

IONOSPHERIC DATA IN JAPAN

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« Real Time Ionograms on the Webhttp://wdc.nict.go.jp/index_eng.html »



NATIONAL INSTITUTE OF INFORMATION
AND COMMUNICATIONS TECHNOLOGY
TOKYO, JAPAN

INTRODUCTION

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

National Institute of Information and Communications Technology, Japan.

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

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

IONOSPHERE

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

A1. Automatic Scaling

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

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

a. Characteristics of Ionosphere

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

b. Descriptive Letters

The following descriptive letters are used in the tables.

- A Impossible measurement because of the presence of a lower thin layer, for example **Es** (for f_oF2).
- C Impossible measurement because of any failure in observation.
- G Impossible automatic scaling because of very small ionization density of the layer (for fEs).
- N Impossible automatic scaling because of complex echoes.
- Blank No digital record because of problems occurring in the automatic data processing system, but existence of film record.

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

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

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

of values.

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

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

d. Reliability of Automatic Scaling

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

e. Summary Plot

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

A2. Manual Scaling

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

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

a. Characteristics of Ionosphere

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

b. Symbols

(i) Descriptive Letters

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

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

(ii) Qualifying Letters

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

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

extraordinary component.

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

(iii) Description of Types of *Es*

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

The types are:

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

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

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

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

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

HOURLY VALUES OF fof2 AT Wakkanai

DEC. 2020

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

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

HOURLY VALUES OF fEs AT Wakkanai

DEC. 2020

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	28	30	G	31	27	G	G	G	49	34	35	43	36	36	33	30	11	11		G	G	G	G	93	
2	G	130	G	G	11	31		28	36	40	42	40	42	54	32	31	11	G	G	G	G	G	G	G	
3	G	G	G	G	G	160	G	38	33	34	59	41	43	40	42	36	26	G	G	G	G		G	G	
4	G	G	G	G		35	G	28	28	38	39	28	29	28	G	45	41	38	G	G	G	G	G	G	
5	G	G	G	G	G	26	G	32	52	37	34	34	33	28	27	G	11	G	G	G	G	G	G	G	
6	G	G	G	G	127	G	G	32	50	70	39	36	35	28	33	34	11	11	G	G		G	G	G	
7	G	24	26	30	G	32	G	154	30	48	49	43	45	36	56	36	40	11	G	G	G	G	G	33	
8	27	G	G	G	G	G	G	11	55	115	156	34	32	49	32	G	42	33	G	25	50	25	27	G	
9	29	58	34	28	126	28	G	84	29	43	39	43	53	41	33	34	28	28		G	G	G	G	G	
10	31	G	G	G	G	G	G	48	32	40	38	38	35	34	32	33	28	26	G	25	G	G	G	G	
11	25	G	G	G	59	G	G	11	30	35	40	103	53	40	54	34	31	31	G	G	G	G	58	G	
12	45	34	46	69	25	G	124	19	126	49	34	36	50	26	26	G	39	G	G	G	G	G	G	29	
13	32	27	G	G	G		39	G	92	38	32	29	50	37	34	41	45	G	G	G	207	G	G	92	
14	G	G	G	G	60	45	G	32	22	39		44	52	G	G	G	11	G	60		115	113	60	40	
15	31	27	G	G	G	G		28	44	48	28	28	34	38	27	G	G	11	G	G	G	G	G	G	
16	33	28	28	G	G	28	27	11	54	26	27	48	50	28	38	38	40	35	32	G		G	G	G	
17	27	27	G	24	26	G	29	69	34	58	G	31	28	50	48	G	34	39	33	33	49	38	56	31	
18	30	G	28	26	G	28	26	G	40	48	45	44	34	33	G	G	19	G	G	38	61	40	28	G	
19	G	G	G	G	G	G		40	39		33	34	36	36	33	G	G	23	25	G	G	35	30	25	G
20	G	G	G	G	G	G	G		29	52	25	26	27	28	27	G	G	11	G	G	G	G	G	30	
21	G	G		G	G	G	G	112	23	26	42	38	35	27	25	G	11	G	G	G	G	G	G	G	
22		G	G	G		G	G	G		54	39	115	45	41	64	N	G	38	G	G	G	G	G	G	G
23	G	24	G	G	25	G	G	27	34	37	55	38	35	34	32	48	11	G	G	G	G	G	G	G	
24	G	G	G	G	G	G	G	G		31	39	36	36	36	36	32	G	30	G	G	G	G	G	G	G
25	43	G	23	26	24	G		G		30	38	36	58	32	47	40	31	21	G	G	G	G	G	G	G
26	28	G	G	G	G	G	G	G		55	31	34	47	28	34	38	23	48	34	G	G	G	G	G	G
27	G		32	26	24	24	G	36	48	48	34	28	G	G		27	32	48	G	G	G	G	G	G	G
28	28	28	G	G	G	G	G	G		48	127	48	57	52	38	48	38	11	G	G	G	G	G	G	G
29	28	G	29	G	23	G	G		26	32	148	36	36	36	48	47	38	11	32	G	G		G	G	G
30	G	G	G	G	24	56	G	125	70	31	34	37	52	G	G	G	70	G		G		31	G	G	
31	G	G	G	G	G	G	G		113	39	48	46	49	G				G	G	31	G	31	35	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	30	30	31	29	30	29	31	30	31	30	31	31	31	30	31	31	31	28	30	30	30	31	31	
MED	13	G	G	G	G	G	G	28	40	39	37	38	36	34	32	31	26	G	G	G	G	G	G	G	
U Q	29	27	23	24	25	28	13	44	52	48	45	44	50	40	38	36	40	28	G	G	28	28	G	G	
L Q	G	G	G	G	G	G	G	G	31	34	34	34	32	28	25	G	11	G	G	G	G	G	G	G	

HOURLY VALUES OF fmin AT Wakkanai

DEC. 2020

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

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

HOURLY VALUES OF fof2 AT Kokubunji

DEC. 2020

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

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

HOURLY VALUES OF fEs AT Kokubunji

DEC. 2020

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1	G	G	G	G	30	G		40	31	33								33	35	G	G	G	G	G			
2	G	G	G	G	30		G	29	36	41	41	38	36	41	38	38	G	40	28	G		G	G	G			
3	G	G	G	G	G			47	47	40	42	39	40	31	35	32	G	11		G	G		G	G			
4	G	G	G	G	G	G	G	47	47	33	33	54	41	29		G	26	33	26	G	G	G	G	G			
5	G	G	G	G	G			28	33	G	48	48	38	37	34	31	G	G	G	G	G	G	G	G			
6	G	G	G	G	G	G	G	G	36	37	178	39	33	43	38	31	32	26	G	G	G	G	G	G			
7	G	G	G	G	G	G	G		32	34	29	41	40	48	40	37	31	G	36	G	G	G		G	G		
8	G	G	G	G		G	G	G	31	45	50	39	40	41	31	31	G	27	G	G		28	G	G	G		
9	G	G		33	29	24		G	G	G		33	42	42	54	40	61	33	31	G	31	33	25	24	25	G	G
10	G	G	G		33	37	26		47	34	42	56	40	39	31	33	41	34	33	G	G	G	G	G	G	G	33
11	G	G	G	G	G	G	G	G		28	34	55	37	33	29	29	34	G	G	G	G	G	G	G	G	G	G
12	G	G		32	31	31		G	G	G		31	39	40	39	40	39	33	G		11	G	G	G		G	G
13	G	G	G	G	G	G	G		165	40	38	32	52	42	37	33	G	29	G	G	26	28	47		G	33	
14	39	27	G	57	G	G	G		26	33	42	58	60	60	50	35	31	G	G		28	29				G	G
15	G	G	G	G	G	G	G		47	24	38	33	40		G		G	G	G	25	G	G		G		G	27
16	G	G	G	G	G	G	G	G		35	55	53	45	55	31		40	32	40	G	G	G	G	G	G	G	G
17	G		G		G	G	G	G		32	56	35	37	37	44	40	31	G	G	G	G	G		11	G	G	G
18	25		G	G	G	G	G	G		35	41	49	55	53	80	51	39	36	G		64	48	54	32	52		G
19	32	G	43	G	30		G	G		32	36	34	54	81	34	41	41	57	55	26	27	29		G	60	28	G
20	45	49	40	31			G		41	40	35	34	54	47	31	29	31	G	G	G	G	G	G				24
21	29	30	31	30	24		29	G		36	62	60	55	37	52	40	32	G	33	30	32	32		G		G	G
22	G	G	G	G			G	G		35	40	57	47	46	33		G		G	G	G	G	G	G	G	G	G
23	G	G	G	G	G	G	G	G		33	35	53	62	57	41	33	41				G	G	G	G	G	G	G
24	G	G	G	G	G		G	G		31	37	G	53	55	36	29	38	33	33	29		G	G	G	G	G	G
25	48	49	38	33	31	25		G	25	33	41	43	39	37	35	35	G	G	G	G		G	G	G	G	G	G
26		G	29	G	133	35		G	G	31	48	69	85	60	43	32	31	G	39	52	26	G	G			G	G
27	38	40	G	40	29	25		G	G	30	41	37	54	33		49	106	31	G	29	40	35	39		G	31	G
28	G	27	G	24	25		G	G		29	35	33	37	53	41	28	28	G	11		24	24		G	G	G	G
29	G	G	G	G	G	G	G	G		31	34	39	32	55	31	34	G	42	G	G		G	G	G	G	G	G
30	G	G	G	G	G	G	G		41	31	34	34	30	37		49	G	G		33		G	G	G	G	G	G
31	G	G	G	G	G	G	G	G		49	29	106	56	42	39		G	G		32		29	39	29		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	30	31	31	28	25	27	31	31	31	30	30	30	30	30	30	28	30	26	29	30	25	28	30			
MED	G	G	G	G	G	G	G	G	33	38	42	46	40	37	34	31	G	18	G	G	G	G	G	G			
U Q	G	G	G	29	29	G	G	40	36	42	55	54	53	41	38	38	31	33	28	26	24	6	G	G			
L Q	G	G	G	G	G	G	G	G	31	34	34	39	37	31	29	G	G	G	G	G	G	G	G	G			

HOURLY VALUES OF fmin AT Kokubunji

DEC. 2020

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

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

HOURLY VALUES OF fof2 AT Yamagawa

DEC. 2020

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

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

HOURLY VALUES OF fEs AT Yamagawa

DEC. 2020

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	28	G	40	G	32	40	49	45	51	44	42	52	43	49	34	G	G	G	G	G
2	G	G	G	G	G	B	B	G	34	40	42	41	47	46	40	42	35	G	40	B	G	G	G	G
3	B	G	G	G	G	G	B	G	41	34	43	44	40	41	38	36	32	G	G	G	G	G	B	B
4	B	B	G	G	G	G	B	G	33	39	46	42	42	48	36	42	31	22	33	G	G	G	G	G
5	B	B	G	G	G	G	B	G	32	37	42	48	60	55	36	38	32	G	48	G	G	B	G	G
6	B	G	G	G	G	G	G	G	32	40	43	53	43	40	58	33	31	G	35	G	G	G	G	G
7	G	G	G	G	23	G	B	G	31	40	45	50	43	40	42	29	31	G	31	G	G	B	40	B
8	39	B	B	25	31	G	G	G	29	33	B	B	B	B	B	B	30	48	11	33	G	23	G	B
9	29	G	G	G	G	G	B	G	29	34	44	48	50	52	42	50	56	38	44	56	44	39	33	31
10	B	G	G	G	G	46	26	G	29	37	49	60	54	56	39	43	40	35	G	G	G	G	G	B
11	G	G	G	G	G	G	40	G	G	41	36	50	48	42	30	36	31	32	38	33	30	G	31	B
12	B	B	G	B	B	G	B	G	31	37	45	46	59	56	45	45	49	29	28	G	G	G	B	B
13	G	G	G	23	28	34	B	G	49	37	44	46	58	50	45	34	30	31	G	33	28	G	B	40
14	33	48	39	34	G	B	B	G	33	40	43	106	72	107	51	43	41	48	60	G	35	33	40	G
15	B	G	B	B	G	B	B	G	G	36	50	66	60	42	38	42	30	G	32	G	31	G	B	G
16	G	G	G	G	G	B	B	G	G	40	44	59	51	42	56	55	G	28	38	G	B	G	B	G
17	G	G	G	G	G	G	G	11	30	41	42	40	49	70	41	52	74	40	31	24	31	73	G	
18	46	G	G	G	G	G	B	G	28	49	44	67	51	48	61	76	G	31	44	46	B	G	40	
19	50	59	G	47	34	G	G	G	31	36	48	43	58	43	44	45	42	56	11	34	39	G	B	B
20	40	40	35	23	B	G	B	G	38	35	61	76	82	74	60	49	46	34	G	33	B	G	B	G
21	B	B	58	49	32	B	B	G	45	38	43	54	51	59	44	37	48	G	24	G	B	B	B	B
22	B	B	G	G	B	B	G	G	G	38	41	50	43	50	87	40	32	34	G	B	B	G	B	B
23	B	B	G	G	G	B	G	G	G	34	49	46	46	55	34	34	32	33	28	G	B	B	B	G
24	G	G	G	G	B	B	B	G	G	50	44	57	70	78	104	92	54	43	58	40	G	B	B	B
25	B	G	48	56	46	G	B	24	30	36	50	69	59	45	64	111	61	G	G	G	G	B	G	B
26	B	G	G	G	G	B	B	G	32	40	44	70	76	45	58	59	61	52	39	31	B	B	B	B
27	B	G	G	G	52	G	48	38	31	35	46	54	48	48	36	36	71	95	71	G	G	G	B	32
28	41	G	G	G	G	B	G	G	26	36	45	48	42	41	38	29	G	41	G	G	B	B	G	B
29	G	G	G	G	G	B	G	G	27	34	35	39	40	39	38	36	31	G	11	G	B	B	G	G
30	G	G	G	G	G	G	G	G	48	35	41	60	49	48	39	36	G	48	G	G	G	G	G	G
31	B	G	G	G	G	B	B	G	G	34	36	40	40	75	72	55	35	31	39	82	40	43	39	40
CNT	17	24	29	29	27	19	13	31	31	31	30	30	30	30	30	30	31	31	29	29	22	22	17	18
MED	G	G	G	G	G	G	G	G	31	37	44	50	50	48	42	42	32	32	32	G	G	G	G	G
U Q	39	G	G	12	28	G	33	G	33	40	46	60	59	56	58	52	48	43	39	33	30	G	36	31
L Q	G	G	G	G	G	G	G	G	26	35	42	45	43	42	38	36	31	G	6	G	G	G	G	G

HOURLY VALUES OF fmin AT Yamagawa

DEC. 2020

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	66	14	14	16	16	17	17	16	17	16	16	18	16	16	17	17	16	15	14	15	14	15	18
2	15	14	16	14	15	15	B	21	16	17	16	15	18	17	17	15	16	17	16	B	24	14	14	16
3	B	14	15	15	15	15	B	16	16	16	15	26	19	17	15	17	16	15	15	15	16	15	15	B
4	B	B	15	15	15	14	B	15	15	17	16	16	19	17	16	14	14	16	15	16	16	15	15	14
5	B	B	14	15	14	14	B	15	16	15	16	20	18	16	16	15	16	18	14	14	15	B	18	14
6	B	23	14	15	14	15	15	15	15	15	16	17	16	17	16	18	15	15	16	15	16	15	15	26
7	71	15	14	15	16	15	B	14	15	13	13	15	15	20	17	16	15	17	16	14	16	15	15	B
8	15	B	B	16	15	16	16	14	15	15	16	B	B	B	B	B	16	18	14	14	16	16	15	B
9	16	15	16	14	14	15	B	14	15	16	16	15	14	16	14	14	15	15	15	15	15	15	15	16
10	B	15	15	15	15	17	16	16	16	16	15	15	14	15	15	14	16	15	15	16	16	23	14	B
11	15	15	15	14	15	15	14	15	15	17	15	12	17	15	23	17	15	17	14	15	15	17	15	B
12	B	B	15	B	B	20	B	17	15	15	17	15	17	21	20	15	17	16	14	15	16	16	16	B
13	26	15	16	16	16	16	B	15	16	15	15	14	15	18	15	18	16	15	15	15	16	15	15	15
14	15	15	15	15	15	15	B	B	15	15	15	17	17	23	19	17	15	15	14	15	15	15	16	17
15	B	15	B	B	20	28	B	B	28	28	28	24	18	19	17	16	17	16	18	16	14	16	15	B
16	18	15	15	71	28	B	B	28	28	30	25	18	19	20	20	18	15	15	16	15	B	16	B	21
17	15	24	15	15	66	15	14	14	16	15	15	18	18	19	16	15	18	15	16	16	16	16	15	17
18	17	14	15	15	14	21	B	15	16	15	14	18	18	17	17	17	16	16	16	16	B	16	B	16
19	15	15	15	14	16	15	15	14	15	16	15	15	18	15	16	15	16	15	15	14	17	15	B	B
20	15	15	15	16	17	16	B	26	16	17	15	16	15	14	14	15	15	15	16	16	B	15	14	231
21	B	B	15	16	15	15	B	15	15	15	15	19	15	23	18	17	15	20	16	15	B	B	B	B
22	B	B	14	66	B	B	71	14	15	16	17	19	21	19	17	17	15	15	15	15	B	15	71	B
23	B	B	71	14	14	B	111	14	22	17	15	18	19	17	15	24	14	15	16	15	B	B	B	15
24	18	15	15	17	B	B	B	15	15	15	16	19	18	19	16	13	14	15	15	15	16	15	B	B
25	B	15	15	16	15	16	B	15	16	15	16	15	17	20	19	20	19	17	16	15	24	15	15	B
26	B	15	15	15	15	B	B	14	16	16	14	17	17	18	20	14	16	17	15	17	B	15	B	B
27	B	22	18	18	15	14	16	15	15	16	15	22	19	20	16	14	16	16	16	15	24	71	15	15
28	15	16	16	15	16	B	16	14	15	17	14	19	16	17	19	15	23	15	15	15	B	B	17	B
29	14	15	14	15	23	B	17	14	15	17	13	17	19	17	18	16	15	16	14	15	B	B	15	23
30	15	23	14	14	14	15	15	15	15	17	16	17	20	15	17	16	16	20	15	15	14	14	14	14
31	B	15	14	14	15	B	B	26	26	16	15	15	15	16	19	18	15	16	15	15	15	15	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	17	26	30	31	29	22	19	31	31	31	30	30	30	30	30	30	31	31	31	30	26	27	23	24
MED	15	15	15	15	15	15	15	15	15	16	15	17	18	17	17	16	15	16	15	15	15	15	15	15
U Q	17	15	15	16	16	16	17	16	16	17	16	18	19	19	18	17	16	17	16	16	16	16	15	17
L Q	15	15	14	14	15	15	15	14	15	15	15	15	16	16	16	15	15	15	15	15	15	15	15	15

HOURLY VALUES OF fof2 AT Okinawa

DEC. 2020

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	30	31	35	41	40	31	B 23	39	57	59	70	85	84	92	93	79	83	61	48	37	43	43	38	32
2	30	N 30	29	29	24	N 23	N 23	39	55	64	75	74	69	80	83	89	62	67	58	49	37	43	43	41
3	39	38	39	45	30	B 23	24	39	53	58	62	71	64	78	75	81	69	56	51	41	35	37	37	30
4	31	31	33	43	32	23	N 23	37	57	67	69	90	76	82	91	70	64	66	46	39	42	43	39	39
5	31	29	33	34	38	35	N 24	34	51	55	63	69	55	92	99	94	65	74	73	48	40	41	34	31
6	31	29	31	36	37	31	N 23	36	61	76	66	63	73	91	91	86	74	62	71	41	51	51	43	N 30
7	30	31	35	43	39	30	N 23	33	49	57	83	85	77	79	82	89	63	59	51	30	42	37	30	30
8	30	N 29	29	28	A	33	A	37	55	65	67	65	74	92	80	73	56	57	53	33	39	36	34	28
9	30	31	33	33	A	36	24	37	57	64	62	63	90	95	83	81	62	66	63	39	39	41	35	34
10	35	33	31	31	37	28	N 23	34	55	67	65	70	80	88	105	97	76	90	67	61	52	52	50	32
11	29	30	33	31	35	23	N 24	35	55	58	62	77	69	69	88	74	63	55	48	40	32	29	A	N 25
12	B	23	29	29	29	29	N 23	33	52	63	66	58	69	73	75	68	74	70	59	45	43	45	42	31
13	26	29	33	29	33	A	A	31	66	66	61	73	93	80	65	A	62	60	42	35	49	45	35	32
14	33	32	31	33	35	A	N 23	34	62	64	67	63	A	95	A	67	65	66	A	A	38	39	A	A
15	A	26	30	29	31	31	B	32	55	57	A	73	93	112	138	115	98	115	97	A	51	45	33	33
16	33	31	37	41	50	32	B 23	33	55	61	63	70	73	79	68	63	66	61	55	34	43	31	28	N 25
17	N 24	29	26	32	32	31	25	36	52	56	56	57	59	A	71	79	60	55	51	39	39	35	31	33
18	32	31	26	31	30	N 22	N 23	32	53	61	60	67	63	75	65	66	61	62	39	A	A	32	37	30
19	A	A	A	A	A	A	A	32	51	52	61	73	59	66	65	64	58	57	55	35	30	34	30	A
20	A	25	A	A	29	25	25	37	51	58	56	55	64	71	76	79	62	51	46	A	41	37	31	B 23
21	B 25	29	25	N 25	B 25	N 23	B 24	A	55	63	64	63	75	85	97	76	79	84	77	A	A	A	A	A
22	A	28	N 25	23	B 23	B 23	N 23	32	57	77	72	69	59	95	111	113	129	107	68	49	41	37	35	30
23	N 25	N 24	29	32	31	N 23	B	30	58	71	80	65	84	113	132	123	103	76	46	40	31	A	A	31
24	30	37	37	32	N 24	N 23	N 22	31	53	63	61	79	100	124	139	128	112	83	51	A	34	35	32	33
25	30	30	32	33	33	A	24	31	59	74	83	89	108	121	127	153	149	107	69	A	54	50	43	42
26	36	34	41	35	24	B 24	A	31	63	61	63	74	91	102	121	146	123	116	A	A	49	A	45	31
27	30	N 27	30	26	35	31	A	28	52	59	59	65	78	99	138	127	99	65	50	A	A	A	A	A
28	A	A	A	A	40	N 22	B 23	32	56	57	67	77	76	117	106	89	66	57	54	A	31	33	34	25
29	29	29	29	33	30	B	N	27	56	65	70	94	97	124	143	87	65	74	57	40	34	26	29	N 23
30	N 25	29	34	35	33	29	N 24	31	53	57	58	99	94	117	115	113	85	70	47	41	41	40	30	B 23
31	24	24	28	27	32	B	B 23	28	62	75	81	111	120	112	94	75	71	54	49	A	25	23	25	31
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	29	28	28	28	25	23	30	31	31	30	31	30	30	30	30	31	31	29	20	28	27	26	27
MED	30	29	31	32	32	28	23	33	55	63	64	71	76	92	92	84	66	66	53	40	40	37	34	31
U Q	31	31	33	35	36	31	24	36	57	66	70	79	91	112	115	113	85	76	65	43	43	43	39	33
L Q	27	28	29	29	29	23	23	31	53	58	61	65	69	79	76	74	62	57	48	36	34	34	31	28

HOURLY VALUES OF fEs AT Okinawa

DEC. 2020

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	G	35	B	23	45	35	51	46	46	46	50	37	33	49	33	11	G	G	G	G
2	G	G	G	G	G	G	G	27	45	39	37	45	39	47	44	36	37	35	39	29	G	G	G	32
3	23	G	G	G	33	B	G	G	30	34	115	46	40	51	40	42	36	31	27	30	G	G	G	G
4	G	G	G	G	G		G	25	34	38	67	50	45	43	44	35	33	48	41	G	G	28	G	G
5	G	G	G	G	G	G	G	G	32	40	54	60	60	59	40	47	40	G	43	48	G	G	G	G
6	G	G	G	G	G	G	G	G	32	58	56	88	47	41	54	58	80	29	48	11	29	G	26	G
7	G	G	G	G	11	11	G	G	27	32	40	46	52	42	43	50	31	G	48	G	G	G	G	G
8	G	G	G	24	30	G	26	G	28	33	41	48	48	46	45	36	34	25	11	11	32	29	25	G
9	G	G	24	28	28	G	G	G	28	40	41	44	44	46	48	79	70	40	27	31	35	G	50	37
10	28	G	G	G	G	G	G	225	28	39	44	88	60	54	43	38	35	34	33	26	33	G	G	G
11	G	G	G	G	11		G	G	27	36	43	52	54	88	47	41	40	26	26	G	34	G	28	G
12	B	G	28	G	G	G	G	G	28	37	45	52	54	60	60	50	46	32	32	26	25	G	G	G
13	G	G	G	G	26	32	32	G	32	39	49	56	67	51	84	60	44	35	30	G	25	32	G	G
14	G	G	G	32	27	30	140	34	41	54	62	90	86	107	115	92	91	70	60	29	29	28	30	G
15	26	G	G	G	G	11	B	134	45	41	55	46	90	49	67	45	41	38	56	50	39	33	25	G
16	G	G	G	G	28	G	B	G	34	40	46	59	54	43	42	44	30	33	37	34	20	G	G	G
17	G	G	G	G	G	G	G		94	45	53	53	57	68	64	64	45	40	36	35	32	30	24	G
18	G	G	G	G	G	G	G	97	34	40	60	38	49	37	70	38	35	34	35	60	28	G	G	G
19	60	58	37	40	37	30	26	26	30	70	45	47	47	50	41	41	47	45	44	59	G	G	32	34
20	32	G	168	31	G	G	G	G	46	41	57	89	60	57	48	71	49	44	48	38	32	27	23	B
21	B	G	G	G	B	G	B	28	48	36	43	51	54	53	49	48	49	44	50	105	90	70	60	33
22	38	G	G	G	B	B	G	G	32	38	47	61	50	59	47	48	38	60	38	50	26	G	G	33
23	G	G	G	G	G	G	B	59	48	33	41	48	72	48	35	30	61	38	29	27	25	35	32	24
24	G	G	G	G	G	G	G	G	29	38	44	55	61	103	57	38	90	46	46	32	26	G	G	G
25	G	G	G	23	26	39	G	G	28	39	44	56	77	126	84	59	55	77	93	60	43	38	25	G
26	G	G	G	38	G	B	29	G	32	42	52	64	52	63	68	49	100	78	92	110	43	40	33	G
27	G	G	G	G	G	G	26	G	38	47	47	93	71	57	78	57	75	32	40	58	70	44	45	53
28	40	40	29	48	28	24	B	G	28	34	43	47	48	53	52	44	42	56	51	53	26	28	G	G
29	G	G	G	G	34	B	G	G	30	34	39	41	43	46	54	37	33	52	48	27	G	G	G	G
30	G	G	G	G	G	G	G	G	31	32	43	46	60	47	45	56	49	36	30	38	G	G	G	B
31	G	G	G	G	11	B	B	G	28	35	44	49	41	44	45	60	52	31	67	58	G	G	G	G
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	31	31	31	29	24	24	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29
MED	G	G	G	G	G	G	G	G	32	39	45	51	54	51	48	47	44	38	40	34	26	G	G	G
U Q	12	G	G	23	27	17	G	26	38	41	54	60	60	59	64	58	55	48	48	58	33	30	28	27
L Q	G	G	G	G	G	G	G	G	28	35	43	46	47	46	44	38	35	32	32	26	G	G	G	G

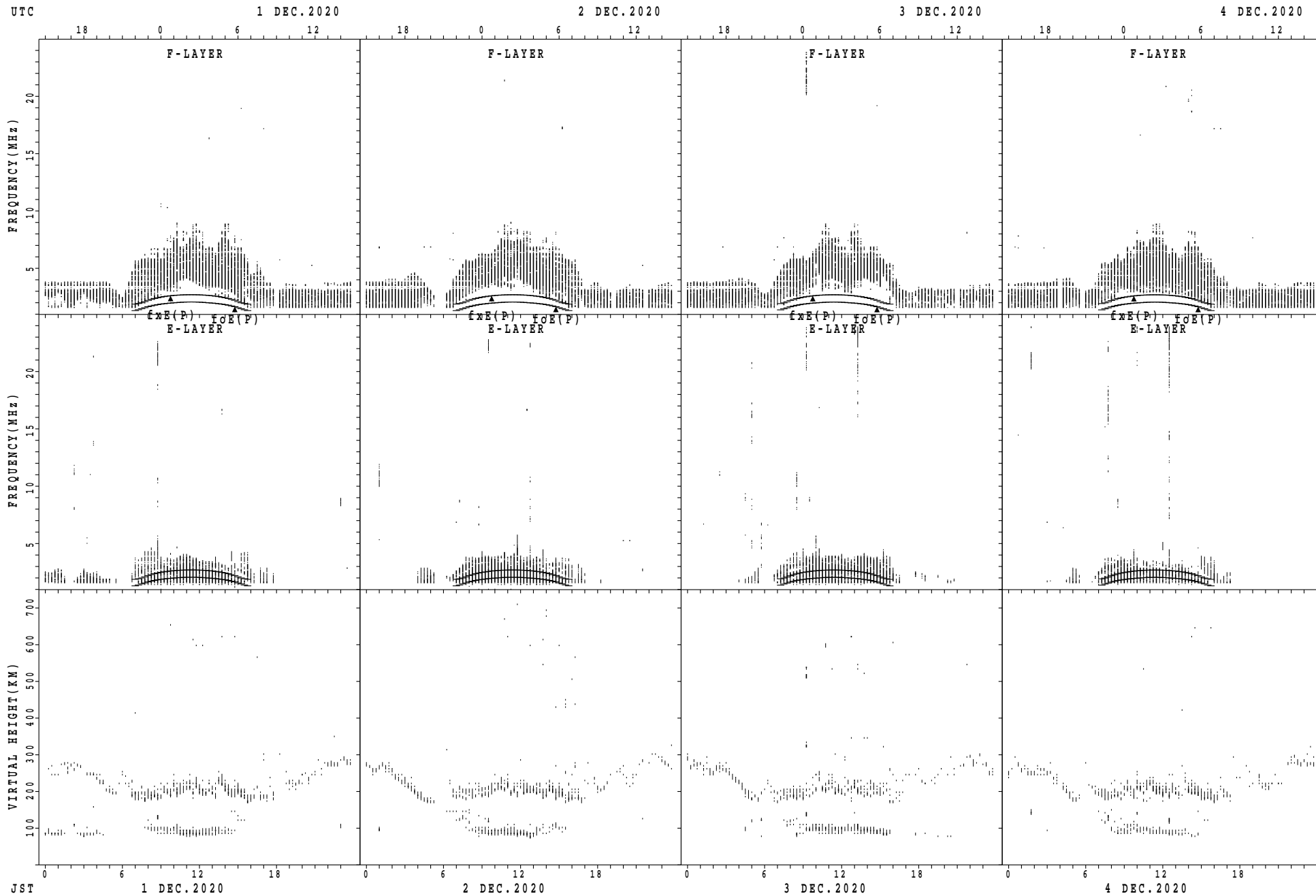
HOURLY VALUES OF fmin AT Okinawa

DEC. 2020

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

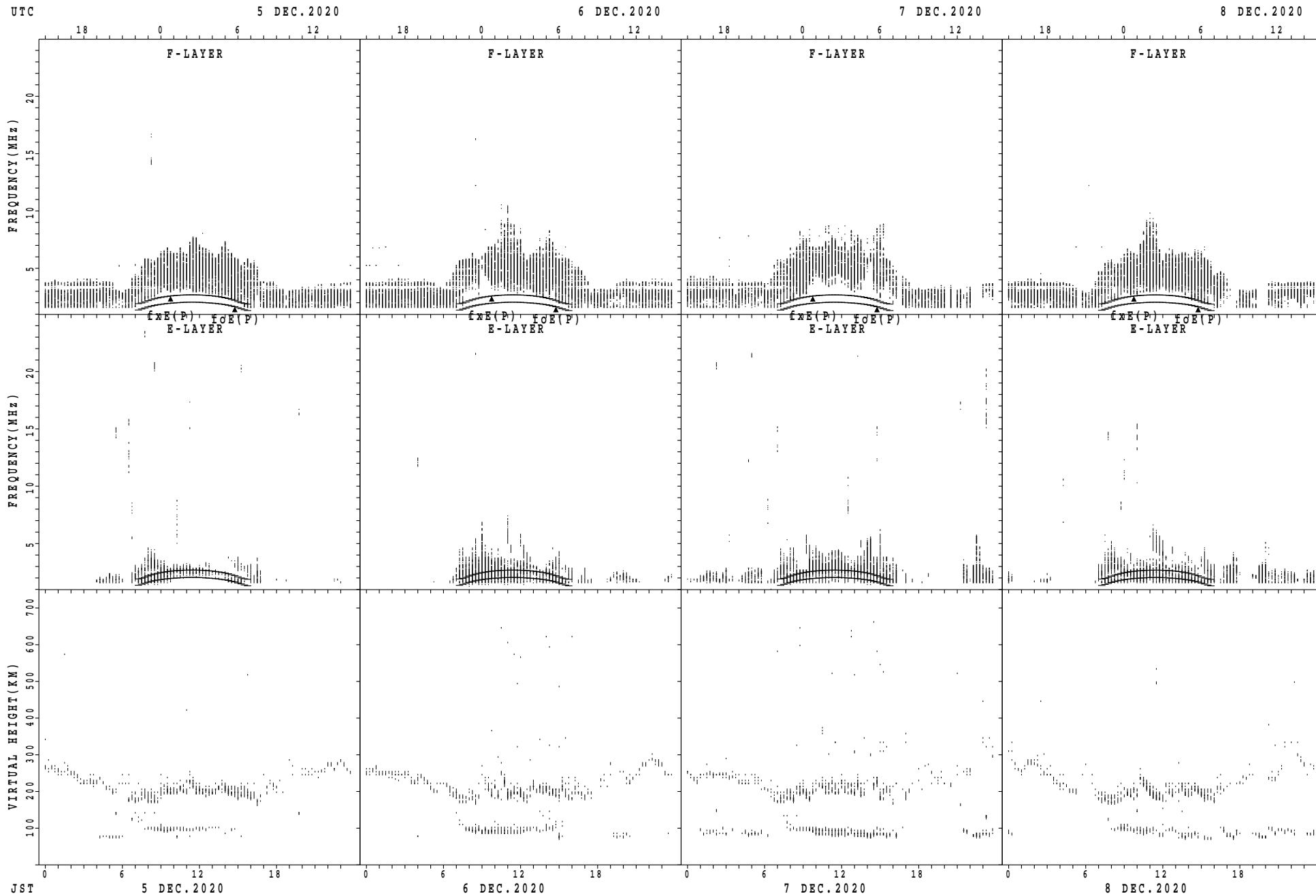
$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	15	15	14	14	14	^B 16	16	17	15	15	16	17	15	15	14	17	15	15	15	15	15	14	15
2	14	15	14	14	15	14	15	16	16	16	15	14	15	15	15	13	15	16	15	15	15	15	15	16
3	16	15	15	15	14	^B 15	16	15	14	15	15	16	15	13	16	14	15	15	15	15	15	15	14	15
4	15	66	14	15	14		15	16	16	14	15	13	15	17	17	17	16	14	15	15	16	15	16	15
5	14	15	14	14	14	15	14	14	16	15	15	14	15	18	15	15	15	15	15	15	16	15	15	15
6	14	15	14	14	15	14	15	15	16	15	13	14	17	15	15	14	15	15	15	14	15	15	15	15
7	14	15	14	14	14	14	27	15	15	15	15	13	15	15	16	15	15	15	15	14	15	15	15	15
8	15	15	15	15	16	15	15	15	15	16	14	14	14	15	17	15	16	15	14	14	16	15	16	15
9	14	15	16	15	15	14	14	14	15	15	14	14	15	14	14	14	14	15	15	15	15	16	15	15
10	16	15	15	15	15	14	14	97	15	16	14	13	13	14	14	14	15	15	15	15	15	16	14	14
11	14	14	14	14	14		15	14	15	16	15	14	14	15	15	15	15	15	15	15	15	15	15	15
12	^B 15	14	15	14	15	14	15	14	15	16	14	15	15	14	15	15	14	15	15	16	16	15	16	17
13	15	14	15	15	16	16	17	14	16	15	14	14	13	14	16	16	15	15	15	16	16	16	15	15
14	14	15	17	16	16	15	15	15	15	15	14	15	16	15	15	15	16	15	15	16	16	15	13	16
15	16	15	15	15	15	14	^B	15	15	15	14	17	15	20	16	15	15	15	16	16	15	16	15	16
16	15	15	14	14	15	17	^B	14	16	16	14	15	15	17	17	16	15	16	15	14	16	16	15	20
17	15	17	15	15	15	14	14		16	15	14	15	13	15	16	14	14	15	15	16	16	16	15	16
18	18	14	14	15	14	14	14	6	15	14	15	15	13	15	15	15	15	16	15	15	15	15	15	16
19	16	16	16	16	15	15	16	16	15	14	14	14	13	16	15	15	15	15	15	14	16	15	16	16
20	17	15	15	16	15	15	14	17	15	15	14	14	14	15	15	15	16	15	15	15	15	16	15	^B 15
21	^B 15	14	14	15	^B	15	^B	16	15	16	15	14	14	14	15	14	15	16	15	14	17	17	15	16
22	16	15	17	16	^B 17	^B	14	14	15	15	14	14	15	14	14	15	15	15	15	15	16	15	15	15
23	15	14	14	14	14	14	^B	19	15	16	15	15	11	15	15	15	14	15	15	15	15	15	15	15
24	14	14	15	14	15	14	15	15	15	15	13	16	15	13	15	14	14	15	15	16	16	14	14	14
25	14	15	16	16	16	15	15	17	15	15	15	14	17	16	15	15	14	15	14	15	15	15	15	16
26	15	16	15	14	15	^B 15	16	15	15	15	15	15	15	14	15	16	9	15	15	16	15	15	16	15
27	20	15	14	15	16	16	15	15	15	15	14	13	17	18	15	15	14	14	15	16	15	16	15	16
28	15	15	16	16	15	16	^B	15	15	15	14	16	15	14	13	15	15	15	15	15	15	15	14	14
29	15	15	14	15	14	^B 15	15	14	15	16	14	15	14	14	16	13	15	16	15	15	15	15	15	14
30	14	15	14	14	15	15	15	15	15	15	14	14	14	15	14	17	16	16	15	14	15	14	15	^B 15
31	15	14	14	14	14	^B	^B	15	15	16	14	14	15	16	15	15	14	15	14	15	16	15	14	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	27	25	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	15	15	15	15	15	15	15	15	15	14	14	15	15	15	15	15	15	15	15	15	15	15	15
U Q	16	15	15	15	15	15	15	16	16	16	15	15	15	16	16	15	15	15	15	16	16	16	15	16
L Q	14	14	14	14	14	14	14	14	15	15	14	14	14	14	15	14	14	15	15	15	15	15	15	15

SUMMARY PLOTS AT Wakkanai



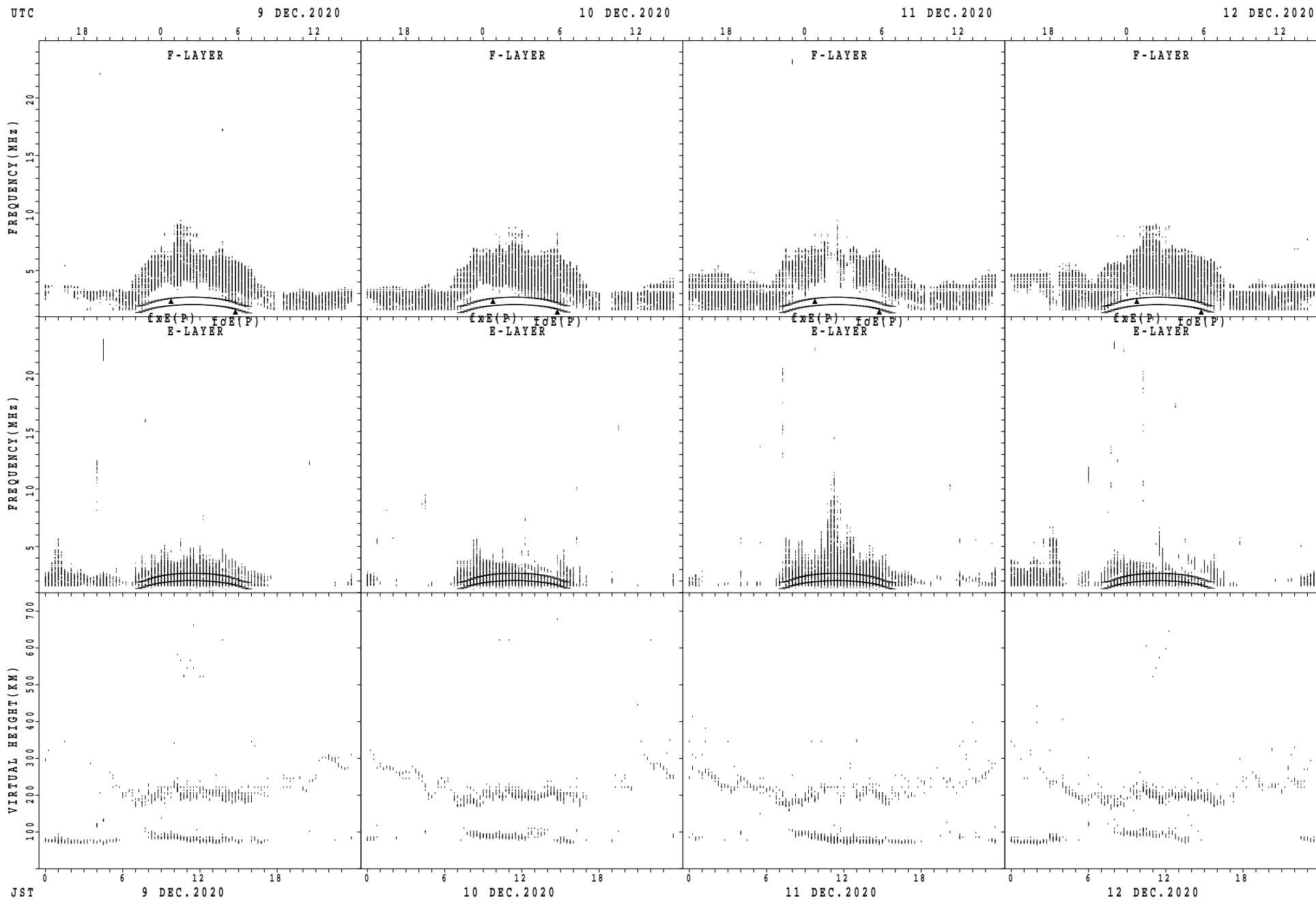
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



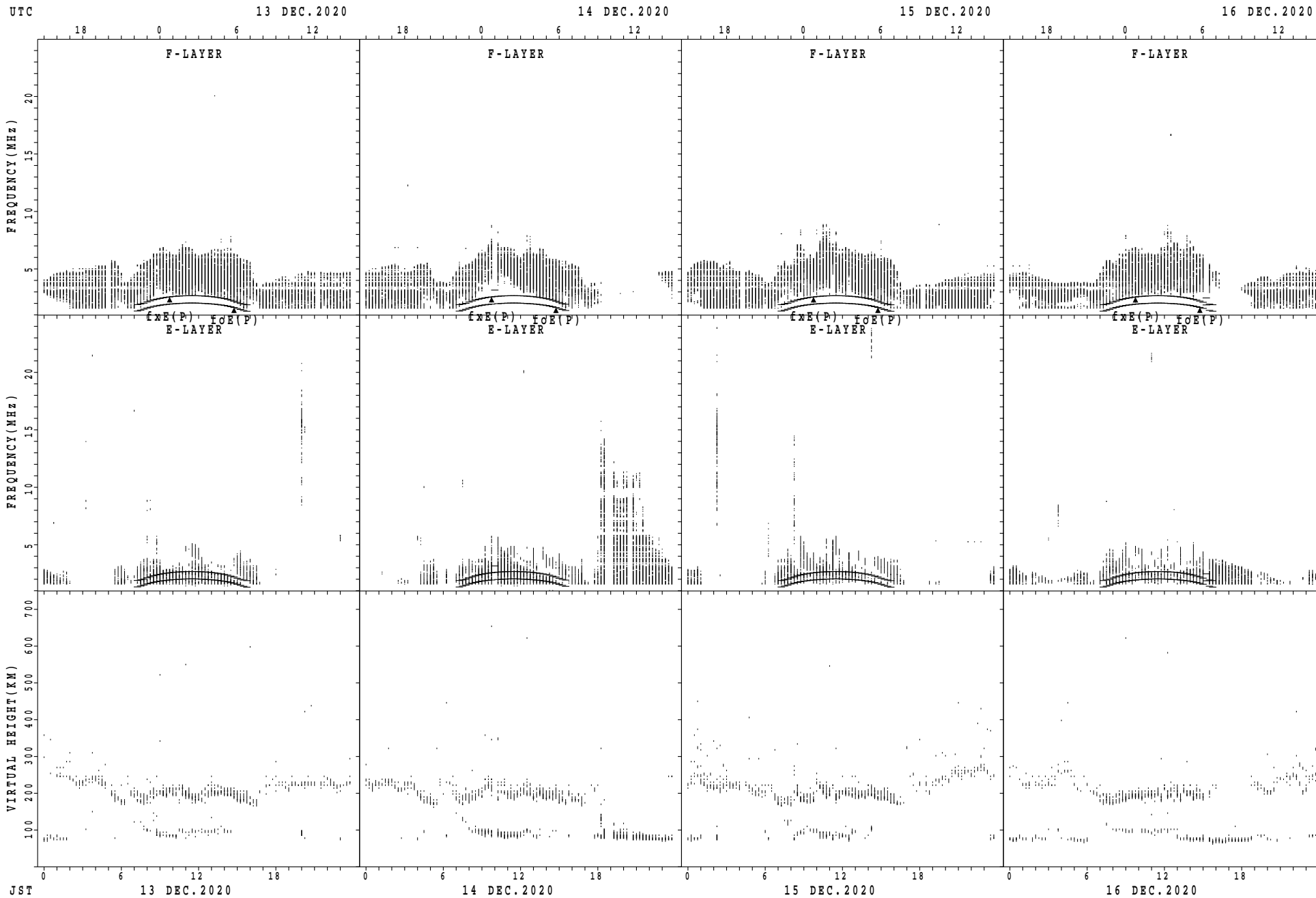
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Wakkanai



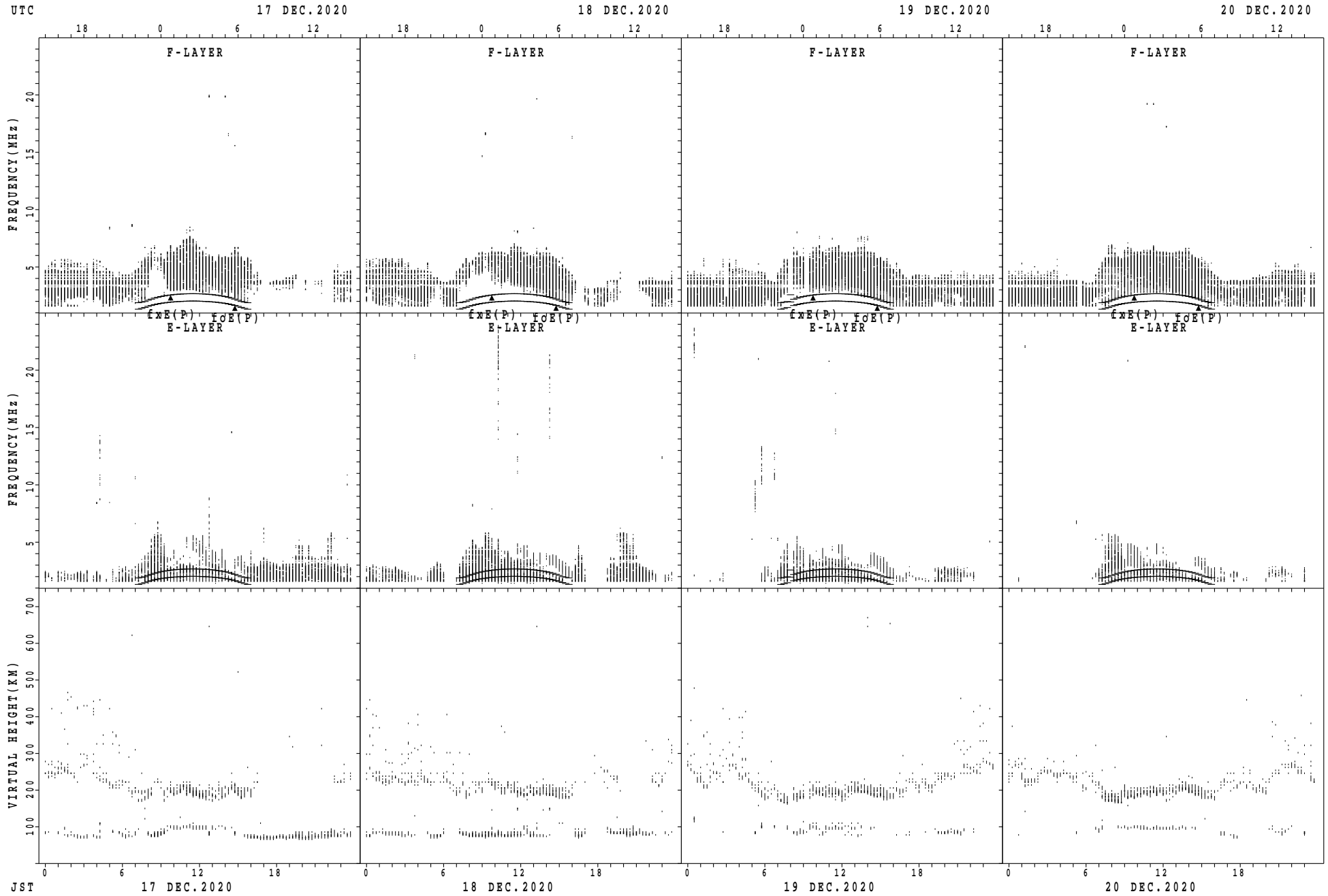
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



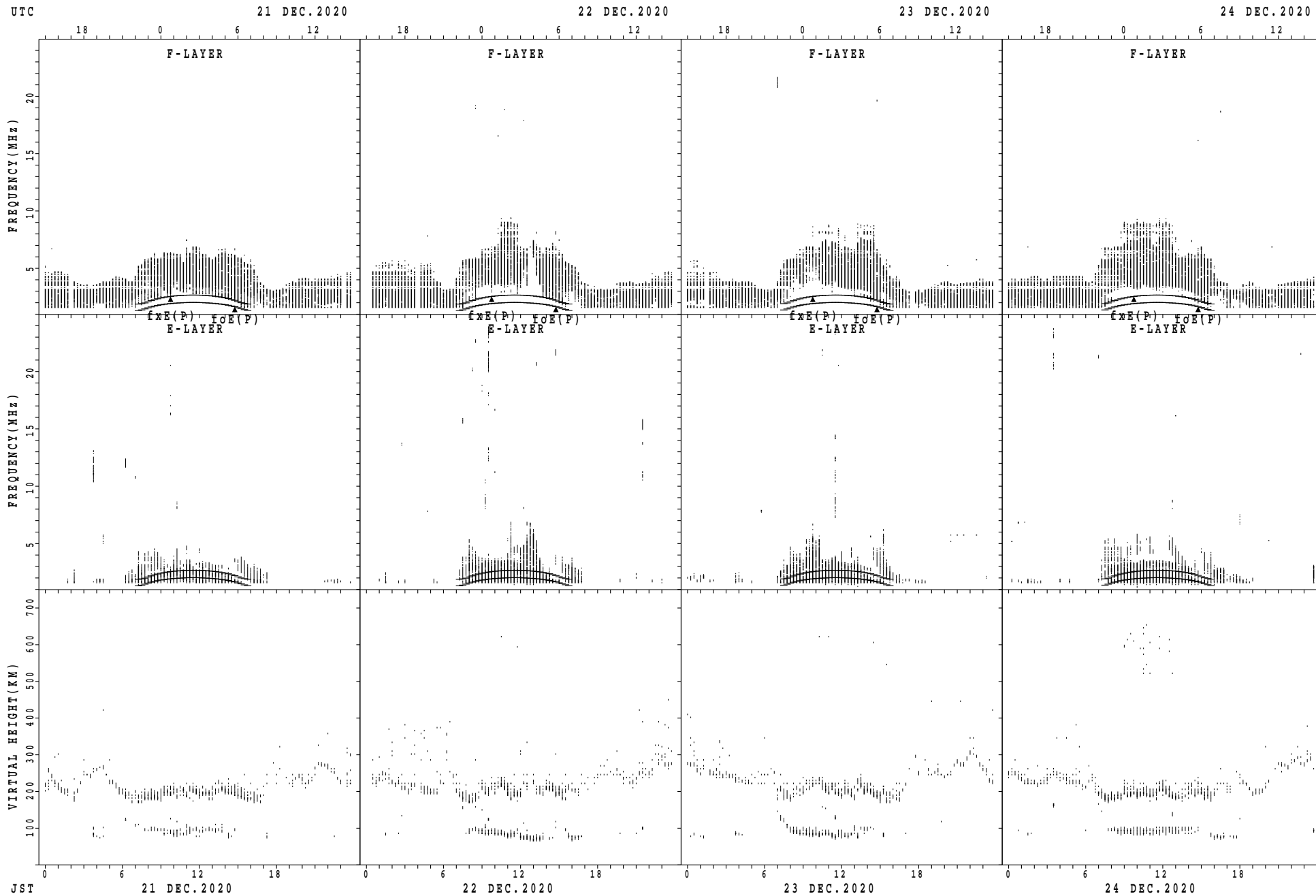
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



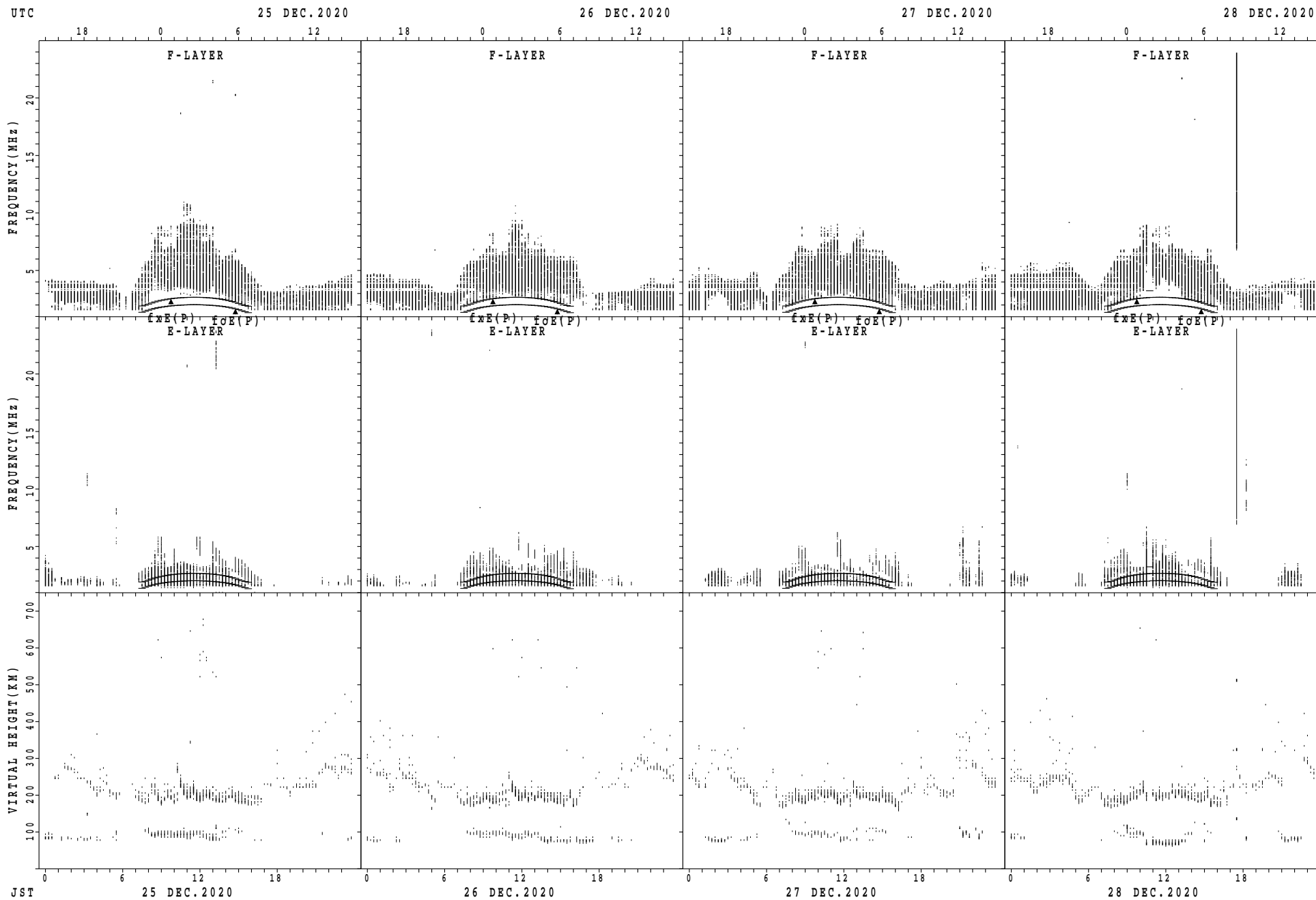
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Wakkanai



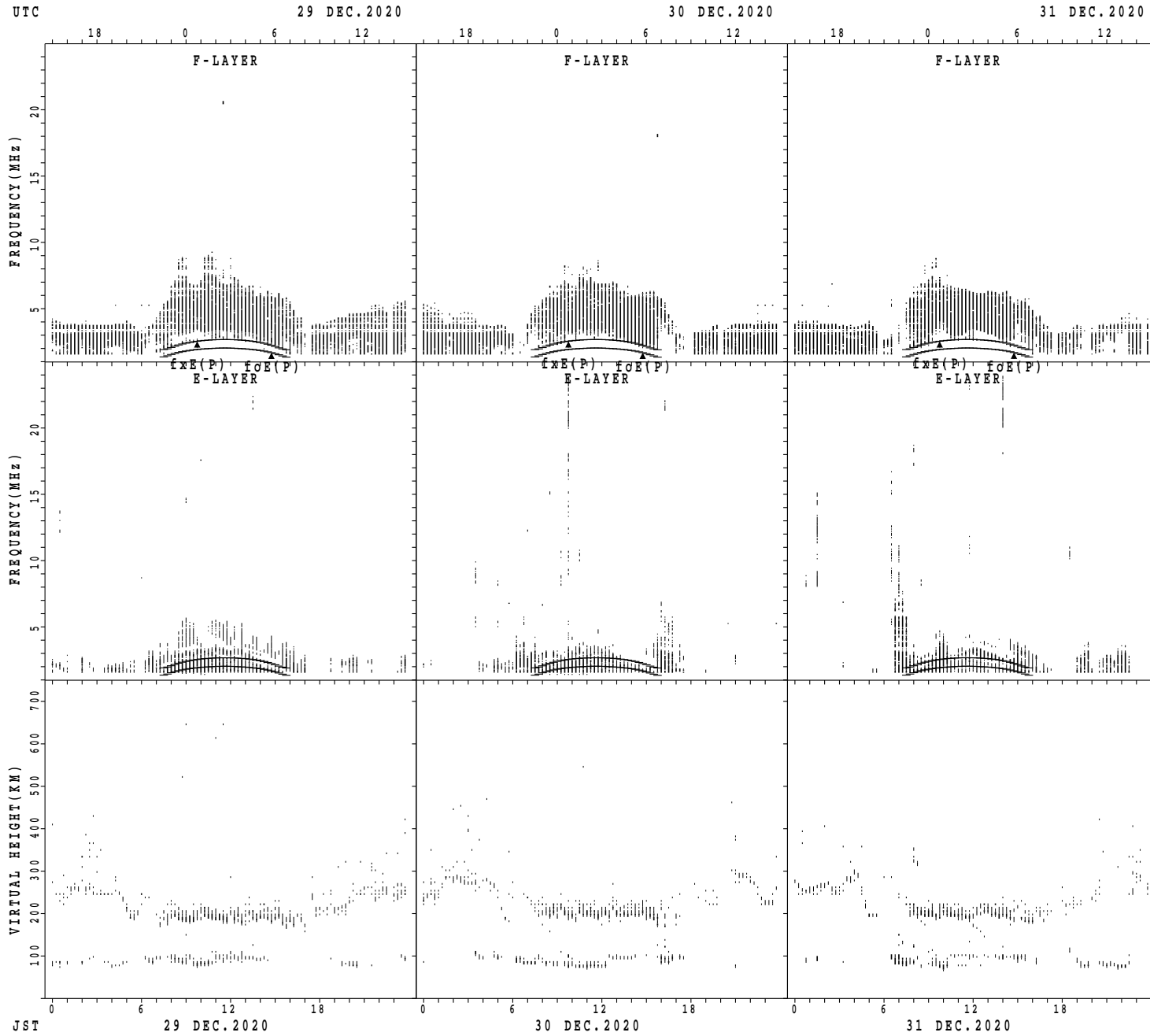
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



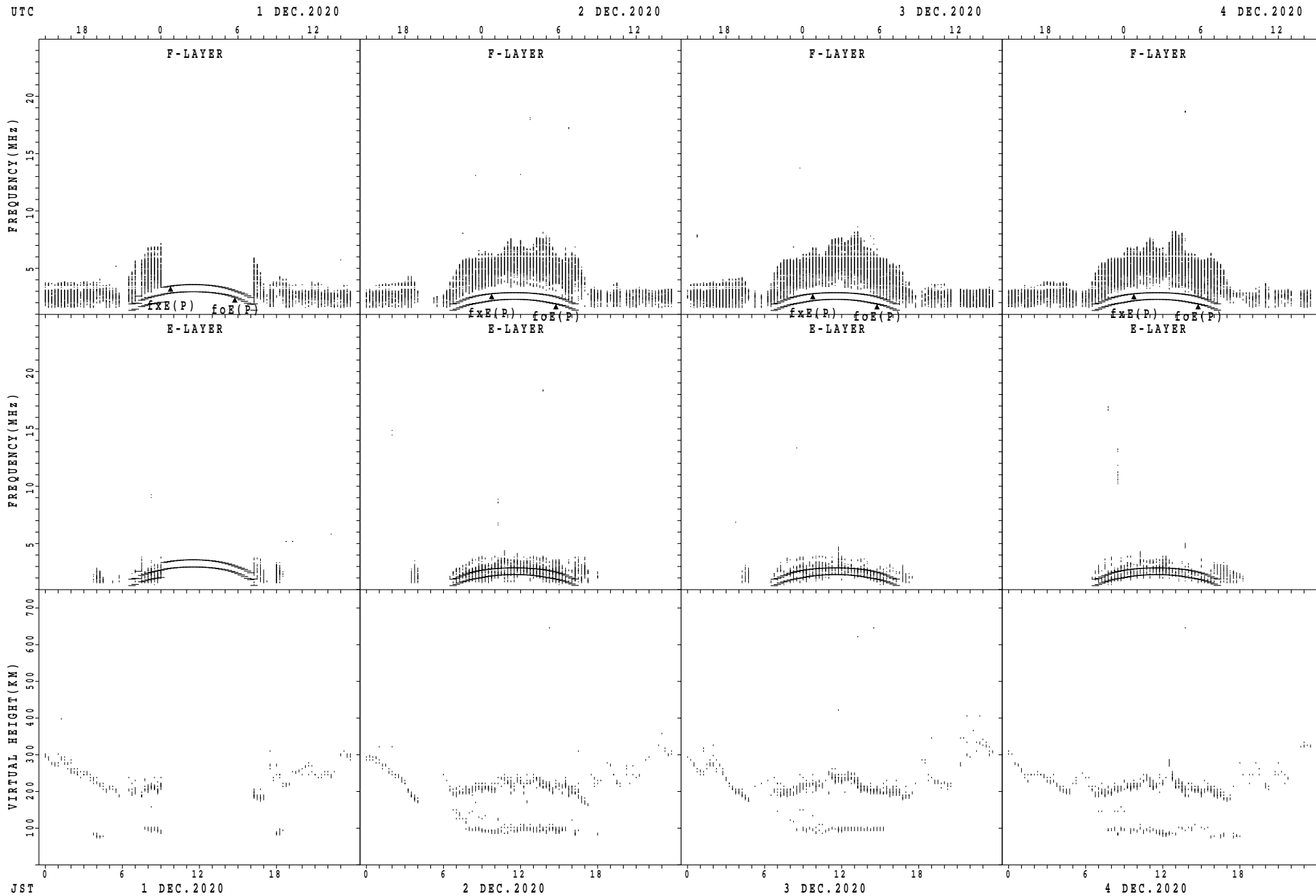
fxE(P); PREDICTED VALUE FOR fxE
 foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



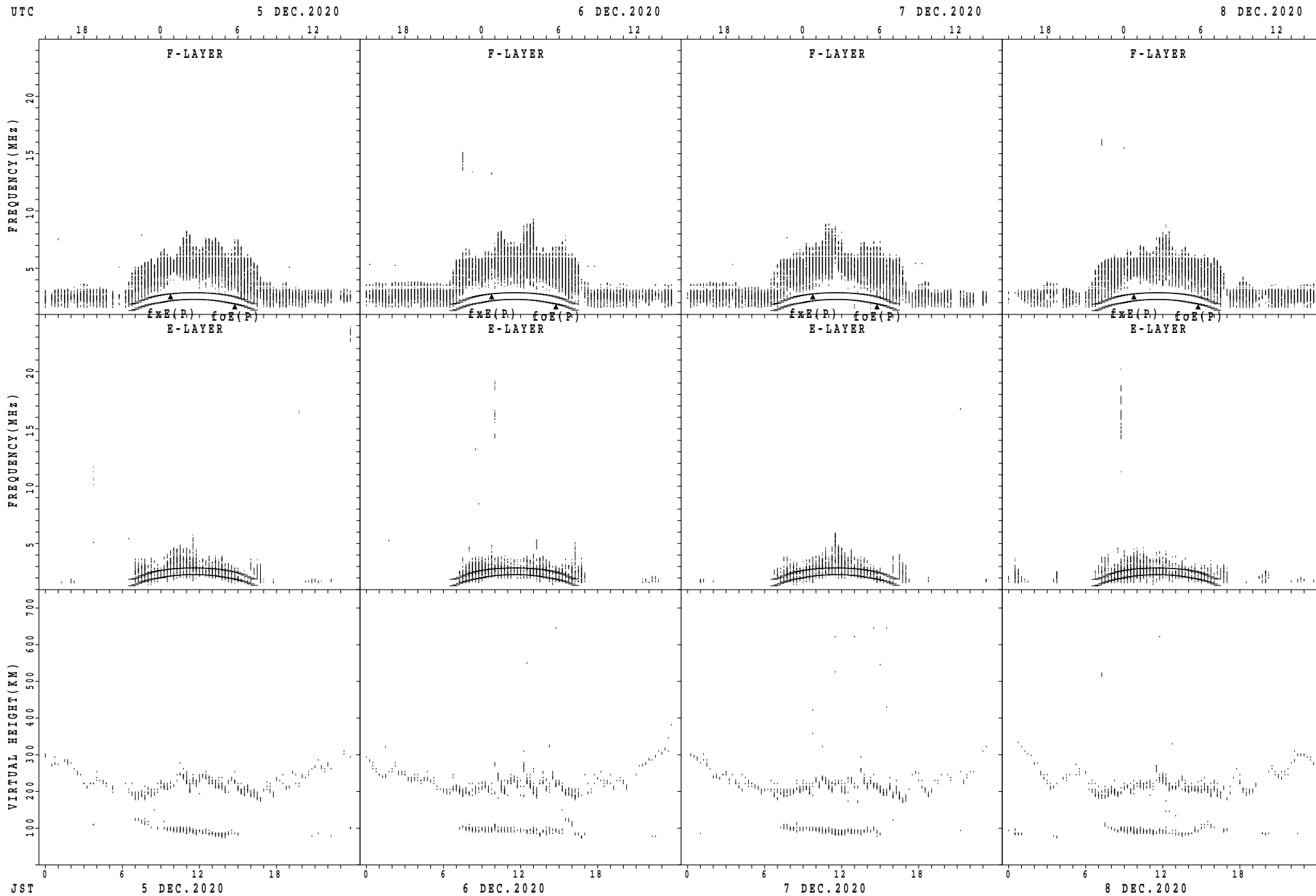
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



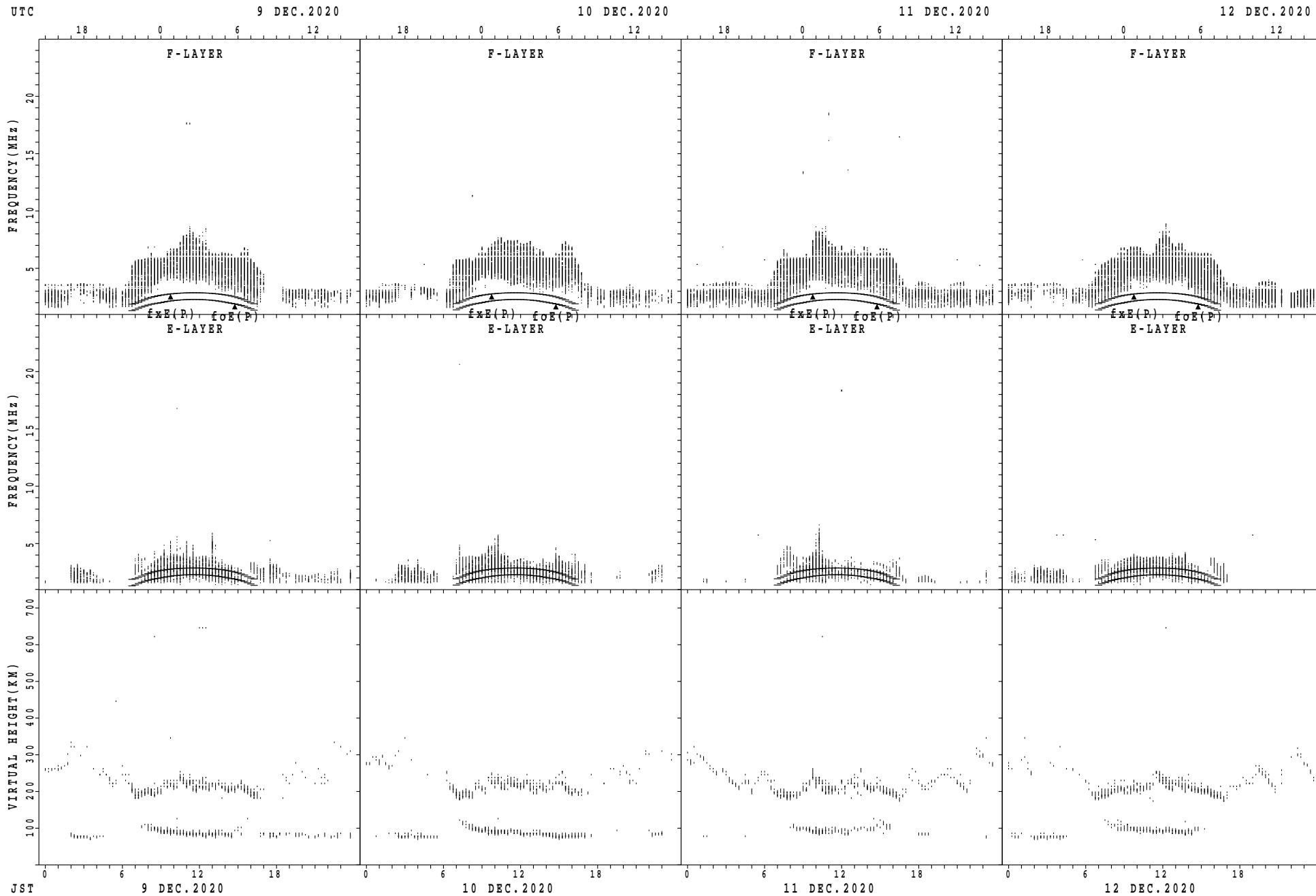
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



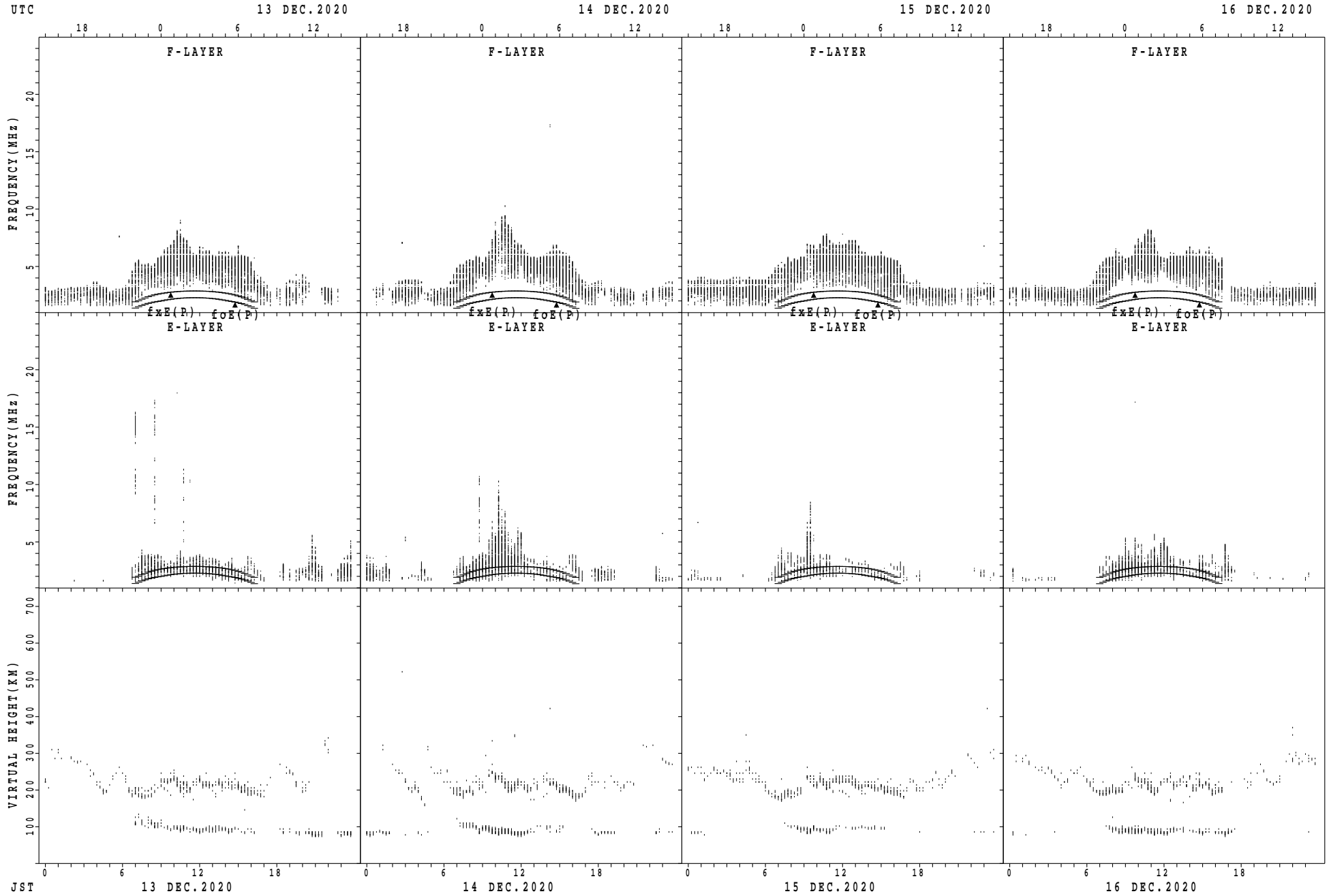
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



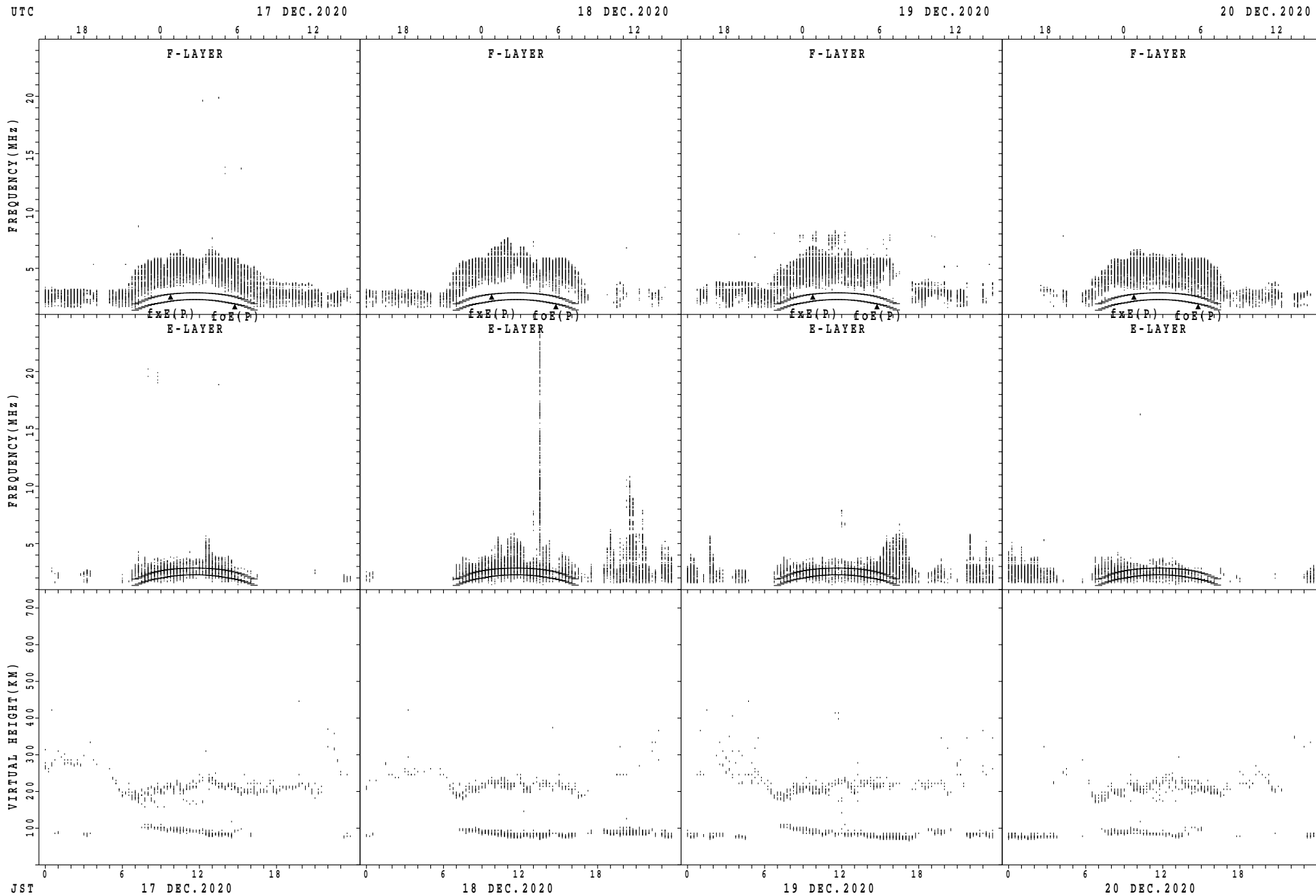
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



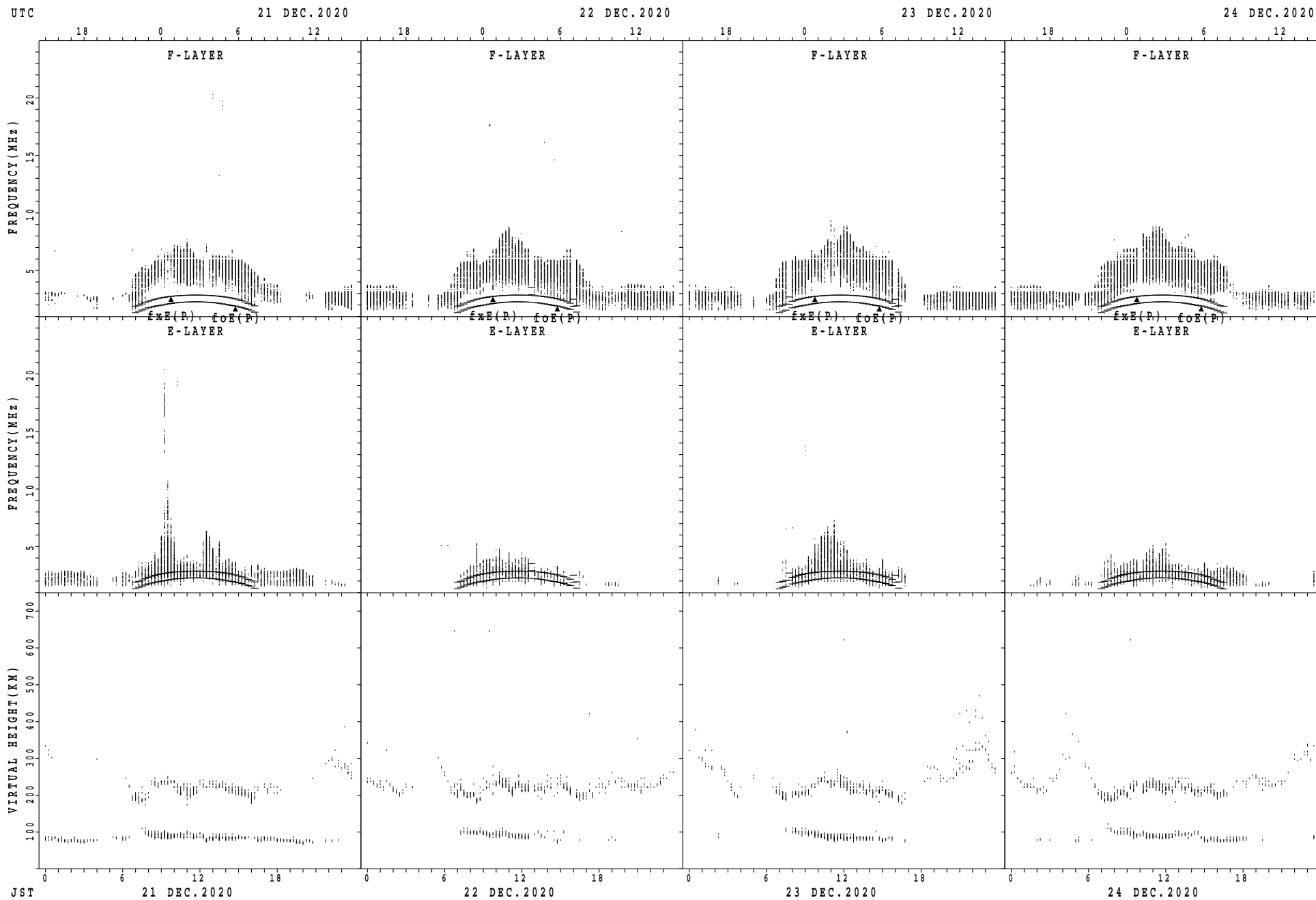
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



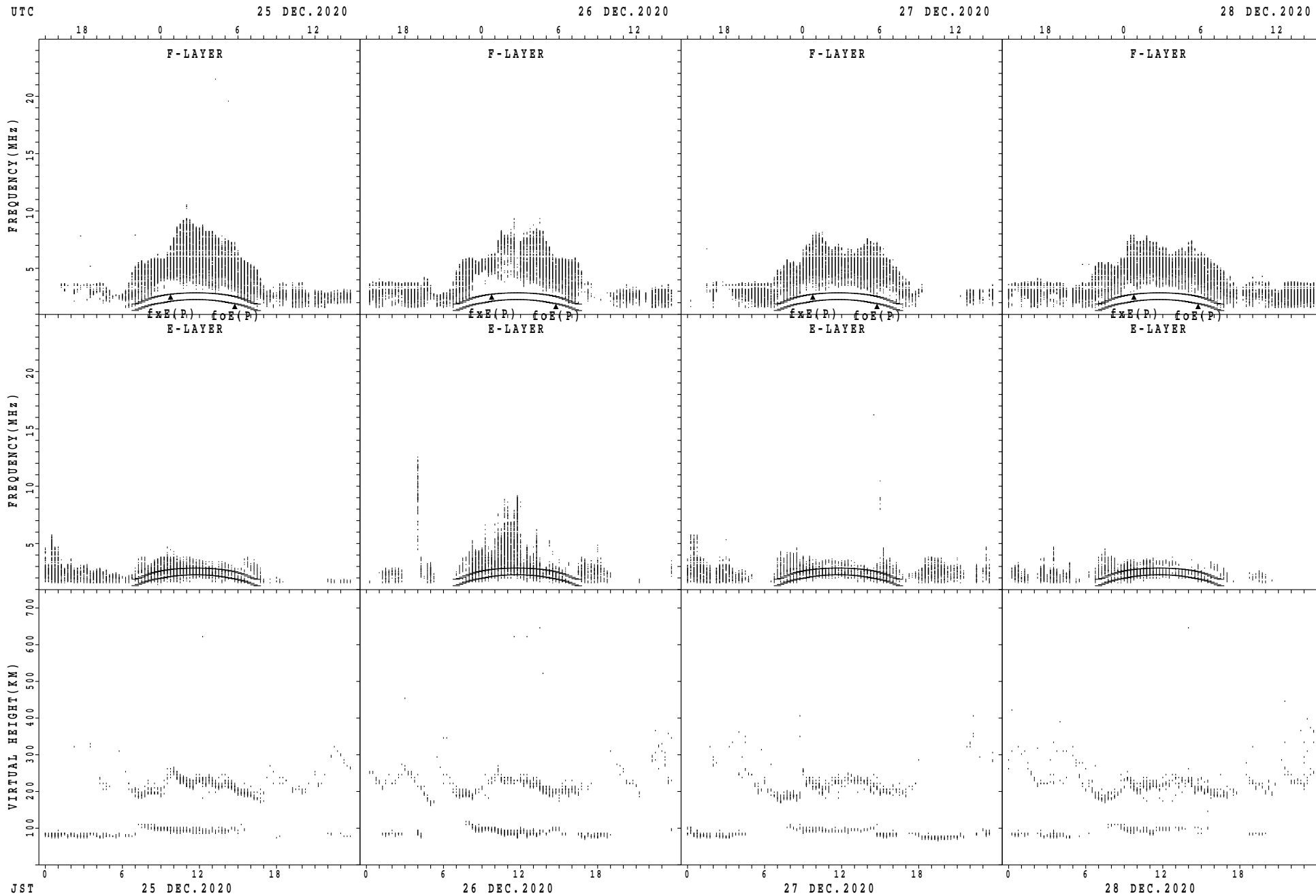
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



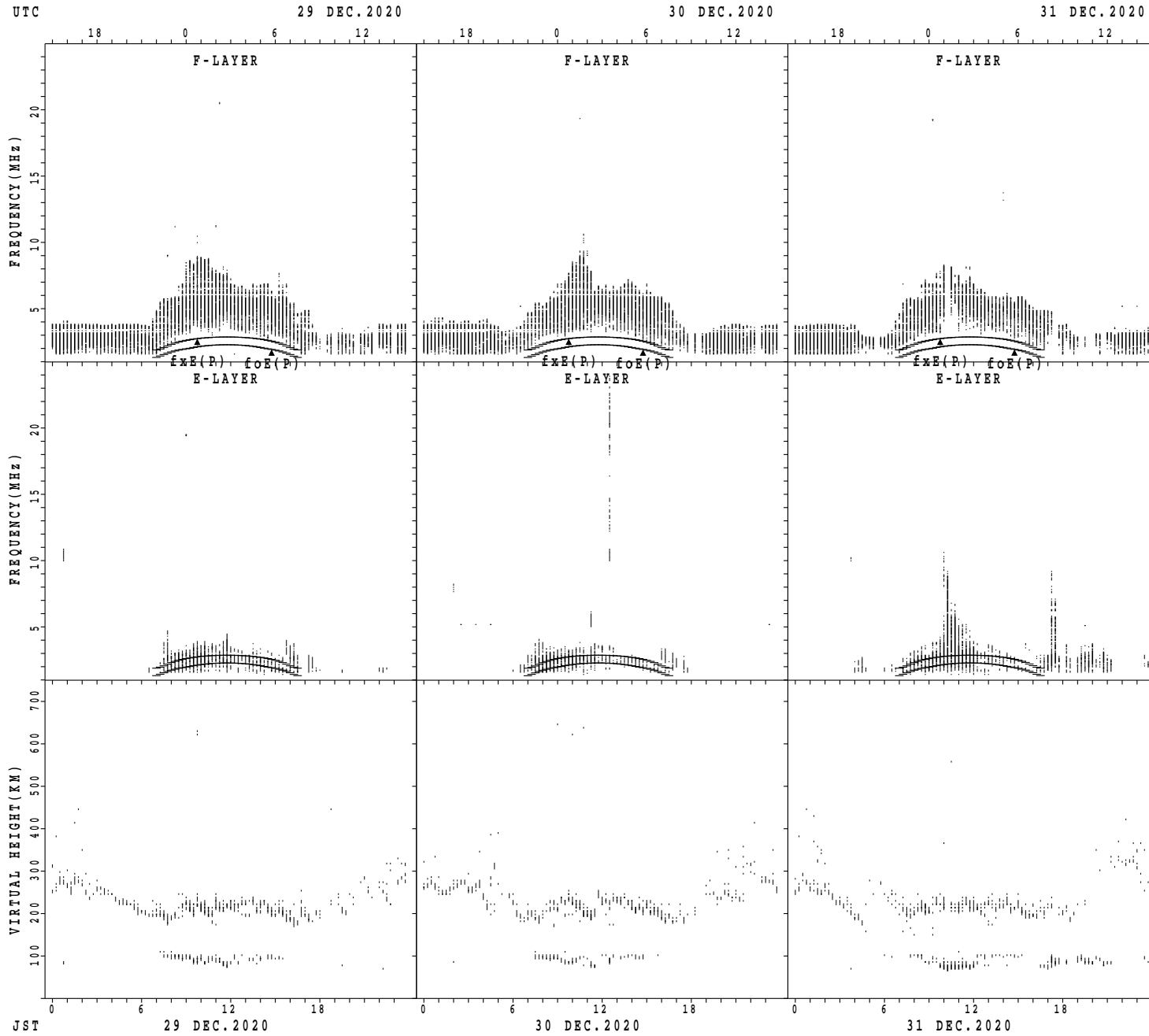
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



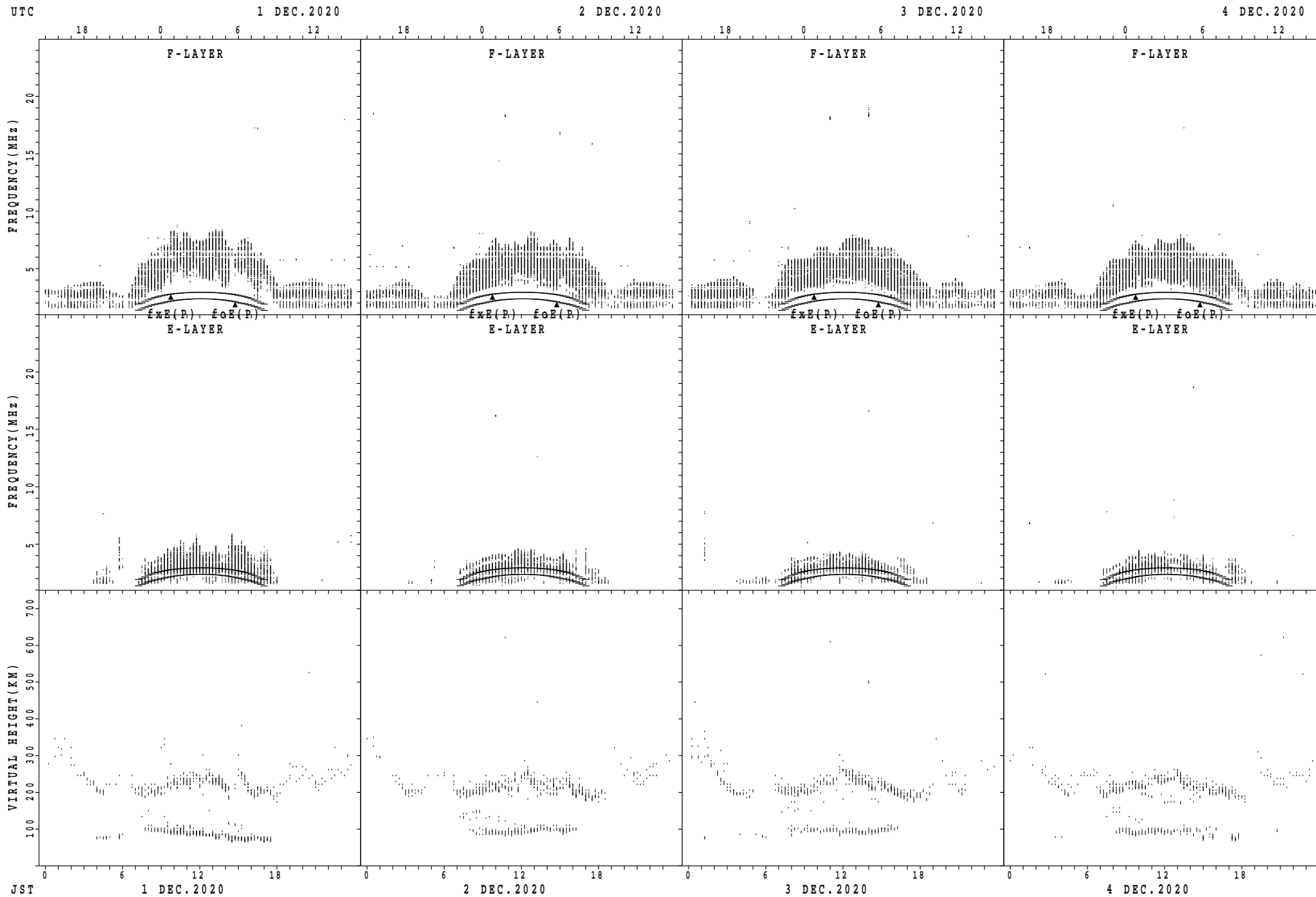
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



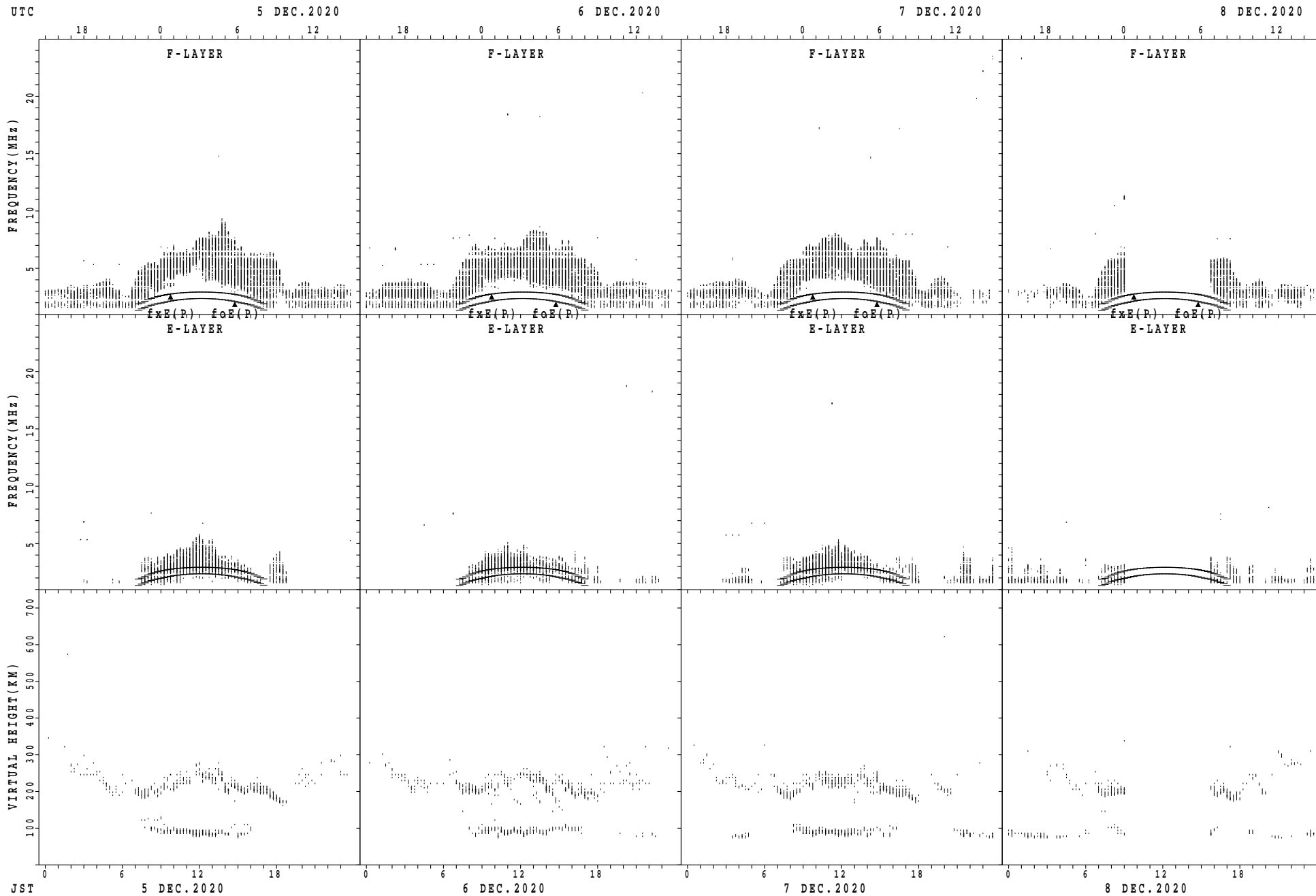
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Yamagawa



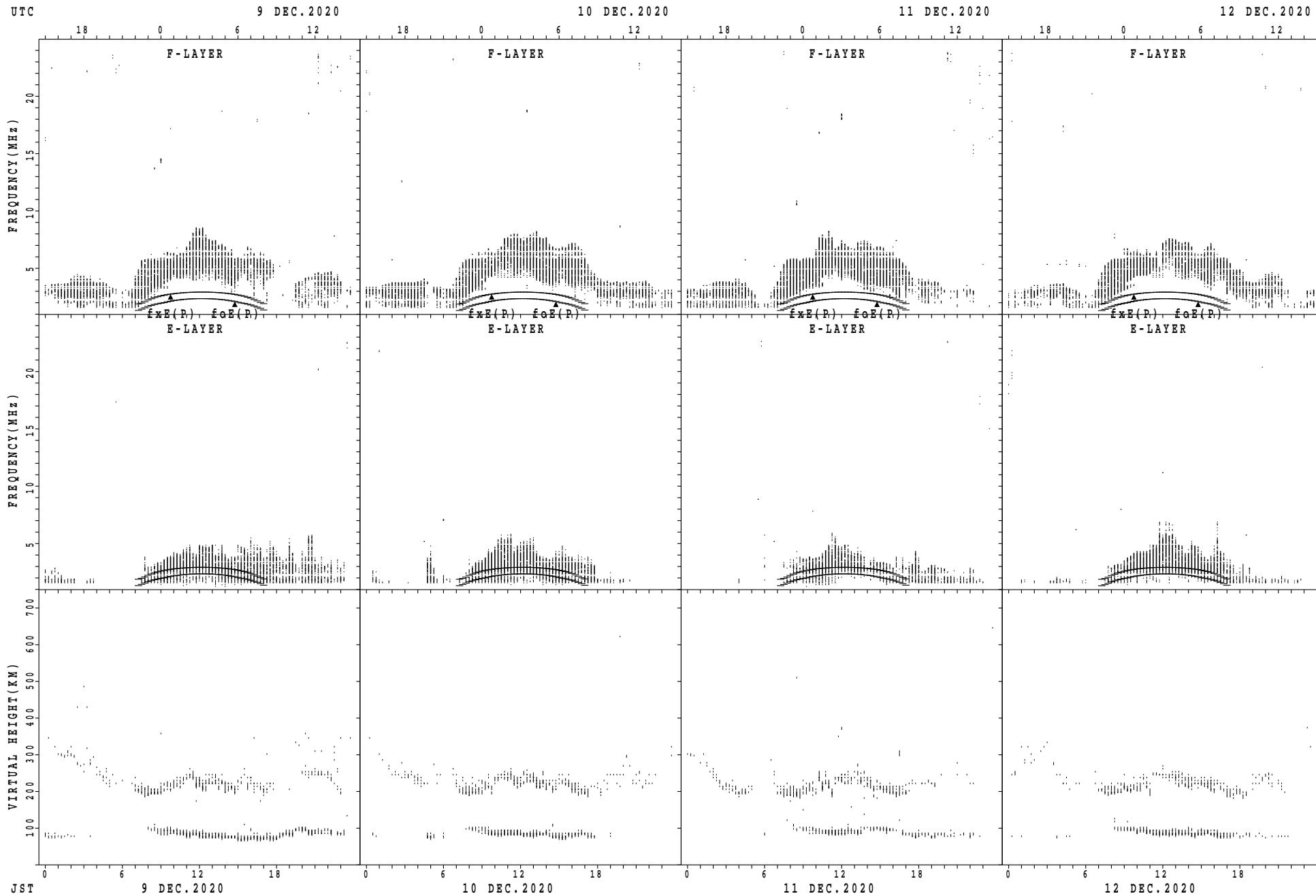
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Yamagawa



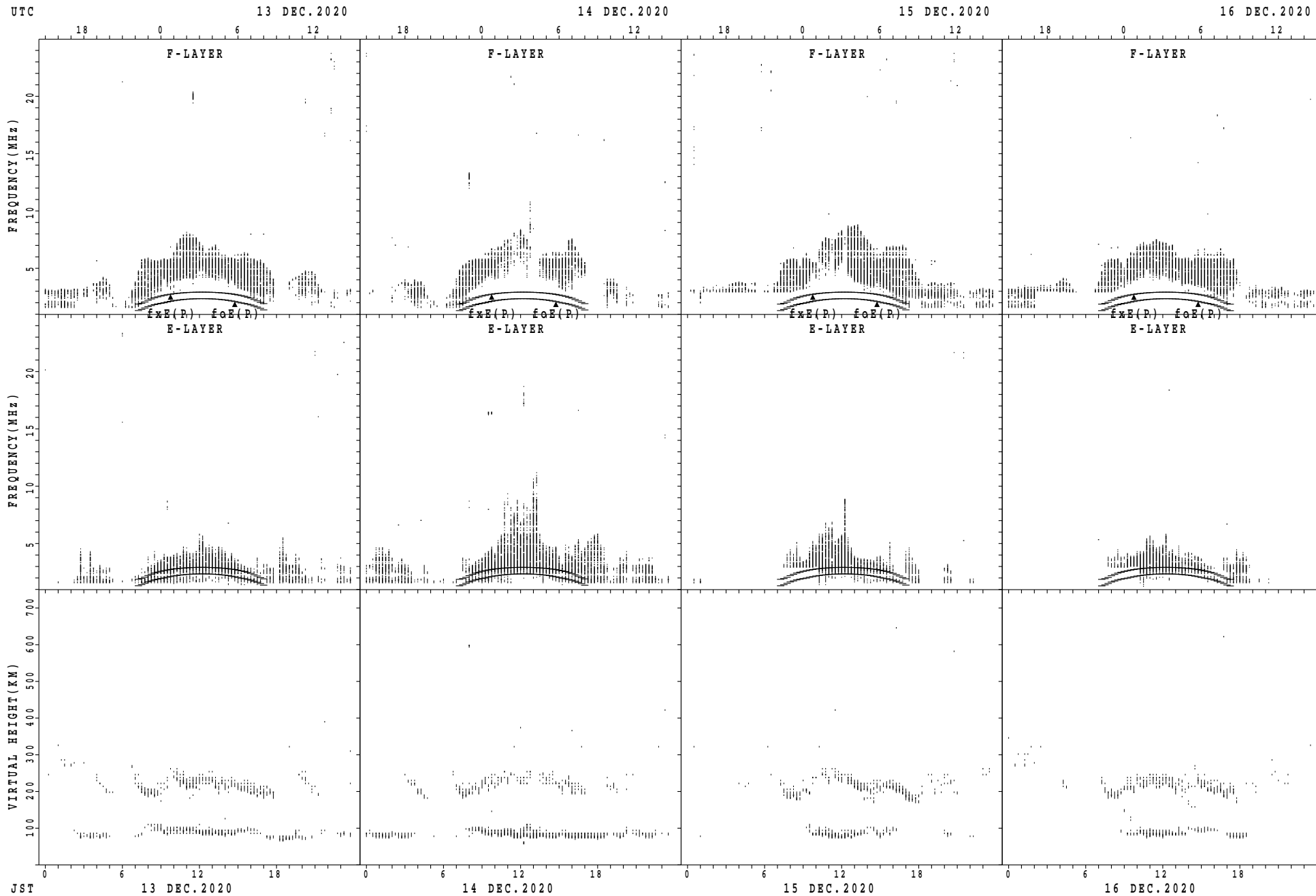
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



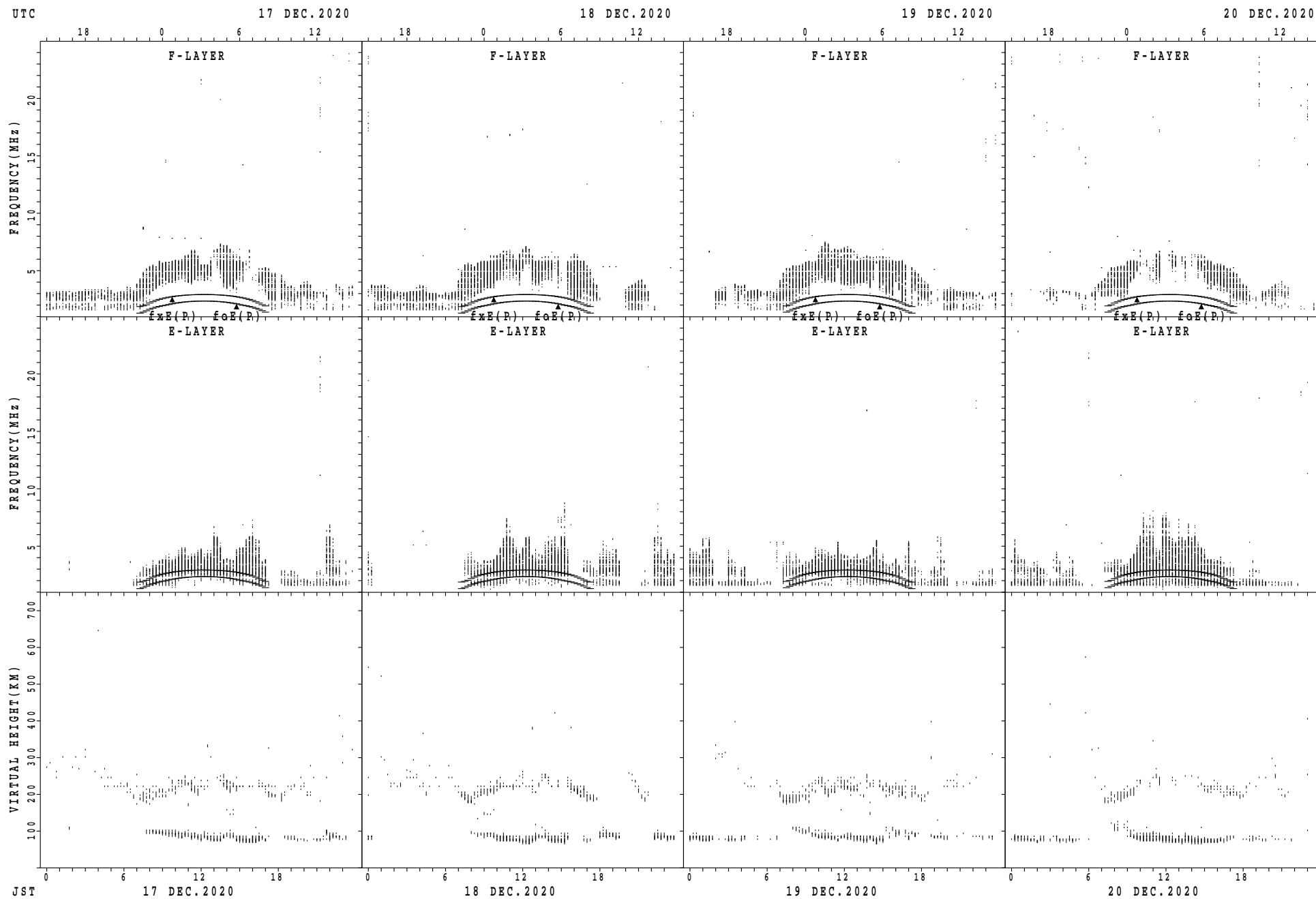
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



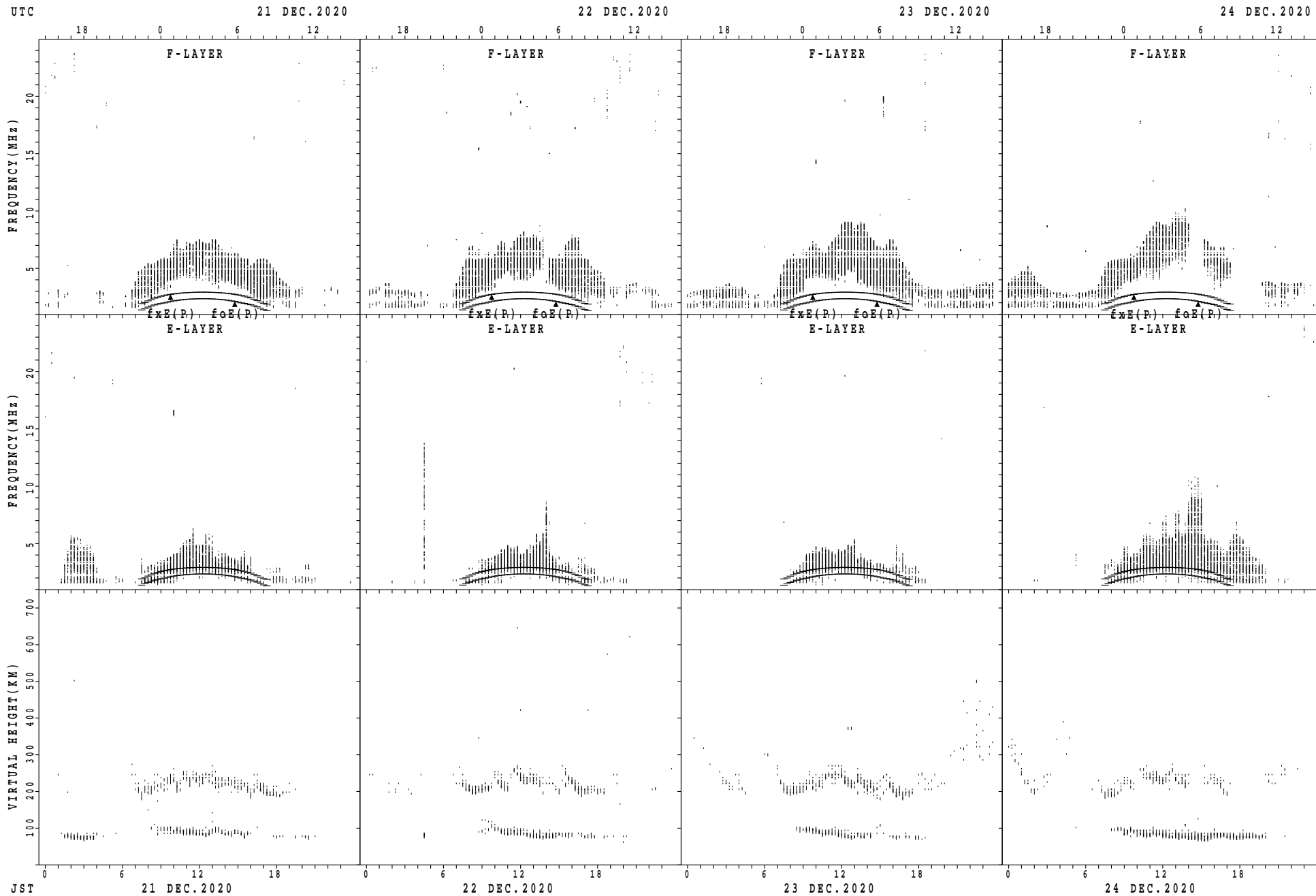
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Yamagawa



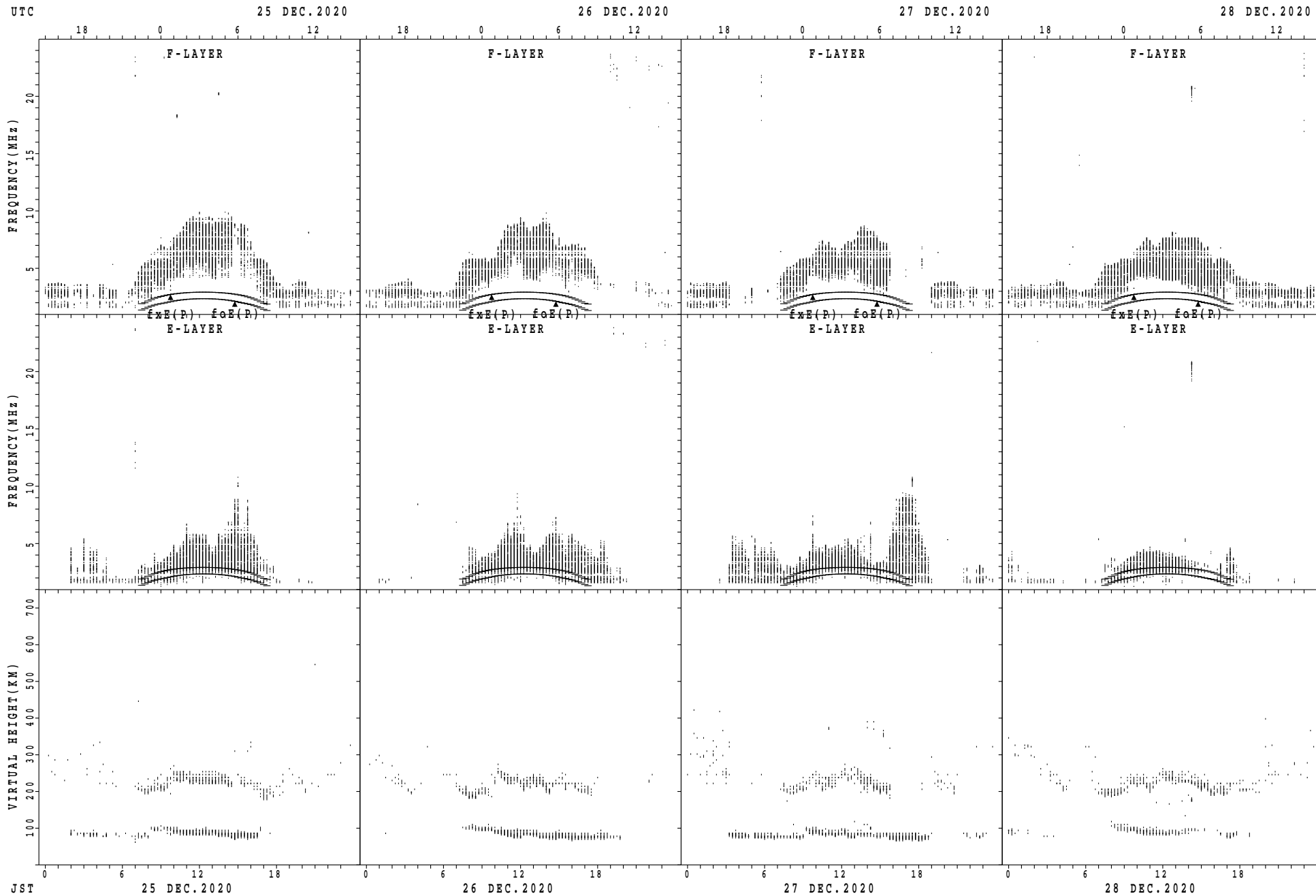
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



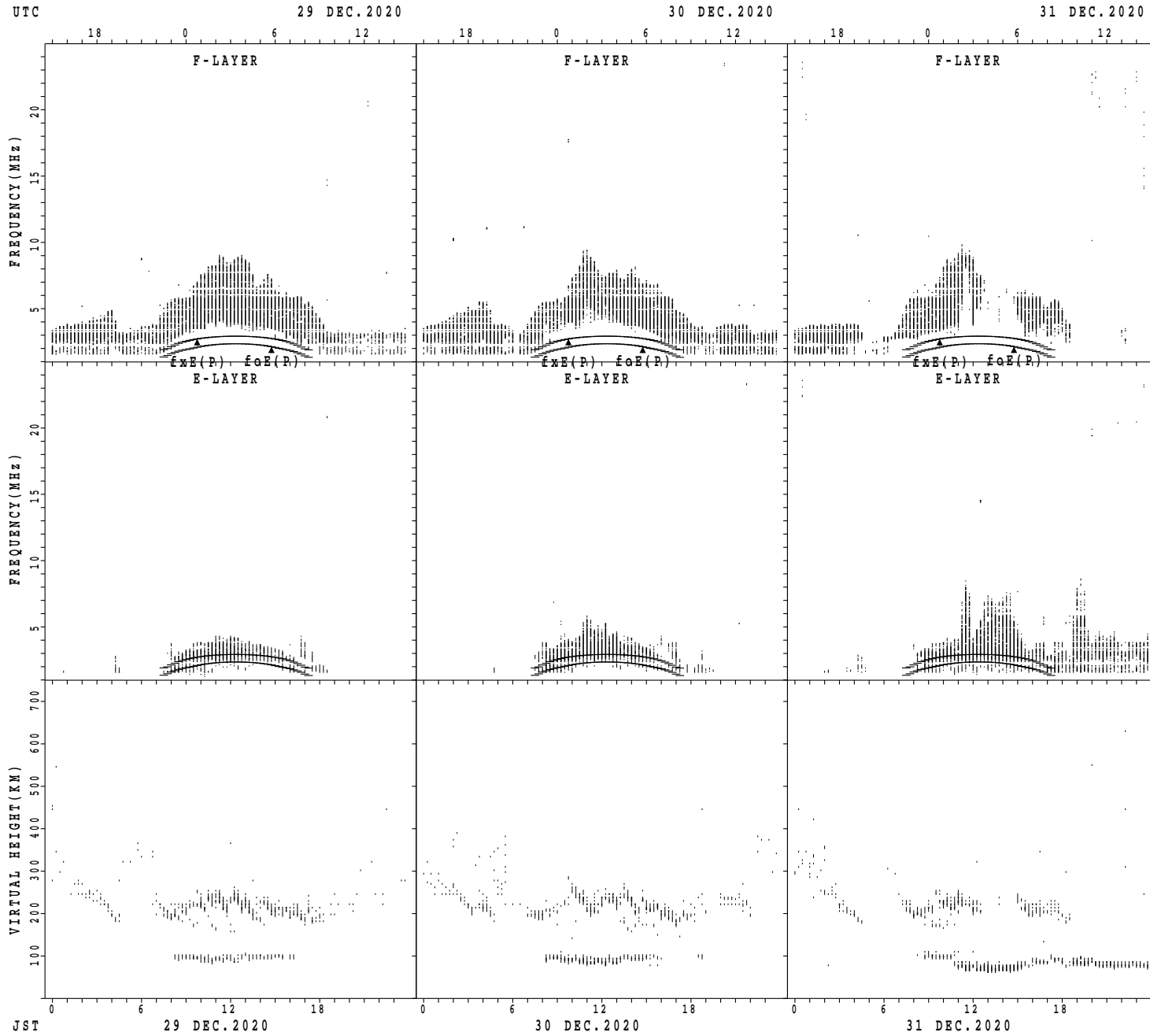
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



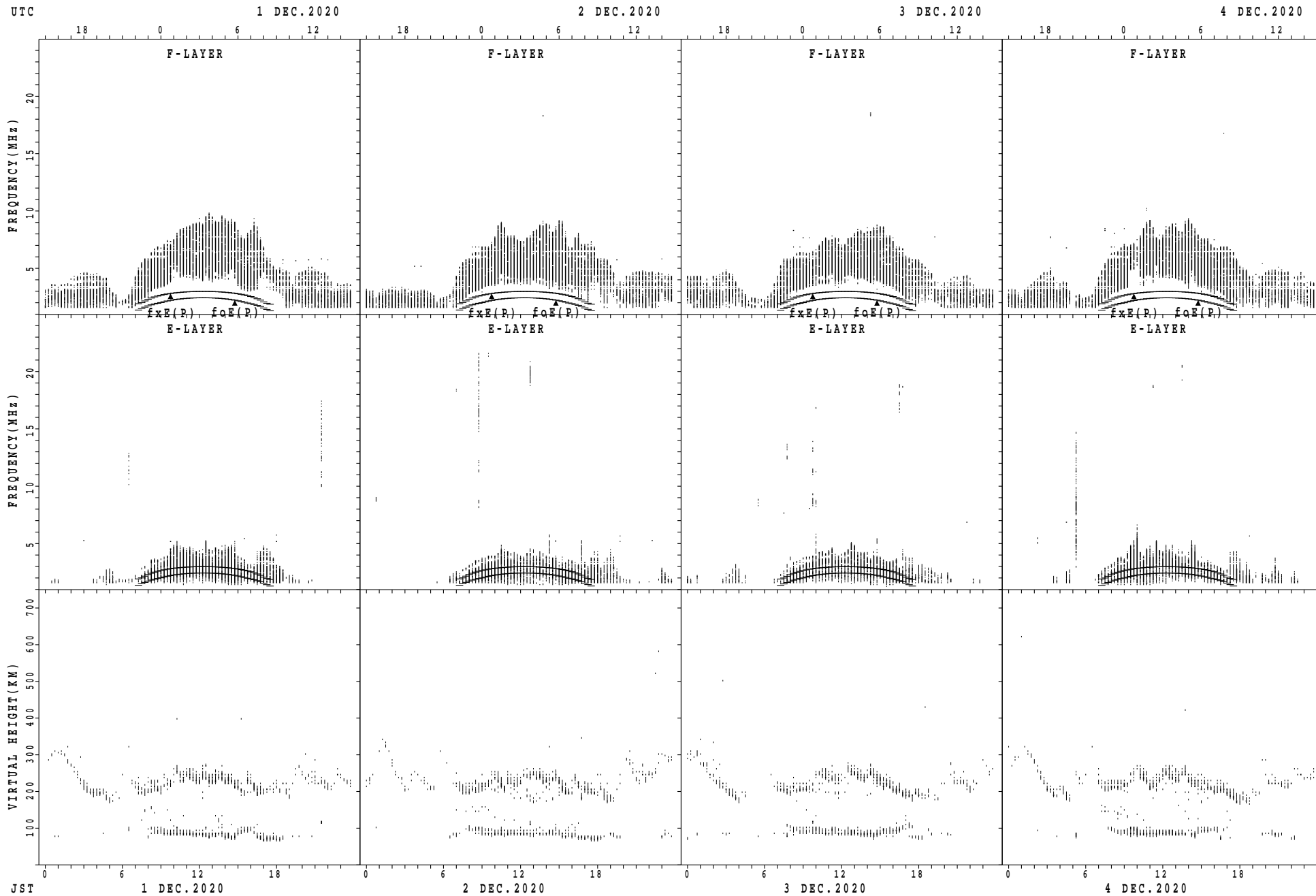
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



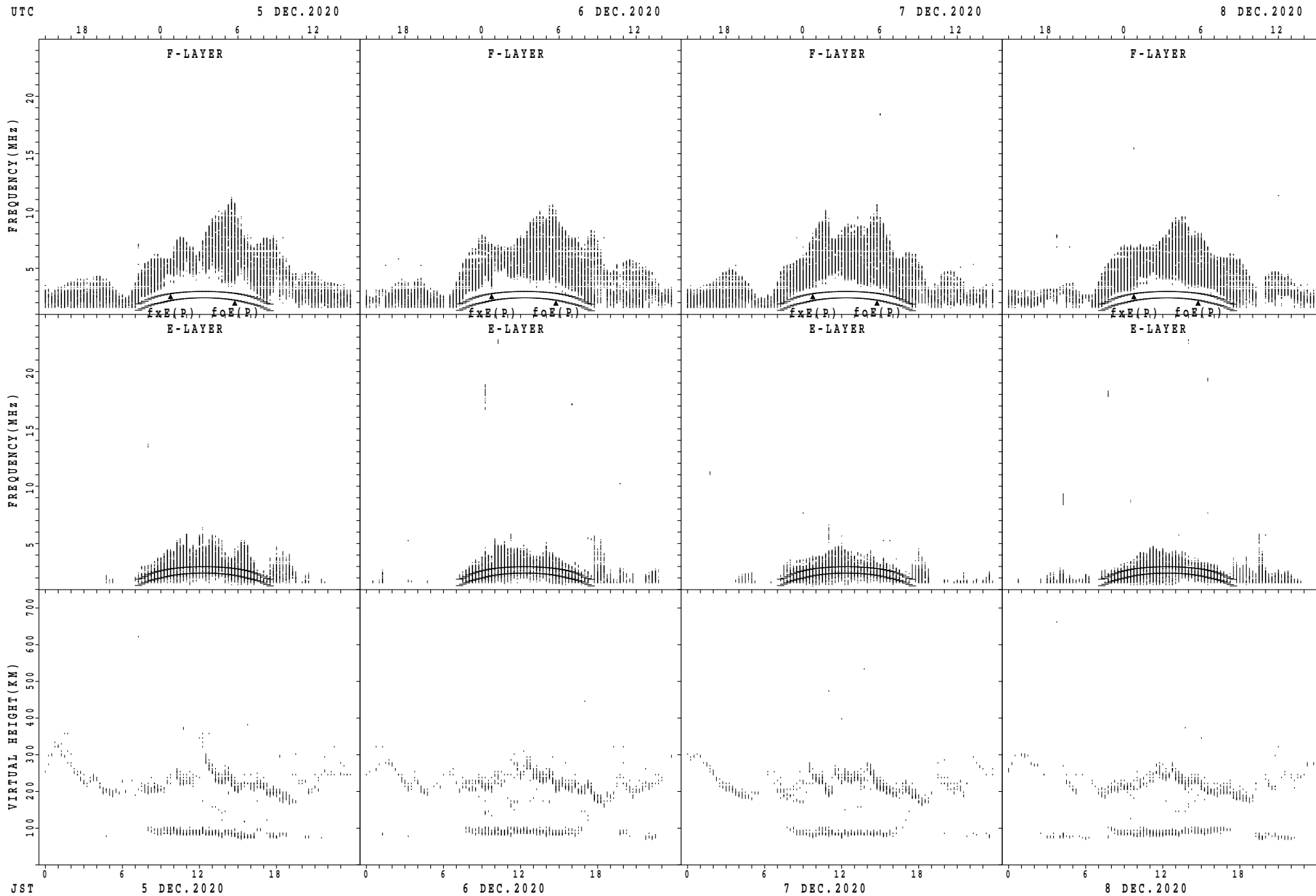
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



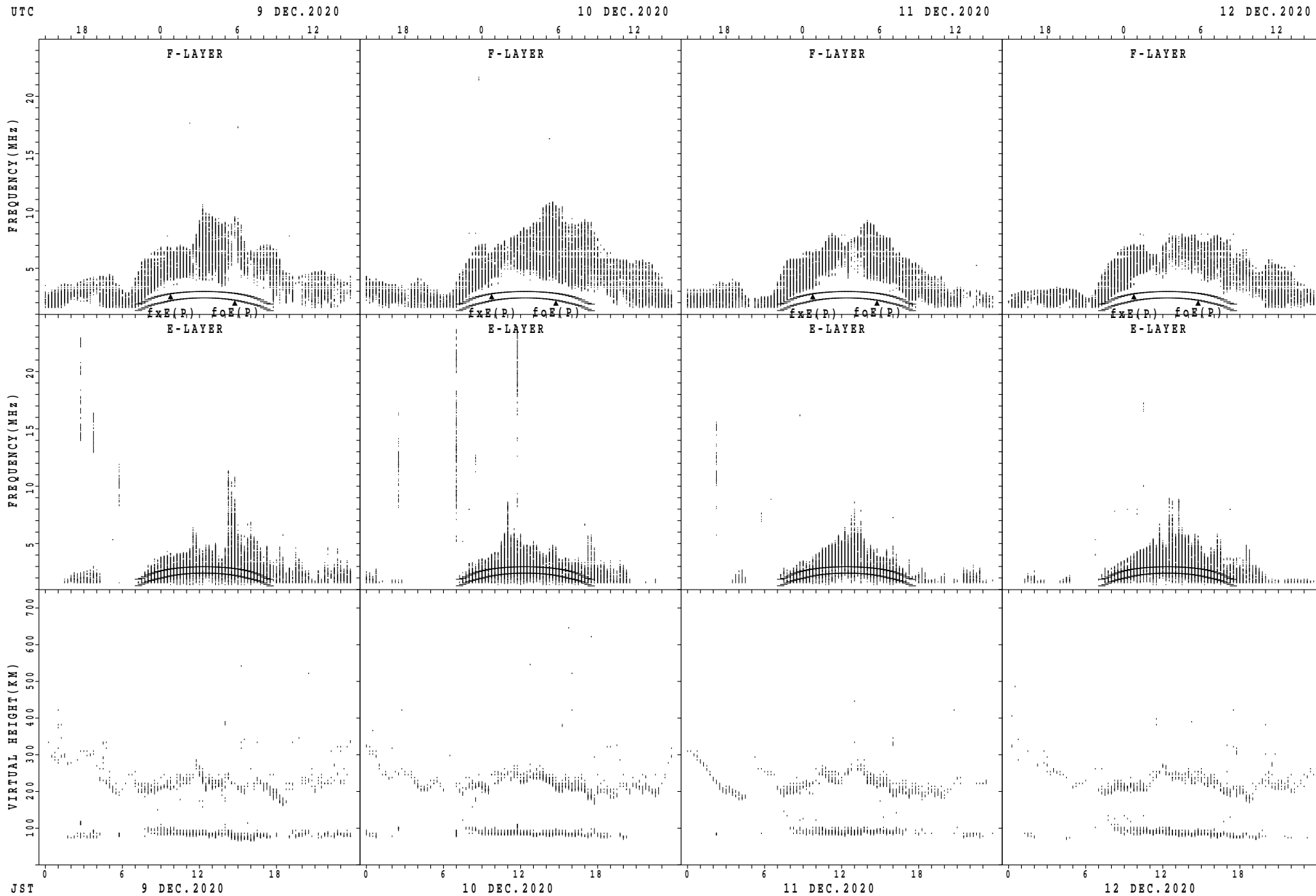
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



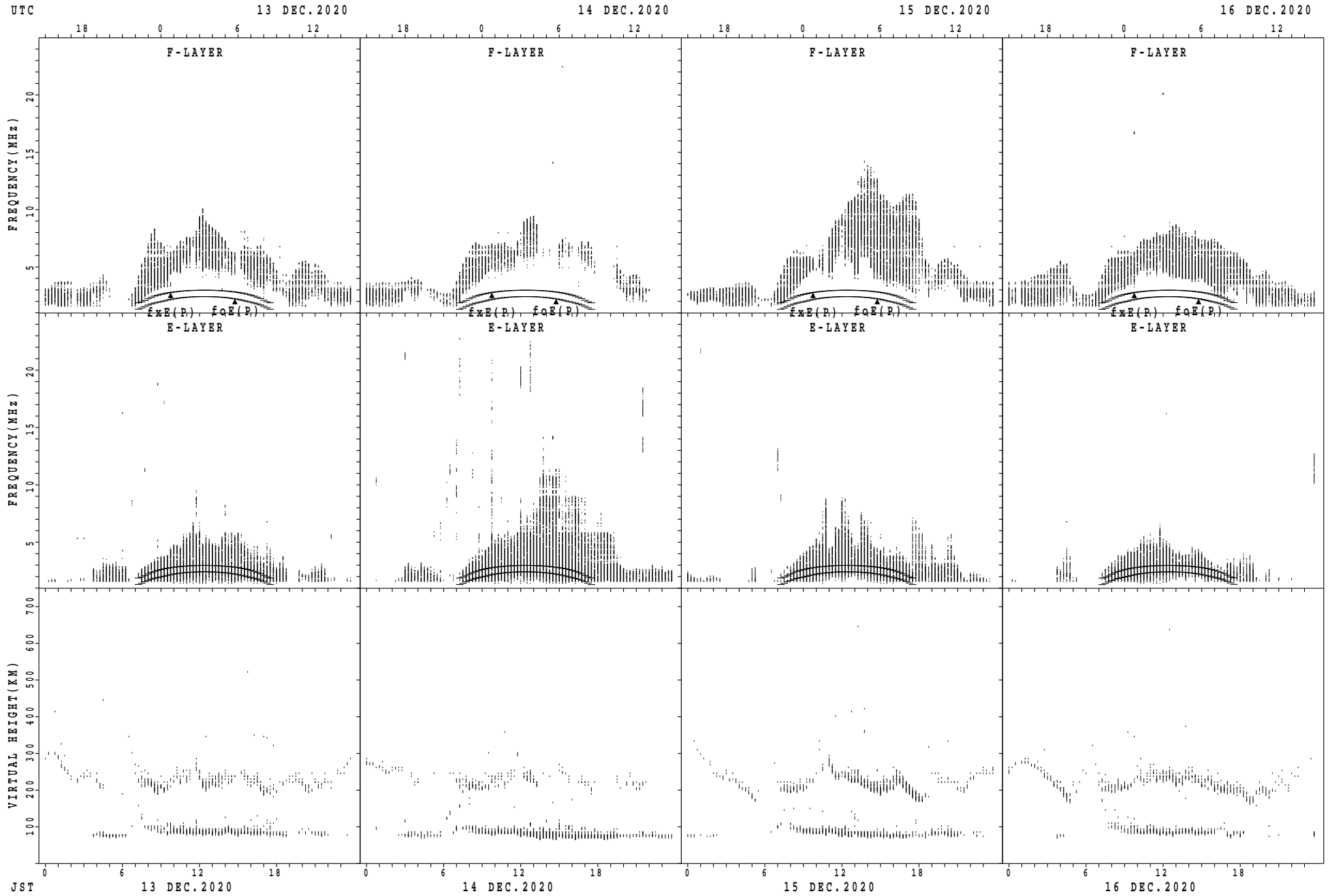
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Okinawa



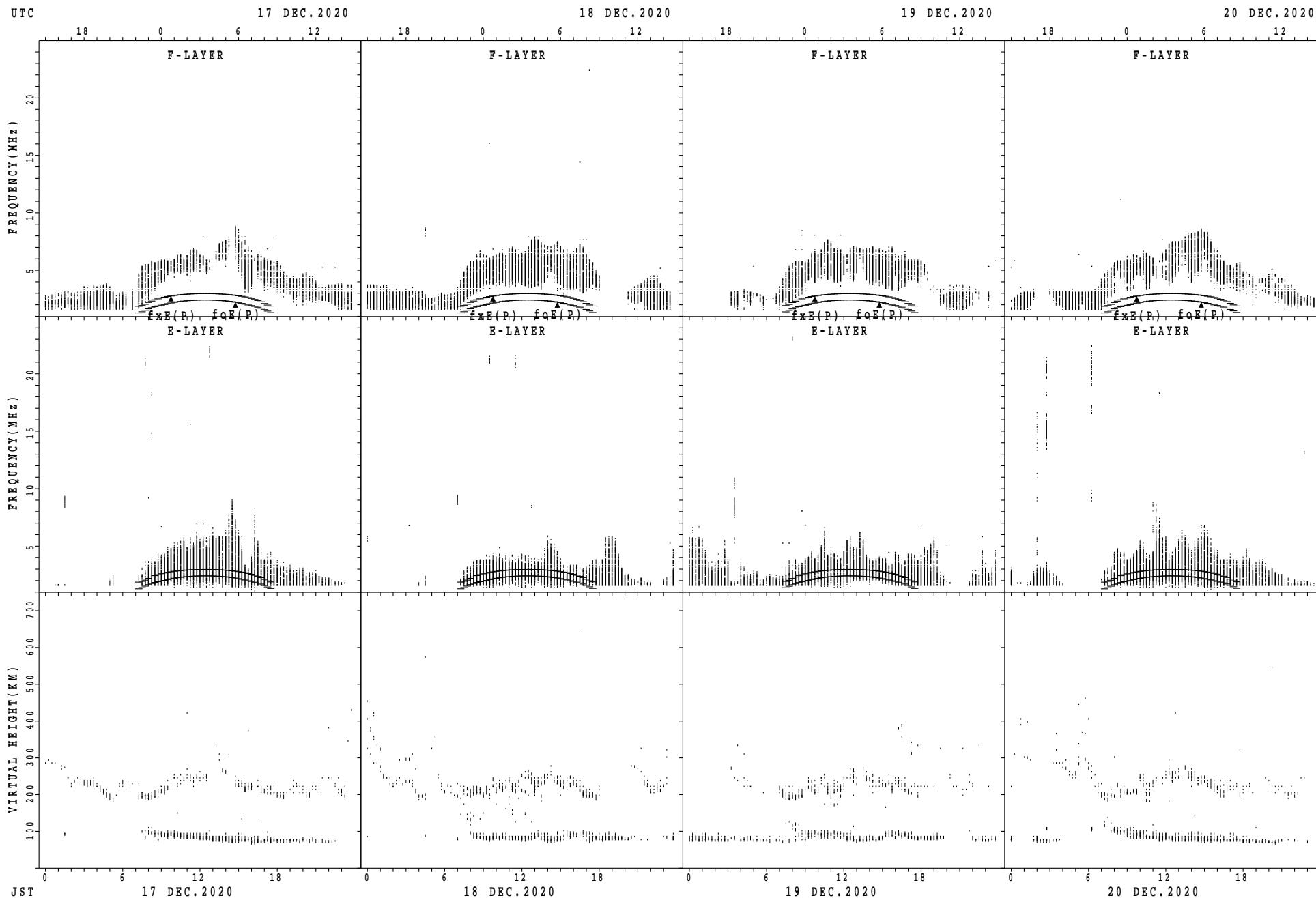
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



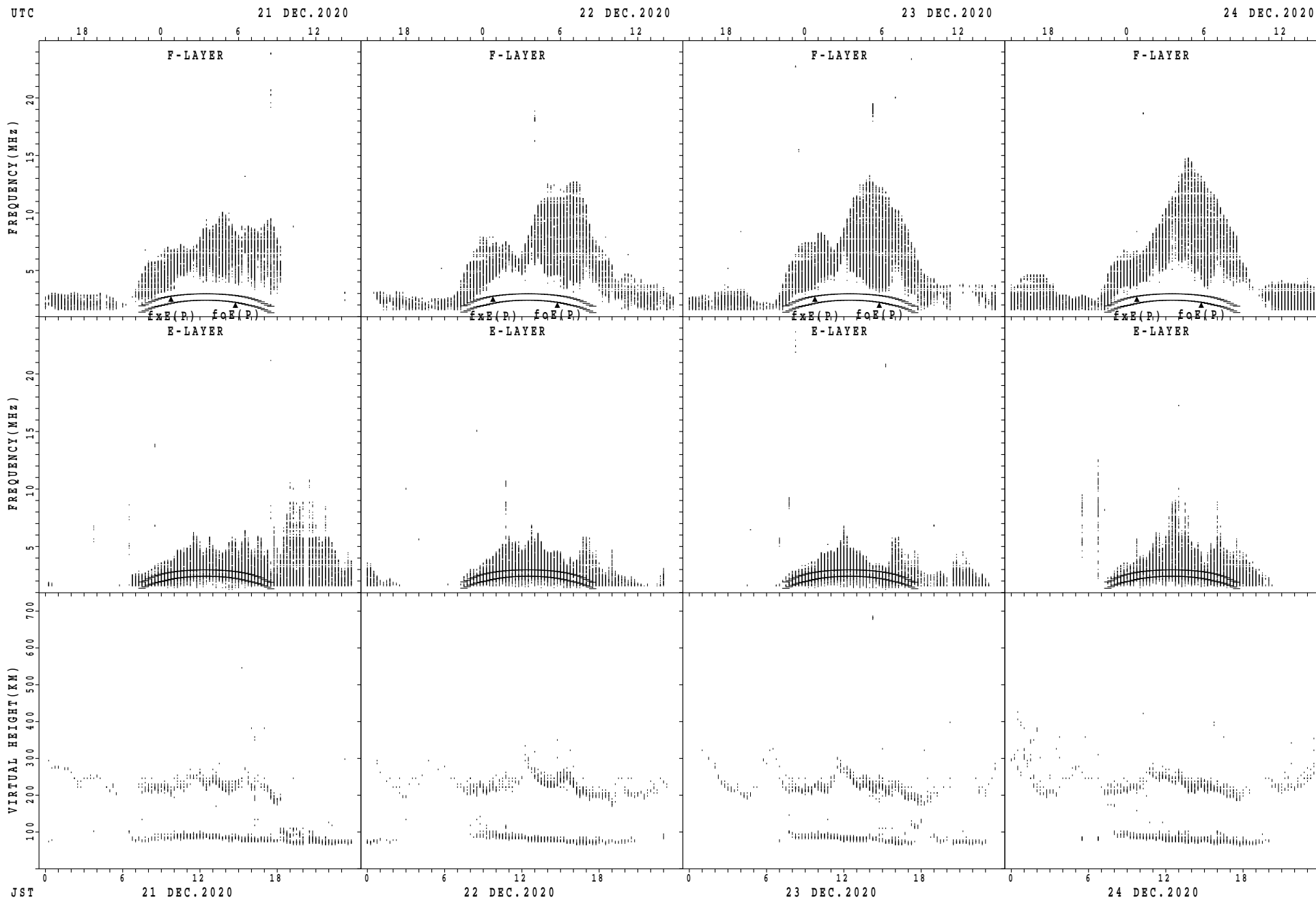
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



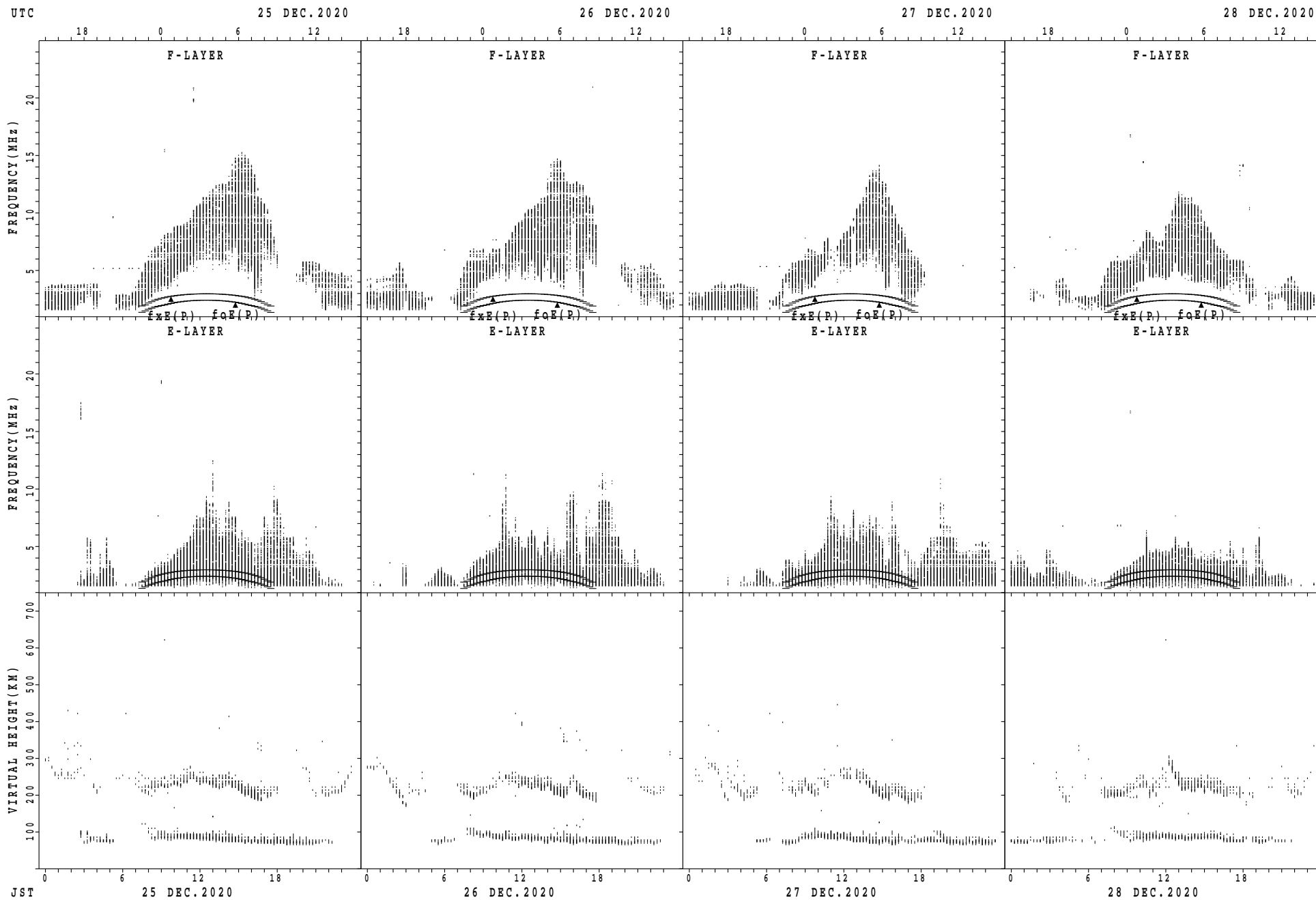
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $foE(P)$; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



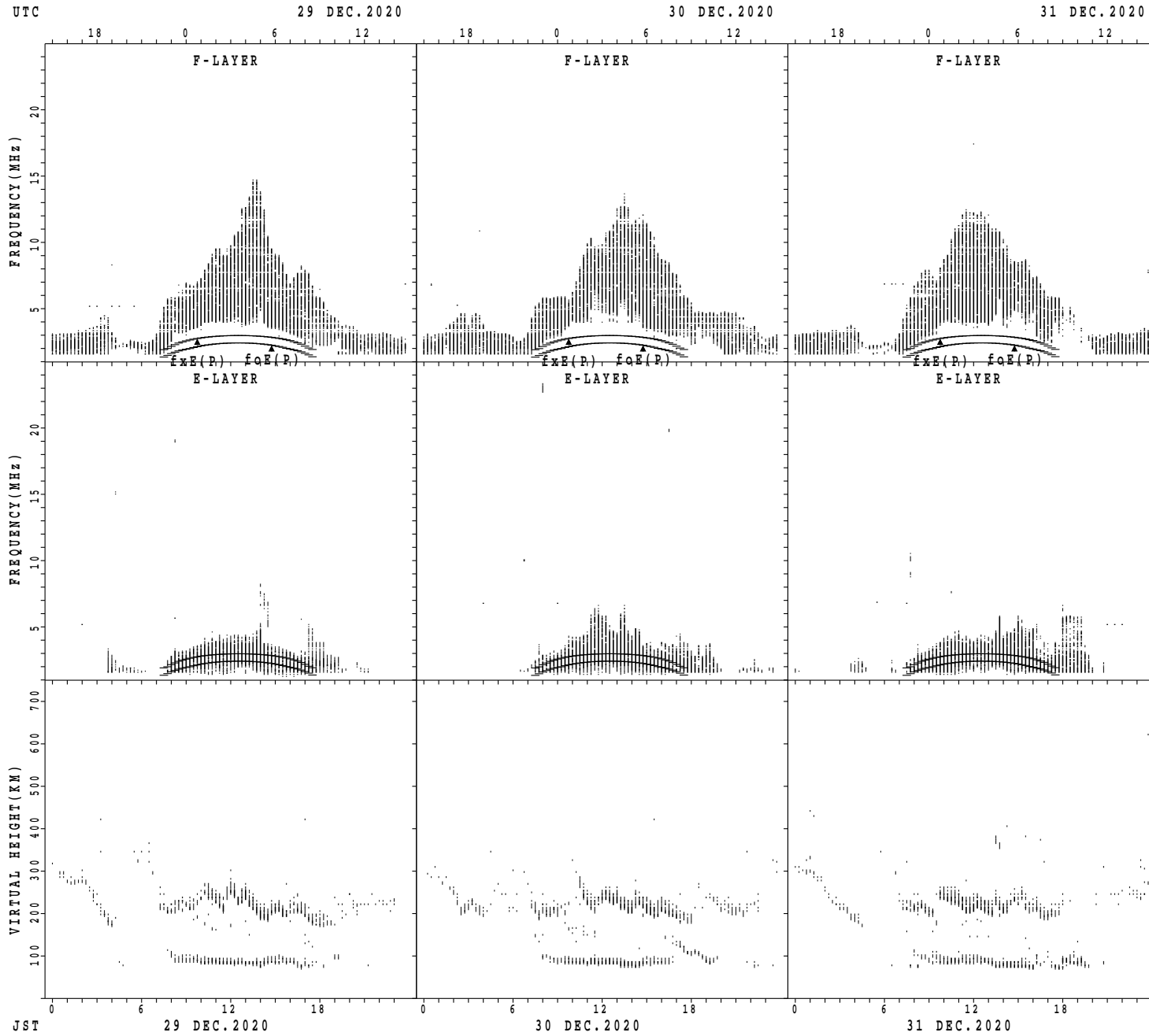
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Okinawa



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

SUMMARY PLOTS AT Okinawa



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

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

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									4	10	15	26	15	14	10	4								
MED									207	213	222	212	212	218	219	221								
U Q									223	218	232	222	218	230	226	237								
L Q									200	200	212	202	200	216	214	204								

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	24	25	24	24	22	18	23	31	31	31	31	31	31	31	30	21	21	20	22	19	20	20	22
MED	96	98	98	98	98	98	98	100	98	98	98	98	100	98	98	98	98	96	97	98	98	98	98	98
U Q	98	98	98	98	98	98	98	153	100	100	102	100	100	102	100	98	99	98	98	98	98	98	98	98
L Q	96	96	96	96	96	98	96	98	98	98	96	96	98	96	98	96	96	94	96	96	96	96	96	96

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1	5	21	20	12	16	16	10	1							
MED									200	224	224	216	231	232	231	220	200							
U Q									100	229	236	224	243	248	238	234	100							
L Q									100	213	215	209	218	220	223	214	100							

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	16	15	20	17	18	19	9	17	31	31	29	30	30	29	29	30	18	22	19	16	16	11	14	19
MED	96	96	96	96	97	98	98	131	98	100	96	98	98	98	98	98	97	98	98	98	98	96	96	96
U Q	97	96	98	98	98	98	98	182	100	100	98	100	98	100	100	98	98	98	98	98	98	98	98	98
L Q	96	94	94	94	96	96	95	98	98	98	93	96	94	96	96	96	96	96	96	96	96	94	96	96

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										2	13	12			20	13	7	1						
MED										220	234	229			224	232	216	220						
U Q										226	251	235			237	241	234	110						
L Q										214	222	218			211	218	210	110						

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	8	13	15	16	17	12	13	7	27	31	30	30	30	30	30	30	30	27	25	23	19	18	14	14
MED	95	96	96	96	96	96	96	96	98	100	98	96	96	96	98	96	98	94	96	96	96	96	96	96
U Q	98	96	98	97	98	96	96	98	98	102	100	98	98	98	100	98	98	98	98	98	98	98	96	98
L Q	94	94	92	95	94	92	93	94	98	98	98	94	94	94	94	92	92	94	94	94	96	96	94	94

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

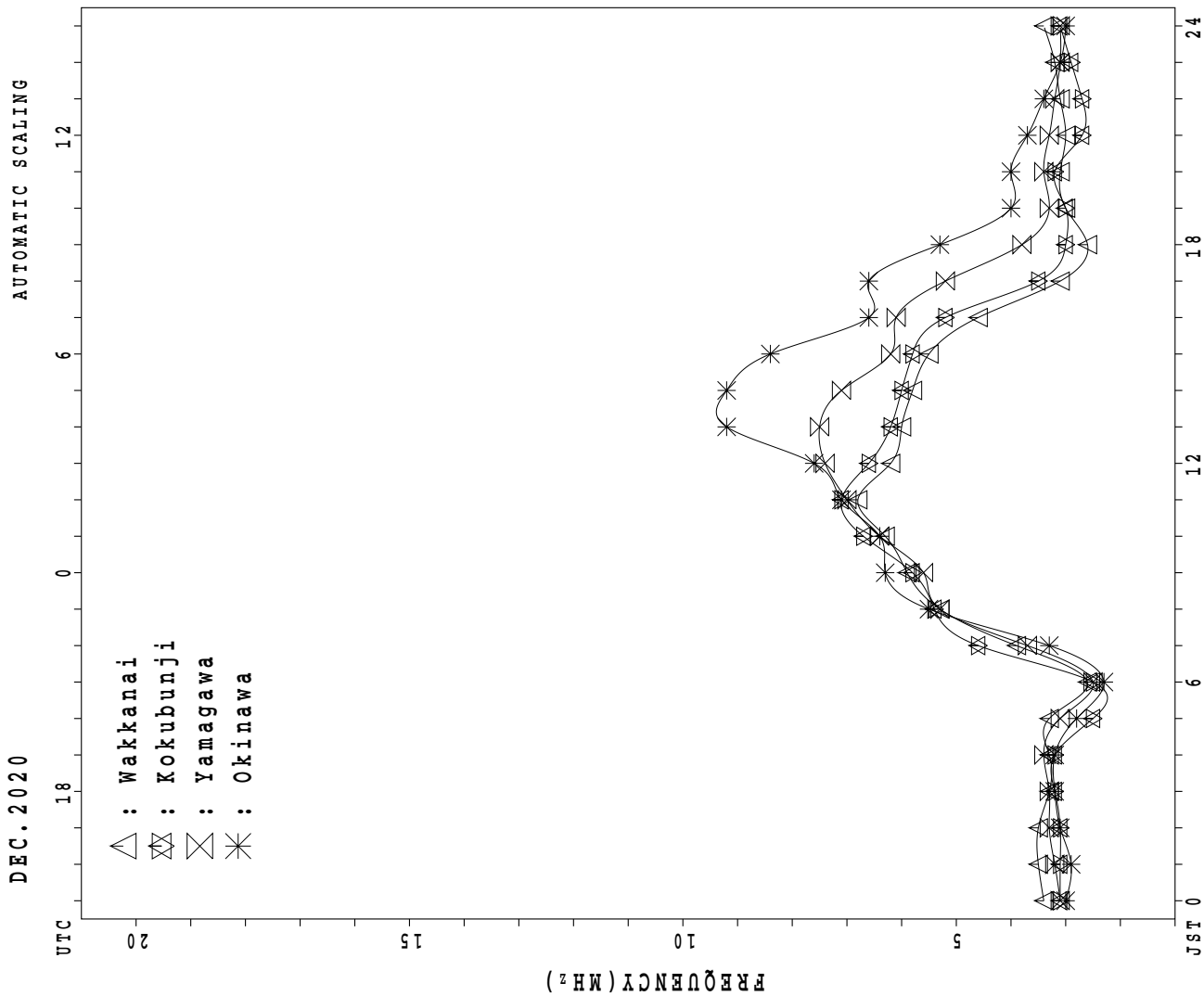
h'F STATION Okinawa LAT. 26°41.0'N LON. 128°09.0'E

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									3	19	14					26	22	13	5					
MED									228	228	236					216	225	208	200					
U Q									234	242	242					224	240	219	208					
L Q									224	220	222					208	218	203	194					

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	17	12	14	11	16	13	10	20	31	31	31	31	31	31	31	31	31	31	30	28	31	27	24	23
MED	96	96	96	96	97	96	96	98	98	98	98	96	96	96	94	96	96	96	96	96	98	96	96	96
U Q	98	97	98	98	98	97	98	98	98	102	98	96	98	98	96	98	98	98	98	98	98	98	98	98
L Q	95	96	94	94	94	94	78	96	98	98	96	94	94	94	92	94	92	92	92	92	96	94	95	96

MONTHLY MEDIANS PLOT OF fOF2



IONOSPHERIC DATA STATION Wakkanai

DEC.2020 f_{XI} (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 41	X 41	X 41	X 41	X 41	X 39													X 30	X 38	X 36	X 36	X 39	X 38	
2	X 42	X 41	X 43	X 45	X 46	X 33													X 39	X 31	X 35	X 33	X 35	X 39	
3	X 39	X 40	X 40	X 41	X 43	X 39													X 35	X 35	X 34	X 34	X 37	X 37	
4	X 38	X 38	X 39	X 39	X 43	X 41													X 36	X 35	X 37	X 37	X 37	X 39	
5	X 40	X 40	X 40	X 40	X 40	X 39													X 37	X 32	X 37	X 37	X 37	X 37	
6	X 39	X 40	X 43	X 43	X 41	X 41													X 36	X 35	X 41	X 40	X 42	X 43	
7	X 44	X 44	X 45	X 43	X 43	X 39													X 35	X 34	X 37	X 35	X 35	X 37	
8	X 38	X 38	X 38	X 39	X 38	X 37													X 34	X 33	X 38	X 38	X 39	X 39	
9	X 39	X 39	X 37	X 37	X 35	X 35													X 32	X 32	X 36	X 31	X 33	X 36	
10	X 36	X 37	X 37	X 37	X 37	X 37													X 30	X 32	X 36	X 33	X 38	X 41	
11	X 44	X 52	X 57	X 51	X 41	X 41													X 37	X 37	X 40	X 37	X 43	X 46	
12	X 46	X 49	X 57	X 54	X 53	X 57	43												X 40	X 36	X 40	X 40	X 37	X 42	X 38
13	X 43	X 46	X 50	X 50	X 51	X 55													X 41	X 43	X 47	X 48	X 48	X 48	
14	X 50	X 52	X 54	X 51	X 53	X 50													X 36	X 40	X A	X 41	X 45	X 48	
15	X 48	X 54	X 59	X 49	X 49	X 46													X 37	X 34	X 40	X 43	X 54	X 48	
16	X 45	X 44	X 44	X 41	X 37	X 39													X 35	X 40	X 45	X 43	X 46	X 56	
17	X 56	X 59	X 58	X 54	X 56	X 53	44												X 38	X 39	X 41	X 37	X 45	X 46	
18	X 57	X 57	X 57	X 57	X 58	X 54	38												X 34	X 38	X 37	X 37	X 44	X 37	
19	X 55	X 45	X 40	C	X 57	X 50													X 44	X 40	X 47	X 47	X 48	X 42	
20	X 52	X 49	X 53	X 48	X 41	X 39													X 38	X 41	X 41	X 44	X 48	X 49	
21	X 53	X 53	X 43	X 36	X 36	X 42	42												X 32	X 37	X 43	X 40	X 42	X 44	
22	X 45	X 58	X 58	X 58	X 58	X 33													X 32	X 32	X 38	X 35	X 38	X 48	
23	X 56	X 15	X 54	X 37	X 40	X 37													X 31	X 35	X 39	X 37	X 39	X 39	
24	X 38	X 41	X 43	X 41	X 43	X 47													X 35	X 38	X 33	X 36	X 39	X 40	
25	X 40	X 42	X 41	X 41	X 38	X 38													X 33	X 37	X 36	X 36	X 42	X 46	
26	X 48	X 48	X 46	X 45	X 46	X 37													X 31	X 33	X 35	X 35	X 44	X 39	
27	X 48	X 46	X 52	X 44	X 44	X 53					68								X 33	X 38	X 39	X 39	X 44	X 53	
28	X 48	X 56	X 57	X 57	X 56	X 56	39												X 35	X 36	X 37	X 44	X 40	X 38	
29	X 42	X 39	X 39	X 37	X 37	X 41													X 40	X 42	X 46	X 46	X 54	X 50	
30	X 55	X 48	X 46	X 56	X 49	X 38													X 31	X 35	X 35	X 37	X 39	X 42	
31	X 42	X 38	X 38	X 38	X 39	X 39													X 33	X 38	X 34	X 37	X 37	X 40	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	30	30	31	6				1							1	31	31	30	31	31	31	
MED	X 44	X 44	X 44	X 43	X 43	X 41	40				68							40	X 35	X 37	X 38	X 37	X 42	X 41	
U Q	50	52	54	51	49	50	43												37	39	41	41	45	48	
L Q	X 40	X 40	X 40	X 39	X 39	X 38	38												X 32	X 34	X 36	X 36	X 38	X 38	

DEC.2020 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

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

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

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

DEC.2020 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	L	L	L	L	L									
2											L	L	L	L				L						
3									L	L	L	L	L	L				L						
4											L	L	L	L										
5													L	316	L									
6											L	L	L	L		L								
7										L		L	L		A		L							
8												L	L	L										
9									L	A			L	L										
10											340	372	L	L										
11									L	L			L	L										
12							L			L		L	L	L										
13											L		L	L	L									
14												L		L										
15											L	L	L	L										
16										L	L	L	L	L										
17											L	L	L	L	L		L							
18												L	C	L										
19											L	L	L											
20											L													
21									L	L	L	L	L	L										
22												L	L											
23												L	L	L										
24											L	L	L	L	L									
25													L	L	L									
26												L	L	L	L		248							
27								L		L	L		L											
28													L		L									
29											L	L	L	L										
30										L	L	L	L	L	L									
31										L	L	L	L	L										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT											1	1	1	1		1								
MED											340	372	300	316		248								
U Q																								
L Q																								

DEC.2020 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1							B										B	B							
2							228	200	216	264	264	276	280	280	240	208	228		B						
3							B	180	204	252	264	276	272	276	268	204	A	224							
4							B	188	248	252	264	284	284	276	228	200	B	B							
5							B	B	232	264	272	212	288	288	244	176	B	B							
6							B	244	232	268	296	280	288	268	260	196	A	A							
7							A	B	212	240	244	260	268	272	184	A	212	212							
8							B	B	220	260	284	268	292	256	244	196	192	A							
9							A	B	216	312	284	284	284	252	232	A	236	A							
10							B	A	A	A	288	288	288	256	248	184	A	A							
11							B	A	208	244	220	244	280	256	A	A	A	A							
12							196	196	180	248	260	288	276	256	240	196	B	B							
13							B	168	216	256	268	268	280	256	216	208	B	B							
14							A	216	216	216	A	216	272	260	240	180	A	B							
15							B	240	192	240	248	280	280	252	244	192	B	B							
16							B	B	192	256	268	276	276	272	A	A	B	A							
17							B	A	228	240	256	280	280	248	244	184	A	A							
18							B	B	A	A	A	A	264	256	220	168	A	A							
19							B	B	208	240	260	264	280	264	216	180	A	A							
20							B	A	192	256	268	276	280	256	244	200	B	B							
21							B	200	200	236	248	276	280	260	244	196	B	A							
22							180	B	A	260	268	268	264	A	236	192	A	A							
23							B	188	188	272	284	272	272	264	240	200	B	A							
24							B	200	A	252	264	276	276	284	240	184	A	B							
25							A	A	200	264	264	296	268	264	228	180	A	B							
26							B	B	196	236	264	264	276	272	A	A	A	B	116						
27							B	B	188	232	252	280	284	256	228	A	B	B							
28							B	A	196	240	272	A	A	268	232	196	B	B							
29							A	200	200	244	256	280	272	264	232	204	B	B							
30							B	A	192	228	252	288	280	256	228	216	A	B							
31							B	A	216	224	A	264	264	260	236	A	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							4	12	27	29	28	29	30	30	28	24	4	3							
MED							198	200	208	248	264	276	280	262	240	196	220	212							
U Q							214	222	216	260	272	280	280	272	244	202	232	224							
L Q							188	188	192	240	256	264	272	256	228	184	202	116							

DEC.2020 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	J A	J A		J A	J A		J A				J A			J A	J A	E B	J A	E B				E B	E B	E B	E B	
2	26	15	28	E B	J A		J A		J A			J A	J A	J A			E B	E B	E B	E B	E B	E B	J A	J A	J A	
3	E B	E B	E B	J A		J A	E B		J A	J A		J A		J A	J A	J A							J A	J A	J A	
4	29	E B	16	20	22	19	E B	E B	J A			J A			J A	E B	E B	E B	J A	J A	E B	E B	E B	E B	E B	
5	E B	E B	E B	J A			J A	E B	J A	J A							E B	E B				E B	E B	E B	E B	
6	22	E B	E B	E B	J A	E B	E B		J A	J A	J A	J A	J A			J A	J A		E B				J A	E B	E B	
7	J A		24	28	32	21	J A		E B		J A	J A	J A	J A	J A	J A	J A		J A	E B	E B	E B	E B	J A	J A	
8	J A		23	20	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				
9	28	J A	J A		20	52	16	J A	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A		E B	E B	E B	E B	E B	E B	
10	J A		29	21	49	21	E B	E B			J A	J A	J A	J A	J A	J A	J A	J A					E B	E B	E B	
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				
12	J A		41	33	51	64	25	26		J A			J A		J A			E B	E B	E B	E B			J A	J A	
13	J A	J A	J A	J A	E B	J A		E B		J A	J A	J A			J A			E B	E B	J A	J A	J A	E B	E B	E B	
14	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	E B	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		32	24	E B		E B			J A		E B			E B	E B	E B	J A	J A	E B	E B	E B	
16	J A		29	28	28	51	28	28		J A	E B				J A	J A	J A	J A		J A			E B	E B	E B	
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	
18	32	J A	J A	J A	J A	J A		J A	J A	J A	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	26	20	22		E B	E B	E B	E B	E B	J A	J A	J A	J A			J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
20	E B	E B	E B		E B	E B	E B											E B			J A		J A	J A	J A	
21	E B	E B	E B	E B	E B	E B	E B	J A		J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
22	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	J A	J A	J A	
23	22	25	20	E B				J A		J A	J A	J A	J A	J A	J A	J A	J A	J A				E B	E B	E B	E B	
24	20	21	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				E B	E B	J A	J A	
25	J A		37	22	24	21	25	86	112	21	26	38	36	31	32	43	26	25	22	16	21	16		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	J A	
27	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	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	J A	J A	J A	J A	J A	J A	
30	27	25	16	16	26	102	15	29	65	33	82	31	42	29												
31	J A	E B	E B	E B	E B	E B	E B	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	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	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	J A	26	23	22	22	24	23	23	23	J A	26	33	34	33	32	30	28	23	24	23	22	24	22	22	22	23
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	J A
L Q	E B	E B	E B	E B	E B	E B	E B	E B	E B									E B	E B	E B	E B	E B	E B	E B	E B	E B

DEC.2020 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

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

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

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

DEC.2020 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

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

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

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

DEC.2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

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

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
1		305	305	305	305	342	358	322	373	372	347	347	342	362	356	356	356	364	361	335	334	316	299	299	281				
2		297	297	297	331	374	374	303	376	376	375	369	355	327	373	331	369	R	342	361	338	339	305	304	286				
3	V	299	298	320	316	330	380	380	353	362	383	355	367	366	357	370	369	V	340	318	337	336	327	327	300	299			
4		320	311	310	311	342	378	332	343	387	336	367	344	383	366	358	358	V	354	384	349	331	331	340	294	294			
5		293	312	312	329	329	334	341	383	396	363	363	331	372	372	376	360	V	360	309	373	315	315	315	299	298			
6		313	313	314	314	313	336	335	378	363	357	372	398	399	363	381	391	V	337	354	315	315	314	314	288	308			
7		308	307	316	315	314	336	335	370	384	334	395	344	348	382	276	381	V	315	374	331	349	339	316	316	293			
8		292	316	308	333	332	330	330	392	411	352	351	386	405	338	329	373	V	379	379	360	320	319	319	285	284			
9		298	297	304	308	307	323	376	379	374	262	328	373	373	352	372	360	V	360	359	328	328	353	303	303	303			
10		302	301	323	308	308	375	332	391	354	353	359	359	382	336	349	364	V	364	382	324	332	318	289	289	288			
11		307	287	296	312	294	330	344	354	354	353	353	376	376	371	355	380	V	357	357	339	298	315	314	308	287			
12		304	315	315	336	324	360	342	384	384	335	335	383	338	370	369	380	V	372	322	321	F	321	329	F	F			
13		275	310	310	319	305	346	382	367	367	334	368	379	384	359	358	359	V	373	322	322	327	327	326	314	316			
14		313	310	326	322	348	386	353	350	361	359	358	374	360	360	373	373	V	346	345	319	349	A	309	309	309			
15		330	299	F	319	318	324	342	367	380	380	342	376	375	369	368	368	V	377	309	332	332	289	289	293	F			
16		314	313	312	312	312	335	353	387	397	397	381	380	363	383	356	380	V	377	377	338	323	323	307	F	327			
17		294	F	F	F	F	F	F	F	363	379	378	369	375	375	374	327	V	380	383	305	356	340	346	297	309			
18		F	F	F	F	F	F	F	F	370	382	382	381	378	378	373	372	V	372	367	366	339	339	338	301	307	285		
19		F	300	300	C	F	F	F	F	363	363	388	397	381	367	379	367	V	367	367	367	351	351	331	331	F	F		
20		F	F	F	F	F	F	F	F	313	312	357	408	381	381	372	379	V	352	369	385	361	332	353	353	322	284		
21		F	F	F	F	F	F	F	F	324	346	355	396	367	377	377	378	V	367	372	371	370	355	329	327	326	300	286	331
22		298	F	297	F	C	338	332	331	397	368	345	386	358	358	357	357	V	355	332	330	306	304	304	303	285	F		
23		F	F	F	F	F	F	F	F	318	317	372	398	368	360	367	367	V	326	358	381	378	343	326	309	309	277	277	307
24		307	307	317	299	288	312	318	354	387	369	387	386	366	385	362	377	V	376	375	332	381	303	298	297	297	F	F	
25		324	299	299	299	335	371	350	350	349	384	353	359	375	374	359	364	V	372	351	326	367	334	334	287	276	F	F	
26		284	284	300	284	F	355	354	353	373	373	365	338	365	364	375	362	V	361	373	334	345	344	296	282	F	F		
27		F	F	F	F	F	F	F	F	346	389	352	375	347	354	374	371	V	375	352	390	335	305	347	348	255	260	F	F
28		F	F	F	F	F	F	F	F	382	365	367	339	374	349	375	365	V	324	377	322	343	315	315	316	315	288	F	F
29		297	313	F	274	318	331	331	349	370	387	348	382	332	353	367	352	V	364	421	338	348	311	296	286	F	F		
30		285	F	273	F	265	326	318	377	342	345	384	361	340	373	354	355	V	355	354	317	317	325	286	276	321	F	F	
31		296	300	299	299	281	344	343	352	361	361	374	380	364	370	354	353	V	365	366	338	337	347	313	310	261	F	F	
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT		24	24	23	25	23	27	28	31	31	31	31	31	31	31	31	31	30	31	31	30	29	30	28	25				
MED		300	307	310	311	318	336	342	367	376	367	363	374	372	367	362	368	364	354	332	332	323	304	298	294				
U Q		310	312	316	319	332	360	352	379	388	380	377	380	378	373	372	380	376	373	339	345	338	316	308	308				
L Q		295	299	299	299	305	324	330	353	362	352	348	359	360	357	355	358	355	332	326	320	315	296	286	285				

DEC. 2020 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L	L	L	L	L	L									
2											L	L	L	L				L						
3									L	L	L	L	L	L				L						
4											L	L	L	L										
5													L	415	L									
6											L	L	L	L		L								
7										L		L	L		A		L							
8												L	L	L										
9									L	A			L	L										
10										409	391		L	L										
11									L	L			L	L										
12							L			L		L	L	L										
13											L		L	L	L									
14												L		L										
15											L	L	L	L	L									
16										L	L	L	L	L										
17											L	L	L	L	L	L		L						
18												L	C	L										
19											L	L	451	L										
20											L													
21									L	L	L	L	L	L										
22												L	L											
23												L	L	L										
24											L	L	L	L	L	L								
25													L	L	L									
26												L	L	L	L	408								
27								L			L	L		L										
28													L		L									
29											L	L	L	L										
30											L	L	L	L	L	L								
31											L	L	L	L	L									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT											1	1	1	1		1								
MED											409	391	451	415		408								
U Q																								
L Q																								

DEC.2020 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

DEC.2020 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										228	238	238	228	228	238									
2											232	246	230	234				258						
3										214	204	236	246	224	232				262					
4											234	250	230	230										
5													230	214	226									
6											234	204	220	246		208								
7										228		226	238		290		334							
8												228	200	224										
9									228	A	252	226	226	226										
10												236	224											
11									224	224			214	222										
12							212			240		226	230	214										
13											232		216	234	224									
14												216		216										
15											264	218	228	240										
16										214	218	218	240	216										
17											216	216	216	216	222		212							
18												222	224	214										
19											216	228	212											
20											218													
21									210	222	224	220	220	224										
22												224	220											
23												224	224	284										
24											220	220	238	224	236									
25													210	210	230									
26												270	228	220	210	226								
27									226		238	238		234										
28													234		234									
29											220	220	216	222										
30											222	224	224	224	224	240								
31											226	226	226	216	222									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1		5	9	18	25	28	25	10	2	2	2						
MED							212		224	224	229	226	224	224	232	217	273	260						
U Q									227	228	236	237	230	233	238									
L Q									212	218	220	220	216	216	224									

DEC.2020 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

DEC. 2020 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	276	264	266	266	236	206	244	200	204	198	198	198	204	200	216	222	202	208	208	230	242	260	274	276
2	274	260	258	232	206	186	^E 288	^B 214	208	208	202	210	192	192	216	214	216	194	218	232	256	228	274	290
3	^Q 284	276	256	266	242	208	214	206	198	198	220	212	202	222	204	208	198	^B	254	224	244	248	288	268
4	262	262	260	262	234	196	264	218	196	220	200	200	198	198	226	208	200	200	232	244	220	234	288	288
5	264	264	260	228	232	218	242	198	198	220	224	224	204	196	212	200	202	198	214	250	258	258	270	286
6	256	254	254	254	244	216	242	204	200	220	198	206	196	196	232	196	204	198	224	274	248	254	292	284
7	266	252	252	250	236	246	216	200	202	200	212	202	200	214	^A	208	188	200	246	254	214	266	266	^Q 286
8	^Q 266	^Q 252	282	256	222	200	260	200	194	208	208	208	174	180	212	214	188	212	224	268	^A 226	254	304	272
9	286	206	268	268	268	246	210	196	^A 200	^A 200	200	196	192	206	214	214	220	226	240	222	242	300	274	^Q
10	274	282	272	262	262	200	234	194	214	212	218	198	200	212	222	210	204	204	230	262	250	264	280	^Q 274
11	258	258	250	226	246	228	222	198	194	186	210	210	184	184	232	204	228	228	228	262	244	220	270	^Q 254
12	254	232	254	238	238	208	190	208	188	196	216	208	194	194	210	206	202	202	238	254	236	214	238	252
13	266	256	244	238	246	228	204	212	200	214	200	210	196	202	202	202	196	248	226	226	^A 236	^A 236	^A 244	230
14	242	238	238	236	216	196	224	218	196	216	216	190	212	200	210	194	208	202	208	208	^Q	^Q	^Q	^Q
15	226	242	224	224	234	216	204	200	196	198	190	198	198	198	220	210	210	228	224	224	238	260	254	268
16	^Q 252	230	230	230	254	226	216	204	188	188	200	198	196	176	222	202	208	202	240	240	216	232	242	216
17	^Q 264	^Q 264	248	264	232	220	222	204	204	190	196	206	202	188	188	208	188	^A	222	230	206	242	242	214
18	^Q 238	^Q 244	234	222	236	216	224	216	198	200	218	186	186	188	216	206	202	230	252	218	236	254	254	222
19	^Q 276	^Q 240	248	^C 242	^Q 220	192	202	186	200	204	192	192	222	214	204	204	226	214	214	242	264	254	290	^Q
20	^Q 234	^Q 242	248	248	234	234	206	210	194	202	196	214	208	212	216	202	196	230	222	222	206	260	268	254
21	220	220	198	256	256	228	206	210	190	190	198	198	198	198	220	212	210	218	240	212	240	256	260	236
22	^Q 236	^Q 238	232	214	^C 206	224	220	204	214	222	214	192	232	232	210	208	234	228	252	238	238	260	290	^Q
23	^Q 284	266	250	248	242	224	240	206	198	220	232	202	200	198	230	198	212	220	242	250	242	298	300	262
24	254	248	246	238	246	238	220	216	202	222	206	198	200	200	200	220	200	228	230	212	212	282	280	276
25	284	260	280	238	210	220	210	210	202	202	202	224	212	212	196	212	202	224	256	214	230	230	282	282
26	260	260	224	254	230	194	218	202	198	212	208	216	198	198	186	200	196	200	250	226	226	298	280	250
27	^Q 250	^Q 212	252	266	232	198	214	200	202	202	202	202	210	210	210	232	204	238	264	230	218	308	282	252
28	^Q 240	250	214	248	248	210	210	206	202	202	236	218	198	226	200	224	204	226	232	232	258	236	256	296
29	270	264	276	272	252	238	244	210	210	210	194	200	182	182	220	212	214	182	218	218	242	276	250	250
30	^Q 244	256	286	266	272	238	194	224	222	198	194	202	186	214	200	212	216	200	278	264	228	296	280	224
31	268	262	270	246	284	212	^E 260	^B 224	216	186	192	198	196	214	226	218	200	210	248	222	234	288	284	290
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	30	31	31	31	31	30	31	31	31	31	30	31	31	29	31	31	30	30	30	31
MED	262	254	252	248	240	216	218	206	200	202	202	202	198	198	215	208	204	212	230	230	236	255	272	268
U Q	274	262	266	262	248	228	242	214	204	214	216	210	202	212	222	214	210	228	246	252	242	266	282	286
L Q	^Q 244	^Q 240	238	236	232	206	210	200	196	198	198	198	192	192	204	202	200	200	222	222	222	236	254	250

DEC. 2020 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

DEC.2020 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							B										B	B						
2							B	98	100	100	104	104	104	104	104	102			B					
3							B	B	100	104	106	106	106	106	112	116		B						
4							B	B	116	100	100	106	106	106	106	102		A	B					
5							B	106	124	108	108	108	108	108	104	104		B	B					
6							B	B	110	110	110		110	110	110	108		B	B					
7							B	B	114	108	110	108	106	106	108	94		A	A					
8							A	B	112	112	102	102	102	102	84		A							
9							B	B	118	118	110	110	106	118	102	112		94	98					
10							A	B	108	108	108	108	110	102	92		A		A					
11							B	A		A		112	112	112	100	106	94	A	A					
12							B	118	110	106	106	94	104			A	A	A	A					
13							98	94	110	112	112	112	112	100	100	100		B	B					
14							B	B	114	114	110	98	98	106	106	100		B	B					
15							A				A						A	B						
16							B	100	108	108		104	112	94	104	104		A	B					
17							B	G	104	116	100	100	100	100	102	124		B	B					
18							B	B	98	106	106	118	108	108			A	A	B	A				
19							B	A	108	108	108	116	116	112	112	102		A	A					
20							B	B	A	A	A	A		102	102	102		B	A	A				
21							B	B	112	112	112	112	112	108	108	122		A	A					
22							B	A	102	122	112	102	112	112	110	110		B	B					
23							B	110	110	110	102	106	102	108	106	106		B	A					
24							B	B	A					A			A	A						
25							B	B	106	112	112	112	96	112	112	104		B	A					
26							B	B	A								A	B						
27							B	B	104	104	114			106	118	118		B	B					
28							B	A	116	108	108	102	102	102	108	110		B	B					
29							104	A	110	110	108	100	100	114	114	110		A	B					
30							B	A	110	110		A					A	B						
31							B	A	110	110		A	106	108	108	106		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							4	5	27	29	28	28	30	30	28	23	4	1						
MED							101	100	110	110	109	107	107	106	106	104	95	98						
U Q							455	108	114	112	112	112	112	108	108	110	106							
L Q							95	96	106	108	106	104	102	102	103	102	93							

DEC.2020 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

DEC.2020 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

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		102	102	108	100	102	102	102	138	154	124	124	106	106	112	110	144	B	B	94	94	94	B	B	B	
2		94	104	104	B	102	102	118	146	96	112	120	116	104	158	150	112	138	B	B	B	B	B	126	102	
3		B	B	B	94	94	130	B	98	128	140	120	118	124	130	112	108	104	G	104	96	92	92	92	110	
4		96	B	98	98	98	B	B	148	142	120	110	108	108	136	128	96	B	B	96	96	B	B	B	B	
5		B	B	B	100	94	94	94	B	120	114	114	102	112	G	96	132	B	B	B	86	96	B	B	96	
6		132	B	B	B	102	B	B	132	116	108	108	118	118	G	132	86	96	110	B	100	98	98	112	B	
7		90	100	100	100	112	102	108	B	112	122	102	108	100	100	102	102	100	122	88	B	B	B	108	108	
8		94	96	96	96	96	B	94	B	114	114	152	152	140	140	146	100	98	98	100	100	104	104	104	104	
9		100	94	94	86	90	90	96	B	128	106	106	104	102	98	98	92	92	92	98	B	B	B	B	B	
10		98	98	98	90	B	B	96	94	106	106	106	98	98	128	118	84	88	96	B	86	100	90	B	B	
11		96	96	96	96	102	114	98	96	114	108	108	102	98	98	96	92	92	92	92	92	92	94	102	102	
12		102	92	92	98	102	94	94	94	120	150	150	150	108	96	98	G	B	B	B	98	98	98	98	98	
13		96	96	96	B	94	94	B	154	112	102	102	118	152	124	114	134	B	B	88	108	108	B	B	92	
14		92	B	92	86	86	94	94	94	102	102	102	102	166	146	126	168	94	B	94	132	110	108	104	96	
15		96	96	102	92	98	B	106	B	134	134	116	98	98	124	B	116	B	B	B	92	92	B	B	B	
16		92	92	92	92	92	92	94	B	140	124	G	98	154	154	90	90	88	88	88	88	92	90	B	98	
17		98	98	92	92	92	102	94	90	102	102	148	138	138	176	G	154	88	86	90	90	90	90	94	94	
18		94	94	94	94	94	94	102	102	102	98	98	98	108	96	142	126	100	100	90	102	102	102	96	96	
19		96	96	96	C	B	B	B	B	104	98	98	126	G	116	122	142	98	96	94	96	100	100	100	100	
20		B	B	88	88	B	B	B	G	G	G	G	G	G	G	G	G	B	98	90	90	96	100	106	94	
21		B	B	B	B	B	B	G	106	G	110	106	98	114	128	146	96	G	B	96	94	B	B	98	98	96
22		92	92	96	96	C	96	114	B	108	108	144	100	92	92	94	94	88	98	92	B	98	98	106	94	
23		94	94	94	B	94	100	100	146	114	110	106	104	102	116	102	138	B	86	90	228	B	B	B	B	
24		104	104	102	102	102	102	100	100	106	116	106	106	106	116	116	156	92	98	98	90	B	B	102	98	
25		104	98	98	94	94	100	128	94	118	118	114	160	104	104	144	110	84	B	88	B	98	110	100	100	
26		94	94	94	88	88	88	B	B	98	160	110	146	122	G	92	92	100	96	100	90	90	B	B	B	
27		B	118	90	96	96	94	B	B	134	144	144	136	118	148	118	118	B	98	B	B	B	B	120	94	108
28		108	96	B	B	B	B	B	90	92	120	130	92	86	86	152	84	B	B	B	B	B	104	104	B	
29		94	98	98	98	96	104	G	108	108	108	94	108	156	168	150	92	B	B	B	100	94	100	100	104	
30		108	108	B	B	108	108	B	106	106	102	92	156	90	154	G	G	110	110	B	104	B	88	B	B	
31		88	B	B	100	B	B	B	116	104	98	94	170	G	148	138	112	B	B	B	106	106	94	94	98	
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT		26	23	24	23	25	21	19	21	30	30	29	30	28	28	27	27	18	19	20	23	20	20	20	21	
MED		96	96	96	96	96	100	100	106	112	111	108	108	108	126	116	110	95	96	92	96	98	99	101	98	
U Q		102	100	98	98	102	102	106	135	120	122	122	136	126	147	138	134	100	98	97	102	101	103	105	103	
L Q		94	94	93	92	93	94	94	94	104	106	102	102	101	102	98	92	88	92	89	90	93	93	97	96	

DEC.2020 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F2	F2	F1	F2	F2	F1	L1	HL11	HL11	CL21	C2	C4	C2	C2	LH21	CL21	L1		F1	F1				
2	F1	F1	F1		F1	F1	LC11	H1	LC11	C2	CL21	CL21	LC22	HL21	HL21	C2	C2						F1	F1
3				F1	F1	F1		L1	C2	H2	C2	C2	C2	H2	C3	C4	L2		F1	F1	F1	F1	F1	F1
4	F1		F1	F1	F1			CL31	CL22	C2	C2	C2		H1	C1	LC11			F1	F1				
5				F1	F2	F2	L2		C2	C1	C1	L1	C2		C1	C1			F1	F1				F1
6	F1				F1			H1	CQ31	CQ21	C2	C1	C2		CL11	LC21	L1	L1		F1	FQ31	F1	F1	
7	FF11	F2	F2	F3	F1	F3	L1		C2	C1	C4	C3	C3	CL11	C4	L3	C2	C1	F1				F1	F2
8	F2	F1	F1	F2	F1		L1		C1	C2	HL11	HL21	HL21	H1	HL21	LC11	C1	LQ11	F1	F2	FF32	FF21	F2	F2
9	FF42	F5	F4	F4	F4	F2	L2		C4	CL32	LC22	C2	C3	LC21	LC21	L4	C2	L2	L1					
10	F2	F1	F1	F1			L1	L1	L2	LQ21	C2	LC11	LC11	CL21	CL21	L2	L2	L1		F1	F1	F1		
11	FQ11	F1	F1	FF11	F1	F1	L1	L1	C2	C3	C2	C3	C2	C3	L2	LQ11	L1	L1	F1	F1	F1	F2	FQ11	F2
12	F3	F6	F4	F2	F3	F1	1	1	2	11	11	21	11	11	11					F1	F1	F1	F1	FQ21
13	FQ21	FQ11	F1		F1	F1		H1	LC11	LC11	C1	H1	C2	C2	C1				F1	F1	FF11			F1
14	F1		F1	F1	F1	F1	F1	C1	C1	C2	L5	C3	HL21	H1	C1	H1	L1		F1	FF22	FQ61	FQ41	FQ41	FQ41
15	FQ21	FQ11	F1	F1	F1		L1		C1	C1	LC11	LC11	LC11			LC11				F1	F1			
16	F3	F3	F3	F1	F1	F2	L2		H1	CL11		CL11	H1	HL11	L2	L1	L4	L3	F3	F3	F2	F2		F1
17	F2	F2	F2	F2	F2	F1	L3	L4	L2	LC31	H1	C1	C1	C1		H1	L3	L3	F3	F3	F4	F3	F3	F2
18	F2	F1	F2	F2	F1	F2	LQ11	L1	L4	L4	L3	L3	CL21	LC21	H1	C2	L1	L1	F1	F3	F4	F3	F2	F1
19	F1	F1	F1						LC21	LC11	LC11	C2		CL11	C2	H2	L1	L1	F1	F1	F2	F2	F1	F1
20			F1	F1				L1						C1				L1	F1	F1	F1	F3	F1	F1
21				F2			L1	C1	C1	C1	C1	C1	C2	H1	LC21			L1	F1			F1	F1	F2
22	F1	F1	F1	F1		F1	C1		C3	LC31	HL21	LC21	LC21	LQ41	LC11	LC21	L2	L1	F1		F1	F1	F2	F1
23	F2	F2	F1		F2	F1	L1	H1	C3	C3	C4	C3	CL22	C2	LC22	C2		L1	F1	F1				
24	F1	F1	F1	F1	F1	F1	L1	L1	C3	C3	LC12	C2	C2	C2	C2	H1	L1	LL11	F2	F1			F1	F1
25	F4	F1	F2	F2	F1	F1	C1	L2	C3	C3	C2	H2	LC11	LC31	H2	C2	C1		FF11		F1	F1	F1	F1
26	F2	F1	F1	F1	F1	F1			LC22	H1	C1	H1	C1		L2	L2	L1	L1	F1	F1	F1			
27		F1	F3	F2	F1	F1			H1	H1	H2	H1	CL11	HL11	CL21	L1		L1				F1	F1	F1
28	F2	FQ11					L1	LC21		C2	L4	L3	LC21	H1	LC21							FQ21	F4	
29	C1	C1	F2	F1	F2	F1	L2	LC11	LC11	LC21	C2	H1	H1	H1	LH11				F1	F3	F1	F1	F1	F1
30	F1	F1		F2	F1	LL11	L5	L21	LC21	LC12	LC12	LC11	LC11	H1			LL21	LL11		F1		F1	F1	F1
31	F1			F1			LQ61	LC11	LC11	L2	HL11			HL21	C2	L3				F1	F1	F3	F2	F1
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

DEC. 2020 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC.2020 f_{XI} (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	X	X	X	X	X	X						C	C	C	C	C	C				X	X	X	X	X		
	38	38	40	41	42	38															39	39	39	38	36		
2	X	X	X	X	X	X															38	34	36	34	34		
	37	37	38	42	34	26																					
3	X	X	X	X	X	X															X	X	X	35	35		
	36	42	38	42	43	31															38	38	33	35	35		
4	X	X	X	X	X	X															X	X	X	X	X		
	35	35	35	40	42	34															34	38	36	33	33		
5	X	X	X	X	X	X															X	X	X	X	X		
	34	34	36	38	35	33															35	35	35	37	36		
6	X	X	X	X	X	X														X	X	X	X	X	X		
	38	40	40	42	42	39														36	38	39	36	37	37		
7	X	X	X	X	X	X															X	X	X	X	X		
	38	38	40	40	39	36															33	33	33	31	31		
8	X	X	X	X	X	X															X	X	X	X	X		
	32	33	35	40	39	32															37	37	37	36	36		
9	X	X	X	X	X	X															X	X	X	X	X		
	37	37	37	37	38	38															35	32	35	35	33	33	
10	X	X	X	X	X	X															X	X	X	X	X		
	36	38	39	36	36	34															32	36	34	34	34		
11	X	X	X	X	X	X															X	X	X	X	X		
	36	37	38	40	40	37															38	35	40	33	36		
12	X	X	X	X	X	X															X	X	X	X	X		
	37	37	38	38	37	34															37	36	40	34	30	32	
13	X	X	X	X	X	X															X	X	X	X	X		
	34	32	34	36	38	32															34	40	44	31	34	35	
14	X	X	X	X	X	X															X	X	X	X	X		
	35	35	37	42	42	32															43	36	35	29	34	38	
15	X	X	X	X	X	X															X	X	X	X	X		
	40	43	43	43	43	40															38	34	34	33	36	37	
16	X	X	X	X	X	X															X	X	X	X	X		
	36	37	36	36	36	32															34	32	39	32	34	34	
17	X	X	X	X	X	X															X	X	X	X	X		
	36	35	33	33	33	33															42	39	39	35	27	34	
18	X	X	X	X	X	X															X	X	X	X	X		
	35	33	37	34	34	32															31	34	40	41	39	37	
19	X	X	X	X	X	X															X	X	X	X	X		
	36	36	37	37	38	36	39														39	41	39	35	40	36	
20	X	X	A	X	X	X															X	X	X	X	X		
	36	36		36	32	30															34	34	37	37	30	31	
21	X	X	A	X	X	X															X	X	A	X	X		
	32	32		29	29	28															39	32		32	33	34	
22	X	X	X	X	X	X															X	X	X	X	X		
	36	37	37	32	28	28															38	37	40	39	35	37	
23	X	X	X	X	X	X															X	X	X	X	X		
	40	35	36	36	30	30															35	32	33	38	40	38	38
24	X	X	X	X	X	X																X	X	X	X	X	
	40	37	37	36	32	31						C									35	36	36	34	33	33	
25	X	A	X	X	X	X																X	X	X	X	X	
	36		36	37	37	32																40	38	35	32	35	
26	X	X	X	X	X	X															X	X	X	X	X		
	38	44	40	38	38	38															36	32	37	38	31	38	
27	X	X	X	X	X	X															X	X	X	X	X		
	39	35	42	40	43	42	39														36	39	34	28	32	40	
28	X	X	X	X	X	X															X	X	X	X	X		
	39	37	42	37	37	40	40														37	44	39	32	40	40	
29	X	X	X	X	X	X															X	X	X	X	X		
	40	41	41	40	39	39															30	34	34	36	38	38	
30	X	X	X	X	X	X															X	X	X	X	X		
	44	44	42	46	45	36															32	32	37	38	39	38	
31	X	X	X	X	X	X															X	X	X	X	X		
	37	41	38	38	38	33															38	30	32	34	40	34	
	00	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	29	31	31	31	3													1	21	31	30	31	31	31	
MED	X	X	X	X	X	X														X	X	X	X	X	X	X	
	36	37	38	38	38	33	39													35	36	36	37	35	34	36	
U Q	X	X	X	X	X	X															X	X	X	X	X	X	
	38	38	40	40	42	38	40														38	38	39	37	38	37	
L Q	X	X	X	X	X	X															X	X	X	X	X	X	
	36	35	36	36	34	32	39														34	33	35	33	33	34	

DEC.2020 f_{XI} (0.1MHz)

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

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

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	32	32	34	35	36	32	25	53	64	67	C	C	C	C	C	C	C	32	37	33	33	33	32	30
2	31	31	32	37	28	20	23	45	56	58	57	70	70	67	64	56	61	41	30	32	28	30	28	28
3	30	34	32	36	37	25	24	47	54	58	62	67	69	75	64	56	50	39	25	32	32	27	F	F
4	29	29	29	34	35	28	25	47	55	60	64	71	61	78	58	53	54	37	28	28	32	30	27	27
5	28	28	30	32	29	27	24	46	52	61	54	79	64	70	60	69	55	35	31	29	29	29	31	30
6	32	34	34	36	36	33	32	54	61	59	64	70	V	V	59	65	61	36	30	32	33	30	31	31
7	32	32	34	34	33	30	28	49	57	61	67	78	69	58	65	64	54	35	32	27	27	27	25	25
8	26	27	29	34	33	26	26	48	57	56	59	61	74	V	60	57	57	33	37	31	31	31	30	31
9	31	31	31	31	32	32	28	52	57	56	63	76	68	60	59	56	54	41	29	26	29	29	27	27
10	30	31	33	30	30	28	27	58	55	64	69	69	68	64	56	60	64	36	29	26	30	28	28	28
11	30	31	32	34	34	31	29	53	57	58	76	69	67	62	62	60	55	31	35	32	29	34	27	30
12	31	31	32	32	31	28	30	45	55	62	64	57	74	66	60	60	53	34	31	30	34	28	24	26
13	28	26	28	30	32	26	28	48	47	58	69	68	62	56	59	63	49	34	28	34	38	25	28	29
14	29	29	31	36	36	26	28	45	52	50	77	82	64	55	58	59	50	33	37	30	29	23	28	32
15	34	37	37	37	37	34	36	46	52	54	61	67	66	68	57	58	52	34	32	28	28	27	30	31
16	30	31	30	30	30	26	29	46	54	52	69	77	54	56	64	56	52	33	28	26	33	26	28	28
17	30	29	28	27	27	27	29	46	54	54	60	57	57	61	55	55	46	42	36	33	33	29	21	28
18	29	27	31	28	28	26	26	47	53	56	66	72	67	52	56	56	49	34	25	28	34	F	F	F
19	30	30	31	31	32	30	F	43	48	60	63	58	58	56	56	57	52	A	33	35	33	29	F	30
20	30	30	A	30	26	24	26	39	54	54	62	60	56	56	55	55	47	31	28	28	31	A	24	25
21	26	26	A	23	23	22	24	43	46	59	67	68	58	60	58	56	48	40	33	26	26	27	28	
22	30	31	31	26	22	22	26	47	60	53	68	82	72	59	56	58	60	40	32	31	34	33	29	31
23	F	29	30	30	24	24	24	48	56	56	60	70	80	67	63	60	51	29	26	27	32	F	F	F
24	F	31	31	30	26	25	25	49	54	65	C	80	73	67	65	55	58	37	29	30	30	28	27	27
25	30	A	30	31	31	26	24	47	52	52	74	90	81	78	70	62	49	32	32	34	32	29	26	29
26	32	38	34	32	32	32	24	44	56	54	59	76	69	74	69	54	54	38	30	26	31	32	25	F
27	F	29	F	F	F	F	F	45	50	63	74	64	64	61	71	64	47	38	30	33	28	22	26	F
28	F	31	F	31	31	F	F	50	49	60	69	70	65	62	70	60	52	38	31	38	33	26	34	F
29	F	35	35	34	33	33	32	43	54	74	85	76	68	62	63	57	50	46	24	28	28	30	32	32
30	F	38	36	F	F	30	29	42	47	60	81	78	61	61	64	60	54	38	26	26	31	32	F	32
31	31	F	32	32	32	F	28	41	52	63	79	70	64	56	56	56	46	45	32	24	26	28	F	28
	00	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	29	27	29	29	28	28	31	31	31	29	30	30	30	30	30	30	30	31	31	30	29	25	25
MED	30	31	31	32	32	27	26	47	54	58	66	70	66	62	60	58	52	36	30	30	31	29	28	29
U Q	31	32	34	34	34	30	29	49	56	61	72	77	69	67	64	60	55	39	32	32	33	30	30	31
L Q	29	29	30	30	28	26	24	45	52	54	62	67	62	58	57	56	49	33	28	27	29	27	26	28

DEC.2020 foF2 (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											C	C	C	C	C	C	C							
2												L	L	L										
3												L	L	L										
4											L	L	L	L										
5												U L 428	L	L										
6										L	L	L	U L 404											
7											L	L	L			L								
8											U L 508	L	U L 404			L								
9											L	L	L	L										
10											L	L	L	L										
11												U L 392	L											
12											L		L	L	L									
13											L	U L 436	L	L										
14											A		A	L	L									
15												L	L	L	L									
16											L					L								
17									L			L	L	A										
18											L	L	L			L								
19											L	L	L			L		A						
20											L	L	L	L										
21												U L 400	L	A	L									
22											L	L	L	L		L								
23												A	L	L	L									
24											C	L	L	L	L									
25											L	L	L	L	L									
26												A	L	L	L									
27										U L 464	L	L	L	L	L									
28											L	L	L	L	L									
29										L	L	L	L	L	L									
30											L	L	A	U L 388	L	L								
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										1	1	3	2	1	1									
MED										U L 464	U L 508	U L 400	U L 420	U L 404	U L 388									
U Q												U L 428												
L Q												U L 392												

DEC.2020 foF1 (0.01MHz)

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IONOSPHERIC DATA STATION Kokubunji

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1							B	U A	U A	C	C	C	C	C	C	C	C	B	B					
2							B	U A	U A	A	A	A	A	A	A	A	A	B	B					
3							B	U R	U A	A	R	A	R	R	R	R	R	B	B					
4							B	U R	U A	A	U R	A	R	R	R	A	A	B	B					
5							B	U R	R	A	A	U R	R	R	U A	R	A	B	B					
6							B	U R	R	R	R	R	R	A	U A	A	A							
7							B	U R	A	U R	A	A	A	A	U R	R	R	B	B					
8							B	U R	A	A	U R	R	R	A	U R	A	R	B	B					
9							B	U R	R	A	A	A	A	A	U R	R	R	B						
10							B	U R	A	A	A	U R	R	R	R	R	A	A	B	B				
11							B	U R	R	A	A	U R	R	R	U A	A	U R	B	B					
12							B	U R	R	A	A	A	A	A	U R	R	R	B	B					
13							B	U R	A	A	A	U R	R	R	R	R	A	R						
14							B	U R	R	A	A	R	A	R	R	R	R	B						
15							B	U R	A	A	A	U R	R	R	R	R	R	B	B					
16							B	B	A	A	A	A	A	A	U R	A	A	B						
17							B	B	U R	R	R	A	A	A	A	U R	R	B						
18							B	U R	A	A	A	A	U R	A	A	A	A	B						
19							B	B	A	U R	R	R	R	R	A	A	A	B						
20							B	U R	R	R	R	U R	R	R	R	R	R	B						
21							B	B	A	A	A	U R	A	A	A	A	B	B						
22							B	B	A	A	A	A	A	A	U R	R	R	B						
23							B	B	U R	R	A	A	A	A	U R	A	R							
24							B	B	U A	A	C	A	A	U R	R	A	A	B						
25							B	B	R	A	A	U R	A	R	R	R	R	B	B					
26							B	U R	R	A	A	A	A	A	U R	R	R	B						
27							B	U R	R	A	A	U R	R	R	R	A	A	B						
28							B	B	U R	R	R	U R	R	R	R	R	U R	B						
29							B	B	A	U R	R	R	R	R	U A	R	A	B						
30							B	U R	R	R	R	U R	R	R	R	A	R	B						
31							B	B	U A	A	A	A	A	U R	A	U R	A	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								18	22	15	6	14	13	15	22	18	17							
MED								U R	R	R	R	R	R	R	R	R	R	R						
U Q								182	244	280	304	316	316	304	282	244	192							
L Q								U R	R	R	U R	R	R	R	R	R	R	R						
								196	248	288	304	320	320	304	284	248	198							
								U	U	U	U	R	R	R	R	R	R	R						
								180	236	280	300	308	312	300	276	236	188							

DEC. 2020 foE (0.01MHz)

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	E 16	E 16	E 16	B 20	J A 25	A 20	E B 16	21	28	33	C	C	C	C	C	C	C	21	J A E 30	B E 16	B E 16	B E 16	B E 16	B E 16	
2	E 16	E 16	E 16	B 16	E B 16	E B 20	E B 16	G	30	33	35	38	36	J A 36	32	J A 33	22	E B 16	J A E 24	B E 17	B E 16	B E 16	B E 16	B E 16	
3	E 16	E 16	E 16	B 16	E B 16	E B 16	E B 16	E B 15	29	34	35	G	J A 39	G	G	G	G	E B 16	B E 17	B E 14	B E 15	B E 16	B E 16	B E 16	
4	E 16	19	E B 16	19	E B 15	E B 19	E B 16	G	29	33	35	G	J A 38	G	G	G	J A 22	21	J A E 24	B E 16	B E 16	B E 16	B E 16	B E 16	
5	E 16	E 16	B 22	E B 16	E B 16	E B 16	E B 17	G	G	J A 34	J A 44	J A 46	G	G	G	G	21	E B 15	B E 15	B E 17	B E 16	21	20	20	
6	E 16	E 16	B 16	E B 16	E B 17	E B 19	E B 16	G	G	G	G	G	G	J A 38	J A 36	27	J A 30	J A E 23	B E 16	B E 15	21	21	21	J A 23	
7	20	20	20	E B 16	E B 16	E B 16	E B 16	G	J A 30	G	35	J A 40	J A 44	J A 35	J A 34	G	G	E B 16	B E 16	B E 15	B E 16	B E 16	15	19	
8	22	22	E B 16	E B 16	22	20	E B 16	G	G	J A 40	J A 47	G	G	35	G	27	G	J A E 24	B E 16	B E 16	J A E 24	B E 16	24	20	
9	18	E B 16	J A 35	J A 30	20	20	E B 16	G	G	J A 37	J A 44	J A 48	J A 39	J A 55	G	G	G	J A 36	J A 32	J A 21	25	22	24	22	
10	J A 26	21	21	J A 34	J A 34	J A 25	19	G	J A 30	43	54	G	G	G	G	J A 36	J A 34	J A 29	J A 27	J A 21	J A 27	23	23	J A 30	
11	E 16	E 16	E 16	B 20	20	22	E B 16	G	G	G	64	G	G	34	32	28	G	E B 16	21	21	E B 16	19	19	19	
12	20	J A 24	J A 30	J A 32	J A 33	22	22	G	G	31	39	34	J A 40	J A 34	G	G	G	E B 16	B E 16	B E 16	B E 16	20	16	B E 16	
13	E 15	E B 15	B 16	20	E B 15	E B 16	E B 16	G	34	36	34	G	J A 48	G	G	G	G	J A 29	J A 27	23	23	23	40	29	36
14	J A 50	J A 24	23	J A 65	23	20	20	G	G	J A 39	J A 59	J A 57	J A 57	G	G	G	G	E B 15	B J 30	J A 25	19	22	22	22	
15	20	J A 23	20	20	E B 16	20	E B 16	16	G	J A 35	J A 35	J A 36	G	G	G	G	E B 18	B E 16	B J 24	A E 16	21	E B 16	16	24	
16	23	23	26	24	20	E B 16	E B 16	B J 16	J A 32	J A 50	J A 49	J A 41	J A 49	J A 34	G	J A 35	J A 28	J A 38	J A 16	J A 21	22	E B 15	22	23	
17	E B 15	B J 25	A E 15	B J 27	E B 16	E B 16	19	21	G	G	G	36	38	42	J A 39	G	G	E B 15	B E 15	B E 15	B E 15	15	15	22	
18	J A E 25	B E 16	B E 16	B E 16	B E 16	B E 16	B E 16	G	J A 37	J A 38	J A 44	J A 54	J A 54	J A 44	J A 54	J A 38	J A 32	J A 26	B E 16	B J 61	J A 48	J A 54	J A 30	J A 53	
19	J A 34	J A 24	J A 42	J A 24	J A 27	E B 21	E B 16	G	J A 28	G	G	G	G	G	J A 38	J A 34	J A 54	J A 50	22	26	26	26	54	26	
20	J A 47	J A 48	J A 36	J A 29	J A 23	J A 23	22	G	J A 36	G	G	G	G	G	G	G	G	E B 15	22	21	17	17	16	24	
21	J A 28	J A 26	J A 27	J A 27	22	22	J A E 24	B J 16	J A 32	J A 58	J A 60	G	G	J A 47	J A 37	26	22	J A 30	J A 28	J A 28	28	24	16	20	
22	E B 16	B E 16	B E 16	B E 16	B E 15	B E 15	B E 15	16	J A 30	J A 35	J A 52	J A 46	J A 43	J A 36	G	G	G	23	22	22	20	E B 16	16	16	
23	E B 15	22	22	E B 16	22	22	22	E B 16	G	G	J A 48	J A 58	J A 62	J A 41	J A 30	J A 35	G	J A 27	A E 16	B E 16	19	E B 15	15	15	
24	E B 16	B E 16	22	22	E B 16	23	22	E B 16	24	30	C	J A 49	J A 50	G	G	J A 34	J A 29	J A 29	J A 30	23	23	16	16	16	
25	J A 43	J A 50	J A 51	J A 32	J A 32	25	23	23	G	J A 38	J A 41	G	J A 34	G	G	G	G	E B 16	22	16	16	16	16	22	20
26	20	J A 25	J A 26	J A 24	J A 15	J A 15	16	G	G	J A 42	J A 68	J A 83	J A 82	J A 50	G	G	G	J A 37	J A 49	J A 23	A E 16	B E 16	16	16	
27	J A 46	J A 42	24	J A 38	J A 26	E B 26	16	G	G	J A 36	J A 34	G	G	G	G	J A 32	J A 51	J A 37	J A 24	J A 26	J A 39	J A 32	J A 34	J A 20	J A 38
28	J A 24	J A 26	20	J A 26	J A 23	E B 21	E B 16	16	G	G	G	G	G	G	G	G	28	E B 16	B J 23	J A 24	22	E B 16	16	16	
29	E B 15	B E 16	B E 16	B E 16	B E 16	B E 16	B E 16	B E 14	J A 26	G	G	G	G	G	G	G	G	22	E B 15	B E 15	21	20	E B 16	22	16
30	E B 16	B E 16	B E 16	B E 16	B E 16	B E 16	B E 16	G	G	G	G	G	G	G	G	G	G	E B 16	B E 16	22	22	E B 16	17	16	
31	E B 16	B E 16	B E 16	B E 16	B E 16	B E 16	22	22	27	31	J A 64	J A 53	J A 39	G	34	28	G	J A 25	J A 26	J A 26	J A 32	J A 30	22	J A 26	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	31	31	31	29	30	30	30	30	30	30	30	31	31	31	31	31	31	31
MED	18	20	20	20	20	20	E B 16	G	24	33	J A 39	G	38	G	G	G	G	21	22	21	20	E B 16	17	20	
U Q	J A 25	J A 24	J A 26	J A 27	J A 23	22	20	G	J A 30	J A 38	J A 50	J A 46	J A 44	J A 36	J A 32	J A 33	J A 28	J A 27	J A 26	J A 23	J A 24	22	22	J A 24	
L Q	E B 16	B E 16	B E 16	B E 16	B E 16	B E 16	B E 16	B E 16	G	G	G	G	G	G	G	G	G	E B 16	B E 16	B E 16	B E 16	B E 16	B E 16	B E 16	

DEC.2020 foEs (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

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

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

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

DEC.2020 fbEs (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

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

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

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

DEC.2020 fmin (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

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

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1		308	311	304	322	348	373	335	357	371	374	C	C	C	C	C	C		372	328	352	310	321	330	296	
2		289	293	326	337	398	324	334	357	395	383	389	346	358	337	358	375	359	389	346	330	310	342	306	287	
3		310	315	290	317	362	320	305	377	394	365	377	337	357	355	368	369	376	380	297	333	358	334	F	F	
4		291	333	329	340	360	307	351	403	394	360	373	366	365	372	357	395	383	368	331	332	361	318	338	294	
5		292	312	311	337	338	345	341	384	377	364	384	367	343	361	367	378	376	353	331	372	339	303	310	301	
6		300	321	309	327	338	333	350	370	399	362	319	320	292	V	V	382	360	313	332	323	337	343	321	307	300
7		293	310	336	330	334	359	354	378	366	340	359	378	388	362	361	373	372	378	339	351	328	328	343	306	
8		302	303	316	362	343	317	346	389	387	380	334	359	367	V	366	374	349	365	355	337	351	305	324	311	300
9		312	312	308	308	313	323	316	391	373	380	377	363	362	368	373	354	370	363	341	364	334	343	320	301	
10		308	296	312	314	335	334	312	375	391	377	375	371	375	375	377	335	394	389	353	319	315	338	302	297	
11		290	289	329	333	348	374	325	365	379	369	377	393	360	368	373	365	381	364	336	344	329	337	320	290	
12		319	319	321	329	329	331	367	387	382	390	400	371	369	364	375	368	394	353	343	314	313	318	307	318	
13		353	319	316	331	365	343	329	393	408	359	358	388	369	377	356	389	394	367	305	329	375	310	280	305	
14		319	320	305	335	385	329	341	389	405	394	359	392	403	360	360	393	405	347	372	351	344	301	280	315	
15		324	317	318	318	339	329	335	413	381	322	374	365	372	383	381	377	380	345	371	355	338	316	306	309	
16		319	311	322	322	354	340	351	382	386	405	387	413	386	367	364	366	381	358	367	360	344	348	300	294	
17		297	309	299	321	321	319	402	382	390	403	365	386	336	373	370	400	350	361	368	344	345	347	292	333	
18		368	343	323	324	329	318	328	394	381	376	367	378	364	378	363	363	387	383	344	328	339	F	F	F	
19		337	311	336	318	340	309	F	395	391	371	378	381	366	394	369	366	369	A	327	353	374	316	F	303	
20		339	305	A	311	320	311	353	416	372	372	385	373	362	363	373	370	378	359	341	341	341	384	280	284	
21		280	314	A	347	308	331	344	391	372	344	368	395	347	359	367	353	366	356	366	353	A	345	305	299	
22		333	329	329	342	354	318	319	379	400	361	340	373	370	369	341	338	363	346	349	328	336	324	328	306	
23		F	286	307	335	308	343	301	362	371	375	352	376	361	344	363	359	384	351	321	302	343	F	F	F	
24		F	356	338	305	303	304	316	382	377	381	C	357		355	369	359	375	385	346	338	338	333	313	285	
25		319	A	319	324	344	368	328	392	375	385	329	355	347	360	356	391	380	371	334	359	387	337	306	300	
26		310	325	361	314	351	283	332	368	397	382	356	377	349	360	384	357	363	372	385	306	333	344	289	F	
27		F	308	F	F	F	F	F	410	394	336	361	377	351	367	363	394	380	346	326	396	351	400	310	F	
28		F	304	F	336	336	F	F	402	403	345	374	372	357	353	332	370	382	366	291	339	389	291	314	F	
29		F	300	300	315	318	329	346	385	370	351	366	349	389	366	377	342	392	357	382	328	334	312	296	296	
30		F	291	301	F	F	297	367	378	387	361	330	382	352	342	374	375	369	368	327	327	303	292	F	292	
31		F	304	F	293	297	354	F	336	365	356	352	383	389	388	364	364	364	371	355	356	383	311	294	F	271
		00	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	29	27	29	29	28	28	31	31	31	29	30	29	30	30	30	30	30	30	31	31	30	29	25	25
MED		310	311	316	324	339	329	336	384	386	371	368	373	362	365	368	367	377	362	341	341	338	324	307	300	
U Q		322	320	329	336	354	342	350	393	394	381	378	382	371	372	374	377	383	372	356	353	345	342	317	306	
L Q		295	304	305	316	325	318	326	375	373	359	357	363	352	360	361	359	369	353	327	328	328	314	298	293	

DEC.2020 M(3000)F2 (0.01)

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											C	C	C	C	C	C	C							
2												L	L	L										
3												L	L	L										
4											L	L	L	L										
5												U L 391	L	L										
6										L	L	L		U L 382										
7											L	L	L			L								
8											U L 362	L	U L 406			L								
9											L	L	L	L										
10											L	L	L	L										
11												U L 420	L											
12											L		L	L	L									
13											L	L	U L 387	L										
14											A		A	L	L									
15												L	L	L	L									
16											L					L								
17									L			L	L	A										
18											L	L	L			L								
19											L	L	L			L		A						
20											L	L	L	L										
21												U L 422	L	A	L									
22											L	L	L	L		L								
23												A	L	L	L									
24											C	L	L	L	L									
25											L	L	L	L	L									
26												A	L	L	L									
27										U L 339	L	L	L	L	L									
28											L	L	L	L	L									
29										L	L	L	L	L	L									
30											L	L	A	U L 369	L	L								
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										1	1	3	2	1	1									
MED										U L 339	U L 362	U L 420	U L 396	U L 382	U L 369									
U Q												U L 422												
L Q												U L 391												

DEC.2020 M(3000)F1 (0.01)

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IONOSPHERIC DATA STATION Kokubunji

DEC.2020 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1											C	C	C	C	C	C	C								
2												244	232	246											
3												252	244	244											
4											232	232	232	226											
5												230	248	232											
6										224	284	242		220											
7											244	226	216		234										
8											310	234	234		224										
9											230	230	230	230											
10											224	224	224	232											
11											220	220	240												
12											230		230	236	236										
13											236	216	224	224											
14											228		218	226	248										
15												224	240	230	230										
16											230				244										
17									218			228	236	236											
18											230	224	224		230										
19											230	230	240		240			A							
20											228	228	250	248											
21											232	220	256	244	244										
22											244	232	232	232		252									
23												236	236	236	236										
24											C	236	226	240	230										
25											254	228	234	234	234										
26												232	240	240	224										
27										268	234	222	228	236	234										
28											232	232	232	244	244										
29										244	224	224	224	234	234										
30											234	214	222	242	228	228									
31												228	228	242	228										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT									1	3	21	27	28	24	18	2									
MED									218	244	232	228	232	236	234	240									
U Q										268	240	232	240	242	240										
L Q										224	229	224	225	231	230										

DEC.2020 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

DEC.2020 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	E B	E B	E B	E B	E B	E B	E B					C	C	C	C	C	C	194	E A	E B	E B	E B	E B	E B	
2	286	260	250	248	230	214	196	196	202	202								194	244	216	234	234	234	264	
3	E B	E B	E B	E B	E B	E B	E B												E B	E B	E B	E B	E B	E B	
4	286	278	246	228	184	276	228	202	202	202	202	202	190	190	202	206	206	180	196	250	226	234	252	290	
5	E B	E B	E B	E B	E B	E B	E B												E B	E B	E B	E B	E B	E B	
6	282	252	260	232	198	198	206	188	194	212	206	204	204	214	206	206	192	190	330	228	224	224	270	328	
7	E B	E B	E B	E B	E B	E B	E B												E B	E B	E B	E B	E B	E B	
8	294	252	242	226	212	224	218	192	192	202	202	178	178	186	186	194	194	186	232	222	206	234	222	306	
9	E B	E B	E B	E B	E B	E B	E B												E B	E B	E B	E B	E B	E B	
10	292	270	270	220	220	194	204	192	198	198	210	202	202	200	200	208	198	198	198	198	208	236	252	270	
11	E B	E B	E B	E B	E B	E B	E B												E B	E B	E B	E B	E B	E B	
12	270	246	256	242	230	222	196	210	206	182	196	190	198	198	206	226	210	210	210	210	214	236	262	284	
13	E B	E B	E B	E B	E B	E B	E B												E B	E B	E B	E B	E B	E B	
14	284	274	238	232	216	216	204	196	196	208	192	192	192	202	198	202	202	196	224	202	230	230	230	306	
15	E B	E B	E B	E B	E B	E B	E B												E B	E B	E B	E B	E B	E B	
16	306	284	274	226	226	224	224	196	204	204	196	188	188	204	194	208	208	186	216	208	274	240	248	282	
17	E B	E B	E B	E B	E B	E B	E B												E A	E A	E B	E B	E B	E B	
18	258	258	258	266	246	228	232	190	200	200	194	200	186	180	204	208	190	190	254	218	218	218	226	292	
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	
20	278	276	268	280	222	220	250	196	196	208	202	194	190	190	190	218	196	196	206	228	228	224	270	290	
21	E B	E B	E B	E B	E B	E B	E B												E B	E B	E B	E B	E B	E B	
22	278	278	246	242	208	206	226	198	192	184	198	172	198	198	210	210	200	196	220	220	228	222	222	276	
23	E B	E B	E B	E B	E B	E B	E B												E B	E B	E B	E B	E B	E B	
24	260	260	266	258	250	238	208	194	198	210	196	194	194	196	196	196	196	192	204	212	236	194	268	268	
25	E B	E B	E B	E B	E B	E B	E B												E B	E B	E B	E B	E B	E B	
26	220	260	260	260	218	212	232	198	192	212	186	186	186	186	204	206	196	196	266	244	200	274	282	282	
27	E B	E B	E B	E B	E B	E B	E B												E A	E A	E B	E B	E B	E B	
28	256	270	260	222	202	226	210	196	196	200		A		190	178	198	196	196	216	210	210	228	288	278	
29	E B	E B	E B	E B	E B	E B	E B												E B	E B	E B	E B	E B	E B	
30	256	242	242	232	220	220	204	182	182	206	206	192	192	192	184	208	192	192	192	202	212	220	266	264	
31	E B	E B	E B	E B	E B	E B	E B												E B	E B	E B	E B	E B	E B	
32	264	268	254	242	214	230	212	198	198	188	194	204	204	204	188	202	202	202	210	210	220	220	262	264	
33	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	
34	264	264	264	264	264	254	196	196	174	200	200	182	182		204	204	204	204	200	200	216	214	296	246	
35	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	
36	208	220	232	232	232	250	234	192	192	200	200	200	200	200	192	212	198	198	208	230	230	230	302	262	
37	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	
38	240	236	276	246	228	220	220	186	194	194	194	186	186	198	198	208	208		E A	E B	E B	E B	E B		
39	E A	E A		E A	E B	E B													E B	E B	E B	E B	E B		
40	256	266		258	258	258	220	176	196	196	190	186	186	186	210	210	210	188	208	206	212	200	290	296	
41	E B	E B	E B	E B	E B	E B	E B												E A	E A	E B	E B	E B		
42	292	254		246	268	268	256	194	194	220	196	188	188		200	200	194	204	204	252		226	260	260	
43	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	
44	232	222	212	224	224	256	242	204	204	198	204	204	196	196	196	196	196	196	196	238	224	224	218	222	
45	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	
46	258	296	266	230	222	236	260	210	210	210	210		A	210	194	194	204	204	194	220	238	232	258	274	312
47	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	
48	254	222	214	232	276	276	240	202	202	202		C	202	200	186	192	198	198	198	208	226	226	224	260	302
49	E B	E B	E B	E B	E B	E B	E B												E A	E A	E B	E B	E B	E B	
50	274		290	270	238	202	246	198	198	198	198	198	198	192	192	196	196	184	232	212	202	220	254	270	
51	E B	E B	E B	E B	E B	E B	E B												E A	E B	E B	E B	E B	E B	
52	252	224	218	250	208	176	220	200	194	194	204		A	194	182	192	184	192	200	230	242	232	202	258	302
53	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	
54	286	266	202	202	222	222	214	186	186	186	192	178	178	192	204	204	200	200	238	196	264	280	298	280	
55	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	
56	264	264	232	224	224	224	202	188	188	200	196	186	186	186	186	202	202	194	212	212	198	238	230	214	
57	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	
58	236	260	260	236	236	222	202	202	194	186	186	184	174	194	202	202	194	194	194	202	224	248	248	234	
59	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	
60	260	252	262	248	244	244	212	196	196	204	198	182		190	190	190	190	190	220	236	230	230	274	270	
61	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	
62	248	248	248	220	194	220	244	196	196	206	222	184	198	188		A	206	198	198	198	198	258	288	296	290
63		00	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	29	31	31	31	31	31	31	28	28	28	28	29	30	30	30	30	31	31	30	31	31	31
MED		E B	E B	E B	E B	E B	E B												E B	E B	E B	E B	E B	E B	E B
U Q		264	260	256	236	224	224	212	196	196	200	198	191	192	192	196	204	198	196	210	216	224	230	262	278
L Q		E B	E B	E B	E B	E B	E B												E B	E B	E B	E B	E B	E B	E B
		284	270	265	250	238	244	234	198	200	206	203	200	198	198	204	208	202	198	230	230	230	236	282	292
		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
		254	248	240	226	214	216	204	192	192	196	194	185	186	187	191	198	194	190	200	206	212	220	248	264

DEC.2020 h'F (KM)

IONOSPHERIC DATA STATION Kokubunji

DEC.2020 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1							B				C	C	C	C	C	C	C	B	B						
2							B	134	122	118		A		A	A	A		B	B						
3							B	126	124	118	112		A				112		B	B					
4							B	120	120	112	112	112		A				A	B	B					
5							B	122	114	112	112	112		A	110	110	110		B	B					
6							B	116	116	116		A	A						B	B					
7							B	126	126	126	126	118	114		A	A		114	120						
8							B	120		A		A		A	A				B	B					
9							B	116	116		A		A						B	B					
10							B	124	108		A	A		A		108	108	116							
11							B	120		A		A		A			A	A	B	B					
12							B	112	112	112		A	A	A					B	B					
13							B	118	118	118	118	118	118	110	110	110	110		B						
14							B	110	110		A	A		A	110	110	110	116							
15							B	B		A	A	A		A				B	B						
16							B	B	116		A	A		A	108	108	108		B						
17							B	B		A	A	A		A					B						
18							B	120	120	120		A	A				114	116							
19							B	118		A		A		A		A	A	A	B						
20							B	B		A		A		A					B						
21							B	112		112	112	112	112	108	108	114	114		B	B					
22							B	B	A	A	A		A		A				B						
23							B	B		A	A	A		A					B						
24							B	B	124	124		C	A	A					B						
25							B	B		A	A		A						B	B					
26							B	110		A	A	112		112	112	112	112		B						
27							B	136	120		A	A		A			116	116	124						
28							B	126	118		A		118	116	116	116		A	A	B					
29							B	B		A									B						
30							B	116	116	116	116	116	110	110	110	110	110		B						
31							B	112	112	112	112	110	110	110	110	110	110		B						
							B	B		A		A		A					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								18	22	19	11	16	15	19	23	21	20								
MED								120	116	112	112	112	112	110	110	110	112								
U Q								126	120	118	118	116	116	112	112	114	116								
L Q								116	110	112	112	112	110	110	110	110	110								

DEC.2020 h'E (KM)

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DEC.2020 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	B	B	98	90	90	B	154	162	140	C	C	C	C	C	C	C	96	96	B	B	B	B	B
2	B	B	B	B	B	146	B	G	136	136	128	106	110	110	110	104	124	B	92	B	B	B	B	B
3	B	B	B	B	B	B	B	B	138	138	124	G	106	G	G	G	G	B	B	B	B	B	B	B
4	B	106	B	94	B	94	B	G	148	148	122	G	98	G	G	G	92	92	92	B	B	B	B	B
5	B	B	92	B	B	B	B	G	G	G	132	106	106	G	G	G	140	B	B	B	B	88	88	88
6	B	B	B	B	B	88	B	G	G	G	G	G	G	92	92	160	132	90	B	B	90	90	90	90
7	90	90	90	B	B	B	B	G	98	G	98	98	94	94	96	G	G	B	B	B	B	B	B	96
8	96	96	B	B	96	96	B	G	G	96	96	G	G	110	G	114	G	108	B	B	92	92	92	92
9	92	B	92	88	88	88	B	G	G	98	98	92	92	92	G	G	G	92	92	92	92	92	92	92
10	92	92	92	88	88	88	88	G	104	104	104	G	G	G	G	90	90	90	90	90	100	100	100	90
11	B	B	B	90	90	90	B	G	G	G	98	G	G	128	128	124	G	B	96	96	B	96	96	96
12	86	86	86	86	86	86	94	G	G	126	102	102	102	102	G	G	B	B	B	B	102	B	B	B
13	B	B	B	90	B	B	B	G	112	112	112	G	98	G	G	G	98	98	98	98	98	88	88	88
14	88	88	88	88	88	88	88	G	G	102	100	100	92	G	G	G	G	B	B	92	92	92	92	92
15	92	92	92	92	B	92	B	B	G	92	92	92	G	G	G	G	B	B	B	B	92	B	B	92
16	92	92	92	92	92	B	B	B	96	96	96	96	96	96	G	96	96	96	B	86	86	B	86	86
17	B	104	B	96	B	B	96	96	G	G	G	96	96	96	98	G	G	B	B	B	B	B	B	98
18	86	B	B	B	B	B	B	G	98	98	98	90	88	88	88	88	88	90	B	90	90	90	90	90
19	90	90	86	86	86	86	B	G	102	G	G	G	G	G	G	92	92	90	84	84	94	94	94	94
20	88	88	88	88	88	88	88	G	88	G	G	G	G	G	G	G	G	B	88	88	B	B	B	88
21	88	88	88	88	88	88	88	B	100	100	100	G	G	92	92	92	92	92	92	92	88	88	B	88
22	B	B	B	B	B	B	B	B	96	100	100	100	96	96	G	G	G	90	90	90	90	B	B	B
23	B	100	100	B	100	100	94	B	G	G	94	94	94	94	94	86	G	86	B	B	B	B	B	B
24	B	B	86	86	B	86	86	B	110	110	C	100	100	G	G	94	86	86	86	86	86	B	B	B
25	86	86	86	86	88	88	88	88	G	100	100	G	100	G	G	G	G	B	B	B	B	B	B	86
26	86	86	86	86	90	B	B	G	G	96	96	96	96	96	G	G	G	92	92	92	B	B	B	B
27	92	92	92	92	92	92	B	G	G	100	100	G	G	G	166	102	102	102	92	84	84	84	84	90
28	90	90	90	90	90	90	B	B	G	G	G	G	G	G	G	122	G	B	94	94	94	B	B	B
29	B	B	B	B	B	B	B	B	102	G	G	G	G	G	G	G	124	B	B	88	88	B	B	B
30	B	B	88	B	B	B	B	G	G	G	G	G	154	G	G	G	G	B	B	102	96	B	B	B
31	B	B	B	B	B	B	106	106	152	152	82	82	82	G	170	154	G	82	88	88	88	88	88	106
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	16	17	18	19	16	19	10	4	16	21	22	15	18	14	11	14	13	17	19	18	20	12	15	19
MED	90	90	89	88	89	88	88	101	103	102	100	96	96	96	96	99	96	92	92	91	91	90	90	90
U Q	92	94	92	92	91	92	94	130	137	134	104	100	100	102	128	122	124	96	94	94	94	93	92	94
L Q	87	88	86	86	88	88	88	92	98	98	96	92	94	92	92	92	90	88	90	88	88	88	88	88

DEC.2020 h'Es (KM)

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

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

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

DEC.2020 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

DEC.2020 f_{XI} (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 36	X 36	X 37	X 39	X 41	X 32														X 38	X 41	X 43	X 38	X 37
2	X 35	X 35	X 38	X 43	X 33	X 28														X 33	X 38	X 42	X 40	X 39
3	X 36	X 36	X 40	X 43	X 40	X 34														X 33	X 40	X 43	X 32	X 35
4	X 35	X 36	X 38	X 40	X 42	X 31														X 34	X 41	X 40	X 37	X 37
5	X 33	X 34	X 37	X 37	X 38	X 43														X 36	X 40	X 35	X 35	X 37
6	X 36	X 36	X 40	X 42	X 39	X 36														X 38	X 41	X 42	X 37	X 36
7	X 36	X 38	X 39	X 40	X 43	X 36														X 39	X 45	X 28	X 32	X 35
8	X 31	X 33	X 35	X 36	X 36	X 36					C	C	C	C	C	C			X 39	X 39	X 36	X 36	X 36	X 36
9	X 36	X 38	X 39	X 47	X 39	X 38														A	X 41	X 46	X 48	X 40
10	X 35	X 37	X 38	X 38	X 39	X 36														X 39	X 40	X 40	X 38	X 33
11	X 34	X 37	X 39	X 40	X 43	X 32													X 43	X 42	X 34	X 35	X 36	X 28
12	X 32	X 34	X 36	X 36	X 38	X 34														X 39	X 45	X 45	X 42	X 31
13	X 33	X 33	X 34	X 34	X 38	X 37														X 40	X 46	X 45	X 32	X 34
14	X 34	X 36	X 37	X 40	X 40	X 27				X 60										X 42	X 38	X 29	A	X 30
15	X 38	X 35	X 37	X 37	X 40	X 37					X 58									X 40	X 38	X 35	X 32	X 35
16	X 34	X 35	X 36	X 42	X 41	X 40														X 38	X 33	X 36	X 29	X 32
17	X 34	X 34	X 33	X 34	X 36	X 36														X 37	X 40	X 32	A	X 39
18	X 40	X 36	X 36	X 34	X 34	X 29														X 28	X 35	X 43	X 29	X 38
19	A	A	X 40	X 37	X 37	X 34	X 35													X 37	X 34	X 35	X 32	X 30
20	X 32	X 38	X 39	X 40	X 34	X 31														X 33	X 35	X 44	X 26	X 29
21	X 31	X 32	A	A	X 32	X 29														X 37	X 36	X 36	X 36	X 29
22	C	X 36	X 36	X 34	X 30	X 26														X 37	X 37	X 39	X 36	X 29
23	X 30	X 32	X 35	X 38	X 36	X 28														X 34	X 30	X 40	X 36	X 40
24	X 41	X 53	X 43	X 34	X 28	X 28														X 38	X 41	X 36	X 38	X 37
25	X 37	X 38	X 37	X 38	X 38	X 33														X 37	X 42	X 36	X 32	X 31
26	X 34	X 36	X 38	X 42	X 35	X 32		X 41												X 36	A	X 41	X 39	X 33
27	X 36	X 41	X 39	X 42	X 36	X 38		X 37												X 36	X 40	X 38	X 37	X 34
28	X 35	X 35	X 38	X 38	X 42	X 32	X 30	X 43												X 41	X 38	X 38	X 35	X 35
29	X 36	X 38	X 42	X 48	X 52	X 34	X 38													X 36	X 35	X 34	X 34	X 34
30	X 37	X 40	X 48	X 55	X 58	X 42														X 36	X 38	X 38	X 36	X 34
31	X 35	X 41	X 37	X 36	X 41	X 27		X 38	X 64											X 31	X 31	X 39	X 36	X 38
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	30	30	31	31	3	4	1	1	1								2	30	30	31	29	31
MED	X 35	X 36	X 38	X 38	X 38	X 34	X 35	X 40	X 64	X 60	X 58								X 41	X 37	X 38	X 38	X 36	X 35
U Q	X 36	X 38	X 39	X 42	X 41	X 36	X 38	X 42												X 39	X 41	X 42	X 38	X 37
L Q	X 34	X 35	X 36	X 36	X 36	X 29	X 30	X 38												X 36	X 35	X 35	X 32	X 31

DEC.2020 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

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

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

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

DEC.2020 foF2 (0.1MHz)

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IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											416	L	L	L	L									
2											L	L	L				L							
3											L	L	U L	L	L	L								
4											A		L	U L	L	L								
5										L	L	L	A	L		L								
6													U L	L		L								
7												L	L	L	L	L								
8										L	C	C	C	C	C	C	U L							
9													L	L	L			280						
10												L	U L	L	L	L	L							
11											L	A	L	L	L	L	L							
12													L	L	L	L	L							
13										L	L	L	L	L	L	L		284						
14											L	L	L	A	L	L				A				
15												A	A	L	L	L								
16							C			C		L	L	L	L									
17											L	L	L	U L	U L	L	L							
18											L	L	L	L	L	L	A	L						
19												L	U L	L	L	L				A				
20													U L	L	L	L	L							
21										L	L	U L	U L	L	L	L	L							
22											L		L	L	A	L								
23										L	L	L	U L	A	L									
24											L	U L	A	A	A	A	A			A				
25											L	A	L	L	L	A	A							
26											L	A	A	U L	L	L	A							
27						A				L		L	L	U L	L	L	A	A	A					
28											L	L	L	L	L									
29										L	L	L	L			L								
30											L	U L	L	L	L	L								
31										L		U L		A		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	5	6	5	1		2							
MED											416	U L	U L	U L	U L		282							
U Q											428	452	452											
L Q											U L	U L												
											412	432	432											

DEC.2020 foF1 (0.01MHz)

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IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1							B	B	U	A	R	A	A	A	U	A	A	A	A	A	A					
2							B	B	U	A	R	U	A	A	A	A	A	A	U	R	B					
3							B	B	U	R		A	A		U	A	R	U	R	B	B					
4							B	B	U	A	A	A	A	A	U	R	R	A	U	R	B	B				
5							B	B	U	A	A	A	A	A	A	U	A	A	U	R	B	B				
6							B	B	U	A	A	A	U	A	U	R	U	R	U	R	B					
7							B	B	U	A	A	A	A	A	A	U	A	U	R	U	R	B				
8							B	B	U	R	R	C	C	C	C	C	C	U	R	U	R					
9							B	B	U	R	R	A	A	A	A	U	R	A	A	B	B					
10							B	B	U	R	R	A	A	A	A	U	R	A	A	A	B					
11							B	B	U	A		A	A	U	R	U	R	A	A							
12							B	B	U	R	R	A	A	A	A	A	A	A	A	B	B					
13							B	B	U	R	R	U	A	A	A	A	U	R	U	R	B	B				
14							B	B	A		A	A	A	A	U	A	A	A	A	B						
15							B	B	B	B		A	A	U	A	R	A	U	R	U	R	B				
16							C	E	C	C	C	E	C	A	A	A	U	R	U	A	A	B	B			
17							B	B	U	A	A	A	A	A	A	U	R	A	A	B	B					
18							B	B	U	R	A	A	A	A	U	A	A	A	U	R	B	B				
19							B	B	A	A	A	A	U	R	U	R	U	A	A	B	B					
20							B	B	A	A	A	A	A	A	A	A	A	A	U	R	B					
21							B	B	U	R		A	A	A	R	A	U	R	U	R	U	R	B			
22							B	B	U	R	A	A	A	A	A	A	U	R	A	B	B					
23							B	B	U	R	R	A	A	A	A	U	R	U	R	B	B					
24							B	B	U	R	A	U	R	A	A	A	A	A	A	B	B					
25							B	B	U	R	R	A	A	A	A	A	A	A	A	B	B					
26							B		A	R	A	A	A	A	A	A	A	A	A	B						
27							B		A	R	A	U	A	A	U	R	A	A	B	B						
28								U	R	A	A	A	U	R	U	R	U	R	A	B	B					
29							B	B	U	R	R	U	R	U	R	U	R	U	R	U	R	B				
30							B	B	U	A	A	A	A	A	U	A	U	R	A	B	B					
31							B		U	A		U	R	A	A	A	A	A	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									23	21	9	5	6	10	18	14	12	8								
MED									U	R	R	U	U	U	U	R	U	R	U	R	U	R				
U Q									220	276	300	316	324	318	308	280	242	182								
L Q									U	R	U	U	U	U	R	U	R	U	R	U	R					
									232	286	308	328	336	320	312	284	246	196								
									U	A	A	U	R	U	R	U	U	R	U	R						
									204	264	290	308	324	312	304	276	236	180								

DEC.2020 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	22	E B E B E B	E B E B E B	J A J A J A	J A J A J A	J A E B	E B			G J A		J A				J A J A J A	J A E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B		
2	E B E B E B	E B E B E B	E B E B E B	E B E B E B	21	21	E B E B E B	E B E B E B	28	34	35	37	39	J A	34	J A J A J A		G 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	
3	E B E B E B	E B E B E B	E B E B E B	E B E B E B	20	21	22	E B E B E B	G		32	33	40	38	36	37		G 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	18	
4	E B E B E B	E B E B E B	E B E B E B	E B E B E B	J A E B	E B E B E B	E B E B E B	E B E B E B	26	30	40	35	37	J A	G	G J A	G J A	26	21	22	E B E B E B	E B E B E B	E B E B E B	E B E B E B	
5	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	28	32	36	44	56	52	35	31		G 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	
6	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	25	J A	38	36	37	G	G		G	G			22	22	22	E B	
7	E B E B E B	E B E B E B	E B E B E B	J A	26	23	E B E B E B	E B E B E B	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		G	G	G		E B	22	22	J A	
8	J A	34	23	23	23	J A J A J A	J A E B	E B	G	G	C	C	C	C	C	C	G		G E B J A	16	34	21	23	J A	
9	J A	26	21	21	21	E B E B E B	E B E B E B	E B E B E B	G	G J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	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	E B	15	20	19	19	E B J A J A	J A		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	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	E B E B E B	E B E B E B	E B E B E B	
11	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	G		32	33	46	43		G	G			30	31	33	28	27	J A
12	E B	16	19	19	19	J A E B	E B	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	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
13	E B	16	21	52	22	J A J A J A	J A	J A	G	G		35	42	54	51	44		G	G J A J A J A	33	25	34	30	21	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	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	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	E B J A E B	J A E B	J A E B	J A E B	J A E B	J A E B	J A E B	J A E B	29	36	51	61	58		G	J A		G	J A E B	J A E B	J A E B	J A E B	J A E B	J A E B	E B
16	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	C E B E C	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	G	31	26	24	34	27	21	21	E B E B	
17	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	24	32	J A J A J A	J A J A J A	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 J A J A	J A J A J A	J A J A J A	J A J A J A	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 E B	43	16	19	16	16	16	16	G		33	42	68	46	35	58	73		G J A J A J A	31	40	61	16	16	J A
19	J A J A	51	54	20	47	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 J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	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	32	35	56	78	82	70	53	48	46		G E B J A	16	27	23	19	19	E B
21	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	26	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	G J A		G			26	22	23	27	E B E B
22	C 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	G		32	35	44	40	45	82	39	31	33	27	25	25	16	E B E B E B	
23	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	G	G J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	E B E B E B	E B E B E B	E B E B E B	E B E B E B	
24	E B	16	19	20	16	16	16	16	G J A		48		50	67	77	89	94	49	41	54	38	22	22	22	22
25	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	J A		48	63	60	42	64	107	62	21	16	16	20	20	16	E B E B	
26	E B	16	20	20	21	21	E B E B E B	J A	G J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	E B E B	
27	E B E B E B	E B E B E B	E B E B E B	J A J A	J A J A	J A J A	J A J A	J A J A	G J A		44	36	44	47	30	34		J A J A J A	J A J A J A	J A J A J A	J A J A J A	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	G		32	43	44		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 J A	J A J A J A	J A J A J A	J A J A J A
29	E B	16	21	16	16	16	16	16	G	G		G			G		G		G E B E B E B	16	16	16	16	16	16
30	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	21	31	34	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	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 E B	16	15	20	16	20	E B E B E B	E B E B E B	G		34		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 J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	31	31	31	31	31	30	31	31	30	30	30	30	30	30	30	31	31	31	31	31	31	31	31	
MED	E B E B	E B E B	19	19	20	16	16	16	25	32	40	44	46	42	37	38	32	31	25	25	21	21	16	E B E B	
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 J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
L Q	E B E B E B	E B E B E B	E B 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	G	G		35	38	39	35		G	G	G	G	E B E B E B	E B E B E B	E B E B E B	E B E B E B	

DEC.2020 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

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

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

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

DEC.2020 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

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

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

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

DEC.2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

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

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1		304	281	306	337	369	375	389	341	367	376	381	358	360	353	377	323	381	385	382	316	311	349	321	330			
2		292	298	321	356	368	312	336	350	376	359	375	370	330	358	346	367	381	390	369	311	306	333	319	315			
3		302	303	309	338	366	396	300	354	369	385	358	365	333	357	369	362	379	379	348	325	326	355	306	316			
4		292	288	321	340	368	362	338	367	370	357	375	342	358	345	366	369	361	376	392	329	311	326	331	314			
5		296	294	312	313	327	370	352	356	397	344	380	365	359	353	368	364	355	372	404	296	332	324	324	321			
6		301	305	321	333	358	369	333	336	366	381	369	371	327	344	371	336	394	385	359	332	337	334	343	312			
7		292	293	315	328	350	376	300	367	354	348	355	368	345	344	371	362	370	363	378	333	346	330	309	303			
8		296	291	320	350	334	358	333	351	377	380		C	C	C	C	C	367	383	358	339	401	297	305	297			
9		315	306	295	F	299	310	322	346	384	384	384	343	373	373	392	370	371	369	388	A	304	326	F	387			
10		283	308	316	324	336	334	328	345	380	375	358	367	379	357	345	347	375	371	346	323	320	327	343	299			
11		303	298	327	345	384	385	315	342	385	386	320	385	365	342	374	376	387	393	341	349	328	321	369	331			
12		297	311	305	312	330	356	346	355	389	381	384	405	350	364	384	360	375	380	376	326	299	339	328	273			
13		318	318	323	318	338	395	313	339	391	369	344	377	382	375	376	367	374	378	369	325	337	373	288	327			
14		289	315	313	351	370	310	306	358	378	371	371	369	389	A	370	362	391	407	A	384	348	354	A	285			
15		306	330	312	312	368	383	332	341	385	362	348	368	360	370	380	349	371	379	370	344	346	346	306	331			
16		308	303	302	318	350	385		C	350	375		C	359	354	374	394	384	358	355	371	391	364	312	339	334	300	
17		315	326	301	318	316	352	350	333	395	386	386	368	385	336	370	376	374	362	371	356	377	312		A	F		
18		F	304	352	316	338	338	339	362	395	384	374	368	368	375	359	358	365	391	397	340	318	367	382	397			
19		A	A	F	312	328	334	329	379	402	382	340	373	373	384	369	366	360	390	371	357	345	330	338	311			
20		304		F	F	F	336	305	338	388	405	386	377	344	369	373	352	374	375	384	381	351	322	374	321	313		
21		295	323		A	A	289	324	342	354	380	368	349	359	370	361	379	381	366	358	382	342	336	345	313	333		
22		C	333	358	348	339	360	331	336	378	384	340	374	357	371	354	314	347	381	347	339	326	349	351	345			
23		307	314	318	342	354	339	318	320	372	375	377	345	355	343	364	352	378	382	349	360	317		F	F	F		
24		F	F	346	382	316	316	351	352	387	388	338	356	351	342	359	349	362	395		A	330	338	348	326	320		
25		295	343	304	308		363	302	352	356	368	350	349	356	352	352	340	396	377	354	324	359	349	329	305			
26		309	319	332	358	350	310	326	334	399	382	335	377	373	354	370	366	357	376	375	318		A	334	354	289		
27		320		F	F	F		F	A	330	370	364	367	376	345	338	361	367		A	A	A	318	353	353	F	287	
28		285	308	297	326	356	301	322	337	397	361	371	376	342	337	349	373	381	364	355	352	295	295	323	323			
29		301	306		F	F	F	F	F		364	389	364	377	344	333	361	345	368	364	356	368	347	336	320	333	314	
30		309	306		F	F	F	F	F		361	361	395	380	341	386	355	348	359	363	383	375	357	359	337	337	360	291
31		296		F	301	318	370	313	298	357	384	374	357	351	371	391	337	367	372	356	389	362	316	340	320	324		
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT		27	26	25	25	28	28	28	31	31	30	30	30	30	29	30	30	30	30	30	28	30	30	30	26	29		
MED		301	306	315	328	344	354	332	351	384	376	363	368	360	357	368	364	373	378	370	339	330	338	327	314			
U Q		308	318	322	346	367	372	340	358	395	384	377	374	373	372	374	368	381	385	382	352	345	349	343	328			
L Q		295	298	304	317	332	314	316	339	372	364	348	354	350	344	354	352	364	371	356	325	316	326	319	300			

DEC.2020 M(3000)F2 (0.01)

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1											402	L	L	L	L									
2											L	L	L				L							
3											L	L	U L	L	L	L								
4											A		L	U L	L	L								
5										L	L	L	A	L		L								
6													U L	L		L								
7												L	L	L	L	L								
8										L	C	C	C	C	C	C	U L							
9												L	L	L										
10											L	U L	L	L	L	L								
11											L	A	L	L	L	L								
12													L	L	L	L								
13										L	L	L	L	L	L	L								
14											L	L	L	A	L	L								
15												A	A	L	L	L								
16							C			C		L	L	L	L									
17											L	L	L	U L	U L	L								
18											L	L	L	L	L	A	L							
19												L	U L	L	L									
20													U L	L	L	L								
21										L	L	U L	U L	L	L	L	L							
22											L		L	L	A	L								
23										L	L	L	U L	A	L									
24											L	U L	A	A	A	A	A							
25											L	A	L	L	L	A	A							
26											L	A	A	U L	L	L	A							
27							A			L		L	L	U L	L	L	A	A	A					
28											L	L	L	L	L									
29										L	L	L	L			L								
30											L	U L	L	L	L	L								
31										L		U L		A		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	5	6	5	1		2							
MED											402	U L	U L	U L	U L		446							
U Q											416	402	394											
L Q											U L	U L	U L											
											398	390	380											

DEC.2020 M(3000)F1 (0.01)

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DEC.2020 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1											228	240	240	240	236										
2											236	236	242			242									
3											254	254	270	250	238	238									
4											226		246	256	246	240									
5										262	234	254	254	250		232									
6													278	240		246									
7												246	234	234	234	234									
8										220		C	C	C	C	C		220							
9												244	234	234			222								
10											250	250	234	234	234	262									
11											280	226	254	274	236	238									
12													254	246	236	242									
13										242	258	228	228	238	232	232	224								
14											240	240	232	A	240	240			A						
15												234	234	222	238	238									
16							C			C		238	238	212	236										
17											232	248	238	284	230	230									
18											242	232	232	240	240	234	234								
19												234	234	234	234			E A							
20												250	258	252	238										
21										238	250	240	232	232	232	232	218								
22											260		240	240	240	266									
23									224		224	268	252	228	224										
24											272	252	228	240	228	224	224			A					
25											252	242	242	242	242	230	208								
26											240	230	226	238	218	230	220								
27							A			238		238	264	250	228	228		A	A	A					
28											246	222	260	246	246										
29											234	234	240	248		224									
30											252	226	250	240		240									
31											240		242		228	250									
	00	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	7	20	25	29	27	23	24	8	1							
MED									224	238	244	240	240	240	236	238	221	E A							
U Q									242	253	247	253	250	240	241	224									
L Q									234	234	233	234	234	234	232	231	219								

DEC.2020 h'F2 (KM)

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135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
1	284	E B E B E B E B E B	288	E B E B E B E B E B	276	E B E B E B E B E B	240	E B E B E B E B E B	204	E B E B E B E B E B	202	192	198	198	198	198	198	206	202	202	200	200	190	E 244	E 244	E 224	E 232	E 232
2	E 272	E 284	E 242	E 196	E 196	E 266	E 232	E 206	E 200	E 200	E 204	E 196	E 190	E 216	E 206	E 192	E 200	E 186	E 186	E 198	E 224	E 220	E 232	E 258				
3	E 276	E 284	E 262	E 208	E 196	E 196	E 276	E 210	E 206	E 206	E 198	E 198	E 198	E 198	E 194	E 192	E 202	E 196	E 196	E 194	E 222	E 206	E 228	E 256				
4	280	E 306	E 256	E 228	E 216	E 202	E 232	E 200	E 212	E 208	A	196	184	184	184	184	198	196	192	E 210	E 232	E 220	E 228	E 228				
5	E 298	E 288	E 260	E 248	E 238	E 208	E 196	E 196	E 192	E 192	E 192	E 204	A	204	204	198	198	198	190	E 198	E 224	E 224	E 224	E 232				
6	E 250	E 264	E 246	E 232	E 224	E 208	E 210	E 218	E 202	E 202	E 202	E 210	E 182	E 192	E 206	E 168	E 194	E 194	E 192	E 218	E 218	E 218	E 218	E 260				
7	E 278	E 278	E 246	E 222	E 210	E 208	E 192	E 204	E 198	E 198	E 198	E 194	E 194	E 192	E 210	E 196	E 196	E 196	E 182	E 220	E 198	E 222	E 276	E 248				
8	E 296	E 296	E 258	E 236	E 262	E 218	E 210	E 210	E 198	E 196	C	C	C	C	C	C	176	188	182	E 206	E 196	E 262	E 262	E 262				
9	E 292	E 282	E 272	E 254	E 246	E 216	E 216	E 206	E 206	E 206	E 206	E 206	E 190	E 190	E 202	E 200	A	200	200	A	E 238	E 238	E 238	E 188				
10	E 272	E 260	E 242	E 242	E 224	E 280	E 228	E 224	E 200	E 200	E 196	E 174	E 188	E 188	E 188	E 188	E 210	E 194	E 192	E 222	E 222	E 222	E 210	E 268				
11	E 298	E 284	E 242	E 212	E 192	E 200	E 256	E 204	E 198	E 198	E 192	A	192	184	200	190	206	200	230	E 220	E 220	E 236	E 218	E 270				
12	E 288	E 268	E 268	E 268	E 226	E 222	E 208	E 200	E 214	E 214	E 198	E 198	E 198	E 190	E 190	E 196	E 196	E 196	E 196	E 196	E 224	E 218	E 218	E 266				
13	E 262	E 252	E 262	E 256	E 208	E 190	E 326	E 226	E 198	E 186	E 192	E 190	E 190	E 200	E 188	E 188	E 188	E 188	E 196	E 260	E 230	E 202	E 256	E 268				
14	E 268	E 308	E 260	E 246	E 200	E 296	E 264	E 214	E 208	E 208	E 190	E 190	E 190	A	182	182	202	190	A	E 208	E 228	E 226	E 306					
15	E 206	E 236	E 276	E 276	E 222	E 252	E 304	E 230	E 200	E 200	E 212	A	A	198	186	180	180	194	180	E 204	E 204	E 196	E 282	E 252				
16	E 274	E 274	E 260	E 284	E 234	E 234	C	E 234	E 196	C	E 196	E 188	E 186	E 188	E 186	E 218	E 202	E 192	E 208	E 202	E 228	E 216	E 216	E 278				
17	E 266	E 256	E 256	E 262	E 244	E 202	E 208	E 186	E 196	E 196	E 196	E 182	E 182	E 182	E 170	E 188	E 196	E 204	E 204	E 204	E 204	E 234	E 278					
18	E 266	E 236	E 214	E 228	E 222	E 240	E 242	E 210	E 200	E 200	E 200	E 198	E 198	E 184	E 184	A	190	190	214	E 272	E 272	E 198	E 198	E 198				
19	A	E 288	E 322	E 254	E 224	E 214	E 200	E 196	E 196	E 206	E 196	E 170	E 182	E 172	E 202	E 202	A	202	E 244	E 214	E 214	E 228	E 282					
20	E 282	E 242	E 326	E 252	E 272	E 280	E 262	E 196	E 196	E 208	E 208	E 208	E 188	E 188	E 194	E 194	E 210	E 196	E 196	E 202	E 224	E 206	E 222	E 268				
21	E 268	E 240	A	E 258	E 258	E 258	E 216	E 206	E 206	E 206	E 196	E 178	E 178	E 178	E 178	E 178	E 200	E 200	E 200	E 234	E 234	E 234	E 234					
22	C	E 224	E 204	E 206	E 238	E 238	E 260	E 214	E 214	E 204	E 204	E 204	E 202	E 202	A	186	E 218	E 212	E 204	E 218	E 262	E 220	E 210	E 210				
23	E 266	E 288	E 262	E 214	E 214	E 214	E 276	E 228	E 192	E 204	E 200	E 200	E 200	A	194	194	E 200	E 200	E 208	E 208	E 208	E 252	E 288	E 284				
24	E 294	E 240	E 202	E 214	E 266	E 276	E 232	E 222	E 192	E 192	E 188	E 188	A	A	A	A	A	188	A	E 282	E 218	E 218	E 222	E 222				
25	E 290	E 238	E 296	E 252	E 266	E 204	E 270	E 216	E 202	E 208	E 198	A	198	196	194	A	A	190	190	E 224	E 208	E 208	E 236	E 274				
26	E 274	E 262	E 232	E 212	E 212	E 266	E 236	E 220	E 194	E 194	E 192	A	A	190	198	188	A	188	188	E 212	E 246	E 208	E 268					
27	E 240	E 240	E 224	E 224	E 250	E 220	A	E 248	E 204	E 188	E 188	E 188	E 182	E 182	E 188	E 188	A	A	A	E 246	E 198	E 198	E 258	E 310				
28	E 290	E 290	E 264	E 252	E 220	E 244	E 266	E 198	E 198	E 198	E 192	E 178	E 172	E 184	E 210	E 202	E 196	E 196	E 210	E 218	E 218	E 218	E 246					
29	E 256	E 256	E 250	E 232	E 202	E 236	E 252	E 202	E 198	E 186	E 170	E 170	E 170	E 218	E 196	E 190	E 190	E 190	E 190	E 190	E 212	E 230	E 224	E 250				
30	E 258	E 248	E 248	E 220	E 210	E 234	E 214	E 210	E 196	E 196	E 196	E 196	E 200	E 200	E 216	E 190	E 190	E 178	E 196	E 196	E 218	E 218	E 204	E 250				
31	E 286	E 246	E 246	E 216	E 196	E 258	E 272	E 248	E 200	E 200	E 210	E 182	E 208	A	208	208	E 198	E 198	E 190	E 204	E 236	E 280	E 290	E 316				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	29	30	30	30	31	31	29	31	31	30	29	26	26	26	28	27	26	29	28	30	30	31	29	31				
MED	E 274	E 263	E 257	E 234	E 222	E 224	E 236	E 208	E 198	E 200	E 198	E 196	E 190	E 191	E 194	E 190	E 198	E 196	E 195	E 209	E 222	E 220	E 228	E 260				
U Q	E 289	E 284	E 264	E 252	E 246	E 258	E 265	E 222	E 202	E 206	E 205	E 198	E 198	E 200	E 202	E 198	E 202	E 199	E 201	E 222	E 230	E 234	E 247	E 274				
L Q	E 266	E 242	E 242	E 216	E 208	E 208	E 214	E 202	E 196	E 196	E 192	E 188	E 182	E 184	E 185	E 188	E 190	E 190	E 190	E 202	E 212	E 214	E 218	E 234				

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1							B	B	108	112	112	112	A	112	112	112	A	A	B						
2							B	B	112	112	112	112	112	A	112	A	A	124	B						
3							B	B	124	124	122	112	112	112	112	112	116	B	B						
4							B	B	116	116	116	114	A	114	114	A	114	B	B						
5							B	B	114	A	A	A	A	A	114	114	114	B	B						
6							B	B	114	114	114	114	114	114	114	110	110	110	B						
7							B	B	110	A	A	A	A	A	A	112	112	112	B						
8							B	B	114	114	C	C	C	C	C	C	114	134							
9							B	B	108	108	A	A	A	A	A	A	A	B	B						
10							B	B	114	108	A	A	A	A	108	A	A	A	B						
11							B	B	108	114	114	A	A	114	114	114	A	A							
12							B	B	108	108	A	A	A	A	A	A	A	B	B						
13							B	B	108	108	108	A	A	A	A	108	108	B	B						
14							B	B	A	A	A	A	A	108	A	A	A	B							
15							B	B	B	B	A	A	A	108	108	A	108	110	B						
16							C	E	C	E	C	C	A	A	A	108	108	A	B	B					
17							B	B	108	108	A	A	A	A	108	A	A	B	B						
18							B	B	108	114	A	A	A	114	A	A	114	B	B						
19							B	B	A	A	A	A	114	114	114	A	A	B	B						
20							B	B	114	114	A	A	A	A	A	A	A	112	B						
21							B	B	112	112	A	A	A	124	A	120	110	118	B						
22							B	B	118	118	112	A	A	A	A	112	A	B	B						
23							B	B	112	112	A	A	A	A	110	110	112	B	B						
24							B	B	112	A	112	A	A	A	A	A	A	A	B						
25							B	B	112	112	A	A	A	A	A	A	A	B	B						
26							B	A	112	A	A	A	A	A	A	A	A	A	B						
27							B	A	110	A	116	116	A	114	A	A	A	B	B						
28							B	114	112	A	A	112	112	112	112	A	B	B							
29							B	B	112	112	112	112	112	112	112	112	110	120	B						
30							B	B	120	118	118	A	A	A	114	114	A	B	B						
31							B	114	114	114	114	114	A	A	A	A	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									24	24	12	8	8	11	19	14	12	8							
MED									112	112	113	113	113	114	112	112	112	115							
U Q									114	114	115	114	114	114	114	114	114	122							
L Q									108	111	112	112	112	112	108	110	110	111							

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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	88	B	B	B	88	88	88	B	166	G	122	118	100	150	142	112	88	88	B	B	B	B	B	B
2	B	B	B	B	88	88	B	B	130	128	120	120	116	104	112	106	100	G	B	B	B	B	B	B
3	B	B	B	B	96	96	96	B	G	148	148	118	118	166	118	G	G	B	B	B	B	B	B	118
4	B	B	B	B	100	B	B	B	144	144	126	108	100	G	G	90	G	90	90	102	B	B	B	B
5	B	B	B	102	B	B	B	B	116	104	104	100	96	96	154	158	G	B	B	90	B	B	B	B
6	B	B	B	B	B	B	B	B	166	116	116	158	G	G	142	G	G	G	102	88	88	88	88	B
7	B	B	B	88	88	88	B	B	108	100	96	96	96	96	96	G	G	G	96	B	96	96	84	84
8	94	94	94	94	94	94	94	B	G	G	C	C	C	C	C	C	G	G	B	94	94	94	94	94
9	92	92	92	92	92	B	B	B	G	G	100	100	100	92	92	86	86	86	86	92	98	98	98	98
10	B	82	82	82	B	82	88	88	G	G	88	92	92	92	G	92	92	92	92	82	82	B	B	B
11	B	B	B	B	B	B	B	B	G	146	146	98	98	G	G	G	98	98	92	92	92	92	88	88
12	B	88	88	88	88	B	88	B	G	G	98	98	98	98	98	98	98	90	90	90	90	90	90	90
13	B	90	90	90	90	90	90	90	G	G	140	104	104	100	100	G	G	100	90	76	76	76	86	86
14	86	86	86	86	86	86	86	86	98	98	98	98	98	90	90	90	90	90	90	90	90	90	90	90
15	B	90	B	90	B	B	90	B	B	98	98	98	92	G	G	92	G	G	92	B	92	B	92	B
16	B	B	B	B	B	B	C	B	C	C	92	92	92	92	G	148	100	96	90	90	98	98	B	B
17	B	B	B	B	B	B	B	B	156	140	104	104	94	94	G	94	86	86	86	86	86	86	86	86
18	86	B	86	B	B	B	B	B	G	136	96	94	82	120	94	90	G	90	90	90	B	B	B	90
19	90	90	90	90	90	90	90	B	104	104	102	94	G	94	94	94	94	94	94	94	94	94	94	94
20	94	88	80	80	80	80	B	B	114	122	92	92	90	90	90	90	90	G	B	90	90	90	90	B
21	B	B	86	86	86	B	86	86	144	144	104	98	98	G	98	G	G	G	78	84	84	84	B	B
22	C	B	B	B	B	B	B	B	G	114	114	98	98	96	88	88	88	88	88	88	88	B	B	B
23	B	B	B	B	B	108	B	B	G	G	104	102	96	86	G	G	G	86	86	B	B	B	B	104
24	B	104	92	B	B	B	B	B	G	92	G	92	92	92	92	84	88	88	88	88	88	88	88	88
25	B	B	88	88	88	88	B	88	88	G	96	96	96	96	96	94	94	94	B	B	94	94	B	B
26	B	94	94	94	94	B	B	B	102	G	102	94	88	94	92	92	86	86	86	86	86	86	B	B
27	B	B	B	96	90	90	88	88	88	G	96	152	106	94	94	94	88	88	84	84	B	B	84	84
28	88	88	88	88	88	B	88	B	G	114	104	100	G	G	G	G	100	96	96	96	B	92	B	B
29	B	86	B	B	B	B	B	B	G	G	G	G	G	152	G	G	G	G	B	B	B	B	B	B
30	B	B	B	B	B	B	B	B	152	152	146	92	92	92	162	G	92	B	B	92	B	B	B	B
31	B	B	92	B	80	B	B	B	B	G	166	G	166	72	78	78	86	86	90	90	90	90	88	88
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	8	13	16	16	18	13	12	6	15	18	28	28	26	24	21	20	19	20	22	23	20	18	15	15
MED	89	90	89	89	88	88	88	88	116	119	104	98	97	94	96	92	90	90	90	90	90	90	88	90
U Q	93	93	92	93	92	92	90	88	152	144	121	104	100	99	115	96	98	94	92	92	94	94	92	94
L Q	87	87	86	87	88	87	88	86	102	104	97	94	92	92	92	90	88	87	86	86	87	88	86	86

DEC.2020 h'Es (KM)

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IONOSPHERIC DATA STATION Yamagawa

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

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

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	F1				F3	F1	L1			H2		C2	C2	L3	HL12	H2	C2	L3	L3						
2					F1	F2				H2	C2	C2	C1	C2	L2	C1	L2	L2							
3					F1	F1	L2				H1	H2	C2	C1	H1	C1									F1
4					F2					H2	H2	H3	C1	L2			L3		L2	L1	F1				
5				F1						C1	L1	L2	L3	L3	L2	H1	HL12				F1				
6										H2	C1	C2	HL12			H1				L1	F1	F1	F2	F2	
7				F2	F3	F1				C2	L5	L3	L2	LH21	L2	L2				L1		F1	F2	F6	F2
8	F4	F3	F3	F5	F5	F1	L1														F2	F1	F2	F1	F2
9	F2	F2	F2	F1	F1							L3	L6	L3	L4	L3	L5	L3	L5	L3	F6	F2	F2	F3	F3
10		F2	F4	F2		F3	L2	L1				L3	L2	L2	L3		L2	L1	L1	L1	F2	F1			
11										H2	H2	L3	L2					L2	L2	L4	F4	F5	F2	F5	F1
12		F2	F1	F1	F1		L1					L1	L3	L3	L2	L2	L2	L3	L4	L5	F2	F2	F1	F1	F1
13		F2	F2	F2	F4	F3	L1	L2				H2	L2	L1	L2	L2			L1	L2	F4	F4	F2	F2	F4
14	F2	F4	F3	F6	F1	F1	L2	L2	L3	L2	L3	L3	L4	L7	L3	L3	L5	L3	L3	L9	F4	F5	F3	F3	F2
15		F2		F2			L2				L1	L5	L4	L4			L2			L1		F1		F2	
16			F1									L2	L3	L3	L3		H2	L1	L2	L5	F1	F1	F1		
17										HL12	H2	L2	L3	L5	L4		L5	L5	L3	L2	F3	F4	F3	F4	F1
18	F2		F1							H2	L4	L4	L4	L4	CL12	L3	L4	L4	L1	L3	F3	F3			F3
19	F6	F7	F1	F3	F6	F2	F2		L2	L4	L3	L3		L2	L2	L2	L3	L5	L1	F9	F3	F1	F2	F4	
20	F2	F3	F4	F3	F2	F2			C2	C2	L5	L6	L4	L3	L5	L2	L3				F2	F2	F1	F1	
21			F9	F5	F4		L1	L1	H2	H2	L3	L3	L3		L2					L2	F2	F4	F2		
22											C2	C4	L3	L2	L3	L9	L1	L2	L3	L3	F2	F2			
23					F1							L2	L3	L3	L4				L2	L2					F1
24		F2	F1							L3		L3	L4	L5	L5	L5	L3	L2	L5	F4	F5	F2	F2	F1	
25			F2	F3	F4	F2		L2	L2		L2	L3	L2	L2	L2	L4	L3	L2			F1	F2			
26		F2	F1	F1	F1				L2		L2	L5	L6	L3	L3	L3	L3	L4	L3	L3	F3	F2			
27				F2	F3	F2	L8	L6	L4			L3	HL22	L2	L3	L1	L1	L9	L6	L9	F2			F2	F4
28	F2	F2	F2	F1	F1		F2			C1	L2	L2						L2	L3	L1	F1		F1		
29		F1													H1										
30									H1	H1	H2	L3	L2	L2	L2	H1		L1			F2				
31			F2	F1							H1		H1	L7	L5	L3	L1	L3	L2	F6	F2	F2	F2	F4	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT																									
MED																									
U Q																									
L Q																									

DEC.2020 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

DEC.2020 f_{XI} (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	X	X	X	X	X	X	X													X	X	X	X	X	
	36	40	42	48	47	36	24													47	50	50	45	38	
2	X	X	X	X	X	X	X													X	X	X	X	X	
	36	35	36	35	32	30	27													55	44	50	48	47	
3	X	X	X	X	X	X	X													X	X	X	X	X	
	45	44	44	51	35	26	27													48	42	44	43	36	
4	X	X	X	X	X	X	X													X	X	X	X	X	
	37	35	40	49	38		28													47	48	51	47	45	
5	X	X	X	X	X	X	X													X	X	X	X	X	
	38	37	40	42	45	40	29													54	48	47	40	38	
6	X	X	X	X	X	X	X													X	X	X	X	X	
	36	36	38	41	43	34	29													50	58	57	50	37	
7	X	X	X	X	X	X	X													X	X	X	X	X	
	37	37	41	50	45	34	27													39	49	46	35	37	
8	X	X	X	X	X	X	X													X	X		X	X	
	36	33	33	35	36	38	29													43	45	48	41	37	
9	X	X	X	X	X	X	X													X	X	X	X	X	
	35	37	39	41	44	45	33													46	47	49	43	39	
10	X	X	X	X	X	X	X													X	X	X	X	X	
	44	40	38	37	43	35	30													69	58	58	58	44	
11	X	X	X	X	X	X	X													X	X	X	X	X	
	36	36	39	38	40	26	28													47	40	36	33	33	
12	X	X	X	X	X	X	X													X	X	X	X	X	
	27	32	33	33	35	33	27													53	54	53	48	37	
13	X	X	X	X	X	X	X													X	X	X	X	X	
	34	37	39	35	40	33	A													44	55	52	41	39	
14	X	X	X	X	X	X	X													X	X	X	X	X	
	38	38	36	39	41	33	30													48	45	45	31	27	
15	X	X	X	X	X	X	X													X	X	X	X	X	
	30	32	35	36	37	36	26													52	58	52	41	40	
16	X	X	X	X	X	X	X													X	X	X	X	X	
	39	40	44	47	56	36	28													43	49	39	35	30	
17	X	X	X	X	X	X	X													X	X	X	X	X	
	31	34	34	38	38	37	32													44	48	43	37	38	
18	X	X	X	X	X	X	X													X	X	X	X	X	
	32	34	34	33	34	28	30													32	34	39	44	32	
19	X	A	X	A	X	X	X													X	X	X	X	X	
	36		32		34	32	26													40	38	42	34	35	
20	X	X	X	X	X	X	X													X	X	X	X	X	
	30	37	37	33	35	34	34													44	48	45	36	29	
21	X	X	X	X	X	X	X													A	A	A	A	X	
	30	31	32	31	31	30	24																	32	
22	A	X	X	X	X	X	X													X	X	X	X	X	
		34	33	32	29	28	28													57	50	44	42	36	
23	X	X	X	X	X	X	X													X	X	X	X	X	
	28	30	34	38	35	27	25													45	38	41	39	36	
24	X	X	X	X	X	X	X												X	X	X	X	X	X	
	37	48	48	35	30	28	28												58	37	40	40	40	39	
25	X	X	X	X	X	A	X													X	X	X	X	X	
	36	38	38	39	40		31													51	58	59	50	50	
26	X	X	X	X	X	X	X													A	X	X	X	X	
	45	41	49	42	32	29	28														54	50	56	38	
27	X	X	X	X	X	X	X													A	A	X	A	A	
	34	34	36	34	40	36	24															43			
28	A	A	X	X	X	X	X												X	X	X	X	X	X	
			36	38	44	28	29												59	44	38	39	42	33	
29	X	X	X	X	X	X	X													X	X	X	X	X	
	33	34	35	40	36	25	26													47	38	34	35	30	
30	X	X	X	X	X	X	X													X	X	X	X	X	
	32	35	41	42	40	34	31													49	50	50	36	29	
31	X	X	X	X	X	X	X													X	X	X	X	X	
	32	31	34	34	37	23	26													38	30	31	33	34	
	00	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	31	30	31	29	30													2	28	29	30	29	30
MED	X	X	X	X	X	X	X													X	X	X	X	X	X
	36	36	37	38	38	33	28												58	47	48	46	41	37	
U Q	X	X	X	X	X	X	X													X	X	X	X	X	X
	37	38	40	42	43	36	30													50	52	50	46	39	
L Q	X	X	X	X	X	X	X													X	X	X	X	X	X
	32	34	34	35	35	28	26													44	40	41	36	33	

DEC.2020 f_{XI} (0.1MHz)

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

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

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	30	34	36	41	41	30	18	39	57	65	71	82	84	90	89 ^H	80	80	64	48	41	44	44	39	31
2	30	29	30	29	26	24	21	39	56	65	74	73	68	78	84 ^H	87	66	66	59	48	38	44	42	41
3	39	38	38	45	29	20	21	40	54	58	62	71	65	76	82	82	70	57	53	42	36	38	37	30
4	31	29	34	43	32	22	22	38	58	68	69	87	74	84	91	72	64	66	49	41	42	45	40	39
5	32	31	34	36	39	34	23	34	51	55	64	68	63	90	96	90	67	72	70	48	42	41	34	32
6	30	30	32	35	37	28	23	36	59	75	64	64 ^V	73	90	89	91	72	64	71	44 ^R	52	51	44	31
7	31	31	35	44	39	28	21	34	49	57	80	82	79 ^H	80	80	90	62	59	51	33	43	40	29	31
8	30	27	27	29	30	32	23	36	55	66	64	64	73	90	81 ^H	76 ^H	57	57	54	37	39	39 ^F	35	31
9	29	31	33	36 ^V	38	39	27	37	58	63	61	63	86	91	88 ^H	85	62	65	62	40	41	43	37	33
10	38 ^Z	34	32	31	37	29	24	34	56	67	64	71	78	84	100	97	74	89	67	63	52	52	52	38
11	30	30	33	32	34	20	22	35	54	59	62	75	68	71	87	75	64	55	48	41	34	30	27	27
12	21	26	27	27	29	27	21	33	52	64	65	58	66	71	72	68	74	70	58	47	48	47	42	31
13	28	31	33	29	34	27	^A	30	65	65	59	72	89	79	66	59	62	60	44	38	49	46	35	33
14	32	32	30	33	35	27	24	33	61	63	66	64	76	89	72	66	68	67	48	42	39	39	25	21
15	24	26	29	30	31	30	20	32	56	57	50	72	91	108	140	112	97	111	93	46	52	46	34	34
16	33	34	38	41	50	30 ^H	22	33	55	60	62	70	74	82	71	68 ^R	70	60	55	37 ^V	43	33	29	24
17	25	28	27	32	32	31	26	36	51	54	56	59	60	56	71	76	59	57	53	38	38	37	31	32
18	26	28	28	27	28	22	24	31	53	60	60	65	61	76	68	66	62	62	41	26	28	33	38	26
19	30	^A	26 ^A	28	26	20	32	51	52	60	70	60	66	65	63	60	57	55	34	32	36	28	29	
20	24	25 ^F	24 ^F	27	28 ^F	27 ^F	26 ^F	37	52	57	57	55	64	72	78	78	61	50	46	38	42	39	30	23
21	24	24	26	25	25	24	18	29	54	60	64	63	74	82	93	77	84	87	79	^A	^A	^A	^A	26
22	^A	28	27	26	23	22	22	32	58	75	69	68	63	94	122 ^{J R}	117	124	102	72	51	44	38	36	30
23	22	24	28	32	29	21	19	28	58	70	78	65	83	112	128	118	98	84 ^{J R}	48	39	32	34	33	30
24	31	36 ^F	38 ^F	29	24	22	22	29	54	62	61	78	100 ^R	126	141	124	108	81	51	31	34	34	34	33
25	30	32	32	33	34	^A	25	31	58	72	83	88	103	117	122	147	138	105	70	45	52	53	44	44
26	39	35	43	36	26	23	23	32	63	63	64	73	89	102	123	142	122	111	72	^A	48	44	49	32
27	28	28	30	28	34	30	18	29	52	60	58	64	76	100	131	129	94	70	52	^A	^A	37	^A	^A
28	^A	^A	30	32	38	22	23	32	56	57	66	74	80	114	109	90	67	57	53	38	31	33	36	27
29	27	28	29	34	30	19	18	29	55	66	69	92	94	123	135	87	66	75	60	41	32	28	29	24
30	26	29	35	36	34	28	25	31	54	56	59	94	95	114	110	110	83	72	52	43	44	44	30	23
31	26	25	28	28	31	17	20	28	62	73	83	108 ^{J R}	124 ^H	115	92	80	69	55	51	32	24	25	27	28
	00	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	31	30	31	30	30	31	31	31	31	31	31	31	31	31	31	31	31	28	29	30	29	30
MED	30	29	30	32	32	27	22	33	55	63	64	71	76	90	89	85	69	66	53	41	42	39	35	31
U Q	31	32	34	36	37	30	24	36	58	66	69	78	89	108	122	110	84	81	67	44	46	44	40	33
L Q	26	28	28	29	28	22	20	31	53	57	60	64	66	78	78	75	62	57	49	38	34	34	30	27

DEC.2020 foF2 (0.1MHz)

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L		L	L			L	L							
2											L	L	L	L	L	L								
3									268	L	L	L	U	U	L	L	L	L						
4										L	L	L	U	L	L	L	L	L						
5										L	U	L	L	L	L	L	L	L						
6										L	U	L	L	L	L	L	L	L						
7								L			L	L	L	L	U	L	L	L						
8									264	L	L	L	L	L	L	L	L	L			228			
9											L	L	L	L	L	L	L	L						
10											L	L	L	L	L	L	L	L						
11										L	U	L	L	L	L	L	L	L						
12										L	L	L	L	L	L	L	L	L						
13								L	L	L	L	L	L	L	L	L	L	L			208			
14										L	L	L	L	L	L	L	L	L						
15										L	L	L	L	L	L	L	L	L						
16										L	L	L	L	L	L	L	L	L						
17										L	U	L	L	L	L	L	L	L						
18										L	L	L	L	L	L	L	L	L						
19											L	L	L	L	L	L	L	L						
20											L	L	L	L	L	L	L	L						
21										L	L	L	L	L	L	L	L	L						
22											L	L	L	L	L	L	L	L						
23										L	L	L	L	L	L	L	L	L						
24									264	L	L	L	L	L	L	L	L	L						
25										L	L	L	L	L	L	L	L	L						
26											L	L	L	L	L	L	L	L						
27									244	L	L	L	L	L	L	L	L	L						
28										L	L	L	L	L	L	L	L	L						
29										L	L	L	L	L	L	L	L	L						
30											L	L	L	L	L	L	L	L						
31										L	L	L	L	L	L	L	L	L						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									4	1	12	25	27	25	27	15	2	2						
MED									264	376	418	440	452	448	436	408	340	218						
U Q									266		428	448	460	452	444	424								
L Q									254		408	430	440	442	432	404								

DEC.2020 foF1 (0.01MHz)

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IONOSPHERIC DATA STATION Okinawa

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								B	A						A			A	A					
2								B		276	312	324	324	336		296	252		A	A				
3								B		216	268	300	316	324	316	308	288		A	A				
4						J K 152		B		220	280	300	320	328	312					172	172			
5								B		216	268	284	316		A		316	292	256	176				
6								B		200	252	304	316	328		312		A		168				
7								B		A		A		A		A			244	172				
8								B		196	248	292	300	308		A		308	292	248	168			
9								B		204	244	292	304	300		A		312	280		A			
10								B		208		A U A 304	308		A		308		A	A	A	A		
11								B		216	260	284			A		A				A	A		
12								B		192	256	292	312	320		A		A		188				
13								B		188	252	284	308	324		A		A		A	A	B		
14								B		208	264	284	312		300			A	A	A	A	A		
15								B		216	272		A	A	A	A	A	A	A	A	A	A		
16								B		204		A U A 312		A	A	A	A	A	A	A	A	A		
17								B		180	252	296		A	A	A	A		244		A	A		
18								B		184	264	292	308					A	A	A	A			
19								B		192		A	A		308	308	312		A	A	A	A		
20								B		232		284		A	A	A	A	A	A	A	A	A		
21								B		A			A	A	A	A	A	A	A	A	A			
22								B		196	248	284	288	304				A	A	A	A	A		
23								B		212	268	292	320	332	296				A	A	A	A		
24								B		A		A	A	A	A	A	A		300		A	A		
25								B		208	260	300	316		A	A	A	A	A	A	A	A		
26								B		232		304		A	A	A	A	A	A	A	A	A		
27								B		A			A	A	A	A	A	A	A	A	A			
28								B		268	284		A	A	A	A	A	A	A	A	A			
29								B		212	264	284		A	A	A	A	A	A	A	A			
30								B		212		A	A	324	328		A	296	252		A	B		
31								B		180	252		A	A	A	A		296	248		A	A		
								B		184	240				A	A	A	A	A	A	A			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1			25	24	23	18	12	7	8	10	8	6	1					
MED					J K 152				208	262	292	312	324	312	310	292	248	172	172					
U Q									216	268	300	316	326	328	312	296	252	176						
L Q									192	252	284	308	308	300	308	288	246	168						

DEC.2020 foE (0.01MHz)

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

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

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

IONOSPHERIC DATA STATION Okinawa

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

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

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

DEC.2020 fbEs (0.1MHz)

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IONOSPHERIC DATA STATION Okinawa

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

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

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

DEC.2020 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

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

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	306	263	298	348	364	404	339	352	368	335	337	346	334	346	353	346	345	354	358	325	293	318	354	329
2	341	322	311	353	331	365	326	348	370	371	345	361	352	344	331 ^H	352	304	352	342	407	280	312	325	303
3	299	297	334	386	409	306	314	354	385	374	348	349	338	344	294	358	361	369	361	342	305	333	375	309
4	306	281	306	360	367	328	333	342	368	372	345	385	332	336	354	337	369	380	348	348	310	333	330	319
5	318	276	312	339	338	366	369	360	378	386	326	375	284	341	332	356	346	358	385	391	309	329	316	317
6	315	302	307	351	363	341	326	349	368	370	378	339 ^V	340	338	333	314	342	334	354	325 ^R	314	337	345	313
7	294	299	319	340	375	397	343	350	368	353	354	390	337	336	323	356	367	367	390	274	331	334	297	317
8	304	298	315	325	333	389	338	353	367	384	358	363	339	352	349 ^H	347 ^H	359	357	365	306	340	304 ^F	318	305
9	305	300	316	300 ^V	328	369	346	342	382	378	378	368	347	372	317 ^H	349	353	367	375	342	310	332	338	363
10	291 ^Z	307	324	326	360	352	335	337	366	373	366	354	361	344	345	350	344	349	345	316	334	320	321	280
11	288	306	342	365	394	327	331	343	377	370	355	352	356	331	352	359	387	375	356	358	364	332	341	341
12	312	311	315	315	320	345	358	360	370	381	381	385	331	360	350	351	361	363	359	334	295	326	358	334
13	288	298	337	333	349	414	A	317	372	380	360	365	355	356	369	349	360	382	359	303	336	321	338	317
14	308	316	323	328	368	322	326	350	381	393	378	358	340	378	368	336	358	362	342	324	345	349	369	288
15	294	310	336	337	361	401	302	344	373	385	351	331	343	346	324	354	328	354	364	291	351	366	330	327
16	313	286	300	330	373	385 ^H	321	339	360	376	360	360	364	349	334	352 ^R	359	361	385	358 ^V	360	316	332	312
17	305	313	343	343	350	383	345	369	382	387	362	339	359	307	343	365	360	366	364	360	354	347	318	366
18	295	309	336	322	381	287	356	349	381	396	390	363	349	354	315	351	342	375	360	379	301	308	323	329
19	300	A	297	A	327	351	355	358	390	372	379	395	372	361	343	359	339	379	370	381	299	346	359	364
20	345	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
20	345	282	304	299	303	329	321	349	370	388	371	370	322	335	324	354	365	369	361	343	320	329	369	311
21	316	321	326	338	337	368	336	344	374	366	361	373	354	350	373	338	310	318	340	A	A	A	A	334
22	A	344	348	324	341	318	325	332	355	390	379	381	300	331	301 ^{J R}	295	340	365	320	384	318	364	335	333
23	303	290	316	363	366	357	310	321	359	370	376	369	322	338	346	340	340	311 ^{J R}	354	360	319	295	331	363
24	276	292	350	363	317	312	336	342	369	370	359	336	321	315	339	343	348	365	383	326	324	343	334	318
25	290	313	315	313	365	A	338	324	354	349	339	338	342	338	325	342	363	347	375	317	319	348	345	323
26	283	288	311	398	344	307	327	333	381	362	365	342	344	330	324	355	339	368	382	A	334	339	341	310
27	296	332	305	376	380	380	330	335	375	366	380	376	338	316	335	348	357	347	384	A	A	A	A	A
28	A	A	325	315	393	295	314	353	391	373	364	372	286	337	325	346	363	376	388	357	326	329	361	310
29	303	309	298	358	397	292	329	319	382	370	351	347	334	333	375	364	337	366	354	333	330	336	342	349
30	303	302	320	337	358	311	352	327	373	378	310	354	328	344	345	352	351	369	321	340	311	315	350	279
31	285	296	311	351	398	310	317	343	374	372	336	358	320 ^{J R}	347	361	328 ^H	364	371	361	375	295	300	318	340
	00	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	31	30	31	30	30	31	31	31	31	31	31	31	31	31	31	31	31	28	29	30	29	30
MED	303	302	316	338	361	348	332	344	373	373	360	361	339	344	339	350	353	365	361	342	319	332	338	318
U Q	310	312	334	358	375	380	343	352	381	384	378	373	352	350	352	355	361	369	375	360	335	343	352	334
L Q	292	291	307	325	337	312	325	335	368	370	348	347	328	335	324	342	340	354	354	324	307	318	324	310

DEC.2020 M(3000)F2 (0.01)

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

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										L		L	L			L	L							
2											L	L	L	L	L	L								
3									437	L	L	L	U	U	L	L	L	L						
4										L	L	L	U	L	L	L	L	L						
5									412	L	U	L	L	L	L	L	L	L						
6										L	U	L	L	L	L	L	L	L						
7								L			L	L	L	L	U	L	L	L						
8									424	L	L	L	L	L	L	L	L	L			431			
9											L	L	L	L	L	L	L	L						
10											L	L	L	L	L	L	L	L						
11										L	U	L	L	A	U	L	L	L						
12										L	L	L	A	L	L	U	L	L	L					
13								L	L	L	L	A	L	L	L	L	L	L			479			
14										L	L	L	L	A	L	U	L	L	L					
15										L	L	L	L	A	L	L	L	L	L					
16										L	L	L	L	L	L	L	L	L	L					
17										L	U	L	U	L	L	L	L	L	L					
18										L	409	383	391	385	384	387	L	L	L					
19												405	397	387	389	L	L	L	L					
20											L	L	U	L	L	L	L	L	L					
21										L	L	L	L	L	L	L	L	L	L					
22											L	L	A	U	L	A	L	L	L	L				
23										L	L	L	L	A	L	L	L	L	L	L				
24									435	L	L	L	L	A	L	L	L	L	L	L				
25										L	L	L	L	A	L	L	L	L	L	L				
26											L	L	L	A	L	L	L	L	L	L				
27									481	L	L	L	L	A	L	A	L	L	L	L				
28										L	L	L	L	L	L	L	L	L	L	L				
29										L	L	U	L	L	L	L	L	L	L	L				
30											L	L	L	L	L	L	L	L	L	L				
31										L	L	L	L	L	L	L	L	L	L	L				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									4	1	12	23	23	25	27	14	2	2						
MED									436	412	396	395	395	388	388	390	408	455						
U Q									459		406	405	399	390	390	400								
L Q									430		390	386	386	384	379	386								

DEC.2020 M(3000)F1 (0.01)

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DEC.2020 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1										214		260	240			222	236								
2											256	236	238	266	246	238									
3									206	220	260	246	246	262	254	238	220								
4										228	262	222	260	244	242	224	218								
5										218	266	232	360 ^L	268	250	218	222								
6										230	226	254	250	252	248	218	216								
7									206		244	206	238	248	276	222									
8									216	226	250	246	258	246	228	224		212							
9											226	236	258	222	228	214	238								
10										230	238	246	242	250	242	218	222								
11										228	246	248	240	262	240	232									
12										228	222	226	288	244	244	246	226								
13									236	224	236	244	248	234	222	236	226	208							
14										218	226	230	268	230	242	252	230								
15										220		286	254	236	224	208									
16										222	254	244	240	230	248	226	214								
17										228	244	260	244		262	228	230								
18										210	222	252	264	232	274	244	246								
19												208	232	242	258	242	230								
20											232	236	268	260	258	246	222								
21										242	234	232	254	250	226	236	230								
22											226	230	246	268	238	254	236								
23											228	232	236	266	236	232	226								
24										218	228	238	266	260	252	228	230								
25											244	248	252	246	236	240	230								
26												236	244	246	234	244	218								
27										218	242	220	226	256	262	238	210	220							
28											230	238	226	262	246	226	226								
29										218	234	252	242	264	250	206	222	226							
30											U 300	L 238	244	242	220	222									
31											230	214	254	234	224		218	234							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT									8	23	28	31	31	28	30	31	20	2							
MED									218	228	238	238	250	246	241	228	226	210							
U Q									224	230	253	248	262	256	248	238	230								
L Q									211	220	229	230	242	236	228	222	221								

DEC.2020 h'F2 (KM)

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IONOSPHERIC DATA STATION Okinawa

DEC. 2020 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

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		260	310	268	218	198	186	^E 270 ^B	220	214	202	220	194	174	236	242	202	214	194	202	190	252	226	214	234	
2		218	272	272	208	234	208	262	226	210	218	222	198	194	^H 184	208	204	198	214	184	182	246	236	244	266	
3		278	274	240	204	178	280	286	218	178	212	206	202	188	196	184	212	214	202	198	198	222	222	210	262	
4		266	316	282	214	212	280	246	236	222	218	218	202	192	190	194	180	206	208	180	194	254	218	210	238	
5		256	316	268	224	232	196	218	202	212	198	200	^A	186	170	216	212	200	224	194	182	216	216	244	258	
6		248	268	274	226	224	206	232	232	220	220	216	192	216	192	210	212	188	212	182	182	218	206	218	226	
7		298	286	250	212	196	188	238	208	196	226	216	204	200	190	202	182	^H 202	218	184	202	222	206	258	260	
8		260	298	274	244	256	212	252	208	190	194	194	208	208	234	176	202	210	198	196	182	222	228	230	234	
9		280	282	262	276	242	218	206	226	210	224	194	192	176	172	176		^A	^A 200	192	202	222	210	214	216	
10		276	260	240	242	218	222	212	228	220	220	226	194	196	198	184	196	206	216	194	192	202	218	210	216	
11		300	284	240	206	192	242	256	220	212	208	206	^A	^A	216	216	188	204	208	202	202	188	232	246	218	
12		268	268	264	260	252	216	226	216	212	218	218	^A	190	208	206	180	212	206	194	178	222	220	202	222	
13		276	290	232	238	230	192	^A	248	226	208	210	^A	180	202	196	192	184	156	192	220	222	218	214	248	
14		266	256	250	246	208	240	248	232	222	204	206	182	^A	^E 224 ^A	^A	188	^A	208	196	^E 260 ^A	194	196	214	^E 376 ^A	
15		330	284	246	244	216	188	302	224	210	208	222	190	^A	200	214	192	222	214	184	192	206	192	202	238	
16		252	272	260	238	204	190	^H 248	224	212	210	196	192	184	198	180	220	206	206	200	176	194	220	226	278	
17		284	274	224	232	224	196	226	210	204	208	202	186	196	^E 228 ^A	172	196	218	216	194	206	204	206	226	202	
18		298	266	226	240	196	304	210	196	212	204	206	178	216	198	222	184	200	210	192	210	314	258	216	222	
19		^E 280 ^A	^A	290	^A	248	216	234	212	208	206	222	178	170	^E 218 ^A	192	212	^A	210	216	204	198	216	210	214	
20		222	^Q 312	296	286	276	256	256	206	210	218	212	192	176	206	206	214	212	^A	212	198	198	222	210	198	280
21		272	270	254	234	244	220	302	234	226	226	210	202	198	184	198	192	220	224	188	^A	^A	^A	^E 234 ^A		
22		^A	244	228	198	226	258	266	228	222	220	222	^A	202	^A	226	192	214	208	200	182	212	194	216	210	
23		298	312	274	224	208	224	^E 312 ^B	248	226	218	210	230	^A	206	188	186	^A	204	190	192	218	298	238	208	
24		292	300	214	206	248	282	246	226	178	216	200	200	^A	196	194	202	220	208	192	184	234	216	218	256	
25		286	252	254	246	212	^A	240	242	218	210	204	^A	^A	212	188	^A	212	198	206	^E 250 ^A	254	192	202	224	
26		268	276	226	180	202	264	268	228	216	214	196	220	^A	184	180	202	226	202	206	^A	240	226	202	214	
27		296	232	^Q 278	190	208	210	294	236	158	220	204	192	196	^A	^A	204	^A	198	192	^A	^E 258 ^A	^A	^A	^A	
28		^A	^A	262	294	202	302	276	218	212	212	204	192	178	176	212	216	226	208	198	194	216	250	206	252	
29		290	276	278	222	180	344	324	244	202	192	194	178	176	172	176	206	196	210	186	186	254	218	234	224	
30		286	280	258	216	206	264	210	234	220	212	216	202	176	234	206	^H 200	228	206	196	228	206	204	220	258	
31		294	306	262	220	190	362	288	238	222	188	176	176	200	218	170	^H	^A 220	206	196	178	258	264	236	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		29	29	31	30	31	30	30	31	31	31	31	25	24	29	29	28	26	31	31	28	29	30	29	30	
MED		277	276	260	225	212	221	248	226	212	212	206	192	191	197	196	201	212	208	194	192	222	218	216	234	
U Q		293	299	274	244	234	264	276	234	220	218	218	202	199	217	211	209	220	212	198	203	243	228	232	258	
L Q		263	268	240	212	202	206	232	216	208	206	200	188	177	187	182	190	202	202	190	182	206	206	210	218	

DEC. 2020 h'F (KM)

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DEC.2020 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								B	A						A			A	A					
2								B		104	104	104	106	106		110	108		A	A				
3								B		108	106	108	104	104	102				A		110	82		
4						B		B		106	106	106	112		A								B	
5								B		106	104	104	104	104		106					104		B	
6								B	A			A		A	A	A			104	114				
7								B		104	104	102	102	102		A							B	
8								B		106	102	102	102	102		A				A	A		B	
9								B		102		102	102		A					A	A	A	A	
10								B		106	102	100			A							A	A	
11								B		108	104	104	104	104		A	A	A				104		B
12								B		112	102	102	102	104		A	A	A	A	A			B	
13								B		106	102	102	102		A									
14								B		104	102				A									
15								B		106		A			A									
16								B		106	106	106			A						102			
17								B		104	104	102	102			A								
18								B		102				104	110	110				A	A	A	A	
19								B		122	A	102		A	A	A	A	A	A	A	A	A		
20								B		A				A	A	A	A	A	A	A	A	A		
21								B		108	104													
22								B		116	102	102	102	102										
23								B		118	108	104	104	102	102									
24								B		A					A									
25								B		104	102	102	102			A								
26								B		108		104			A									
27								B		A					A									
28								B		114	106				A									
29								B		112	104	104			A									
30								B		110			A	106	110		106	104						
31								B		110	100			A	A		108	102						
								B		114	102				A		A	A	A	A				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									25	24	23	18	12	7	8	10	8	6	1					
MED									106	104	102	102	104	102	105	108	104	108	82					
U Q									111	106	104	104	104	110	109	110	109	112						
L Q									105	102	102	102	102	102	103	106	103	104						

DEC.2020 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

DEC.2020 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

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		108	88	B	B	108	B	104	102	84	170	124	120	110	150	90	128	154	84	84	B	90	B	B	B	
2		B	B	B	B	B	B	B	B	94	152	146	134	120	124	124	174	184	106	88	88	94	86	98	80	92
3		84	86	96	92	B	B	B	B	90	G	92	138	120	136	104	100	112	138	138	86	96	98	B	94	96
4		B	B	B	B	B	B	B	B	162	152	138	110	112	102	98	G	104	176	150	84	102	98	94	84	84
5		B	B	B	B	B	B	B	B	88	B	136	124	110	106	102	102	150	94	94	140	94	92	B	86	B
6		B	100	B	B	90	B	B	B	182	170	108	110	108	108	102	102	G	148	B	B	98	88	90	90	
7		B	B	B	B	B	B	B	B	132	172	176	106	104	150	152	100	96	162	B	B	98	94	98	94	94
8		100	B	B	92	92	88	88	88	134	130	116	108	102	102	150	144	108	156	B	102	90	88	86	B	
9		90	94	86	86	88	B	B	B	182	118	110	100	100	96	G	88	88	94	94	92	96	86	92	92	
10		98	92	88	88	B	B	B	B	178	144	110	102	100	98	98	G	98	98	94	94	90	92	B	B	
11		B	B	B	B	B	B	B	B	192	154	128	108	104	100	108	108	106	G	100	100	110	104	94	94	
12		92	B	90	B	90	B	B	B	130	134	110	106	110	102	102	102	102	94	92	92	90	90	90	86	
13		88	86	110	102	92	88	90	B	190	146	114	104	104	104	104	100	96	120	94	104	98	96	90	90	
14		86	B	B	92	92	88	88	92	110	108	104	102	102	96	90	104	90	94	90	90	90	94	88	88	
15		90	88	88	B	104	B	B	B	82	148	108	102	108	100	100	94	94	94	92	88	98	96	90	90	
16		90	84	80	B	86	B	B	B	154	138	120	118	104	104	98	100	160	94	92	B	86	86	86	B	
17		B	84	114	B	B	B	B	B	130	110	108	106	102	98	96	96	92	90	90	88	88	88	84	84	
18		B	B	B	B	B	B	B	B	148	150	110	98	96	152	92	92	106	106	98	100	98	98	90	94	
19		94	100	94	92	92	90	90	92	88	114	108	106	106	92	96	98	100	102	98	96	114	96	96	90	
20		92	90	90	90	90	92	B	146	116	118	104	108	102	94	96	94	94	94	90	88	86	90	90	86	
21		86	B	B	B	B	B	B	B	92	164	152	124	108	108	104	102	98	94	94	92	110	110	116	84	84
22		86	90	86	B	B	B	B	B	102	136	128	108	102	104	98	96	94	90	90	92	90	88	88	B	100
23		B	B	B	B	B	B	B	B	106	164	162	110	104	100	96	98	92	90	148	132	100	88	88	86	86
24		B	B	B	B	B	B	B	B	86	132	162	102	102	102	102	94	92	108	94	86	86	86	B	B	B
25		B	B	94	88	90	90	90	90	172	106	114	106	104	106	106	92	92	92	92	90	86	86	84	84	
26		90	86	92	B	B	88	94	90	G	106	106	108	104	102	92	92	90	92	90	94	84	86	86	86	
27		B	B	B	B	90	90	94	92	90	98	112	108	102	98	94	94	90	84	94	94	92	90	86	86	
28		92	90	88	86	96	110	90	90	G	G	104	106	104	102	102	106	104	96	92	90	94	88	B	88	
29		B	B	B	B	96	90	94	B	G	106	100	104	100	98	96	156	G	152	122	108	84	88	86	B	
30		B	B	B	B	B	B	B	B	154	G	180	162	102	102	94	G	172	144	120	102	106	90	92	90	
31		90	B	B	B	B	168	98	96	116	118	110	112	160	156	98	94	90	120	100	98	126	96	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		17	14	14	10	15	12	11	18	27	29	31	31	31	31	29	29	29	30	28	27	31	27	25	23	
MED		90	89	90	91	92	90	90	92	148	130	110	106	104	102	98	98	96	95	92	94	90	90	88	90	
U Q		93	92	94	92	96	91	94	102	164	151	120	110	106	104	103	105	107	140	96	100	98	96	91	92	
L Q		87	86	88	88	90	88	90	90	130	109	108	104	102	98	94	94	91	92	90	90	86	88	86	86	

DEC.2020 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

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

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

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

DEC.2020 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

f-PLOTS OF IONOSPHERIC DATA

KEY OF f-PLOT	
	SPREAD
⬡	f _o F ₂ , f _o F ₁ , f _o E
×	f _x F ₂
✱	DOUBTFUL f _o F ₂ , f _o F ₁ , f _o E
⊗	f _b E _s
└	ESTIMATED f _o F ₁
†, ‡	f _{min}
^	GREATER THAN
∨	LESS THAN

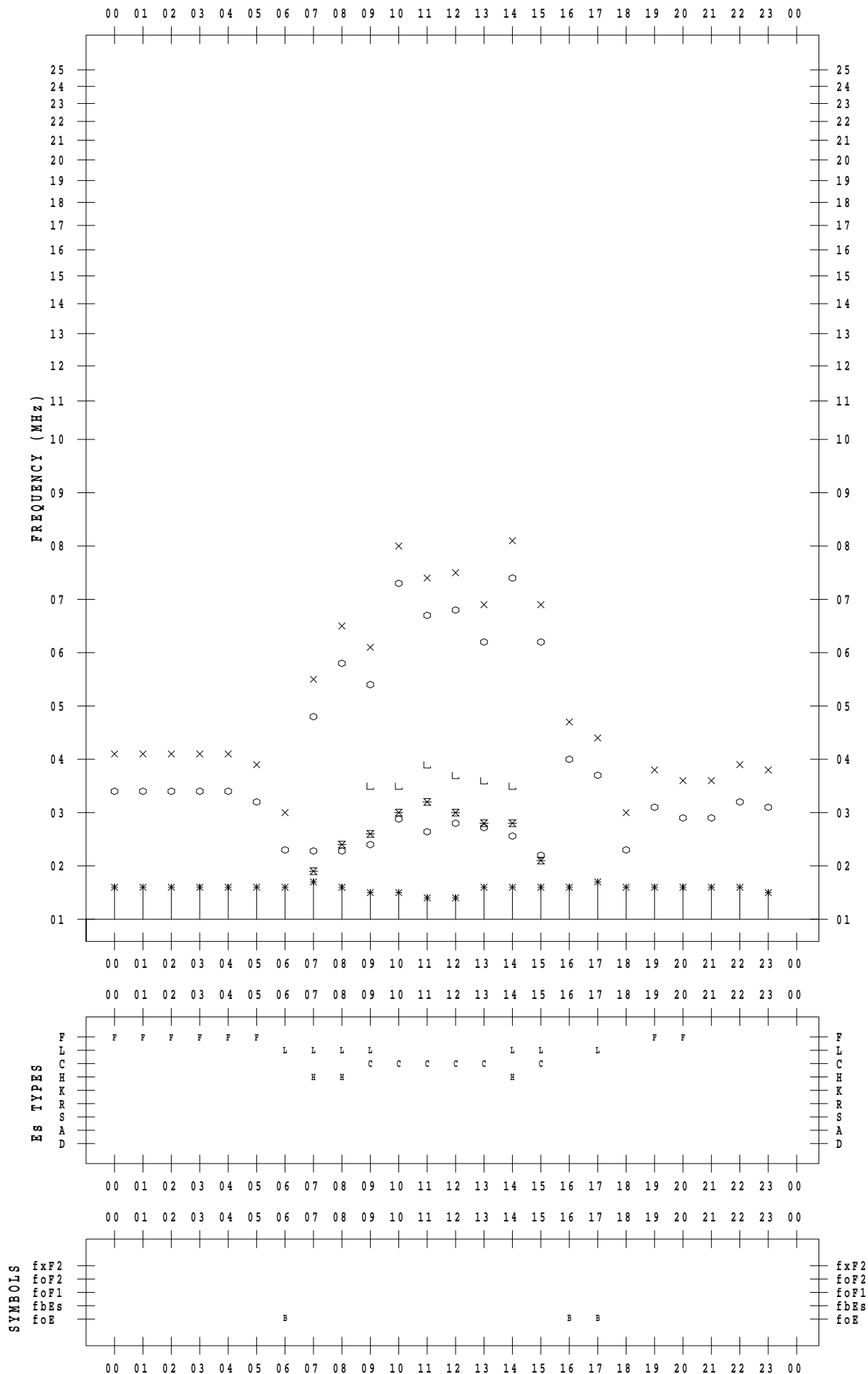
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/ 1

135 ° E MEAN TIME



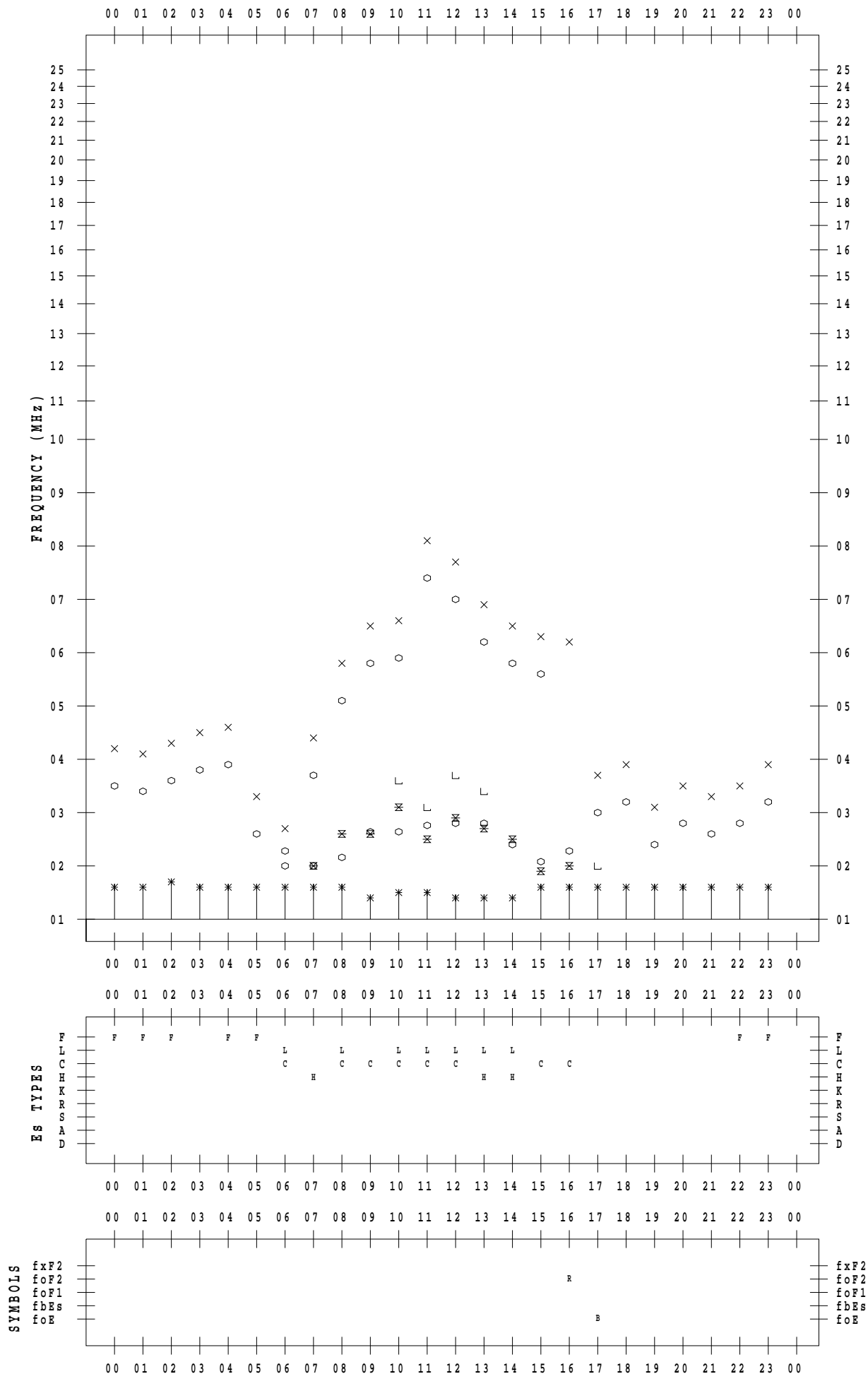
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/ 2

135 ° E MEAN TIME



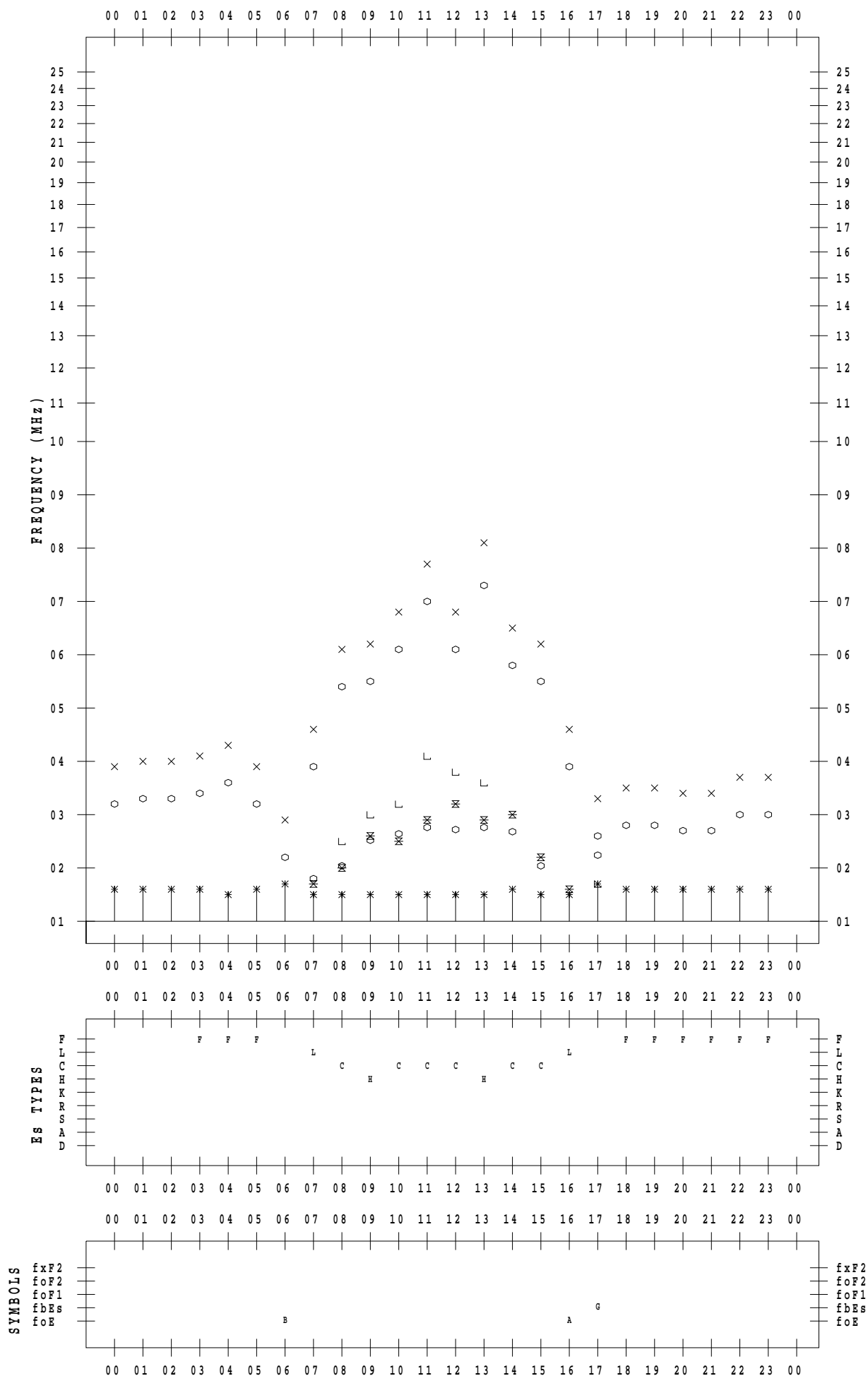
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/ 3

135 ° E MEAN TIME



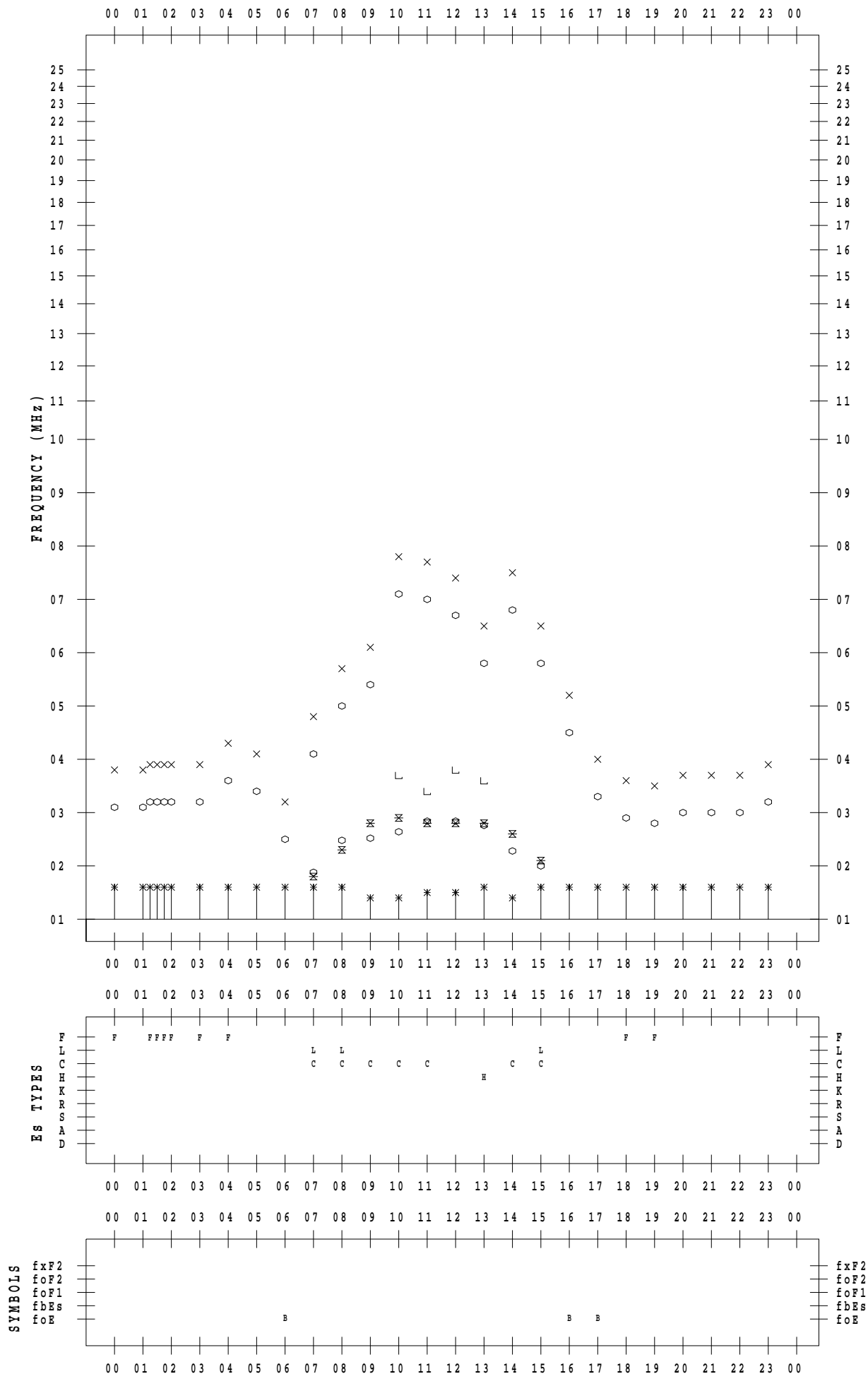
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/ 4

135 ° E MEAN TIME



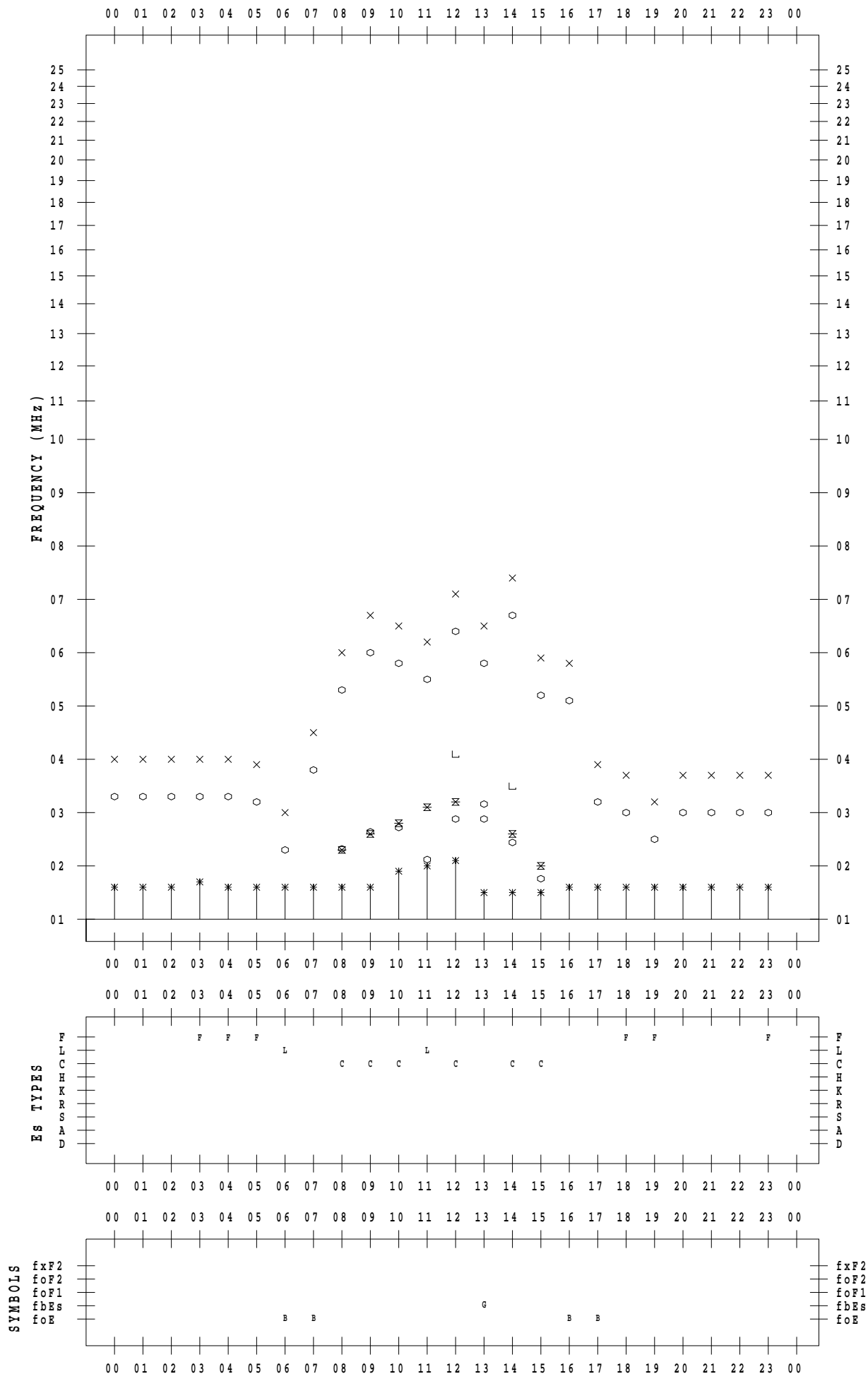
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/ 5

135 ° E MEAN TIME



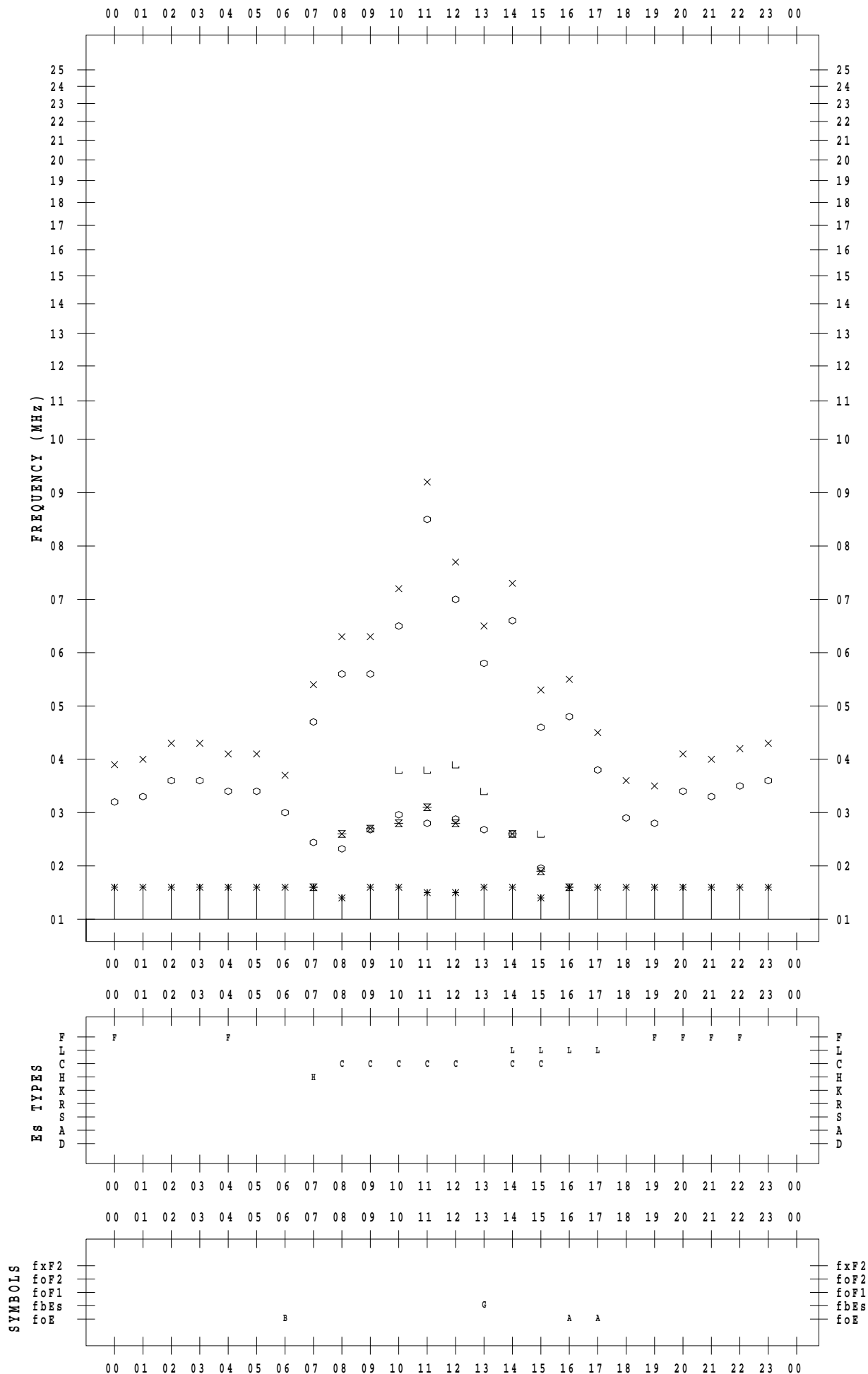
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/ 6

135 ° E MEAN TIME



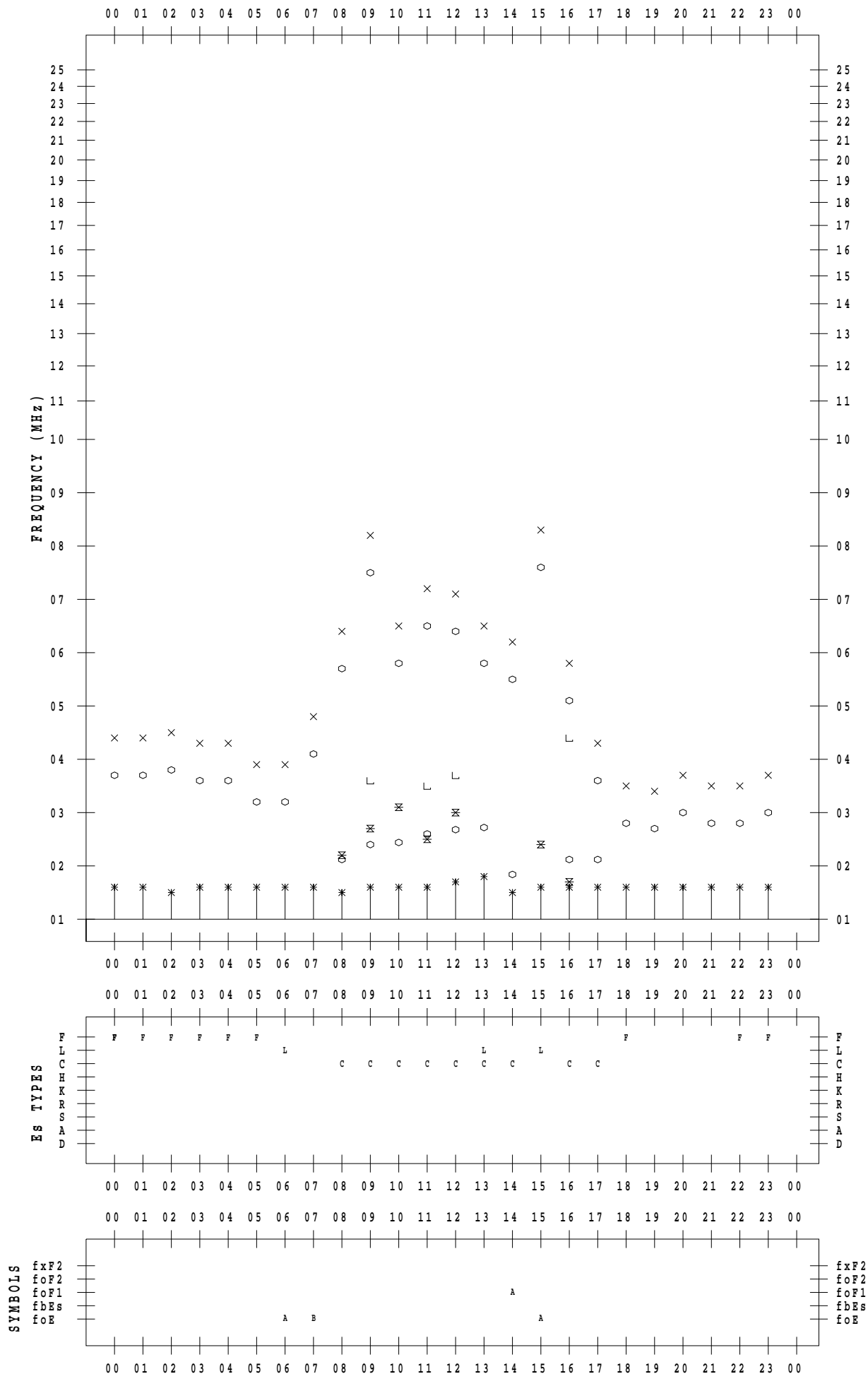
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/7

135 ° E MEAN TIME



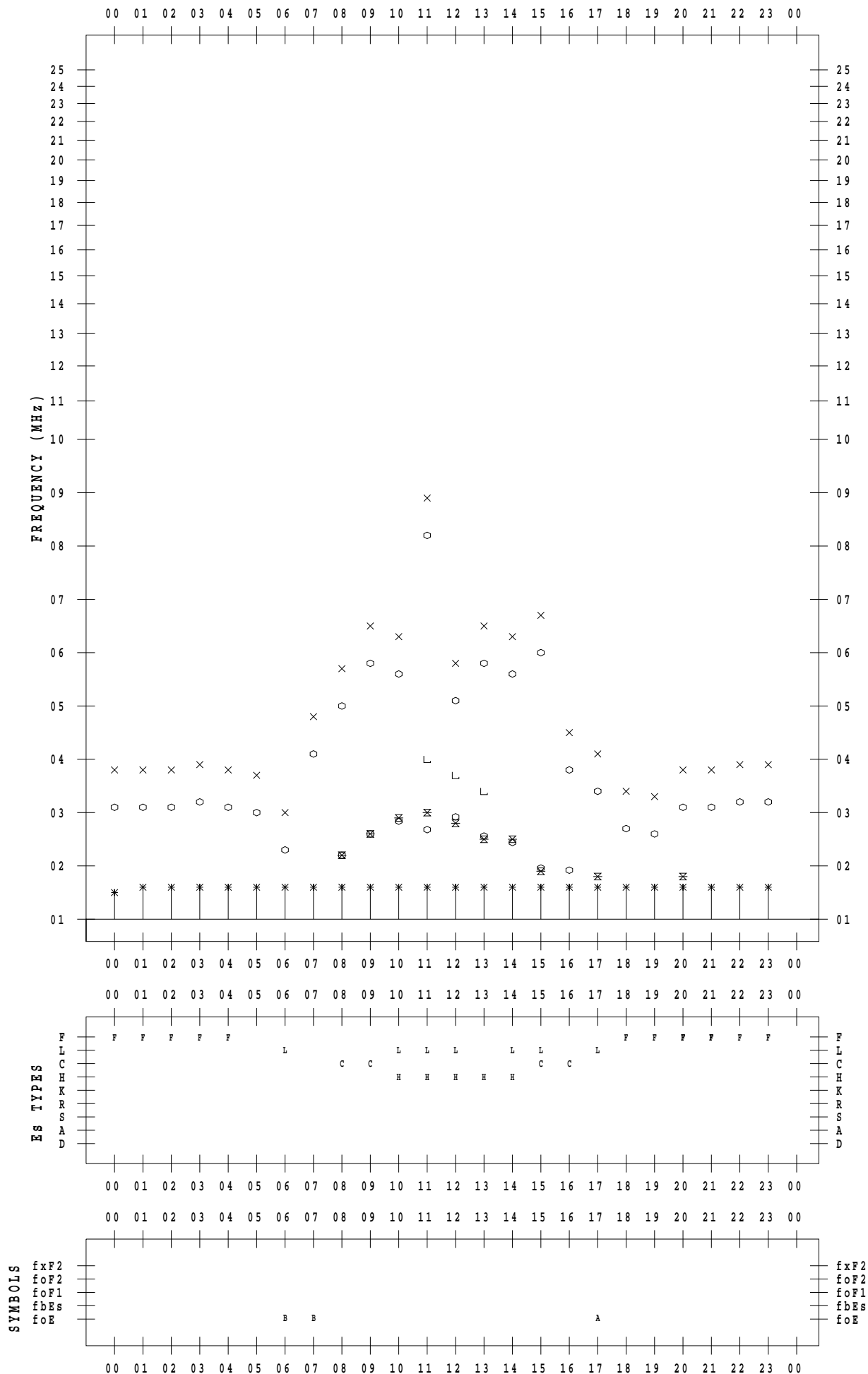
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/ 8

135 ° E MEAN TIME



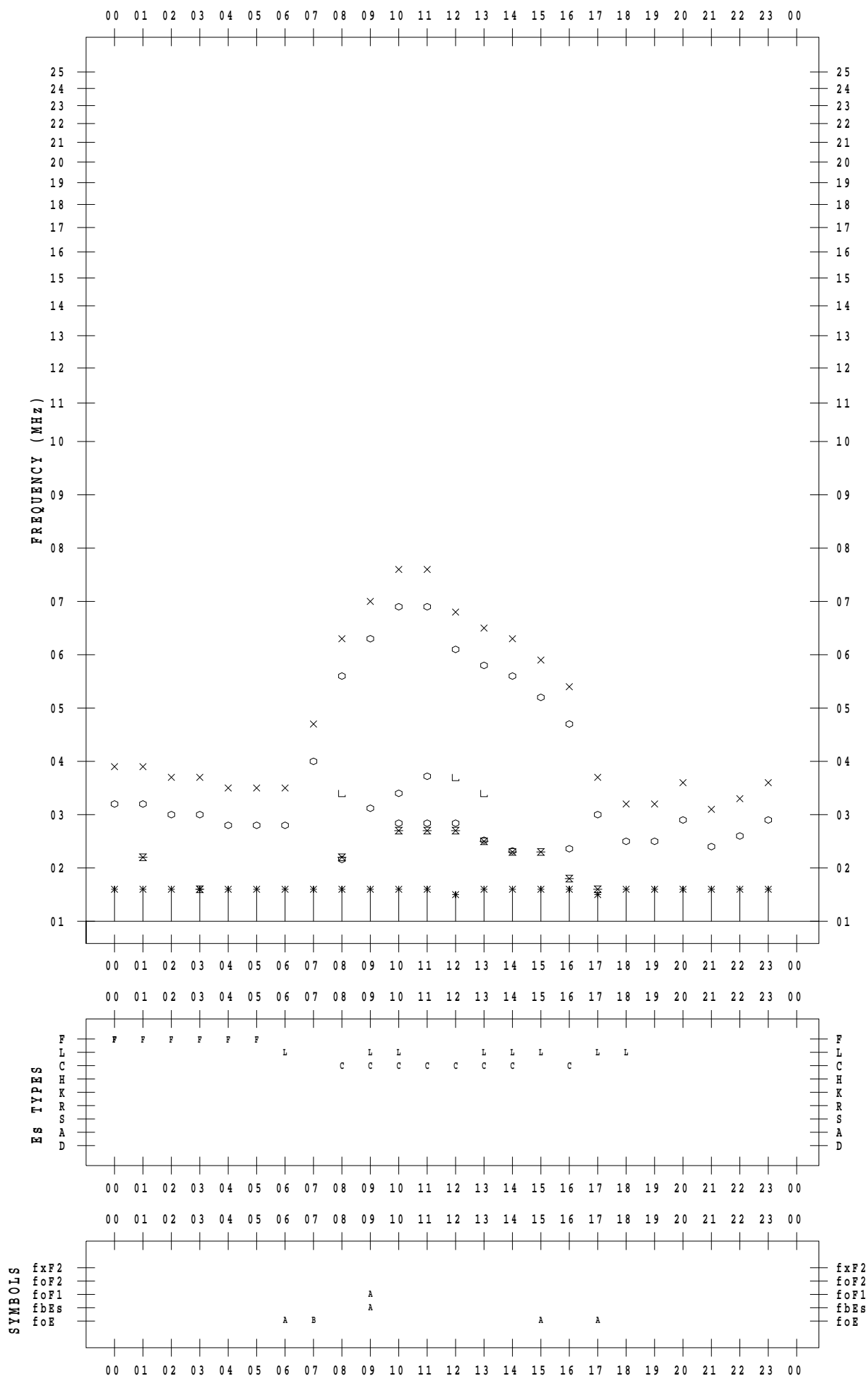
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/9

135 ° E MEAN TIME



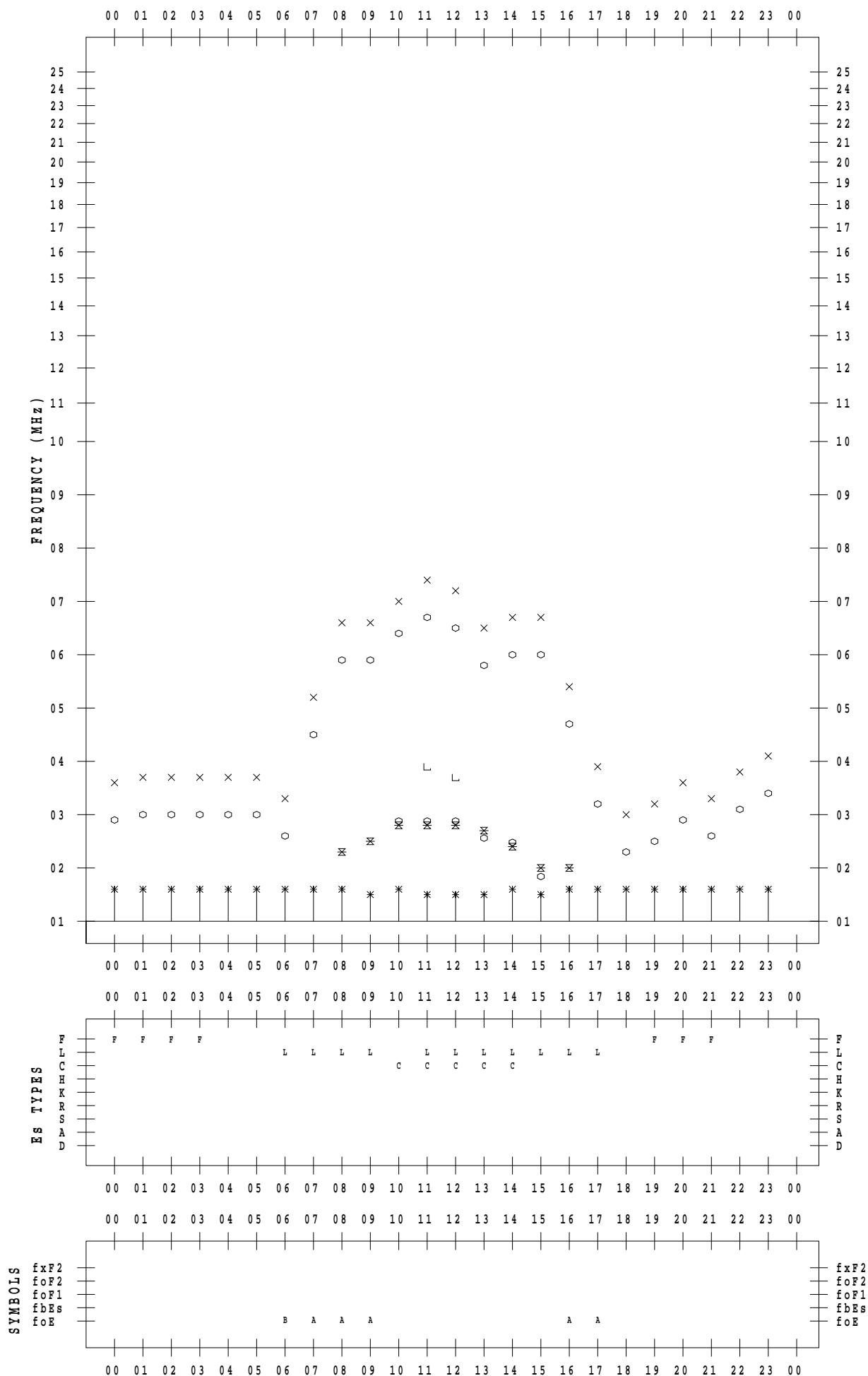
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/10

135 ° E MEAN TIME



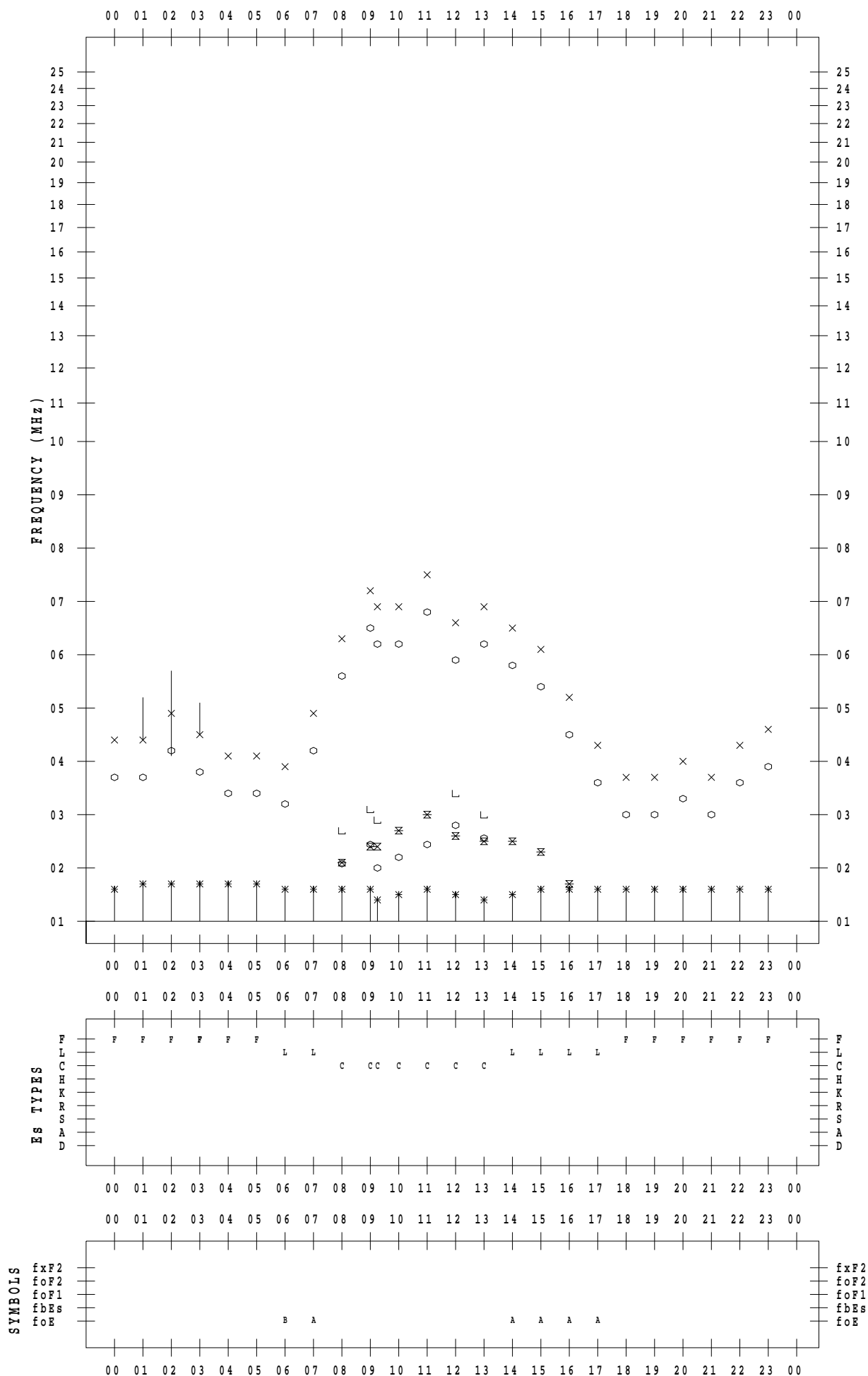
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/11

135 ° E MEAN TIME



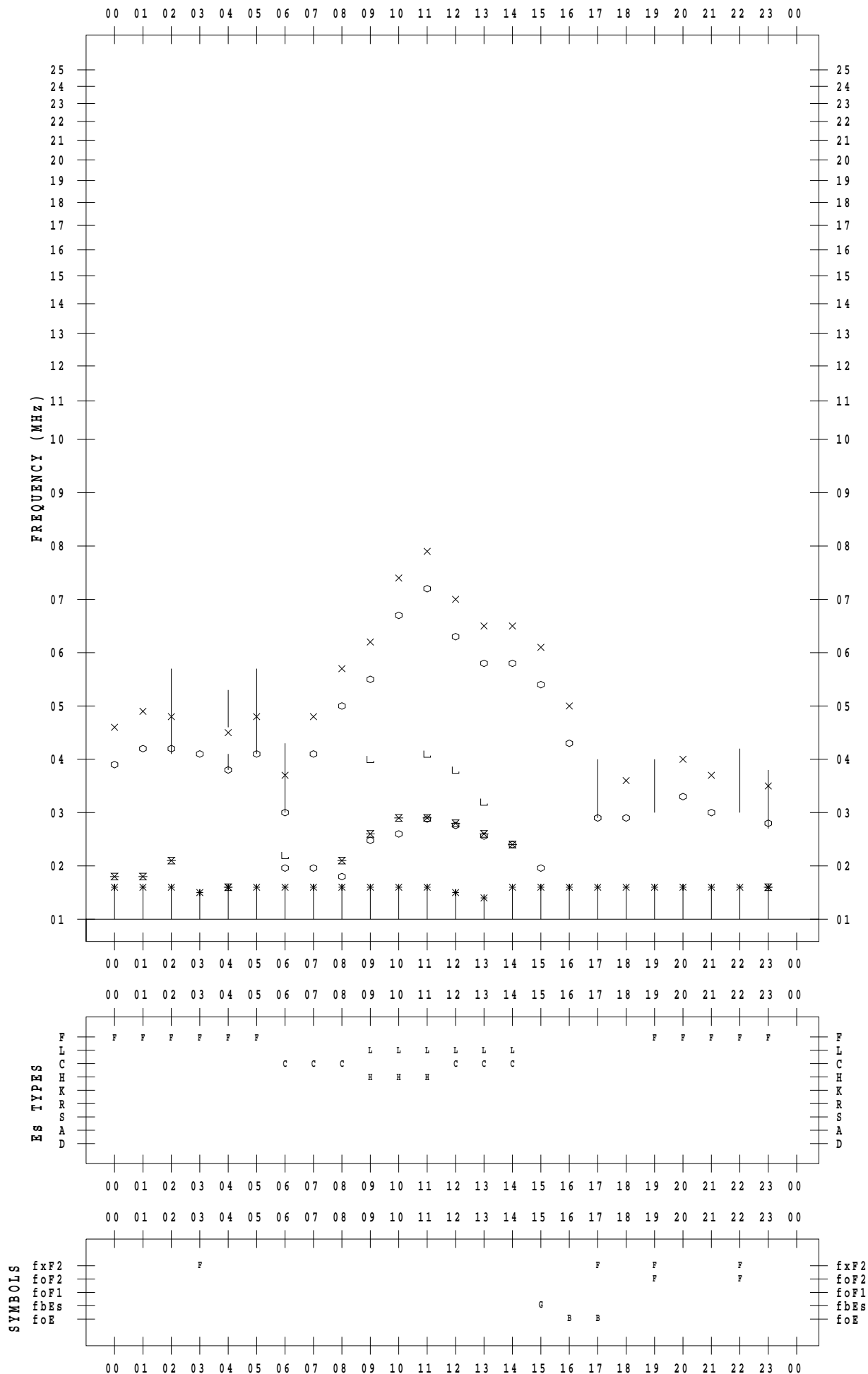
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/12

135 ° E MEAN TIME



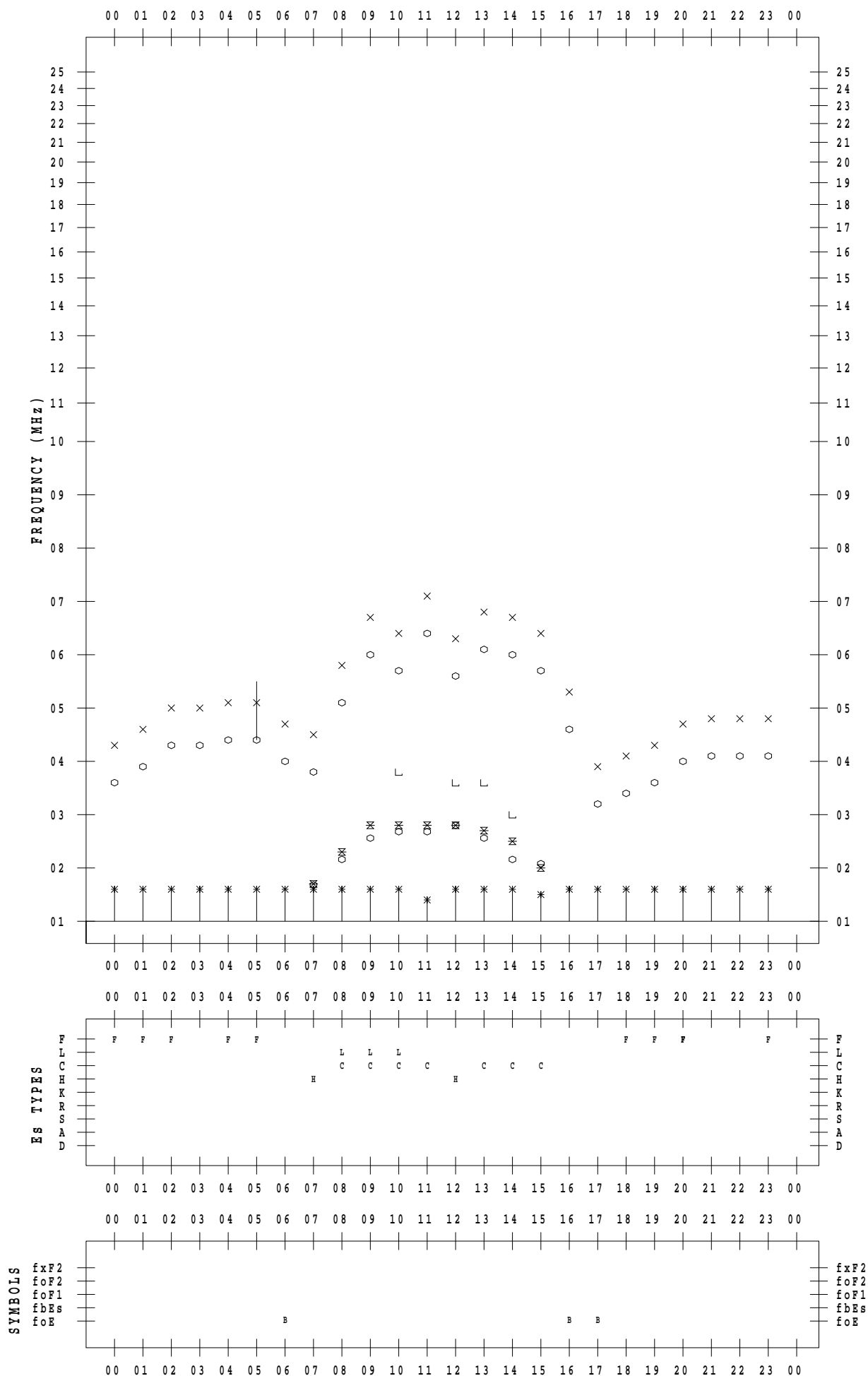
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/13

135 ° E MEAN TIME



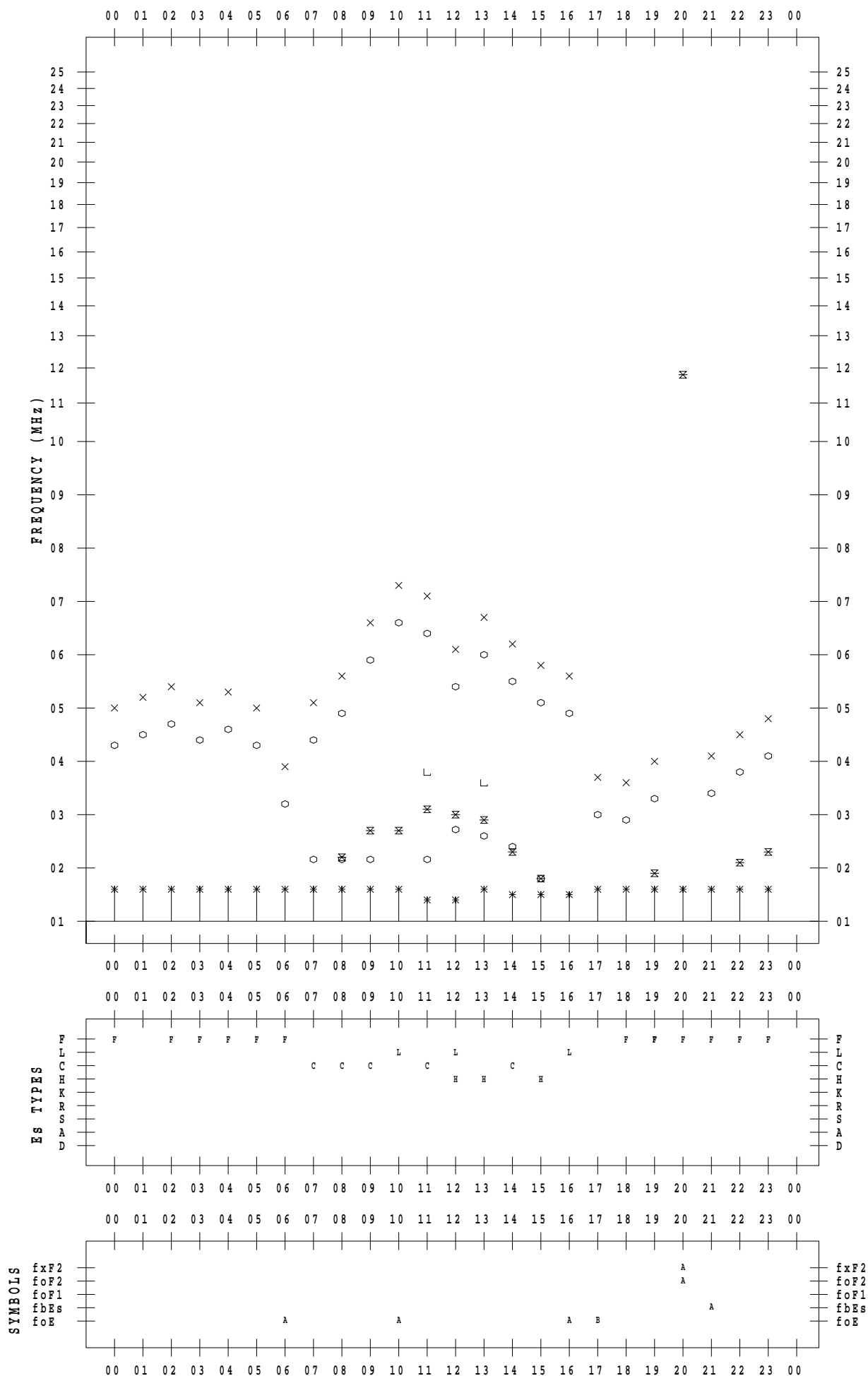
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/14

135 ° E MEAN TIME



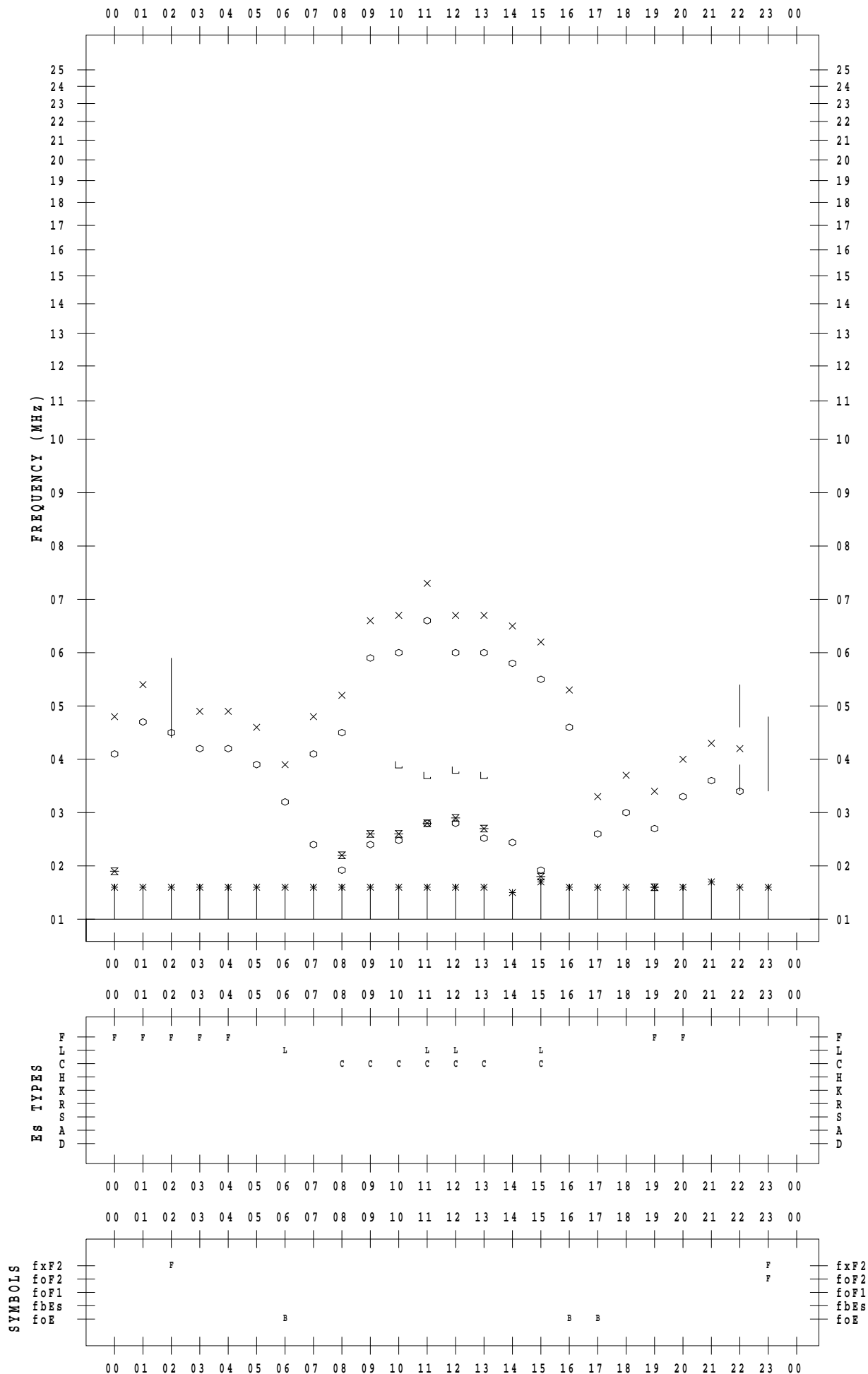
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/15

135 ° E MEAN TIME



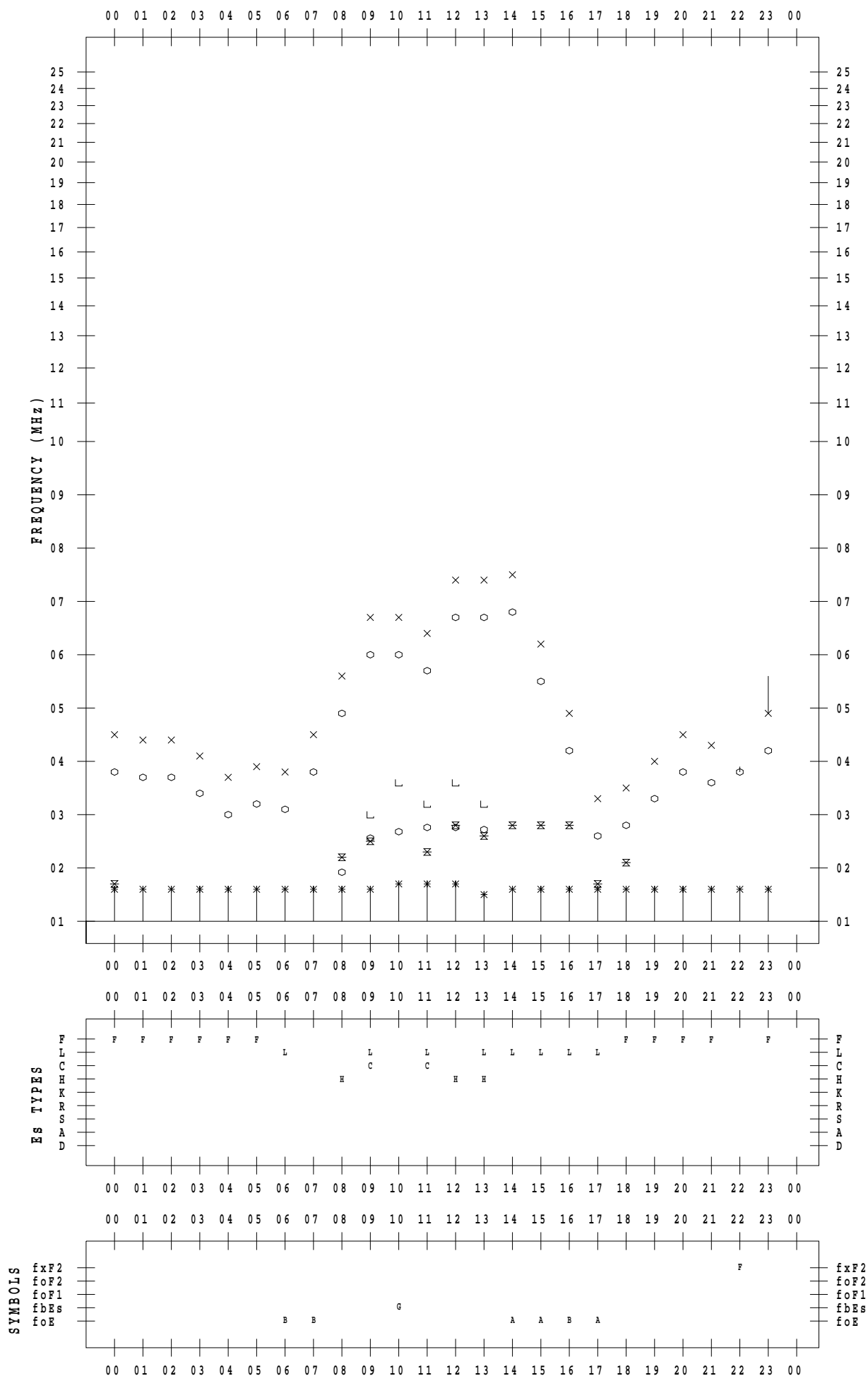
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/16

135 ° E MEAN TIME



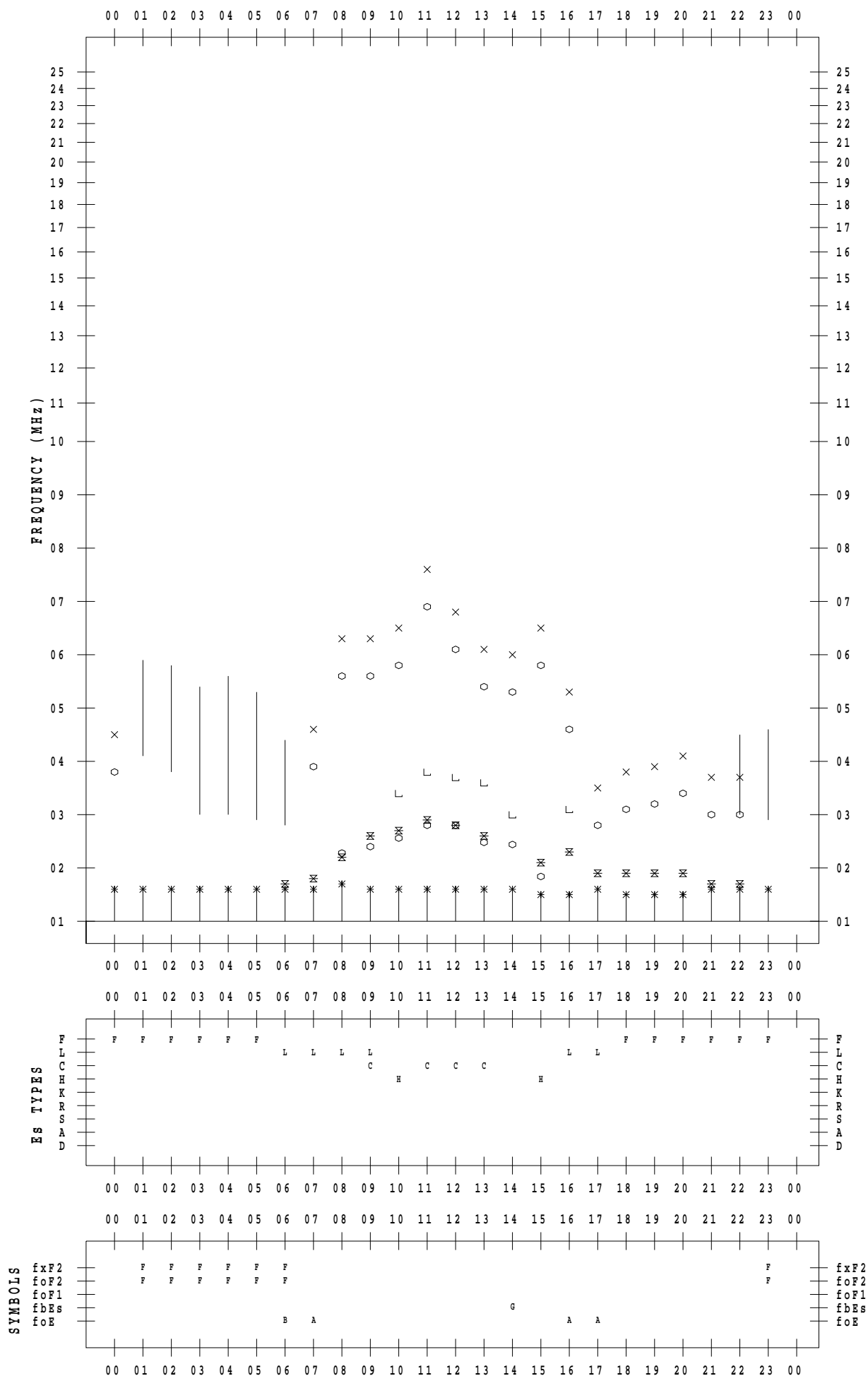
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/17

135 ° E MEAN TIME



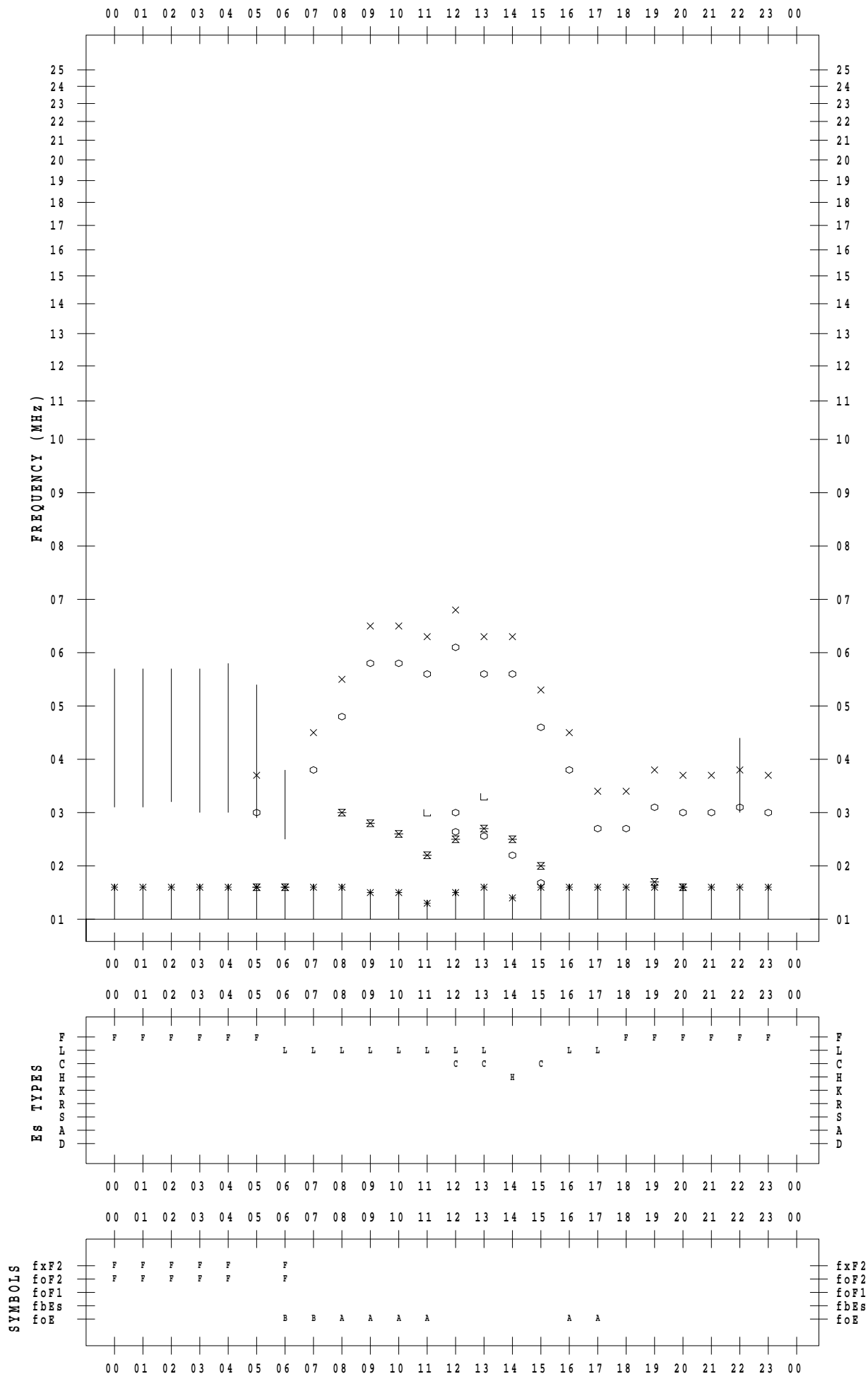
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/18

135 ° E MEAN TIME



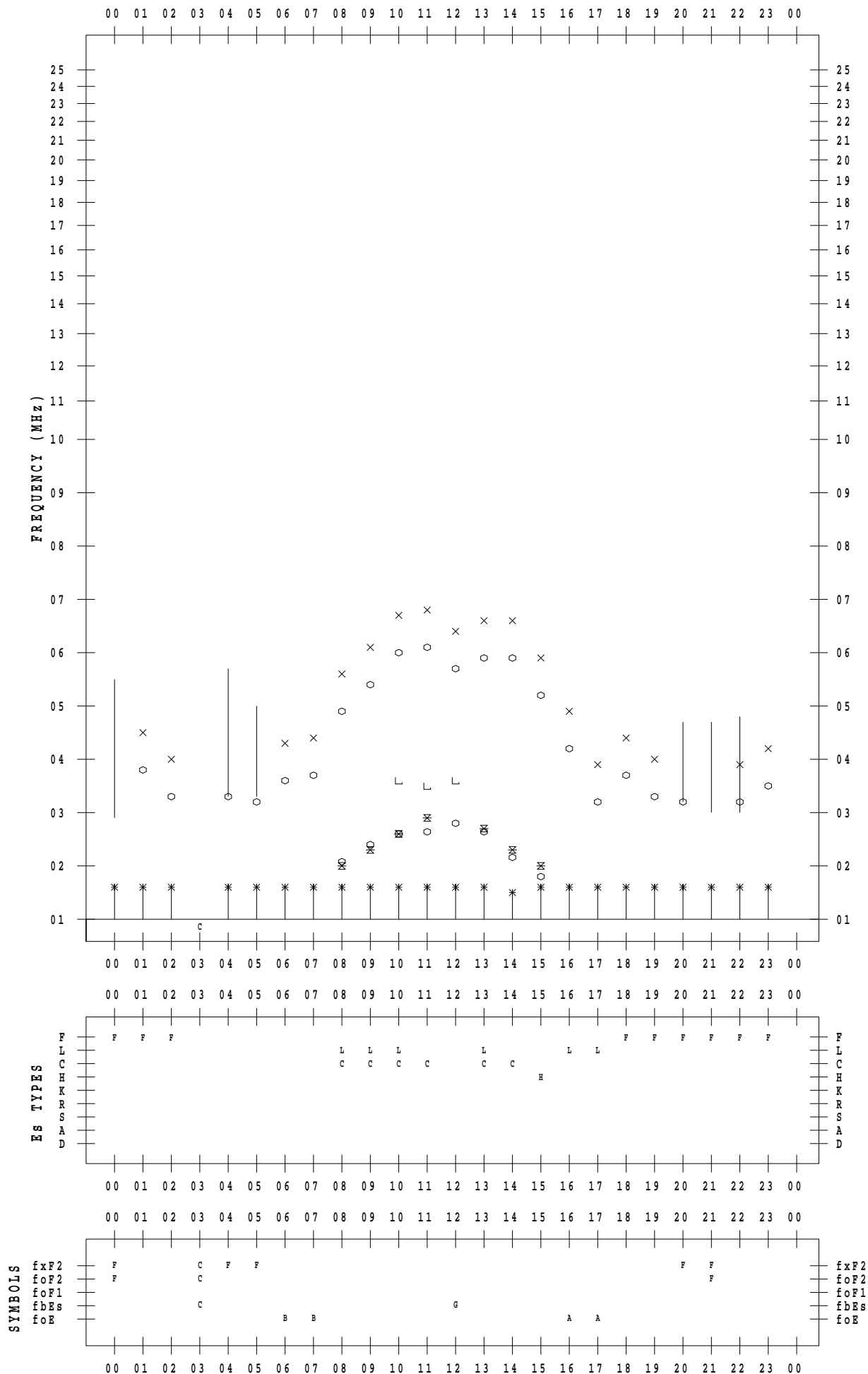
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/19

135 ° E MEAN TIME



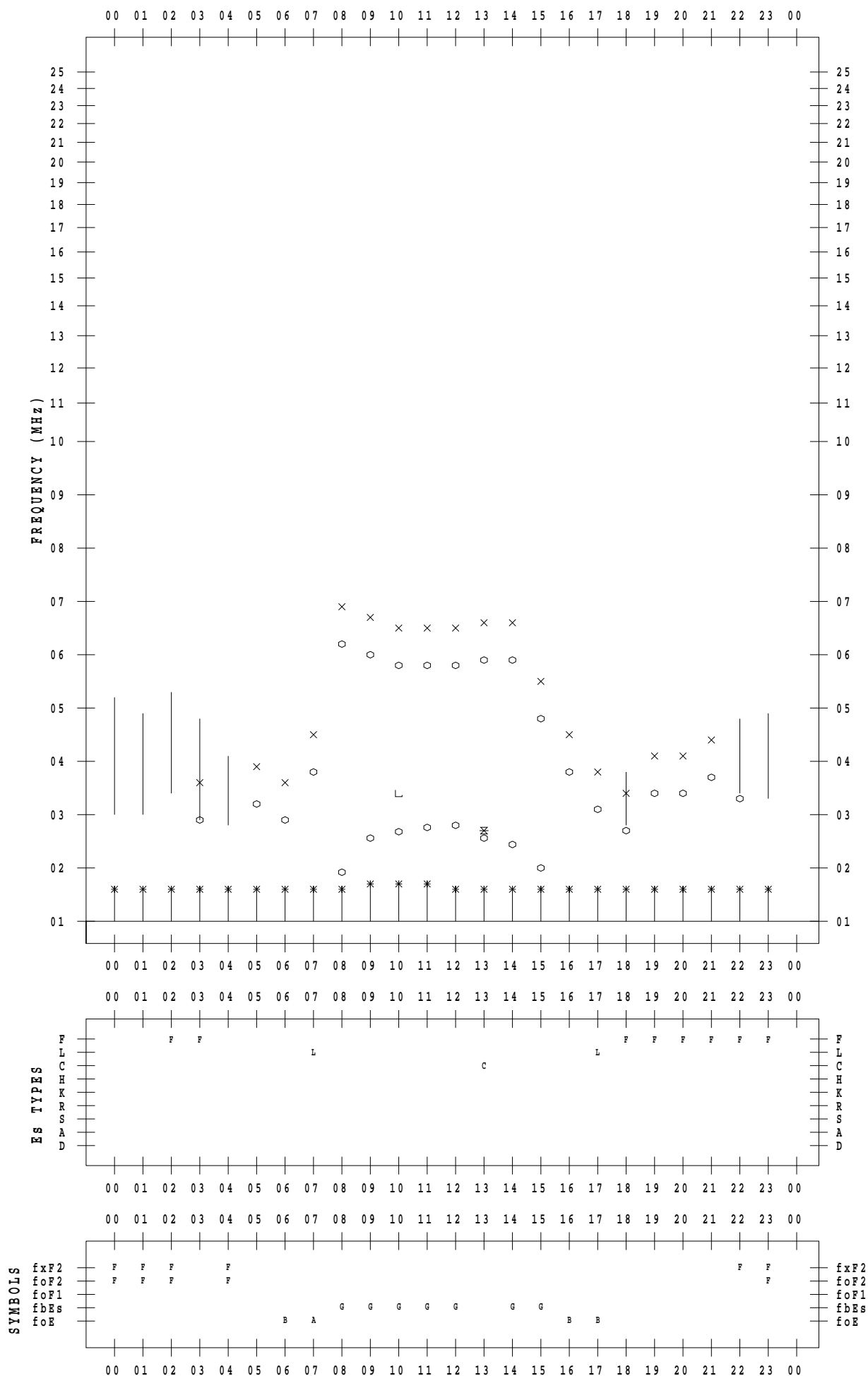
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/20

135 ° E MEAN TIME



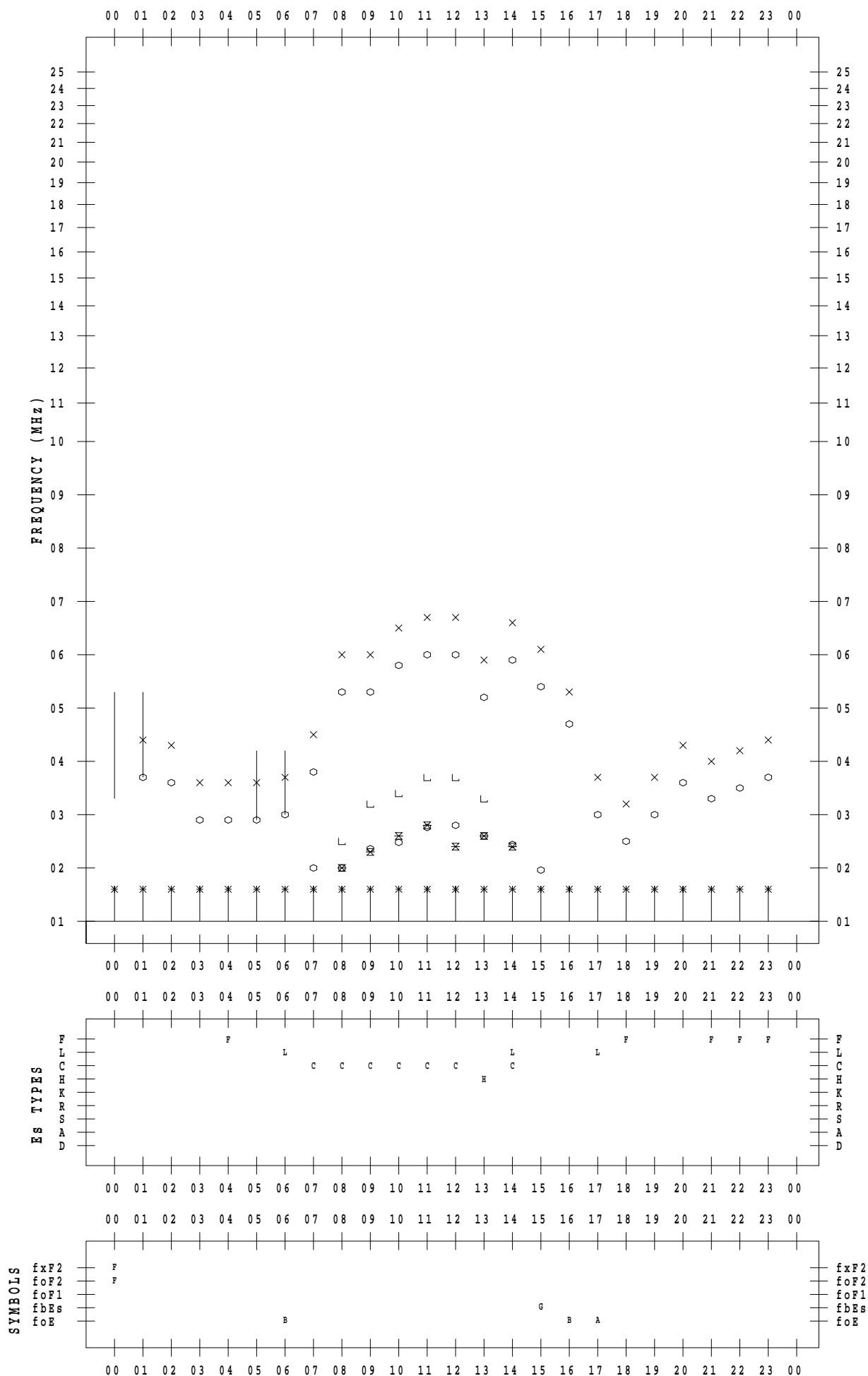
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/21

135 ° E MEAN TIME



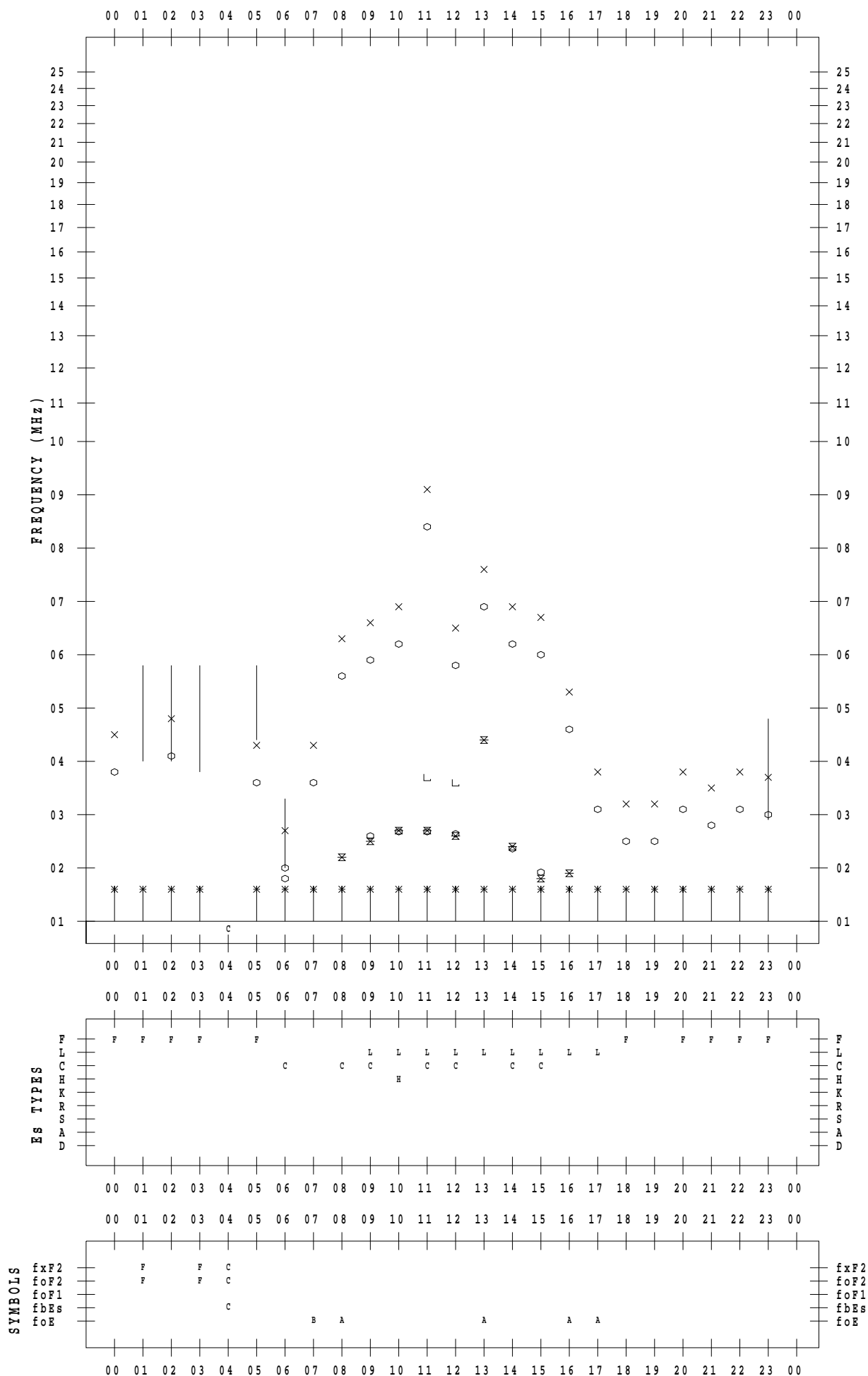
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/22

135 ° E MEAN TIME



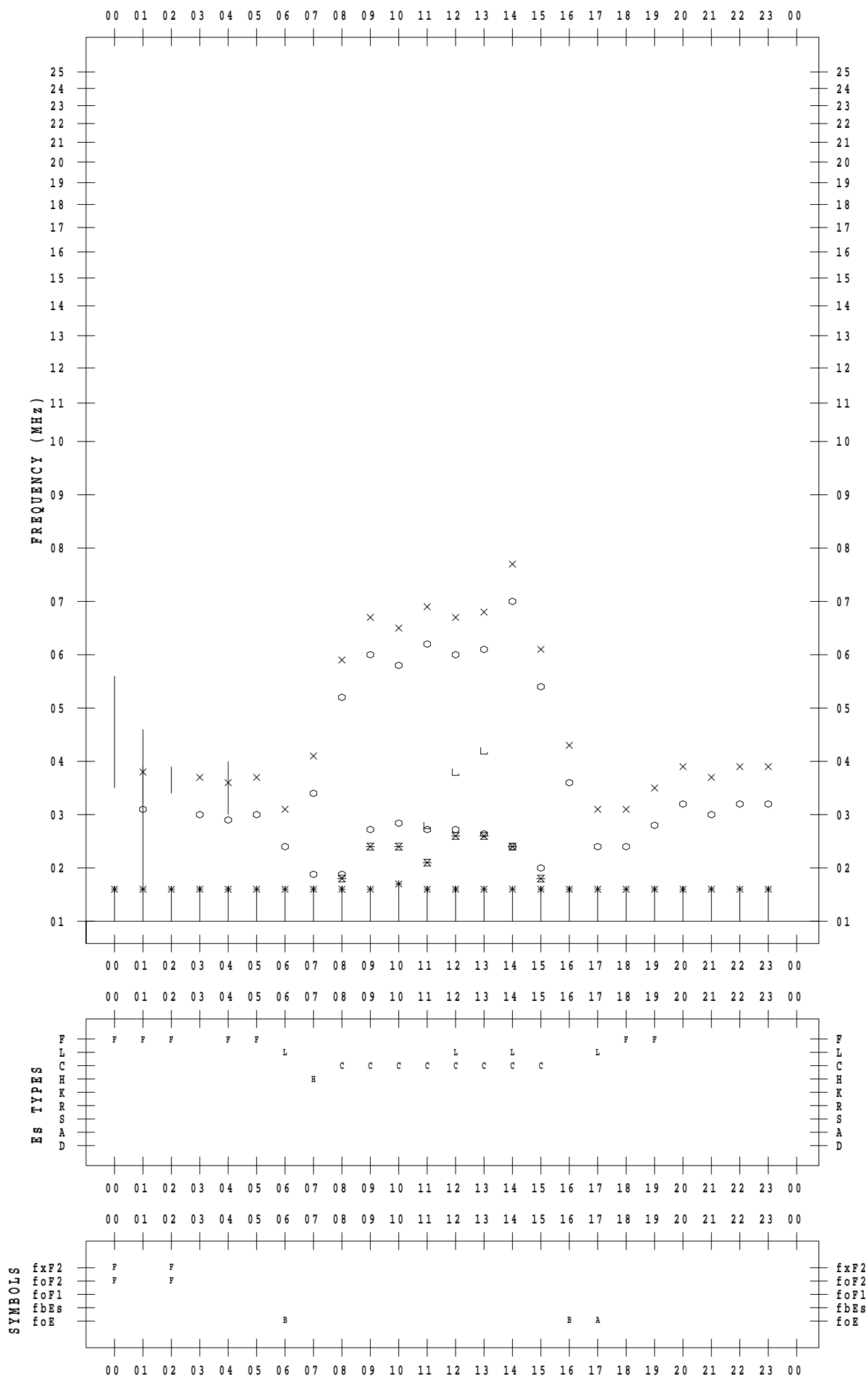
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/23

135 ° E MEAN TIME



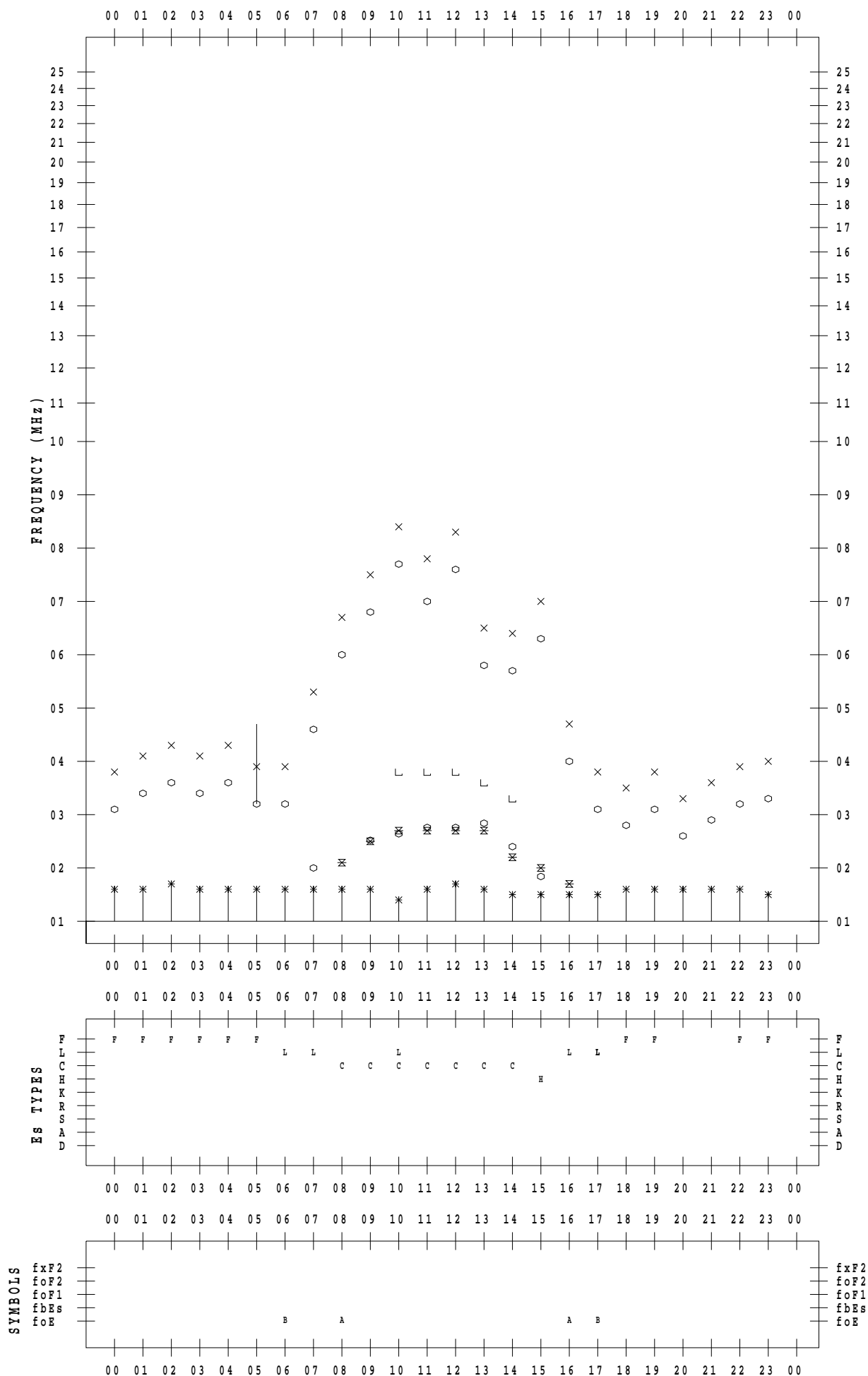
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/24

135 ° E MEAN TIME



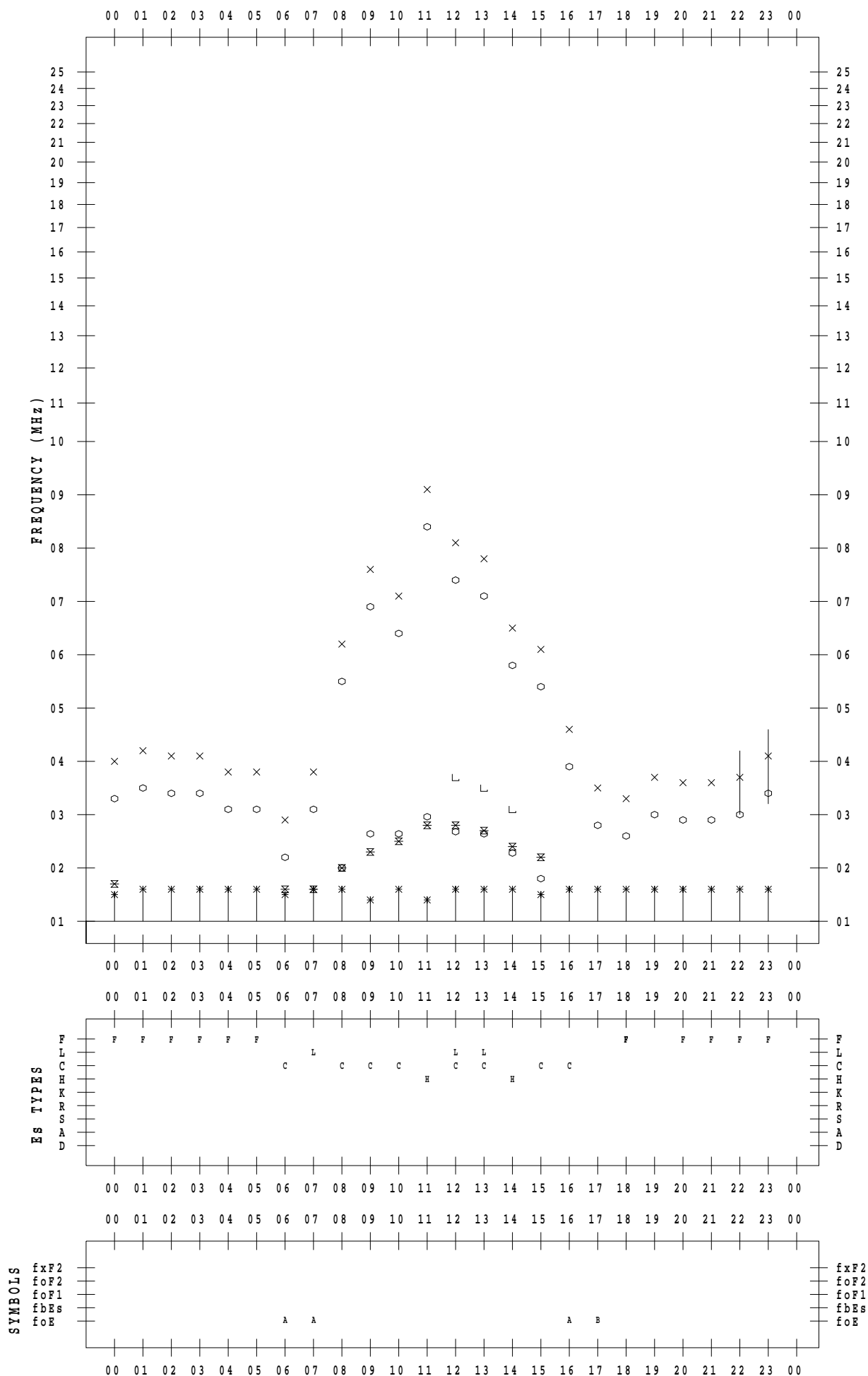
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/25

135 ° E MEAN TIME



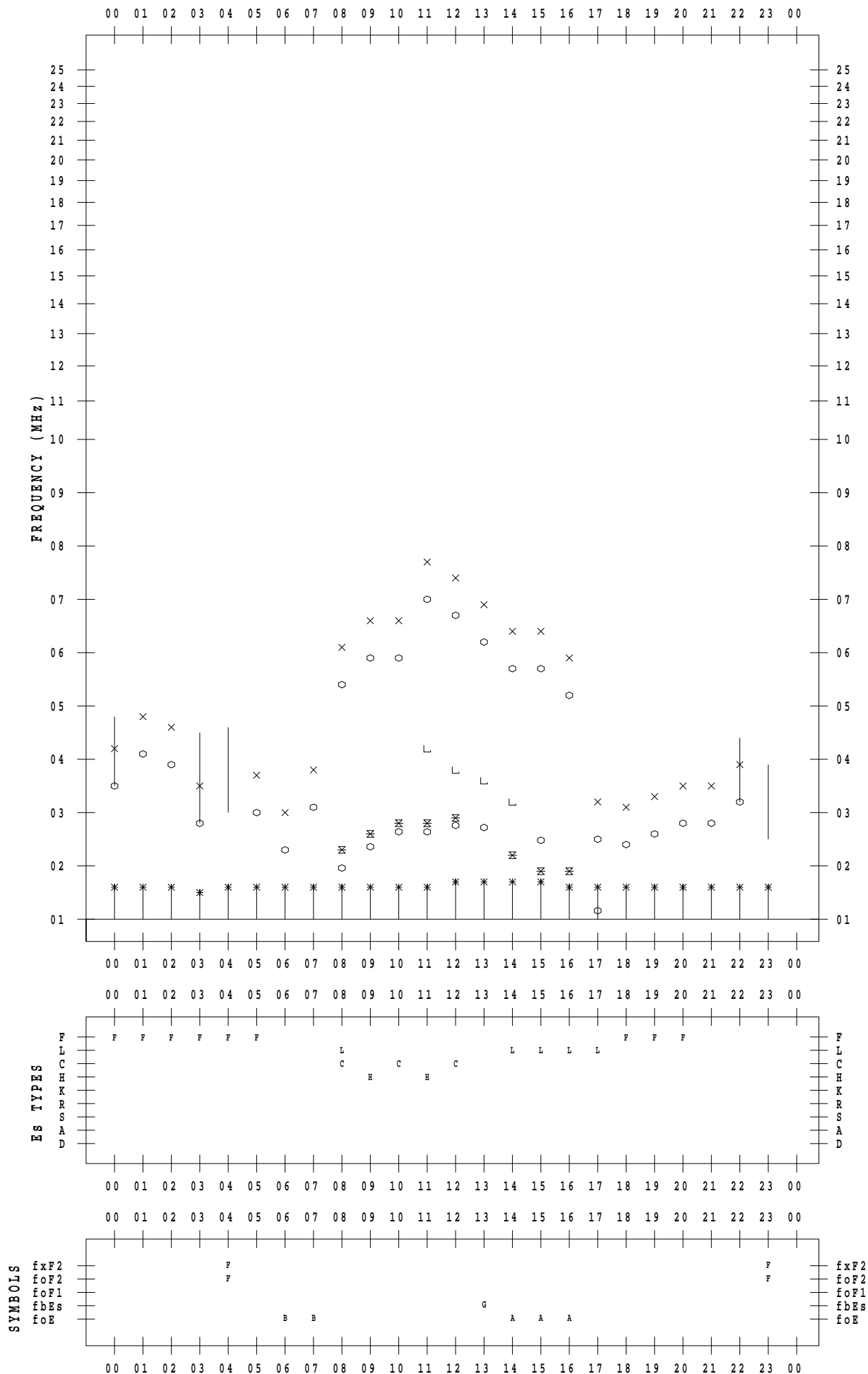
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/26

135 ° E MEAN TIME



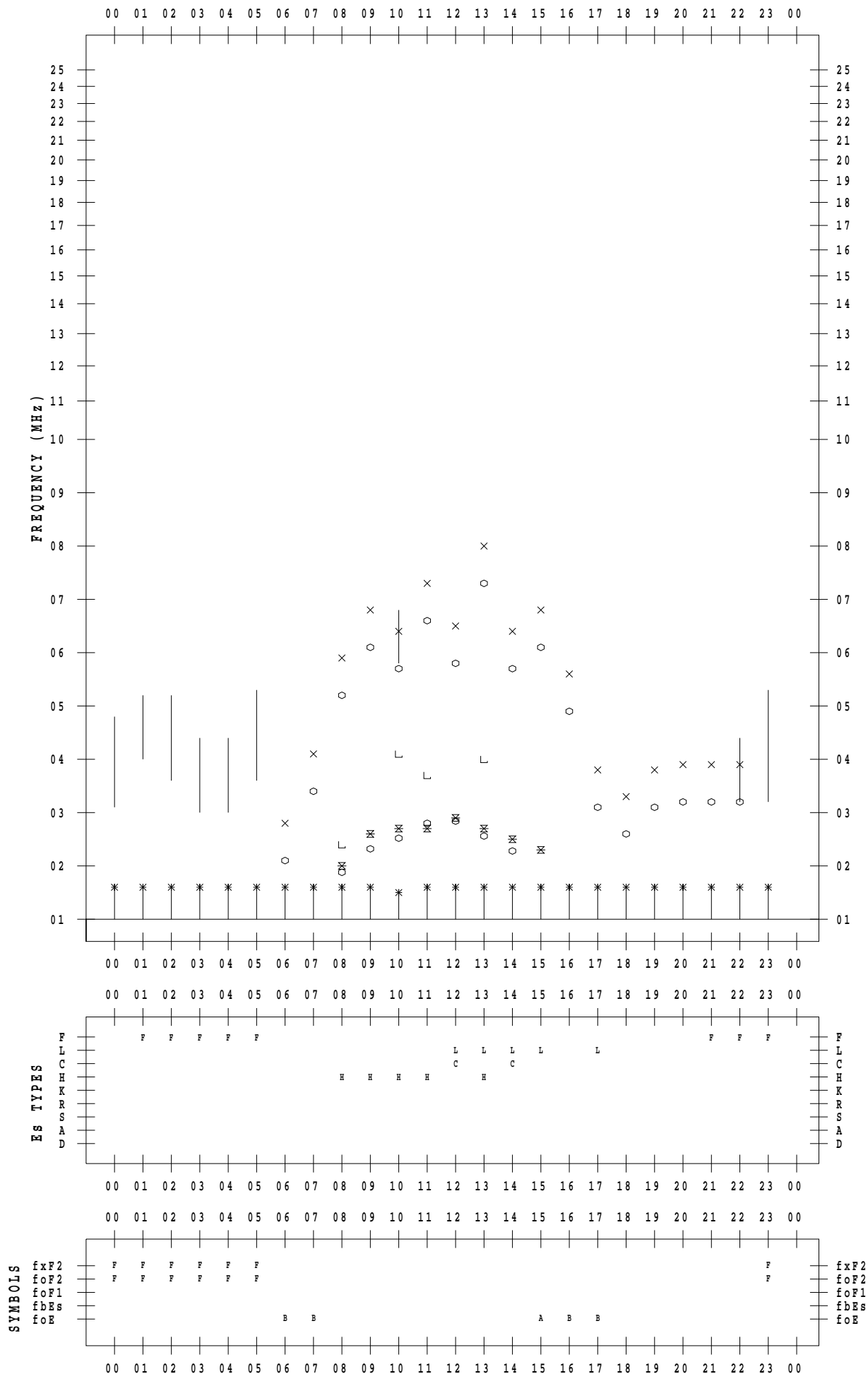
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/27

135 ° E MEAN TIME



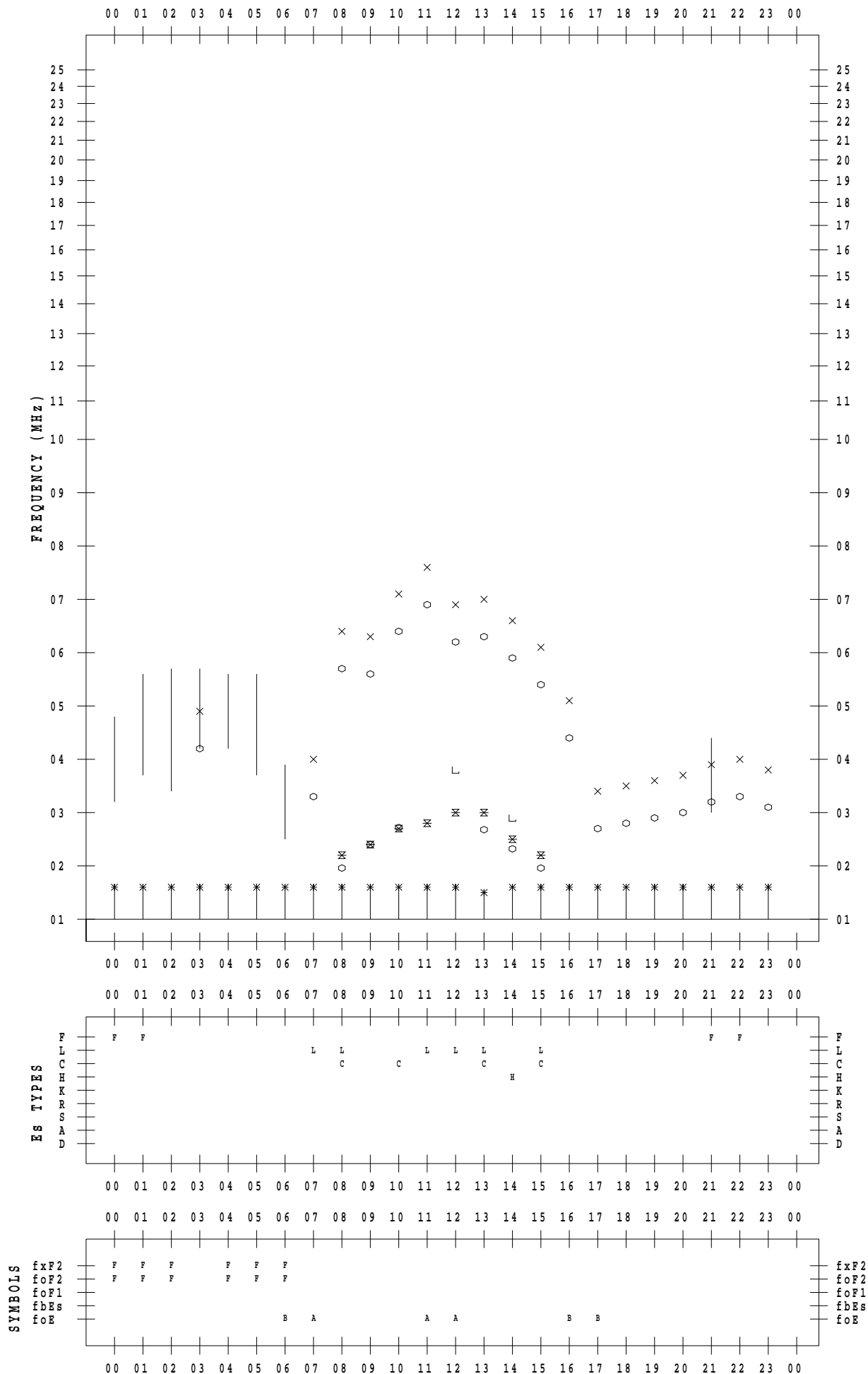
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/28

135 ° E MEAN TIME



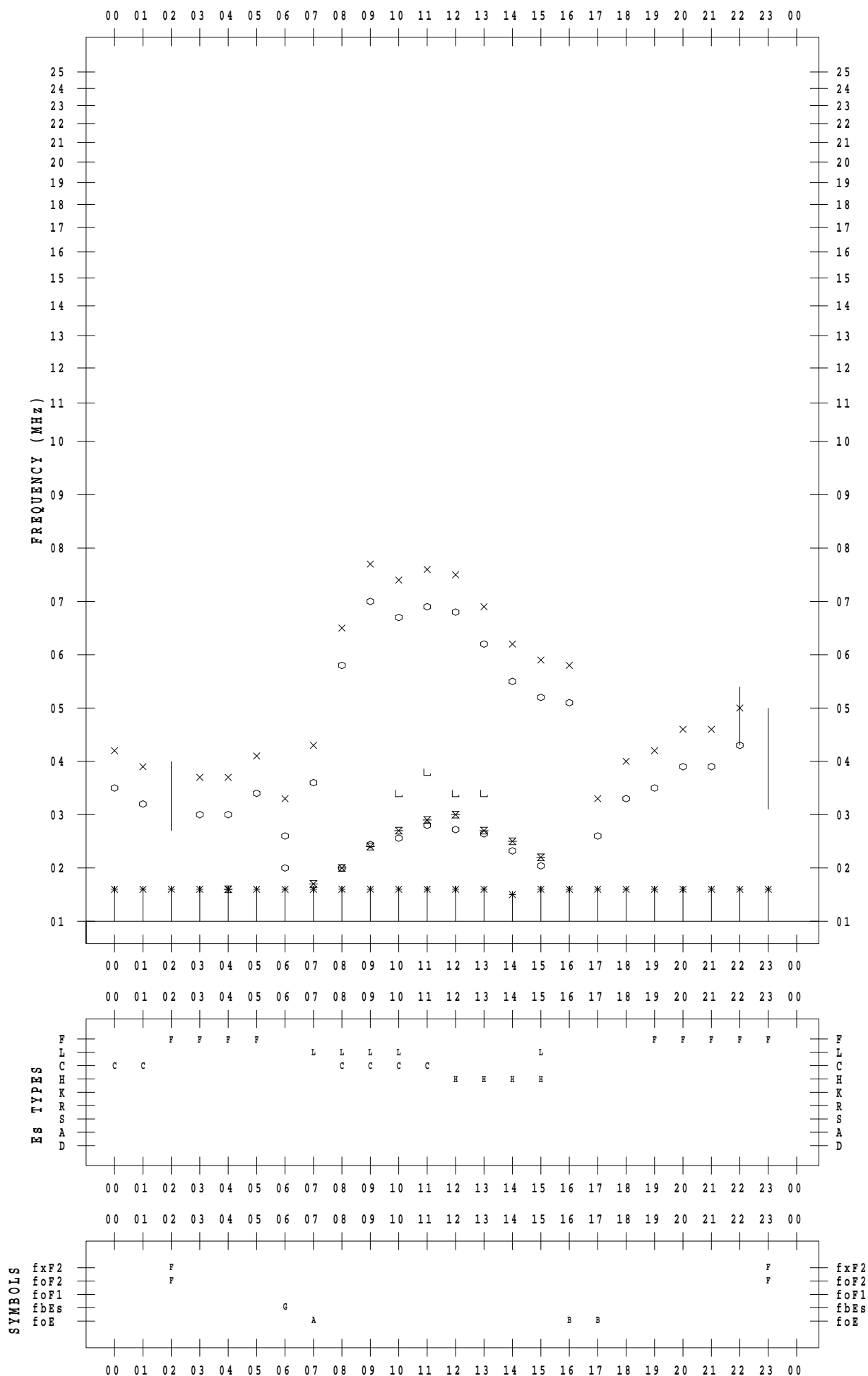
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/29

135 ° E MEAN TIME



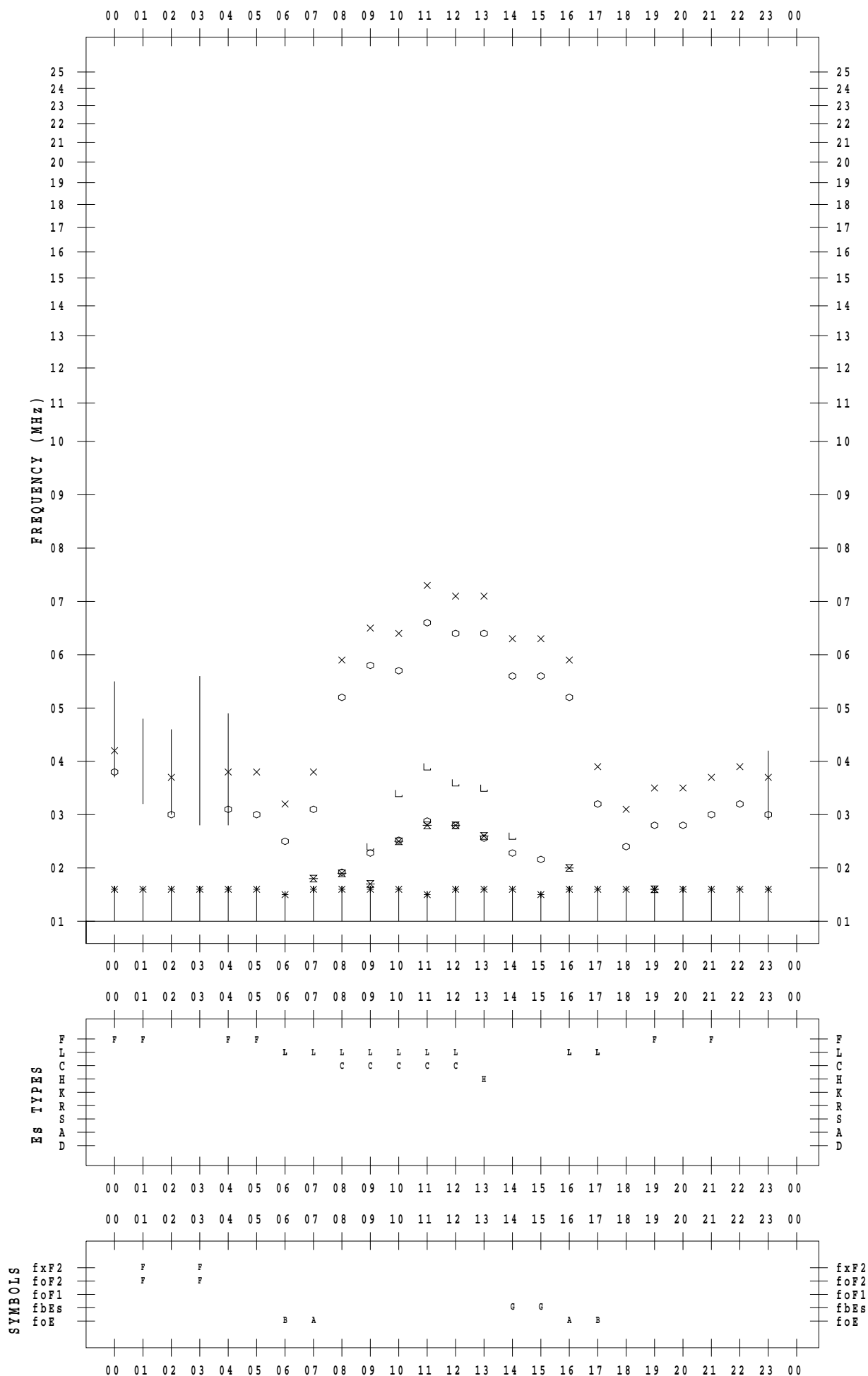
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/30

135 ° E MEAN TIME



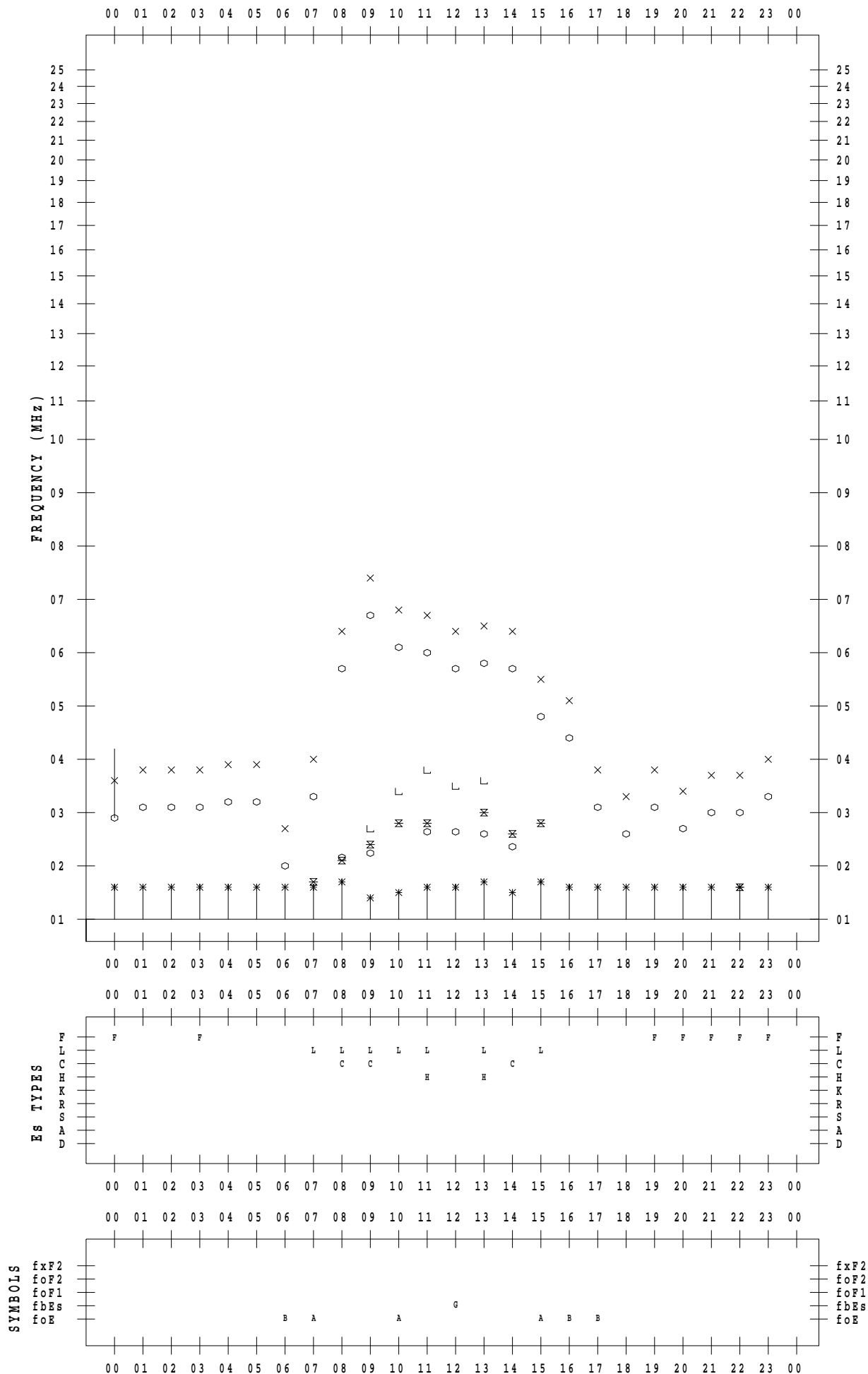
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2020/12/31

135 ° E MEAN TIME



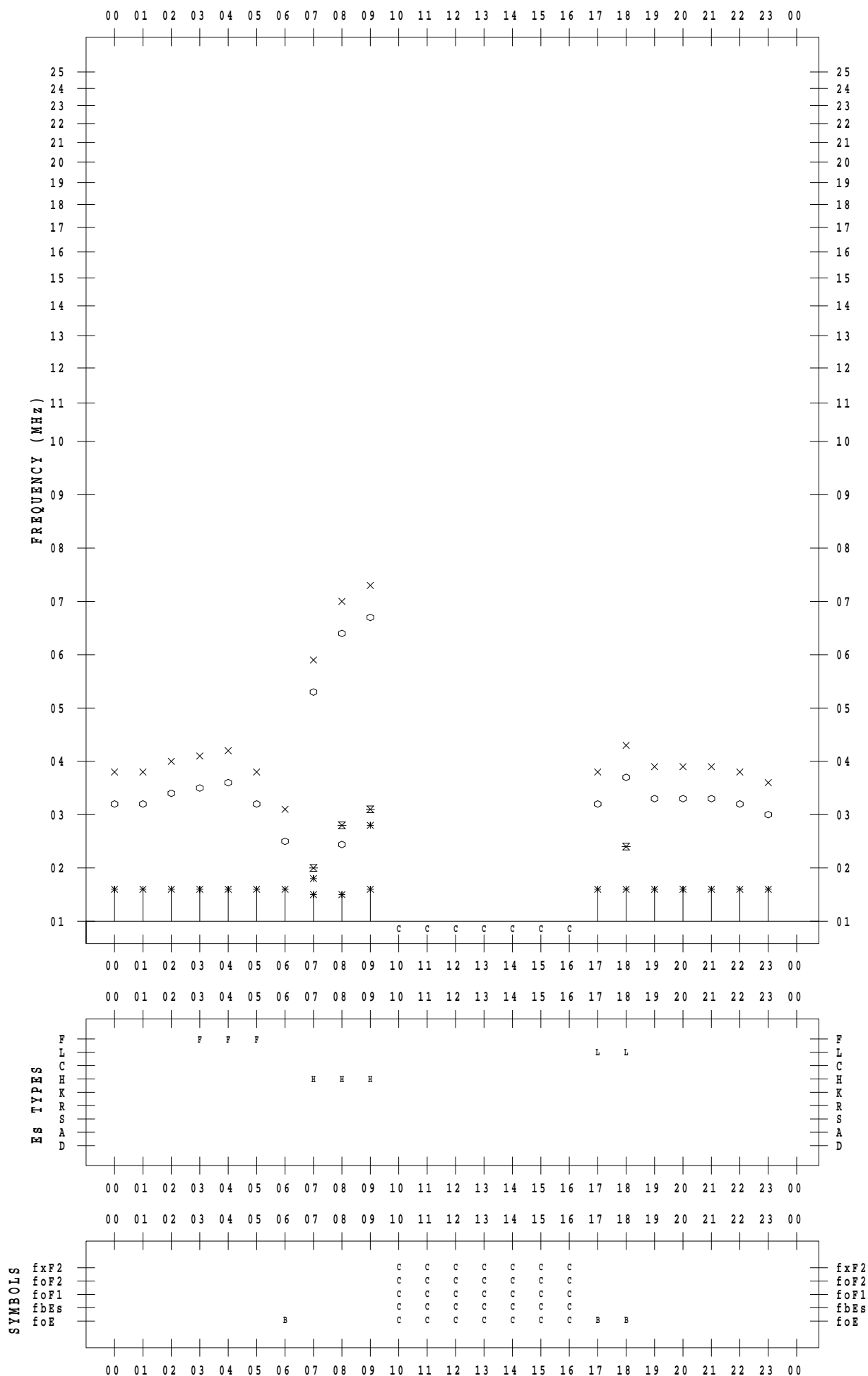
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/ 1

135 ° E MEAN TIME



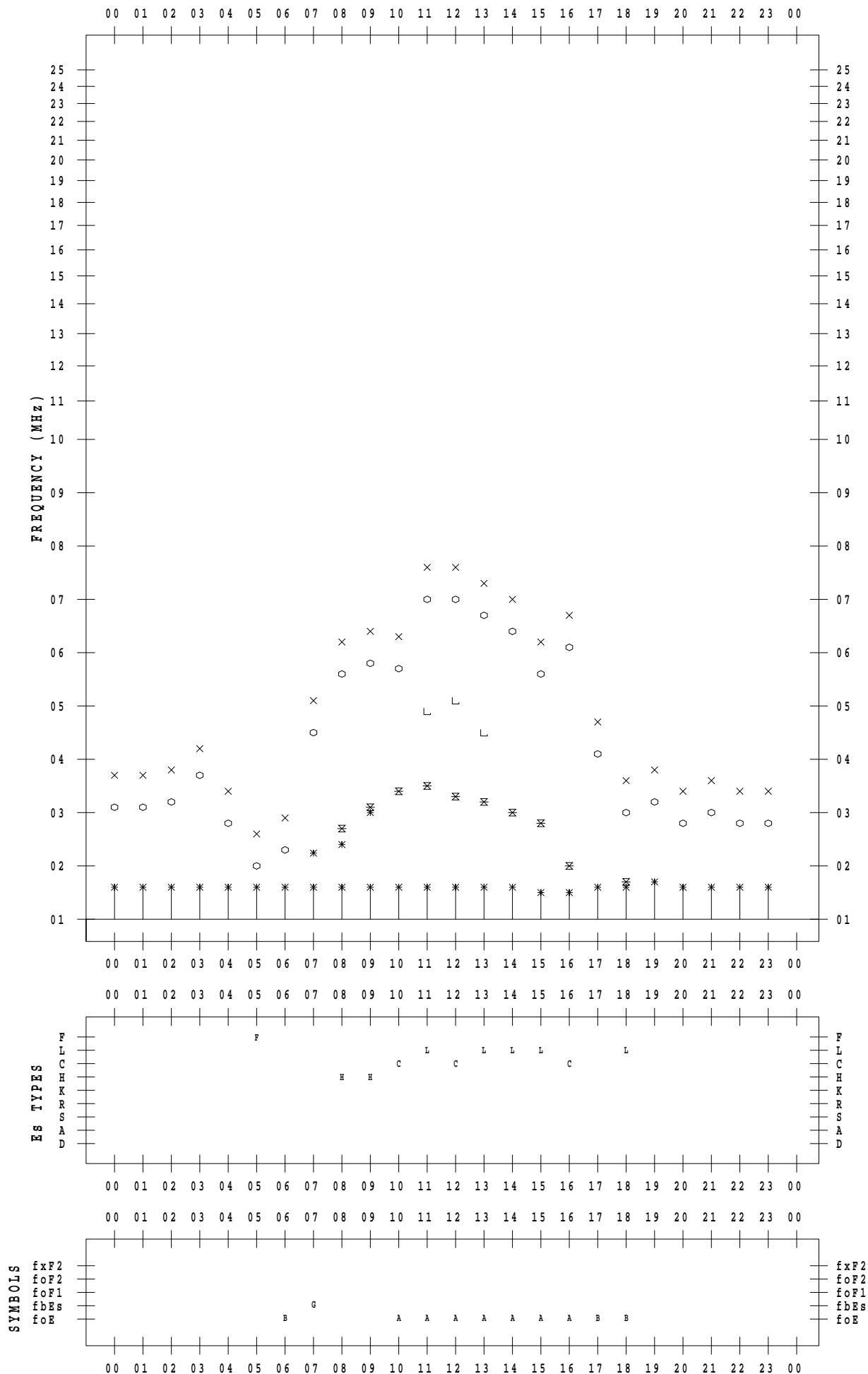
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/ 2

135 ° E MEAN TIME



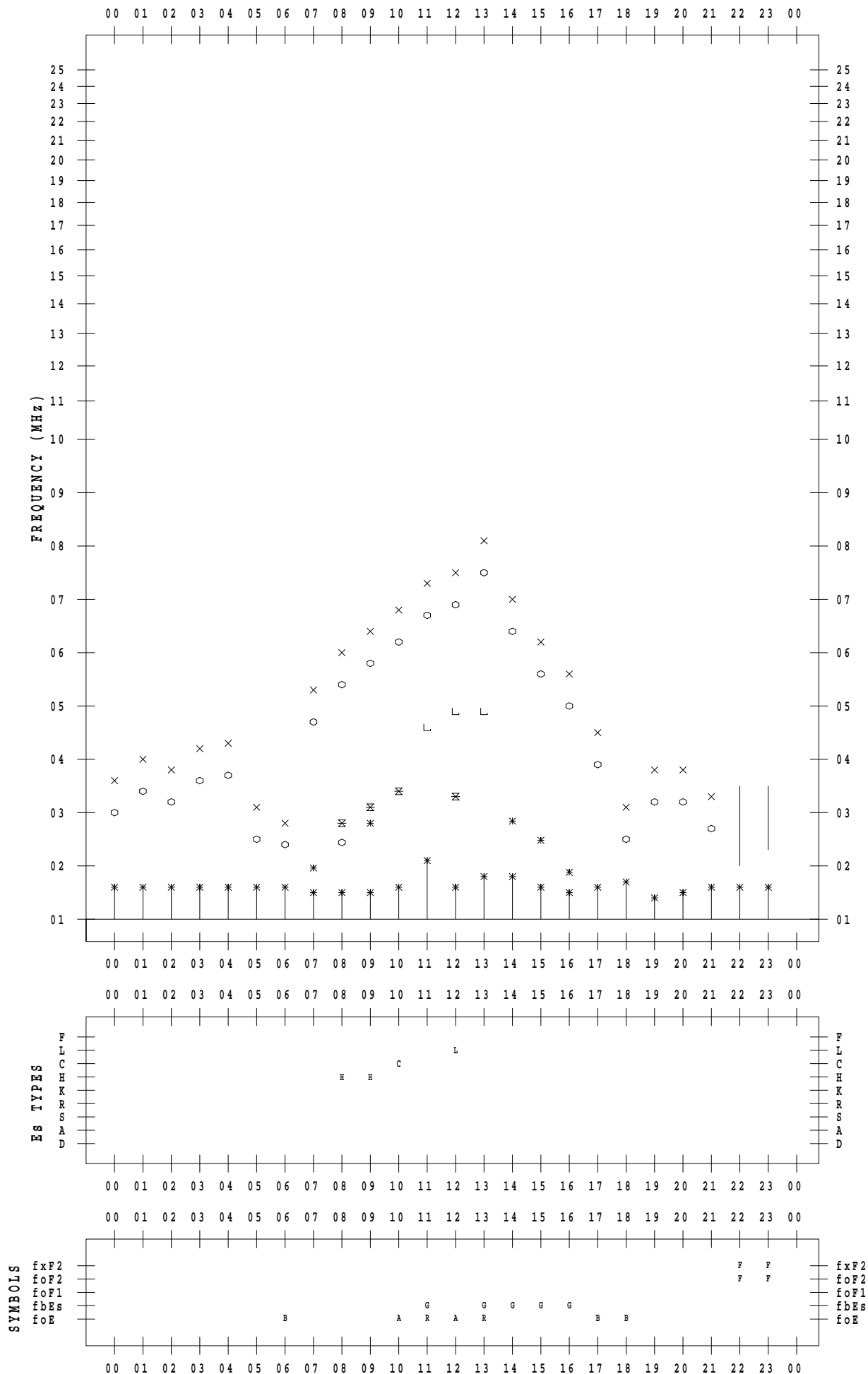
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/ 3

135 ° E MEAN TIME



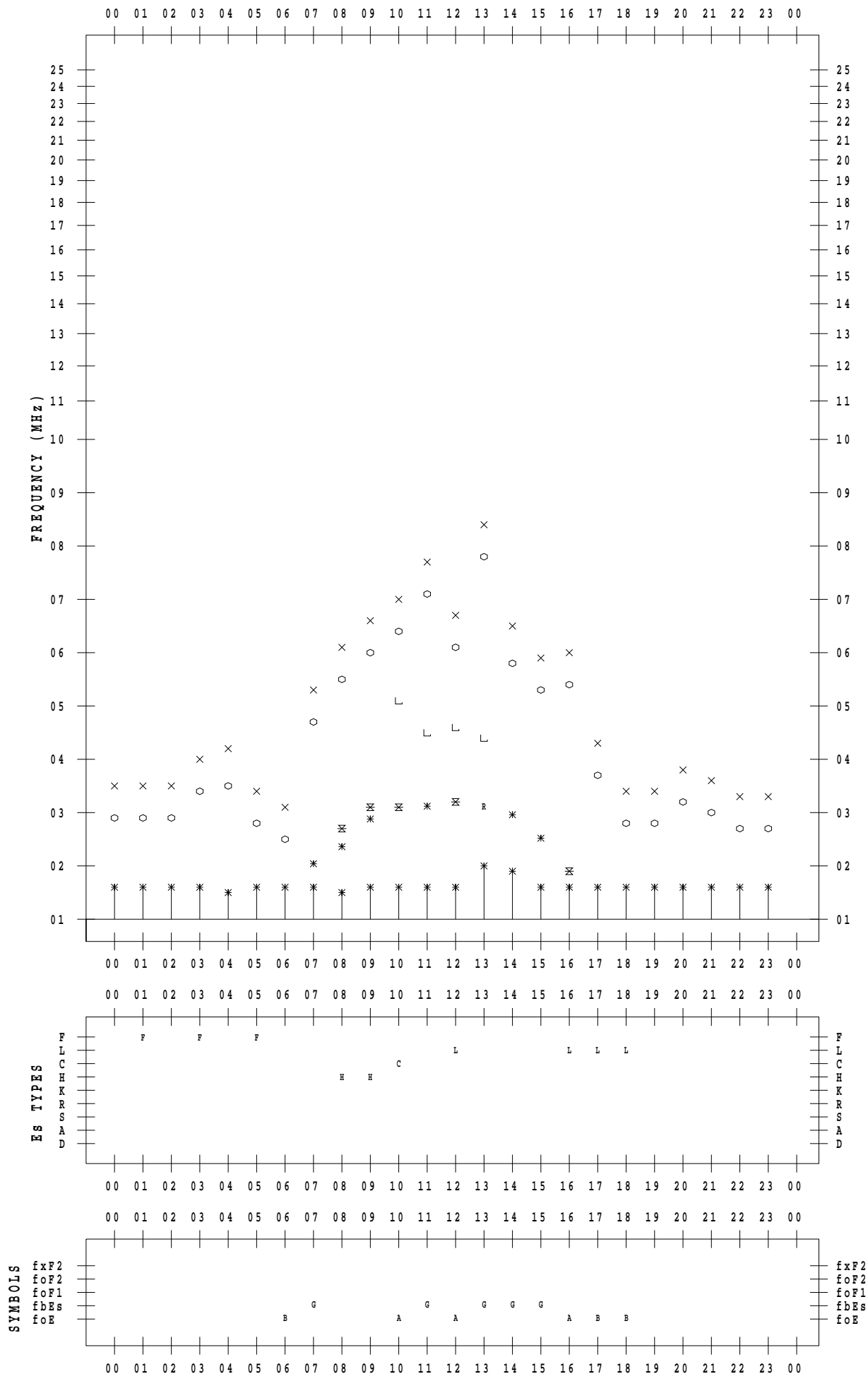
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/ 4

135 ° E MEAN TIME



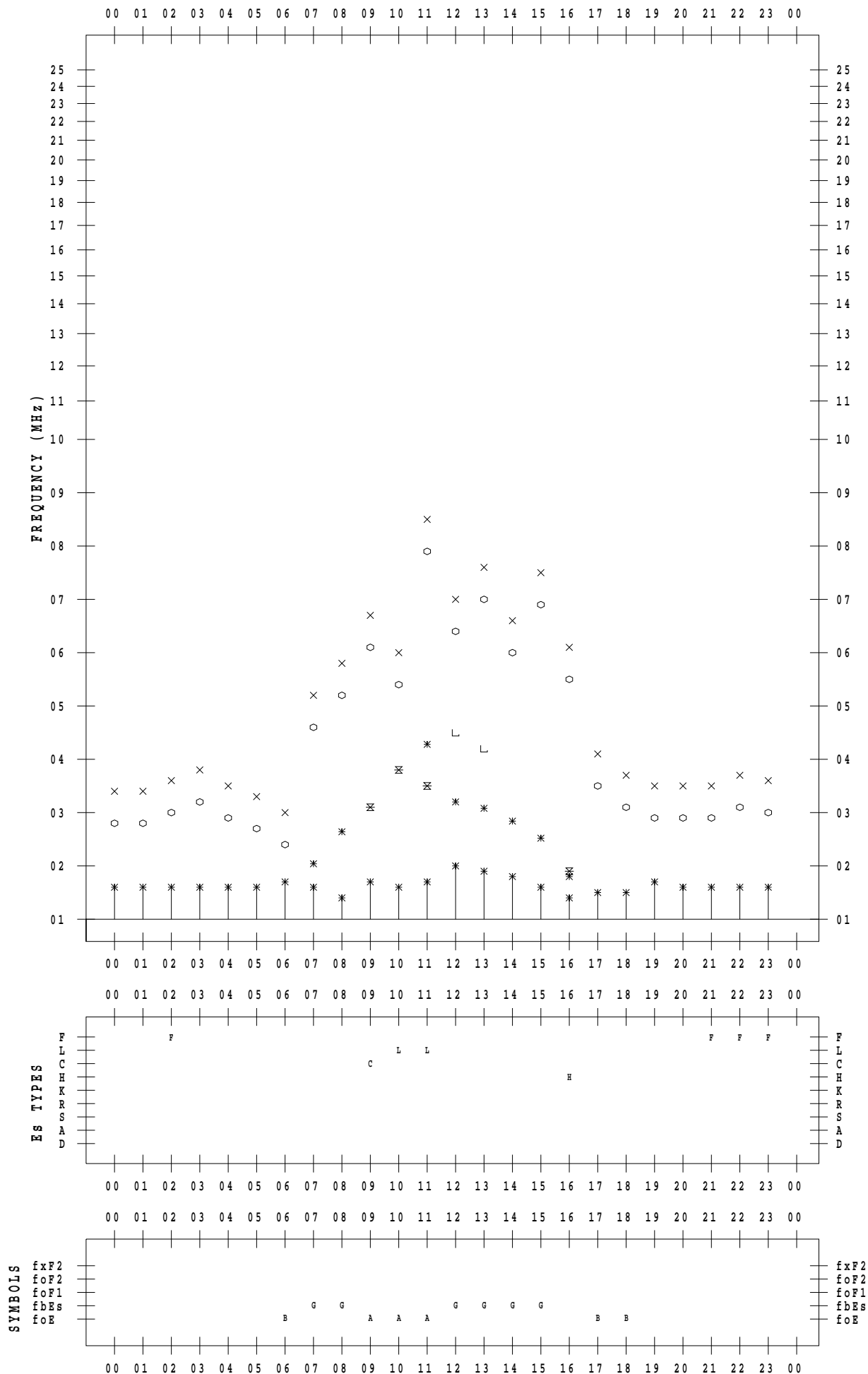
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/ 5

135 ° E MEAN TIME



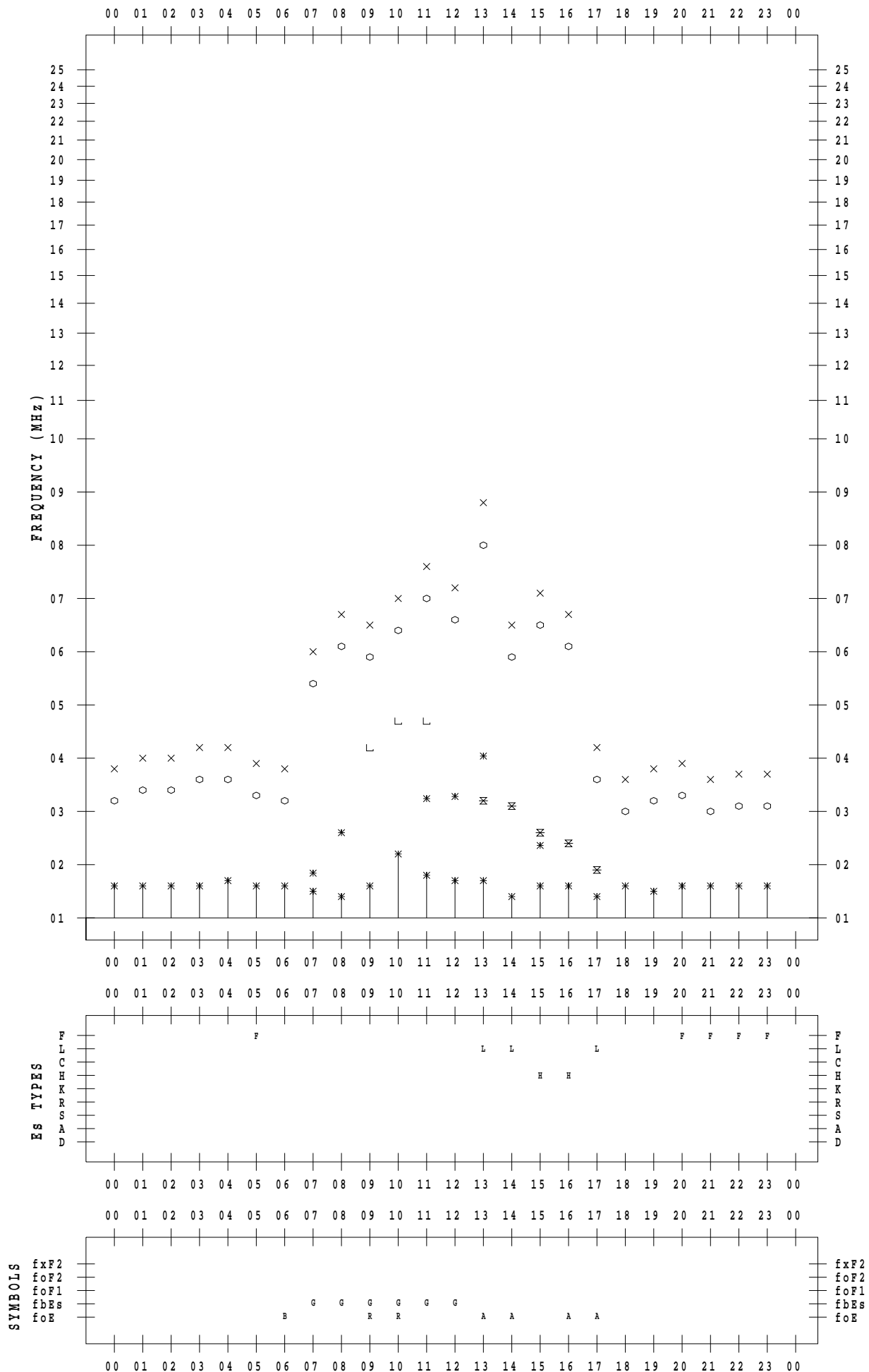
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/ 6

135 ° E MEAN TIME



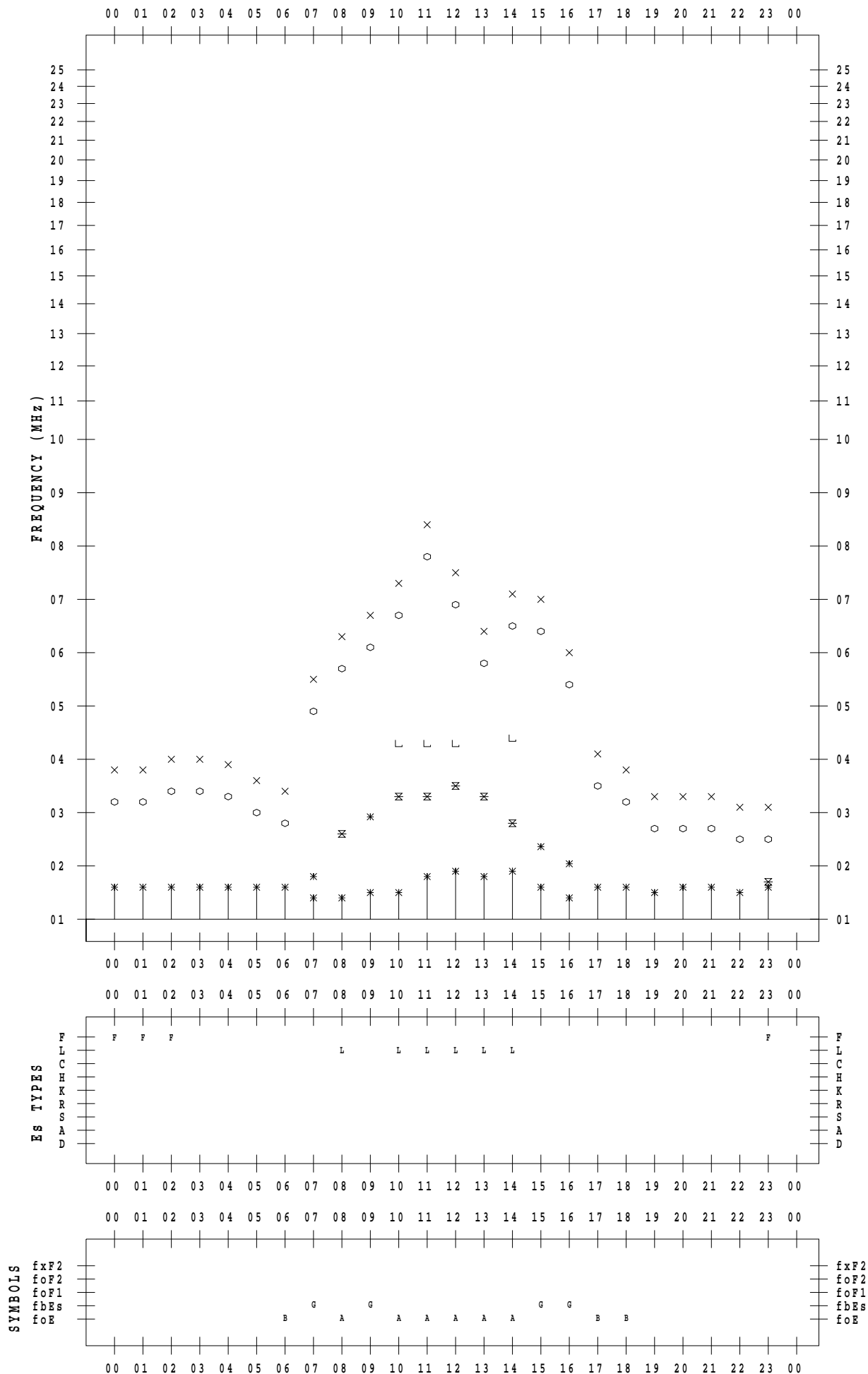
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/7

135 ° E MEAN TIME



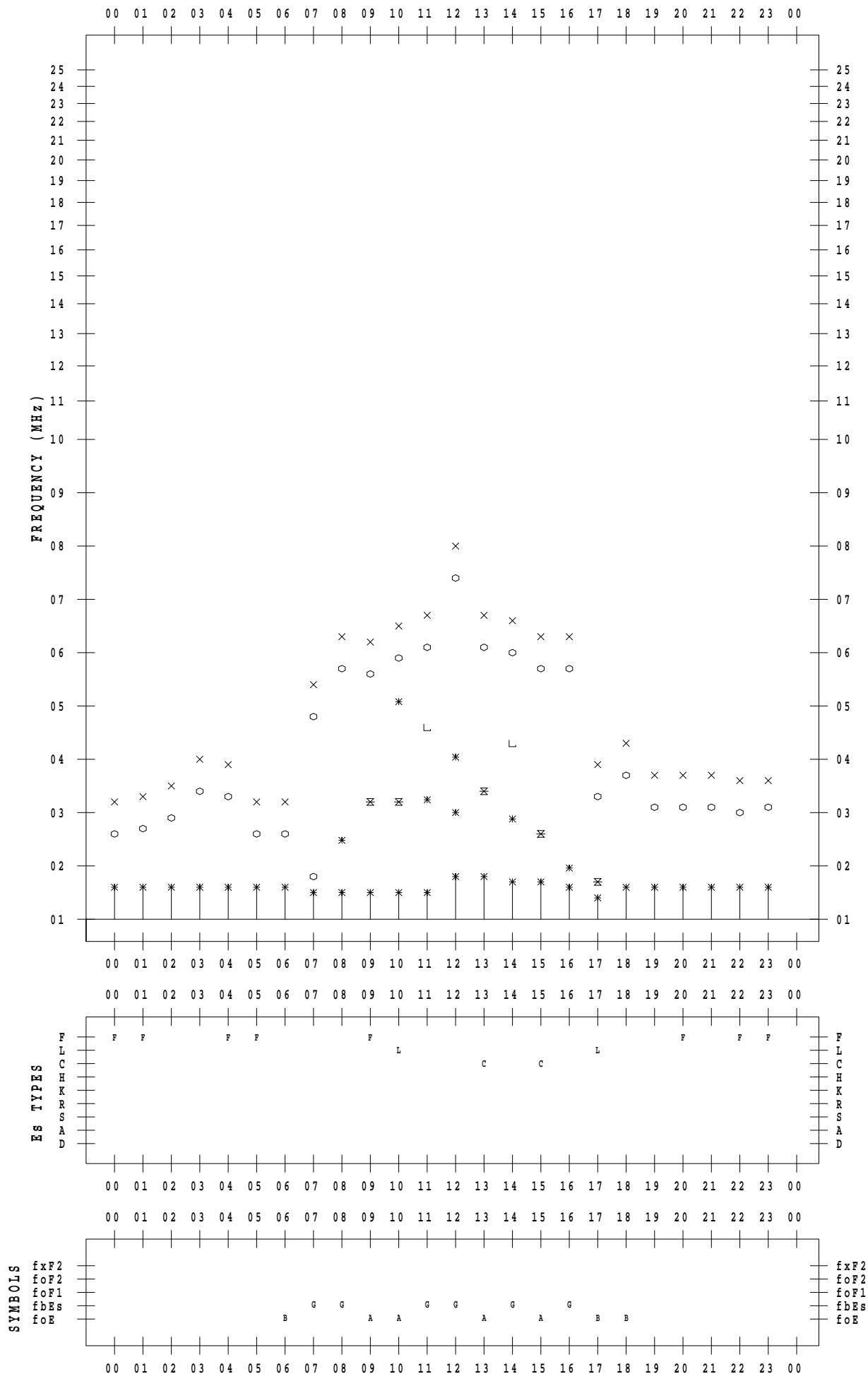
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/ 8

135 ° E MEAN TIME



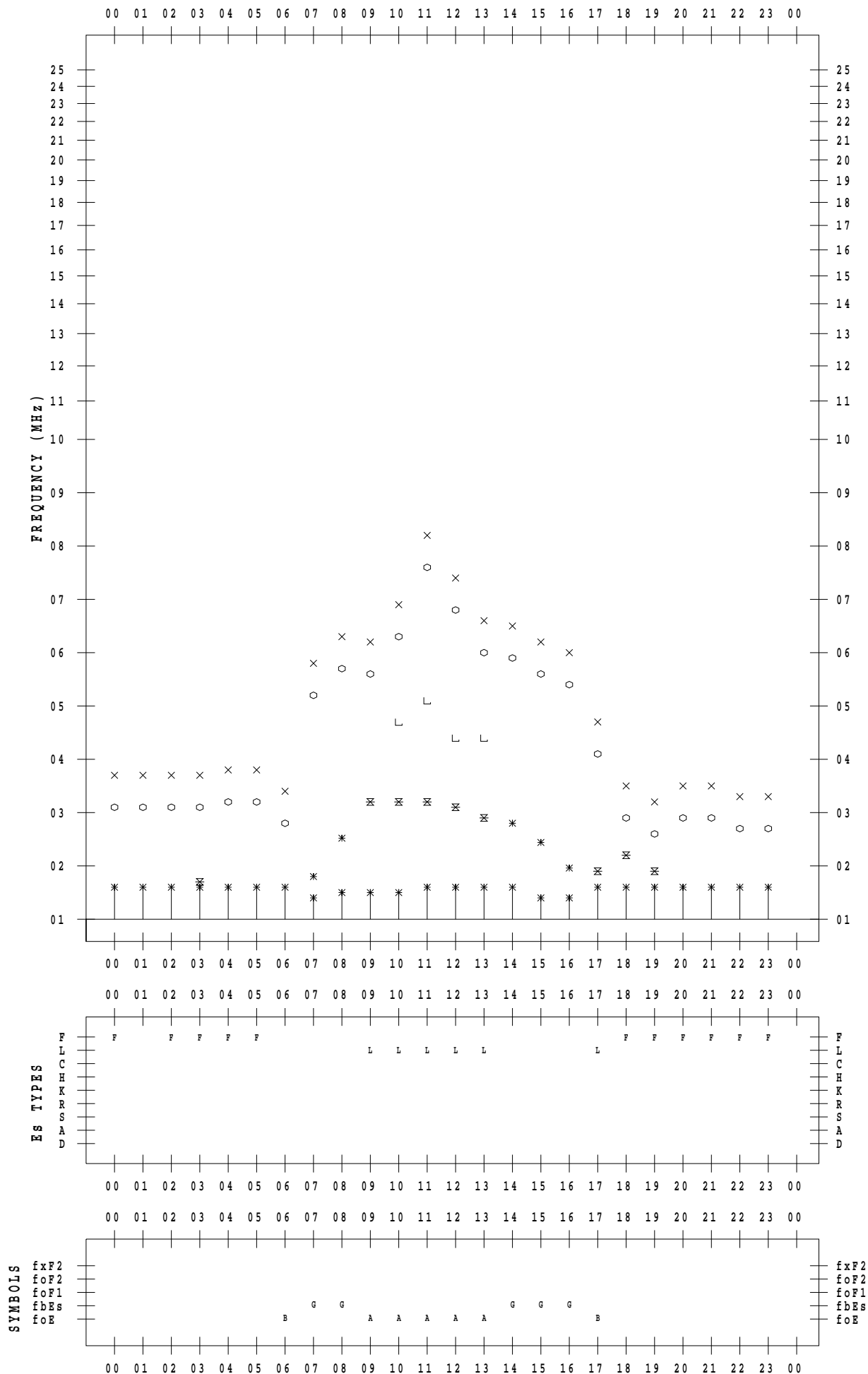
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/ 9

135 ° E MEAN TIME



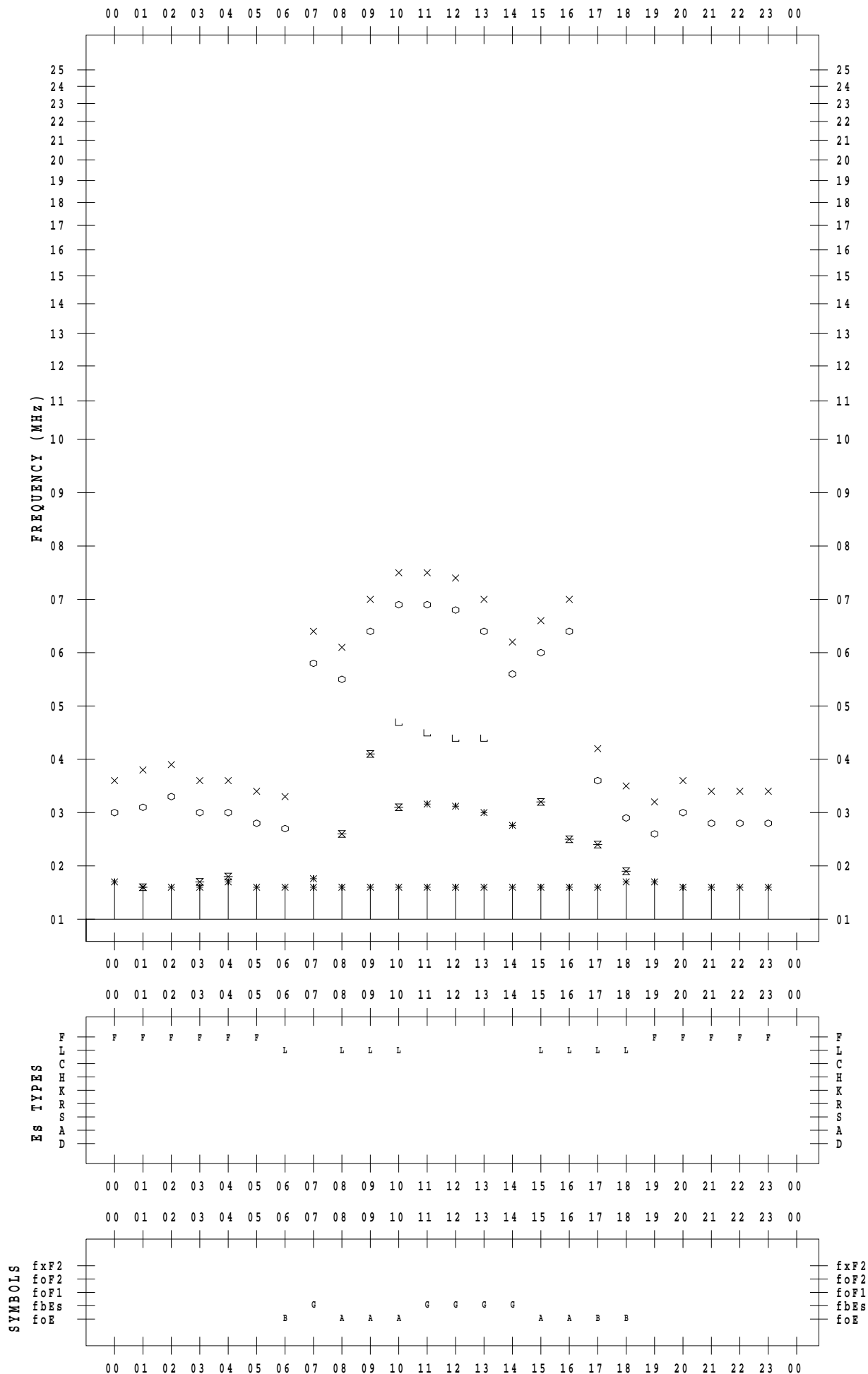
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/10

135 ° E MEAN TIME



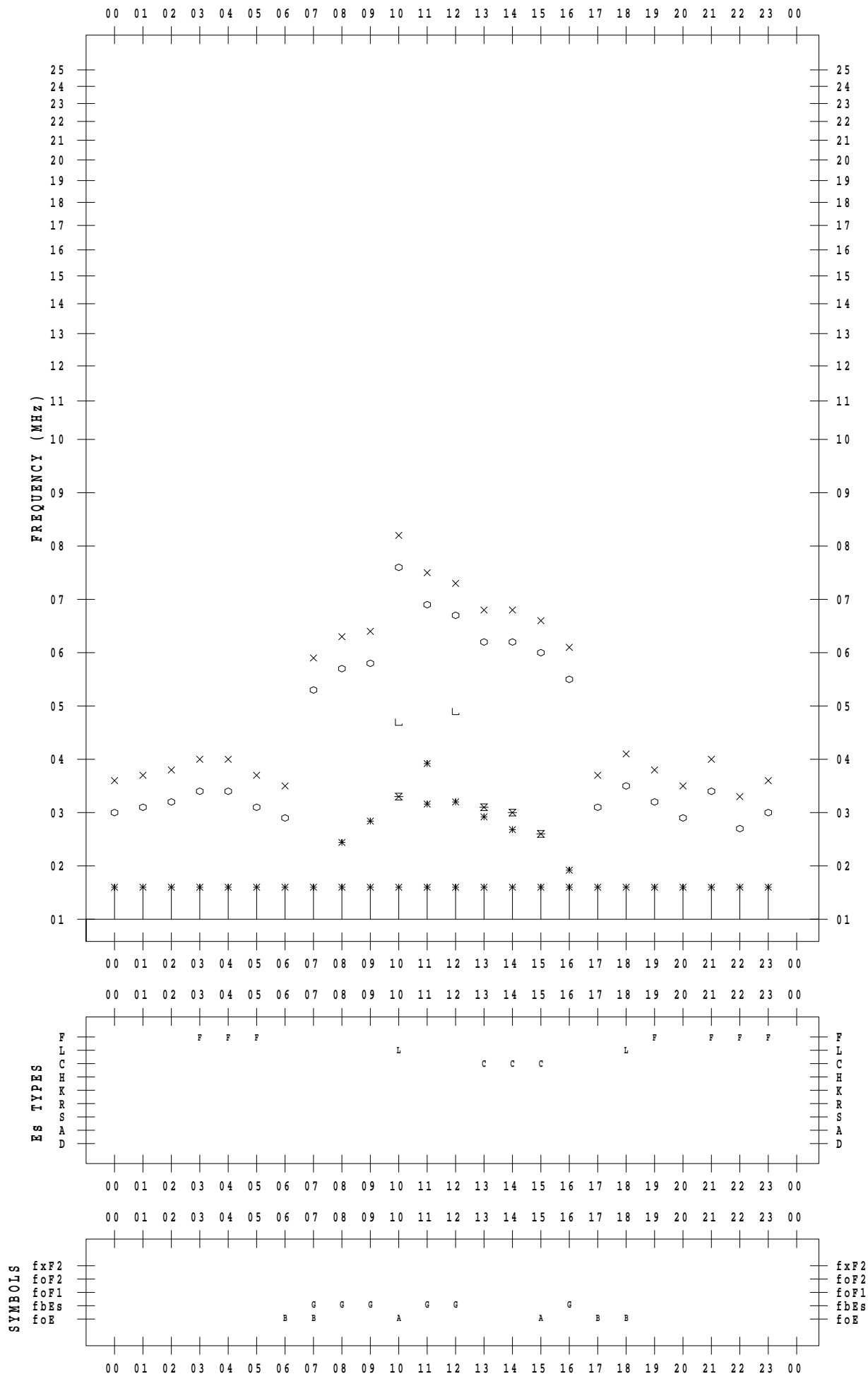
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/11

135 ° E MEAN TIME



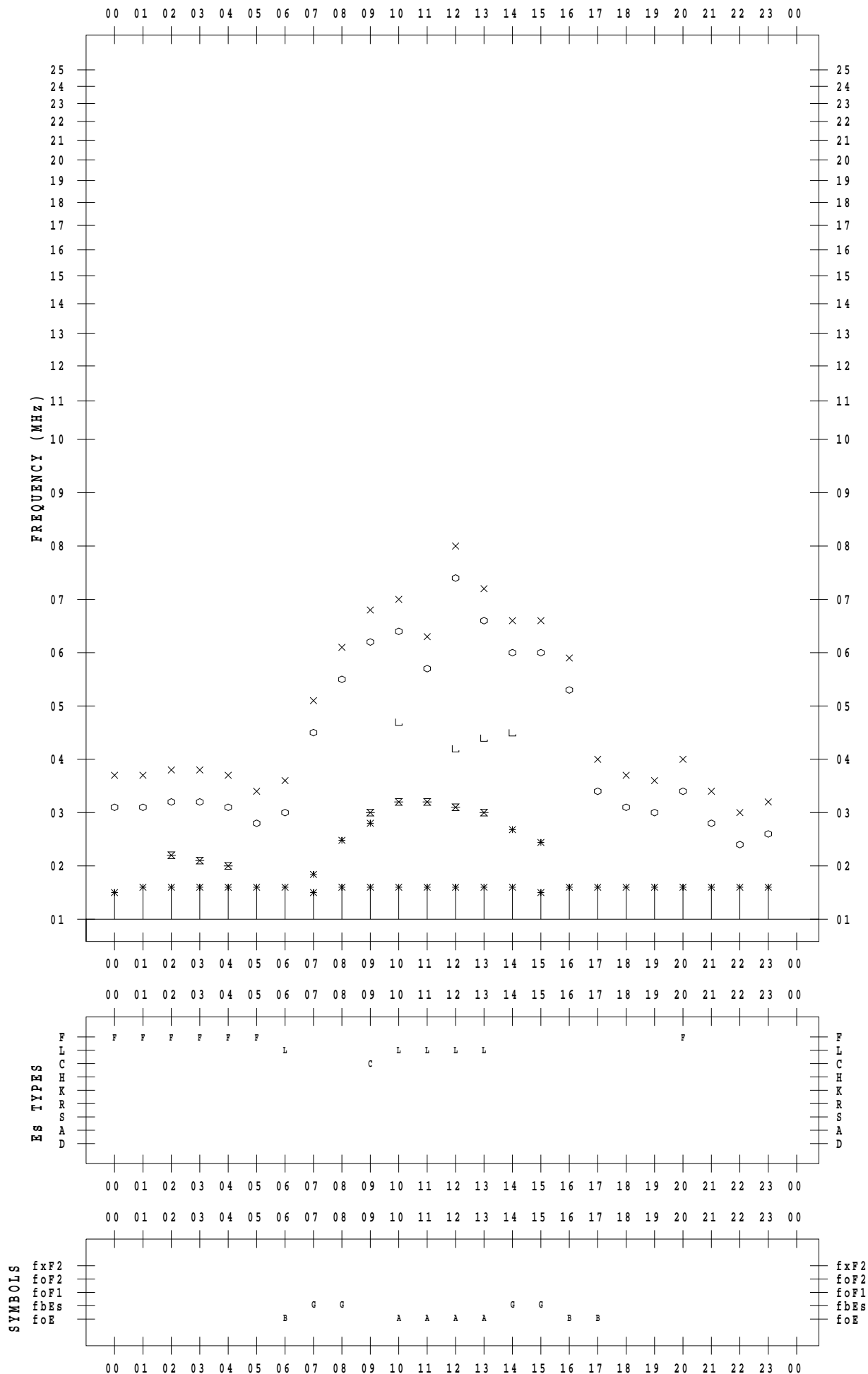
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/12

135 ° E MEAN TIME



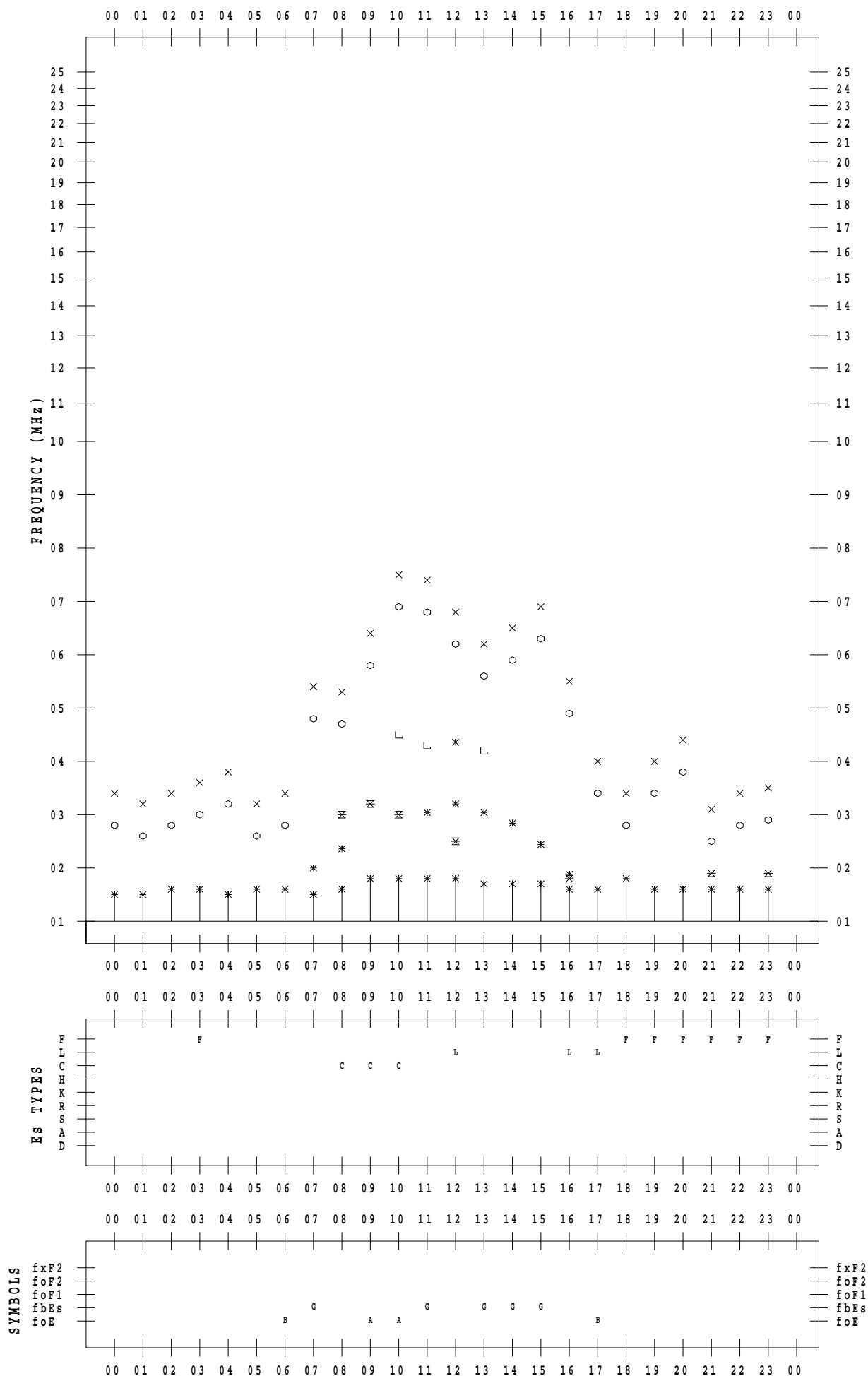
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/13

135 ° E MEAN TIME



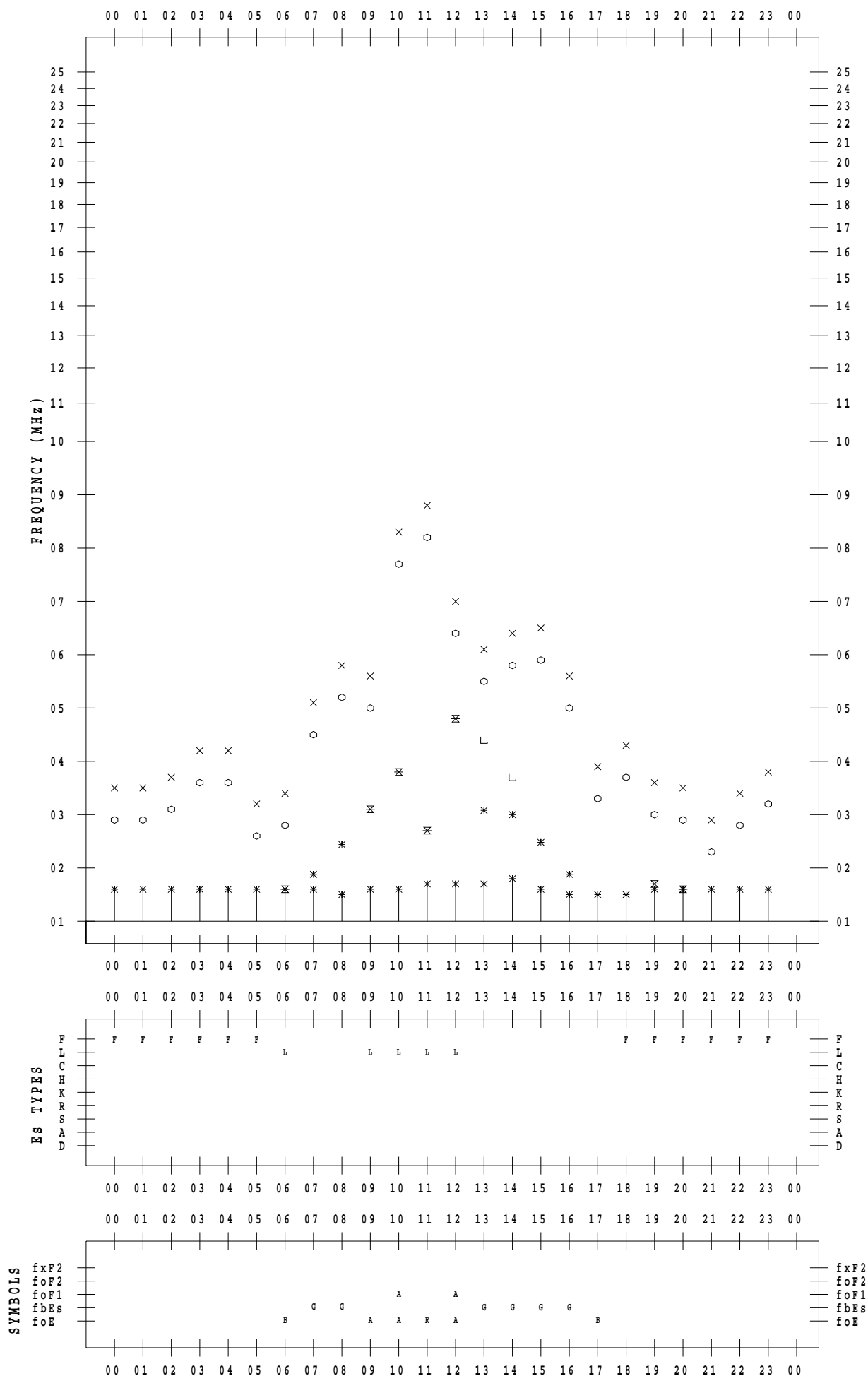
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/14

135 ° E MEAN TIME



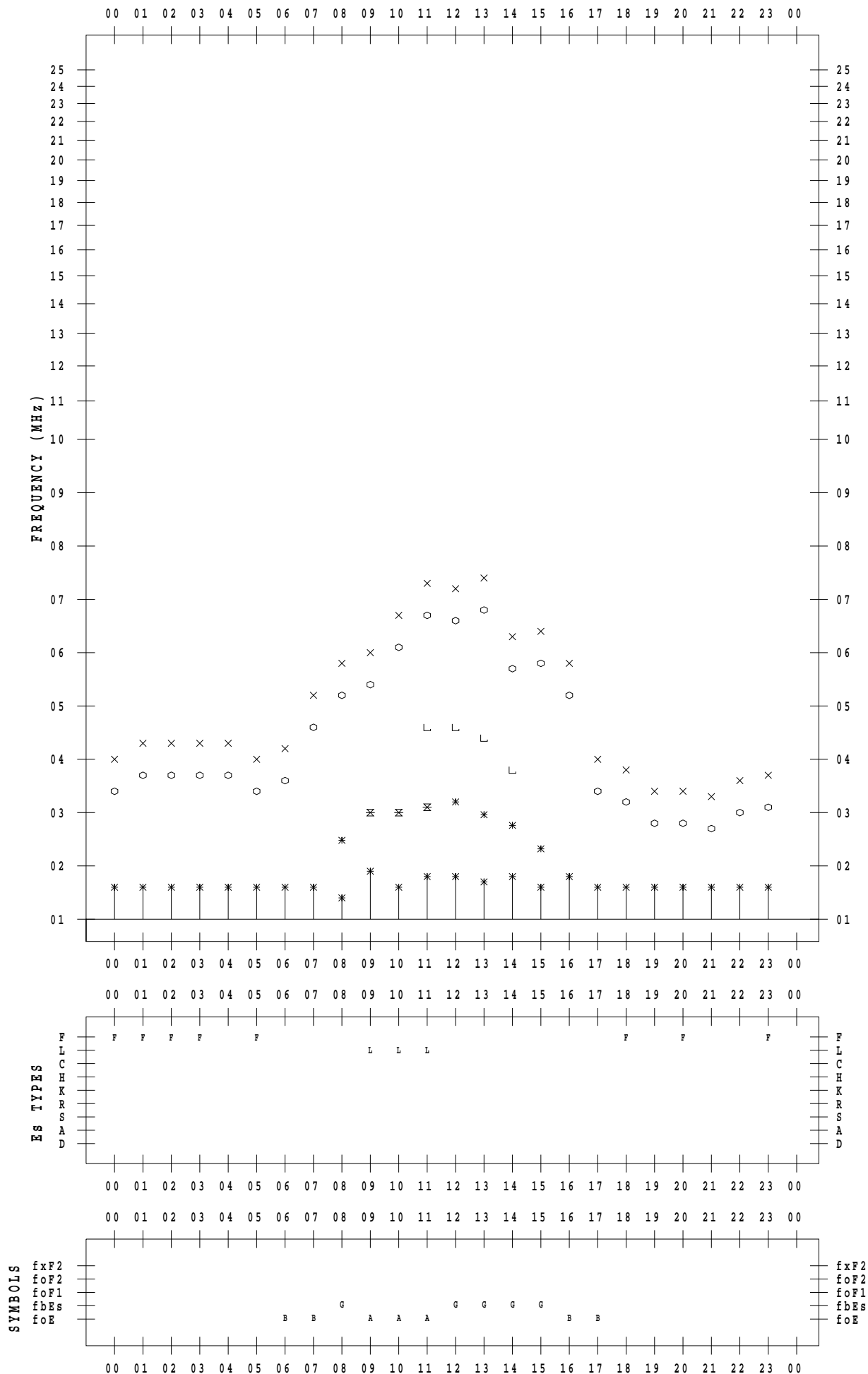
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/15

135 ° E MEAN TIME



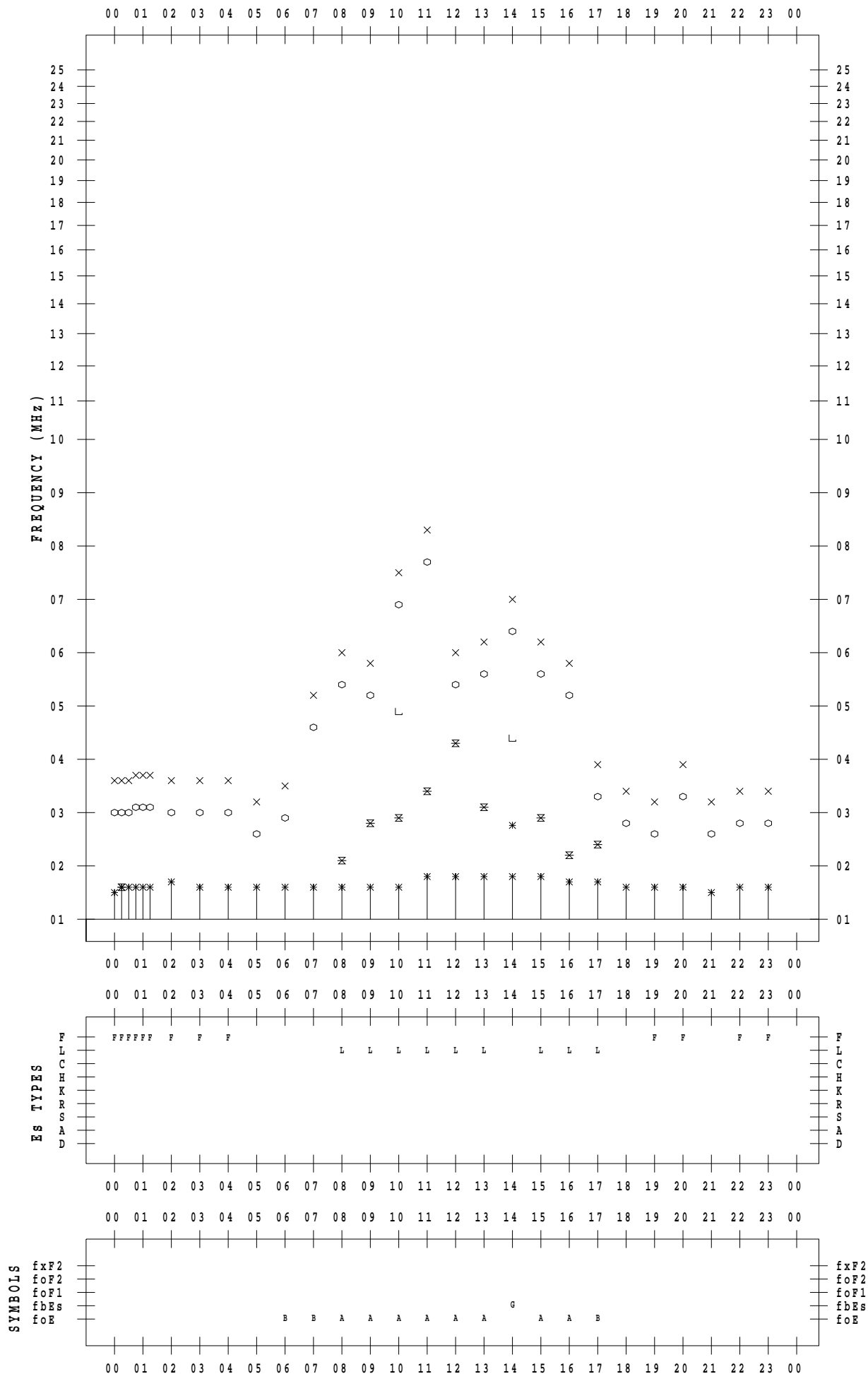
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/16

135 ° E MEAN TIME



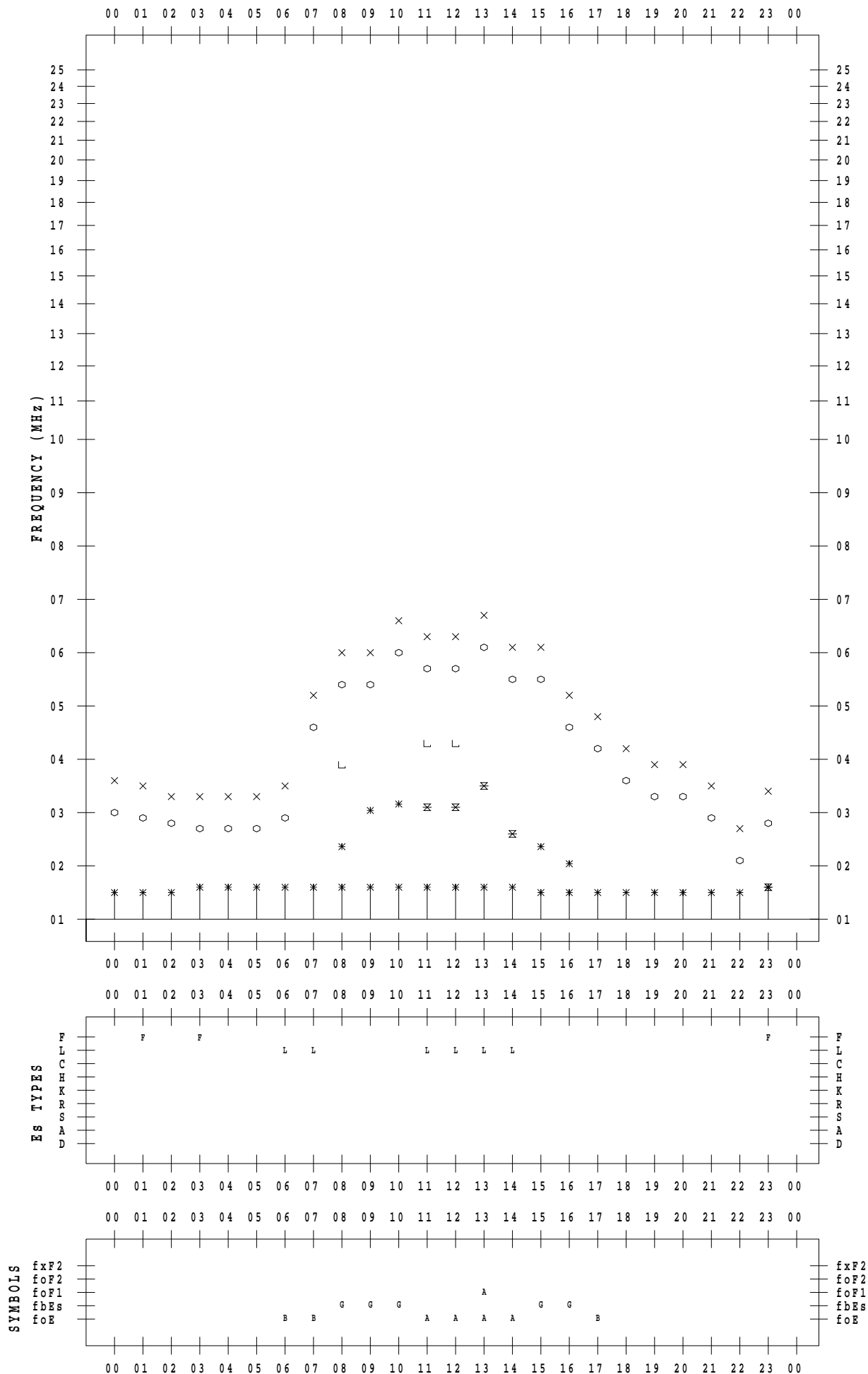
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/17

135 ° E MEAN TIME



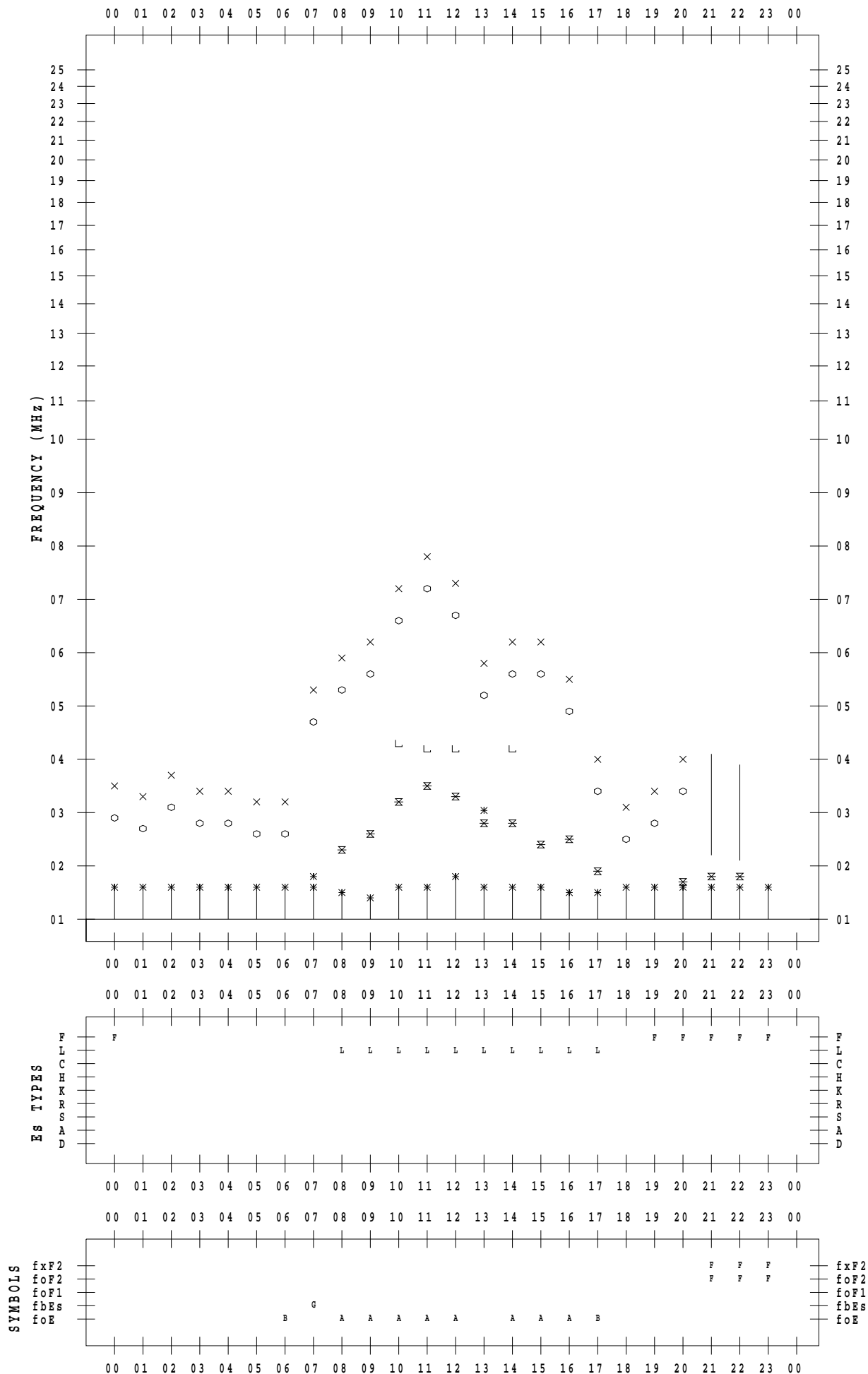
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/18

135 ° E MEAN TIME



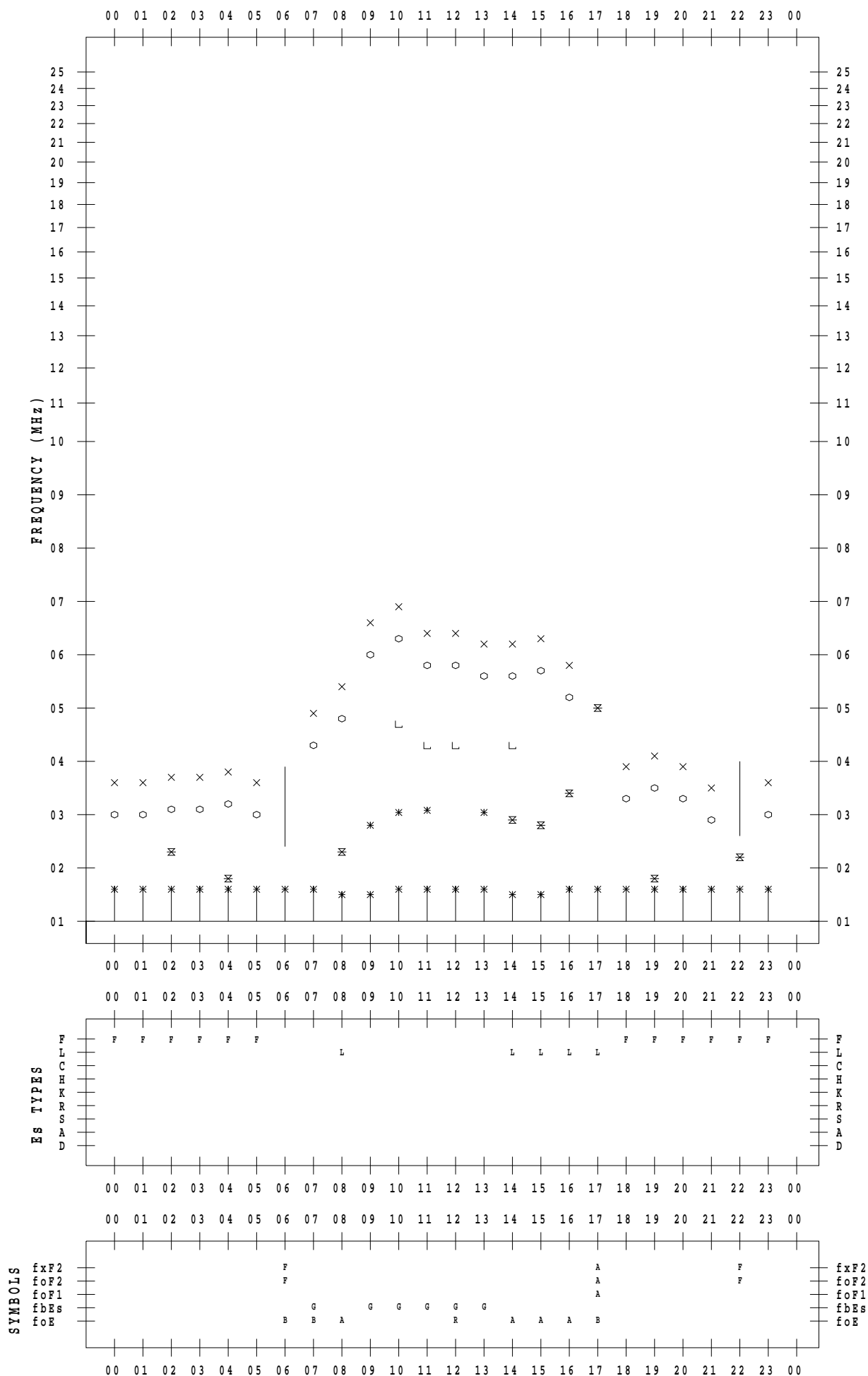
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/19

135 ° E MEAN TIME



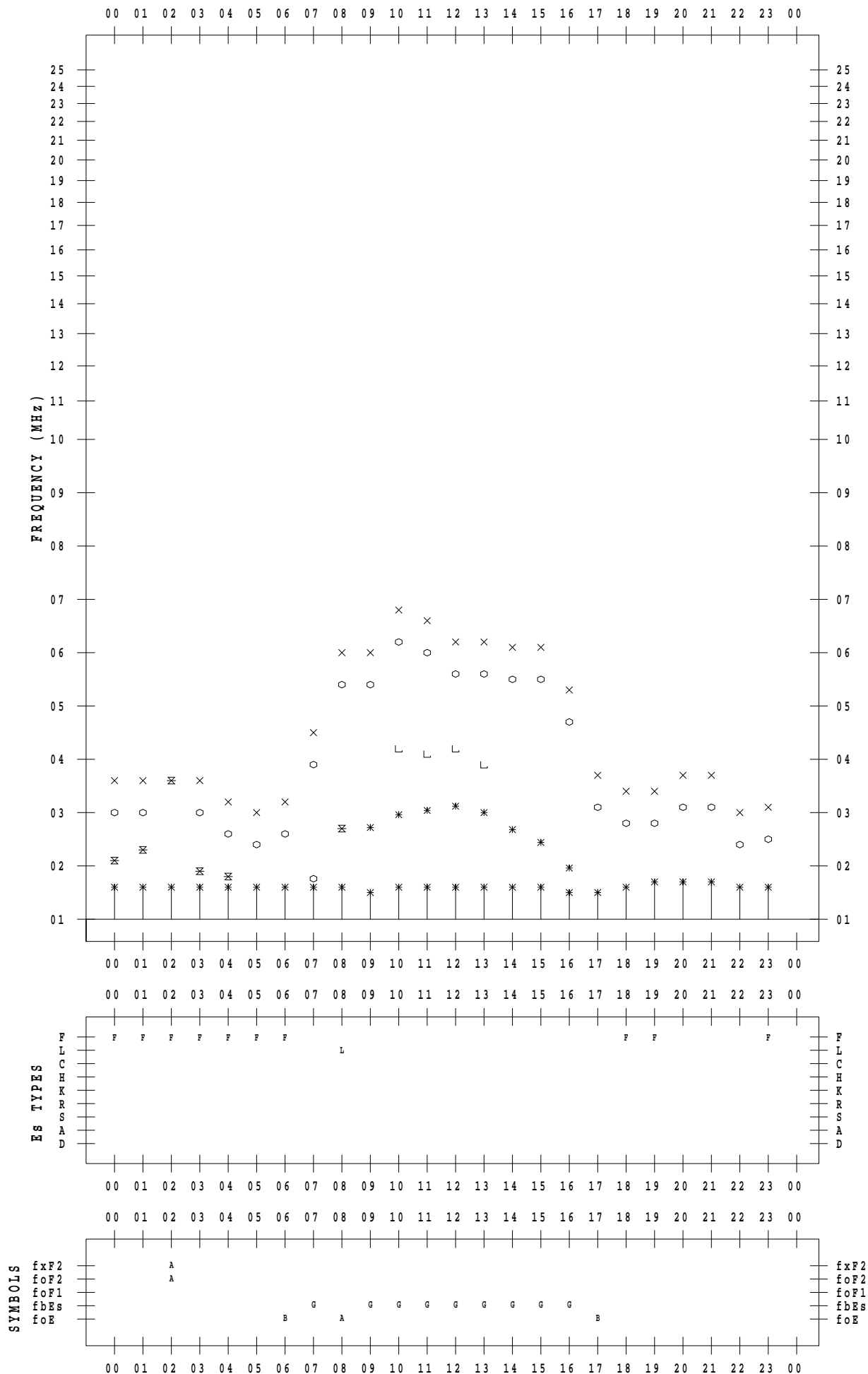
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/20

135 ° E MEAN TIME



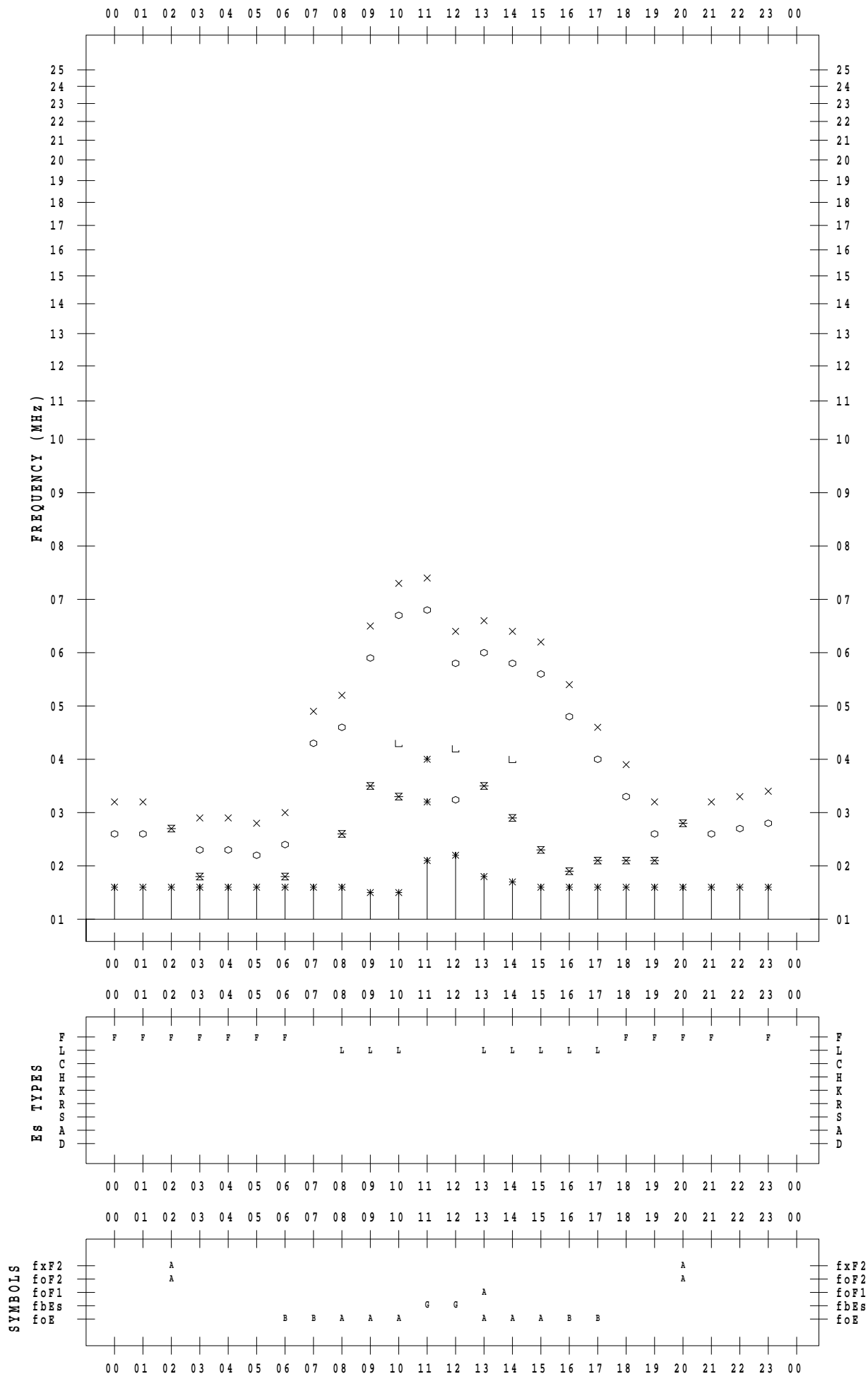
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/21

135 ° E MEAN TIME



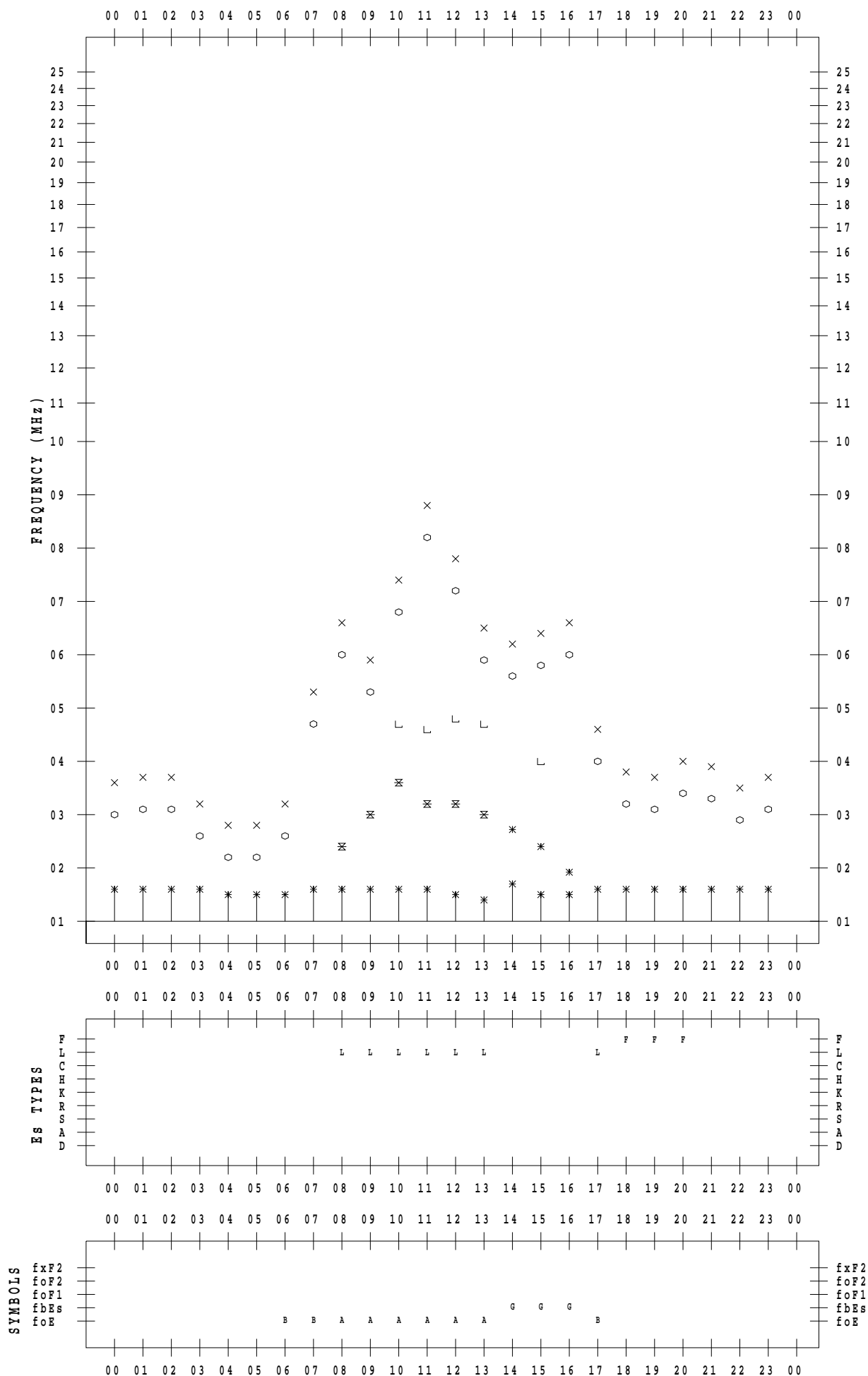
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/22

135 ° E MEAN TIME



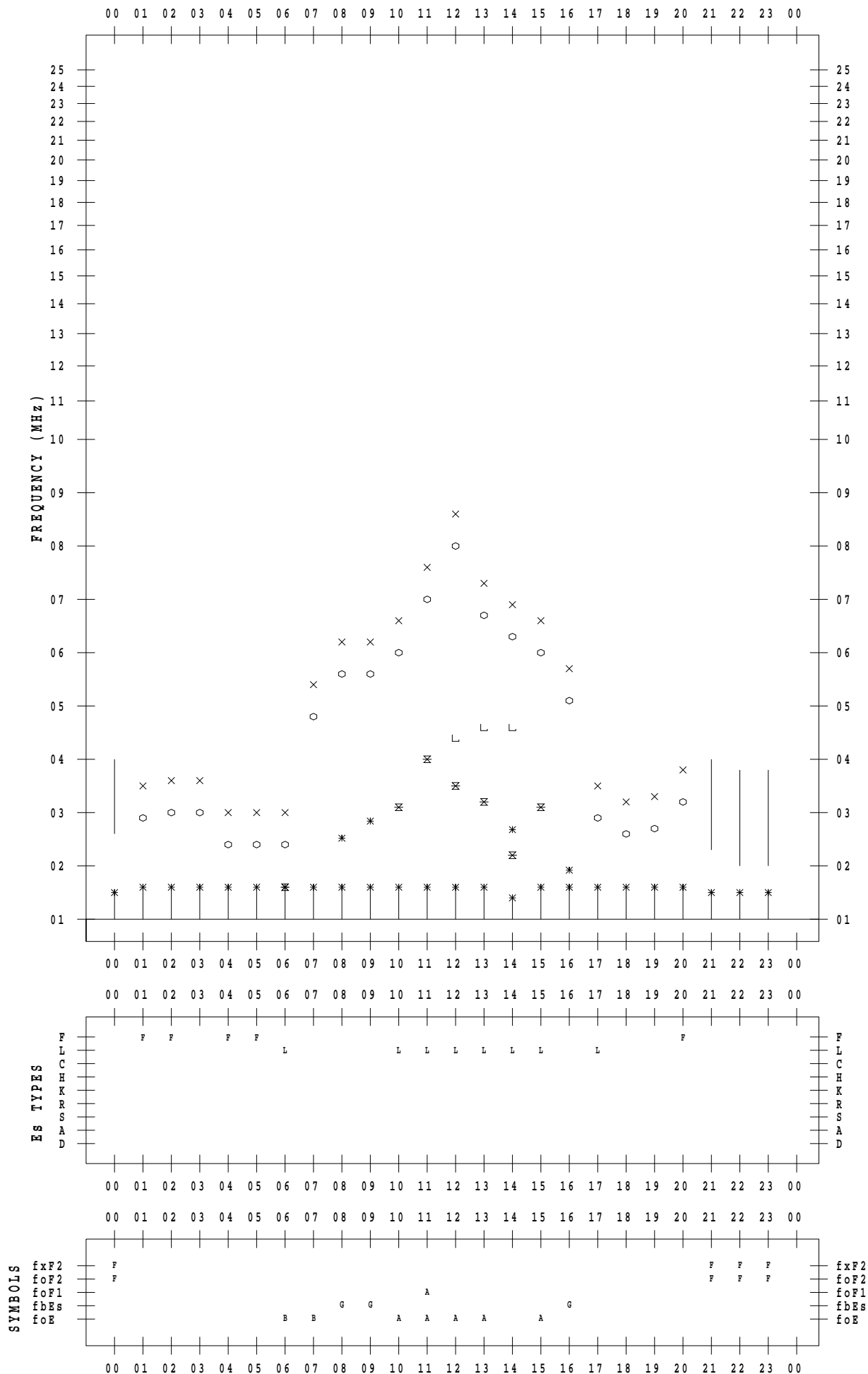
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/23

135 ° E MEAN TIME



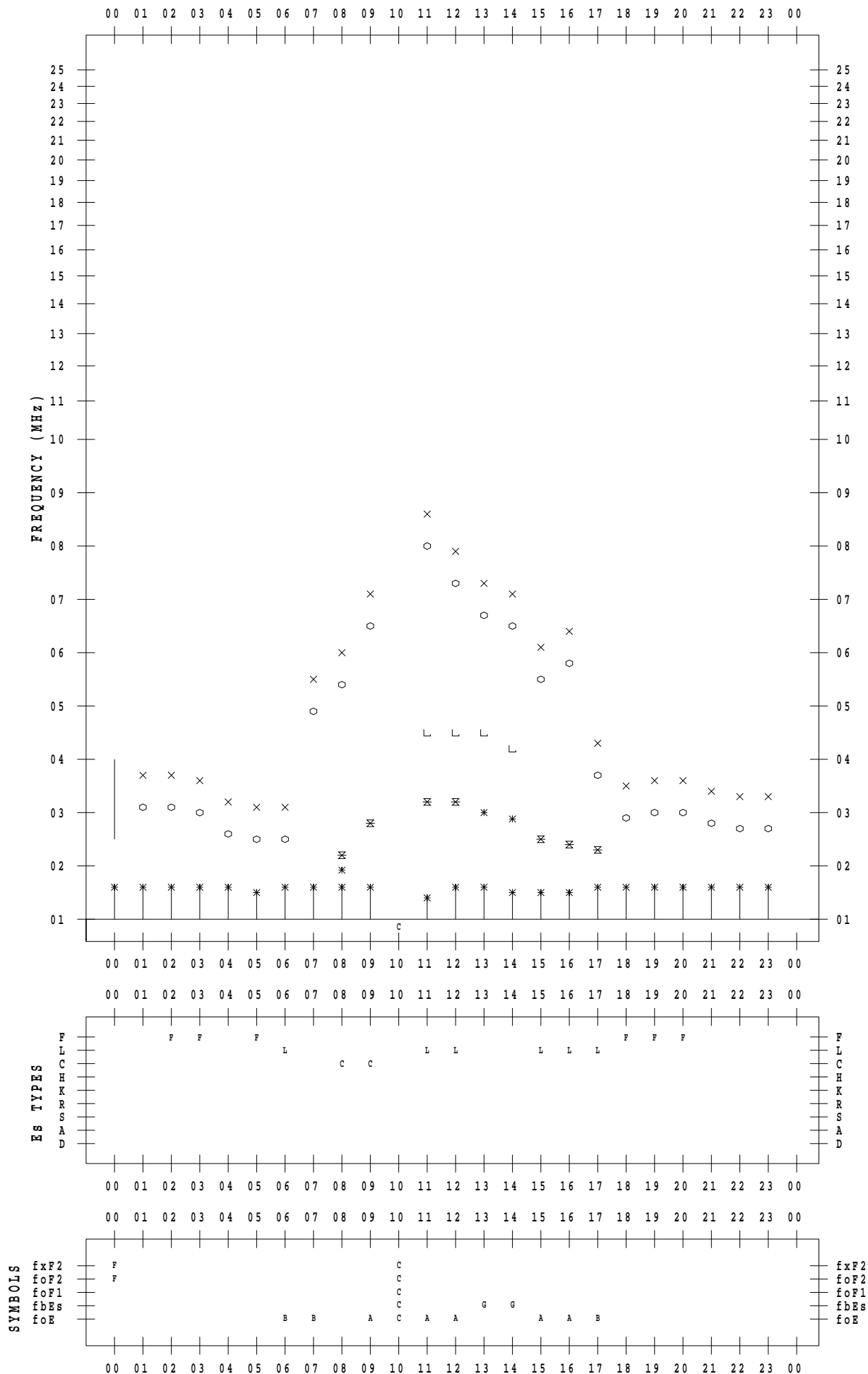
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/24

135 ° E MEAN TIME



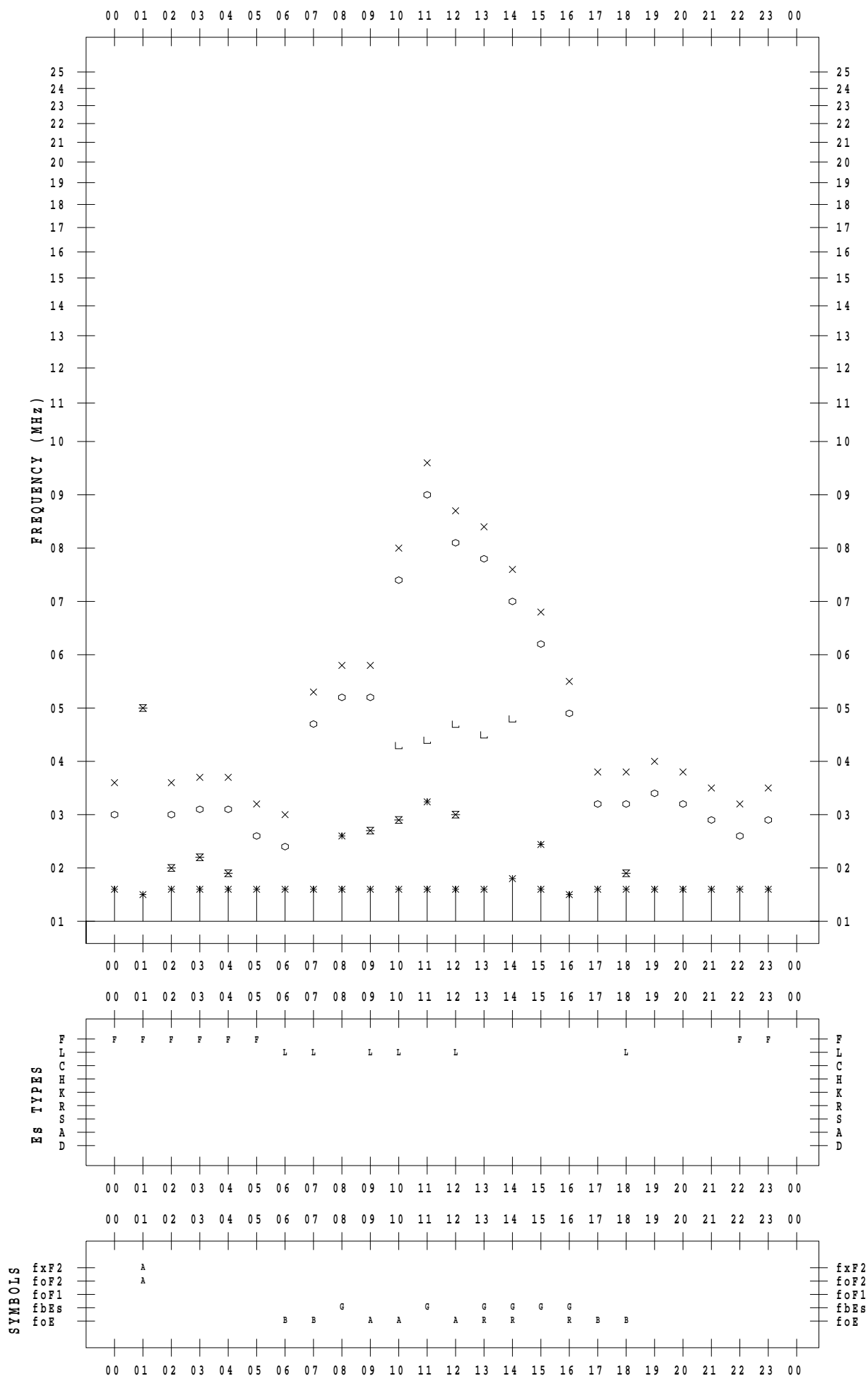
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/25

135 ° E MEAN TIME



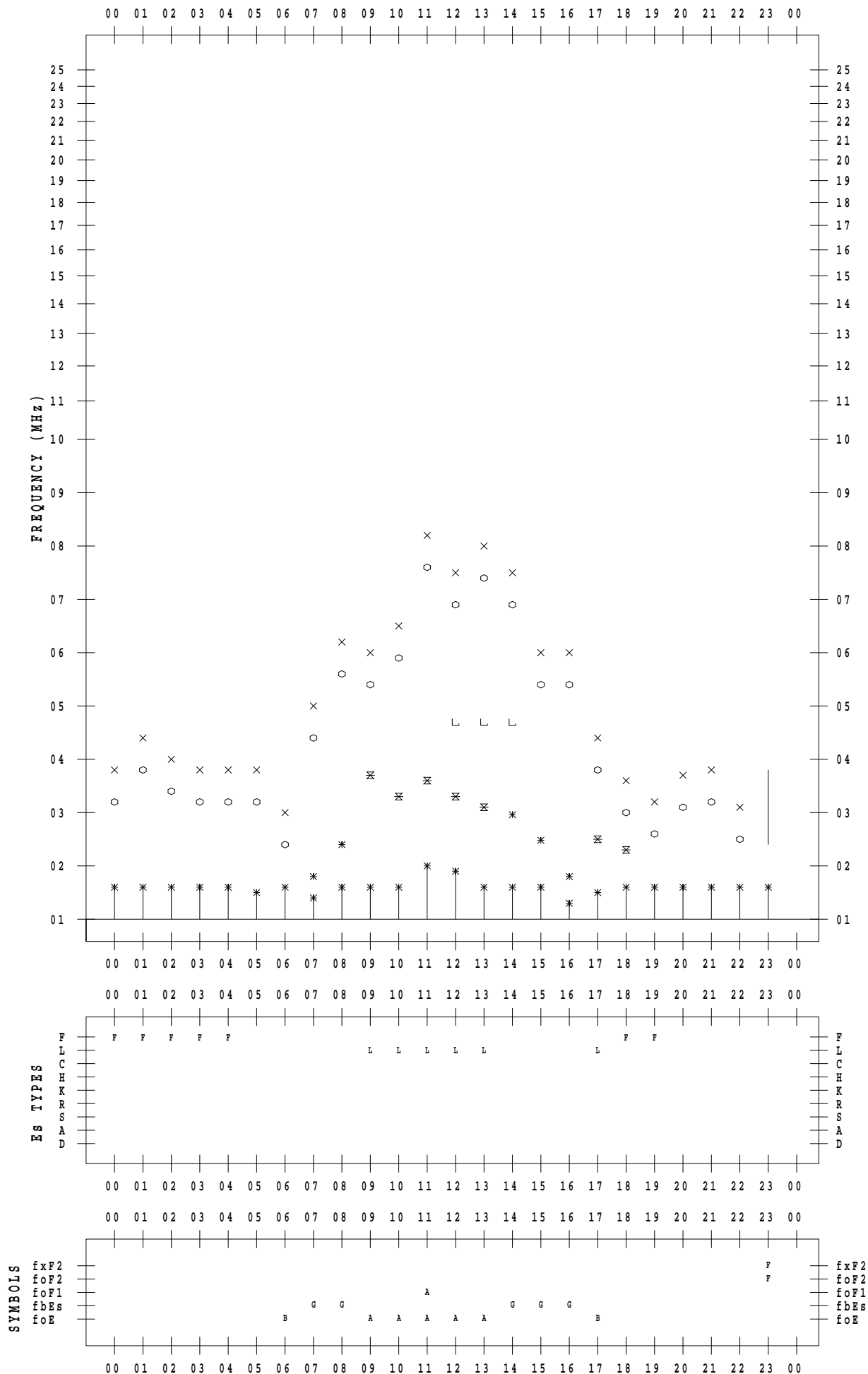
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/26

135 ° E MEAN TIME



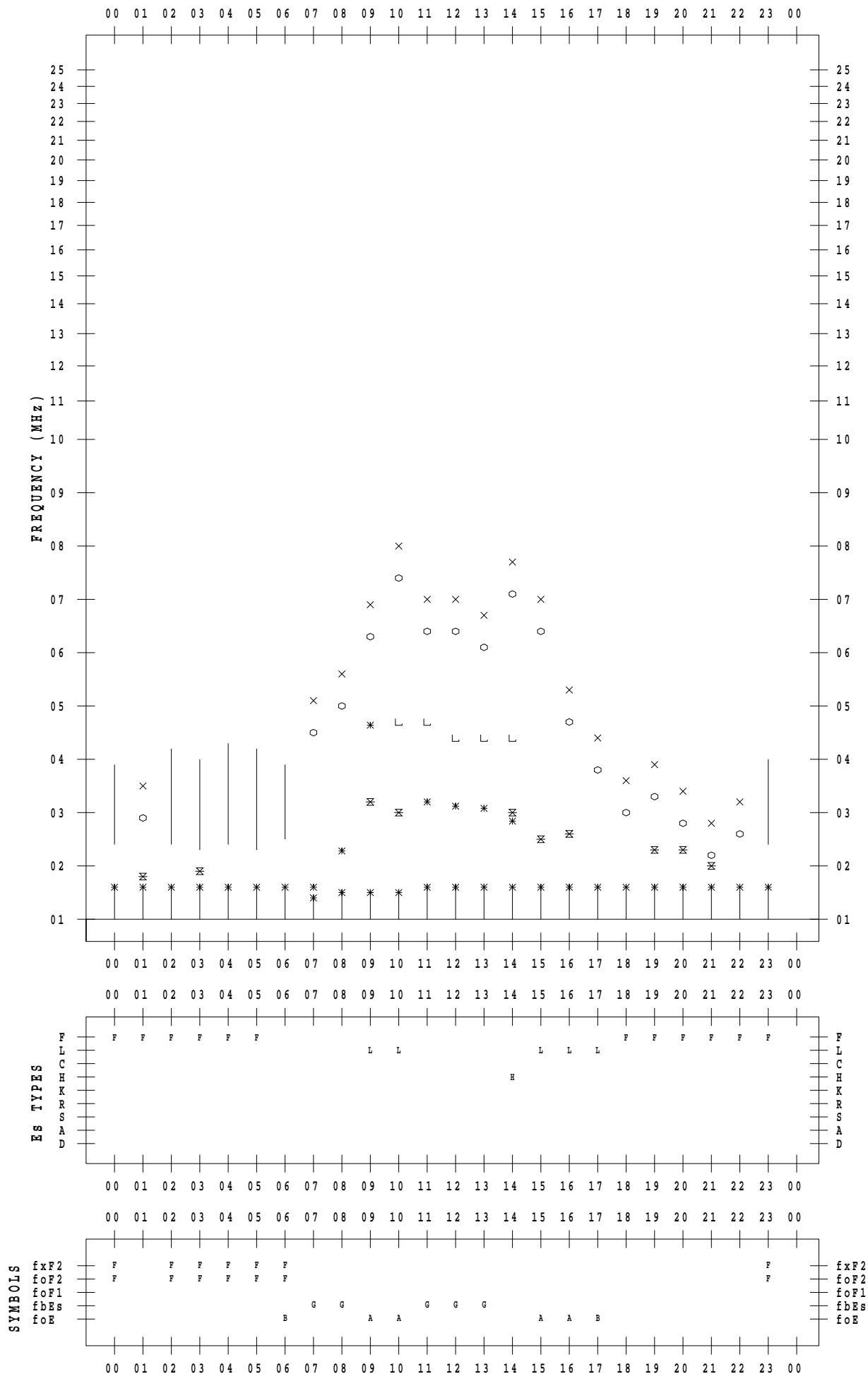
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/27

135 ° E MEAN TIME



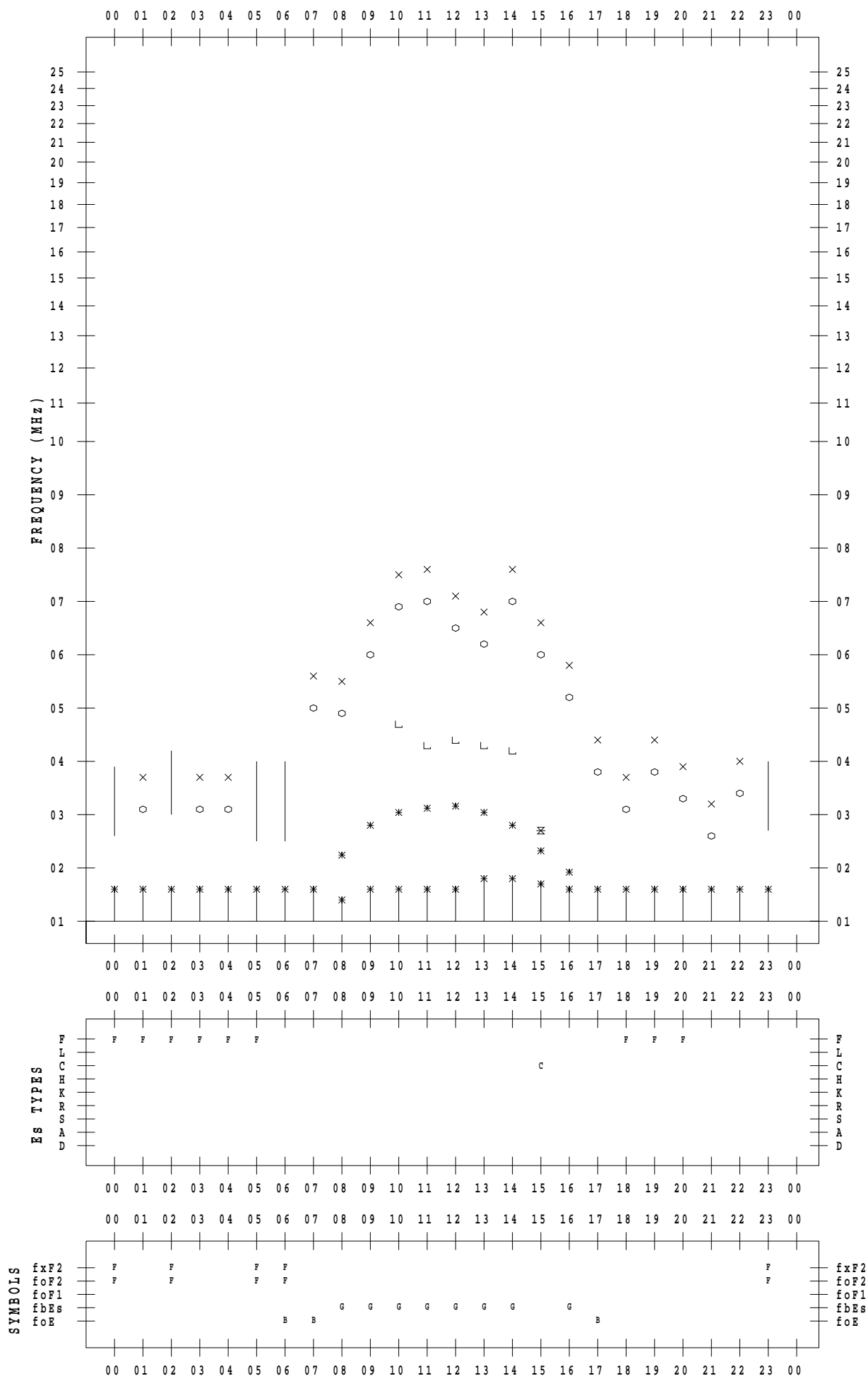
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/28

135 ° E MEAN TIME



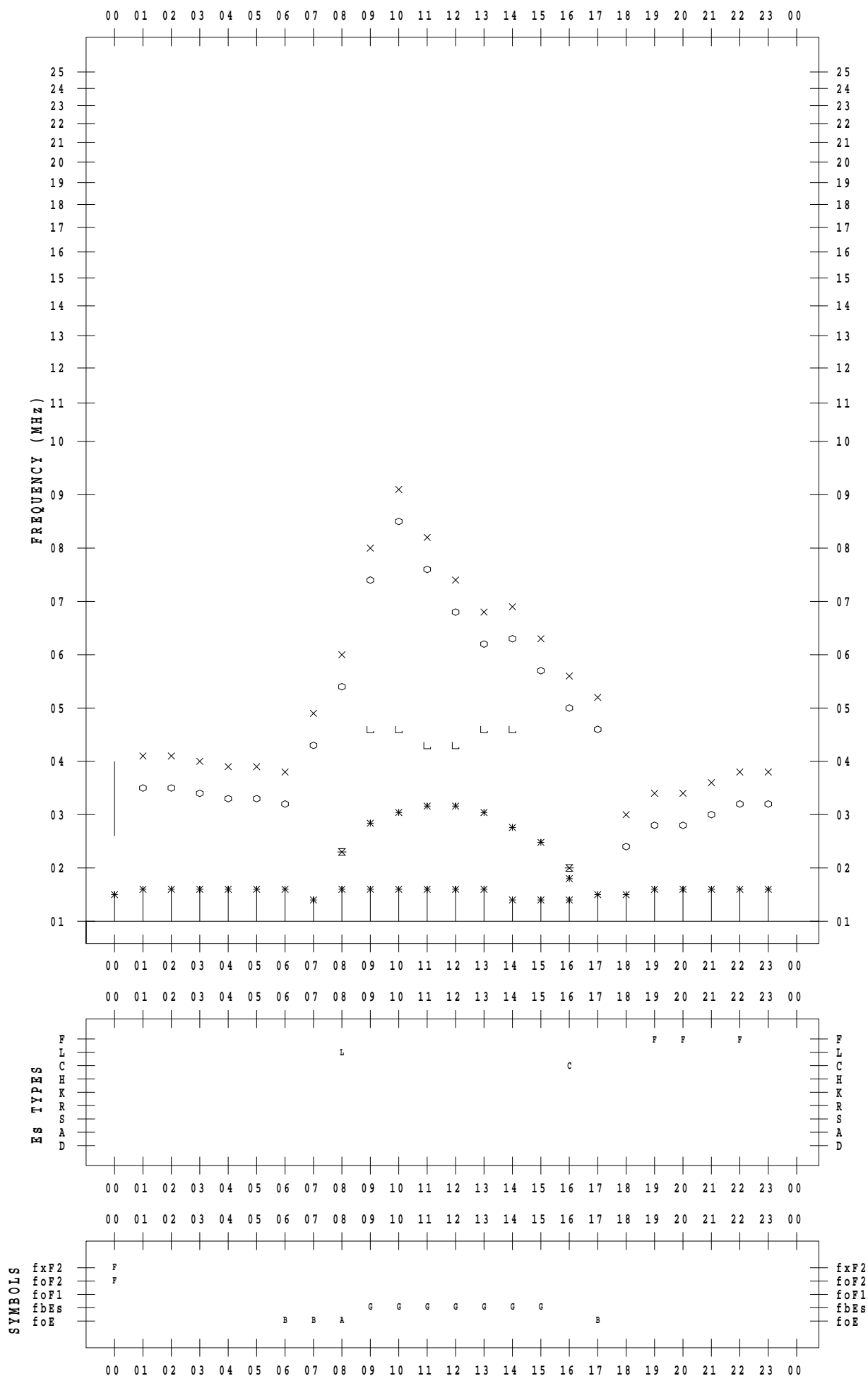
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/29

135 ° E MEAN TIME



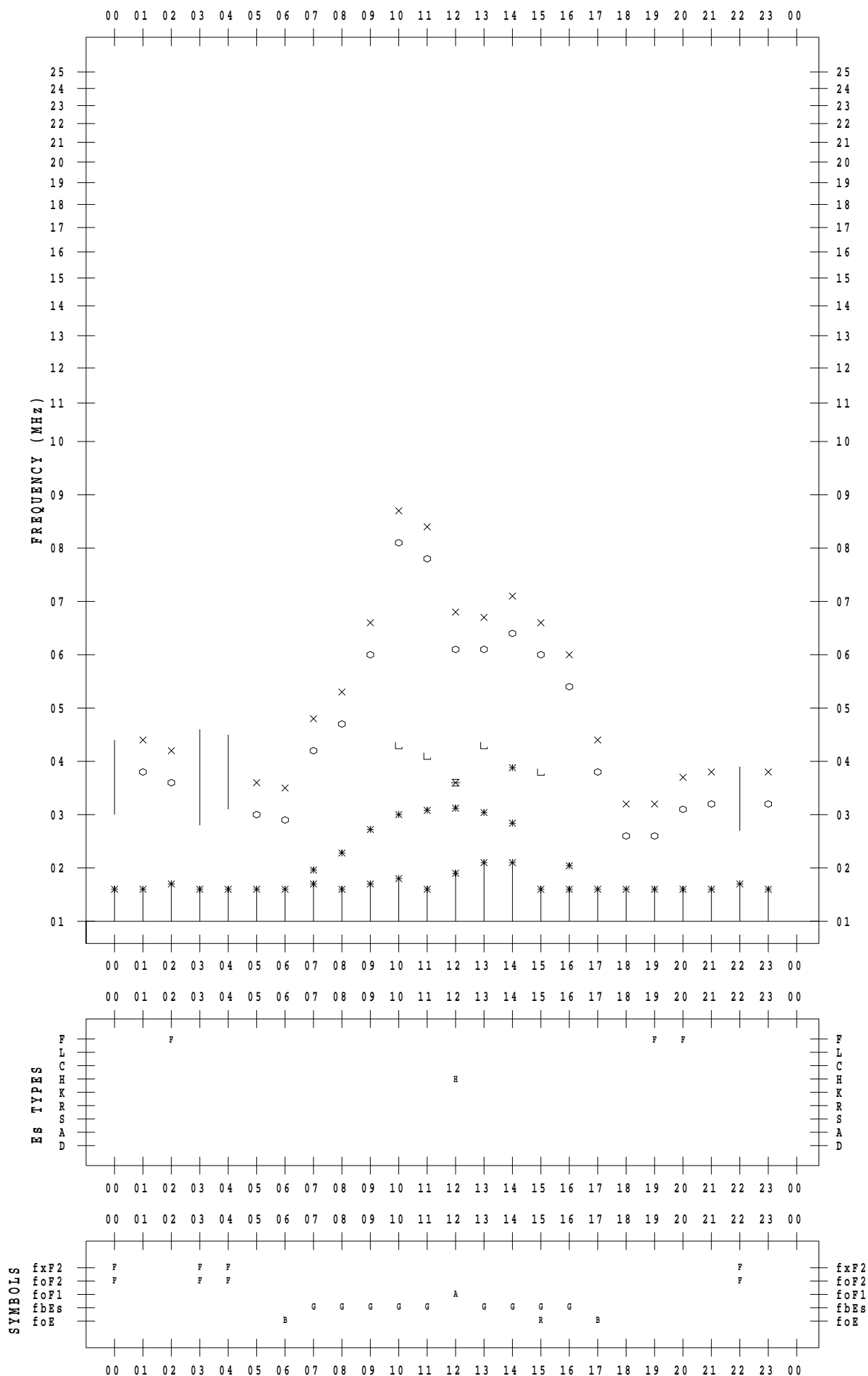
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/30

135 ° E MEAN TIME



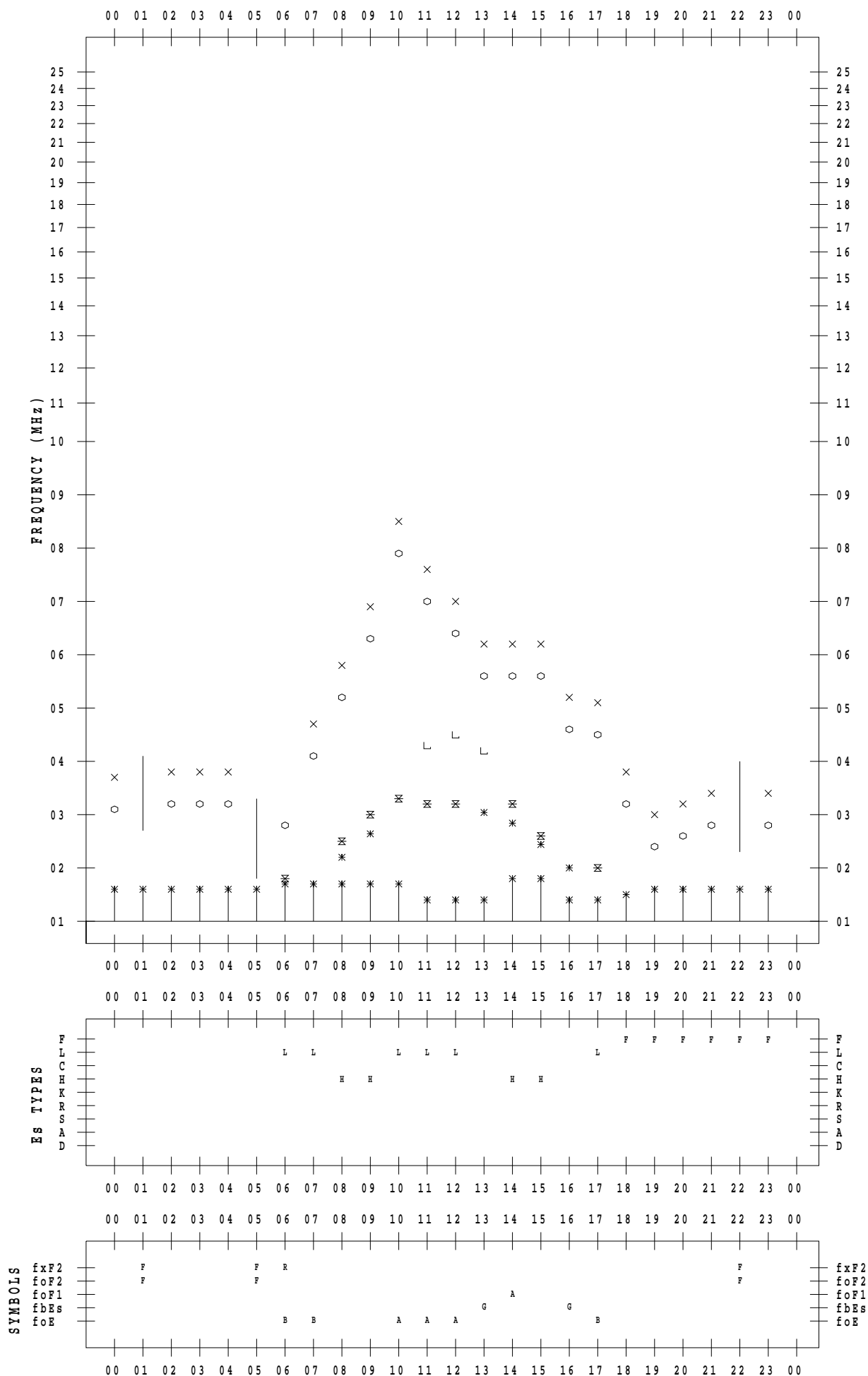
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2020/12/31

135 ° E MEAN TIME



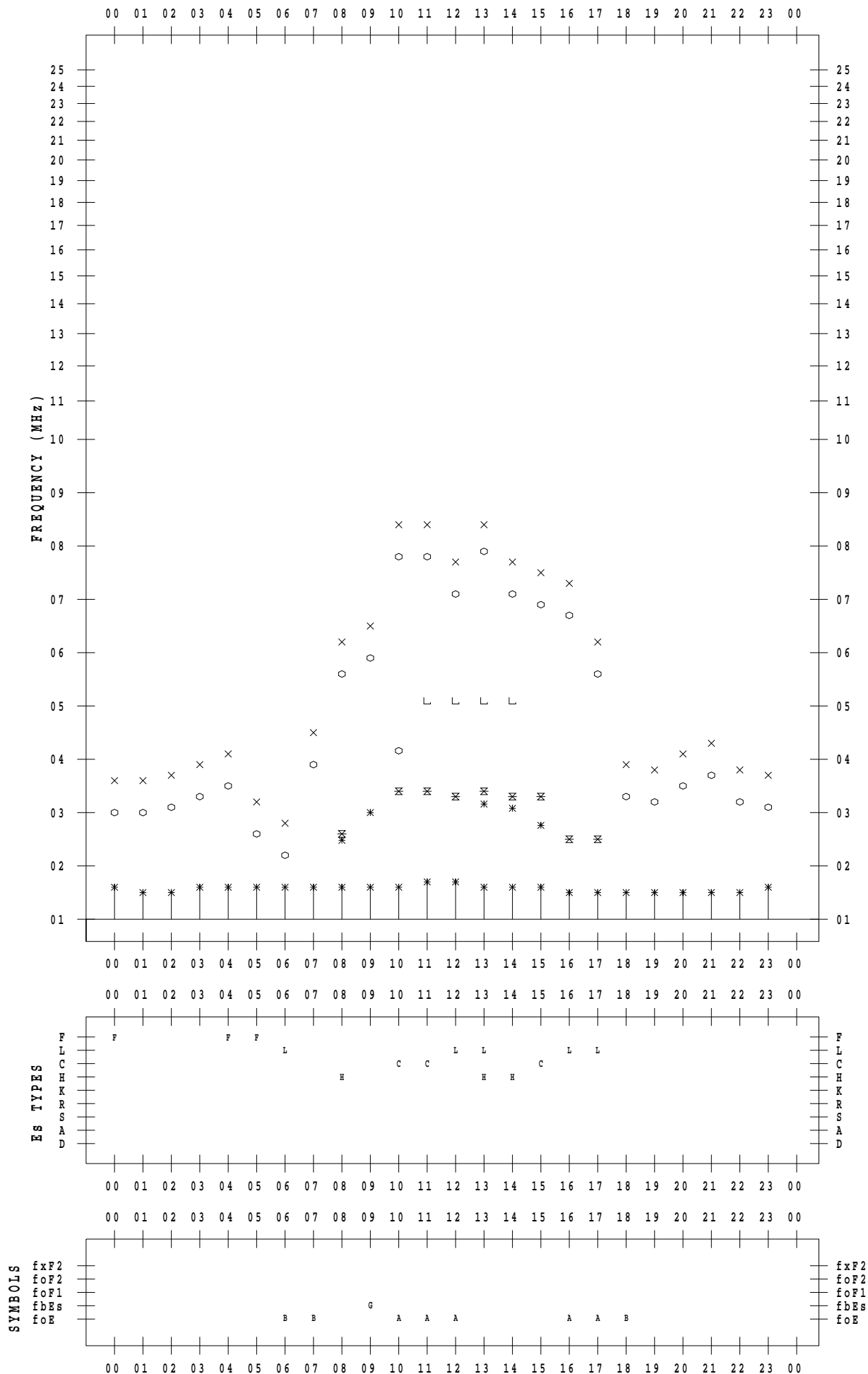
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/ 1

135 ° E MEAN TIME



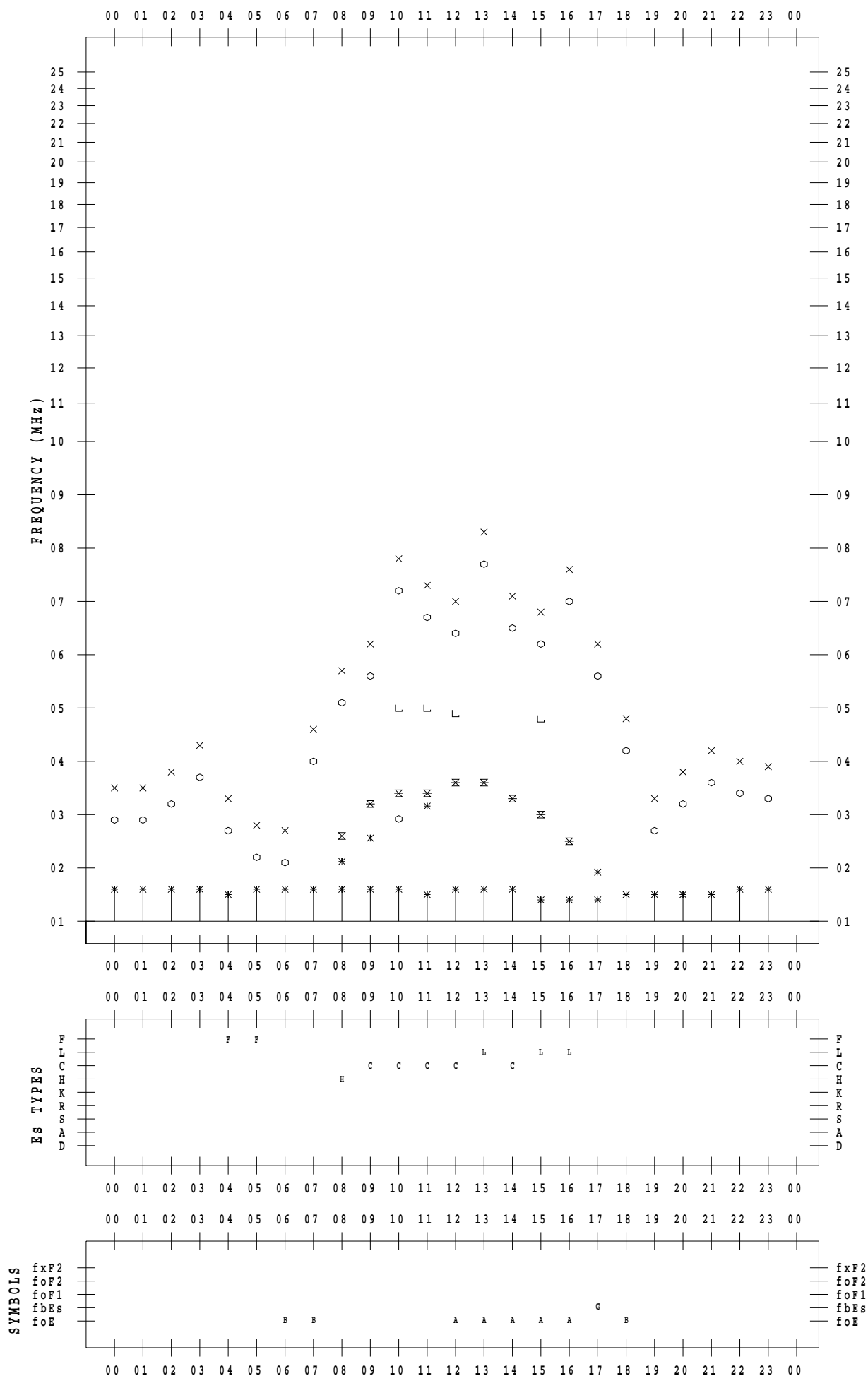
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/ 2

135 ° E MEAN TIME



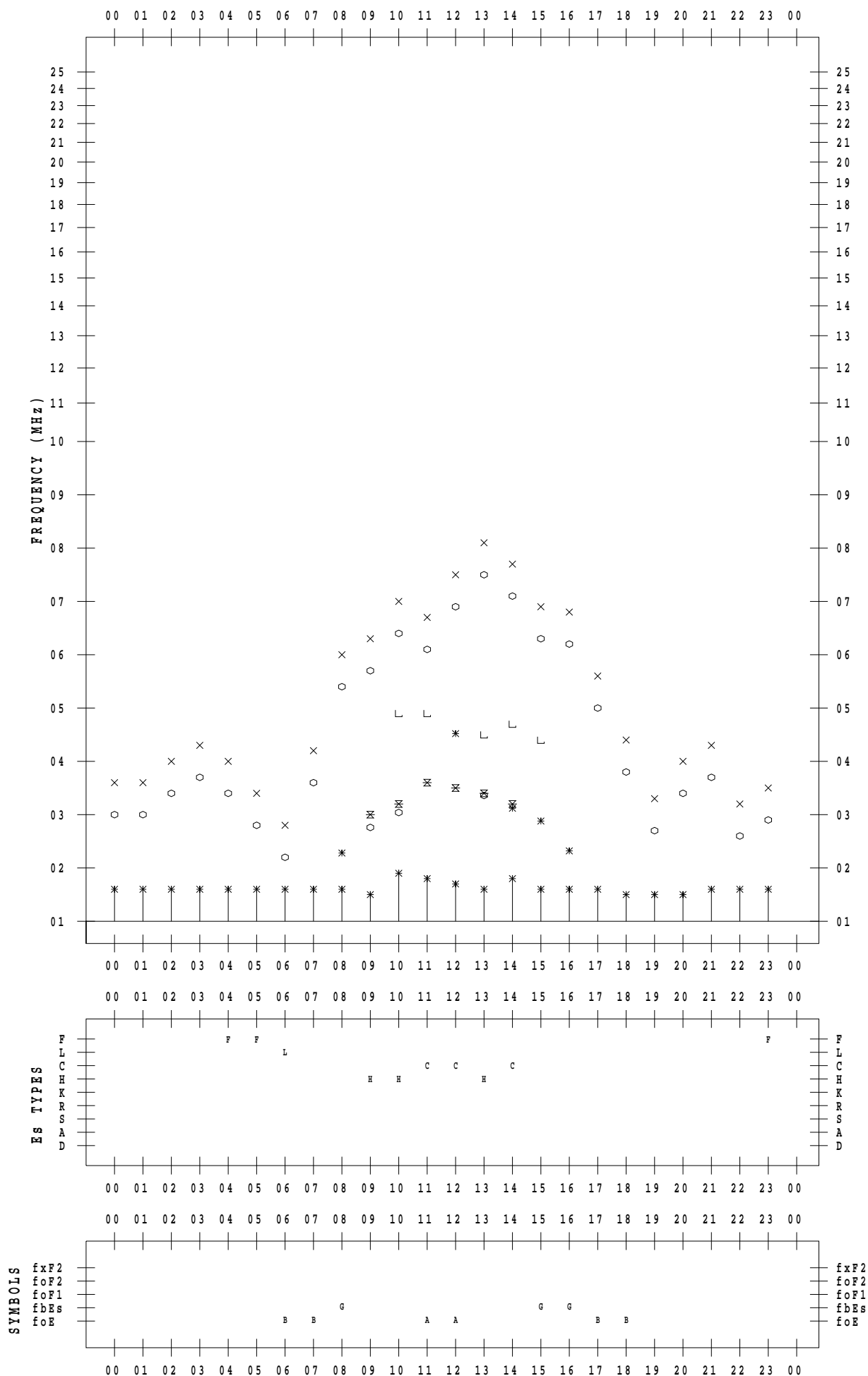
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/ 3

135 ° E MEAN TIME



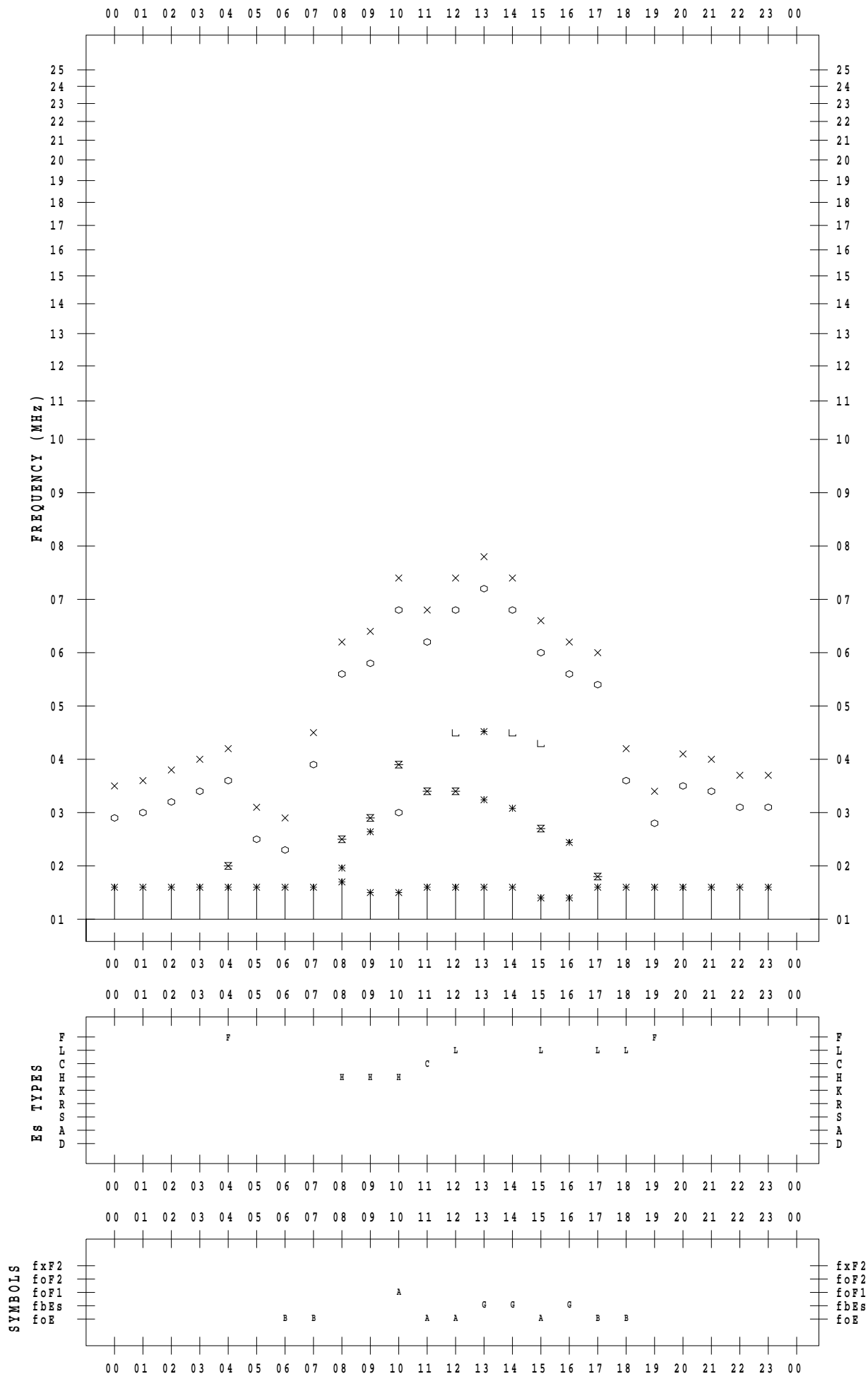
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/ 4

135 ° E MEAN TIME



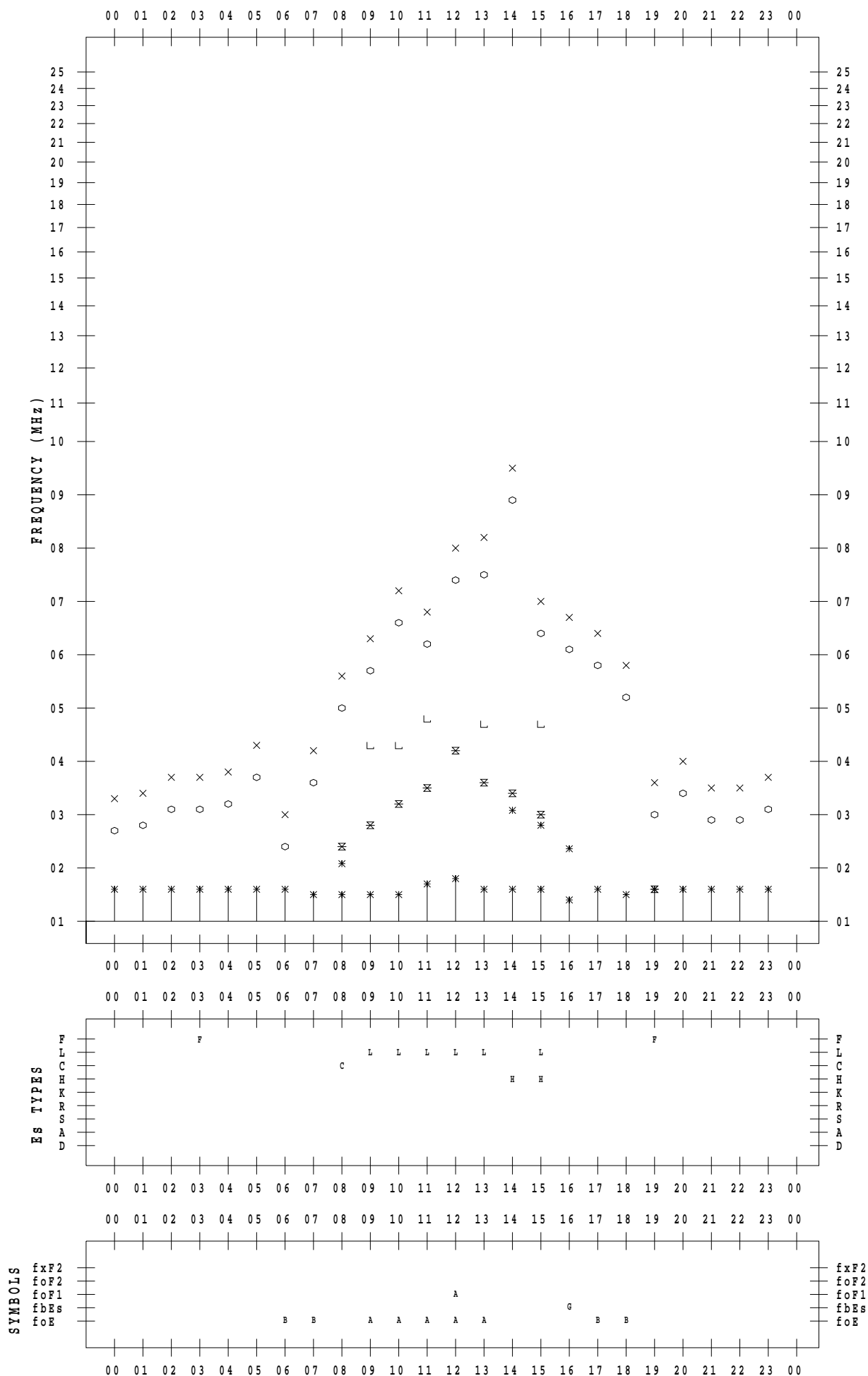
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/ 5

135 ° E MEAN TIME



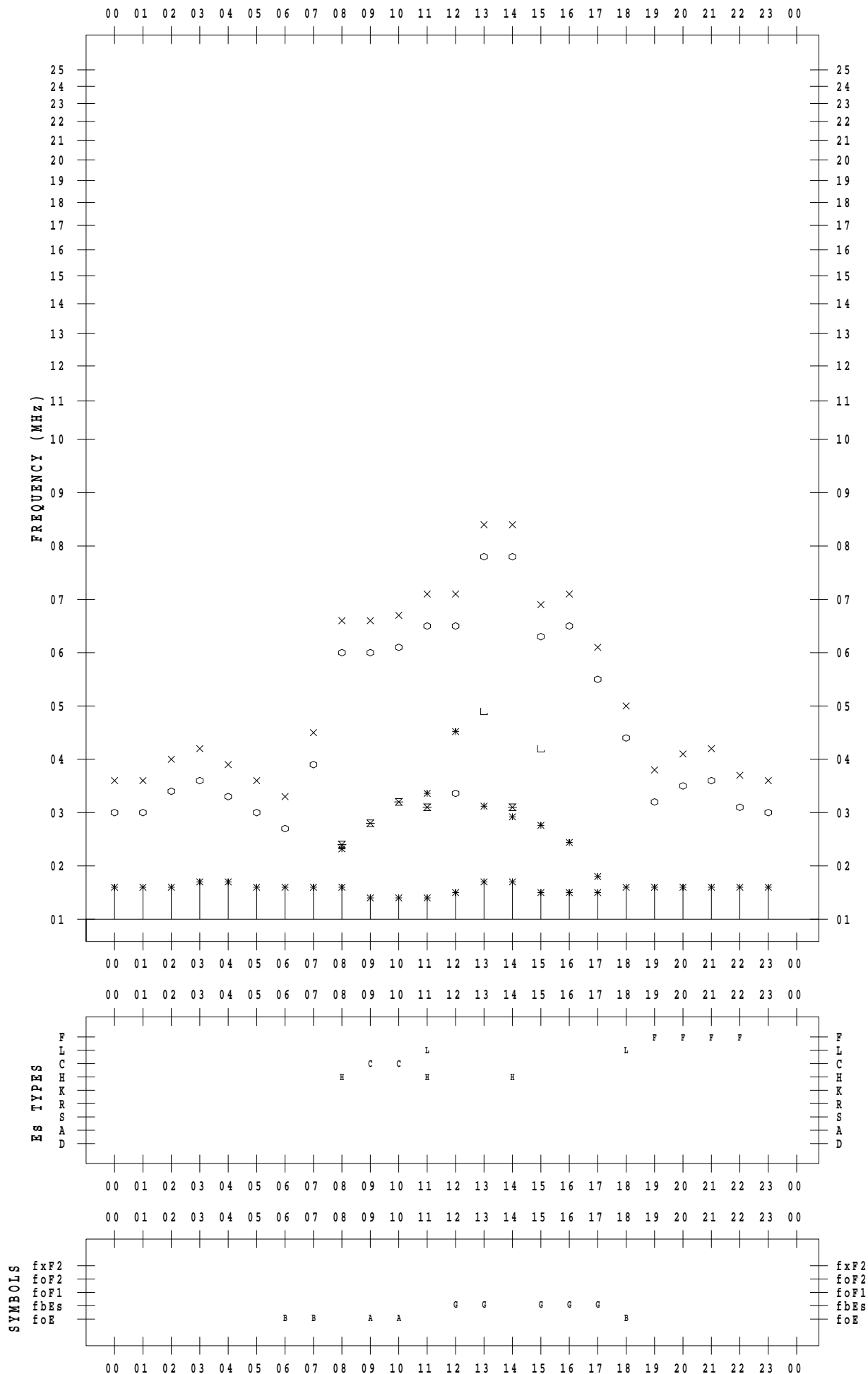
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/ 6

135 ° E MEAN TIME



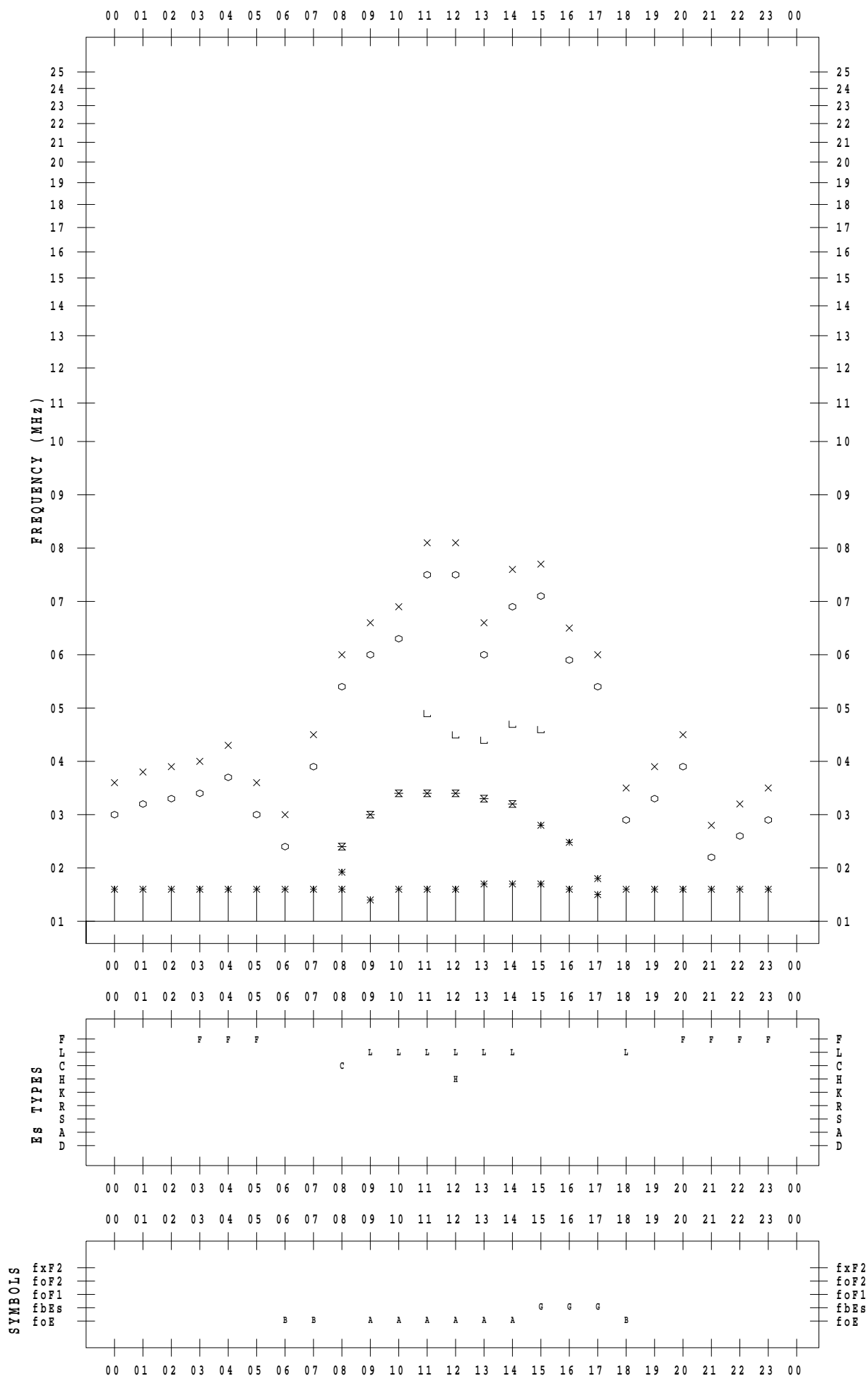
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/7

135 ° E MEAN TIME



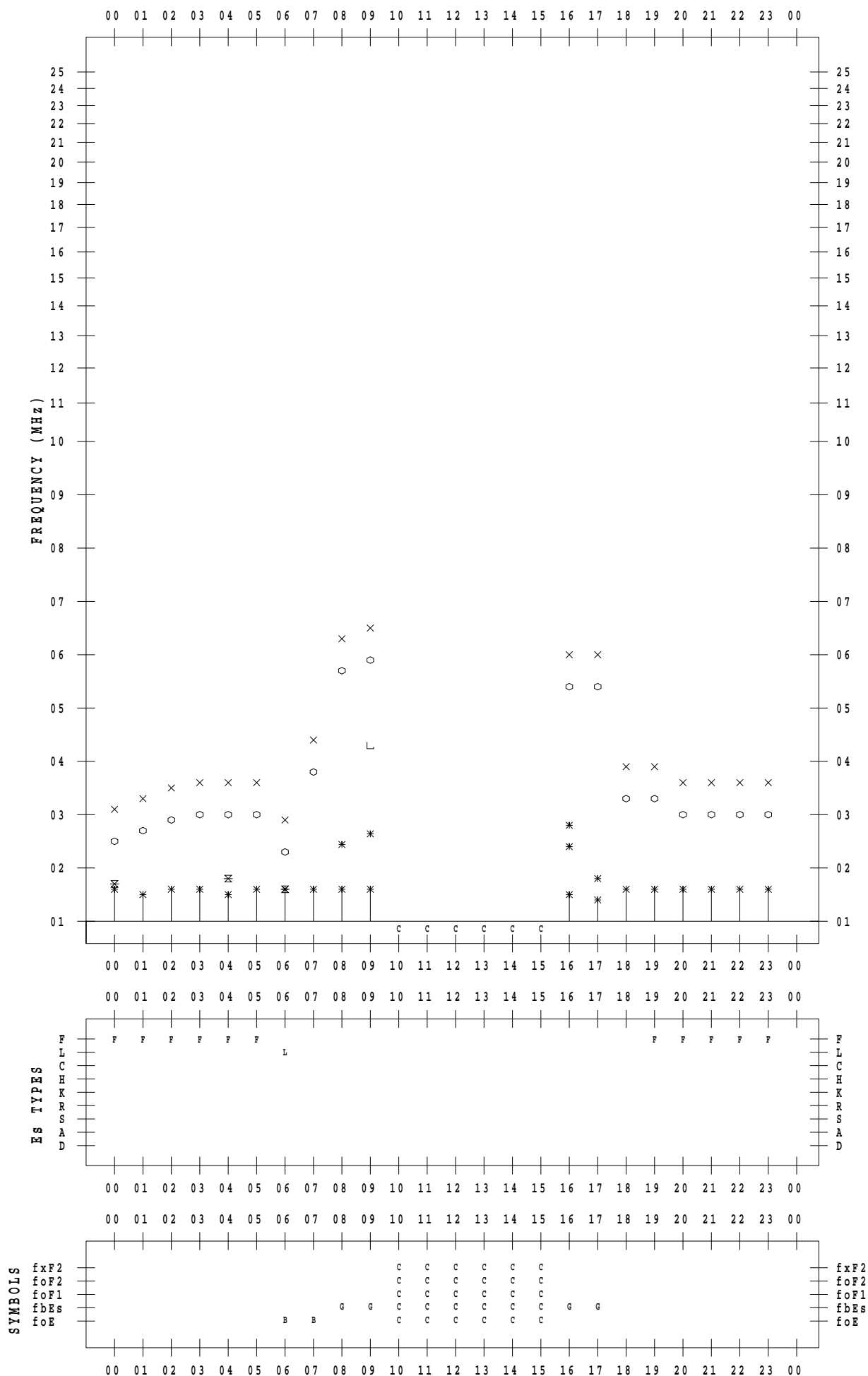
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/ 8

135 ° E MEAN TIME



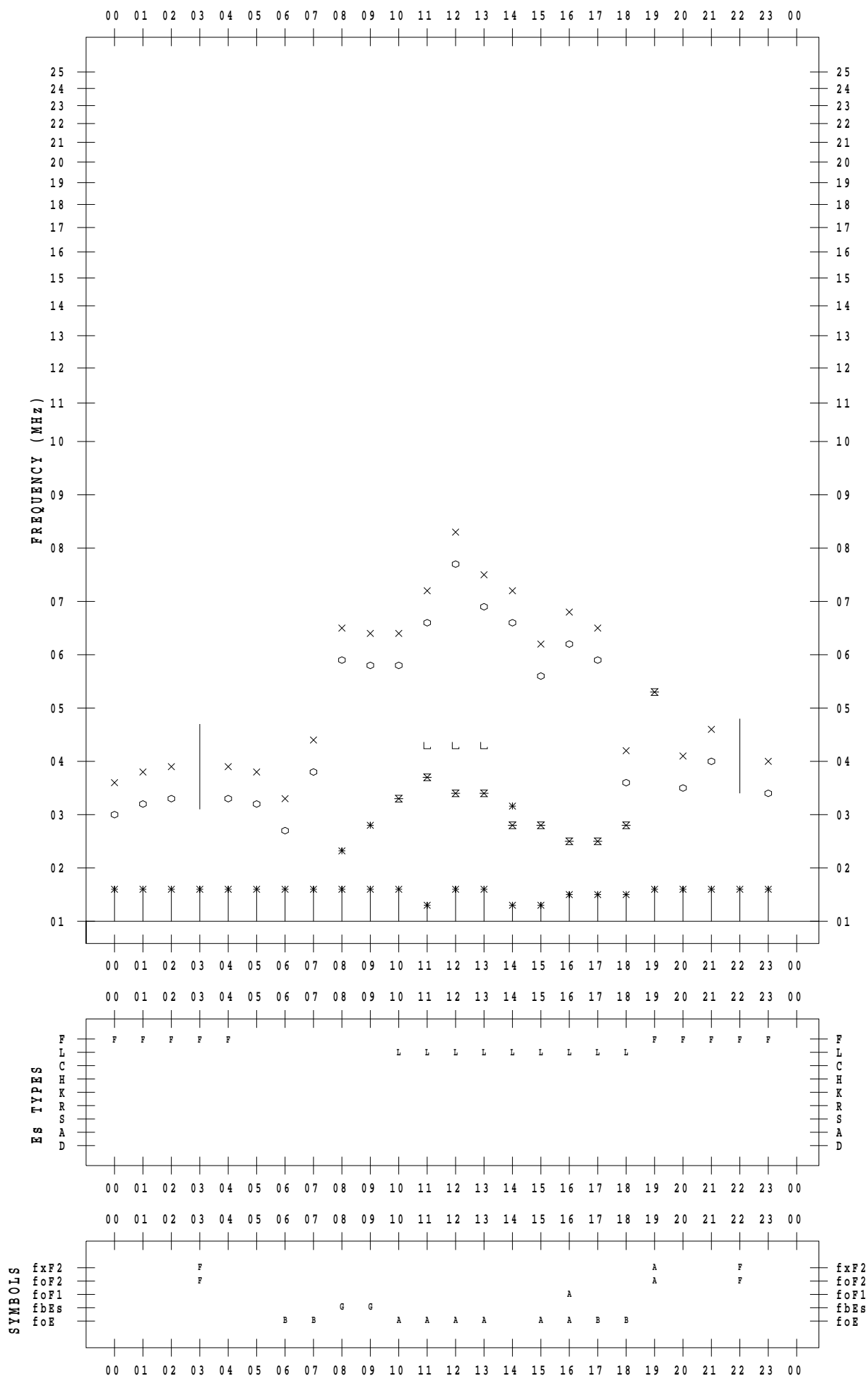
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/ 9

135 ° E MEAN TIME



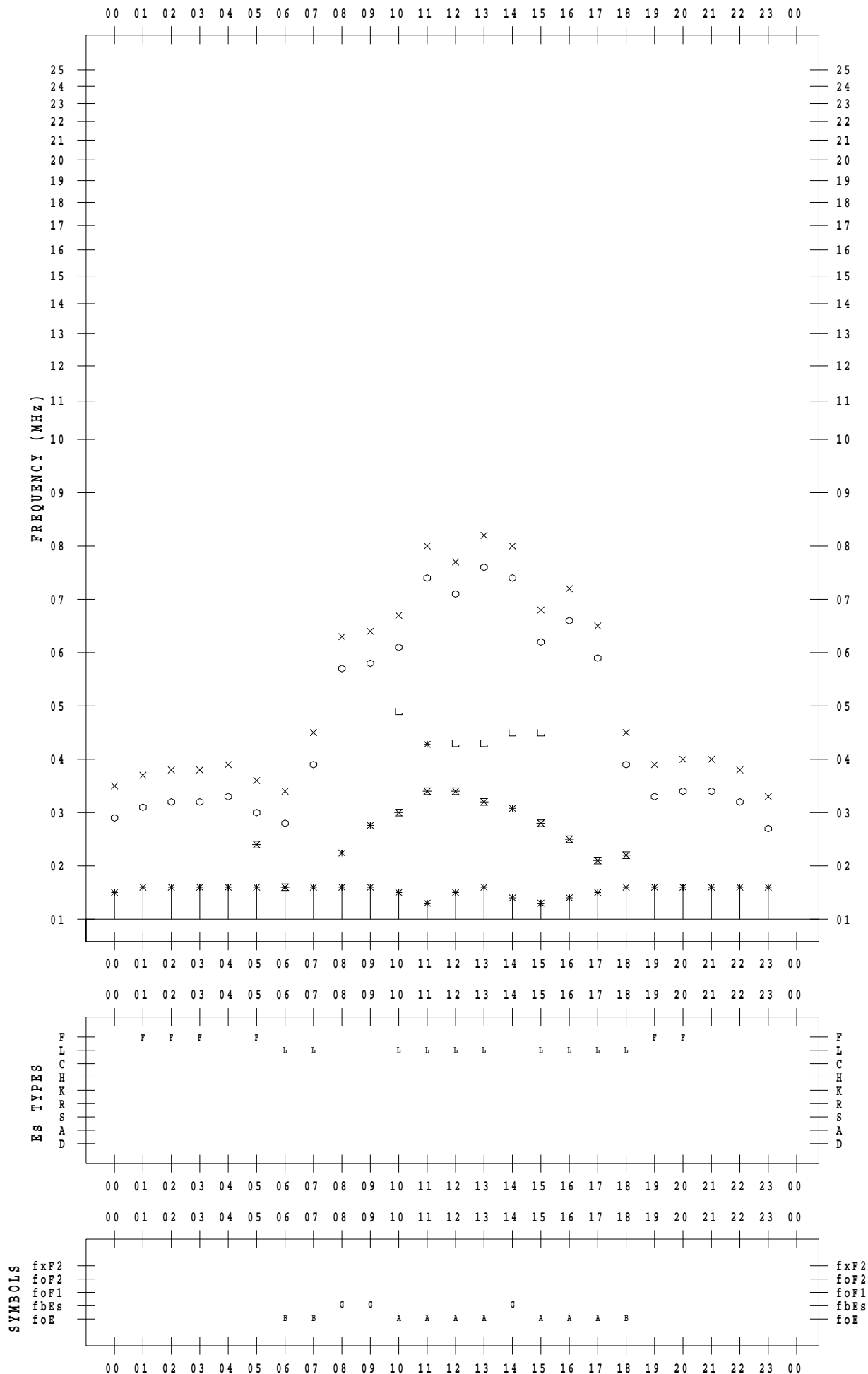
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/10

135 ° E MEAN TIME



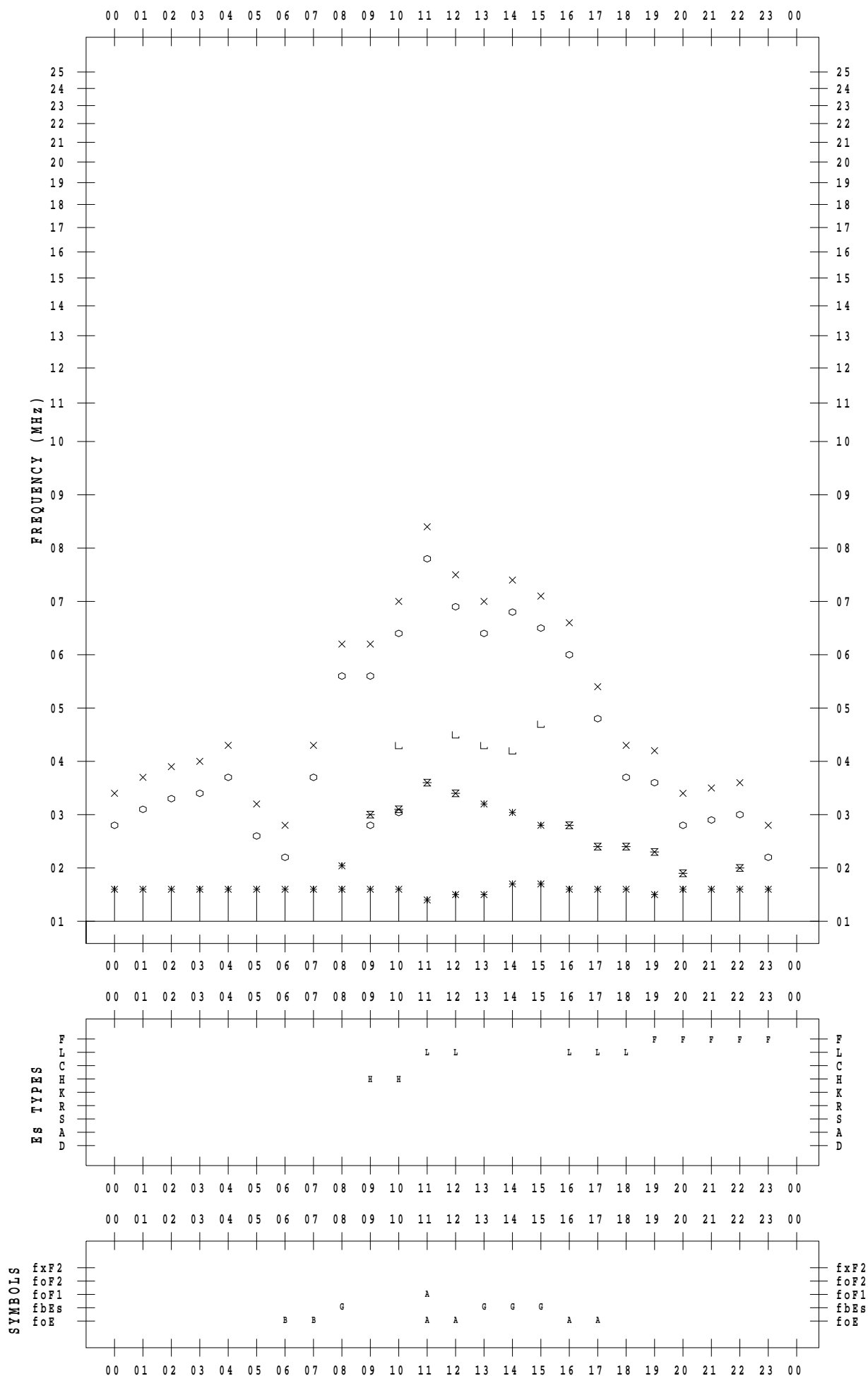
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/11

135 ° E MEAN TIME



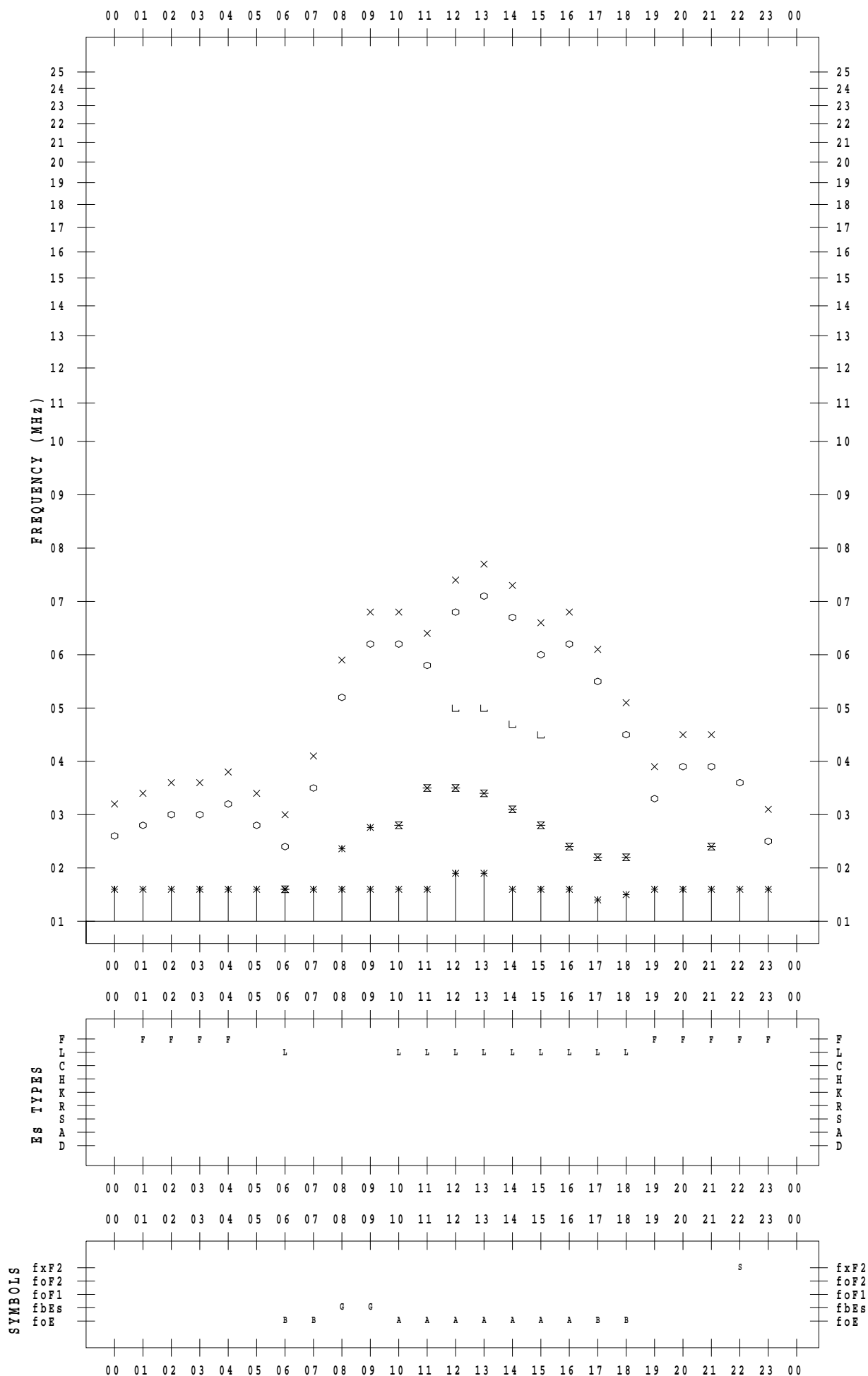
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/12

135 ° E MEAN TIME



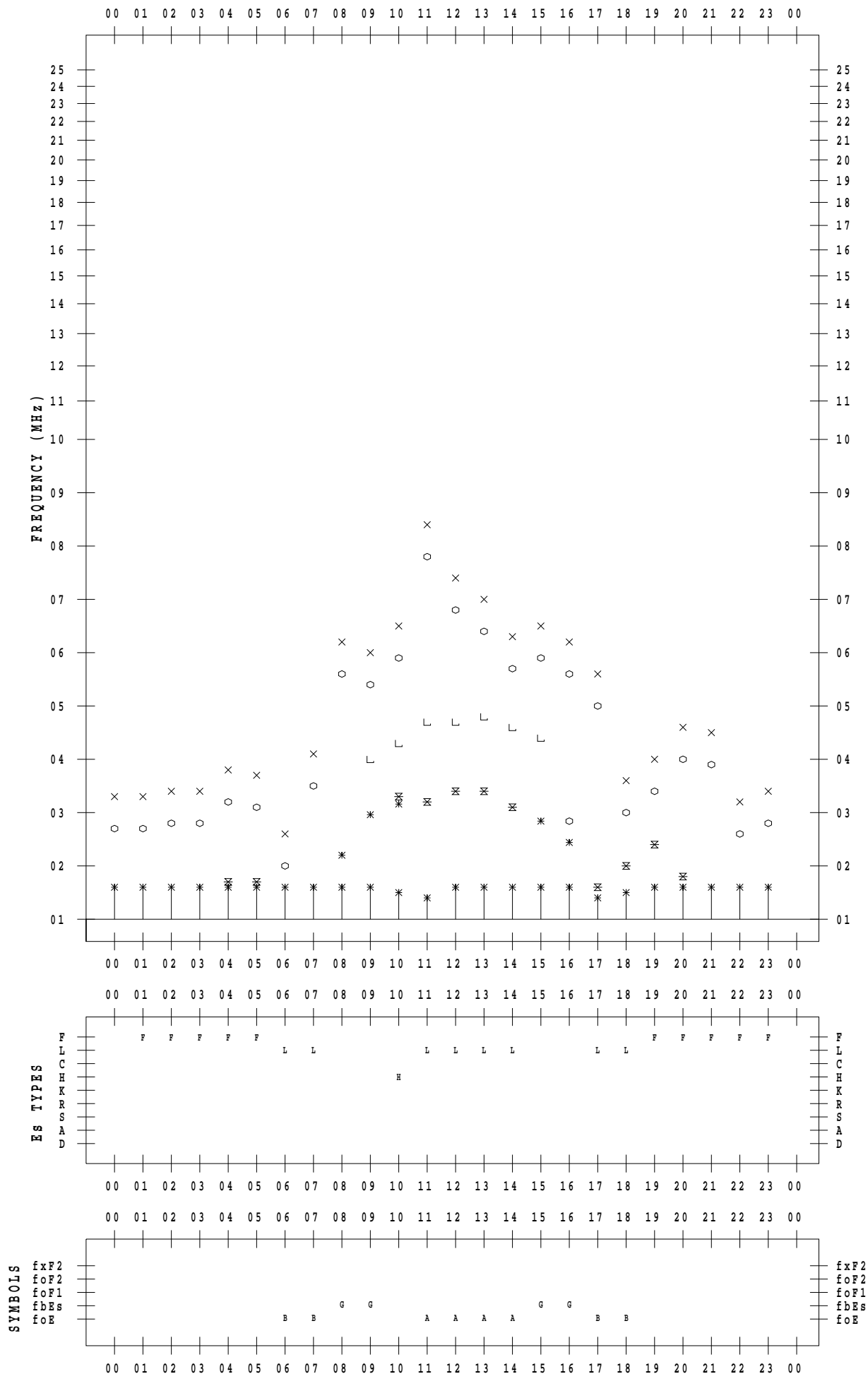
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/13

135 ° E MEAN TIME



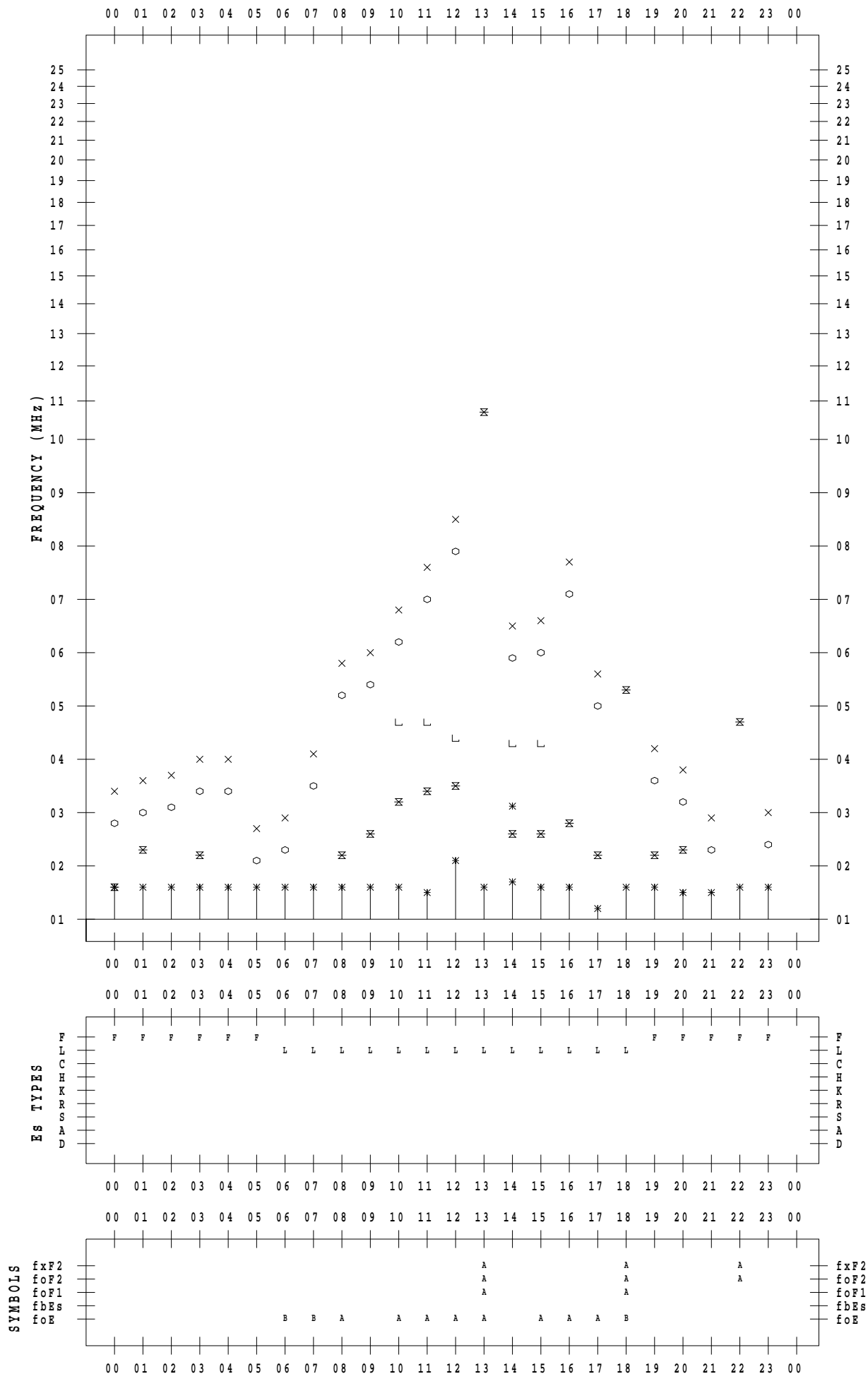
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/14

135 ° E MEAN TIME



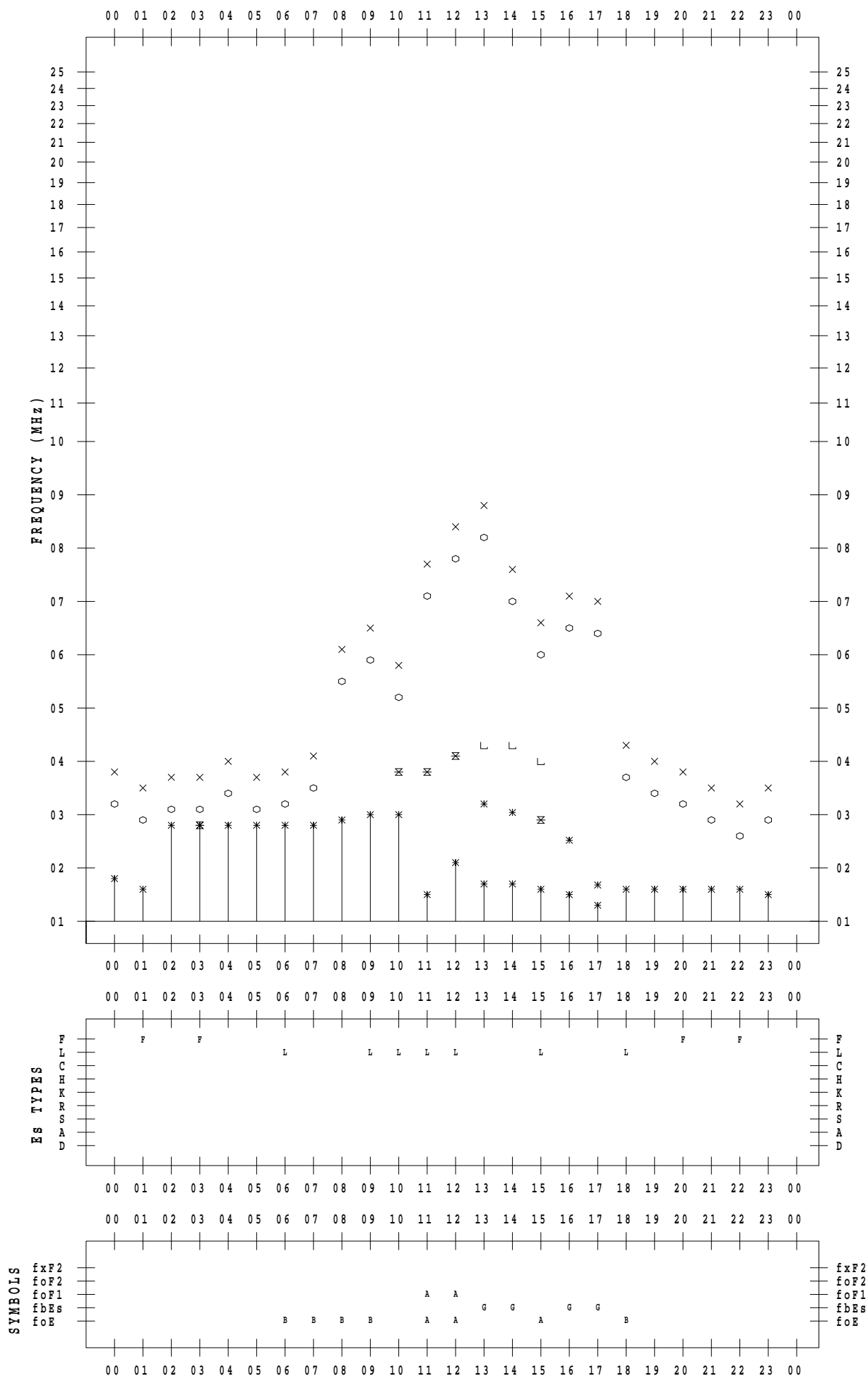
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/15

135 ° E MEAN TIME



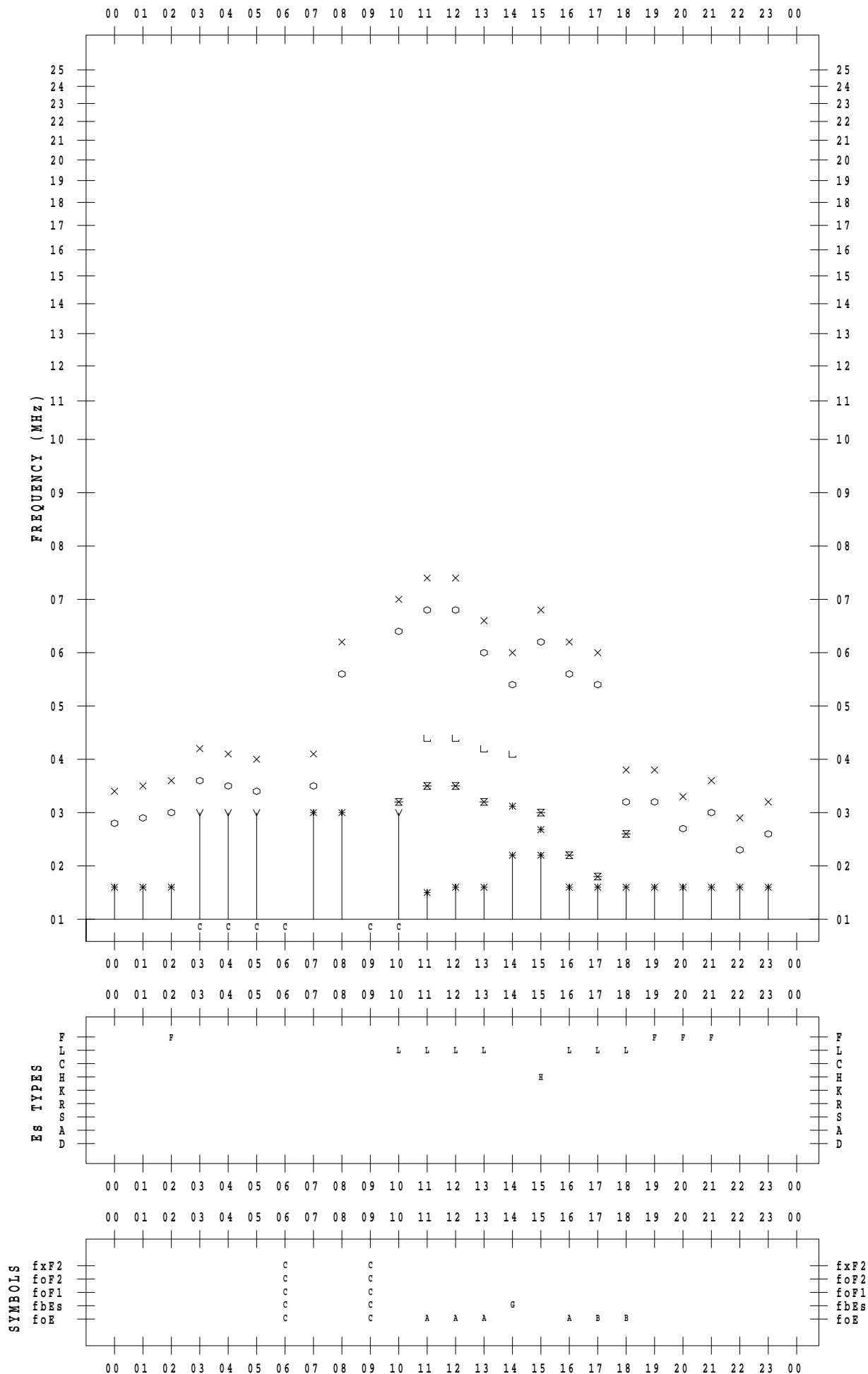
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/16

135 ° E MEAN TIME



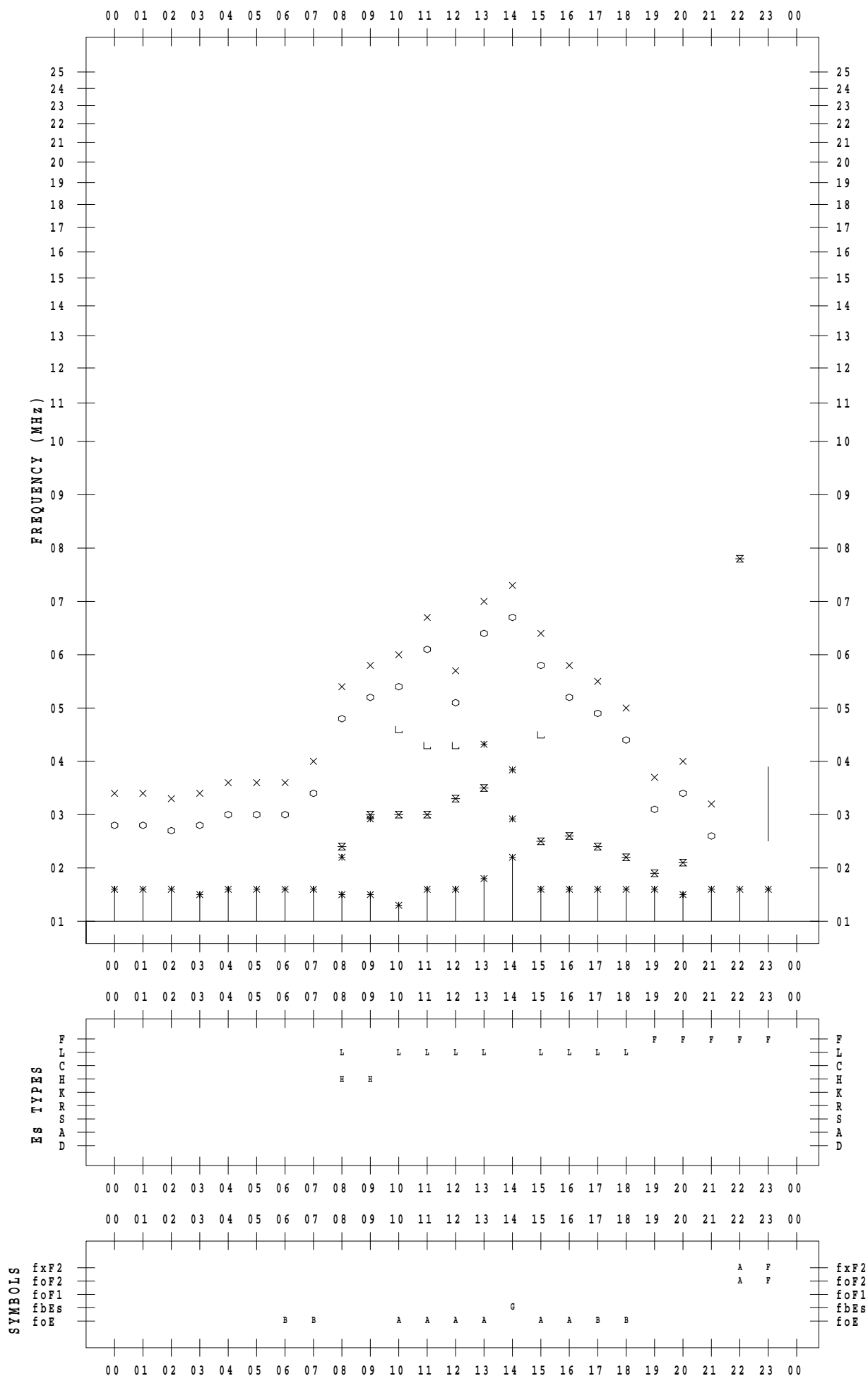
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/17

135 ° E MEAN TIME



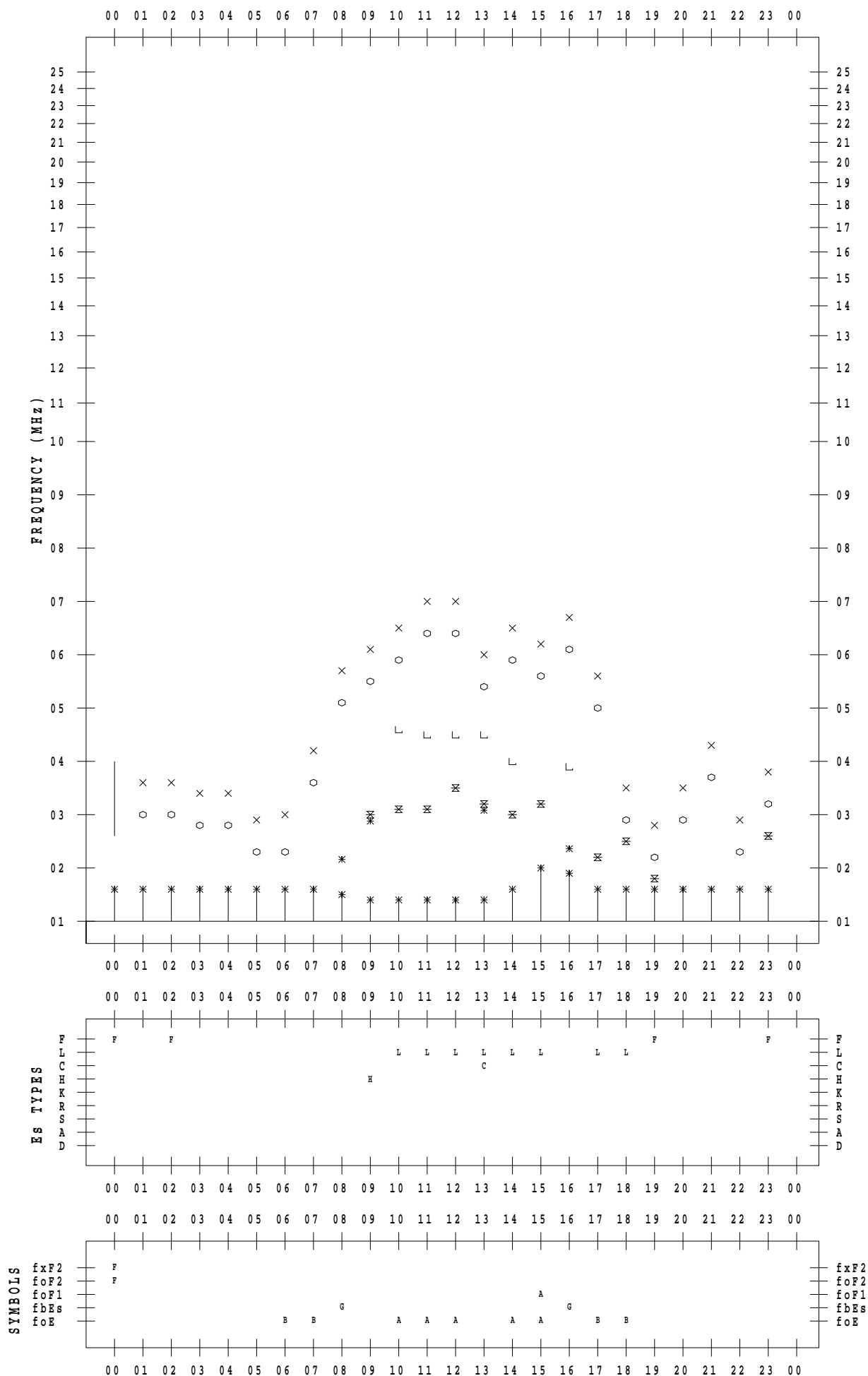
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/18

135 ° E MEAN TIME



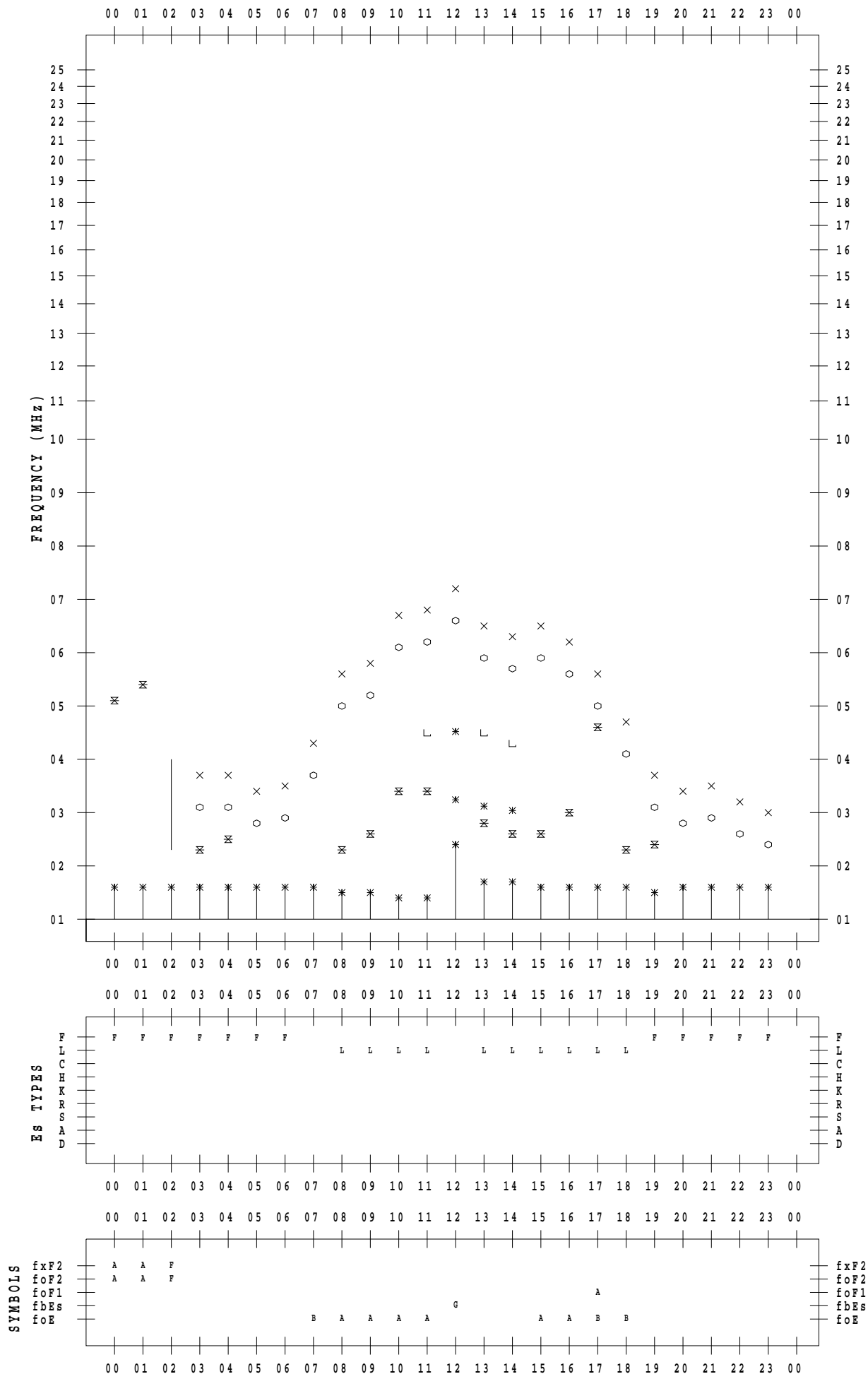
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/19

135 ° E MEAN TIME



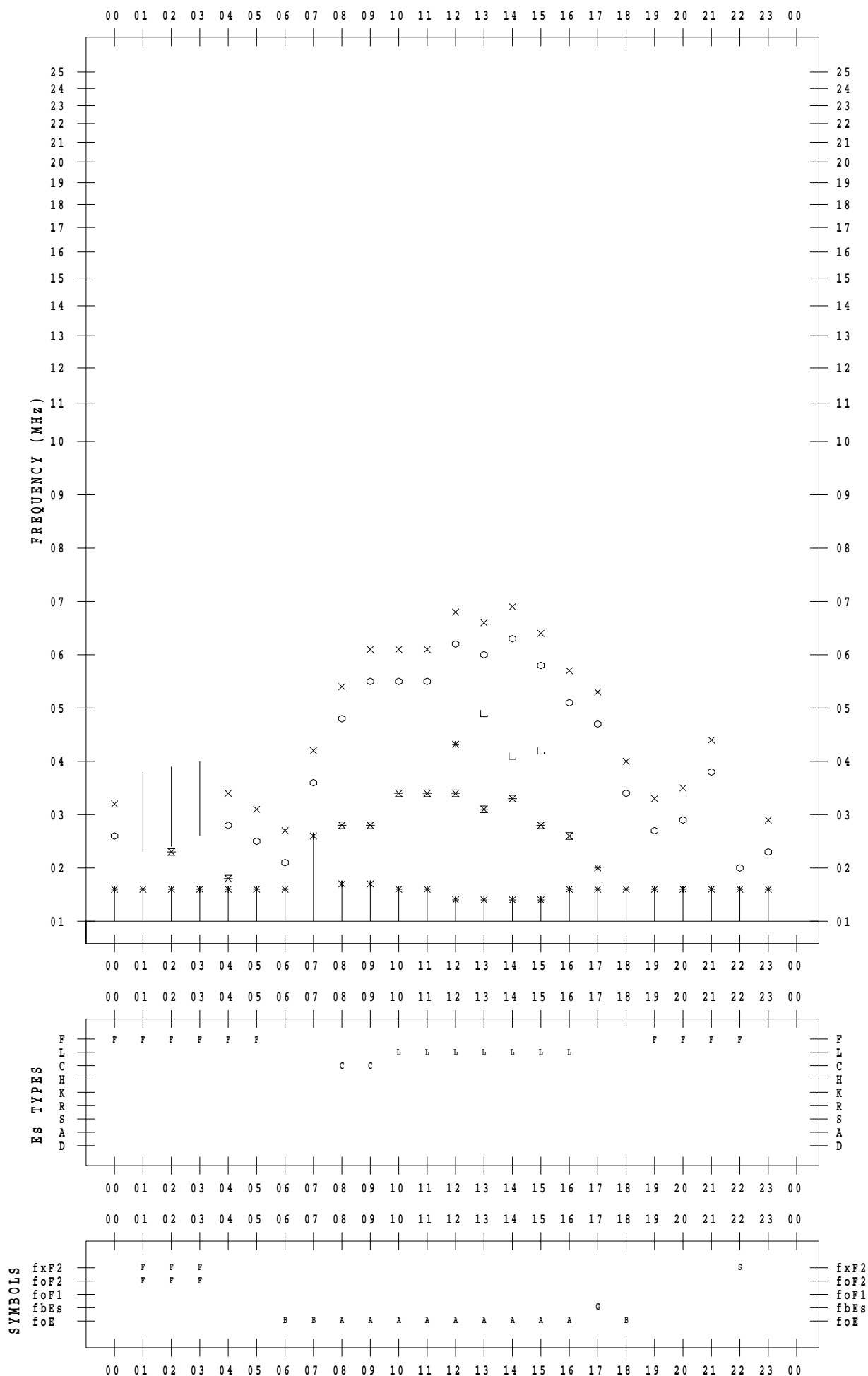
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/20

135 ° E MEAN TIME



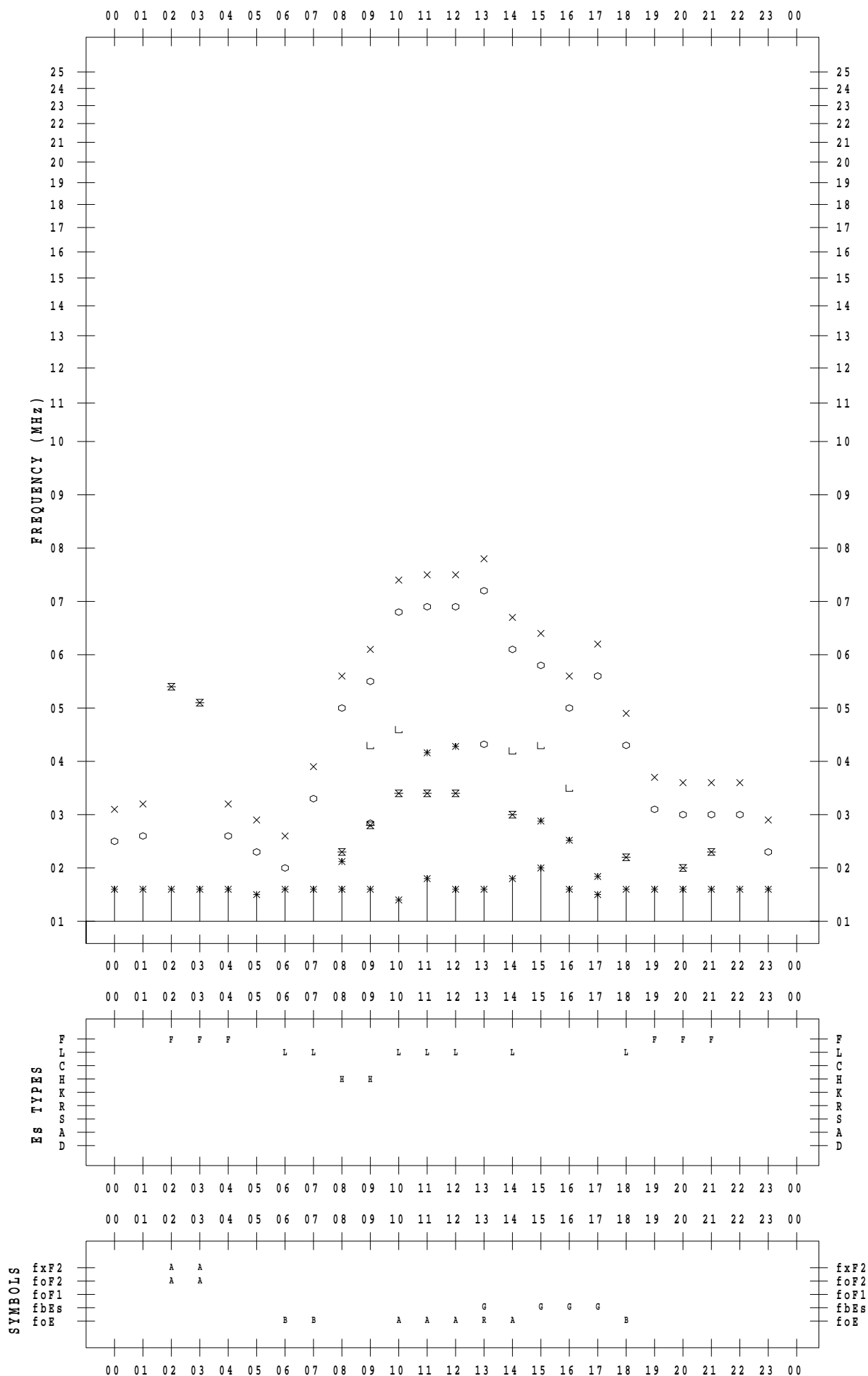
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/21

135 ° E MEAN TIME



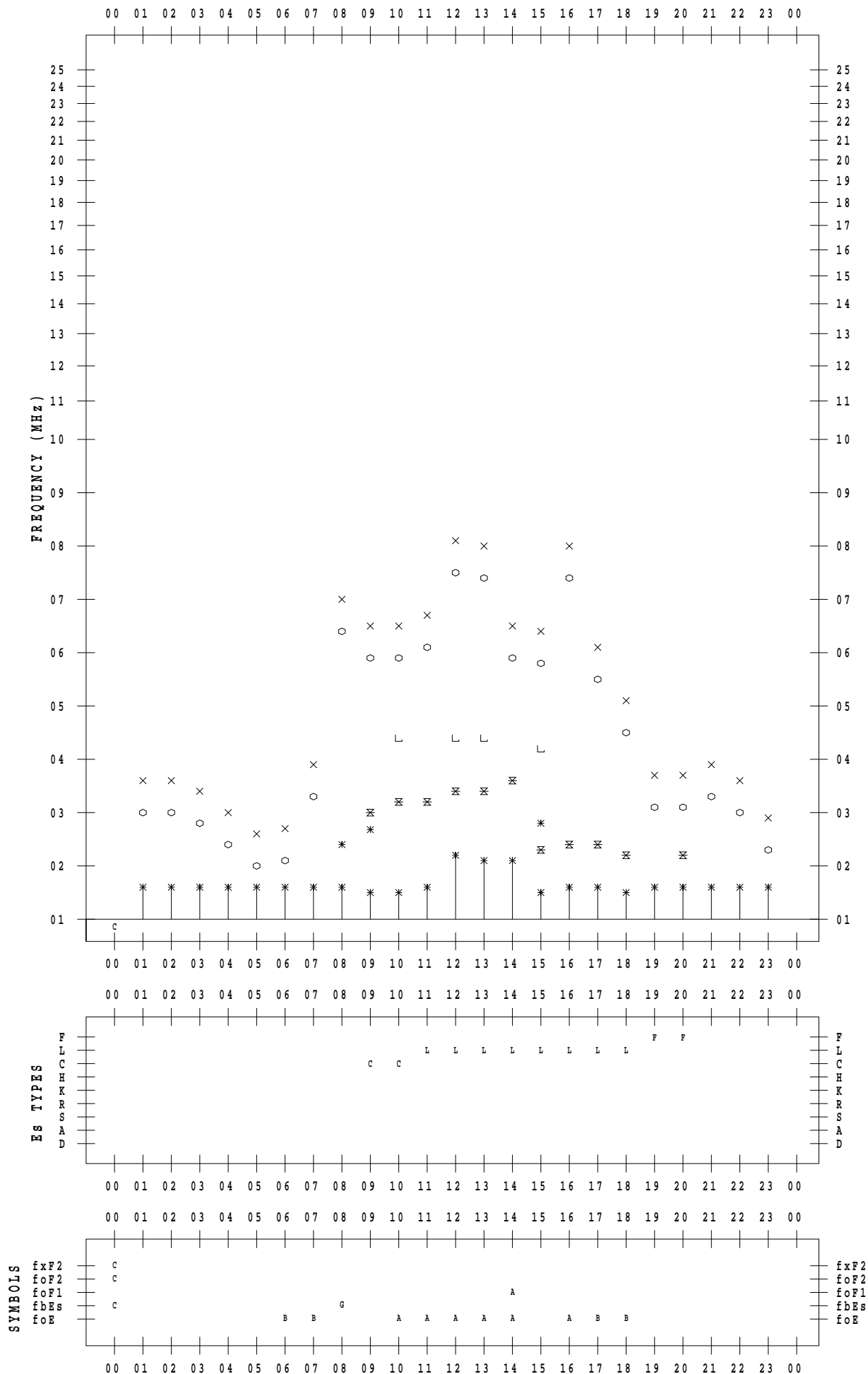
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/22

135 ° E MEAN TIME



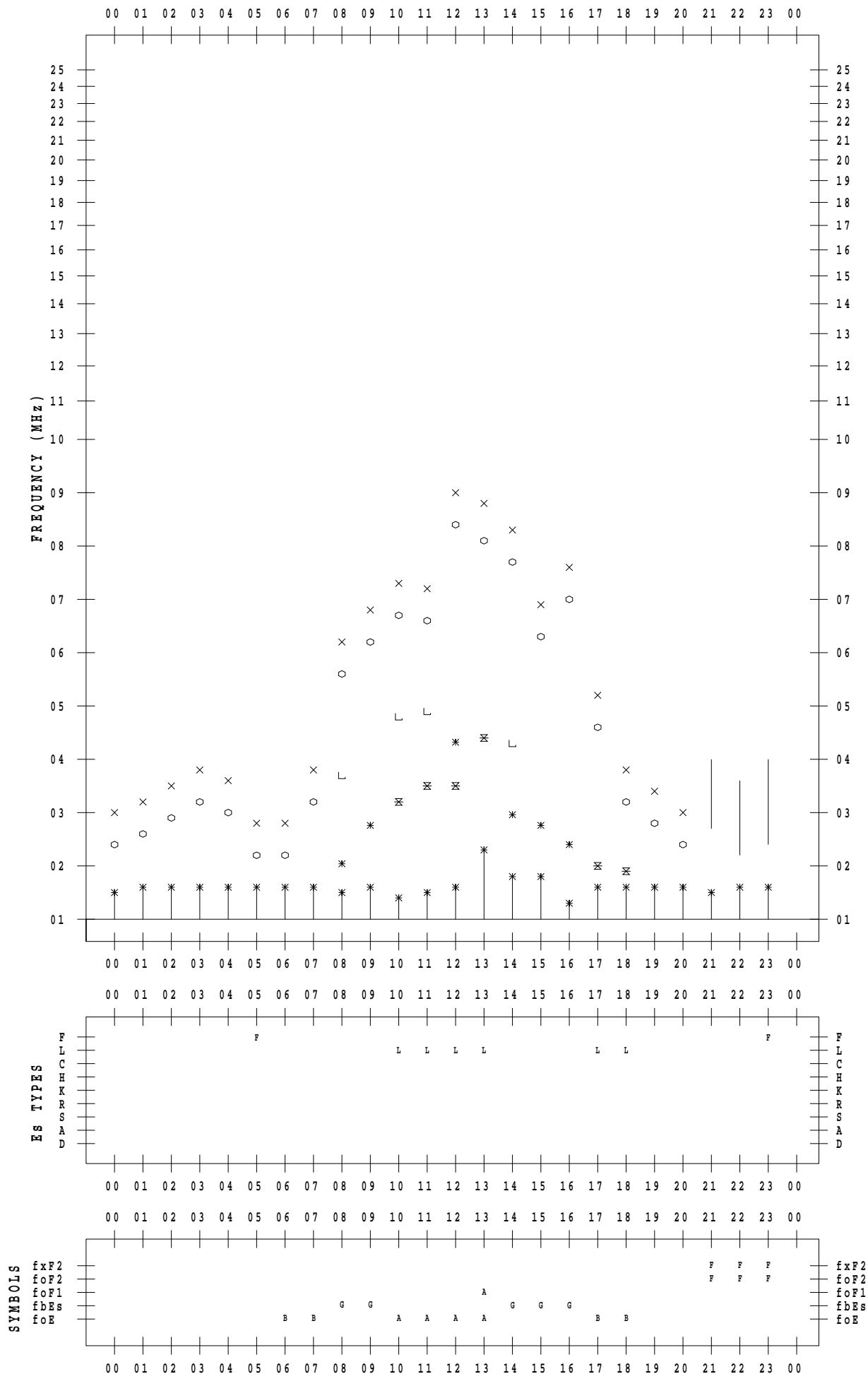
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/23

135 ° E MEAN TIME



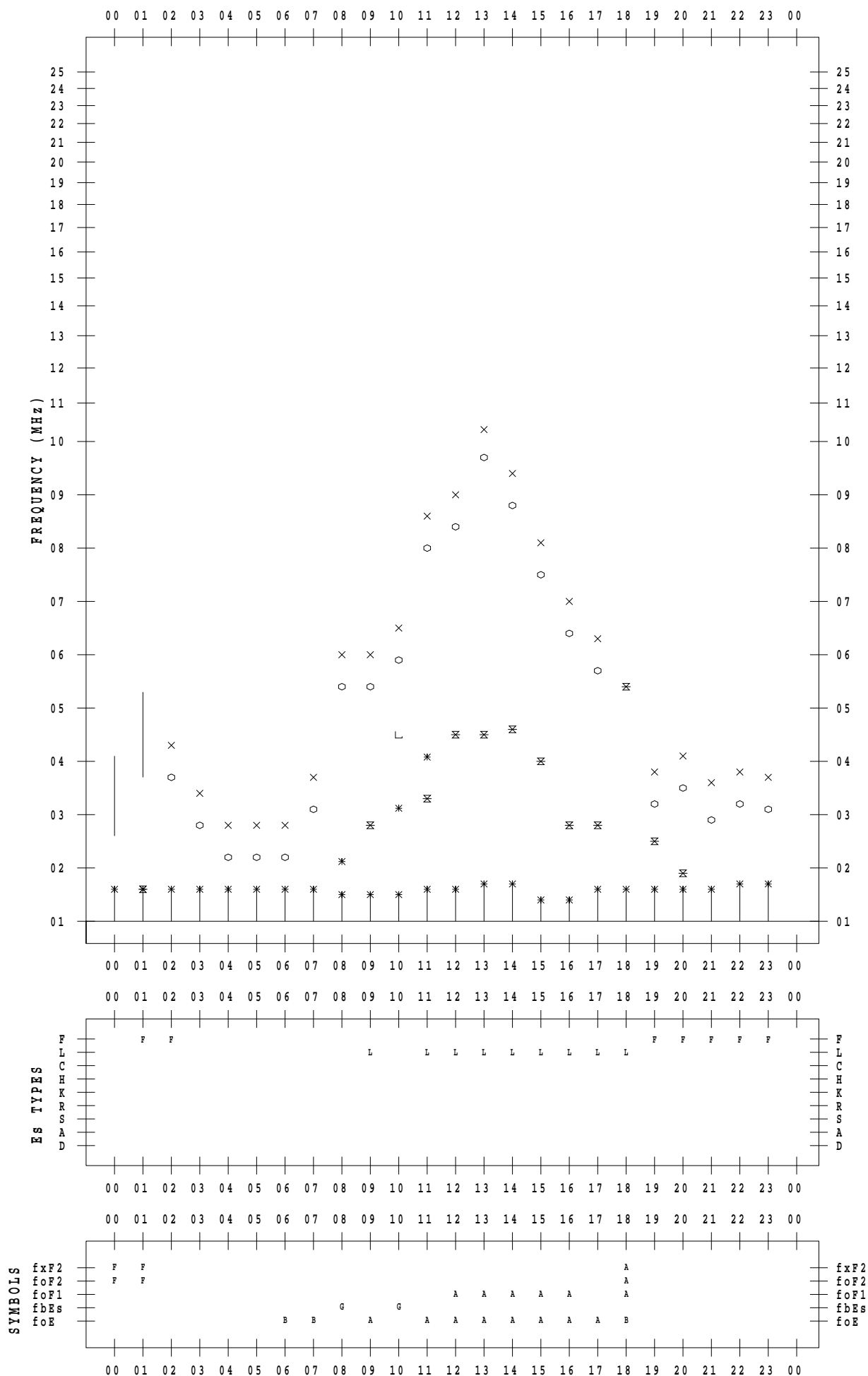
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/24

135 ° E MEAN TIME



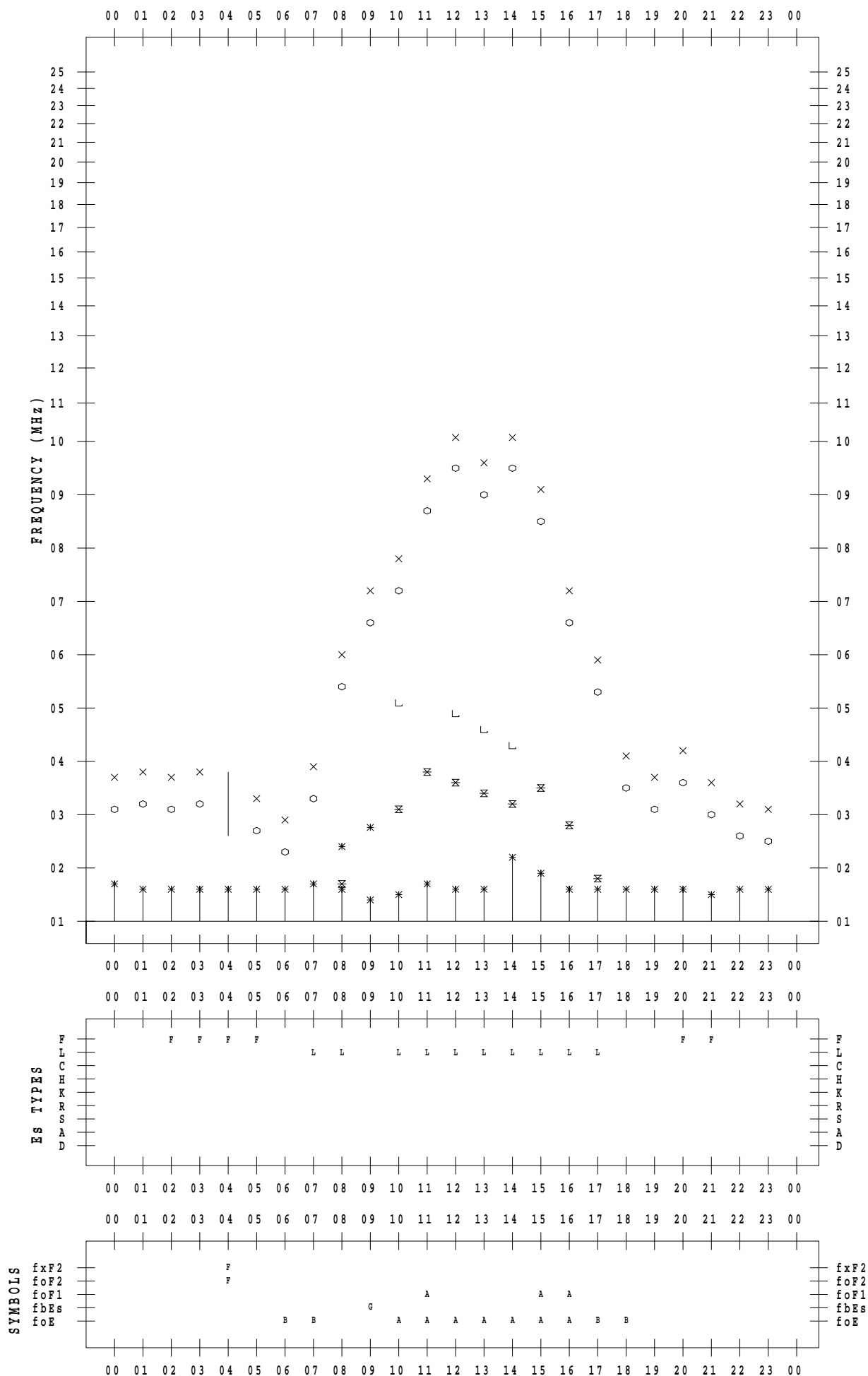
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/25

135 ° E MEAN TIME



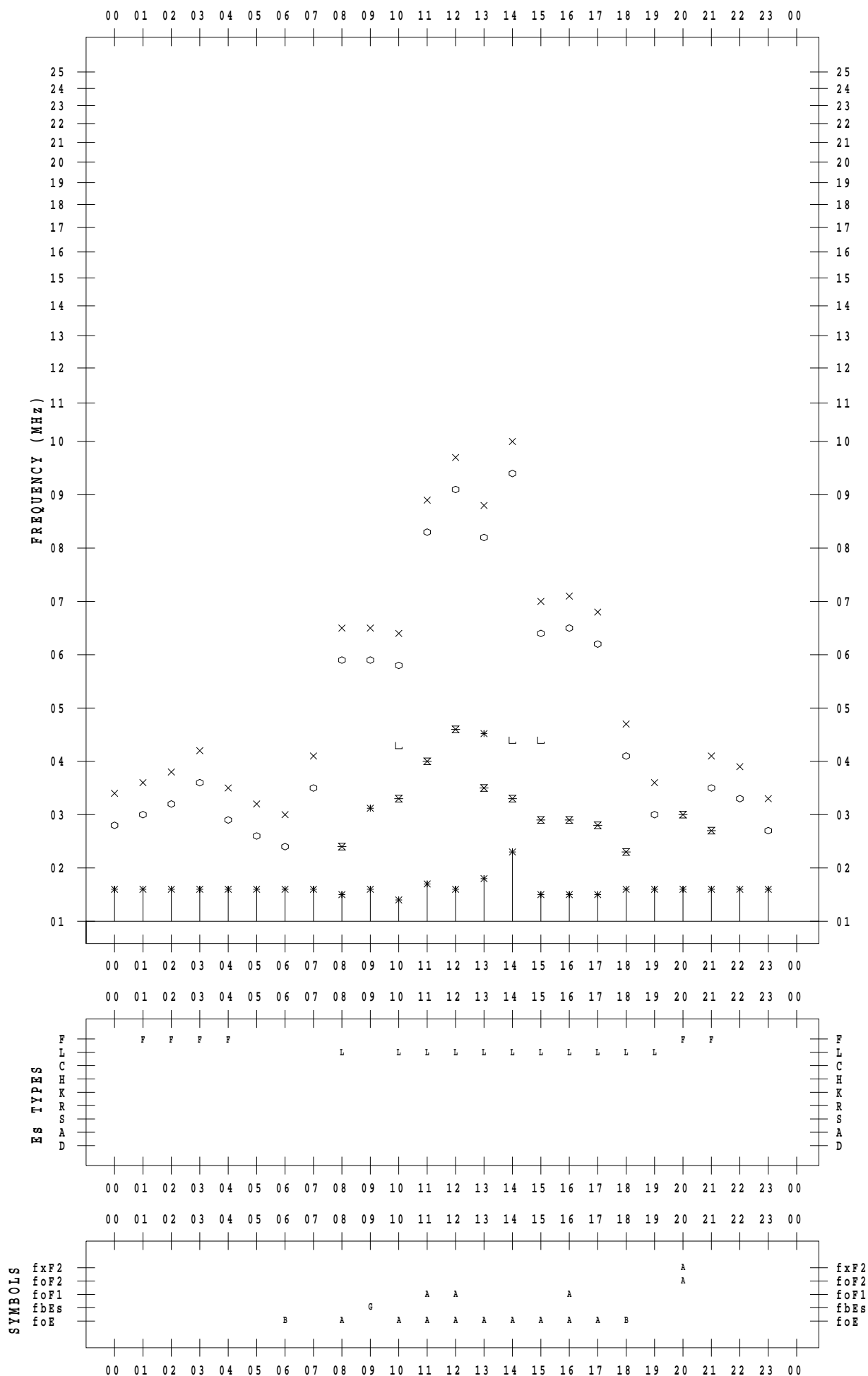
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/26

135 ° E MEAN TIME



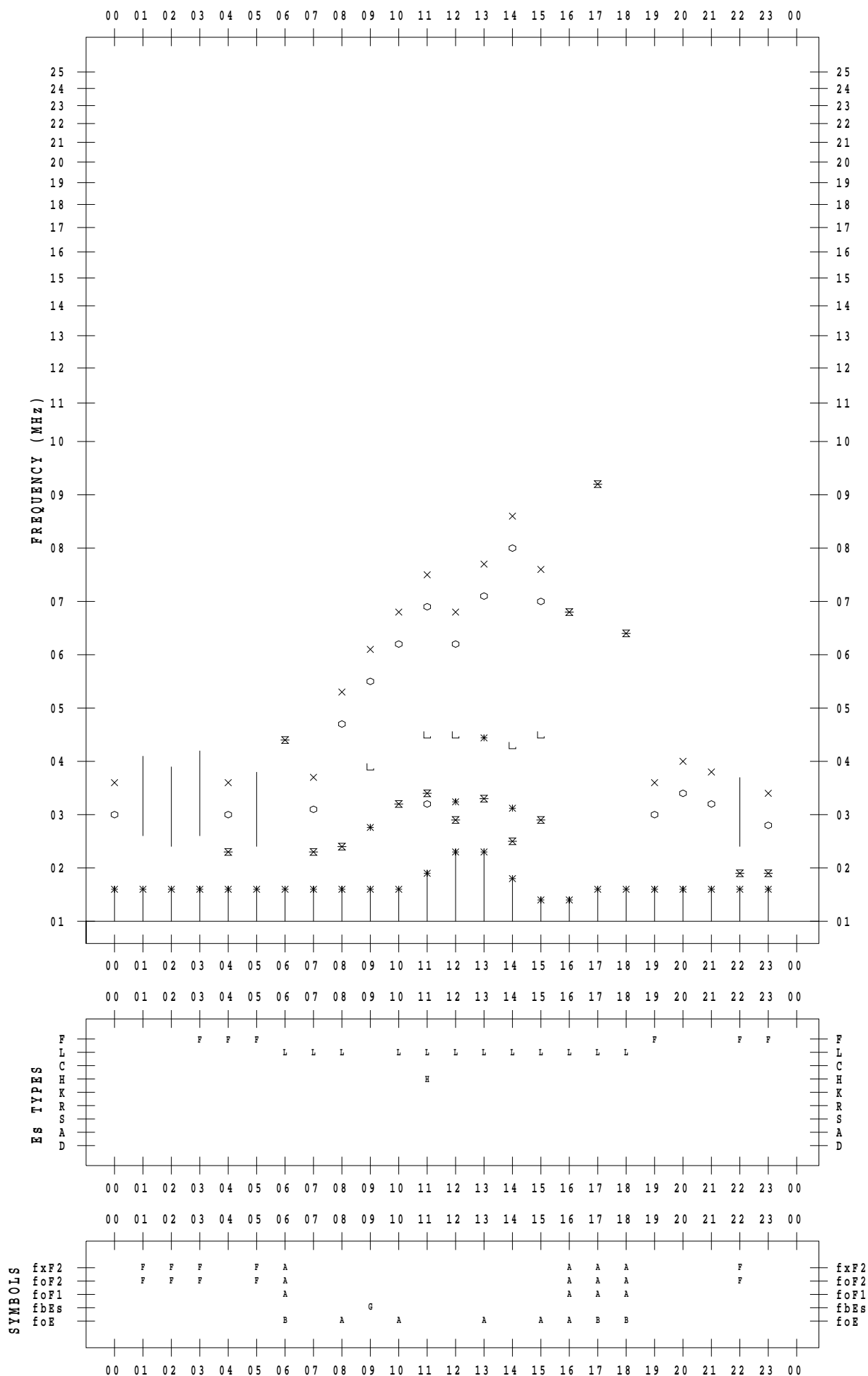
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/27

135 ° E MEAN TIME



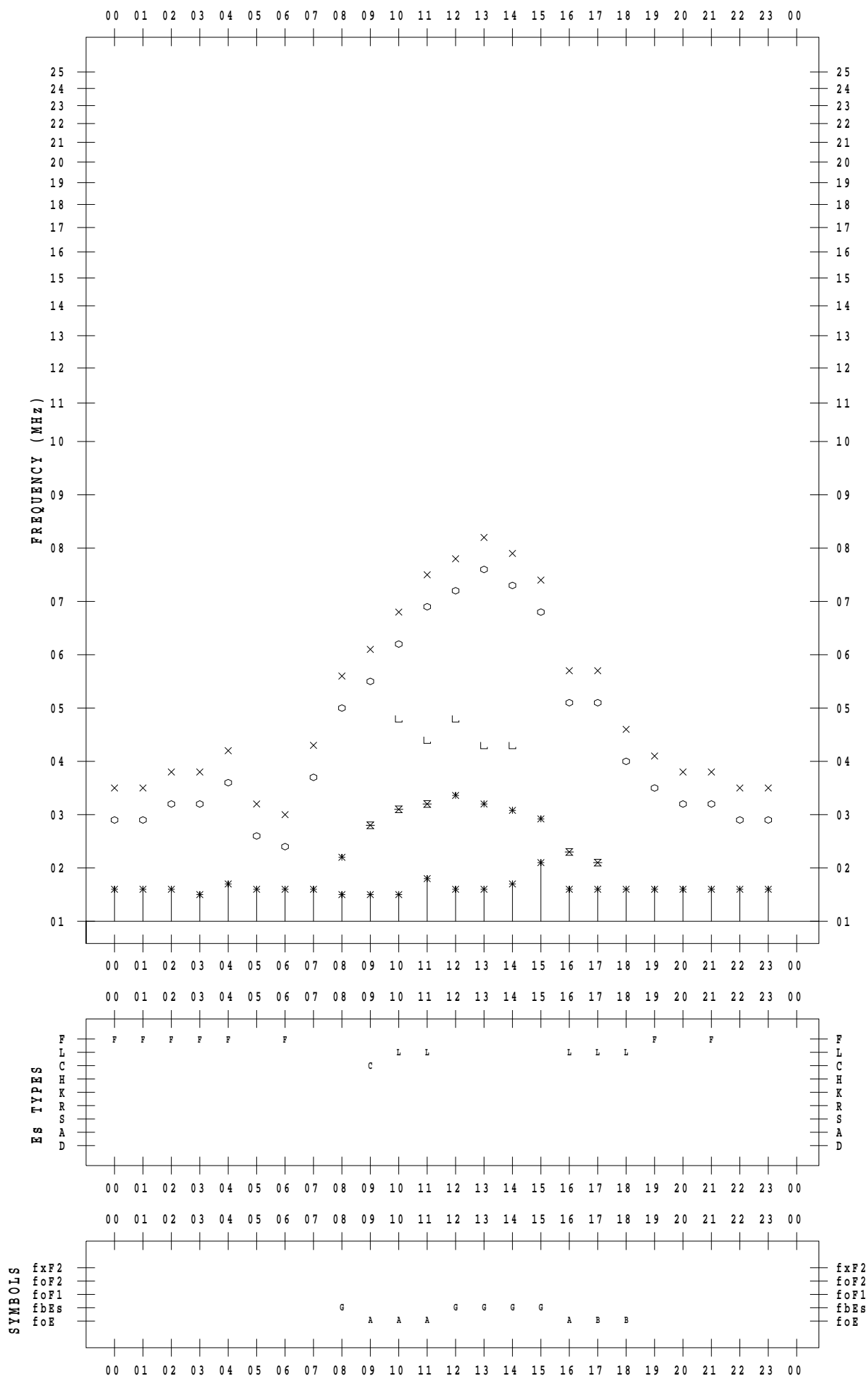
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/28

135 ° E MEAN TIME



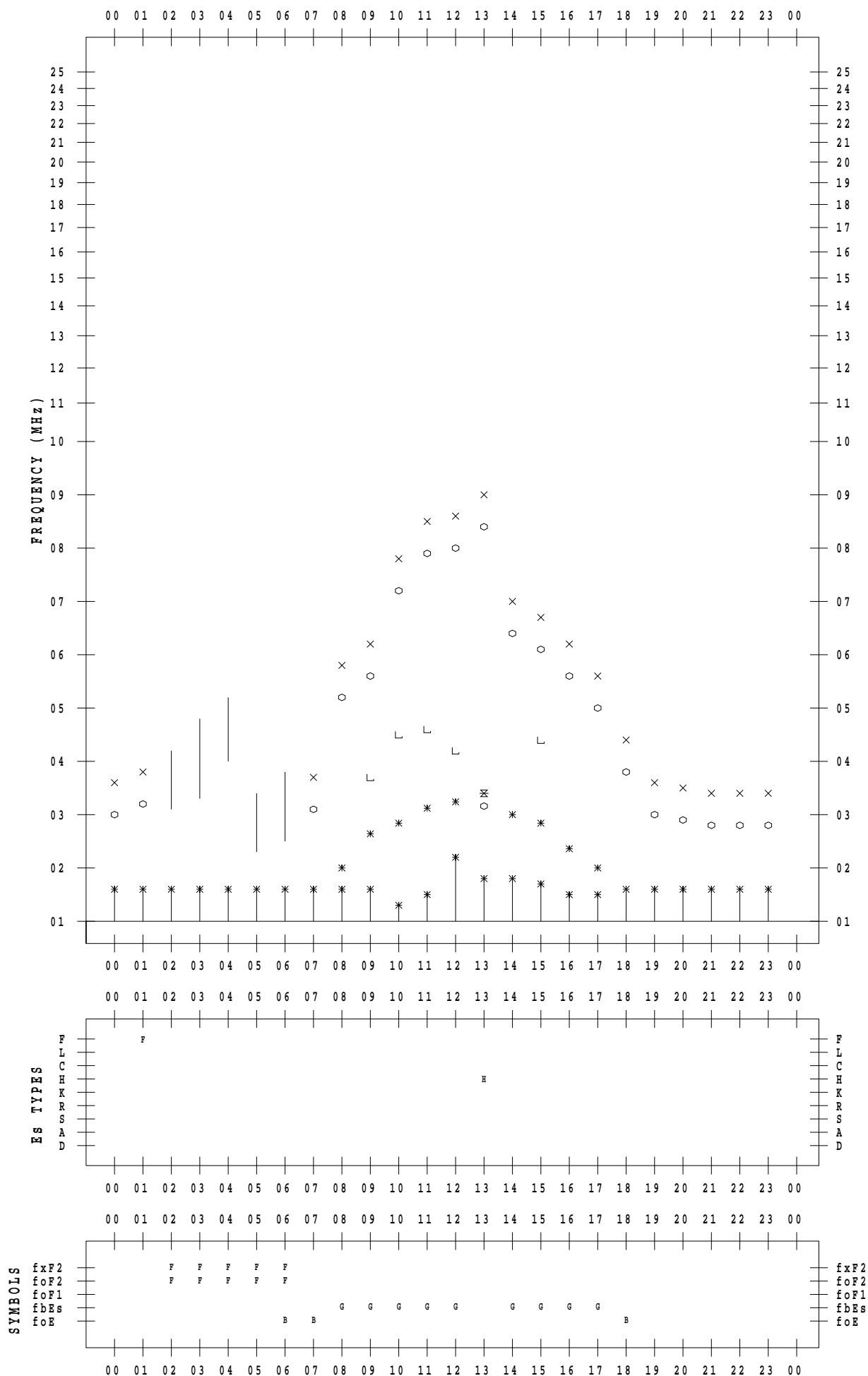
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/29

135 ° E MEAN TIME



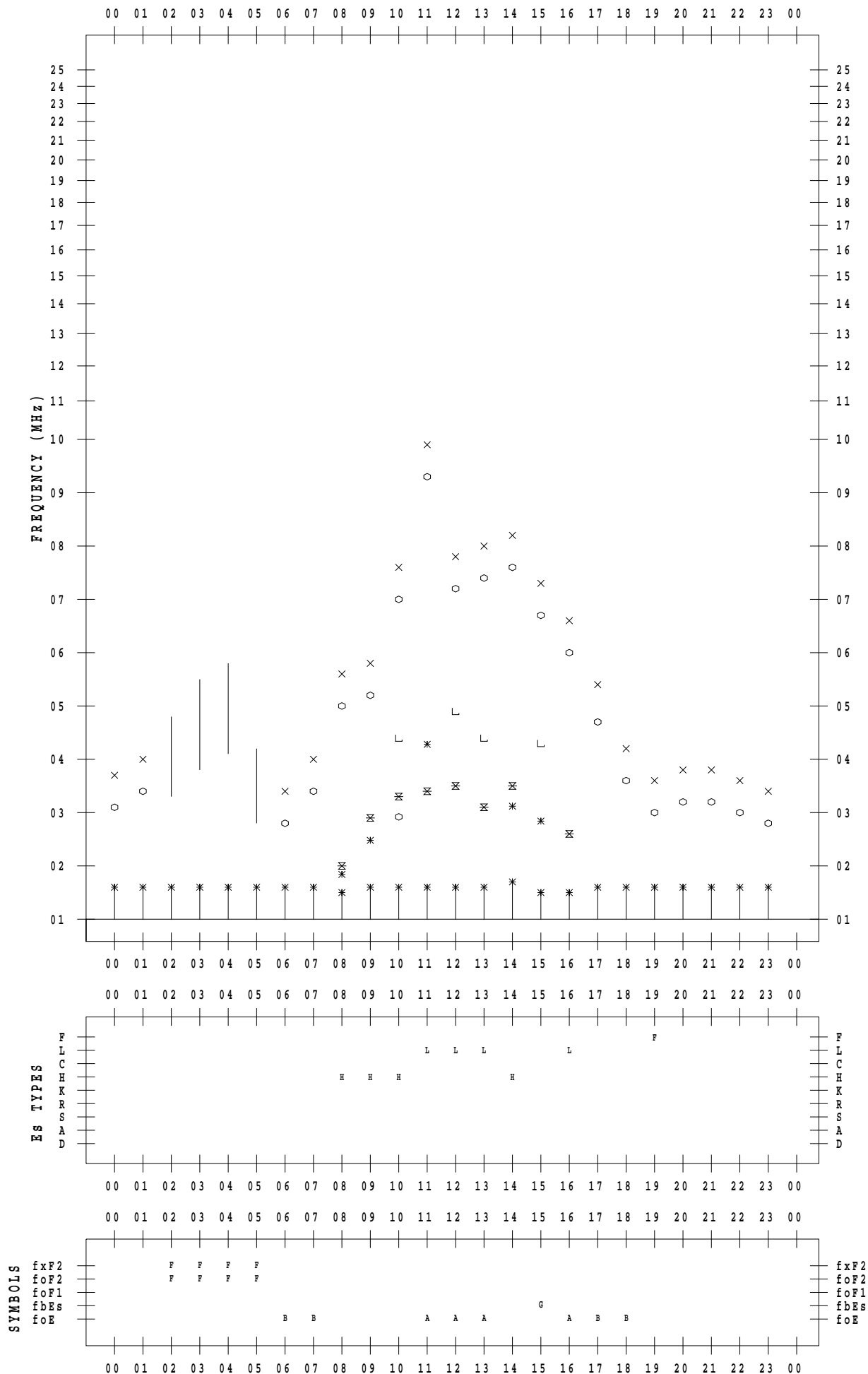
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/30

135 ° E MEAN TIME



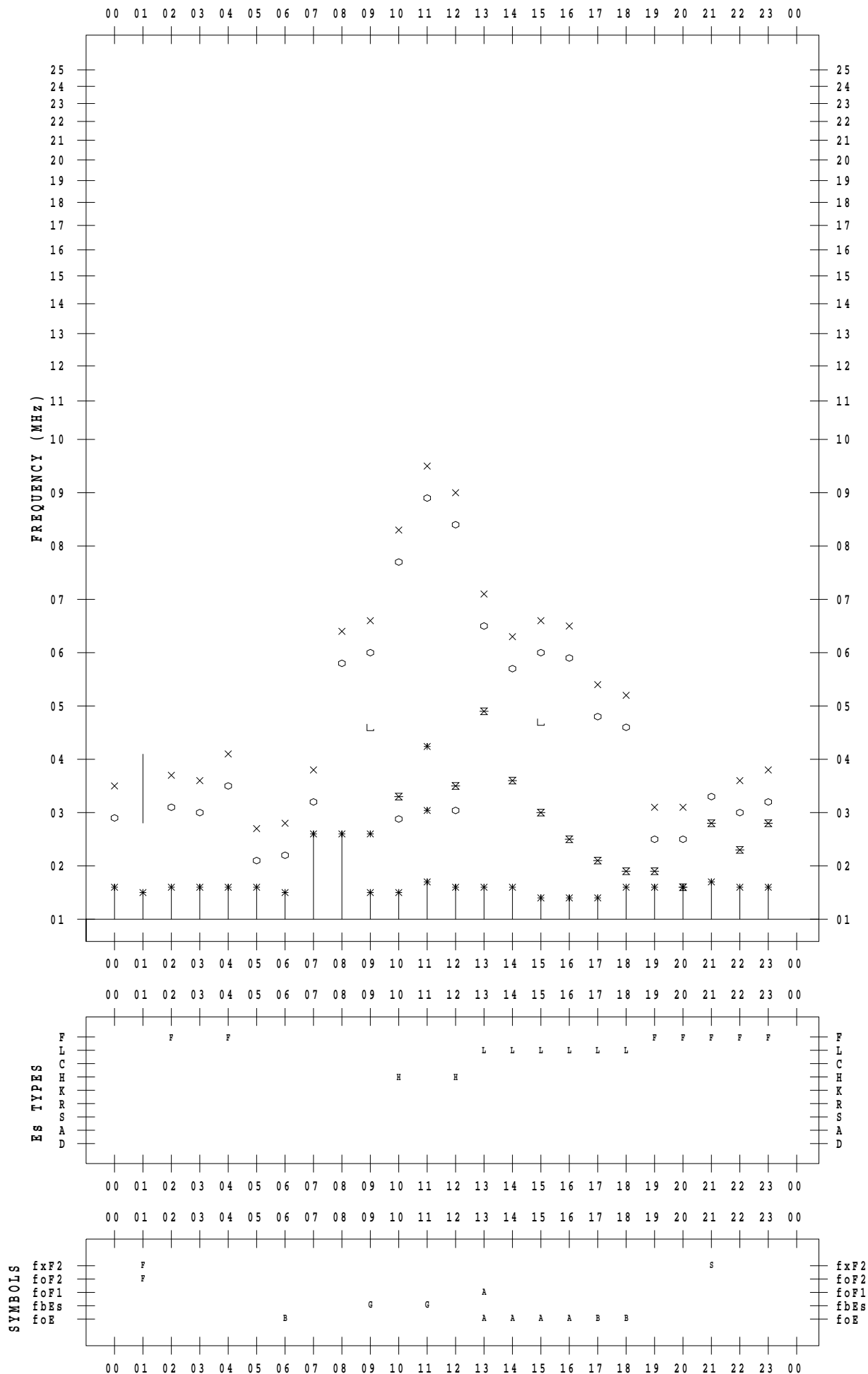
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2020/12/31

135 ° E MEAN TIME



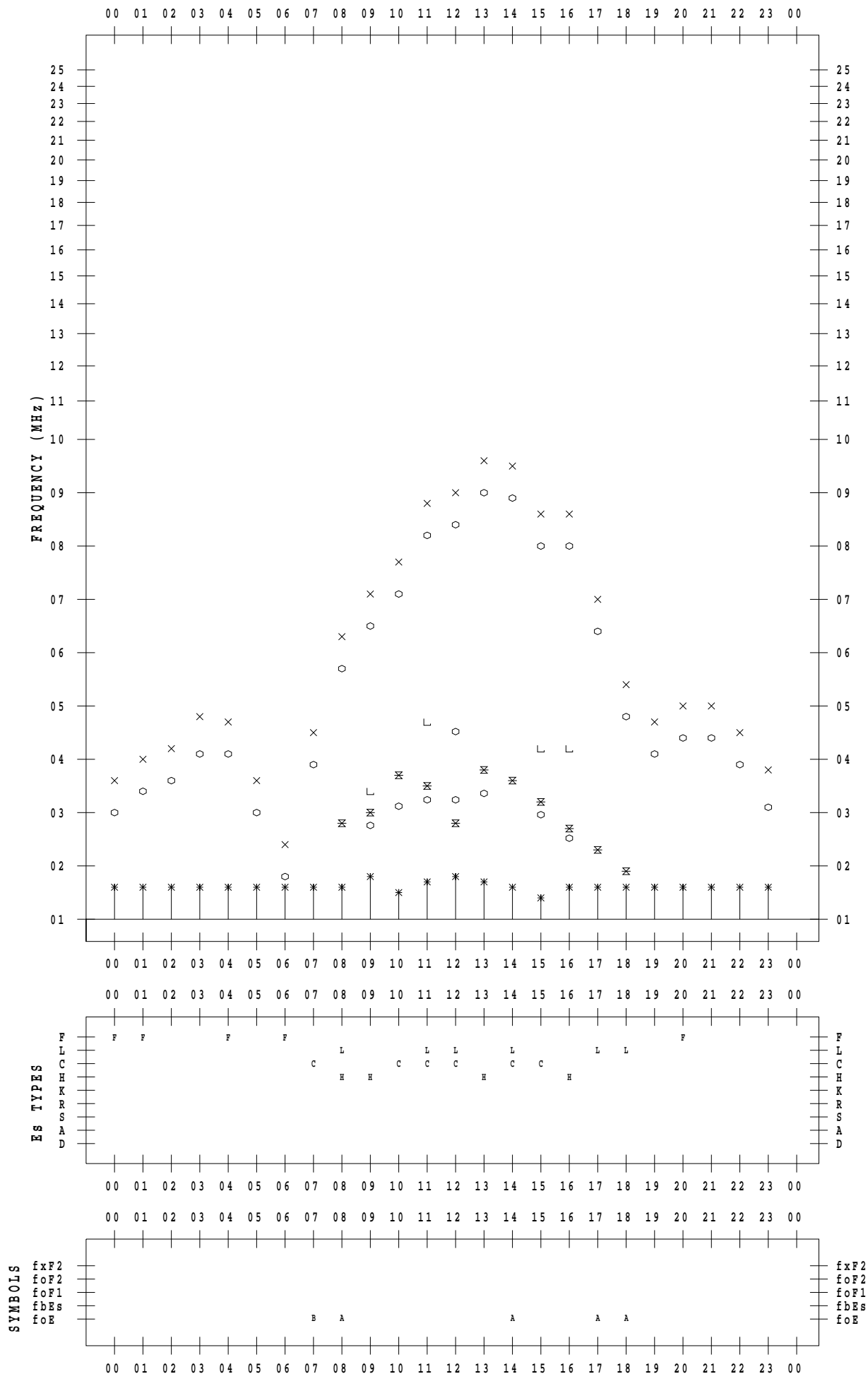
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/ 1

135 ° E MEAN TIME



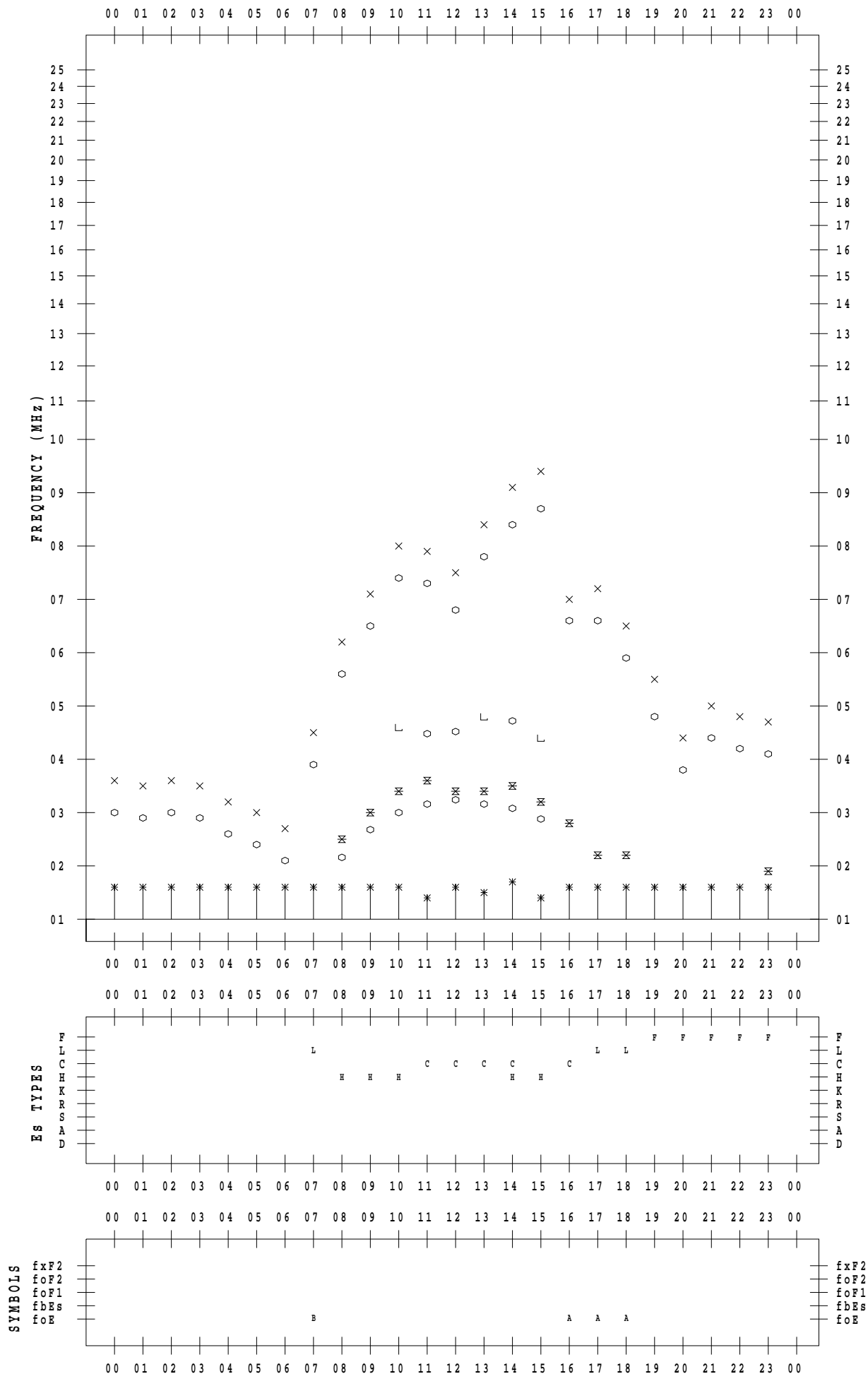
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/ 2

135 ° E MEAN TIME



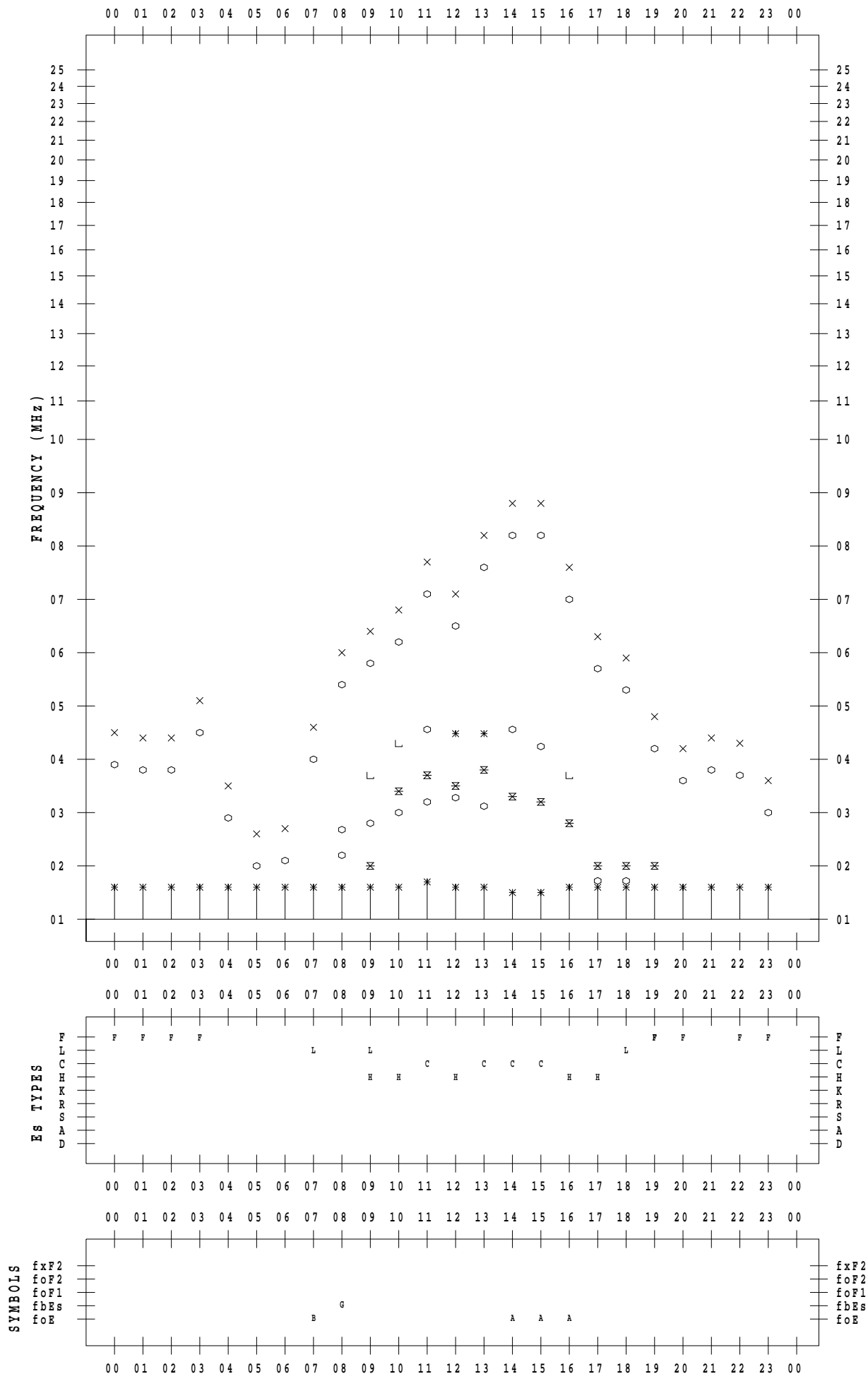
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/ 3

135 ° E MEAN TIME



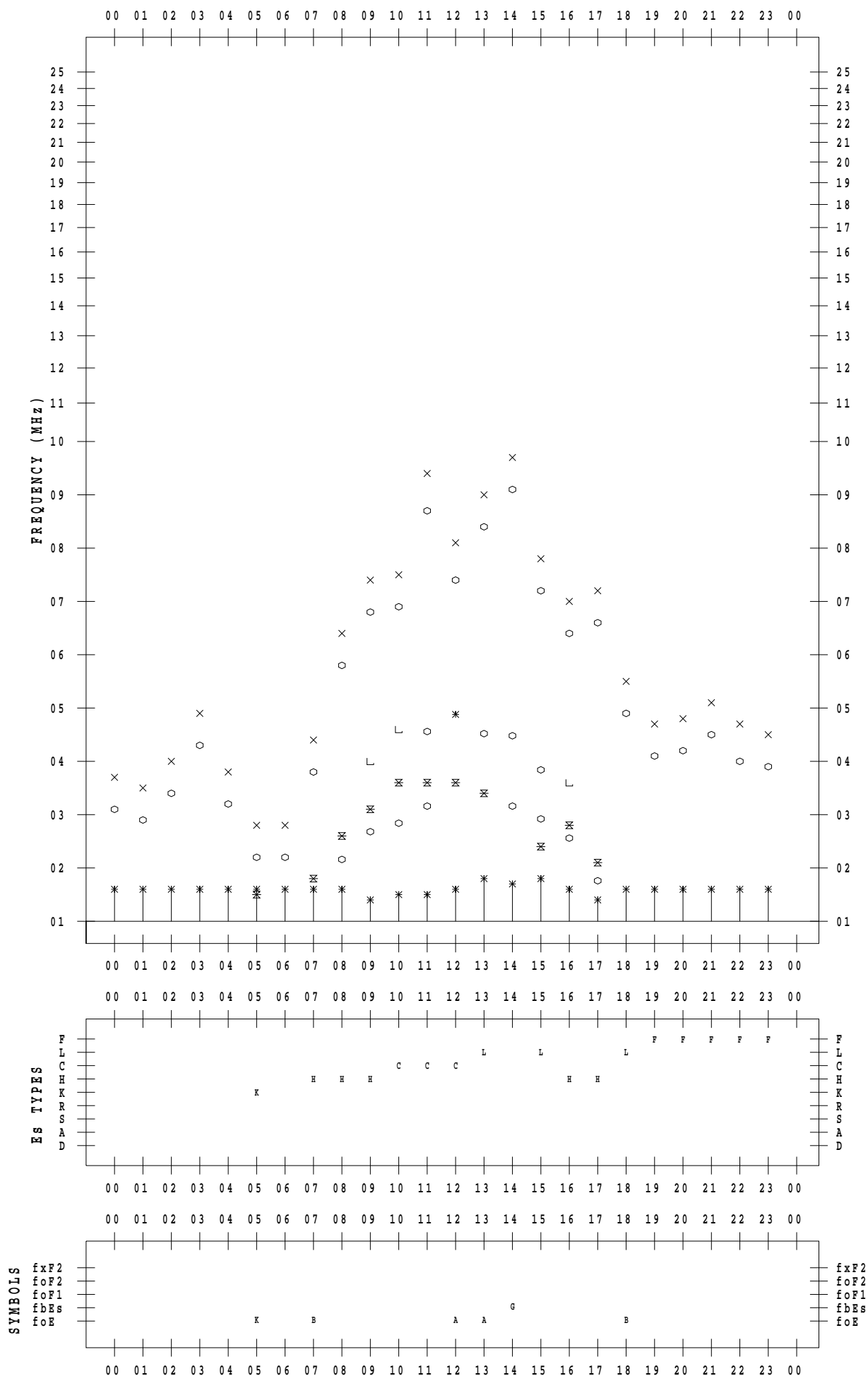
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/ 4

135 ° E MEAN TIME



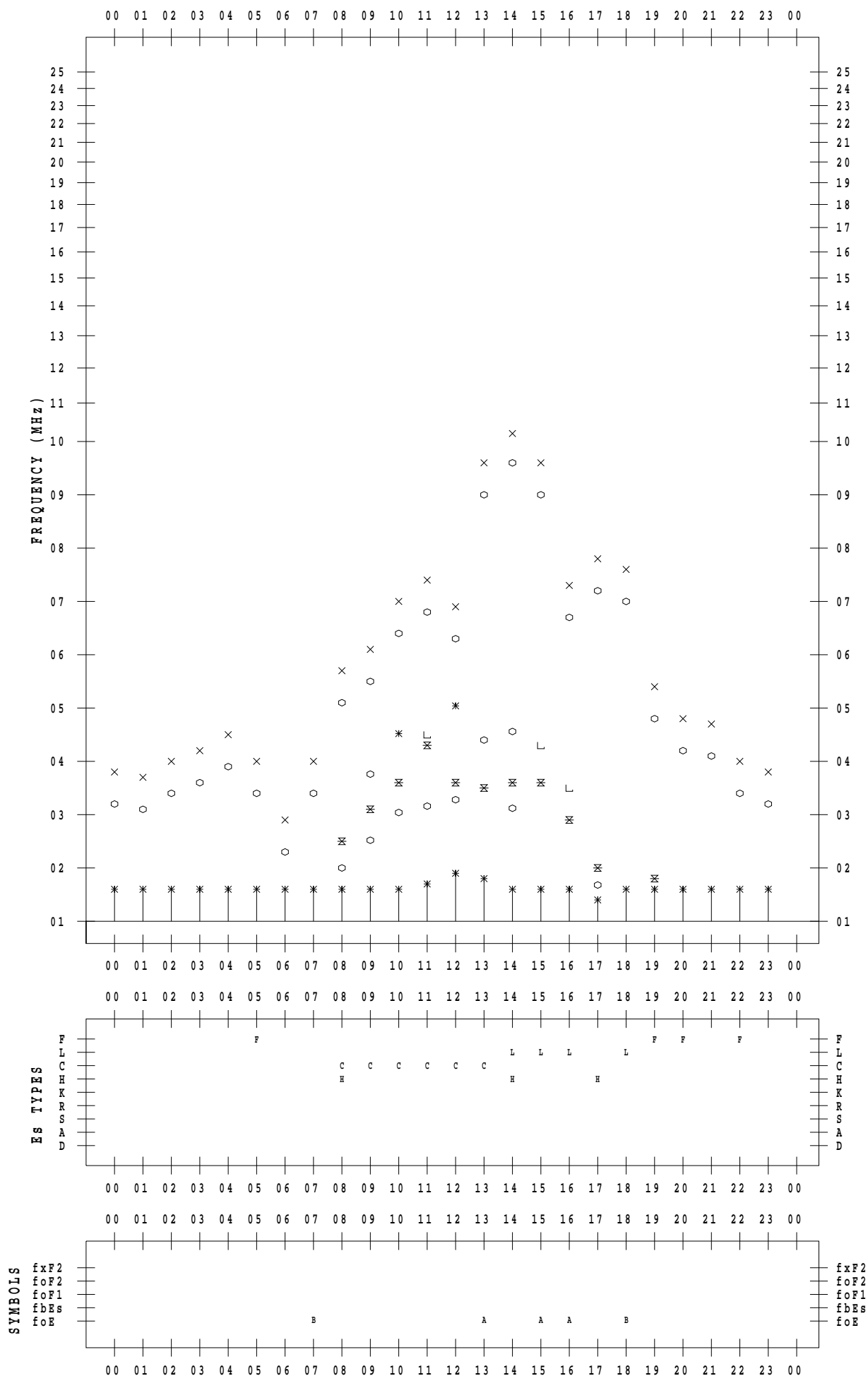
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/ 5

135 ° E MEAN TIME



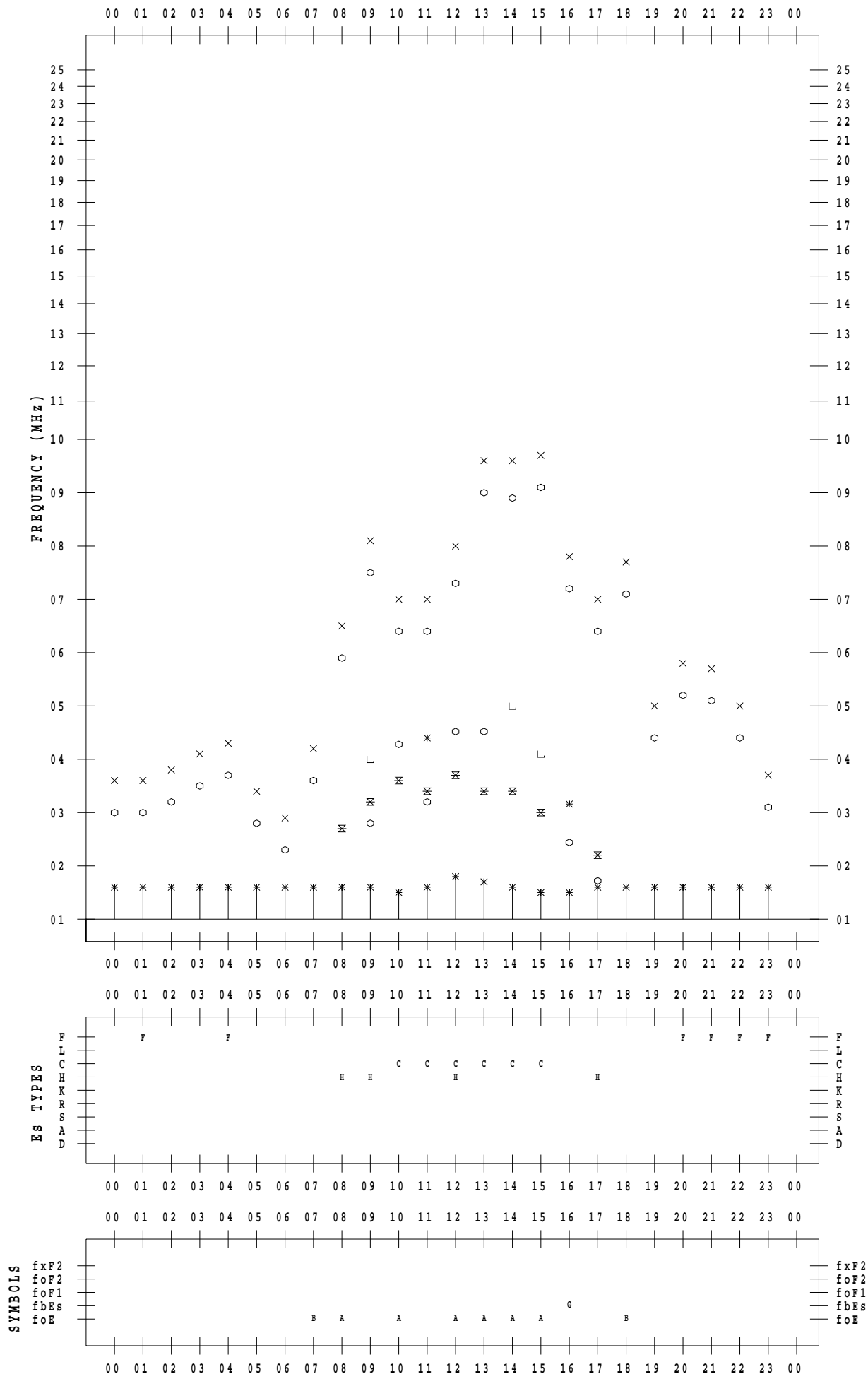
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/ 6

135 ° E MEAN TIME



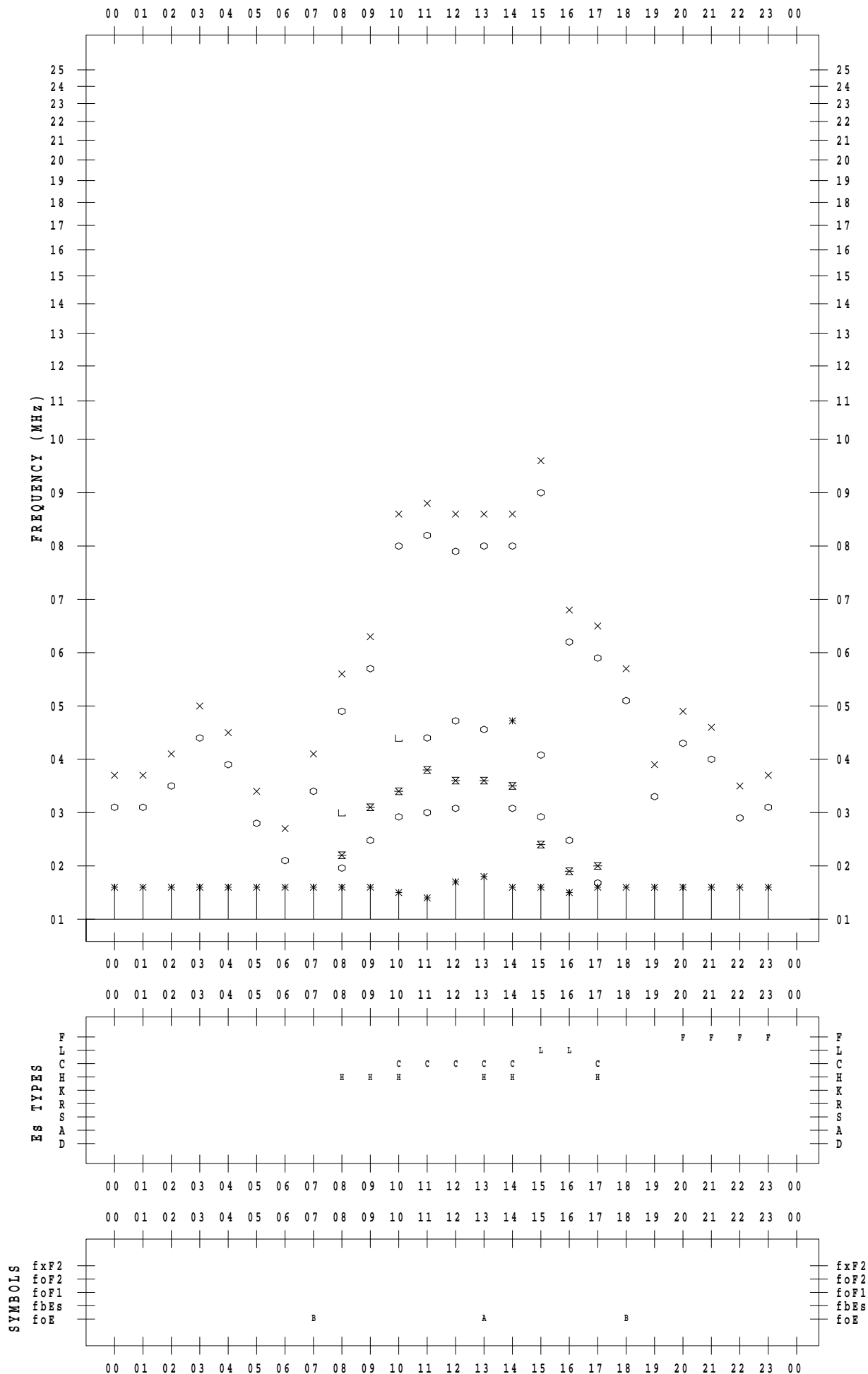
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/7

135 ° E MEAN TIME



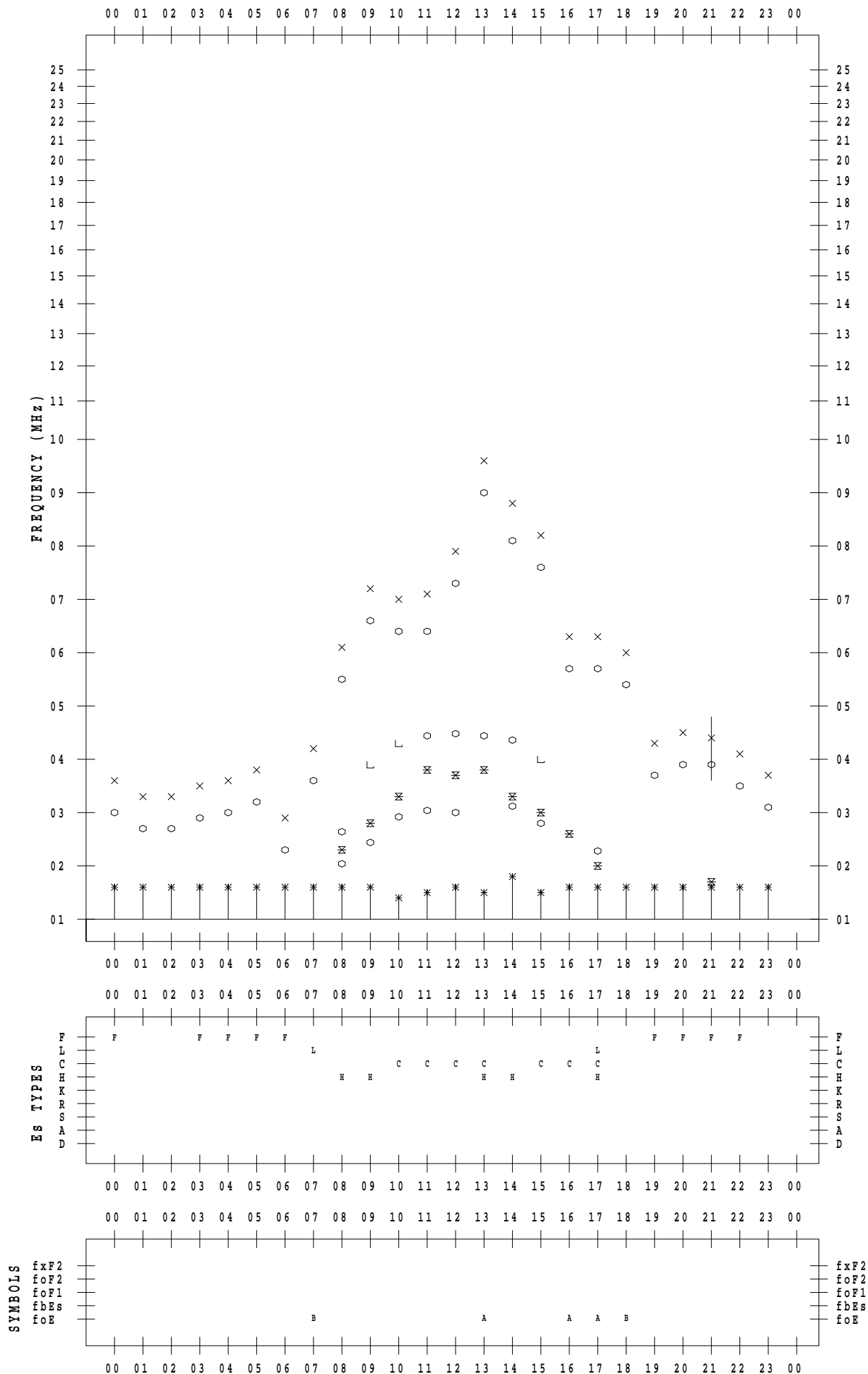
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/ 8

135 ° E MEAN TIME



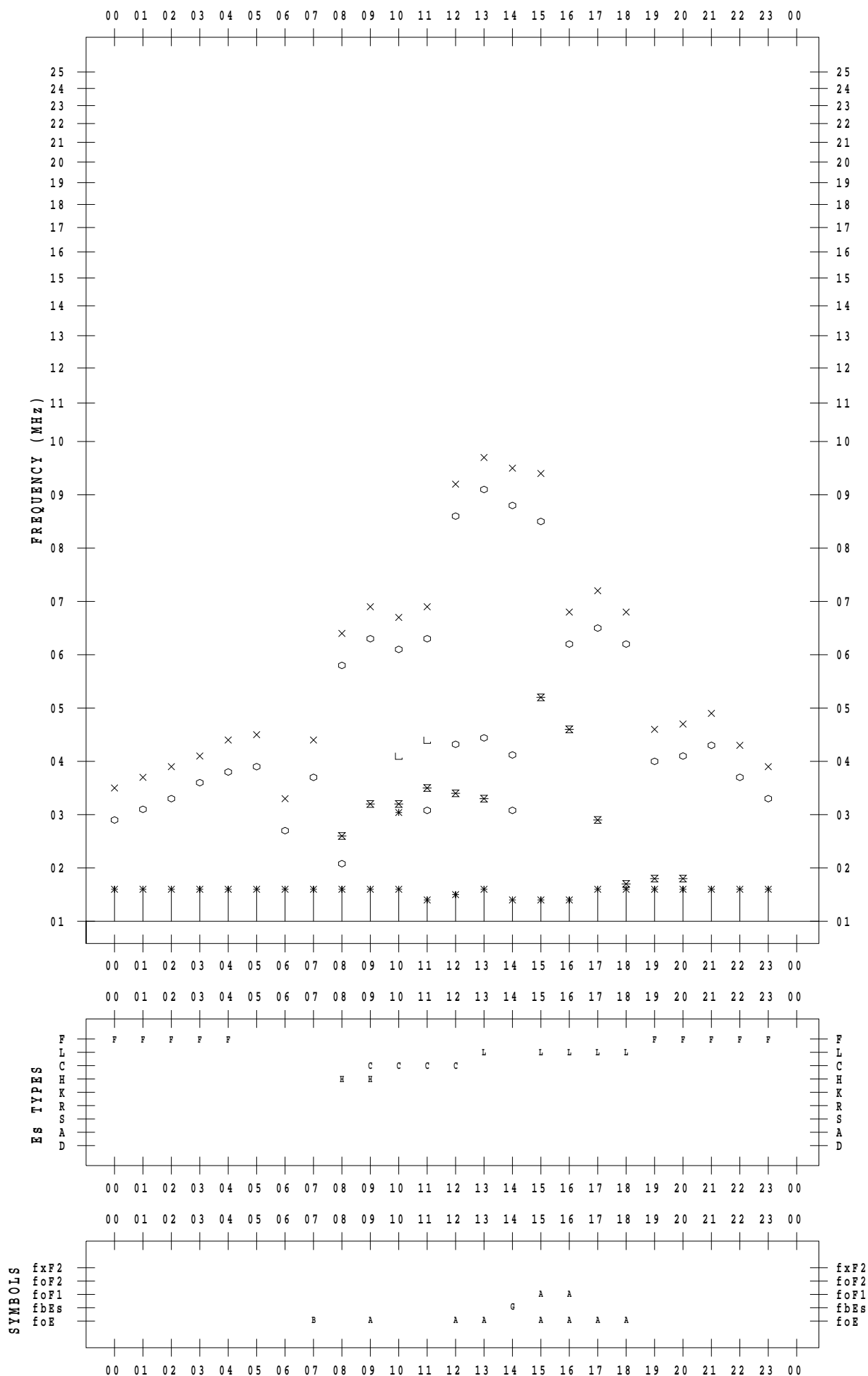
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/ 9

135 ° E MEAN TIME



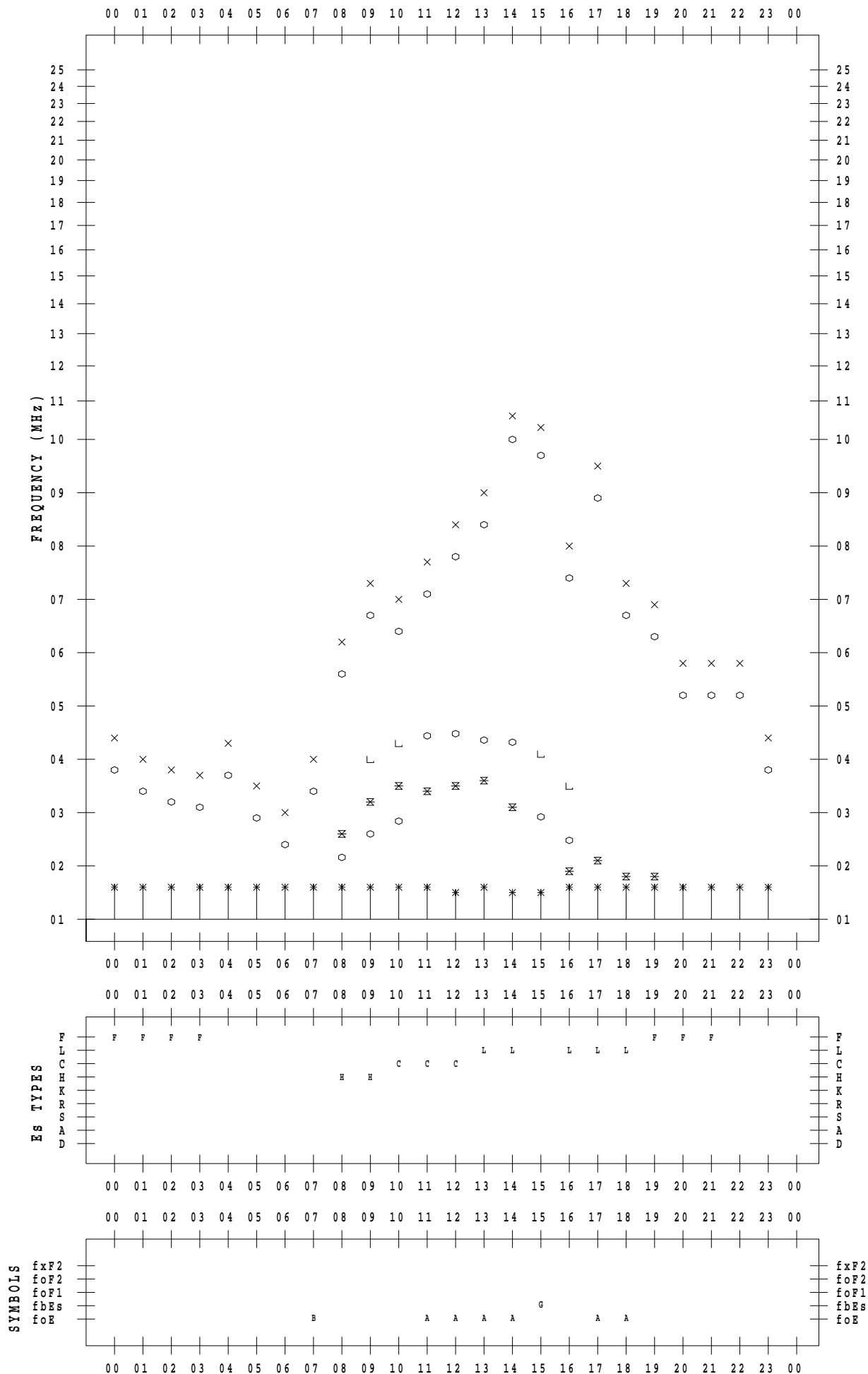
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/10

135 ° E MEAN TIME



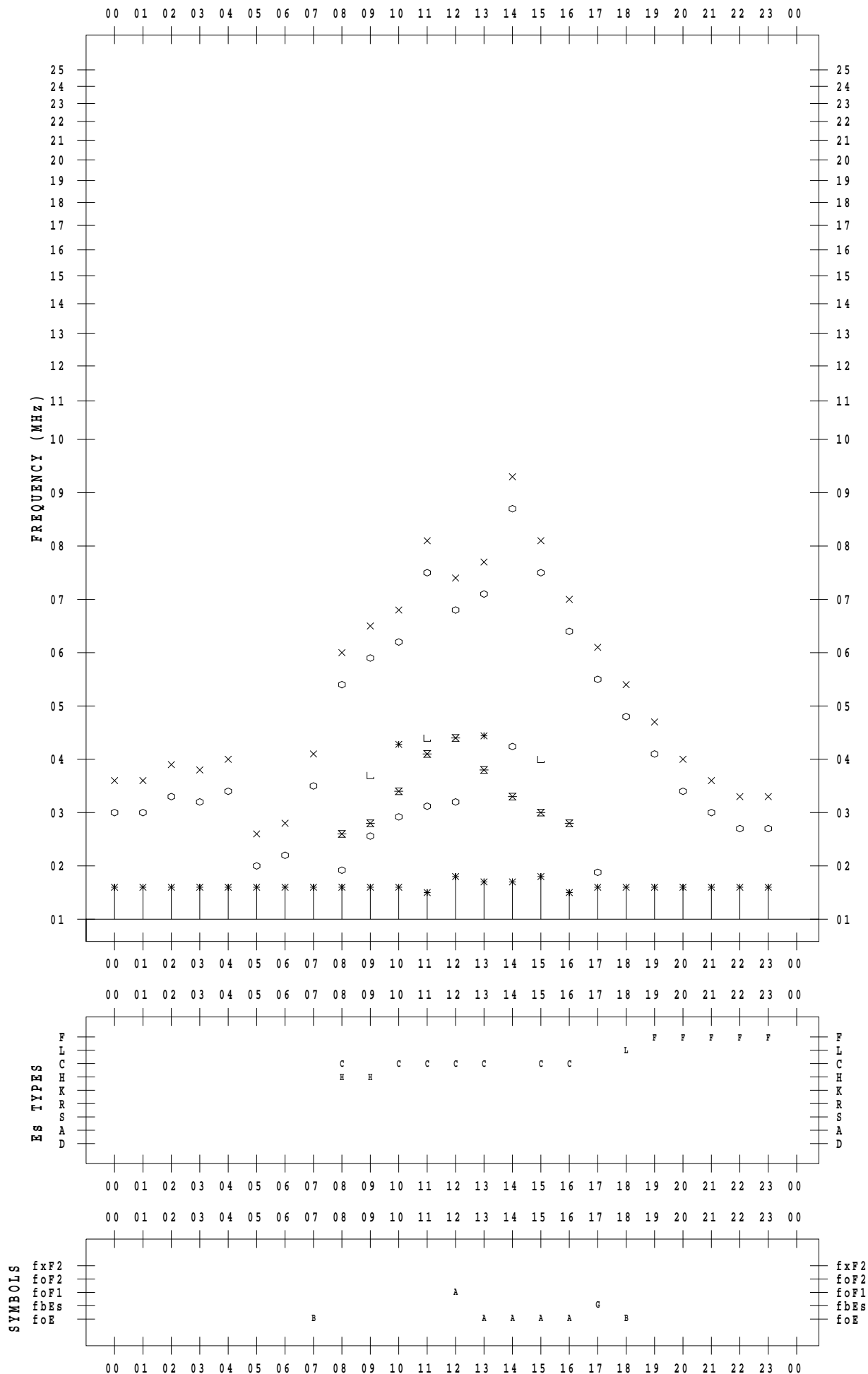
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/11

135 ° E MEAN TIME



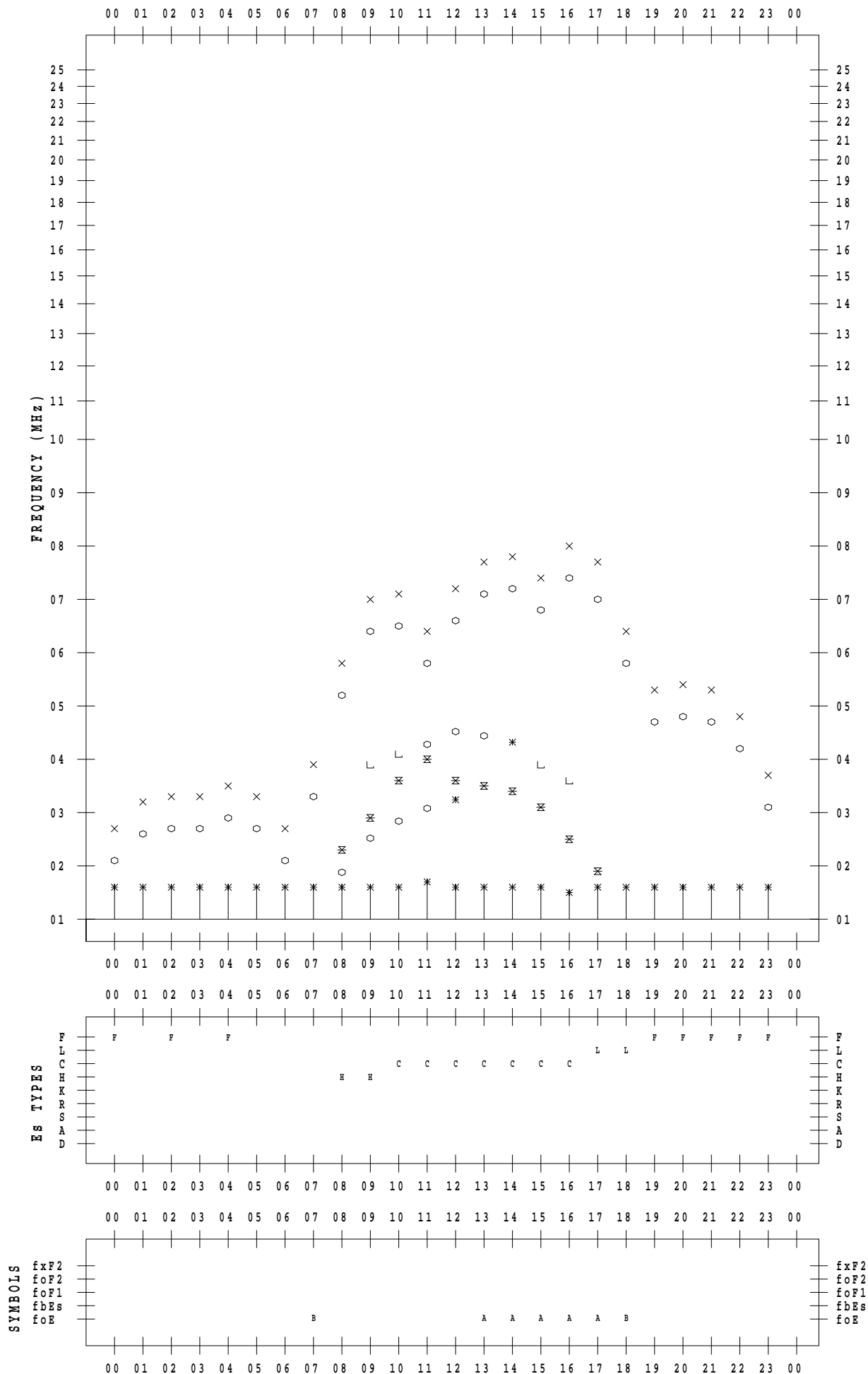
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/12

135 ° E MEAN TIME



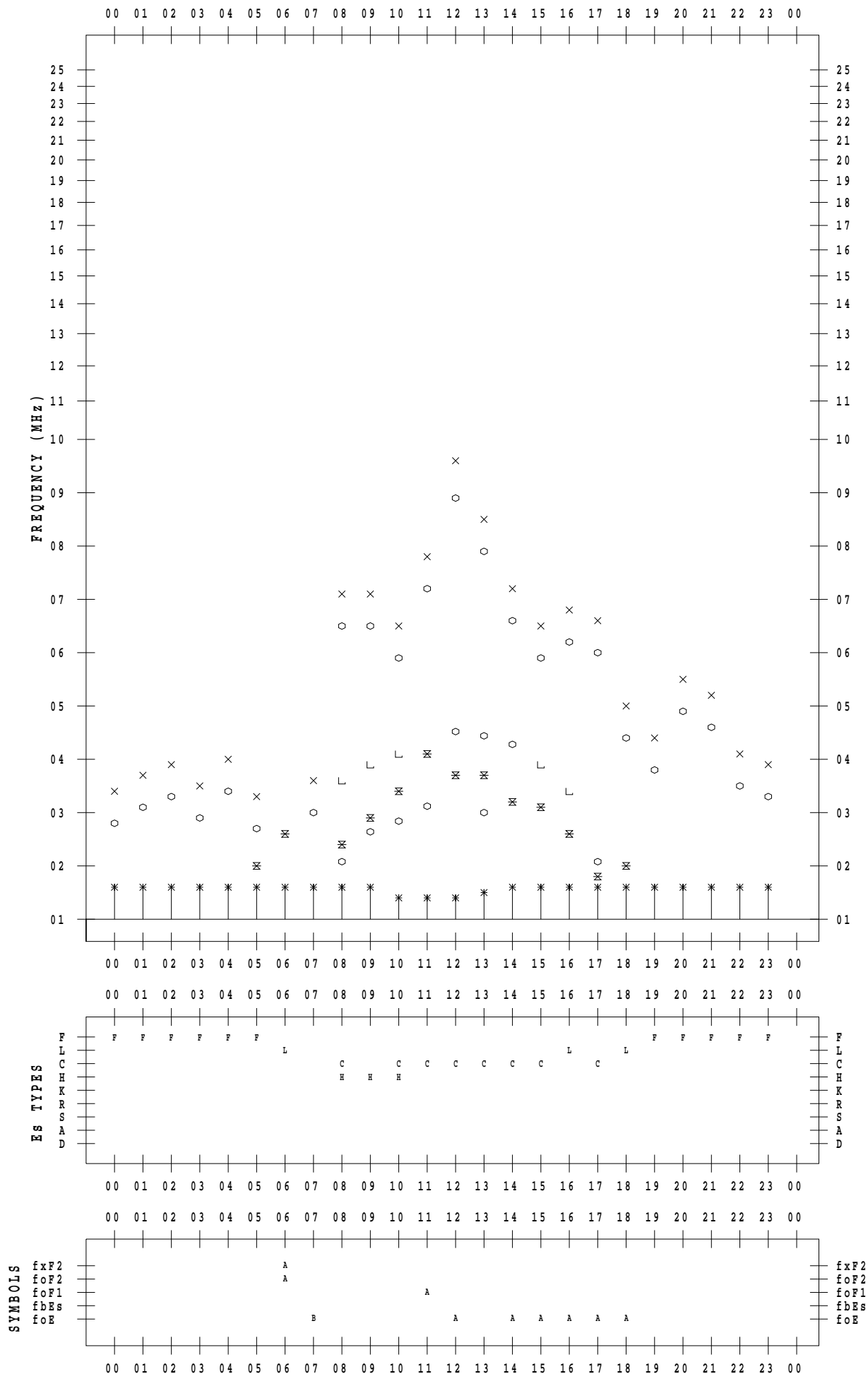
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/13

135 ° E MEAN TIME



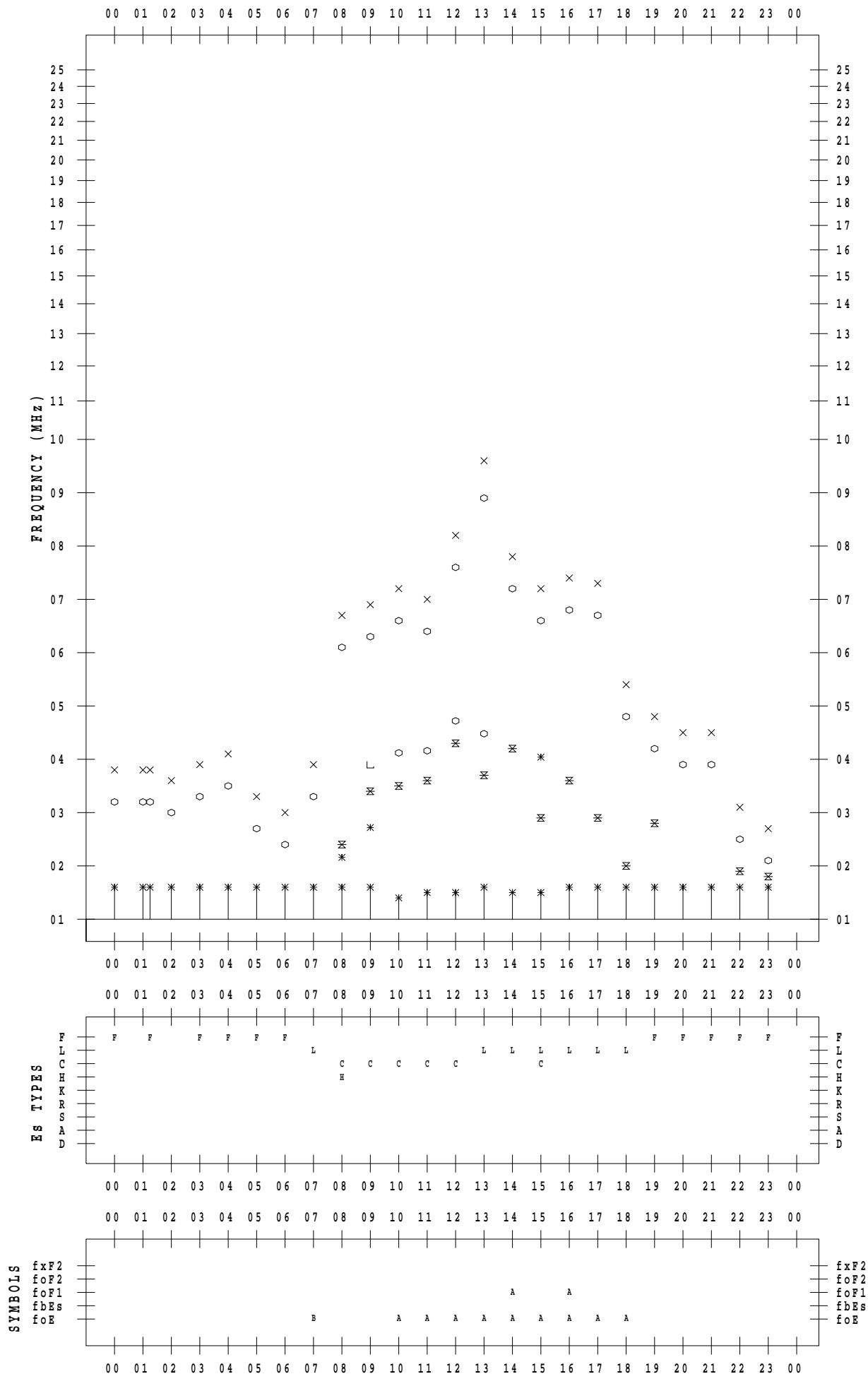
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/14

135 ° E MEAN TIME



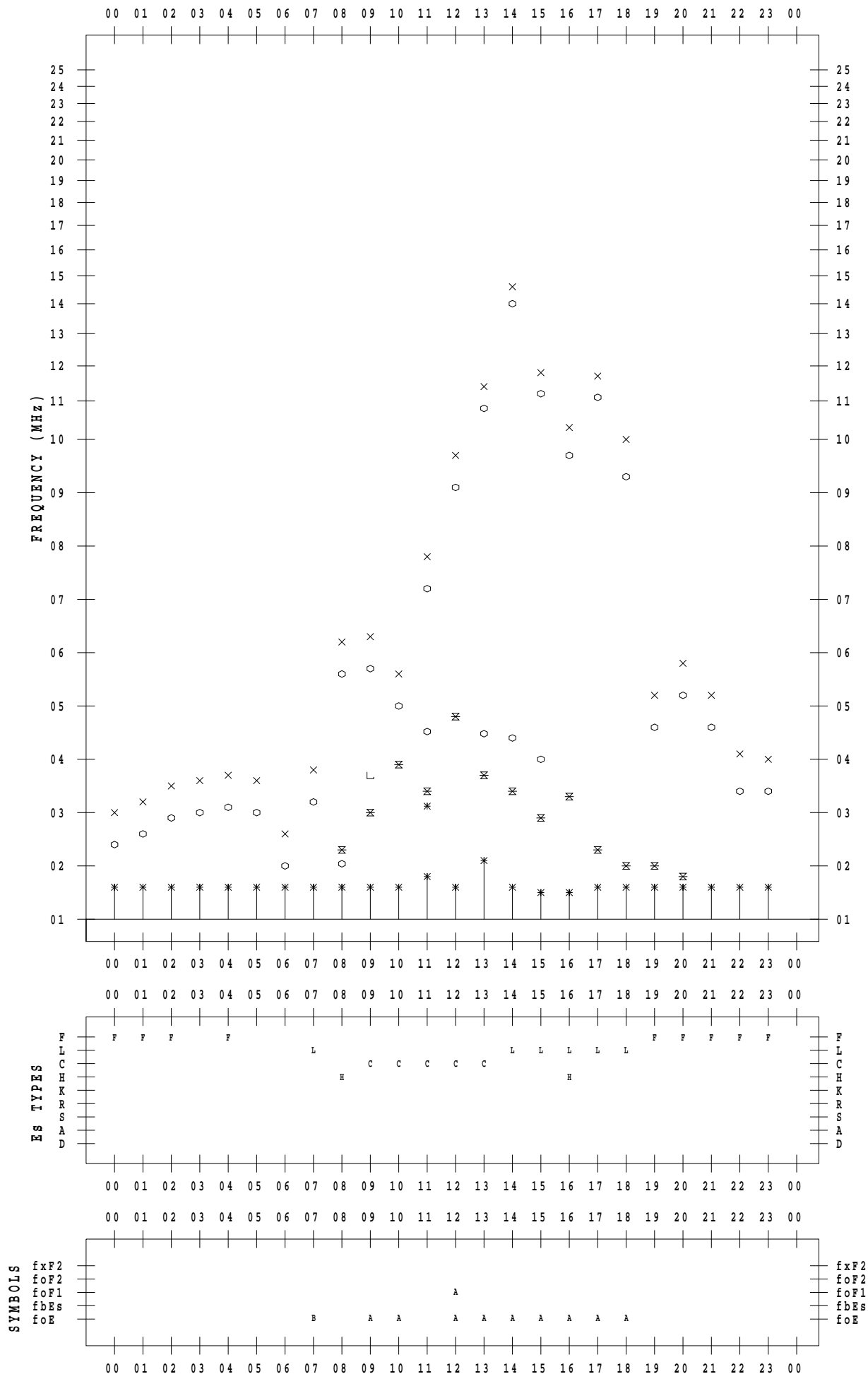
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/15

135 ° E MEAN TIME



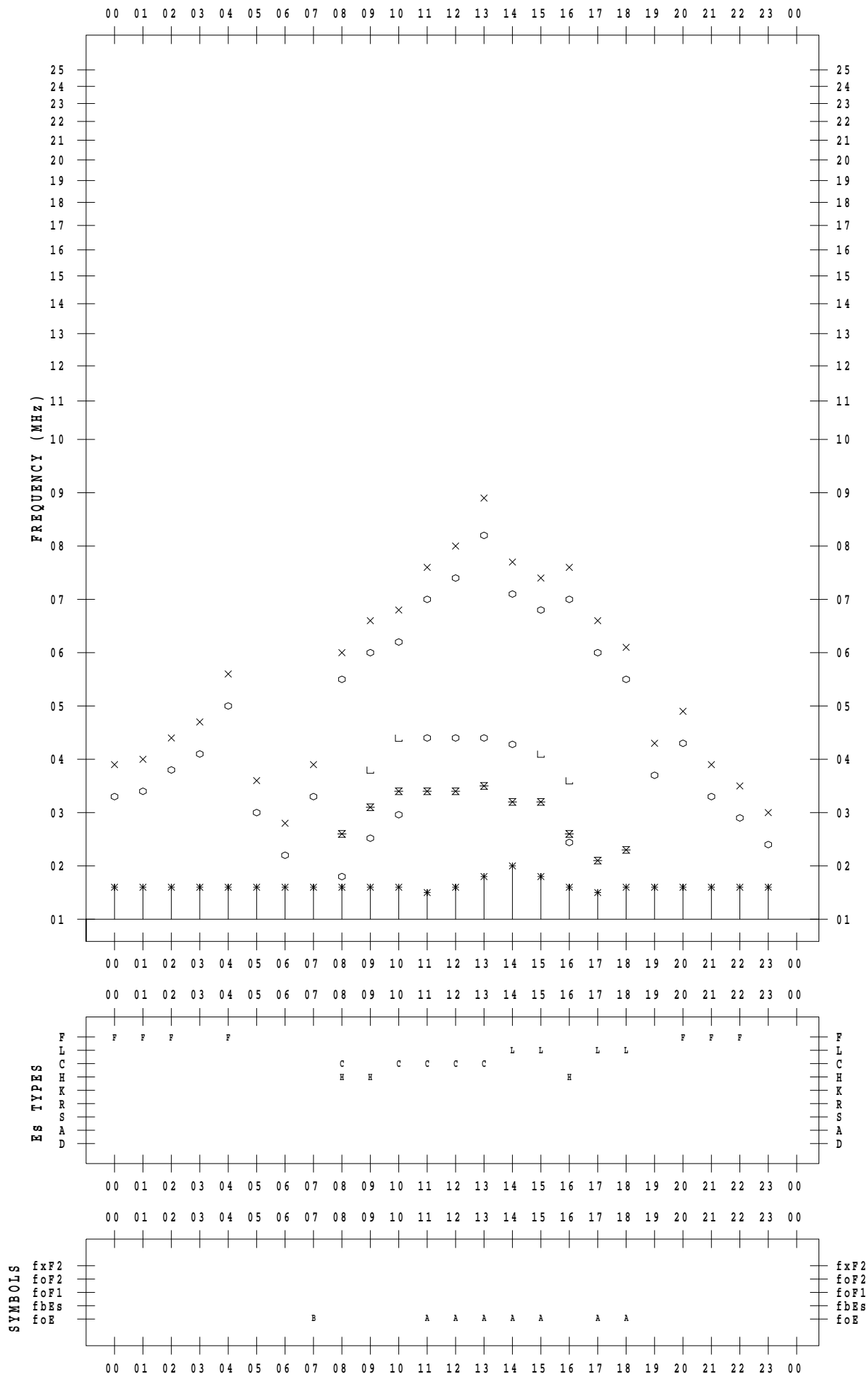
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/16

135 ° E MEAN TIME



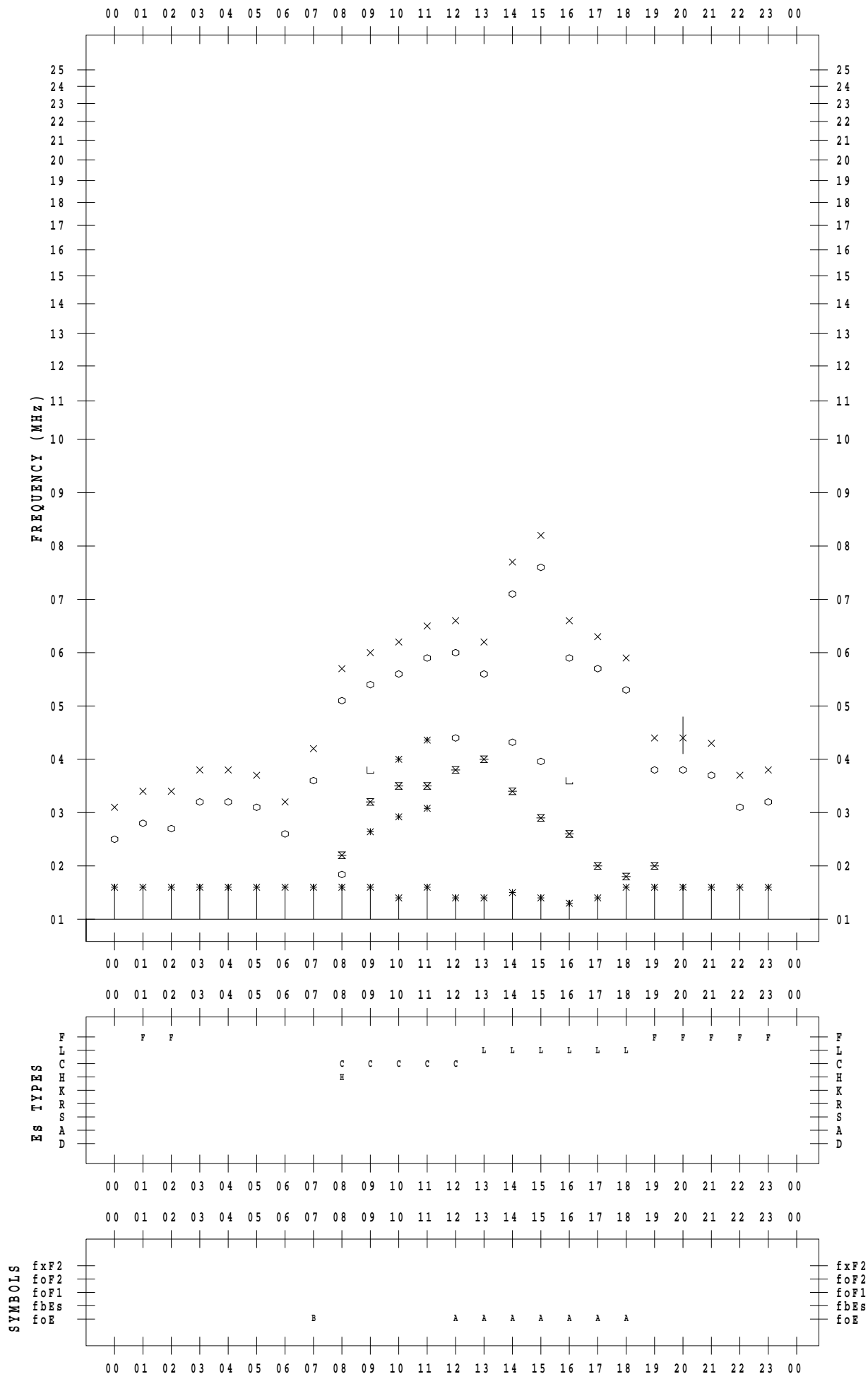
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/17

135 ° E MEAN TIME



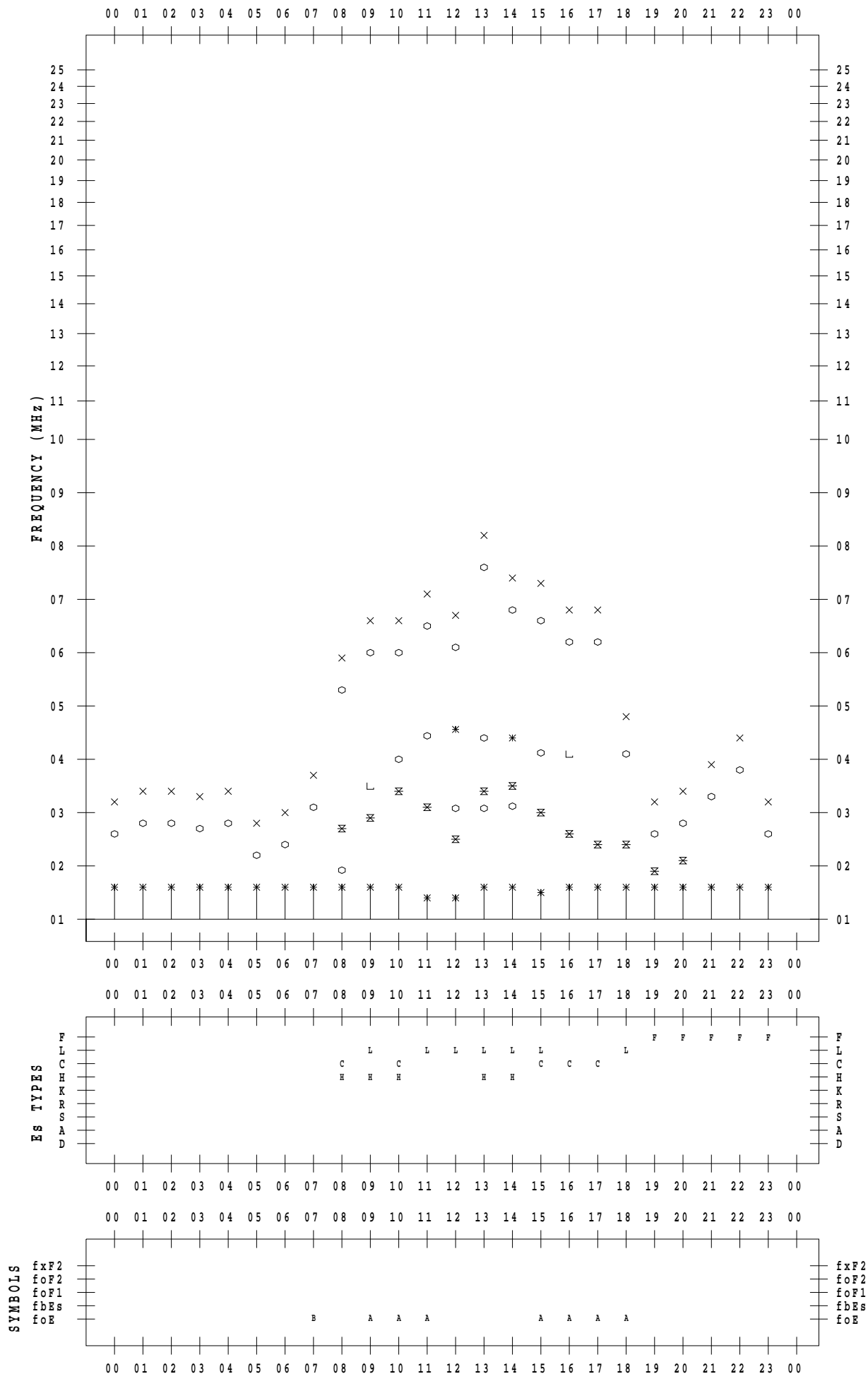
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/18

135 ° E MEAN TIME



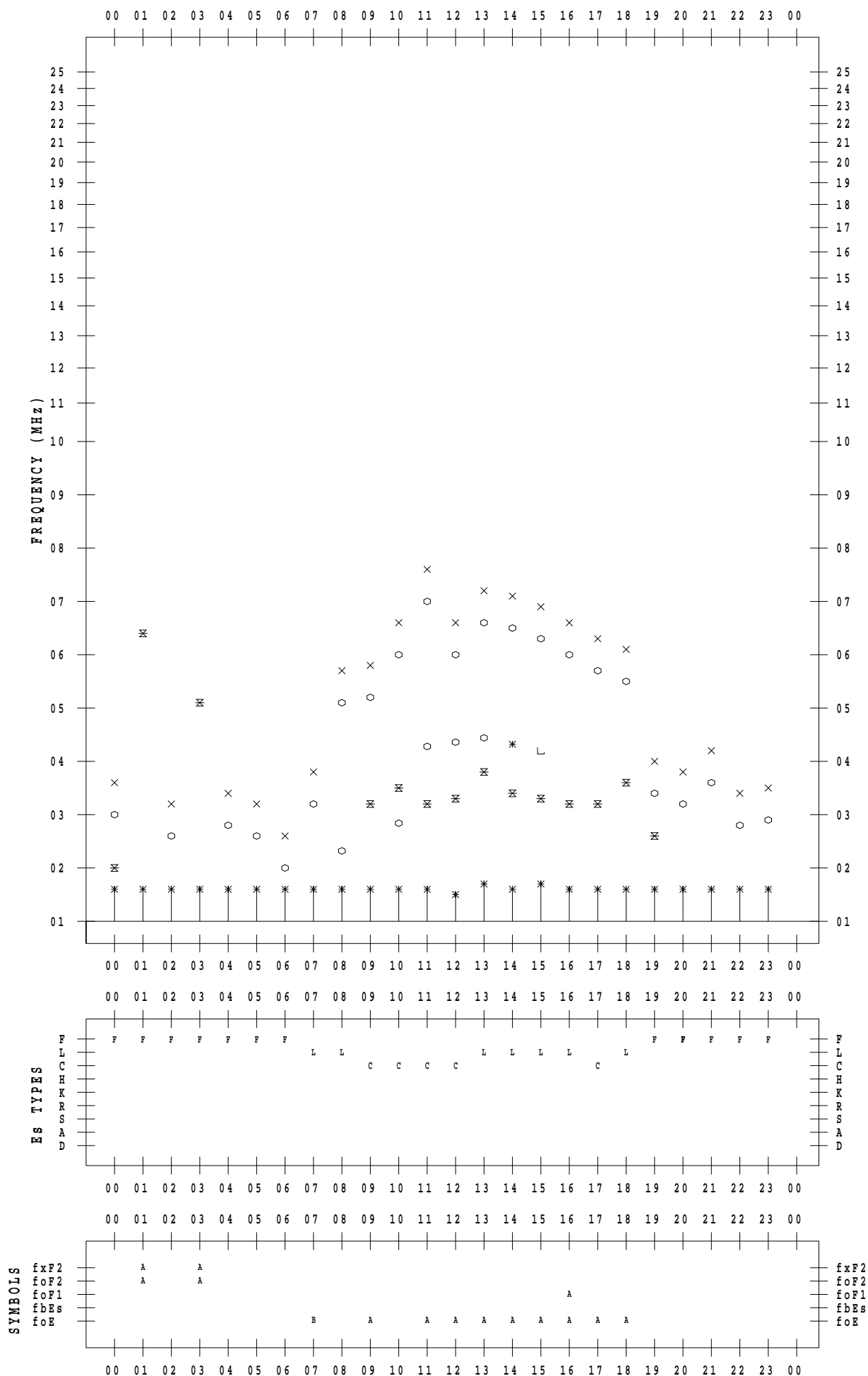
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/19

135 ° E MEAN TIME



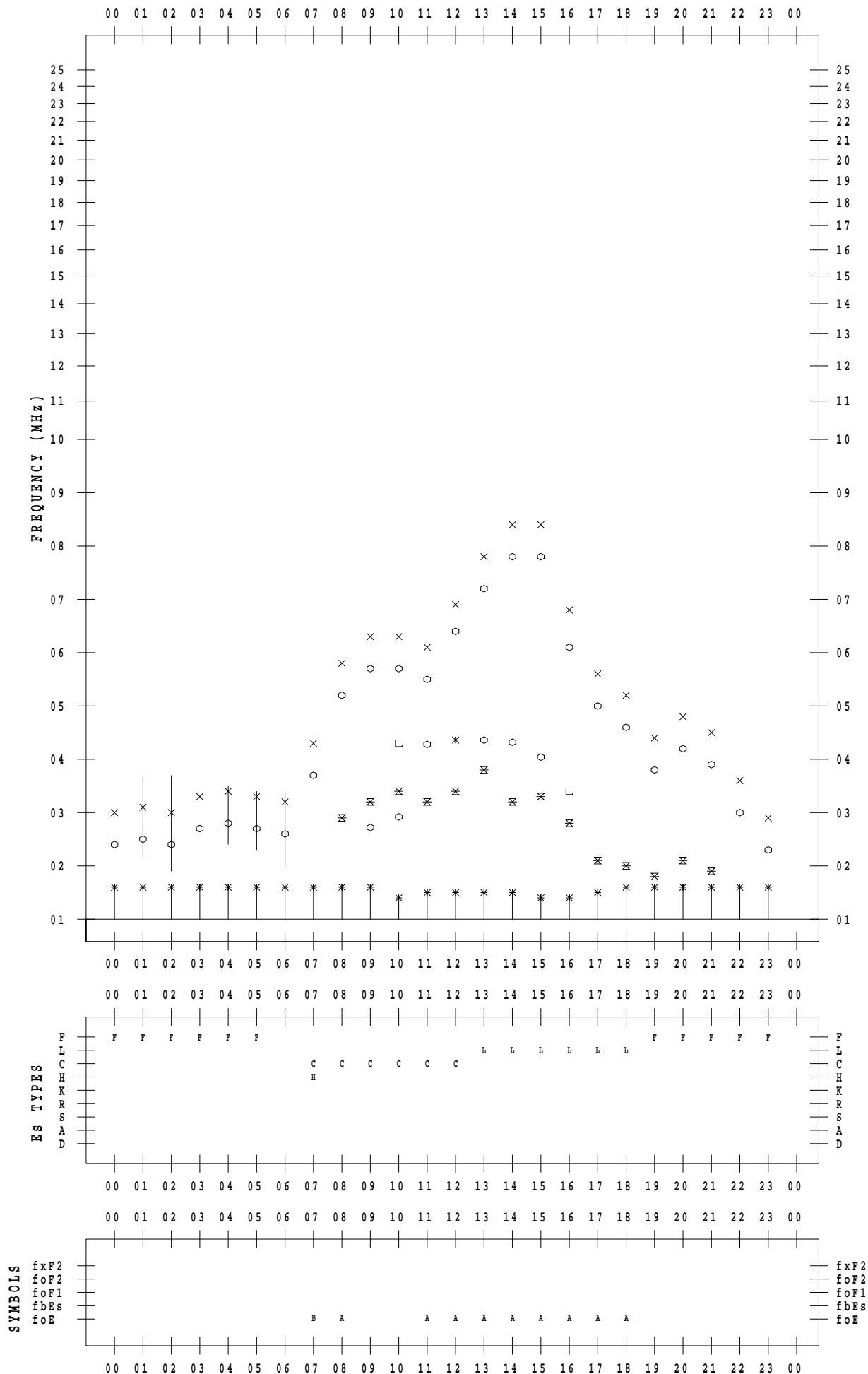
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/20

135 ° E MEAN TIME



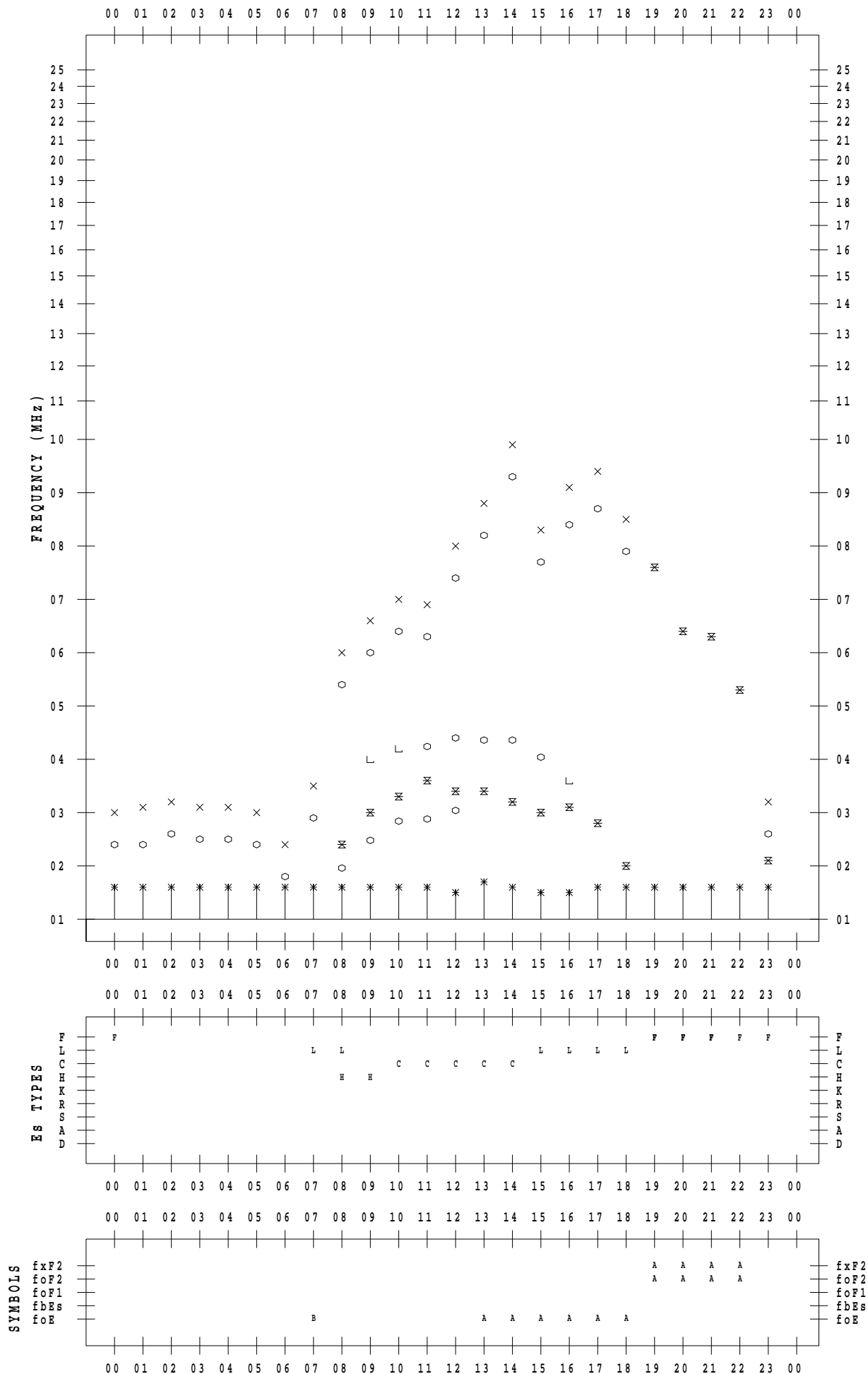
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/21

135 ° E MEAN TIME



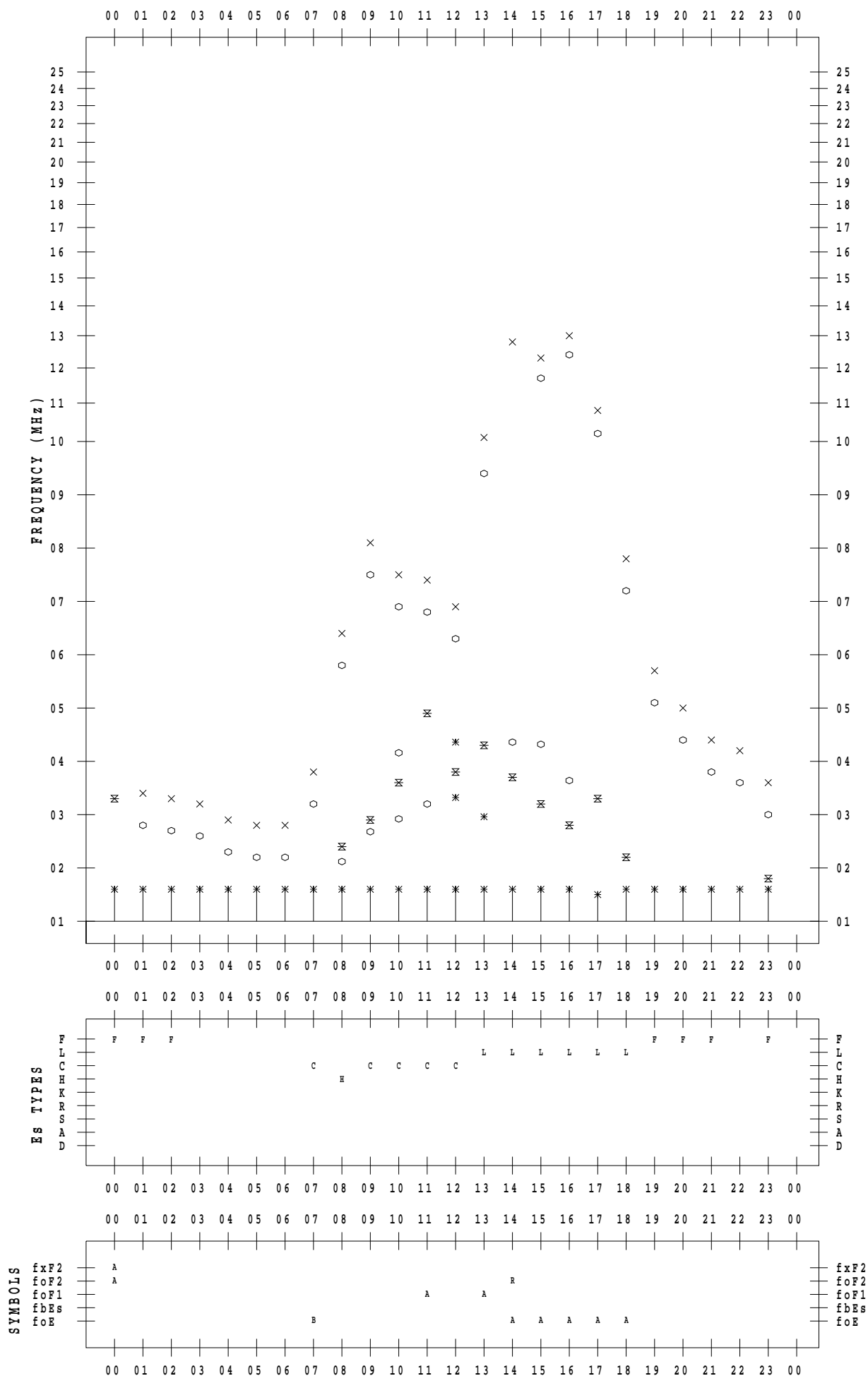
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/22

135 ° E MEAN TIME



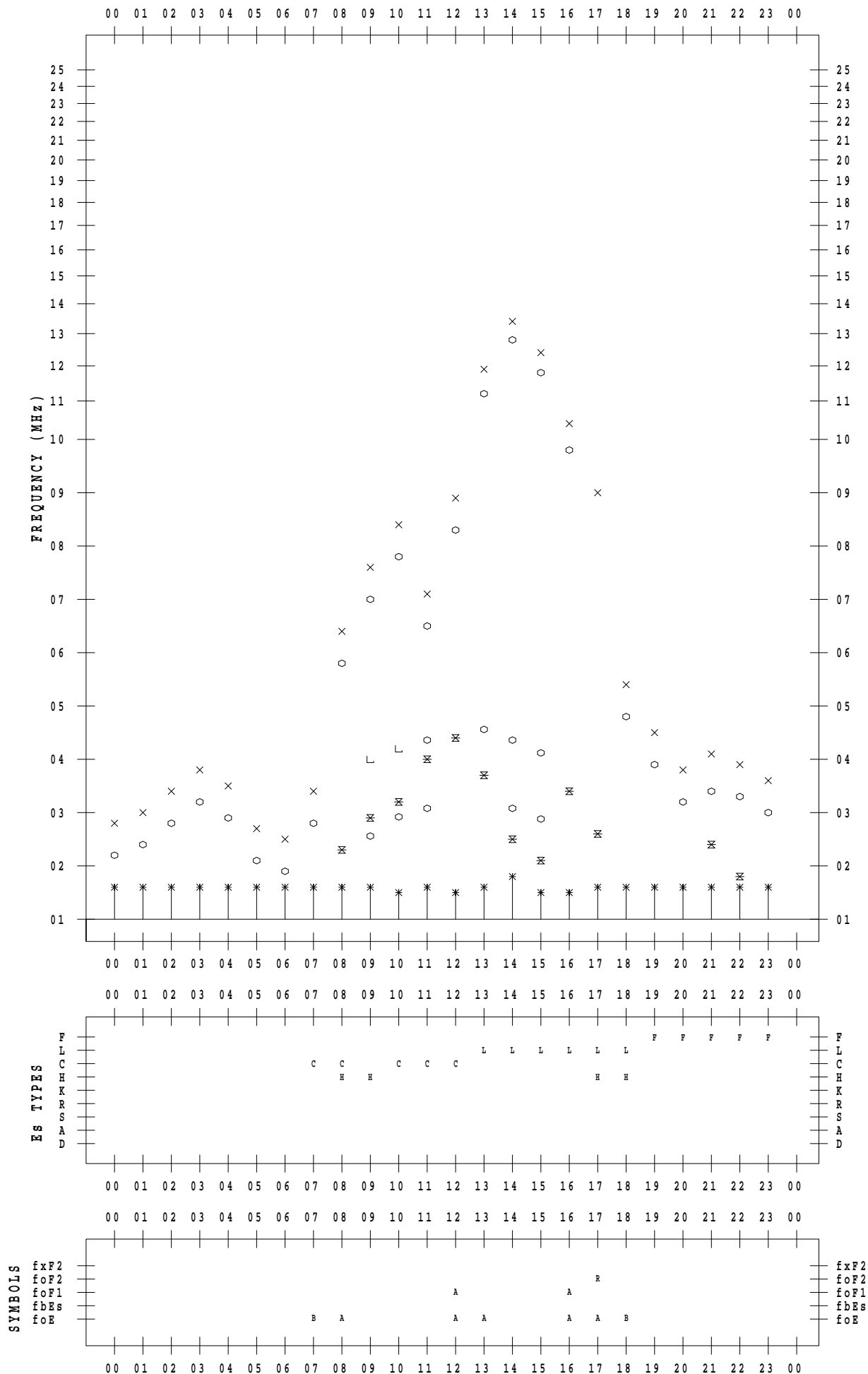
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/23

135 ° E MEAN TIME



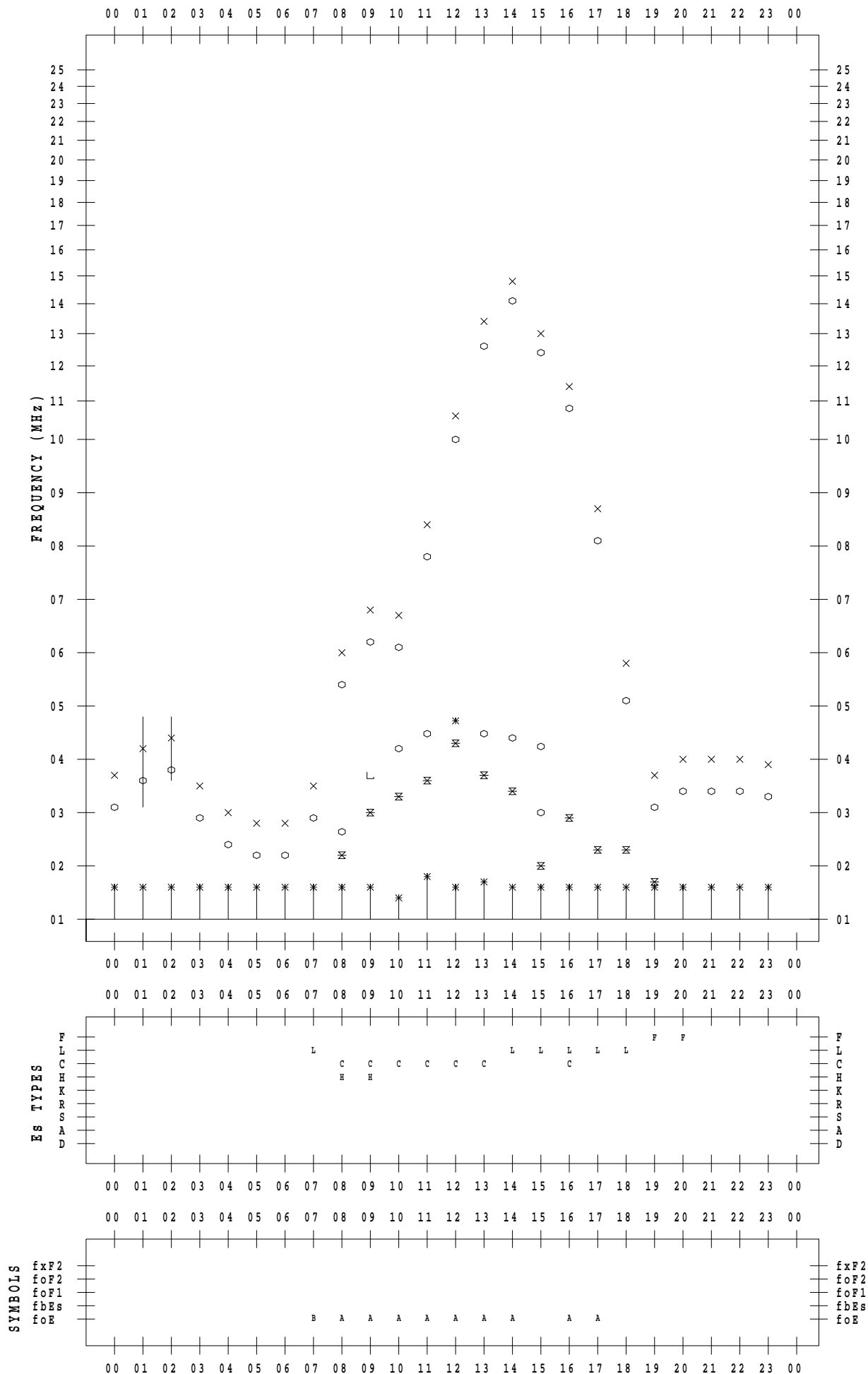
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/24

135 ° E MEAN TIME



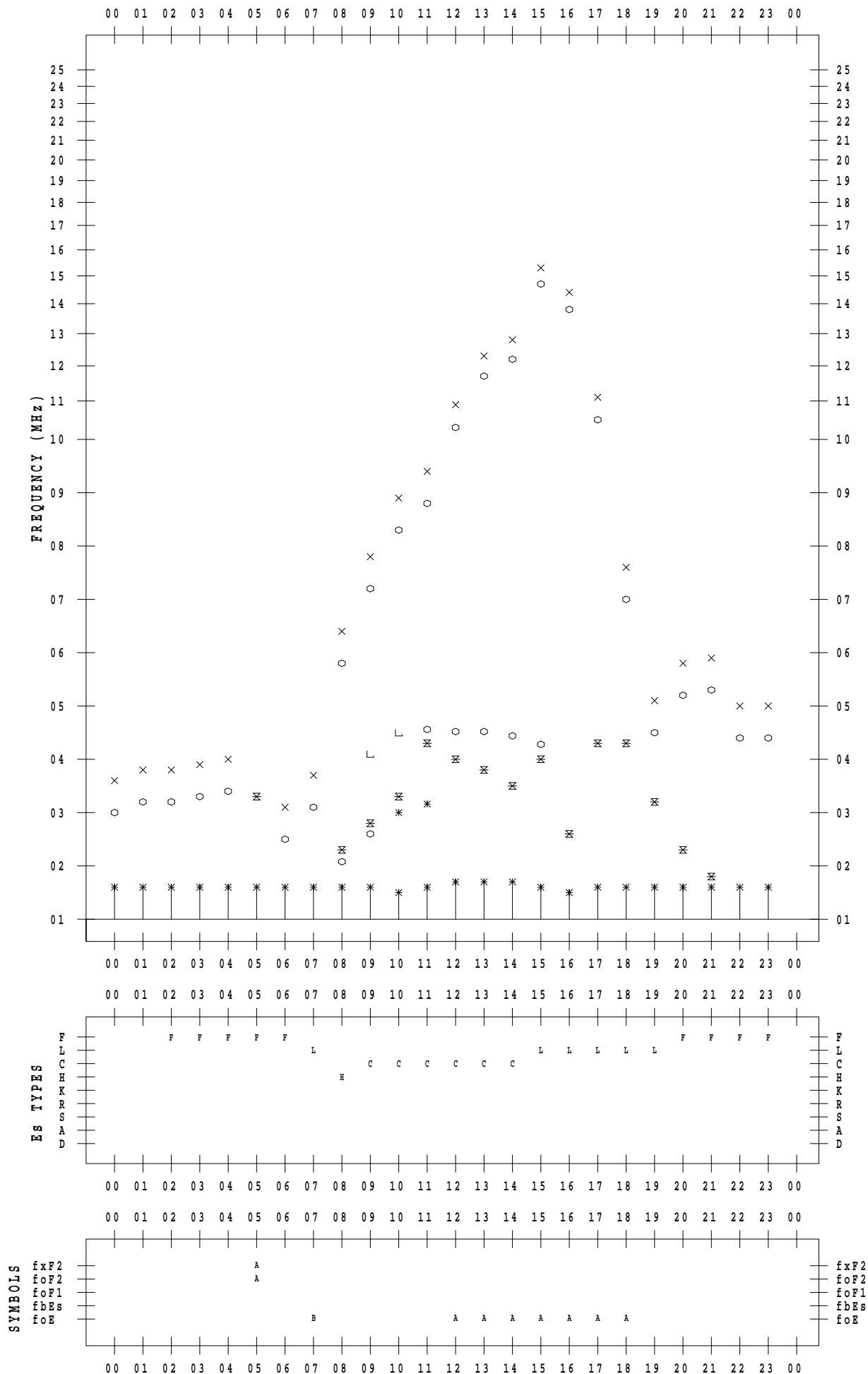
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/25

135 ° E MEAN TIME



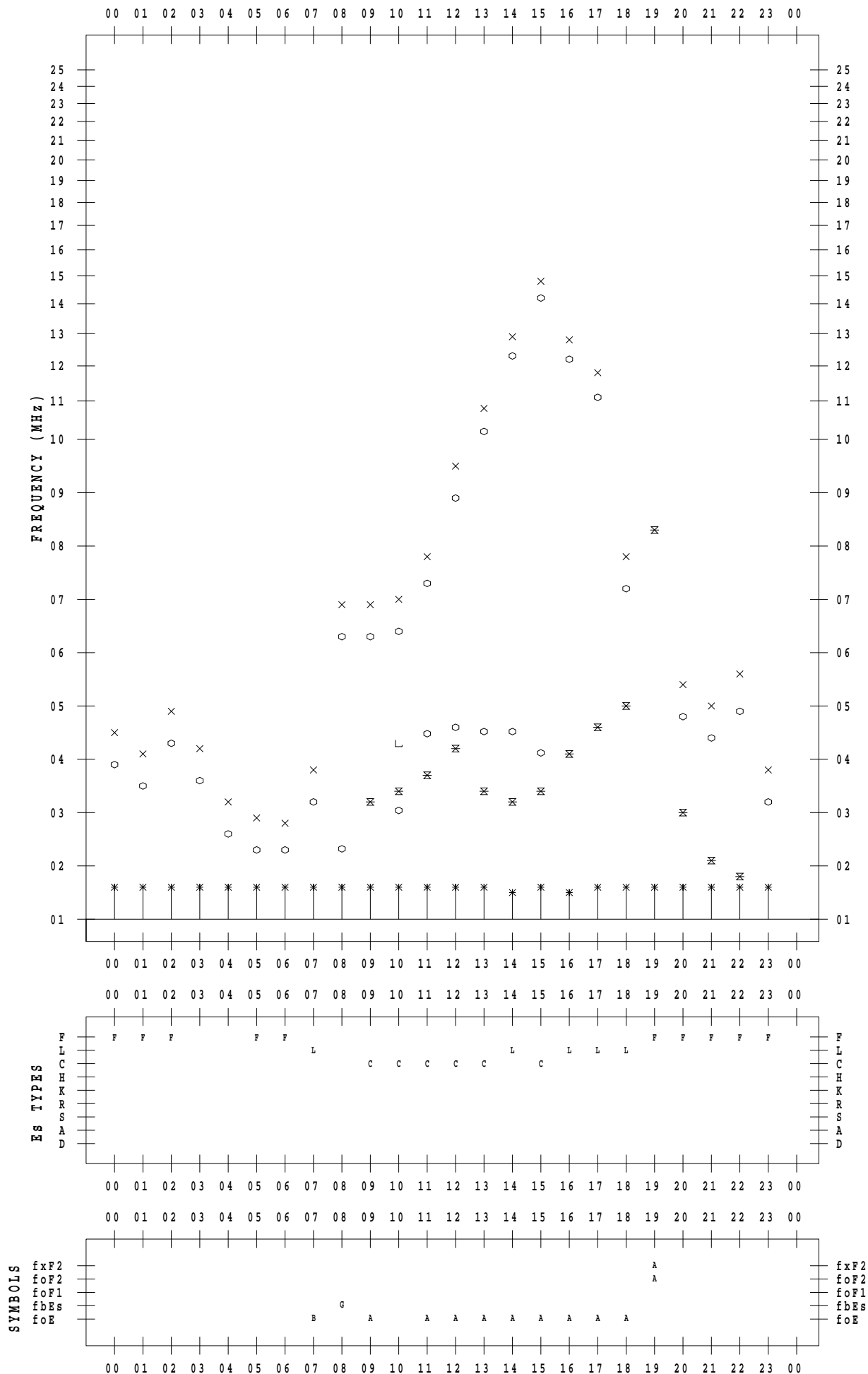
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/26

135 ° E MEAN TIME



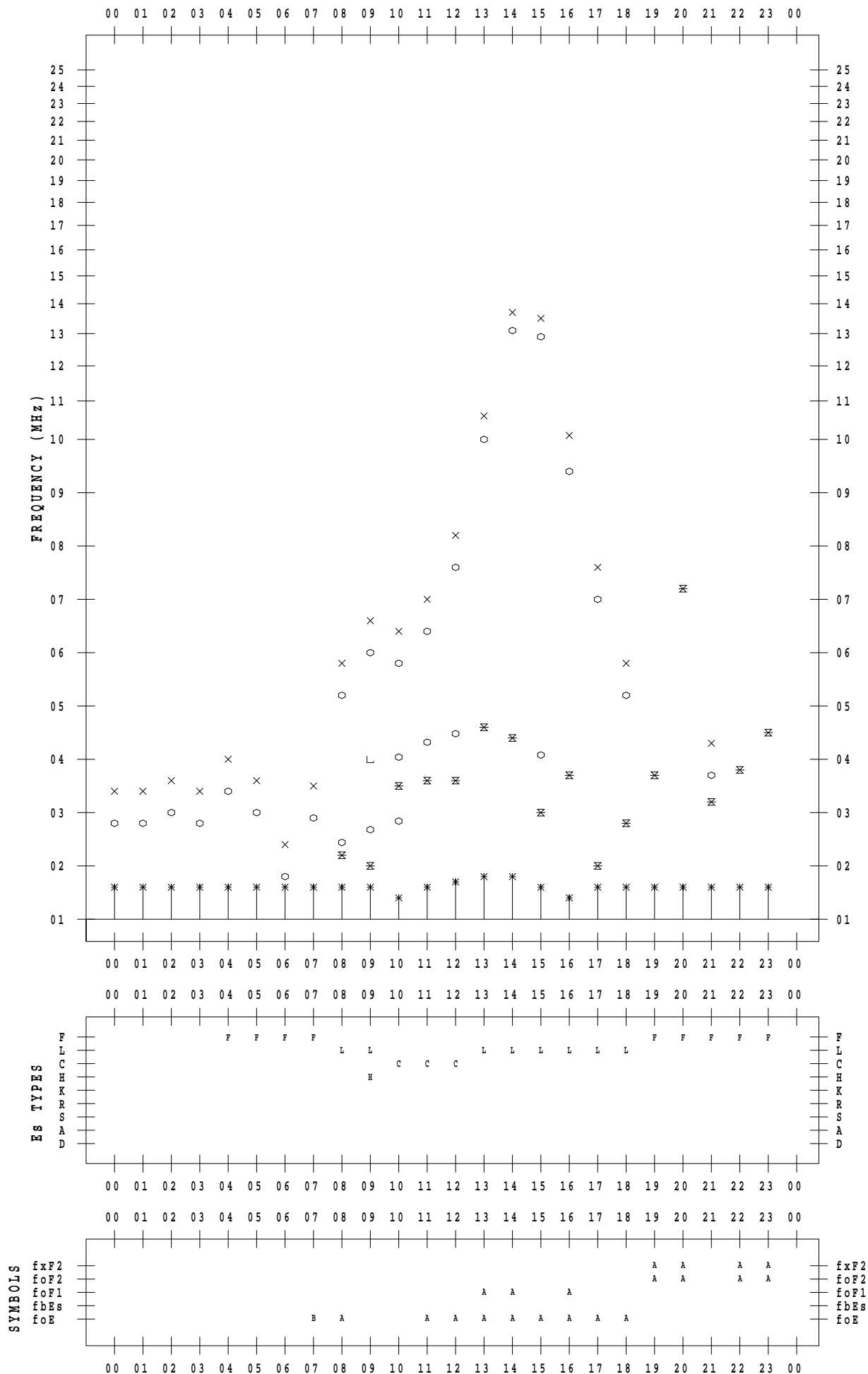
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/27

135 ° E MEAN TIME



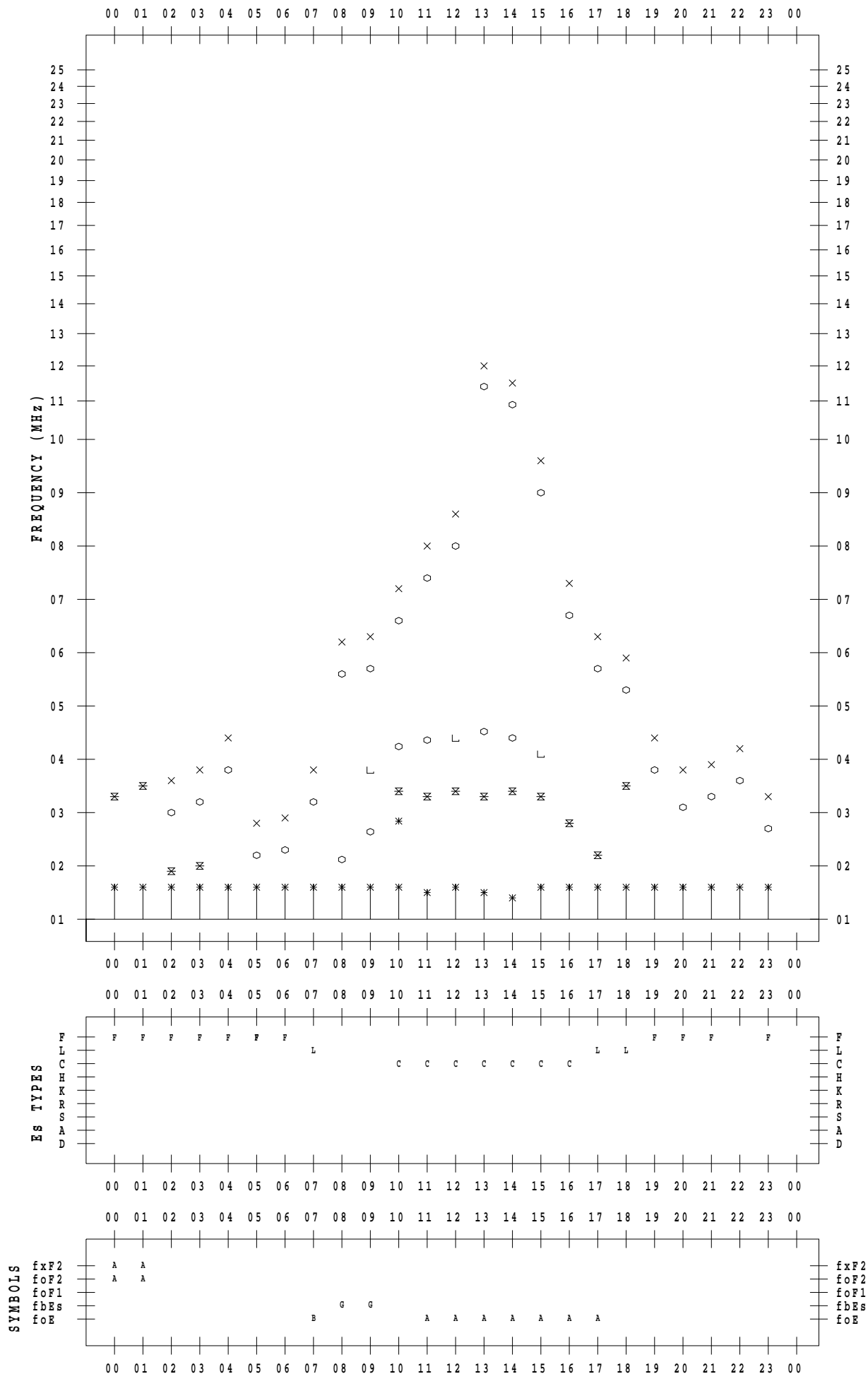
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/28

135 ° E MEAN TIME



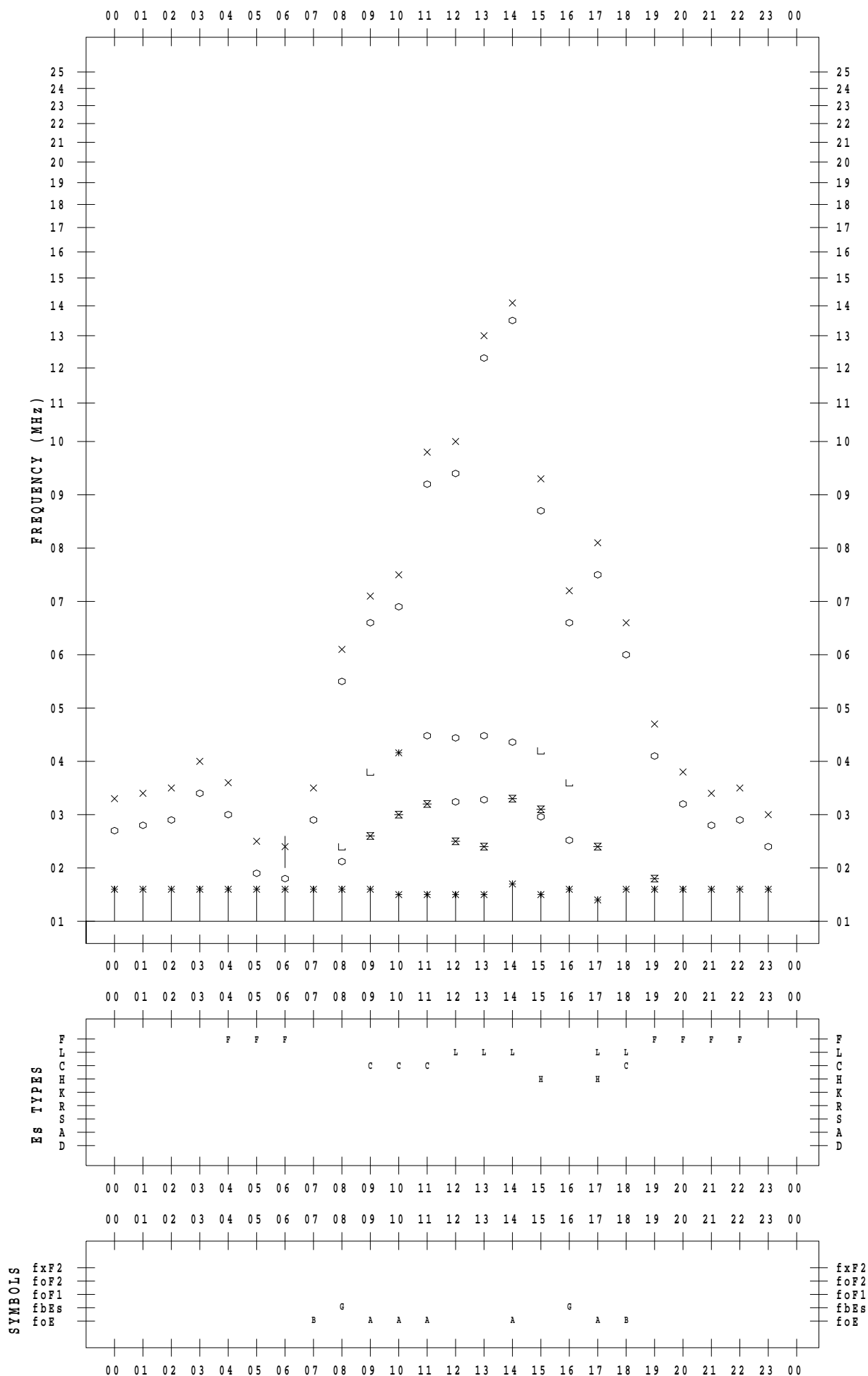
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/29

135 ° E MEAN TIME



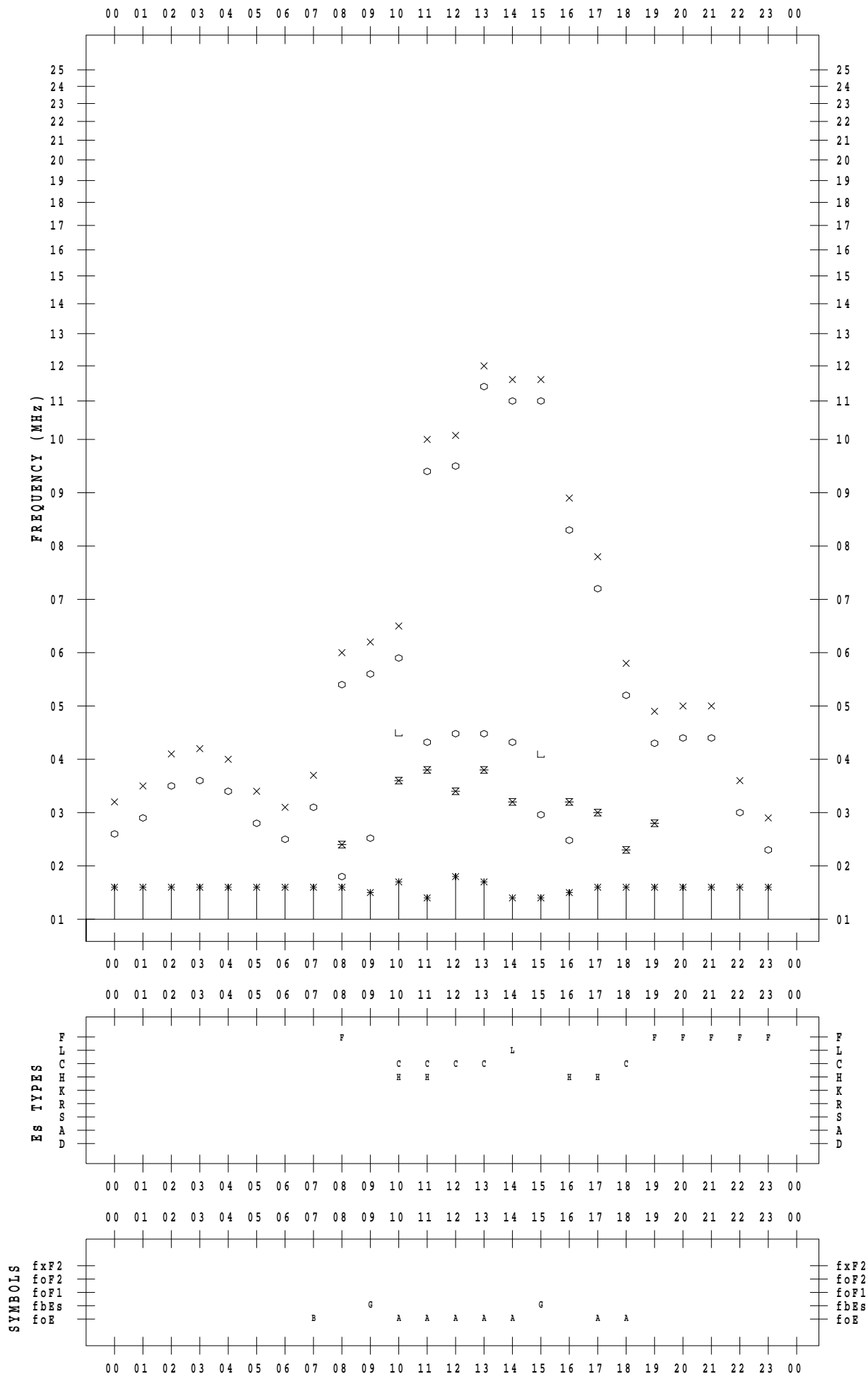
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/30

135 ° E MEAN TIME



f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2020/12/31

135 ° E MEAN TIME

