

IONOSPHERIC DATA IN JAPAN

FOR JULY 2019

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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 as-associated with high absorption and large *fmin*.
- n** The designation 'n' is used to denote an *Es* trace which cannot be classified into one of the standard types.
- k** The designation 'k' is used to show the presence of particle *E*. When *foEs* > *foE* (particle *E*) the *Es* type precedes k.

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

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

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

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

HOURLY VALUES OF fof2 AT Wakkanai

JUL. 2019

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		36	A	A	A	A	A	109	A		A		A	A	A		A	52	50	99	67	74	78	A	41			
2		41	40	40	43	45	52	49	103	63	A	A	A	64	A	64	54	92	149	87	60	58	55	A	A			
3		A	A		42	A	37	51	52	89	189	A	A	A	A	A	A	A	A	A		90	64	A	A	34		
4		29	28	30	34	A	50	A	A	49	A	A	A	A	A	A	A	A	A		199	A	A	A	A			
5				A	34	A	59	A		51	A	A	A	A			A		A		A	A	A		A			
6		A	A	A	A	40	40	A	102		A	A	N	A	189	204	139	129		47	A	A	A	A	36			
7		A	A	A	A	40	42	A	90	55		A	A	A	A	49	A	A			45		A	A	A	52		
8		A	A		45	A	40	A	A	52	85	55		66	A	A	A	40	45	50	56		52	189	54			
9		50	49	42	42	34	42	A	A	A	108	A	A	56	N	A	A	79	A	139	A	58	54	50	47			
10		A	42	A	A	A	A	A	A	50	A	A	A	A	A	41	A	A		54	52	58	58	55	51	A		
11		A	A	A	A	A	A	A	A	A		119		A	A	A	109		36	A	44	54	51	48	38			
12		A	A		30	36	A	A	A	A		43		A	A	A	A	A	A		44	A	51	A	A	34		
13		A		34	40	34	32	36	41	41		A	A	111		A	A		109	44	A	54	54	A	A			
14		A		40	37	38	36	A				A	A			A	A	110		A		48	53	52	54	51		
15		40	37	38	38	A	40	46	48	55	44	A	44		A	A	A	A			A	58	54	58	A			
16		A		32	34	35	34	40		64	50	86		A	A	A	A	82	119	157		129		A	A	A		
17		52	40		32	34	34	A	A	A	99	A	A	A	A	A	A	A		89	50	54	51	A	A	A		
18		40	37	30	32	36		A	A	87		48		A	A	A	79		86	79		50		A	A	A		
19		40	A	A	A	A	42	A	129	A	A	A	52		A	N	A	169	A	A	A	63	58	42	A			
20		A		34	34	36	37	A	50	N	A	A	A		A		46	42	63		A	A	A		A	A		
21		A	A	A		32	32	40		A	A	A	A	122		A	A	A	50	47	A		A	49	43	A		
22		A		A	A	A	50	54		47	51	57	52		A	A	A	A		182		59	64	50	54	43		
23		44	43	42	40	A	38	40		A	A	C	C	C	C	C	C			42	42	47	33		A	A		
24		A	A	A		34	34	N		C	C	C	C	C	C	C	C	C	A	A	A	46	51	47	A			
25		42	42	38	37	38	42	48		A	A	A	46	44		A	A	A	A		46	54		51	50	40		
26		37	34	A	31	34	A	A		51	A	A	A	A	A	A	A	34	A		45	51	58	52	A	A		
27		A		36	32	34	A	A	47	A	A	55		86		A	A			53	48	34	54	51	48	A		
28		A	A	A		34	34	30	40	A	A	A	A	A	A	A	A	100		189		54		A	A	A		
29		42	A	A	40	41	44	44		A		A	A	A	A	A	A	45		111		A	A	A	A	A		
30		42		A	A	A	A	36		A	A	A	86	86	109		A	A	A	A	41	46	45	48	50	47	40	32
31		34	34	32		23	42	47	58		A	A	A	A	A	A	A	49		86		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		14	16	16	20	17	21	14	10	13	12	6	7	4	2	8	5	15	15	18	17	20	17	15	12			
MED		40	37	38	34	34	40	47	61	52	86	56	52	60	118	64	79	63	54	50	54	54	52	50	40			
U Q		42	41	41	38	39	43	50	102	75	103	86	109	65	189	120	110	110	109	87	63	58	54	54	49			
L Q		37	34	32	34	34	37	41	52	50	53	48	46	50	47	47	48	45	46	45	47	51	51	47	35			

HOURLY VALUES OF fEs AT Wakkanai

JUL. 2019

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

$\frac{H}{D}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	35	70	81	45	39	106	94	60		133		106	64	62	G	46	51	46	45	60	39	58	66	56	
2	32	G	33	G	34	38	52	99	71	70	71	59	94	62	60	56	71	38	50	27	32	25	70	93	
3	91	70	29	45	61	38	53	92	60	110	101	101	52	70	46	70	91	59	82	70	58	82	84	28	
4	G	32	33	38	40	60	64	50	54	76	92	69	92	80	105	50	145	110		108	60	161	152	150	
5			133	29	34	56	125		39	65	63	50	41	41	91	112		128		162	134	113	58	82	
6	116	57	40	48	G	G	41	72		97	73	86	125	116	152	143	83		60	61	60	84	116	103	
7	111	69	56	48	35	31	48	78	117	66	115	76	84	81	59	50	115	154		108	93	69	60	56	
8	60	46	38		56	36	69	69	45	80	53	76	125	69	64	39	44		46	44	59	48	180	G	
9	40	G	30	G	G	36	55	95	44	124	58	65	55	G	46	114	59	85	101	128	55	39	54	90	
10	58	46	70	118	57	56	50	47	91	92	101	71	54	54	G	66	37	64	39	29	50	50	50	46	
11	46	39	59	40	48	47	40	93	60	84		64	73	68	93	57	46	50	60	36	G	G		28	48
12	60	41	34	31	39	45	41	53	76	G	43	53	56	52	64	146	44	60	40	50	54	69	82	58	
13	41	G	110	G	G	32	113	40	52	59	80	96	70	53	46	52	60	61	56	90	35	47	128	130	
14	65	27	G	G	G	92	60	132		116	60	52	G	40	46	92	72	167		45	50	43	36	34	
15	34	24	G	38	55	33	43	44	38	60	40	107	47	48	84	83	148	88		125	39	34	116	91	
16	43	24	26	28	G	29	59	53	60	124	43	47	106	41	42	77	88	140	124	115	111	108	84	69	
17	36	34	35	26	G	31	52	61	58	61	69	84	71	60	125	74	82	46	45	91	35	60	94	54	
18	35	34	34	G	28	85	58	78	74	41	G	63	44	145	65	59	53	40	83	125	44	70	70	81	
19	58	73	69	57	45	34	69	93	106	112	106	54	63	49	68	72	65	64	70	109	41	38	56	56	
20	35	38	31	24	35	45	40	70	85		56	72	G	48	G	G	82	130	143	135	143	107	60	92	
21	72	90	59	27	G	39	106	90	128	134	92	90	106	62	70	111	40	46	66		94	35	59	85	
22	59		48	60	58	90	58	60	40	147	52	50	40	56	64	44	72	127	109	70	29	49	39	39	
23	32	32	G	24	57	31	39	53	64	C	C	C	C	C	C	C		38	34	40	34	45	45	58	
24	45	71	48	34	36	112	35	72	105		C	C	C	C	C	C		95	116	127	32	33	39	38	
25	33	G	G	G	G	33	48	69	109	154	42	83	40	40	49	82	40	49	33	35	84	31	44	35	
26	30	146	52	40	29	36	126	72	59	71	46	150	47	49	60	60	36	44	40	43	53	46	58	70	
27	58	34	92	35	46	55	46	54	84	66	52	72	88	69	56	64		49	46	40	35	38	60	92	
28	46	44	43	158	57	156	31	47	50	50	64	56	68	81	54	64	59		150	106	92	106	72	58	
29	40	106	38	39	58	56	48	59		137	120	70	46	60	39	39	G	90	100	111	145	112	111	113	
30	26	59	44	58	90	34	46	60	60	67	85	62	100	98	95	71	54	40	61	44	35	28	G	G	
31	G	34	92	56	58	60	34	51	162	112	59	70	85	78	55	75	41		127	116	59	82		71	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	29	31	30	31	31	31	30	27	28	27	29	29	29	29	29	27	28	26	30	31	31	30	31	
MED	42	39	40	36	39	39	52	65	60	82	63	70	64	60	60	66	59	60	60	80	53	49	60	58	
U Q	59	69	59	48	57	60	64	78	91	120	92	85	90	74	77	82	82	102	101	115	84	82	84	91	
L Q	34	29	31	24	G	33	41	53	52	65	52	57	46	48	46	51	44	46	45	44	35	38	50	46	

HOURLY VALUES OF fmin AT Wakkanai

JUL. 2019

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

HOURLY VALUES OF fof2 AT Kokubunji

JUL. 2019

LAT. 35°43.0'N LON. 139°29.0'E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC 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	A	A	A	A	A	A	A	111	154	N	118	A	100	A	61	A	A			99	84	A	A	66
2	A	A	34	A	32	A	51	56	A	149	129	66	117	A	119		A	A	154	A	66	A	54	43
3	36	36	A	A	35	A	44	49	A	A	A	A		A	A	A	47	A	A	A	74	A	A	A
4	A	A	A	A	A	A	A	105	130		121	139	159	A	90	121	A	37	47	55	54	51	A	34
5	A	A	A	A	A	A	A	A	51	A	A	A				A	A	A	A	79	A	A	A	48
6	42	39	36	35	32	34	46	51	A	A	73	A	A	A	52	A	A		84	57	58	51	A	A
7	A	25	A	34	34	35	A	A	109	A	A	A	A	A	A	A	45	A		47	48	51	A	34
8	37	42	39	34	34	A	41	A	52	129	A	A		A	A	A	A	A	A	54	54	A	50	A
9	A	A	A	A	32	A	A	A	A	A	56	61	A	A	110	122	110	A	149	122	A	51	A	A
10	A	A	A	A	32	A	A	A	90	128	A	N	A	A	A		A	55	55	66	A	37	A	A
11	A	A	36	34	34	A	A	A	A	A	A	A	A	A	A	A	A	68	A	48	54	50	A	A
12	A	31	A	27	27	A	62	A	A	A	A	A	A	A	A	A	46	A	A	54	52	A	A	A
13	A	A	A	A	A	34	32	A	A	A	A	A	A	A	A	A	A	76	35	A	49	34	31	A
14	A	A	A	A	A	A	104	N	130		144	A	A			A	A	A	A	A	54	51	A	38
15	A	A	A	35	34	A	A	54		A	A				54	A	A	54	58	A	A	A	A	A
16	A	A	A	A	A	20	44	A	58	A	A	A				55	A	49	52	58	54	A	A	A
17	79	A	A	A	30	N	A	A	56	A	A	A		A	A	A	A	A	79	A	36	54	54	36
18	30	27	27		30	34	53	A	A	A	A			109	A	N	A	A	50	A	47	36	38	36
19	35	34	A	27	79	A	32	A	A	A	55	64	A		48		38	47	52		71	A	A	32
20	32	27	27	27	26	32	A	109	105	A	A	A	60	64		A	43	44	A	111	A	A	A	35
21	A	A	30	27	25	A	A	A	A	A	A	N	99	A	A	A	52	A	44	51	51	49	43	38
22	36	32	31	32	31	A	A	A	148	148	78	66	A	A	A		A	A	A	A	64	52	47	49
23	39	38	A	35	34	A	42	49	59		154	A	61	47	59	51	53	A	A	A	54	34	A	A
24	A	A	A	27	A	A	A	50	A	A		A	A		A	51	49	A	47	58	43	40	39	A
25	A	A	32	34	35	36	43	48	49	A	A					A	A	41	44	45	52	43	35	34
26	34	34	32	27	27		A	A	N	A		A	55	51			A	A	A	55	65	35	A	A
27	A	A	A	A	27	32	A	A	50	A	A	A	A		87	56	54	50	42	51	54	45	A	32
28	A		25	A	A	A	A	A	A	56			A	A	A	A	54	46	A	50	A	54	48	A
29	A	A	A	A	A	A	A	A		107	118	107	56		A	A	A	51	47	47	39	48	A	A
30	A	A	A	31	26	38	25	A	A	A	110	A		A	A	A	A	A	A	51	47	45	34	A
31	A	32	28	25	28	35	38	51	56	53	A	A		A	A	59	A	A	N	A	52	48	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	10	12	12	16	22	10	14	11	16	7	11	6	7	4	9	7	12	12	16	20	25	20	11	14
MED	36	33	32	32	32	34	44	51	74	128	110	65	99	58	61	56	50	48	51	54	54	48	43	36
U Q	39	37	35	34	34	35	51	105	119	148	129	66	117	86	100	121	53	54	68	62	61	51	50	43
L Q	34	29	27	27	27	32	38	49	54	56	73	61	60	49	53	51	45	45	45	50	48	38	35	34

HOURLY VALUES OF fEs AT Kokubunji

JUL. 2019

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

$\frac{H}{D}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	40	104	59	83	89	113	45	59	71	65	154	144	83	51	60	161	132			106	147	127	57	70	
2	135	54	34	37	72	44	59	52	156	111	62	71	71	62	56		128	145	122	79	44	48	32	30	
3	70	38	54	42	53	59	33	40	56	54	70	52	G	137	56	55	44	60	55	85	129	59	57	45	
4	37	42	35	29	28		60	80	101		153	147	144	146	104	117	53	82	42	39	40	39	34	G	
5	49	69	60	33	79	42	42	58	55	91	50	112	G		G	49	55	61	80	110	115	130	158	35	
6	G	27	G	G	G	G		49	64	68	152	124	70	40	40	119	39		53	49	29	30	58	134	
7	60	36	39	37	24	G	37	57	58	71	79	60	116	95	54	53	62	117		117	49	135	70	34	
8	24	24			43	60	38	40	47	86	150	155		92	50	76	47	56	60	49	55	80	59	69	
9	82	70	40	41	39	30	56	51	65	57	42	G	130	83	83	111	90	84	90	143	150	28	150	84	
10	60	54	45	39	31	42	57	93	79	88	79	89	52	79	52	G	50	72	35	69	146	84	41	57	
11	70	60	34	26	34		108	46	56	84	49	79	58	52	41	40	43	53	151	41	32	43	50	42	
12	93	29	73	G	G	42	58	82	55	74	55	113	128	50	82	41	42	46	62	57	34	107	83	72	
13	57	40	55	43	37	32	G	42	46	42	41	41	66	83	44	61	42	85	34	60	39	38	25	110	
14	34	41	84	90	40	39	128	104	126		146	53	57	G	G	42	50	40	55	84	49	70	70	71	
15	70	60	42	G	40	53	57	37		113	71	G	51		50	61	67	42	51	80	80	78	57	116	
16	69	65	73	41	57	26	34	117	61	102	74	G	61	G	G	G	41	39	55	45	41	127	79	104	
17	80	72	46	41	31	26	37	46	45	57	51	41		48	56	63	123	96	104	63	39	40	28	G	
18	G	G	G		G	28	55	153	64	83	57	G		87	77	66	94	110	116	57	G	G	G	G	
19	33	G	41	G	42	61	37	112	50	40	127	41	40	G	G	G	G		34	50		69	72	43	G
20	G	G	G	G	G	29	82	54	G	48	40	45	41	54		46	38	37	53	69	127	84	142	59	
21	57	57	G	G	G	32	39	57	81	109	150	90	97	79	109	93	51	128	33	28	G	60	33	G	
22	27	49	29	G	G	39	59	148	143	127	153	46	90	60	83	G	43	63	84	93	126	57	55	29	
23	40	115	54	39	59	42	36	52	59		154	114	41	48	52	G	38	72	79	53	55	40	39	38	
24	41	49	37	26	52	38	69	36	47	54		80	46	G	54	38	G		39	31	39	33	31	34	39
25	46	43	33	23	G	34	33	38	38	39	40	G	G	G	G	G	42	39	38	31	G	23	G	29	
26	32	G	G	G	G		32	53	51	50	G	43	46	G	G	G	42	62	56	40	11	43	55	87	
27	36	43	33	29	30	27	50	82	39	82	88	67	144		78	49	42	48	36	31	42	33	32	G	
28	31		26	40	26	35	42	52	46	42		101	118	51	55	55	42	51	39	69	39	80	46		
29	71	45	34	31	29	35	40	51	147	128	151	91		71	80	88	53	55	45	40	38	60	125	59	
30	70	73	39	G	G	G	42	50	72	56	77	59		70	93	85	116	65	82	G	G	G		33	91
31	80	27	29	28	G	29	34	38	37	50	82	57		55	65	58	118	51	58	94	81	40	53	35	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	30	31	30	31	28	31	31	30	28	29	30	25	28	31	30	31	29	29	30	31	31	31	31	
MED	49	44	37	29	31	35	42	52	57	70	77	60	61	58	54	54	50	60	55	57	44	48	55	45	
U Q	70	60	54	40	43	42	58	82	72	89	150	91	99	83	78	76	67	83	81	84	81	80	70	72	
L Q	33	29	29	G	G	28	36	46	47	52	50	41	43	44	40	38	42	42	43	40	33	38	33	29	

HOURLY VALUES OF fmin AT Kokubunji

JUL. 2019

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	13	13	14	13	14	14	14	15	23	18	21	22	28	26	24	29	17			14	14	13	14	15
2	14	14	14	13	13	14	13	14	17	20	23	29	31	24	24		17	14	14	13	14	13	14	15
3	14	13	14	17	14	14	13	14	20	21	29	28	29	25	23	21	15	13	14	14	14	17	13	14
4	13	13	13	14	15		14	13	14		21	26	25	22	25	21	15	14	13	14	13	14	14	14
5	14	14	13	13	14	13	14	14	15	18	21	25	46		24	21	15	13	17	13	15	14	13	14
6	17	17	18	18	14	25	13	17	14	22	26	28	24	26	22	20	17		14	14	14	14	13	13
7	14	13	13	14	13	20	13	14	17	22	21	22	25	22	29	21	22	14		13	14	17	14	14
8	14	14	13	13	13	17	14	14	15	18	21	23		24	25	17	15	14	17	14	14	15	14	14
9	14	13	14	14	13	13	18	14	14	24	18	31	30	29	23	18	17	15	14	14	13	14	14	14
10	13	14	13	14	14	14	14	15	15	21	22	23	21	33	31	20	15	17	14	13	14	17	13	17
11	13	14	13	13	13		13	14	20	20	30	22	21	22	31	21	21	14	13	13	14	13	13	13
12	14	14	14	13	14	13	13	17	15	20	21	28	29	23	22	22	24	13	15	14	13	14	14	14
13	13	14	13	14	14	14	13	14	15	15	20	26	34	22	22	22	15	14	13	14	14	13	14	14
14	13	14	14	13	14	14	13	18	21		25	22	24	21	20	30	20	17	15	14	13	13	13	13
15	13	14	13	14	13	14	13	14		20	22	22	34		33	23	14	14	15	14	14	14	13	14
16	14	14	13	13	14	14	13	18	15	22	26	25	26	22	21	20	17	14	13	13	14	13	14	13
17	14	13	13	13	14	17	15	13	17	20	22	22		33	33	23	20	14	14	13	13	14	14	14
18	14	14	14		18	13	13	17	17	21	30	28		31	22	21	15	15	15	14	13	14	18	17
19	13	14	13	14	14	13	13	17	18	18	21	21	22	22	21	18	14	13	13		14	13	13	13
20	13	14	14	14	13	14	13	14	14	20	18	21	21	18	21	14	14	14	13	14	17	14	14	14
21	14	14	14	13	14	13	14	13	14	17	23	24	22	28	22	18	14	20	15	15	14	13	14	13
22	14	14	13	14	13	13	13	13	15	17	17	26	26	18	21	18	21	14	14	14	14	14	13	13
23	13	13	13	14	13	13	13	13	14		17	22	23	21	18	43	14	17	14	14	14	13	17	13
24	17	14	13	14	14	13	13	14	18	17		20	23	20	17	13	14	14	13	13	14	13	14	13
25	13	13	13	14	14	13	13	13	14	17	20	21	22	20	21	21	18	17	13	14	18	14	17	17
26	14	13	14	14	13		13	13	17	18	21	22	21	20	20	20	17	14	13	13	17	14	14	13
27	14	13	13	13	15	14	13	14	17	21	17	23	29		18	15	13	13	13	13	14	14	14	14
28	14		14	13	13	14	13	13	13	14			23	22	20	18	17	15	14	14	14	13	15	14
29	14	13	13	13	13	14	13	14	17	21	20	24		20	20	17	14	14	14	13	15	14	13	13
30	13	13	13	13	14	13	14	13	14	20	22	21		22	22	31	15	17	14	13	17	17	17	13
31	14	13	14	14	13	13	14	14	18	20	21	33		31	15	26	15	14	13	13	13	13	14	13
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	30	31	30	31	28	31	31	30	28	29	30	25	28	31	30	31	29	29	30	31	31	31	31
MED	14	14	13	14	14	14	13	14	15	20	21	23	25	22	22	21	15	14	14	14	14	14	14	14
U Q	14	14	14	14	14	14	14	15	17	21	23	26	29	26	24	22	17	15	14	14	14	14	14	14
L Q	13	13	13	13	13	13	13	13	14	18	20	22	22	21	20	18	14	14	13	13	14	13	13	13

HOURLY VALUES OF fof2 AT Yamagawa

JUL. 2019

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	189	A	A	A	A	26	A	A	54	68	58	A	A	A	72	67	A	A	60	80	A	A	A	A	
2	A	A	A	A	A	A	A	38	51	57	A	A	A	A	72	A	54	A	A	65	A	A	A	38	
3	38	A	A	A	A	A	A	48	44	47	51	A	A	A	A	49	A	47	A	48	48	A	A	A	
4	A	B	B	A	A	A	A	A	A	A	A	A	A		A	A	A	A	50	A	A	A	B	B	
5	B	B	B	A	B	B	A		A		50	A	A	A	A		54	A	A	A		52	54	51	
6	34	34	34	34	31	28	41	42	50	A	A	97	A	A	51	52	48	A	54	54	71	42	A	30	
7	31				A	26	38	41	48	47	A	A	50	N	A	72	A	50	53	47	50	52	40	A	
8	36	42	42	41	42	32	40	42	41	A	48	A	A	A	A	A	A	A	48	46	54	51	51	48	
9	42	A	A	A	A	A	A	A	A	52	65	140	144	A	A	A	A		74	67	A	A	47	47	
10	A	A	42	34	29	31	A	A	A	A	A	99	A	A	A	70	A	86	38	54	A	A	A	A	
11	A	A	A	A	A	A	32	A	A	159	A	A	A	A	A	107	A	45	50	54	50	A	N	A	
12	A	26	N	25	A	N	A	A	N	A	A	A	A	49	49	48	52	52	A	52	A	A	A	A	
13	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	58		49	A	A	36	
14	A	A	A	A	25	N	A	48	44	A	A	A	A	59	50	A	A	A	A	44	51	66	52	37	
15	A	A	A	A	A	A	A	106	50	A	A	A	A	50	50	A	38	40	51	55	50	47	A	A	
16	A	A	A	A	A	A	38	54	A	A	55	A	A	52	52	52	46	50	58	64	77	72	34	49	
17	25	28	A	A	A	A	A	A	64	A	A	A	A	A	A	50	A	55	29	45	54	A	51	50	
18	30	34	34	30	A	49	A	A	45	102	A	A	53	128	A	A	A		54	39	40	44	42	37	
19	A	A	A	A	26	29	34	169	A	A	109	A	A	A	A	47	50	48	52	54	74	A	A	32	
20	28	31	26	28	24	N	39	42	41	A	A	50	60	51	A	A	41	45	53	46	52	54	38	A	
21	A	A	A	A	A	25	A	A	A	A	A	A	A	A	70	70	58	A	32	48	54	43	36	34	
22	32	28	26	25	25	A	37	A	44	58	58	A	A	A	A	99	A	50	47	50	54	A	A	38	
23	42	A	A	A	A	A	A	A	109	57	51	57	61	A	A	70	66	66	49	53	54	42	37	A	
24	32	A	A	N	A	A	34	A	43	A	A	A	A	52	64	45	A	A	62	A	34	A	36	40	
25	37	34	34	26	28	28	37	38	44	50	A	51	51	A	51	64	54	A	A	48	51	50	40	38	
26	34	34	28	29	B	N	34	51	45	A	44	50	53	A	A		40	37	48	55	72	32	A	30	
27	30	A	A	A	A	A	34	53	45	A	A	A	55	A	55	68	58	A	A	48	51	36	A	29	
28	28	25	A	N	A	A	38	A	A	53	A	A	A	A	A	A	53	A	A	A	54	A	A	35	
29	32	A	28	26	25	28	A	A	A	A	A	77	169	A	57	50	51	47	43	42	46	A	A	34	
30	A	A	A	A	A	25	A	A	A	179	86	42	A	A	A	A	A	A	75	76	57	53	42	32	59
31	32	A	A	24	25	26	37	45	46	48	A	A	A	A	A	A	A	A	A	48	54	52	34	29	
	00	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	10	10	11	10	12	14	14	19	13	10	11	10	6	11	17	15	18	22	26	24	17	16	16	
MED	32	32	34	28	26	28	37	44	45	57	53	57	57	52	55	64	52	50	50	50	54	47	37	36	
U Q	37	34	34	34	29	30	38	51	51	85	58	99	61	52	70	70	54	58	54	54	54	52	43	44	
L Q	30	28	28	25	25	26	34	41	44	49	50	50	51	50	51	49	46	47	44	48	50	42	36	31	

HOURLY VALUES OF fEs AT Yamagawa

JUL. 2019

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

$\frac{H}{D}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	25	33	52	58	58	G	34	53	49	50	50	48	49	92	54	50	52	55	42	49	109	168	43	57
2	111	57	55	52	59	56	69	38	49	50	53	60	64	61	46	62	57	92	90	33	82	84	39	32
3	34	40	33	70	58	70	56	48	40	42	41	55	53	48	57	44	40	36	39	29	31	31	30	53
4	33	B	B	30	28	32	33	55	52	51	80	77	115	G	74	76	103	89	40	37	45	41	B	B
5	B	B	B	28	B	B	33	40	G	43	50	65	57	66	88	G	44	91	130	80	45	36	34	48
6	30	33	26	G	G	G	28	36	44	69	74	67	109	127	40	53	39	72	51	34	28	56	40	29
7	28	90	40	70	40	G	43	36	72	46	84	93	54	93	129	83	54	G	G	28	G	G	G	111
8	46	25	32	30	23	G	32	36	45	50	45	53	111	127	109	84	84	59	45	41	48	30	37	26
9	32	85	111	84	59	45	55	52	57	45	151	88	110	108	128	146	75	40	39	54	178	58	41	70
10	46	57	38	26	G	37	35	67	70	72	107	96	147	91	57	67	60	91	54	54	58	41	60	60
11	93	84	59	45	70	60	32	111	54	56	52	71	67	56	60	78	106	40	31	G	84	56	G	40
12	25	G	29	G	36	40	46	78	115	56	62	56	76	78	48	45	48	52	79	116	71	104	112	70
13	113	92	82	73	47	36	44	52	41	46	46	74	59	117	109	110	137	109	143	110	79	70	34	40
14	60	54	64	32	24	G	39	43	45	77	89	95	50	47	51	90	60	87	54	G	116	144	31	44
15	78	59	109	58	40	44	40	50	46	95	75	42	49	45	46	50	43	53	48	34	47	47	69	70
16	91	59	59	40	71	49	34	41	106	59	57	54	53	54	41	46	39	39	G	37	31	24	G	G
17	G	45	45	48	32	55	72	59	45	55	51	46	54	55	79	46	66	48	38	48	69	70	43	35
18	31	27	26	32	59	28	58	45	116	91	108	132	116	116	84	88	78	50	41	43	34	G	G	91
19	71	41	54	38	28	24	33	163	103	93	77	70	64	59	45	44	G	38	37	31	28	80	50	36
20	G	G	33	G	G	G	32	38	40	46	49	46	47	G	47	46	38	34	34	27	50	41	29	41
21	60	108	59	71	59	39	45	52	79	116	103	112	92	175	70	46	179	60	41	40	32	G	32	24
22	G	G	G	G	30	43	28	40	59	82	145	70	61	100	67	76	46	37	38	59	50	56	69	40
23	38	50	48	48	53	72	49	83	70	40	47	45	52	79	78	46	G	36	31	G	11	34	70	70
24	70	103	84	41	36	28	26	84	59	60	46	107	49	G	G	46	45	55	49	127	24	73	56	35
25	35	G	G	G	G	G	29	34	35	45	49	49	G	48	46	44	51	58	50	34	36	36	24	G
26	G	G	G	G	B	35	29	39	46	47	46	48	G	46	45	G	G	G	32	G	25	31	41	11
27	G	49	56	48	38	35	30	35	45	78	57	55	60	60	50	49	50	92	70	38	47	G	34	31
28	G	28	28	27	38	45	40	56	78	54	50	46	58	71	110	70	42	60	64	46	34	87	45	41
29	32	45	46	27	G	G	112	53	60	60	71	61	142	73	57	46	44	43	49	39	53	70	72	71
30	112	90	49	34	33	G	60	84	149	126	74	63	80	109	84	94	89	43	41	40	40	26	G	35
31	38	58	40	G	G	34	26	36	45	44	47	59	66	81	117	149	72	106	60	34	G	35	24	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	30	29	29	31	29	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30
MED	34	49	46	34	36	35	35	50	52	55	57	61	60	71	57	50	51	53	42	38	45	41	38	40
U Q	70	71	59	52	58	45	49	59	72	77	80	77	92	100	84	83	75	87	54	49	69	70	50	60
L Q	25	27	30	26	23	G	32	38	45	46	49	49	52	48	46	46	42	39	38	31	31	31	29	32

HOURLY VALUES OF fmin AT Yamagawa

JUL. 2019

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

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

HOURLY VALUES OF fof2 AT Okinawa

JUL. 2019

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	A	A	A	A	A	A	30	A	55	58	A	52	56	75	76	74	73	72	81	84	A	A	A	A	
2	A	A	A	A	A	A	A	A	A	55	A	62	A	A	71	A	A	A	A	A	A	A	47	A	A
3	32	32	26	A	A	A	A	37	A	50	52	51	56	A	A	A	52	62	80	63	50	40	42	A	
4	31	A	30	A	A	A	34	38	A	47	A	A	A	68	60	65	A	A	65	77	90	A	A	A	
5	A	B	A	A	A	A	34	37	A	58	64	A	A	A	A	A	56	75	65	50	54	51	42	A	
6	34	B	N	19	25	N	35	51	42	A	A	55	A	52	43	50	50	55	63	74	58	30	26	A	
7	A	A	25	A	A	A	A	A	A	A	A	A	A	A	A	A	72	66	64	63	52	52	44	38	
8	37	49	41	41	39	N	36	A	45	A	A	A	A	A	A	60	70	A	A	44	51	54	50	40	
9	38	A	A	38	A	25	37	44	A	A	67	A	A	A	52	58	72	85	54	44	44	A	45	A	
10	A	36	A	A	A	A	40	40	A	A	A	A	A	A	A	62	A	67	71	58	A	A	A	A	
11	A	A	A	A	A	A	32	38	A	A	A	A	A	A	A	A	A	47	58	67	39	44	A	A	
12	A	A	N	N	A	A	32	A	48	A	A	A	A	A	51	A	A	A	79	71	A	A	A	A	
13	A	A	A	A	A	59	38	A	A	A	A	A	A	A	A	A	A	70	72	64	A	A	A	31	
14	A	A	A	A	A	A	37	109	A	A	A	A	A	50	A	50	A	A	A	A	64	A	32	49	
15	49	A	28	26	A	A	A	44	A	A	A	A	A	61	71	71	76	75	75	72	80	A	A	A	
16	A	A	A	A	N	26	A	47	45	A	A	A	A	60	55	54	50	54	60	72	84	42	31	26	
17	B	A	B	B	A	A	A	45	45	A	A	A	A	A	55	55	49	54	A	47	54	54	A	39	
18	36	31	29	31	26	N	A	A	44	A	A	B	50	52	A	A	65	59	B	58	59	42	31	28	
19	26	A	59	A	25	A	30	35	A	A	A	59	A	A	48	51	54	57	60	67	67	A	A	A	
20	A	26	A	24	A	N	37	A	A	A	A	56	51	A	A	A	A	51	52	50	51	53	A	A	
21	A	A	A	A	A	A	A	A	A	A	A	A	A	111	78	77	72	61	57	63	51	37	A	A	
22	30	26	26	N	B	N	32	40	50	A	51	A	A	169	54	60	A	50	57	42	A	A	A	A	
23	A	A	A	32	A	A	A	A	A	51	A	58	69	70	A	78	80	80	72	75	77	47	26	A	
24	A	N	A	A	A	N	40	36	44	A	A	A	A	62	A	A	A	52	53	56	A	36	34	34	
25	34	A	A	28	B	A	A	47	139	48	65	A	A	171	65	72	A	A	56	54	52	54	44	38	
26	36	32	29	49	30	29	29	54	41	A	42	49	47	A	A	A	A	A	50	60	56	51	34	29	
27	59	29	26	N	A	A	28	50	47	A	A	A	A	70	80	A	A	53	64	45	A	A	A	26	
28	A	B	B	A	A	A	31	41	51	51	A	A	A	57	59	A	54	47	A	51	62	A	A	A	
29	A	A	N	N	A	A	A	A	51	48	42	A	A	A	57	A	51	54	A	A	A	A	A	A	
30	A	A	A	A	A	A	A	A	A	45	A	197	A	A	A	78	82	86	90	86	51	44	34	32	
31	A	30	A	A	A	N	35	40	52	51	A	A	A	A	A	A	A	72	68	A	67	66	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	12	9	9	10	5	4	19	18	16	11	7	9	6	12	16	18	16	23	25	26	23	19	14	12	
MED	35	31	29	30	26	28	34	40	48	51	52	56	54	65	57	61	68	61	63	63	54	47	34	33	
U Q	37	34	35	38	34	44	37	47	51	55	65	60	56	93	70	74	72	72	72	72	67	54	44	38	
L Q	31	27	26	26	25	25	31	38	44	48	42	51	50	56	53	55	51	54	55	54	51	42	31	28	

HOURLY VALUES OF fEs AT Okinawa

JUL. 2019

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	34	40	106	57	56	60	30	43	54	56	61	46	51	49	48	43	45	38	70	44	84	40	69	60
2	93	90	84	134	54	108	58	93	59	57	71	60	78	70	65	77	88	69	116	77	88	44	43	28
3	G	G	28	40	39	60	48	39	144	58	47	G	46	152	46	48	56	42	45	36	24	26	G	70
4	26	46	23	30	31	29	160	44	73	53	51	49	97	47	63	62	66	60	53	49	74	49	60	43
5	31	B	46	59	28	29	26	49	43	54	56	95	103	51	57	44	63	43	34	28	26	30	25	35
6	35	B	G	G	G	G	G	40	44	43	42	106	49	49	46	48	41	35	116	28	49	G	G	24
7	25	24	G	105	67	57	49	70	108	56	77	148	97	60	78	85	70	70	56	27	G	G	G	G
8	58	58	35	35	32	G	25	84	48	48	76	70	68	175	130	49	76	86	59	40	50	29	25	27
9	32	55	82	56	44	G	60	129	69	109	67	109	64	113	45	44	61	40	37	31	32	59	59	45
10	48	35	55	45	53	55	28	129	70	72	105	105	102	73	71	70	66	46	44	36	45	37	50	58
11	80	88	81	70	50	41	35	44	48	61	78	64	62	65	72	79	106	60	58	143	59	70	135	60
12	46	33	26	48	31	27	G	47	50		88	74	49	58	48	92	76	91	62	136	91	57	55	103
13		124	74	54	58	29	83	66	70	67	54	52	63	56	70	76	105	51	53	73	92	58	33	25
14	55	60	78	56	51	37	40	66	102	91		70	79	86	48	44	49	81	117	84	84	52	28	25
15	27	36	28	G	57	38	34	38	58	92	83	88	52	46	55	54	39	43	42	43	29	48	79	40
16	58	128	57	40	G	26	135	47	55	53	89	68	60	92	40	54	46	46	41	30	30	27	24	G
17	B	28	B	B	49	37	59	39	40	56	179	86	47	49	50	45	50	38	57	30	31	30	58	38
18	27	26	27	G	35	39	57	78	134	115	62	B	50	50	64	60	45	48	B	40	39	41	23	G
19	G	33	57	59	26	41	27	38	60	72	67	69	92	64	46	46	G	39	36	36	36	35	92	39
20	35	G	59	27	30	G	29	50	47	57	50	46	50	47	65	45	48	37	33	27	28	50	G	26
21	25	27	45	48	54	59	158	87	167	175	115	154	90	48	42	46	G	G	34	32	26	26	34	27
22	25	89	54	G	B	G	29	33	50	74	60	59	116	51	48	54	58	43	40	44	93	60	80	108
23	29	92	92	32	40	56	57	132	111	56	106	47	51	47	92	39	42	G	31	G	G	45	G	34
24	37	26	48	92	70	29	28	56	44	48	52	60	49	47	92	54	60	58	41	35	45	26	55	34
25	59	69	114	94	B	32	46	33	44	41	48	48	52	48	52	44	69	58	72	39	30	G	47	G
26	G	G	G	G	G	G	26	52	42	50	48	49	88	93	64	51	43	44	36	28	54	38	32	G
27	G	24		G	36	31	159	32	44	50	47	47	54	115	62	48	70	140	45	40	55	G	34	26
28	58	B	B	29	35	25	G	35	55	43	46	48	52	55	52	59	53	45	46	52	38	46	46	72
29	56	36	G	25	26	37	55	46	35	146	47	69	49	69	59	68	51	50	53	60	58	59	148	110
30	32	59	59	38	58	36	47	112	79	41	172	108	115	86	93	50	100	75	60	32	45	35	27	G
31	39	83	112	60	45	25	G	53	38	45	49	48	89	68	75		111	44	49	156	30	22	47	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	28	28	30	29	31	31	31	31	30	30	30	31	31	31	30	31	31	30	31	31	31	31	31
MED	34	38	54	42	40	32	40	49	55	56	62	66	62	58	59	50	58	46	48	39	45	38	43	34
U Q	55	76	79	59	54	41	58	78	73	72	83	88	90	86	71	62	70	60	59	52	59	50	59	58
L Q	25	26	27	27	30	25	27	39	44	50	49	48	50	49	48	45	45	40	40	30	30	26	25	25

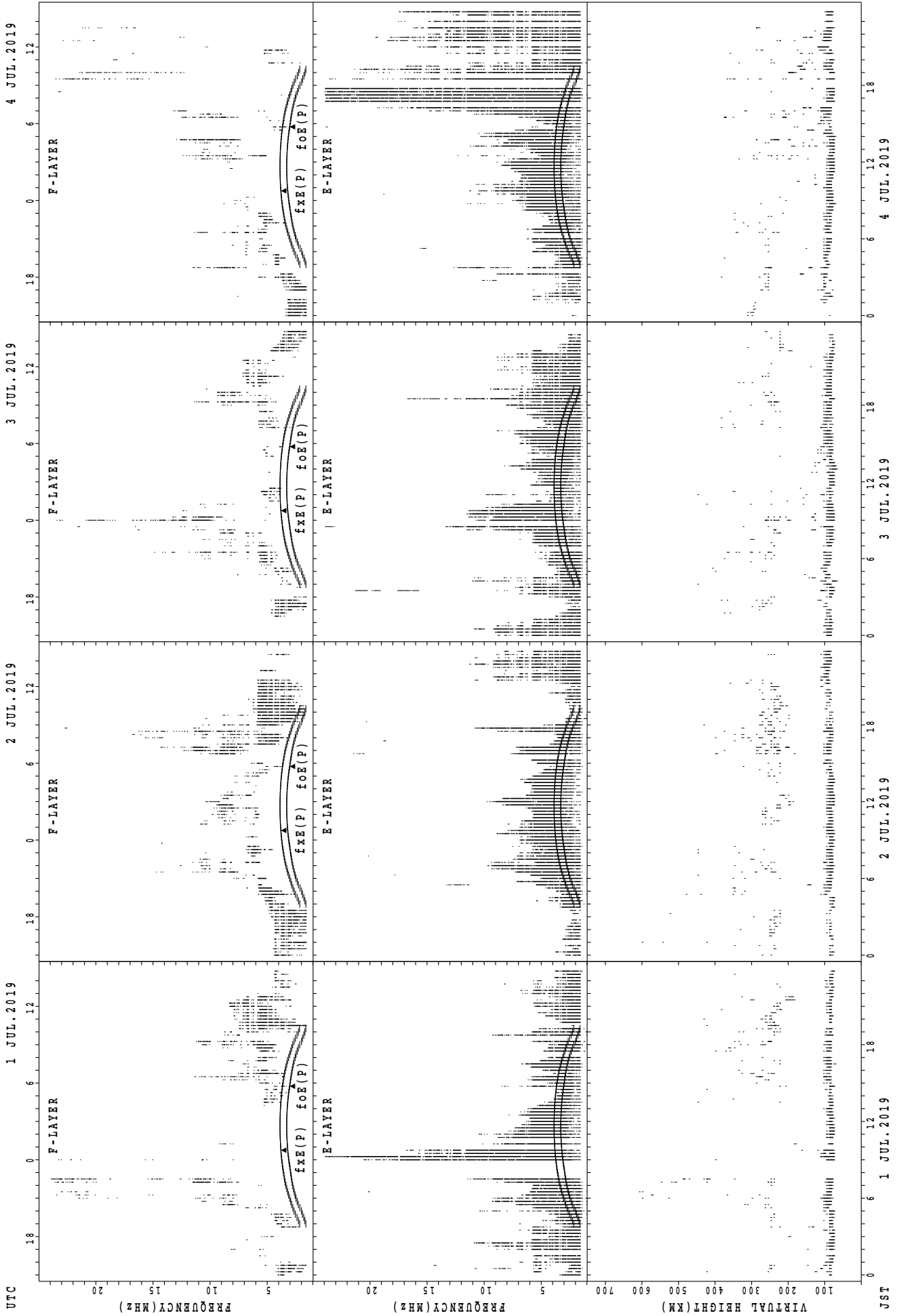
HOURLY VALUES OF fmin AT Okinawa

JUL. 2019

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

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

SUMMARY PLOTS AT Wakkanai

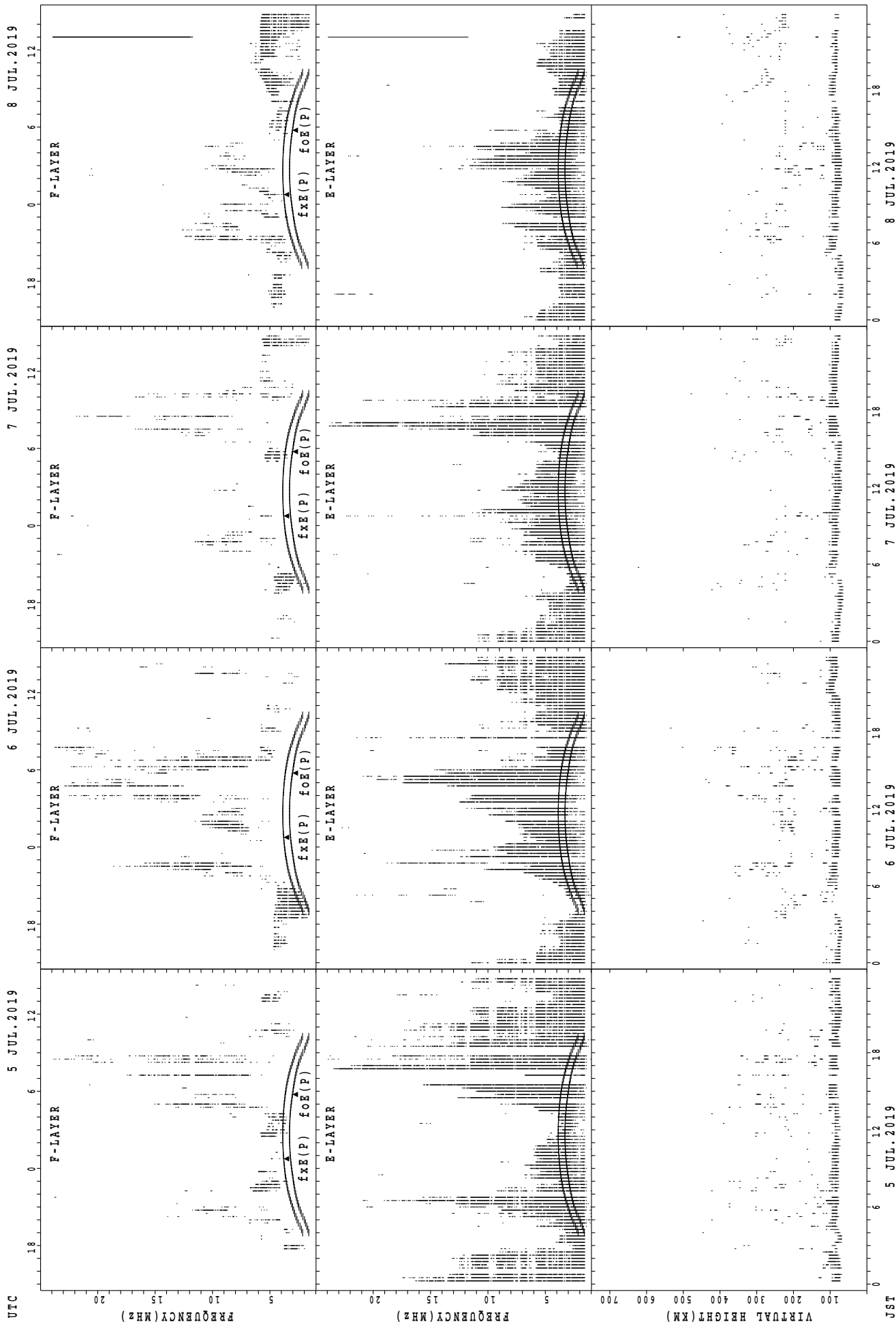


UTC
 1 JUL.2019
 2 JUL.2019
 3 JUL.2019
 4 JUL.2019

JST
 1 JUL.2019
 2 JUL.2019
 3 JUL.2019
 4 JUL.2019

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

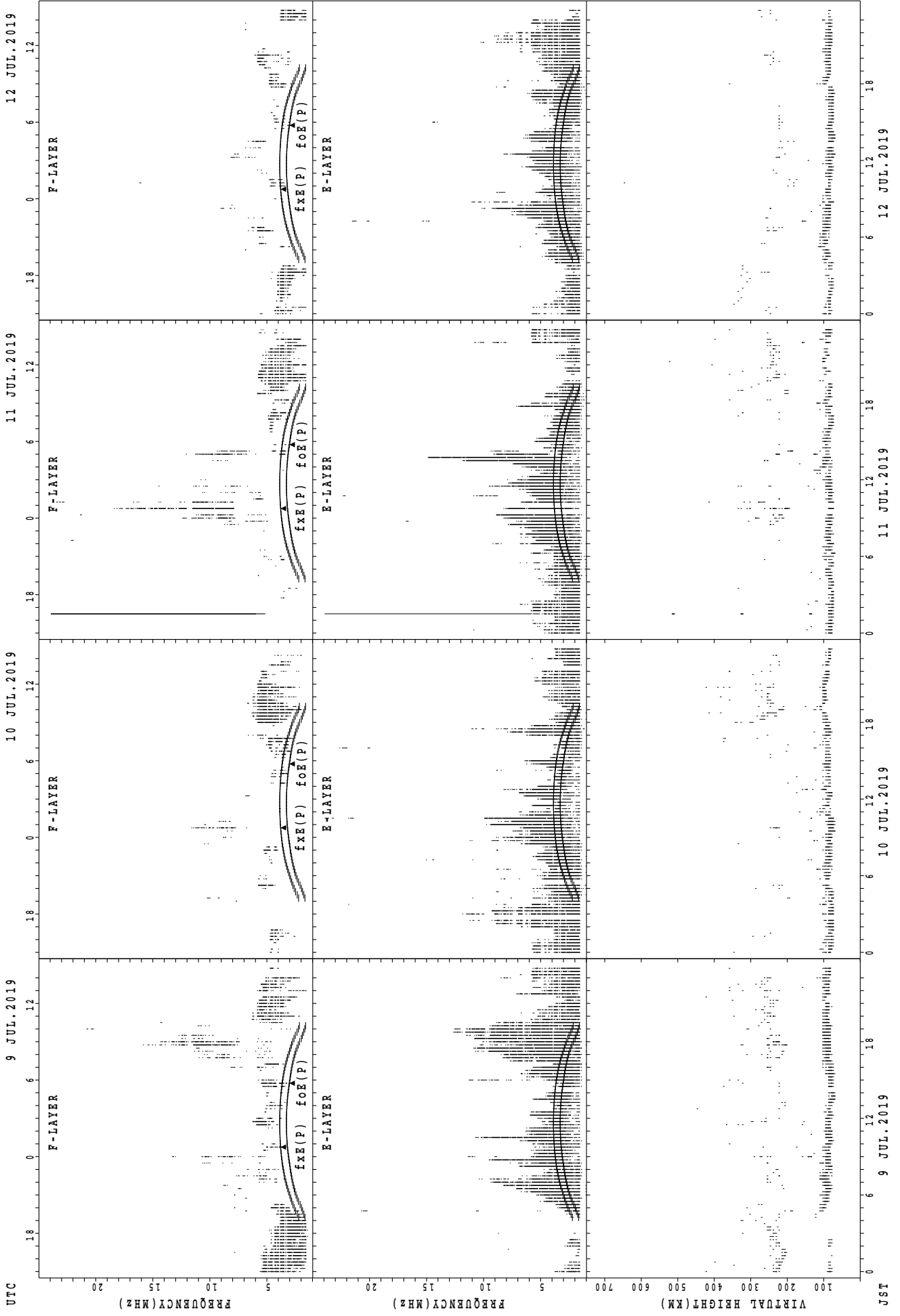
SUMMARY PLOTS AT Wakkanai



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

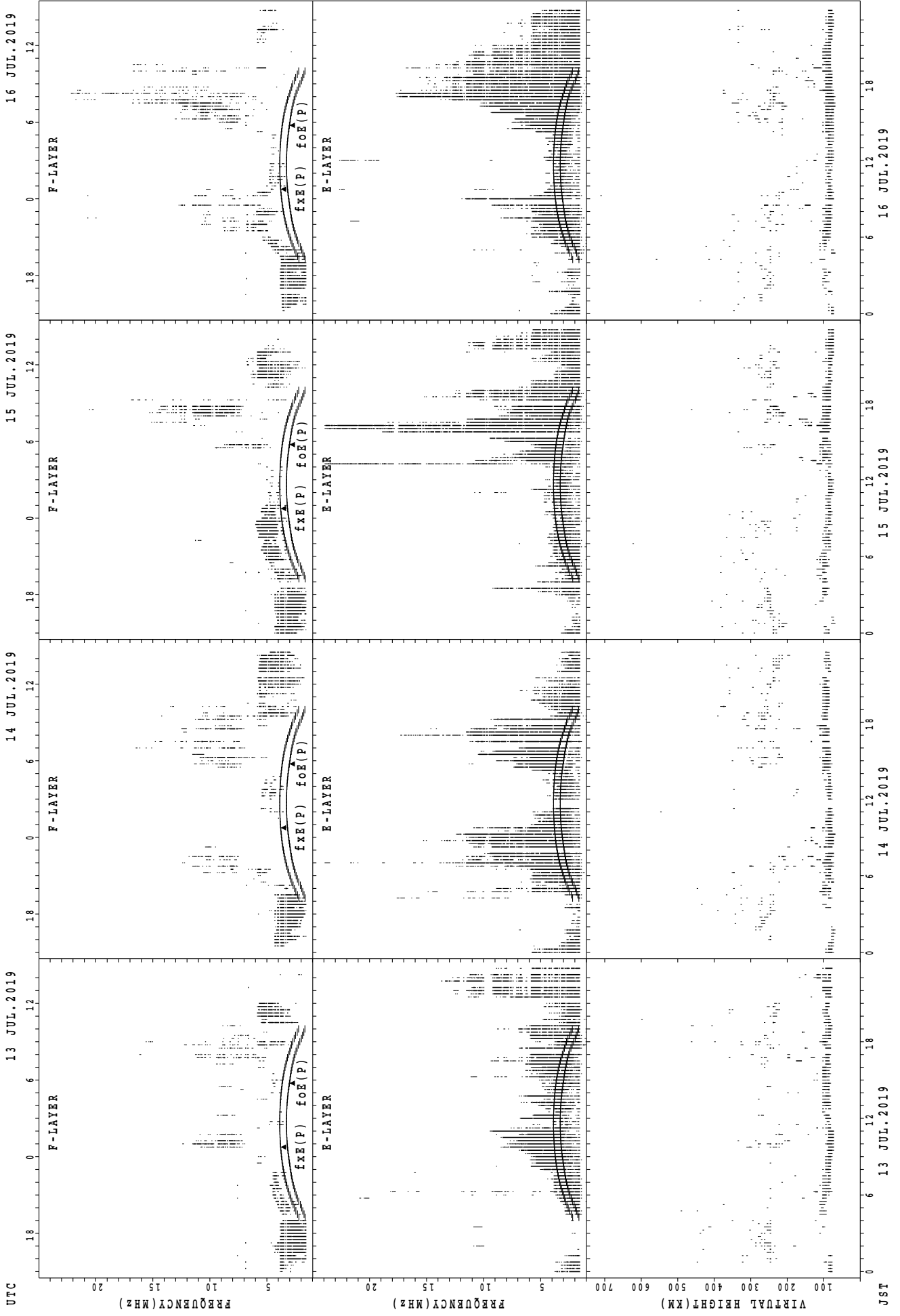
JST

SUMMARY PLOTS AT Wakkanai



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

SUMMARY PLOTS AT Wakkanai



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

16 JUL.2019

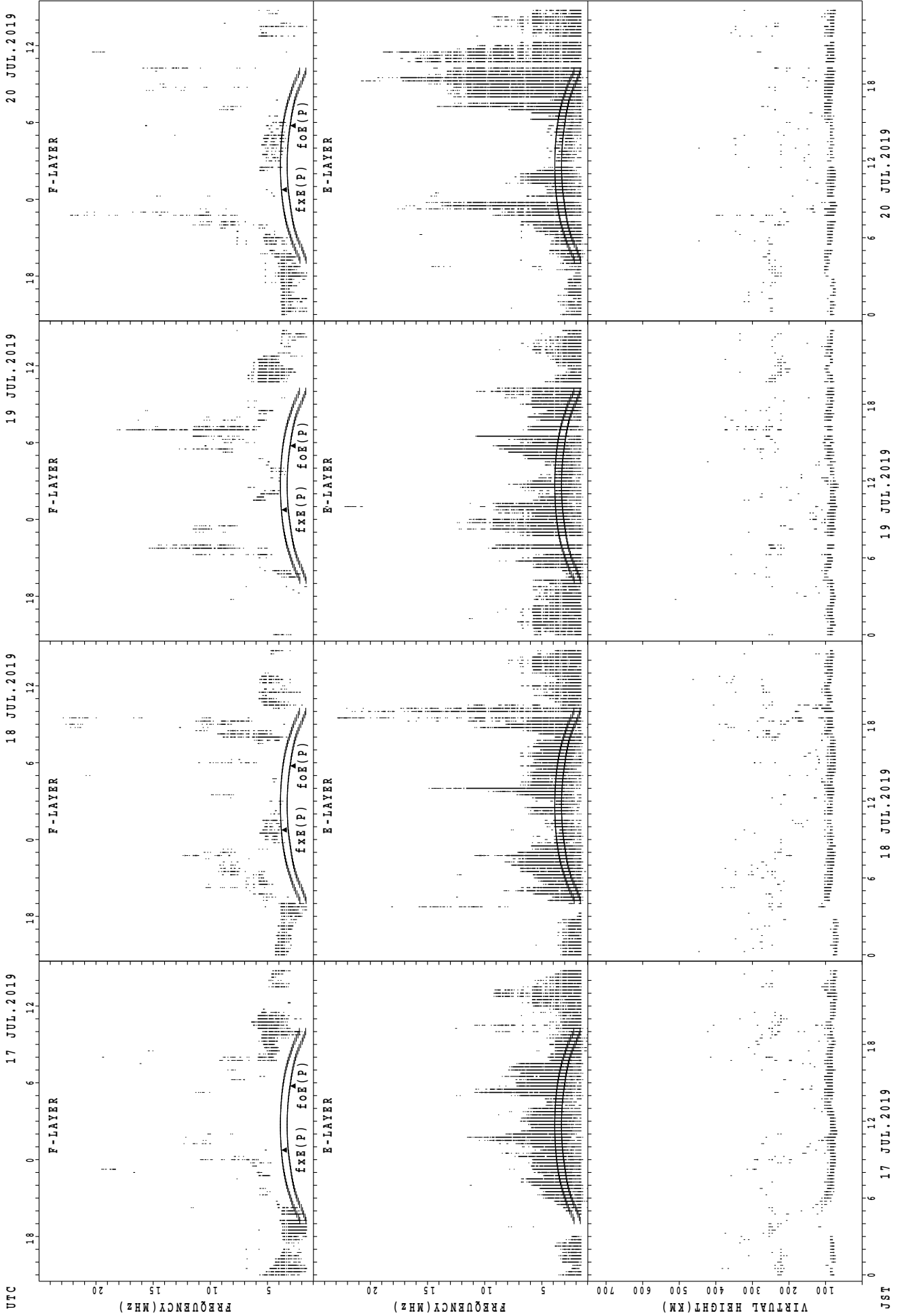
15 JUL.2019

14 JUL.2019

13 JUL.2019

JST

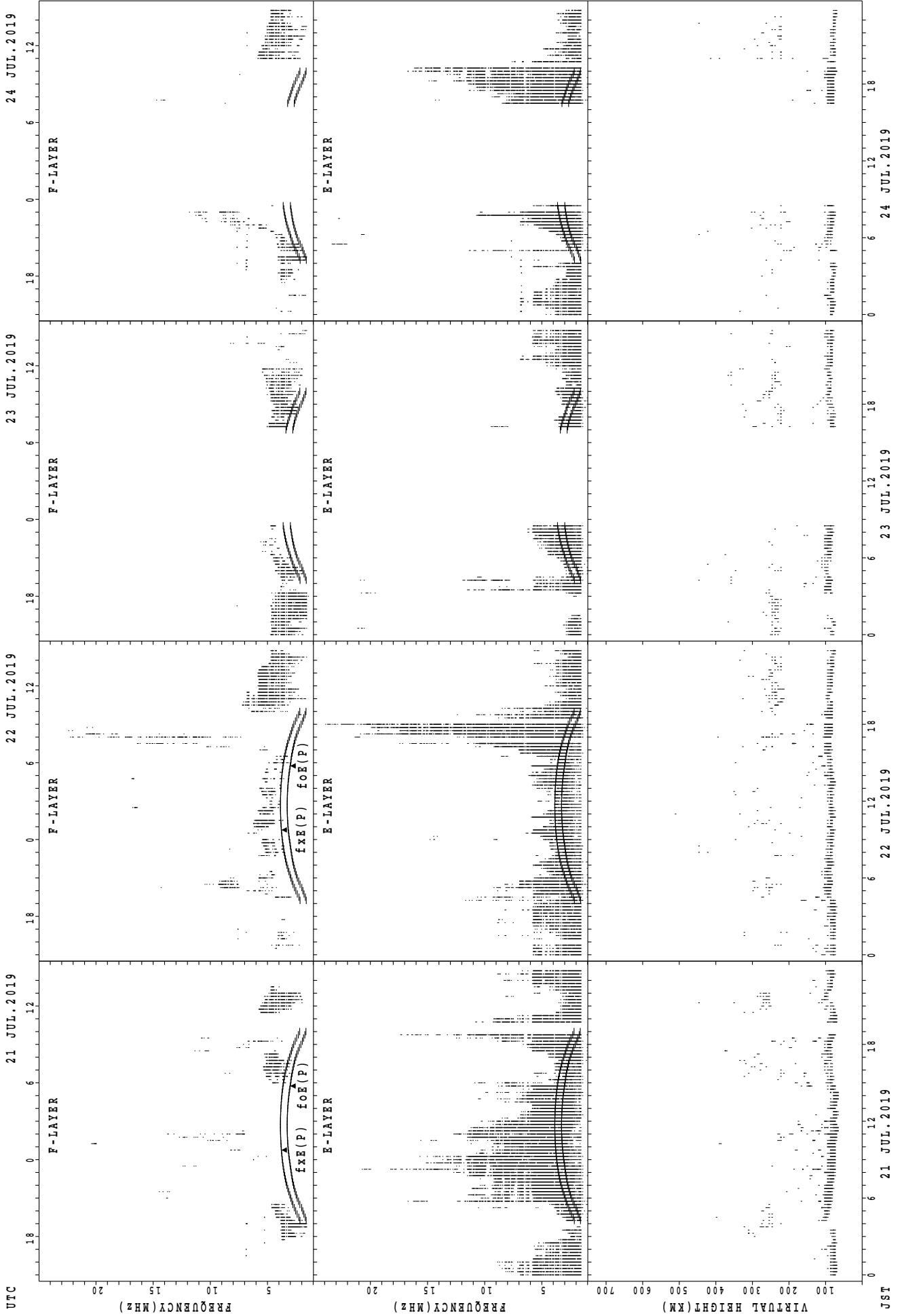
SUMMARY PLOTS AT Wakkanai



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

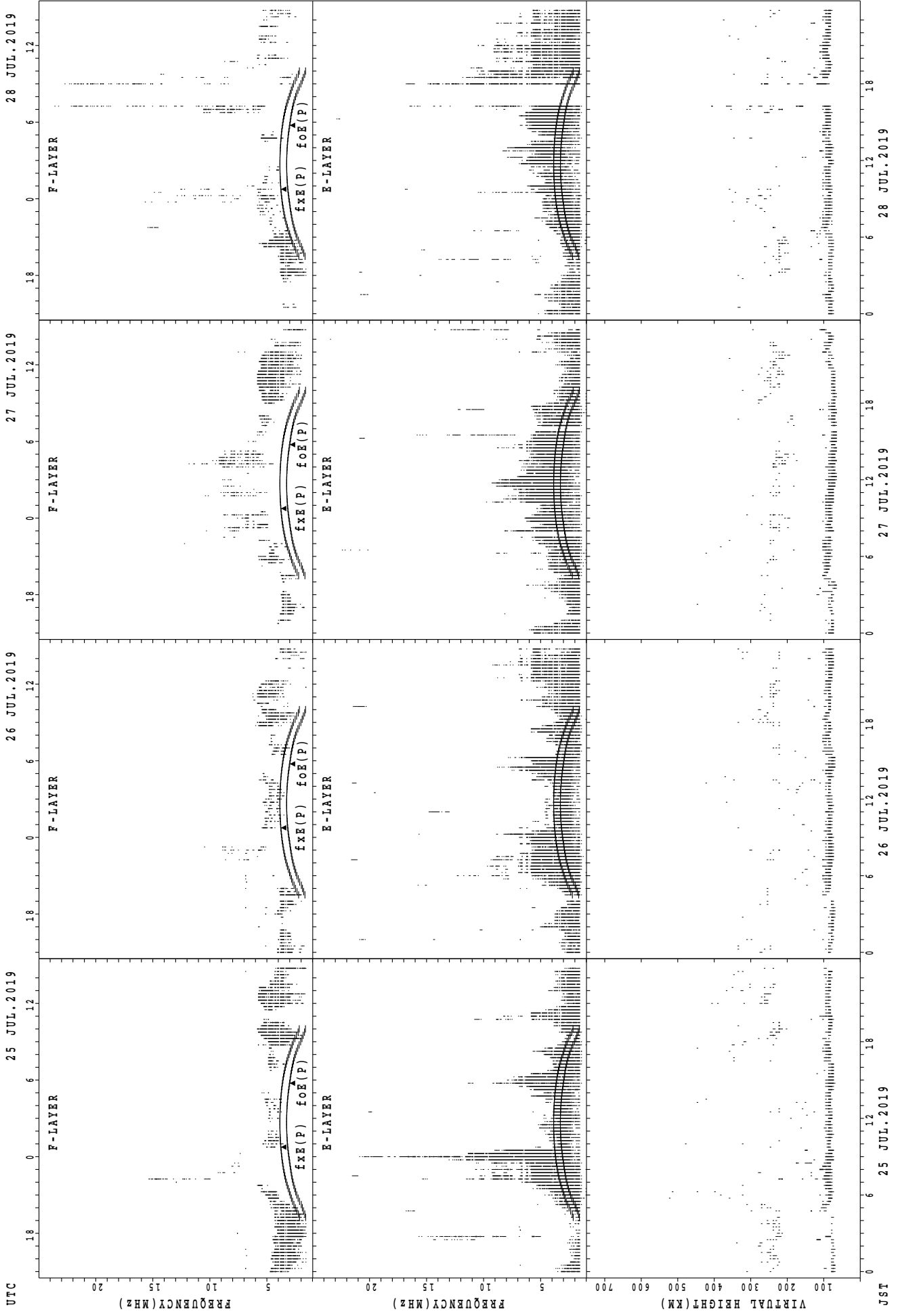
JST

SUMMARY PLOTS AT Wakkanai



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

SUMMARY PLOTS AT Wakkanai

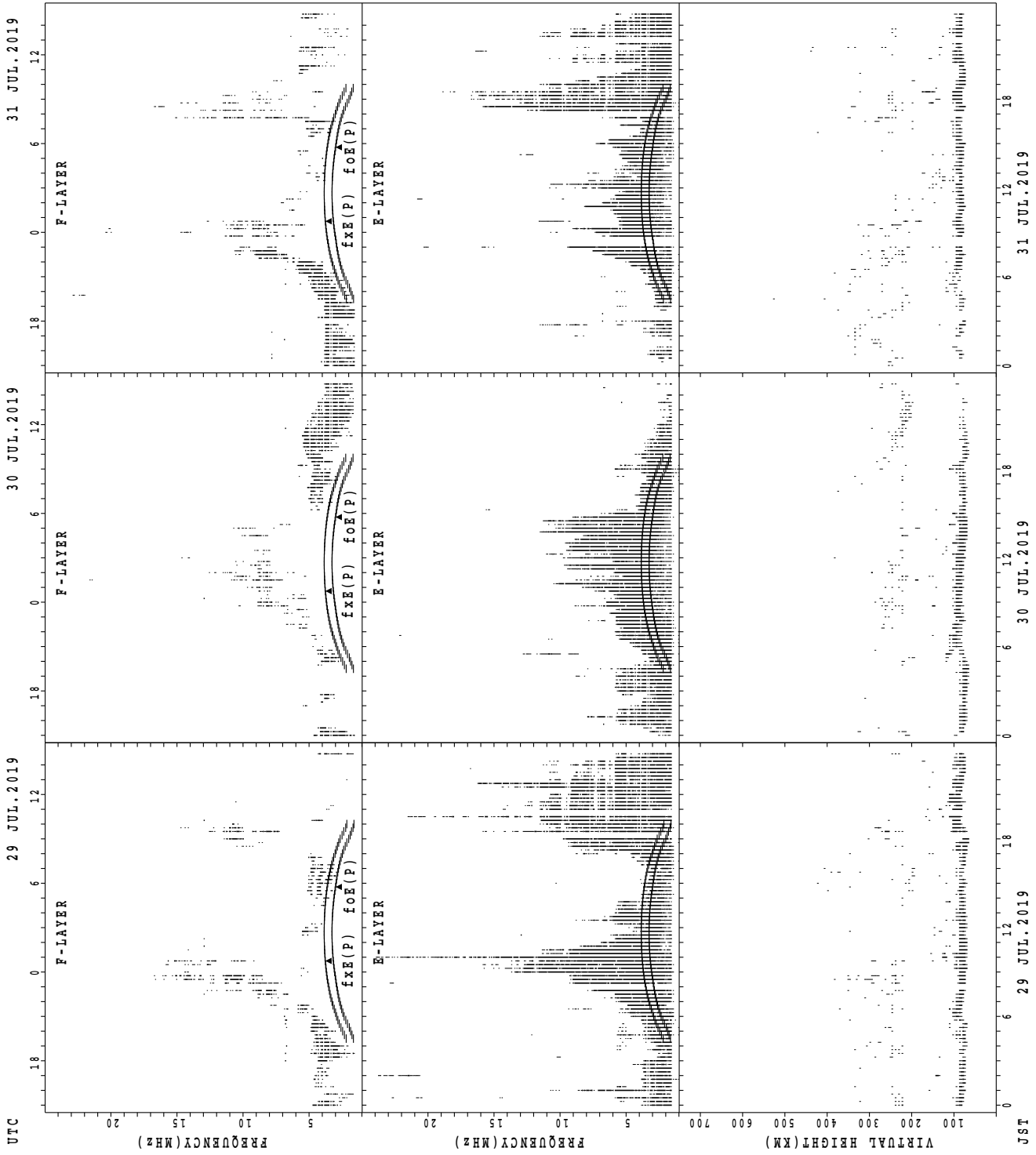


UTC

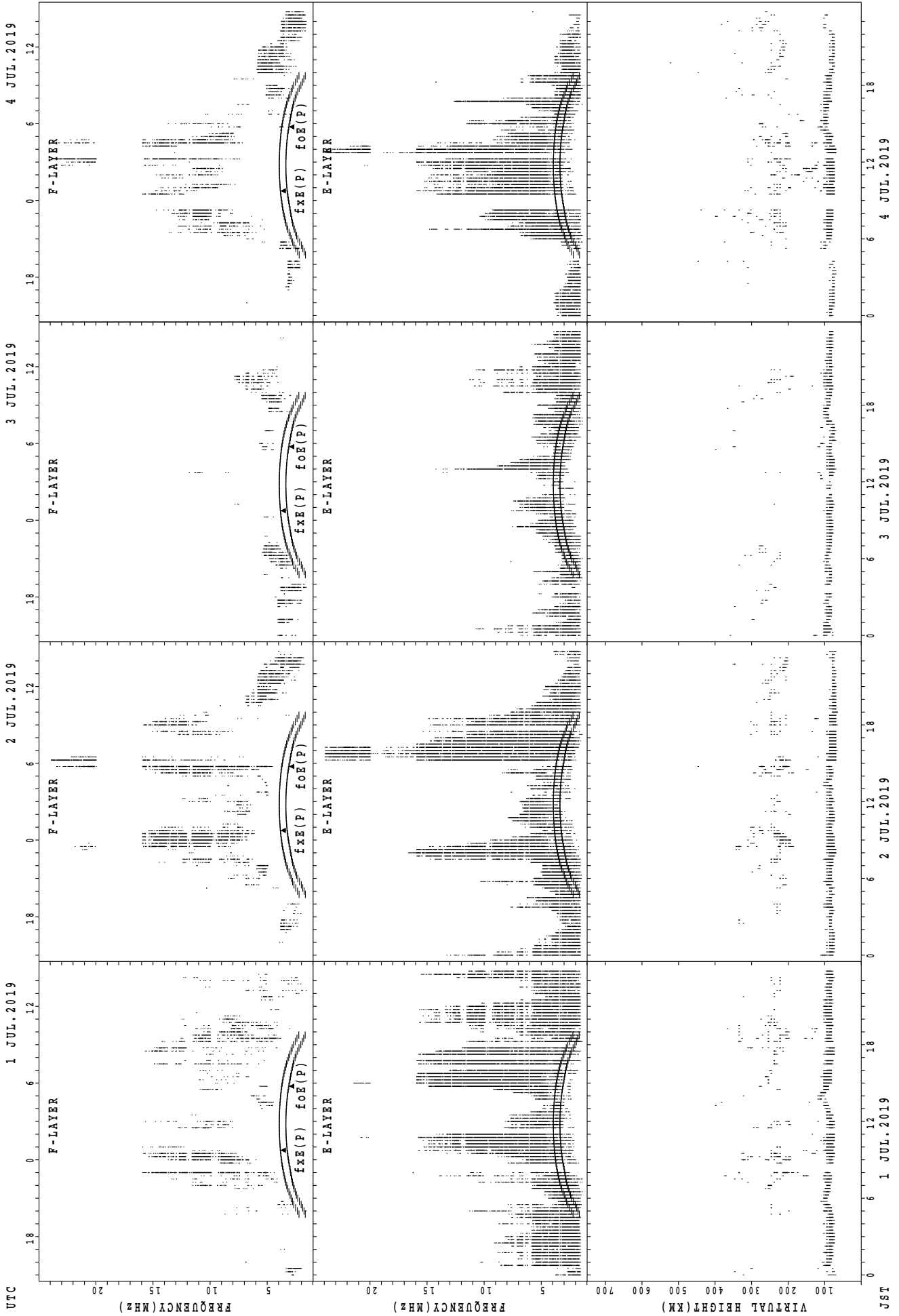
foE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

JST

SUMMARY PLOTS AT Wakkanai

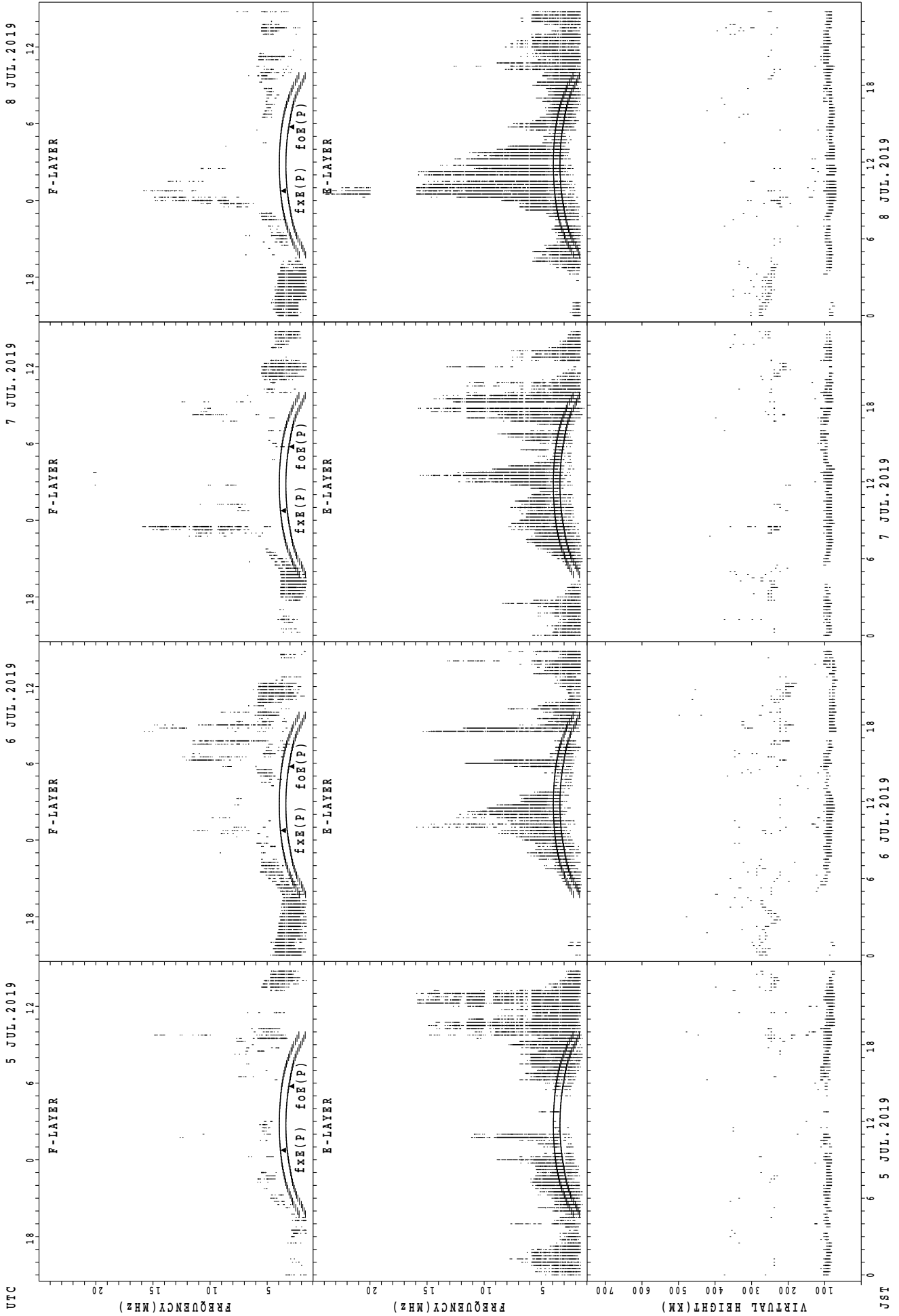


SUMMARY PLOTS AT Kokubunji



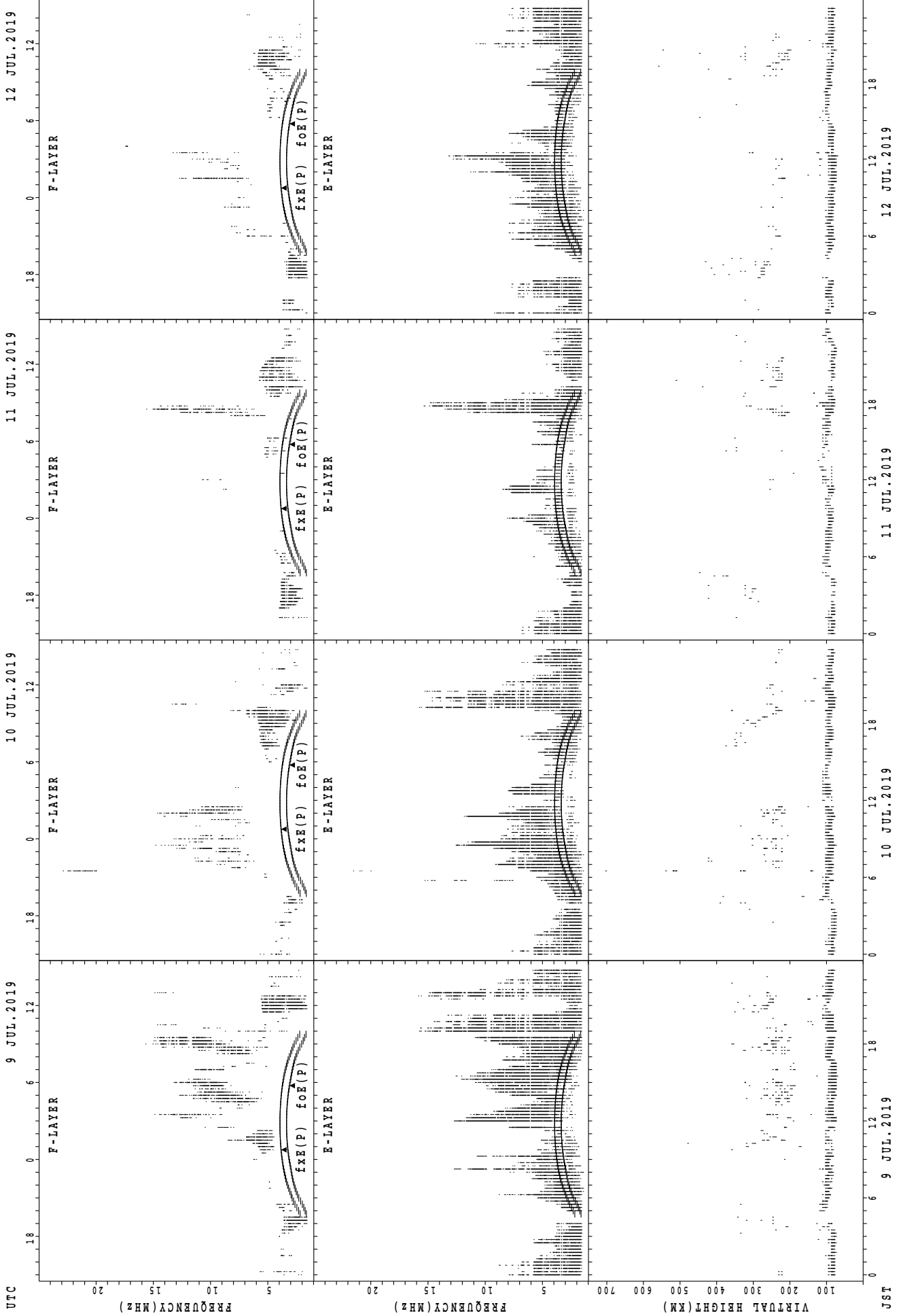
JST
1 JUL.2019
2 JUL.2019
3 JUL.2019
4 JUL.2019
 $f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Kokubunji



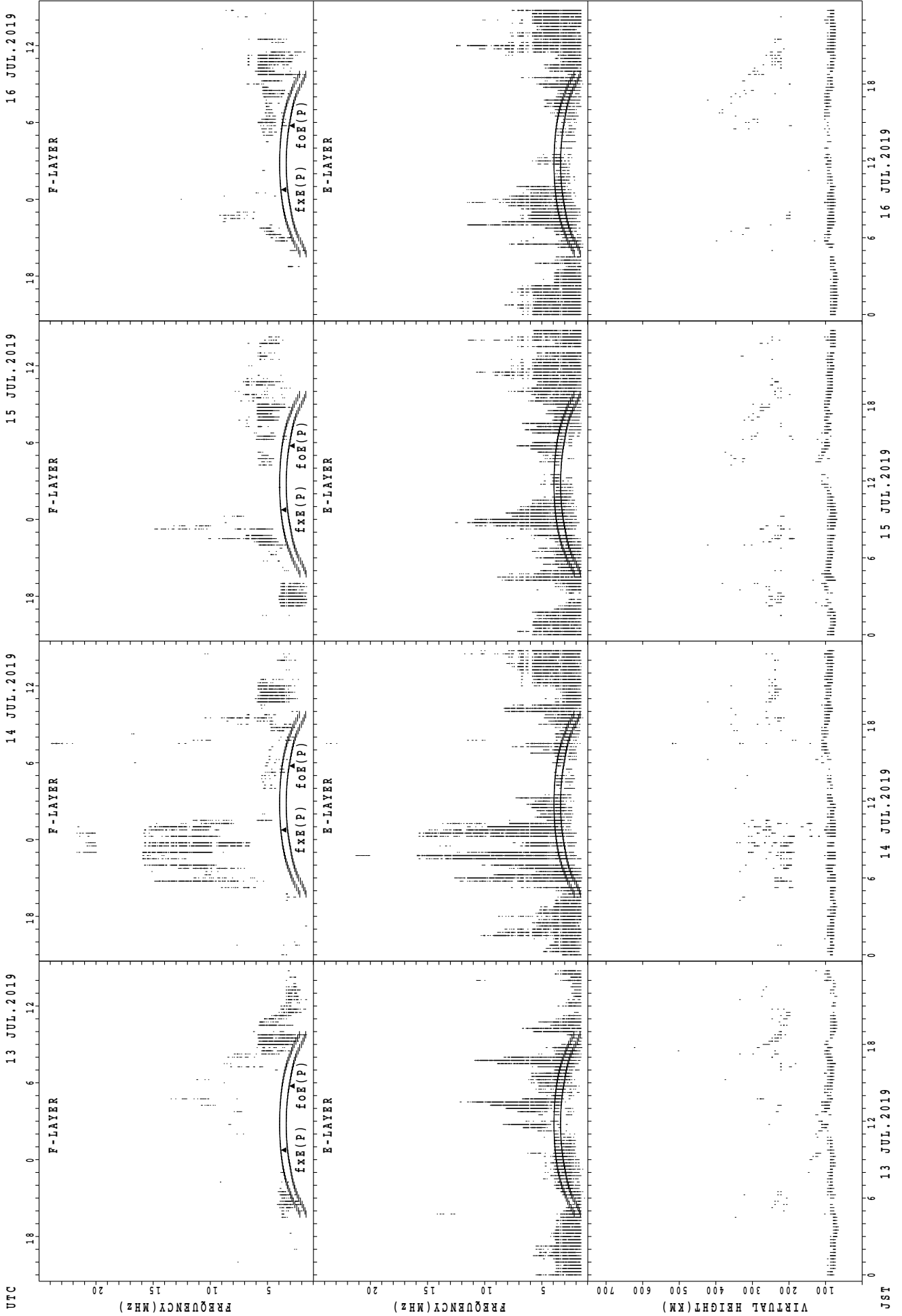
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



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

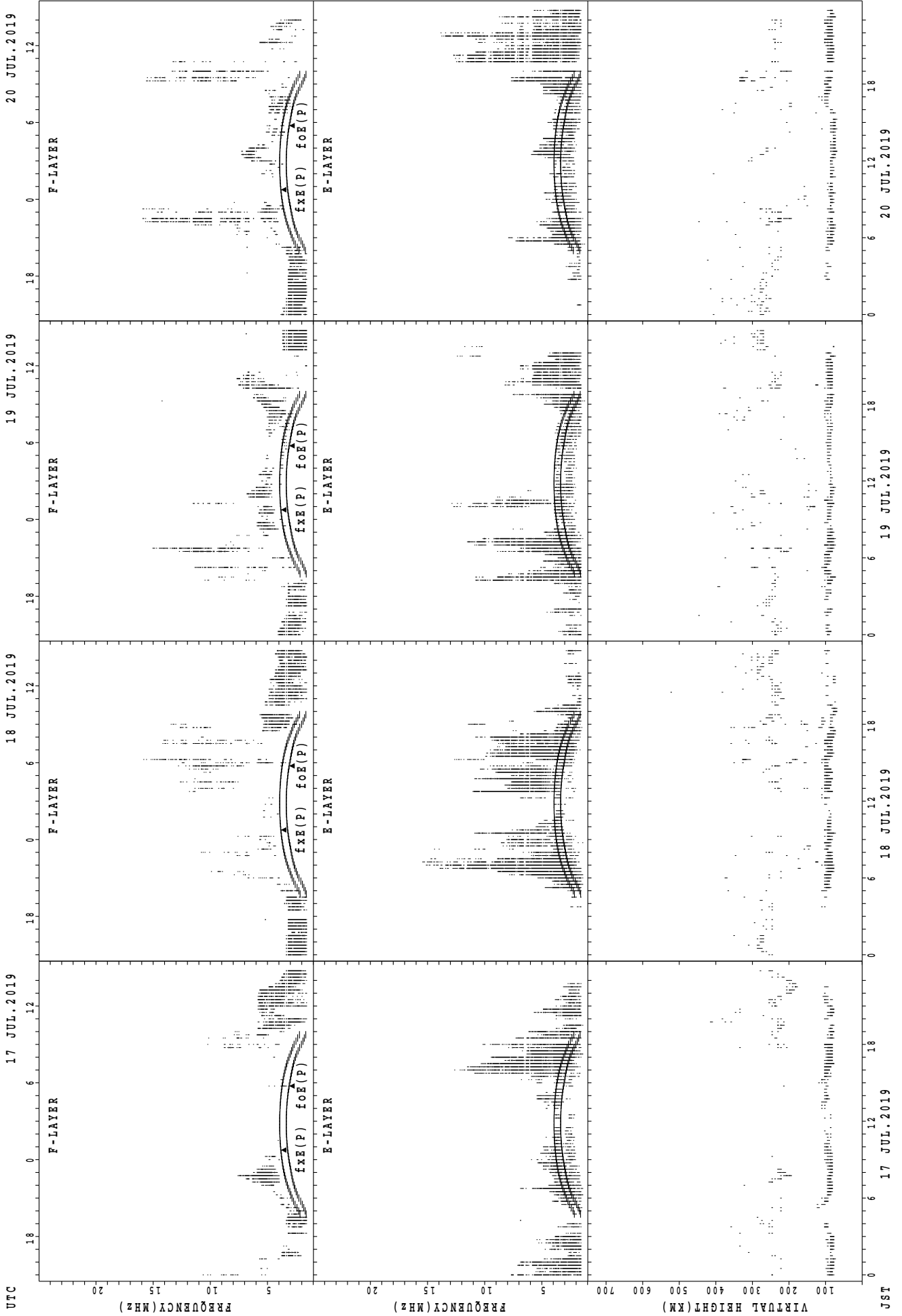
SUMMARY PLOTS AT Kokubunji



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

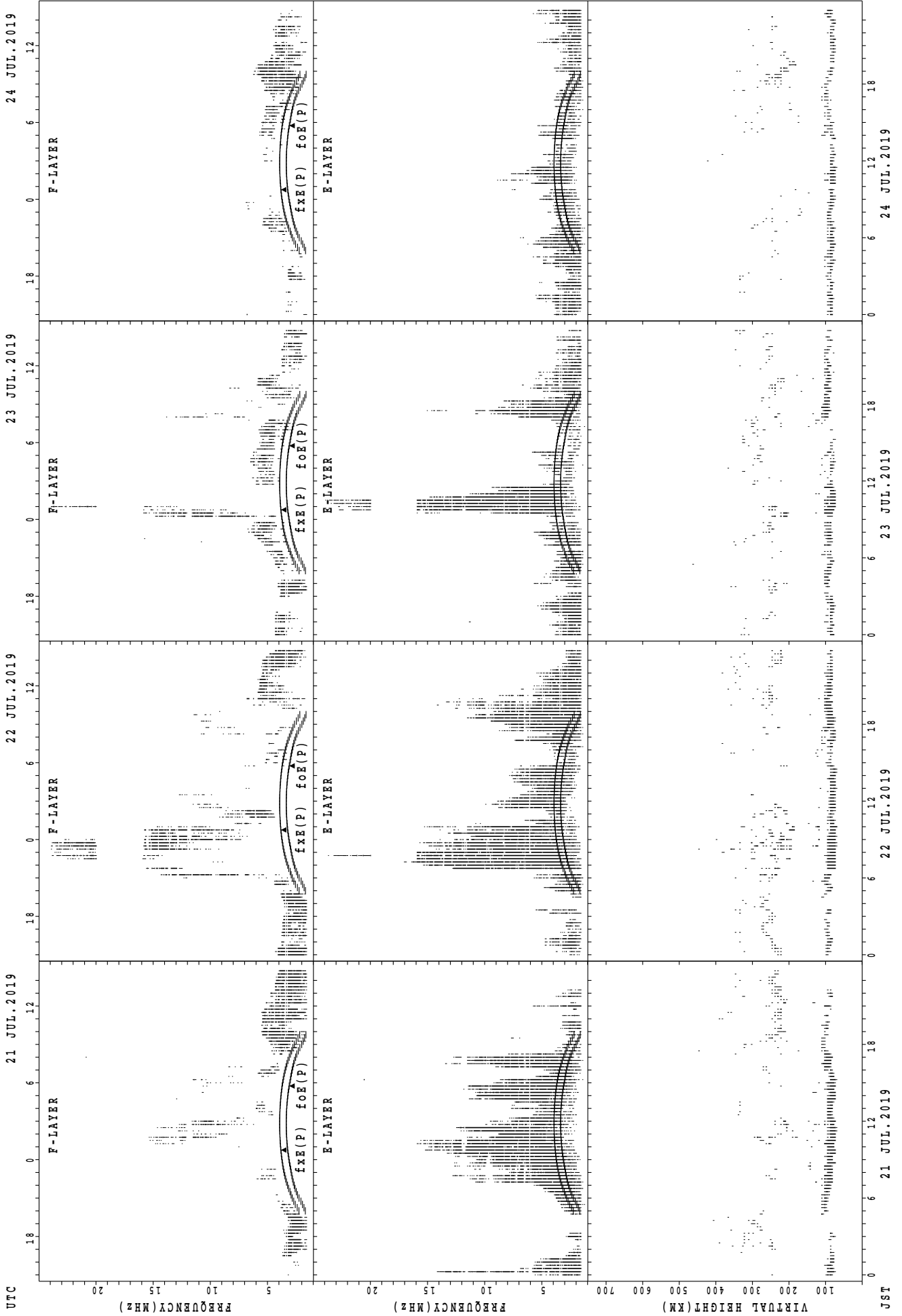
JST

SUMMARY PLOTS AT Kokubunji



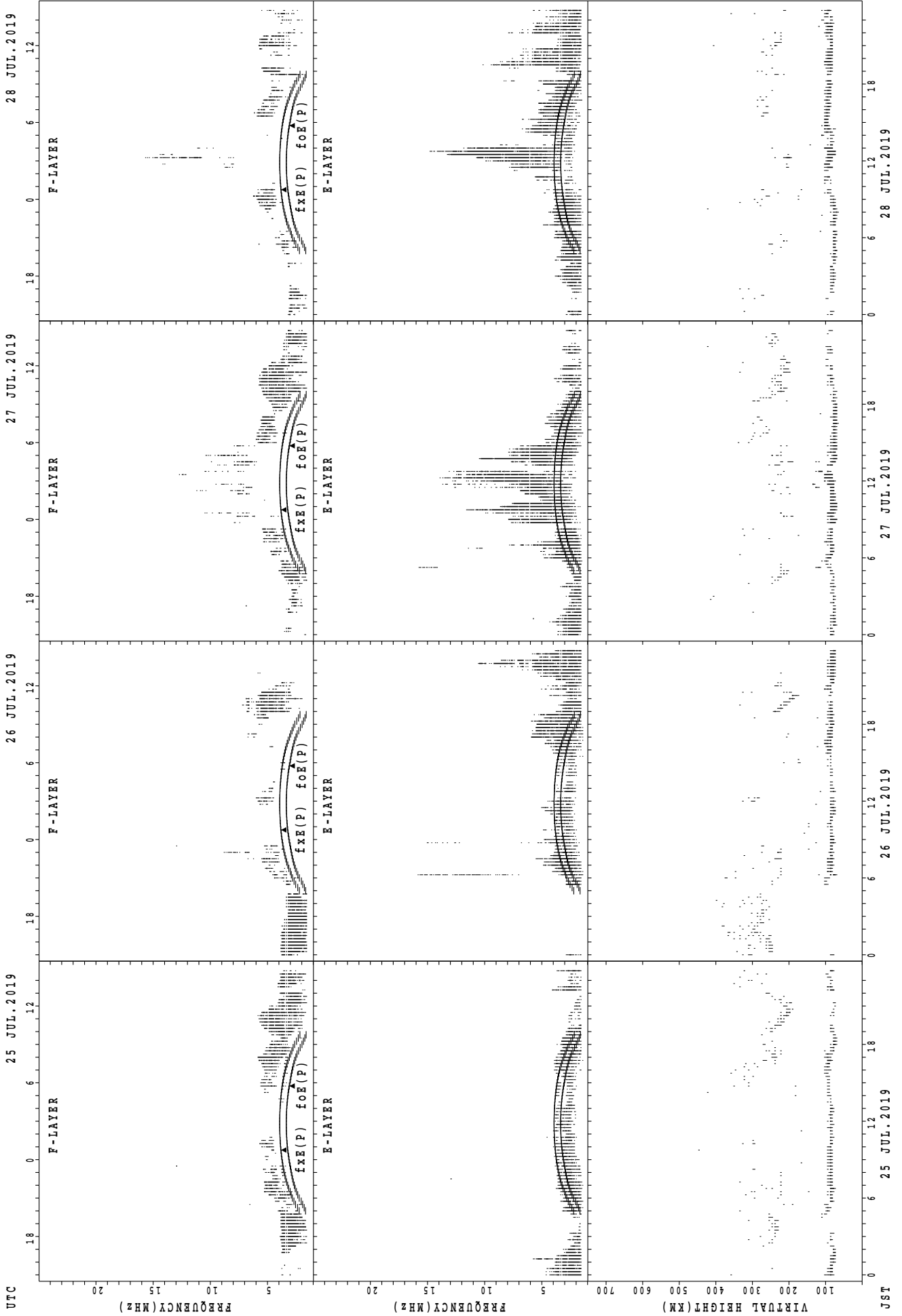
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



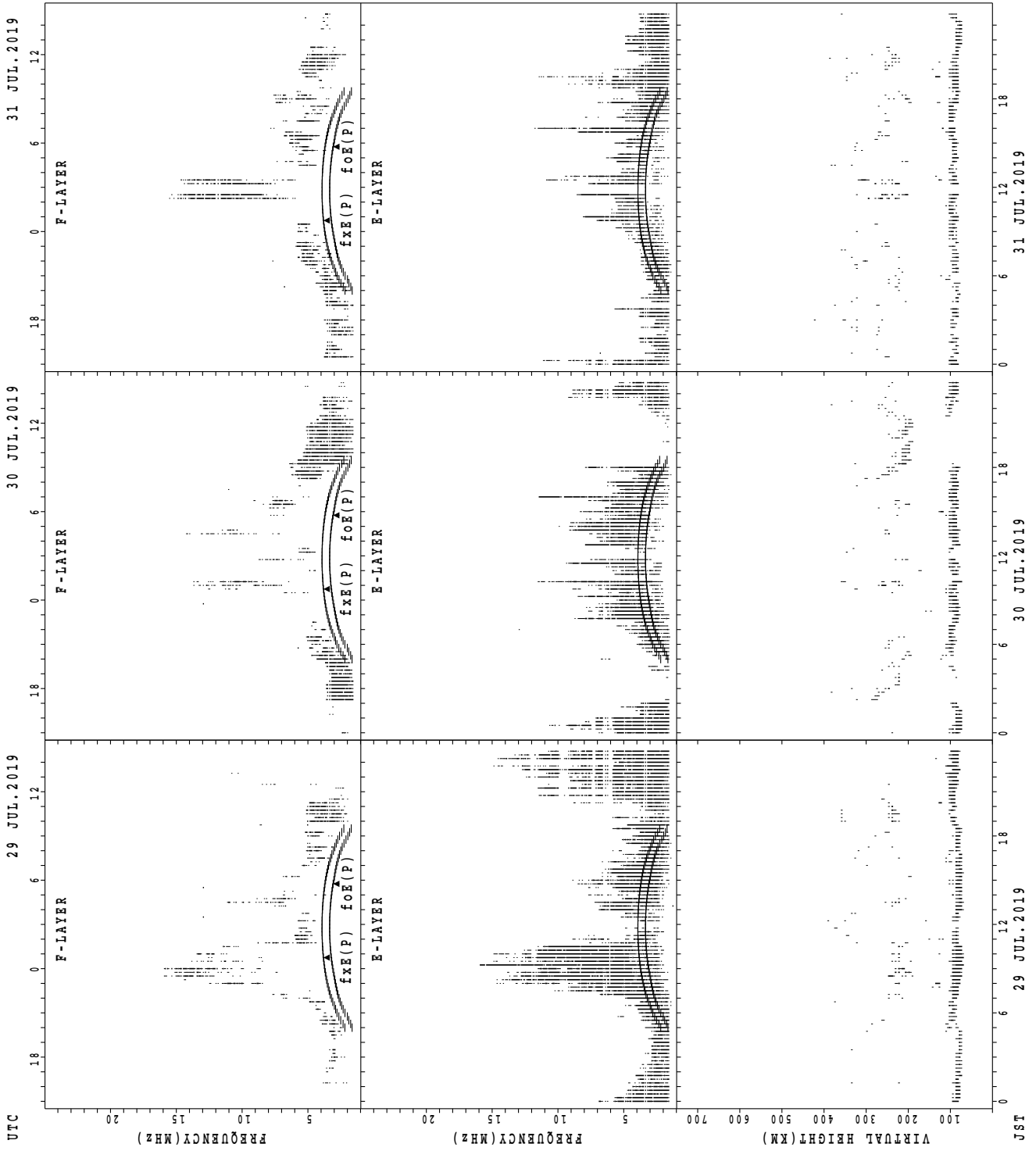
fxE(P); PREDICTED VALUE FOR fxe
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



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

SUMMARY PLOTS AT Kokubunji

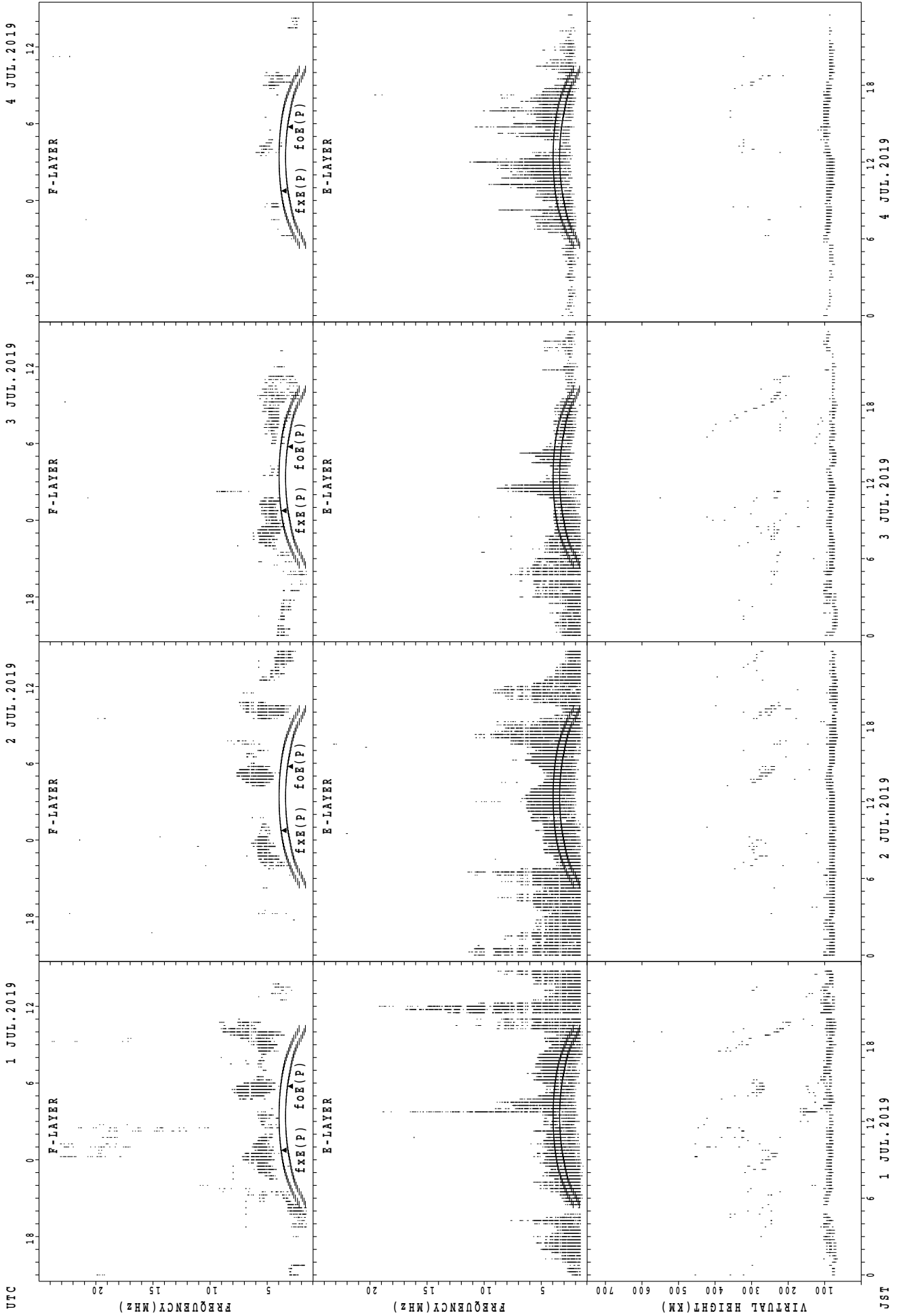


f_xE(P); PREDICTED VALUE FOR f_xE
foE(P); PREDICTED VALUE FOR foE

UTC

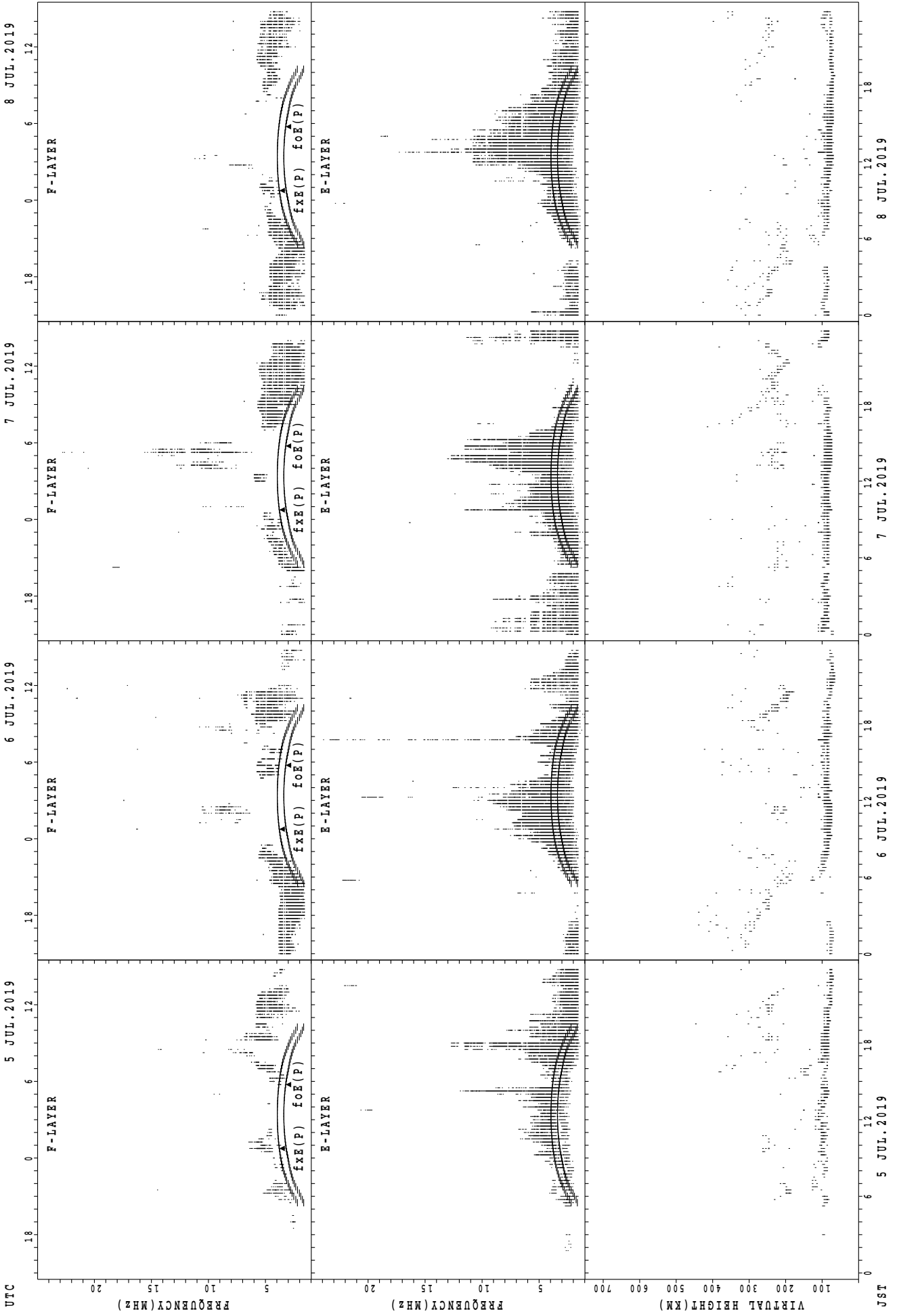
JST

SUMMARY PLOTS AT Yamagawa



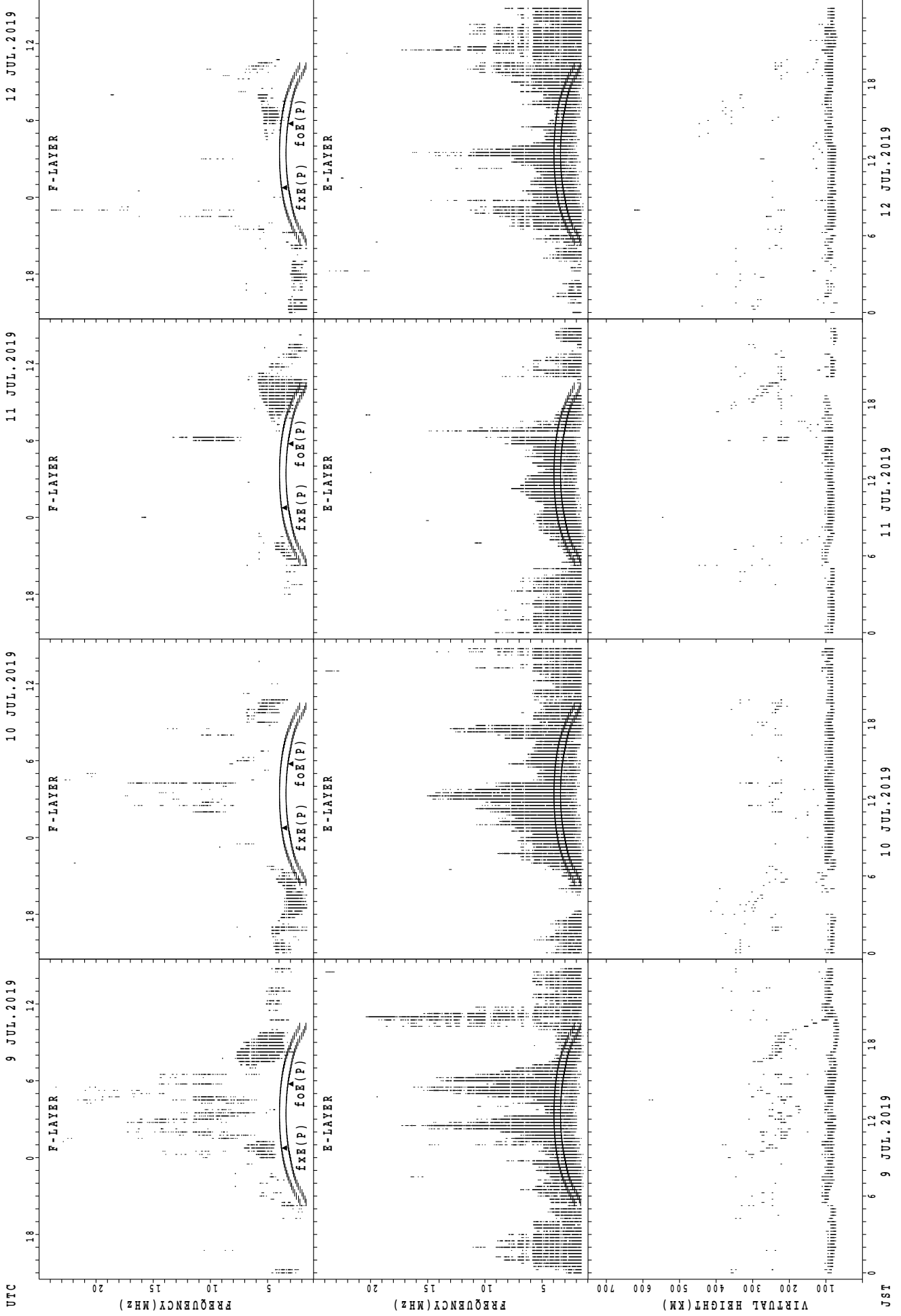
foF2(P); PREDICTED VALUE FOR foF2
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



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

SUMMARY PLOTS AT Yamagawa



UTC

9 JUL.2019 10 JUL.2019 11 JUL.2019 12 JUL.2019

F-LAYER

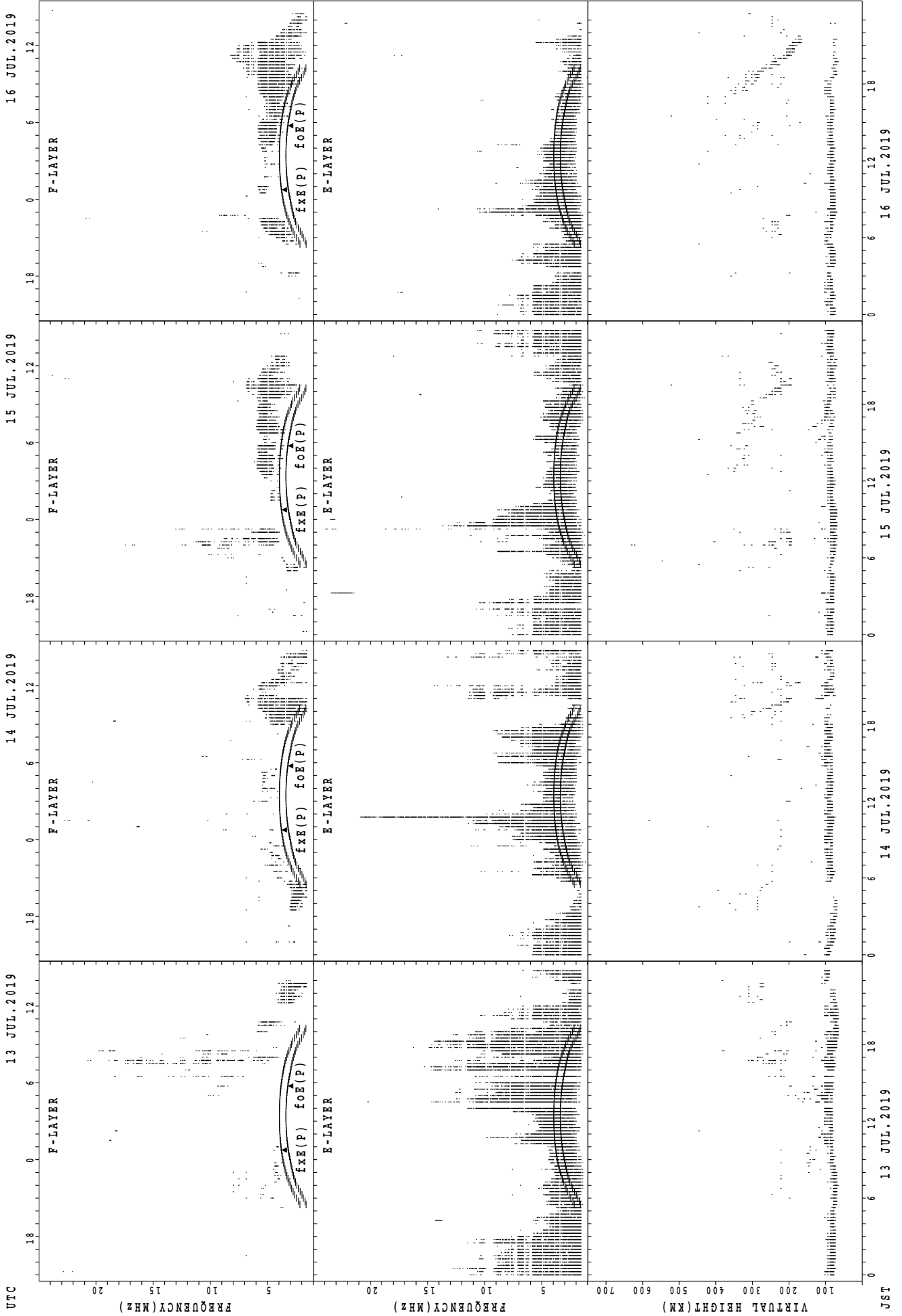
E-LAYER

VIRTUAL HEIGHT (KM)

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

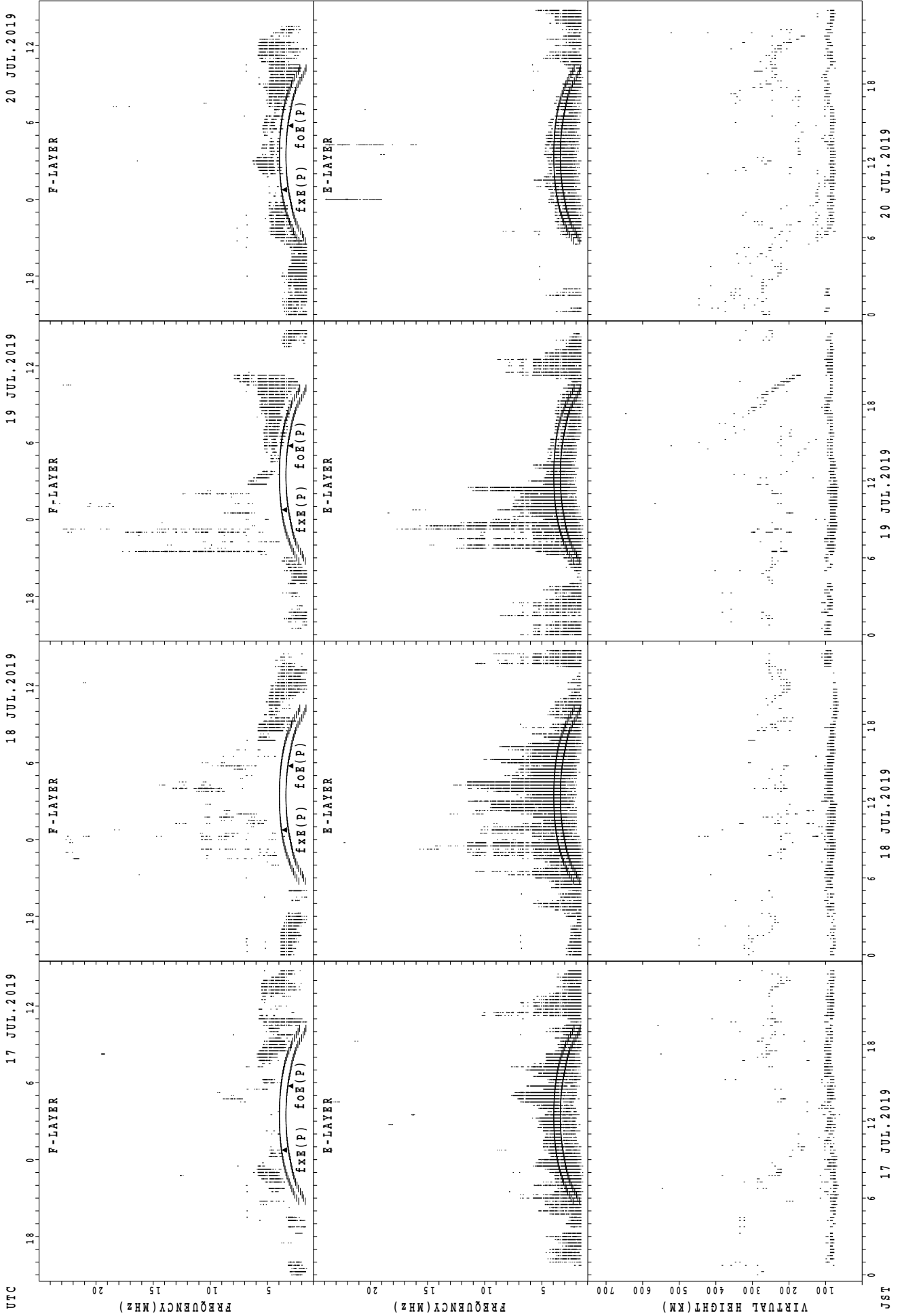
JST

SUMMARY PLOTS AT Yamagawa



foE(P); PREDICTED VALUE FOR foE
foF2(P); PREDICTED VALUE FOR foF2

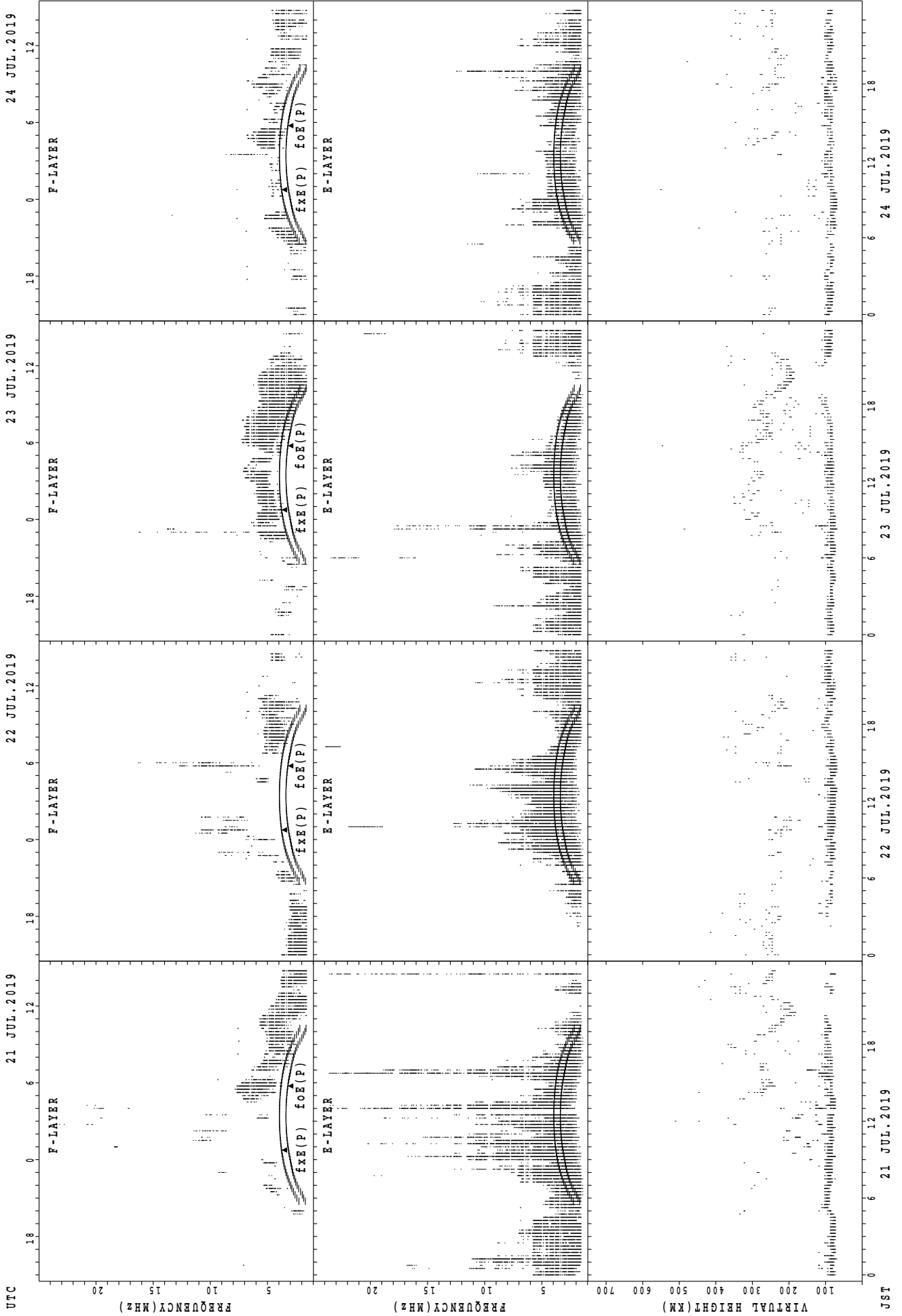
SUMMARY PLOTS AT Yamagawa



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

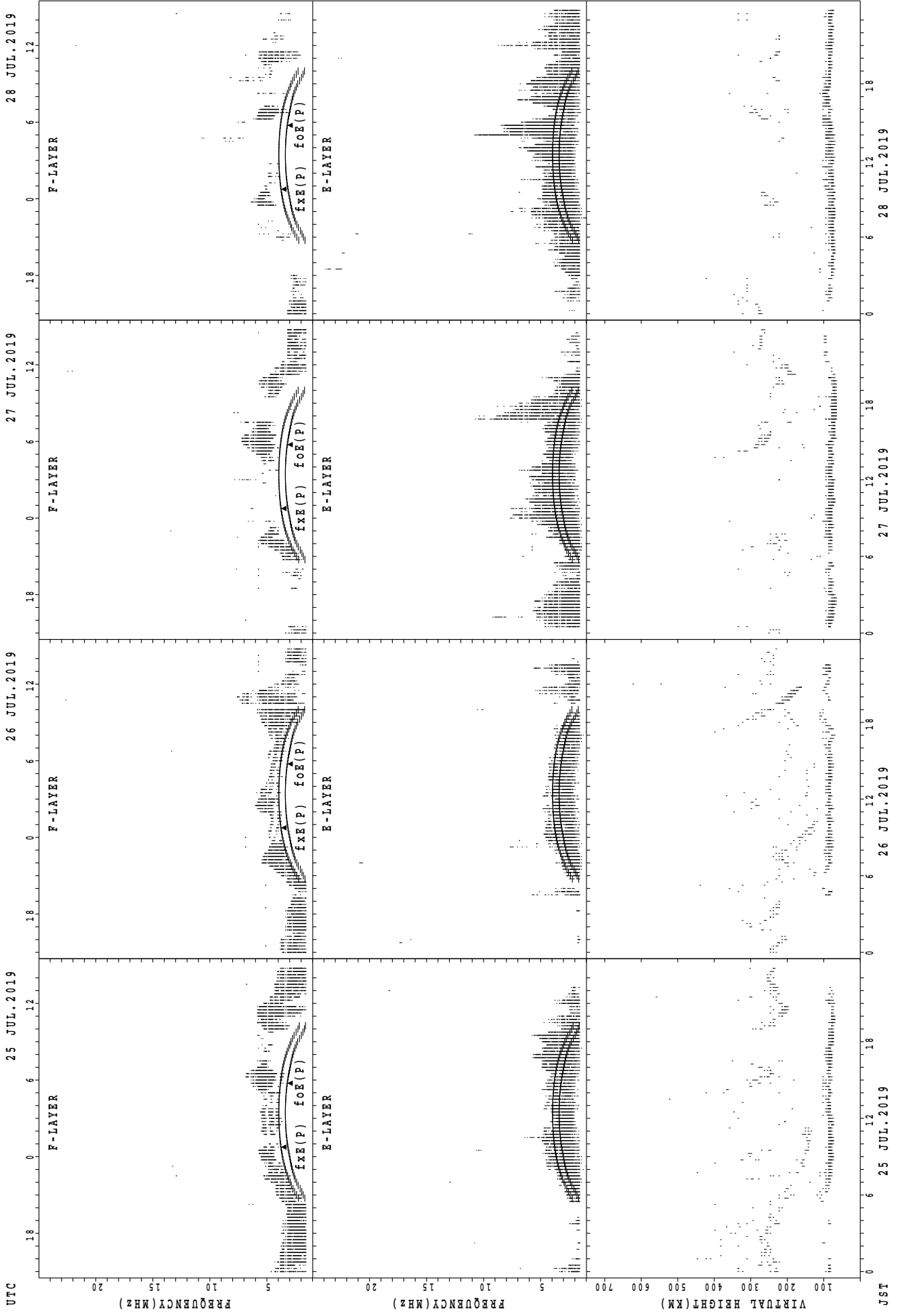
JST

SUMMARY PLOTS AT Yamagawa



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

SUMMARY PLOTS AT Yamagawa



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

28 JUL.2019

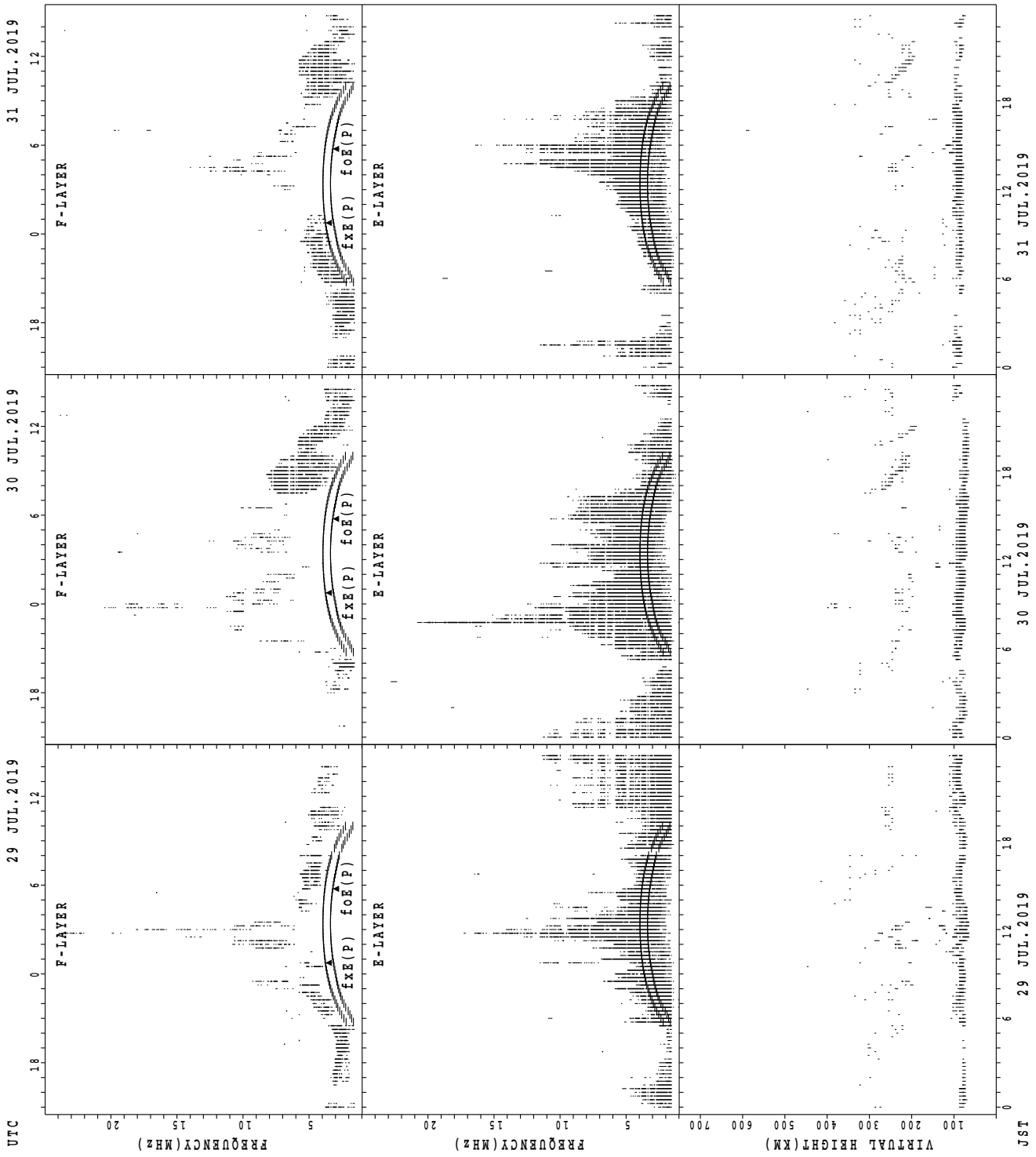
27 JUL.2019

26 JUL.2019

25 JUL.2019

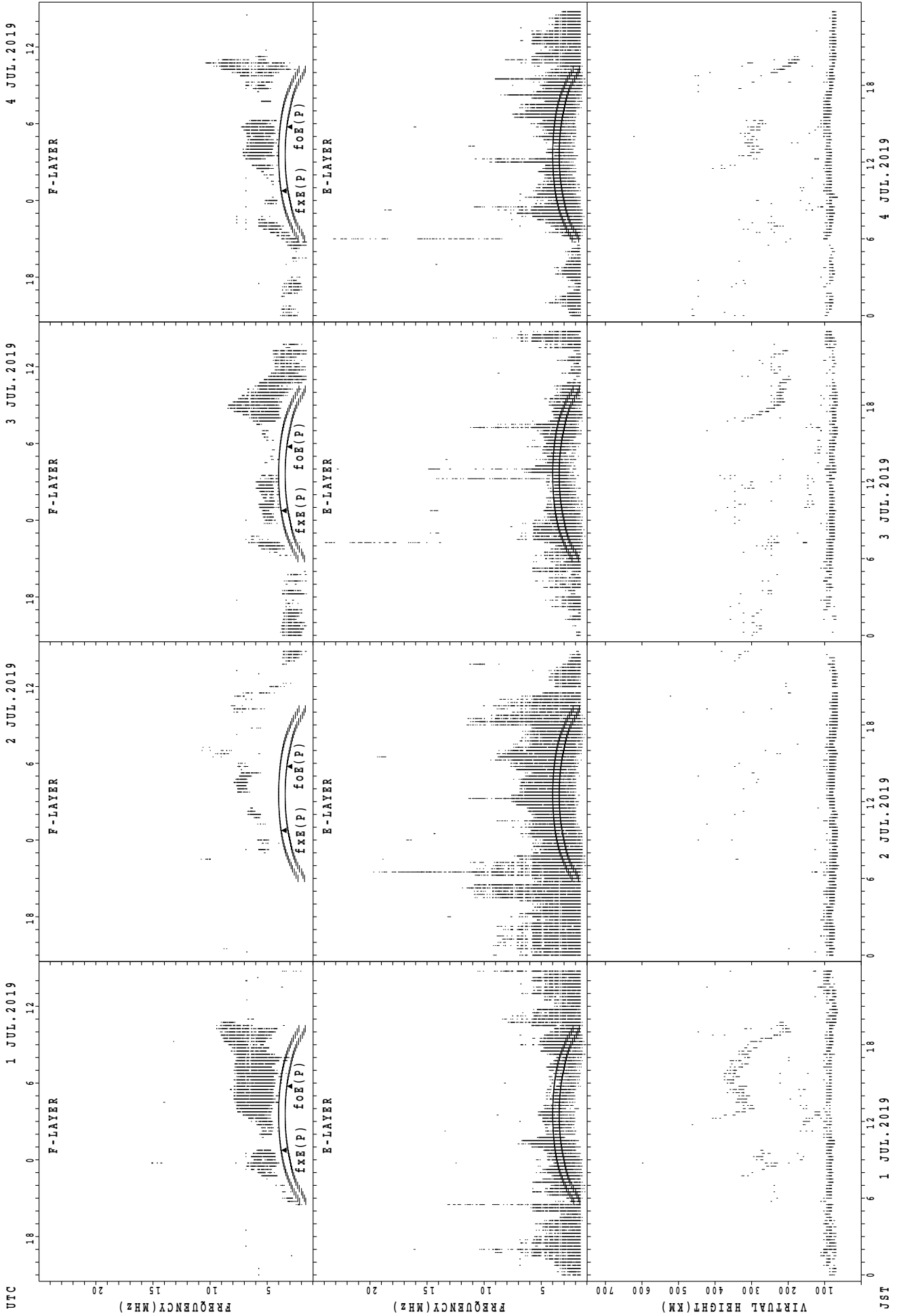
JST

SUMMARY PLOTS AT Yamagawa



UTC
 29 JUL.2019
 30 JUL.2019
 31 JUL.2019
 JST
 $f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Okinawa



f_{x E(P)}; PREDICTED VALUE FOR f_{x E}
f_{o E(P)}; PREDICTED VALUE FOR f_{o E}

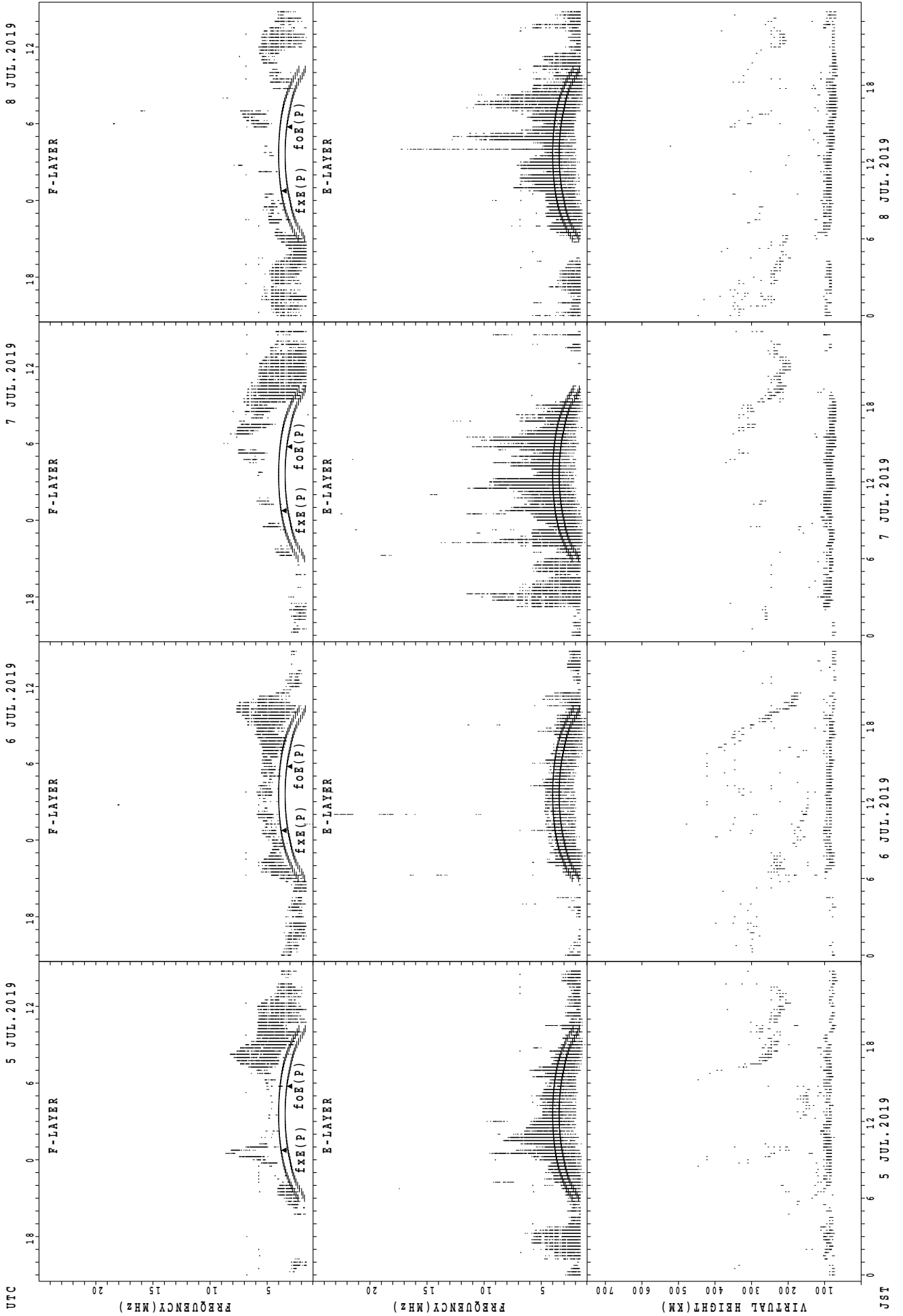
JST 1 JUL.2019

2 JUL.2019

3 JUL.2019

4 JUL.2019

SUMMARY PLOTS AT Okinawa



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

5 JUL.2019

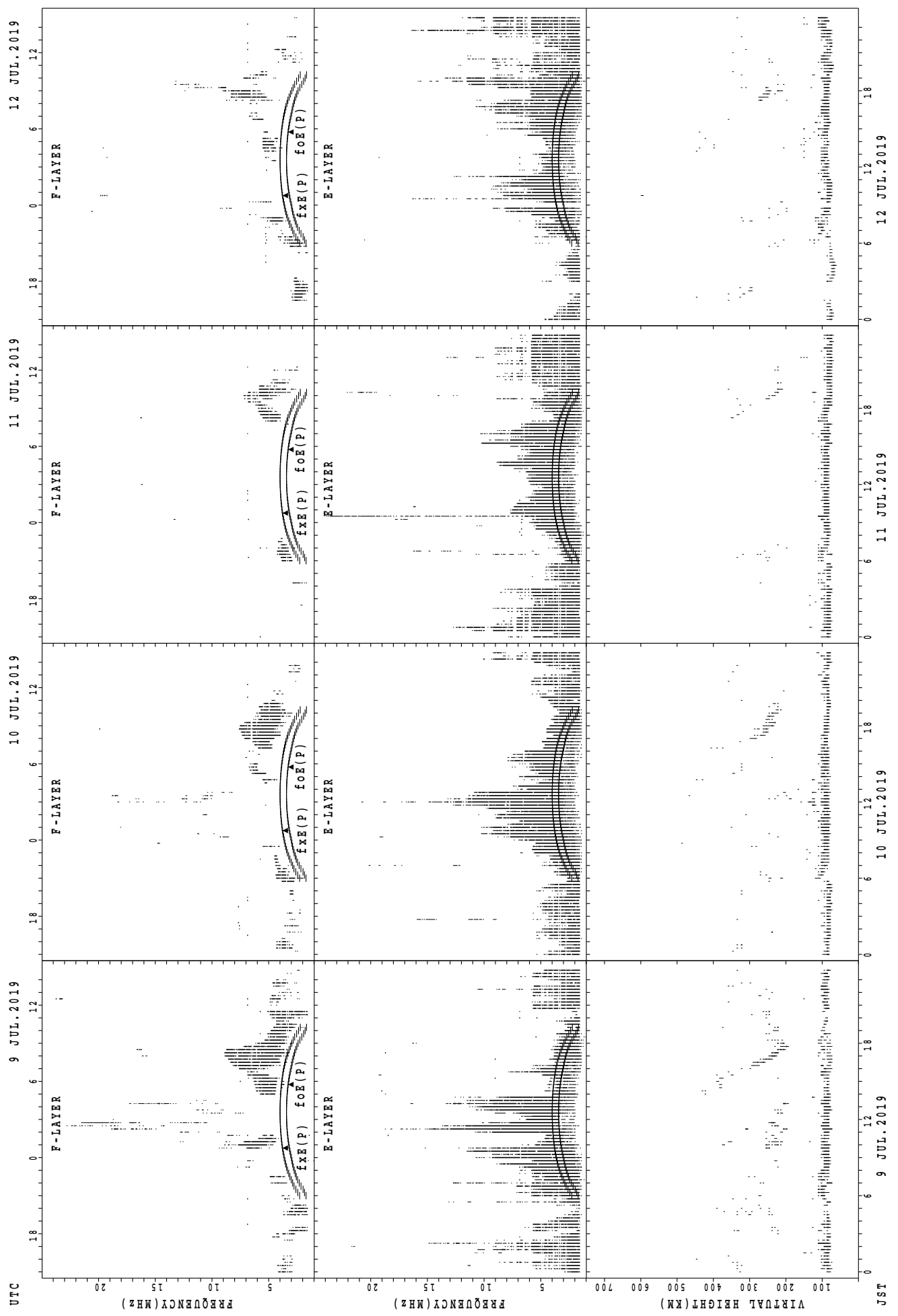
6 JUL.2019

7 JUL.2019

8 JUL.2019

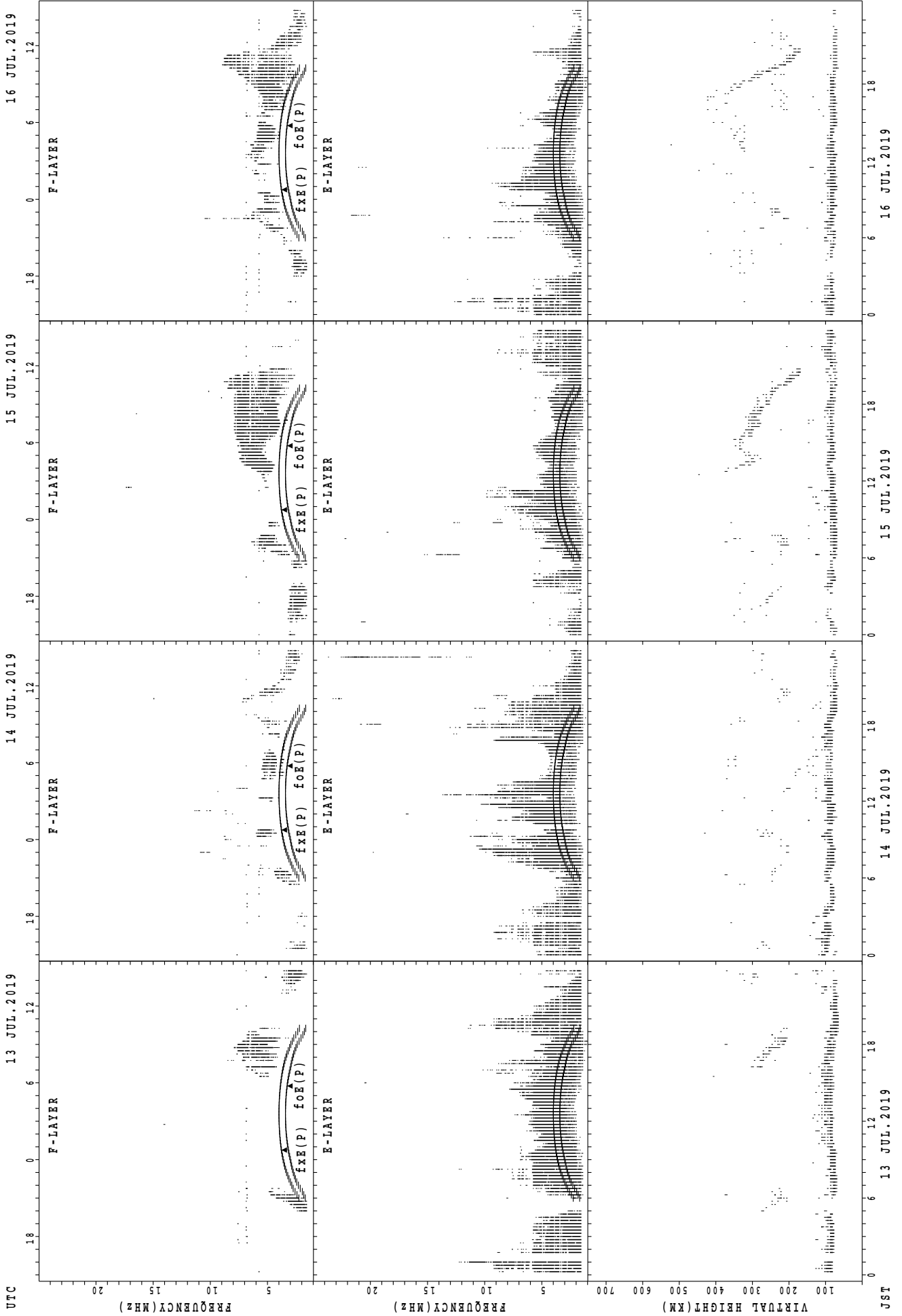
JST

SUMMARY PLOTS AT Okinawa



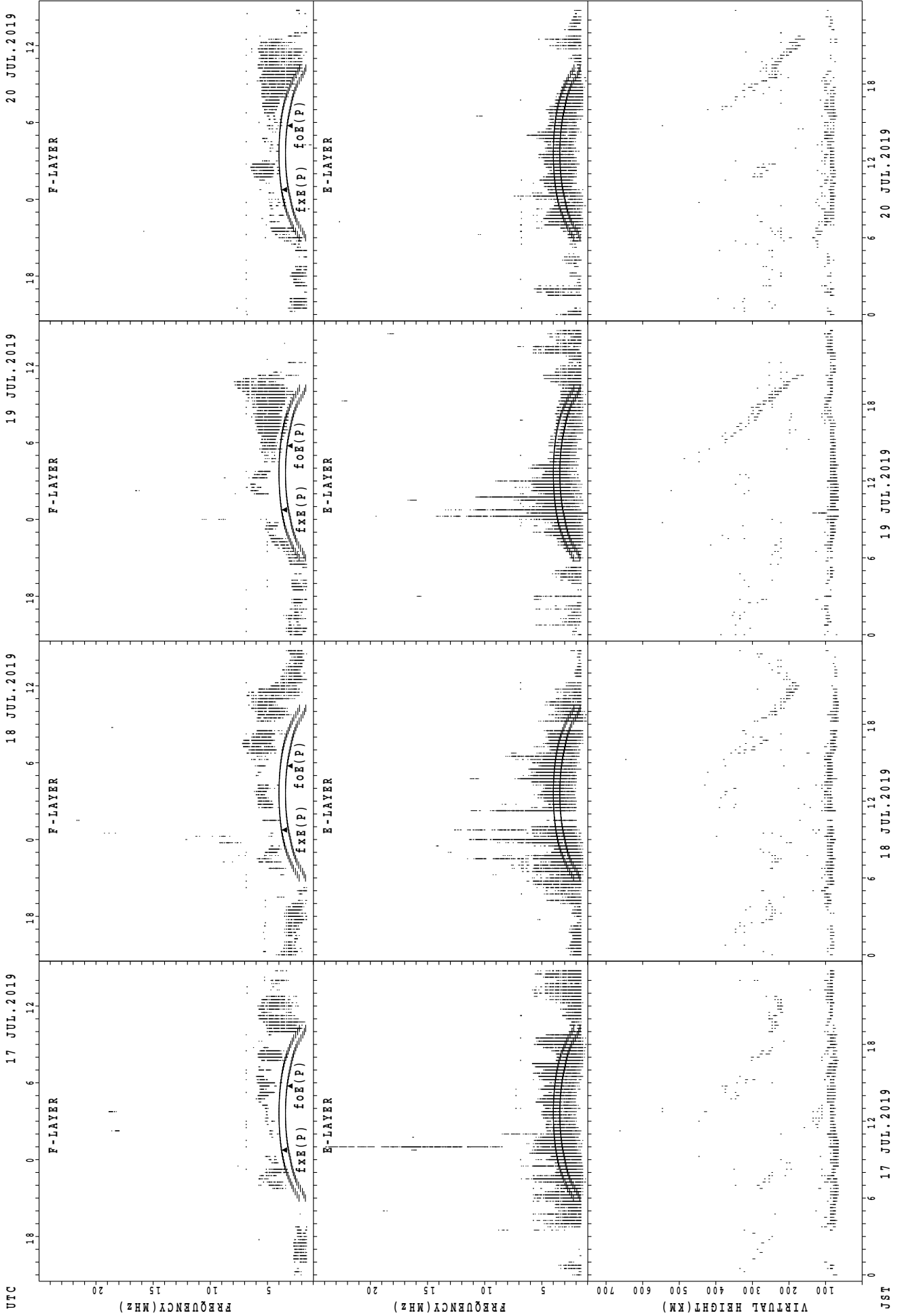
fxE(P); PREDICTED VALUE FOR fxe
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



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

SUMMARY PLOTS AT Okinawa

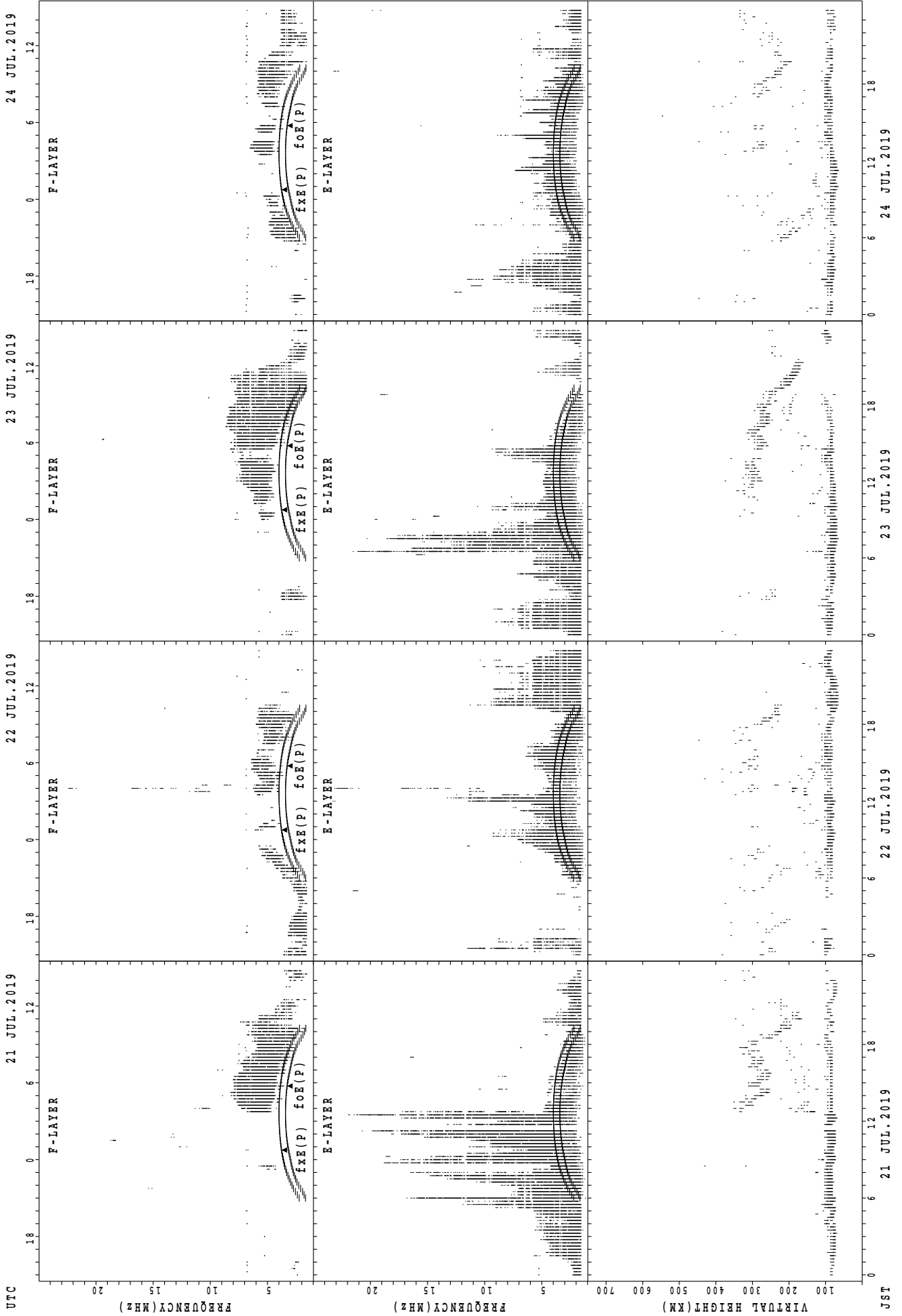


UTC
17 JUL.2019
18 JUL.2019
19 JUL.2019
20 JUL.2019

JST
17 JUL.2019
18 JUL.2019
19 JUL.2019
20 JUL.2019

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

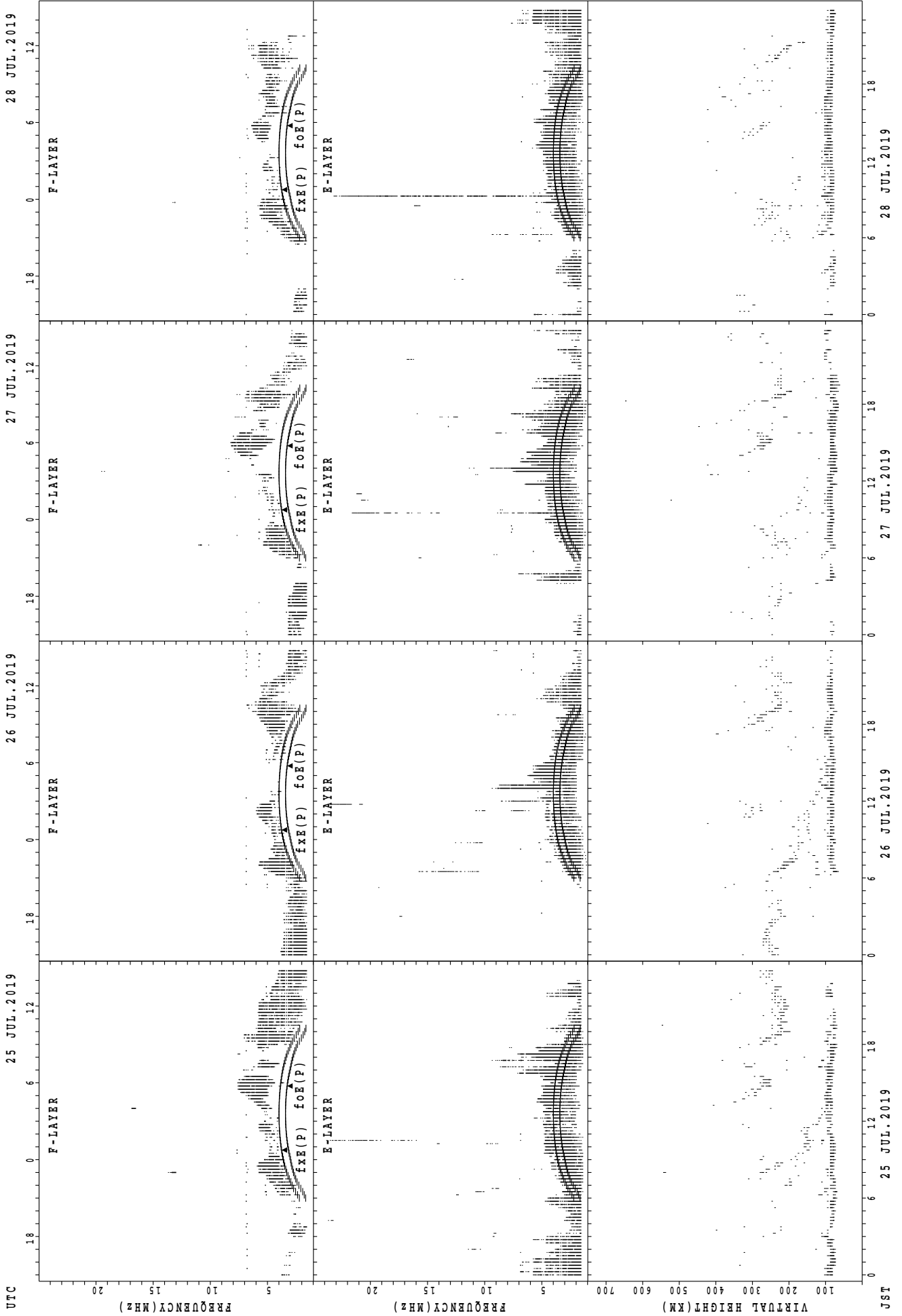
SUMMARY PLOTS AT Okinawa



UTC

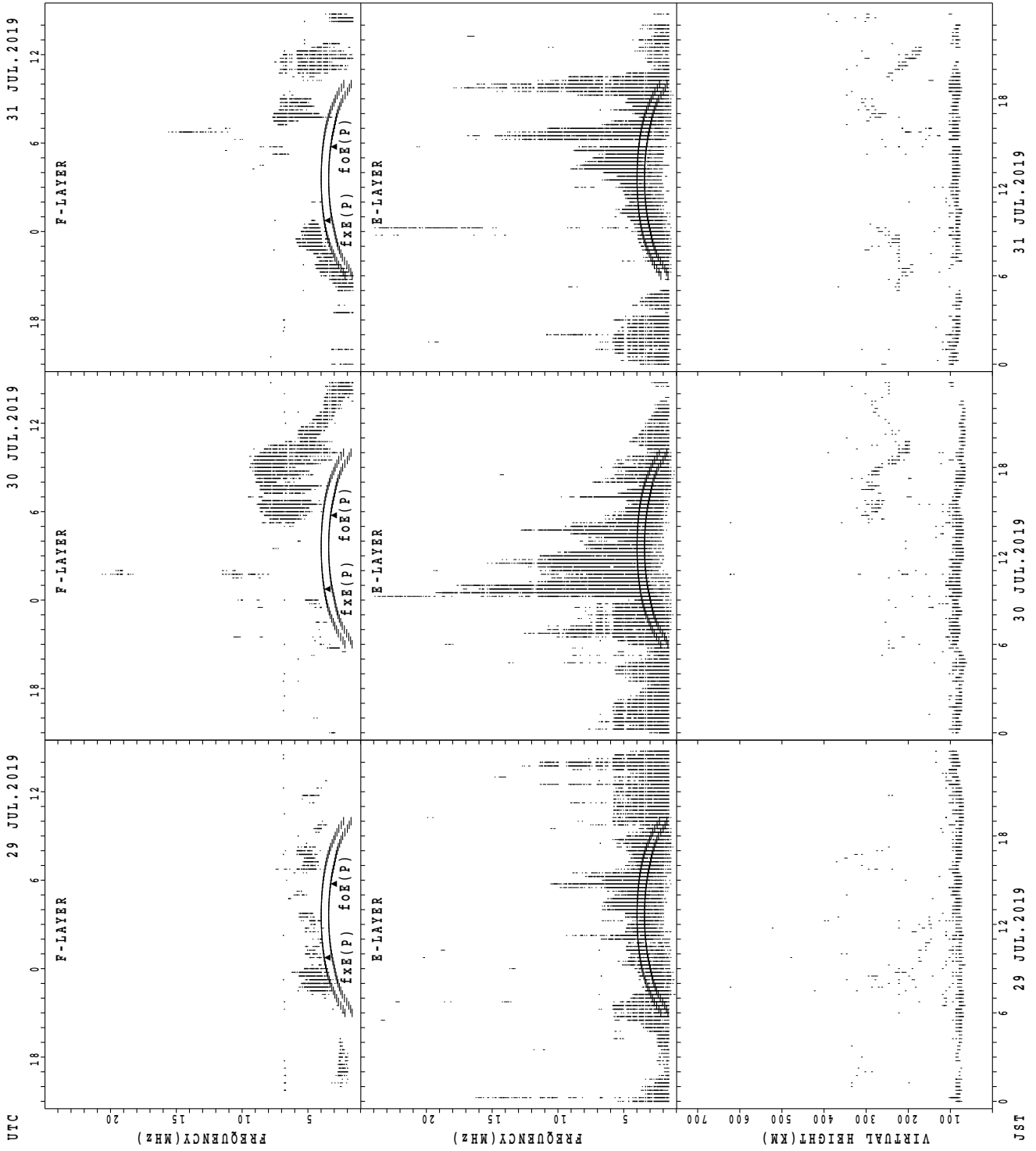
JST

SUMMARY PLOTS AT Okinawa



UTC
25 JUL.2019
26 JUL.2019
27 JUL.2019
28 JUL.2019
JST
fxe(P); PREDICTED VALUE FOR fxe
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



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

MONTHLY MEDIANS OF h'F AND h'Es
 JUL.2019 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						2	1	1										7	8	5		1	1	1
MED						239	324	224										214	240	208		232	326	306
U Q						252	162	112										272	265	265		116	163	153
L Q						226	162	112										210	205	200		116	163	153

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	28	25	27	24	22	30	31	30	26	27	26	29	27	28	26	27	26	27	26	30	30	30	29	29
MED	87	83	89	88	88	97	97	89	94	89	89	85	89	91	95	95	95	95	89	91	89	94	95	91
U Q	99	97	101	101	97	101	101	93	107	95	95	97	113	108	107	107	103	99	103	103	97	99	101	102
L Q	83	83	81	81	81	89	95	89	89	85	85	82	83	84	83	83	89	89	87	87	87	89	88	88

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						3	4										2	7	6	4			1
MED	248						218	227										211	206	221	224			198
U Q	124						234	259										216	224	224	242			99
L Q	124						190	197										206	200	200	205			99

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	28	26	25	21	21	25	29	31	29	28	28	25	22	22	24	23	29	29	29	29	26	29	29	25
MED	90	84	87	83	89	93	95	89	89	89	93	91	93	89	96	99	95	97	91	89	91	89	89	89
U Q	96	91	89	91	100	99	99	97	95	93	115	116	111	97	101	111	103	101	100	100	97	101	97	96
L Q	87	81	83	81	81	88	89	87	84	85	87	84	87	83	86	89	89	91	88	86	83	83	87	86

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	5									4	3	2	4	1		
MED								200	232									253	242	235	221	262		
U Q								100	270									279	400	236	257	131		
L Q								100	194									219	236	234	212	131		

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	24	24	26	24	23	21	31	31	30	31	31	31	29	28	30	29	28	28	29	27	28	27	25	27
MED	89	89	89	89	87	89	95	91	92	95	101	93	89	96	92	99	92	92	89	87	87	89	89	89
U Q	98	95	95	91	99	101	107	115	101	107	121	107	101	112	101	125	107	100	95	95	95	99	95	99
L Q	83	85	83	83	83	86	87	83	85	87	85	87	83	88	87	84	85	85	83	81	81	79	83	85

MONTHLY MEDIANS OF h'F AND h'Es
 JUL.2019 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									1									8	8	9	8			
MED									198									275	265	244	221			
U Q									99									307	282	272	237			
L Q									99									249	232	215	213			

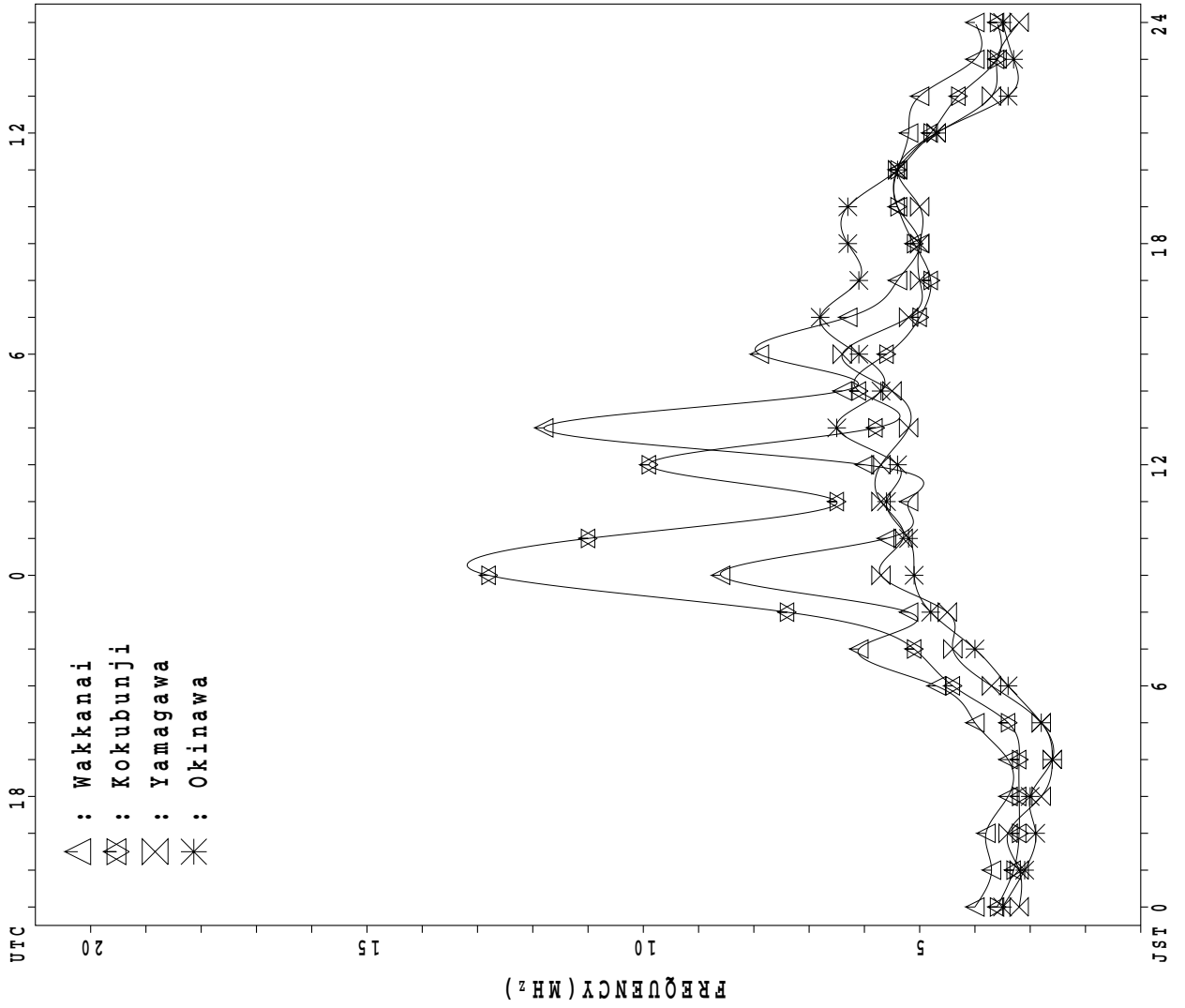
h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	25	24	24	26	25	26	31	31	30	30	29	31	31	31	30	29	29	30	30	28	27	26	25
MED	91	93	95	91	89	87	96	91	101	95	95	95	95	95	95	101	95	101	93	87	87	89	89	89
U Q	98	104	102	99	95	91	113	103	123	103	105	113	105	107	107	119	107	109	97	95	90	95	101	92
L Q	82	87	88	88	83	83	87	85	89	87	89	89	87	89	89	87	89	88	83	83	82	81	81	82

MONTHLY MEDIANS PLOT OF fOF2

JUL. 2019

AUTOMATIC SCALING



UTC

20

15

10

5

JST 0

FREQUENCY (MHz)

0

6

12

18

24

12

6

12

18

24

IONOSPHERIC DATA STATION Wakkanai

JUL.2019 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 40	X 41	A																			X 83	X 58	X 45
2	X 46	X 45	X 45																			X 60	X 58	A
3	A	A	X 44																			X 74	A	X 38
4	X 33	X 33	X 34																			X 51	A	A
5	A	A	X 39	38																	X 65	X 59	59	A
6	A	X 47	X 46																			X 56	A	A
7		A	X 44																			X 59	X 59	X 55
8	X 51	X 51	X 51																			X 61	X 59	X 58
9	58	58	51																			X 59	X 55	X 51
10	X 49	X 49	X 42																			X 58	X 55	X 33
11	X 41	X 37																				X 57	X 52	X 45
12	X 45	X 42	X 41																			X 55	A	X 39
13	X 39	X 39	X 44																			X 57	X 43	X 41
14	X 42	X 45	X 41	44																	X 57	X 59	X 58	X 54
15	X 43	42	43	46	44																	X 66	X 63	A
16	X 36	X 38	X 39																		X 54	A	X 59	56
17	56	44	X 34																			X 51	X 51	X 50
18	X 44	X 41	X 41																			X 55	X 53	X 56
19	X 47	A	X 33																			X 65	X 45	X 41
20	X 37	X 39	X 40																			X 55	X 59	59
21	A	38	39	39	38																	X 58	X 49	A
22	X 45	X 38	X 40																			X 60	X 59	X 49
23	X 49	X 45	X 45							C	C	C	C	C	C	C						X 51	X 39	X 39
24	X 39	A	A		X 39					C	C	C	C	C	C	C						X 55	X 51	X 49
25	X 45	X 46	X 44																			X 56	X 59	47
26	X 43	X 40	X 39																		X 56	X 49	X 43	
27	X 39	X 39	X 37																			X 57	X 55	40
28	X 35	X 37	X 35																			X 59	X 54	57
29	51	X 45	X 45	44																		X 45	A	A
30	47	A	X 39	A																		X 53	X 47	X 41
31	X 40	X 41	40	40	40																	X 56	A	X 57
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	25	28	6	4															2	2	30	25	24
MED	X 44	X 41	X 41	42	40															55	61	57	55	48
U Q	X 47	X 45	X 44	44	42																	X 59	X 59	X 56
L Q	X 39	X 38	X 39	39	38																	X 55	X 50	X 41

JUL.2019 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

JUL.2019 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	33	34	A	J	A	34	37	A	A	A	56	55	51	48	E	G	47	50	49	57	67	72	76	51	38						
2	39	38	38	39	42	48	53	60	60	60	52	55	A	A	R	A	A	49	54	58	58	53	51	A							
3	A	A	37	35	32	37	41	54	A	A	A	50	48	A	R	A	44	44	44	A	48	60	67	A	31						
4	26	26	27	37	36	38	A	47	48	A	E	G	A	A	A	A	39	A	A	A	A	48	44	A	A						
5	A	A	32	F	26	27	38	A	53	49	49	47	E	G	A	A	A	A	A	46	50	58	52	F	A						
6	A	40	39	37	38	36	37	A	A	A	A	51	48	A	A	A	44	46	45	45	44	46	49	A	A						
7	A	A	37	39	36	40	A	A	53	A	R	A	A	46	48	45	45	R	43	38	43	A	52	52	48						
8	44	44	44	38	37	38	48	A	E	G	42	53	A	A	46	48	E	G	43	47	54	58	54	52	51						
9	F	F	Z	36	32	40	38	E	G	36	46	40	48	48	53	E	G	45	48	45	A	52	57	52	48	44					
10	42	42	35	30	30	A	A	42	47	A	A	E	G	A	E	G	39	A	42	47	53	59	57	51	48	26					
11	34	30	A	30	27	36	G	E	G	36	A	A	A	A	A	E	G	38	A	42	43	39	42	52	50	45	38				
12	38	35	34	33	28	34	A	A	A	E	G	E	G	A	E	G	E	G	E	G	A	42	44	56	48	A	32				
13	32	32	37	32	29	34	39	38	A	A	A	A	A	A	A	E	G	40	38	40	44	42	44	53	50	36	34				
14	35	38	34	F	32	37	A	A	47	A	E	G	42	46	48	46	E	G	42	A	46	43	44	46	50	52	51	47	A		
15	36	F	F	F	F	38	44	45	52	48	44	42	E	G	41	46	A	A	A	47	51	54	59	59	56	F	A				
16	29	31	32	32	30	38	48	62	55	A	45	42	40	41	41	E	G	41	41	A	A	47	A	A	A	52	42	F	A		
17	F	42	37	27	31	31	32	A	A	A	53	A	44	A	A	E	G	41	A	A	45	44	49	52	55	44	44	43	A	43	
18	37	34	34	32	32	A	A	A	A	46	50	47	44	44	42	A	A	A	A	A	43	45	38	48	48	46	49	A	49		
19	40	A	26	25	30	40	42	A	A	49	54	50	E	G	E	G	42	42	A	44	A	A	52	59	58	38	34	F	A		
20	30	32	33	33	33	40	48	A	A	54	41	48	47	48	47	40	44	44	A	A	A	A	48	52	43	F	A	A	42		
21	A	F	F	F	F	E	G	E	G	39	37	47	46	45	46	A	A	40	46	46	A	A	A	44	42	A	A	A	A	42	
22	38	31	33	32	32	A	40	42	46	49	55	52	E	G	42	51	48	44	A	44	52	58	59	53	52	42	A	42	42		
23	42	38	38	35	32	36	39	43	A	A	C	C	C	C	C	C	C	C	B	39	40	42	46	44	32	32	A	32	32		
24	32	A	A	32	32	34	E	G	34	A	A	C	C	C	C	C	C	C	C	45	40	41	50	48	44	42	F	F	42		
25	38	39	37	35	36	40	44	48	E	G	40	47	49	E	G	E	G	46	45	E	G	41	42	43	44	53	48	49	44	34	
26	36	33	32	34	29	36	R	42	42	49	48	46	54	46	E	G	42	49	A	E	G	38	41	44	49	56	49	42	36	36	
27	32	32	30	30	30	G	44	E	G	39	A	A	A	A	A	A	A	A	A	A	44	48	50	56	50	48	29	F	29	F	
28	28	30	28	32	32	34	E	G	41	40	44	51	48	48	A	A	49	45	45	45	43	44	53	52	47	47	F	F	47	47	
29	F	38	38	38	F	26	37	40	41	46	A	A	51	50	48	46	42	R	45	43	45	A	A	44	38	A	A	A	A	A	
30	F	A	32	A	E	G	32	38	A	A	A	A	A	A	49	46	A	E	G	41	45	44	42	46	49	46	40	34	A	34	
31	33	34	F	F	F	29	37	44	52	A	A	A	A	A	A	A	A	A	44	45	48	43	48	50	49	A	50	A	50	50	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23							
CNT	26	25	28	30	31	27	21	19	16	14	21	18	18	19	19	18	21	25	23	26	27	30	25	24							
MED	36	34	34	32	32	37	41	43	48	48	48	48	46	46	45	44	44	44	44	48	55	50	48	40							
U Q	39	38	37	35	34	40	44	52	52	49	52	51	48	46	48	45	45	46	49	53	58	52	52	46							
L Q	32	31	30	30	29	36	E	G	39	39	46	46	E	G	E	G	E	G	E	G	E	G	40	42	43	42	44	49	48	43	34

JUL.2019 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

JUL.2019 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				A			A	A	A	A	A	L	L	L	L	L	A	L	A	A	L			
2				L		L	A	L	L	A	L	A	A	A	L	A	A	364	L	L				
3						308	360		A	A	A	L	L	A	L	L	L	A	A					
4					L	A	A	A	A	A	L	A	A	A	A	A	A	A	A	A				
5						L	A	L	L	L		432	428		436		A	A	A	A	L			
6					L		L	A	A	A	A	A	A	A	A	L	L	L	L					
7	A					L	A	A	L	A		436		A	A	L	L	L	L	L	L	A		
8					A	L	L	A	L		420		A	A	A	L	L	384	L	L	L	L		
9					L	L	A		L	A	L	L	L	L	L	L	L	A	A					
10						A	A	L	L	A	A		412		A	A	392	364	L	L	L			
11			A			L	L	L	A	A	A	A	A	A		384	A	L	L	316				
12						A	A	A	A	L	L	A	L	L	A	L	L	A	L	A				
13						L	L	L	A	A	A	A	A	A	L	L	L	L	L	A				
14					L	L	A	A	L	A	L		416		L	L	A	L	L	L				
15						L	L	L	L	L	L	L			408		A	A	A	A				
16					L	L	L	L	L	A	L	L	L	L	L	A	A	A	A			A		
17						L	A	A	L	A	L	A	A	L	A	A	A	A	A	L				
18						A	A	A	A	L	L	L	L	A	A	A	A	A	L	L	A			
19						L	L	A	A	L	L	L	L	L	A	A	A	A	A					
20					L	L		A	A	L	L	L	L	L	L	L	L	A	L	A	A	A		
21					L		388	368	400		A	A	A	L	A	A	L	L	L	A	A	A		
22					A	A	8	L	L	L	L	L		416		L	L	L	A	A	L	L		
23						L	L		A	C	C	C	C	C	C	C	C	B	L					
24						L	L	A	A	C	C	C	C	C	C	C	C	C	L	L				
25						L	L	L	L	L	L	L		428		L	L	L	L	L	L			
26						L	L	L	L	L	L	L	L	L	L	A	L	L	L					
27							A	L	A	A	A	A	A	A	L	A	A	L	L					
28						L	L	A	L	L	A	L	A	A	L	L	L	L	L					
29						L	A	A	A	A	L	A	L	L	L	L	L	A	A	A				
30					A		A	A	A	A	A	A	A	L	A	L	L	L	L					
31					L	L	L	A	A	A	A	A	A	L	A	A	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	4	3	1	1	2	3	2	2	2		2	1	2					
MED						316	354	368	400	420	434	416	422	422	388		374	364	334					
U Q						334	374	368				428												
L Q						270	229	360				412												

JUL.2019 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

JUL.2019 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	224	248	248	280	304	304	304	A	304	340	328	320	292	240	204	A	A				
2			8	A	204	232	268	288	304	308	336	312	324	312	312	280	208	236	180	228	A	A			
3			A	A	192	240	260	300	312	312	316	A	320	320	316	284	240	196	A	A					
4			B	A	192	248	276	304	316	316	316	A	316	288	A	316	292	A	A	A	A				
5			B	A	192	252	228	276	312	312	308	A	328	328	312	280	252	204	A						
6			B	A	184	196	240	276	304	320	320	320	320	320	320	288	240	A	A	A	A				
7	A		B	A	208	256	272	288	308	324	324	280	A	A	344	312	292	264	192	A	A				
8			B	A	220	240	284	292	320	316	316	A	A	320	296	316	248	208	A	A					
9			B	B	208	256	256	288	308	308	328	328	328	328	292	248	248	192	A	A					
10			B	A	216	228	268	284	296	300	320	320	328	320	300	292	236	200	252	A					
11		5	B	A	224	216	260	292	292	292	304	304	316	316	304	232	248	200	A	B					
12			B	A	184	232	260	292	292	296	312	292	292	A	308	308	A	212	A	A					
13			B	A	204	260	236	272	292	300	324	A	320	328	304	304	280	248	204	A					
14			180	A	216	A	240	248	288	288	288	A	324	336	320	292	292	244	208	A					
15			B	A	208	252	264	288	316	292	A	320	332	316	300	300	240	200	A						
16			B	B	200	244	276	296	296	296	296	A	A	320	312	312	256	A							
17			B	A	204	236	268	284	284	300	292	320	324	324	308	280	256	188	A	A					
18			B	A	160	228	268	280	288	308	324	308	312	284	256	A	248	200	A	A					
19			B	A	188	252	272	280	296	284	324	320	336	312	300	288	244	192	A	B					
20			B	A	168	248	268	280	296	296	288	332	324	308	308	288	252	A	A	A					
21			B	B	168	228	252	288	288	288	252	316	A	A	268	268	268	212	A	A					
22			B	A	A	228	272	284	296	316	316	A	268	328	300	272	252	188	A	B					
23			B	A	192	224	260	304	C	C	C	C	C	C	C	C	B	264	200	A	A				
24			B	A	176	240	264	292	C	C	C	C	C	C	C	C	C	232	A	A					
25			B	A	184	228	288	288	308	280	340	340	336	312	300	292	248	180	252	A					
26			B	A	A	232	A	276	284	328	336	336	328	316	284	284	252	184	A						
27			B	A	A	228	284	284	300	312	304	A	A	A	A	A	A	A	A	A	A				
28			B	A	180	228	272	296	316	316	316	A	316	316	304	292	260	196	A	A					
29			B	A	192	232	264	292	304	304	A	288	A	320	300	288	292	A	A	A					
30			A	A	320	236	276	300	300	316	316	308	A	288	316	A	256	232	A	B					
31			B	A	196	232	260	292	312	324	324	324	300	A	A	268	248	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	2	4	27	31	30	31	29	29	24	22	22	24	27	26	27	23	3	2				
MED		588	144	210	196	236	268	288	300	308	316	320	324	320	304	288	248	200	252	216					
U Q				220	208	248	276	296	312	316	324	324	328	322	312	292	256	208	252						
L Q				194	184	228	260	284	294	296	306	308	316	312	296	280	244	192	180						

JUL.2019 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

JUL.2019 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	38	J A	J A	J A	J A	J A	J A	J A	154	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
2	38	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
3	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
4	24	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
5	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
6	116	59	40	46	38	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
7	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
8	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
9	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
10	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
11	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
12	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
13	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
14	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
15	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
16	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
17	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
18	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
19	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
20	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
21	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
22	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
23	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
24	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
25	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
26	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
27	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
28	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
29	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
30	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
31	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	29	29	29	29	29	29	29	29	31	31	31	31	31	31	31
MED	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
U Q	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
L Q	36	31	28	28	29	31	36	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A

JUL.2019 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

JUL.2019 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	16	A A	66	18	G	GA	AA	AA	AA	AA	A		32	36	36	34	34	A		A	22	19	23	33	21	
2	17	E B	E B	E B	17	17	28	31	30	E A			50	A A	A A	A A	A A	56	66	22	G	G	21	16	43	85
3	A A	A A	E B	E B	17	23	34	33	A A	A A	A A			A A	A A	33	35	32	29	A A	A A	24	32	83	16	
4	E B	E B	E B	E B	17	24	A E	A E	A A	A A			A A	A A	A A	97	30	A A	A A	A A	A A	E A	A A	A A	A A	
5	A A	A A	A A	E B	E B	E A	A A										A A	A A	A A	A A		22	22	21	63	
6	A A	116	25	22	22	16											G	A								
7	A A	A A	A A	E A	18	20	GA	AA	AA	AA							A A	A A				A A	A A	20	20	22
8	22	20	17	20	E A	23	23	31	A A	63	35	36										28	24	21	16	
9	16	E B	E B	E B	E B	20		30	34	34	34															
10	16	22	24	24	E A	AA	AA	A A																		
11	18	20	61	21	E A	24	24	27	26	52	83	65	59	65	64	36	49	30	27	19	29	15	16	16	16	
12	16	16	20	E B	16	21	24	34	45	71	30	33	45	35	35	60	31	30	59	24	25	24	23	81	17	
13	17	E B	E B	E B	E B	23	26	31	A A	A A	A A															
14	E B	E B	E B	E B	E B	16	16	50	24	9	32	111	36	36	34	36	36	91	31	29	29	24	23	16	23	16
15	E B	E B	E B	E B	21	22	28	32	30	34	33	35	35	37	76	79	25	4								
16	17	E B	E B	E B	E B	21	27	34	34	117	34	32	34	31	34	77	91	169	131	34	94	86	31	24		
17	19	E B	E B	E B	E B	16	15	45	59	36	62	36	81	67	36	71	69									
18	17	17	17	17	16	77	52	70	72	34	34	37	34	144	36	54										
19	23	A A	E B	E B	22	21	26	87	75	37	37	37	36	36	66	41	A A	A A	A A	A A	18	17	17	22	16	
20	16	16	16	16	20	23	23	70	79	32	34	34	37	34	34	32										
21	A A	65	24	18	E B	E B	22	28	29	29	41	38	136	38	61	63	30	31	31	A A	A A	104	20	17	59	
22	19	16	16	16	22	62	26	33	30	36	36															
23	E B	16	17	16	14	20	18	29	31	57																
24	18	A A	A A	A A	G	16	27	60	69																	
25	17	E B	E B	E B	E B	G	18	28	30	32	36	34	G	G	34	34	G	G								
26	E B	16	17	17	17	21	28	31	35	35	35	36	36	33	35	A A	A A	29	29	26	20	20	20	20	16	
27	17	17	E B	E B	18	19		32	75	65	44	63	79	36	26	A A	A A	A A								
28	16	21	22	16	16	18	26	34	34	34																
29	16	16	22	17	E B	17	23																			
30	E B	A A	A A	A A	A A	G	16	33	59	59	68	79	59													
31	E B	E B	E B	E B	E B	G	18	25																		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	31	31	31	31	30	31	28	29	31	29	26	27	28	29	29	28	23	27	29	31	31	30	31	31		
MED	17	17	16	16	17	22	28	34	40	55	36	40	36	36	36	34	31	29	24	22	20	20	21	18		
U Q	A A	A A	A A				A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A					
L Q	E B	E B	E B	E B	E B	G	18	27	31	32	36	34	35	35	34	34	31	G	29	26	22	20	18	16	18	16

JUL.2019 fbEs (0.1MHz)

IONOSPHERIC DATA STATION Wakkanai

JUL.2019 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

JUL.2019 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

JUL. 2019 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	312	312	A	J	A		A	A	A	A	330	341	296	283	G	292	317	292	294	307	305	333	364	316	
2	316	314	308	334	300	310	304	302	303	353	319	325	A	A	R	262	A	A	307	334	323	321	326	297	
3	A	A	300	316	318	299	307	388		A	A	302	274	A	R	279	317	302	305	A	303	320	337	A	
4	311	284	316	322	319	278	A	336	347	A	G	A	A	A	A	347	A	A	A	A	A	322	304	A	
5	A	A	292	292	312	302	A	325	325	333	295	G	304	G	A	A	A	A		306	334	335	328	F	
6	A	298	309	312	347	345	323	A	A	A	A	332	312	A	A	310	305	319	317	350	327	307	A	A	
7	A	A	284	307	295	318	A	A	352	A	R	A	A	283	310	297	239	259	R	242	302	A	314	335	
8	300	303	315	332	311	340	360	A	354	G	353	A	A	293	330	291	G	306	329	310	311	305	293	324	
9	F	F	Z	325	314	307	331	303	G	312	345	307	270	358	G	283	323	299	A	A	320	323	323	310	313
10	309	303	361	324	325		A	286	343	A	A	A	G	A	A	G	A	258	294	310	323	334	322	354	
11	335	282	A	287	316	307	G	G	A	A	A	A	A	A	A	G	A	298	318	294	294	327	314	343	
12	298	309	296	293	303	286	A	A	A	G	G	A	G	G	A	G	G	A		316	301	333	350	A	
13	309	309	282	280	326	313	326	G	A	A	A	A	A	A	A	G	G	267	322	319	239	333	354	352	
14	324	304	303	F	317	297	A	A	320	A	G	252	299	301	G	A	A	289	225	309	335	303	290	321	
15	308	F	F	F	F	301	289	327	338	329	323	393	G	294	G	G	A	A	A	A	A	A	A	F	
16	320	297	301	304	305	313	300	384	375	A	311	G	358	A	A	G	A	A	A	A	322	A	A	321	
17	F	352	328	278	308	357	A	A	A	A	364	A	A	G	A	A	315	319	330	334	336	249	340	337	
18	307	333	329	358	346		A	A	A	315	317	302	396	A	371	A	279	348	349	A	279	315	309	306	
19	331	A	334	298	243	322	250	A	A	316	359	348	G	G	A	268	A	A	A	A	328	335	341	362	
20	324	312	301	305	345	358	335	A	A	366	G	300	261	286	345	275	320	255	A	A	A	A	F	A	
21	A	F	F	F	F	E	G	G	A	366	G	A	302	A	A	404	342	338	A	A	A	F	A	A	
22	329	309	331	326	316	A	313	284	300	307	343	272	G	339	305	331	A	315	331	322	339	320	320	309	
23	312	323	315	310	317	309	320	328	A	C	C	C	C	C	C	C	C	B	316	310	326	326	353	349	
24	302	A	A	330	330	401	G	A	A	C	C	C	C	C	C	C	C		369	331	321	354	306	324	
25	341	328	309	308	327	312	340	341	G	304	324	G	G	299	264	G	284	321	320	359	300	284	317	F	
26	314	323	313	274	315	272	282	315	357	337	319	300	287	332	A	A	G	291	317	327	339	335	342	335	
27	319	320	329	340	340	G	375	G	A	A	A	A	A	315	320	A	A	324	334	313	332	317	346	F	
28	300	306	307	332	317	331	G	295	335	362	320	372	A	A	326	298	331	333	311	306	321	307	R	296	
29	F	316	332	338	327	357	295	316	A	A	330	321	310	327	R	293	294	328	A	A	335	326	A	A	
30	F	A	338	A	347	G	331	A	A	A	A	A	345	295	A	G	317	323	337	344	320	340	352	342	
31	316	309	298	F	F	F	335	330	308	249	A	A	A	A	A	295	305	359	316	318	322	295	A	307	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	26	25	28	30	31	28	22	19	16	14	21	18	18	19	19	18	21	25	23	26	27	30	25	24	
MED	316	309	311	309	317	313	306	302	336	326	319	301	298	286	283	294	298	318	317	322	326	316	324	318	
U Q	329	323	329	326	330	338	326	328	352	345	330	332	312	301	326	317	316	326	331	328	335	333	348	327	
L Q	309	303	300	297	309	300	289	G	316	307	298	252	G	G	G	G	268	262	293	310	307	320	305	310	

JUL. 2019 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

JUL.2019 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				A			A	A	A	A	A	L	L	L	L	L	A	L	A	A	L			
2				L		L	A	L	L	A	L	A	A	A	L	A	A	377	L	L				
3						357	395		A	A	A	L	L	A	L	L	L	A	A					
4					L	A	A	A	A	A	L	A	A	A	A	A	A	A	A	A				
5						L	A	L	L	L	420	439		L	A	A	A	A	L					
6					L	496	L	A	A	A	A	A	A	A	A	L	L	L	L					
7	A					L	A	A	L	A	439		A	A	L	L	L	L	L	L	L	A		
8					A	L	L	A	L	428		A	A	A	A	L	L	390	L	L	L	L		
9					L	L	A		L	A	L	L	L	L	L	L	L	A	A					
10						A	A	L	L	A	A	436		A	A	401	A	369	L	L	L			
11			A			L	L	L	A	A	A	A	A	A	416	A	L	L	369					
12						A	A	A	A	L	L	A	L	L	A	L	L	A	L	A				
13						L	L	L	A	A	A	A	A	A	L	L	L	L	L	A				
14					L	L	A	A	L	A	L	419		L	L	L	A	L	L	L				
15						L	L	L	L	L	L	L		L	407	A	A	A	A	A				
16					L	L	L	L	L	A	L	L	L	L	L	A	A	A	A	A		A		
17						L	A	A	L	A	L	A	A	L	A	A	A	A	A	L				
18						A	A	A	A	L	L	L	L	A	A	A	A	A	L	L	A			
19						L	L	A	A	L	L	L	L	L	A	A	A	A	A	A				
20					L	L	385		A	A	L	L	L	L	L	L	L	A	L	A	A	A		
21					L		382	420	384		A	A	A	L	A	A	L	L	L	A	A	A		
22					A	A	A	L	L	L	L	L		L	L	L	A	A	L	L				
23						L	L	A	C	C	C	C	C	C	C	C	B	L	343					
24						L	L	A	A	C	C	C	C	C	C	C	C	L	L					
25						L	L	L	L	L	L	L	429		L	L	L	L	L	L				
26						L	L	L	L	L	L	L	L	L	L	A	L	L	L					
27							A	L	A	A	A	A	A	A	L	A	A	L	L					
28						325	L	L	A	L	L	A	L	A	A	L	L	L	L					
29						L	A	A	A	A	L	A	L	L	L	L	L	A	A	A				
30					A		A	A	A	A	A	A	A	L	A	L	L	L	L					
31					L	L	L	A	A	A	A	A	A	L	A	A	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	3	3	1	1	2	3	2	2	2		2	1	2					
MED						368	385	413	384	428	430	436	438	392	408		380	377	356					
U Q						438	395	420				439												
L Q						341	382	402				419												

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JUL. 2019 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				A			A	A	A	A	288	288	354	396	G	424	310	372	314	306	278			
2				260		334	224	A	310	278	328	310	A	A	268	A	A	326	274	258				
3						384	356	234	A	A	A	356	364	A	398	380	364	336	A					
4					310	402	A	300	308	A	G	A	A	A	A	266	A	A	A	A				
5						372	A	290	304	300	376	G	384	G	A	A	A	A		312				
6					258	222	250	A	A	A	A	306	336	A	A	A	368	346	328	316				
7	A					294	A	A	294	A	402	A	A	418	354	382	420	418	A	324	A			
8					292	310	264	A	300	G	288	A	A	408	314	392	G	354	308	278	298			
9					318	312	A	G	362	292	388	444	282	G	436	332	370	A	A					
10						A	A	394	296	A	A	A	G	A	A	G	A	306	354	312	252			
11			A			304	324	G	A	A	A	A	A	A	A	G	A	396	330	346				
12						A	A	A	A	G	G	A	G	G	A	G	G	A	336	334	A			
13						350	340	G	A	A	A	A	A	A	A	G	G	314	318	308	386			
14					286	360	A	A	334	A	G	418	378	398	G	A	344	422	296					
15						296	354	330	290	312	340	254	G	G	G	A	A	A	A		A			
16					322	350	350	226	242	A	364	G	298	G	G	A	A	A	A					
17						244	A	A	286	A	236	A	A	G	A	A	366	334	280					
18						A	A	A	A	342	316	342	220	A	250	A	A	286	304	A				
19						326	A	A	A	358	272	292	G	G	A	E	A	A	A					
20					270	270	272	A	A	254	G	374	456	308	312	396	A	446	A	A	A			
21					268	O	G	G	330	346	350	A	348	A	A	216	306	280	A	A	A			
22						A	320	A	330	340	304	352	G	302	358	338	A	E	A	332	278	274		
23						354	372	368	A	C	C	C	C	C	C	C	C	B	316	328				
24						222	G	A	A	C	C	C	C	C	C	C	C	C	282	266				
25						310	318	294	G	372	326	G	G	386	466	G	412	332	312					
26						340	386	348	294	318	328	352	418	G	310	A	G	384	316					
27						G	G	A	A	A	A	A	A	E	A	A	A	A	318	278				
28						360	232	G	348	324	272	338	266	A	A	316	368	702	298	310				
29						228	A	A	A	A	300	332	362	342	316	380	408	320	A	A				
30						280	G	A	A	A	A	A	A	294	370	A	G	350	306	284				
31						262	280	A	A	A	A	A	A	A	A	A	394	364	270	270				
						226	342	360	480					378										
CNT				1	11	25	20	18	16	14	21	18	18	19	18	18	19	24	21	8	2			
MED				260	270	326	325	358	306	329	338	352	371	398	378	384	366	328	308	292	288			
U Q				310	357	358	G	332	358	395	444	G	G	G	G	G	G	426	420	354	315	329		
L Q				258	287	268	300	294	292	302	306	336	370	314	368	344	311	279	266					

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JUL. 2019 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	224	244	A	A	244	234	A	A	A	A	A	204	194	194	194	210	A	A	A	A	210	232	206	246	
2	254	258	258	230	260	230	A	210	216	A	198	A	A	A	198	A	A	206	208	208	240	240	A	A	
3	A	A	282	258	276	214	208	A	A	A	A	H	162	168	A	194	200	202	A	A	276	250	222	202	
4	248	274	262	244	236	A	A	A	A	A	188	A	A	A	A	A	A	A	A	A	A	234	276	A	A
5	A	A	280	304	236	A	A	202	192	A	198	180	172	208	A	A	A	A	A	196	232	232	232	A	A
6	A	262	230	260	200	184	A	A	A	A	A	A	A	A	A	208	A	208	208	226	246	246	A	A	
7	A	A	278	296	208	186	A	A	214	A	178	A	A	178	186	186	A	206	206	214	A	252	252	230	
8	268	206	236	216	A	216	206	A	204	204	A	A	A	A	208	192	192	206	A	214	220	240	262	248	
9	218	218	230	238	226	226	A	188	208	A	198	A	198	190	186	190	208	A	A	264	244	220	264	264	
10	266	266	204	E A	294	288	A	208	202	A	A	178	A	A	198	A	244	244	214	226	248	246	228	A	
11	192	A	A	A	336	208	208	212	A	A	A	A	A	A	212	A	212	212	210	A	232	240	212	246	
12	266	244	280	280	208	A	A	A	A	176	196	A	190	190	A	196	198	A	210	A	236	220	A	238	
13	240	248	252	262	268	226	202	206	A	A	A	A	A	A	188	194	226	226	214	A	244	218	206	252	
14	264	242	270	248	212	208	A	A	198	186	196	176	208	208	A	A	200	208	248	248	248	248	216	216	
15	210	238	240	248	232	224	210	224	198	202	192	170	172	194	A	A	A	A	A	230	242	242	224	A	
16	208	270	254	250	E B	232	232	214	210	196	A	190	176	182	188	202	A	A	A	A	228	A	A	250	240
17	232	232	242	262	252	218	A	A	206	A	192	A	A	204	A	A	A	A	A	204	262	218	A	230	
18	240	222	252	210	246	A	A	A	A	214	192	204	192	A	A	A	A	206	214	A	268	262	244	236	
19	236	A	218	A	A	230	222	A	A	208	208	182	188	188	A	A	A	A	A	224	240	220	202	248	
20	286	258	266	238	228	228	212	A	A	188	176	194	216	180	202	210	A	228	A	A	A	228	250	250	
21	A	214	218	284	210	256	210	190	190	A	A	A	196	A	A	204	192	224	A	A	A	254	258	A	
22	208	208	238	248	A	A	A	218	196	200	198	A	168	190	206	200	A	A	214	238	232	232	248	242	
23	242	242	242	264	286	238	238	206	A	A	C	C	C	C	C	C	C	B	198	236	262	242	222	236	
24	212	A	A	260	258	214	222	A	A	C	C	C	C	C	C	C	C	216	196	244	216	244	262	246	
25	236	236	248	226	254	228	A	A	196	196	196	186	186	174	194	204	202	212	196	220	260	268	268	260	
26	260	258	A	244	244	214	202	190	190	190	174	186	204	184	202	A	208	226	A	242	234	242	232	240	
27	240	230	258	248	260	220	A	216	A	A	A	A	A	A	194	A	A	194	194	232	232	228	194	278	
28	264	A	A	254	246	188	204	A	A	180	180	196	A	A	202	206	228	198	216	216	230	272	A	272	
29	206	242	236	246	234	234	A	A	A	A	178	A	196	196	196	186	204	A	A	A	210	216	A	A	
30	220	A	236	A	A	204	A	A	A	A	A	A	A	A	200	A	192	234	192	204	222	242	218	218	220
31	240	256	272	298	184	244	226	A	A	A	A	A	A	206	A	A	192	212	202	248	256	234	A	262	
	00	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	26	27	27	25	14	13	15	10	17	13	16	17	18	15	15	19	19	22	27	29	22	22	
MED	240	242	250	249	240	224	210	208	198	198	192	186	189	190	198	200	204	208	208	231	240	240	234	246	
U Q	260	258	266	264	260	231	222	214	206	204	198	196	196	202	202	206	226	224	214	248	246	247	252	252	
L Q	218	230	236	244	226	211	206	196	192	188	182	177	174	186	194	192	198	206	202	222	232	222	216	236	

JUL. 2019 h'F (KM)

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JUL.2019 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	104	104	104	104	104	104	104	A	104	104	104	104	104	104	A	A				
2				100	100	100	102	102	102	102	102	102	102	102	114	114	94	110	98	98				
3				A	A	112	100	100	100	100	100	104	A	98	110	110	110	110	98	A	A			
4				B	A	110	110	110	108	108	106	106	98	A	112	112	A	A	A	A				
5				B	A	112	112	94	102	102	102	102	A	102	102	110	104	104	104	A				
6				B	106	122	108	106	106	106	106	94	104	104	104	104	104	A	A	A	A			
7	A			B	A	114	100	100	100	100	106	100	100	A	116	94	108	108	90	A	A			
8				B	A	104	104	104	104	104	104	104	A	A	112	98	112	112	96	A	A			
9				B	B	118	118	112	112	112	112	106	106	106	106	94	94	96	114	A	A			
10				B	A	96	102	102	102	102	92	104	104	104	102	102	102	102	104	130	A			
11			92	B	A	104	94	104	104	104	106	106	106	106	104	102	102	102	102	A	B			
12				B	A	102	102	98	108	98	106	106	96	96	A	96	96	114	A	A				
13				B	120	118	110	110	110	110	104	A	104	112	112	112	112	112	112	A	A			
14				90	104	A	104	104	104	104	104	A	104	104	104	104	108	108	104	A				
15				B	A	122	106	106	106	106	98	A	108	108	100	104	104	104	104	A	A			
16				B	B	108	108	108	108	104	104	104	A	A	104	104	104	104	A		A			
17				B	A	120	110	102	102	96	96	96	104	104	104	104	104	104	104	A	A			
18				B	A	104	104	104	104	104	112	106	102	114	112	102	A	102	102	A	A			
19				B	A	102	110	110	110	110	92	100	106	106	106	106	106	106	106	A	B			
20				B	A	106	106	106	106	106	92	106	106	106	106	106	106	106	A	A	A			
21				B	B	106	106	98	98	100	100	100	110	A	90	102	102	102	A	A				
22				B	A	A	116	96	96	106	106	98	A	98	110	108	108	108	98	A	B			
23				B	A	118	118	102	102	C	C	C	C	C	C	C	C	B	108	108	A	A		
24				B		94	106	106	106	C	C	C	C	C	C	C	C	106	A	A				
25				B	A	112	112	106	106	106	106	106	106	106	106	106	106	112	102	102	A			
26				B	A	A	102	A	102	102	102	102	102	108	108	108	108	108	90	A				
27				B	A	A	98	108	102	102	102	102	A	A	A	A	A	A	A	A	A			
28				B	A	102	102	102	102	102	102	102	A	102	102	102	102	112	102	A	A			
29				B	A	92	108	108	108	108	108	A	108	A	108	108	108	100	A	A	A			
30				A	90	104	104	104	104	104	104	104	104	A	104	112	A	112	112	A	B			
31				B	A	102	102	98	98	98	98	98	98	98	A	A	98	108	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	2	5	27	31	30	31	29	29	24	22	22	24	27	26	27	23	3	2			
MED			92	95	104	106	106	104	104	104	104	103	104	104	105	104	105	106	104	102	106			
U Q					113	114	110	106	106	106	106	106	106	106	109	108	108	108	108	130				
L Q					102	102	102	102	102	102	100	100	102	102	104	102	102	102	102	98				

JUL.2019 h'E (KM)

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JUL.2019 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	104	104	104	92	94	82	110	106	104	104	104	104	104	104	96	112	112	106	106	106	98	98	98	98	
2	98	102	98	96	94	106	104	102	104	98	102	102	102	102	102	112	106	100	100	98	102	118	108	102	
3	102	102	104	102	108	110	110	110	102	98	110	110	98	88	110	110	108	114	100	100	100	106	98	98	
4	92	96	90	114	108	108	108	112	104	102	108	100	100	100	100	120	116	108	98	98	98	122	106	110	
5	110	110	110	102	96	108	102	104	104	104	104	96	96	132	108	118	106	106	106	106	98	100	100	100	
6	106	102	96	96	108	G	126	108	100	100	100	100	112	104	96	96	96	96	96	96	96	118	110	108	
7	96	96	96	90	84	116	116	102	94	102	114	102	100	94	94	94	112	116	116	110	106	108	102	102	
8	102	94	86	86	88	88	112	106	106	106	98	98	98	98	98	154	100	136	108	108	98	98	98	98	
9	98	98	98	96	B	108	108	108	106	106	106	94	100	152	96	94	100	108	108	116	110	110	104	116	
10	104	104	98	108	104	104	110	108	108	104	92	106	102	106	120	106	126	100	104	140	112	B	112	104	104
11	104	98	98	92	92	104	114	104	104	104	102	102	106	114	128	112	104	96	120	102		112	104	114	
12	104	104	98	98	98	108	118	108	104	104	104	104	98	92	92	92	110	102	110	106	106	100	100	106	
13	98	98	108	120	120	120	106	106	106	100	100	100	100	104	104	116	114	106	114	98	104	104	104	122	
14	102	90	92	96	92	114	106	106	116	100	100	100	172	96	116	116	116	116	116	112	112	112	106	106	
15	106	84	134	114	114	120	120	106	106	100	100	100	96	120	116	116	112	112	106	106	106	96	96	96	
16	96	96	106	106	142	82	110	110	104	96	96	96	96	96	114	108	108	98	98	98	110	108	108	98	
17	98	98	98	98	110	114	116	108	100	98	98	98	98	108	108	108	108	108	98	98	98	98	98	102	
18	90	90	90	90	116	108	108	100	100	100	108	108	108	108	108	100	98	120	106	106	106	106	106	106	
19	112	98	106	100	106	120	100	100	100	100	98	162	136	136	116	116	114	104	104	104	104	104	104	104	
20	104	92	92	96	106	106	106	106	98	112	100	100	158	150	126	118	106	106	106	106	96	104	106	106	
21	94	96	106	92	B	112	108	108	108	102	102	96	98	98	94	106	116	122	110	100	100	106	114	104	
22	104	104	96	96	96	106	114	110	110	106	104	100	98	96	112	130	112	112	104	106	106	106	102	102	
23	102	96	B	110	112	104	108	108	102	C	C	C	C	C	C	C	C	B	94	126	106	106	106	106	
24	102	100	100	100	96	88	108	104	104	C	C	C	C	C	C	C	C		102	100	100	112	96	96	90
25	84	98	90	90	96	110	110	102	108	102	102	102	98	98	98	98	120	106	106	98	106	106	106	106	
26	98	100	92	92	92	106	106	102	102	102	158	128	120	104	112	92	98	108	104	104	104	104	100	100	
27	96	100	100	90	90	104	104	108	96	96	96	96	96	96	92	92	86	86	90	88	88	100	106	106	
28	100	100	96	96	90	90	130	114	110	110	110	106	102	102	112	112	104	122	126	102	120	120	104	104	
29	104	90	90	90	96	98	112	110	104	102	102	96	86	96	96	92	94	112	94	114	110	110	110	106	
30	106	92	92	92	90	90	120	114	110	110	108	108	108	108	96	106	94	108	96	90	90	90	90	90	
31	90	100	100	90	90	90	82	108	106	106	106	104	104	136	94	96	112	112	110	94	94	106	106	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	31	31	30	31	29	30	31	31	31	29	29	29	29	29	29	29	29	31	31	31	30	31	31	31	
MED	102	98	98	96	96	106	110	108	104	102	102	100	100	104	104	108	108	108	106	104	104	106	104	104	
U Q	104	102	104	102	108	110	114	108	106	105	107	105	107	111	113	116	113	112	110	106	106	110	106	106	
L Q	96	96	92	92	92	98	106	104	102	100	100	98	98	96	96	96	100	102	100	98	98	100	100	100	

JUL.2019 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

JUL.2019 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	F5	F4	F9	L9	C2	C4	C5	C4	C6	C5	CQ31	CQ21	CQ21	CQ21	CQ11	C2	C4	C4	C5	L7	L7	F8	F8	F8
2	F4	F1	F2	L2	C4	C6	C4	C4	C3	C4	C3	C3	C3	C3	C2	C4	C3	C5	CL12	CL2	C2	F1	F8	F8
3	F8	F7	F3	L2	L2	C3	C4	C3	C3	C5	C3	C2	L2	C3	C1	C2	C2	C4	C8	L4	L4	F3	F4	F2
4	F1	F1	FF11	L2	L3	C7	C4	C4	C4	C2	C2	C3	C3	C3	L3	C2	C4	LQ53	LQ73	LQ71	L3	FF62	FF8	F6
5	FQ61	FQ31	FQ31	LQ21	LQ21	CQ51	C6	LQ21	C1	C2	C2	C2	L2	CL21	C3	C5	C5	C4	C3	L4	L3	F5	F3	F5
6	FQ41	FQ31	FQ41	L4	L1		C2	C6	C4	C3	C3	C3	C3	C5	C6	C5	C3	L3	L4	LQ31	LQ31	FQ81	FQ81	FQ61
7	L7	L8	L6	L6	L4	C2	C6	C6	LC12	C4	C2	C3	C3	L2	L2	LC21	CL31	C4	C5	L6	L8	F51	F3	F6
8	FQ51	FQ41	F4	L5	L4	LC21	C3	C4	C2	C3	C3	C3	L4	L3	LC22	CL12	C3	C2	C4	L4	L9	F7	F6	F2
9	F3	F1	F2	L2		C3	C5	C3	C2	C2	C2	C2	C2	HL11	L2	C2	C2	C6	C7	L5	L3	F4	F4	F3
10	F3	FQ21	FQ31	LQ41	L3	C5	C5	C3	C2	C4	C4	C1	C2	C3	C1	C3	C2	C3	C3	H2	L3	F3	F6	F7
11	L5	F6	F9	L5	L4	L3	C3	C2	C3	C4	C4	C3	C2	C1	C2	C3	C3	C3	HC23	L5		F1	F1	FF11
12	F4	F7	F4	L2	LL22	C3	C4	C3	C3	C1	C1	C2	C2	C2	C3	C2	CL21	LQ21	CQ21	L7	L8	F8	F6	FF22
13	F3	F2	F1	L1	C1	LC3	LC23	C3	C3	C3	C4	C3	C2	C2	C2	C2	C2	C5	C4	L4	L4	F5	F5	FQ31
14	FQ31	F2	F2	C1	LC11	L2	C5	C4	C2	C3	C2	C2	L1	LC11	C1	C3	C3	C4	C5	L5	L4	F2	F4	F1
15	F1	F2	FF11	L2	L3	LC31	C2	C3	C2	C2	C1	L2	LC21	C2	C3	C4	C4	C4	C5	C3	C4	F3	F6	F6
16	F3	F2	FQ11	LL11	L1	LC12	C4	C4	C3	C4	C2	C2	L2	L2	CL22	C5	C5	C5	C8	C7	C7	FQ51	FQ92	
17	F5	F4	F5	L2	L1	C2	C4	C5	C5	C3	C2	C4	C2	C2	C3	C3	C4	C4	C3	L4	L4	F8	F4	F4
18	F4	F3	F2	L1	L2	C5	C4	C4	C3	C2	C1	C2	C2	C2	C3	C3	C3	C3	C3	L6	L6	F7	F5	F5
19	F4	F5	F3	L5	L4	C5	C6	C8	C3	C2	C3	H1	H2	H1	C3	CL31	CQ31	CQ41	C5	C5	CQ31	F5	F6	F2
20	F3	F2	F2	L2	L6	C7	C3	C3	C3	C1	C2	C2	H1	H1	CL21	C1	C5	C5	L7	L8	L6	F5	F3	F4
21	F7	F6	F3	L2		C5	C4	CQ21	CQ31	CQ31	CQ31	CQ41	CQ21	L2	L2	C2	C2	C3	C7	L4	L4	FF21	FF31	F6
22	F3	F5	F6	L5	L3	L8	C5	C3	C2	C2	C2	C3	L1	L2	LC21	C2	C4	C5	C7	L4	L1	F3	F3	F4
23	F2	F4		L2	L2	LC11	C3	C3	C3									L3	CL21	L4	L4	F7	F5	F5
24	F4	F5	FQ41	L3	L3	LC11	C3	C4	C6									C7	L3	L6	C1	F4	F3	F3
25	FF31	F2	F2	L1	L1	C2	C3	C4	C2	C3	C	C2	C1	C2	C2	CL22	C4	C3	C2	L3	F2	F4	F2	
26	F2	F5	F5	L3	L2	L3	L4	L3	C3	C2	CL11	HL11	CL21	LC11	CL11	CL31	CL4	C4	C4	L4	L6	F5	F6	FF32
27	FQ31	FQ41	FF32	LL32	LQ31	LQ31	CQ71	CQ41	CQ41	CQ31	C2	C3	L4	L3	L4	L4	L4	L5	L4	L3	L5	F4	F2	F4
28	F3	F3	F3	L3	L3	LC21	CL21	C4	C2	C2	C3	C1	L2	C3	C2	C3	C3	C3	C3	L5	C3	F4	F6	F6
29	F3	F3	F4	L3	L2	LC22	C4	C4	C7	C5	C3	C3	C2	C2	C2	LC21	LC21	CL22	LQ51	LQ51	L3	F4	F3	F4
30	F3	F5	F3	L6	L3	LL11	C4	C3	C3	C3	C4	C2	C2	C2	C6	C2	L2	C3	C3	L3	L3	F2	F1	F1
31	F1	F2	F2	L2	L2	LC11	LC11	C3	C8	C5	C2	C3	C3	CL11	L3	L2	C2	C4	L4	L4	L5	FF31	F8	F7
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

JUL.2019 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL.2019 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

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 33	X 33	A	X 32	X 32																99	A 56	X 37	A				
2	48	44	42	39																		71	62	60	49			
3	X 42	46	A	X 42	X 40															A	X 77	A	A	43				
4	X 36	X 34	X 33	X 33	X 33																	62	55	39	37			
5	39	X 34	X 32	X 33	X 28																	X 60	X 58	60	52			
6	X 46	X 44	X 40	X 39	X 36																	X 66	X 62	X 41	46			
7	43	38	42	41	40																X 51	X 53	X 57	X 52	X 45			
8	X 43	X 45	X 44	X 45	X 40																	X 60	X 58	61	60			
9	62	44	44	44	38																	X 54	X 57	X 52	X 53			
10	X 45	49	X 45	40	38																X 73		X 41	X 42	X 46			
11	A	42	44	39	38																	X 53	X 60	X 54	A 33			
12	X 37	39	X 32	X 31	X 32																		X 65	A	A	A		
13	A	38	X 36	X 42	X 37	X 40																	X 57	X 42	X 37	X 37		
14	X 37	A	X 36	40	39																		X 64	X 62	A	X 47		
15	43	A	40	43	41																		X 66	71	63	69		
16	A	A	A	X 33	X 34																		X 70	X 64	X 66	A		
17	53	A	X 38	41	32																		X 60	X 60	X 58	X 45		
18	X 35	X 32	X 34	X 32	X 38																		X 52	X 50	X 46	X 46		
19	44	X 38	X 34	X 33	X 38																		X 76	A	X 38	X 38		
20	42	36	35	X 33	X 32	X 36																	A	X 60	A	X 40		
21	43	42	39	39	37																		X 56	X 55	X 48	X 43		
22	X 42	39	39	X 36	39																			X 70	X 71	X 59	X 59	
23	X 44	X 44	X 44	X 39	X 40																			X 61	X 39	X 38	X 38	
24	X 34	X 34	X 33	X 32	X 37	X 37																		X 51	X 45	X 45	X 44	
25	X 39	X 39	X 38	X 43	X 39																			X 61	X 48	X 46	X 39	
26	42	X 38	40	X 33	X 32																			X 70	X 47	A	A	
27	40	X 33	X 33	X 30	X 32																			X 59	X 50	X 36	X 37	
28	X 34	X 32	X 34	X 43	X 32																			X 59	X 61	X 49	X 40	
29	A	X 38	41	39	X 30																			X 53	A	52	48	
30	X 31	42	39	38	36																			X 54	X 51	X 41	X 37	
31	X 37	X 37	35	38	38																			X 57	X 52	X 46	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	27	27	28	31	30	3															3	29	26	25	27			
MED	X 42	X 38	X 38	X 39	X 37	X 37																X 53	X 60	X 56	X 48	X 44		
U Q	44	44	42	41	39	40																	X 73	X 68	X 61	X 58	X 48	
L Q	X 37	X 34	X 34	X 33	X 32	X 36																		X 51	X 56	X 50	X 41	X 38

JUL.2019 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL.2019 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

JUL.2019 foF2 (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

JUL.2019 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						A	352	A	A	A	A	A	A	A	A	A	A	A	A					
2					A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
3						A	352388		A	A	A	A	A	A	A	A	U L	A	A					
4					U L	A	A	A	A	A	A	A	A	A	A	A	U L	U L	U L					
5						A	352	A	A	A	A	U L	A	A	A	A	A	A	A					
6					272	364	396		A	A	A	A	A	A	416	A	U L	A	A	A				
7					276	340		A	A	A	A	A	A	A	U L	U L	U L	A	A					
8					A	U L	364384		A	A	A	A	A	A	416	A	400	A	A	A				
9					284	A	A	A	A	U L	U L	A	A	A	A	A	A	A	A	A				
10					A	A	A	A	A	A	A	A	A	A	A	U L	A	A	A		A			
11					260	U L	316	A	A	A	A	A	A	U L	408	404	356	U L	A	A				
12						U L	344	356	A	A	A	A	A	A	A	A	A	A	A	A				
13						256	376		A	A	A	A	A	A	A	A	A	A	U L					
14						A	A	A	A	A	A	A	A	U L	432	400	404	U L	364	U L	A			
15					A	A	380		A	A	A	A	A	U L	432	420	A	A	A	A				
16					260	356		A	A	A	A	U L	420	424	408	400	376	364						
17					U L	276	348		A	A	A	A	A	U L	432	A	A	A	A	A				
18					268	A	A	U L	416	A	U L	456	432	A	A	A	U L	A	A	A				
19					A	344	A	A	U L	416	A	U L	428	452	432	U L	424	400	380	360				
20						A	A	400	416	A	432	432	A	U L	416	408	388	368	A	A				
21						336	A	408	A	A	A	A	A	A	A	A	A	A	U L	A				
22							A	A	A	A	U L	444	A	A	A	A	412	380	A	A	A			
23					U L	288	368	368	A	416	A	A	444	436	U L	416	388	A	A	A				
24						U L	332	368	400	A	A	A	A	428	A	412	396	364	L					
25					U L	304	332	400	396	388	440	420	444	428	416	404	384	368	L					
26					280	324	376	400	A	432	A	A	436	440	384	408	380	A	A					
27						A	U L	372	392	A	A	A	A	A	A	U L	400	A	368	U L				
28						A	400	A	432	A	A	A	A	A	A	A	A	A	A	A				
29					U L	252	344	A	A	A	A	A	U L	464	416	A	A	A	U L	A				
30							A	U L	408	A	A	U L	444	436	A	A	A	A	A	A				
31						A	368	408	A	A	A	A	A	U L	404	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						12	18	12	10	4	5	8	8	10	13	14	17	9	7					
MED						274	344	376	400	416	440	430	442	432	416	406	388	364	316	U L				
U Q						282	352	386	408	416	452	438	448	432	416	412	392	368	340	U L				
L Q						264	332	368	400	402	432	420	436	428	404	400	380	358	316	U L				

JUL.2019 foF1 (0.01MHz)

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IONOSPHERIC DATA STATION Kokubunji

JUL.2019 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						A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B			
2					A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B			
3						A	U R 260	A	A	A	A	A	A	A	A	A	A	A	A	A				
4						A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B			
5						A	A	A	A	A	A	A	U A 364	A	U A 344	A	A	A	A	A	B			
6						U R 200	A	A	A	A	A	A	A	U A 360	A	A	A	A	A	B				
7						U R 196	A	A	A	A	A	A	A	A	A	A	A	A	A					
8						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
9						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
10						B	A	A	A	A	A	A	A	A	A	A	A	A	A		A			
11						B	A	A	A	A	A	A	A	A	A	A	A	A	A					
12						A	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
13							R	A	A	U A 364	A	A	A	A	A	A	A	A	A	B				
14						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
15						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
16						B	A	A	A	A	A	R	A	A	A	A	A	A	A	B				
17						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
18						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
19						B	A	A	A	A	A	A	348	308	U A 304	A	A	A	A	B				
20							A	A	A	A	A	A	A	A	A	A	A	A	A					
21	A					B	A	A	A	A	A	A	A	A	A	A	A	A	B					
22						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
23						B	A	A	A	A	A	A	A	A	A	R	U R 284	A	A	B				
24							A	A	A	A	A	A	A	U A 332	A	A	A	A	A	B				
25						B	A	A	A	A	U R 356	U R 356	A	A	U R 336	U R 308	A	A	A	B				
26						B	A	A	A	A	A	A	A	A	U R 332	U R 312	A	A	A	B				
27						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
28						B	A	A	A	U A 352	352	A	A	A	A	A	A	A	B	B				
29						B	A	A	A	A	A	A	R	A	A	A	A	A	A	B				
30						U R 192	A	A	A	A	A	A	R	A	A	A	A	A	A	B				
31						B	A	A	A	A	A	A	A	A	A	A	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						3	1			2	2	1	2	3	5	2	1							
MED						U R 196	U R 260			U A 358	354	U R 356	356	U A 332	U A 332	U 310	U R 284							
U Q						U R 200								U A 360	U A 340									
L Q						U R 192								308	318									

JUL.2019 foE (0.01MHz)

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IONOSPHERIC DATA STATION kokubunji

JUL.2019 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

IONOSPHERIC DATA STATION Kokubunji

JUL.2019 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	18	17	A A	21	20	A A	30	A A	36	53	47	48	45	44	49	A A	A A	A A	A A	38	24	62	A A	44	A A
2	20	20	21	21	A A	29	A A	55	41	163	109	44	A A	A A	49	47	49	A A	A A	A A	A A	34	35	22	16
3	21	18	A A	18	17	34		G	32	40	43	66	42	42	A A	A A	A A	A A	A A	A A	A A	20	A A	A A	23
4	21	24	22	19	18	18	37	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	21	26	E B	E B
5	E B	16	23	21	17	E B	24	31	38	39	87	49	44	39	50	37	40	42	A A	A A	50	35	49	31	28
6	E B	16	18	E B	E B	E B	E B	G	26	34	45	50	49	44	66	42	36	113	32	A A	36	30	24	20	25
7	24	20	22	16	16		26	42	44	47	46	57	46	93	36	36	33	36	A A	A A	108	24	21	E B	22
8	E B	E B	E B	E B	E B	E B	A A	26	32	39	81	223	157	A A	90	37	42	36	38	44	37	22	44	22	38
9	46	18	20	21	16	21	37	40	42	50	35	38	128	49	81	110	86	48	84	155	27	17	23	22	
10	22	21	22	21	16	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	E B	15	19
11	A A	67	20	19	20	22	19	26	42	52	82	48	74	56	47	36	37	33	50	32	22	16	23	50	16
12	E B	E B	E B	E B	E B	E B	20	29	30	38	74	52	90	109	52	77	36	35	30	59	29	23	103	82	84
13	A A	54	24	24	21	23	20		G	31	50	46	42	45	68	80	55	63	30	34	23	26	28	16	19
14	24	A A	38	23	20	20	21	122	100	133	99	94	43	57	37	36	36	32	30	24	23	21	20	72	21
15	20	A A	55	22	E B	E B	A A	A A	47	55	27	40	115	66	42	50	38	36	52	A A	62	33	35	48	45
16	A A	72	67	74	24	17	17	27	41	52	100	70		58	37	35	34	34	29	42	29	24	24	45	107
17	A A	23	67	22	20	E B	18	27	34	35	40	48	45	41	36	57	62	125	A A	40	38	36	E B	E B	E B
18	E B	E B	E B	E B	E B	E B	A A	A A	A A	53	151	36	46	39	38	44	50	44	33	A A	100	46	24	44	16
19	20	E B	E B	E B	E B	E B	A A	A A	64	28	110	41	33	43	35	39	37	35	32	30	27	32	25	44	73
20	E B	E B	E B	E B	E B	E B	A A	A A	84	50	34	36	44	38	36	46	36	33	31	27	33	40	126	35	145
21	19	19	E B	E B	E B	E B	22	29	38	35	44	154	86	94	42	103	46	32	A A	126	23	18	E B	E B	E B
22	E B	16	17	E B	E B	E B	23	30	148	201	139	103	36	87	61	84	34	33	37	A A	78	34	22	22	20
23	E B	16	19	22	20	15	21	24	32	42	34	156	96	37	38	41		G	A A	33	67	33	40	23	16
24	E B	E B	E B	E B	E B	E B	20	28	30	31	51	54	76	43	38	45	34	31	28	21	20	20	16	20	17
25	E B	17	22	20	E B	E B	23	23	28	32	32		G	G		36	36	38		G	32	30	22	20	18
26	E B	E B	E B	E B	E B	E B	17	28	30	35	A A	46	36	A A	40	36	37		G	36	30	A A	58	46	22
27	20	23	18	17	18	18	A A	46	29	30	79	83	62	106	62	78	34	35	27	22	18	25	19	17	E B
28	E B	E B	E B	E B	E B	E B	A A	29	55	31	40		G	A A	A A	A A	40	44	44	33	34	23	22	22	23
29	A A	82	26	21	20	19	23	27	37	46	126	129	44	36	66	34	69	37	28	24	20	28	56	24	19
30	19	22	16	E B	E B	E B	G	30	36	33	60	46	39		G	A A	A A	A A	A A	A A	E B	E B	E B	E B	19
31	26	17	E B	E B	E B	E B	20	28	30	34	41	78	67	88	37	60	46	76	33	30	25	20	16	34	24
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	20	19	20	17	E B	21	29	38	40	51	49	45	56	49	44	40	35	37	33	26	22	20	23	19	
U Q	24	23	22	20	18	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A
L Q	E B	E B	E B	E B	E B	E B	18	26	31	35	43	44	39	39	38	36	34	32	30	24	22	E B	E B	E B	E B

JUL.2019 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL.2019 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

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

JUL.2019 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL.2019 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		323	307	A	317	381	A	280	A	309	334	325	336	311	277	320	A	A	A	290	330	F	A	322	A	
2		F	F	F	F	A	282	A	339	A	A	312	A	A	320	316	364	A	A	A	A	326	328	340	330	
3		333	F	A	313	345	288	326	348	349	308	A	309	R	A	A	327	311	A	A	A	361	A	A	F	
4		320	332	346	319	317	268	322	A	A	A	A	A	A	A	A	A	318	317	330	321	323	377	342	302	
5		F	323	321	F	310	294	339	367	340	A	A	367	321	A	R	259	264	306	A	346	324	337	321	F	
6		324	327	323	345	312	315	323	341	320	356	353	336	A	A	320	A	309	A	316	336	342	370	329	F	
7		F	F	325	F	F	333	331	342	313	348	331	A	331	A	303	326	302	309	A	319	316	348	312	290	
8		313	315	312	F	332	A	354	285	333	A	A	A	A	A	267	301	296	297	331	319	314	315	F	F	
9		F	F	F	F	F	291	327	346	324	285	326	351	A	334	A	A	A	341	A	A	339	A	316	320	
10		306	F	314	F	F	A	A	A	A	A	A	A	A	A	A	273	302	320	308	335	A	318	286	322	
11		A	311	F	302	306	293	282	A	A	A	A	A	A	A	311	323	281	A	320	310	329	366	A	284	
12		311	F	318	312	306	344	297	297	333	A	A	A	A	A	A	R	279	306	258	A	332	351	A	A	
13		A	304	339	F	301	346	312	319	A	A	A	A	A	A	A	A	296	327	338	363	362	295	316	318	
14		320	A	320	F	F	333	A	A	A	A	A	331	A	320	326	338	321	300	312	312	331	350	F	358	
15		F	A	F	F	F	A	A	326	377	A	A	A	A	A	318	302	333	A	320	315	342	361	F	F	
16		A	A	A	353	327	265	314	349	387	A	A	312	A	R	309	325	337	305	317	311	308	329	315	A	
17		F	A	312	F	313	283	273	337	376	313	A	A	A	287	A	A	A	A	325	334	343	300	F	352	
18		324	312	318	311	F	324	A	A	296	336	290	318	343	288	306	316	A	320	328	347	320	323	289	F	
19		F	331	308	331	F	A	299	A	316	302	296	343	332	304	294	275	320	324	316	307	375	A	323	277	
20		F	F	F	338	309	352	A	A	368	R	A	296	327	361	303	295	306	309	362	307	A	352	A	331	
21		F	F	F	F	F	332	276	340	362	358	A	A	A	326	A	343	368	A	320	350	318	328	337	340	
22		327	F	F	330	F	329	311	A	A	A	A	A	A	A	A	332	350	341	A	305	F	F	F	F	
23		333	324	330	340	334	312	299	313	358	377	A	A	A	334	323	327	325	355	A	319	332	377	318	327	
24		290	317	361	317	F	331	275	365	360	A	A	A	323	281	350	331	340	273	344	364	357	336	311	335	
25		321	324	295	F	296	312	355	351	319	300	336	R	340	312	288	333	328	364	339	317	340	366	F	300	
26		F	308	F	290	308	282	325	344	357	A	R	A	339	353	302	299	336	A	321	322	363	362	A	A	
27		F	335	306	334	332	391	A	334	349	A	A	A	A	A	A	320	358	347	318	338	322	351	332	342	
28		314	326	328	F	368	349	364	A	331	368	362	A	A	A	273	285	354	368	315	311	317	337	343	314	
29		A	339	F	F	353	323	313	321	352	A	A	307	289	A	326	A	355	326	326	343	338	A	F	F	
30		380	F	F	F	F	368	376	356	389	A	362	318	306	A	A	A	A	A	347	345	355	333	364	314	311
31		318	327	F	F	F	337	363	345	379	A	A	A	A	294	A	331	A	333	356	310	327	322	351	332	
CNT		16	17	17	15	18	26	24	21	24	12	10	13	13	16	19	23	23	22	25	28	27	22	19	20	
MED		320	324	320	319	315	324	318	341	349	335	328	331	327	315	306	325	318	322	321	327	333	336	327	321	
U Q		326	329	329	338	334	337	335	348	365	357	353	342	336	324	325	333	350	341	338	342	357	362	342	334	
L Q		314	312	312	312	308	291	298	324	322	305	312	310	308	291	294	295	305	309	316	312	322	321	314	306	

JUL.2019 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL.2019 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						A		A	A	A	A	A	A	A	A	A	A	A	A						
2					A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A					
3						A			A	A	A	A	A	A	A	A	U L	A	A						
4						U L	A	A	A	A	A	A	A	A	A	A	U L	U L	U L						
5						A		A	A	A	A	U L	A			A	A	A	A						
6						366	374	389		A	A	A	A			A	U L	A	A	A					
7						392	409		A	A	A	A	A	A	U L	U L			A	A					
8						A	U L		A	A	A	A	A	A		A			A	A	A				
9						358		A	A	A	U L	U L	A	A	A	A	A	A	A	A	A				
10						A	A	A	A	A	A	A	A	A		U L	A	A			A				
11						343	U L	A	A	A	A	A	A	U L		U L	U L	A	A						
12							U L		A	A	A	A	A	A		A		A	A	A					
13							458	U L	A	A	A	A	A	A		A		A	U L						
14							A	A	A	A	A	A	A	U L		U L	U L	U L	A	A					
15							A	A	A	A	A	A	A	U L		A	A	A	A	A	A				
16						379	360		A	A	A	U L		U L	U L	U L									
17						U L		A	A	A	A	A	U L		A	A	A	A	A	A					
18						353		A	U L	A	U L	U L		A	A	U L	A	A	A	A					
19							360	A	A	U L	A	U L	U L	U L	U L	U L	315	418	373						
20							A	A		A		A		U L		U L									
21							386	A	406	A	A	A	A	A	A	A		408		U L					
22								A	A	A	U L		A	A	A		393	384	A	A	A				
23						U L	U L	U L		A	A	A	U L	U L	U L	U L	U L	U L	A	A	A				
24							U L				A	A		U L		U L									
25						U L	U L	U L	U L		U L	U L	U L	U L	U L	U L	U L	U L	U L	U L	U L				
26						343	363	U L	U L	U L	U L	U L	U L	U L	U L	U L	U L	U L	U L	U L	U L				
27							A	U L	U L	U L	A	A	A	A	A	U L		A		U L					
28								A	404		A	A	A	A	A	A	A	A	A	A	A				
29						U L	U L	A	A	A	A	U L		A		A	A	U L	A						
30								A	U L	A	U L	U L		A	A	A	A	A	A	A	A				
31							A		369	367	A	A	A	U L		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						12	18	12	10	4	5	8	8	10	13	14	17	9	7						
MED						356	382	400	412	422	434	421	414	412	413	403	401	381	371						
U Q						381	392	414	439	446	452	433	436	422	440	420	418	388	383						
L Q						343	363	392	U L	U L	U L	U L	U L	U L	U L	U L	U L	U L	U L	U L					

JUL.2019 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL.2019 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						A		A				E A			E A	A	A	A						
2						A																		
3						E A																		
4																								
5						E A																		
6																								
7																								
8																								
9																								
10																								
11																								
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30																								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						15	21	21	24	13	10	14	13	16	19	23	23	22	25	10				
MED						U	361	334	292	280	286	313	308	320	350	337	U	315	337	301	274	E A	264	
U Q						410	402	324	316	E A	320	336	356	358	393	394	374	366	346	320	E A	278		
L Q						334	307	271	264	276	292	280	311	315	316	302	278	280	266	252				

JUL.2019 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL.2019 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						A	A	A	A	A	A	A	A	A	114	A	A	A	A	B				
2					A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
3						A		A	A	A	A	A		A	A		A	A	A					
4						A	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
5						A	A	A	A	A	A	A		A		116	116		A	A	A	B		
6						124	110		A	A	A	A	A	108	108		A	A	A	A	B			
7						124		A	A	A	A	A	A	A	A		A	A	A					
8						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
9						B	A	A	A	A		98	A	A	A	A	A	A	A	A	B			
10						B	A	A	A	A	A	A		98	A	A	A	A	A		A			
11						B		A	A	A	A	A	A		110	112	110	110		A	A			
12						A	A	A	A	A	A	A	A	A	A		112	112		A	A	B		
13							A	A		112	120	112	110		A	A	A	A	A	B				
14						B	A	A	A	A	A	A	A	A	A		108		A	A	A	B		
15						B	A	A	A	A	A	A	A		116	114		A	A	A	B			
16						B	A	A	A	A	A		116	110	114	116	108		A	A	B			
17						B	A	A	A	A	A	A		116	A	A	A	A	A	B				
18						B	A	A	A	A	A	A	A	A	A		108		A	A	A	B		
19						B	A	A	A	A	A	A		106	110	110	116	114	114		A	B		
20							A	A	A	A	A	A		A		A		110	110		A	A		
21	A					B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
22						B	A	A	A	A	A	A	A	A	A		116	112		A	A	B		
23						B		A	A	A	A	A	A		A		108	106		A	A	B		
24							A	A	A	A	A	A	A		A		108	106						
25						B	A	A	A	A		112	108		A	A		112	110		A	B		
26						B		A	A	A	A	A	A		A		104	114		A	A	B		
27						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
28						B	A	A		108	108		A	A		112		A	A	A	B	B		
29						B	A	A	A	A	A	A		114		A	A	A	A		A	B		
30							A	A	A	A	A	A		114		A	A	A	A		A	B		
31						112				A	A	A		114		A	A	A	A		A	B		
						B		114	114	114														
	00	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	7	1	1	2	4	3	8	7	11	14	8	4	1					
MED						124	110	114	114	110	110	112	113	110	112	111	111	112	112					
U Q						124	112				116	116	114	110	114	116	112	113						
L Q						112	110				103	108	108	108	110	108	109	111						

JUL.2019 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

JUL.2019 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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1		86	102	98	92	90	88	116	92	100	92	92	88	90	96	122	96	96	94	88	94	96	96	96	94			
2		96	92	94	92	92	96	98	96	90	86	90	88	88	94	94	94	86	86	80	80	80	78	76	82			
3		94	98	94	94	96	96		G	96	96	90	92	92	116	92	92	112	116	96	96	96	96	96	96			
4		92	94	90	90	88	98	102	98	96	90	90	90	90	84	92	106	106	104	102	102	90	90	90	104			
5		102	100	98	98	98	100	96	102	98	102	106	104	152	108	154	116	104	104	94	92	94	88	88	90			
6		88	90	88	B	B	G	126	106	92	96	96	96	92	134	140	98	98	80	84	86	82	80	88	88			
7		96	96	98	96	94		G	96	92	90	92	92	92	92	100	118	106	106	96	94	92	90	90	94			
8		92	98	B	94	94	96	94	102	98	96	88	90	84	90	90	88	88	94	102	100	100	100	104	102			
9		96	90	88	86	98	116	106	100	100	102	108	100	88	90	88	88	86	96	98	94	96	102	102	100			
10		94	94	90	88	90	104	100	98	98	90	100	92	110	100	104	100	98	94	94	96	88	98	94	94			
11		92	90	92	92	90	104	110	102	102	98	96	94	102	114	118	108	110	106	96	98	98	94	92	98			
12		100	90	96	112	110	100	92	92	94	92	90	88	86	96	96	110	114	100	98	94	92	92	92	92			
13		92	90	88	86	84	84		G	90	90	134	132	122	114	102	100	96	94	94	96	92	86	86	86	92		
14		96	94	92	90	88	88	88	90	88	88	90	90	86	90	90	116	100	104	110	100	98	98	98	96			
15		96	88	90	104	108	100	94	92	90	88	88	88	98	124	112	98	96	100	98	94	90	88	92	88			
16		88	82	86	88	88	92	98	96	98	90	92		G	96	124	116	118	108	100	98	98	92	86	86	92		
17		90	88	86	88	98	118	102	94	98	94	94	102	112	104	100	104	100	92	96	90	96	90	102	96			
18		96	90	90	B	102	102	102	96	96	96	96	98	98	98	98	106	100	98	94	84	86	96	96	B			
19		96	102	96	104	102	102	100	90	90	98	96	96	150	148	132	126	120	112	102	94	92	92	94	B			
20		B	88	B	98	98	98	92	90	90	92	94	94	88	88	140	84	114	122	100	96	94	96	96	96			
21		90	90	98	96	100	108	106	104	98	98	94	94	90	92	92	92	94	94	110	108	108	102	94	B			
22		94	94	94	98	B	98	106	96	92	92	92	92	92	86	86	132	114	92	94	94	102	98	98	96			
23		88	90	90	90	96	98	112	102	100	100	94	92	92	114	94		G	154	106	106	98	96	98	98			
24		98	96	96	96	96	96	92	90	92	92	92	90	88	118	104	110	116	114	114	100	98	92	90	90			
25		92	88	88	96	98	106	102	98	98	98		G	G	98	98	168		G	108	96	94	88	88	84	106	86	
26		94	94	B	B	B	120	134	96	98	94	90	94	90	88		G	152	100	90	90	90	94	96	92	90		
27		86	90	92	98	92	94	94	94	92	92	84	84	92	90	84	86	80	80	78	84	92	90	96	94			
28		92	92	92	90	88	86	86	90	92	168		G	100	100	94	112	100	98	98	96	96	96	94	96	96		
29		96	94	90	90	90	94	100	100	98	88	88	88	100	92	86	86	86	110	96	94	100	98	98	98			
30		94	90	90	92	90		G	104	106	98	98	98	92		G	98	100	100	100	100	98		B	B	B	104	100
31		96	98	98	98	98	96	120	120	116	98	96	96	96	96	98	98	106	102	102	98	96	96	94	90			
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT		30	31	28	28	28	28	29	31	31	31	29	29	30	31	30	29	31	31	31	30	30	30	31	28			
MED		94	92	92	93	95	98	100	96	96	94	92	92	92	96	100	100	100	98	96	94	94	94	94	94			
U Q		96	96	96	98	98	103	106	102	98	98	96	96	100	108	116	114	110	104	102	98	96	98	98	97			
L Q		92	90	90	90	90	95	94	92	92	90	90	90	90	90	92	95	96	94	94	92	90	90	90	90			

JUL.2019 h'Es (KM)

IONOSPHERIC DATA STATION Kokubunji

JUL.2019 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F4	F4	F5	F4	F3	L6	C3	L4	L2	L3	L3	L3	L2	L2	C1	L4	L5	L5	L4	L6	F7	F7	F7	F6
2	F3	F6	F2	F6	F4	L5	L4	L3	L4	L4	L2	L3	L3	L3	L2	L3	L4	L3	L5	L5	F5	F5	F4	F2
3	F2	F3	F5	F6	F3	L5		L4	L3	L2	L2	L2	C1	L3	L2	CL21	CL23	L4	L3	F4	F3	F4	F5	F4
4	F3	F4	F5	F3	F2	L1	L4	L4	L5	L5	L5	L3	L4	L4	L3	L3	L2	L2	L3	L2	F4	F6	F3	F1
5	F5	F5	F6	F2	F3	L3	L3	L4	L3	L3	L2	L2	L1	L2	L1	C2	L2	L3	L3	L5	F6	F5	F5	F5
6	F2	F2	F2				C2	L2	L3	L2	L2	L3	L3	L1	L3	C1	L3	L2	L5	L5	F5	F4	F6	F3
7	F6	F6	F5	F3	F2		L4	L3	L3	L3	L2	L3	L3	L3	L2	C1	L2	L3	L5	L5	F3	F1	F5	F2
8	F2	F2		F1	F3	L3	L3	L2	L2	L4	L5	L4	L3	L2	L2	L2	L3	L2	L6	L6	F4	F7	F7	F7
9	F7	F5	F6	F6	F2	C2	L3	L3	L2	L3	L1	L2	L4	L2	L3	L4	L4	L4	L5	L6	F5	F3	F5	F7
10	F5	F7	F5	F3	F2	L4	L5	L4	L5	L3	L2	L3	C2	L3	L2	L1	L2	L3	L2	F3	F4	F4	F3	F6
11	F7	F4	F4	F6	F5	L5	C3	L3	L2	L2	L3	L2	L2	L1	L1	C2	C2	L3	L4	L3	F3	F5	F4	F3
12	F4	F2	F5	F1	F2	L3	L4	L3	L2	L3	L3	L4	L4	L2	L2	C3	C2	L2	L3	L5	F5	F5	F6	F4
13	F5	F6	F7	F6	F3	L2		L3	L3	CL22	CL22	CL11	C4	L3	L2	L3	L3	L4	L2	L5	F5	F3	F2	F3
14	F6	F8	F6	F6	F6	L2	L5	L5	L5	L4	L5	L2	L2	L2	L1	C1	L2	L2	L4	L3	F4	F4	F8	F5
15	F3	F5	F5	F2	F4	L4	L5	L4	L4	L4	L3	L2	L2	C1	C2	L3	L4	L2	L6	L6	F6	F6	F5	F5
16	F4	F4	F5	F3	F2	L2	L2	L5	L4	L3	L2		L4	C1	C1	C1	C2	L3	L5	L6	F4	F5	F6	F3
17	F3	F7	F6	F5	F2	C3	L3	L3	L2	L3	L2	L2	C2	L2	L2	L2	L3	L2	L4	L3	F3	F3	F2	F1
18	F1	F1	F2		F1	L2	L4	L3	L2	L2	L2	L2	L2	L2	L2	L1	L2	L3	L3	L3	F2	F2	F1	
19	F4	F2	F2	F2	F3	L6	L5	L4	L2	L2	L2	L2	L1	L1	C1	C1	C2	C2	L7	L4	F7	F8	F4	
20		F2		F2	F2	L2	L3	L3	L2	L2	L2	L2	L2	L3	HL12	L3	C1	C2	L4	L7	F6	F6	F6	F2
21	F4	F5	F2	F2	F1	L3	L3	L3	L2	L3	L3	L3	L2	L3	L3	L3	L2	L3	L2	L2	F3	F2	F2	
22	F1	F3	F2	F2		L3	L4	L4	L5	L4	L4	L2	L3	L3	L2	C2	C2	L3	L3	L4	F5	F4	F4	F3
23	F4	F3	F4	F3	F4	L2	C1	L3	L2	L1	L3	L3	L2	CL12	L2		H1	L3	L4	L4	F4	F3	F2	F5
24	F4	F2	F6	F2	F6	L3	L3	L3	L2	L3	L2	L2	L2	C2	L2	C1	C1	L2	L2	L3	F3	F2	F3	F3
25	F4	F4	F2	F2	F1	L4	L3	L3	L2	L1			L2	L2	H1		L2	L3	L3	L3	F2	F3	F1	F2
26	F2	F1				C2	C2	L3	L2	L3	L2	L2	L2	L2		H1	L2	L3	L5	L5	F2	F3	F6	F6
27	F6	F5	F7	F5	F3	L3	L5	L3	L2	L3	L3	L3	L3	L3	L4	L3	L3	L3	L3	L2	F4	F2	F3	F2
28	F2	F2	F2	F5	F5	L4	L4	L3	L3	H1		L2	L3	L3	C2	L2	L2	L4	L4	L5	F4	F4	F5	F4
29	F4	F6	F6	F4	F3	L4	L4	L3	L3	L4	L4	L2	L2	L3	L2	L2	L3	CL22	L4	L3	F3	F5	F4	F5
30	F4	F3	F2	F1	F1		L4	L2	L3	L2	L2	L2		L2	L2	L2	L3	L4	L2				F2	F4
31	F5	F3	F2	F2	F2	L3	C3	C2	C2	L2	L3	L2	L3	L2	L3	L3	L5	L3	L5	L5	F4	F4	F5	F3
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

JUL.2019 TYPES OF Es
 NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

JUL.2019 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 30	X 30	A	X 27	39																X 79	A	48	56	
2	X 39	X 38	X 38	X 32	A														X 59		A	A	X 54	X 44	
3	X 44	X 43	X 39	X 38	X 38		A													O 63	X 63	X 52	X 44	A	
4	O 35	X 32	X 34	X 34	X 33																A	A	X 40	X 40	
5	O 33	X 34	X 32	X 34	X 33																	X 66	X 62	X 56	X 45
6	X 38	X 38	44	44	X 37	38																X 77	X 52	X 37	X 37
7	X 37	41	39	39	38	38																X 56	X 58	X 46	X 44
8	48	58	X 48	51	X 47															X 53	X 60	X 58	X 57	X 54	
9	51	A	A	X 38	A	38																X 51	X 54	61	A
10	50	X 47	50	42	38	X 35																X 54	X 37		A
11	X 37	A	A	X 38	39	39	X 36															X 72	X 50	X 34	X 32
12	X 33	X 31	X 29	X 30	X 29	X 29																A	A	A	A
13	A		A	A	A	38																A	42	45	45
14	A	A	X 32	X 30	34	34																X 71	X 64	X 43	X 40
15	48	X 34	41	38	X 33	X 33																X 69	X 53	60	60
16	A	A	40	40	A	42																X 84	X 78	X 41	X 31
17	X 31	X 31	X 38	X 32	X 36																	X 58	X 60	X 55	X 54
18	X 42	X 38	X 38	X 34	X 30																	X 52	X 50	X 43	X 45
19	40	X 33	40	40	36	37		X 55														X 80	39	A	X 36
20	40	42	33	39	35	35																X 59	X 62	X 46	X 38
21	A	A	A	A	A	33																X 57	X 49	41	41
22	X 36	41	X 30	X 29	X 29	35																X 61	X 44	X 42	X 55
23	50	A	47	46	X 32					65												X 63	X 50	X 42	X 44
24	43	X 30	X 33	X 30	X 36																	X 52	X 45	X 44	X 45
25	48	44	44	40	40																	X 62	X 55	X 44	X 43
26	X 41	X 41	X 33	X 33	X 29	31																X 76	X 40	X 36	X 36
27	X 36	X 31	X 31	X 31	X 30																	X 56	X 42	X 34	X 33
28	X 33	34	34	35	X 29			X 44														X 60	A	X 45	X 44
29	39	X 33	X 38	X 30	X 30																	X 52	X 48	X 48	X 41
30	40	X 32	X 34	39	36	34																X 60	X 49	X 38	X 37
31	X 37	A	X 32	36	37	40																X 62	X 59	X 41	X 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	27	22	26	29	26	18	1	1	1	1										1	2	27	26	28	27
MED	X 39	X 36	X 38	X 36	X 34	36	X 36	X 44	X 55	65										X 59	X 58	X 61	X 51	X 44	X 43
U Q	44	41	40	40	38	38																X 71	X 58	X 48	X 45
L Q	X 36	X 32	X 32	X 32	X 30	34																X 56	X 45	X 41	X 37

JUL.2019 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

JUL.2019 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	24	24	A	21	F	23	31	37	53	67	57	48	51	58	71	66	49	51	59	86	72	A	F	F
2	32	32	32	26	A	A	A	48	56	56	52	56	54	53	70	60	53	A	53	65	A	A	47	38
3	37	37	33	32	32	32	A	46	59	47	48	50	48	46	A	49	49	50	56	57	57	46	38	A
4	29	26	R	28	27	26	31	A	50	47	A	A	58	55	52	A	A	A	52	R	A	A	34	34
5	27	27	26	28	27	22	46	41	R	42	46	R	58	51	A	48	45	52	62	62	59	60	56	39
6	32	32	F	F	31	F	39	42	50	46	A	A	48	45	52	52	49	48	52	61	71	46	31	31
7	31	F	F	F	F	F	37	42	48	47	A	47	55	A	A	A	48	49	54	49	50	52	40	38
8	F	F	42	F	41	31	39	43	46	44	51	48	A	A	A	55	55	50	48	46	54	52	51	48
9	F	A	A	32	A	F	42	A	43	52	63	A	A	48	A	A	64	72	66	44	45	48	F	A
10	F	41	F	F	F	29	34	A	A	A	A	A	A	A	A	A	52	A	62	64	48	31	A	A
11	31	A	A	32	F	F	30	38	40	A	A	A	A	A	46	A	43	43	50	54	66	44	28	26
12	27	25	23	24	23	23	32	A	A	46	A	A	A	44	48	48	52	55	60	69	A	A	A	A
13	A	A	A	A	A	F	A	A	39	A	42	A	A	A	A	44	A	59	A	59	A	F	F	F
14	A	A	26	23	F	F	37	46	43	A	A	48	48	48	45	A	A	42	52	65	58	36	30	
15	F	28	F	F	27	27	29	48	61	A	46	43	45	55	56	51	56	57	56	61	63	47	F	F
16	A	A	F	F	A	F	37	51	A	51	54	44	47	52	53	53	47	50	60	64	77	72	35	25
17	25	25	F	26	F	A	30	45	59	A	A	44	A	A	A	48	A	54	47	45	52	F	48	48
18	36	32	32	28	24	26	A	42	56	47	46	52	50	A	48	A	52	53	54	48	46	44	37	F
19	F	27	F	F	F	F	32	A	49	49	51	55	61	48	46	48	49	48	52	57	74	F	A	30
20	F	F	F	F	F	F	37	42	44	42	44	49	59	50	49	49	43	46	48	46	52	56	40	32
21	A	A	A	A	A	F	A	48	48	48	47	46	52	61	68	68	59	48	45	46	51	43	F	F
22	30	F	24	23	23	F	36	35	48	59	56	50	A	A	A	52	47	48	48	53	55	37	36	F
23	F	A	F	F	25	26	34	40	56	F	50	58	59	64	57	68	66	63	52	52	57	44	36	F
24	F	A	24	F	24	F	36	A	46	A	46	44	51	52	62	45	41	48	61	53	46	39	F	39
25	F	F	F	F	F	26	36	37	44	51	45	49	50	49	52	61	55	48	45	49	56	49	38	37
26	35	35	27	27	23	F	32	49	45	42	R	51	50	53	46	44	43	43	43	49	59	70	33	30
27	30	25	25	25	24	22	34	50	43	A	A	47	51	47	56	68	58	A	A	46	50	36	28	27
28	27	F	F	F	23	A	37	38	48	58	48	44	A	A	A	59	52	45	A	46	54	A	39	F
29	F	27	F	24	24	25	34	43	52	A	A	A	A	52	55	50	51	49	44	42	46	42	42	34
30	F	26	28	F	F	F	A	A	A	A	A	A	A	A	A	A	67	74	75	60	54	43	32	31
31	31	A	26	F	F	F	36	44	45	48	47	A	A	A	A	67	68	56	49	48	55	53	34	27
	00	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	16	14	15	15	13	25	23	27	20	20	21	17	20	20	24	27	26	28	31	27	23	22	19
MED	30	27	26	26	24	26	36	43	48	48	49	48	51	50	52	52	52	50	52	53	55	46	36	32
U Q	32	32	32	28	27	28	37	48	53	52	53	50	56	54	56	60	56	56	60	60	65	52	40	38
L Q	27	26	25	24	23	23	32	40	44	46	46	45	49	48	48	48	48	48	48	46	50	42	34	30

JUL.2019 foF2 (0.1MHz)

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IONOSPHERIC DATA STATION Yamagawa

JUL.2019 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								A	U L	384 408	436 436		A	A	A	A	A	A	A					
2						A	A	U L	380 392	412 428	428	A	A	440 428		A	A	A		A				
3								U L	376 372	420 428	448		A	436	A	420 400	376 344	U L						
4								A	A	A	A	A	A	436	A	A	A	A	352					
5								U L	412 372	408 424	440	U L	A	428	A	404	A	A	A	A				
6								U L	436	A	A	A	U L	436 424	428 428	408 392	U L	A	A					
7								U L	368 372	408	A	A	U L	424	A	A	408 380	352	L					
8								A	408 432	432		A	A	A	A	A	A	A	A					
9							A	A	U L	448 408	424	A	A	A	A	A	A	A	L					
10								A	A	A	A	A	A	A	A	A	A	A	A				A	
11								U L	348 368	A	A	A	A	A	A	A	380 364	320	L					
12								A	A	400	A	A	A	U L	412 428	408 396	U L	396	A					
13		A					A	A	U L	356 408	A	A	A	A	A	412	A	360	A					
14							A	U L	360 380	A	A	428	A	432 428	416	A	A	U L	280					
15								A	388	A	412 412	428 424	424 404	404	400		A	A	L					
16							U L	L	A	A	U L	424 416	436 436	428 408	396 364	U L	340 288	U L	U L					
17					A		A	A	380	A	A	412	A	A	A	412	A	A	L	A				
18							A	U L	364 412	416	U L	A	U L	A	A	A	A	A	L					
19								A	412 424	424	A	A	A	A	416 408	392 372	340	A						
20								U L	380 388	420 408	424 440	432 424	404 388	376 348	U L	U L	U L	L						
21							A	A	A	A	U L	416 432	440 424	420 412	400 384	368	U L							
22							U L		A	A	A	440	A	A	A	A	396 372	372	U L					
23								348 380	412 428	436	A	436 428	400 404	376 348	U L									
24								A	U L	412 420	416 420	428 432	U L	A		A	A							
25								352 384	400 412	428 416	420 424	408	A	A	A	A	A	A	L					
26								U L	360 400	432 432	432 424	412 396	352 340	U L	U L	U L	L							
27								L	A	A	U L	432	A	U L	432 424	404	A	A	A					
28					A				396	A	420 408	A	A	A	A	A	396	A	A					
29									A	A	A	A	A	A	A	408 396	380	U L	A					
30								A	A	A	A	A	A	A	A	A	A	360	L					
31								L	392 408	424	A	A	A	A	A	A	A	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							2	12	18	15	19	17	10	17	14	17	15	16	12	2				
MED							U L	U L	384 408	424 432	434 432	426 408	396 376	346 284										
U Q							U L	U L	378 392	412 428	436 436	436 428	412 400	380 352										
L Q							U L	U L	350 372	408 416	416 424	424 424	404 396	364 340										

JUL.2019 foF1 (0.01MHz)

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IONOSPHERIC DATA STATION Yamagawa

JUL.2019 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	A	A	A	A	A	A	360	U R	A	A	A	A	A	B				
2						B	B	A	A	A	A	A	A	A	A	A	A	A		B				
3						B		A	A	A	U R	A	A	R	A		316	A	A	A				
4						B	B	A	A	A	A	A	A	A	A	A	A	A	A	B				
5						B	A	A	A	A	A	A	A	A	A	U A	U A	A	A	A	B			
6						B	B	A	A	A	A	A	A	U R	A	A	A	A	A	B				
7							B	A	A	A	A	A	A	A	A	A	A	U R	U A	B				
8						B	B	U A	A	A	A	A	A	A	A	A	A	A	276	220				
9						B	A	A	A	A	A	A	A	A	A	A	A	U R	A	B				
10							A	A	A	A	A	A	A	A	A	A	A	A	A	B			B	
11								A	A	A	A	A	A	A	A	A	A	A	A	B				
12							A	A	A	A	A	A	A	A	A		320	A	A	A	B			
13		A				B	A	A	A	U A	A	A	A	A	A	A	A	A	A	B				
14						B	B	A	A	A	A	A	A	A	A	A	A	A	A	B				
15							A	A	292	A	A	A	A	A	A	A	U A	A	A	B				
16							A	A	A	A	A	A	A	U R	U R	R	A	A	A	B				
17						B	A	A	A	A	U A	A	A	A	A	A	A	A	A	B				
18						B	B	A	A	A	A	A	A	A	A	A	A	A	A	B				
19						B	B	A		A	A	A	A	U R	U A	A	A	A	A	B				
20						B	B	A	A	A	A	A	A	A	A	A	U R	U R	U R	B				
21						B	A	A	A	A	A	A	A	A	A	A	U A	A	A	B				
22						B	U R	A	A	A	A	A	A	A	A	A	A	A	A	B				
23						B	A	A	U R	288	336	324	A	A	A	U A	A	R	A	B				
24						B	U R	A	A	A	U A	A	A	A	U R	A	A	A	A	B				
25						B	R	U A	A	A	A	U A	A	A	A	A	A	A	A	B				
26						B	A	A	A	R	324	344	U R	U A	U A	U A	U A	U R	U A	B				
27						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
28						B	A		A	A	A	A	A	A	A	A	U A	A	A	B				
29						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
30						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
31						B	U R	U A	A	A	A	A	A	A	A	A	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							4	4	4	2	4	3	2	2	5	7	6	4	4					
MED							U R	A	U		U A	U A	U	U R	U A	U A	U R	U R						
U Q							192	238	290	326	326	344	376	350	340	320	302	274	236					
L Q							R	198	246	294	U	U A			U R	U	U R	U R						
							188	234	284		324	336			U	U A	U R	U A						

JUL.2019 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

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JUL.2019 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	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
2	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
3	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
4	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
5	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
6	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
7	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
8	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
9	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
10	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
11	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
12	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
13	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
14	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
15	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
16	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
17	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
18	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
19	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
20	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
21	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
22	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
23	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
24	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
25	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
26	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
27	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
28	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
29	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
30	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
31	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31		
MED	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
UQ	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A
LQ	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A	J	A

JUL.2019 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

JUL.2019 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	A A	E B	E B	E B	18	28	29	33	39	36	41	42	41	41	41	45	34	34	51	A A	20	28	
2	21	21	21	20	A A	A A	A A	24	34	34	38	47	42	40	38	49	45	A A	37	21	A A	A A	21	18	
3	E B	22	E B	E B	E B	E B	A A	28	32	34	35	38	43	G A	A A	35	35	30	28	24	23	23	22	A A	
4	23	22	23	24	24	23	22	A A	38	39	A A	A A	52	35	43	A A	A A	A A	26	29	A A	A A	24	E B	
5	20	E B	24	22	E B	19	20	31	31	35	35	40	56	38	A A	39	40	48	50	45	34	17	19	17	
6	E B	E B	E B	E B	E B	E B	19	27	34	41	A A	A A	39	38	G	38	36	31	37	24	E B	21	22	E B	
7	17	E B	20	16	E B	E B	18	23	27	38	A A	44	36	A A	A A	A A	A A	G	G	19	E B	E B	E B	E B	
8	E B	E B	16	16	E B	E B	20	28	35	35	35	39	A A	A A	A A	47	46	43	32	32	27	21	21	E B	
9	19	A A	A A	A A	A A	E B	A A	A A	37	34	39	88	107	40	A A	A A	A A	G	23	27	17	20	20	A A	
10	E B	16	E B	E B	E B	E B	24	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	
11	E B	A A	A A	A A	E B	E B	21	30	33	54	52	66	64	52	39	88	30	29	21	18	20	20	E B	19	
12	E B	E B	E B	E B	E B	E B	25	A A	A A	A A	A A	A A	A A	36	34	34	35	33	51	42	A A	A A	A A	A A	
13	A A	A A	A A	A A	A A	A A	A A	A A	30	39	36	63	62	119	114	35	A A	A A	A A	A A	A A	77	18	18	18
14	A A	A A	A A	E B	E B	E B	26	23	32	A A	A A	A A	A A	35	35	40	A A	A A	A A	E B	E B	16	16	17	19
15	E B	16	18	20	21	22	E B	24	29	33	A A	35	36	38	37	37	39	34	37	34	18	20	23	32	21
16	A A	A A	A A	20	17	A A	25	25	A A	102	39	36	36	37	36	G	G	30	29	22	20	E B	E B	E B	
17	E B	E B	15	18	E B	E B	20	36	30	52	44	37	52	53	75	37	A A	64	36	27	32	E B	22	18	23
18	19	E B	E B	E B	E B	E B	55	30	34	34	38	42	38	130	43	A A	84	43	36	22	23	19	E B	E B	22
19	18	E B	E B	E B	E B	E B	22	A A	114	40	36	34	43	51	41	G	34	32	29	27	22	E B	A A	E B	
20	E B	E B	E B	E B	E B	E B	23	26	32	37	38	37	38	38	37	34	G	G	G	20	18	20	22	24	
21	A A	A A	A A	A A	A A	A A	40	32	43	40	34	34	35	39	36	35	38	32	24	18	16	E B	E B	E B	
22	E B	E B	E B	E B	E B	E B	G	26	38	37	53	38	59	94	66	37	33	30	25	28	22	22	18	18	
23	20	A A	54	19	19	18	20	22	G	37	35	37	42	36	35	G	G	29	G	E B	E B	E B	E B	19	
24	16	A A	E B	E B	E B	17	17	G A	A A	27	57	37	38	38	36	G	39	34	36	35	31	E B	16	20	16
25	E B	E B	15	16	E B	E B	G	G	G	32	33	40	37	38	36	36	41	41	38	20	20	20	16	16	
26	E B	E B	E B	E B	E B	E B	22	26	27	G	38	37	G	38	37	35	32	G	G	E B	19	20	E B	E B	16
27	E B	18	E B	E B	E B	E B	20	18	22	A A	A A	37	42	36	36	36	A A	A A	A A	23	20	E B	17	17	
28	E B	E B	16	17	E B	A A	20	30	30	38	38	38	A A	A A	A A	50	32	39	A A	34	22	A A	29	17	
29	E B	21	E B	E B	E B	E B	20	25	39	A A	A A	A A	A A	A A	A A	33	32	27	29	20	20	19	E B	E B	16
30	16	18	23	E B	E B	E B	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	44	28	24	25	23	16	E B	E B	16
31	E B	A A	A A	E B	E B	E B	G	27	31	34	37	A A	A A	A A	A A	43	40	45	30	19	16	16	E B	E B	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	31
MED	E B	16	18	17	E B	E B	E B	22	28	33	38	38	40	50	39	41	39	38	33	28	23	20	20	18	17
U Q	20	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	23	22	22	22	
L Q	E B	E B	E B	E B	E B	E B	20	25	30	34	35	37	38	36	36	35	32	29	23	19	E B	E B	E B	E B	16

JUL.2019 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

JUL.2019 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

JUL.2019 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

JUL. 2019 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		311	313	A	363	F	343	374	363	344	340	304	312	290	291	321	331	266	291	303	345	361	A	F	F	
2		292	315	352	293	A	A	A	321	339	346	297	309	316	287	344	319	336	A	306	314	A	A	343	310	
3		319	304	308	316	316	322	A	327	381	315	345	284	298	280	A	296	287	305	352	362	361	326	313	A	
4		317	330	317	344	311	368	389	A	345	321	A	A	340	333	307	A	A	A	315	350	R	A	A	301	305
5		307	295	340	339	321	351	389	281	303	295	375	368	A	320	A	250	303	333	348	340	297	332	356	308	
6		304	305	F	F	313	F	351	343	293	314	A	A	273	264	320	318	306	297	321	356	363	345	324	325	
7		323	F	F	F	F	F	381	295	333	332	A	285	330	A	A	A	296	313	349	336	315	340	333	302	
8		F	F	294	F	370	376	363	330	337	326	333	287	A	A	A	316	328	336	330	306	317	321	327	320	
9		F	A	A	328	A	F	336	A	302	329	379	A	A	292	A	A	321	361	376	326	321	289	F	A	
10		F	301	F	F	F	338	367	A	A	A	A	A	A	A	A	A	301	A	331	354	275	310	A	A	
11		310	A	A	311	F	F	334	303	294	A	A	A	A	A	278	A	263	295	327	312	363	318	330	300	
12		288	282	283	283	314	364	344	A	A	323	A	A	A	272	303	295	306	306	309	357	A	A	A	A	
13		A	A	A	A	A	F	A	A	387	A	263	A	A	A	A	268	A	340	A	341	A	F	F	F	
14		A	A	344	329	F	F	311	343	321	A	A	311	A	319	316	304	A	A	302	309	354	372	332	358	
15		F	316	F	F	305	317	373	333	386	A	278	285	263	309	334	312	317	330	319	312	343	343	F	F	
16		A	A	F	F	A	F	332	381	A	368	349	306	289	321	317	347	295	296	309	306	337	357	375	359	
17		343	311	F	292	F	A	281	345	382	A	A	306	A	A	A	315	A	343	358	319	323	F	319	397	
18		311	315	312	328	332	321	A	299	387	384	254	314	325	A	283	A	313	334	361	354	336	343	331	F	
19		F	339	F	F	F	F	374	A	334	317	322	317	341	295	270	293	323	316	340	335	381	F	A	320	
20		F	F	F	F	F	F	358	350	340	335	285	300	365	311	302	322	289	329	360	328	336	359	383	330	
21		A	A	A	A	A	F	A	354	344	357	295	261	296	319	326	350	351	337	308	340	346	350	F	F	
22		325	F	298	330	317	F	346	355	348	382	358	284	A	A	A	317	310	311	312	351	336	312	300	F	
23		F	A	F	F	311	320	346	282	343	F	308	327	334	342	322	300	345	334	314	343	355	349	353	F	
24		F	A	338	F	307	F	376	A	262	A	307	280	260	325	360	319	336	310	377	325	364	306	F	306	
25		F	F	F	F	F	F	316	372	293	360	322	289	314	336	266	299	334	357	337	308	315	342	363	331	322
26		331	354	285	326	363	F	349	353	385	326	286	R	323	347	325	342	279	292	295	303	338	359	311	323	323
27		328	346	293	306	331	307	342	382	412	A	A	300	307	270	308	353	336	A	A	329	359	354	304	309	
28		309	F	F	F	362	A	375	371	315	382	355	324	A	A	A	354	360	301	A	315	331	A	340	F	
29		F	336	F	343	300	348	334	353	333	A	A	A	A	301	324	305	346	308	345	334	314	309	354	369	
30		F	313	325	F	F	F	A	A	A	A	A	A	A	A	A	330	A	313	335	346	359	312	356	325	329
31		334	A	283	F	F	F	386	372	364	334	317	A	A	A	A	326	343	329	336	292	337	376	375	313	
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT		16	16	14	15	15	13	25	23	27	20	20	21	17	20	20	24	27	26	28	31	27	23	22	19	
MED		314	314	310	328	316	338	358	343	343	330	308	306	316	305	318	316	313	322	328	335	337	343	331	320	
U Q		326	333	338	339	332	358	374	355	381	352	347	316	338	320	328	328	336	335	348	350	359	356	353	330	
L Q		308	304	293	306	311	318	339	303	321	322	288	285	290	284	302	298	296	305	309	315	321	312	323	308	

JUL. 2019 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

JUL.2019 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								A	U L				A	A	A	A	A	A	A					
2						A	A	U L	402	405	426	418	A	A			A	A	A					
3								U L	400	426	379	406	399	A		A	406	404	391	U L				
4								A	A	A	A	A	A		414	A	A	A	A	U L				
5								U L	393	420	424	419	429	A		A	361	A	A	A	A			
6								U L	373	A	A	A	U L	U L	431	443	449	U L	A	A				
7								U L	406	423	427	A	A	U L	A	A		397	388	356	L			
8								A		426	411	418	A	A	A	A	A	A	A	A				
9							A	A	U L	397	414	401	A	A	A	A	A	A		355	L			
10								A	A	A	A	A	A	A	A	A	A	A	A	A				A
11								U L	390	385	A	A	A	A	A	A		407	382	406	L			
12								A	A		A	A	A	U L		U L	U L	U L	A					
13		A					A	A	U L	471	A	U L	A	A	A	A		A	A	A				
14							A	U L	394	407	A	A	435	A	431	435	415	A	A	U L				
15								A		414	A	411	430	425	431	433	384	409	A	A	U L			
16							U L	L	363	A	A	U L	434	419	406	415	421	U L	U L	U L	U L			
17						A		A		382	A	A	451	A	A	A		398	A	A	L	A		
18							A	U L	421	A	U L	419	406	A	U L	A	A	A	A	A	L			
19								A			409	388	A	A	A		454	402	420	398	383	A		
20								U L	403	427	434	401	406	421	440	454	465	410	395	366	L			
21							A	A	A	A	U L	U L	435	439	420	436	441	448	399	389	342			
22							U L		394		A	A	A	404	A	A	A		423	406	352			
23								380	406	409	416	406	A		359	444	476	415	387	384				
24								A	U L	406	A	U L	424	424	430	438	406	A	A	A				
25								408	468	451	452	388	451	457	406	420		A	A	A	L			
26								U L	387		445	436	438	424	414	447	426	409	445	380	L			
27								L		A	A	U L	430	A	U L	456	445	467	A	A	A			
28						A				423	A	429	489	A	A	A	A		401	A	A			
29								423		A	A	A	A	A		A		461	417	U L	A			
30							A	A	A	A	A	A	A	A	A	A	A	A	A	407	L			
31								L				A	A	A	A	A	A	A	A	A	L			
									373	396	439													
CNT								2	12	18	15	19	17	10	17	14	17	15	16	12	2			
MED								U L	378	397	406	414	416	429	426	431	434	420	409	390	376	356		
U Q								407	423	427	435	436	447	441	445	454	417	402	384					
L Q								U L	388	397	403	401	406	421	414	415	402	401	386	361				

JUL.2019 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

JUL.2019 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								236	292	268	314	356	402	368	292	272	E A 474	E A 378	E A 316						
2						A	A	312	268	276	354	E A 346	318	394	264	302	E A 284	E A A		256					
3								318	246	360	312	394	386	446		A	394	396	342	268					
4								A	E A 268	E A 304	A	A	E A 304	290	E A 350	A	A	A	A	300					
5								350	R 360	368	236	272		A	326	A	522	344	286	E A 252	E A 252				
6									E A 414	E A 334	A	A	444	446	332	318	354	360	308	234					
7								380	292	332	A	E A 434	312		A	A	A	370	336	266	266				
8									294	352	320	412		A	A	E A 350	294	E A 294	E A 272						
9						E A 256	A	A	398	318	230		A	A	392	A	A	306	246	238					
10								A	A	A	A	A	A	A	A	A	A	340	A	268				A	
11								360	376		A	A	A	A	A	A	414	460	400	298	288				
12								A	A	338	A	A	A	456	406	402	328	320	E A 324						
13		A						A	A	246	A	504	A	A	A	A	496	A	280	A					
14								E A 304	282	360	A	A	372	A	362	362	384	A	A	372	290				
15								292	216		A	572	408	408	342	312	324	324	280	278	248				
16								332	256		256	270	398	418	338	338	300	384	374	304	288				
17						A		E A 288	E A 242	A	A	A	352	A	A	A	350	A	266	266	E A 274				
18								A	374	228	252	516	334	334	A	E A 392	A	348	278	258					
19									A		322	334	334	E A 294	384	446	390	332	332	270	254				
20								300	300	336	444	402	258	332	374	340	392	310	276	284					
21								A	E A 274	E A 288	280	400	486	392	322	290	258	256	308	336					
22								312		286	236	302	406	A	A	A	328	352	326	326					
23								396	264	306	358	296	294	280	306	304	270	268	284						
24								A	378	A	370	450	450	322	252	322		330							
25								384	294	306	428	350	328	446	360	290	252	E A 290	E A 328	E A 280					
26								262		348	410	350	288	356	370	456	410	376	324	260					
27								260		A	A	390	364	462	326	268	268	A	A						
28						A			318	240	308	458	A	A	A	A	272	270	E A 346	A					
29								306	272		A	A	A	A	342	314	336	266	322	266					
30								A	A	A	A	A	A	A	A	A	A	294	262	238					
31									248	280	304	324	A	A	A	A	274	262	E A 286	E A 284	308				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT							4	19	24	21	20	21	17	20	20	24	26	26	26	14					
MED							308	300	290	306	344	381	334	359	328	324	328	308	278	266					
U Q							322	360	339	337	419	410	405	420	372	387	370	342	316	288					
L Q							E A 280	262	266	272	310	348	299	329	309	295	270	280	266	254					

JUL.2019 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

JUL. 2019 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B E B	E B E B	A E B E B	E B E B	E B E B	E B E B	E B E B	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	222	220	A E A E A	A E A E A
2	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	A	E A E A	E A E A	E A E A	E A E A	A	A	210	200	A	A	E A E A	E A E A	A	A	A	E A E A
3	E B E A	E B E A	E B E A	E B E A	E B E A	E B E A	E B E A	A	E B E A	E B E A	E B E A	E B E A	A	A	A	184	184	208	208	208	208	212	E A E A	E A E A
4	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	A	E A E A	E A E A	E A E A	E A E A	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
5	E A E B	E A E B	E A E B	E A E B	E A E B	E A E B	E A E B	A	E A E B	E A E B	E A E B	E A E B	A	A	A	A	A	A	A	A	E A E A	E A E A	E A E A	E A E A
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	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
7	E A E B	E A E B	E A E B	E A E B	E A E B	E A E B	E A E B	A	E A E B	E A E B	E A E B	E A E B	A	A	A	A	A	A	A	A	E B E B	E B E B	E B E B	E B E B
8	E B E A	E B E A	E B E A	E B E A	E B E A	E B E A	E B E A	A	E B E A	E B E A	E B E A	E B E A	A	A	A	A	A	A	A	E A E A	E A E A	E A E A	E A E A	
9	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	A	E A E A	E A E A	E A E A	E A E A	A	A	A	A	A	A	A	A	E A E A	E A E A	E A E A	E A E A
10	E B E A	E B E A	E B E A	E B E A	E B E A	E B E A	E B E A	A	E B E A	E B E A	E B E A	E B E A	A	A	A	A	A	A	A	A	E A E A	E A E A	E A E A	E A E A
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	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	202	200	198	216
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	E B E B	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	A	A	A	A
13	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	A	E A E A	E A E A	E A E A	E A E A	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
14	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	A	E A E A	E A E A	E A E A	E A E A	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
15	E B E A	E B E A	E B E A	E B E A	E B E A	E B E A	E B E A	A	E B E A	E B E A	E B E A	E B E A	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
16	E B E A	E B E A	E B E A	E B E A	E B E A	E B E A	E B E A	A	E B E A	E B E A	E B E A	E B E A	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
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	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
18	E A E B	E A E B	E A E B	E A E B	E A E B	E A E B	E A E B	A	E A E B	E A E B	E A E B	E A E B	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
19	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	E B E B	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
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	E B E B	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
21	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	A	E A E A	E A E A	E A E A	E A E A	A	A	A	A	A	A	A	A	A	A	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	E B E B	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
23	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	A	E A E A	E A E A	E A E A	E A E A	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
24	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	E A E A	A	E A E A	E A E A	E A E A	E A E A	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
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	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	A	A	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	E B E B	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	A	A	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	E B E B	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
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	E B E B	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	A	A	E A E A	E A E A
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 E B	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	A	A	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	E B E B	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	A	A	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	E B E B	A	E B E B	E B E B	E B E B	E B E B	A	A	A	A	A	A	A	A	A	A	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	27	22	26	29	26	28	23	19	20	15	19	17	10	17	14	17	16	16	18	26	27	26	28	27
MED	E 254	E 268	E 265	E 262	E 251	E 239	207	202	201	200	190	195	194	192	190	189	195	195	202	214	213	205	U 210	E 238
U Q	E 264	E 282	E 304	E 284	E 270	E 259	220	206	210	208	206	201	202	201	198	206	203	204	210	222	E 228	E 232	E 261	E 264
L Q	E 236	E 260	E 254	E 234	E 238	E 227	200	194	192	194	186	190	190	188	186	185	189	191	196	204	204	200	213	224

JUL. 2019 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

JUL.2019 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1						B	A	A	A	A	A	A	112	112	A	112	112	A	A	B					
2						B	B	A	A	A	A	A	A	A	A	A	A	A		B					
3						B		A	A	A		A	A		A		A		A						
4						B	B	A	A	A	A	A	A	A	A	A	A	A	A	B					
5						B	A					A		A	A			A	A	B					
6						B	B	A	A	A	A	A	A	A		114	112		A	A	B				
7							B	A	A		A	A	A	A	A	A	A		112	110	B				
8						B	B		A	A		A	A	A	A	A	A	A	B						
9						B	A	A	A	A	A	A	A	A	A	A	A		112	A	B				
10							A	A	A	A	A	A	A	A	A	A	A	A	A	B			B		
11								112	A	A	A	A	A	A	A	A	A	A	A	B					
12							A	A	A	A	A	A	A	A			112	112	A	A	B				
13		A				B	A	A	A					A		A	A	A	A	B					
14						B	B	A	A	A	A	A	A	A	A	A	A	A	A	B					
15							A	A		A	A	A	A		114	112	112	112	110	A	B				
16							A	A	A	A	A	A	A		110	110		110	A	B					
17						B	A	A		A			A		A		A	A	A	B					
18						B	B	A	A	A	A	A	A	A	A	A	A	A	A	B					
19						B	B	A		A	A	A	A			112	112	112	112	A	B				
20						B	B													B					
21							112	112	112	112	110	110	108	108	108	108	108	108	114	A	B				
22						B	A	A	A	A	A	A	A	A	A		114	114			B				
23						B		A						A	A	A			112	112	112				
24						B		A	A	A							112	108	108	108	B				
25						B				A	A										B				
26						B															B				
27							126	126		168	108	108	108	116	118	114	114	114	114	A	B				
28						B	A		A	A				A	A	A			A	A	B				
29						B	A	A	A	A	A	A	A	A	A	A	118		A	A	B				
30						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B					
31						B						A	A	A	A	A	A	A	A	B					
							118	118	118	118	118														
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT							5	7	7	7	10	8	8	7	8	13	13	10	5						
MED							114	112	112	112	112	112	112	112	111	112	112	112	112						
U Q							122	118	116	118	116	114	114	116	114	113	113	112	114						
L Q							111	112	110	112	112	110	111	112	110	111	110	110	109						

JUL.2019 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

JUL.2019 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

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	78	76	84	96	96	114	100	100	100	100	100	100	148	148	96	112	112	98	98	98	98	98	98	98
2	98	94	92	92	90	90	90	90	88	88	88	86	86	88	90	90	90	90	90	84	82	82	82	82
3	90	84	84	88	92	90	88	88	88	94	136	92	92	G	88	116	88	98	84	84	84	82	84	96
4	96	96	94	94	92	90	94	94	94	94	94	94	92	92	98	98	98	98	96	88	88	88	86	84
5	84	B	92	98	B	98	100	118	118	118	114	104	112	98	98	162	148	92	92	92	92	90	88	84
6	84	84	84	84	84	84	104	104	98	98	92	92	94	94	G	94	116	96	96	96	96	84	84	84
7	82	92	92	92	96	96	96	96	96	110	100	100	98	96	92	92	92	G	G	100	100	100	100	100
8	100	100	100	98	98	B	112	118	104	100	114	100	88	88	88	88	86	84	84	82	82	82	82	82
9	92	92	92	92	90	90	102	100	98	96	94	92	92	92	92	90	90	G	86	84	86	100	100	96
10	96	94	94	94	94	92	102	98	98	98	100	100	92	92	96	96	96	96	96	94	94	92	90	92
11	92	94	92	92	90	88	100	110	102	98	96	94	92	92	98	92	92	96	96	96	94	94	114	92
12	92	112	104	104	104	104	96	96	96	96	96	98	98	98	98	154	126	106	98	98	96	96	96	96
13	92	92	92	92	92	92	88	88	88	136	126	120	120	100	112	102	98	102	94	86	84	84	84	104
14	98	90	90	90	82	82	92	102	102	102	98	98	96	92	92	98	100	96	100	102	108	106	94	94
15	94	94	94	94	94	94	94	92	146	86	90	90	90	124	116	116	132	110	98	92	90	90	90	96
16	96	96	94	94	90	90	96	94	92	92	92	92	90	90	G	G	90	106	100	82	82	82	82	82
17	82	96	96	96	94	88	86	84	96	96	156	116	92	112	98	108	102	102	102	96	94	94	94	94
18	94	92	92	92	92	98	98	100	100	100	98	90	94	94	94	94	94	92	92	82	82	82	82	92
19	92	96	96	96	96	106	106	94	94	94	86	86	86	86	G	134	110	110	108	106	96	96	96	96
20	102	102	102	B	B	B	118	118	118	118	116	116	116	116	116	116	G	G	G	106	94	94	94	94
21	94	94	94	90	90	90	100	100	98	98	98	98	94	94	94	114	114	106	106	106	104	B	104	104
22	B	B	86	92	92	92	G	92	92	94	94	94	92	86	86	86	118	118	118	98	86	86	92	96
23	94	92	92	92	90	90	96	96	G	164	136	122	96	94	100	G	G	122	B	B	122	100	98	
24	100	100	100	100	96	96	G	94	94	86	136	118	118	120	G	120	120	102	106	100	100	98	98	98
25	90	90	104	104	98	98	G	G	G	96	96	138	126	100	100	100	100	94	94	94	84	84	84	B
26	B	84	B	88	92	102	124	124	94	G	130	130	G	142	136	122	116	G	G	B	112	100	100	96
27	96	92	92	92	92	92	98	98	98	98	98	98	92	92	92	92	94	82	82	82	82	104	104	104
28	104	98	92	92	88	88	88	88	90	90	90	122	116	96	96	98	116	92	92	92	92	92	92	92
29	92	92	92	92	92	92	92	92	92	92	92	96	94	112	96	96	96	96	90	90	106	94	100	100
30	100	98	98	98	98	108	100	94	94	94	94	94	94	94	92	86	86	84	84	84	84	84	84	94
31	100	100	100	100	B	90	G	132	132	118	118	96	96	96	94	94	94	94	94	94	94	94	94	90
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	29	30	30	28	29	27	30	29	30	31	31	30	30	27	29	29	27	27	29	30	30	31	30
MED	94	94	92	92	92	92	98	96	96	97	98	98	94	94	96	98	98	96	96	94	93	93	94	95
U Q	98	97	96	96	96	98	102	102	101	100	116	116	98	100	98	116	116	106	100	98	96	98	100	98
L Q	91	92	92	92	90	90	92	92	93	94	94	92	92	92	92	92	92	92	90	84	84	84	84	92

JUL.2019 h'Es (KM)

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IONOSPHERIC DATA STATION Yamagawa

JUL.2019 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F3	F4	F9	F6	F2	C1	L3	L3	L3	L2	L2	L1	H1	H2	L3	C2	C3	L7	L6	L9	F6	F5	F7	F8
2	F8	F6	F3	F9	F9	L9	L7	L3	L3	L2	L4	L4	L2	L2	L4	L5	L7	L6	L6	F8	F8	F6	F4	
3	F3	F6	F6	F2	F2	L3	L6	L4	L4	L2	HL12	L3	L3	L4	C2	L2	CL12	L3	L1	F2	F3	F2	F3	
4	F2	F2	F2	F2	F2	F3	L1	L3	L2	L1	L3	L3	L2	L1	L2	L2	L3	L2	L3	L6	F4	F2	F2	F2
5	F2		F2	F2		L1	L3	L4	L1	L1	C4	L2	C1	L2	L2	H1	H2	L6	L7	L7	F6	F3	F6	F7
6	F4	F3	F2	F1	F1	L1	L2	L3	L3	L4	L5	L5	L3	L2		L4	C2	L5	L5	L7	F4	F5	F5	F4
7	F5	F5	F8	F5	F2	F2	L5	L2	L2	C2	L5	L3	L3	L4	L6	L6	L4			L3	F1	F1	F2	F3
8	F3	F2	F5	F7	F2		C2	C3	L5	L2	C1	L2	L4	L3	L3	L5	L5	L6	L9	F9	F7	F9	F9	F3
9	F8	F8	F9	F8	F9	L5	L8	L6	L5	L3	L3	L4	L5	L3	L5	L6	L5		L7	L9	F5	F6	F8	F9
10	F2	F6	F3	F2	F2	F6	L6	L8	L6	L5	L5	L5	L5	L5	L3	L4	L6	L7	L8	L9	F3	F9	F9	F6
11	F7	F8	F9	F2	F4	F2	L7	C3	L4	L4	L3	L5	L4	L3	L3	L5	L3	L2	L2	L2	F4	F3	F3	F8
12	F2	F1	F2	F1	F3	F2	L8	L7	L5	L3	L4	L3	L3	L3	L2	C2	C3	L6	L8	L8	F8	F6	F7	F8
13	F7	F8	F8	F7	F8	F9	L8	L7	L5	HL22	CL2	C4	C4	L3	C3	C3	L7	L4	L6	L9	F7	F3	F5	F7
14	F8	F9	F7	F3	F2	F1	L7	L3	L3	L3	L2	L3	L2	L2	L3	L2	L2	L4	L4	L2	F2	F2	F3	F6
15	F6	F6	F6	F6	F9	F5	L6	L6	HL22	L7	L3	L2	L3	CL12	C2	C2	H2	C5	L8	L3	F7	F5	F9	F6
16	F6	F9	F9	F5	F9	F6	L5	L3	L4	L4	L3	L2	L2	L3			L2	C2	L2	L4	F4	F3	F2	F1
17	F1	F2	F7	F6	F4	F9	L9	L7	L3	L5	HL22	C2	L3	C2	L4	C3	L4	L4	L7	L5	F8	F7	F6	F4
18	F4	F2	F3	F6	F6	L4	L8	L8	L6	L7	L4	L5	L3	L4	L4	L6	L6	L5	L3	L7	F5	F3	F1	F3
19	F3	F3	F4	F2	F4	L2	L5	L8	L7	L6	L5	L5	L5	L4		H2	C2	C2	L6	L9	F3	F3	F9	F5
20	F2	F2	F2				C5	C3	C3	C3	C2	C2	C2	C2	C1	C1				L6	F6	F5	F6	F6
21	F9	F9	F8	F8	F7	L2	L8	L8	L7	L4	L3	L2	L3	L3	L3	C2	C2	L2	L2	L3	F2		F2	F2
22			F2	F1	F1	L2		L5	L5	L3	L4	L3	L3	L4	L5	L4	CL22	C2	C2	L7	F6	F5	F6	F7
23	F7	F8	F8	F9	F9	L8	L4			H2	H1	C1	L2	L2	L2			C2				F1	F2	F4
24	F2	F4	F6	F2	F4	F2		L6	L3	L4	L1	C2	C2	C1		C2	C2	L3	L4	L6	F2	F3	F6	F4
25	F2	F2	F2	F2	F2	L1				L3	L2	H1	C1	L1	L1	L2	L3	L8	L9	L4	F4	F2	F2	
26		F2		F2	F1	L1	C3	CL22	L2		H2	H1		H1	H1	C1	C2				F3	F5	F3	F2
27	F1	F3	F4	F5	F6	L6	L2	L4	L3	L5	L4	L3	L2	L3	L3	L2	L6	L6	L7	L4	F3	F2	F6	F2
28	F2	F2	F2	F2	F4	L6	L4	L7	L5	L5	L3	CL12	C2	L4	L5	L4	C3	L4	L7	L9	F9	F8	F9	F7
29	F2	F4	F2	F4	F2	L4	L3	L5	L5	L6	L6	L4	L5	CL23	L4	L2	L3	L5	L8	L2	F5	F4	F4	F4
30	F4	F6	F8	F2	F2	F1	L7	L7	L6	L4	L5	L3	L3	L5	L4	L5	L4	L4	L3	L4	F5	F3	F1	F3
31	F3	F5	F2	F2		L2		C2	CL23	C2	C2	L3	L3	L4	L4	L4	L6	L6	L4	L3	F1	F2	F2	F2
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

JUL.2019 TYPES OF Es

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IONOSPHERIC DATA STATION Okinawa

JUL.2019 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

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 28	X 30	X 30	X 27	A																X 74	X 38	X 36	A
2	A	X 31	X A	A	A																X 79	X 52	X 38	X 36
3	X 36	X 38	X 36	X 37	X 34																X 56	X 47	X 48	X 33
4	42	44	44	44	41																X 94	A	A	A
5	X 33	X 34	X 25	X 31	A	X 23															X 63	X 63	X 47	X 39
6	X 39	X 38	X 32	X 30	X 33	X 28															X 66	X 36	X 32	X 30
7	X 30	X 30	X 30	X 32	X 32	X 29															X 64	X 61	X 52	X 44
8	45	59	58	52	52	33															X 57	X 59	X 56	X 45
9	X 43	X 38	X 39	X 37	X 31	X 36															X 50	X 52	X 50	X 45
10	X 42	X 45	X 35	X 34	X 32	X 32															X 49	X 35	X 35	A
11	X 32	X 31	A	A	X 31	X 30															X 59	X 48	A	A
12	A	X 30	X 34	X 29	X 28	A															X 44	X 45	X 37	A
13	A	A	A	A	A	X 24															A	X 40	X 42	X 47
14	44	41	44	38	A	X 28															X 74	X 48	X 37	X 36
15	X 33	X 33	X 31	X 35	X 28	X 29															X 85	A	X 37	X 36
16	X 38	X 44	X 30	X 28	X 36	X 36															X 89	X 50	X 37	X 32
17	X 28	X 28	X 28	X 27	X 26	X 26															X 59	X 60	X 48	X 54
18	44	X 36	X 34	X 35	X 30	X 27						C									X 66	X 49	X 40	X 34
19	38	38	34	X 32	X 30	X 27															X 74	X 34	X 31	A
20	34	X 31	X 30	X 29	X 25	X 27															X 63	X 62	X 29	X 26
21	X 26	X 27	A	X 26	X 25	X 25															X 70	X 43	X 34	X 36
22	X 39	X 32	X 30	X 26	X 24	X 25															X 49	X 44	X 34	X 33
23	39	A	A	47	A	A															X 85	X 54	X 33	X 31
24	X 30	X 29	A	X 28	A	X 26															X 54	X 42	X 39	X 36
25	42	X 33	X 33	X 38	X 26	X 28															X 64	X 59	X 50	X 42
26	X 41	X 37	X 37	X 37	X 32	X 28															X 66	X 60	X 38	X 34
27	X 33	X 32	X 32	X 32	X 26	X 23															X 51	X 37	X 34	X 31
28	X 30	X 27	X 26	X 27	A	A															X 63	X 67	X 34	A
29	A	X 31	X 30	X 28	X 28	A															X 55	X 54	A	A
30	X 31	A	A	X 33	A	X 25															X 62	X 51	X 41	X 36
31	X 33	X 33	X 30	X 29	X 29	X 28															X 74	X 70	X 34	X 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	28	24	28	22	23															30	29	28	23
MED	X 36	X 33	X 32	X 32	X 30	X 28															X 64	X 50	X 37	X 36
U Q	42	38	36	37	32	29															X 74	X 60	X 44	X 42
L Q	X 31	X 30	X 30	X 28	X 26	X 25															X 56	X 42	X 34	X 32

JUL.2019 f_{XI} (0.1MHz)

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JUL.2019 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

JUL.2019 foF2 (0.1MHz)

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IONOSPHERIC DATA STATION Okinawa

JUL.2019 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									372	408	428	L 428	A 428	A 424	A 416	A 404	A 372		A						
2						A	A	A	396	412	416	U 444	A	A	A	A	A	A	A						
3								L 356	L 404	L 468	H 424	432	436	424	404	U 396	A 368	A 348							
4								352	400	404	412	A	A	U 428	A 424	A 412									
5										396	424	U 424	L 428	A	A	408	384	368	344						L
6								L 356	L 396	L 408	L 416	420	428	428	424	400	392	372	340	280					L
7								U 356	L A	L A	U 420	A 436		A	A	A	A	A	A						L
8								A	424	416		A	428	A	424	A	396	392	A	U 340	L				
9								U 368	L A	L A	412	A	A	A	A	416	404	A	380						L
10								344	A	A	A	A	A	A	A	A	A	A	A	A					
11										A	A	A	A	A	A	A	A	A	364	336					
12								A	384		A	A	420	416	424	408	U 416	A	A						
13								A	388	404	396		A	A	A	A	A	384							
14								A	A	A	A	A	U 432	A 424	A 420	A 404	384	368	324						
15								L 344	A	U 408	L 408	U 412	U 424	U 420		A	412	396	356						
16								A	388	412	424	424	428	424	424		A	388	364	336	276				
17						A		348	L 380	L 396	L 420	L 424	L 420	L 420		A	408	A	372						L
18								U 356	L 408	L 392	L 396	C	416	424		A	A	392	364						L
19									384	400		A	A	A	424	412	404	388	364	336					
20								A	U 384	L 392	L 412	L 424	L 432	L 424	L 424	A	404	384	360	344					L
21						A		A	384		A	A	A	428	420	408	388	376	344						L
22								L 344	L 408		A	420	428	U 432	A 428	432	420	400	380	340					
23								A	392	404	416	416	432	428	424	404	396	380	340						L
24								U 344	L A	L 404	L A	416	420	428		A	A	392	368	364					L
25									380	412	424	432	428	428		A	408	400		328					
26								L		396	412	420	420		A	A	416	392	364	336	268				
27								L 344	L A	L 412	L 428	L 412			A	A	404	404		A	U 344	L			
28								U 332	L 384	L 408	L 412	L 420	L 428	L 420	L 404		A	396	372	352					L
29								U 356	L 372	L 416	L 412	L 420	L 424	L 424	L 416		A	396	380						
30									A	404		A	A	U 432	A A	A	416	R 408	A	A					
31										376	400	432	424		A	A	A	A	360						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								14	19	22	22	21	17	22	14	20	22	21	17	3					
MED								L 350	L 384	L 404	L 416	L 424	L 428	L 426	L 422	L 408	L 392	L 368	L 340	L 276					
U Q								U 356	L 396	L 408	L 424	L 428	U 432	A 428	A 424	A 414	A 396	A 374	A 344	A 280					
L Q								L 344	L 380	L 400	L 412	L 420	L 420	L 424	L 416	L 404	L 388	L 364	L 336	L 268					

JUL.2019 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

JUL.2019 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	320	332	348	348	A	328	304	268	208	A				
2						A	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
3						B	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
4						B	A	A	A	A	A	340	A	A	344	332	300	276	208	A				
5						A	220	272	296	320	332	352	348	336		A	A	268	228	A				
6						A	A	A	308	A	336	A	A	A	A	A	A	264	A	A				
7						A	248	A	A	336	348	348	332		A	A	A	A	A	A				
8						184	204	260	300	316	A	344	A	A	A	A	A	A	A	A				
9						A	200	268	296	324	336	344	340	332	316	296	264	228	A					
10						A	192	268	292	320	336	A	A	340	320	300	268	236	A					
11						A	200	A	A	308	328	328	328	324	320	288	A	A	A					
12						A	216	256	A	A	A	A	A		332	312		A	A	212				
13						A	A	A	A	A	332	340	336	324	312	280	268	212	A					
14						A	196	256	288	316	328	336	324	332	312	296	264	216	A					
15						A	A	A	A	A	A	A	A	A	A	A	268	220	A					
16						A	A	A	A	A	A	A	A	A	A	A	312	A	A	A				
17						A	A	264	A	A	A	336	340	332	316	296	268	220	A					
18						A	U 208	A	A	A	C	344	340	324	308	A	A	C	A					
19						A	A	A	A	A	A	A	A	A	316	296	264	208	A					
20						A	A	280	A	324	340	344	340	328	328	A	280	228	A					
21						A	220	276	300	320	328	A	344	324	316	296	268	196	A					
22						A	A	A	A	A	A	A	332	332	320	A	256	A	A					
23						A	A	A	A	A	336	336	340	332	A	292	256	228	B					
24						B	A	252	296	A	A	A	344	340	324	300	280	236	A					
25						A	192	272	304	328	340	344	344	332	320	292	264	A	A					
26						172	200	252	284	316	336	A	340	336	316	296	264	A	A					
27						A	200	A	A	A	A	A	A	A	A	A	A	A	A					
28						B	204	260	292	312	336	A	344	324	316	300	272	208	A					
29						A	220	A	280	308	340	340	336	324	A	A	A	A	A					
30						A	A	A	A	U 304	A	324	A	A	A	A	284	A	A	A				
31						B	A	A	A	A	296	336	340	336	336	312	296	272	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							2	15	13	13	15	19	15	19	20	19	18	20	16					
MED							178	204	264	296	320	336	344	340	332	316	296	268	218					
U Q							220	272	300	324	340	344	344	336	320	300	270	228						
L Q							200	256	290	312	332	336	336	324	312	292	264	208						

JUL.2019 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

JUL.2019 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

IONOSPHERIC DATA STATION Okinawa

JUL.2019 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	20	E B	17	A A	E B	19	27	34	34	37	36	44	43	35	36	35	30	46	37	43	22	E B	A A
2	A A	E B	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A
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	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	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
6	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	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	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	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	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	25	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	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	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	A 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	E B	E B	E B
13	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A
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	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	18	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
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	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	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	18	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
19	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
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	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	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	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	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A
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	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	22	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	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	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	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	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	A 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	E B	E B	E B
30	E B	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A	A A
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	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	30	31	31	31	31	31	31	30	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	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
U Q	16	18	20	16	38	16	23	37	36	44	43	44	53	48	49	46	41	40	40	28	33	21	20	38
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

JUL.2019 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

JUL.2019 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	12	16	14	16	18	21	18	20	18	17	15	12	16	16	16	16	16
2	16	16	16	16	16	16	16	12	14	16	17	20	18	20	17	17	15	14	12	16	16	16	16	16
3	16	16	16	16	16	16	16	14	14	14	15	18	20	20	17	16	15	14	15	16	16	16	16	16
4	16	16	16	16	16	16	16	12	14	16	17	22	20	22	20	20	19	15	14	16	16	16	16	16
5	16	16	16	16	16	16	16	15	14	15	22	20	20	19	19	18	16	15	13	14	14	16	16	16
6	16	16	16	16	16	16	16	14	14	20	18	22	21	22	21	20	15	13	12	14	16	16	16	16
7	16	16	16	16	16	16	16	16	14	16	15	18	22	20	21	17	19	17	14	16	16	16	16	16
8	16	16	16	16	16	16	15	14	14	14	19	17	17	20	20	21	16	14	13	16	16	16	16	16
9	16	16	16	16	16	16	16	16	14	14	17	21	21	20	17	19	15	14	12	16	16	16	16	16
10	16	16	16	16	16	16	16	15	15	16	16	18	21	20	17	18	16	15	14	14	16	16	16	16
11	16	16	16	16	16	16	16	16	13	16	21	20	21	18	20	15	14	15	14	15	16	16	16	16
12	16	16	16	16	16	16	16	16	16	14	15	16	18	17	16	18	15	14	14	15	16	16	16	16
13	16	16	16	16	16	16	16	14	14	16	17	17	18	21	17	16	16	14	10	14	16	16	16	16
14	16	16	16	16	16	16	16	14	15	18	20	21	22	21	21	19	17	14	13	14	16	16	16	16
15	16	16	16	16	16	16	16	14	16	16	15	20	21	22	20	20	14	14	14	16	16	16	16	16
16	16	16	16	16	16	16	16	16	13	15	16	21	21	21	22	20	16	14	12	14	16	16	16	16
17	16	16	16	16	16	16	16	16	14	16	16	17	20	17	18	17	16	13	11	16	16	16	16	16
18	16	16	16	16	16	16	16	14	15	15	18	C	21	23	20	18	18	14	C	12	16	16	16	16
19	16	16	16	16	16	16	16	16	14	15	17	15	17	18	18	18	15	15	12	14	16	16	16	16
20	16	16	16	16	18	16	16	14	15	15	22	18	16	21	20	19	14	15	14	16	16	16	16	16
21	16	16	16	16	16	16	16	15	14	17	16	17	20	17	18	18	15	14	12	16	16	16	16	16
22	16	16	16	16	16	16	16	16	14	15	16	21	19	15	16	17	14	14	13	16	16	16	16	16
23	16	16	16	16	16	16	16	14	14	15	16	20	20	20	18	18	15	14	14	16	16	16	16	16
24	16	16	16	16	16	16	16	16	14	16	18	16	20	21	21	20	17	14	14	16	16	16	16	16
25	16	16	16	16	16	16	16	16	14	15	16	16	22	18	20	20	16	14	12	16	16	16	16	16
26	16	16	16	16	16	16	16	14	16	16	18	18	20	20	17	19	15	12	14	16	16	16	16	16
27	16	16	16	16	16	16	16	13	12	14	18	18	24	19	20	20	15	13	12	16	17	16	16	16
28	16	16	16	16	16	16	16	16	13	15	16	16	15	20	21	17	16	14	14	16	16	16	16	16
29	16	16	16	16	16	16	16	16	13	16	15	15	20	18	17	16	14	14	14	16	16	16	16	16
30	16	16	16	16	16	16	16	16	14	16	14	20	20	22	19	18	16	14	14	15	16	16	16	16
31	16	16	16	16	16	16	16	16	14	14	16	16	21	21	21	16	15	14	14	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	30	31	31	31	31	31	31	30	31	31	31	31	31
MED	16	16	16	16	16	16	16	15	14	15	16	18	20	20	20	18	15	14	14	16	16	16	16	16
U Q	16	16	16	16	16	16	16	16	15	16	18	20	21	21	20	20	16	15	14	16	16	16	16	16
L Q	16	16	16	16	16	16	16	14	14	15	16	17	19	18	17	17	15	14	12	14	16	16	16	16

JUL.2019 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

JUL.2019 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									436	443	452	L 446	A	A	454	404	388	393	A						
2						A	A	A	411	438	443	A	A	A	A	A	A	A	A						
3								L 377	L 411		A 405	A 391	A 436	A 451	A 416		A 408	A 390							
4								394	427	442	450	A 428	A 442		A	A	A	A	A						
5									413	434	428	U L 428	A	A	A	412	409	394	390	L					
6								L 404	L 417	A 429	A 441	A 478	A 422	A 396	A 409	A 429	A 397	A 428	A 382	A 361	L				
7								U L 388	A	A	A	A	A	A	A	A	A	A	A	A	L				
8								A	367	452	A	A	A	A	A	A	435	396	A	U L 403					
9								A 386	A	A	A	A	A	A	A	440	397	A	390	L					
10								365	A	A	A	A	A	A	A	A	A	A	A	A					
11									A	A	A	A	A	A	A	A	A	A	382	375					
12								A	379	A	A	A	A	A	A	A	A	A	A						
13								A	418	428	467	A	A	A	A	A	A	386	A						
14								A	A	A	A	A	A	A	441	431	424	429	391	413					
15								L 397	A	U L 424	A	A	A	A	A	A	414	412	A	A					
16								A	402	403	A	A	A	A	A	A	418	408	393	363	L				
17							A	375	L 419	A 427	A 410	A 433	A 417	A 403	A	397	A	397	A	L					
18								U L 412	U L 390	A 413	A 446	C 439	A 460	A	A	A	413	399	C	L					
19									406	444	A	A	A	A	418	427	435	417	416	384					
20								A	A	376	419	417	451	438	465	A	424	398	407	375	L				
21							A	A	391	A	A	A	A	A	455	442	433	427	400	377	L				
22								L 394	L 396	A	411	428	A	A	472	411	388	401	402	374					
23								A	390	425	432	454	A	A	439	424	438	389	383	387	L				
24								U L 422	A	423	A	A	A	A	A	A	A	429	414	393	L				
25									434	418	467	462	345	407	A	411	395	A	393						
26								L		424	448	490	428	A	A	A	413	418	371	379					
27								L 419	L	A	453	443	464	A	A	456	A	A	U L 406						
28								U L 397	U L 387	A 412	U L 450	A 427	A 431	A 449	A 452	A	397	410	360	L					
29								U L 383	U L 399	A 432	A 440	A 404	A 457	A 467	A	A	407	387	A	A					
30									A	441	A	A	A	A	A	A	411	417	A	A					
31											U A 392	A 411	A 389	A 443	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								14	19	22	18	20	14	20	12	17	20	19	17	3					
MED								L 394	L 399	L 424	L 444	L 434	L 425	L 440	L 432	L 416	L 408	L 400	L 387	L 363					
U Q								L 404	L 418	L 438	L 452	L 450	L 439	L 452	L 446	L 434	L 417	L 410	L 393	L 379					
L Q								L 383	L 390	L 413	L 432	L 428	L 411	L 420	L 422	L 408	L 396	L 391	L 375	L 361					

JUL.2019 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

JUL.2019 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									286	286	362	372	398	310	324	364	356	322	296					
2						A	A	A	278	342	370	330	372	274	286	272	A	396	316					
3									256	242	322	358	384	308	466	G	522	400	310	240				
4									230	268	284	G	432	316	288	308	268	444	402	298				
5										308	220	284	A	380	A	466	352	264	248	288				
6									230	288	406	382	302	406	322	420	432	386	360	310	238			
7									364	A	A	318	444	A	374	326	336	310	308	300	236			
8									E A	412	448	A	424	408	488	430	318	258	A	364				
9									270	A	A	234	A	A	A	416	402	312	244	222				
10									376	396	A	A	A	A	432	A	306	354	298	250				
11											A	A	A	A	A	A	A	464	384	292				
12									266	316	292	A	G	G	410	394	402	330	296					
13									A	G	G	678	A	A	A	A	A	312	274					
14									A	A	A	296	A	430	340	386	372	412	442	318				
15									216	242	360	L	G	416	482	356	302	326	314	308	270			
16									276	244	290	324	344	352	320	360	356	378	410	348	266			
17								A	276	232	442	578	560	392	508	330	330	314	296	A	260			
18									272	270	300	434	C	350	350	396	354	316	274	C	248			
19										346	430	416	330	314	406	460	388	344	304	280				
20									A	L	342	346	G	288	320	562	308	500	378	330	298	268		
21								A	A	A	A	A	A	336	344	286	296	278	292	306	232			
22										342	268	274	290	G	384	302	390	324	300	338	292			
23										A	246	340	338	328	294	308	306	280	298	270	266	252		
24									232	262	386	A	G	570	288	A	324	440	300	292				
25										278	258	520	408	436	444	310	272	288	A	286				
26									216		G	442	312	342	A	A	346	G	468	308	252			
27									244	258	A	G	456	408	A	326	268	256	298	272				
28									286	258	266	466	L	506	478	G	306	264	368	376	328	294	L	
29									320	L	240	212	352	574	406	382	306	328	288	274				
30										292	316	A	A	A	408	318	284	296	284	260				
31										260	274	G	G	A	A	296	A	E A	A	338	272	294		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								18	25	24	24	23	23	25	25	28	30	29	26	11				
MED								270	270	319	399	416	392	374	326	329	328	304	293	252				
U Q								298	329	396	628	560	430	438	395	380	378	368	308	268				
L Q								232	252	285	331	330	336	315	306	290	300	279	270	238				

JUL.2019 h'F2 (KM)

IONOSPHERIC DATA STATION Okinawa

JUL.2019 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	106	102	104	108	A	102	102	106	100	A				
2						A	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
3						B	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
4						B	A	A	A	A	A	102	A	A	102	104	106	106	102	A				
5						A	104	104	106	106	106	106	106	106	A	A	A	106	108	A				
6						A	A	A	102	A	102	A	A	A	A	A	A	102	A	A				
7						A	120	A	A	110	106	106	106	A	A	A	A	A	A	A				
8						120	110	106	106	104	A	102	A	A	A	A	A	A	A	A				
9						A	104	104	104	104	104	102	102	102	102	104	104	108	A					
10						A	104	102	108	104	104	A	A	106	106	106	106	106	A	A				
11						A	106	A	A	106	106	106	106	106	106	106	106	A	A	A				
12						A	106	106	A	A	A	A	A	104	104	A	A	104	A	A				
13						A	A	A	A	A	102	104	104	104	108	104	104	106	A					
14						A	104	102	102	102	102	102	102	106	106	108	104	104	A					
15						A	A	A	A	A	A	A	A	A	A	A	102	102	A					
16						A	A	A	A	A	A	A	A	A	A	A	104	A	A	A				
17						A	A	106	A	A	A	112	108	106	106	106	106	106	106	A				
18						A	106	A	A	A	C	106	106	106	106	A	A	C	A					
19						A	A	A	A	A	A	A	A	A	A	112	108	106	106	A				
20						A	A	108	A	108	108	108	108	108	108	A	108	104	A					
21						A	106	102	102	104	104	A	100	102	102	102	102	102	102	A				
22						A	A	A	A	A	A	A	102	106	106	A	110	A	A					
23						A	A	A	A	A	102	102	108	104	A	104	104	104	B					
24						B	A	108	108	A	A	A	112	106	106	106	106	106	108	A				
25						A	102	106	106	108	104	106	106	106	106	106	106	104	A					
26						130	108	102	102	104	104	A	104	A	A	106	108	108	A					
27						A	108	A	A	A	A	A	A	A	A	A	A	A	A	A				
28						B	102	108	108	108	108	A	104	102	104	106	106	106	A					
29						A	114	A	106	102	104	110	104	104	A	A	A	A	A					
30						A	A	A	A	106	106	A	A	A	A	106	A	A	A					
31						B	A	A	A	A	104	104	104	106	106	106	106	106	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							2	15	13	13	15	19	15	19	19	19	18	20	16					
MED							125	106	106	106	106	104	106	106	106	106	106	106	105					
U Q							108	107	107	108	106	106	108	106	106	106	106	106	106					
L Q							104	102	102	104	102	102	104	104	104	104	104	104	103					

JUL.2019 h'E (KM)

IONOSPHERIC DATA STATION Okinawa

JUL.2019 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	86	102	100	100	104	98	108	100	96	102	102	108	144	148	102	152	120	118	98	98	92	86	104	104	
2	96	102	98	102	96	94	90	94	86	88	88	92	94	98	94	94	92	90	88	84	84	82	84	90	
3	92	98	106	96	96	96	96	118	94	94	154	150	138	92	130	120	88	90	88	84	88	86	84	98	
4	102	96	102	98	94	88	108	98	94	98	104	120	102	100	116	116	108	104	96	96	90	88	90	88	
5	88	90	100	104	98	96	82	134	120	106	110	110	98	148	150	106	112	108	114	92	92	90	92	84	
6	86	84	84	84	86	80	98	98	100	122	116	142	98	98	96	100	100	128	94	112	106	84	82	120	
7	84	100	102	116	98	96	92	96	96	120	110	110	98	98	96	96	94	92	90	118	B	108	B	100	
8	96	96	96	96	96	B	G	112	114	112	104	104	106	90	92	94	90	90	90	88	84	88	86	116	
9	96	98	94	92	94	96	112	108	110	104	102	102	102	100	130	122	108	112	110	108	102	102	100	100	
10	96	98	90	94	94	90	120	116	110	110	108	108	108	118	108	108	106	106	102	100	96	100	100	96	
11	96	96	96	102	94	98	118	108	110	106	104	106	108	104	104	104	102	114	102	94	92	92	88	92	
12	88	92	108	88	82	86	128	114	118	116	116	96	102	102	172	124	118	104	100	98	96	96	96	108	
13	100	104	100	98	98	110	154	90	92	94	98	118	116	120	114	114	106	112	102	100	86	86	112	86	
14	114	110	106	118	96	92	106	98	98	104	108	102	108	100	132	142	122	112	102	90	88	88	90	84	
15	88	94	94	108	96	94	90	90	90	90	92	92	94	100	98	96	164	116	108	100	100	100	98	94	
16	98	112	100	98	98	96	90	100	96	98	92	96	96	98	96	90	88	88	100	88	84	84	82	84	
17	80	100	90	B	92	86	88	84	120	86	86	88	134	118	106	112	108	120	102	106	98	96	98	100	
18	98	94	94	96	100	112	98	102	102	96	96	C	120	116	104	104	92	92	C	88	84	88	82	82	
19	100	102	106	104	102	94	96	96	94	96	92	90	88	90	90	158	124	116	110	102	98	88	96	96	
20	98	98	98	96	98	126	140	114	114	88	118	114	116	116	G	104	116	106	G	106	100	94	96	96	96
21	96	94	94	92	94	108	100	102	102	96	100	98	98	G	146	156	146		124	94	98	104	86	86	
22	106	106	110	B	94	98	122	108	110	100	106	96	110	154	134	128	114	116	126	100	92	94	102	106	
23	118	102	98	98	94	94	94	92	92	92	94	126	118	120	110	146	166	138	G	B	B	B	108	100	
24	100	94	98	98	96	92	92	92	152	144	90	88	90	114	104	112	106	108	112	100	96	96	96	96	
25	98	92	92	102	94	90	86	140	138	94	92	G	124	114	106	114	104	100	94	98	104	86	96	100	
26	B	B	B	B	B	96	90	134	138	152	146	120	96	110	110	112	116	116	102	100	96	98	92	96	
27	94	92	98	B	B	94	110	116	102	96	100	102	100	92	94	98	96	100	86	96	94	96	108	100	
28	98	96	96	92	88	90	126	106	112	116	106	114	114	108	106	102	118	112	100	98	96	96	94	94	
29	94	92	88	90	90	90	88	86	120	130	104	102	152	98	104	96	100	94	94	90	88	92	102	98	
30	100	100	92	90	108	84	102	98	98	104	104	98	94	104	92	116	100	100	84	86	82	82	82	86	
31	104	114	102	94	94	92	82	88	134	140	116	116	110	102	100	114	102	110	98	100	96	96	94	94	
	00	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	27	29	30	30	31	31	31	31	29	31	30	31	31	31	29	29	30	29	30	30	31	
MED	96	98	98	98	96	94	98	100	102	102	104	104	106	103	104	112	106	108	100	98	94	92	95	96	
U Q	100	102	102	102	98	96	112	114	118	116	110	115	116	116	116	122	118	116	107	100	97	96	100	100	
L Q	92	94	94	92	94	90	90	94	96	94	94	96	98	98	96	100	100	97	94	90	88	86	86	88	

JUL.2019 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

JUL.2019 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F4	F4	FF32	FF32	FF31	L6	C3	C3	L2	C2	C2	C1	H1	H1	C1	H1	C1	C1	C5	L6	F6	F3	FF23	F6
2	F6	F3	FQ61	F7	F5	LQ51	L5	L3	L3	L3	L2	L2	L3	L3	L3	L4	L4	L5	L6	L7	F6	F3	F4	F2
3	F1	F1	FF11	F2	F2	L2	L3	CL21	L3	L2	HL11	HL11	HL11	L4	HL12	CL12	L4	L2	L3	L4	F1	F3	F3	FF33
4	F2	F2	F1	F2	F2	L2	C3	L2	L3	L1	C1	C1	C2	L1	C2	C2	C4	C5	L6	L6	F6	F6	F5	F6
5	F3	F1	F3	F2	F1	FF11	L2	H2	C2	C2	C1	C1	LC12	H1	H1	CH11	CL21	C1	C2	L2	F4	F3	F2	F3
6	F3	F1	F1	F1	F1	F1	L1	L2	C2	C1	C1	H1	LH11	L11	LH11	LH11	LH11	CL11	LC11	C1	FF11	F1	F1	FF12
7	F1	FF11	F1	F2	F5	F3	L3	L2	L4	C2	C2	C1	L4	L2	L2	L4	L5	L5	L2	CL11		F1		F1
8	F2	F3	F3	F3	F2			C2	C2	C3	C3	C2	C1	L2	L2	L1	L3	L6	L3	L5	F7	F4	F2	FF13
9	F3	F2	F2	F5	F2	F2	C2	C3	C5	C5	C3	C6	C3	C4	C1	C1	C2	C1	C3	C3	F2	F3	F2	F8
10	F6	F5	F4	F2	F2	F3	C3	C4	C2	C3	C4	C5	CQ21	CQ21	C4	C4	C2	C3	C3	C3	F9	F4	FF14	F6
11	F3	F5	F8	F5	F2	F2	C2	C2	C2	C3	C3	C2	C2	C4	C3	C3	C4	C1	C5	L7	F3	F4	F5	FQ51
12	FQ41	F2	FF11	F2	F5	FQ11	C1	C2	C2	CL13	CL13	L2	C1	CH11	HH11	CL21	CL32	C3	C7	L6	FF54	FF22	F4	FQ71
13	FQ41	FQ61	FQ31	FQ71	F3	F2	HL11	L9	LQ21	LQ21	LC21	C2	C2	C3	C3	C2	C3	C4	CL13	F5	F4	FF14	FF22	
14	FF22	F2	F2	F2	F3	F2	C2	L3	L6	C5	C2	C2	C3	C2	C1	C1	C2	C2	C5	F6	F3	F2	F2	
15	F1	F3	F2	F2	F2	F3	L3	LH21	L5	L3	L3	L2	L2	L1	L2	LH21	HL11	C2	L9	FF42	FF71	FQ41	FF21	
16	F4	FF22	F2	F2	FF11	F2	L6	C3	L2	L2	L3	L2	L3	L1	L1	L3	L1	L1	L2	F2	F1	F2	F1	
17	F2	F1	F1		F2	F1	L5	LC42	CL12	LC31	L3	LH11	HL11	CL11	CL21	CL11	CL3	CL42	C2	F3	F4	F3	F7	
18	FQ21	F2	F2	F2	F2	F2	L5	C3	L1	L4	L1		C1	CH11	C3	C2	L2	L3		L5	F6	F2	F2	F1
19	FF11	F4	F1	F2	F2	F3	LC11	L3	L3	L2	L3	LH11	L4	LC31	LH11	HL11	CL11	C2	C4	C3	F4	F3	F3	F3
20	F2	F1	F3	F1	F1	F1	H3	C2	C4	L1	C2	C1	C2	C1	C2	C1	CLH11		C1	C1	FF22	FF11	F1	F2
21	F2	F2	F6	F8	F3	FF31	C3	C7	C3	CQ31	C4	C8	L3		H1	H1	H1		C1	LC21	F1	F3	F2	F1
22	F2	F2	F1		F1	FF11	CL12	CH11	CH11	C3	CH11	L2	CL23	H1	HH11	C2	C2	C2	CL11	CL43	FF33	FF33	F3	F3
23	FF12	F6	F4	F3	F9	F5	L3	L9	LQ41	L2	L2	CL11	CL11	CL11	C1	H1	H1	H1					F1	F3
24	F2	F3	F9	F3	FQ31	F2	L1	LC22	L1	HL11	LH22	LH21	L2	CL11	C3	C2	C2	C3	C3	F4	F2	F1	F2	
25	F2	F6	F4	F1	F2	F6	L3	HCL11	L1	L1			CH11	C1	C1	C1	C3	C5	L2	L1	FF13	F3	F3	F1
26					F1	L1	HL11	H11	H11	HC11	H1	C1	LH11	C3	C3	C2	C2	C1	C2	CL31	F4	F3	F2	F2
27	F3	F2	F1		F2	C1	CL22	CH21	L2	C1	C1	C1	L6	L3	L2	L2	L4	L3	L3	FF22	F1	F4	F2	
28	F3	F1	F1	F2	F3	F1	CL11	C2	C2	C2	C2	C1	C1	C2	C2	C3	C1	C2	C4	L6	F4	F3	F4	F5
29	F3	F2	F2	F1	F3	F5	L3	LC21	CL11	HC11	C1	C2	HL11	L2	L2	L4	L2	L4	L6	L4	F4	F3	F2	FQ41
30	F2	F4	FQ31	F3	FF13	F3	C3	L4	L5	CH11	L7	L5	L4	CL22	L3	CL11	C3	CL54	L5	L2	F3	F2	F2	F1
31	F2	FQ11	F3	F3	F3	F2	LH11	LH21	HL22	HC11	CL21	C1	C2	C3	C3	CC15	C4	C2	C6	L5	F3	F1	F2	F2
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

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

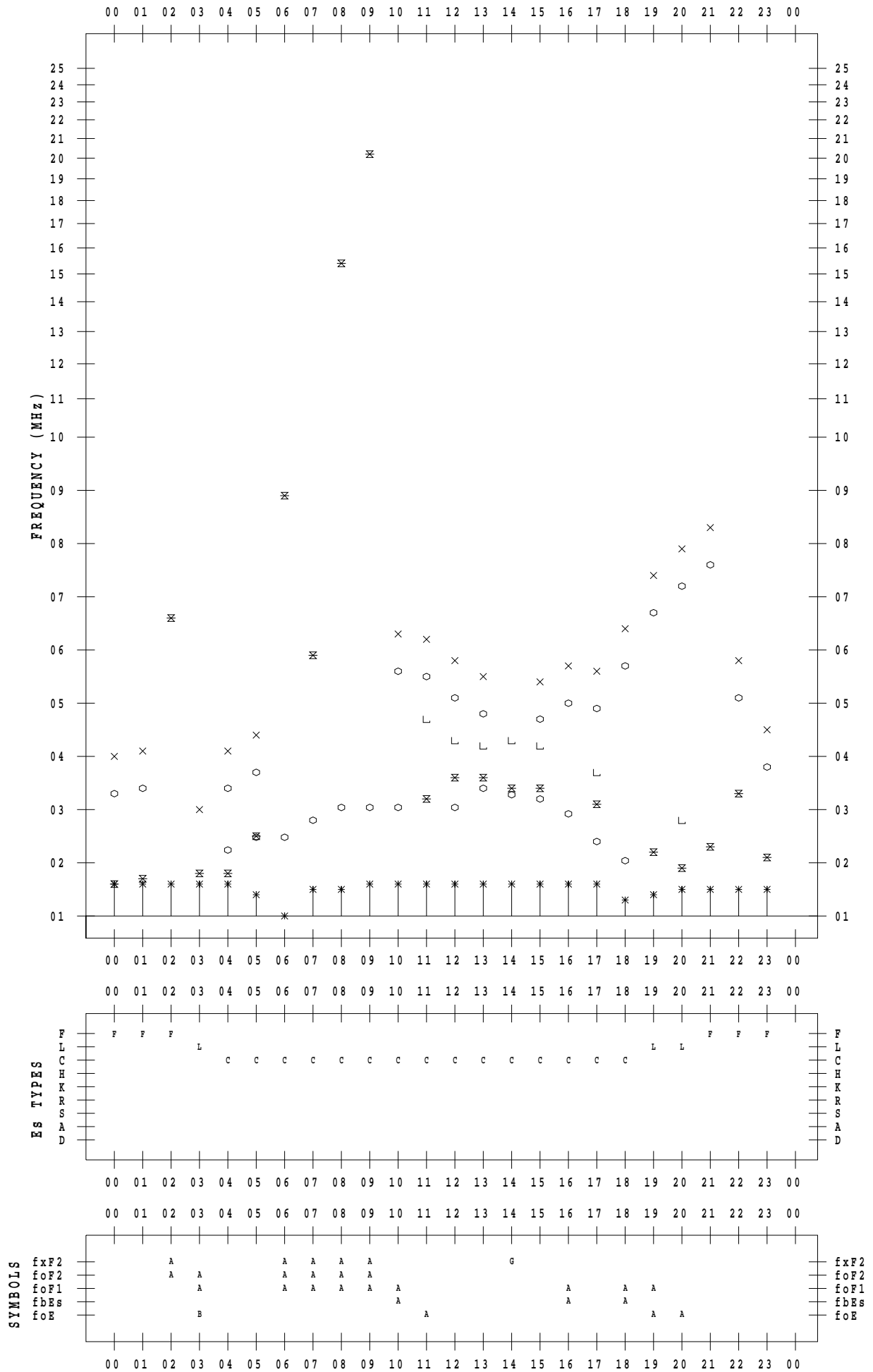
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 1

135 ° E MEAN TIME



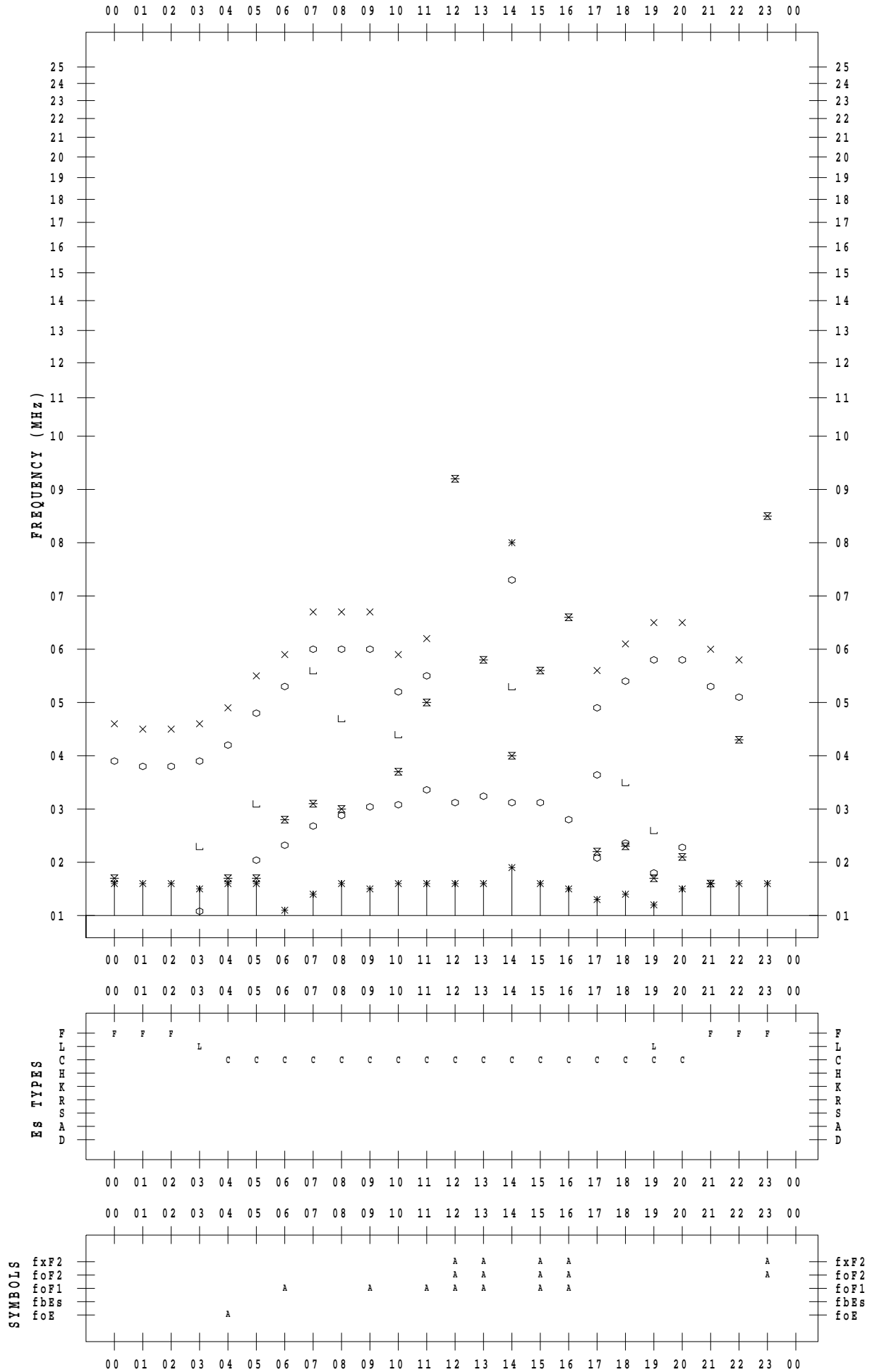
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 2

135 ° E MEAN TIME



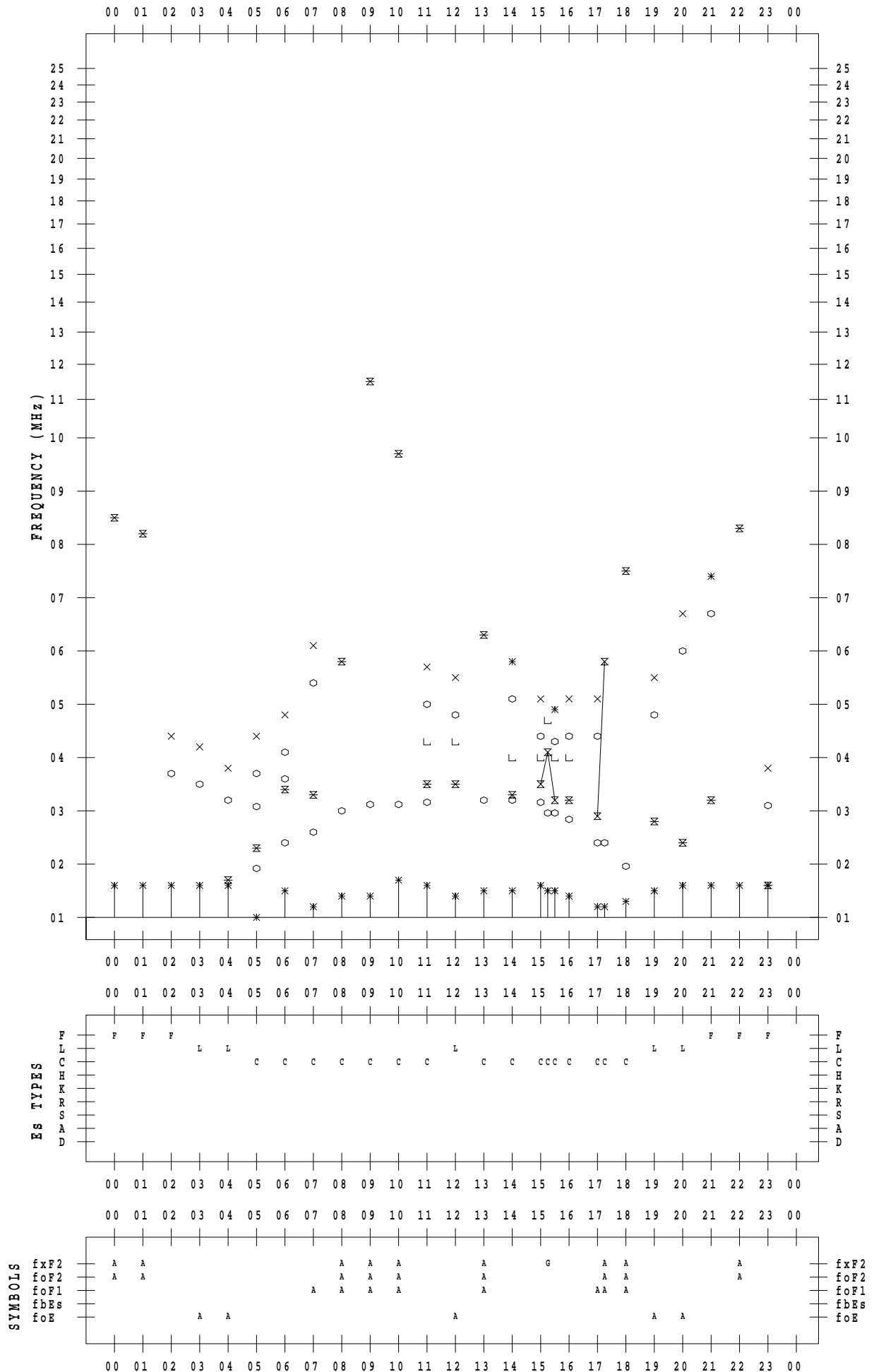
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 3

135 ° E MEAN TIME



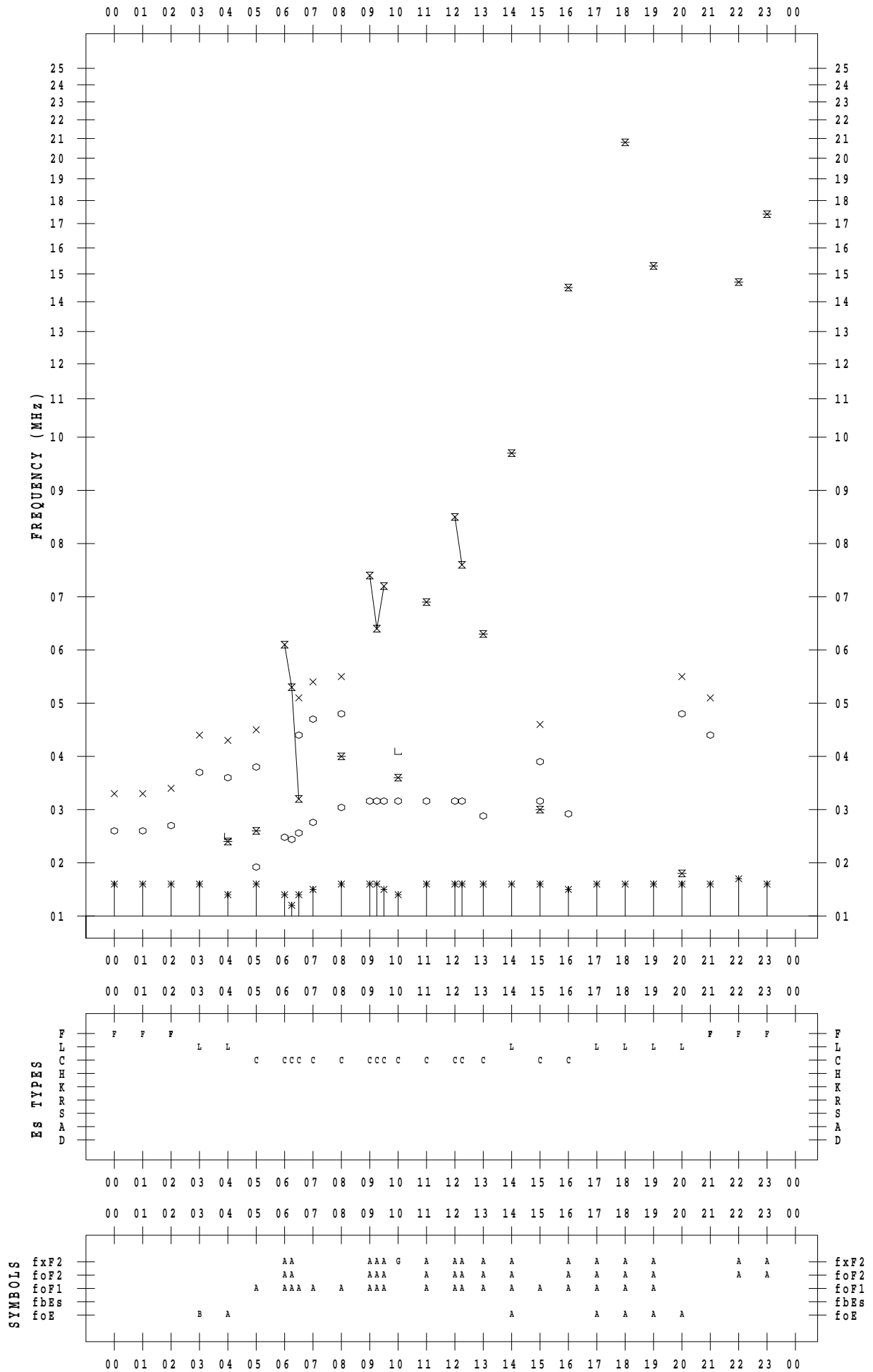
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 4

135 ° E MEAN TIME



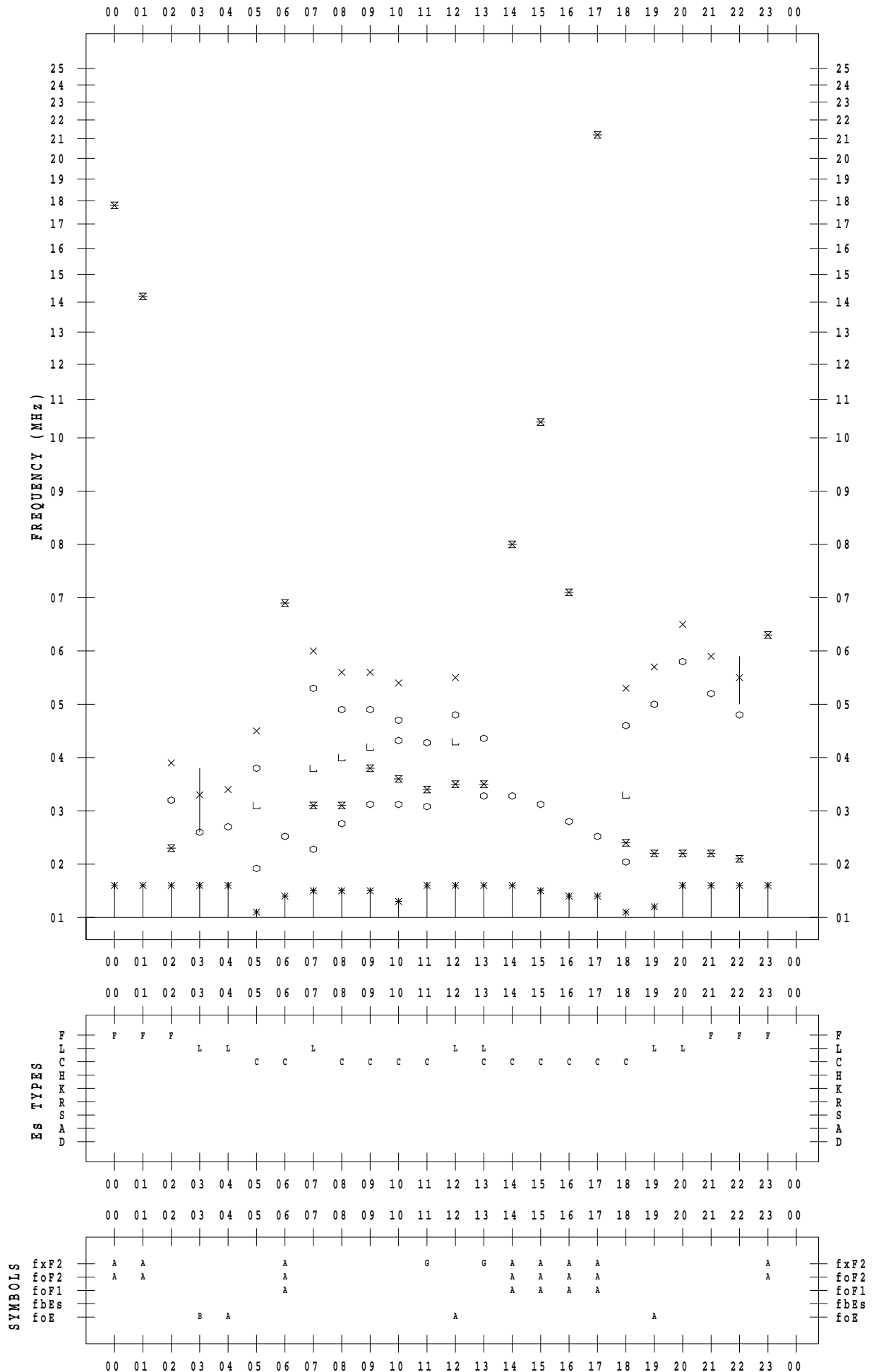
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 5

135 ° E MEAN TIME



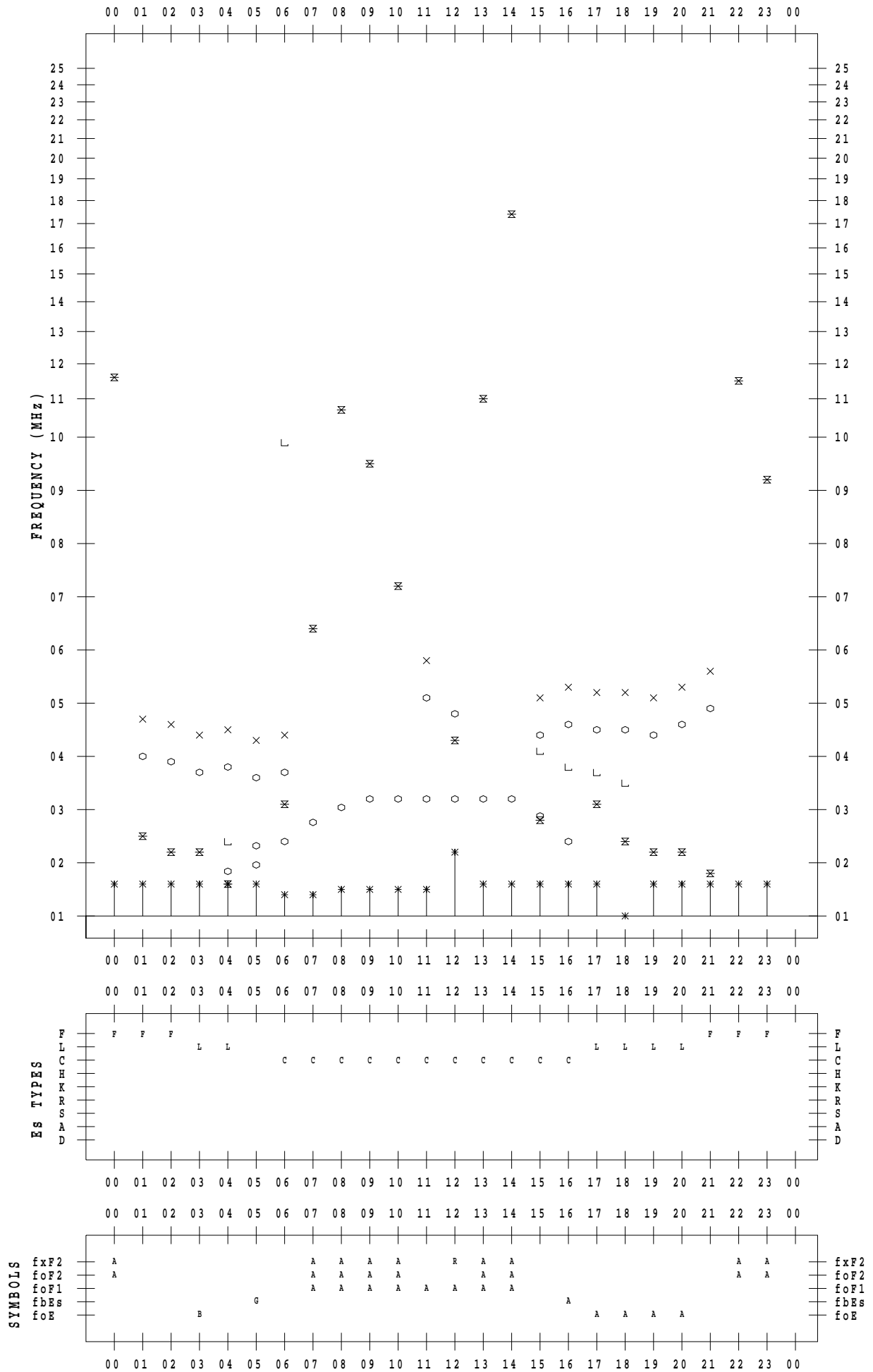
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 6

135 ° E MEAN TIME



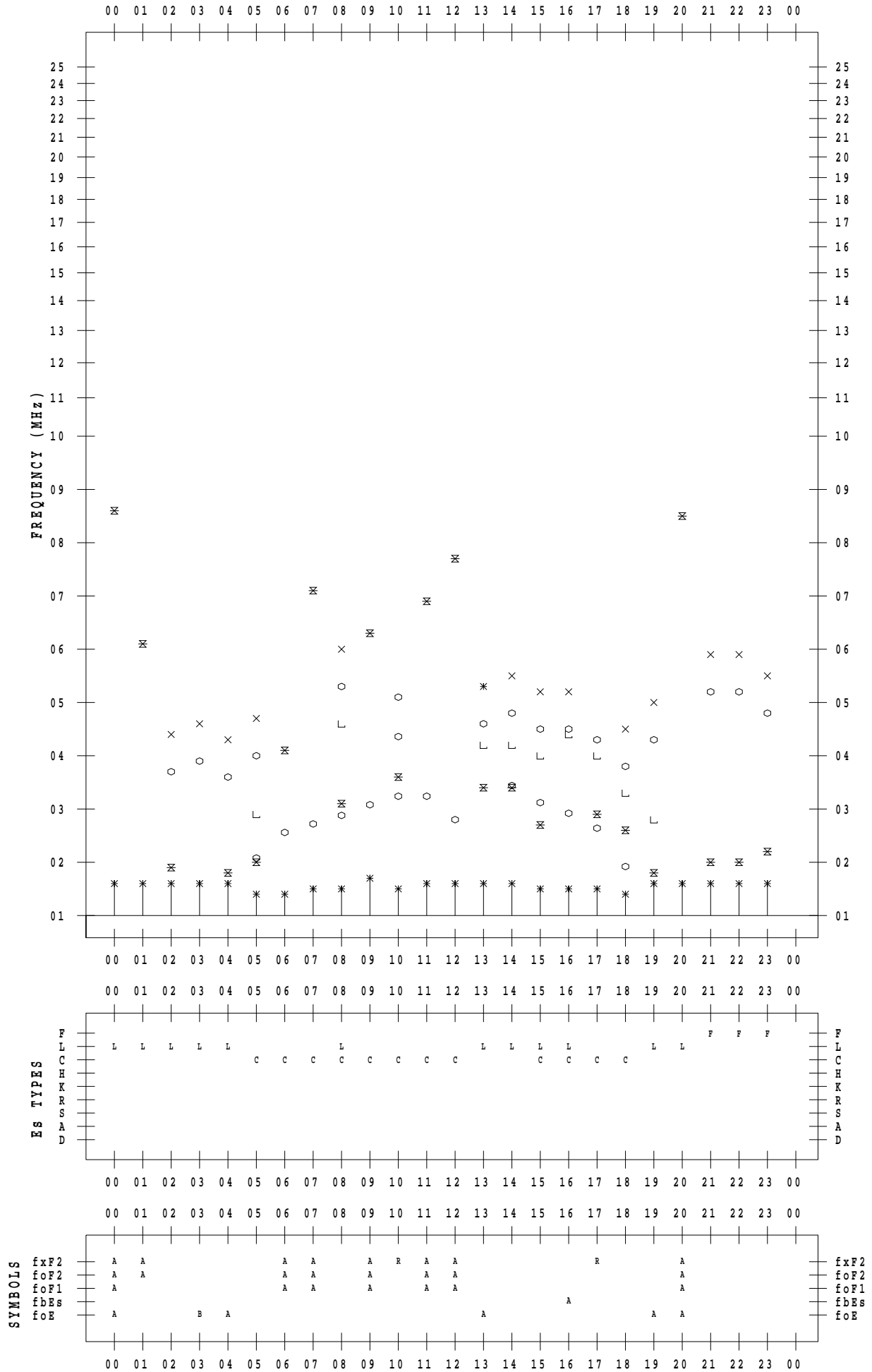
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 7

135 ° E MEAN TIME



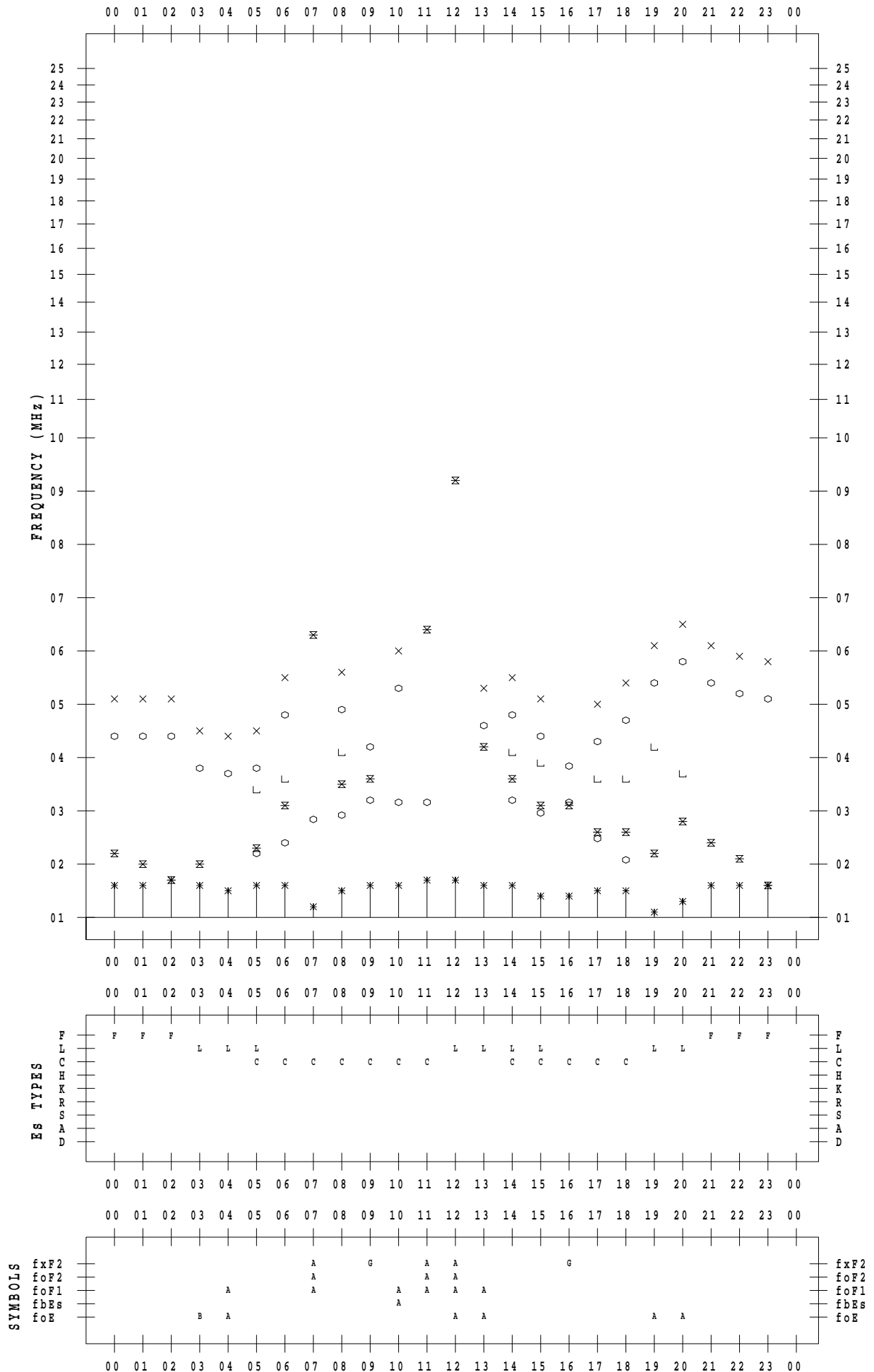
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 8

135 ° E MEAN TIME



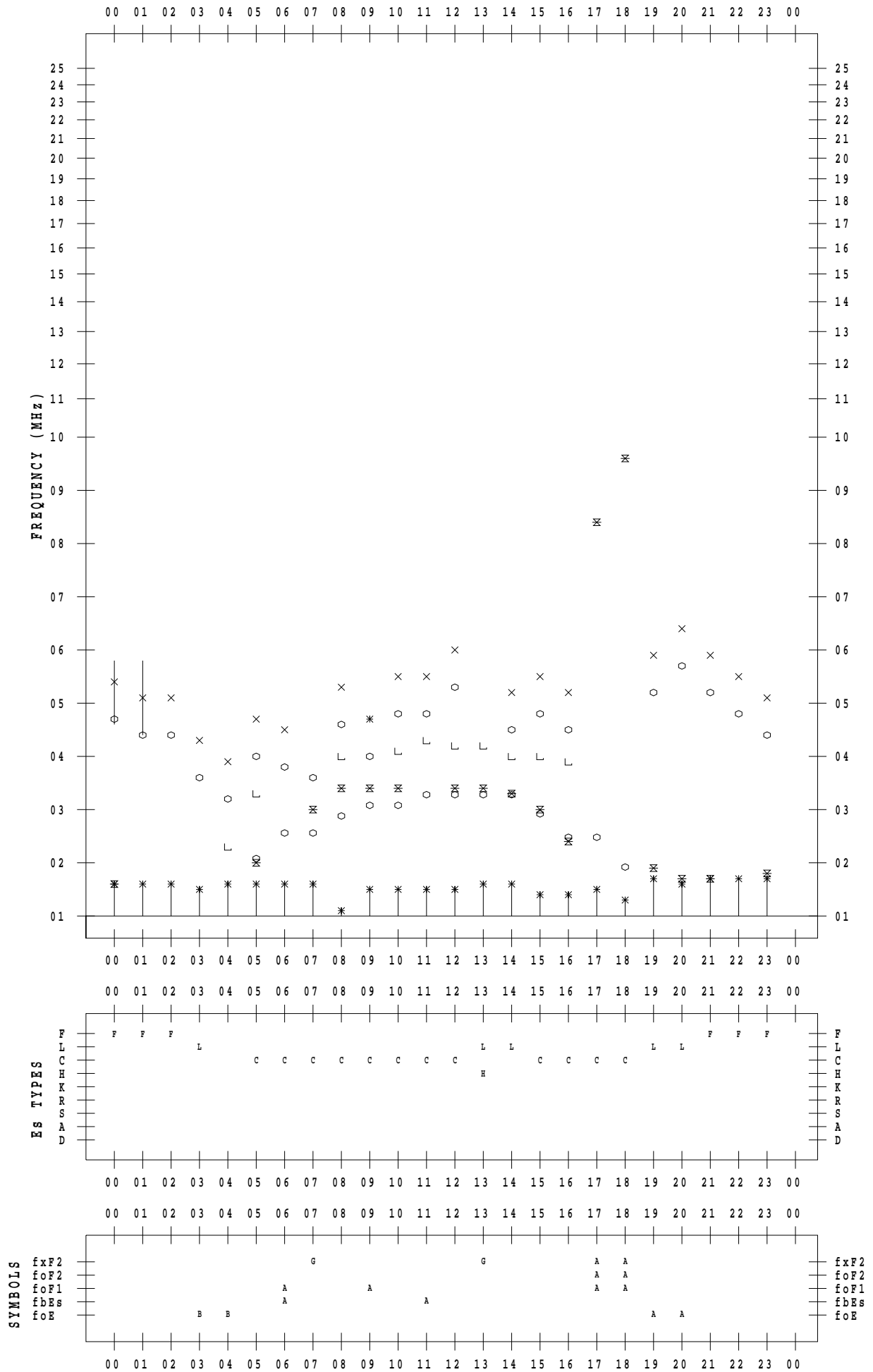
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 9

135 ° E MEAN TIME



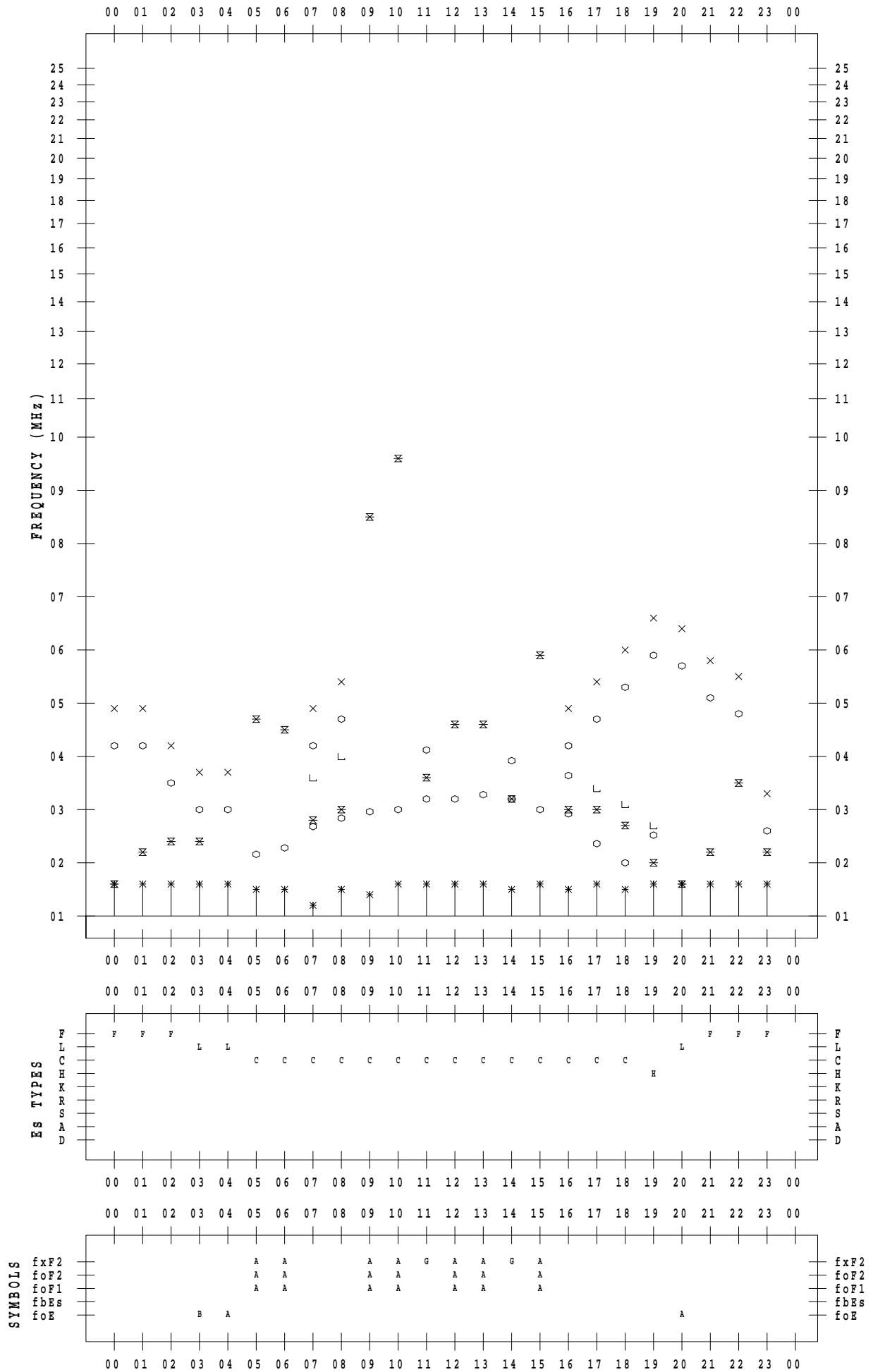
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 10

135 ° E MEAN TIME



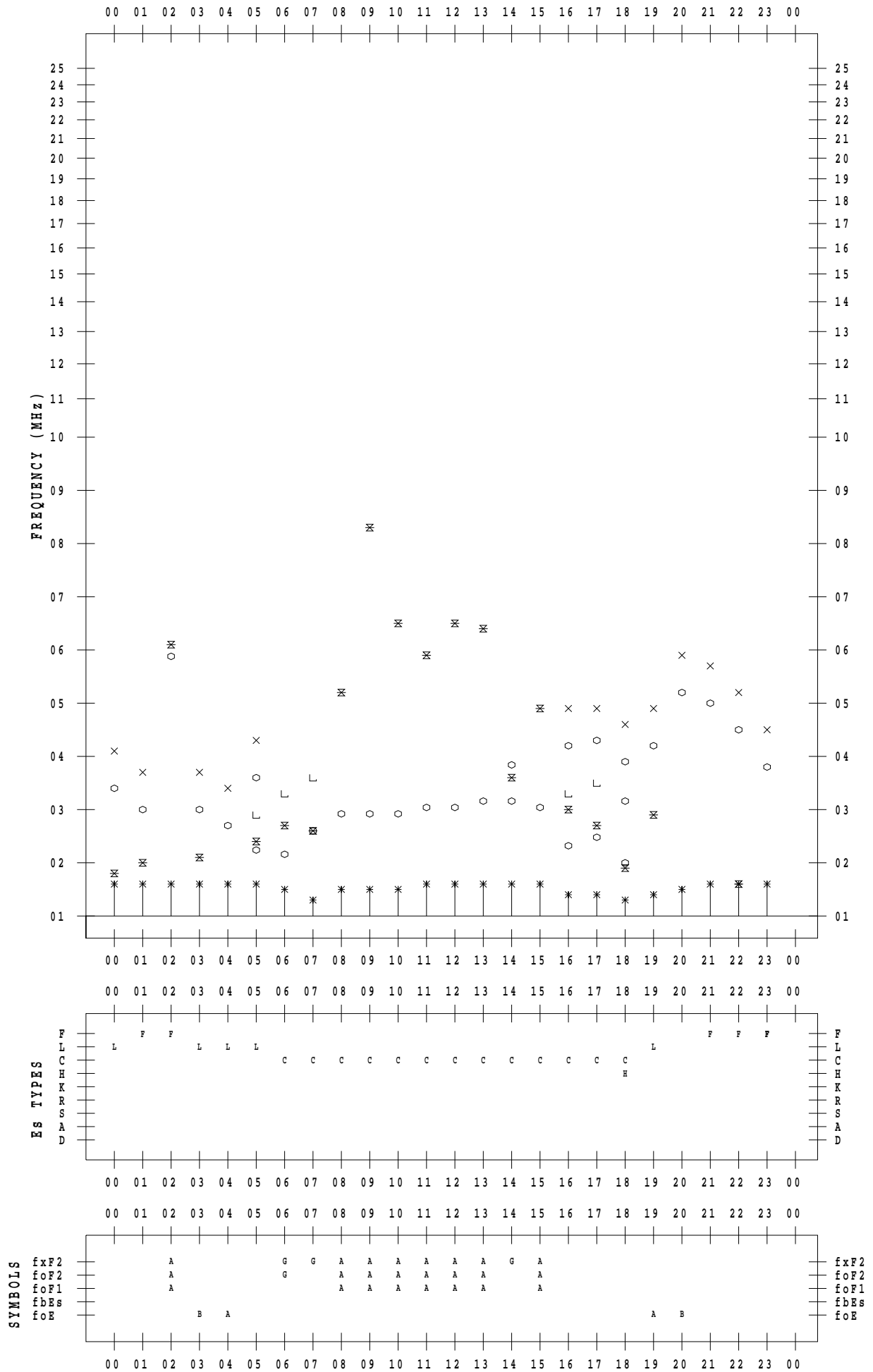
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 11

135 ° E MEAN TIME



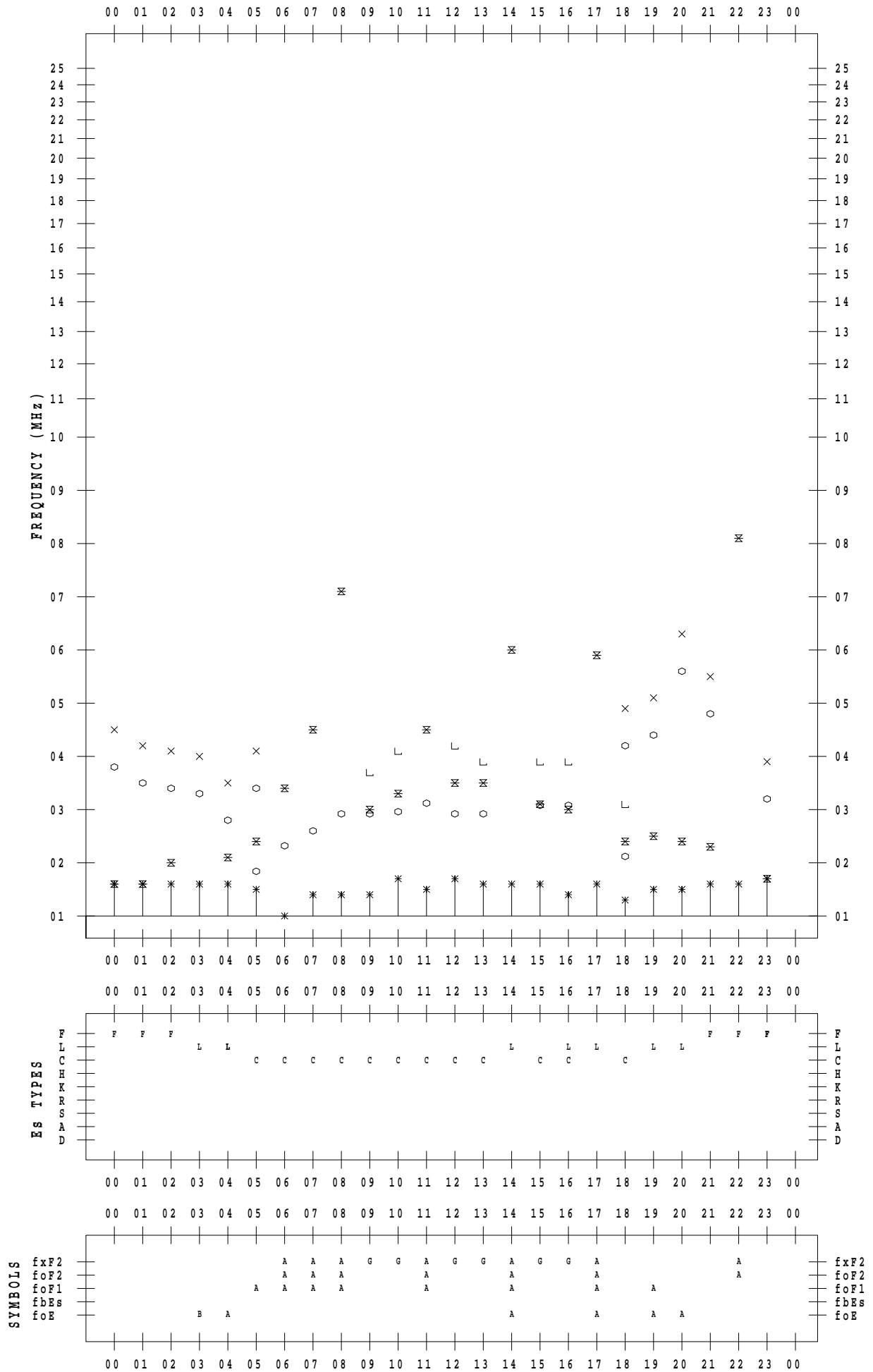
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 12

135 ° E MEAN TIME



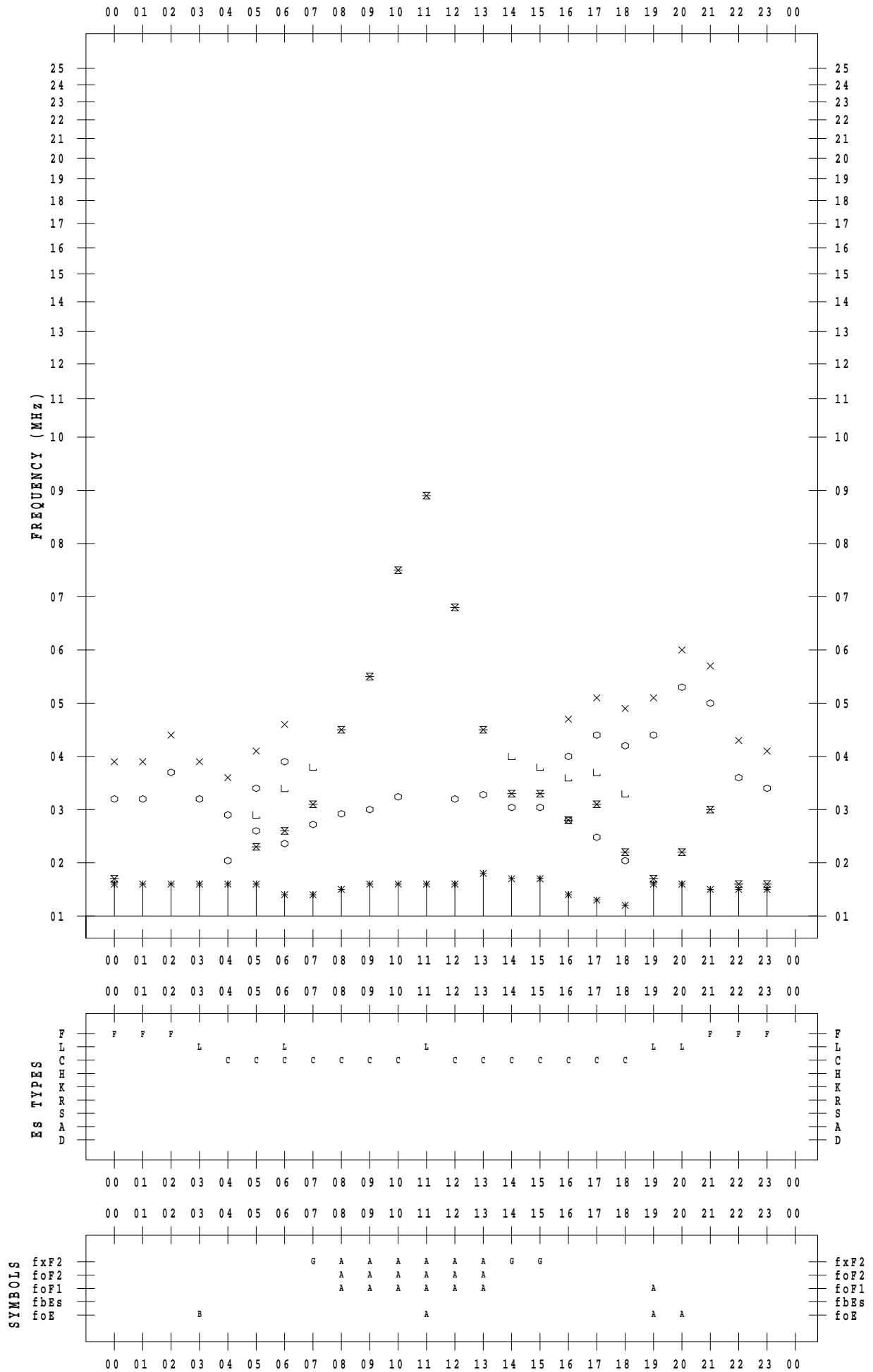
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 13

135 ° E MEAN TIME



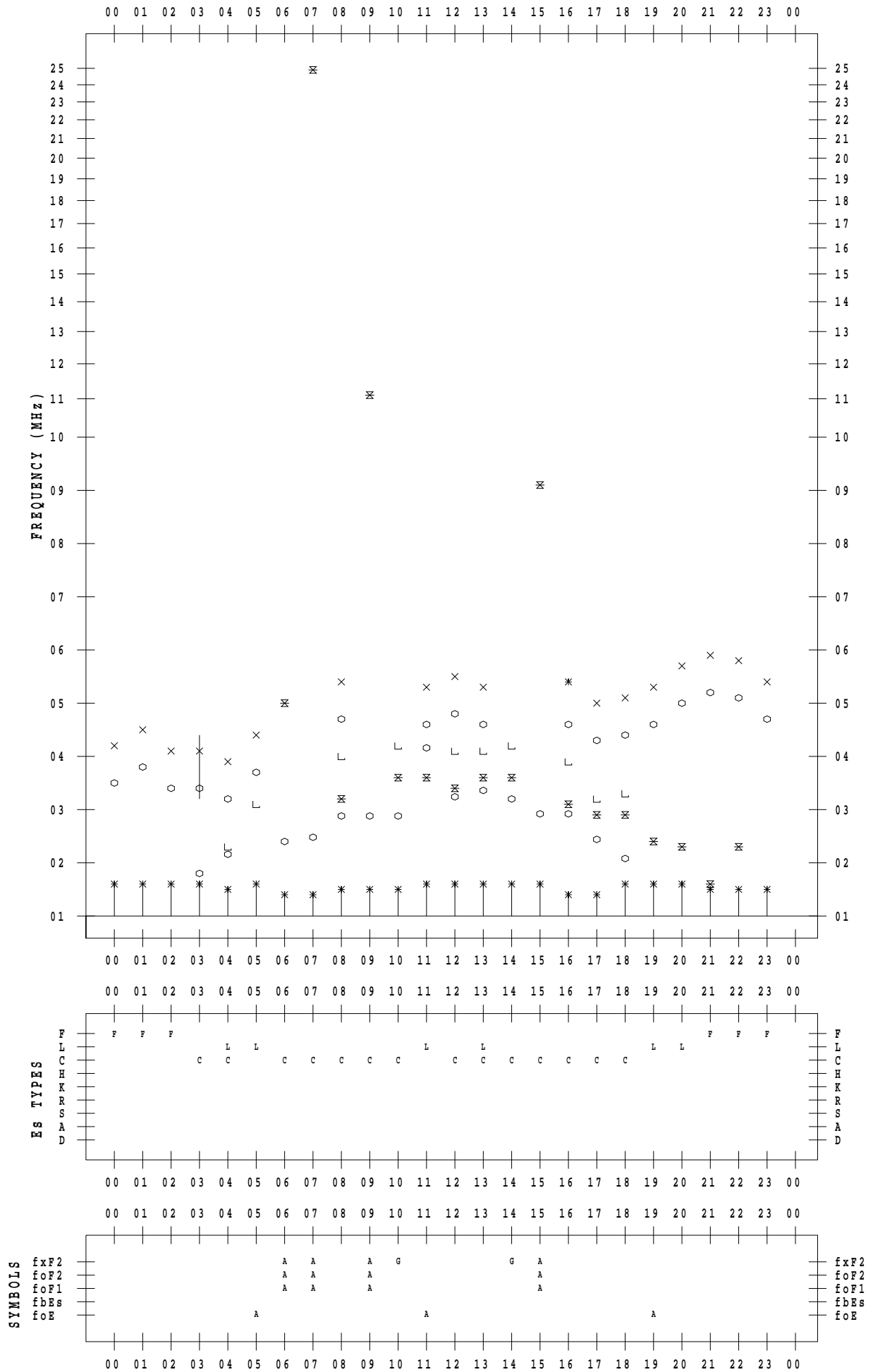
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 14

135 ° E MEAN TIME



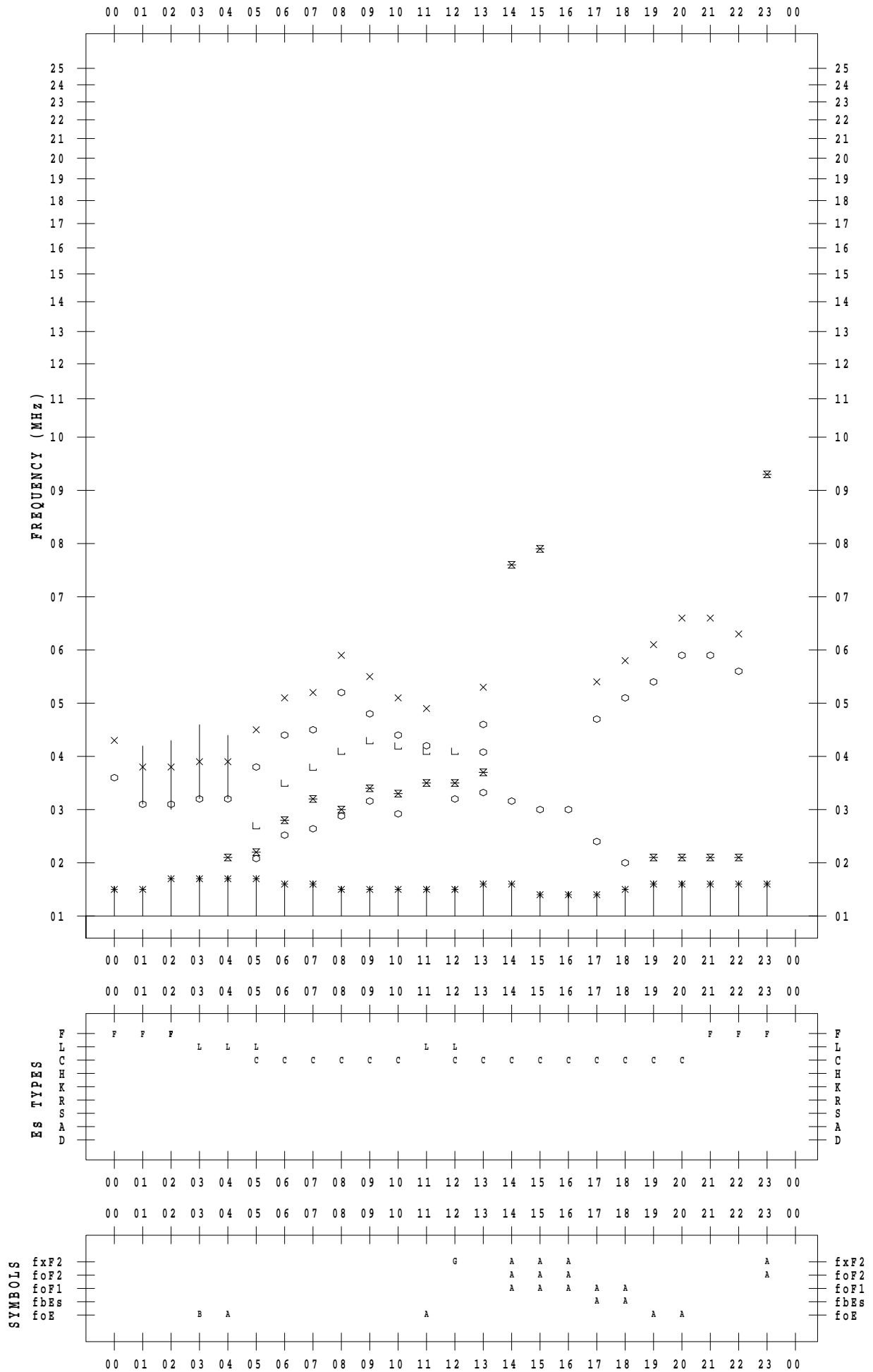
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 15

135 ° E MEAN TIME



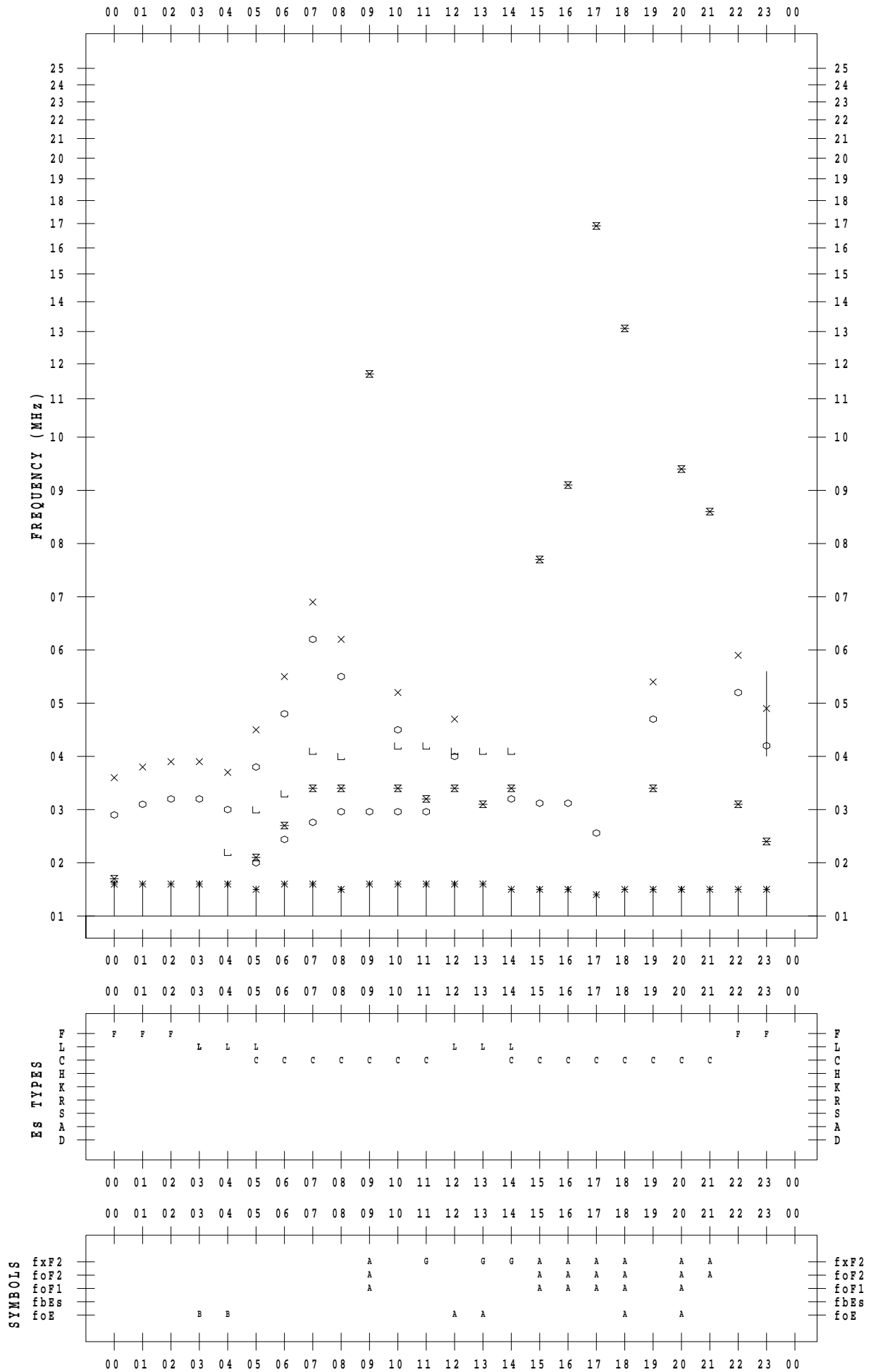
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 16

135 ° E MEAN TIME



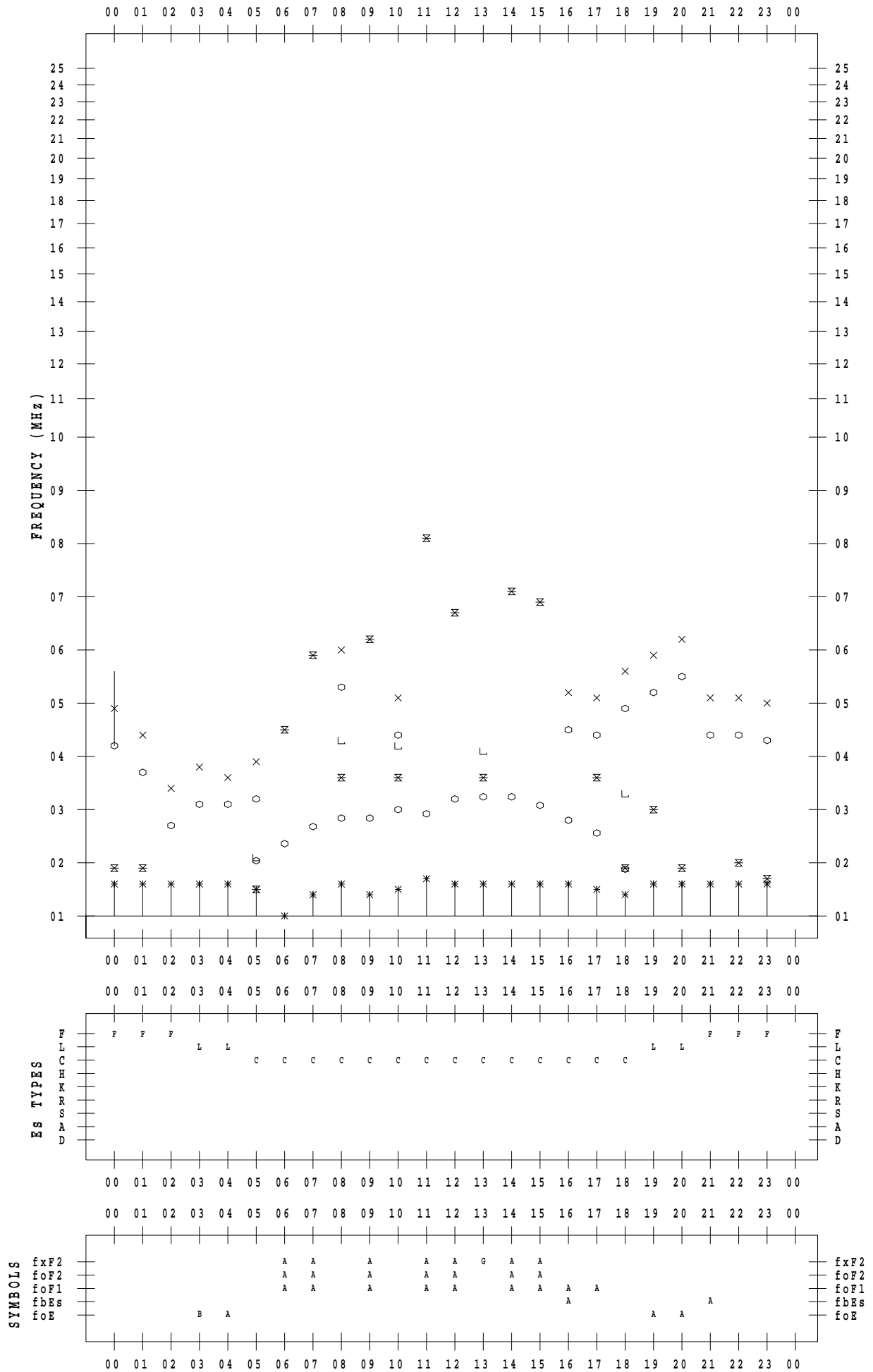
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 17

135 ° E MEAN TIME



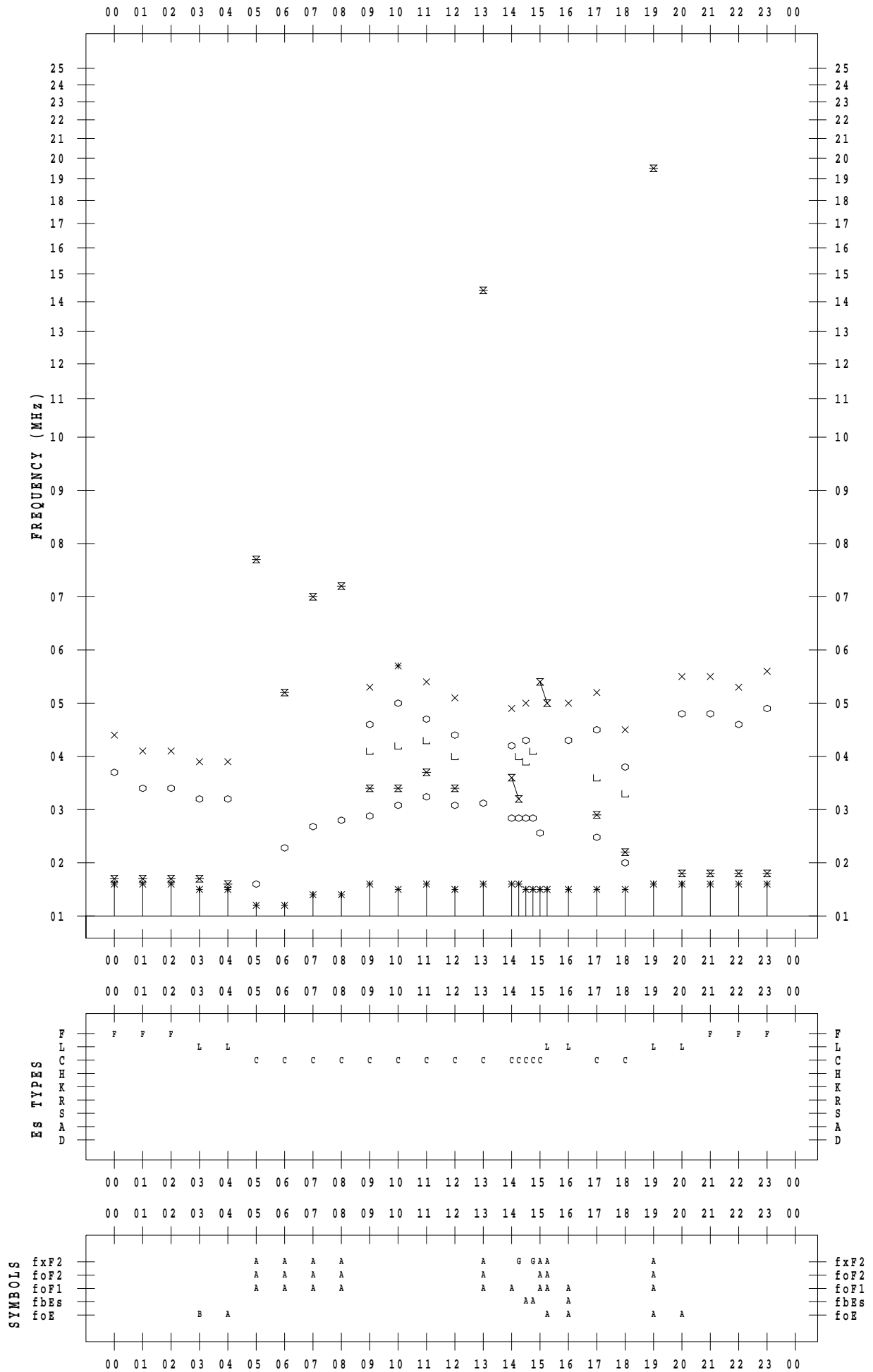
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 18

135 ° E MEAN TIME



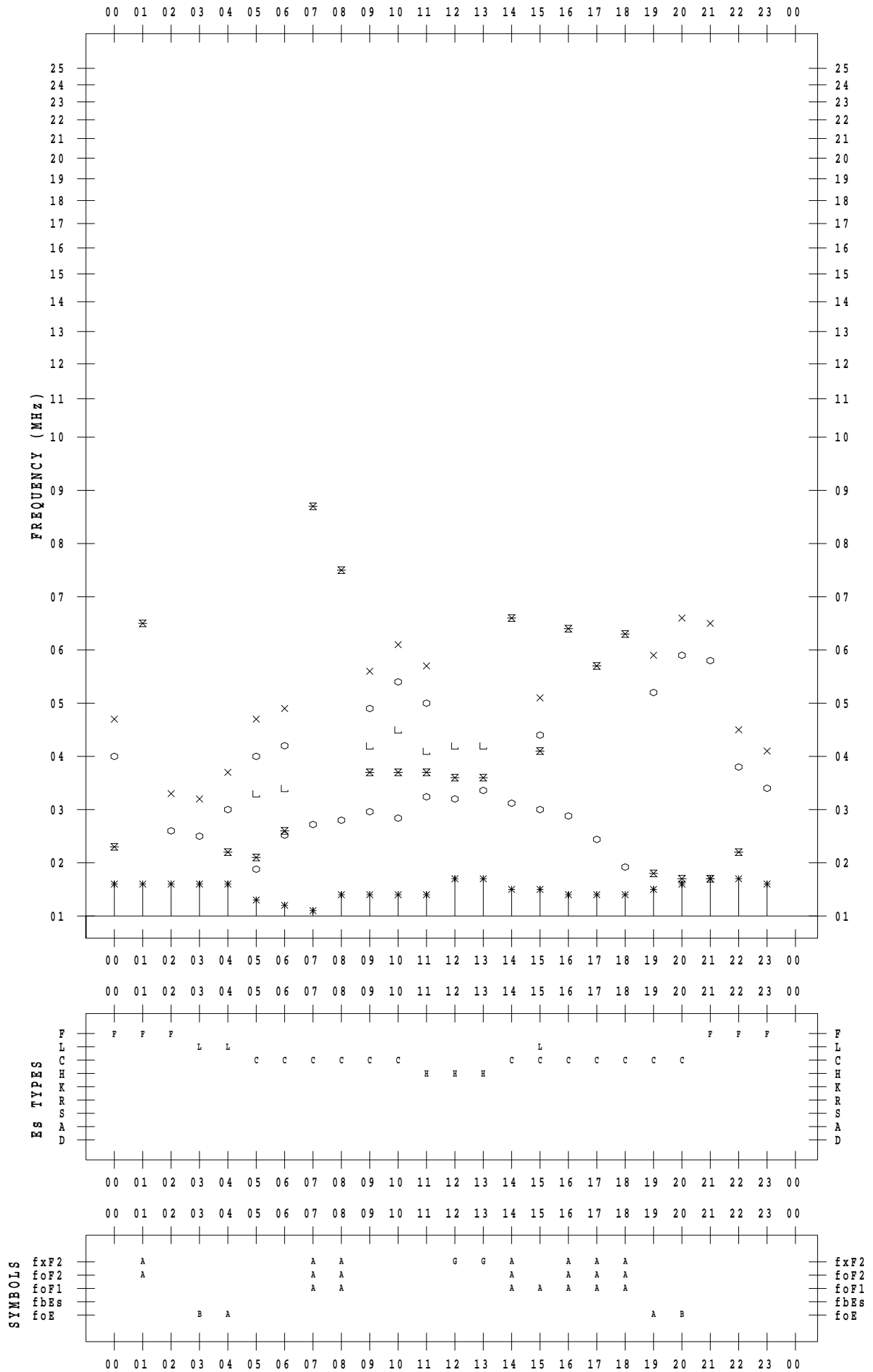
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 19

135 ° E MEAN TIME



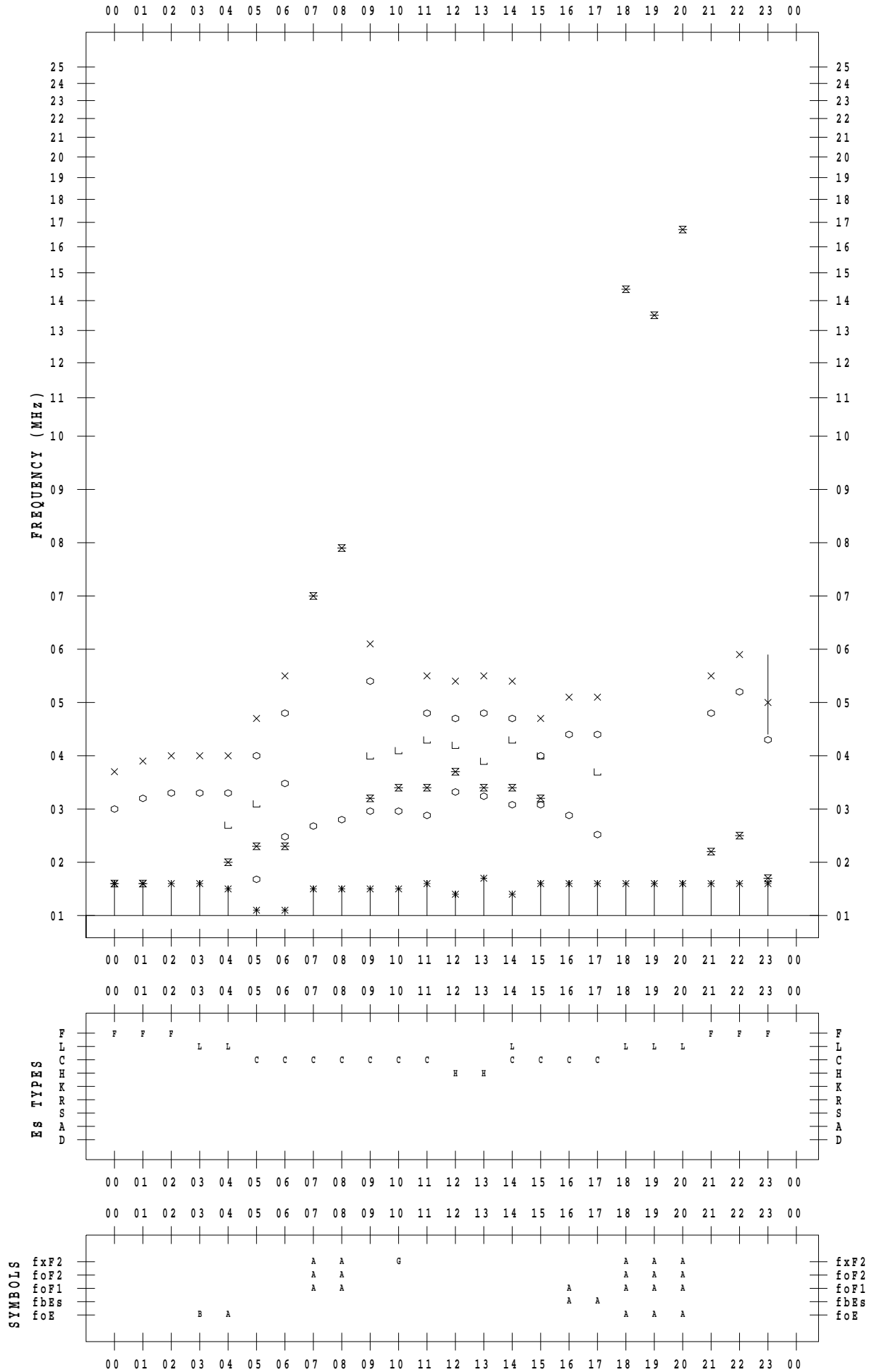
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 20

135 ° E MEAN TIME



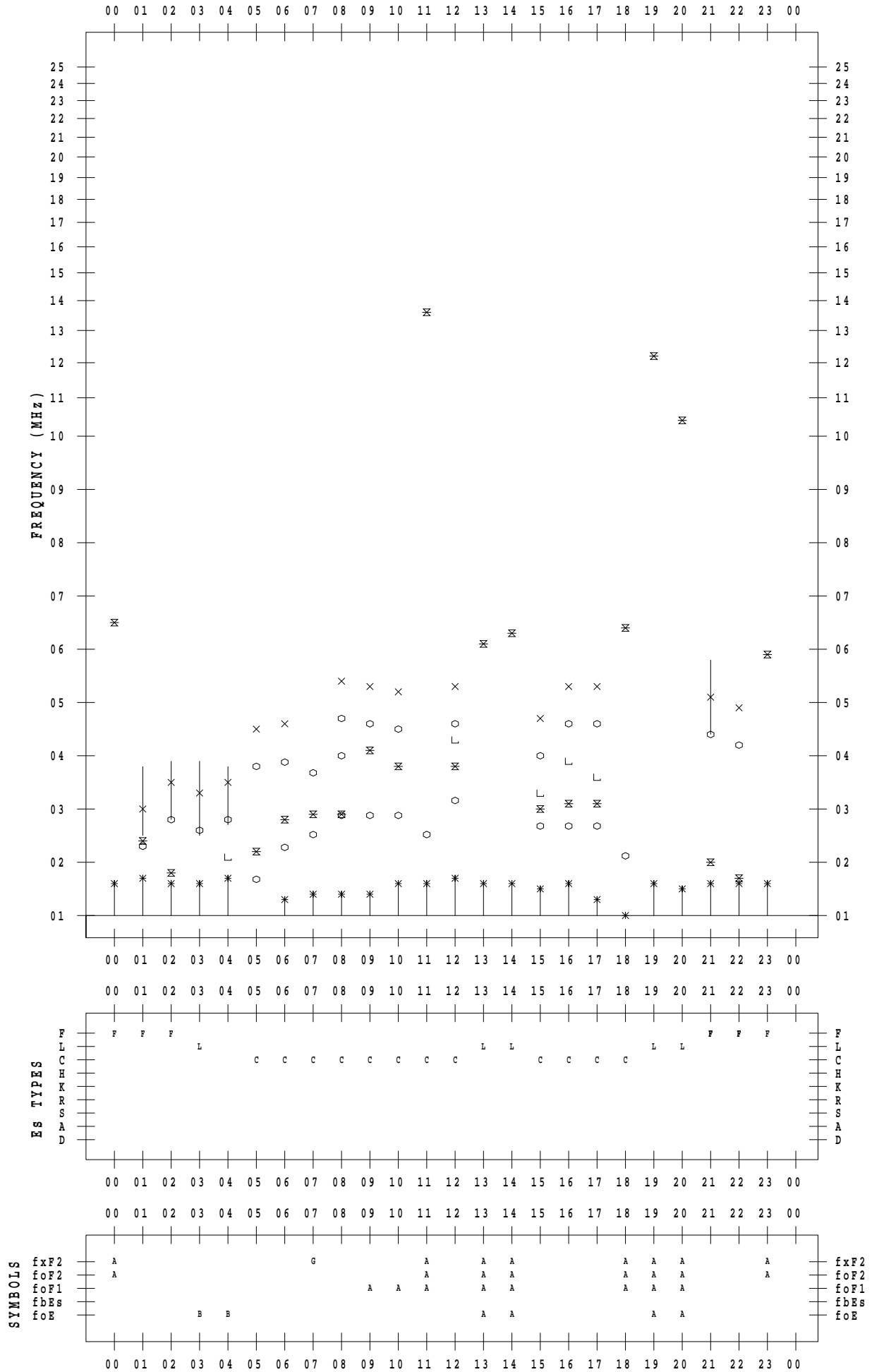
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 21

135 ° E MEAN TIME



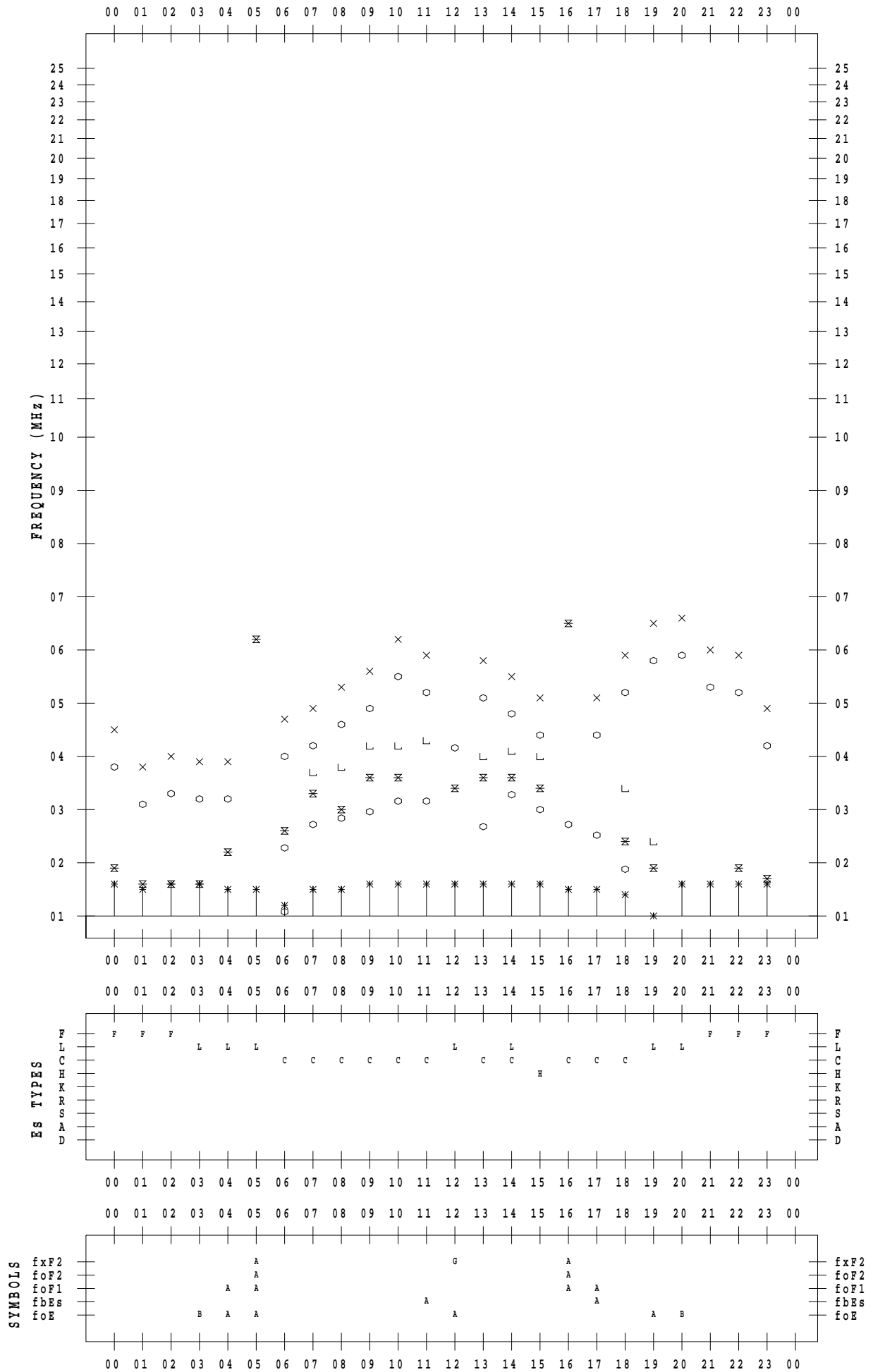
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 22

135 ° E MEAN TIME



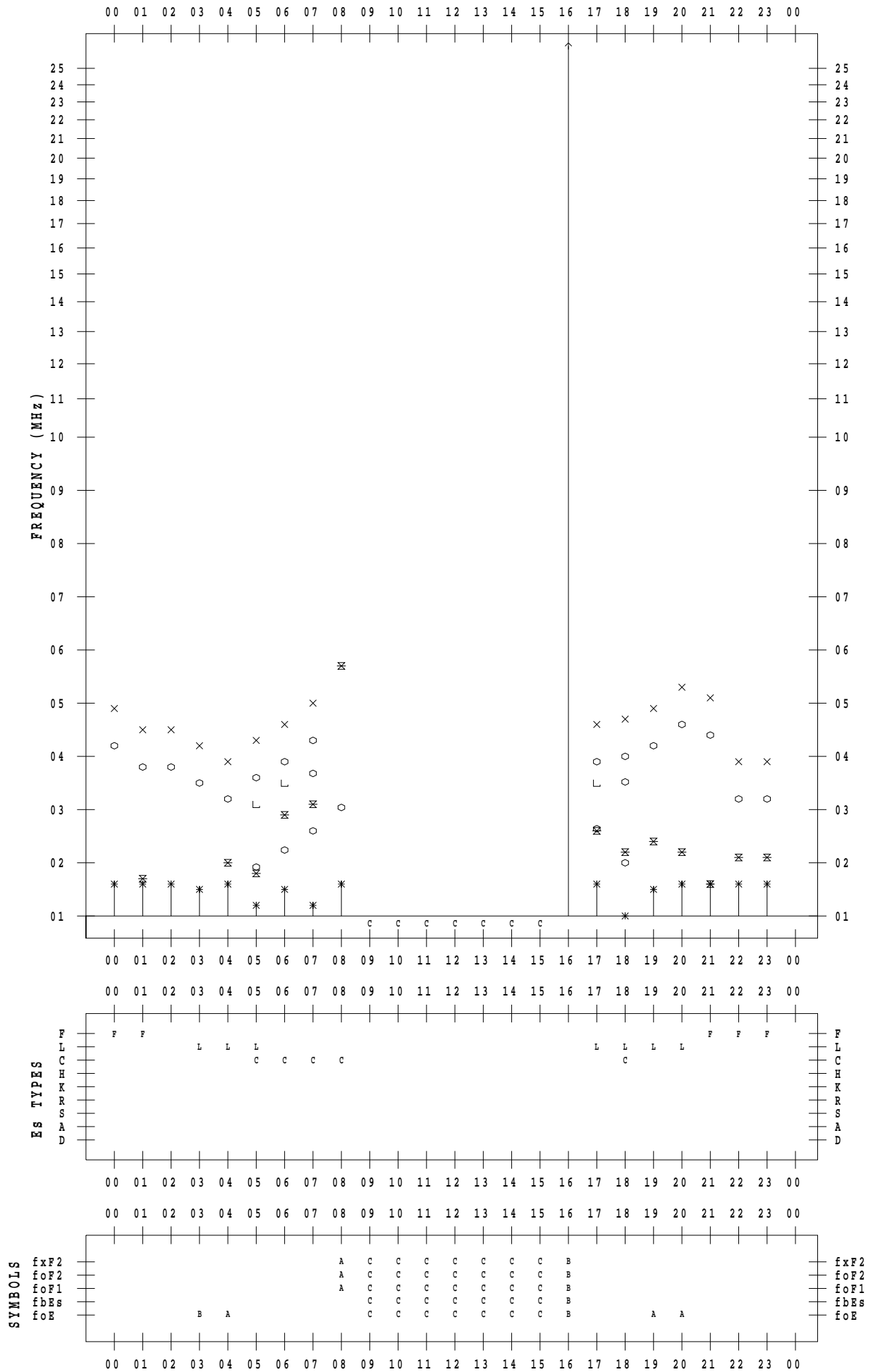
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 23

135 ° E MEAN TIME



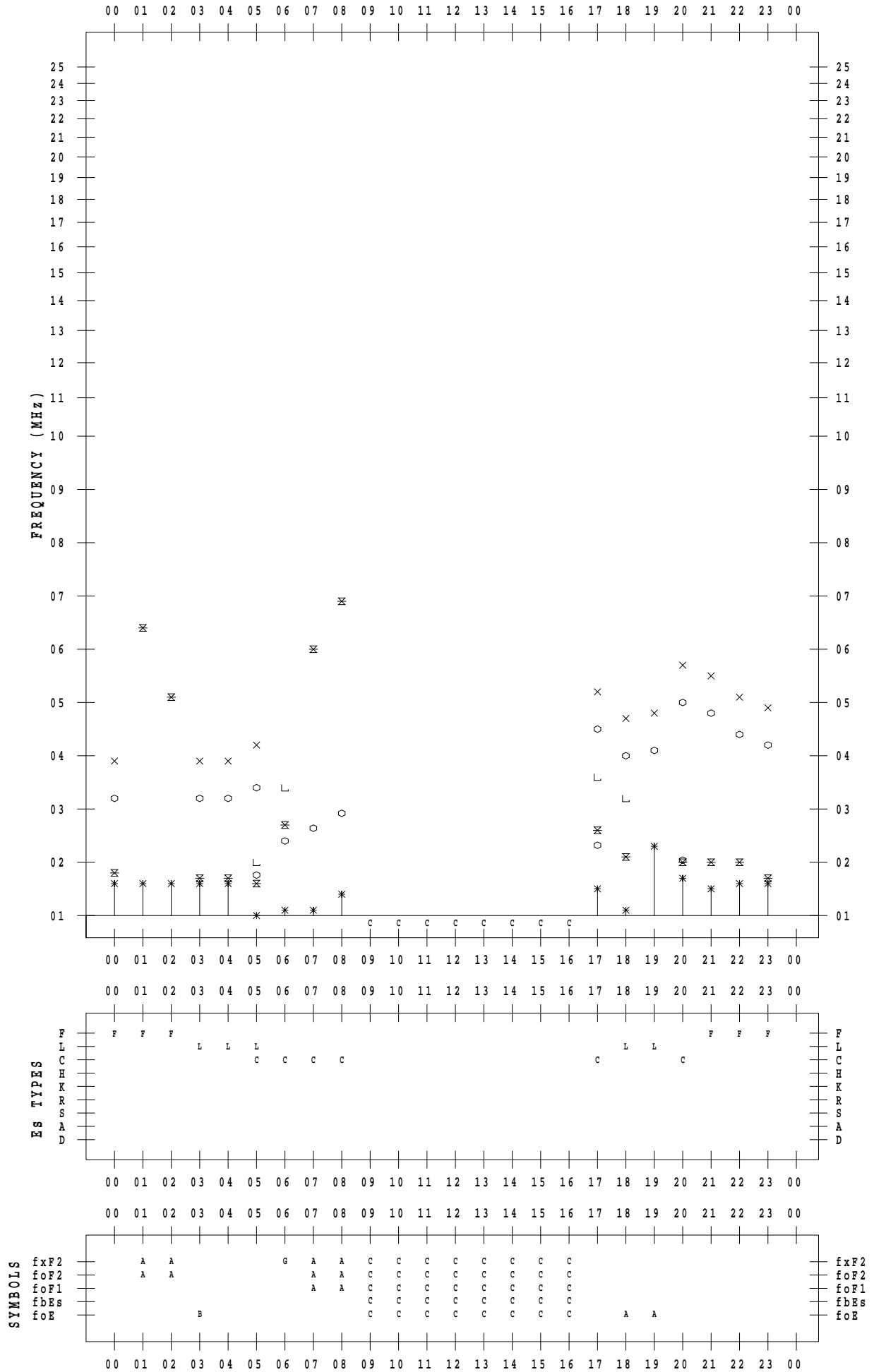
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 24

135 ° E MEAN TIME



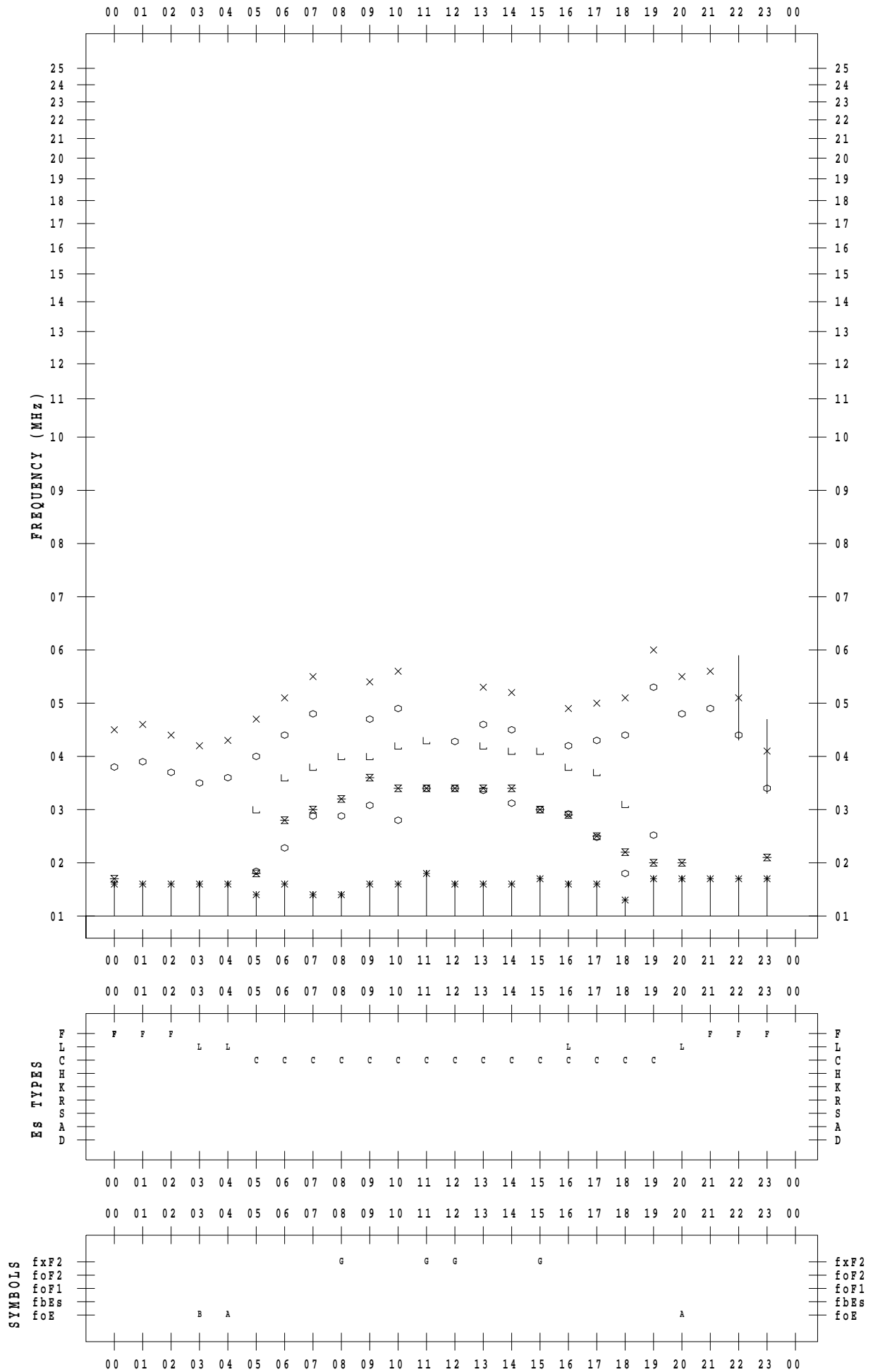
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 25

135 ° E MEAN TIME



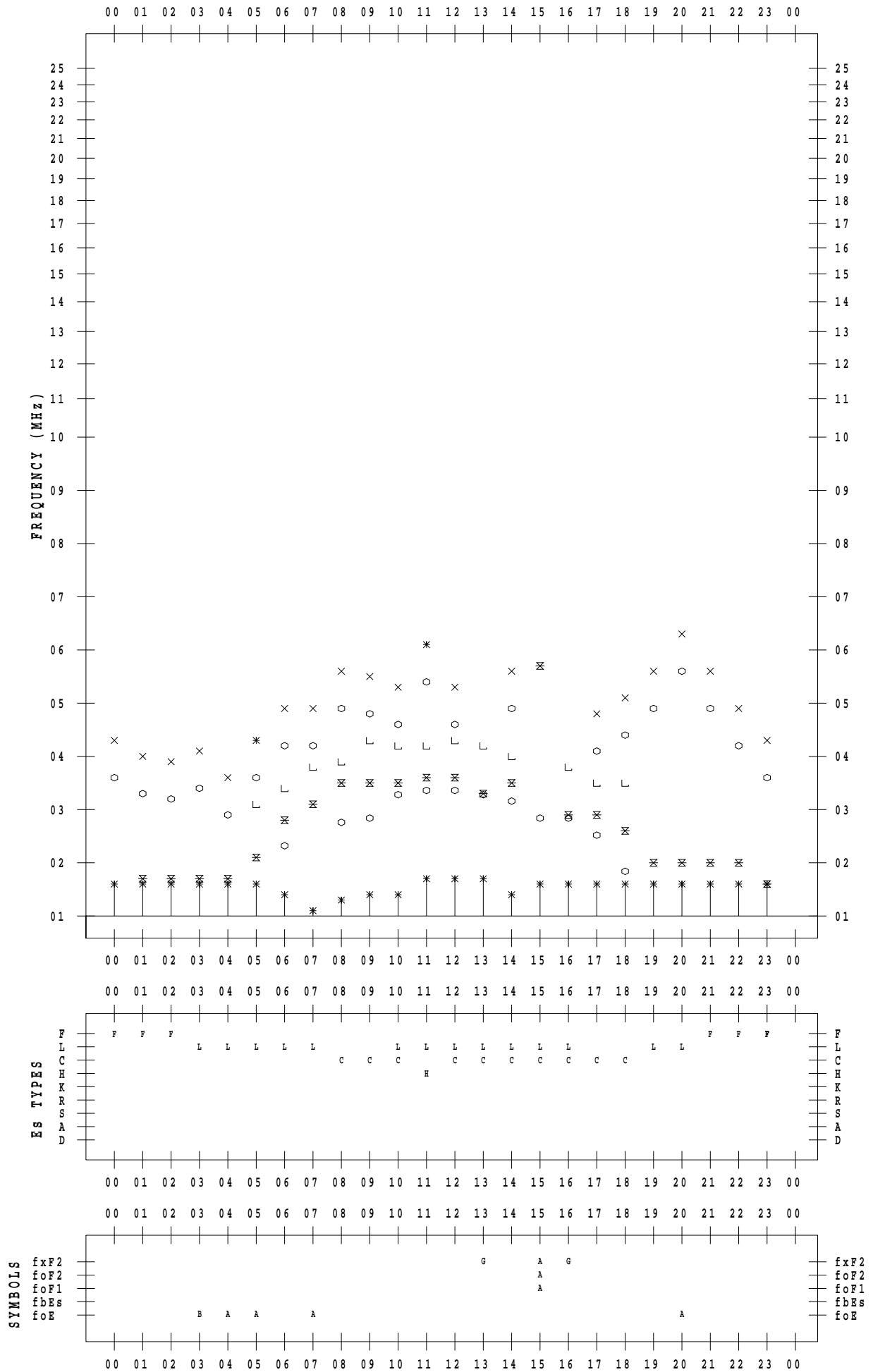
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 26

135 ° E MEAN TIME



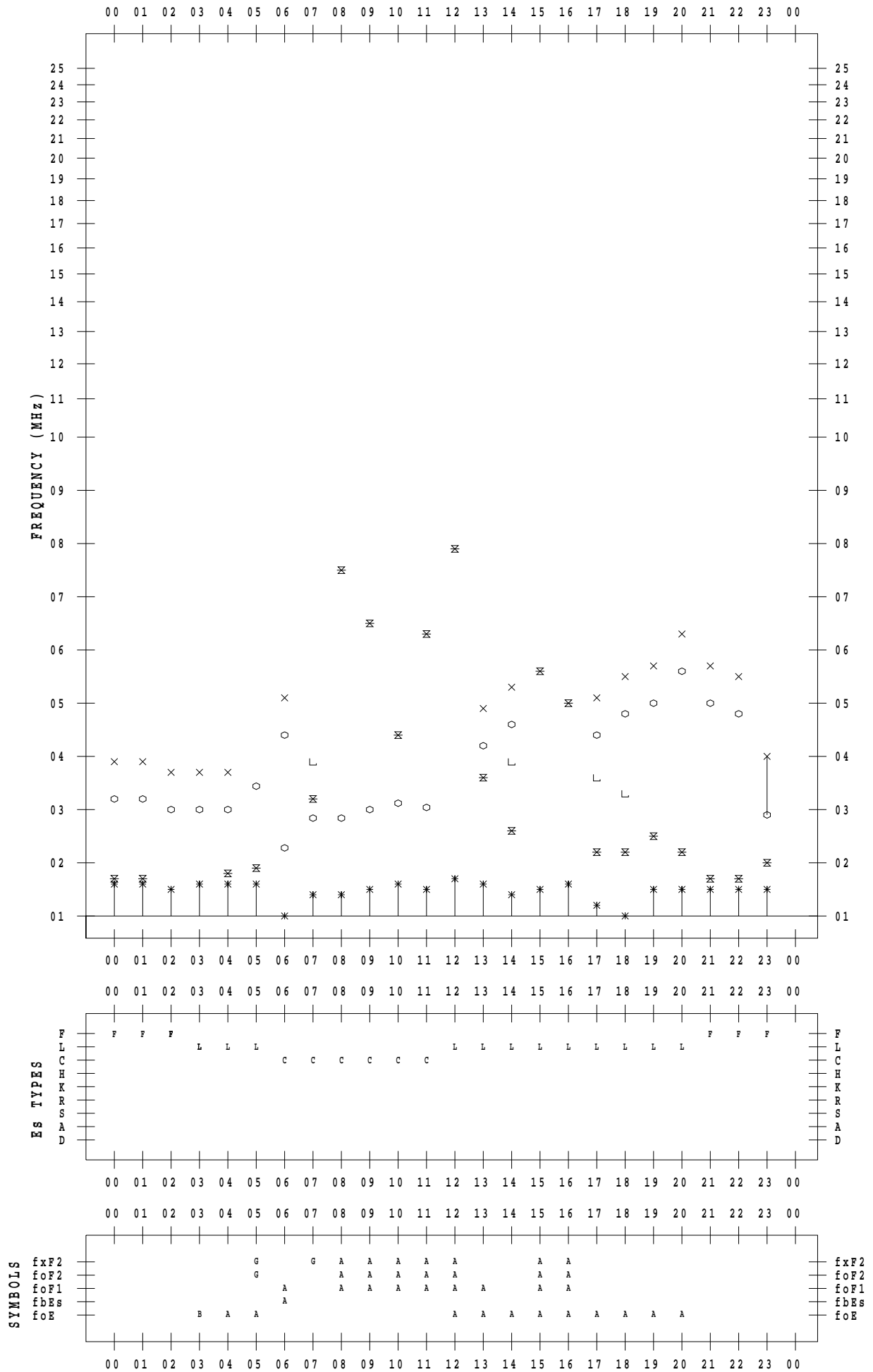
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 27

135 ° E MEAN TIME



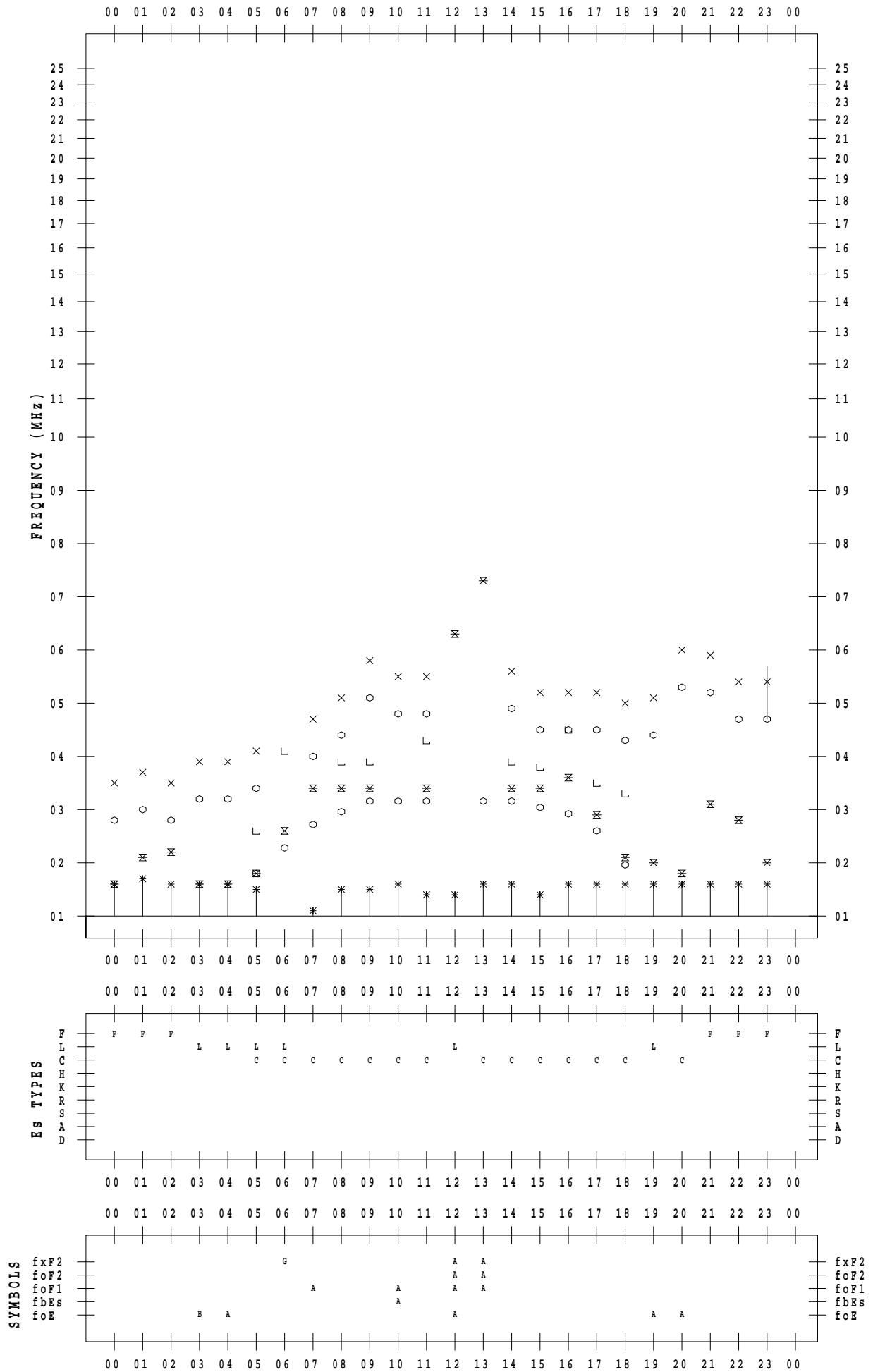
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 28

135 ° E MEAN TIME



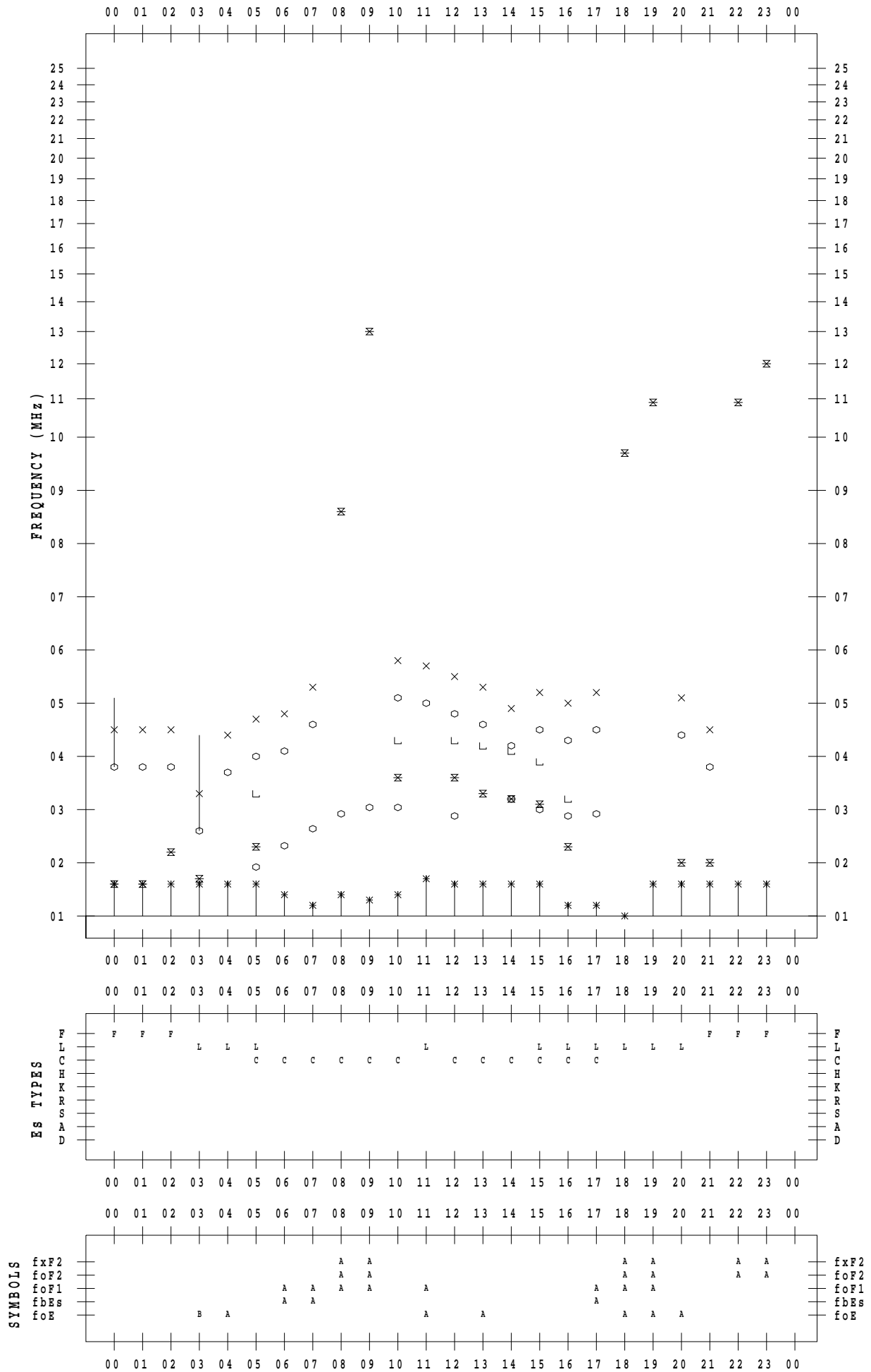
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 29

135 ° E MEAN TIME



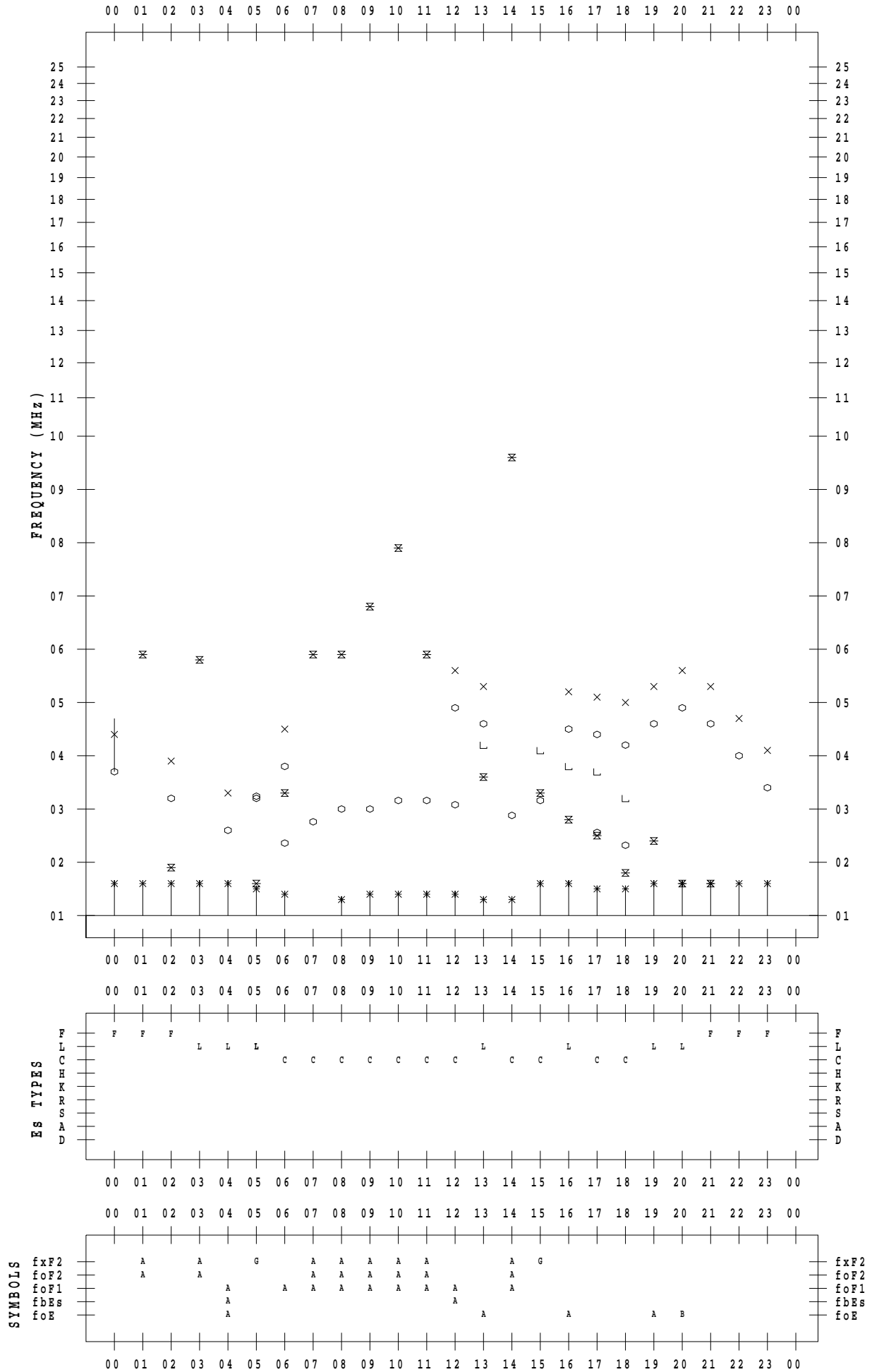
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 30

135 ° E MEAN TIME



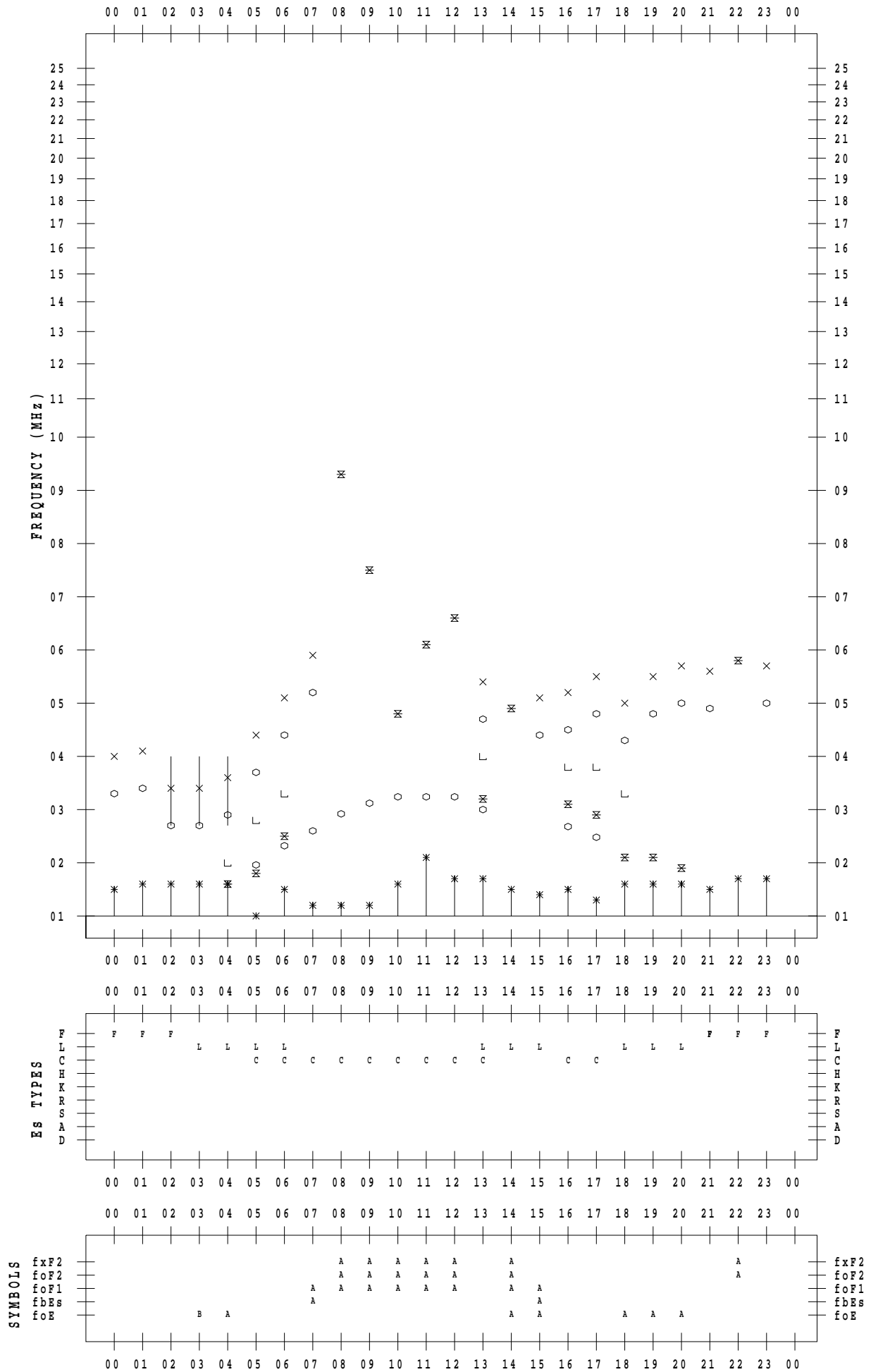
f - PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019 / 7 / 31

135 ° E MEAN TIME



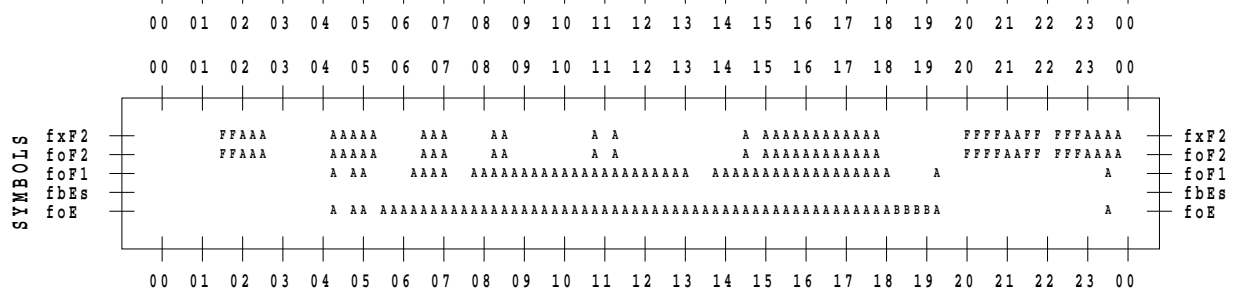
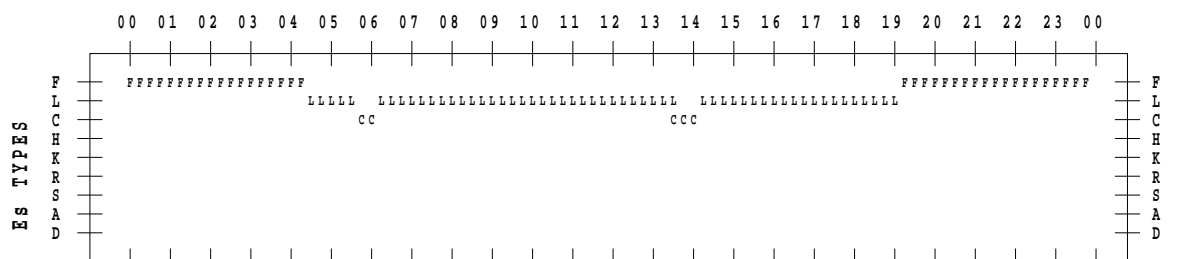
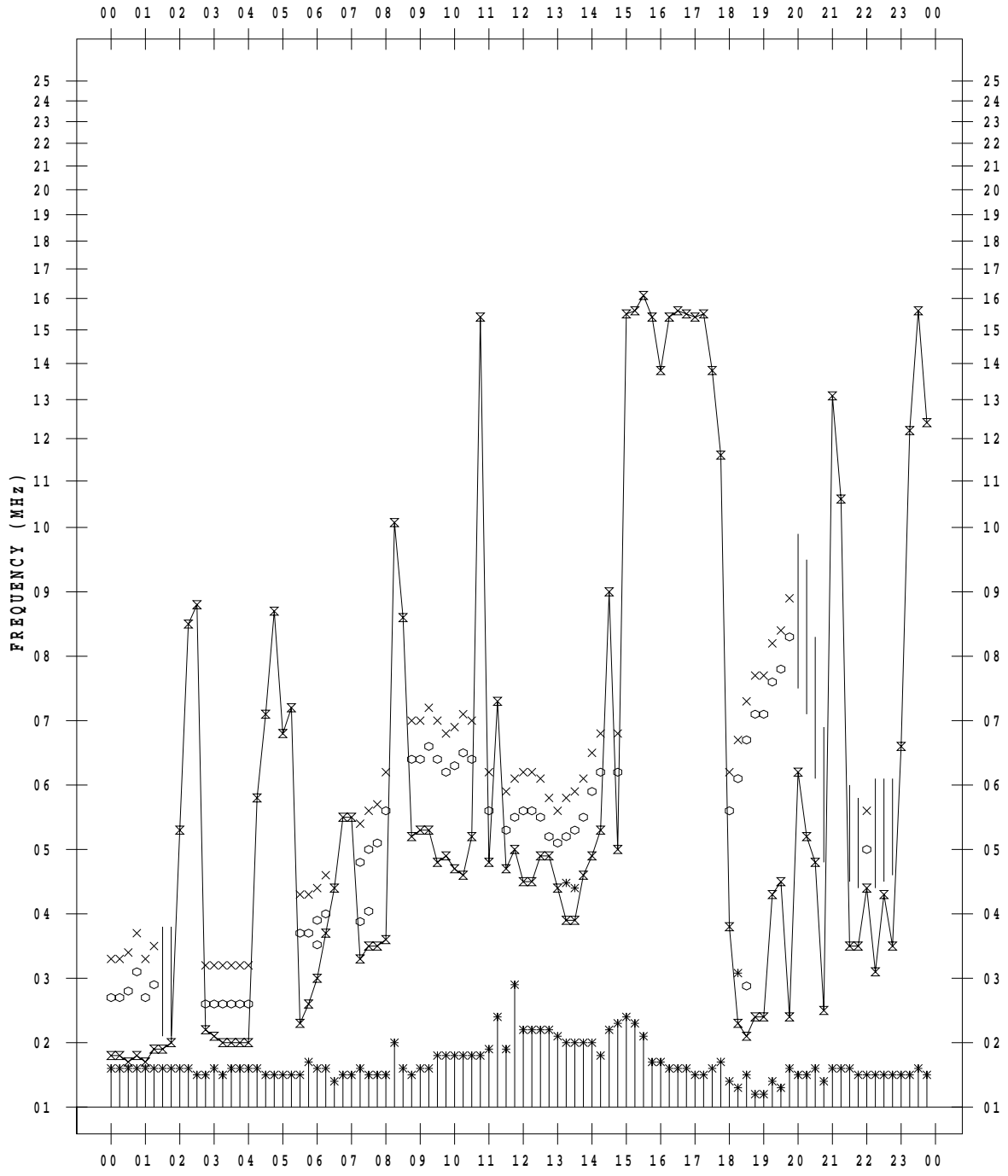
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 1

135 ° E MEAN TIME



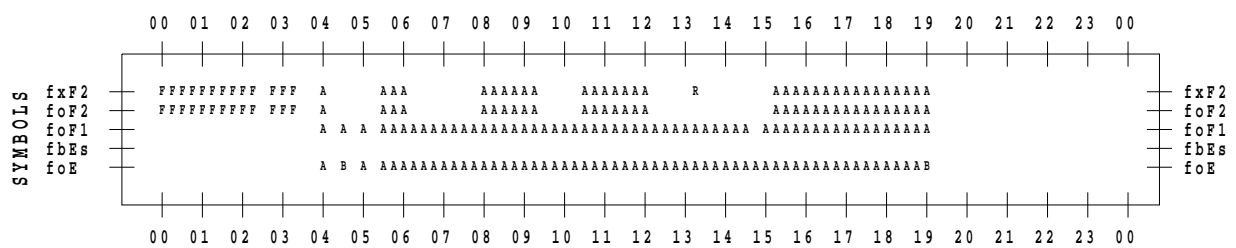
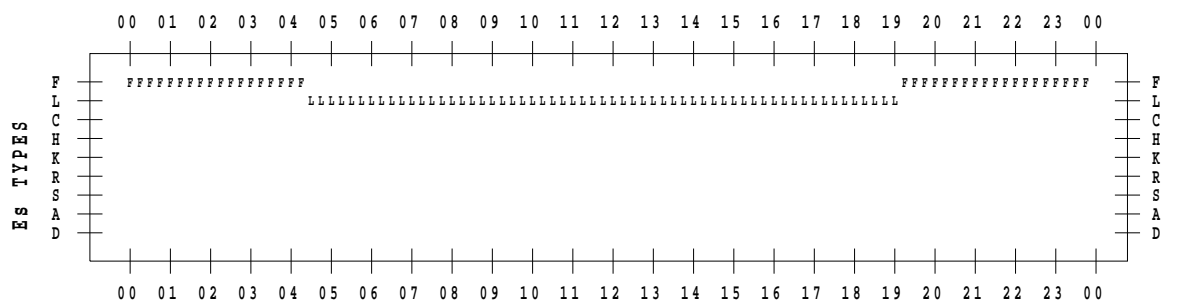
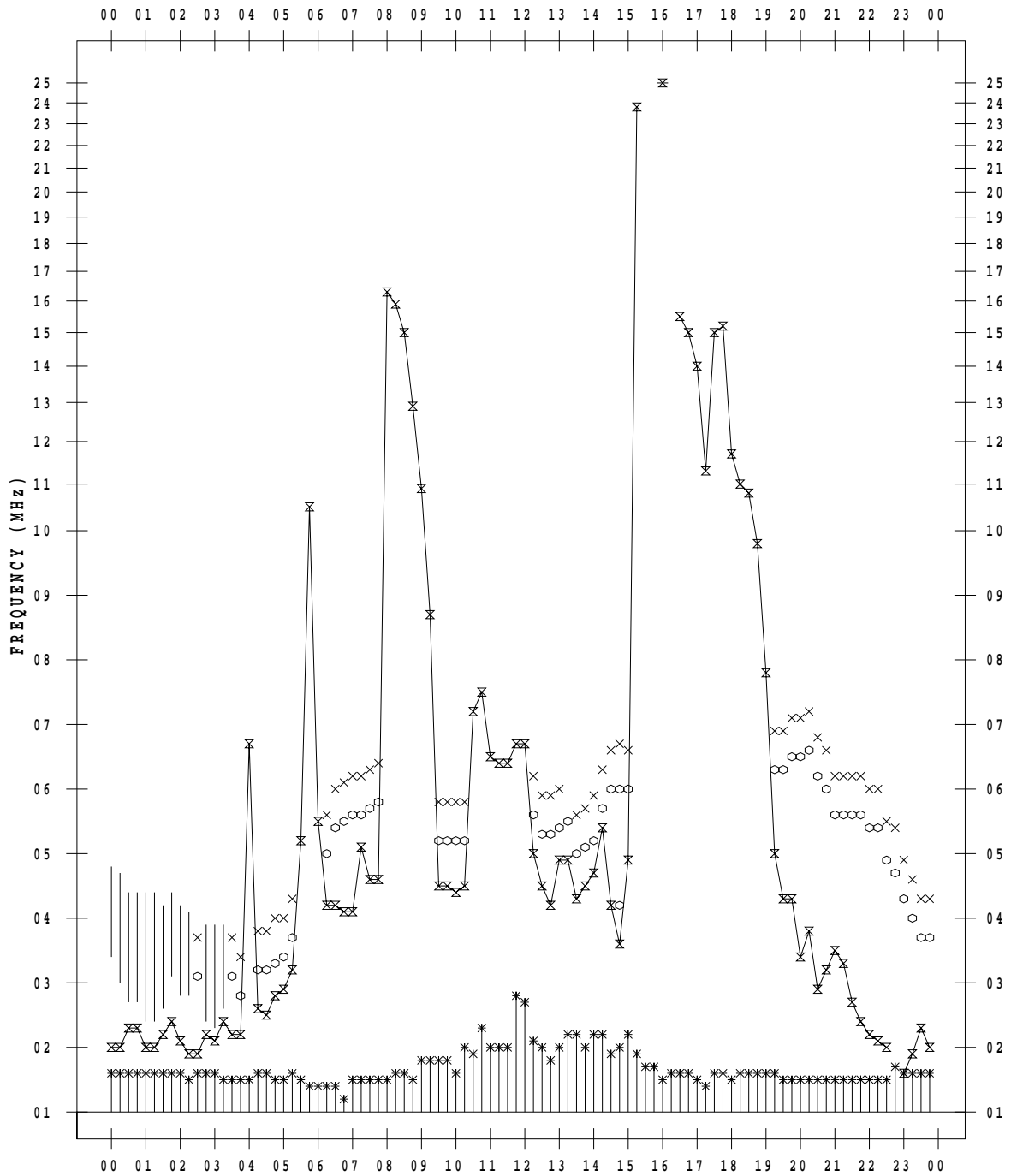
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 2

135 ° E MEAN TIME



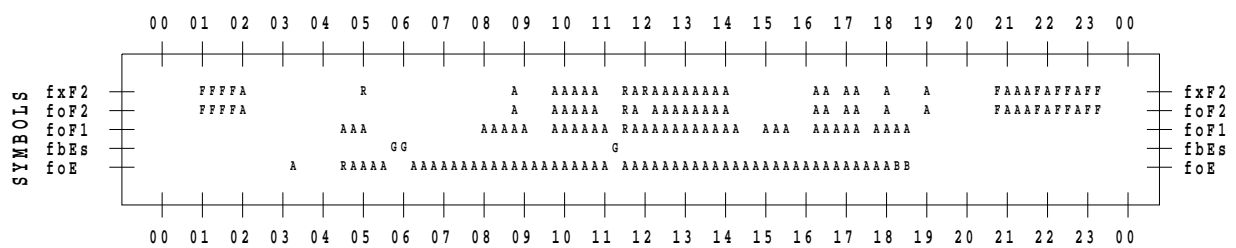
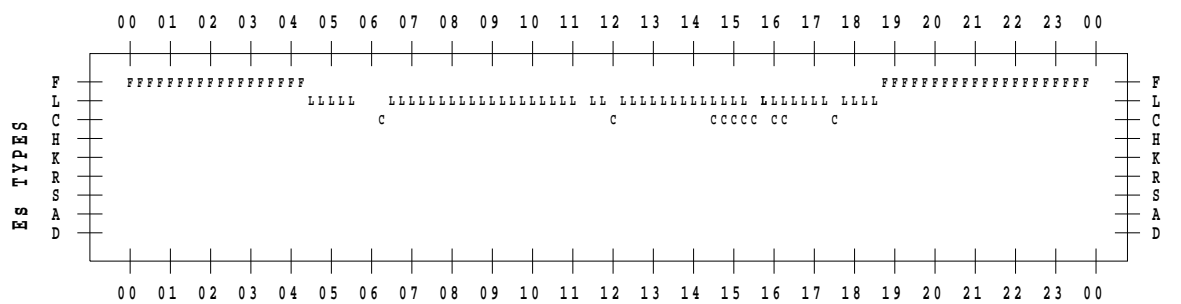
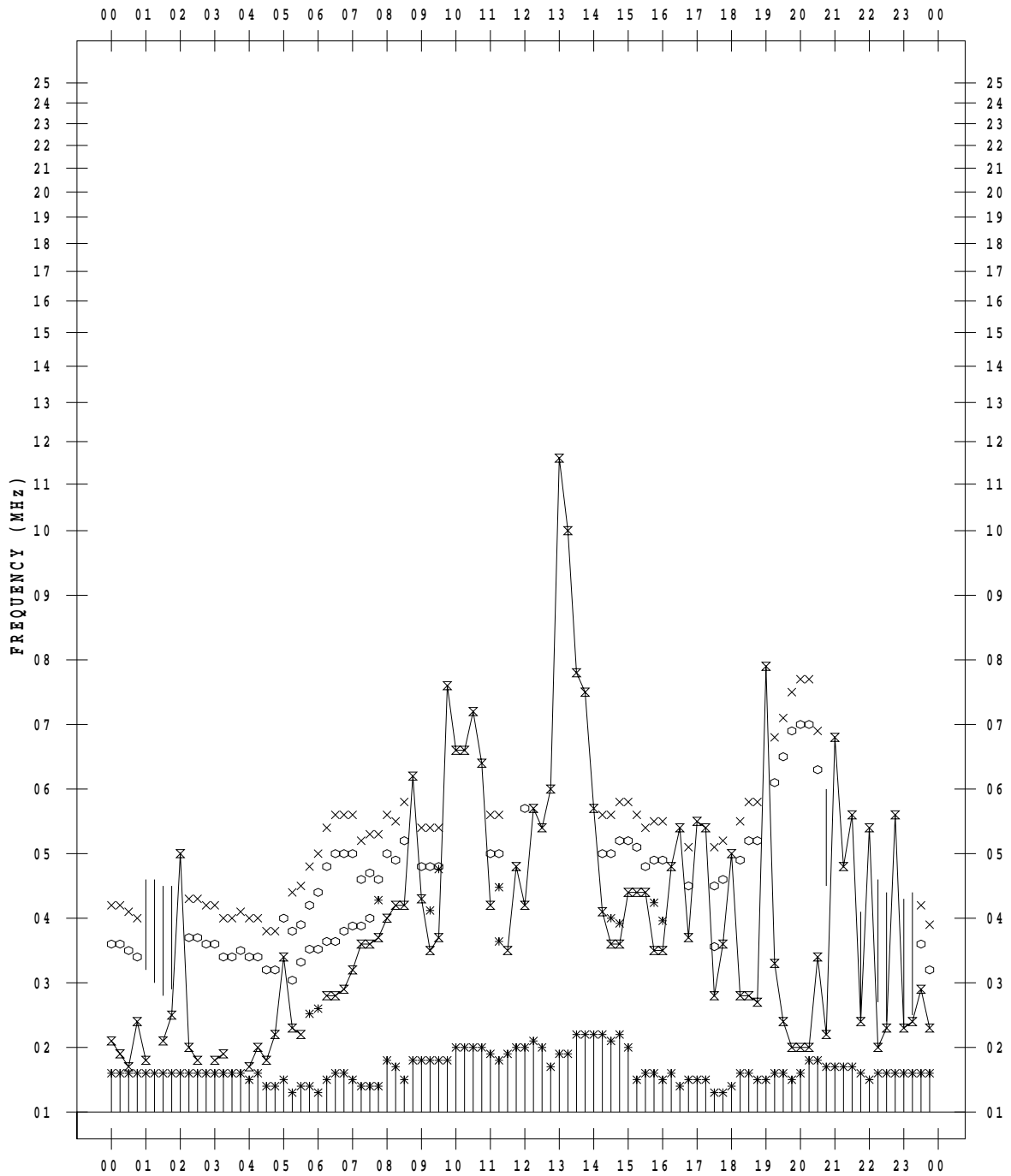
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 3

135 ° E MEAN TIME



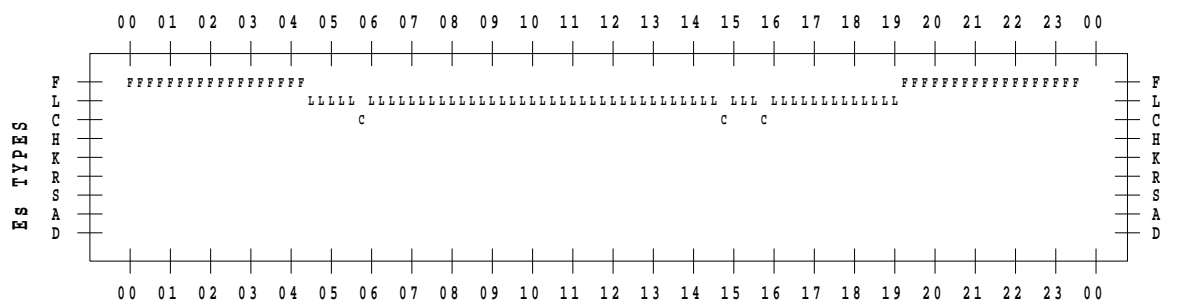
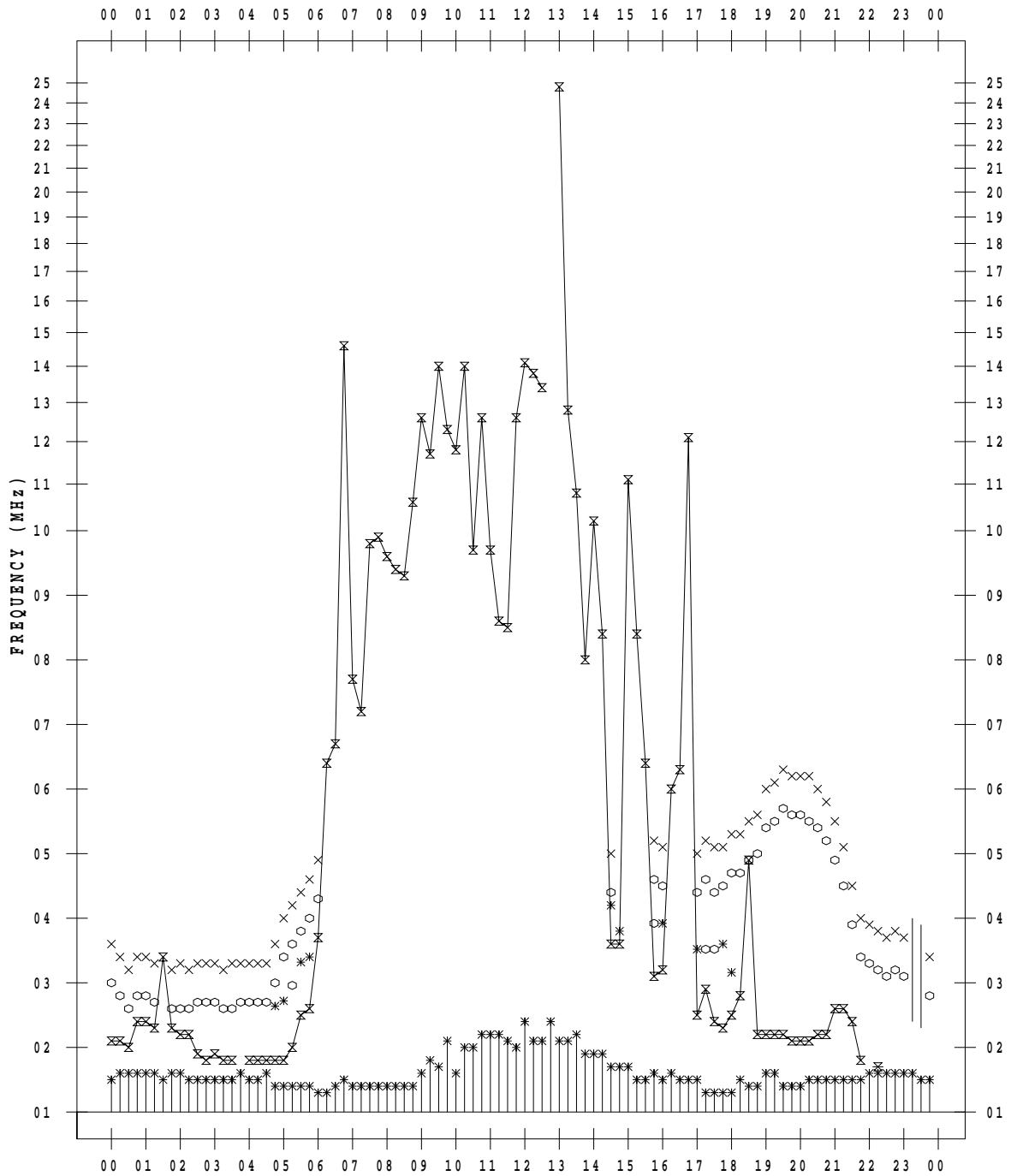
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 4

135 ° E MEAN TIME



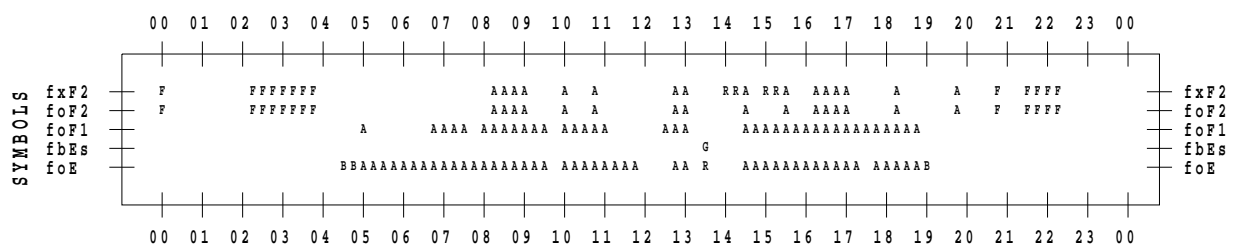
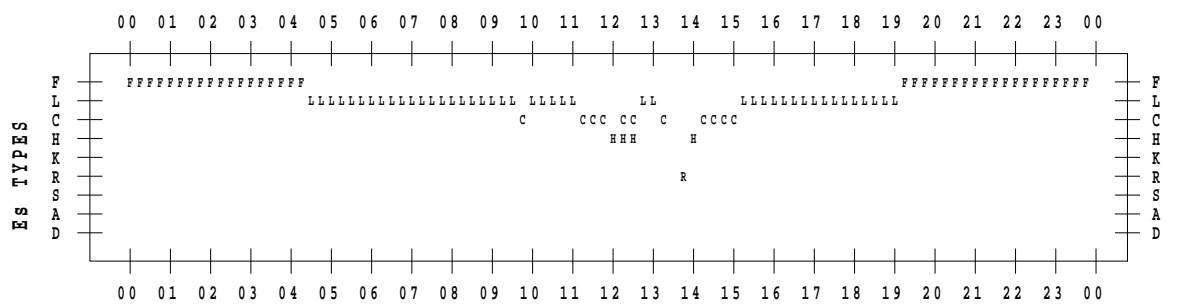
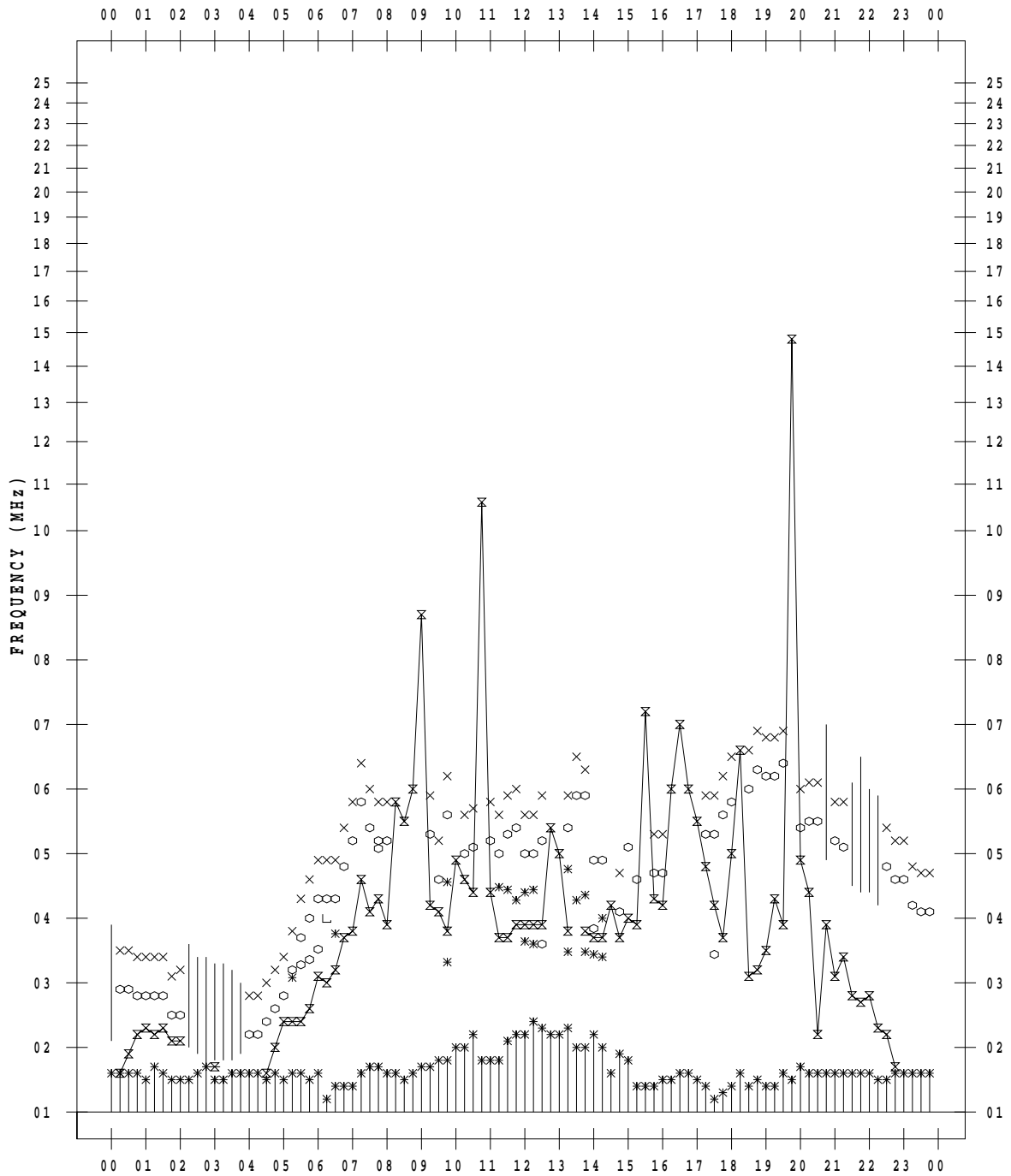
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 5

135 ° E MEAN TIME



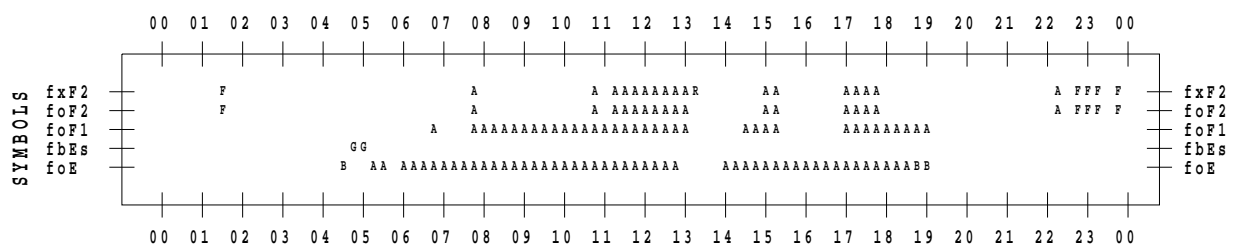
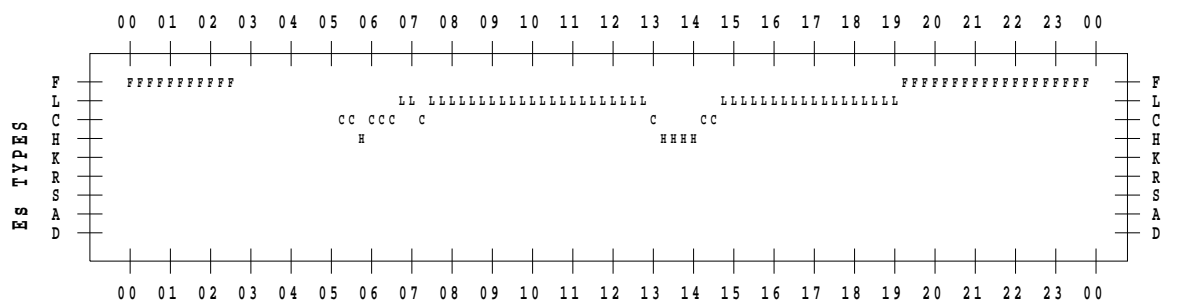
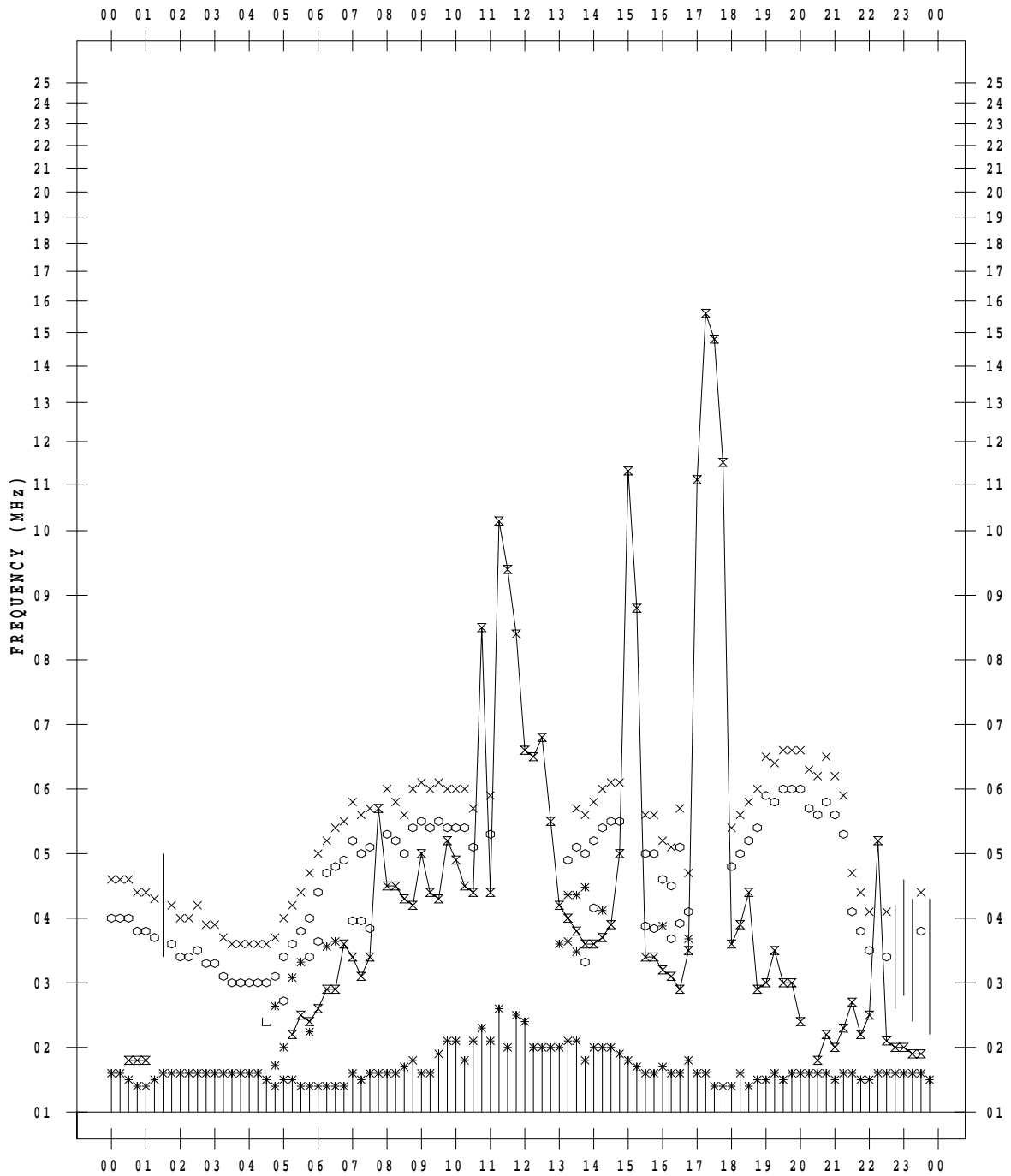
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 6

135 ° E MEAN TIME



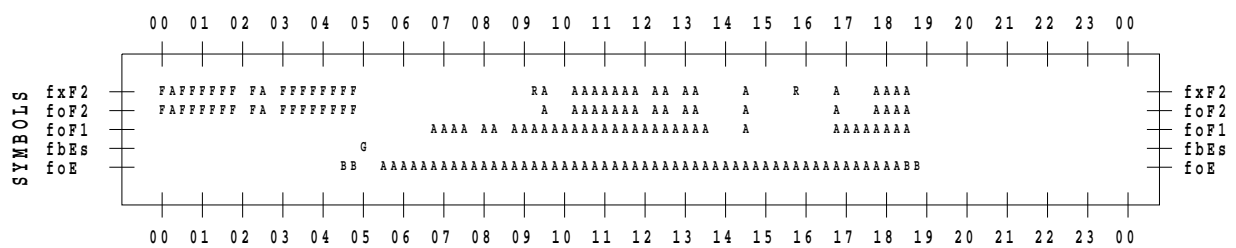
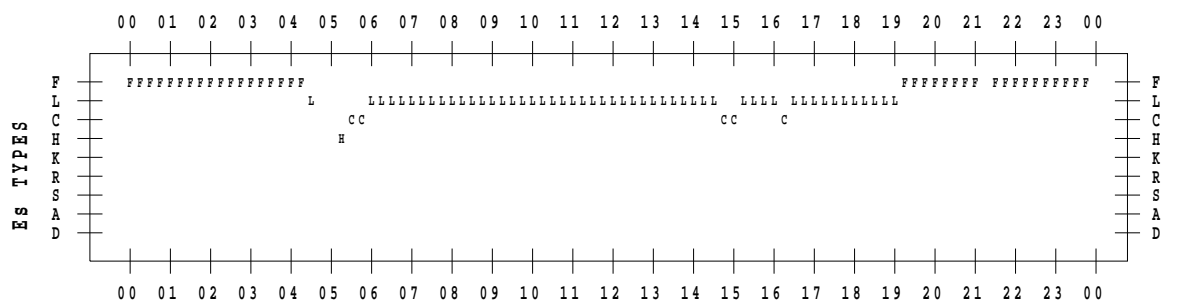
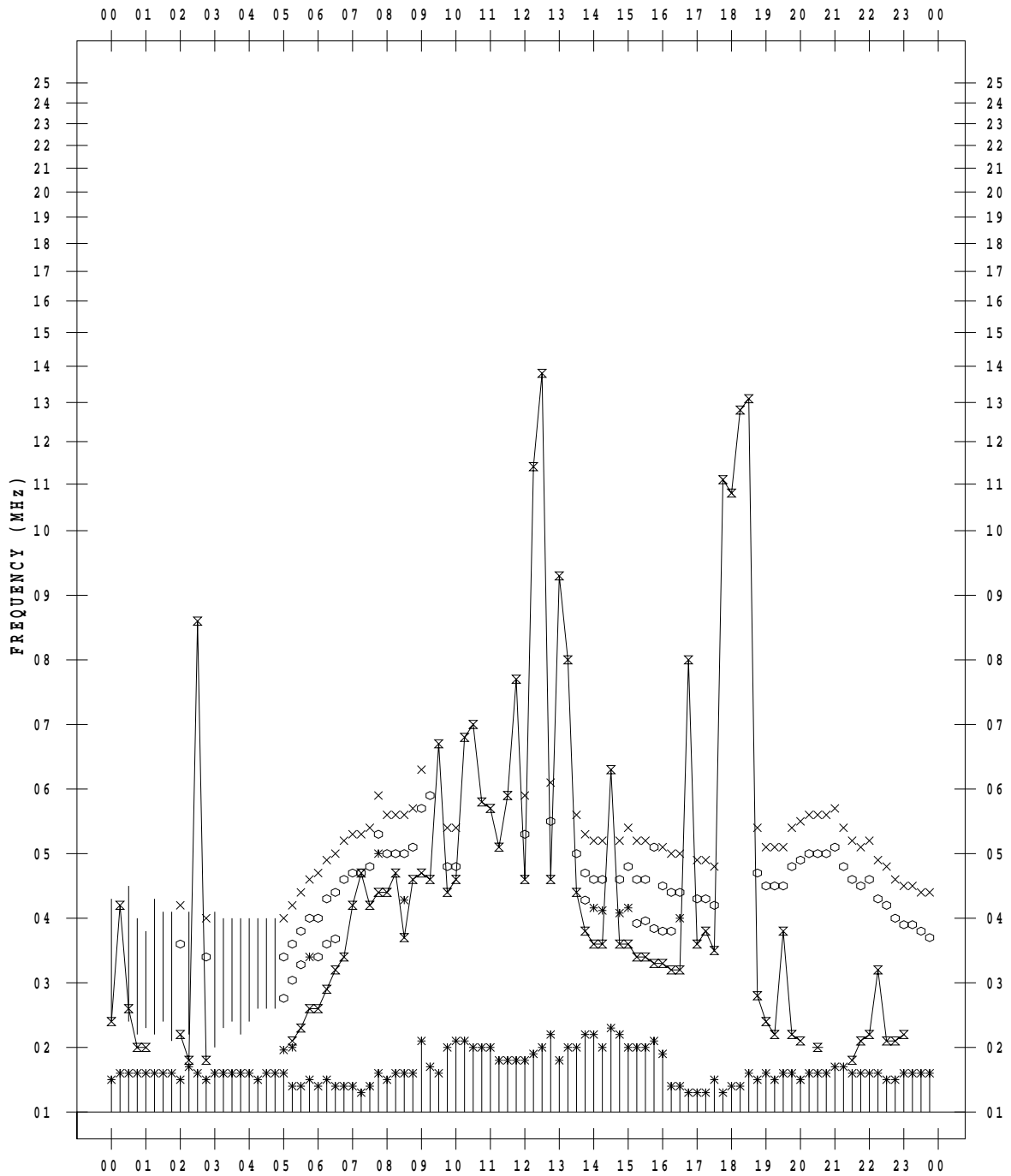
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 7

135 ° E MEAN TIME



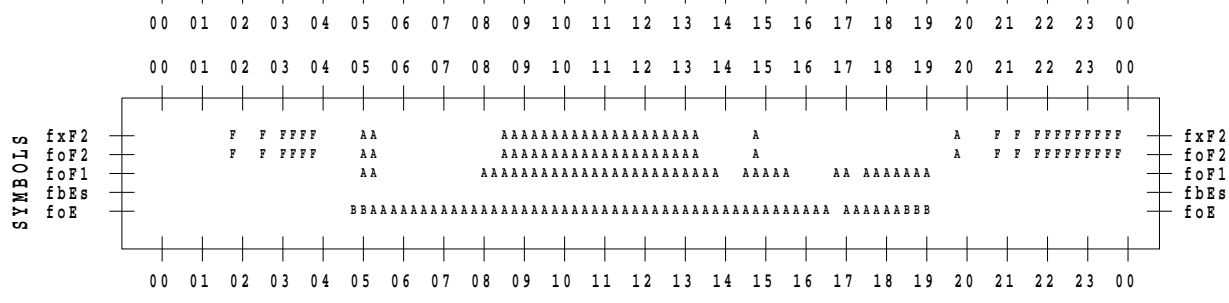
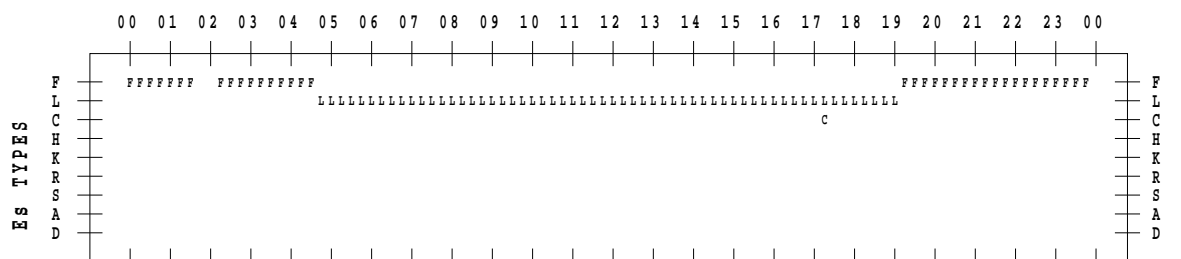
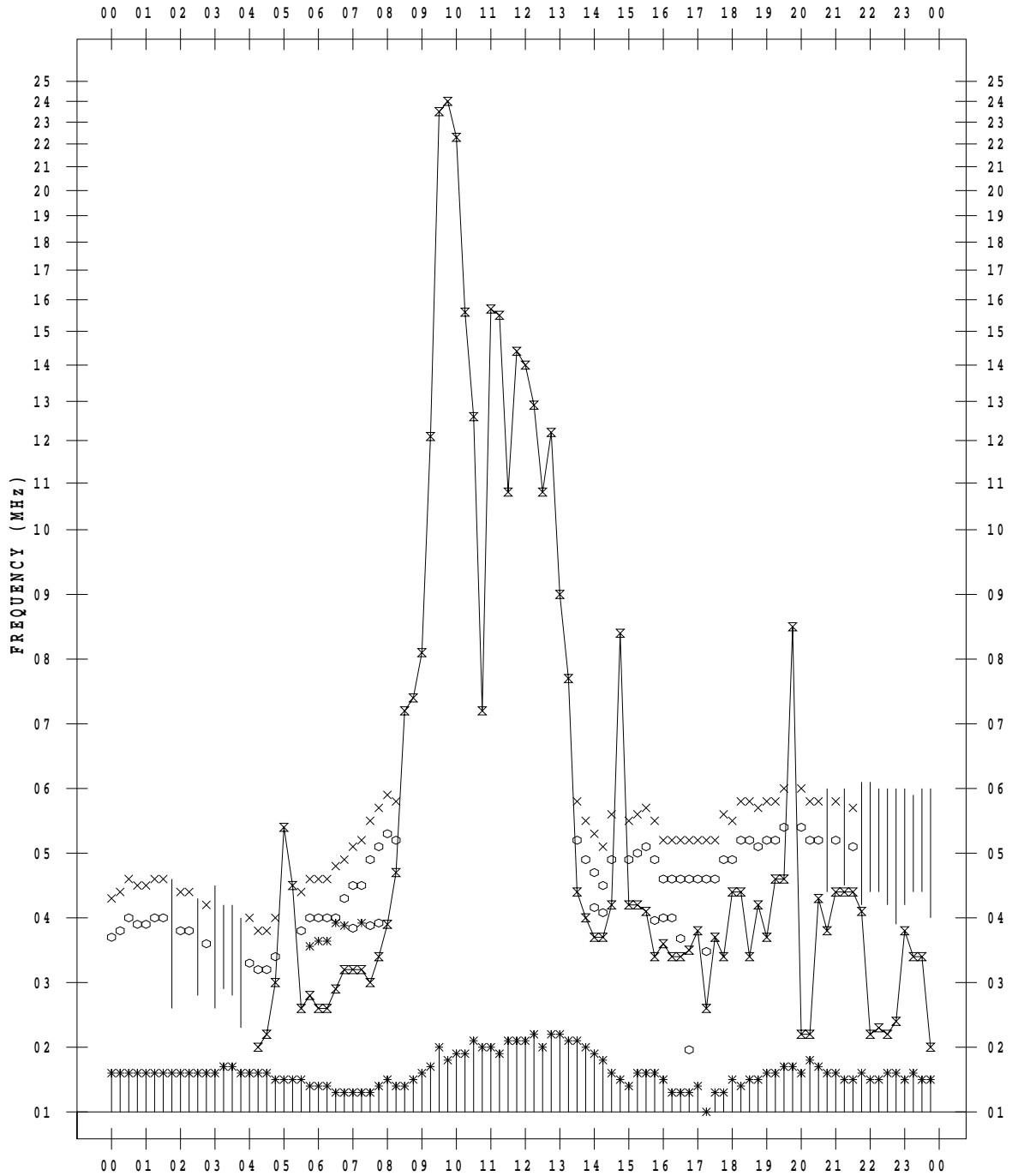
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 8

135 ° E MEAN TIME



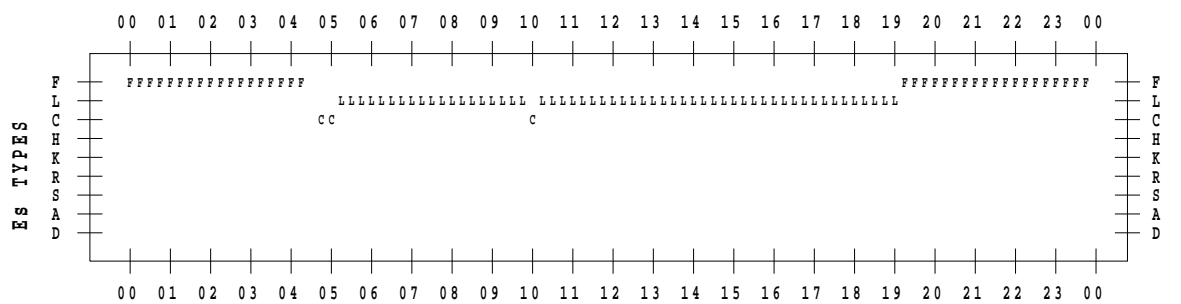
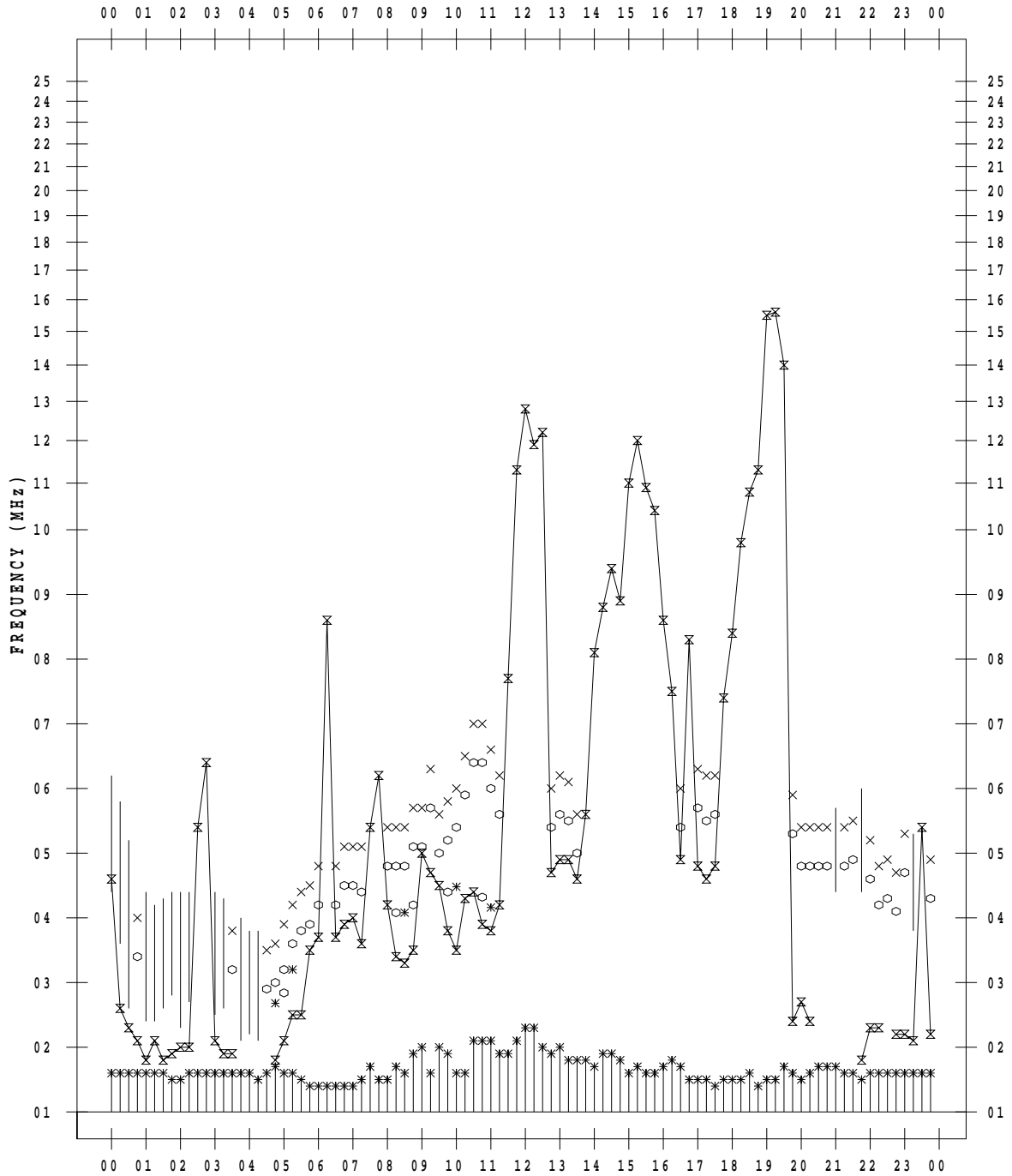
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 9

135 ° E MEAN TIME



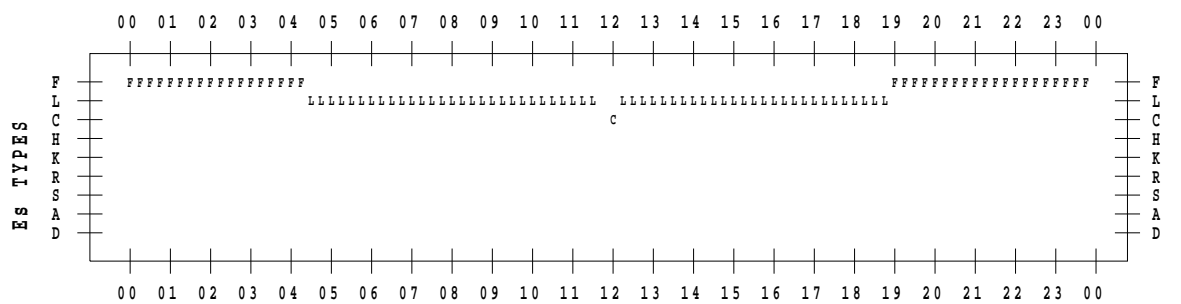
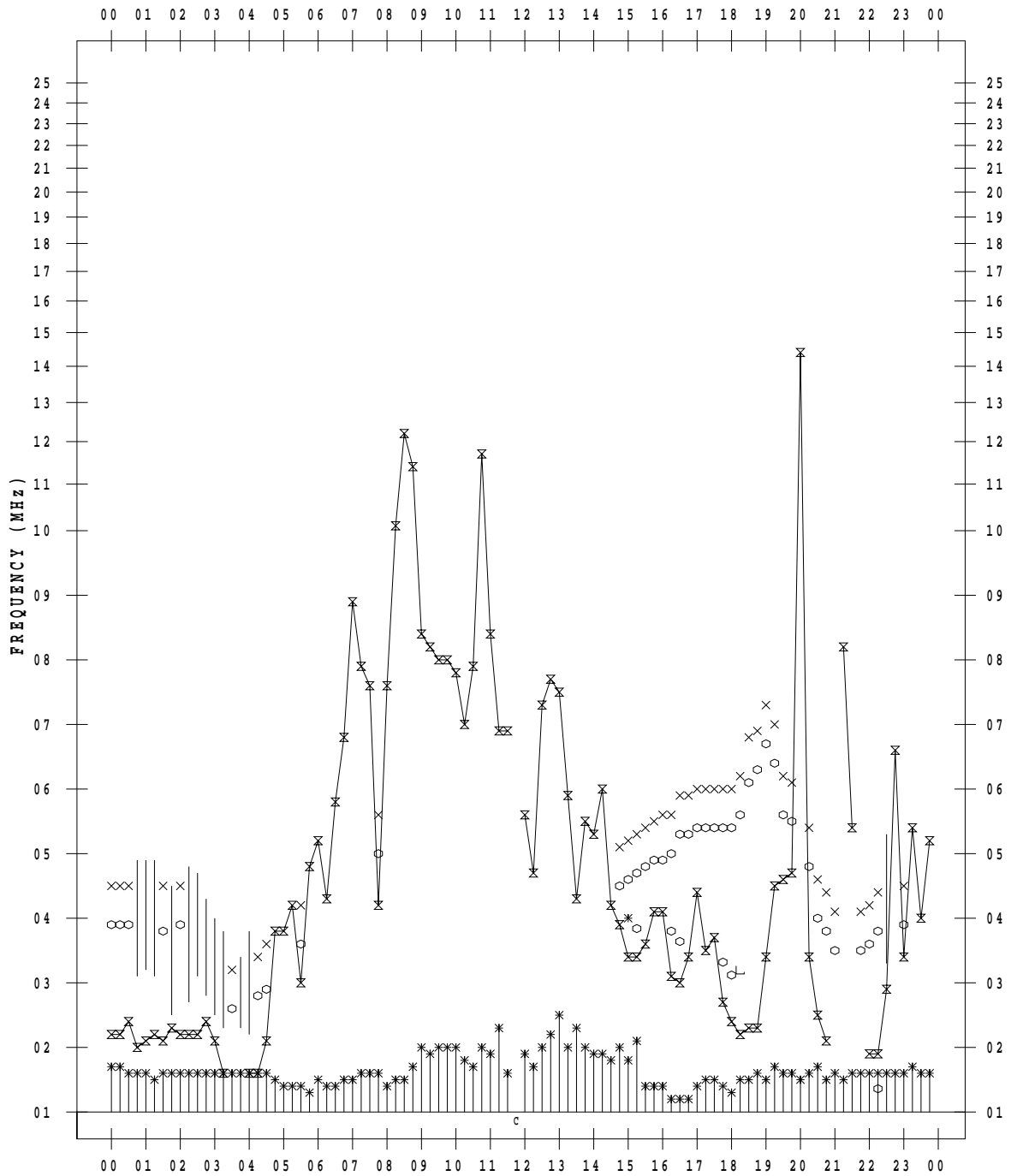
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 10

135 ° E MEAN TIME



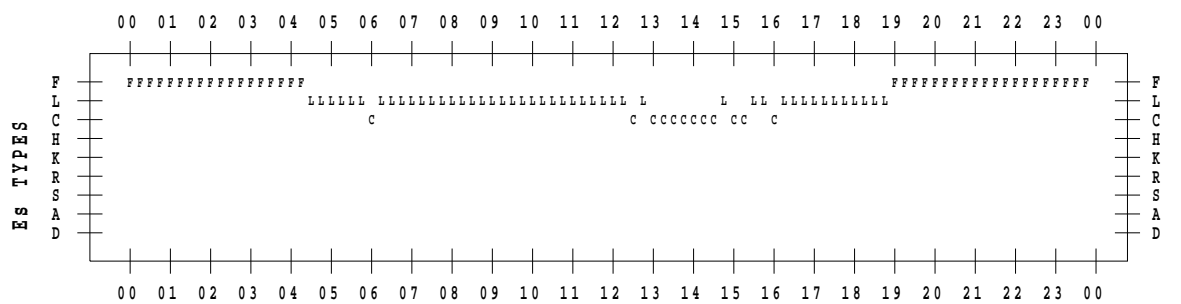
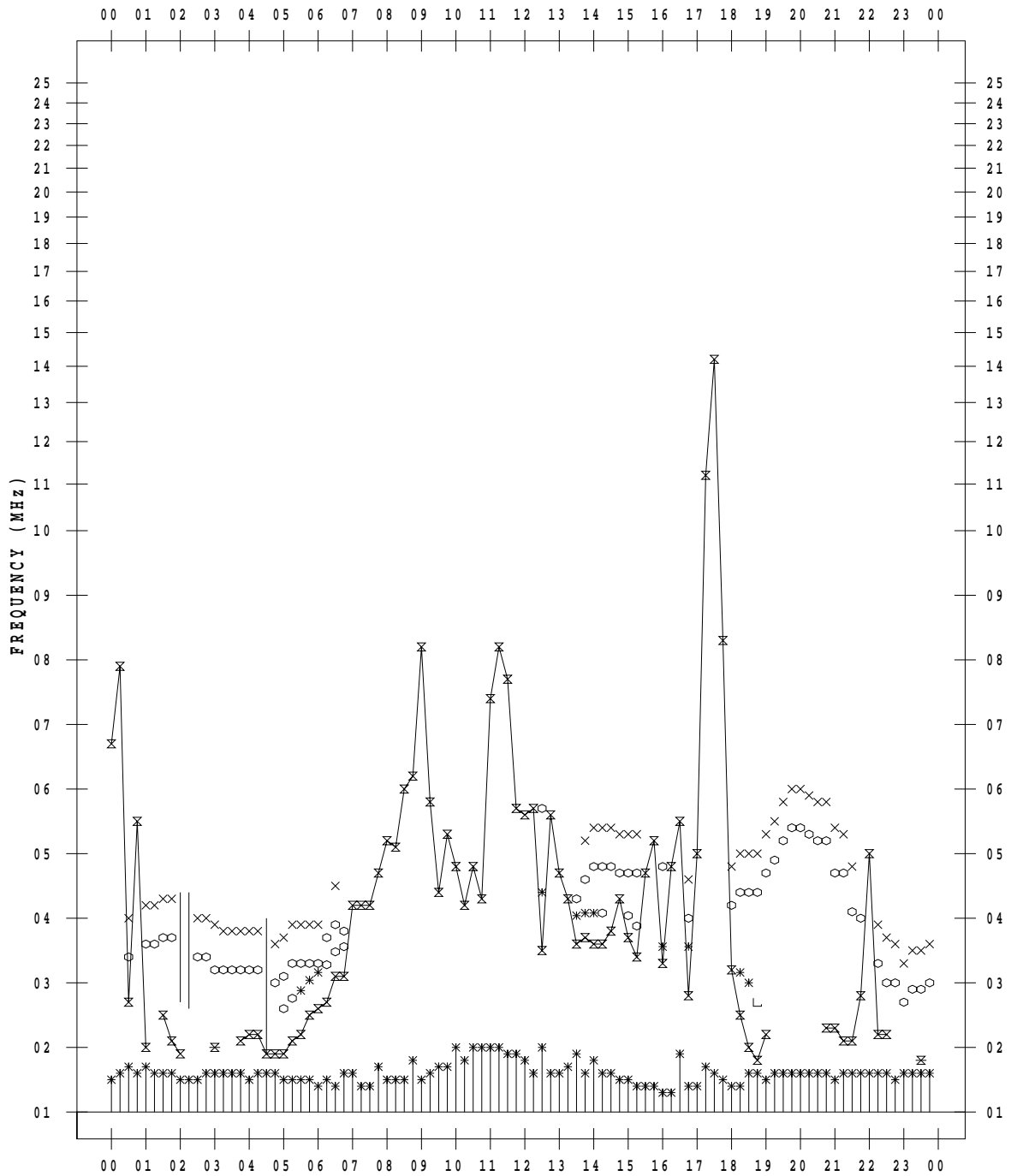
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 11

135 ° E MEAN TIME



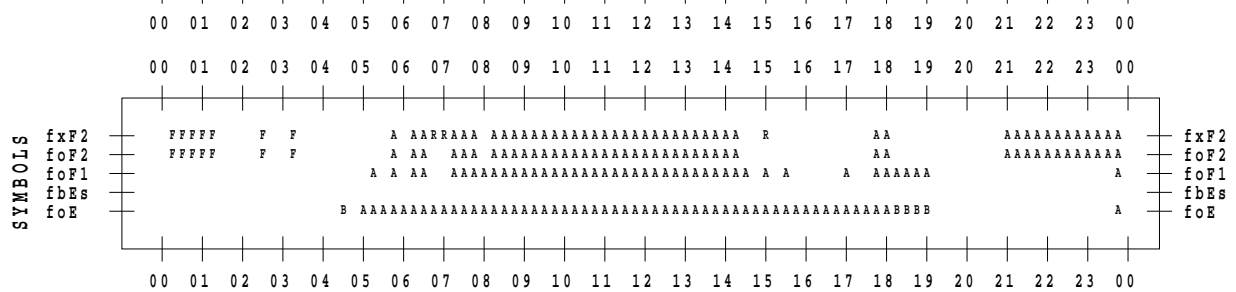
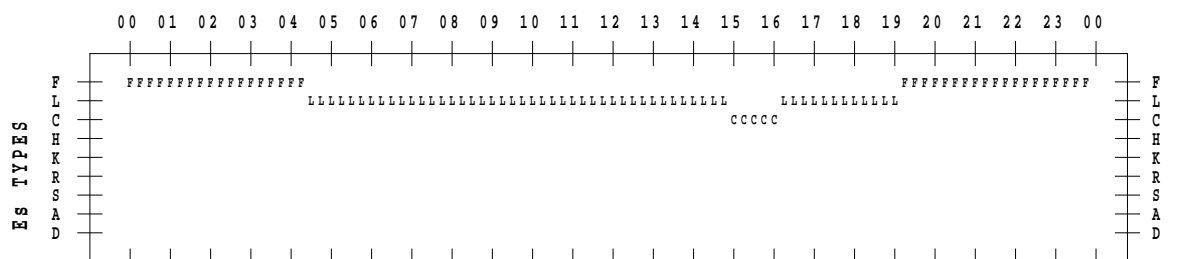
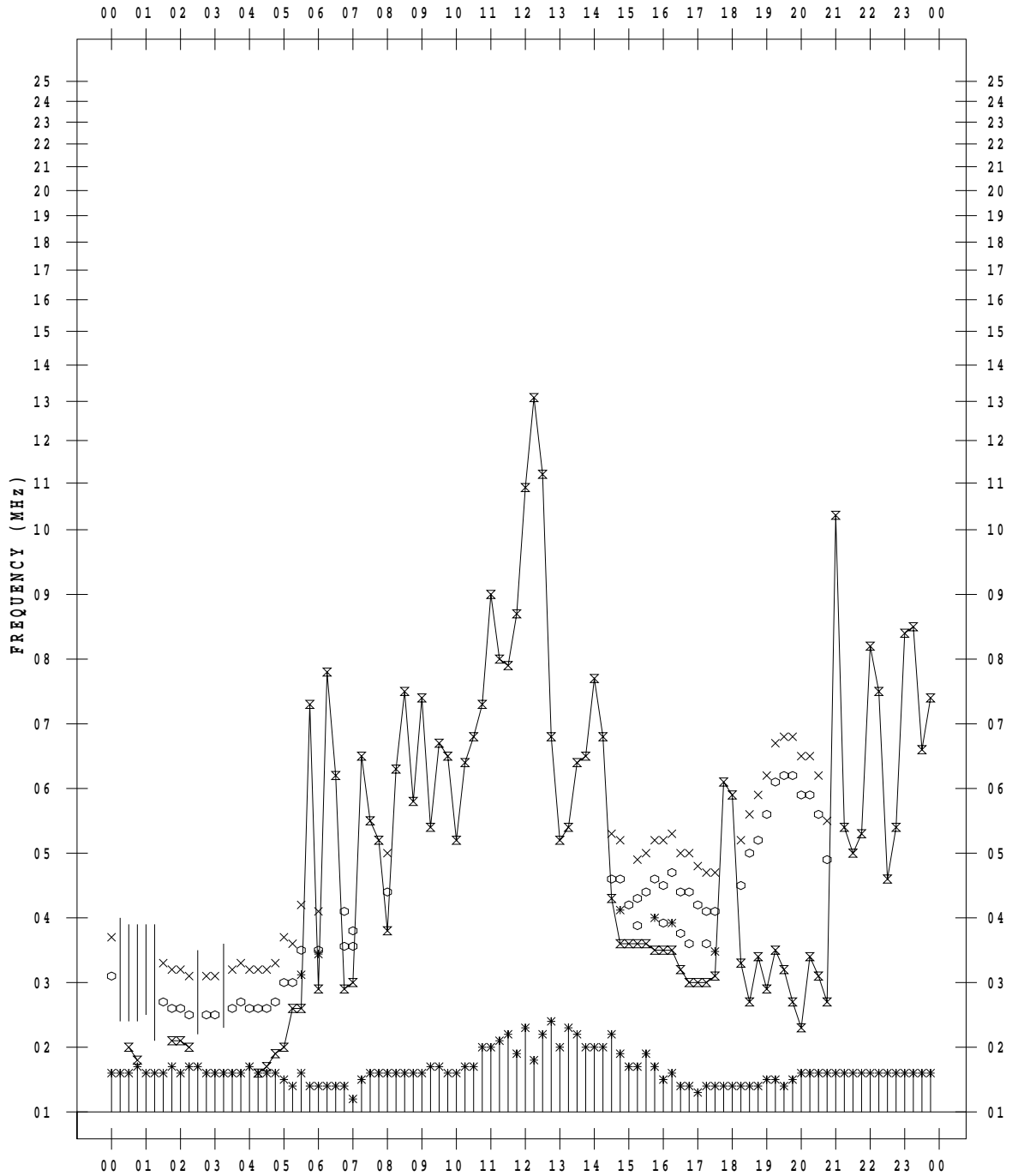
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 12

135 ° E MEAN TIME



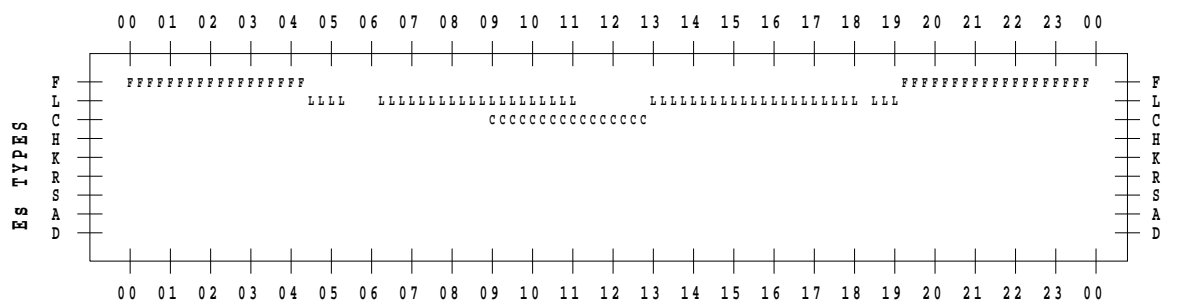
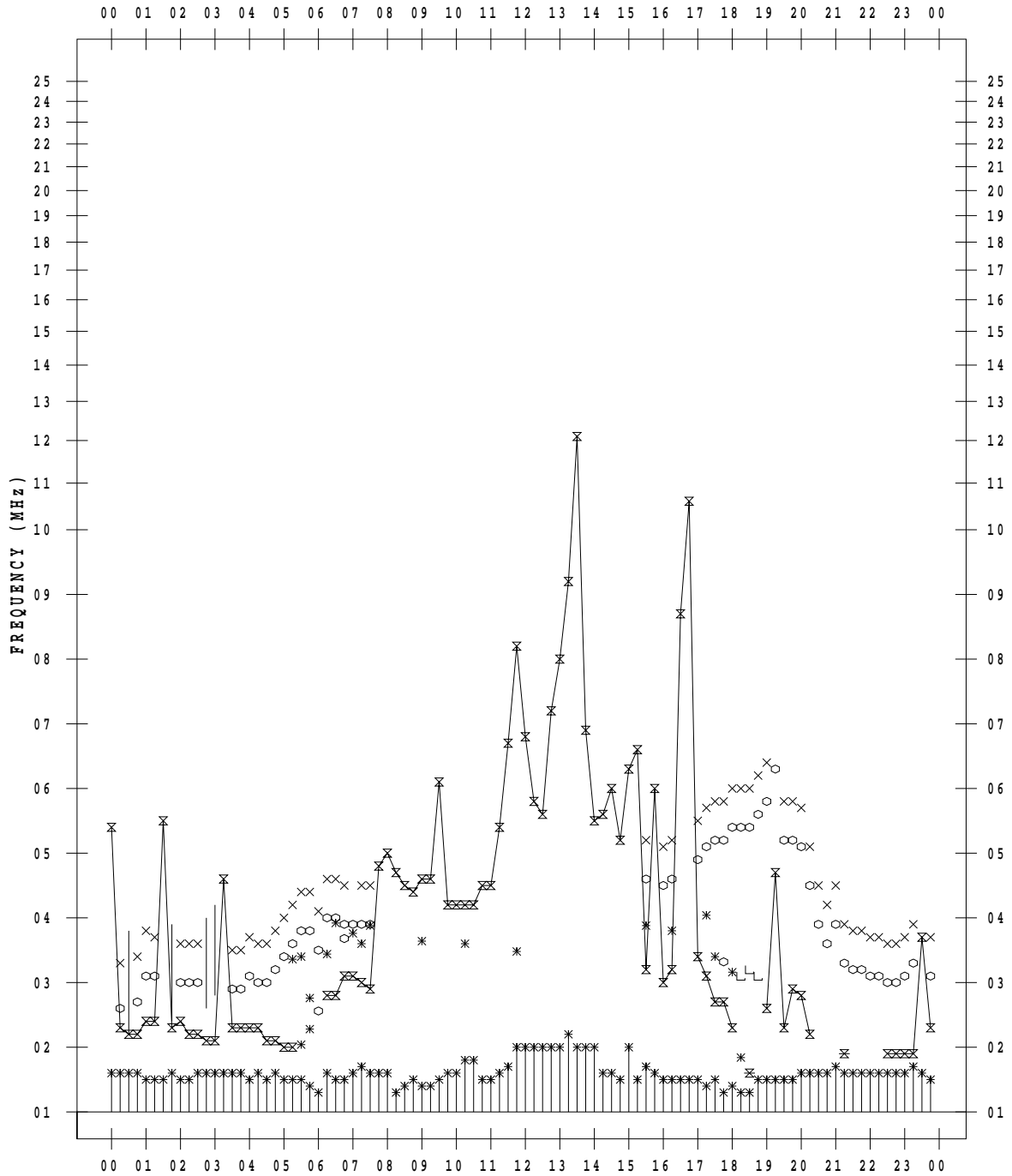
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 13

135 ° E MEAN TIME



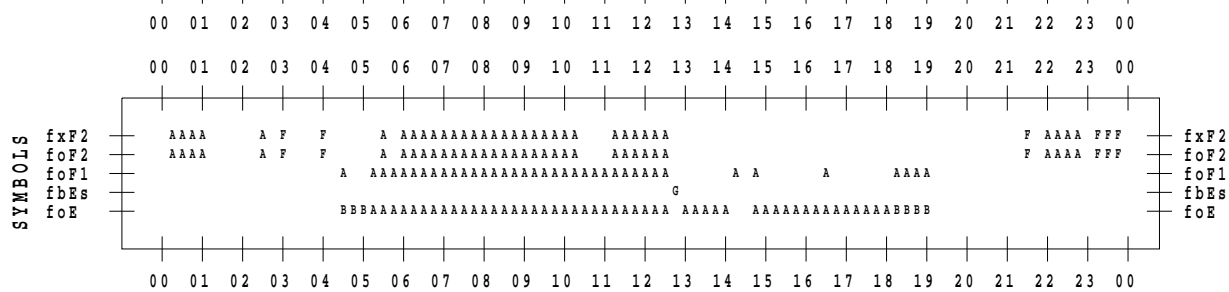
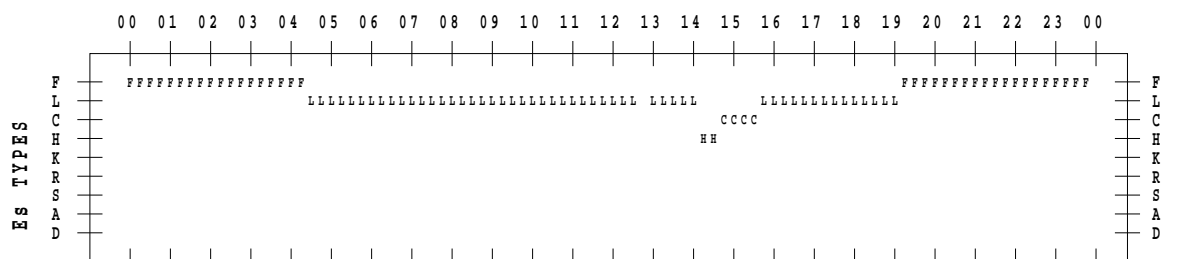
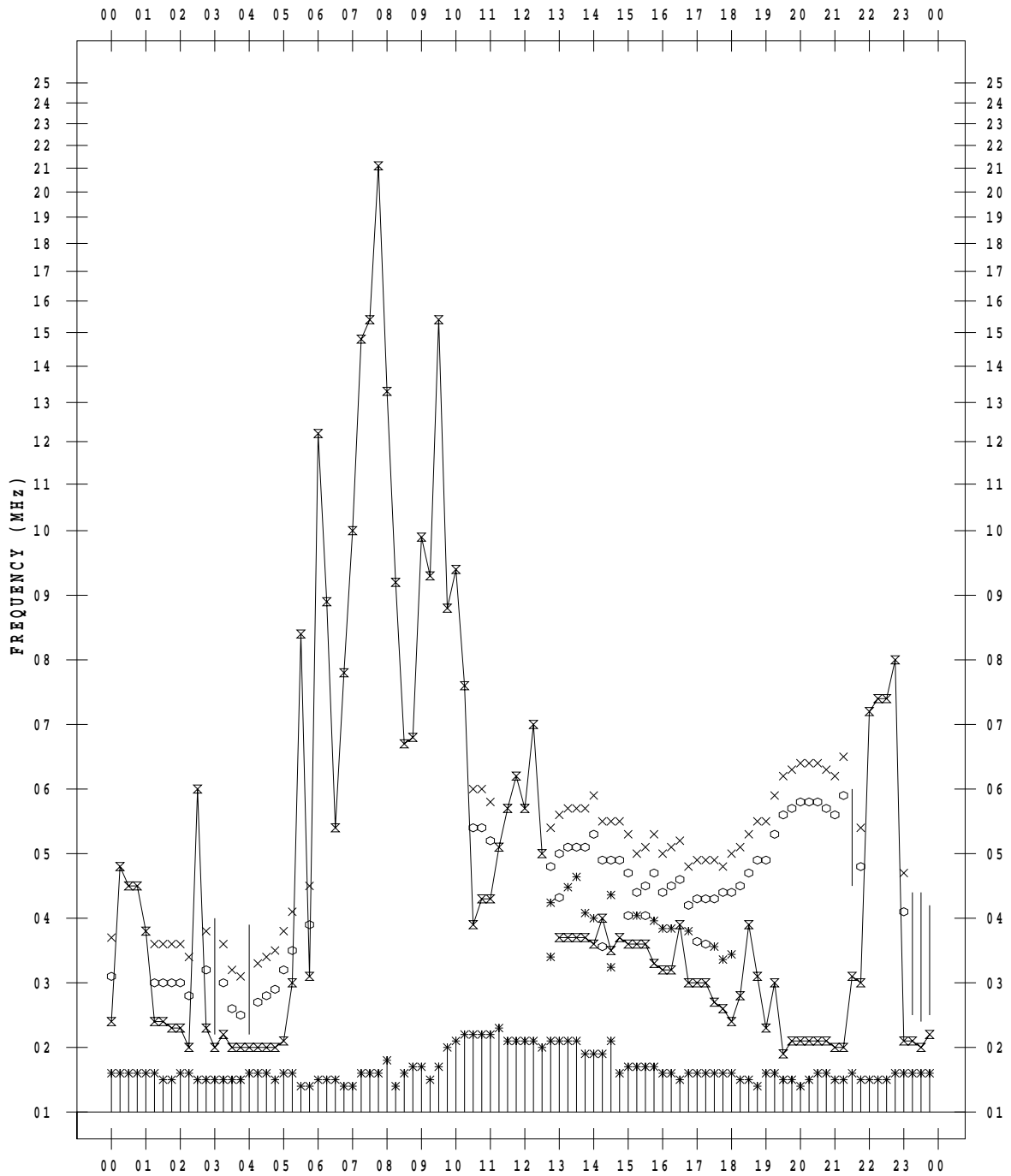
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 14

135 ° E MEAN TIME



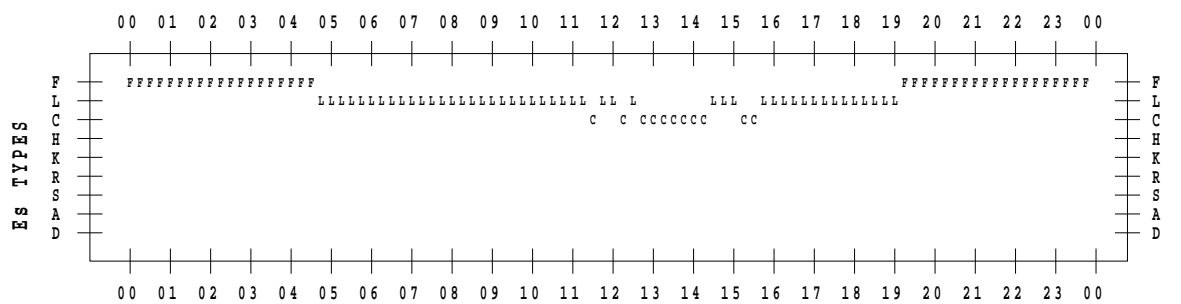
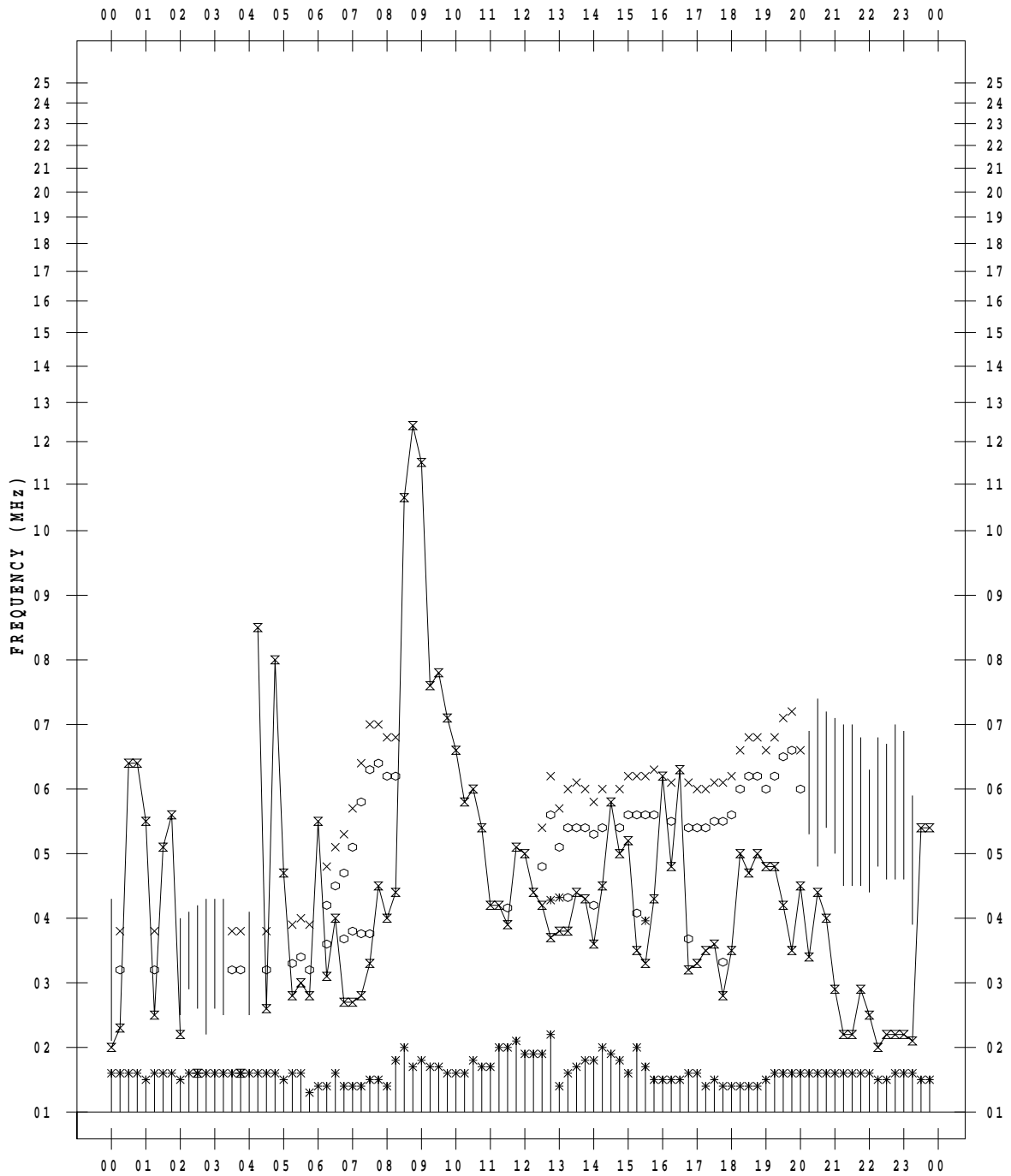
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 15

135 ° E MEAN TIME



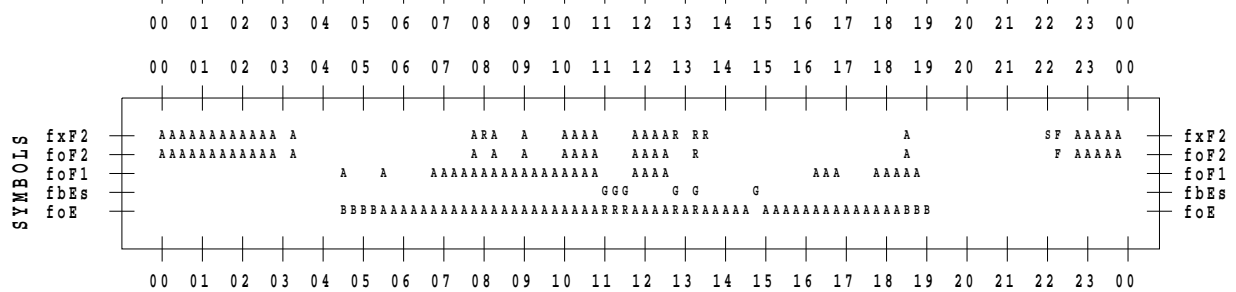
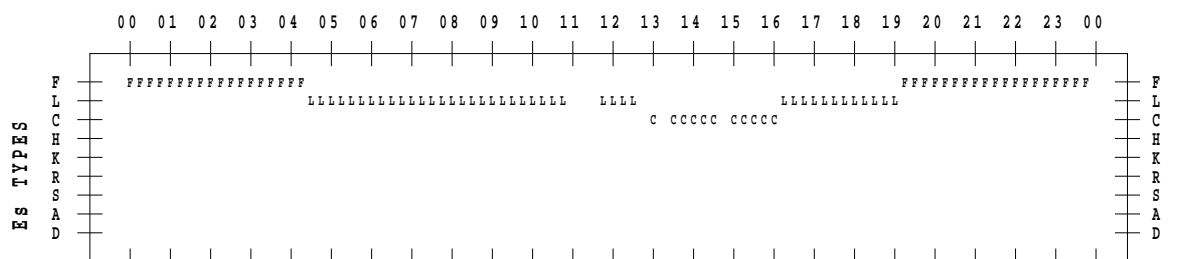
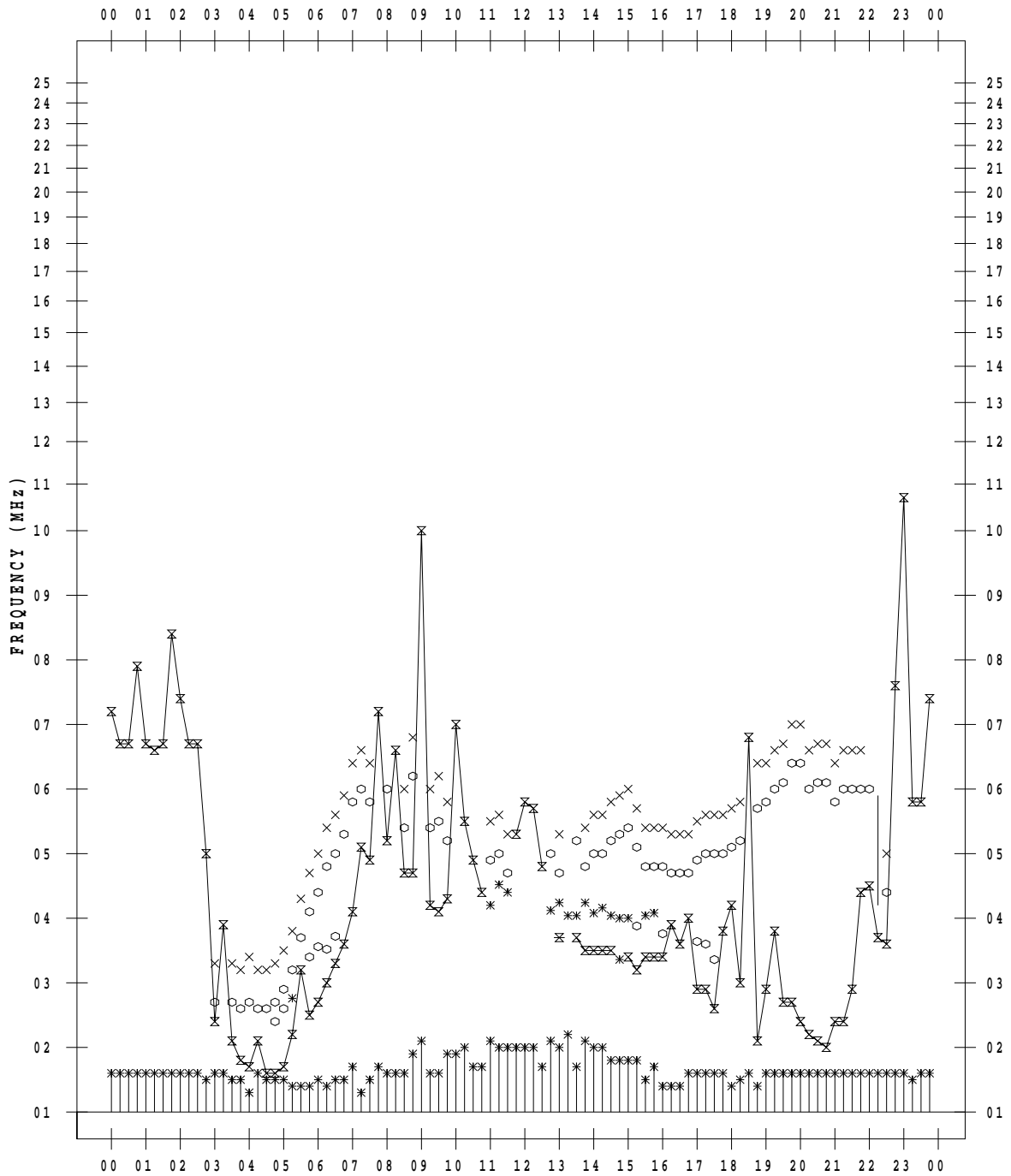
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 16

135 ° E MEAN TIME



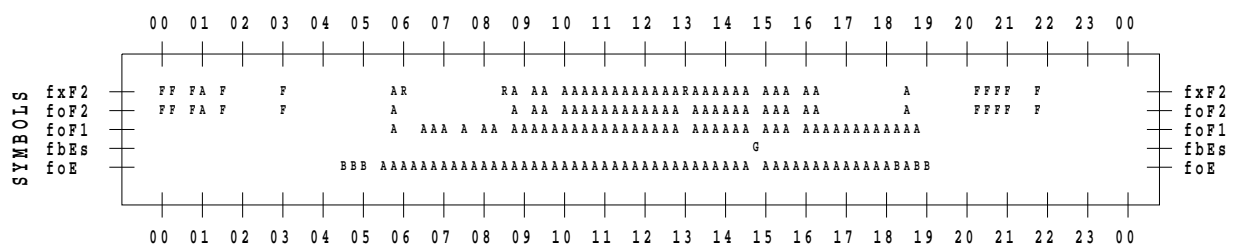
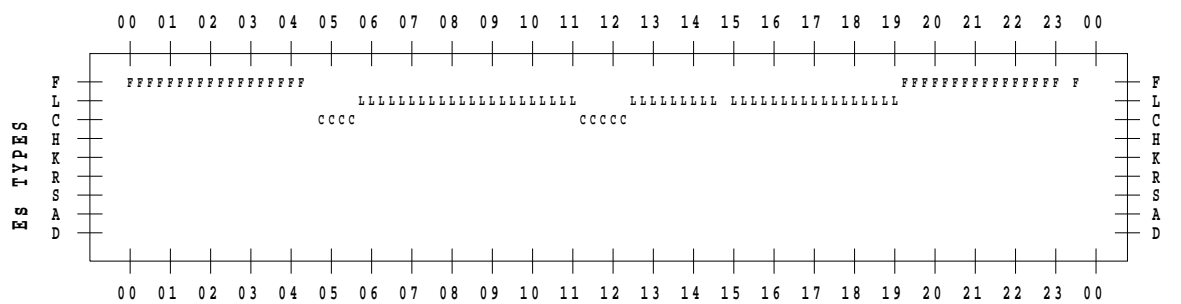
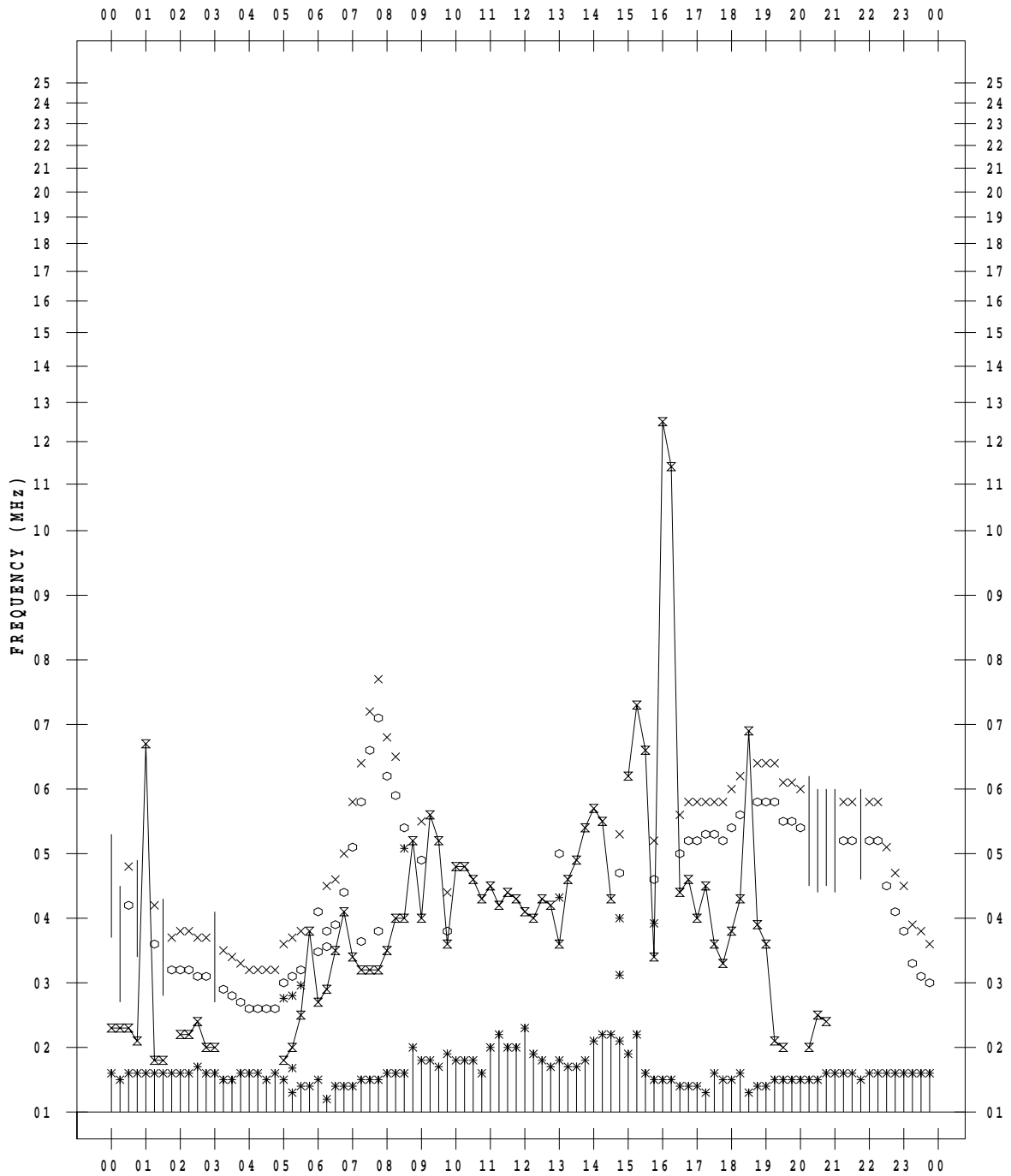
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 17

135 ° E MEAN TIME



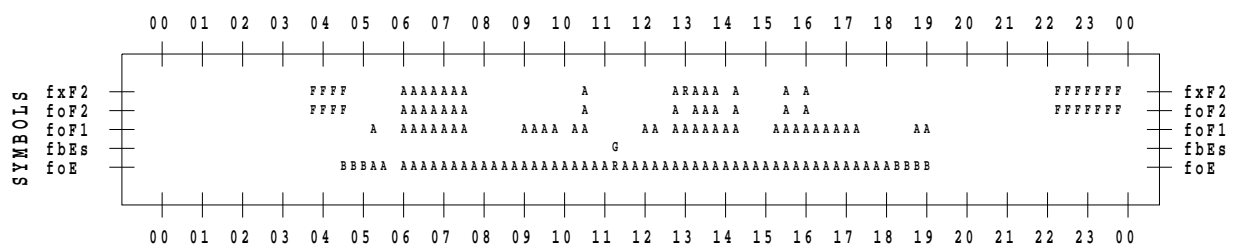
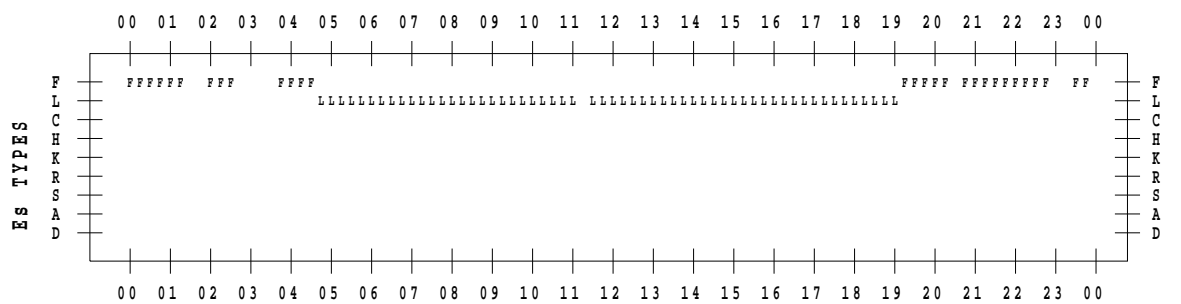
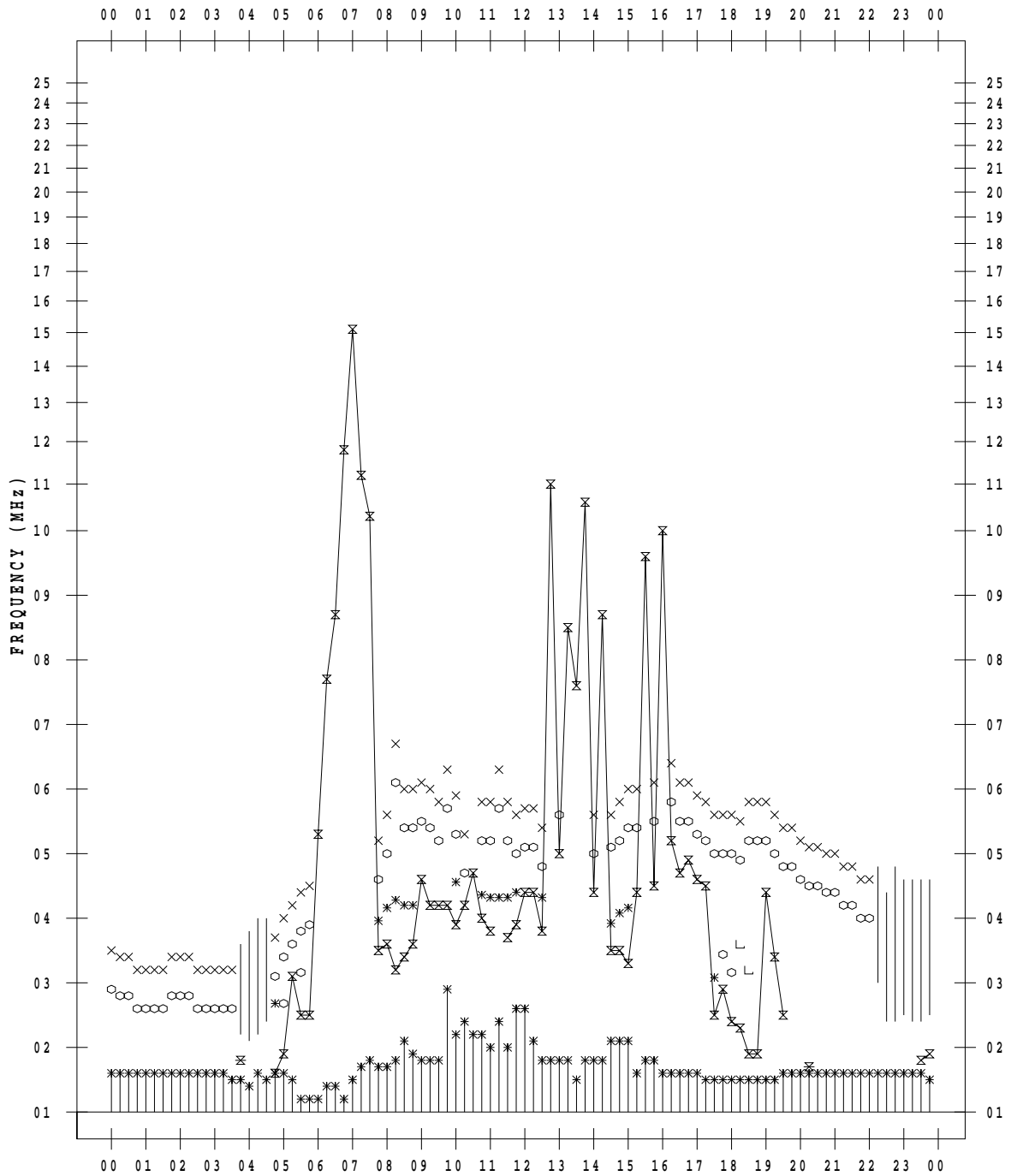
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 18

135 ° E MEAN TIME



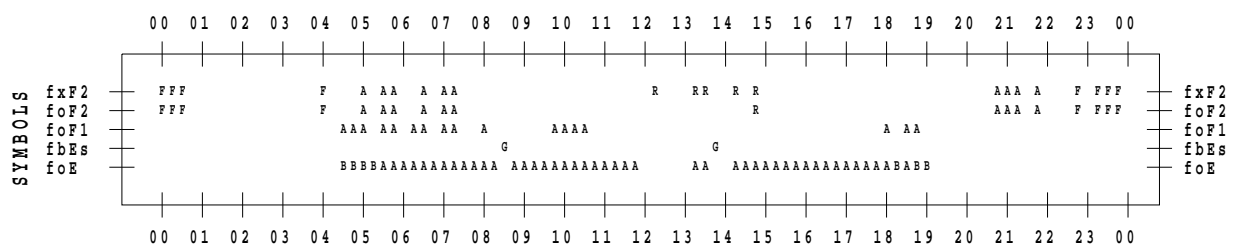
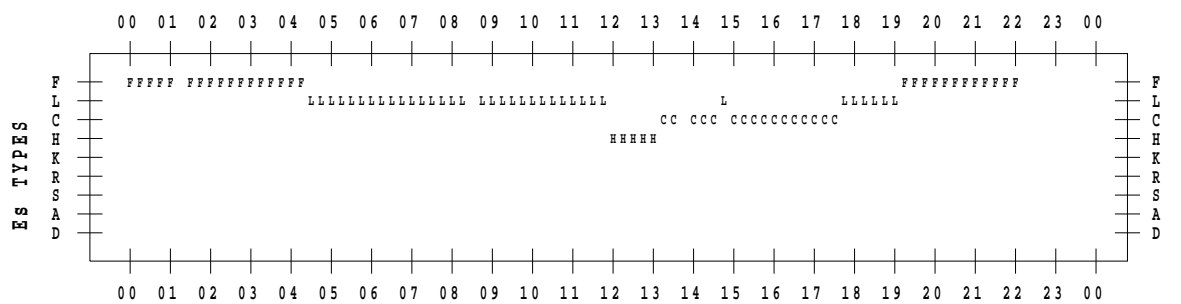
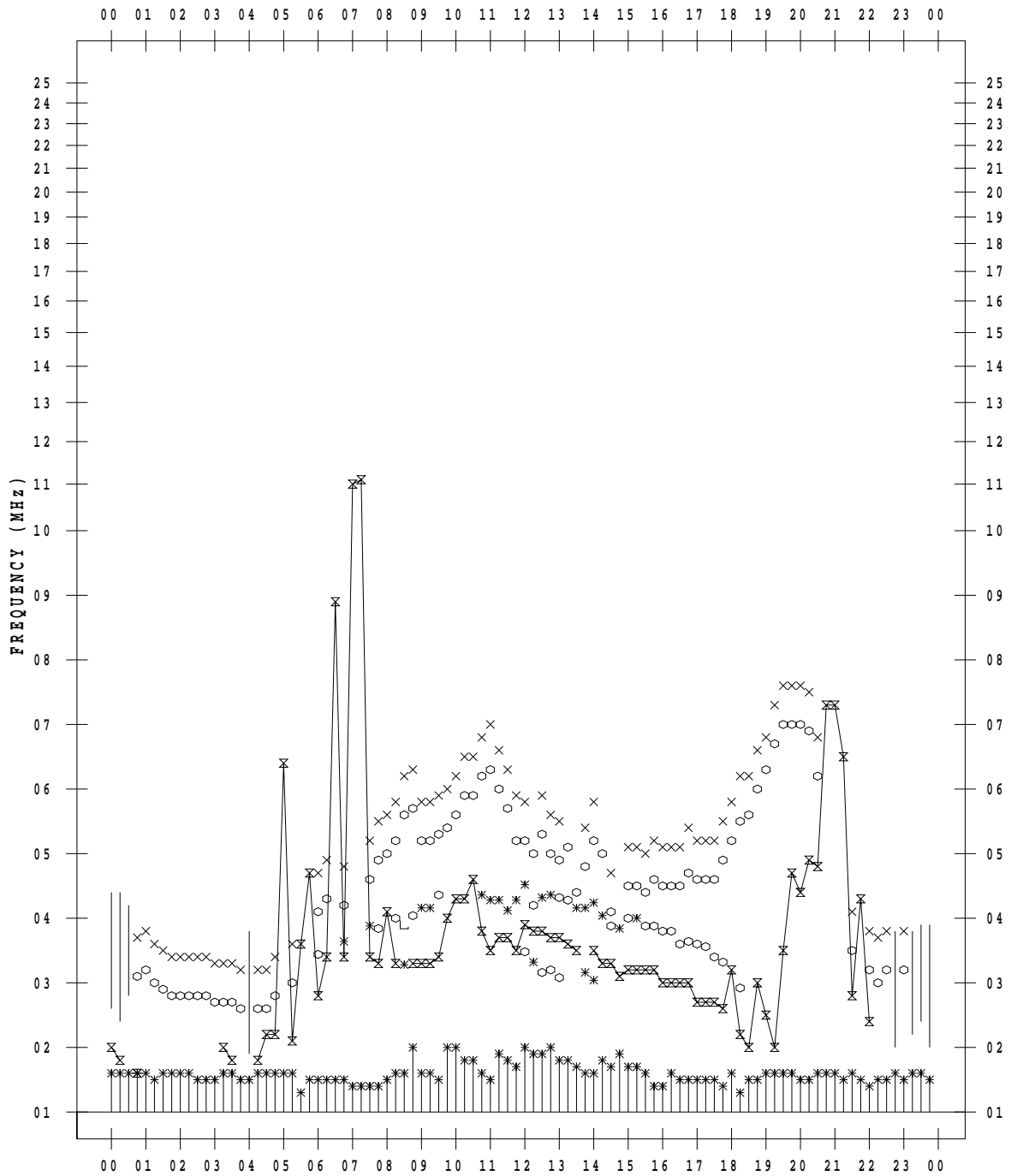
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 19

135 ° E MEAN TIME



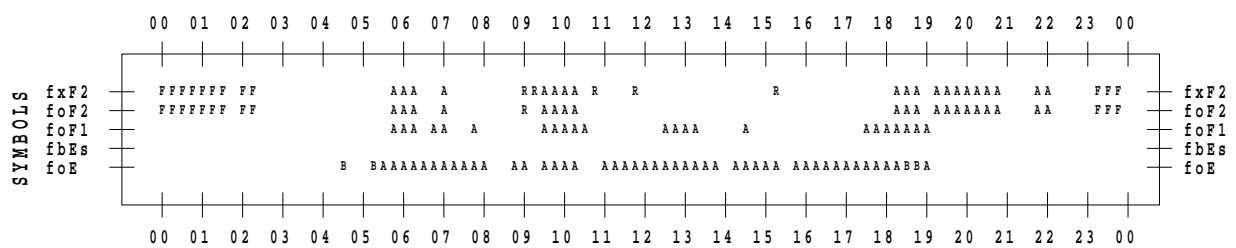
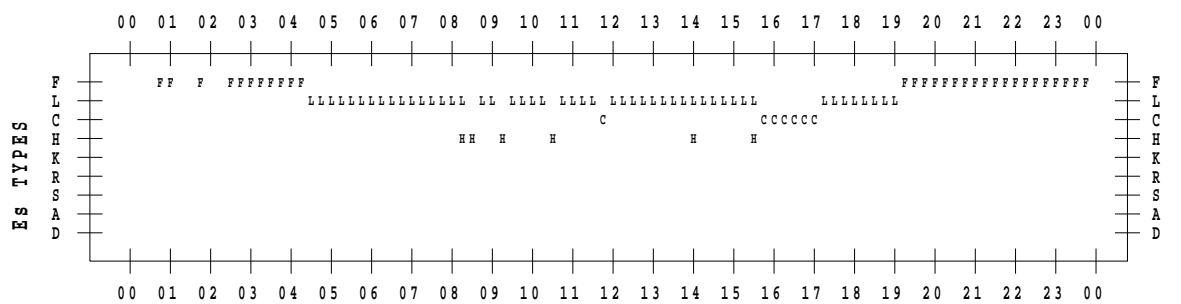
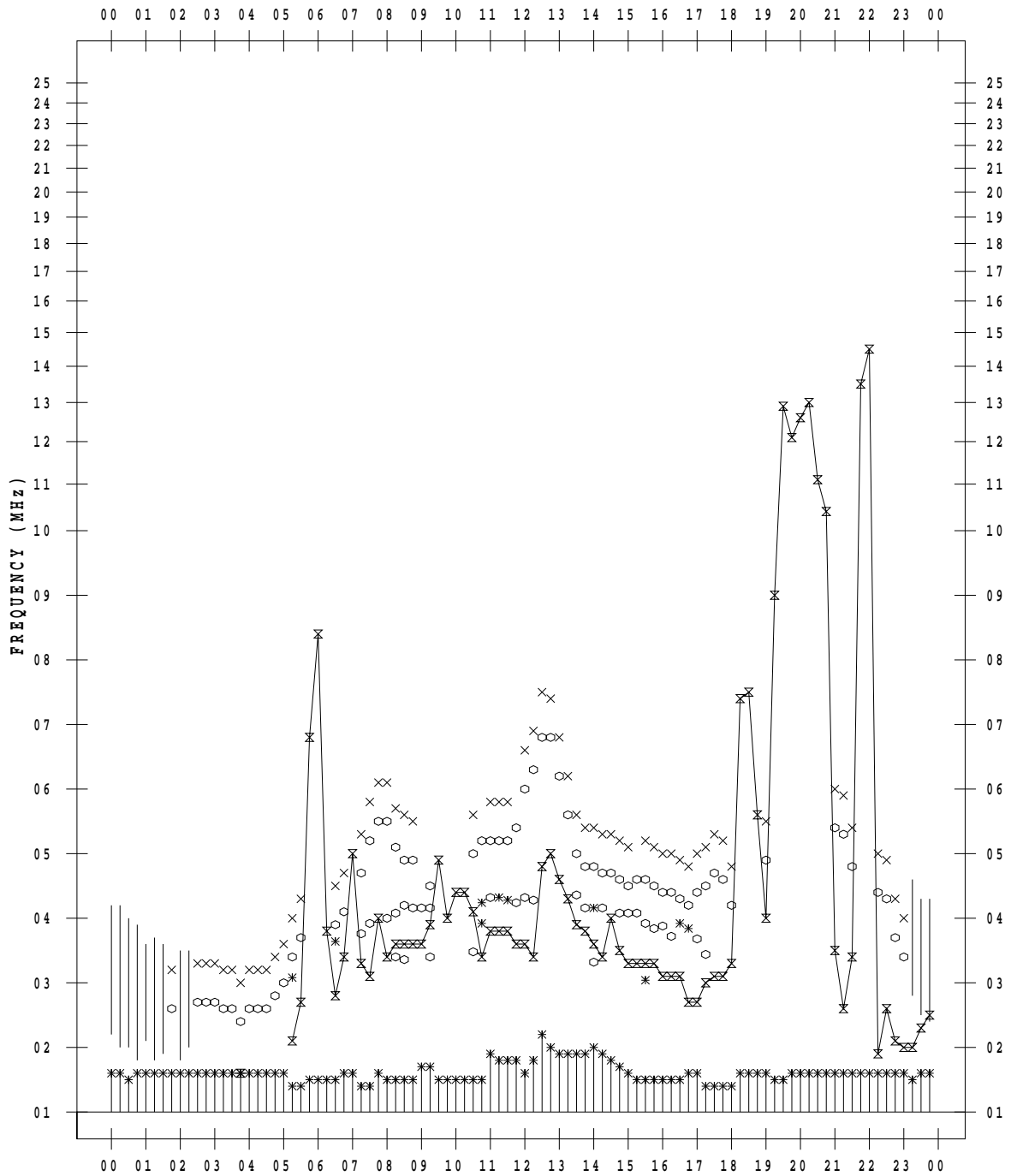
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 20

135 ° E MEAN TIME



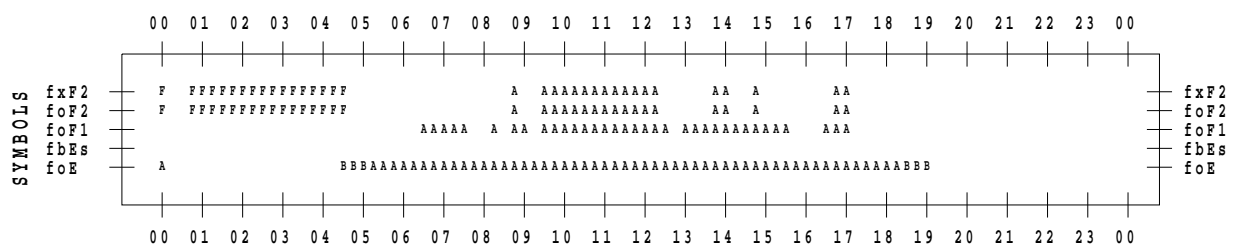
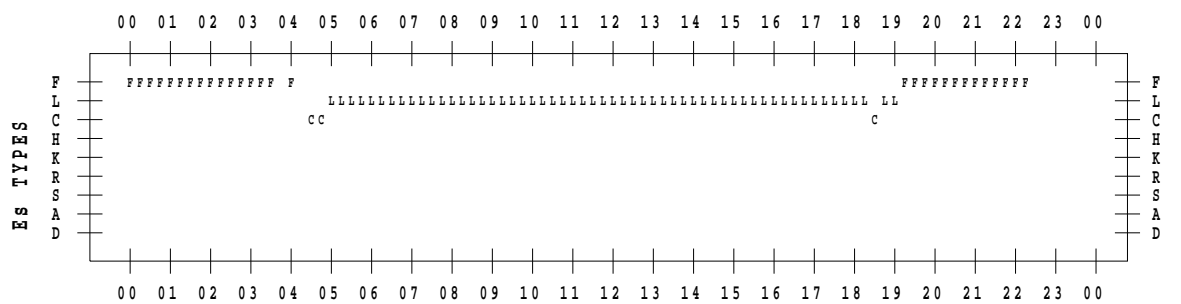
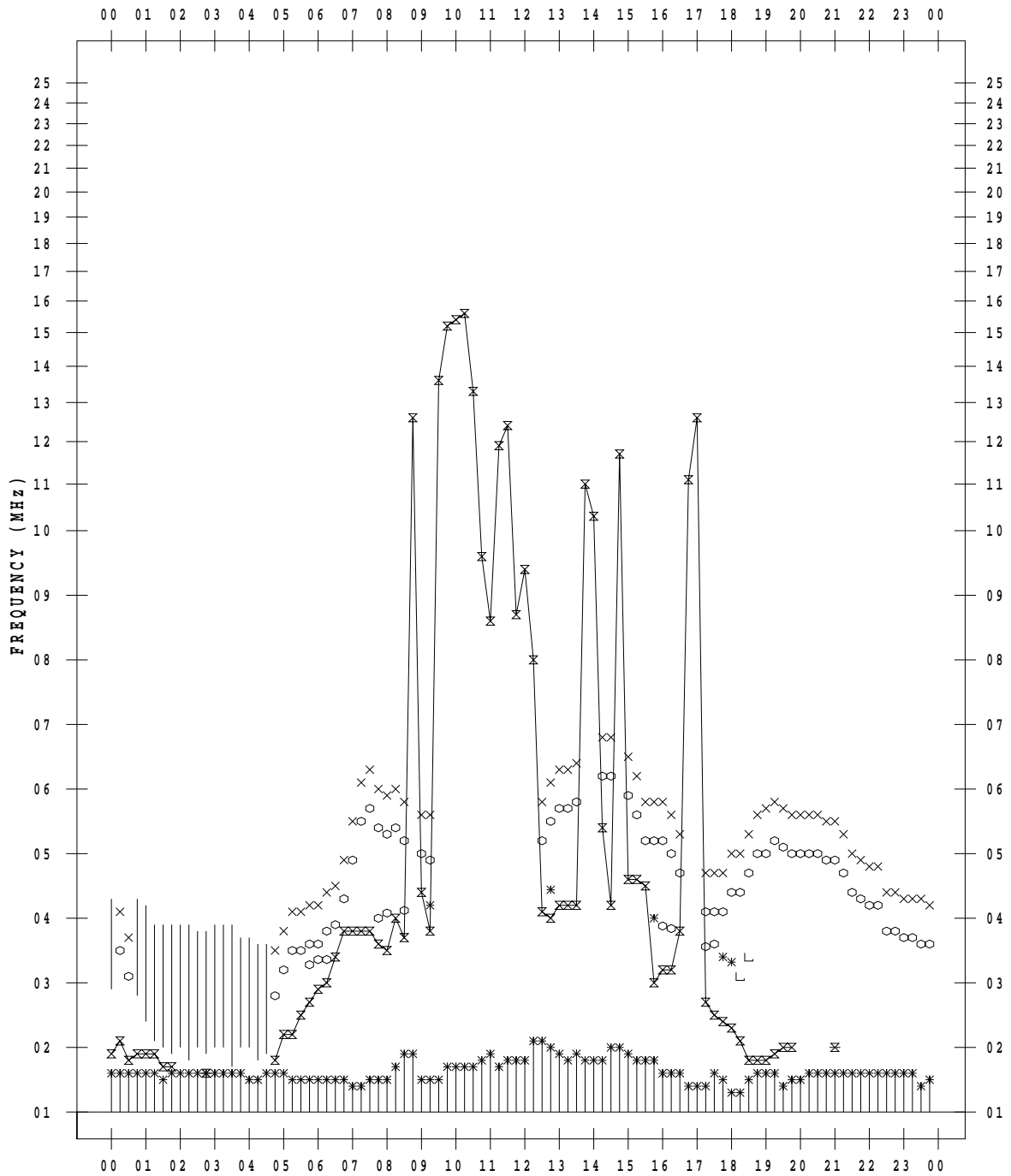
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 21

135 ° E MEAN TIME



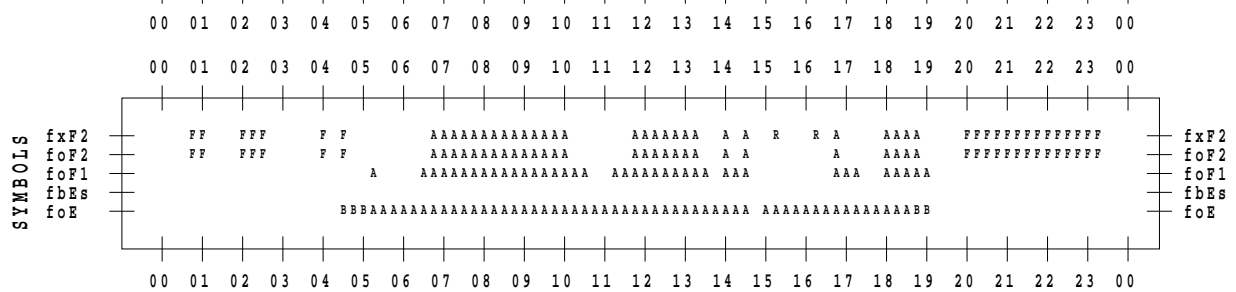
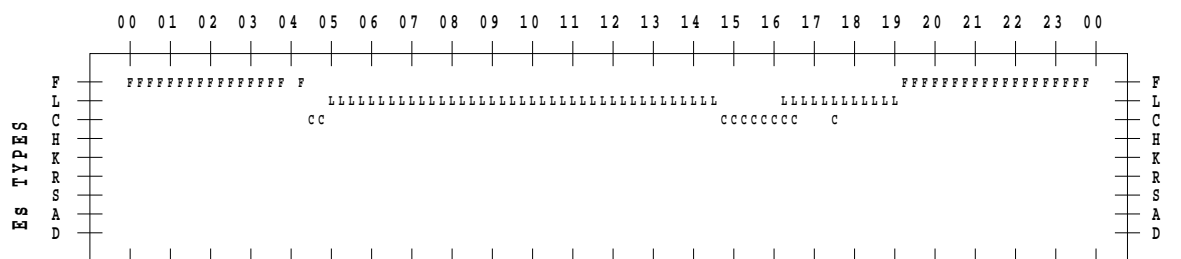
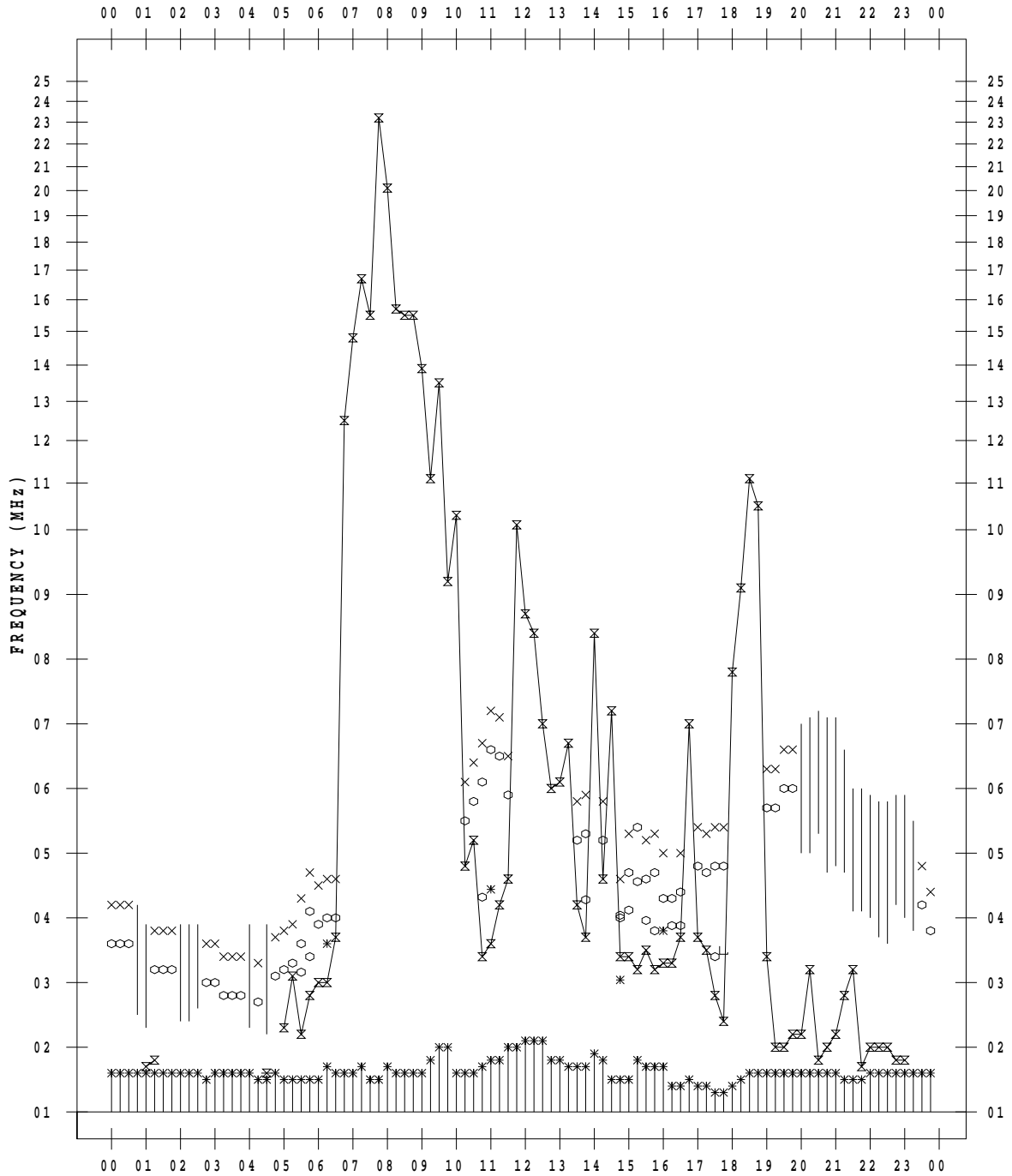
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 22

135 ° E MEAN TIME



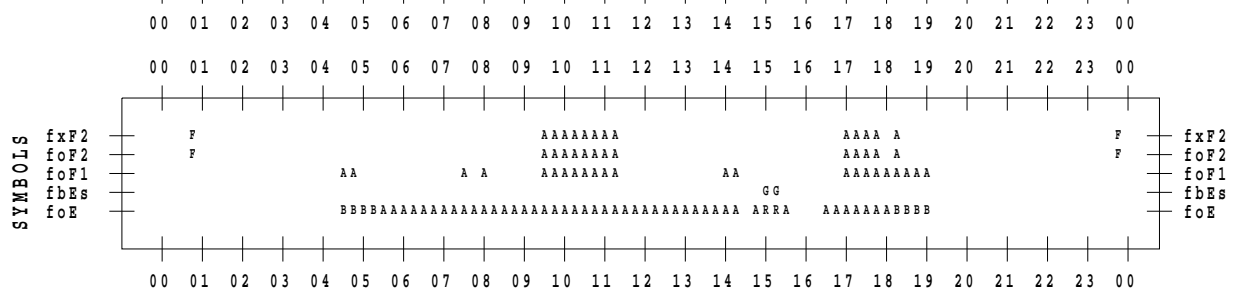
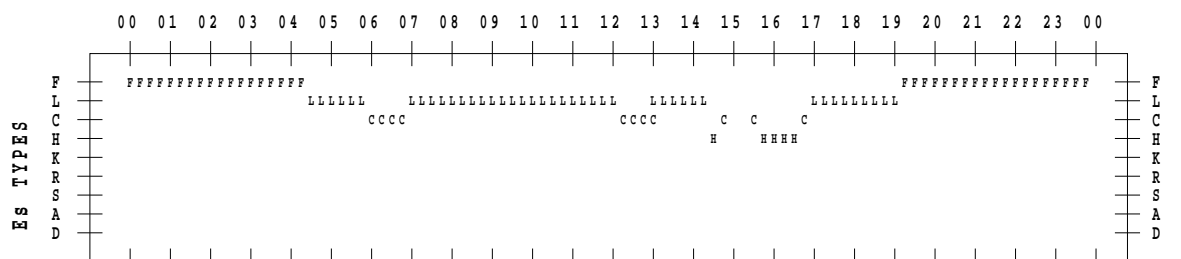
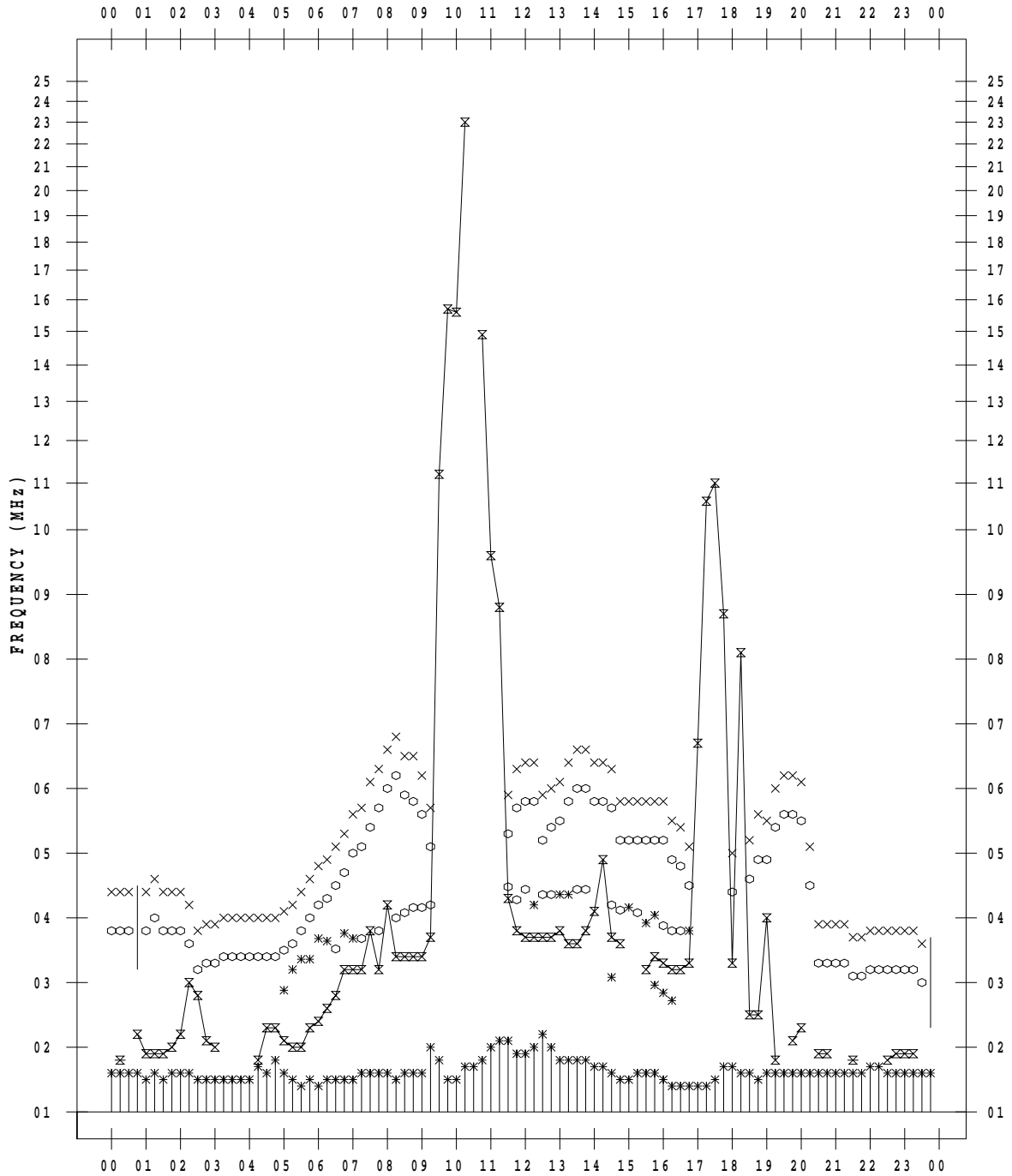
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 23

135 ° E MEAN TIME



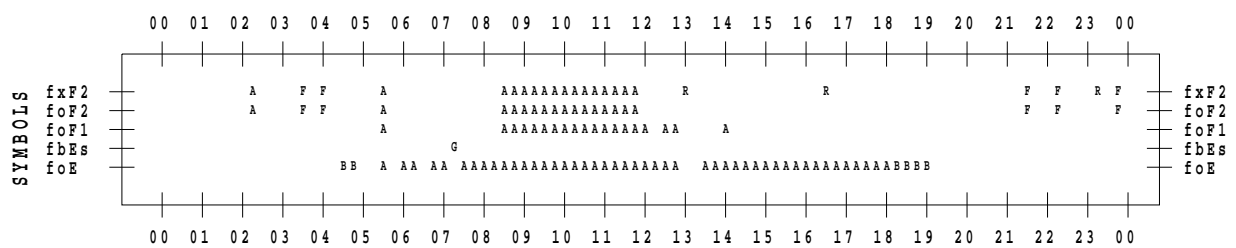
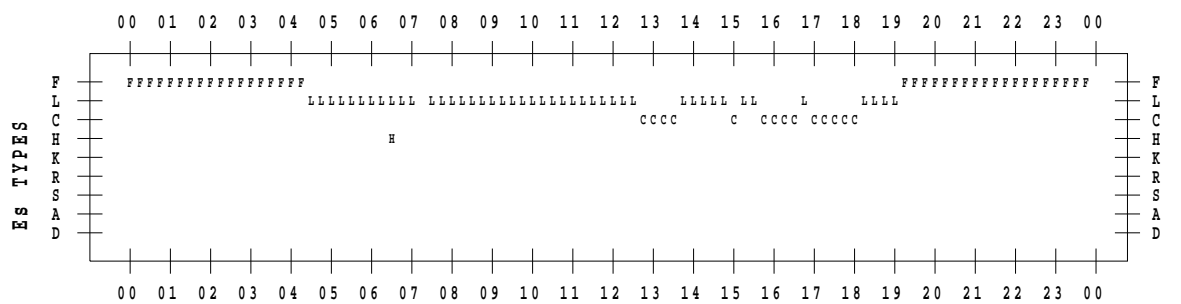
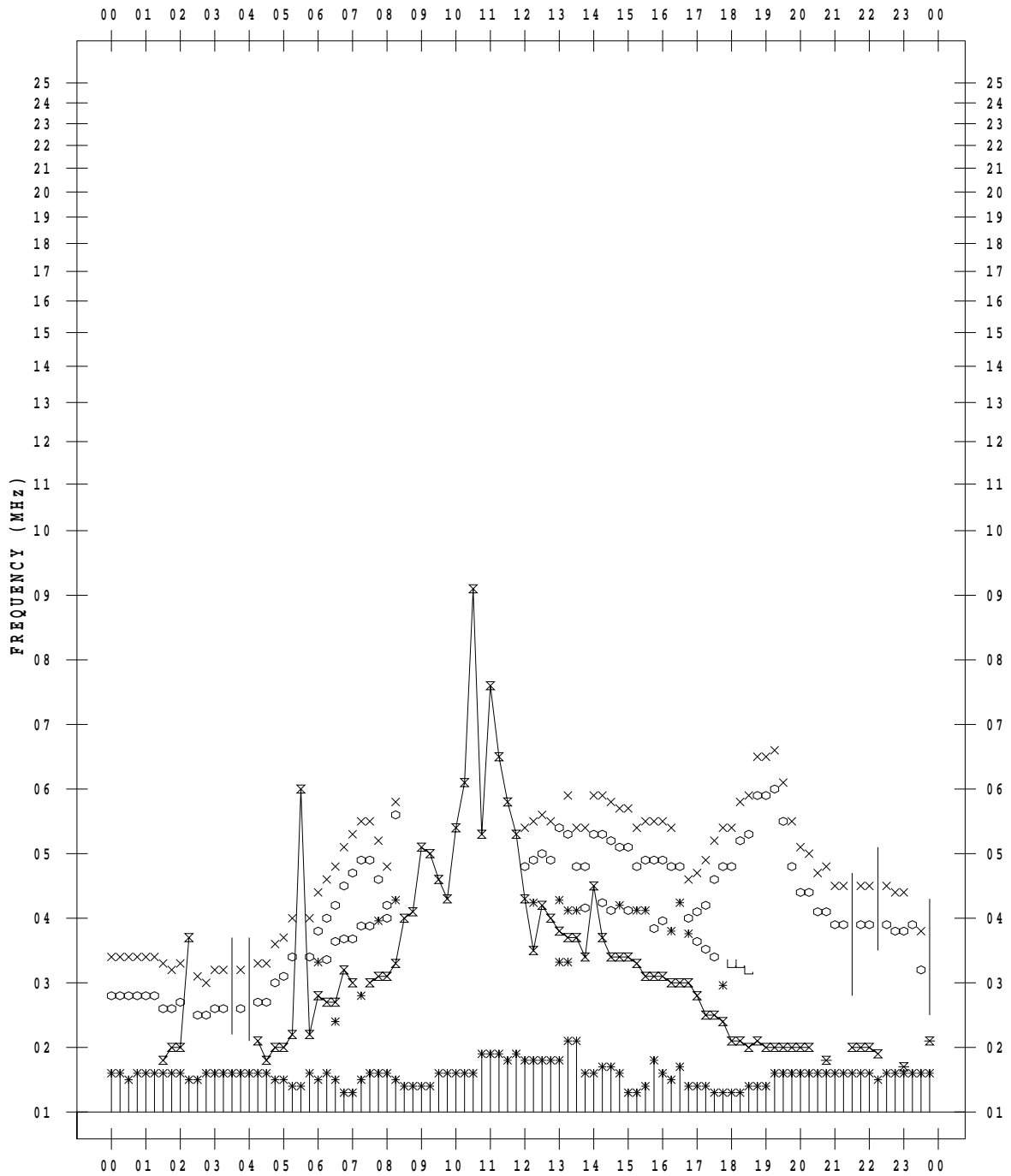
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 24

135 ° E MEAN TIME



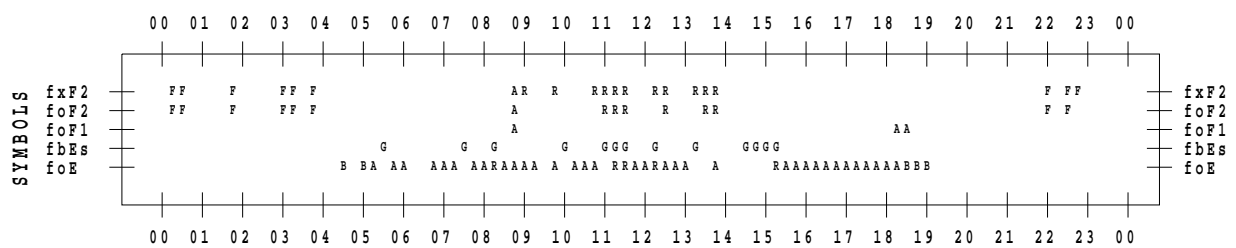
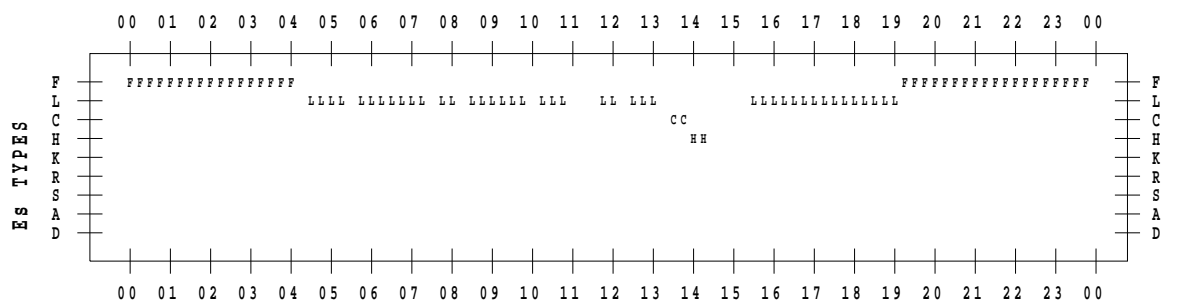
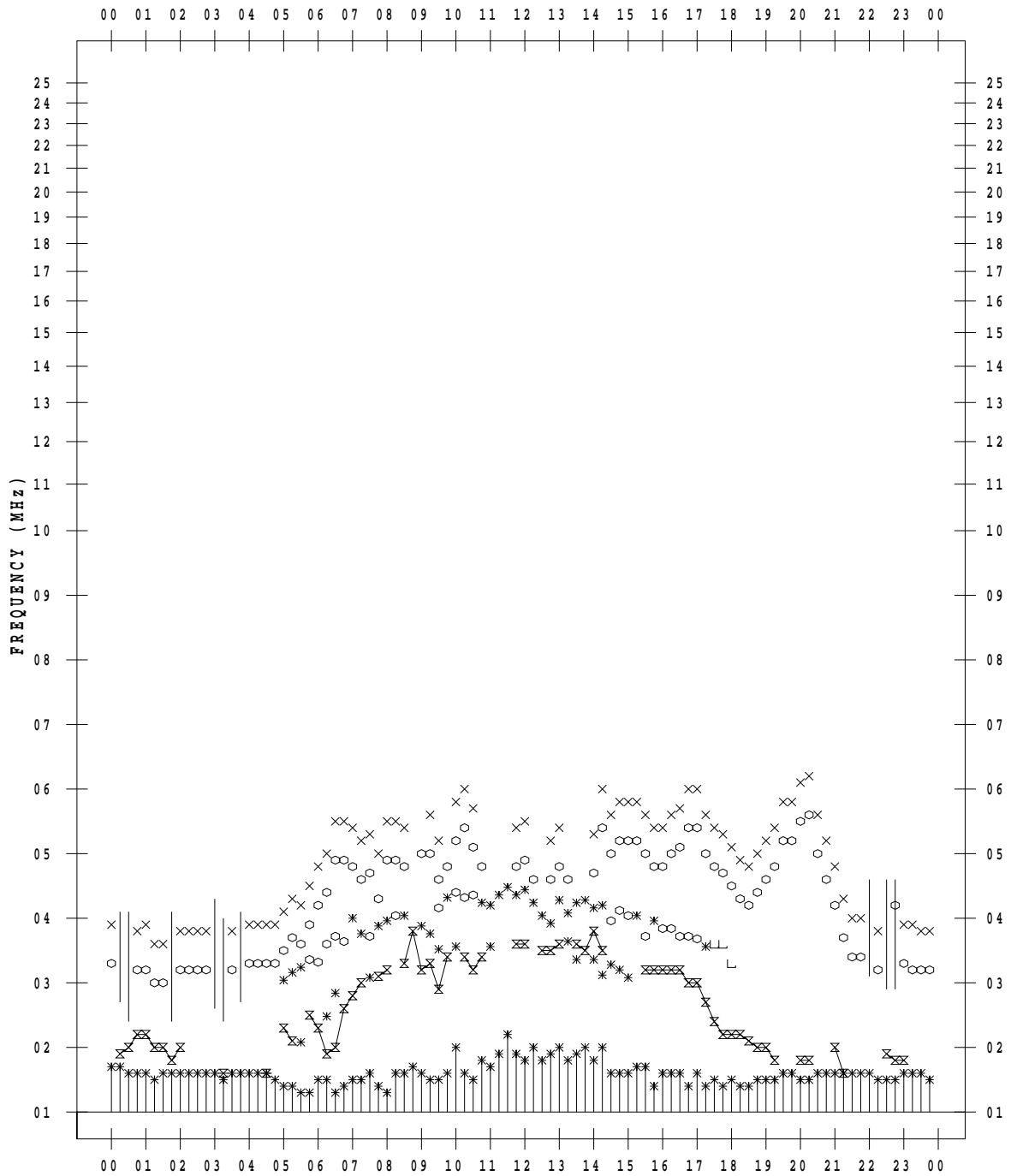
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 25

135 ° E MEAN TIME



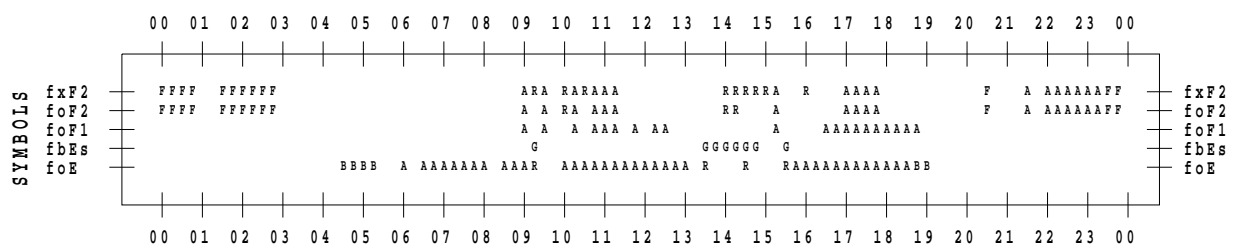
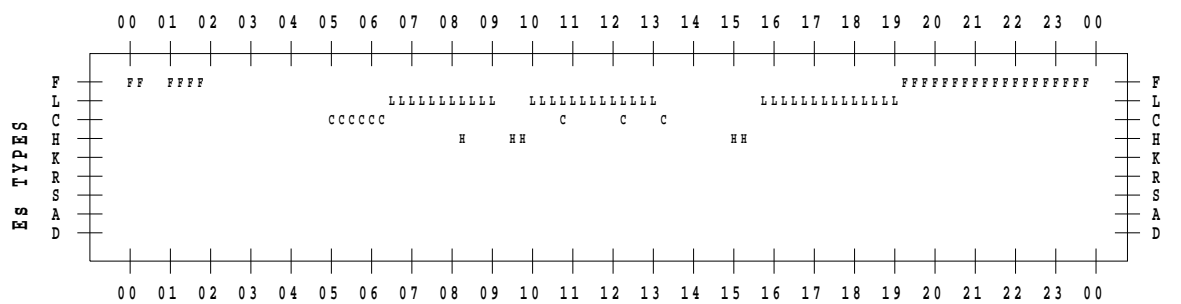
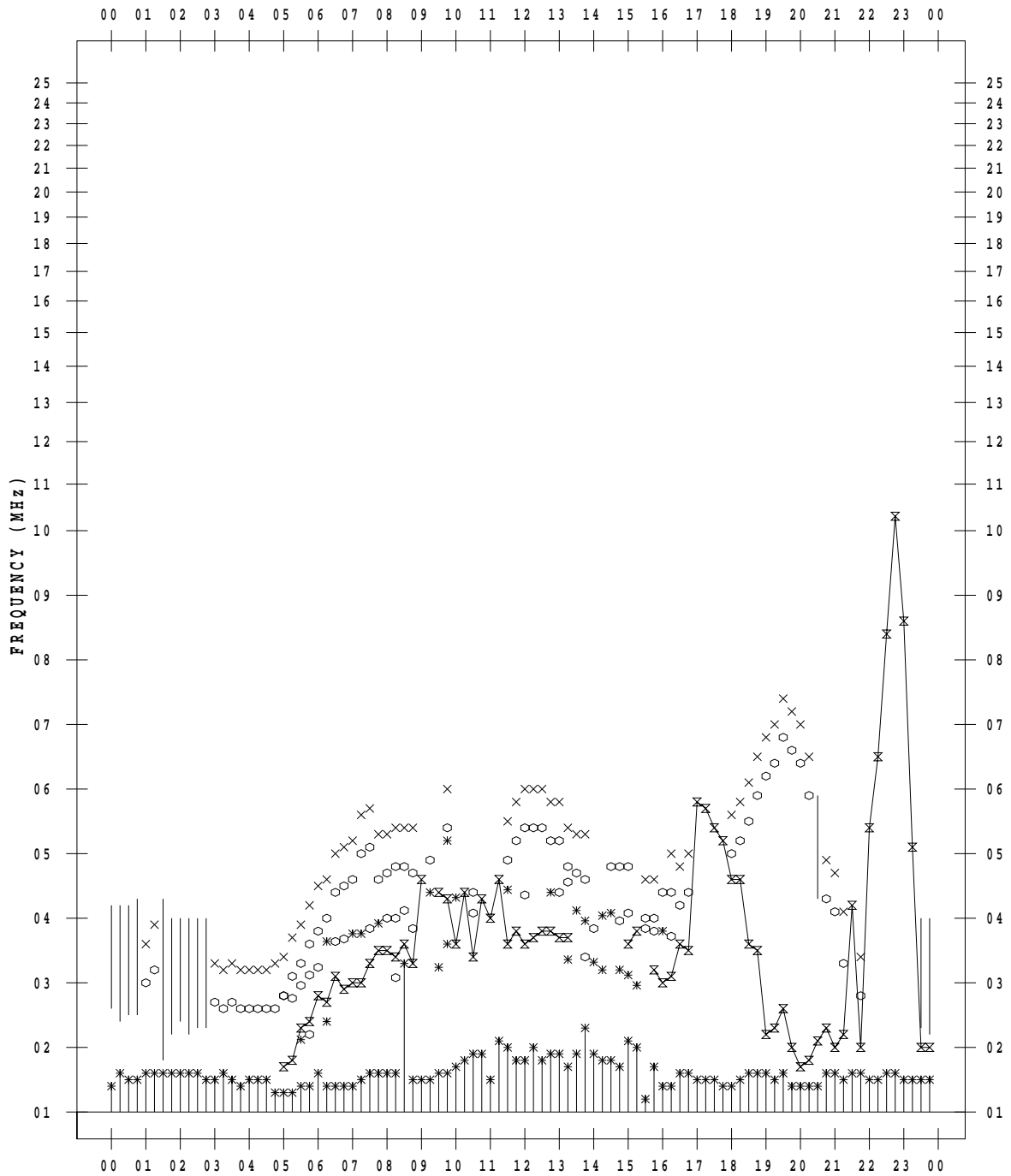
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 26

135 ° E MEAN TIME



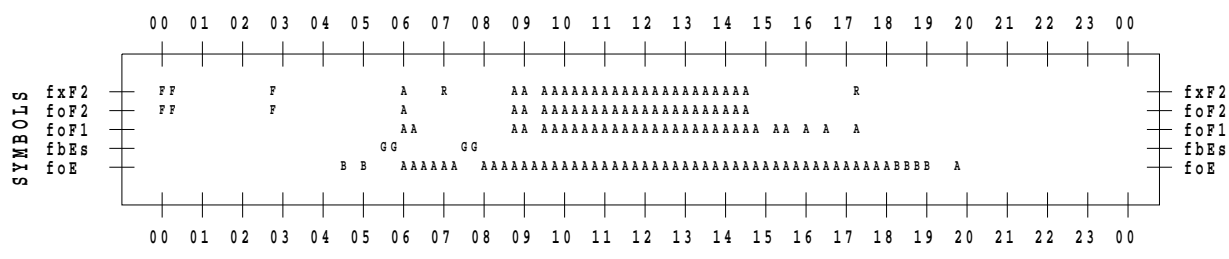
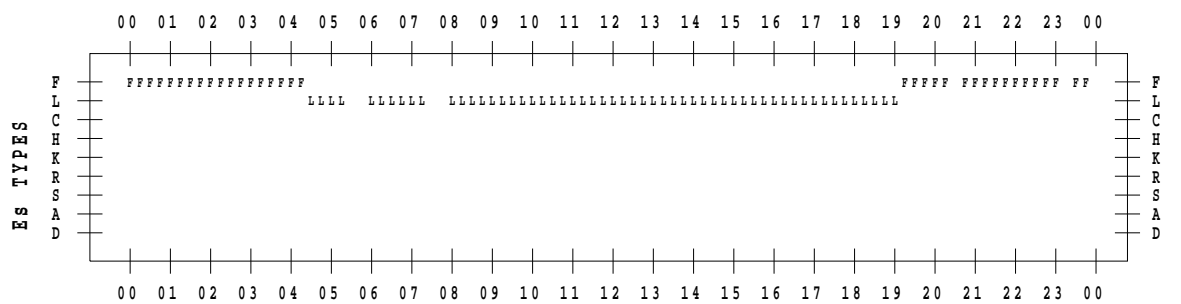
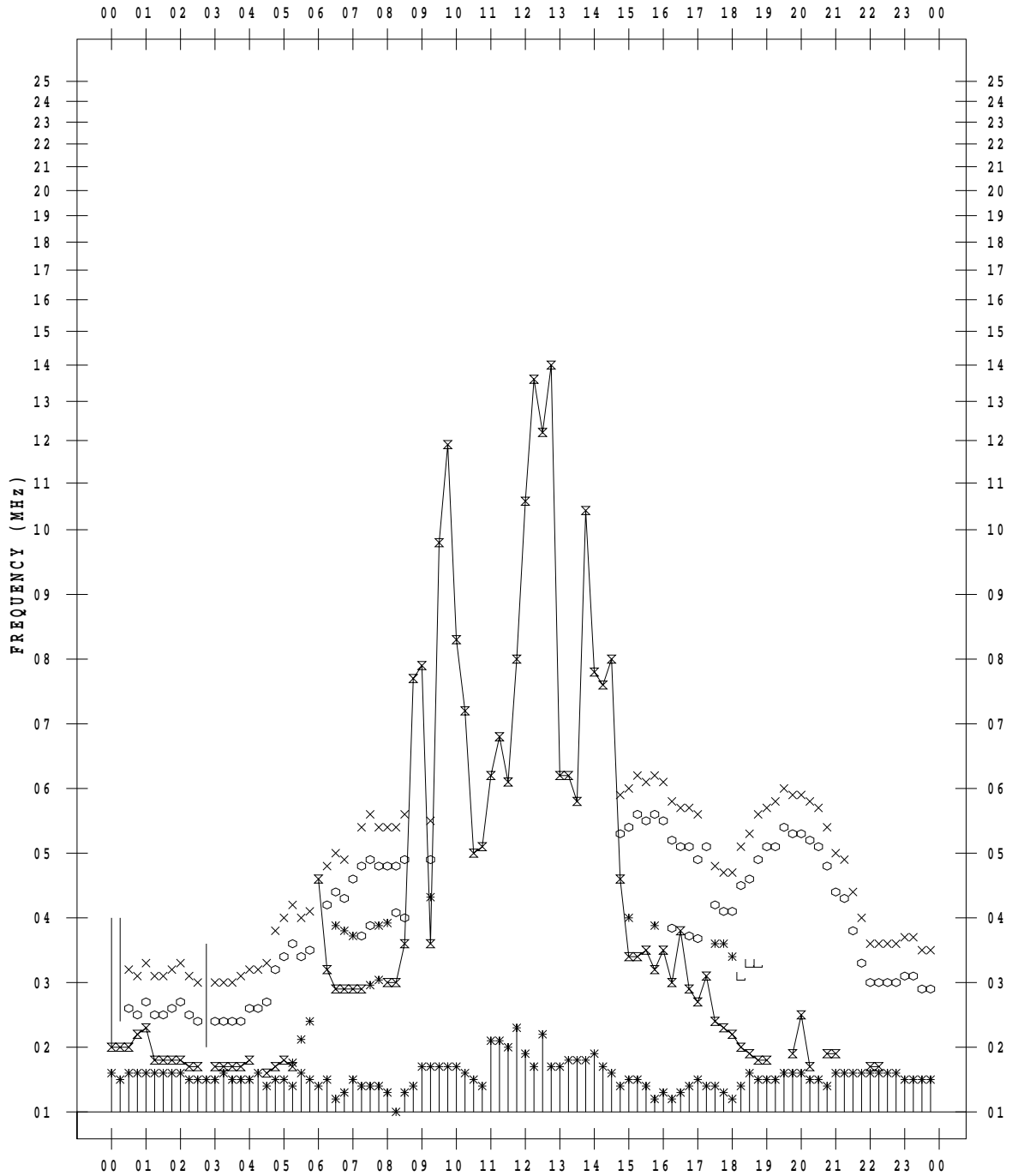
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 27

135 ° E MEAN TIME



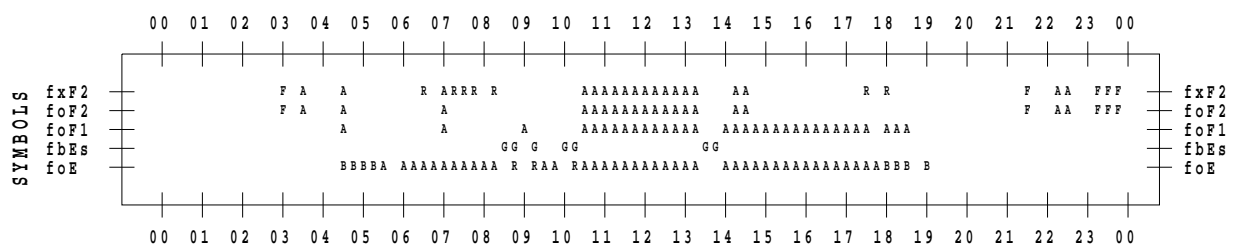
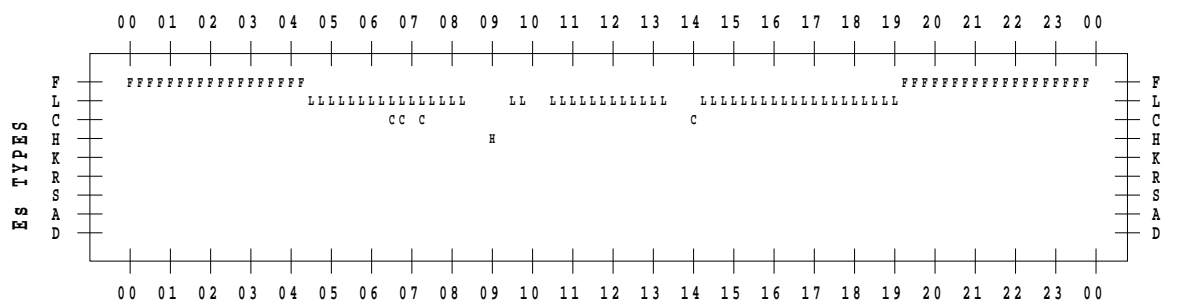
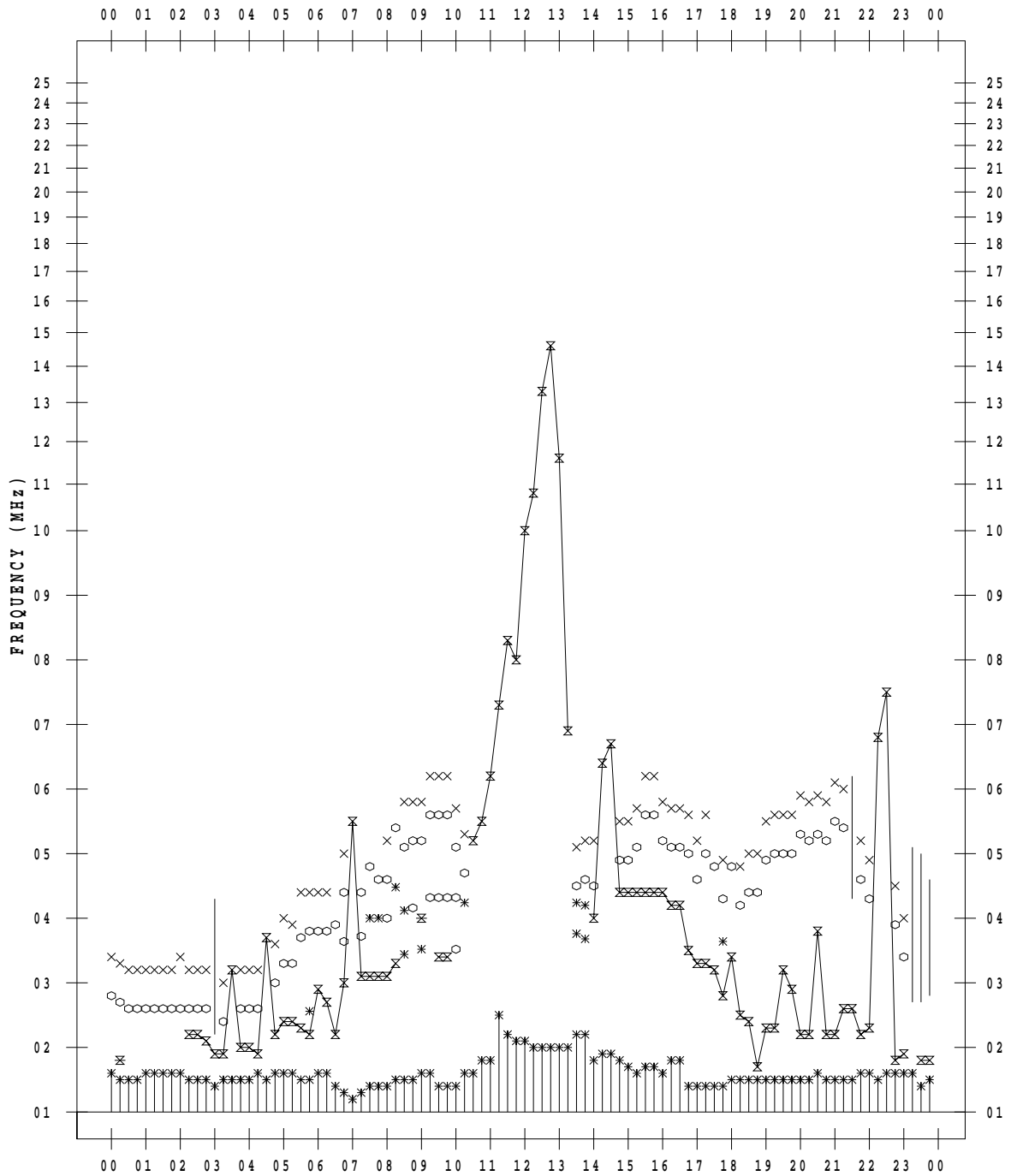
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 28

135 ° E MEAN TIME



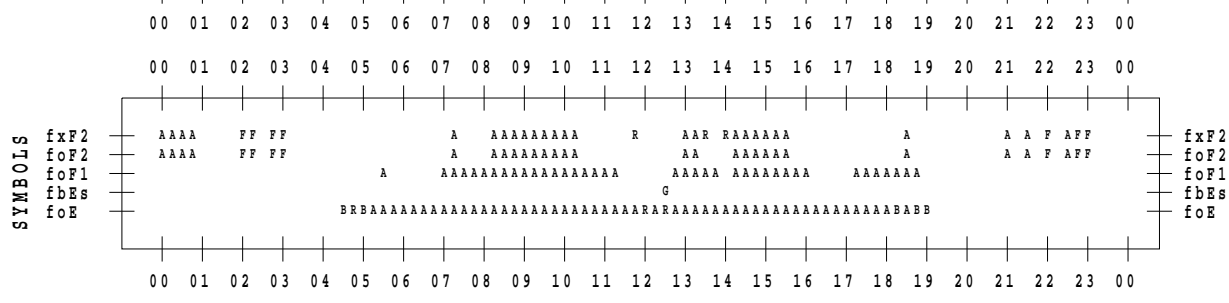
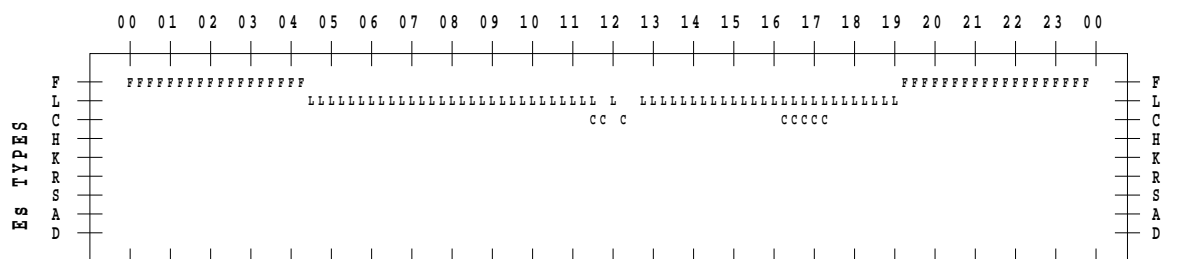
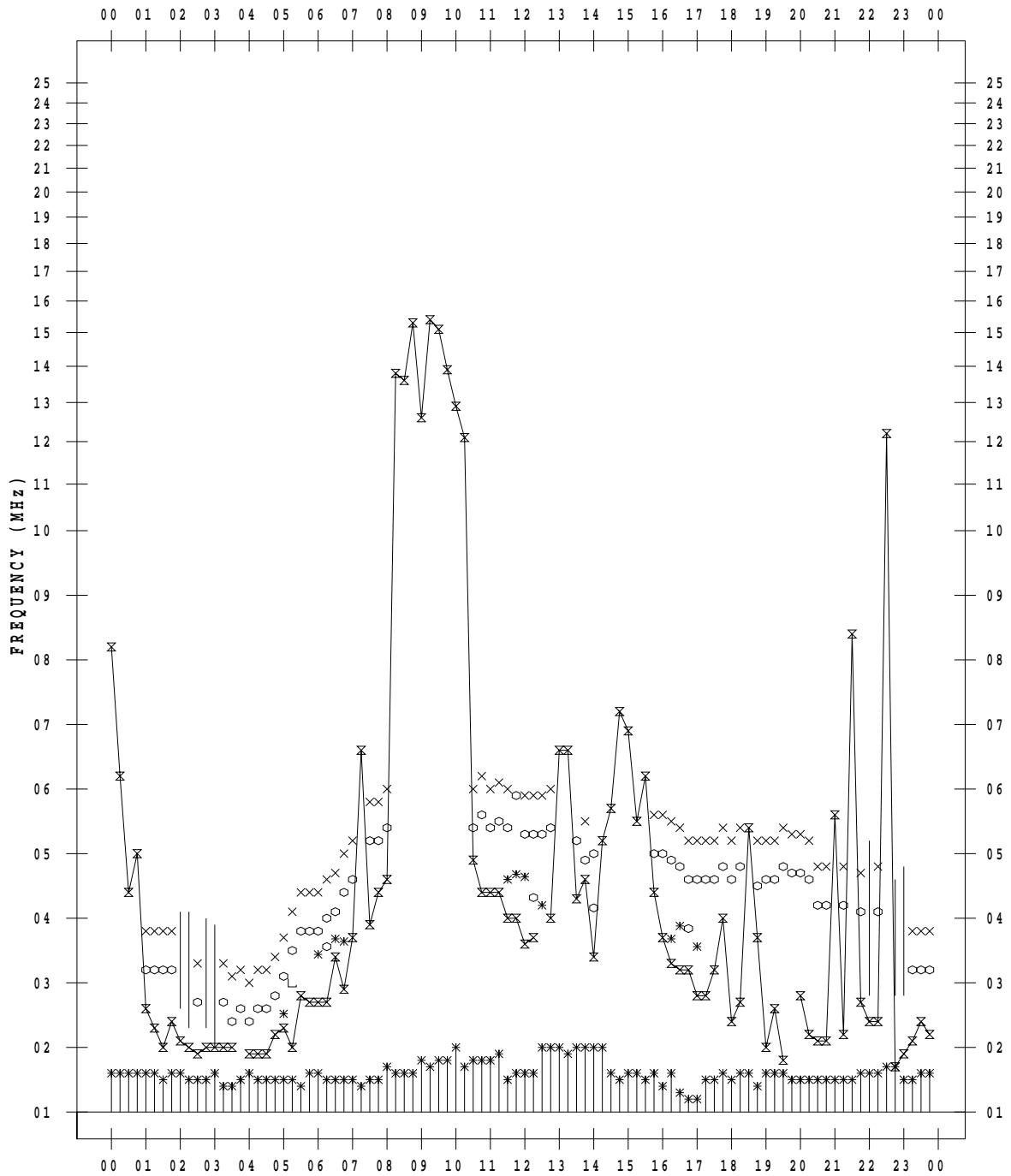
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 29

135 ° E MEAN TIME



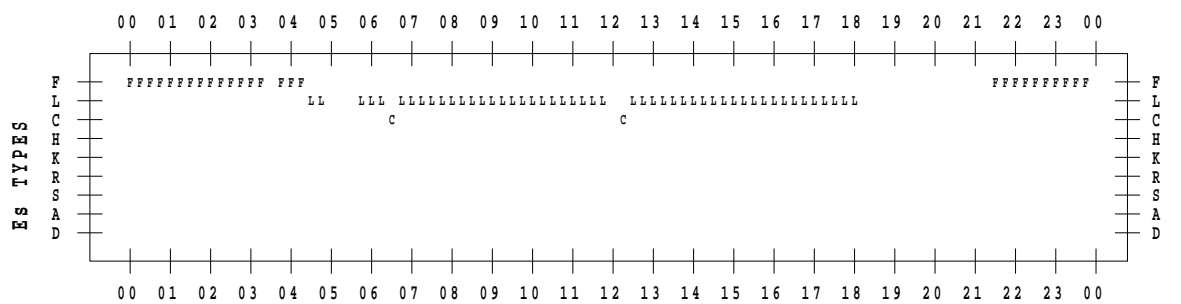
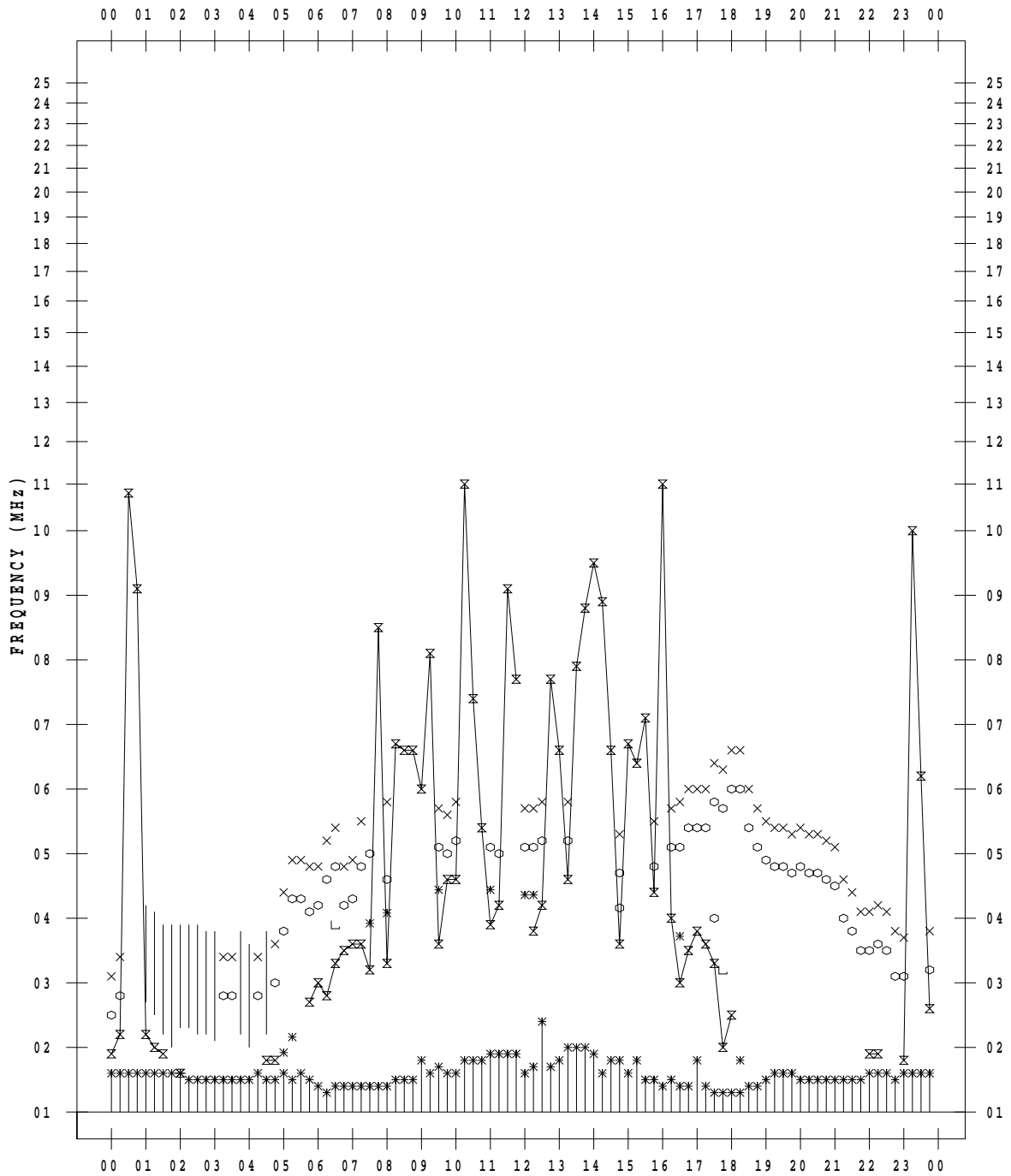
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 30

135 ° E MEAN TIME



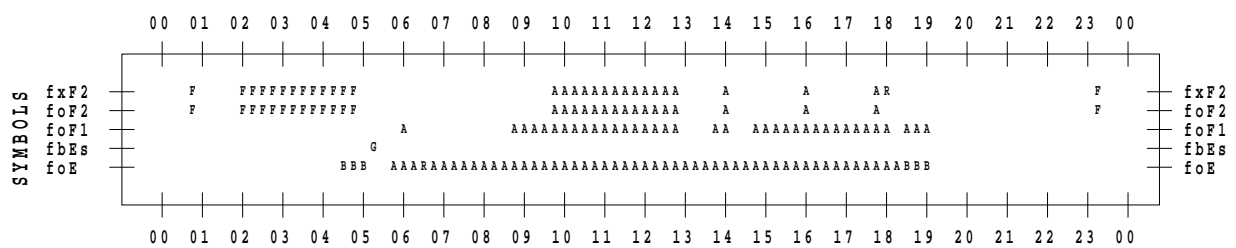
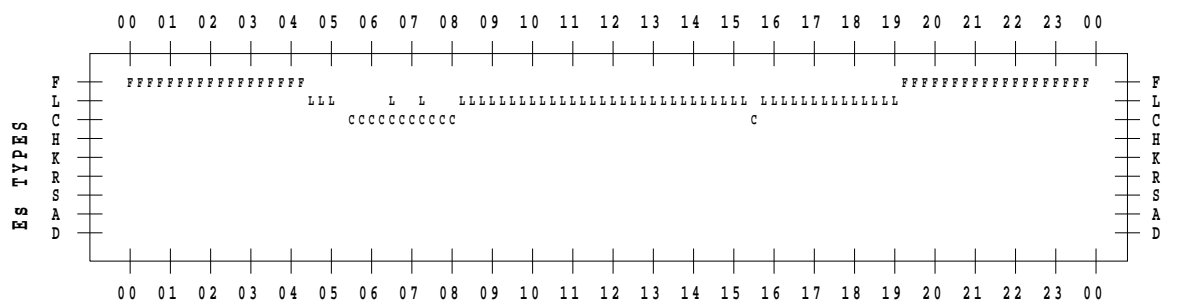
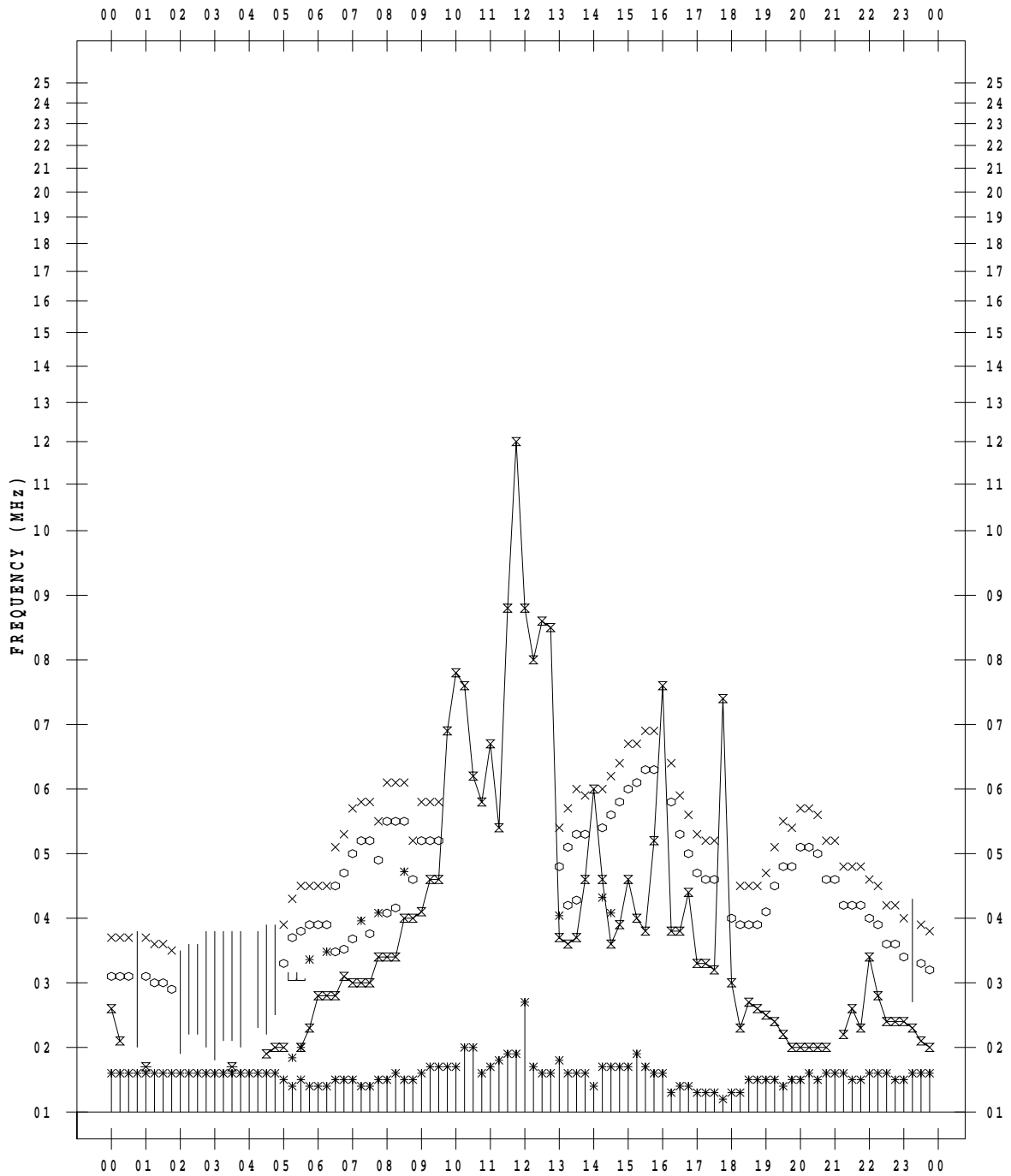
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019 / 7 / 31

135 ° E MEAN TIME



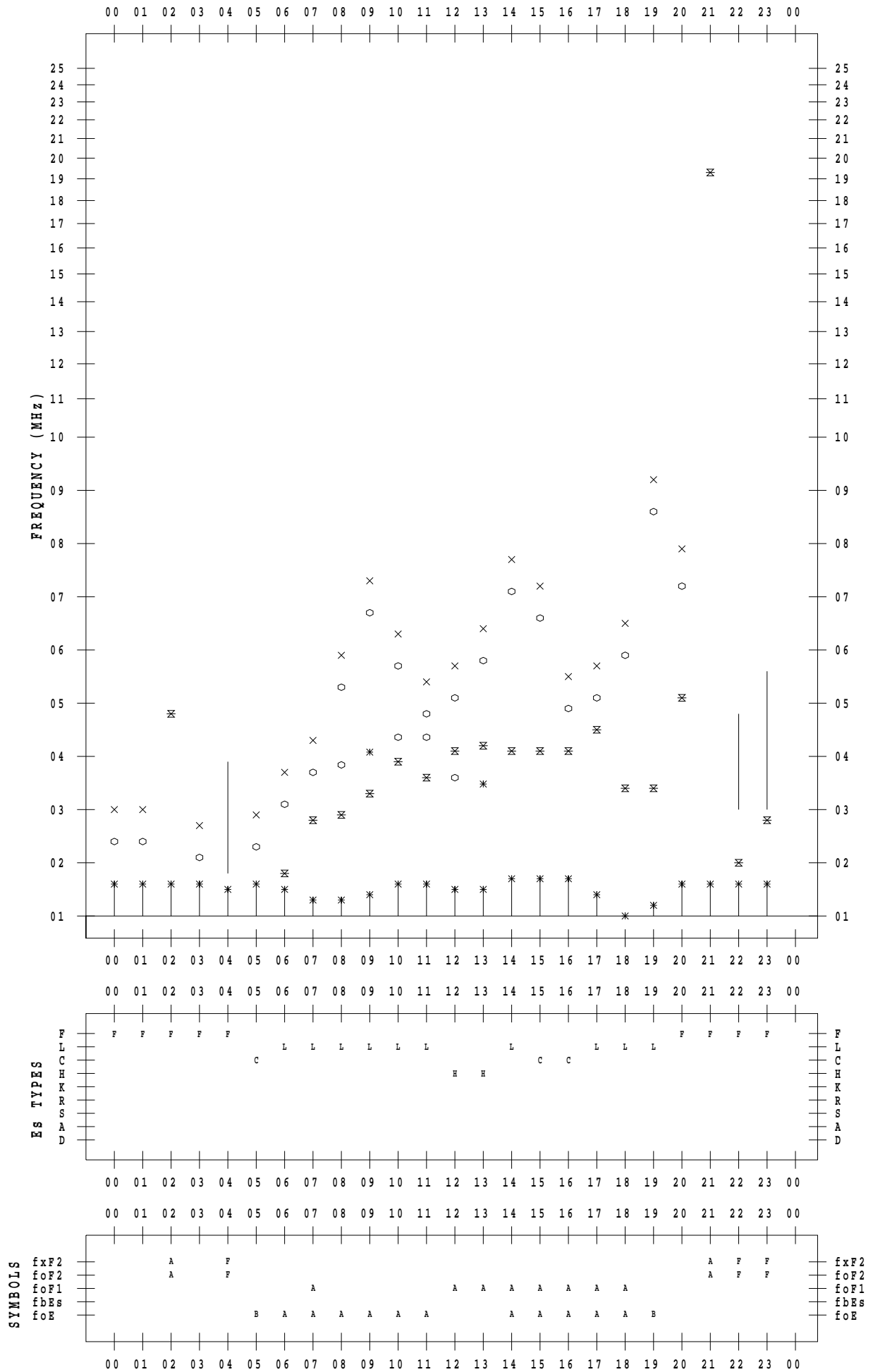
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 1

135 ° E MEAN TIME



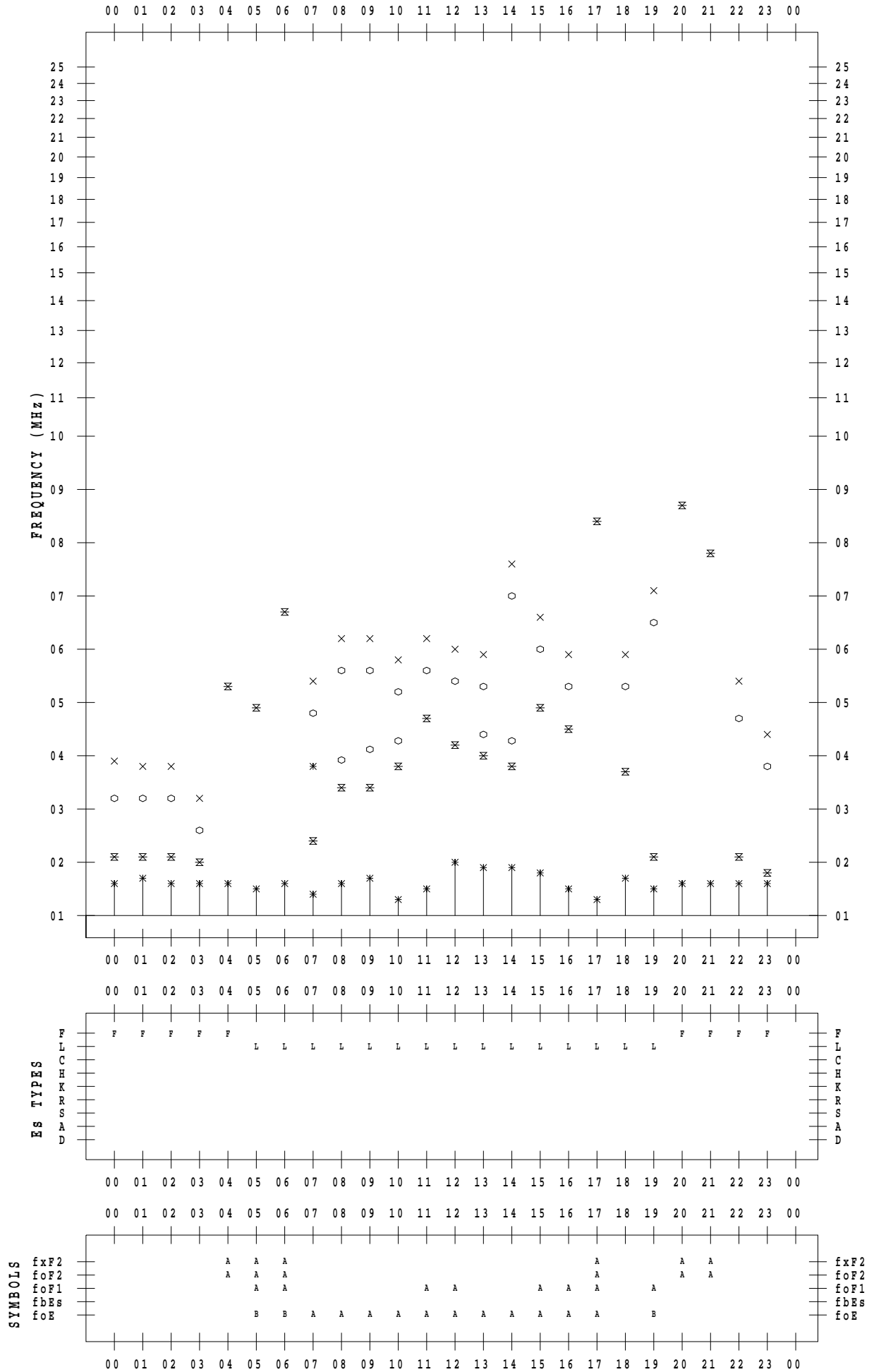
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 2

135 ° E MEAN TIME



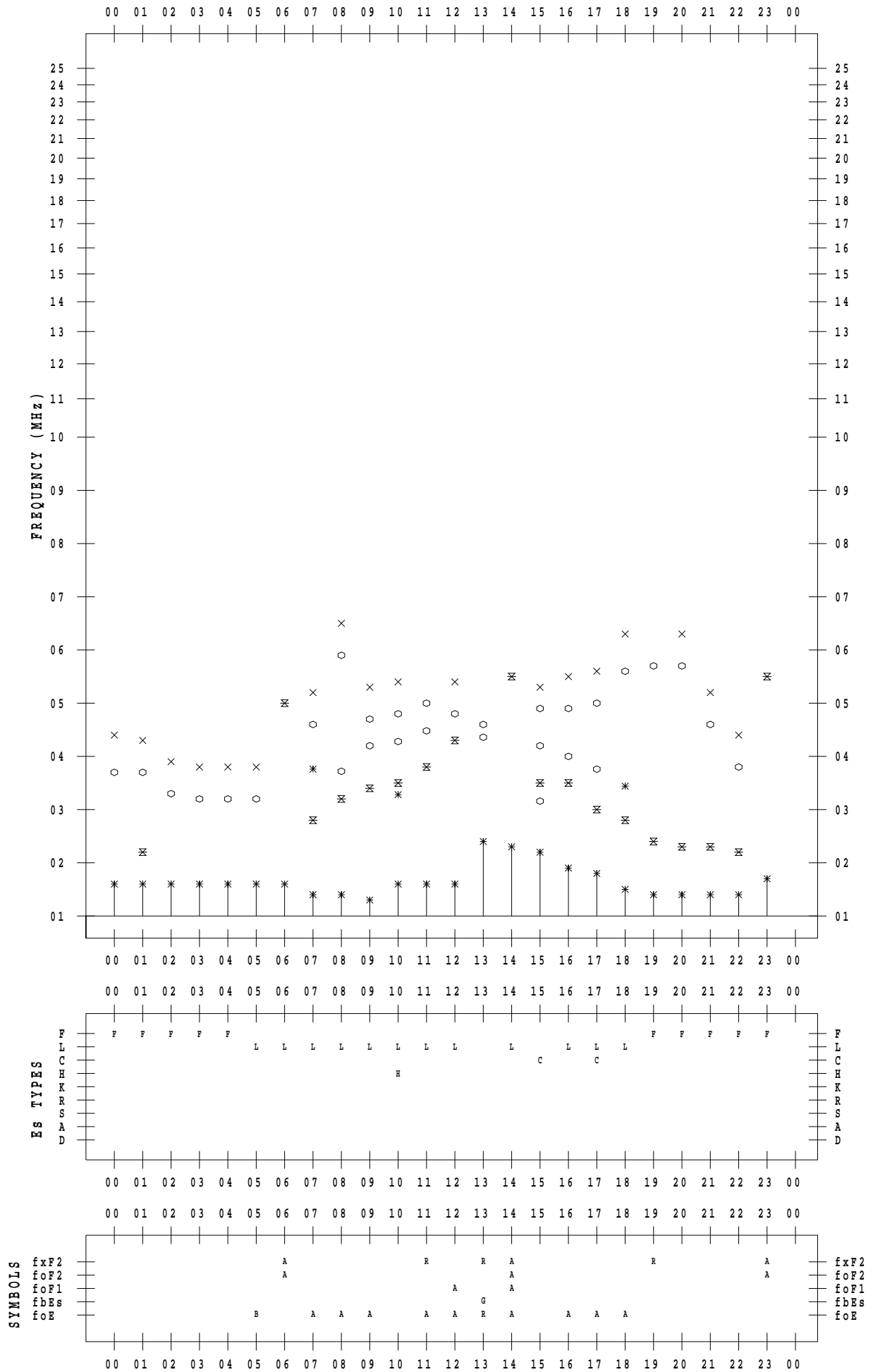
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 3

135 ° E MEAN TIME



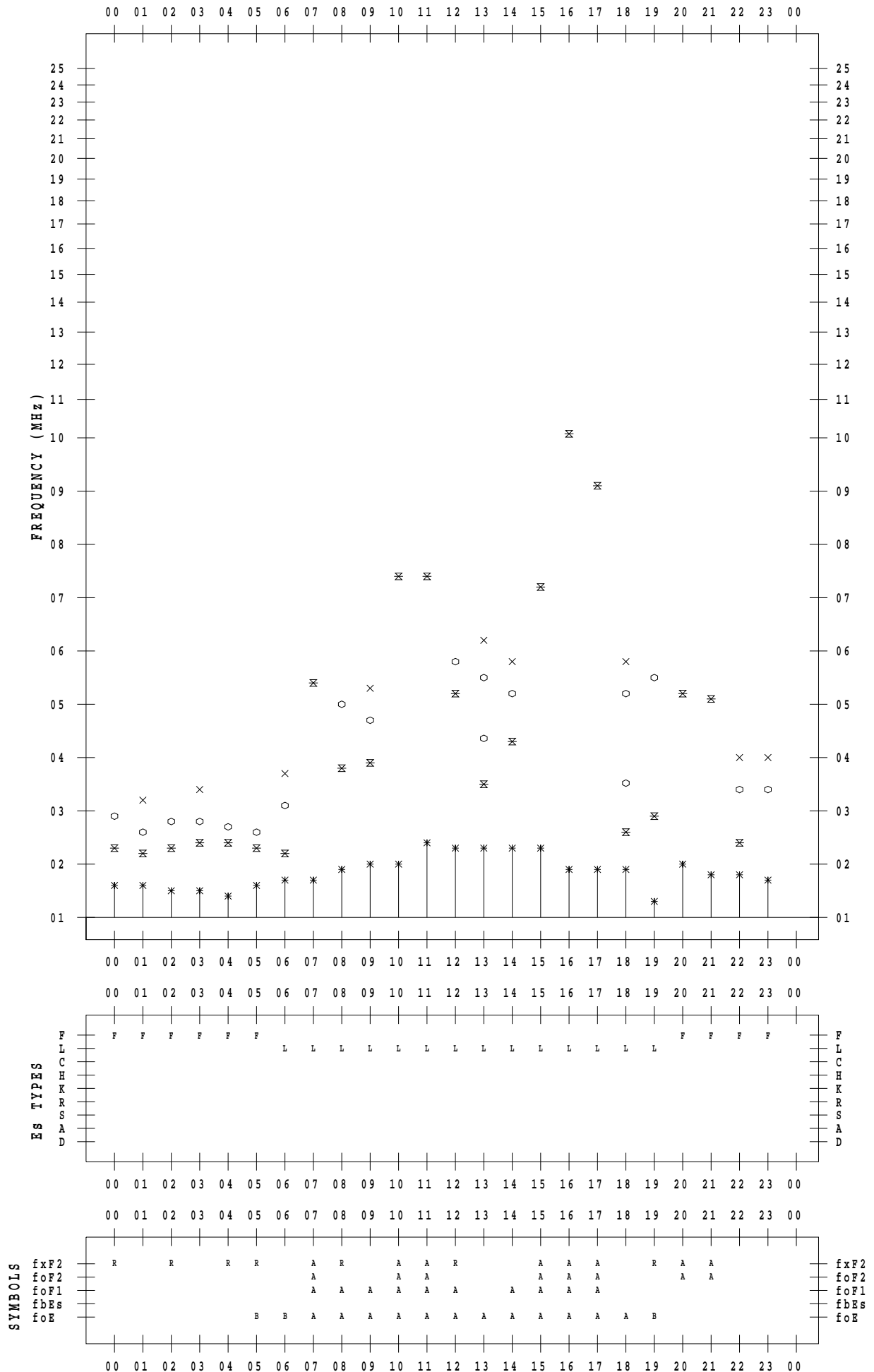
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 4

135 ° E MEAN TIME



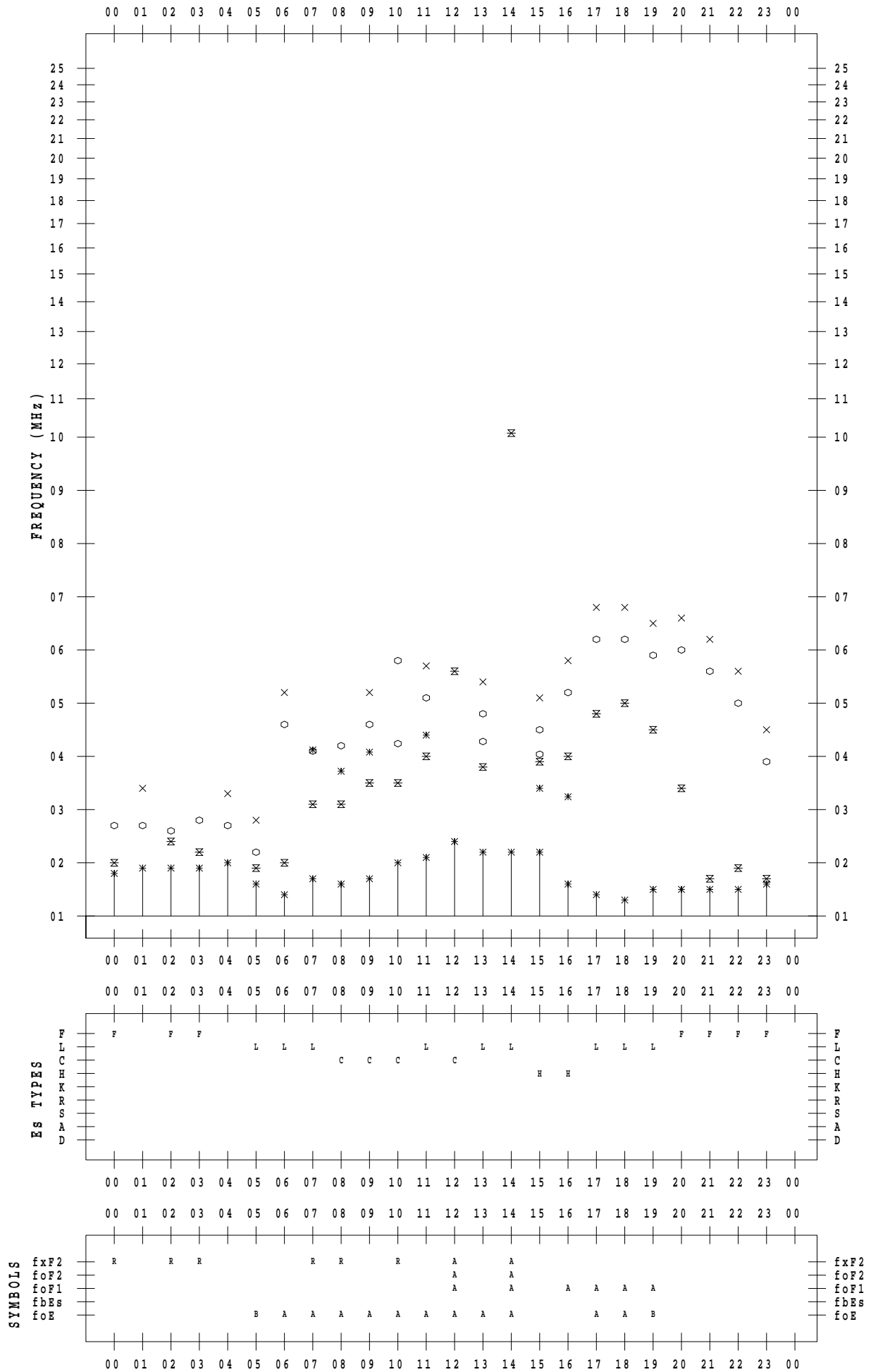
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 5

135 ° E MEAN TIME



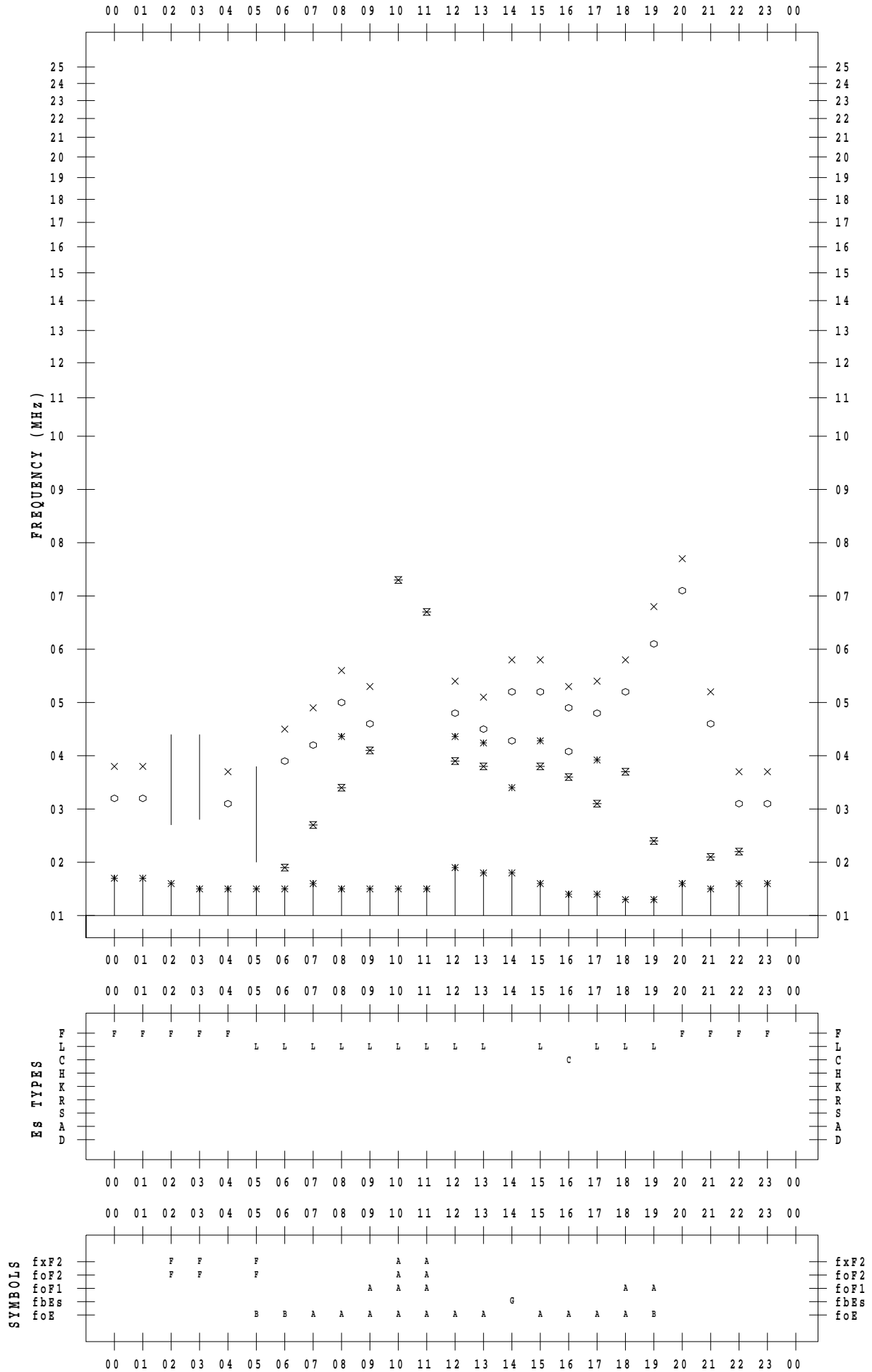
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 6

135 ° E MEAN TIME



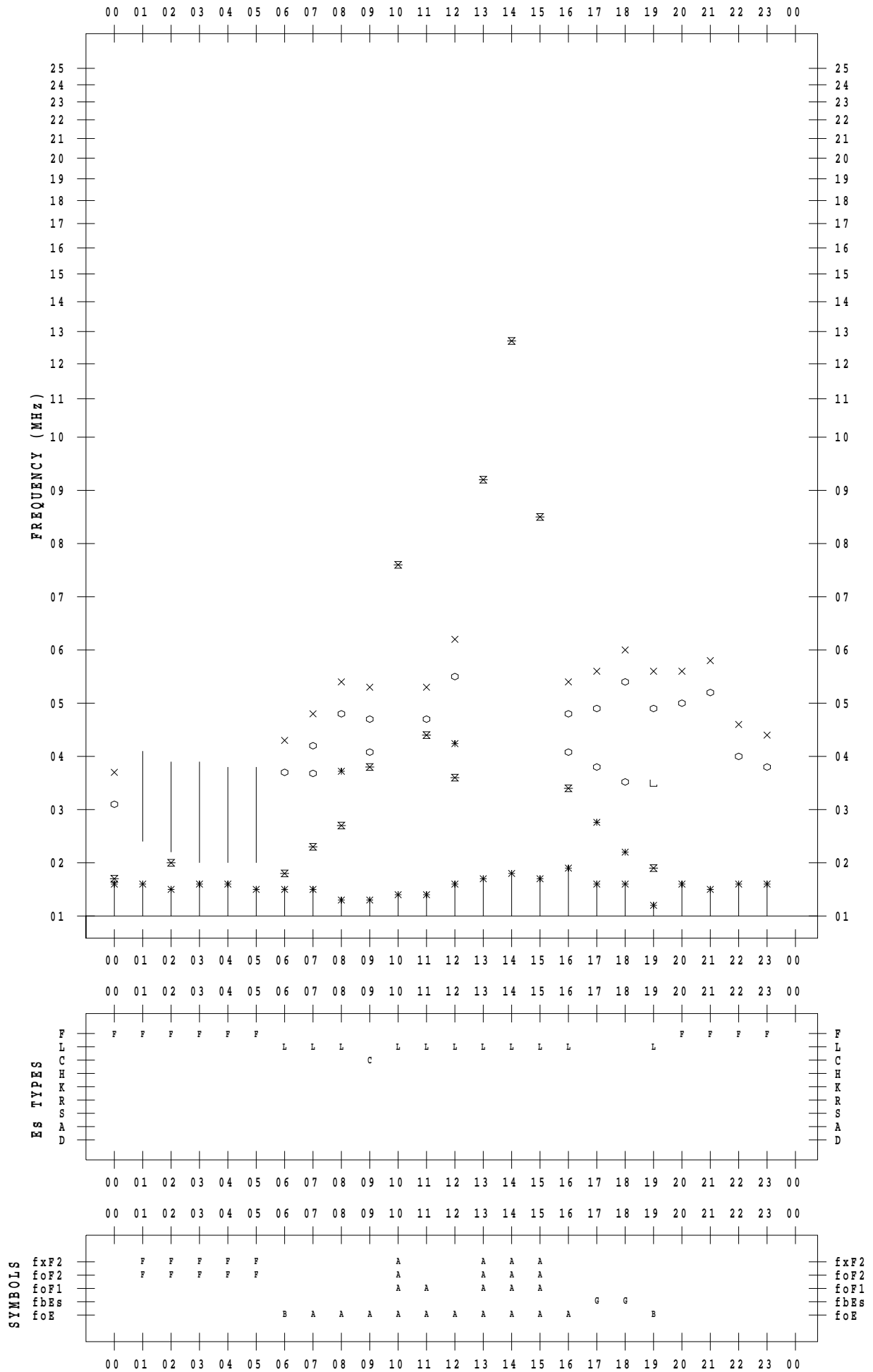
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 7

135 ° E MEAN TIME



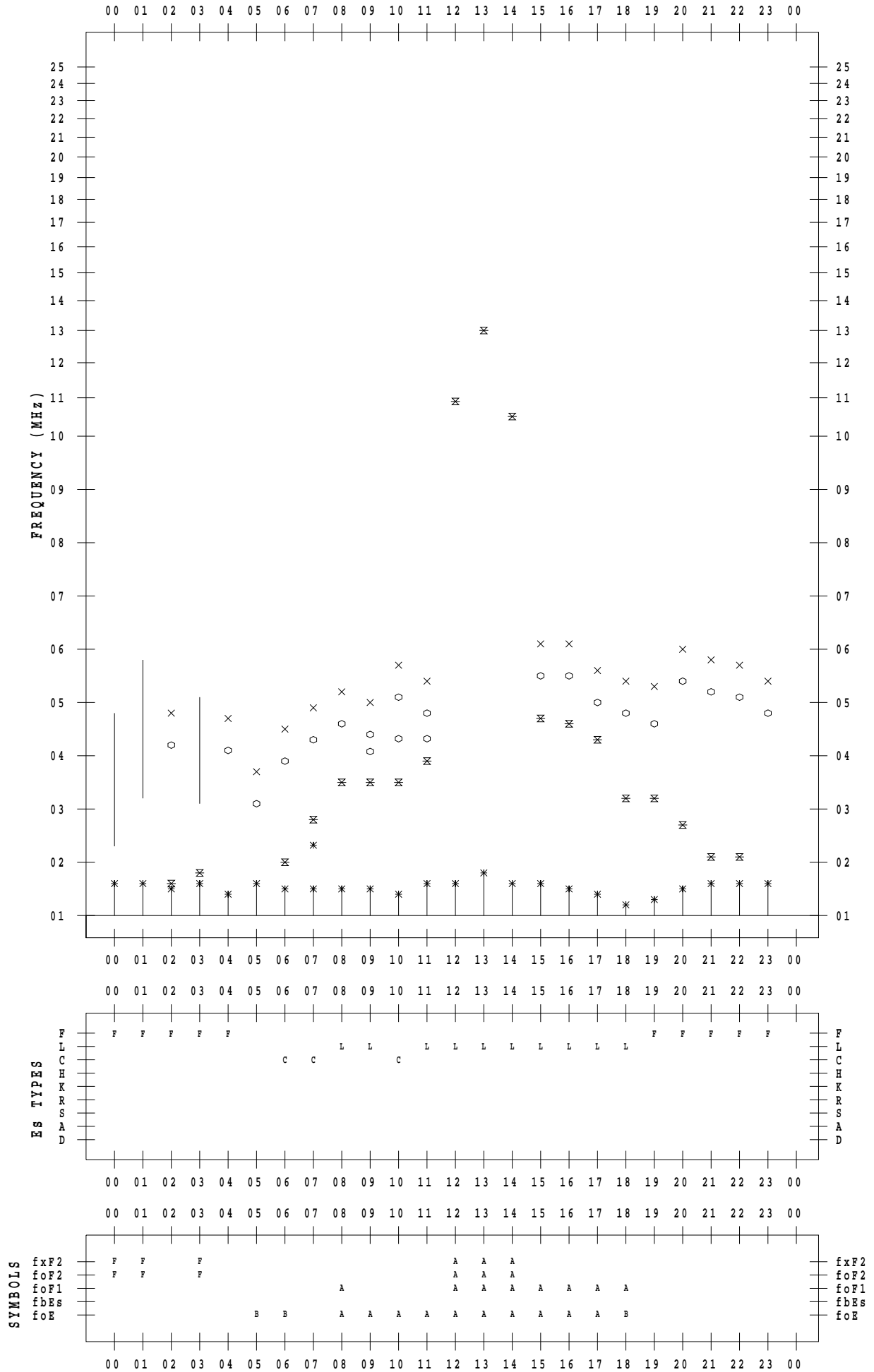
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 8

135 ° E MEAN TIME



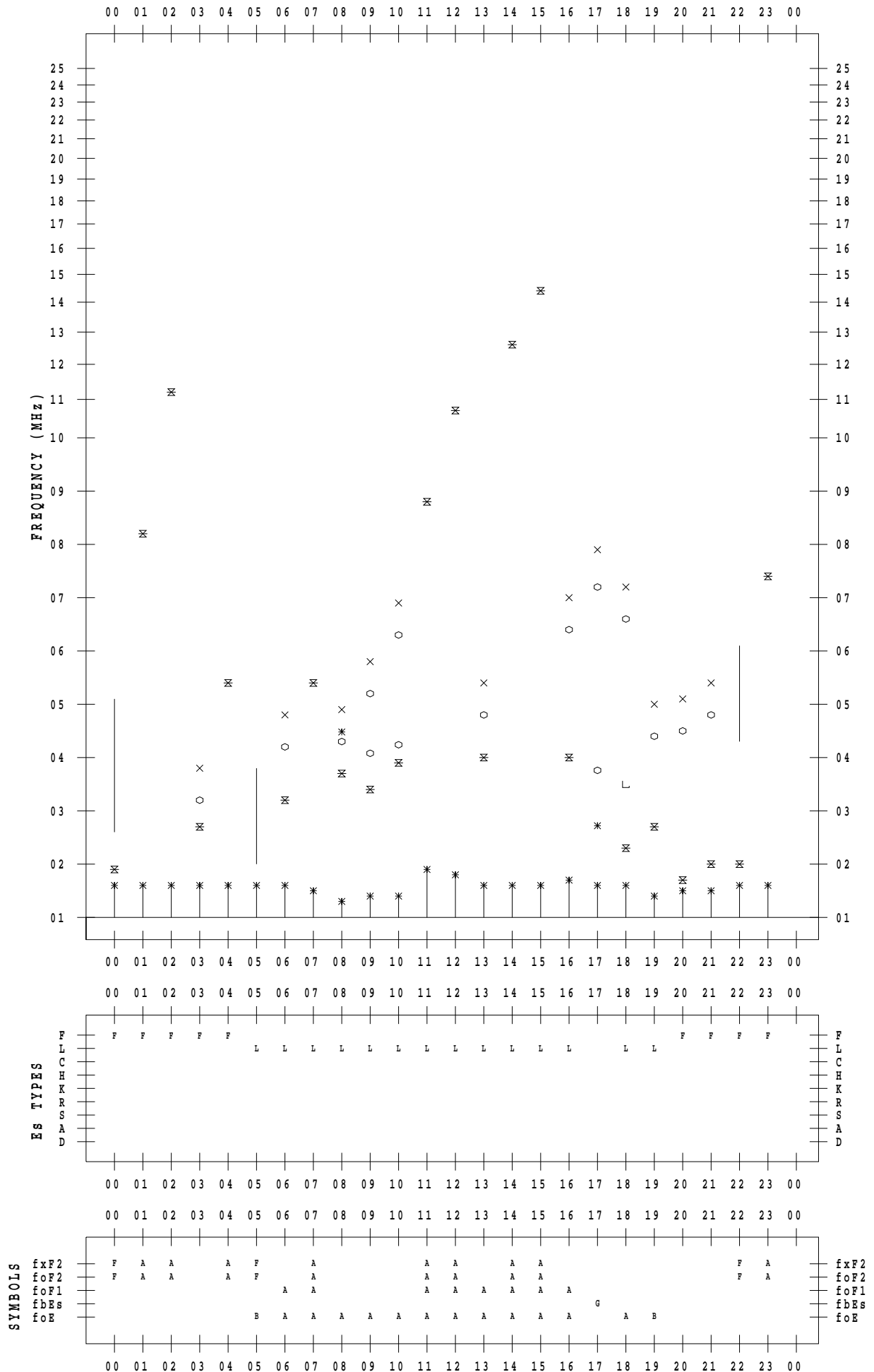
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 9

135 ° E MEAN TIME



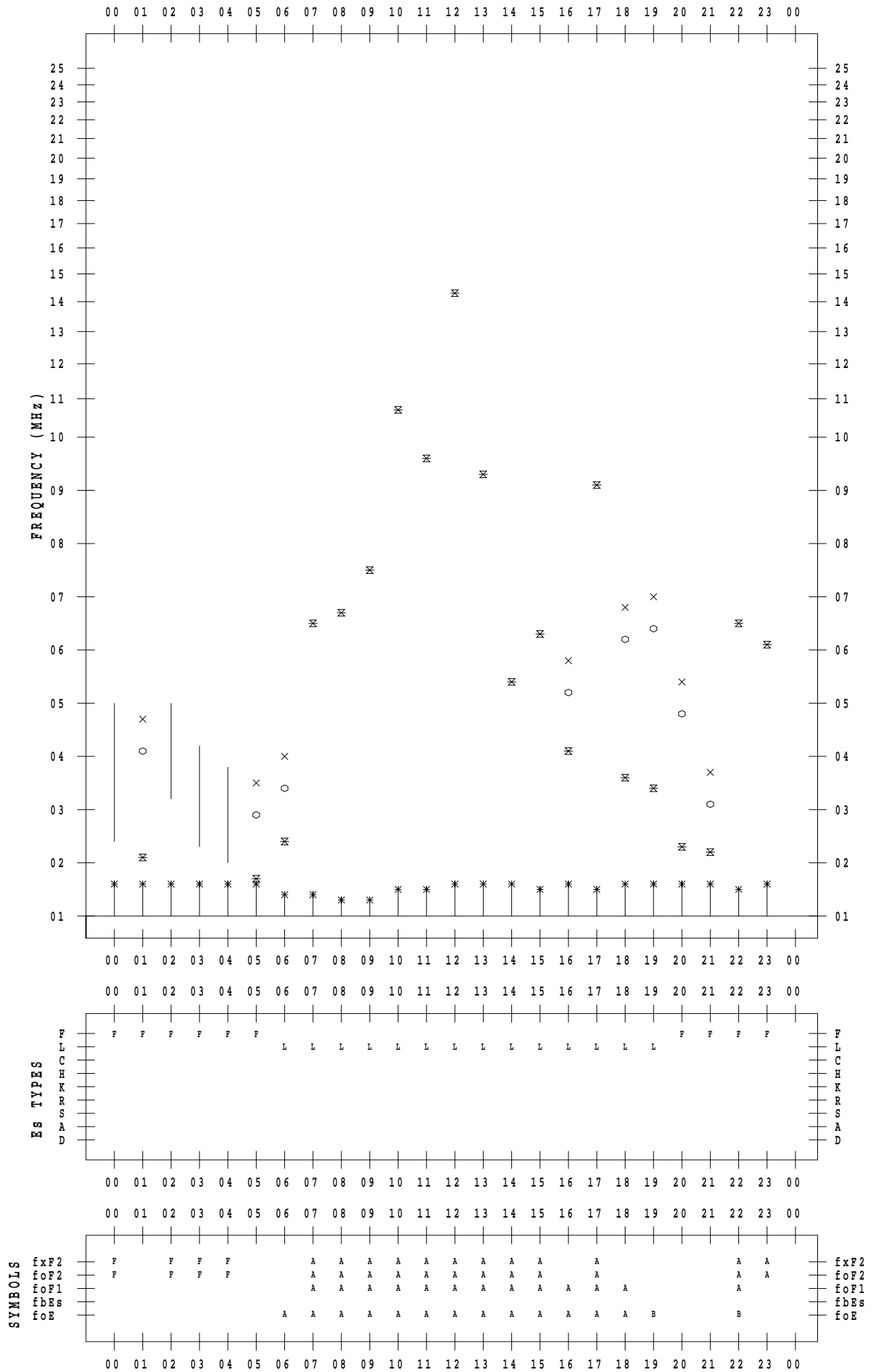
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 10

135 ° E MEAN TIME



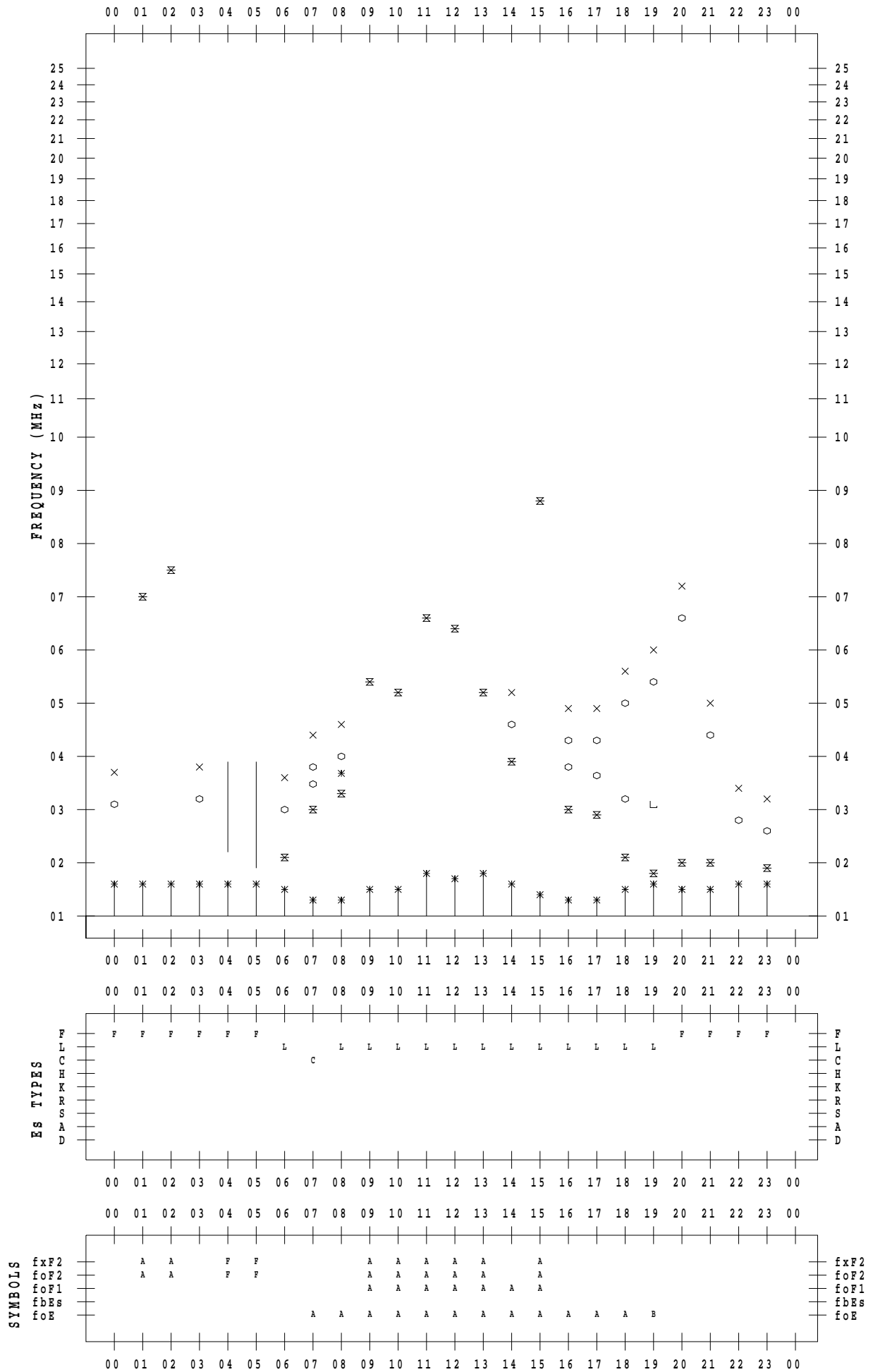
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 11

135 ° E MEAN TIME



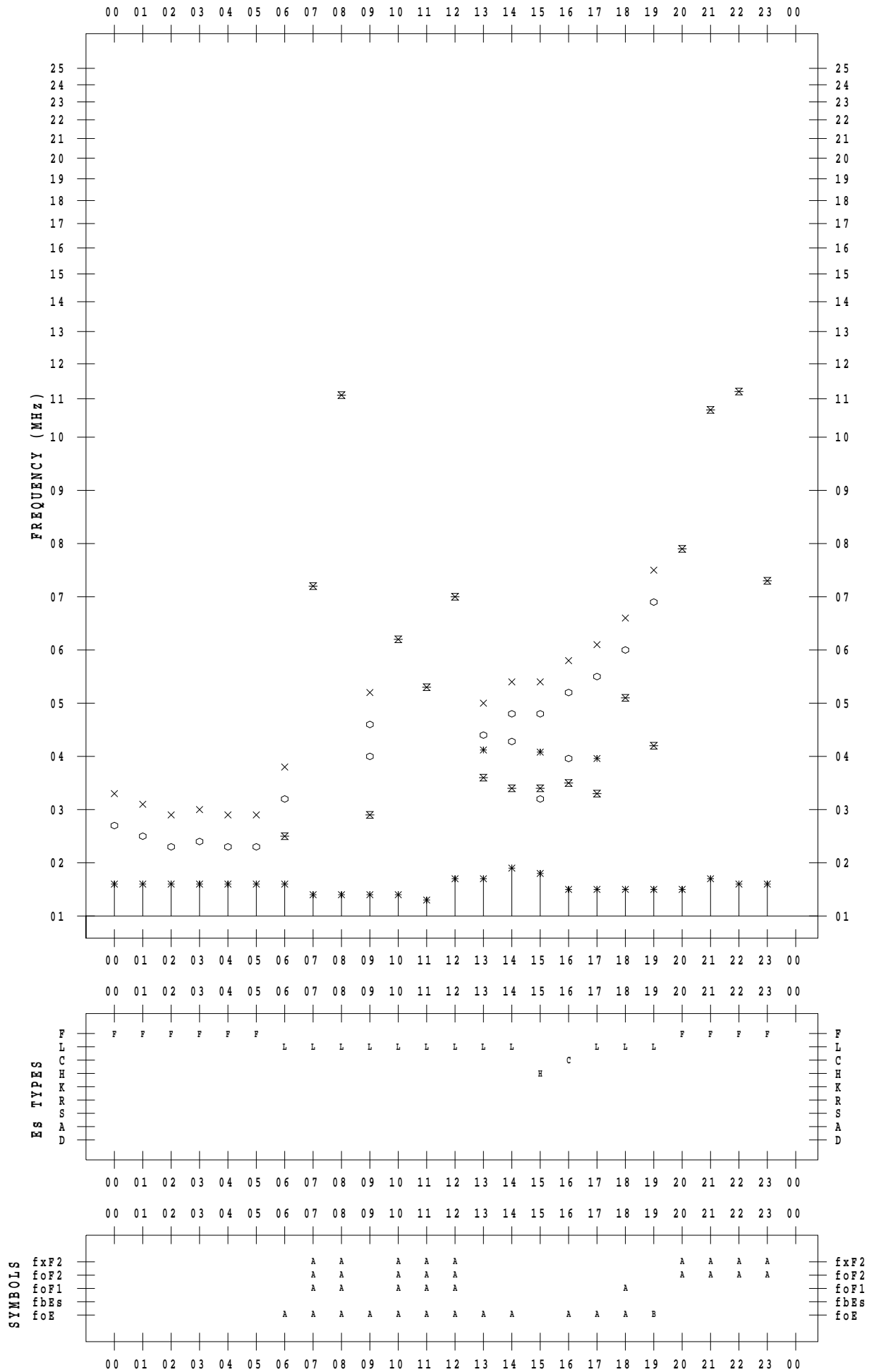
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 12

135 ° E MEAN TIME



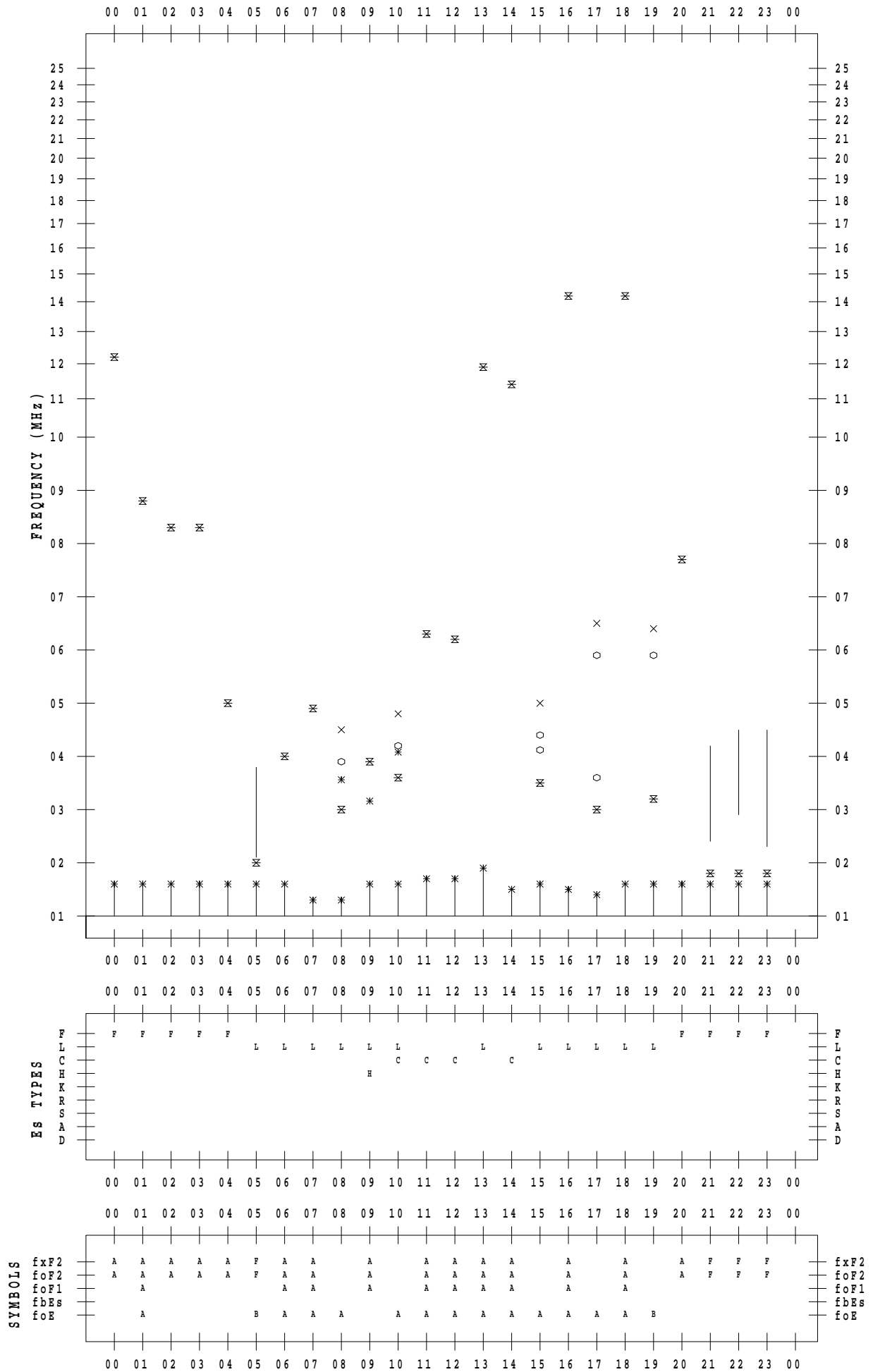
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 13

135 ° E MEAN TIME



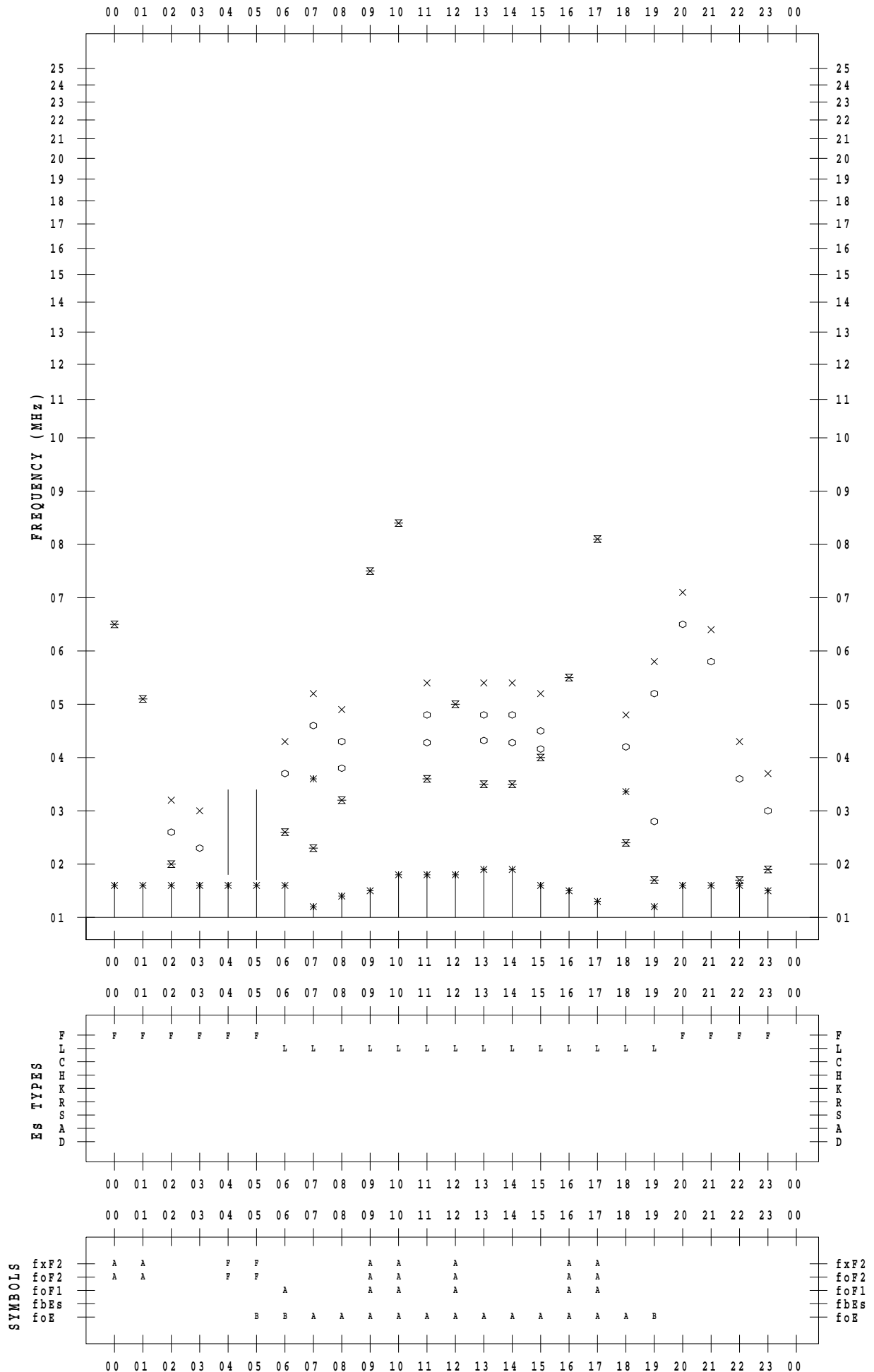
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 14

135 ° E MEAN TIME



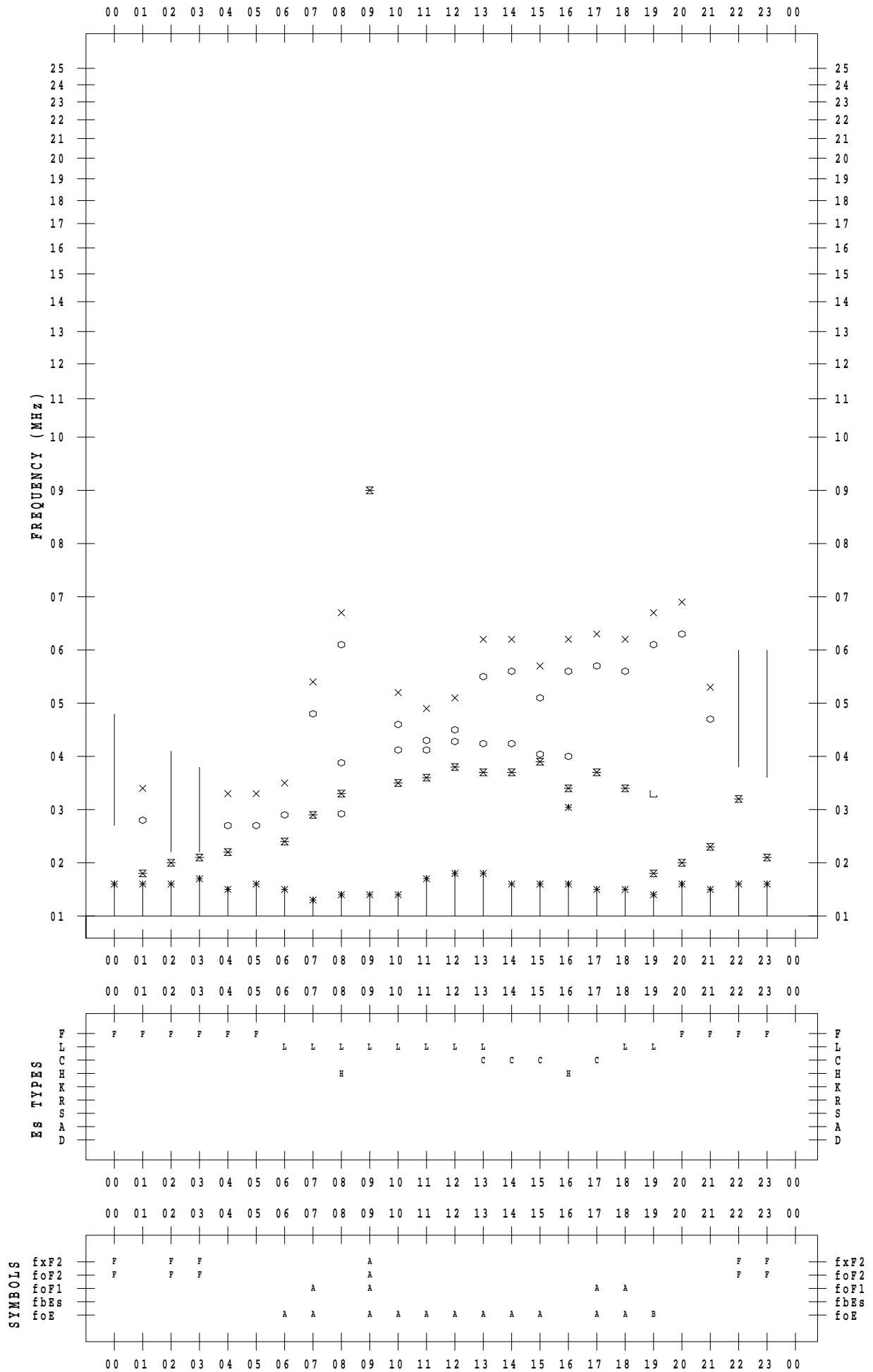
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 15

135 ° E MEAN TIME



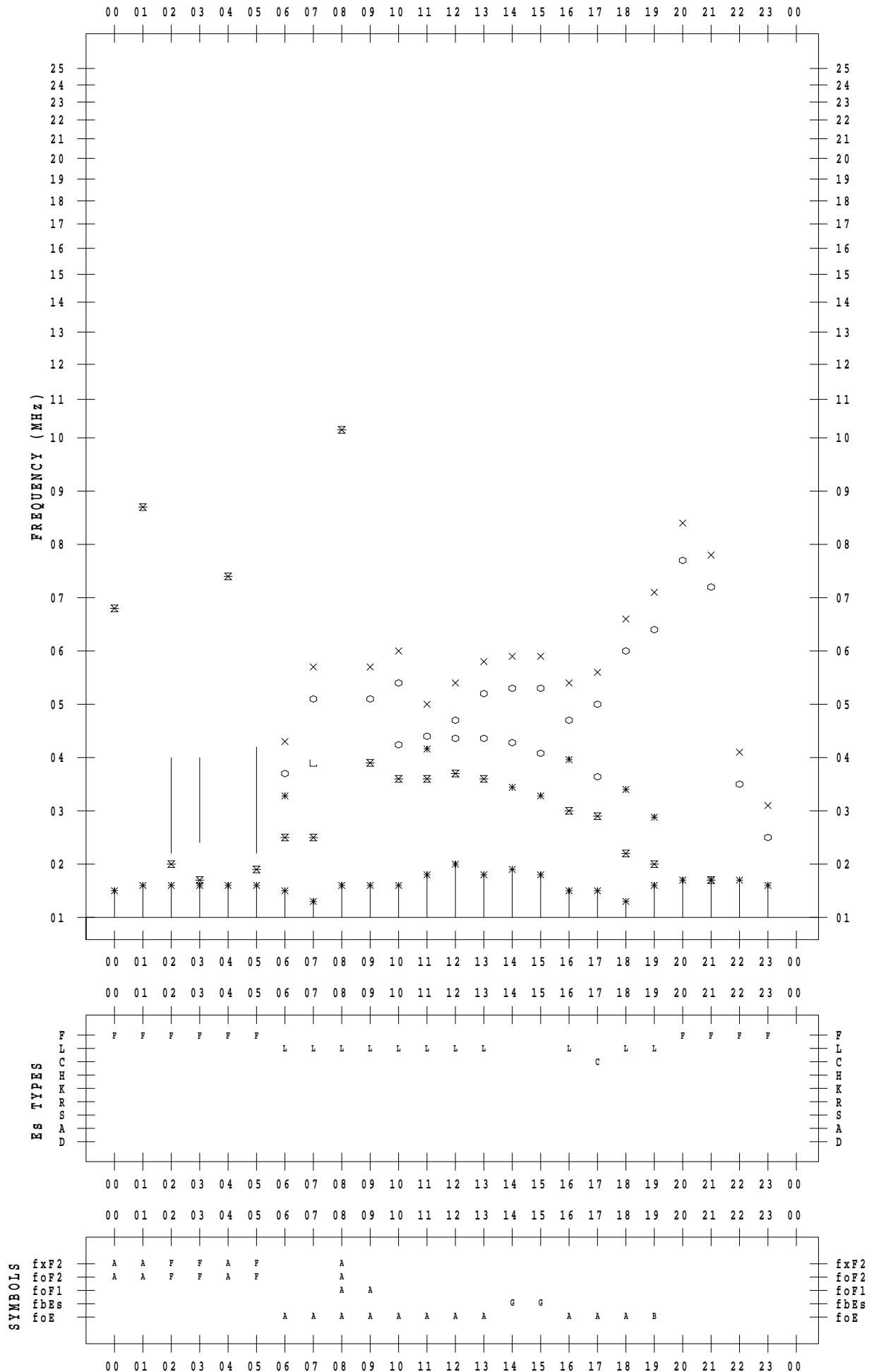
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 16

135 ° E MEAN TIME



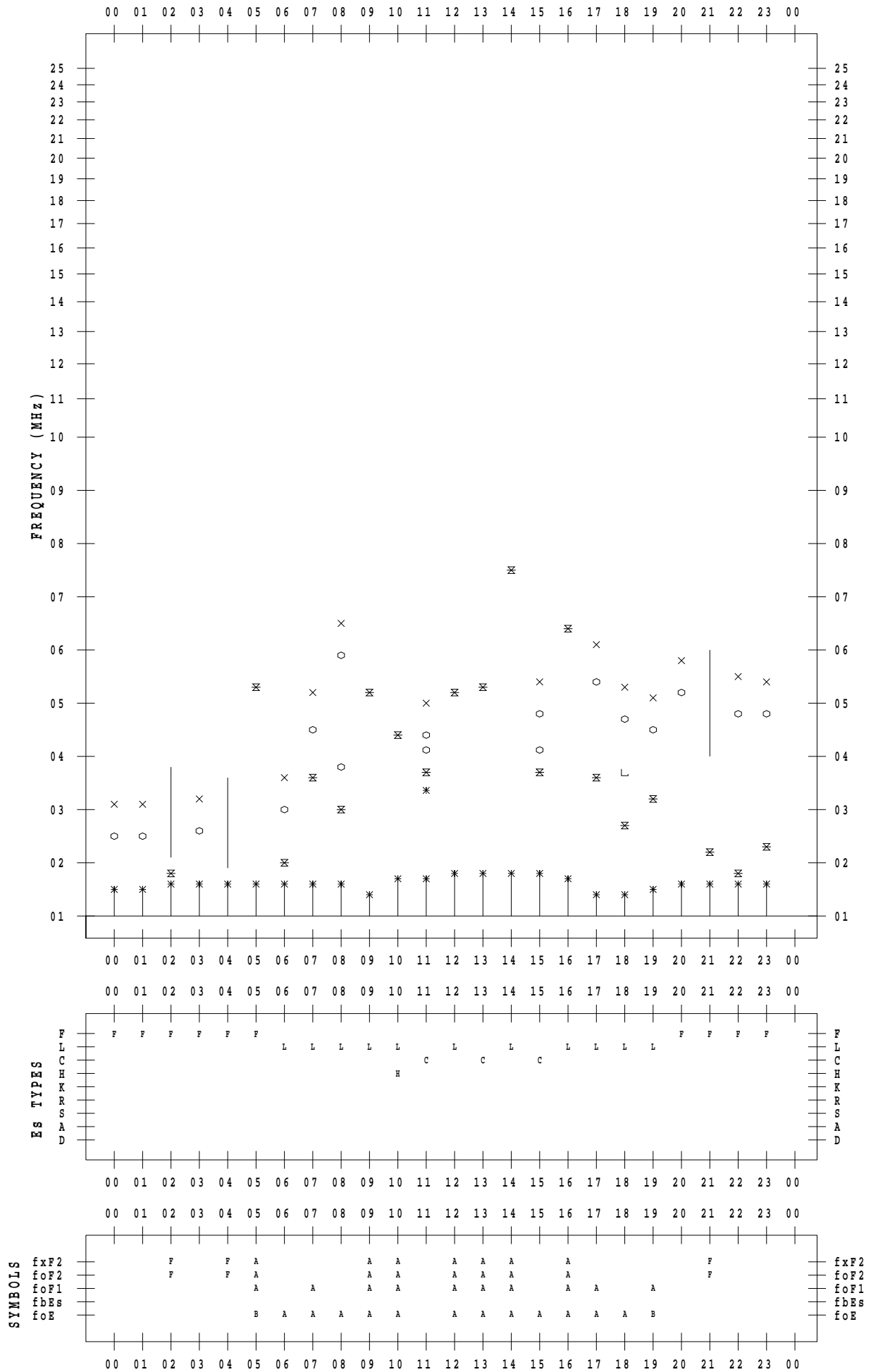
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 17

135 ° E MEAN TIME



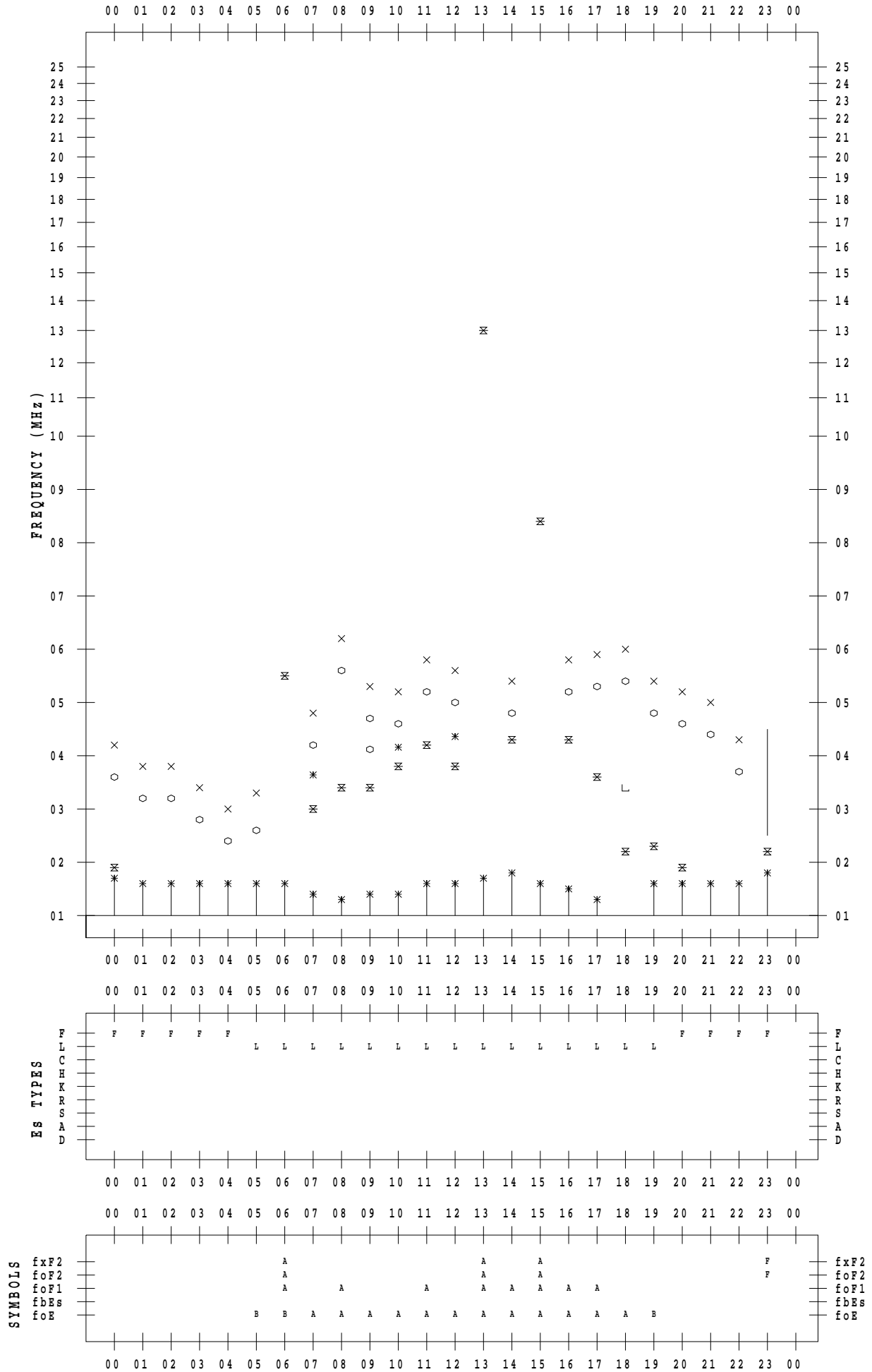
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 18

135 ° E MEAN TIME



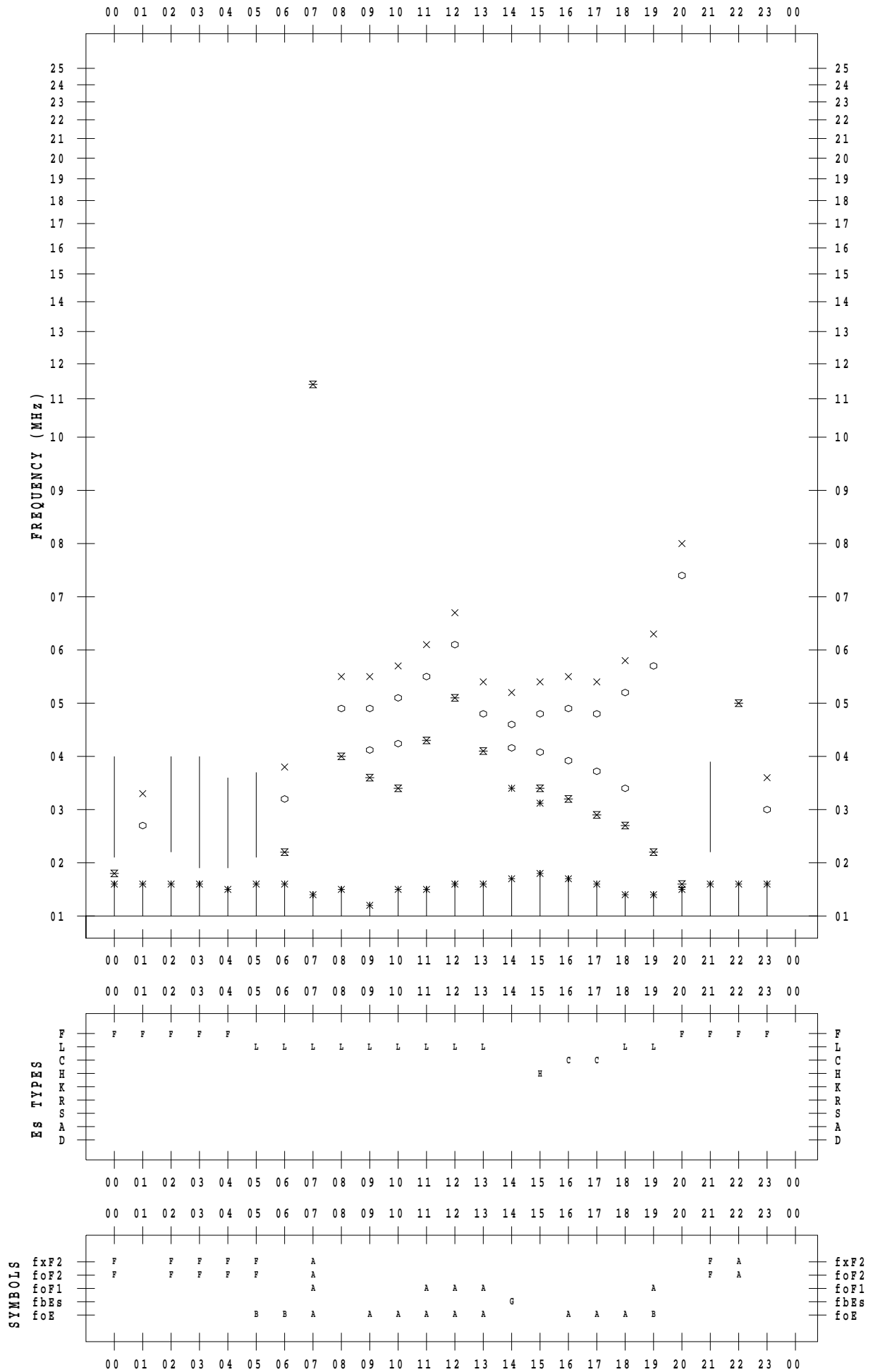
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 19

135 ° E MEAN TIME



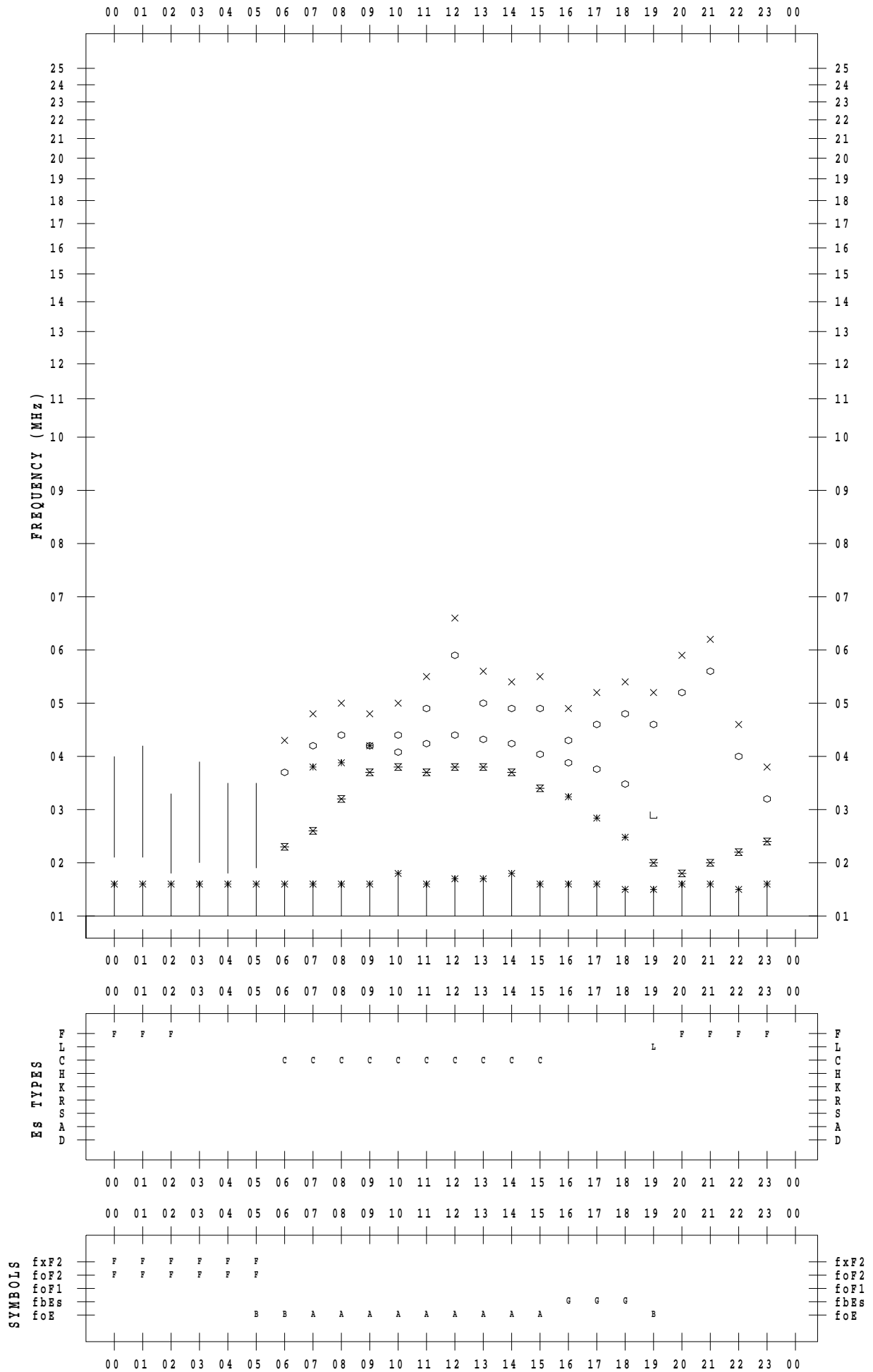
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 20

135 ° E MEAN TIME



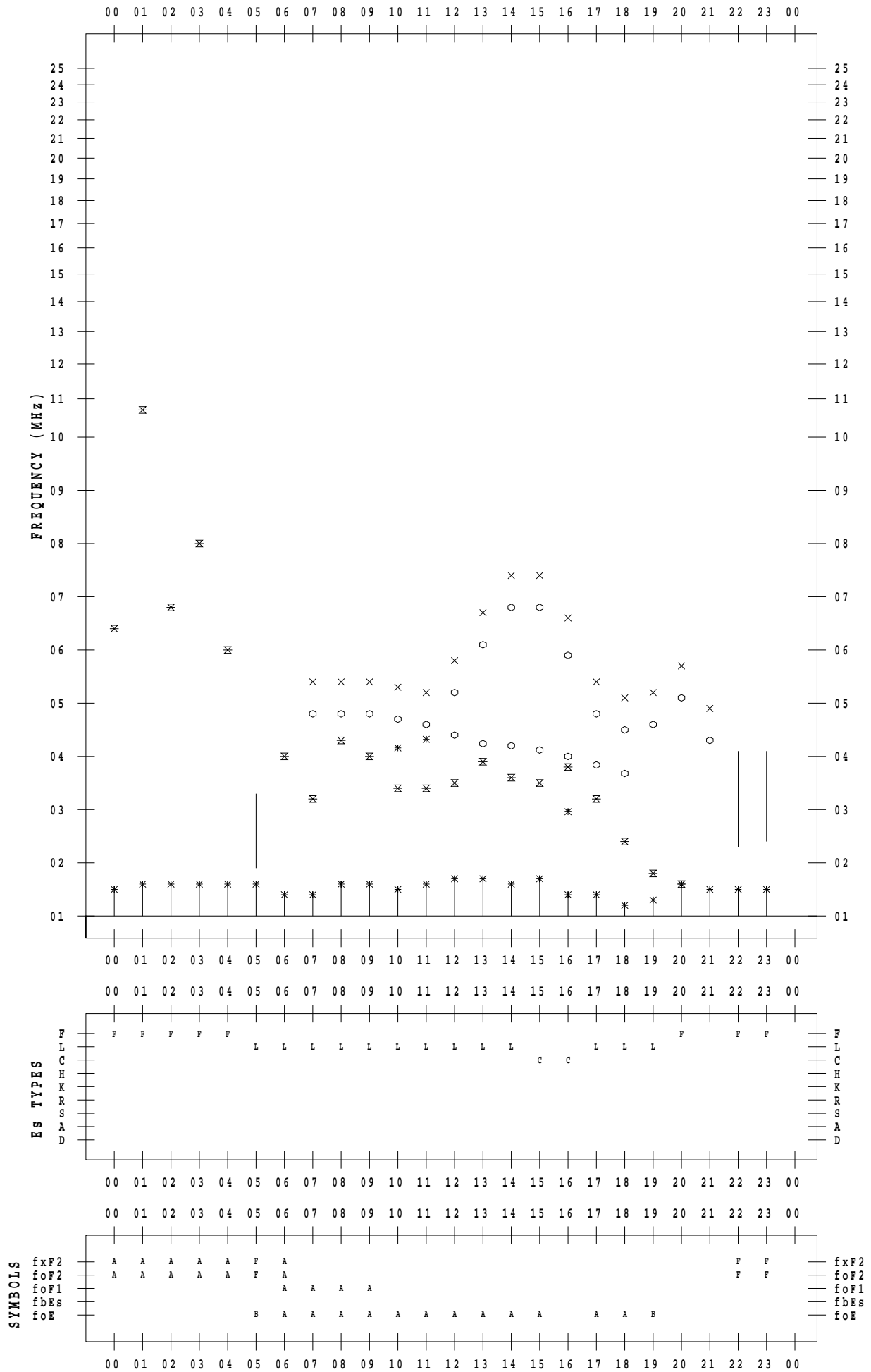
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 21

135 ° E MEAN TIME



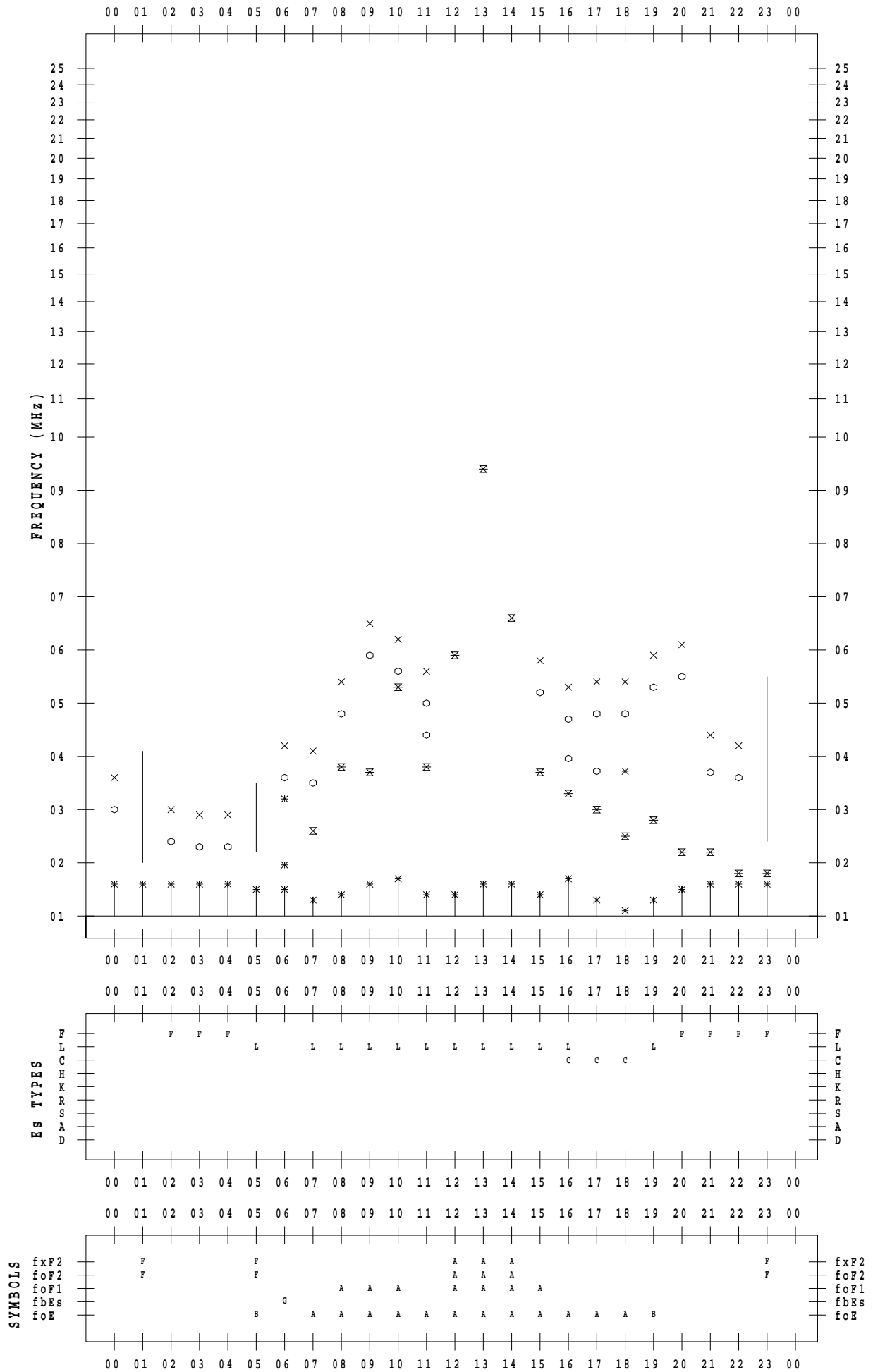
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 22

135 ° E MEAN TIME



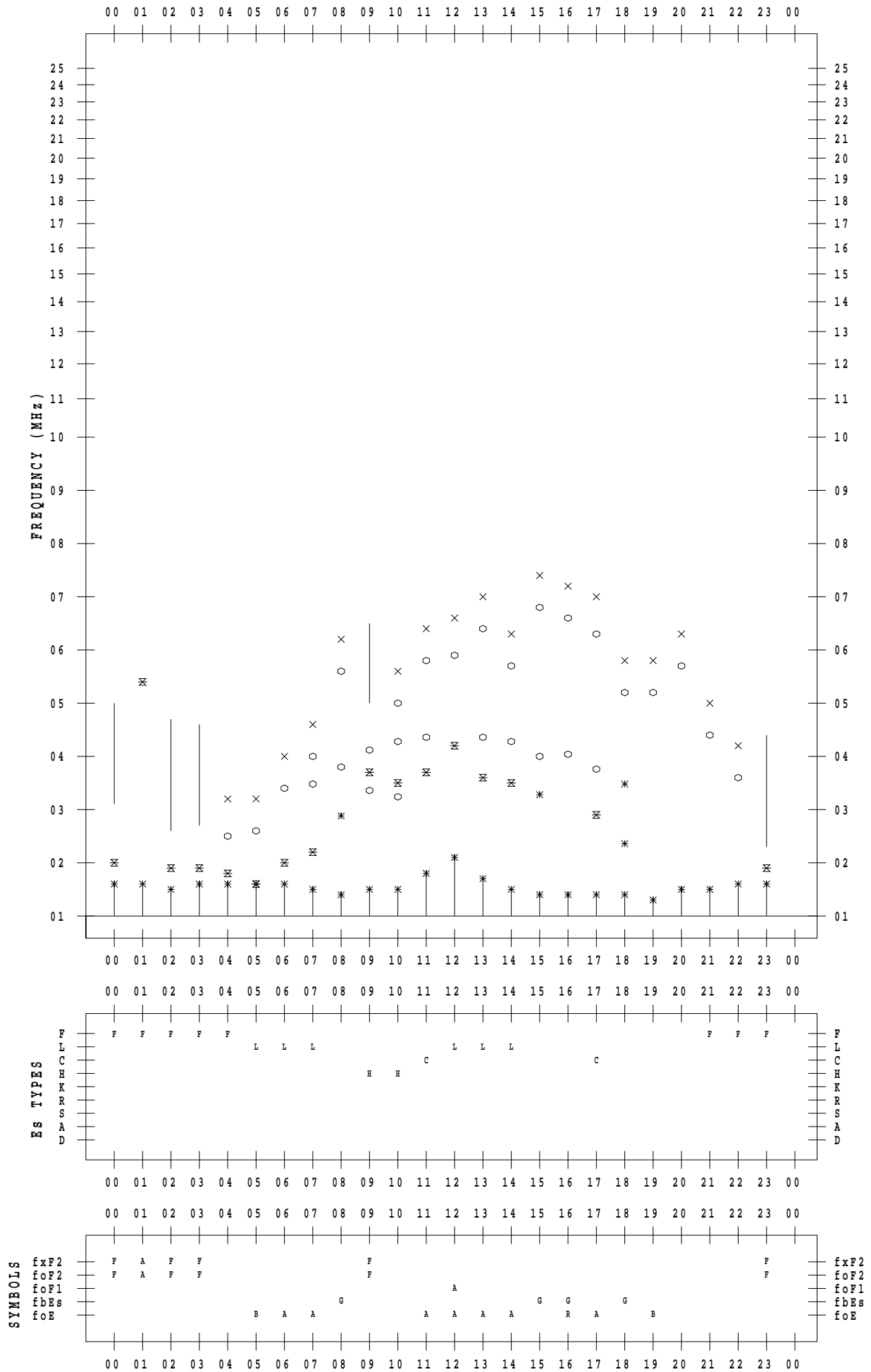
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 23

135 ° E MEAN TIME



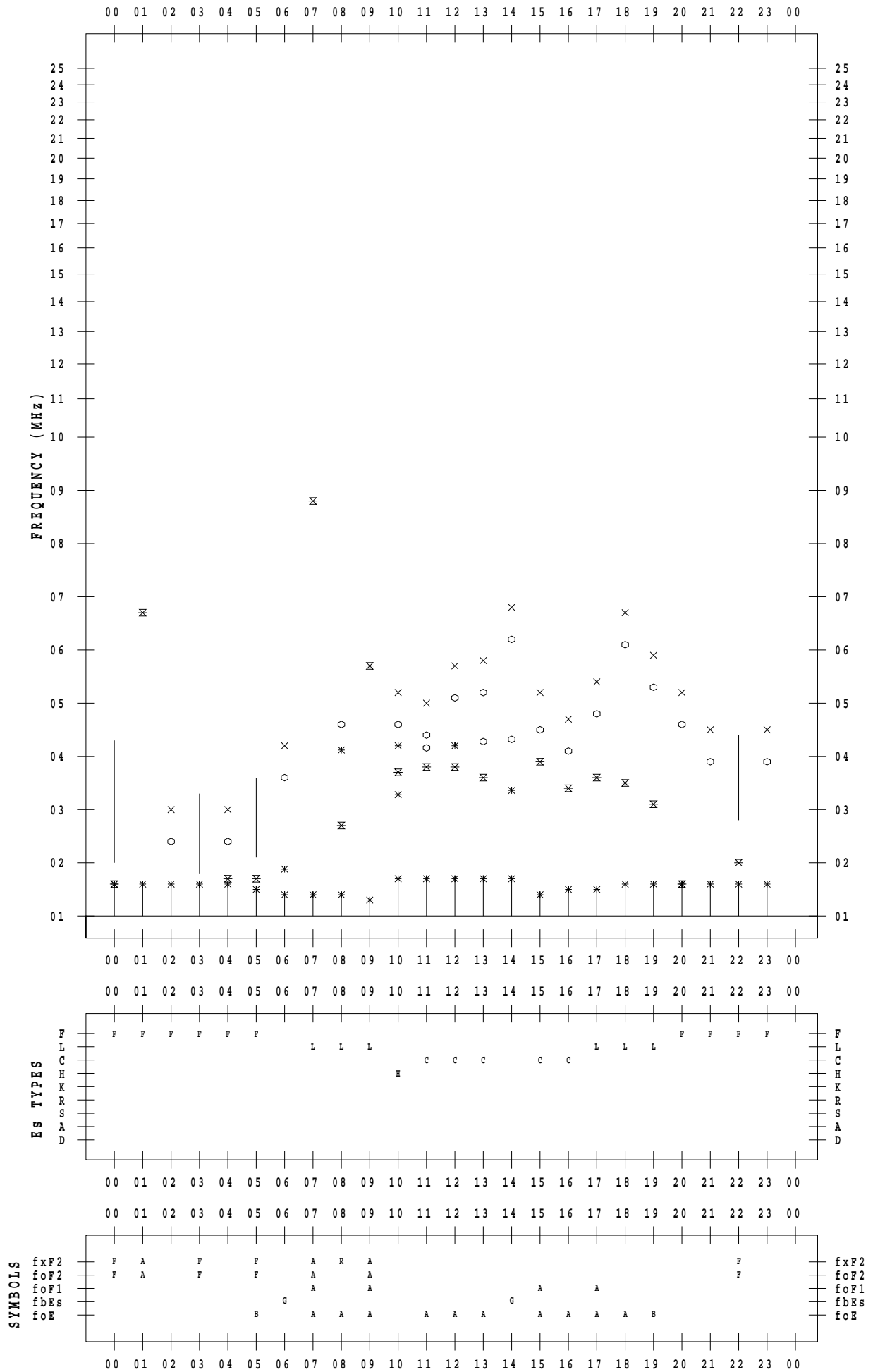
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 24

135 ° E MEAN TIME



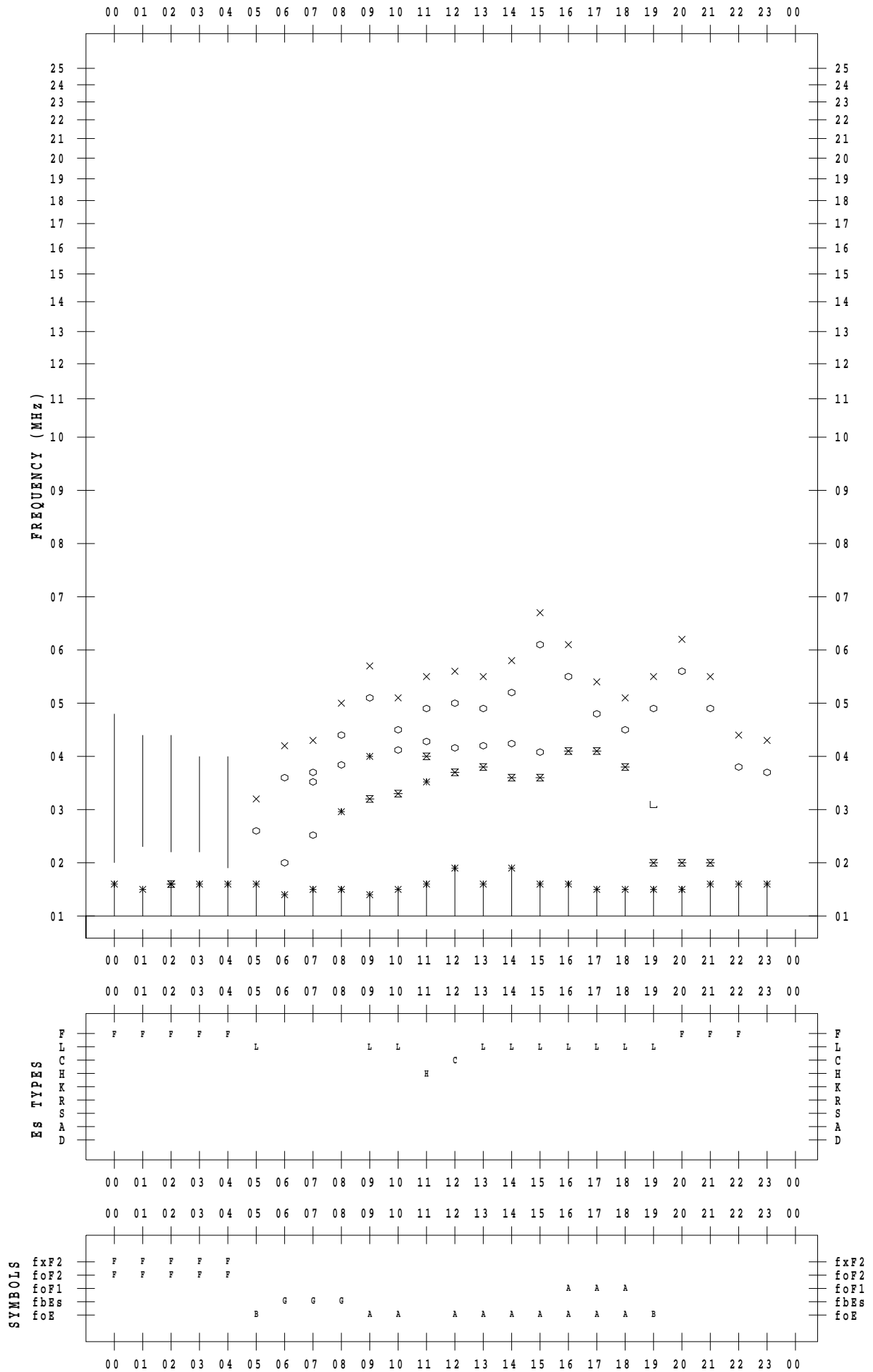
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 25

135 ° E MEAN TIME



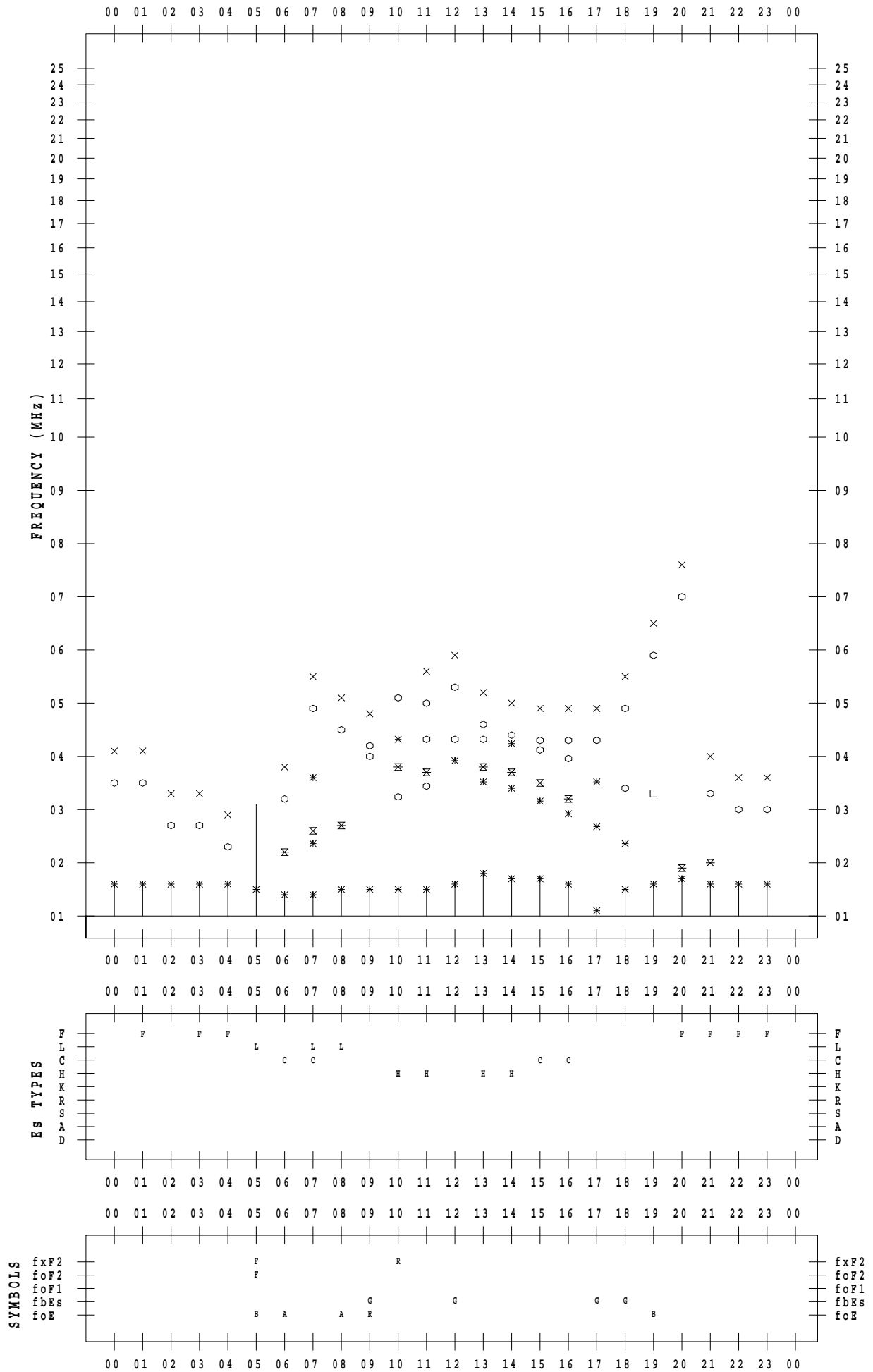
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 26

135 ° E MEAN TIME



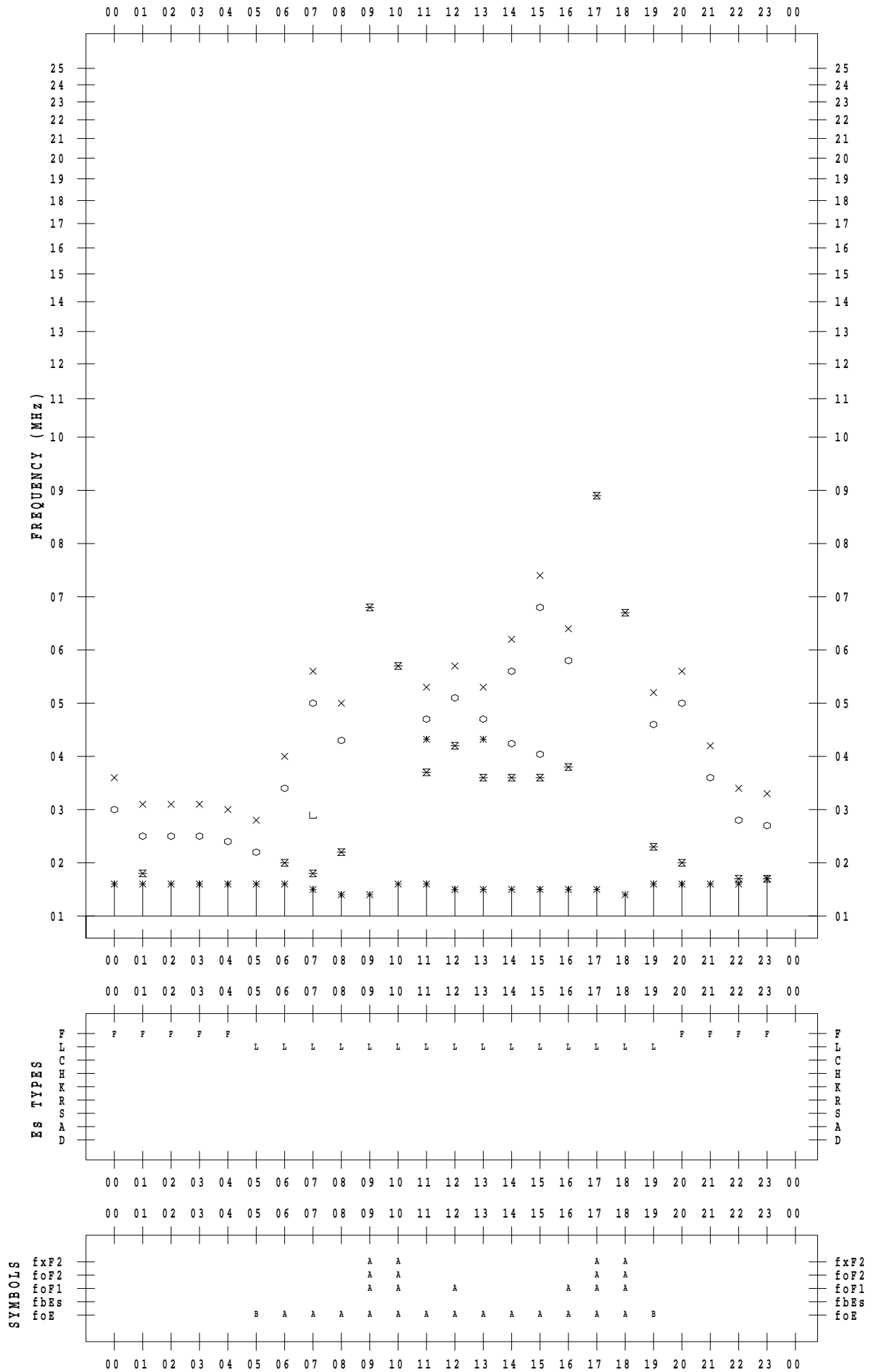
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SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 27

135 ° E MEAN TIME



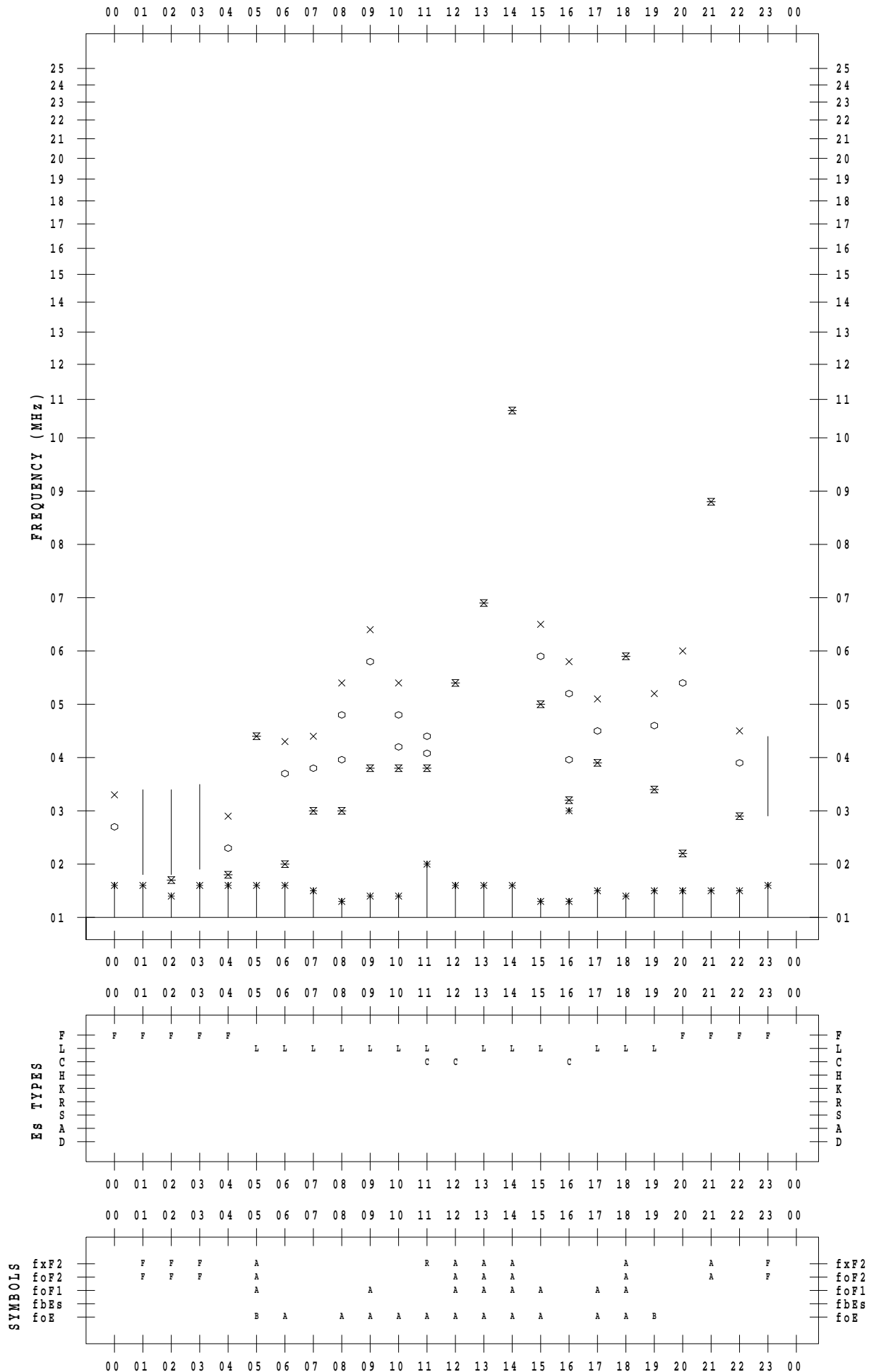
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 28

135 ° E MEAN TIME



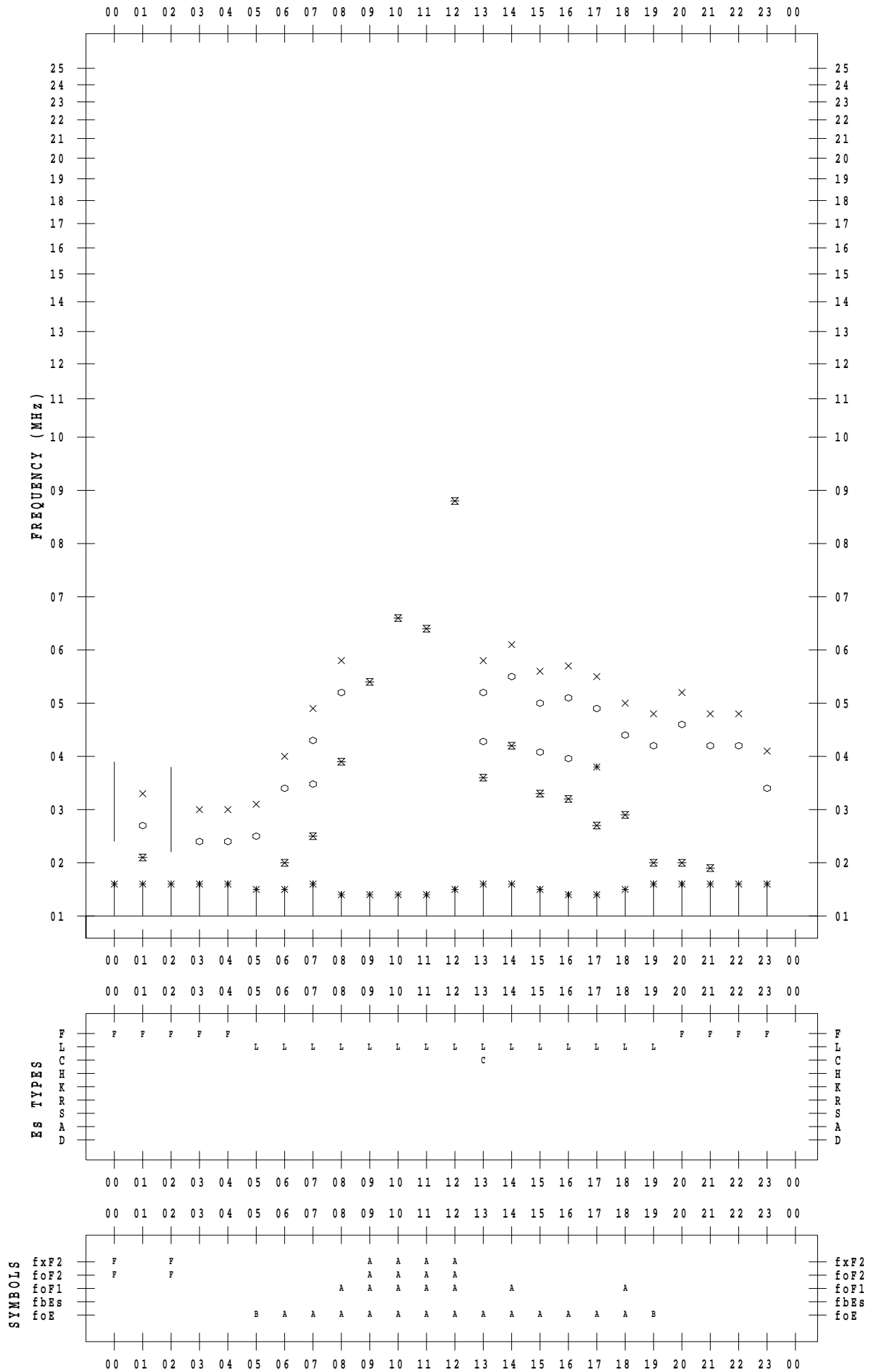
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 29

135 ° E MEAN TIME



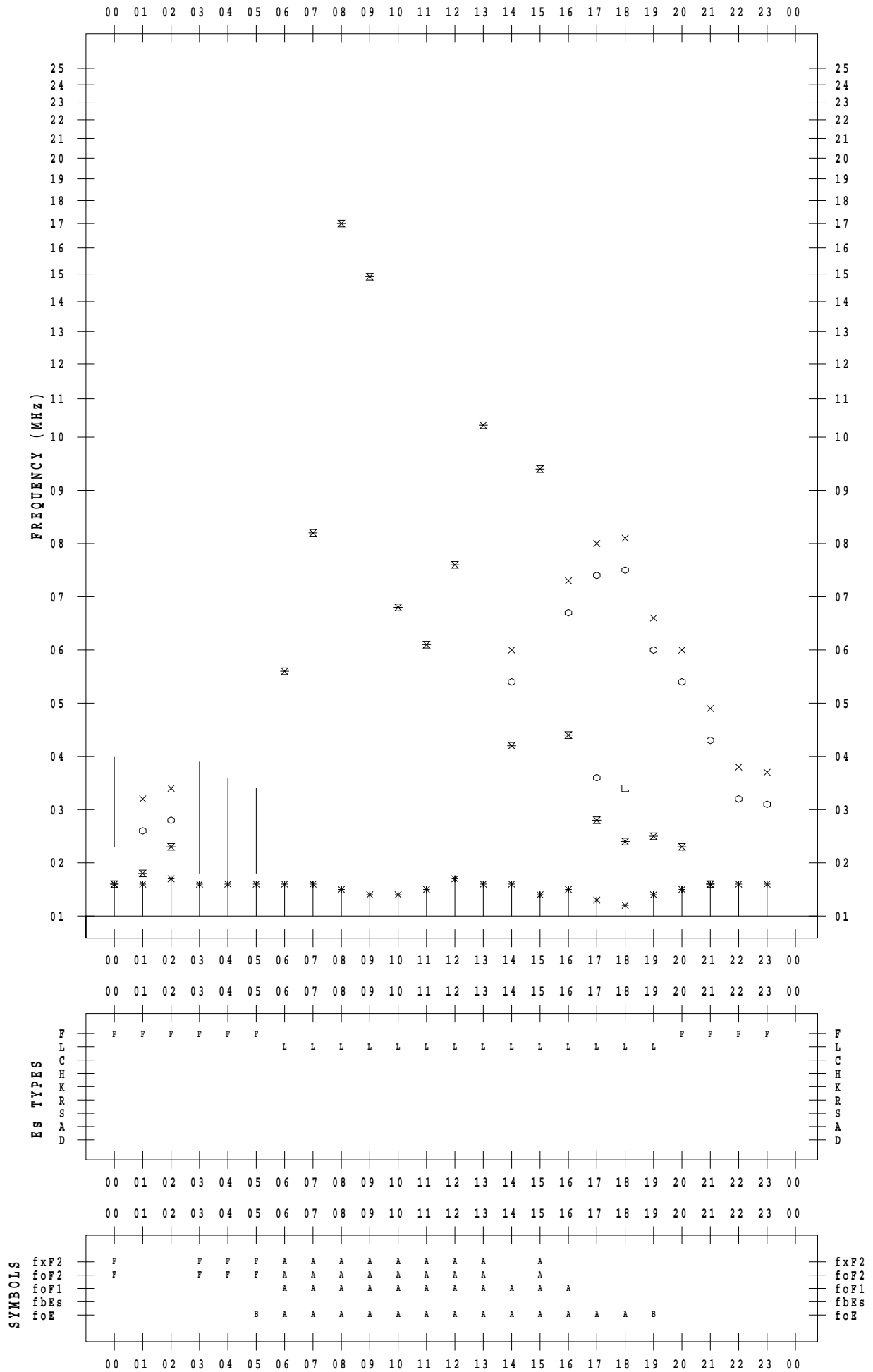
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 30

135 ° E MEAN TIME



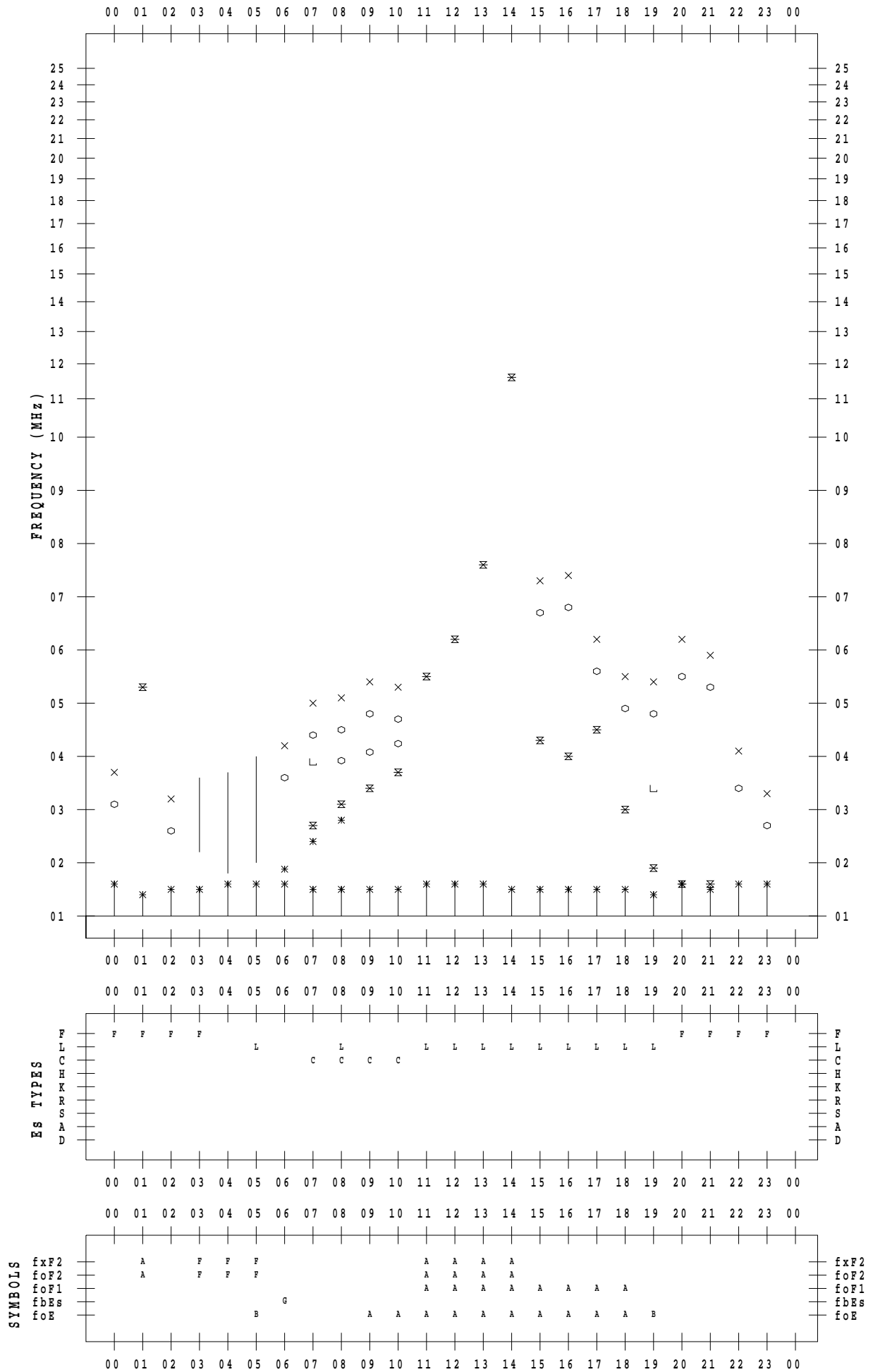
f - PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019 / 7 / 31

135 ° E MEAN TIME



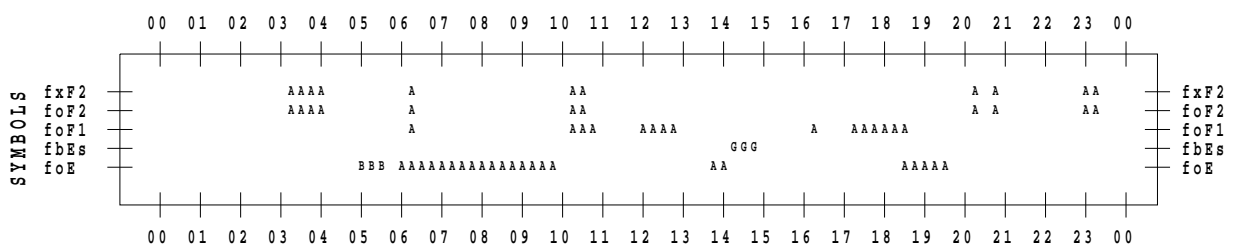
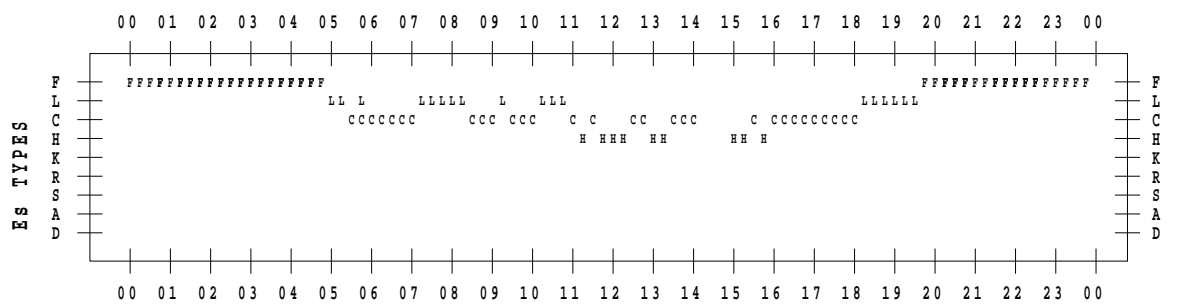
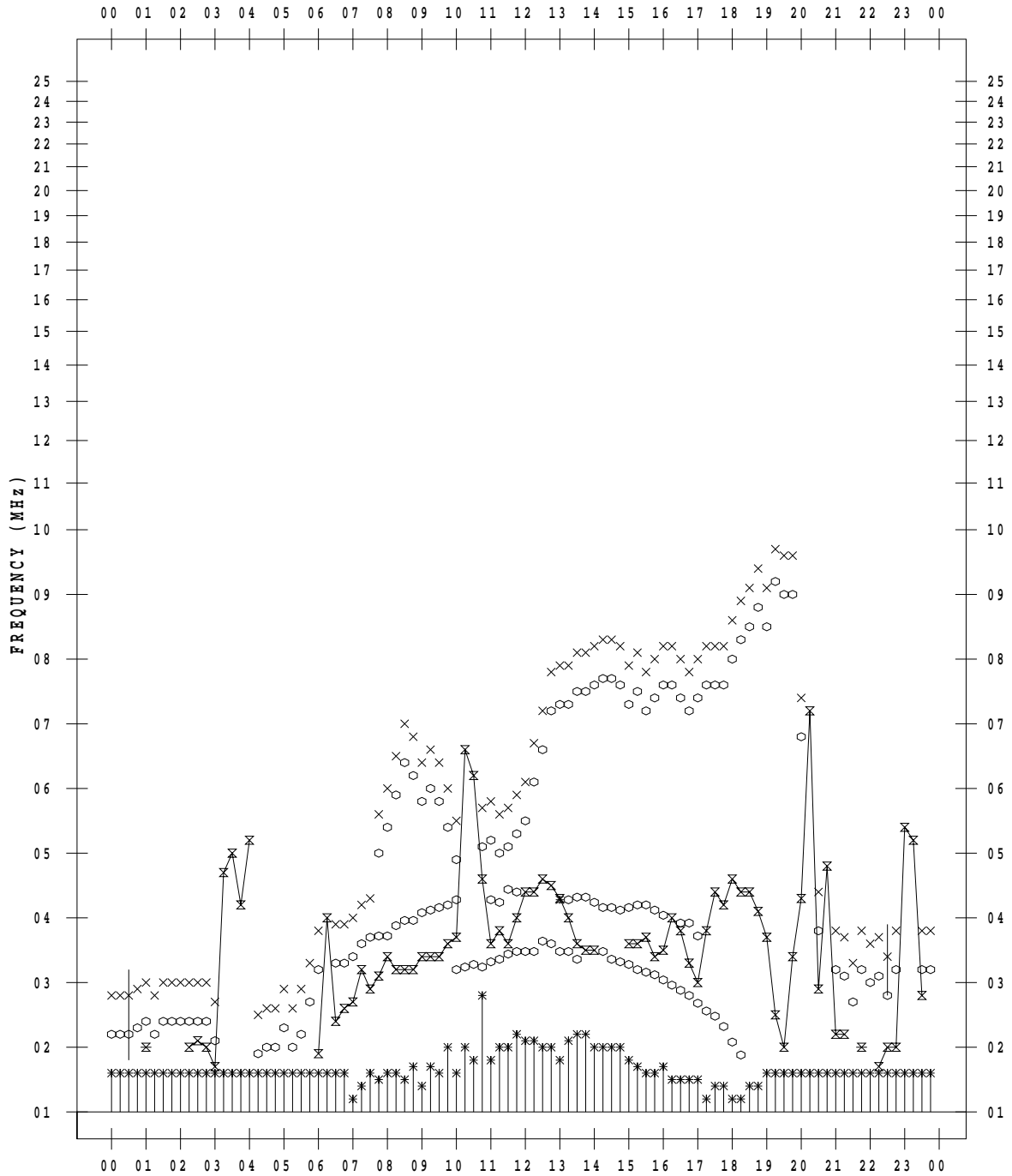
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 1

135 ° E MEAN TIME



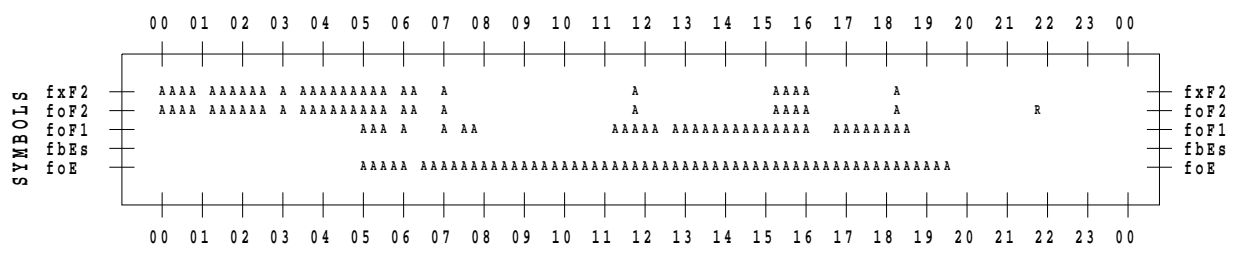
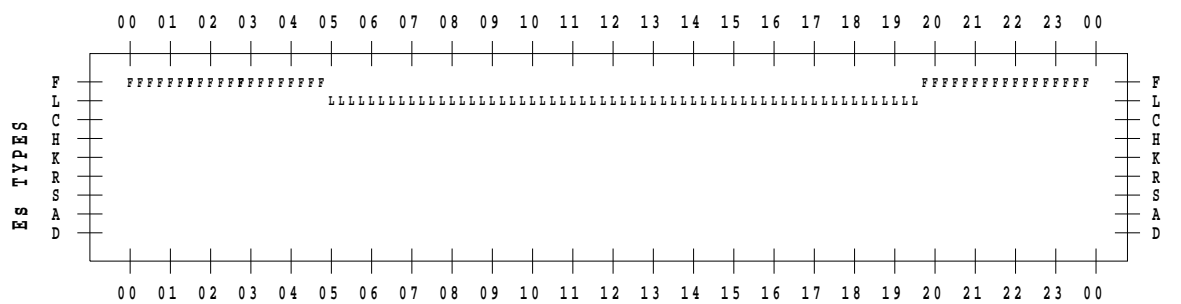
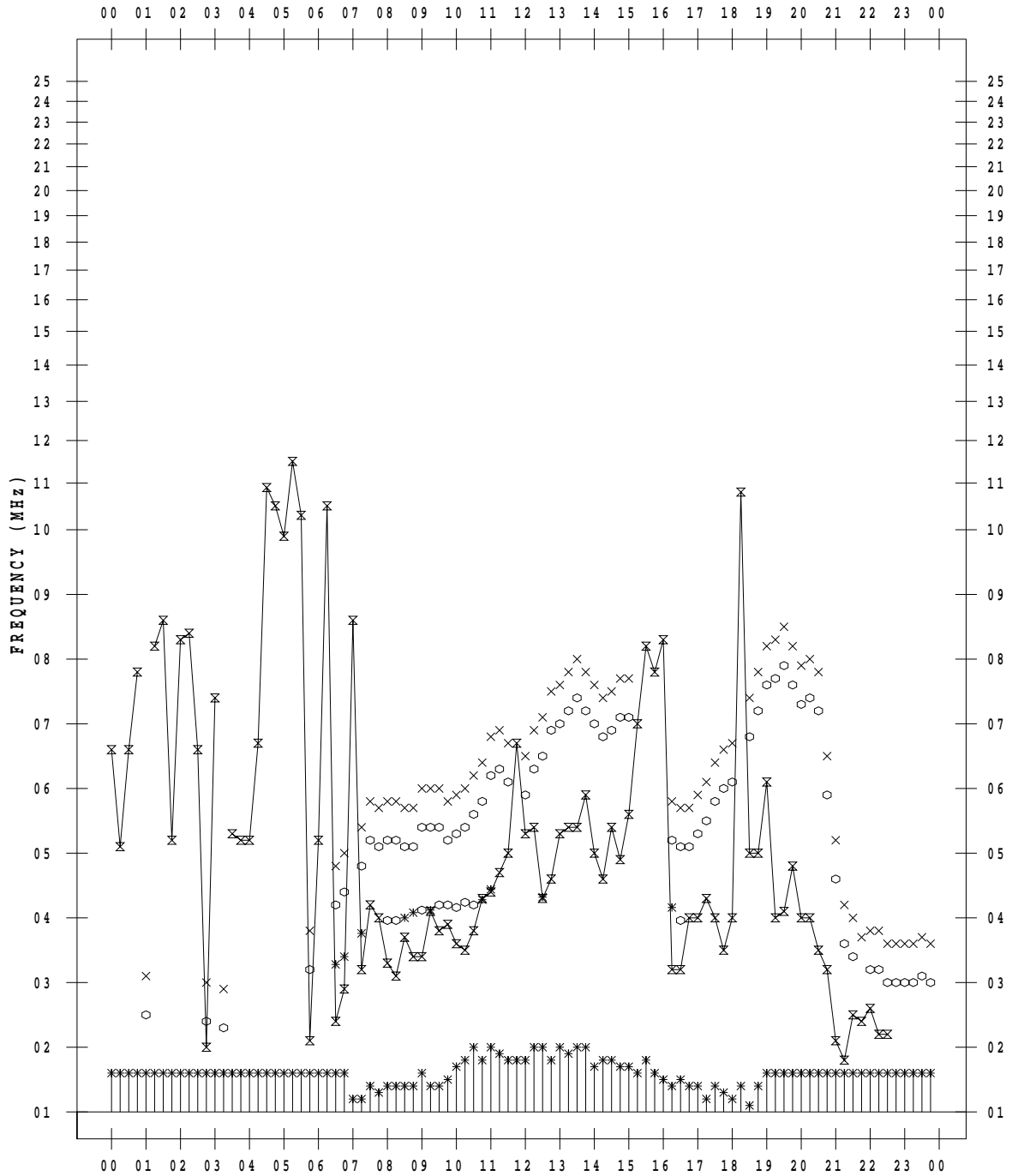
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 2

135 ° E MEAN TIME



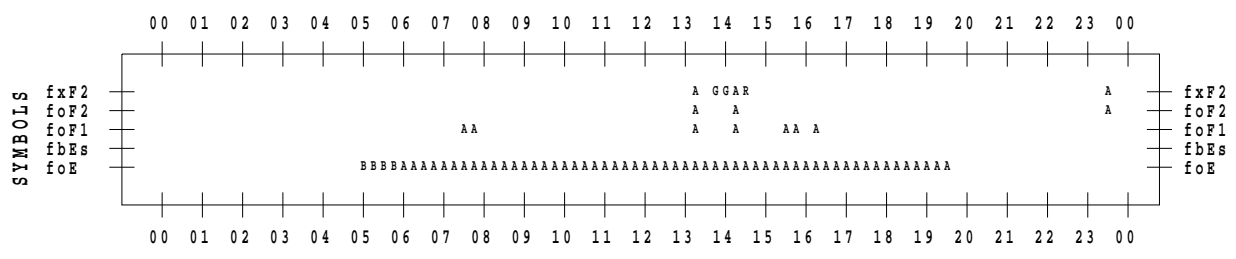
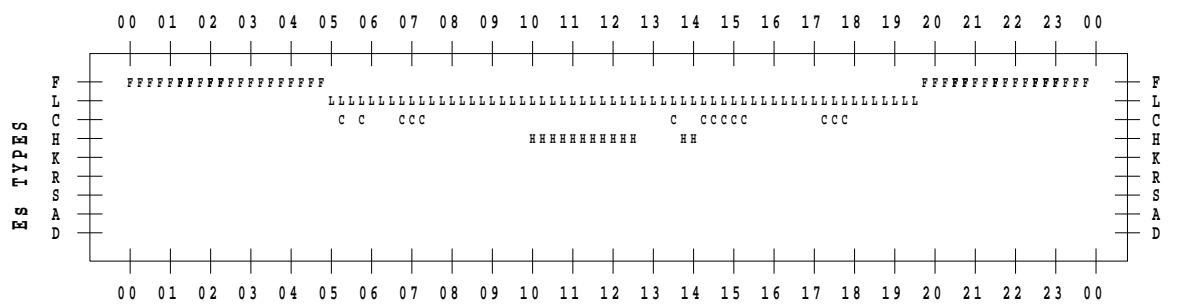
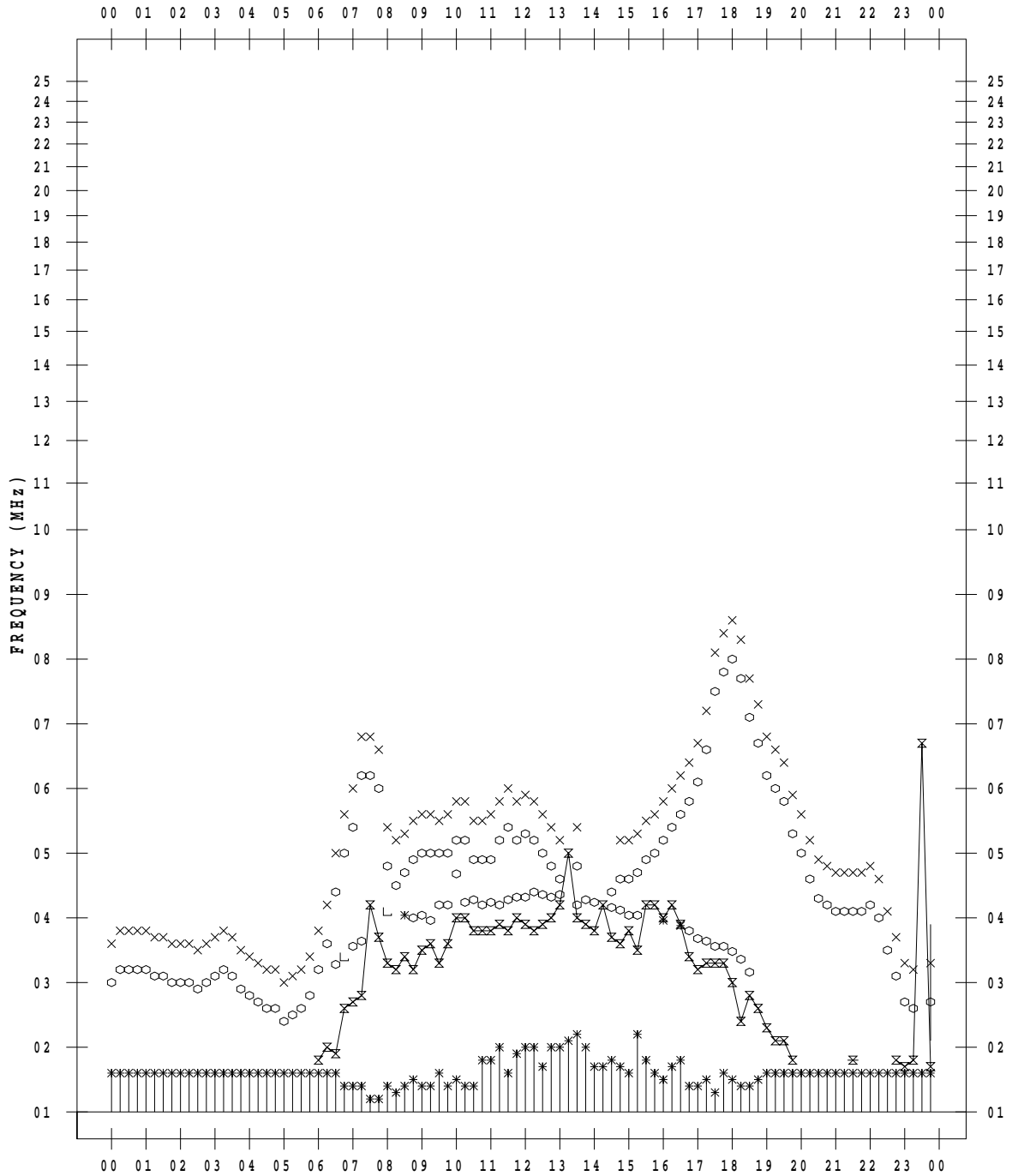
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 3

135 ° E MEAN TIME



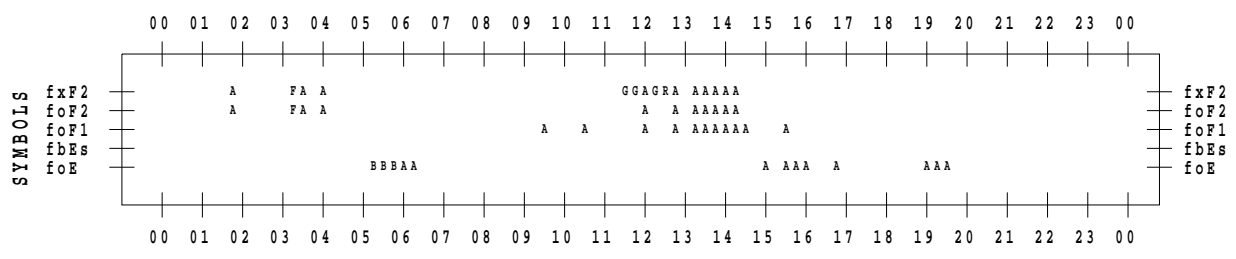
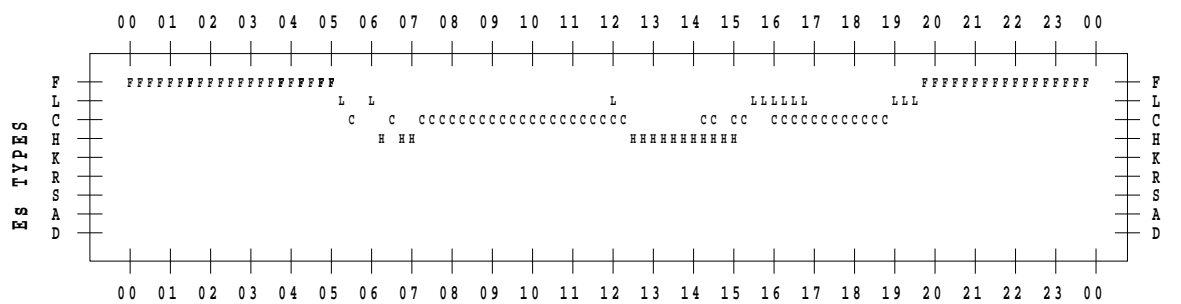
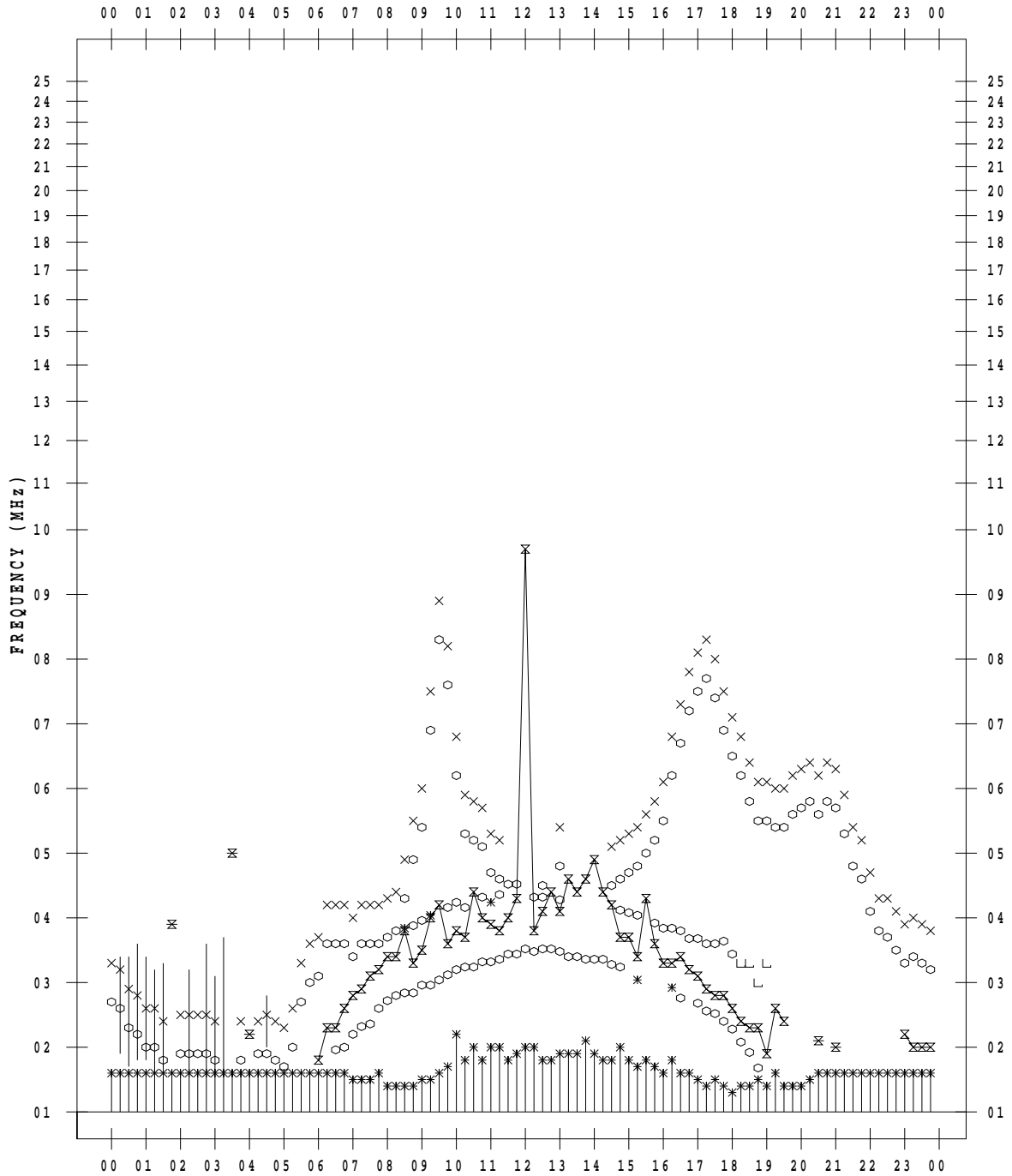
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 5

135 ° E MEAN TIME



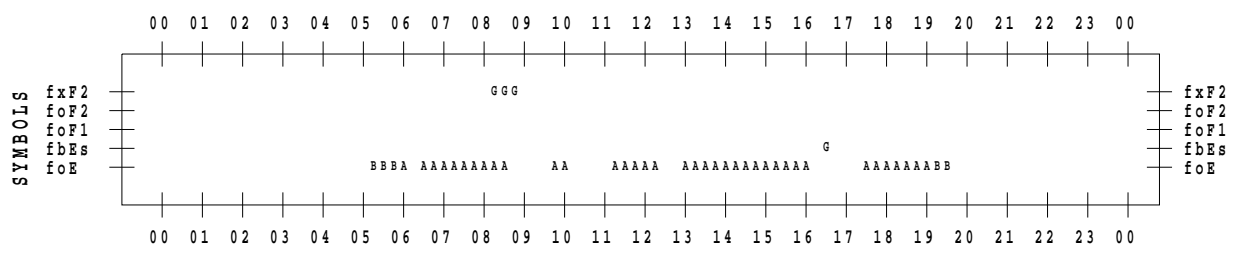
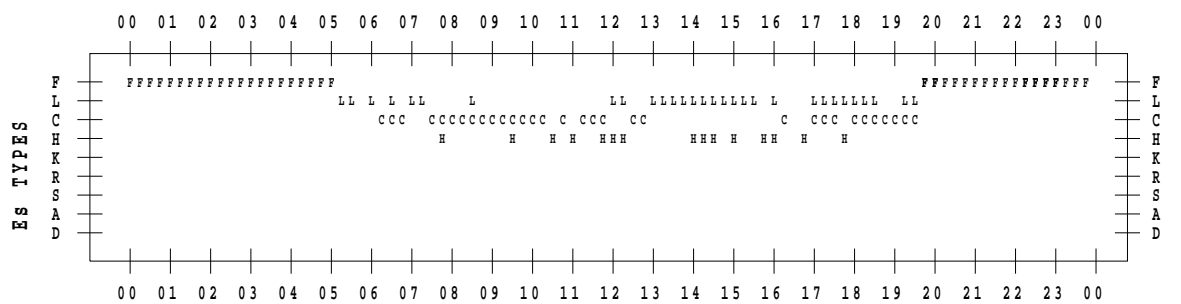
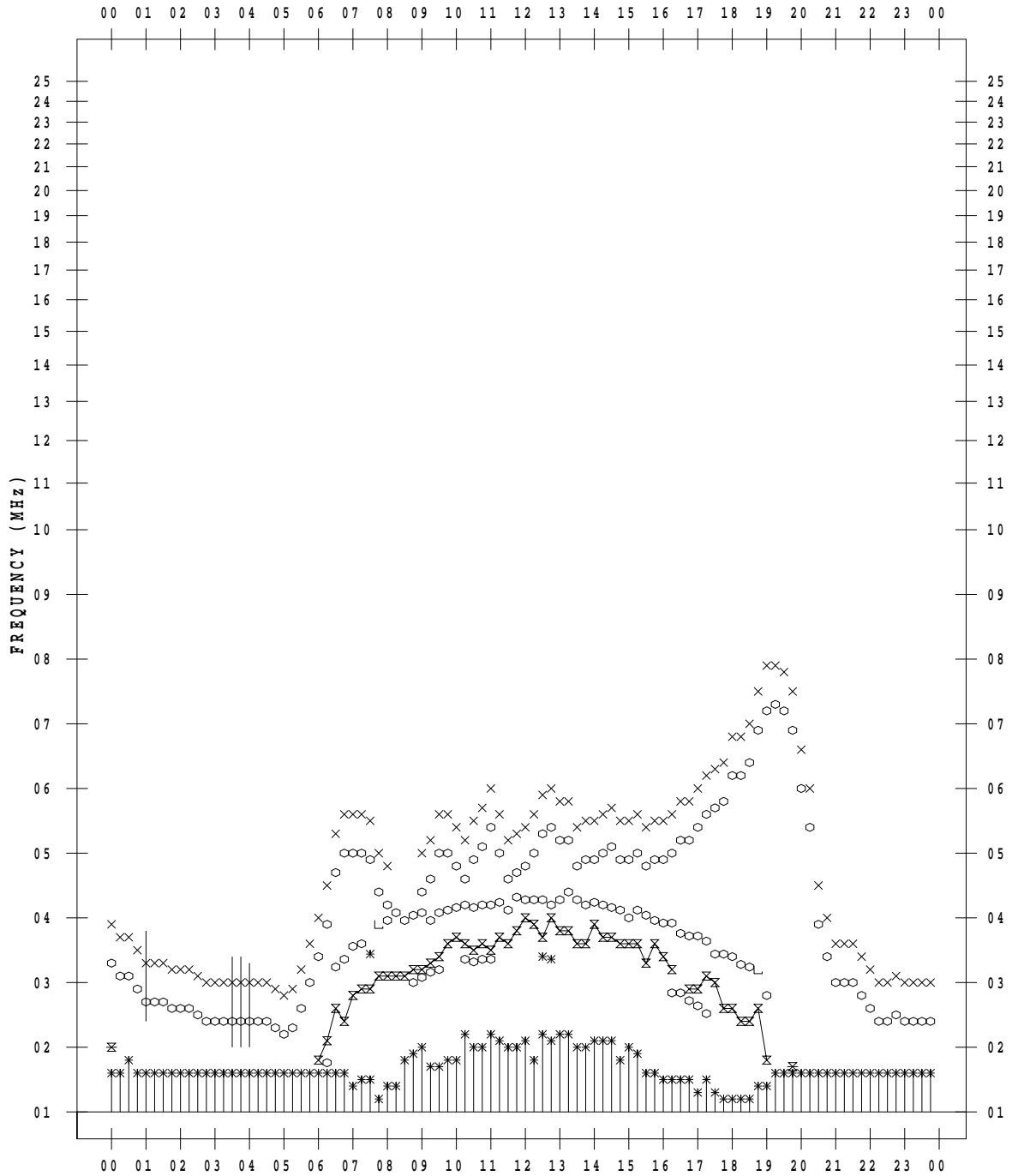
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 6

135 ° E MEAN TIME



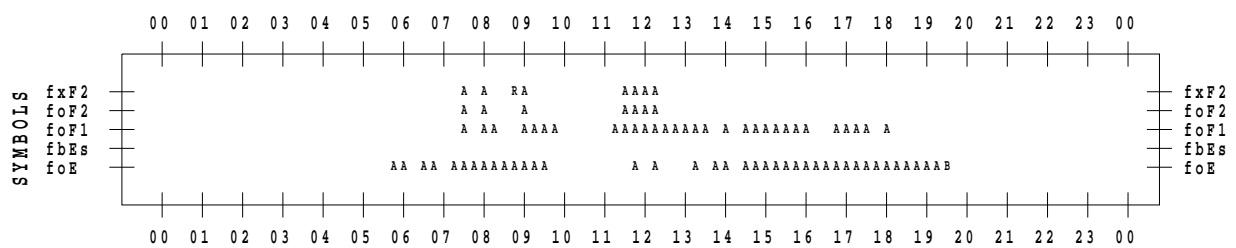
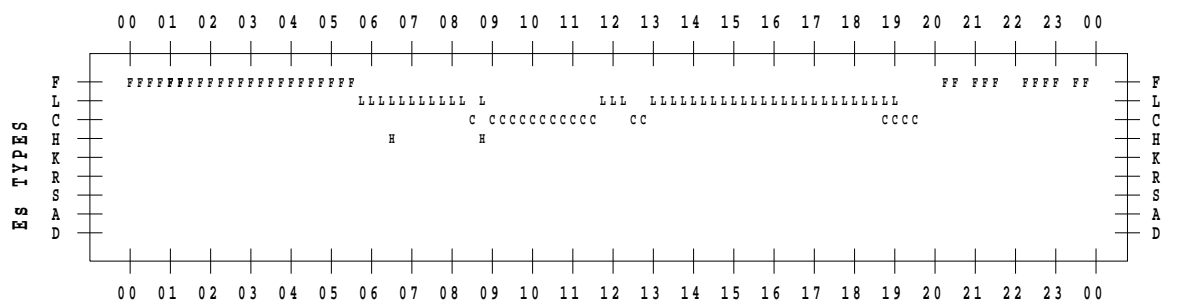
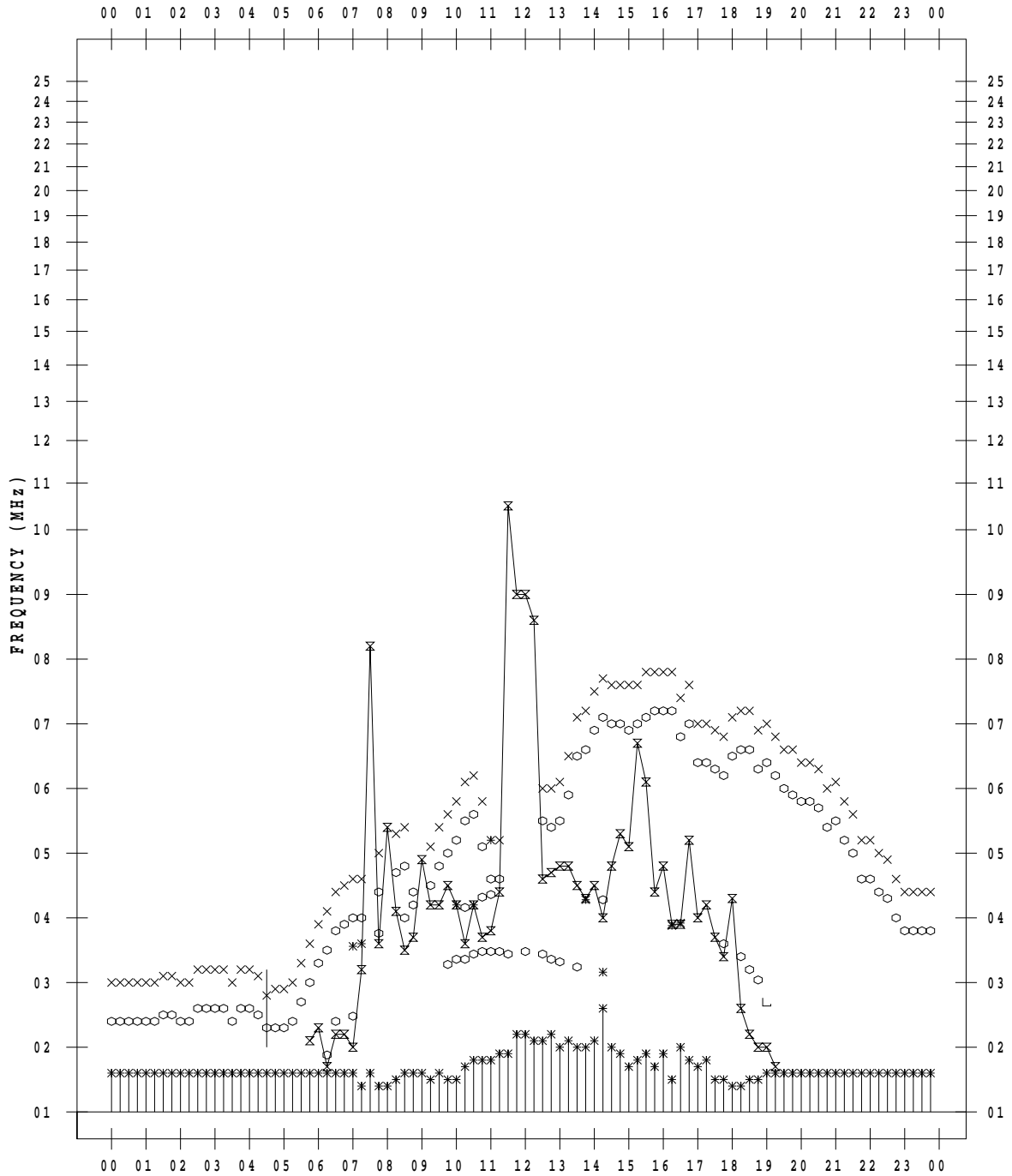
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 7

135 ° E MEAN TIME



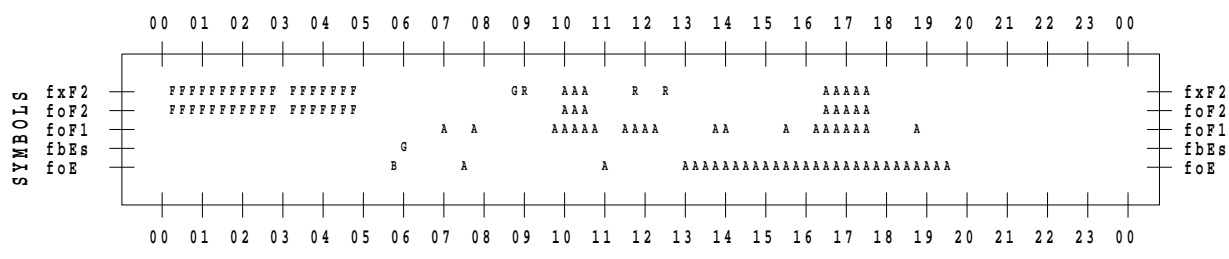
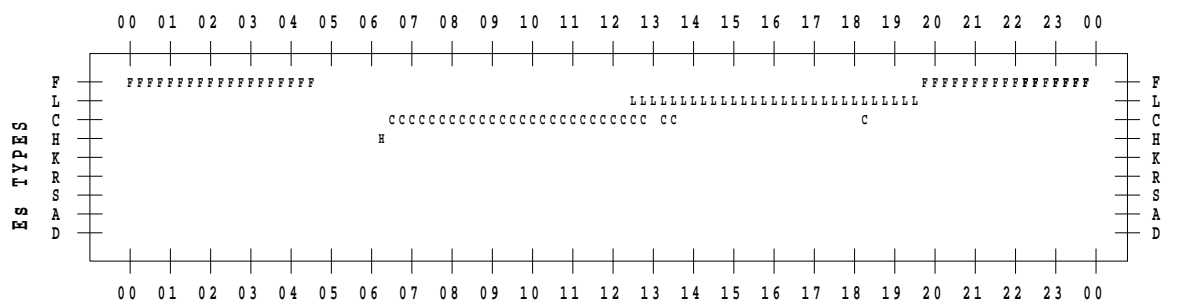
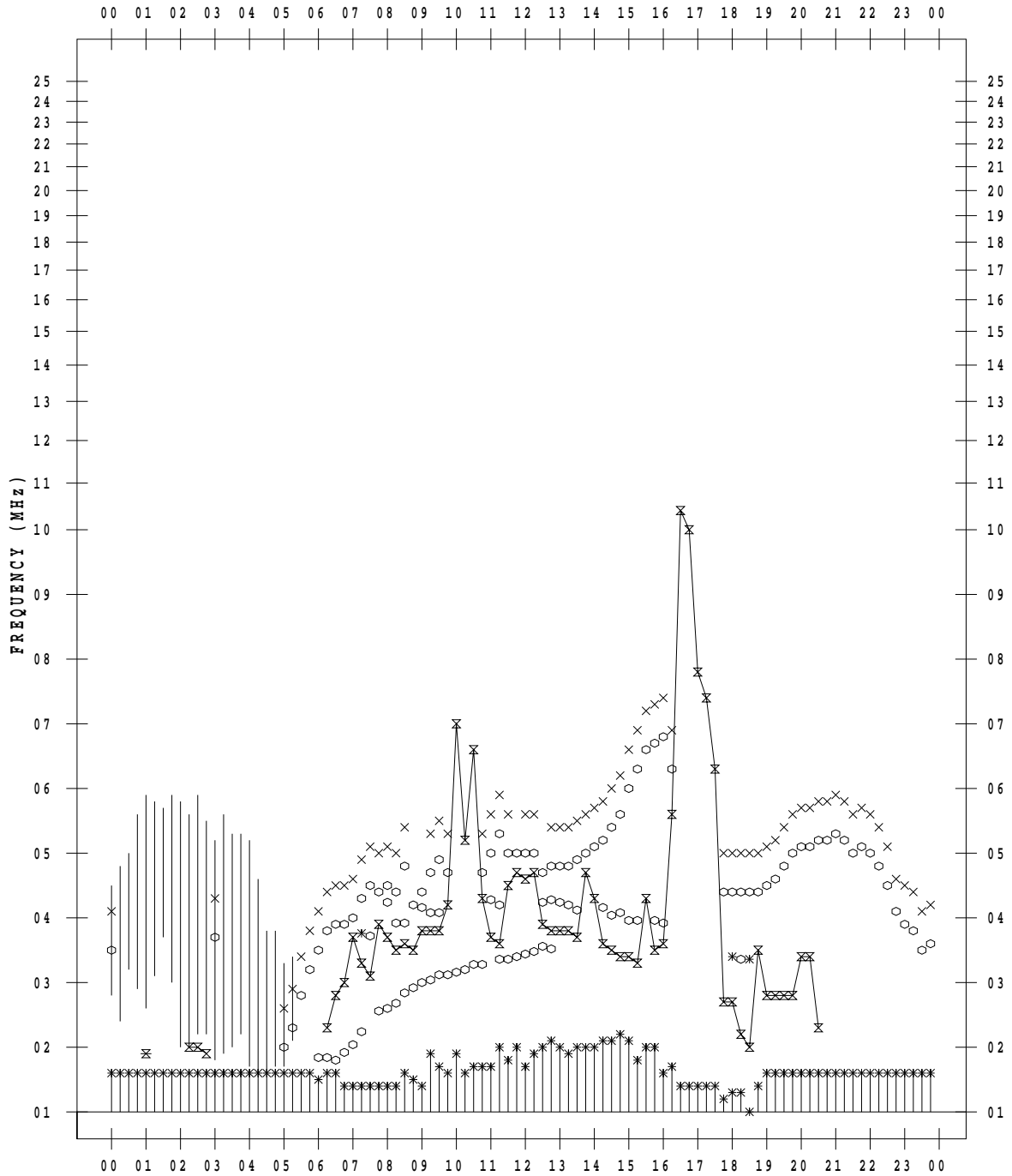
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 8

135 ° E MEAN TIME



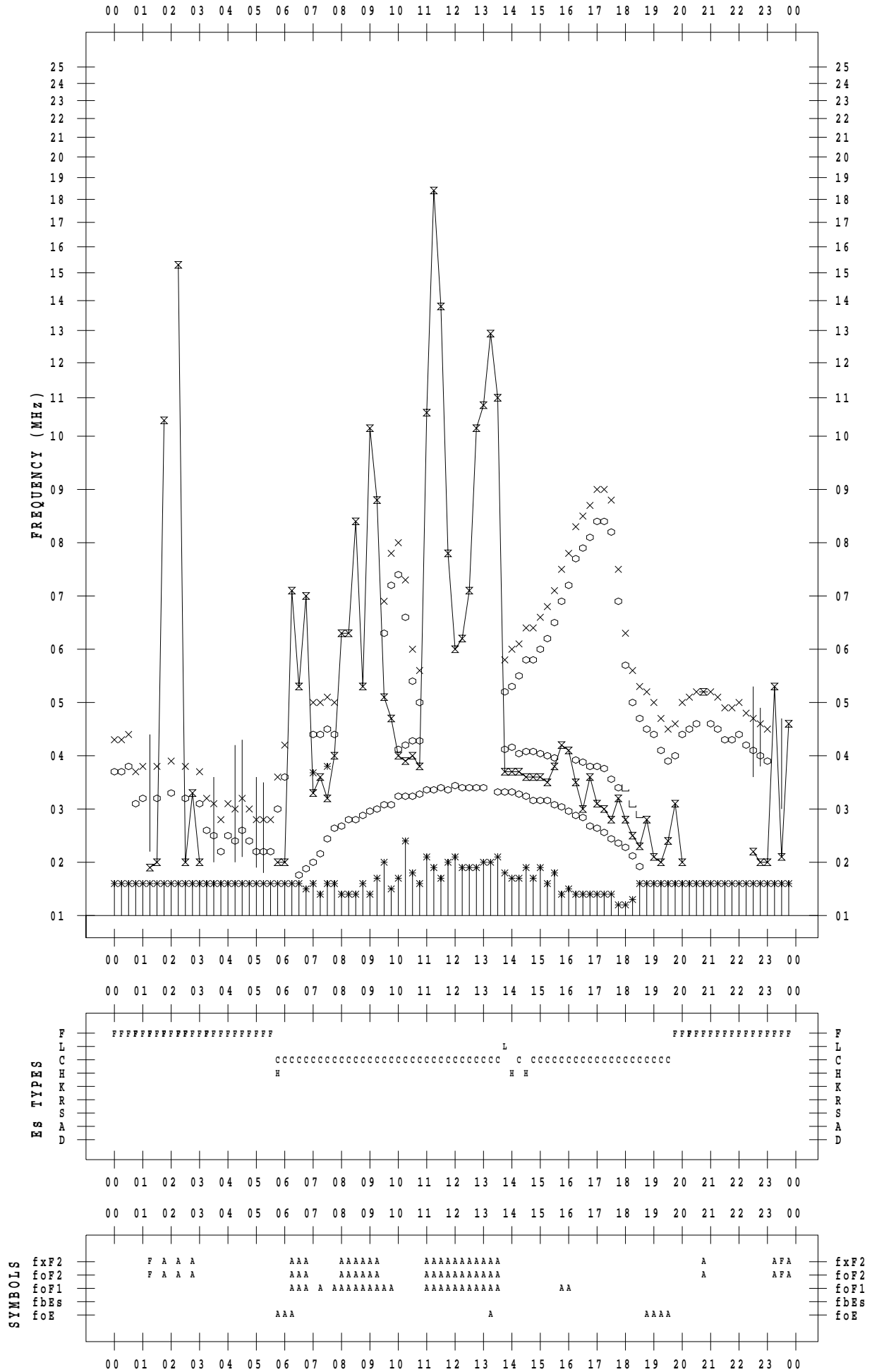
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 9

135 ° E MEAN TIME



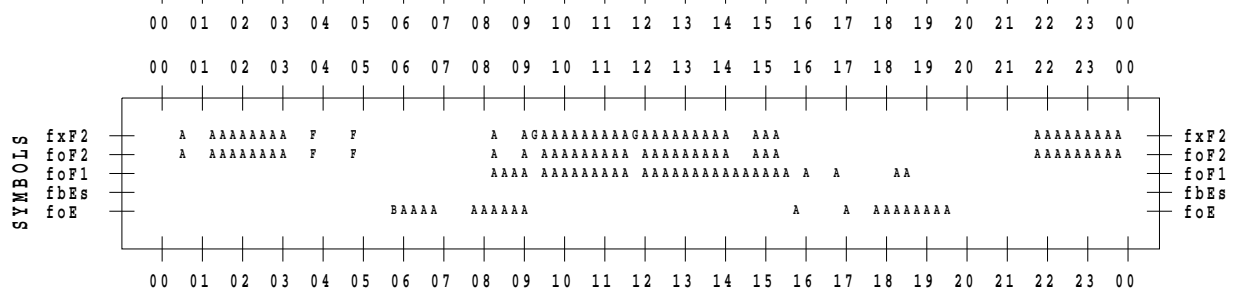
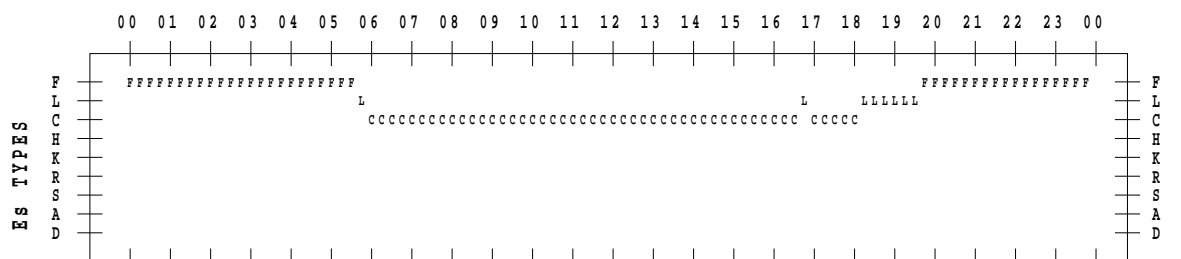
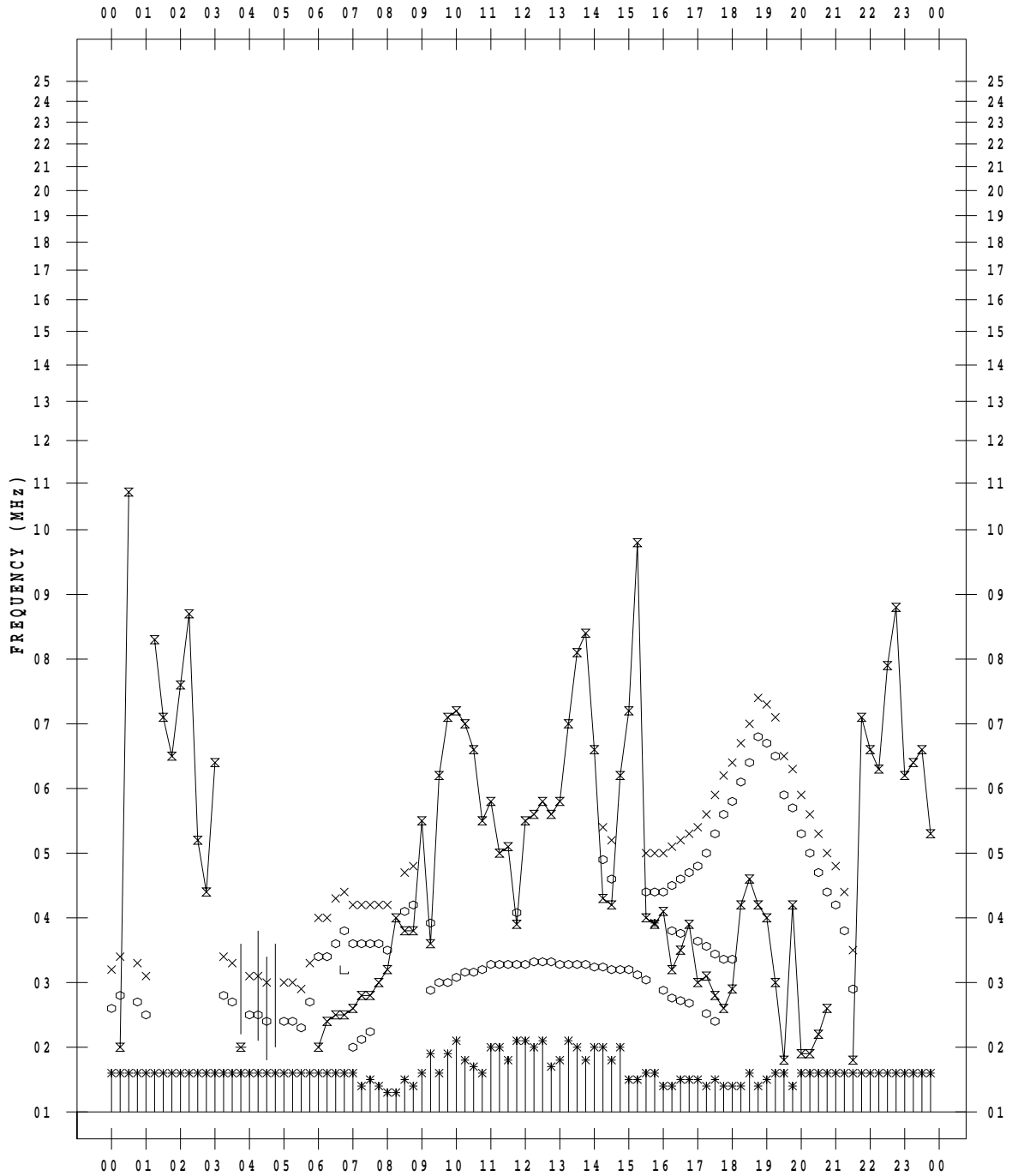
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 11

135 ° E MEAN TIME



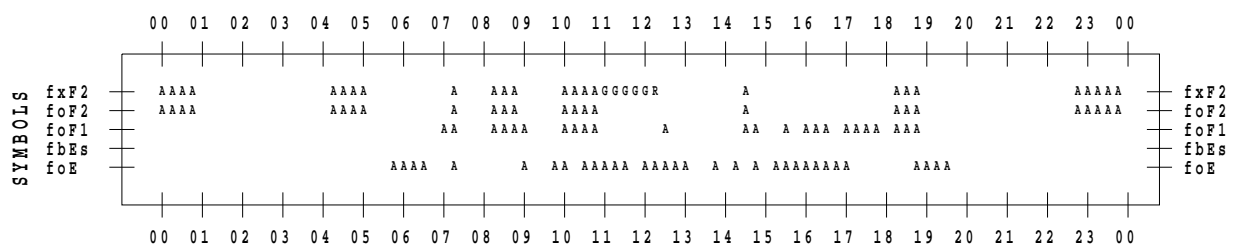
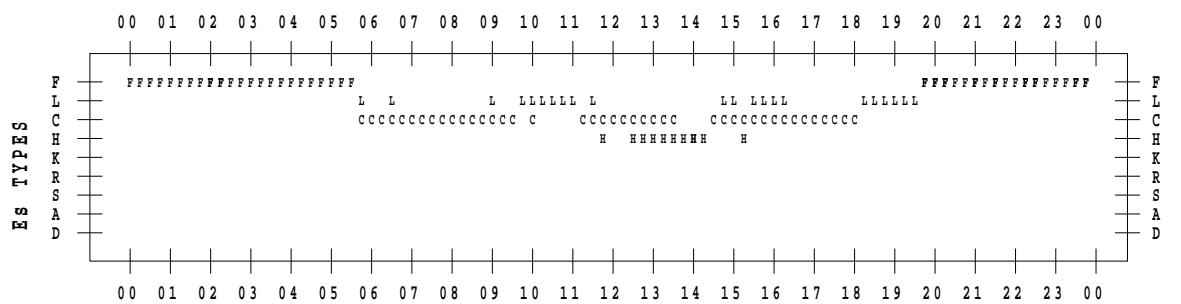
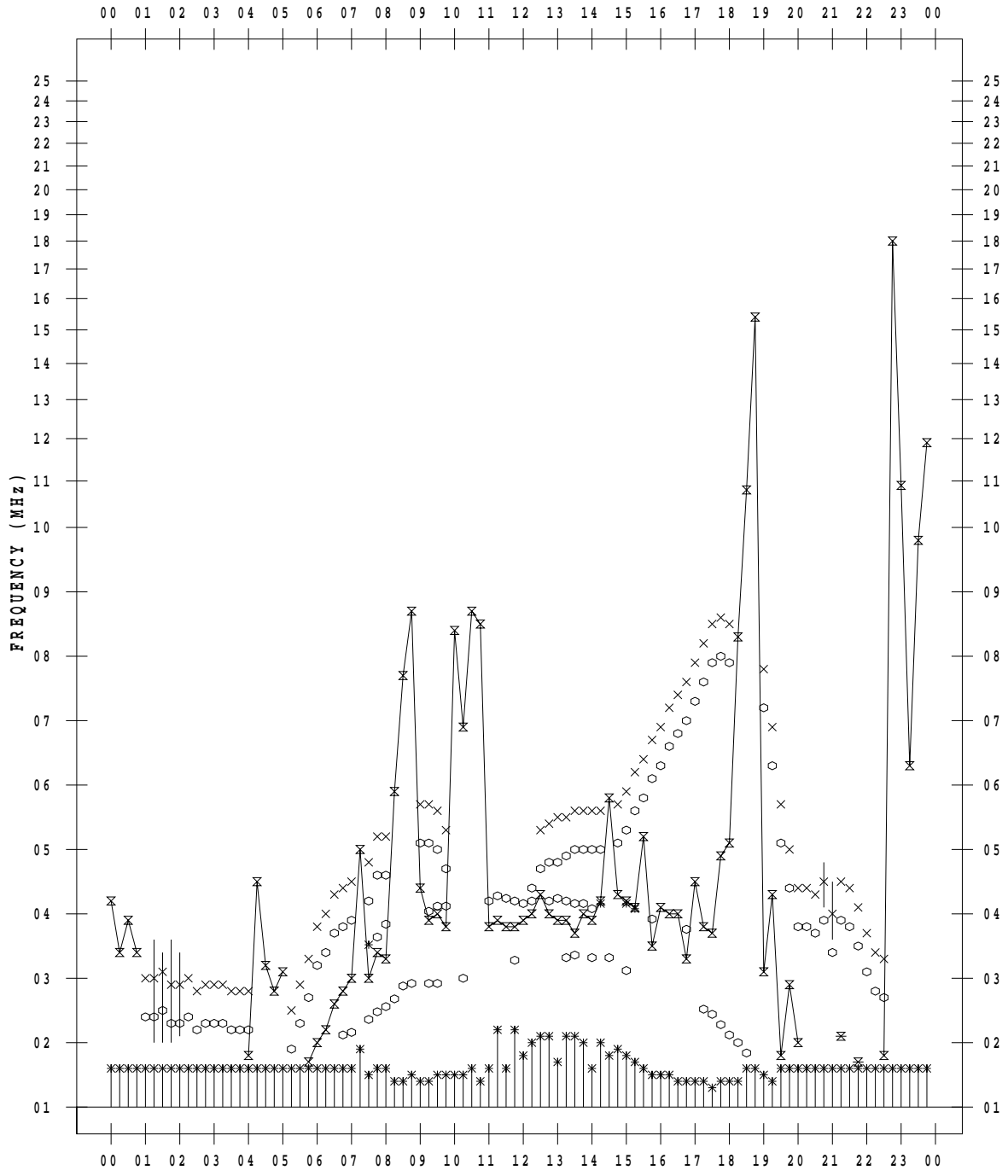
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 12

135 ° E MEAN TIME



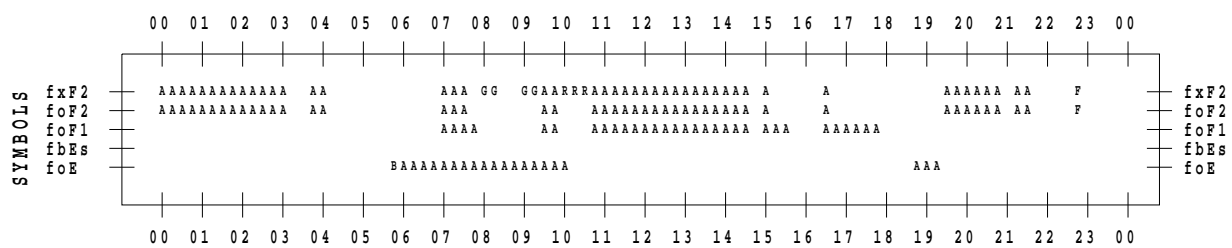
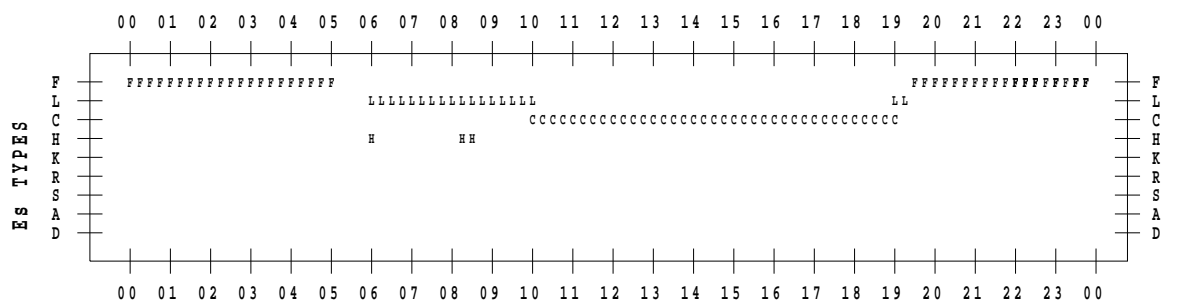
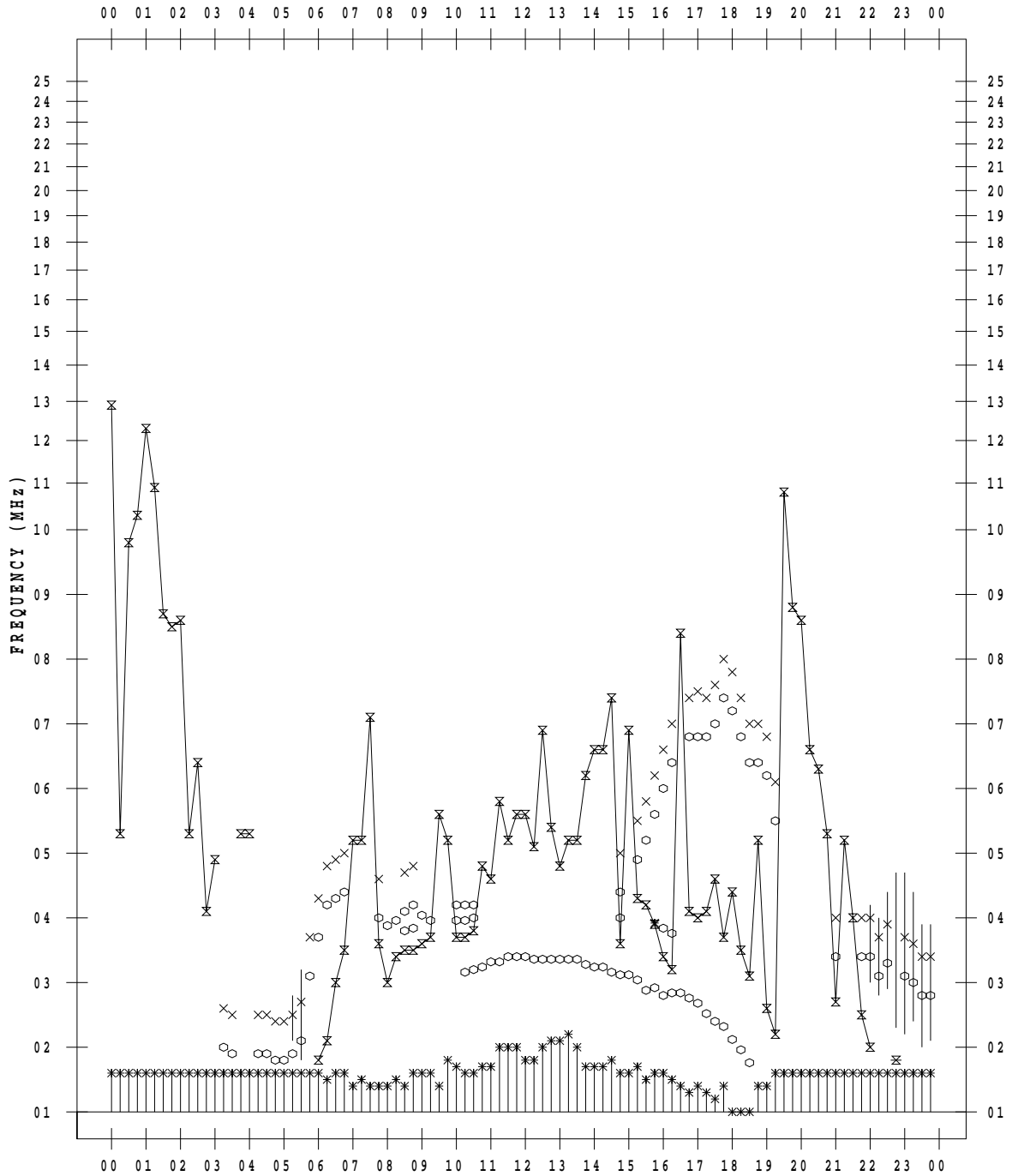
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 13

135 ° E MEAN TIME



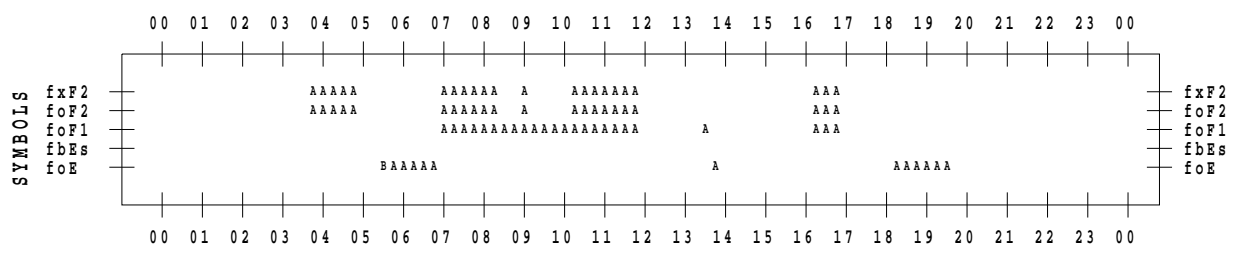
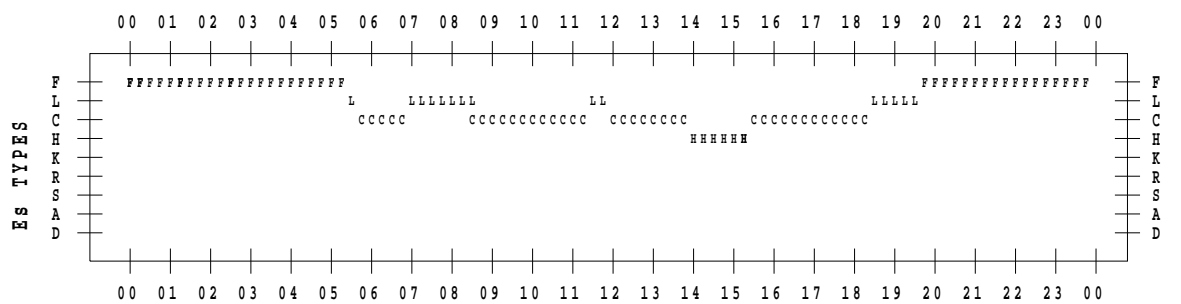
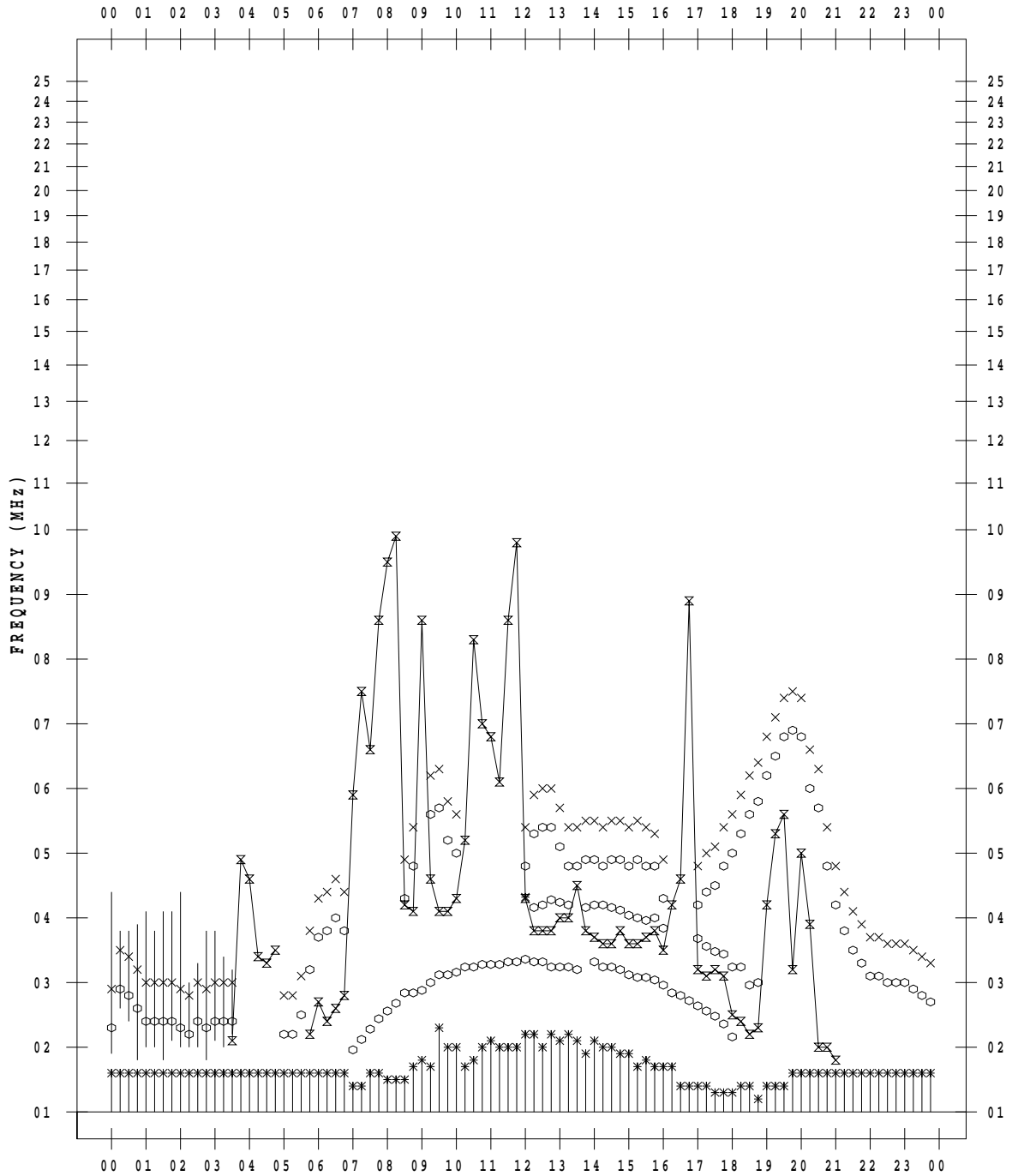
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 14

135 ° E MEAN TIME



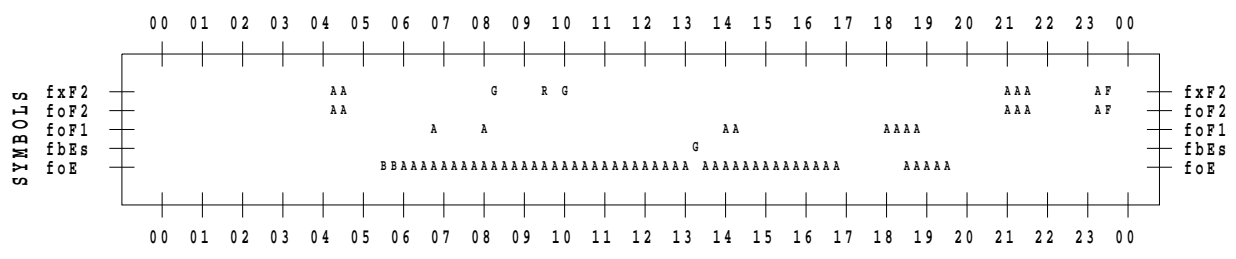
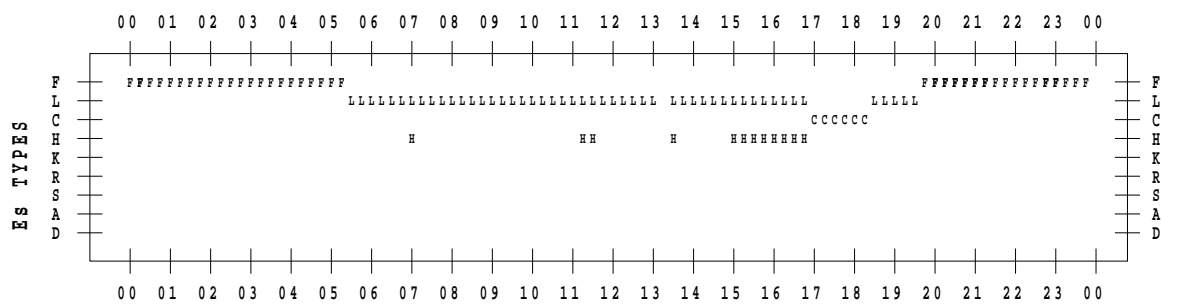
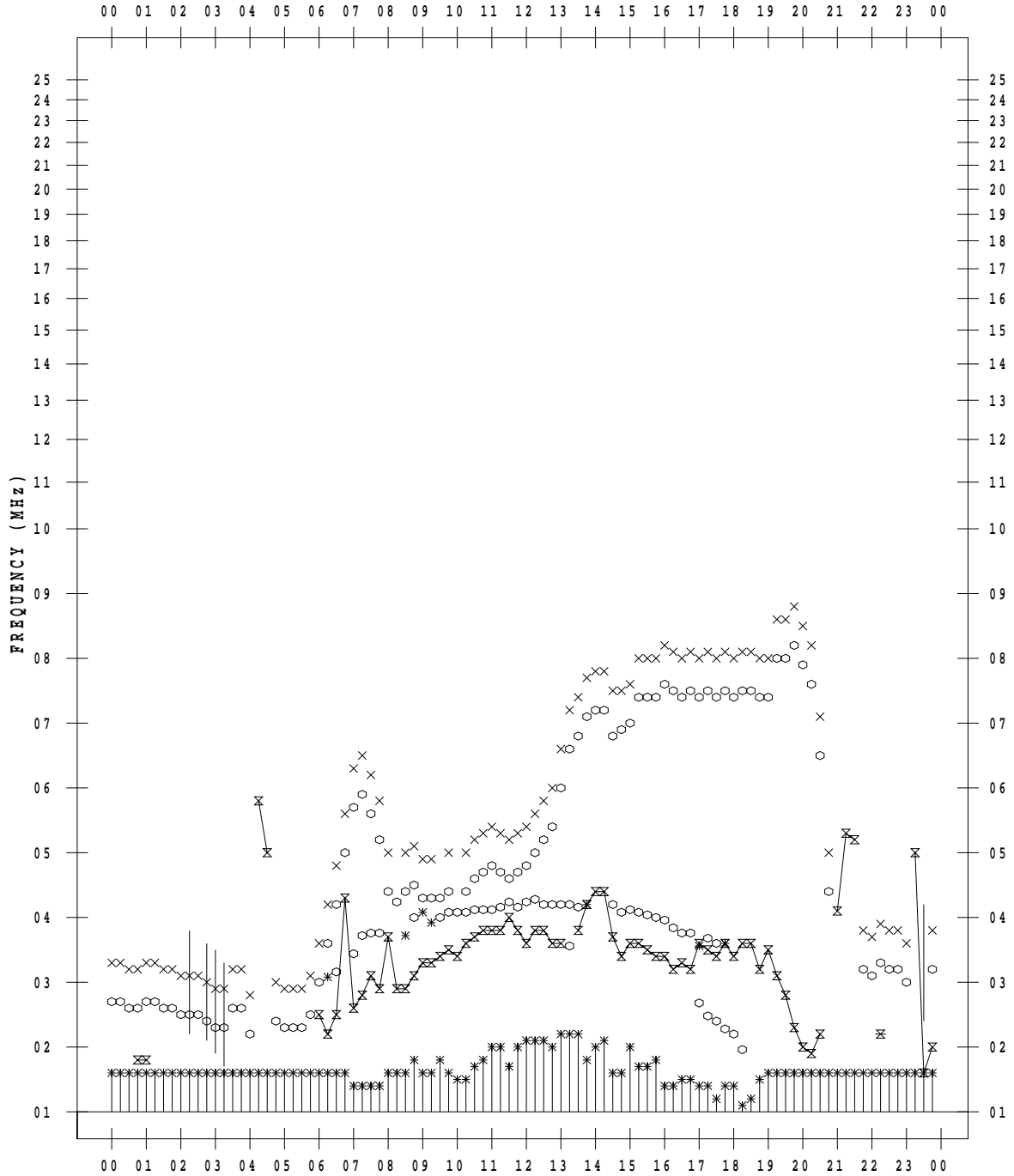
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 15

135 ° E MEAN TIME



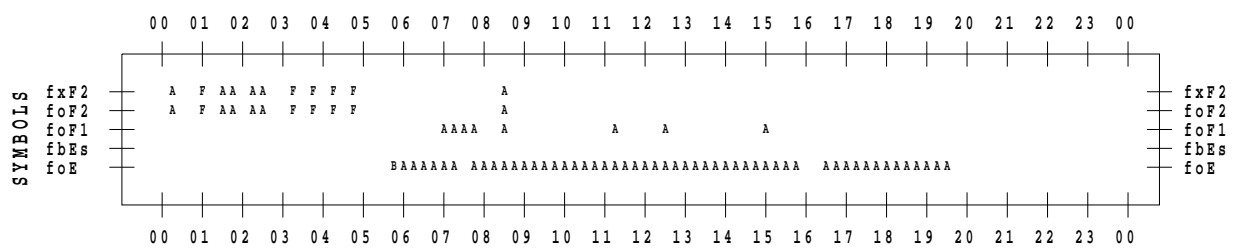
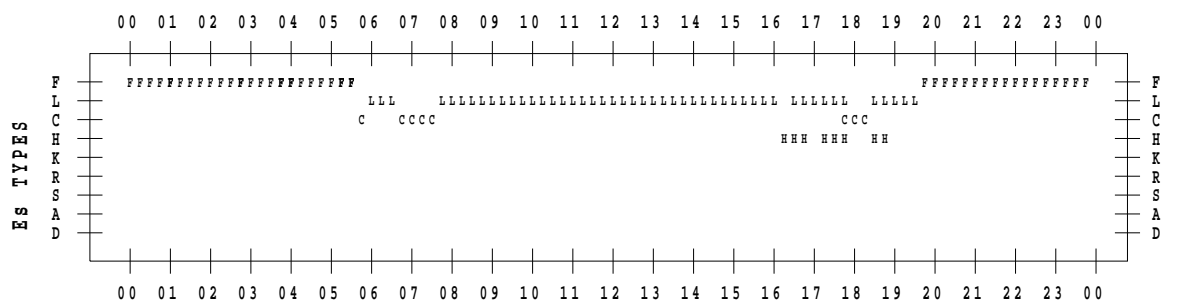
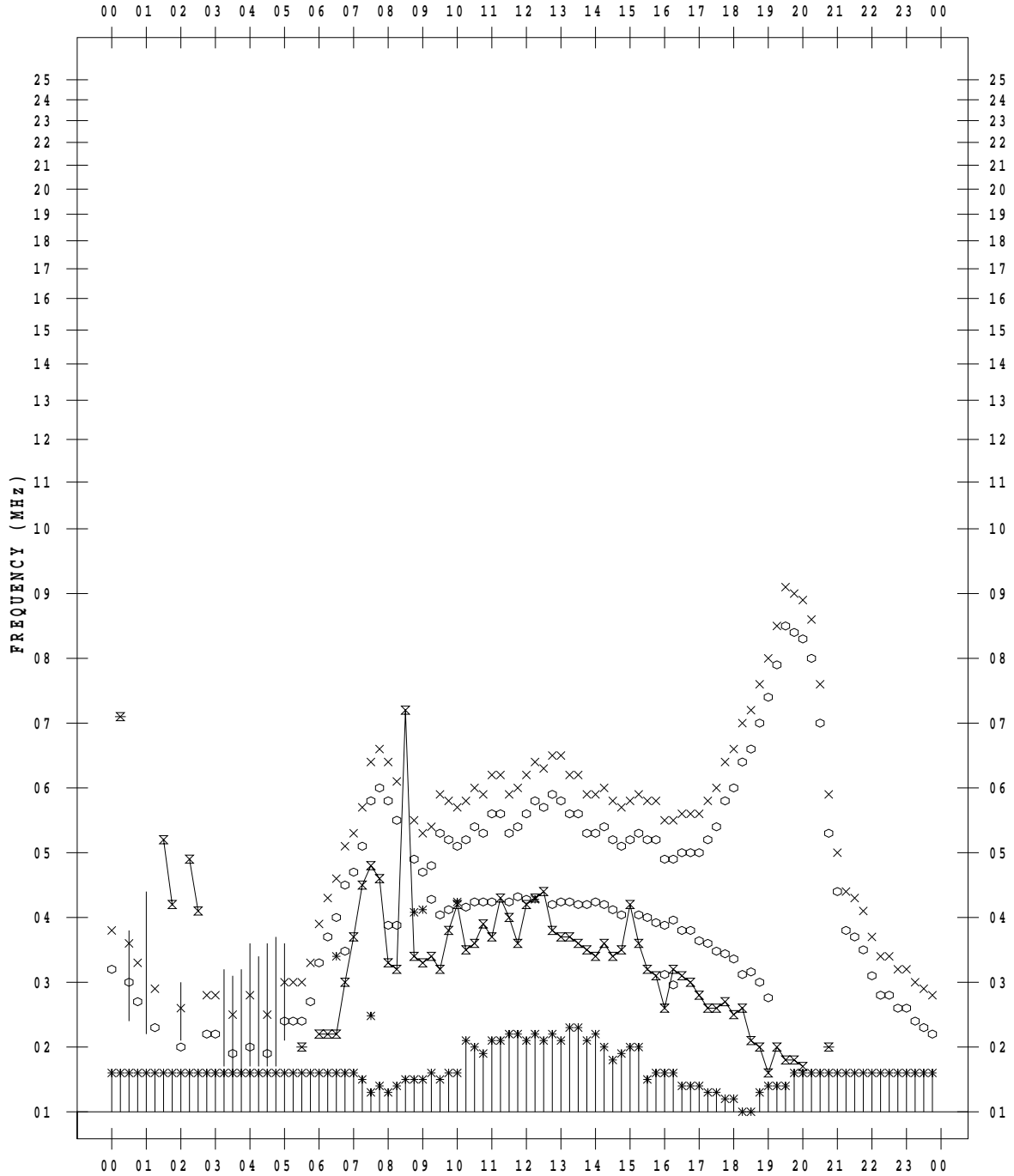
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 16

135 ° E MEAN TIME



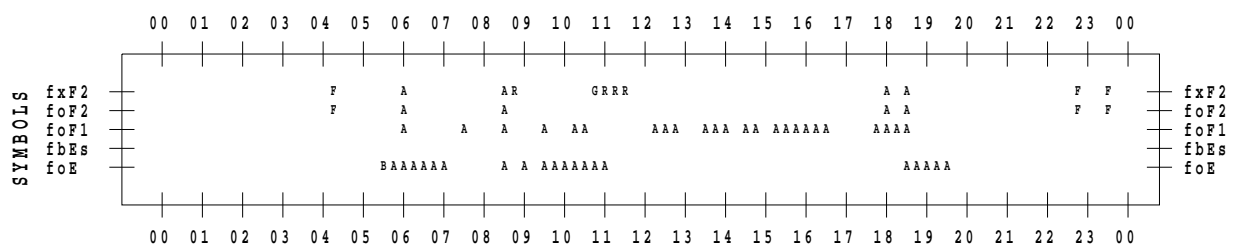
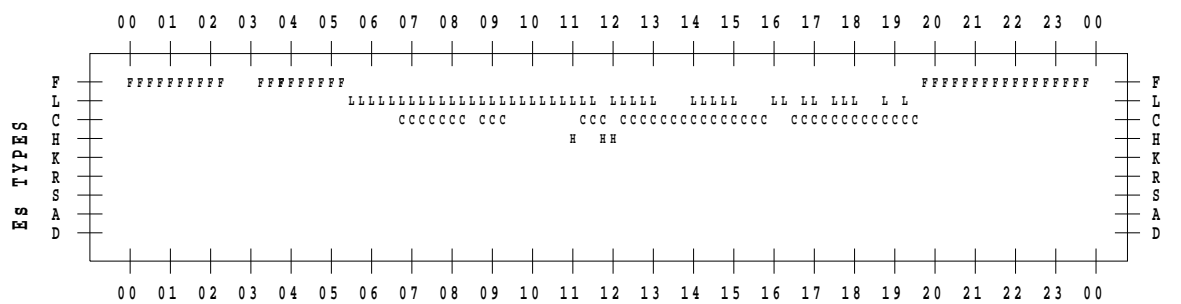
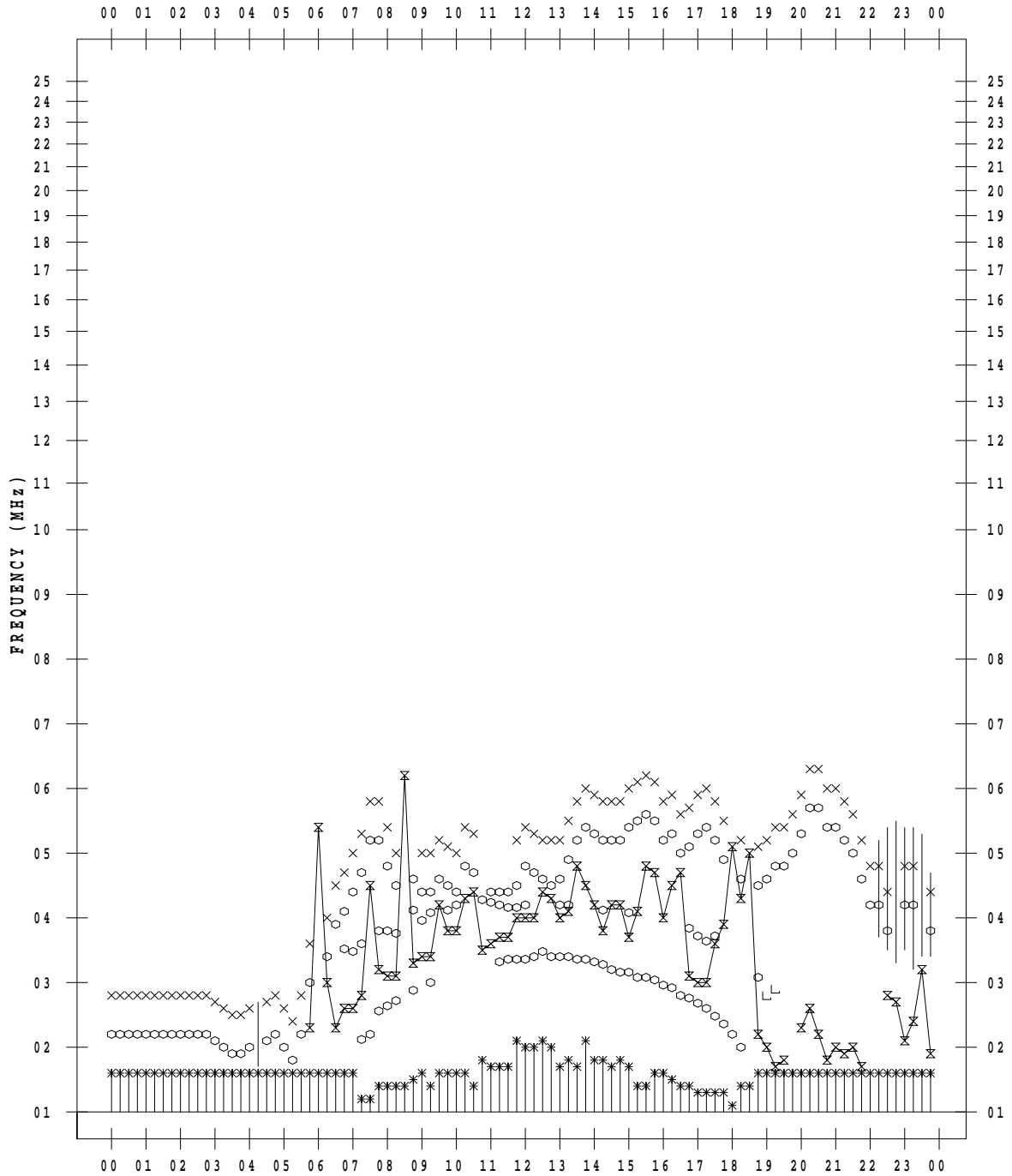
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 17

135 ° E MEAN TIME



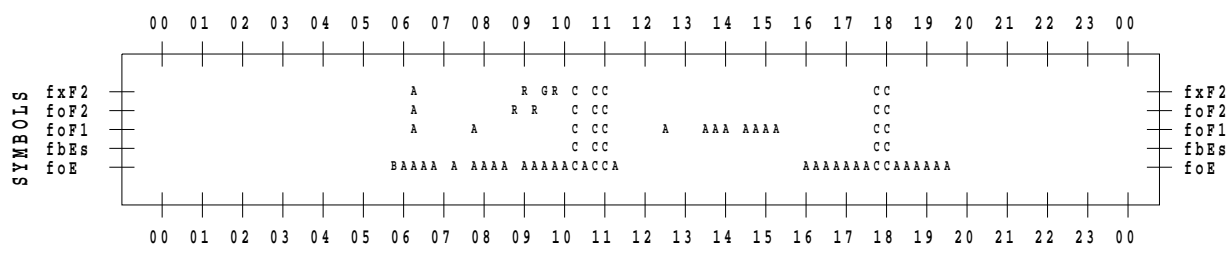
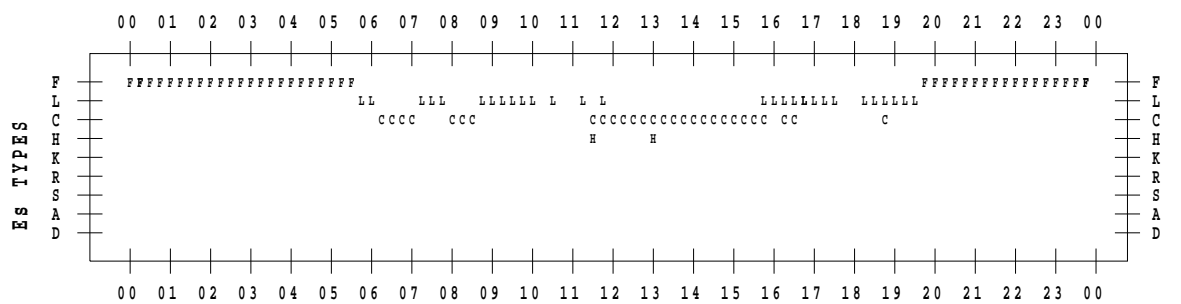
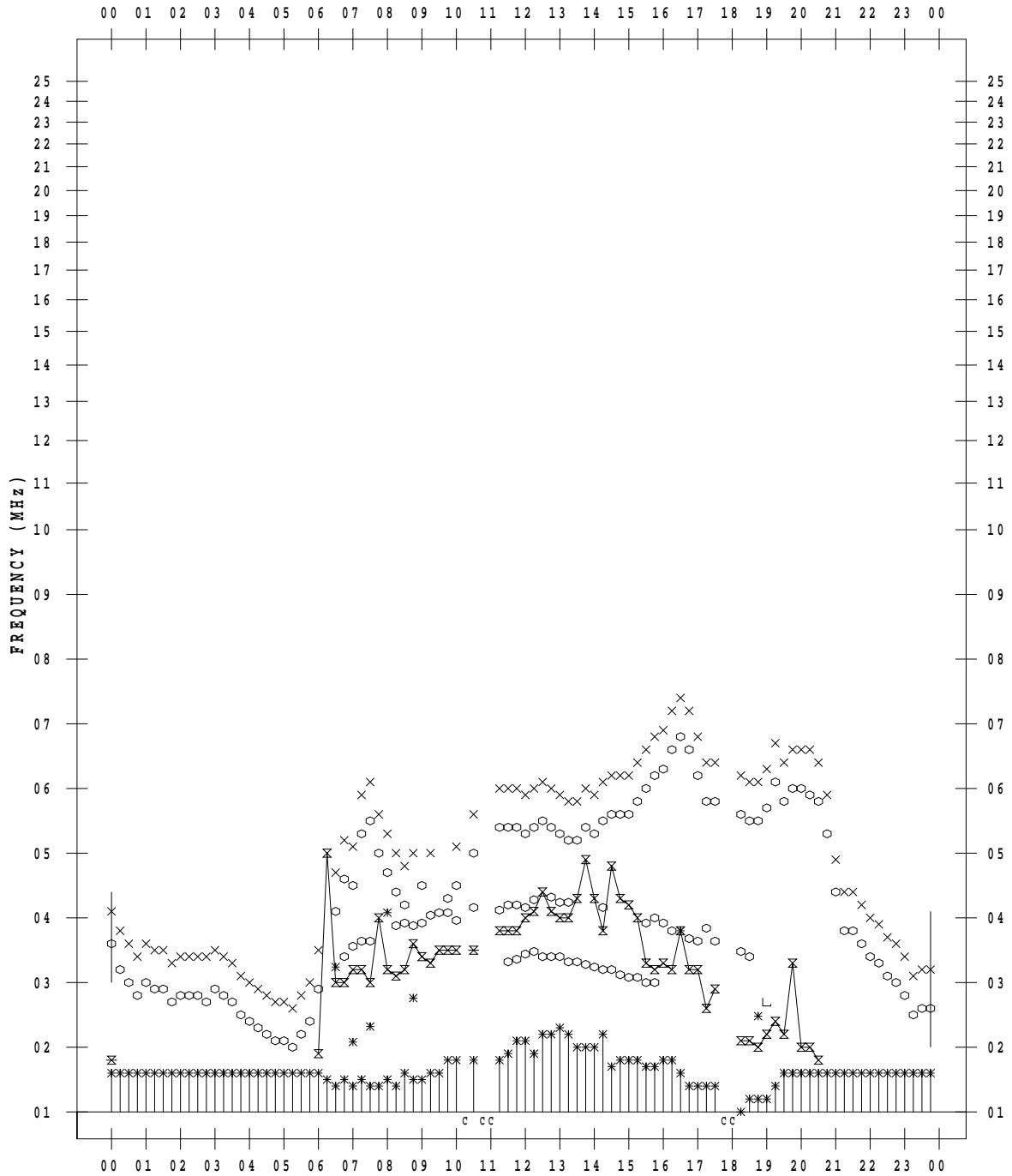
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 18

135 ° E MEAN TIME



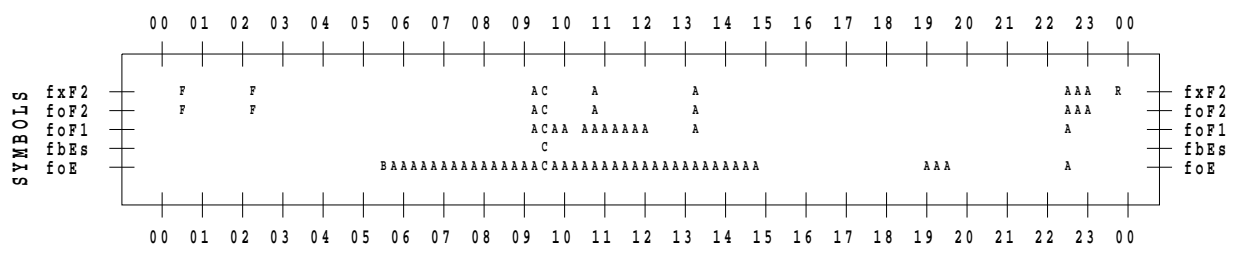
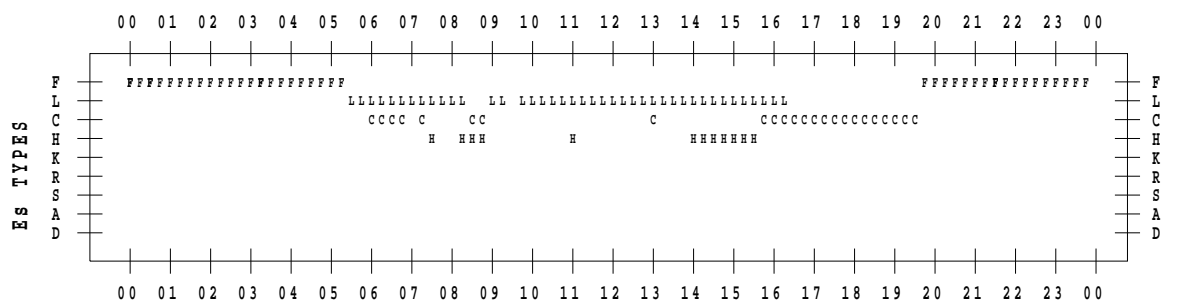
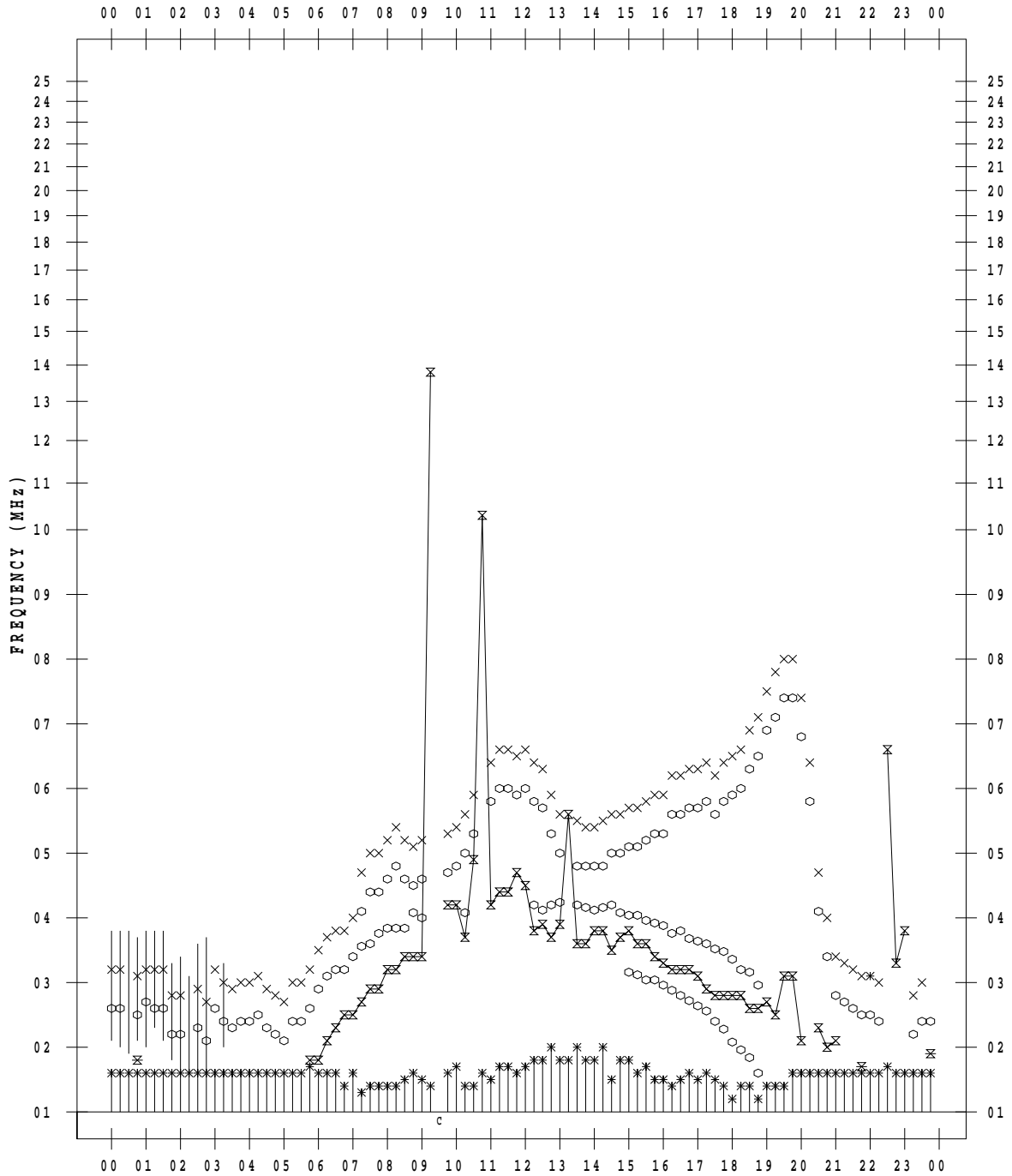
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 19

135 ° E MEAN TIME



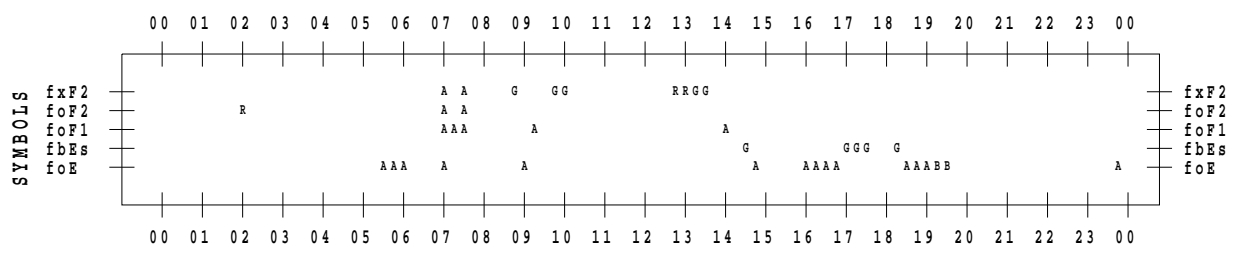
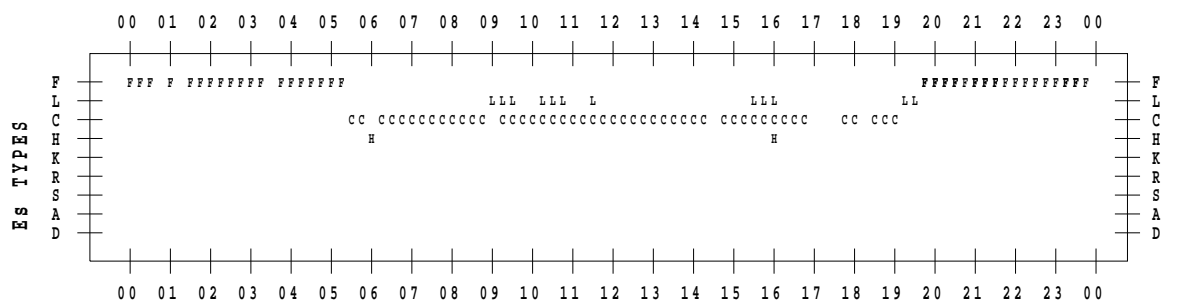
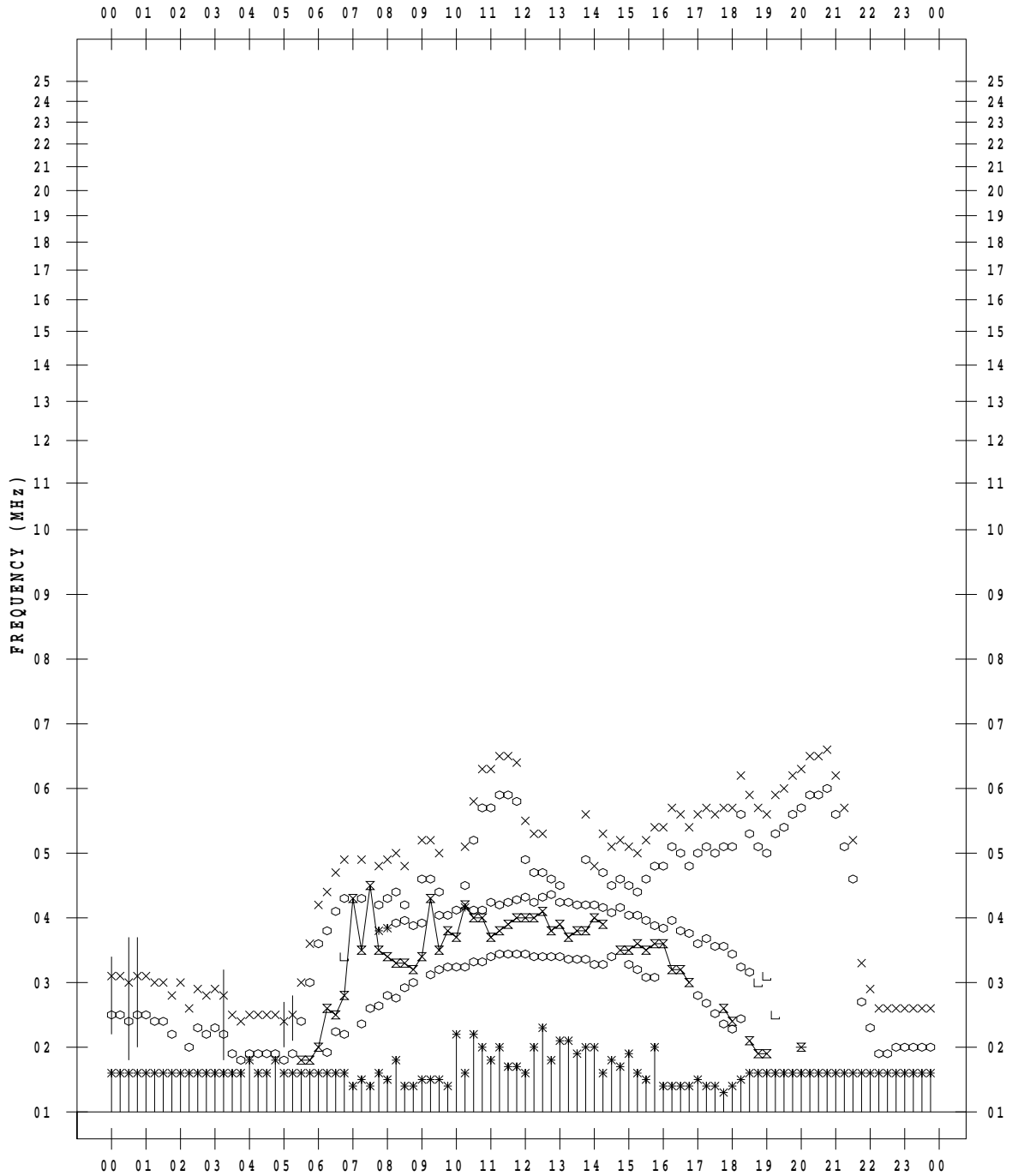
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 20

135 ° E MEAN TIME



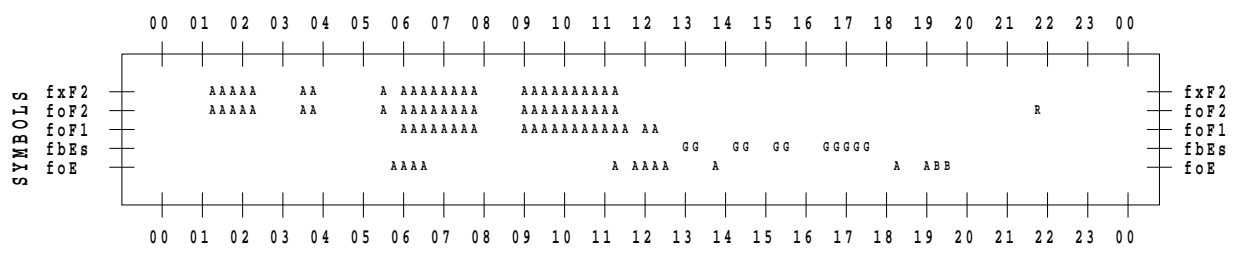
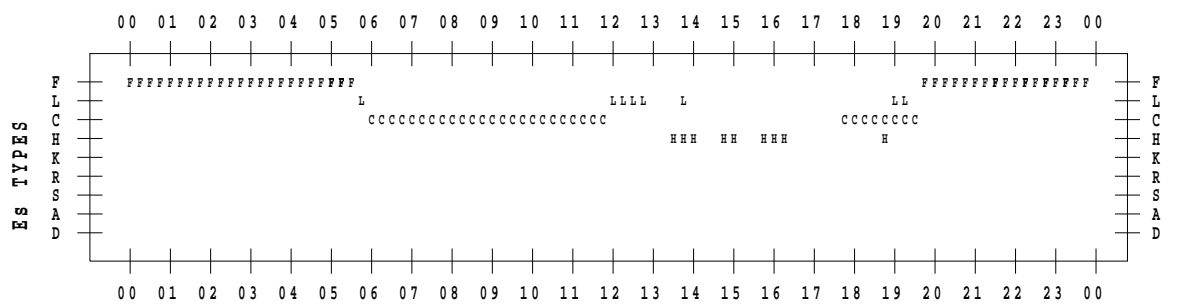
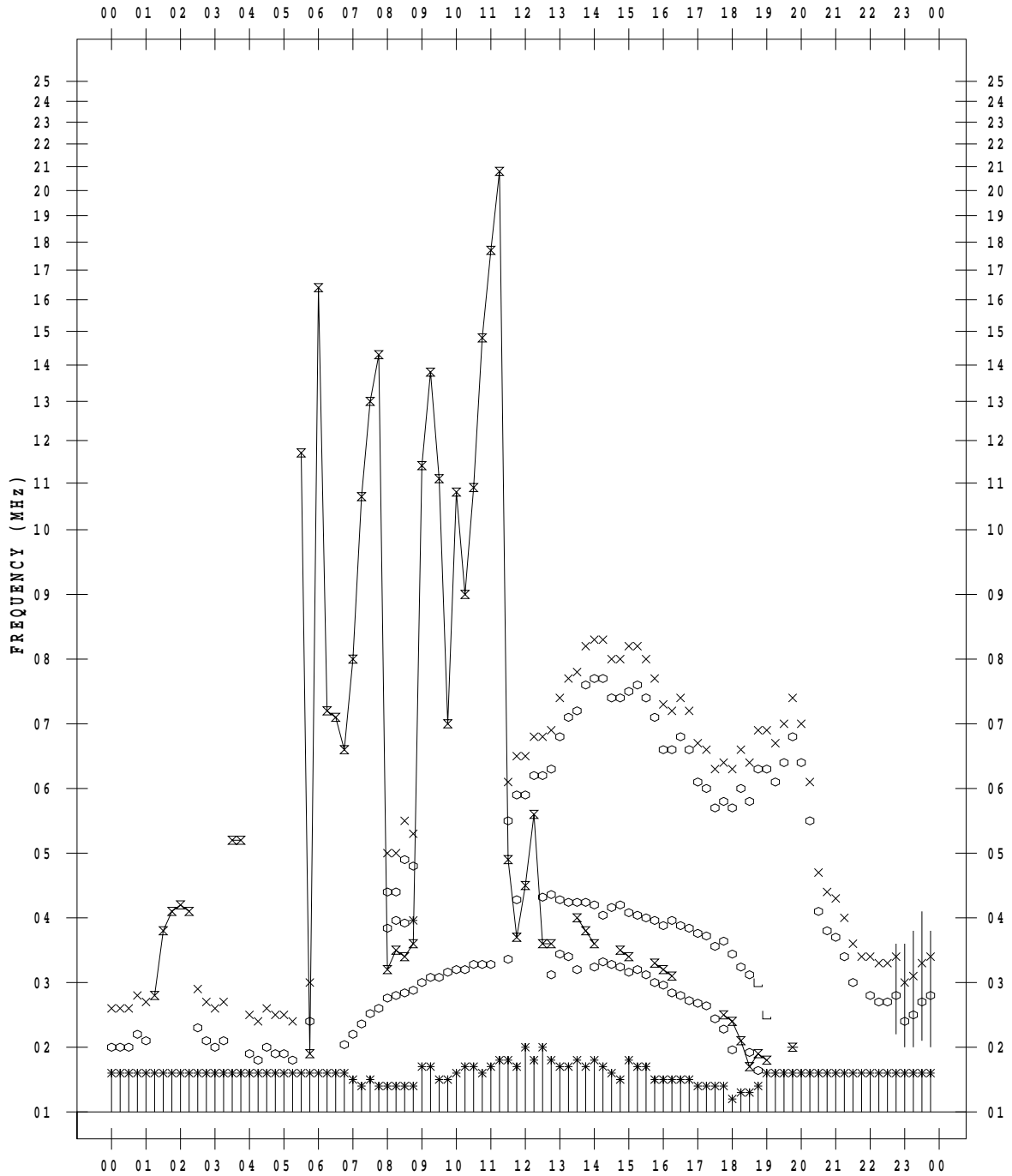
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 21

135 ° E MEAN TIME



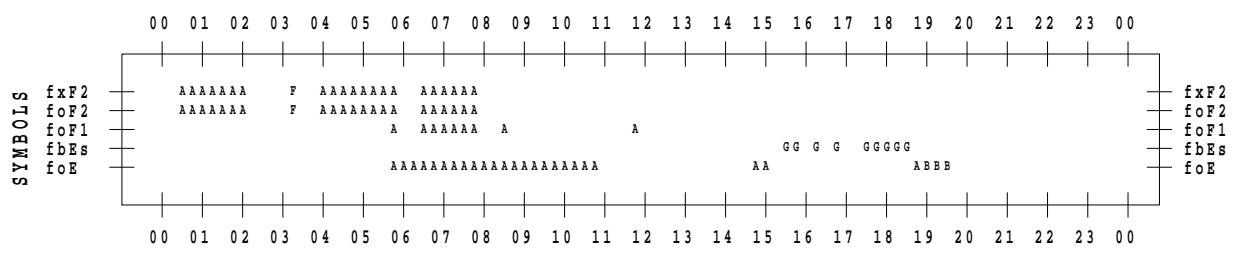
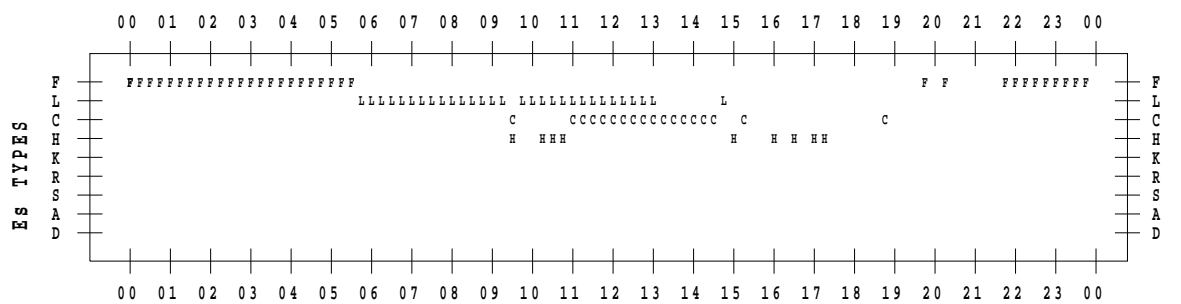
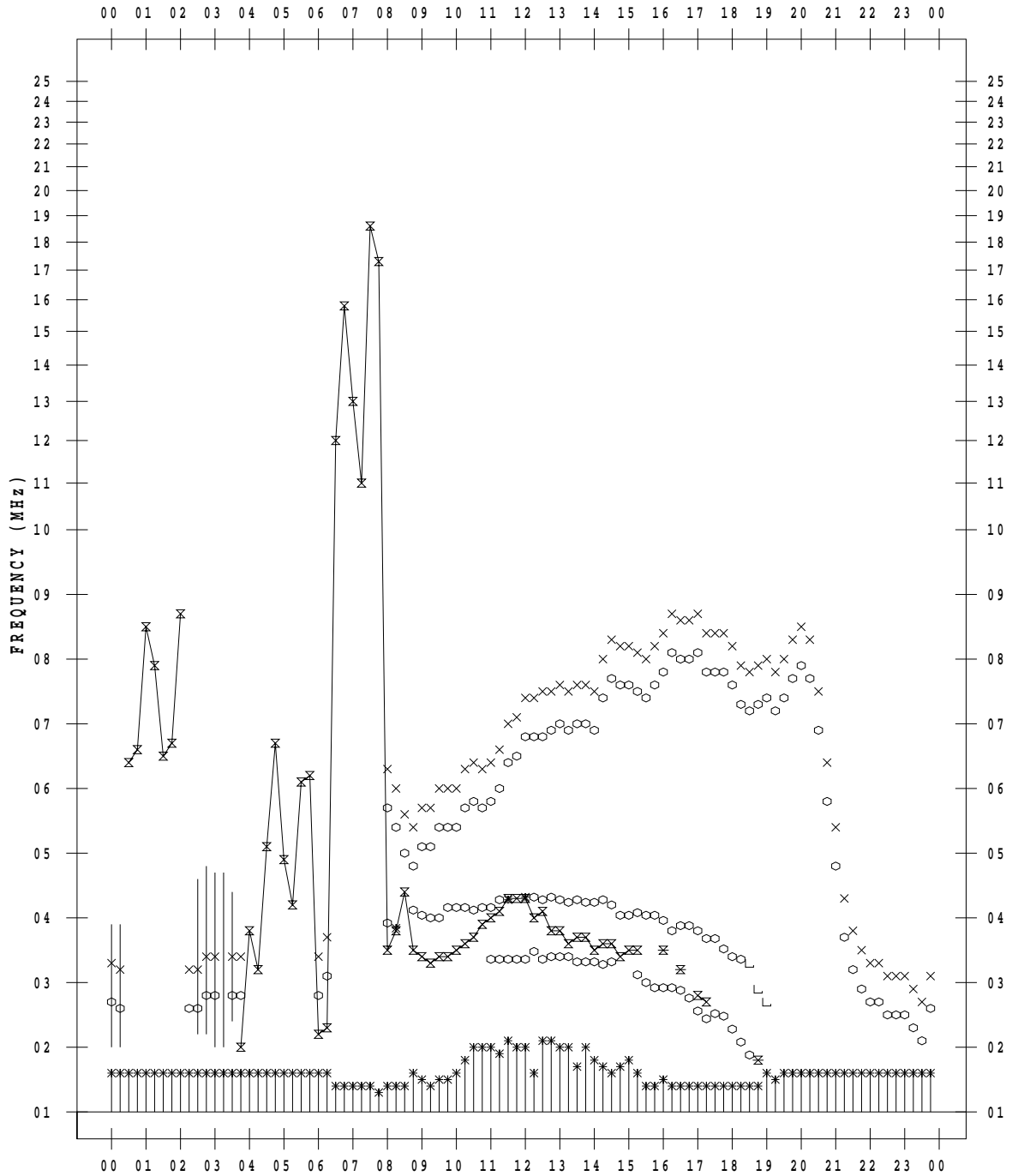
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 23

135 ° E MEAN TIME



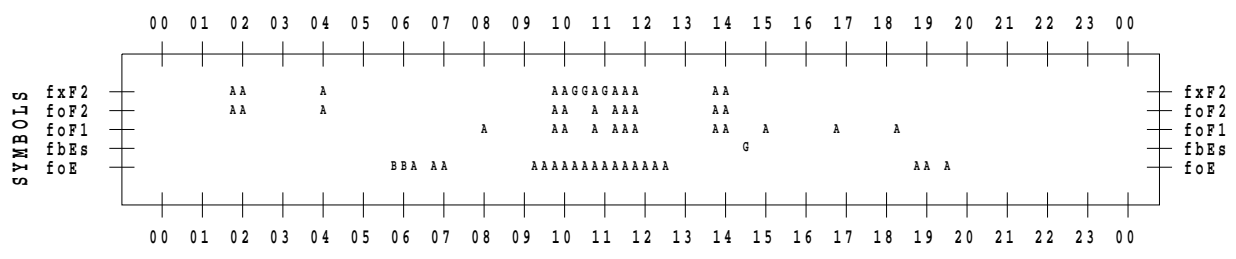
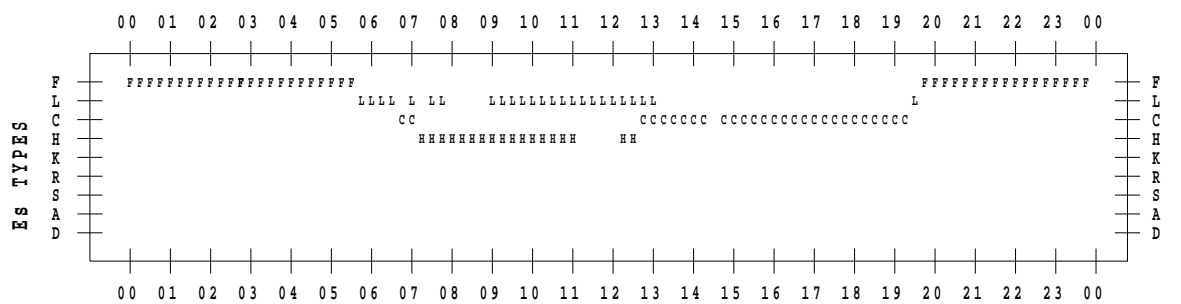
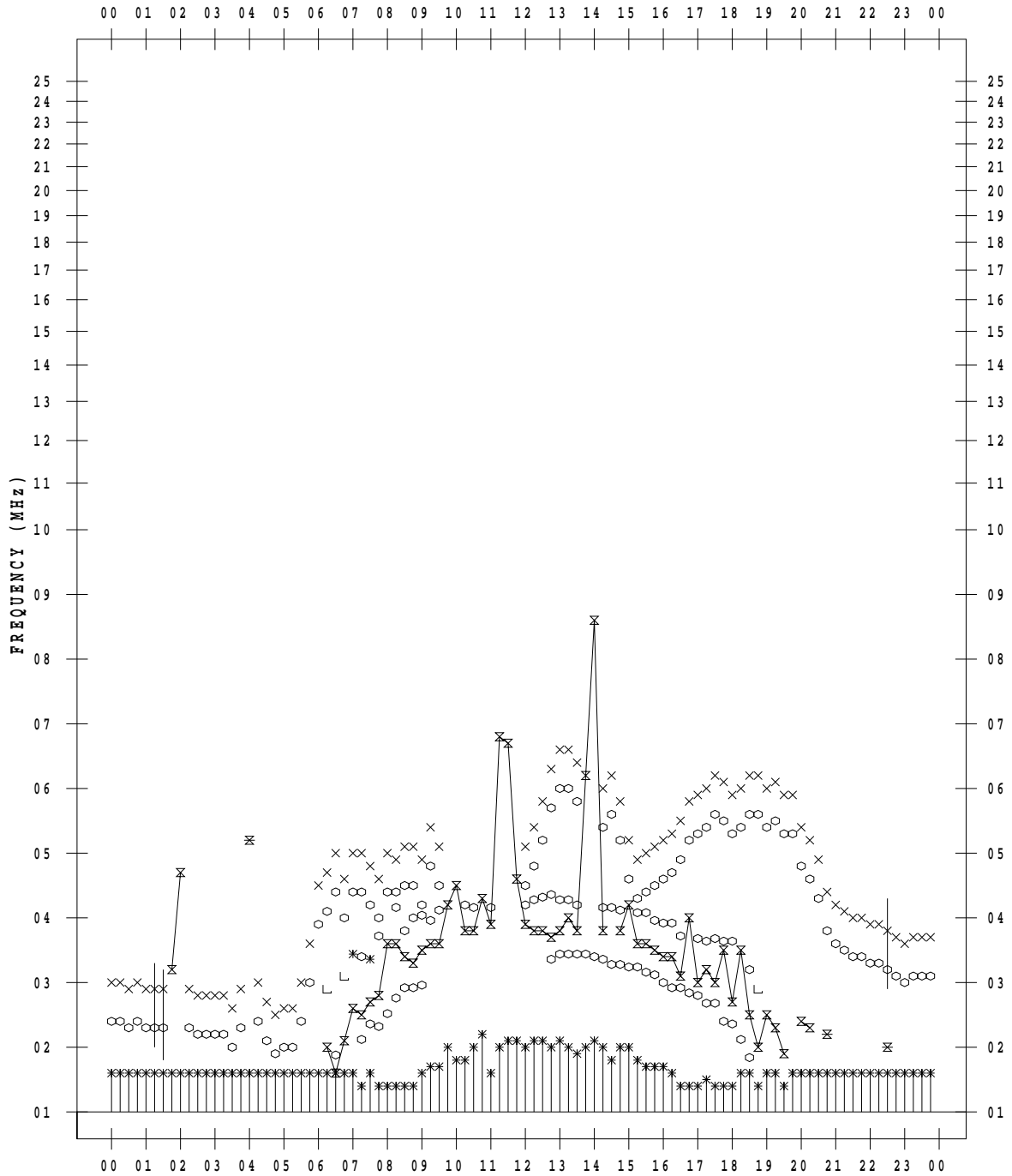
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 24

135 ° E MEAN TIME



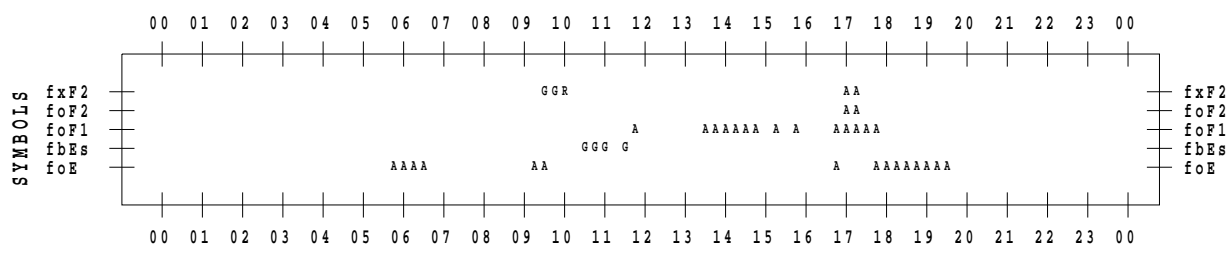
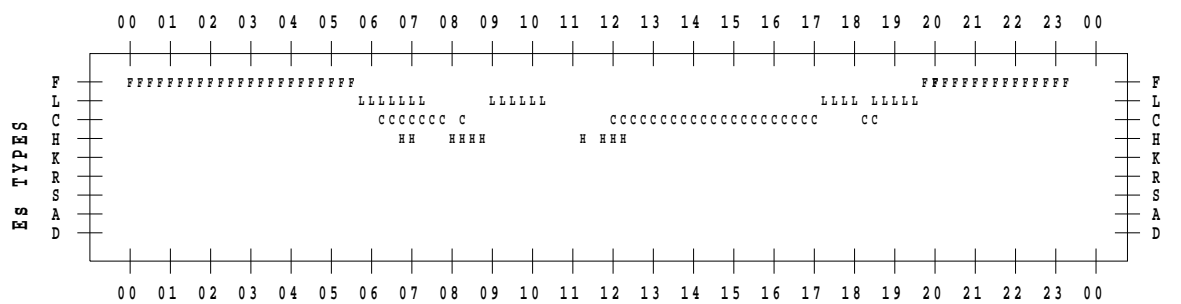
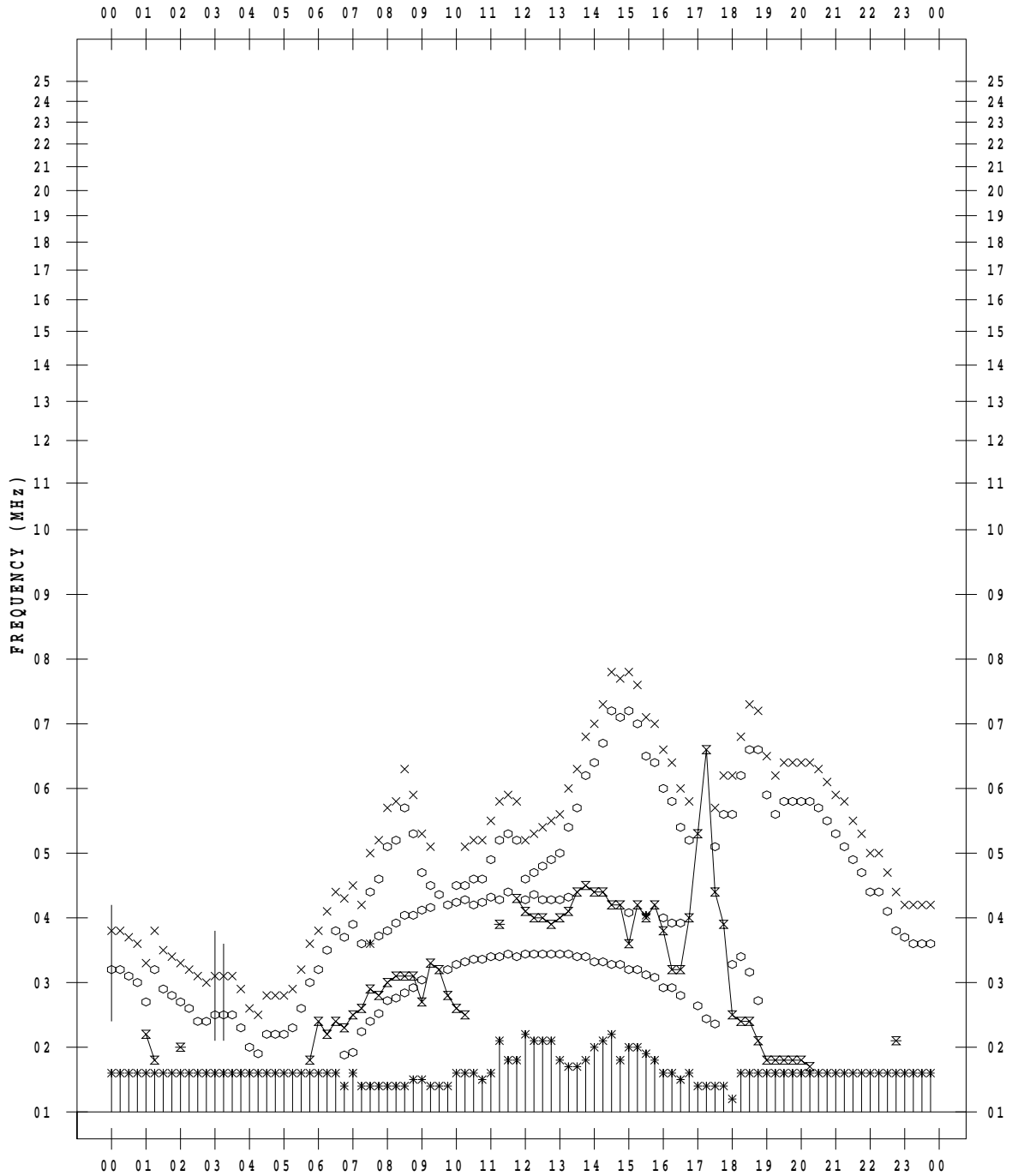
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 25

135 ° E MEAN TIME



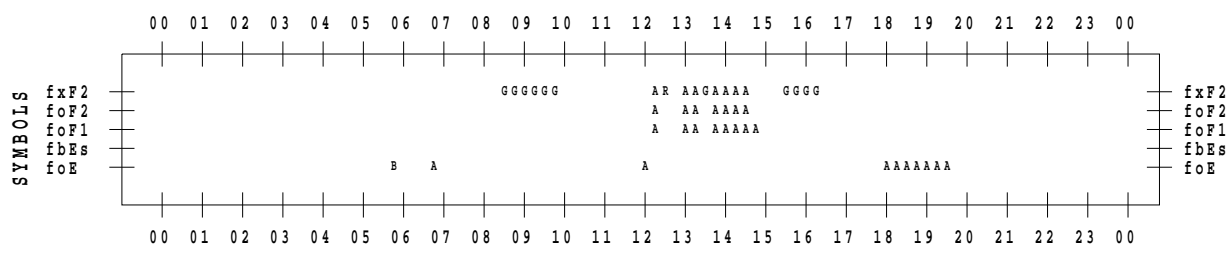
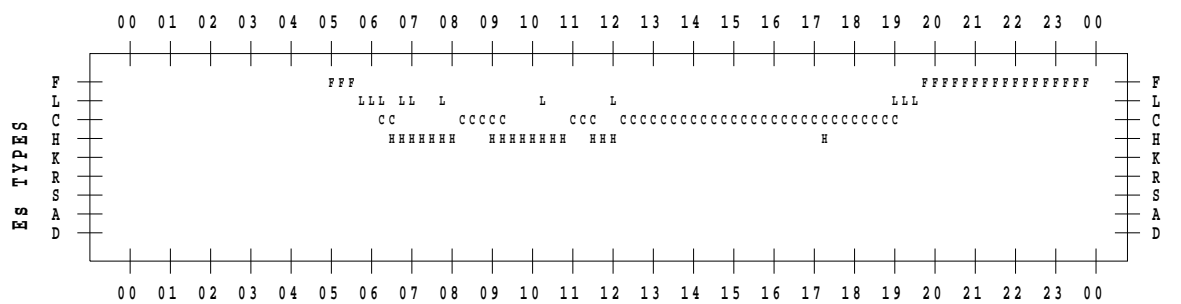
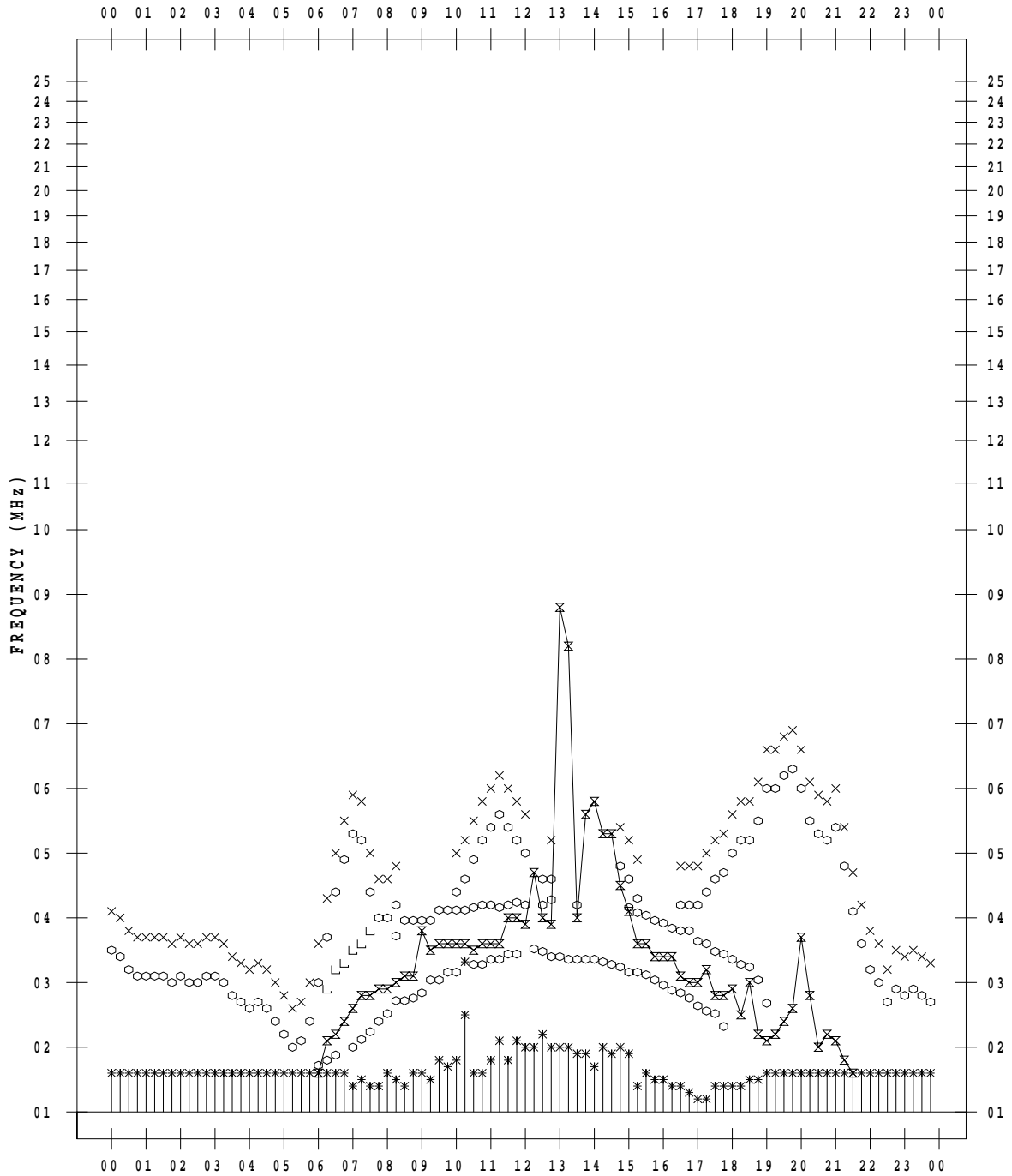
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 26

135 ° E MEAN TIME



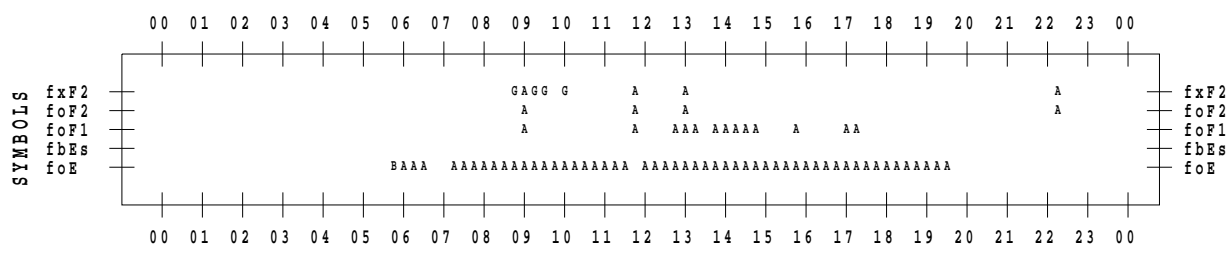
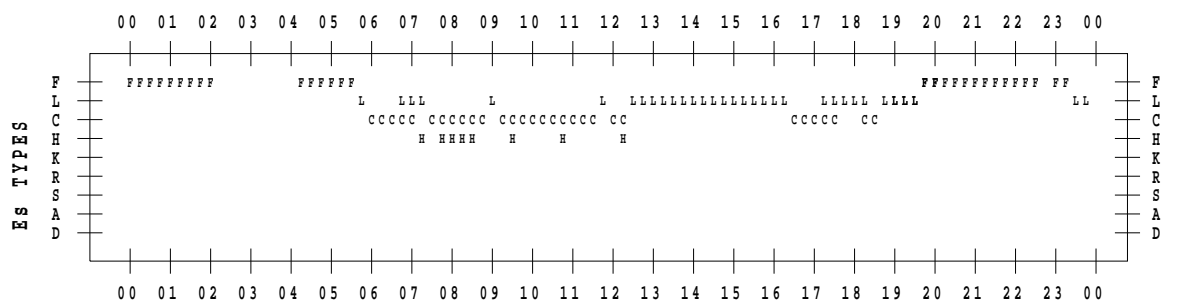
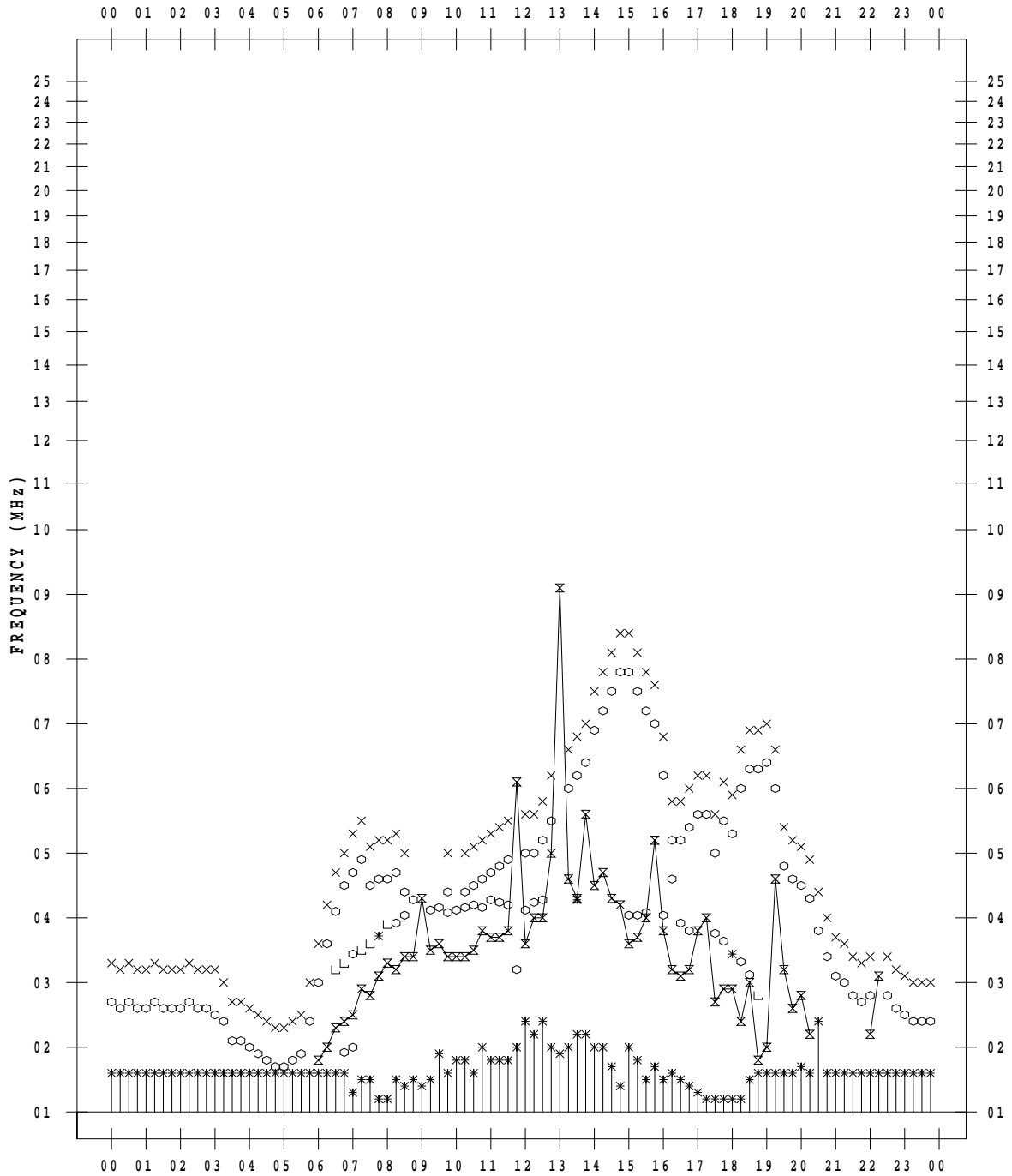
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 27

135 ° E MEAN TIME



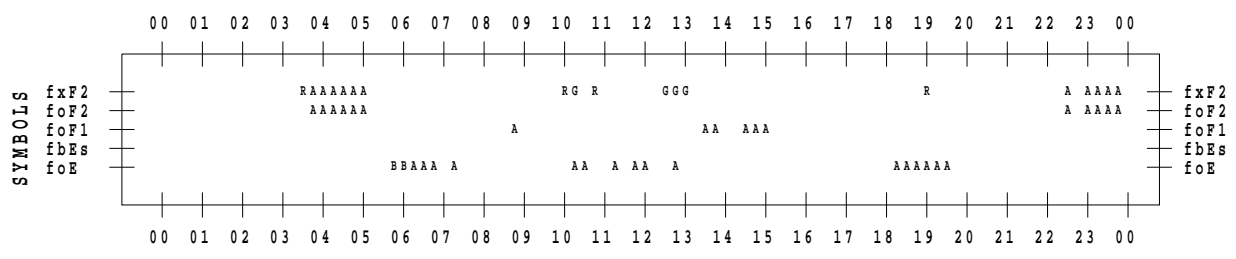
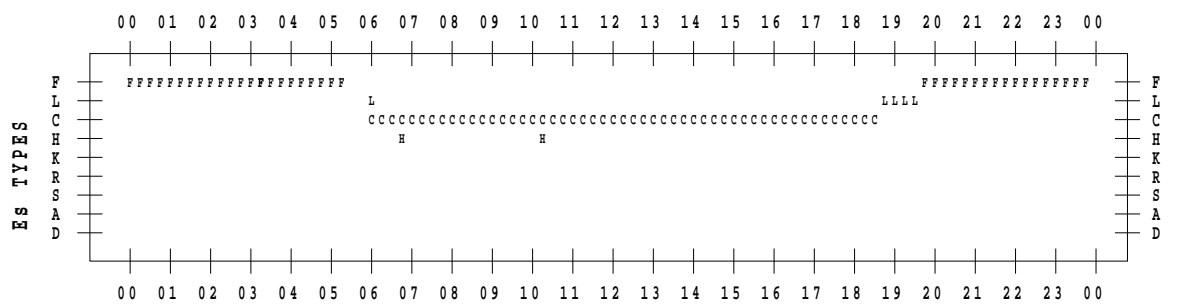
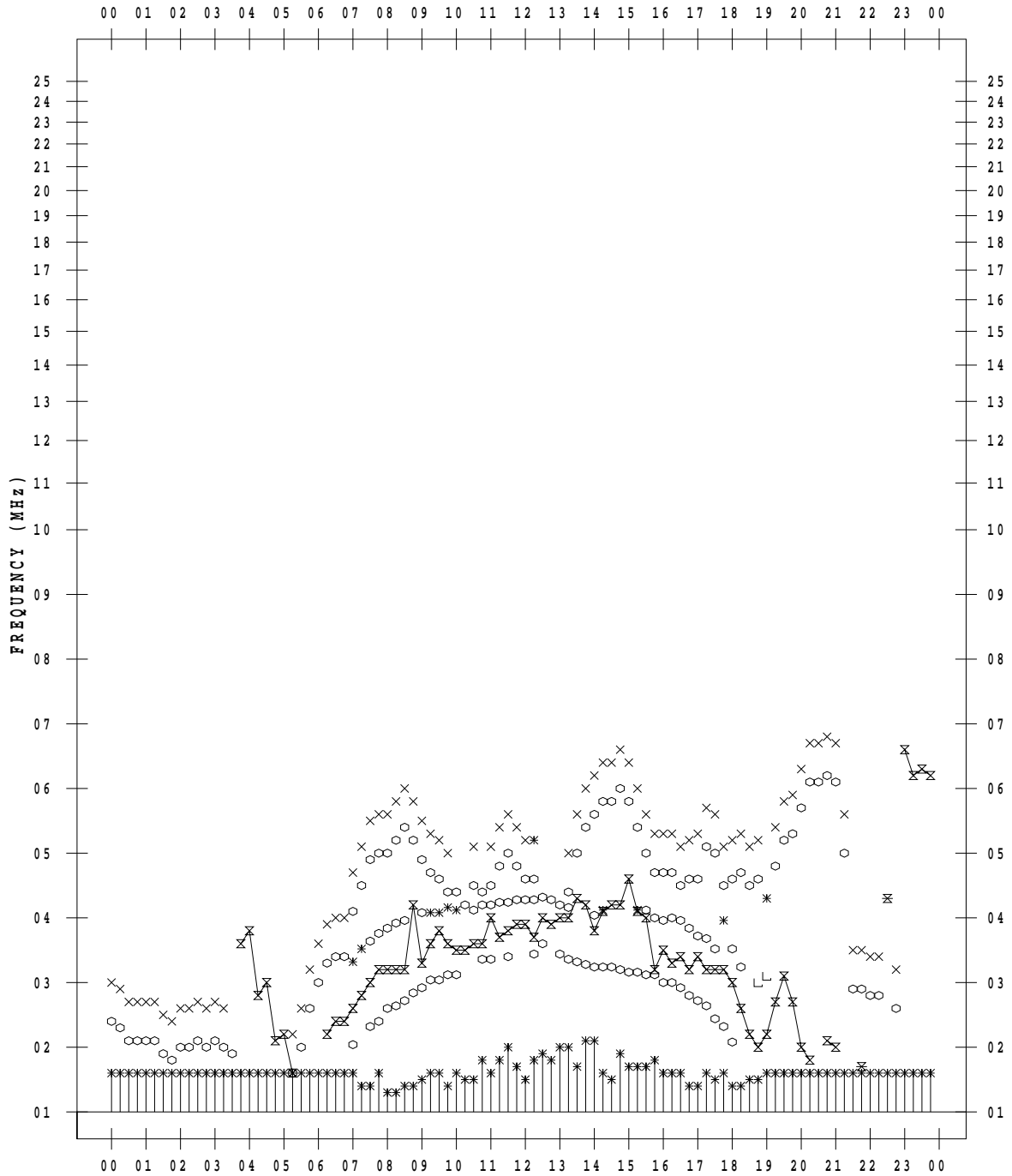
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 28

135 ° E MEAN TIME



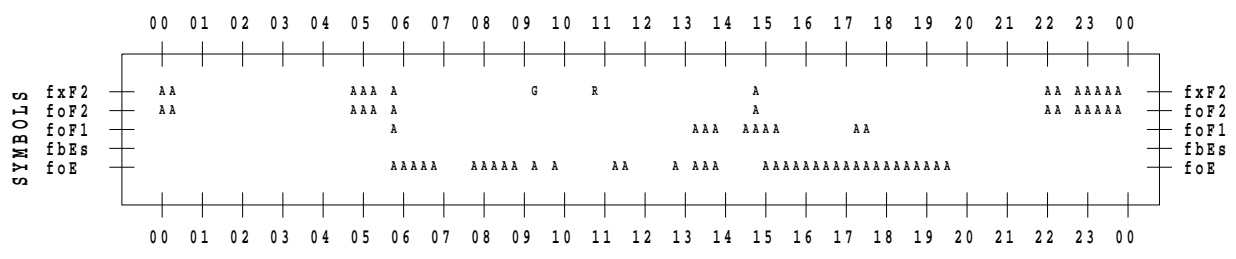
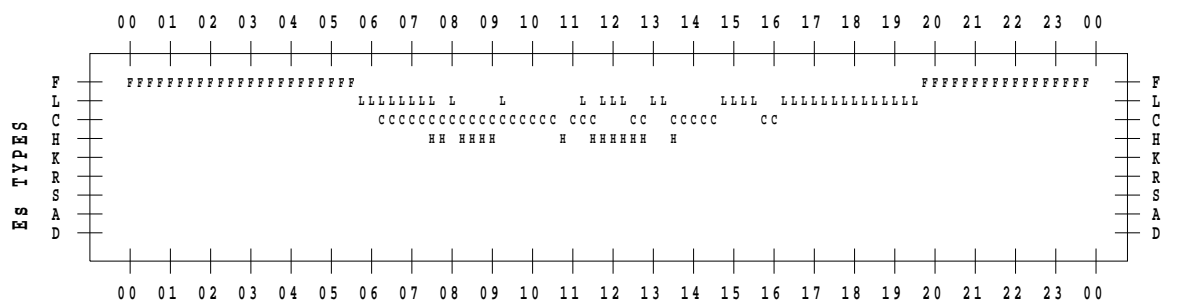
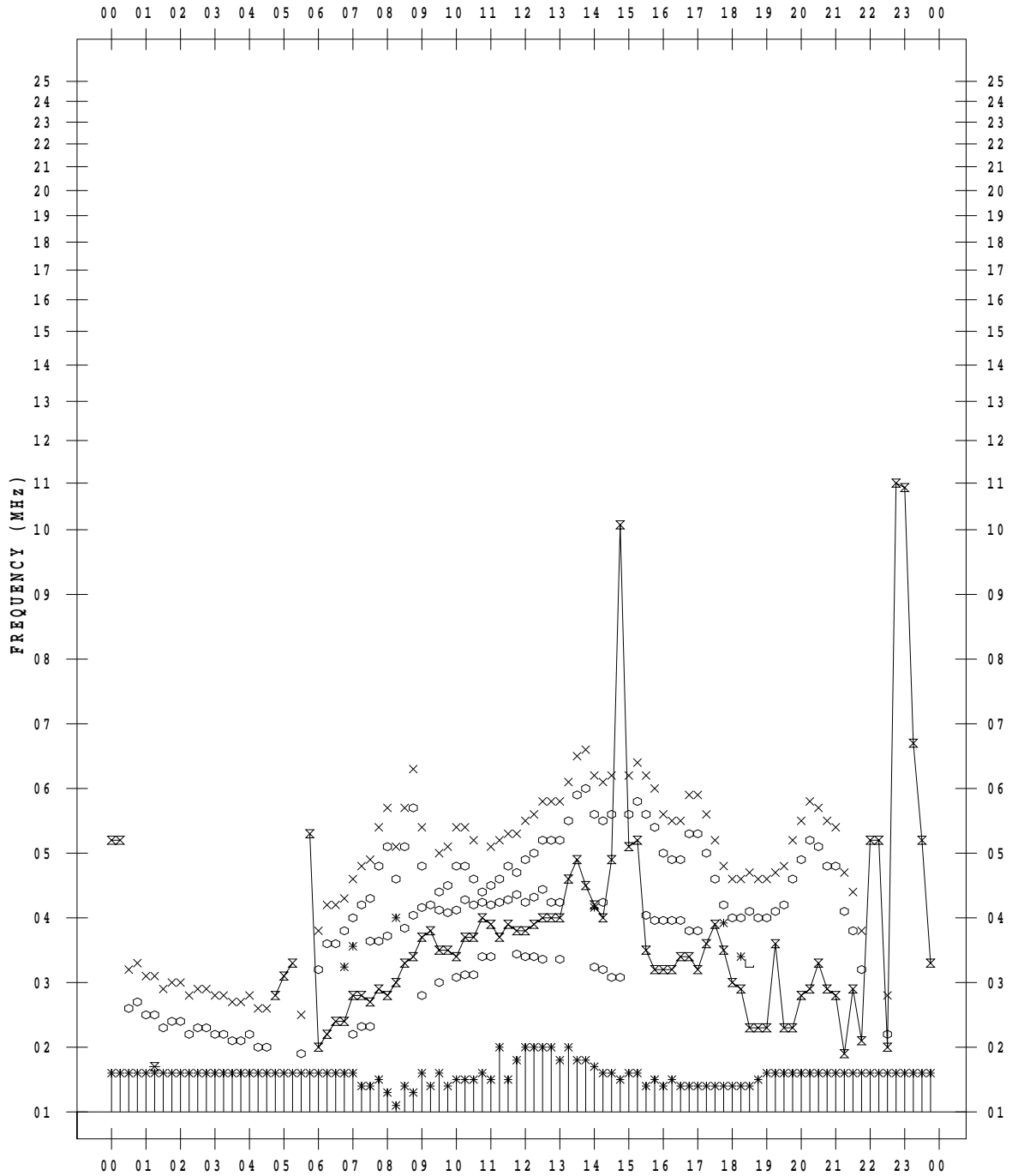
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 29

135 ° E MEAN TIME



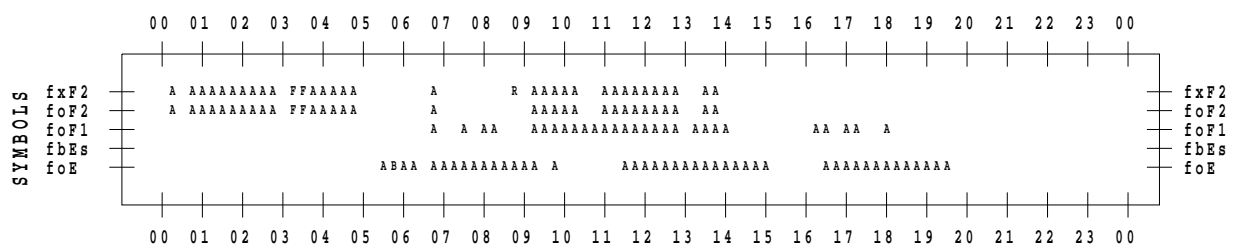
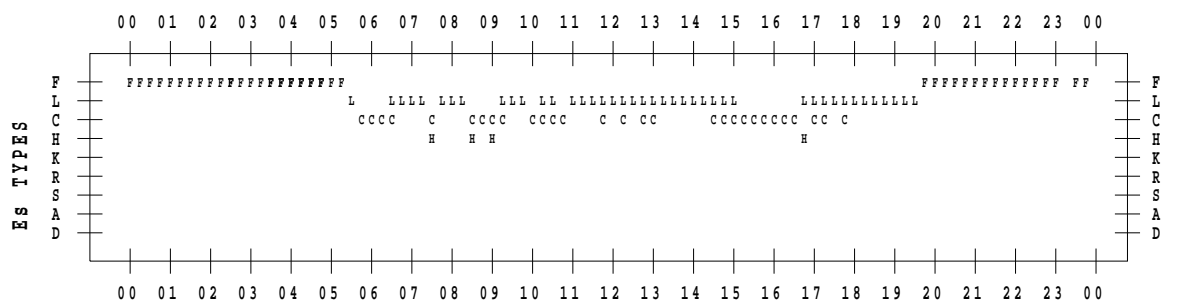
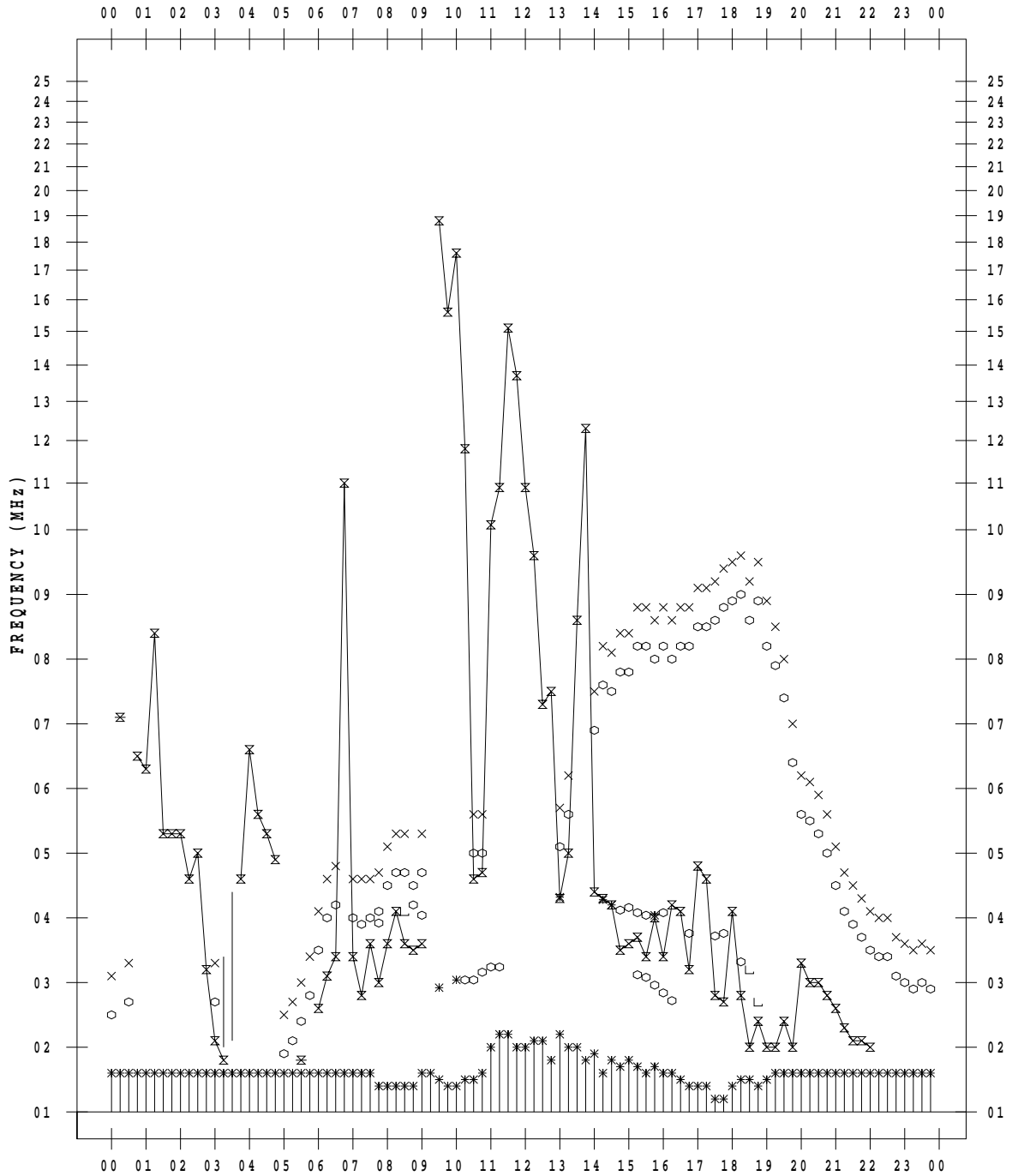
f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 30

135 ° E MEAN TIME



f - PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019 / 7 / 31

135 ° E MEAN TIME

