

# IONOSPHERIC DATA IN JAPAN

FOR July 2023

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«WDC for Ionosphere and Space Weather ... <https://wdc.nict.go.jp/IONO/wdc/index.html> »



NATIONAL INSTITUTE OF INFORMATION  
AND COMMUNICATIONS TECHNOLOGY  
TOKYO, JAPAN

# INTRODUCTION

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

National Institute of Information and Communications Technology, Japan.

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

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

## IONOSPHERE

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

### A1. Automatic Scaling

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

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

#### a. Characteristics of Ionosphere

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

#### b. Descriptive Letters

The following descriptive letters are used in the tables.

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

C Impossible measurement because of any failure in observation.

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

N Impossible automatic scaling because of complex echoes.

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

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

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

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

of values.

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

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

#### d. Reliability of Automatic Scaling

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

#### e. Summary Plot

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

### A2. Manual Scaling

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

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

#### a. Characteristics of Ionosphere

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

## b. Symbols

## (i) Descriptive Letters

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

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

## (ii) Qualifying Letters

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

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

extraordinary component.

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

(iii) Description of Types of *Es*

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

The types are:

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

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

**Median count ( 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

JUL. 2023

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	78	73	73	71	61	56	51	66	74	57	69	65	71	A	66	69	67	67	71	72	73	73	70	71
2	64	71	74	68	72	69	71	85	89	73	N 70	65	69	69	76	69	66	67	70	77	80	85	85	81
3	63	64	64	63	57	59	67	65	53	A	A	A	59	51	54	55	59	57	A	63	68	73	72	67
4	68	67	67	59	62	66	91	82	77	67	73	69	76	73	73	65	67	69	75	78	79	74	77	80
5	77	71	68	73	75	71	70	71	65	63	63	A	53	A	58	55	55	57	61	65	75	80	77	75
6	77	71	72	66	69	67	93	94	73	77	75	79	86	87	86	81	70	69	72	73	81	91	91	89
7	77	62	58	58	55	57	52	53	57	53	A	A	A	A	A	49	48	A	61	66	76	76	81	79
8	59	57	59	55	A	58	53	A	A	A	48	51	50	61	N 54	47	A	A	54	58	64	70	70	63
9		61	62	66	59	67	69	A	78	77	71	70	72	77	A	68	71	49	47	A	79	85	85	78
10	79	79	73	68	66	73	87	A	52	69	72	65	102	A	51	57	59	46	58	N 60	A	A	75	65
11	69	65	69	59	61	68	A	120	47	77	A	72	49		A	71	67	A	38	75	A	73	73	75
12	71	75	67	67	63	73	69	66	63	69	65	A	A	63	59	53	50	58	A	71	76	69	70	72
13	70	A	65	56	A	A	75	A	66	67	62	66	A	67	N 64	71	72	75	71	67	N 68	A	A	75
14	69	69	69	69	67	69	78	81	79	74	A	A	A	A	77	49	51	73	70	74	A	75	A	A
15	66	68	66	59	61	68	70	82	81	54	A	50	49	A	A	62	52	A	A	A	78	80	A	79
16	77	72	66	65	67	55	A	77	74	72	A	74	73	68	75	76	75	77	78	83	73	74	71	73
17	66	A	65	64	60	57	57	54	76	71	71	69	71	A	A	64	65	66	71	83	87	90	83	88
18	67	61	60	57	54	51	51	55	55	56	A	A	63	55	65	73	71	70	69	75	74	72	75	73
19	70	69	72	70	70	64	63	71	74	73	77	77	80	81	79	77	76	76	74	77	A	89	83	81
20	77	75	76	69	68	73	76	83	86	80	73	82	91	A	83	A	76	75	78	82	88	A	A	81
21	78	76	76	67	64	62	73	77	83	79	84	81	75	77	76	82	A	77	71	75	A	86	85	94
22	75	75	74	69	72	77	47	80	77	80	82	83	A	86	77	75	73	75	A	75	88	A	76	A
23	75	71	68	A	63	64	65	71	73	A	76	52	52	71	68	A	66	A	A	71	82	80	75	79
24	77	76	78	70	59	57	59	51	61	64	66	A	72	72	62	69	65	65	72	70	69	75	A	72
25	73	73	66	63	65	70	79	87	89	88	78	87	85	77	77	68	71	67	A	75	75	78	76	81
26	76	72	71	68	68	70	71	90	83	73	60	77	71	60	69	77	74	81	73	75	79	71	70	74
27	69	67	69	63	62	71	85	78	73	64	54	65	65	65	62	60	62	59	64	69	70	76	73	70
28	69	67	64	63	64	78	95	62	75	A	A	72	75	71	72	71	70	65	67	69	A	81	75	75
29	73	A	A	66	65	69	65	64	A	65	A	67	69	74	71	70	73	70	69	65	65	73	74	71
30	65	69	70	65	59	63	71	75	56	67	66	64	65	A	65	63	A	A	65	66	65	A	70	66
31	65	56	64	59	53	58	59	A	54	65	A	59	58	A	A	58	A	60	65	67	73	73	73	64
	00	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	28	30	30	29	30	29	26	29	27	21	24	26	20	26	28	27	25	26	29	25	26	26	29
MED	70	70	68	66	63	67	70	76	74	69	71	69	71	71	68	68	67	67	70	72	75	76	75	75
U Q	77	73	72	68	67	70	77	82	78	77	75	77	75	77	76	72	72	75	72	75	79	81	81	80
L Q	67	66	65	59	59	58	59	65	59	64	64	65	59	64	62	57	59	59	64	66	69	73	72	71

HOURLY VALUES OF fEs                      AT Wakkanai

JUL. 2023

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	24	31	31	35	55	56	51	53	54	98	90	57	86	55	58	62	113	40	39	33	37
2	G	37	48	35	30	37	48	70	76	90	100	71	55	67	56	59	54	57	38	43	48	25	G	28
3	G	G	G	26	G	38	46	60	53	62	62	71	57	41	52	51		107	103	52	49	34	28	G
4	G	G	26	G	G	31	36	38	62	64	74	55	43	92	48	51	38	37	40	45	54	24	29	26
5	31	33	40	34	G	39	44	50	55	57	57	84	60	94	49	43	39	31	34	43	26	G	G	25
6	G	G	G	G	G	31	36	38	34	51	54	49	N	40	38	47	46	37	44	50	31	33	26	G
7	G	G	G	G	G	36	43	48	47	52	59	64	102	74	70	51	50	66	47		54	41	56	39
8	29	34	32	49	60	55	152	57	62	53	76		112		71	114	90	62	54	40	49	60	113	35
9		29	36	28	42	44	65	75	163	100	69	57	48	56	130	47	44	117	100	124	83	66	25	41
10	G	G	G	G	28	47	81	57	136	135	102	112		60	76	70	103			140	115	127	60	41
11	37	36	40	37	49	43	94			179	179		136		119	86	62	74	118	146	115	106	48	39
12	33	41	34	G	32	59	56	74	56	65	113	98	72	52				95	69	49	38	50	49	28
13	41	107	45	41	72	78		72	58	55	58	55	78		118	50	45	91	43	60	40	108	93	39
14	41	34	41	26	G	25	36	42	51	88	129	108	93	109	106		100	52	75	60	104	70	116	104
15	26	39	34	39	50	56	54	114	90	61	69		127	70	56	136		107	45	77	94	56	107	61
16	32	24	24	27	G	36	153	56	58	69	106	90	50	47	38	59	55	65	62	43	49	56	44	42
17	49	71	48	36	48	32	41	48	60	72	94	74	69	64	96	64	59	44	65	31	33	23	G	G
18	32	G	G	G	26	35	126	48			57	72	38		40	39	39	46	46	29	31	35	G	G
19	28	G	G	G	G	157	46	46	44	39	48	72	70	91	53	50	44	39	38	60	86	82	40	32
20	G	G	G	G	G	38	40	46	44	56	54	60	65	110	59	127	148	136	59	53	48	92	72	49
21	34	36	26	28	30	51	55	54	72	60	65	67	91	62	54	117	85	94		116	124	81	57	45
22	81	60	49	38	41	92	135	116	48	105		114	130	46	90	55	41	66	118	48	76	88	64	92
23	48	59	48	71	47	58	66	40	60	104	84	104	112	128	137	116	112	100	95	45	37	29	54	38
24	40	58	32		G	33	40	53	56	56	80	71	52	52	58	53	36	37	38	37	46	113	107	48
25	56	40	40	G	G	24	41	58	58	83	95	51	54	62	50	62	63	53	70	39	37	32	59	40
26	58	27	G	G	40	35	43	50	55	51	44	75	41	37	36	62	56	65		55		27	39	43
27	45	G	28	G	28	36	42	61	57	60	69	88	53	N	50	45	39	55	30	32	39	54	27	40
28	30	60	29	31	29	38	124		81	106	100	76	62	86	64	128	46	85	64	63	70	71	60	69
29	60	92	93	54	51	32	43	56	69	64	72	54	76	54	52	38	37	38	46	69	69	46	G	43
30	G	G	32	G	G	50	50	117	110	54	41	53	85	92	64	46	106	88		77	58	83	32	25
31	G	29	G	G	26	40	44	61	76	53	65	63	61	66	81	38	70		132	36	38	54	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	30	31	31	30	29	29	30	30	28	29	26	30	29	28	29	27	30	30	31	31	31
MED	32	33	32	26	28	38	46	56	58	62	69	71	69	65	58	55	54	65	59	51	49	54	44	39
U Q	41	41	40	36	42	51	66	65	74	88	95	86	95	91	81	86	77	92	75	69	76	82	60	43
L Q	G	G	G	G	G	33	41	48	54	54	57	56	53	52	50	47	42	45	43	43	38	33	26	26

HOURLY VALUES OF fmin                      AT Wakkanai

JUL. 2023

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	15	15	17	16	15	15	14	16	17	15	15	15	17	15	16	15	14	15	11	15	15	15	15
2	15	16	14	15	15	15	15	16	17	19	17	17	21	16	16	15	16	14	14	14	14	15	16	15
3	14	15	16	15	14	14	14	15	14	44	17	15	19	17	16	15	16	14	13	15	14	15	15	16
4	14	14	15	17	14	15	14	14	15	15	17	20	17	17	20	17	15	15	14	15	16	16	15	16
5	16	16	15	16	17	17	15	16	14	16	15	18	19	17	19	17	16	16	16	15	15	16	14	16
6	16	15	16	16	17	15	13	15	15	16	19	19	20	18	21	17	17	16	15	14	14	15	15	15
7	16	15	17	15	14	17	15	15	15	16	19	18	15	18	18	19	15	13	13	14	16	15	15	14
8	16	15	14	16	14	14	14	15	16	18	14	17	17	18	19	14	14	14	15	15	13	14	18	15
9		16	15	16	14	15	14	13	7	15	15	17	22	16	16	15	13	9	11	17	17	14	15	15
10	16	15	16	16	15	12	15	14	13	18	15	20	19	28	20	16	9	5	15	77	10	15	14	15
11	14	15	15	14	14	16	12	49	5	16	34	15	15	9	17	17	16	15	15	17	7	12	15	14
12	15	16	15	15	16	14	13	15	20	17	19	17	24	22	17	81	25	7	18	15	13	15	15	16
13	15	7	15	15	16	17	15	14	15	17	21	21	18	18	20	17	15	11	13	13	15	15	16	15
14	15	15	15	15	15	15	15	16	18	13	17	12	15	13	17	5	13	13	14	15	15	16	15	10
15	15	15	15	15	15	14	15	17	15	16	19	21	13	18	17	6	33	101	14	14	15	15	15	16
16	16	16	15	16	16	15	13	13	13	14	17	17	18	15	15	16	15	13	14	15	15	15	15	17
17	14	16	15	15	15	16	15	15	15	16	16	15	18	17	16	15	18	15	14	15	15	15	15	14
18	16	17	16	15	15	16	14	14	19		37	19	23	20	20	21	20	14	14	15	15	14	16	15
19	14	14	15	15	15	16	14	15	17	17	18	18	17	23	19	18	17	14	14	14	16	16	15	16
20	15	16	15	16	15	16	15	14	16	17	19	16	17	14	15	7	11	5	15	15	15	16	14	15
21	14	15	15	16	15	13	14	14	15	14	19	16	20	19	16	15	15	17	14	15	5	14	15	15
22	6	14	15	16	15	16	9	12	15	15	19	17	13	55	18	15	15	13	15	15	15	16	15	16
23	15	15	16	15	14	15	15	14	15	17	17	19	21	21	11	17	17	14	15	15	14	15	15	15
24	14	15	15	148	16	15	14	15	15	15	16	18	17	21	22	22	16	15	15	15	14	15	13	15
25	16	14	13	15	14	15	15	14	13	16	19	42	20	15	15	16	16	13	15	15	15	15	15	15
26	17	15	16	16	15	16	14	14	17	17	18	17	19	17	21	18	15	15	14	17	15	15	14	15
27	16	15	15	15	15	16	15	14	19	15	17	19	19	20	21	19	16	13	15	16	14	16	16	15
28	16	15	15	15	15	15	15	16	19	15	17	22	19	18	18	17	16	14	13	15	16	16	15	15
29	14	15	14	14	15	16	15	15	15	16	16	17	15	20	17	14	15	15	13	14	15	15	14	15
30	15	15	16	15	15	14	14	15	19	17	19	23	23	18	16	15	10	14	13	15	15	15	16	16
31	15	15	16	14	14	15	14	17	16	15	16	17	15	21	24	17	15	13	14	15	15	16	14	17
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	15	15	15	15	15	14	15	15	16	17	17	18	18	17	16	15	14	14	15	15	15	15	15
U Q	16	16	16	16	15	16	15	15	17	17	19	19	20	20	20	17	16	15	15	15	15	16	15	16
L Q	14	15	15	15	14	15	14	14	15	15	16	17	15	17	16	15	15	13	14	14	14	15	15	15

HOURLY VALUES OF fof2                      AT Kokubunji

JUL. 2023

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	83	88	79	71	71	72	83	83	73	59	73	82	87	83	80	79	80	81	73	75	74	72	77	80
2	72	<sup>N</sup> 72	72	72	63	71	89	88	76	68	69	71	125	80	110	116	<sup>A</sup>	<sup>A</sup>	85	84	91	92	85	81
3	80	78	72	84	74	72	66	65	151	<sup>A</sup>	<sup>A</sup>	<sup>A</sup>	<sup>A</sup>	<sup>A</sup>	68	<sup>A</sup>	<sup>A</sup>	62	63	63	<sup>A</sup>	<sup>A</sup>	69	69
4	71	73	71	64	63	65	83	89	85	71	69	77	77	84	89	87	88	85	86	84	74	73	73	80
5	77	76	73	73	65	67	78	84	76	73	<sup>A</sup>	68	<sup>A</sup>	68	<sup>A</sup>	70	70	71	71	77	76	141	73	82
6	77	77	76	71	71	73	95	85	71	74	77	86	93	97	92	83	79	<sup>A</sup>	87	85	163	89	85	87
7	88	83	76	70	61	64	68	60	<sup>A</sup>	87	<sup>A</sup>	<sup>A</sup>	<sup>A</sup>	162	<sup>A</sup>	<sup>A</sup>	<sup>A</sup>	<sup>A</sup>	65	70	74	75	71	81
8	71	81	72	72	71	76	71	57	58	56	<sup>A</sup>	<sup>A</sup>	68	62	<sup>A</sup>	<sup>A</sup>	<sup>A</sup>	59	61	59	64	69	69	<sup>A</sup>
9	<sup>A</sup>	<sup>A</sup>	64	59	<sup>A</sup>	64	69	72	89	76	78	<sup>A</sup>	82	86	90	<sup>A</sup>	91	85	81	80	<sup>A</sup>	<sup>A</sup>	81	81
10	<sup>A</sup>	<sup>A</sup>	86	73	84	81	81	89	82	81	85	<sup>A</sup>	76	70	78	71	144	<sup>A</sup>	78	90	80	71	72	72
11	72	72	<sup>A</sup>	74	50	69	72	94	94	96	92	89	88	93	90	86	<sup>A</sup>	95	90	86	<sup>A</sup>	78	80	77
12	76	83	86	83	86	90	87	80	103	<sup>A</sup>	<sup>A</sup>	90	81	77	75	<sup>N</sup>	<sup>A</sup>	68	79	85	80	78	81	72
13	83	84	66	68	<sup>A</sup>	66	82	95	89	78	<sup>A</sup>	151	80	80	86	85	83	80	73	73	75	77	69	72
14	72	79	81	83	72	71	70	81	81	77	85	88	87	88	85	90	89	91	94	87	73	72	72	79
15	77	76	76	72	69	80	90	75	111	148	75	71	75	72	70	69	65	70	<sup>A</sup>	78	81	65	<sup>A</sup>	<sup>A</sup>
16	77	79	85	73	70	68	69	81	88	<sup>A</sup>	<sup>A</sup>	79	<sup>A</sup>	82	80	89	90	91	93	<sup>A</sup>	82	85	87	85
17	81	79	77	71	63	63	69	71	81	74	69	75	75	76	85	85	86	73	69	88	94	82	83	87
18	81	77	73	69	69	65	<sup>A</sup>	<sup>A</sup>	<sup>A</sup>	<sup>A</sup>	<sup>A</sup>	66	78	87	95	97	89	87	86	84	79	75	86	<sup>A</sup>
19	77	81	86	85	70	64	71	86	85	63	76	85	103	107	104	93	90	89	90	89	81	84	85	89
20	88	87	76	74	73	81	87	101	93	84	93	99	103	110	117	111	106	102	100	90	91	88	86	81
21	81	79	79	73	67	56	90	101	189	80	91	95	95	97	<sup>N</sup> 103	105	94	85	84	87	85	90	87	89
22	83	83	79	80	76	84	<sup>A</sup>	90	89	91	<sup>A</sup>	91	<sup>A</sup>	<sup>A</sup>	103	97	96	93	91	85	77	80	82	70
23	300	76	<sup>A</sup>	72	69	65	<sup>A</sup>	80	76	78	84	83	93	89	80	82	78	84	84	86	85	87	81	84
24	68	82	73	77	76	71	78	69	60	73	80	82	83	<sup>A</sup>	94	81	83	139	76	<sup>A</sup>	75	70	83	83
25	71	83	<sup>A</sup>	77	77	80	71	93	108	112	108	<sup>A</sup>	96	94	98	97	89	80	76	73	72	77	83	82
26	71	68	71	70	71	73	93	101	70	80	88	<sup>A</sup>	85	90	85	94	87	88	85	93	85	72	76	71
27	68	68	63	69	72	78	89	99	82	107	239	97	102	94	87	79	73	<sup>A</sup>	72	<sup>A</sup>	<sup>A</sup>	77	80	69
28	72	72	81	72	71	63	147	71	77	67	75	68	71	77	83	<sup>A</sup>	76	74	75	73	77	63	69	75
29	54	77	72	70	72	76	65	75	80	75	87	88	99	95	101	91	87	81	73	67	70	69	72	51
30	66	59	64	59	56	57	82	69	81	86	93	87	91	92	87	85	75	78	66	72	73	<sup>A</sup>	81	<sup>A</sup>
31	69	69	68	64	61	70	81	90	<sup>A</sup>	83	74	85	82	<sup>A</sup>	79	71	<sup>A</sup>	<sup>A</sup>	72	80	73	<sup>A</sup>	73	71
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	28	31	29	31	28	30	28	27	22	25	26	27	28	25	24	25	30	28	27	27	30	27
MED	77	78	74	72	71	71	81	84	82	78	82	85	86	87	87	86	87	84	78	84	77	77	80	80
U Q	81	82	79	74	72	76	88	90	91	86	91	90	95	94	96	95	90	90	86	86	85	85	83	83
L Q	71	72	71	70	64	65	70	72	76	73	75	76	78	77	80	80	78	73	72	73	74	72	72	72



## HOURLY VALUES OF fEs AT Kokubunji

JUL. 2023

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	36	27	25	G	G	G	33	53	59	48	65	52	84	99	43	G	52	59	46	47	89	G	59	92	
2	97	30	59	45	39	44	40	33	47	51	68	71	101	85	93	87	112	131	94	116	116	40	102	40	
3	56	G	G	58	G	33	51	51	195	79	70	60		142	51	134	75	31	35	52	60	73	59	29	
4	23	G	G	G	G	G	28	116	49	61	60	56	65	G	39	47	43	27	68	54	33	39	81	23	
5	G	39	G	G	G	G	37	47	67	G	71	55	88	67	59	55	53	41	78	34	27	71	59	30	
6	59	G	24	G	G	G	33	47	64	75	49	61	77	62	138	78	59	115	67	75	72	91	G	55	
7	69	G	G	27	124	32	59	55	61	79	51	63	72	168		81	182	135	116	60	42	85	69	115	
8	47	71	41	45	71	59	49	57	68	41	52	55	64	59	57	53	69	44	42	37	31	59	92	93	
9	83	72	32	69	88	23	70	56	59	78	75	129	77	77	67	112	35	61	53	152	151	129	70	147	
10	149	110	49	39	30	46	54	67	91	87	96	125	53	73	38	76	115	116	110	G	G	G	91	70	
11	59	106	85	88	44	53	70	91	169	89	65	82	56	G	71	46	109	124	77	64	130	86	65	53	
12	43	57	47	49	39	G	41	53	103	169	173	G	G		78	61	71	92	42	59	62		37	49	45
13	57	55	32	65	91	142	65	52	66	70	84	71	61	58	66	53	67	81	70	43	42	56	59	58	
14	33	91	67	56	47	47	43	56	66	52	51	70	60	G	57	71	75	58	65	47	35	69	56	108	
15	57	G	50	33	G	48	70	47	118	96	56	65	65	48	G	56	54	48	120	63	111	59	116	93	
16	150	89	59	83	84	33	39	59	81	125	241	139	153	65	62	67	55	60	124	104	71	54	43	G	
17	G	G	G	41	G	35	33	31	G	G	37	G	55	G	G	G	G		31	39	G	G	70	56	71
18	39	55	39	35	G	31	59	59	77		77	47	55	53	G	39	54	50	59	35	G	G	73	134	
19	39	39	G	G	40	G	39	44	70	39	45	70	53	G	45	39	45	39	49	37	38	32	107	G	
20	90	59	45	33	G	53	60	55	46	79	47	71	115	78	66	56	37	47	42	70	52	45	34	G	
21	32	43	48	47	G	46	49	64	135	84	120	59	G	57	87	75	113	84	55	61	95	84		70	
22	70	86	72	42	69	106	133	146	112	53	115	87	129	169	93	59	61	76	52	71	30	92	58	59	
23	91	59	82	42	32	39	71	39	49	41	42	G	109	64	56	61	63	59	53	49	35	25		G	
24	G	24	G	G	G	32	38	47	56	70	108	63	69	89	111	56	66	92	63	188	85	60	79	79	
25	69	56	117	59	38	35	49	53	71	61	59	51	39	47	35	G	35	37	G	G	G	G	G	59	
26	57	38	58	29	27	G	46	51	49	64	82	110	80	63	41	52	65	108	61	114	G	G	28	34	
27	54	48	45	74	38	32	49	89	111	109	70	55	58	79	40	57	51	77	83	154	91	59	59	116	
28	54	71	71	58	G	19	31	31	61	70	60	91	G	46	81	154	67	44	47	32	G	G	G	24	
29	G	81	55	44	32	30	46	38	71	70	63	87	77	53	91	83	55	53	39	53	G	71	32	30	
30	39	75	G	G	G	49	35	37	87	42	96	90	39	G	63	37	40	42	38	95	89	145	59	127	
31	85	73	30	28	G	G	38	52	77	50	47	45	53		G	58	76	89	37	57	42	83	38	69	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	31	31	30	31	31	30	30	30	31	31	31	31	31	31	31	31	31	
MED	56	55	45	42	30	33	46	53	68	70	65	63	64	62	58	57	61	59	59	57	42	59	59	59	
U Q	70	73	59	58	44	47	59	59	91	79	84	87	80	78	71	76	75	89	77	75	89	83	73	93	
L Q	36	27	G	27	G	G	38	47	59	50	51	55	53	47	40	47	51	42	42	37	G	32	34	30	

HOURLY VALUES OF fmin AT Kokubunji  
 JUL. 2023  
 LAT. 35°43.0'N LON. 139°29.0'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	17	16	16	17	17	15	17	19	23	26	29	39	38	35	41	29	26	21	17	16	16	11	16	16
2	17	16	16	17	16	18	19	19	23	37	34	41	42	41	37	32	23	20	19	17	17	16	17	16
3	16	16	16	17	16	15	16	15	29	46	37	35		36	35	25	26	18	15	16	17	17	17	16
4	17	16	16	17	16	17	17	19	24	39	39	40	59	54	35	32	24	17	16	16	17	17	17	17
5	17	17	17	16	16	17	18	19	28	47	27	41	38	36	32	33	22	17	15	17	16	16	17	17
6	17	17	16	15	17	17	16	18	24	27	43	39	41	42	41	34	35	25	16	17	17	17	17	16
7	17	17	17	17	17	17	17	21	24	36	36	40	36	33		30	29	17	15	16	16	17	17	17
8	16	17	17	15	17	15	17	18	21	25	32	42	58	53	23	27	19	18	17	16	16	17	17	17
9	17	17	16	16	16	16	17	18	18	32	31	40	33	26	27	22	22	18	17	11	17	16	17	16
10	17	17	15	16	16	17	20	23	25	29	33	20	33	67	33	29	19	18	17	17	17	17	17	17
11	17	16	17	16	16	15	18	21	25	32	42	43	34	62	33	29	27	18	17	16	17	17	17	16
12	16	17	16	16	16	16	17	17	33	34	36	46	60	44	37	34	20	21	26	16	20	17	17	17
13	16	17	16	16	17	15	19	20	26	30	35	36	35	46	34	24	21	17	17	17	17	17	18	17
14	17	16	16	16	16	16	17	21	24	27	34	34	41	25	34	30	30	19	17	16	17	17	17	16
15	16	16	16	16	16	17	18	18	27	22	41	59	44	43	55	34	23	23	15	16	17	17	17	17
16	17	17	16	16	16	15	17	21	23	28	32	29	35	32	42	23	23	17	16	16	17	17	17	16
17	15	19	17	17	17	16	18	23	25	30	35	31	35	59	57	33	24	17	16	15	19	16	17	17
18	17	16	15	16	17	15	18	23	41		45	44	37	36	36	34	26	17	17	17	30	18	17	17
19	17	16	16	16	17	15	17	20	26	29	26	64	35	62	23	21	20	17	15	17	17	17	16	21
20	17	16	16	15	17	17	17	19	26	28	31	33	35	27	30	34	29	18	17	16	16	17	16	63
21	17	15	16	16	16	16	16	18	23	34	29	34	36	31	33	22	20	15	17	17	17	16	37	16
22	16	16	15	17	15	16	15	25	29	29	31	37	31	42	37	28	27	21	16	15	15	17	17	16
23	17	17	16	15	15	16	15	19	24	27	32	63	30	31	43	32	20	18	17	17	16	16	42	40
24	67	16	17	16	16	16	17	18	23	29	34	41	33	33	34	27	27	24	16	16	16	17	17	16
25	17	17	16	17	17	17	17	18	27	30	29	44	33	31	23	19	29	15	16	33	17	39	35	17
26	17	17	15	16	16	17	15	20	21	29	34	34	35	35	34	27	22	17	17	14	16	19	16	16
27	16	17	16	16	17	16	17	19	30	34	33	33	34	33	33	17	21	20	17	16	16	17	16	16
28	17	16	17	16	16	18	19	26	29	33	35	43	67	36	41	35	29	19	17	15	38	20	48	17
29	16	16	16	16	16	16	18	19	25	29	31	36	33	34	33	34	24	18	17	16	16	17	17	16
30	16	16	19	16	16	16	18	23	23	31	33	33	32	74	42	29	24	20	18	16	17	17	17	17
31	17	16	15	16	16	16	16	17	22	30	31	44	34		33	35	23	17	19	16	16	17	16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	30	31	31	30	30	30	31	31	31	31	31	31	31	31	31
MED	17	16	16	16	16	16	17	19	25	30	33	40	35	36	34	29	24	18	17	16	17	17	17	17
U Q	17	17	17	17	17	17	18	21	27	34	36	43	41	46	41	34	27	20	17	17	17	17	17	17
L Q	16	16	16	16	16	15	17	18	23	28	31	34	33	33	33	25	21	17	16	16	16	17	17	16

HOURLY VALUES OF foF2 AT Yamagawa

JUL. 2023

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	91	97	79	81	73	73	72	78	73	A	A	88	93	88	94	94	93	82	79	78	79	72	79	87
2	85	81	77	68	67	66	73	86	70	69	72	A	127	86	A	A	83	91	95	95	A	79	84	91
3	95	92	91	94	88	77	75	67	65	A	111	A	A	72	69	A	A	A	A	A	A	69	A	65
4	59	77	71	75	64	61	75	81	73	A	70	77	82	88	98	97	96	97	88	76	71	72	77	81
5	83	75	95	87	61	56	65	83	82	75	77	81	87	92	95	94	89	85	91	89	93	73	79	72
6	91	84	89	80	73	73	78	72	69	A	72	82	95	92	88	89	90	88	93	94	83	89	85	85
7	97	82	80	74	69	62	72	66	65	A	A	A	A	74	A	A	A	61	69	A	72	69	73	A
8	74	A	78	78	58	68	66	57	A	A	61	65	A	A	50	66	A	A	61	58	A	66	67	62
9	61	63	59	57	61	54	65	82	72	67	75	A	89	86	A	100	93	92	89	89	83	83	85	83
10	83	81	85	88	79	76	71	70	81	75	84	75	A	79	87	88	81	84	A	92	68	A	76	79
11	84	83	81	81	78	67	61	74	92	87	88	82	84	86	93	99	101	92	92	86	89	81	81	85
12	76	82	84	79	79	73	64	60	72	A	A	89	81	77	83	84	78	78	87	82	87	67	81	81
13	86	84	80	85	78	72	72	84	88	73	74	83	91	93	88	83	79	77	80	83	79	74	75	81
14	81	85	85	91	77	71	69	73	81	83	87	85	91	83	91	95	96	102	109	93	72	76	80	79
15	75	78	81	75	65	67	79	71	70	74	79	87	84	80	80	78	75	79	82	82	79	68	73	A
16	74	81	82	70	60	61	69	76	81	76	A	81	A	A	90	90	95	96	103	99	93	93	89	87
17	97	101	99	93	77	70	69	72	72	79	77	81	84	79	87	95	88	85	82	87	98	87	81	85
18	88	74	75	75	70	62	76	64	64	A	141	A	A	88	99	95	90	86	84	81	79	71	75	75
19	A	76	95	83	67	63	62	82	73	68	74	86	95	95	105	111	102	102	111	92	86	84	90	90
20	86	81	79	67	73	72	80	84	73	78	92	93	103	111	115	122	121	120	109	105	97	95	99	97
21	93	88	83	75	58	62	79	86	73	A	81	85	99	107	112	114	109	85	85	76	86	84	88	93
22	88	87	84	83	77	83	79	84	90	85	81	83	94	115	102	96	115	102	103	94	79	77	78	81
23	80	82	83	75	74	77	71	73	64	80	61	83	97	86	93	93	91	95	103	92	92	89	92	93
24	89	81	81	81	84	78	80	72	78	80	71	77	83	97	103	99	101	95	91	76	65	73	80	83
25	69	73	83	67	68	67	83	96	92	107	91	89	83	95	100	102	103	89	79	79	81	83	97	95
26	79	81	76	75	80	82	101	86	74	83	79	71	88	97	A	93	94	A	98	93	78	81	A	81
27	79	73	74	71	77	75	77	95	A	99	98	109	116	114	111	117	107	96	86	81	81	78	82	80
28	A	89	74	70	69	78	79	75	82	81	62	74	82	88	95	90	90	89	87	87	83	78	83	87
29	81	82	79	75	75	77	77	79	91	88	88	96	103	114	116	111	109	91	A	77	73	72	78	79
30	56	77	75	72	62	57	64	73	86	98	91	99	109	115	113	100	89	A	84	83	75	68	71	68
31	84	91	73	71	64	64	60	80	81	93	93	94	97	99	94	90	88	88	87	95	83	67	75	80
	00	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	31	31	31	31	31	31	29	22	27	26	25	29	27	28	28	27	28	29	28	30	29	29
MED	83	82	81	75	73	70	72	76	73	80	79	83	91	88	94	95	93	89	88	87	81	76	80	81
U Q	88	85	84	83	77	76	79	84	82	87	91	89	98	98	103	100	101	96	96	93	86	83	85	87
L Q	75	77	76	71	64	62	66	72	71	75	72	81	84	84	88	90	88	85	83	80	76	71	75	79

# HOURLY VALUES OF fEs AT Yamagawa

JUL. 2023

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

$\begin{smallmatrix} \text{H} \\ \text{D} \end{smallmatrix}$	00	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	26	32	44	36	48	59	70	52	71	72	56	75	41	66	72	78	148	57	52	38	38	39	41			
2	41	59	34	24	24	G	33	44	50	52	56	79	125	128	82	113		55	41	43	116	48	60	54			
3	41	32	31	24	34	66	61	47	50	72	107	106	69	64	56	110	109	81	60	70	67	38	84	57			
4	49	G	39	41	34	31	26	42	67	90	67	75	77	106	46	44	42	53	38	49	41	52	37	34			
5	60	73	28	25	28	28	40	72	52	50	60	59	90	55	44	44	44	42	50	30	G	G	G	39			
6	G	G	G	G	G		53	32	55	61	90	112	72	51	46	44	60	106	44	71	60	72	49	37	58		
7	47	46	54	54	30	29	39	45	48	61	112	66	53	116	73	65	65	51	49	87	38	56	29	70			
8	50	90	50	56	41	25	36	49	87	60	70	60	90	53	112	52	94	72	54	50	73	72	56	69			
9	43	56	24	49	33	31	39	43	56	52	96	110	57	59	93	56	41	49		116	145	G	49	27			
10	24	31	26	G	28	G	61	41	73	64	174	124	128	G	G		53	84	65	180	130	83	81	49	39		
11	30	41	58	39	35	35	36	53	56	53	60	48	53	56	42	39	34	33	41	33	26	24	36	60			
12	40	48	50	35	33	44	32	54	64	114	112	60	G	49	72	70	61	47	47	39	70	49	32	85			
13	69	90	40	56	56	58	72	70	77	75	59	53	82	92	106	46	71	73	56	53	N	34	39	35			
14	38	56	58	48	41	38	53	54	50	52	57	60	54	58	34	73	74	62	92	52	31	G	G	32			
15	25	33	55	57	55	G	28	41	72	60	47	62	46	G		66	65	66	64	42	60	49	54	55	88		
16	82	58	57	72	40	39	32	57	73	79	97	152	164	133	110	79	68	71	93	42	30	36	70	49			
17	60	46	50	43	40	36	37	44	35	34	39	59	53	54	88	36	38	54	59	G	G	G	G	38			
18	35	G	G	G	G		35	64	49	46	49	139	92	101	54	59	46	38	40	30	31	32	G	49	53		
19	72	59	32	39	46	44	47	59	50	53	44	61	69	76	64	84	71	55	42	35	48	46	39	26			
20	39	40	56	36	32	33	40	45	72	72	50	64	56	63	69	58	100		82	65	34	G	G	G			
21	G	G		32	25	G	G		56	56	124	53	41	57	40	38	50	36	61	50	42	66	74	58	30		
22	47	58	59	40	35	40	39	49	72	77	56	44	86	68	86	82	64	49	54	58	40	60	34	60			
23	49	48	31	61	28	41	28	45	45	44	56	50	119	39	45	56	55	62	45	39	40	45	59	33			
24	28	G	G		34	33	26	32	49	49	54	70	97	52	95	65	46	45	45	50	G	G	G	25	35		
25	48	57	G	G		58	57	30	59	57	44	46	G	56	71	65	53	42	41	34	G	G		27	26	26	
26	24	G		28	33	G	G		40	37	43	51	39	50	G		86	143	70	82	112	57	63	153	59	150	46
27	24	35	G		44	38	25	36	156	127	83	70	60	51	59	62	78	47	40	41	G	G	G	29	G	37	
28	54	47	55	49	50	G		23	50	41	53	56	49	58	53	60	46	50	59	55	37	40	32	28	G		
29	26	28	28	31	G	G		36	67	69	66	146	74	58	122	77	64	88	89	124	38	52	G	49	34		
30	35	G		33	25	38	G		40	60	48	46	66	53	46	46	54	96	122	48	32	40	27	31	57		
31	38	45	58	46	29	45	G		53	44	48	36	41	50	56	36	38	43	44	70	G	G	G	G	39		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	30	31	30	31	31	31	31		
MED	40	45	33	39	34	33	36	49	56	60	60	60	57	58	65	56	64	55	52	42	40	36	37	39			
U Q	49	57	55	49	40	44	40	57	72	75	97	75	86	86	82	72	82	71	60	60	67	52	55	57			
L Q	28	26	28	25	28	G	30	44	49	51	50	50	53	49	45	46	43	45	42	32	30	G	26	33			

HOURLY VALUES OF fmin AT Yamagawa

JUL.2023

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

$\begin{matrix} H \\ \diagdown \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	16	15	15	15	16	15	15	17	15	17	15	14	21	19	20	15	13	5	15	14	15	16	16	15
2	15	15	16	15	16	14	15	16	19	20	19	17	23	20	22	13	5	15	15	15	15	16	15	15
3	15	15	15	15	16	15	15	16	17	21	22	26	26	18	20	20	21	18	15	15	16	15	15	16
4	15	14	15	16	15	16	15	16	15	19	22	18	19	25	23	24	17	14	15	15	15	15	15	16
5	15	16	15	15	16	16	15	16	17	20	21	22	21	20	19	18	18	18	15	15	14	16	14	19
6	15	16	15	15	16	15	15	15	15	11	20	21	23	47	22	21	17	16	15	15	14	15	15	16
7	15	15	16	15	16	15	18	15	18	19	19	20	38	26	17	18	21	17	16	14	14	15	15	15
8	15	15	15	15	15	15	17	15	16	19	21	22	21	20	24	17	19	15	14	16	16	15	15	15
9	15	16	16	15	15	16	15	15	15	21	18	22	21	20	23	18	16	17	10	7	15	16	15	15
10	15	16	16	16	15	15	15	17	16	17	21	25	26	62	56	32	17	15	15	15	15	15	15	15
11	16	16	16	15	15	16	15	16	17	20	20	20	24	40	40	56	17	16	15	15	15	17	15	15
12	15	15	15	16	15	15	17	14	19	23	22	16	54	42	23	19	17	17	22	15	15	15	15	15
13	15	15	15	16	15	15	16	18	19	20	19	19	26	25	21	21	18	17	14	15	14	16	15	15
14	15	15	14	15	15	15	15	16	17	20	17	22	23	21	20	16	21	16	13	15	16	20	15	16
15	16	16	16	15	15	15	15	15	17	23	20	19	52	49	39	20	18	19	15	15	15	15	15	16
16	16	15	15	16	15	15	16	15	18	20	21	19	68	26	22	19	17	16	17	15	16	15	16	15
17	15	15	14	15	15	15	14	16	20	22	20	39	21	40	21	22	21	16	16	14	14	14	16	17
18	14	16	15	14	16	15	15	15	23	42	28	19	27	26	23	23	19	17	16	15	16	17	15	15
19	17	17	15	15	15	16	15	15	17	19	22	20	18	19	17	19	17	15	14	16	14	15	15	16
20	16	16	16	15	16	15	15	15	17	19	22	18	23	21	19	20	13	17	17	17	16	15	14	15
21	14	14	15	16	17	14	15	15	17	19	19	42	19	32	20	19	17	17	14	14	16	15	16	16
22	15	15	17	15	16	14	15	15	18	18	21	21	20	14	19	19	17	19	15	16	15	16	15	15
23	15	15	16	15	15	15	15	15	16	19	20	19	21	32	42	19	17	16	15	15	15	15	15	16
24	15	17	15	15	15	16	16	17	19	19	20	19	18	26	27	33	19	19	19	14	14	18	16	15
25	16	16	15	16	17	15	16	15	18	15	22	42	23	22	19	16	17	15	15	15	14	16	15	15
26	16	15	16	16	16	15	16	15	17	18	18	43	48	26	23	23	20	11	15	16	16	16	14	15
27	16	16	16	16	15	15	15	15	7	19	21	24	21	24	21	21	19	16	14	15	15	16	15	15
28	14	15	15	15	15	15	16	16	18	22	21	38	19	23	21	21	19	21	16	15	15	16	16	16
29	15	16	16	15	16	15	16	15	15	19	5	21	22	18	17	19	16	16	15	16	16	16	15	15
30	15	15	16	15	15	21	23	14	17	17	20	20	21	60	42	21	18	20	14	15	15	16	15	14
31	16	15	15	15	16	15	15	13	14	16	17	20	21	21	21	20	15	17	16	14	14	15	21	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	15	15	15	15	15	15	15	17	19	20	20	22	25	21	20	17	16	15	15	15	16	15	15
U Q	16	16	16	16	16	15	16	16	18	20	21	24	26	32	23	21	19	17	16	15	16	16	15	16
L Q	15	15	15	15	15	15	15	15	16	18	19	19	21	20	20	18	17	15	14	15	14	15	15	15

**HOURLY VALUES OF fof2                  AT Okinawa**  
**JUL.2023**  
**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	81	82	86	80	65	67	74	77	69	A	81	87	97	105	111	107	96	A	85	92	84	81	83	79
2	87	91	86	77	69	66	77	79	71	59	74	85	92	87	A	119	91	A	107	112	93	73	83	88
3	84	87	81	84	69	69	64	73	A	69	69	A	A	A	A	A	A	A	60	A	60	65	A	62
4	63	A	60	65	63	63	62	72	69	57	A	A	88	93	A	A	119	105	88	76	77	70	78	81
5	80	87	81	61	68	60	72	A	78	73	A	A	56	A	A	98	88	101	112	111	90	75	80	83
6	85	89	90	79	74	71	77	70	63	74	71	86	96	99	102	99	93	87	A	103	94	A	84	89
7	86	94	85	79	70	61	59	70	A	A	A	A	A	A	69	52	63	69	81	75	69	69	71	76
8	72	61	54	A	61	58	57	A	A	A	55	54	69	76	71	72	73	69	68	68	A	A	61	64
9	67	61	60	63	59	55	68	A	A	A	79	80	91	105	103	110	111	107	112	101	89	A	84	85
10	86	91	95	92	82	69	68	78	78	77	A	A	77	84	93	95	93	A	109	84	69	73	78	85
11	84	81	82	75	71	63	60	75	87	86	73	87	90	85	91	105	97	105	105	100	87	83	81	85
12	83	78	82	74	71	69	62	75	78	79	85	81	81	85	90	89	90	91	87	91	85	78	75	87
13	83	82	82	77	74	59	61	85	83	67	74	83	101	93	86	84	82	85	89	98	71	77	80	83
14	82	80	87	79	76	A	63	75	77	85	A	82	89	A	95	101	109	114	114	87	A	A	76	80
15	81	80	77	78	67	61	67	71	72	75	83	92	97	90	95	99	92	90	90	96	73	A	73	73
16	64	78	86	72	67	56	61	83	76	79	80	A	91	A	99	99	101	101	111	114	109	97	109	117
17	136	133	127	115	102	88	69	A	A	89	84	84	93	93	99	104	100	104	105	102	103	79	83	87
18	92	79	77	76	77	58	60	66	77	55	A	75	80	97	109	117	114	110	109	96	90	85	81	80
19	89	97	95	89	67	58	67	69	73	71	57	86	95	98	108	117	117	123	114	97	85	87	89	90
20	86	95	87	79	73	75	77	76	76	82	A	95	103	116	122	A	136	138	157	147	125	114	133	131
21	114	113	95	74	73	57	72	93	65	74	77	85	100	113	118	120	111	107	95	86	85	92	85	93
22	97	102	95	88	93	82	74	85	89	89	A	82	A	120	118	106	128	137	121	100	91	87	83	86
23	81	89	95	76	73	75	91	A	82	66	77	93	102	103	107	115	120	124	122	101	97	100	103	96
24	93	99	101	97	100	87	82	80	99	85	59	89	91	104	119	124	135	139	122	95	82	79	87	83
25	67	71	70	69	69	63	75	85	83	89	80	75	83	99	106	106	106	102	97	97	95	101	109	91
26	83	83	79	82	83	93	106	63	73	87	91	79	93	106	93	100	110	108	109	100	95	87	72	A
27	79	78	73	74	77	72	72	93	86	67	85	107	111	123	128	140	151	124	107	107	103	91	87	99
28	100	107	104	83	63	64	82	96	73	79	74	61	91	103	96	101	110	A	105	92	84	82	91	92
29	87	83	85	77	75	69	77	88	96	83	88	97	112	126	134	140	133	123	110	97	A	91	89	82
30	80	84	84	90	72	56	55	69	92	89	80	103	122	130	133	125	112	98	109	100	85	73	73	71
31	64	91	77	65	59	56	56	74	82	83	89	90	98	105	104	99	105	97	103	95	81	70	73	73
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	30	31	30	31	26	26	28	23	25	28	26	27	28	30	26	30	29	28	27	29	30
MED	83	86	85	78	71	64	68	76	78	78	79	85	92	101	103	104	108	105	107	97	86	81	83	85
U Q	87	94	95	83	76	71	77	85	83	85	84	91	99	106	118	117	117	123	112	101	94	91	88	90
L Q	80	80	77	74	67	58	61	71	73	68	73	80	88	93	93	99	93	97	90	92	81	73	77	80

## HOURLY VALUES OF fEs AT Okinawa

JUL. 2023

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

$\begin{matrix} \text{H} \\ \text{D} \end{matrix}$	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	88	40	36	35	25	26	48	47	55	84	74	62	55	55	56	82	92	132	62	49	32	G	35	32
2	55	30	G	G	G	G	31	39	48	93	67	92	88	76	182	123	54	134	115	37	93	36	58	46
3	55	41	45	28	25	G	30	44	124	63	71	115	116	105	105	96	104	110	90	154		87	176	31
4	49	59	33	40	49	G	28	40	64	56	113	78	54	67	166	160	124	72	76	56	38	60	40	55
5	28	45	38	47	48	30	30	162	179	116	127	112	147	164	175	108	116	46	33	32	48	45	G	G
6	G	37	26	38	41	58	34	46	83	46	62	64	62	54	66	56	76	48	96	52	60	133	92	26
7	48	65	40	46	32	53	35	54	94	93	96	92	116	87	52	38	52	38	44	38	46	G	G	G
8	32	48	38	60	45	28	45	83	94	94	148	56	58	72	46	44	45	74	63	70	115	92	114	48
9	43	113	48	50	93	44	38	151	96	104	64	60	65	90	63	57	66	62	83	45	31	163	116	107
10	G	26	32	28	25	G	29	54	104	117	148	161		G	G	166	54	133	151	125	45	59	G	G
11	46	48	34	38	26	43	127	36	48	52	89	53	56	65	50	39	37	40	35	G	G	G	G	G
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13	41	60	56	60	36	40	92	70	92	64	66	68	85	76	47	72	53	48	42	86	27	24	28	G
14	G	56	38	53	126	111	54	66	69	64	104	64	57	97	78	70	79	57	53	53	167	151	25	24
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18	G	92	34	G	G	28	30	59	50	B	84	47	53	48	60	76	46	39	36	26	59	G	G	G
19	G	G	G	G	G	G	G	32	41	41	50	72	67	60	76	92	74	54	41	56	41	G	G	57
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21	28	39	24	28	30	G	25	36	50	91	46	46	51	59	38	56	49	49	38	28	41	G	G	40
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26	G	G	G	G	G	G	G	40	49	56	43	92	56	47	56	62	57	55	39	30	G	G	59	60
27	G	G	G	G	G	G	G	58	62	46	80	56	50	51	63	45	96	42	37	G	G	G	G	G
28	G	G	G	31	G	30	G	52	115	66	87	56	77	53	48	53	52	141	117	108	33	28	35	G
29	G	G	29	G	G	G	G	32	50	80	106	72	96	52	84	90	93	92	55	74	92	33	G	30
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CNT	31	31	31	31	31	31	31	31	31	30	31	31	30	31	31	31	31	31	31	31	30	31	31	31
MED	33	40	34	29	28	26	30	47	58	64	67	62	60	62	56	63	55	50	51	37	38	27	28	29
U Q	48	55	44	45	45	40	45	59	94	91	104	79	77	86	71	90	79	74	83	56	51	59	57	40
L Q	G	30	24	G	G	G	25	39	48	49	50	49	54	51	50	53	49	46	39	28	25	G	G	G

HOURLY VALUES OF fmin AT Okinawa

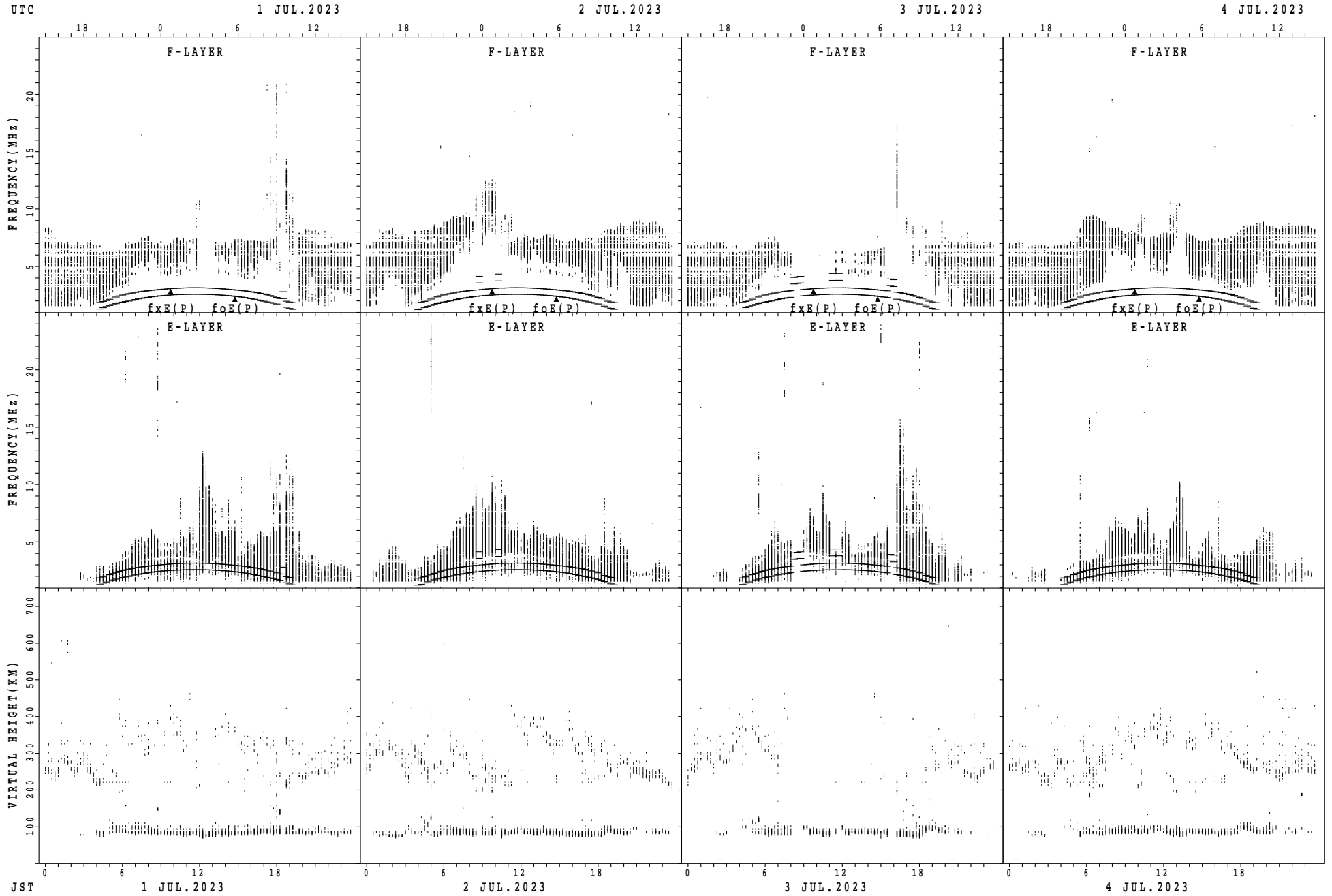
JUL. 2023

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

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H	D																											
D	H																											
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U Q	16	16	16	16	15	16	16	16	17	18	19	19	19	27	30	19	18	17	16	15	16	16	16	17				
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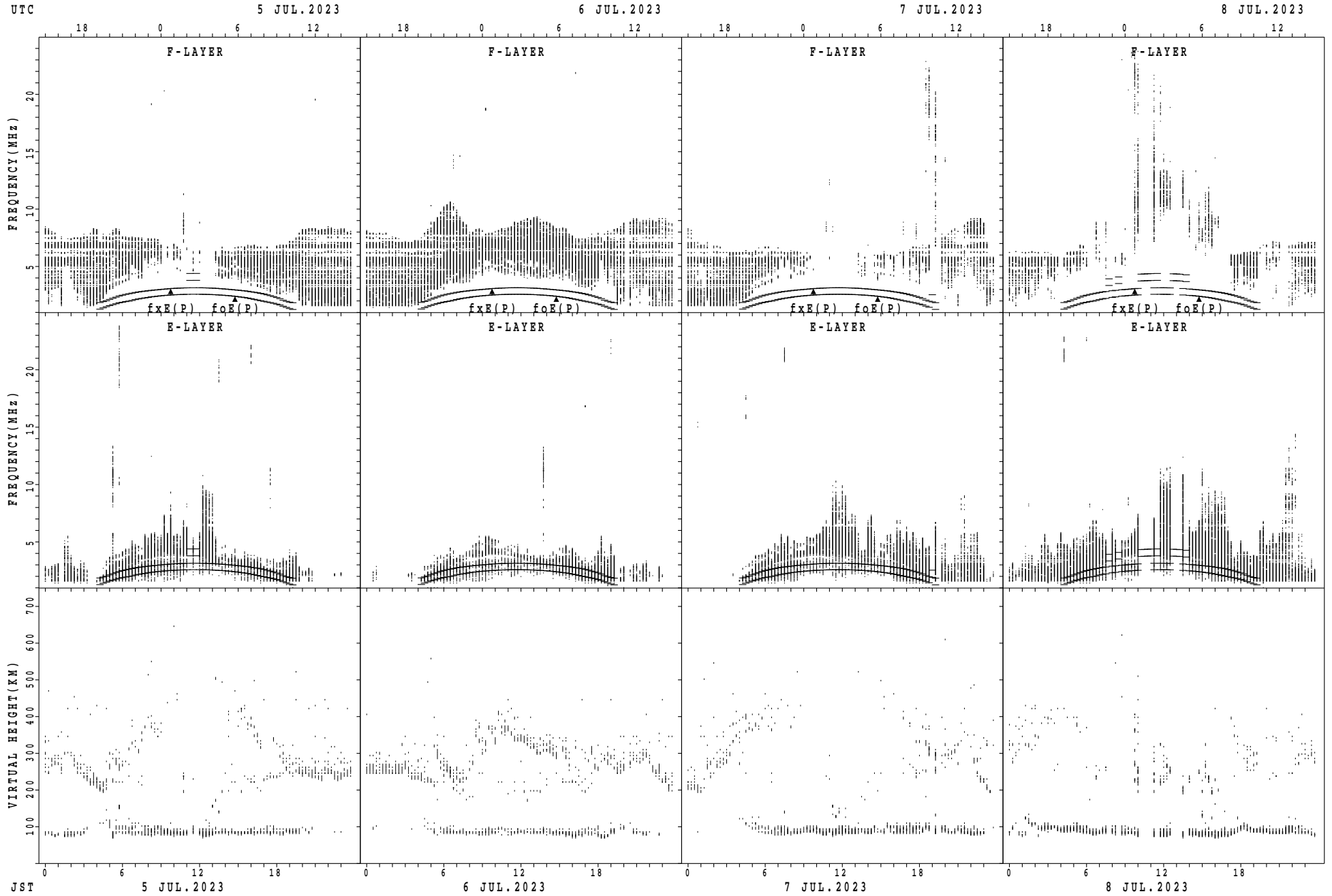


# SUMMARY PLOTS AT Wakkanai



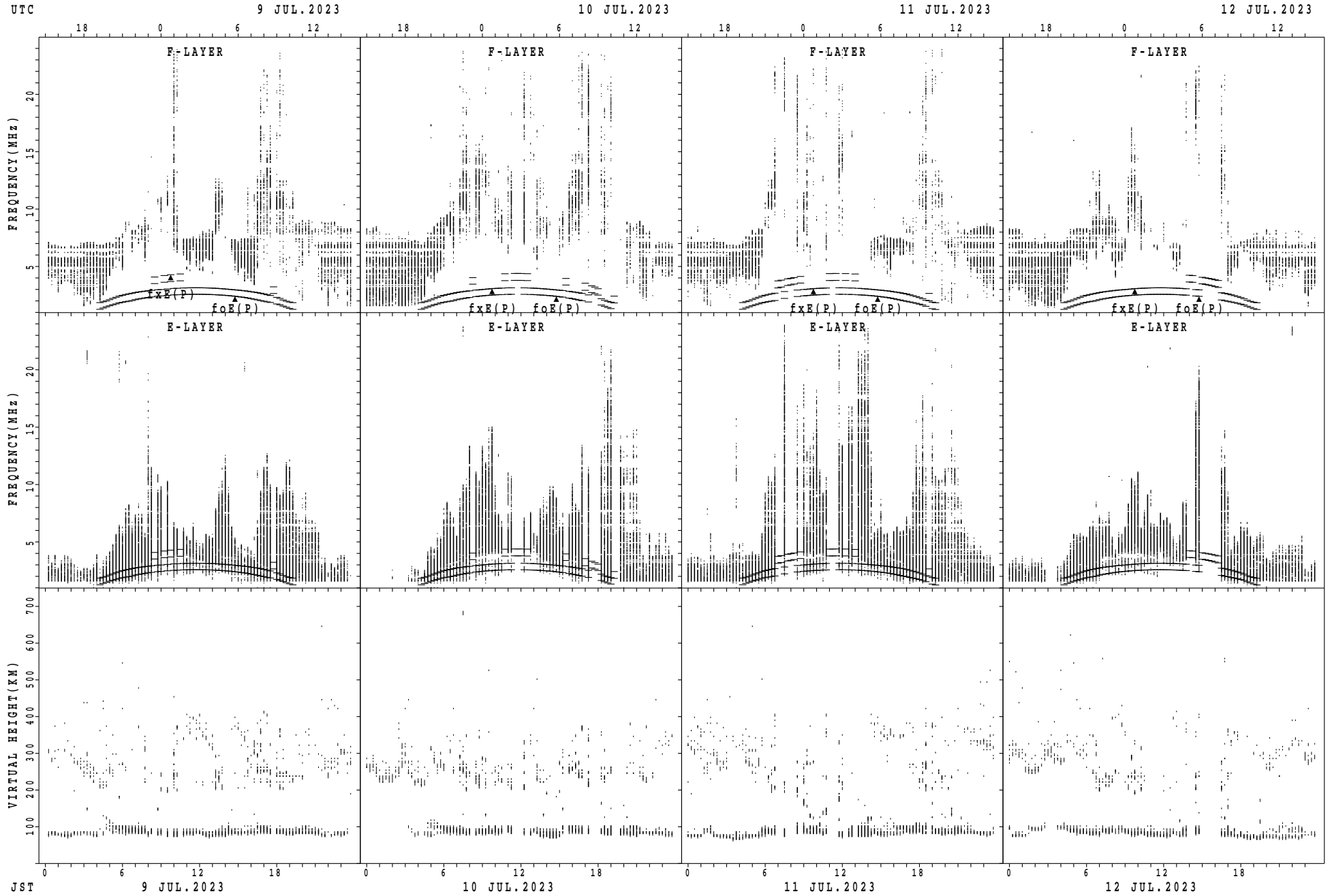
$f_{xE}(P)$ ; PREDICTED VALUE FOR  $f_{xE}$   
 $f_{oE}(P)$ ; PREDICTED VALUE FOR  $f_{oE}$

SUMMARY PLOTS AT Wakkanai



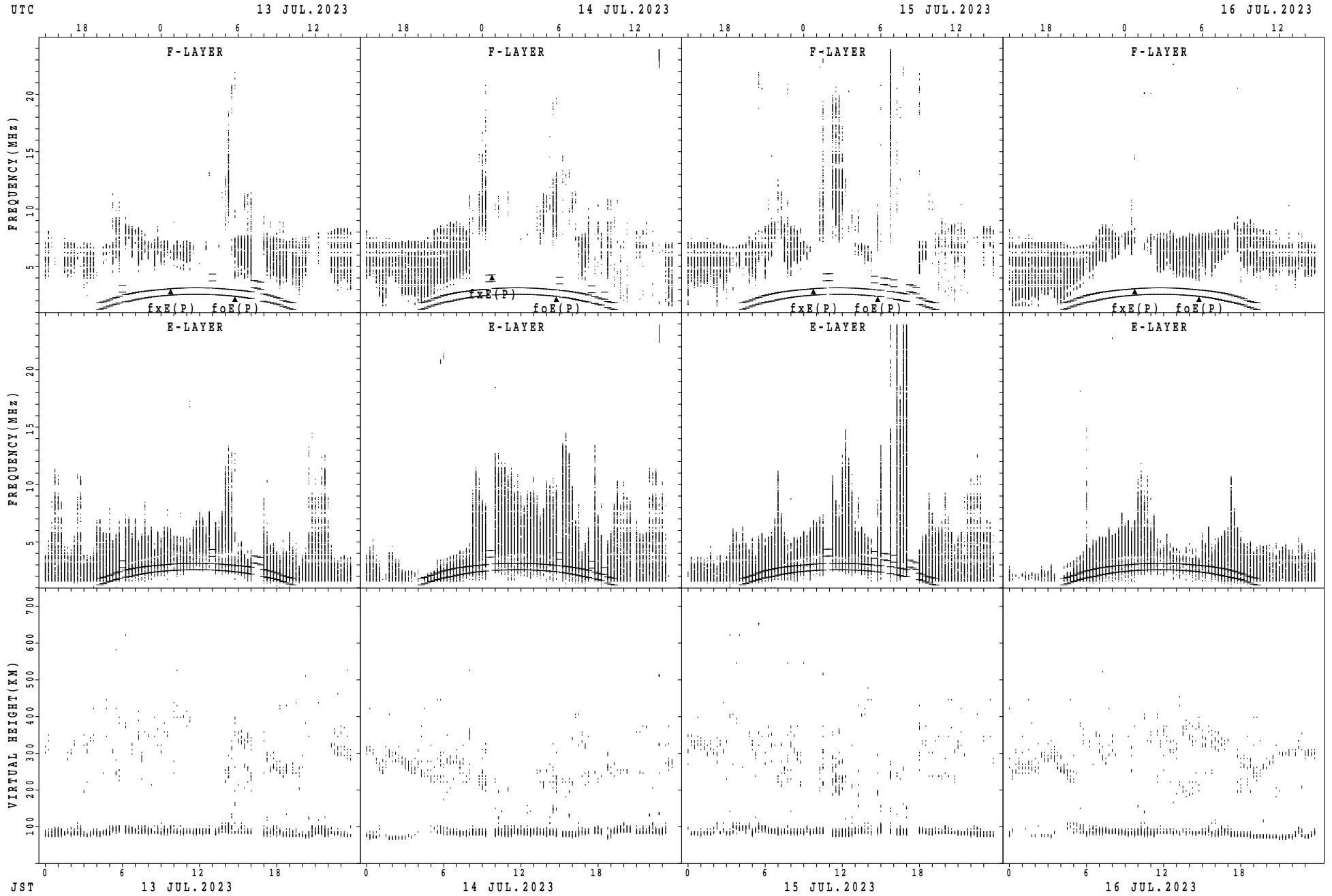
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 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

# SUMMARY PLOTS AT Wakkanai



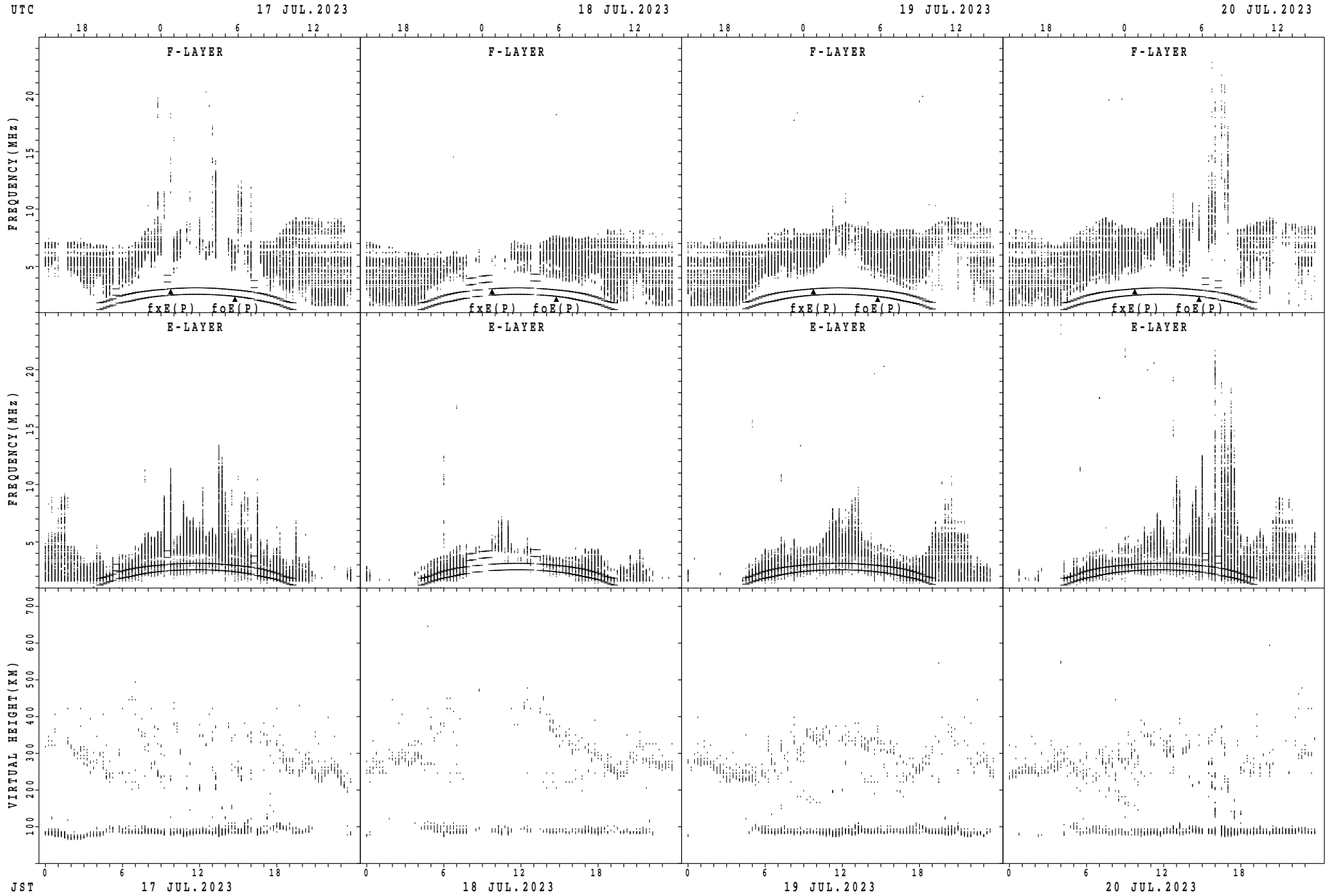
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 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

# SUMMARY PLOTS AT Wakkanai



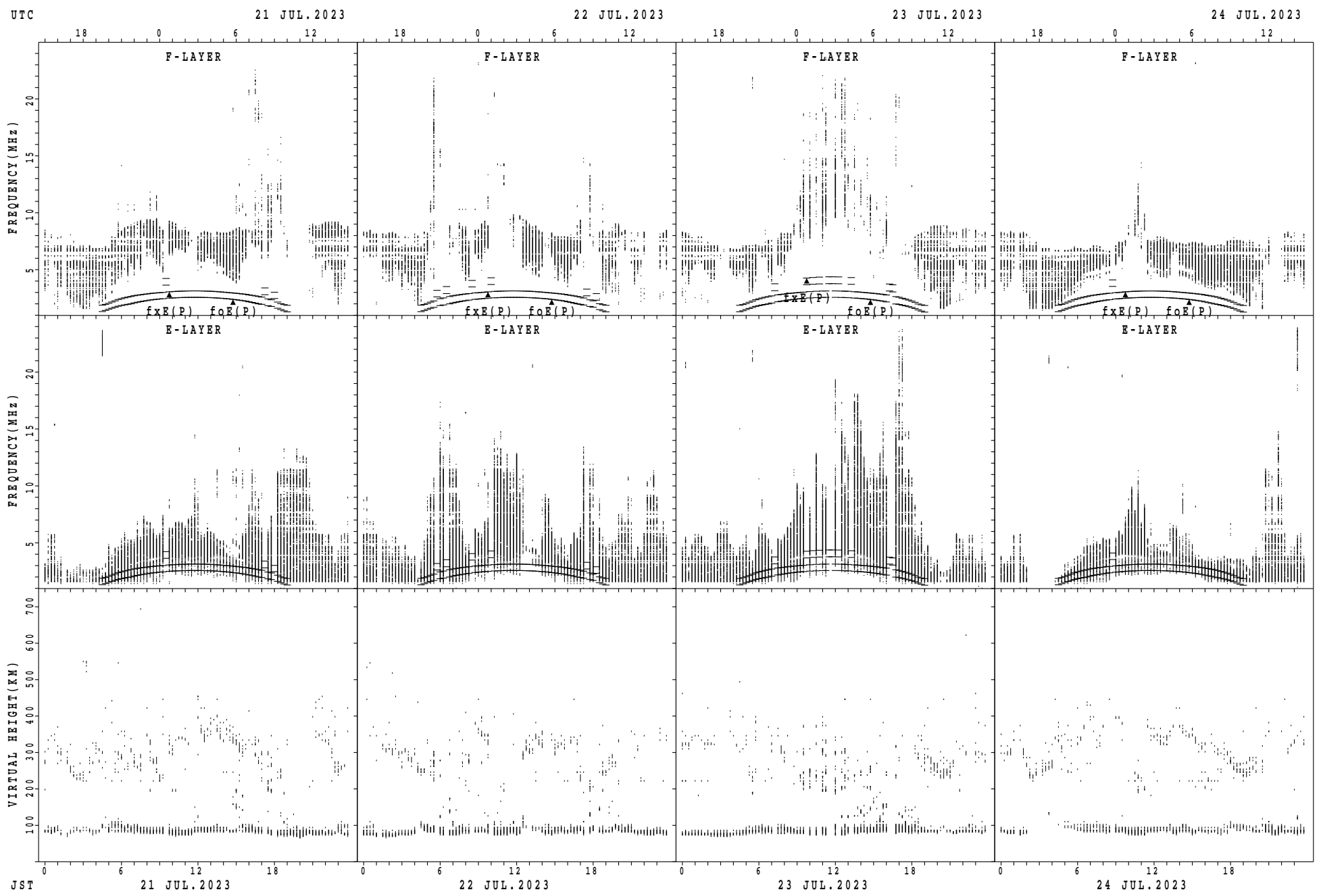
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foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



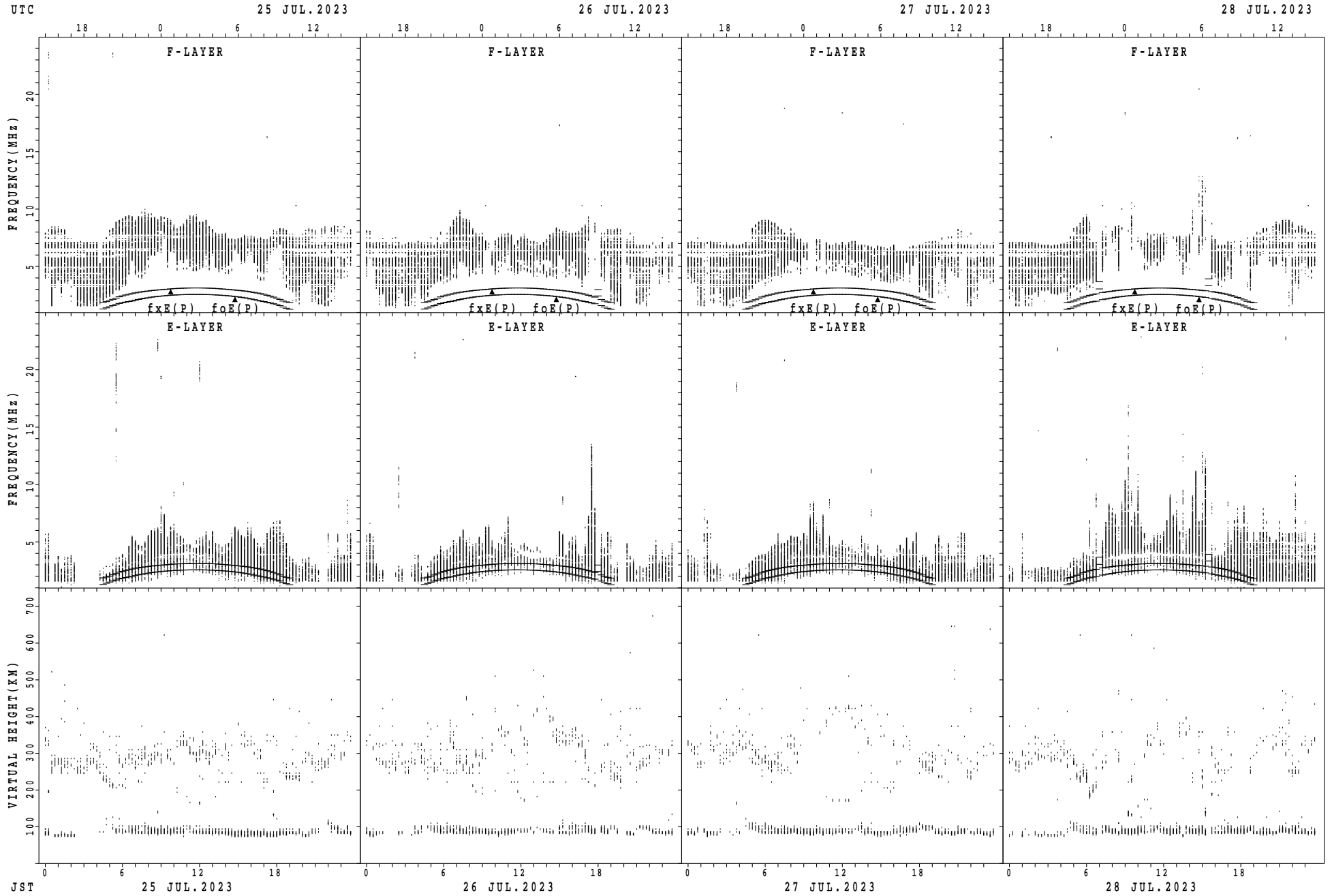
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foE(P); PREDICTED VALUE FOR foE

# SUMMARY PLOTS AT Wakkanai



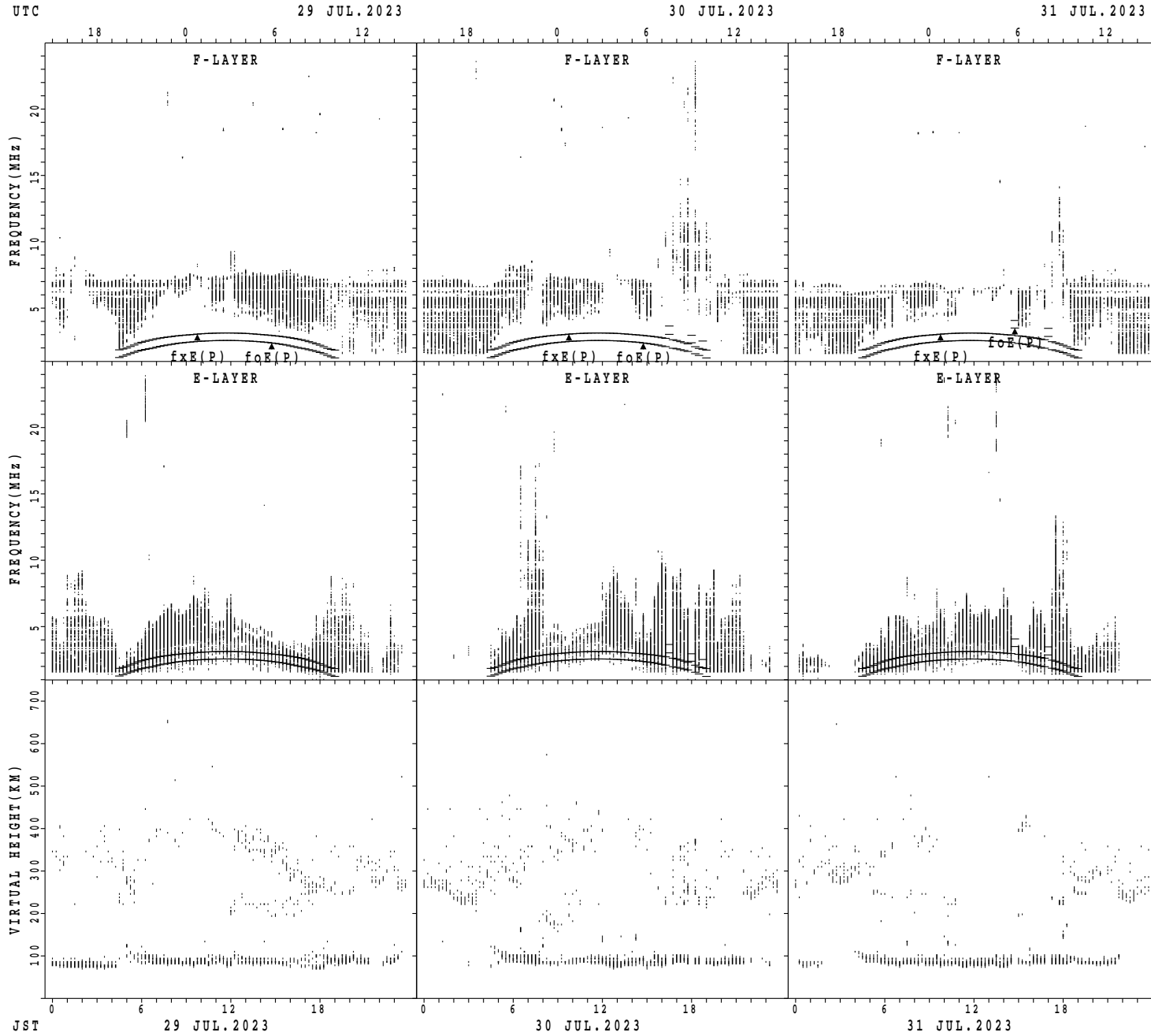
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 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Wakkanai



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

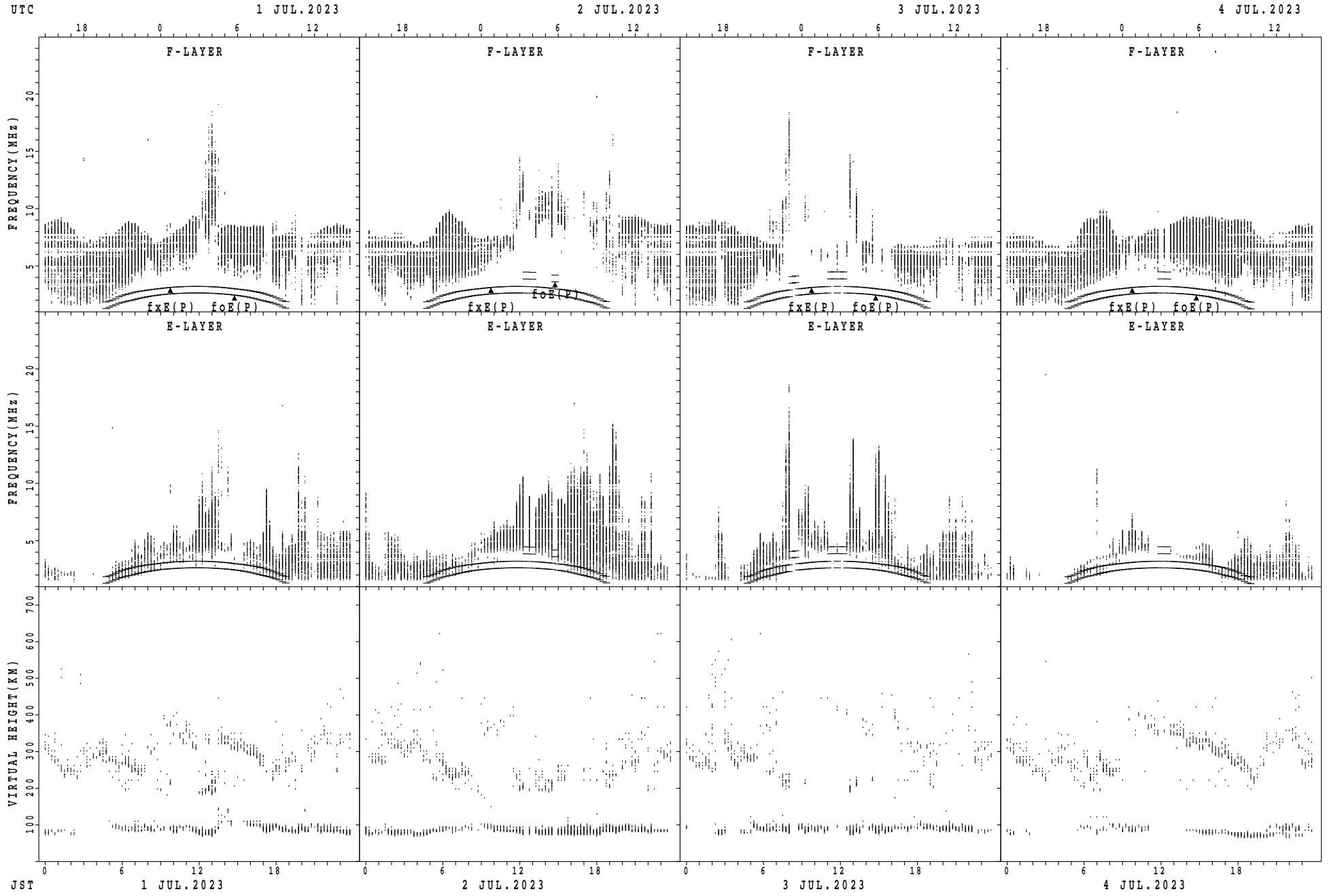
# SUMMARY PLOTS AT Wakkanai



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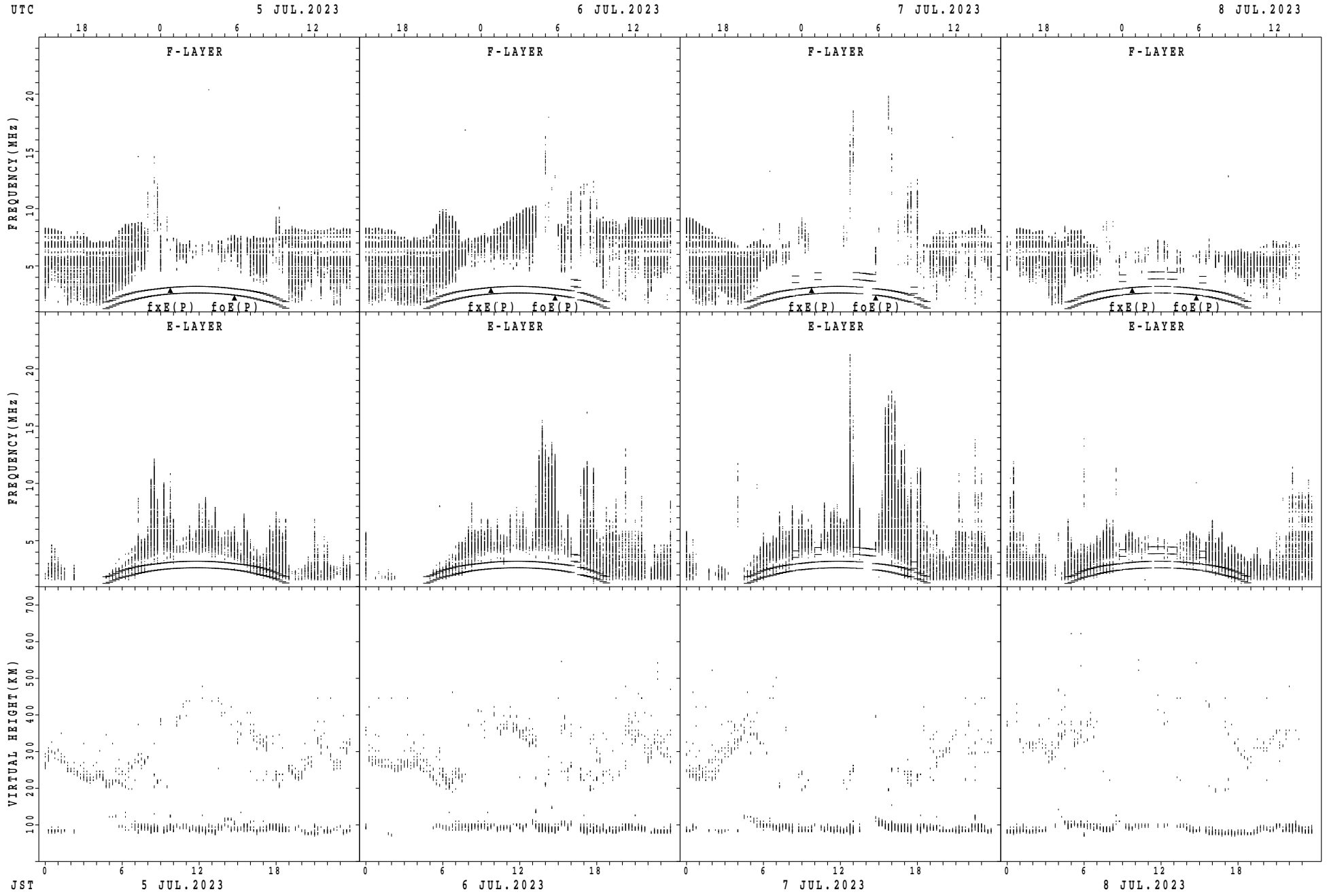


# SUMMARY PLOTS AT Kokubunji



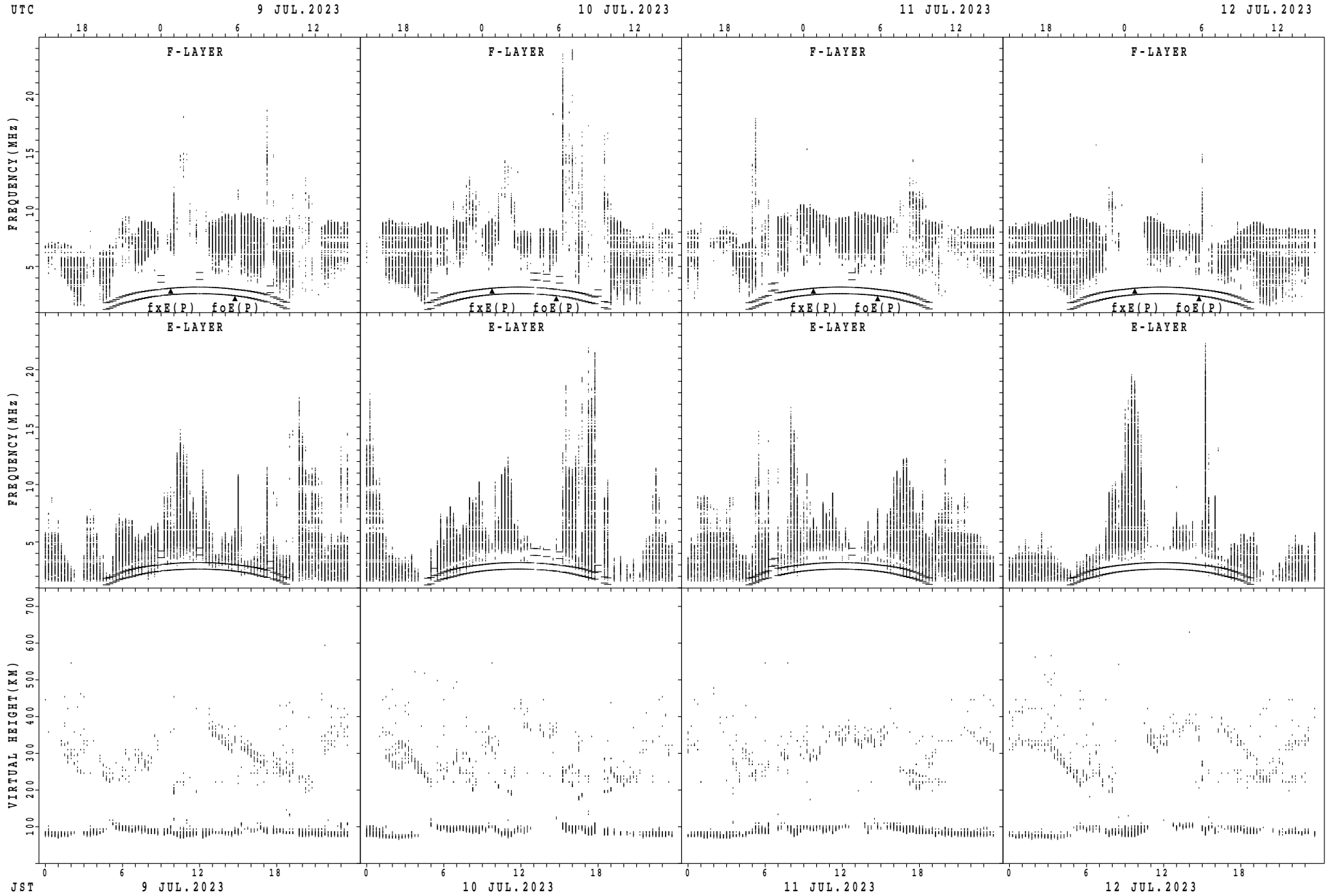
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 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

# SUMMARY PLOTS AT Kokubunji



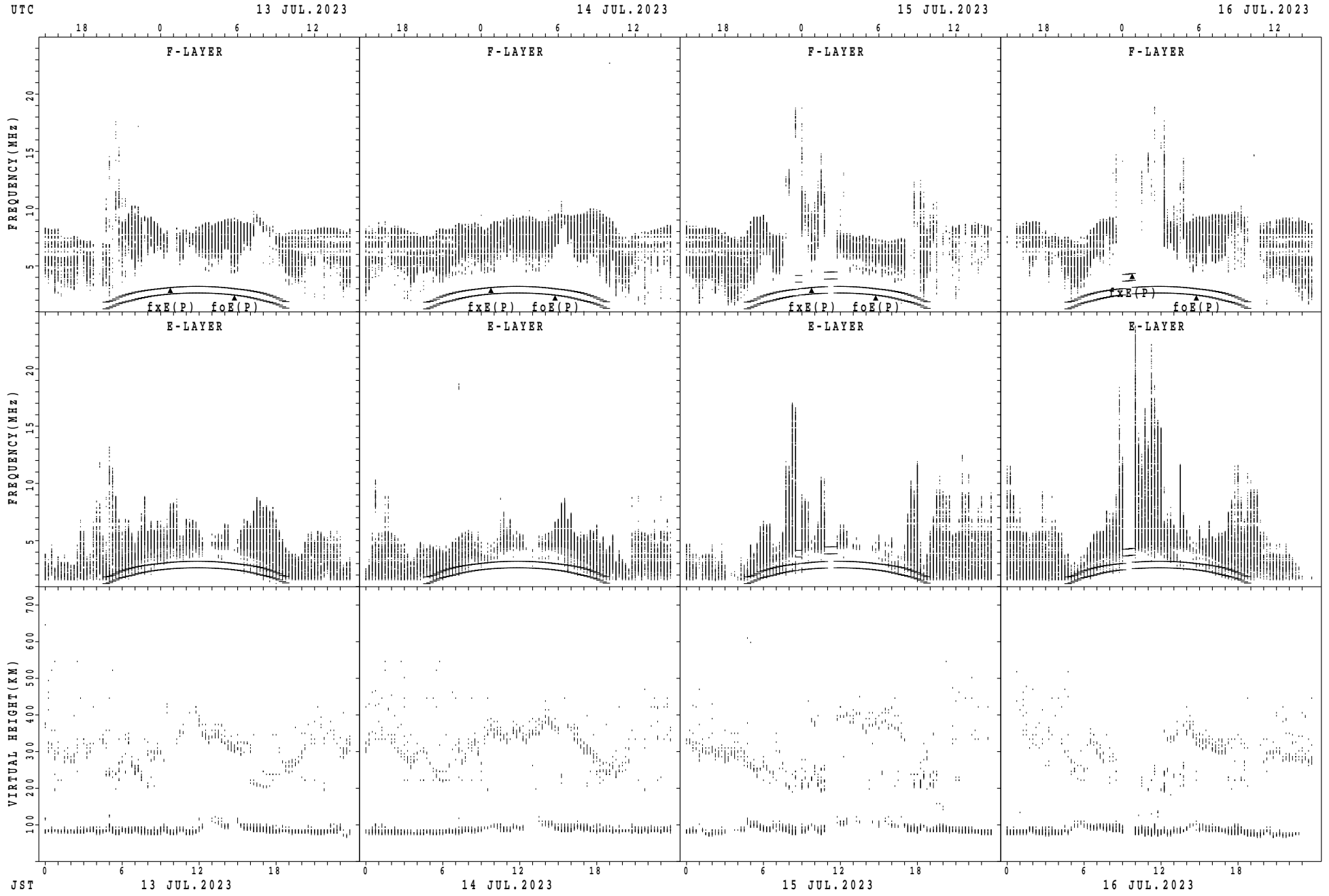
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 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

# SUMMARY PLOTS AT Kokubunji



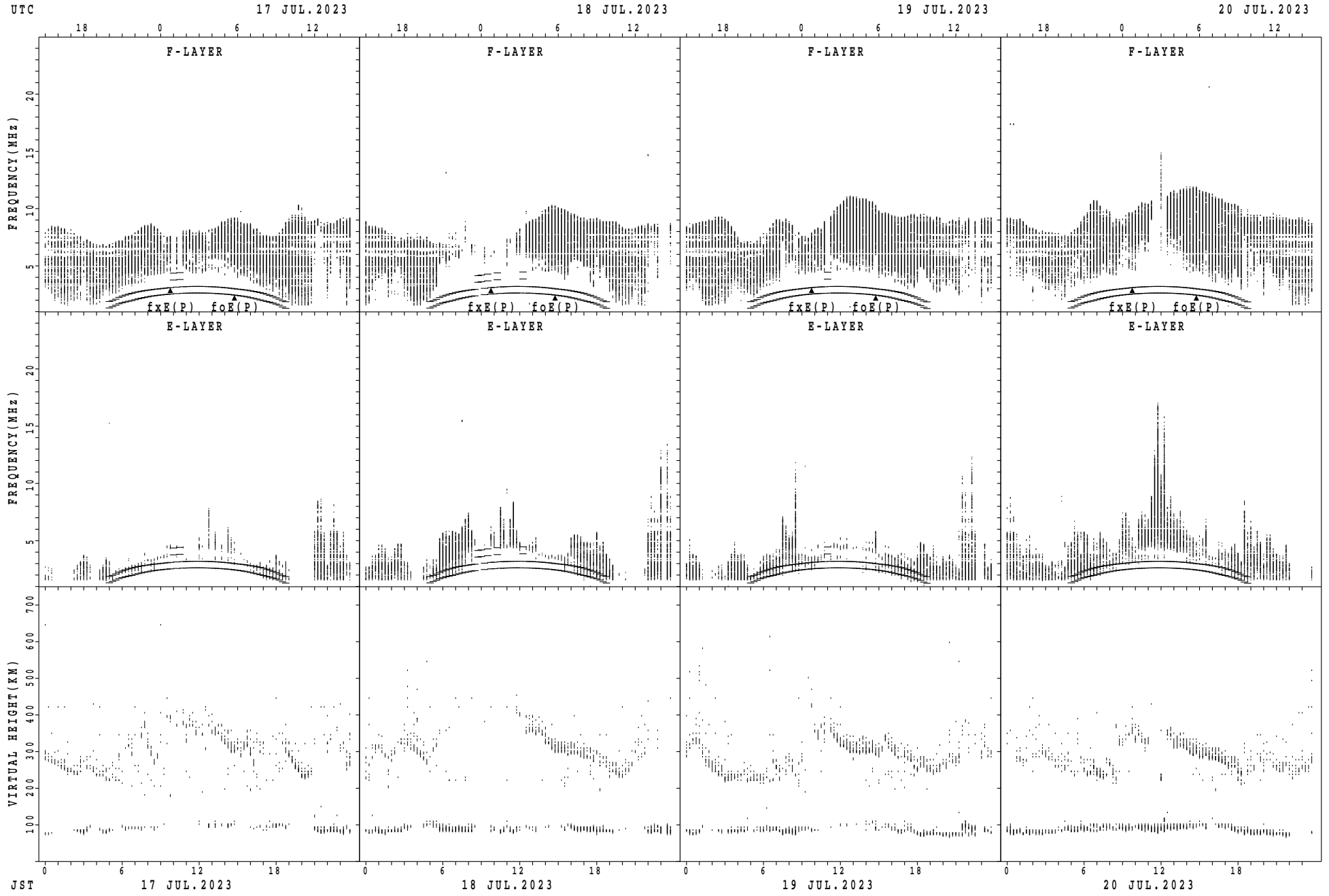
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 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Kokubunji



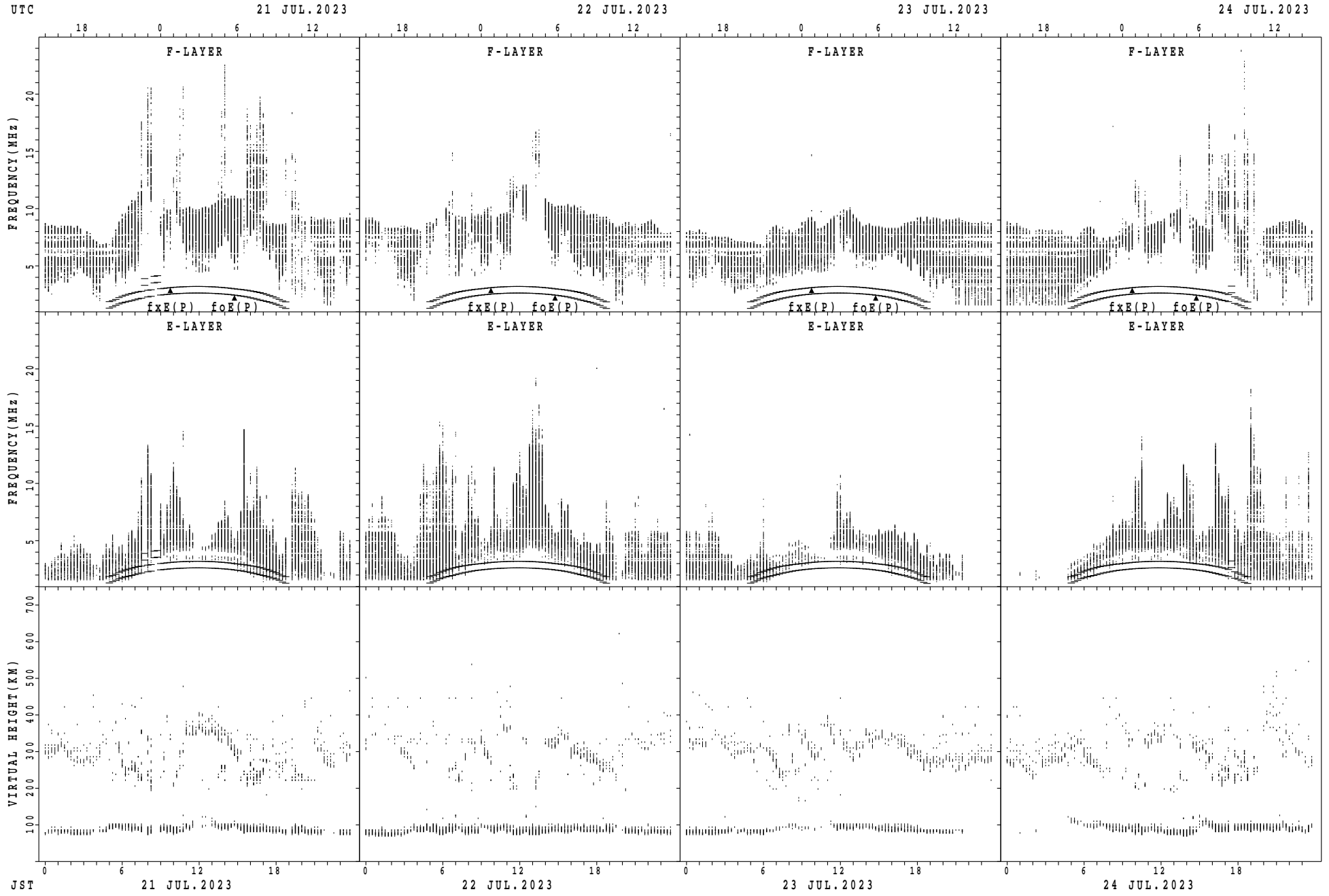
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 f<sub>o</sub>E(P); PREDICTED VALUE FOR f<sub>o</sub>E

SUMMARY PLOTS AT Kokubunji



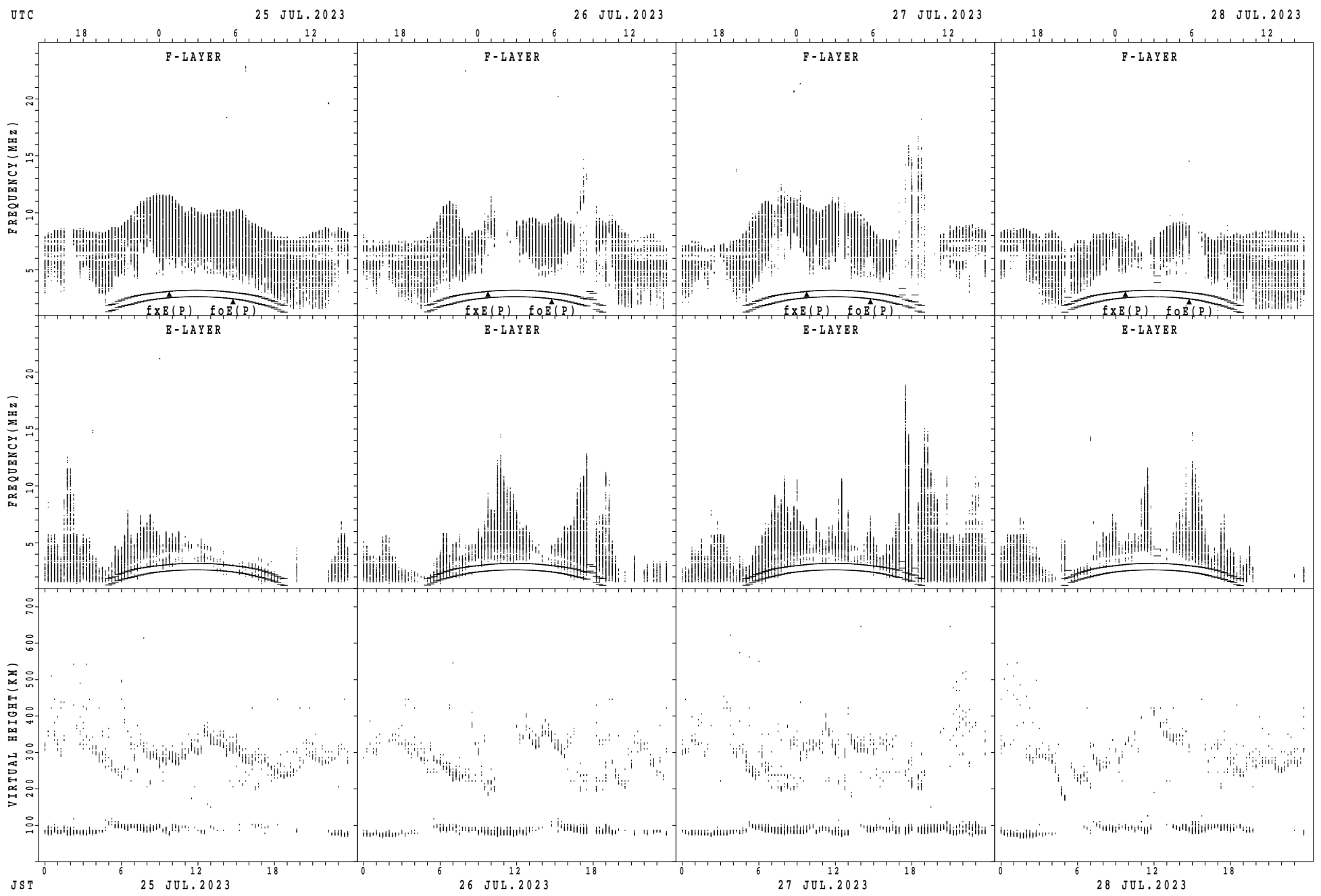
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SUMMARY PLOTS AT Kokubunji



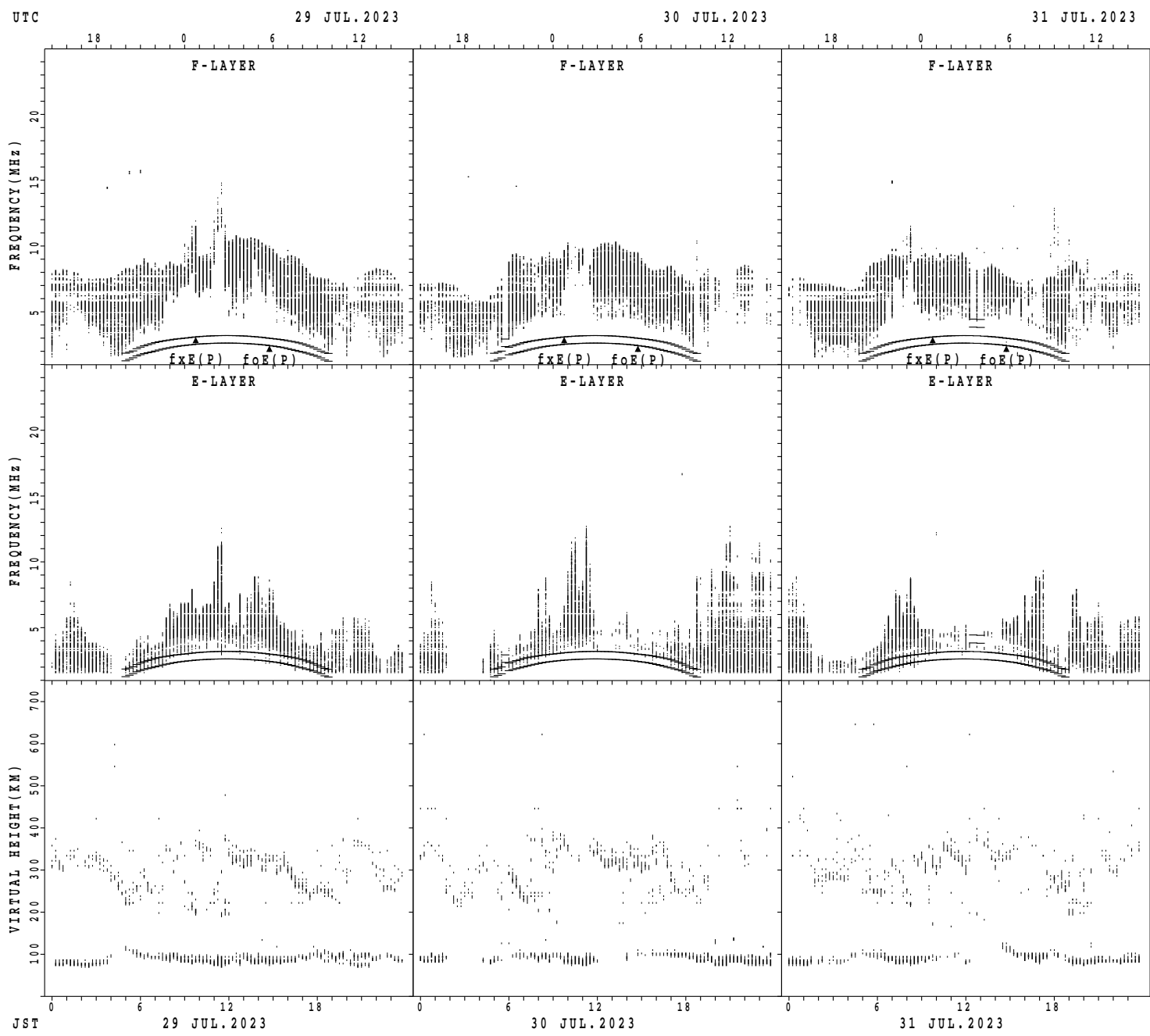
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 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

# SUMMARY PLOTS AT Kokubunji



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

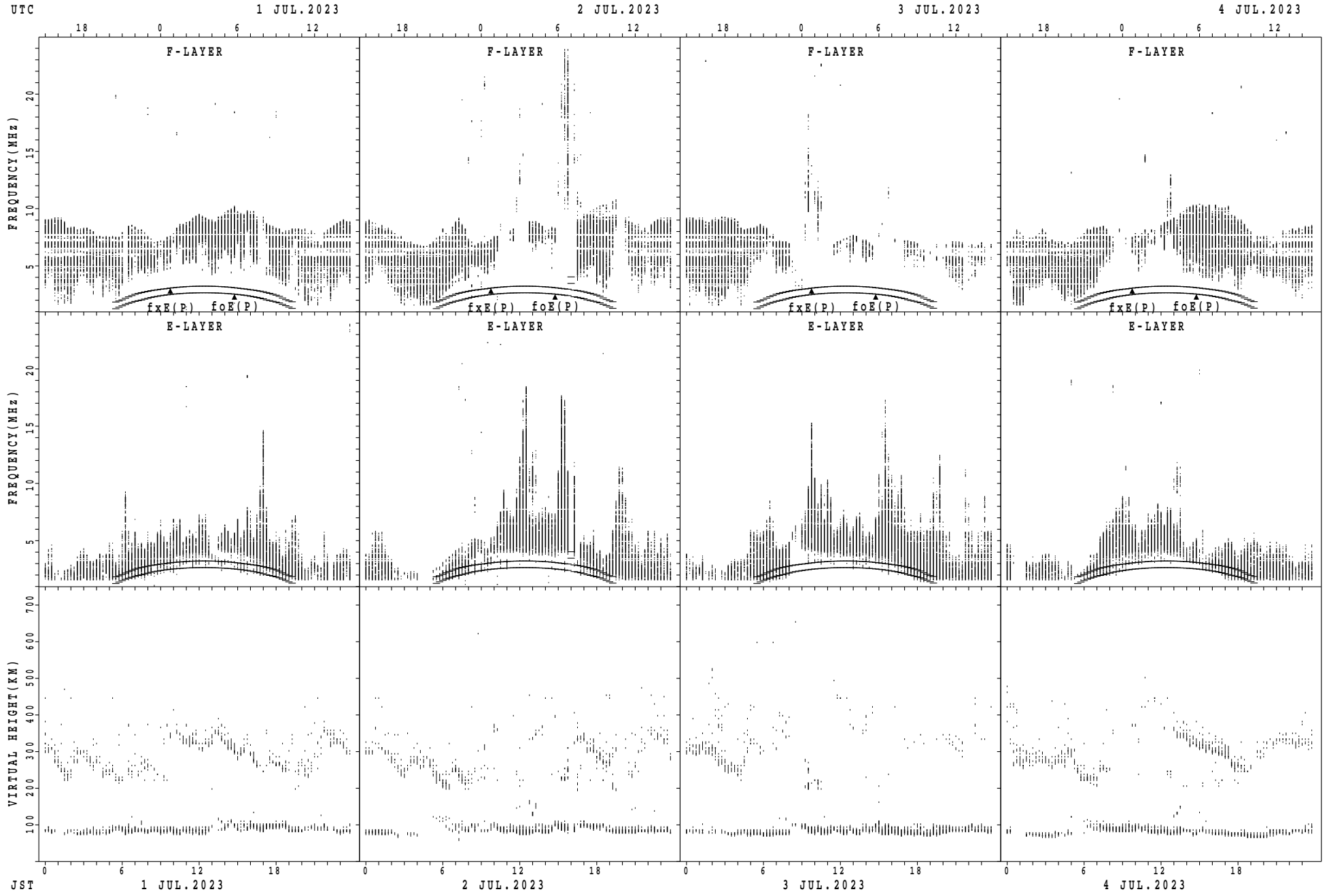
# SUMMARY PLOTS AT Kokubunji



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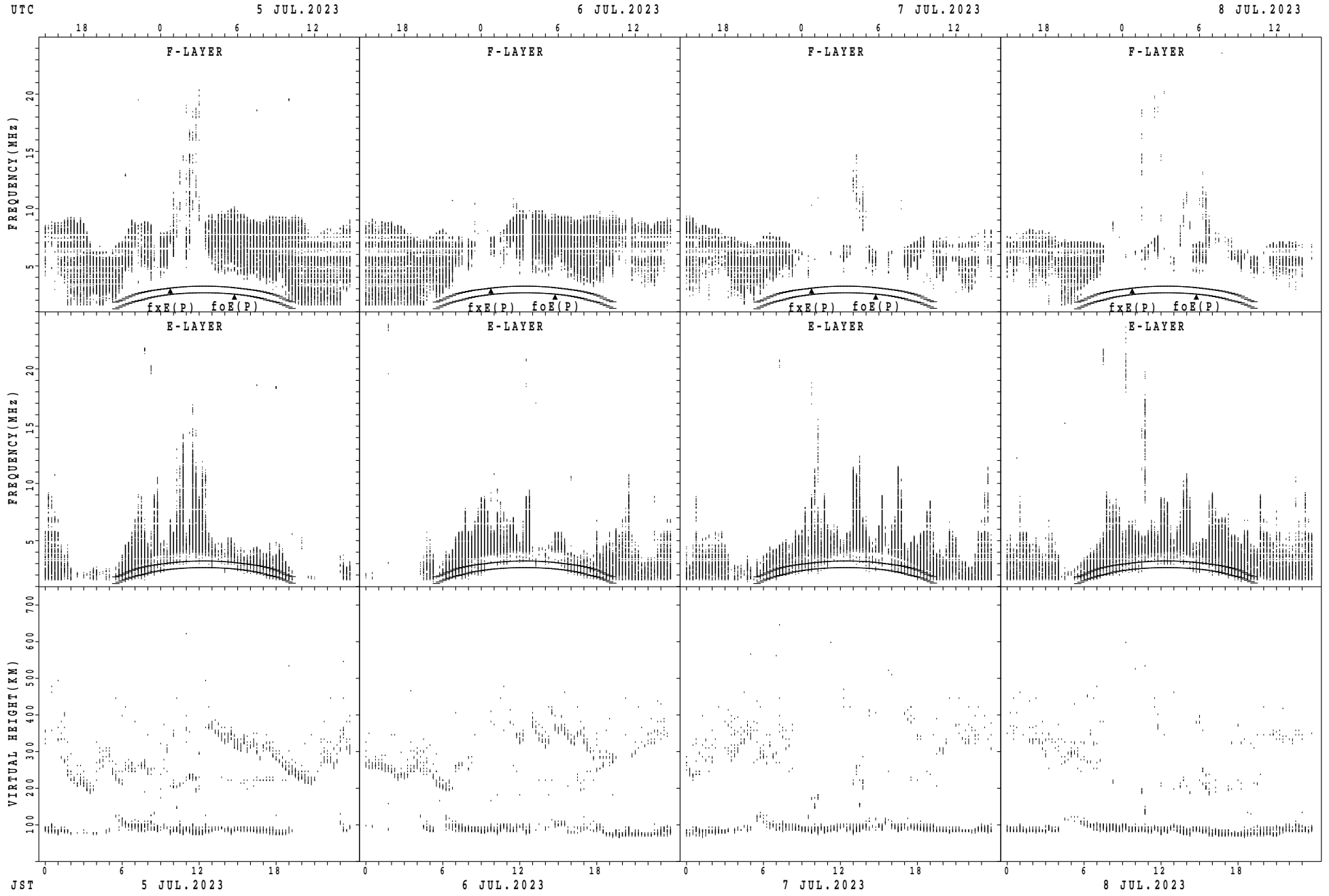


SUMMARY PLOTS AT Yamagawa



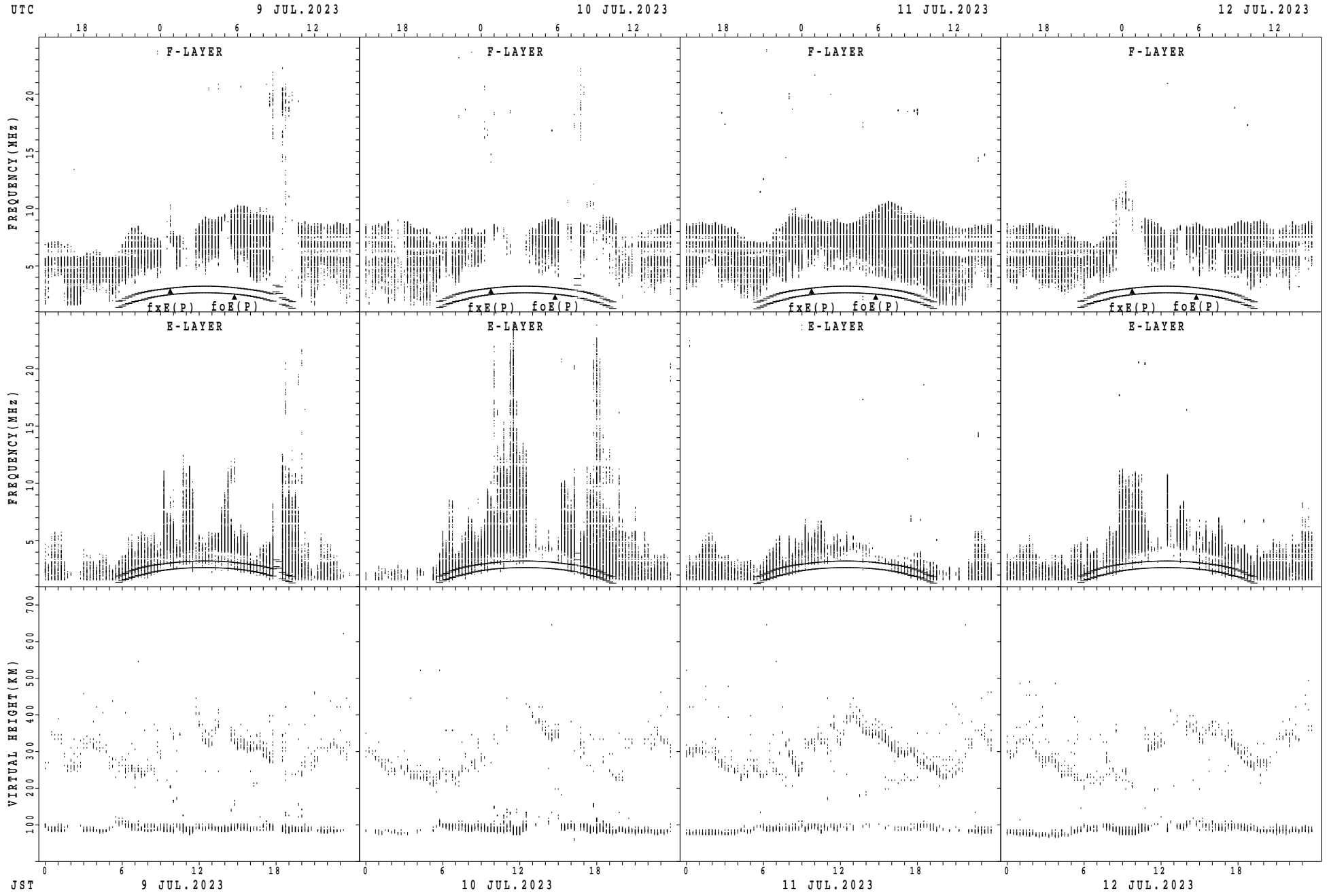
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 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



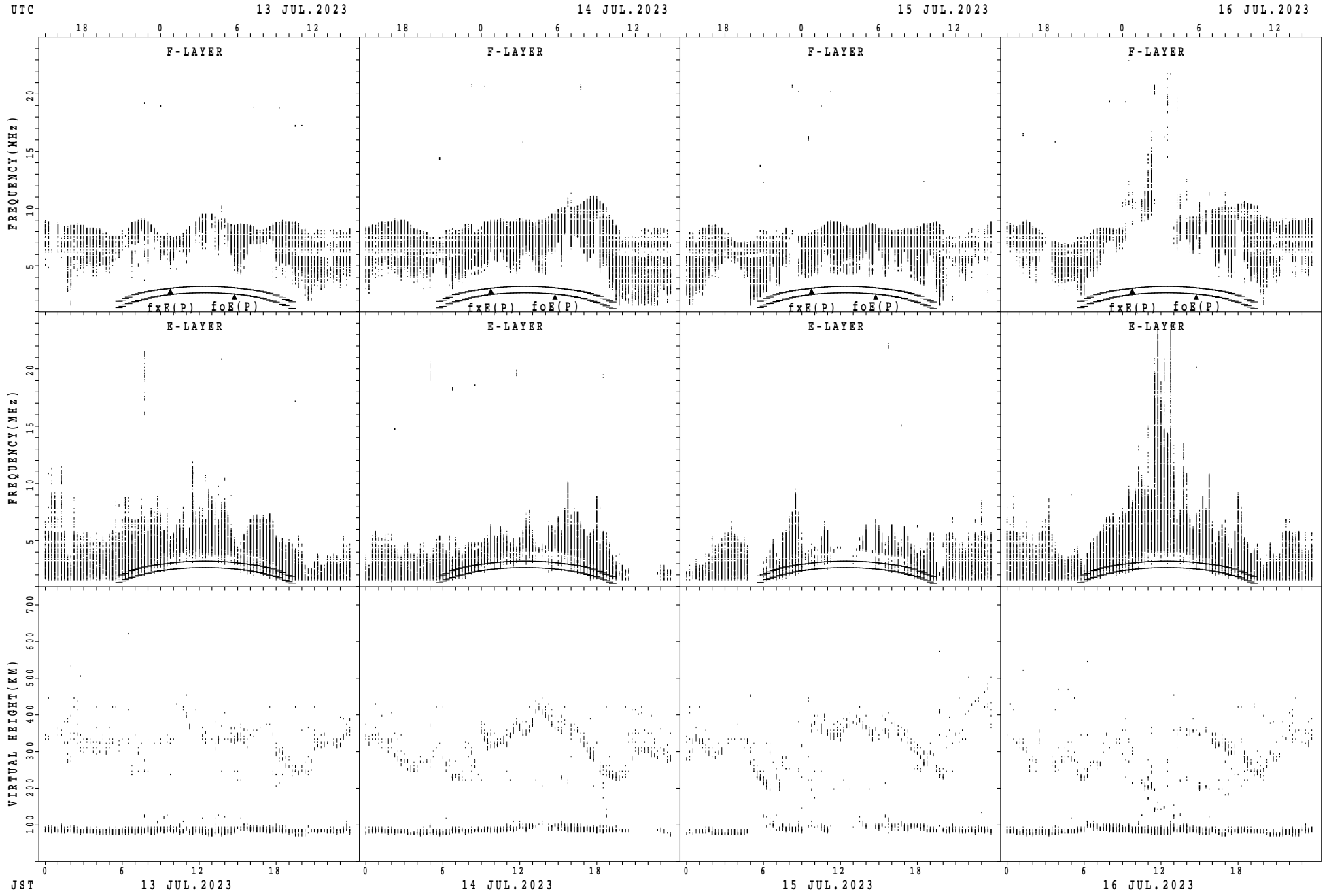
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 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

SUMMARY PLOTS AT Yamagawa



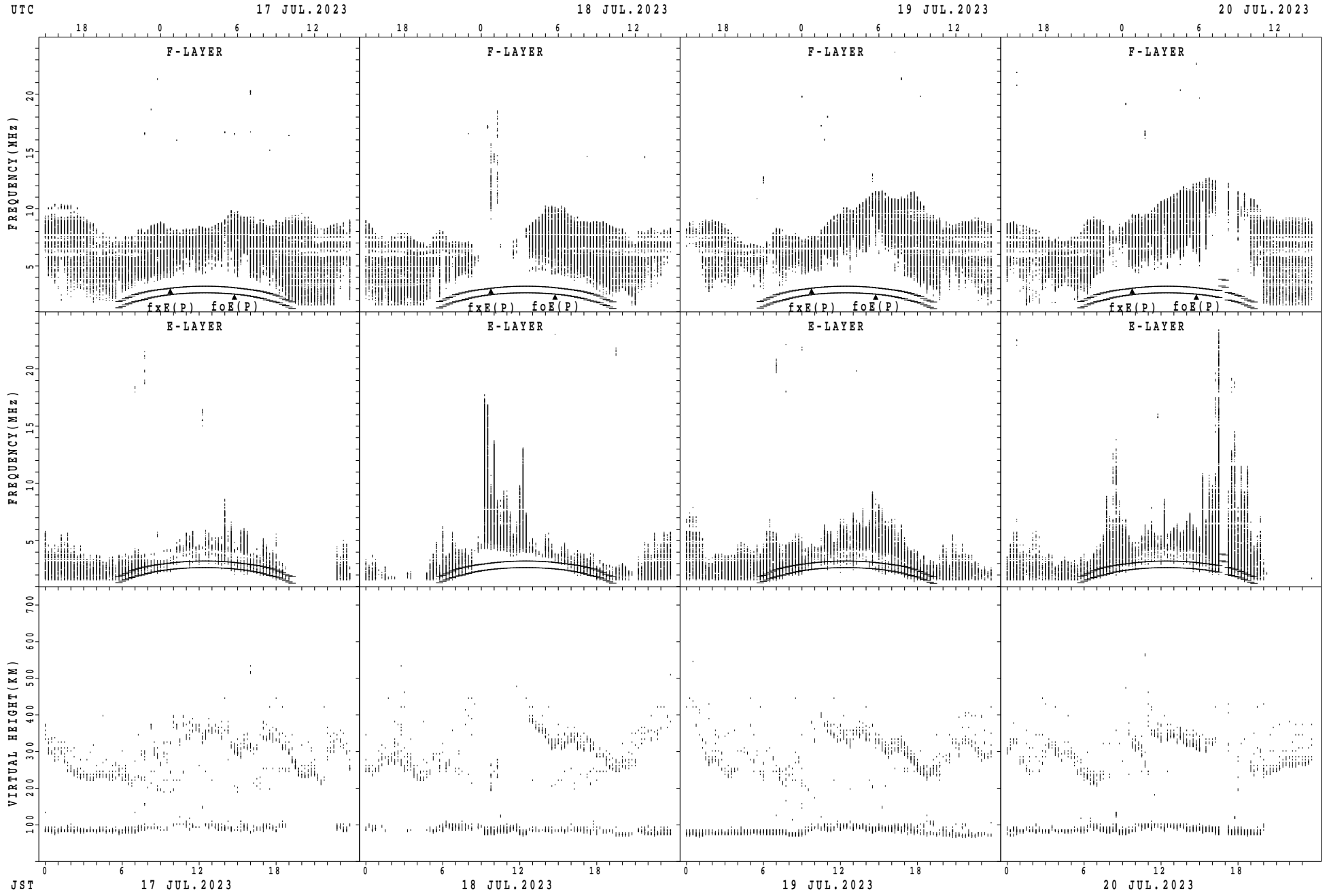
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SUMMARY PLOTS AT Yamagawa



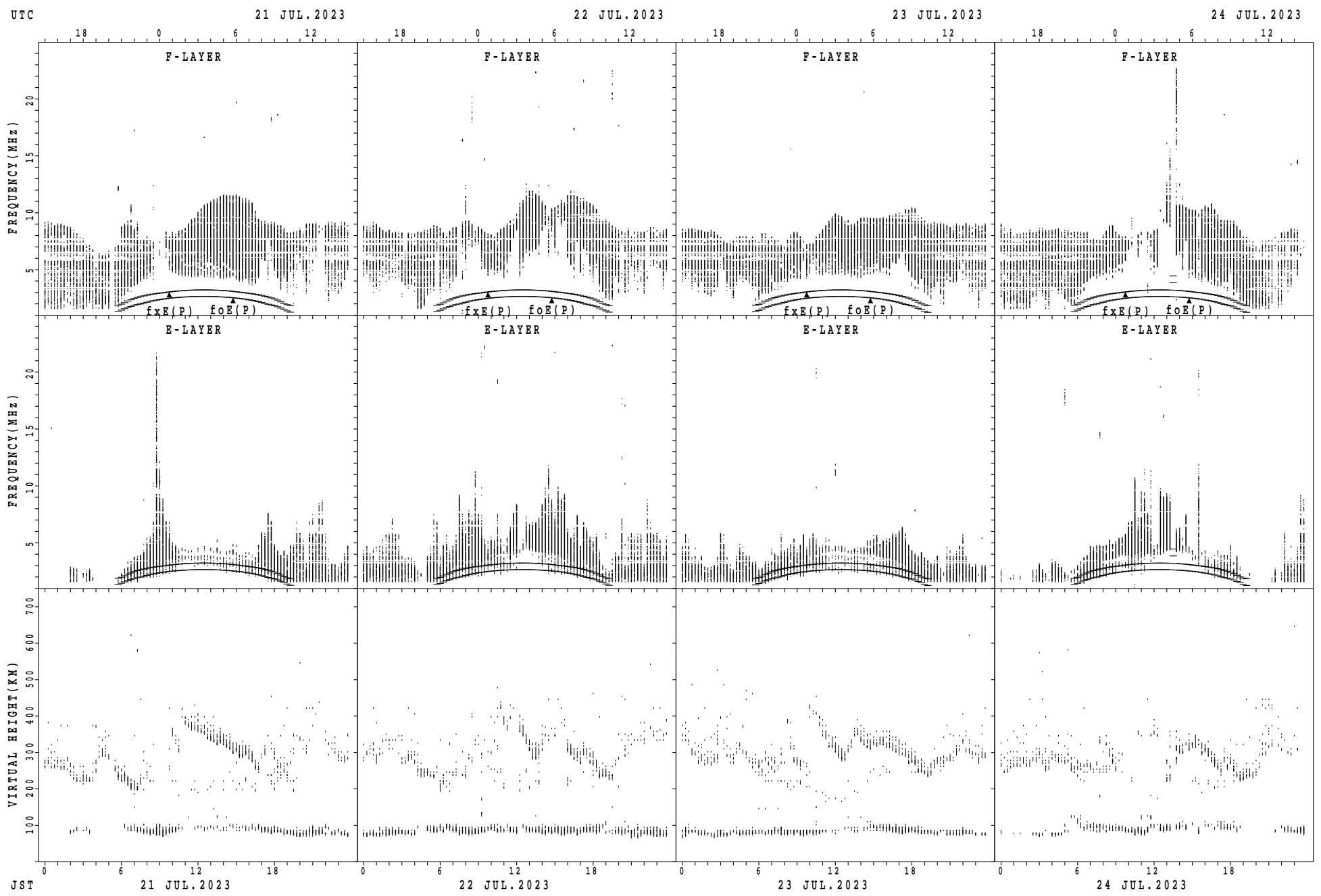
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 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

SUMMARY PLOTS AT Yamagawa



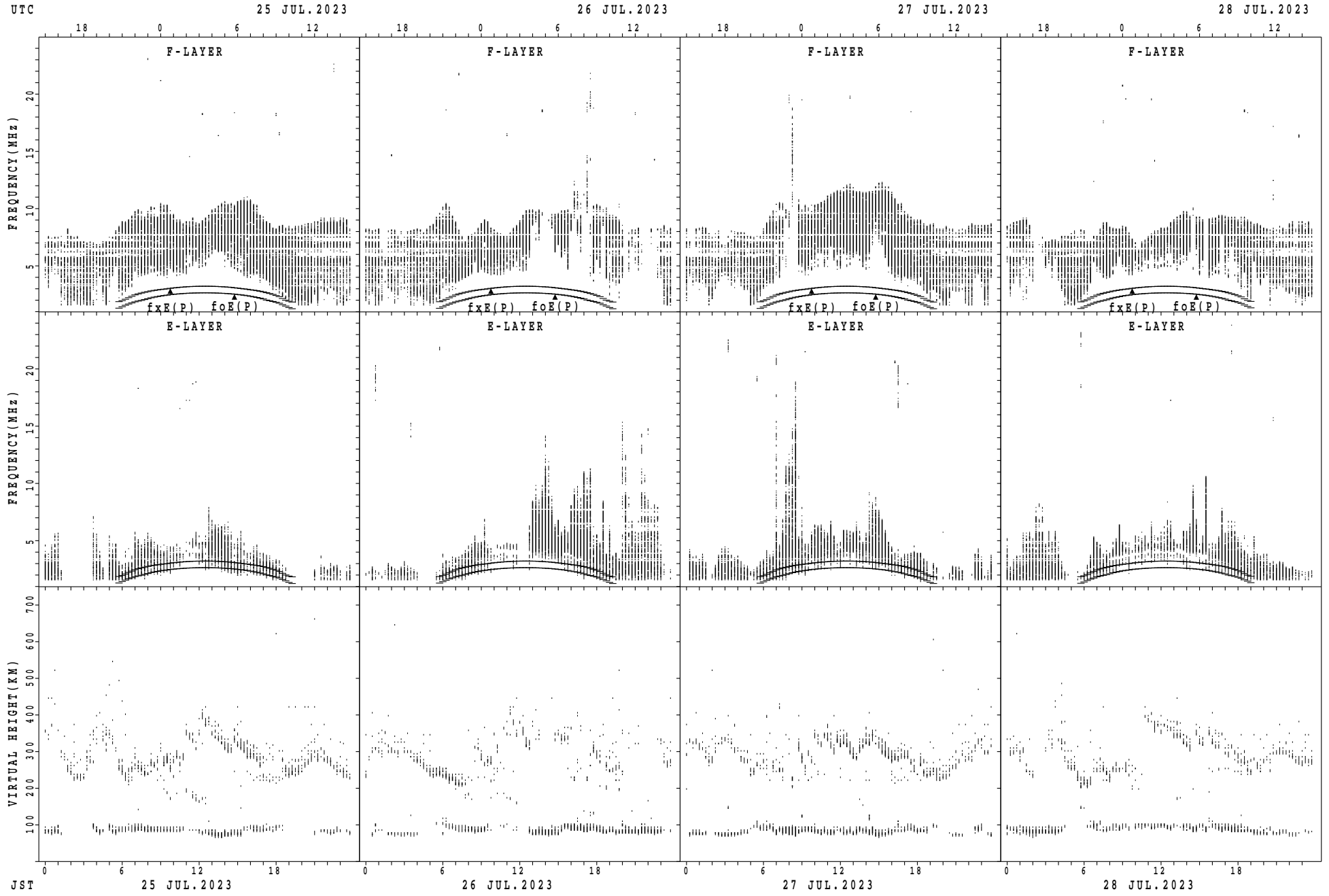
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foE(P); PREDICTED VALUE FOR foE

# SUMMARY PLOTS AT Yamagawa



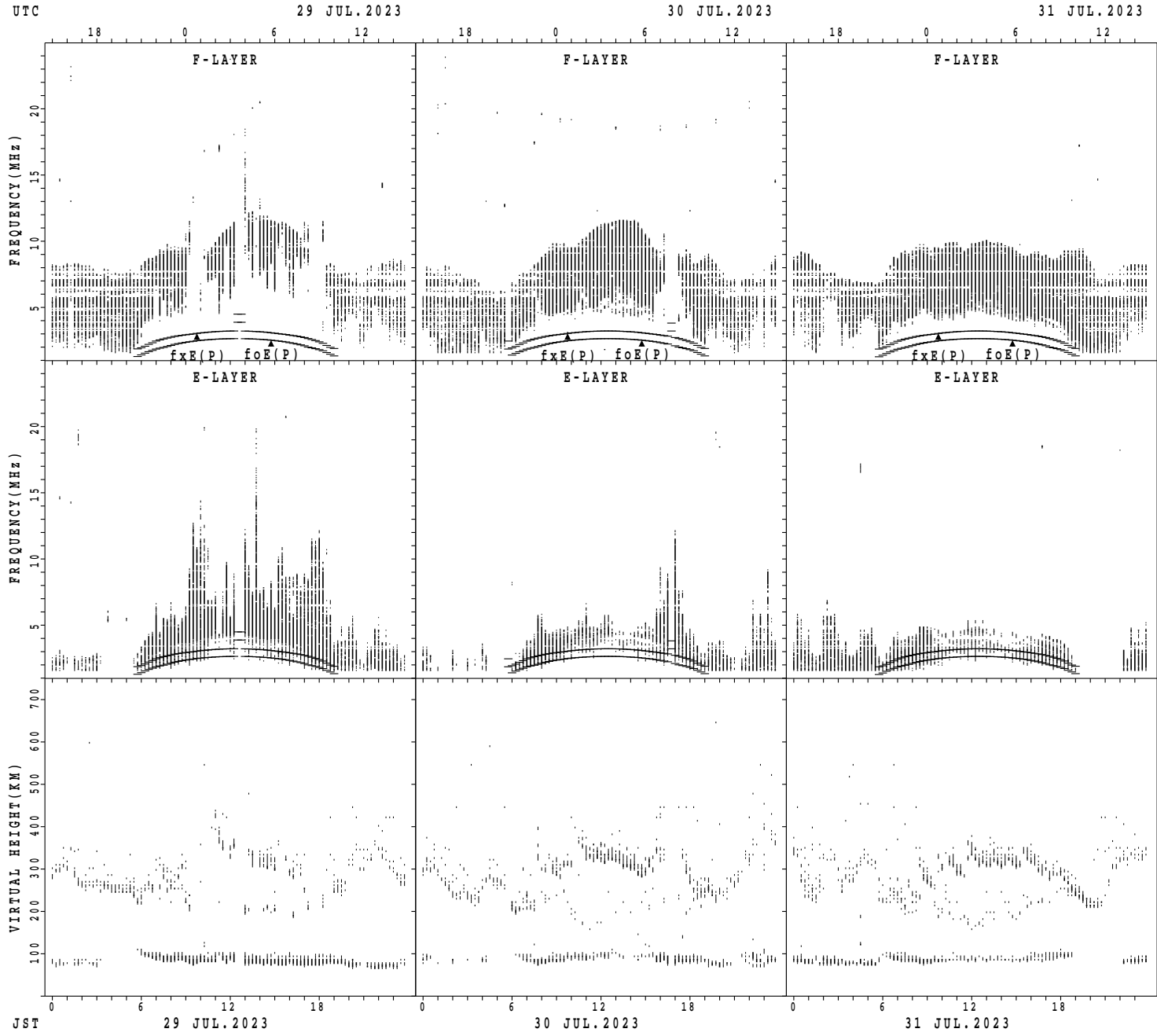
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### SUMMARY PLOTS AT Yamagawa



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

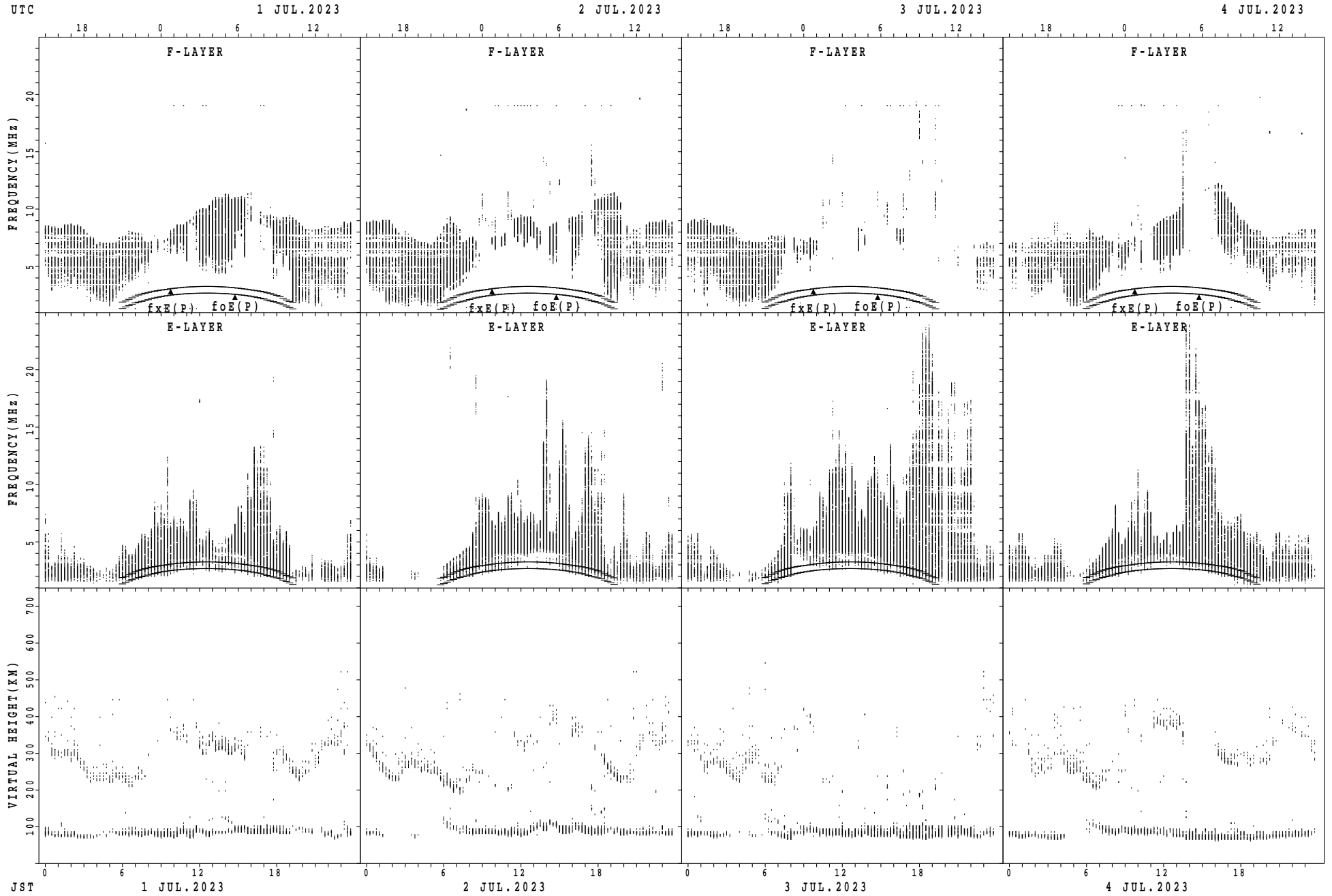
SUMMARY PLOTS AT Yamagawa



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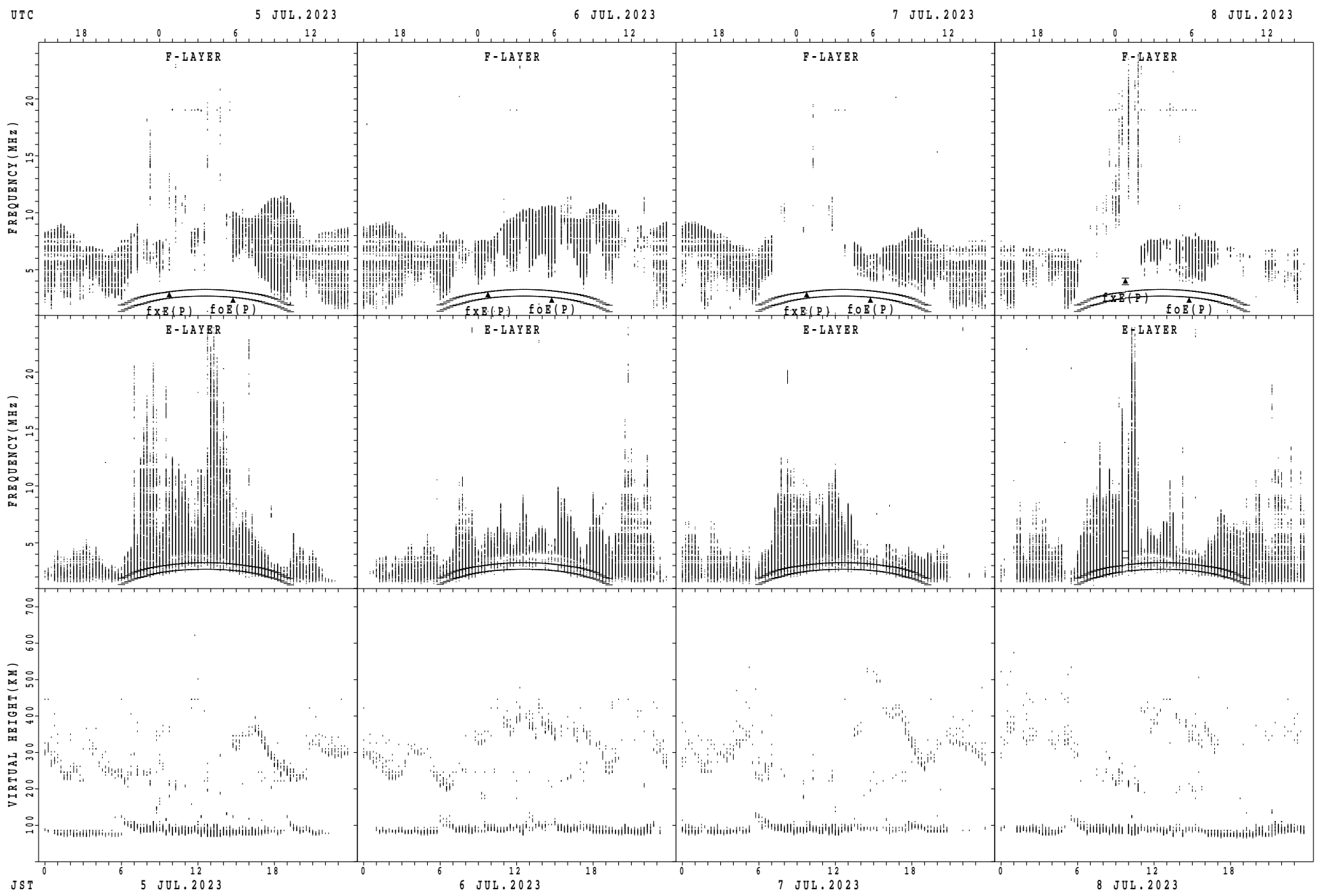


SUMMARY PLOTS AT Okinawa



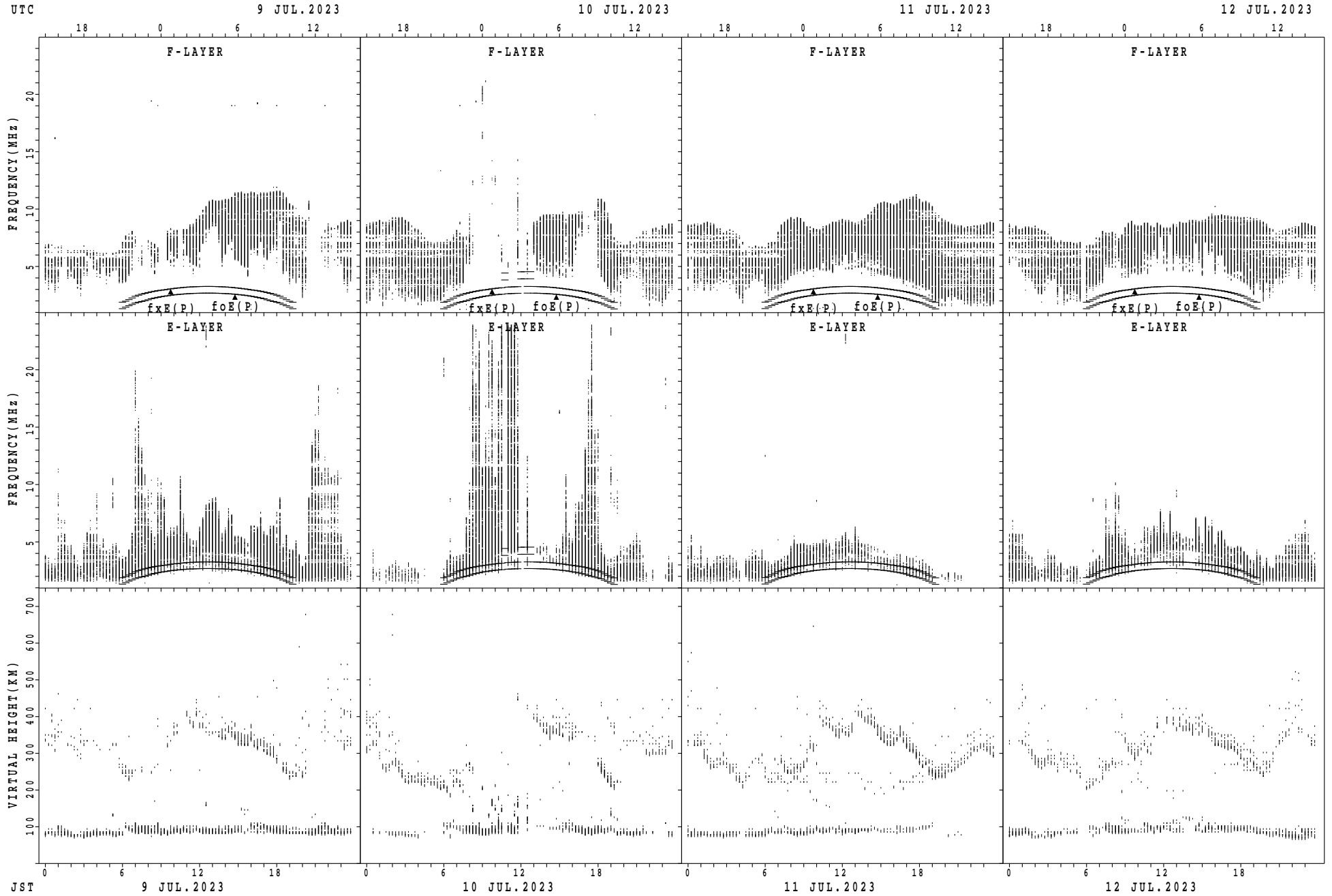
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 $f_oE(P)$ ; PREDICTED VALUE FOR  $f_oE$

# SUMMARY PLOTS AT Okinawa



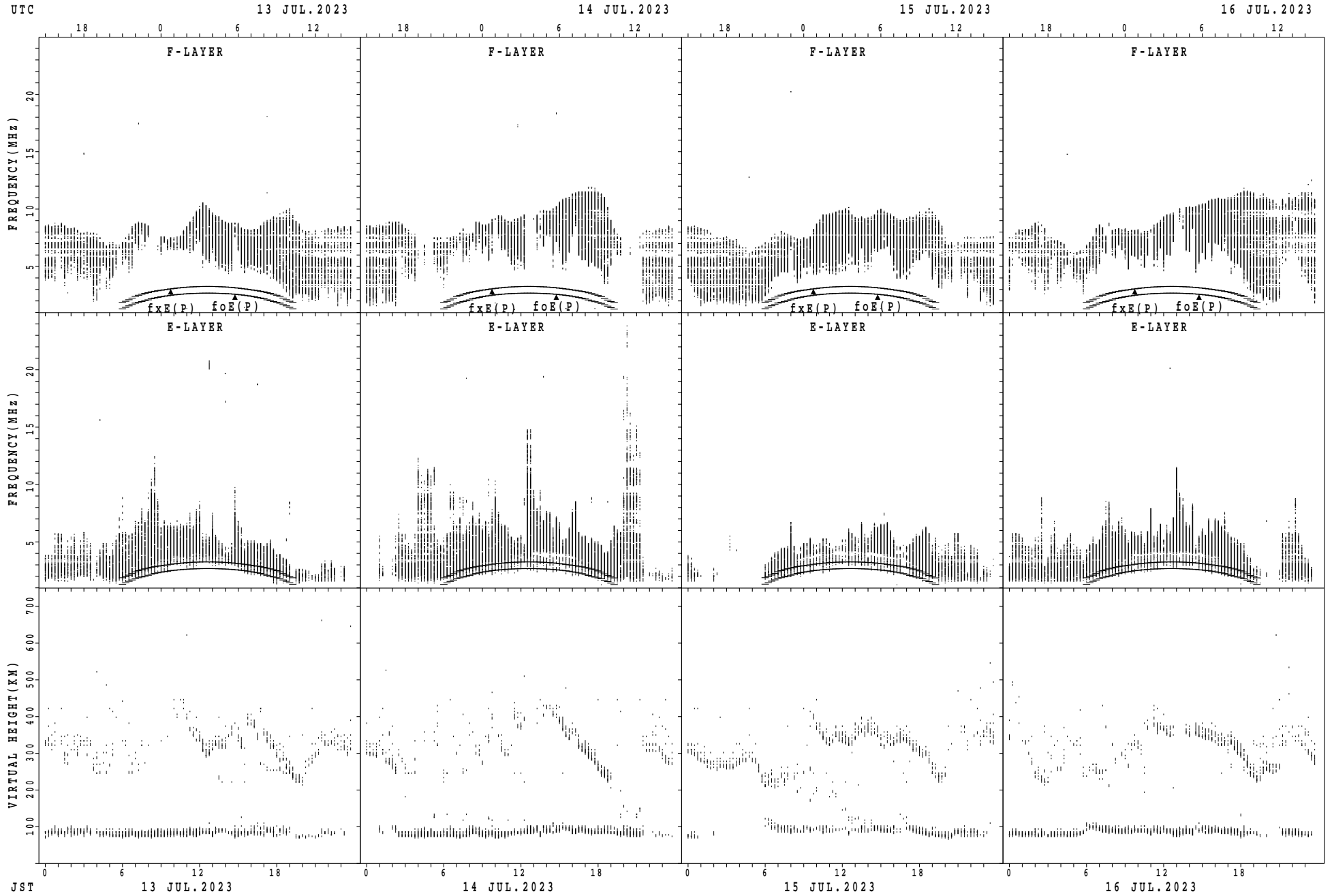
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 $foE(P)$ ; PREDICTED VALUE FOR  $foE$

# SUMMARY PLOTS AT Okinawa



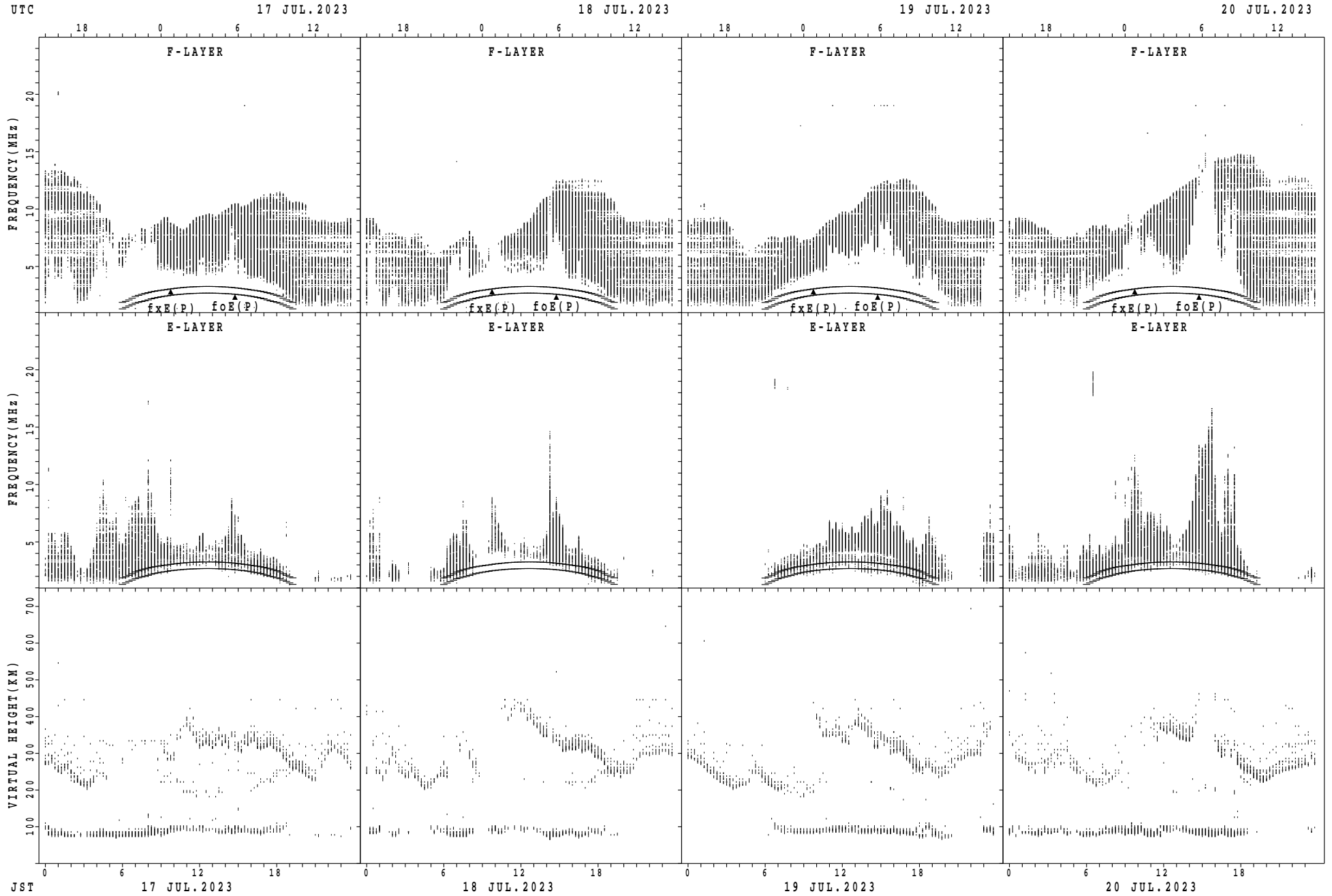
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SUMMARY PLOTS AT Okinawa



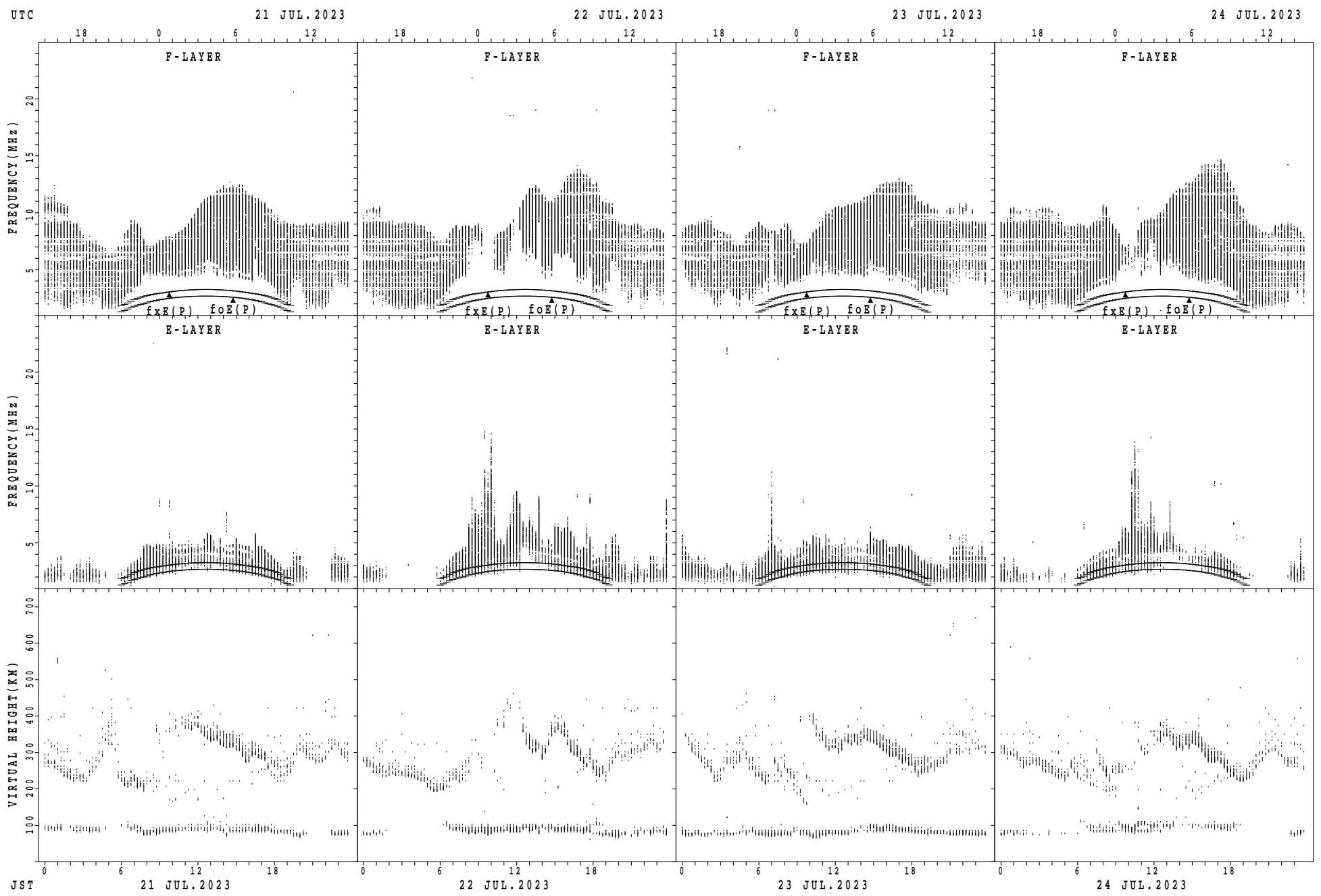
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foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



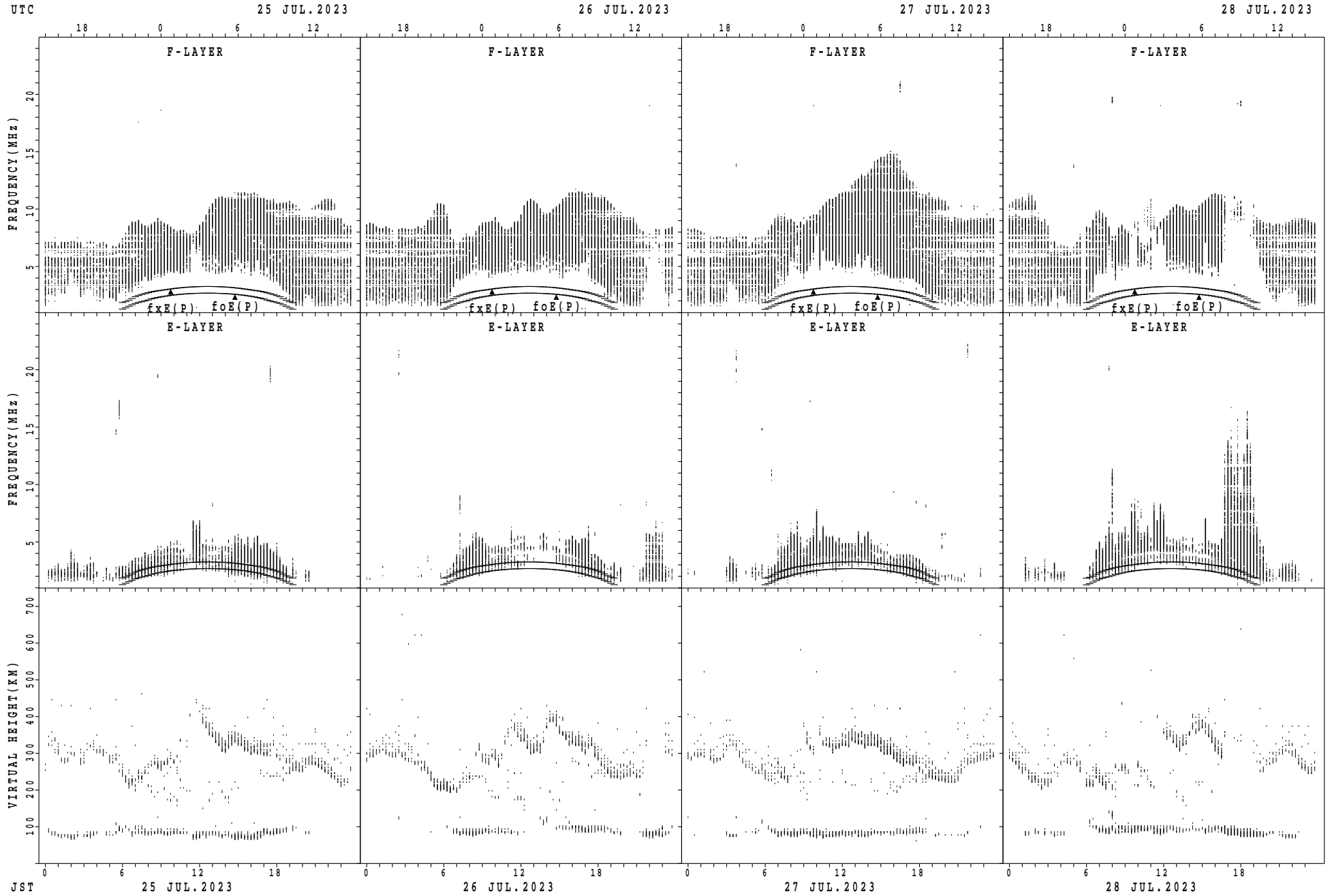
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# SUMMARY PLOTS AT Okinawa



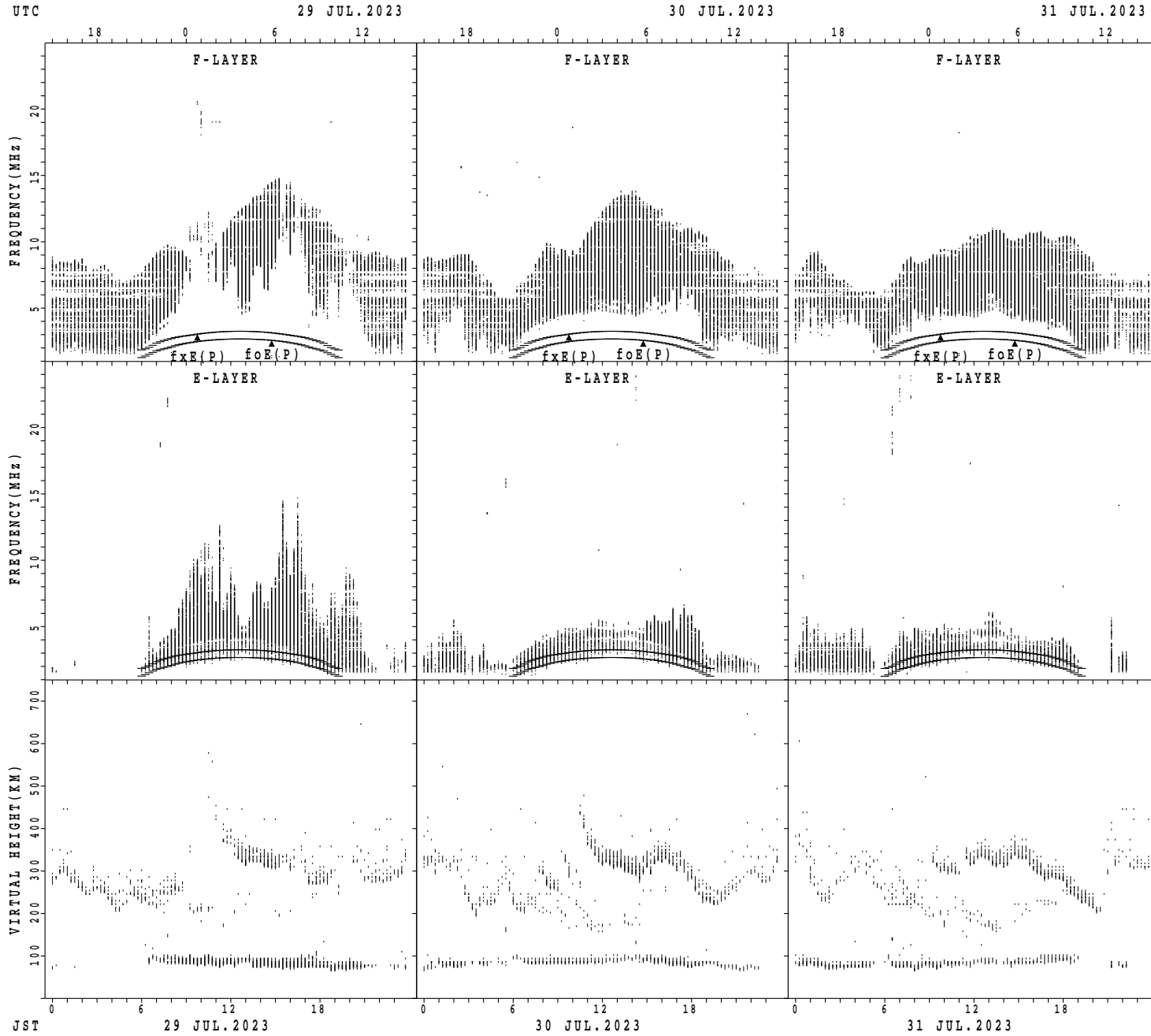
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SUMMARY PLOTS AT Okinawa



$f_xE(P)$ ; 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  
 JUL. 2023 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	14		5	2	3	6	12	5										12	10	15	10	14	10	12
MED	329		314	303	308	297	276	290										269	219	270	278	304	315	310
U Q	338		322	316	320	320	298	326										324	282	280	296	322	338	330
L Q	308		302	290	274	280	229	270										220	200	200	252	280	292	266

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	27	30	30	26	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	29	28
MED	98	96	96	96	97	98	98	98	96	97	96	96	96	96	96	96	98	96	98	96	96	96	96	97
U Q	98	98	98	98	98	100	100	98	98	98	98	96	98	98	98	98	98	98	98	98	98	98	98	98
L Q	95	94	92	94	96	94	96	96	94	94	94	94	94	94	94	94	94	94	94	94	94	92	92	94

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	29	29	28	31	29	31	28	30	24	25	22	23	25	26	27	24	24	25	30	28	27	27	30	27
MED	326	282	265	268	272	250	267	263	278	330	366	364	370	357	354	314	305	284	278	259	276	306	321	306
U Q	365	319	284	300	286	260	294	288	314	431	414	442	428	366	410	329	317	301	304	275	294	326	360	320
L Q	315	262	243	250	256	228	238	244	251	292	318	346	334	340	324	303	286	265	266	253	250	292	298	286

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	30	30	29	28	27	26	31	31	30	28	30	26	25	24	25	29	30	31	31	30	29	29	27	28
MED	94	94	94	94	94	98	98	96	96	96	96	96	94	94	96	96	96	98	94	95	96	94	94	94
U Q	96	96	96	96	96	98	98	98	98	97	98	96	97	101	100	100	98	98	98	98	98	96	96	98
L Q	92	90	91	92	94	96	96	96	94	94	96	92	92	93	94	95	96	94	94	94	93	92	92	92

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	14	18	17	12	7	8	12	19	19									25	23	21	11	7	5	14
MED	341	329	310	314	298	311	273	256	248									294	278	280	280	320	356	339
U Q	354	356	338	340	378	429	291	270	290									314	298	294	312	340	380	366
L Q	316	314	284	277	278	275	239	232	232									266	264	264	272	304	336	330

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	30	28	29	29	30	25	30	31	31	31	31	30	29	29	30	31	31	31	31	31	26	26	28	30
MED	96	92	94	94	96	96	98	98	96	96	96	96	96	96	96	96	98	96	96	96	95	94	94	94
U Q	96	95	96	96	96	98	98	98	98	96	98	98	98	98	98	98	98	98	98	98	98	96	96	96
L Q	94	90	92	90	94	94	96	94	94	92	94	96	94	95	96	94	96	94	94	94	92	92	92	92

MONTHLY MEDIANS OF h'F AND h'Es  
 JUL. 2023 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	16	18	19	13	9	5	11	17	21									24	30	27	17	7	11	13
MED	344	320	298	292	280	314	254	260	256									296	272	264	284	330	352	346
U Q	359	340	314	305	320	434	266	281	276									313	294	274	307	344	360	363
L Q	321	300	274	256	253	248	250	245	233									282	258	254	268	306	288	327

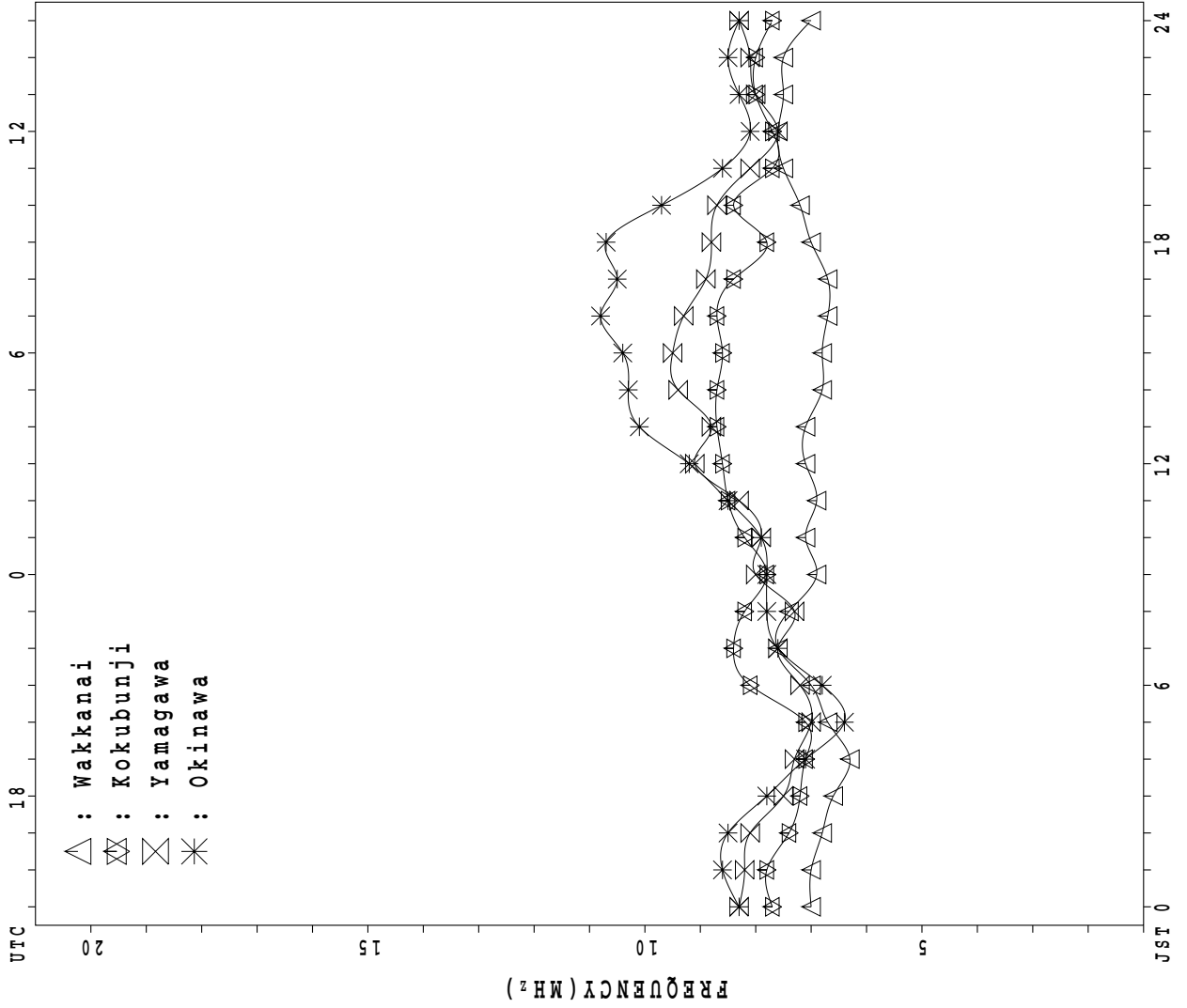
h'Es

	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	30	29	28	26	26	23	30	31	31	30	31	31	31	30	30	31	31	31	31	30	27	26	21	23
MED	96	94	94	94	96	96	97	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	94	94
U Q	96	96	96	96	96	98	98	98	98	98	98	97	98	98	98	98	98	98	98	98	98	96	96	96
L Q	94	92	92	90	92	94	96	92	94	94	94	94	94	94	94	94	96	94	94	92	92	92	92	92

MONTHLY MEDIANS PLOT OF fOF2

JUL. 2023

AUTOMATIC SCALING



UTC

20

15

10

5

JST 0

18

0

6

12

18

24

FREQUENCY (MHz)

## IONOSPHERIC DATA STATION Wakkanai

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

LAT. 45°10.0'N LON. 141°45.0'E 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 86	X 83	X 82	X 79																	X 81	X 82	X 82	X 78	
2	X 77	X 84	X 85	X 79			91															X 88	X 92	X 91	X 85
3	X 72	X 71	X 71	X 71																		X 77	X 81	X 81	X 75
4	X 75	X 75	X 74	X 67																		X 88	X 84	X 89	X 87
5	X 84	X 79	X 77	X 81	84																	X 83	X 85	X 85	X 83
6	X 82	X 79	X 78	X 75																		X 89	X 95	X 96	X 95
7	X 86	X 70	X 71	X 69																		X 84	X 85	X 92	X 90
8	X 66	X 65	X 69	X 62																		X 73	X 79	X 77	X 73
9	C	X 69	X 70	X 72																		X 93	X 93	X 91	X 86
10	X 87	X 84	X 80	X 78	79																	X 91	X 92	X 82	X 75
11	X 77	X 78	X 76	X 71		83																X 84	X 84	X 86	X 91
12	X 86	X 81	X 78	X 78																		X 84	X 82	X 81	X 80
13	X 81	X 76	X 71	X 72																		X 79	X 83	X 84	X 84
14	X 79	X 77	X 77	X 75																		X 79	X 83	A	X 79
15	X 77	X 78	X 76	X 68																		X 86	X 90	X 88	X 86
16	X 85	X 79	X 74	X 72																		X 85	X 84	X 80	X 79
17	X 80	X 72	X 86	X 76	72																	X 94	X 99	X 92	X 93
18	X 77	X 71	X 66	X 65																		X 83	X 80	X 83	X 83
19	X 77	X 77	X 79	X 76																		X 97	X 98	X 92	X 90
20	X 86	X 83	X 82	X 75																		X 95	X 92	X 89	X 89
21	X 87	X 84	X 84	X 77																		A	X 90	X 93	X 97
22	X 86	X 84	X 82	X 80																		X 93	X 86	X 85	X A
23	X 88	X 79	X 76	X 71																		X 92	X 90	X 88	X 87
24	X 85	X 82	X 85	X 77																		X 79	X 83	X 82	X 86
25	X 84	X 82	X 76	X 72																		X 83	X 85	X 85	X 89
26	X 83	X 80	X 79	X 75																		X 88	X 81	X 79	X 82
27	X 78	X 76	X 77	X 73																		X 83	X 85	X 81	X 77
28	X 76	X 74	X 72	X 71																		X 86	X 88	X 93	X 85
29	X 82	X 80	X 80	X 74																		X 76	X 79	X 80	X 81
30	X 75	X 75	X 75	X 70																		X 73	X 79	X 78	X 74
31	X 72	X 65	X 70	X 67																		X 82	X 81	X 79	X 72
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	31	31	31	3	1	1														30	31	30	30	
MED	X 82	X 78	X 77	X 73	79	83	91														X 84	X 85	X 85	X 84	
U Q	X 86	X 82	X 80	X 77	84																X 89	X 90	X 91	X 89	
L Q	X 77	X 74	X 72	X 71	72																X 81	X 82	X 81	X 79	

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

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

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	79	76	75	72	65	59	62	65	72	66	68	68	70	68	66	69	68	67	72	74	74	75	75	71
2	70	72	F	72	70	72	F	88	88	73	A	66	70	71	74	68	68	68	70	79	81	85	84	78
3	65	64	64	64	57	61	70	68	58	A	58	58	60	55	60	61	61	58	60	64	70	74	F	68
4	68	68	67	60	63	70	91	85	78	72	74	72	75	76	73	67	69	70	76	80	81	77	F	80
5	77	72	71	F	73	72	72	70	68	65	64	61	59	59	61	61	62	60	63	67	76	78	J R	76
6	75	72	71	68	70	83	94	94	75	77	76	80	85	88	84	79	73	71	74	75	82	88	89	88
7	79	63	V	62	58	60	60	59	60	57	55	55	58	56	55	56	55	59	62	68	77	78	85	F
8	59	58	F	55	52	58	58	49	53	53	A	A	A	A	A	A	A	55	56	60	66	72	70	66
9	C	62	63	65	60	67	72	75	83	87	74	72	73	77	A	70	72	A	A	A	86	86	84	79
10	80	78	73	71	F	74	88	C	A	70	72	67	A	62	A	60	A	A	A	A	84	85	F	F
11	70	71	69	F	62	72	76	A	A	78	71	74	A	A	71	72	70	68	75	78	77	75	F	F
12	J R	J R	71	F	64	76	76	70	65	70	A	63	64	66	A	A	A	63	68	74	77	75	74	F
13	74	69	64	64	58	62	77	78	68	69	66	68	63	68	67	72	72	74	73	70	72	76	F	77
14	72	70	70	68	67	70	82	84	78	75	A	74	76	75	78	A	A	75	74	74	72	76	A	72
15	70	71	F	61	62	72	78	87	81	67	A	62	A	65	64	62	A	A	69	73	79	83	81	79
16	78	72	67	65	66	60	65	77	72	70	70	74	74	70	74	75	76	78	81	83	78	77	73	72
17	F	65	F	F	59	60	66	75	72	72	74	72	67	69	64	66	68	72	86	87	92	85	86	86
18	70	64	59	58	55	55	55	58	58	60	62	62	65	64	68	72	72	71	72	76	76	73	76	76
19	70	70	72	69	69	65	66	75	76	74	75	78	81	82	78	77	76	78	74	81	90	91	85	83
20	79	76	76	69	68	74	78	84	H	84	80	76	80	87	85	85	79	R	A	76	A	83	86	90
21	80	77	77	70	64	69	81	87	85	84	90	81	77	78	77	81	80	79	A	76	83	86	A	90
22	79	77	75	73	73	78	A	87	80	82	86	84	A	85	79	76	74	76	78	80	86	79	78	A
23	F	72	69	64	64	65	68	73	76	A	77	A	A	74	70	68	68	72	74	78	85	83	81	F
24	78	75	78	70	61	61	64	63	63	68	A	68	74	72	68	69	66	67	73	70	72	76	75	77
25	F	75	69	65	66	74	86	88	92	89	83	86	87	78	74	70	72	69	77	76	76	78	78	82
26	76	73	72	68	67	71	75	90	86	72	68	75	72	68	70	77	75	82	77	78	81	74	72	75
27	71	69	70	66	63	76	85	R	H	80	78	67	70	65	66	67	63	62	64	61	64	69	76	78
28	69	67	65	64	64	78	90	77	75	A	71	72	75	72	73	72	69	66	67	70	79	81	F	78
29	75	F	73	67	64	69	65	65	69	68	67	69	70	74	72	70	73	A	70	68	65	69	72	73
30	68	68	68	63	59	65	72	77	67	68	67	67	66	66	67	65	A	70	68	66	66	72	71	67
31	65	58	63	60	56	60	63	63	64	66	60	61	60	60	62	60	60	61	66	69	75	74	72	65
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	31	28	29	30	31	30	29	29	28	25	29	25	29	27	28	25	28	28	29	30	31	28	29
MED	72	71	70	65	64	69	74	77	75	70	71	69	72	70	70	70	70	70	72	74	77	78	77	77
U Q	78	74	72	70	67	74	81	86	80	76	76	74	76	76	74	74	74	74	74	78	82	83	84	81
L Q	70	67	64	62	60	61	65	66	66	67	66	64	64	66	66	63	66	64	68	69	74	75	74	72

JUL. 2023 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

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

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

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							L			L				A							A				
2						L		432	468	A	A	516	512	532	544	512	528	492	492	472	U	L			
3												A	504	504	512	516	488	500		A	U	L	A		
4								452	500	L	A	A	A	548	532	A	532	536	508	468	464	L			
5							L	440	472	L		504	496	508	A	512	524	500	488	484	440	412			
6							L		L		476	508	508	528	540	532	516	524	564	L	L	U	L	L	
7								280	356	408	444	456	492	500	496	504	508	A	484	452	448	388			
8								408		A	A	464	A	A	A	A	A	A	A	A	A	A			
9									A	A	A	A	A				A	H	H	A	A	A			
10							412		A	C	A	A	A	A	564	540	528		536	512	A	A	A	A	
11									A	A	A	A	528	A	A	A		532	500	492	A	A			
12								A	A	A		A	A	A		508	A	A	A	480	L	A			
13								A	A	A		512	488	540	536	A	A	A	504	492	460	L			
14								L	488	504		A	A	A		536		A	A	A	L	A			
15							L	376	396	L		492	A	A	A	A		532	500	A	A	L			
16										A	A	A	U	L	624	532	536	504	532	492	476	L			
17							L			A	A	524	H	A		524	U	L	500	564	484	492	L		
18								380	428	452	476	500	512	A	544	540	524	496	496	472	U	L	L		
19										L	U	L	500	544	596	556	544	528	528	508	L	L			
20							L					L	A	548	500	492	552	536	528	A	L	A	L		
21								L	444	496	556	500	A	564	564	560	516	524	500	L	A	A			
22									A	476	576	540	A	A	A		552	520	524	520	H	U	L	A	A
23							U	L	380	A	472	500	A	A	A	A		580	524	U	L	A	L	A	
24							U	L	364	440	480	508	512	A	A	540	528	532	532	U	L	U	L	L	
25									L	484	504	532	532	536	580	A	532	536	L	U	L	A			
26							L	L		468	500	536	H	548	556	528	540	524	H	504	460	A	L		
27						L	L	364	436	480	512	540	564	524	536	536	532	484	472	A	L	A			
28								360		544	A	A	548	544	496	548	528	A	472	480	L				
29							L	U	L	428	488	A	540	532	540	540	532	524	504	L	L	L			
30							L	428	440	460	560	516	512	528	532	A	512	512	U	L	A	A	A		
31							L	352	432		476	500	492	A	524	520	A	488	A	U	L	A			
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						2	11	15	20	19	18	19	18	21	20	23	25	18	17	3					
MED						280	364	432	478	504	504	528	536	532	530	528	504	492	464	412					
U Q							380	440	488	512	532	548	548	542	542	532	530	504	476	416					
L Q							356	408	468	492	496	512	532	524	516	516	492	476	460	388					

JUL. 2023 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

LAT. 45°10.0'N LON. 141°45.0'E 0SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					172	220	280	316	340	368	372	352	340	A	A	332	A	304	224	A				
2					A	228	276	320	340	364	376	A	396	380	360	A	A	A	A	A				
3					A	204	268	300	348	A	388	372	A	A	348	348	A	A	A	A				
4					A	A	292	324	356	372	388	388	384	A	A	A	A	304	244	A				
5					A	232	280	324	352	372	380	380	360	A	A	364	A	A	A	A				
6					B	204	288	320	348	364	388	384	A	392	380	A	A	292	A	A				
7					A	212	280	324	352	364	380	380	360	A	A	364	340	296	248	176				
8					A	224	276	308	336	360	368	368	A	344	A	344	A	A	240	A				
9					A	236	280	324	348	372	372	372	A	A	A	A	A	300	244	A				
10					A	244	288	332	352	360	372	400	376	A	324	A	340	320	248	A				
11					A	A	292	328	340	368	380	A	360	372	A	A	348	308	244	A				
12					A	244	300	328	360	372	396	376	A	A	A	A	324	A	A	A				
13					A	A	284	332	352	A	A	A	A	408	388	380	A	A	252	A				
14					A	A	304	A	A	A	A	A	388	A	A	A	A	A	240	A				
15					A	A	280	316	336	352	368	372	A	376	384	368	344	296	A	A				
16					B	232	280	320	356	368	360	372	U A	A	A	A	320	336	296	A	A			
17					A	A	268	324	352	360	368	372	380	356	A	372	352	296	256	A				
18					B	208	280	316	364	B	A	400	404	388	396	A	352	312	A	A				
19					B	244	296	328	352	384	396	A	A	A	A	356	356	312	232	A				
20					B	216	276	328	368	380	A	A	376	392	376	368	340	272	A	A				
21					A	216	280	316	352	368	A	A	A	A	368	372	340	276	A	A				
22					A	200	256	A	364	368	372	A	A	396	372	A	A	304	240	A				
23					A	A	276	328	352	376	384	388	A	388	376	348	340	292	A	A				
24					B	204	292	328	356	376	384	384	A	376	A	A	348	316	248	A				
25					B	208	272	328	356	376	396	404	388	U A	A	A	A	A	A	A				
26					B	216	280	324	352	376	A	A	A	392	396	368	344	308	240	A				
27					B	A	276	328	356	368	372	384	372	A	A	A	336	292	240	A				
28					B	208	292	324	372	372	384	400	400	392	384	368	340	280	240	A				
29					A	236	268	316	348	356	A	A	U A	A	A	324	332	304	232	A				
30					B	192	272	304	344	368	A	A	A	A	A	396	A	300	224	A				
31					B	U A	A	A	A	A	A	A	A	A	A	368	332	300	A	A				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT					1	23	31	28	30	27	22	20	15	15	13	18	18	23	18	1				
MED					172	216	280	324	352	368	380	380	376	388	376	366	340	300	240	176				
U Q					232	288	328	356	372	388	388	388	392	386	368	348	308	248						
L Q					204	276	316	348	364	372	372	360	372	364	348	336	292	240						

JUL. 2023 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

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

JUL. 2023 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	E 16	E 16	E 16	E 16	G 13	24	32	40	45	41	45	46	56	46	43	40	42	41	54	51	E 16	E 16	E 16	E 16	17	
2	E 16	E 16	E 16	E 16	E 16	15	28	38	54	58	61	A 94	49	46	56	44	41	39	31	27	25	47	E 16	E 16	E 16	17
3	E 16	E 16	E 16	E 16	E 16	18	26	36	38	41	A 55	47	47	42	40	42	40	51	36	42	33	21	E 14	E 16	E 16	16
4	E 16	E 16	E 16	E 16	E 16	19	25	31	36	49	54	58	45	42	57	44	37	36		G 27	34	28	E 16	E 16	E 16	16
5	E 16	E 16	E 16	E 16	E 16	17	28	34	40	43	44	48	53	42	46	40	G 32	34	30	27	22	E 16	E 16	E 16	E 16	16
6	E 16	E 16	E 16	E 16	E 16	16	25	31	36	36	42	44	42	41	42		G 39	34	32	31	40	18	22	E 16	E 16	16
7	E 16	E 16	E 16	E 16	E 16	17	25	33	38	39	42	48	43	43	41	50	42	39	38	30	46	E 16	E 16	E 34	E 16	16
8	E 16	E 16	E 22	E 36	47	42	38	46	47	41	A 69	A 67	A 96	A 63	A 67	A 83	A 45	A 44	A 28	20	51	E 16	E 16	E 16	16	
9	C	19	25	E 16	23	32	43	62	64	80	55	47	41	42	A 114	38	36	A 113	A 91	A 117	21	41	E 16	E 16	18	
10	E 16	E 16	E 16	E 15	17	34	61	C 129	A 61	52	57	89	52	A 69	44	A 96	A 145	A 120	A 210	54	44	35	31	E 16	E 16	16
11	25	23	18	21	25	29	61	A 169	A 156	54	46	58	129	A 114	45	41	46	52	50	22	62	42	E 16	E 16	E 16	16
12	E 16	E 16	E 16	E 16	19	44	45	49	46	53	A 105	55	54	44	A 140	A 150	A 170	35	48	34	21	23	22	E 16	E 16	16
13	26	25	E 16	27	36	47	51	55	48	43	45	45	52	64	57	41	38	34	28	23	19	22	44	26	E 16	16
14	E 16	E 16	E 22	E 16	17	25		G 34	42	66	A 121	56	52	45	61	A 129	A 93	A 34	61	49	40	44	A 83	A 25	E 16	16
15	E 16	E 16	E 16	E 26	40	27	36	68	42	56	A 61	59	A 127	54	48	46	A 206	A 300	A 31	26	21	41	49	20	E 16	16
16	E 16	E 16	E 16	E 16	16	28	40	46	49	55	42	50	41	40	39	40	38	40	44	27	21	32	21	E 16	E 16	16
17	E 16	21	26	E 16	23	24	32	40	50	50	44	57	51	52	44	48	39	33	36	20	E 16	E 16	E 16	E 16	E 16	16
18	E 16	E 16	E 16	E 16	16	26	32	37	42	E 46	48	56		G 43		G 38	38	37	32	20	19	23	E 16	E 16	E 16	16
19	17	E 16	E 16	E 16	E 16	G	34	36	38	G	G	44	50	45	44	41	G	G	28	48	18	E 16	E 16	E 16	E 16	16
20	E 16	E 16	E 16	E 16	E 16	28	33	37	G	G	45	44	46	76	50	62	44	67	26	37	35	51	53	28	E 16	16
21	21	E 16	E 16	E 16	20	39	38	41	50	48	53	53	46	45	44		G 45	50	A 82	A 42	A 119	52	36	E 16	E 16	16
22	23	22	24	E 16	20	40	A 128	36	G	49	59	55	A 123	45	46	41	35	52	50	21	63	E 16	50	A 85	E 16	16
23	37	36	31	36	21	25	51	36	48	A 96	72	A 99	A 188	64	56	40	57	35	33	25	20	E 16	33	19	E 16	16
24	18	21	E 16	E 16	E 16	24	31	40	46	A 46	A 75	57	43	44	41	40	G	34	29	25	19	40	24	E 16	E 16	16
25	21	E 16	E 16	E 16	E 16	24	32	42	48	51	49	44	46	52	42	49	46	36	43	21	E 16	E 16	E 16	E 16	E 16	16
26	27	E 16	E 16	E 16	E 16	25	34	38	42	41	40	46	42		G 52	G 40	35	37	20	E 16	E 16	E 16	E 16	E 16	E 16	16
27	25	E 16	E 16	E 16	E 16	24	32	37	44	47	42	44	42	42	40	37	36	44	26	22	22	22	E 16	E 16	E 16	30
28	18	E 16	E 16	E 16	E 16	28	33	40	53	A 99	48	48	46	48	48	55	38	31	33	29	31	34	E 16	E 16	E 16	19
29	35	24	44	37	24	G	33	43	58	52	50	44	51	45	42	36	37	35	34	25	E 16	E 16	E 16	E 16	E 16	16
30	E 16	E 16	E 16	E 16	E 16	24	35	36	38	G	41	45	46	55	43	28	G 96	A 53	34	44	43	24	E 16	E 16	E 16	16
31	E 16	E 16	E 16	E 16	E 16	29	34	37	37	42	44	53	50	51	50	G	46	36	40	19	19	30	E 16	E 16	E 16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	30	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	E 16	E 16	E 16	E 16	17	26	34	40	46	49	48	49	46	46	44	41	39	36	34	27	21	22	E 16	E 16	E 16	
U Q	21	19	18	16	21	29	40	46	50	55	A 59	56	A 54	55	50	48	A 51	50	48	42	35	41	34	22		
L Q	E 16	E 16	E 16	E 16	E 16	24	32	37	41	42	44	45	42	43	42	38	36	34	29	22	E 18	E 16	E 16	E 16	E 16	

JUL. 2023 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

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

JUL. 2023 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1		283	277	286	286	298	268	274	288	316	278	295	290	296	287	281	298	296	290	302	306	292	280	284	274	
2		282	260	F	296	294	286	F	289	332	317	A	275	284	289	290	298	286	282	273	292	287	286	288	309	
3		278	265	274	274	255	265	292	332	278	A	247	251	288	243	280	284	296	295	285	289	275	276	288	279	
4		279	277	282	305	291	272	296	292	301	295	304	280	300	290	295	282	288	292	300	302	300	278	F	282	
5		278	279	282	F	333	311	306	296	263	290	275	262	239	256	279	291	277	281	288	293	286	291	J R	290	
6		281	290	286	282	287	262	298	326	311	309	280	274	278	283	301	283	278	286	290	285	277	274	274	291	
7		301	274	264	V	259	262	263	252	265	281	279	245	243	277	243	243	254	263	278	280	270	269	265	281	330
8		273	265	F	267	A	272	280	A	248	264	A	A	A	A	A	A	A	277	278	289	275	278	286	274	
9	C	293	287	305	F	310	322	297	286	290	307	285	279	279	296	A	281	291	A	A	A	295	288	285	274	
10		284	302	294	265	288	280	317	C	A	282	317	305	A	286	A	267	A	A	A	A	290	304	291	273	
11		271	278	287	F	279	295	276	A	A	311	294	290	A	A	285	294	295	293	298	295	303	272	F	F	
12	J R	271	J R	277	F	279	288	286	296	278	313	A	248	262	284	A	A	A	284	285	279	285	280	267	281	
13		279	280	286	276	274	315	278	292	294	302	280	284	290	A	270	296	297	304	307	296	279	267	F	279	
14		271	293	291	287	283	296	287	293	292	292	A	286	282	273	276	A	A	286	299	300	283	265	A	277	
15		263	264	264	F	263	278	293	254	271	294	274	A	A	A	261	270	270	A	A	287	286	279	275	274	273
16		292	286	280	276	291	280	278	302	291	283	272	302	287	292	291	298	295	292	301	315	290	285	279	286	
17		F	274	F	F	310	289	268	312	315	274	293	303	262	285	276	292	275	272	271	274	284	272	303		
18		277	276	272	274	274	277	274	317	267	259	276	244	263	262	272	300	301	288	286	291	281	279	271	269	
19		271	271	283	299	309	319	297	288	298	281	296	285	288	288	297	302	298	298	302	282	287	292	279	279	
20		284	284	294	275	278	298	294	289	316	314	307	293	301	285	293	296	290	R	275	307	293	284	284	280	280
21		283	273	290	291	278	270	277	286	279	336	283	288	272	277	272	291	293	293	A	283	A	273	262	292	
22		276	254	271	276	284	292	A	292	282	271	288	266	A	301	294	307	287	296	282	289	298	267	276	A	
23		F	266	274	265	269	287	281	298	297	A	A	A	A	302	277	284	293	304	285	277	289	296	271	280	
24		274	284	285	285	260	269	287	271	289	270	A	276	286	302	287	292	303	291	304	301	278	268	287	257	
25		F	289	288	282	272	270	283	298	299	315	300	293	306	312	305	286	302	298	296	311	274	271	276	283	
26		267	275	273	272	276	284	270	302	317	300	272	299	286	272	266	293	277	297	285	282	282	269	274	276	
27		269	272	266	267	260	268	303	296	R	H	283	258	276	262	289	311	289	304	295	297	292	279	282	281	286
28		275	277	271	275	273	307	365	307	306	A	309	302	299	286	289	298	317	294	294	290	273	270	303	F	284
29		267	F	276	288	277	299	286	269	287	270	282	272	277	283	294	285	312	A	306	301	299	273	273	276	281
30		271	280	292	290	271	272	308	276	259	297	298	269	282	281	282	272	A	294	307	311	272	275	287	269	
31		281	269	269	276	259	290	277	277	278	294	285	261	276	271	298	281	284	284	297	286	280	277	287	274	
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT		29	31	28	29	29	31	30	28	29	28	24	28	25	28	27	28	25	28	28	29	30	31	28	29	
MED		277	276	282	276	278	286	286	292	291	293	284	280	284	284	285	290	293	292	295	291	282	277	280	280	
U Q		282	284	287	290	290	298	297	298	304	310	297	292	293	290	294	297	300	296	301	300	289	284	286	286	
L Q		271	269	272	273	272	270	277	282	278	278	274	268	276	272	276	282	286	284	285	284	275	271	274	274	

JUL. 2023 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1						L			L				A					A	A						
2					L		L	A	A	A	A	A	352	A	378	384	372	U L	L						
3					318	351	375	389	390		A	390	359	385	384	417	372	A U	L	A					
4							345	372	L	A	A	A	382	378	A	368	352	348	347	L					
5					L		L	374	374	374	403		A	408	366	388	385	360	U L	L					
6					L		L	382	383	392	379	393	381	372	374	337	L	L U	L	L					
7					319	348	359	381	394	378		A	411	395	395		A	367	387	329	U L	L			
8							A	A	A	400		A	A	A	A	A	A	A	A	A					
9							A	A	A	A	A	A	390	384		A	H	H	A	A	A				
10					360		A	C	A	A	A	A	A	A	A	A	A	A	A	A	A				
11							A	A	A	A	A	A	A	A		351	381		A	A	A				
12						A	A	A		A	A	A	A			A	A	A	L	A					
13						A	A	A	A					396					329						
14							L	365	387		A	A	A			A	A	A	L	A					
15					L		A	A		A	A	A	A	A	A	A	A	A	A	L					
16					353			A	A	A	U L	A	390	411	380	388	392		L						
17						L		374		A	A	H	A	A	A	395		380	333	L					
18					323	346	357	379	387	386		A	370	369	364	362	346	U L	L						
19								L U	L			402	407	331	A	367	A	367	359	L	L				
20					L			363	389	459	373	409	426		340			A	L	A	L				
21						L		368	362	359		A	A	355	342	380	369		A	A	A				
22							A	390	360	333		A	A	A	389	407	372	349	H U	L	A	A			
23					U L		A	368		A	A	A	A	A	A	A	U L	A	L	A					
24					U L		348	345	362		A	A	A	391	389	376	346	U L	U L	L	L				
25						L		A		A	A		415	351		381		A	L U	L	A				
26					L	L		359	389	399	372	363	421	380	369		A	H	359	344					
27					L	L		339	367	359		362	375	399	401	364	370	384	379	A	L				
28						L		353	388		A	A	392	424		A	A	A	378	352	A				
29						L U	L	367		A	A	A		378		378	367	367	L	L					
30					L		328	349	372	348	415	419	399	377		A	385	359	A	A	A				
31					L		350	347		396	399	392		A	A	A	A		A U	L	A				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT					2	11	12	18	14	15	14	14	16	17	19	21	16	16	3						
MED					318	348	363	370	386	399	388	392	388	380	376	369	364	344	354						
U Q					L	L		353	368	381	390	403	393	409	398	389	385	383	378	350	358				
L Q					L		339	346	362	374	387	375	372	374	368	367	358	354	336	342					

JUL. 2023 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

JUL. 2023 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						310	358	352	304	390	360	328	350	362	376	326	330	322	E A 292					
2					280		282	286	252	296	A	418	376	364	340	328	344	340	324					
3					376	372	314	276	400	A	534	524	400	588	404	402	348	338	326					
4							282	286	304	308	312	374	334	336	336	366	346	326	288					
5						262	280	326	400	364	420	460	540	486	404	374	384	334	326					
6						228	266	240	270	304	334	374	346	322	316	334	288	302	302					
7					354	370	430	416	378	428	554	548	422	556	560	498	458	378	304					
8						332		A	504	468	A	A	A	A	A	A	A	398	334					
9						254	356	314	E A 358	340	382	376	322		A	378	324	A	A	A				
10					322	258	C	A	E A 382	314	350		A	378	A	436	A	A	A	A				
11						332	A	A	288	350	342	A	A		372	336	336	336	304					
12						298	268	304	382	320	A	502	452	380		A	A	A	364	320				
13					E A 272	342	312	334	310	410	386	370	E A 430	430	338	318	304	264						
14						276	282	346	356	A	364	366	384	374		A	A	E A 322	340					
15					312	274	E A 354	328	430	A	E A 536	A	A	440	440	422	A	A	288					
16						336	312	318	362	422	312	354	268	352	326	324	316							
17						252		414	292	302	388	312	354	450	328	414	352	366	332					
18						376	384	326	448	452	434	534	440	456	414	328	308	320	284					
19									248	268	336	366	342	322	316	316	312	278	262					
20						266		306	274	272	284	336	312	E A 388	324	330	306	E A 350	266					
21						296	290	334	230	294	344	400	362	342	330	302	E A 284	A						
22						A	264	304	362	326	366	A	A	310	322	298	320	316	310					
23					E A 310	346	314	282	A	E A 416	A	A	A	334	410	346	360	294	274					
24						324	326	400	362	402	A	388	346	324	378	354	318	310	284					
25							268	274	276	282	276	328	290	298	320	364	304	292	282					
26						300	334	282	254	292	420	332	372	410	426	328	342	298						
27					332	318	290	280	324	372	442	422	426	380	334	334	334	330	290					
28						276		330	328	A	340	322	308	366	356	324	274	332	264					
29						282	306	388	E A 348	390	364	408	392	366	354	350	288	274						
30						354	286	308	436	338	352	400	378	386	400	370	A	306	262					
31						302	338		390	352	390	464	436	446	372	398	372	356	294					
	00	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	20	26	26	29	28	25	29	25	29	27	28	25	28	25					
MED					343	306	297	308	326	342	356	374	372	372	372	342	324	322	291					
U Q					365	323	336	352	380	386	420	441	411	435	404	376	347	339	322					
L Q					306	274	276	282	287	299	330	339	346	329	334	328	307	303	278					

JUL. 2023 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

JUL. 2023 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

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	250	244	254	272	220	226	194	234	A	188	208	E A 238	A	234	202	218	232	E A 270	A	E A 266	226	246	244	276	
2	254	284	290	238	254	218	242	A	A	A	A	E A 278	252	A	208	198	226	224	226	262	E A 274	256	234	224	
3	214	272	252	258	276	240	236	216	206	A	230	270	200	220	190	208	A	216	A	292	E A 280	264	238	248	
4	262	250	256	220	280	232	228	200	A	A	A	212	192	A	216	194	206	210	234	256	240	236	254	268	
5	258	258	246	240	216	224	220	216	222	218	E A 250	A	190	238	202	204	212	204	224	260	254	248	248	238	
6	254	254	256	266	240	206	216	204	184	194	204	180	172	222	212	204	204	202	228	E A 276	262	274	272	226	
7	210	192	244	280	276	232	228	216	204	220	E A 246	198	210	198	A	236	218	282	260	E A 324	260	276	E A 286	220	
8	294	312	E A 300	E A 352	E A 426	E A 358	E A 264	A	A	220	A	A	A	A	A	A	A	A	A	E A 272	E A 272	E A 342	E A 250	268	
9	C 254	E A 274	E A 246	E A 218	E A 238	A	A	A	A	A	E A 230	188	172	A	188	196	A	A	A	A	258	276	246	268	
10	266	232	230	276	226	236	A	C	A	A	A	A	A	A	A	E A 314	A	A	A	A	E A 302	E A 266	E A 266	E A 278	
11	E A 310	E A 268	268	E A 244	E A 266	252	A	A	A	A	E A 246	A	A	A	248	220	A	A	A	A	244	E A 304	E A 316	E A 284	292
12	270	270	250	298	282	A	A	A	214	A	A	A	A	220	A	A	A	224	A	E A 272	256	266	294	272	
13	E A 280	E A 278	E A 248	E A 300	E A 316	A	A	A	E A 282	198	216	196	A	A	216	204	208	240	232	242	314	330	282	282	
14	262	250	E A 260	E A 252	E A 270	232	212	182	210	A	A	A	A	230	A	A	A	230	A	294	E A 290	E A 332	E A 276	276	
15	278	292	286	E A 320	E A 316	214	250	A	204	A	A	A	A	E A 338	E A 282	A	A	A	248	282	E A 262	E A 292	E A 312	280	
16	240	248	242	268	262	216	266	A	A	A	190	180	178	192	208	204	270	264	244	236	266	274	266	266	
17	250	280	E A 282	252	250	224	224	224	A	A	196	A	E A 272	E A 214	E A 288	208	226	300	256	246	240	254	224	224	
18	236	254	280	282	300	242	238	222	224	224	242	A	196	212	208	212	228	232	260	262	242	266	260	264	
19	264	272	264	236	234	228	218	198	188	184	166	218	E A 270	E A 234	E A 208	196	206	206	220	E A 278	256	236	246	270	
20	236	242	246	258	266	238	218	206	184	172	218	178	174	276	264	222	258	260	288	316	280	280	280	280	
21	268	258	250	230	294	284	256	264	260	A	E A 336	E A 236	242	230	212	252	A	A	E A 268	E A 322	E A 324	E A 240	E A 240	240	
22	E A 278	E A 296	E A 288	242	252	266	A	222	200	324	A	A	A	190	206	190	216	A	A	238	306	252	318	A	
23	E A 308	E A 318	E A 300	E A 322	E A 306	220	A	212	A	A	A	A	A	E A 326	E A 196	A	250	A	A	262	244	242	296	266	
24	270	258	252	240	270	254	226	226	E A 260	208	A	A	194	212	194	218	214	222	244	246	248	310	276	272	
25	E A 294	252	234	248	268	222	222	246	A	E A 246	258	180	222	198	300	A	232	A	242	248	260	268	276	276	
26	E A 294	264	266	252	286	240	232	230	212	192	170	232	184	220	202	A	210	242	268	244	232	258	268	E A 292	
27	E A 286	264	292	288	300	226	212	220	E A 240	242	184	190	178	226	186	186	216	A	244	264	262	262	240	E A 280	
28	E A 272	266	276	280	288	244	232	208	A	A	208	190	E A 272	E A 248	E A 252	A	220	198	A	258	E A 272	E A 308	E A 238	E A 252	
29	E A 314	E A 304	E A 318	E A 268	284	236	226	254	A	A	A	194	E A 328	216	212	200	240	244	254	244	248	276	262	258	
30	264	256	240	234	268	240	256	200	200	168	182	206	210	A	210	234	A	A	E A 260	E A 320	E A 284	E A 244	E A 276	276	
31	262	258	288	276	306	258	234	220	186	190	232	A	E A 382	A	A	198	A	242	A	250	260	276	244	246	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	31	31	31	31	29	24	22	18	16	18	17	20	19	23	25	20	21	16	29	30	31	30	30	
MED	258	256	255	253	269	234	226	217	205	203	202	198	194	220	207	204	214	225	243	253	250	E A 266	254	258	
U Q	E A 280	E A 278	E A 286	E A 280	E A 294	E A 243	E A 240	E A 226	E A 224	E A 222	E A 242	E A 235	E A 244	E A 234	E A 230	E A 227	E A 227	E A 243	E A 260	E A 272	E A 272	E A 292	E A 286	E A 276	
L Q	254	252	248	242	252	224	219	206	200	189	190	190	186	212	202	197	206	209	227	245	246	256	246	248	

JUL. 2023 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

JUL. 2023 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					122	102	102	100	100	96	96	96	96	A	A	96	A	96	96	A				
2					A	96	98	98	96	96	96	A	96	96	96	A	A	A	A	A				
3					A	100	98	96	96	A	100	98	A	A	96	96	A	A	A	A				
4					A	A	100	100	100	100	98	98	98	A	A	A	A	98	102	A				
5					A	102	100	98	98	100	100	100	100	A	A	A	A	A	A	A				
6					B	104	98	98	96	98	98	98	A	98	98	A	A	100	A	A				
7					A	104	102	100	100	100	100	100	100	A	A	104	106	100	102	108				
8					A	108	102	98	98	98	98	98	A	98	A	96	A	A	102	A				
9					A	102	102	100	92	96	96	96	A	A	A	A	A	98	96	A				
10					A	108	98	96	96	96	96	96	96	A	96	A	100	100	100	A				
11					A	A	98	98	98	98	98	A	98	98	A	A	96	100	100	A				
12					A	100	94	94	98	98	98	98	A	A	A	A	94	A	A	A				
13					A	A	98	98	94	A	A	A	A	102	102	102	A	A	102	A				
14					A	A	100	A	A	A	A	A	100	A	A	A	A	A	104	A				
15					A	A	104	100	100	98	98	98	A	98	98	100	100	100	A	A				
16					B	104	100	98	98	98	98	98	A	A	A	96	100	100	A	A				
17					A	A	100	100	100	96	96	96	96	96	A	96	100	100	100	A				
18					B	104	104	100	100	B	A	100	100	100	100	A	100	100	A	A				
19					B	104	98	98	98	98	98	A	A	A	A	100	96	98	100	A				
20					B	100	98	96	96	96	A	A	96	98	98	98	98	98	A	A				
21					A	98	98	98	96	96	A	A	A	A	96	96	98	98	A	A				
22					A	98	96	A	98	98	98	A	A	98	98	A	A	102	104	A				
23					A	A	100	98	98	98	98	96	A	98	98	98	98	100	A	A				
24					B	108	102	102	100	100	100	100	A	100	A	A	100	104	104	A				
25					B	104	98	98	98	98	98	98	98	98	A	A	A	A	A	A				
26					B	104	100	100	100	100	A	A	A	100	98	100	100	100	100	A				
27					B	A	100	100	100	100	100	100	100	A	A	A	100	100	102	A				
28					B	106	100	100	100	100	100	100	100	100	102	102	102	98	102	A				
29					A	110	100	100	100	100	A	A	100	A	A	98	104	102	102	A				
30					B	106	104	100	98	98	A	102	A	A	A	102	A	104	104	A				
31					B	104	98	A	98	98	A	A	A	A	A	98	98	98	A	A				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT					1	23	31	28	30	27	22	20	15	15	13	17	18	23	18	1				
MED					122	104	100	98	98	98	98	98	98	98	98	98	100	100	102	108				
U Q						106	102	100	100	100	100	100	100	100	99	101	100	100	102					
L Q						100	98	98	96	96	98	97	96	98	96	96	98	98	100					

JUL. 2023 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Wakkanai

JUL. 2023 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	B	94	B	90	90	128	118	108	102	102	164	96	92	90	92	120	98	100	100	98	94	94	94	94
2	94	86	88	96	112	110	106	98	98	98	98	88	98	94	94	90	90	90	90	100	96	100	98	98
3	B	94	92	92	116	114	104	102	102	102	98	92	108	92	96	98	92	90	108	108	110	98	96	B
4	B	B	86	90	174	124	148	126	102	102	100	102	102	92	180	98	96	G	110	102	100	100	94	94
5	92	92	92	94	130	110	110	108	104	100	98	96	96	92	92	92	132	132	132	98	100	100	B	92
6	92	102	86	B	B	126	146	108	138	106	98	104	98	184	G	94	88	116	100	102	102	96	94	96
7	84	B	B	B	128	114	108	104	108	104	102	100	100	100	98	118	112	104	106	106	104	100	96	94
8	92	88	116	106	104	102	102	98	100	100	90	90	90	90	92	90	88	88	108	102	100	98	98	94
9	88	92	84	94	86	110	108	102	100	96	90	92	92	88	92	98	102	102	98	92	98	94	96	90
10	92	90	104	118	88	108	106	98	98	98	100	100	92	98	90	88	102	100	98	98	98	92	92	92
11	88	88	92	82	80	88	98	96	92	100	98	88	88	92	90	90	112	104	100	100	94	96	98	94
12	106	86	104	94	104	100	98	96	100	102	94	92	88	92	98	98	94	104	98	84	102	102	102	88
13	98	98	96	88	92	96	108	100	102	108	102	100	96	96	106	116	94	92	102	98	98	96	96	92
14	86	100	80	78	92	112	G	156	108	94	90	92	98	94	92	90	88	96	100	100	100	98	98	94
15	100	92	112	92	110	90	108	96	100	100	100	94	90	98	108	104	98	98	102	92	96	94	90	90
16	90	96	86	86	114	106	104	104	100	98	94	92	98	102	100	98	114	98	92	86	86	82	82	84
17	96	88	80	84	92	98	100	102	100	98	102	94	96	94	98	102	110	110	114	104	96	100	100	B
18	88	92	92	B	116	108	112	104	102	B	96	96	G	100	G	100	108	104	98	104	96	94	120	94
19	88	B	B	108	B	G	98	96	106	G	G	94	94	96	98	100	G	G	108	98	94	100	88	88
20	108	92	84	84	B	100	106	104	G	G	152	94	92	98	110	100	G	100	94	102	98	94	96	96
21	96	96	88	100	94	100	108	104	98	98	90	90	100	98	98	G	100	100	88	88	84	90	90	94
22	94	86	86	92	104	102	92	92	G	94	94	94	92	106	100	98	112	102	102	98	98	96	92	92
23	90	88	86	88	90	94	98	114	104	94	94	94	88	94	100	100	102	102	94	100	94	94	94	96
24	98	96	92	B	B	110	122	106	100	100	96	96	96	96	96	90	G	114	106	102	98	106	96	94
25	94	88	88	B	B	168	118	102	102	102	100	108	100	96	96	G	G	90	90	92	90	94	92	94
26	94	94	B	104	98	108	104	106	108	102	96	96	156	G	G	104	104	110	98	102	96	96	100	94
27	92	B	90	B	92	110	106	102	100	100	102	98	96	170	96	90	130	104	114	104	94	96	92	92
28	92	88	92	88	88	106	102	114	100	100	102	104	102	102	102	100	106	102	100	98	96	102	102	94
29	94	90	86	86	88	G	112	104	98	98	96	96	98	98	98	98	202	188	108	98	98	98	B	98
30	B	100	86	86	B	116	106	102	108	G	100	168	94	90	92	86	94	104	102	96	96	96	96	94
31	B	90	96	B	108	100	98	92	100	96	94	92	92	94	92	G	106	102	98	98	94	92	B	B
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	27	27	24	25	29	30	31	29	27	30	31	30	30	28	29	29	29	31	31	31	31	28	28
MED	92	92	88	91	98	108	106	102	100	100	98	94	96	96	97	98	102	102	100	98	96	96	96	94
U Q	96	96	92	95	113	113	110	106	104	102	100	100	98	98	100	100	111	104	108	102	100	100	98	94
L Q	90	88	86	86	90	100	102	98	100	98	94	92	92	92	92	90	94	97	98	98	94	94	93	92

JUL. 2023 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		F1		F2	L1	CL11	C2	C2	C2	C1	HC12	C2	L3	L3	L2	CL11	CL22	C4	C6	C6	F2	F2	F2	F3
2	F1	F4	F4	F2	CL12	C2	C3	C2	C5	C3	C3	L2	C1	L3	L2	L2	L3	L2	L3	C4	F6	F2	F1	F3
3		F1	F1	F1	C2	C2	C2	C2	C2	C1	C2	L2	CL11	L1	C1	C1	L2	L2	CL22	C4	FF24	F3	F2	
4			F2	F1	H1	C2	H1	C1	C3	C2	C2	C1	C1	L2	HL11	C1	C2		C3	C4	F5	F1	F3	F1
5	F4	F3	F5	F1	H1	C2	C2	C2	C2	C2	C2	C2	C2	LQ11	L1	L2	HL11	HL12	HL12	C4	F3	F1		F2
6	F1	F1	F1			C2	H1	C1	H1	C2	C1	C1	C1	H1		L1	L3	H1	CL32	C6	F6	F3	F2	F1
7	F1				C2	C1	C2	C2	C1	C1	C2	C1	C2	CQ11	C2	C1	C1	C3	C4	C8	F4	F2	FQ41	FQ21
8	F4	F2	F2	F8	C4	C7	C3	C3	C2	C1	L2	L4	L3	L3	L2	L3	L3	C3	C5	F9	F7	F3	F5	
9	F5	F4	F4	F1	L3	C3	C5	C4	C4	C4	C3	L2	L1	L2	L4	L1	L2	C6	C7	C9	F4	F7	F2	F3
10	F1	F1	F1	FF11	L1	C3	C5	C3	C5	C4	C2	C2	L2	C1	L3	L2	C4	C5	C7	C7	F4	F4	F5	F7
11	F6	F5	F4	F5	L3	L3	C3	C6	C5	C2	C2	L4	L5	LQ51	LQ21	L2	C2	C4	C5	C5	F4	FQ61	FQ71	F4
12	F4	F4	F3	F1	C2	C6	C3	C2	C1	C2	C3	L3	L3	L2	L1	C3	CQ51	C7	CL22	CL22	L7	FF75	FF44	FF54
13	FF53	FF43	FF35	FF55	L5	C4	C5	C3	C2	C1	C1	C2	C2	C1	C2	C1	L2	L3	C3	CL24	FF34	FQ31	FQ51	F4
14	F4	FF22	FF55	F2	L1	C1		HL11	C1	L4	L4	L3	L2	LQ21	L4	L7	L4	L3	C6	C7	F7	F5	F9	F4
15	F2	F4	FF22	F6	C4	L2	C3	C3	C2	C3	C3	L3	L4	C2	C2	C2	C5	CQ51	C4	L3	F6	F5	F7	FQ41
16	F3	F2	F3	F2	C1	C3	C3	C3	C3	C2	C2	L2	L1	L1	L1	CQ11	CL22	CL32	L3	L4	F8	F6	F3	F5
17	F5	F5	FQ31	FQ21	LQ31	C1	C2	C2	C2	C2	C1	L3	L2	L2	C2	C2	C2	C1	C3	C3	F5	F2	F1	
18	F4	F1	F1		C1	C3	C2	C3	C1		C1	C2		C1		C1	C1	C2	C4	C2	F4	F7	FF12	F1
19	F2			F1			C3	C2	C1			L2	L2	L3	C2	C2			C2	C6	C5	FQ21	FQ21	F2
20	F1	F1	F1	F1	C3	C2	C2				HC11	L2	L2	C4	C2	C4	C3	L6	C3	C4	F4	F6	F5	F5
21	F6	F2	F2	F2	L4	C3	C3	C3	C4	C4	L2	L3	CH11	C2	C2		C3	C3	L5	L5	F5	F5	F5	F3
22	FQ41	FQ41	F55	F55	CL22	C4	L4	LQ21		L2	L3	LQ21	LQ31	C1	C2	C2	CL13	C4	C2	C3	F8	F8	F9	FQ81
23	F5	F7	F8	FQ61	LQ31	L2	C4	C2	C3	C4	L4	L6	L6	L3	C3	C2	C4	CQ41	LQ31	C4	F5	F4	F9	F7
24	F6	F6	F2		C2	C2	C2	C2	C2	C3	C2	C2	C1	C1	L2			CL22	C2	C2	F4	F4	FQ41	F3
25	F2	F5	F4			HC11	C2	C2	C2	C2	C2	C1	C2	C2	C2	L3	L3	L3	L4	L3	F4	F3	FF21	F4
26	F6	F2		F1	C3	C2	C2	C2	C2	C1	C1	CH11	HC11			C2	C2	C2	C4	C2	F3	F2	F5	F8
27	F6		F2		L1	C3	C3	C2	C2	C2	C2	C2	C1	HC11	L1	L2	L1	L2	C2	C4	F3	F3	F2	F4
28	F4	F2	F2	F2	L1	C4	C2	C2	C4	C2	C2	C1	C2	C2	C2	C3	C1	C2	C3	C5	F6	F5	F3	F4
29	F4	F5	F6	F6	L4		C2	C2	C3	C3	C2	C1	L2	C2	C1	L1	L1	HL11	CL22	CL22	F2	F2		F3
30		F1	F1	F1		C1	C2	C2	C1		C1	HC11	L2	L3	L1	L1	L2	C3	C4	L4	F6	F5	F2	F2
31		F2	F2		C2	C3	C3	L2	C2	C2	L2	L2	L2	L2	L3		C3	C4	C3	C3	F4	F3		
	00	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																								

JUL. 2023 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	X 92	X 94	X 86	X 77	X 76																X 81	X 81	X 86	X 86	
2	X 83	X 78	X 90	X 84	X 72	78																X 97	X 97	X 90	X 87
3	X 88	X 86	X 94	X 84	X 79	79	73															X 76	X 74	X 82	X 76
4	X 78	X 78	X 77	X 70	X 68																	X 80	X 81	X 81	X 86
5	X 84	X 82	X 78	X 78	X 71																	X 84	X 82	X 84	X 83
6	X 85	X 84	X 82	X 77	X 77																	X 90	X 95	X 95	X 98
7	X 93	X 88	X 78	X 74	X 69																	X 82	X 82	X 83	X 86
8	X 77	X 84	X 79	X 79	X 81	83																X 70	X 73	X 74	X 74
9	X 71	X 74	X 70	X 65	X 63																	A	X 87	X 92	X 93
10	X 95	X 94	X 94	X 92	X 87		85															X 88	X 79	X 79	X 83
11	X 84	X 86	X 82	X 87	X 73																	X 90	X 86	X 86	X 86
12	X 83	X 82	X 90	X 90	X 92																	X 87	X 86	X 86	X 84
13	X 83	X 78	X 79	X 74	X 70																	X 84	X 83	X 86	X 82
14	X 84	X 92	X 89	X 84	X 78																	X 80	X 80	X 81	X 86
15	X 91	X 84	X 86	X 80	X 74																	X 88	X 86	X 88	X 88
16	X 84	X 89	X 90	X 81	X 80																	X 90	X 93	X 94	X 92
17	X 89	X 85	X 82	X 77	X 71																	X 102	X 92	X 89	X 93
18	X 89	X 84	X 78	X 74	X 80																	X 87	X 86	X 87	X 86
19	X 86	X 90	X 91	X 92	X 76																	X 94	X 93	X 94	X 95
20	X 94	X 93	X 83	X 80	X 79																	X 98	X 99	X 93	X 92
21	X 89	X 85	X 85	X 79	X 73																	X 92	X 96	X 95	X 97
22	X 92	X 89	X 86	X 85	X 82																	X 89	X 90	X 90	X 81
23	X 81	X 78	X 76	X 76	X 74																	X 92	X 95	X 91	X 91
24	X 91	X 88	X 81	X 84	X 83																	X 82	X 88	X 89	X 89
25	X 81	X 88	X 91	X 90	X 84																	X 81	X 86	X 88	X 88
26	X 83	X 76	X 78	X 77	X 77																	X 92	X 81	X 82	X 80
27	X 74	X 76	X 70	X 74	X 78		104															X 80	X 86	X 90	X 90
28	X 87	X 90	X 89	X 79	X 87																	X 86	X 88	X 86	X 86
29	X 82	X 82	X 78	X 77	X 78																	X 76	X 79	X 84	X 80
30	X 73	X 72	X 73	X 65	X 61																	X 80	X 78	X 88	X 84
31	X 80	X 80	X 72	X 71	X 68																	X 83	X 78	X 82	X 78
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	3	3														30	31	31	31	
MED	X 84	X 84	X 82	X 79	X 77	79	85														X 86	X 86	X 87	X 86	
U Q	X 89	X 89	X 89	X 84	X 80	83	104														X 90	X 92	X 90	X 91	
L Q	X 81	X 78	X 78	X 74	X 71	78	73														X 81	X 81	X 83	X 83	

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

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

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

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

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		86	88	80	71	70	72	82	83	74	66	74	81	87	83	82	80	80	80	72	75	75	75	80	80	
2		76	F 69	F 68	F 64	F 69	F 69	88	87	76	68	72	72	A	81	A	A	77	85	85	85	91	91	84	81	
3		82	80	F 72	F 73	70	F 65	64	A	A	A	64	67	A	68	A	62	63	64	63	70	68	F 80	F 81		
4		72	72	71	64	62	65	83	90	87	71	72	77	78	83	88	88	89	86	87	85	74	75	74	80	
5		78	76	72	72	65	67	80	84	75	73	71	68	66	68	69	71	70	A	72	78	78	F 76	F 78	F 77	
6		79	78	76	71	71	72	95	84	70	74	78	86	94	98	92	83	80	A	88	87	84	F 86	F 86	F 86	
7		87	82	72	68	63	F 64	68	62	66	A	56	58	63	61	58	A	A	A	67	72	76	76	77	80	
8		71	78	F 73	F 73	F 67	F 73	70	59	A	60	58	63	69	62	58	59	A	59	61	59	64	67	68	68	
9		F 65	F 68	F 59	F 59	F 57	F 63	69	76	89	76	82	82	83	86	92	92	A	84	82	80	A 81	81	F 81	F 81	
10		F 80	F 80	F 80	F 80	F 80	F 80	75	86	82	83	86	A	77	77	80	74	A	79	80	90	83	73	73	F 75	
11		F 72	F 70	F 81	F 80	F 89	87	83	A	94	98	94	89	90	93	92	88	A	90	87	86	86	84	80	80	80
12		77	76	81	80	89	87	83	A	84	86	90	84	78	76	A	68	69	77	85	81	80	80	80	78	
13		77	72	72	68	64	64	85	96	90	79	80	76	80	82	86	86	83	76	75	76	78	77	80	76	
14		F 76	F 76	F 74	F 74	72	71	76	80	82	80	84	88	88	89	87	92	90	92	96	88	74	74	75	F 75	
15		F 80	F 76	F 76	72	68	79	90	77	A	A	76	73	75	73	72	69	A	68	70	A	79	82	80	F 80	82
16		78	F 76	F 75	F 70	68	70	84	88	77	78	80	A	85	83	90	91	91	95	84	84	87	88	88	86	
17		83	79	76	71	65	63	69	72	83	76	73	78	76	78	85	88	83	74	73	89	96	86	83	87	
18		83	78	72	68	F 65	65	63	A	69	67	71	79	86	96	97	92	88	87	86	81	80	81	80	80	
19		80	F 83	85	86	70	66	72	88	86	74	78	87	100	107	104	96	91	88	90	90	88	87	88	89	
20		88	87	77	74	73	75	91	103	94	86	95	103	105	112	116	112	108	102	98	92	92	93	87	86	
21		F 81	79	79	73	67	67	94	103	A	92	98	97	96	99	105	106	96	86	83	82	86	90	89	91	
22		86	83	80	79	76	82	94	92	89	92	89	94	113	118	106	99	99	95	92	86	83	84	84	75	
23		75	72	70	70	68	66	71	82	H 76	H 84	86	84	94	93	82	82	80	H 84	H 88	88	86	89	85	85	
24		85	82	F 75	F 78	77	72	79	72	H 70	75	82	83	86	92	94	82	78	77	77	73	76	F 83	83	83	
25		75	79	F 78	F 80	80	83	97	110	114	110	98	98	97	98	99	89	84	77	76	75	80	82	82		
26		77	70	72	71	71	74	94	105	F 78	80	82	79	88	91	86	93	87	83	88	95	86	74	76	74	
27		F 68	70	F 64	F 68	72	80	F 103	U 103	A 84	109	101	98	106	97	94	80	73	72	73	74	74	80	84	84	
28		F 80	F 80	F 80	F 73	65	71	72	79	77	76	70	74	84	87	83	77	75	76	76	80	82	80	80	80	
29		76	76	72	71	72	78	83	81	H 83	81	88	89	101	103	101	93	89	82	73	70	70	73	F 78	F 73	
30		67	66	67	59	55	60	84	88	H 83	88	97	94	95	100	94	87	77	80	70	74	74	72	F 84	F 84	
31		F 69	F 66	F 66	F 65	62	69	83	92	86	88	87	88	89	80	81	71	68	71	73	81	77	72	75	72	
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT		29	27	24	27	27	31	30	31	25	28	30	30	29	30	30	27	28	29	30	31	30	29	29	26	
MED		77	76	72	71	70	69	81	84	83	80	82	82	87	86	87	88	83	82	78	82	80	80	80	80	
U Q		82	80	78	73	73	75	87	92	88	87	88	89	96	97	94	93	90	86	88	87	84	85	84	84	
L Q		74	72	72	68	65	65	71	76	76	74	74	73	76	80	81	80	77	73	73	75	75	74	78	76	

JUL.2023 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						L	L	L	H				A	A			L		L					
2							432	460	532	608	524	560			504	520	480							
3						L	A		A	A	A			A		A		U	L	L	L			
4						L	L	L	U	L	A							U	L	L	L			
5							472				A				508		488	468						
6							472	468	496	584		532	564	524	528	496	484	476						
7							L	L	A		A			R	A	U	L		A	L				
8					348	A	A	A	A		492	500		A	528	492		A	A	A	L			
9							412	468		480	496	508	504	500	504	484		A	464	380				
10							A	L	A	A	A	A		A			A	H						
11							520				584		520	536	512		492	460	392					
12							512				A	A	552	596	556			A	A	A				
13						A			L	L	A	A		540	524	548	524		A	A	A			
14							L	L	A	A	A		560	548		532			480	400				
15							392	456	572	516		616	560	576		516		A	A	A				
16								L	U	L	552	536	552	540	560			A	A	A				
17							U	L	A	A		528	A	532	508	520	488	484						
18							A		A	A	A	A	A	A	A	A		520		A	L			
19							U	L	U	L	524	560	564	536	548	540	460	476		L	L			
20					L	A	A	A	A		A	556	568	548	540	540	520		A	L				
21								L	L					H	H	H		516		L	L			
22							L		L					L						L				
23							476	544	552	552	572	540	532	536	540	512	480			L	L			
24							A	L	A	A	A	584	572	552		516		A	L	L				
25								L	A		A	A	A	A	A		556		A	L	A			
26						L	L	H	L					A		A	U	L	A					
27							468	568	572	532	604	548		560		532		A	A	A				
28						L	424	472		A	A		536	548		540		A	A	A				
29							A	L	A					H		536	536	492	476		L			
30							L	L		A				A				A	A	A				
31								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	8	17	13	19	16	23	23	23	23	21	18	13	4					
MED						342	L	L																
U Q						430	472	520	552	542	556	552	536	536	520	492	476	396						
L Q						446	514	560	584	552	572	564	552	548	540	516	480	404						
						418	464	502	532	524	532	536	528	512	516	484	462	386						

JUL.2023 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

JUL. 2023 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						184	268	324	348	328	A	A	A	A	392	376	348	308	236	A						
2						A	A	A	352	380	U G	384	384	A	A	A	A	A	A	A	A					
3						196	248	304	328	U G	A	A	U R	A	A	A	A	A	312	224	A					
4						192	280	324	348	364	A	A	A	A	A	A	A	A	A	A	A					
5						A	276	320	348	B	A	A	A	A	A	A	332	300	236	A						
6						200	244	304	348	360	A	A	A	A	A	A	A	A	A	A	A					
7						A	256	316	348	372	388	388	380	A	B	360	348	296	A	A						
8						B	268	316	336	356	376	B	R	R	R	A	A	A	A	A	A					
9						196	272	308	348	372	352	A	A	A	A	A	376	356	296	220	A					
10						A	264	316	352	392	392	A	R	B	392	388	332	296	A	B						
11						216	A	324	348	A	A	A	R	U R	380	380	348	304	A	A						
12						A	260	320	356	A	A	A	A	A	R	A	R	A	A	A	A					
13						A	A	A	A	A	A	A	A	A	A	404	380	348	312	A	A					
14						A	A	A	A	A	A	A	A	A	A	396	380	348	308	A	A					
15						A	256	308	344	364	A	A	A	A	B	376	348	320	228	A						
16						A	264	324	356	376	A	A	A	A	A	360	332	280	A	A						
17						A	A	A	A	A	384	388	416	U R	400	388	380	348	308	240	B					
18						A	264	312	A	A	A	A	A	A	A	396	356	300	A	A	A					
19						A	A	A	A	R	R	B	R	R	416	416	396	388	344	A	A	A				
20						A	A	312	356	368	432	A	U G	G	408	396	388	368	340	292	A	A				
21						A	268	320	340	A	388	392	412	392	388	376	344	288	204	A						
22						A	A	320	A	356	372	392	A	A	388	368	344	296	A	A						
23						A	A	328	364	392	A	U G	G	U G	A	A	372	336	300	A	A					
24						A	272	328	356	372	388	396	392	A	A	400	360	316	204	A						
25						A	244	324	352	384	396	A	U G	U G	420	380	372	344	304	236	B					
26						188	A	308	A	356	A	A	A	A	A	A	380	348	296	A	A					
27						A	264	328	364	380	A	396	A	A	404	A	A	A	220	A						
28						A	248	332	368	376	A	A	U G	U G	420	412	384	A	A	300	212	A				
29						A	252	320	356	376	U A	A	A	A	A	A	A	A	A	A	A					
30						A	240	308	348	A	A	A	U G	B	412	388	392	356	304	A	A					
31						A	252	308	328	348	A	392	A	B	U G	372	372	340	292	228	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						7	21	26	24	21	13	9	15	9	20	23	23	24	13							
MED						196	264	320	348	372	388	392	408	U	400	388	376	348	300	224						
U Q						200	268	324	356	380	394	396	416	U G	414	396	380	348	308	236						
L Q						188	250	308	348	358	380	388	380	396	382	372	340	296	212							

JUL. 2023 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	J A	J A	J A	J A	J A	J A	23	30	J A	J A	J A	J A	J A	J A	44	43	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	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	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	J A
L 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

JUL.2023 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	22	19	E B 16	E B 16	E B 16	21	29	39	49	40	45	45	76	72	43	42	44	47	28	35	E B 16	E B 16	26	21	
2	26	E B 16	E B 28	E B 16	23	29	31	36	40	50	60	57	A A 95	74	A A 87	A A 82	65	75	62	65	E B 16	E B 16	33	25	
3	E B 16	E B 16	E B 16	E B 16	E B 16	25	44	42	A A 190	A A 73	A A 64	46	G A 137	A A 44	A A 128	44		G	28	24	25	42	27	E B 16	
4	26	E B 16	E B 16	E B 16	E B 16	24	30	36	38	53	53	47	G U 42	G U 38	Y	40	37	31	30	25	20	E B 16	22	E B 16	
5	E B 16	E B 16	E B 16	E B 16	E B 16	23	29	38	51	E B 42	58	46	55	50	52	42	40	31	65	20	E B 16	E B 16	21	E B 16	
6	E B 16	E B 16	E B 16	E B 16	E B 16	22	29	35	49	44	44	45	47	49	67	50	44	A A 108	38	32	38	26	E B 16	21	
7	33	E B 16	E B 16	E B 16	E B 16	23	42	50	A A 46	A A 73	43	48	56	50		G A 82	A A 116	A A 133	35	26	29	37	28	36	
8	E B 16	22	23	27	E B 16	41	37	43	A A 63	42	45	46	44	46	44	44	A A 63	32	31	25	22	21	21	50	
9	41	35	E B 16	E B 16	28	22	50	44	49	57	47	74	47	44	44	65		G	40	28	21	A A 146	54	E B 16	28
10	34	40	28	24	E B 16	37	42	48	58	54	57	A A 122	47	E B 52		G	A A 57	A A 110	52	45	16	E B 16	E B 16	34	36
11	27	28	44	44	20	25	49	38	46	42	57	57	46	45	50	43	57	77	65	44	45	36	45	22	
12	19	23	30	22	22	21	33	40	A A 99	67	57	47	U G 48	56	50	A A 66	55	34	30	35	E B 16	E B 16	31	24	
13	25	25	19	25	36	21	29	42	52	48	58	58	52	49	58	45	55	71	60	32	22	34	43	E B 16	
14	E B 16	30	E B 16	22	29	35	34	41	46	43	44	47	48	44	47	63	65	45	55	32	22	E B 16	33	45	
15	34	E B 16	E B 16	18	E B 16	37	46	38	A A 119	A A 98	50	48	57	47	E B 43	51	41	39	A A 114	36	43	43	41	35	
16	21	35	E B 16	21	30	21	32	48	45	59	56	67	A A 149	58	53	55	46	48	32	50	E B 16	28	25	E B 16	
17	20	E B 16	E B 16	E B 16	E B 16	24	26	33	40	43	40	U G 48		G	43		G	G	G	29	E B 15	E B 16	25	E B 16	
18	E B 16	23	26	E B 16	E B 16	21	45	50	A A 71	52	54	48	50	46	44		G	46	44	36	27	E B 16	E B 16	27	42
19	E B 16	E B 16	E B 15	E B 16	20	20	31	36	47		G	44	E B 44	46	45	45		G	38	32	28	30	22	17	E B 16
20	19	29	E B 16	E B 16	24	32	28	36	41	43	45	56	47	46	44	41	37	35	34	36	22	26	E B 16	16	
21	22	24	30	31	18	32	40	43	A A 128	57	80	47	44	46	58	44	49	38	30	36	73	42	E B 16	40	
22	43	40	45	22	23	34	48	36	60	44	59	55	58	104	72	48	50	42	39	31	E B 15	23	30	E B 16	
23	25	28	24	22	22	26	29		G	39		42	45	45	55	48	52	50	50	43	24	22	E B 16	E B 16	
24	E B 16	E B 16	E B 17	E B 16	E B 16	24	31	37	47	58	68	50	50	58	60	48	54	74	44	23	44	20	E B 16	E B 16	
25	20	26	52	28	22	22	40	44	64	43	51	50	U Y 40	47	44	43		G	G	E B 26	E B 17	E B 16	E B 16	34	
26	29	E B 16	26	18	20		G	30	42	36	52	76	48	58	47	U G 41	44	56	66	43	23	18	E B 16	19	22
27	20	30	20	34	19	21	36	61	58	65	45	49	52	50		G	42	44	70	45	49	52	35	34	26
28	25	36	30	19	E B 16	19	29		G	54	49	51	50		G	45	47	52	38	34	37	19	E B 16	E B 16	E B 16
29	E B 16	E B 16	30	E B 16	E B 16	23	30	36	52	62	54	62	46	44	67	43	35	33	24	25	E B 17	21	22	19	
30	26	E B 16	E B 16	E B 16	E B 16	24	28	37	40	45	52	60	49	E B 44	45	44	37	34	29	26	36	45	34	41	
31	34	29	E B 16	E B 16	E B 16	20	29	46	48	43	42	42	46	E B 46		G	48	54	36	28	32	27	37	E B 16	24
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	22	23	E B 17	E B 16	E B 16	23	31	39	49	49	52	48		G	47	45	45	46	40	35	27	22	21	22	22
U Q	27	29	28	22	22	29	42	44	A A 60	58	58	57	55	55	53	55	55	66	45	35	36	36	33	35	
L Q	E B 16	E B 16	E B 16	E B 16	E B 16	21	29	36	45	43	45	46	46	45	43	42	38	33	29	23	E B 16	E B 16	E B 16	E B 16	

JUL. 2023 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION Kokubunji

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

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

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

JUL. 2023 fmin (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

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

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

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		269	302	291	277	274	293	295	321	295	257	287	276	293	289	291	293	305	320	301	295	282	267	266	287				
2		288	290	288	286	F	281	309	323	337	278	292	284	A	292	A	A	281	287	294	274	288	290	270	278				
3		268	276	F	260	283	289	F	267	272	A	A	A	265	274	A	297	269	300	287	286	281	272	F	F				
4		279	280	287	286	280	295	288	297	328	272	283	283	267	279	292	287	290	299	303	318	270	266	273	278				
5		279	286	290	310	300	288	315	300	289	272	286	267	254	276	275	297	291	290	A	290	297	291	268	274	276			
6		271	283	295	284	291	302	341	331	288	276	260	265	270	277	285	271	268	A	286	287	280	F	F	F				
7		291	294	302	275	251	268	300	249	280	A	227	241	270	250	267	A	A	A	272	271	277	258	268	273				
8		258	265	274	280	F	259	280	272	A	259	239	253	287	268	219	266	A	282	289	289	263	254	264	276				
9		274	279	F	282	295	320	301	298	306	314	260	A	283	276	283	287	292	313	307	294	A	274	263	F				
10		F	F	F	F	290	338	297	298	313	298	309	A	252	257	270	293	A	285	290	301	294	277	264	F				
11		F	F	F	F	278	295	279	279	276	295	270	282	283	278	276	291	301	303	291	282	270	270	260					
12		268	269	F	F	284	318	280	325	A	274	289	287	283	289	279	A	279	279	290	289	278	267	274	265				
13		270	284	293	281	275	271	281	314	301	319	300	286	280	287	299	296	304	A	289	286	275	265	260	286				
14		F	F	F	F	293	288	297	282	274	294	277	284	284	270	270	259	269	271	278	300	307	273	267	265				
15		F	F	F	F	266	277	278	278	265	296	318	271	A	A	273	264	271	276	283	280	276	282	A	280	267	267	267	274
16		263	274	F	F	310	268	295	278	292	300	273	283	280	A	278	271	284	285	290	301	288	277	269	281	271			
17		283	280	292	288	296	295	284	270	292	298	274	289	285	286	292	290	312	286	260	270	304	271	267	271				
18		287	271	282	268	F	280	283	267	A	269	274	262	271	274	280	287	287	283	287	285	274	266	259	258				
19		273	257	F	286	295	309	297	310	314	309	339	287	260	283	290	285	284	287	294	295	294	275	277	260	270			
20		281	288	283	276	287	284	301	324	318	293	273	264	268	281	281	284	279	300	304	297	275	292	282	285				
21		F	268	285	289	276	272	280	338	A	286	264	272	261	265	275	295	298	298	297	280	265	272	277	275				
22		286	274	273	277	283	272	309	310	279	281	273	256	272	297	287	274	279	286	300	296	268	263	273	276				
23		266	272	271	270	267	277	283	337	296	277	308	270	292	290	285	280	284	287	276	286	271	276	272	274				
24		273	281	268	274	273	273	300	321	291	280	298	285	285	281	303	290	300	A	309	275	254	F	276	284				
25		273	267	F	F	270	276	274	285	291	290	296	285	284	277	283	284	303	295	308	288	263	269	280	291				
26		288	271	269	259	273	269	296	323	323	313	303	269	281	286	279	288	281	281	270	283	292	261	266	291				
27		271	259	268	256	278	291	F	304	U	326	288	271	259	292	264	282	308	302	A	305	301	271	266	284	289			
28		F	F	F	270	F	354	319	297	307	315	295	276	269	287	281	303	306	294	298	284	269	271	278	279				
29		263	279	276	274	274	290	291	283	283	289	276	268	273	281	293	287	292	313	300	298	268	264	272	297				
30		261	262	288	290	274	274	289	319	H	268	255	287	274	274	277	276	299	288	311	286	279	288	265	F	F			
31		F	F	276	275	261	266	292	281	283	285	295	279	291	269	304	298	287	A	302	291	295	261	269	268				
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT		29	27	23	27	26	31	30	31	25	28	30	29	29	30	30	27	28	25	30	31	30	29	29	26				
MED		271	276	283	278	277	288	294	298	295	280	285	270	274	278	282	287	288	290	296	288	275	267	270	276				
U Q		280	283	290	288	288	296	301	321	311	296	295	284	284	287	291	295	299	300	302	296	282	272	276	285				
L Q		266	268	273	274	273	273	282	279	286	274	273	264	270	274	276	280	280	284	287	283	269	265	266	271				

JUL.2023 M(3000)F2 (0.01)

## IONOSPHERIC DATA STATION Kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						L	L		A	H			A	A			A		L					
2							L	L		L	U	L	A	A	A	A	A	A	A					
3						L	A	A	A	A	A				A		A	U	L	L	L			
4						L	L	U	L		A	A						U	L	L				
5							L	L	A		A													
6							L	L					A	A	A	U	L	A	A	L				
7							A	A	A	A			A	A		A	A	A	A	A				
8						327	A	A	A	A	423	411			392			A	A	A	A			
9							A	U	L	A	A	A						H		L				
10										A	A	A	A				A	A	A	A				
11							A		L	L	A	A					A	A	A					
12							L	L	A	A	A													
13								A	A	A	A	A	A	A	A									
14								L	A	U	L		A											
15								U	L	A	A													
16								A	A	A	A	A	A	A	A	A	A	A	A	L				
17								U	L		U	L						H		L	L			
18						L	A	A	A			A												
19								L	L															
20							L		L															
21							A	L	A	A	A													
22								L	A		A													
23						L	L	H	L															
24						L			A	A	A	A	A	A	A	A	A	A	A	A				
25							A	A	A		A	A												
26							L	L		A	A													
27						L	A	A	A	A	L	U	L	A										
28							L	L	A	A	A													
29							L	L	A	A	A	A												
30							U	L			A	A												
31						L	L	L	A															
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						2	7	12	8	15	11	17	18	17	19	16	12	12	3					
MED						334	363	374	370	369	385	379	384	386	380	366	362	351	354					
U Q							375	376	378	381	402	392	401	398	392	382	376	354	367					
L Q							348	360	357	343	374	358	360	373	374	360	357	344	343					

JUL. 2023 M(3000)F1 (0.01)

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## IONOSPHERIC DATA STATION Kokubunji

JUL. 2023 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1						286	278	258	322	504	352	366	E A 356	E A 362	330	314	298		274						
2							270	240	254	376	356	360	E A 388	E A 388	A	A	404	E A 380	E A 308						
3						284	344	380	A	A	A	456	416	A	352		A	428	296	294	304				
4						274	302	258	246	388	328	372	386	356	324	316	310	302	276						
5							252	280	280	380	360	406	468	410	404	330	360	324	E A 388						
6							238	238	382	378	404	368	346	328	322	372	340	A		284					
7						354	308	460	360	A	606	544	430	514	464		A	A	A		344				
8						338	334	388	A	468	552	482	380	440	646	462		A	374	314					
9							288	294	268	296	374	E A 490	E A 352	358	328	324	298	A	274	274					
10							300	308	322	292		A	418	430	372	344		A	320	292					
11							294		290	314	292	326	336	342	336	330	320	E A 362	300						
12							238	248	A	382	342	334	334	354	390		A	384	360	304					
13							276	244	298	284	334	366	382	346	328	312	302	E A 360	E A 330						
14							262	300	358	350	334	362	354	386	350	342	302	274							
15							314	A	A			414	392	390	364	370	382	338	A						
16							302	288	372	350	384	A	328	354	324	310	298	264							
17							280	322	336	398	334	368	360	330	316	298	314	316							
18						296	346	410	A		394	426	404	364	332	310	304	294	280						
19							264	290	280	362	384	326	308	304	298	310	296	260							
20							268	246	272	298	338	316	338	322	316	294	292	274	258						
21							270	258	A	310	E A 376	358	372	364	330	292	284	298	278						
22							266	314	334	274	362	342	E A 354	316	334	292	298	276							
23						302	318	264	364	334	288	382	330	286	354	320	336	320							
24						318	296	266	244	360	336	320	338	344	310	312	318	E A 422	264						
25							242	296	292	272	284	290	300	336	320	314	278	282	258						
26							276	234	244	304	E A 364	376	348	350	352	322	302	362	290						
27						282	238	246	246	310	322	354	306	358	316	306	E A 318	E A 400	274						
28							228	334	270	292	338	394	416	350	336	312	304	322	274						
29							266	262	332	324	360	358	344	314	314	308	302	266							
30							302	236	374	306	326	322	350	320	314	304	326	284							
31						328	260	316	260	336	300	344	300	388	314	334	358	U G 338	288						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT						10	24	30	25	27	29	30	29	30	30	27	28	28	27	1					
MED						299	276	265	290	334	344	365	351	353	330	316	310	308	278	304					
U Q						328	302	302	322	376	369	394	389	364	354	334	341	E A 360	304						
L Q						284	256	248	264	304	324	334	337	336	316	310	300	296	274						

JUL. 2023 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL. 2023 h'F (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
1	296	254	244	244	278	250	210	224	E A	260	190	216	212	A	A	216	232	A	272	216	E A	258	248	284	E A	302	268		
2	E A	276	260	E A	272	E A	E A	240	216	202	196	286	A	A	A	A	A	A	A	E A	346	258	248	E A	E A	276			
3	290	258	238	314	264	252		E A	A	A	A	230	286	A	218		258	224	224	262	E A	E A	E A	E A	270	316	326	252	
4	E A	292	274	244	222	280	248	208	206	198	E A	316	A	210	232	188	196	206	208	224	238	228	250	284	E A	314	264		
5	258	262	244	226	230	214	214	212		A	212		212	A	E A	E A	E A	206	228	216		A	254	232	258	276	258		
6	288	260	252	260	270	236	214	186	260	206	190	198	E A	218	A	A	280	E A	278	A	E A	E A	E A	E A	E A	E A	E A	280	
7	E A	246	228	228	276	314	250		A	A	A	A	182	206	A	E A	A	A	A	E A	E A	E A	E A	E A	E A	E A	E A	290	
8	318	306	288	E A	282	302	E A	E A	E A	A	190	216	226	216	226	210	228		A	216	256	256	E A	E A	E A	E A	E A	346	
9	E A	E A	E A	E A	E A	E A	E A	E A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	
10	284	292	258	272	244	224	224	274		E A	A	A	A	A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	310	
11	E A	E A	E A	E A	E A	E A	E A	E A	A	A	A	A	A	A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
12	288	316	330	288	214	244		236	272	198		198	210	288	224		A	A	A	A	A	E A	262	274	286	318	302		
13	E A	E A	E A	E A	E A	E A	E A	E A	E A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	
14	286	304	300	292	264	238	216	246		E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
15	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
16	276	318	290	236	288	240	226		E A	E A	A	A	A	A	A	A	292		A	252	278	250	274	272	280				
17	E A	276	262	246	254	234	226	216	210	240	214	178	250	236	188	192	202	202	202	246	296	236	282	278	286				
18	232	288	274	288	296	248		A	A	A	394	A	210	292	234	216	220	E A	A	276	256	230	276	318	340				
19	276	308	252	228	216	226	222	206	236	214	192	184	192	218	220	206	208	206	242	252	246	260	276	284					
20	272	272	242	276	262	254	218	206	200	198	188		192	212	202	210	208	218	254	246	246	250	232	256					
21	E A	E A	E A	E A	E A	E A	E A	E A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	E A	E A	
22	E A	E A	E A	E A	E A	E A	E A	E A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	E A	
23	296	302	314	274	256	232	242	218		202				E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
24	322	294	292	298	286	266	210	196	190	182	206	220	184	228	A	298		A	A	282	256	250	250	262	280				
25	272	266	228	260	276	264	254	222		A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	E A	
26	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
27	262	272	318	314	296	250	242		194	272	224		224	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	
28	E A	E A	E A	E A	E A	E A	E A	E A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E A	E A	E A	E A	E A
29	288	310	278	358	290	256		A	A	A	A	204	208	232	190	206	254		A	A	A	240	262	270	246	270			
30	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A
31	276	306	288	288	288	254	226	246	256	239	216	240	252	232	234	257	259	248	256	270	274	308	300	306					
	276	266	244	254	264	232	214	207	196	198	188	208	198	200	200	208	202	216	234	248	244	264	272	262					
CNT	31	31	31	31	31	30	23	25	14	20	15	22	22	22	23	20	17	18	19	31	30	31	31	31					
MED	E A	U	U	255	263	269	247	217	215	216	206	197	214	212	206	211	217	205	220	244	252	246	267	286	280				
U Q	296	306	288	288	288	254	226	246	256	239	216	240	252	232	234	257	259	248	256	270	274	308	300	306					
L Q	276	266	244	254	264	232	214	207	196	198	188	208	198	200	200	208	202	216	234	248	244	264	272	262					

## IONOSPHERIC DATA STATION Kokubunji

JUL. 2023 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						112	98	102	100	96	A	A	A	A	106	106	106	102	102	A				
2						A	A	A	102	96	96	96	A	A	A	A	A	A	A	A				
3						108	A	98	98	A	A	A	A	A	104	104	A	A	104	104	A			
4						120	104	100	100	96	A	A	110	A	A	A	A	A	A	A	A			
5						A	106	100	100	B	A	A	A	A	A	102	A	102	102	102	A			
6						112	100	100	98	98	A	A	A	A	A	A	A	A	A	A	A			
7						A	100	100	100	E B	106	102	E B	E B	A	B	102	102	98	A	A			
8						B	100	100	100	100	100	100	B	100	100	100	A	A	A	A	A			
9						122	106	102	98	98	98	A	A	A	A	A	98	98	98	98	A			
10						A	100	100	100	100	100	A	96	B	108	108	98	98	A	B				
11						96	A	100	100	A	A	A	100	108	98	106	102	102	A	A				
12						A	102	102	96	A	A	A	A	A	102	102	100	100	A	A				
13						A	A	A	A	A	A	A	A	A	100	100	100	100	A	A				
14						A	A	A	A	A	A	A	A	A	102	102	102	102	A	A				
15						A	102	100	100	100	A	A	A	A	B	100	100	100	100	A				
16						A	100	100	100	98	A	A	A	A	A	102	102	98	A	A				
17						A	A	A	A	A	102	100	100	102	102	100	98	100	108	B				
18						A	104	100	A	A	A	A	A	A	A	108	102	102	A	A				
19						A	A	A	A	98	100	B	102	102	102	100	100	A	A	A				
20						A	A	100	100	100	100	A	100	98	100	100	106	106	A	A				
21						A	106	100	98	A	98	100	100	100	100	100	100	100	100	A				
22						A	A	A	A	A	E B	104	A	A	100	100	100	102	A	A				
23						A	A	100	98	98	A	98	98	98	A	98	98	98	A	A				
24						A	104	104	100	96	100	100	102	A	A	100	110	102	98	A				
25						A	100	100	100	100	100	A	A	100	96	106	106	102	104	B				
26						116	A	100	A	98	A	A	A	A	A	100	100	100	A	A				
27						A	100	100	100	100	A	100	A	A	100	A	A	A	100	A				
28						A	102	98	98	98	A	A	102	102	102	A	A	102	102	A				
29						A	102	102	100	100	100	A	98	A	98	A	A	A	98	A				
30						A	100	102	100	A	A	A	92	B	100	100	102	102	A	A				
31						A	104	100	98	98	A	98	A	B	104	102	102	102	106	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						7	20	26	24	21	13	9	15	9	20	23	23	24	13					
MED						112	102	100	100	98	100	99	100	100	101	100	102	102	102					
U Q						120	104	102	100	100	100	E B	101	102	102	106	102	102	104					
L Q						108	100	100	98	98	98	98	98	99	100	100	100	100	99					

JUL. 2023 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

JUL. 2023 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

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	88	88	86	86	94	148	128	106	100	98	90	98	90	88	124	110	110	98	100	94	100	110	96	92
2	88	88	88	90	80	90	94	120	112	176	96	94	92	92	90	90	100	100	100	98	98	98	90	92
3	100	90	90	92	94	112	102	106	98	104	94	96	G	92	110	92	94	G	112	102	98	100	100	92
4	90	B	90	B	B	136	142	120	106	98	98	98	G	106	96	92	88	116	82	80	80	98	98	80
5	98	92	B	B	B	150	140	108	98	B	98	102	96	94	114	116	108	114	100	102	94	102	92	94
6	100	92	80	B	B	186	116	112	98	102	108	100	102	116	98	100	108	94	94	92	96	96	92	92
7	92	96	96	90	B	114	108	102	100	96	104	100	96	96	G	110	102	100	100	98	94	94	96	96
8	92	92	94	94	140	108	106	104	100	108	100	104	106	106	100	94	88	88	88	88	98	104	98	96
9	90	86	90	90	92	124	104	104	98	92	92	90	88	90	90	98	G	100	98	96	94	90	90	110
10	96	96	98	84	84	114	108	104	100	104	100	90	96	B	G	110	102	96	96	98	B	92	88	88
11	88	88	88	88	88	98	98	102	98	106	106	102	108	174	96	120	108	100	98	98	92	90	90	90
12	88	86	86	84	84	106	96	100	92	92	94	114	110	108	108	104	102	106	102	98	102	94	96	92
13	90	92	92	96	90	96	96	94	92	92	88	88	118	112	102	114	102	96	92	92	92	92	88	98
14	90	92	92	90	88	88	88	90	92	94	102	94	100	100	110	102	100	100	96	96	92	94	92	92
15	90	92	86	92	90	106	102	106	98	98	98	106	112	116	B	108	110	110	94	94	96	96	92	90
16	90	90	94	88	92	94	110	102	100	96	92	90	90	98	100	100	96	94	90	84	84	82	82	84
17	84	B	84	88	B	94	98	102	188	184	110	G	110	G	110	G	G	G	102	102	98	98	90	92
18	90	90	96	98	B	108	98	98	98	102	98	98	170	96	102	G	102	100	92	94	B	94	94	92
19	92	90	90	90	94	164	92	146	92	G	112	B	108	110	110	G	102	102	88	86	84	84	100	B
20	92	92	92	92	96	100	100	104	108	102	110	102	102	102	102	106	118	104	94	90	92	84	82	B
21	84	90	90	88	94	104	102	102	94	92	96	100	146	108	102	108	98	100	96	90	94	94	86	86
22	88	84	84	88	96	94	90	98	90	104	94	96	92	92	94	98	98	98	94	94	96	92	90	92
23	90	90	86	92	90	88	88	G	104	G	104	166	104	102	102	100	98	98	94	92	92	92	B	B
24	B	90	90	90	B	120	124	110	102	98	92	96	96	92	88	112	108	100	100	102	102	102	96	92
25	92	92	92	88	92	114	106	104	100	104	102	102	92	156	148	182	G	G	136	B	B	B	B	88
26	84	86	88	88	86	G	106	102	100	94	90	88	88	92	94	114	104	98	94	94	94	B	92	92
27	92	88	86	86	90	92	102	96	96	94	100	100	92	88	G	96	94	104	102	94	98	96	94	110
28	92	86	80	84	84	126	112	G	102	98	98	94	G	110	100	92	98	104	100	98	B	B	B	92
29	92	92	86	88	98	112	108	112	100	96	96	92	92	98	98	92	94	114	108	100	92	102	98	98
30	98	98	B	B	94	92	122	108	98	178	92	90	192	B	100	112	120	108	104	106	106	96	90	94
31	92	92	88	94	94	106	104	100	96	96	100	108	88	B	G	116	104	96	104	96	90	96	94	104
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	29	27	24	30	31	29	31	28	31	29	28	27	26	28	28	28	31	30	27	28	27	28
MED	90	90	90	90	92	107	104	104	98	98	98	98	98	100	101	105	102	100	98	95	94	95	92	92
U Q	92	92	92	92	94	120	110	108	100	104	102	102	109	110	110	112	108	104	102	98	98	98	96	95
L Q	88	88	86	88	88	94	98	101	96	95	94	93	92	92	96	97	98	98	94	92	92	92	90	91

JUL. 2023 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Kokubunji

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

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

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

JUL. 2023 TYPES OF Es  
 NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

LAT. 31°12.0'N LON. 130°37.0'E 0SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X	93	X	X	X	X																X	X	X	X
2	X	90	X	X	X	X																106	91	89	94
3	X	96	X	X	X	X	85		77													X	X	76	79
4	X	82	88	85	86	74	72															X	X	X	X
5	X	87	94	98	92	65																X	X	X	X
6	X	96	X	X	X	X																X	X	X	X
7	X	102	X	X	X	X	72															X	X	X	X
8	X	81	X	X	X	78			73													X	X	X	X
9	X	72	76	71	67	68																X	X	X	X
10	X	88	X	X	X	X															X	X	X	X	X
11	X	88	X	X	X	X															X	X	X	X	X
12	X	89	X	X	X	X	80															X	X	X	X
13	X	90	X	X	X	X	80	82														X	X	X	X
14	X	86	X	X	X	X																X	X	X	X
15	X	83	X	X	X	X																X	X	X	X
16	X	93	X	X	X	X	75															X	X	X	X
17	X	99	X	X	X	X	X															X	X	X	X
18	X	91	X	X	X	X	72															X	X	X	X
19	X	85	93	93	91	78	72															X	X	X	X
20	X	90	X	X	X	X	X															X	X	X	X
21	X	95	X	X	X	X	X															X	X	X	X
22	X	92	X	X	X	X	X															X	X	X	X
23	X	87	X	X	X	X	X															X	X	X	X
24	X	93	X	X	X	X	X															X	X	X	X
25	X	78	X	X	X	X	X	90														X	X	X	X
26	X	85	X	X	X	X	X															X	X	X	X
27	X	85	X	X	X	X	X															X	X	X	X
28	X	88	X	X	X	X	X															X	X	X	X
29	X	88	X	X	X	X	X															X	X	X	X
30	X	86	X	X	X	X	X															X	X	X	X
31	X	91	X	X	X	X	X															X	X	X	X
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		31	31	31	31	31	21	2	2												1	31	31	31	31
MED		X	X	X	X	X	X	86	75												X	X	X	X	X
U Q		X	X	X	X	X	X															X	X	X	X
L Q		X	X	X	X	X	X															X	X	X	X
		85	84	81	79	73	72															82	80	83	86

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

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

JUL. 2023 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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	F	86	91	80	78	73	70	76	80	72	70	76	84	93	87	93	93	93	83	80	77	81	76	77	84	
2		84	78	75	68	66	64	76	82	70	68	72	75	A	86	80	A	84	92	96	98	100	85	83	88	
3		90	88	F	89	86	F	79	F	68	65	61	A	64	69	72	68	64	73	72	64	63	66	69	F	
4	F	F	F	F	F	F	F	73	80	72	70	73	76	83	89	98	98	97	96	88	76	73	75	78	80	
5		81	F	92	F	83	59	58	67	84	85	77	80	81	84	92	94	94	88	85	91	90	90	74	79	
6		90	86	84	78	72	73	76	72	70	A	73	84	94	94	93	90	91	90	94	94	88	87	83	F	
7		96	82	80	74	69	F	72	70	66	58	58	58	62	A	63	A	60	63	70	A	74	72	72	78	
8		75	75	78	F	73	F	68	68	F	65	60	58	60	65	73	58	A	A	A	61	59	60	67	67	
9		66	F	F	F	F	F	53	64	81	72	70	75	73	84	88	92	99	96	94	90	88	84	84	83	
10		82	85	85	84	76	76	74	74	81	76	83	74	75	80	87	86	82	83	89	91	70	72	77	F	
11		82	82	80	80	76	68	66	77	91	90	88	85	87	85	92	99	102	95	93	90	86	82	80	82	
12		83	82	F	79	F	76	72	66	66	74	A	86	88	81	78	82	83	78	78	84	84	86	79	84	
13		84	84	82	81	76	72	72	83	84	74	74	79	88	92	87	83	82	77	84	87	80	76	78	77	
14		80	83	84	86	78	71	73	76	82	82	89	86	88	85	90	96	98	102	107	93	76	78	80	80	
15		77	77	82	76	65	66	76	76	72	75	77	85	A	A	80	82	79	76	78	80	84	80	72	F	
16	F	83	F	F	F	F	F	70	78	79	78	74	A	A	88	90	91	96	98	100	101	91	92	86	87	
17		93	99	98	90	80	71	71	74	76	H	77	79	80	79	85	94	87	84	86	90	93	88	81	85	
18		85	75	73	73	67	64	75	66	66	63	A	69	73	85	97	R	99	92	86	86	82	80	75	78	
19		79	F	F	F	F	F	65	79	73	70	74	85	94	96	105	112	106	106	107	92	87	84	87	87	
20		84	83	78	70	70	70	81	86	80	82	91	94	103	109	115	120	122	120	113	106	95	92	93	92	
21		89	86	83	73	61	63	H	82	84	75	73	80	84	98	106	112	112	108	89	88	81	85	87	87	
22		86	84	78	78	79	81	83	84	91	83	78	84	96	116	107	101	113	108	103	92	81	80	80	82	
23		81	F	F	F	73	74	71	74	69	78	70	81	95	H	88	92	94	93	97	102	92	90	89	92	88
24		87	81	79	81	81	80	80	76	78	80	73	79	80	98	103	101	103	95	91	78	70	74	80	82	
25		72	74	74	64	64	F	F	82	93	94	98	94	87	84	95	103	102	104	88	80	82	83	86	93	
26		79	78	76	76	78	82	97	85	74	83	77	73	86	V	95	92	93	92	94	100	96	83	80	77	
27		79	80	74	74	75	73	79	100	98	101	100	107	114	114	110	118	109	94	87	83	81	79	82	81	
28		82	85	74	71	F	74	76	74	80	79	62	72	79	87	93	89	88	90	88	86	82	81	84	86	
29		82	79	78	75	75	74	79	86	94	93	89	96	108	117	116	112	108	93	A	78	74	77	78	84	
30		80	77	74	72	63	59	66	73	85	94	93	99	108	110	112	102	89	79	85	85	76	70	68	F	
31	F	86	72	69	63	F	F	66	84	88	92	H	93	94	94	97	94	88	87	85	86	93	82	72	77	
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT		28	28	28	29	27	29	31	31	31	29	29	30	29	30	30	29	30	30	30	30	31	31	31	28	
MED		82	82	79	75	73	70	74	78	76	78	77	82	86	88	93	94	92	90	88	88	82	79	80	82	
U Q		86	85	84	80	76	74	79	84	85	84	88	86	94	97	103	102	103	95	96	92	87	85	84	86	
L Q		80	78	74	72	66	64	68	74	72	70	73	74	80	85	87	88	87	83	84	82	76	74	77	80	

JUL. 2023 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

LAT.31°12.0'N LON.130°37.0'E 0SWEEP 1.0MHz TO 30.0MHz IN 15.0SEC IN MANUAL SCALING

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									A	L	U	L	A			A	A		L	L					
2									L	L			A	A	A	A	A		A	L	A				
3									468		A	A	A		A				A						
4									L	A	A		A	A						A					
5									L	L	A									L	L				
6									L	L	A									L					
7									L	U	L	A							A	A					
8									U	L										A	U	L			
9									L	L										A	U	L			
10																									
11									U	L	L														
12									U	L	A														
13									A	L	L	U	L							A	A				
14																									
15									L	A	U	L	L	A						A	A				
16									A	A	A	A													
17									L	U	L														
18																									
19									L	L	U	L	L												
20																									
21									L	L	H														
22									L	L	L	U	L												
23									L	L	U	L	H	H											
24									L	L	U	L													
25									L	L															
26																									
27									L	L	A														
28																									
29																									
30																									
31																									
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								2	4	16	23	22	25	24	21	21	23	21	21	11					
MED								U	L	L															
U Q																									
L Q																									

JUL. 2023 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						A	A	260	A	A	A	A	A	A	392	376	360	324	276	A				
2						B	U	A	A	A	U	G	U	G	A	380	364	392	360	336	284	A		
3						A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
4						A	228	300	336	360	388	388	384	364	A	A	A	A	A	A	A			
5						B	208	296	336	368	376	380	372	A	A	A	A	A	A	A	A			
6						B	212	280	336	356	356	380	388	400	A	392	356	324	268	A				
7						B	A	288	328	376	A	A	A	A	400	388	380	360	320	272	180			
8						B	196	284	320	356	376	376	A	384	A	A	A	A	A	A	A			
9						B	208	280	324	360	380	392	380	396	384	368	356	320	276	A				
10						B	A	292	332	356	372	372	340	B	U	R	396	388	372	324	A			
11						A	A	A	344	376	A	404	A	A	A	A	360	328	280	A				
12						A	A	288	A	A	A	A	432	416	412	364	364	332	288	A				
13						A	A	A	A	A	A	A	A	A	A	400	364	332	276	A				
14						A	A	A	A	A	A	A	396	396	396	388	364	332	U	A	A			
15						B	224	288	328	A	388	388	U	G	U	G	A	376	368	340	272	A		
16						A	284	328	360	384	392	392	384	A	A	A	360	A	252	A				
17						A	A	A	348	384	408	416	416	396	380	364	332	A	A					
18						A	A	A	A	A	A	A	A	A	A	A	384	332	A	196				
19						A	A	A	A	A	404	404	412	416	404	388	360	320	A	A				
20						A	284	316	A	388	412	420	412	400	388	A	308	A	A					
21						196	280	A	A	A	396	400	396	392	384	368	328	260	A					
22						A	268	A	A	380	392	400	428	404	380	U	A	A	A	A				
23						204	284	A	A	A	A	404	408	396	380	356	320	A	A					
24						220	292	332	364	380	A	A	A	A	A	400	372	324	A	A				
25						A	U	A	A	A	A	412	A	A	A	A	A	A	276	188				
26						228	A	A	A	348	A	B	A	A	A	A	376	328	268	A				
27						A	A	A	A	A	A	A	A	A	A	A	A	332	A	A				
28						A	292	344	368	392	408	416	404	396	396	356	316	A	A	A				
29						200	280	328	364	368	A	404	404	388	376	A	A	A	A	A				
30						192	232	A	A	A	A	408	420	412	396	352	296	A	A					
31						200	276	316	A	396	408	400	404	396	380	372	328	280	188					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							14	22	16	14	18	18	20	20	17	21	23	23	15	4				
MED							208	284	330	360	380	392	402	404	396	384	360	328	276	188				
U Q							220	288	336	368	388	404	412	416	402	392	368	332	280	192				
L Q							200	280	326	356	372	380	390	396	390	378	356	320	268	184				

JUL.2023 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	J	A	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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
UQ	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
LQ	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A

JUL. 2023 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B 16 16	E B 16 16	E B 16 16	24	24	20	26	45	38	43	54	45	50	42	54	54	46	44	33	34	29	21	E B 16 20	
2	E B 16 16	23	E B 16 16	E B 16 16	E B 16 16	E B 16 16	25	35	38	44	46	68	A A 128	58	61	A A 107	52	39	35	32	36	21	34	25
3	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	39	37	34	38	50	A A 100	60	50	56	43	52	63	36	40	34	26	E B 16 16	E B 16 16
4	21	E B 16 16	18	23	19	E B 16 16	26	34	46	62	49	57	68	51	41	42	38	33	29	37	23	21	20	E B 16 16
5	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	28	49	38	39	51	48	76	44	41	38	36	32	31	21	E B 16 16	E B 16 16	E B 16 16	E B 16 16
6	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	25	38	45	A A 84	49	50	43	43	44	51	40	34	32	25	48	28	27	23
7	18	19	27	28	E B 16 16	E B 16 16	30	34	36	50	43	42	45	A A 111	45	A A 58	49	41	38	A A 80	28	34	E B 16 16	E B 16 16
8	E B 16 16	24	20	20	20	E B 16 16	27	34	42	44	44	49	63	45	A A 106	43	A A 87	A A 66	A A 41	26	34	29	E B 16 16	24
9	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	27	34	35	41	58	44	45	45	58	45	38	37	61	70	E B 16 16	E B 16 16	E B 16 16	E B 16 16
10	E B 16 16	19	E B 16 16	E B 16 16	19	E B 16 16	34	32	42	43	47	46	48	E B 59	44	40	47	36	34	26	E B 16 16	E B 16 16	E B 16 16	19
11	20	21	23	22	23	24	31	34	40	42	45	G	46	48	41	40	G	36	32	24	E B 16 16	E B 16 16	E B 16 16	E B 16 16
12	E B 16 16	E B 16 16	26	24	25	25	25	31	36	A A 108	66	50	46	48	54	42	43	36	38	29	34	20	E B 16 16	35
13	35	29	E B 16 16	25	20	30	37	36	41	41	48	44	52	60	48	42	60	57	48	31	23	21	E B 16 16	25
14	20	26	30	22	21	21	41	31	40	41	48	44	45	44	42	63	58	54	66	30	21	E B 16 16	E B 16 16	18
15	E B 16 16	E B 16 16	20	42	29	E B 16 16	27	33	52	40	G	54	G	G	55	57	55	55	33	52	20	36	24	42
16	41	22	21	42	21	26	24	44	54	53	62	A A 94	A A 188	49	50	50	48	39	58	31	E B 16 16	28	36	20
17	42	E B 16 16	E B 16 16	20	E B 16 16	E B 16 16	27	32	35	37	42	50	46	47	44	40	39	42	30	20	E B 16 16	E B 16 16	E B 16 16	E B 16 16
18	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	20	43	33	38	48	A A 134	58	63	44	42	41	G	35	28	G 12	E B 16 16	E B 16 16	E B 16 16	22
19	46	34	22	23	22	28	24	32	39	39	G	46	51	58	51	48	52	37	31	26	30	22	E B 16 16	E B 16 16
20	21	E B 16 16	E B 16 16	E B 16 16	19	20	26	31	39	41	43	49	46	54	56	43	40	40	48	33	E B 16 16	E B 16 16	E B 16 16	E B 16 16
21	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	24	32	36	40	42	43	G	43	42	42	G	52	40	21	36	32	21	E B 16 16
22	30	22	E B 16 16	20	21	21	24	36	42	41	45	44	76	62	74	49	52	42	43	22	27	21	20	22
23	26	E B 16 16	E B 16 16	22	E B 16 16	23	23	26	36	40	43	43	43	44	43	46	42	50	35	27	25	25	23	20
24	18	E B 16 16	E B 16 16	25	E B 16 16	E B 16 16	24	36	40	44	54	52	43	80	56	46	42	35	41	22	E B 16 16	E B 16 16	E B 16 16	21
25	18	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	22	35	40	40	44	43	G 36	47	43	45	37	34	G 22	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16
26	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	G 18	34	35	40	42	U G 39	E B 44	66	51	57	75	60	44	22	37	37	36	E B 16 16
27	E B 16 16	20	E B 16 16	23	28	E B 16 16	24	34	52	37	47	46	47	47	47	59	39	G	32	21	E B 16 16	E B 16 16	E B 16 16	20
28	E B 16 16	E B 16 16	20	20	20	E B 16 16	23	40	37	43	44	45	44	45	50	42	38	34	28	20	21	E B 16 16	E B 16 16	E B 16 16
29	E B 16 16	E B 16 16	17	20	E B 16 16	E B 16 16	27	44	42	50	44	56	48	79	64	54	46	A A 65	A A 118	23	33	E B 16 16	E B 16 16	20
30	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	23	32	36	40	41	48	44	44	44	46	42	55	31	22	22	E B 16 16	E B 16 16	E B 16 16
31	22	E B 16 16	E B 16 16	23	18	30	22	31	35	40	G	G	G	G	G	G	G	35	31	G	E B 16 16	E B 16 16	E B 16 16	E B 16 16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	E B 16 16	E B 16 16	E B 16 16	20	19	E B 16 16	26	34	39	41	45	46	46	47	47	46	42	39	35	26	22	20	E B 16 16	18
U Q	21	21	20	23	21	23	28	36	42	48	51	52	52	58	55	54	52	52	43	32	30	25	21	22
L Q	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	E B 16 16	24	32	36	40	43	44	44	44	43	42	38	35	31	21	E B 16 16	E B 16 16	E B 16 16	E B 16 16

JUL. 2023 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

$\frac{H}{D}$	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	16	16	16	16	16	16	16	16	18	21	20	28	27	28	28	26	24	20	18	16	16	17	16	16
2	16	16	16	16	16	16	16	18	20	21	27	22	28	30	29	37	22	22	17	16	16	16	16	16
3	16	16	16	16	16	16	16	16	18	36	27	31	36	24	28	28	29	20	16	15	16	16	16	16
4	16	16	16	16	16	16	16	18	18	24	27	29	29	29	29	28	22	17	16	16	16	16	16	16
5	16	16	16	16	16	16	16	16	19	22	24	30	27	27	22	21	21	19	16	16	16	16	16	16
6	16	16	16	16	16	16	16	17	17	20	23	27	27	29	29	27	22	17	16	15	16	16	16	16
7	16	16	16	16	16	16	16	16	20	22	22	26	32	30	23	26	23	18	16	16	16	16	16	16
8	16	16	16	16	16	16	16	17	18	17	23	26	28	26	24	21	20	18	16	16	16	16	16	16
9	16	16	16	16	16	16	16	17	17	25	26	26	27	28	26	22	20	20	16	16	16	16	16	16
10	16	16	16	16	16	16	16	17	19	21	28	32	28	59	32	32	21	17	15	16	16	16	16	16
11	16	16	16	16	16	16	16	16	18	25	26	30	32	38	35	30	24	22	15	16	16	16	16	16
12	16	16	16	16	16	16	16	16	22	25	26	26	34	36	37	23	20	17	24	16	16	16	16	16
13	16	16	16	16	16	16	16	19	21	21	33	30	35	36	27	25	20	17	16	16	16	16	16	16
14	16	16	16	16	16	16	16	16	20	24	24	26	29	31	26	25	23	18	17	15	16	16	16	16
15	16	16	16	16	16	16	16	16	19	23	25	25	28	28	40	28	21	23	18	16	16	16	16	16
16	16	16	16	16	16	16	16	18	21	21	24	31	31	26	36	22	22	20	17	16	16	16	16	16
17	16	16	16	16	16	16	16	17	21	22	25	30	29	33	29	26	24	19	17	16	16	16	16	16
18	16	16	16	16	16	16	17	17	25	40	43	36	37	35	32	31	25	19	16	16	16	16	16	16
19	16	16	16	16	16	16	16	15	20	21	24	24	23	24	28	22	23	18	16	16	16	16	16	16
20	16	16	16	16	16	16	16	17	20	20	26	28	26	26	25	22	19	20	16	16	16	16	16	16
21	16	16	16	16	16	16	16	18	18	21	23	32	26	26	22	24	20	16	14	16	16	16	16	16
22	16	16	16	16	16	16	16	18	20	21	26	26	27	35	28	19	23	20	15	16	16	16	16	16
23	16	16	16	16	16	16	16	16	17	20	22	27	26	26	28	20	22	19	16	16	16	16	16	16
24	16	16	16	16	16	16	16	18	23	23	23	22	36	43	43	34	26	24	22	17	16	16	16	16
25	16	16	16	16	16	16	16	17	20	20	26	37	30	28	24	18	22	19	16	16	16	16	16	16
26	16	16	16	16	16	16	16	16	20	22	23	34	44	34	29	30	26	16	17	16	16	16	16	16
27	16	16	16	16	16	16	16	16	20	21	23	33	26	38	29	27	20	17	16	17	16	16	16	16
28	16	16	16	16	16	16	16	16	20	24	29	33	30	32	24	27	26	23	17	16	16	16	16	16
29	16	16	17	16	16	16	16	16	17	22	22	36	27	27	24	24	18	17	16	16	16	16	16	16
30	16	16	16	16	16	16	16	16	16	23	24	29	32	30	34	23	23	22	16	16	16	16	16	16
31	16	16	16	16	16	16	16	16	16	21	21	23	24	25	27	24	16	18	18	16	16	16	16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	16	16	16	16	16	16	16	16	20	22	24	29	28	29	28	25	22	19	16	16	16	16	16	16
U Q	16	16	16	16	16	16	16	17	20	24	26	32	32	35	32	28	24	20	17	16	16	16	16	16
L Q	16	16	16	16	16	16	16	16	18	21	23	26	27	26	25	22	20	17	16	16	16	16	16	16

JUL. 2023 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

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 <sup>F</sup>	298	269	286	292	311	293	318	313	286	283	294 <sup>A</sup>	295 <sup>A</sup>	288	286	312 <sup>A</sup>	299	292	301	294	293	278	255	267
2	279	289	289	292	279	290	335	333	369	302	290 <sup>A</sup>	<sup>A</sup>	293	269		272	277	280	285	313	265	269	264 <sup>F</sup>	
3	279 <sup>F</sup>	272 <sup>F</sup>	275 <sup>F</sup>	290 <sup>F</sup>	300 <sup>F</sup>	280 <sup>F</sup>	289 <sup>F</sup>	289 <sup>F</sup>	289	283		<sup>A</sup>	275	293	286	271	280	302	293	276	277	271	251 <sup>F</sup>	<sup>F</sup>
4	<sup>F</sup>	<sup>F</sup>	<sup>F</sup>	310 <sup>F</sup>	<sup>F</sup>	<sup>F</sup>	316	324	329	285	276	275	263	268	276	285	292	298	306	295	270	262	266	269
5	275	<sup>F</sup>	322	334 <sup>F</sup>	287	282	311	341	308	295	271	273	250	262	273	285	283	286	285	295	315	270	269	249 <sup>F</sup>
6	285	290	300	304	286	294 <sup>F</sup>	335	341	321		<sup>A</sup>	275	258	278	263	273	267	271	275	271	282	282	276	261
7	293	300	287	286	269 <sup>F</sup>	<sup>F</sup>	299	269 <sup>F</sup>	295	266	241	234	254	<sup>A</sup>	275 <sup>A</sup>	<sup>A</sup>	254	264	283	<sup>A</sup>	271	256	262	273
8	265	257 <sup>F</sup>	268 <sup>F</sup>	290 <sup>F</sup>	<sup>F</sup>	274	265	266 <sup>F</sup>	268	246	252	259	304	273	<sup>A</sup>	285	<sup>A</sup>	<sup>A</sup>	285	293	278	265	277	281
9	289	<sup>F</sup>	300 <sup>F</sup>	<sup>F</sup>	<sup>F</sup>	290	313	329	310	303	304	283	275	286	270	287	285	294	288	298	286	281	277	272 <sup>F</sup>
10	280	284	297	307	306	321	329	333	312	315	306	291	267	270	277	281	282	297	295	317	291	268	263	254 <sup>F</sup>
11	277	281	292	306	300	288	281	298	297	283	283	278	277	259	267	270	282	279	291	287	286	274	263	265
12	278	266	<sup>F</sup>	292	310 <sup>F</sup>	305	312	317	308	<sup>A</sup>	295	300	301	280	286	295	283	280	291	293	285	265	258	260
13	281	280	274 <sup>F</sup>	291	291 <sup>F</sup>	289	312	298	307	294	275	274	281	301	297	287	287	277	291	284	289	264	264	269
14	265	276	279	297	298	295	290	304	298	273	286	285	265	260	253	262	267	277	308	312	271	254	262	270 <sup>F</sup>
15	264 <sup>F</sup>	263 <sup>F</sup>	295 <sup>F</sup>	287 <sup>F</sup>	272 <sup>F</sup>	281 <sup>F</sup>	349	316	319	290	273	278	279	272	274	295	275	283	289	284	296	259	265	
16	<sup>F</sup>	281	<sup>F</sup>	297 <sup>F</sup>	<sup>F</sup>	284	326	317	320	308	270	<sup>A</sup>	<sup>A</sup>	274	283	271	279	284	279	289	282	276	262	268
17	274	283	310	301	306	290	315	302	274	279 <sup>H</sup>	275	295	284	289	285	302	291	275	252	275	291	279	254	272
18	297	285	274 <sup>F</sup>	289 <sup>F</sup>	291 <sup>F</sup>	290 <sup>F</sup>	306	275	281	256	<sup>A</sup>	258	257	267	273	276 <sup>R</sup>	271	285	279	292	279	264	256	258
19	269	<sup>F</sup>	309 <sup>F</sup>	<sup>F</sup>	295 <sup>F</sup>	295 <sup>F</sup>	328	328	334	299	293	277	281	271	273	278	282	285	311	286	286	264	258	276
20	279	293	293	278	277	289	311	312	295	307	284	269	266	270	278	278	293	293	292	297	294	274	270	273
21	280	280	301	316	275	277	292 <sup>H</sup>	357	312	256	287	261	259	268	276	285	292	285	298	282	270	257	259	279
22	280	276 <sup>F</sup>	274 <sup>F</sup>	280 <sup>F</sup>	279	315	331	310	316	306	274	263	258	288	285	264	277	288	293	304	271	269	251	274
23	263	287	286	275	279	290	314	313	284	333	264	286	302	282	281	274	274	288	290	297	283	279	275	272
24	280	273	283	278	279	276	284	302	283	330	318	291	281	286	292	271	286	306	299	298	266	255	260	277
25	262	262	306	303	269	274	311	303	293	298	285	273	269	266	277	274	291	294	280	278	269	262	285	302
26	276	263	270	270	283	309	338	355	291	308	286	291	272 <sup>V</sup>	286	282	268	282	266	284	289	283	262	250	268
27	272	271	271	273	282	293	276	290	306	306	268	271	280	293	272	275	295	300	290	295	285	275	267	265
28	276	286	317	286	257 <sup>F</sup>	288	334	332	338	315	370	279	286	281	291	287	287	295	296	304	285	267	270	273
29	276	268	280	283	291	291	288	276	301	273	263	253	265	282	278	280	289	301	<sup>A</sup>	298	269	264	259	273 <sup>F</sup>
30	277	271	290	297	291	284	341	323	292	300	278	271	273	281	286	278	288	279	304	283	300	273	273	274 <sup>F</sup>
31	<sup>F</sup>	303	291	287	282 <sup>F</sup>	282 <sup>F</sup>	276	290	297	305	286 <sup>H</sup>	293	284	293	293	293	284	300	296	307	308	262	255	264
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	27	28	29	27	29	31	31	31	29	29	28	29	30	30	29	30	30	30	30	31	31	31	28
MED	278	280	290	290	286	290	312	313	306	298	283	276	275	280	278	278	283	286	291	293	285	265	262	271
U Q	280	287	300	302	295	294	329	329	316	306	288	288	282	288	286	287	289	295	296	298	291	274	269	274
L Q	273	271	274	284	279	282	290	298	292	281	272	266	265	268	273	271	277	279	284	284	271	262	258	265

JUL. 2023 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								A	L	U	L	A	A	A	A	A	A	A	L					
2								L	L			A	A	A	A	A	A	A	L	A				
3								369		A	A	A	A	A	A	A	A	A	A					
4								356	379			A	A	A	406			A	A					
5								L	A	A	A	A	A	A	381	379	371	362	373					
6									L	L	A	A	A	A			A		L	L				
7								L	L	A	A	A	A	A			A	A	A	A	A			
8								U	L		A	A	A	U	L	A		A	A	A				
9								L	L	L		A	A			A				A				
10										A														
11								U	L	L														
12								351		L														
13									U	L	A	A	A	A	A	A	A	A	A	A	A			
14									A	L	L	A	A	A	A	A	A	A	A	A	A			
15										L	A	U	L	L	A	A	A	A	A	A	L			
16									A	A	A	A	A	A	A	A	A	A	A	A				
17									L	U	L		A	A						U	L	L		
18										A	A	A	A	A						L	L			
19									L	L	U	L	L	A	A	A	A	A	A	L				
20										L		U	R	A	A				L	A				
21									L	L	H		A	A	H	H			A	L				
22									L	L	L	U	L	A	A	A	A	A	L	A				
23									L	L	U	L	H	H	U	L	L	A	L					
24									L	L	U	L	A	A	A	A	A	A	L	L				
25									L	L	L				H				L	L				
26										L					A	A	A	A	A	A				
27									L	L	A						A		L					
28										L	U	L			A				L					
29										L	L				A	A	A	A	A	A				
30										L	U	L			H			A	A	L				
31										L					H	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							2	4	15	20	18	19	18	18	17	18	16	19	8					
MED							U	L	L	L									L					
U Q							346	363	369	376	374	394	392	382	381	368	361	346	350					
L Q								L	L	L									L					
							368	383	397	388	401	402	403	402	383	371	353	362						
							L	L	L	L								L						
							358	362	362	367	371	380	371	372	358	352	343	342						

JUL.2023 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



## IONOSPHERIC DATA STATION Yamagawa

JUL. 2023 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1								254	264	346	372	332	308	330	330	288	300	316	276						
2								254	230	248	364	E A 406	A	336	E A 364	A	354	340	294	270					
3								306	350	402	A E 518	E A 398	356	368	424	398	318	274							
4								236	248	E A 396	378	E A 392	E A 366	340	316	300	294	270							
5								248	258	354	368	E A 498	370	332	316	318	316	288							
6								244	260	A	372	392	332	378	318	360	332	328	264						
7							292	306	324	438	532	562	496	A	426	A	484	412	344		A				
8							330	404	502	496	464	354	432	A	386	A	A	U L 360							
9							274	240	264	296	324	370	378	326	360	318	310	296	302						
10								248	286	318	358	388	396	356	350	346	300	294							
11							320	254	298	258	312	304	320	404	360	348	312	298	284						
12								286	A	344	312	322	382	354	338	354	342	304	266						
13							222	230	314	344	400	358	316	328	340	320	372	298							
14								286	362	322	326	368	380	406	364	342	324	276							
15								E A 238	E A 252	328	388	356	340	382	370	332	358	338	306						
16								264	294	286	E A 392	A	A	364	340	354	328	314	324						
17								278	278	272	378	344	360	356	338	298	318	346	334	304					
18								366	476	A	446	456	388	348	328	336	316	296	266						
19								254	248	262	336	366	340	326	340	310	304	298	260						
20									268	314	384	338	346	328	314	290	286	258							
21								212	258	434	360	386	370	344	328	314	296	282	296						
22								248	254	278	314	386	E A 402	316	294	344	316	280	280						
23								270	266	266	278	424	360	314	312	342	332	326	304	282					
24								272	270	318	258	290	334	360	356	310	326	312	270	278					
25								280	250	310	280	356	354	356	316	326	296	280	298						
26								362	290		354	384	340	342	342	E A 346	366	294							
27								280	250	270	276	352	340	324	292	334	318	284	292						
28								240	292	240	394	360	348	326	330	330	300	282							
29								268	296	356	392	336	E A 316	312	306	294	E A 292	A							
30								248	292	296	316	330	330	328	308	296	326	342	278						
31								232	280	310	298	346	320	314	316	324	308	296							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT							7	20	30	29	28	30	29	30	30	29	30	30	29	4					
MED							280	254	265	291	346	363	352	352	338	328	320	311	294	268					
U Q							320	268	294	354	375	392	386	378	356	346	342	338	300	287					
L Q							272	242	248	274	315	340	334	326	326	315	304	294	277	266					

JUL. 2023 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Yamagawa

JUL. 2023 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	284	258	234	E A 270	248	232	218		E A 222	214		A 194	E A 272	196		A 246	E A 264	E A 236	E A 256	E A 256	E A 252	316	294		
2	272	282	262	236	272	272	212	202	198	224	234		A A	A A	A A	A A	A A	232	254		E A 252	232	E A 298	E A 324	
3	274	286	284	250	236	E A 306	260	216	206		A A		E A 280		A 202		A 200		A 298	E A 264	E A 270	314	272		
4	E A 326	Q E A 266	E A 250	E A 250	E A 258	Q 280	230	218		A A	E A 260		A A	E A 248	192	230	214	188	216	E A 238	E A 264	E A 292	E A 304	E A 298	
5	280	276	230	210	226	278	218	232	196	186	268	222		A 164	202	204	202	210	220	246	238	226	276	304	
6	268	258	244	234	260	238	212	228	E A 242		E A 312	E A 342	186	186	214		216	202	226	258	E A 288	E A 272	E A 314	E A 306	
7	250	230	E A 262	E A 272	284	312	276	234	208		A 216	192	198		256		A A	E A 282	E A 290		E A 286	E A 326	310	276	
8	310	E A 322	E A 290	E A 272	274	294	246	226	E A 282	E A 260	216	E A 310		A 194		200		A A	E A 276	E A 262	E A 318	E A 322	E A 278	E A 276	
9	264	278	254	276	284	262	230	208	196	204		200	170	200		258	214	206		E A 314	242	254	272	280	
10	276	268	242	240	234	218	222	218		A 204	188	200	214		B 192	192	E A 262	200	226	250	204	E A 292	E A 286	E A 318	
11	E A 280	E A 284	258	250	240	236	234	222	202	198	204	176	236	210	186	206	208	230	234	254	236	244	284	306	
12	286	306	E A 306	E A 262	E A 248	240	210	222	192		A 244		E A 202	E A 204		204	226	212	274		E A 264	E A 254	302	E A 334	
13	E A 308	E A 288	262	E A 262	258	266	244		A 204	192	244	190	308		A 216	218		A A	A A	E A 240	246	282	302	E A 296	
14	322	306	E A 296	E A 260	E A 236	E A 252	E A 264	216	206	182		A 206	190	200	194		A A	A A	A A	A A	240	234	296	304	290
15	274	302	254	E A 280	E A 306	272	220	214		A 190	180		A 180	192		A A	A A	A A	238	276	228	310	336	374	
16	E A 326	E A 288	E A 240	E A 280	E A 228	E A 270	226		A A	A A	A A	A A	A A	E A 230	E A 320		A A	A A		A 220	252	E A 234	E A 264	E A 304	E A 300
17	E A 326	256	240	222	222	226	228	218	208	192	198	E A 238	E A 210	E A 218	198	194	214	234	208	254	240	244	278	290	
18	246	254	276	248	230	240	270	234	212	292		A A	A A	E A 208	E A 204	210	212	202	218	254	250	272	308	324	
19	E A 344	E A 308	276	E A 236	E A 230	E A 260	230	226	214	192	174	214	E A 272		E A 274	E A 254		A A	216	230	244	270	E A 286	302	278
20	286	250	250	264	282	276	234	206	218	218	184	234	184		A 210	214	220		A 246	240	252	266	270		
21	266	268	242	220	254	288	228	192	190	172	196	182	196	186	202	202	198		A 276	248	E A 292	E A 308	E A 284	E A 274	
22	E A 256	268	268	248	258	244	206	228	228	212	214	208		A A	A A	E A 270		A 264		A 246	264	274	312	284	
23	E A 316	268	266	E A 262	E A 266	274	246	224	200	190	184	188	184	186	190		E A 232	222		A 248	252	264	268	286	282
24	260	264	268	E A 274	276	276	240	226	224	206		E A 290	E A 182		A A		222	222	216	262	240	244	306	298	276
25	288	300	250	228	294	312	244	224	230	222	216	198	166	206	198	214	188	208	212	244	248	282	266	248	
26	234	308	292	282	270	240	240	220	188	170	206	174	170		E A 330		A A	A A	A A	256	E A 238	E A 300	E A 346	278	
27	278	E A 294	274	E A 308	E A 282	242	244	232		A 186	248	202	232	190	228		A 210	208	226	246	234	246	282	296	
28	276	274	228	E A 258	E A 300	258	222	236	216	230	196	176	176	172	E A 266	198	196	220	228	248	254	280	276	268	
29	280	300	256	250	250	248	224	264	230	262	186		E A 240		A A		E A 238		A 256	274	290	332	E A 280		
30	272	292	244	234	E A 244	256	214	212	200	184	192	250	170	194	192	240		E A 222		A 248	244	234	266	296	296
31	E A 330	240	246	260	E A 252	E A 302	228	212	198	176	192	180	168	184	188	190	204	214	222	250	218	242	304	300	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	28	26	25	23	24	24	20	21	20	20	22	22	28	31	31	31	31	
MED	276	273	253	U 246	254	259	229	222	205	195	198	196	186	193	198	207	212	213	229	248	241	262	293	284	
U Q	E A 310	300	274	E A 272	276	278	244	228	222	220	234	236	234	207	E A 242	231	222	230	254	256	E A 264	E A 292	E A 310	E A 304	
L Q	268	264	244	236	236	240	220	215	198	186	188	189	178	186	192	201	206	206	222	245	236	252	282	276	

JUL. 2023 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

JUL.2023 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						A	A	100	A	A	A	A	A	A	100	100	104	104	106	A				
2						B	110	100	A	A	98	98	A	98	98	A	102	102	106	A				
3						A	A	A	A	A	A		A	A	A	A	A	A	A	A				
4						A	116	102	100	98	98	98	98	96	A	A	A	A	A	A				
5						B	104	100	100	98	96	96	96	A	A	A	A	A	A	A				
6						B	104	104	98	98	98	98	98	98	A	100	100	100	100	A				
7						B	A	100	100	100	A	A	A	100	100	104	102	102	102	102				
8						B	102	102	98	98	96	100	A	100	A	A	A	A	A	A				
9						B	100	104	100	100	100	98	98	98	98	102	102	102	102	A				
10						B	A	102	100	100	98	98	98	B	104	104	100	100	A					
11						A	A	A	100	100	A	98	A	A	A	A	98	98	104	A				
12						A	A	98	A	A	A	A	100	108	108	100	100	100	104	A				
13						A	A	A	A	A	A	A	A	A	A	100	100	100	100	A				
14						A	A	A	A	A	A	A	100	100	100	100	100	100	100	A				
15						B	104	102	102	A	100	100	100	100	A	100	100	100	102	A				
16						A	102	102	102	100	100	100	100	A	A	96	A	96	A	A				
17						A	A	A	94	98	98	98	98	100	100	100	100	100	A	A				
18						A	A	A	A	A	A	A	A	A	A	A	100	100	A	104				
19						A	A	A	A	98	98	98	98	96	98	88	100	A	A					
20						A	100	100	A	98	102	102	102	100	100	A	98	A	A					
21						108	110	A	A	A	98	102	102	102	102	102	102	102	96	A				
22						A	100	A	A	100	100	100	98	98	98	98	A	A	A					
23						110	104	A	A	A	A	100	100	100	100	100	100	A	A					
24						116	102	102	102	96	A	A	A	A	A	110	110	106	A	A				
25						A	98	96	96	A	98	98	A	A	A	A	A	104	118	A				
26						118	A	A	A	98	A	B	A	A	A	98	98	98	A	A				
27						A	A	A	A	A	A	A	A	A	A	A	98	A	A					
28						A	102	98	98	98	102	102	102	100	100	100	100	A	A					
29						112	102	96	96	96	A	98	98	98	98	A	A	A	A					
30						114	98	A	A	A	A	100	100	104	100	100	100	A	A					
31						106	102	98	A	98	98	98	98	94	94	100	100	100	106	110				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							14	22	16	14	18	18	20	20	17	20	23	23	15	4				
MED							109	102	100	98	98	98	99	100	100	100	100	100	102	107				
U Q							114	102	100	100	98	100	100	100	101	101	102	102	104	114				
L Q							104	100	98	98	98	98	98	98	98	100	100	100	100	103				

JUL.2023 h'E (KM)

IONOSPHERIC DATA STATION Yamagawa

JUL. 2023 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	94	90	94	90	90	92	98	112	92	92	94	94	90	100	104	100	104	100	106	100	96	100	98	90
2	92	90	90	94	80	B	124	104	112	108	108	96	92	92	94	104	104	106	104	98	92	92	94	94
3	90	94	94	88	84	86	86	114	114	104	92	92	96	94	94	116	92	94	110	86	92	96	96	98
4	90	B	84	82	82	86	126	114	100	94	98	96	96	92	92	176	86	88	88	82	82	92	90	90
5	94	92	92	90	86	92	116	104	110	116	96	96	88	92	94	96	96	94	90	118	B	90	90	110
6	102	B	B	B	94	92	140	106	100	98	98	98	100	118	114	110	110	112	100	88	82	84	82	96
7	86	94	92	92	96	100	116	108	104	100	98	98	100	96	106	110	108	108	102	98	98	92	92	98
8	100	96	94	94	100	118	114	106	102	102	98	96	90	96	88	94	86	86	84	84	96	96	98	98
9	104	98	96	94	92	98	114	104	102	104	96	98	98	102	B	96	104	120	104	98	92	94	94	92
10	92	86	86	86	88	112	108	128	102	104	98	98	92	B	124	122	106	106	94	94	94	90	92	88
11	88	88	88	86	90	92	102	100	106	110	106	G	104	102	100	104	G	118	104	98	96	98	94	94
12	90	84	84	84	80	98	106	104	104	90	90	98	112	178	106	112	112	114	102	98	96	96	96	96
13	96	94	94	90	90	92	92	92	96	98	92	98	90	90	90	120	100	96	96	94	94	96	92	92
14	90	94	94	92	92	88	88	94	110	114	110	102	106	104	112	104	100	98	94	96	94	102	94	94
15	84	90	90	88	88	B	126	118	100	114	G	96	G	G	104	102	108	100	108	94	94	96	92	94
16	94	88	86	88	90	90	96	104	98	98	96	94	90	100	98	92	100	88	90	94	88	84	90	94
17	96	92	94	94	92	94	94	92	100	128	136	104	112	106	100	136	116	102	98	124	B	B	B	102
18	96	116	98	106	92	96	96	104	106	102	92	92	92	96	92	92	G	132	100	90	84	116	88	90
19	88	84	92	86	90	92	88	90	86	86	G	104	102	102	100	98	98	98	100	110	98	112	112	82
20	98	94	94	94	92	92	94	104	92	94	106	104	106	104	100	102	92	94	90	92	96	B	B	B
21	B	B	90	96	B	B	180	142	92	92	92	120	G	154	138	114	G	100	92	92	86	98	96	92
22	86	84	86	90	90	100	100	100	94	94	102	108	98	98	96	96	94	94	98	110	100	88	88	96
23	96	94	88	94	96	90	142	90	90	90	90	90	142	118	114	106	102	96	96	94	90	88	92	88
24	88	86	86	84	84	92	122	106	104	102	98	92	104	102	104	170	184	112	102	114	B	B	108	90
25	90	94	B	B	92	98	118	102	96	108	162	90	90	84	84	152	102	94	94	G	B	88	88	90
26	90	90	84	84	82	B	84	178	98	98	160	104	B	90	88	88	100	100	100	94	94	92	92	92
27	92	86	88	86	88	96	100	96	96	98	98	92	94	88	90	88	90	G	92	114	90	84	B	100
28	100	98	88	90	90	B	150	108	118	110	104	108	104	106	106	112	106	102	96	94	90	88	84	90
29	90	86	82	86	B	B	110	100	98	98	100	94	100	96	92	92	92	86	92	90	86	86	78	82
30	98	84	92	92	92	B	164	104	92	102	100	100	102	110	130	122	98	90	92	92	84	92	92	82
31	96	92	92	90	90	88	118	104	100	90	G	G	G	G	G	G	G	116	104	G	B	B	B	92
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	28	29	29	29	24	31	31	31	31	28	29	27	28	30	30	27	30	31	29	26	27	27	30
MED	92	91	90	90	90	92	110	104	100	100	98	98	98	100	100	104	100	100	98	94	94	92	92	92
U Q	96	94	94	94	92	98	124	108	104	108	105	103	104	105	106	116	108	106	102	99	96	96	96	96
L Q	90	86	86	86	87	91	96	100	96	94	95	94	92	93	92	96	94	94	92	92	88	88	90	90

JUL. 2023 h'Es (KM)

IONOSPHERIC DATA STATION Yamagawa

JUL. 2023 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	F2	F1	F1	FQ31	F3	L3	C2	CL33	L2	L2	L2	L2	L3	C1	C2	C3	C3	C2	C4	F3	F2	F2	F4	
2	F4	F3	F2	F1	F1		C1	C1	CL11	C1	C2	L4	L2	L3	C4	C3	C2	C2	C3	F4	F5	FQ41	F9	
3	F5	F2	F2	F2	F3	L3	LQ31	CL22	CL13	C1	L4	L3	L2	L1	L1	CL32	LC22	L2	CL32	LQ31	FQ41	F3	FQ21	FQ31
4	FQ41		F4	FQ31	F2	L2	CL11	C1	C4	L4	C2	C3	L2	L1	HL11	L1	L1	L2	L5	FQ31	F3	F4	F2	
5	F2	F3	F3	F2	F3	L1	C2	C4	C1	C1	C2	L4	L1	L1	L1	L1	L2	L3	CL22		F1	F1	F1	
6	F1				F1	L2	H1	C2	C3	C2	C3	C1	C1	CL11	C1	C2	C1	C3	L3	F8	F3	F4	FF24	
7	FF22	FF22	F4	F3	F2	C2	CL21	C1	C1	C2	C2	C1	C1	C4	C1	C2	C3	C2	C3	C5	F5	F8	F3	F3
8	F2	F4	F3	F5	F3	C1	C2	C2	C3	C2	C2	L3	C1	L3	L1	L4	L4	L2	LQ31	FF45	FF23	F3	F4	
9	F2	F4	F1	F2	F4	C2	C2	C2	C1	C1	C2	C2	C1	C2	C3	C2	C1	C1	C6	L6	F4	F2	FQ31	F2
10	F2	F3	F1	F1	F2	C1	C2	C1	C3	C2	C2	L2		C1	C1	C2	C1	LQ31	LQ21	F2	F3	F2	F3	
11	F3	F2	F3	F3	F2	L3	C3	C2	C1	C1	C1	C2	C2	C1	C1	C1	C1	C2	C2	F1	F1	F2	FQ31	
12	F6	F4	F3	F4	F3	CL22	C1	C1	C1	L4	L4	C1	C1	H1	C2	C1	C1	C1	C1	F6	F4	F2	F5	
13	F5	FQ31	F2	F3	F2	L3	LQ31	L5	L3	C2	L1	L2	L3	L3	C1	C3	C5	C5	L6	FF52	F7	F4	F6	
14	F3	FQ31	FQ51	FQ51	FQ31	LQ31	L6	L2	CL11	CL11	CL11	C1	C1	C1	C3	C3	C3	C4	L4	F3	F1	F1	F2	
15	F2	F3	F5	F5	F4		C2	C2	C3	CL11		C2			C2	C2	C2	C3	C2	L6	F2	F5	F8	F5
16	FQ31	F7	F4	FQ41	FQ41	F4	L2	C4	C3	C3	C3	L3	L6	C2	C2	L2	LC31	L6	L6	F2	F5	F4	F3	
17	F3	F2	F2	F3	F3	F2	L3	L2	C1	C1	H1	C1	C1	C1	C1	H1	C1	C2	C1				F3	
18	F2	F1	F1	F1	F1	F4	F4	C2	C1	C1	L4	L1	L2	L1	L1	L1		C1	C1	L1	F3	F1	F3	F3
19	FQ31	FQ31	FQ21	FQ31	FQ31	FQ41	L2	L2	L2	L2		C1	C2	C2	C2	C2	C1	C3	CL42	FF42	FF24	FF23	F2	
20	FF32	F3	F2	F2	F4	F6	L2	C1	L3	L2	C1	C2	C1	C2	C2	C1	LQ21	L3	L3	LQ51	F2			
21			F3	F1			H1	HL11	L3	L2	L1	C1		H1	H1	C1		C3	L6	L8	F5	F4	FF14	F2
22	F4	F3	F2	F2	F3	F3	C2	C3	L3	L2	C2	C1	C3	C2	C3	C3	L2	L2	C4	CL11	FF62	FF33	F2	FF22
23	FF23	F2	F4	FF23	FQ11	FQ51	HL11	LH21	L2	L2	L2	L1	L1	L1	L2	C2	C3	C3	C3	F3	F3	F4	F4	
24	F3	F2	F1	F4	F4	F1	C1	C3	C1	C2	C2	C2	C1	C3	C1	HC11	HC11	C1	C1			F1	F3	
25	F3	F2			F2	F2	CL11	C2	C2	C1	HC11	L1	L2	L2	L1	HL11	C1	L2	L2		F2	F4	F1	
26	F2	F1	F3	F2	F1		L1	HC11	C1	C2	HC11	C1	L2	L3	L2	C4	C3	C4	L4	F4	F5	F4	F2	
27	F2	F3	F1	F4	F4	F2	C5	C3	C4	C1	CQ21	L2	L1	L3	LH11	L3	L2	L4	C1	F1	F3		F3	
28	F2	F3	FF23	F3	F4		HC11	C4	C1	C1	C1	C1	C1	C1	C1	C1	C1	C2	L2	F4	FQ21	F2	F1	
29	F1	F1	FQ11	F3			C3	C3	C2	C2	C2	L3	C2	C6	C3	C3	C3	L4	L7	L4	F6	F1	F4	F3
30	F3	F1	F2	F1	F2		H1	C2	L2	C1	C1	CH21	CH11	C1	H1	C1	C3	L4	L3	L2	F5	F1	F2	F2
31	F6	F3	F3	F4	F7	F6	C1	C2	C1	L2								C1	C1					FQ31
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

## IONOSPHERIC DATA STATION Okinawa

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

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	X	90	90	90	X	X																X	X	X	X	
2	X	90	X	X	X	X																	X	X	X	X
3	X	89	X	X	X																		X	X	X	X
4	X	76	92	76	94	93	82	80															X	X	X	X
5	X	85	X	X	X	X																	X	X	X	X
6	X	89	X	X	X	X																	X	X	X	X
7	X	90	X	X	X	X																	101	93	90	92
8	X	78	75	77	70	72	72																X	X	X	X
9	X	70	71	65	65	65																	X	X	X	X
10	X	88	X	X	X	X																	X	X	X	X
11	X	88	90	87	82	80																	X	X	X	X
12	X	90	X	86	82	74	X	X															X	X	X	X
13	X	88	90	85	81	83	76																X	X	X	X
14	X	87	X	94	X	X	X	76															X	X	X	X
15	X	88	X	82	81	73	X																X	X	X	X
16	X	80	X	89	78	73	66																X	X	X	X
17	X	142	X	135	X	X	X																116	115	110	130
18	X	95	X	81	78	81	65																X	X	X	X
19	X	98	X	100	X	X	X																X	X	X	X
20	X	92	X	88	82	77	77																X	X	X	X
21	X	127	X	99	82	78	64																X	X	X	X
22	X	103	X	98	94	94	87																X	X	X	X
23	X	88	X	92	84	77	78																X	X	X	X
24	X	98	X	102	X	X	X																X	X	X	X
25	X	77	X	76	75	75	71																X	X	X	X
26	X	89	X	84	86	87	96																X	X	X	X
27	X	87	X	81	78	80	78																X	X	X	X
28	X	107	X	112	X	X	X																X	X	X	X
29	X	91	X	90	82	80	74																X	X	X	X
30	X	90	X	89	92	78	63																X	X	X	X
31	X	76	X	83	72	64	65																X	X	X	X
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT		31	31	31	31	31	23	2														31	31	31	31	
MED		X	X	X	X	X	X															X	X	X	X	
U Q		92	94	94	91	81	78															101	97	94	93	
L Q		X	X	X	X	X	X															X	X	X	X	
		87	86	82	78	73	68															87	82	82	84	

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

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

## IONOSPHERIC DATA STATION Okinawa

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

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

D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 80	F 79	F 82	77	69	65	72	75	69	71	80	86	96	104	109	107	99	96	89	91	82	79	80	80
2	84	86	82	73	F 68	64	77	80	72	67	74	A	92	86	81	A	90	98	107	110	90	79	85	86
3	83	F 84	F 82	F 80	F 68	F 68	71	74	72	70	69	A	A	79	72	74	76	80	A	A	65	66	67	66
4	F 79	F 84	F 76	F 64	F 64	F 60	F 71	F 83	F 76	F 72	A	A	88	94	106	A	119	106	87	78	75	72	76	78
5	79	84	76	64	F 64	60	71	83	76	72	A	A	84	A	98	96	91	100	109	109	88	76	81	83
6	83	88	88	80	72	71	77	72	69	73	74	87	96	101	102	102	94	92	100	104	95	87	84	86
7	84	88	81	78	67	F 67	59	75	A	A	60	A	A	71	66	60	67	69	79	77	70	70	72	74
8	72	F 72	F 79	F 75	F 72	F 64	58	A	A	A	62	69	74	73	72	74	73	68	67	61	58	64	61	64
9	64	F 64	59	59	59	56	67	72	70	72	77	79	91	104	106	110	113	111	116	102	90	83	84	84
10	82	86	90	87	80	70	70	78	78	76	79	72	74	86	93	92	92	A	105	86	70	73	80	82
11	82	F 82	F 81	F 76	74	62	61	74	88	84	81	84	88	85	91	102	101	106	105	98	87	83	82	82
12	84	78	F 78	F 75	F 68	F 66	64	73	76	78	82	82	80	83	86	86	91	90	89	90	84	80	80	84
13	82	F 82	79	75	72	F 64	64	82	81	74	74	81	97	93	85	84	78	85	91	97	81	78	78	80
14	81	82	F 82	79	73	F 66	F 66	76	75	82	89	86	91	94	96	102	109	114	112	90	72	75	77	80
15	81	80	76	75	67	62	67	74	74	73	84	93	96	90	90	95	91	91	95	95	76	70	72	71
16	74	76	83	72	67	F 56	64	82	76	79	78	79	90	95	98	101	105	106	111	110	110	109	104	124
17	R 136	R 140	129	112	106	86	69	78	80	86	83	80	90	92	96	100	104	108	110	105	102	90	87	87
18	89	79	75	72	75	58	60	68	76	53	67	74	80	95	109	122	122	119	118	110	R 91	92	88	84
19	92	101	94	90	69	62	67	72	74	69	75	86	95	98	110	119	119	122	112	104	88	86	86	87
20	86	90	82	76	71	71	76	78	77	82	88	96	104	113	120	130	R 140	142	145	144	128	127	129	126
21	121	110	93	73	72	58	72	91	67	72	76	84	101	112	120	120	115	107	96	90	86	90	90	91
22	97	102	92	88	88	81	74	83	86	87	78	81	94	118	113	110	129	136	122	109	91	90	85	83
23	82	86	86	78	71	72	Z 87	79	82	69	76	H 92	101	104	107	116	123	128	120	103	97	102	108	94
24	92	101	96	100	100	85	85	85	H 104	82	68	88	91	104	118	125	138	144	H 127	101	86	82	86	85
25	71	72	70	69	69	65	72	83	81	86	79	77	82	102	108	110	111	108	102	104	94	102	110	89
26	83	80	78	80	81	90	100	65	73	84	88	78	93	104	93	101	113	109	110	102	95	86	75	78
27	81	77	75	72	74	72	74	92	H 88	H 90	H 96	105	113	121	129	143	144	128	109	109	104	91	88	95
28	101	110	105	85	66	65	80	94	74	78	74	71	89	101	95	102	110	109	104	92	84	83	88	91
29	85	81	84	76	74	68	76	88	94	88	87	96	112	124	133	144	141	J 128	R 124	102	102	91	90	84
30	84	84	83	86	72	57	60	72	91	88	90	103	119	130	134	127	120	H 109	H 107	101	86	76	73	72
31	70	87	77	66	F 58	F 56	58	74	82	83	90	92	98	104	104	99	104	98	100	95	82	72	72	72
	00	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	27	27	28	30	27	30	30	29	29	30	27	29	30	31	29	31	30	30	30	31	31	31	31
MED	83	84	82	76	71	65	70	77	76	78	78	84	92	100	102	102	109	108	107	102	87	83	84	84
U Q	86	90	90	82	74	71	76	83	82	84	84	92	98	104	110	120	120	119	112	105	95	90	88	87
L Q	81	80	77	72	67	60	64	73	72	72	74	79	88	90	91	96	91	96	96	91	81	75	76	78

JUL. 2023 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

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

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

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									L	L	A	A					A	A		L						
2									L	L	A	A	A	A	A		A		A	A	L					
3									L	L	A		A	A	A	A	A	A	A	A	A					
4										A		548	532	528	560		A	A	A	A	A					
5										L	L	A	A			A	A		L	L						
6										L	L	U	L	L	L		A		A	L	A					
7									A	A	A		508									L				
8								A	A	A	A		500	504	508	R					A	A				
9									A	L	L		L			A					A					
10										468	588	572	504	552	R						A				L	
11									L	L	L				U	L					L	L				
12										L	L	L	L	L							L	L				
13										L	A		544	544	540	556	536	528	544	520	452					
14									A	L	L	A	L	L	A	A			A	A	A	A				
15										L	L						A				A	A				
16									A	A	L	L	A								L	L				
17									A	L	L	L					H			L	L	L				
18									A	544	492	528	560	556	556	556	552	544	528	476						
19										U	L	568		A	A				L	L	L					
20										U	L	588	552	572	580	552				A	A	L				
21									L	L	L	U	L				H			L	L					
22									L	L		U	L						R	A						
23										520	668	560								520	448					
24										L	L	U	L							L	L					
25										L	L	U	L							L	L					
26									L	L	L										L	L				
27									L		A								H		L	L				
28										524	540	568								L	L					
29									L	L		A	A							A	A	L	L			
30										L	L	U	L													
31									U	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	11	21	25	23	25	23	22	22	22	22	23	13					
MED									L	L	L									L	L					
U Q									420	500	536	548	560	560	556	556	548	538	504	456						
L Q										U	L	U	L							L	L					
										524	572	564	572	578	572	564	556	548	520	470						
										L	L									L	L					
										468	506	530	544	554	548	536	524	520	496	442						

JUL.2023 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN



IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						B	A	A	A	A	A	A	412	A	404	388	352	320	U A	A				
2						B	A	272	312	356	380	380	380	392	392	388	368	332	A	A				
3						B	216	272		A	A	400	392	384	A	A	A	A	A	A				
4						B	A	268	324	352	364		A	A	A	A	A	A	A	A				
5						A	A	280	308		A	376	388	380		A	A	A	A	A				
6						A	A	U A	U A	U A	A	368	372	372	404	396	396	364	328	276				
7						A	A	276	324	352		A	A	A	400	400	380	368	324	272				
8						B	A	260	320	344	376	384	396		A	A	376	352		A	A			
9						A	A	260	308		A	U A	U A	A	396	396	384	364	328	268				
10						B	A	280	320		A	392	408	408		B	408	404	384		A	A		
11						A	A	A	A	A	A	A	A	A	A	A	396	380	328	284				
12							A	A		A	400		A	428	420	412	396	368	336	292				
13							A	A	A	A	A	A	A	A	A	A	A	A		336	272			
14							A	A	A	A	A	A	A	A	A	396	396	368	336	264				
15							A	268	316	360	388	404	412	412	404	384	364	340	280					
16							A	272	332	356	388	396	400	396	400	384	360	320		A	A			
17							A	A	A	A	A	408	412	412	404	388	368	328	280					
18							A	A	A	B	R	400	400		A	A	A	A		336	272			
19							196	280	332	356		A	420	412	408	400	392	364	328	284				
20							A	A				A	A				A	A	A	A				
21								316	356	372				416	412									
22							196	276		A	A	392	404	412	408	400	388	364	332		A	A		
23							A	A		312	348		388	408	436	416	388	360	312	264				
24							A	320	360		A	A	412	416	412	396	364	320		A	A			
25							A	260	316	356	380	408	404		B	412	412	384	344	284	200			
26							A	272	320	368	388		A	A		A	A	A	A		A	A		
27							184	U A	U A	U A	A	404	416	416		A	408	376	332		A	A		
28							192	272		A	A	A	A	A	A	A		372	348		A	208		
29							196	256	332	368	396	416	416	404	396	384	364	332		U A	A	A		
30							196	260	320	364	380	404	404	404	400		U A	A	A	A	A	A		
31							A	260		A	A	A	408	420	412	408	388	360	312		A	A		
							A	A	A	A		392	404	412	408	404	392	368	332	284				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							7	19	20	15	20	20	21	20	23	22	23	23	16	3				
MED							196	272	320	356	388	404	412	408	404	388	364	332	276	200				
U Q							196	276	324	360	392	408	412	416	408	396	368	336	284	208				
L Q							192	260	312	352	376	390	398	404	396	384	364	324	272	196				

JUL. 2023 foE (0.01MHz)

IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	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	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
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	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
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	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
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	E B	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	J A	J A	J A	J A	J A	J A
19	E B	E B	E B	E B	E B	E B	E B	G	G	G	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
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	E B	G	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
22	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
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	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
27	J A	J A	E B	J A	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	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	E B	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
29	J A	E B	E B	E B	E B	E B	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
30	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
31	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	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	J A
L Q	J A	J A	E B	E B	E B	E B	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A

JUL.2023 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

JUL.2023 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	26	E B	16	24	23	E B	E B	21	33	38	49	56	45	46	44	44	67	69	43	36	38	17	E B	19	E B							
2	E B	16	18	E B	16	E B	E B	23	31	G	26	50	55	A A	86	72	60	44	117	38	62	47	22	36	E B	E B	E B	16	16			
3	24	20	24	E B	16	E B	E B	G	35	41	54	46	A A	A A	89	56	58	63	50	60	A A	A A	A A	49	26	20	E B	16				
4	21	34	E B	16	23	23	E B	21	32	47	44	48	48	45	57	71	A A	168	63	47	50	38	26	21	28	21						
5	E B	16	20	E B	16	22	30	20	24	46	37	39	A A	A A	A A	122	105	49	A A	207	58	44	42	35	23	21	40	E B	E B	E B	16	16
6	E B	E B	E B	E B	E B	E B	20	22	33	38	38	42	44	42	48	57	48	60	37	76	41	54	43	17	E B	16						
7	21	23	E B	16	32	18	24	28	38	A A	A A	A A	43	88	109	47	42	40	41	35	33	26	28	E B	E B	E B	E B	16	17			
8	21	E B	E B	16	39	E B	E B	A A	A A	A A	A A	46	45	46	48	41	G	G	32	44	48	39	40	E B	E B	E B	16	15	20			
9	22	25	24	28	30	27	29	48	46	40	42	46	48	73	48	47	47	40	46	32	22	63	26	18								
10	E B	E B	E B	E B	E B	E B	22	32	44	48	47	44	44	E B	42	G	G	A A	127	28	20	E B	E B	E B	E B	16	16	16	16	16		
11	20	E B	16	25	24	18	25	24	29	34	39	42	47	45	44	43	G	G	G	24	30	21	14	E B	E B	E B	E B	16	16	16		
12	E B	E B	16	20	25	E B	16	18	22	30	38	33	43	45	45	47	45	43	40	38	38	26	29	22	31	26						
13	20	24	22	21	E B	19	26	42	49	52	45	43	45	46	47	44	43	42	38	32	24	E B	E B	E B	E B	16	16	20	16	16		
14	E B	E B	E B	E B	33	31	40	23	46	46	45	54	48	48	56	70	52	68	47	42	44	48	20	E B	E B	E B	E B	16	16	16	16	
15	31	E B	16	20	E B	E B	16	16	23	34	44	42	42	42	45	48	46	56	44	38	50	31	31	53	22	E B	16					
16	E B	E B	16	23	21	21	30	30	42	52	50	48	66	44	91	58	56	62	44	38	20	E B	E B	E B	E B	16	16	28	21	21		
17	E B	16	22	33	E B	16	20	38	40	41	40	41	41	44	47	46	47	44	G	G	G	20	E B	E B	E B	E B	E B	16	16	16	16	
18	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
19	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
20	22	20	19	18	E B	E B	14	29	30	40	54	43	51	49	44	62	101	70	52	34	22	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
21	E B	E B	E B	E B	E B	E B	E B	G	G	37	38	30	44	46	51	42	44	41	41	29	20	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
22	19	E B	16	16	E B	E B	16	16	19	30	35	40	42	43	88	58	46	50	56	37	30	27	28	16	16	16	16	16	16	16	16	
23	31	E B	16	20	20	19	E B	30	32	G	22	40	42	41	46	45	45	48	43	41	34	25	23	22	18	20						
24	18	E B	E B	E B	E B	E B	E B	21	30	34	38	43	46	52	48	48	50	42	G	G	G	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
25	E B	16	18	29	19	E B	17	21	32	G	27	42	G	U	Y	37	45	G	42	42	39	36	28	E B	E B	E B	E B	E B	E B	E B	E B	
26	E B	E B	E B	E B	E B	E B	E B	G	28	37	40	G	45	50	46	47	45	47	40	31	21	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
27	E B	E B	E B	E B	E B	E B	E B	G	G	12	37	38	57	44	47	42	46	42	G	G	G	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
28	E B	E B	E B	E B	E B	E B	E B	G	38	40	43	47	48	64	46	G	43	42	39	29	50	24	E B	E B	E B	E B	E B	E B	E B	E B	E B	
29	E B	E B	E B	E B	E B	E B	E B	G	28	36	50	77	64	52	45	72	74	78	37	31	41	40	24	E B	E B	E B	E B	E B	E B	E B	E B	
30	19	18	34	E B	22	E B	16	20	29	34	38	40	G	G	44	G	48	45	39	50	20	24	E B	E B	E B	E B	E B	E B	E B	E B	E B	
31	E B	E B	16	26	21	21	22	20	30	37	37	G	45	G	54	46	G	G	34	34	20	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23								
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	E B	E B	E B	E B	E B	E B	E B	22	32	38	42	43	45	46	47	46	48	42	39	33	24	22	16	16	16	16	16	16	16	16	16	
U Q	21	20	24	23	20	22	28	41	44	49	48	51	52	56	58	56	56	44	46	38	31	21	20	20								
L Q	E B	E B	E B	E B	E B	E B	E B	G	30	35	38	42	44	45	45	43	43	G	G	29	20	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	

JUL.2023 fbEs (0.1MHz)

## IONOSPHERIC DATA STATION Okinawa

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

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

$\frac{H}{D}$	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	16	16	16	16	16	16	15	19	19	20	23	25	30	30	25	25	22	20	19	16	16	16	16	16
2	16	16	18	16	16	16	17	19	20	22	25	25	34	35	28	25	24	20	21	19	16	15	16	16
3	16	16	16	16	16	16	17	15	20	34	27	25	26	28	27	25	28	21	18	16	14	16	16	16
4	16	16	16	16	16	16	16	18	20	23	24	25	32	31	24	26	22	20	18	16	16	16	17	16
5	16	16	16	16	16	16	16	19	20	22	24	24	24	26	23	24	21	20	19	17	16	16	16	16
6	16	16	16	16	16	16	16	17	20	22	23	24	28	28	29	27	22	23	19	16	16	16	16	16
7	16	16	16	16	16	16	16	20	20	21	25	25	25	24	26	26	22	20	18	16	16	16	16	17
8	16	16	16	16	16	16	16	17	19	20	24	26	26	24	23	22	21	20	18	14	16	16	15	16
9	16	16	16	16	16	14	15	19	19	23	23	27	28	24	24	24	22	20	18	16	16	16	16	16
10	16	16	16	14	14	16	16	17	20	23	25	26	25	47	30	28	24	20	17	16	16	16	16	16
11	15	16	16	16	16	16	16	17	22	23	29	26	26	26	25	26	24	20	20	16	14	16	16	16
12	16	16	16	16	16	16	18	18	21	22	26	28	30	28	29	22	24	20	20	16	16	16	16	16
13	16	16	16	16	19	15	16	18	20	22	28	26	28	28	26	26	21	19	13	16	16	16	16	16
14	16	16	16	16	14	14	16	19	21	21	23	23	27	26	23	24	20	20	18	17	18	16	16	16
15	16	16	16	16	16	16	17	18	20	22	28	24	30	28	27	25	22	23	18	16	16	16	16	16
16	16	16	16	16	16	16	16	20	21	21	24	24	26	24	27	25	25	19	17	17	16	16	16	16
17	16	13	16	16	14	14	14	20	20	22	27	28	28	31	25	27	22	20	18	16	16	16	16	16
18	16	16	16	15	20	16	16	16	25	45	34	35	34	32	32	26	28	21	18	16	16	17	16	16
19	16	16	17	17	16	14	14	16	20	21	23	23	24	25	23	21	24	19	12	13	16	16	16	16
20	16	16	16	16	16	14	17	17	21	23	25	25	30	28	25	27	22	20	18	20	16	16	16	16
21	16	16	16	16	15	16	16	14	20	22	23	28	28	25	25	24	22	20	16	18	16	16	16	16
22	16	16	16	16	16	16	16	19	18	22	22	23	26	37	32	24	24	21	20	16	16	16	16	16
23	16	16	16	16	16	16	16	17	20	21	22	23	24	22	25	24	22	22	18	16	16	16	16	16
24	16	16	16	16	16	16	16	18	20	22	26	23	23	39	34	30	24	23	20	16	16	16	16	16
25	16	16	16	16	16	14	18	18	19	21	22	30	28	24	24	20	18	18	16	16	16	16	16	16
26	16	16	16	16	16	16	16	18	21	21	22	28	26	26	44	33	28	20	18	16	16	16	16	16
27	16	16	16	16	16	16	16	16	21	21	21	23	27	30	25	27	24	19	18	17	16	16	16	16
28	16	16	16	16	16	17	16	16	21	21	23	34	28	28	30	28	24	21	16	16	16	16	16	16
29	16	16	16	16	16	16	16	18	20	20	24	26	23	29	25	25	20	19	17	16	16	16	16	16
30	16	16	16	16	16	16	16	16	18	22	24	23	27	29	28	22	22	21	18	16	16	16	16	16
31	16	16	16	14	16	16	16	16	18	20	25	26	27	24	26	23	20	18	18	16	16	16	16	16
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	16	16	16	16	16	16	16	18	20	22	24	25	27	28	26	25	22	20	18	16	16	16	16	16
U Q	16	16	16	16	16	16	16	19	21	22	26	27	28	30	29	27	24	21	19	16	16	16	16	16
L Q	16	16	16	16	16	16	16	16	20	21	23	24	26	25	25	24	22	20	17	16	16	16	16	16

JUL. 2023 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

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

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

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

JUL. 2023 M(3000)F2 (0.01)

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IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								L	L	A	A					A	A	A	L					
2								L	L	A	A	A	A	A	370	A	357	A	A	L				
3								L	A	A		A	A	A	A	A	A	A	A	A				
4									A		A			A	A	A	A	A	A					
5									L	U	L	A	A		A	A	384	362	347	L	L			
6									L	L	U	L	A	L	A	A	A	A	L	A				
7								A	A	A		386		A							L			
8							A	A	A	A		370	417	A	A	402	399	335	A	A	A			
9								A	L	U	L		L		A		A		A					
10									A	L	U	L		R							L			
11								A	L	L			U	L							L			
12									L	U	L		L	U	L						A			
13									L	A											L			
14								A	U	L	A	A	L	L	A	A		A	A	A	A			
15									L	U	L				A	A	A	A	L	A	A			
16								A	A	L	A	A	A	A	A	A	A	A	A	L	L			
17								A	U	L	L				H		L			L	L			
18								A		A	A				A	A				L	L			
19									U	L			A	A	A	A	A	A	A	L				
20									A						A	A	A	A	A	L				
21								L	L	U	L	U	L		A	H		L		L				
22								L	L		U	L		A	A		A	A						
23									L	U	L				L		A			L				
24									L	U	L	U	L		A		L		L	L				
25									L	L		U	L						L	U	L			
26								L	L	L										L				
27										A								H		L	L			
28														A					L		L			
29								L	L		A	A	A						A	A	L	L		
30									L	L	U	L					A							
31								U	L	L										L	L			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	9	18	22	21	21	17	20	16	19	19	12					
MED								U	L	L	L									L				
U Q								359	368	368	374	380	377	392	384	375	356	345	348					
L Q									L	U	L								L					
								398	384	387	394	388	399	397	384	362	347	352						
								U	L	L									L					
								354	353	365	368	365	374	368	356	340	339	342						

JUL. 2023 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

# IONOSPHERIC DATA STATION Okinawa

JUL. 2023 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

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								238	282	308	348	340	324	344	318	312	308	292	298					
2								220	234	264	352	A	324	316	414	A	356	356	296	258				
3								262	326	404	380	A	A	356	364	E A	370	354	328	A	A			
4									256	410	352	390	384	378	352	A	302	280	272					
5									228	276	A	A	424	A	354	318	338	338	274	248				
6									222	336	282	380	396	376	388	346	366	326	336					
7								250	A	A	426	A	A	390	362	518	418	410	324	264				
8							300	A	A	A	484	420	388	436	388	344	368	308	338	302				
9								234	258	360	362	412	380	348	350	332	348	316	284					
10									258	342	338	258	448	404	362	360	348	A	276	222				
11								242	260	276	278	382	368	376	394	348	334	326	282	258				
12									270	342	304	312	364	374	374	368	330	318	296	280				
13									274	244	416	398	332	318	326	338	386	358	302	260				
14								264	336	274	332	302	378	394	420	396	354	312	268	230				
15									U L	292	334	378	328	344	346	368	330	332	342	300	254			
16								238	294	296	328	410	374	E A	506	356	350	342	310	304	248			
17								244	298	338	294	384	326	324	340	314	342	326	320	280				
18								E A	274	298	262	488	398	424	388	354	328	322	318	300	258			
19									366	406	344	338	388	358	332	312	294	266						
20									334	342	368	370	358	346	E A	366	326	296	272					
21								232	214	334	356	378	378	344	326	318	292	292	274					
22								246	272	284	U L	430	384	E A	524	324	294	368	332	290	266			
23									268	232	404	344	326	336	344	338	308	294	280					
24									264	254	488	316	326	354	328	338	300	290	246					
25									268	266	282	348	410	354	312	336	310	308	302					
26								204	242	294	296	364	342	314	378	366	338	314	294					
27								262		384	314	330	328	340	328	316	298	286	270					
28									258	270	464	346	330	362	378	322	U A	316	282					
29								260	268	E A	496	422	364	324	330	312	302	290	284					
30									304	264	280	372	326	324	306	320	334	310						
31								294	240		314	298	330	338	320	342	312	294	288					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	16	25	27	30	27	29	30	31	29	31	30	29	13				
MED							300	244	268	296	348	372	364	349	354	338	332	311	284	258				
U Q								262	293	342	406	398	386	378	368	366	348	326	301	272				
L Q								236	249	264	304	330	329	330	328	324	310	294	273	248				

JUL. 2023 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

JUL. 2023 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

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 312	E A 266	E A 276	E A 252	220	228	226	208	210	A	A	200	200	200	202	A	A	E A 262	236	264	238	270	302	324	
2	296	262	234	266	264	250	224	216	190	A	A	A	A	A	200	A	218	A	A	240	E A 218	246	316	296	
3	E A 314	E A 266	260	252	228	282	230	228	E A 244	A	232	A	A	A	A	A	A	A	A	E A 356	E A 300	E A 300	E A 274		
4	E A 312	E A 354	238	E A 248	270	246	226	214	A	222	E A 250	E A 232	222	A	A	A	A	A	A	E A 250	E A 268	E A 322	E A 344	E A 312	
5	E A 284	E A 256	234	E A 218	E A 272	242	242	270	198	190	A	A	234	A	A	212	226	206	218	244	228	274	302	292	
6	296	266	238	234	276	248	218	216	194	182	174	202	176	E A 246	E A 268	A	A	228	A	258	E A 278	E A 322	320	296	
7	264	254	252	E A 280	266	328	236	A	A	A	216	A	A	196	182	196	228	212	238	258	E A 286	316	316	296	
8	292	352	286	E A 336	294	312	A	A	A	A	244	196	E A 246	E A 230	194	202	198	A	A	E A 342	E A 280	E A 300	E A 316		
9	E A 314	E A 292	280	E A 294	E A 282	274	252	A	A	204	192	194	226	A	226	248	280	240	A	240	E A 238	E A 336	E A 298	288	
10	306	274	258	226	230	218	218	234	A	258	220	184	174	212	178	190	206	A	228	220	258	296	294	302	
11	310	292	256	256	226	258	242	E A 224	208	204	180	252	184	196	202	192	216	210	228	236	248	262	300	312	
12	300	294	270	268	270	248	214	220	214	188	194	210	212	204	200	200	208	228	E A 254	254	E A 254	E A 296	E A 350	E A 330	
13	308	302	274	288	250	248	288	258	252	A	180	210	200	262	204	198	212	224	234	254	218	290	314	306	
14	304	292	264	E A 236	E A 256	E A 334	228	A	226	E A 234	A	296	224	A	A	232	A	A	A	E A 376	E A 332	E A 306	E A 284		
15	E A 302	E A 282	E A 256	E A 262	276	282	220	214	230	210	186	184	180	E A 256	E A 218	A	E A 246	E A 220	A	A	E A 236	E A 394	E A 314	328	
16	322	288	240	216	E A 236	E A 286	224	A	A	282	256	A	186	A	A	A	A	E A 290	E A 264	E A 234	260	260	312	304	
17	272	250	238	218	214	E A 236	E A 260	A	220	204	194	200	218	192	210	236	198	204	220	248	256	230	304	300	
18	246	232	284	240	236	208	240	A	222	E B 226	E A 216	196	190	208	E A 252	E A 262	214	208	222	250	254	284	300	308	
19	292	276	244	222	214	238	232	212	196	188	174	A	A	E A 282	A	A	E A 244	E A 262	E A 236	252	244	278	300	300	
20	286	278	246	260	272	260	230	208	214	E A 284	206	E A 248	272	194	A	A	A	A	A	232	246	236	256	264	274
21	270	256	232	218	264	326	230	206	192	168	168	190	200	E A 294	E A 178	218	204	234	218	246	282	284	288	E A 296	
22	266	246	244	244	240	212	206	220	212	202	200	188	A	194	270	A	212	212	232	262	286	302	296		
23	E A 330	E A 276	E A 260	E A 232	258	272	244	234	200	194	172	178	200	186	222	E A 258	226	242	230	248	264	E A 288	274	296	
24	296	284	266	270	248	232	242	220	210	192	222	194	E A 282	196	252	286	216	212	216	232	268	306	290	264	
25	252	284	E A 268	270	298	278	246	208	198	216	172	204	168	168	186	192	186	206	214	250	262	270	252	214	
26	284	304	292	288	266	238	210	200	198	198	192	214	232	212	210	260	260	244	224	244	244	244	E A 238	E A 328	E A 314
27	288	296	284	298	288	256	238	208	218	214	A	192	252	198	220	178	204	218	222	242	234	238	278	288	
28	292	252	230	216	260	274	222	230	212	210	220	204	A	178	170	198	200	238	234	E A 264	E A 248	282	292	260	
29	272	294	E A 262	E A 262	230	226	234	224	218	262	A	A	A	212	A	A	A	224	236	E A 256	E A 278	E A 270	E A 278	288	
30	304	304	292	238	226	238	236	210	200	206	174	182	168	194	180	E A 240	238	E A 236	E A 290	244	232	246	292	270	
31	316	268	226	230	E A 266	E A 286	240	210	200	196	180	214	190	A	230	186	212	218	236	248	224	290	328	308	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	30	24	25	25	25	24	24	22	22	22	22	24	23	27	31	31	31	31	
MED	291	277	251	246	255	249	230	216	210	203	190	198	200	198	200	U 204	212	220	229	246	U 245	273	300	296	
U Q	E A 310	E A 294	E A 274	E A 270	E A 272	E A 282	E A 242	E A 226	E A 219	E A 224	E A 220	E A 212	E A 229	E A 230	E A 220	E A 258	E A 228	E A 239	E A 236	E A 254	E A 268	E A 300	E A 314	E A 308	
L Q	284	262	238	230	230	238	224	209	198	193	177	191	185	194	186	196	204	212	220	240	236	262	292	288	

JUL. 2023 h'F (KM)



IONOSPHERIC DATA STATION Okinawa

JUL. 2023 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						B	A	A	A	A	A	A	100	A	100	100	98	98	104	A				
2						B	A	104	104	A	100	100	100	118	108	108	104	104	A	A				
3						B	124	114	A	A	102	100	100	A	100	A	A	A	A	A				
4						B	A	100	98	98	98	A	A	A	A	A	A	A	A	A				
5						A	A	104	98	A	98	98	98	A	A	A	A	A	A					
6						A	A	102	94	A	98	98	98	98	102	102	102	102	104	A				
7						A	A	104	100	100	A	A	A	100	100	104	104	104	100	A				
8						B	A	100	98	98	98	98	98	A	A	98	108	A	A	A				
9						A	A	100	98	A	98	98	A	98	98	98	100	100	100	A				
10						B	A	104	102	A	100	100	100	B	100	100	98	A	A	A				
11						A	A	A	A	A	A	A	A	A	A	98	98	98	100	A				
12						A	A	100	A	98	A	102	102	102	102	102	100	100	100	A				
13						A	A	A	A	A	A	A	A	A	A	A	A	100	100	A				
14						A	A	A	A	A	A	A	A	A	96	96	100	100	98	A				
15						A	98	100	100	100	100	100	100	100	100	100	100	102	102	A				
16						A	102	102	98	98	98	98	98	98	98	100	100	100	A	A				
17						A	A	A	A	A	100	100	104	100	100	100	100	100	100	A				
18						A	A	A	B	100	100	A	100	A	A	A	A	102	102	A				
19						112	100	100	98	A	98	98	100	100	100	100	100	100	104	A				
20						A	A	98	96	96	A	A	98	98	A	A	A	A	A	A				
21						102	102	A	A	98	98	98	98	98	98	100	100	100	A	A				
22						A	A	100	98	A	98	98	96	98	98	98	98	98	100	A				
23						A	A	100	100	A	A	96	96	96	96	100	100	A	A					
24						A	106	100	98	98	98	98	B	104	104	104	104	104	102	106				
25						A	102	100	100	100	A	A	96	96	A	A	A	A	A	112				
26						132	A	96	96	96	100	100	100	A	100	100	100	A	A					
27						108	102	A	A	A	A	A	A	A	A	A	106	106	A	124				
28						120	102	102	98	102	102	100	100	102	102	102	102	100	A	A				
29						136	102	102	100	100	100	100	100	100	100	A	A	A	A	A				
30						A	108	A	A	A	100	100	100	100	100	100	100	98	A	A				
31						A	A	A	A	98	96	96	96	96	96	96	96	100	104	A				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							7	19	20	14	20	20	21	20	23	22	23	23	16	3				
MED							120	102	100	98	98	99	100	100	100	100	100	100	101	112				
U Q							132	104	101	100	100	100	100	100	100	102	102	102	104	124				
L Q							108	100	98	98	98	98	98	98	98	98	98	100	100	100	106			

JUL. 2023 h'E (KM)

IONOSPHERIC DATA STATION Okinawa

JUL. 2023 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

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	90	90	88	86	84	90	94	90	92	88	88	112	114	122	126	104	98	98	98	98	98	98	90	88
2	92	90	88	B	82	B	122	110	94	98	98	96	94	106	106	102	120	98	96	98	94	92	92	94
3	90	92	86	90	88	86	G	116	88	108	104	98	94	94	110	108	104	108	108	106	104	100	98	102
4	94	84	86	82	82	110	116	108	98	100	96	96	96	90	86	84	106	110	100	100	100	88	90	90
5	94	90	90	84	86	110	126	106	100	116	96	94	94	88	92	92	92	92	94	118	98	90	84	B
6	B	96	94	94	94	90	118	112	100	108	100	100	104	124	106	114	100	110	96	96	94	92	92	102
7	96	96	94	92	94	94	120	112	100	96	114	94	110	104	138	146	118	130	106	102	96	88	B	B
8	94	112	112	104	90	102	110	100	100	98	100	100	100	92	100	G	92	88	86	86	100	102	98	94
9	92	102	88	90	90	92	112	100	100	98	106	102	104	100	106	102	116	112	98	96	96	96	96	94
10	94	92	88	88	82	B	112	168	100	96	98	106	108	B	128	G	112	94	98	102	94	94	94	B
11	96	90	86	86	88	90	92	92	94	92	104	164	92	96	96	G	G	92	132	110	86	86	B	B
12	92	94	86	94	90	98	172	128	112	94	134	104	108	114	114	114	114	108	102	100	94	94	98	96
13	96	96	104	94	94	92	90	88	88	90	92	92	92	92	100	92	102	102	100	100	100	82	96	102
14	94	96	98	90	90	90	96	88	104	90	88	110	130	106	106	106	100	100	100	98	106	94	88	86
15	82	88	88	B	B	B	112	106	102	106	112	118	144	114	112	104	106	116	100	92	86	94	96	106
16	88	90	90	88	90	94	116	104	102	102	100	96	102	94	96	106	106	100	100	92	88	102	98	90
17	106	88	86	92	88	88	88	90	92	98	100	112	106	114	102	102	G	G	G	86	86	84	B	84
18	B	100	92	94	B	96	96	90	94	B	98	100	100	G	90	88	114	88	120	88	B	B	B	92
19	86	B	B	B	B	B	G	G	G	G	96	106	106	106	104	100	102	98	116	104	104	B	B	104
20	100	94	90	96	100	94	90	90	102	98	100	92	106	146	100	92	92	92	94	128	B	104	B	102
21	100	100	100	98	96	B	G	G	92	92	94	112	170	108	132	108	106	98	92	138	82	B	B	86
22	86	86	B	B	B	B	106	96	98	98	94	102	96	96	102	100	102	102	110	88	86	82	90	96
23	90	90	84	86	86	90	88	86	90	122	86	86	160	162	144	104	102	100	96	90	90	86	88	88
24	88	88	88	84	88	80	118	124	114	118	106	112	108	104	176	202	186	G	G	G	B	B	88	86
25	92	86	80	88	90	90	94	108	90	180	G	92	86	G	134	82	116	100	94	G	B	B	B	
26	90	86	B	B	90	100	G	96	94	96	G	174	162	128	118	172	110	100	100	98	B	B	90	102
27	120	88	B	88	94	B	G	86	90	94	88	88	178	94	94	94	92	92	102	G	86	86	102	B
28	102	112	94	98	90	B	G	102	106	104	104	106	102	106	G	114	108	94	90	92	90	90	82	B
29	80	B	88	B	B	B	G	130	104	100	98	96	96	100	92	90	88	90	90	84	86	86	B	78
30	80	94	88	94	94	96	100	136	102	98	98	G	G	116	G	102	100	96	92	92	88	80	80	B
31	108	98	86	88	88	88	94	86	84	92	G	176	G	174	158	G	G	144	100	102	B	96	90	B
00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	29	27	25	25	23	24	29	30	29	28	30	29	28	29	27	28	29	29	28	26	25	22	22
MED	92	92	88	90	90	92	108	102	99	98	98	101	104	106	106	102	105	100	100	98	94	92	91	94
U Q	96	96	94	94	92	96	117	112	102	105	104	112	112	115	127	108	113	108	102	102	98	96	96	102
L Q	89	88	86	87	87	90	94	90	92	94	95	96	96	95	98	92	100	93	94	92	86	86	88	88

JUL. 2023 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	FQ 41	FQ 21	F 4	F 2	F 1	L 1	L 3	L 4	L 2	L 3	L 4	CL 12	C 1	CL 11	C 1	C 4	C 4	C 3	C 3	C 3	F 2	F 1	F 2	F 5	
2	F 2	F 1	F 1		F 1		C 1	C 2	LC 12	CL 31	C 2	C 5	L 2	C 3	C 3	C 5	C 1	C 6	C 5	C 3	F 6	F 4	F 4	F 3	
3	F 5	F 2	F 3	F 1	F 1	L 1		CL 22	LQ 31	CL 11	C 2	C 5	L 3	L 3	CL 33	CL 33	CL 23	CL 33	CLQ 55	CLQ 47	FFQ 35	FFQ 24	FF 23	FF 21	
4	FQ 41	FQ 41	FQ 21	FQ 21	FQ 21	C 1	CL 11	C 3	C 3	C 1	C 3	C 2	C 2	L 2	LQ 51	LQ 81	CL 15	CL 34	CL 43	CL 35	FF 33	FF 33	F 7	F 3	
5	F 1	F 3	FF 23	FF 32	F 2	CL 11	CL 11	CL 31	C 3	C 1	C 4	C 4	L 2	L 5	L 3	L 2	L 3	LQ 21	LQ 11	C 1	F 7	F 4	F 1		
6		F 4	F 2	F 3	F 2	L 5	C 1	CQ 21	CQ 21	C 1	C 1	C 1	C 1	C 1	C 2	C 1	C 2	C 1	C 3	C 4	F 9	F 4	F 3	FQ 11	
7	F 1	FQ 21	F 3	F 6	F 2	L 6	C 3	C 4	C 5	C 5	CL 11	L 3	CL 43	C 2	H 1	H 1	C 1	H 1	C 2	C 3	F 5	F 1			
8	F 3	F 1	FFQ 23	FF 13	FQ 51	C 1	C 6	C 6	C 3	C 6	C 5	C 1	C 1	L 3	C 1		L 1	L 5	L 5	L 6	FF 47	FF 42	F 3	F 3	
9	F 4	FF 23	F 3	FF 45	F 4	L 2	CL 33	CQ 31	C 2	CQ 31	C 2	C 1	C 2	C 2	C 2	C 2	C 2	C 3	C 6	C 4	F 3	F 5	FQ 41	FQ 31	
10	F 1	F 2	F 2	F 2	F 2		C 1	H 2	C 3	C 3	C 3	C 2	C 1		C 1		C 1	L 5	C 2	C 1	F 2	F 3	F 1		
11	FF 12	F 2	F 2	F 2	F 1	LQ 31	LQ 31	LQ 21	L 1	L 1	C 1	HC 11	L 1	L 1	L 1			L 1	H 1	C 1	F 1	F 1			
12	FQ 41	FQ 21	F 2	FF 42	F 2	FQ 21	H 1	CQ 11	CQ 11	CL 11	H 1	C 1	C 1	C 1	C 1	C 1	C 1	C 2	C 1	C 4	F 9	F 3	FF 25	FF 33	
13	FF 22	F 2	FF 21	F 2	F 2	F 6	L 8	L 6	L 3	L 2	L 2	L 1	L 1	L 1	L 1	L 1	L 1	CL 21	CL 21	C 2	FF 11	F 1	F 1	F 1	
14	F 1	F 1	F 1	FQ 51	F 4	F 9	C 3	L 7	CL 52	L 3	L 3	CHL 11	HCL 11	C 2	C 6	C 3	C 3	C 3	C 4	C 6	FF 17	FQ 51	F 1	F 1	
15	F 3	F 1	F 1				C 1	C 2	C 5	C 1	C 1	C 1	H 1	C 1	C 1	C 2	C 3	C 1	C 6	C 3	F 8	F 8	FF 33	FF 12	
16	F 2	F 5	F 5	F 8	FQ 31	F 7	CL 31	C 3	C 4	C 2	C 2	C 2	C 1	C 4	C 1	C 2	C 4	C 5	CL 32	LC 11	F 11	FF 11	F 4	F 2	
17	F 3	F 5	F 7	F 2	FQ 61	F 7	L 4	L 4	L 3	C 1	C 1	C 1	C 1	C 1	C 1	CH 11				L 1	F 1	F 1		F 1	
18		FQ 11	FQ 31	F 1		F 3	C 1	LQ 41	L 1		C 1	C 1	C 1		L 1	L 2	CL 11	L 1	C 1	L 1				F 1	
19	F 1										C 1	C 2	C 2	C 1	C 2	C 4	C 2	CL 31	CL 31	CL 31	FF 12			F 4	
20	FQ 31	F 2	F 4	F 3	F 1	F 1	L 5	L 3	C 1	C 2	CQ 31	LQ 21	C 1	H 1	C 2	L 5	L 5	L 3	L 2	L 1		F 1		F 1	
21	F 3	F 2	F 1	F 3	F 2			L 3	L 1	L 1	L 1	C 1	H 1	C 1	H 1	C 1	C 1	C 2	L 2	HL 11	F 4			F 3	
22	F 5	F 1					C 1	C 2	C 3	C 2	C 2	C 1	C 4	C 2	C 1	C 2	C 3	C 1	C 1	C 3	FQ 31	F 2	F 3	F 1	
23	FQ 41	F 2	FQ 21	F 2	F 2	F 2	L 3	L 6	L 2	C 1	L 2	L 1	H 1	H 1	H 1	C 1	C 2	C 2	C 2	L 3	F 3	F 5	F 3	F 4	
24	F 4	F 4	F 2	F 1	F 1	F 1	CL 11	CL 11	L 1	L 1	C 2	CH 11	C 1	C 1	HC 11	H 1	H 1						F 1	F 4	
25	F 1	F 2	F 5	F 2	F 1	F 1	L 1	C 3	L 1	H 1		L 1	L 2		H 1	L 3	CL 12	C 2	LC 21		F 1				
26	F 1	F 1			F 1	F 1		C 3	C 2	C 1		H 1	H 1	C 1	C 1	H 1	C 2	C 2	C 2	C 1			FF 34	FF 23	
27	F 1	F 1		F 1		F 1		L 1	L 3	L 1	L 2	L 1	HL 11	L 1	L 2	L 1	L 1	L 2	L 1	C 1	F 1	F 2	F 1		
28	F 1	F 1	F 2	F 2	F 2			C 5	C 2	C 1	C 2	C 1	C 2	C 1		C 1	C 1	L 4	LQ 31	L 5	F 7	F 1	F 2		
29	F 3		F 1					H 1	C 3	C 4	C 6	C 2	C 3	C 1	L 2	L 7	L 8	L 3	LQ 41	LQ 51	F 5	F 2		F 3	
30	FQ 21	F 3	F 6	F 2	F 2	F 1	C 1	HLQ 11	CQ 21	CQ 11	CQ 11			C 1		C 1	C 1	C 3	L 6	L 1	F 2	F 2	F 1		
31	F 2	F 2	F 6	F 4	F 5	F 2	L 1	L 2	L 3	L 1		H 1		H 1	H 1				H 1	C 1	F 2	F 4			
	00	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																									

## 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

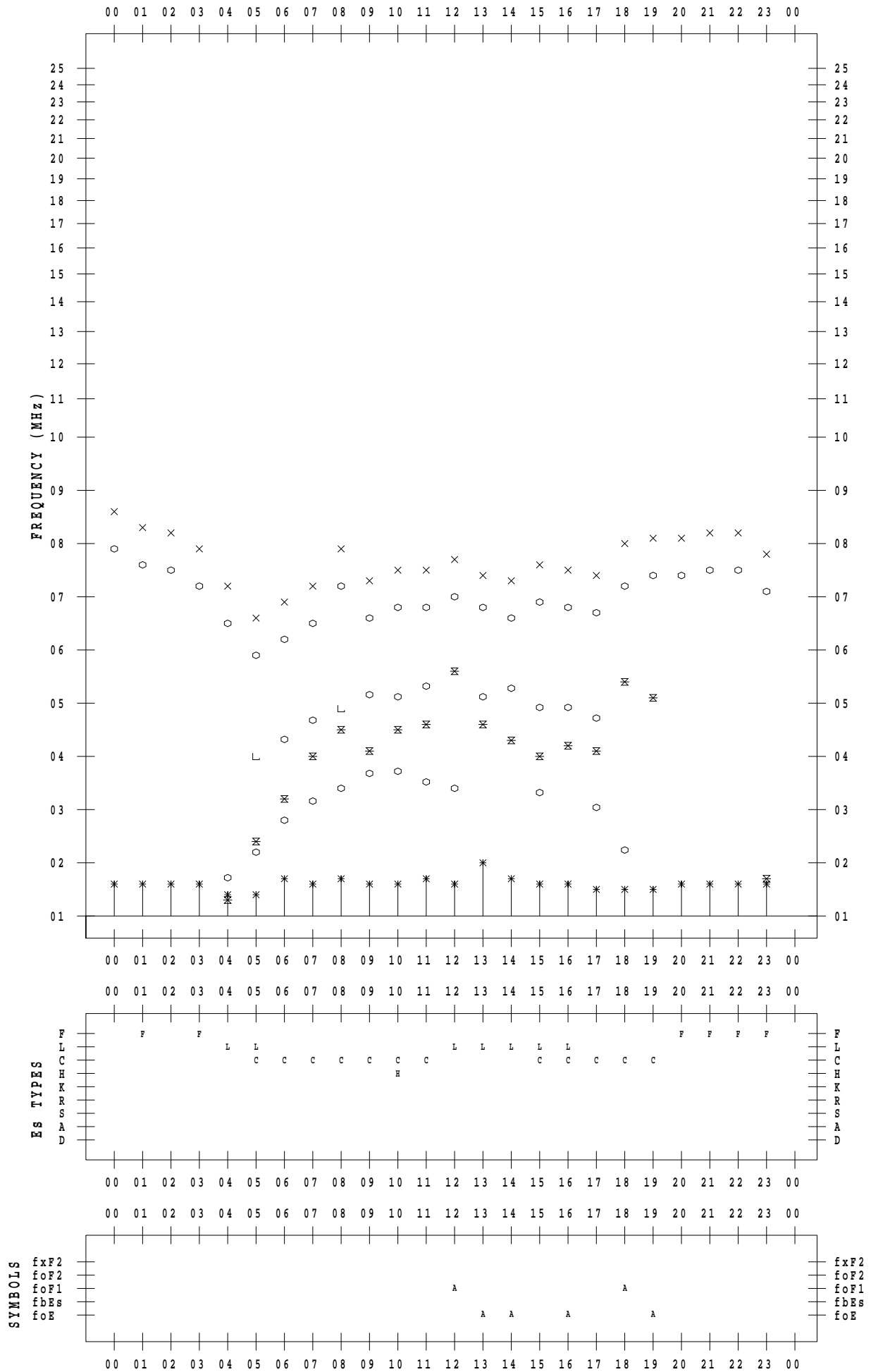
# f - PLOT DATA

SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 1

135 ° E MEAN TIME



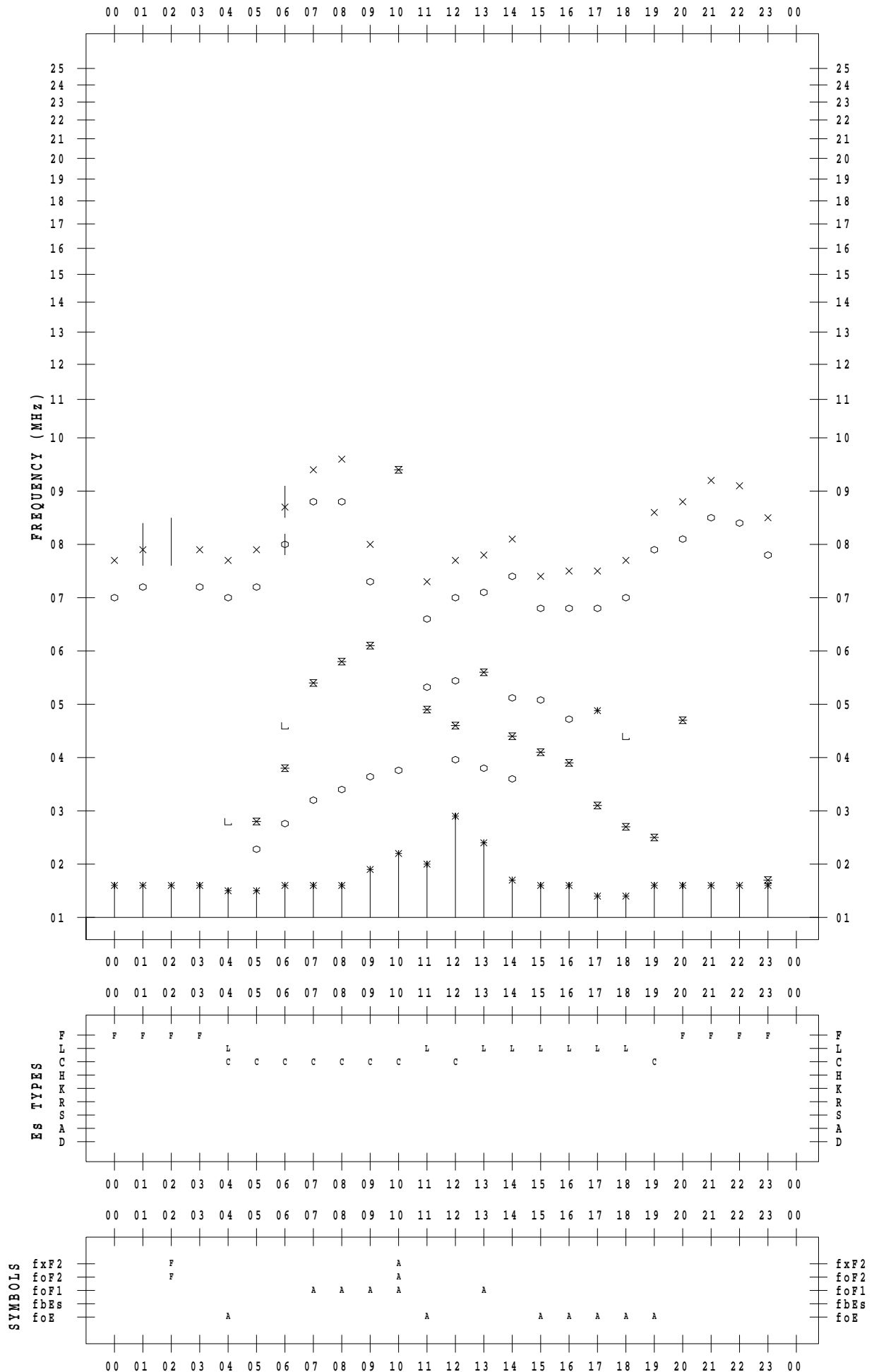
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 2

135 ° E MEAN TIME



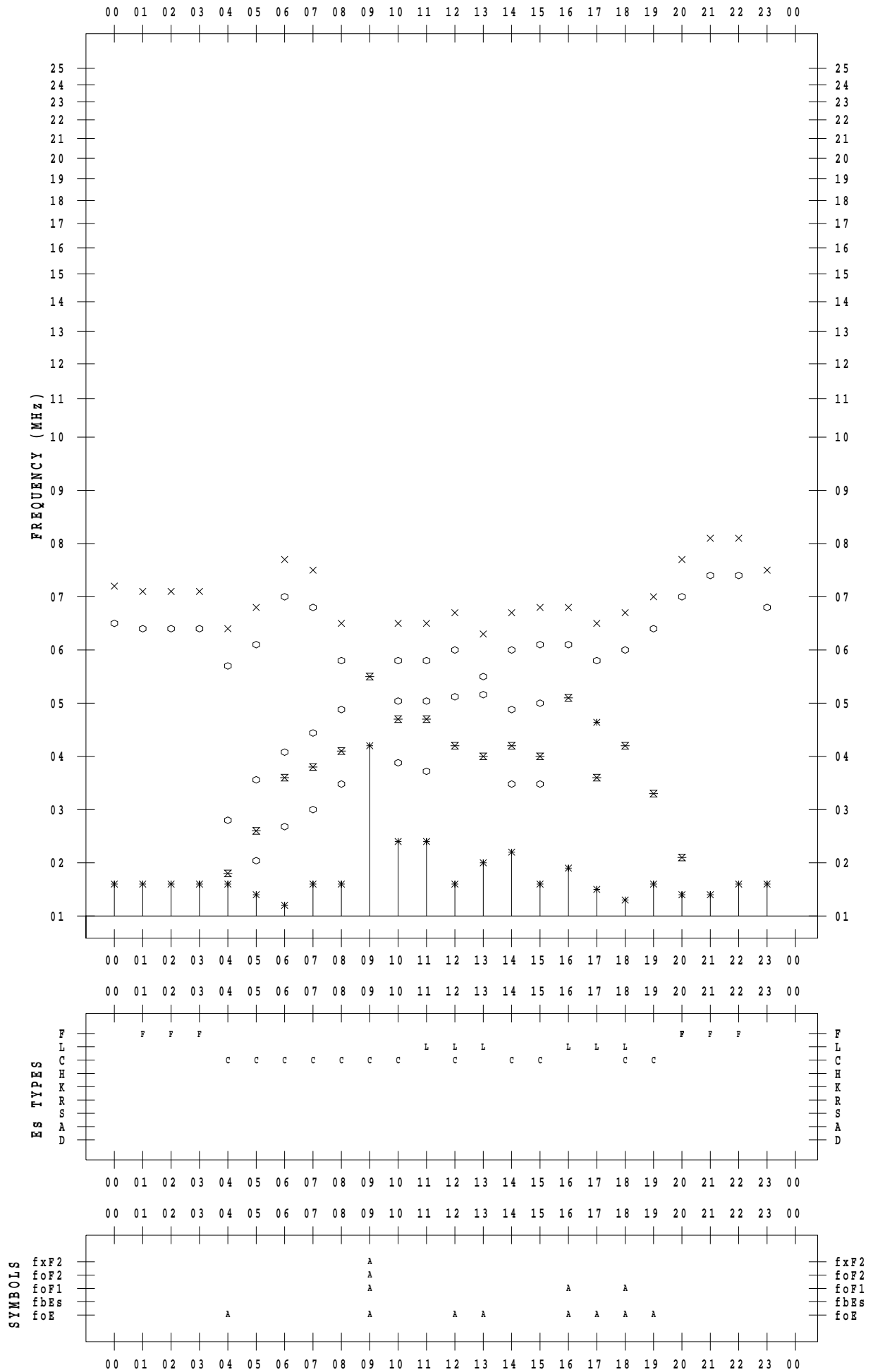
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 3

135 ° E MEAN TIME



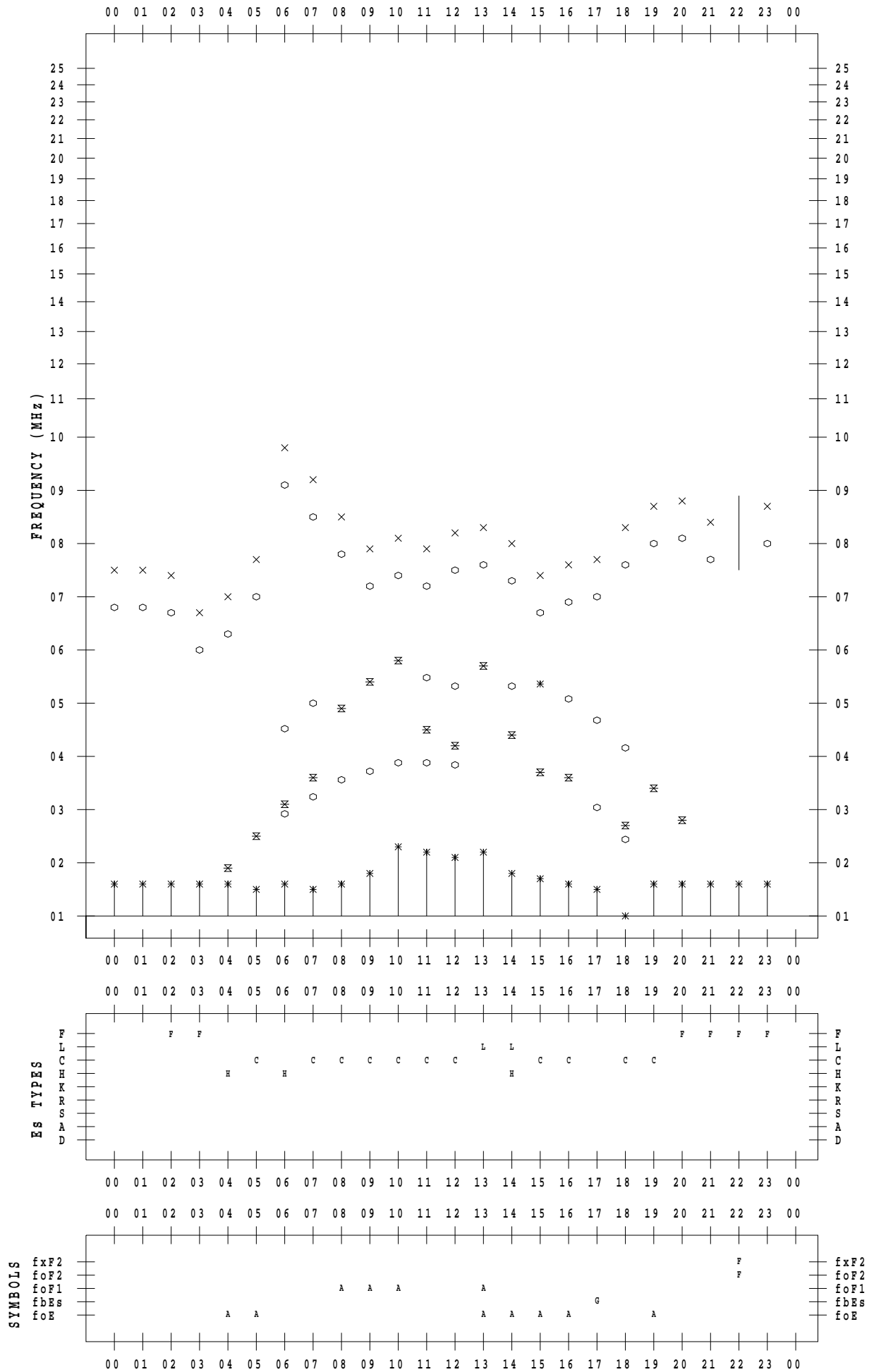
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 4

135 ° E MEAN TIME





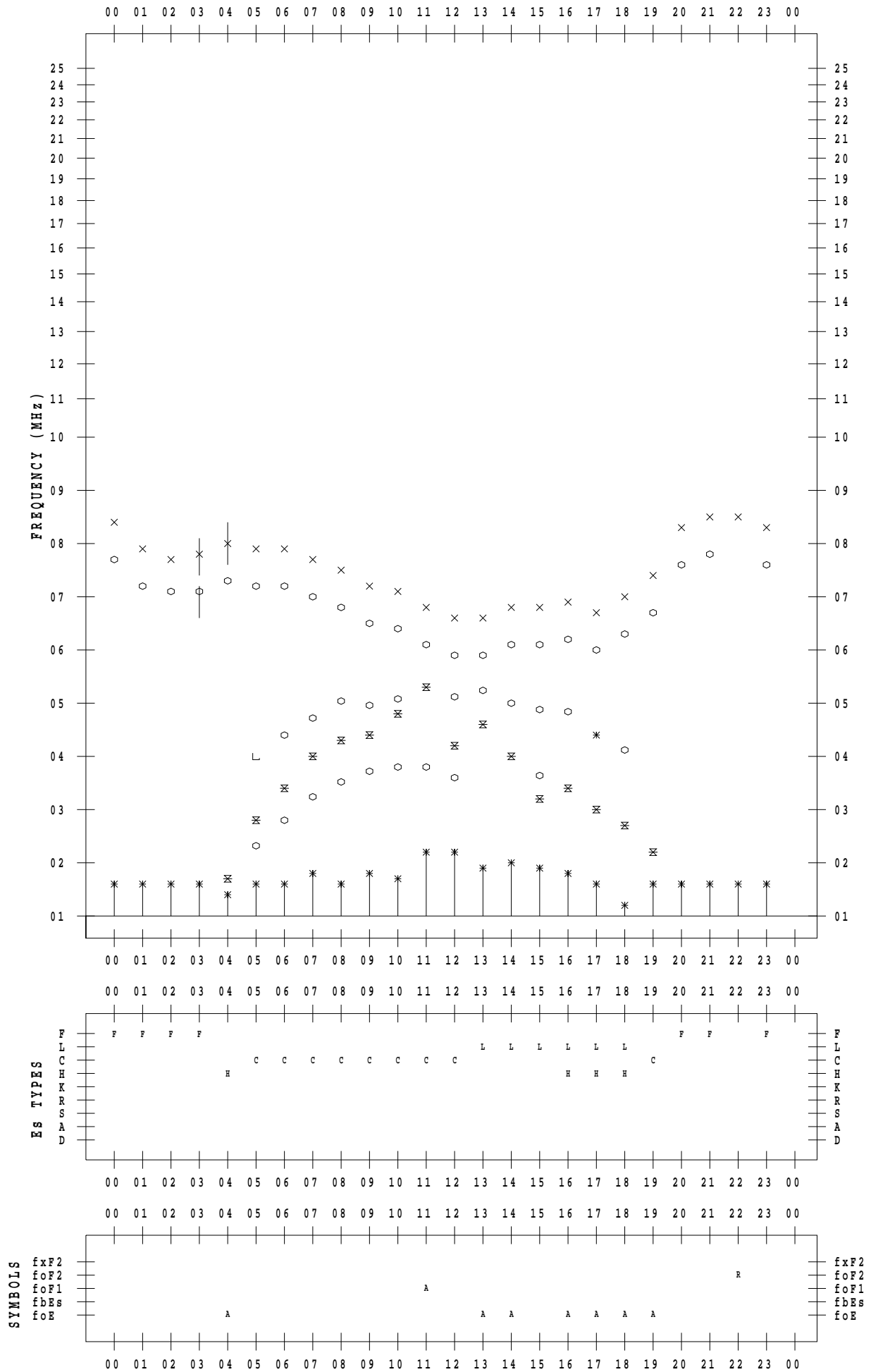
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 5

135 ° E MEAN TIME



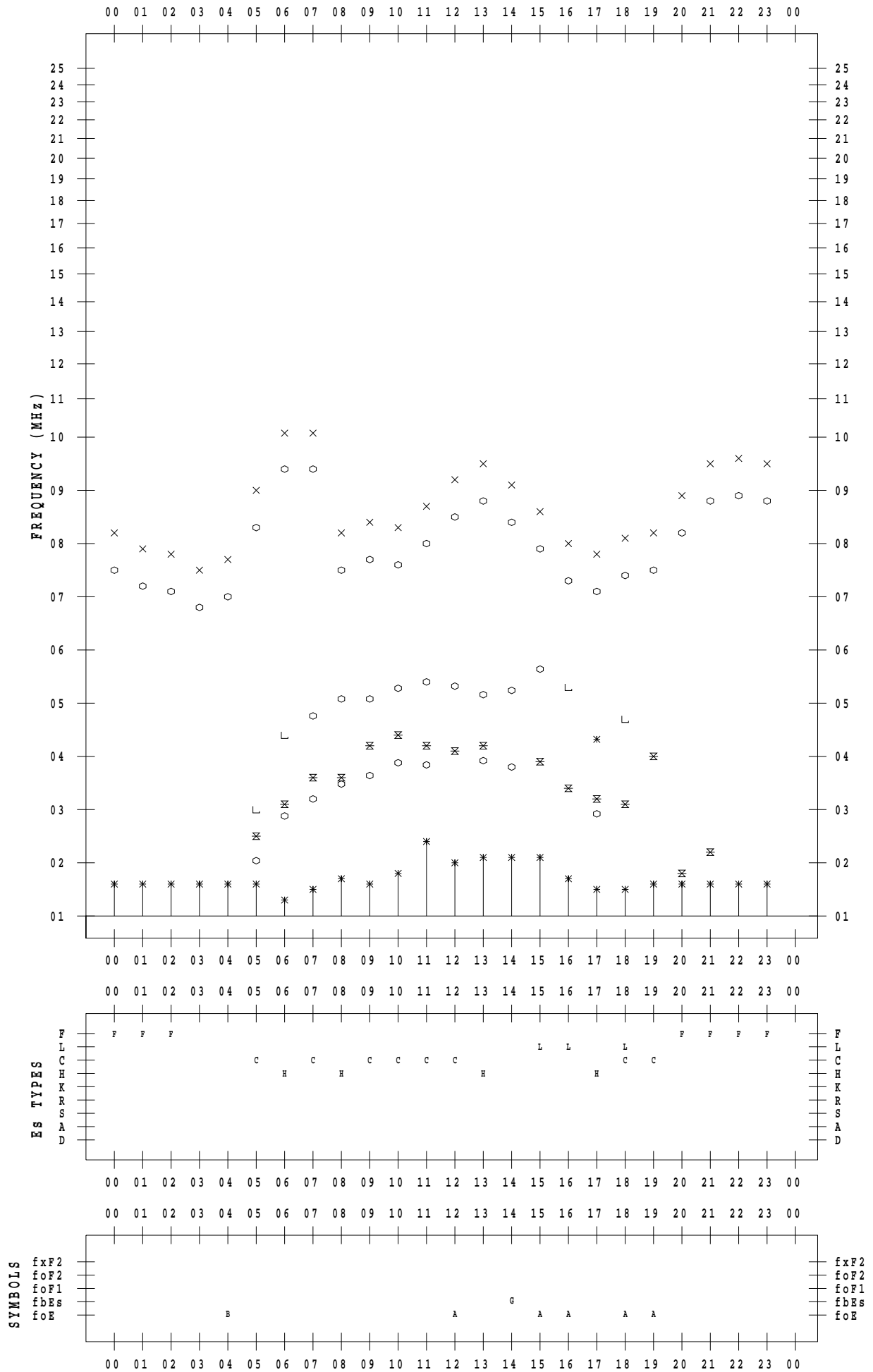
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 6

135 ° E MEAN TIME



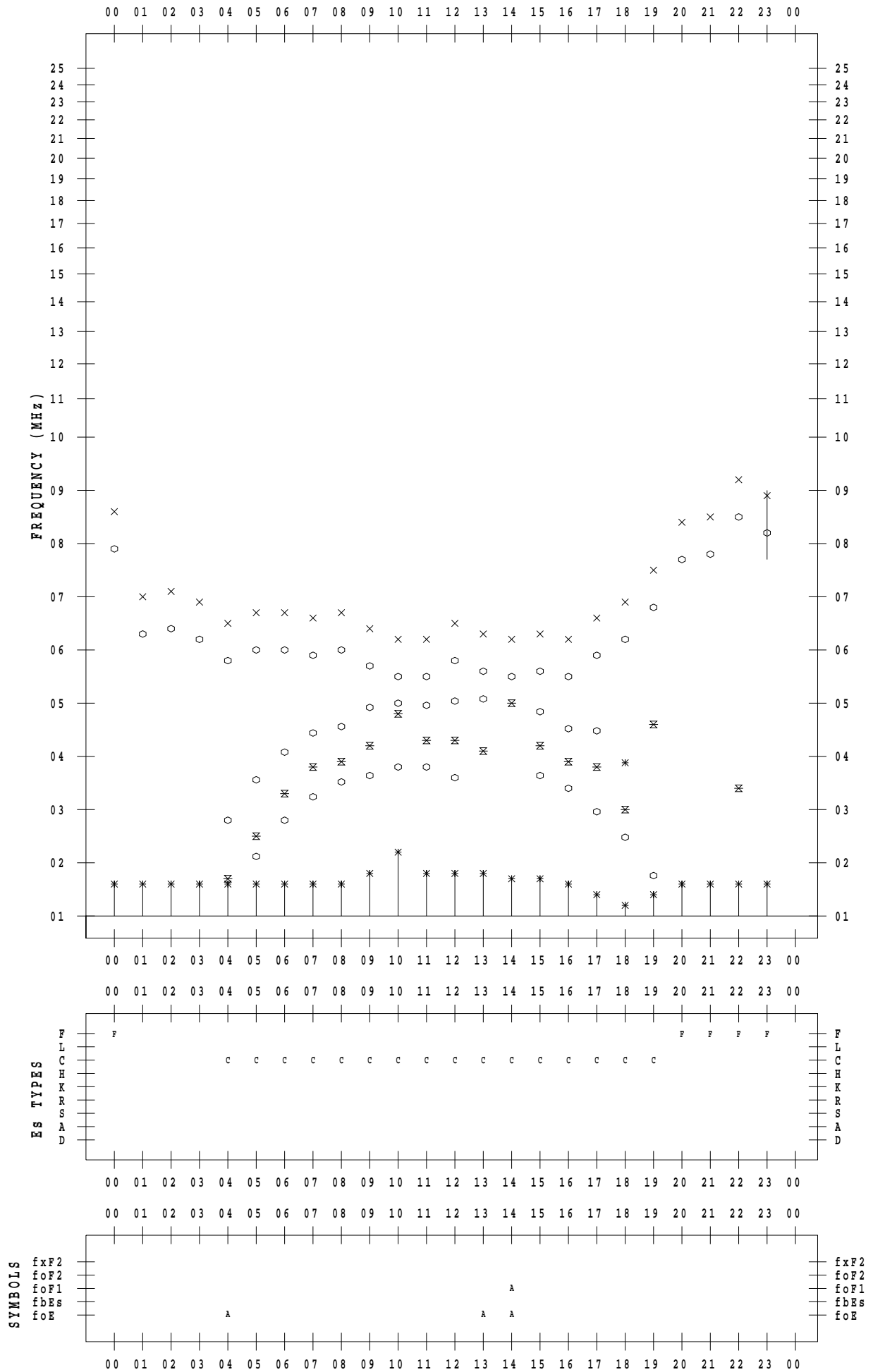
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 7

135 ° E MEAN TIME



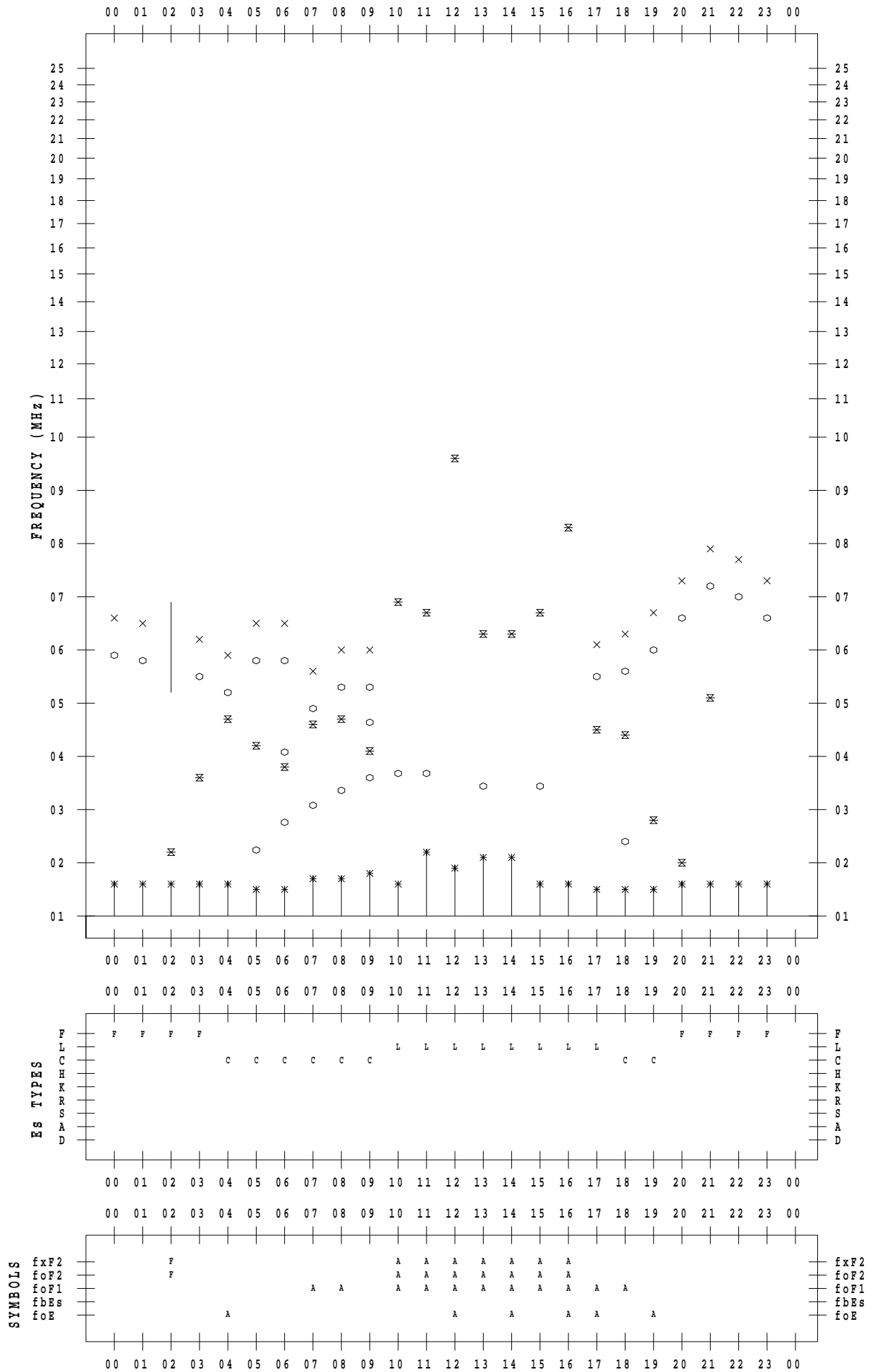
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 8

135 ° E MEAN TIME



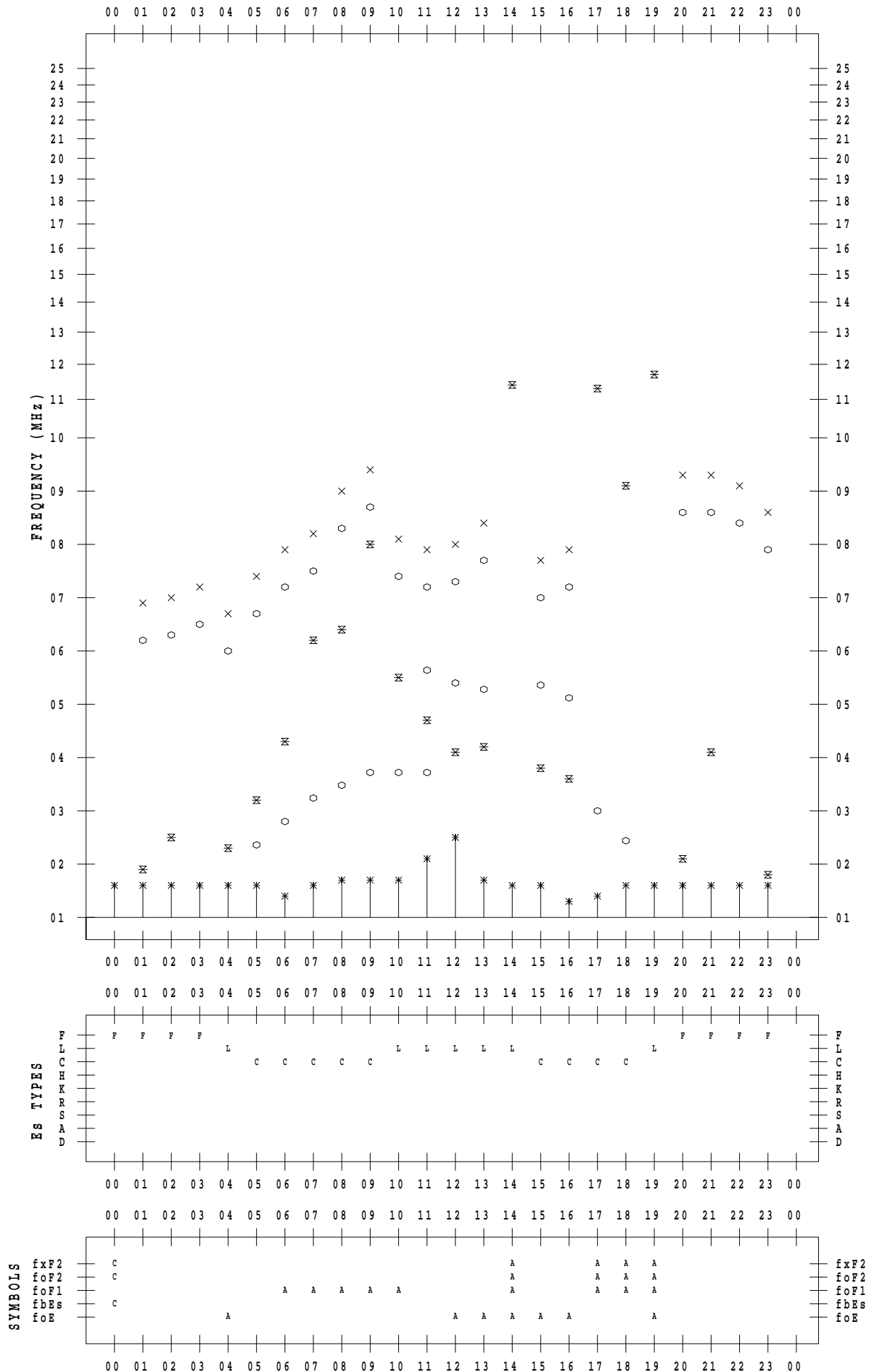
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 9

135 ° E MEAN TIME





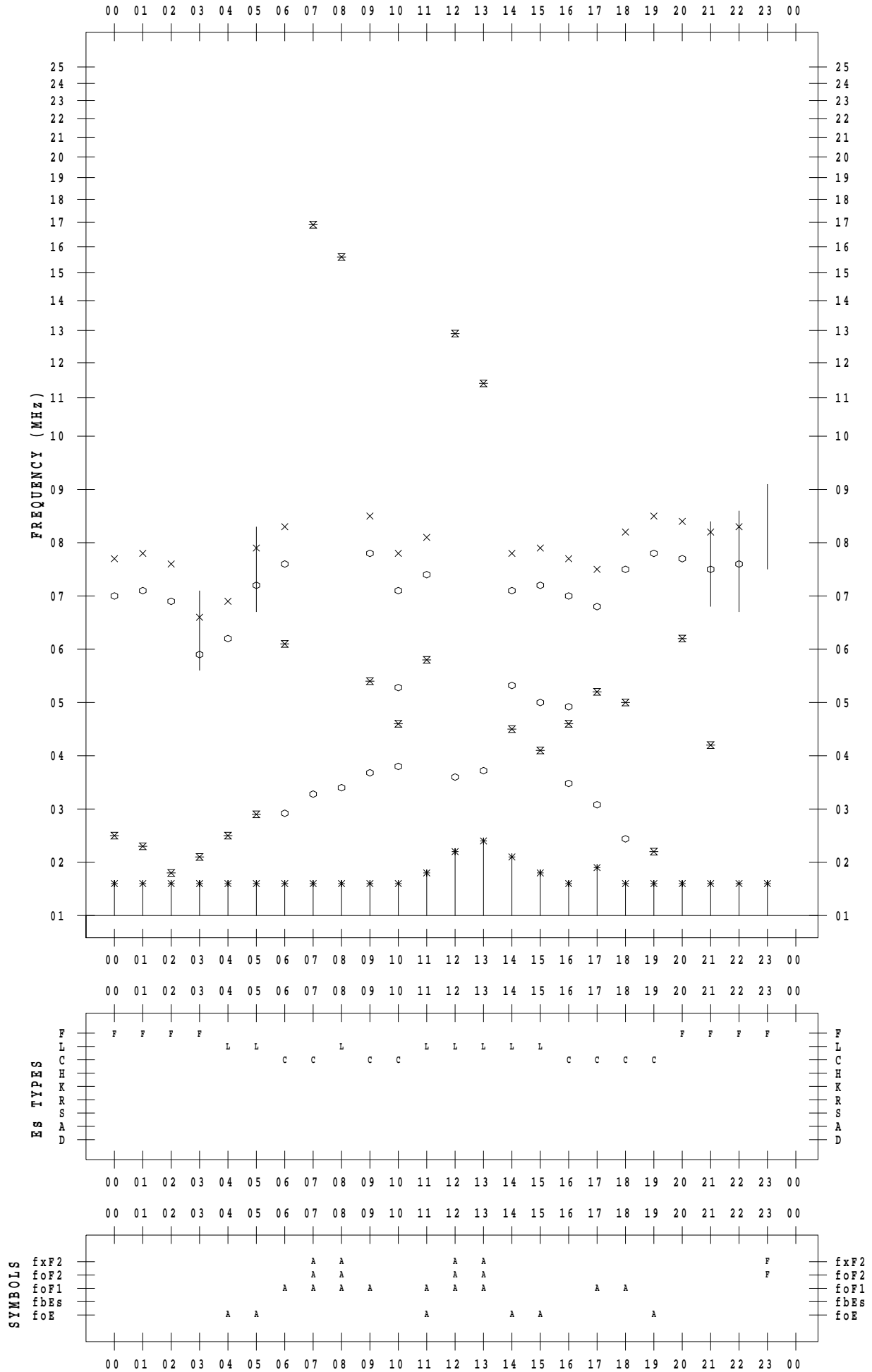
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 11

135 ° E MEAN TIME



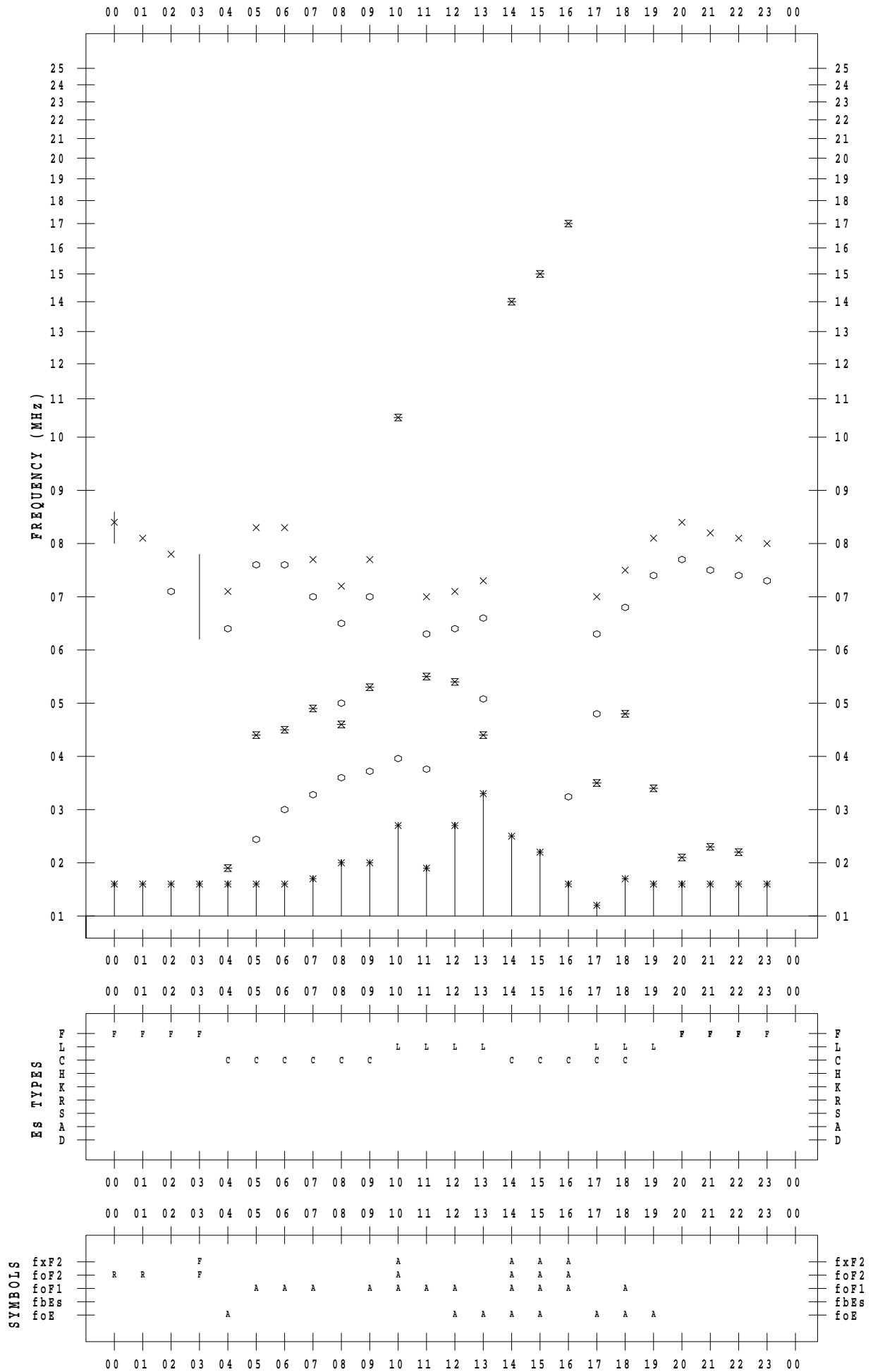
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 12

135 ° E MEAN TIME





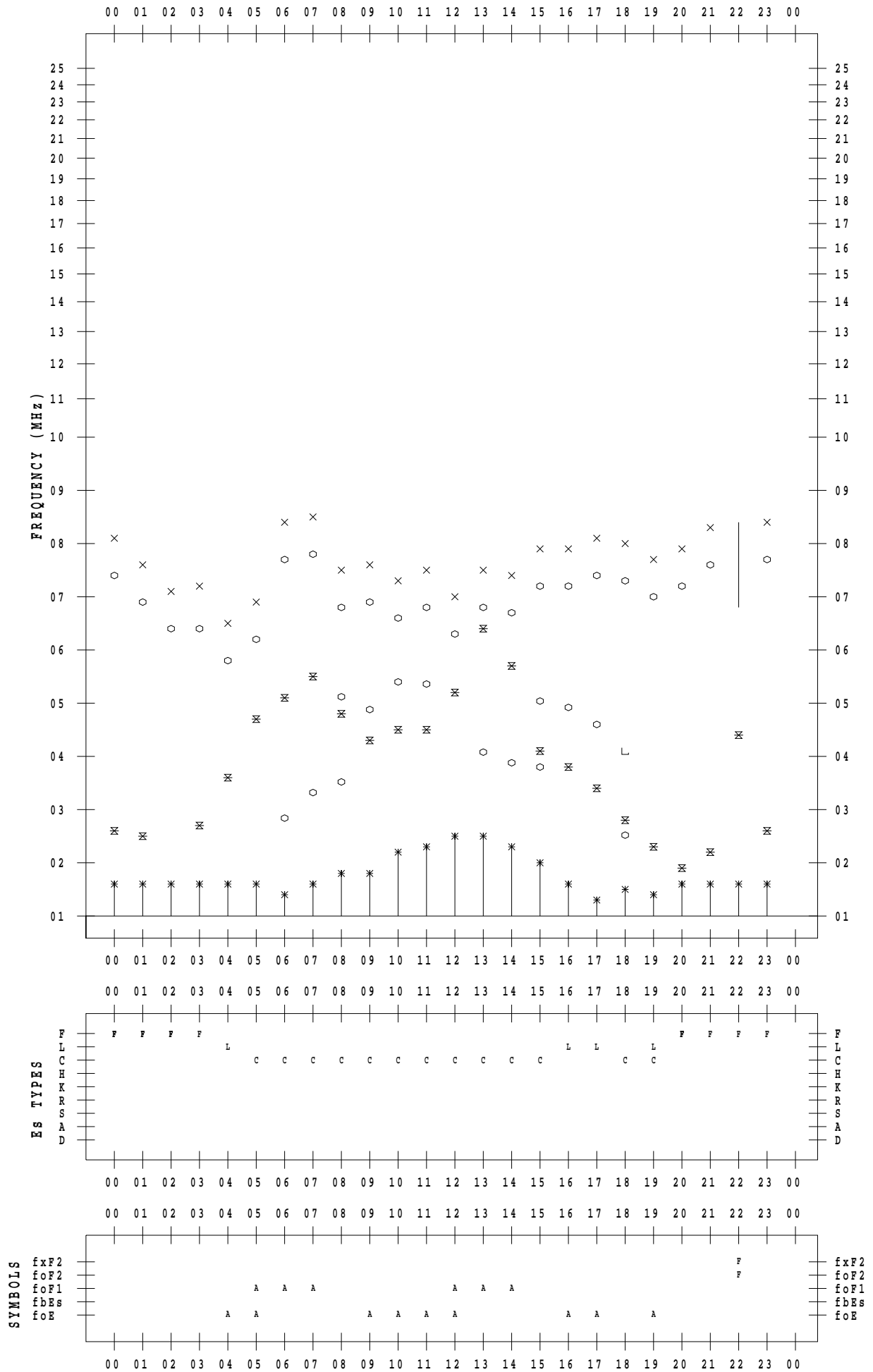
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 13

135 ° E MEAN TIME



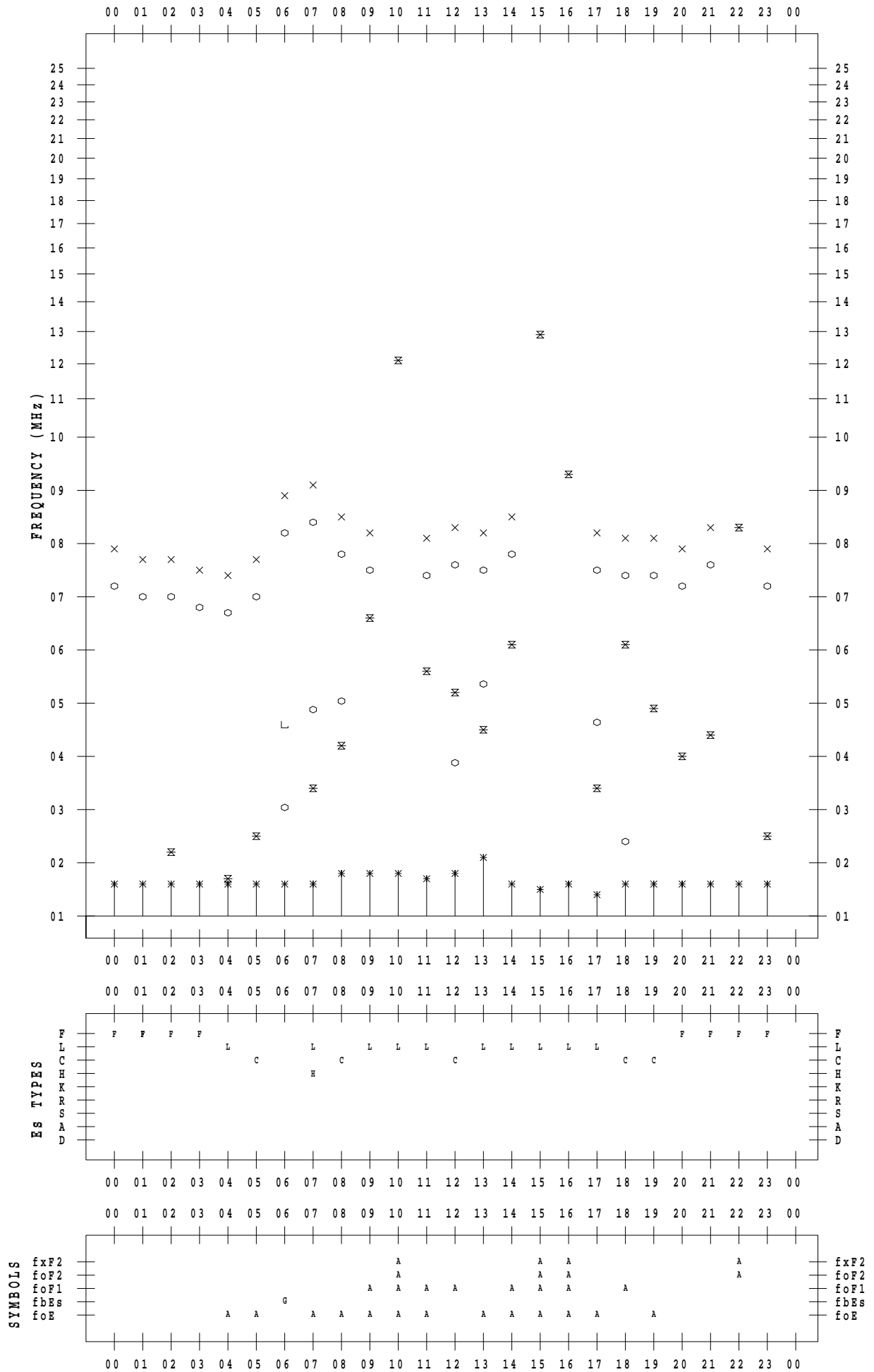
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 14

135 ° E MEAN TIME



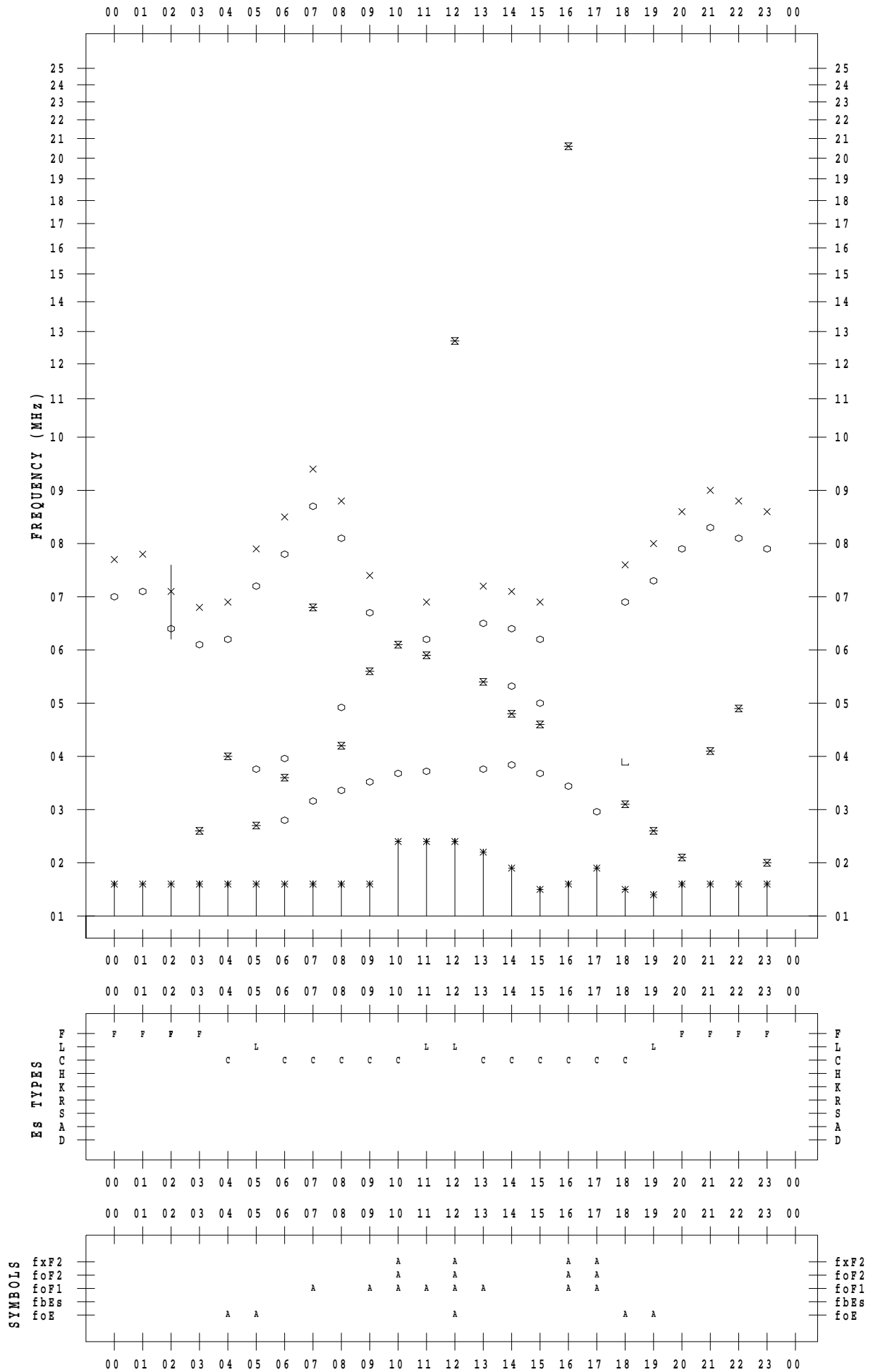
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 15

135 ° E MEAN TIME



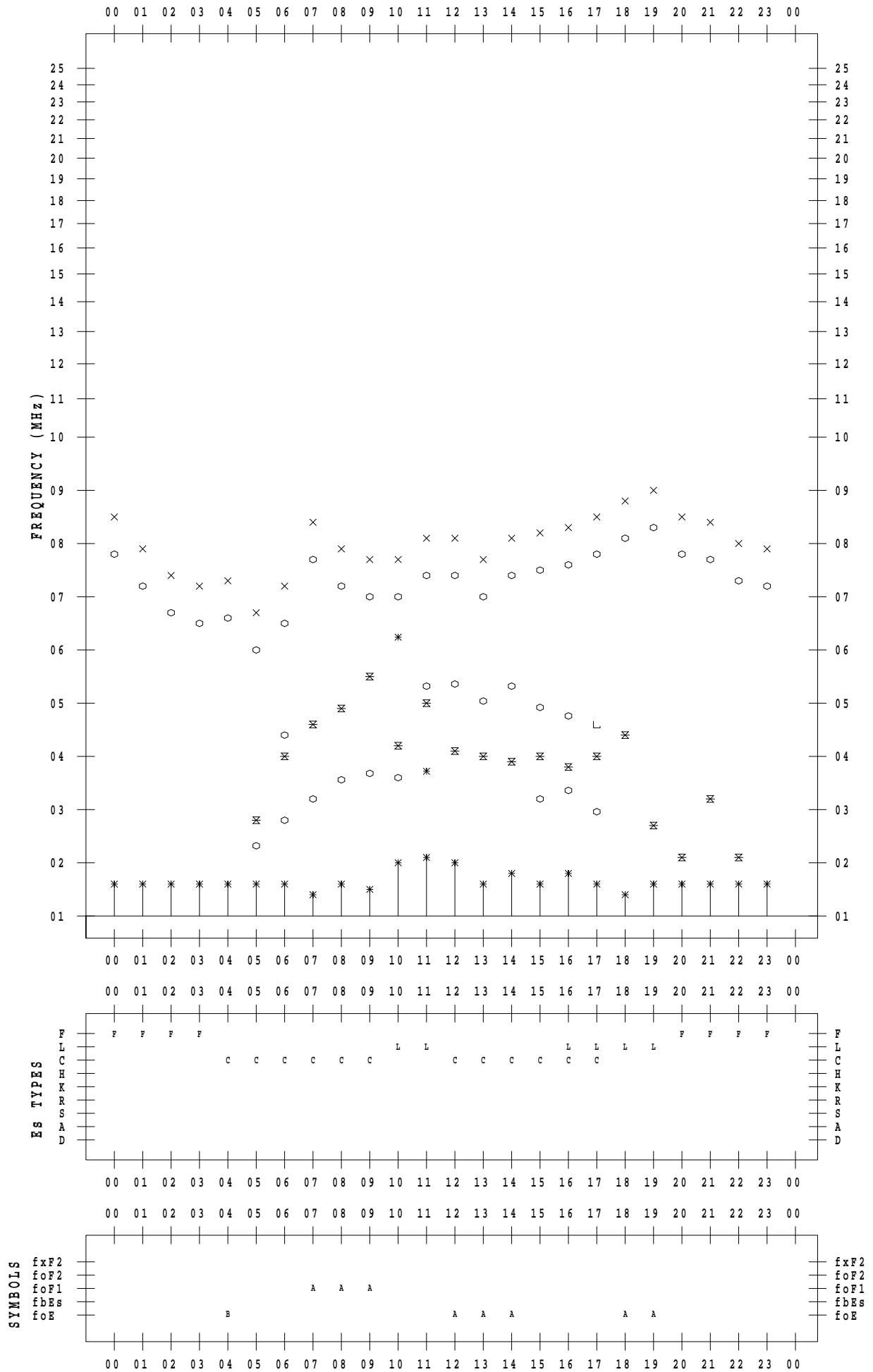
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 16

135 ° E MEAN TIME



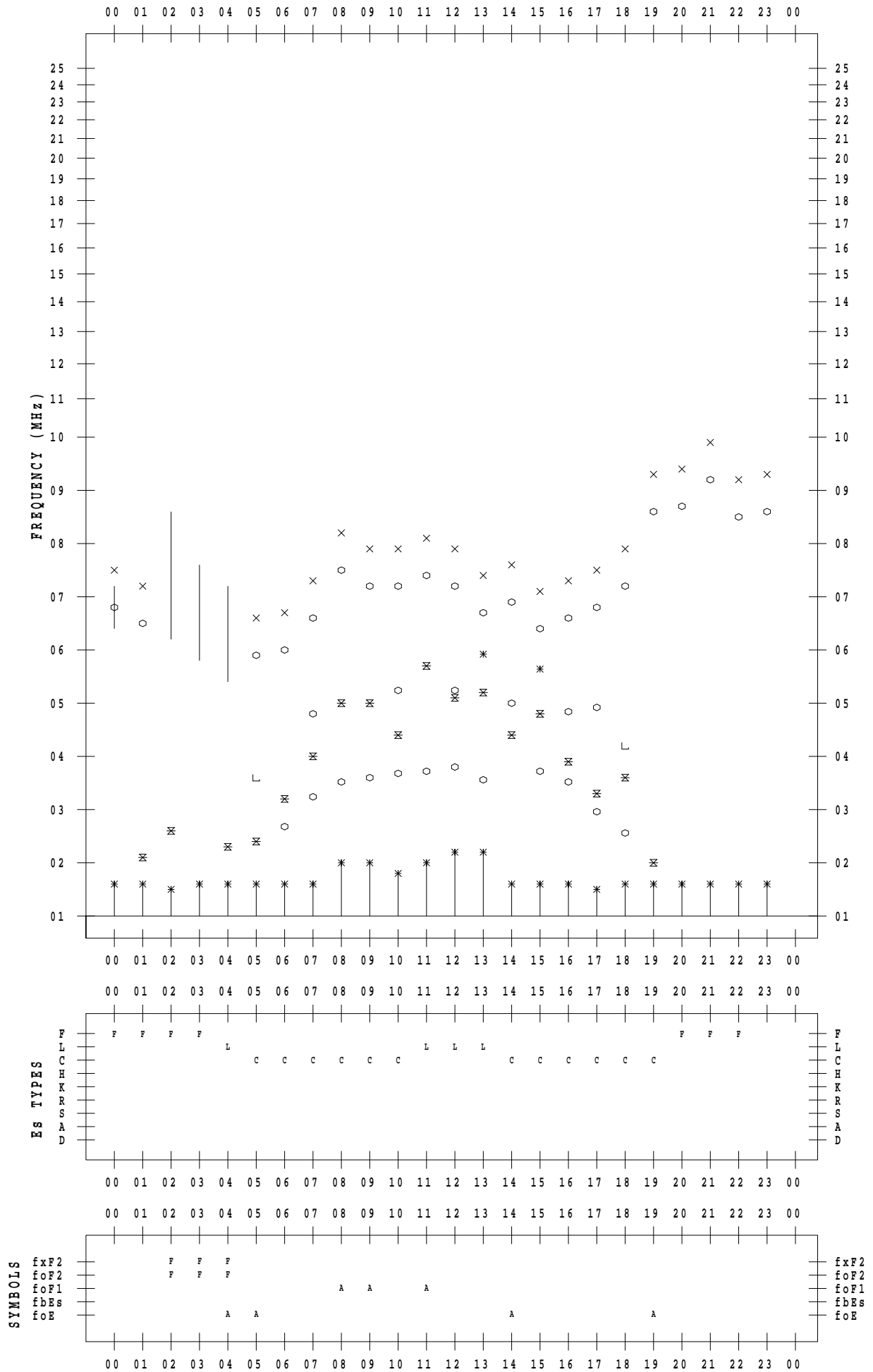
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 17

135 ° E MEAN TIME



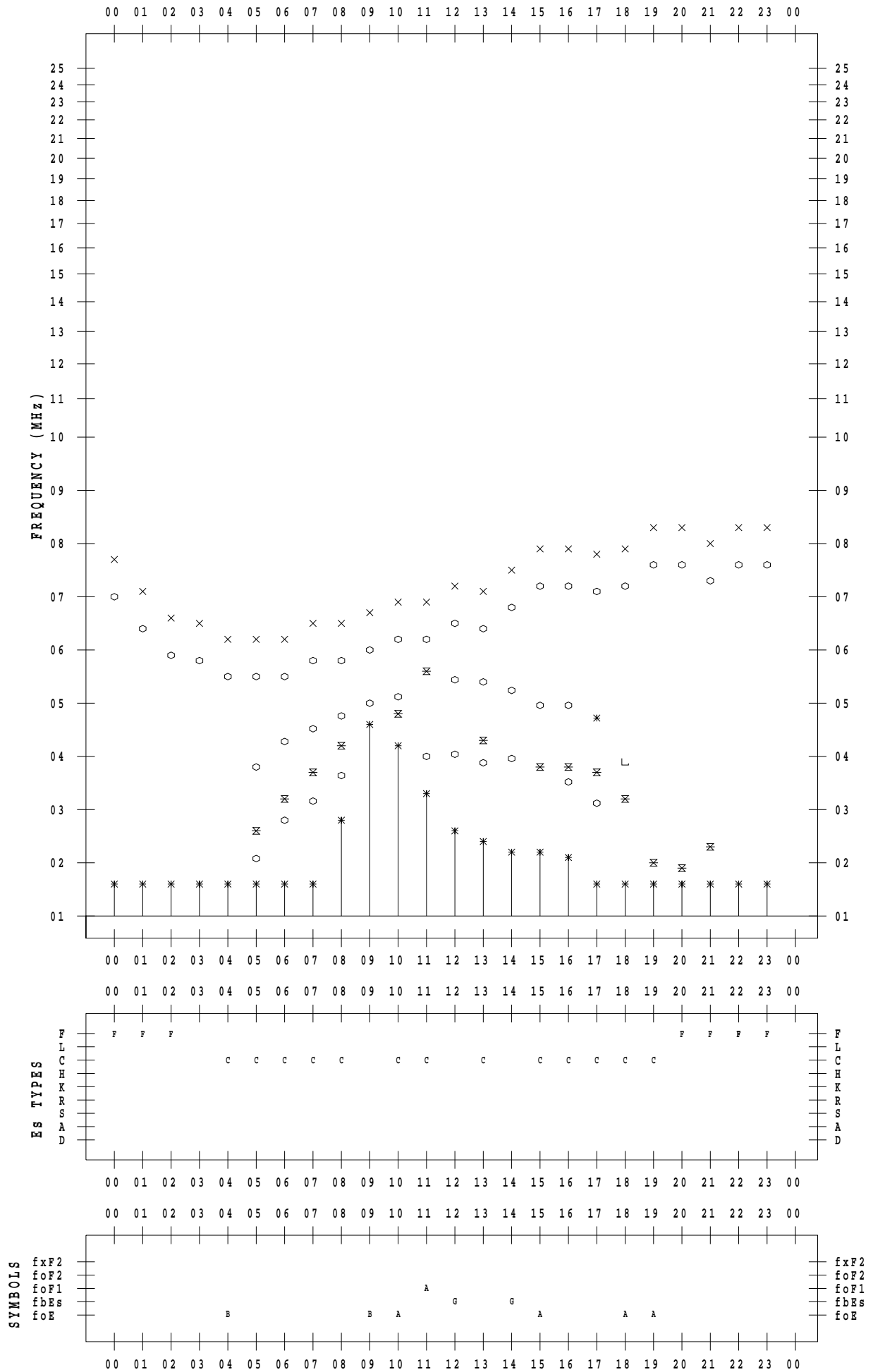
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 18

135 ° E MEAN TIME



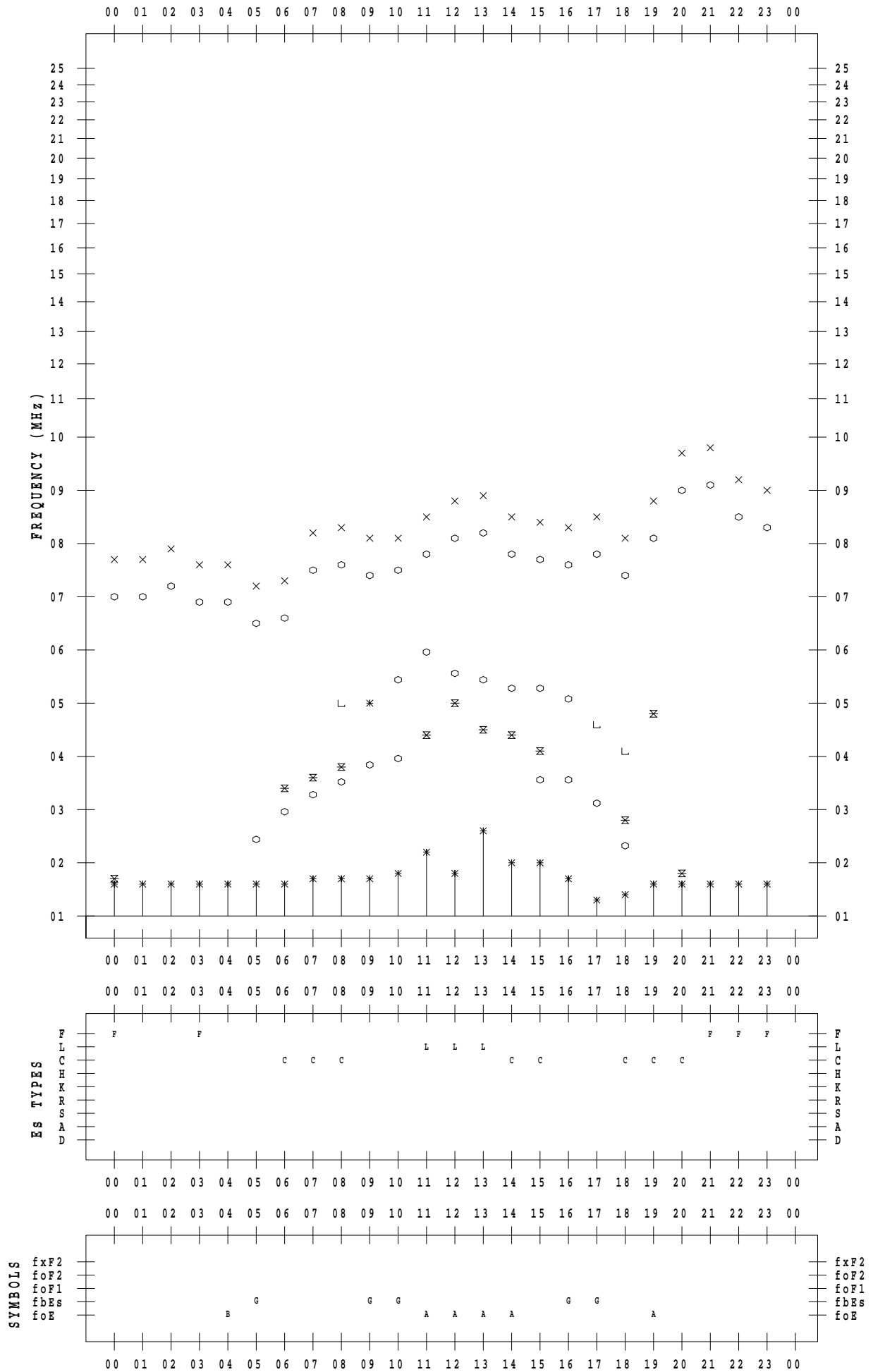
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 19

135 ° E MEAN TIME



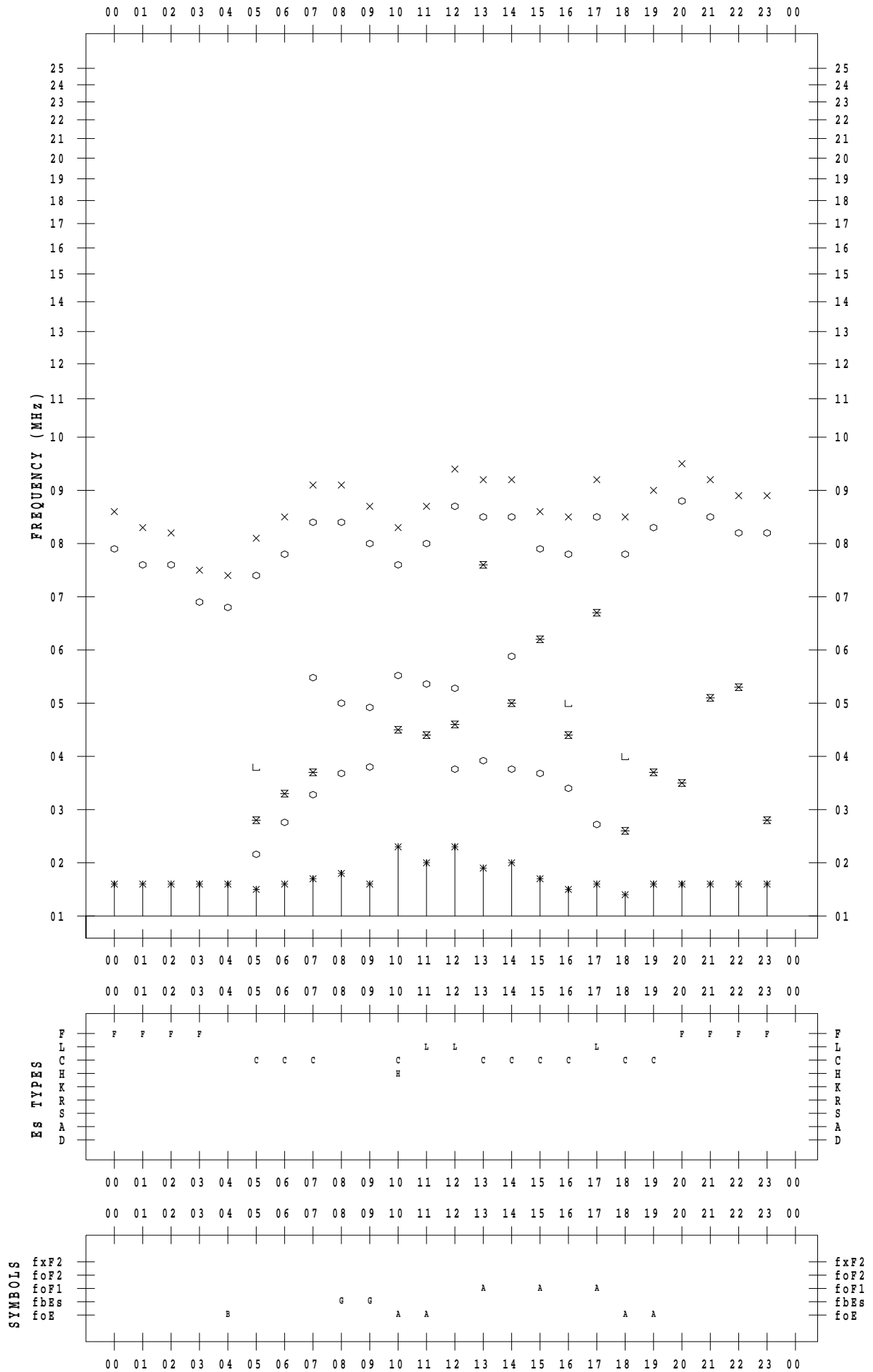
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 20

135 ° E MEAN TIME





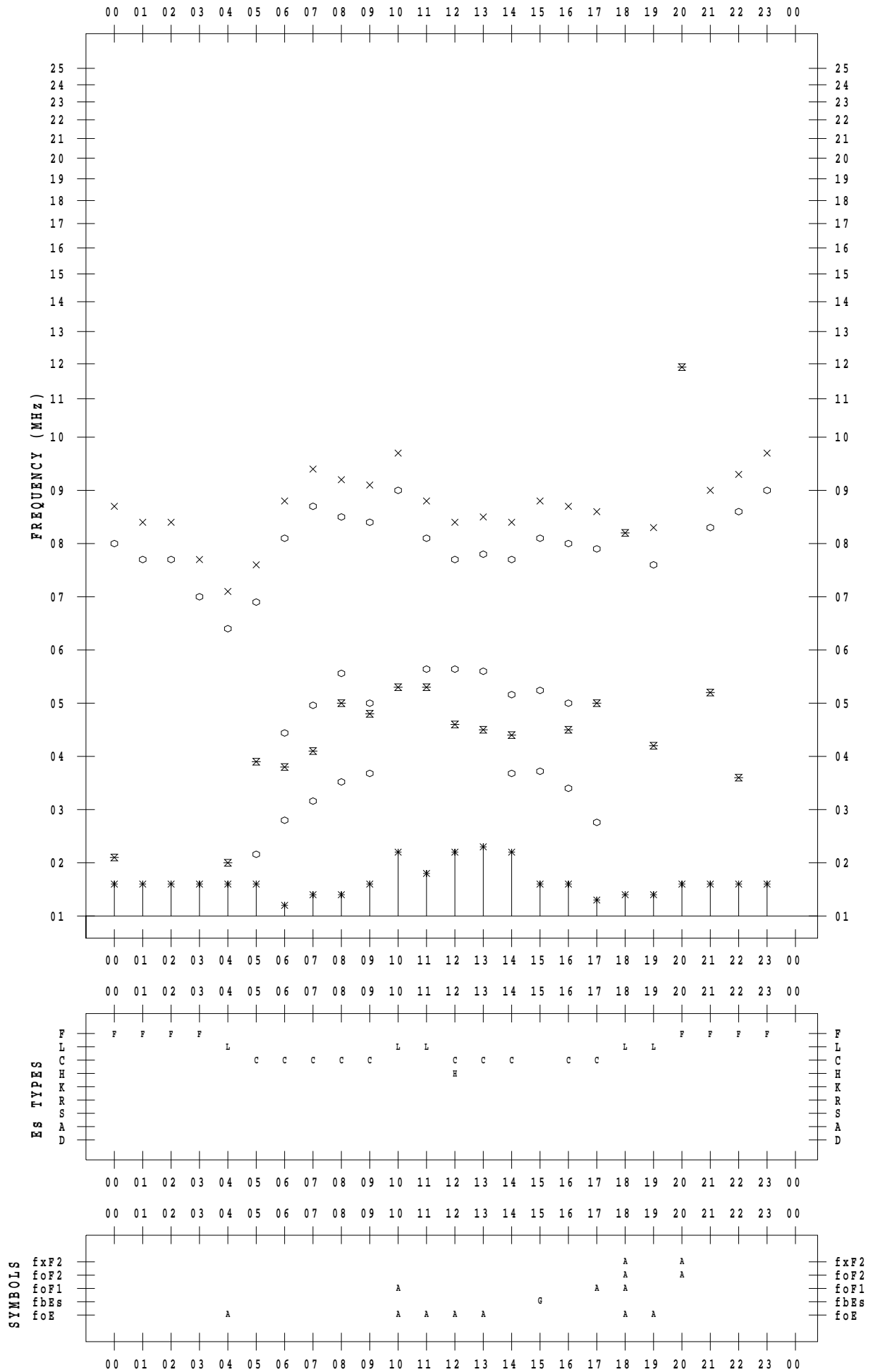
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 21

135 ° E MEAN TIME



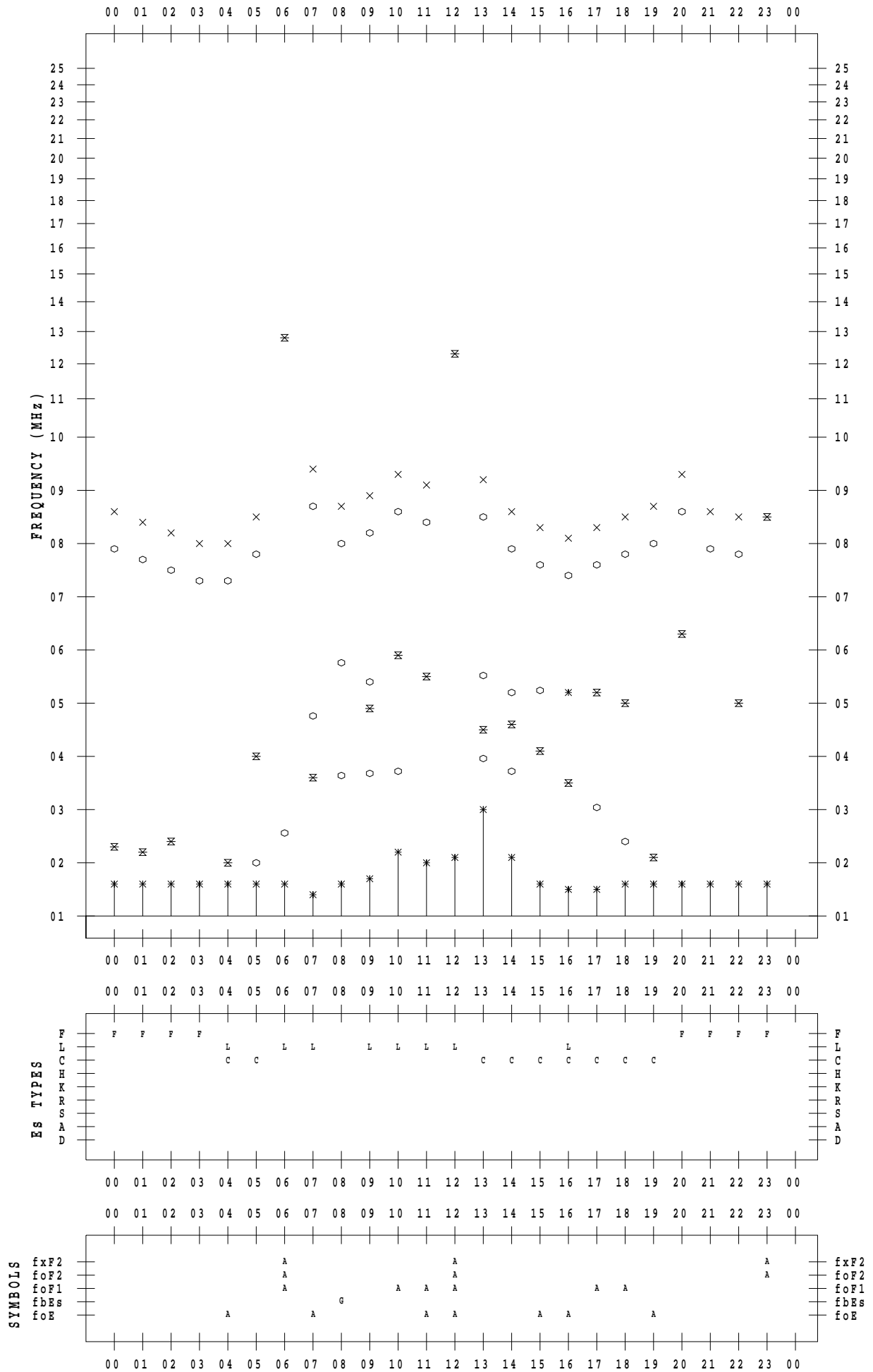
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 22

135 ° E MEAN TIME



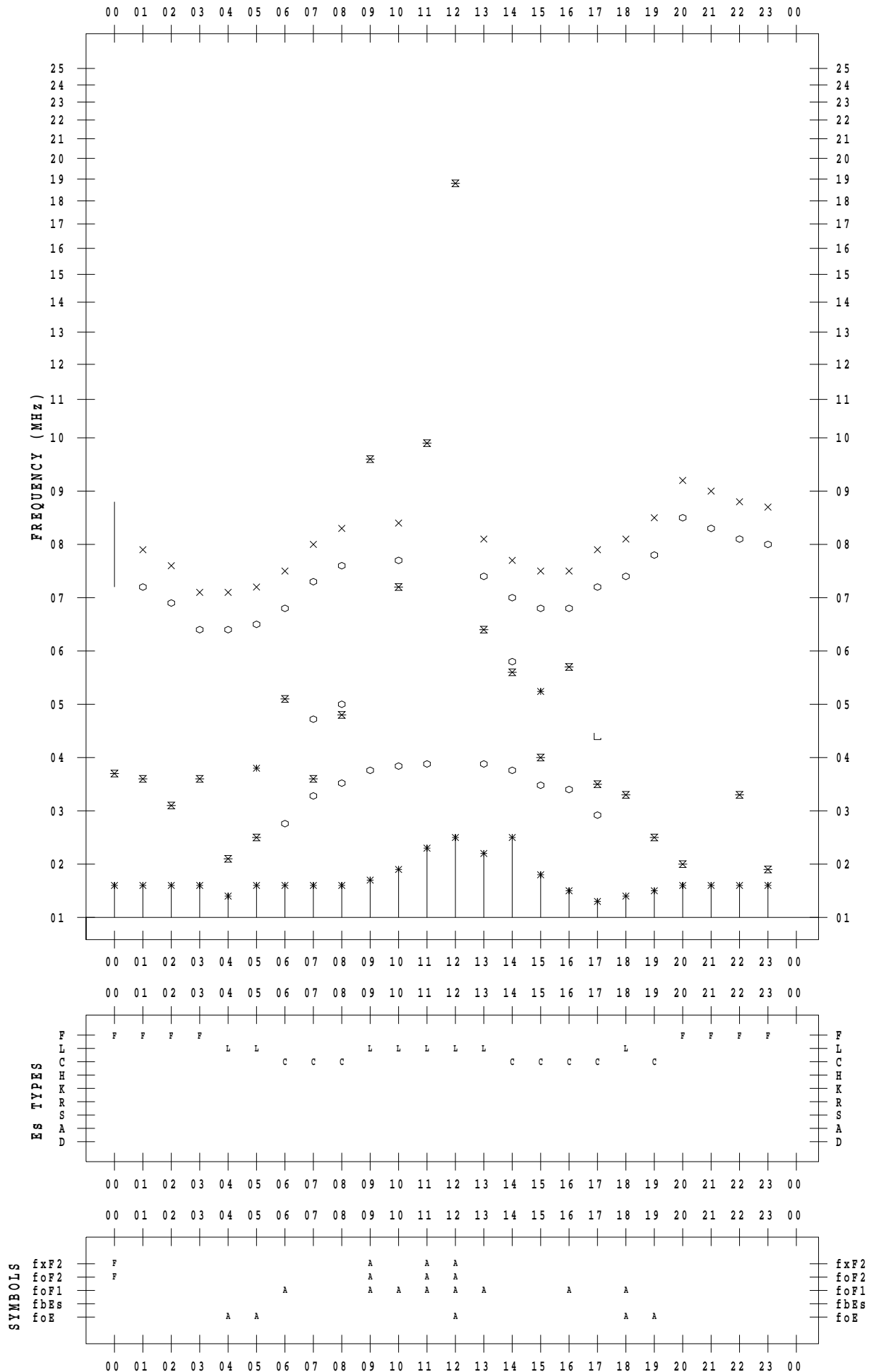
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 23

135 ° E MEAN TIME



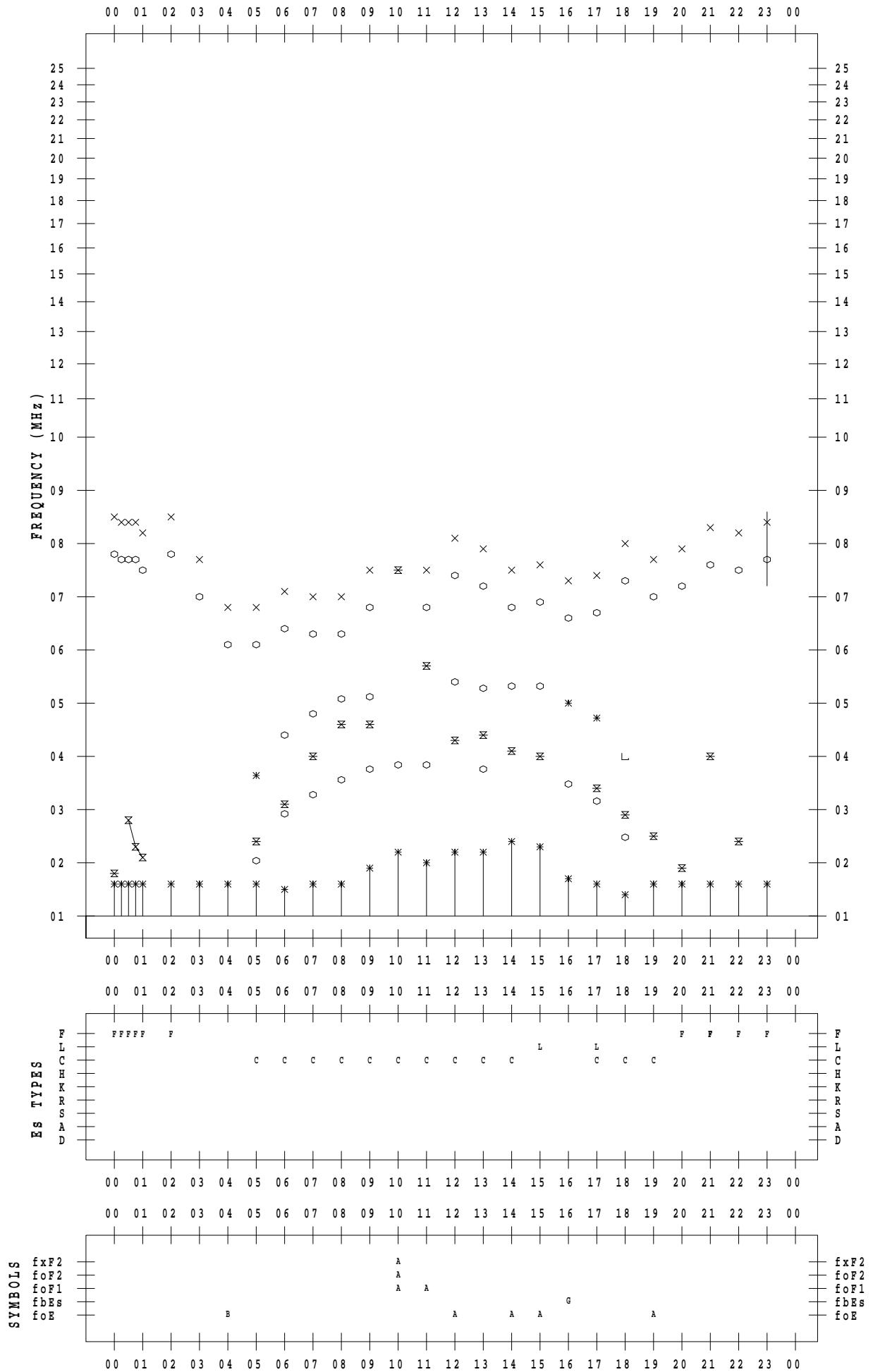
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 24

135 ° E MEAN TIME



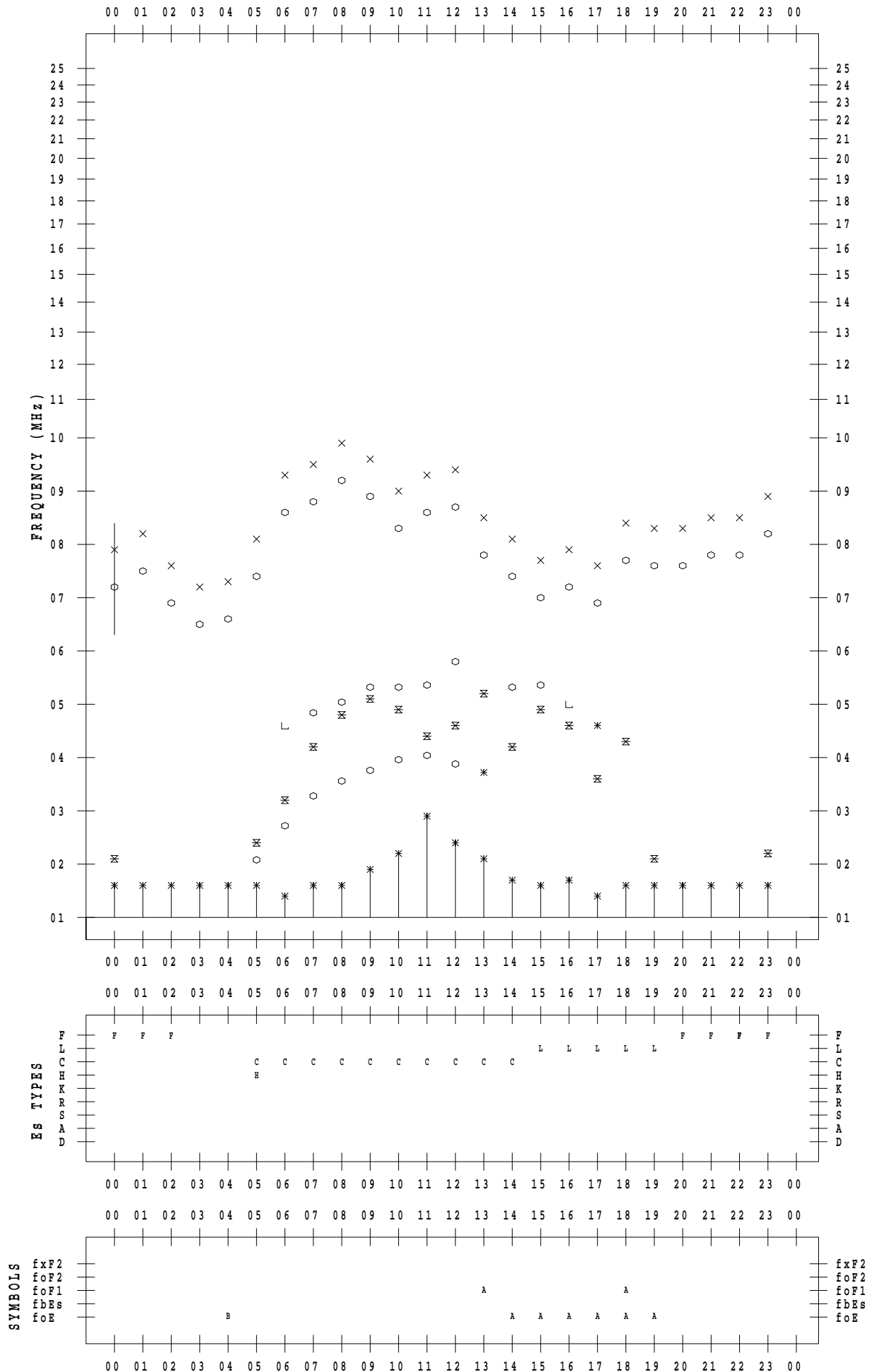
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 25

135 ° E MEAN TIME



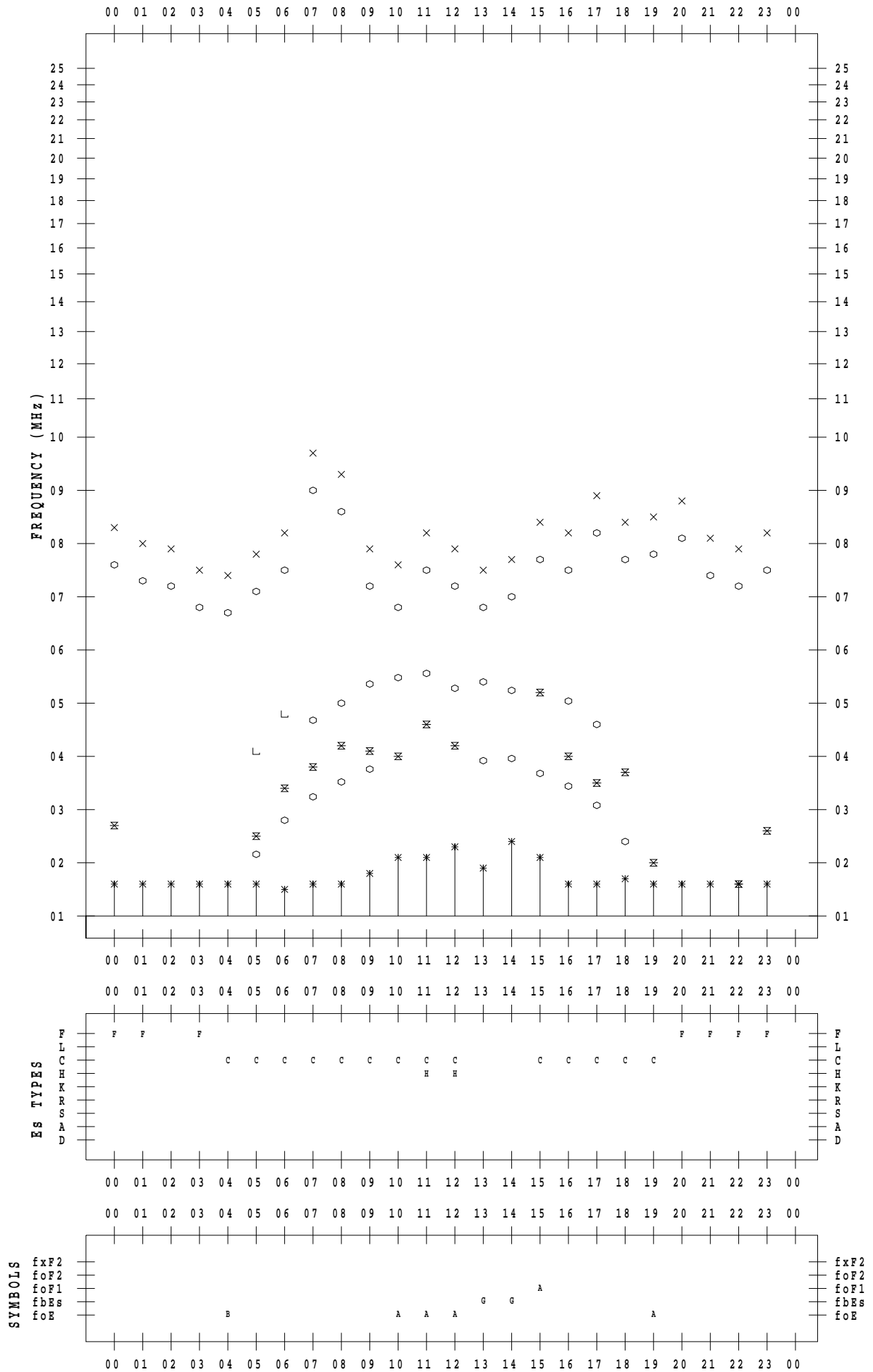
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 26

135 ° E MEAN TIME



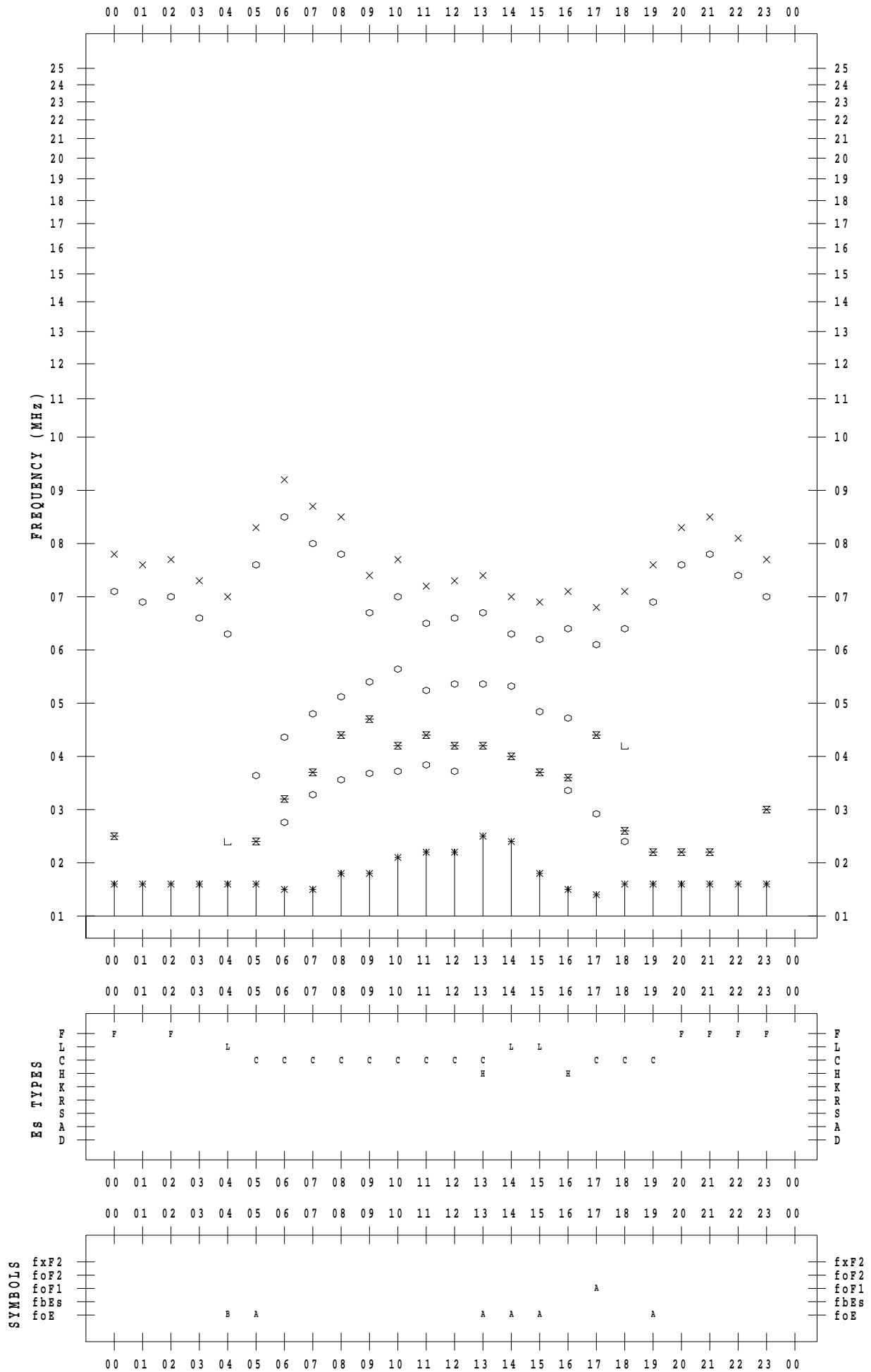
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 27

135 ° E MEAN TIME



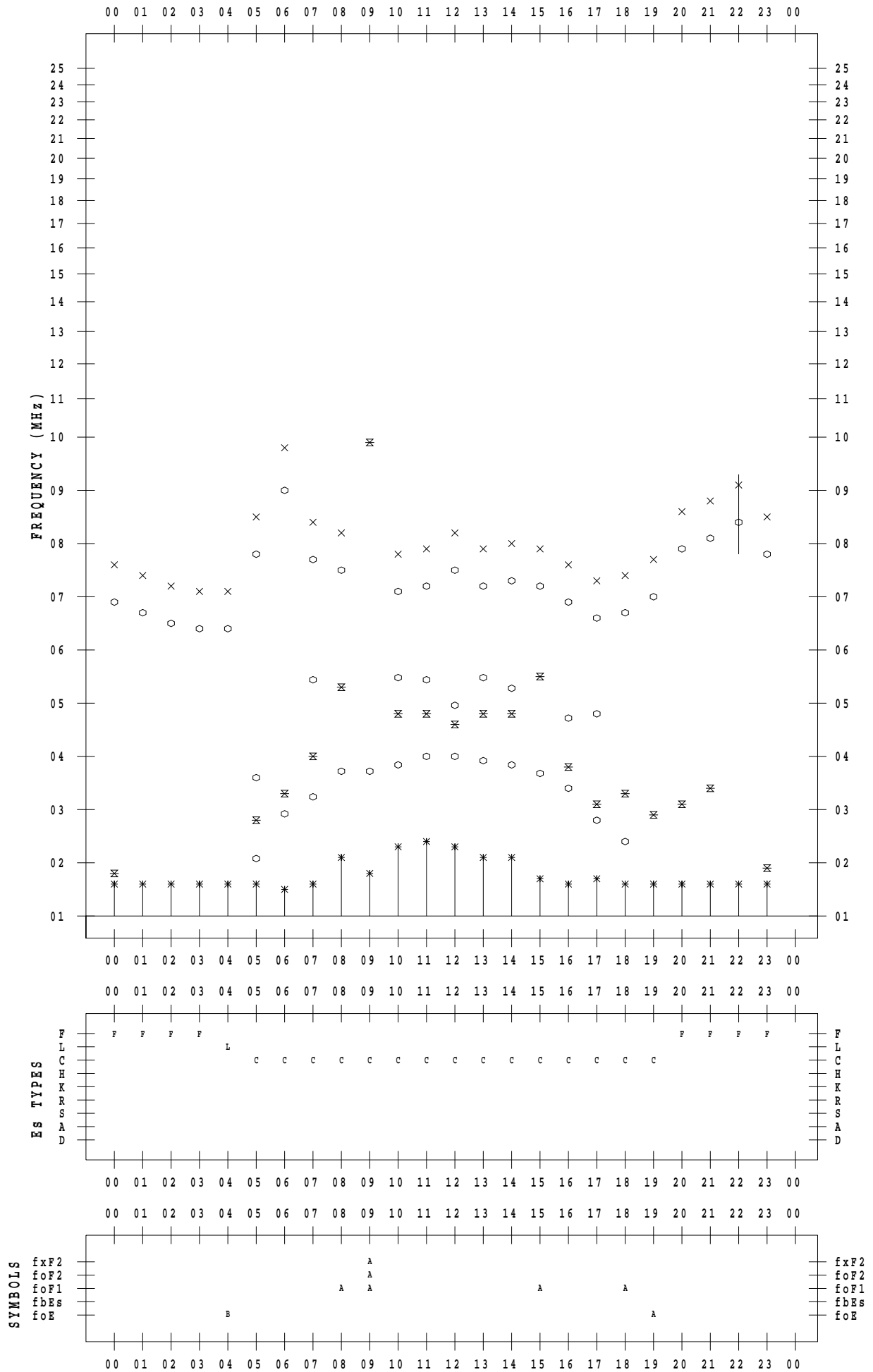
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 28

135 ° E MEAN TIME





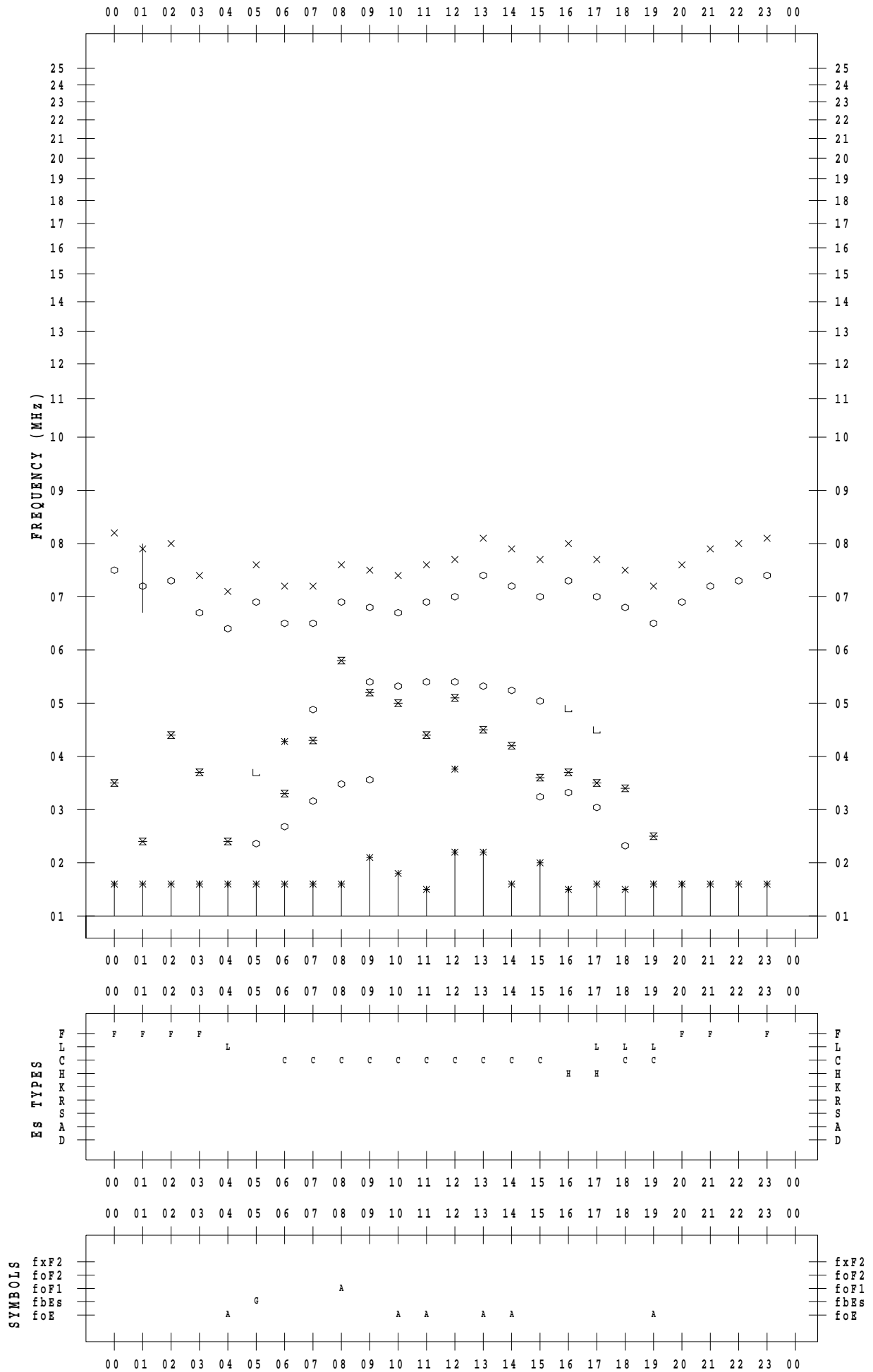
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 29

135 ° E MEAN TIME



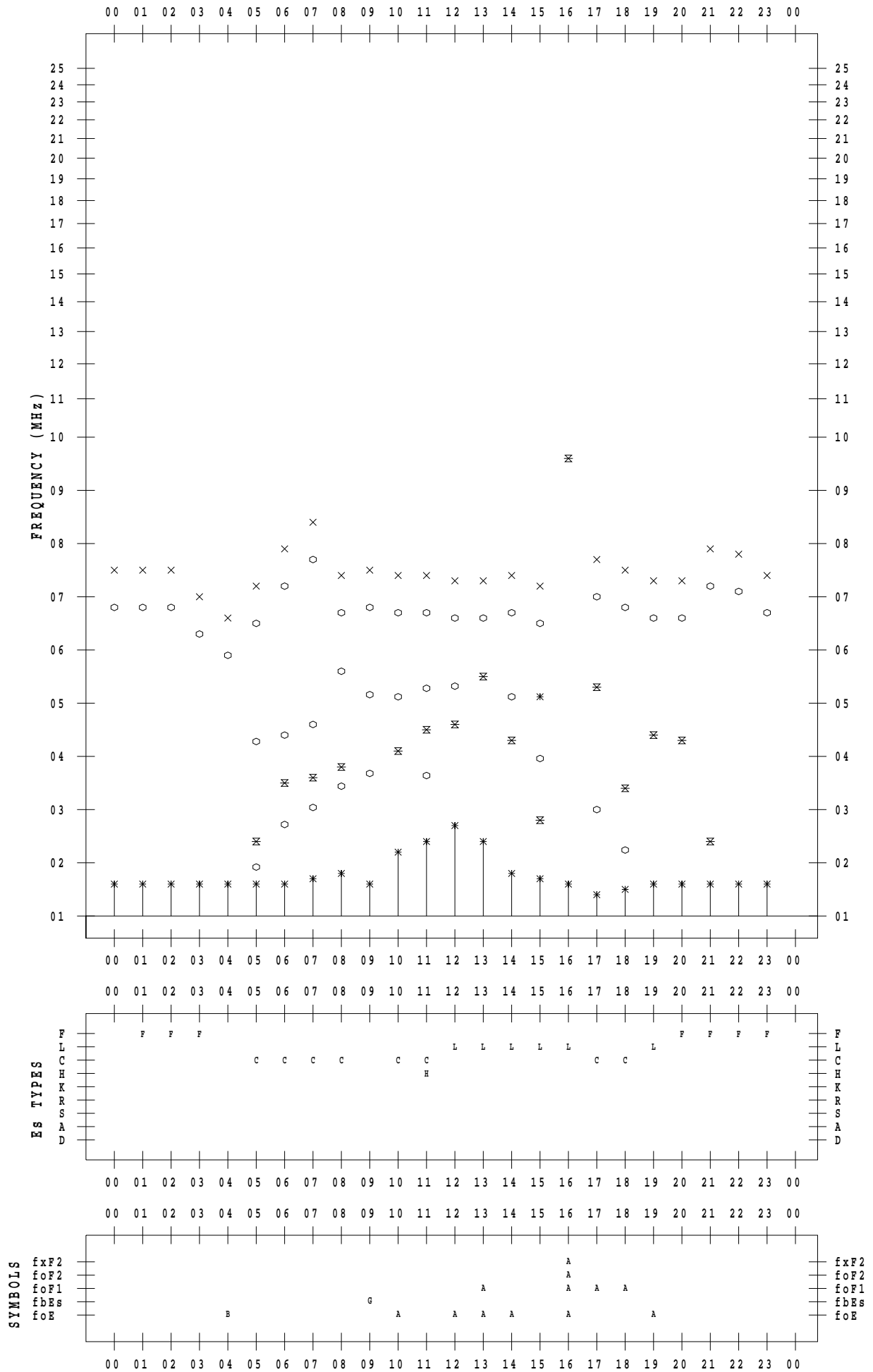
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 30

135 ° E MEAN TIME



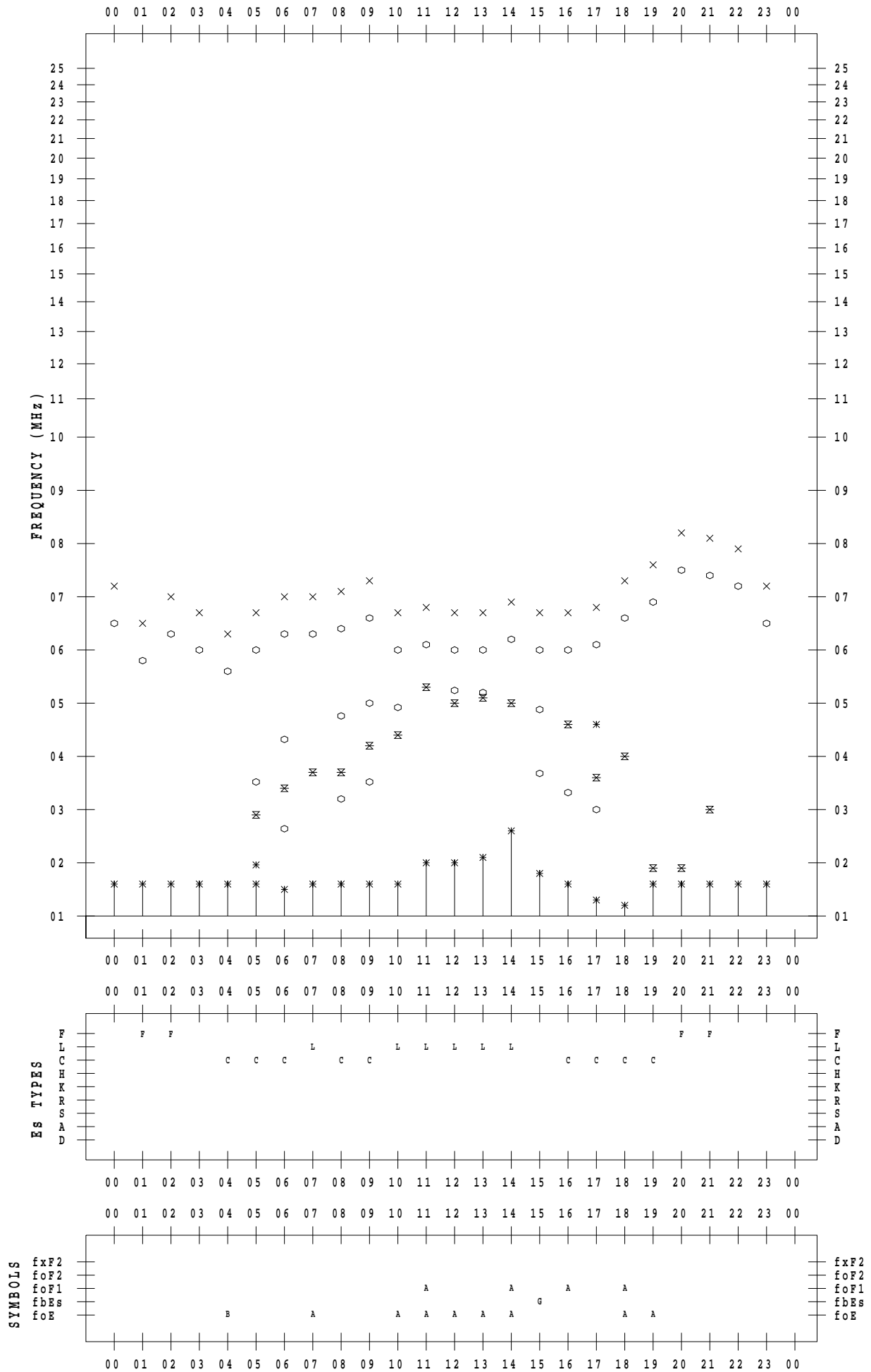
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SCALER :

STATION : Wakkanai

DATE : 2023 / 7 / 31

135 ° E MEAN TIME



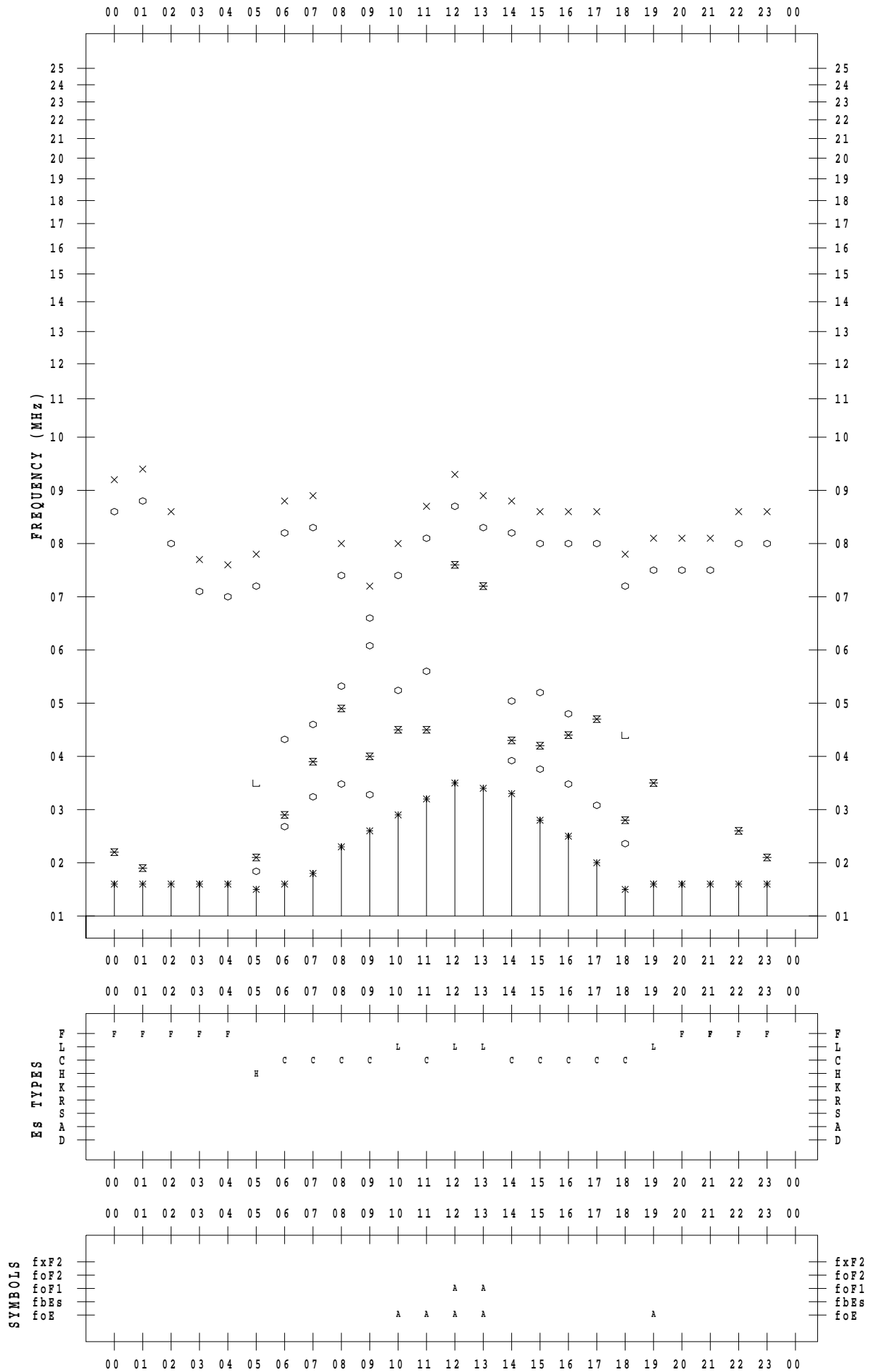
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 1

135 ° E MEAN TIME



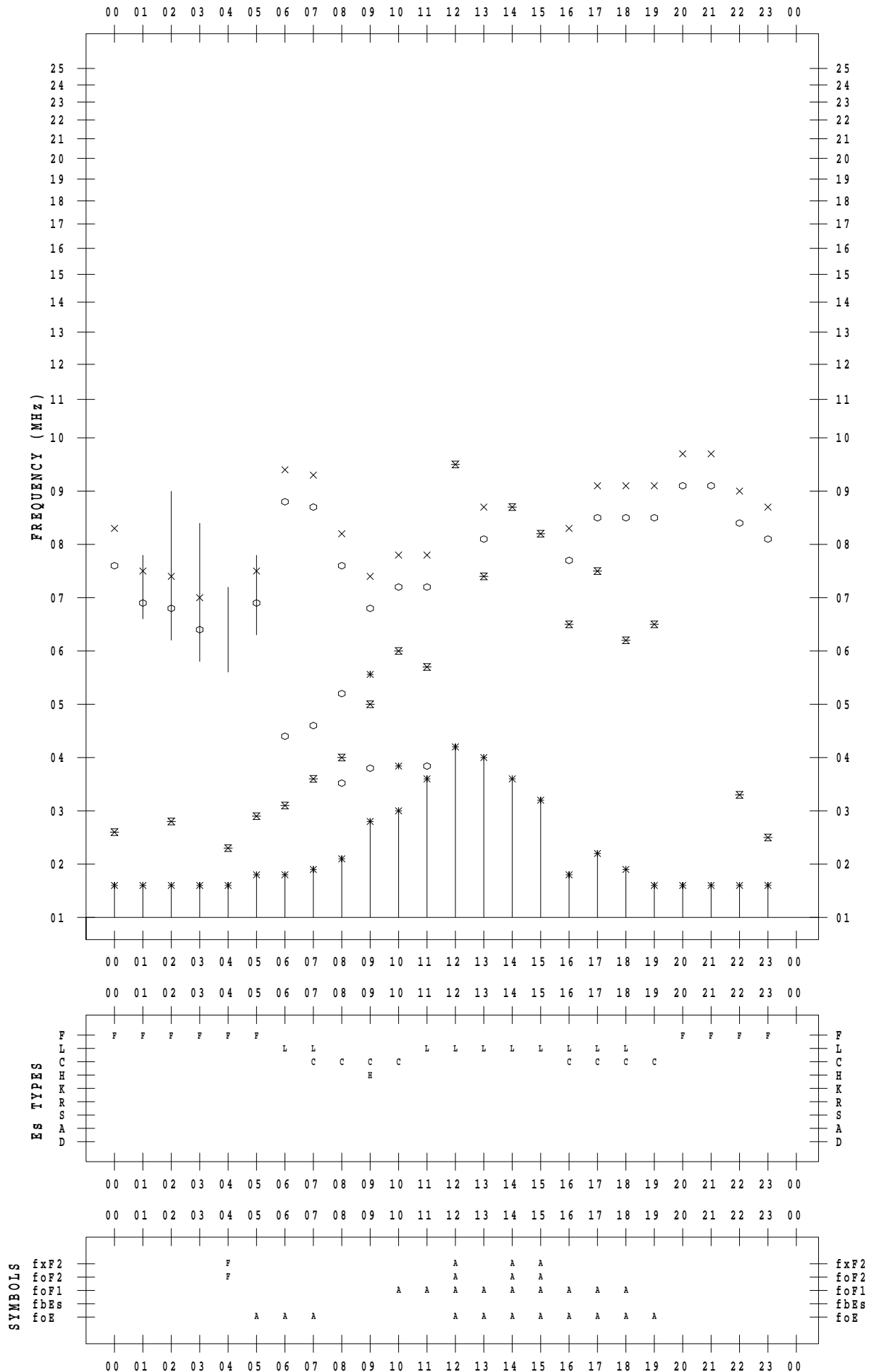
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STATION : Kokubunji

DATE : 2023 / 7 / 2

135 ° E MEAN TIME



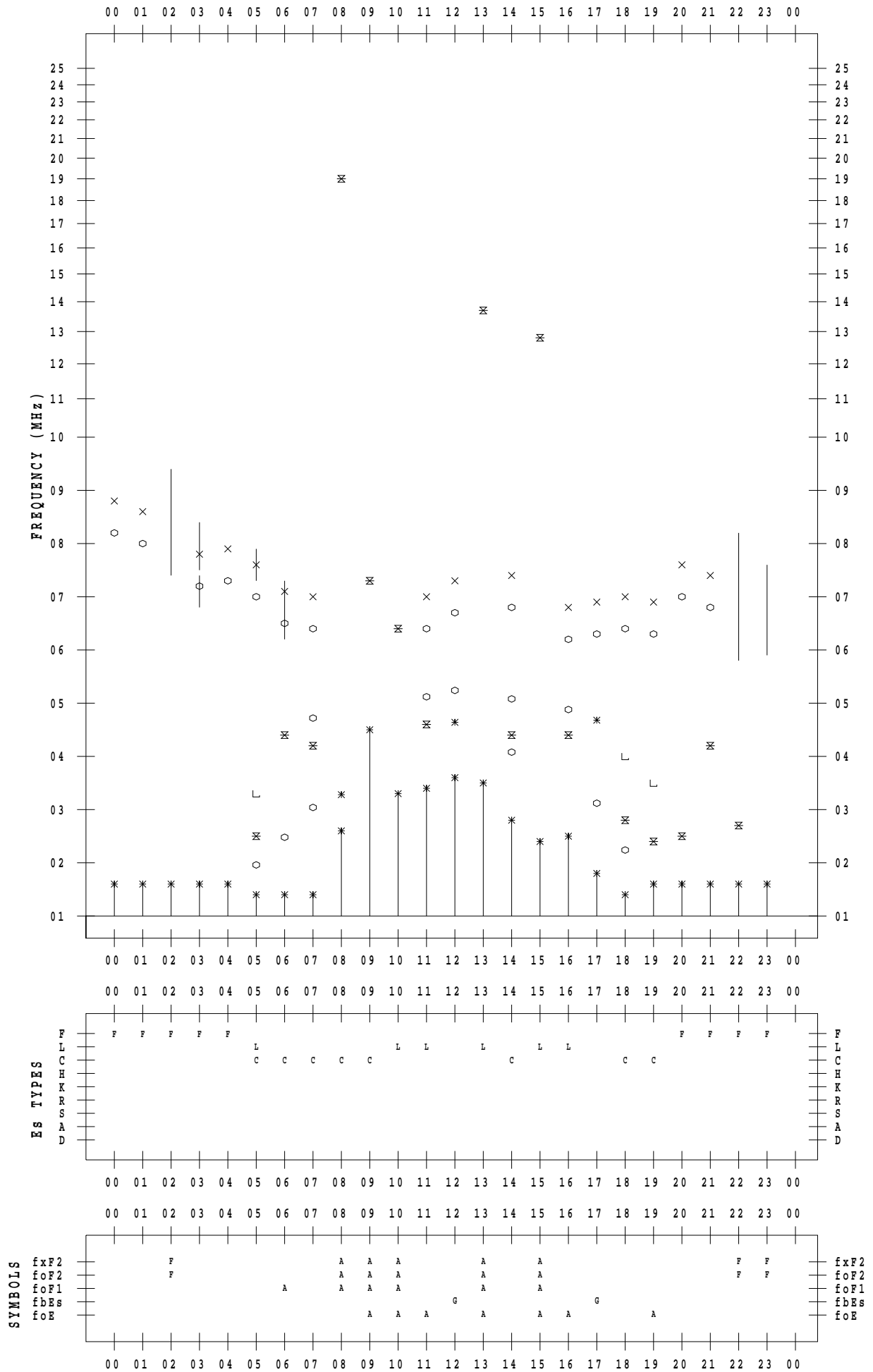
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 3

135 ° E MEAN TIME



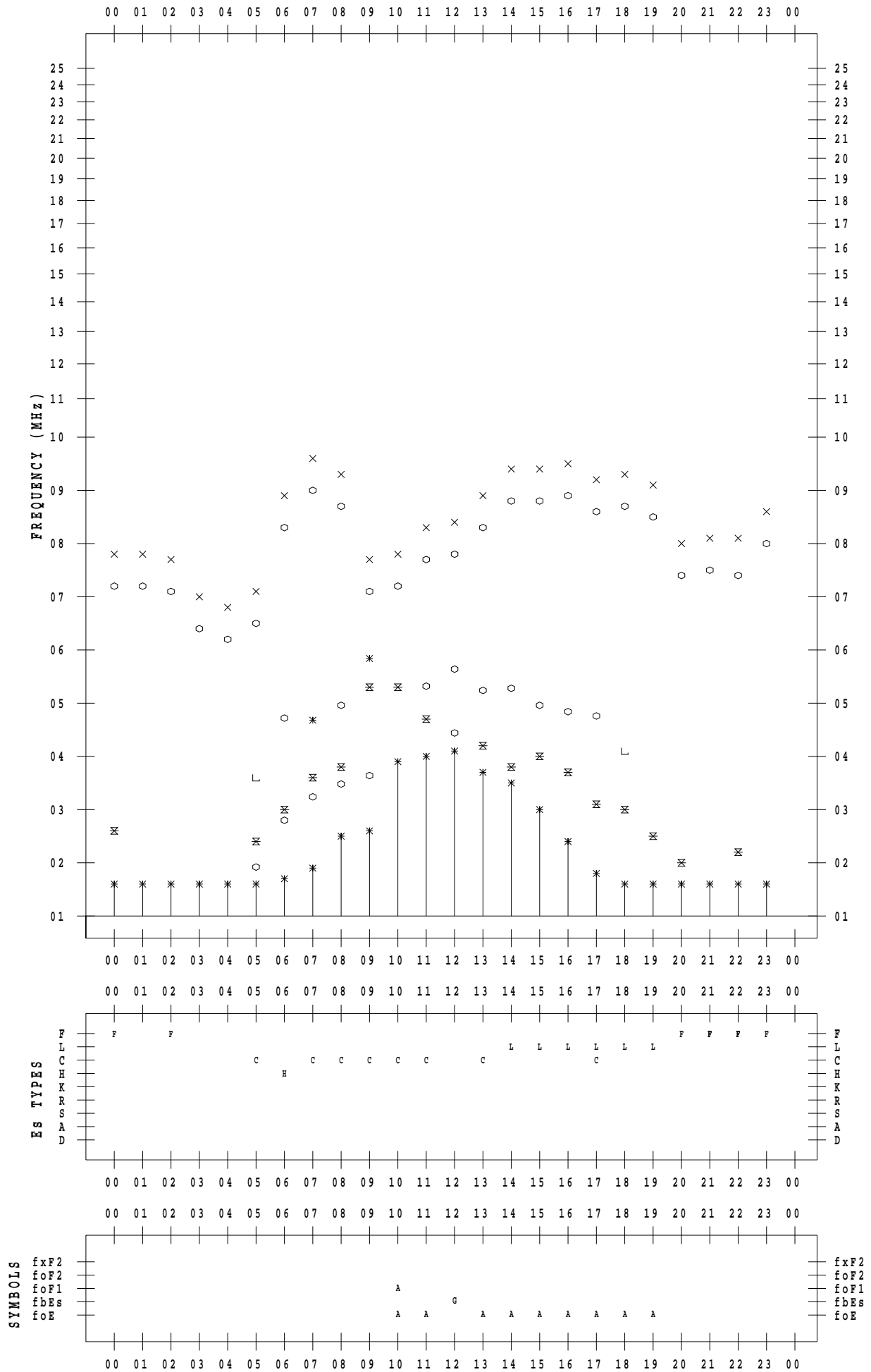
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 4

135 ° E MEAN TIME



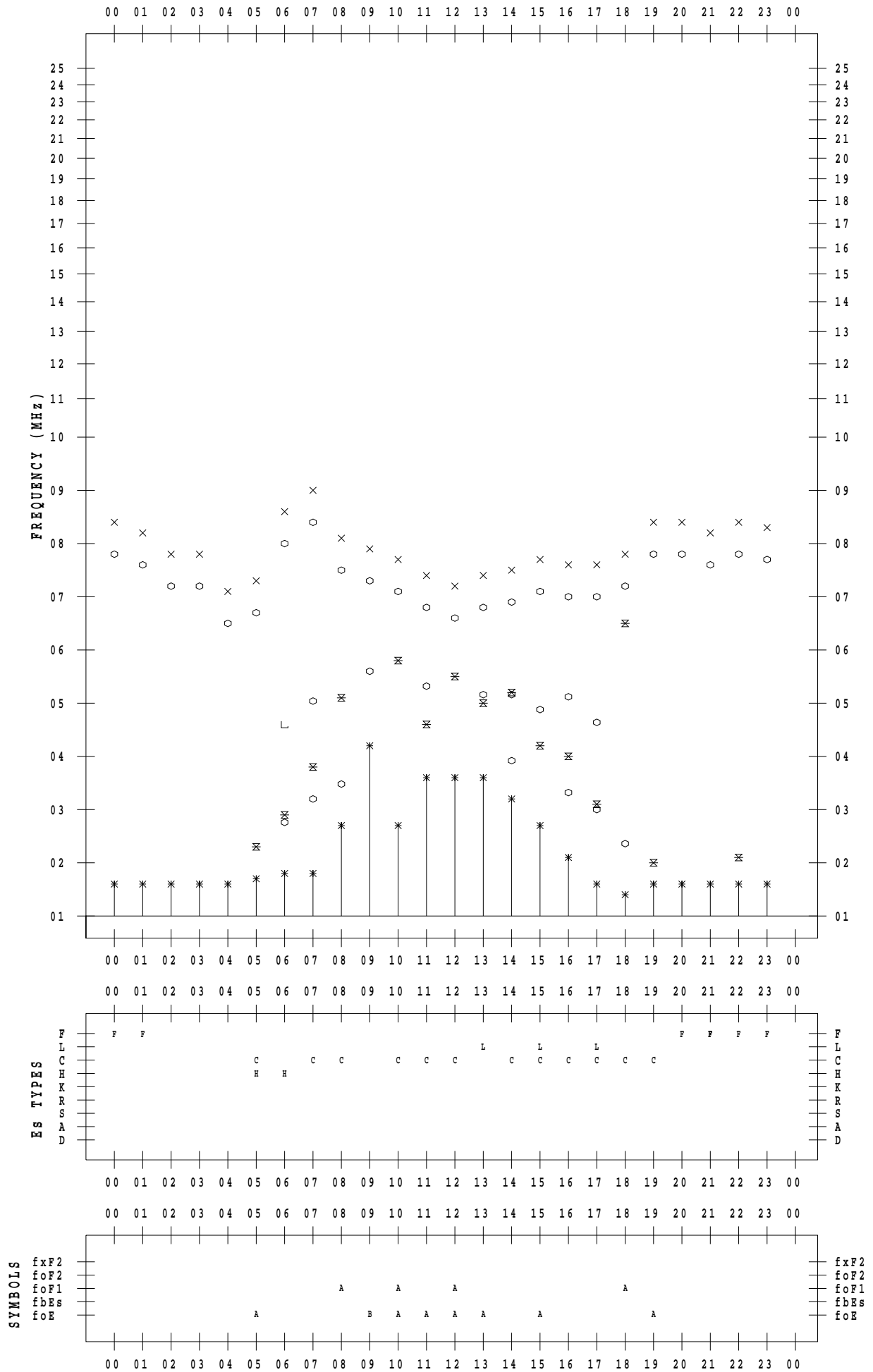
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 5

135 ° E MEAN TIME





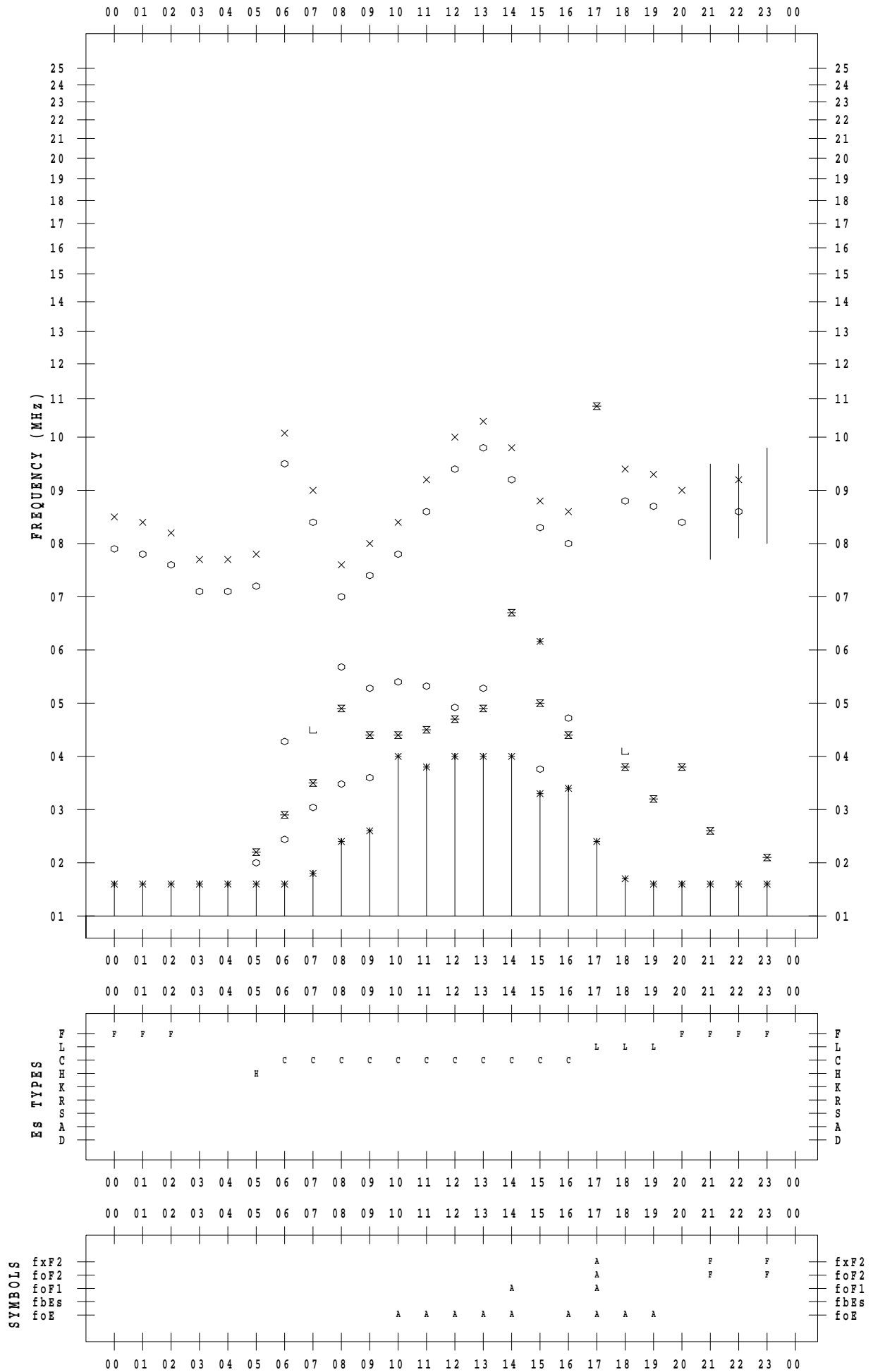
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 6

135 ° E MEAN TIME



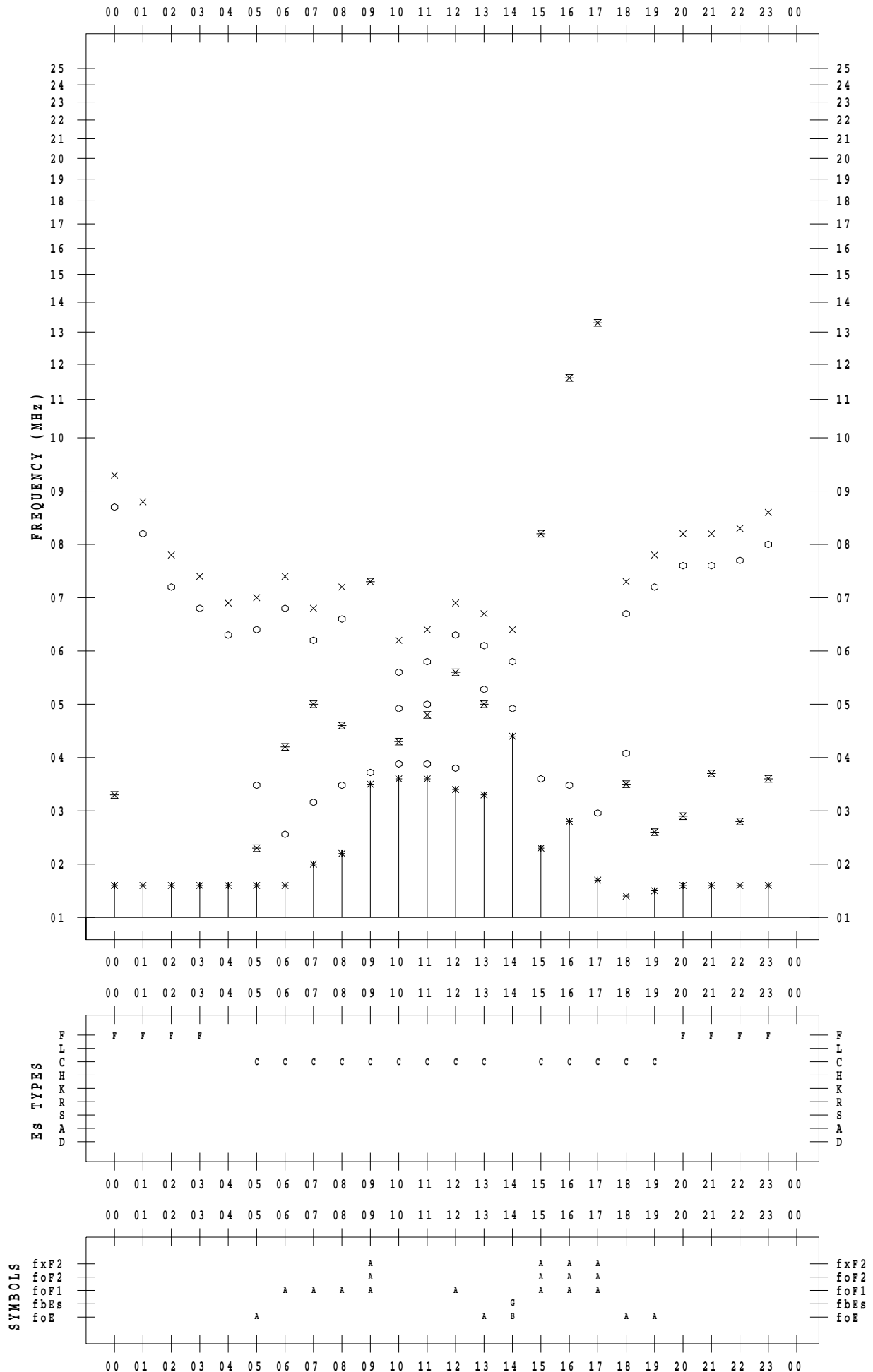
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 7

135 ° E MEAN TIME



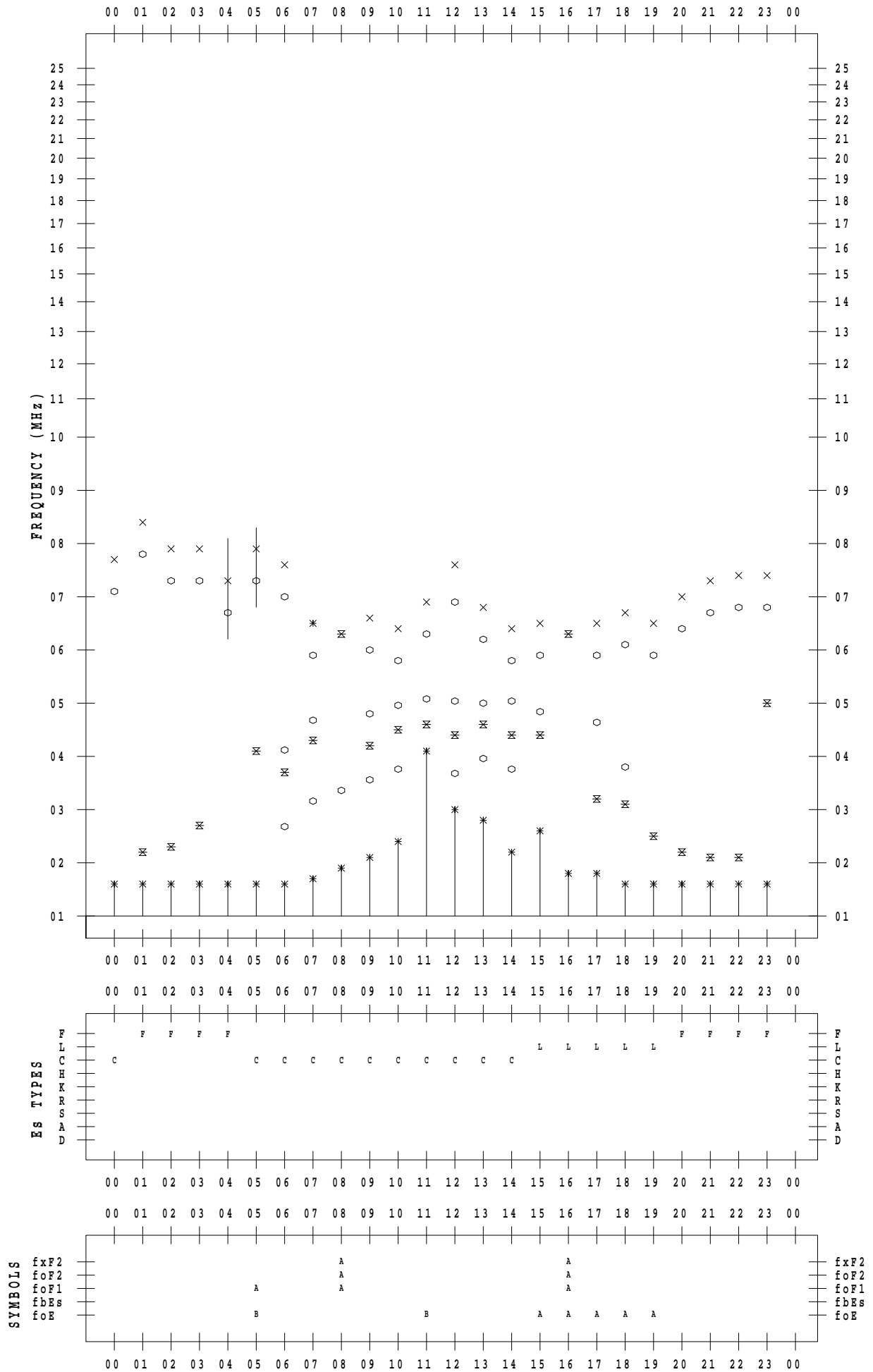
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 8

135 ° E MEAN TIME



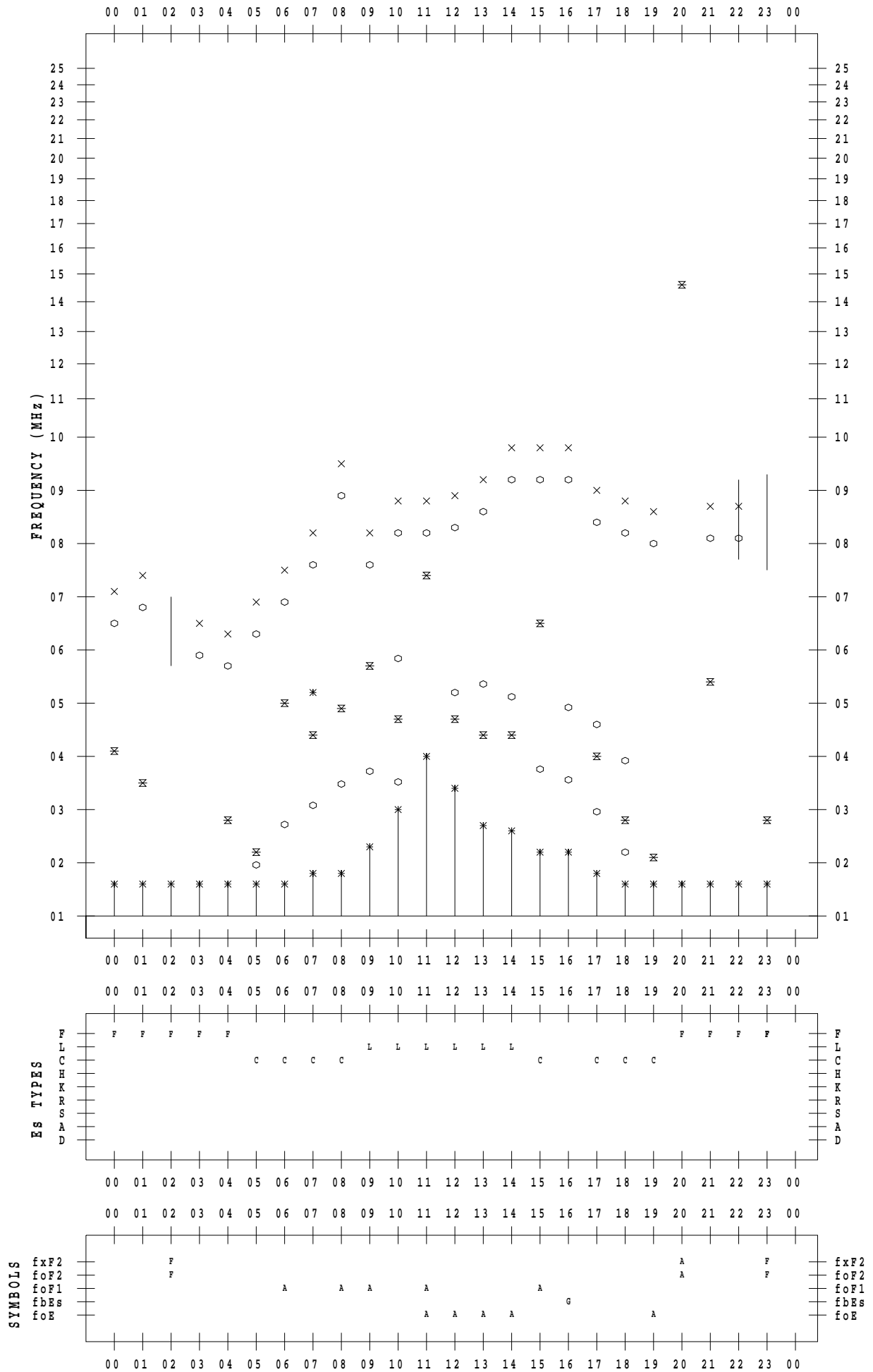
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 9

135 ° E MEAN TIME



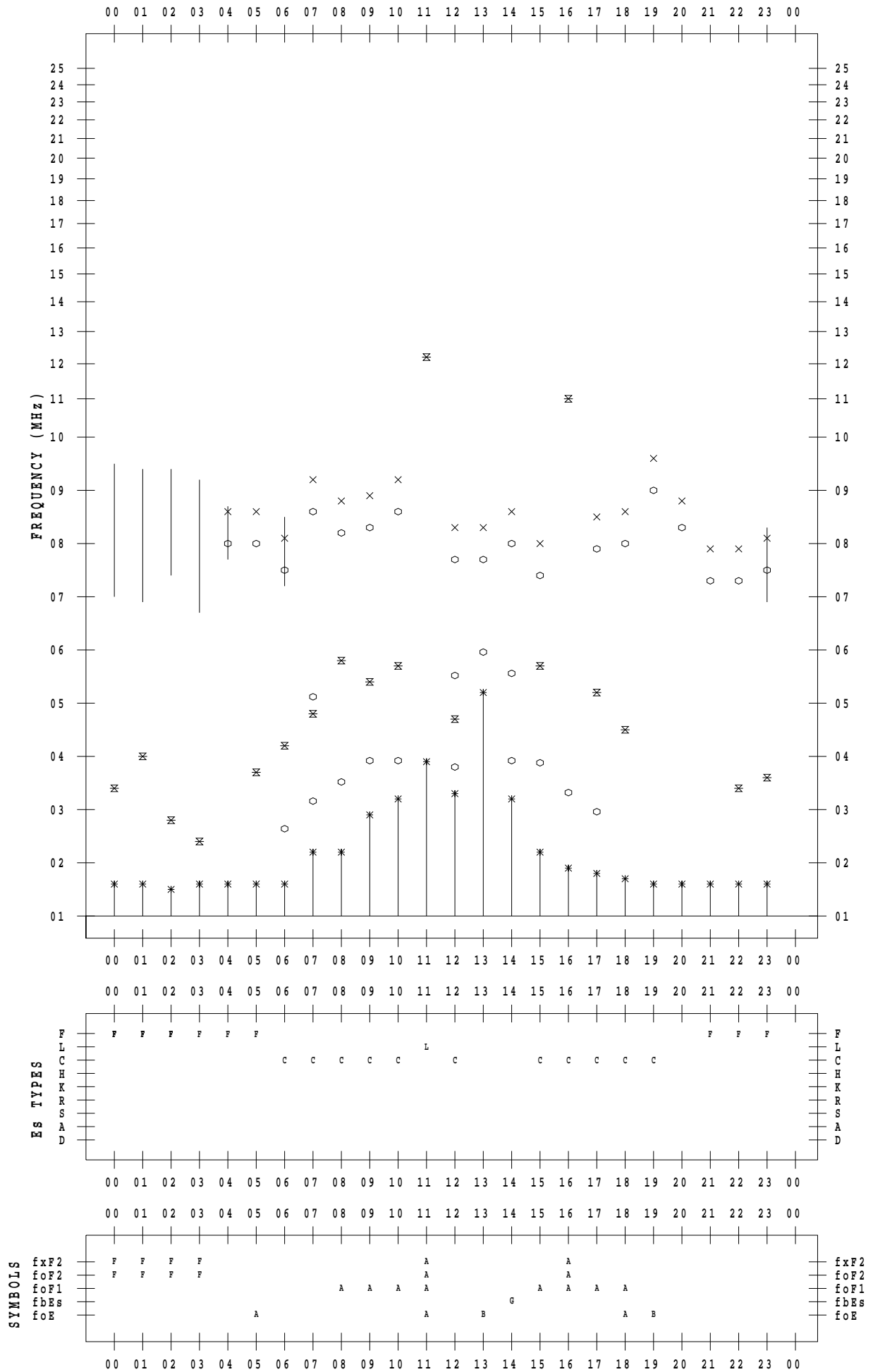
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 10

135 ° E MEAN TIME



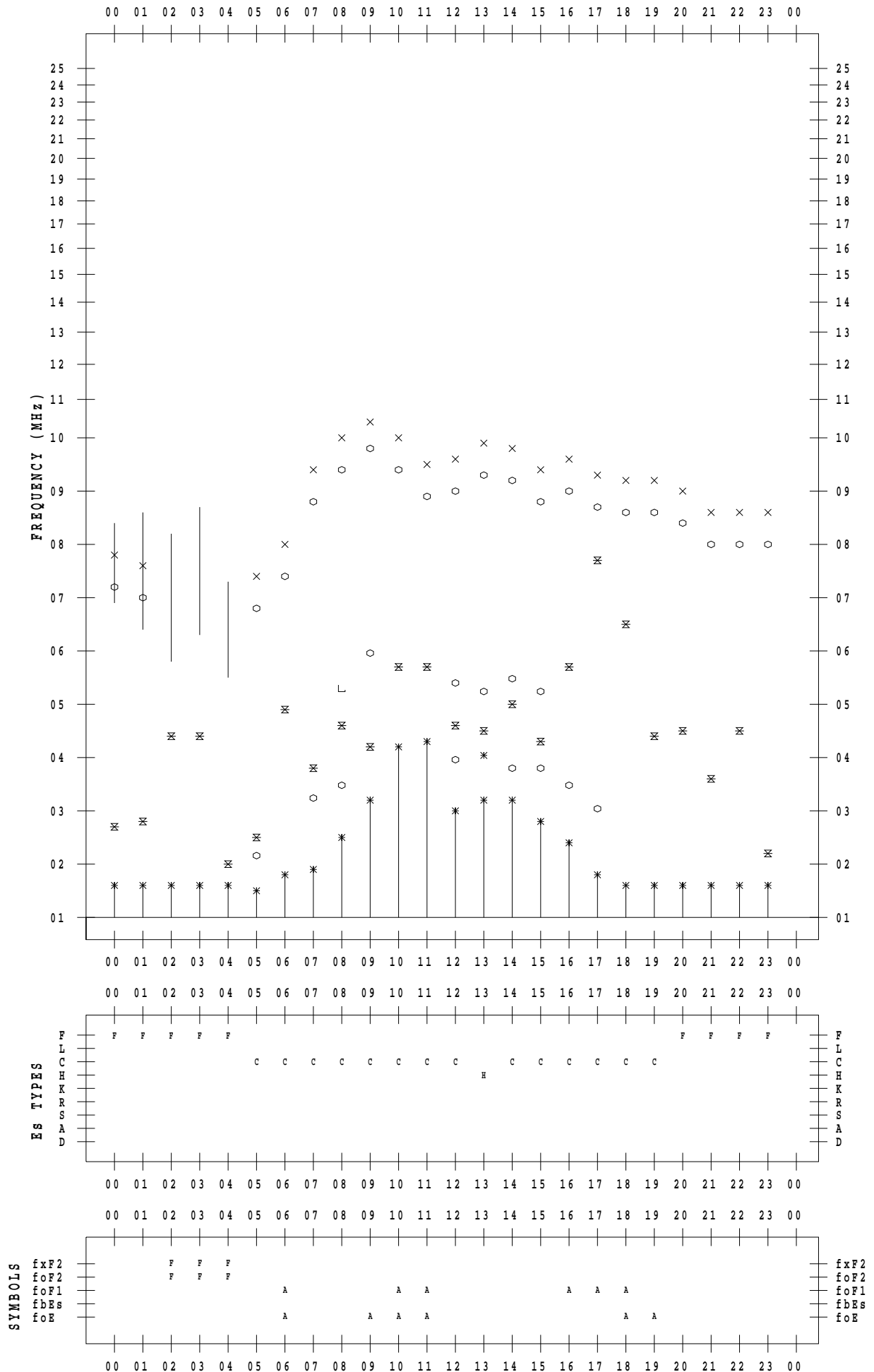
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 11

135 ° E MEAN TIME



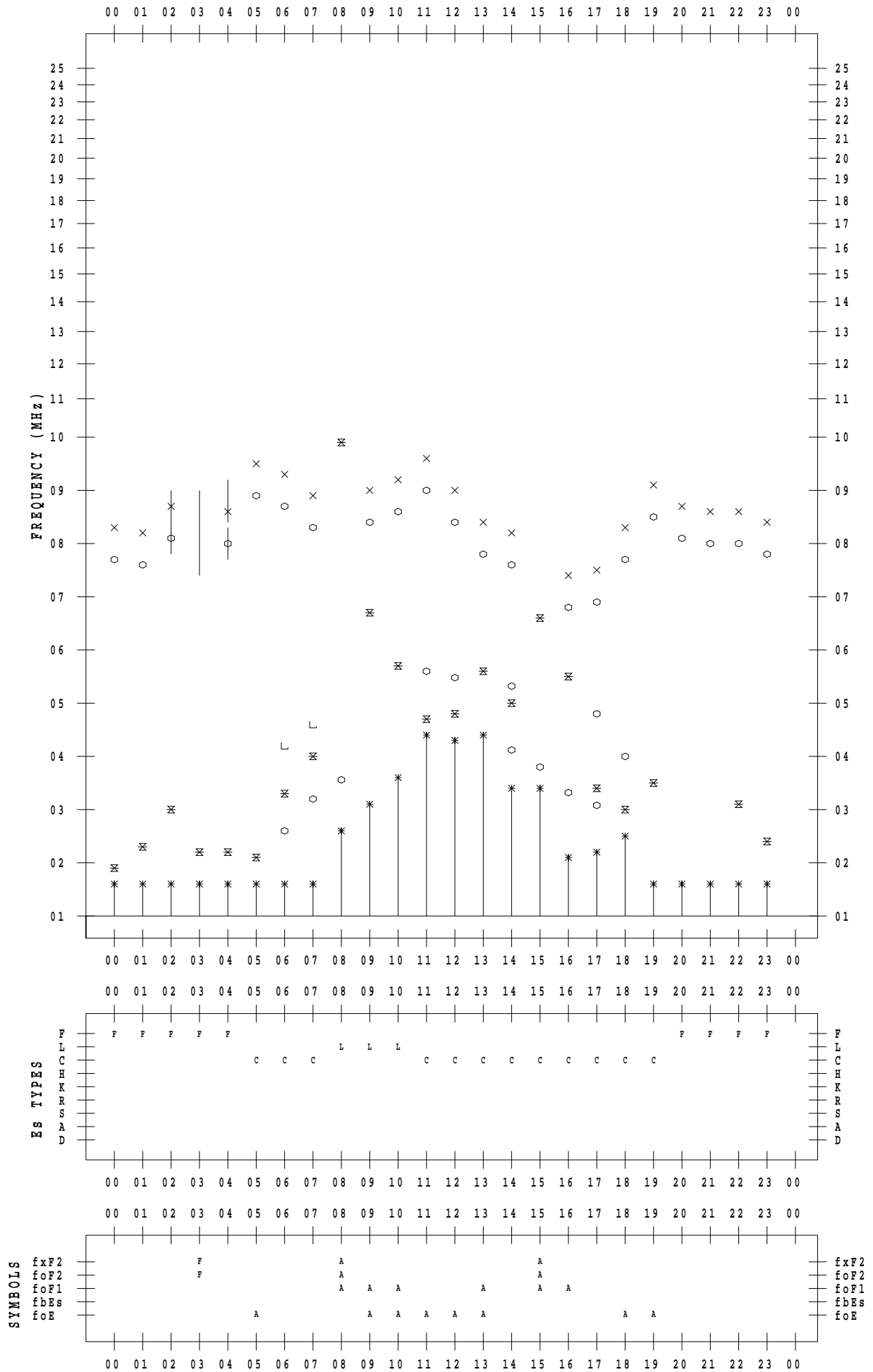
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SCALER :

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DATE : 2023 / 7 / 12

135 ° E MEAN TIME



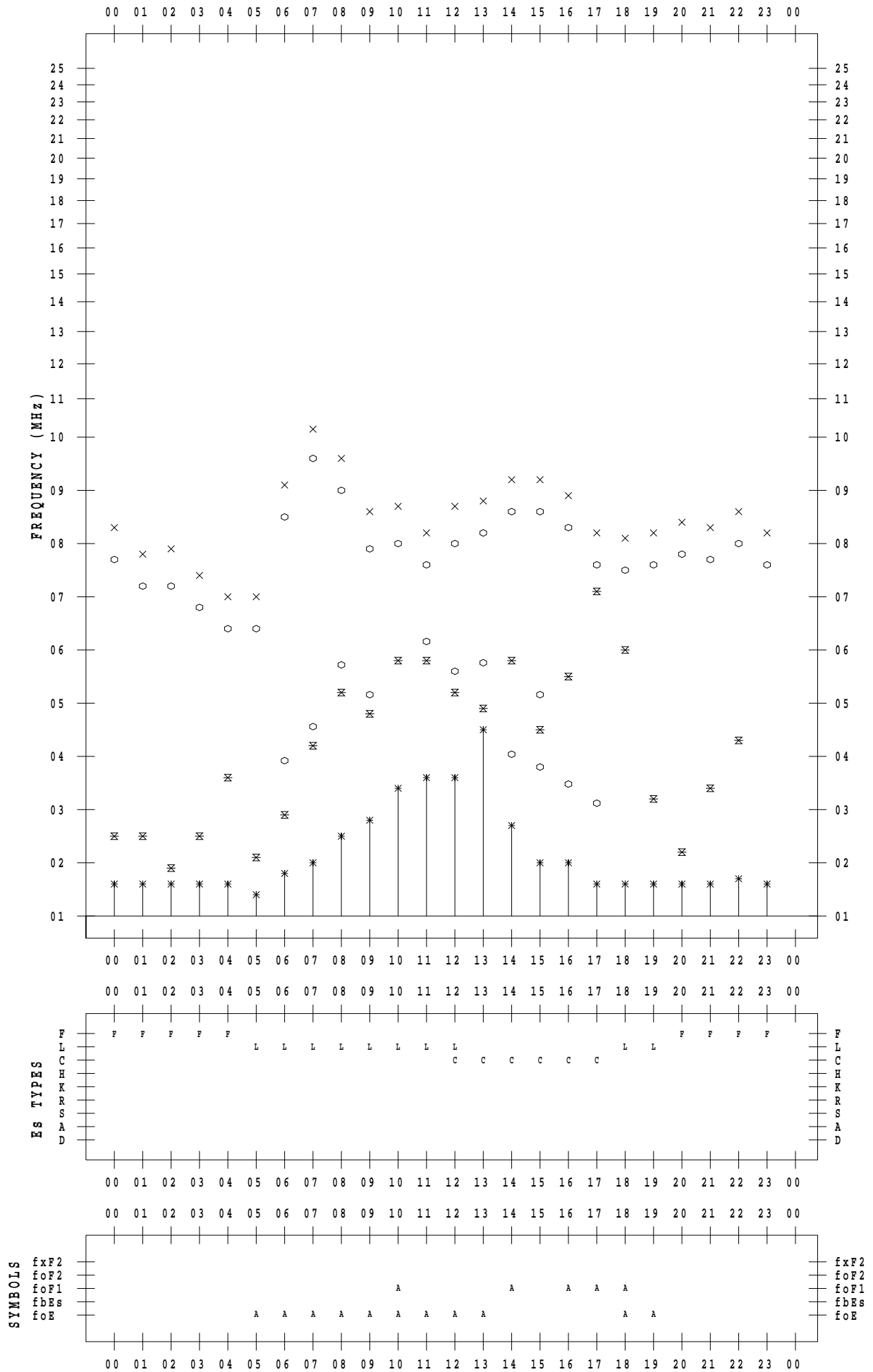
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DATE : 2023 / 7 / 13

135 ° E MEAN TIME





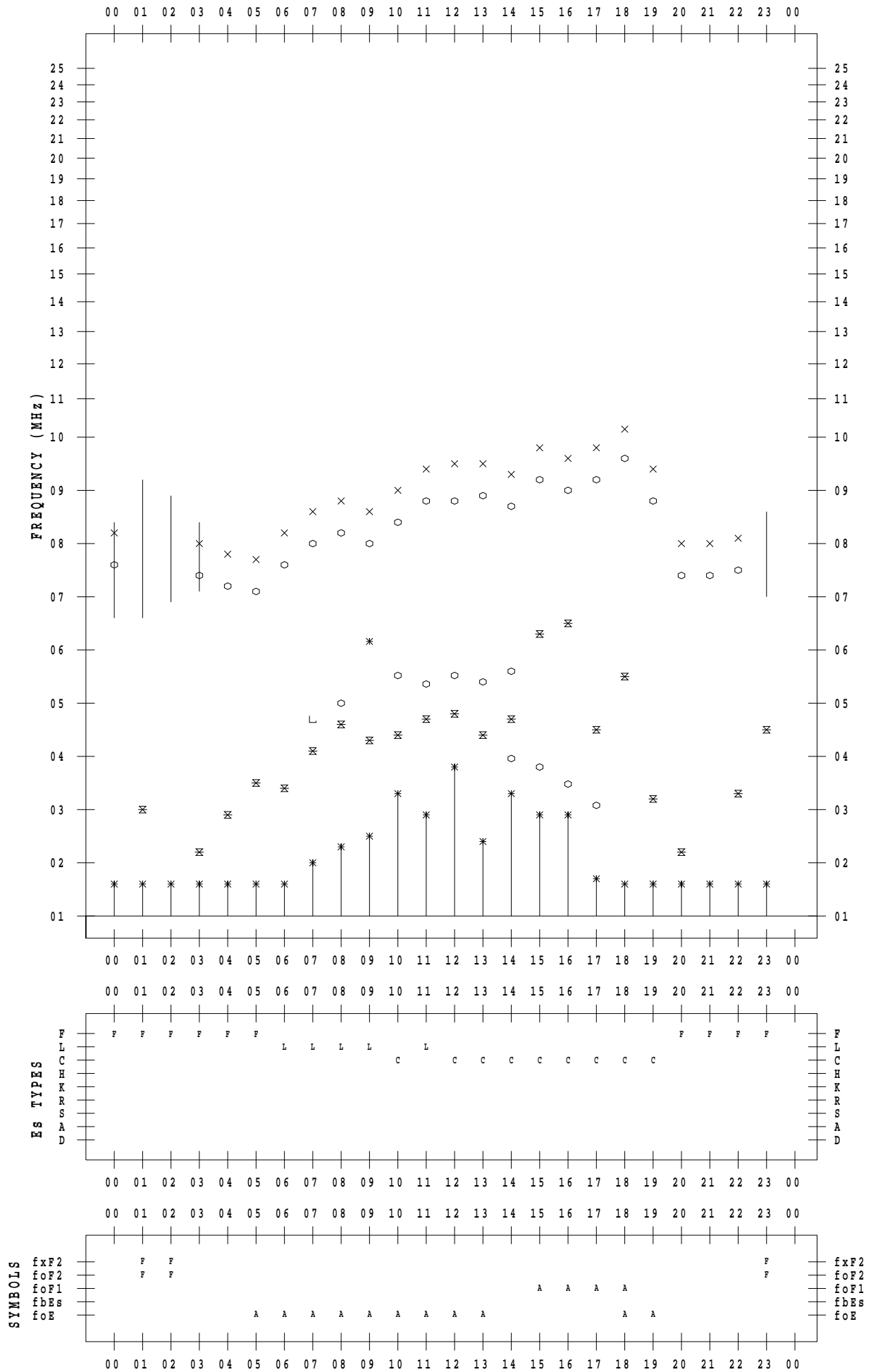
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SCALER :

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DATE : 2023 / 7 / 14

135 ° E MEAN TIME



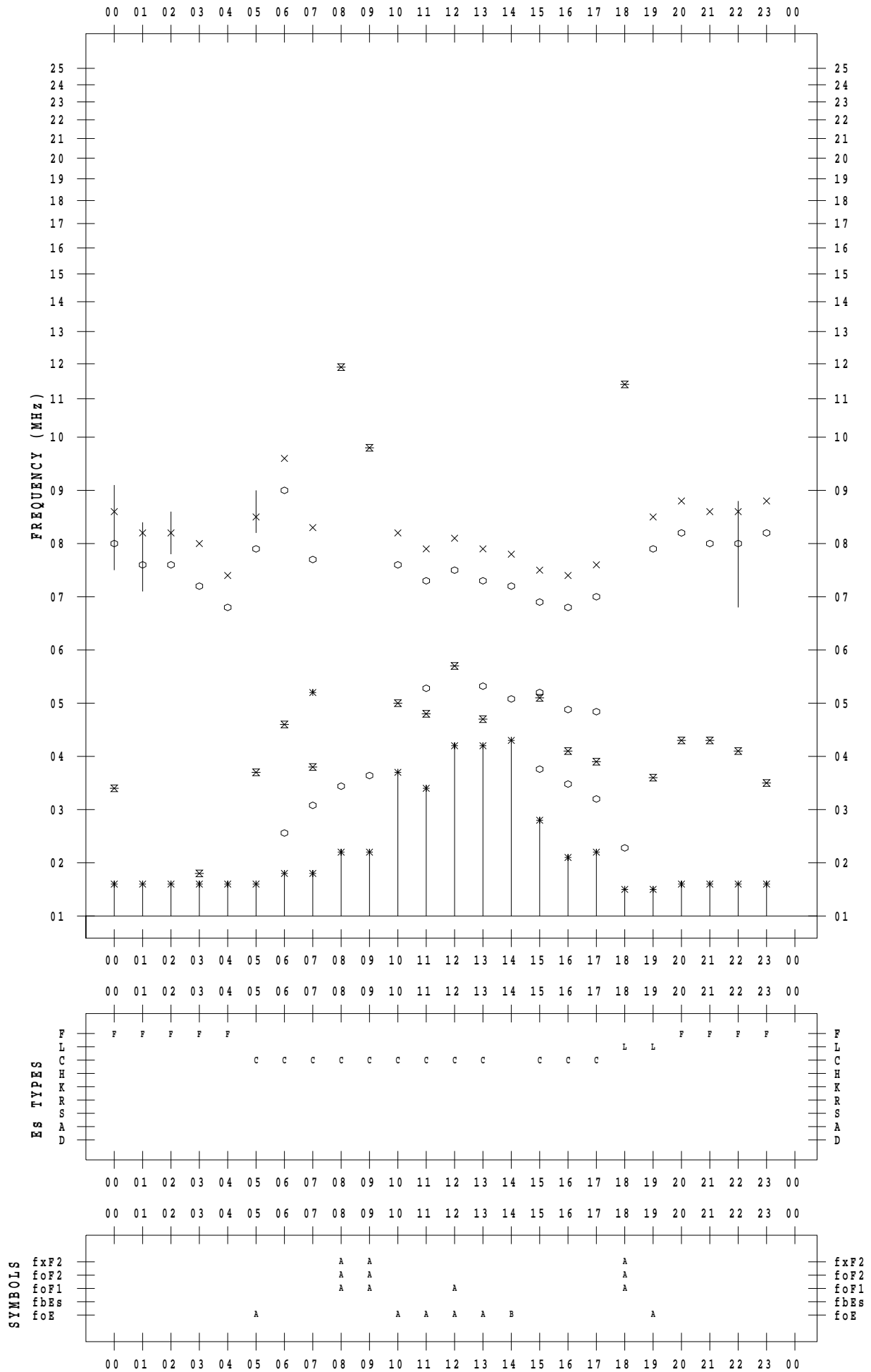
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 15

135 ° E MEAN TIME



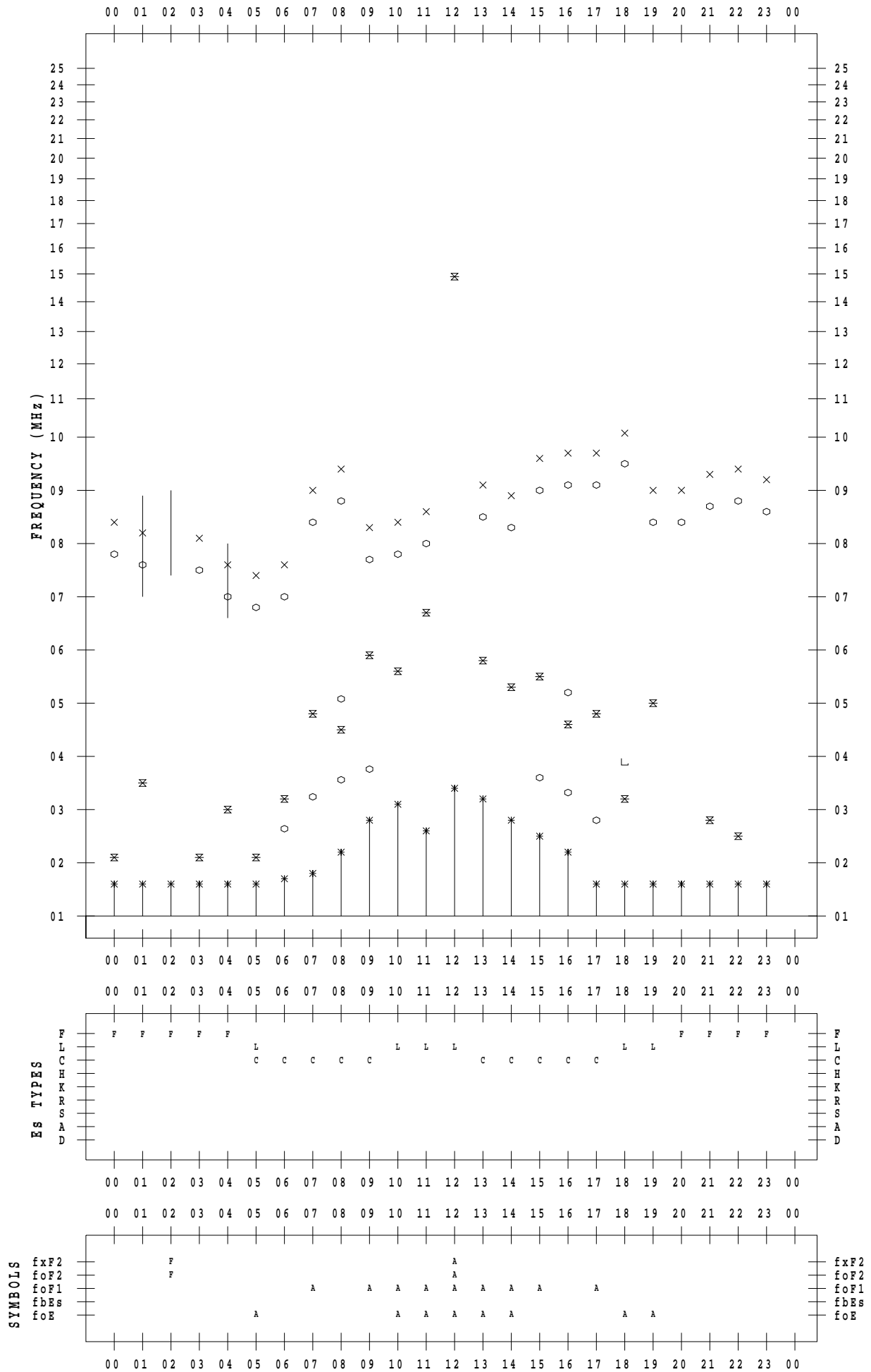
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SCALER :

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DATE : 2023 / 7 / 16

135 ° E MEAN TIME



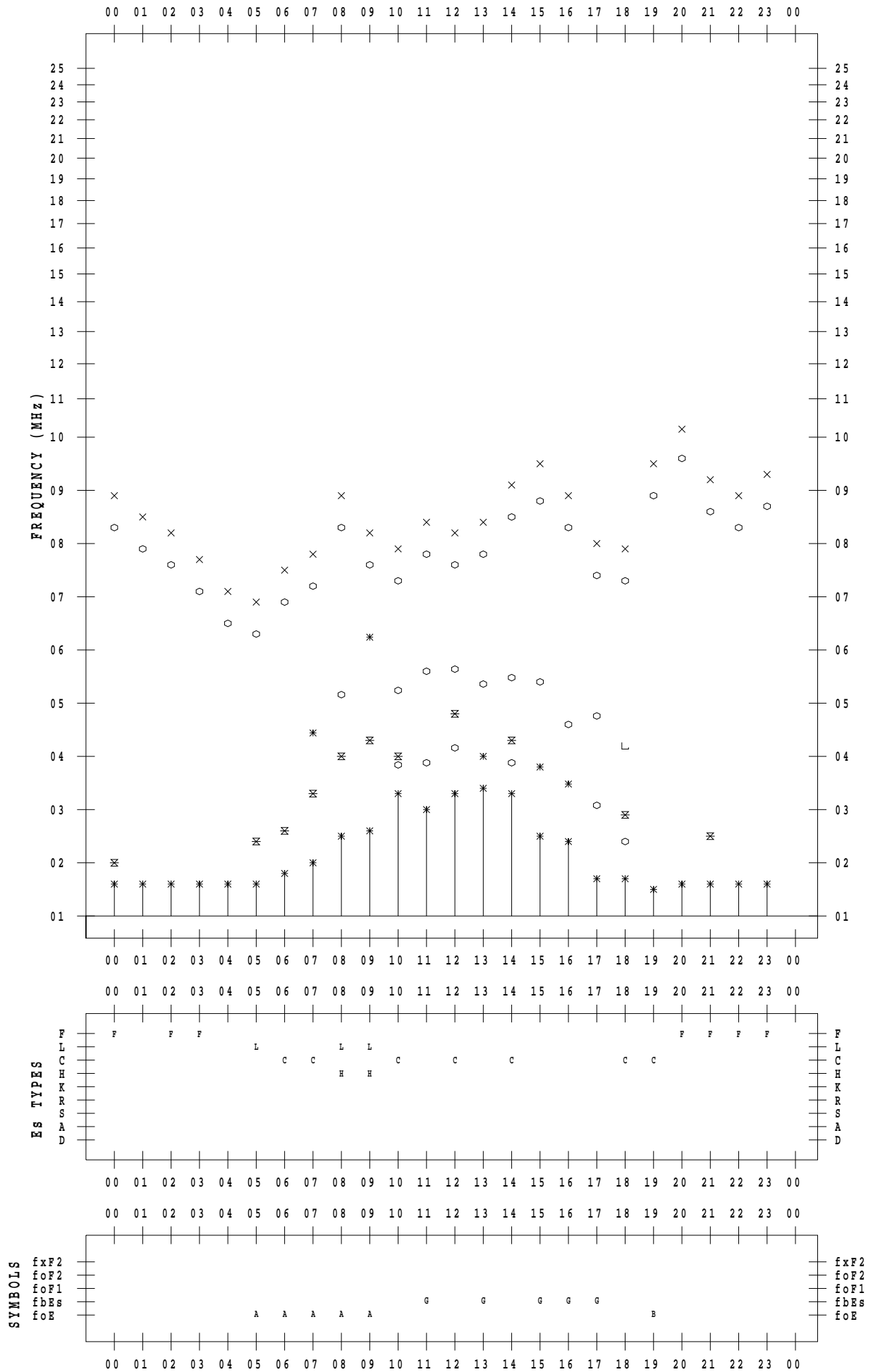
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 17

135 ° E MEAN TIME



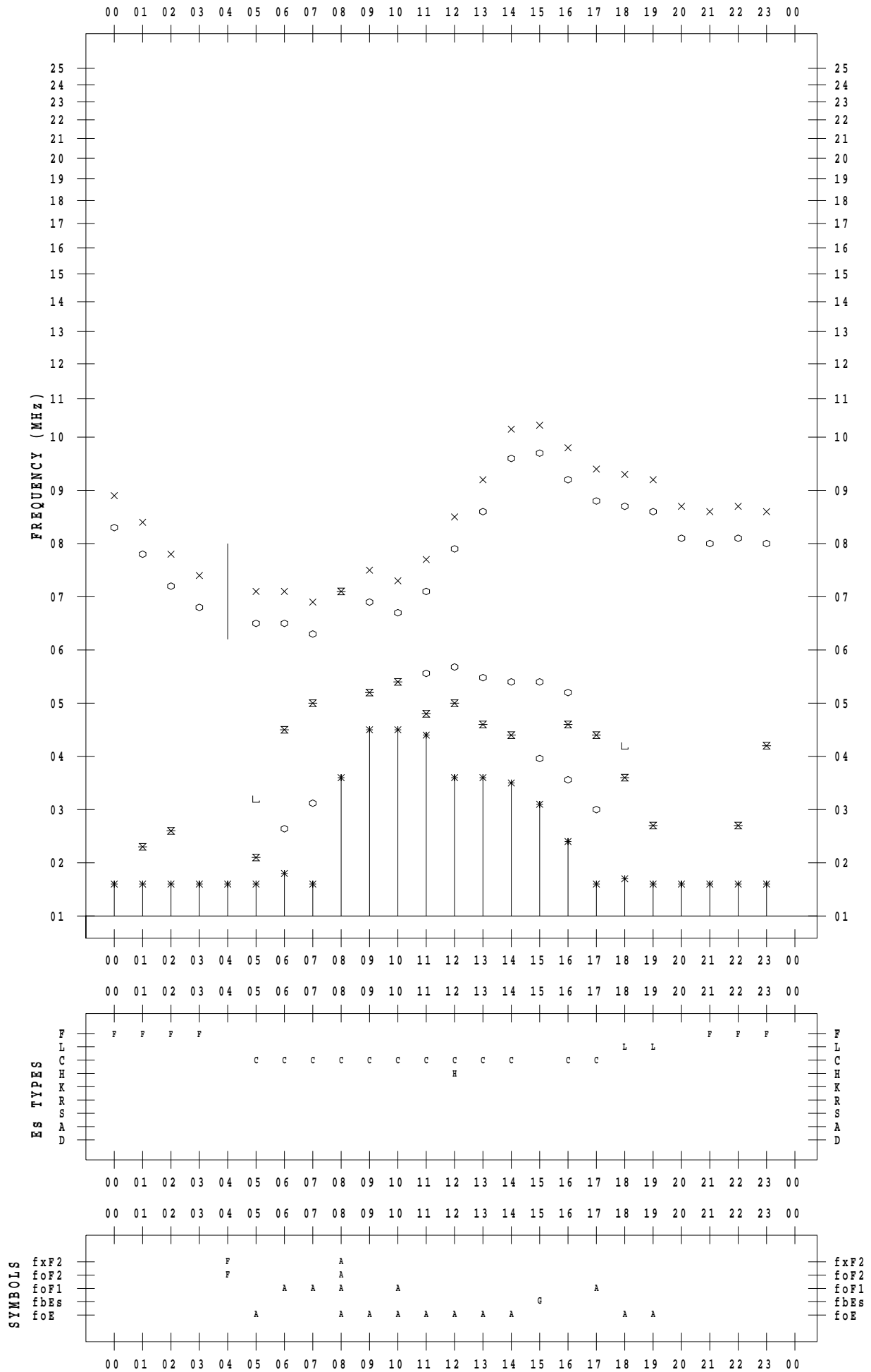
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SCALER :

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DATE : 2023 / 7 / 18

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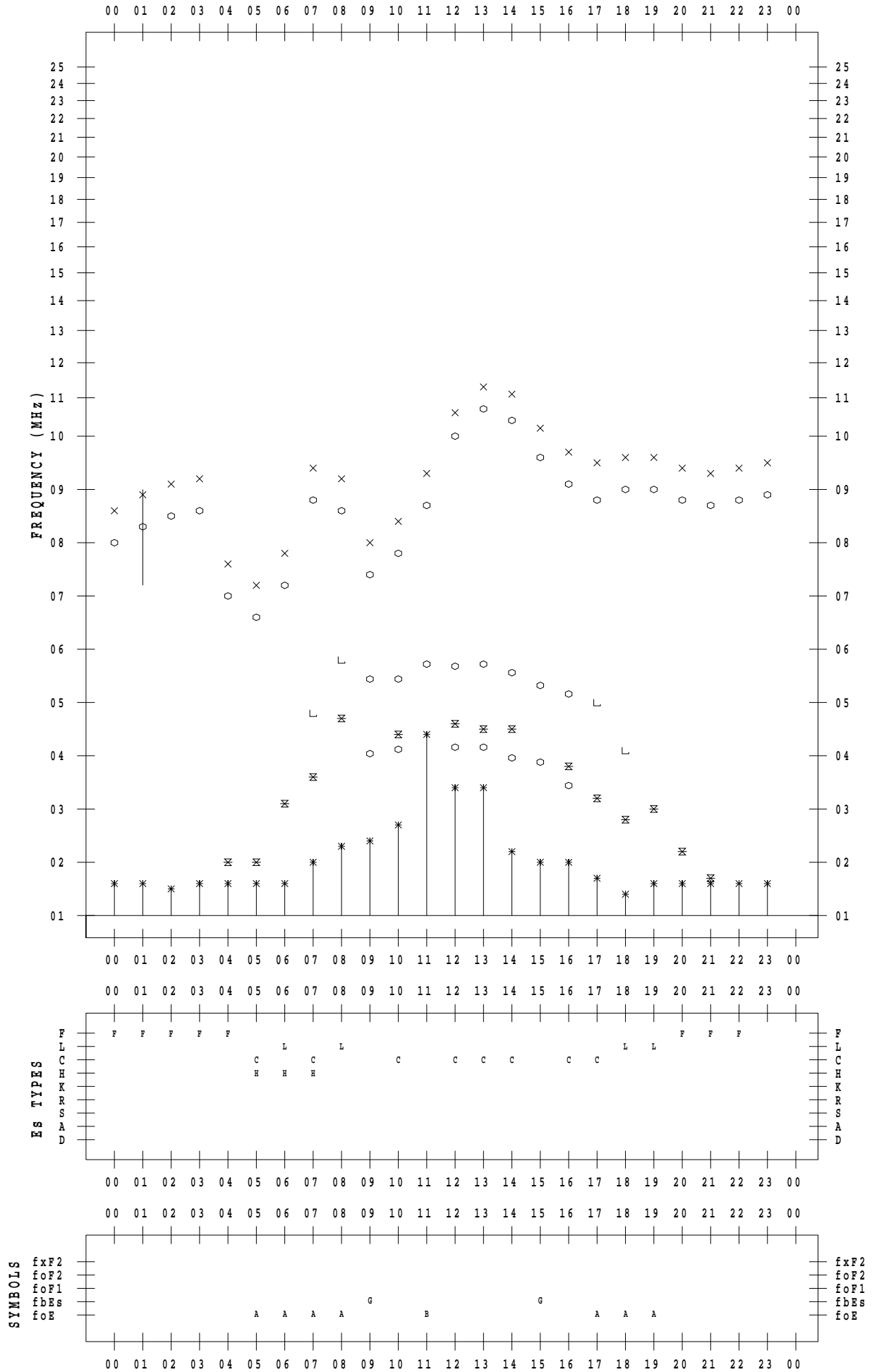
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SCALER :

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DATE : 2023 / 7 / 19

135 ° E MEAN TIME



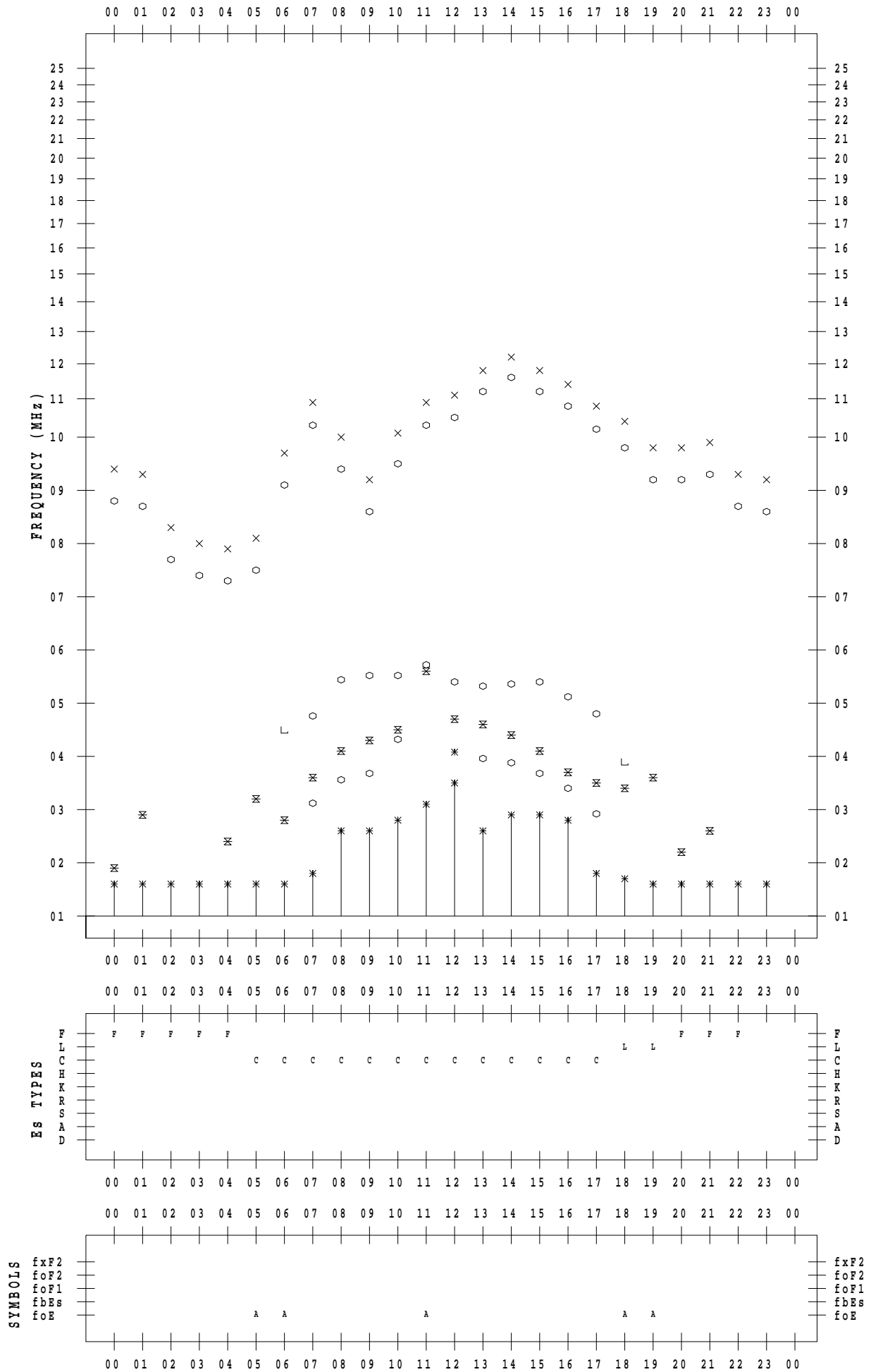
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DATE : 2023 / 7 / 20

135 ° E MEAN TIME



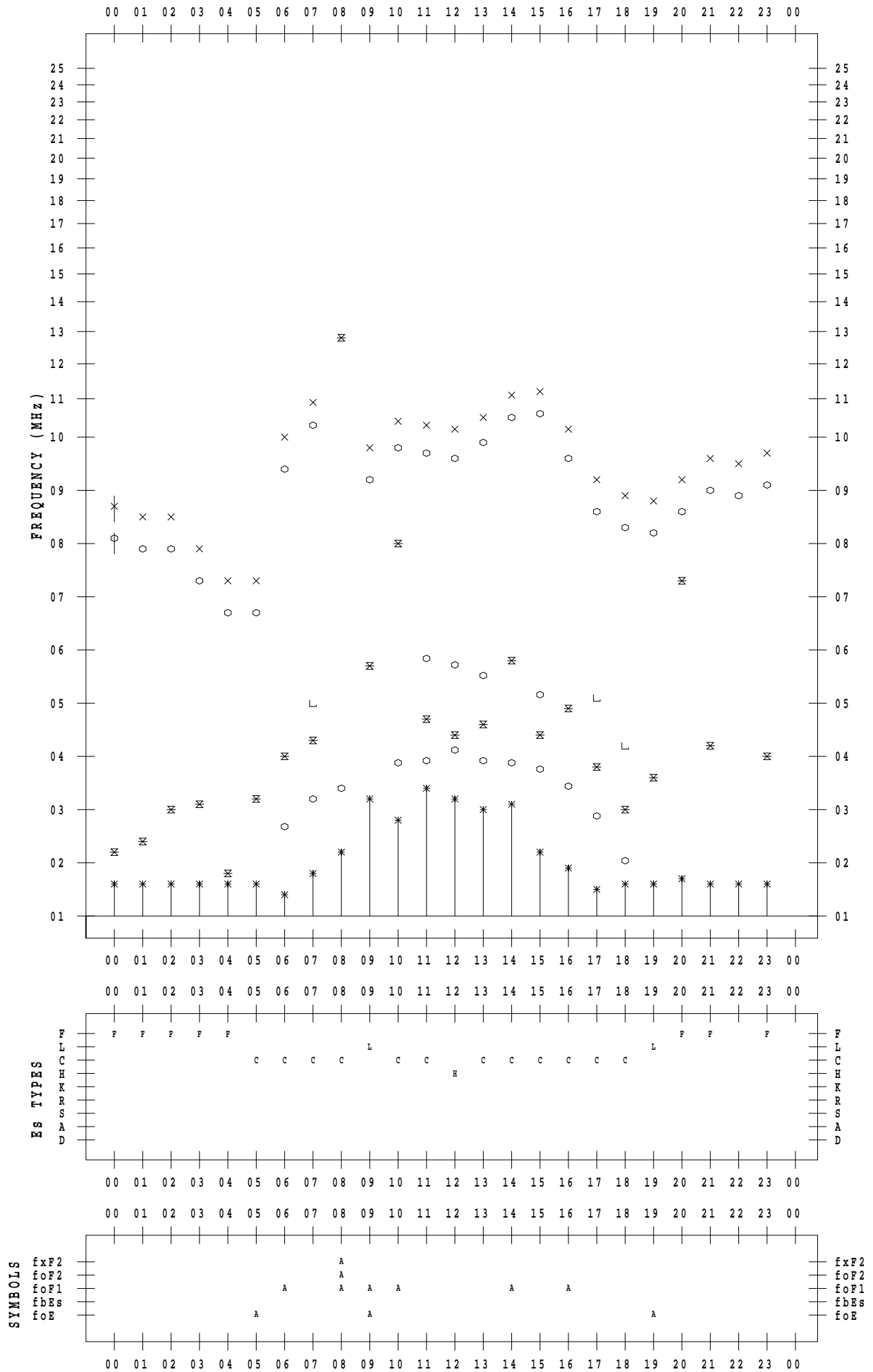
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 21

135 ° E MEAN TIME





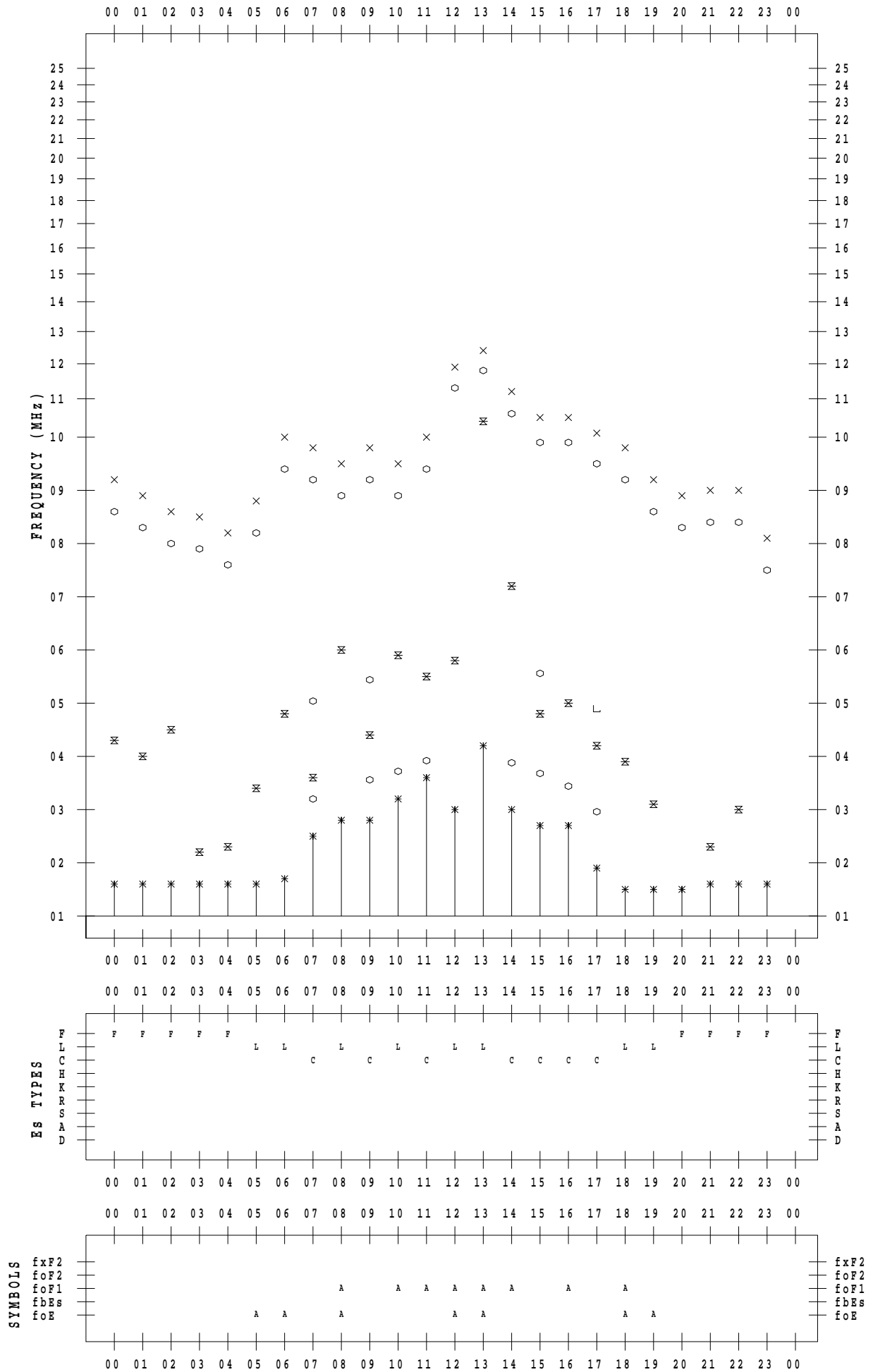
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 22

135 ° E MEAN TIME



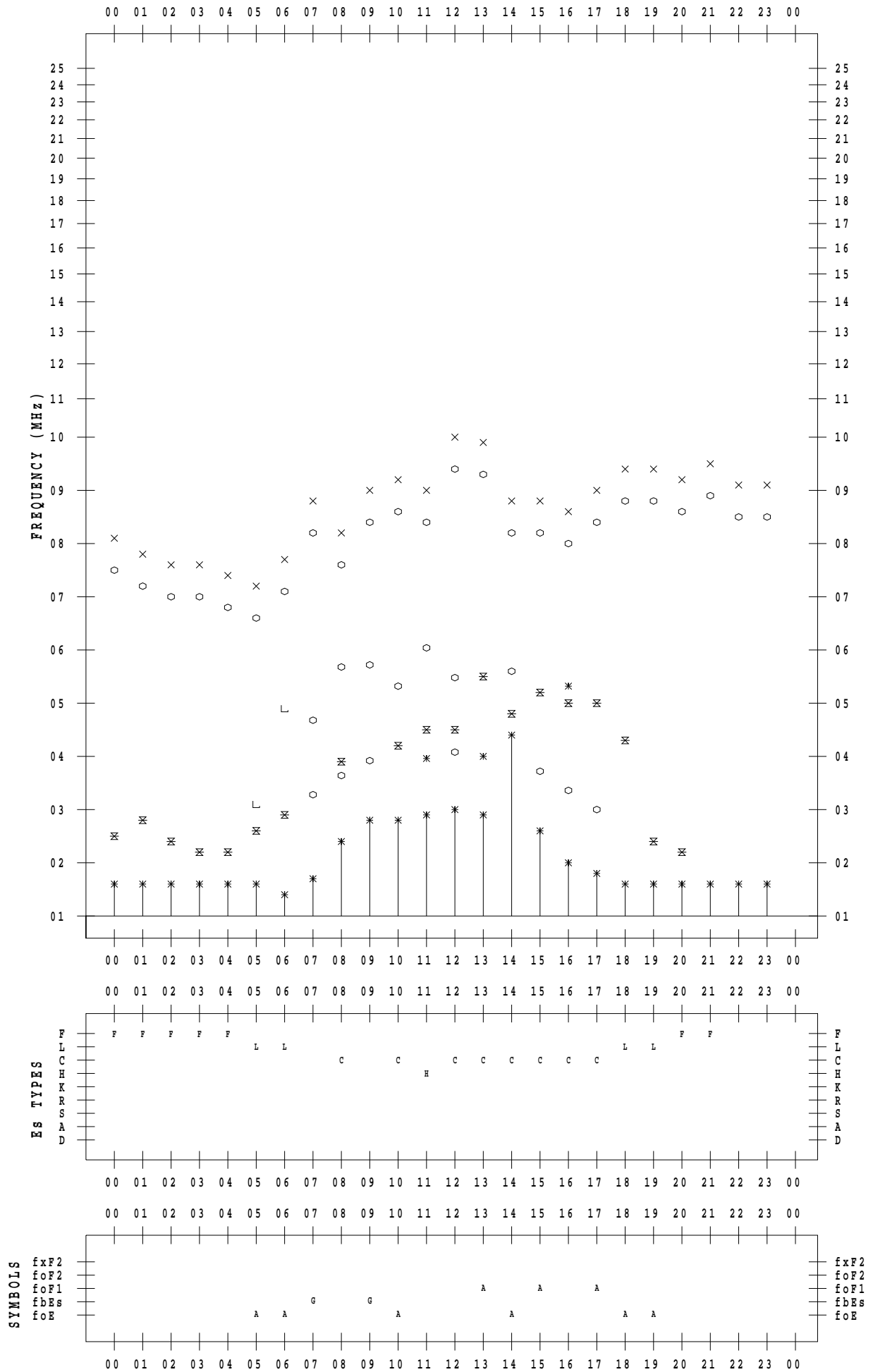
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 23

135 ° E MEAN TIME



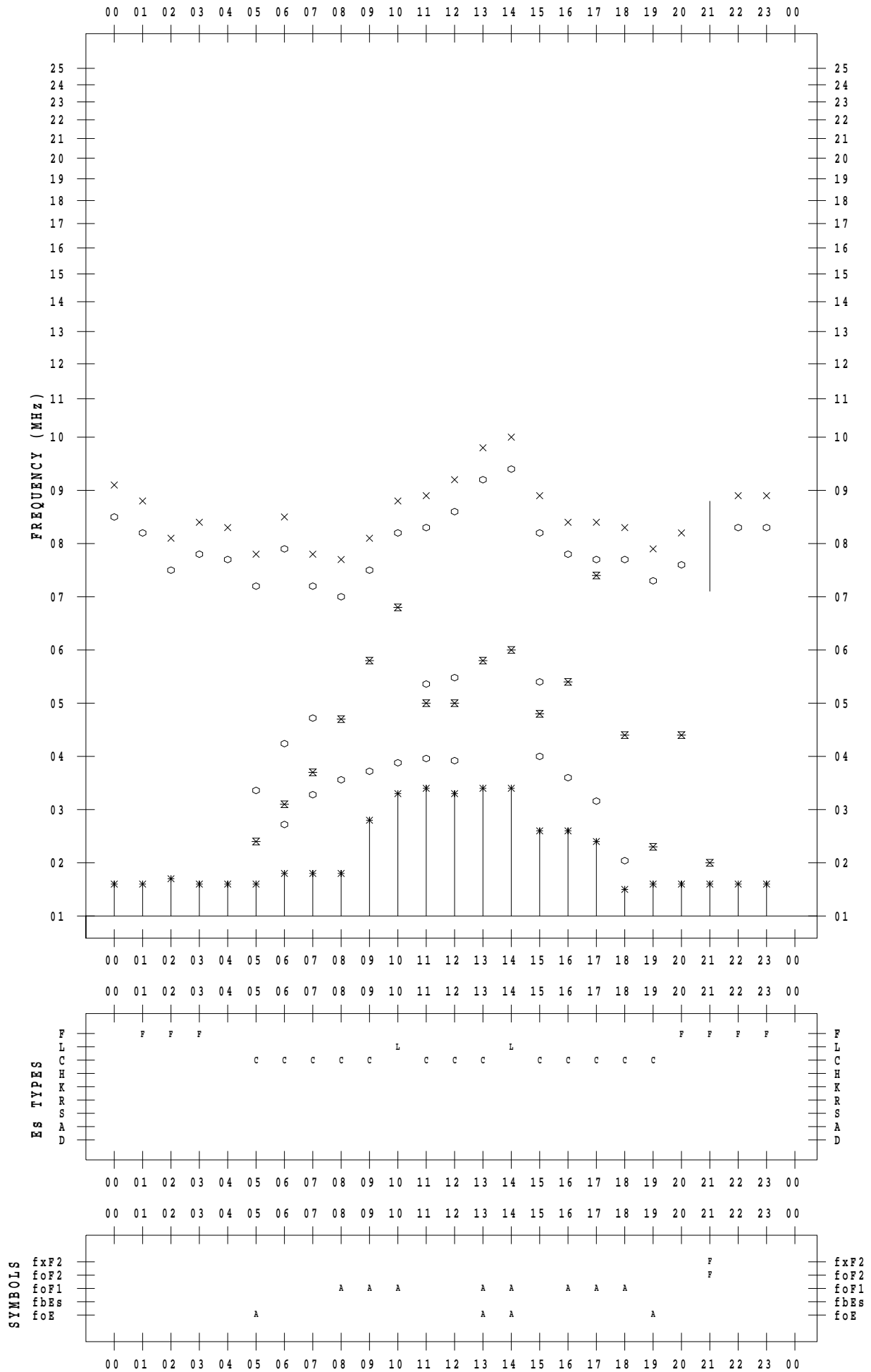
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 24

135 ° E MEAN TIME



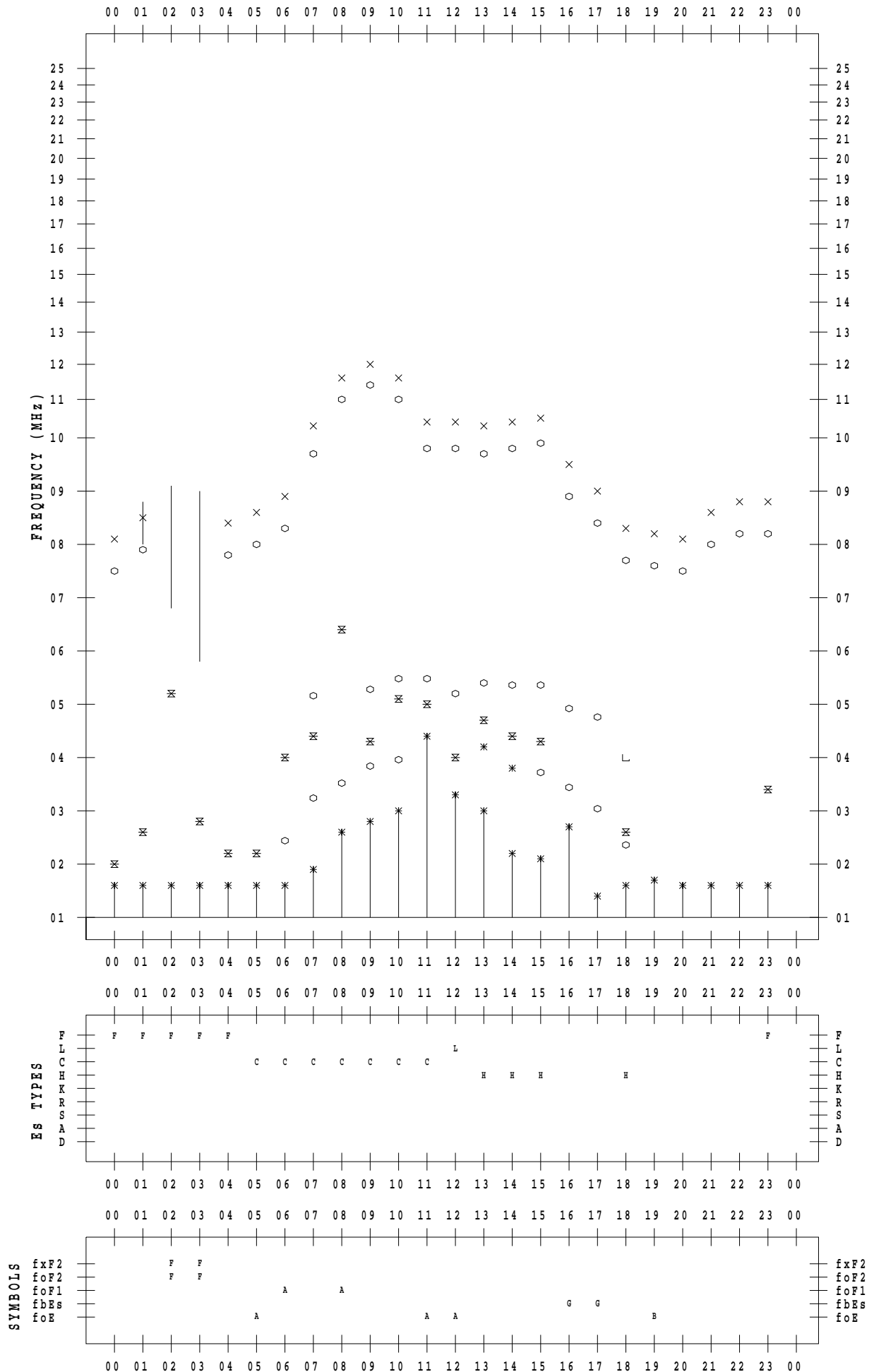
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 25

135 ° E MEAN TIME



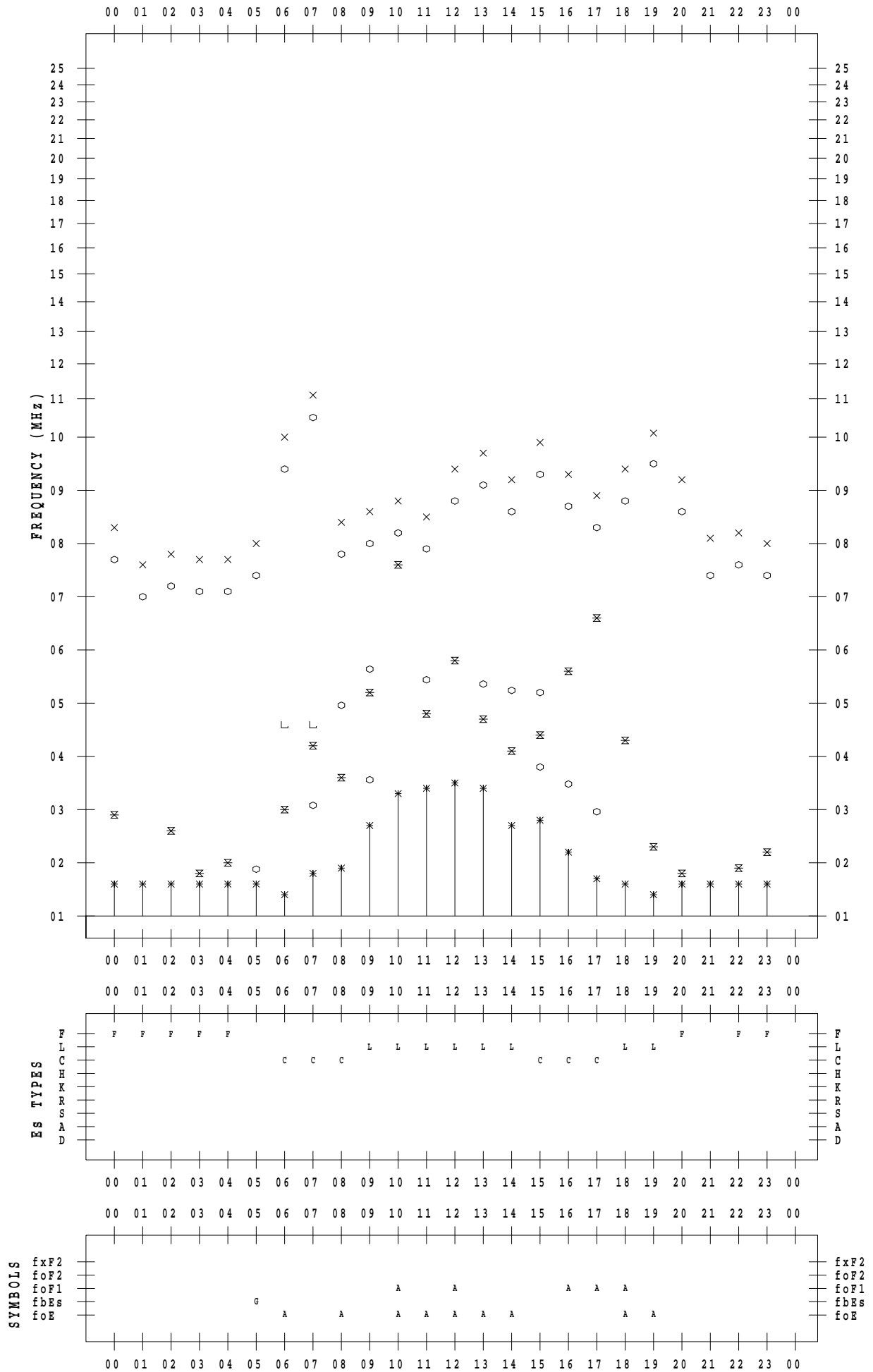
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 26

135 ° E MEAN TIME



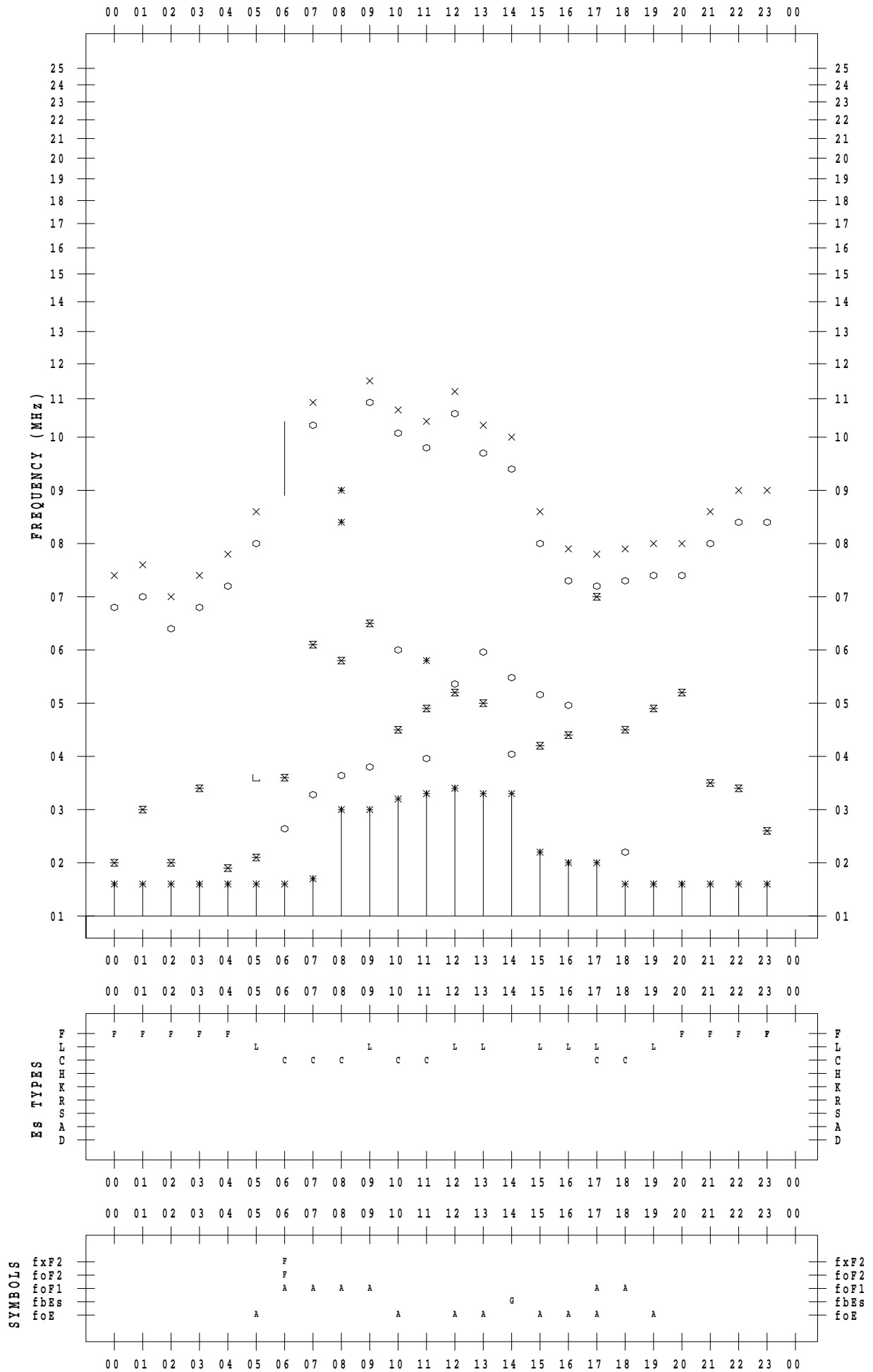
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 27

135 ° E MEAN TIME



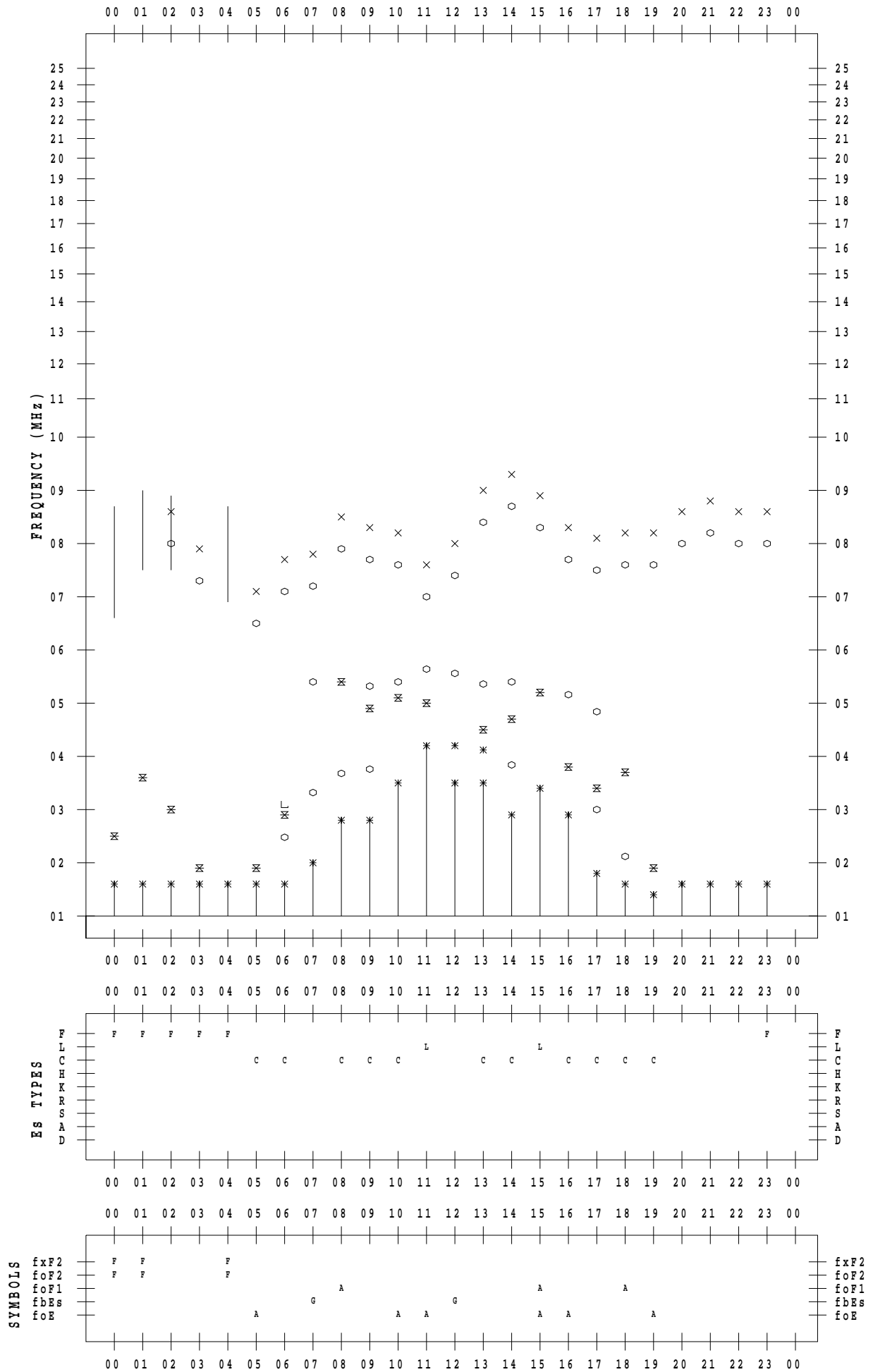
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 28

135 ° E MEAN TIME



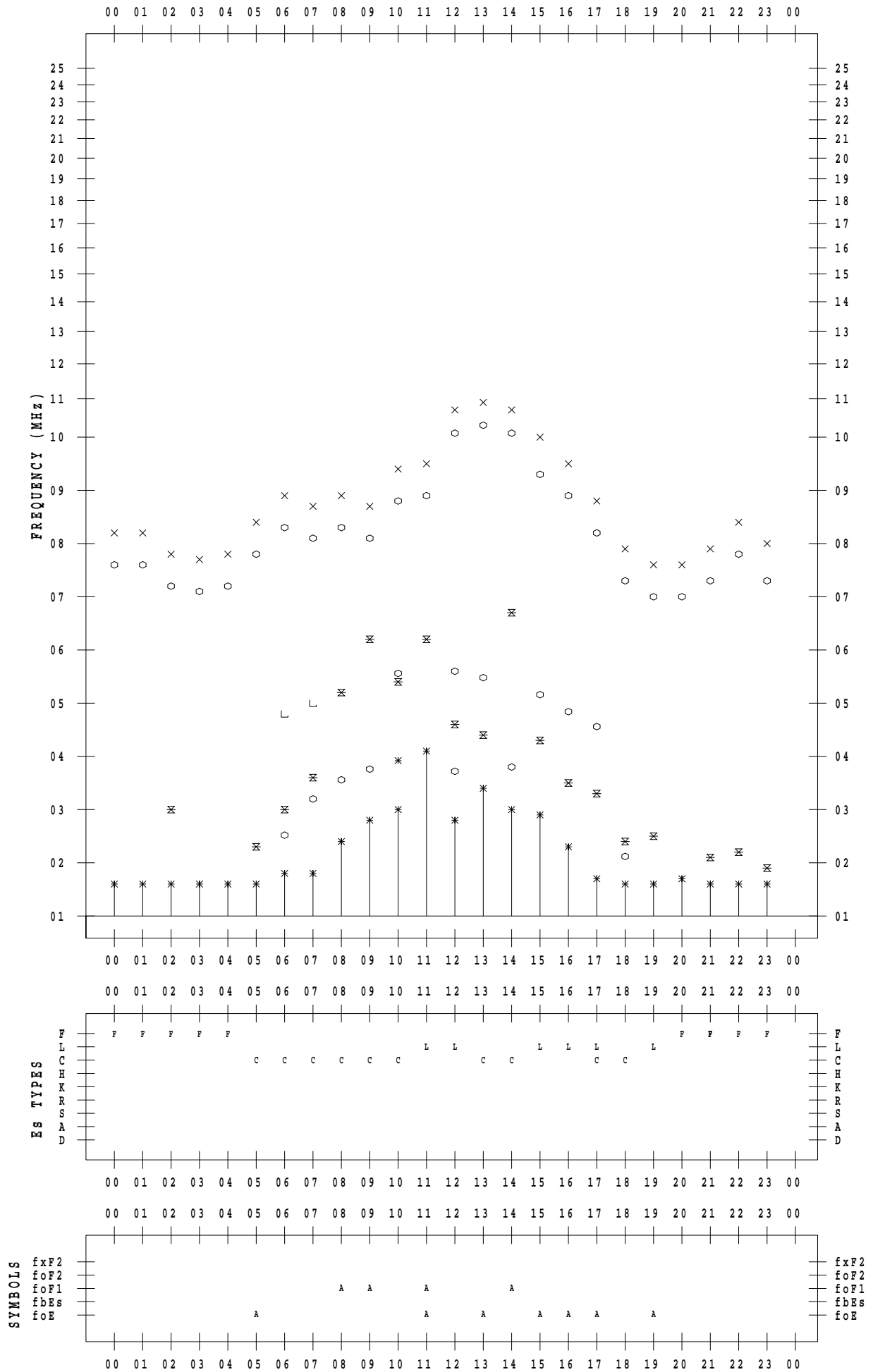
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 29

135 ° E MEAN TIME





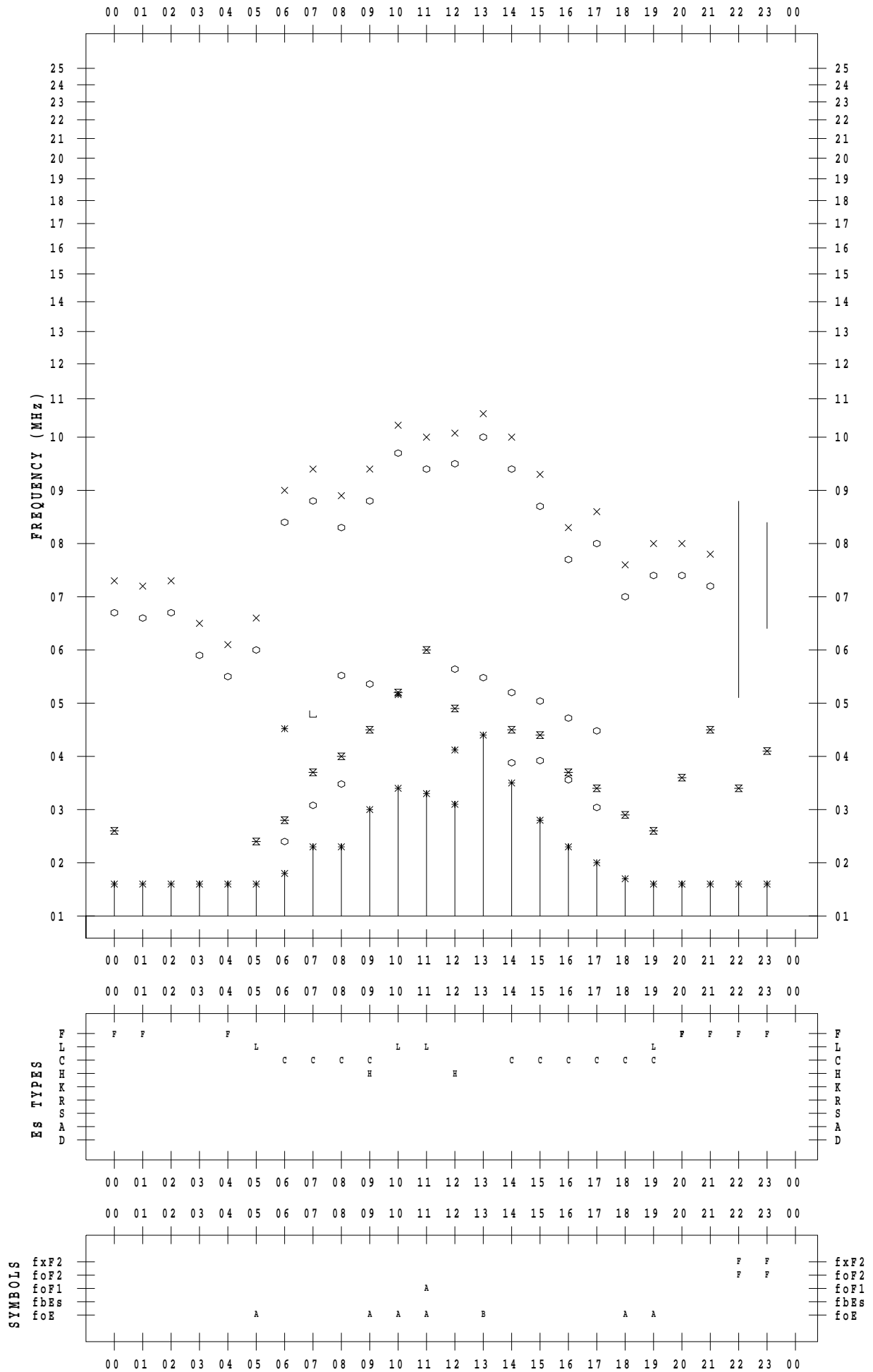
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 30

135 ° E MEAN TIME



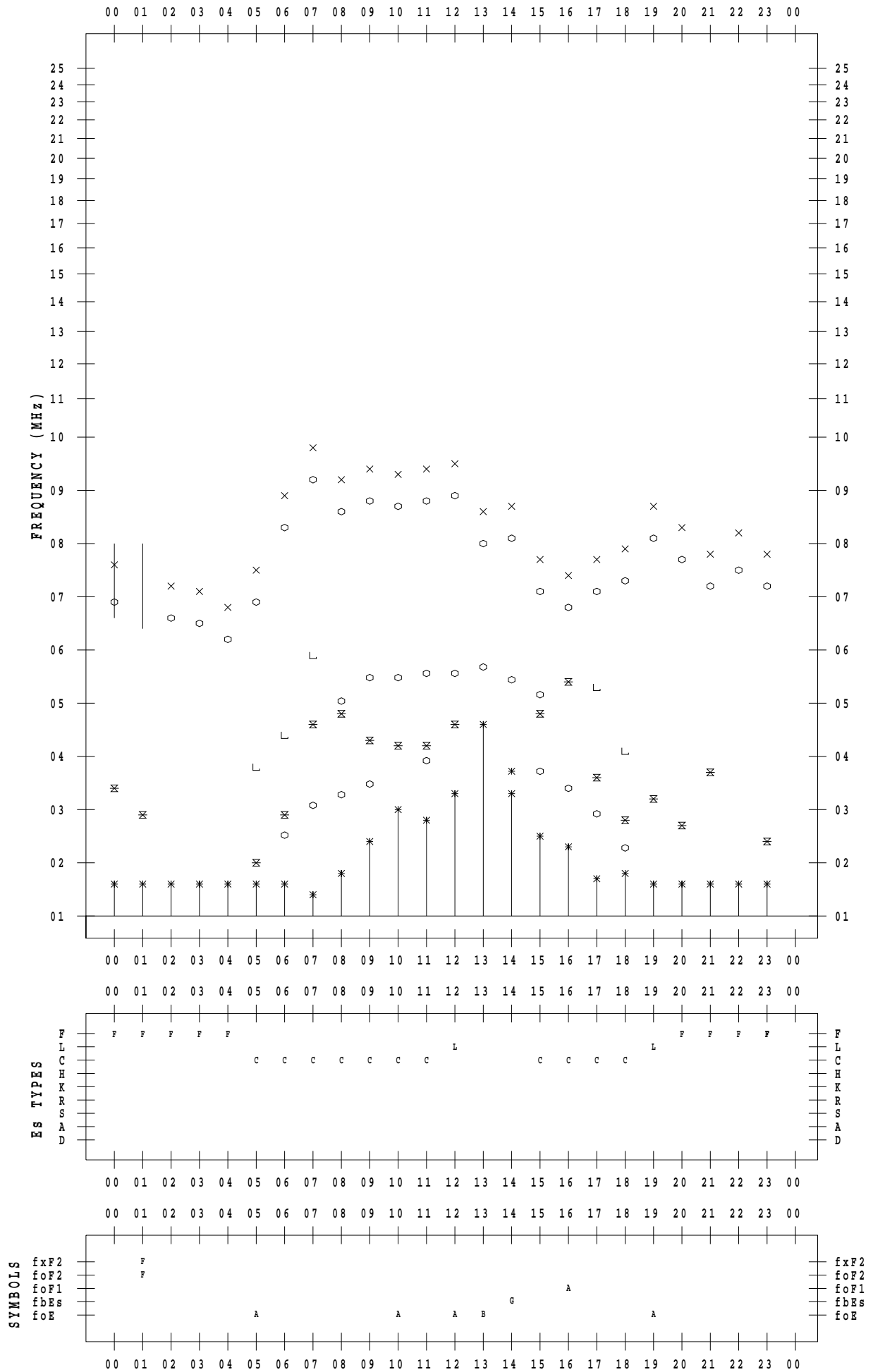
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SCALER :

STATION : Kokubunji

DATE : 2023 / 7 / 31

135 ° E MEAN TIME



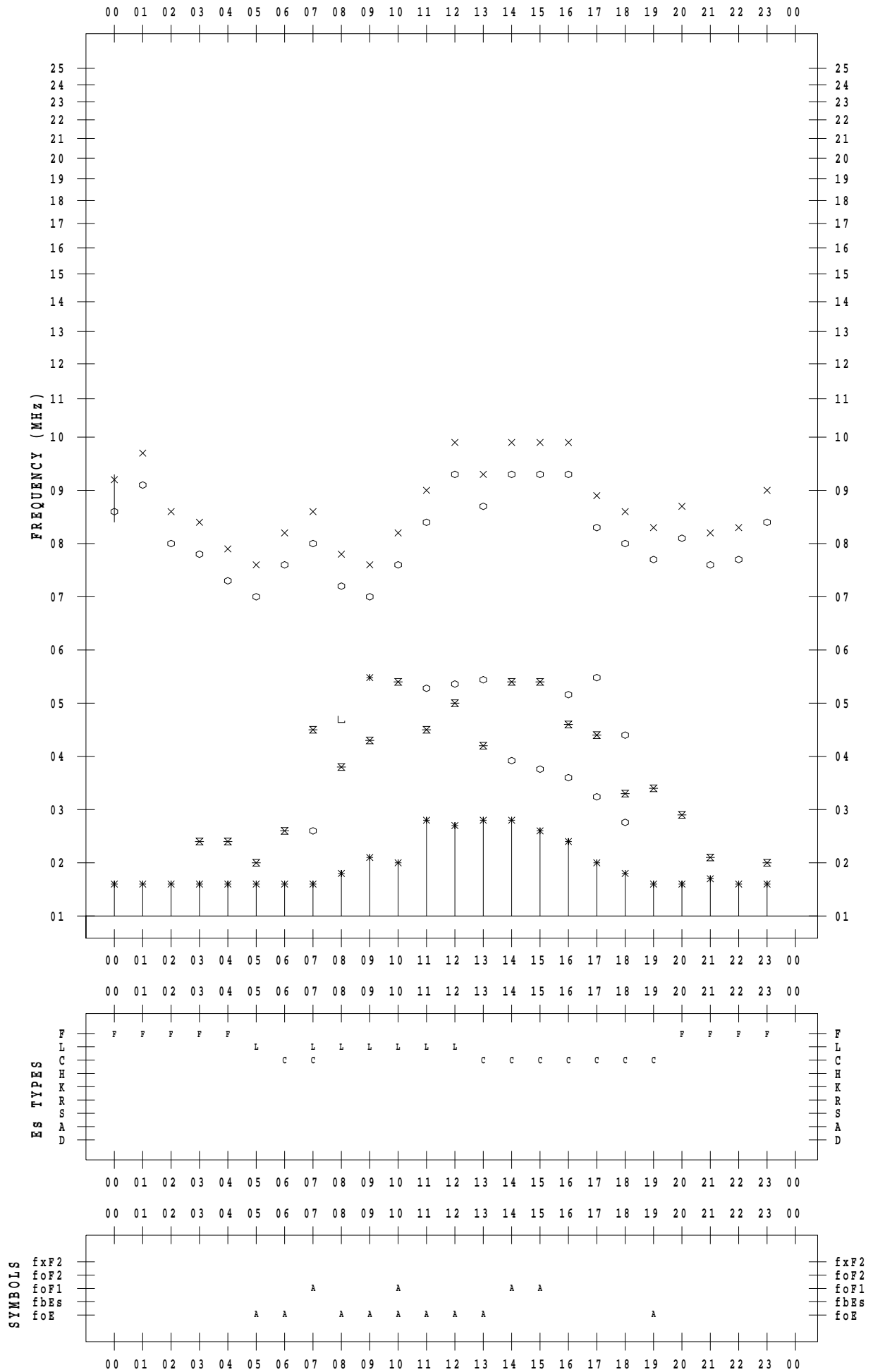
# f - PLOT DATA

SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 1

135 ° E MEAN TIME



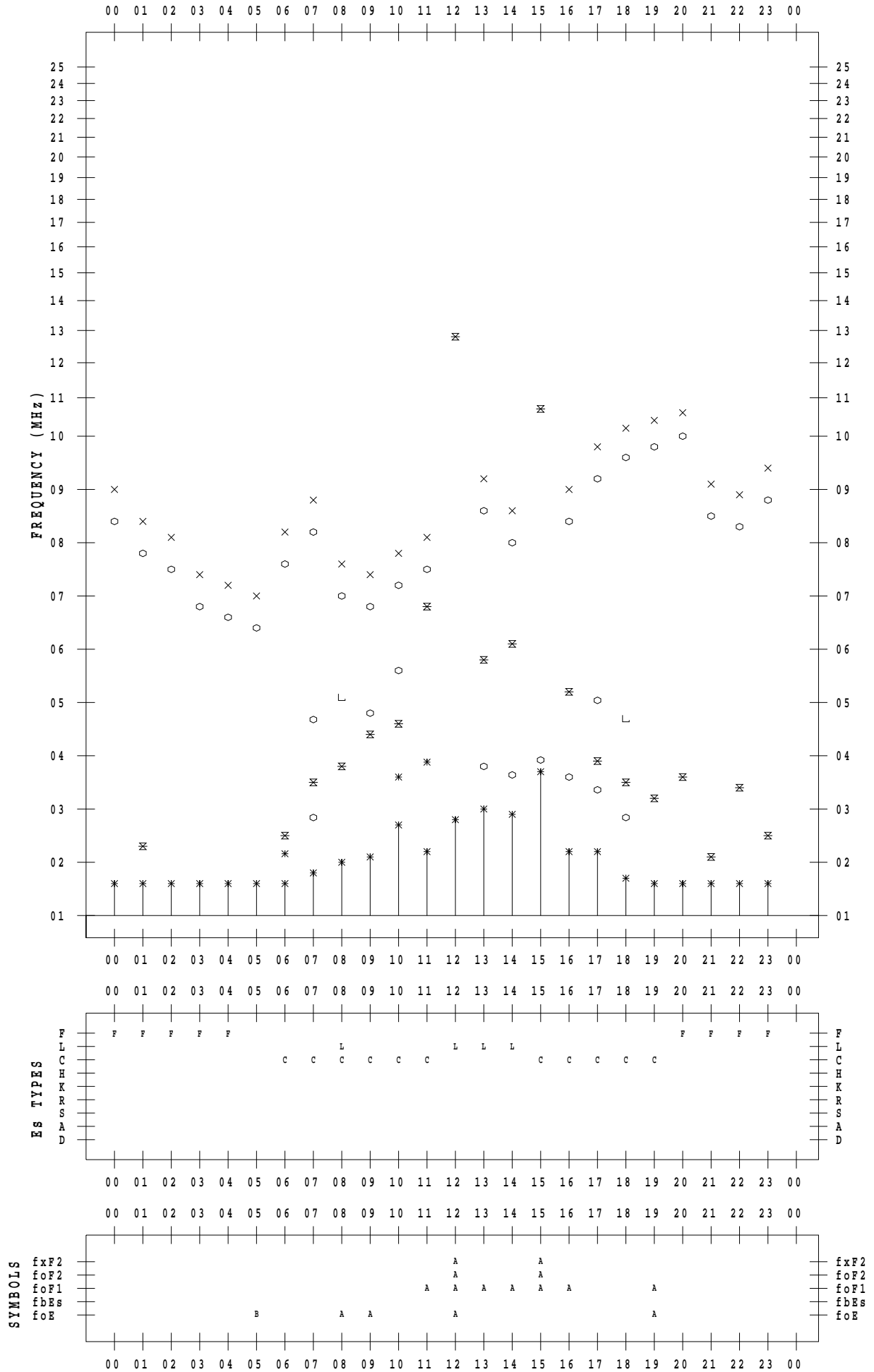
# f - PLOT DATA

SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 2

135 ° E MEAN TIME



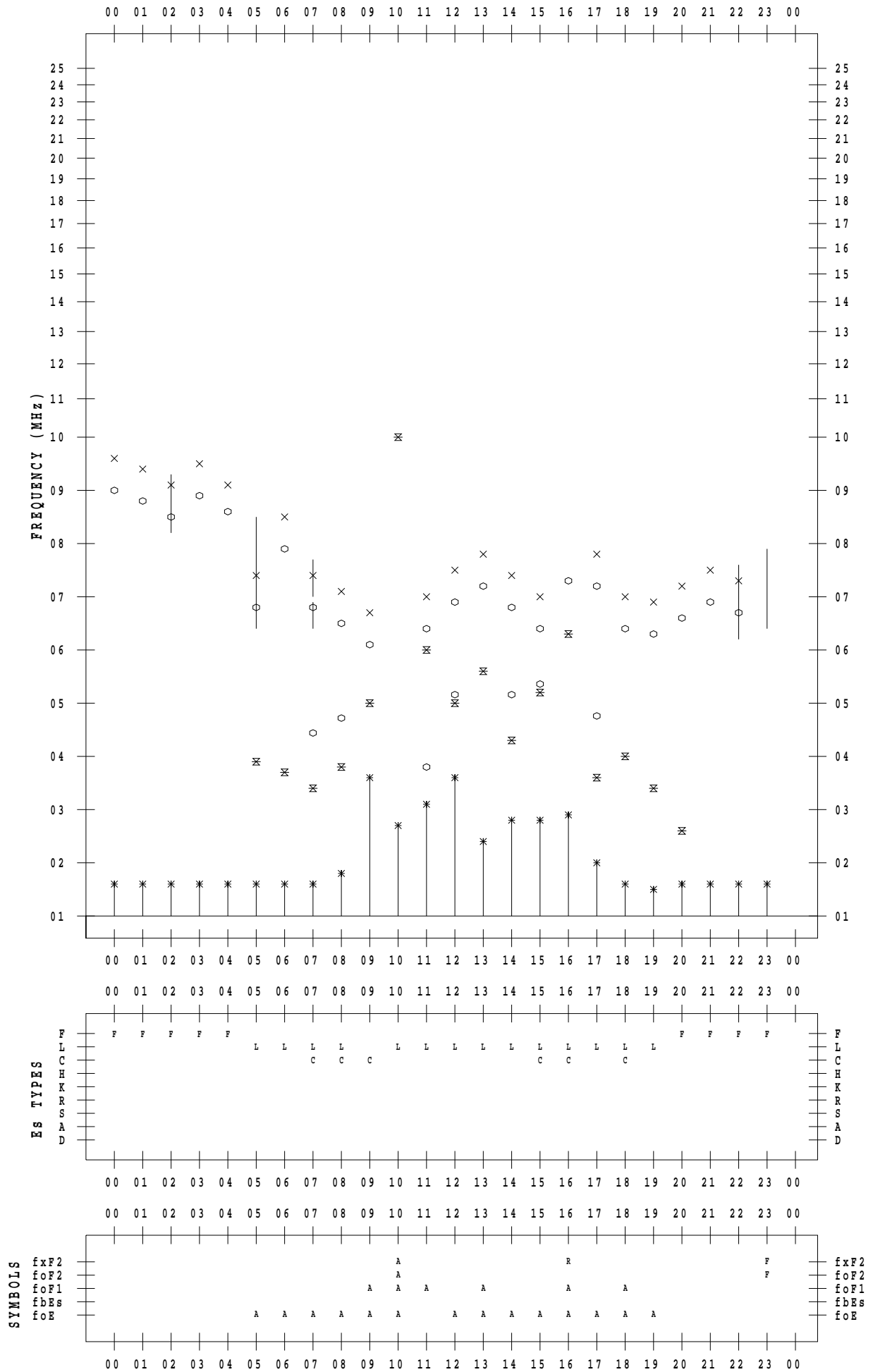
# f - PLOT DATA

SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 3

135 ° E MEAN TIME



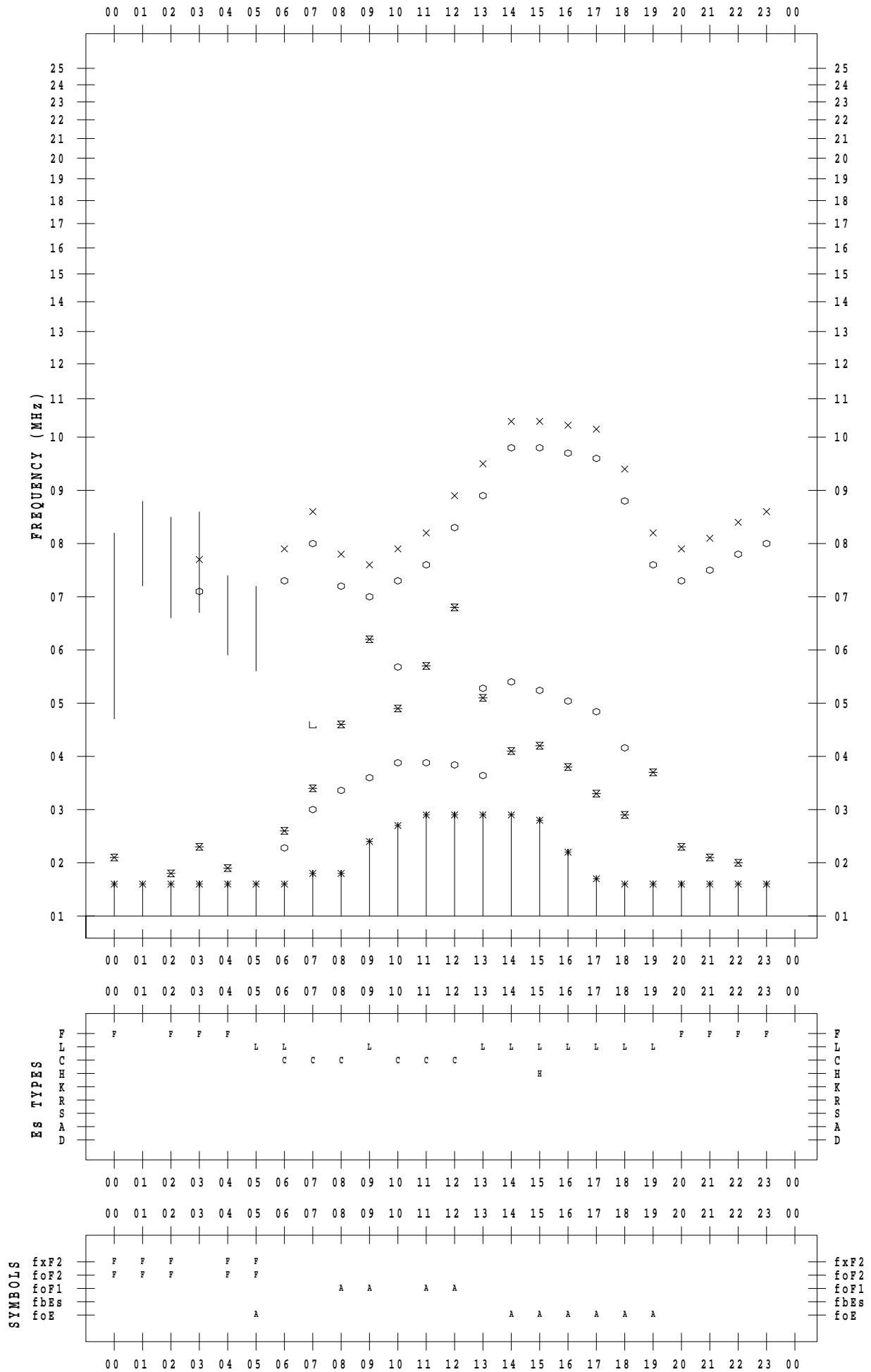
# f - PLOT DATA

SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 4

135 ° E MEAN TIME



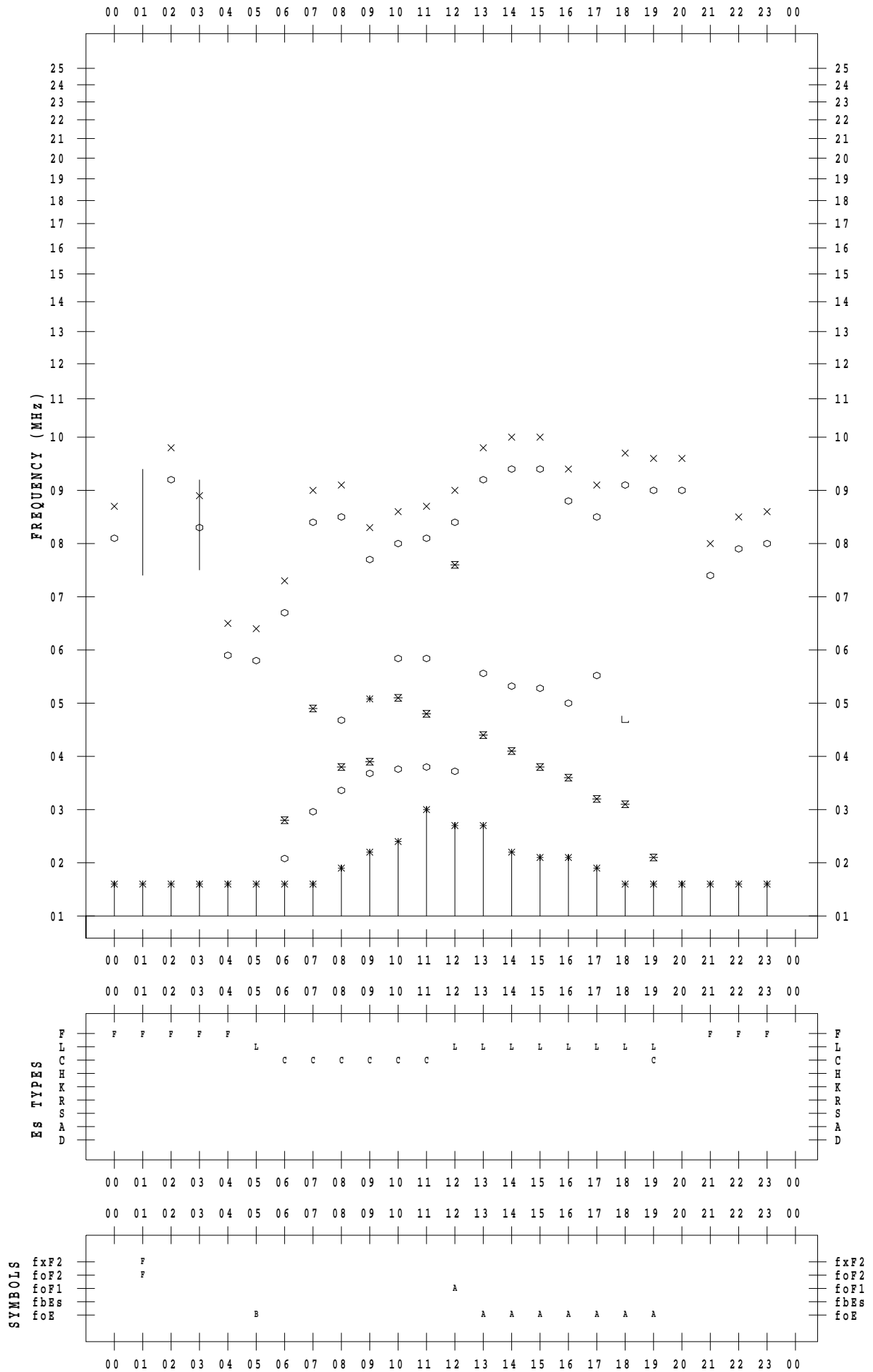
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 5

135 ° E MEAN TIME



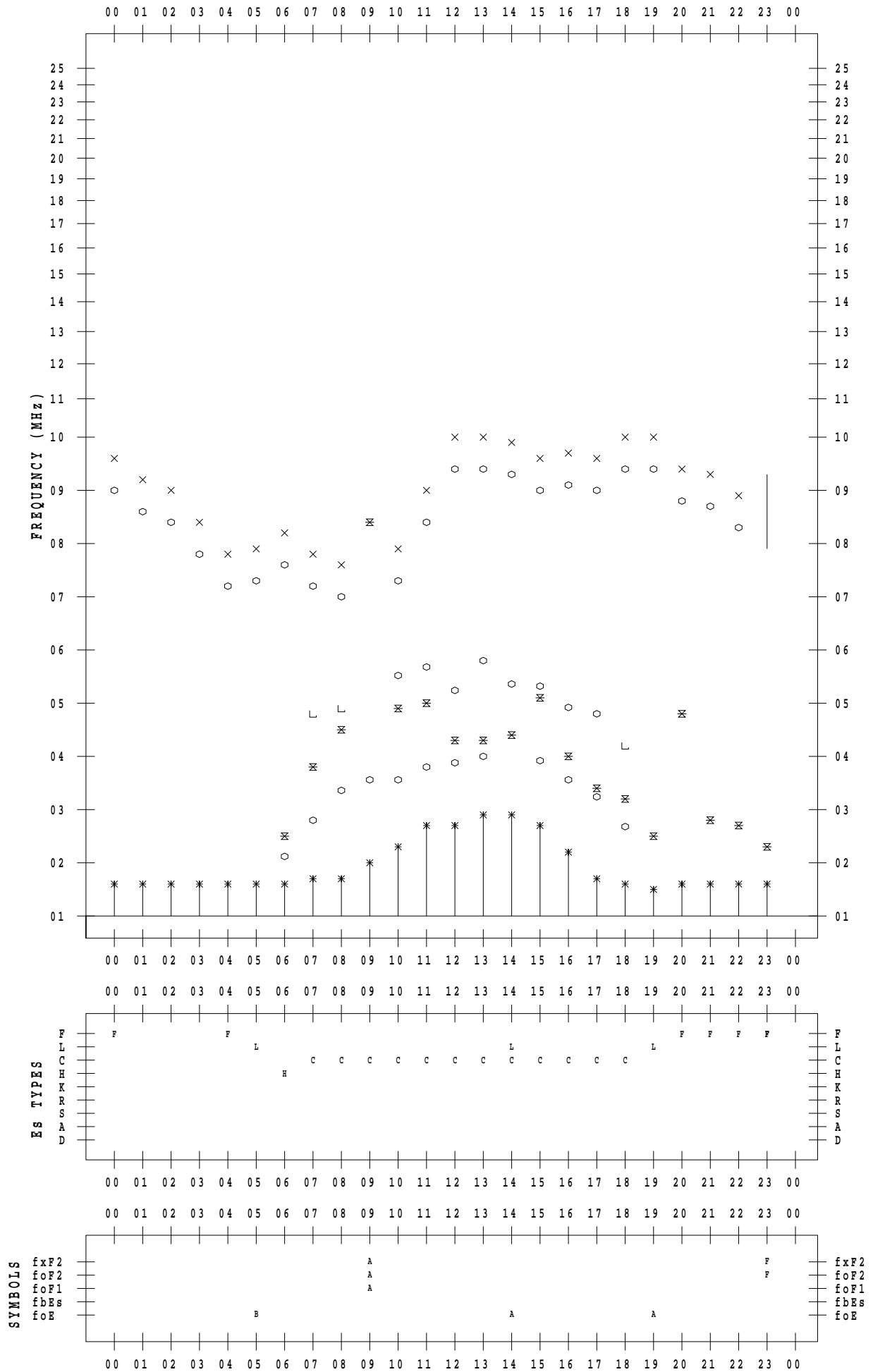
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 6

135 ° E MEAN TIME





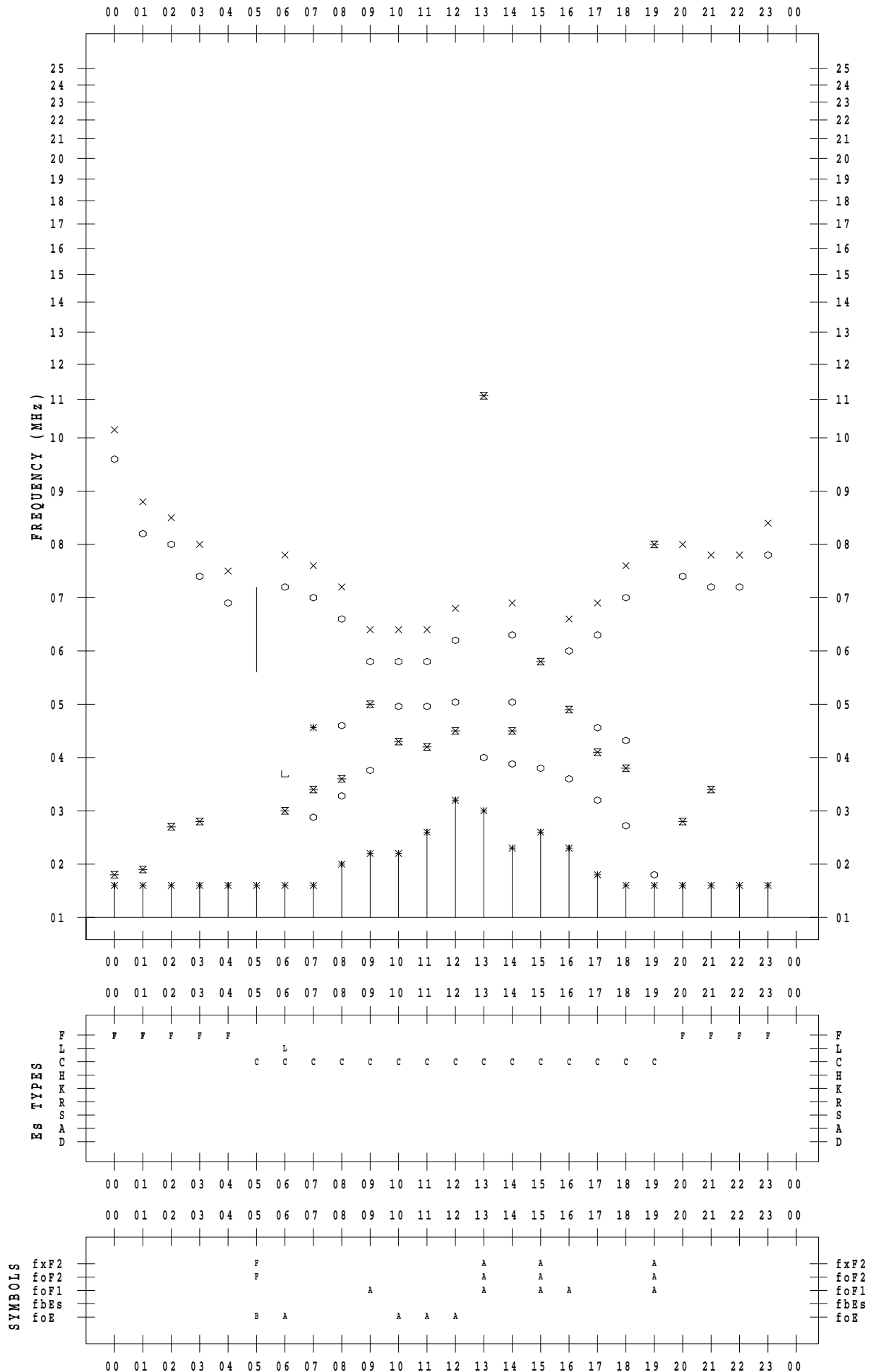
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 7

135 ° E MEAN TIME



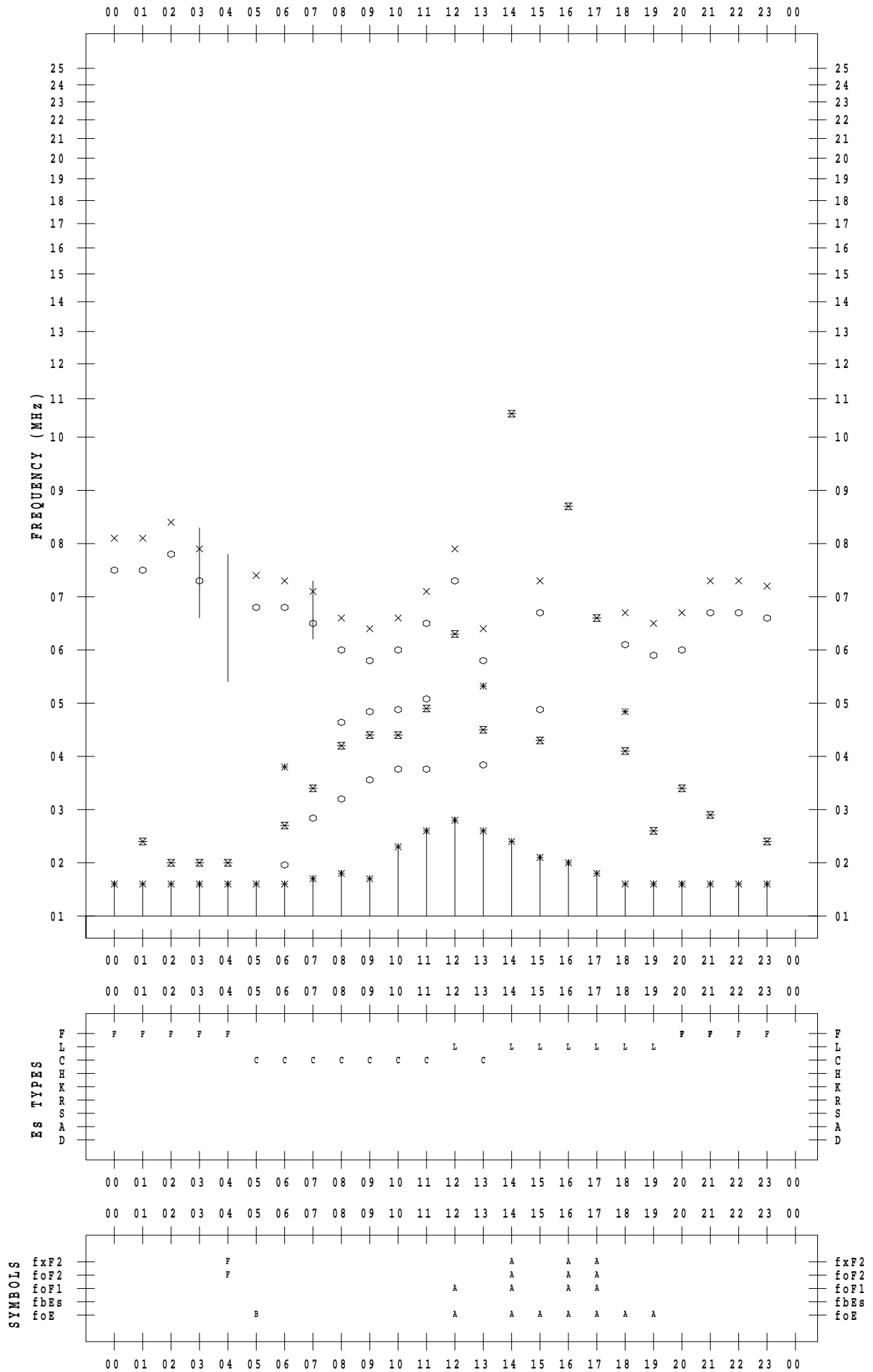
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 8

135 ° E MEAN TIME



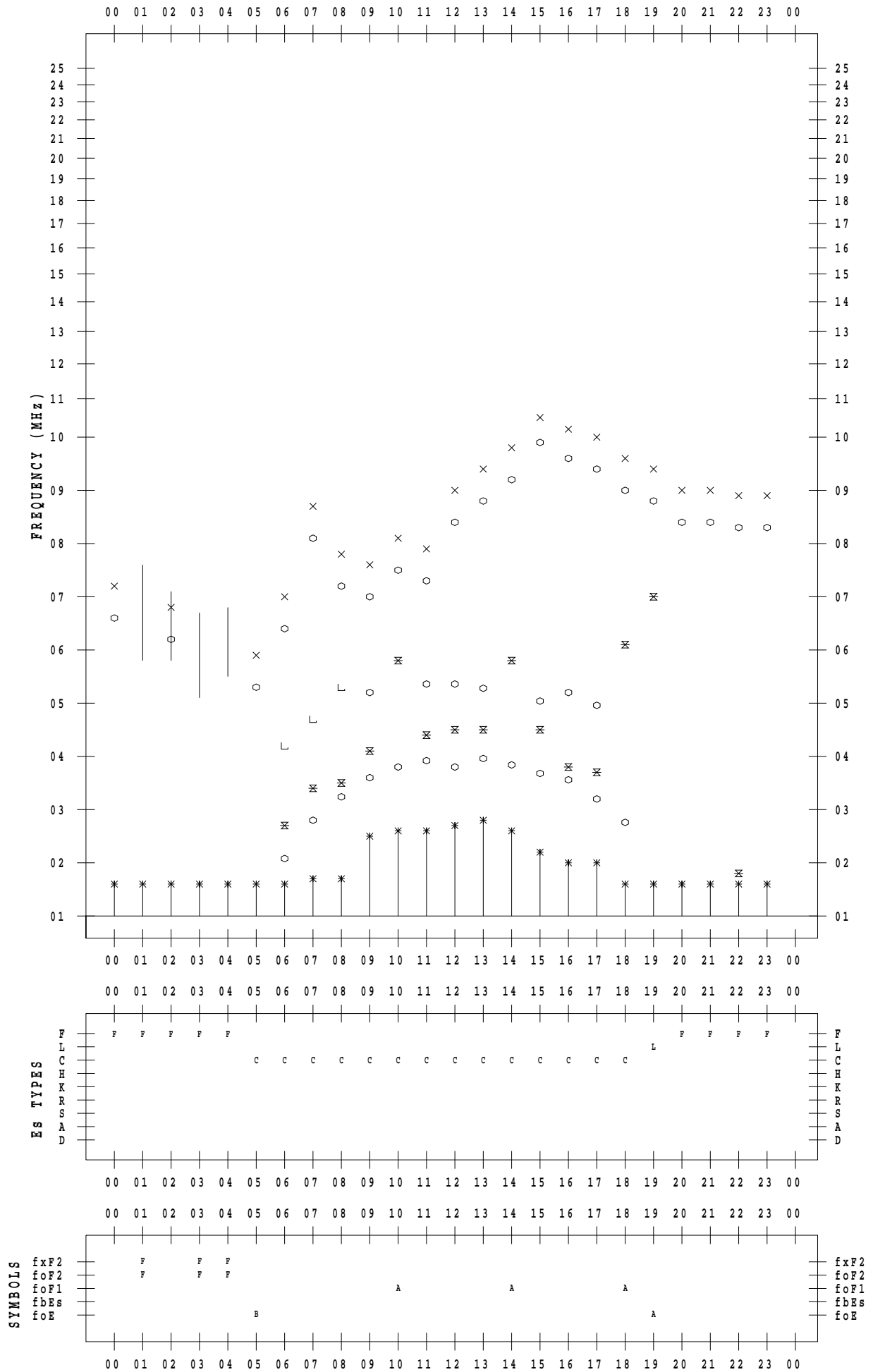
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 9

135 ° E MEAN TIME



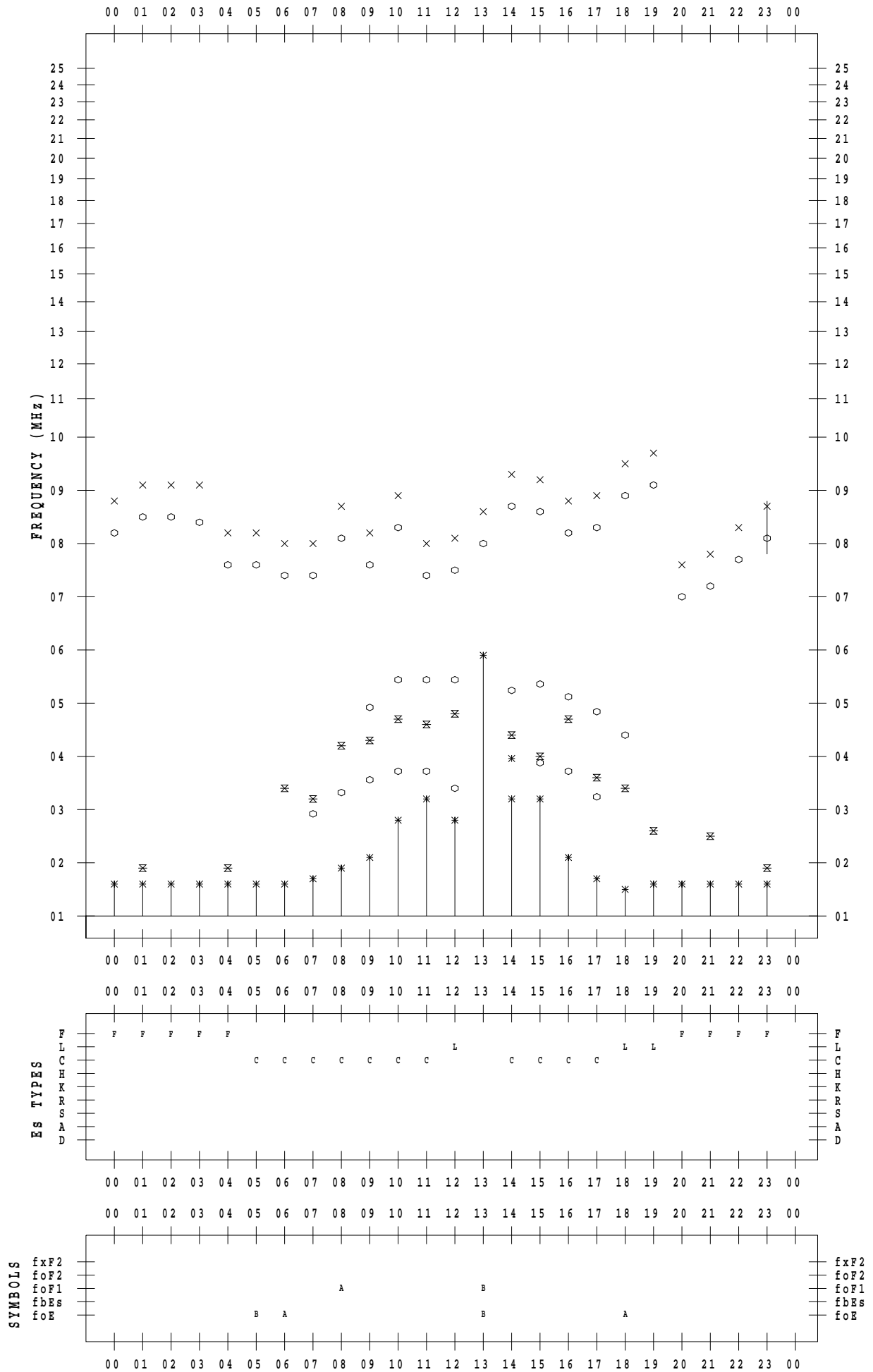
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 10

135 ° E MEAN TIME



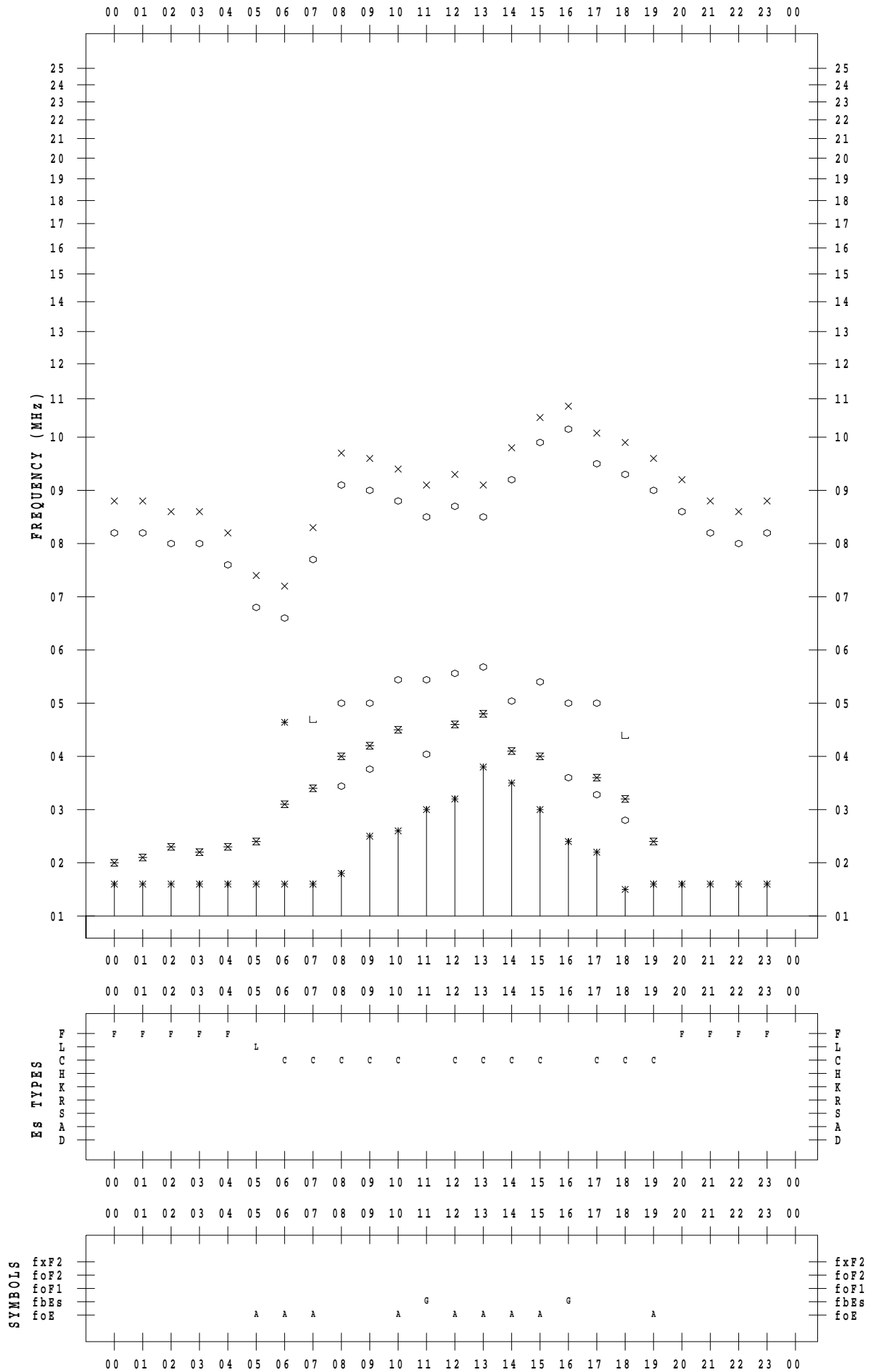
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 11

135 ° E MEAN TIME



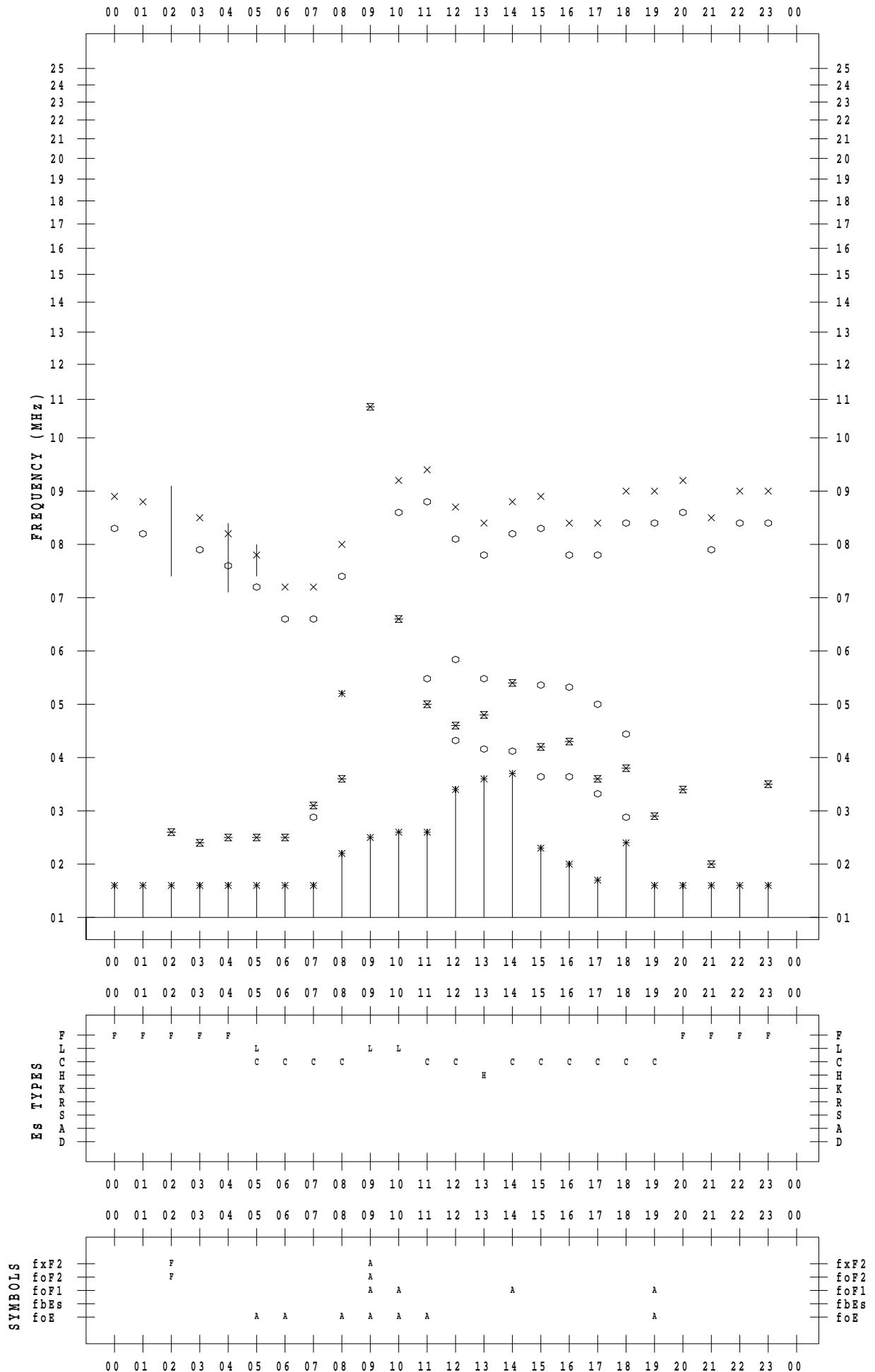
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 12

135 ° E MEAN TIME



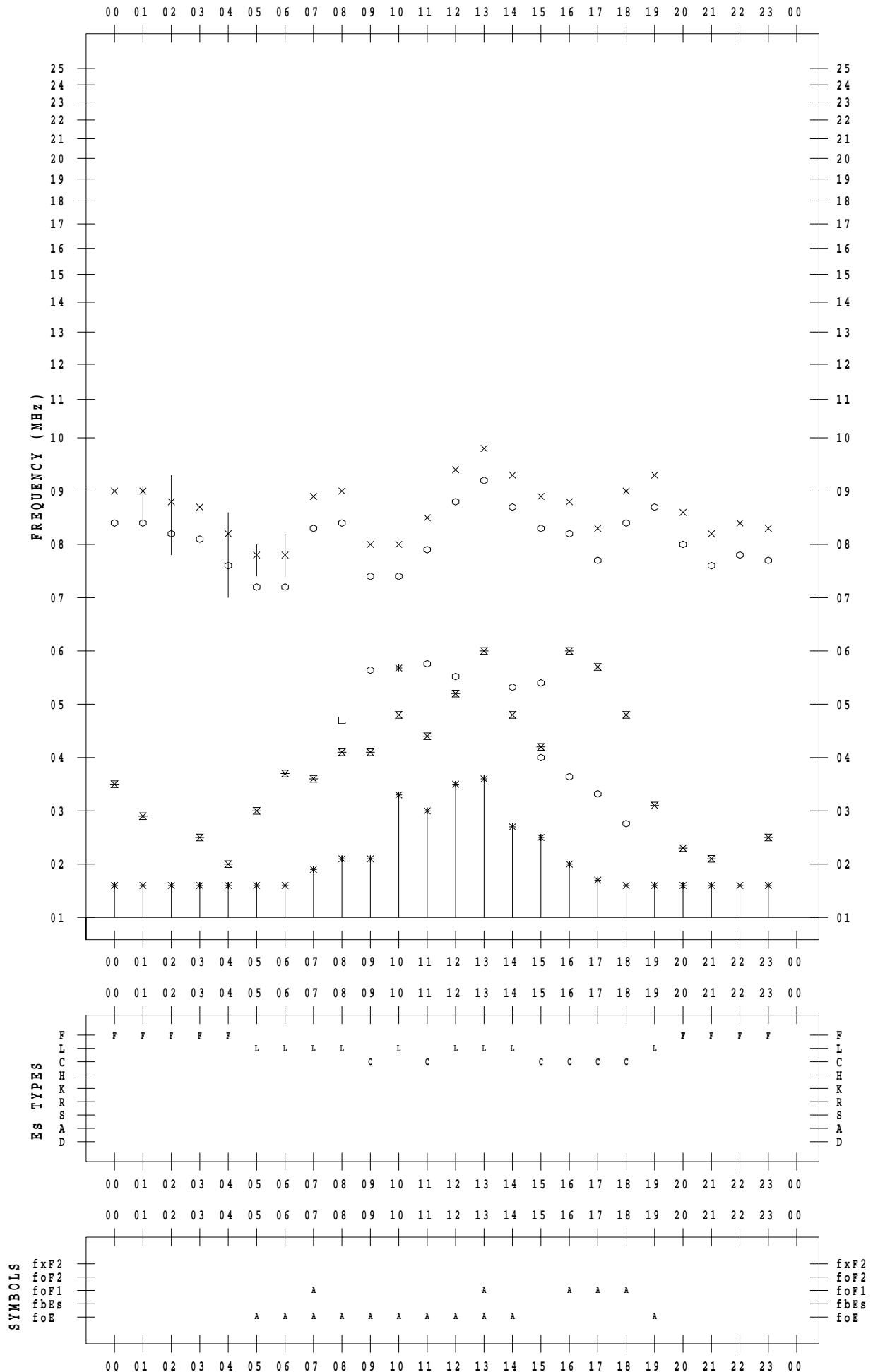
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SCALER :

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DATE : 2023 / 7 / 13

135 ° E MEAN TIME



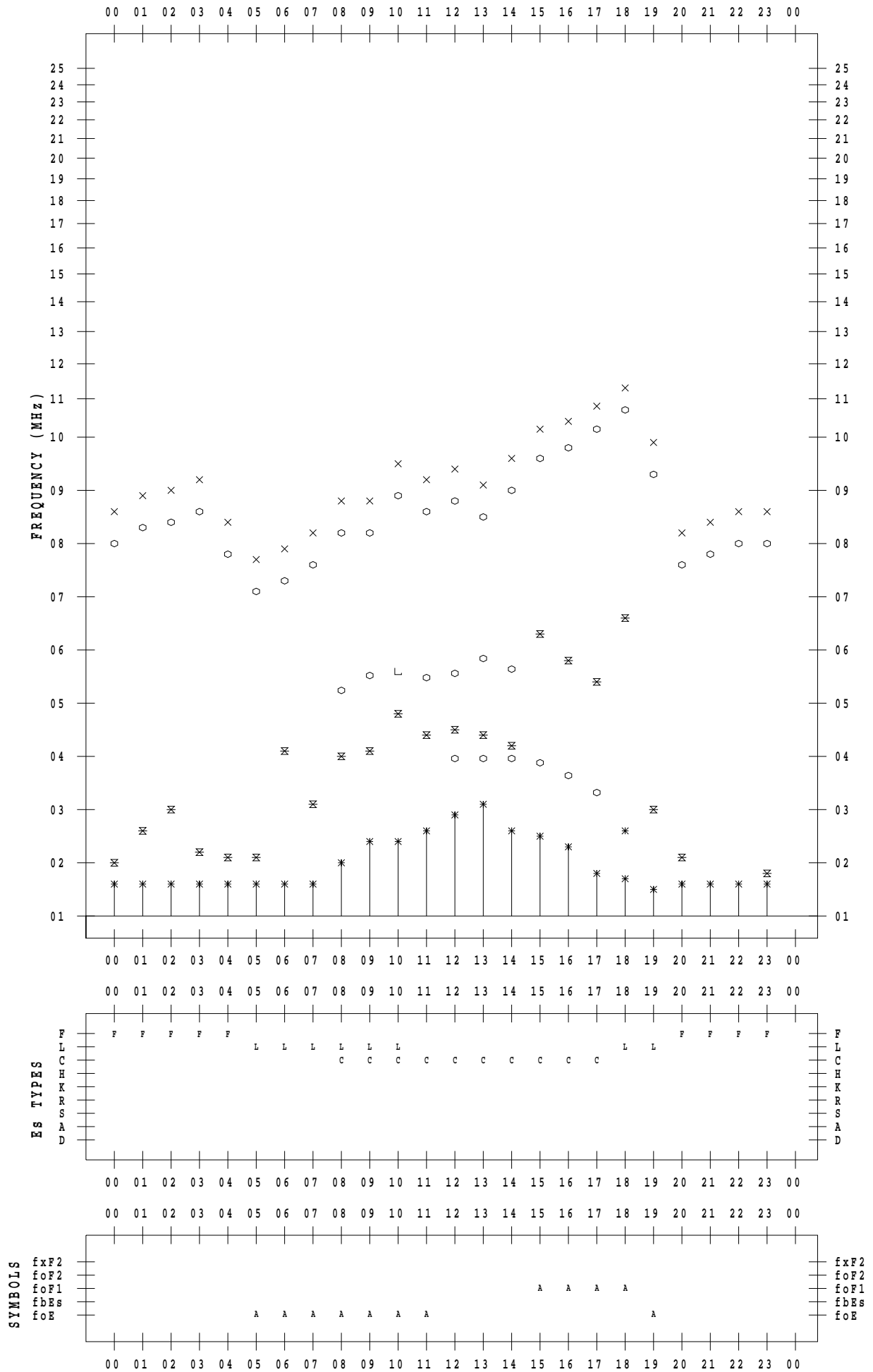
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 14

135 ° E MEAN TIME





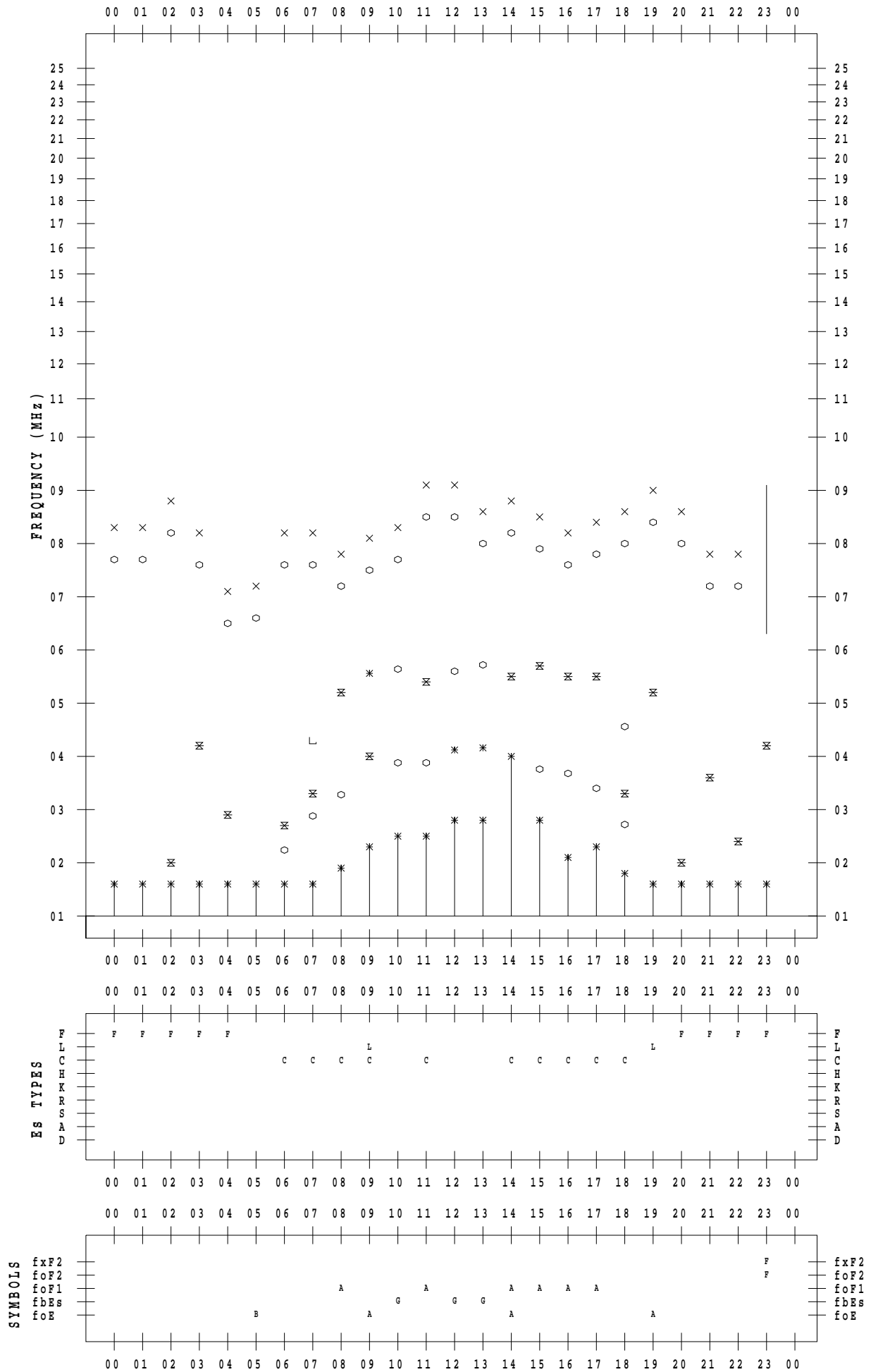
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 15

135 ° E MEAN TIME



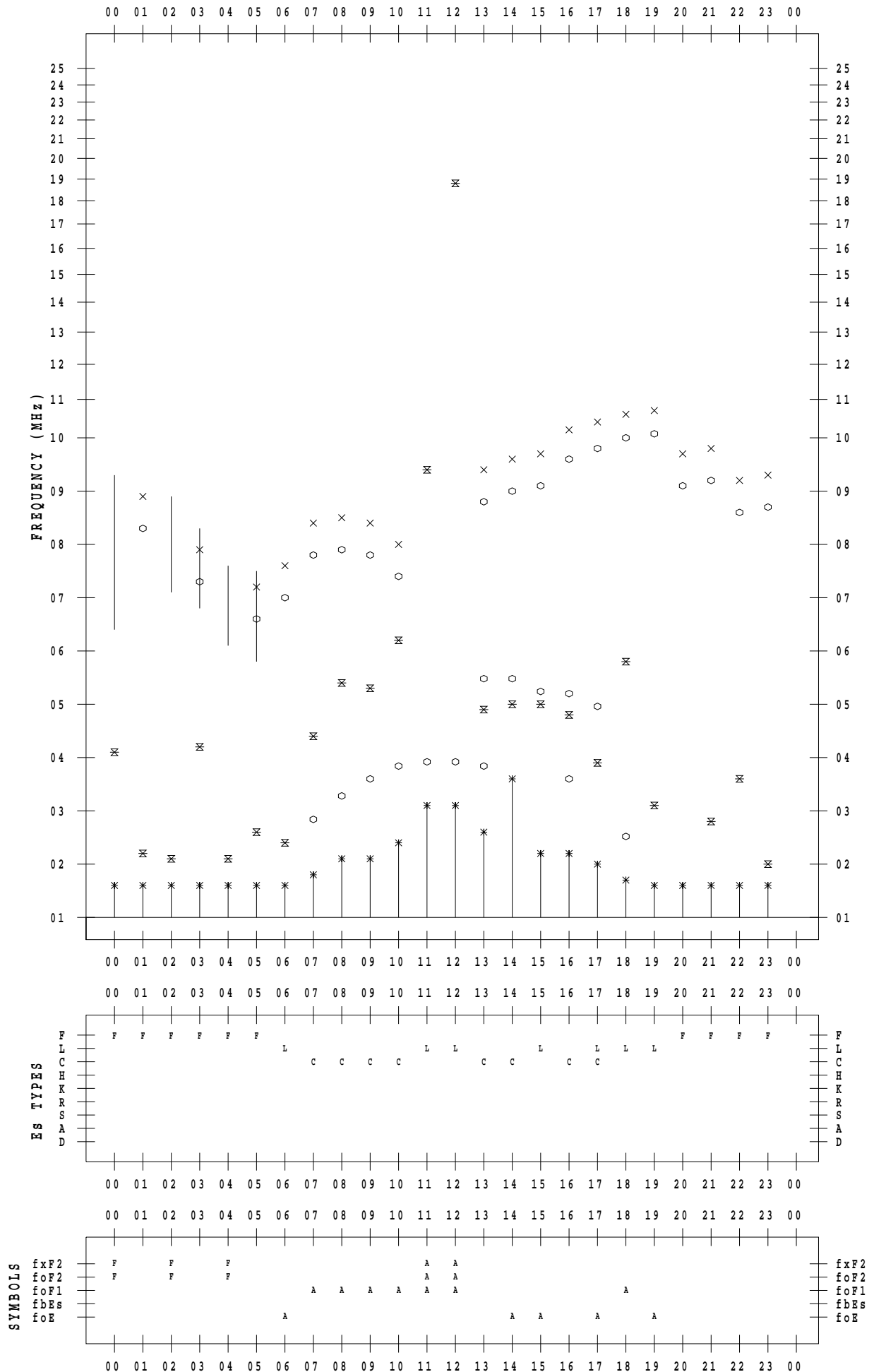
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 16

135 ° E MEAN TIME



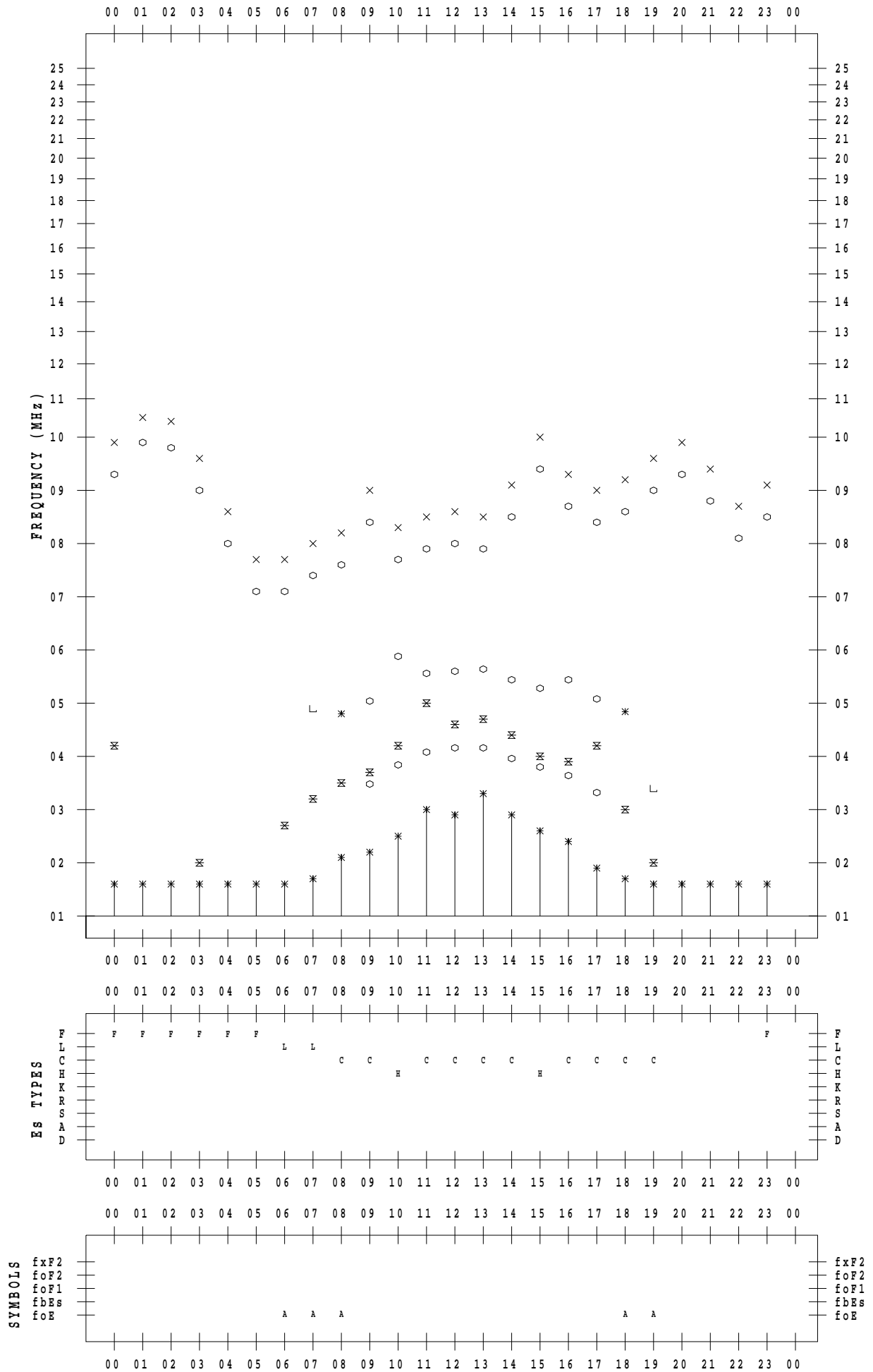
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 17

135 ° E MEAN TIME



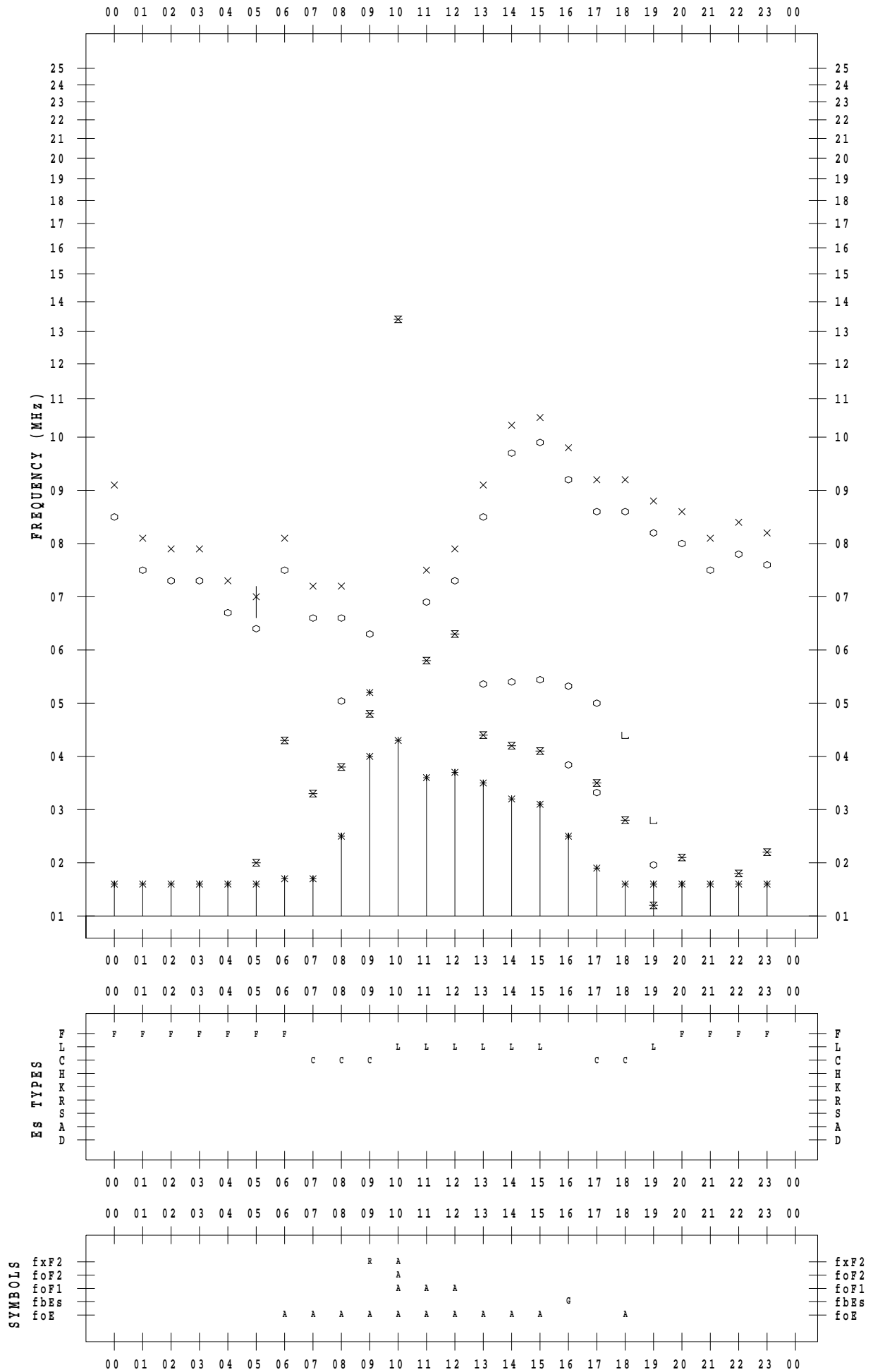
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 18

135 ° E MEAN TIME



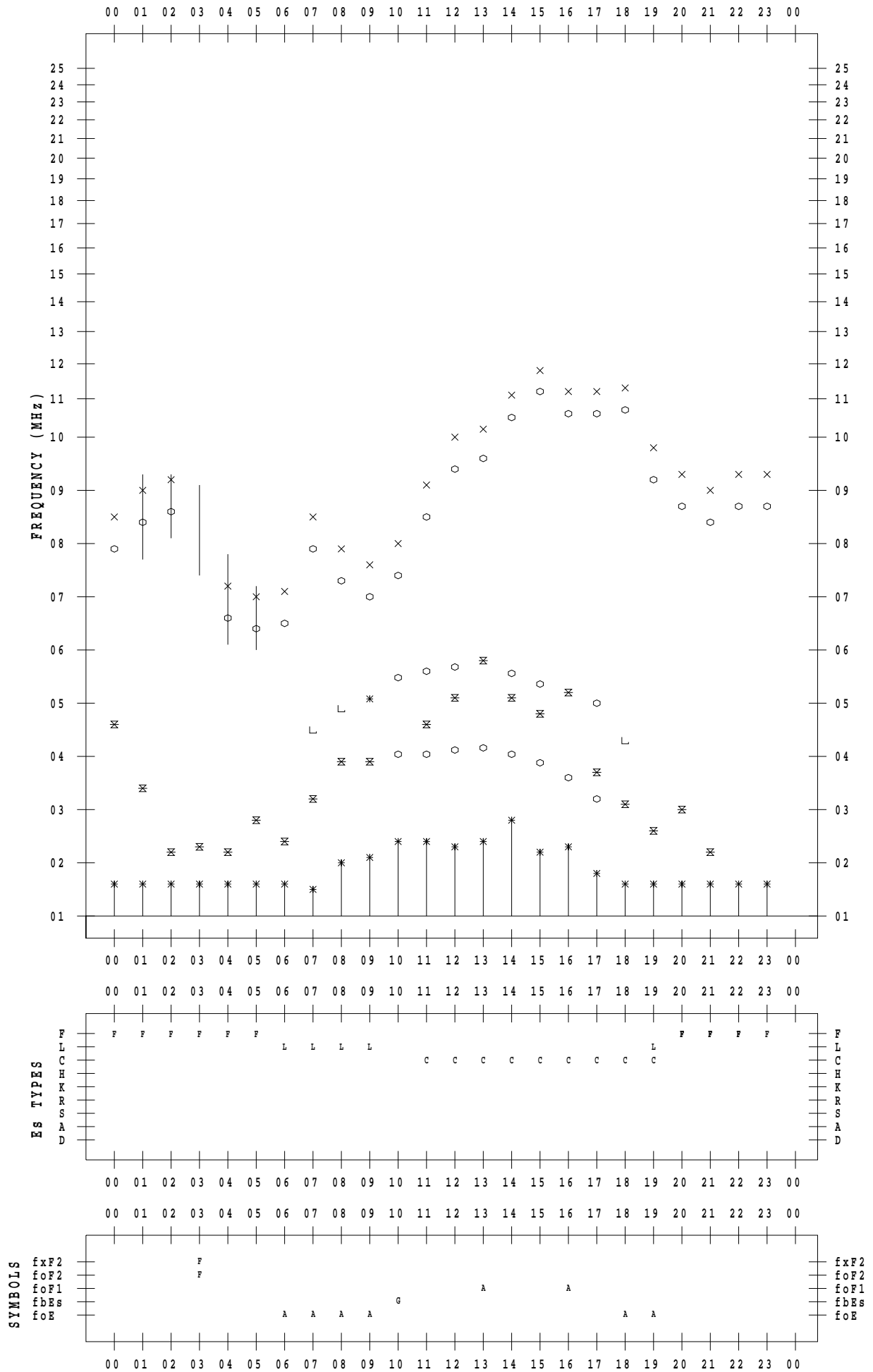
# f - PLOT DATA

SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 19

135 ° E MEAN TIME



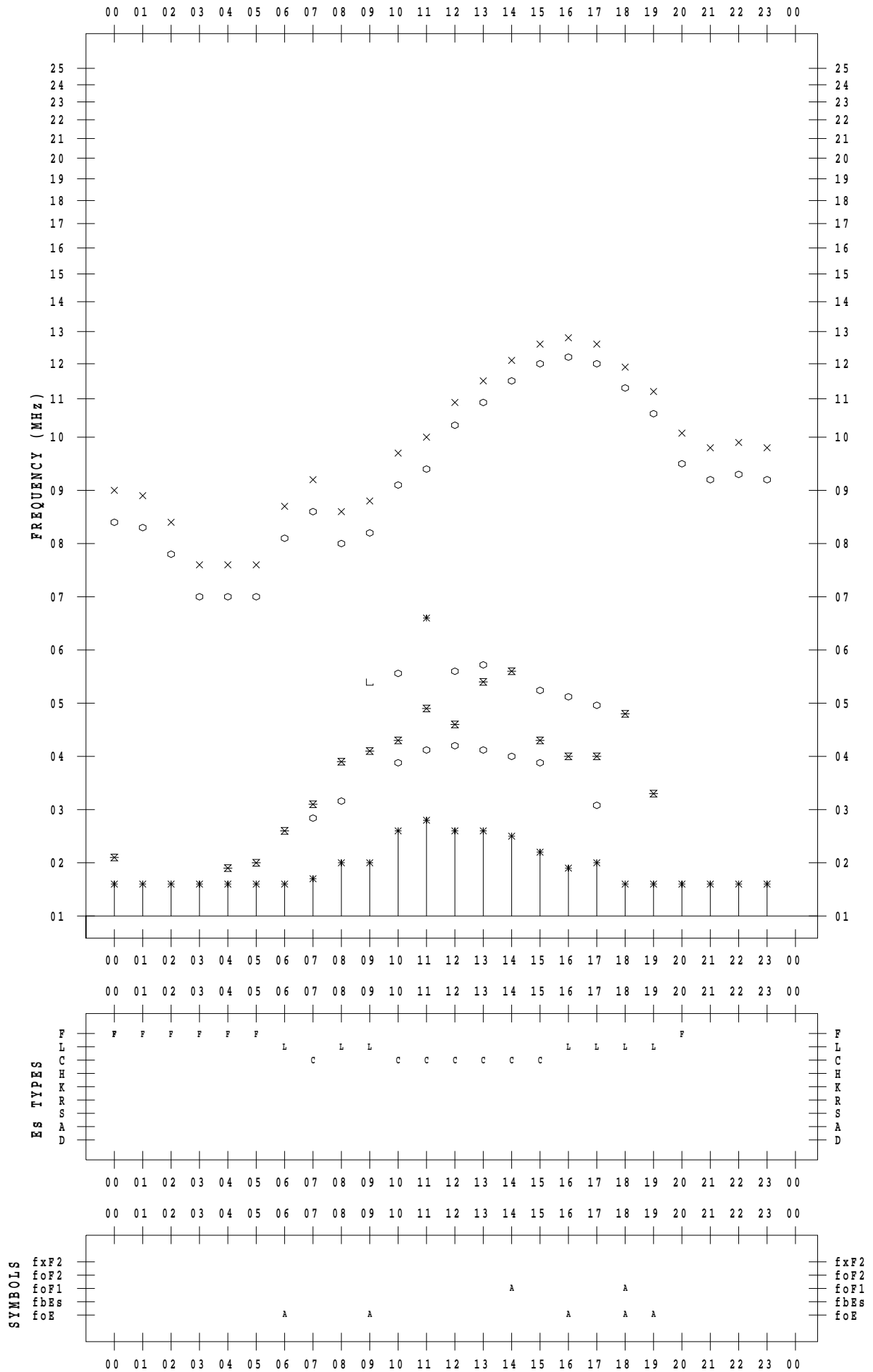
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 20

135 ° E MEAN TIME



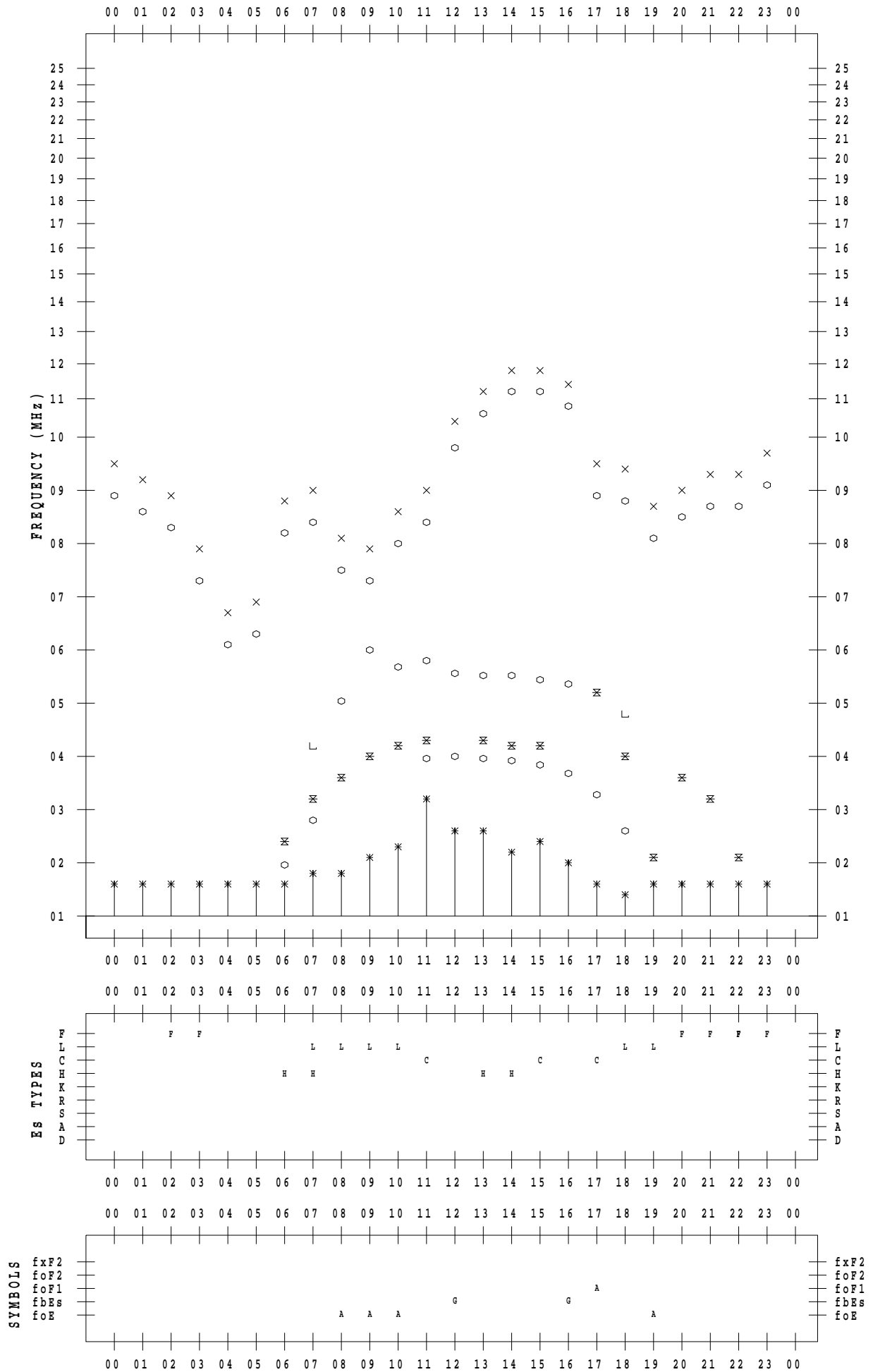
# f - PLOT DATA

SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 21

135 ° E MEAN TIME



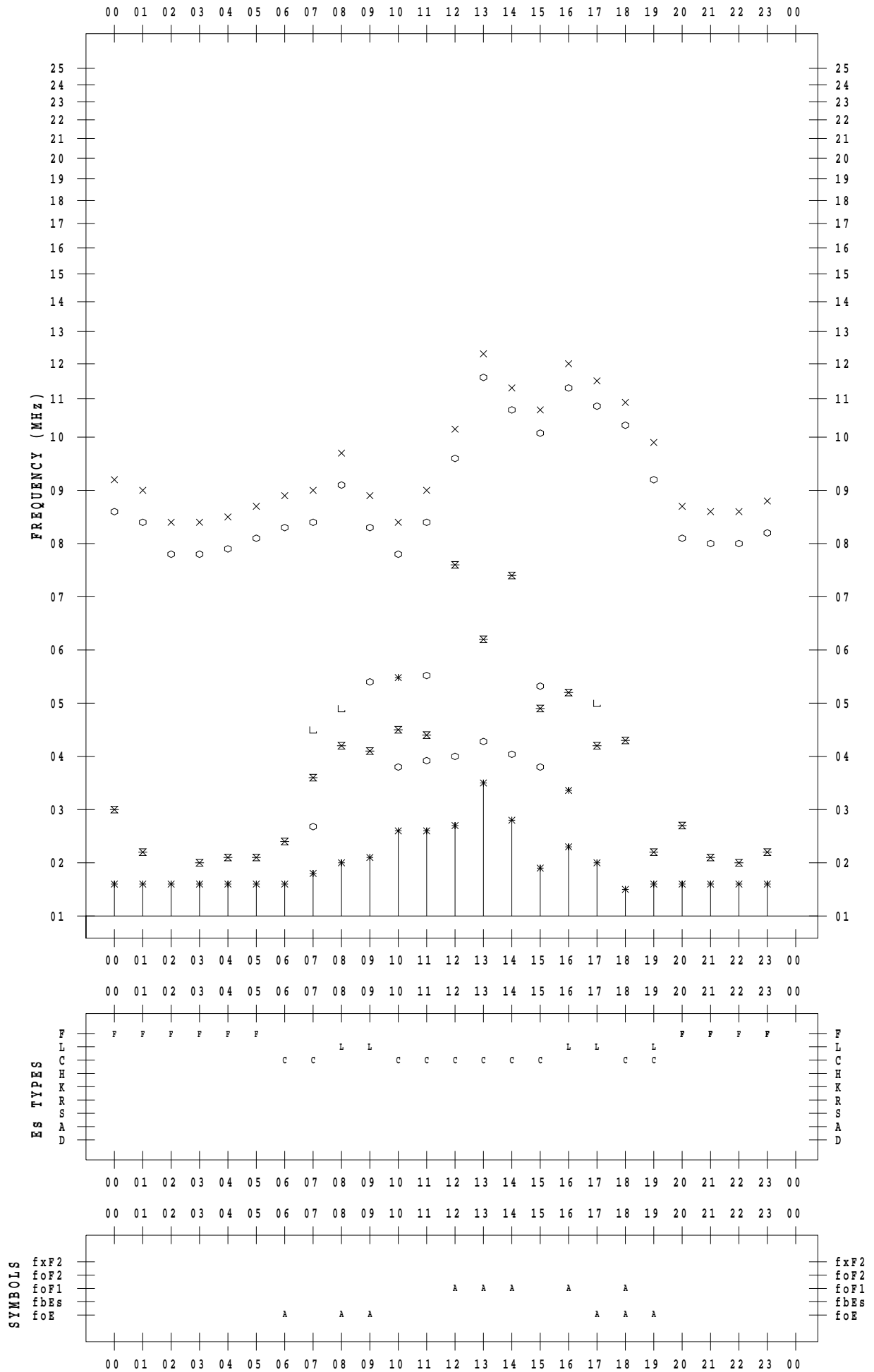
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 22

135 ° E MEAN TIME





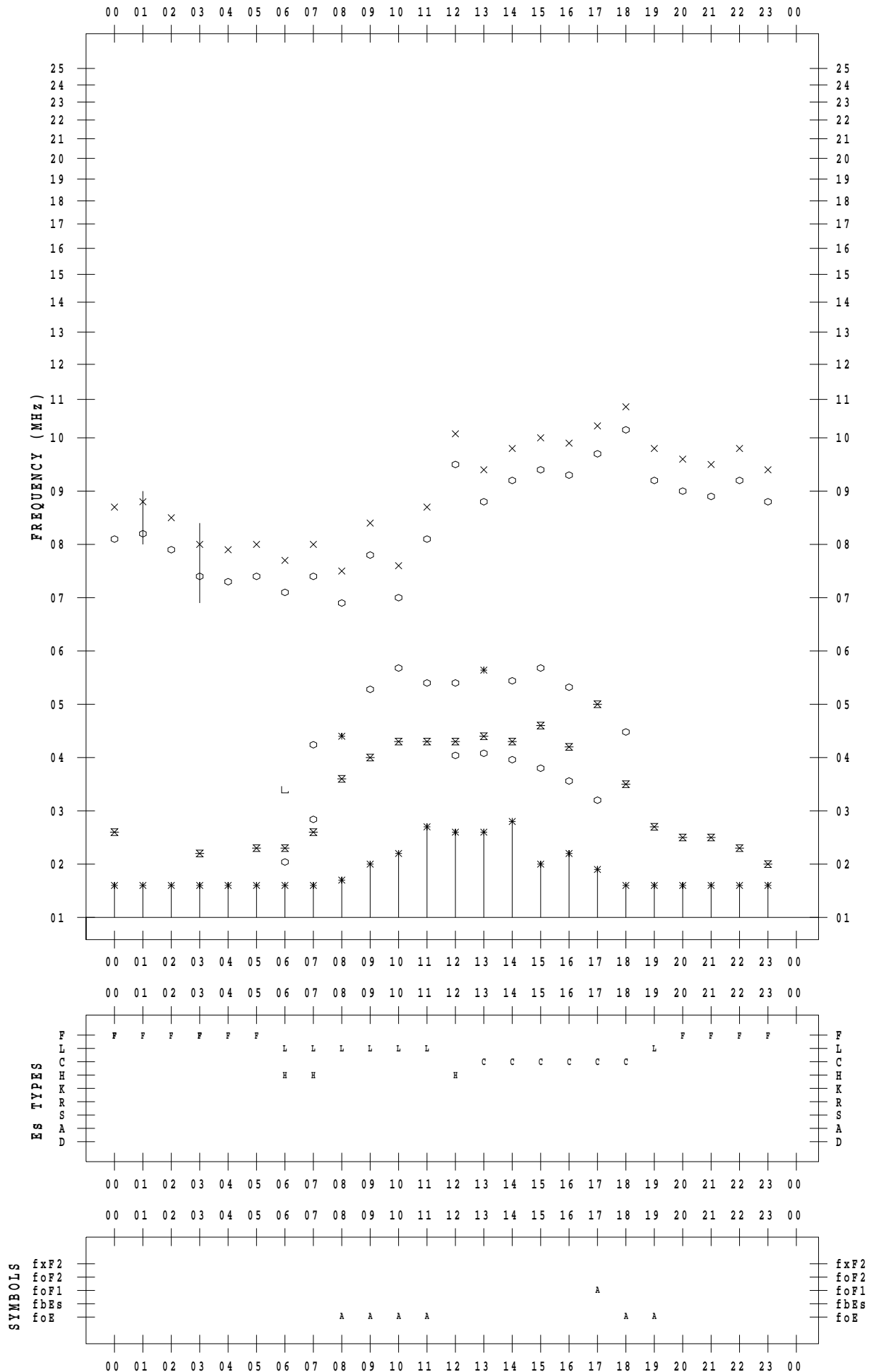
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 23

135 ° E MEAN TIME



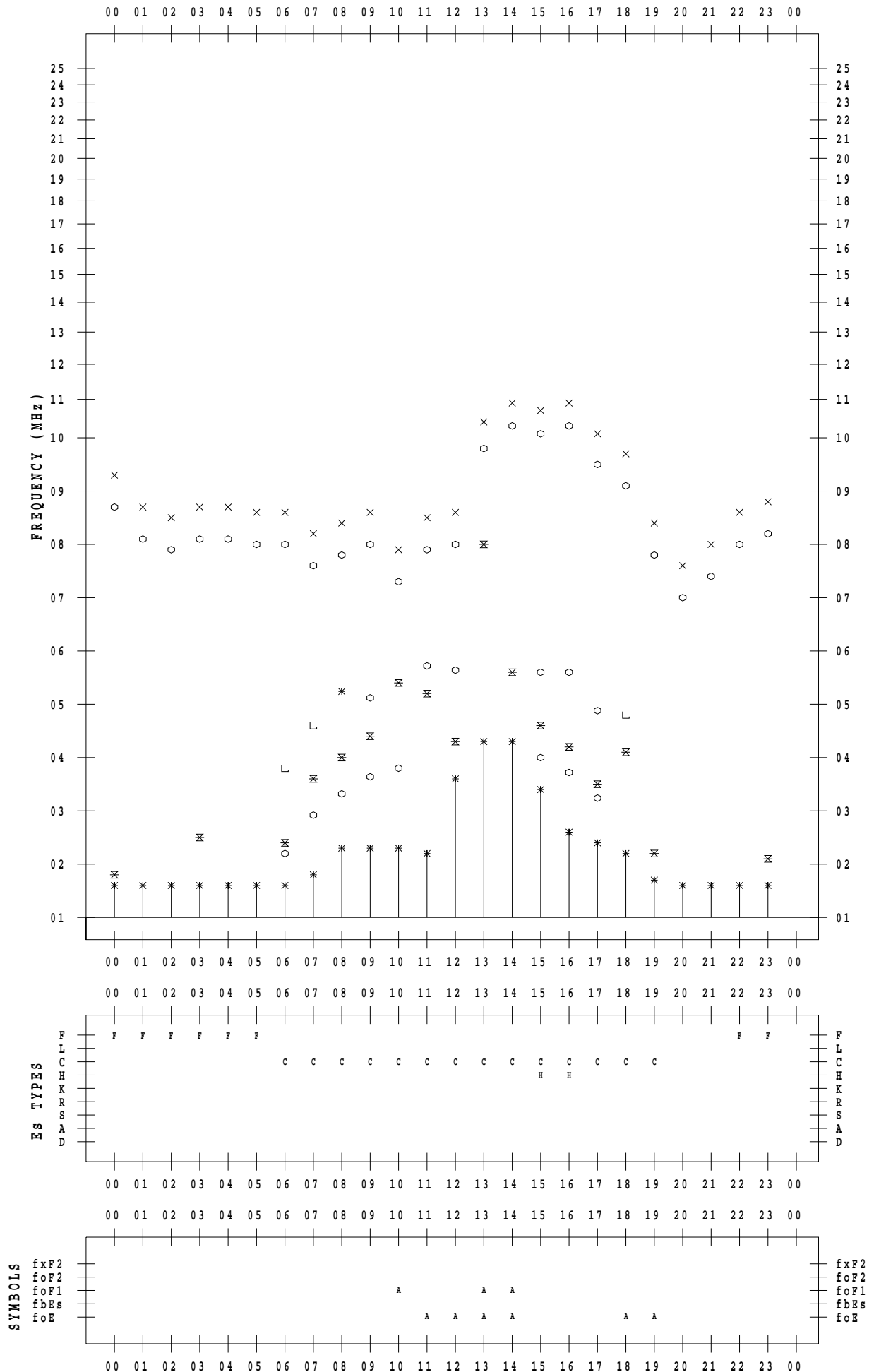
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 24

135 ° E MEAN TIME



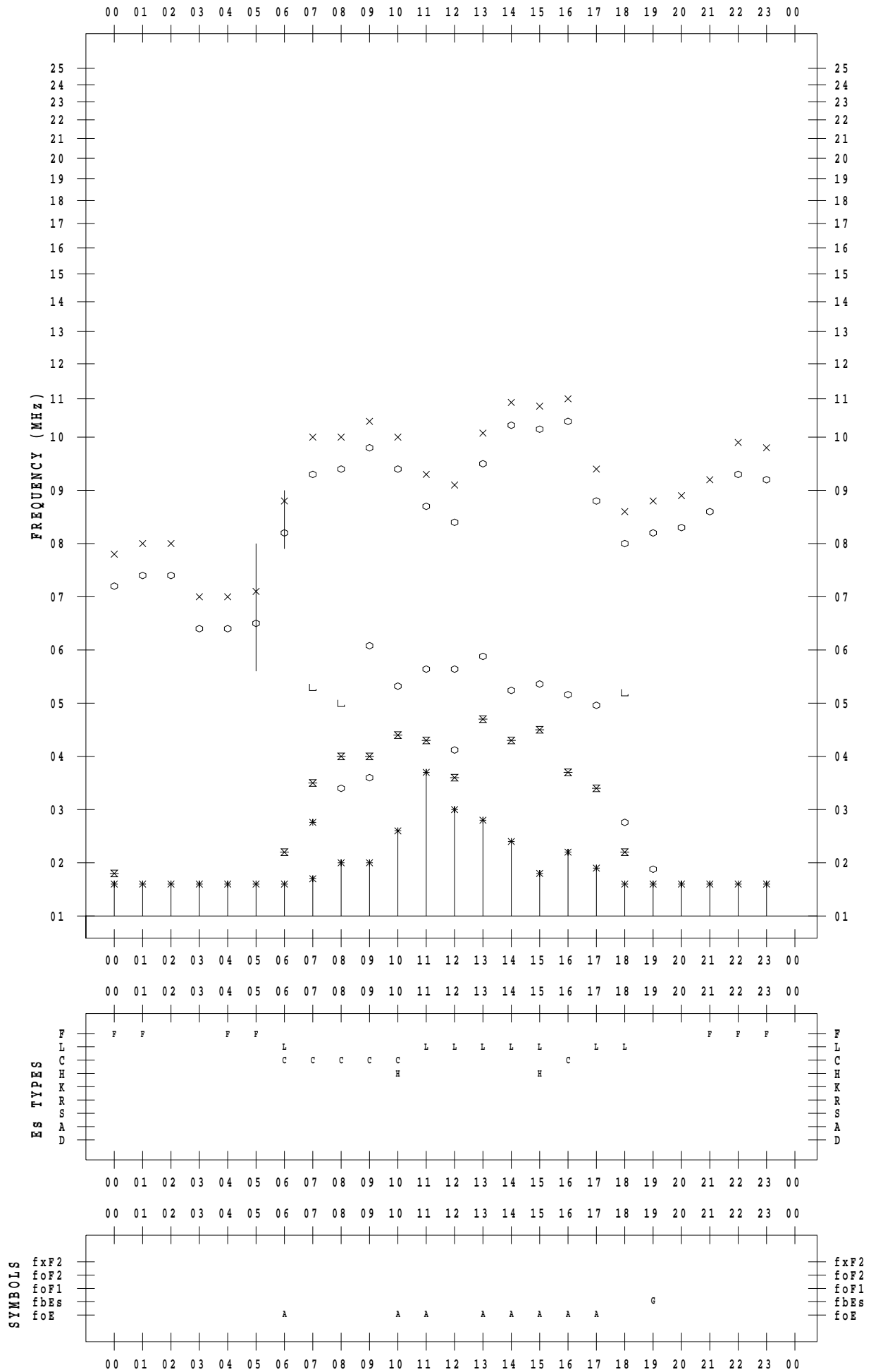
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 25

135 ° E MEAN TIME



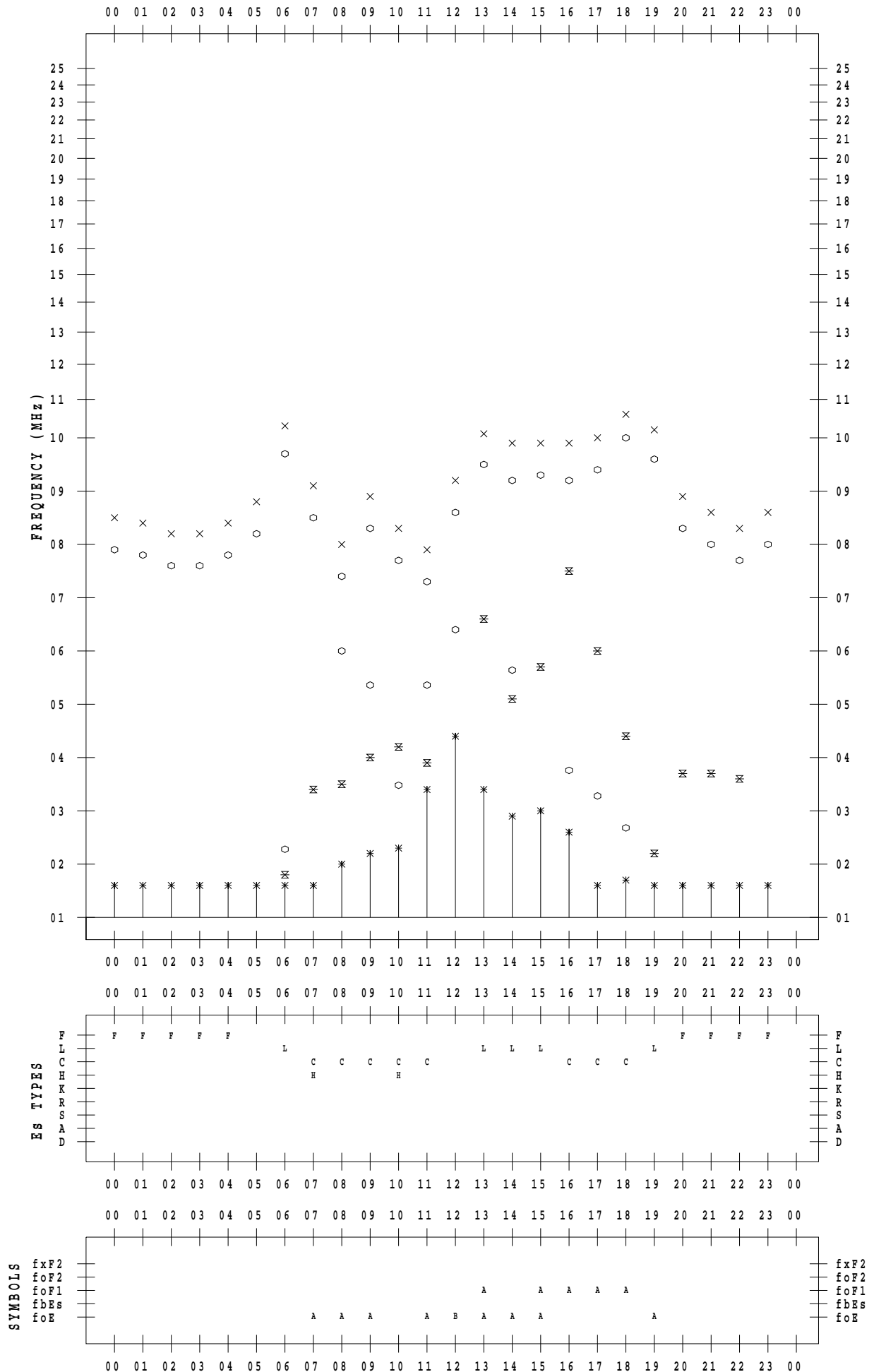
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 26

135 ° E MEAN TIME



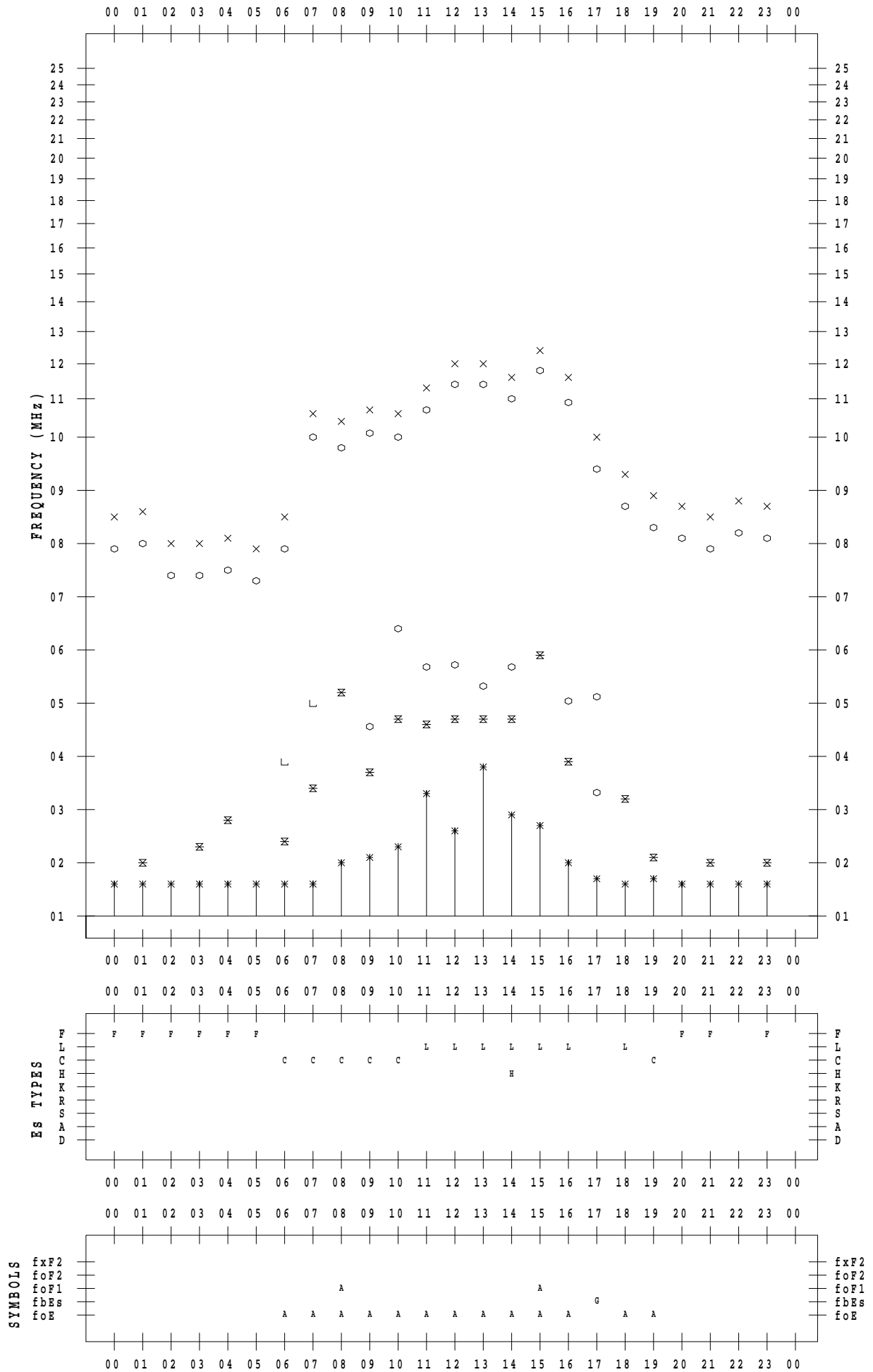
# f - PLOT DATA

SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 27

135 ° E MEAN TIME



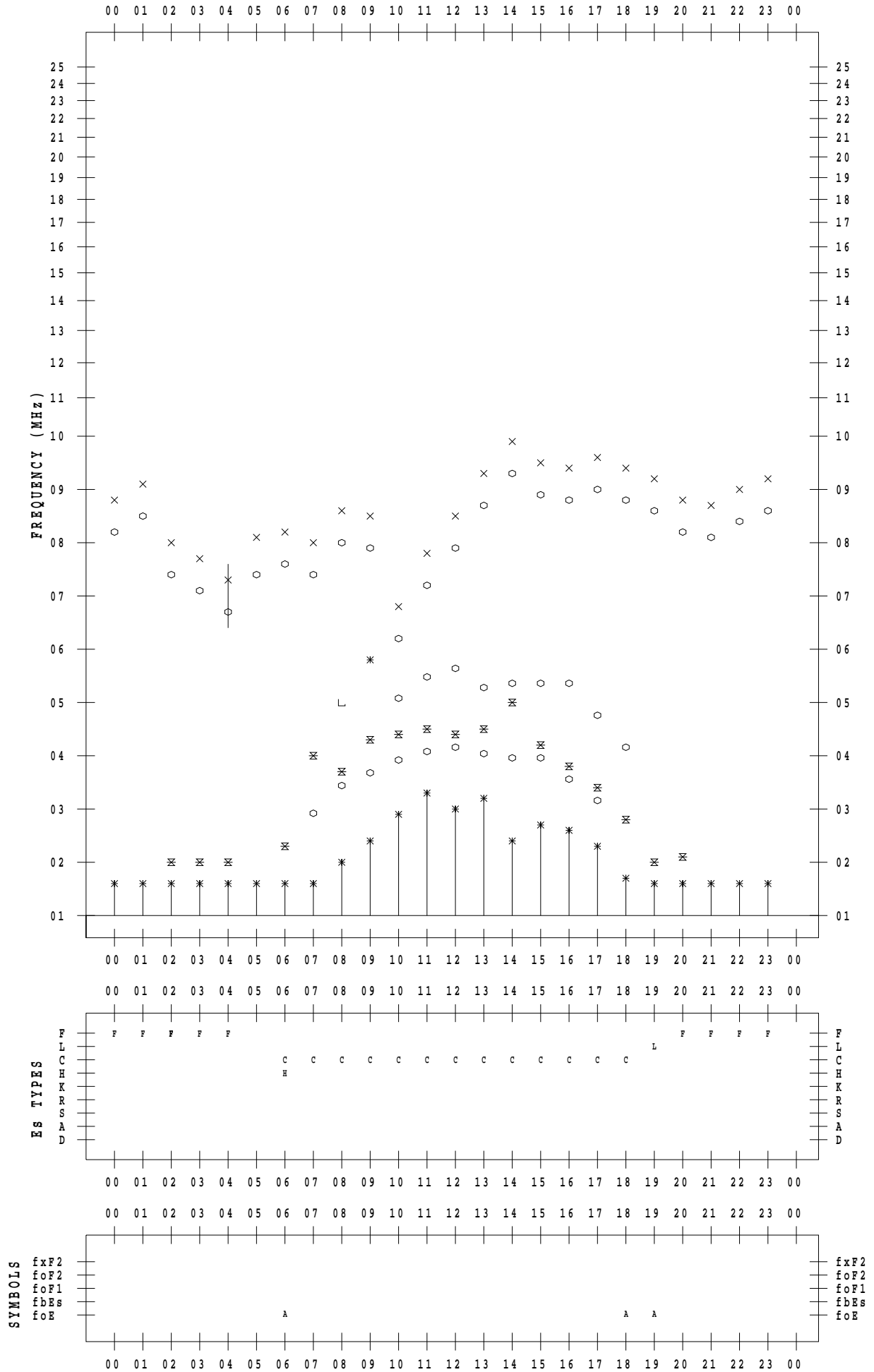
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 28

135 ° E MEAN TIME



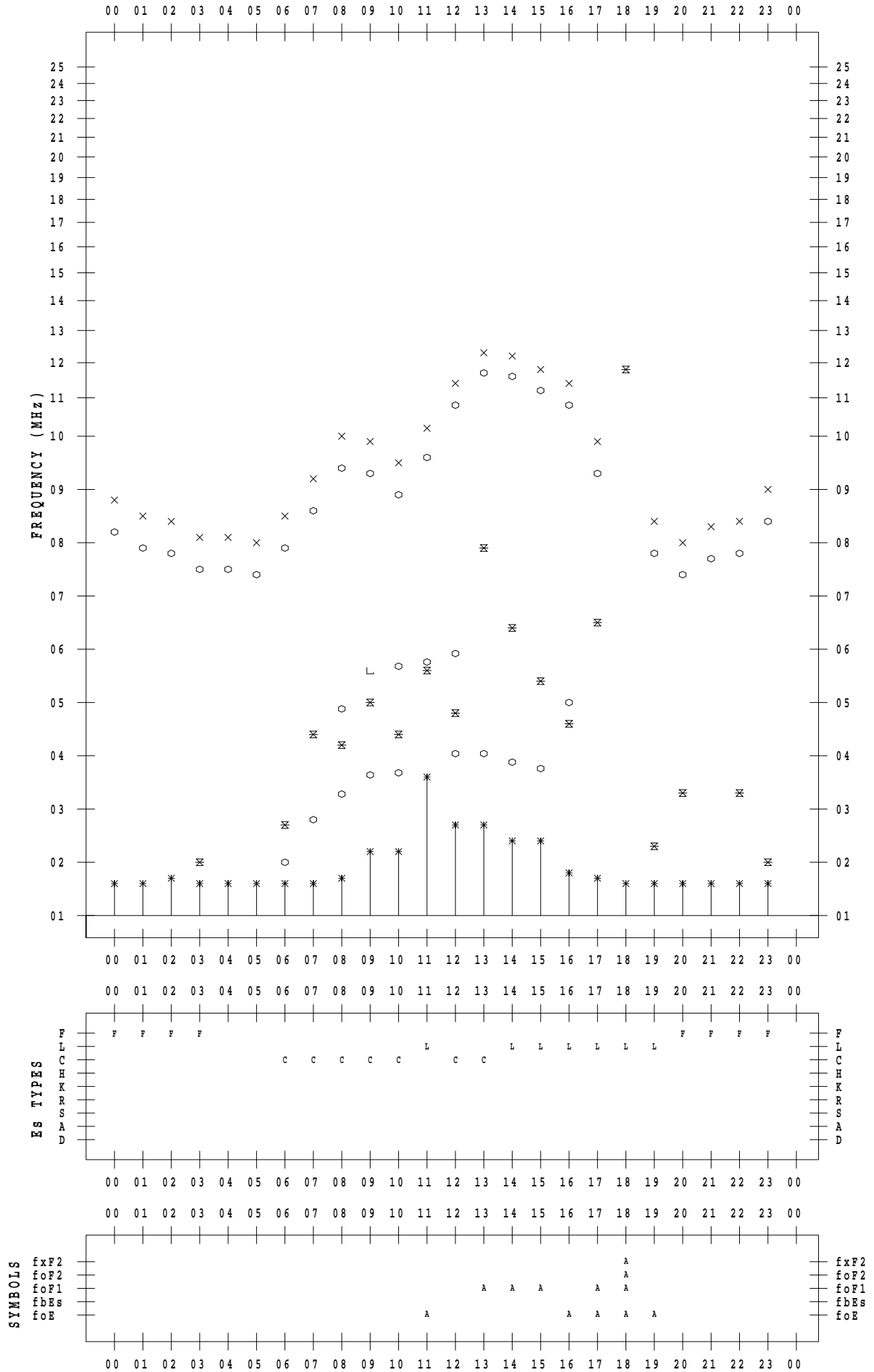
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 29

135 ° E MEAN TIME



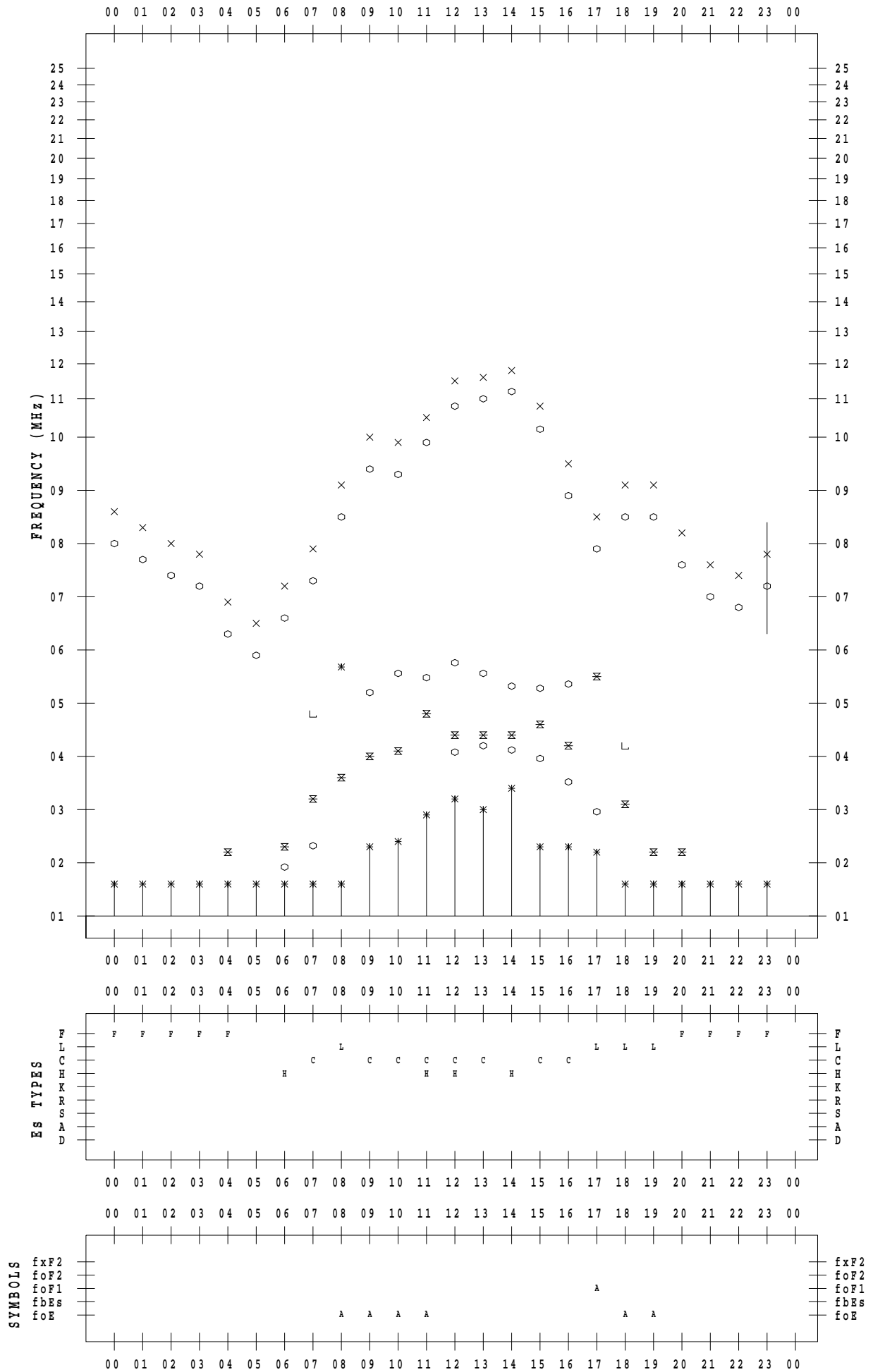
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SCALER :

STATION : Yamagawa

DATE : 2023 / 7 / 30

135 ° E MEAN TIME





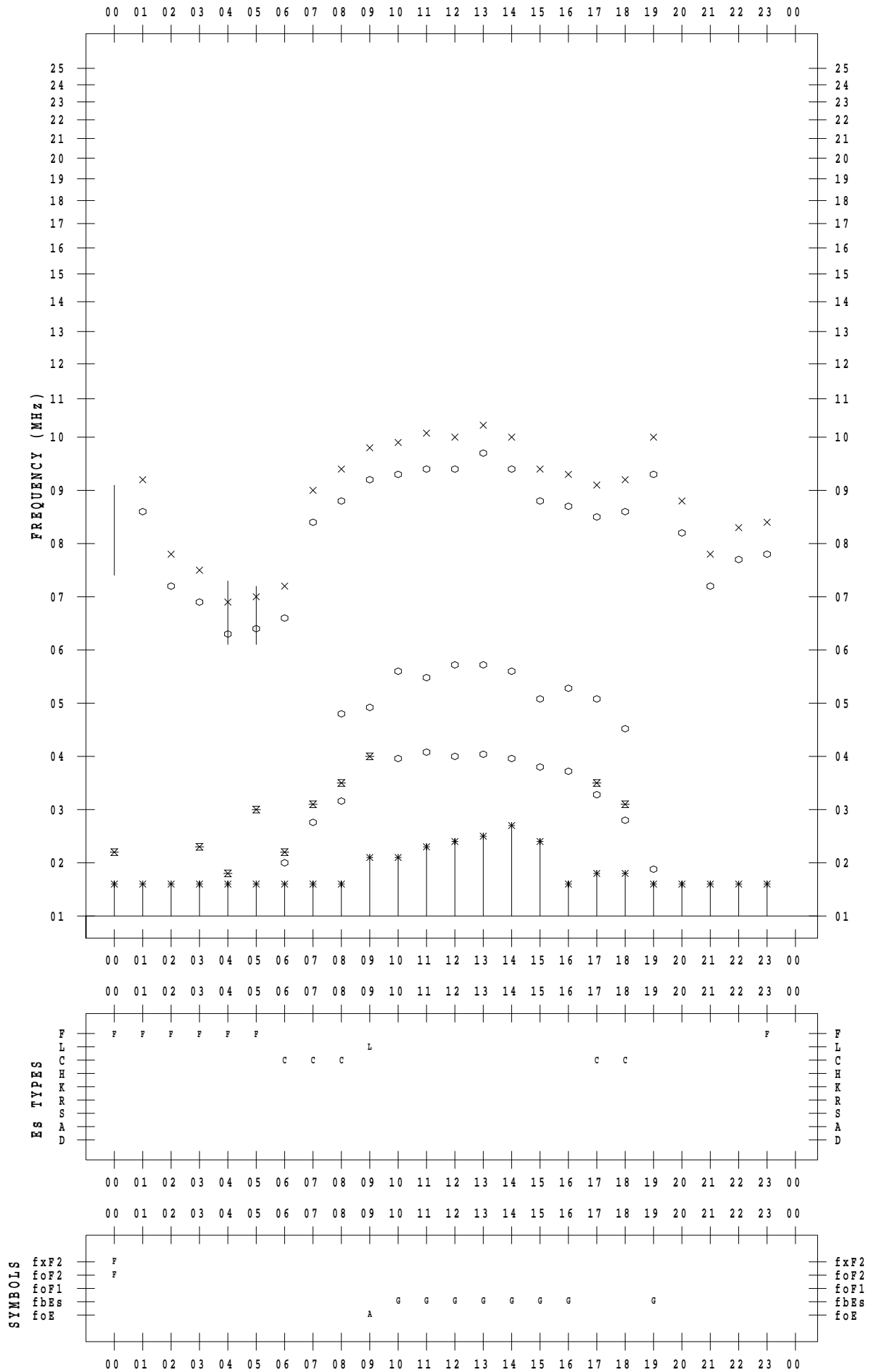
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SCALER :

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DATE : 2023 / 7 / 31

135 ° E MEAN TIME



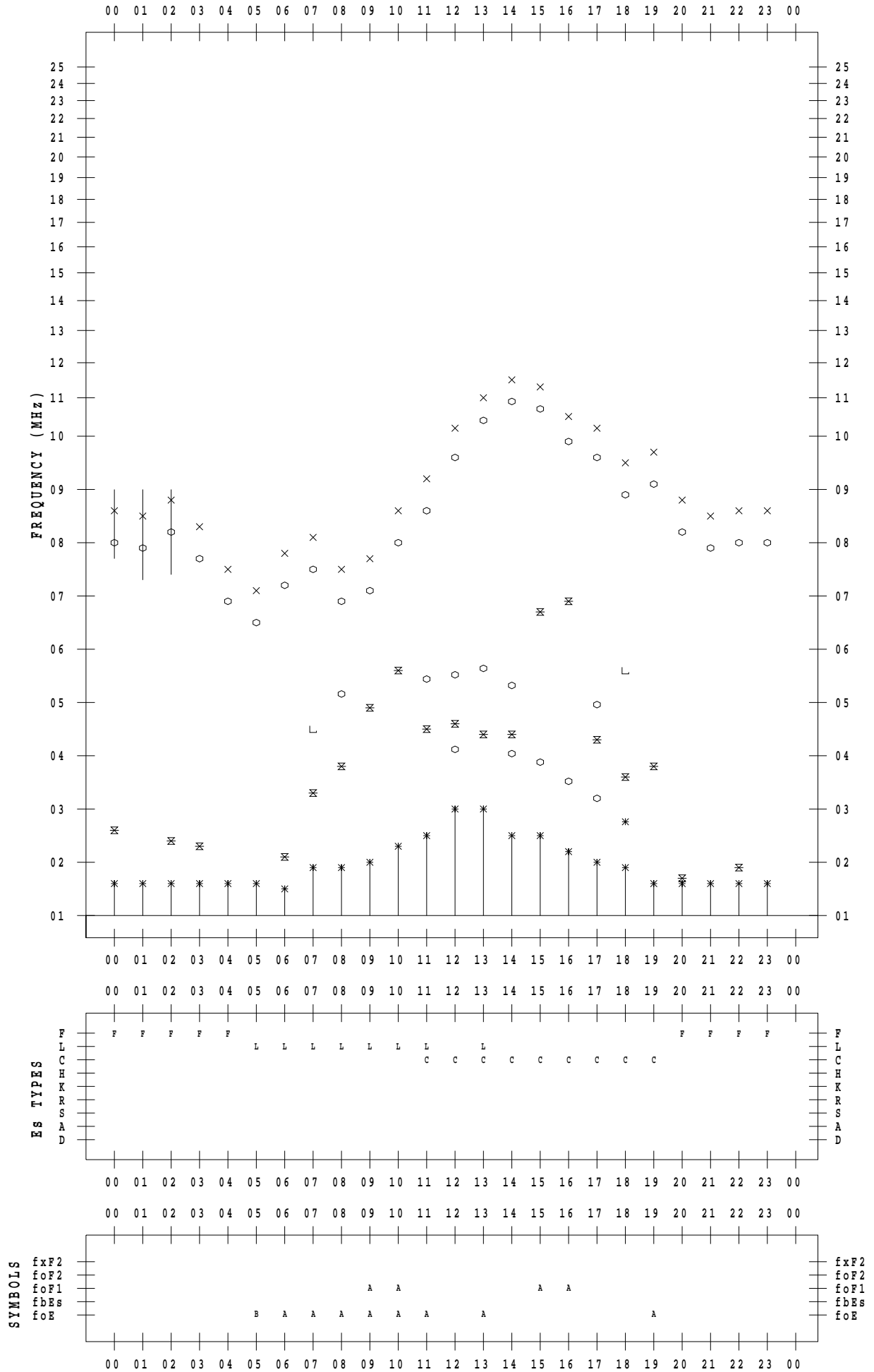
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SCALER :

STATION : Okinawa

DATE : 2023 / 7 / 1

135 ° E MEAN TIME



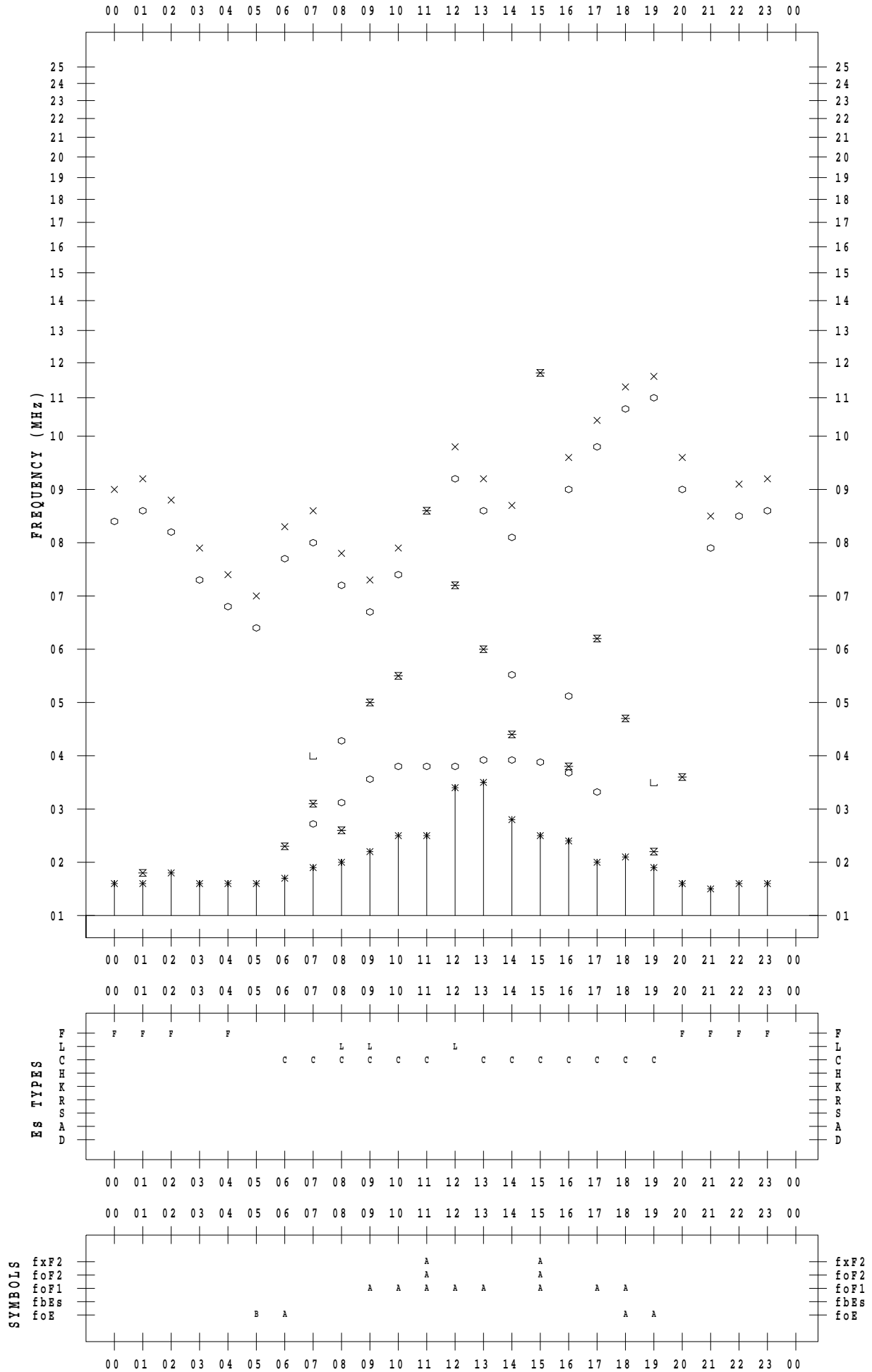
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SCALER :

STATION : Okinawa

DATE : 2023 / 7 / 2

135 ° E MEAN TIME



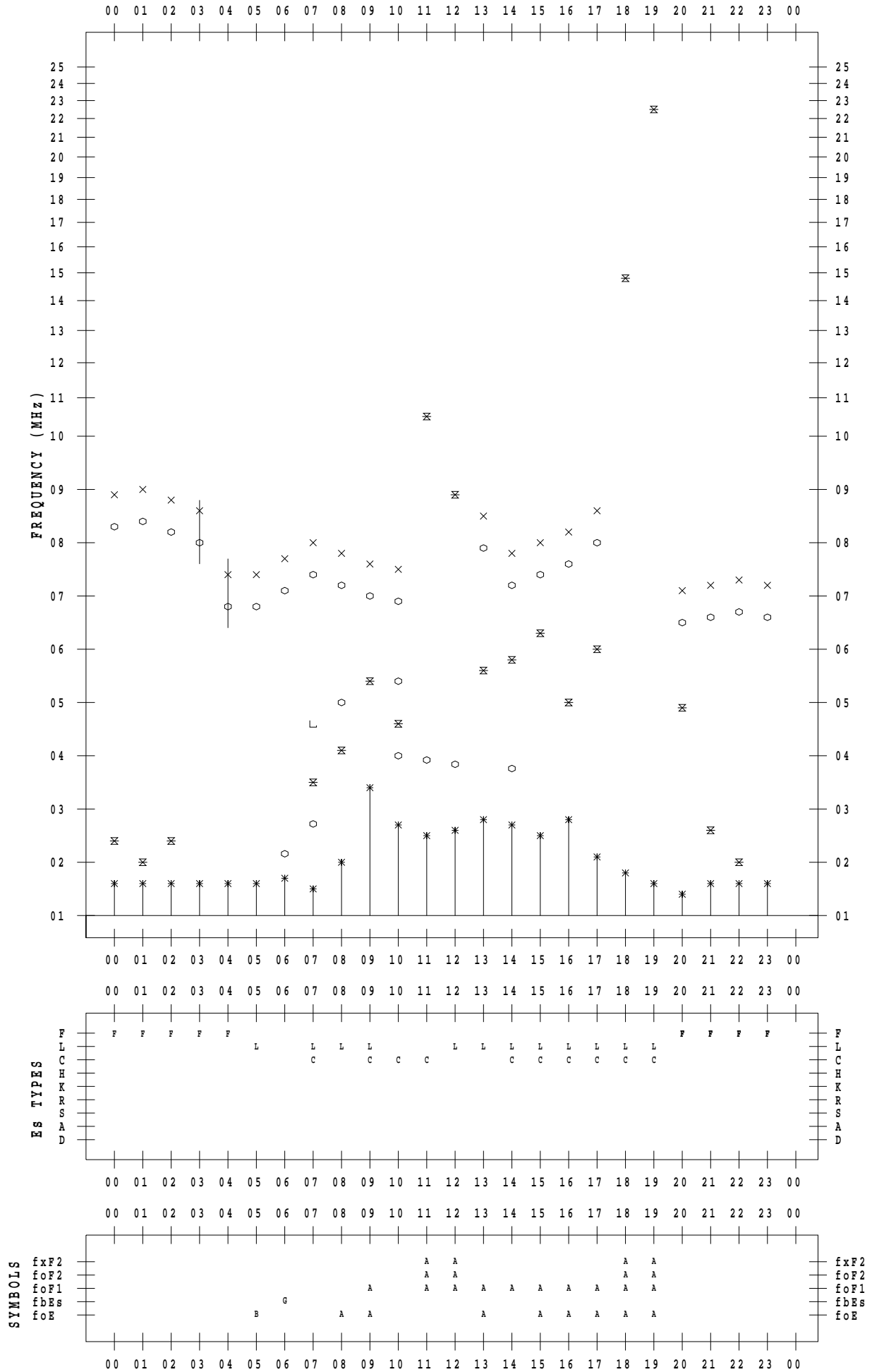
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SCALER :

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DATE : 2023 / 7 / 3

135 ° E MEAN TIME



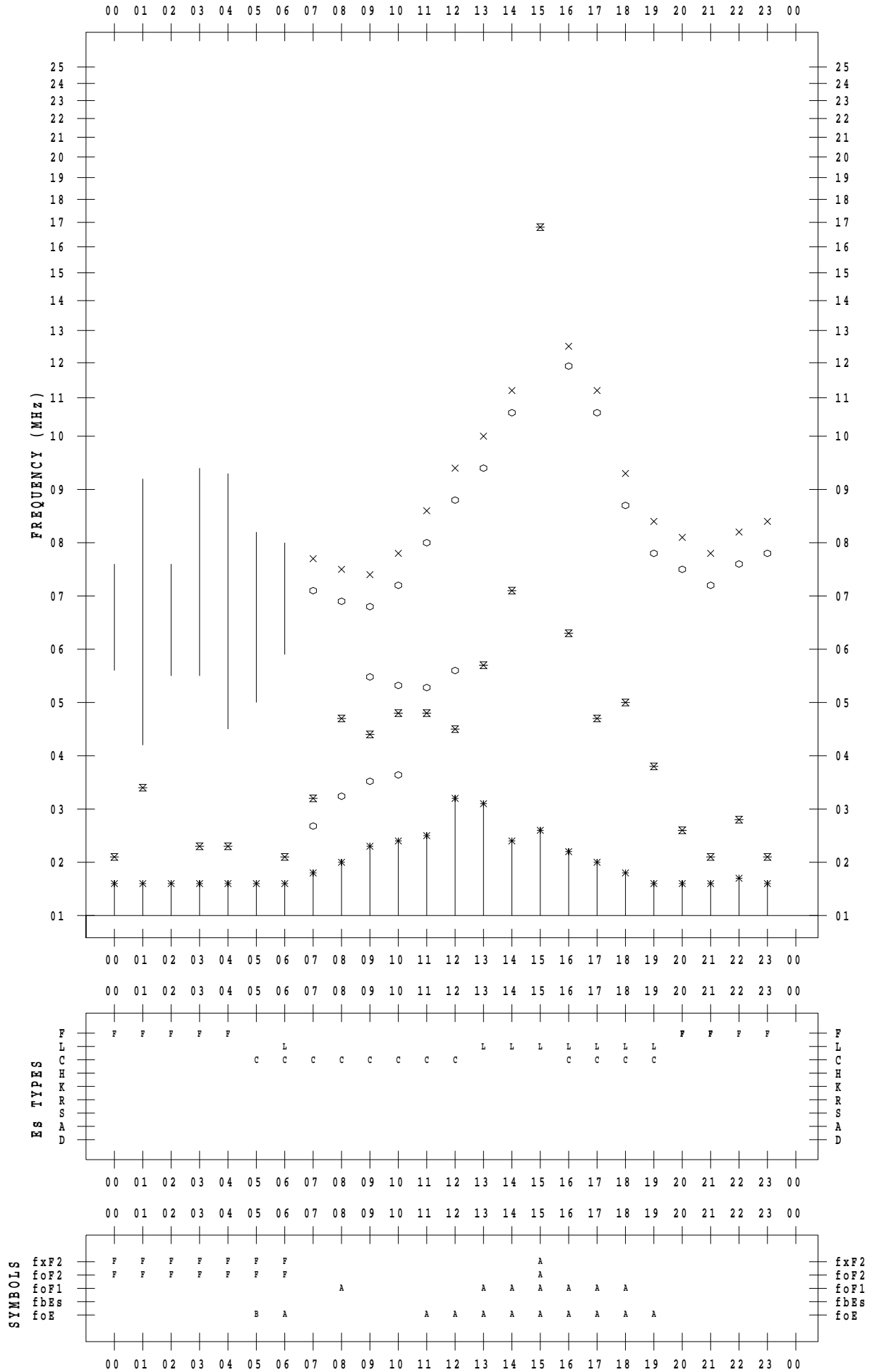
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SCALER :

STATION : Okinawa

DATE : 2023 / 7 / 4

135 ° E MEAN TIME



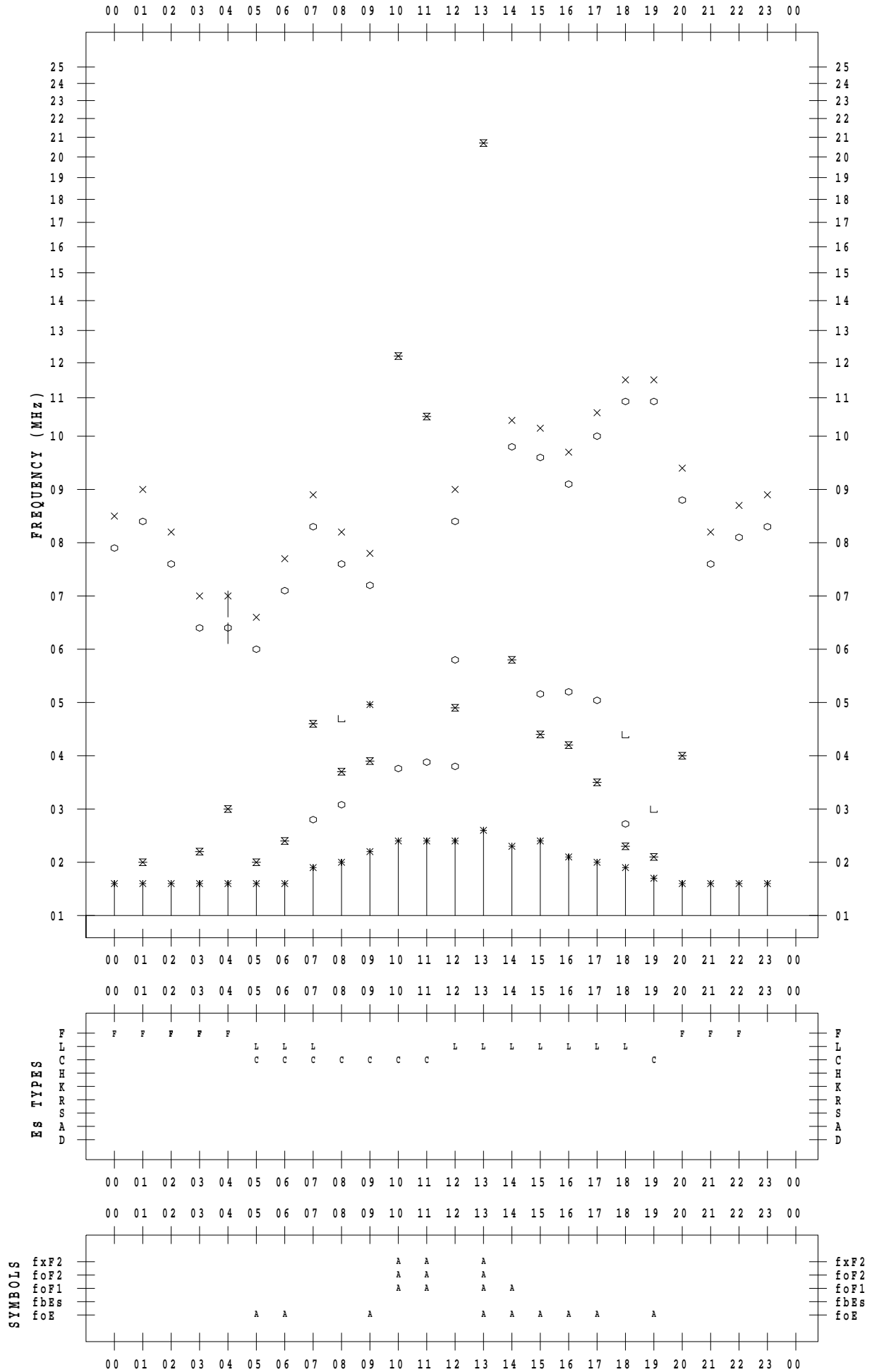
# f - PLOT DATA

SCALER :

STATION : Okinawa

DATE : 2023 / 7 / 5

135 ° E MEAN TIME



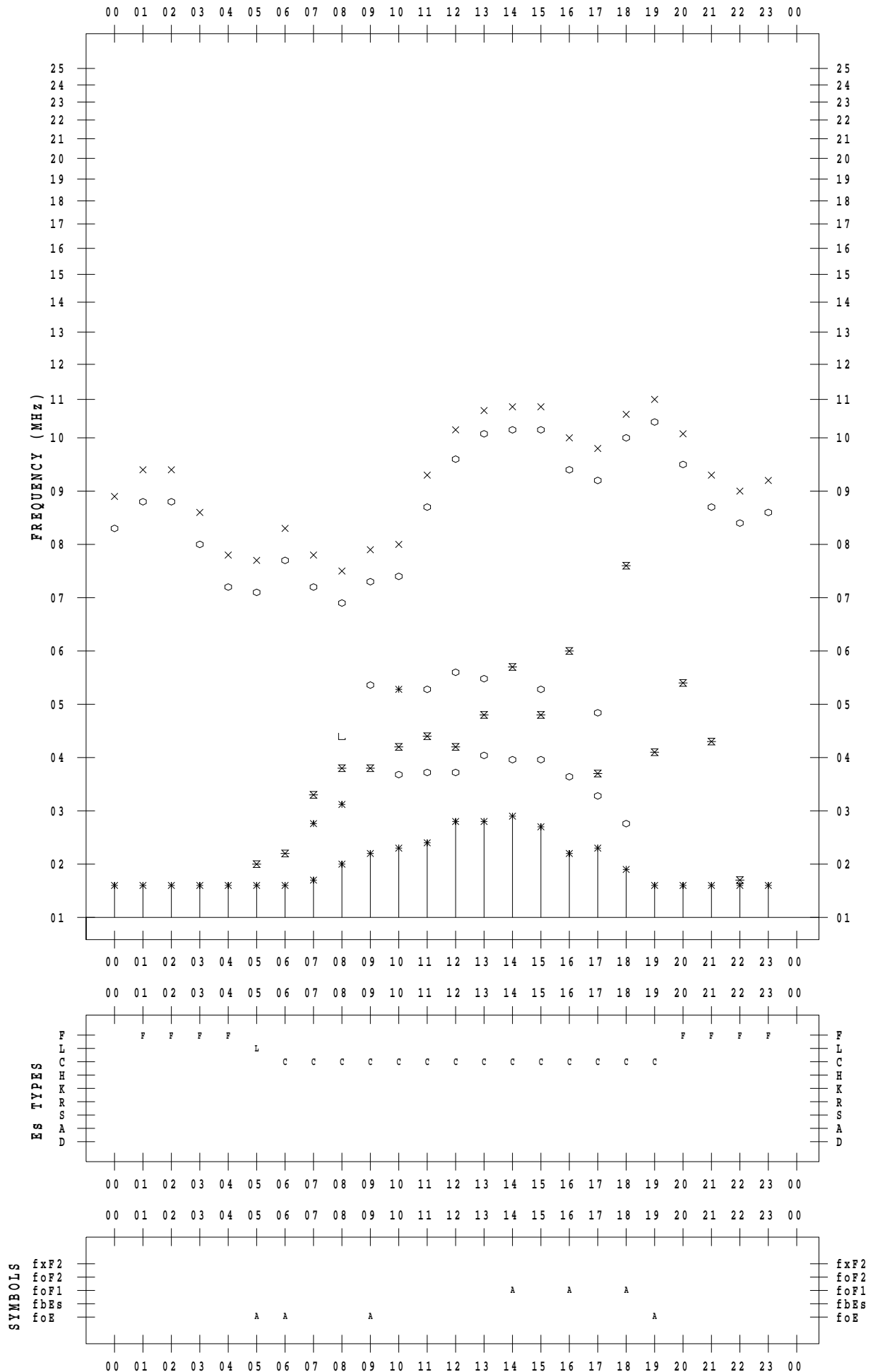
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SCALER :

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DATE : 2023 / 7 / 6

135 ° E MEAN TIME



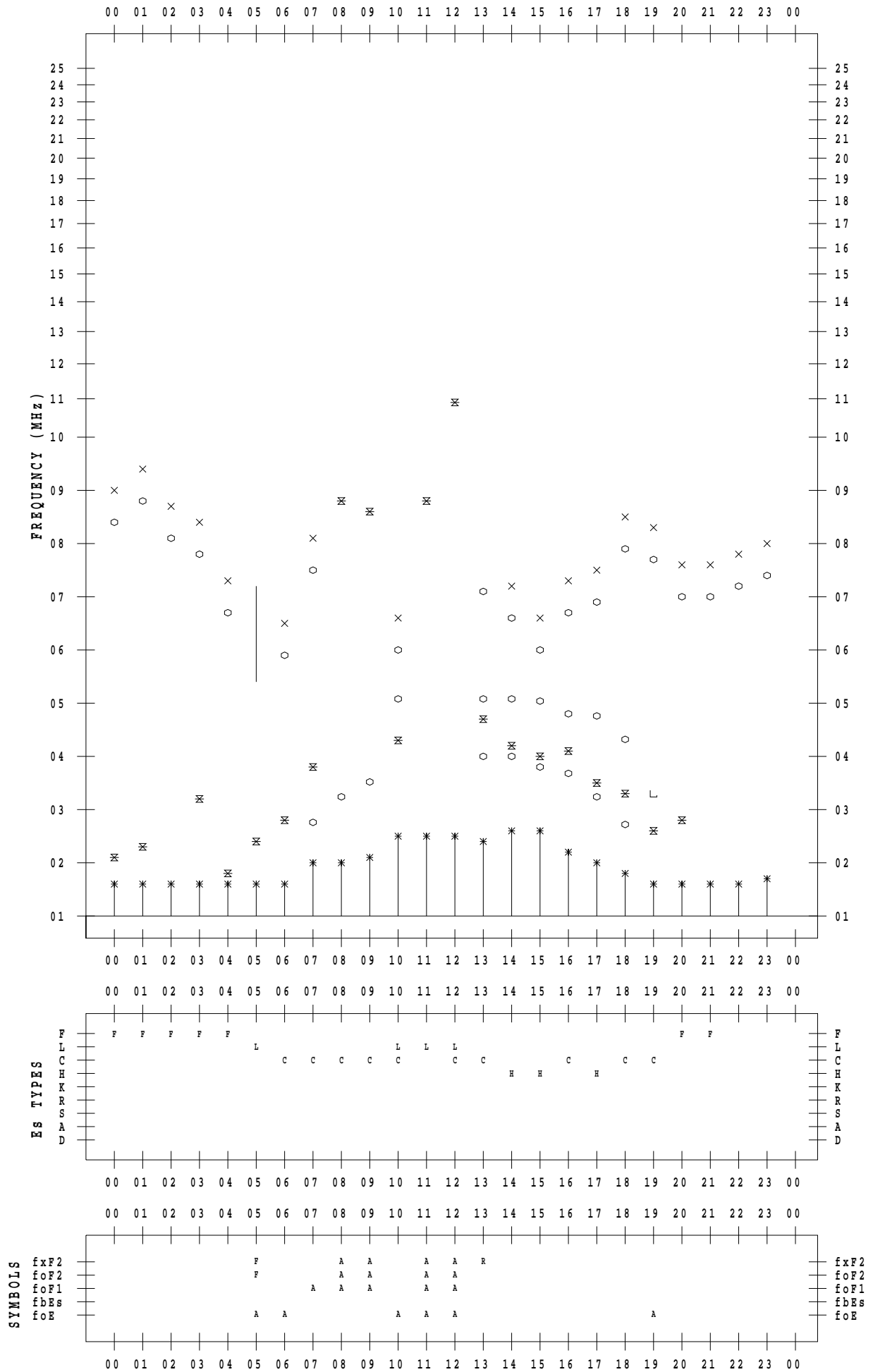
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SCALER :

STATION : Okinawa

DATE : 2023 / 7 / 7

135 ° E MEAN TIME





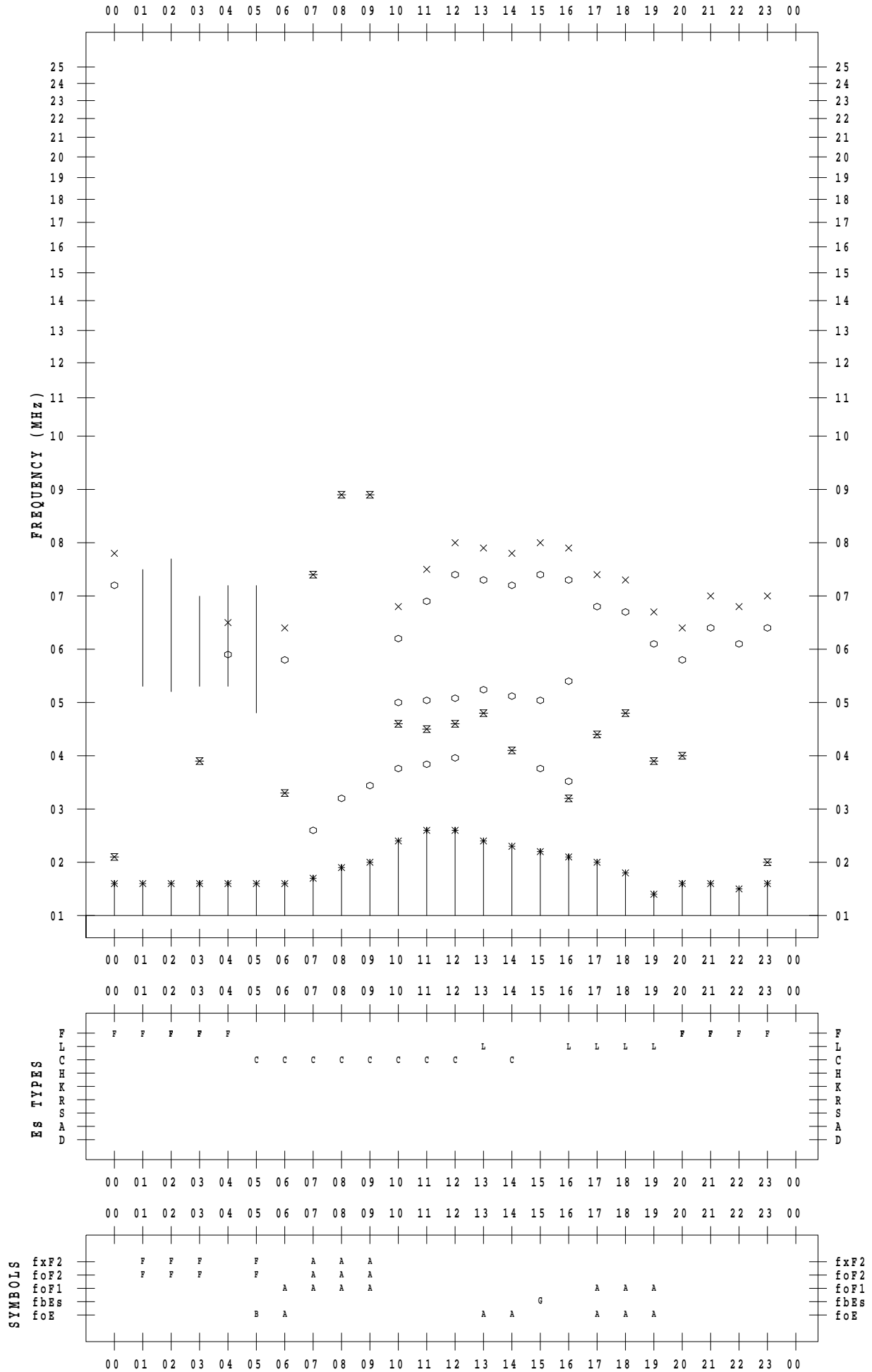
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SCALER :

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DATE : 2023 / 7 / 8

135 ° E MEAN TIME



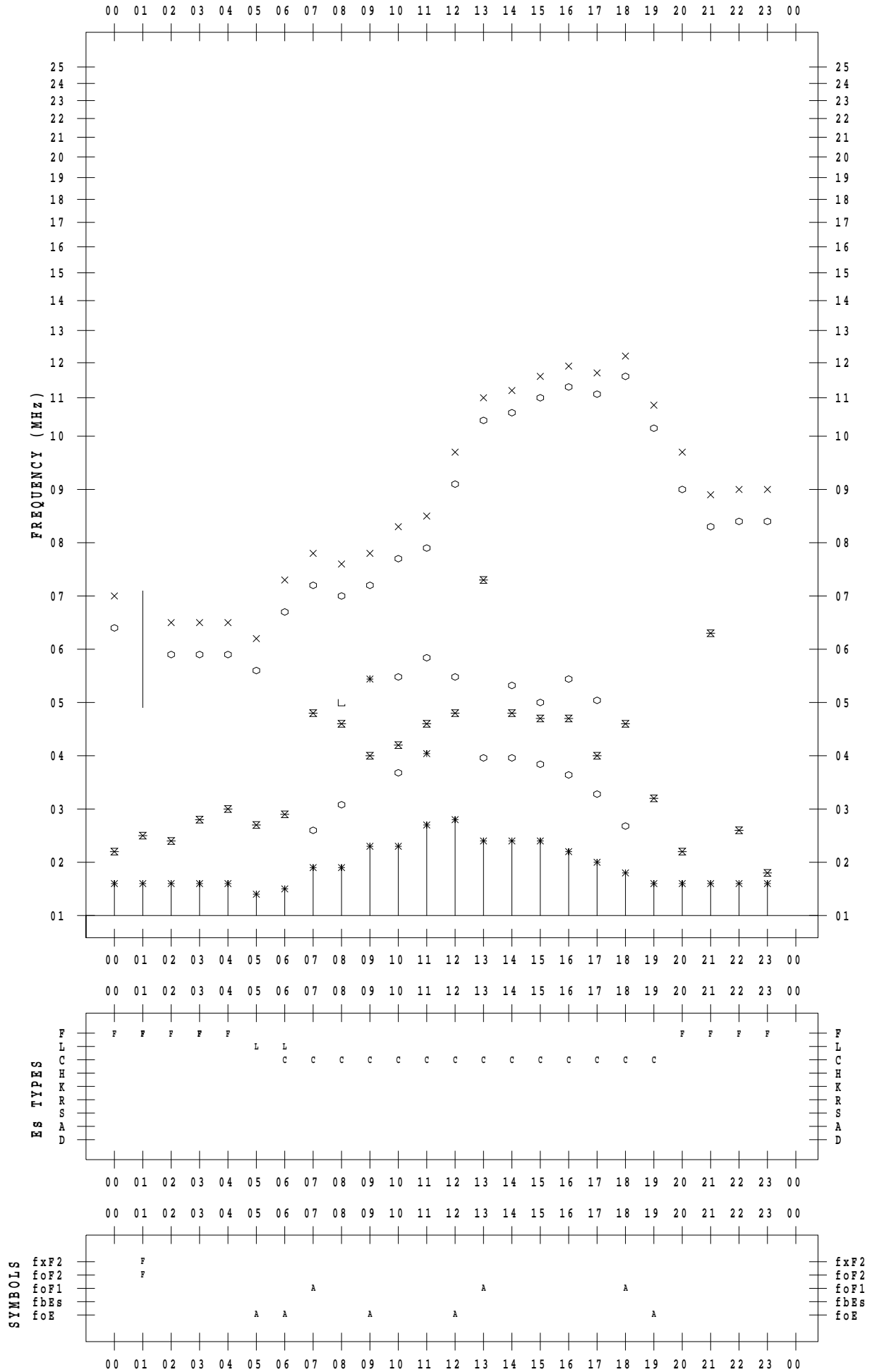
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SCALER :

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DATE : 2023 / 7 / 9

135 ° E MEAN TIME



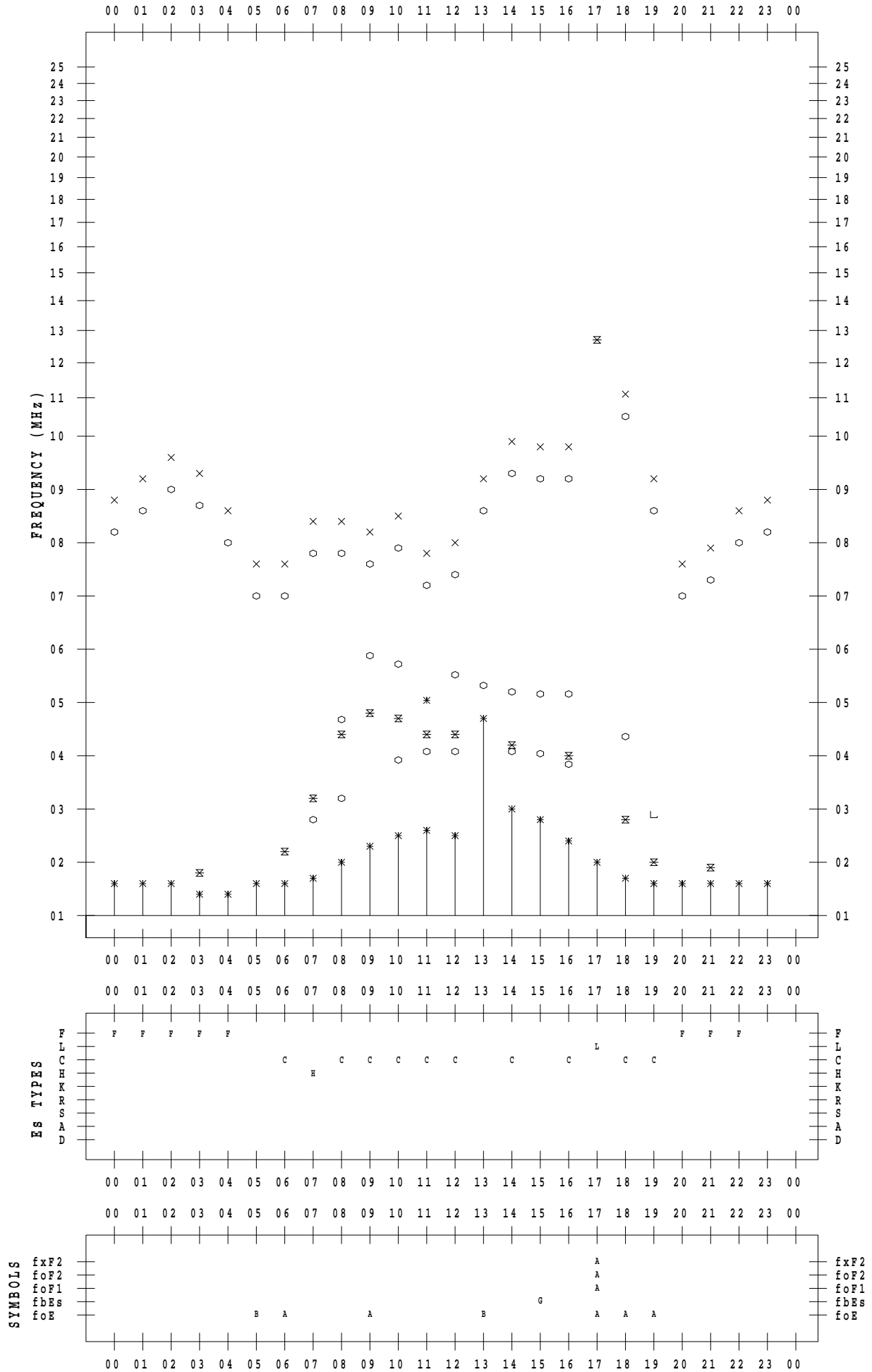
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SCALER :

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DATE : 2023 / 7 / 10

135 ° E MEAN TIME



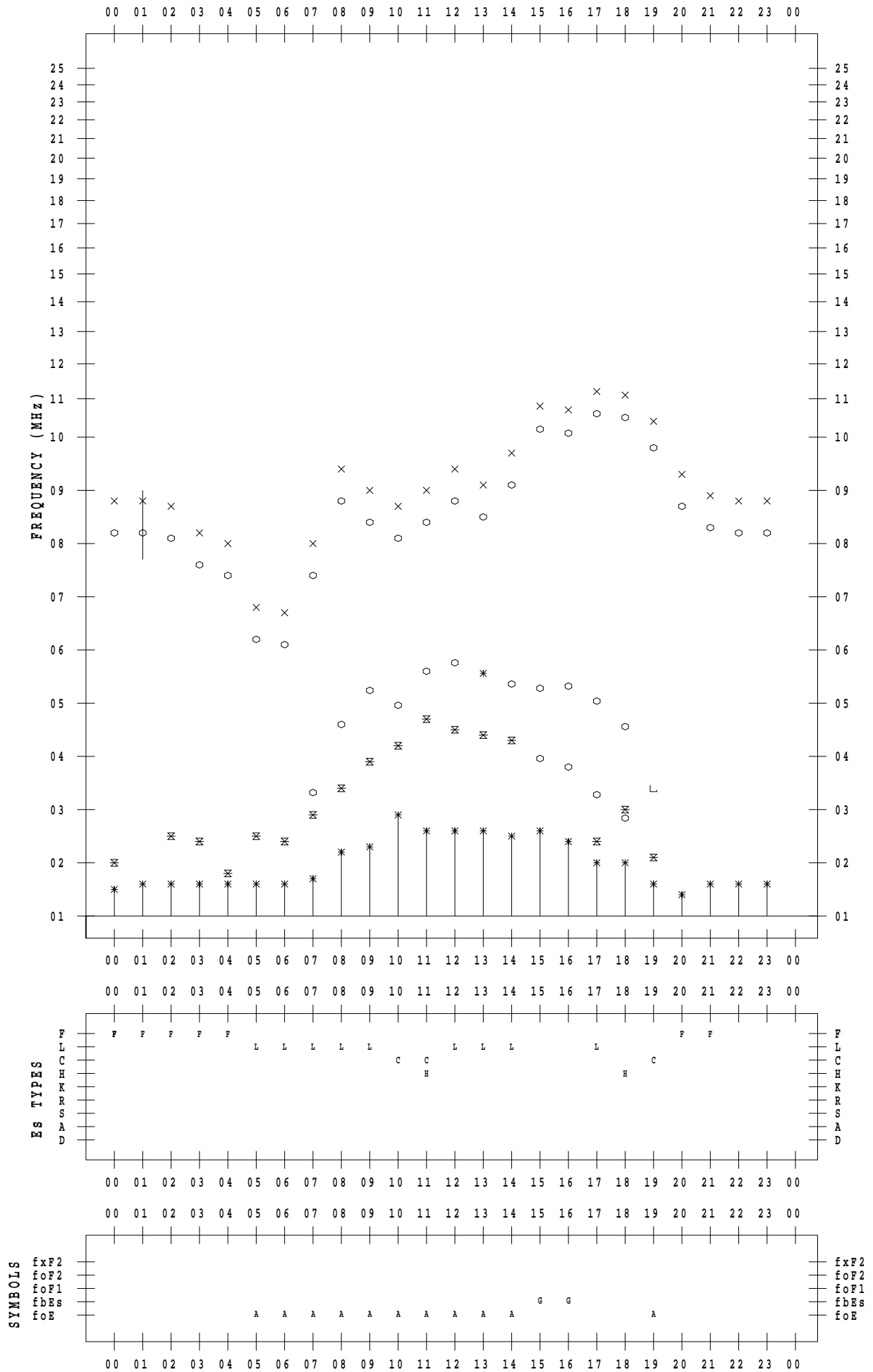
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SCALER :

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DATE : 2023 / 7 / 11

135 ° E MEAN TIME



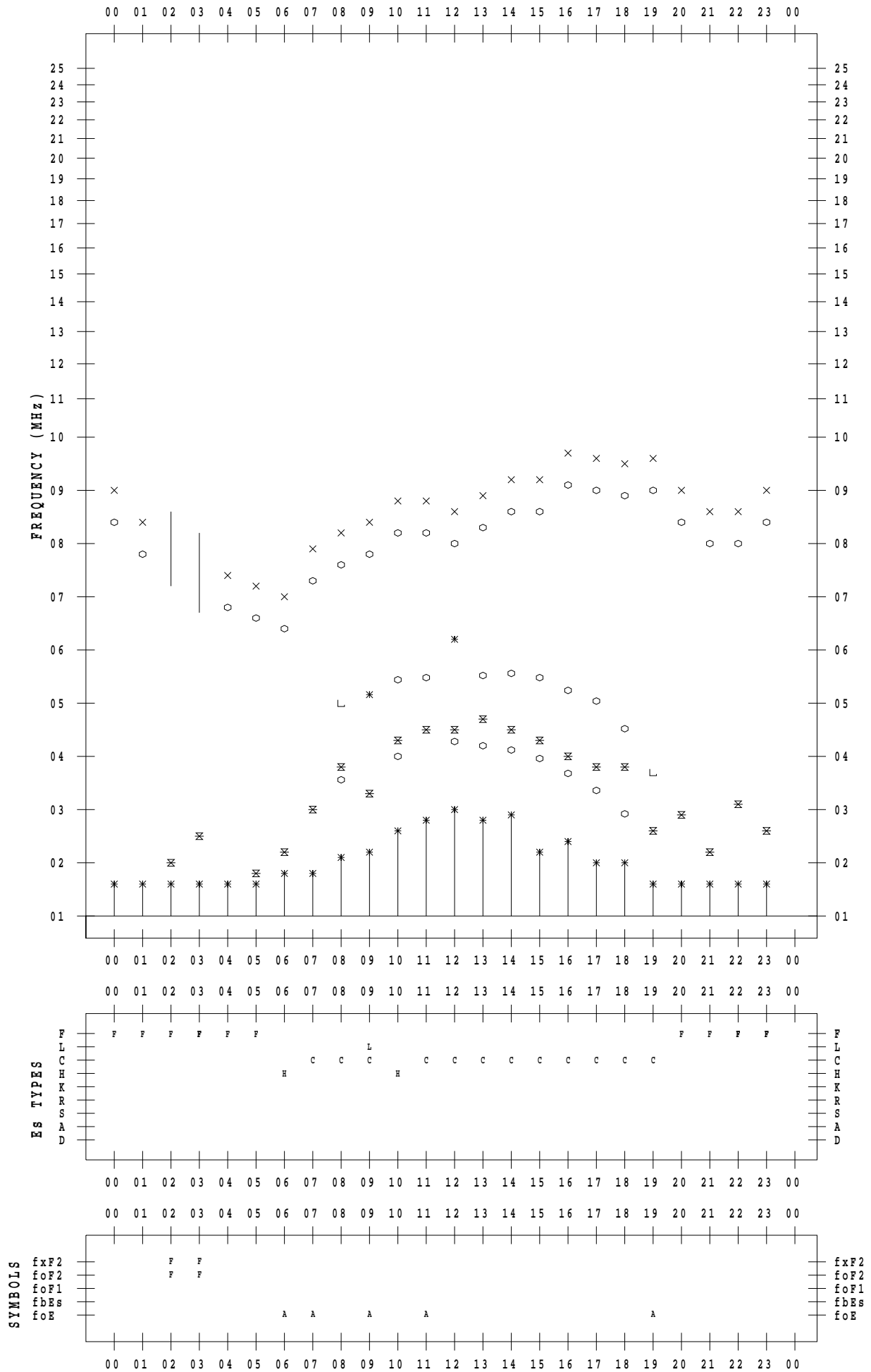
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SCALER :

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DATE : 2023 / 7 / 12

135 ° E MEAN TIME



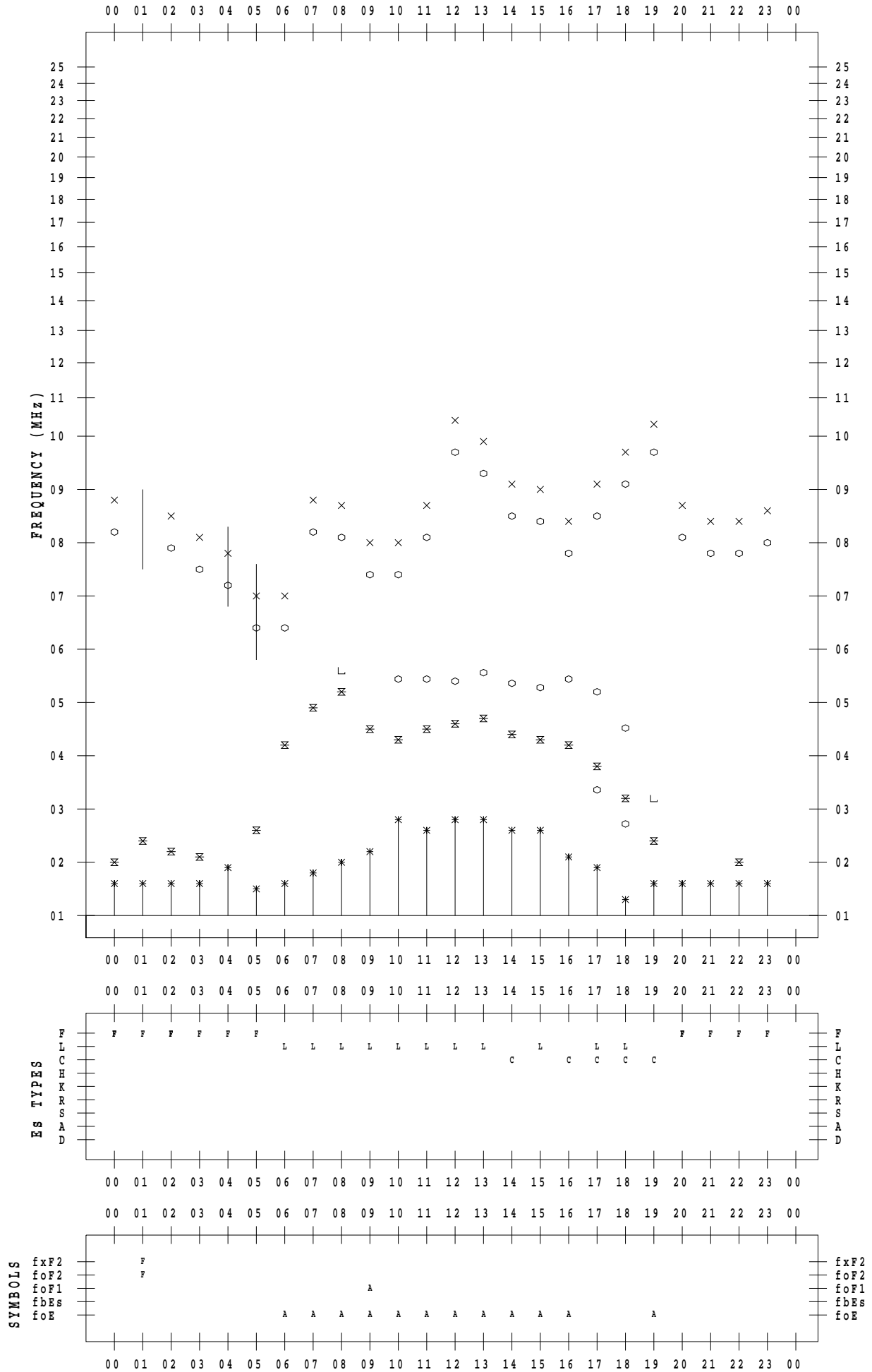
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SCALER :

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DATE : 2023 / 7 / 13

135 ° E MEAN TIME



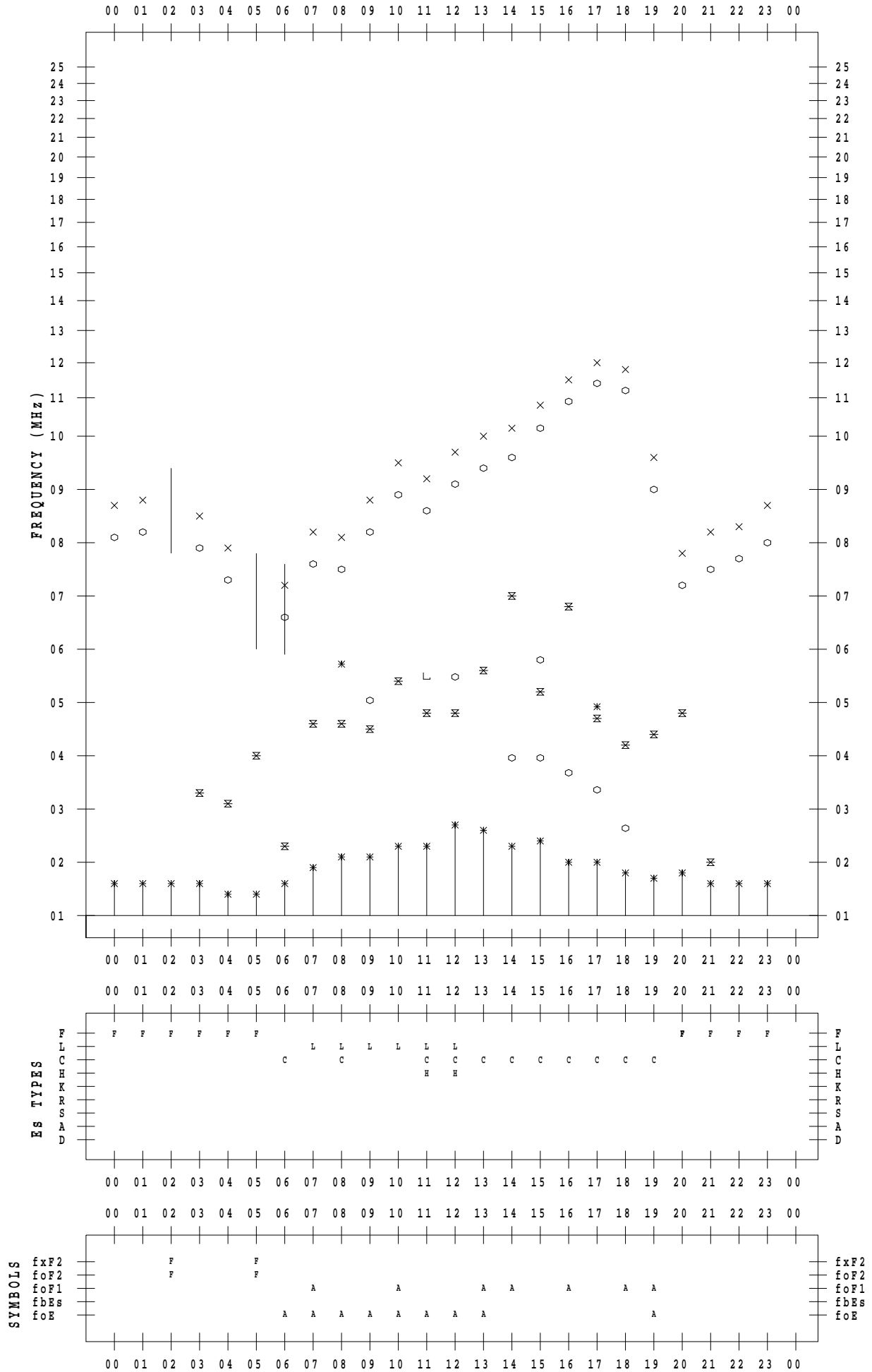
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SCALER :

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DATE : 2023 / 7 / 14

135 ° E MEAN TIME



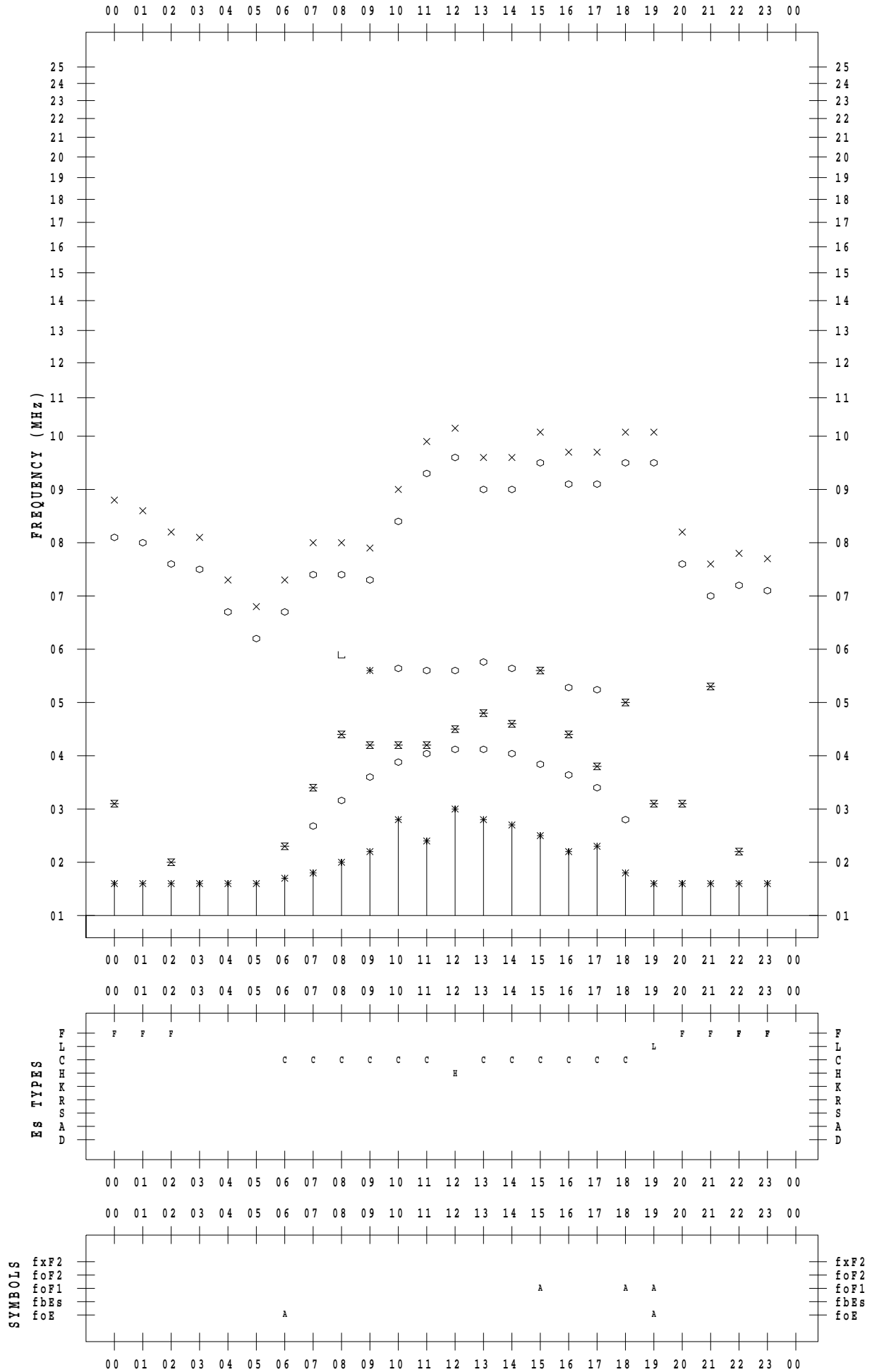
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SCALER :

STATION : Okinawa

DATE : 2023 / 7 / 15

135 ° E MEAN TIME





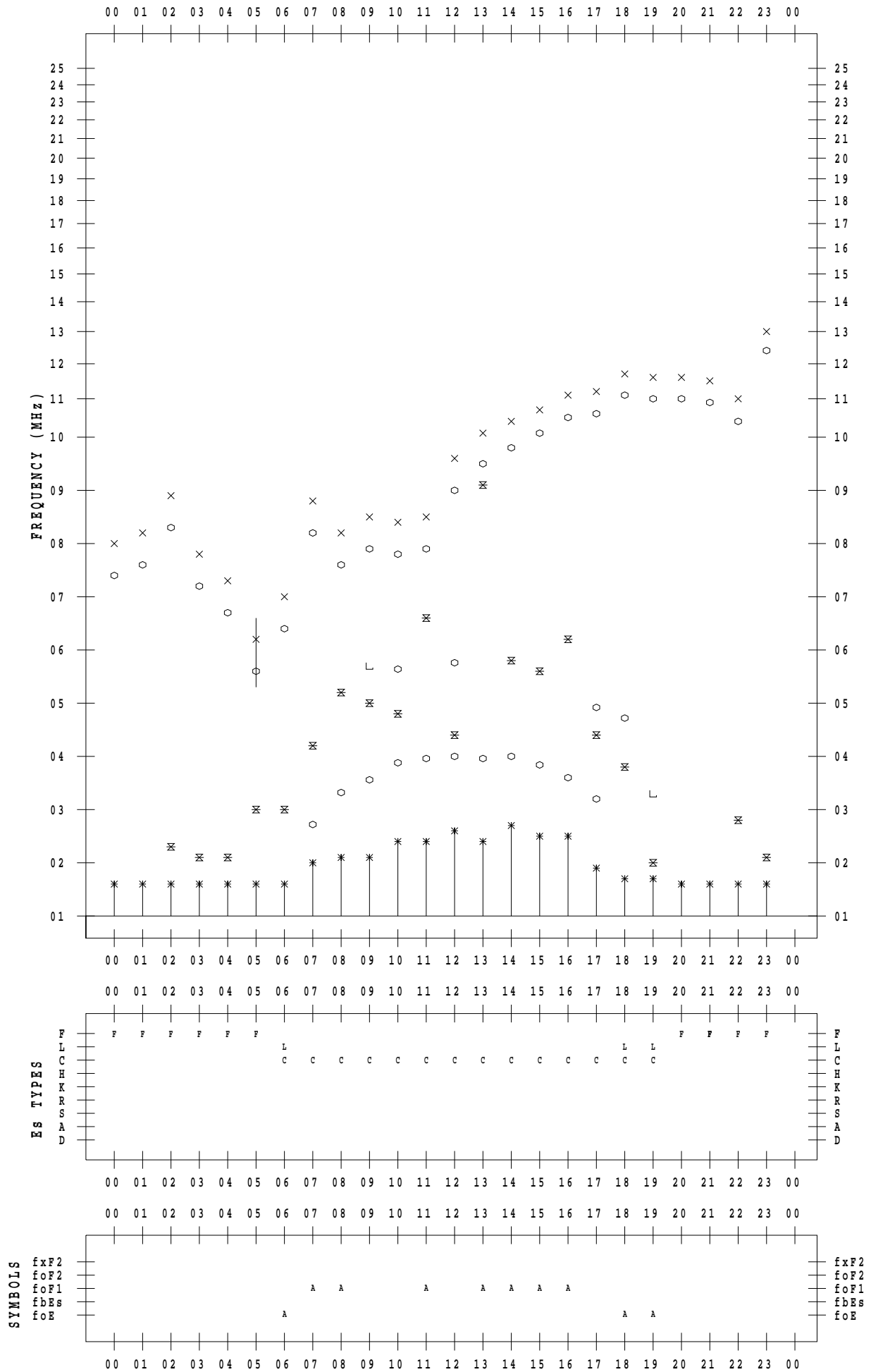
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SCALER :

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DATE : 2023 / 7 / 16

135 ° E MEAN TIME



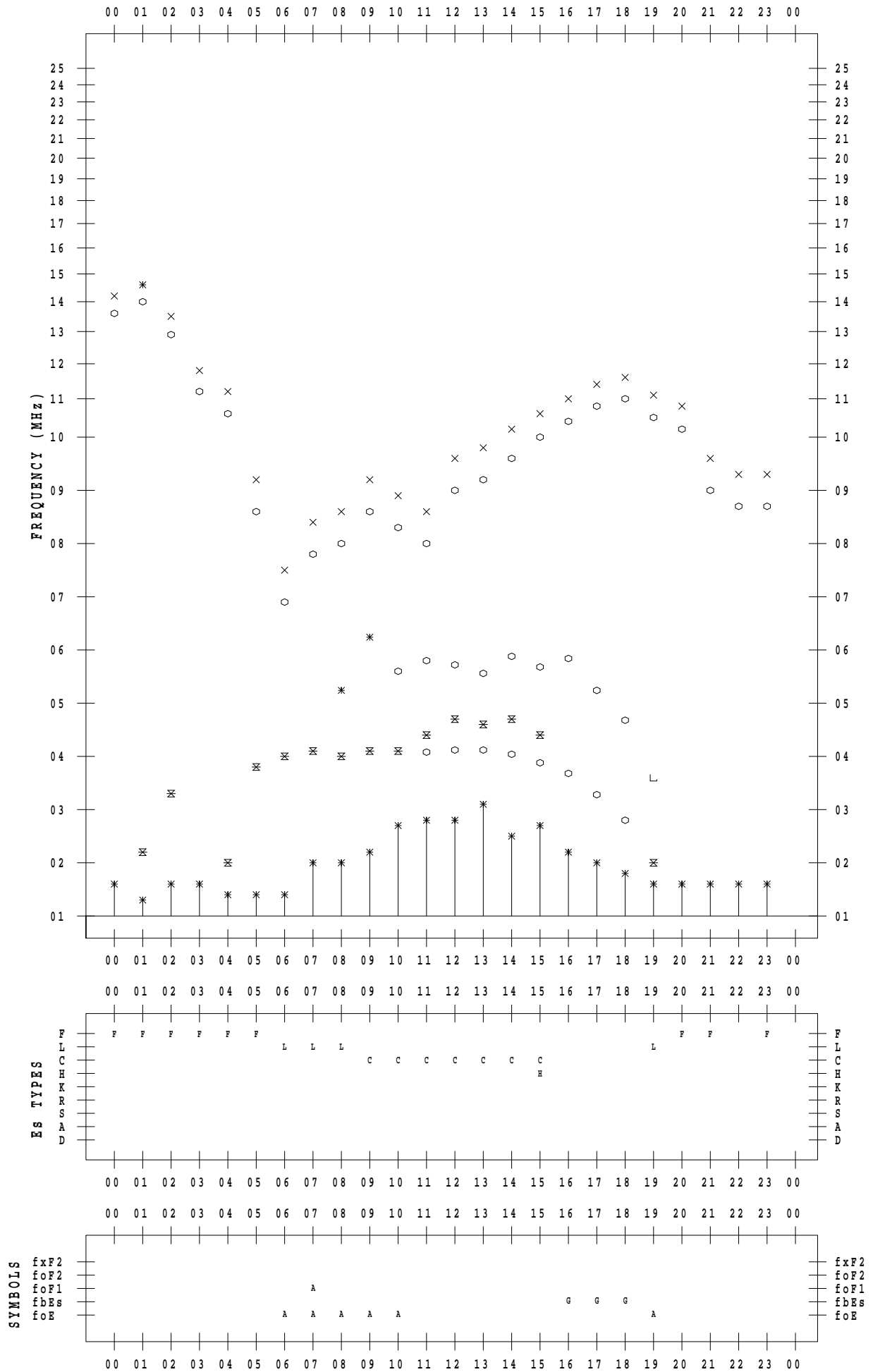
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SCALER :

STATION : Okinawa

DATE : 2023 / 7 / 17

135 ° E MEAN TIME



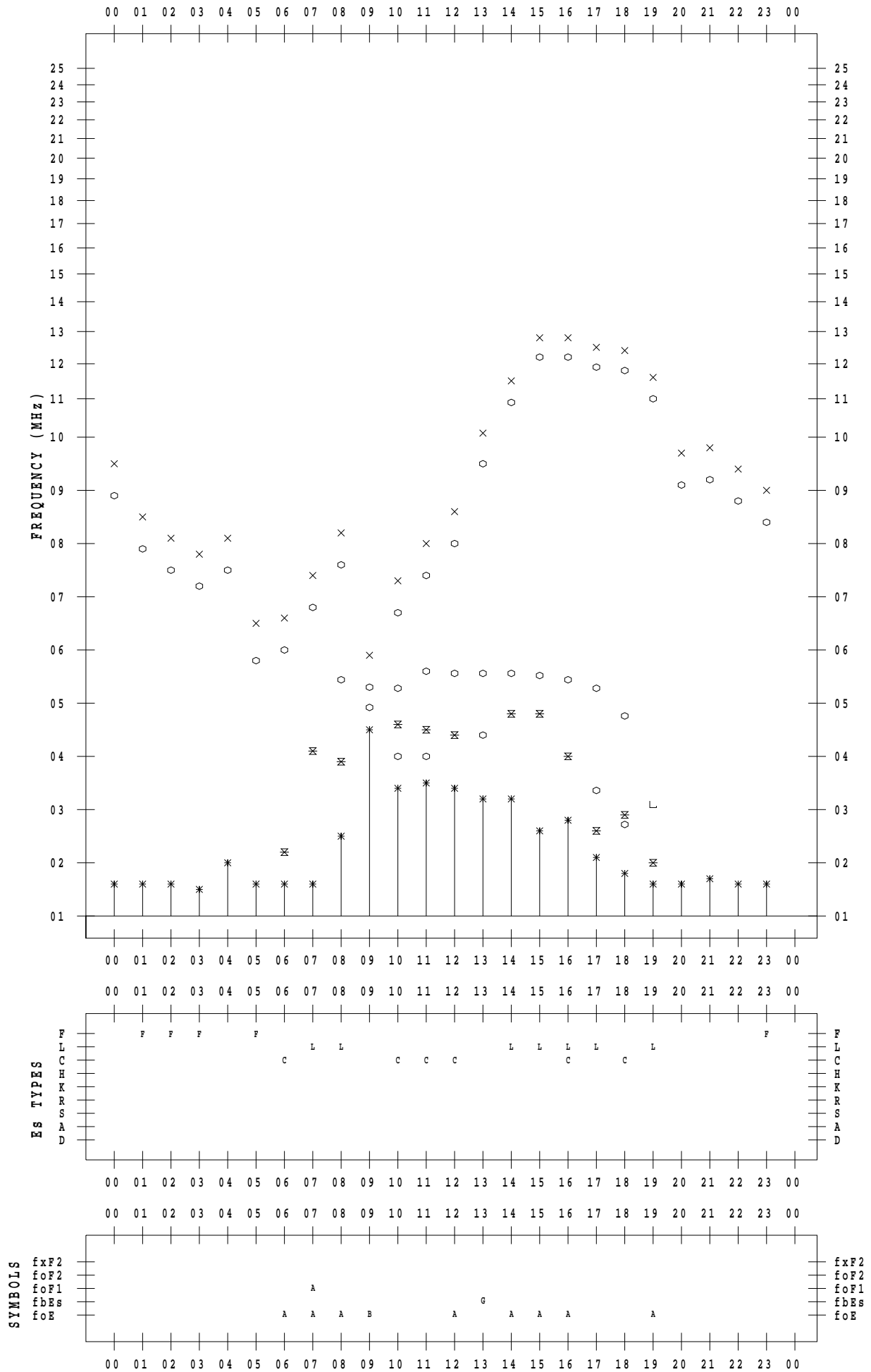
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SCALER :

STATION : Okinawa

DATE : 2023 / 7 / 18

135 ° E MEAN TIME



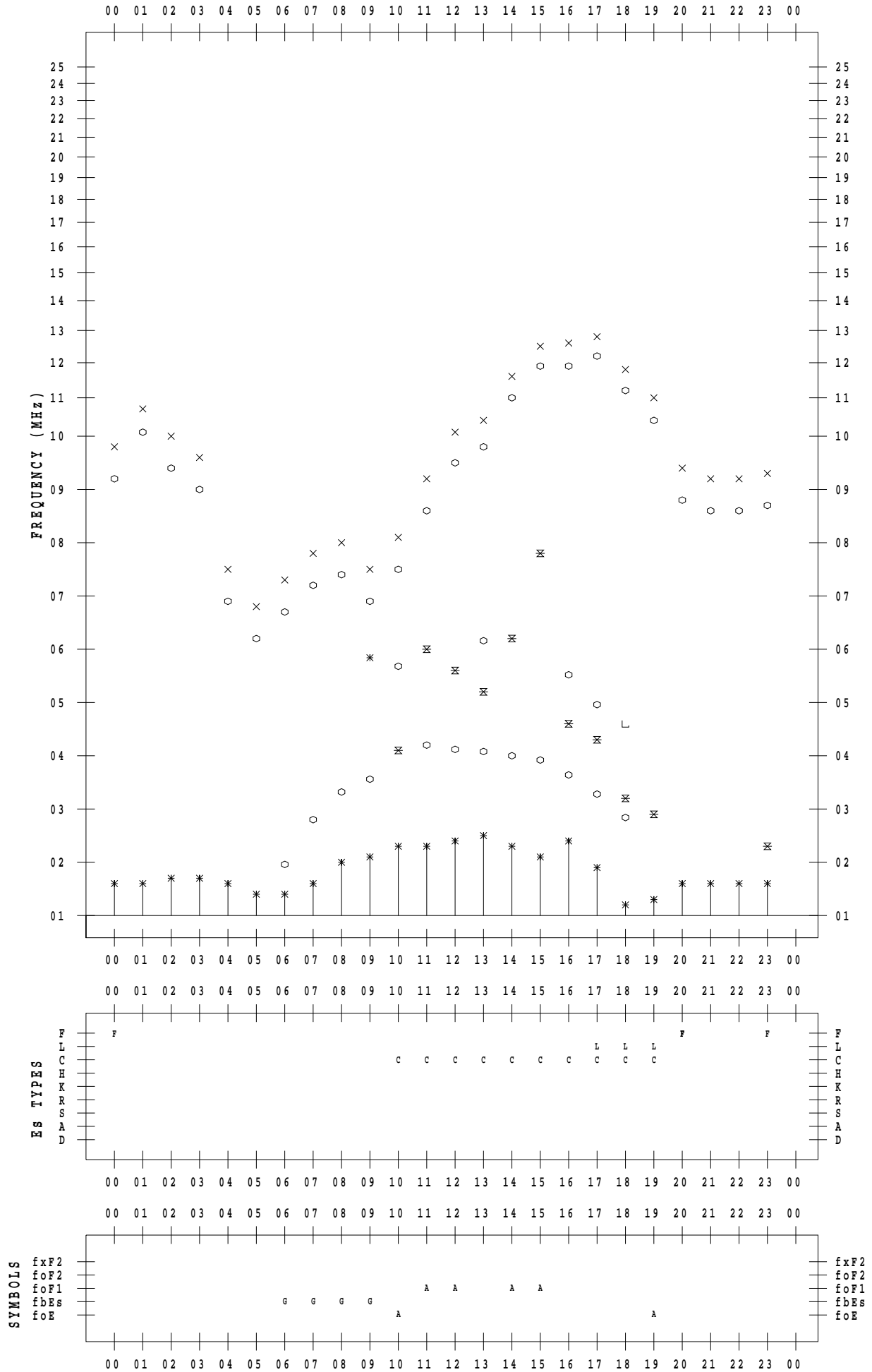
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SCALER :

STATION : Okinawa

DATE : 2023 / 7 / 19

135 ° E MEAN TIME



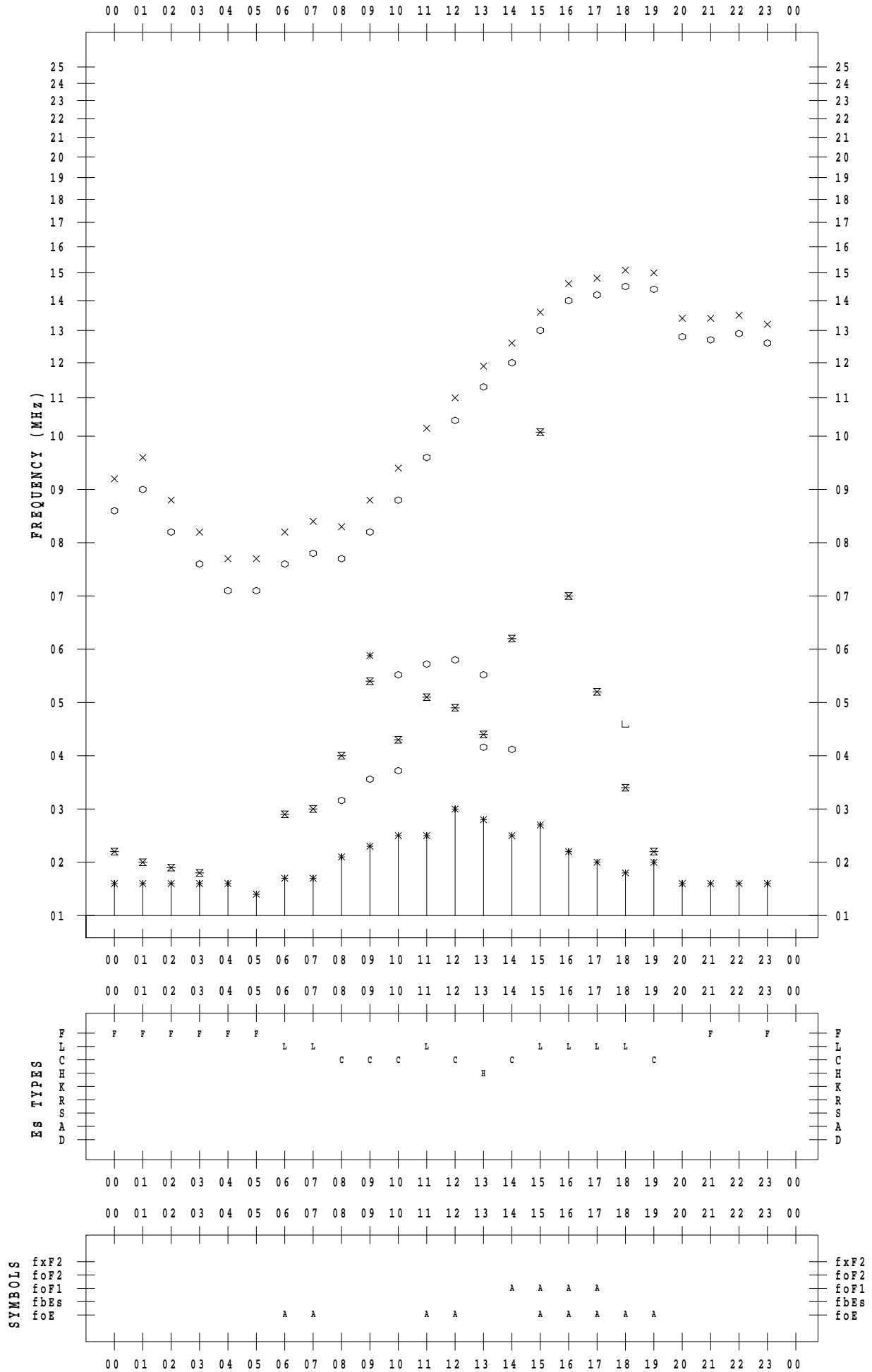
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SCALER :

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DATE : 2023 / 7 / 20

135 ° E MEAN TIME



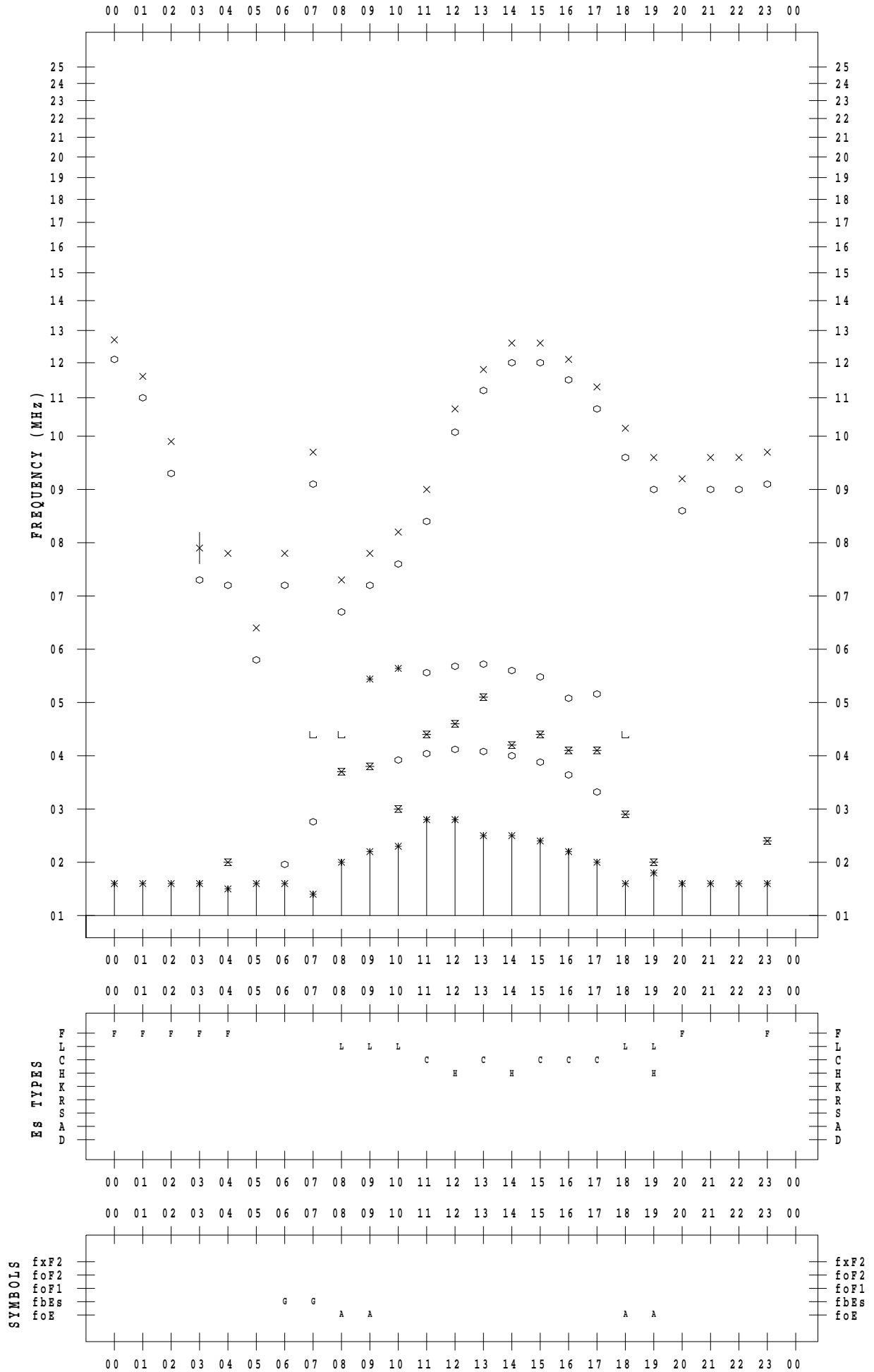
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SCALER :

STATION : Okinawa

DATE : 2023 / 7 / 21

135 ° E MEAN TIME



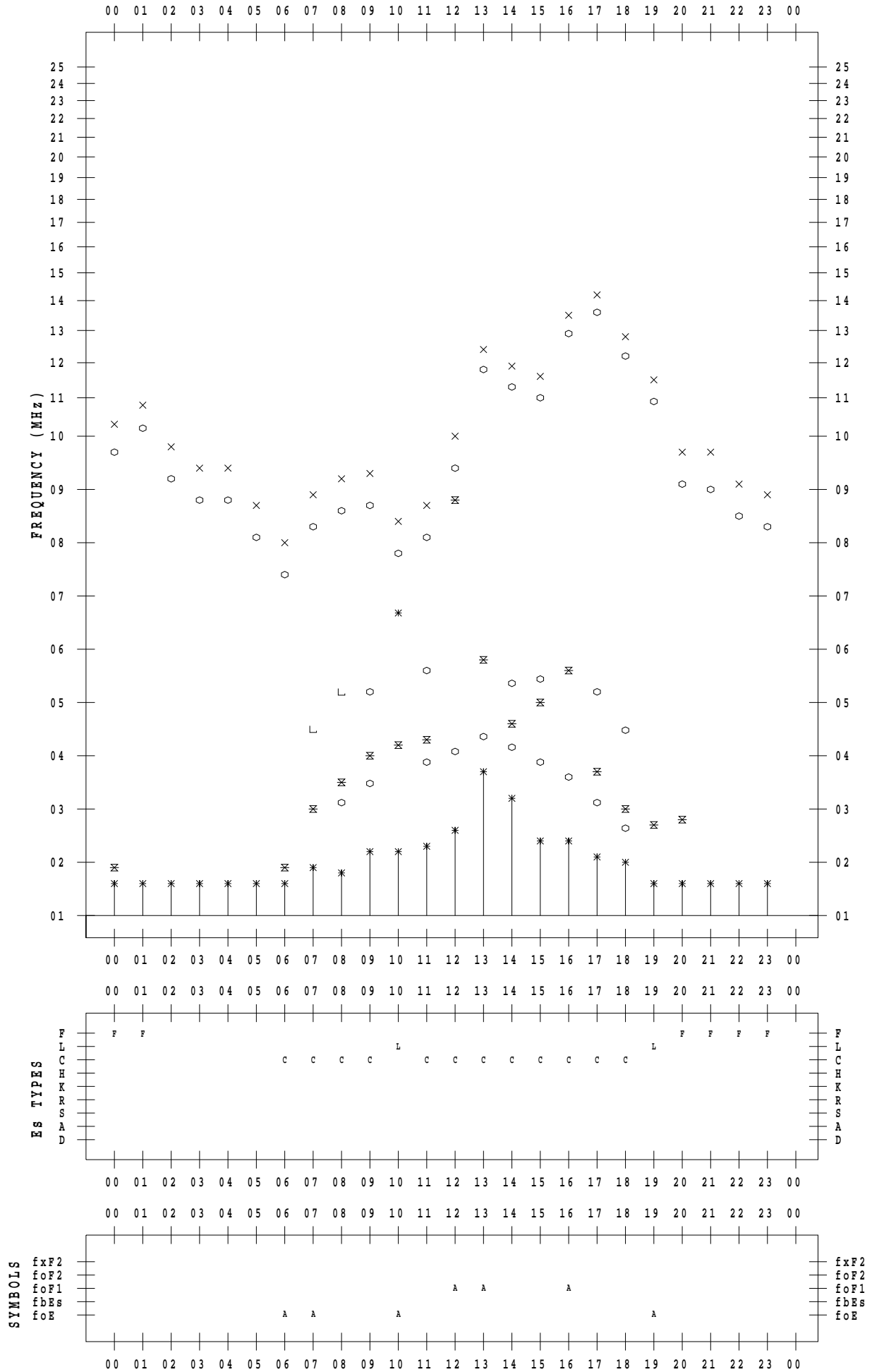
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SCALER :

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DATE : 2023 / 7 / 22

135 ° E MEAN TIME



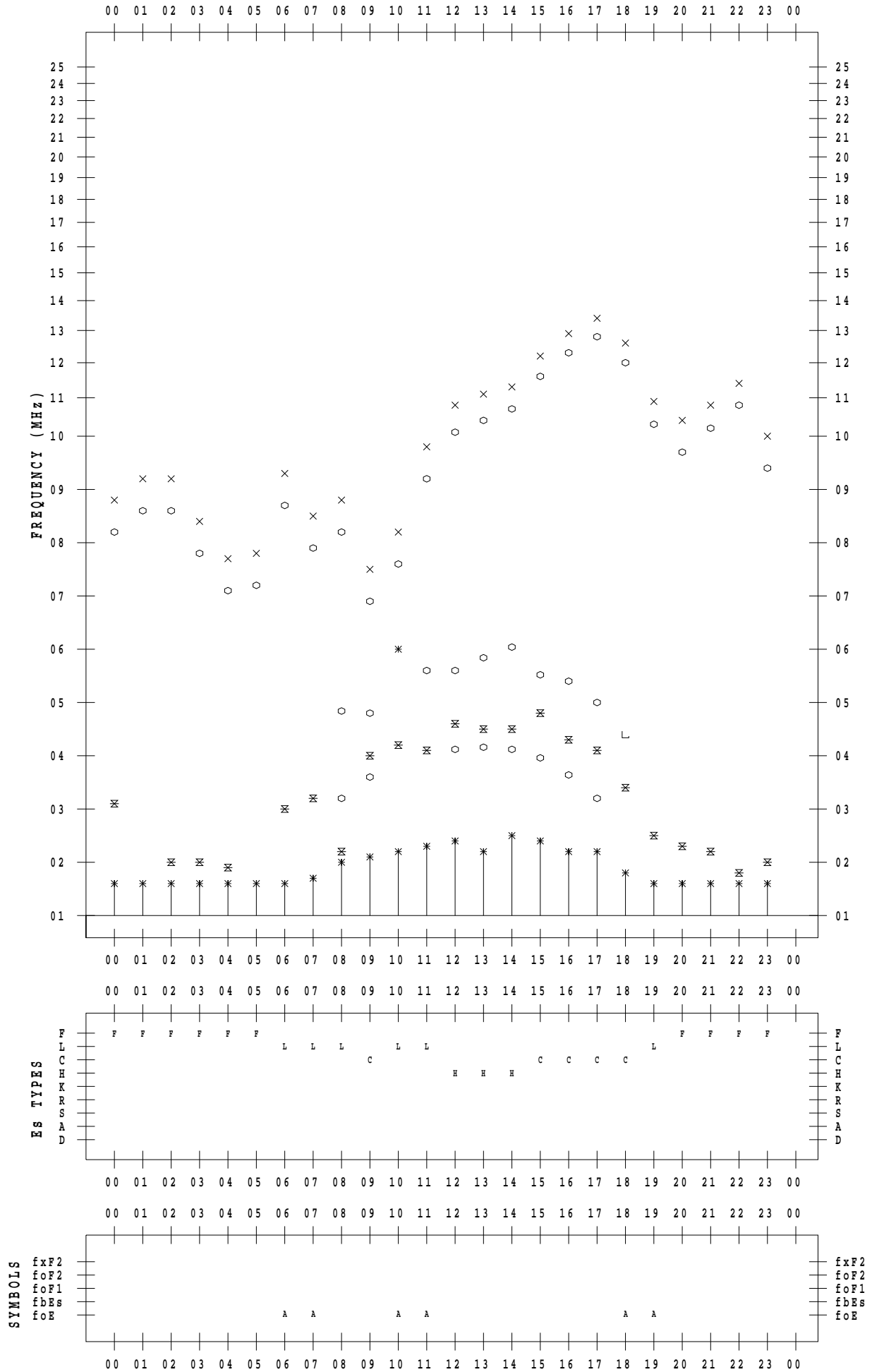
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SCALER :

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DATE : 2023 / 7 / 23

135 ° E MEAN TIME





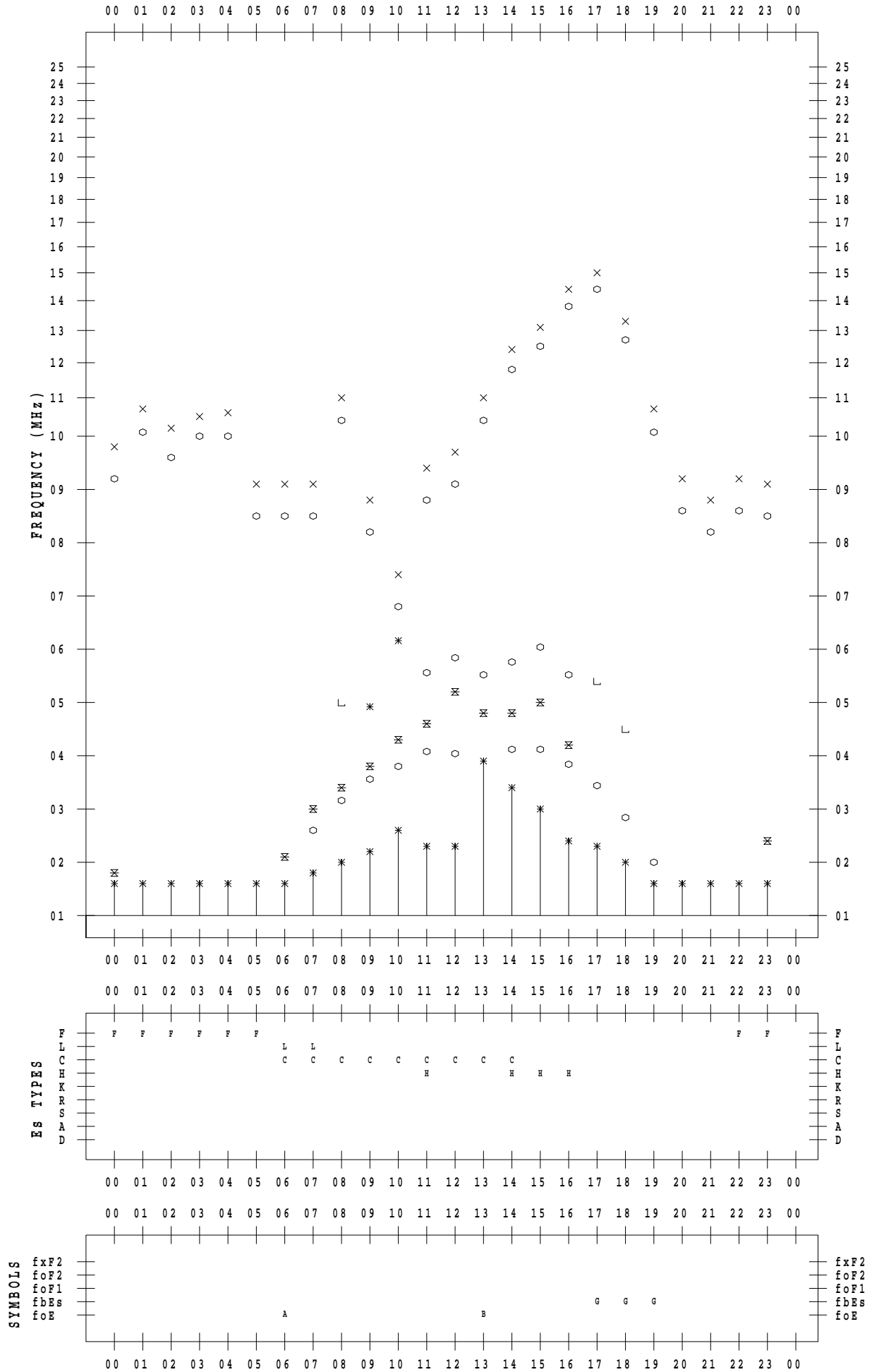
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SCALER :

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DATE : 2023 / 7 / 24

135 ° E MEAN TIME



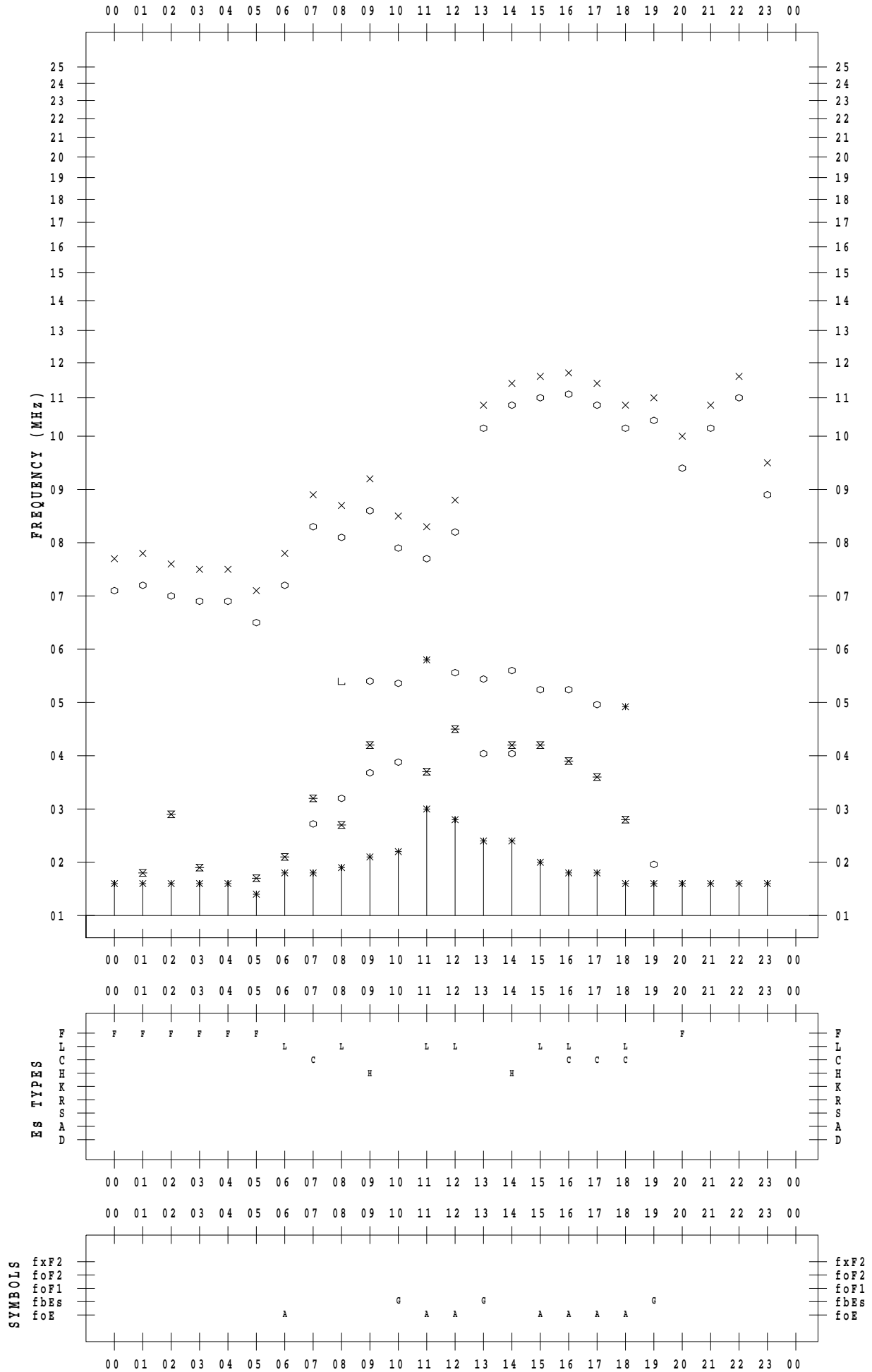
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SCALER :

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DATE : 2023 / 7 / 25

135 ° E MEAN TIME



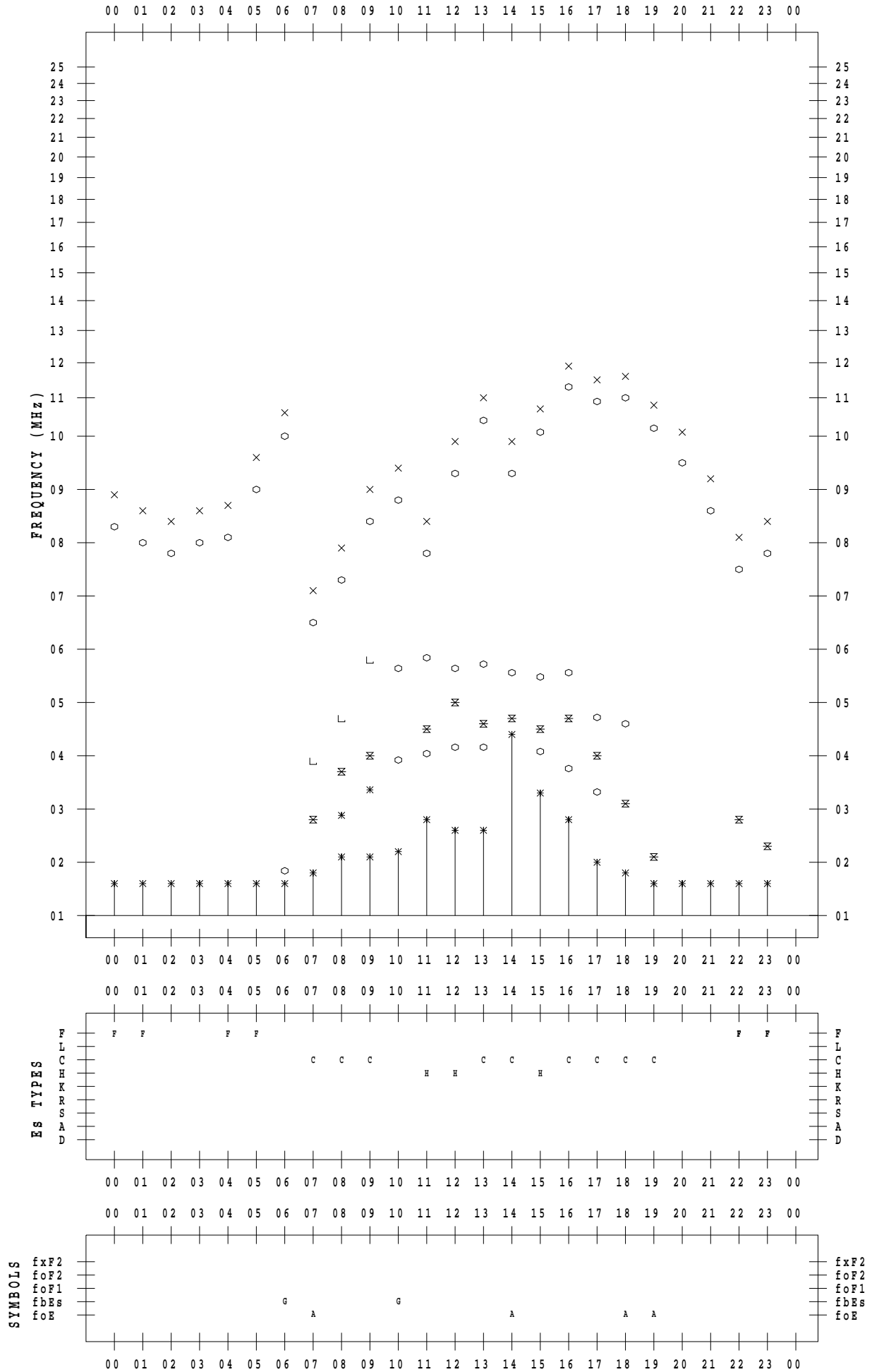
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SCALER :

STATION : Okinawa

DATE : 2023 / 7 / 26

135 ° E MEAN TIME



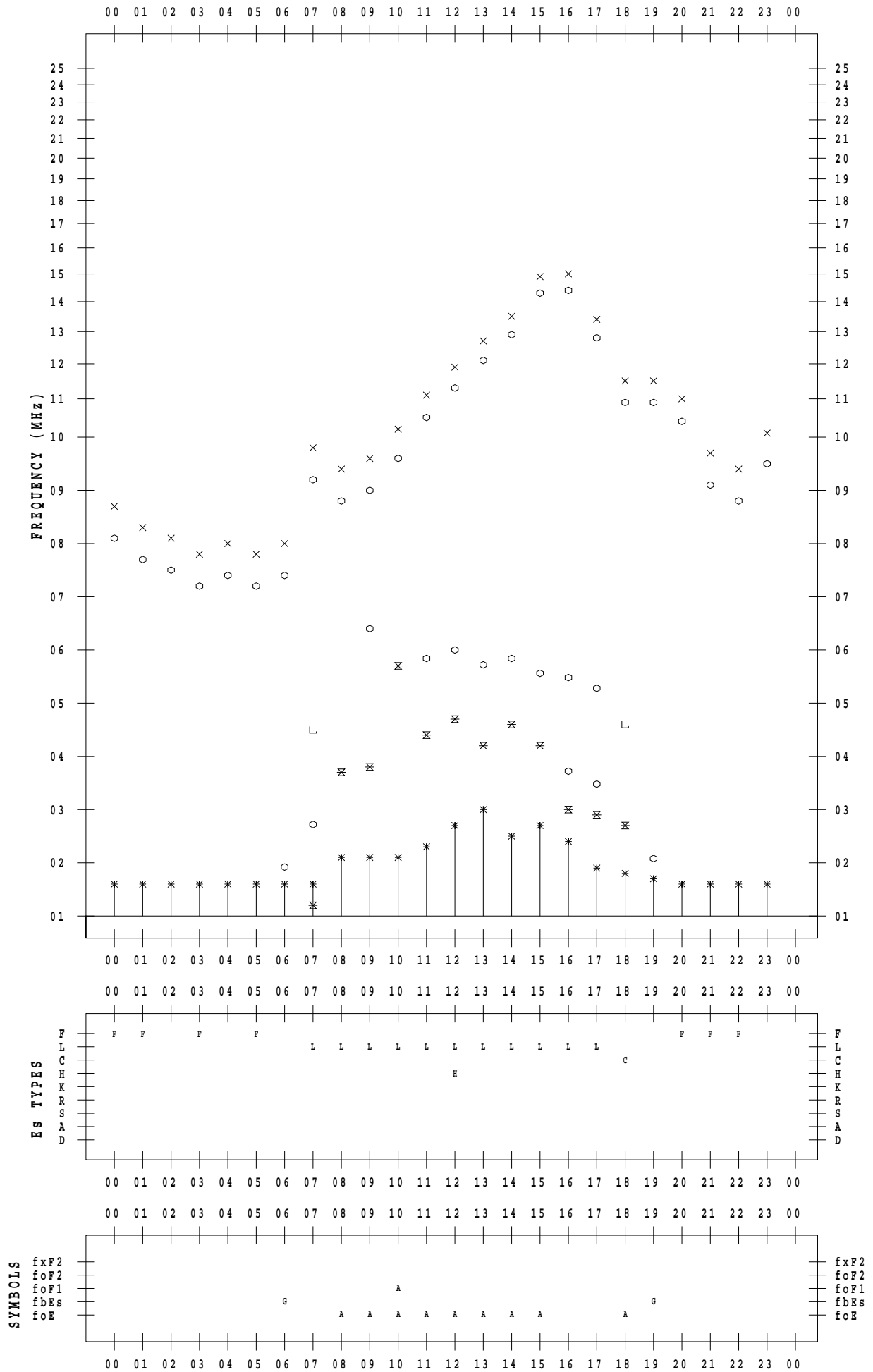
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SCALER :

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DATE : 2023 / 7 / 27

135 ° E MEAN TIME



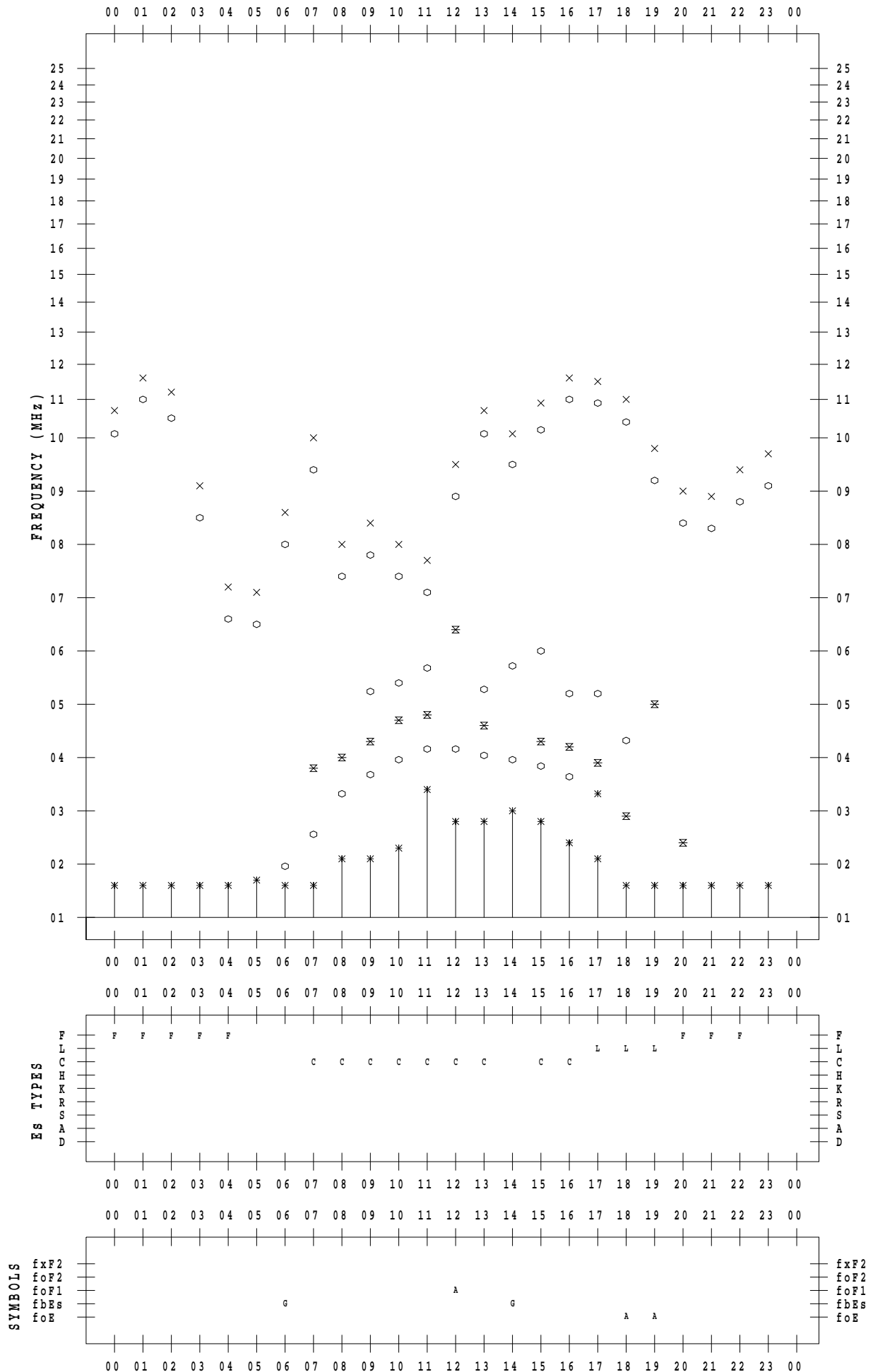
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SCALER :

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DATE : 2023 / 7 / 28

135 ° E MEAN TIME



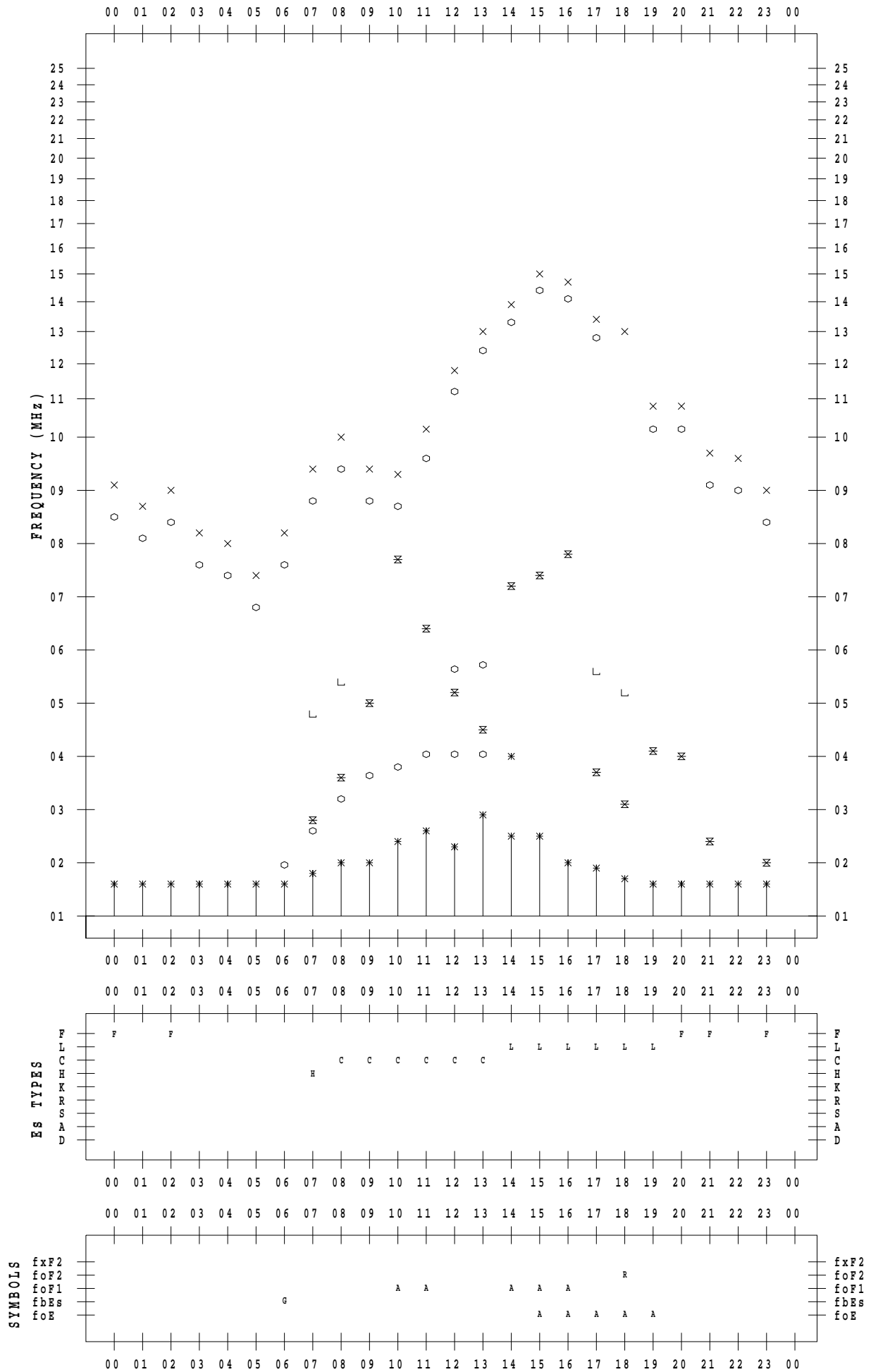
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SCALER :

STATION : Okinawa

DATE : 2023 / 7 / 29

135 ° E MEAN TIME



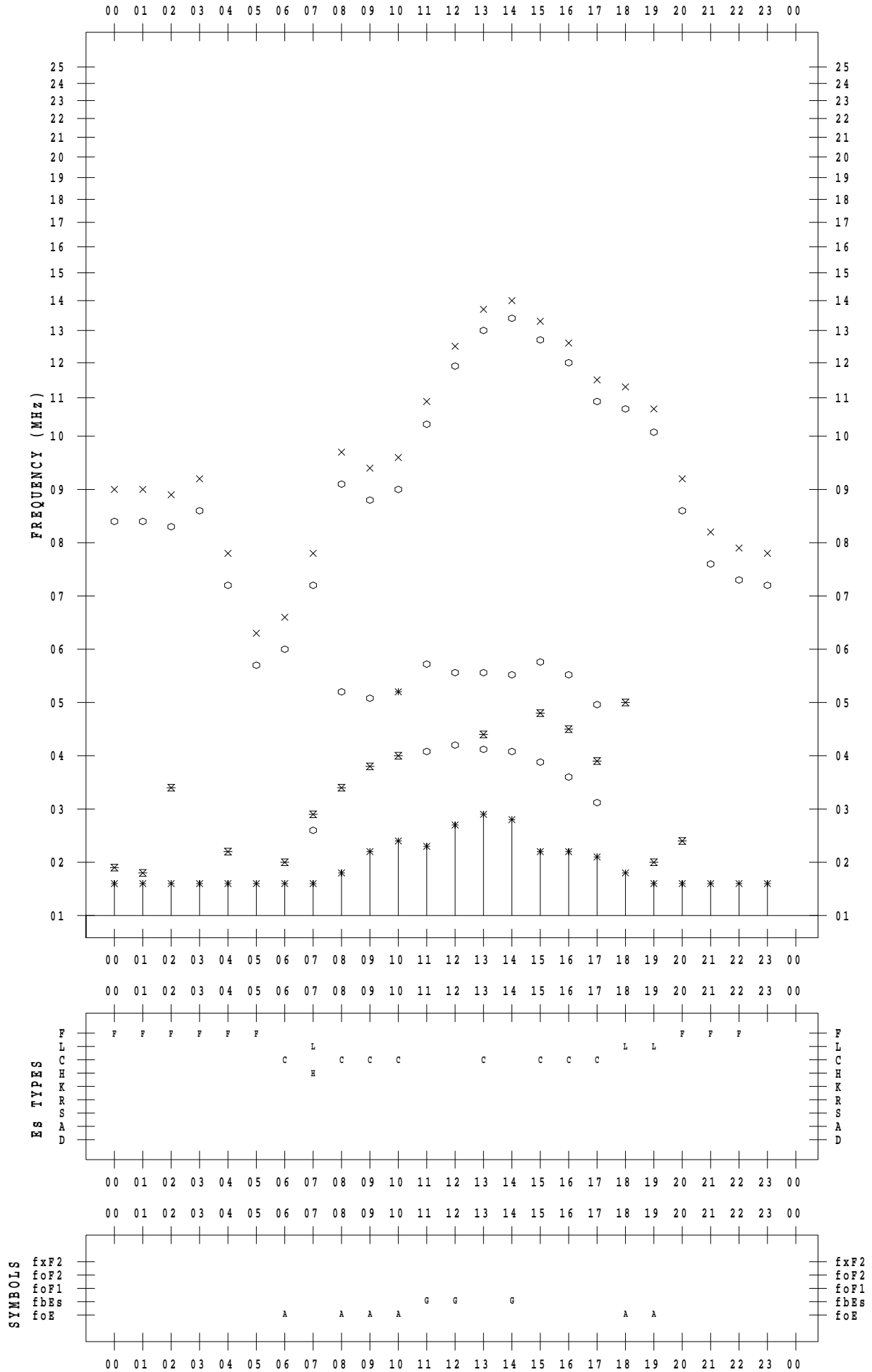
# f - PLOT DATA

SCALER :

STATION : Okinawa

DATE : 2023 / 7 / 30

135 ° E MEAN TIME



# f - PLOT DATA

SCALER :

STATION : Okinawa

DATE : 2023 / 7 / 31

135 ° E MEAN TIME

