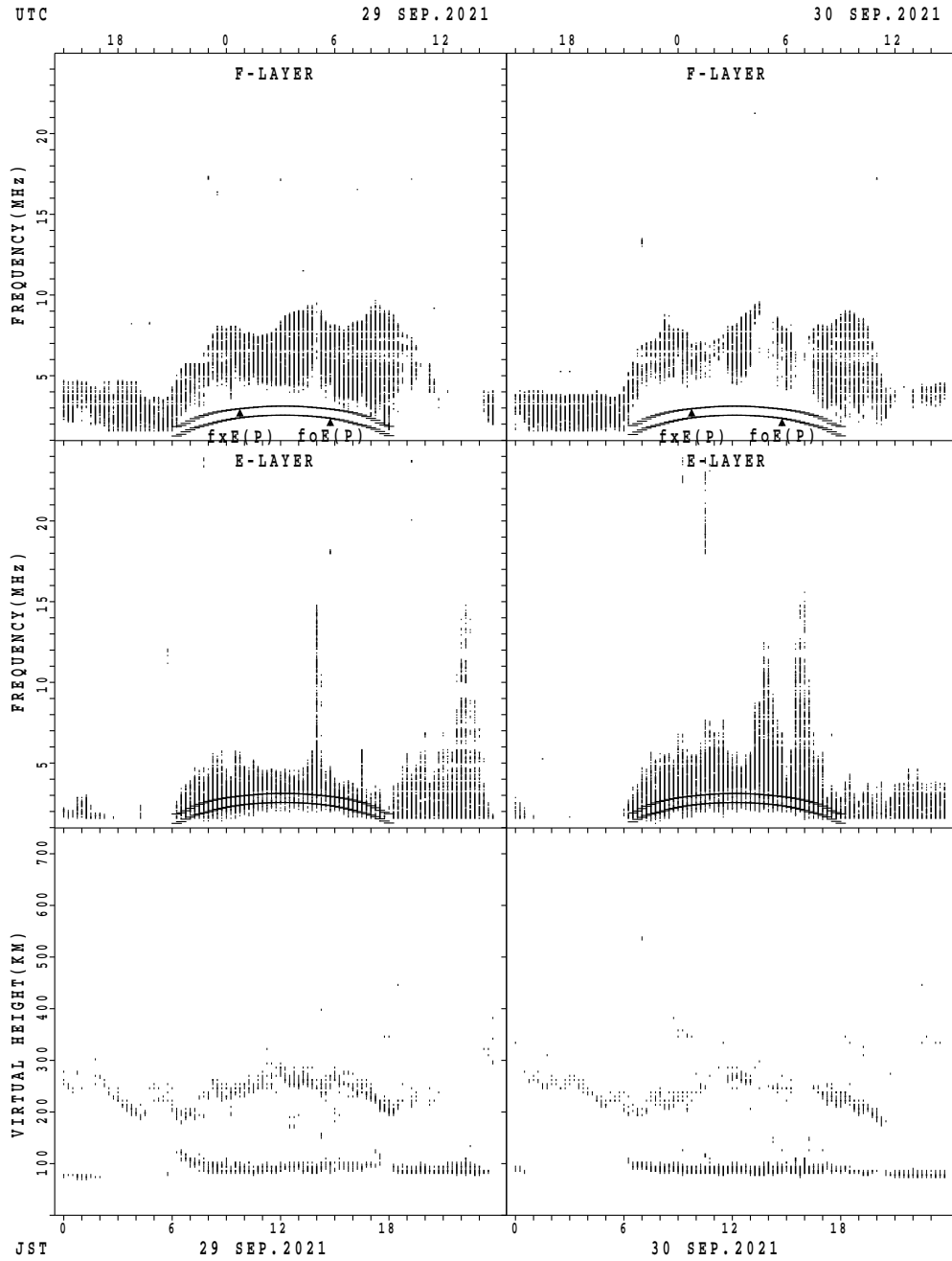
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



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

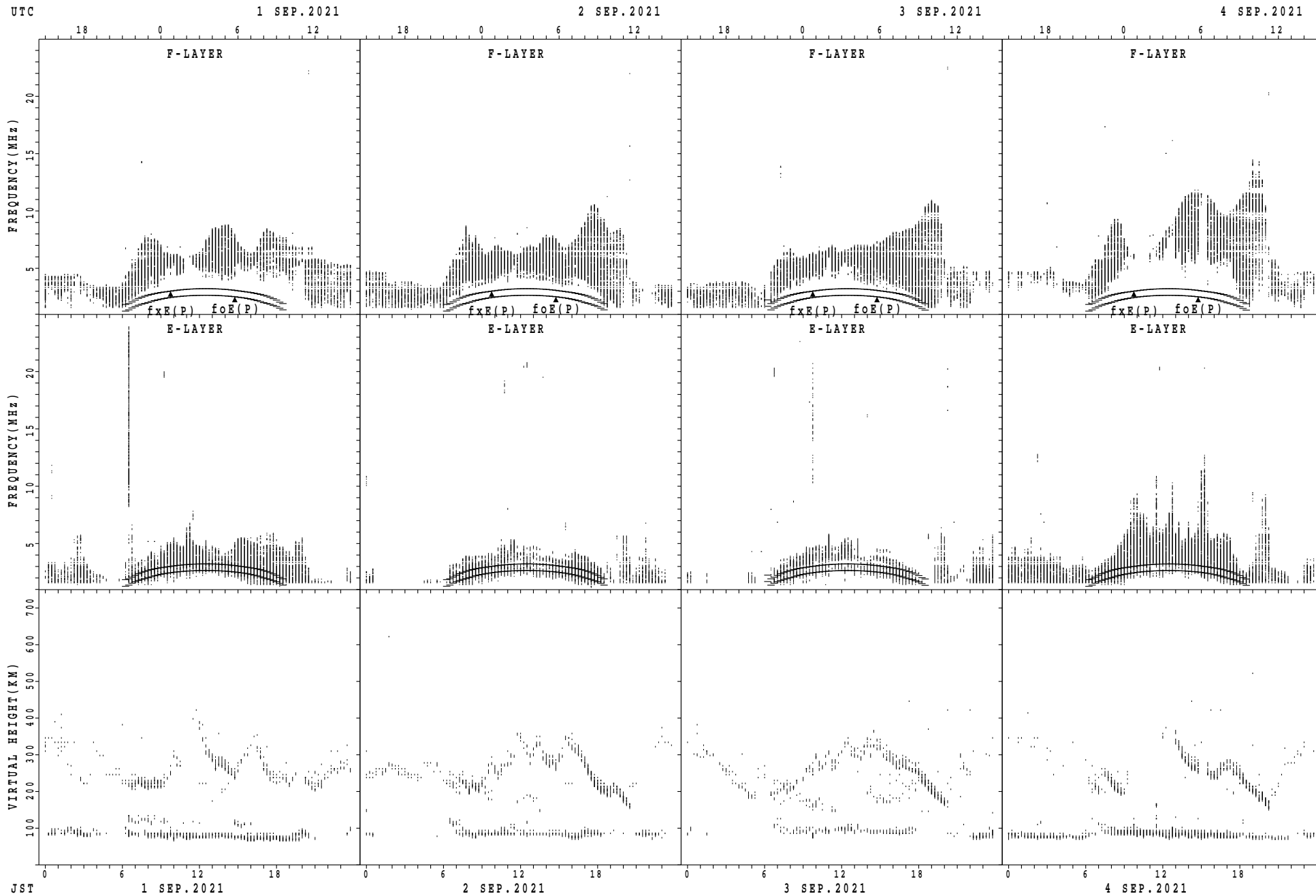
SUMMARY PLOTS AT Yamagawa



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

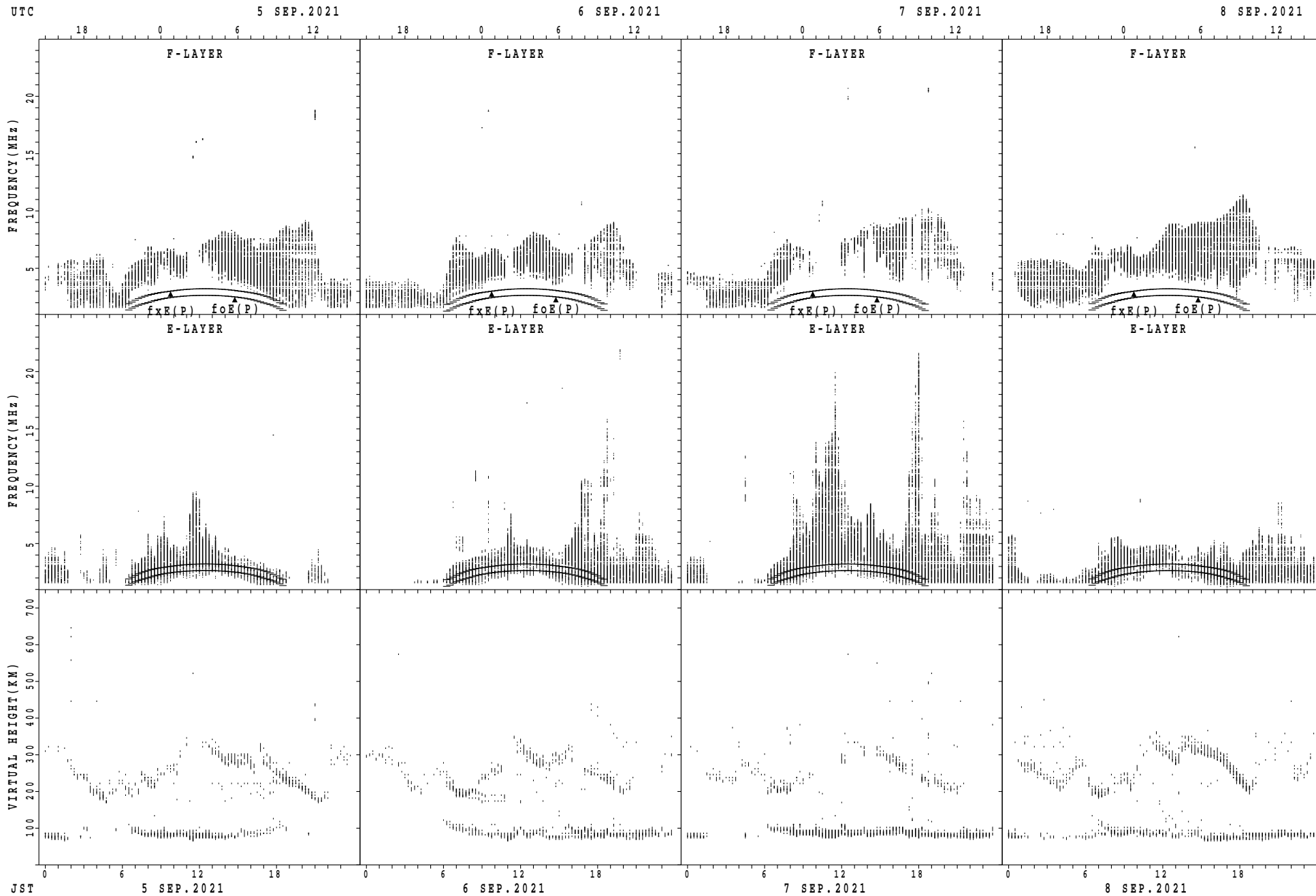


SUMMARY PLOTS AT Okinawa



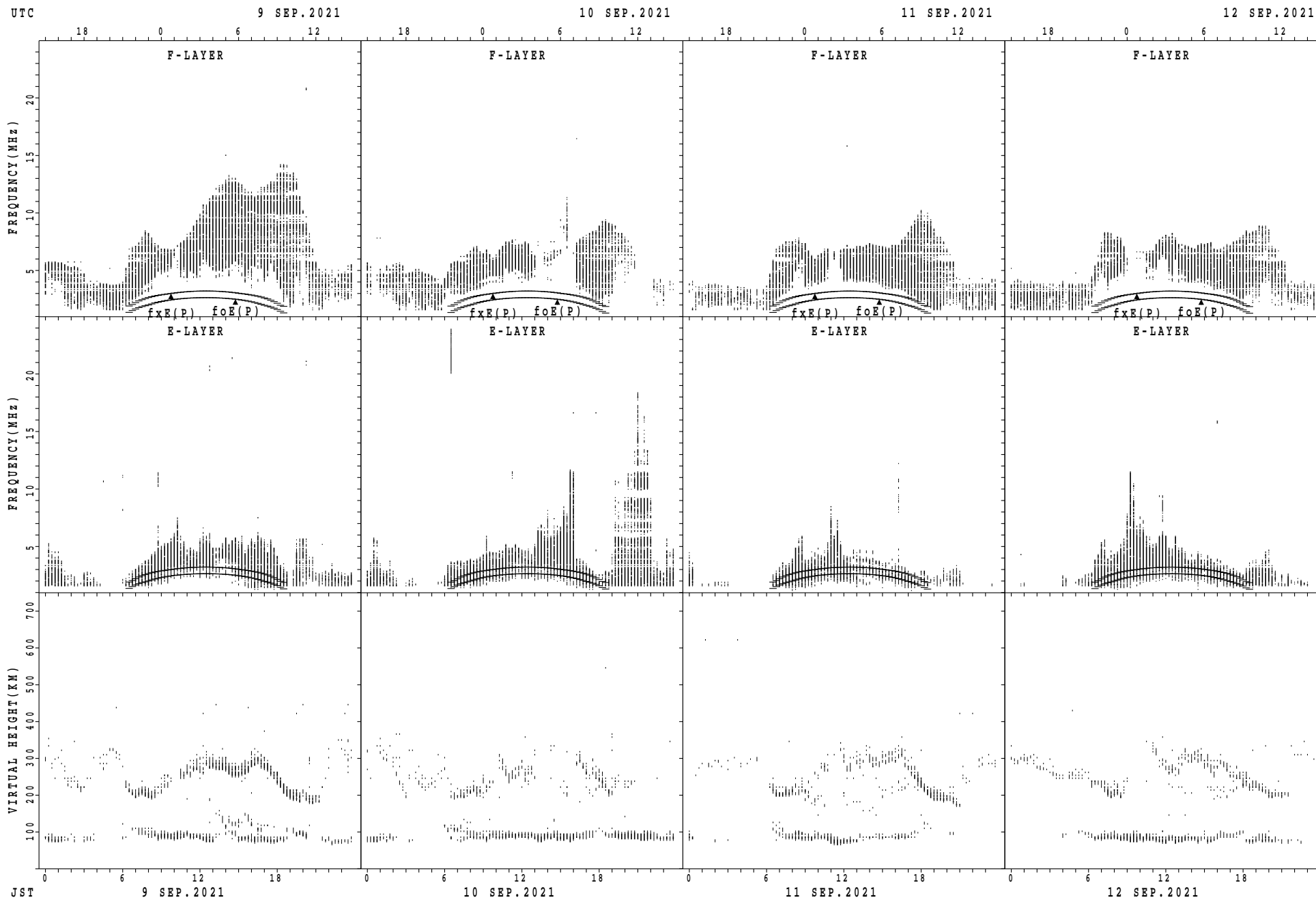
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Okinawa



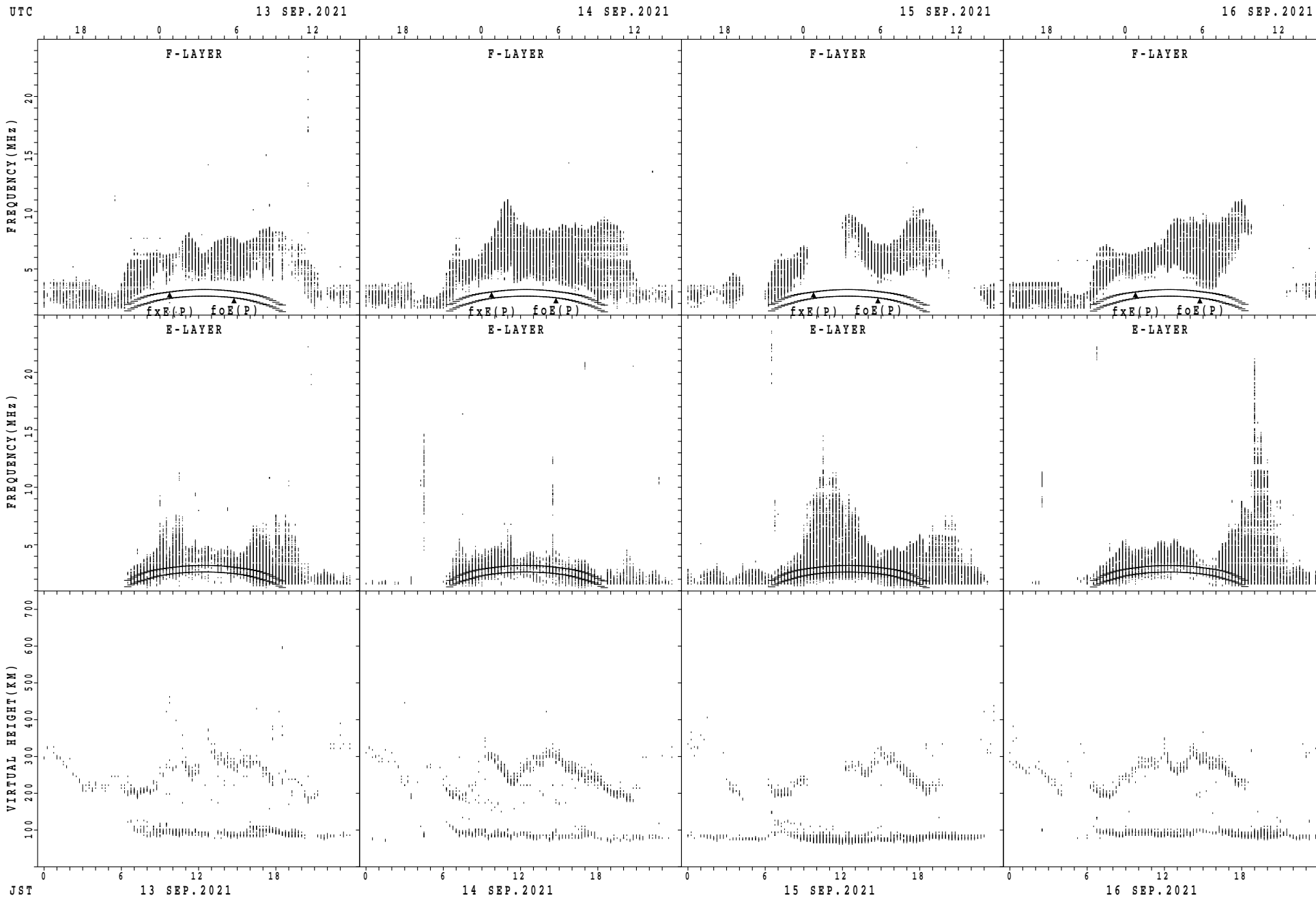
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

## SUMMARY PLOTS AT Okinawa



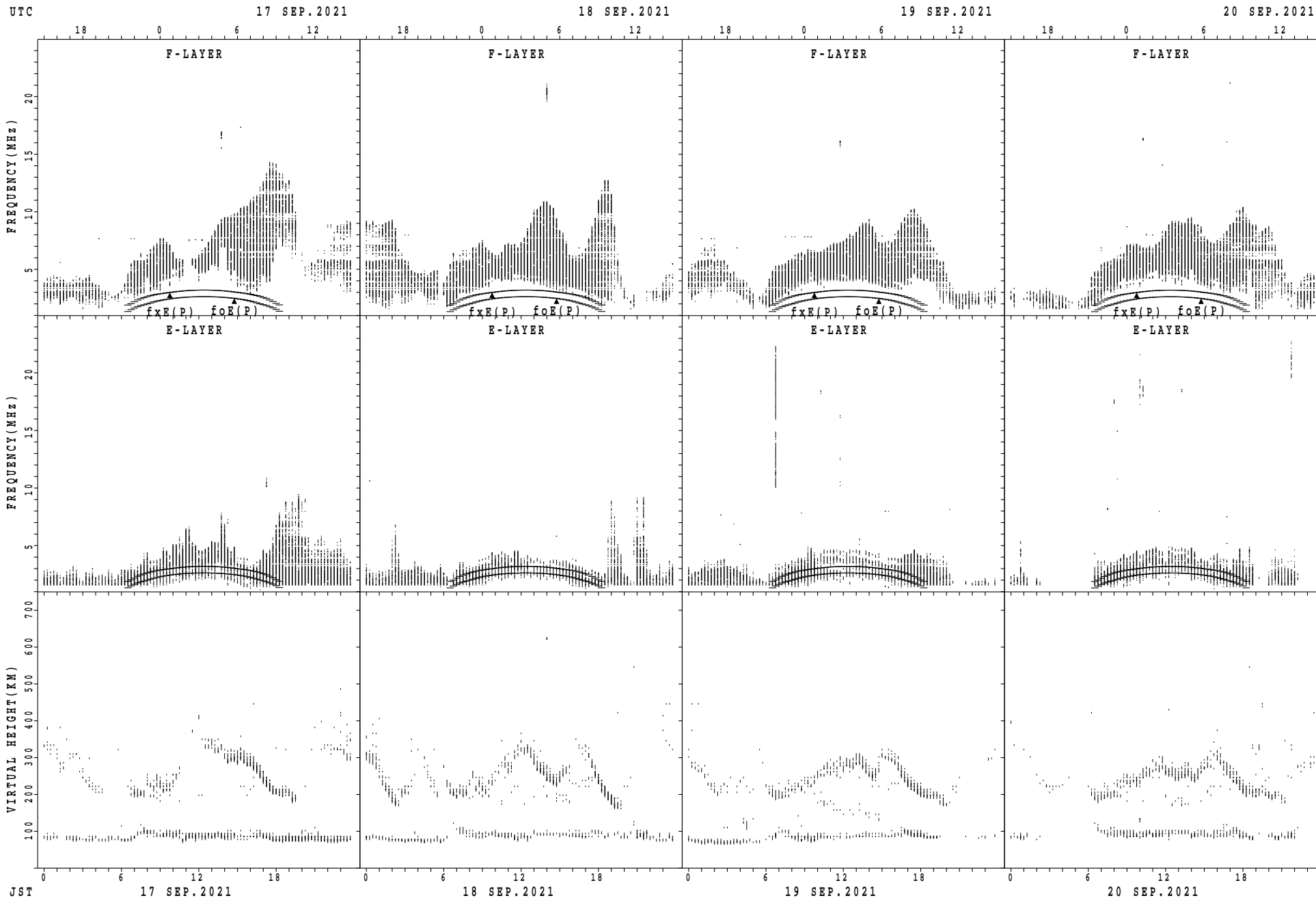
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



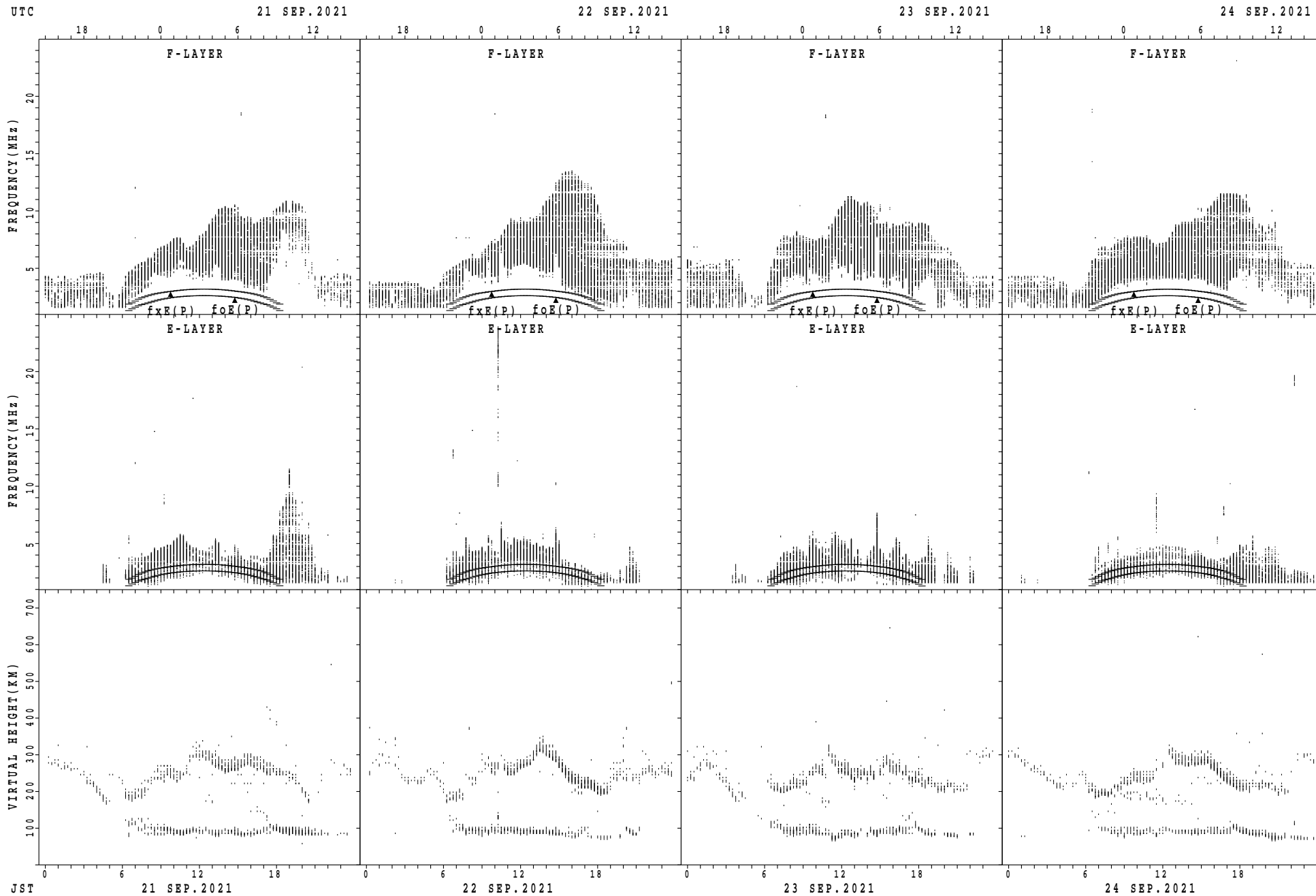
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



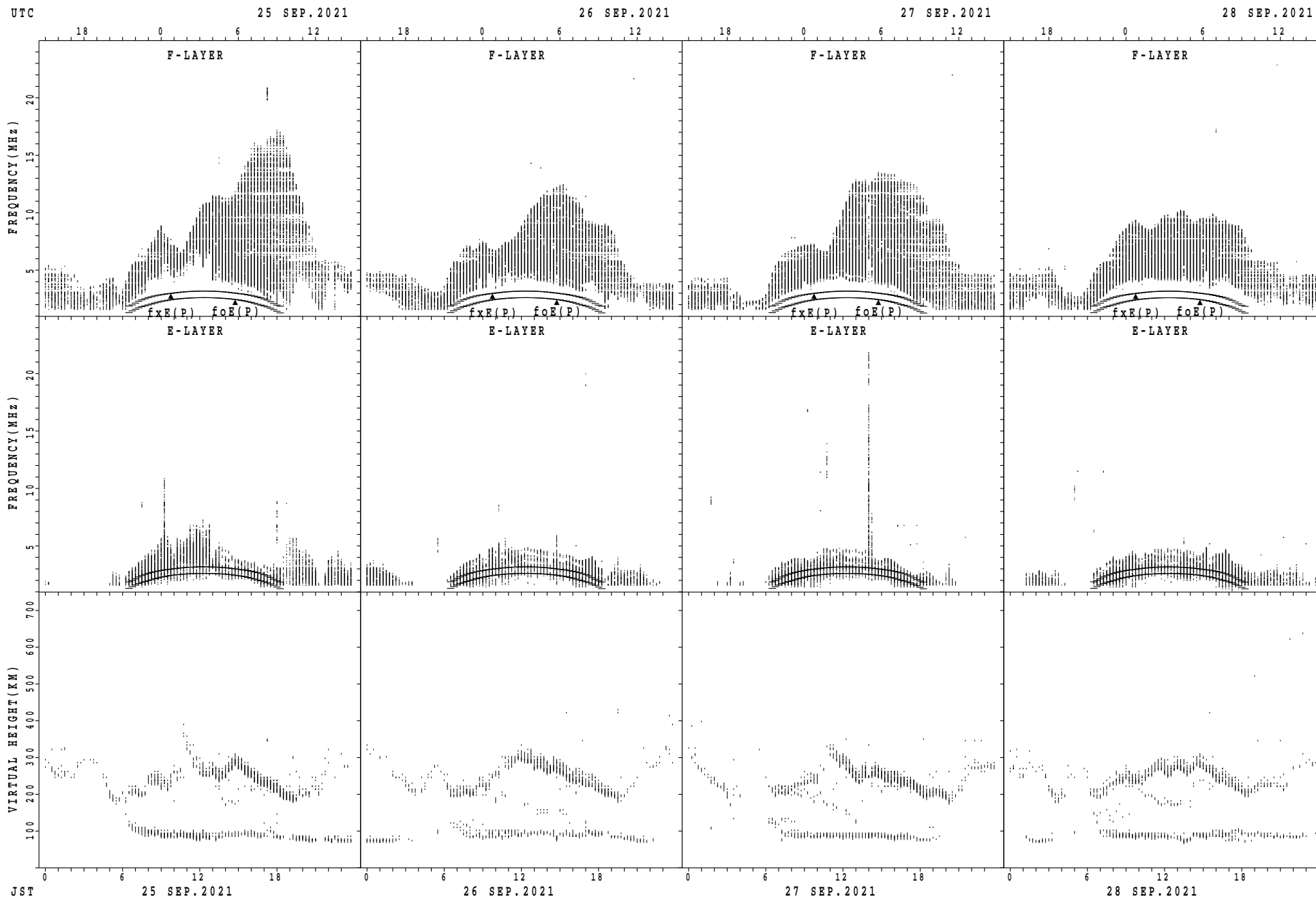
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Okinawa



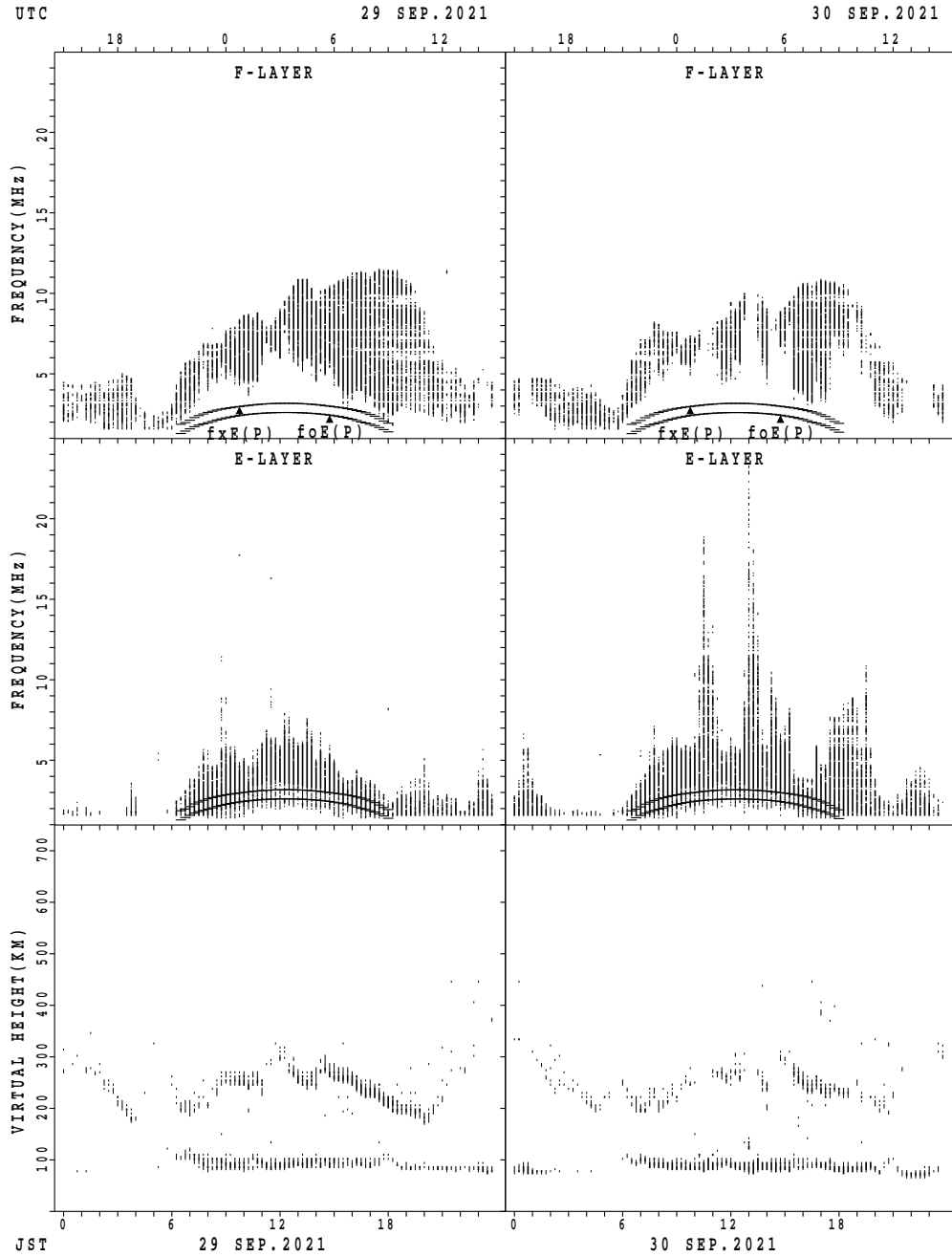
$f_xE(P)$ ; PREDICTED VALUE FOR  $f_xE$   
 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

## SUMMARY PLOTS AT Okinawa



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

SUMMARY PLOTS AT Okinawa



$f_{xE}(P)$ ; PREDICTED VALUE FOR  $f_{xE}$   
 $f_{oE}(P)$ ; PREDICTED VALUE FOR  $f_{oE}$



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

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								2	4							5	6	2	1	1				1
MED								237	253							260	253	239	194	282				202
U Q								242	256							262	258	252	97	141				101
L Q								232	241							240	240	226	97	141				101

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	25	19	20	22	23	23	28	30	30	30	30	30	30	30	30	30	30	26	26	24	27	26	25	22
MED	98	98	98	98	98	98	98	98	98	96	97	98	98	98	98	98	98	97	98	98	98	98	98	98
U Q	98	98	98	98	98	98	100	100	100	98	98	98	98	98	98	98	100	98	98	98	98	98	98	98
L Q	96	96	96	96	96	96	98	98	96	94	94	94	96	96	96	96	96	96	96	96	96	98	96	96

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							2	9	15							8	9	15	9	11	2			2
MED							220	236	232							252	260	240	248	234	226			267
U Q							224	254	242							270	278	258	269	272	256			280
L Q							216	214	210							230	246	216	223	226	196			254

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	20	17	18	15	27	30	30	29	30	30	28	30	30	30	30	30	28	28	26	25	24	21
MED	96	95	96	96	96	96	98	98	98	98	96	96	96	97	96	98	98	97	98	96	96	96	96	96
U Q	96	96	98	98	98	98	100	100	98	98	98	98	98	98	98	98	98	98	98	98	98	98	96	98
L Q	94	94	95	94	94	96	98	98	96	96	94	94	94	94	94	94	96	94	96	94	94	91	94	93

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		1	1					4	9								10	15	21	18	6	1		
MED		436	254					218	240								259	240	248	229	212	220		
U Q		218	127					219	248								288	280	257	256	232	110		
L Q		218	127					211	209								248	230	222	216	204	110		

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	21	21	19	20	18	13	15	26	25	25	26	26	26	26	26	26	26	26	25	21	24	23	20	22
MED	96	96	96	96	96	96	98	98	98	98	96	98	98	98	98	98	98	97	98	96	97	96	96	94
U Q	96	98	96	98	98	98	98	100	100	98	98	98	98	98	98	98	98	98	98	98	98	98	96	96
L Q	90	96	94	96	96	94	96	98	96	96	92	96	94	94	94	96	96	94	95	94	94	94	94	94

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

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	1	1	1					8	14	5							16	27	28	23	13			1
MED	360	358	208					211	215	232							260	250	226	222	208			426
U Q	180	179	104					221	222	260							279	266	247	226	218			213
L Q	180	179	104					202	206	217							243	224	208	206	202			213

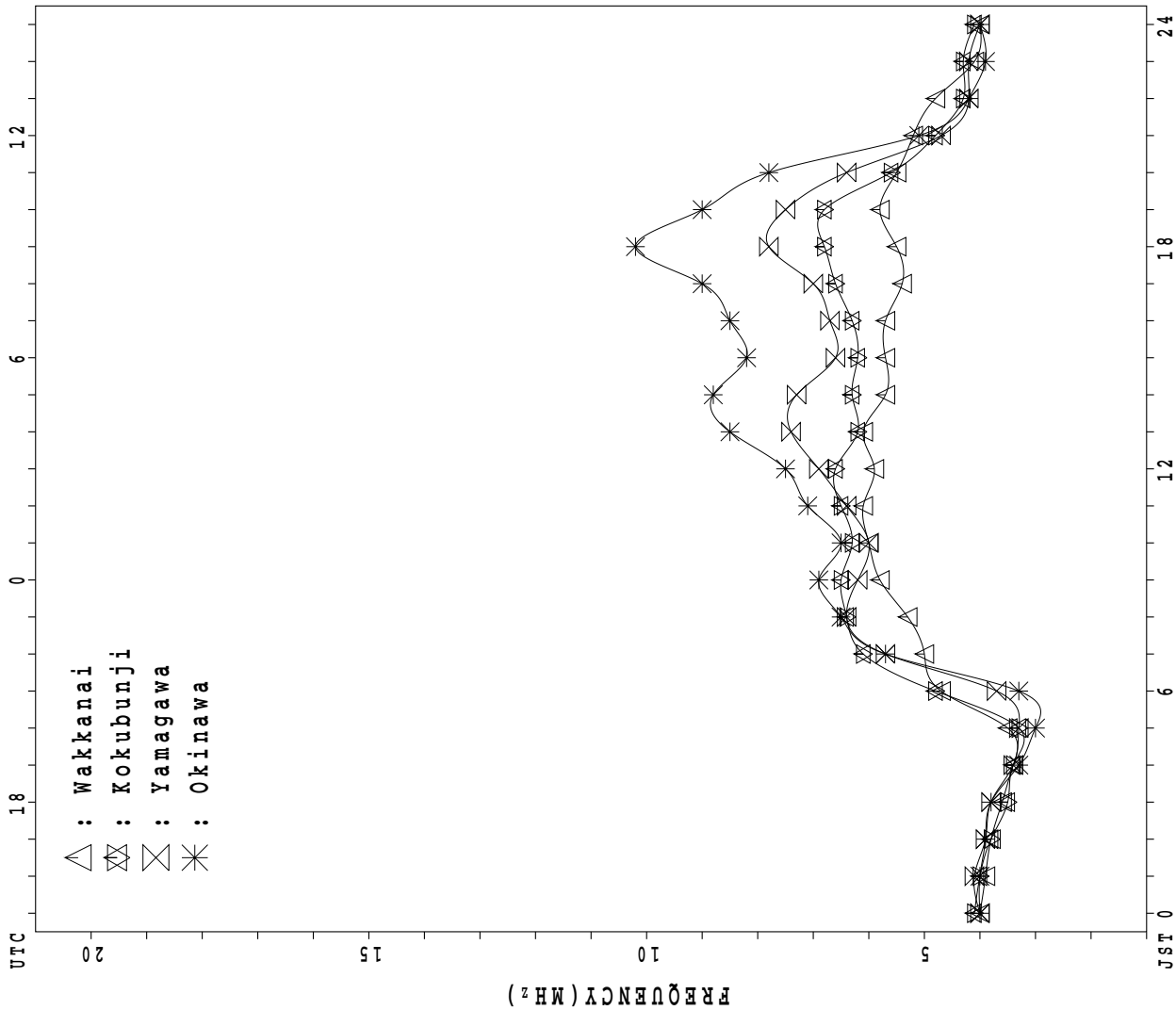
h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	19	20	15	12	13	16	30	30	30	30	30	30	30	30	30	30	30	30	28	29	28	27	24
MED	96	96	96	96	98	96	97	98	97	97	98	96	96	96	96	98	98	98	96	96	96	96	96	96
U Q	98	96	98	98	98	98	98	100	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	96
L Q	94	94	96	96	96	96	96	96	96	96	96	94	94	94	94	96	96	96	92	92	94	95	92	93

MONTHLY MEDIANS PLOT OF fOF2

SEP. 2021

AUTOMATIC SCALING



UTC

FREQUENCY (MHz)

JST

## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	X 47	X 47	X 45	X 43																	X 64	X 65	X 61	X 55	
2	X 51	X 47	X 45	X 43																		X 61	X 58	X 54	X 52
3	X 48	X 48	X 45	X 44																		X 67	X 69	X 64	X 55
4	X 50	X 47	X 44	X 41																		X 65	X 60	X 55	X 48
5	X 45	X 44	X 42	X 44																		X 66	X 63	X 61	X 55
6	X 48	X 45	X 46	X 44																		X 67	X 67	X 60	X 45
7	X 44	X 43	X 45	X 44																		X 66	X 63	X 63	X 45
8	X 45	X 44	X 40	X 40																		X 65	X 63	X 60	X 58
9	X 37	X 44	X 41	X 38																X 66	X 62	X 62	X 60	X 55	
10	X 49	X 48	X 46	X 45																X 62	X 61	X 55	X 55	X 54	
11	X 51	X 48	X 45	X 45	X 44															X 58	X 59	X 61	X 61	X 51	
12	X 48	X 51	X 54	X 55	X 56															X 67	X 63	X 59	X 55	X 53	
13	X 51	X 49	X 49	X 48	X 37															X 63	X 62	X 58	X 48	X 45	
14	X 45	X 43	X 43	X 39	X 34															X 62	X 65	X 63	A	X 45	
15	X 40	X 39	X 39	X 39	X 37														0	X 66	X 61	X 60	X 45	X 39	
16	X 39	X 38	X 39	X 39	X 39															X 65	X 61	X 60	X 50	X 46	
17	X 52	X 52	X 54	X 53	X 54															X 66	X 63	X 54	X 45	X 44	
18	X 46	X 38	X 41	X 39	X 34															X 61	X 61	X 58	X 58	X 57	
19	X 58	X 56	X 58	X 57	X 56															X 60	X 59	X 61	X 48	X 45	
20	X 45	X 44	X 44	X 38	X 40															X 64	X 56	X 55	X 48	X 45	
21	X 45	X 44	X 45	X 42	X 46															X 65	X 64	X 61	X 54	X 49	
22	X 46	X 48	X 46	X 45	X 46															X 65	X 57	X 54	X 53	X 51	
23	X 49	X 48	X 45	X 45	X 39															X 62	X 63	X 55	X 54	X 54	
24	X 51	X 46	X 44	X 44	X 42															X 65	X 66	X 59	X 56	X 55	
25	X 54	X 51	X 46	X 49	X 50															X 57	X 54	X 54	X 51	X 50	
26	X 51	X 49	X 48	X 48	X 45															X 56	X 58	X 58	X 54	X 55	
27	X 54	X 51	X 51	X 49	X 48															X 55	X 52	X 51	X 51	X 51	
28	X 51	X 48	X 48	X 48	X 45															X 65	X 63	X 59	X 55	X 55	
29	X 55	X 51	X 54	X 51	X 47															X 65	X 59	X 54	X 52	X 45	
30	X 45	X 46	X 48	X 48	X 47															X 62	X 58	X 55	X 53	X 53	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	30	30	20															22	30	30	29	30	
MED	X 48	X 47	X 45	X 44	X 45															X 64	X 62	X 59	X 54	X 51	
U Q	X 51	X 49	X 48	X 48	X 48															X 65	X 65	X 62	X 60	X 55	
L Q	X 45	X 44	X 44	X 41	X 39															X 61	X 59	X 55	X 51	X 45	

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

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	40	40	38	36	31	37	47	60	55	57	61	61	60	62	54	56	54	52	49	58	57	58	54	48
2	44	40	38	36	36	36	44	45	55	54	54	59	59	56	56	57	55	55	52	56	54	51	47	<sup>J</sup> 45 <sup>R</sup>
3	41	41	38	37	36	35	48	58	64	62	52	56	56	59	58	56	54	52	53	59	<sup>J</sup> 60 <sup>R</sup>	62	57	48
4	43	40	37	34	36	34	39	48	53	54	52	59	56	54	59	54	54	54	56	59	58	53	48	41
5	38	37	35	37	37	37	47	56	<sup>H</sup> 52	56	57	56	55	56	52	58	58	58	56	59	59	56	54	48
6	41	38	39	37	36	34	42	46	53	60	58	55	57	54	52	54	53	52	56	60	60	60	53	38
7	37	36	38	37	35	38	45	48	48	58	60	62	56	53	55	52	54	56	57	59	59	56	56	38
8	38	37	33	33	32	34	50	55	57	60	56	60	62	64	61	59	57	56	53	59	58	56	53	51
9	30	37	34	31	31	34	48	58	53	59	60	64	58	60	58	58	58	53	55	59	55	55	53	48
10	42	41	39	38	34	38	49	49	57	56	57	52	53	62	62	61	61	60	55	55	54	48	48	47
11	44	41	38	38	37	37	44	56	70	67	64	56	61	59	58	58	60	52	48	51	52	54	54	44
12	41	44	47	48	49	50	55	52	54	73	68	62	61	56	58	59	58	53	57	60	56	52	48	46
13	44	42	42	<sup>Z</sup> 38	30	31	41	42	52	58	53	62	56	61	55	57	56	56	55	56	55	51	41	38
14	38	36	36	<sup>F</sup> 30	27	30	39	46	48	52	48	50	55	53	58	58	54	48	51	55	58	56	<sup>A</sup>	38
15	33	32	32	32	30	32	41	48	53	52	59	55	56	56	55	57	53	52	63	<sup>R</sup> 59	54	53	38	32
16	32	31	32	32	32	34	51	52	49	50	57	57	59	57	56	53	49	50	54	58	54	53	43	39 <sup>F</sup>
17	45	45	47	46	47	47	47	51	52	62	60	56	57	61	53	52	59	58	<sup>J</sup> 62 <sup>R</sup>	59	56	47	38	30 <sup>F</sup>
18	<sup>F</sup> 31	31	34	32	27	<sup>A</sup>	34	38	45	<sup>R</sup>	51	43	47	49	52	52	48	51	52	54	54	51	51	50
19	<sup>F</sup> 37	49	<sup>F</sup> 47	<sup>F</sup>	<sup>F</sup> 26	30	41	47	50	51	55	58	58	60	57	57	50	46	48	53	52	54	41	38
20	38	37	37	31	33	<sup>V</sup> 34	42	48	54	54	58	54	57	62	57	54	52	56	60	57	49	48	41	38
21	38	37	38	35	39	37	49	49	50	56	64	56	56	62	52	52	48	55	59	58	57	54	47	42
22	38	41	39	38	39	38	46	58	56	59	63	62	62	65	59	62	66	60	58	58	50	47	46	44
23	42	41	38	38	32	34	53	52	53	62	75	68	64	62	64	61	55	52	55	55	56	48	47	47
24	44	39	37	37	35	36	49	51	63	62	68	67	61	65	58	62	59	58	58	58	59	52	49	48
25	47	44	39	42	43	40	50	50	53	60	58	72	75	65	67	63	60	60	54	50	47	47	44	43
26	44	42	41	41	38	37	48	52	59	62	65	66	74	75	69	63	63	55	52	49	51	51	47	48
27	47	44	44	42	41	40	48	56	58	68	70	74	67	59	62	59	65	77	56	48	45	44	44	44
28	44	41	41	41	38	36	46	52	61	71	72	66	73	72	64	60	64	60	58	58	56	52	48	48
29	48	44	47	44	40	35	47	59	68	79	76	66	73	66	66	63	65	65	64	58	52	47	45	38
30	38	39	41	41	40	41	55	61	68	75	77	74	70	68	67	66	62	64	68	55	51	48	46	46
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	29	30	29	30	30	30	29	30	30	30	30	30	30	30	30	30	30	30	30	29	30
MED	41	40	38	37	36	36	47	52	54	59	60	60	58	60	58	58	56	55	56	58	55	52	47	44
U Q	44	42	41	41	39	38	49	56	58	62	65	66	62	64	62	61	60	58	58	59	58	55	53	48
L Q	38	37	37	34	32	34	42	48	52	55	56	56	56	56	55	54	54	52	53	55	52	48	44	38

SEP. 2021 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					L	L	A	L	L	452	L	L	436	L	428	H	L	L	L					
2							L	L	L	L	L	L	L	L	L	L	A	A						
3							L	L	L	L	L	A	L	L	L	L	A							
4					L		L	L	H	L	L	L	L	L	428	L	L	L						
5					L	L	L	L	L	L	A	L	L	L	H	L	L							
6						L	L	L	L	L	L	L	L	L	L	L	L							
7							388	L	L	L	L	L	L	L	L	H	H	L						
8							L	L	L	L	L	L	L	L	L	L	L							
9							L	L	L	L	L	L	L	L	L	L	L	L						
10							L	L	L	L	L	L	L	L	L	L	L							
11					L	L	L	L	L	L	L	A	A	L	L	L	A	L						
12							L	L	L	L	L	L	L	L	L	L	L	L						
13					L	L	L	L	L	L	A	L	L	L	L	L	L	L						
14							L	L	L	L	L	L	L	L	L	L	L	L						
15					L	L	L	L	L	L	L	L	L	L	L	L	L	L						
16						L	A	L	A	L	L	L	L	A	L	L	L	L						
17							L	L	L	L	L	L	L	L	L	L	L	L						
18					A	L	L	L	L	L	L	L	L	L	L	L	L	L						
19							L	L	L	L	L	L	L	L	L	L	L	L						
20							L	L	L	L	L	L	L	L	L	L	L	L						
21							L	L	L	L	L	L	L	L	L	L	L	L						
22					L	L	L	L	L	L	L	L	L	L	L	L	L	L						
23					L	L	L	L	L	L	L	L	L	L	L	L	L	L						
24							L	L	L	L	L	L	L	L	L	L	L	L						
25							L	L	L	L	L	L	L	L	L	L	L	L						
26							L	L	L	L	L	L	L	L	L	L	L	L						
27							L	L	L	L	L	L	L	L	L	L	L	L						
28							L	L	L	L	L	L	L	L	L	L	L	L						
29							L	L	L	L	L	L	L	L	L	L	L	L						
30							L	L	L	L	L	L	L	L	L	L	L	L						
31							L	L	L	L	L	L	L	L	L	L	L	L						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						2	1	8	13	15	16	13	16	15	20	13	8							
MED						L	L	L	L	L	L	L	L	L	L	L	L							
U Q						256	240	362	396	436	440	448	440	440	426	408	364							
L Q								382	412	436	450	452	452	452	432	416	374							
								L	L	L	L	L	L	L	L	L	L							
								346	392	420	432	424	432	416	414	382	302							

SEP. 2021 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					A	A	A	256	288	304	308	320	320	312	316	292	256	212	180	A				
2					A	B		236	256	280	312	324	340	344	324	308	288	256	212	A	A			
3					B	A		204	256		A	A	292	308	288	288	320	288	268	212	224	248		
4					204	232	216	252	280	296	328	332	324	324	324	284	296	220	A	A				
5					A		204	192	240	248	284	284	296	324	324	320	292	252	196	A	A			
6					184	208	232	220	284	252	324	324	328	320	328	292	260	192	A	A				
7					192	208	208	260	276	284	312	324	A	332	304	252	256	212	A	B				
8					A	A		212	264	280	296	320	A	320	356	236	A	A	A	A	A			
9					176	188	188	252	284	300	300	336	336	324	304	A	256	A	A	A				
10					A	A		188	256	308	308	308	312	304	U	U	U	A	A	A				
11					A			228	260	288	316	328	328	336	316	A	A	260	200	A				
12					B			200	272	A	320	328	324	316	316	292	264	244	208	A				
13					B			176	244	268	308	292	336	336	320	304	280	224	180	A				
14					A			192	236	284	292	312	312	280	280	260	B	264	196	A				
15					A			196	236	264	288	308	292	312	292	268	268	244	172	A				
16					A			192	244	268	296	296	296	A	A	288	A	A	A	A				
17					A			196	252	276	288	296	296	296	296	288	236	244	A	A				
18					A	A	A		252	300	308	296	312	308	304	260	220	B	A					
19					A	A	A		A	A	A	A	A		308	284	264	224	A	B				
20					A			172	248	276	304	324	324	304	304	A	260	A	196	A				
21					B	B		244	280	304	324	328	328	312	300	276	252	188	A					
22					184	188	244	280	300	304	328	316	288	288	252	180	A	A						
23					A			180	244	292	296	316	320	332	316	304	280	232	184	B				
24					B			184	236	276	296	300	292	312	312	292	272	232	192	200				
25					B			204	248	276	308	316	316	316	316	280	268	240	A	A				
26					A			176	232	264	296	312	320	320	320	A	A	244	176	A				
27					B			172	256	280	296	280	332	332	324	300	280	232	180	B				
28					A			196	228	280	304	304	336	A	288	304	268	232	192	B				
29					216	168	228	280	300	312	292	264	196	A	264	228	196	A	A					
30					B			160	248	280	300	304	320	300	280	252	A	244	A	A				
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT					4	7	26	28	27	28	29	28	26	29	26	23	27	20	4	1				
MED					188	208	192	248	280	300	308	320	318	312	300	272	244	196	192	248				
U Q					198	216	204	256	284	304	322	328	328	322	304	288	256	210	212					
L Q					180	188	180	238	276	296	300	302	304	290	284	264	232	186	182					

SEP. 2021 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

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

SEP. 2021 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Wakkanai

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

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

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

SEP. 2021 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

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

SEP. 2021 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

$\begin{matrix} H \\ D \end{matrix}$	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	315	321	321	316	323	347	326	353	295	307	336	334	338	352	326	337	337	324	321	307	301	317	317	315	
2	317	316	315	302	332	368	349	305	335	319	297	352	327	330	328	335	335	352	332	316	311	296	293	R	
3	316	287	286	287	287	352	324	352	371	375	344	336	320	331	331	330	348	321	321	316	295	J R	334	323	305
4	309	321	320	320	318	353	323	347	315	334	304	319	339	306	332	337	328	329	329	322	320	305	319	318	
5	302	314	312	311	302	315	342	365	332	351	351	318	340	346	310	329	334	329	318	318	311	311	320	333	
6	305	314	331	320	319	347	344	326	336	351	373	345	327	354	345	315	329	329	324	323	310	323	349	333	
7	305	305	297	303	326	325	358	325	362	339	333	343	353	324	310	327	327	337	321	311	303	303	342	340	
8	318	314	314	318	310	316	360	358	326	348	383	328	331	311	328	327	345	344	323	281	288	297	304	312	
9	365	322	322	310	293	331	342	368	331	343	331	349	326	336	344	343	332	337	332	318	303	303	308	328	
10	318	317	316	323	342	342	368	344	353	351	360	324	324	335	339	328	327	338	324	303	302	315	312	310	
11	333	320	305	296	297	283	306	305	366	346	366	320	322	328	335	326	347	347	339	299	304	324	336	309	
12	309	306	283	304	310	330	356	336	319	360	317	344	344	333	332	344	336	352	324	324	315	314	320	309	
13	306	301	300	345	356	332	375	311	307	345	321	347	319	344	325	335	335	335	315	315	309	339	310	321	
14	305	297	320	F	320	290	330	313	329	302	319	311	310	319	327	369	349	344	334	298	319	324	A	303	
15	295	294	309	309	288	318	344	320	338	337	328	365	320	332	322	354	336	335	328	316	R	299	330	353	322
16	305	318	317	317	317	350	350	370	341	328	351	351	329	360	331	322	326	344	336	335	316	321	354	307	
17	303	301	306	304	300	326	383	344	343	369	343	358	350	349	338	301	341	327	J R	349	344	330	318	299	F
18	F	302	304	231	321	A	351	258	305	R	349	R	301	315	342	326	334	315	315	315	312	310	296	295	
19	F	284	F	F	F	339	345	363	332	332	332	351	336	336	343	361	358	340	340	300	325	340	340	312	
20	315	314	324	312	341	340	378	357	357	364	369	353	327	349	338	347	345	334	334	334	333	331	328	310	
21	309	309	308	307	279	310	383	376	339	340	361	361	341	343	308	322	320	326	325	313	313	316	318	312	
22	311	306	317	333	332	336	365	364	352	312	360	330	328	333	314	330	344	356	319	318	318	280	301	316	
23	315	311	321	331	354	320	345	334	319	337	341	343	347	335	360	301	354	331	323	305	325	319	286	304	
24	300	329	318	311	310	310	367	366	368	367	354	354	350	349	342	334	337	336	340	310	337	309	302	312	
25	309	314	314	294	314	314	372	372	359	362	310	334	334	345	332	332	332	332	332	331	305	302	301	300	
26	300	299	299	298	308	307	373	367	355	339	341	340	339	339	339	338	349	349	329	320	320	307	302	327	
27	320	317	313	320	319	324	371	365	347	340	352	351	351	322	330	330	329	354	353	310	307	304	286	285	
28	300	300	324	316	316	316	355	366	339	368	360	327	345	337	346	328	343	343	320	314	313	313	311	290	
29	319	315	314	329	328	328	358	367	330	361	361	337	336	336	336	336	335	335	335	321	320	318	315	315	
30	315	307	294	309	309	328	365	364	355	363	372	362	343	346	332	340	339	334	351	316	316	312	310	307	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	29	28	29	29	30	30	30	29	30	29	30	30	30	30	30	30	30	30	30	30	29	29	
MED	309	312	314	311	317	328	356	355	338	345	346	343	335	336	332	331	336	336	328	316	312	314	312	312	
U Q	316	317	320	320	327	341	368	366	355	362	360	352	343	346	339	338	345	344	335	321	320	323	326	320	
L Q	305	301	304	304	305	316	344	326	329	336	331	329	326	330	327	327	332	329	321	310	304	305	302	304	

SEP. 2021 M(3000)F2 (0.01)

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## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					L	L	A	L	L	377	L	L	417	L	380	H	L	L	L					
2								L	L	L	L	L	L	L	L	L	A	A						
3								L	L	L	L	A	L	L		L	A							
4						L		L	H	L	L		L	L	383	L	L	L						
5						L	L	L	L	L	A	L		L	H		L	L						
6							L		L	L	L		L	L	L	L	L							
7							388	L	L	L		396	384	L	L	H	H		L					
8								L		354	390	390	L	L	348	L	357	L						
9								L		410	L	390	L	L	366	L	L	L	L					
10								L	L	L	L	L	L	L	L		L		L					
11						L	L	L	L		L	A	A		A	L	A	L						
12								L	L	L	L	L	L	L	L	U	R	L						
13						L	L	L	U	L	L	A	L	L	U	L	L	L	L					
14								U	L	L	L	L	L	A	L	L	A							
15						L	L	L	L		L		L	L		L	L	L						
16							L	A	L	A	L	L	L	A	L	L	L							
17							U	L	L		L		L	U	L	H	L	L						
18					A	L	L		378	379	410	415	L	396	380	362	L	L						
19								L	L	L		A	L	L	364	361	372	L						
20								L	L	L	L	L	L	L	376	U	L	L						
21								401	398	391	390	400	399	418	376	386	415	L						
22						L		L	L	L	L	L	L	386	405	L	L							
23						360	396	L	U	L	393	364	364	L	H	L	L	L						
24						U	L		397		400	365	372	393	383	L	U	L	U	L	L			
25								L	H	H	H	396	406	L	U	L	U	L	L					
26								L	L	U	L	385	396	424	389	385	368	L						
27								L	U	L	L	380	380	372	371	372	398	397	L					
28								L	L	L	L	381	382	381	398	L	L	L	L					
29								L	L	L	L	435	410	L	L	L	U	L						
30								L	L	L	L	403	386	385	385	409	420	L	U	L				
31								U	L		H	391	400	392	374	382	382	382	373	385				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						2	1	8	13	15	16	13	16	15	20	13	8							
MED						L		L	386	380	390	396	385	382	376	371	380							
U Q								L	399	405	390	400	412	402	396	382	U	L	L					
L Q								U	L		L	380	377	365	368	360	367							

SEP. 2021 M(3000)F1 (0.01)

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## IONOSPHERIC DATA STATION Wakkanai

SEP. 2021 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					276	252	A	258	352	328	286	304	300	264	296	306	256	268	268					
2							276	366	294	282	282	268	292	298	304	282	286	276						
3							298	238	238	238	268	288	310	304	304	290	278							
4					250		286	316	304	350	316	290	330	290	292	290	256							
5					298	256	230	286	274	272	328	284	288	338	292	254	274							
6							258	310	282	262	250	276	312	274	278	312	286							
7								294	310	280	294	276	280	318	318	286	300	268						
8								248	306	256	238	300	310	304	290	284	254							
9								242	232	278	278	270	288	278	270	270	276	250						
10								282	264	272	270	304	338	304	278	288	270	240						
11					332	260	314	242	246	238	284	290	304	282	282	252	256							
12								236	246	240	288	268	268	270	286	260	246							
13					300	244	330	294	274	304	266	324	266	290	262	260	260							
14								340	320	354	332	346	342	306	294	240	258							
15					320	234	270	292	298	300	272	354	292	308	256	268								
16							240	236	280	302	260	280	298	264	284	292	244							
17								250	254	246	274	266	266	278	288	360	266	270						
18					A	244	322	338	A	286	308	316	324	294	294	286	288							
19								234	276	262	298	266	286	272	264	242	242							
20								242	246	252	252	266	286	258	250	262	238	264						
21								222	238	268	244	256	280	268	312	272								
22					290	220	242	252	308	254	290	274	266	280	264	244								
23					282		242	284	276	264	272	268	270	248	240									
24								244	244	230	258	238	248	270	254	262	254							
25								230	232	238	246	278	256	256	278	260								
26								234	244	250	250	280	272	264	264	266	230	222						
27								222	226	270	264	240	256	298	270	278	276							
28								230	258	242	242	266	252	264	246	254	248	236						
29								222	268	240	240	254	254	274	272	250	256							
30								242	228	242	234	242	264	256	270	256								
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	8	10	30	30	29	30	30	30	30	30	30	26	14	1					
MED					276	294	250	242	266	268	266	274	286	274	283	271	257	262	268					
U Q					310	260	286	294	281	286	290	310	304	294	290	276	270							
L Q					267	240	234	244	244	250	266	268	266	270	260	248	250							

SEP. 2021 h'F2 (KM)

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## IONOSPHERIC DATA STATION Wakkanai

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135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	278	240	240	268	212	210	A	224	220	220	216	202	180	184	198	182	204	224	234	258	284	264	240	246
2	246	262	262	266	256	216	216	208	224	196	188	186	192	180	182	228	A	A	242	236	236	252	266	248
3	252	276	288	274	264	238	220	214	204	200	186	A	220	206	194	226	A	242	244	262	264	232	232	252
4	256	252	252	A	244	208	228	228	202	204	178	200	200	196	194	186	236	214	234	258	250	228	248	248
5	274	274	276	254	230	248	204	198	218	216	A	186	210	196	186	200	204	202	268	236	236	246	240	232
6	258	264	248	240	266	244	202	210	206	A	206	196	196	198	206	216	226	242	254	254	270	246	220	220
7	270	270	280	280	246	264	230	204	244	230	204	220	204	178	176	200	216	216	246	244	256	256	230	200
8	234	248	272	256	280	274	244	214	214	214	196	198	186	216	194	224	218	246	250	294	284	270	250	250
9	202	246	246	276	284	264	240	232	194	208	198	184	194	184	200	198	198	198	248	254	262	264	254	252
10	252	242	262	244	244	244	210	198	216	198	198	188	188	190	226	200	214	210	234	244	252	252	250	262
11	248	250	270	278	294	274	220	230	216	206	A	A	A	198	A	216	A	220	256	274	282	250	234	242
12	A	270	286	274	264	252	224	196	196	196	200	186	196	196	194	198	212	234	244	246	246	246	246	246
13	246	268	270	250	200	250	212	206	216	204	A	198	216	220	204	212	224	224	244	252	256	228	232	248
14	270	298	254	246	276	250	242	A	220	206	220	194	194	A	212	208	A	234	262	262	262	240	A	246
15	262	264	274	266	290	252	196	202	210	212	200	A	226	182	204	216	202	246	252	252	252	238	212	A
16	A	274	250	250	254	266	212	A	208	A	208	194	198	A	198	204	200	234	240	240	236	232	218	272
17	272	246	248	288	236	236	210	192	214	200	192	196	200	212	202	192	196	216	216	236	228	236	292	310
18	294	260	260	A	228	A	200	226	192	196	196	214	186	198	184	206	244	234	252	234	232	240	266	244
19	260	256	262	228	240	234	226	202	200	180	202	A	192	188	190	204	208	226	234	252	240	220	214	262
20	260	248	252	236	220	220	218	196	202	208	200	198	198	178	198	206	194	232	218	224	224	224	224	252
21	260	242	250	248	260	246	214	198	190	194	206	194	192	192	210	216	230	248	244	238	238	226	222	244
22	266	266	250	254	246	238	196	220	216	232	200	194	194	198	198	210	222	232	232	232	246	308	260	262
23	254	252	246	226	212	246	224	210	216	202	196	188	198	194	216	210	230	226	240	250	238	246	266	254
24	242	240	246	264	234	260	228	208	200	200	220	212	188	190	194	186	220	242	242	242	224	228	258	266
25	234	264	290	288	246	266	220	200	192	208	192	190	208	E A H	234	206	232	230	238	238	250	264	276	254
26	254	254	254	254	220	256	212	196	206	200	200	200	190	204	204	206	196	196	226	256	242	250	278	254
27	260	252	252	230	234	228	216	202	180	210	200	200	188	190	196	196	218	238	212	240	246	292	282	282
28	278	274	248	256	240	230	226	196	202	208	194	196	196	190	210	208	212	204	242	252	252	240	274	274
29	248	230	244	238	202	222	210	198	206	234	202	202	182	186	186	186	206	232	234	228	232	244	244	244
30	278	278	268	270	240	250	218	194	190	194	200	204	198	200	188	206	238	234	220	234	242	234	248	274
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	30	30	28	30	29	29	28	30	28	27	26	29	28	29	30	26	29	30	30	30	30	29	29
MED	259	258	254	255	244	246	218	203	206	205	200	196	196	194	198	206	215	232	242	245	246	245	248	252
U Q	270	270	270	272	264	258	226	214	216	211	204	200	200	199	205	212	226	236	248	254	256	252	266	262
L Q	248	248	248	245	230	232	210	198	200	199	196	190	189	187	192	198	204	216	234	236	236	232	231	245

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## IONOSPHERIC DATA STATION Wakkanai

SEP. 2021 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					A	A	A	102	98	98	98	98	96	94	92	96	96	102	96	A				
2					A	B	112	102	98	98	98	104	104	102	102	102	102	102	A	A				
3					B	A	102	102	A	A	94	94	94	94	98	102	102	102	116	100				
4					98	118	106	108	102	96	96	100	100	94	94	94	104	104	A	A				
5					A	94	94	100	100	100	100	100	104	100	104	104	104	100	A	A				
6					90	96	108	108	102	102	102	96	96	96	96	104	102	102	A	A				
7					90	106	102	100	100	100	100	100	A	100	108	98	104	114	A	B				
8					A	A	98	106	92	98	98	A	98	98	88	A	A	A	A	A				
9					112	98	98	98	98	98	98	102	102	102	102	A	102	A	A	A				
10					A	A	106	92	106	100	100	100	100	100	100	100	100	A	92					
11					A	110	110	96	106	106	106	106	100	100	A	A	104	104	A					
12					B	102	100	A	100	100	100	100	100	100	86	88	88	88	A					
13					B	106	106	106	102	102	102	102	102	102	102	100	104	104	A					
14					A	112	90	98	98	98	98	98	98	98	98	B	98	90	A					
15					A	108	108	108	96	102	94	94	94	94	94	104	104	104	A					
16					A	102	102	98	96	96	96	A	A	96	A	A	A	A	A					
17					A	116	94	102	98	106	100	104	100	100	100	100	106	A	A					
18					A	A	A	102	104	100	106	106	102	110	110	110	B	A						
19					A	A	A	A	A	A	A	A	A	96	96	104	108	A	B					
20					A	108	108	108	100	100	100	100	100	100	A	108	A	128	A					
21					B	B	100	104	104	104	98	98	98	102	102	102	106	104	A					
22					102	E B	110	108	98	100	100	98	98	98	98	98	98	A	A					
23					A	116	98	106	102	98	104	94	96	100	104	114	136	E B	B					
24					B	106	112	108	106	106	100	104	104	108	108	108	124	116	A					
25					B	120	110	110	110	102	102	102	102	102	102	102	A	A						
26					A	108	102	102	98	98	98	98	98	98	A	A	98	98	A					
27					B	100	108	104	104	104	104	104	104	104	104	104	112	112	B					
28					A	124	106	106	108	100	112	A	108	108	102	116	116	B	B					
29					98	128	120	98	98	98	98	98	98	92	A	102	110	110	A					
30					B	106	106	106	104	102	96	96	96	96	A	108	A	A	A					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT					4	7	26	28	27	28	29	28	26	29	26	23	27	20	4	1				
MED					94	98	106	104	102	100	100	100	100	100	100	102	104	104	106	100				
U Q					105	106	112	108	106	104	102	102	102	102	102	104	108	113	116					
L Q					90	96	102	100	98	98	98	98	98	96	96	100	102	102	94					

SEP. 2021 h'E (KM)

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## IONOSPHERIC DATA STATION Wakkanai

SEP. 2021 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	98	98	104	98	100	96	106	108	118	116	102	122	100	118	104	102	94	172	126	116	120	108	90	90	
2	90	124	98	88	96	116	126	114	90	114	176	140	178	118	112	108	112	102	104	104	108	94	102	102	
3	88	100	96	96	96	106	106	106	102	104	118	100	104	104	122	122	110	110	116	98	110	104	104	104	
4	100	B	120	116	114	G	118	110	102	100	100	130	200	192	102	128	118	118	106	106	96	96	96	96	
5	96	98	102	100	108	108	104	104	104	104	98	98	108	G	104	106	108	112	96	94	92	96	B	98	
6	102	100	100	102	100	100	96	98	114	106	106	106	106	106	106	164	128	110	110	108	108	108	94	94	
7	94	96	96	88	92	116	116	116	106	106	106	102	94	102	102	100	G	180	106	B	100	104	104	102	
8	102	88	92	102	96	106	122	110	108	108	G	98	158	104	102	102	102	102	112	106	106	106	B	98	
9	B	B	98	98	126	118	110	110	112	106	108	G	102	102	102	90	104	94	92	104	98	98	98	98	
10	88	98	98	98	94	94	94	96	112	110	108	104	104	100	106	100	98	96	96	96	92	B	92	102	
11	B	98	B	B	98	102	120	132	138	114	110	110	102	106	102	102	124	118	116	92	106	92	104	100	
12	100	100	96	90	B	B	114	116	100	98	98	190	100	100	92	88	88	94	94	B	90	B	B	B	
13	100	94	B	B	B	B	118	116	114	106	98	102	104	110	122	150	146	140	110	122	122	94	B	B	
14	96	108	B	100	106	96	114	114	106	106	106	106	104	96	96	96	106	106	106	90	90	90	102	96	
15	90	92	92	100	96	96	96	114	114	108	108	98	102	98	98	98	108	104	104	100	100	106	104	98	
16	92	92	B	96	B	106	106	106	106	106	106	98	100	96	92	92	94	142	94	114	110	110	102	114	
17	100	B	100	90	90	94	154	120	106	118	110	110	110	98	98	104	118	98	98	92	96	90	88	82	
18	82	90	90	102	98	94	94	94	114	106	114	100	156	120	G	120	120	102	110	100	B	B	100	B	
19	B	B	94	90	94	94	90	96	96	96	96	92	90	92	102	162	106	98	B	104	94	98	106	96	
20	94	92	96	B	B	96	144	144	152	112	86	106	106	106	106	106	106	108	100	90	B	98	86	92	
21	98	B	B	B	98	B	106	144	156	138	126	120	126	122	122	118	112	112	94	110	90	90	106	104	
22	84	B	92	94	94	98	98	160	120	108	116	104	108	108	108	98	98	98	102	B	B	92	92	100	
23	B	B	B	100	B	100	126	126	90	102	96	100	108	102	112	116	158	168	B	100	108	B	92	98	
24	88	104	B	B	B	B	134	138	132	104	114	104	98	122	148	132	146	122	110	B	B	110	110	98	
25	100	B	94	94	94	B	130	122	116	110	104	104	104	104	96	126	98	98	98	98	B	B	90	B	
26	B	B	102	102	102	102	152	146	126	126	110	98	98	98	98	98	98	98	98	96	100	92	92	92	
27	88	B	B	102	86	B	128	134	134	92	98	G	184	142	114	106	162	134	B	B	98	98	98	100	
28	100	100	B	100	100	100	156	140	154	126	112	172	86	98	148	160	144	142	B	116	110	94	92	96	
29	98	B	94	B	94	104	100	100	126	108	106	94	92	96	96	114	92	92	92	96	92	94	B	B	
30	96	96	96	96	B	B	112	142	116	112	92	104	104	102	102	92	96	96	96	86	86	96	96	B	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	25	19	21	24	23	22	30	30	30	30	29	28	30	29	29	30	29	30	26	25	25	25	25	24	
MED	96	98	96	98	96	100	114	115	114	107	106	104	104	104	102	106	108	107	103	100	100	96	98	98	
U Q	100	100	100	101	100	106	126	134	126	112	111	110	108	114	112	122	122	122	110	107	108	105	104	101	
L Q	89	92	94	94	94	96	104	106	106	104	98	99	100	98	98	98	98	98	96	95	92	93	92	96	

SEP. 2021 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F3	F4	F1	F1	L3	L3	C2	C1	C2	C3	C2	CL21	LC21	CL11	CL21	LC21	C2	H2	C1	LL22	F3	F2	F1	F1
2	F2	FF22	F1	F1	L1	C1	C2	C2	LC11	C2	C1	C1	H1	C1	C1	C3	C4	L2	L3	F5	F5	F3	F3	
3	F2	F1	F2	F1	L3	L6	C5	C5	L3	L3	C2	C3	LC11	C2	C2	C1	C4	C4	C1	C4	F2	F2	F1	F1
4	F1		F1	F8	LC11		C3	C2	C2	C3	C2	C2	LC21	LC21	C2	CL21	CL21	C3	L2	L2	F4	F2	F4	F3
5	F2	F2	F1	F1	L2	C3	C2	C2	C3	C3	C3	C2	C1		LC11	C2	C2	C2	L1	L1	F1	F2		F1
6	F2	F2	F3	F1	C2	C2	LC21	LC22	C2	C3	C2	C2	C2	C1	C2	HL11	C3	C3	L5	L4	F3	F3	F3	F2
7	F4	FQ11	F2	F2	LC11	C2	C3	C2	CQ21	CQ21	C2	C2	L2	C1	C1	C2		H1	L3		F2	F4	F5	F2
8	F3	F4	F2	F2	L3	LL11	C2	C3	C3	C3		L2	CL22	C2	C2	C4	C3	L5	LQ31	L5	F5	F3		F1
9			F1	F1	CL11	CL21	C3	C4	C2	C3	C1		C2	C1	LC21	C3	C2	L2	L21	L1	F2	F4	F2	F3
10	F2	F1	F2	F5	LQ41	LQ41	LC21	LC22	LH11	CL11	C3	C2	C2	C2	C2	LC33	LC22	L2	C2	F2	F1		F1	F1
11		F1			F1	L1	C2	C2	H2	C2	C2	C2	C2	C2	C1	L2	C2	C3	LL11	L1	F2	FF21	F4	F5
12	FQ51	F3	F2	F2			C4	C3	L3	L3	L2	C2	C2	LC21	LC22	LC21	LC31	LCL22	L1		F1			
13	F1	F1					C2	CL21	C2	C2	C3	C2	C2	C2	C2	H1	H2	H2	L4	F5	F1	F1		
14	F1	F2		F2	F1	L3	C2	C4	C3	C2	C2	C2	C2	C3	C2	C3	C4	C3	L5	F4	F3	F2	FQ31	F1
15	F1	F3	F1	F1	F2	L2	LC11	C2	C2	C2	C1	C2	C2	C2	C2	C2	C3	C5	L5	F4	F4	F1	F1	F4
16	F5	F1		F1	L3	C3	C5	C3	C4	C2	C2	C2	C2	L4	LQ21	L3	L3	H1	L1	L1	F3	F6	F5	FF21
17	F3		F1	F3	F4	LC31	HC11	C2	C3	C2	C2	C2	C2	C3	C2	C2	C2	L2	L3	F4	F3	F2	F2	F1
18	F3	F2	F2	F3	F2	L5	L2	L2	L1	L2	L1	L2	H1	CL21		C1	C2	C3	L1	L1			F2	
19			F2	F1	F2	L2	L4	L3	L2	L2	L3	L3	L2	L2	C2	H1	C2	L1		F1	F1	F1	F1	F1
20	F1	FQ21	F1		L1	H2	H1	H1	H1	C1	C1	C1	C1	F3	CL21	C2	L2	LH11	L1	F1		F2	F2	F2
21	F1				F1	C3	H2	H2	H2	C2	C1	C3	C1	C1	C2	C2	C2	C2	L4	F2	F2	F1	F1	F2
22	F1		F1	F1	F1	C1	LC11	H2	C2	C2	C2	C3	C2	C2	C2	C2	C3	L4	LQ21			F4	F2	F1
23				F1	L1	CL21	CL22	LC31	C2	LC21	CL21	C2	C2	CL11	C1	H2	H1		F2	F1		F2	F2	F2
24	F1	F1				H2	H2	H2	H2	C2	C2	C3	C1	HL11	HL21	HL21	L1	C1				F1	F2	F5
25	F1		F3	F1	F1	H3	C2	C2	C3	C2	C2	C2	C3	C3	C2	C2	L2	L1	L1	F1			F1	
26			F1	F1	F1	L1	H2	HL21	CL21	CL21	CL21	CL21	C1	C2	CL21	CL21	CL21	C3	LQ31	FQ41	FQ21	FQ21	FQ11	F2
27	F2			F1	F1	C2	H1	HL21	LC11	CL21		CL11	HL21	CL22	CL11	HL11	H1			F1	F2	F2	F2	F1
28	F1	F1		F1	F1	L1	H2	H2	H2	CL21	CL21	HL11	L4	C2	HL22	HL11	H2		F1	F2	F1	F2	F2	F8
29	F1		F1		F1	C2	LC11	LC21	CL21	C3	C3	C3	C2	C2	C2	C2	LC21	LC11	L3	FF11	F1	F1		
30	F2	F2	F2	F1		CL21	C1	C2	C2	LC11	C2	C3	C3	C3	C3	L3	CL11	LQ11	LQ11	FQ11	F1	F1	F1	
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

SEP. 2021 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

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

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

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

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

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## IONOSPHERIC DATA STATION Kokubunji

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

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

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

SEP. 2021 foF2 (0.1MHz)

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## IONOSPHERIC DATA STATION Kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1								L	440	448	460	468	464	456	448	436	400								
2								L	432	L	452	464	460	460	456	436	404	L							
3								L	424	L	476	472	448	460	456		A	A	A	A					
4								L		L	448	460	460	464	464	452	436	L	L						
5							L	L	L		436	456		A	U	L	468	468	448	436	392				
6							L	L	L		440	460	460	476		456	L	L		A					
7					A				A		444	A	460	464	476	472	432	L	A						
8							L			A	A	A	A	468	472	460	L	L							
9										A		456	464	464	452	468	452	L	L						
10								L	L	L		464		A	A	A	440	A							
11					A		L	L	L	A	A	A	A	A	A	A	L	L							
12							L	L		444	444	460		A	460	456	L	L							
13									464	444	444	448	468	456	448	452	L								
14									A	A	A		472	460	456	A	388	L	A	A			A		
15						A	A	L		A		464	452	452	A	412	L	A							
16							L	L	A		448		A	C	A	U	L	A	A						
17									A	A	U	L		A	A	U	L	A	A						
18					A				448	444	444				460	400	396	L	L						
19							L	L			392	432	416	452	452	464	L	L	L	L					
20								L	A		452	444	456	448	448		L	L							
21									C	U	L		492	452	460	448	436	A	L	A					
22								A	L		456	456	480	464	452		L	A							
23							L	L	L		488		A	480	468	L	L	A	A						
24								L	L		448	L	L	L		452	L								
25								L	456	480	472		L	472	460	L	L								
26							L	L	L	L		480		472		L	L	A							
27								L	L	L		476	480		L	L	L								
28								A	L	A		472	U	L	484	460	468	L							
29									L	L		484	U	L	L	A	A	A	A						
30									L	A		464	480		A	A	A	A	A	A					
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT									6	10	19	24	22	21	19	13	4								
MED									428	444	456	464	464	460	456	436	398								
U Q									440	448	460	472	480	468	460	438	402								
L Q									420	436	448	454	460	454	448	416	394								

SEP. 2021 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1							B 208	A A	A A	A A	A A	A 352	U 336	A 332		A 272	U 212	A A	B						
2							B 232	U 256	A A	A A	A 360	U 360	A 344	U 336	U 316	A 272	U 228	A A	B						
3							B B	A A	A A	A A	A A	U 360	A A	U 344	U 320	A A	A A	B							
4							B A	A A	A 356	A A	A A	A A	A A	U 344	U 328	A A	A A	B							
5							B 224	U A	A A	A A	A A	A A	A R	A A	U A	A R	A A	B							
6							B 236	U R	A A	A A	A A	A A	A A	A A	U A	U R	A A	B							
7							B A	A A	A A	A A	A A	U 352	U 364	U R	A A	A A	A A	B							
8							B 224	U A	A A	A A	A A	A A	A A	U 340	U 324	U 284	U 228	B							
9							B 208	U A	A A	A 376	U R	A A	A A	A A	U 320	U 276	U 228	U 192							
10							A 256	U A	A A	A A	A A	A A	A A	A A	A A	A A	A A	B							
11							B 216	U A	A A	A A	A A	A A	A A	A A	A A	A A	A A	B							
12							B B	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A								
13							B 212	U 284	A A	A A	A A	A A	A A	U 320	U 296	U 276	A A	B							
14							B A	A A	A A	A A	A A	A A	A A	A A	A A	U 280	A A	A A					A		
15							A A	A A	A A	A A	U 404	U 376	U R	A A	A A	A A	A A	B							
16							B B	A A	A A	A A	A A	A C	A A	A A	A A	U 248	A A	A A	B						
17							U 252	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	B							
18							B 272	U 308	U 312	A A	A A	A A	U 324	U R	U 288	U 256	A A	B							
19							B 164	U 244	U 268	U 328	U 336	U 348	U 348	U 324	U 308	U 288	U 260	U 196	B						
20							B 212	U 240	U 292	A A	A A	A A	A A	U 348	U 288	U 252	A A	B							
21							B 224	U 264	U 284	C 348	U 348	U 344	U 340	U 320	U 296	A A	A A	B							
22							B 248	U A	A A	A A	A A	A A	A A	A A	U 308	U 268	U 192	B							
23							B 204	U 240	U 312	U 300	U 308	U 352	U 336	A A	U 344	U 252	U 180	B							
24							B 204	U 248	A 340	U R	U 348	U 352	U 328	U 316	U 288	U 260	U 204	B							
25							B 212	U 272	A A	A A	A A	U 384	U R	A A	U 308	A A	A A	B							
26							B A	U 240	U 292	U 328	U 328	A A	A A	A A	A A	A A	A A	B							
27							B 240	U 292	U 308	U 344	U 356	U 344	U 336	U 324	U 288	U 264	U 208	B							
28							B 200	U 252	U 296	U 336	A A	U 368	U R	U 328	U 296	A A	A A	B							
29							204	A A	A A	A A	A A	U 360	U 328	A A	A A	A A	A A	B							
30							B B	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	B							
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT							16	15	8	8	6	7	12	9	13	17	14	10	1						
MED							U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
U Q							212	252	292	328	340	352	352	336	332	304	266	210	192						
L Q							224	264	302	338	348	360	364	342	344	320	276	228							
							U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
							204	240	288	310	328	348	346	326	320	288	256	196							

SEP. 2021 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

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

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

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

SEP. 2021 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

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

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

H	00	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	B 18	A 86	A 23	E 16		25	32	33	34	34	39	38	37	37	33	30	26	E 17	E 15	E 15	E 16	E 16	E 16						
2	E 16	E 16	E 16	E 16	E 16	E 16		G	31	34	33	36	40	39	40	36		G	30	27	E 16	E 15	E 15	18	E 16	E 15					
3	20	18	E 16	20	20	19		22	27	32	43	35	36	39	40	37	40	47	A 100	A 39	E 15	21	15	16	24						
4	20	E 16	E 16	E 16	E 16	E 16		18	32	33	28	36	36	36	34		G	36	28	28	25	E 16	22	40	24	E 16					
5	E 15	E 15	E 15	E 15	E 15	E 15		G	26	32	38	35	41	37		G		G		G	E 15	E 15	E 15	E 15	E 15	E 16					
6	E 15	E 15	E 15	20	E 16	E 15		G	29	32	37	35	35	35	35		G		G	32	25	21	21	E 15	E 15	34	19				
7	17	E 16	E 16	E 16	E 16	18		21	27	39	36	43	38		G	G							E 16	E 16	E 16	E 16					
8	20	E 16	E 15	E 15	E 15	E 16		G	31	35	44	A 63	44	40	34		G	G	G				E 18	E 19	E 19	E 16	E 16	E 16			
9	E 16	17	17	18	E 16	E 16		23	30	37	41		G	36	36	36	37		G	G	G		E 15	E 15	21	E 16	E 16				
10	E 16	E 16	E 16	E 16	E 16	E 16		32	28	33	36	38	39	42	A 74	A 42	36		G	G	G		E 16	E 16	18	E 16	E 16				
11	E 16	E 16	E 16	E 16	E 16	19		G	20	28	30	36	48	A 87	A 80	51	48	A 123		A 28	A 24	29	41	42	37	22	27				
12	24	20	23	20	E 16	E 16		20	28	31	36	34	37	47	38	34	31				E 28	E 24	E 17	E 16	E 16	E 17	E 16				
13	E 16	E 17	E 16	E 15	E 15	E 15		G	G	28	34	36	39	39	39	35		G	G				E 30	E 24	E 24	E 16	E 16	24	22		
14	22	E 16	E 16	18	A 45	A 19		E 16	17	58	43	A 81	37	36	37	40	34						A 32	A 33	A 41	A 49	A 32	A 108	A 82	16	
15	20	22	16	E 16	20	E 15		A 66	27	34	35	41		G	G					A 29	A 62	25	E 16	E 16	E 16	20	E 16	E 16			
16	E 15	E 16	E 16	E 15	E 15	E 15		19	29	33	40	39	52		C								E 16	E 19	19	19	20				
17	E 16	E 16	E 19	E 16	24	20		23	30	37	39	39	40	A 106	A 48	38	33	30	20	E 15	E 15	E 15	22	20	20	E 15	E 15				
18	19	19	E 15	18	A 43	A 32		G	G		34	34	35	36		G						E 21	E 17	E 16	E 16	E 16	E 16	E 16	E 16		
19	E 15	E 16	E 16	E 16	E 16	E 15		G		31		G	G	G	G							E 16	E 16	E 16	E 15	E 15	E 15	E 15	E 15		
20	E 16	E 15		C	E 16	E 16		G		29	31	38	38	39	39	36		G					E 31	E 30	E 19	E 20	E 16	E 16	E 16		
21	E 16	E 15	E 15	E 15	E 15	E 15		G		28	32	C	40	38	39		G	G					E 34	E 30	E 26	E 26	E 20	E 16	E 16	E 16	
22	E 16	18	E 16	E 16	E 15	E 15		22	30	42	36	36	36	37	37	36	34	32	39	21	26	34	18	16	16	16	E 16	E 16	E 16		
23	E 16	E 16	E 16	E 16	E 16	E 16		G		29		G	34	34	39	38	35		G			E 18	E 15	E 15	E 15	E 15	E 15	E 15	E 15		
24	E 16	E 16	E 16	E 16	E 16	E 15		G		27	33		36		G							E 23	E 19	E 18	E 16	E 16	E 16	E 16	E 16		
25	E 15	E 15	E 16	E 15	E 15	18		G	G		32	36	35	37		G							E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	
26	E 16	E 16	E 16	E 16	E 16	E 15		23	28	30	34	36	36	38	38	35	32	33	21	21	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	
27	E 16	15	E 16	E 15	E 15	E 15		26	29	32	34		G	G	G	G	G	G			E 17	E 17	E 17	E 17	E 15	E 15	E 15	E 15	E 15		
28	E 16	E 16	E 16	E 16	E 16	E 16		22	30	34		44	34		G	G	G	G				E 26	E 25	E 24	E 16	22	E 16	19	A 42		
29	E 15	E 16	E 16	E 16	E 16	E 16		G		29	32	34	35	35		G							E 22	E 16	20	20	20	E 20	E 20	E 20	
30	22	22	E 16	E 16	E 16	E 16		18	26	36	36	41	38	39	49	39	41	34	60	43	43	40	20	20	20	E 16	E 16	E 16	E 16	E 16	
31																															
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23							
CNT	30	30	29	29	30	30	30	30	30	29	30	30	29	30	30	30	30	30	30	30	30	29	30	30	30						
MED	E 16	E 16	E 16	E 16	E 16	E 16		G	28	33	36	36	37	38	36	35	32	30	25	21	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	
U Q	19	17	16	17	16	16		22	30	34	38	40	39	39	38	37	34	32	29	26	21	22	18	20	16	16	16	16	16	16	
L Q	E 16	E 16	E 16	E 16	E 15	E 15		G	28	32	34	35	35		G	G	G	G				E 26	E 21	E 17	E 16	E 16	E 16	E 16	E 16	E 16	E 16

SEP. 2021 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

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

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

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

SEP. 2021 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Kokubunji

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

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

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		297	F	331	A	316	325	348	336	357	350	337	333	354	320	323	324	343	325	V	323	335	328	300	294	312
2		332	F	315	F	319	319	318	307	338	365	360	361	351	357	333	322	309	330	341	332	331	343	383	318	317
3		F	F	296	304	F	334	354	353	387	383	357	331	336	333	329	355	319	A	318	329	335	302	F	301	
4		F	318	295	317	312	305	326	342	361	351	374	336	311	328	316	335	324	336	336	329	326	306	320	298	
5		301	308	304	317	335	302	357	384	370	379	309	355	314	320	336	324	342	328	313	315	326	332	332	321	
6		307	313	307	326	326	313	363	379	379	380	340	343	325	346	320	331	335	322	329	324	335	339	F	351	331
7		323	304	307	305	282	302	F	358	391	379	361	338	322	374	317	304	319	329	337	332	344	358	F	319	310
8		315	292	305	309	301	F	365	358	358	353	A	314	331	294	323	319	328	337	320	315	283	289	349	298	
9		366	309	317	332	306	284	371	369	376	347	364	332	343	335	324	324	324	329	310	314	339	316	273	F	
10		332	322	319	314	344	F	364	360	362	349	365	339	346	A	346	319	A	333	320	336	338	305	272	296	300
11		346	335	F	313	304	288	311	343	360	349	345	A	A	340	339	A	302	321	326	330	307	305	F	F	
12		292	F	F	304	315	320	354	353	362	364	358	352	336	328	338	336	342	335	333	319	341	332	304	282	
13		296	296	302	324	305	317	373	360	321	356	356	350	346	343	343	305	337	334	345	329	319	336	320	292	
14		300	298	326	324	A	299	357	375	361	334	A	331	335	341	344	342	340	325	345	318	337	A	A	275	
15		F	F	F	313	F	316	A	375	357	343	343	342	353	332	336	355	331	A	329	373	391	305	F	302	
16		318	318	303	324	328	330	375	377	384	391	346	354	C	316	342	330	333	336	361	377	333	310	F	F	
17		F	319	320	343	F	335	370	373	374	381	366	361	A	359	299	319	308	335	373	397	343	317	296	288	
18		301	305	368	335	A	A	338	307	367	375	368	338	326	297	343	325	338	316	308	363	367	F	F	F	
19		F	F	F	F	F	F	374	384	381	357	326	337	344	357	355	352	333	345	342	357	378	327	F	315	
20		324	330	C	C	344	324	378	368	370	365	363	363	346	361	349	341	348	343	323	355	C	328	311	318	
21		321	318	329	327	332	323	371	370	377	C	346	341	339	346	339	355	329	321	314	338	407	331	292	304	
22		303	F	342	311	295	318	378	364	380	378	341	344	324	335	327	324	332	370	349	310	290	286	294	306	
23		315	318	307	326	326	310	342	339	353	361	320	336	341	355	345	336	349	337	331	319	303	327	311	299	
24		305	311	319	310	307	315	357	391	352	372	356	356	342	347	341	349	325	343	349	353	333	311	294	295	
25		302	311	302	283	F	314	367	381	402	361	332	340	336	339	336	334	345	340	360	321	286	289	294	293	
26		307	314	301	315	303	311	368	383	382	373	369	353	326	333	338	346	342	374	348	332	313	294	264	309	
27		306	316	311	332	358	322	388	364	361	368	338	339	344	348	329	337	340	340	360	345	284	289	295	290	
28		305	307	316	319	318	309	374	359	369	376	343	342	337	342	350	343	331	357	349	323	307	314	306	A	
29		310	316	311	316	326	341	371	367	366	364	340	341	318	337	342	340	349	346	360	361	317	314	307	304	
30		307	308	291	289	298	326	385	357	389	380	373	346	346	347	337	332	345	341	341	372	334	311	285	282	
31																										
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	
CNT		25	24	25	27	23	26	29	30	30	29	28	29	27	29	30	29	30	28	30	30	29	27	23	24	
MED		307	314	311	317	316	316	365	366	368	364	346	341	337	337	338	334	334	336	334	334	333	311	304	300	
U Q		322	318	320	326	328	324	374	377	379	377	364	352	346	346	343	342	342	342	349	355	342	327	319	310	
L Q		302	308	302	310	304	307	354	357	360	352	339	336	326	325	324	324	329	326	323	321	307	300	294	292	

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1								L	356	403	410	423	388	412	383	394	374								
2								L	372	L	423	412	421	407	400	378	U L 378	L							
3								L	382	U L 394	A U L 431	412	415	388		A	A	A	A						
4								L	L	L	393	394	411	421	387	385	371	L	L						
5							L	L	L		422	431	A U L 390	375	389	391	388								
6							L	L	L		423	414	426	378	L	394	L	L		A					
7					A				A		415	A	421	400	400	394	372	L	A						
8							L				400	A	A	395	392	374	L	L							
9											A	421	415	408	376	368	363	L	L						
10									L	L	L	391	A	A	A	369	A								
11						A		L	L	L	A	A	A	A	A	A	L	L							
12								L	L				A			L	L								
13									389	397	430	426	402	415	387	381	L								
14									A	A	A	374	401	398	A	454	L	A	A			A			
15							A	A	L		A	360	413	401	A	400	L	A							
16								L	L	A		A	C	A	U L 408	374	A	A							
17									A	A U L 438	408	A	A U L 392	402	364	L	L								
18					A				379	423	414	414	411	374	A	L	L								
19								L	L		410	434	416	412	L	L	L	L							
20									L	A	398	419	421	426	381	A	L	A							
21										C U L 372	447	440	421	392		L	A								
22									A	L	391	420	399	389	376	L	A								
23								L	L	L	387	A	394	395	L	L	A	A							
24									L	L	441	L	L	L	388	L									
25									L	399	393	404	L	384	383	L	L								
26								L	L	L	L	385	L	371	L	L	A								
27									L	L	L	396	396		389	L	L								
28									A	L	A	U L 427	400	421	371	L									
29										L	L	U L 385	369	L	A	A	A	A							
30										L	A	414	400	A	A	A	A	A	A						
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT									6	10	19	24	22	21	19	13	4								
MED									380	406	414	414	400	400	387	381	376								
U Q									389	422	430	424	413	415	392	397	383								
L Q									372	397	394	400	395	386	376	372	369								

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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								258	248	226	284	320	256	310	310	310	260							
2								250	242	246	254	254	264	320	326	290	254	254						
3								236	222	218	270	314	276	296	296	258	E A 324	A 248						
4								264	240	256	240	300	314	294	326	282	282	270						
5							264	216	240	244	310	266	324	306	268	290	268	282						
6							256	232	232	230	260	282	306	262	290	284	284		248					
7					E A 260			232	252	276	274	242	324	358	312	282	258							
8						250		236	236		A E A 276	294	342	292	284	272								
9									246	246	270	284	302	302	286	296	270							
10								262	262	240	280	286		A 282	288	270								
11					E A 312		256	238	240	256		A	A	266	266		A 318	280						
12								238	238	246	238	268	E A 292	292	276	276	260							
13									288	238	240	250	268	276	276	300	270							
14									E A 268	282	A	282	282	282	272	258	272	252	E A 244				A	
15						A	228	248	262	264	256	270	298	262	248	286		A						
16							252	238	230	272	E A 288		C E A 312	282	290	268	242							
17								242	240	268	262		A 272	336	336	328								
18					A			244	248	242	298	320	352	244	300	266								
19							242	242		290	290	274	242	242	258	270	254							
20								244	240	250	248	276	258	258	270	270								
21									C 282	278	278	248	268	252	276	244								
22								224	248	260	260	294	272	284	282	236								
23							258	244	230	272	254	260	246	248	280	234	234							
24								234	234	242	260	258	246	266	266									
25								224	242	304	266	264	256	274	256	258								
26							228	244	244	246	280	280	264	264	264	258								
27								246	242	256	272	272	260	260	274	264								
28								228	238	238	274	262	262	250	250									
29									238	240	252	302	284	260	256	256	236							
30									228	228	268	250	250	250	240	240	E A 292	242						
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	3	13	26	28	28	29	27	29	30	29	28	13	4					
MED					E A 286	256	242	240	241	256	270	276	274	273	280	270	254	246						
U Q						264	257	244	247	272	282	294	304	292	290	282	275	248						
L Q						250	230	234	235	241	260	264	259	260	258	259	243	243						

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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 258	B 270	E 238	B 238	A 298	E 234	A 228										E 232	A 220					E 238	B 256	B 232
2	216	E 234	B 234	B 222	E 236	B 250	220	208	200	188	188	196	196	204	194	194	194	196	206	198	194	220	E 220	B 268	
3	E 308	A 300	E 300	B 296	E 264	A 242	204	194	190		A 190	182	190	190	200		A	A	A	A	202	220	E 290	B 264	
4	E 250	A 244	B 242	B 226	E 236	B 280	208	208	206	188	188	184	184	194	204	202	208	212	210	E 206	214	E 290	A 246	B 246	
5	E 264	B 256	B 248	B 230	222	E 256	206	196	192	188	188		A 194	200	200	198	196	198	218	E 216	210	208	E 206	B 206	
6	E 232	B 234	B 252	212	224	E 248	204	196	196	196	188	188	188	196	196	196	214	204		A 220	208	E 206	B 220	220	
7	E 242	A 240	B 262	B 242	E 268		204	204		A 194		A 194	194	194	194	192	216		A 216	208	198	E 294	B 228	B 228	
8	E 266	A 264	B 244	B 244	E 266	B 282	206	206	200		A 200	A 200	192	194	200	206	214	228		E 274	274	E 210	B 220		
9	208	E 292	B 230	B 258	E 242	A 294	214	204	220		A 188	188	186	196	202	186	194	200	216	E 224	204	E 228	B 270	B 242	
10	206	E 230	B 230	B 232	E 210	E 230	208	208	196	200	202	208		A 208		A 214	A 206	214		E 212	268	E 254	A 208		
11	206	E 228	B 266	B 266	E 296		212	200	200	200		A 204	A 204	A 212	A 226		204	204	212	E 276	276	E 216	B 280		
12	E 308	A 294	A 308	E 274	E 254	A 230	222	196	198	196	194	194		A 192	192	198	198	204	206	214	E 214	B 212	B 222	B 272	
13	262	E 270	B 258	198	E 198	210	208	206	196	194	186	186	192	194	188	190	198	202	202	208	214	E 206	B 222	B 312	
14	E 314	A 284	B 242	232	E 312	A 208	208			A 208	190	204		A 202	206		A 260	E 256		E 256		A 348	B 348		
15	E 326	A 326	B 260	252	E 294	A 246			200	200		A 210	198	198		A 196	196		A 224	204	186	E 264	B 322	B 268	
16	E 252	B 242	B 250	250	E 242	A 234	206	208	202		A 194		A 192	192		A 210	208	200	216	E 294	B 234		E 234		
17	E 234	B 248	B 248	214	E 266	A 234	206	204		A 192	E 224		A 194	194	206	234	200	188	188	E 294	B 326	B 286			
18	E 314	A 286	218	260		A 246	208	208	192	192	184	180	188		A 188	202	216	E 236	210	206	E 206	B 298	B 284		
19	E 266	B 238	B 220	212	E 224	A 228	204	206	196	196	194	188	186	182	182	196	198	208	208	198	192	E 198	B 274	B 252	
20	E 242	B 238		C 200	E 218	C 218	190	196	188		A 188	188	188	188	188	200	202	202	220	206		C 206	B 222	B 242	
21	E 240	B 238	B 238	238	E 230	A 238	208	208	208		C 208	176	176	176	176		A 194		A 224	224	186	E 194	B 260	B 244	
22	E 254	B 280	B 222	234	E 254	A 252	206	206		A 186	186	186	180	190	196	212		A 212	212	E 236	308	E 280	B 246	B 232	
23	E 248	B 238	B 238	226	E 204	A 218	218	220	198	184	184		A 194	194	196	206		A 230	230	E 250	212	B 234	B 240		
24	E 240	B 240	B 240	226	E 234	A 236	208	208	188	188	178	174	206	200	186	202	202	224	210	204	212	E 212	B 242	B 254	
25	E 254	B 240	B 254	304	E 300	A 266	190	216	196	196	184	184	204	204	192	204	204	208	206	210	E 240	B 286	B 250	B 234	
26	E 222	B 226	B 240	208	E 220	A 232	208	202	202	192	196	196	212	212	214	210		A 204	204	202	E 212	B 242	B 276	B 236	
27	E 236	B 236	B 230	220	E 206	A 246	200	200	200	194	194	196	186	210	202	196	208	216	210	202	E 250	B 250	B 264	B 264	
28	E 254	B 242	B 232	218	E 220	A 228	202	206		A 198		A 190	194	182	180	204	204	218	202	202	E 248	B 234	B 248		
29	E 238	B 230	B 228	228	E 216	A 218	192	204	196	196	196	184	184	184		A 218	A 218	A 218	208	226	E 210	B 258	B 256		
30	E 282	A 280	A 280	242	E 242	A 242	206	206	206	194		A 194	180		A 180		A 180	A 180	A 202	E 264	B 228	B 280	B 270		
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	29	28	28	27	29	29	25	22	23	25	25	25	23	25	22	21	26	30	29	29	29	29	
MED	E 251	B 242	B 242	232	E 236	A 238	206	206	200	194	190	188	190	194	194	198	202	208	210	206	E 203	B 228	B 250	B 246	
U Q	E 266	A 280	A 256	251	E 265	A 252	210	208	203	196	194	196	195	200	200	203	206	216	218	220	E 249	B 271	B 275	B 269	
L Q	E 236	B 238	B 231	221	E 220	A 230	204	201	196	188	188	184	185	189	188	194	198	203	206	202	E 202	B 209	B 222	B 233	

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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	120	A	A	A	A	A	112	112	112	112	112	112		B				
2						B	112	108	108	108	A	108	A	108	108	108	102	102		B				
3						B	B	A	A	A	A	A	112	110	108	108		A	A	B				
4						B	A	A	A	90	A	A	A	A		110	110		A	A	B			
5						B	112	A	A	A	A	A	A	112		A	112	110	108		B			
6						B	122	108	110	110	108	A	A	A	A		108	108		A	B			
7						B	112	110	A	A	A	A	110	110		A	A	A	A	B				
8						B	114	A	A	A	A	A	A	A		108	108	108	108		B			
9						B	108	108	A	A	108	A	A	A	A		108	110	110	110				
10						A	122	118	118	A	A	A	A	A	A	A	A	A	A	B				
11						B	110	A	A	110	A	A	A	A	A	A	A	A		B				
12						B	B	110	A	A	A	A	A	A	A	A	A	A						
13						B	116	110	108	108	A	A	A	A		108	108	108	108		B			
14						B	A	A	A	A	A	A	A	A	A		110	114		A	A		A	
15							A	A	A	A	A	110	110		A	110		A	A	B	B			
16						B	B	A	110	A	A	A	C	A	A	A		110		A	B			
17							116	A	A	A	A	A	A	A	A	A		A	A	B				
18						B	A	110	110	110	A	A	A		A	108	108	108		A	B			
19						B	108	106	108	108	108	108	108	108	108	108	108	108		B				
20						B	118	120	116	116	A	A	A		110	110	110	110	110		B			
21						B	120	120	112	A	112	112	110	108	106	106	106		A	B				
22						B	B	108	A	A	A	A	A	A		A	114	116	110		B			
23						B	122	120	112	112	110	110	110	110	110		A	110	110		B			
24						B	122	124	124	116	A	110	108	108	108	108	108	116		B				
25						B	128	110	110	A	A	A		A	A		A	A		B				
26						B	A	110	114	114	114	114	A	A	A	A		A		B				
27						B	B	114	114	114	114	114	114	114	112	112	112	112		B	B			
28						B	126	110	110	110	A	A	110	110	110	110	110		B	B				
29							106	110	112	A	A	A	112	112	112		A	A	A	B				
30						B	B	A	A	A	A	A	A	A	A	A	A	A		B				
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							18	20	16	13	7	8	12	14	15	19	18	13	1					
MED							117	110	111	110	110	110	110	110	110	108	110	110	110					
U Q							122	117	114	114	114	113	112	112	110	110	110	111						
L Q							112	109	110	108	108	109	110	108	108	108	108	108						

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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	98	106	96	90	90	90	116	100	100	100	98	92	132	126	146	120	142	130	B	92	B	B	92	90
2	92	94	B	94	92	B	G	110	110	110	94	154	98	130	128	G	120	120	92	92	B	92	B	94
3	86	86	86	84	84	78	84	90	90	90	92	92	128	128	150	112	100	96	96	96	88	92	92	78
4	78	82	82	B	B	B	88	90	90	90	90	90	90	88	G	162	102	100	92	92	92	82	82	82
5	92	92	86	B	88	88	G	88	92	92	90	88	88	G	88	G	G	128	82	82	82	82	B	B
6	B	B	B	82	88	88	G	110	114	114	108	96	96	96	94	G	118	104	100	98	98	98	98	90
7	94	88	80	92	92	92	112	110	96	94	94	94	G	G	94	94	102	102	100	90	90	90	90	90
8	84	84	84	90	B	B	G	90	90	92	92	88	88	88	G	G	G	G	88	88	88	88	88	88
9	88	84	84	84	84	84	120	116	102	98	G	98	88	86	86	G	G	G	G	B	B	86	86	86
10	92	82	82	88	88	88	110	124	120	98	98	100	98	90	90	90	90	90	92	92	92	86	86	82
11	106	B	96	94	94	94	108	86	84	114	96	92	92	92	92	90	90	144	98	98	98	98	92	92
12	84	84	84	84	84	82	98	110	100	98	96	96	92	92	92	92	84	84	84	84	84	84	84	B
13	B	B	B	98	B	B	G	116	110	114	102	98	94	94	G	G	134	124	98	98	94	96	96	96
14	92	92	92	92	88	90	100	100	94	94	92	96	96	94	90	114	160	98	98	98	98	98	94	94
15	94	94	92	92	92	90	84	84	90	90	90	G	G	94	104	100	98	92	92	92	92	92	92	92
16	88	B	B	106	106	112	108	98	110	98	98	90	C	88	88	90	114	100	94	94	92	92	92	92
17	90	88	88	88	88	88	88	114	100	96	94	94	86	86	92	88	88	88	88	88	88	88	88	88
18	80	80	84	84	82	82	82	G	G	116	96	96	96	96	88	G	G	102	102	98	98	90	90	B
19	B	B	B	78	B	B	132	G	126	G	G	G	G	G	136	G	G	G	B	B	92	90	90	90
20	B	B	C	C	B	B	G	112	116	114	98	98	96	102	G	134	126	120	90	90	C	B	B	88
21	B	B	88	B	B	B	G	152	136	C	120	120	112	G	G	142	132	98	104	104	B	B	88	B
22	88	88	88	108	B	B	118	112	100	100	96	96	96	96	94	158	144	118	114	98	98	98	88	B
23	B	B	B	B	B	B	G	106	G	106	114	140	132	120	G	96	130	118	96	96	92	B	B	B
24	B	B	B	B	B	B	G	120	120	G	92	G	144	144	G	156	G	116	108	110	108	108	96	B
25	B	B	96	90	90	90	G	G	108	98	96	96	G	96	94	160	90	90	90	90	90	90	B	86
26	B	B	B	B	B	86	122	132	142	132	118	112	104	98	98	98	94	90	90	90	88	88	88	B
27	B	86	86	B	B	B	124	136	130	130	G	G	G	G	G	G	G	G	108	96	96	94	B	B
28	B	B	B	B	B	94	158	126	126	G	96	90	G	G	G	G	122	104	100	100	92	100	92	92
29	92	B	B	92	B	B	G	118	118	98	96	92	G	110	110	90	90	90	90	90	90	90	90	90
30	90	86	84	84	84	98	98	86	100	96	96	96	96	96	96	96	96	90	90	90	90	90	90	90
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	17	19	21	17	18	19	27	28	26	27	26	22	23	21	20	23	26	27	28	25	25	24	21
MED	90	86	86	90	88	89	108	110	105	98	96	96	96	96	94	99	102	101	94	92	92	90	90	90
U Q	92	92	92	93	92	92	120	118	119	114	98	98	104	110	107	138	130	118	100	98	97	95	92	92
L Q	86	84	84	84	84	86	88	90	95	94	92	92	92	90	90	91	90	90	90	90	89	88	88	87

SEP. 2021 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	F5	F2	F6	F6	F7	L4	C2	L2	L3	L2	L1	L2	H1	C2	HL12	C1	H1	H1		F1			F2	F1	
2	F2	F2		F1	F1			C2	C2	C1	L2	L1	L1	H1	C1		C2	C2	L1	F1		F3		F2	
3	F5	F2	F3	F6	F4	L2	L3	L3	L2	L2	L2	L2	C1	C1	H2	C2	L3	L5	L6	F2	F4	F3	F3	F8	
4	F4	F4	F2				L3	L3	L2	L2	L2	L2	L2	L3		H2	L3	L2	L3	F3	F5	F8	F5	F2	
5	F2	F2	F1		F2	L2		L2	L2	L3	L3	L2	L2		L2			C1	L3	F3	F2	F1			
6				F3	F2	L2		C2	C2	C2	C1	L1	L1	L1	L2		C2	L3	L4	F4	F2	F3	F6	F2	
7	F3	F2	F2	F1	F1	F2	C2	C1	L3	L1	L2	L1			L1	L1	L1	L3	L2	F5	F2	F3	F2	F5	
8	F2	F3	F5	F3				L3	L3	L3	L3	L3	L2	L2					L1	F3	F3	F3	F2	F2	
9	F2	F7	F7	F5	F3	F1	C3	C2	L2	L2		L2	L2	L2	L3							F3	F3	F2	
10	F2	F4	F2	F2	F3	L2	CL52	CC22	C2	L2	L2	L2	L2	L3	L3	L2	L3	L3	L3	F4	F3	F3	F2	F2	
11	F1		F1	F2	F2	L5	C1	L2	L2	L1	L3	L4	L3	L3	L3	L4	L3	L2	L4	F7	F7	F8	F4	F3	
12	F4	F7	F4	F4	F2	L2	L3	C1	L2	L2	L1	L2	L3	L2	L2	L2	L2	L2	L2	F2	F1	F2	F1		
13				F1				C2	C2	L1	L1	L1	L2	L1			H1	L2	L3	F3	F2	F2	F7	F7	
14	F7	F3	F3	F4	F5	F6	L2	L4	L3	L2	L3	L2	L1	L2	L2	C1	H1	L3	L3	F6	F2	F6	F7	F7	
15	F6	F9	F3	F2	F4	L4	L4	L3	L3	L2	L2			L1	C2	L2	L3	L5	L4	F2	F3	F2	F5	F2	
16	F1			F1	F2	C1	C2	L3	C2	L2	L1	L3		L3	L2	L1	C3	L2	LC22	F2	F4	F4	F4	F5	
17	F2	F2	F2	F2	F4	F5	L3	C2	L2	L1	L2	L2	L4	L3	L2	L3	L3	L1	L3	F2	F1	F4	F3	F2	
18	F4	F3	F3	F5	F7	L8	L3			C1	L2	L2	L2		L3			L2	L1	F3	F4	F4	F2		
19				F2			H1		C1						H1						F1	F3	F1	F2	
20								C2	C2	C3	L2	L2	L1	C2		H1	C2	C2	L4	F3				F2	
21			F1					H2	H2		C2	C2	C1			H2	C2	L5	L3	F6			F2		
22	F2	F5	F2	F1			C3	C3	L3	L2	L1	L1	L2	L2	L2	H1	H2	C5	C2	F6	F6	F2	F1		
23								C3		C1	C1	H1	H2	C1		L3	H2	C5	L6	F4	F3				
24								C1	C2		L1		H1	H1		H1		C2	L3	F3	F3	F1	F1		
25			F2	F5	F3	L3		C1	L1	L1	L1	L1		L1	L1	H1	L3	L3	L5	F3	F2	F2		F1	
26					L1	C2	C1	C2	C1	C2	C1	L2	L2	L2	L2	L2	L4	L4	L4	F4	F3	F2	F2		
27		F1	F1				C4	H2	C2	C2									L2	F1	F2	F1			
28					L1	H2	C2	C2			L2	L1					C1	L3	L3	F2	F6		F3	F6	
29	F2			F2			C2	C2	L1	L1	L1			C1	C3	L4	L4	L5	L3	F3	F6	F4	F5	F5	
30	F5	F7	F5	F2	F2	L1	L3	L3	L3	L2	L2	L2	L2	L2	L2	L3	L3	L5	L6	F7	F5	F5	F4	F2	
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																									

SEP. 2021 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	X 50	X 50	X 50	X 44	X 42	41														X 74	X 65	X 60	X 59	X 59	
2	X 56	X 54	X 50	X 47	X 43		X 45														X 86	X 61	X 50	X 44	X 40
3	X 42	X 41	X 45	X 42	X 42																X 92	X 78		X 54	X 60
4	X 55	X 55	X 57	X 49	X 50																X 89	X 86	A	A	A
5	X 50	X 48	X 50	X 45	X 41	37															X 78	X 86	X 77	X 55	X 48
6	X 46	X 47	X 46	X 44	X 42		X 47														X 88	X 78	X 66	X 55	X 51
7	X 48	X 49	X 49	X 47	X 43																X 92	X 84	X 60	X 60	X 58
8	X 59	X 57	X 57	X 47	X 50	46															X 77	X 65	X 68	X 68	X 68
9	X 69	X 56	X 55	X 47	X 42																X 90	X C	X 58	X 50	X C
10	X 59	X 52	X C	X 51	X C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	X C	X C	X C	X C	X C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	X 55	C	C
12	X C	X C	X C	X C	X 46	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
13	X C	X C	X C	X C	X 41	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	X C	X C	X C	X C	X C	C	C	C	C	C					C						X 82	X 78	X 46	X 39	X 48
15	X 48	X 48	X 38	X 41	X 39	39															X 99	X 70	X 34	X 36	X 36
16	X 37	X 38	X 36	X 38	X 35		X 38														X 75	X 45	X 38	X 37	X 40
17	X 37	X 41	X 47	X 35	X 39	42															X 89	X A	X A	X 44	X 47
18	X 73	X 81	X 91	X 64	X 43																X 103	X 50	X 34	X 35	X 43
19	X 42	X 37	X 37	X 34	X A																X 72	X 51	X 38	X 38	X 37
20	X 37	X 37	X 37	X 35	X 33		X 41														X 78	X 87	X 48	X 43	X 41
21	X 41	X 40	X 40	X 39	X 37																X 91	X 92	X 48	X 41	X 41
22	X 40	X 41	X 44	X 41	X A																X 67	X 64	X 58	X 56	X 60
23	X 57	X 52	X 51	X 50	X 48																X 77	X 77	X 64	X 54	X 53
24	X 55	X 53	X 50	X 46	X 45																X 74	X 73	X 54	X 45	X 46
25	X 47	X 47	X 44	X 42	X 42																X 78	X 58	X 53	X 50	X 50
26	X 50	X 50	X 46	X 46	X 42																X 72	X 57	X 47	X 45	X 49
27	X 47	X 46	X 44	X 44	X 34																X 70	X 61	X 52	X 51	X 53
28	X 52	X 51	X 49	X 50	X 42																X 70	X 55	X 53	X 52	X 52
29	X 50	X 50	X 47	X 50	X 48																X 78	X 64	X 41	X A	X 41
30	X 42	X 42	X 40	X 39	X 40	X															X 89	X 66	X 45	X 45	X 46
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	26	25	26	25	6	4													26	24	24	24	24	
MED	X	X	X	X	X	40	43													X	X	X	X	X	
U Q	X	X	X	X	X	42	46													X	X	X	X	X	
L Q	X	X	X	X	X	39	40													X	X	X	X	X	
	42	41	42	41	40	39	40													X	X	X	X	X	

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

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	44	44	44	38	F	F	38	58	73	69	57	57	60	A	65	66	64	65	68	68	59	54	53	53	
2	50	48	44	41	37	33	39	59	67	63	63	65	60	57	66	65	63	72	80	80	55	44	38	34	
3	36	35	F	36	F	33	41	60	56	54	58	62	58	60	64	62	64	65	72	86	72	50	48	F	
4	49	F	F	43	F	38	40	57	64	77	65	56	64	75	81	81	83	70	79	82	80	A	A	A	
5	44	42	F	39	F	F	38	58	54	59	57	58	64	65	69	66	59	57	65	72	80	71	49	42	
6	40	41	40	38	36	31	41	64	66	58	64	59	63	68	60	56	54	60	76	82	72	60	49	45	
7	42	F	F	F	F	34	42	58	A	62	60	69	63	61	59	61	70	76	84	86	78	54	54	F	
8	F	F	F	41	F	F	44	58	59	59	61	62	67	66	72	79	79	72	75	71	59	62	62	62	
9	63	50	49	41	36	34	41	66	64	69	68	61	60	64	70	67	67	70	72	84	C	52	44	C	
10	F	F	C	44	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
11	C	C	C	C	C	C	C	C	C	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	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	C	C	C	C	C	
15	F	F	32	35	33	F	35	54	57	57	64	70	79	88	73	60	60	66	80	93	64	28	30	30	
16	31	32	30	32	29	26	32	59	76	58	55	58	66	60	64	60	65	80	88	69	39	32	31	F	
17	31	F	F	29	F	F	36	55	66	59	59	54	62	64	66	66	73	97	110	83	A	A	F	F	
18	F	F	F	F	F	32	31	61	60	54	58	58	55	71	87	62	55	57	76	97	44	28	29	F	
19	F	31	31	28	A	A	33	49	56	59	56	56	79	79	63	59	59	78	78	66	45	32	32	31	
20	31	31	31	29	27	22	35	49	58	62	60	58	64	73	66	62	58	64	70	72	81	44	37	35	
21	35	34	34	33	31	32	35	52	58	64	59	64	70	72	77	66	66	66	74	85	86	42	35	35	
22	F	F	38	35	A	32	37	58	63	57	67	80	68	74	82	97	105	86	71	61	58	52	50	F	
23	51	46	45	46	42	26	34	60	84	71	66	70	92	87	79	70	64	62	74	71	71	58	48	47	
24	49	47	44	40	39	36	41	67	68	68	63	73	73	70	74	68	78	96	94	68	67	48	39	39	
25	41	41	38	36	36	36	44	56	63	66	64	70	82	93	90	90	88	94	90	72	52	47	44	44	
26	44	44	40	40	36	32	38	55	64	67	64	66	76	91	91	80	74	70	64	66	51	41	39	F	
27	41	40	38	38	28	24	34	53	63	70	61	68	83	92	88	82	76	68	78	64	55	46	45	47	
28	46	45	43	44	36	33	36	53	66	85	67	73	76	83	78	70	71	76	71	64	51	47	46	46	
29	46	44	41	44	42	34	39	57	66	75	72	71	79	87	92	76	79	90	88	72	58	35	A	35	
30	36	36	34	33	34	34	38	63	73	76	67	66	76	87	90	75	72	76	84	83	60	39	39	40	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	20	18	18	24	17	19	25	26	24	25	26	26	26	25	26	26	26	26	26	26	24	25	23	16	
MED	43	42	39	38	36	33	38	58	64	63	63	64	68	72	72	66	68	70	76	72	60	47	44	41	
U Q	48	45	44	41	38	34	41	60	66	70	66	70	76	87	82	76	76	78	84	83	72	53	49	46	
L Q	36	35	34	34	32	31	35	55	58	58	59	58	63	64	66	62	63	65	71	68	54	40	35	35	

SEP. 2021 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1							A		A	L	L			A	A		A	L	L						
2									L		L	456472		U L	468	456	U L	U L	L						
3							L			424444	456484			A	A	A		L	A						
4								L	L	A	U L			A		468452	420	L	L						
5										440448	468456			A	448428		L	L	L						
6										L	A				L	460440		A	L						
7									A	A	L		U L		A	A	A		A						
8								L	L	A	A	472484	476				U L	L	A						
9									L	L	A						A		A						
10						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
11						C	C		C	C	C	C	C		460		C	C	C	C					
12						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					
14						C	C	C	C	C						C			L						
15									A		A	A	A	A	A	A	424	A							
16										L	A				A			A							
17							A		A	L	U L	A		A	A		A	A							
18									L		A		U L				L	L							
19						A				L	U L			L		U L	L								
20										L	L				L		L	L							
21									A	A	A						L	L	A						
22						A				A	A							L							
23										L	U L			L	L	L	L	L							
24										L		A	U L			L									
25									L	L	A	U L				L	L	L							
26									L		L						L	L	L						
27										L	L						L	L	L						
28										L		U L			L	L	L	L							
29									L	L	L		U L		A	U L	L	L							
30										L	L	L	L	A	A	L	L								
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT										4	7	20	24	18	13	16	11	3							
MED										430	456	472	470	466	468	450	424	392							
U Q										436	460	482	484	476	470	458	436	400							
L Q										426	448	458	468	460	460	438	420	392							

SEP. 2021 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						B	B	A	A	A	A	U A 340	A	A	A	A	U A 296	A	B					
2						B		A	U A 288	A	A	U R 364	U R 352	A	A		316	U A 296	A	B				
3						B	B	U R 252	U A 280	U A 296	A	A	A	A	A	A	U R 296	U R 284	B				A	
4						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
5						B	B	U A 240	A	A	U A 356	A	U R 356	A	U A 348	U R 336	U A 300		U R 204					
6						B		U A 216	U A 272	A	A	A	U A 344	A	A	U R 336	U A 304	A	A					
7						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
8							B	U R 248	U R 308	A	A	A	U A 360	U R 368	U R 340	U R 332	A	A	A					
9						B	B	U R 252	U A 288	A	A	A	A	U R 360	U R 348	U R 324		A	A	B				
10						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
11						C	C	A	C	C	C	C	C	C	U R 360		C	C	C					
12						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					
14						C	C	C	C	C	U R 344	A	A	A	A	C	A	A	A	B				
15						B	B	U A 208	A	A	A	A	A	A	U A 328	A	A	A	B					
16						B		A	A	A	A	A	A	A	A	A	U A 316	A	A	B				
17						B	A	U A 224	A	U A 304	A	A	A	A	A	A	A	A	B					
18					156		B	U A 200	U A 268	A	A	A	A	U R 332	U R 324	U R 316	U R 284	U R 236	B					
19					B	B	A	U A 252	U A 292	A	A	U R 328	U R 320	U R 316	U R 300	U A 276	U A 220	B						
20					B		U A 232	A	A	A	U R 352	U R 364	U R 344	U R 328	U R 316		U A 232	B						
21					B	B	A	A	A	A	A	A	A	U A 332	A	U A 296	U A 228	B						
22					B	B	U A 228	A	A	A	A	A	A	A	A	U R 320	U R 292	U R 236	B					
23					B	B	U A 232	A	A	A	U A 340	U R 360	U R 348	A	R	U A 284	U A 236	B						
24					B	B	U A 204	U A 312	U A 328	U A 356	A	A	A	U R 348	U R 336	U R 316	U R 288	A	B					
25					B	B	U A 236	U A 304	A	A	A	A	A	U R 344	U R 320	U R 292	U R 256	B						
26					B	B	U A 228	U R 296	U A 312	A	A	A	U R 356	A	A	U R 288	U R 252	B						
27					B	B	U A 204	U A 268	A	A	A	U R 352	U R 348	U R 340	U R 320		A	U R 172						
28					B	B	U A 204	A	A	A	A	U R 356	U R 340	U R 328	U R 312	U A 284	U A 228	B						
29					B	B	U A 208	A	A	A	A	A	A	A	A	U R 320	U R 284	A	B					
30						B	A	A	A	A	A	A	A	A	A	A	A	U R 220						
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		17	10	5	3	6	9	10	13	14	16	10	3					
MED					156			U A 228	U A 284	U A 304	U A 344	U A 346	U R 356	U R 348	U R 336	U R 320	U R 292	U R 236	U R 204					
U Q								U R 238	U R 296	U R 312	U R 356	U R 356	U R 360	U R 356	U R 346	U R 324	U R 296	U R 252	U R 220					
L Q								U A 206	U A 268	U A 294	U A 328	U A 340	U R 348	U R 340	U R 328	U R 316	U R 284	U R 228	U R 172					

SEP. 2021 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	34	28	E B	E B	E B	E B	22	24	46	33	38	38	41	A A	44	29	34	30	21	22	E B	E B	E B	16	
2	E B	16	17	E B	E B	E B	E B	25	27	32	35	35	G	G	38	36	34	34	30	20	23	E B	E B	E B	16
3	E B	15	15	E B	E B	E B	E B	16	G	29	33	34	36	36	52	45	57	G	G	28	23	E B	16	24	24
4	28	24	20	22	E B	E B	E B	15	25	30	35	45	40	38	45	37	37	32	32	22	E B	E B	A A	A A	A A
5	E B	16	16	E B	E B	E B	E B	16	27	26	36	40	35	G	49	37	G	G	G	E B	E B	E B	E B	E B	
6	E B	16	16	E B	E B	E B	E B	16	27	32	34	55	38	38	38	37	G	34	44	24	E B	16	24	26	E B
7	E B	16	18	E B	E B	E B	E B	24	A A	84	55	38	40	38	38	51	53	44	32	28	56	32	28	28	25
8	E B	25	15	E B	E B	E B	E B	16	G	G	45	42	40	39	35	G	29	26	22	17	23	23	26	27	
9	E B	16	16	E B	E B	E B	E B	15	G	32	37	44	36	38	G	G	G	41	29	23	23	C E	B	C	
10	E B	15	16	C E	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	27	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	24	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 E	B	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	G	36	36	40	C	34	30	24	19	E B	E B	E B	E B	E B	
15	22	21	E B	E B	E B	E B	E B	26	32	32	43	61	65	47	43	39	31	34	41	36	E B	E B	E B	18	
16	E B	16	16	E B	E B	E B	E B	20	28	31	39	47	36	36	41	34	G	43	28	40	E B	E B	E B	E B	
17	E B	15	15	E B	E B	E B	18	20	20	24	36	33	36	43	40	44	44	32	39	32	64	62	A A	A A	E B
18	E B	16	16	E B	E B	E B	E B	25	30	37	41	45	40	G	G	G	G	G	19	15	E B	E B	E B	E B	
19	E B	16	16	E B	E B	E B	A A	22	31	32	33	G	G	G	37	32	G	25	16	16	E B	E B	E B	E B	
20	E B	16	15	E B	E B	E B	E B	24	30	35	36	G	G	G	39	38	32	29	21	21	E B	E B	E B	E B	
21	E B	16	16	E B	E B	E B	E B	25	36	35	38	35	37	36	37	34	33	28	34	38	44	32	E B	E B	
22	E B	16	21	E B	A A	E B	15	26	30	38	42	38	38	37	39	G	G	G	16	16	E B	E B	E B	E B	
23	E B	16	16	E B	E B	E B	E B	24	28	32	33	37	G	38	G	35	G	26	20	16	E B	E B	E B	E B	
24	E B	16	16	E B	E B	E B	E B	23	30	34	35	42	35	38	G	G	G	26	18	18	E B	E B	E B	E B	
25	E B	15	16	E B	E B	E B	E B	25	31	36	46	38	38	38	36	G	G	G	15	15	E B	E B	17	20	
26	E B	16	16	E B	E B	E B	E B	25	G	33	37	37	38	G	37	34	G	G	17	16	E B	E B	E B	E B	
27	E B	15	15	E B	E B	E B	E B	26	32	33	35	35	G	G	G	40	31	23	G	E B	E B	E B	E B	E B	
28	E B	16	16	E B	E B	E B	E B	28	29	34	34	36	G	G	37	34	31	26	19	E B	E B	E B	E B	E B	
29	E B	16	20	E B	E B	E B	E B	28	32	36	37	37	36	36	43	34	31	24	E B	16	45	40	20	A A	E B
30	E B	16	16	E B	E B	E B	E B	19	25	30	38	40	40	48	50	33	29	23	G	16	E B	E B	E B	E B	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	26	26	25	26	27	25	25	26	25	25	26	26	26	26	26	26	26	26	26	26	26	25	27	26	25
MED	E B	E B	E B	E B	E B	E B	E B	25	30	34	38	38	38	38	37	34	31	26	20	16	E B	E B	E B	E B	
U Q	16	17	16	16	16	16	16	26	32	36	42	40	38	44	43	35	33	30	24	23	24	25	20	20	
L Q	E B	E B	E B	E B	E B	E B	E B	23	28	33	35	36	G	G	G	G	G	G	E B	E B	E B	E B	E B	E B	

SEP. 2021 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

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

SEP. 2021 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		288	305	323	345	F	F	356	355	373	367	349	358	322	A	328	337	334	331	351	343	311	308	300	312
2		305	308	290	326	307	328	342	363	370	370	370	371	307	298	338	328	314	336	335	366	354	322	307	304
3		273	305	F	305	F	327	348	384	356	343	342	371	303	315	333	314	332	332	338	328	356	297	290	F
4		283	F	F	323	F	306	343	347	361	374	373	303	327	315	306	313	347	338	339	351	363	A	A	A
5		299	308	F	332	F	F	359	402	376	351	360	327	337	325	335	339	327	329	323	314	343	364	341	300
6		312	306	319	332	360	319	347	361	409	349	357	344	330	325	344	333	316	319	330	331	349	352	322	324
7		316	F	F	F	F	309	348	389	A	372	360	344	338	331	313	324	333	325	342	343	356	341	335	F
8		F	F	F	298	F	F	346	371	361	382	342	329	343	296	300	316	319	320	332	334	296	309	309	311
9		306	312	321	331	302	287	340	393	362	360	370	335	335	332	331	306	313	325	317	323	C	348	270	C
10		F	F	C	326	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12		C	C	C	C	309	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
13		C	C	C	C	302	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	C	C	C	F
15		F	F	286	333	339	F	340	364	371	351	342	317	331	339	351	342	330	331	348	368	409	296	292	292
16		302	318	301	297	322	331	337	365	392	390	353	334	354	321	320	305	317	330	373	379	357	299	303	F
17		288	F	F	301	F	F	340	369	373	362	362	349	314	329	331	292	296	337	367	391	A	A	F	F
18		F	F	F	F	F	339	303	374	366	402	363	351	320	311	351	358	329	297	315	373	396	296	273	F
19		F	303	356	358	A	A	348	400	361	380	354	316	344	353	351	332	331	363	368	369	383	333	302	292
20		297	308	314	332	355	346	361	405	349	378	361	333	341	363	342	332	339	337	349	334	374	314	319	297
21		297	304	301	322	339	381	346	386	360	383	340	347	334	338	335	331	337	330	324	340	384	347	301	303
22		F	F	295	348	A	333	365	382	409	367	320	357	309	323	305	317	351	352	358	312	301	282	289	F
23		312	301	298	320	348	316	328	361	368	372	350	342	341	341	341	338	333	328	346	336	346	331	310	282
24		300	299	315	311	321	312	344	391	366	384	358	340	356	335	340	310	321	346	355	331	350	375	308	308
25		300	316	300	301	292	338	367	370	367	365	348	337	332	336	320	327	323	339	351	366	331	304	297	291
26		312	310	307	328	340	297	329	376	359	373	373	318	316	327	324	332	340	358	348	344	336	307	281	F
27		306	309	313	357	326	303	345	366	368	369	370	334	323	325	339	339	326	334	347	343	334	299	296	287
28		298	307	315	346	354	325	362	360	344	370	352	330	315	337	329	335	344	352	338	350	310	311	296	283
29		304	309	306	326	376	332	346	383	353	358	348	349	325	326	346	322	331	344	363	354	361	296	A	292
30		280	302	320	305	311	349	371	355	361	383	335	335	336	327	340	326	299	343	345	359	385	311	290	286
31																									
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		20	18	18	24	17	19	25	26	24	25	26	26	26	25	26	26	26	26	26	26	24	25	23	16
MED		300	308	310	326	326	327	346	370	366	370	354	338	330	327	335	330	330	335	346	343	355	311	301	294
U Q		306	309	319	332	351	338	358	386	372	381	362	349	338	338	342	337	334	344	351	366	368	344	310	306
L Q		292	304	300	308	308	309	340	361	360	361	342	330	320	322	324	316	319	329	335	334	335	299	290	289

SEP. 2021 M(3000)F2 (0.01)

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## IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1							A		A	L	L			A	A		A	L	L						
2									L		L	421	410	U	L		U	L	U	L	L				
3							L			411	446	437	404	406	382	334	367		L	A					
4								L	L	429	452	457	431		A	A	A	375		L	A				
5									L	417	372	405		A		381	394	388		L	L				
6										403	405	408	428		A	409	414		L	L	L				
7										L	A				L			A	L		A				
8								A	A	L			U	L		A	A	A		365		A			
9								L	L	A	A	411	403	407					U	L	L	A			
10									L	A	427	424	363	398	400	371		A			A				
11						C	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				
13						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
14						C	C	C	C	C					C				L						
15									A		413	398	386	429		409	378		A						
16									L		A	A	A	A	A	A	372		A						
17						A		A	L	U	L	A		A	A	356	372		A	A					
18								L		417	406			406		371			L	L					
19					A				L		A	U	L	401	408	393	394		L	L					
20									L	406	U	L	381	431	403		L	U	L	L					
21									L	L	407	405	411		L	385		L	L	A					
22					A				A	A	413	409	409	386	374			L	L						
23										L	U	L	416	407	408	408	378	423		L					
24									L		401	400		A	U	L			L	L					
25									L	L	A	U	L	396	396	390		L	L	L					
26									L		L	416	402	390	386			L	L	L					
27										L	L	382	410	435	377			L	L	L					
28									L	L	409	428	414	391			L	L	L						
29									L	L	409	404	376	424		U	L	A	U	L	L	L			
30									L	L	400	391	374		U	L	A	U	L	L	L				
31									L	L	L	L	L	A	A	L	L								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT										4	7	20	24	18	13	16	11	3							
MED										414	409	408	406	408	393	380	372	367							
U Q										423	417	416	426	411	402	397	378	372							
L Q										407	405	400	400	399	386	370	U	L	364	365					

SEP. 2021 M(3000)F1 (0.01)

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## IONOSPHERIC DATA STATION Yamagawa

SEP. 2021 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							242		242	242	270	274	338	A	294	274	274	274	256					
2									234	234	234	244	316	362	280	280	300	264	248					
3							242			280	280	246	316	E A	310	288	E A	344	284	282	242			
4								254	244	232	234	374	308	284	290	288	254	254	254					
5										264	264	326	292	300	278	274	280	260	272					
6										E A	262	262	288	288	296	268	286	E A	316	294	254			
7									A E A	254	244	264	294	294	E A E A	338	338	272	272	244				
8								218	258	220	268	322	274	338	314	280	274	274	236					
9									244	244	234	270	304	298	282	320	296	274	250					
10						C	C	C	C	C	C	C	C	C	C	C	C	C	C					
11						C	C		C	C	C	C	C	C	270		C	C	C	C				
12						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					
14						C	C	C	C	C		278	246	280	270	C	268	268	244					
15									228		264	E A E A	310	286	252	252	252	294	258					
16										238	274	282	254	310	294	306	296	254						
17							214		230	230	250	262	318	290	288	314	314	240						
18									254		246	274	316	314	230	240	290	322						
19						A				230	270	312	270	244	244	292	292	254						
20										242	242	280	284	254	262	268	268	268						
21										234	234	264	278	280	280	264	264	266	266	240				
22						E A	266				230	298	242	282	282	290	290	228	226					
23											234	272	264	240	258	270	258	276						
24										220		250	250	268	270	274	276							
25										256	242	250	280	266	250	260	250	264	258					
26										250		236	294	298	272	264	252	252	244					
27											244	244	286	278	258	248	248	246	256					
28											246	246	262	286	264	264	264	264	252					
29											252	252	252	262	282	262	252	274	266	250				
30											260	280	284	268	252	262	284							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	3	2	12	20	25	26	26	25	26	26	26	24	10					
MED					E A	266	242	236	244	241	251	275	284	276	268	273	274	258	249					
U Q							242		253	249	269	288	304	299	288	290	292	274	254					
L Q							214		234	231	243	262	278	260	258	264	264	253	242					

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## IONOSPHERIC DATA STATION Yamagawa

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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 A E A E B E B E B	344	284	226	200	226	226	A	A	214	216	208	206	206	A	A	182	A	220	212	212	E B E B E B E B	206	238	248	240	
2	E B E A E B E B E B E B	240	252	272	230	260	228	232	204	204	204	204	188	188	188	188	196	196	196	204	204	196	E B E B E B E B	196	234	276	
3	E B E B E B E B E B E B	284	274	262	258	228	210	202	200	192	188	184	174	174	A	A	A	186	200	A	204	196	216	E A E A E A	288	280	
4	E B E A E B E B E B E B	328	286	276	216	234	236	222	210	210	194	A	192	186	A	194	194	188	202	202	E B	202	186	A	A	A	
5	E A E B E B E B E B E B	288	272	266	224	218	214	214	200	200	200	206	200	184	A	190	190	212	186	216	232	E B	210	200	200	236	
6	E B E B E B E B E B E B	258	264	256	232	206	228	216	206	198	192	A	192	186	186	220	192	192	A	200	212	210	210	E A E B	228	228	
7	E B E A E B E B E B E B	228	262	246	272	272	256	216	204	A	A	190	196	190	190	A	A	A	210	A	E A	228	218	216	210	268	
8	E A E B E B E B E B E B	264	246	274	248	218	278	218	194	188	A	A	186	186	190	190	190	190	206	A	212	E A E A E A E A	288	260	270	248	
9	E A	248	198	224	210	254	280	220	210	198	200	A	194	194	194	190	190	A	202	A	214	C	202	286	E A	C	
10	E B E B	252	252	C	E B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	200	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	E A	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	208	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	174	174	180	180	C	180	194	202	216	206	192	186	E B E A	226	320	
15	E A E A E B E B E B E B	316	306	320	248	224	214	208	200	A	200	A	A	A	A	A	A	200	A	E A	228	208	190	190	E B E B E B E B	284	294
16	E B E B E B E B E B E B	288	256	268	258	238	238	224	212	202	202	194	A	190	188	A	188	196	A	208	204	196	E B E B E B E B	236	270	258	
17	E B E B E B E B E B E B	224	302	266	240	230	252	212	A	184	184	A	190	A	A	202	A	A	A	202	202	A	A	E A E B E B	300	324	
18	E B E B	272	250	196	196	238	220	250	202	214	204	A	A	204	194	186	192	192	210	224	204	184	E A E B E B E B	300	300	328	
19	E B E B E B E B E B E B	262	256	236	214	A	A	200	200	200	196	188	184	178	174	198	196	190	210	208	194	E B	E B E B E B E B	202	252	282	
20	E B E B E B E B E B E B	282	262	252	232	226	226	206	198	198	198	194	188	186	194	224	216	210	208	212	226	192	192	E B E B	218	260	
21	E B E B E B E B E B E B	260	256	256	238	222	200	200	188	A	A	A	188	184	184	202	202	218	218	A	224	206	222	E B E B E B E B	250	256	
22	E B E A E B E B E B E B	250	284	282	234	A	A	208	186	198	A	A	184	184	186	186	180	180	188	198	214	218	E B E B E B E B	246	254		
23	E B E B	238	250	264	234	182	250	226	212	220	212	182	178	178	202	196	208	192	204	218	206	E B	E B E B E B E B	220	276		
24	E B E B E B E B E B E B	264	252	246	246	230	230	208	190	194	186	186	A	186	186	186	186	192	212	202	202	E B	E B E B E B E B	226	274		
25	E B E B E B E B E B E B	270	252	252	286	278	202	202	186	192	192	A	192	192	192	192	186	196	206	206	194	E B E B E B E B	236	266	266		
26	E B E B E B E B E B E B	238	248	248	220	208	224	220	204	204	204	206	196	188	188	204	206	198	208	208	208	192	E B E B E B E B	204	284	284	
27	E B E B E B E B E B E B	250	250	254	210	182	252	208	208	206	190	182	174	174	174	188	202	202	204	204	198	198	E B E B E B E B	216	280		
28	E B E B E B E B E B E B	250	242	242	222	194	232	208	202	202	204	190	190	180	180	188	196	198	206	206	202	E B	E B E B E B E B	224	272		
29	E B E A E B E B E B E B	240	240	246	222	202	218	212	196	198	204	206	190	190	190	A	190	200	202	200	214	220	220	A	E B	270	
30	E B E B E B E B E B E B	278	256	256	256	234	218	206	206	214	184	184	184	196	A	A	194	202	218	218	200	186	E A E B E B E B	270	302		
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	26	26	25	26	25	23	23	26	20	21	17	21	25	19	18	23	22	22	21	26	24	25	24	24			
MED	E B E B E B E B E B E B	261	256	256	232	226	221	211	202	200	200	190	188	186	188	191	192	196	206	207	205	196	208	E B E B E B E B	251	273	
U Q	E B E A E B E B E B E B	282	272	267	248	238	250	220	208	205	204	205	193	190	192	200	202	200	210	216	214	208	236	E B E B E B E B	283	283	
L Q	E B E B E B E B E B E B	248	250	246	220	208	218	208	198	198	192	184	184	182	184	188	188	192	202	202	202	192	201	E B E B E B E B	227	257	

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## IONOSPHERIC DATA STATION Yamagawa

SEP. 2021 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1						B	B	A	A	A	A	112	A	A	A	A	108	A	B						
2						B		108	108	A	A	108	108	108	A	108	108	A	B						
3						B	B	108	108	108	A	108	A	A	A	A	108	108	B			A			
4						B	A	108	108	A	A	A	A	A	A	A	A	A	B						
5						B	B	108	A	A	A	108	A	A	108	108	110	110	110						
6								110	110	110	A	A	110	A	A	110	110	A	110						
7						B	A	A	A	A	A	A	A	A	A	A	A	A	B						
8							B	110	110	A	A	A	112	112	112	112	A	A	A						
9						B	B	112	118	A	A	A	A	116	110	110	A	A	B						
10						C	C	C	C	C	C	C	C	C	C	C	C	C	C						
11						C	C	118	C	C	C	C	C	C	110	C	C	C	C						
12						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						
14						C	C	C	C	C	108	A	A	A	C	A	A	A	B						
15						B	B	108	A	A	A	A	A	A	108	108	A	A	B						
16						B		A	A	A	A	A	A	A	A	A	108	A	B						
17						B	A	108	A	108	108	A	A	A	A	A	A	A	B						
18						B	B	110	110	A	A	A	A	110	108	108	108	108	B						
19						B	B	A	108	112	112	112	108	108	108	108	108	108	B						
20						B		116	116	116	108	108	108	108	108	108	108	108	B						
21						B	B	110	114	A	A	A	A	A	112	114	114	114	B						
22						B	B	114	A	A	A	A	A	A	A	116	110	110	B						
23						B	B	110	A	A	A	110	110	110	110	110	110	110	B						
24						B	B	110	110	110	110	110	A	110	110	110	110	112	B						
25						B	B	112	112	A	A	A	A	A	110	110	110	110	B						
26						B	B	110	110	110	A	110	110	110	A	A	110	110	B						
27						B	B	110	114	114	A	A	112	110	110	110	A	A	130						
28						B	B	122	124	124	A	A	112	112	108	108	110	110	B						
29						B	B	114	116	118	118	A	A	A	A	118	118	118	B						
30							B	A	A	A	A	A	A	A	A	A	A	A	118						
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								21	16	10	7	8	10	11	14	16	17	13	4						
MED								110	110	111	108	110	110	110	110	110	110	110	114						
U Q								113	115	116	112	111	112	112	110	111	110	111	124						
L Q								108	109	110	108	108	108	108	108	108	108	108	110						

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SEP. 2021 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	92	92	98	98	98	B	126	92	88	88	88	116	92	80	80	82	156	82	82	82	B	B	B	82
2	88	88	88	88	88	88	B	110	110	98	98	G	G	114	96	132	120	100	100	100	100	100	B	B
3	B	B	92	B	102	88	B	G	136	134	96	108	102	90	90	90	G	G	94	94	94	94	88	88
4	88	88	88	88	88	88	96	112	116	102	102	102	92	92	92	92	96	96	96	96	88	88	88	88
5	88	88	88	88	B	B	B	148	92	92	144	88	G	84	128	G	160	G	G	104	102	B	B	B
6	B	B	B	B	B	106	118	118	114	114	76	98	110	94	94	G	118	92	122	B	104	104	104	98
7	98	98	98	86	86	98	94	98	98	98	90	90	88	88	88	88	88	94	94	90	90	90	90	90
8	82	82	82	82	86	86	B	G	G	94	94	132	132	G	134	G	84	84	84	84	84	84	88	88
9	88	88	88	88	B	B	B	G	108	98	94	94	94	G	G	G	90	90	90	90	C	90	90	C
10	90	90	C	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	122	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	C
12	C	C	C	C	110	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	B	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	G	90	92	92	C	84	92	92	122	92	90	90	90	90
15	90	86	86	86	86	86	86	120	80	90	88	80	80	102	110	110	92	92	92	92	92	92	92	92
16	92	92	92	92	92	92	B	96	96	96	96	96	96	96	88	88	G	94	94	94	94	94	94	94
17	104	96	96	96	90	90	90	124	82	110	112	92	92	92	92	92	92	92	92	92	92	92	86	86
18	B	86	92	88	88	88	88	116	122	102	102	94	88	G	G	G	G	G	104	B	104	94	94	90
19	94	90	88	88	86	84	84	84	118	118	120	G	G	G	138	138	G	138	104	B	94	94	94	94
20	88	B	88	88	B	100	134	134	130	118	112	G	G	G	142	142	122	130	116	100	100	100	100	
21	100	B	B	B	B	B	100	124	120	96	96	96	96	92	138	116	148	130	118	108	94	94	94	108
22	86	90	86	86	86	86	B	122	102	102	96	96	96	96	96	96	G	G	B	96	94	94	94	B
23	88	90	90	86	136	136	136	100	100	100	116	G	138	G	94	G	164	112	100	100	B	B	B	
24	B	B	B	B	B	B	B	144	122	136	140	158	98	154	G	G	G	128	96	96	96	B	B	96
25	96	96	88	88	94	104	B	132	132	102	96	96	96	96	148	G	G	G	B	B	94	94	84	84
26	84	84	84	84	B	B	B	120	G	132	96	114	114	G	G	G	106	106	G	106	B	100	96	96
27	88	88	B	B	B	92	B	120	120	128	92	92	G	G	G	124	88	88	G	88	88	88	88	
28	88	88	88	B	B	B	B	124	130	130	92	92	G	G	138	138	122	118	92	92	92	92	92	
29	92	82	82	82	98	B	116	118	118	118	118	96	96	96	96	122	140	124	112	G	98	98	96	96
30	96	96	B	96	B	96	B	102	102	102	96	96	96	96	96	96	96	96	G	90	90	90	90	90
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	22	21	20	19	15	17	12	23	23	25	25	23	19	18	20	18	17	20	21	21	24	22	20	21
MED	89	88	88	88	88	90	98	120	114	102	96	96	96	95	96	101	96	95	96	94	94	94	91	90
U Q	94	92	92	88	98	99	122	124	122	118	107	108	98	96	136	124	131	126	112	99	100	94	94	96
L Q	88	87	87	86	86	87	89	110	98	97	93	92	92	92	92	90	91	92	92	90	91	90	88	88

SEP. 2021 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F6	F6	F2	F1	F2		C2	LC32	L6	L3	L3	CL11	L2	L5	L3	L2	H2	L3	L2	F3				F2
2	F2	F2	F2	F2	F2	L1		C1	C2	L2	L1			C1	L2	H1	C1	L2	L2	F5	F1	F3		
3			F1		F1	L2			H1	H2	L2	C1	L1	L3	L3	L5			L4	F2	F1	F4	F5	F5
4	F9	F4	F4	F3	F2	L1	L1	C2	C3	L3	L3	L2	L2	L3	L2	L2	L3	L5	L2	F1	F1	F4	F8	F7
5	F3	F2	F3	F2				H2	L4	L3	H2	L2		L4	C2		H1			F1	F1			
6					L1	C1	C2	C2	C2	L4	L2	C1	L1	L1		C2	L6	C1		F2	F3	F3	F2	F2
7	F2	F4	F2	F3	F2	L2	L3	L2	L8	L6	L2	L2	L2	L2	L4	L5	L5	L4	L6	F9	F7	F5	F6	F7
8	F3	F2	F2	F2	F1	F2				L3	L3	CL12	CL22		H1		L2	L2	L3	F4	F3	F3	F3	F3
9	F6	F2	F3	F1				C3	L3	L3	L2	L2					L5	L2	L3	F4		F2	F2	
10	F1	F1																						
11							C4																	
12				F7																				
13																								
14											L2	L2	L3			L2	L2	L4	CL22	F1	F2	F1	F4	F7
15	F4	F5	F5	F2	F3	L2	L2	C3	L5	L4	L4	L4	L4	LL22	C2	C2	L3	L4	L7	F9	F8	F3	F2	F4
16	F2	F1	F1	F1	F1	L1		L4	F2	F3	F3	L3	L1	L1	L3	L2		L5	L8	F7	F5	F2	F2	F2
17	F1	F2	F2	F6	F8	L7	L7	C2	L6	C2	C2	L2	L2	L2	L3	L2	L4	L5	L8	F7	F6	F4	F3	F2
18		F1	F1	F6	F2	L4	L1	C2	C2	L3	L3	L3	L3						L3		L3	F4	F2	F4
19	F2	F1	F2	F1	F7	F7	L3	L3	C2	C2	C2				H1	H1		H1	L3		F1	F2	F2	F2
20	F2		F2	F2		L2	H1	H2	H2	C2	C2				H2	H2	C1	H2	C3	F6	F2	F4		F2
21	F1					L1	C2	C2	L1	L3	L3	L1	L1	L2	H1	C2	H2	C3	C7	F8	F6	F4	F2	F2
22	F2	F2	F4	F4	F5	L8		C2	L2	L3	L3	L2	L2	L2	L2					F4	F1	F3	F2	
23	F2	F1	F1	F1		H1	H1	H2	L3	L3	L2	C2		H1		L3		H1	C2	F1	F3			
24							H2	C2	L1	L1	H2	L1	H1					C2	L5	F3	F1			F2
25	F1	F2	F2	F2	F2	L2		C2	C2	L2	L6	L2	L2	L2	H1						F1	F3	F5	F6
26	F2	F2	F1	F1				C3		C1	L4	C2	C2		L1	L1			L3		F1	F1	F2	F2
27	F2	F1				L1		C3	C3	CL22	L2	L2				CL23	L3	L2		F1	F3	F1	F2	F3
28	F2	F1	F2					C3	CL22	CL22	L2	L2			H1	H1	C1	C2	L3	F5	F1	F6	F6	F2
29	F3	F7	F2	F1	F1		C1	C4	C3	C2	C2	L2	L2	L1	L5	C1	H1	C2	C2	F7	F7	F6	F7	F6
30	F2	F1		F1		F1		L2	L3	L4	L3	L3	L3	L3	L3	L2	L2	L3		F2	F1	F8	F6	F5
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																								

SEP. 2021 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	X 45	X 44	X 44	X 45	X 36	X 36															X 72	X 67	X 58	X 54		
2	X 53	X 50	X 45	X 43	X 40	X 38																X 81	X 42	X 37	X 37	
3	X 36	X 37	X 38	X 39	X 38	X 36																X 71	X 53	X 52	X 51	
4	X 50	X 48	X 49	X 50	X 42	X 40																X 108	X 56	X 49	X 51	
5	X 53	X 56	X 58	X 60	X 64	X 40																X 91	X 76	X 40	X 43	
6	X 45	X 40	X 42	X 42	X 38	X 32																X 76	X 52	X 47	X 48	
7	X 48	X 45	X 44	X 41	X 40	X 41																X 93	X 72	X 52	A	
8	X 59	X 58	X 57	X 58	X 56	X 52																X 73	X 71	X 70	X 65	
9	X 61	X 58	X 53	X 50	X 42	X 40																X 107	X 65	X 51	X 52	
10	X 58	X 57	X 58	X 46	X 52	X 46																X 85	X 61	X 45	X 44	
11	X 42	X 41	X 40	X 39	X 37	X 37																X 72	X 45	X 42	X 45	
12	X 45	X 44	X 44	X 43	X 42	X 42																X 86	X 67	X 42	X 43	
13	X 44	X 44	X 44	X 45	X 39	X 34																X 75	X 56	X 38	X 37	
14	X 39	X 40	X 39	X 40	X 27	X 28																X 85	X 44	X 37	X 38	
15	X 37	X 37	X 37	X 40	X 45	A																X 58	X 36	X 35	X 39	
16	X 38	X 38	X 39	X 39	X 34	X 30																A	X 34	X 37	X 40	
17	X 52	X 47	X 38	X 39	X 38	X 31																X 68	X 54	X 66	X 92	
18	X 115	X 92	X 97	X 63	X 45	X 48																X 38	X 32	X 33	X 34	
19	X 54	X 67	X 72	X 55	X 43	X 32																X 50	X 34	X 34	X 35	
20	X 38	X 35	X 36	X 34	X 30	X 25																X 89	X 59	X 39	X 39	
21	X 45	X 44	X 42	X 44	X 47	X 30																X 105	X 53	X 44	X 47	
22	X 46	X 40	X 37	X 40	X 38	X 34														X 90		X 77	X 63	X 61	X 59	
23	X 60	X 54	X 54	X 56	X 47	X 28																X 82	X 75	X 58	X 46	X 45
24	X 45	X 46	X 46	X 45	X 42	X 36																X 104	X 89	X 73	X 52	X 52
25	X 54	X 53	X 48	X 40	X 39	X 46																X 155	X 112	X 72	X 58	X 55
26	X 52	X 51	X 49	X 47	X 41	X 35																X 87	X 58	X 44	X 42	X 42
27	X 43	X 44	X 44	X 44	X 29	X 26																X 104	X 88	X 58	X 50	X 49
28	X 50	X 48	X 48	X 54	X 37	X 33																X 66	X 63	X 56	X 49	X 48
29	X 47	X 47	X 46	X 50	X 38	X 29																X 110	X 92	X 65	X 59	X 46
30	X 46	X 49	X 47	X 43	X 47	X 34																X 96	X 75	X 59	X 48	X 45
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	30	30	30	30	30	29															9	29	30	30	29	
MED	X 46	X 46	X 44	X 44	X 40	X 35															X 96	X 77	X 57	X 46	X 45	
U Q	X 53	X 53	X 49	X 50	X 45	X 40															X 107	X 90	X 65	X 52	X 52	
L Q	X 44	X 41	X 40	X 40	X 38	X 30															X 84	X 72	X 45	X 39	X 40	

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

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

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

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	39	38	38	39	30	30	32	56	74	66	58	56	61	80	84	69	60	77	74	70	66	61	52	48
2	47	44	39	37	34	32	33	58	75	63	65	61	59	64	75	68	68	86	98	76	75	36	31	31
3	30	31	32	33	32	30	30	53	63	56	58	63	61	65	66	69	76	80	88	105	65	47	46	45
4	44	42	43	44	36	34	36	55	83	71	61	59	72	92	113	116	103	93	108	143	102	<sup>R</sup> 50	43	45
5	47	50	52	54	58	<sup>V</sup> 34	32	51	65	60	62	60	64	71	78	75	70	68	73	82	85	70	34	37
6	39	34	36	36	32	26	32	72	60	57	63	59	66	77	72	61	59	66	76	85	70	46	41	42
7	42	39	38	35	34	35	36	63	68	63	59	65	73	74	79	84	84	90	<sup>R</sup> 96	95	87	<sup>H</sup> 66	46	<sup>A</sup>
8	<sup>F</sup> 42	52	51	52	50	46	47	63	62	59	56	61	75	85	83	87	88	94	108	92	67	65	64	59
9	55	52	47	44	36	34	35	67	78	65	64	76	96	114	126	124	115	120	134	134	101	58	45	46
10	<sup>F</sup> 49	<sup>F</sup> 46	<sup>F</sup> 48	40	<sup>V</sup> 46	40	38	57	62	60	60	71	68	59	61	66	69	77	85	87	79	55	39	38
11	36	35	34	33	31	31	33	70	71	68	58	64	65	67	69	67	68	79	97	82	66	39	36	39
12	39	39	38	37	36	36	34	70	73	61	63	64	77	71	66	68	64	68	77	82	80	61	36	37
13	38	38	38	39	33	28	34	62	59	59	61	75	64	65	73	71	70	80	79	71	69	50	32	31
14	33	34	33	34	21	22	30	68	52	62	81	106	84	80	79	83	82	80	87	87	79	38	31	32
15	31	31	31	34	39	<sup>A</sup>	28	56	55	65	<sup>A</sup>	68	86	91	76	68	71	88	97	83	52	30	29	<sup>F</sup> 30
16	32	32	33	33	28	24	26	64	62	59	60	66	73	90	91	93	88	95	107	<sup>A</sup>	<sup>A</sup>	28	31	<sup>F</sup> 34
17	<sup>F</sup> 32	<sup>F</sup> 34	<sup>F</sup> 32	33	32	25	27	56	58	72	60	54	58	77	91	95	106	122	139	123	62	48	60	
18	<sup>F</sup> 76	<sup>F</sup> 79	<sup>F</sup> 88	<sup>F</sup> 52	39	42	34	55	59	73	58	68	71	96	104	84	62	66	109	113	32	26	27	29
19	48	61	66	49	37	26	29	48	57	58	61	66	72	78	88	71	75	95	91	66	44	28	28	29
20	32	29	30	28	24	19	27	51	56	67	66	64	81	87	93	80	69	86	99	84	83	53	33	33
21	38	37	35	38	41	24	30	48	55	65	71	63	74	90	99	98	91	90	98	103	<sup>J</sup> <sup>R</sup> 99	47	38	41
22	40	34	31	34	32	28	37	48	56	59	69	84	88	91	107	124	131	118	104	<sup>R</sup> 84	71	57	55	53
23	54	48	48	50	41	22	27	65	72	74	70	77	99	106	103	<sup>H</sup> 84	86	83	88	76	69	52	40	39
24	39	40	40	39	36	30	34	62	65	74	73	71	68	83	86	91	106	114	110	98	83	67	46	46
25	48	46	42	34	33	40	33	56	63	84	67	72	98	112	109	123	154	155	168	149	106	66	52	49
26	46	45	43	41	35	29	32	57	66	70	63	70	84	102	115	123	110	89	86	81	52	38	36	36
27	37	38	38	38	23	20	26	55	62	69	64	67	100	126	127	133	132	126	118	98	82	52	44	43
28	44	42	42	48	31	27	31	50	65	83	88	84	93	96	91	92	92	87	81	60	57	50	43	42
29	41	41	40	44	32	23	32	55	64	72	82	79	84	105	91	101	110	108	113	104	<sup>J</sup> <sup>R</sup> 86	59	53	40
30	40	43	41	37	41	28	32	65	76	72	69	78	82	96	87	88	104	106	101	90	69	<sup>J</sup> <sup>R</sup> 53	42	39
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	29	30	30	30	30	29	30	30	30	30	30	30	30	30	29	29	30	30	28
MED	40	40	38	38	34	29	32	56	63	65	63	66	74	86	88	84	85	88	98	87	71	51	40	39
U Q	47	46	43	44	39	34	34	64	71	72	69	75	84	96	103	98	106	106	108	104	84	59	46	45
L Q	37	34	34	34	32	24	30	55	59	60	60	63	66	74	76	69	69	80	86	82	66	39	33	34

SEP. 2021 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	L	U	L				A			A					
2									L	L	U	L				L			L					
3								L	416	452	468								L					
4									404	432	464	488				A	A	A	A	L				
5										424	476	464	472	464	464	448	432	404	L					
6									L	L	L						A		A					
7									L	A	U	L	A		A	A		A						
8									A	U	L	U	L						L					
9									L		U	L				A	A	A	A					
10									L	U	L	U	L			A			L					
11									L	L	U	L	A					L	U	L	L			
12									L	A	L	L	A					U	L	L	L			
13									L		L	L						L	L	A				
14									L	U	L	L						L	L	L	L	L		
15										432		A					468	440	A					
16									L	L					U	L		A	A	A				
17									L	L	A	A			A				A					
18									L	L	U	L						U	L	L	L			
19									L	U	L						L	L	A					
20										L														
21									L	L								L	L	L	L			
22										U	L													
23									L	L	U	L	L						L					
24										L														
25									L	L														
26										U	L	L					L	L	L	L				
27									L	L														
28										L	L													
29									L	U	L	L	A	A	A		L	L	L	L				
30										A	A						L	L	L	L	L			
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									3	19	27	24	27	24	25	25	24	15	1					
MED									404	432	464	478	476	476	468	460	442	404	312					
U Q									416	448	476	484	488	484	482	468	448	412						
L Q									U	L	L	L												

SEP.2021 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1							B		A	A	A	A	A		A		A	A	A	A					
								192						348		332									
2							B				A			A					A	B					
								196	260	292		340	348		336	316	300	256							
3							B														B				
								184	272	304	332	340	356	348	348	332	308	264	192						
4							B				A	A	A	A	A	A	A	A	A	A					
								224	264	292															
5							B	A	A	A	A	A	A	A	A						A				
																328	292	236	200						
6							B					A	A		A				A	B					
								204	264	300	328			336		320	300	252							
7							B						A						A	A					
								208	268	296	316	324		336	340	328	288	252							
8							A					A	A	A					A	A	A				
								200	260	296	316				344	328	312								
9							B					A	A	A				A	A	A	A				
								204	268	300	324				344	332									
10							B								A					A					
								224	276	308	332	344	352	344		324	300	268	196						
11							B					A	A							B					
								196	248	304	332			348	348	324	296	252	180						
12							A			A	A	A	A						A	B					
								184	248						336			256							
13							B							A					A	A					
								188	252	300	324	344	344		340		300	244	156						
14							B	A	A		A	A	A	A					A	A	A				
										292					336	320	288								
15							B	A	A	A	A	A	A	A	A	A	A	A	A	A					
16							B			A			A						A	A					
								212	260		324	336		324	308	316	284	244							
17							A												A	A	A				
								204	252	300	324	332	340	336	324	312	292								
18							A					A	A						A	B					
								192	264	288	312			332	336	316	284	236							
19							B		A										A	A					
								204		288	312	324	340	336	324	308	280	236	152						
20							B												A	B					
								200	256	300	312	332	340	332	332	316	292	244							
21							B							A	A	A	A		A	A					
								176	244	308	328	340	340						248						
22							B												A						
								200	248	300	324	340	352	340	328	308	284	240							
23							B						A												
								180	244	300	324	332		308	360	316	292	252	164						
24							B					A							A						
								188	256	308	336		356	356	344		304	240							
25							B						A						A						
								188	268	304	332	344			344	328	300	240							
26							B												A						
								196	256	304	332	344	352	352	340		288	240							
27							B				A	A	A						A	A					
								184	248	304				356	340	324		232							
28							B		A	A	A	A							A	A					
								180	268				356	348	340		296	236							
29							B													A					
								208	256	296	324	348	356	352	344	324	296	248							
30							B	A				A		A					A						
									268	308	328		348		328	308	296	244							
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								26	25	24	21	15	14	18	23	22	23	23	7						
MED								196	260	300	324	340	350	342	340	322	296	244	180						
U Q								204	268	304	332	344	356	348	344	328	300	252	196						
L Q								188	250	296	320	332	340	336	332	316	288	240	156						

SEP. 2021 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION Okinawa

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

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

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

IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	E 16	E 16	E 16	B 25	E 16	E 16	E 16	B 26	32	37	39	41	40	39	36	48	37	32	37	28	35	E 16	E 16	E 16	
2	E 16	E 16	E 16	E 16	E 16	E 16	E 16	B 26	29	34	36	38	39	39	38	35	35	32	24	E 16	E 16	E 16	E 16	E 16	
3	E 16	E 16	E 16	E 16	E 16	E 16	E 16	B 22	32	35	43	46	43	38	G	G	36	G	21	E 16	E 16	E 16	E 16	E 26	
4	E 16	E 16	E 26	23	19	20	E 16	G	31	37	37	41	41	40	47	72	48	47	23	18	22	20	E 16	E 16	
5	20	20	E 16	E 16	E 16	E 16	E 16	25	34	38	36	37	41	37	36	35	G	26	22	E 16	E 16	E 16	E 16	E 16	
6	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26	30	33	36	43	38	40	38	36	42	30	43	E 16	22	25	17	E 16	
7	E 16	21	E 16	E 16	E 16	E 16	E 16	25	33	44	42	55	40	49	54	46	33	49	32	56	21	E 16	33	A 67	
8	E 16	E 16	E 16	E 16	E 16	E 16	E 18	26	39	40	35	40	43	42	37	36	34	30	25	46	27	28	21	25	
9	E 16	23	E 16	E 16	E 16	E 16	E 16	25	31	37	40	37	38	42	51	49	48	38	33	18	50	E 16	E 16	20	
10	22	E 16	E 16	E 16	E 16	E 16	E 20	28	32	36	38	41	39	42	39	54	38	G	G	E 22	E 16	40	24	E 16	
11	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26	32	33	38	49	38	37	G	35	33	G	23	E 16	E 16	E 16	E 16	E 16	
12	E 16	E 16	E 16	E 16	E 16	E 16	E 20	41	30	49	39	40	50	39	36	34	33	G	20	18	18	18	E 16	E 16	
13	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	32	35	38	39	39	38	39	34	42	33	61	51	21	E 16	E 16	E 16	
14	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	30	34	35	37	39	38	35	G	32	28	20	18	18	18	E 16	E 16	
15	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	29	36	A 98	52	60	49	46	37	39	40	52	39	40	20	20	E 16	
16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	32	34	36	39	40	41	41	34	32	52	80	A 224	A 127	E 16	17	E 16	
17	E 16	E 16	E 16	E 16	E 16	E 16	E 20	24	32	32	44	46	40	46	49	35	G	38	31	65	42	E 16	30	20	
18	E 16	E 16	E 16	20	22	E 16	18	23	G	32	36	35	35	G	G	G	33	26	20	E 16	E 16	E 16	E 16	E 16	
19	E 16	22	23	22	19	E 16	16	24	30	32	34	36	39	38	38	35	33	36	32	32	E 16	E 16	E 16	E 16	
20	E 16	E 16	E 16	E 16	E 16	E 16	E 16	23	29	34	36	40	38	37	42	G	36	28	28	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	25	33	40	44	42	40	38	38	33	33	29	50	61	38	E 16	E 16	E 16	
22	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	32	40	37	42	46	43	38	43	G	G	19	E 16	E 16	25	E 16	E 16	
23	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26	32	34	39	40	41	39	33	36	G	34	25	37	E 16	E 16	E 16	E 16	
24	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	30	34	36	36	G	G	G	34	G	30	35	38	30	21	E 16	18	
25	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	31	39	36	42	46	38	G	G	G	27	21	E 16	28	20	E 16	30	
26	E 16	21	E 16	E 16	E 16	E 16	E 16	25	31	34	35	40	G	G	G	36	34	32	24	21	18	18	E 16	E 16	
27	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	32	34	35	37	40	40	40	29	30	25	18	18	E 16	E 16	E 16	E 16	
28	E 16	E 16	E 16	E 17	E 16	E 16	E 16	25	34	35	34	36	31	G	G	G	38	36	36	26	19	E 16	17	E 16	
29	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	31	36	37	51	51	51	40	38	G	28	20	22	E 16	E 16	E 16	17	
30	E 16	20	E 16	E 16	E 16	E 16	E 16	26	36	49	48	38	38	51	43	38	32	28	64	73	E 16	E 16	26	20	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
MED	E 16	E 16	E 16	E 16	E 16	E 16	E 16	25	32	35	37	40	40	39	38	35	33	30	25	20	18	E 16	E 16	E 16	
U Q	E 16	E 16	E 16	E 16	E 16	E 16	E 16	26	32	38	39	42	41	42	41	38	36	36	35	39	28	20	17	18	
L Q	E 16	E 16	E 16	E 16	E 16	E 16	E 16	24	30	34	36	37	38	38	G	G	G	G	E 28	E 16	E 16	E 16	E 16	E 16	

SEP.2021 fbEs (0.1MHz)

## IONOSPHERIC DATA STATION Okinawa

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

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

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

SEP. 2021 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

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

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	284	298	335	380	301	317	336	366	375	386	340	305	289	321	328	336	304	331	340	336	313	328	302	304
2	312	319	320	311	319	313	333	354	390	360	351	327	310	323	328	320	295	315	359	352	404	310	292	286
3	286	303	298	319	342	377	337	372	390	378	337	329	324	322	309	304	318	320	327	362	381	294	311	294
4	295	278	302	327	323	332	333	365	360	400	336	297	283	281	309	315	337	314	319	330	396	299 <sup>R</sup>	270	274
5	286	281	300	316	343	375 <sup>V</sup>	344	363	385	367	351	311	309	311	321	329	327	315	320	335	352	379	309	295
6	277	287	291	329	345	340	340	402	392	363	358	301	311	321	315	339	328	340	337	342	374	319	291	306
7	319	318	314	328	284	309	336	387	390	383	338	324	321	300	281	286	299	323	309 <sup>R</sup>	346	367	334 <sup>H</sup>	299	<sup>A</sup>
8	303 <sup>F</sup>	294	316	314	324	300	316	397	372	362	355	288	303	308	283	292	297	315	345	353	292	298	306	318
9	293 <sup>F</sup>	293 <sup>F</sup>	311 <sup>F</sup>	326	299	286	312	385	393	387	339	332	302	290	314	315	302	304	327	360	359	356	298	288
10	312 <sup>F</sup>	302 <sup>F</sup>	307 <sup>F</sup>	340	329	338 <sup>V</sup>	322	377	385	362	313	350	336	323	320	313	315	311	316	331	354	379	300	307
11	307	308	310	306	296	296	318	376	382	381	334	359	327	323	327	319	311	306	344	356	365	310	285	288
12	293	286	296	308	333	322	334	359	379	359	339	310	333	317	325	329	320	331	322	340	380	365	289	288
13	284	294	306	340	334	324	351	390	374	374	347	339	347	315	327	337	326	345	328	355	360	351	303	270
14	295	299	302	349	352	327	352	393	378	290	314	356	319	310	294	303	315	337	332	354	375	358	294	317 <sup>F</sup>
15	283	283	290	331	400	<sup>A</sup>	326	379	371	382	<sup>A</sup>	316	314	336	332	304	308	315	356	367	350 <sup>A</sup>	304 <sup>A</sup>	294	287 <sup>F</sup>
16	305	316	315	331	386	301	328	398	384	364	340	328	295	311	260	267	282	331	373	<sup>A</sup>	<sup>A</sup>	306	301	306 <sup>F</sup>
17	303 <sup>F</sup>	309 <sup>F</sup>	315 <sup>F</sup>	342 <sup>F</sup>	372	351	326	389	370	377	374	319	276	275	302	297	302	335	367	377	371	297	275	<sup>F</sup>
18	282 <sup>F</sup>	293 <sup>F</sup>	357 <sup>F</sup>	352 <sup>F</sup>	314	347	329	386	353	355	346	351	283	297	333	323	266	283	337	398	351	282	282	283
19	289	295	353	346	346	370	348	386	373	362	348	344	316	316	330	291	297	353	378	380	379	324	304	302
20	293	306	334	367	352	338	369	382	371	367	369	342	327	341	326	294	297	315	369	339	374	378	319	304
21	306	300	314	331	365	327	341	387	369	361	362	342	302	299	322	297	291	312	331	348 <sup>J R</sup>	384 <sup>J R</sup>	361	281	295
22	293	305	310	333	348	315	362	395	371	333	346	339	321	286	281	311	339	327	342	244 <sup>R</sup>	300	313	301	294
23	311	296	300	329	354	415	316	369	376	369	335	307	325	343	303	308 <sup>H</sup>	294	325	332	359	352	332	301	288
24	295	309	311	326	347	334	341	388	363	356	368	353	326	303	308	305	307	332	345	317	322	377	289	280
25	285	292	304	287	307	378	316	378	350	372	343	305	319	317	303	301	322	336	347	357	341	315	315	298
26	297	301	318	331	332	311	332	372	391	370	341	327	300	312	319	298	310	343	351	371	352	322	305	277
27	286	310	335	374	414	307	321	376	369	352	363	311	293	329	311	314	315	297	324	303	336	289	289	293
28	296	310	315	359	385	296	334	369	351	343	352	310	321	305	312	310	341	342	364	336	327	338	311	291
29	300	302	318	352	389	300	321	383	377	339	343	354	306	329	320	309	308	335	352	352	306 <sup>J R</sup>	296 <sup>J R</sup>	259	285
30	278	306	318	324	350	348	327	379	385	388	332	346	309	331	328	304	310	331	344	356	329 <sup>J R</sup>	269 <sup>J R</sup>	294	290
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	29	30	30	30	30	29	30	30	30	30	30	30	30	30	29	29	30	30	28
MED	294	300	312	331	344	327	333	380	376	366	343	328	312	316	317	308	309	326	341	352	354	320	298	292
U Q	303	308	318	346	354	348	341	388	385	378	354	344	324	323	327	319	320	335	352	360	374	356	304	303
L Q	286	293	302	324	323	308	322	372	370	359	338	310	302	303	303	298	297	315	327	336	332	299	289	286

SEP. 2021 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	L	U L	U L				A			A					
2									L	L	U L	U L	399	424	410		371	361						
3								L				A												
4									401	395	392		395	401	383	390	361	363						
5									379	401	397	391	430	402										
6									L	L	L													
7									L	A	U L	A												
8									A	U L	U L	U L												
9									L															
10									L	U L	U L	U L												
11									L	U L	U L	A												
12									L	A	L	L	A											
13									L		L	L												
14									L	U L	L	L												
15											L	A												
16									L	L														
17									L	L	A	A												
18									L	U L	U L	U L												
19									L	U L	L	L												
20									L	L	A	A												
21									L	L	A	A												
22									U L	L		A												
23									L	U L	L	L												
24									L	L														
25									L	L														
26									L	L														
27									L	L														
28									L	L														
29									L	U L	L	A												
30									L	L	A	A												
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									3	19	26	22	25	22	22	24	23	14	1					
MED									401	398	392	398	399	400	383	372	363	364	385					
U Q									U L	L	L	L	L	L	L	L	L	L	L					
L Q									379	387	384	390	387	384	374	358	359	359						

SEP. 2021 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

SEP. 2021 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									226	230	292	362	386	300	274	270	340	274	234					
2									218	238	270	292	356	314	292	300	332	284	226					
3								214	218	248	306	306	324	314	340	332	292	280	260					
4									234	212	294	370	334	344	286	268	254	276	252					
5									250	274	344	344	318	294	282	280	294	262						
6									214	252	260	374	330	298	276	292	300	274	256					
7									218	224	280	308	294	320	326	314	302	270						
8									226	246	272	364 <sup>U L</sup>	316	292	336	320	304	284	242					
9									212	224	274	276	284	294	286	266	296	288	254					
10									228	254	318 <sup>U L</sup>	256	286	308	312	318	310	274	260					
11									222	226	278	256	302	306	308	306	308	284	248					
12									220	244	274	332	282	278	302	296	296	266						
13									224	226	276	278	272	328	294	278	286	254 <sup>E A</sup>	276					
14								208	224	270	302	248	258	312	310	304	272	246	252					
15									236		316 <sup>A</sup>	308	266	268	318	304	262							
16									214	250	288	290	324	270	312	302	286	262	238					
17									246	236	238	300	422	344	304	302	298	250						
18									242	230	266	276	336	302	256	252		336	250					
19									234	246	260	272	284	300	268	322	302	240						
20									248	250	274	276	258	260	288	310	264							
21									234	254	256	268	300	296	272	280	290	274						
22									296	266	264	282	304	318	284	240	226							
23									226	236	278	316	274	248	248	262		262						
24									242	244	244	288	294	286	294	276	246							
25									250	232	276	334	276	274	264	288	262	238						
26									240	270	288	308	286	272	274	256	236							
27									232	246	246	326	302	254	262	258	254	242						
28									256	260	248	268	274	288	276	282	254							
29									224	264	262	248	308	270	258	272	264	246						
30									222	250	264	280	262	252	294	262	244							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								2	23	30	29	30	30	30	30	30	28	29	14					
MED								211	226	243	272	289	301	297	286	290	291	264	252					
U Q								234	250	279	326	324	312	308	304	303	278	260						
L Q								218	230	258	268	282	274	268	274	263	246	242						

SEP. 2021 h'F2 (KM)

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## IONOSPHERIC DATA STATION Okinawa

SEP. 2021 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1	314	288	256	218	268	236	230	222	222	218	228	196	194	178	188	A	222	246	A	220	258	210	242	260			
2	246	252	260	246	234	252	238	212	212	204	194	196	188	182	192	200	204	204	198	206	188	202	288	316			
3	316	294	284	246	212	194	244	190	196	188	242	A	E A	224	174	214	180	232	210	212	212	176	246	252	E A	306	
4	268	286	E A	E A	228	246	238	216	196	E A	206	190	200	190	184	A	A	A	A	220	208	180	214	268	290		
5	286	272	264	242	202	192	232	198	232	E A	204	176	172	214	176	174	194	208	196	242	230	214	186	194	276		
6	292	292	280	246	208	238	238	208	200	188	180	198	174	210	202	216	A	220	A	230	200	E A	234	276	264		
7	256	262	252	236	254	254	216	214	210	A	212	A	180	A	A	A	214	A	252	236	200	196	E A	294	A		
8	288	254	254	230	214	250	250	202	A	202	172	176	260	254	184	210	208	230	238	218	268	E A	274	252	234		
9	272	248	222	220	286	312	258	212	208	194	208	172	188	250	A	A	A	E A	280	A	210	198	188	252	E A	304	
10	248	266	274	190	232	234	262	210	218	204	186	194	180	190	182	A	E A	244	222	238	214	210	216	258	246		
11	266	272	276	260	282	292	242	214	214	202	196	A	192	186	172	200	206	202	238	202	190	178	268	284			
12	286	286	278	264	246	252	254	238	208	A	204	192	A	220	202	198	212	188	240	226	200	200	270	296			
13	298	290	266	216	216	228	226	216	216	202	190	206	222	184	206	196	A	246	A	240	210	196	238	320			
14	302	286	284	222	218	266	230	202	190	196	170	170	222	194	176	172	218	218	230	202	196	218	266	290			
15	320	306	310	240	200	A	248	210	204	216	A	A	A	A	A	A	E A	204	248	A	A	E A	290	E A	314	300	
16	286	262	266	240	204	258	254	208	206	206	196	194	206	E A	E A	E A	198	224	A	A	A	A	258	292	274		
17	296	272	262	244	200	226	270	216	208	198	A	A	192	A	A	214	216	A	214	208	202	244	E A	308	298		
18	Q	Q	190	208	E A	260	220	242	210	208	208	182	186	186	204	200	192	222	232	232	192	176	292	336	326		
19	278	256	212	204	218	204	228	206	210	192	188	180	206	182	234	216	218	A	218	200	178	226	298	284			
20	294	288	244	216	230	264	232	204	208	200	196	218	198	184	A	216	230	226	224	202	200	196	262	280			
21	268	274	262	236	208	202	218	200	198	E A	230	A	E A	214	212	168	228	190	212	226	244	236	204	182	E A	252	
22	248	266	270	234	226	246	204	192	212	E A	228	202	A	A	E A	238	212	A	208	200	212	218	234	238	260	262	
23	240	266	260	224	186	166	264	222	216	228	194	226	222	222	222	198	252	A	242	224	206	200	250	300			
24	292	278	260	232	218	214	224	204	214	204	190	184	180	170	170	188	198	228	224	220	212	194	220	280			
25	272	252	252	298	268	204	194	220	212	212	194	186	A	202	180	194	208	214	228	196	202	220	246	270			
26	274	282	246	232	214	238	248	214	216	214	190	190	184	172	160	226	218	A	226	208	192	228	258	290			
27	296	270	236	204	192	318	250	220	208	200	182	168	204	204	242	196	210	214	216	212	198	218	274	270			
28	266	248	252	220	200	238	234	208	230	218	198	186	184	178	180	E A	E A	E A	220	232	242	220	214	220	216	252	282
29	264	270	264	216	182	296	234	206	204	198	214	A	A	A	214	212	208	222	218	200	186	200	264	296			
30	294	270	234	238	218	214	246	212	214	A	A	184	192	A	A	224	230	230	236	246	198	216	E A	E A	308		
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	30	30	30	30	30	29	30	30	29	27	26	23	25	25	23	24	26	22	25	29	29	30	30	29			
MED	286	271	260	232	218	238	238	210	210	203	194	188	192	185	196	198	214	222	228	212	200	211	260	282			
U Q	294	286	274	244	234	256	250	216	215	214	202	198	213	211	214	215	230	230	238	225	211	234	288	300			
L Q	266	262	252	218	204	214	230	204	205	198	186	180	185	178	180	194	208	210	218	204	191	196	252	270			

SEP. 2021 h'F (KM)

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## IONOSPHERIC DATA STATION Okinawa

SEP. 2021 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

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

SEP. 2021 h'E (KM)

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## IONOSPHERIC DATA STATION Okinawa

SEP. 2021 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	96	100	102	94	98	B	B	94	138	120	92	92	92	94	118	122	88	90	88	86	102	84	82	B	
2	98	B	B	B	B	92	96	116	110	110	172	118	136	136	138	132	120	108	100	98	96	94	98	92	
3	96	B	B	B	B	B	B	138	176	114	176	108	116	140	G	G	196	G	164	B	98	92	90	90	
4	100	96	90	90	88	88	94	G	110	110	104	102	102	100	98	96	98	94	94	88	88	84	88	92	
5	92	92	106	106	B	B	B	132	96	96	98	96	94	96	92	136	G	158	130	110	104	100	B	B	
6	B	B	B	B	94	94	B	114	114	124	114	92	110	100	104	142	114	104	98	96	94	98	100	104	
7	94	92	B	B	88	88	B	112	108	104	106	102	116	100	104	106	106	104	96	98	96	96	94	100	
8	100	90	94	86	86	90	90	126	106	106	108	98	154	118	144	118	90	88	116	94	94	96	94	96	
9	98	92	98	92	92	B	94	126	120	108	104	110	102	96	130	136	136	124	94	118	106	B	92	86	
10	96	94	92	90	B	B	126	122	122	120	110	106	106	104	106	104	102	G	G	106	100	100	100	94	
11	96	92	90	92	B	B	B	120	122	126	166	94	88	148	G	158	168	G	138	B	B	B	B	B	
12	96	88	B	108	100	112	102	100	104	102	102	98	96	92	150	136	122	G	114	90	94	88	88	86	
13	B	B	B	B	B	B	B	130	122	114	108	108	106	106	102	100	128	116	110	104	98	B	96	94	
14	B	B	96	B	B	B	B	110	102	106	104	108	174	156	144	G	172	108	92	86	92	92	90	92	
15	94	94	92	96	90	90	90	126	120	108	100	92	90	88	110	116	84	102	100	98	98	96	94	94	
16	92	B	88	B	B	90	92	106	106	108	106	106	102	102	102	162	138	106	100	100	108	124	94	92	
17	96	94	96	92	92	90	120	128	112	116	108	104	108	104	104	112	G	104	96	94	94	96	92	92	
18	94	94	90	90	92	90	90	136	G	116	108	102	98	G	G	G	180	164	104	100	100	98	94	86	
19	94	86	86	84	84	84	90	122	120	118	102	162	152	158	152	138	126	112	108	100	98	B	96	94	
20	96	96	96	B	B	B	B	128	118	112	104	104	106	108	104	G	118	138	104	112	96	100	98	B	
21	B	B	B	B	B	B	B	128	120	112	110	106	106	100	166	104	158	146	114	106	102	98	96	96	96
22	B	B	B	92	B	B	B	128	112	108	110	108	108	106	106	102	G	G	148	86	112	100	102	B	
23	B	B	B	B	B	B	B	140	122	112	114	110	176	102	100	98	108	118	128	112	98	96	94	94	B
24	92	88	90	B	B	B	B	148	146	150	102	104	G	G	G	102	G	136	110	100	94	88	84	82	
25	86	B	B	B	B	B	B	132	116	104	110	104	98	152	G	G	G	120	102	88	92	90	92	92	
26	88	88	88	88	B	B	B	150	118	114	122	110	G	G	G	170	132	118	108	100	92	86	86	82	
27	B	B	86	B	B	B	B	134	128	134	134	116	98	166	130	98	98	96	154	90	122	92	B	B	B
28	B	B	86	86	B	B	B	148	128	150	98	98	98	G	90	100	122	110	110	102	100	96	96	96	
29	92	90	86	B	B	B	B	120	126	116	110	110	110	106	110	112	114	G	108	118	100	98	98	96	98
30	92	92	88	92	90	90	110	114	108	104	104	106	106	100	104	102	156	106	100	96	94	104	84	84	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	22	18	20	16	12	12	15	29	29	30	30	30	28	26	24	25	24	25	29	28	29	25	27	23	
MED	95	92	90	92	91	90	96	126	116	112	108	104	106	104	105	114	122	110	104	99	96	96	94	92	
U Q	96	94	96	93	93	91	120	131	122	118	110	108	113	130	134	136	147	132	114	103	100	99	96	96	
L Q	92	90	88	89	88	89	90	115	109	108	104	98	98	100	102	102	104	104	97	94	94	91	90	86	

SEP. 2021 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F2	F2	F1	F5	F2			LH11	HL12	CL12	LC32	L3	LC21	LC31	CL12	CL22	LC32	L4	L4	L3	FF31	F2	F1	
2	F1					F1	L1	C2	C1	C1	HL11	C1	H1	H1	H1	H1	CL12	C2	C4	L1	F1	F2	F2	F1
3	F1							H1	H1	C1	H1	C2	C1	H1			H1		H1		F1	F1	F1	F4
4	F3	F2	F5	F3	F5	F3	L2		C2	C2	C3	C2	C2	L2	L3	L5	L2	L5	L2	L3	F2	F3	F1	F2
5	F3	F2	F1	F2				HC11	LH11	L3	L2	L1	L2	L1	L2	HL11		HC11	H1	C1	F1	F1		
6					F1	F1		C2	C1	C1	CL11	L3	C1	C1	C1	HL11	C2	C3	L3	L3	F3	FF33	F2	F1
7	F5	F4			F1	F1		C3	C3	C3	C3	C4	CL11	C2	C3	C3	C1	C7	L4	L8	F4	F3	F4	FQ31
8	F2	F4	F1	F1	F1	F1	L2	CL21	C3	C2	C1	LH21	HL11	CL11	H1	CL11	LC31	L3	CL9	L24	FF42	F3	F2	F3
9	F2	F3	F1	F2	F2		L1	C1	C2	C2	C2	C1	L1	L11	H2	HL11	HC31	CL32	L5	L1	F6		F2	F2
10	F3	F2	F1	F1			C3	C3	C1	C1	C1	C1	C1	C2	C2	C4	C6			C4	F3	F4	F3	F3
11	F3	F1	F1	F1				C2	CL31	C1	H1	L3	L2	H1		H1	H1		H2					
12	F1	F1		F1	F2	F1	C3	C6	C3	C3	C2	L2	L2	L2	HL11	HC11	CL11		C1	L3	F3	F3	F1	F1
13								H2	C1	C2	C2	C1	C1	C1	C1	C2	C2	C3	C8	C8	F3		F3	F2
14			F1					C2	C2	C2	C1	C1	H1	HL11	HL11		H1	C2	L1	L3	F3	F3	F2	F1
15	F3	F1	F3	F1	F3	F9	L3	C1	CL11	CL13	CL23	L3	L5	L3	CL22	CL13	LC23	CL22	CL94	L4	F5	F4	F3	F1
16	F1		F1			F1	L2	C1	C3	C1	C2	C1	C2	C1	C1	H1	H1	C5	C6	L4	FF45	FF13	F3	F2
17	F2	F2	F2	F3	F2	F4	CL23	CL11	C2	C1	C3	C2	C1	C2	C3	C1		C5	L7	L5	F5	F3	F3	F3
18	F2	F2	F5	F7	F3	F2	L3	H1		C1	C1	L1	L1				H1	H1	C2	L3	F2	F4	F3	F1
19	F2	F4	F4	F5	F3	F1	C1	C2	C1	CL11	C1	H1	H1	H1	H1	H1	C1	C4	C5	L9	F1		F1	F2
20	F2	F2	F2					C2	C1	C1	C1	C2	C1	C1	C1		C2	H1	C4	C1	F3	F4	F2	
21								C3	C2	C1	C2	CH11	C1	HC11	C1	C1	HL11	H1	C5	C8	F4	F4	F5	F1
22				F1				C2	C2	C2	C1	C2	C2	C2	C1	C2			HL11	F2	FF11	F5	F1	
23						H1	C3	C3	C1	C2	HC11	C1	CH11	L1	C1	C1	C2	C2	C2	F8	F1	F2	F2	
24	F1	F1	F1					H1	H1	HC11	CH11	C1				C1		H2	C4	C5	F6	F5	F1	F2
25	F1							H2	C1	C3	C1	C2	L2	HL11				C1	C2	F3	F2	F2	F3	F4
26	F2	F3	F2	F2				H1	C1	C1	C1	C1				H1	H1	C4	C5	F8	F3	F4	F1	F1
27			F1				H1	C1	H1	HL11	C1	L1	HL11	HL11	LC11	L1	L1	H1	L2	FF21	F1			
28			F3	F2				H2	C2	HC11	L1	L1	L1		L1	L1	C1	C4	C4	F3	F3	F4	F3	F1
29	F1	F1	F1				C1	C4	C2	C2	C1	C2	C3	C3	C2	C2		C2	C2	F5	F2	F2	F2	F4
30	F3	F5	F3	F1	F1	F2	C1	C3	C2	C4	C2	C1	C1	C3	C2	C3	H1	C3	C3	F9	F4	F1	F3	F3
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																								

SEP. 2021 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## f-PLOTS OF IONOSPHERIC DATA

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

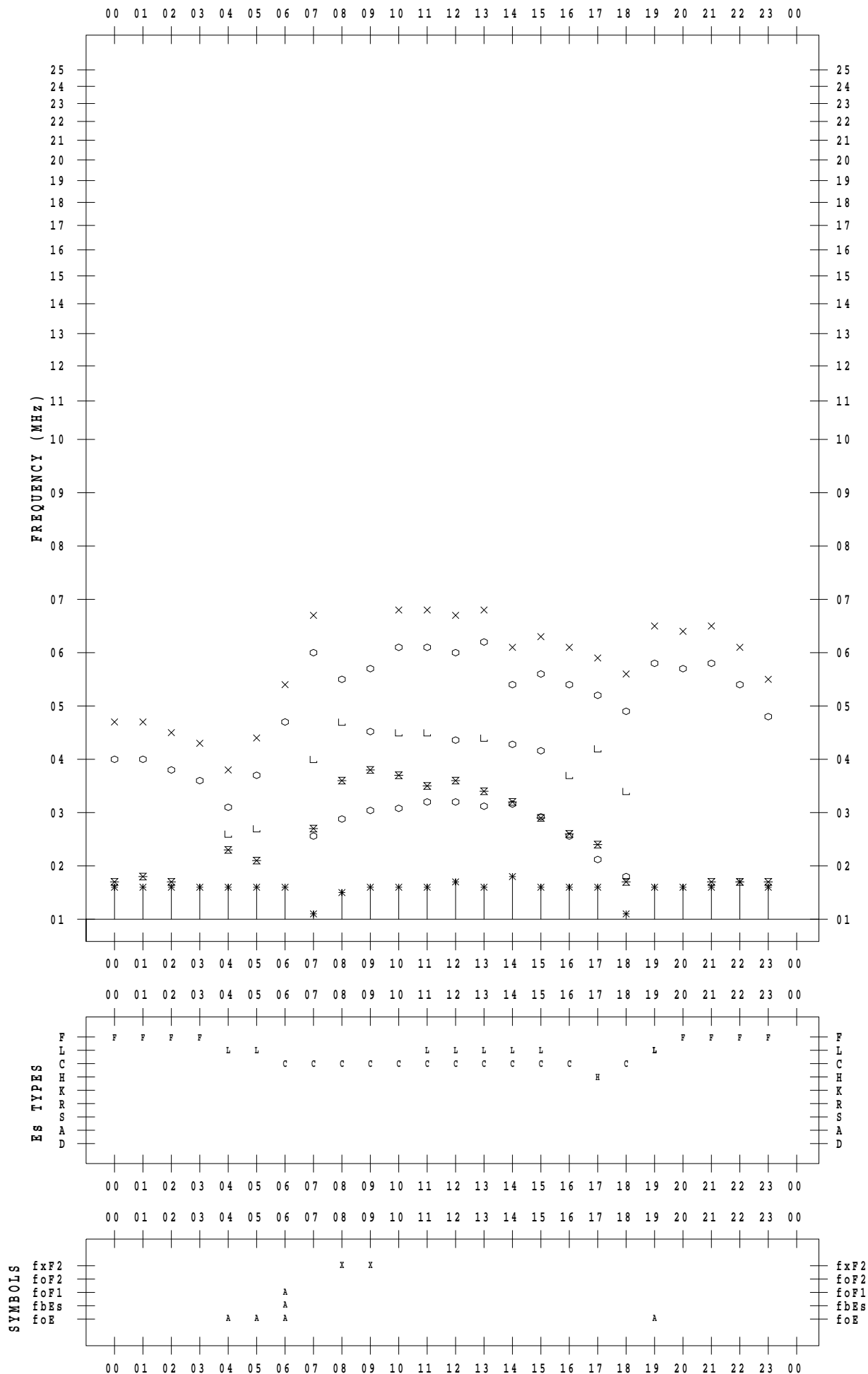
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 1

135 ° E MEAN TIME



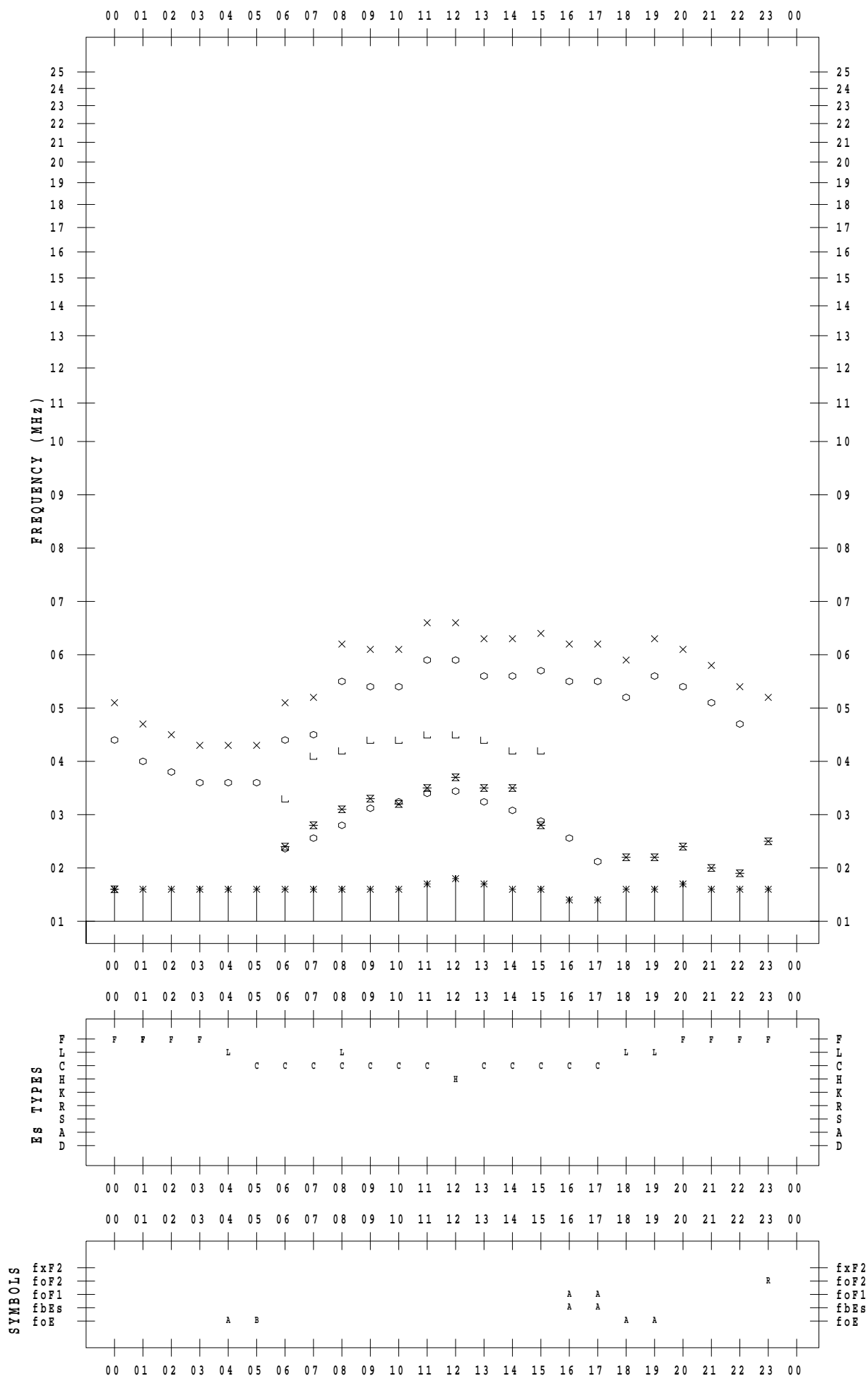
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 2

135 ° E MEAN TIME



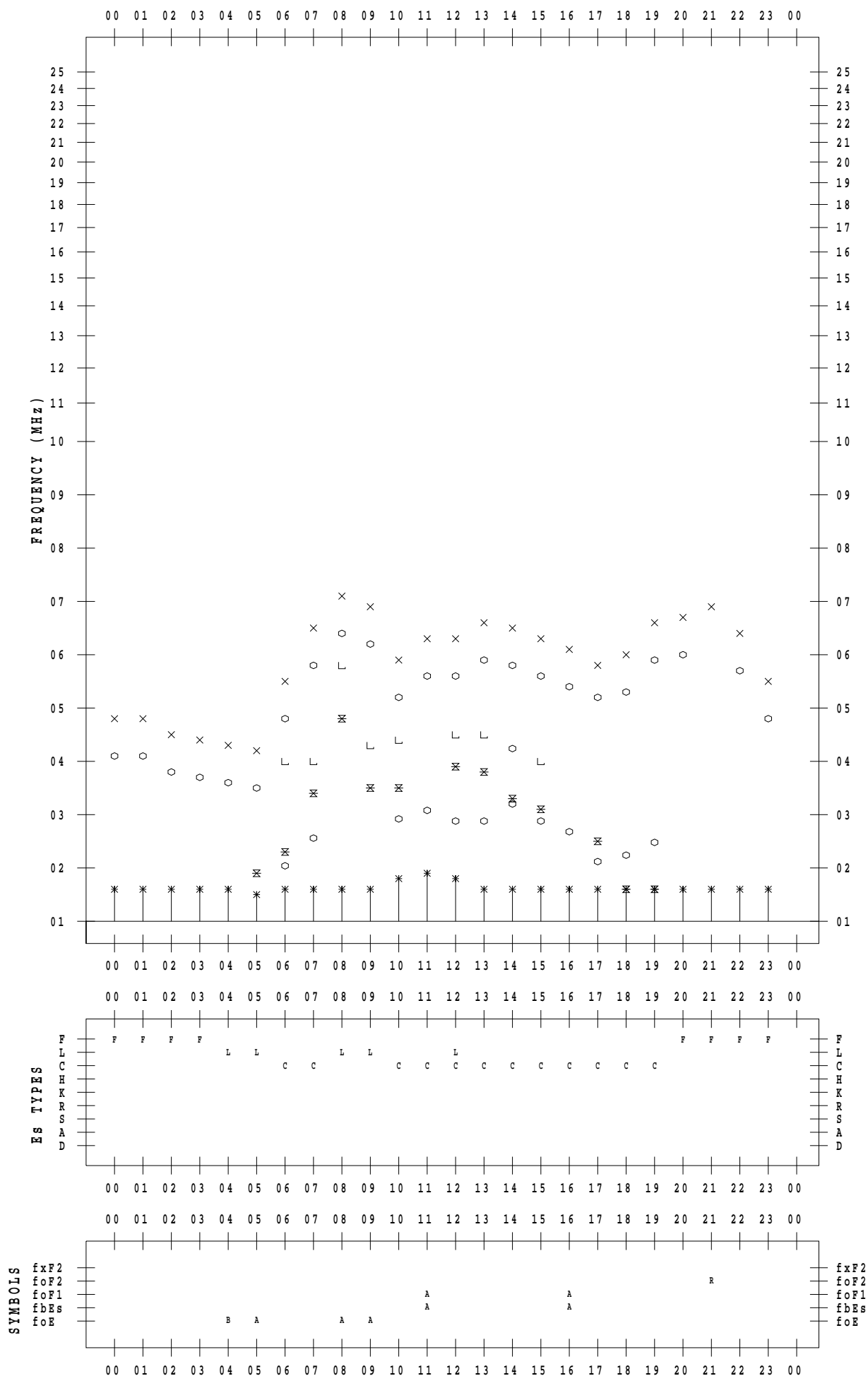
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 3

135 ° E MEAN TIME



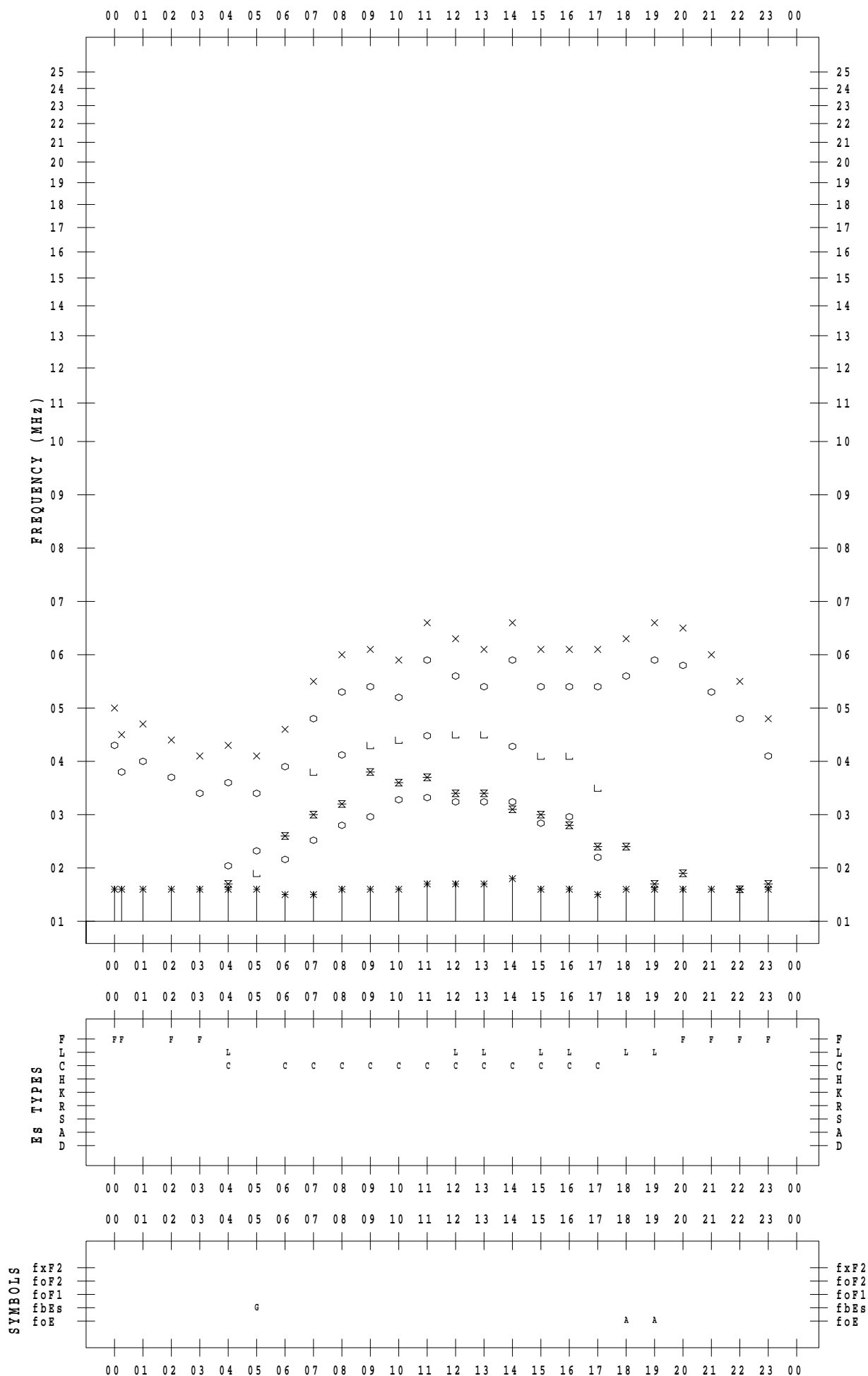
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 4

135 ° E MEAN TIME





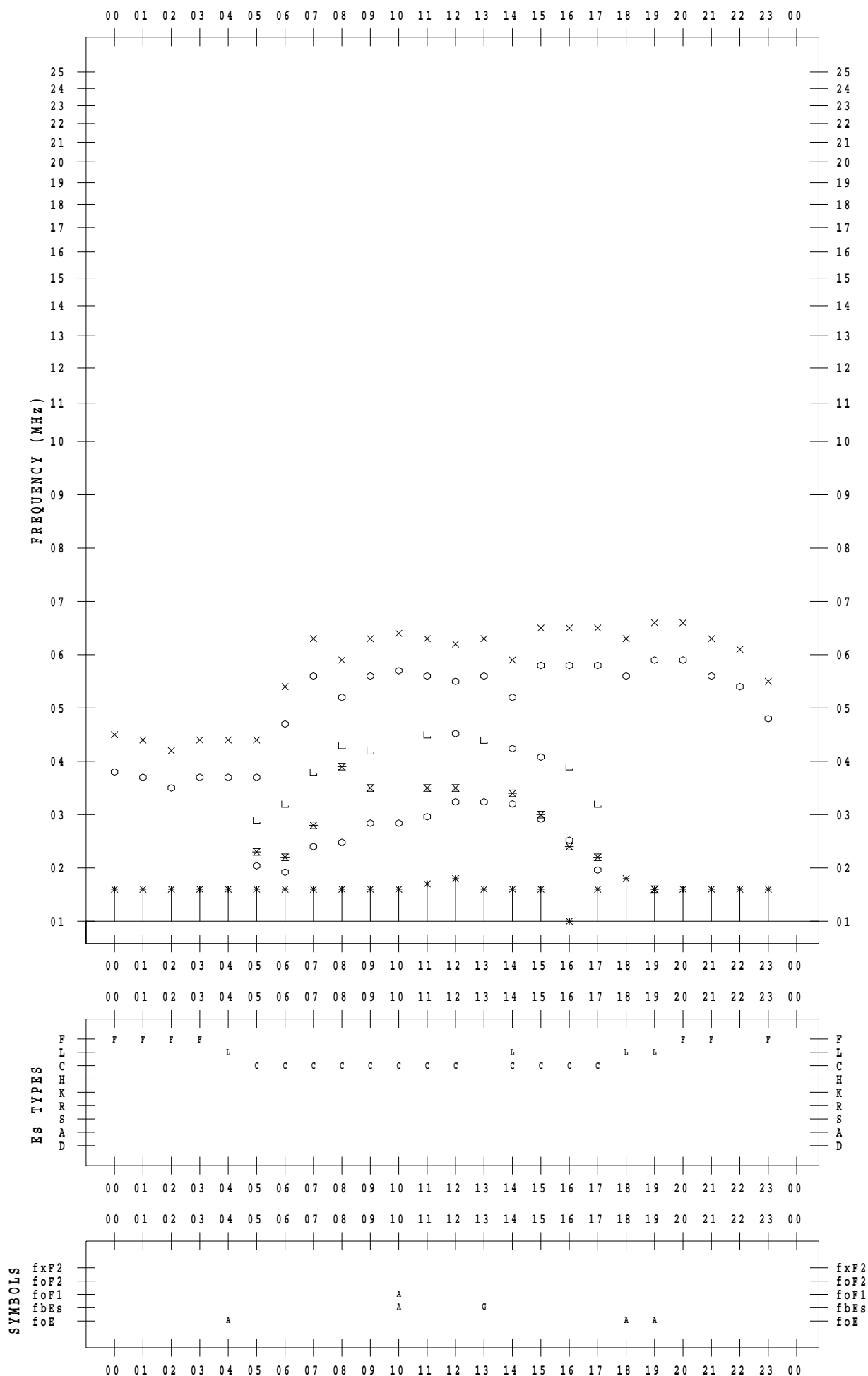
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 5

135 ° E MEAN TIME



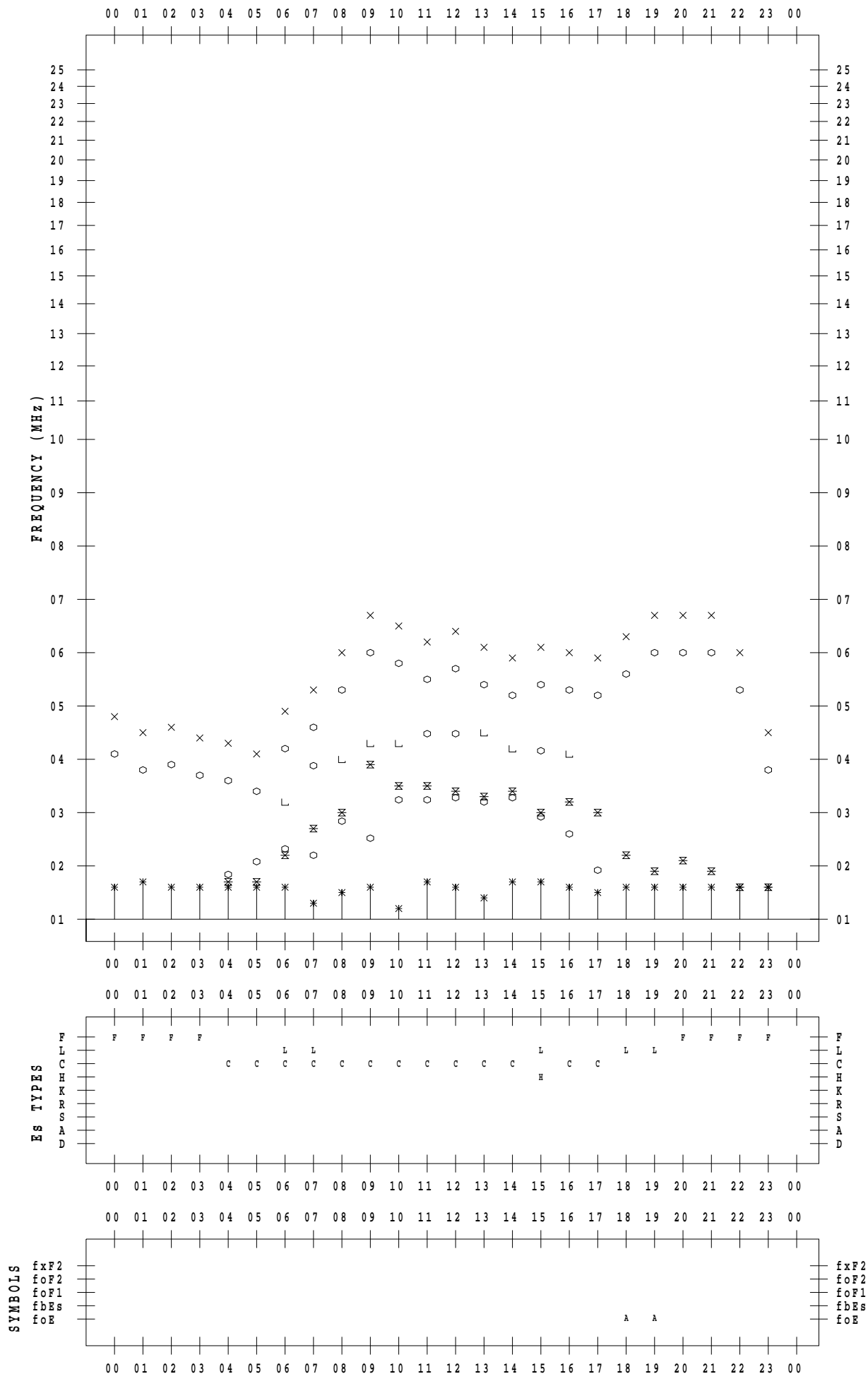
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 6

135 ° E MEAN TIME



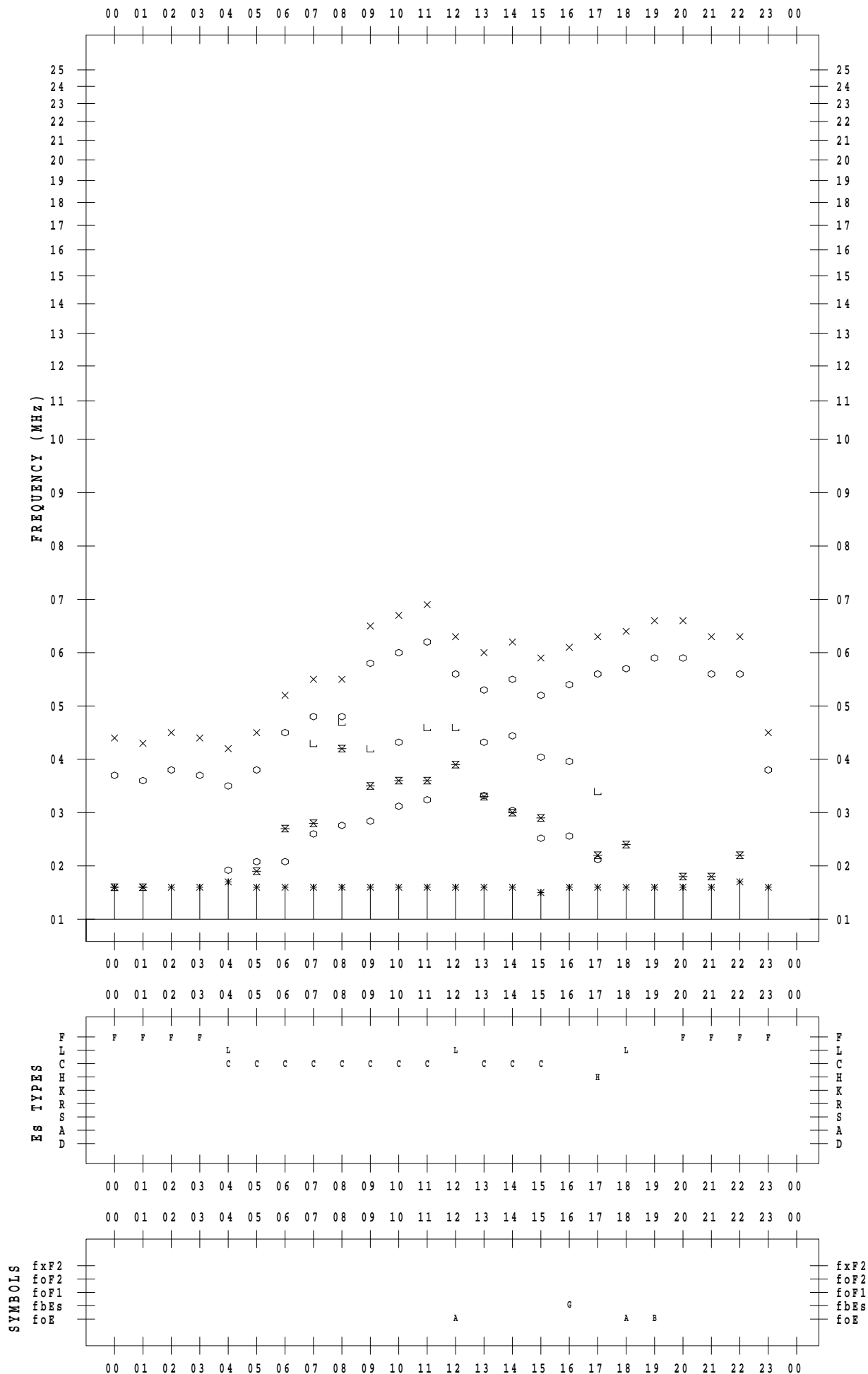
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 7

135 ° E MEAN TIME



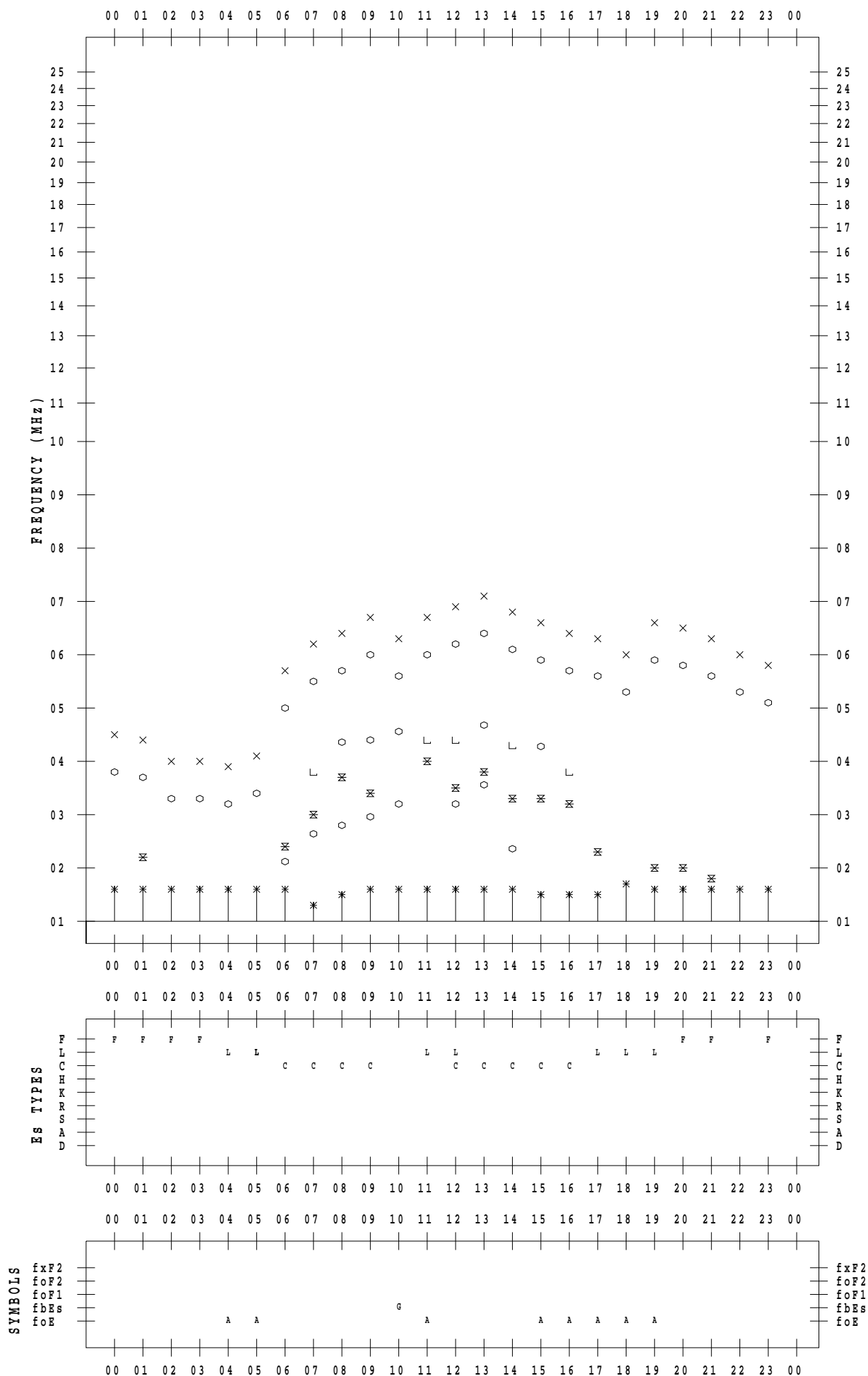
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 8

135 ° E MEAN TIME



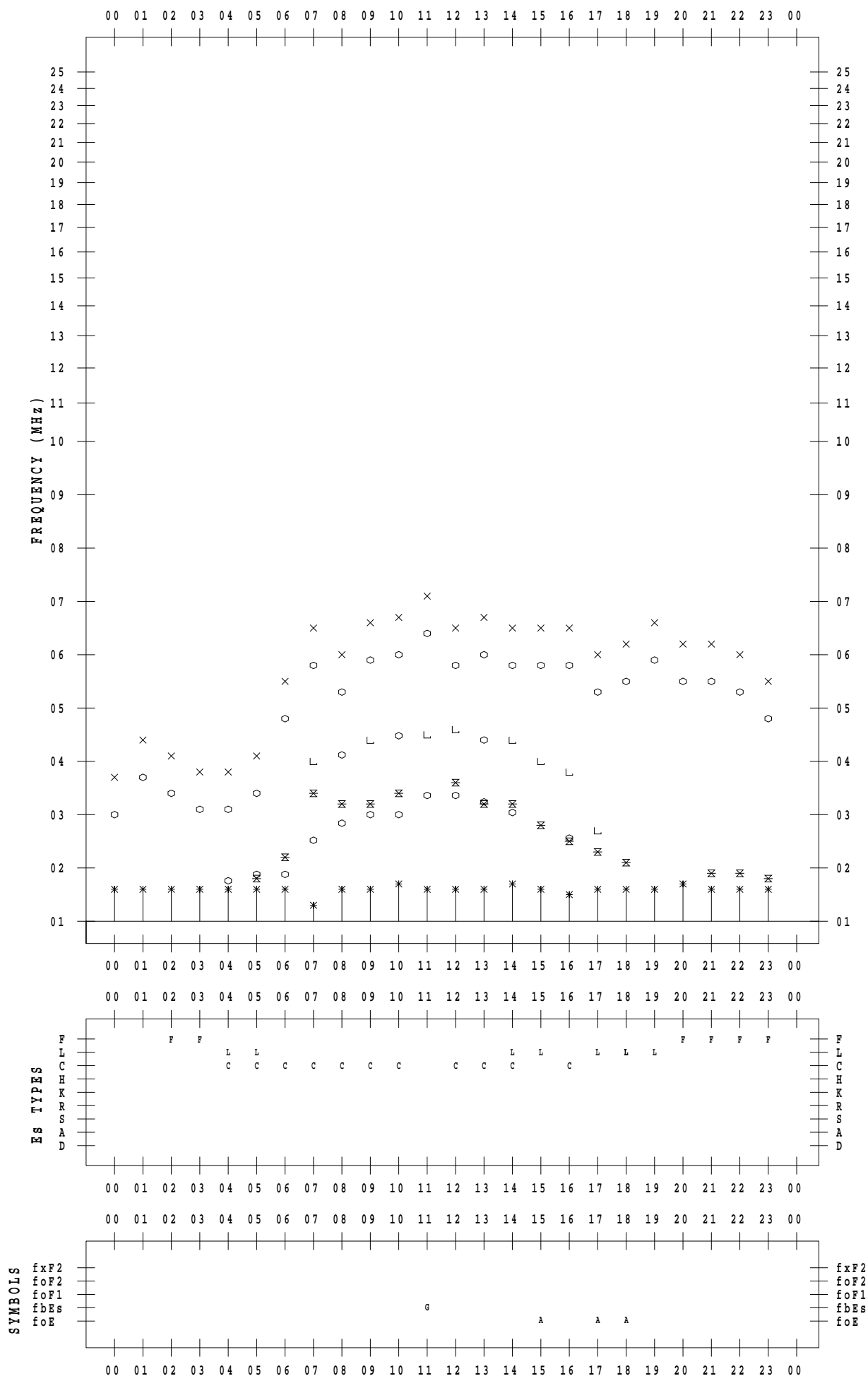
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 9

135 ° E MEAN TIME



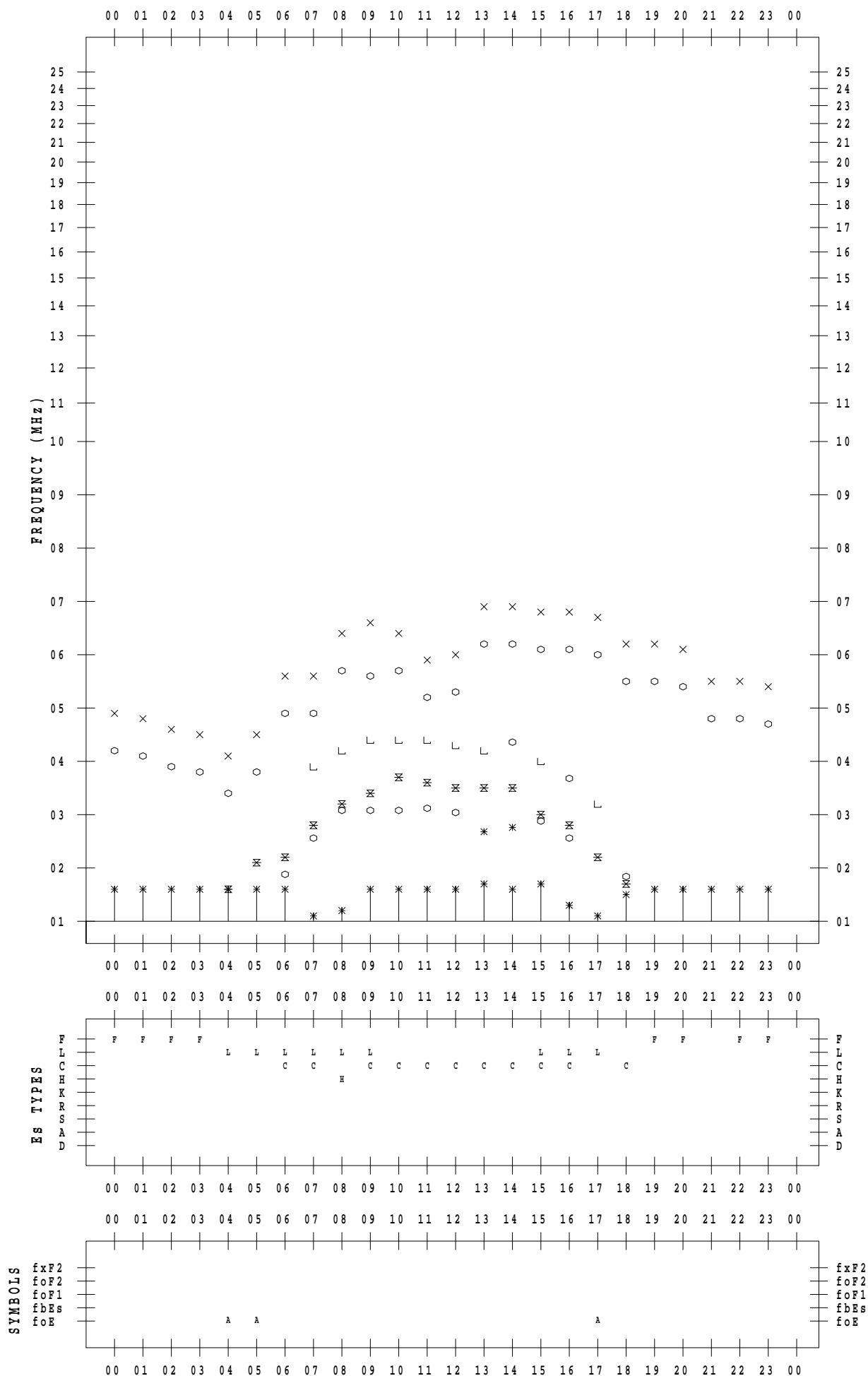
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 10

135 ° E MEAN TIME



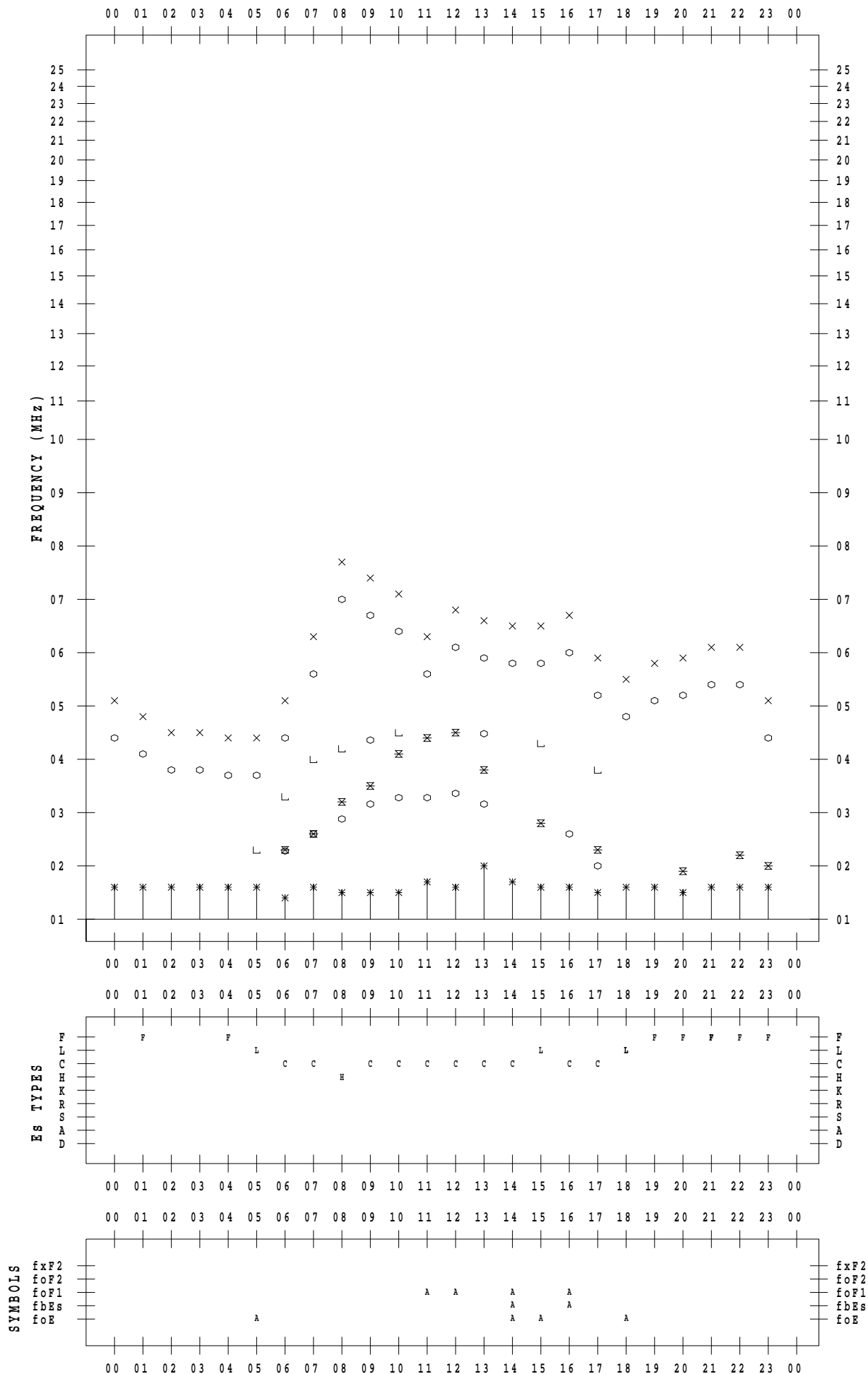
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 11

135 ° E MEAN TIME



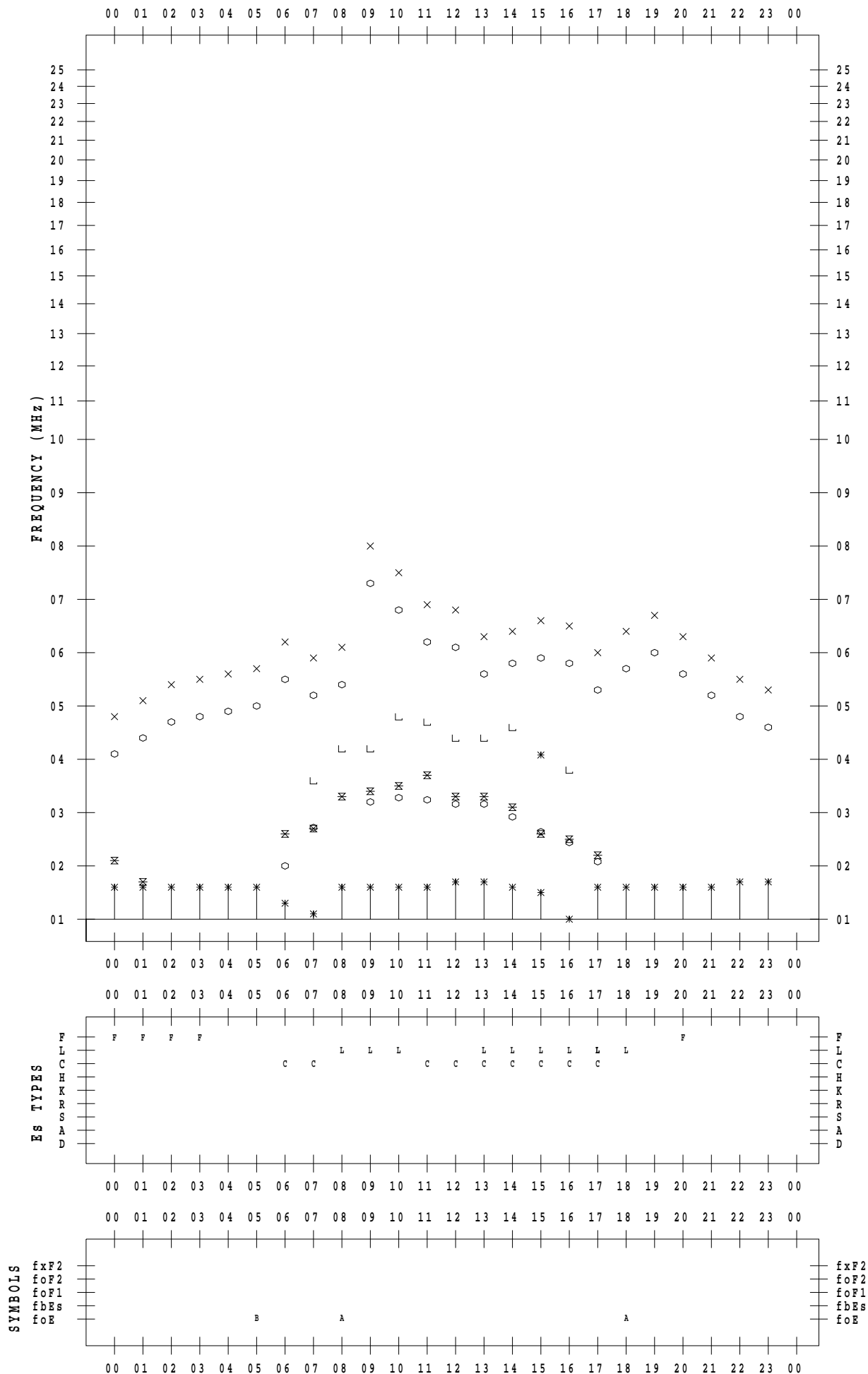
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 12

135 ° E MEAN TIME





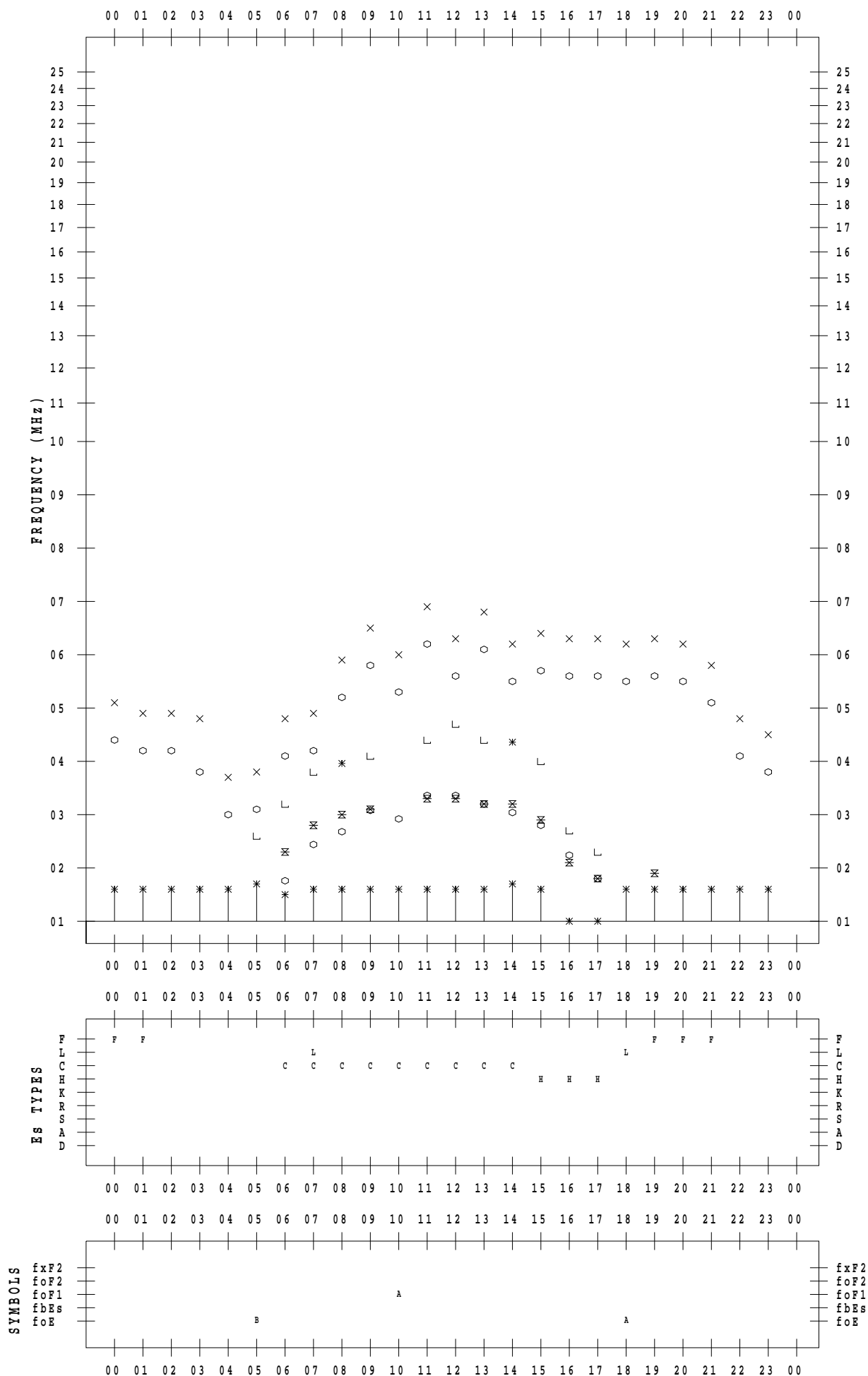
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/ 9/13

135 ° E MEAN TIME



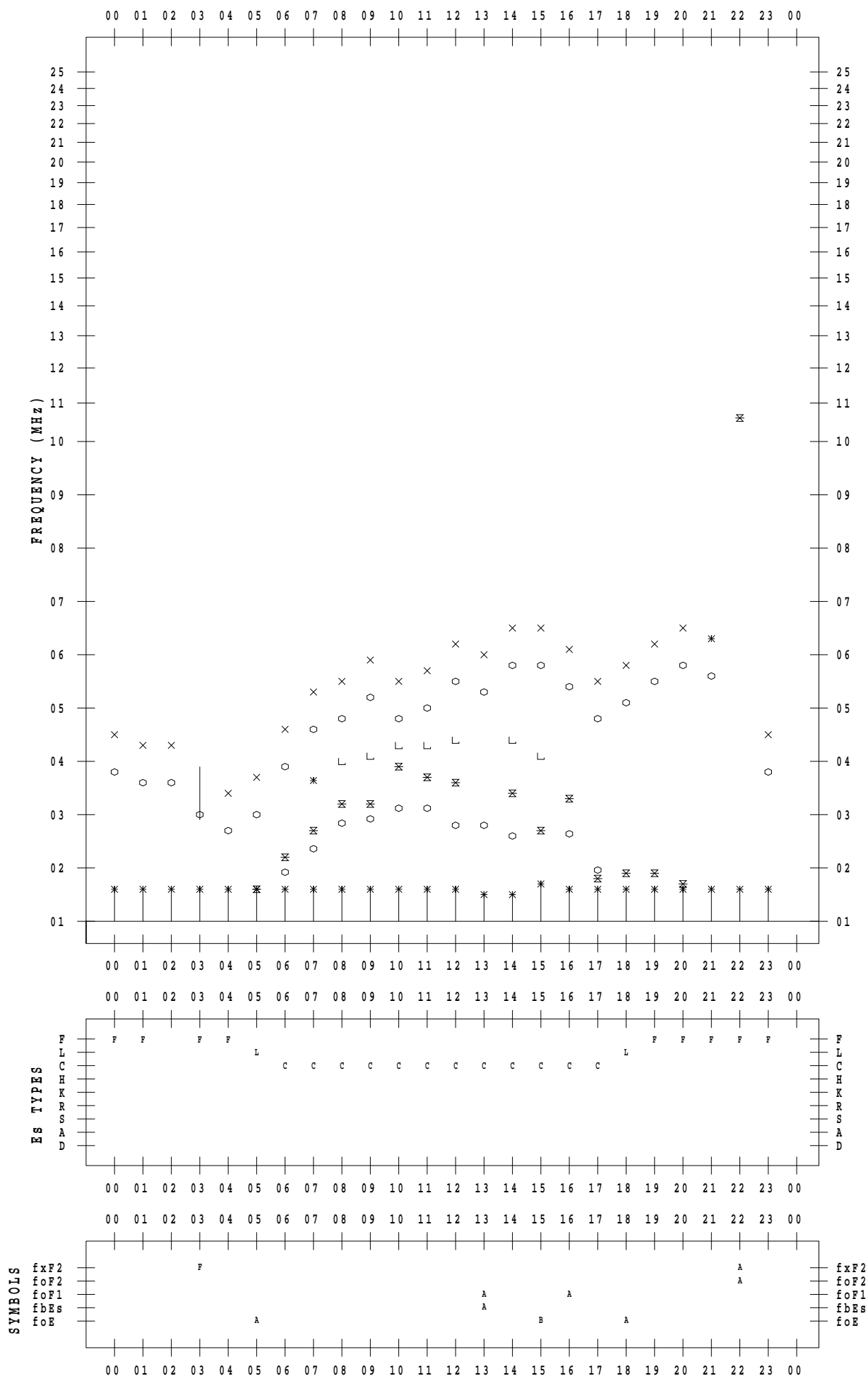
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 14

135 ° E MEAN TIME



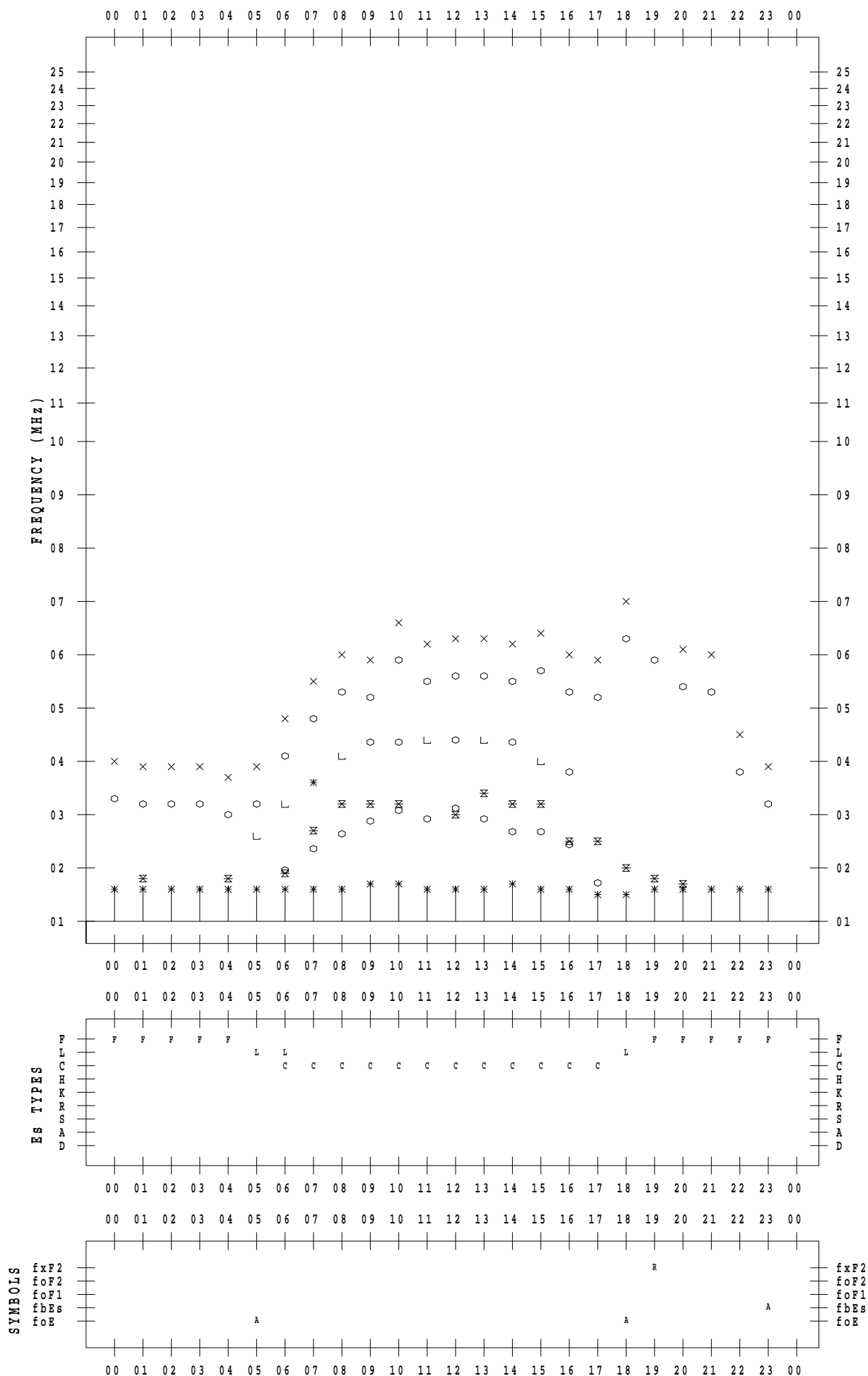
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 15

135 ° E MEAN TIME



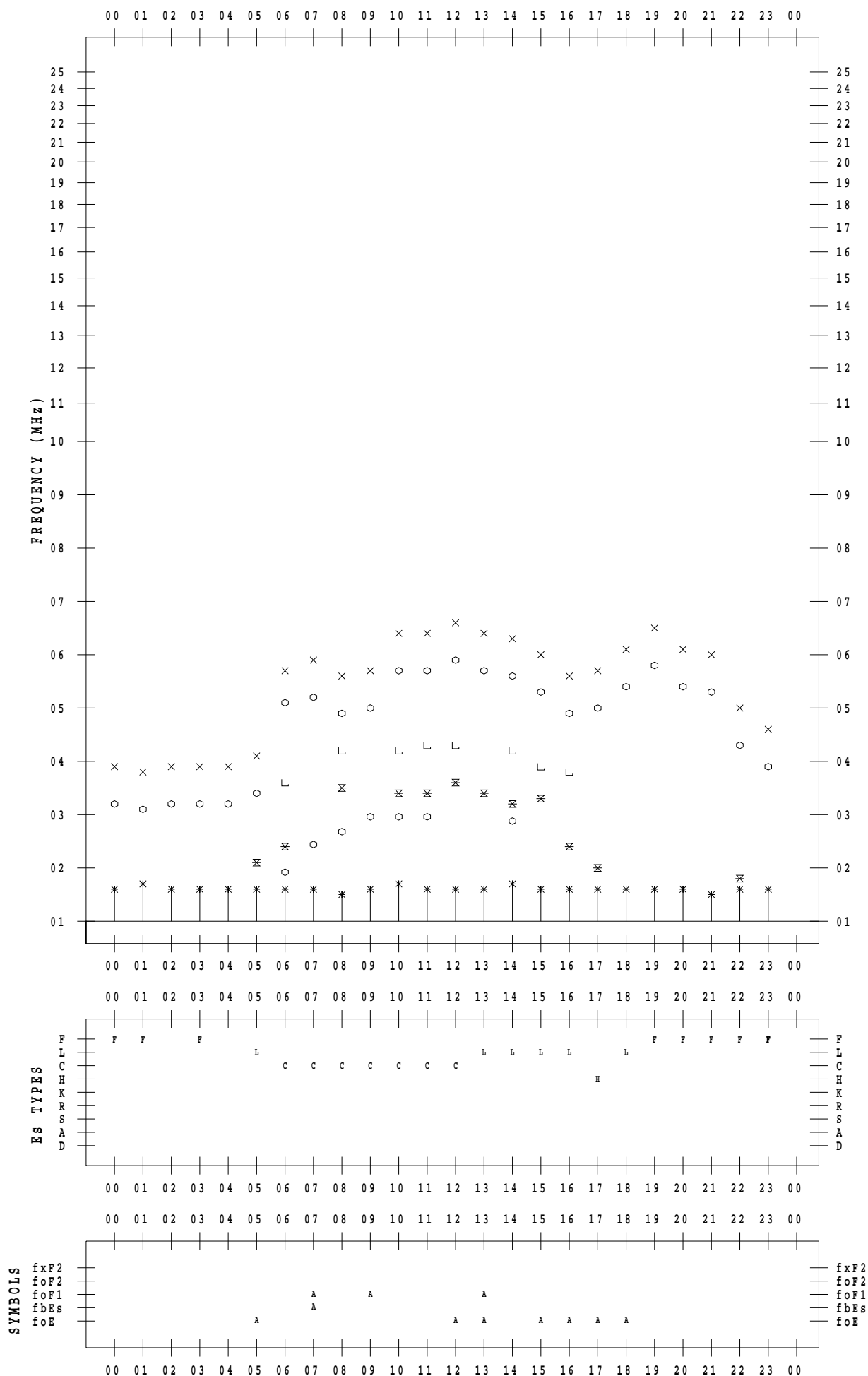
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 16

135 ° E MEAN TIME



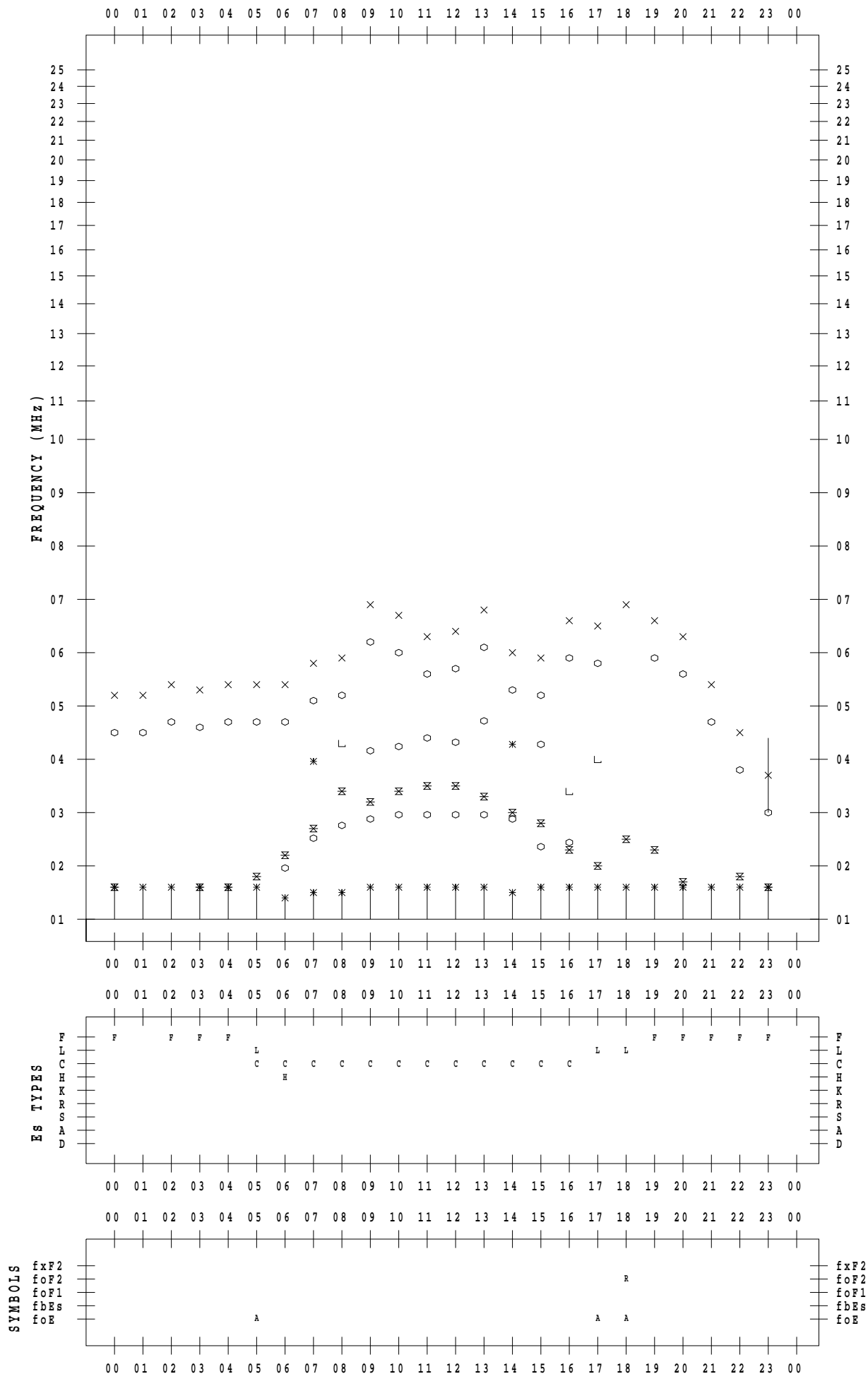
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 17

135 ° E MEAN TIME



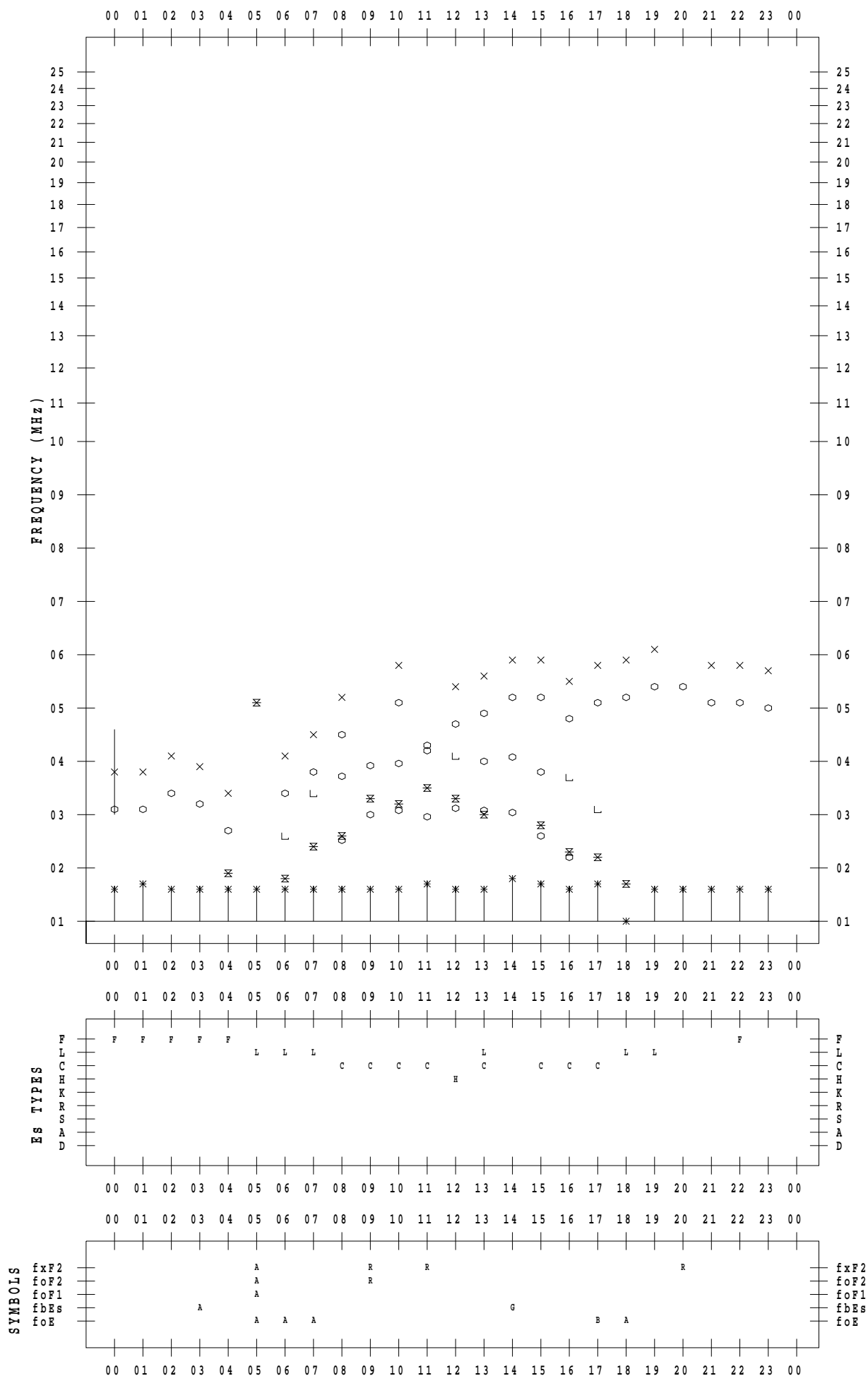
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 18

135 ° E MEAN TIME



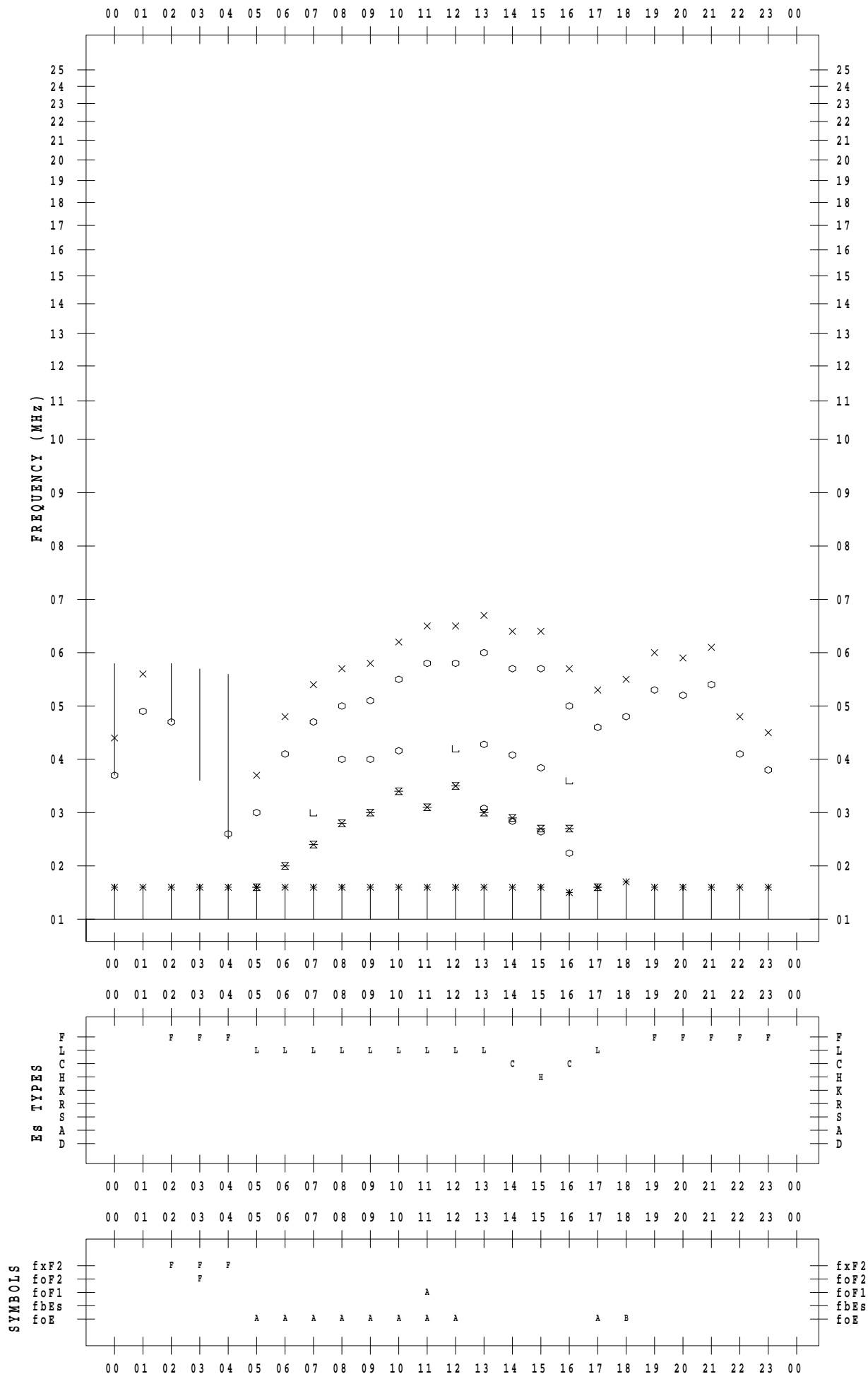
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 19

135 ° E MEAN TIME



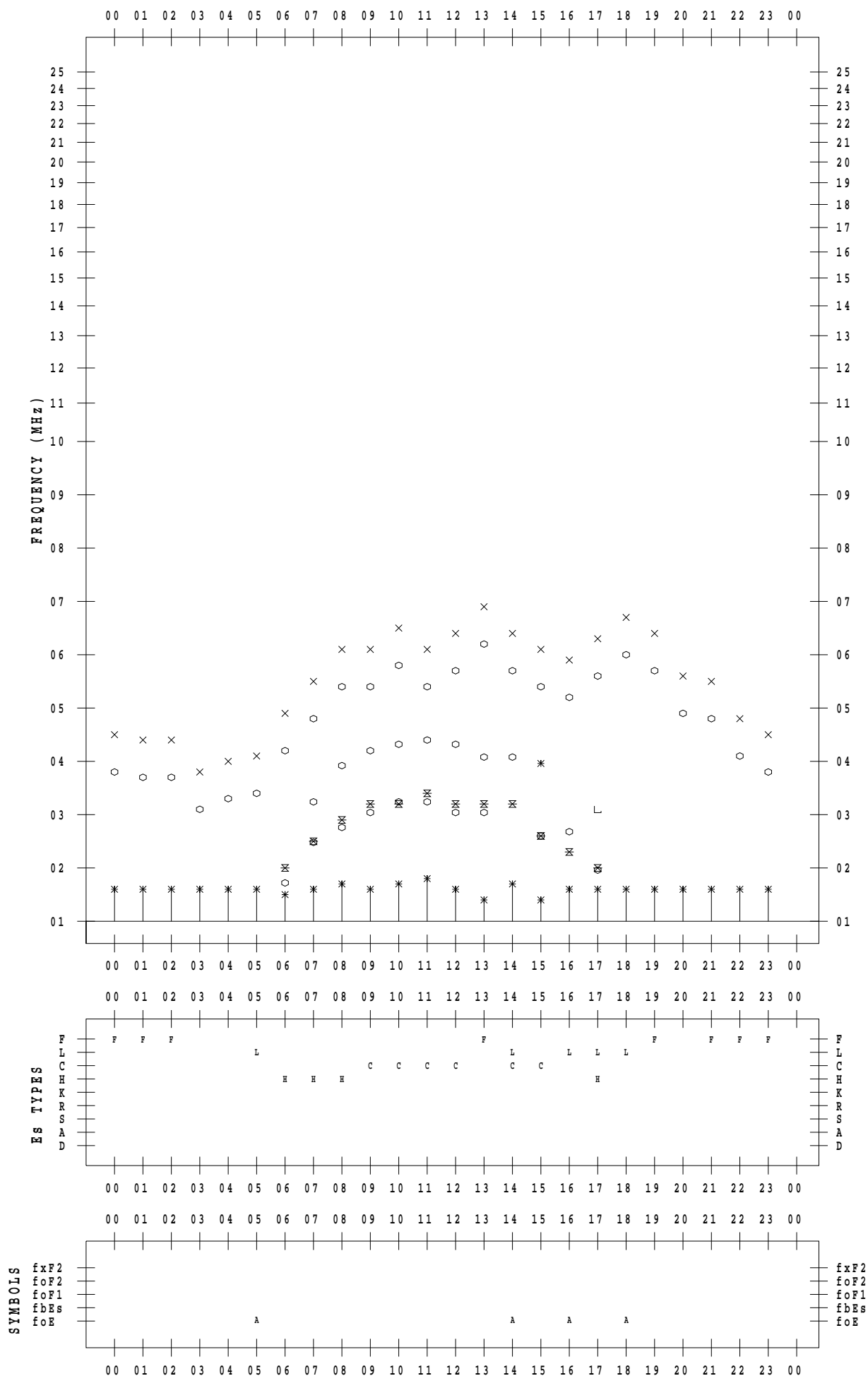
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 20

135 ° E MEAN TIME





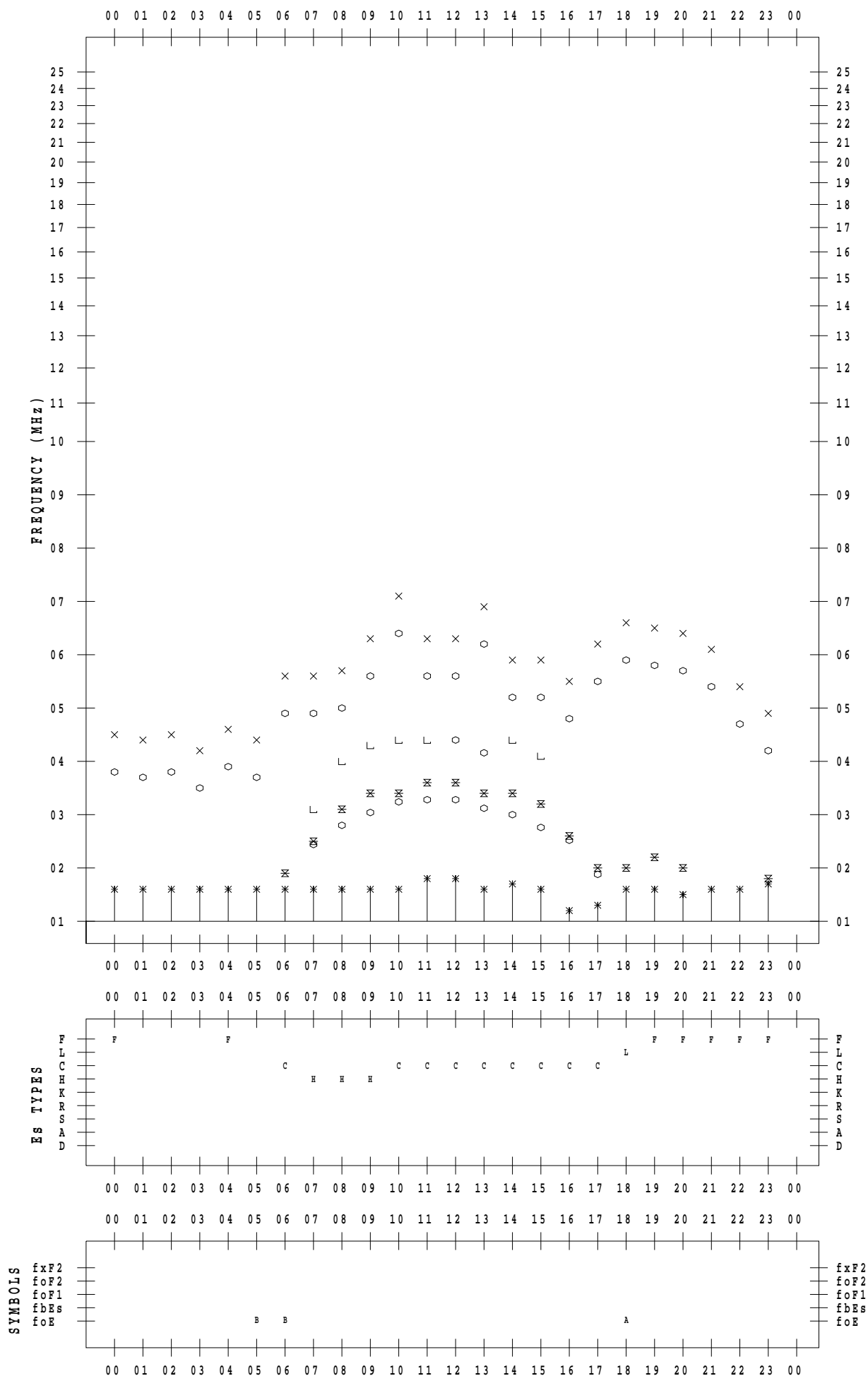
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 21

135 ° E MEAN TIME



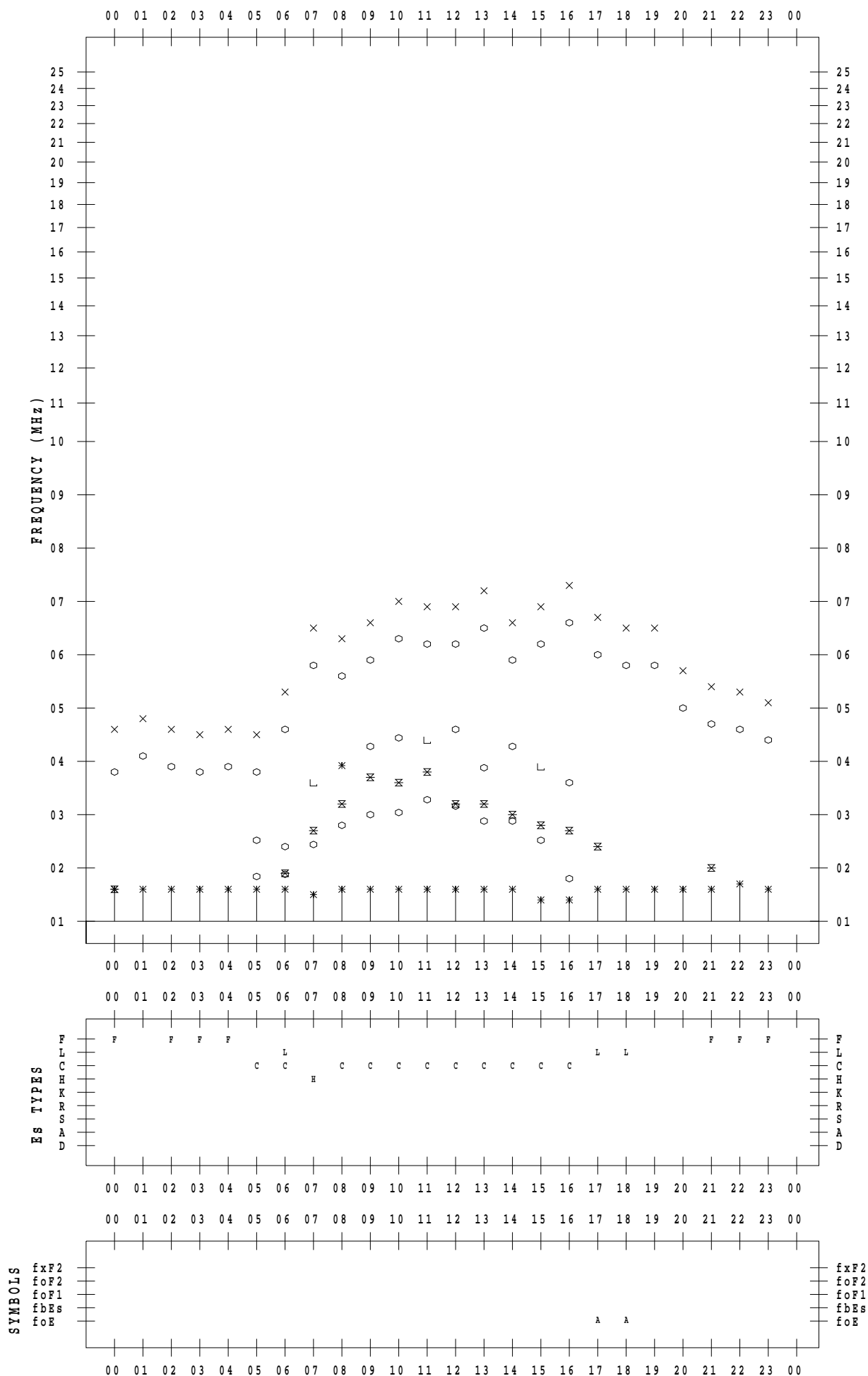
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021/ 9/22

135 ° E MEAN TIME



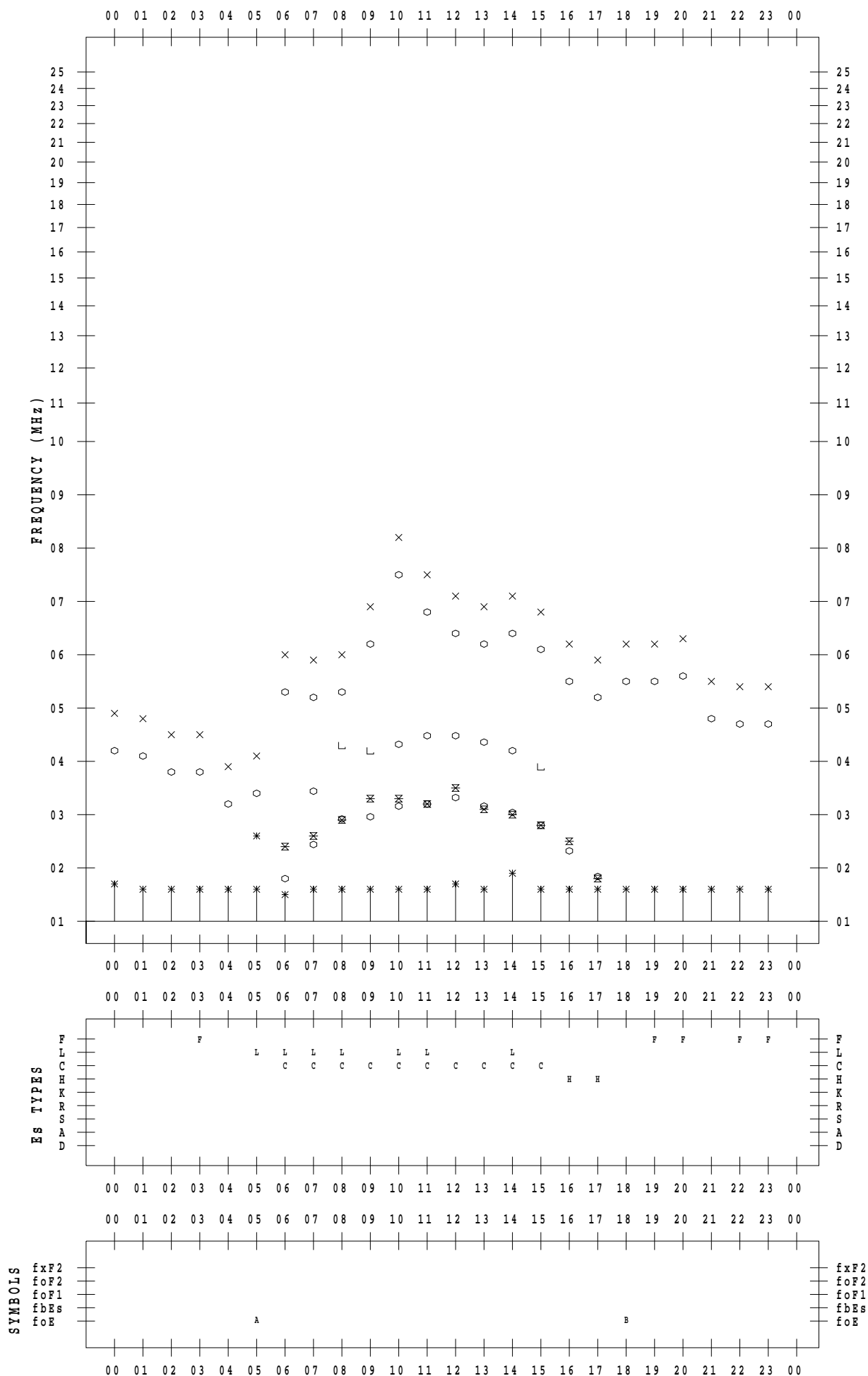
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 23

135 ° E MEAN TIME



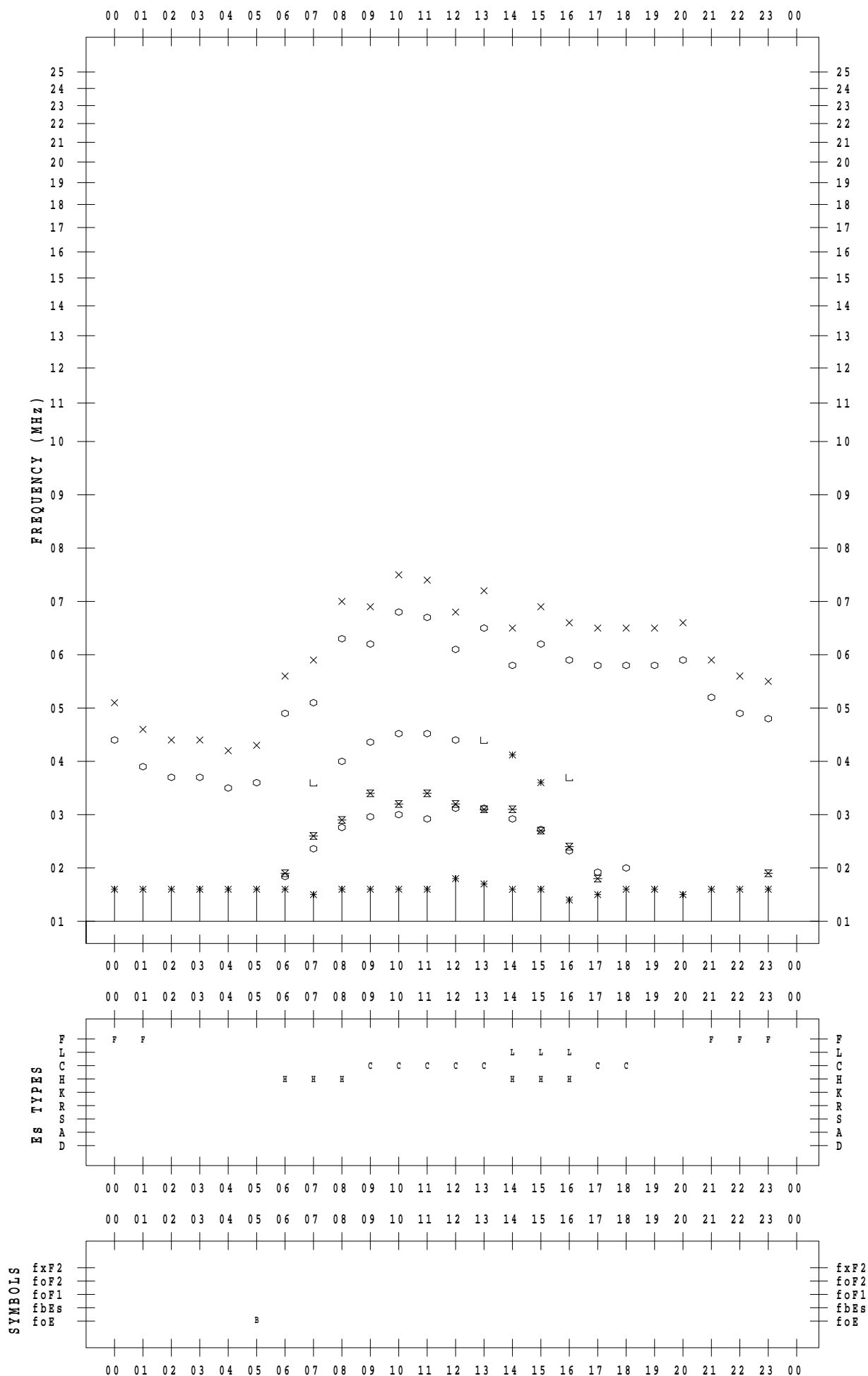
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 24

135 ° E MEAN TIME



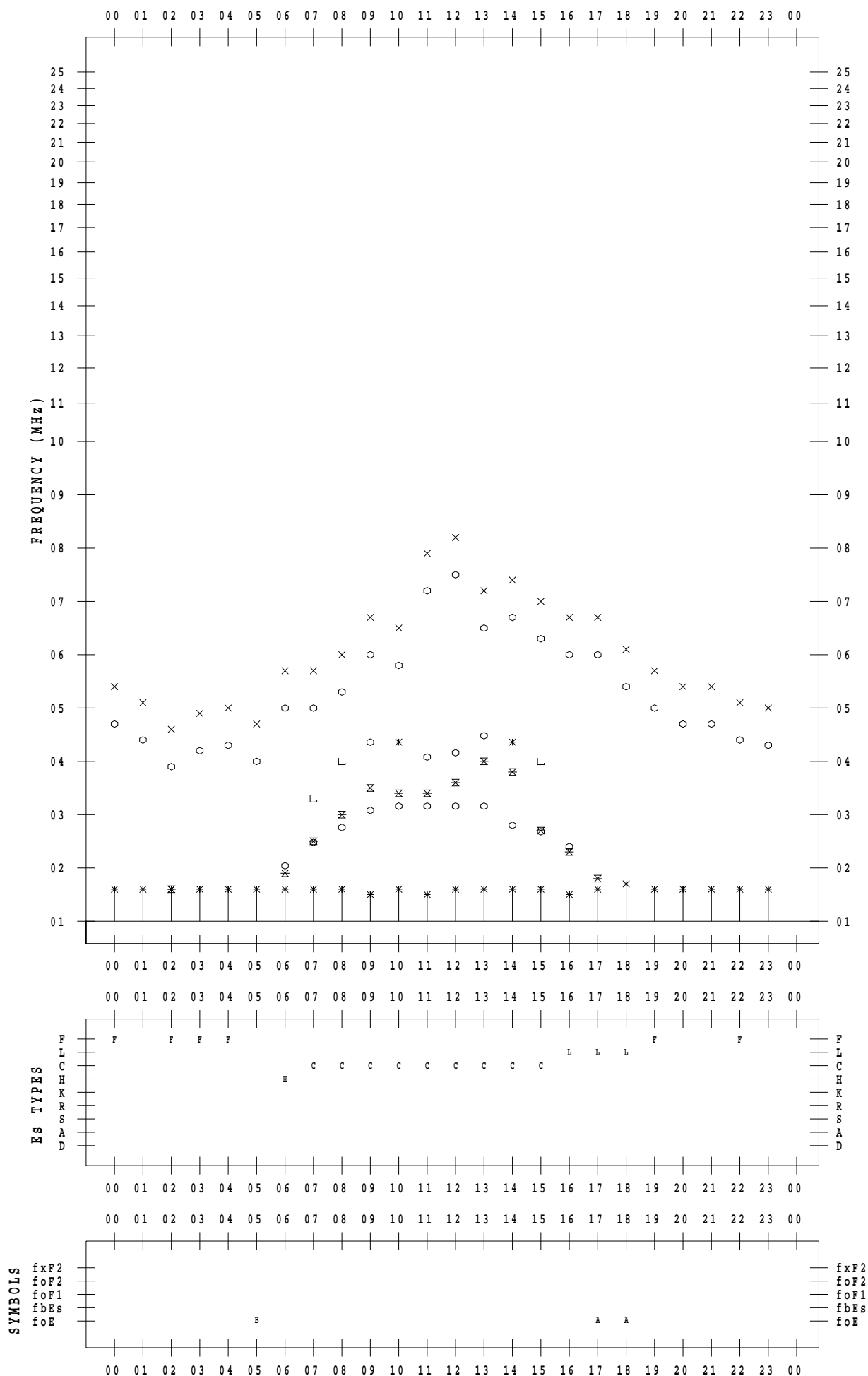
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 25

135 ° E MEAN TIME



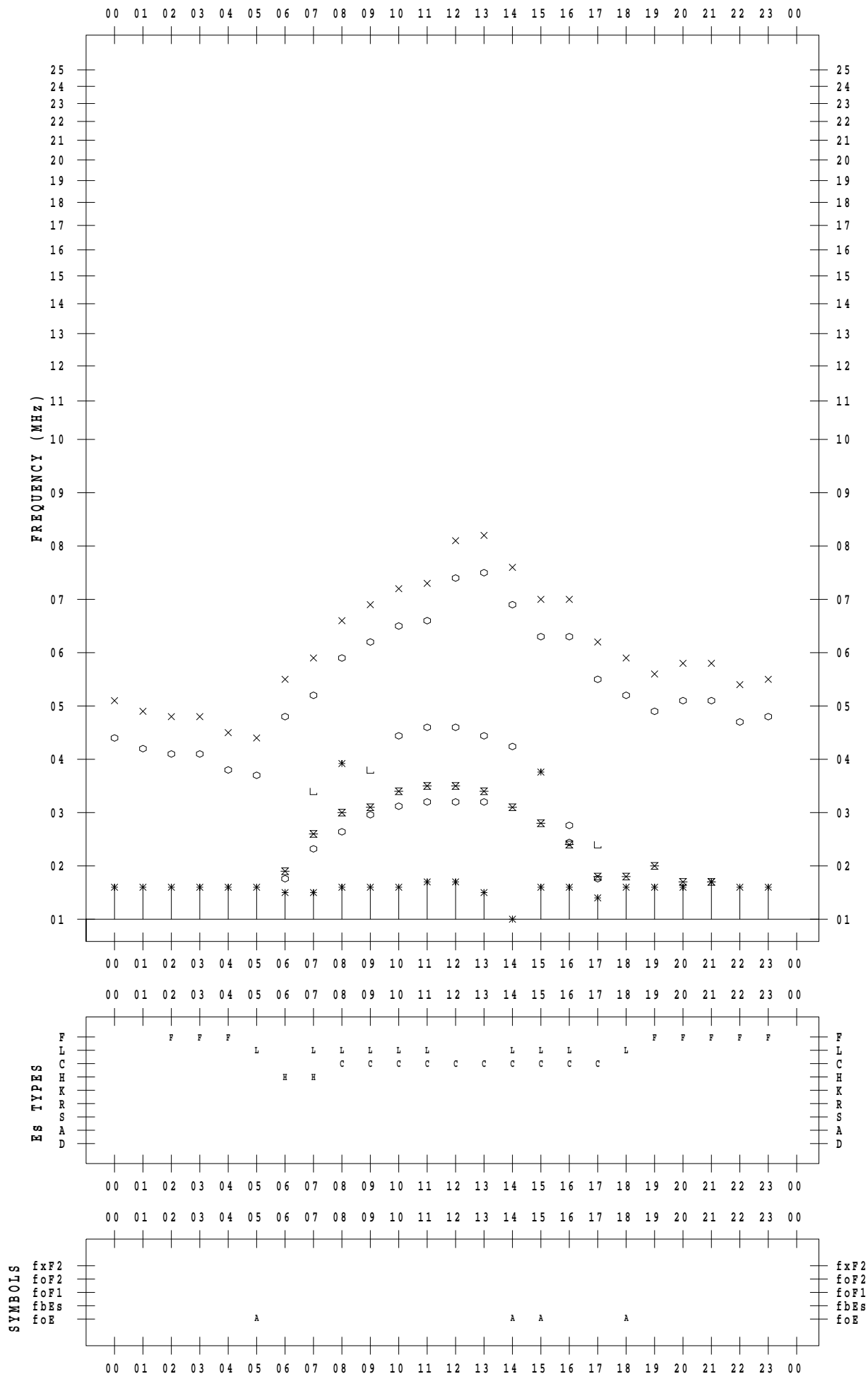
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 26

135 ° E MEAN TIME



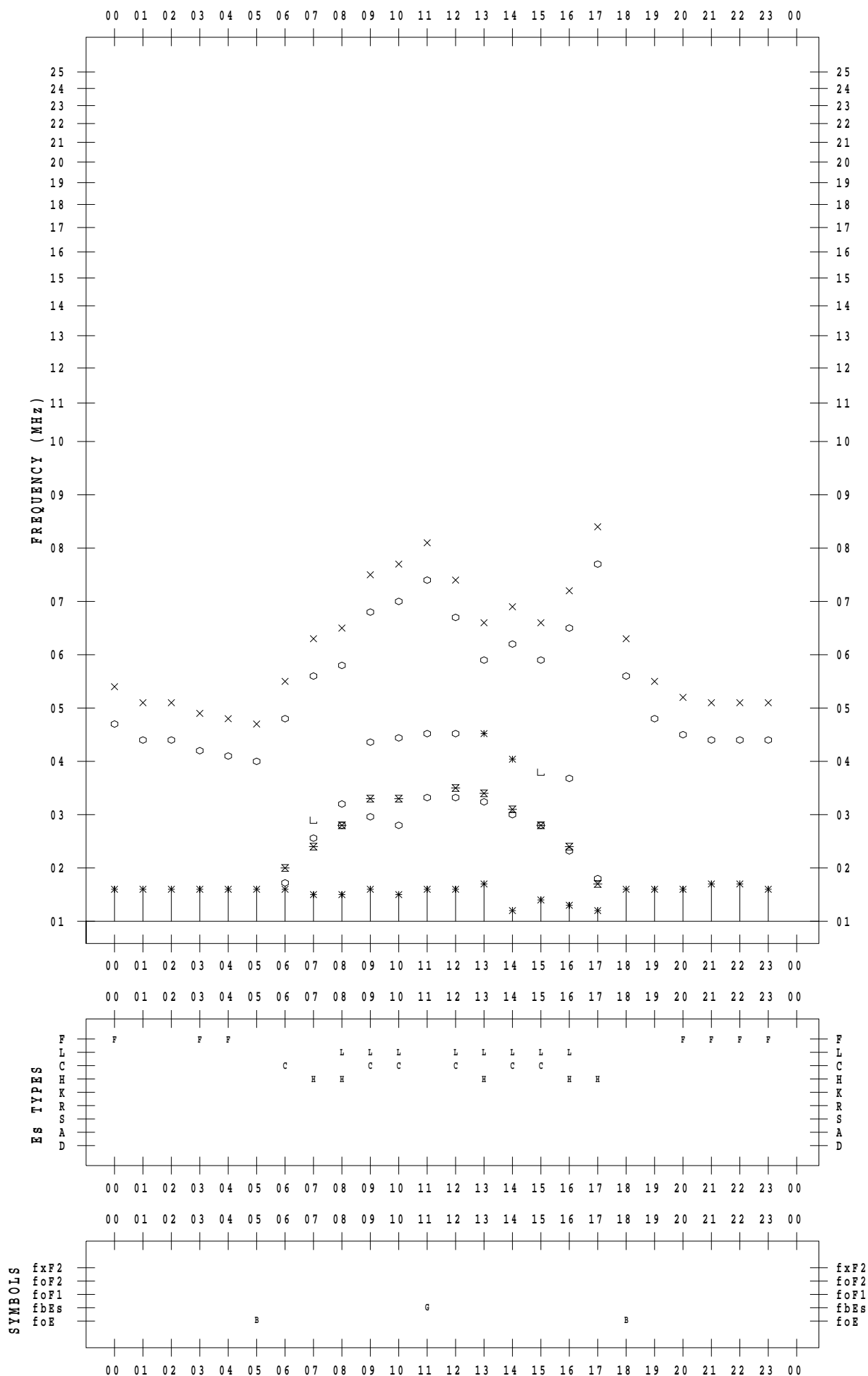
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 27

135 ° E MEAN TIME



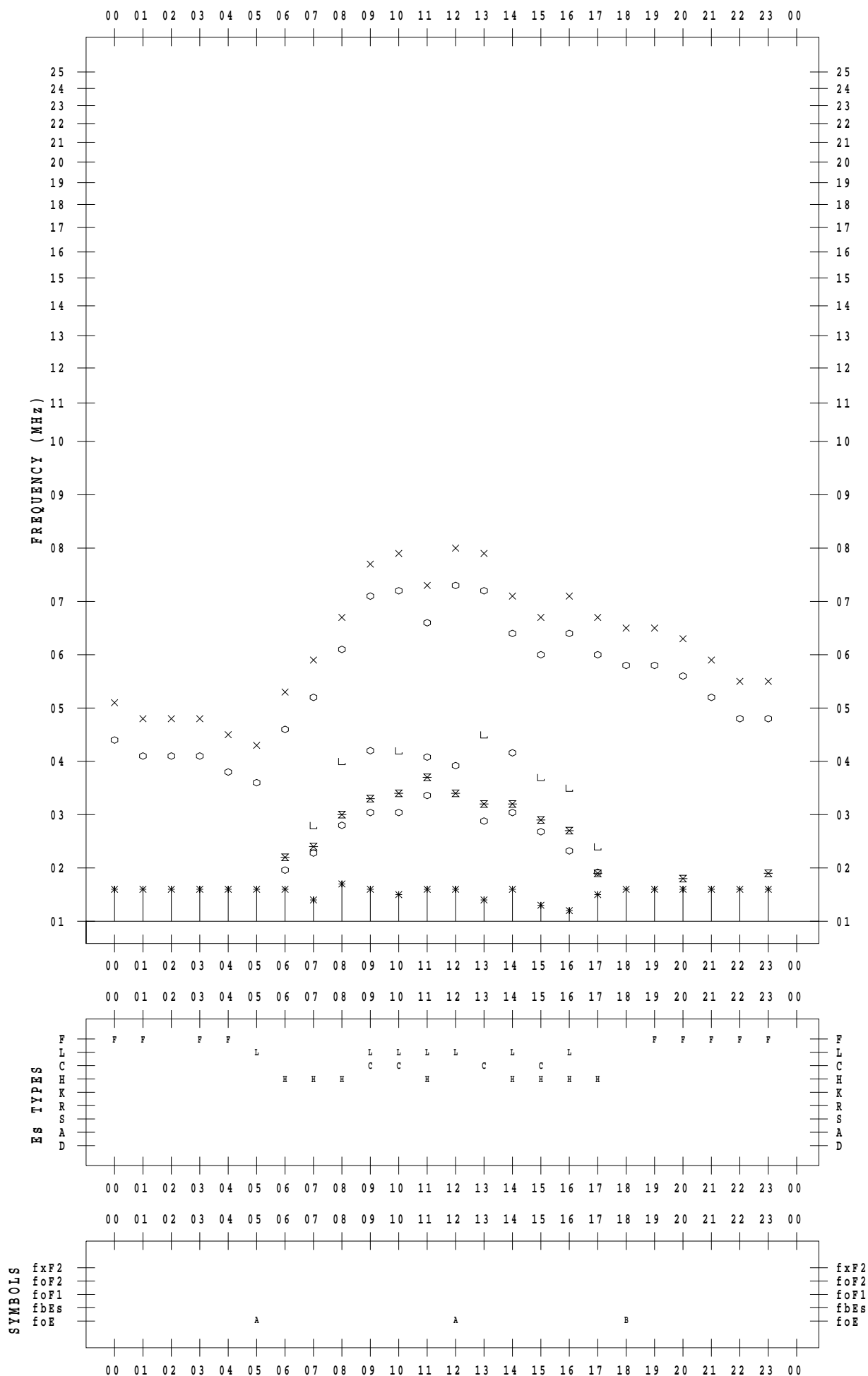
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 28

135 ° E MEAN TIME





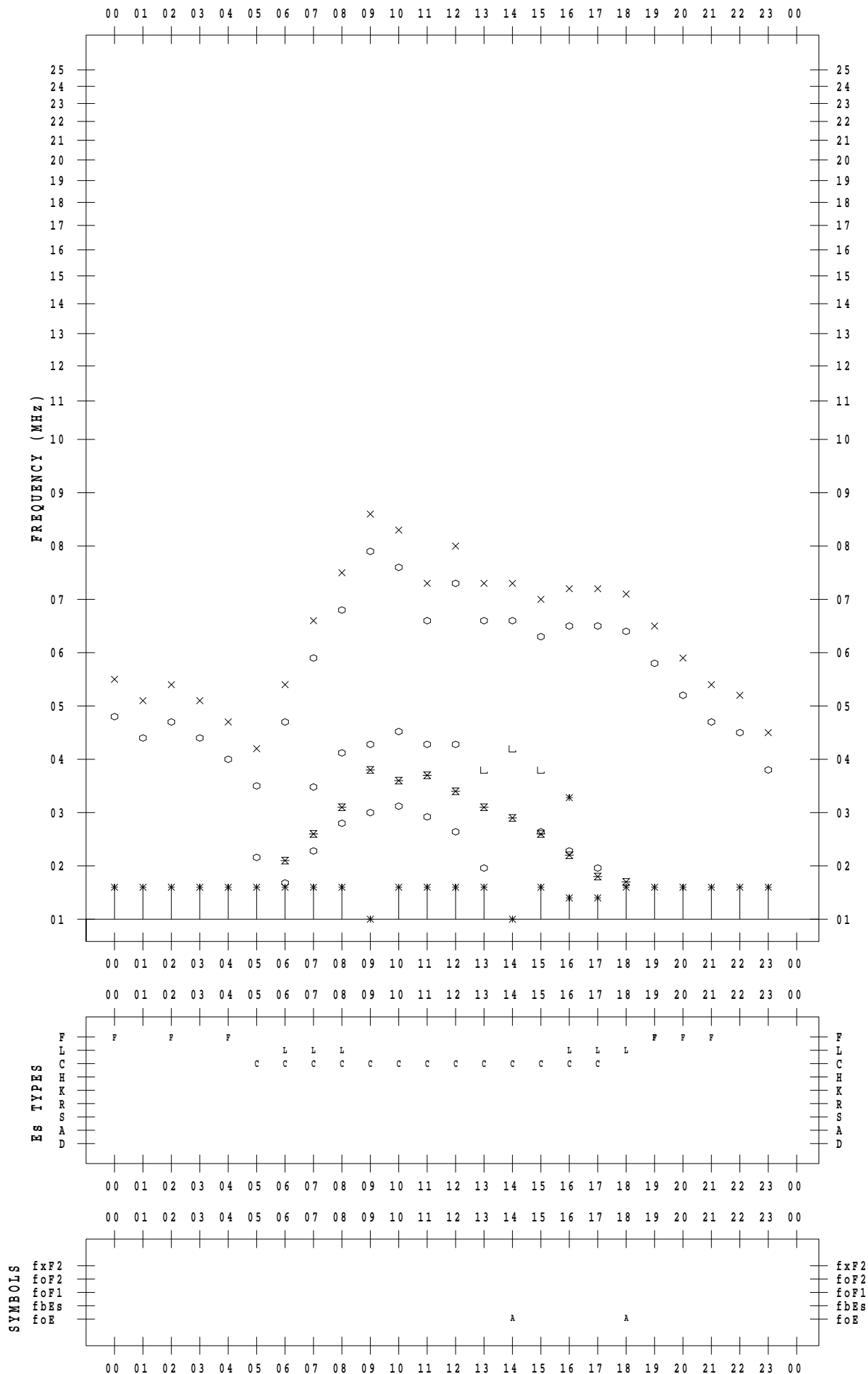
# f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 29

135 ° E MEAN TIME



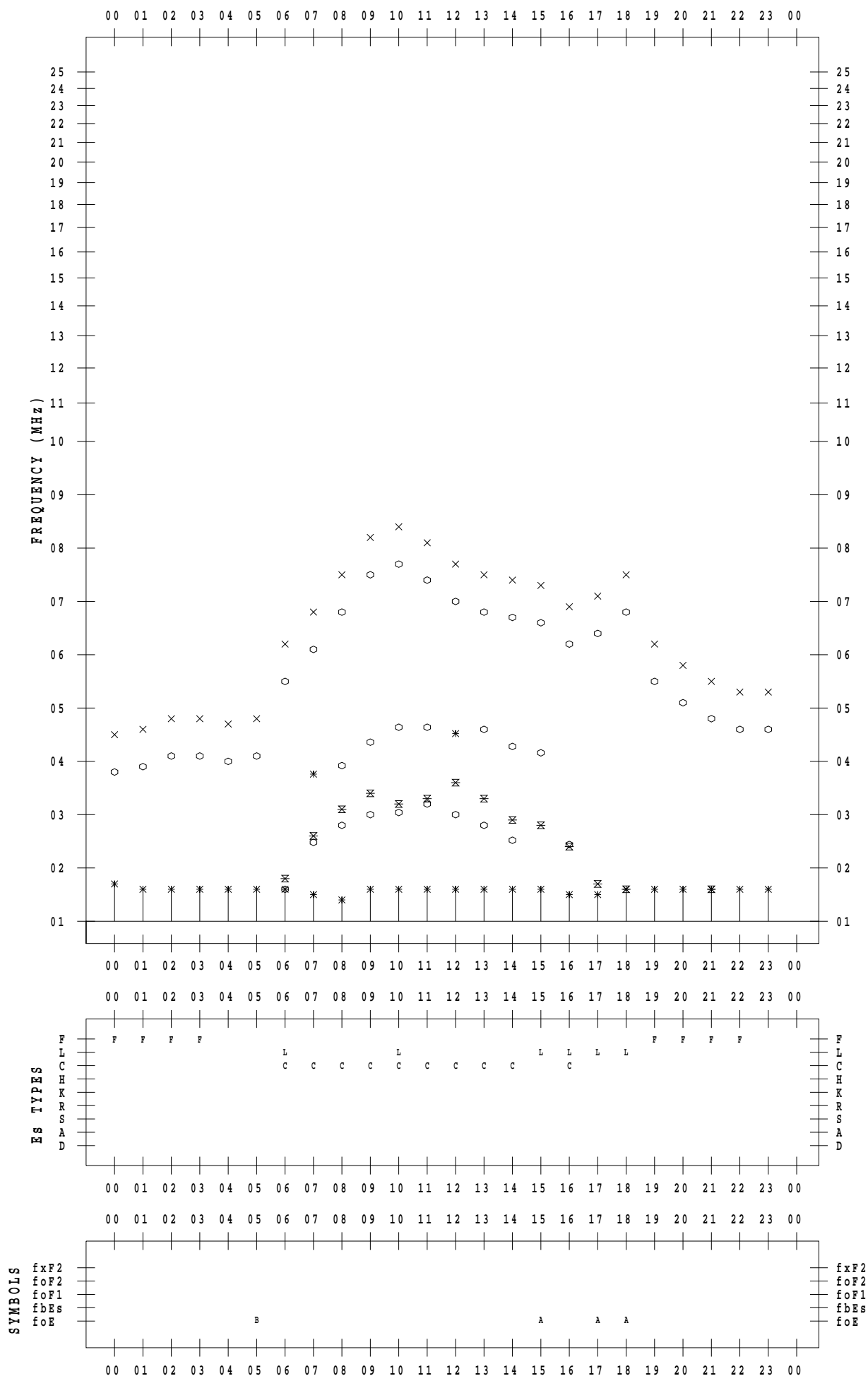
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2021 / 9 / 30

135 ° E MEAN TIME



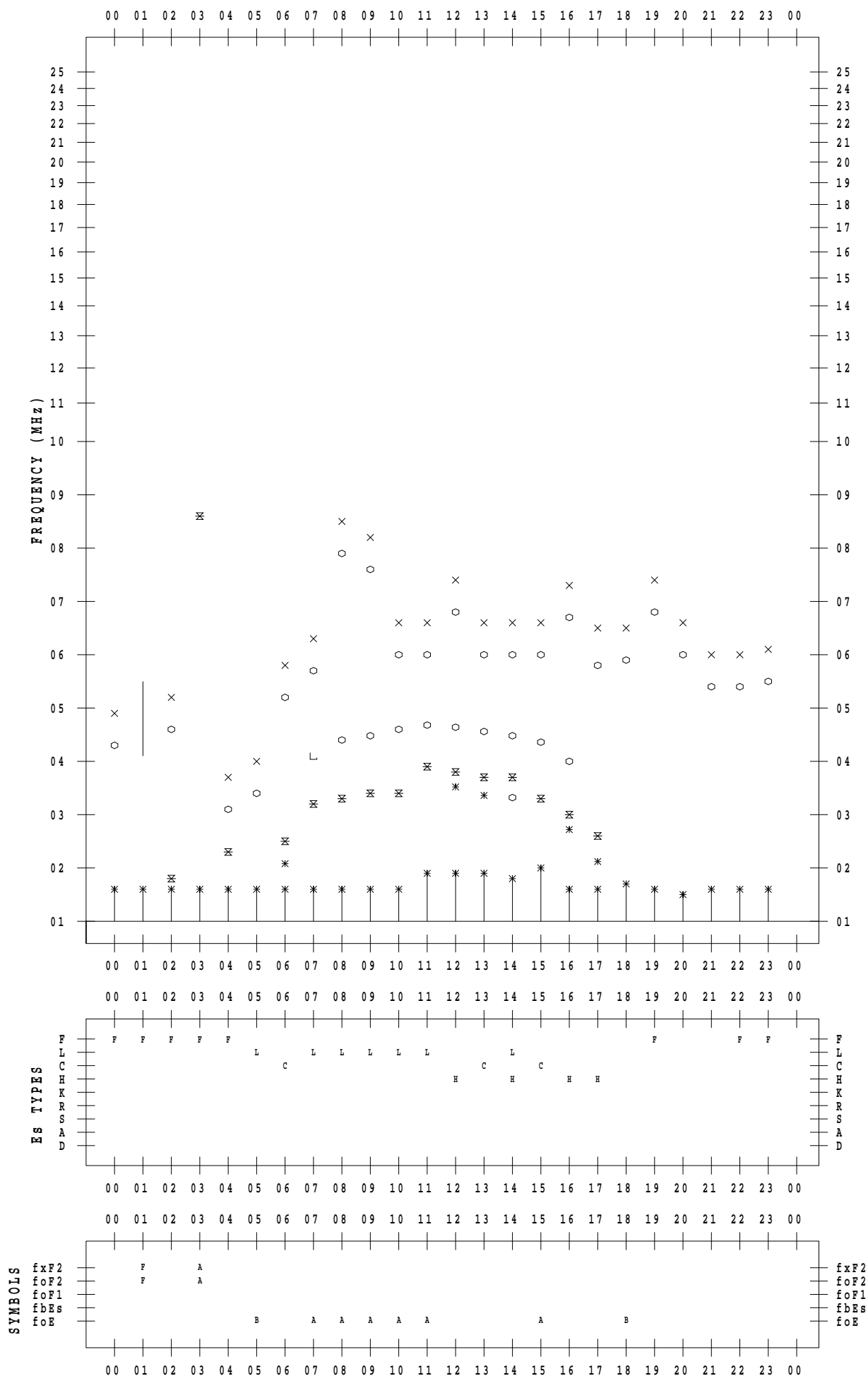
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 1

135 ° E MEAN TIME



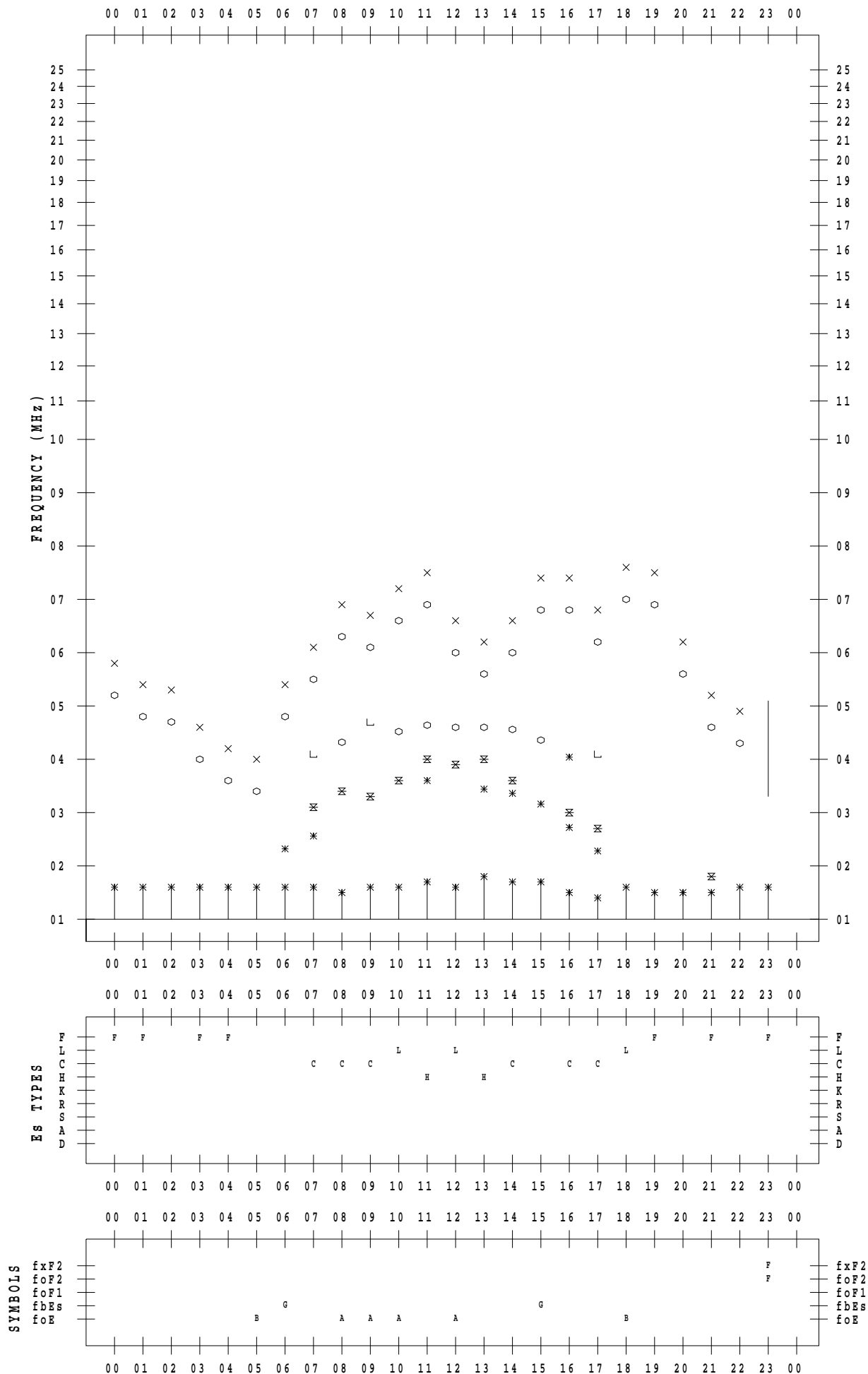
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 2

135 ° E MEAN TIME



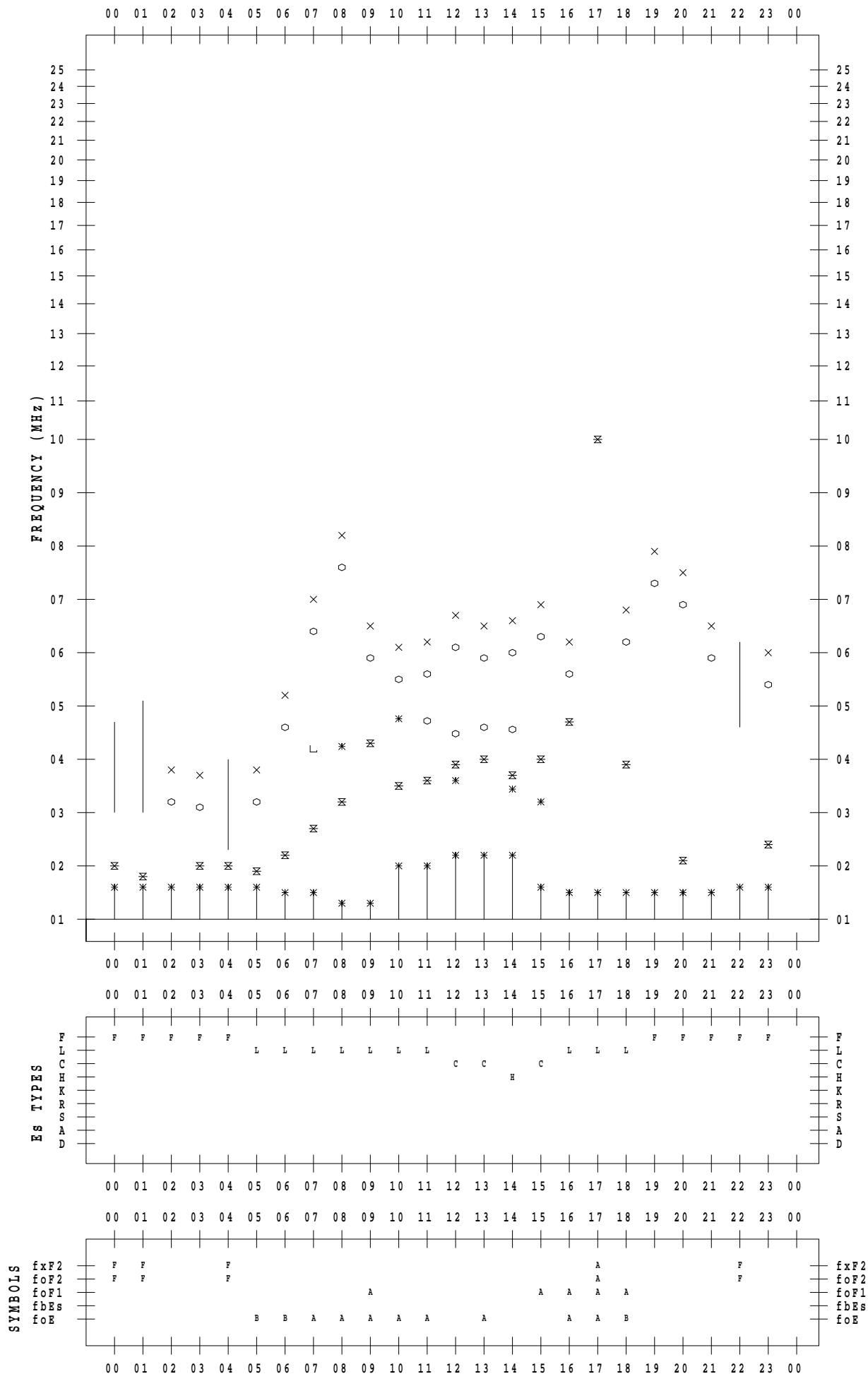
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 3

135 ° E MEAN TIME



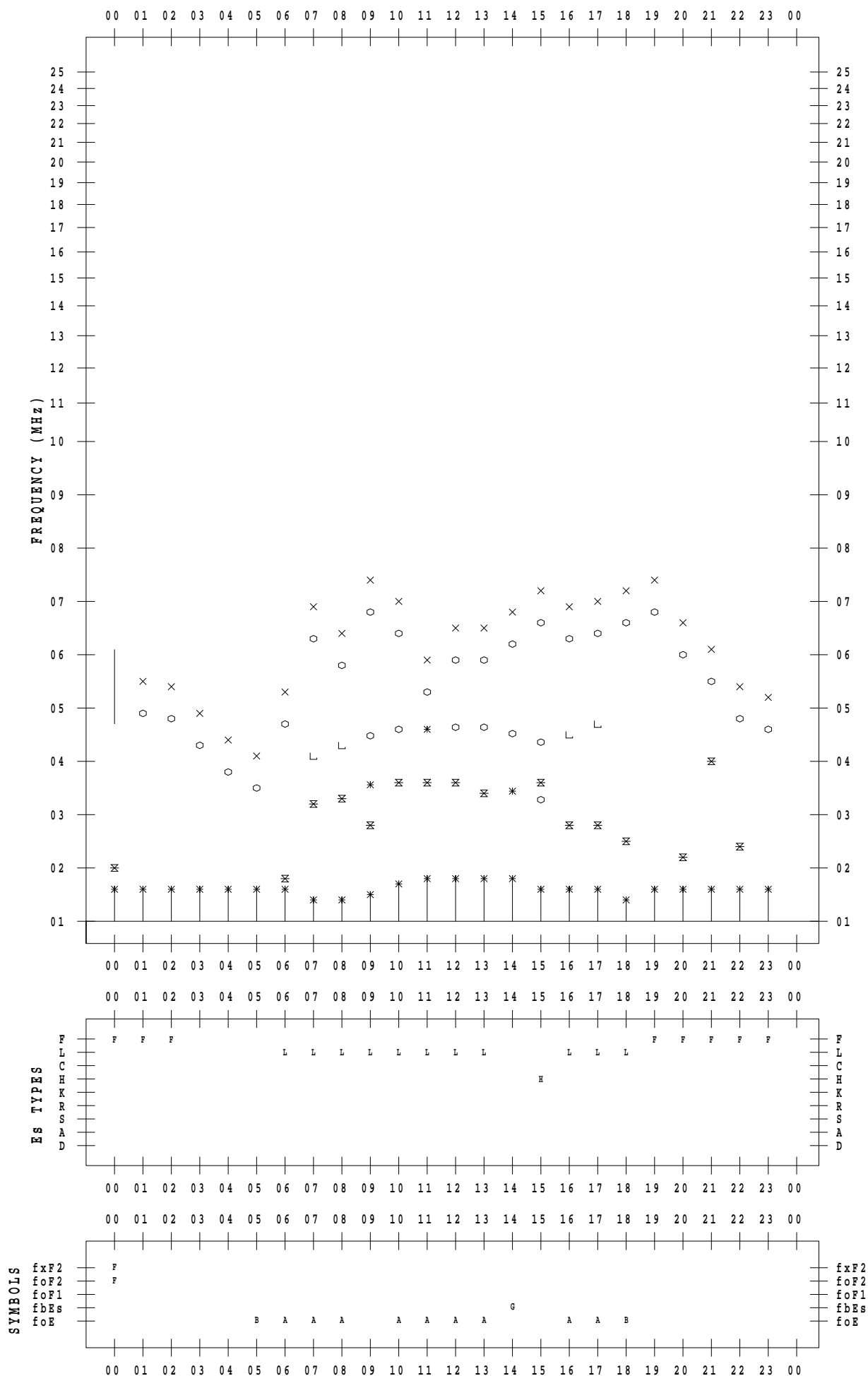
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 9/ 4

135 ° E MEAN TIME



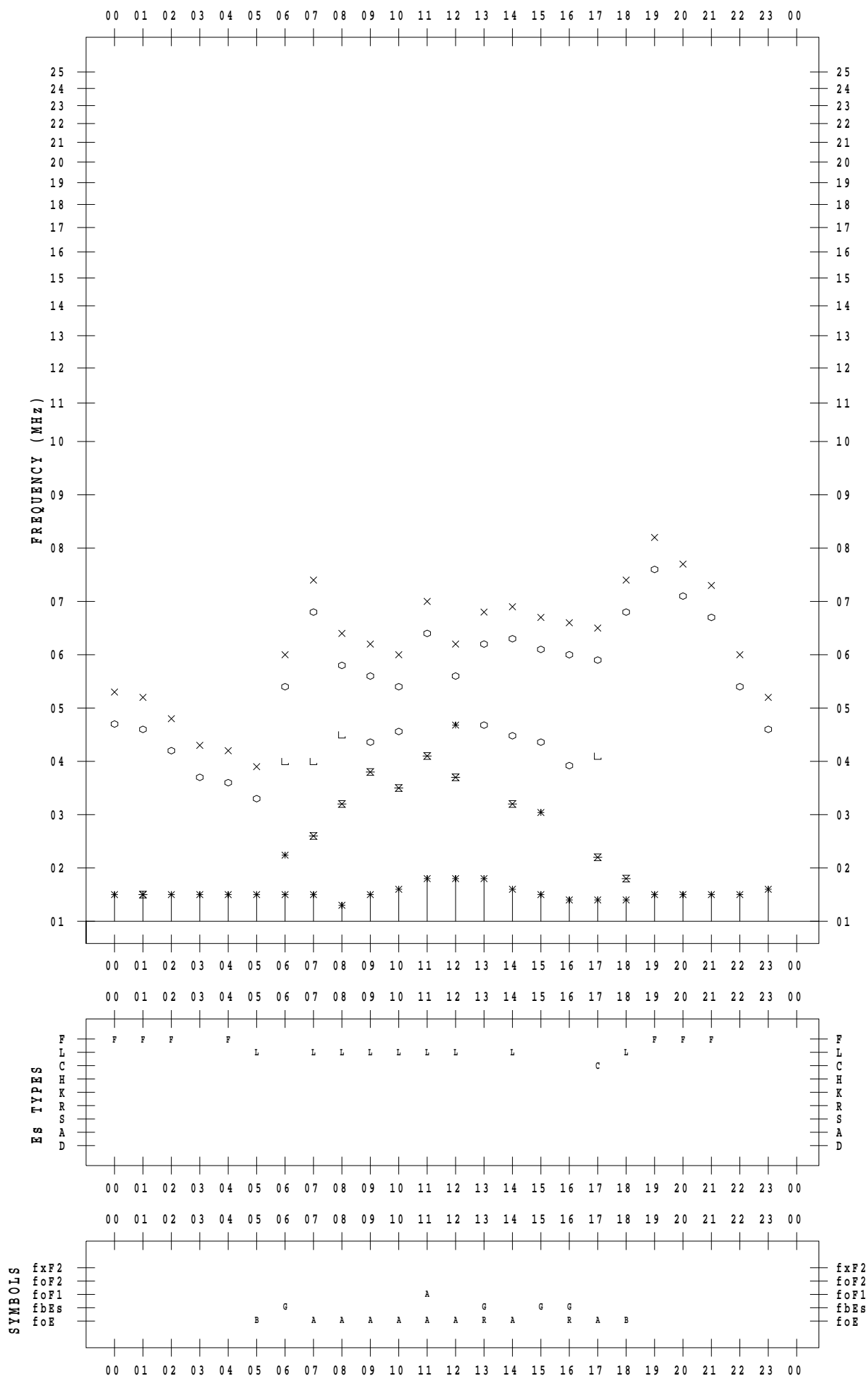
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 5

135 ° E MEAN TIME



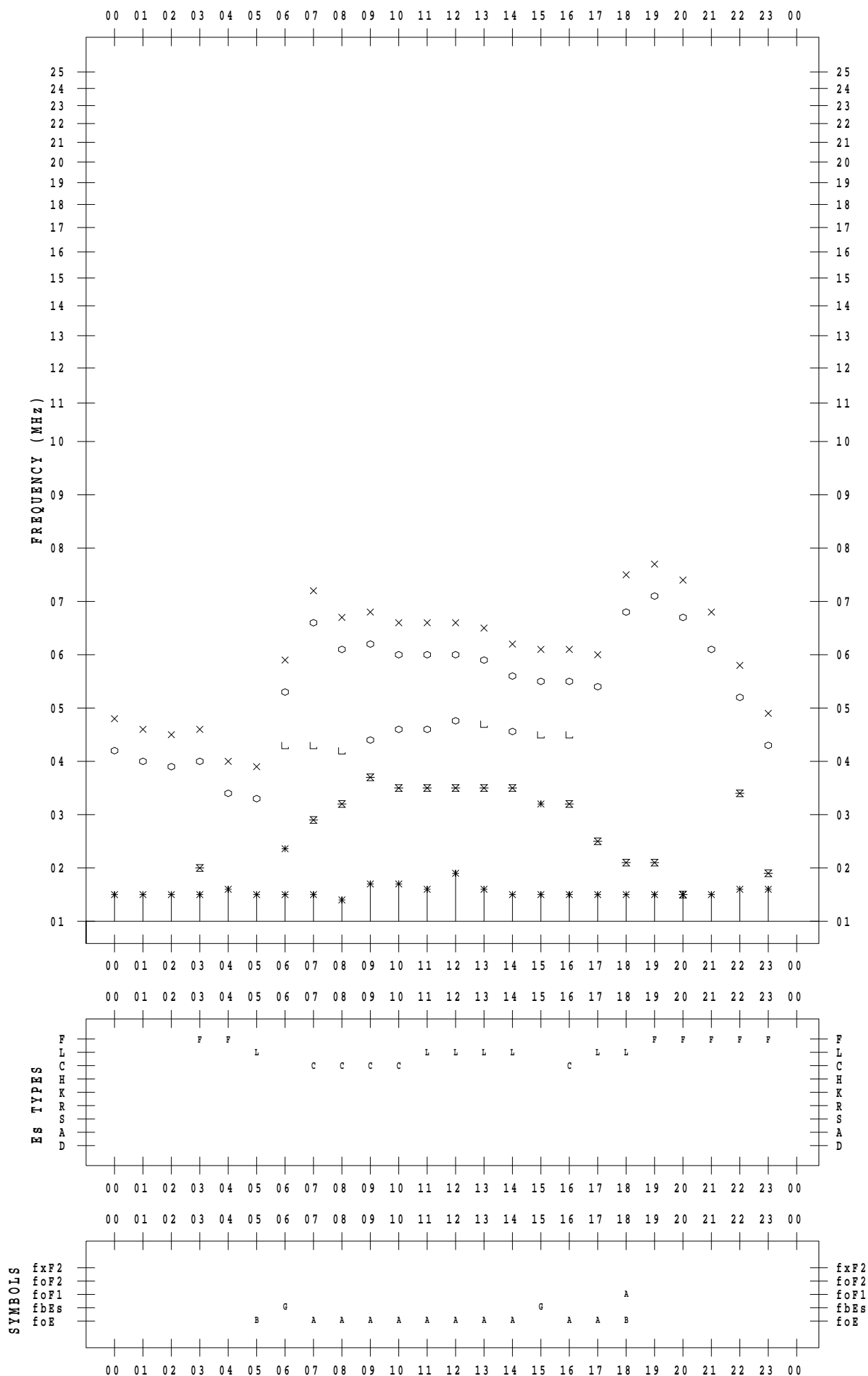
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 6

135 ° E MEAN TIME





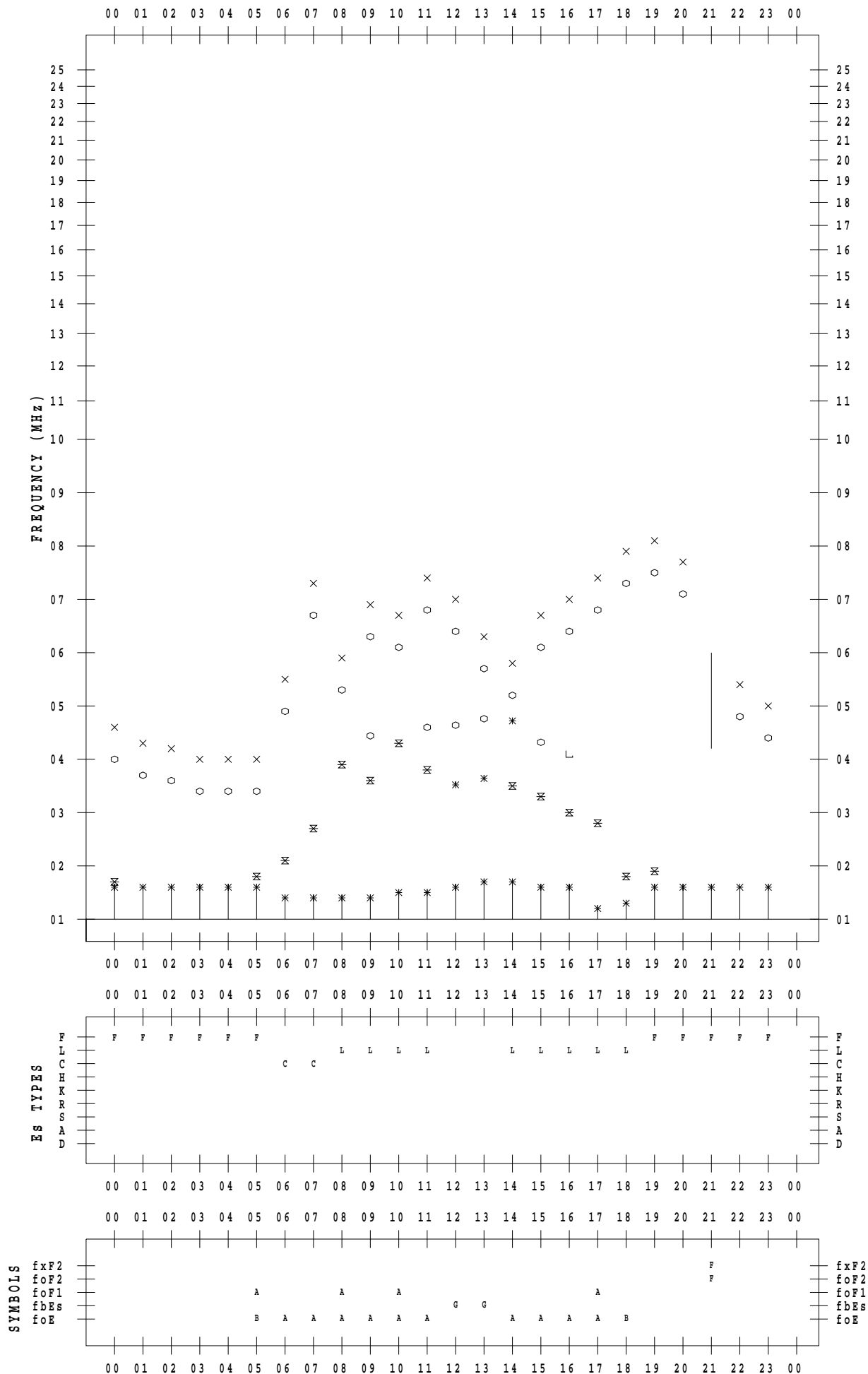
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 9/ 7

135 ° E MEAN TIME



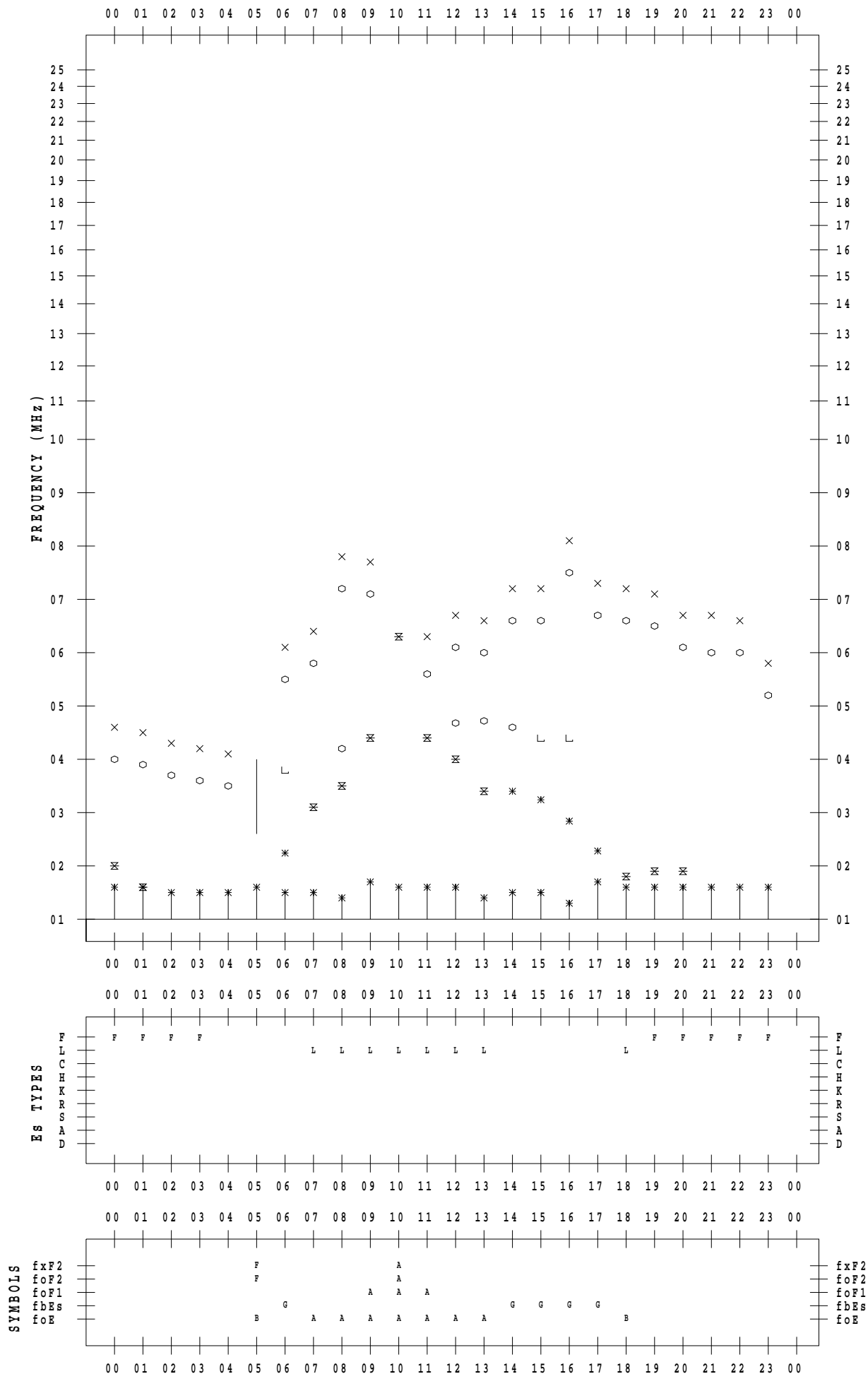
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 8

135 ° E MEAN TIME



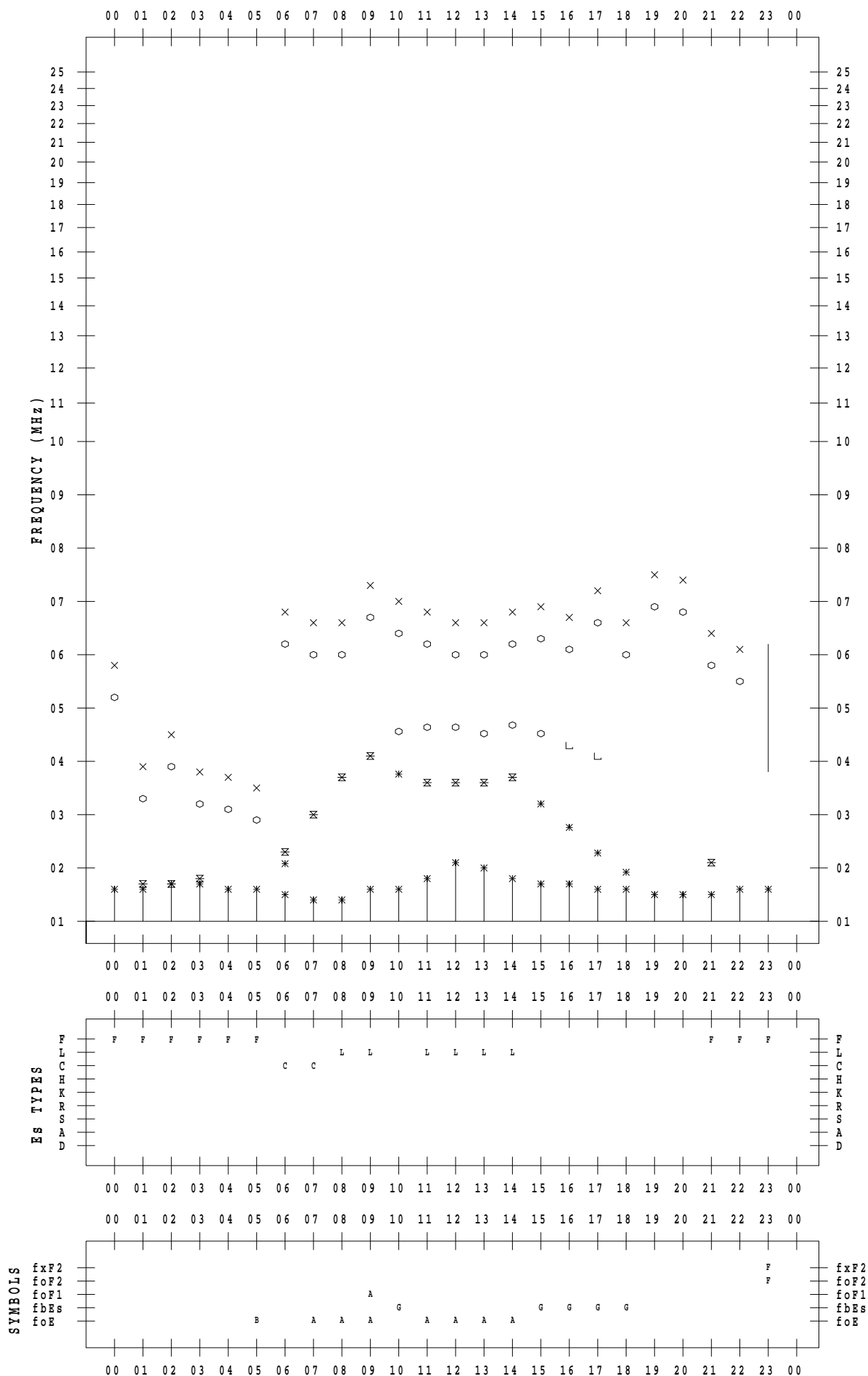
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 9

135 ° E MEAN TIME



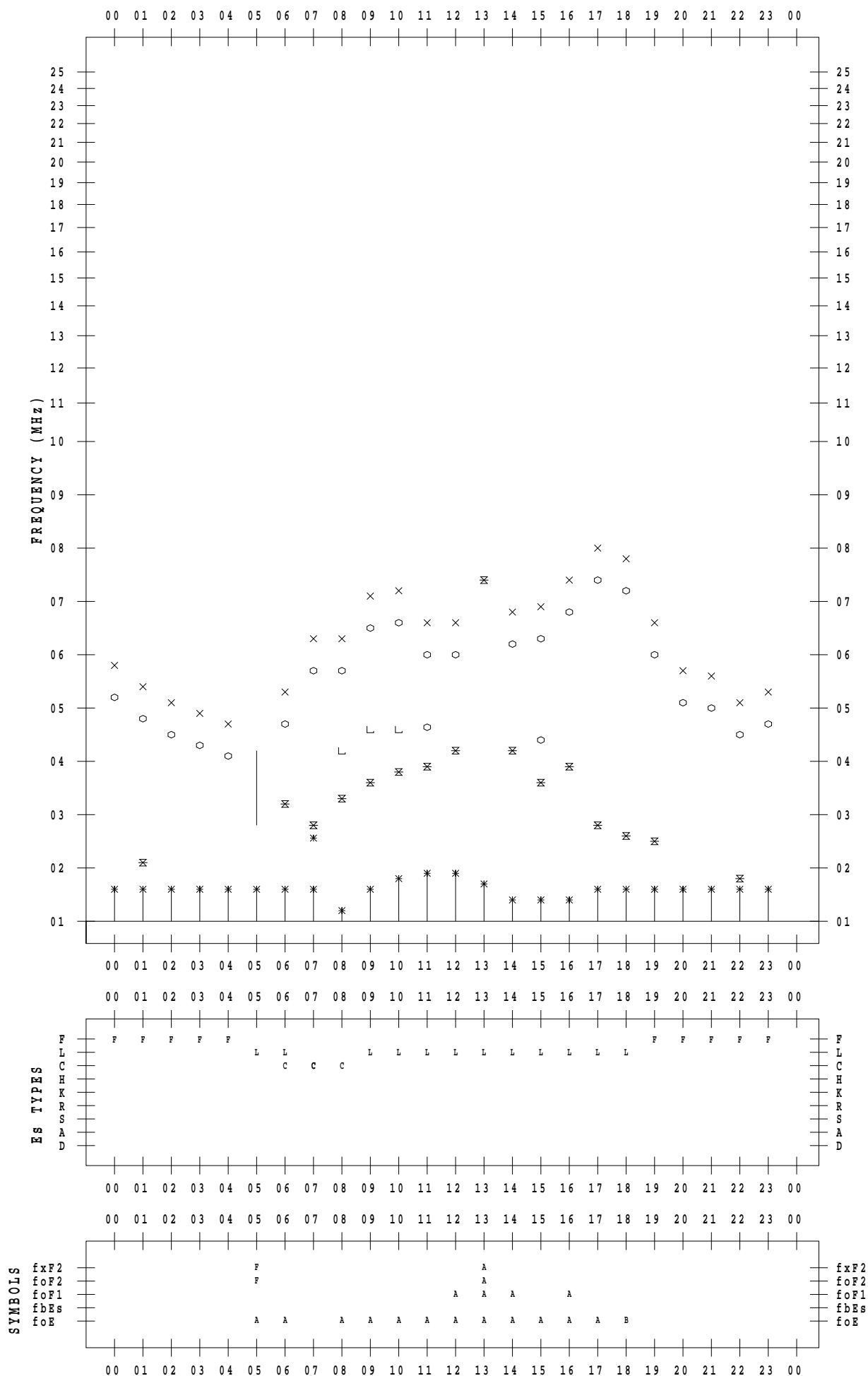
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 9/10

135 ° E MEAN TIME



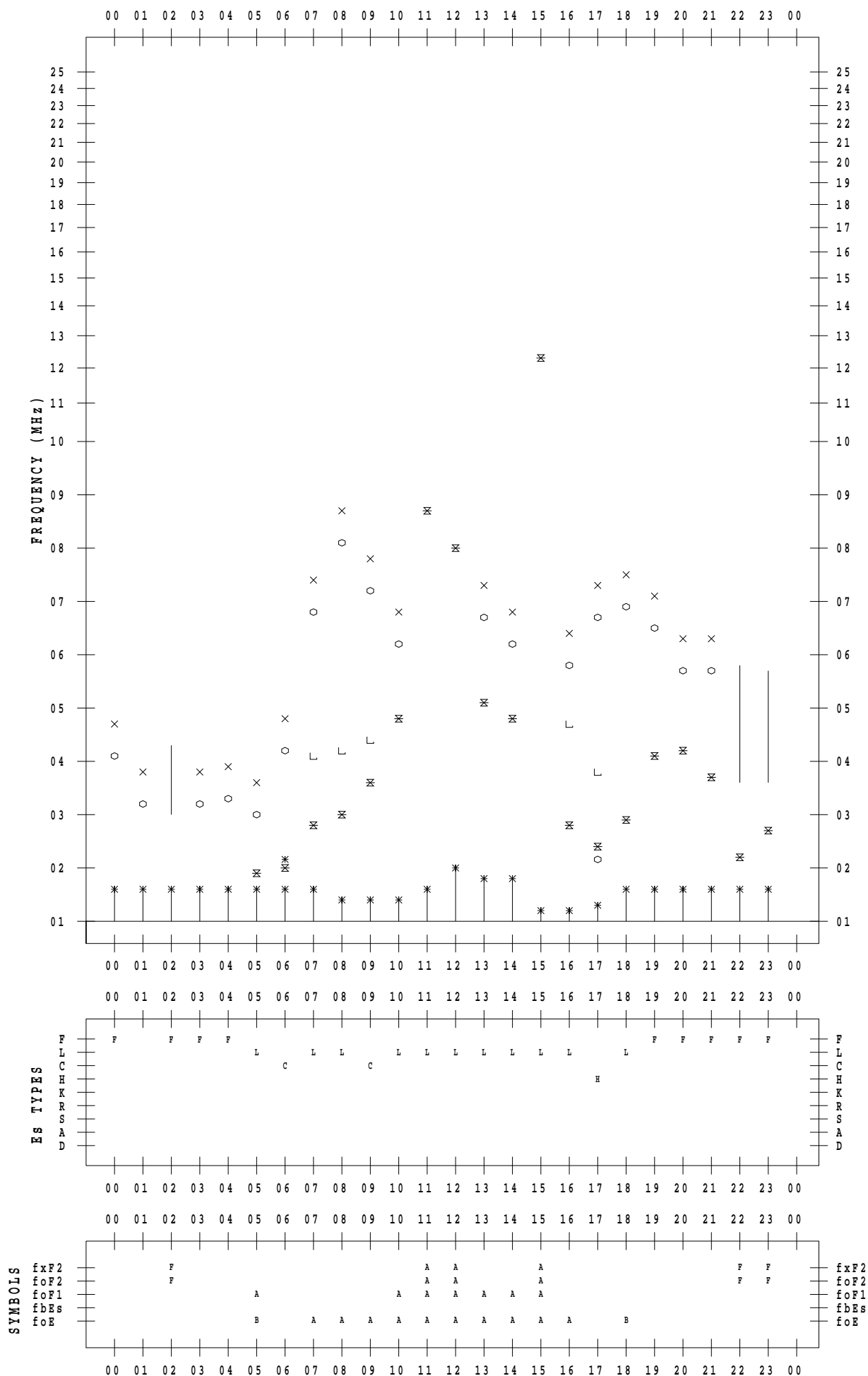
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 9/11

135 ° E MEAN TIME



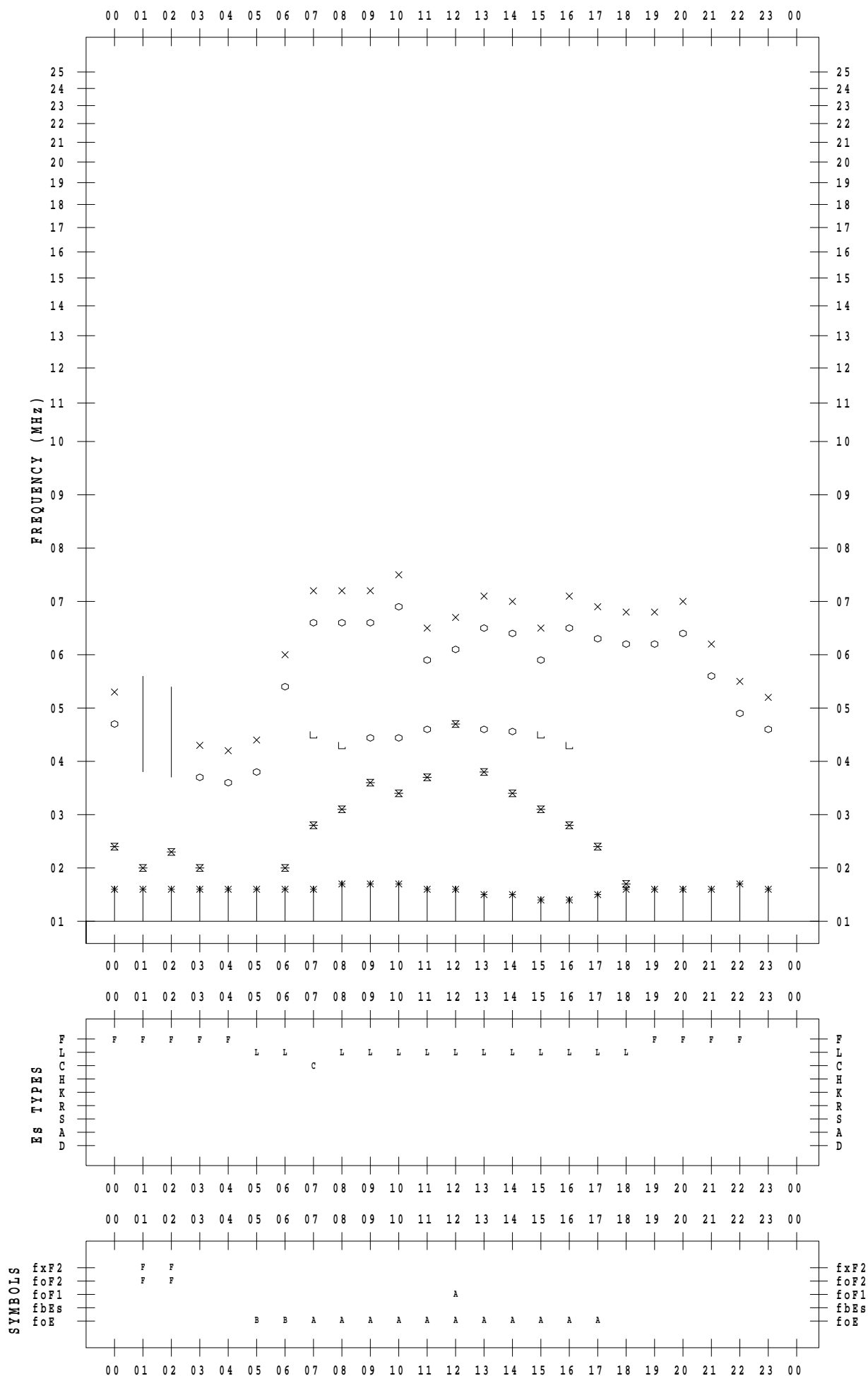
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 9/12

135 ° E MEAN TIME



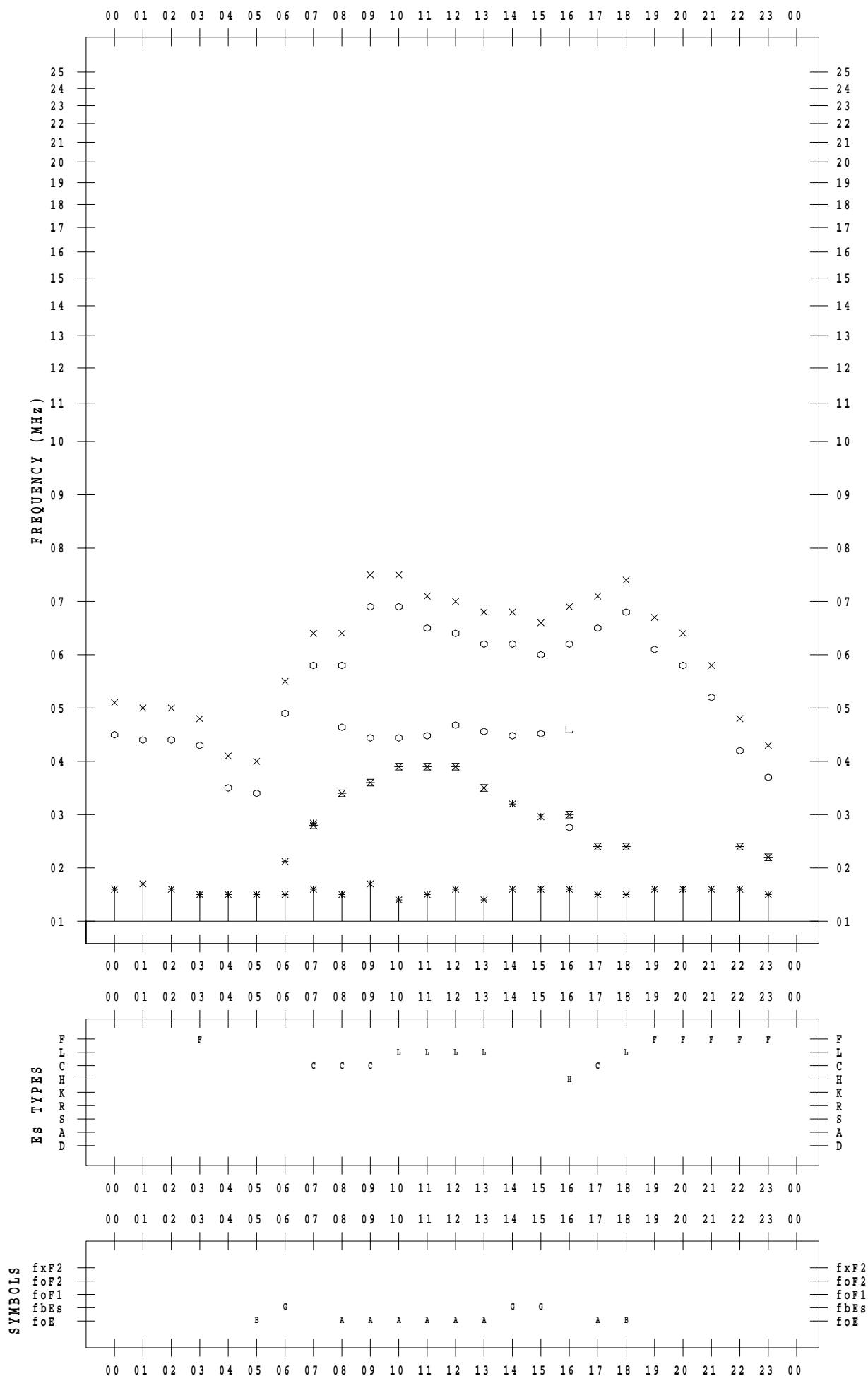
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 9/13

135 ° E MEAN TIME



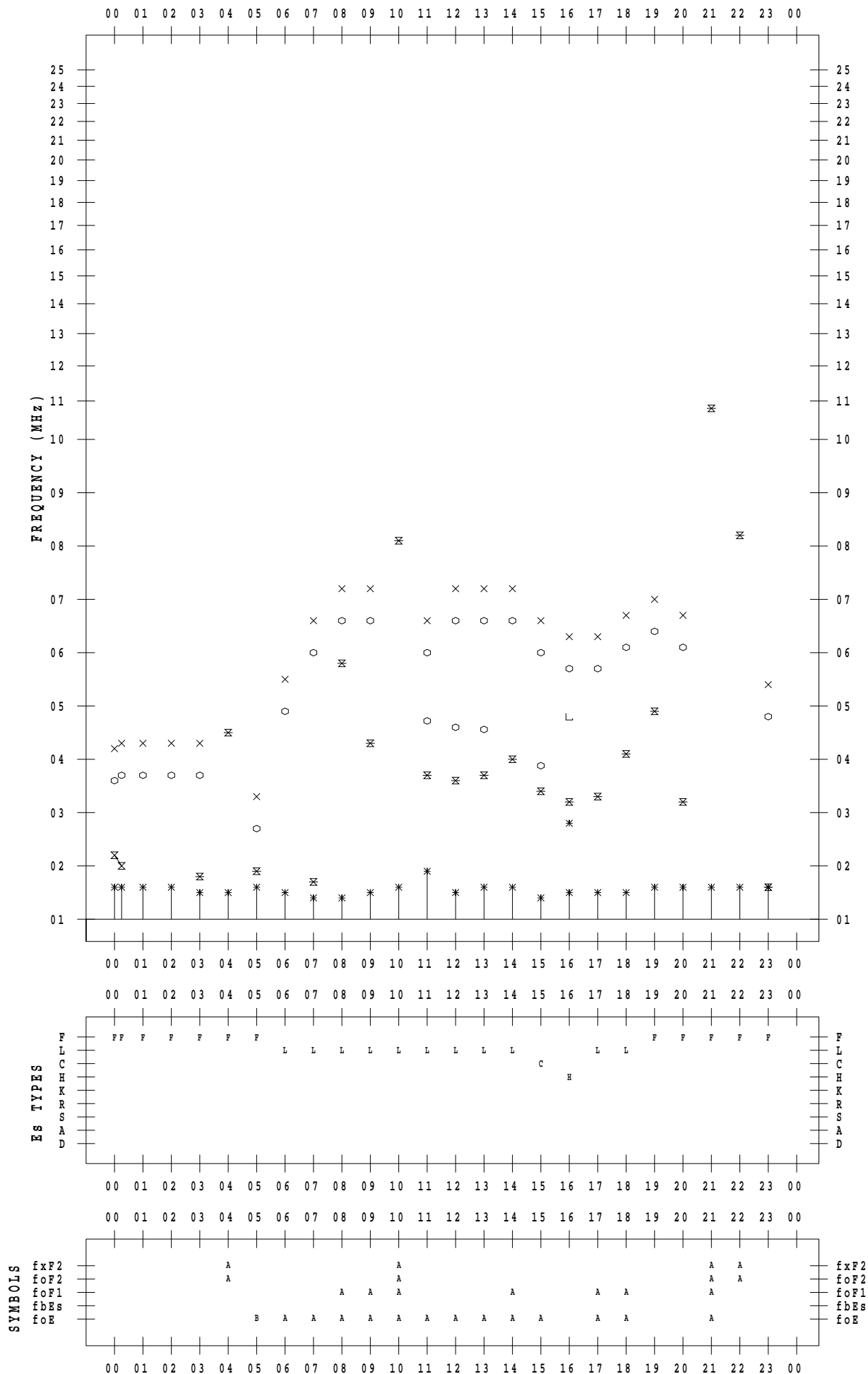
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 9/14

135 ° E MEAN TIME





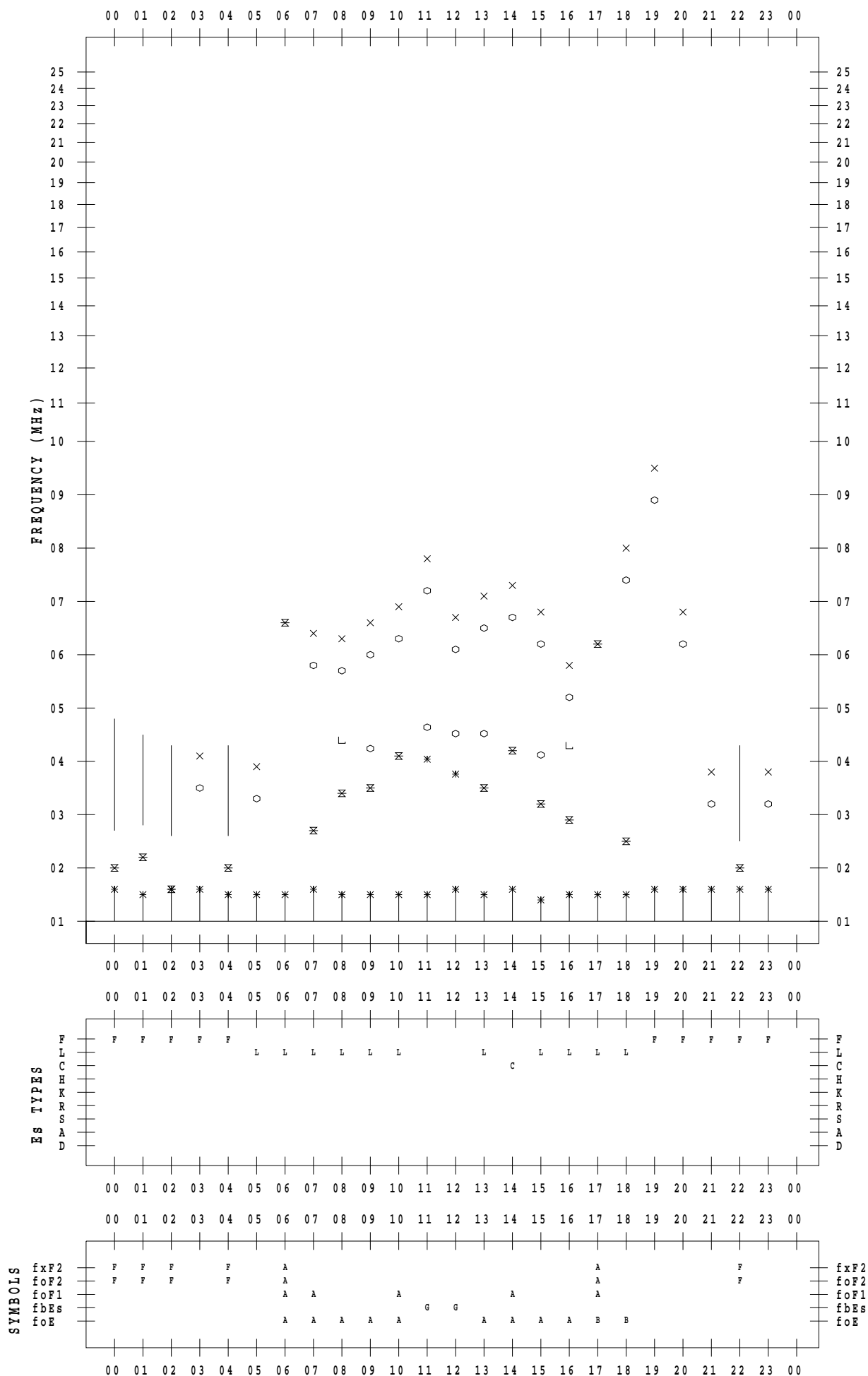
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 9/15

135 ° E MEAN TIME



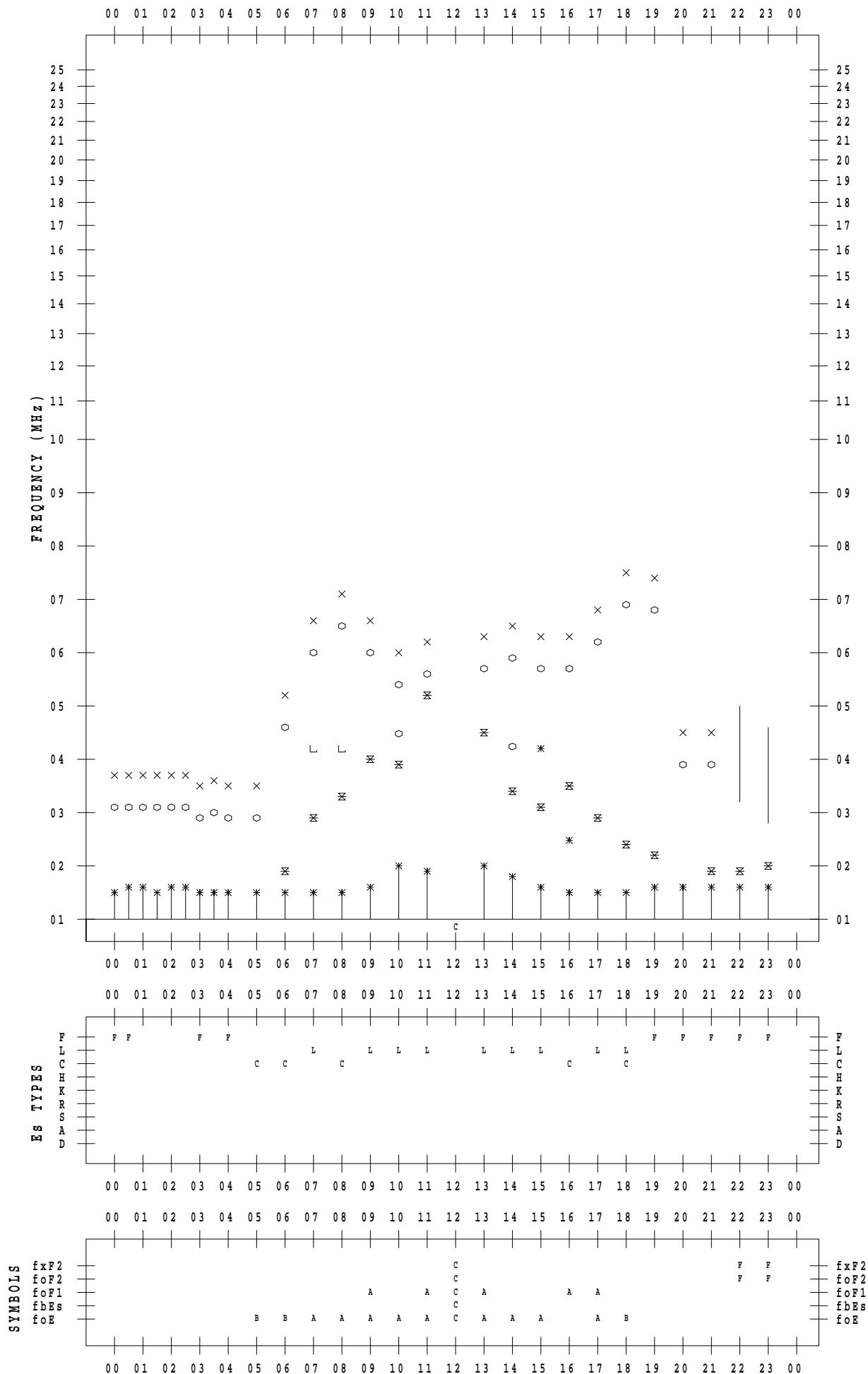
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 16

135 ° E MEAN TIME



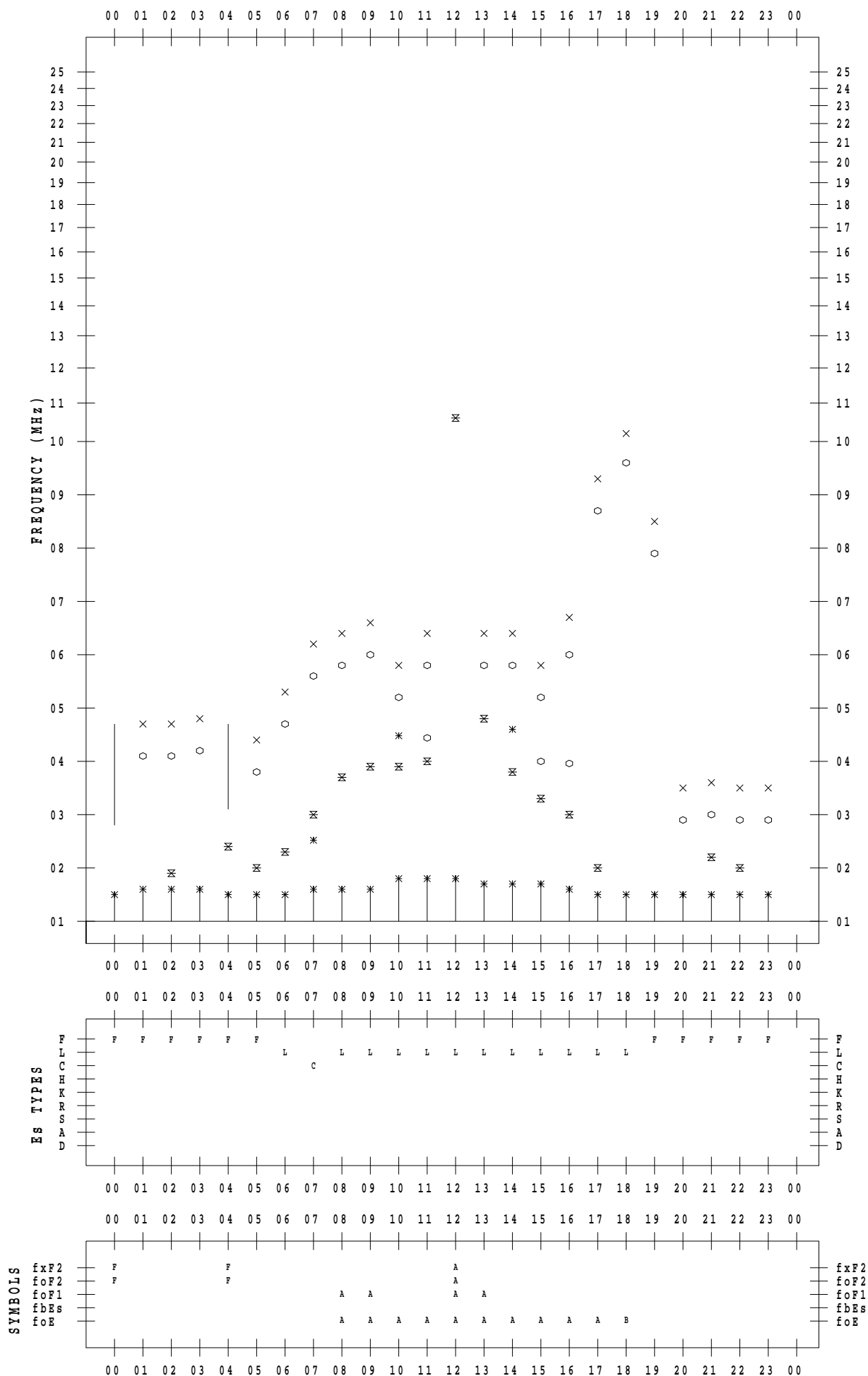
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 9/17

135 ° E MEAN TIME



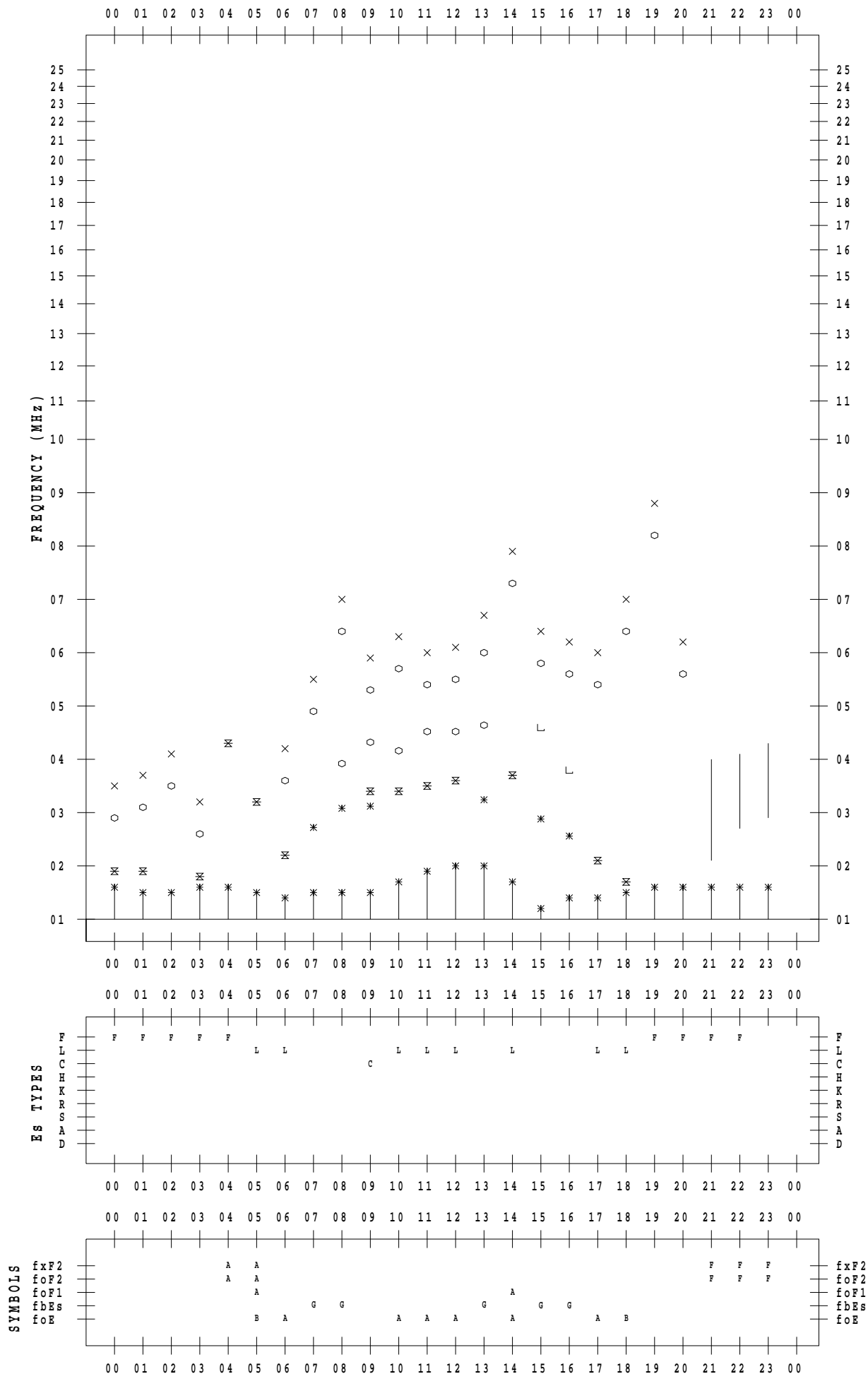
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 9/18

135 ° E MEAN TIME



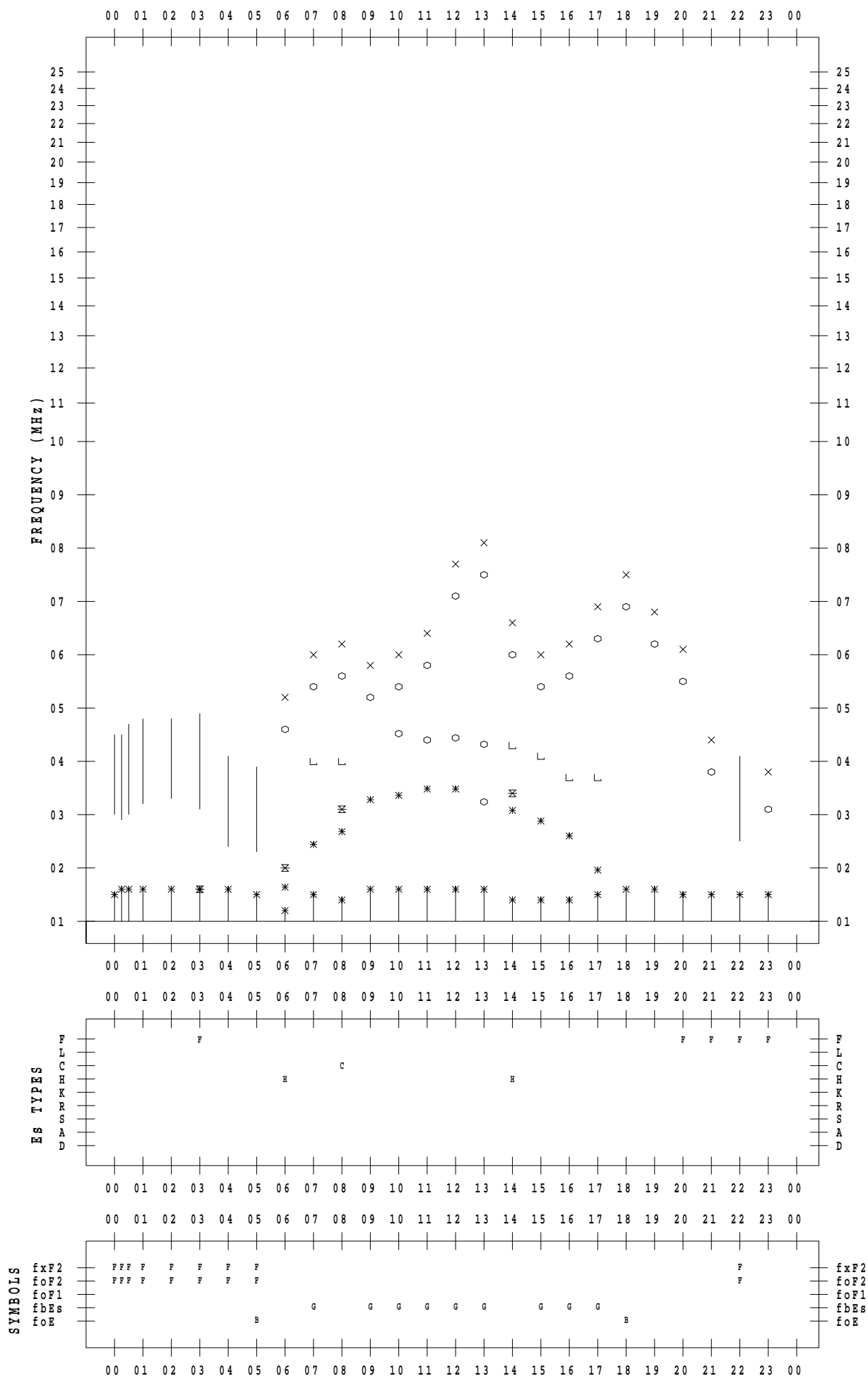
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 9/19

135 ° E MEAN TIME



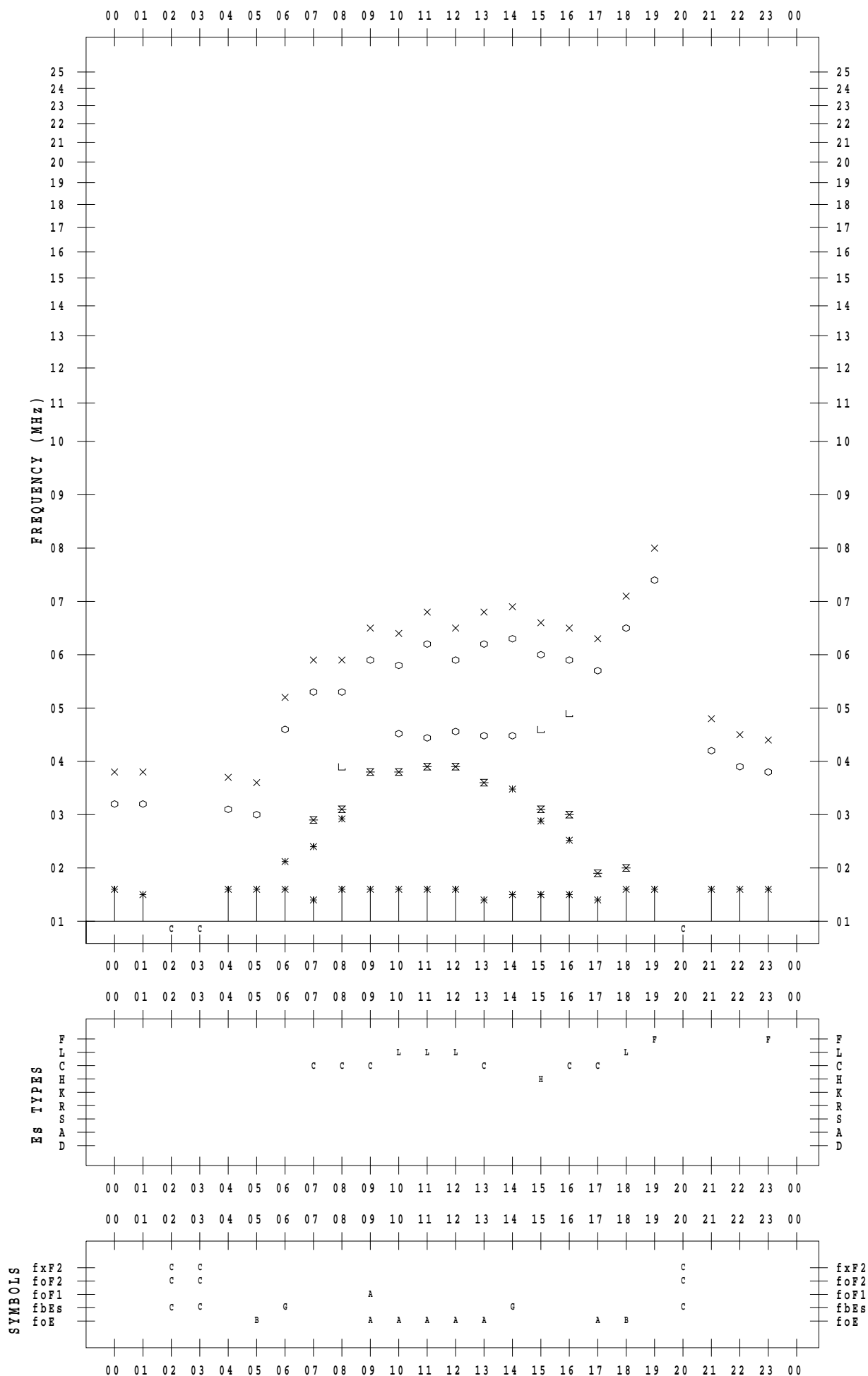
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 20

135 ° E MEAN TIME



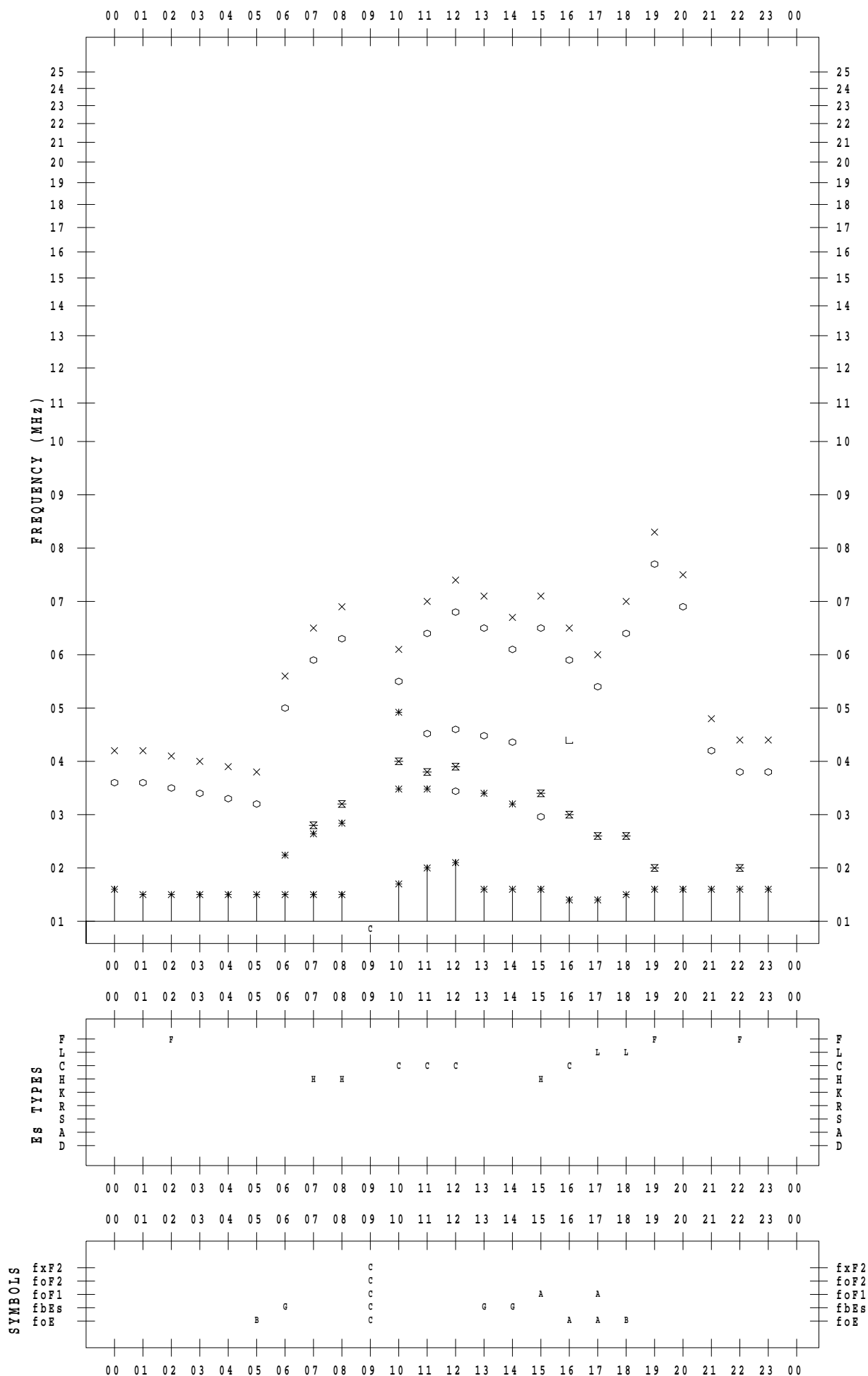
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 21

135 ° E MEAN TIME



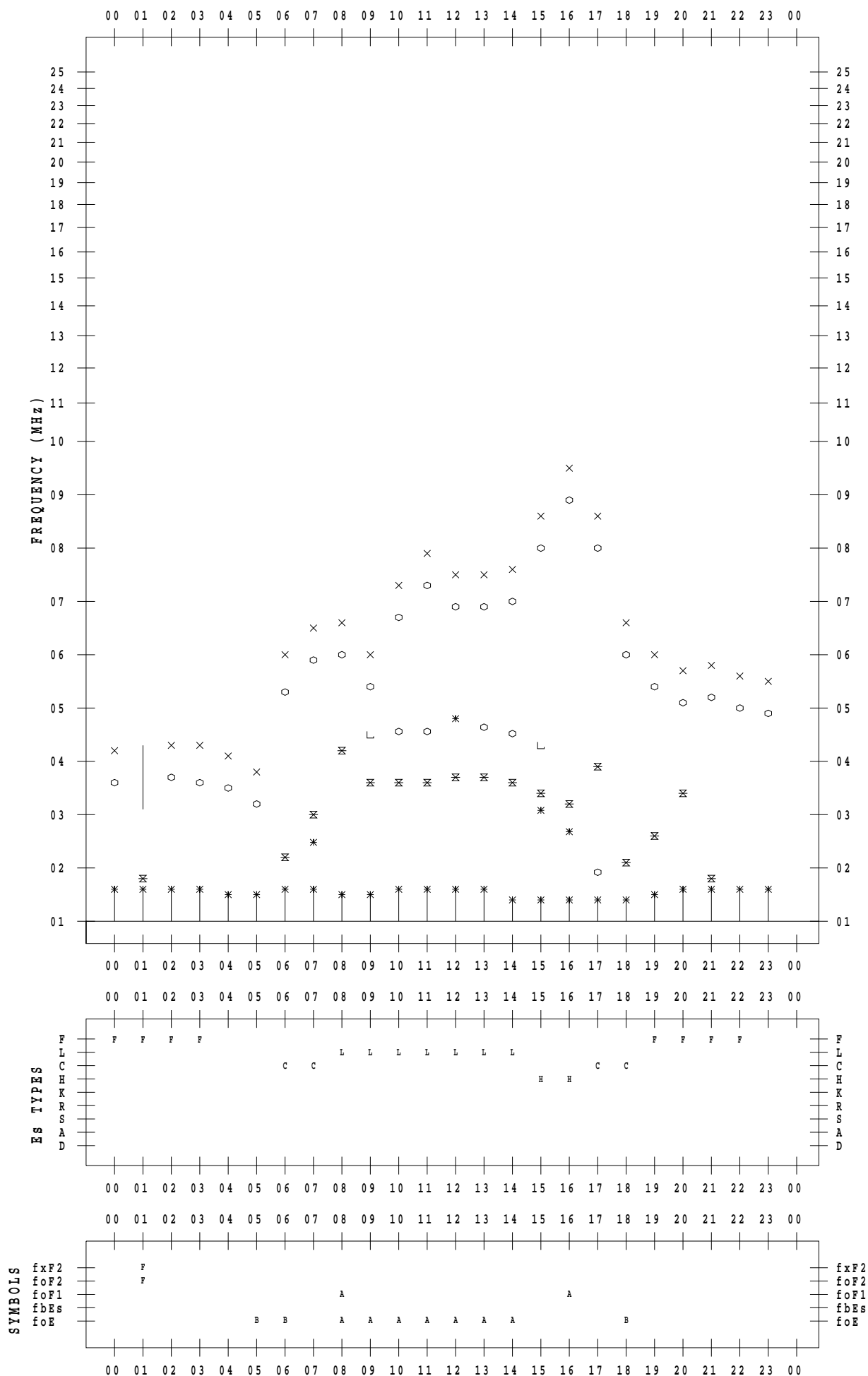
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 22

135 ° E MEAN TIME





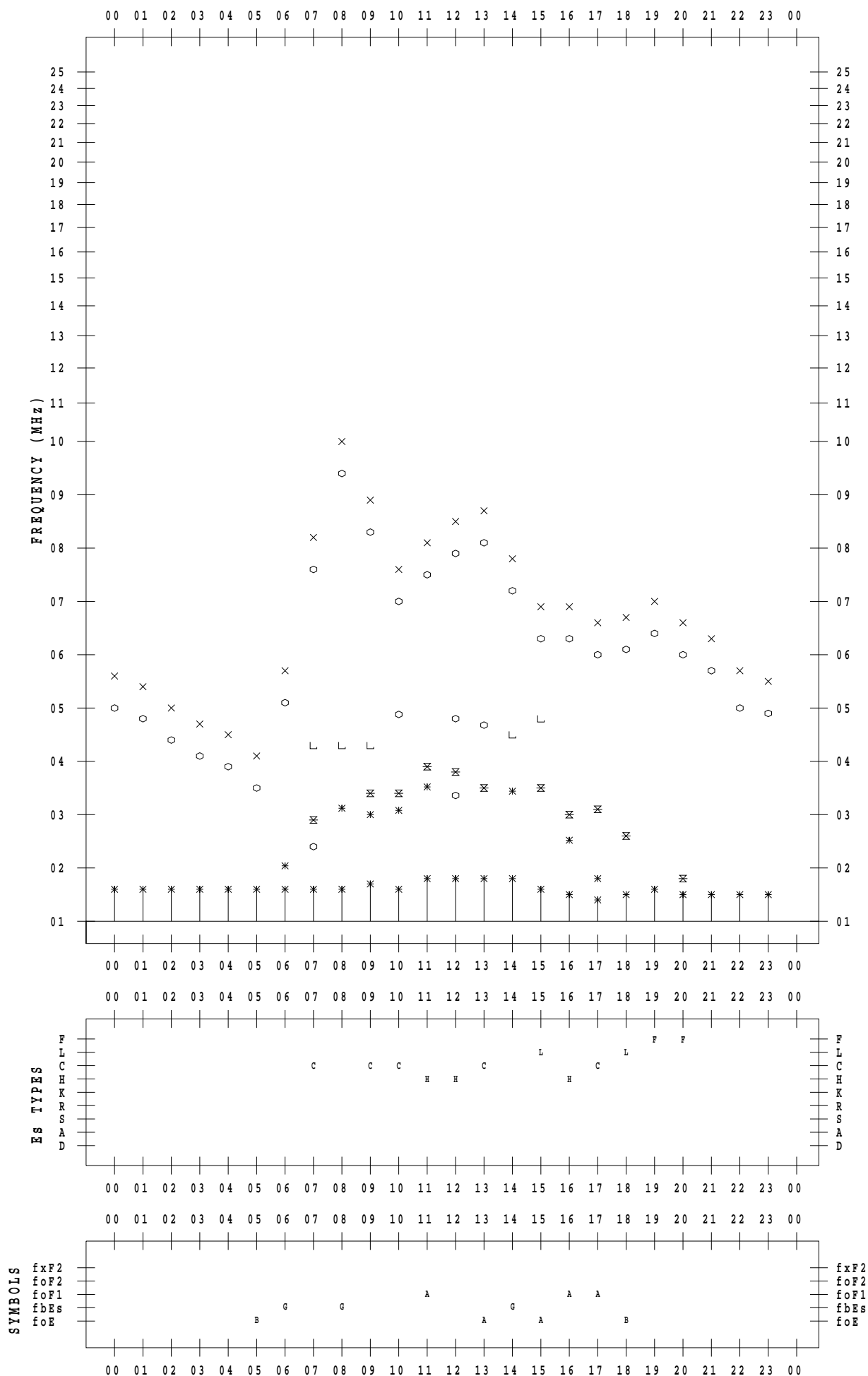
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 23

135 ° E MEAN TIME



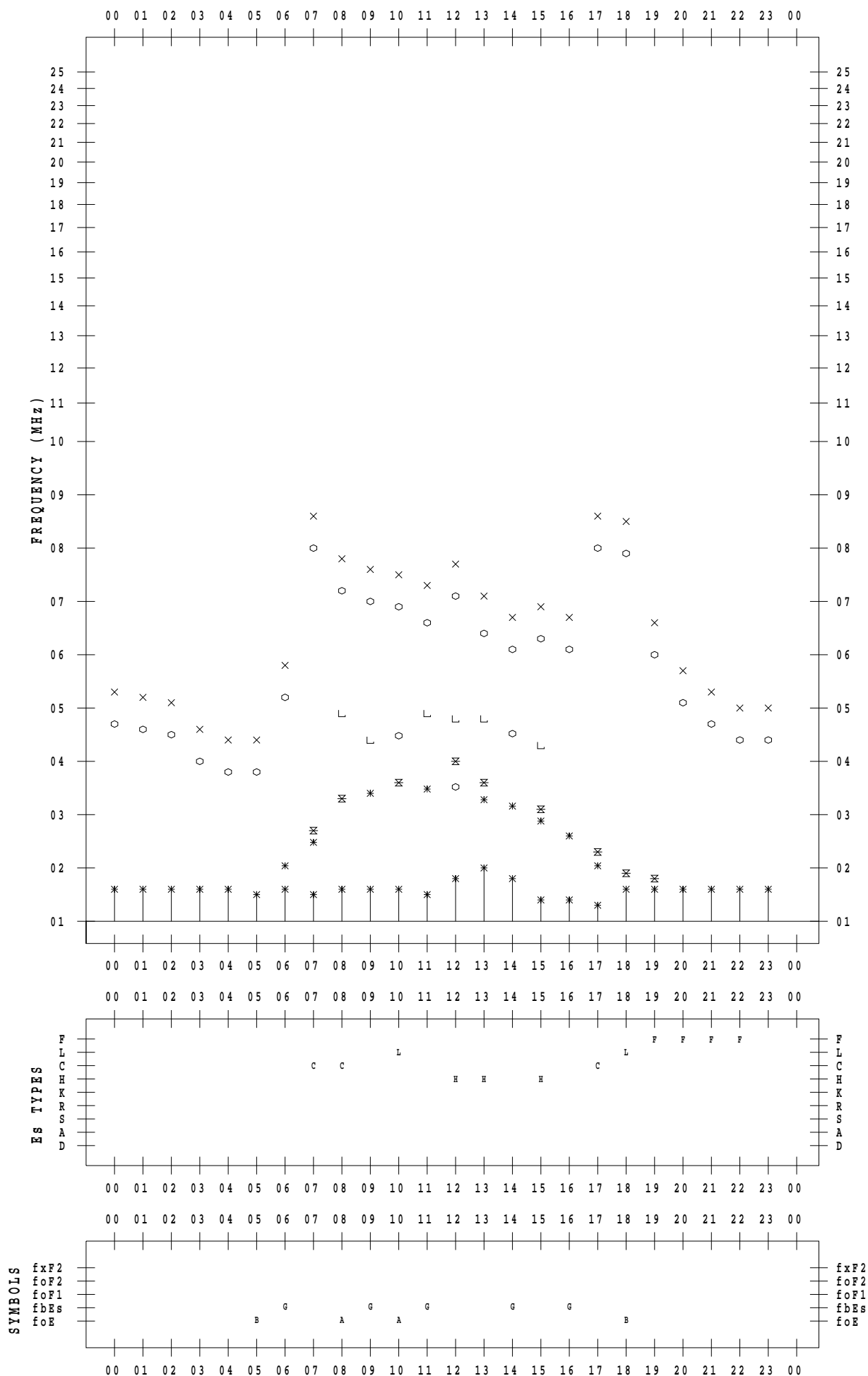
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 9/24

135 ° E MEAN TIME



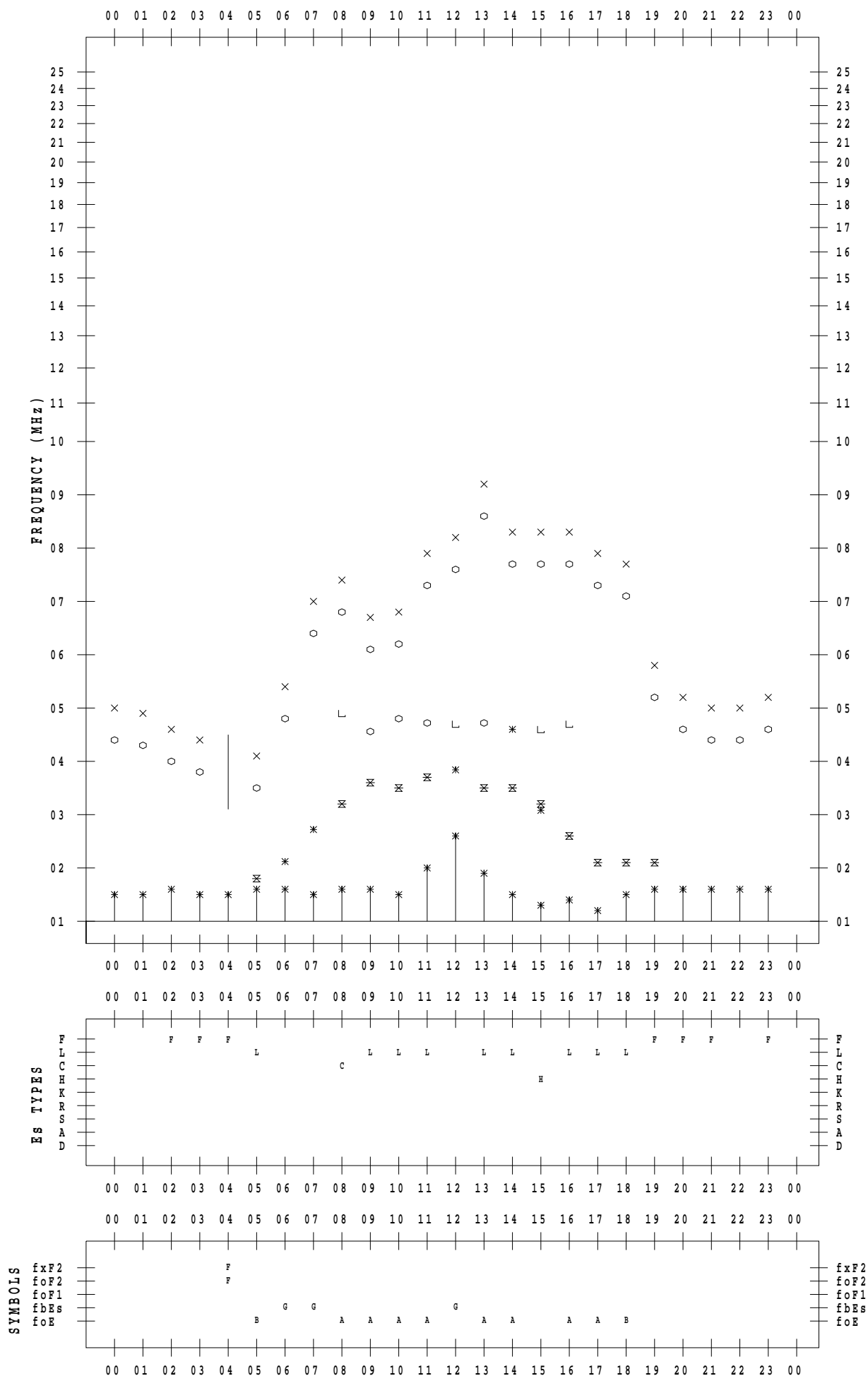
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021/ 9/25

135 ° E MEAN TIME



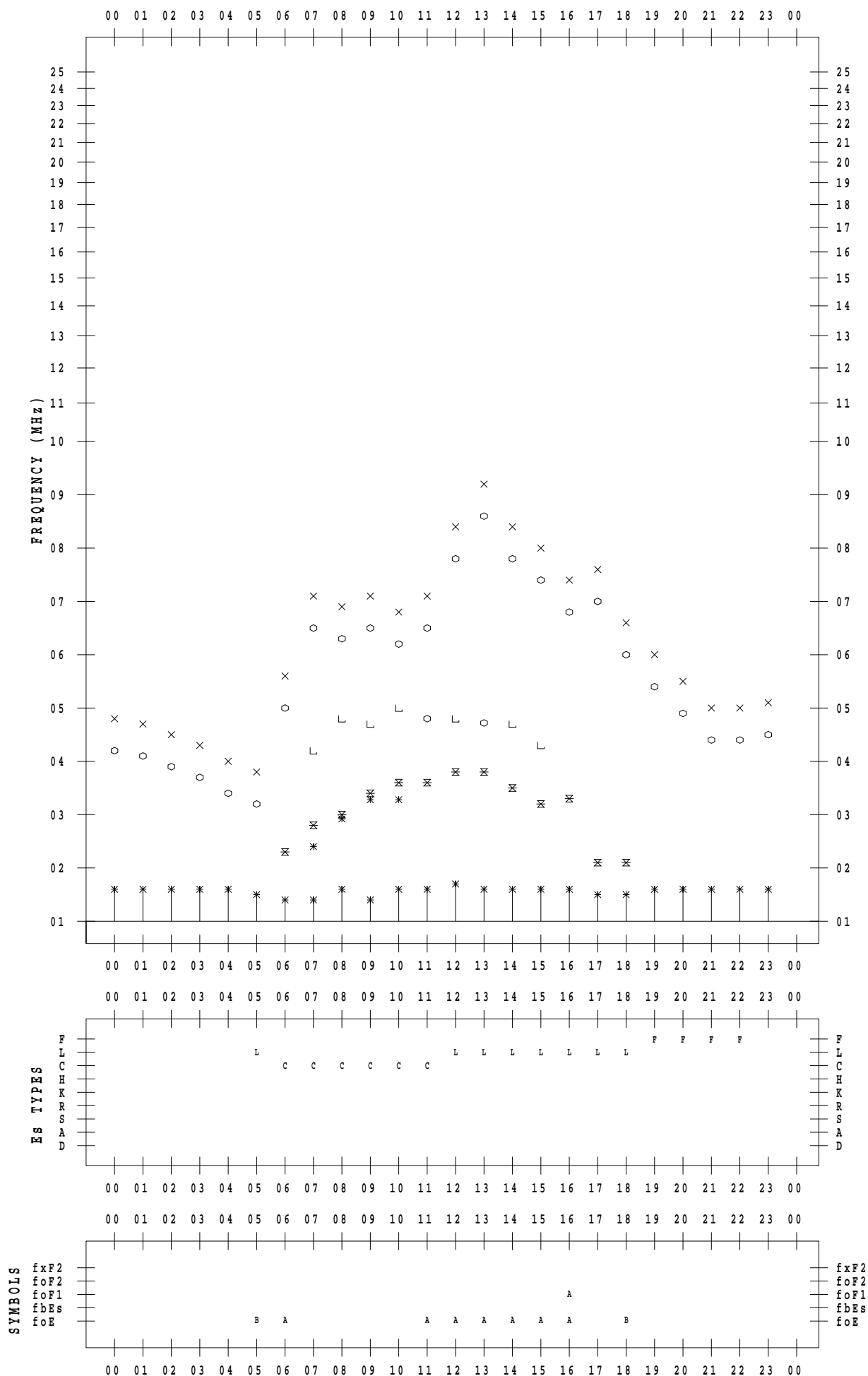
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 26

135 ° E MEAN TIME



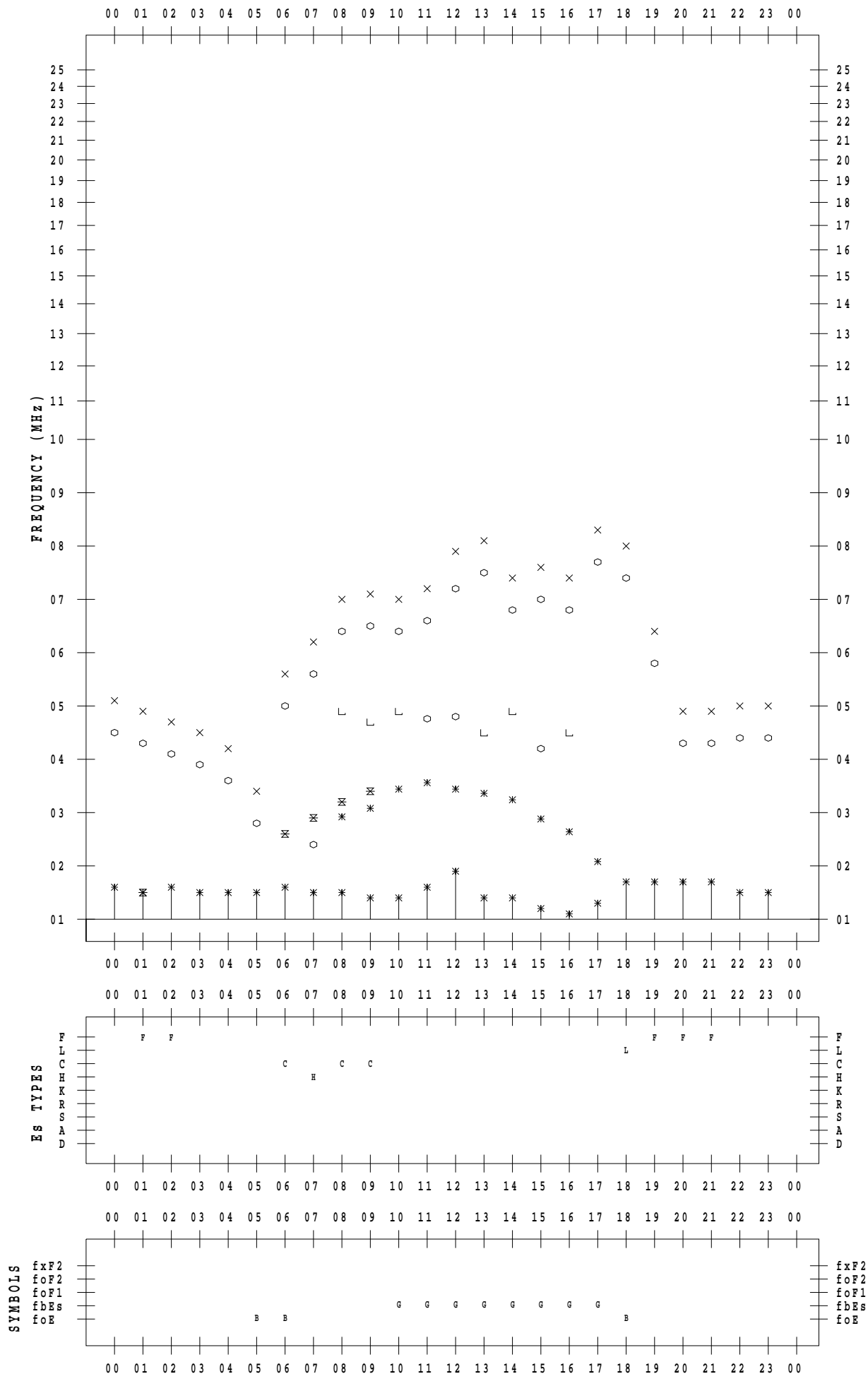
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 27

135 ° E MEAN TIME



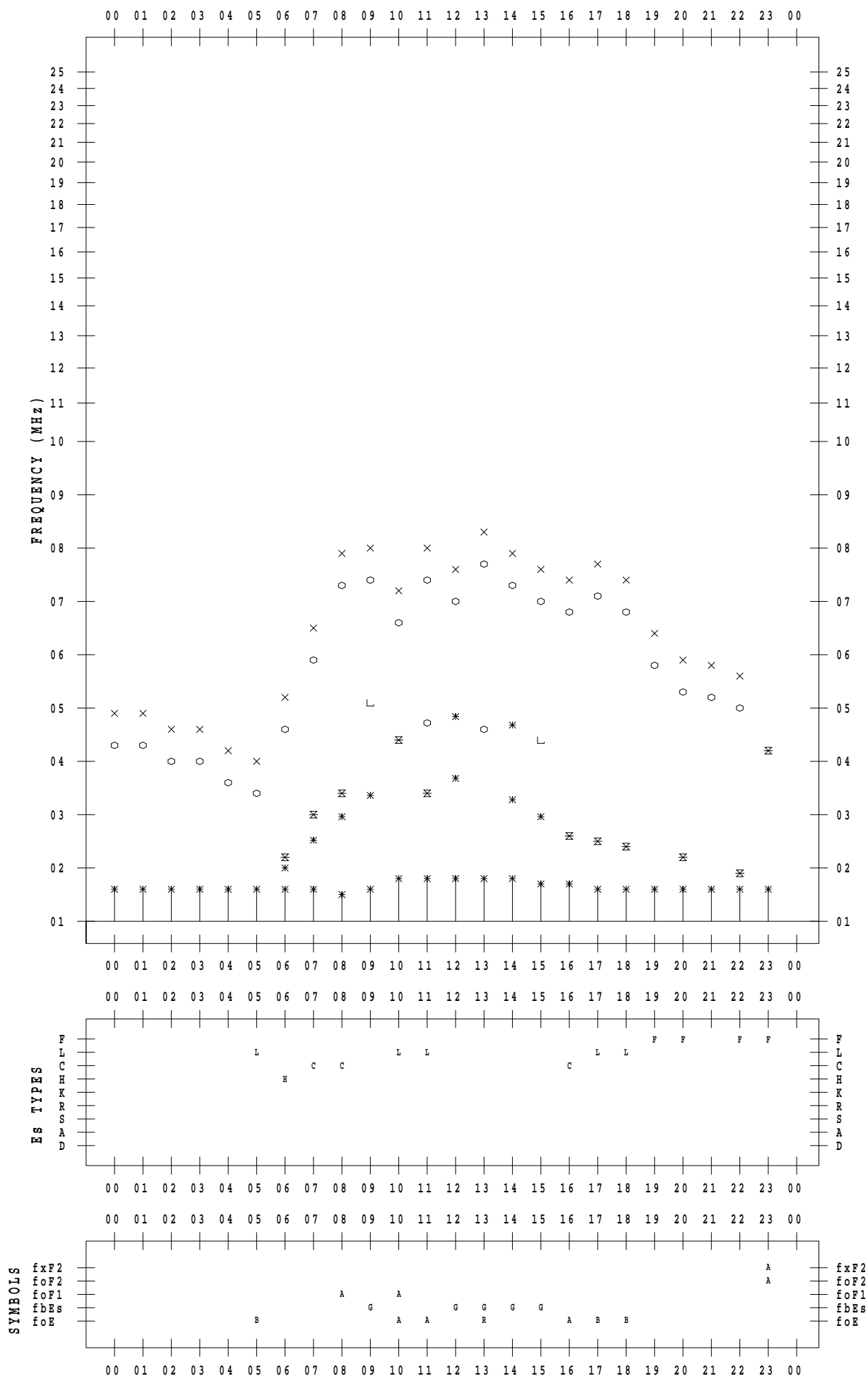
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 28

135 ° E MEAN TIME



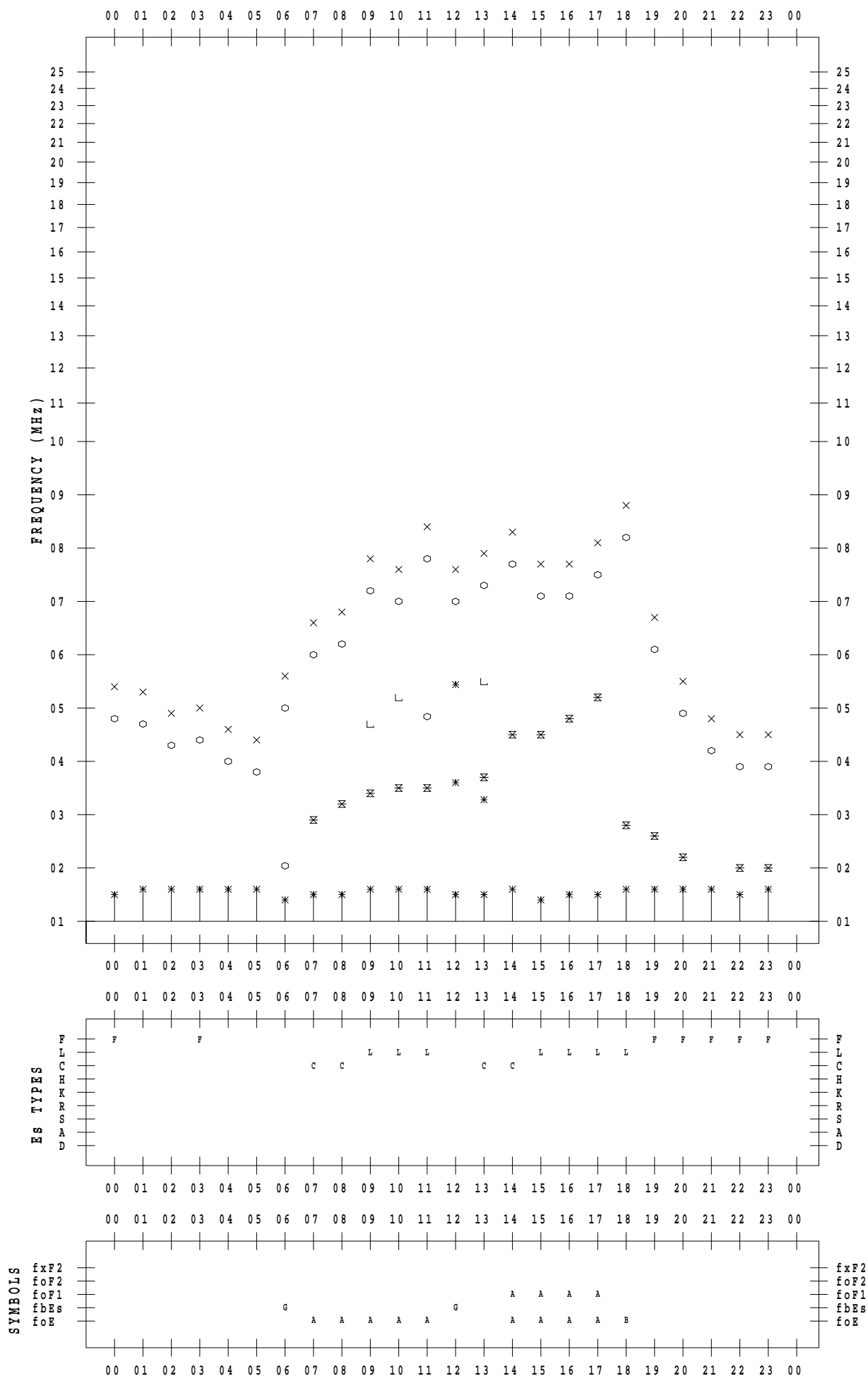
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 29

135 ° E MEAN TIME



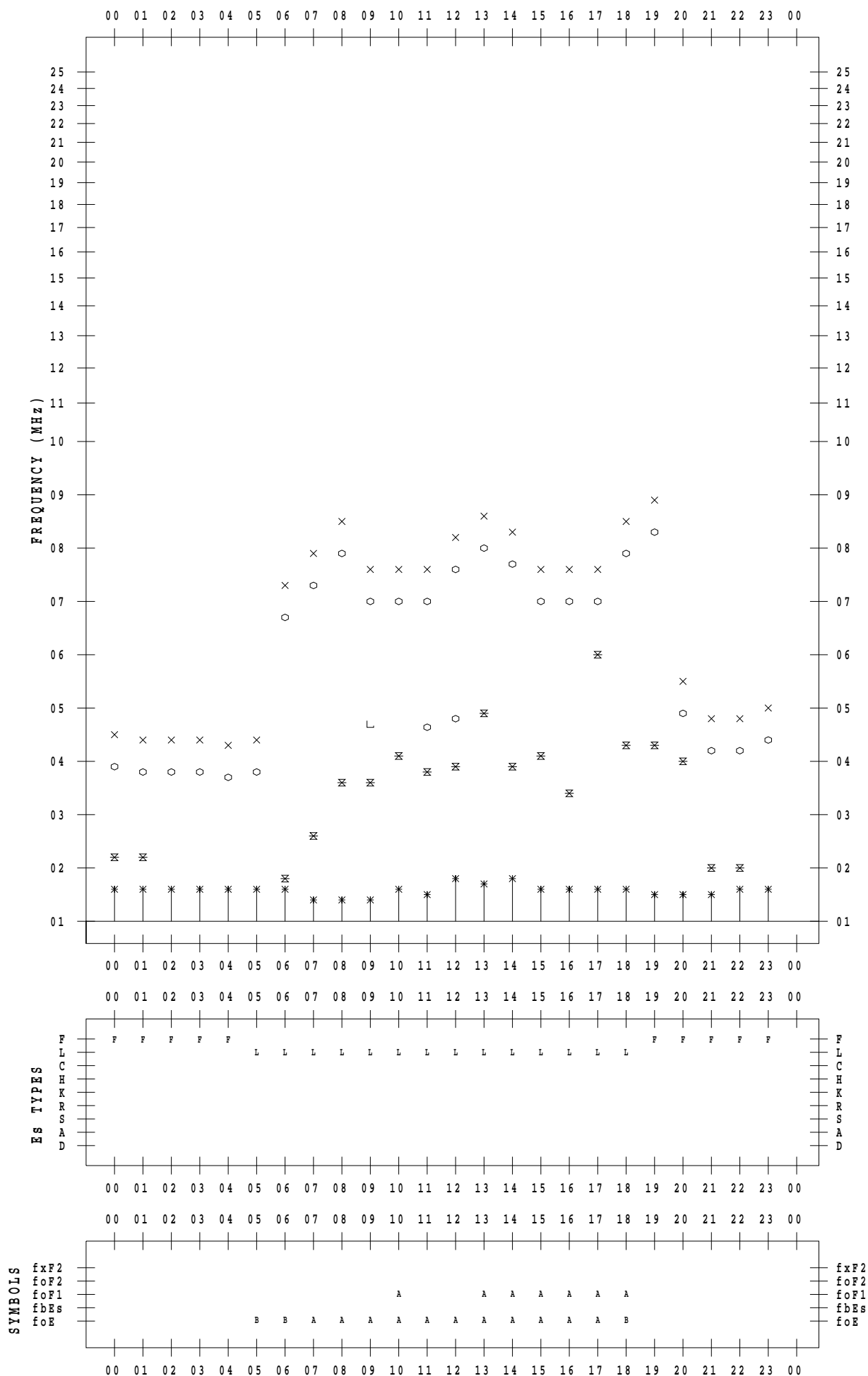
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2021 / 9 / 30

135 ° E MEAN TIME





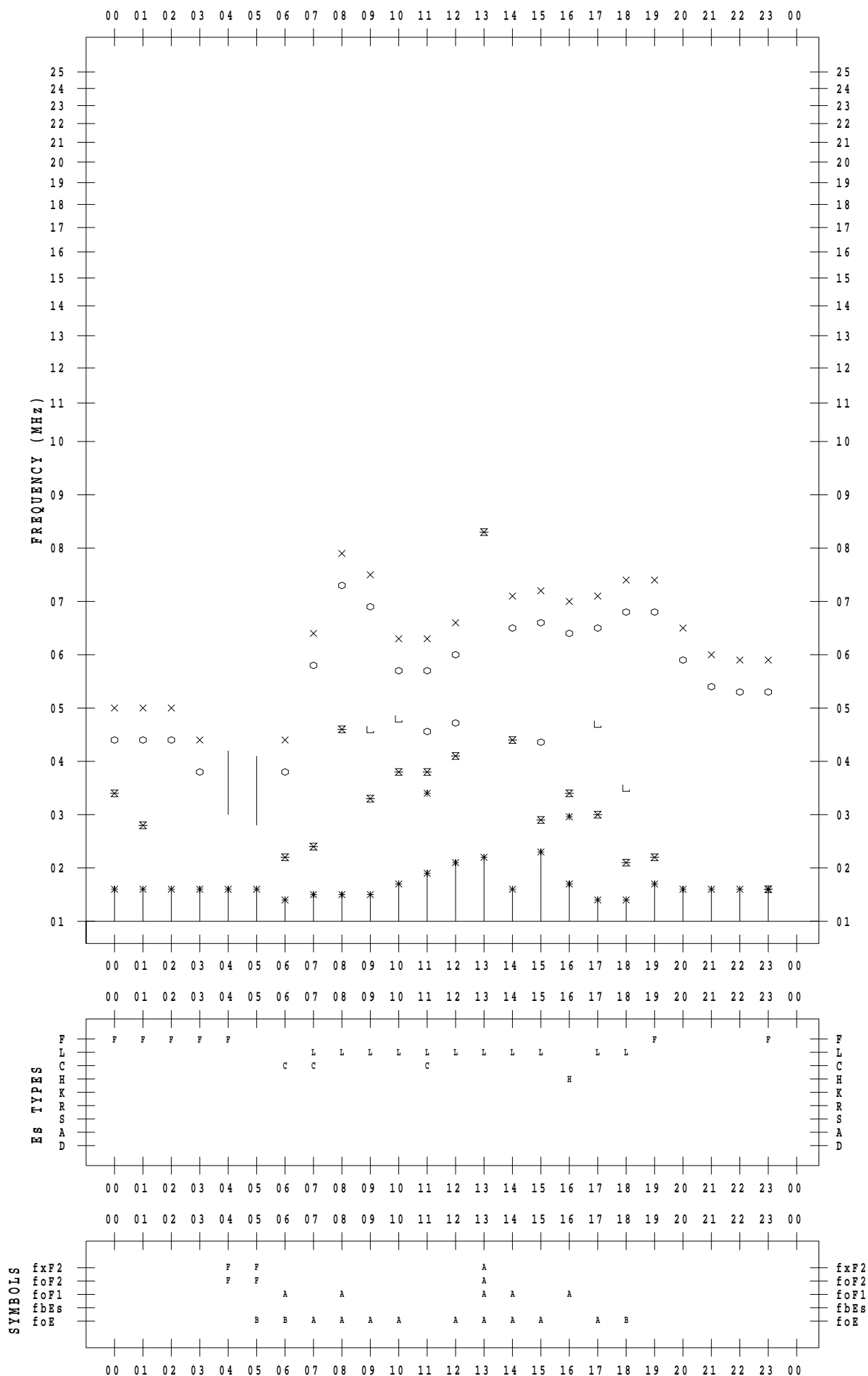
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 1

135 ° E MEAN TIME



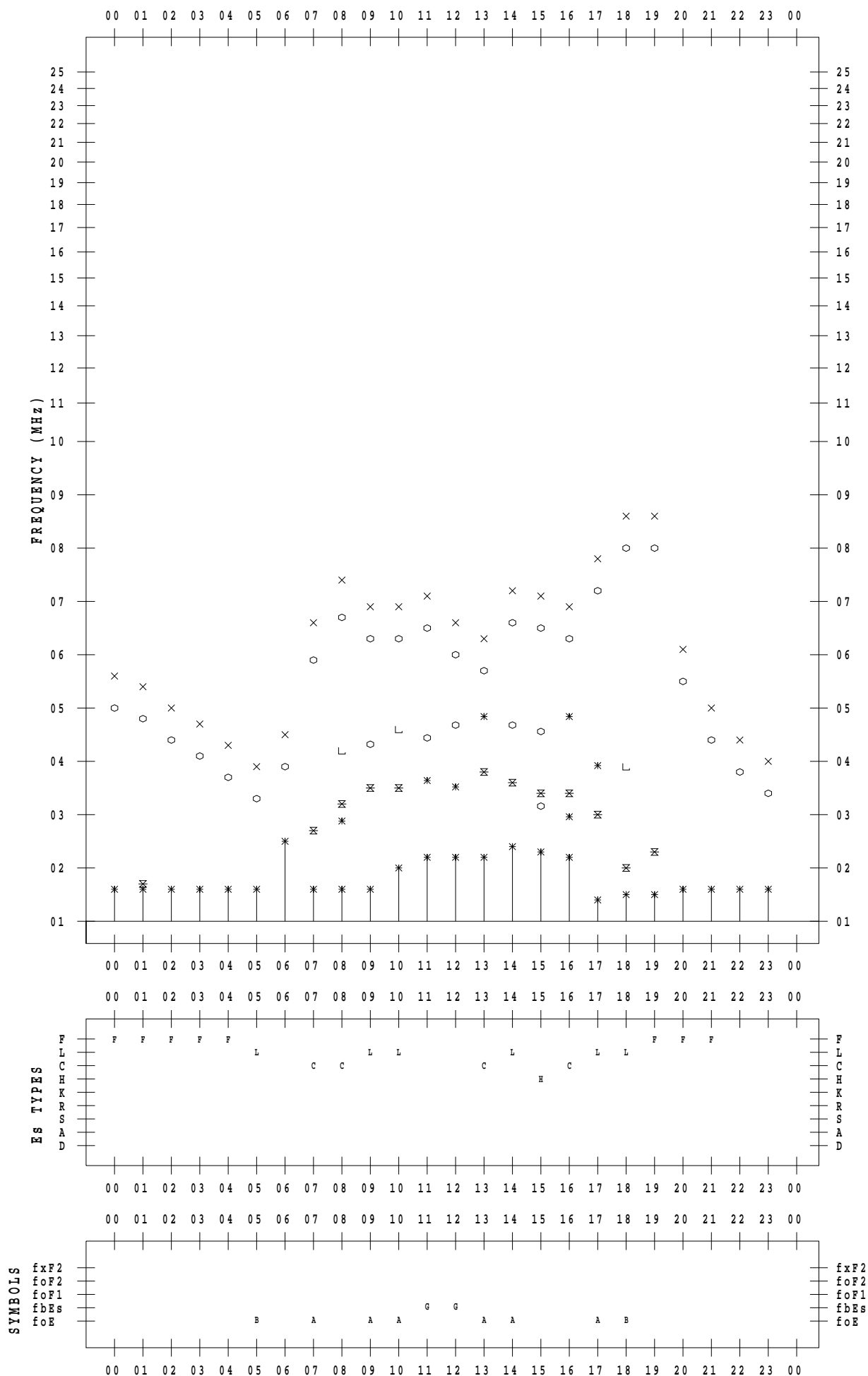
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 2

135 ° E MEAN TIME



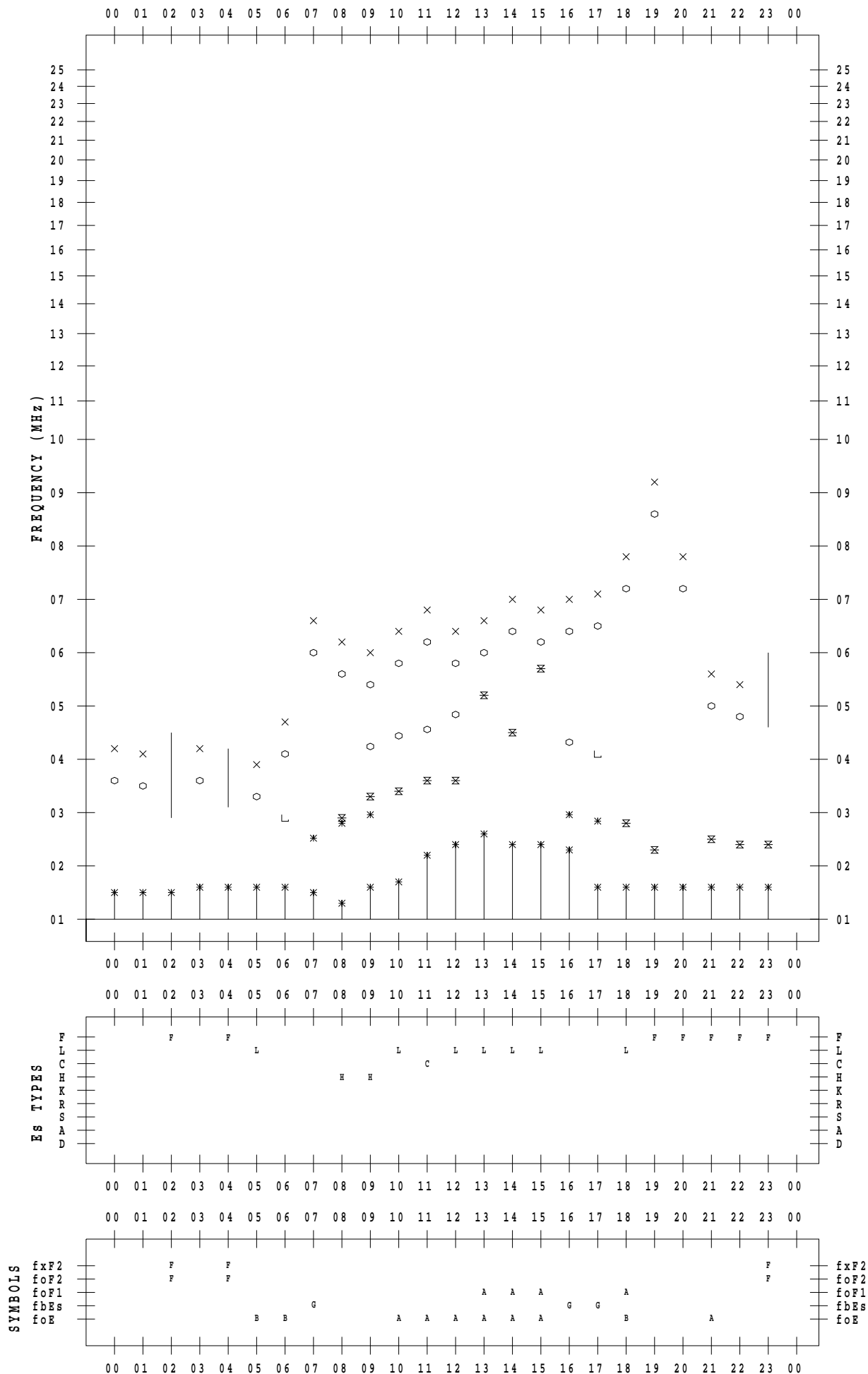
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 3

135 ° E MEAN TIME



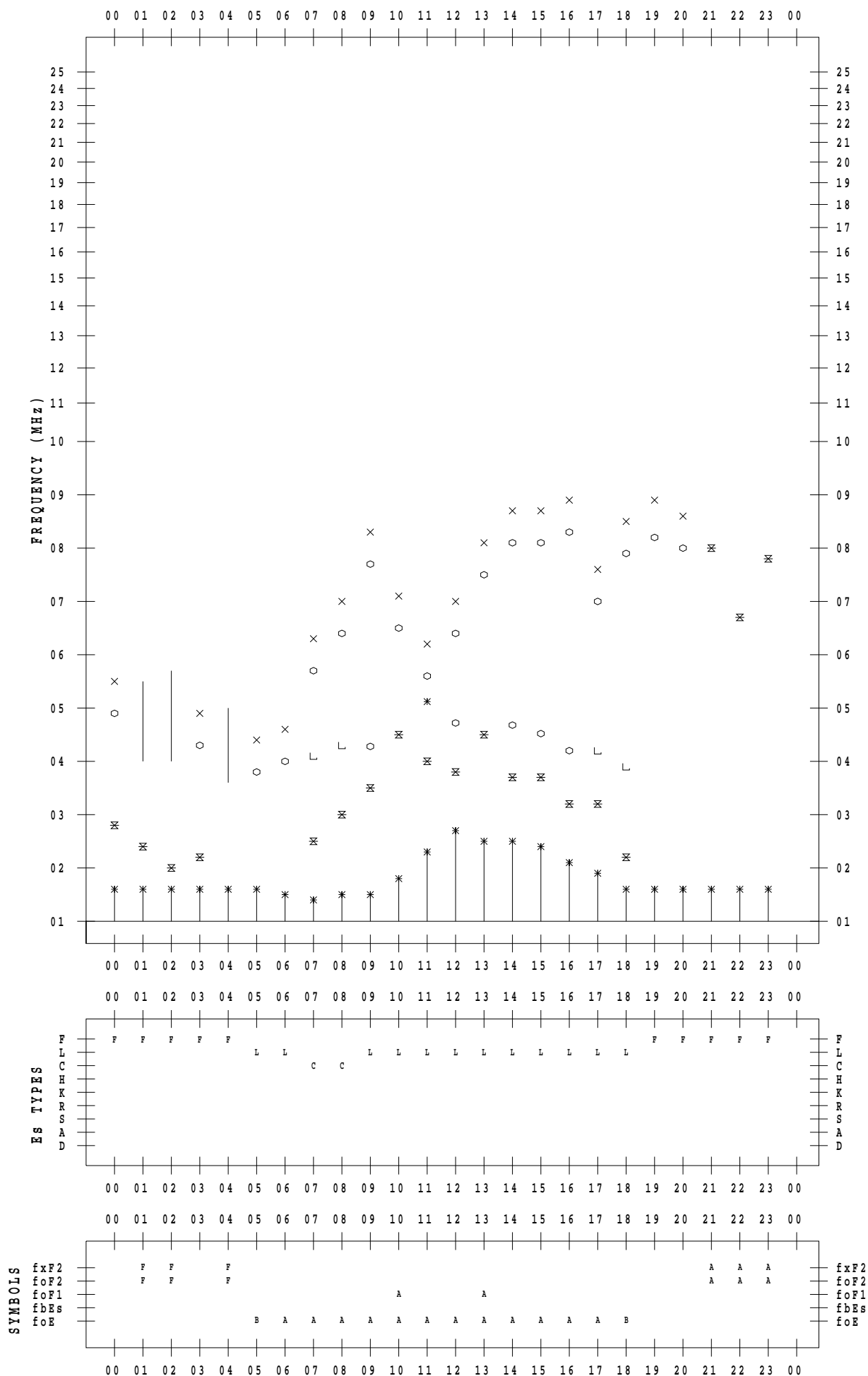
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 4

135 ° E MEAN TIME



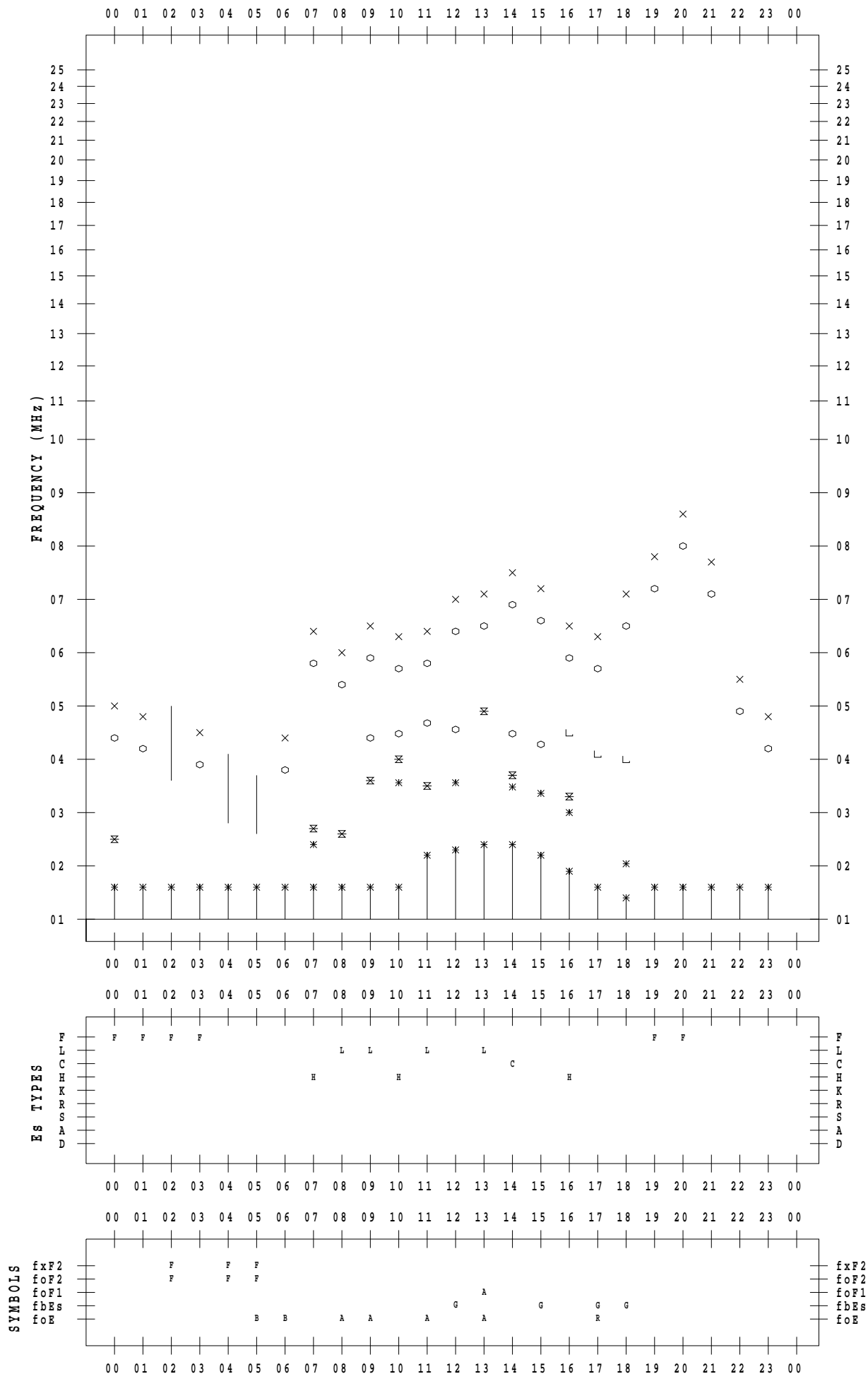
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 5

135 ° E MEAN TIME



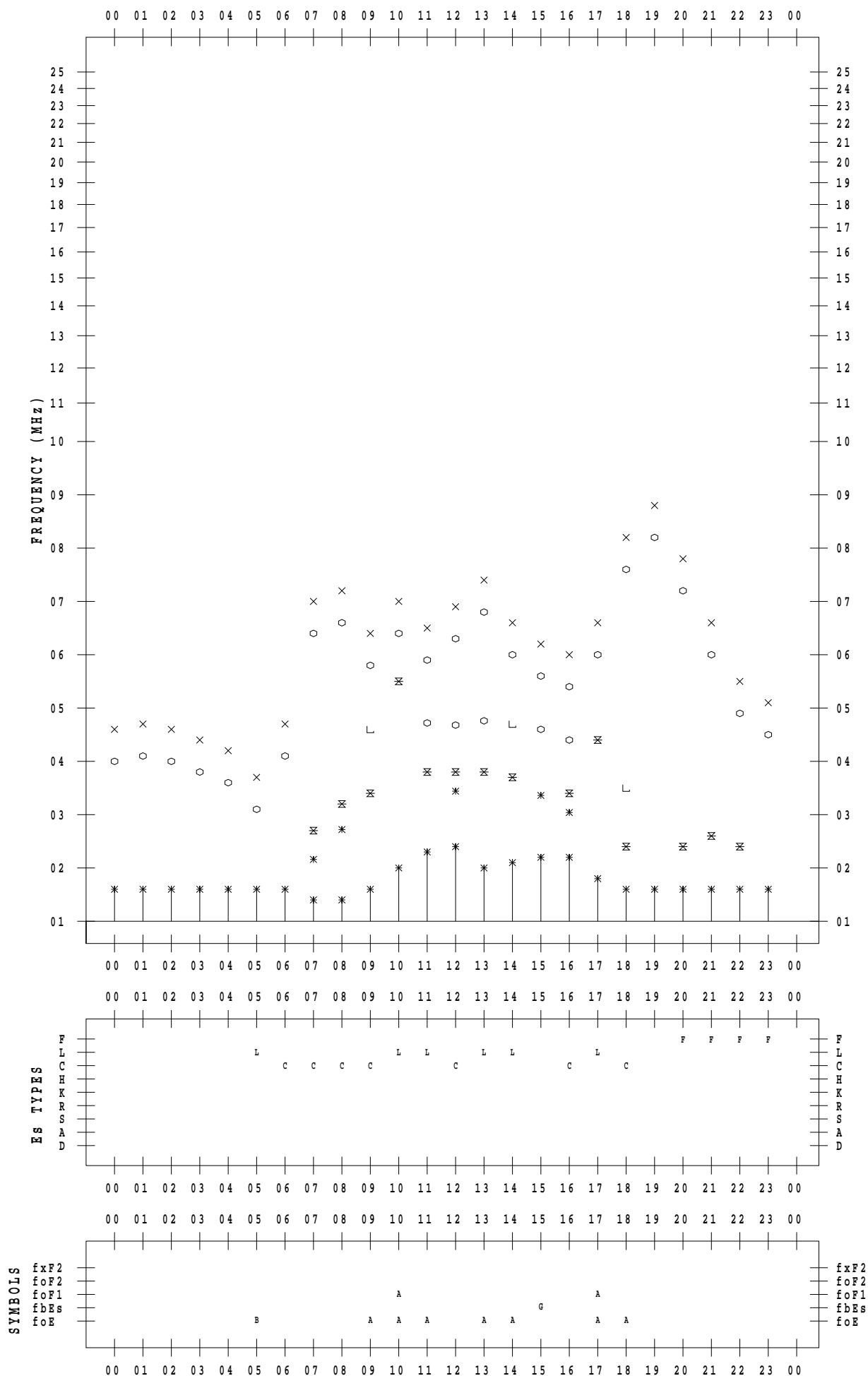
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/ 9/ 6

135 ° E MEAN TIME



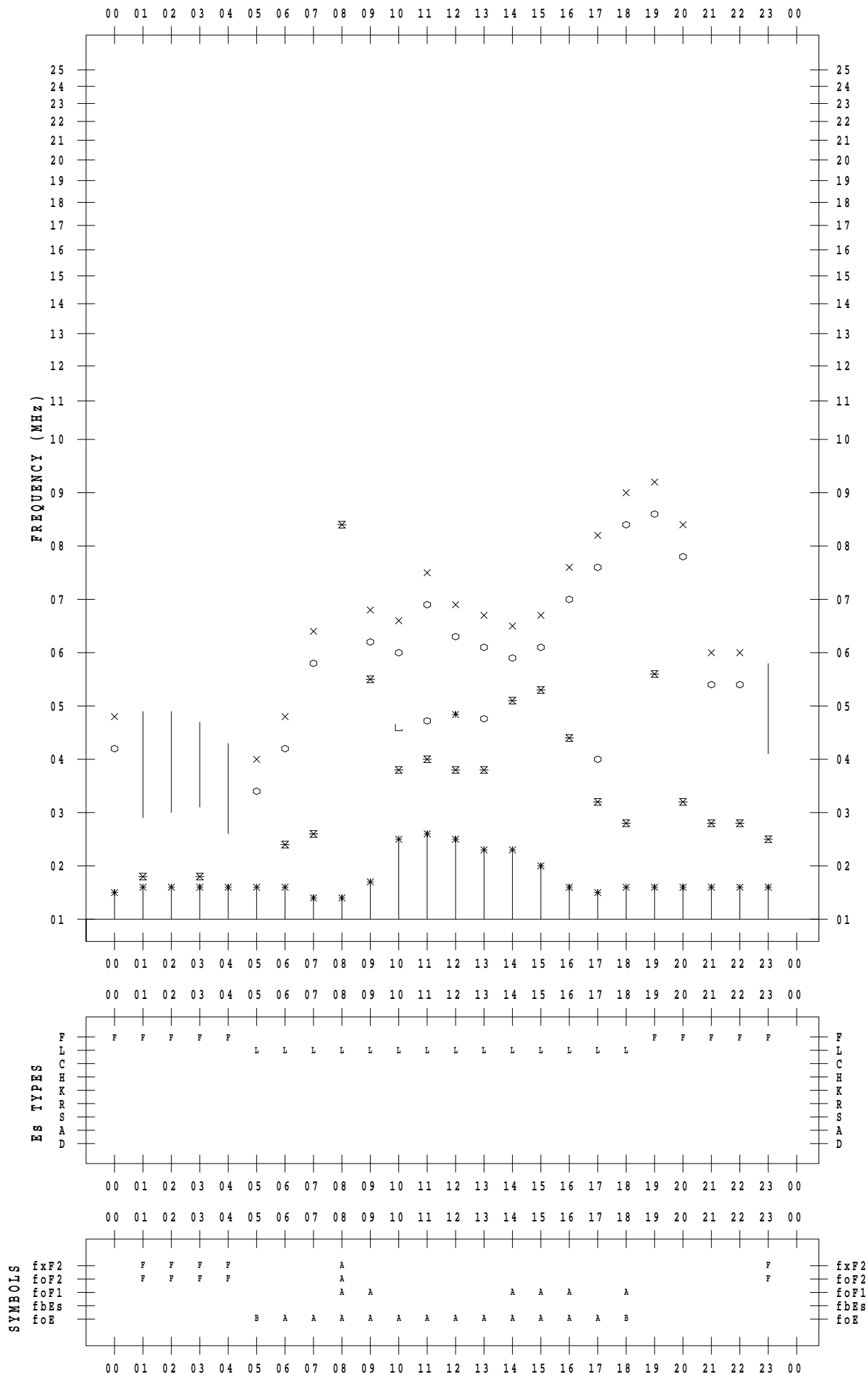
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 7

135 ° E MEAN TIME



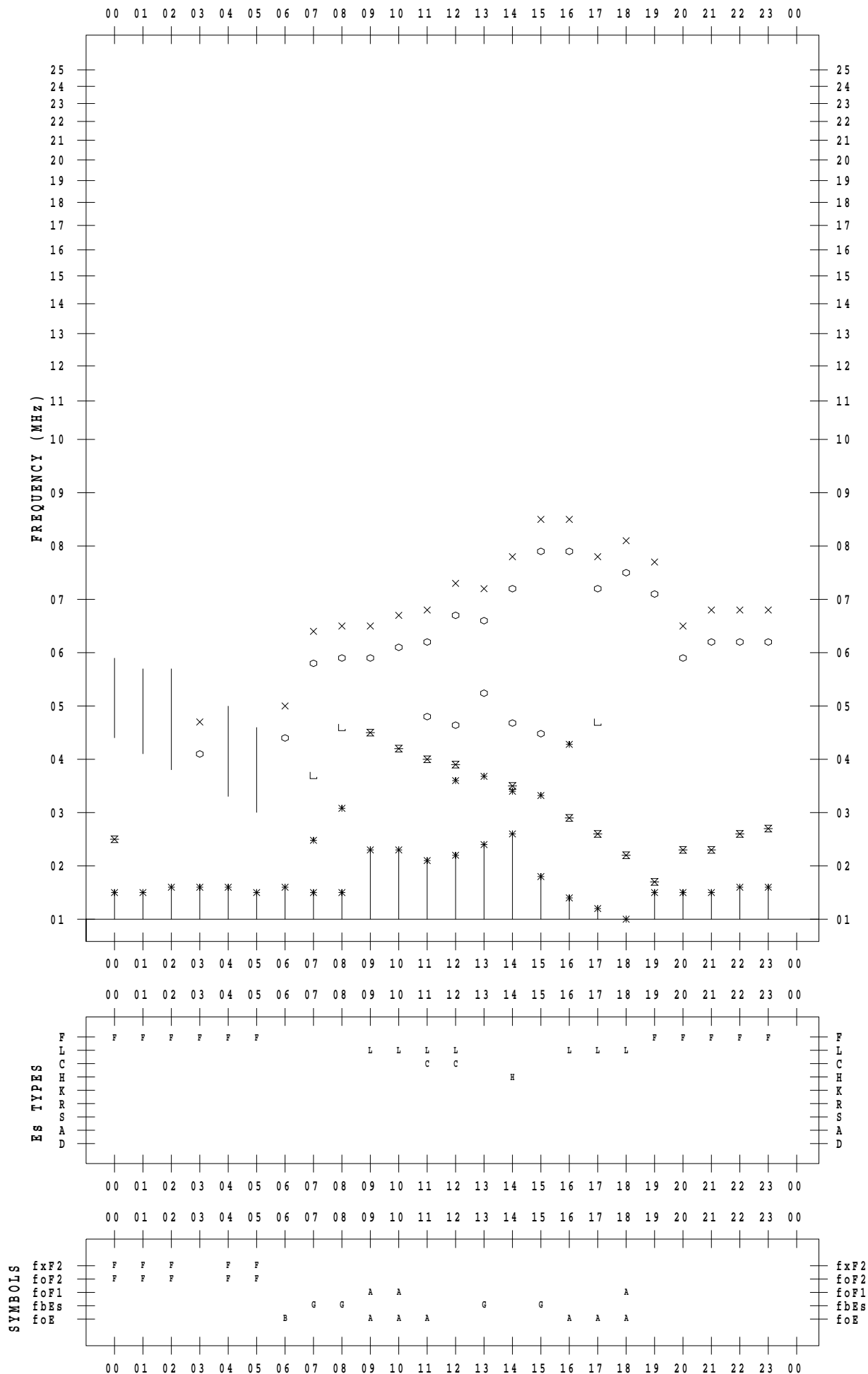
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 8

135 ° E MEAN TIME





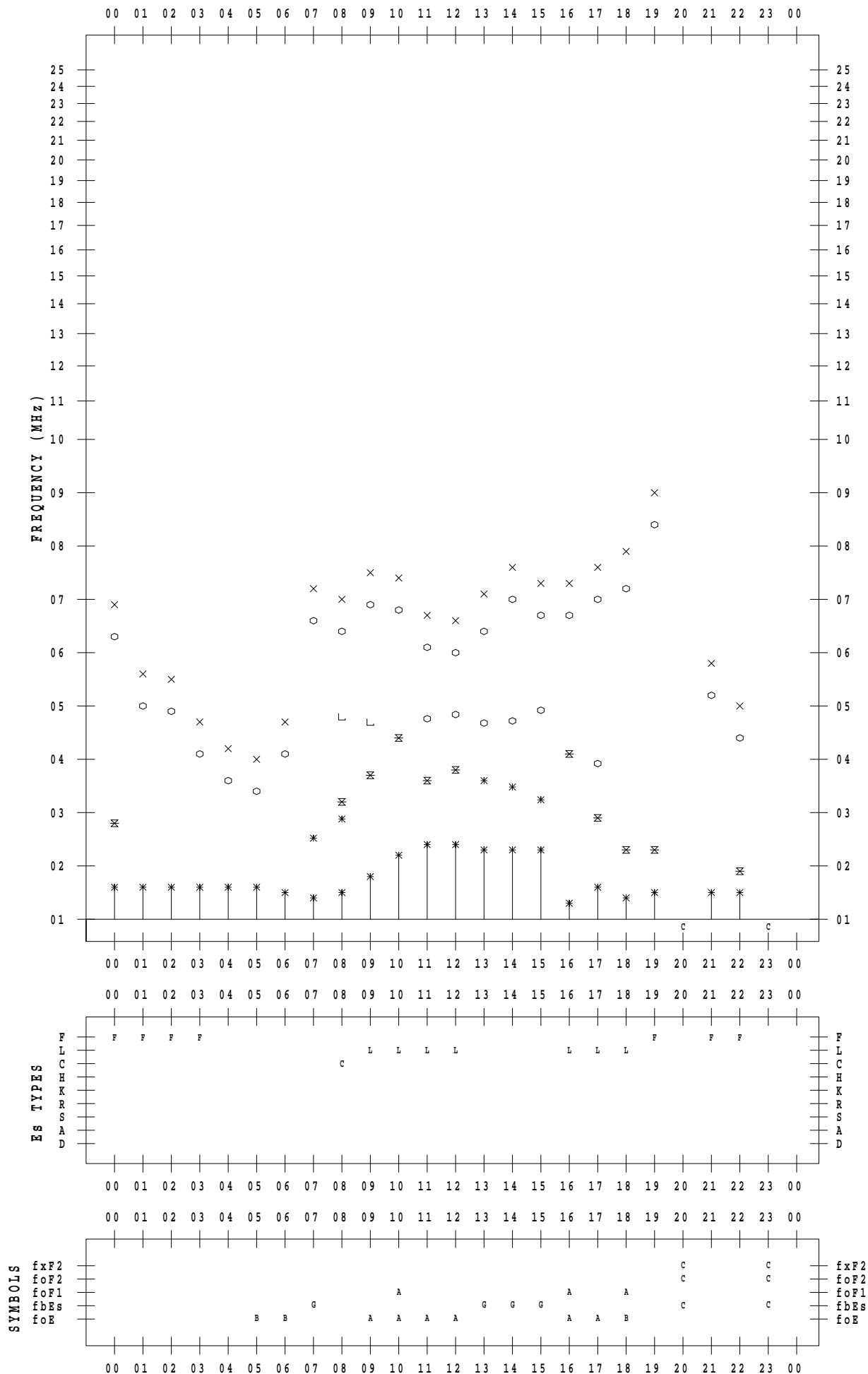
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 9

135 ° E MEAN TIME



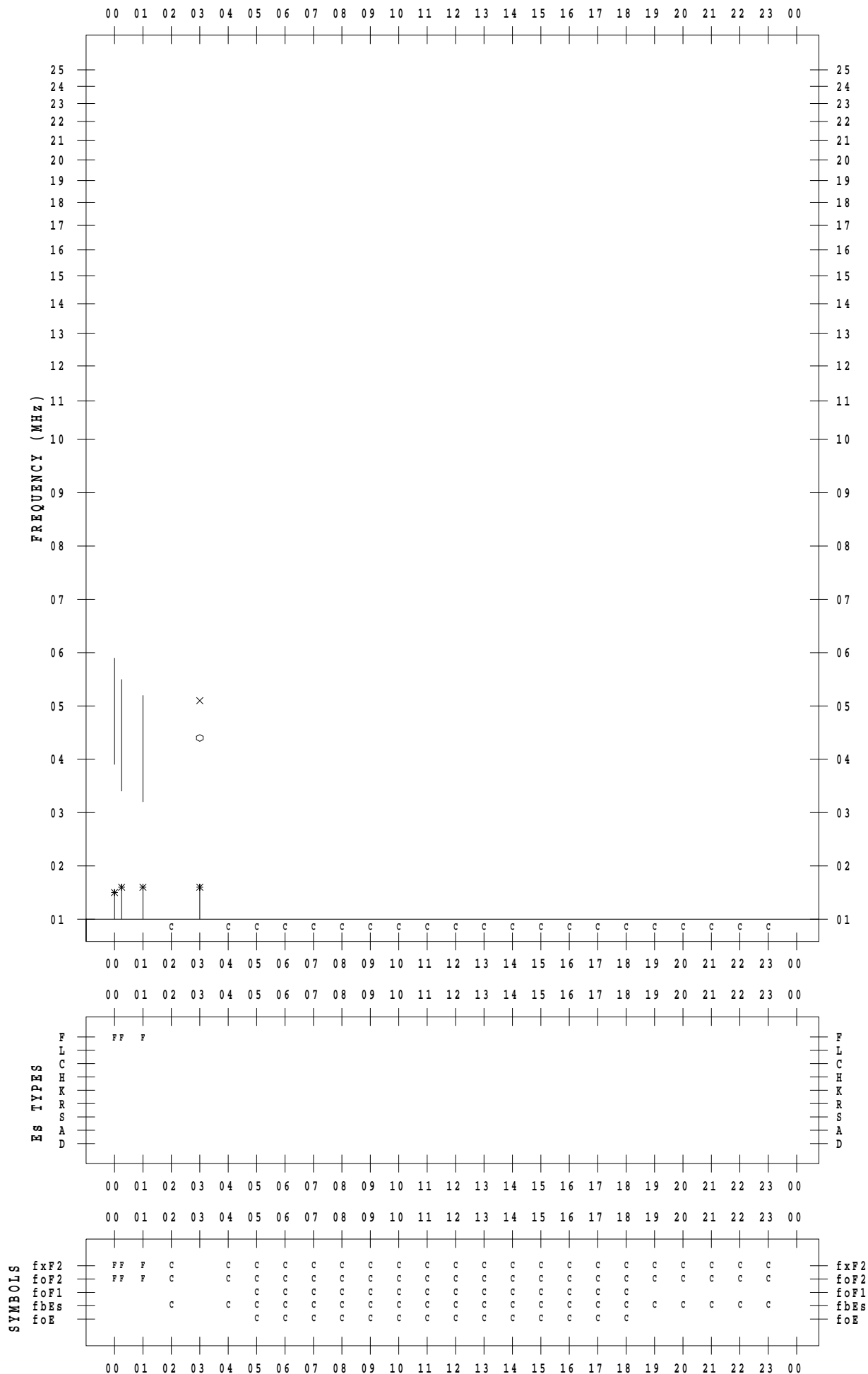
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 10

135 ° E MEAN TIME



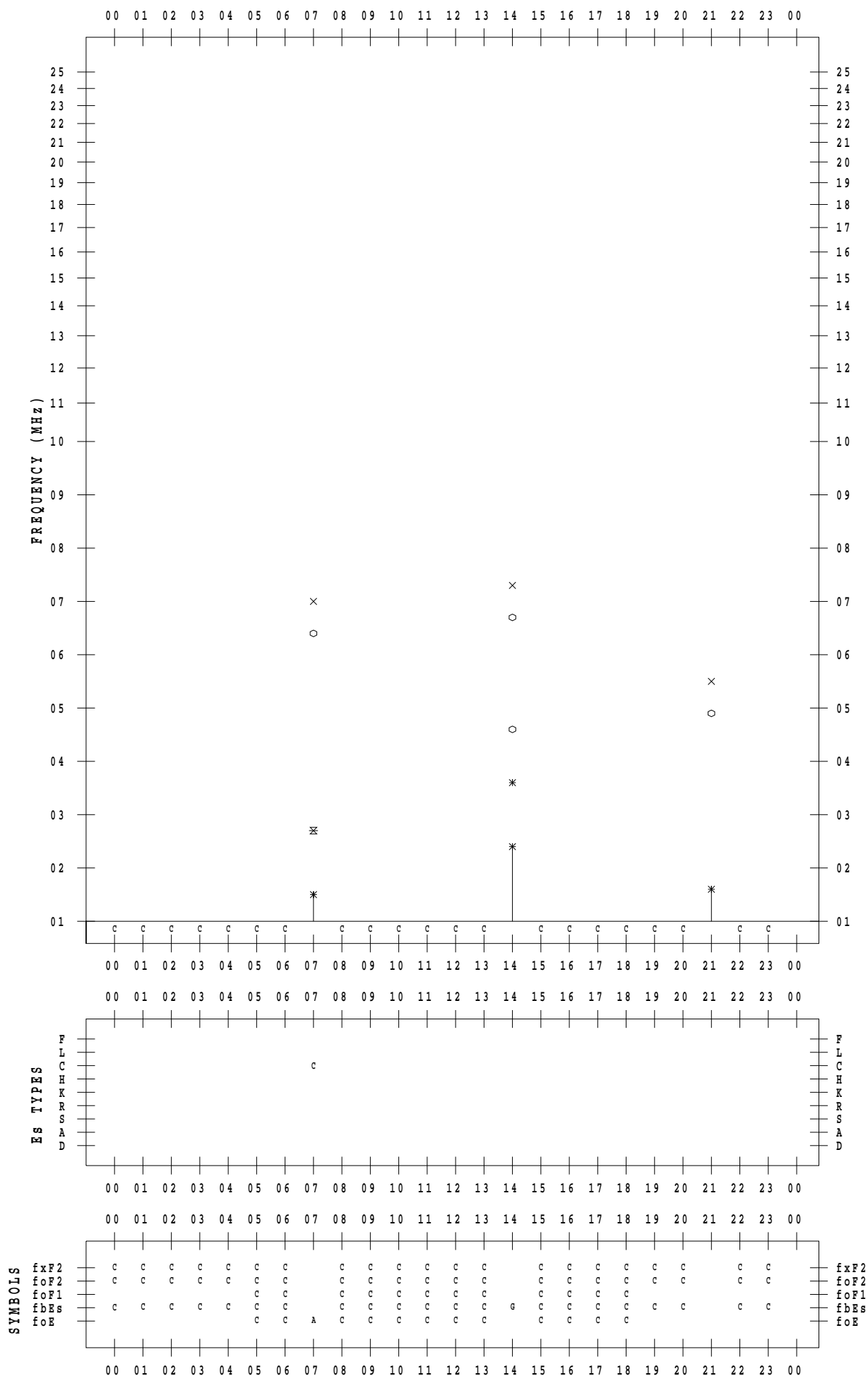
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 11

135 ° E MEAN TIME



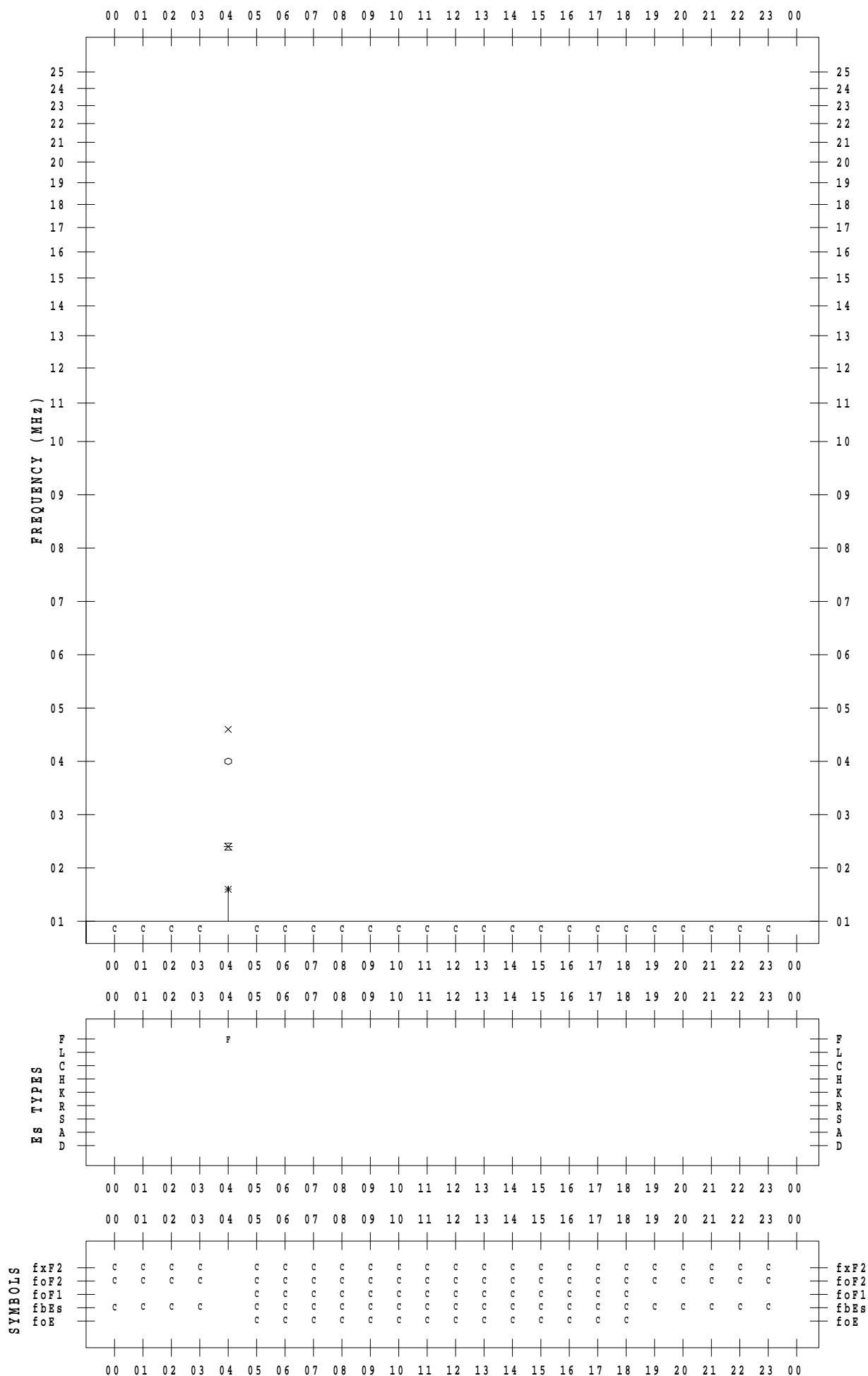
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 12

135 ° E MEAN TIME



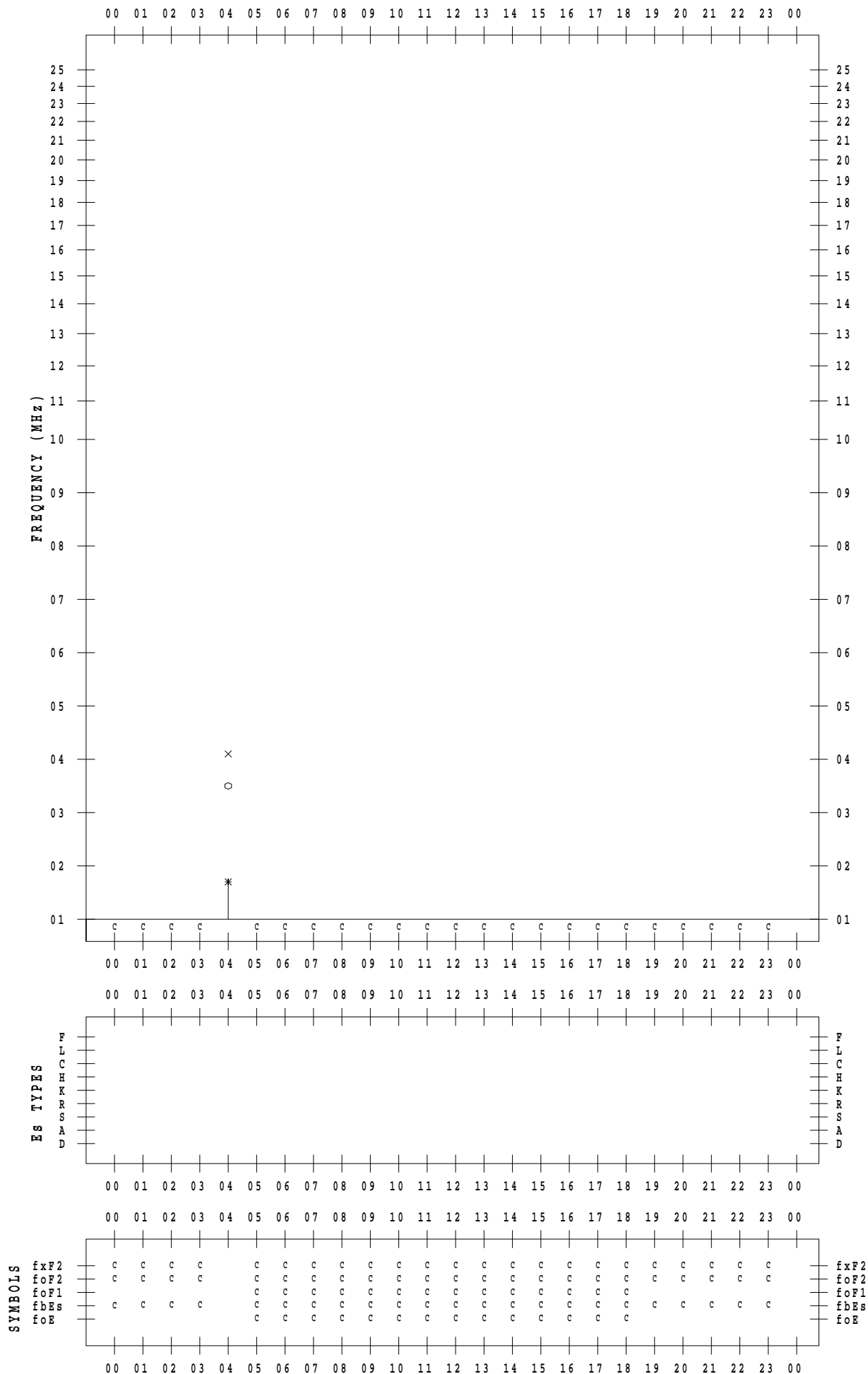
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 13

135 ° E MEAN TIME



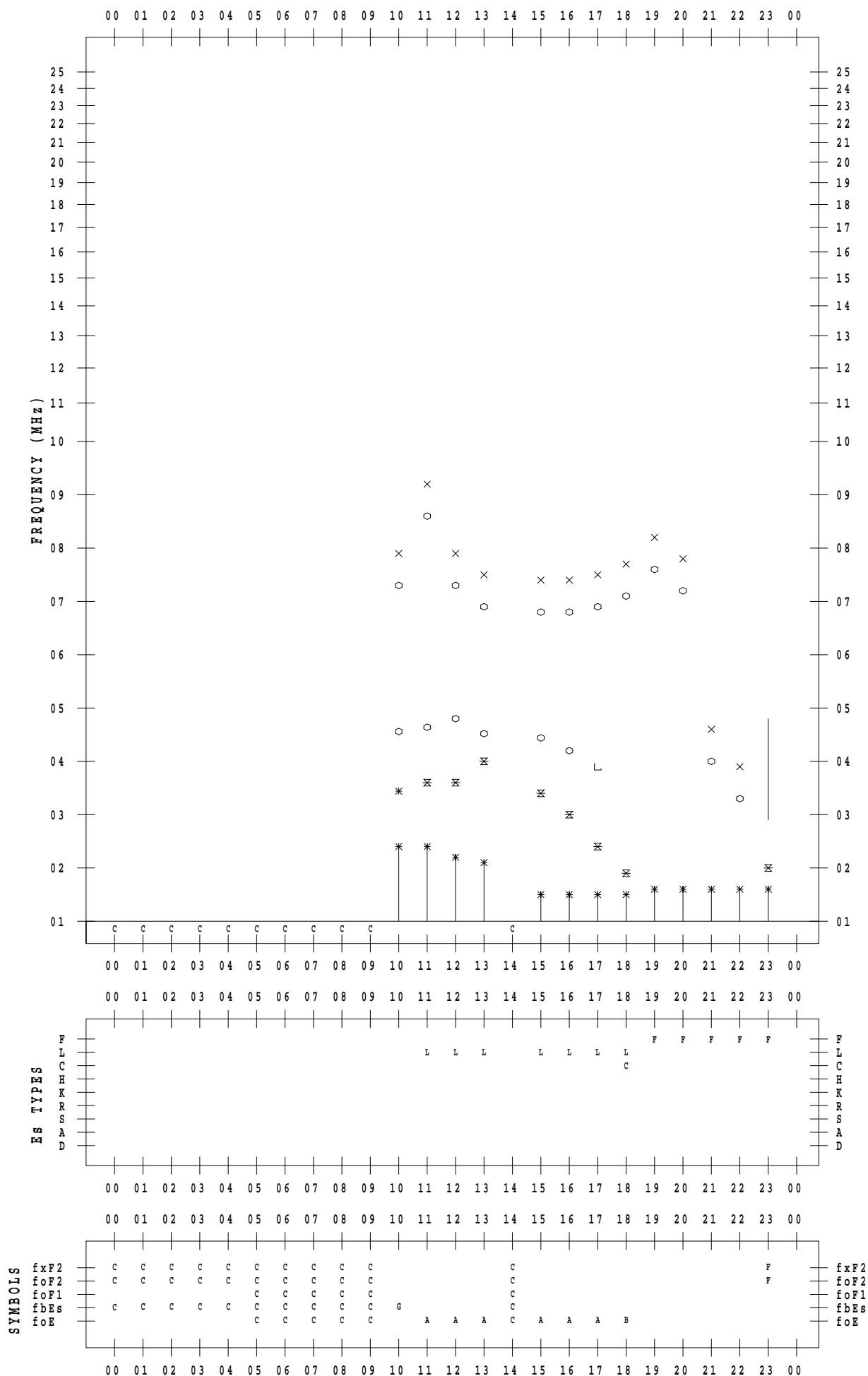
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 14

135 ° E MEAN TIME



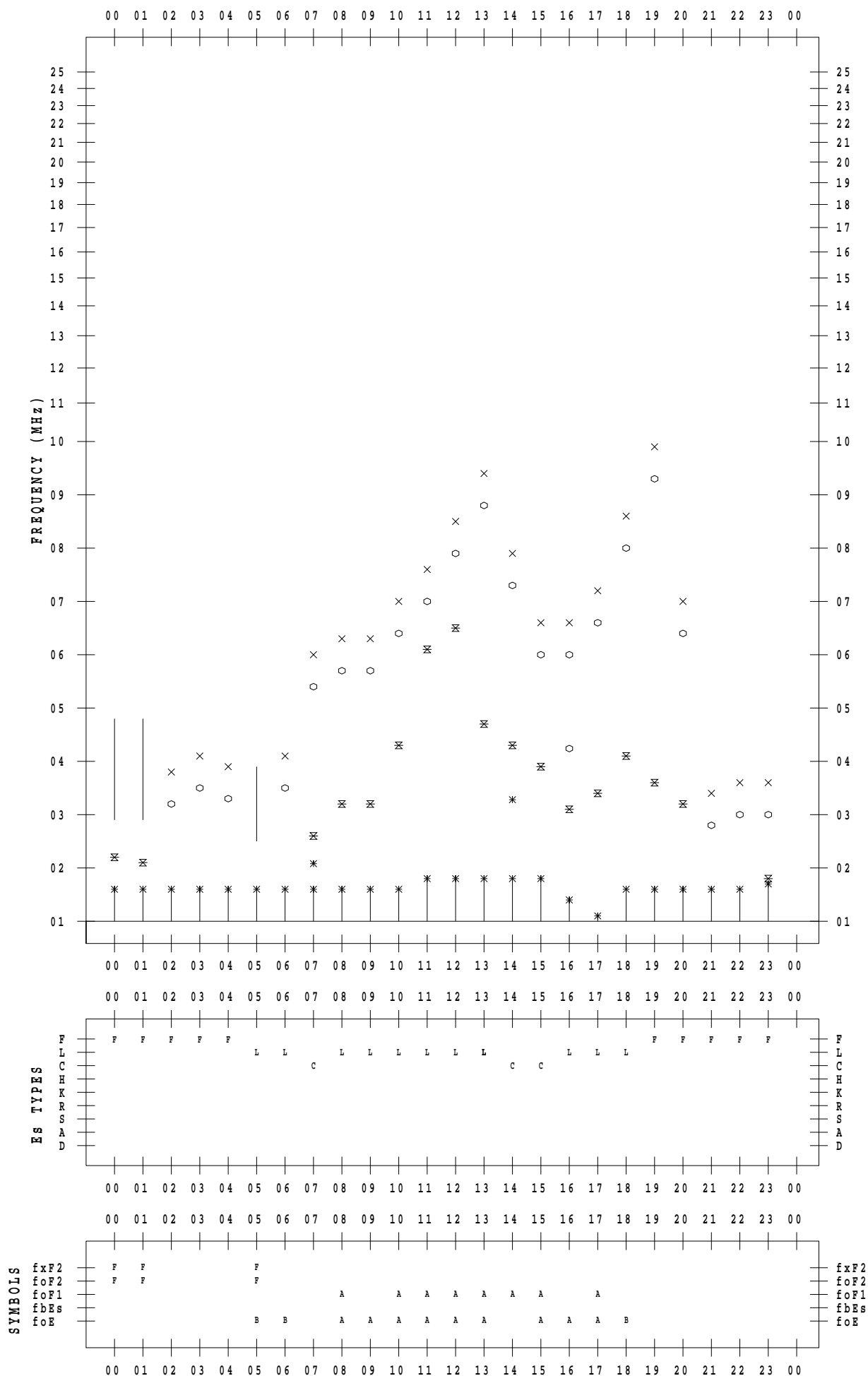
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 15

135 ° E MEAN TIME



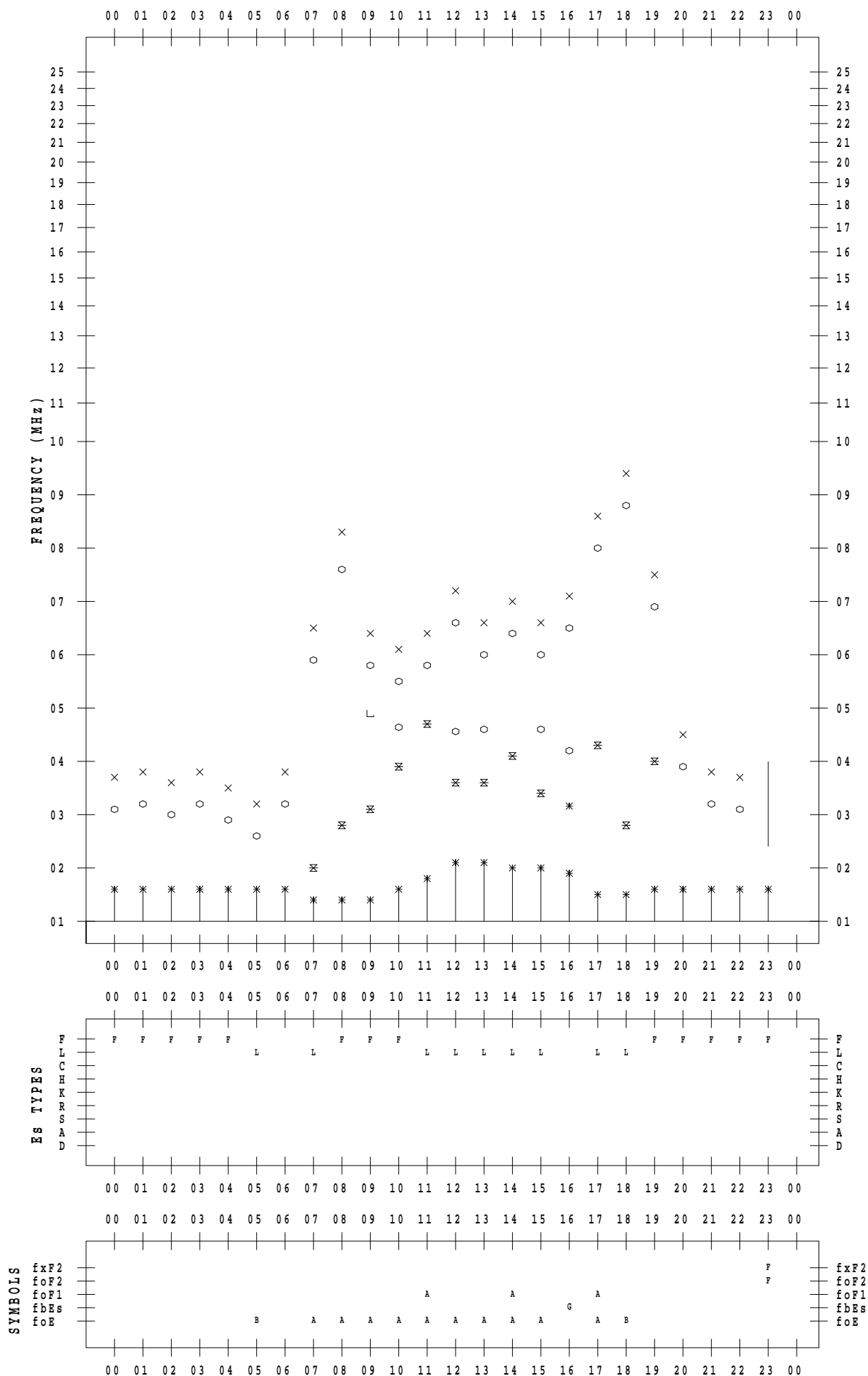
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/ 9/16

135 ° E MEAN TIME





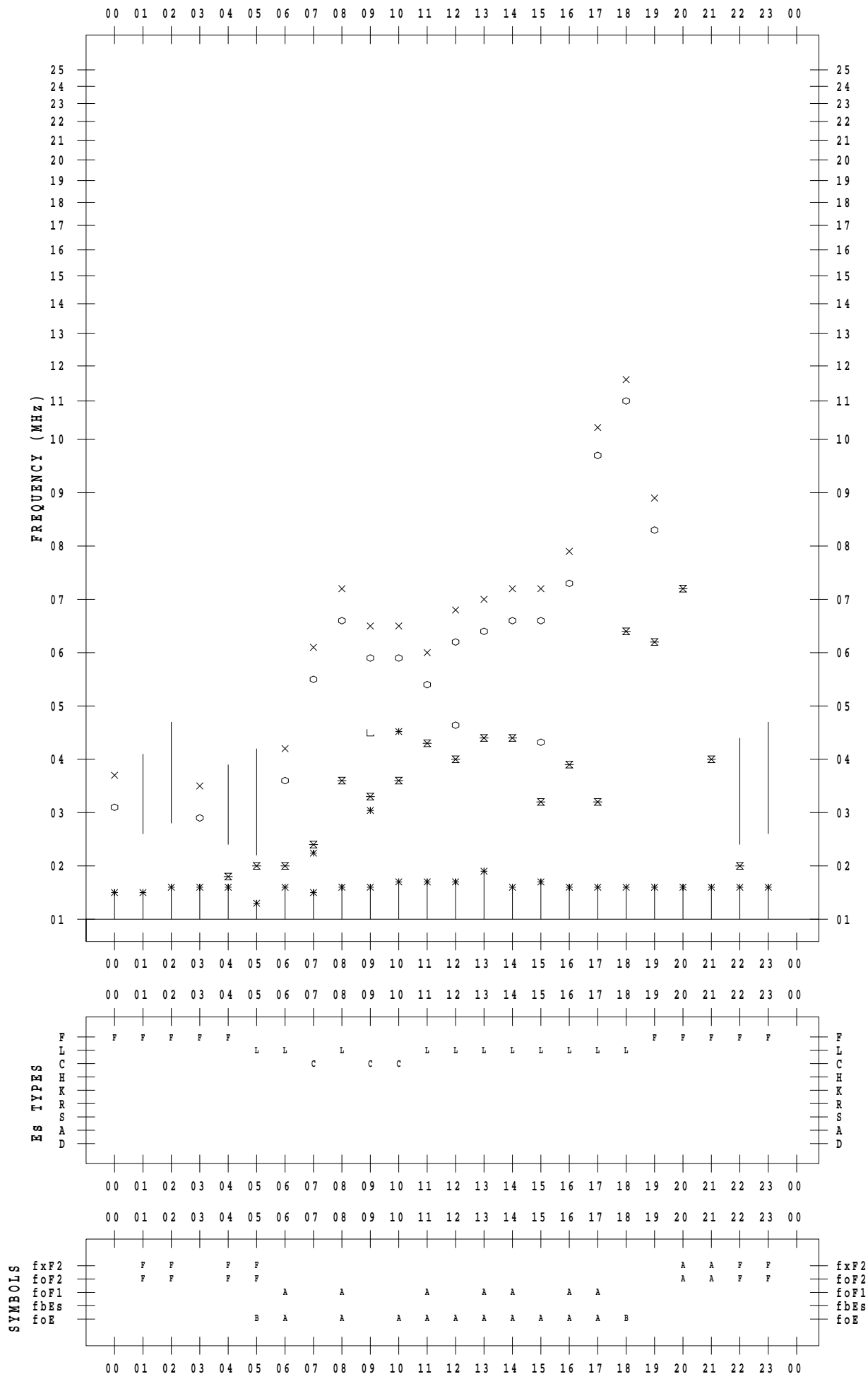
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 17

135 ° E MEAN TIME



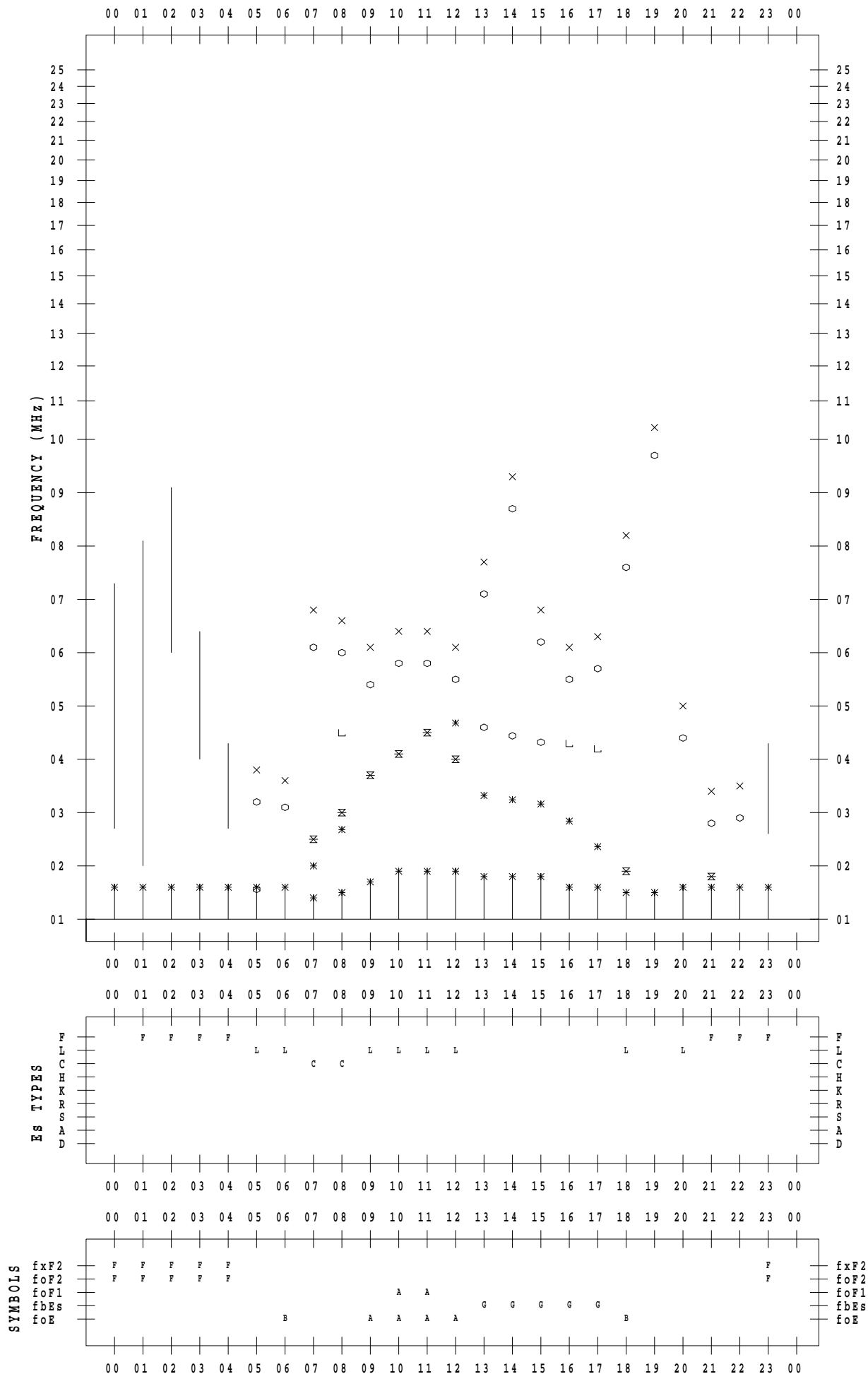
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 18

135 ° E MEAN TIME



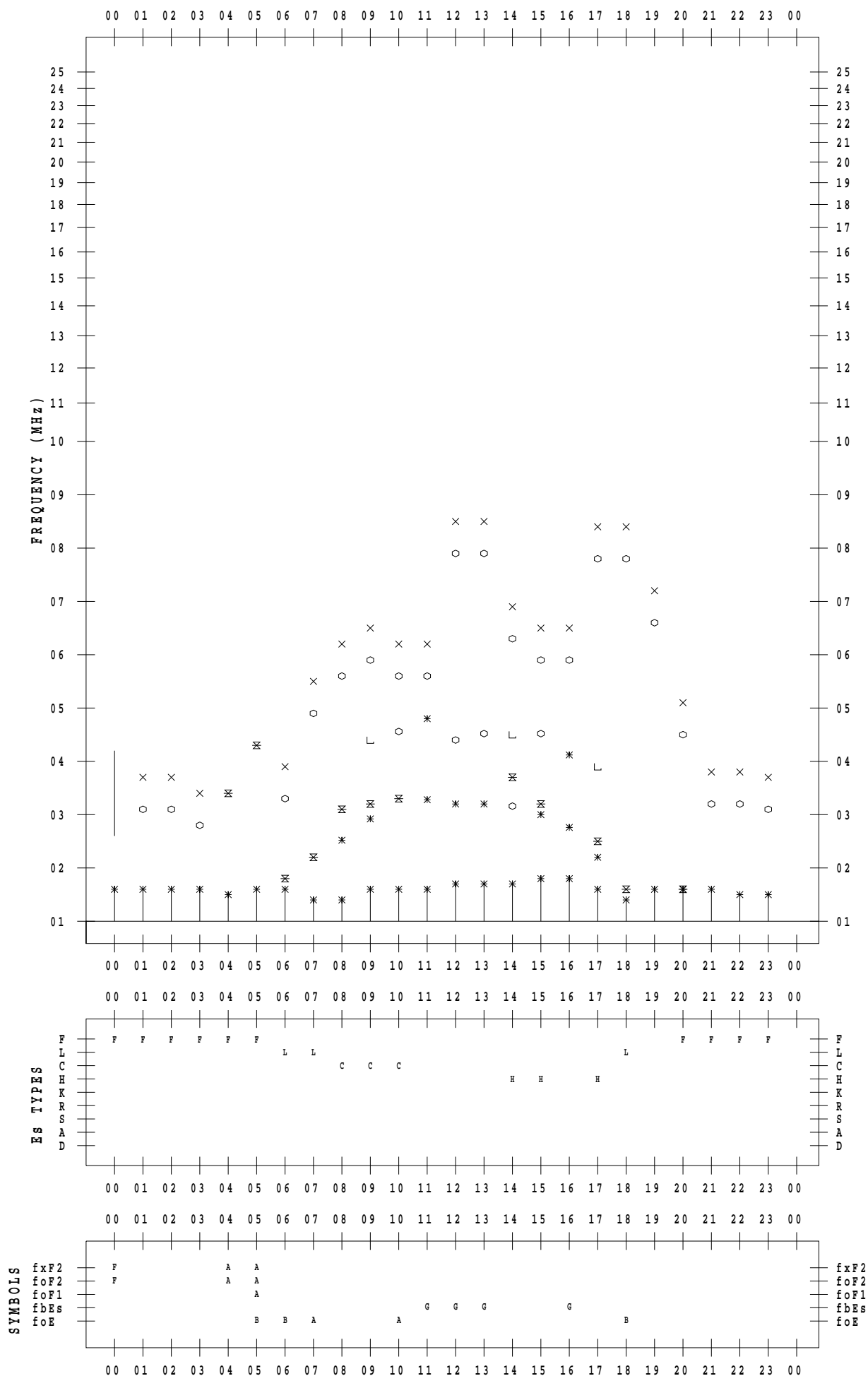
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021/ 9/19

135 ° E MEAN TIME



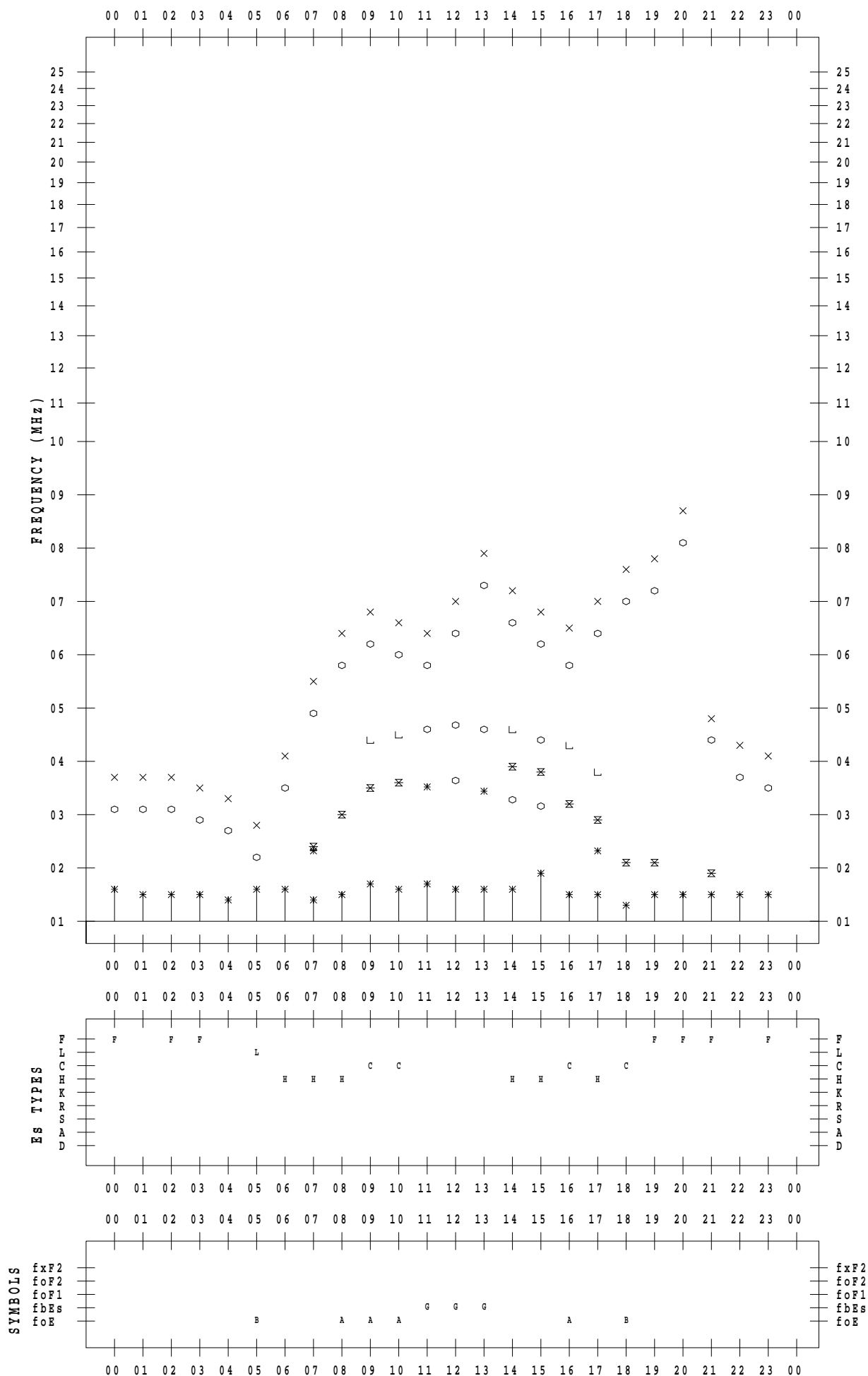
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 20

135 ° E MEAN TIME



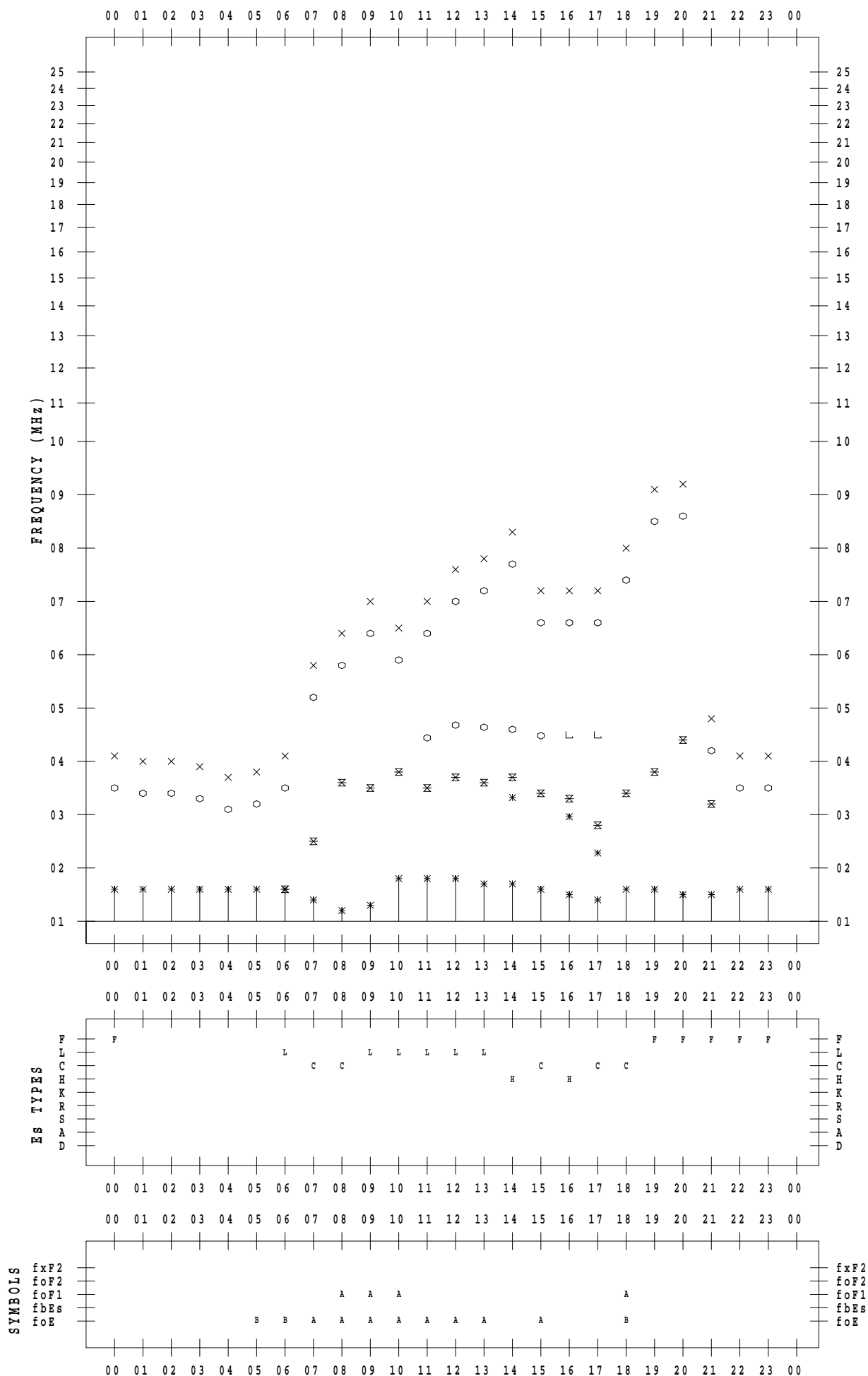
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 21

135 ° E MEAN TIME



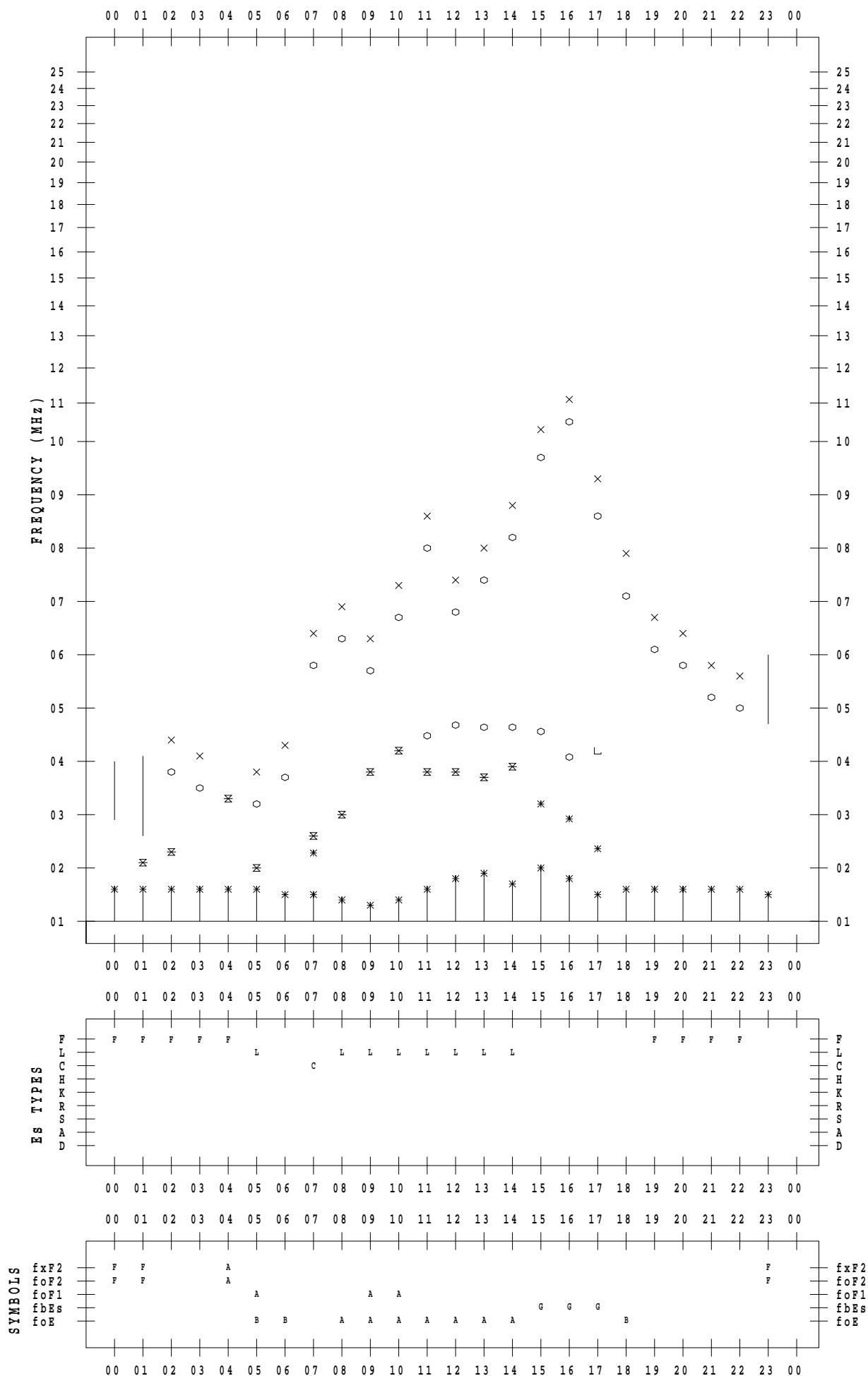
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 22

135 ° E MEAN TIME



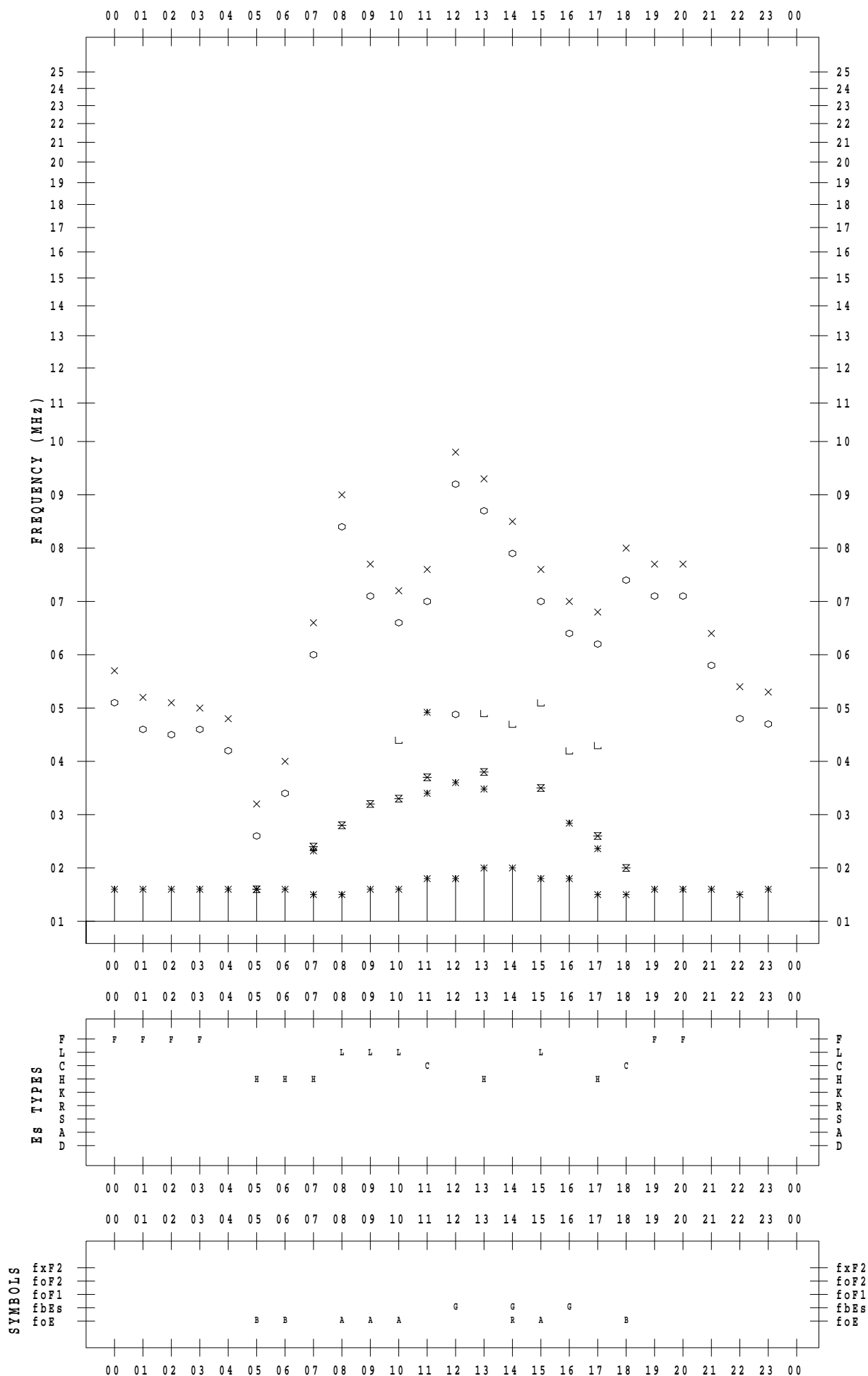
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 23

135 ° E MEAN TIME



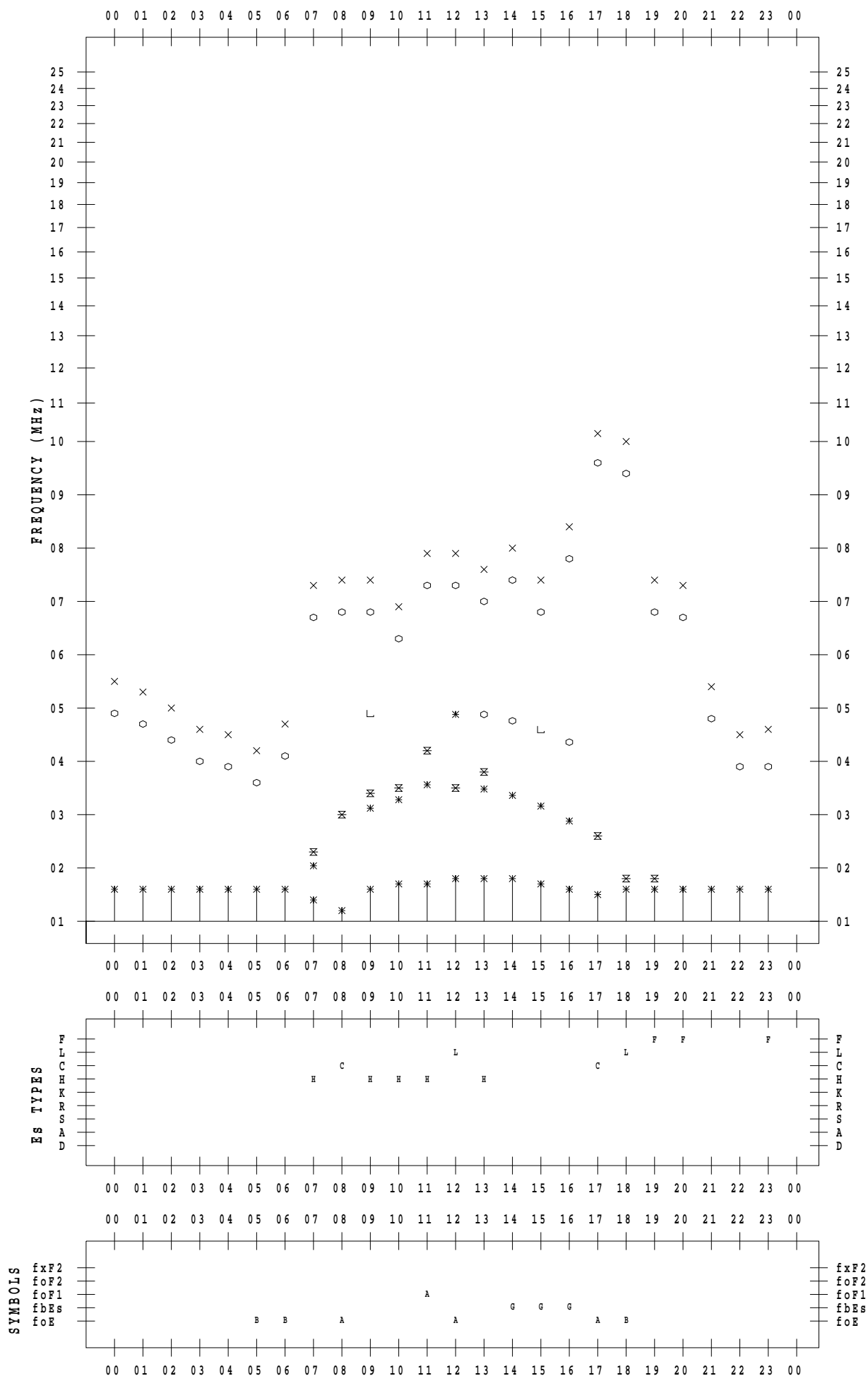
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 24

135 ° E MEAN TIME





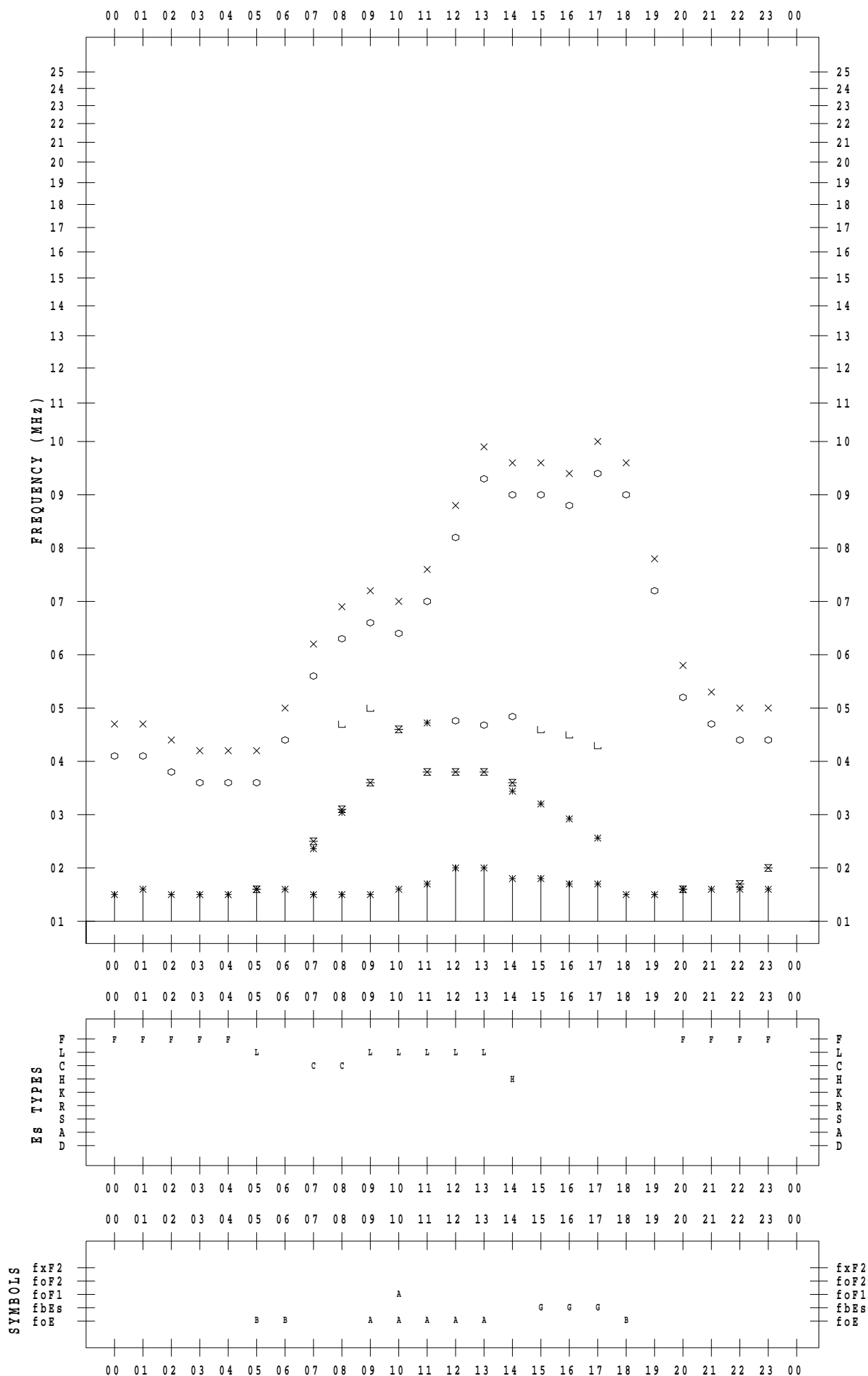
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 25

135 ° E MEAN TIME



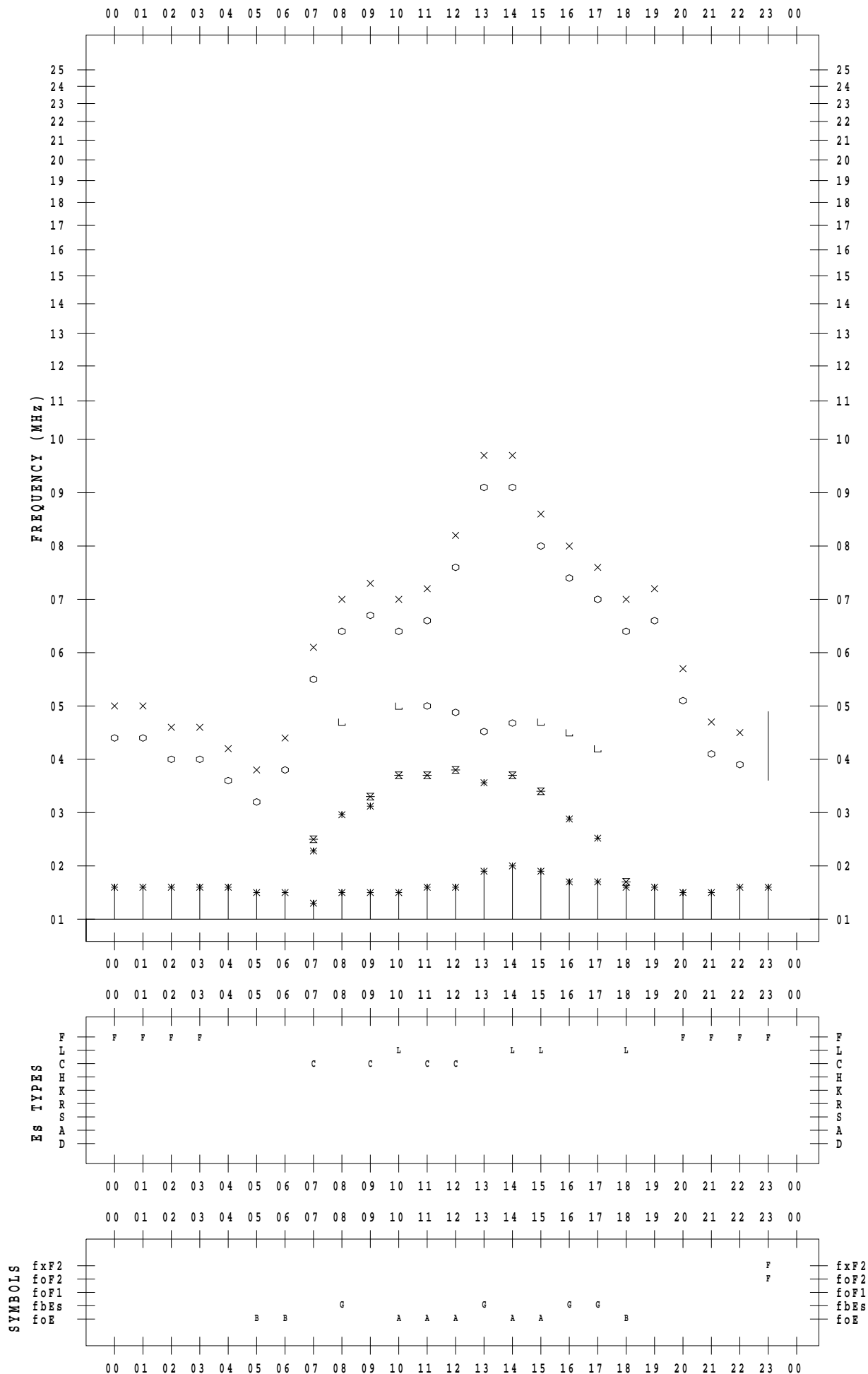
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 26

135 ° E MEAN TIME



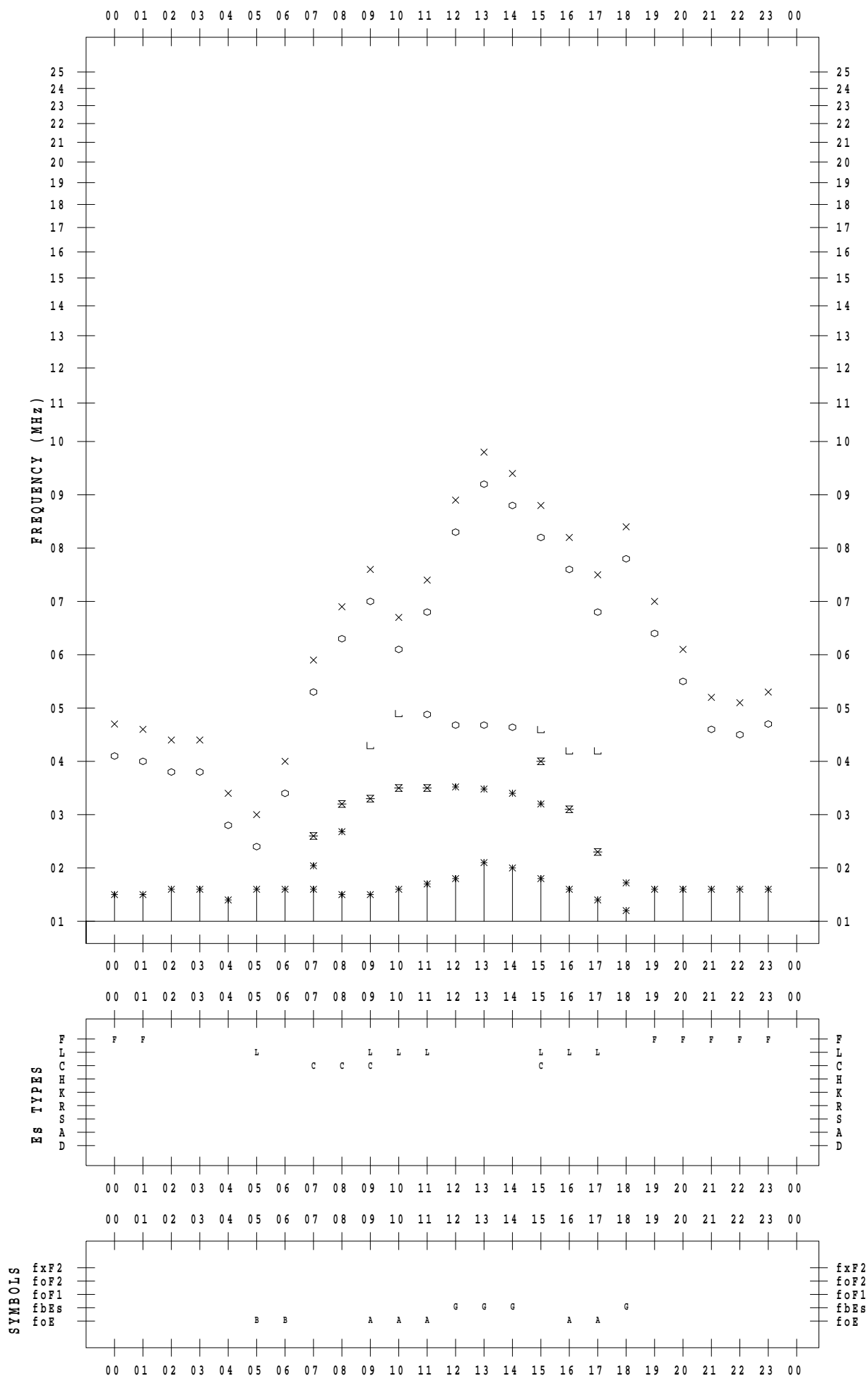
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 27

135 ° E MEAN TIME



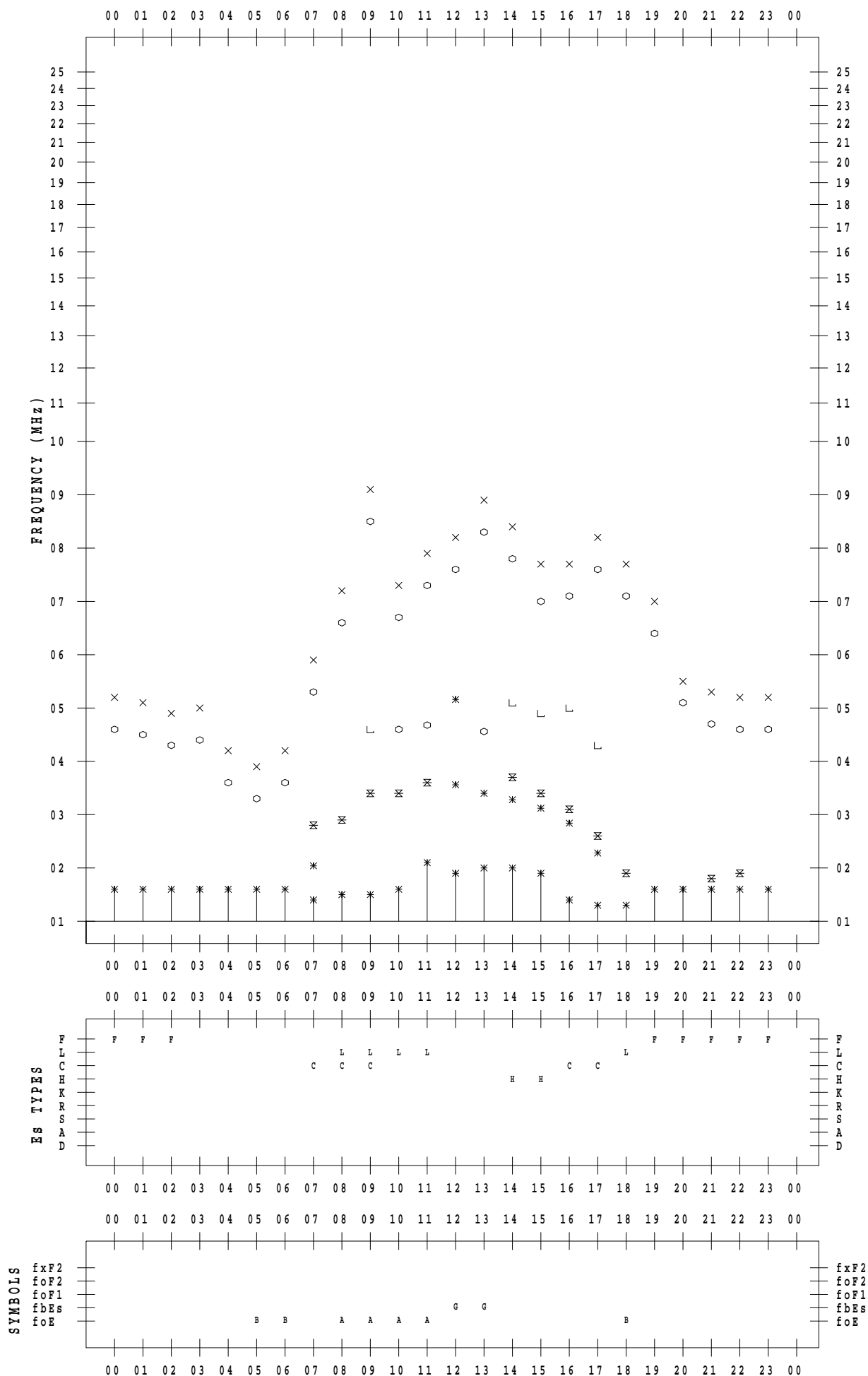
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 28

135 ° E MEAN TIME



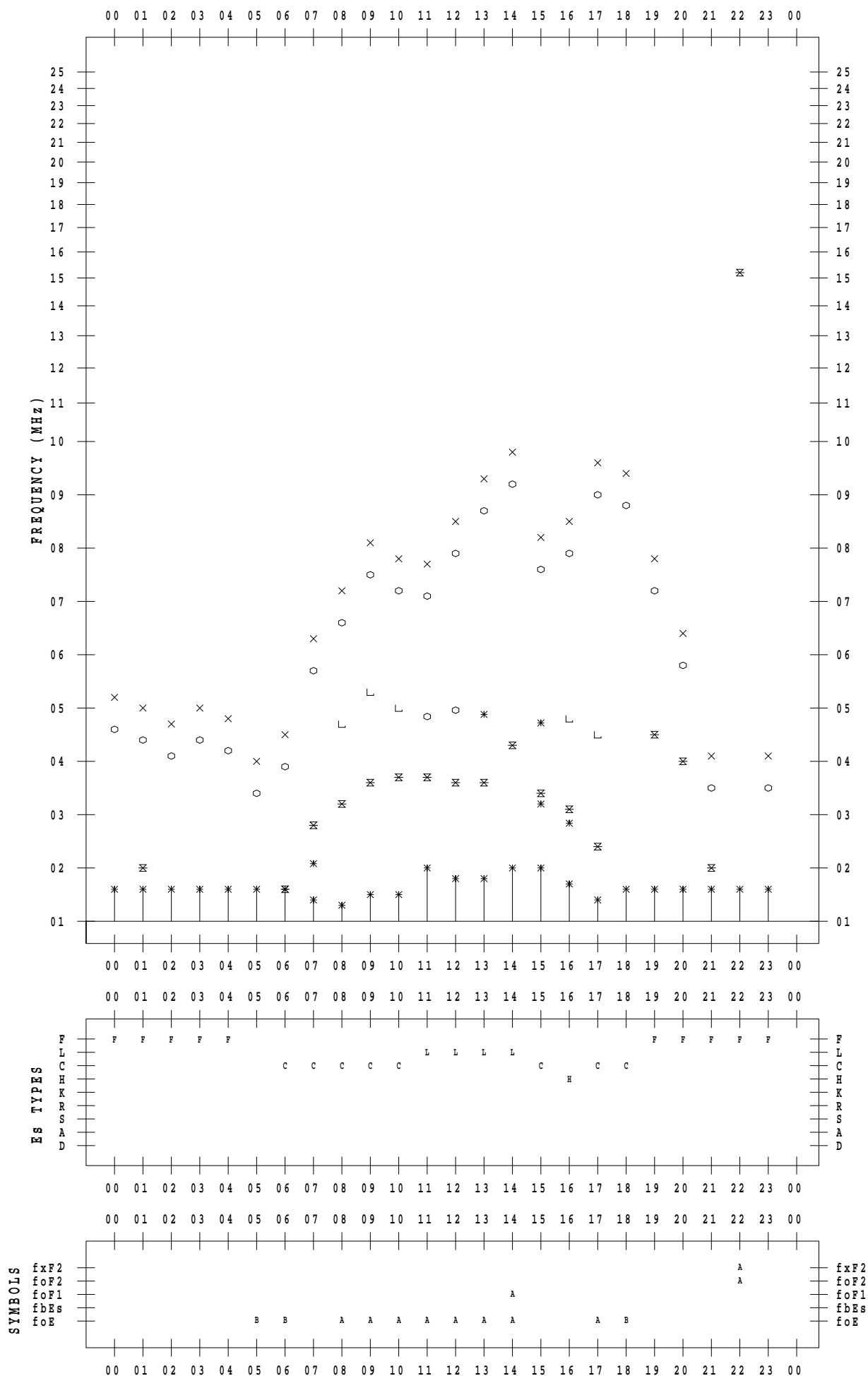
# f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 29

135 ° E MEAN TIME



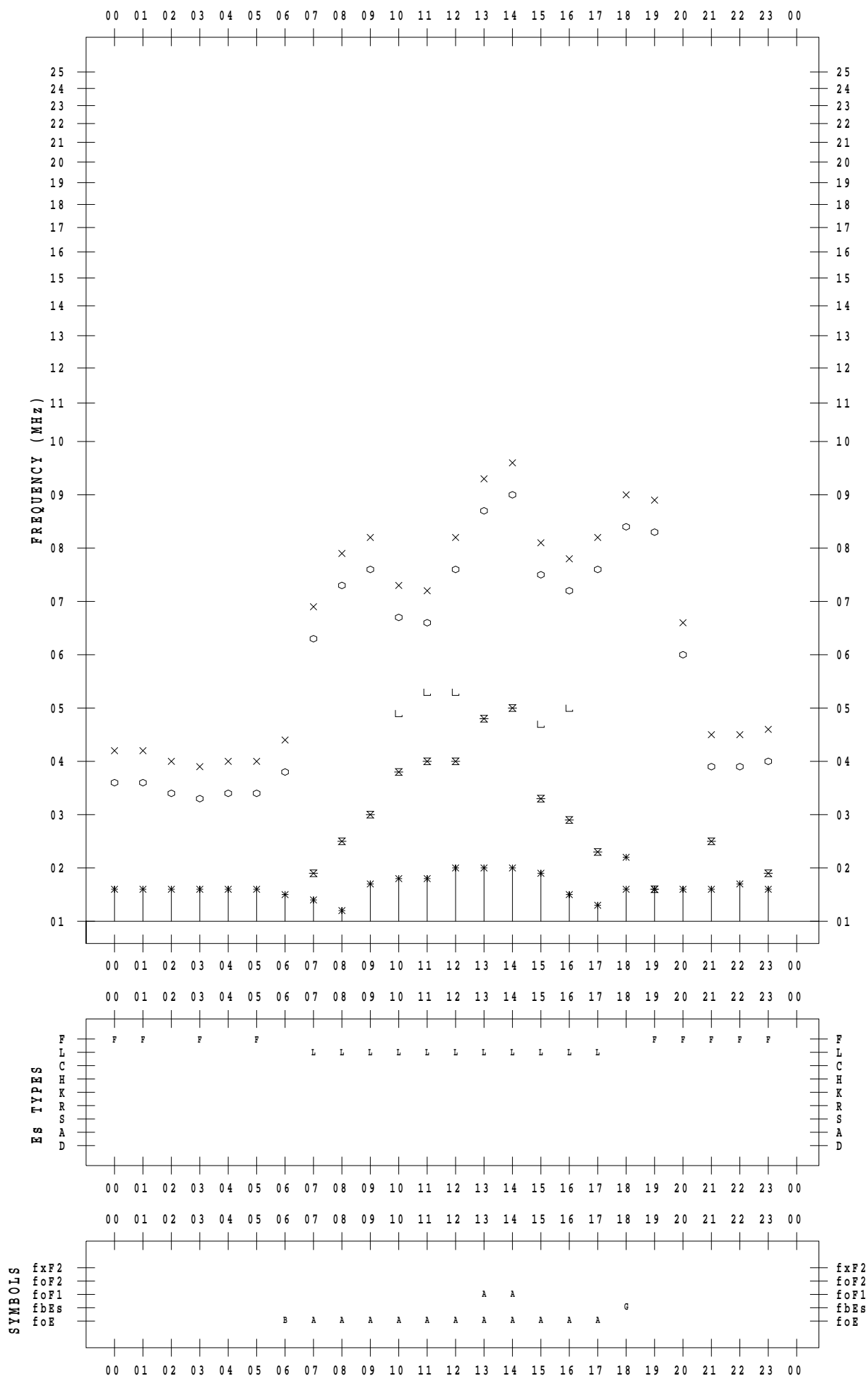
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2021 / 9 / 30

135 ° E MEAN TIME



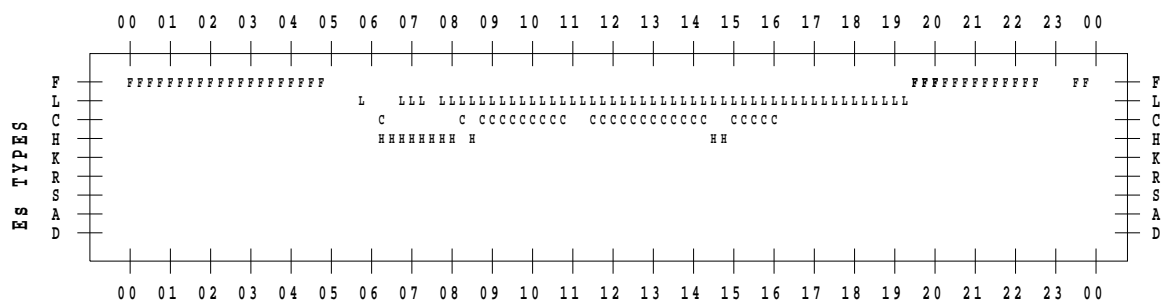
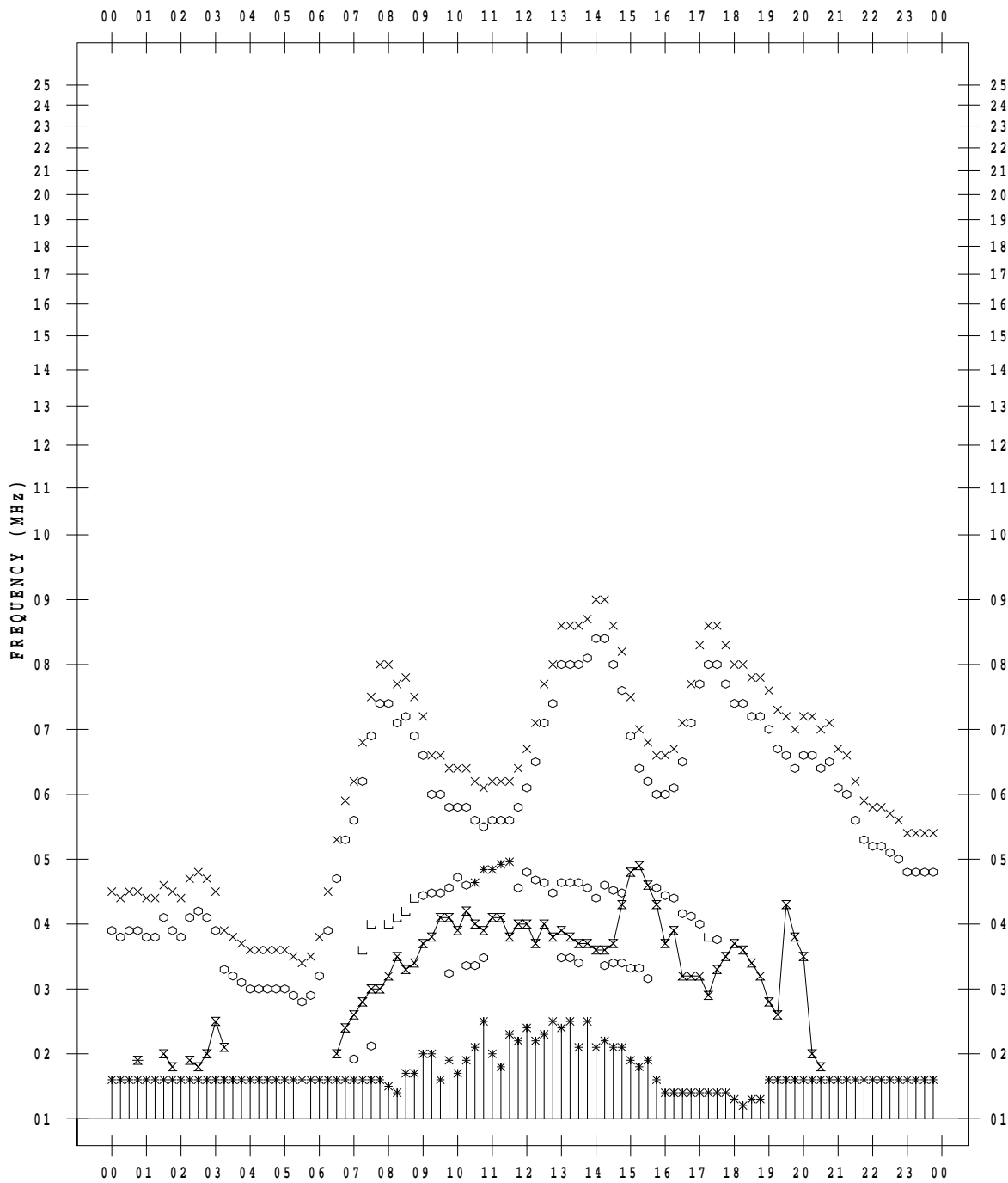
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 9 / 1

135 ° E MEAN TIME



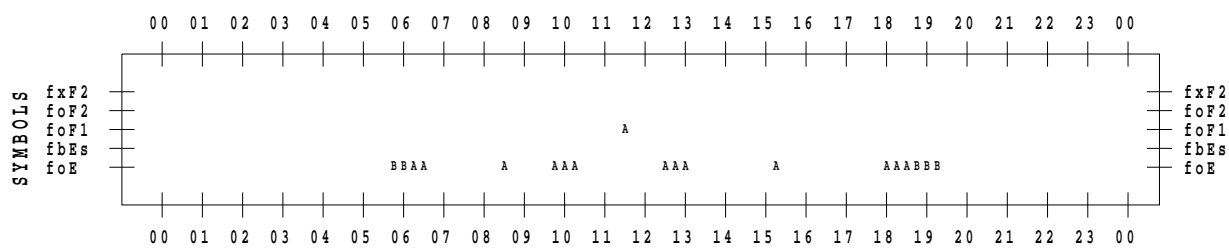
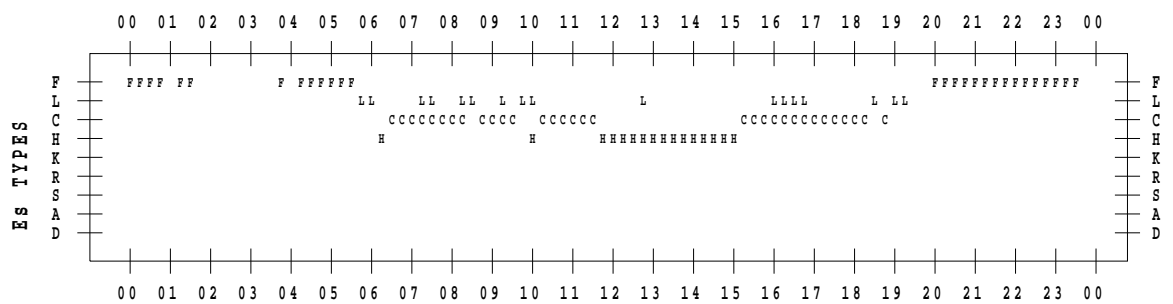
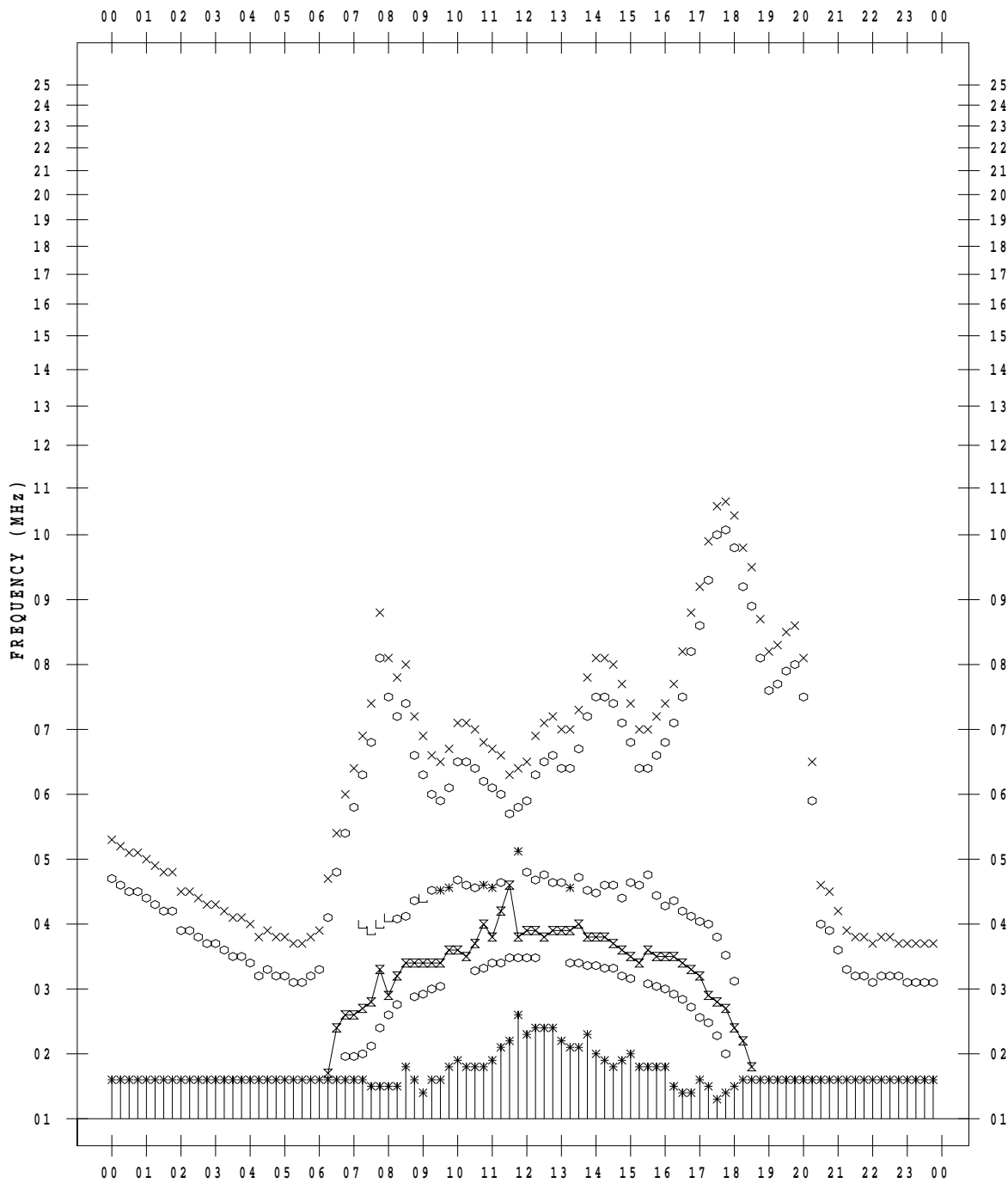
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/ 2

135 ° E MEAN TIME







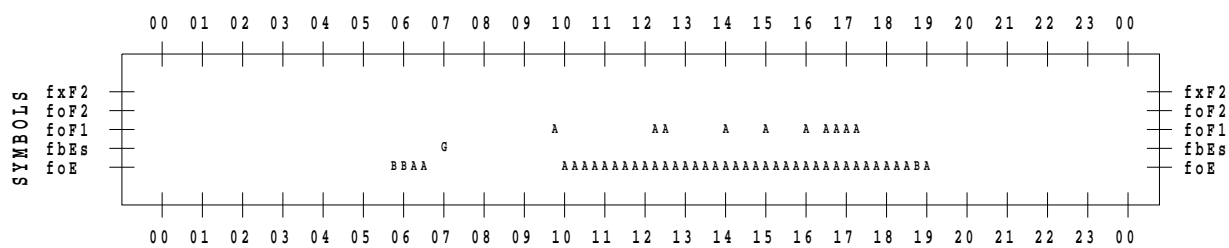
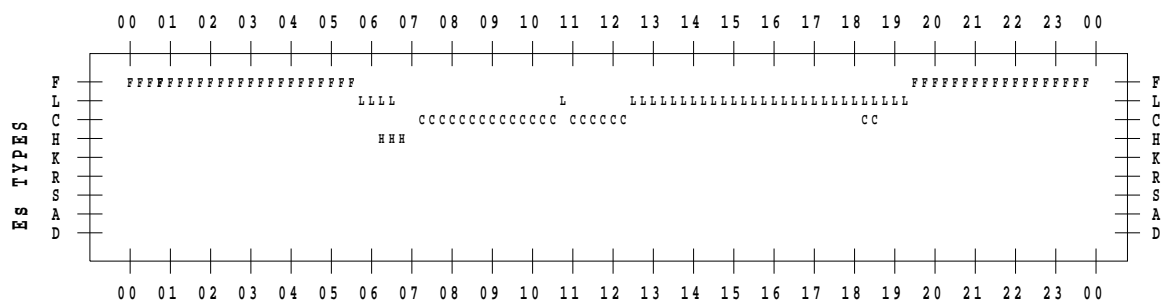
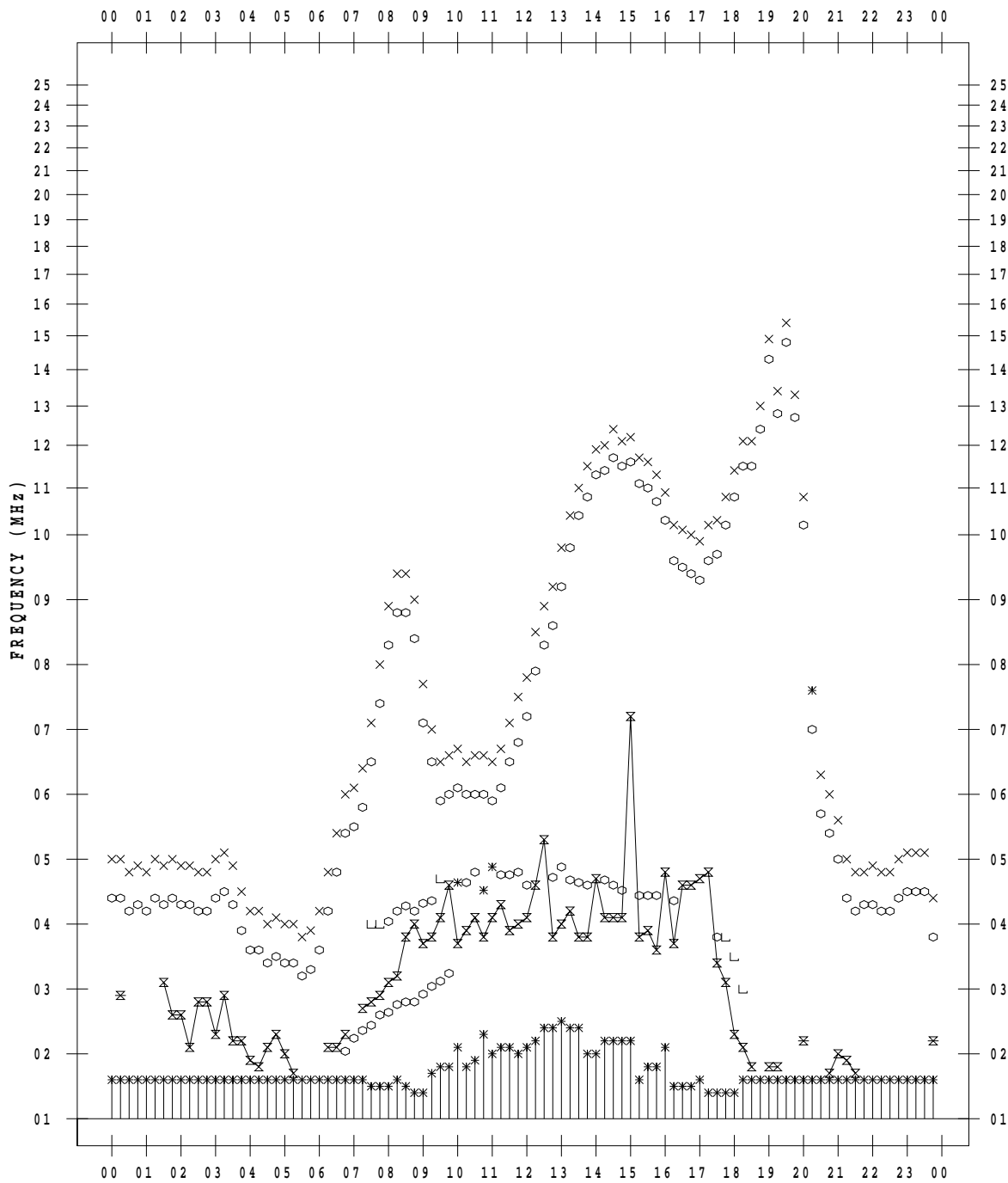
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/ 4

135 ° E MEAN TIME



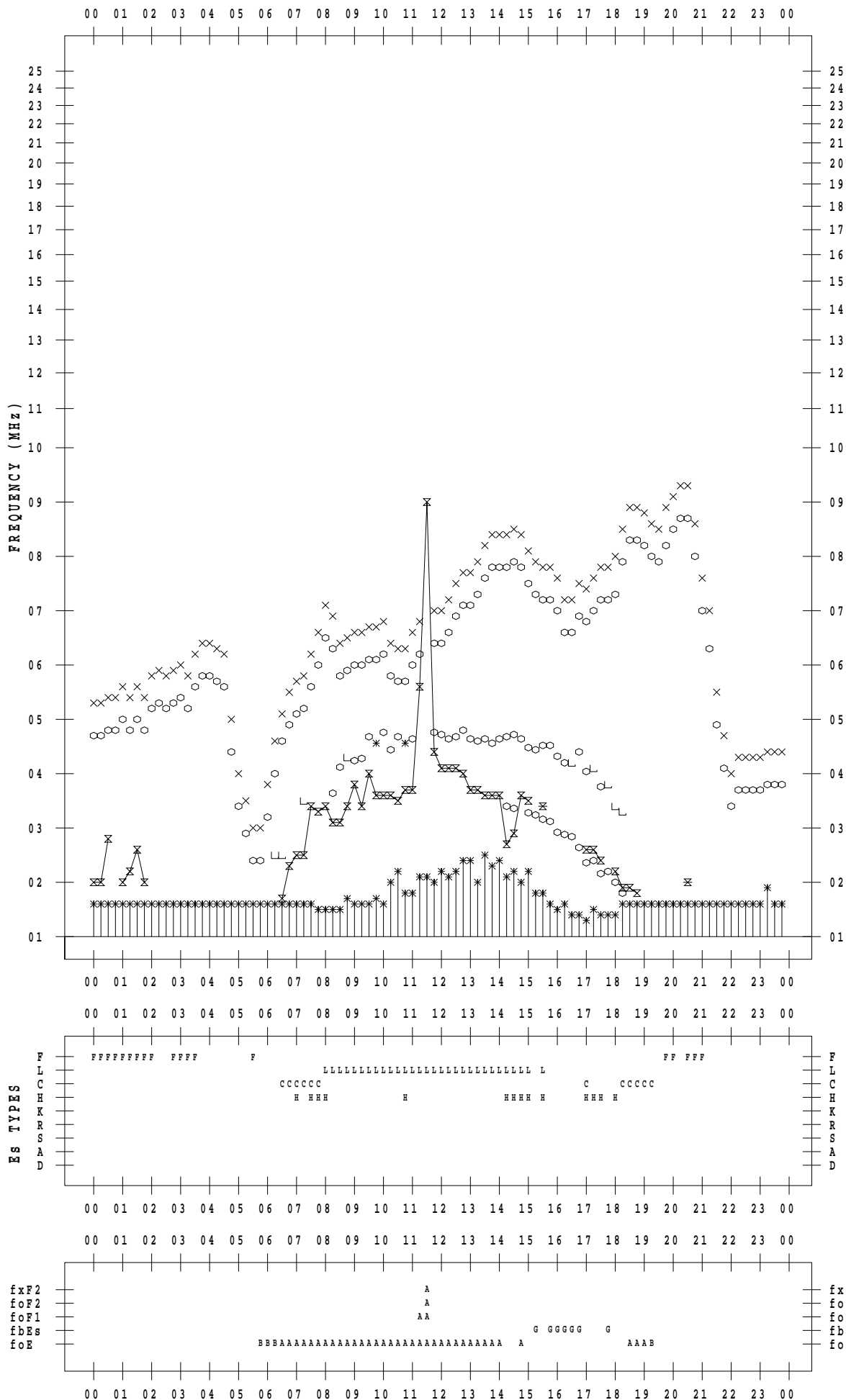
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 9 / 5

135 ° E MEAN TIME





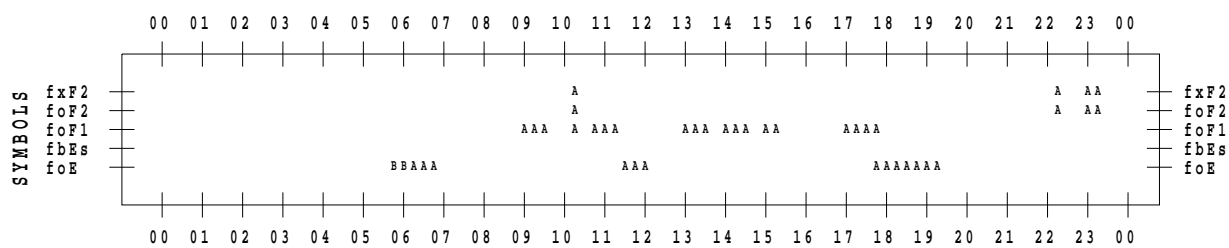
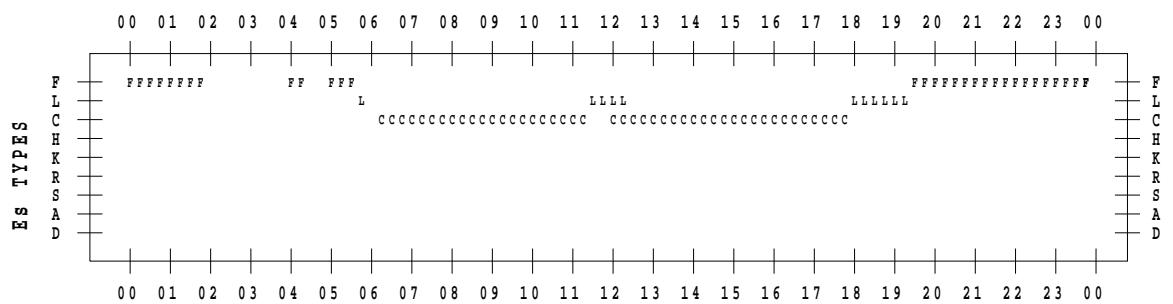
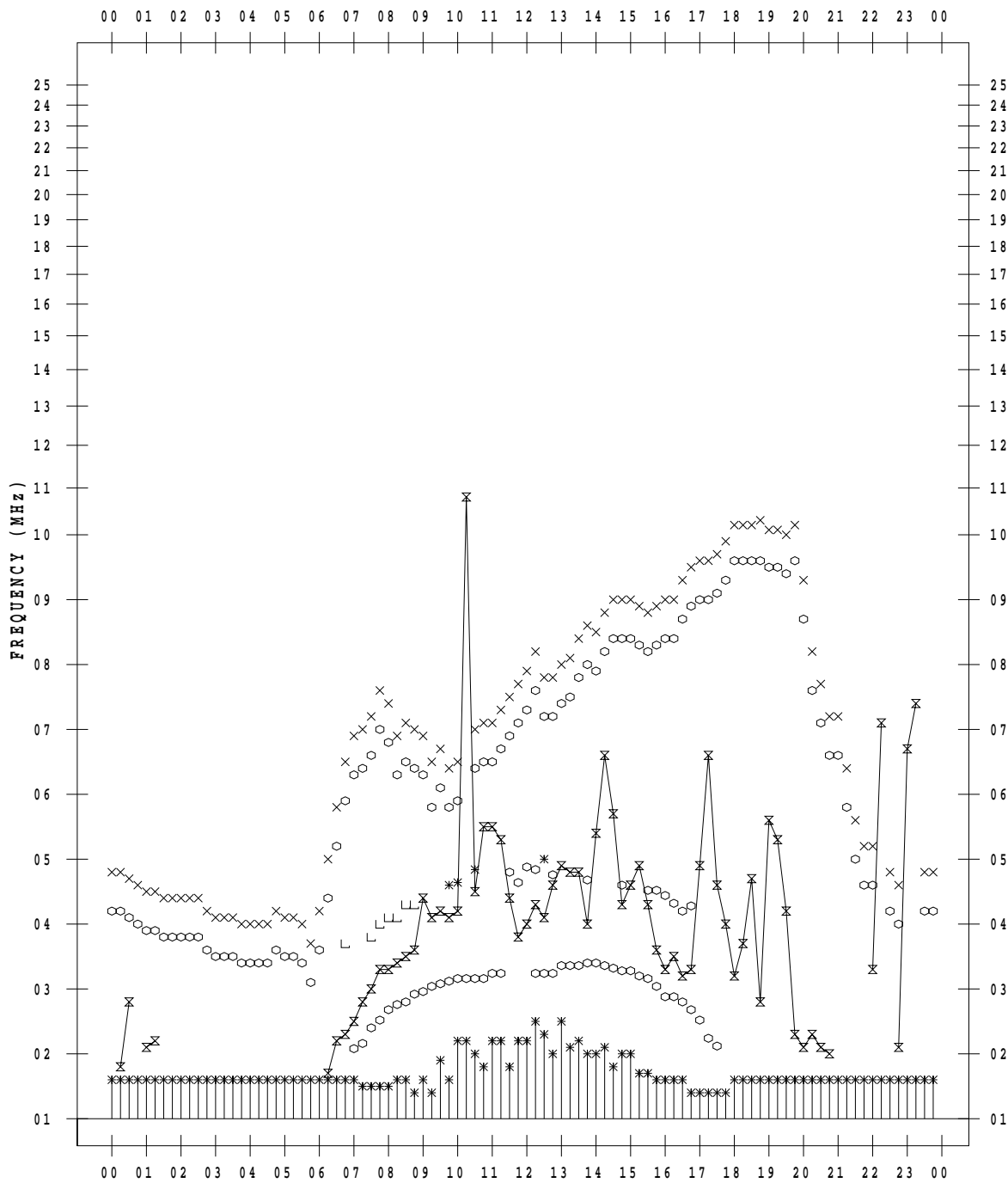
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 9 / 7

135 ° E MEAN TIME



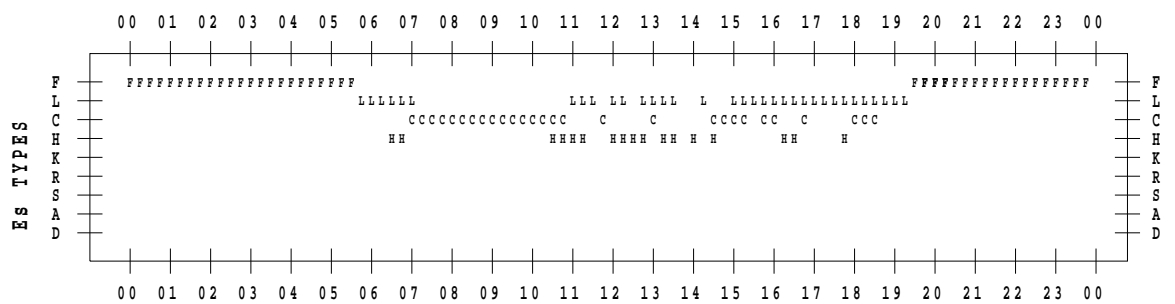
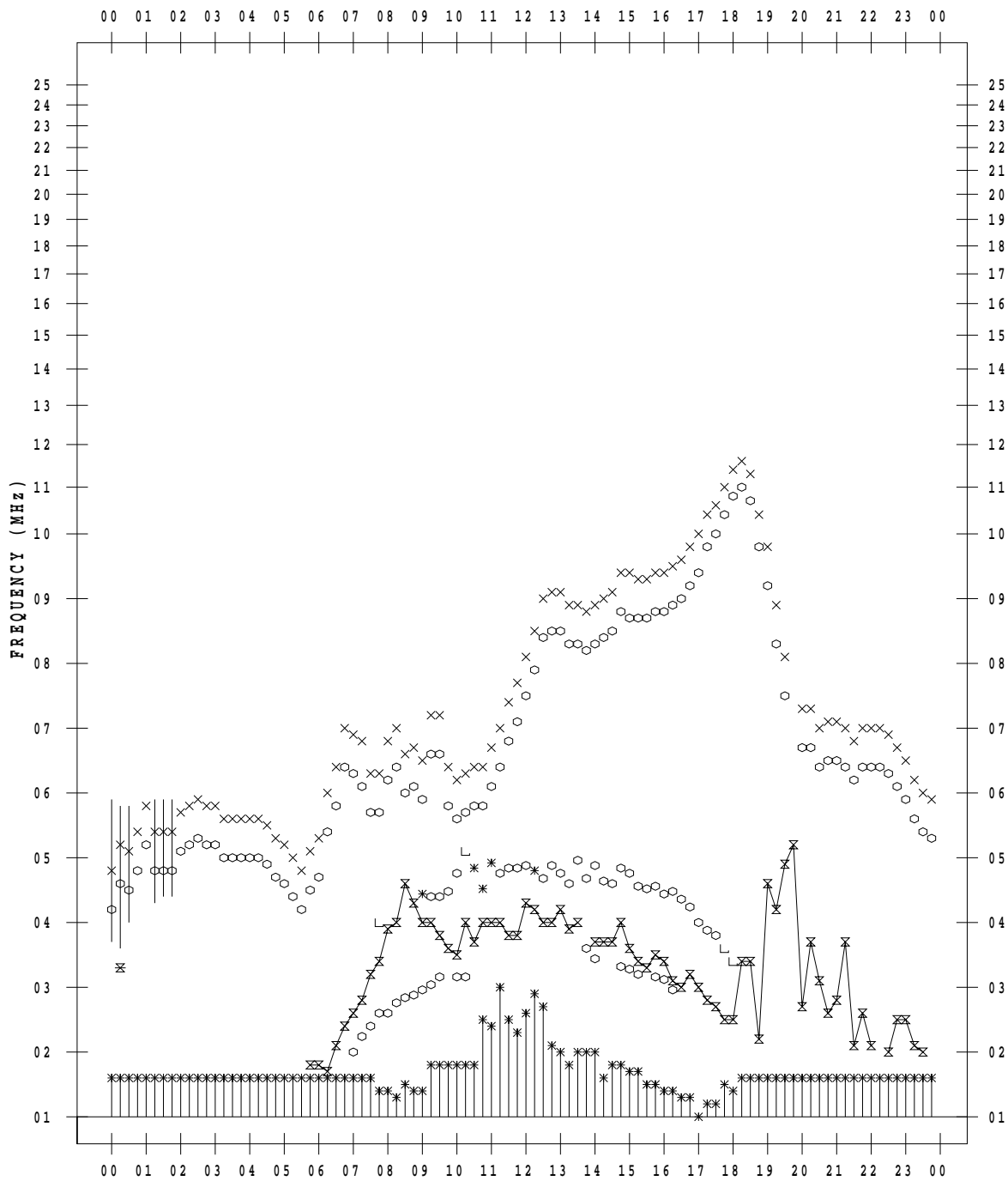
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/ 8

135 ° E MEAN TIME



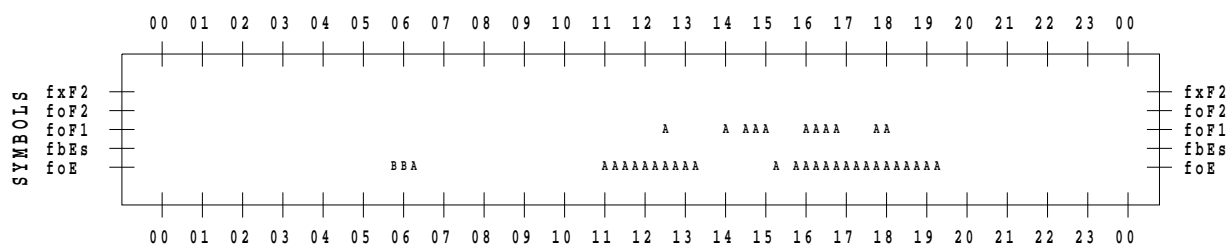
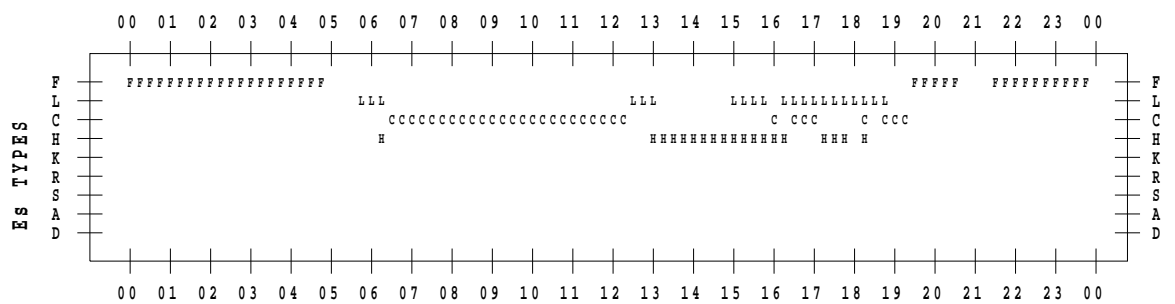
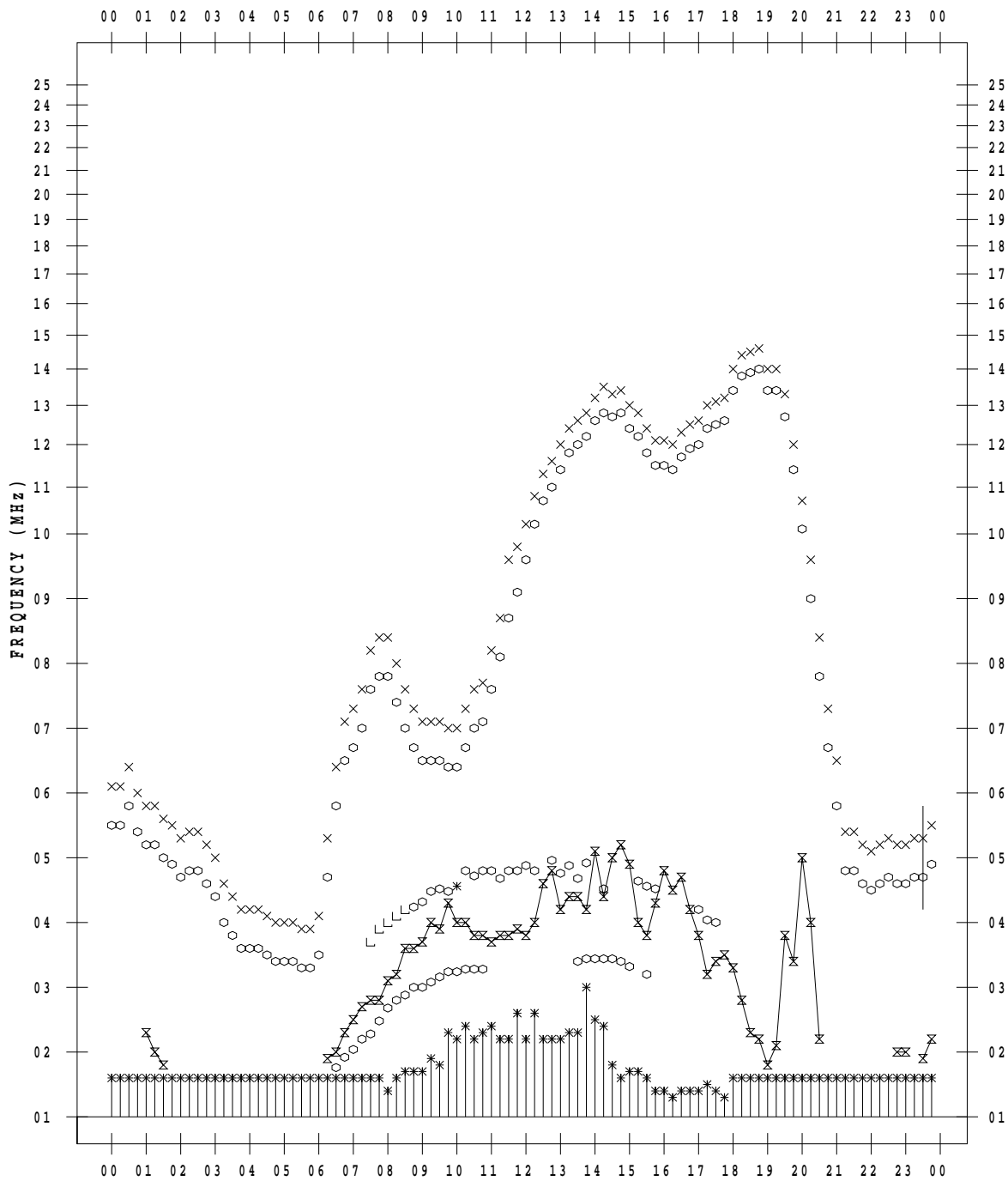
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/ 9

135 ° E MEAN TIME



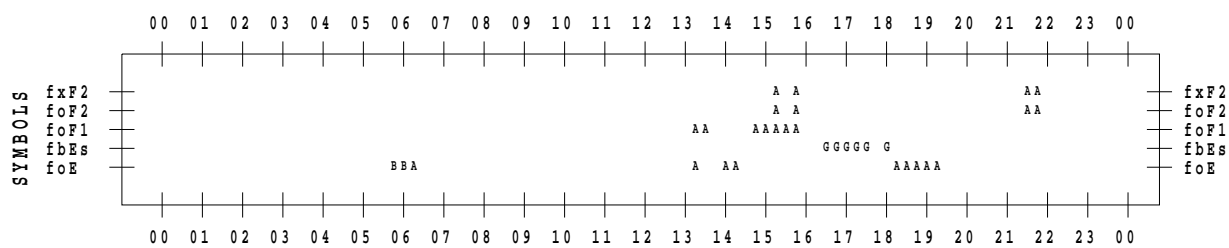
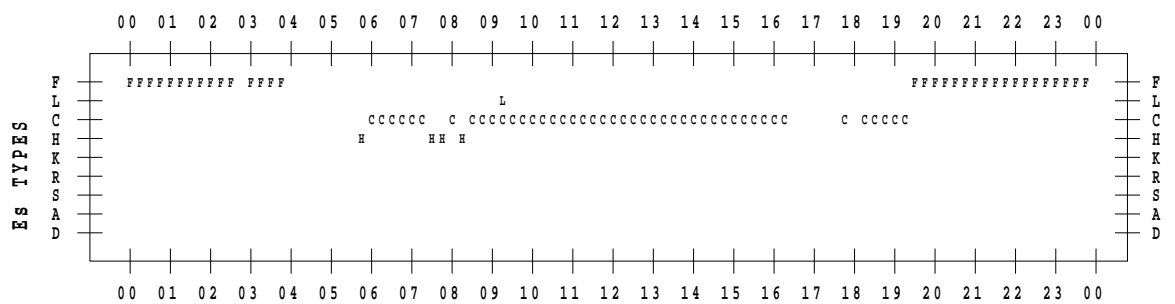
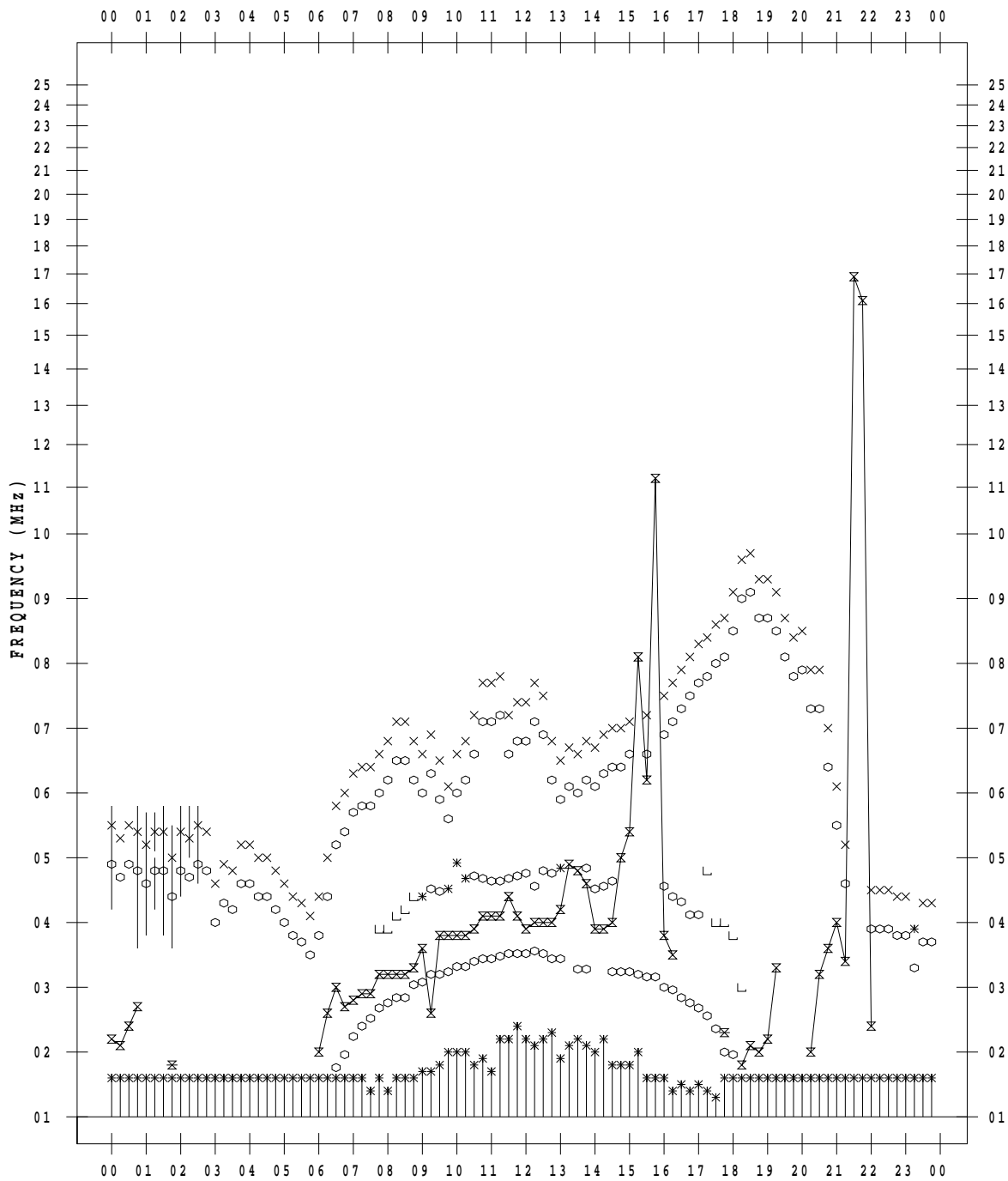
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/10

135 ° E MEAN TIME





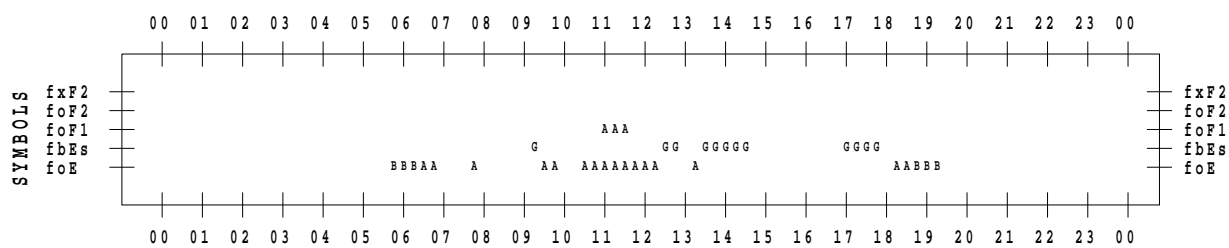
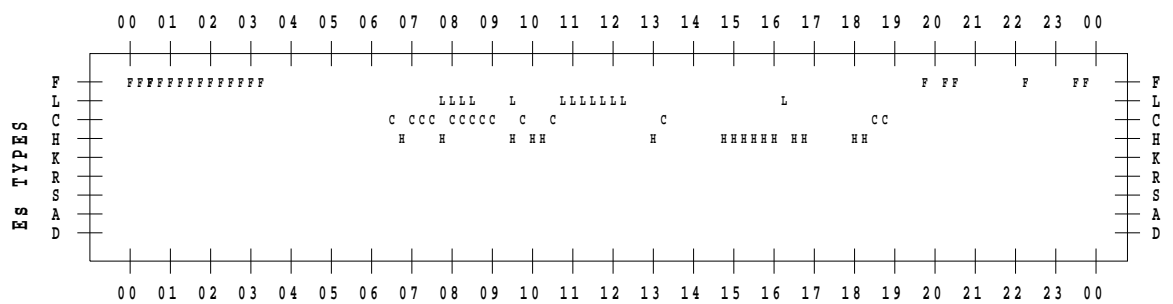
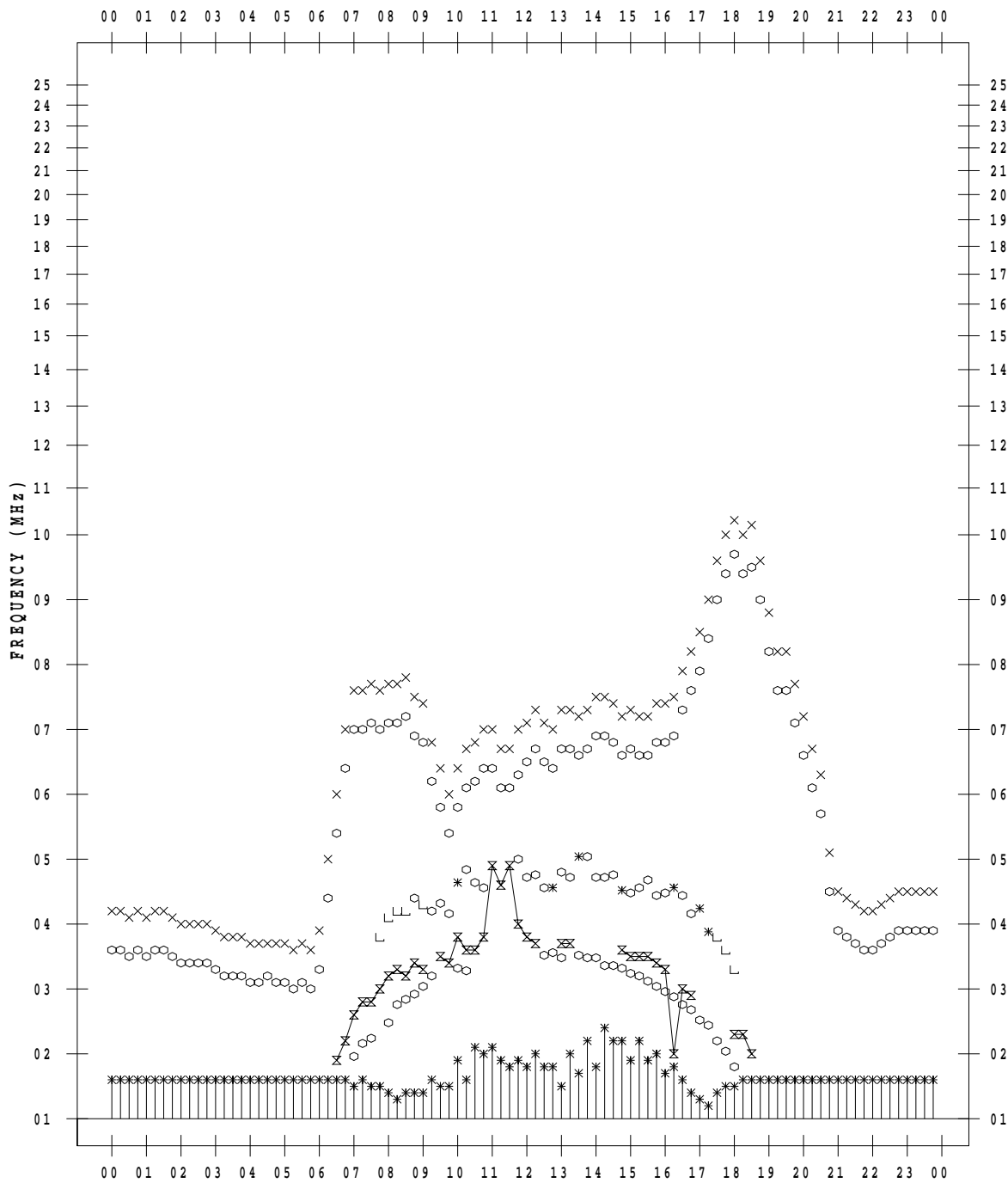
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/11

135 ° E MEAN TIME



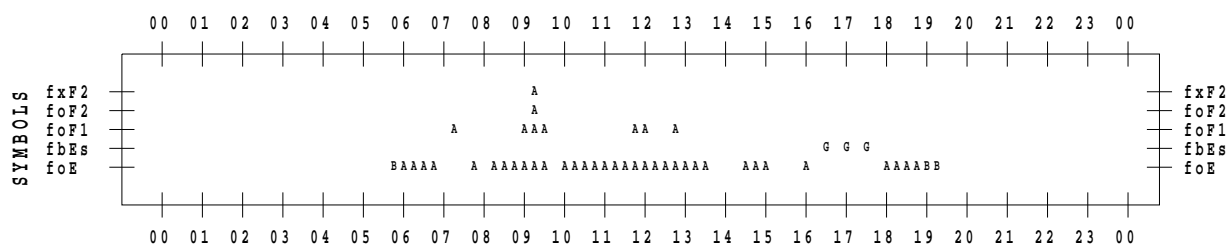
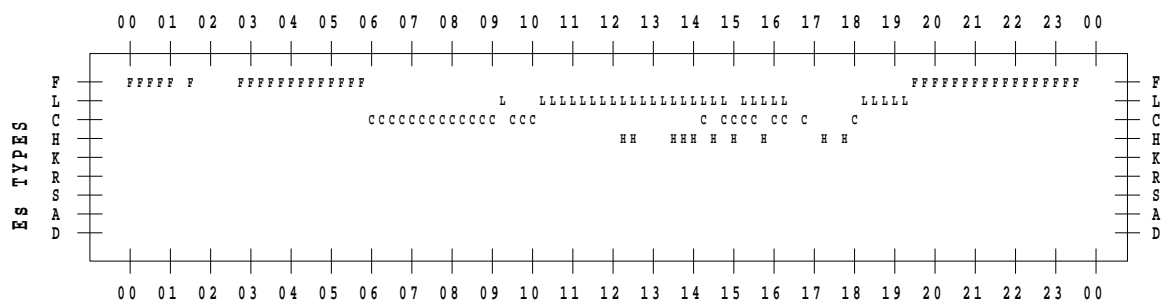
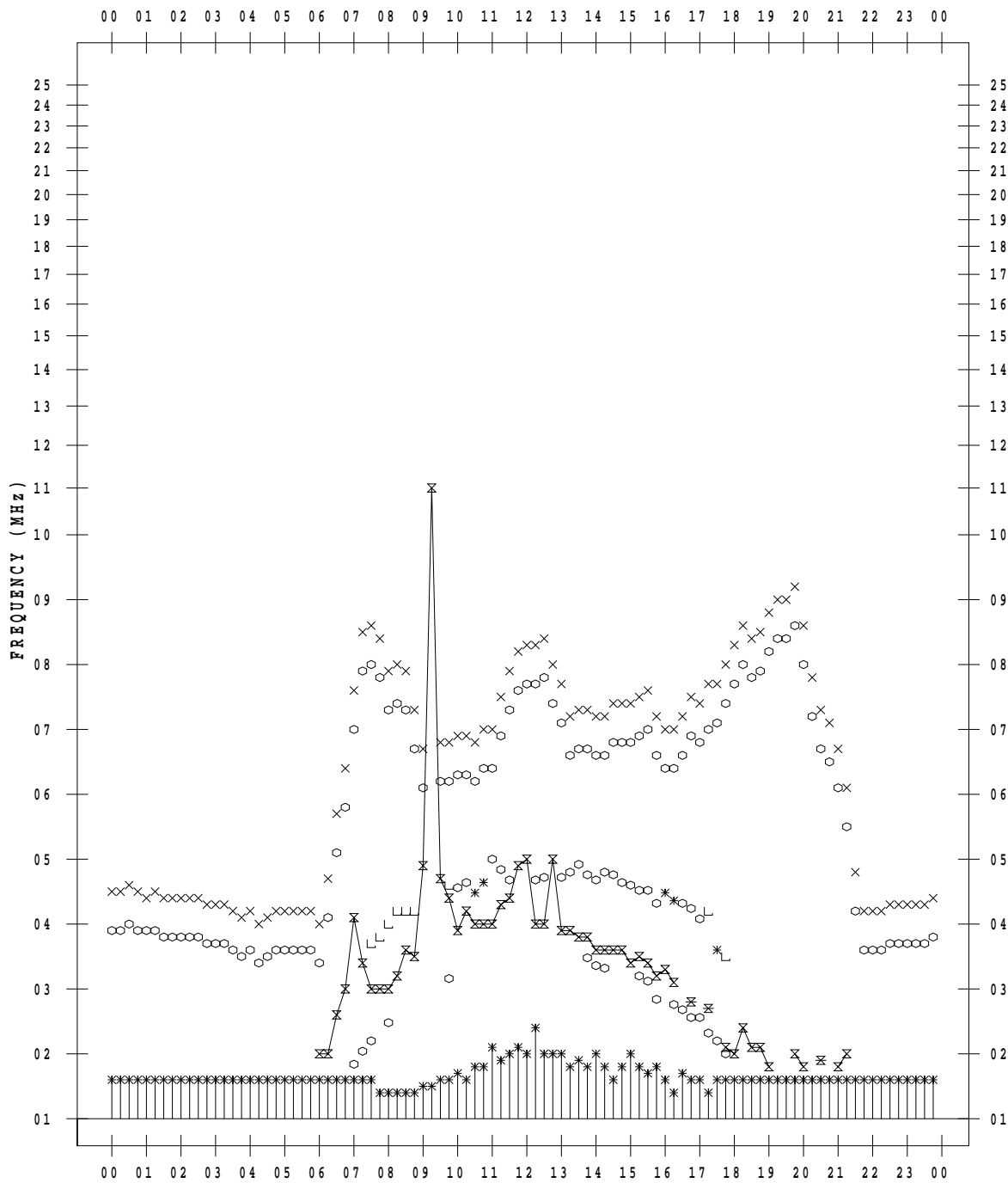
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/12

135 ° E MEAN TIME



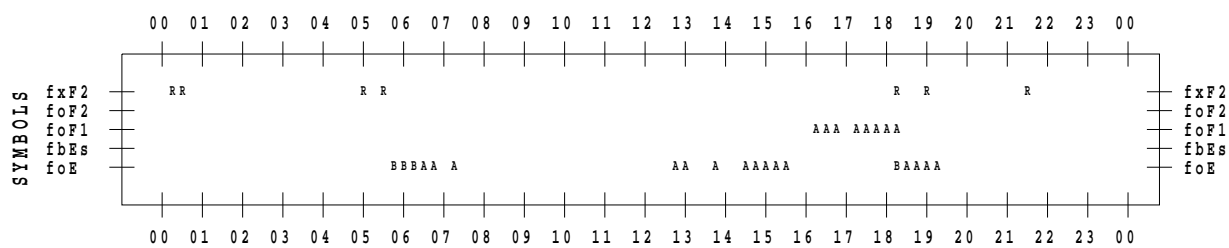
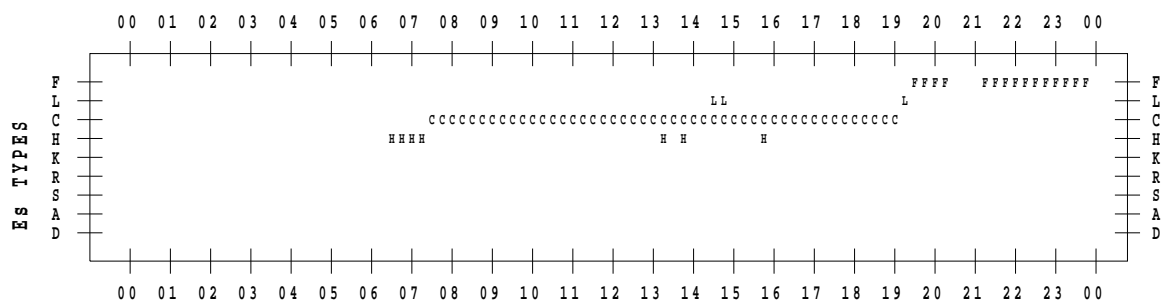
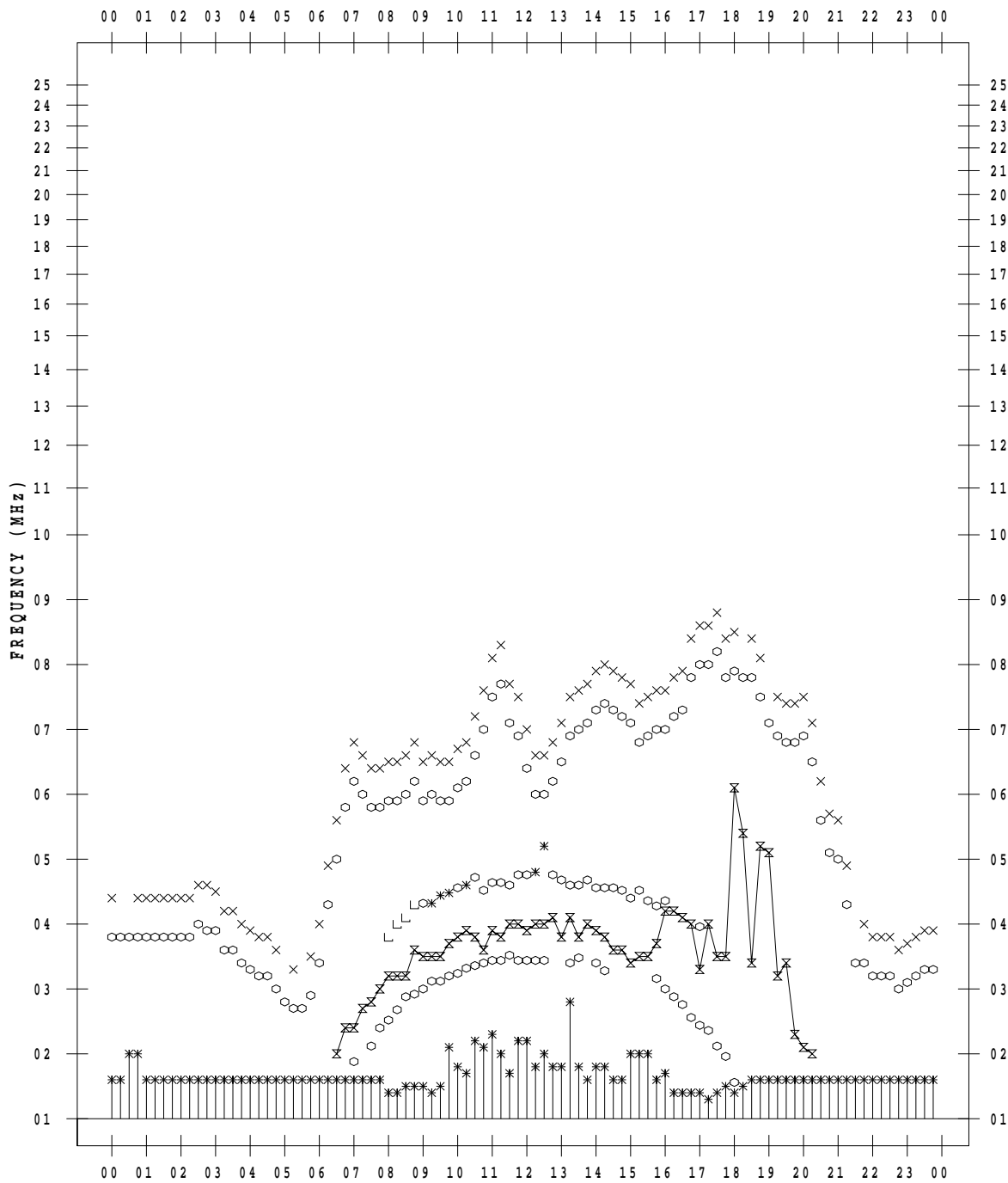
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/13

135 ° E MEAN TIME



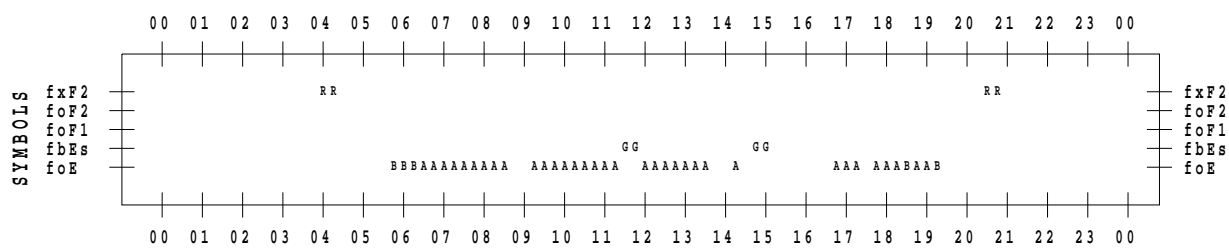
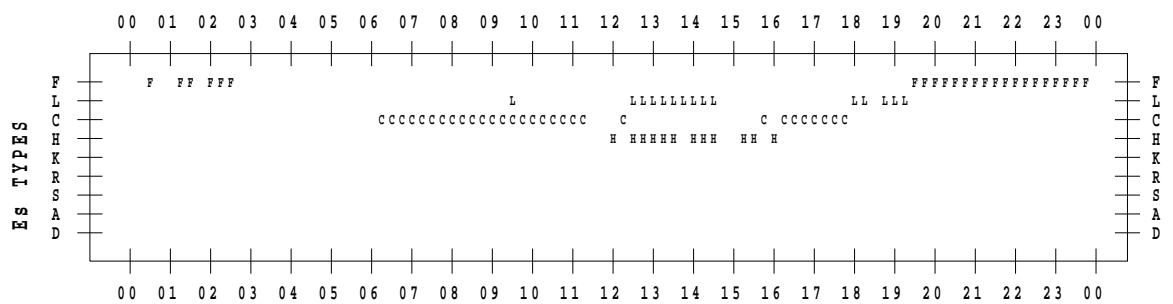
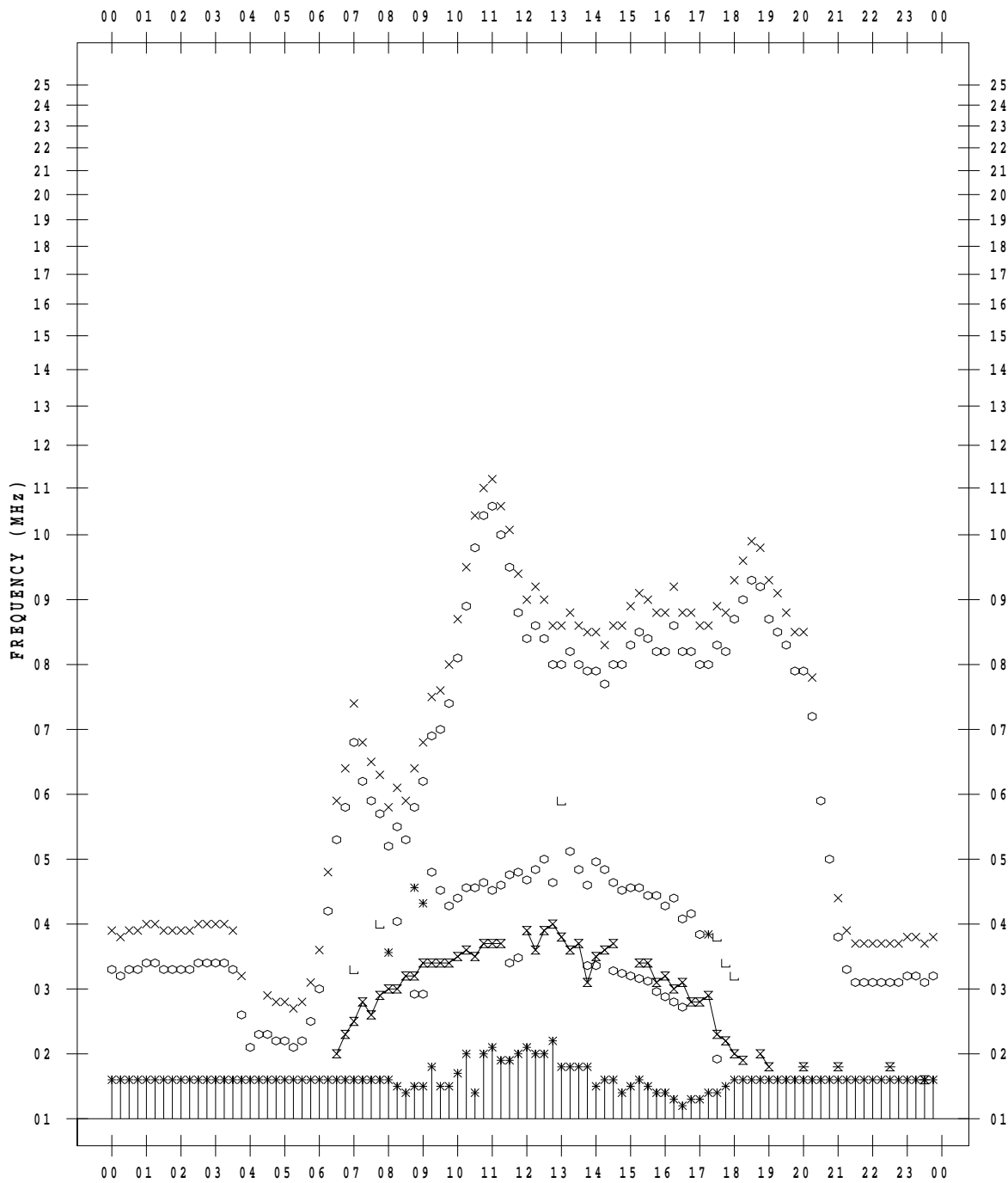
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/14

135 ° E MEAN TIME



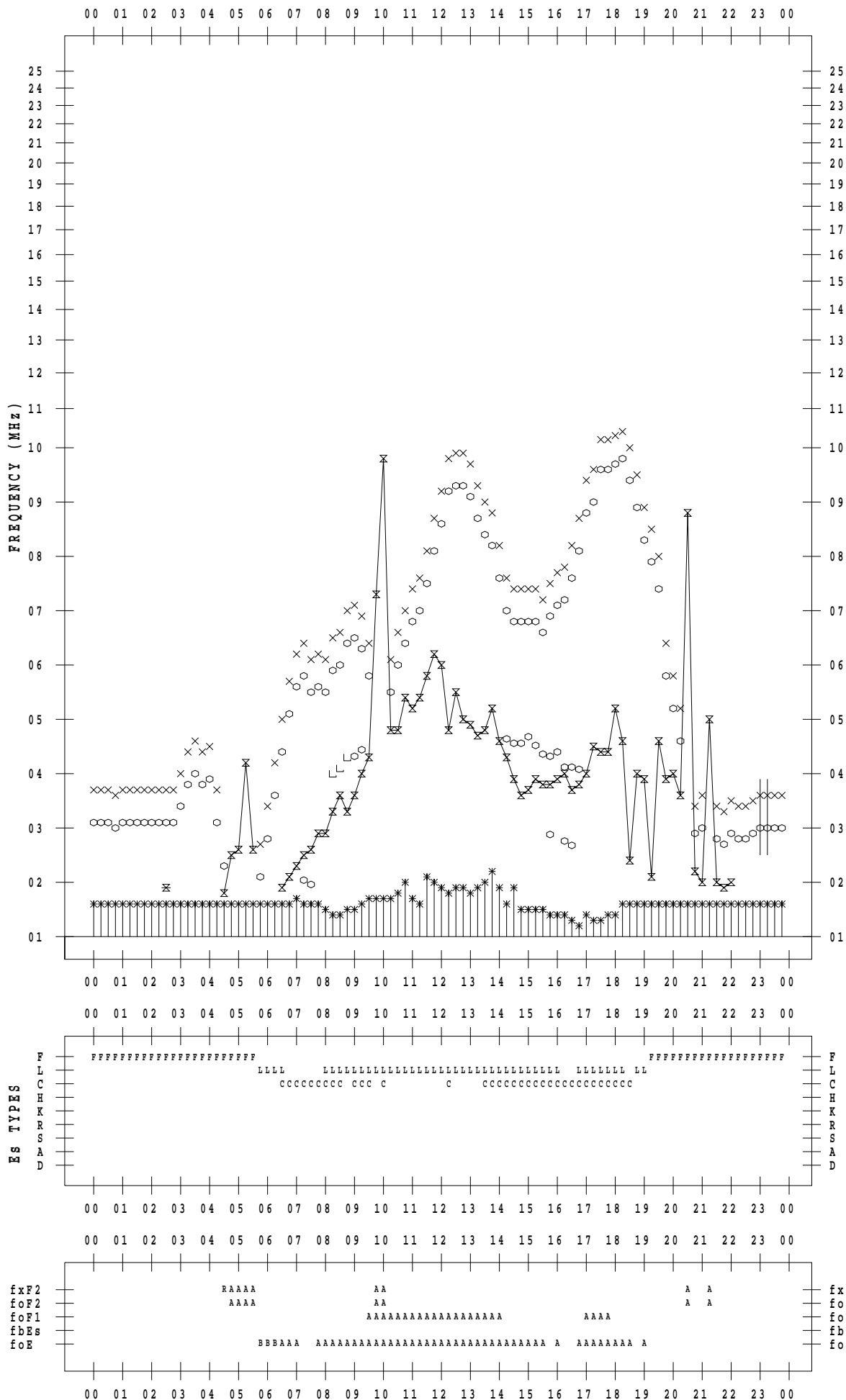
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/15

135 ° E MEAN TIME



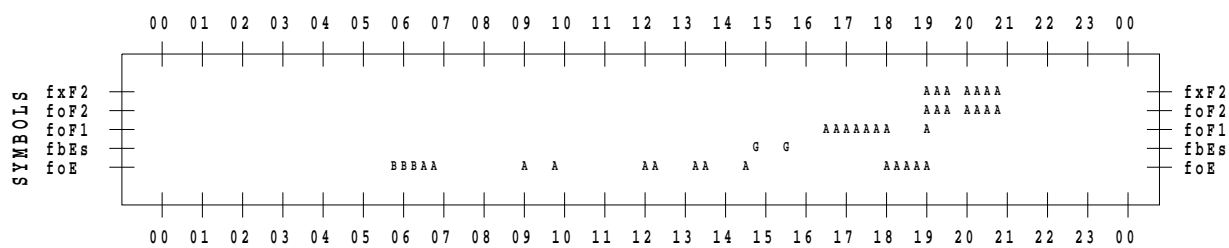
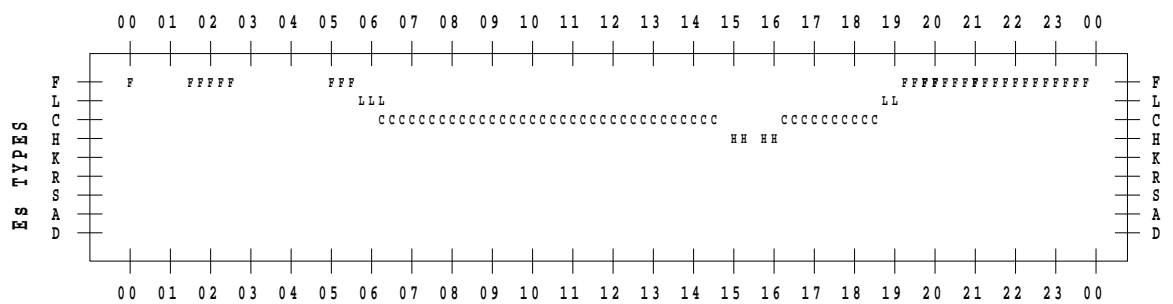
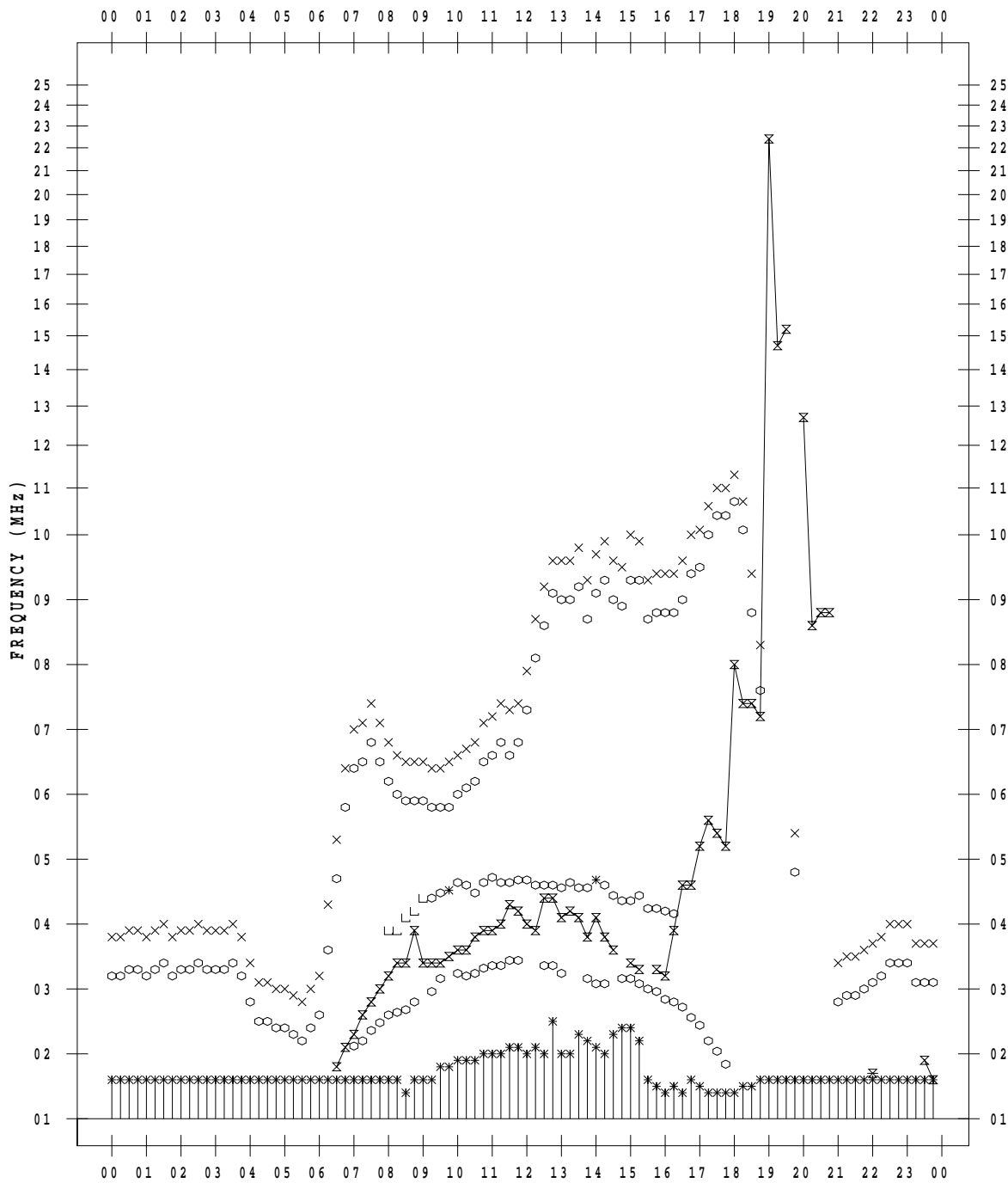
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/16

135 ° E MEAN TIME



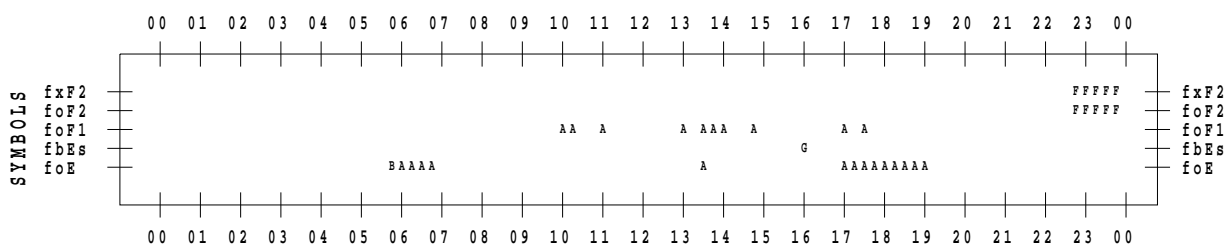
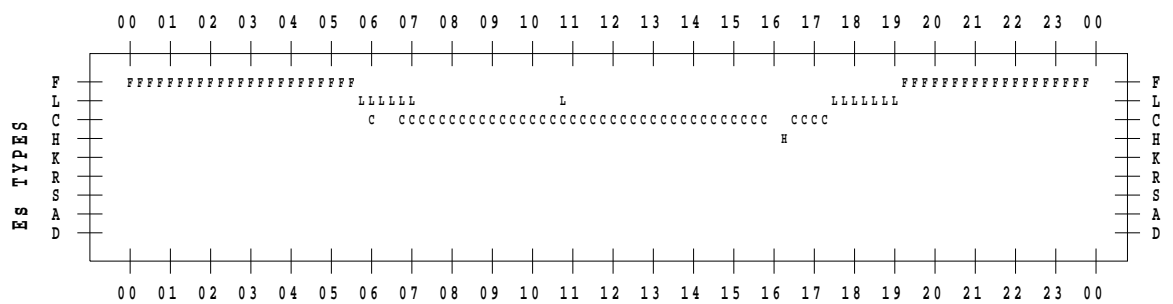
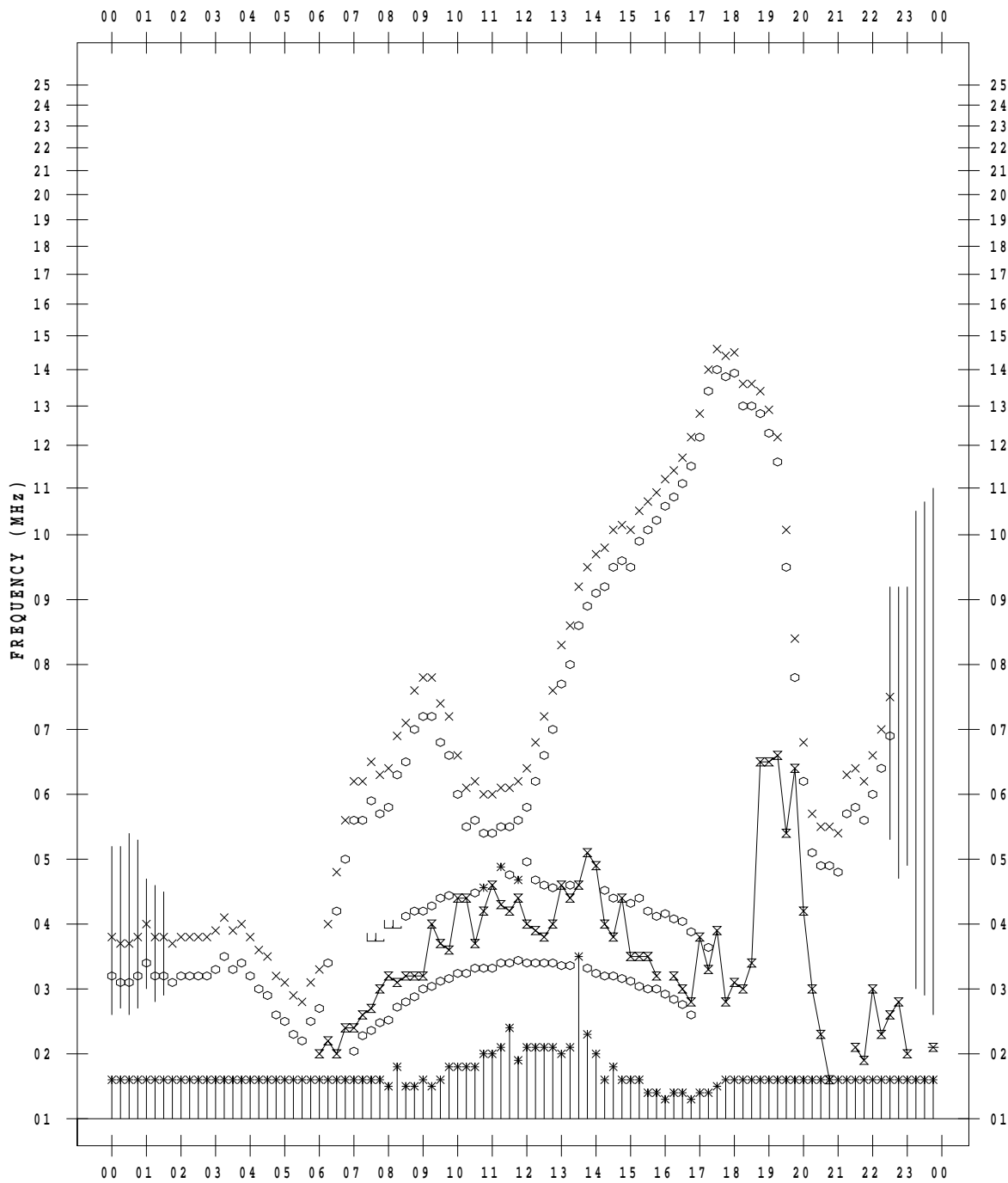
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/17

135 ° E MEAN TIME



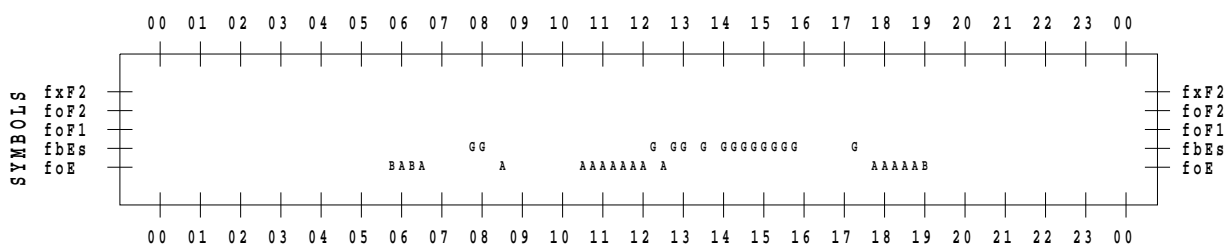
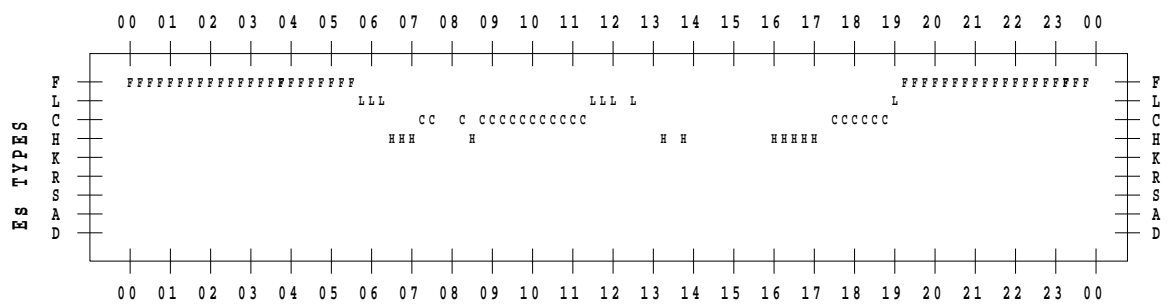
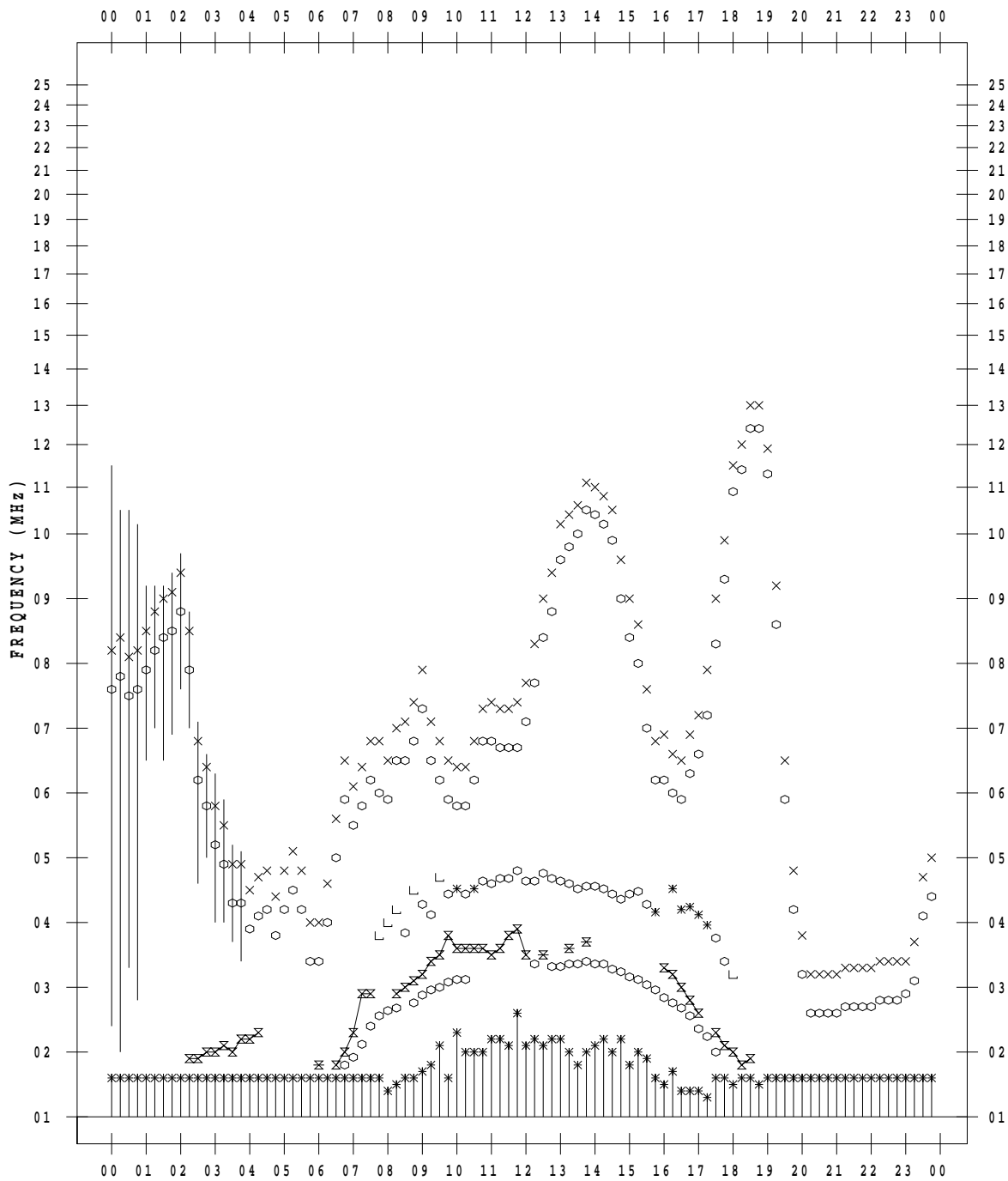
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/18

135 ° E MEAN TIME







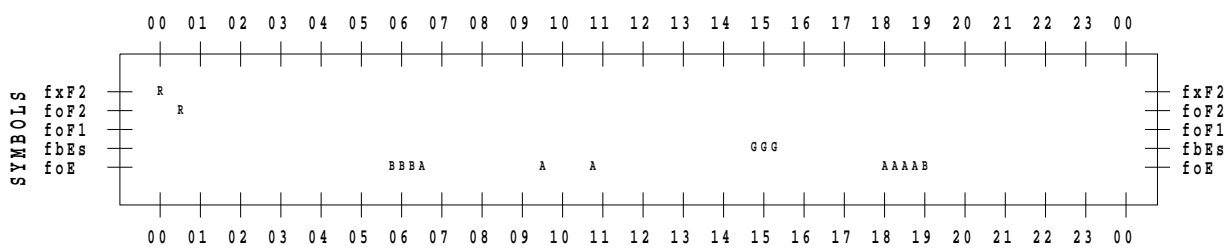
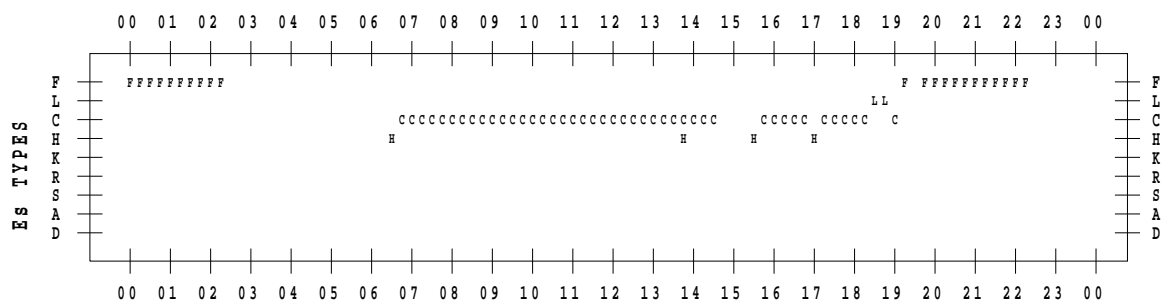
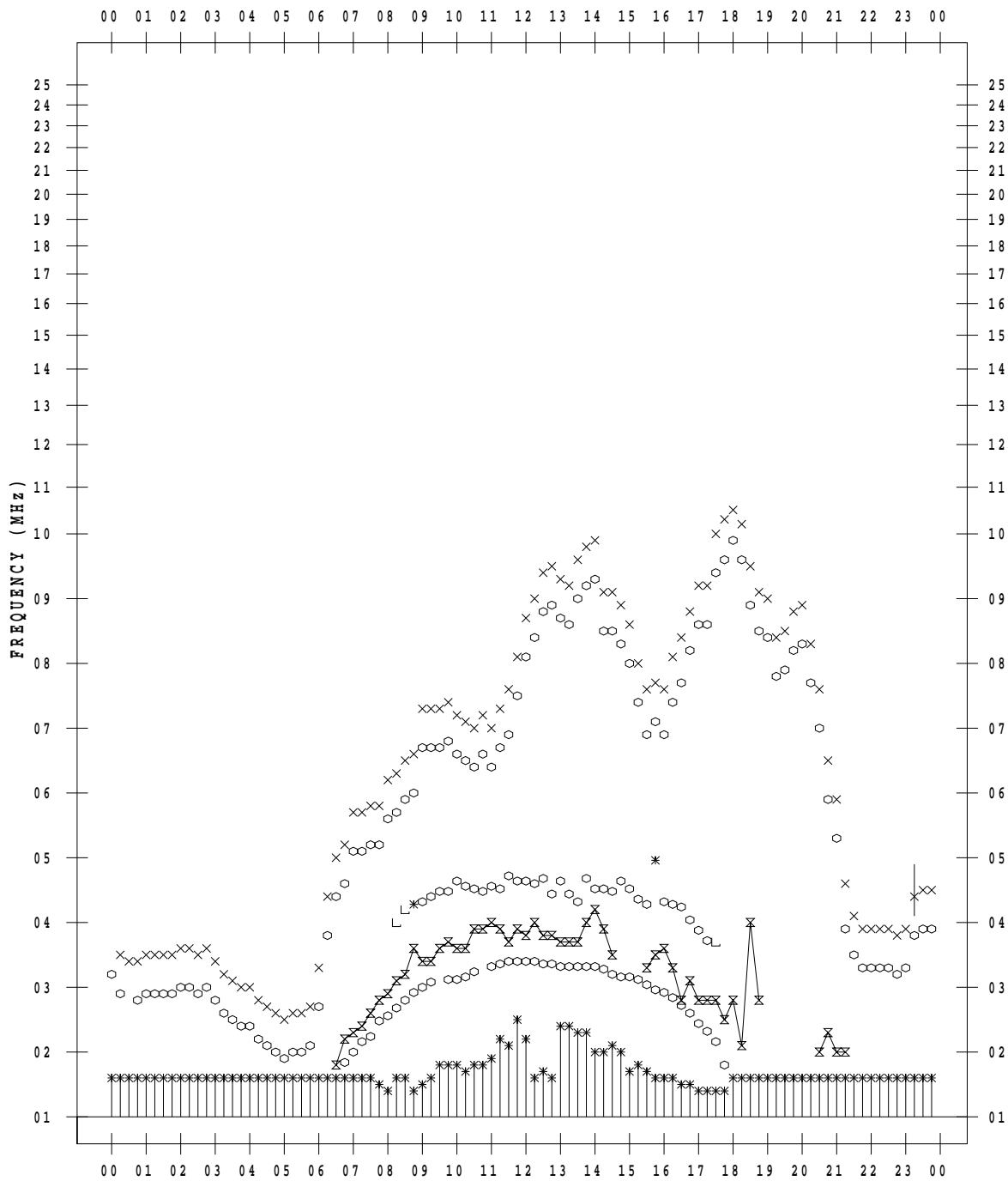
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 9 / 20

135 ° E MEAN TIME



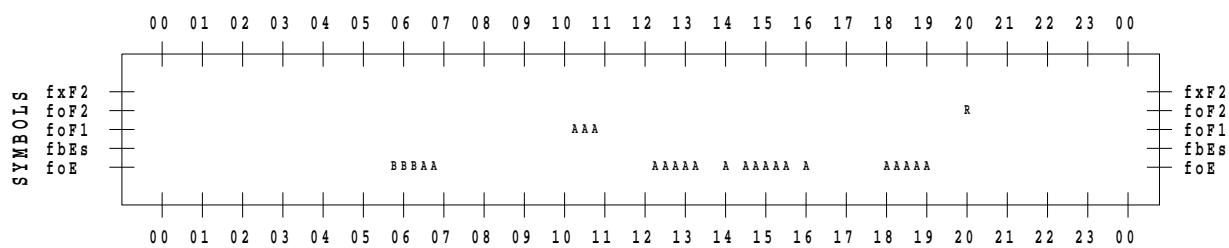
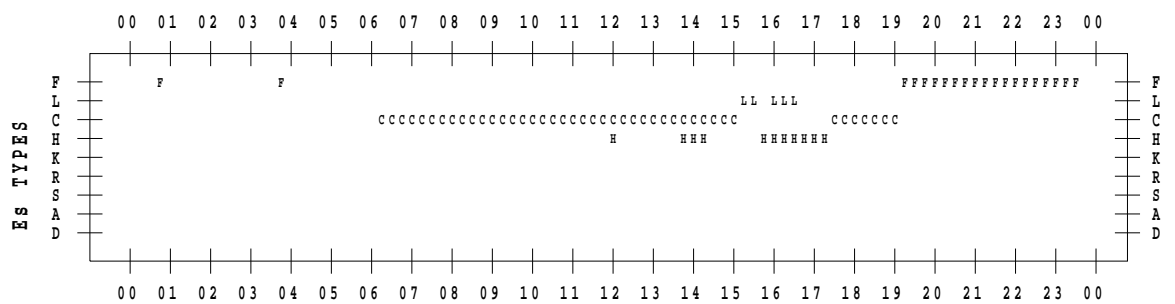
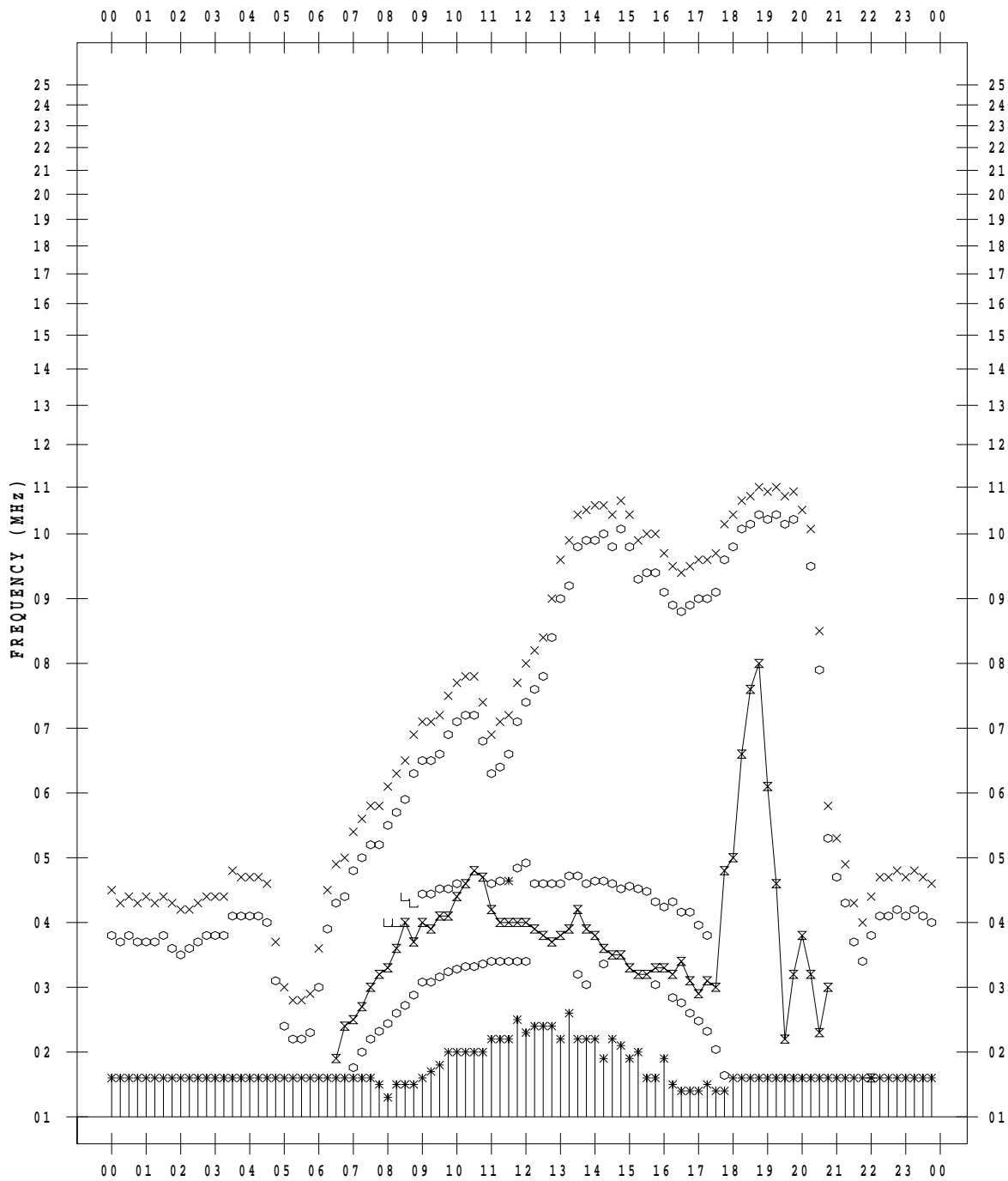
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/21

135 ° E MEAN TIME



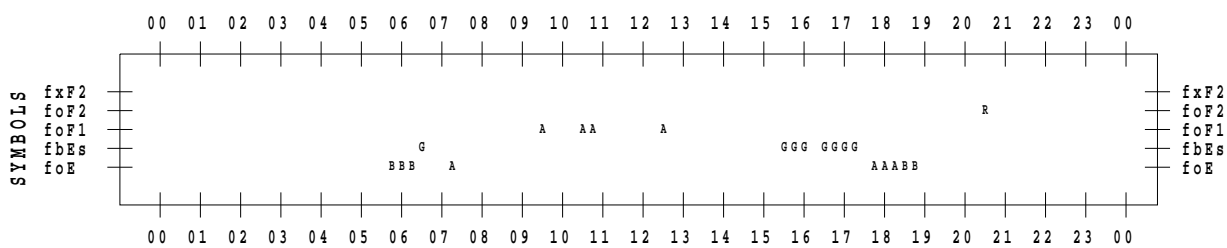
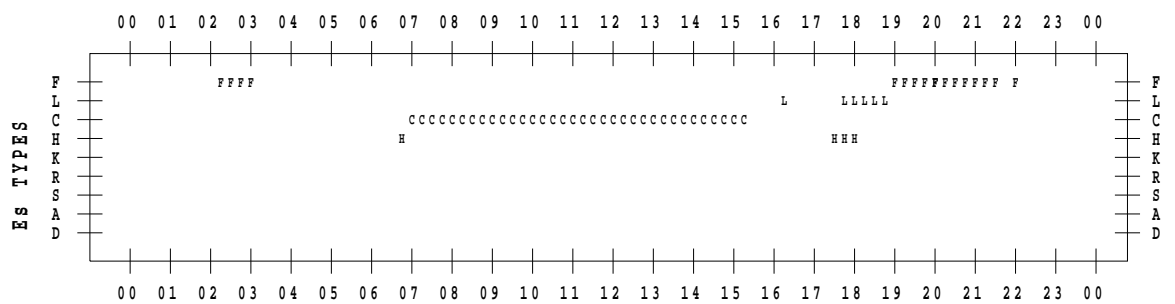
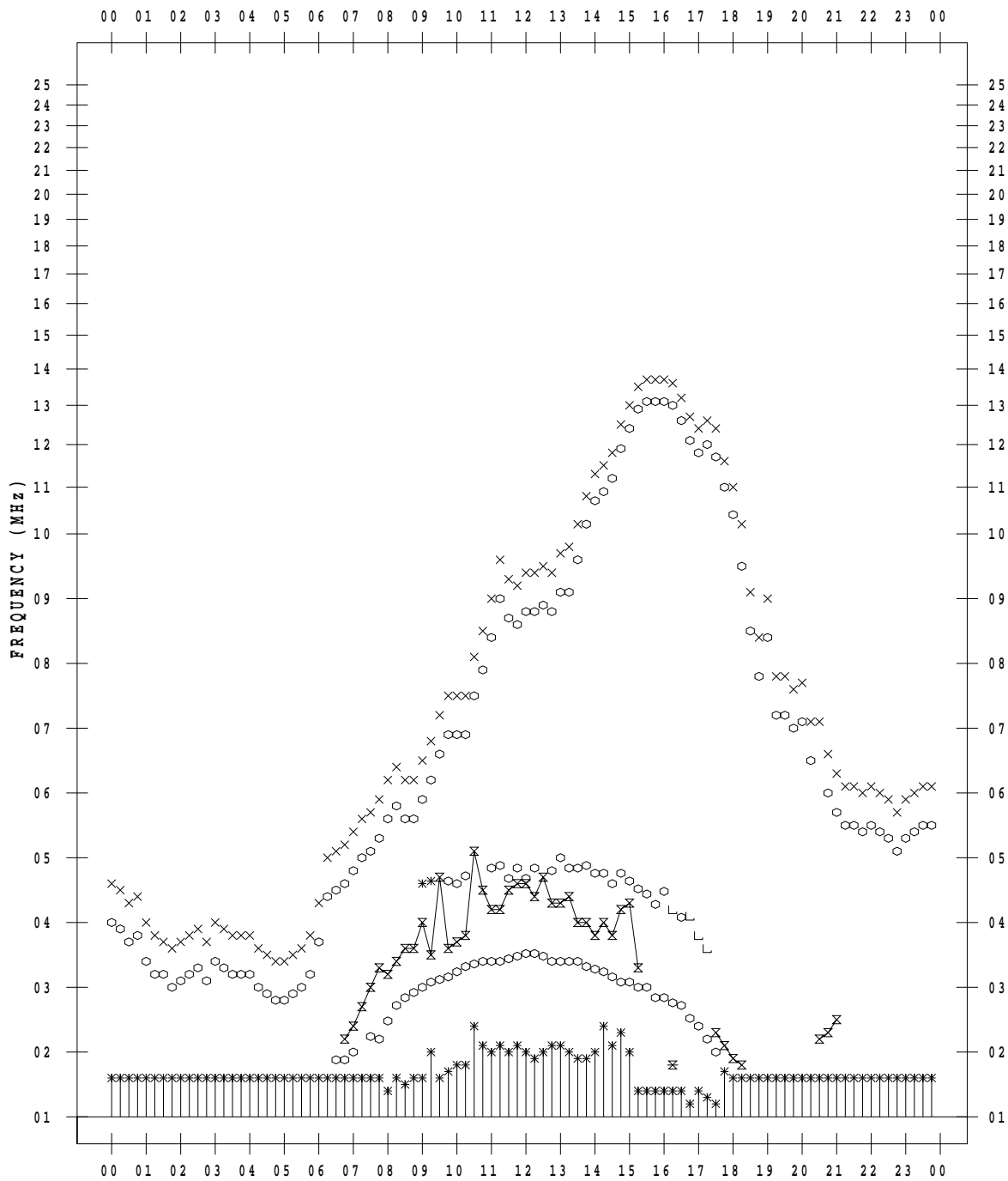
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/22

135 ° E MEAN TIME



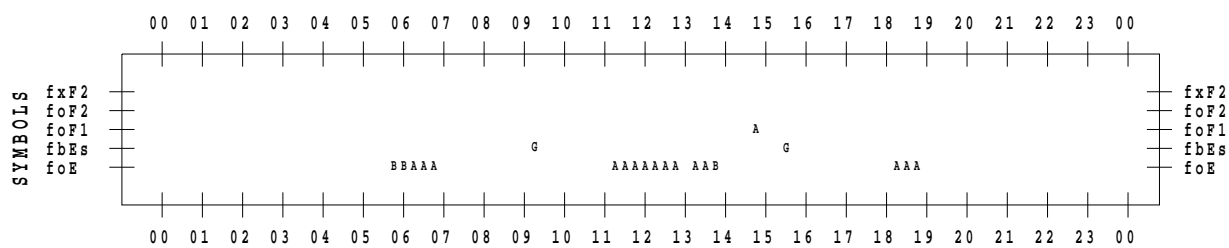
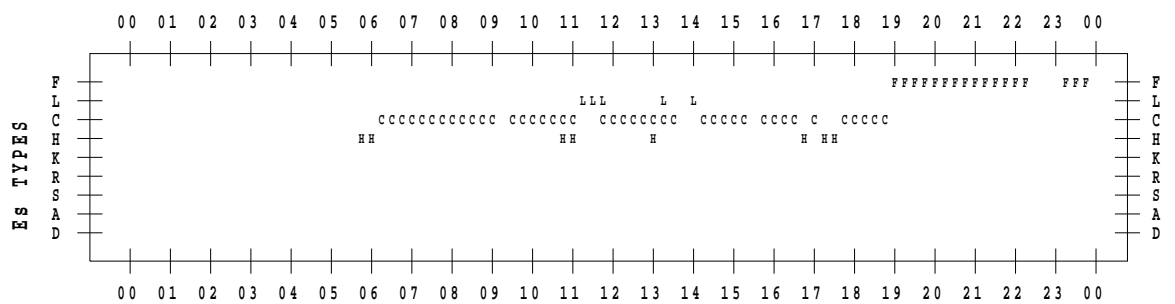
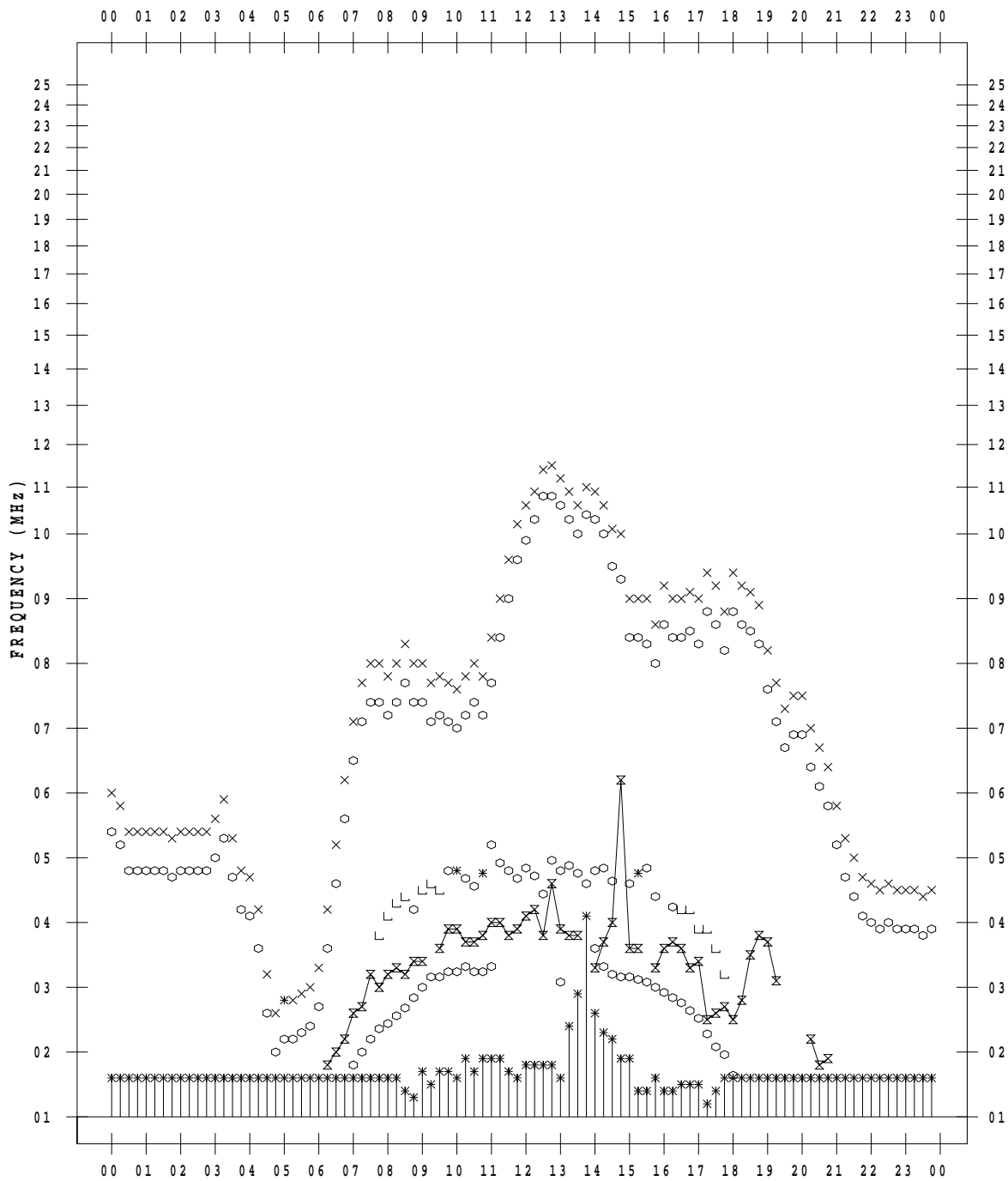
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 9 / 23

135 ° E MEAN TIME



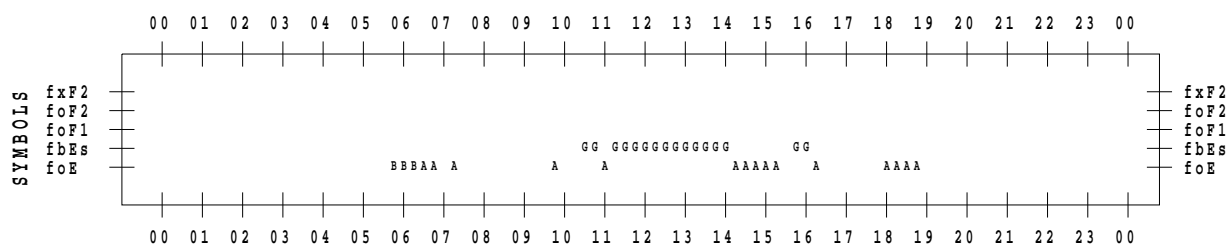
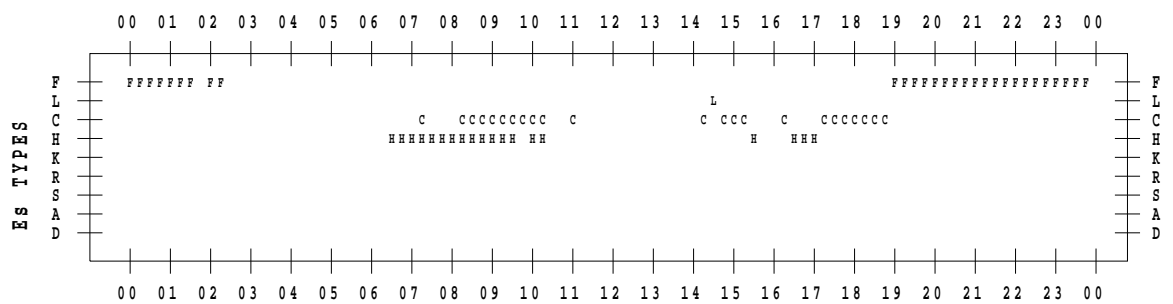
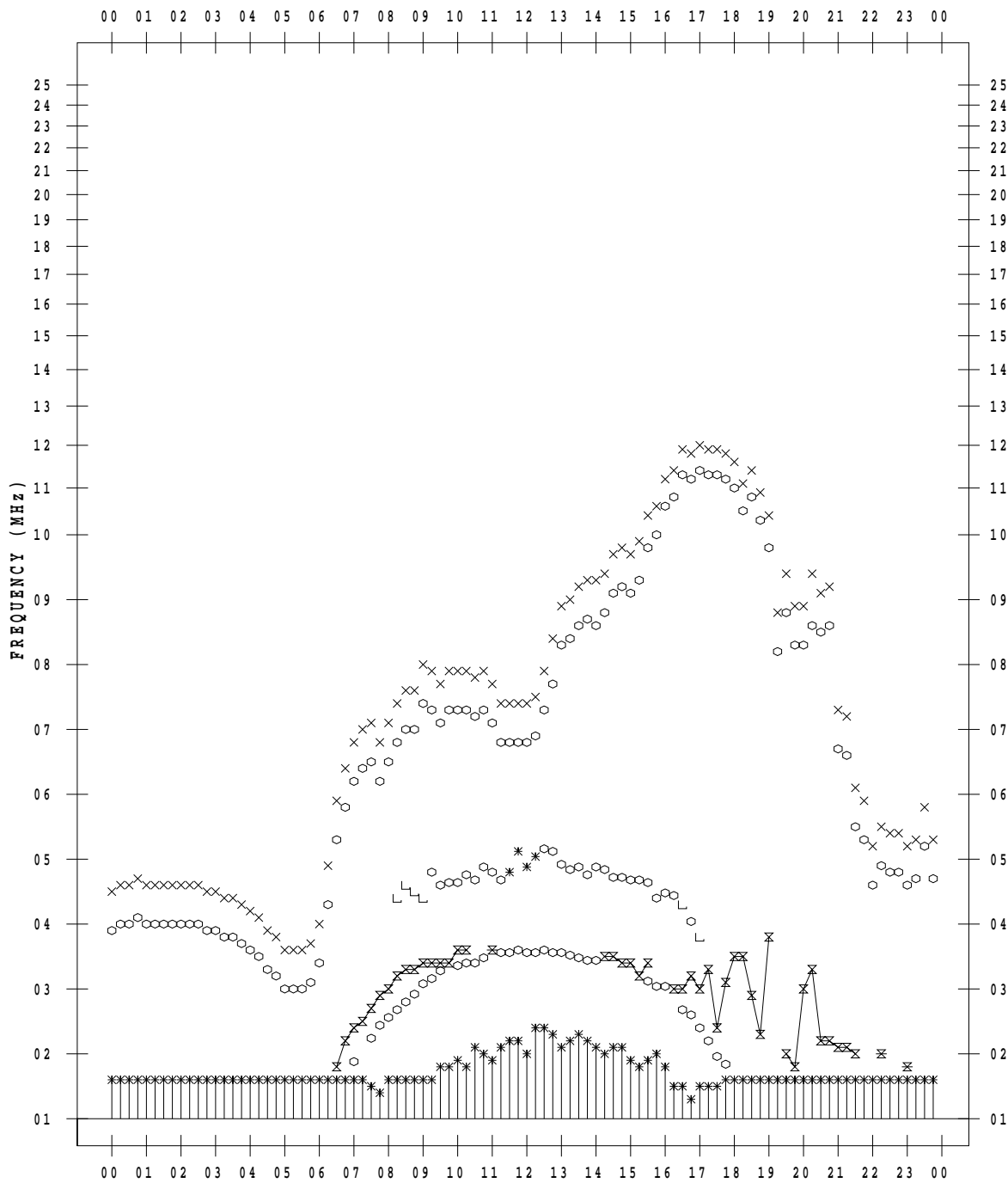
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 9 / 24

135 ° E MEAN TIME



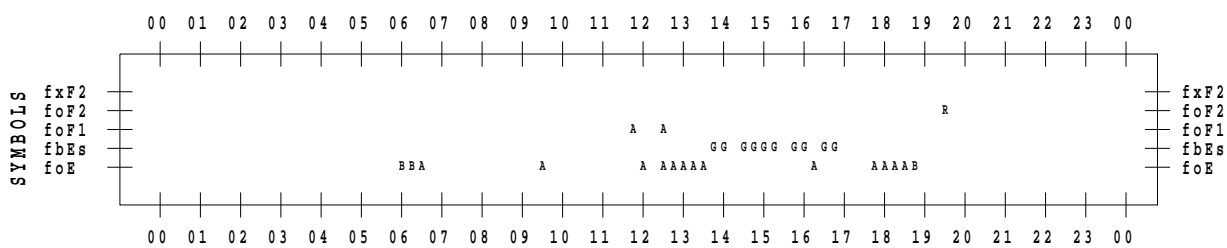
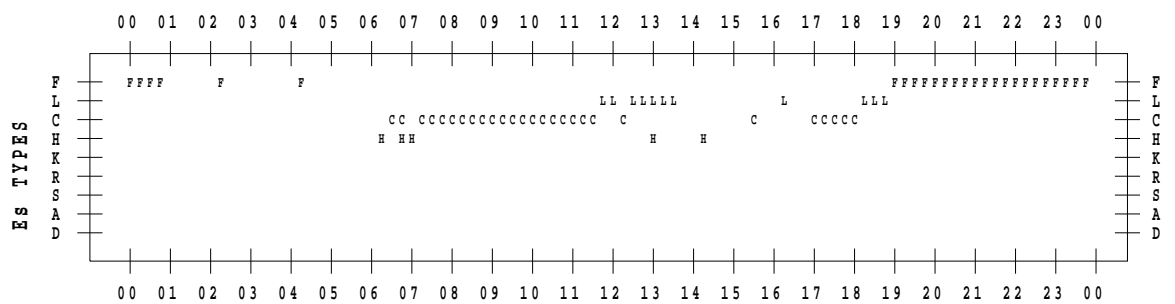
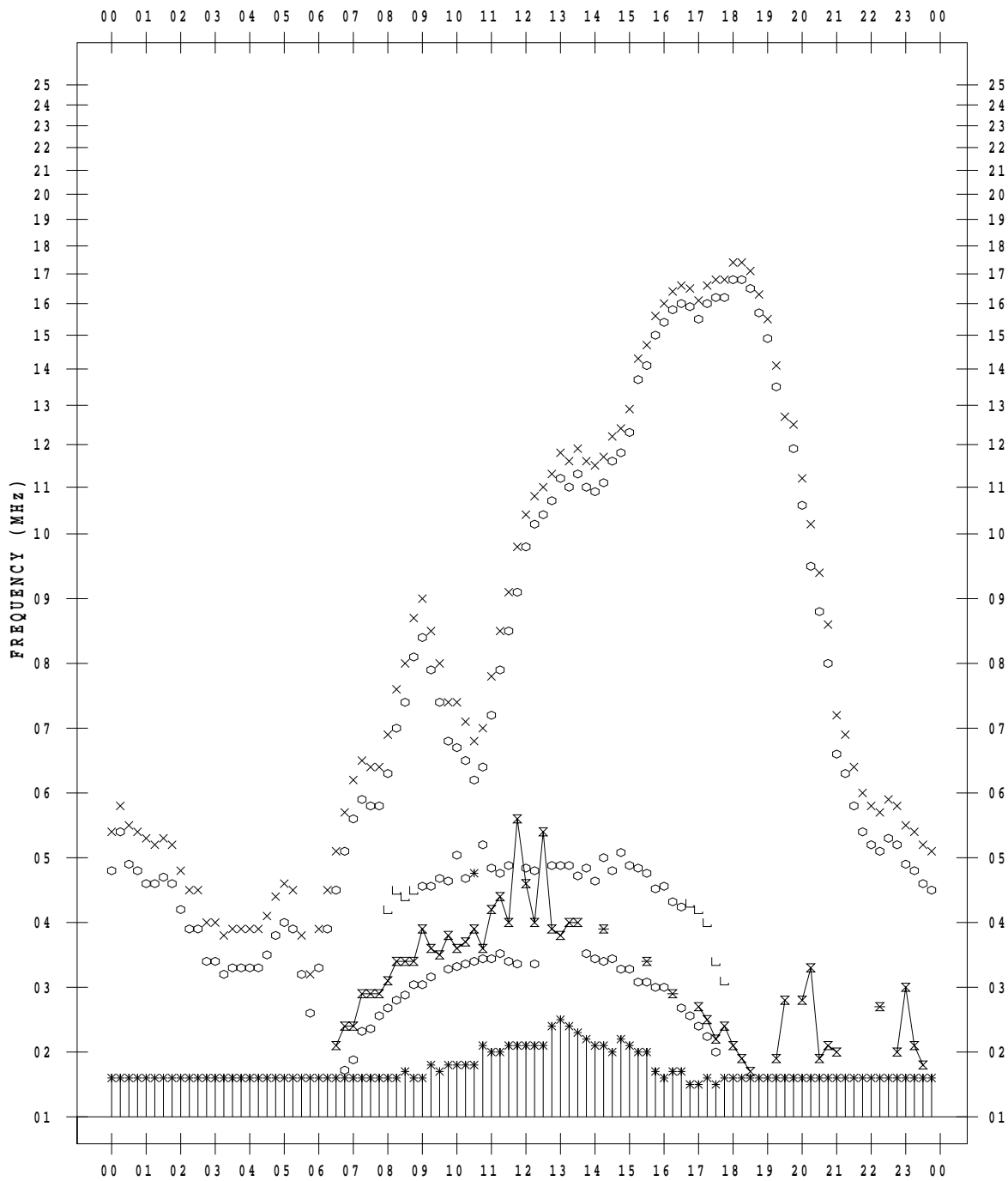
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 9 / 25

135 ° E MEAN TIME







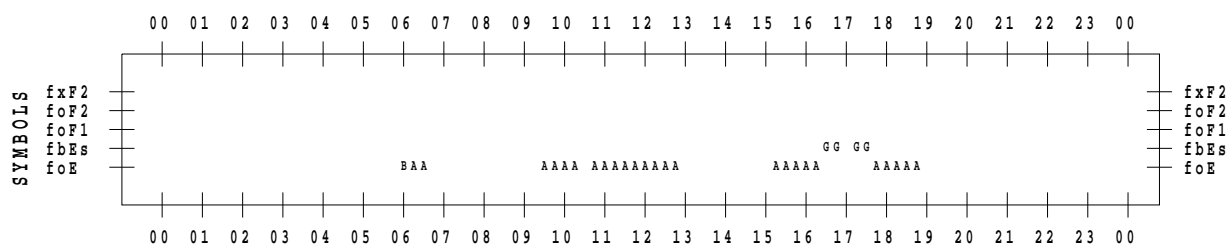
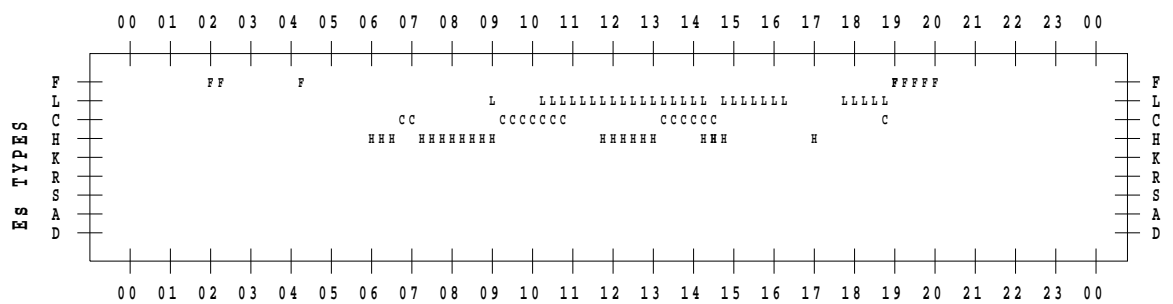
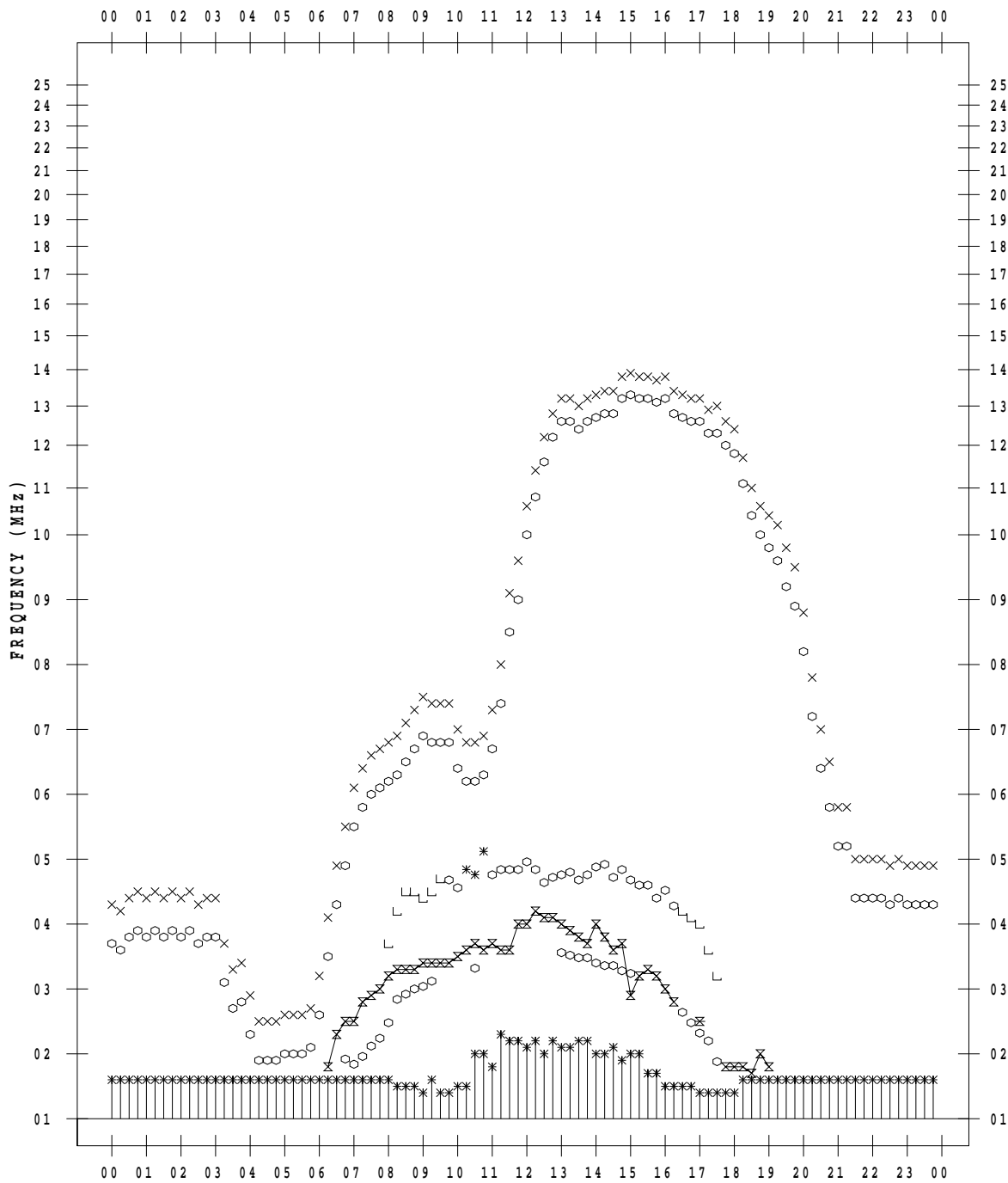
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021/ 9/27

135 ° E MEAN TIME



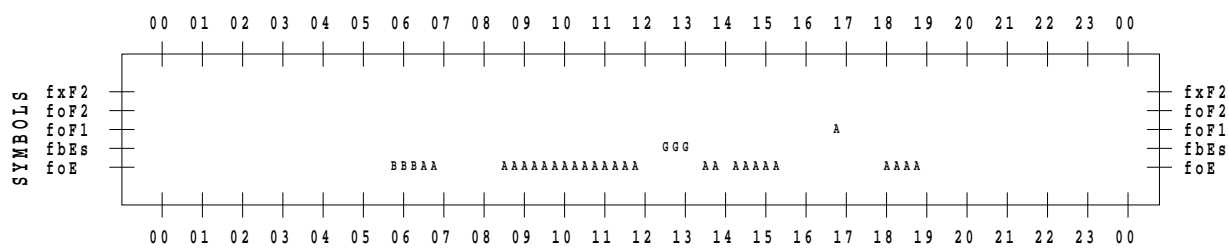
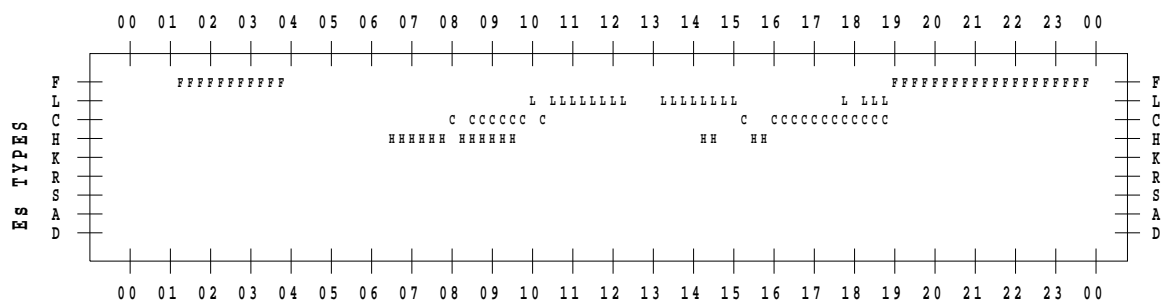
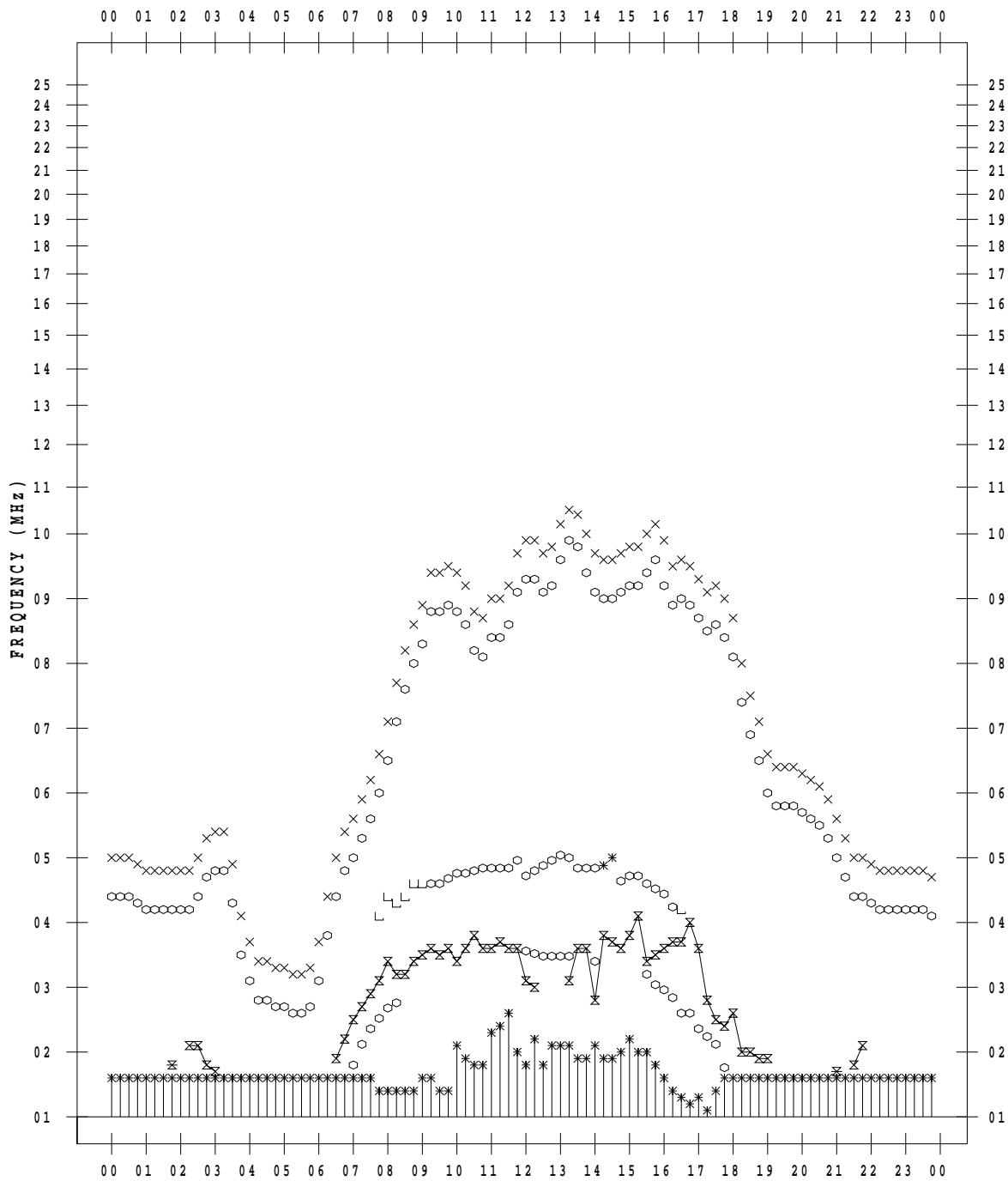
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 9 / 28

135 ° E MEAN TIME



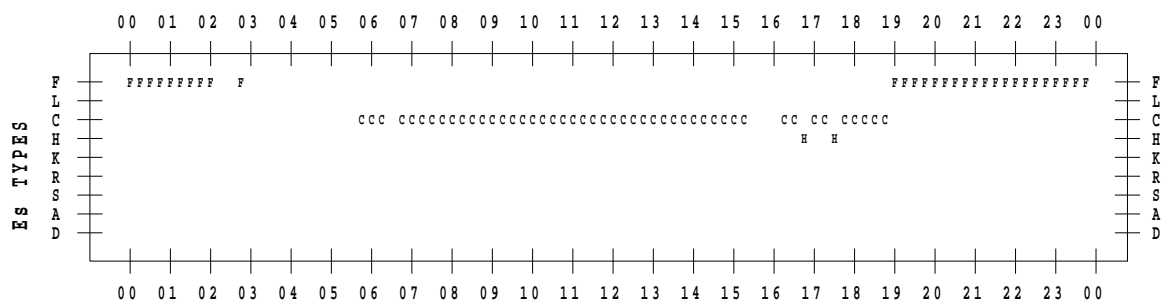
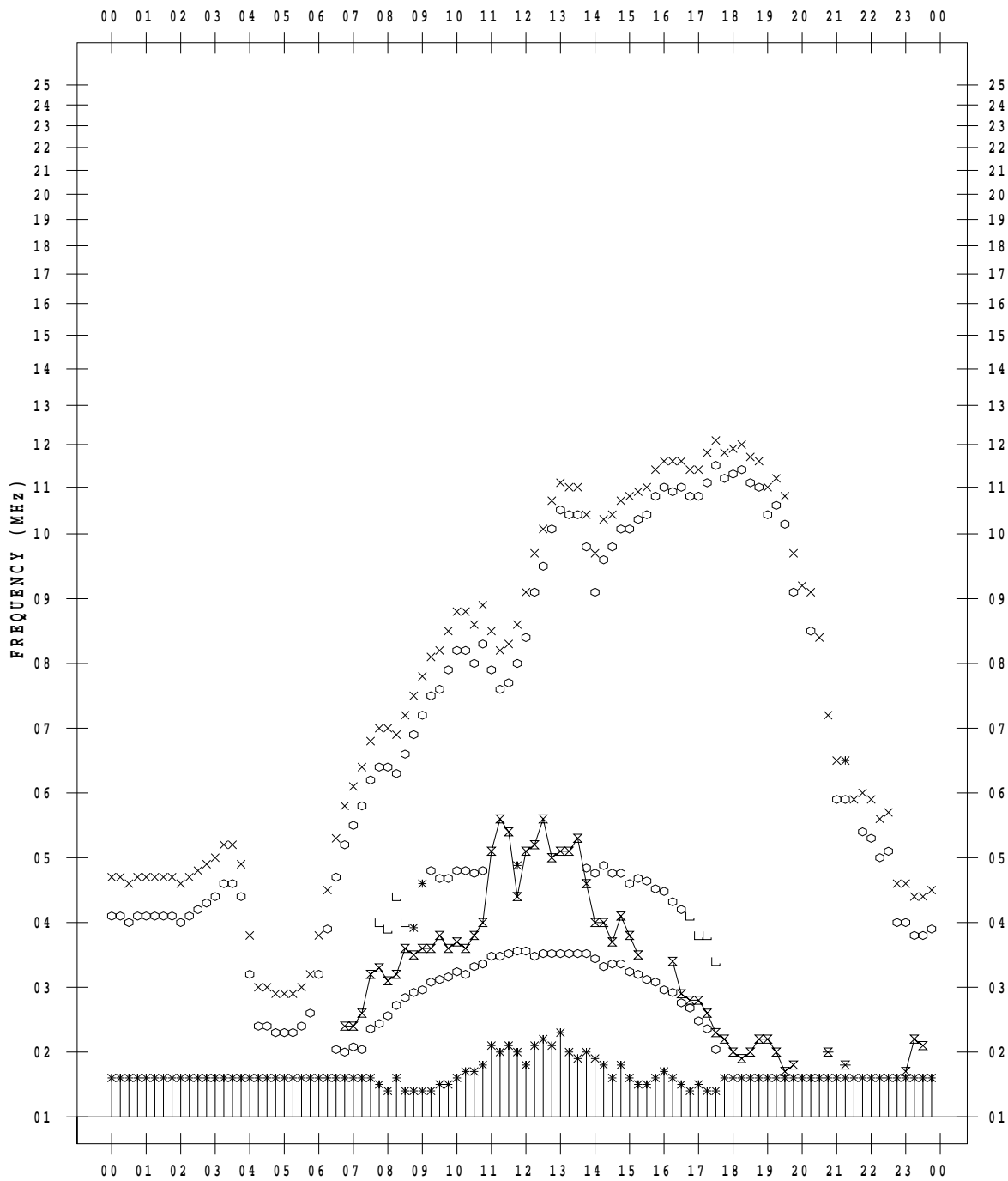
# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 9 / 29

135 ° E MEAN TIME



# f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2021 / 9 / 30

135 ° E MEAN TIME

