F-845

IONOSPHERIC DATA IN JAPAN

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≪Real Time Ionograms on the Web ・・・・・・・・・・・・http://wdc.nict.go.jp/index_eng.html≫

NATIONAL INSTITUTE OF INFORMATION
AND COMMUNICATIONS TECHNOLOGY
TOKYO, JAPAN

INTRODUCTION

This Series contains data on ionosphere (I) and solar radio emission (S) obtained at the following stations under the National Institute of Information and Communications Technology , Japan.

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

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

IONOSPHERE

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

A1. Automatic Scaling

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

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

a. Characteristics of Ionosphere

foF2	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 iono-spheric 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 *foF2*).

C Impossible measurement because of any failure in observation.

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

N Impossible automatic scaling because of complex echoes.

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

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

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

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

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

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

d. Reliability of Automatic Scaling

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

e. Summary Plot

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

A2. Manual Scaling

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

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

a. Characteristics of Ionosphere

fxI	Top frequency of spread ***F*** trace
foF2 ***foF1*** ***foE*** ***foEs***	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 replaced 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 atmospherics.

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-sociated 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

MAY 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	40	41	40	38	35	45	42	44	46	47	35	36	A	A	A	A	N	51	A	52	29	51	A	40
2	50	47	49	46	38	38	A	A	44	47	42	43	A	42	54	55	56	51	53	52	54	52	51	51
3	50	50	50	50	44	46	51		51	42	A	48	46	42	54	57	A	50	52	58	54	62	49	53
4	50	42	42	40	36	40	42	43	50	51	65	50	A	51	45	50	52	54	66	71	67	51	26	A
5	A	32	32	30	28		52	52		47	46	A	A	39	49		48	48	47	51	54	49	47	40
6	40	41	34	35	36	38	44	50	53	55	56	51	A	A	52	54	55	54	53	58	60	58	54	51
7	47	40	40	42		43	50	42	55	50	A	54	A	55	86		149	A		A	A	52	52	48
8	47	41	40	36	40	48	A	A	A	A	A	125	120	A	A	A	A	51	56	63	54	50	55	A
9	A	A	40	47	47	47	A	54	52	55	A	A	A	A	A	58	52		A	58	63	58	49	54
10	49	43	40	38	36	45	41	47	52	A	A	A	A	A	A	54	58	57	A	64	66	A	A	48
11	47	50	48	47	45	47	52	52	A	54	53	56	56	127				58	48	64	A	A	A	52
12	A	45	36	32	A	A	A	A	A	A	35	A	A	A	A	A	A	102	109	A	A	52	A	A
13	A	A	A	A	A		52	54	A	88	54	A	A	52	51	51	48	50	58	58	A	A	50	42
14	46	42	42	41	40	42	50	54	51	A	A	A	A	A	58	51	70	78	82	72	54	35	A	A
15	36	37	34	34	A	54	A	A	A	N	A	A	A	A	41		A	54	109	A	A	A	A	A
16	A	37	37	36	37	41	A	A	A	111	A	A	A	A	A	A	106	74	51	65	67	A	49	A
17	A	A	A	A	41	A	A	A	A	59	85	A	A	A	59	89	A	A	A	47	A	A	A	A
18	36	37	32	37	37	40	A	A	A	A	A	A	A	A	A	109	50	48	44	48	54	54	47	42
19	40	40	40	41	41	42	40	39	A	A	A		A	43			A	91	A	48	54	51	A	40
20	A	A	34	34	32	42	N	A	A	A	A	A	A	A	49	47	54	A	87	A	49	54	A	A
21	A	38	34	34	36	40	A	A	A	A	A	A	A	42	41	A			46	50	54	53	42	40
22	35	36	40	66	38	48	50	A	A	A	80	A	A	A	A	A	A		156	A	54	51	52	41
23	34	36	35	32	32	40	A	54	A	A	84	51	A	A	A	145		51	89	63	64	54	58	51
24	48	42	37	36	37	41	A	A	A	A	59	56	A	59	52	48	52	52	48	55	62	54	54	52
25	51	53	55	54	52	42	47	47	A	A	55	56	49	A	51	50	51	50	A	55	64	54	65	58
26	40	43	41	42	42	46	48	52	A	55	A	A	A	43	51	50	A	A	47	51	54	51	51	42
27	41	40	42	50	42	44	A	58	A	A	A	39	A	A	A	A	A	47	82	63	60	58	54	54
28	A	34	32	32	31	37	59	A			127	104	A	A	A	A	48	104	90	A	49	58	51	52
29	42	43	40	37	34	39	A	A	A	A	64	A	A	A	152	59				A	64	A	54	44
30	41	46	45	45	47	47	51	79	110	A	A	A	A	A	49	A	47	50	51	56	64	63	54	A
31	49	40	40	40	40	A	47	A	55	48	A	A	A	A	A	55	A		52	58	54	58	50	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	22	27	29	29	27	26	17	16	11	14	15	13	4	11	17	17	16	22	23	24	25	24	22	21
MED	44	41	40	38	38	42	50	52	52	52	56	51	52	43	51	54	52	52	53	58	54	54	51	48
U Q	49	43	42	45	42	46	51	54	55	55	80	56	88	55	56	58	57	58	87	63	64	58	54	52
L Q	40	37	34	34	36	40	43	45	50	47	46	45	47	42	49	50	49	50	48	51	54	51	49	41

HOURLY VALUES OF fEs AT Wakkanai

MAY 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	G	G	G	G	G	G	35	38	37	G	G	G	48	44	45	50	56	38	50	39	70	26	37	G
2	G	G	G	23	24	30	154	36	G	G	G	G	61	G	38	G	G	36	30	G	G	32	30	26
3	36	29	39	G	28	28	31		36	38	124	G	G	G	G	54	60	44	G	28	28	G	G	G
4	G	G	G	G	G	139	34	39	60	46	43	41	47	G	38	G	39	36	G	G	G	34	27	83
5	59	G	G	G	25		57	52		58	46	68	60	40	G		34	G	32	24	34	G	G	38
6	33	30	25	24	G	29	60	109	140	44	92	41	40	40	G	G	35	37	37	G	G	36	G	G
7	G	G	G	G		28	35	39	40	48	56	46	102	57	58		144	102		115	65	58	33	G
8	30	33	33	30	30	38	127	156	163	126	75	117	129	70	75	94	83	36	30	G	G	G	116	86
9	53	61	36	30	70	48	48	58	52	45	54	92	76	69	76	59	53		118	35	41	46	G	52
10	G	G	G	G	G	34	38	66	54	61	70	145	113	64	63	41	59	53	70	39	35	107	86	G
11	G	G	30	32	37	34	105	52	70	46	45	56	G	75				33	32	35	72	92	60	30
12	60	25	26	29	43	33	58	164	57	65	G	62	55	47	50	43	46	74	41	142	35	84	70	72
13	59	53	112	71	70		55	50	61	116	53	46	48	48	47	45	45	45	71	45	48	74	34	28
14	G	26	G	G	24	31	42	55	46	48	48	57	69	50	39	G	G	33	32	29	26	29	58	58
15	G	23	31	24	35	47	59	136	93	91	46	54	75	57	G	G	55	49	61	71	72	59	48	40
16	85	30	G	G	29	38	48	89	120	112	61	68	63	45	39	65	76	71	44	27	40	50	35	56
17	109	65	45	48	20	33	46	105	84	69	72	59	139	46	39	81	127	142	83	41	60	72	69	40
18	35	32	26	29	G	33	45	72	72	60	94	94	52	63	53	54	36	36	G	26	35	40	G	24
19	G	G	G	G	G	G	54	58	70	70	60	G	60	48	G	G	43	74	70	32	32	G	59	56
20	50	40	32	29	G	33	45	61	59	67	48	50	59	55	G	44	66	62	50	47	41	36	59	35
21	41	26	24	23	27	33	41	109	65	61	62	46	41	47	40	39			35	40	G	G	32	G
22	G	G	27	G	G	34	46	64	84	92	57	57	63	46	51	57	50		137	144	35	59	G	25
23	G	29	26	G	G	36	66	60	57	64	80	52	60	56	59	135		40	66	31	60	36	43	37
24	36	27	29	27	28	38	85	64	84	64	54	51	50	51	139	41	36	34	47	39	32	31	40	116
25	27	28	G	G	G	36	39	44	57	59	54	47	44	45	43	G	40	38	53	43	38	33	28	40
26	34	G	26	G	34	33	47	90	66	64	60	66	45	44	40	46	125	37	42	38	50	60	33	29
27	G	25	30	30	G	36	60	50	93	74	68	51	57	60	71	64	70	G	69	30	33	35	41	39
28	57	G	29	23	28	154	50	96			117	62	103	65	47	49	58	91	46	150	39	40	34	29
29	G	G	G	G	G	36	127	65	90	113	70	61	70	61	66	81				94	77	132	34	G
30	G	G	G	53	44	93	60	126	93	54	94	56	48	60	44	43	36	36	33	30	39	41	59	60
31	36	27	26	G	G	36	40	61	57	46	65	77	100	70	56	64	73		31	34	34	40	G	43
	00	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	29	31	30	29	30	31	31	31	31	30	28	27	26	29	31	31	31	31	31
MED	30	25	26	23	24	34	48	62	65	61	60	56	60	50	44	46	53	38	44	35	35	40	34	37
U Q	50	30	30	29	30	38	60	96	87	70	72	66	75	61	58	61	70	62	67	45	50	59	59	56
L Q	G	G	G	G	G	32	41	52	55	46	48	46	48	45	38	20	36	36	32	28	32	31	27	24

HOURLY VALUES OF fmin AT Wakkanai

MAY 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	14	14	14	14	14	14	14	14	14	14	20	16	15	17	14	14	14	14	14	14	14	15	14	14
2	14	14	14	14	15	14	14	14	14	15	15	20	15	14	14	14	14	14	14	14	14	14	14	14
3	15	14	14	14	14	14	14		14	14	15	14	15	14	16	14	14	14	15	14	14	14	14	14
4	14	15	14	14	14	14	14	14	14	14	14	14	14	15	15	14	14	14	14	14	14	14	15	14
5	14	14	15	14	14		14	14		15	14	14	15	33	15		14	14	14	14	14	14	14	14
6	14	14	14	14	14	14	14	14	14	15	15	23	21	16	15	14	14	14	14	14	14	14	15	15
7	15	14	14	14		14	14	14	14	14	15	14	16	14	16		14	14		14	14	14	14	14
8	14	14	14	14	15	14	14	14	15	14	16	16	18	15	15	14	14	14	14	14	14	14	15	14
9	15	14	14	14	14	14	14	14	14	15	14	16	17	14	14	16	14		14	14	14	15	14	15
10	14	24	14	14	14	14	14	14	14	14	14	14	15	14	15	15	14	14	14	14	14	14	14	14
11	14	14	14	14	14	14	14	14	14	14	16	15	16	15				14	14	14	14	15	14	14
12	15	14	14	14	14	14	14	14	14	15	16	15	15	15	15	14	14	14	14	14	14	14	14	14
13	15	14	14	14	14		14	14	14	14	14	17	22	14	14	14	14	14	14	14	14	14	14	15
14	14	14	14	14	14	15	14	14	14	14	15	14	15	20	15	14	14	14	14	14	15	14	15	14
15	14	14	14	14	14	14	14	14	14	15	15	14	15	17	14	14	14	14	14	14	14	14	14	14
16	14	14	14	14	15	14	15	14	15	15	14	14	15	15	14	14	14	14	14	16	14	14	14	15
17	14	15	14	14	14	14	14	14	14	17	15	15	14	16	15	14	14	14	14	14	14	14	14	14
18	14	14	14	14	16	15	14	14	14	15	17	20	15	15	15	16	14	14	14	15	14	14	14	15
19	14	14	15	14	14	14	14	14	14	14	18	16	15	15	15	14	14	14	14	14	14	14	14	14
20	14	14	14	15	14	14	14	14	15	14	14	16	14	15	17	14	14	14	14	14	14	14	14	14
21	14	15	14	14	14	14	14	14	14	14	18	14	14	14	18	14			14	14	14	14	14	14
22	14	14	14	14	14	14	14	14	14	14	17	15	15	18	14	14	15		14	14	14	14	14	14
23	14	14	14	14	14	14	14	14	14	14	16	15	15	20	17	15		14	14	15	14	14	14	14
24	14	14	14	14	14	14	14	14	14	15	16	15	14	15	15	14	14	14	14	14	14	14	14	15
25	15	15	14	14	15	15	14	14	15	15	14	15	16	15	15	15	14	14	14	14	15	14	14	14
26	14	14	14	14	14	14	14	14	14	15	17	15	15	15	15	15	14	14	14	15	14	14	14	14
27	14	15	15	14	14	14	14	14	14	14	15	16	15	15	14	15	14	14	14	14	15	15	14	14
28	14	14	14	14	14	14	15	14			14	17	16	15	14	15	15	14	14	14	14	14	14	14
29	14	14	14	14	14	14	14	14	17	14	15	21	15	15	15	14				14	14	14	14	14
30	14	14	14	14	14	14	14	14	14	14	15	22	15	15	15	14	14	14	14	14	14	14	14	14
31	14	14	15	14	14	14	14	14	14	15	20	15	17	17	15	15	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	31	31	31	31	30	29	31	30	29	30	31	31	31	31	30	28	27	26	29	31	31	31	31	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	16	16	16	15	15	14	14	14	14	14	14	14	14
L Q	14	14	14	14	14	14	14	14	14	14	14	14	15	15	14	14	14	14	14	14	14	14	14	14

HOURLY VALUES OF foF2 AT Kokubunji

MAY 2019

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	A	32	A	30	38	52	49	A		A		A	A	88	66	61	55	104	A	54	51	46	39
2	32	A	36	36	32	38	45	47	53	A		A		58	65	75	69	64	55	54	44	43	43	39
3	42	39	37	32	31	36	50	52	50	56	A		59	62	65	61	55	55	52	51	52	50	51	52
4	51	35	34	31	31	34	47	55	57	56	A	58	A	A	A	N	116	A	64	72	54	58	39	A
5	A	32	A	31	26	54	107	114	119	A	51	A		A	58	54	56	52	83	64	52	51	44	38
6	34	35	32	31	30	37	47	49	54	57	49	53	52	55	58	186			169	124	A	A	51	49
7	A	43	39	A	34	44	53	54	49	A	89	56		55	58	59	59	A	A	67	69	52	54	50
8	A	A	A	A	A	38	A	A	N	A	A		54	A	A	A	149	A	A	74	54	52	46	32
9	32	A	58	34	30	37	47	A	108	88	A	130	A		51	58	64	A	79	58	54	A	A	A
10	A	A	35	34	31	34	47	A	122		A	A	A		58	A	68	149	111	66	A	A	A	A
11	A	A	A	51	47	46	54	N	A	111	108	109	139	71	76	81	84	69	58	54	75	52	A	54
12	A	52	43	A	34	34	A	A	A	A	A			34	A	54	55	54	105	A	52	44	A	A
13	A	A	A	A	A	39	54	55	76	86	N	A	54	54	56	52	56	53	A	54	50	A	A	A
14	42	A	35	A	A	52	122	100	48	A	A	A	A	A	56	78	72	94	99	78	34	A	A	A
15	A	A	31	31	A	A	88	144	A	A	A	A	A	A	A	A	84	A	50	83	103	A	A	A
16	A	34	34	32	27	39	46	A	A	87	A	A	A		52	52	55	51	A	64	A	51	A	A
17	36	A	A	A	34	34	A	A	A	A	118	120	A	A	A	A	47	52	A	63	51	A	A	A
18	A	A	A	36	36	A	A	A	A	A	A	A	A	A	A	56	A	109	85	64	64	A	A	A
19	34	A	34	32	31	39	51	46	A			A	A	A	A		48	A	44	52	51	A	A	34
20	A	A	A	A	26	A	51	51	A	A	A	A	A	A	A	56	53	153	A	67	A	A	A	A
21	A	50	A	A	A	A	47	A	A	A	A	A	A	A	A	A	A	109	52	181	A	39	A	A
22	A	30	32	34	34	A	44	A	51	A	A		A	A	99	A	A	A	A	A	A	A	A	A
23	A	34	A	A	A	A	89	A			111		A	A	A	A	53	58	N	64	54	52	35	34
24	A	34	A	A	A	35	A	111	54	A	A		56	A	63	62	58	58	54	51	51	48	44	A
25	42	44	42	34	34	44	39	A	56	55	A	A	A	A	A		52	57	54	58	75	66	A	A
26	A	A	30	A	A	36	48	A	84	109	N	57	A	A		A	51	A	54	A	51	A	A	A
27	A	32	A	34	32	36	53	A	A	A	A	A	A	A	A	56	52	46	43	A	52	47	A	A
28	A	A	A	39	34	A		A	A	A		A	189	188	A	90	A	A	52	57	51	54	52	A
29	38	34	36	34	34	42	A	A	A	109	78	174	A	A	A	67	73	140	76	80	78	71	54	A
30	A	A	A	A	A	A	A	58	A	140	131	154	109	A	A	61	A	54		A	A	52	A	A
31	A	A	46	A	A	45	48	A	106	A	A	A		A	A		151	54	59	72	78	47	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	14	18	17	21	23	23	14	15	11	8	9	8	8	14	19	25	21	22	25	24	19	12	10
MED	37	34	35	34	32	38	50	54	56	87	98	109	58	56	58	61	58	57	58	64	53	51	46	39
U Q	42	43	39	35	34	44	54	100	106	109	114	142	124	66	65	75	72	101	85	73	66	52	51	50
L Q	34	34	32	31	30	36	47	49	51	56	64	56	54	54	56	56	53	53	52	55	51	47	43	34

HOURLY VALUES OF fEs AT Kokubunji

MAY 2019

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	52	51	38	40	G	26	42	40	51	G	40		50	66	79	G	43	36	114	61	39	25	58	G
2	G	35	33	49	37	32	33	41	48	78	G	46	G	G	G	G	G	G	34	33	24	G	G	G
3	G	G	G	G	G	26	35	40	47	55	41		G	G	48	G	43	77	42	71	80	57	46	40
4	26	29	G	28	28	27	34	41	56	43	41	G	53	70	160	129	72	84	79	55	57	39	34	49
5	39	31	29	G	G	68	71	51	60	73	126	52	G	47	G	42	G	49	40	41	28	G	31	G
6	24	G	G	31	G	33	41	42	55	52	G	50	G	G	G	156			93	129	156	131	40	34
7	33	24	32	43	G	G	37	47	48	64	85	50		G	40	46	51	70	78	78	58	151	45	41
8	72	59	45	51	50	31	41	148	156	84	110		134	62	59	62	78	144	151	34	56	29	G	G
9	G	58	55	29	32	35	45	64	90	79	75	86	56		40	38	40	73	69	48	42	56	57	71
10	59	60	40	34	G	31	41	78	118		78	80	95		39	135	57	137	81	62	80	70	126	87
11	85	91	69	G	G	G	38	127	110	103	106	65	109	G	G	G	G	31	29	G	27	59	69	48
12	59	42	29	38	25	31	42	46	56	57	67			G	53	38	36	61	71	57	42	G	59	57
13	59	80	71	40	81	32	31	47	63	72	132	61	52	G	G	G	43	41	69	55	56	116	111	116
14	69	57	38	40	70	56	85	84	50	50	59	50	53	73	G	G	G	G	34	36	42	35	109	70
15	59	33	24	53	72	65	60	72	144	152	107	83	166	136	92	98	70	60	73	55	111	108	83	65
16	41	26	36	41	G	33	40	121	97	72	79	57	55		G	G	G	40	61	79	110	52	93	73
17	28	59	34	57	G	32	40	55	61	87	97	72	62	84	71	73	36	107	52	52	49	69	54	60
18	72	56	42	28	32	42	57	58	69	50	57	67	59	55	46	39	67	92	108	111	33	56	49	45
19	31	40	G	24	30	31	35	G	50	G	G	63	68	52	48	G	42	45	34	39	39	43	37	57
20	45	40	29	34	G	46	55	50	57	126	59	66	65	42	53	52	46	70	85	60	69	86	59	61
21	104	53	60	91	53	64	39	54	59	65	78	92	75	57	85	102	95	97	35	106	168	112	77	60
22	42	32	33	33	33	45	45	60	53	59	78		79	80	60	40	64	64	71	164	153	113	90	73
23	42	32	41	40	50	53	53	84			85		90	52	41	69	46	57	78	49	56	53	G	34
24	60	33	55	56	47	31	49	71	62	106	65	G	53	54	G	55	53	55	41	34	50	41	43	71
25	27	G	G	G	35	28	36	50	58	56	56	41	47	60	52	G	G	43	40	50	92	45	90	56
26	72	57	33	42	59	33	56	73	78	75	104	G	84	61	G	37	47	64	53	61	78	107	72	57
27	56	38	41	29	28	29	40	55	60	75	65	118	116	104	86	48	G	43	33	72	42	34	65	83
28	73	94	59	26	40	34		127	130	149		66	151	150	105	117	51	55	45	47	39	42	38	54
29	36	29	25	G	25	32	56	144	82	76	124	152	160	85	73	G	69	98	82	58	37	60	65	61
30	58	59	42	54	116	94	71	42	57	110	127	152	140	106	73	53	73	71		124	82	45	71	114
31	69	55	35	40	57	30	41	63	150	65	60	79		54	72		116	45	35	G	24	29	114	43
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	30	31	30	29	30	25	28	28	31	30	30	30	30	31	31	31	31	31
MED	52	40	35	38	32	32	41	55	60	72	76	65	64	56	48	41	46	60	65	55	56	53	59	57
U Q	69	58	42	43	50	45	55	78	90	85	104	81	102	76	73	69	67	77	79	72	80	86	83	71
L Q	31	31	29	28	G	30	38	46	55	55	57	50	52	21	G	G	36	43	40	41	39	35	40	41

HOURLY VALUES OF fmin AT Kokubunji

MAY 2019

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	13	14	14	13	15	14	14	18	21	22		28	25	21	18	15	14	21	14	14	14	13	21
2	21	13	14	13	14	13	13	14	14	21	23	22	33	20	18	22	18	29	13	14	13	13	14	14
3	13	13	13	13	14	15	14	13	14	21	17		43	45	18	13	14	13	15	14	14	14	13	14
4	15	14	15	17	14	14	14	14	15	21	26	45	26	33	22	21	25	13	13	14	13	13	13	14
5	13	13	14	14	14	13	13	13	21	22	22	28	22	23	21	21	17	13	14	13	13	13	14	14
6	15	17	14	14	14	13	14	14	20	21	30	30	44	26	23	18			13	15	14	13	13	14
7	13	14	14	15	14	18	14	21	22	21	22	35		45	44	21	17	17	13	14	14	14	13	13
8	13	13	14	14	13	13	15	13	18	17	29		34	34	33	30	17	15	13	13	13	13	14	18
9	17	14	13	14	14	13	13	14	18	23	22	28	28		34	45	18	14	13	13	14	17	13	14
10	14	13	14	13	14	14	14	18	15		22	21	31		22	22	15	15	14	13	14	14	14	13
11	13	14	13	14	14	17	14	15	18	22	21	31	48	31	44	21	18	14	14	13	13	13	14	13
12	13	13	13	13	15	13	14	13	14	20	23			22	34	18	17	14	13	13	13	15	13	13
13	13	17	13	13	14	13	13	14	18	30	31	30	30	23	22	42	28	15	14	13	13	14	13	14
14	13	14	14	13	14	13	14	15	18	23	29	23	34	30	45	42	17	24	14	13	13	14	14	13
15	14	14	14	13	13	13	14	13	18	20	26	34	30	24	23	15	25	13	13	14	17	14	14	13
16	13	13	14	13	14	13	14	17	20	26	30	28	22		20	43	18	22	14	13	13	14	13	14
17	14	14	14	14	14	13	14	15	20	33	30	22	23	28	23	24	29	14	14	14	13	14	14	14
18	13	13	14	14	14	14	13	14	17	23	31	31	22	30	30	31	14	18	13	14	13	13	13	13
19	14	14	14	14	14	17	18	18	17	23	31	25	29	29	17	18	14	14	14	14	14	14	14	14
20	13	13	14	14	14	13	14	14	18	23	28	23	22	21	18	31	17	17	14	13	14	14	14	14
21	13	13	14	13	13	13	13	14	15	18	23	21	24	21	22	21	15	13	13	13	13	14	13	13
22	14	13	14	13	14	13	13	15	14	17	23		25	23	21	18	18	20	14	13	15	14	13	13
23	13	13	13	13	14	14	18	14			25		28	28	23	18	17	14	13	15	14	14	14	13
24	13	13	14	14	14	13	14	18	26	29	20	24	24	28	44	18	18	14	13	13	13	14	14	13
25	13	14	17	14	14	13	13	14	17	22	31	30	30	29	34	20	14	14	13	14	14	14	13	13
26	14	13	13	14	15	13	13	13	15	20	30	46	30	22	26	18	14	14	14	17	14	14	13	13
27	13	13	13	13	13	14	14	15	18	23	18	29	28	30	28	22	18	17	13	13	13	13	13	13
28	14	14	13	14	14	13		18	15	21		29	29	25	23	18	18	14	15	13	14	14	13	13
29	13	14	14	13	13	15	13	17	17	21	22	24	29	26	21	18	14	13	13	14	14	14	14	14
30	14	13	14	14	13	13	13	15	17	21	23	26	22	18	20	17	14	13		14	14	13	14	14
31	13	14	14	14	13	13	13	15	17	22	24	24		21	22		18	13	14	17	13	13	15	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	31	31	31	31	31	31	30	31	30	29	30	25	28	28	31	30	30	30	30	31	31	31	31	31
MED	13	13	14	14	14	13	14	14	18	21	24	28	28	26	23	21	17	14	14	14	14	14	13	14
U Q	14	14	14	14	14	14	14	15	18	23	30	30	30	30	33	24	18	17	14	14	14	14	14	14
L Q	13	13	13	13	13	13	13	14	15	21	22	23	24	22	21	18	15	13	13	13	13	13	13	13

HOURLY VALUES OF foF2 AT Yamagawa

MAY 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	A	A	A	A	A	24	40	49	A	A	51	A	58	59	69	72	72	187	64	54	53	A	A	A
2	42	38	36	34	36	N	29	51	A	51	51	54	58	75	86	90	94	78	58	54	52	42	42	44
3	47	42	41	38	N	B	42	51	51	51	A	A	66	82	71	57	54	54	55	54	67	62	53	51
4	47	42	38	35	31	32	46	54	51	A	A	65	58	53	A	102	64	50	62	72	72	A	A	42
5	38	36	31	34	31	30	39	54	169	A	A	54	60	A	65	71	87	146	A	106	65	48	40	38
6	A	36	32	29	A	59	44	52	56	54	55	A	55	61	79	A	64	54		A	43	53	A	A
7	42	42	38	36	34	32	51	50	A	A	58	57	64	67	70	65	64	71	68	54	75	59	46	A
8	A	A	A	A	34	26	36	64	54	A	A	A	57	50	54	54	60	78	A	A	A	A	A	42
9	42	40	34	34	32	29	40	A	A	A	61	A	56	55	51	58	72	81	65	52	54	A	A	A
10	A	A	36	A	A	34	44	51	A	A	54	A		106	64	78	78	77	77	72	73	48	A	A
11	A	34	A	46	36	34	47	51	71	62	100	65	A	A	70	81	86	81	60	58	A	A	A	A
12	A	48	53	42	A	38	A	A	A	123	A	189	105	A	A	A	A	A	51	51	51	42	A	A
13	37	34	34	A	A	A	40	52	49	A	A	100	56	60	54	56	60	60	50	64	67	A	A	A
14	A	A	A	A	A	A	47	77	A	A	A	A	A	A	68	86	78	91	78	88	23	A	A	A
15	A	A	A	A	A	A	A		A	181	A	A	A	A	50	51	51	A	A	A	44	A	A	A
16	A	A	A	34	25	A	45	A	A	A	A	A	A	A	A	61	58	55	122	A	A	A	A	A
17	A	A	A	A	A	A	42	A	54	A	105	A	A	65	66	71	66	64	A	73	77	A	A	A
18	25	A	A	A	A	28	42	189	104	48	A	A	82	A	54	57	68	71	N	A	75	58	51	A
19	A	A	A	A	A	32	44	50	A	A	A	A	A	A	A	48	50	50	51	60	66	50	A	34
20	A	A	29	A	28	30	44	51	A	52	A	A	A	A	A	A	71	67	50	64	50	A	38	A
21	A	36	A	A	A	28	46	A	53	189	105	85	78		100	A	63	66	70	76	49	A	A	A
22	A	A	A	A	A	A	41	A	A	A	A		A	A	A	A	A	A	A	54	A	A	52	A
23	42	A	A	A	A	30	A	A	89	105	A	A	A	A	A	A	56	58	69	A	A	49	A	A
24	A	30	A	A	24	32	40	A	102	89	N	139	A	A	A	75	82	77	A	54	A	A	A	A
25	42	39	34	32	34	32	A	51	A	A	98	A	A	A	A	A	51	A	A	52	109	A	A	A
26	A	A	A	A	A	A	33	42	A	106	N	A	103	A	108	A	70	79	77	72	66	51	39	42
27	42	51	36	A	A	30	23	42	A	A	A		A	A	A	A	A	61	62	54	64	58	52	50
28	48	42	42	42	38	30	A	A	A	A	A	A	A	A	A	A	51	54	54	51	53	55	42	40
29	A	A	A	A	A	A	44	54	A	86	123		A	A	60	60	67	68	76	82	72	54	A	A
30	A	52	A	42	A	A	47	54	50	A	A	103	110	189	A	A	85	A	A	A	A	A	A	A
31	A	A	A	A	34	35	46	A	106	126	A	A	A	A	A	62	66	56	63	77	78	51	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	16	14	13	13	20	26	20	14	14	11	10	15	12	18	20	28	26	21	24	24	15	10	9
MED	42	40	36	35	34	31	43	51	55	88	61	75	60	63	67	64	66	68	63	59	66	51	44	42
U Q	44	42	38	42	35	33	46	54	102	123	105	103	82	78	71	76	75	78	73	72	72	58	52	47
L Q	40	36	34	34	29	29	40	50	51	52	54	57	57	57	54	57	59	56	54	54	51	48	40	39

HOURLY VALUES OF fEs AT Yamagawa

MAY 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	92	60	45	60	70	50	27	36	59	71	50	81	113	50	48	G	G	G	29	24	29	54	46	58
2	25	35	29	G	G	G	29	41	60	51	45	51	41	42	G	43	43	40	32	G	G	G	30	32
3	26	G	G	G	G	B	28	35	40	49	48	107	46	44	G	39	49	50	50	58	39	49	37	35
4	45	46	34	27	G	G	36	41	46	59	59	55	49	57	107	82	60	56	43	33	33	79	92	43
5	30	36	G	G	G	25	29	41	81	92	85	51	68	89	66	67	106	140	143	92	49	36	35	G
6	46	G	G	28	36	G	35	47	51	45	106	51	52	52	76	110	108	67		116	58	169	56	47
7	41	25	26	25	45	G	G	59	73	70	51	68	46	48	49	45	42	44	44	35	26	40	27	45
8	91	72	109	54	33	G	59	44	61	88	100	63	52	50	49	48	38	48	91	111	174	110	69	46
9	29	48	34	28	29	G	161	55	60	57	50	68	55	55	45	G	51	66	58	47	48	84	59	57
10	69	55	34	40	83	56	31	46	54	75	54	109		104	60	52	G	40	41	40	45	28	55	72
11	70	26	70	28	57	33	32	36	45	58	98	58	108	90	46	42	45	G	29	36	79	66	60	60
12	49	43	55	41	92	35	46	115	69	82	59	152	85	144	125	115	92	87	46	41	36	114	31	92
13	31	35	28	57	41	58	32	39	44	56	58	99	55	44	G	41	39	39	40	34	49	59	40	33
14	41	60	60	57	34	30	39	72	74	101	82	74	76	74	64	40	48	70	71	47	34	45	112	115
15	84	58	58	58	50	98	59		145	143	128	110	86	60	41	52	50	60	69	76	35	93	69	93
16	108	72	82	38	G	35	35	53	106	84	85	94	67	50	60	54	45	48	84	172	175	113	106	92
17	50	58	69	71	60	50	36	56	54	83	108	97	74	53	79	85	59	57	59	49	146	105	91	110
18	59	44	65	43	49	26	32	53	106	53	59	93	75	49	48	53	49	48	54	110	29	45	39	69
19	58	58	45	41	47	G	29	45	69	45	69	65	74	61	59	45	46	48	45	49	39	30	48	36
20	82	39	G	30	G	G	34	52	94	69	176	59	111	70	63	56	44	58	57	49	38	40	30	53
21	73	44	83	81	90	40	39	59	78	70	95	94	93		163	90	42	40	44	34	59	56	56	39
22	41	56	72	45	40	40	40	79	76	77	95		148	148	147	47	56	90	142	76	124	67	58	60
23	50	49	54	38	40	G	45	69	83	95	136	127	126	106	58	60	54	54	78	112	116	85	59	50
24	48	31	60	35	27	G	40	60	93	92	166	162	124	126	92	58	93	60	69	45	133	92	92	60
25	38	G	38	32	32	G	67	53	77	73	78	55	125	72	127	92	45	60	134	60	122	70	115	59
26	45	55	57	32	49	41	42	92	84	97	170	150	132	126	112	64	48	49	49	55	29	35	54	29
27	34	30	38	40	49	40	33	56	78	65	71		122	105	147	114	130	69	49	34	50	36	40	41
28	30	32	28	26	28	25	50	81	142	116	145	109	119	138	112	51	G	38	G	38	34	44	43	46
29	45	70	59	59	49	60	45	73	60	59	92		169	132	49	41	G	34	40	61	36	44	84	110
30	72	33	52	41	39	39	33	45	59	77	125	73	114	142	112	118	100	72	92	74	124	88	111	92
31	72	108	57	92	32	26	54	91	99	167	175	75	112	76	90	84	53	46	53	72	111	53	33	128
	00	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	30	31	30	31	31	31	28	30	30	31	31	31	31	30	31	31	31	31	31
MED	48	44	52	40	40	28	36	53	73	73	85	78	86	71	63	53	48	50	52	49	48	56	56	57
U Q	72	58	60	57	49	40	45	69	84	92	125	108	119	106	112	84	59	66	71	76	116	88	84	92
L Q	38	32	29	28	28	G	32	44	59	58	59	61	55	50	48	43	42	40	43	36	34	40	39	41

HOURLY VALUES OF fmin AT Yamagawa

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

HOURLY VALUES OF foF2 AT Okinawa

MAY 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	36	31	A	30	A	A	A	35	A	A	A	58	65	75	81	90	96	90	68	63	53	54	42	42
2	A	A	39	36	A	26	42	A	A	A	A	58	79	102	116	120	122	107	101	78	67	54	54	54
3	52	50	63	40	N		34	60	54	A	A	60	78	86	78	66	60	58	63	66	52	53	54	A
4	44	53	42	40	A	26	42	53	A	A	A		85	75	80	85	74	66	67	75	78	54	40	38
5	40	A	34	35	A	N	40	52	68	A	A	A	77	85	91	87	74	73	81	76	A	A	A	A
6	31	A	A	A	B	A	38	50	A	104	58	70	A	A	A	A	A	76	77	86	74	50	A	A
7	44	45	A	38	A	A	44	A	A	A	189	109	A	86	88	87	86	86	87	91	88	78	37	32
8	A	A	A	A	69	59	34	75	A	A	A	A	A	72	90	A	77	83	92	86	88	72	42	A
9	A	A	A	A	30	A	A	53	66	61	64	57	71	77	72	78	94	102	80	71	55	A	A	51
10	A	A	A	A	A	A	47	47	A	54	59	60	64	67	78	A	95	94	90	90	84	48	A	37
11	A	A	A	29	A	26	A	52	66	A	62	65	75	77	68	87	97	82	78	75	74	A	A	54
12	54	A	A	46	A	A	A	41	A	A	A	A	A	A	55	61	63	60	60	64	52	A	A	A
13	32	28	A	A	A	A	41	46	42	51	55	57	66	A	64	65	67	A	A	75	65	36	A	34
14	35	A	A	30	26	29	42	49	50	A	A	A	A	87	A	96	91	90		A	A	A	A	A
15	A	A	A	A	A	26	41	A	A	A	A	A	A	A	57	100	A	A	A	A	A	A	A	A
16	51	50	42	34	34	29	42	A	A	A	A	A	A	A	61	71	75	A	50	A	52	A	A	A
17	A	A	A	A	A	A	44	58	55	A	A	A	A	A	90	85	90	89	A	97	A	A	A	A
18	A	A	A	A	A	A	A	48	51	A	A	A	A	A	89	74	80	85	87	88	86	52	A	41
19	43	A	A	A	A	A	45	73	A	169	B	B	B	B	B	B	B	B	B	B	B	B	B	B
20	B	B	B	B	B	B	B	B	A	46	A	A	A	56	55	70	82	86	A	A	A	A	A	A
21	A	A	A	A	A	A	41	44	52	60	A	127	A	48	52	62	72	84	85	94	48	A	A	A
22	A	A	A	A	59	A	40	43	A	119	104	A	49	54	64	A	A	A	A	A	54	A	A	A
23	43	38	34	34	28	59	A	57	89	A	A	A	A	49	49	51	60	63	A	A	74	A	A	A
24	A	A	A	A	A	A	A	A	A	A	A	A	A	75	A	A	104	100	103	61	54	40	A	A
25	34	32	A	30	A	A	41	54	A	72	A	A	A	A	59	66	71	72	78	84	83	A	A	A
26	A	A	A	25	B	N	34	44	A	55	57	A	A	A	55	A	75	88	86	A	51	51	41	40
27	37	39	A	A	A	A	A	A	A	A	A	A	A	A	86	153	A	A	A	A	60	62	A	54
28	54	52	48	48	42	29	40	58	A	A	A	A	A	A		A	58	67	73	72	73	54	40	N
29	34	36	28	A	32	A	48	A	189	A	A	A	51	67	72	71	A	78	87	85	73	58	54	54
30	A	49	46	38	A	A	34	A	A	A	71	A	A	92	106	A	A	109	A	85	74	72	66	47
31	50	47	48	41	42	40	42	54	A	A	61	A	A	A	74	76	81	75	80	87	71	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	17	13	10	16	9	10	22	22	11	10	10	10	11	18	26	22	24	25	21	22	25	16	10	13
MED	43	45	42	36	34	29	41	52	55	60	62	60	71	75	73	77	78	84	80	81	71	54	42	42
U Q	50	50	48	40	50	40	42	57	68	104	71	70	78	86	88	87	92	90	87	87	76	60	54	54
L Q	34	34	34	30	29	26	40	46	51	54	58	58	64	67	59	66	71	72	70	72	53	50	40	37

HOURLY VALUES OF fEs AT Okinawa

MAY 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	28	30	45	28	43	50	43	41	51	113	90	54	104	73	43	G	G	G	G	26	28	G	28	58
2	94	70	36	33	40	38	39	56	70	58	76	51	54	48	G	G	38	G	58	50	G	G	G	G
3	G	27	G	36	27	G	95	36	45	58	56	50	59	46	50	54	46	50	46	51	46	44	52	39
4	26	26	G	25	39	G	33	78	116	157	128		46	46	G	43	G	44	41	32	34	20	24	G
5	G	41	59	28	52	30	36	36	44	77	111	142	63	57	56	50	61	66	71	44	70	81	60	46
6	30	58	39	45	B	29	32	35	106	91	56	143	112	76	124	167	89	56	47	G	40	92	91	57
7	38	41	55	34	36	55	40	51	55	69	89	125	180	54	52	67	63	52	44	30	31	11	G	G
8	46	72	132	69	32	G	28	57	71	73	77	70	64	66	90	94	54	59	107	59	55	59	61	60
9	70	71	58	49	29	94	46	44	43	42	44	56	49	41	59	39	G	39	31	27	60	59	69	46
10	110	90	69	72	46	69	29	43	60	128	89	45	53	53	57	110	64	40	39	35	25	35	40	45
11	48	56	41	59	57	46	39	44	53	78	60	52	46	50	G	40	G	G	39	G	44	59	59	49
12	40	94	91	G	93	89	49	35	170	72	80	93	89	103	57	40	G	34	G	29	31	41	38	40
13	26	41	39	46	56	58	38	93	106	42	50	77	48	85	51	65	60	78	77	28	21	G	40	46
14	G	40	39	30	G	G	27	36	42	70	110	100	146	87	84	73	88	74		147	127	74	70	70
15	44	45	36	48	134	32	38	160	116	146	152	142	143	102	61	100	83	94	116	106	92	60	66	58
16	48	45	28	G	G	25	32	60	76	78	88	150	96	162	53	44	G	62	48	129	146	146	116	82
17	136	93	90	55	46	57	40	67	73	82	66	118	82	110	86	96	145	57	126	178	94	92	108	70
18	109	60	71	88	35	44	45	43	161	85	146	59	88	74	84	57	44	58	57	53	24	22	39	34
19	39	47	54	56	52	36	27	38	85	G	B	B	B	B	B	B	B	B	B	B	B	B	B	B
20	B	B	B	B	B	B	B	B	67	46	68	48	55	51	49	58	55	72	85	75	113	115	59	59
21	60	69	58	58	47	138	32	37	113	52	160	115	156	50	54	74	49	61	54	40	54	33	35	49
22	39	27	39	36	24	71	32	78	145	115	89	72	48	144	G	72	58	91	112	60	144	151	111	58
23	25	35	27	31	G	36	60	51	92	109	107	109	92	51	50	49	48	55	72	71	58	128	69	60
24	58	41	53	34	66	34	48	91	88	93	110	108	93	93	124	108	62	71	110	45	32	29	47	48
25	35	34	37	31	33	37	94	154	70	46	116	125	136	145	57	52	46	58	69	94	107	127	128	92
26	72	50	36	27	B	G	32	43	59	73	65	92	47	50	48	76	48	42	52	71	84	40	G	G
27	28	36	44	40	94	38	40	70	60	130	140	108	164	100	84	145	155	122	103	65	44	52	59	45
28	35	27	26	G	G	G	28	42	58	76	111	169	125	127		146	105	37	33	58	G	20	G	G
29	28	27	G	46	32	69	124	72	138	150	112	109	48	49	91	47	78	62	62	39	48	56	38	65
30	90	56	35	45	67	36	38	70	69	69	81	94	109	74	88	133	113	88	92	60	45	69	57	35
31	26	46	30	G	59	G	35	94	57	73	69	77	90	93	59	44	39	85	59	49	39	136	46	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	30	30	30	30	28	30	30	30	31	31	30	29	30	30	29	30	30	30	29	30	30	30	30	30
MED	39	45	39	36	42	36	38	51	70	76	89	94	88	74	57	62	54	58	58	50	46	58	54	48
U Q	60	60	58	49	56	57	45	72	106	109	111	121	112	100	84	96	78	72	88	71	84	92	69	59
L Q	28	35	35	28	30	25	32	41	57	58	68	57	53	50	49	44	39	42	42	32	31	29	38	39

HOURLY VALUES OF fmin AT Okinawa

MAY 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	15	14	14	14	14	15	14	14	14	16	17	17	18	20	20	18	14	14	14	14	14	14	14	14
2	14	14	14	15	14	14	14	14	14	17	18	22	20	21	21	18	14	14	14	14	14	15	14	14
3	15	14	15	14	14	131	14	14	14	15	16	18	20	21	20	17	15	14	14	14	14	14	14	14
4	14	14	15	14	14	17	14	14	14	14	17		20	26	20	20	14	14	14	14	14	15	14	15
5	14	14	14	14	14	14	14	14	14	14	17	20	24	22	20	18	16	14	14	14	14	15	14	14
6	15	14	14	14	B	15	14	14	17	16	18	23	21	23	22	17	15	16	14	14	14	14	15	14
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19	15	14	14	15	14	14	15	14	14	160	B	B	B	B	B	B	B	B	B	B	B	B	B	B
20	B	B	B	B	B	B	B	B	14	14	15	21	20	20	18	16	14	14	14	14	18	14	14	14
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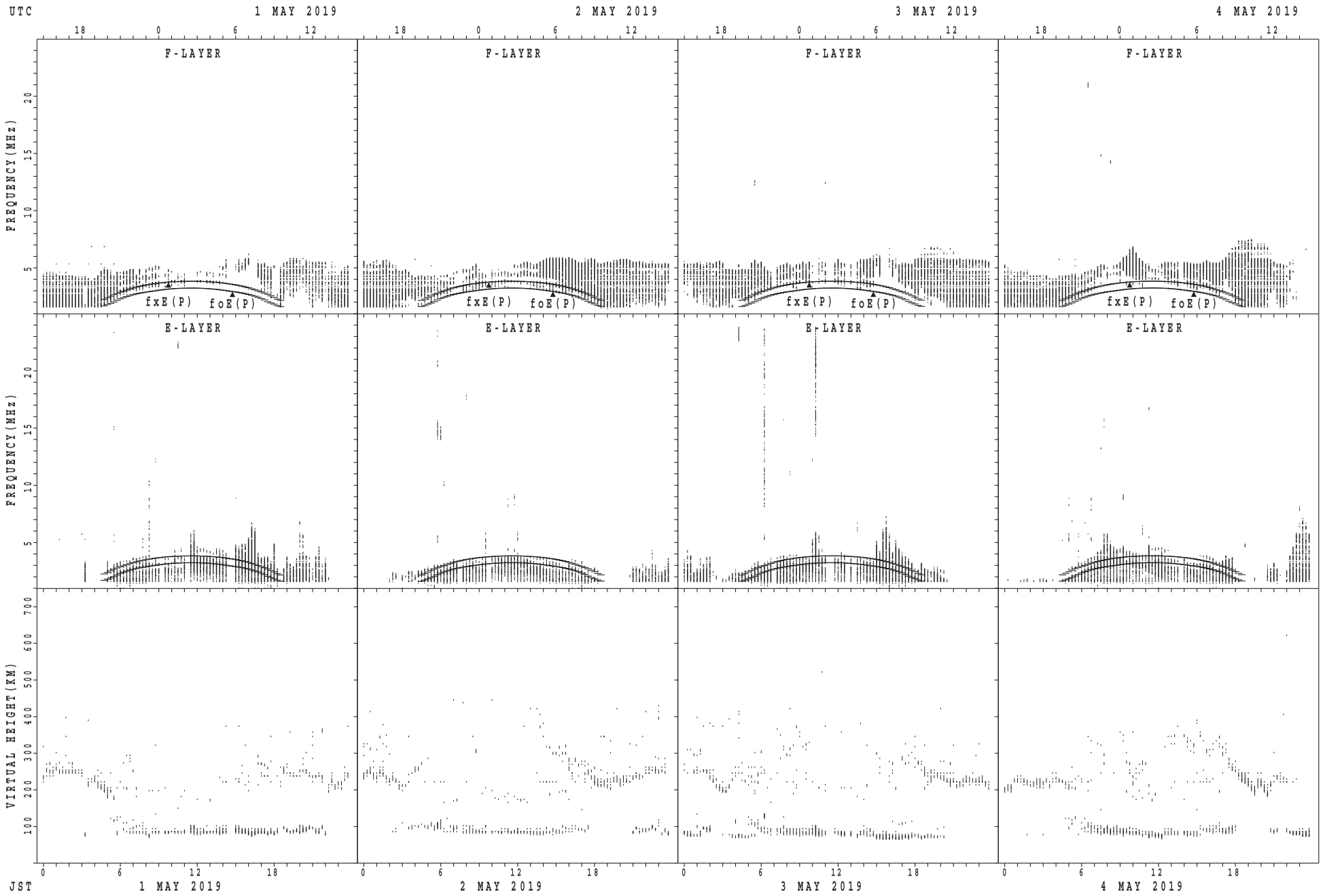
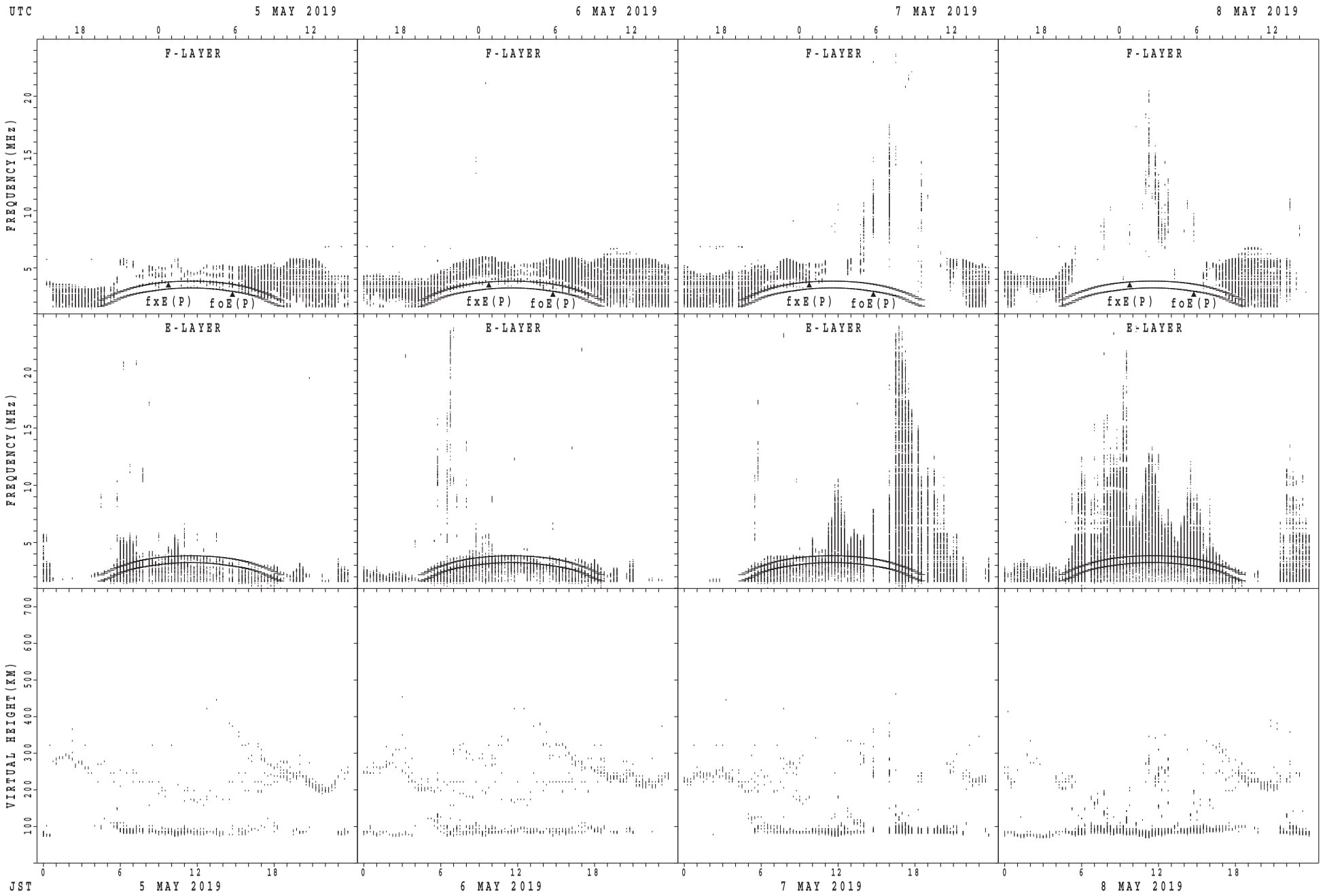
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	28	30	30	30	31	31	30	29	30	30	29	30	30	30	29	30	30	30	30	30
MED	14	14	14	14	14	14	14	14	14	15	17	20	20	20	20	18	15	14	14	14	14	14	14	14
U Q	15	14	14	14	14	15	14	14	14	16	18	21	21	21	20	18	15	14	14	14	14	14	14	14
L Q	14	14	14	14	14	14	14	14	14	14	17	17	18	20	18	17	14	14	14	14	14	14	14	14

SUMMARY PLOTS AT Wakkanai



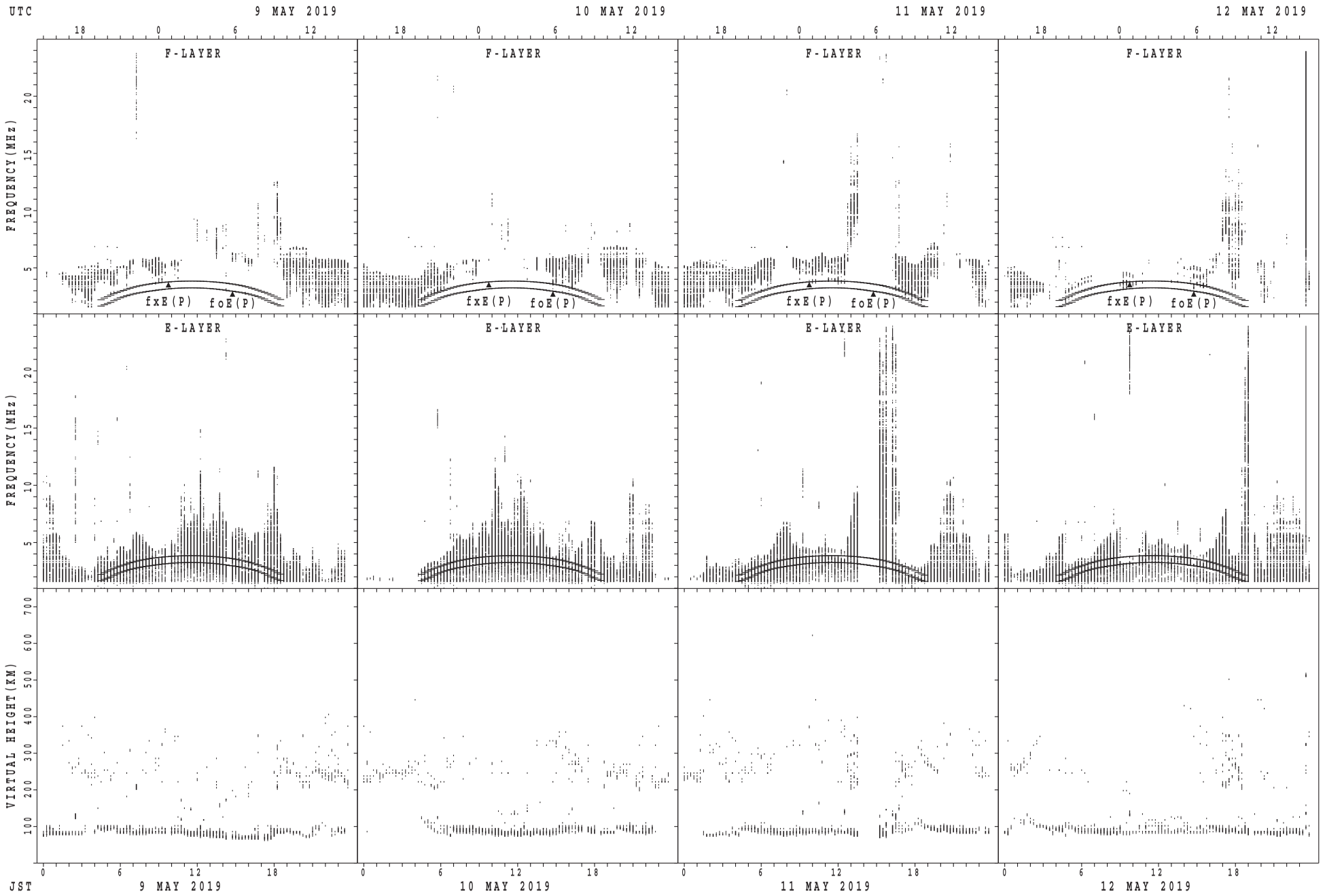
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



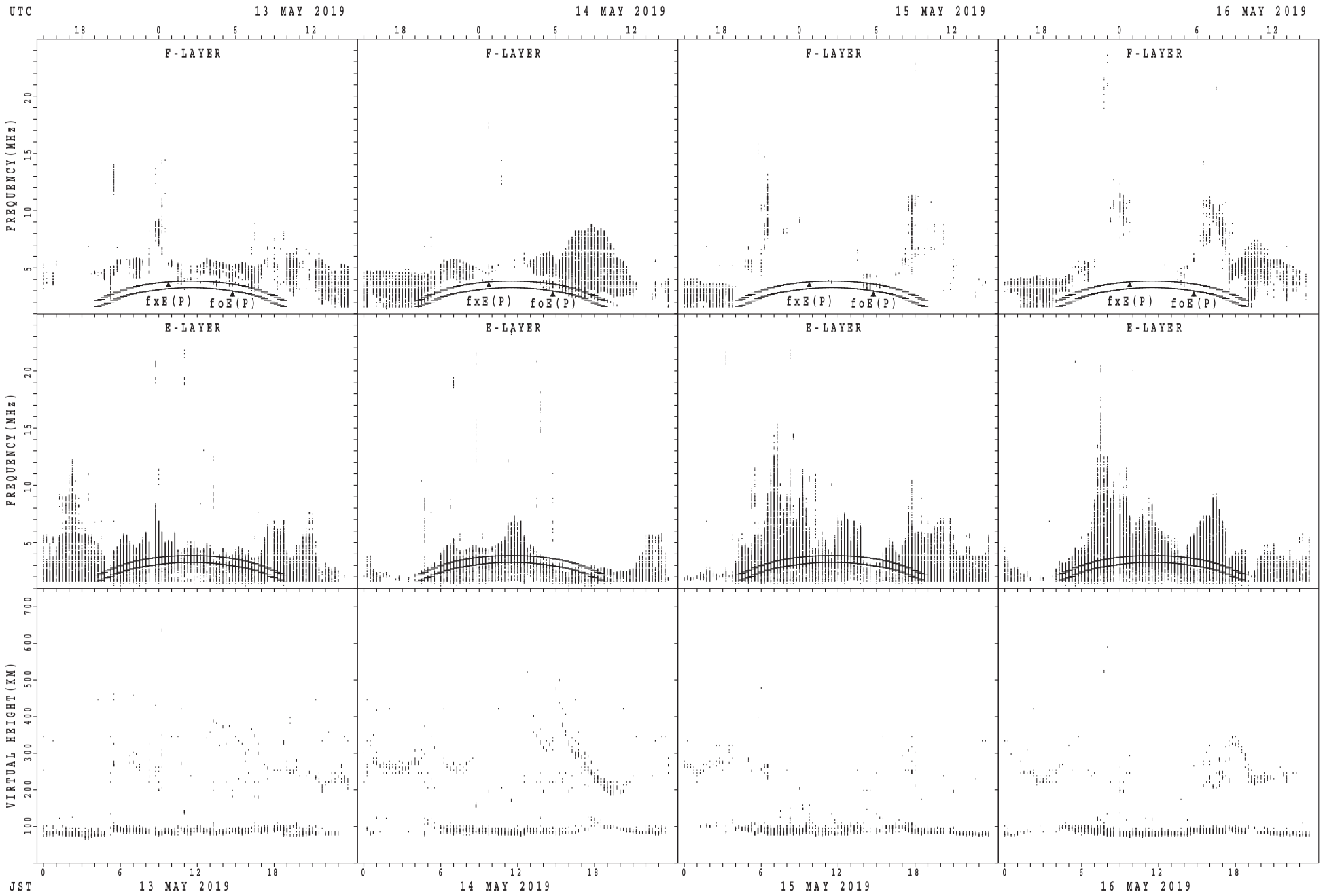
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



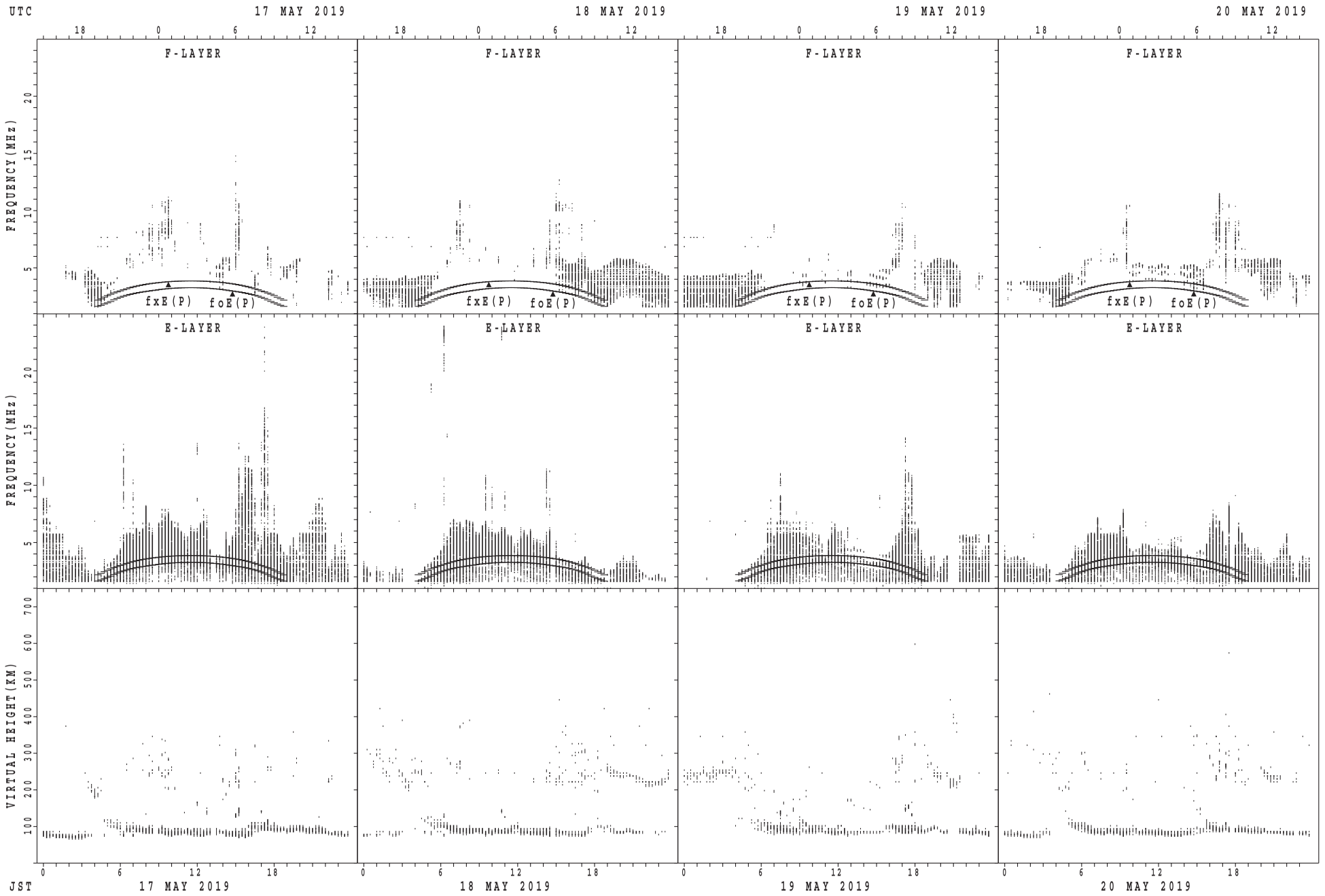
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



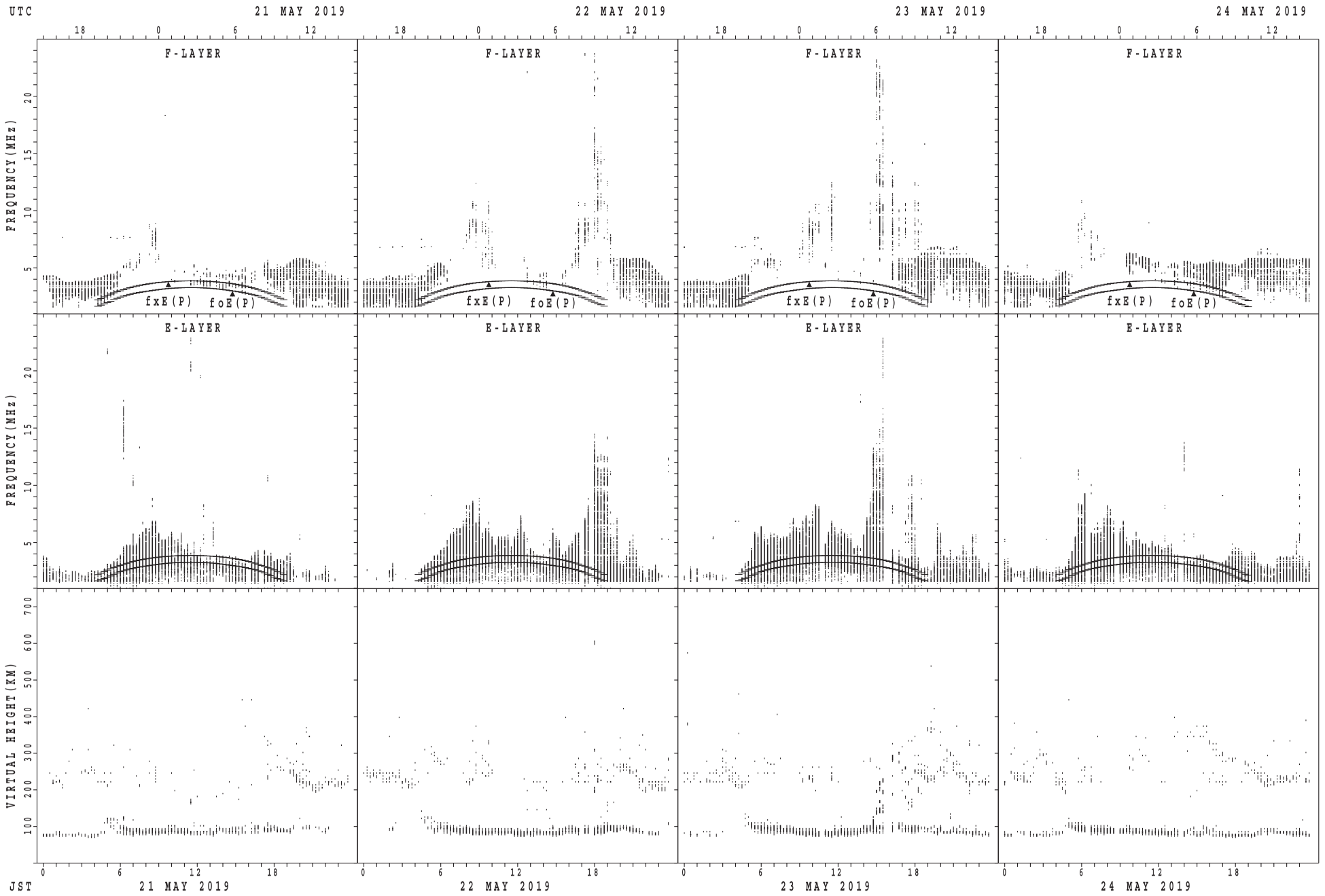
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



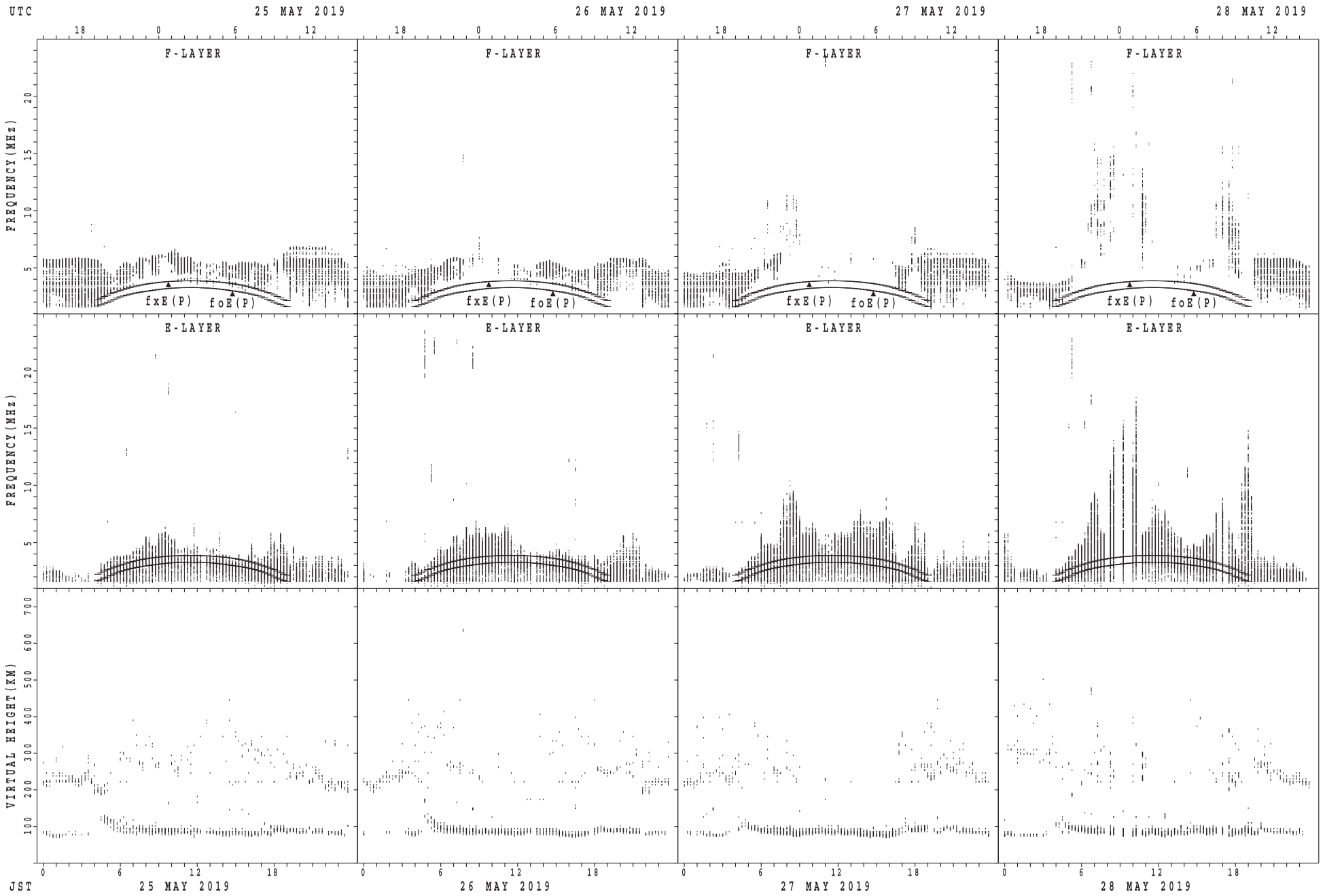
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



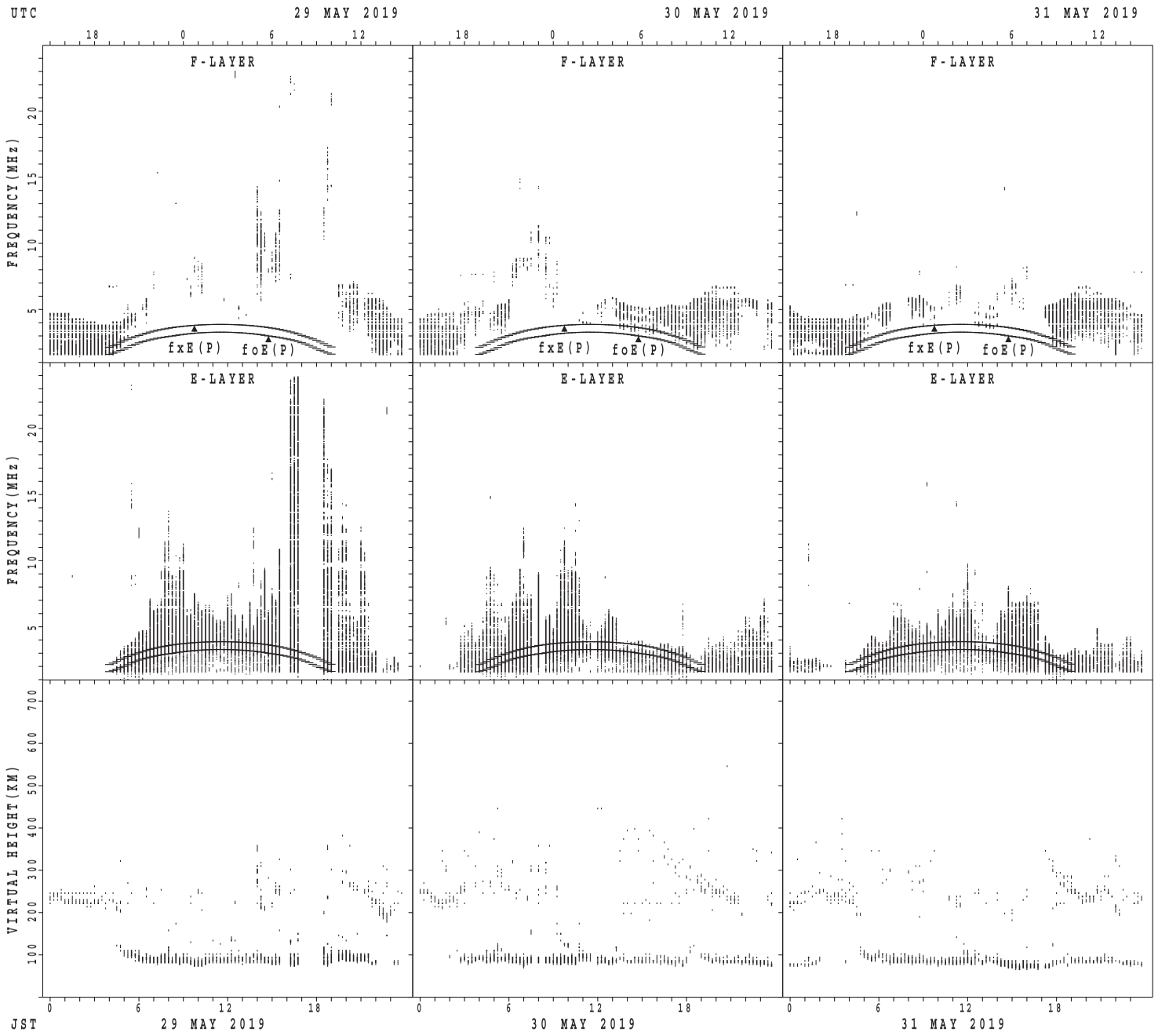
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



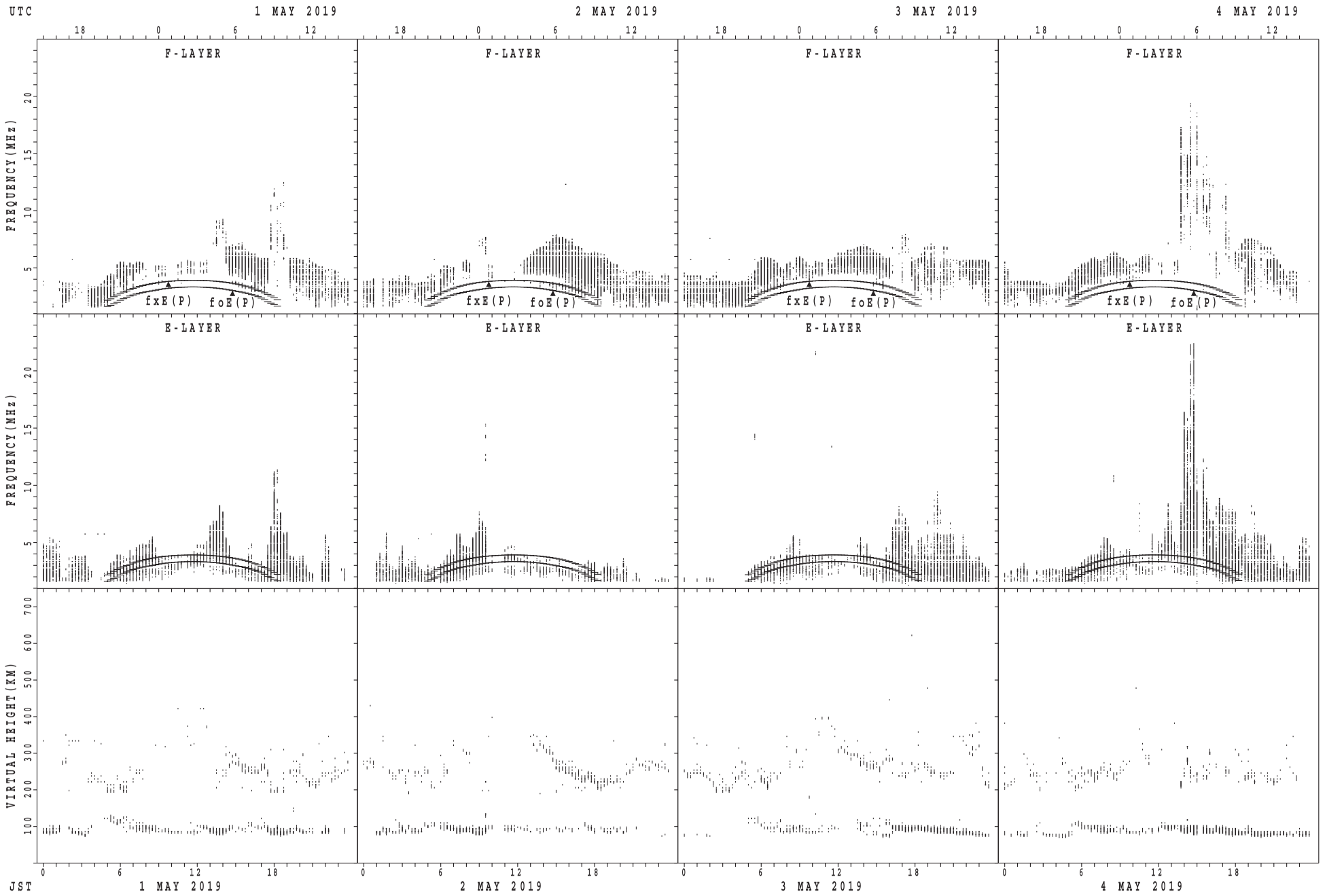
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



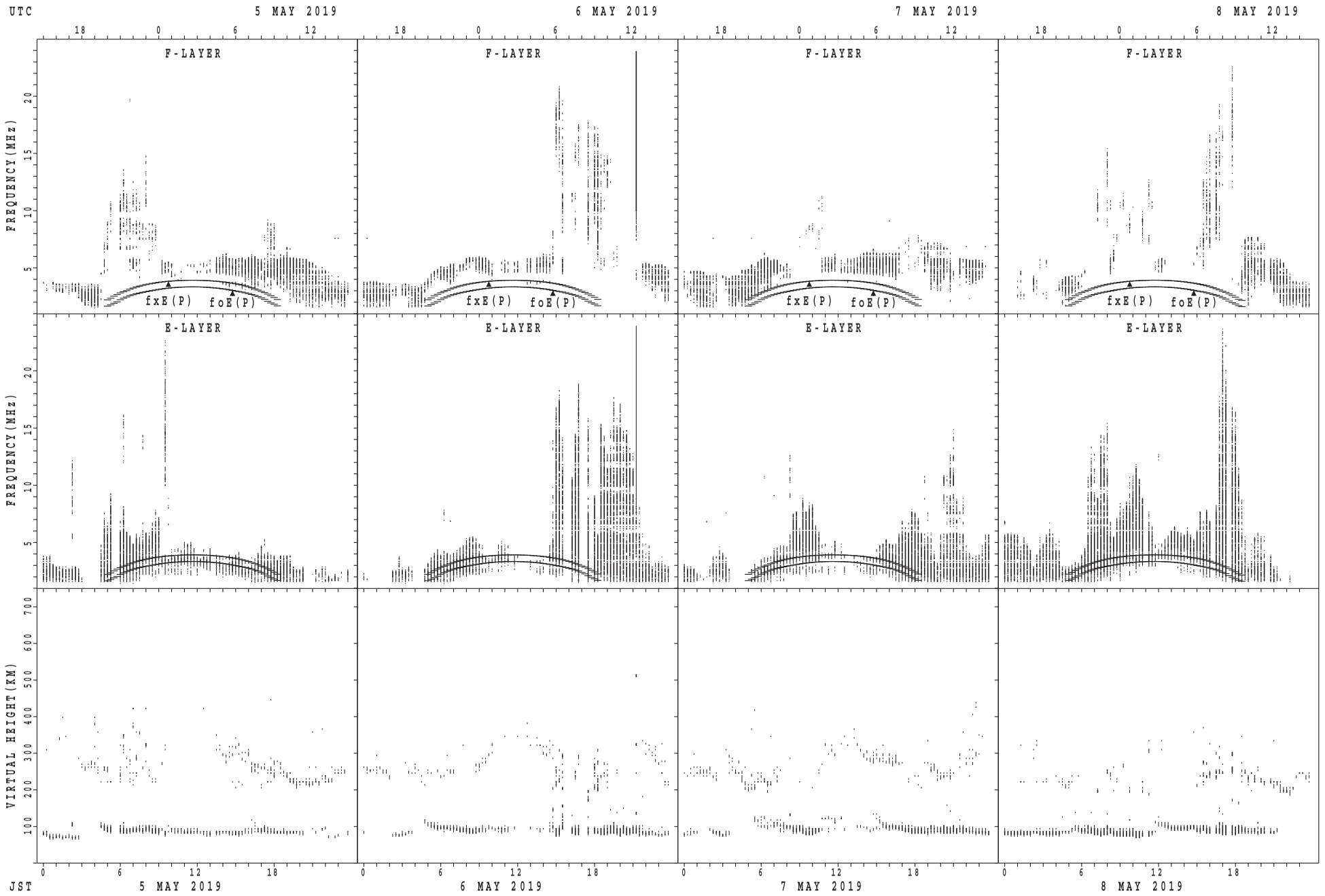
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji

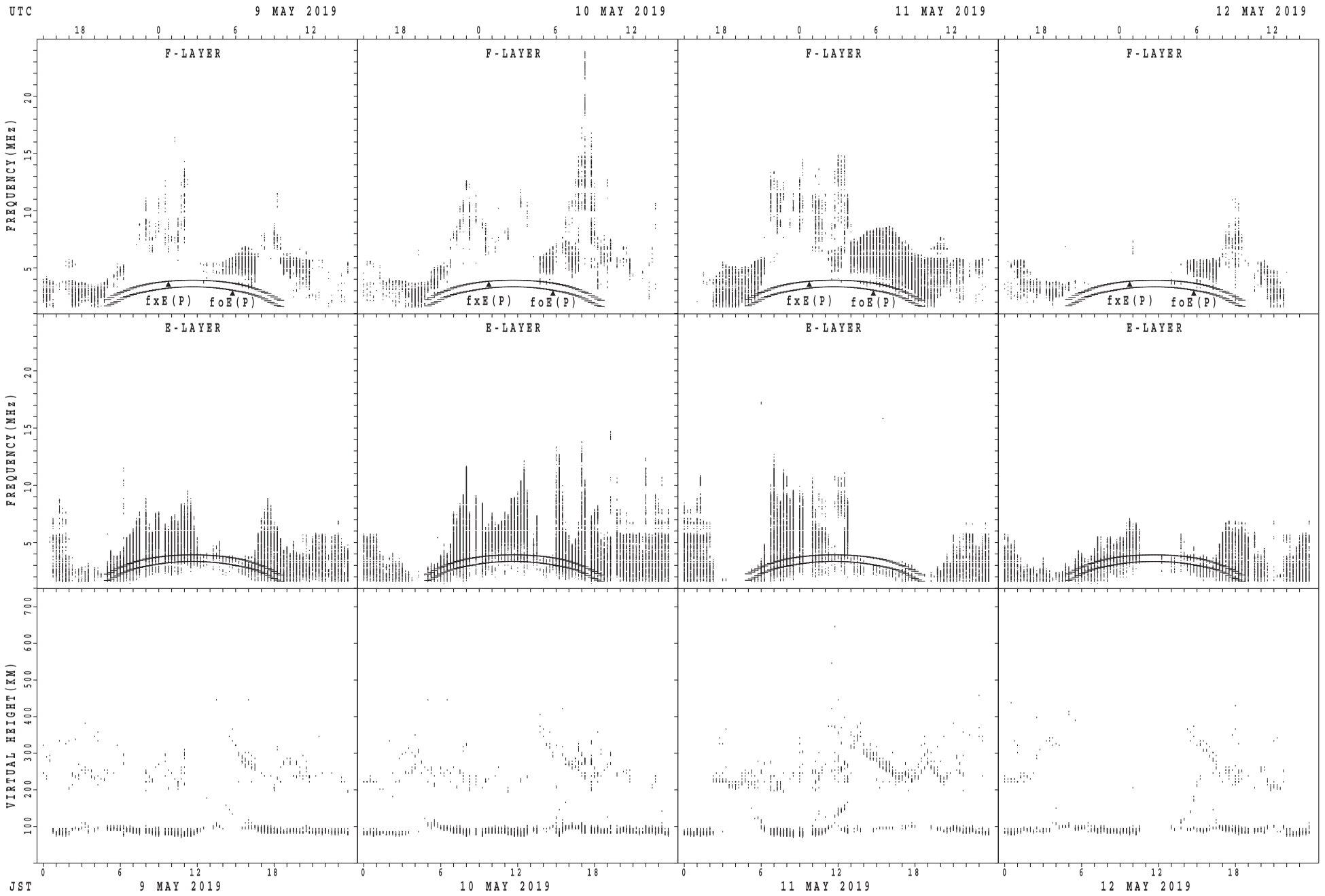


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji

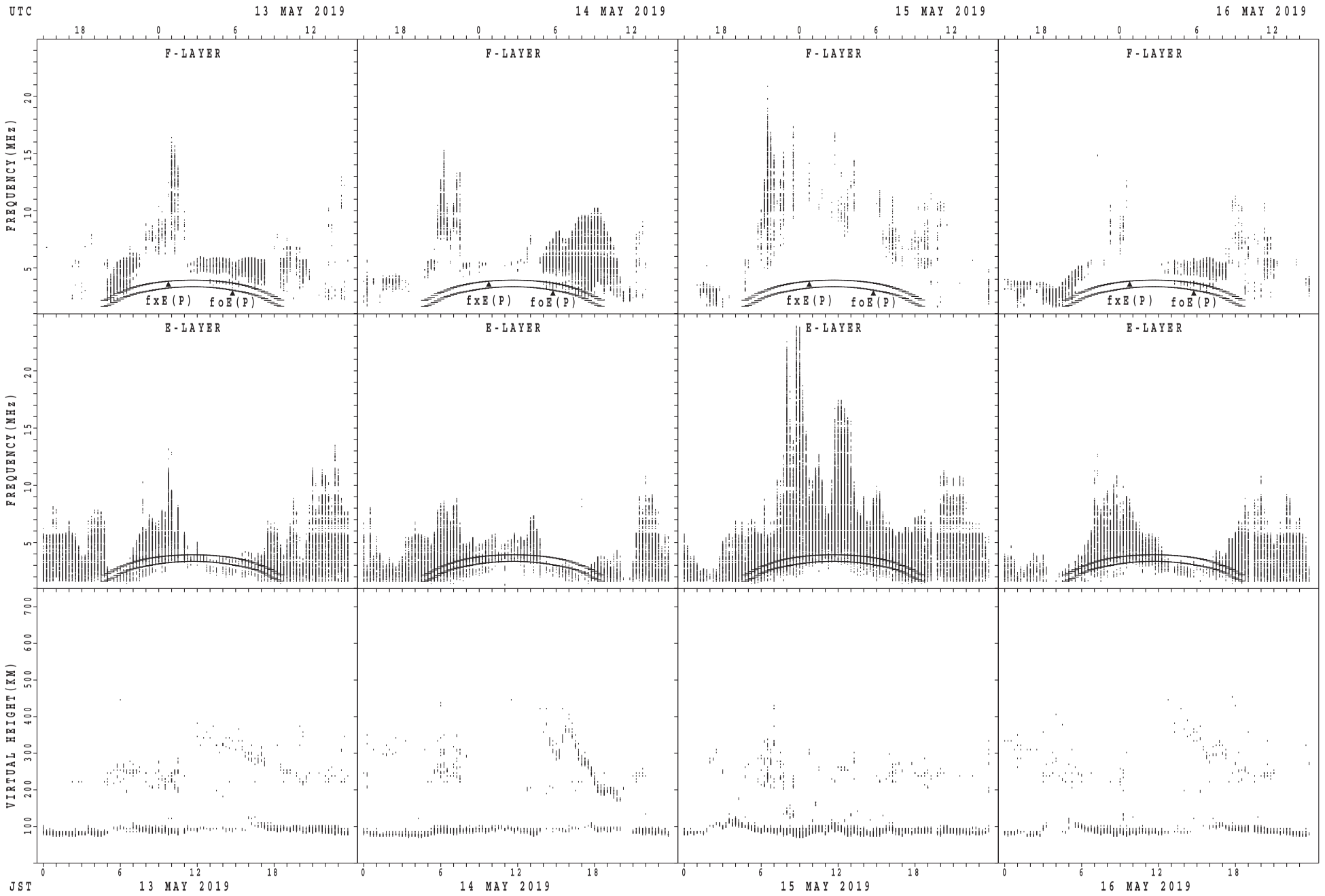


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

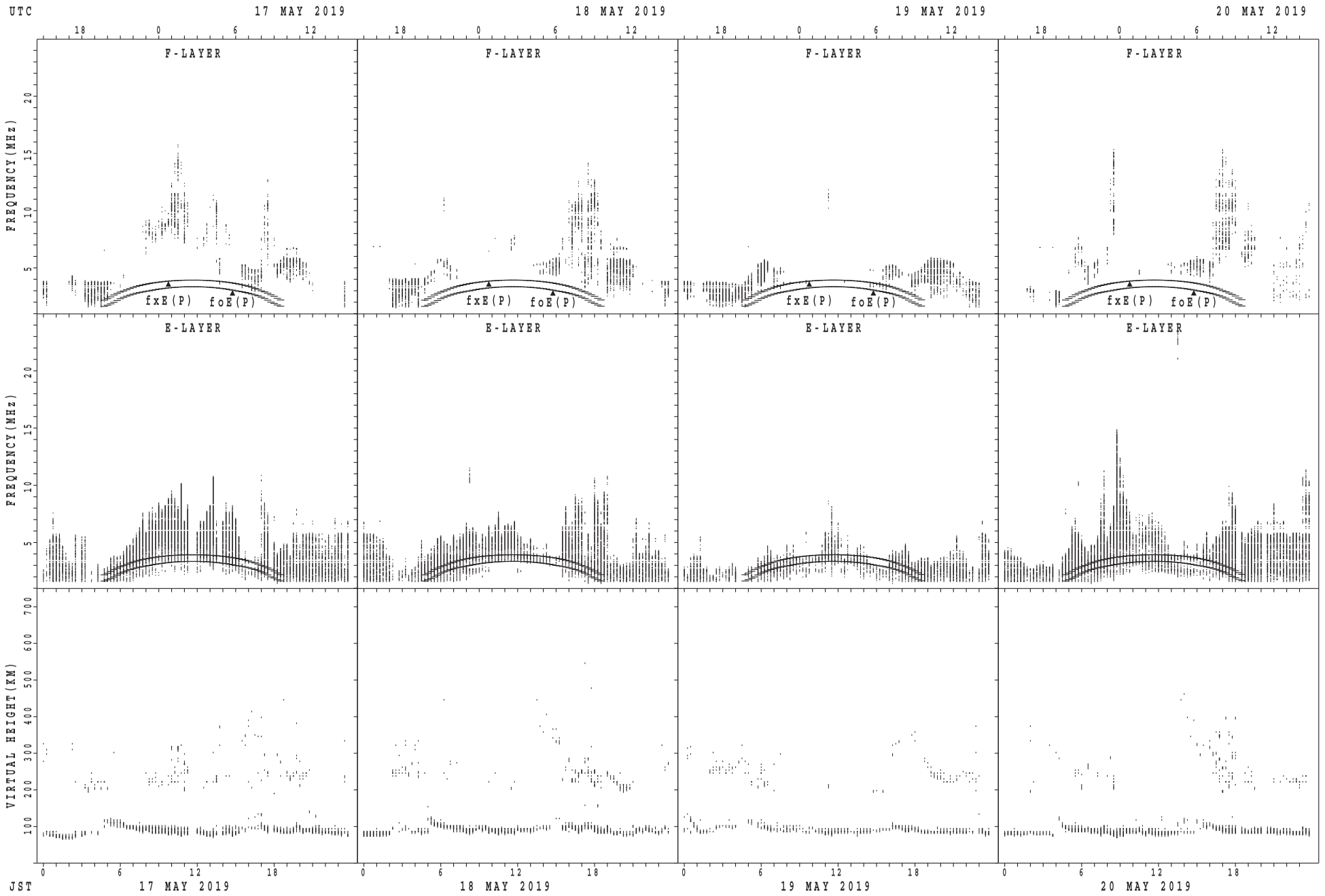


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji

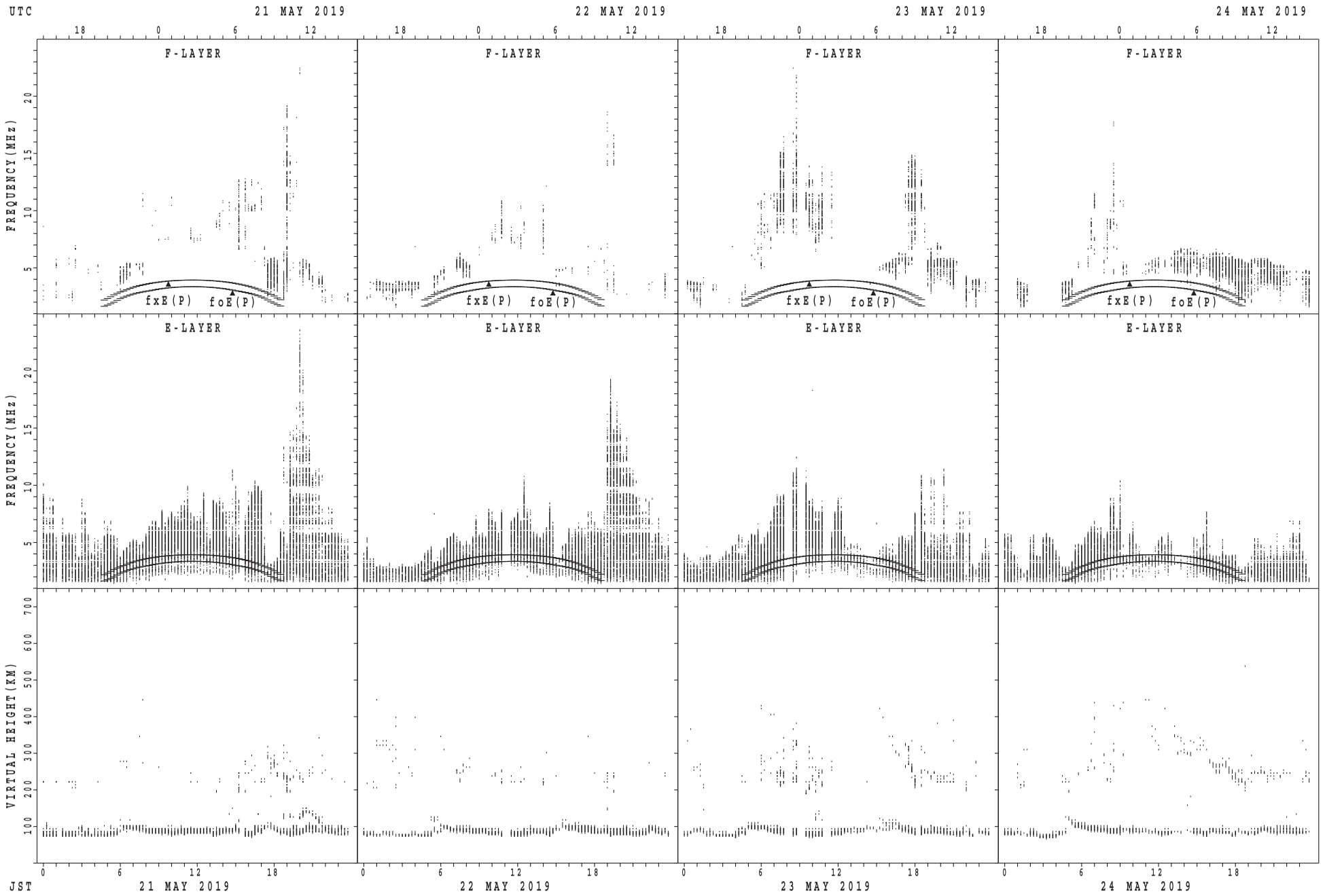


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE



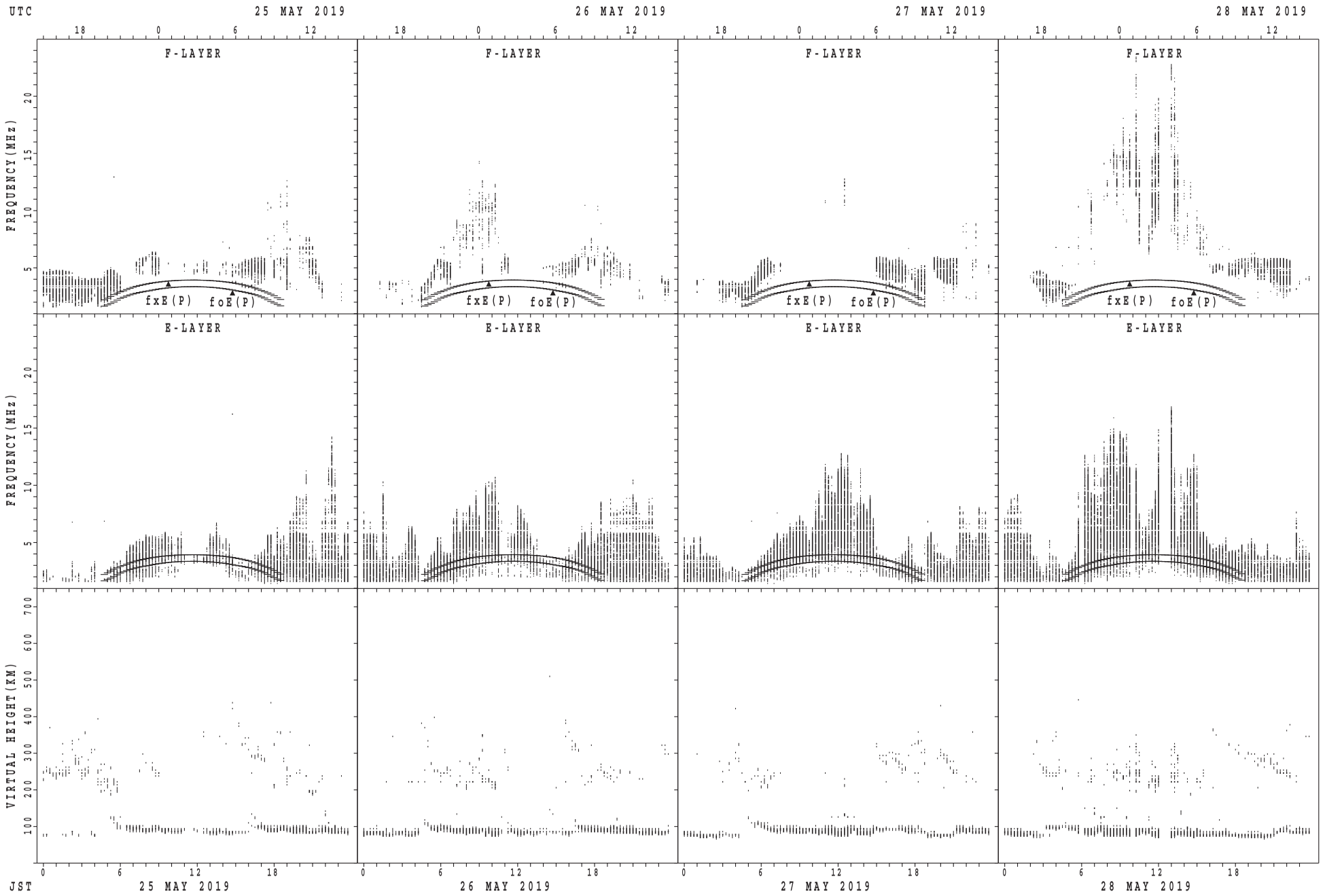
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



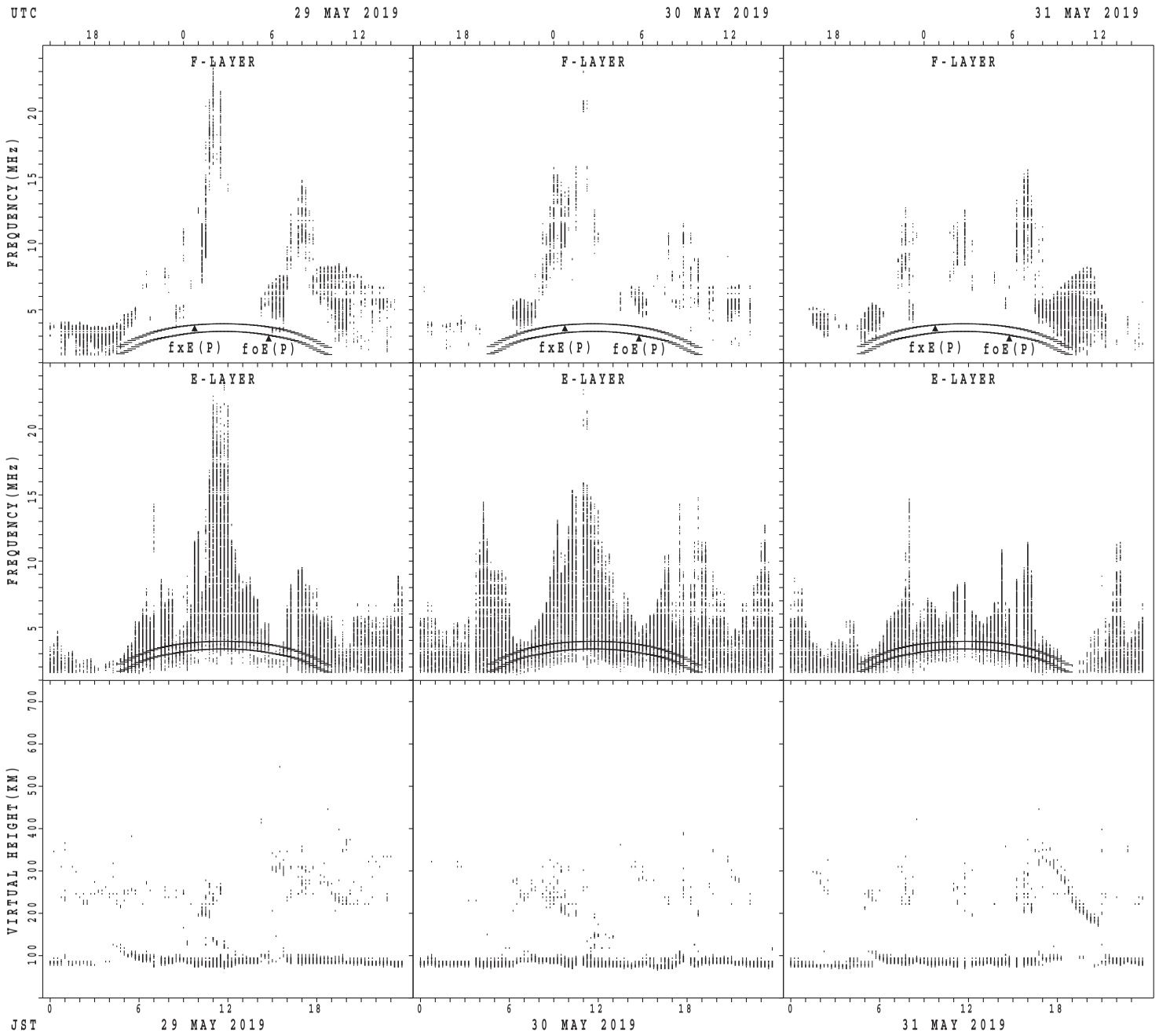
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



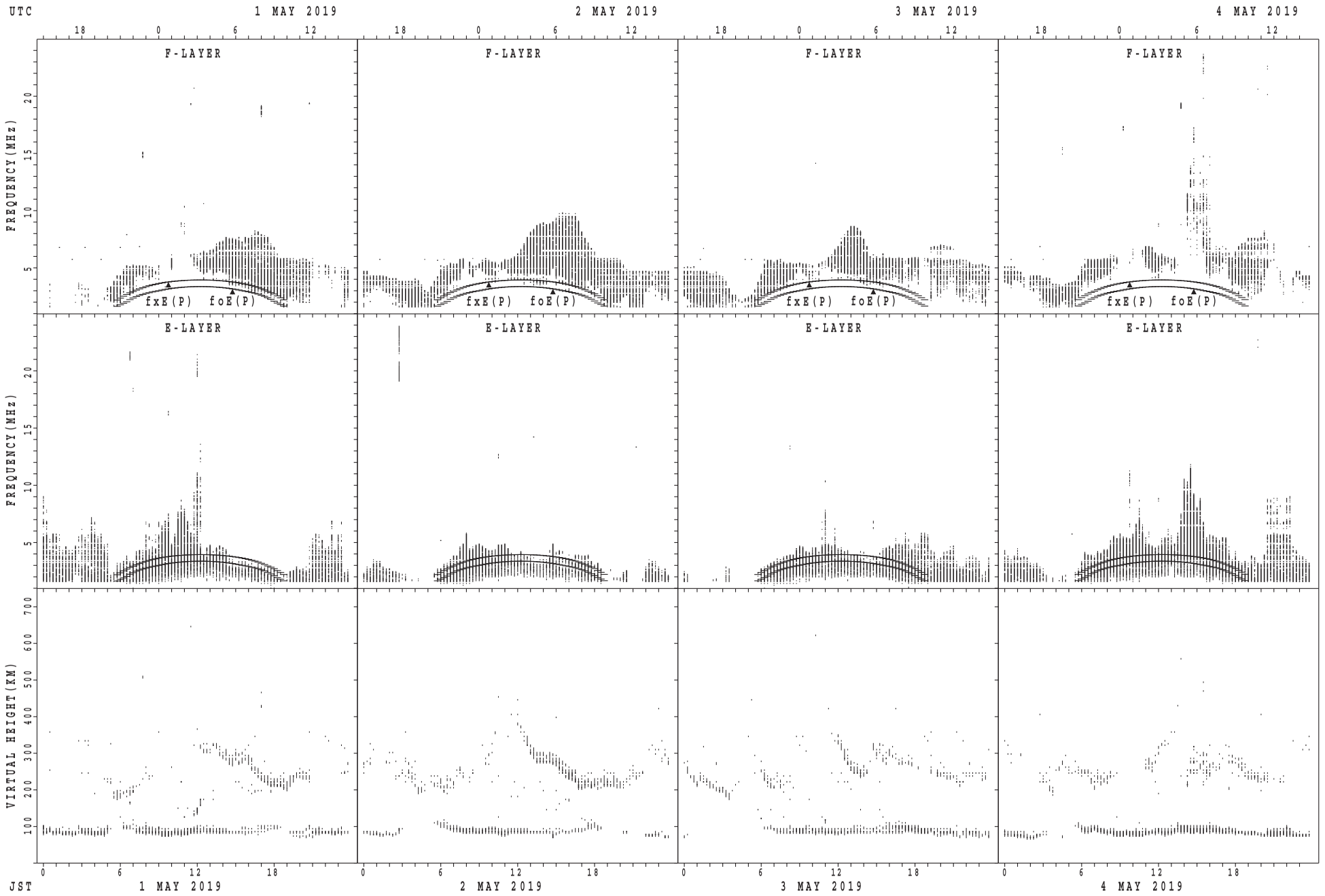
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji

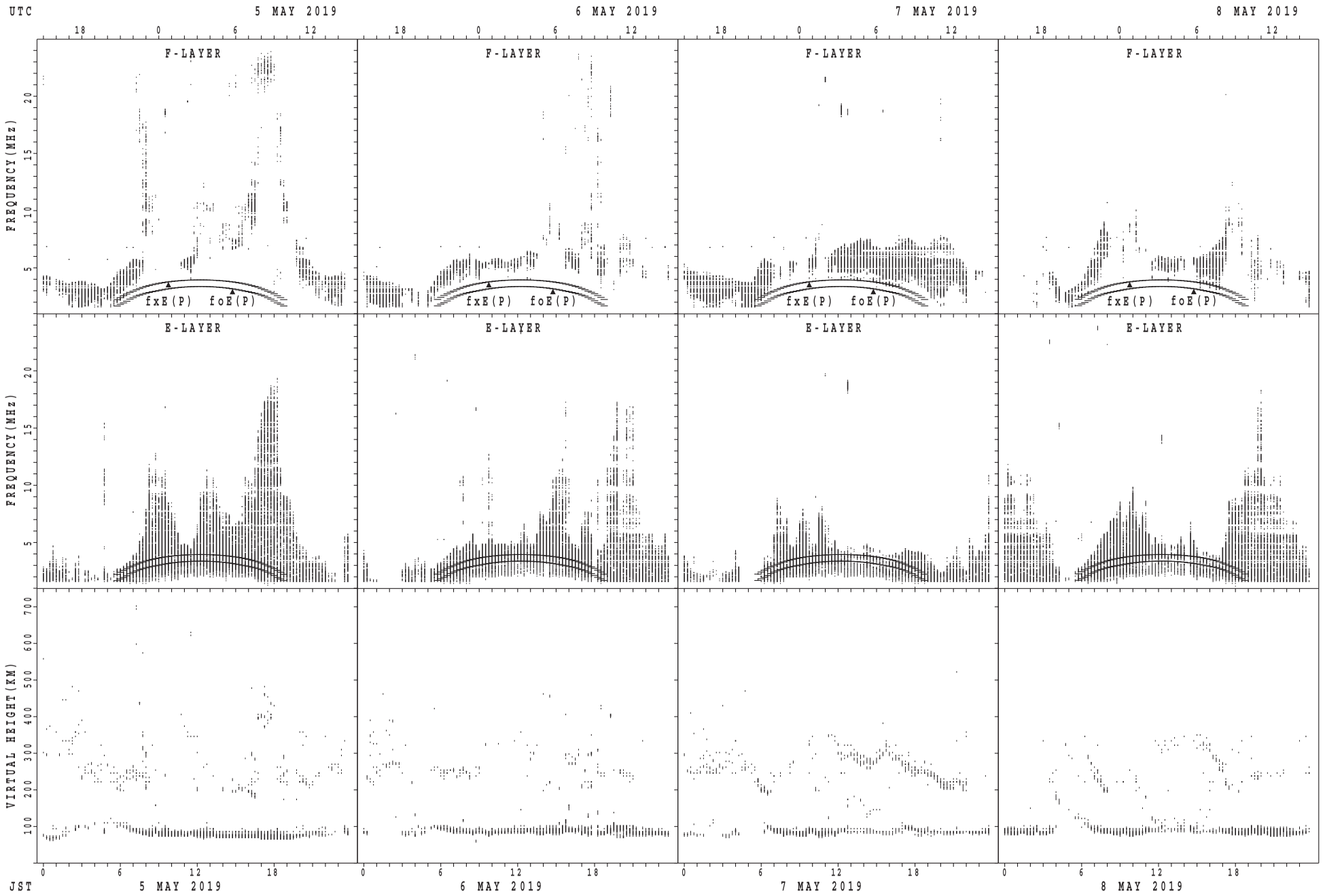


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

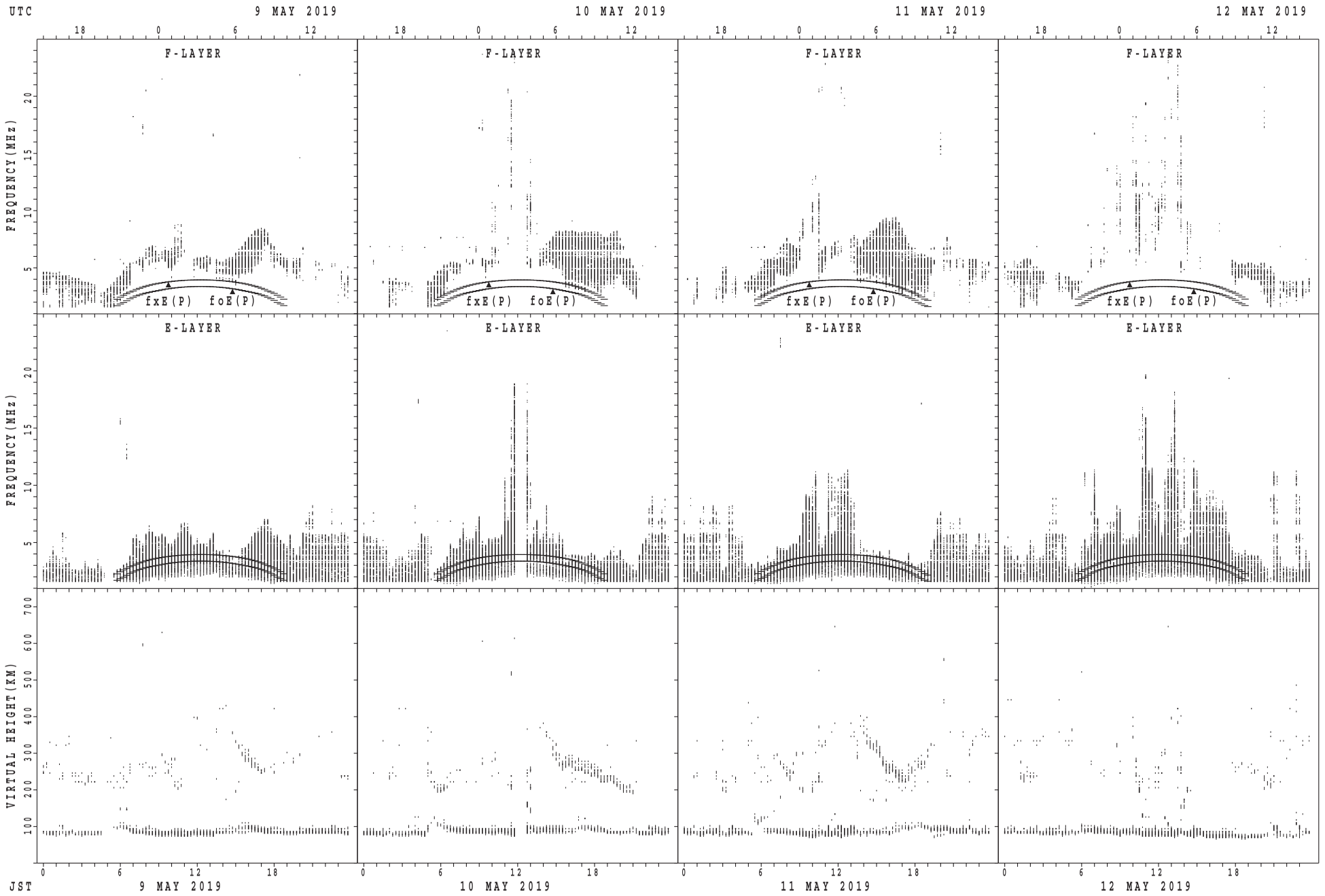
SUMMARY PLOTS AT Yamagawa



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

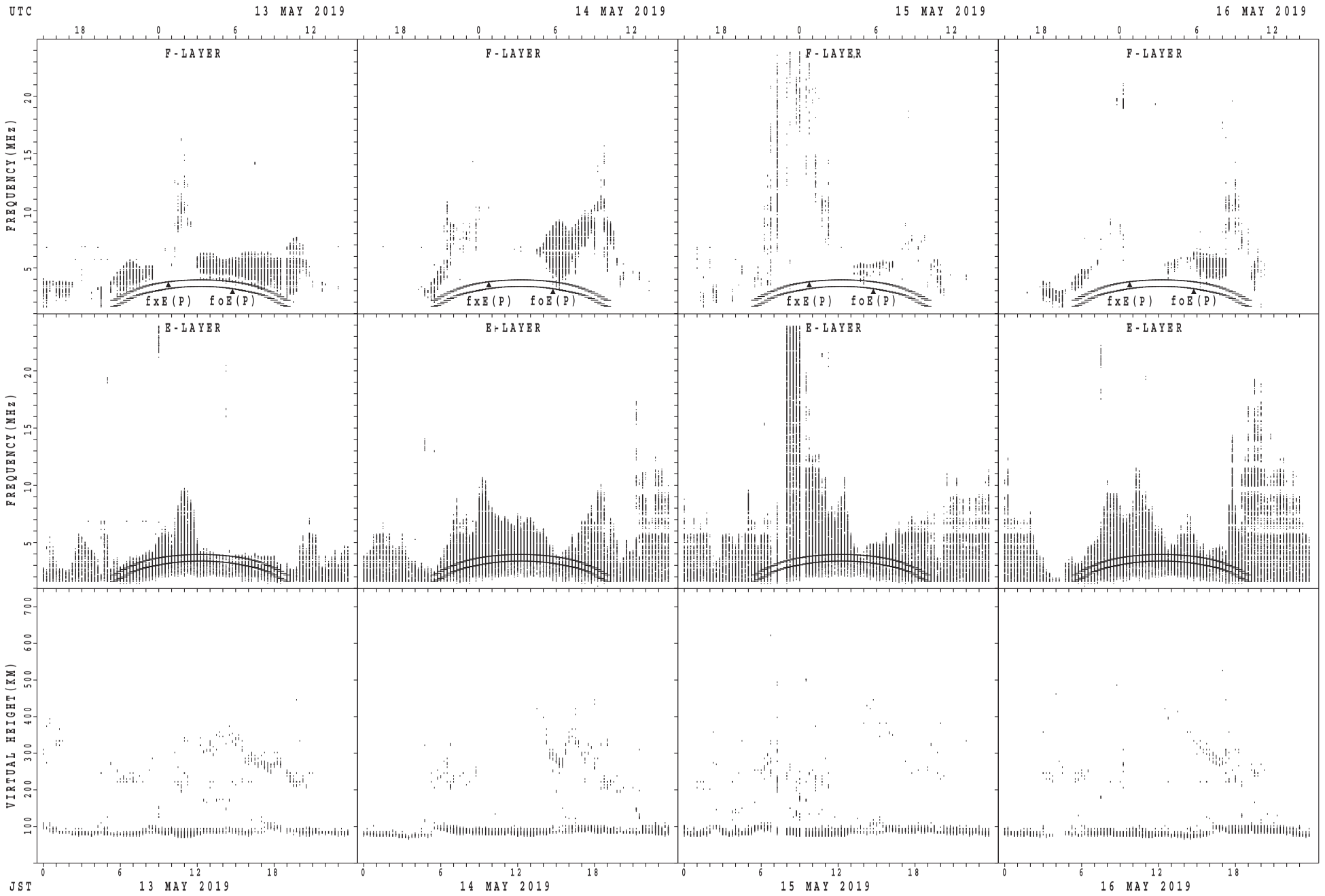

SUMMARY PLOTS AT Yamagawa
UTC
5 MAY 2019
6 MAY 2019
7 MAY 2019
8 MAY 2019
F-LAYER
E-LAYER
FREQUENCY(MHz)
VIRTUAL HEIGHT(KM)
fxE(P) foE(P)
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



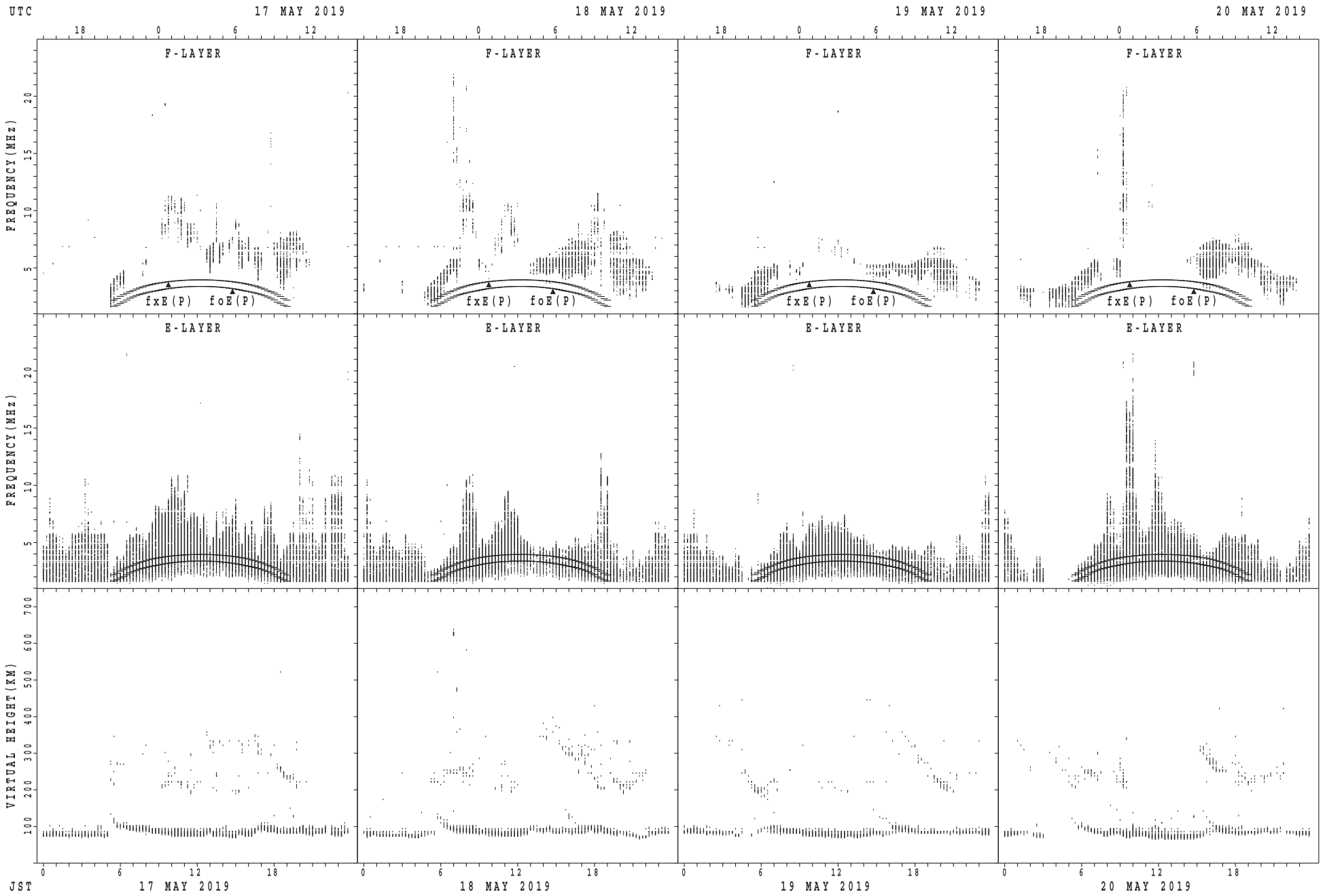
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



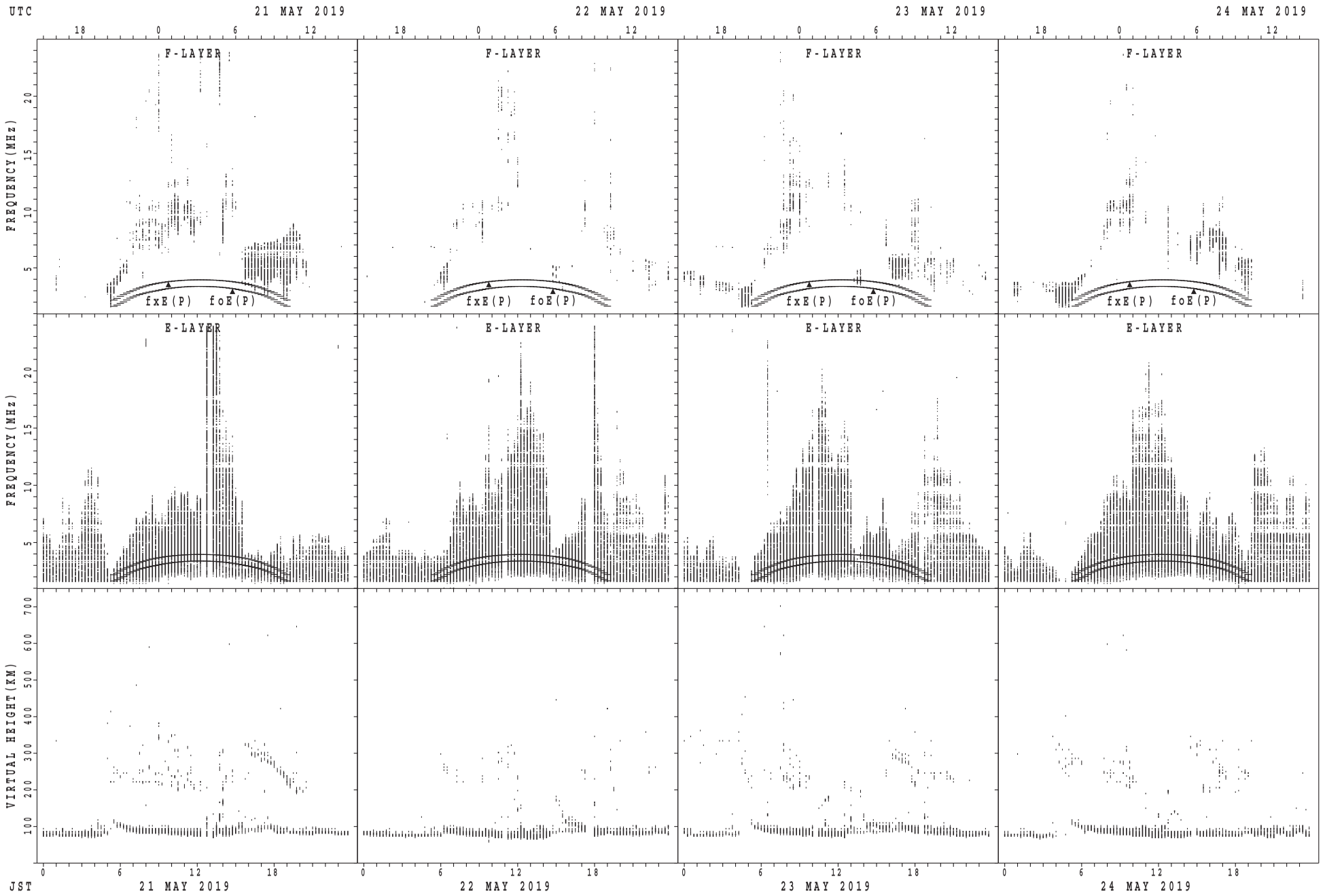
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



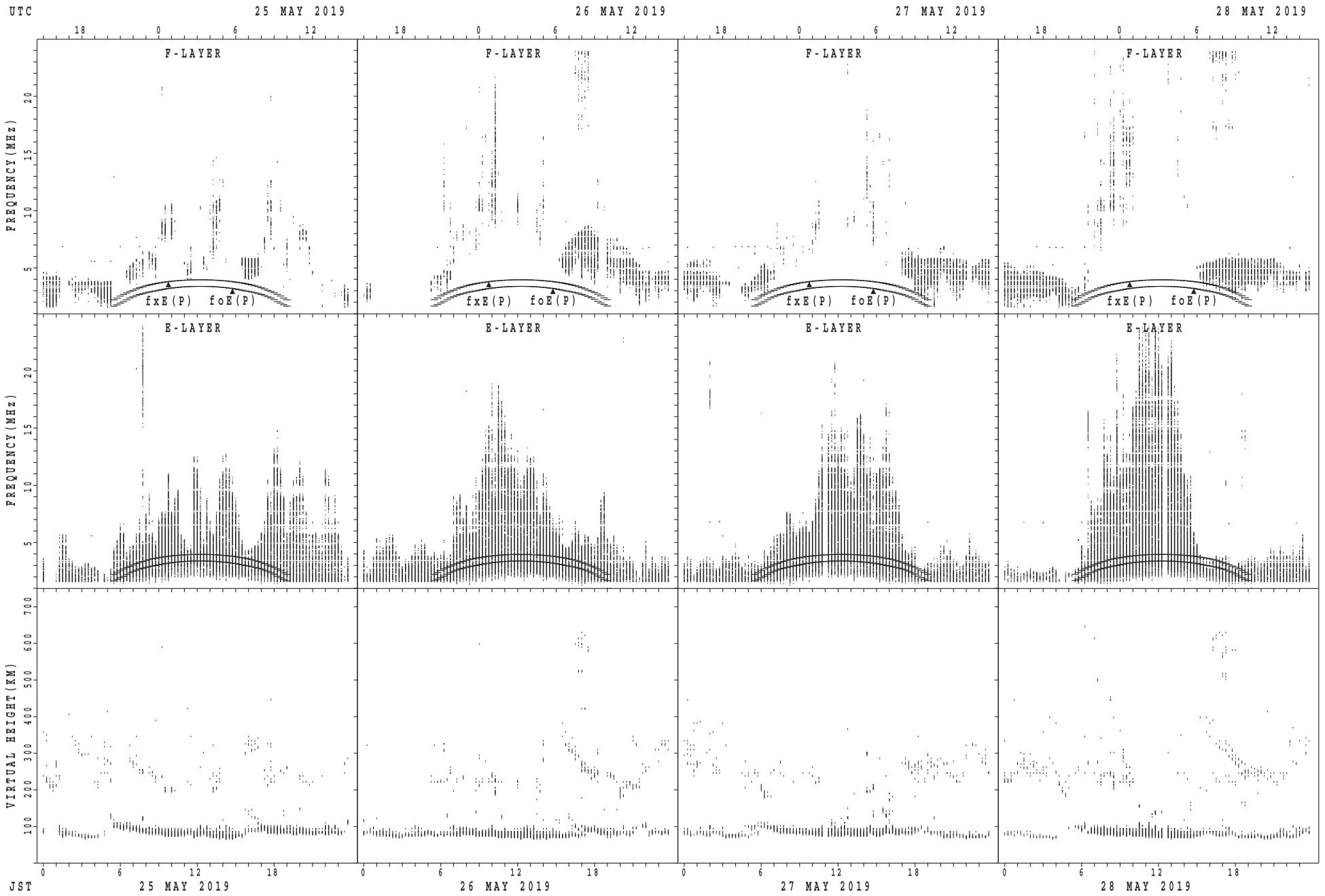
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



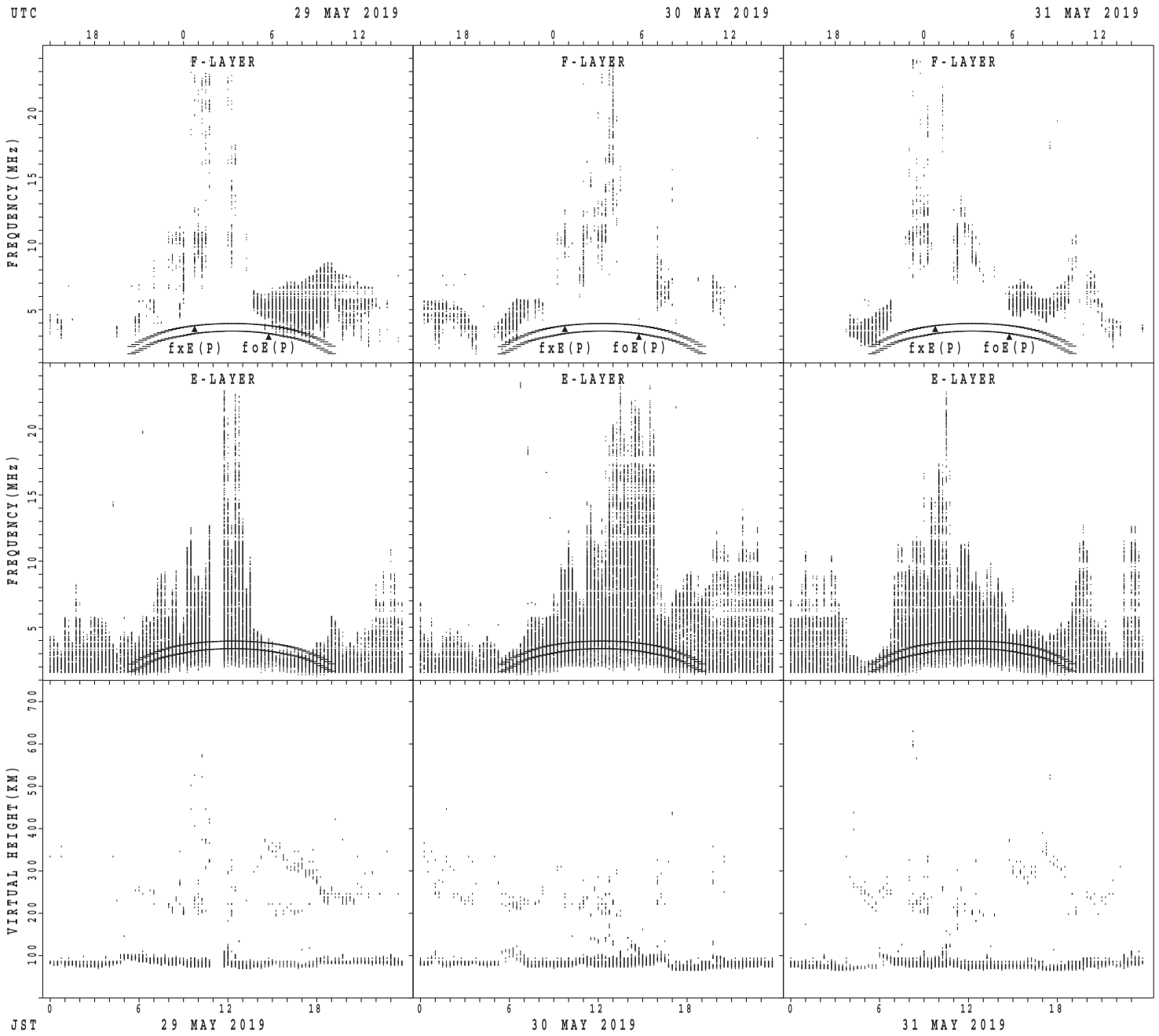
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



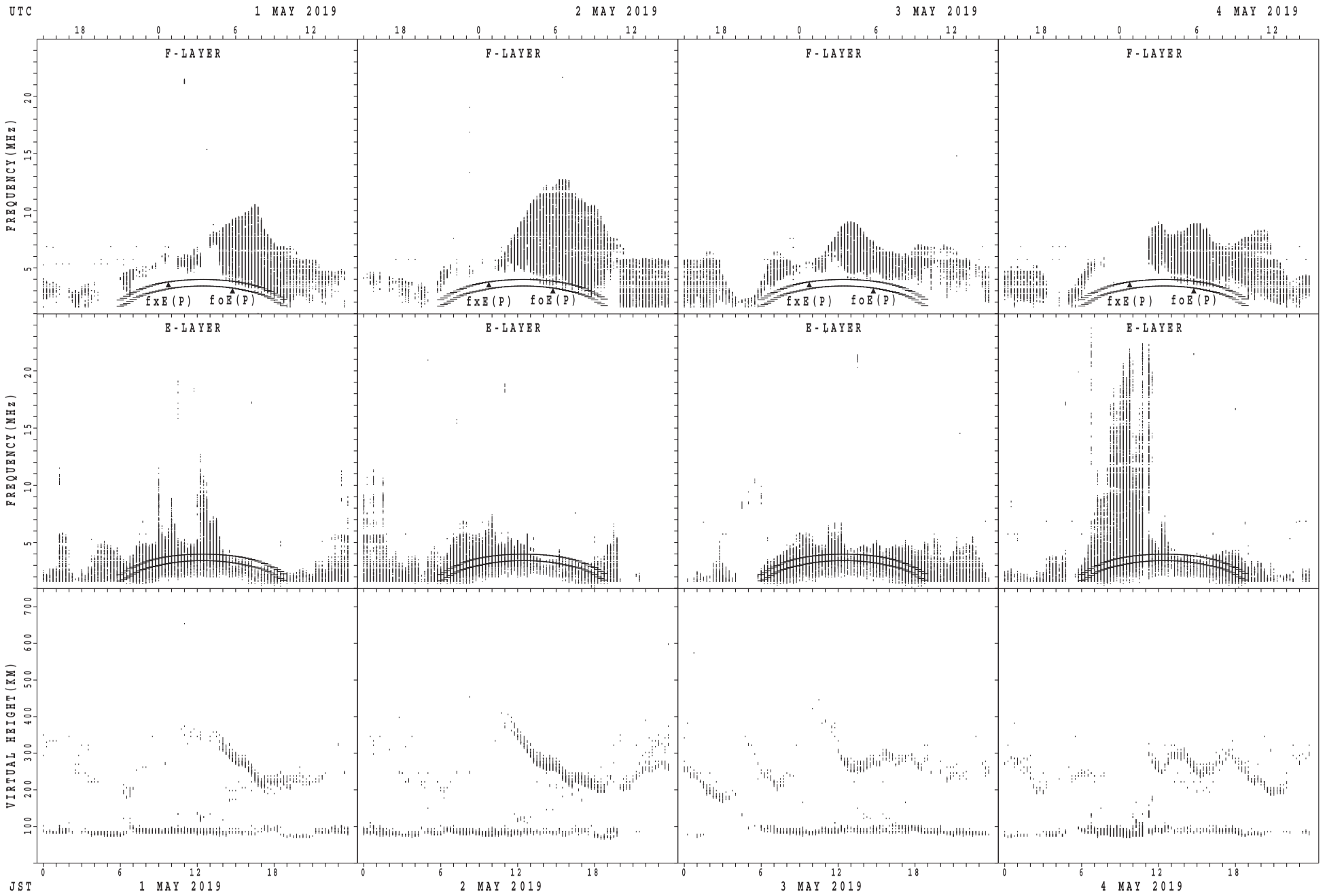
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



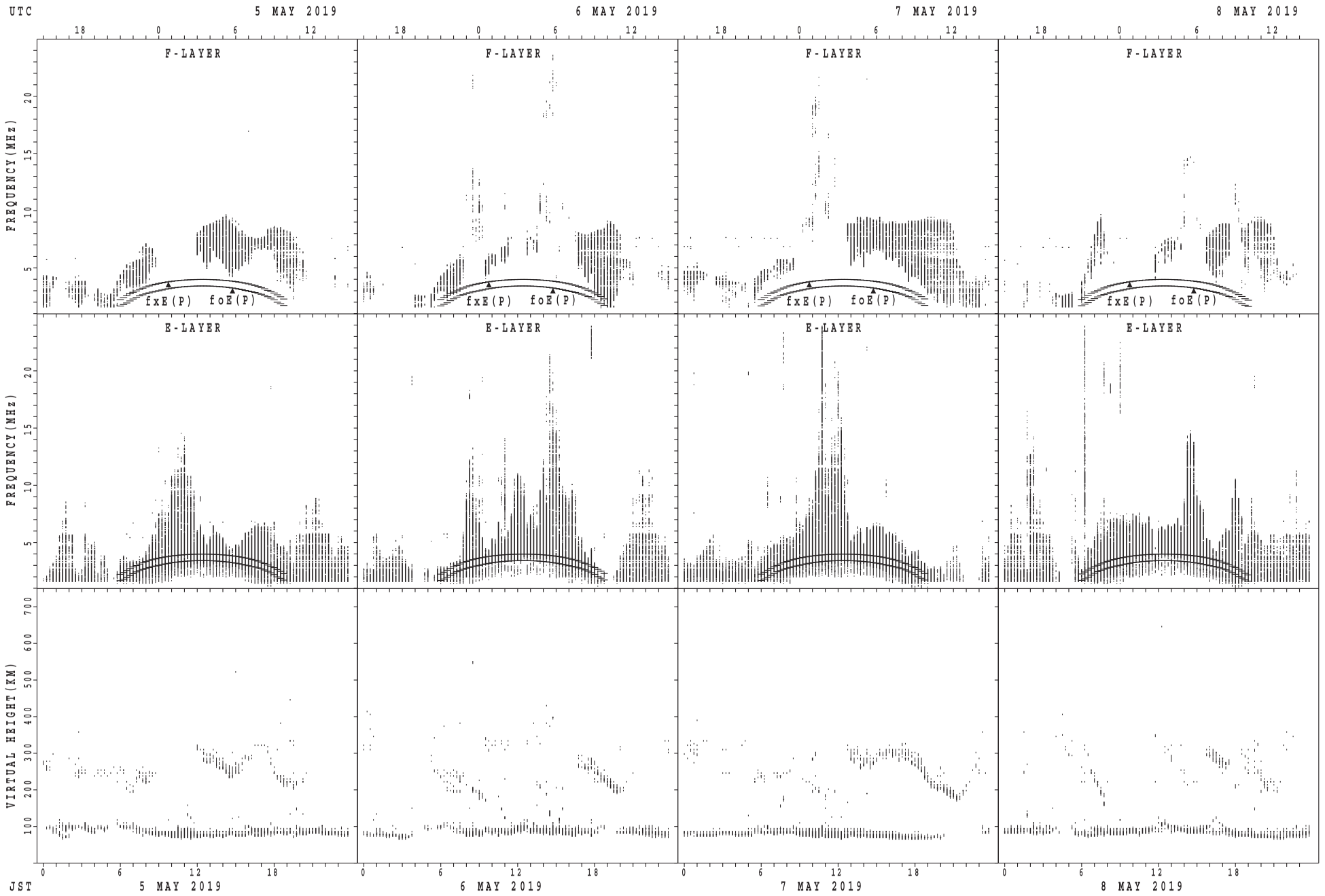
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



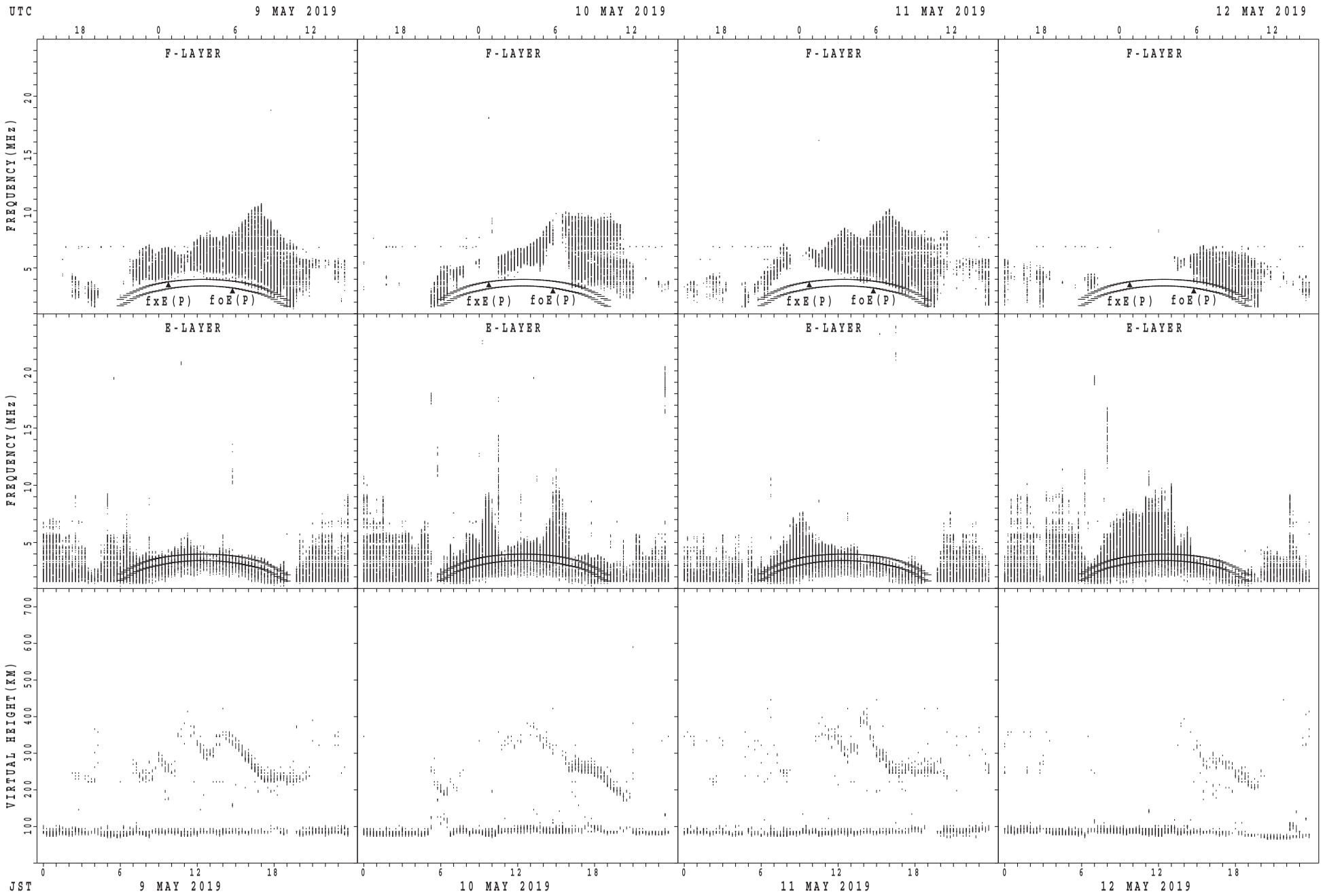
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



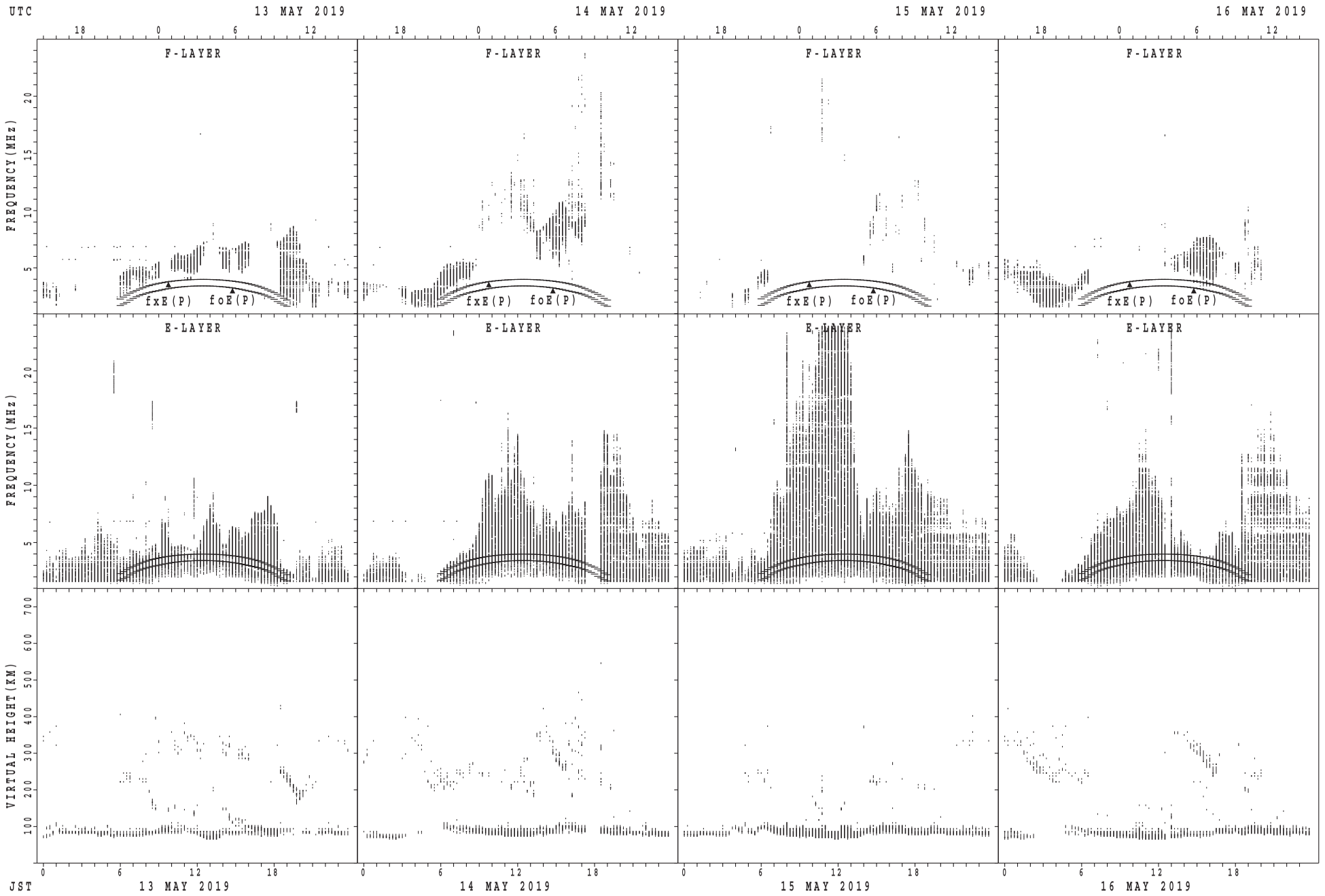
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



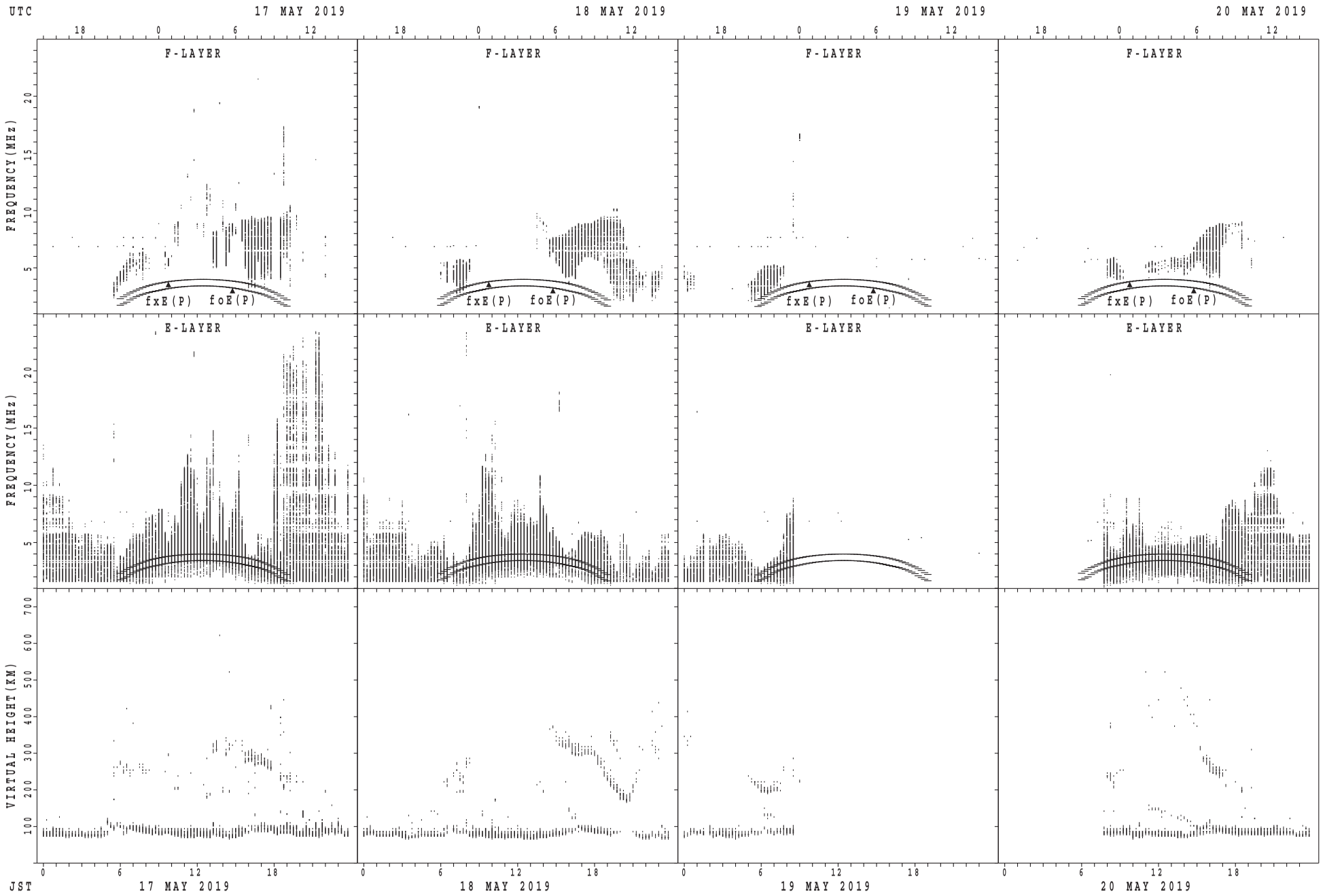
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



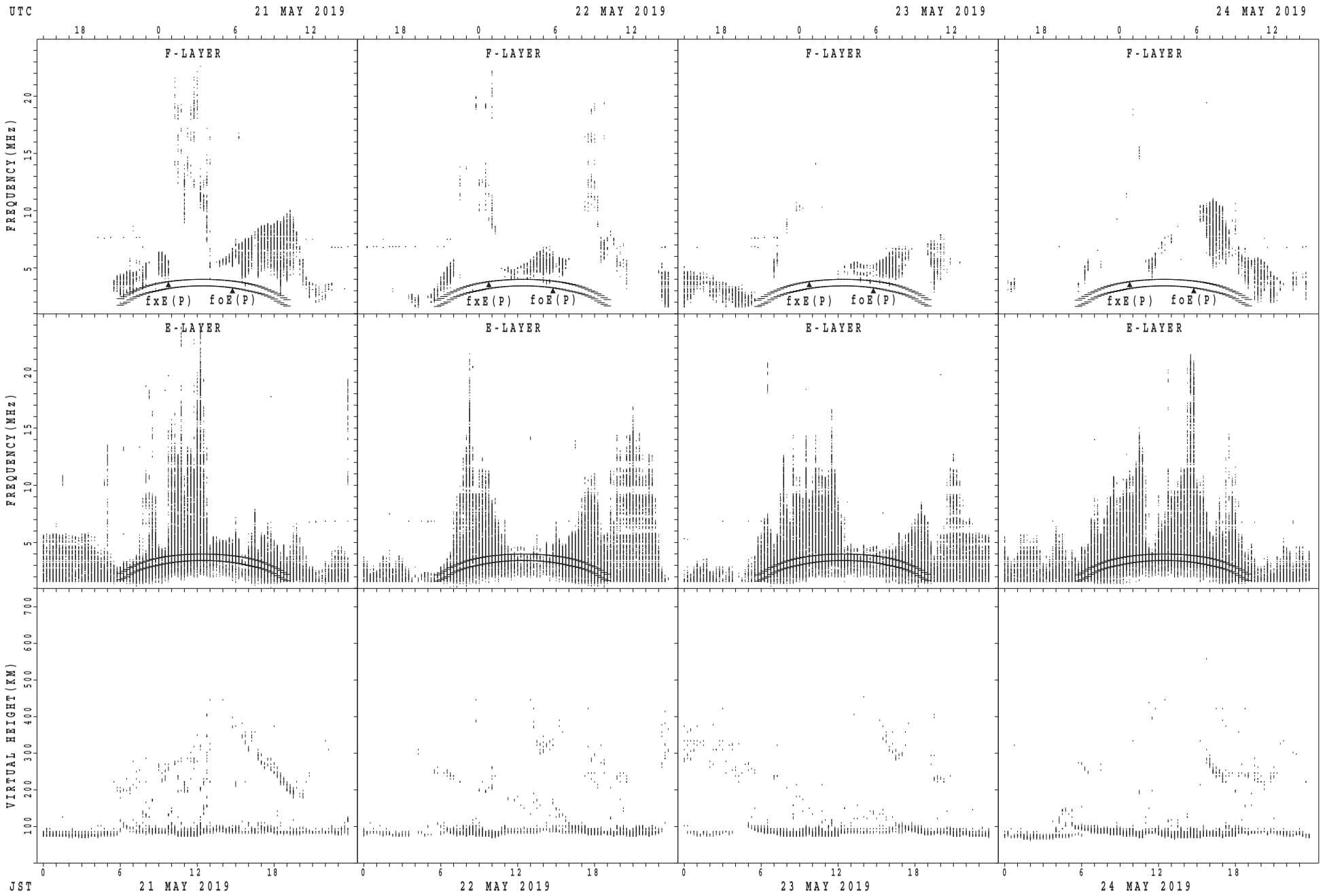
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



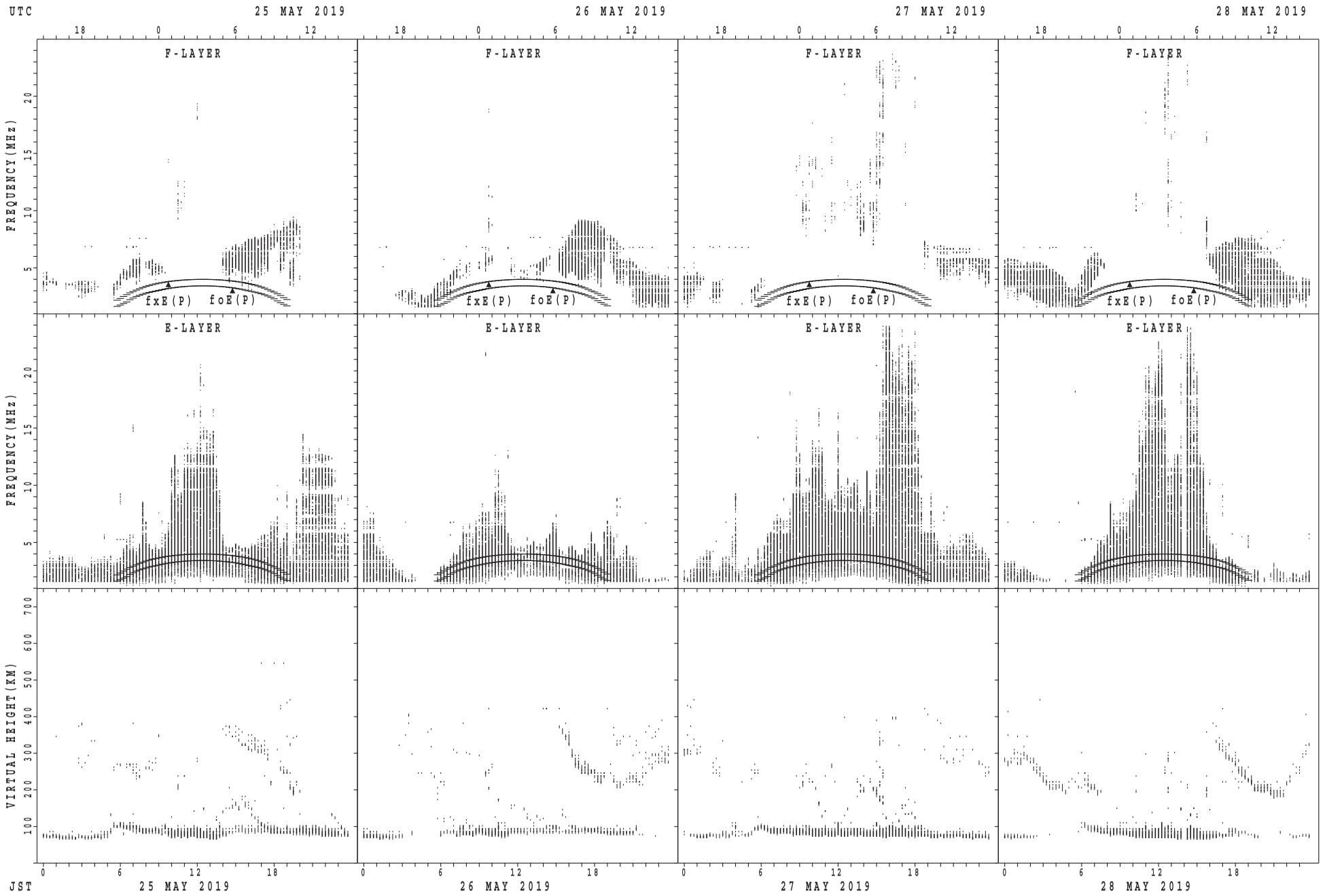
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



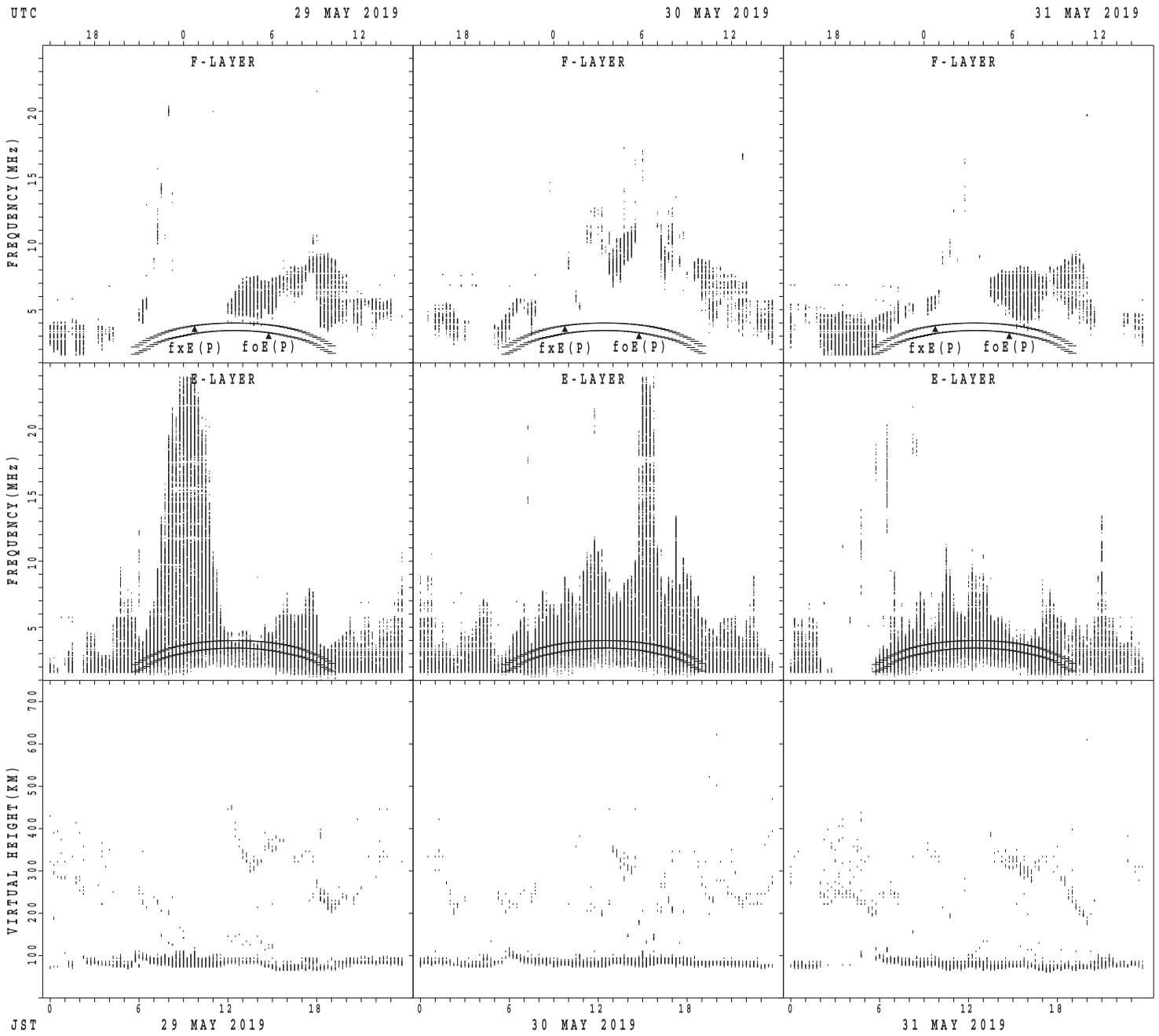
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



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

SUMMARY PLOTS AT Okinawa



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

MONTHLY MEDIANS OF h'F AND h'Es

MAY 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						1											1	8	9	2	3		1	
MED						282											204	260	244	249	284		292	
U Q						141											102	292	261	274	298		146	
L Q						141											102	205	208	224	252		146	

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	16	18	19	16	16	27	31	30	28	28	28	27	29	28	24	21	24	24	26	27	26	26	24	24
MED	85	83	83	81	95	107	99	95	91	90	88	89	99	89	90	89	96	95	91	89	89	89	89	87
U Q	89	89	93	100	103	119	113	103	97	96	95	101	121	99	101	111	103	106	101	97	95	95	93	95
L Q	81	81	81	79	83	97	95	89	89	87	86	85	89	83	83	83	87	89	89	89	87	87	87	83

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	5	6									7	11	11	9	3	2		
MED						218	216	241									268	218	204	222	212	267		
U Q						109	263	398									302	244	216	269	250	332		
L Q						109	208	196									216	206	198	206	192	202		

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	28	26	26	21	29	30	30	30	27	27	22	24	21	22	19	23	28	30	28	31	28	28	27
MED	85	86	83	83	87	103	98	95	91	89	89	86	92	87	92	95	95	95	91	89	91	89	89	87
U Q	89	89	91	95	93	114	107	99	95	95	103	95	95	92	107	107	107	99	95	95	97	93	96	95
L Q	83	83	81	79	81	89	95	89	89	87	83	85	88	83	87	87	89	89	87	87	87	87	87	85

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								4	8									13	8	8	9			
MED								254	200									252	246	244	240			
U Q								258	204									266	276	267	253			
L Q								229	195									231	212	219	214			

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	31	28	27	28	25	18	30	30	31	31	31	28	30	30	28	29	27	29	29	30	30	30	31	30
MED	87	83	87	83	83	85	100	95	89	87	87	83	87	89	92	85	107	93	89	89	89	89	89	87
U Q	91	89	91	85	89	97	113	97	95	89	91	89	97	99	103	101	129	102	94	91	95	95	99	95
L Q	83	83	81	80	77	83	95	89	87	83	81	80	81	81	84	83	99	87	86	85	87	87	83	81

MONTHLY MEDIANS OF h'F AND h'Es

MAY 2019 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

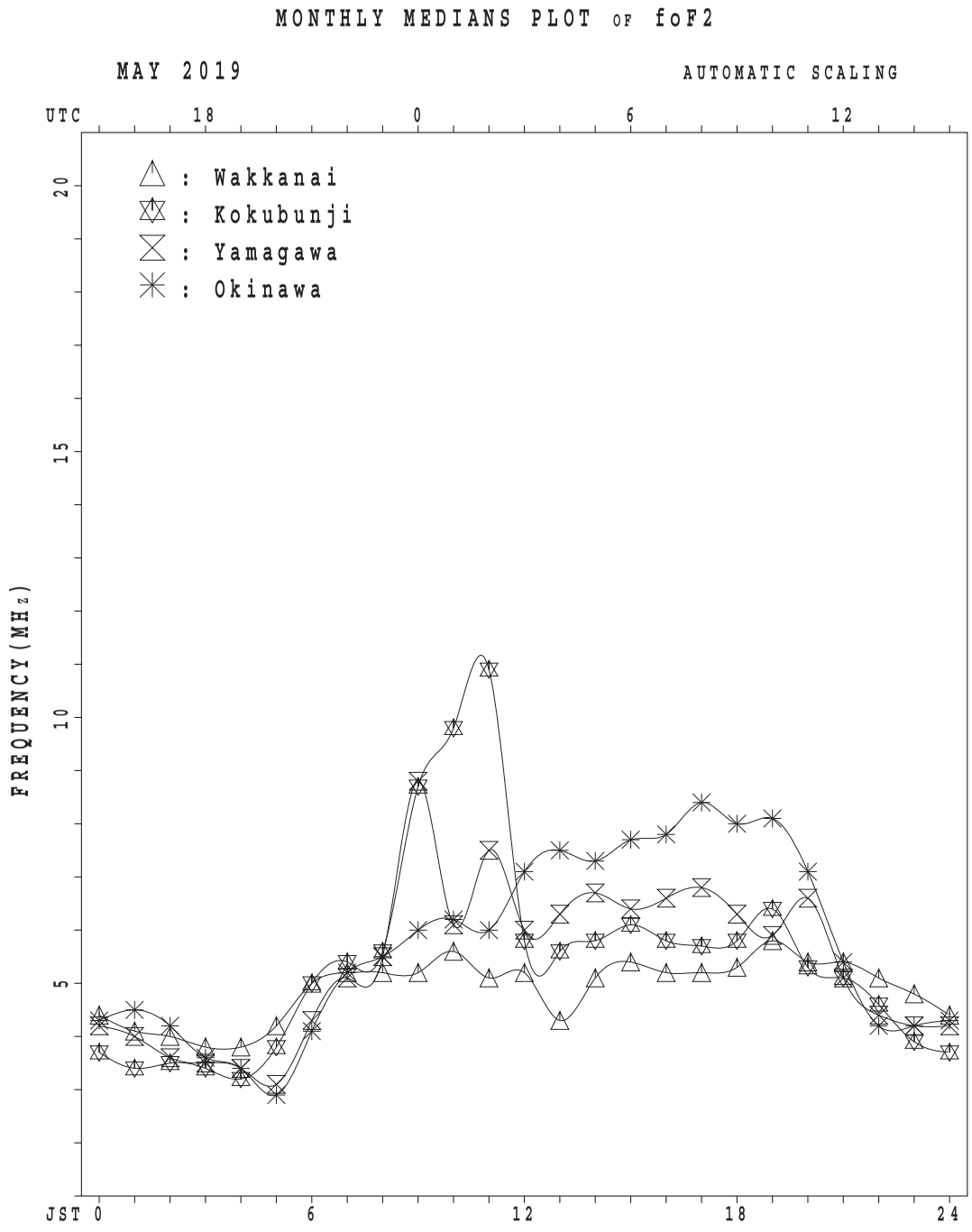
h'F

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								4	6									18	17	16	11	2		
MED								226	218									263	250	244	226	212		
U Q								235	240									280	282	269	246	224		
L Q								210	198									218	222	228	206	200		

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	27	30	27	26	24	22	30	30	31	30	30	29	30	30	25	28	24	27	27	28	28	25	26	25
MED	83	86	83	87	85	89	95	95	95	93	88	95	95	96	87	90	103	97	91	87	89	89	88	87
U Q	91	95	89	89	98	97	103	113	107	101	95	103	107	113	104	106	113	107	99	89	96	93	89	98
L Q	81	79	81	81	83	85	83	89	89	87	83	83	83	83	82	83	90	89	87	83	87	85	85	82


MONTHLY MEDIANS PLOT OF foF2
MAY 2019
AUTOMATIC SCALING
UTC
18
0
6
12
: Wakkanai
: Kokubunji
: Yamagawa
: Okinawa
FREQUENCY(MHz)
20
15
10
5
JST 0
6
12
18
24

IONOSPHERIC DATA STATION Wakkanai

MAY 2019 fxI (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

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

MAY 2019 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

MAY 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

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

MAY 2019 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

MAY 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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					L		L	384	L	L	L	L	392	400	396	L	A	L	L					
2						L	L	L	L	L	L	L	412	L	L	L	L	340	280					
3					L	L	L	L	L	412	L	L	L	L	L	L	L	L	L					
4							L	384	400	L	L	L	L	L	L	L	L	L	L					
5						L	A	A	L	L	L	420	L	L	L	L	384	L	L					
6							L	L	L	L	L	L	L	L	L	416	388	L	L					
7							L	L	L	L	L	L	A	L	A	A	A			A				
8							L	288	L	L	432	A	A	L	A	L	L	L	L					
9							L	A	L	L	A	L	L	L	A	A	A	A	A					
10					L	L		A	A	L	L	A	432	L	L	L	L		A					
11						L	L	L	A	428	L	L	L	A	A	A	L	L	L					
12					A	L	L		A	L	L	A	A	L	L	L	A	A		A				
13					L	L	A	L	A	A	A	L	L	428	L	400	388	L	A					
14					L	L	L	L	L	428	L	A	L	L	L	L	L	L	L					
15						A	A	A	A	A	400	404	A	A	L	L	A	A	A		A			
16					L	L	A	372504	A	A	L	432	L	L	L	A	A	A	A					
17						L	A	A	A	A	A	L	L	L	L	A	A	A	L					
18						L	A	A	A	A	A	A	A	A	A	L	L	L	L					
19						L	L	A	396	396	L	L	L	L	L	L	L	A	L					
20							360	A	A	A	L	L	L	L	L	L	A	A	L	L				
21						L	L	A	A	A	A	400	L	L	L	L	L	L	L					
22						L	L	A	A	A	A	A	A	A	408	392	L	A						
23						L	A	A	L	A	A	L	L	L	A	A	L	L	L	L				
24						L	A	A	A	A	L	L	L	L	L	L	L	L	L					
25							L	L	A	L	A	L	L	L	L	408	396	L						
26						328	L	L	A	A	A	440	L	L	L	L	424	L	L					
27					L	L	A	A	A	A	L	L	428	A	A	A	A	L	A					
28					L	L	A	A	A	A	A	A	A	L	408	A	A	A	A	L				
29					L	356	A	A	A	L	A	L	A	L	A	A	A	L	A	A				
30								A	A	A	L	L	L	L	L	L	L	360	L					
31						L	L	L	L	L	A	A	L	428	L	A		L	L					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						2	2	4	2	4	2	5	4	3	3	4	5	2	1					
MED						342	366	384	398	420	416	420	420	428	408	404	388	350	280					
U Q								444		428		436	430	428	408	412	410							
L Q								336		404		402	402	400	396	396	386							

MAY 2019 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

MAY 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

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					B	196	220	252	284	300	316	320	316	316	292	288	244	204	A	A				
2					176	168	220	252	280	320	324	320	320	320	300	280	272	228	168	B				
3					A	188	232	268	308	308	312	312	312	A	300	U A 312	A	A	172	A				
4					180	172	232	272	272	316	288	248	324	320	280	292	260	204	168	B				
5					184	176	212	256	292	300	300	248	320	288	308	288	264	232	172	A				
6					A	A	232	268	292	304	324	328	328	328	300	284	A	236	172	168				
7				236	B	196	228	276	284	296	288	308	A	328	320	300	268	312		A				
8				A	A	180	260	276	304	312	312	312	316	316	316	296	280	228	176	B	B			
9				A	192	A	224	272	292	300	320	A	A	A	A	A	A	A	A	A	A			
10				196	B	180	224	276	300	300	320	320	308	276	280	304	264	232	A	A	A			
11				A	228	176	240	268	296	312	316	316	316	316	288	A	A	224	180	A	A			
12				A	A	168	212	264	280	292	292	324	324	324	316	288	260	240	164	A	A			
13				A	A	A	244	276	284	284	304	316	316	308	280	284	248	240	168	A	284			
14				B	200	200	232	264	288	304	320	320	320	320	300	276	244	220	192	A				
15				180	A	180	236	260	272	316	304	336	328	328	296	292	256	240	176		A			
16				A	216	184	236	276	276	300	304	304	A	268	A	296	260	220	168	172	A			
17				A	A	184	240	264	292	308	320	320	A 284	300	A	296	A	224	A	A	A			
18				A	A	176	244	260	300	316	316	316	324	312	280	A	264	264	200	180				
19				188	204	180	232	276	292	312	312	324	324	300	288	300	272	240	176	A	A			
20				A	208	188	244	268	288	304	316	316	296	A	320	300	276	240	196	A				
21				A		212	232	276	296	308	320	320	308	328	284	284	276	240	188	A	A			
22				A	B	176	240	268	292	308	308	308	308	A	308	336	288	252						
23				A	B	204	252	284	308	308	320	304	272	A	324	304	292	256	A	A	A			
24				B	188	204	256	280	308	312	312	328	320	A	316	260	288	236	A	A	A			
25				A	A	220	240	280	296	316	316	316	316	300	A	292	284	252	192	A	A			
26					A	204	248	288	312	320	320	320	320	320	280	280	A	A	208	A	A			
27					224	196	248	272	292	312	312	316	316	316	280	A	A	256	204	A	A			
28				B	232	212	252	276	296	320	308	308	308	A	308	308	288	248	240	A				
29				B	B	216	232	276	292	320	316	316	320	320	320	308	308	248	240	A	A			
30				B	A	256	256	280	292	312	308	340	312	304	316	280	A	228	188	188	A			
31		156		A	208	216	252	296	320	320	320	320	320	320	284	240		A	204	168	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		4	13	28	31	31	31	31	31	30	28	24	27	27	22	27	23	5	1			
MED		156		192	204	188	236	272	292	308	316	316	316	316	300	292	270	240	180	172	284			
U Q				216	220	204	248	276	300	316	320	320	320	320	316	300	284	248	200	184				
L Q				184	186	178	232	264	284	300	308	312	310	302	284	284	260	228	172	168				

IONOSPHERIC DATA STATION Wakkanai

MAY 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

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	E B 16	E B 16	25	J A 26	E B 16	27	27	31	34	34	34	34	40	36	J A 40	J A 43	J A 51	J A 31	J A 45	J A 33	J A 62	J A 51	J A 37	18
2	E B 16	E B 16	J A 25	22	23	22	26	37	32	G	38	36	J A 61	G 35	34	G	28	28	22	E B 16	22	32	30	25
3	39	J A 22	J A 48	20	25	23	28	J A 50	36	37	J A 47	37	35	J A 31	35	J A 56	J A 56	36	22	29	J A 21	22	E B 16	E B 16
4	21	21	19	20	19	J A 133	27	34	J A 51	39	35	35	40	36	34	34	31	J A 29	22	E B 16	E B 16	34	J A 21	J A 63
5	59	22	25	31	25	J A 22	J A 51	J A 47	36	J A 50	J A 39	J A 61	J A 51	G	J A 51	32	G	G	24	J A 27	34	22	21	36
6	J A 30	30	25	25	J A 22	J A 22	29	31	J A 99	36	J A 51	42	G	41	34	33	35	29	J A 32	23	E B 16	J A 31	20	20
7	E B 16	E B 16	20	G 22	E B 16	J A 39	28	32	34	34	J A 48	46	101	48	J A 51	J A 86	J A 94	J A 243	J A 167	J A 110	J A 62	J A 51	38	E B 16
8	J A 27	J A 30	J A 50	J A 28	J A 26	J A 30	111	J A 52	95	J A 121	J A 67	J A 111	J A 84	J A 63	75	94	J A 52	28	J A 25	E B 16	E B 16	E B 16	J A 113	J A 83
9	J A 51	59	38	30	J A 30	47	J A 41	J A 53	52	37	J A 51	J A 73	J A 81	J A 61	J A 67	58	48	J A 55	117	34	43	J A 41	26	J A 47
10	20	20	20	J A 20	E B 16	J A 27	31	J A 81	J A 48	J A 60	J A 75	J A 61	J A 65	J A 57	J A 61	J A 48	J A 64	52	69	38	38	J A 109	J A 84	22
11	22	22	32	31	J A 33	J A 27	29	J A 49	72	J A 41	J A 38	J A 51	38	J A 74	116	J A 155	J A 245	J A 26	23	J A 34	J A 65	J A 86	58	31
12	59	26	26	28	J A 36	23	30	J A 103	J A 49	J A 57	35	61	J A 48	39	J A 43	36	J A 41	76	J A 35	J A 249	34	J A 84	72	72
13	J A 51	J A 48	J A 107	J A 83	J A 49	34	J A 48	50	59	70	54	J A 40	J A 41	J A 42	J A 40	J A 39	J A 37	J A 45	70	45	J A 41	J A 85	33	28
14	28	27	27	J A 23	25	30	35	55	38	40	40	J A 51	J A 64	43	J A 35	34	28	25	25	J A 22	26	30	J A 52	J A 51
15	21	24	30	26	34	J A 39	J A 61	J A 133	J A 87	90	J A 49	J A 49	73	J A 53	35	34	47	49	J A 56	J A 63	J A 82	J A 63	49	40
16	J A 42	30	22	23	28	J A 30	J A 42	J A 81	J A 119	J A 112	J A 56	J A 62	61	J A 49	J A 37	64	J A 68	J A 65	J A 37	J A 25	40	J A 45	J A 38	36
17	J A 102	58	J A 51	J A 50	20	25	40	J A 104	84	69	69	54	J A 60	J A 39	J A 32	60	J A 95	J A 47	J A 75	J A 37	J A 52	J A 73	J A 64	J A 47
18	J A 29	30	27	30	J A 51	J A 26	J A 38	J A 65	70	58	J A 55	J A 57	J A 46	63	J A 47	J A 51	J A 29	J A 29	J A 21	J A 28	35	J A 38	22	25
19	E B 16	E B 16	22	21	J A 51	22	J A 45	J A 52	J A 65	J A 65	J A 61	38	J A 54	34	34	34	37	J A 69	J A 61	37	J A 24	35	J A 53	J A 51
20	J A 48	40	J A 27	J A 29	26	26	J A 38	58	J A 51	65	37	J A 63	J A 56	J A 48	39	35	J A 61	J A 55	J A 52	J A 40	39	J A 37	J A 52	34
21	39	26	26	24	32	J A 27	34	50	J A 57	60	J A 56	48	45	G	33	33	34	J A 37	J A 28	42	J A 86	23	32	E B 16
22	E B 16	20	26	20	E B 15	J A 27	38	59	J A 79	J A 83	56	J A 49	J A 54	J A 39	34	J A 49	50	J A 64	154	128	34	J A 52	25	27
23	24	29	31	29	E B 16	J A 29	J A 59	J A 51	56	58	J A 73	J A 45	J A 52	55	59	J A 65	50	J A 33	J A 63	35	J A 60	32	J A 38	37
24	J A 30	27	27	26	31	29	86	59	J A 77	62	J A 47	J A 43	J A 43	J A 43	J A 52	41	36	34	49	J A 36	32	J A 25	J A 32	J A 116
25	31	29	26	J A 21	24	29	32	37	J A 49	J A 53	J A 50	J A 47	37	J A 37	J A 38	35	35	31	52	43	40	32	38	44
26	35	E B 16	26	20	33	26	J A 39	J A 49	60	J A 57	60	J A 59	J A 50	J A 37	35	J A 51	46	J A 33	J A 34	J A 33	J A 44	J A 62	33	29
27	25	31	31	31	G	28	J A 52	J A 45	J A 87	72	J A 61	42	J A 51	J A 55	J A 64	60	J A 63	28	J A 61	31	33	38	J A 44	J A 32
28	J A 47	24	27	25	29	31	J A 50	J A 90	J A 77	J A 126	J A 109	62	J A 75	J A 56	39	40	57	J A 85	J A 39	J A 153	J A 32	38	J A 29	30
29	E B 16	E B 16	E B 16	21	E B 15	28	J A 40	J A 61	J A 132	J A 111	J A 63	J A 55	J A 72	61	J A 64	J A 77	J A 229	J A 253	J A 180	J A 173	J A 143	J A 126	32	22
30	22	E B 16	24	J A 50	J A 37	J A 86	J A 52	J A 84	91	42	J A 88	J A 81	J A 42	J A 55	J A 38	J A 38	J A 29	J A 30	J A 29	29	J A 38	44	59	59
31	36	J A 21	J A 25	32	25	28	32	J A 57	J A 49	47	61	J A 69	J A 95	J A 38	J A 49	67	J A 71	52	24	J A 26	33	42	J A 29	J A 37
	00	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	29	24	26	26	25	28	38	J A 52	J A 59	58	J A 54	J A 51	J A 52	J A 43	J A 39	43	J A 48	J A 36	J A 39	J A 34	38	J A 38	37	34
U Q	J A 42	30	31	30	J A 33	J A 30	J A 50	J A 65	J A 84	J A 70	J A 61	61	J A 65	J A 55	J A 52	60	J A 63	J A 55	63	J A 43	J A 52	J A 62	J A 52	J A 47
L Q	E B 21	E B 20	25	21	E B 19	26	30	47	49	40	40	42	42	37	35	34	35	29	25	27	32	32	29	25

MAY 2019 foEs (0.1MHz)

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IONOSPHERIC DATA STATION Wakkanai

MAY 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

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	E B 16	E B 16	E B 16	E B 16	E B 16	G 20	26	30	33	33	34	33	G	34	32	A	A A 51	25	17	19	23	18	20	E B 16
2	E B 16	E B 16	E B 16	16	G 16	21	23	28	29	G	G 32	34	33	G 32	32	G	G 26	26	20	E B 16	16	E B 16	16	E B 16
3	22	16	E B 16	16	E B 16	G 18	G 23	29	32	31	34	36	32	29	31	34	A	22	19	18	E B 16	E B 16	E B 16	E B 16
4	E B 16	E B 16	E B 16	E B 16	E B 16	20	25	30	33	36	32	32	G 32	35	32	31	29	26	18	E B 16	E B 16	E B 16	16	16
5	16	E B 16	E B 16	E B 16	G 16	18	A A 51	A A 47	32	32	34	34	G 32	G	G 30	31	G	G	21	15	24	E B 16	E B 16	E B 16
6	E B 16	17	E B 16	E B 16	E B 16	19	24	30	31	34	37	37	G	33	32	32	28	28	25	E B 16	E B 16	16	E B 16	E B 16
7	E B 16	E B 16	E B 16	E B 16	E B 16	G 18	27	28	31	31	35	35	A A 101	34	E A 46	A A 86	A A 94	G 24	A A 167	A A 110	20	18	E B 16	E B 16
8	E B 16	16	E B 16	17	E B 16	G 17	G 23	G 24	33	34	35	A A 111	A A 84	E A 40	A A 75	36	31	G 23	20	E B 16	E B 16	E B 16	18	18
9	21	22	E B 16	17	G 18	22	28	30	A	36	36	36	37	38	42	46	26	A A 55	A A 117	22	22	16	E B 16	E B 16
10	E B 16	E B 16	E B 16	E B 16	E B 16	24	26	41	38	37	37	A A 61	36	35	36	32	28	28	A	22	19	A A 109	23	16
11	E B 16	16	16	E B 17	E B 16	22	26	32	A A 72	37	35	34	35	51	A A 116	A A 155	32	24	21	24	20	A A 86	E A 48	16
12	A	E B 16	E B 16	E A 20	A A 36	20	26	E A 30	A A 49	31	33	A A 61	A A 48	35	41	34	37	A A 76	23	A A 249	19	23	A A 72	A A 72
13	A 23	E A 23	E A 20	18	19	22	28	28	A A 59	A A 70	A	34	38	36	30	32	28	G 24	A A 70	24	G 27	35	21	16
14	16	E B 16	E B 16	E B 16	G 16	20	29	40	36	37	37	A	34	A	31	30	25	24	22	16	16	E B 16	20	A A 51
15	E B 16	E B 16	E B 16	E B 16	17	A A 39	A A 61	A A 133	A A 87	A A 90	36	36	A A 73	A A 53	32	32	A A 47	A A 49	A A 56	A A 63	A A 82	A A 63	A A 49	25
16	16	E B 16	E B 16	E B 16	G 18	27	29	44	A A 119	A A 112	38	37	34	32	32	A A 64	A A 68	A A 65	20	18	21	19	19	20
17	E A 21	E A 22	E A 20	E A 28	E B 16	23	A A 40	A A 104	A A 84	A A 69	A A 69	36	36	36	30	A	A A 95	A A 47	21	21	22	A A 73	A A 64	A
18	16	E B 16	E B 16	E B 16	E B 16	23	A A 38	37	A A 70	A A 58	A A 55	A A 57	A A 46	A A 63	A A 47	32	28	G 23	G 19	G 16	24	21	E B 16	16
19	E B 16	E B 16	E B 16	E B 16	E B 16	20	28	30	30	G 30	34	34	G 32	32	32	32	32	A A 69	24	22	20	16	21	16
20	16	16	17	17	G 16	23	E A 31	A A 58	A A 51	A A 65	34	36	36	29	G 30	34	A A 61	A A 55	29	22	19	22	20	21
21	16	E B 16	E B 16	E B 16	E B 16	G 21	29	A A 50	A A 57	A A 60	A A 56	34	36	G	30	G 28	G 26	27	21	19	16	E B 16	E B 16	E B 16
22	E B 16	E B 16	E B 16	16	E B 15	19	27	A A 59	A A 79	A A 83	A A 56	A A 49	A A 54	A A 39	33	G 33	G 24	A A 64	A A 154	20	18	16	E B 16	E B 16
23	E B 16	E B 19	E B 16	E B 16	E B 16	26	A A 59	A A 51	36	43	49	35	33	36	A A 59	E A 41	32	28	23	16	16	E B 17	E B 17	17
24	17	E B 17	E B 17	E B 17	E B 16	27	A A 86	A A 59	E A 39	E A 41	E A 36	38	36	34	34	31	G 28	G 23	20	20	16	17	24	17
25	17	E B 17	E B 16	E B 16	E B 16	25	30	33	E A 46	35	43	35	36	34	31	32	31	28	28	28	24	18	18	17
26	17	E B 16	E B 16	E B 16	20	24	30	35	E A 44	A A 57	A A 60	40	37	34	32	32	30	22	26	26	18	24	16	16
27	16	E B 16	E B 16	E B 16	G	26	29	37	A A 87	A A 72	37	37	35	A A 55	42	A A 60	E A 46	26	25	19	E B 16	E B 16	16	16
28	16	E B 16	E B 16	E B 16	G 18	25	A A 50	A A 90	A A 77	A A 126	A A 109	A A 62	35	35	35	A	E A 41	A A 85	35	E B 16	17	17	17	E B 17
29	E B 16	E B 16	E B 16	E B 17	E B 15	25	A A 40	A A 61	A A 132	35	A A 63	35	A A 72	35	A A 64	A A 77	A A 229	G 24	E A 48	A A 173	29	44	E B 18	16
30	E B 16	E B 16	E B 16	E B 16	17	G 22	27	A A 84	A A 91	40	37	36	36	36	34	32	26	25	23	20	17	17	18	31
31	19	G 16	E B 16	E B 16	E B 16	25	30	G 28	34	34	A A 61	A A 69	34	34	32	38	E A 38	25	G 20	23	18	16	E B 16	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	30	31	31	31	31	31	31	31	30	31	30	30	31	30	31	28	30	31	30	31	31	31	31	30
MED	16	E B 16	E B 16	E B 16	E B 16	22	28	37	A 44	37	37	36	36	34	32	32	30	26	22	20	19	17	18	16
U Q	17	E 16	E 16	17	17	25	A A 38	A A 58	A A 77	A A 65	A A 55	A A 40	A A 38	A A 36	A A 42	A A 40	A A 46	A A 49	A A 29	24	22	23	21	17
L Q	E B 16	E B 16	E B 16	E B 16	E B 16	20	26	30	33	34	34	34	G 33	33	31	32	G	G 24	20	E B 16	E B 16	E B 16	E B 16	E B 16

MAY 2019 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

MAY 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

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

IONOSPHERIC DATA STATION Wakkanai

MAY 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

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	289	295	293	F 323	320	381	327	365	322	327	381	343	G	264	287	311	A	337	330	326	356	315	325	317
2	F 292	F 297	325	338	317	325	298	289	305	303	298	G	275	289	298	315	350	330	351	333	301	308	306	304
3	309	294	310	351	319	328	341	316	341	313	296	303	342	286	320	351	348	314	292	311	314	322	318	311
4	338	310	339	327	330	353	326	324	358	301	380	367	262	331	330	314	326	299	307	325	331	321	321	336
5	291	298	285	290	340	351	A	A	309	319	334	G	G	303	326	332	340	323	326	320	313	344	349	314
6	305	315	F 300	F 287	F 325	362	353	329	334	335	355	327	270	277	316	322	328	334	320	309	322	313	324	308
7	F 316	322	F 289	319	351	347	367	259	371	338	R 305	332	A	330	343	A	A	266	A	A	316	322	308	331
8	318	331	296	313	338	377	375	F 284	318	372	329	A	A	325	A	305	320	323	327	312	342	338	330	306
9	348	242	309	F 312	F 334	365	326	362	353	357	327	336	301	317	322	335	318	A	A	310	332	317	297	309
10	307	313	307	292	305	347	382	347	353	331	331	A	318	301	315	307	331	342	253	321	323	A	328	323
11	315	F 321	F 283	F 324	F 324	312	318	338	A	318	290	320	306	225	A	A	308	334	300	296	279	A	311	319
12	295	323	275	281	A	234	270	393	A	338	385	A	A	G	288	302	295	A	322	A	307	337	A	A
13	F 305	302	229	F 307	F 292	292	299	318	A	A	334	280	258	329	310	312	328	334	A	306	337	337	343	306
14	324	F 303	F 303	305	299	356	346	G	368	322	282	287	283	280	306	258	281	295	326	351	330	344	276	A
15	293	333	285	320	331	A	A	A	A	A	G	G	A	A	G	G	A	A	A	A	A	A	A	304
16	292	292	328	313	319	325	337	G	A	A	305	300	290	277	270	A	A	A	298	314	338	318	325	333
17	313	R 244	330	346	375	G	A	A	A	A	A	260	303	294	284	288	A	A	228	318	308	A	A	219
18	295	F 276	F 335	F 313	F 302	322	A	364	A	A	A	A	A	A	A	264	316	333	321	308	319	317	F 316	326
19	309	298	311	324	319	326	G	331	G	G	G	G	G	G	G	R 271	299	A	304	312	328	331	294	297
20	331	305	313	313	313	354	317	A	A	A	280	G	271	283	310	313	A	A	324	311	313	344	333	314
21	304	346	307	296	326	325	291	A	A	A	A	G	G	G	G	272	305	318	329	313	327	342	341	338
22	323	336	332	359	321	312	357	A	A	A	A	A	A	A	G	G	295	A	A	294	310	315	353	F 338
23	344	345	340	F 297	F 336	G	A	A	274	340	346	349	332	G	A	284	322	334	324	324	313	F 291	318	F 323
24	F 333	F 278	F 316	F 295	F 324	G	A	A	311	317	338	350	308	311	303	299	314	332	330	325	343	328	332	322
25	319	320	329	318	F 335	363	327	297	330	344	336	333	294	282	328	303	330	328	320	311	323	323	351	345
26	340	327	328	312	F 335	317	312	342	298	A	A	292	295	255	311	329	G	288	311	334	315	316	F 333	F 328
27	328	335	322	F 307	F 311	330	341	359	A	A	295	G	G	A	331	A	226	305	272	313	293	302	291	330
28	F 316	292	274	289	310	337	A	A	A	A	A	A	333	275	R 373	306	304	A	326	325	303	309	320	326
29	318	318	317	319	330	237	A	A	A	342	A	332	A	280	A	A	A	308	229	A	309	318	312	357
30	313	327	324	F 321	331	341	354	A	A	245	274	G	283	314	302	313	306	330	309	302	314	328	311	303
31	322	319	292	293	335	308	306	329	343	343	A	A	278	G	305	336	317	300	304	314	326	316	328	346
	00	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	30	23	20	17	20	23	24	24	27	26	26	24	22	26	27	30	27	28	29
MED	315	313	310	313	324	327	327	329	330	329	327	296	283	282	308	306	316	326	320	313	318	321	322	322
U Q	324	327	328	323	335	353	353	353	353	341	338	332	304	311	322	315	328	334	326	325	330	337	332	332
L Q	304	295	292	296	317	312	306	293	307	315	290	G	G 260	G 255	G 287	284	302	305	300	310	310	315	311	307

MAY 2019 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

MAY 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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					L		L	386	L	L	L	L	416	423	404	L	A	L	L					
2						L	L	L	L	L	L	L	405	L	L	L	L	368	378					
3					L	L	L	L	L	388	L	L	L	L	L	L	L	L	L					
4							L	377	359	L	L	L	L	L	L	L	L	L	L					
5						L	A	A	L	L	L	429	L	L	L	L	358	L	L					
6							L	L	L	L	L	L	L	L	L	378	366	L	L					
7							L	L	L	L	L	L	A	L	A	A	A			A				
8							L	385	L	L	416	A	A	L	A	L	L	L	L					
9							L	A	L	L	A	L	L	L	A	A	A	A	A					
10					L	L		A	A	L	L	A	406	L	L	L	L		A					
11						L	L	L	A	366	L	L	L	A	A	A	L	L	L					
12					A	L	L		A	L	L	A	A	L	L	L	A	A		A				
13					L	L	A	L	A	A	A	L	L	384	L	390	372	L	A					
14					L	L	L	L	L	395	L	A	L	L	L	L	L	L	L					
15						A	A	A	A	A	425	390	A	A	L	L	A	A	A		A			
16					L	L	A	378	A	A	L	390	L	L	L	A	A	A	A					
17						L	A	A	A	A	A	L	L	L	L	A	A	A	L					
18						L	A	A	A	A	A	A	A	A	A	L	L	L	L					
19						L	L	A	426	426	L	L	L	L	L	L	L	A	L					
20							360	A	A	A	L	L	L	L	L	L	A	A	L	L				
21						L	L	A	A	A	A	454	L	L	L	L	L	L	L					
22						L	L	A	A	A	A	A	A	A	407	373	L	A						
23						L	A	A	L	A	A	L	L	L	A	A	L	L	L	L				
24						L	A	A	A	A	L	L	L	L	L	L	L	L	L					
25							L	L	A	L	A	L	L	L	L	373	343	L						
26						329	L	L	A	A	A	305	L	L	L	L	339	L	L					
27					L	L	A	A	A	A	L	L	399	A	A	A	A	L	A					
28					L	L	A	A	A	A	A	A	A	L	405	A	A	A	A	L				
29					L	355	A	A	A	L	A	L	A	L	A	A	A	L	A	A				
30								A	A	A	L	L	L	L	L	L	L	359	L					
31						L	L	L	L	L	A	A	L	394	L	A		L	L					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						2	2	4	2	4	2	5	4	3	3	4	5	2	1					
MED						342	356	382	392	392	420	390	406	394	405	376	358	364	378					
U Q								386		410		442	411	423	407	384	369							
L Q								378		377		348	402	384	404	373	341							

MAY 2019 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

MAY 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

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					Q 252		252	262	338	338	270	310	G	316	386	322	A	266	270					
2						296	378	404	366	348	394	G	432	398	354	320	280	280	236					
3					262	268	262	320	294	354	408	382	320	440	332	296	274	290	316					
4							286	320	282	358	236	270	472	332	350	356	300	318	274					
5						248	A	A	368	348	322	G	G	374	330	330	306	306	256					
6							256	308	308	308	290	324	444	444	340	318	298	268	284					
7							246	G 404	264	290	A	312	A	312	298	A	A			A				
8							248	334	362	248	332	A	A	314	A	338	318	306	284					
9							298	254	298	288	328	314	356	374	A	E A	A	A	A					
10					286	242		274	286	320	310	A	352	388	346	334	286		A					
11						314	298	298	A	316	392	324	374	A	A	A	278	270	266					
12					A	G 344	362		A	296	244	A	A	G	402	364	350	A		A				
13					290	360	A	292	A	A	300	312	364	342	370	372	298	298	A					
14					288	264	280	G	274	332	412	392	436	418	336	444	348	304	244					
15						A	A	A	A	A	G	G	A	A	G	G	A	A	A		A			
16					266	318	302	G	A	A	374	384	404	400	432	A	A	A	306					
17						G	A	A	A	A	A	456	392	394	408	412	A	A	536					
18						252	A	A	A	A	A	A	A	A	A	474	336	300	288					
19						250	G	304	G	G	G	G	G	G	G	A	376	A	328					
20							304	A	A	A	404	G	432	434	360	354	A	A	304	298				
21						298	390	A	A	A	A	G	G	G	G	484	358	358	300					
22						318	278	A	A	A	A	A	A	A	G	G	350	A						
23						G	A	A	434	292	272	296	328	G	A	412	332	312	284	242				
24						G	A	A	E A 380	320	278	288	366	366	378	388	318	290	278					
25							304	372	282	282	284	298	364	396	332	354	304	254						
26						336	336	274	372	A	A	378	328	314	354	330	G	364	320					
27					272	294	294	260	A	A	404	G	G	A	316	A	A	356	A					
28					328	306	A	A	A	A	A	A	310	466	276	350	E A 376	A	290	290				
29					258	G 326	A	A	A	280	A	G 278	A	420	A	A	A	310	A	A				
30								A	A	322	374	G	402	342	348	348	386	316	302					
31						348	348	304	290	274	A	A	280	G	364	E A 294		354	292					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT					9	21	20	18	17	20	22	24	24	26	25	24	21	20	21	3				
MED					272	314	298	306	303	318	330	380	397	397	354	354	318	305	288	290				
U Q					289	G 346	342	G 372	370	343	404	G	G 458	G 444	G 405	G 412	354	317	305	298				
L Q					260	266	270	274	284	289	284	311	354	342	334	330	298	285	272	242				

MAY 2019 h'F2 (KM)

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IONOSPHERIC DATA STATION Wakkanai

MAY 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

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	Q 238	Q 260	Q 252	Q 248	214	206	208	206	196	198	198	188	214	198	198	A	A	198	210	256	238	250	240	226
2	Q 240	Q 242	230	222	262	206	194	202	204	196	196	196	190	198	208	194	190	204	232	228	232	238	266	250
3	250	250	240	214	232	202	200	200	210	196	196	200	184	198	186	194	A	204	228	242	242	234	234	242
4	210	230	216	224	232	220	204	204	204	198	198	194	182	200	192	200	216	216	210	228	228	208	220	210
5	A 284	266	250	268	194		A	A	208	198	192	192	180	192	186	196	198	198	220	252	252	226	210	236
6	248	260	Q 264	Q 250	Q 226	228	196	198	196	196	204	194	188	188	198	204	222	210	A	252	236	252	240	240
7	240	Q 240	Q 242	258	248	210	196	208	196	186	E A 236	204	A	190	A	A	A	220	A	A	220	234	236	238
8	248	238	254	234	238	208	202	214	202	202	194	A	A	A	A	218	214	208	208	234	226	214	232	222
9	222	A	E B 232	A 238	238	208	224	A	A	204	A	192	192	208	A	A	A	A	A	244	222	238	238	Q 220
10	Q 226	248	250	244	234	202	228	A	A	212	202	A	202	202	202	196	216	276	A	246	236	A	230	236
11	248	Q 238	Q 280	254	258	206	200	206	A	206	194	196	206	A	A	A	194	196	208	286	244	A	A	244
12	A	250	254	A	A	230	198	222	A	196	196	A	A	210	A	226	A	A	256	A	234	216	A	A
13	288	266	A	272	A	220	A	222	A	A	A	196	196	208	206	196	204	200	A	242	222	210	212	238
14	238	Q 280	270	268	B	206	220	242	216	206	200	A	198	A	198	194	206	216	216	216	206	220	A	A
15	270	244	274	274	236	A	A	A	A	A	208	212	A	A	200	206	A	A	A	A	A	A	A	A
16	250	274	252	222	230	232	218	224	A	A	184	198	206	198	198	A	A	A	A	258	228	222	222	236
17	A	A	232	226	198	212	A	A	A	A	A	E A 274	204	198	194	A	A	A	234	246	258	A	A	A
18	228	Q 254	Q 228	Q 246	Q 256	206	A	A	A	A	A	A	A	A	A	194	196	204	208	276	242	236	218	232
19	Q 238	Q 238	Q 230	Q 262	248	204	204	A	192	192	194	196	196	190	174	218	232	A	214	288	248	226	248	232
20	216	252	252	252	262	222	228	A	A	A	186	204	190	190	202	222	A	A	226	226	244	212	212	214
21	242	240	276	252	254	222	222	A	A	A	A	194	196	202	202	202	200	206	214	252	236	220	220	220
22	242	240	226	224	232	242	218	A	A	A	A	A	A	A	200	210	222	A	A	226	252	230	202	Q 202
23	234	234	224	Q 234	236	214	A	A	214	A	A	196	196	196	A	A	232	204	204	204	248	260	208	214
24	214	Q 250	Q 236	Q 270	240	222	A	A	A	A	A	198	218	194	188	188	206	206	192	250	220	220	220	238
25	238	238	238	Q 230	212	216	208	204	A	200	A	188	188	184	174	216	202	202	236	252	240	234	234	216
26	216	216	244	252	266	228	A	218	A	A	A	308	198	188	182	204	192	206	222	254	262	230	Q 194	230
27	Q 214	Q 214	238	Q 244	210	210	A	A	A	A	196	196	196	A	A	A	A	204	A	258	266	262	242	200
28	232	Q 270	270	286	232	228	A	A	A	A	A	A	A	196	196	A	A	A	A	222	248	248	232	232
29	240	Q 234	Q 222	224	196	212	A	A	A	A	A	192	A	192	A	A	A	202	A	A	282	A	Q 226	208
30	264	234	234	226	230	206	222	A	A	A	196	188	194	210	200	200	200	200	208	268	262	230	230	A
31	216	250	Q 250	250	250	214	204	206	206	184	A	A	194	194	198	A	A	198	212	244	226	226	210	232
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	30	30	28	30	20	15	12	16	18	23	23	24	22	20	18	22	20	27	30	26	26	26
MED	238	244	243	247	236	212	206	206	204	198	196	196	196	197	198	201	205	204	214	246	239	230	228	232
U Q	248	257	254	254	252	222	221	222	209	203	200	200	202	201	200	213	216	208	227	256	248	238	236	238
L Q	224	238	232	226	230	206	200	204	196	196	194	192	190	191	188	195	198	200	208	228	228	220	212	216

MAY 2019 h'F (KM)

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IONOSPHERIC DATA STATION Wakkanai

MAY 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

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					B	124	96	102	102	100	100	100	102	102	102	102	102	102	A	A				
2					114	114	110	114	114	116	108	104	110	104	104	104	104	108	108	B				
3					A	128	110	104	104	104	104	98	98	A	106	98	A	A	98	A				
4					98	110	102	102	102	102	102	102	102	102	102	102	102	94	106	B				
5					112	112	100	100	100	100	100	100	100	100	100	104	104	104	104	A				
6					A	A	108	108	108	104	104	104	104	104	104	116	A	108	114	108				
7				100	B	114	114	112	106	106	96	106	A	106	110	102	102	124		A				
8				A	A	98	112	112	112	112	108	108	104	108	110	108	108	108	108	B	B			
9				A	124	A	104	104	104	104	104	A	A	A	A	A	A	A	A	A	A			
10				108	B	120	106	106	106	106	106	106	106	106	98	98	98	108	A	A	A			
11				A	108	108	108	108	108	108	108	108	108	108	108	A	A	108	114	A	A			
12				A	A	114	104	104	106	106	104	104	104	104	108	108	108	108	108	A	A			
13				A	A	A	108	108	108	108	108	106	106	102	102	102	102	108	108	A	108			
14				B	100	100	102	108	108	108	108	108	100	106	106	106	106	106	106	A				
15				102	A	106	102	102	102	102	102	102	102	102	102	102	102	102	102		A			
16				A	120	108	108	108	108	108	106	102	A	102	A	108	108	108	108	108	A			
17				A	A	108	108	108	108	108	108	106	A	102	A	102	A	102	A	A	A			
18				A	A	106	106	106	106	106	106	106	106	106	106	A	98	96	112	112				
19				112	102	102	102	102	102	102	102	102	102	102	96	98	104	112	106	A	A			
20				A	106	106	106	106	106	106	106	106	96	A	106	106	112	112	100	A				
21				A		120	110	110	110	112	112	110	98	110	100	110	110	110	110	A	A			
22				A	B	120	108	108	108	108	108	98	98	A	98	98	110	110						
23				A	B	110	110	100	100	108	108	102	102	A	102	108	114	114	A	A	A			
24				B	108	120	120	120	120	120	110	108	108	A	108	108	108	108	A	A	A			
25				A	A	126	124	108	108	108	108	108	108	108	A	108	108	108	96	A	A			
26					A	110	110	110	110	110	110	110	110	108	100	102	A	A	102	A	A			
27					128	108	108	108	108	108	108	108	108	108	108	A	A	108	108	A	A			
28				B	116	122	104	104	104	104	104	104	104	A	104	104	104	104	104	A				
29				B	B	124	102	102	102	102	102	102	102	102	102	102	102	116	116	A	A			
30				B	A	126	116	116	116	114	108	108	108	104	104	104	A	114	96	102	A			
31				A		108	108	108	112	112	112	110	110	110	110	96	96		A	96	96	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				4	13	28	31	31	31	31	31	30	27	24	27	27	22	27	23	5	1			
MED				105	108	111	108	108	108	108	106	106	104	104	104	104	104	108	106	108	108			
U Q				110	118	120	110	110	108	108	108	108	108	108	106	108	108	110	108	110				
L Q				101	104	108	104	104	104	104	104	102	102	102	100	102	102	104	102	99				

IONOSPHERIC DATA STATION Wakkanai

MAY 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

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	B	B	94	104	B	148	124	112	106	118	118	118	106	110	104	104	104	104	94	104	104	108	96	84
2	B	B	86	114	114	112	112	112	120	G	104	106	106	100	104	G	116	132	130	B	122	100	100	118
3	96	112	110	88	88	88	100	98	104	104	104	108	104	96	104	90	90	90	118	82	100	100	B	B
4	100	94	94	86	86	96	110	110	110	98	98	98	88	160	90	144	104	104	102	B	B	102	102	102
5	92	102	102	102	112	120	110	110	110	114	106	106	106	G	92	142	G	G	112	102	102	98	92	96
6	98	96	96	96	96	134	116	108	94	102	116	104	G	184	152	152	98	110	104	104	B	104	92	92
7	B	B	92	92	B	94	120	110	104	104	104	104	104	138	118	108	108	112	106	106	106	106	124	B
8	102	92	92	92	102	100	106	106	116	112	100	100	102	108	108	136	102	102	102	B	B	B	134	104
9	98	98	98	98	96	106	106	106	106	106	106	98	98	98	98	92	86	86	102	102	102	102	102	102
10	90	90	92	96	B	120	102	102	102	106	106	100	100	100	100	100	108	114	106	104	110	110	110	102
11	96	96	96	96	96	108	108	108	98	104	104	104	104	100	98	98	100	116	122	120	108	108	108	108
12	102	122	126	120	112	112	106	94	100	106	110	110	118	126	118	134	118	108	108	104	96	96	104	104
13	96	98	98	106	98	100	110	110	104	98	98	102	104	104	104	104	104	104	108	108	100	100	98	96
14	96	136	136	116	120	120	104	104	106	106	106	108	108	102	104	98	170	134	118	110	110	102	102	102
15	112	112	112	108	108	108	108	100	110	104	110	102	112	118	118	140	112	112	104	104	104	104	96	96
16	102	Q 100	100	100	108	110	110	100	100	100	100	100	98	96	96	108	108	108	108	108	102	102	102	96
17	96	90	90	90	88	114	114	92	102	102	102	102	104	98	98	98	98	118	112	106	106	106	100	96
18	96	90	90	98	98	130	118	108	108	108	108	108	108	100	100	100	94	98	118	92	102	102	102	98
19	B	B	118	90	104	132	116	116	108	114	108	108	108	108	100	136	120	106	112	112	96	124	102	106
20	104	94	94	94	94	122	114	112	106	106	106	98	98	98	98	148	114	114	114	104	104	104	94	94
21	94	94	90	90	90	128	116	108	108	108	108	108	108	G	104	104	104	116	108	108	122	104	104	B
22	B	106	104	106	B	126	116	106	106	106	102	102	102	102	136	100	118	108	106	110	110	110	106	94
23	94	94	94	94	B	128	112	112	112	104	104	96	96	96	112	112	112	112	106	106	106	106	94	98
24	98	98	96	96	96	124	116	116	106	106	102	102	98	98	98	98	98	100	96	96	106	106	96	96
25	96	86	94	94	94	124	124	116	106	106	106	106	106	102	96	134	122	122	106	106	106	98	104	92
26	92	B	92	92	92	124	114	114	106	106	106	106	108	98	96	106	92	92	106	106	106	106	92	92
27	96	96	96	94	G	114	112	108	102	102	102	102	102	102	102	98	94	144	106	106	98	114	104	104
28	96	96	96	92	114	110	110	110	106	110	100	100	100	98	114	114	110	108	108	116	116	106	100	100
29	B	B	B	96	B	112	112	104	104	104	102	102	102	102	110	106	106	118	102	124	130	108	98	98
30	98	B	96	106	106	112	110	110	110	112	120	100	98	98	102	102	102	102	104	104	104	104	104	94
31	94	94	94	92	100	112	112	112	106	106	102	102	114	96	98	92	92	106	124	108	108	102	104	92
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	24	30	31	24	31	31	31	31	30	31	31	30	29	31	30	30	30	31	28	28	30	30	28
MED	96	96	96	96	98	114	112	108	106	106	104	102	104	100	102	105	104	108	106	106	106	104	102	97
U Q	99	101	100	104	108	124	116	112	108	108	108	106	108	108	110	134	112	116	112	108	109	106	104	102
L Q	95	94	92	92	94	108	108	104	104	104	102	100	100	98	98	98	98	104	104	104	102	102	96	94

IONOSPHERIC DATA STATION Wakkanai

MAY 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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1			F1	F1		C2	C2	C3	C2	C2	C2	C2	C1	C2	C2	C3	C4	C4	L3	L8	F5	F3	F4	F1
2			F1	F1	C2	C4	C2	C2	C1		C1	C2	C1	C2	LC11		C2	C2	C4		F1	F3	F5	F2
3	F4	F2	F2	F2	L2	LC31	LC21	LC22	C2	C2	C1	C2	C2	L2	C2	L2	L4	LL31	CL21	L2	FF22	F1		
4	F1	F1	F1	F2	C1	LC13	C2	C2	C3	C3	C2	C2	LC21	H1	C2	C1	C2	C3	F1			F4	F3	F9
5	F7	F1	F1	F1	C2	C2	C4	C3	C2	C2	C2	C1	C1		C1	H1			C2	L1	F6	F1	F1	F3
6	F2	F4	F2	F2	L1	C2	C2	C2	C1	C2	C2	C1		C1	C1	H1	L2	C2	C4	L1		F4	F2	F2
7			F1	C1		LC11	C2	C2	C2	C2	C2	C2	L2	C2	C3	C6	C8	CQ52	L8	L8	L6	L5	L1	
8	L3	L3	F2	L3	L2	C1	CQ31	C3	CQ31	CQ21	CQ21	CQ32	CQ41	CQ21	CQ41	HC13	C2	L2	C3				FF23	F6
9	F6	F9	F4	L3	C2	C5	C4	C4	C4	C2	C2	L2	L2	L4	L4	L3	L6	L6	L8	L4	L8	F4	F1	F2
10	F1	F1	F1	C1		C2	C2	C3	C3	C3	C2	C3	C2	C2	C3	CL21	C2	C4	L8	L4	L4	F7	F6	F1
11	F1	F1	F2	L2	C2	C4	C2	C4	C4	C2	C2	C1	C1	C4	C6	CQ82	LQ41	C2	C3	C3	L5	FQ81	FQ81	F3
12	FF92	F1	F1	L3	L6	C3	C4	C3	C4	C2	C2	C3	C2	C1	C2	C2	C4	C7	C3	L7	L4	F6	F6	F7
13	F6	F9	F7	LL13	L4	L3	C7	C3	C3	C4	C3	C2	C2	C2	C2	C3	C3	LC22	C8	L6	C3	F5	F2	F2
14	F3	FF21	F1	L1	C1	C2	C3	C4	C2	C2	C2	C2	C3	C2	C2	C1	C2	C1	C1	L1	L1	F4	F7	F8
15	F1	F1	F3	C2	L4	C3	C5	C7	C3	C3	C1	C1	C2	C2	C1	C1	C2	C3	C5	L5	L9	F9	F9	F8
16	F6	F3	F2	L1	C1	C3	C4	C4	C4	C5	C2	C2	L3	L2	L2	C3	C5	CQ82	CQ51	C2	L8	F7	F4	F3
17	F4	F5	F5	L4	C1	C2	CL51	LC13	C3	C4	C7	C2	L2	C2	L2	LL21	LQ42	C4	C4	L4	L5	F8	F6	F6
18	F4	F2	F2	L2	L1	C2	C5	C4	C5	C3	C2	C2	C2	C5	C2	L2	C2	C4	C2	L2	L4	F8	F1	F2
19			F1	C1	C1	C2	C3	C3	C2	C1	C1	C1	C2	C1	L1	C2	C2	C4	C4	L3	L6	L2	F5	F3
20	F5	F3	F4	LL22	LC11	C3	C3	C3	C4	C3	C2	C2	C2	C2	C2	C2	C3	C6	C5	L3	L5	F5	F7	F4
21	F4	F2	F2	L2	L2	C2	C4	CL31	C5	C3	C2	C2	C1		C2	C2	C2	C4	C5	L5	L1	F1	F1	
22		F1	F2	L1		L2	C6	C4	C5	C5	C3	C2	C2	L2	C1	C2	C2	C6	L8	L7	L2	L7	F1	F1
23	F2	F2	F2	L1		C4	C4	C5	C3	C3	C3	C2	C2	L2	C2	C2	C2	C2	L2	L3	L3	F3	F2	F5
24	F3	F2	F2	L2	L1	C3	C6	C4	C3	C2	C2	C2	C3	L2	LC21	C2	C1	L3	L4	L5	L2	F3	F7	F4
25	F2	F2	F2	L1	L1	C3	C2	C3	C3	C2	C2	C1	C2	C2	L	CL11	CL22	CL31	C3	L5	L3	F3	FF21	F2
26	F2		F2	F1	F3	C2	C4	C4	C4	C3	C3	C2	C1	C2	C2	C2	L3	L2	C3	L3	L8	F5	F3	F3
27	F1	F2	FQ31	FQ21		CQ31	CQ51	CQ41	CQ41	CQ31	CQ21	C2	C1	C2	C2	L4	L4	C2	C8	L3	L3	F3	F4	FQ32
28	FQ41	FF22	FQ21	LQ21	CQ21	C3	C7	C5	C4	CQ41	CQ32	CQ31	C2	L3	CL21	C2	C5	C5	C4	LQ41	F3	FQ42	FQ31	FQ21
29				C1		C4	C4	C3	C3	C2	C4	C1	C2	C2	C3	C3	C6	CQ32	C7	CQ83	CC71	CQ72	FQ32	F1
30	F1		FF21	L3	L4	CLQ21	C4	LC24	C4	C3	C1	LC11	C2	C2	C2	C2	L2	C2	C4	C2	L5	L4	F6	F9
31	F4	F2	F1	LL11	C1	C3	C3	C3	C3	C2	C3	C2	C2	C2	C2	C4	L4	L4	CL21	C3	L4	F3	FF11	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																								

MAY 2019 TYPES OF Es

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IONOSPHERIC DATA STATION Kokubunji

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

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

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

MAY 2019 fxI (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

MAY 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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F	31	F	F	27	38	51	48	46	47	R	51	44	A	63	64	61	53	A	54	53	52	46	42
2	38	38	F	F	30	38	42	46	51	A	48	46	A	58	65	74	70	63	60	54	46	43	43	41
3	41	39	38	32	F	34	53	52	50	57	50	52	60	62	64	60	54	55	55	65	64	52	51	F
4	46	34	35	F	F	38	48	56	56	57	46	57	51	A	A	A	58	61	62	70	68	58	42	38
5	F	32	30	30	F	A	A	55	A	A	49	A	49	51	57	54	55	52	50	64	58	50	44	38
6	36	34	32	30	28	37	46	49	53	56	50	52	52	54	58	A	58	57	A	A	A	A	F	47
7	44	42	39	38	38	44	51	52	50	A	A	55	57	52	60	59	59	60	A	67	66	F	F	F
8	47	43	39	A	38	38	42	54	59	60	A	A	53	A	A	A	56	A	A	73	69	58	46	37
9	41	34	F	33	30	39	46	A	A	A	58	A	49	49	51	59	62	A	A	58	61	58	48	A
10	A	A	F	33	29	37	48	A	A	A	A	A	A	54	58	65	68	63	A	67	67	47	A	46
11	A	A	40	47	F	46	53	A	A	A	A	61	62	70	74	80	82	68	58	60	72	F	F	F
12	46	50	41	34	33	32	34	A	A	A	A	R 46	R	46	A	52	54	A	A	A	52	46	34	A
13	33	A	A	30	A	40	51	60	A	A	A	A	54	54	56	52	56	53	54	67	64	A	A	A
14	F	F	F	F	38	50	A	A	50	51	47	48	53	A	60	77	72	93	98	77	40	26	A	29
15	A	F	30	29	26	A	A	A	A	A	A	A	A	A	A	A	A	A	52	52	A	A	A	A
16	F	32	33	30	26	38	47	A	52	A	A	50	55	52	52	52	56	50	54	64	69	F	A	A
17	F	33	35	F	33	34	35	A	A	A	A	A	52	A	54	A	46	46	50	61	62	F	F	A
18	F	39	37	36	F	39	A	47	49	47	A	A	A	47	50	55	55	59	A	62	66	48	32	32
19	F	33	32	31	30	39	50	44	A	A	A	A	A	A	43	42	48	43	42	52	57	49	37	32
20	A	28	26	F	25	A	A	50	A	48	48	49	A	50	50	54	52	A	A	67	A	48	50	A
21	A	A	A	26	F	A	46	48	A	A	A	A	A	A	A	48	A	51	56	61	61	F	F	F
22	31	F	F	F	32	36	44	55	51	A	A	A	A	A	A	44	45	46	48	55	A	A	A	F
23	F	30	27	A	A	A	A	A	A	A	A	A	A	A	A	47	51	59	A	62	65	51	41	34
24	34	F	27	A	26	34	A	A	56	A	48	50	55	55	60	61	60	57	53	52	56	48	44	42
25	F	F	42	F	F	40	40	A	56	E 54	49	50	50	51	49	49	52	54	53	59	70	64	44	38
26	F	F	F	28	A	35	53	A	A	58	A	56	A	A	46	48	53	54	54	63	56	F	A	F
27	34	F	F	32	28	36	53	50	A	A	A	A	A	A	53	55	53	53	44	52	57	56	A	A
28	A	A	41	39	34	31	A	A	A	A	A	A	A	A	A	A	48	49	52	58	57	58	51	F
29	F	F	F	31	31	41	A	A	52	50	A	A	A	A	54	66	72	A	75	80	79	70	61	F
30	40	36	36	37	F	A	A	54	53	A	A	A	A	56	63	60	A	54	57	60	62	F	F	50
31	A	F	F	F	34	44	48	54	57	47	A	A	A	51	A	61	A	54	60	70	78	45	43	F
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	13	17	19	19	20	25	21	17	16	12	10	14	15	17	22	25	27	25	21	29	27	20	17	14
MED	40	34	35	32	30	38	48	52	52	52	48	50	53	52	56	55	56	54	54	62	62	50	44	38
U Q	45	39	39	36	34	40	51	54	56	57	50	55	55	56	60	62	61	60	59	67	68	58	49	42
L Q	34	32	30	30	28	36	43	48	50	48	48	49	50	50	51	50	52	52	51	56	57	48	42	34

IONOSPHERIC DATA STATION Kokubunji

MAY 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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								L		U L 416	U L 436	U L 432	A	A	A	U L 428	A	L	A					
2							U L 344	U L 412	400	A	420	U L 428	A	U L 436	U L 432	U L 408	380	L						
3							L		U L 440	416	U L 448	U L 444	432	E A 440	A	U L 416	A	A	A					
4							L	A	A	U L 432	U L 432	U L 436	A	A	A	A	A	A	A					
5							A	A	A	A	U L 440	A	U L 428	U L 424	U L 428	U L 416	392	A	A					
6								L	U L 416	A	436	444	U L 448	U L 432	U L 436	A	A	A	A					
7							L		A	A	A	A	A	U L 456	U L 428	420	A	A	A					
8							A	A	416	A	A	A	A	A	A	A	A	A	A					
9							A	A	A	A	A	A	A	U L 436	U L 432	U L 428	396	A	A					A
10								A	A	A	A	A	A	U L 424	432	A	A	A	A					
11							L	A	A	A	A	A	456	440	440	424	384	L	L					
12							A	A	A	A	A		R	U L 420	A	U L 408	380	A	A					
13							L	A	A	A	A	A	A	U L 440	U L 420	U L 404	384	U L 376	A					
14							A	A	A	A	A	A	A	A	U L 448	U L 416	U L 376	364						
15							A	A	A	A	A	A	A	A	A	A	A	A	A					
16								A	A	A	A	A	A	U L 424	U L 424	U L 408	392	A	A					
17								A	A	A	A	A	A	A	A	A	U L 396	U L 356	A					
18							A	A	A	A	A	A	A	A	A	U L 436	A	380	A					
19							U L 360	U L 376	A	A	A	A	A		U L 400	U L 388	380	A	312					
20							A	A	A	A	U L 420	A	A	U L 420	A	A	380	A	A					
21							L	A	A	A	A	A	A	A	A	A	A	A	L					
22						A	A	A	A	A	A	A	A	A	A	408	A	A	A					
23						A	A	A	A	A	A	A	A	A	A	U L 388	A	A	A					
24							A	A	A	A	A	U L 444	A	U L 444	U L 440	U L 408	A	L	A					
25								A	A	A	A	U L 444	U L 444	A	A	U L 408	U L 388	A	A					
26						U L 312	A	A	A	A	A	U L 416	A	A	U L 428	404	U L 376	A	A					
27							L	A	A	A	A	A	A	A	A	A	404	U L 360	U L 344					
28							A	A	A	A	A	A	A	A	A	A	A	A	A					
29							A	A	A	U L 440	A	A	A	A	A	U L 412	A	A	A	A				
30						A		392	A	A	A	A	A	A	A	A	A	A	L					
31							L	A	U L 420	A	A	A	A	A	A	A	A	392	316					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						1	2	3	5	4	7	8	5	13	13	19	14	6	3					
MED						U L 312	U L 352	U L 392	U L 416	U L 424	U L 436	U L 440	U L 444	U L 436	U L 432	U L 408	384	370	316					
U Q								U L 412	U L 430	U L 436	U L 440	U L 444	452	U L 440	U L 438	U L 420	392	380	U L 344					
L Q								U L 376	408	416	420	U L 430	430	U L 424	U L 426	U L 408	380	U L 360	312					

MAY 2019 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 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

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	U R 356	A	A	A	A	A	A	A	B					
2							A	A	A	A	A	A	A	U R 364	R	U R 300	U R 264	R	B					
3							A	A	A	A	U R 364	A	U R 360	U A 340	A	A	A	A	B					
4							A	A	A	A	A	R	A	A	A	A	A	A	B					
5							A	A	A	A	A	A	A	A	U A 336	A	U A 276	A	B					
6						B	A	A	A	A	A	A	A	A	A	A	A	A	B					
7						B	A	A	A	A	A	U A 360	A	U R 348	U A 328	A	A	A	B					
8						B	A	A	A	A	A	A	A	A	A	A	A	A	B					
9						B	A	A	A	A	A	A	A	A	A	U A 328	A	A	A					A
10							A	A	A	A	A	A	A	A	A	A	A	A	B					
11							A	A	A	A	A	A	A	A	U R 328	U R 328	U R 280	A	B					
12							A	A	A	A	A	A 352	A	U A 328	A	R	U A 284	A	B					
13							A	A	A	A	A	A	A	A	U R 324	R	U A 288	A	B					
14							A	A	A	A	A	A	A	A	A	U R 292	U R 268	U A 224	B					
15							A	A	A	A	A	A	A	A	A	A	A	A	B					
16						B	A	A	A	A	A	A	A	U R 332	U R 336	A	A	A	B					
17							A	A	A	A	A	A	A	A	A	A	A	A	B					
18							A	A	A	A	A	A	A	A	A	A	A	A	B					
19							A	A	A	A	A	A	A		A	A	A	A	A					
20							A	A	A	A	A	A	A	A	A	A	A	A	B					
21							U A 224	A	A	A	A	A	A	A	A	A	A	A	B					
22						B	A	A	A	A	A	A	A	A	A	U A 336	A	A	B					
23						B	A	A	A	A	A	A	A	A	A	A	A	A	B					
24							A	A	A	A	A	A	A	A	U A 336	A	A	A	A					
25						U R 204	A	A	A	A	A	A	A	A	A	R	U A 284	A	B					
26						B	A	A	A	A	A	A	A	A	A	316	A	A	B					
27						A	A	A	A	A	A	A	A	A	A	A	R	A	A					
28							A	A	A	A	A	A	A	A	A	A	A	A	A					
29						A	A	A	A	A	A	A	A	A	A	A	A	A	B	A				
30						B		A	A	A	A	A	A	A	A	A	A	A	B					
31						B	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						1	1				2	2	1	5	6	6	7	1						
MED						U R 204	U A 224				U R 360	A 356	U R 360	U R 340	U 332	U 322	U A 280	U A 224						
U Q														U R 356	U 336	U 328	U A 284							
L Q														U 330	U 328	U R 300	U R 268							

MAY 2019 foE (0.01MHz)

IONOSPHERIC DATA STATION Kokubunji

MAY 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

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	J A 50	J A 48	J A 34	J A 35	22	J A 26	J A 38	35	J A 48	38	G	J A 40	44	J A 66	J A 72	35	42	28	J A 107	J A 62	J A 35	25	J A 53	E B 16
2	E B 16	J A 31	J A 33	J A 44	J A 35	32	J A 29	J A 36	J A 43	J A 74	36	40	J A 42	G	G	G	G	G	J A 30	J A 28	24	20	E B 16	19
3	21	20	22	E B 17	E B 16	J A 24	30	33	J A 43	J A 53	G	40	G	38	J A 51	37	J A 45	J A 75	J A 40	J A 72	J A 85	J A 64	J A 52	J A 40
4	J A 24	J A 27	J A 27	J A 26	J A 25	J A 29	J A 32	J A 38	J A 54	J A 42	42	G	J A 48	J A 77	J A 160	J A 110	J A 69	J A 80	J A 82	J A 86	J A 64	J A 38	J A 32	J A 46
5	J A 35	J A 27	J A 26	J A 24	E B 15	J A 62	J A 64	J A 47	J A 54	J A 68	J A 43	J A 48	J A 41	J A 42	36	J A 37	32	J A 44	J A 36	J A 38	J A 23	J A 23	J A 27	20
6	J A 23	J A 25	22	J A 32	E B 16	J A 28	J A 37	J A 40	J A 51	J A 50	41	J A 48	38	37	37	J A 162	J A 86	J A 155	J A 88	J A 132	J A 167	J A 129	J A 50	J A 32
7	J A 28	J A 26	J A 34	J A 38	E B 16	E B 16	30	J A 45	J A 44	J A 65	J A 80	44	J A 49	41	40	40	J A 47	J A 64	J A 73	J A 80	J A 53	J A 158	J A 40	J A 39
8	J A 67	J A 54	J A 46	J A 48	J A 50	J A 28	J A 35	J A 113	J A 147	J A 82	J A 107	J A 91	45	J A 58	J A 58	J A 58	J A 73	J A 234	J A 163	J A 33	J A 52	J A 26	E B 16	E B 16
9	19	J A 64	J A 74	J A 37	J A 33	J A 31	J A 42	J A 58	J A 86	J A 73	J A 70	J A 80	J A 53	40	39	38	34	J A 69	J A 72	J A 43	J A 38	J A 50	J A 54	J A 68
10	J A 54	J A 54	J A 35	J A 32	J A 32	J A 26	J A 35	J A 73	J A 114	J A 72	J A 72	J A 75	J A 80	41	38	J A 67	J A 54	J A 134	J A 76	J A 62	J A 82	J A 72	J A 126	J A 88
11	J A 88	J A 86	J A 77	20	E B 16	E B 17	J A 36	J A 124	J A 108	J A 102	J A 63	J A 59	39	38	G	G	G	29	22	22	J A 22	J A 54	J A 65	J A 51
12	J A 50	J A 37	J A 29	J A 36	24	J A 25	J A 36	J A 41	J A 50	J A 51	J A 66	40	42	39	J A 54	G	32	J A 54	J A 65	J A 56	J A 42	J A 66	J A 54	J A 52
13	J A 53	J A 80	J A 65	J A 37	J A 80	J A 28	J A 30	J A 43	J A 64	J A 74	J A 95	J A 56	J A 49	37	G	G	37	J A 37	J A 65	J A 50	J A 66	J A 121	J A 111	J A 121
14	J A 73	J A 52	J A 34	J A 40	J A 64	J A 51	J A 83	J A 77	J A 46	J A 46	J A 58	J A 48	J A 48	J A 67	36	G	G	27	J A 29	J A 32	J A 22	J A 30	J A 110	J A 81
15	J A 53	J A 28	22	J A 47	J A 67	J A 64	J A 59	J A 67	J A 226	J A 247	J A 111	J A 68	J A 174	J A 117	J A 88	J A 102	J A 68	J A 54	J A 69	J A 53	J A 79	J A 105	J A 88	J A 65
16	J A 49	J A 24	J A 33	J A 35	J A 23	J A 30	J A 38	J A 84	J A 99	J A 70	J A 76	J A 56	J A 56	38	G	35	33	J A 39	J A 56	J A 75	J A 108	J A 52	J A 88	J A 68
17	J A 23	J A 62	J A 46	J A 52	J A 26	J A 28	J A 36	J A 50	J A 60	J A 85	J A 97	J A 74	J A 63	J A 81	J A 65	J A 68	36	J A 52	J A 47	J A 49	J A 54	J A 64	J A 54	J A 62
18	J A 67	J A 52	J A 42	J A 34	J A 30	J A 31	J A 53	J A 53	J A 63	J A 48	J A 60	J A 62	J A 58	J A 50	J A 47	39	J A 63	J A 86	J A 109	J A 107	J A 30	J A 64	J A 50	J A 39
19	J A 28	J A 40	23	J A 30	J A 26	J A 27	J A 34	33	J A 45	39	40	J A 61	J A 66	J A 57	J A 45	33	34	J A 40	J A 29	J A 34	J A 34	J A 42	J A 42	J A 34
20	J A 42	J A 40	J A 29	J A 30	E B 14	J A 43	J A 52	J A 47	J A 55	J A 120	J A 58	J A 60	J A 66	J A 42	J A 50	J A 52	J A 46	J A 64	J A 84	J A 56	J A 64	J A 81	J A 54	J A 67
21	J A 97	J A 51	J A 62	J A 90	J A 47	J A 65	33	J A 49	J A 55	J A 60	J A 73	J A 89	J A 72	J A 56	J A 88	J A 100	J A 79	J A 90	J A 30	J A 55	J A 92	J A 110	J A 54	J A 60
22	J A 41	J A 29	J A 29	J A 29	J A 29	J A 43	J A 41	J A 56	J A 49	J A 56	J A 74	J A 101	J A 79	J A 80	J A 58	38	J A 59	J A 62	J A 65	J A 177	J A 152	J A 111	J A 88	J A 67
23	J A 38	J A 32	J A 35	J A 36	J A 45	J A 46	J A 50	J A 78	J A 74	J A 116	J A 85	J A 103	J A 88	J A 49	J A 41	40	J A 46	J A 55	J A 81	J A 44	J A 64	J A 64	J A 52	J A 35
24	J A 55	J A 34	J A 52	J A 53	J A 48	J A 26	J A 46	J A 66	J A 61	J A 100	J A 65	40	J A 49	J A 49	39	J A 55	J A 51	J A 51	J A 36	J A 31	J A 47	J A 44	J A 40	J A 66
25	J A 22	E B 16	J A 24	22	J A 29	G	31	J A 47	J A 55	J A 53	J A 53	J A 45	J A 44	J A 54	J A 49	G	34	J A 39	J A 51	J A 55	J A 91	J A 45	J A 87	J A 54
26	J A 73	J A 54	J A 35	J A 40	J A 60	J A 29	J A 52	J A 71	J A 78	J A 74	J A 99	J A 62	J A 81	J A 59	J A 40	G	J A 48	J A 63	J A 53	J A 58	J A 90	J A 101	J A 68	J A 53
27	J A 51	J A 34	J A 40	J A 30	J A 25	J A 23	J A 35	J A 50	J A 58	J A 69	J A 67	J A 119	J A 119	J A 104	J A 82	J A 45	G	J A 40	J A 33	J A 72	J A 40	J A 30	J A 64	J A 82
28	J A 74	J A 107	J A 56	J A 28	J A 46	J A 30	J A 124	J A 88	J A 129	J A 143	J A 122	J A 62	J A 154	J A 168	J A 83	J A 114	J A 50	J A 51	J A 44	J A 54	J A 40	J A 39	J A 33	J A 52
29	J A 34	J A 31	J A 25	J A 23	J A 23	J A 24	J A 52	J A 62	J A 78	J A 50	J A 120	J A 240	J A 215	J A 80	J A 68	J A 38	J A 68	J A 100	J A 77	J A 63	J A 52	J A 55	J A 64	J A 64
30	J A 55	J A 54	J A 43	J A 50	J A 110	J A 104	J A 67	J A 38	J A 54	J A 105	J A 122	J A 155	J A 86	J A 82	J A 72	J A 49	J A 67	J A 71	J A 80	J A 123	J A 81	J A 47	J A 66	J A 110
31	J A 63	J A 66	J A 34	J A 37	J A 52	J A 26	J A 36	J A 58	J A 122	J A 54	J A 59	J A 74	J A 73	J A 49	J A 67	J A 66	J A 116	J A 39	J A 30	22	23	J A 26	J A 113	J A 51
	00	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 50	J A 40	J A 34	J A 35	J A 29	J A 28	J A 37	J A 50	J A 58	J A 69	J A 67	J A 61	J A 56	J A 50	J A 49	39	J A 46	J A 54	J A 65	J A 55	J A 53	J A 54	J A 54	J A 53
U Q	J A 63	J A 54	J A 46	J A 40	J A 48	J A 43	J A 52	J A 71	J A 86	J A 85	J A 95	J A 80	J A 80	J A 77	J A 68	J A 66	J A 67	J A 75	J A 80	J A 72	J A 82	J A 81	J A 87	J A 67
L Q	J A 28	J A 28	27	29	E B 23	26	34	J A 41	J A 50	J A 51	53	45	44	40	38	G 33	34	39	J A 36	J A 38	J A 35	38	J A 42	39

MAY 2019 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 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

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	E B 17	18	E B 16	19	E B 15	E B 15	32	33	40	34	G	35	40	A A 66	57	33	38	28	A A 107	39	22	E B 16	21	E B 16
2	E B 16	19	E B 16	E B 16	18	28	24	31	36	A A 74	35	37	A A 42	G	G	G	G	G	23	20	E B 15	E B 16	E B 16	E B 16
3	E B 16	E B 15	E B 16	E B 17	E B 16	17	26	31	36	36	G	36	G	37	42	35	36	35	25	27	22	22	27	29
4	18	E B 16	E B 16	E B 16	E B 16	18	25	32	40	35	36	G	42	A A 77	A A 160	A A 110	54	42	23	E B 16	22	E B 16	22	23
5	22	21	21	E B 15	E B 15	A A 62	A A 64	42	A A 54	A A 68	38	A A 48	32	35	35	30	31	39	33	26	18	E B 16	E B 16	E B 17
6	18	E B 17	E B 16	E B 16	E B 16	22	32	32	36	41	37	37	36	35	36	A A 162	47	48	A A 88	A A 132	A A 167	A A 129	22	22
7	22	E B 16	E B 16	25	E B 16	E B 16	28	37	40	A A 65	A A 80	42	44	39	38	36	40	44	A A 73	28	23	25	22	26
8	34	35	31	A A 48	20	20	32	41	34	47	A A 107	A A 91	43	A A 58	A A 58	A A 58	48	A A 234	A A 163	E B 16	20	21	E B 16	E B 16
9	E B 16	E B 15	E B 15	E B 16	E B 16	22	36	A A 58	A A 86	A A 73	52	A A 80	44	36	37	36	32	A A 69	A A 72	38	26	35	30	A A 68
10	A A 54	A A 54	21	E B 16	E B 16	20	28	A A 73	A A 114	A A 72	A A 72	A A 75	A A 80	38	36	45	47	50	A A 76	44	43	33	A A 126	20
11	A A 88	A A 86	21	E B 16	E B 16	E B 17	30	A A 124	A A 108	A A 102	A A 63	55	38	37	G	G	G	27	20	E B 16	19	26	41	26
12	32	34	20	18	E B 16	21	30	A A 41	A A 50	A A 51	A A 66	37	38	36	A A 54	G	32	A A 54	A A 65	A A 56	24	E B 15	21	A A 52
13	20	A A 80	A A 65	24	A A 80	20	23	38	A A 64	A A 74	A A 95	A A 56	43	36	G	G	35	31	36	24	34	A A 121	A A 111	A A 121
14	E B 16	21	18	23	E B 16	26	A A 83	A A 77	44	39	43	43	45	A A 67	34	G	G	25	26	28	E B 15	22	A A 110	20
15	A A 53	20	E B 16	24	24	A A 64	A A 59	A A 67	A A 226	A A 247	A A 111	A A 68	A A 174	A A 117	A A 88	A A 102	A A 68	A A 54	42	43	A A 79	A A 105	A A 88	A A 65
16	E B 15	E B 16	19	E B 16	E B 16	22	28	A A 84	45	A A 70	A A 76	46	45	37	G	34	31	35	47	48	64	34	A A 88	A A 68
17	E B 16	25	23	28	E B 17	21	28	A A 50	A A 60	A A 85	A A 97	A A 74	47	A A 81	50	A A 68	33	29	43	34	18	20	24	A A 62
18	23	22	E B 16	E B 16	E B 16	22	A A 53	45	42	41	A A 60	A A 62	A A 58	45	39	37	48	30	A A 109	24	21	23	18	24
19	E B 16	20	16	E B 16	E B 14	21	27	29	A A 45	A A 39	A A 40	A A 61	A A 66	A A 57	36	32	30	35	24	23	24	31	19	E B 16
20	A A 42	22	20	18	E B 14	A A 43	A A 52	40	A A 55	41	34	44	A A 66	37	43	42	34	A A 64	A A 84	46	A A 64	42	40	A A 67
21	A A 97	A A 51	A A 62	22	17	A A 65	30	43	A A 55	A A 60	A A 73	A A 89	A A 72	A A 56	A A 88	41	A A 79	44	23	24	40	20	18	20
22	21	21	E B 16	20	20	29	35	50	39	A A 56	A A 74	A A 101	A A 79	A A 80	A A 58	35	40	44	34	30	A A 152	A A 111	A A 88	21
23	26	E B 16	21	A A 36	A A 45	A A 46	A A 50	A A 78	A A 74	A A 116	A A 85	A A 103	A A 88	A A 49	A A 41	35	37	46	A A 81	34	25	20	E B 15	20
24	21	21	E B 16	A A 53	18	20	A A 46	A A 66	50	A A 100	44	38	42	38	36	35	38	28	23	21	22	21	21	24
25	E B 16	E B 16	E B 16	E B 17	22	G	28	A A 47	48	44	43	37	36	45	42	G	31	33	40	29	45	22	21	26
26	20	20	20	22	A A 60	24	29	A A 71	A A 78	50	A A 99	36	A A 81	A A 59	35	G	41	44	41	41	28	33	A A 68	28
27	21	20	22	16	E B 16	20	27	40	A A 58	A A 69	A A 67	A A 119	A A 119	A A 104	43	41	G	28	22	45	24	21	A A 64	A A 82
28	A A 74	A A 107	22	E B 16	E B 16	20	A A 124	A A 88	A A 129	A A 143	A A 122	A A 62	A A 154	A A 168	A A 83	A A 114	42	34	33	35	29	21	21	23
29	21	E B 15	E B 16	E B 16	E B 15	22	A A 52	A A 62	44	36	A A 120	A A 240	A A 215	A A 80	44	36	55	A A 100	51	40	25	36	34	23
30	21	20	20	22	22	A A 104	A A 67	33	46	A A 105	A A 122	A A 155	A A 86	46	50	41	A A 67	43	23	47	24	27	32	29
31	A A 63	25	22	19	23	22	30	45	33	43	A A 59	A A 74	A A 73	43	A A 67	54	A A 116	32	24	E B 15	E B 16	19	21	20
	00	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	21	20	19	18	E B 16	22	30	45	48	A A 60	A A 66	A A 56	45	45	42	36	38	39	40	30	24	22	22	24
U Q	A A 34	A A 25	21	23	20	A A 28	A A 52	A A 67	A A 64	A A 74	A A 95	A A 80	A A 80	A A 67	A A 57	A A 45	48	A A 48	A A 73	43	40	34	A A 64	A A 52
L Q	E B 16	E B 16	E B 16	E B 16	E B 16	20	28	37	40	41	40	37	42	37	36	G 30	31	30	24	24	21	E B 20	21	E B 20

MAY 2019 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 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

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

MAY 2019 fmin (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

MAY 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	F	317	F	F	336	379	395	391	381	351	R	310	281	A	313	335	354	338	A	296	329	343	313	336
2	309	309	F	F	341	354	339	315	340	A	309	302	A	305	295	325	331	357	353	339	312	302	303	309
3	318	329	325	323	F	366	366	363	331	354	292	311	329	335	334	340	329	330	316	298	323	340	300	F
4	351	335	317	F	F	358	361	381	386	364	366	349	311	A	A	A	338	336	305	325	335	348	312	327
5	F	302	306	305	F	A	A	381	A	A	352	A	290	295	333	320	334	335	328	334	338	338	331	318
6	315	322	330	331	322	357	378	370	360	370	346	316	319	329	323	A	329	306	A	A	A	A	F	312
7	328	330	321	339	312	354	355	369	343	A	A	322	326	303	339	323	333	327	A	310	336	F	F	F
8	345	338	311	A	360	376	339	351	362	362	A	A	329	A	A	A	327	A	A	333	346	348	346	331
9	303	297	F	319	343	344	338	A	A	A	350	A	315	305	290	321	339	A	A	320	328	334	325	A
10	A	A	F	302	288	337	354	A	A	A	A	A	A	316	303	322	334	339	A	313	357	339	A	318
11	A	A	307	322	F	321	353	A	A	A	A	326	292	302	303	308	323	328	324	291	351	F	F	F
12	285	311	350	290	283	287	349	A	A	A	A	R 311	R	R 292	A	323	324	A	A	A	327	332	306	A
13	326	A	A	339	A	334	335	362	A	A	A	A	324	314	329	316	333	331	313	329	352	A	A	A
14	F	F	F	F	315	373	A	A	365	325	306	275	306	A	291	307	265	303	338	363	408	295	A	303
15	A	F	299	323	316	A	A	A	A	A	A	A	A	A	A	A	A	A	328	331	A	A	A	A
16	F	298	319	341	310	365	375	A	349	A	A	302	272	306	304	306	339	316	317	297	333	F	A	A
17	F	311	334	F	354	372	361	A	A	A	A	A	300	A	328	A	299	315	334	335	341	F	F	A
18	F	315	315	299	F	357	A	351	346	336	A	A	A	279	316	307	311	330	A	322	365	373	316	319
19	F	319	329	325	343	365	369	385	A	A	A	A	A	A	263	281	315	319	305	318	339	345	318	336
20	A	304	312	F	317	A	A	367	A	344	293	298	A	308	280	317	328	A	A	341	A	332	310	A
21	A	A	A	324	F	A	337	339	A	A	A	A	A	A	A	308	A	283	329	338	340	F	F	F
22	323	F	F	F	350	333	326	356	381	A	A	A	A	A	A	314	301	294	316	329	A	A	A	F
23	F	328	348	A	A	A	A	A	A	A	A	A	A	A	A	291	307	338	A	339	341	338	330	307
24	334	F	322	A	310	383	A	A	368	A	332	286	332	300	314	303	332	327	342	305	319	322	328	319
25	F	F	316	F	F	385	361	A	381	E 391	334	299	307	332	317	306	321	329	313	321	365	395	322	316
26	F	F	F	295	A	308	394	A	A	376	A	338	A	A	258	274	306	329	320	343	343	F	A	F
27	340	F	F	345	337	364	396	386	A	A	A	A	A	A	316	328	326	348	293	311	291	300	A	A
28	A	A	296	289	322	362	A	A	A	A	A	A	A	A	A	A	307	307	304	318	308	295	310	F
29	F	F	F	323	308	371	A	A	366	362	A	A	A	A	300	305	296	A	298	317	332	330	306	F
30	345	315	339	326	F	A	A	372	366	A	A	A	A	294	309	323	A	319	323	321	312	F	F	308
31	A	F	F	F	315	360	347	332	379	341	A	A	A	312	A	307	A	297	305	334	375	349	314	F
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	13	17	19	19	20	25	21	17	16	12	10	14	15	17	22	25	27	25	21	29	27	20	17	14
MED	326	315	319	323	320	360	355	367	366	358	333	310	311	305	311	314	327	328	317	322	338	338	314	318
U Q	342	328	330	331	342	372	372	381	380	367	350	322	326	315	323	323	333	336	328	334	351	346	326	327
L Q	312	306	311	302	311	340	339	351	348	342	306	299	292	298	295	306	307	311	305	312	327	326	308	309

IONOSPHERIC DATA STATION Kokubunji

MAY 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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								L		U L 420	U L 425	U L 387	A	A	A	U L 363	A	L	A					
2							U L 371	U L 371	420	A	421	U L 430	A	U L 408	U L 382	U L 374	391	L						
3							L		U L 377	417	U L 418	U L 361	420	E A 355	A	U L 371	A	A	A					
4							L	A	A	U L 399	U L 440	U L 415	A	A	A	A	A	A	A					
5							A	A	A	A	U L 408	A	U L 426	U L 409	U L 395	U L 387	390	A	A					
6								L	U L 398	A	433	421	U L 415	U L 410	U L 374	A	A	A	A					
7							L		A	A	A	A	A	U L 366	U L 388	376	A	A	A					
8							A	A	398	A	A	A	A	A	A	A	A	A	A					
9							A	A	A	A	A	A	A	U L 432	U L 411	U L 379	373	A	A					A
10								A	A	A	A	A	A	U L 414	399	A	A	A	A					
11							L	A	A	A	A	A	386	416	376	376	392	L	L					
12							A	A	A	A	A		R	U L 416	A	U L 421	365	A	A					
13							L	A	A	A	A	A	A	U L 395	U L 418	U L 417	379	U L 378	A					
14							A	A	A	A	A	A	A	A	U L 368	U L 376	U L 393	369						
15							A	A	A	A	A	A	A	A	A	A	A	A	A					
16								A	A	A	A	A	A	U L 425	U L 399	U L 411	382	A	A					
17								A	A	A	A	A	A	A	A	A	U L 392	U L 378	A					
18							A	A	A	A	A	A	A	A	A	U L 374	A	372	A					
19							U L 390	U L 418	A	A	A	A	A		U L 411	U L 419	384	A	358					
20							A	A	A	A	U L 320	A	A	U L 411	A	A	390	A	A					
21							L	A	A	A	A	A	A	A	A	A	A	A	L					
22						A	A	A	A	A	A	A	A	A	A	391	A	A	A					
23						A	A	A	A	A	A	A	A	A	A	U L 433	A	A	A					
24							A	A	A	A	A	U L 407	A	U L 401	U L 387	U L 363	A	L	A					
25								A	A	A	A	U L 425	U L 433	A	A	U L 404	U L 368	A	A					
26						U L 352	A	A	A	A	A	U L 458	A	A	U L 403	419	U L 434	A	A					
27							L	A	A	A	A	A	A	A	A	A	393	U L 374	U L 344					
28							A	A	A	A	A	A	A	A	A	A	A	A	A					
29							A	A	A	U L 381	A	A	A	A	A	U L 372	A	A	A	A				
30						A		385	A	A	A	A	A	A	A	A	A	A	L					
31							L	A	U L 397	A	A	A	A	A	A	A	A	331	366					
	00	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	3	5	4	7	8	5	13	13	19	14	6	3					
MED						U L 352	U L 380	U L 385	U L 398	U L 408	U L 421	U L 418	U L 420	U L 410	U L 395	U L 379	390	373	358					
U Q								U L 418	409	418	433	U L 428	U L 430	U L 416	U L 407	U L 417	U L 392	U L 378	366					
L Q								U L 371	U L 387	U L 390	U L 408	U L 397	400	U L 398	U L 379	U L 374	379	369	U L 344					

MAY 2019 M(3000)F1 (0.01)

IONOSPHERIC DATA STATION Kokubunji

MAY 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

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								232		308	R 372	358	E A 392	A	E A 330	284	254	270	A					
2							296	340	284	A	394	414	A	338	326	268	258	228						
3							256		322	268	404	362	302	292	272	264	284	266	256					
4							264	244	238	250	288	298	E A 354	A	A	A	E A 306	E A 262	E A 262					
5							A	234	A	A	298	A	408	392	298	320	298	260	E A 268					
6								260	272	254	288	352	346	318	302	A	274	E A 330	A					
7							250		E A 254	A	A	324	302	362	292	296	278	E A 278	A					
8							246	264	254	230	A	A	330	A	A	A	E A 300	A	A					
9							E A 286	A	A	A	E A 294	A	356	392	406	320	272	A	A					A
10								A	A	A	A	A	A	334	338	300	264	E A 258	A					
11							258	A	A	A	A	E A 328	358	322	306	288	262	256	256					
12							E A 304	A	A	A	A		R	R 418	A	316	296	A	A					
13							272	246	A	A	A	A	338	340	320	320	292	286	314					
14							A	A	E A 272	326	E A 386	E A 444	348	A	360	288	358	278						
15							A	A	A	A	A	A	A	A	A	A	A	A	E A 282					
16								A	E A 292	A	A	E A 376	438	362	364	328	276	296	E A 336					
17								A	A	A	A	A	E A 382	A	E A 318	A	362	342	E A 300					
18							A	E A 324	E A 294	312	A	A	A	E A 440	348	334	E A 324	284	A					
19							266	262	A	A	A	A	A		462	472	322	316	342					
20							A	260	A	302	410	E A 380	A	368	424	318	318	A	A					
21							294	E A 284	A	A	A	A	A	A	A	E A 336	A	428	274					
22						E A 272	E A 310	E A 272	242	A	A	A	A	A	A	390	E A 386	E A 400	298					
23						A	A	A	A	A	A	A	A	A	A	388	346	E A 278	A					
24							A	A	E A 252	A	E A 336	432	306	356	308	296	274	266	242					
25								A	E A 248	238	304	388	346	E A 306	344	354	314	290	E A 298					
26						344	228	A	A	254	A	314	A	A	506	430	324	E A 274	270					
27							230	224	A	A	A	A	A	A	330	290	306	254	330					
28							A	A	A	A	A	A	A	A	A	A	E A 354	324	E A 300					
29							A	A	E A 262	270		A	A	A	E A 370	310	E A 314	A	E A 290	E A 244				
30						A		250	260	A	A	A	A	E A 372	E A 320	288	A	E A 306	268					
31							264	E A 314	232	E A 312	A	A	A	352	A	E A 348	A	336	300					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						2	15	15	15	12	11	13	15	17	22	25	27	25	19	1				
MED						308	260	252	254	265	U 320	U 345	343	348	329	314	U 289	276	U 279	E A 244				
U Q							294	E A 284	284	310	394	401	382	382	364	342	324	320	300					
L Q							250	244	248	252	294	326	330	328	308	289	274	264	268					

MAY 2019 h'F2 (KM)

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MAY 2019 h'F (KM) 135°E MEAN TIME (G.M.T. + 9 H)

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

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	E B 276	E A 290	E B 266	E A 294	220	200	212	202	230	196	186	198	A	A	A	E A 242	A	198	A	E A 286	E A 234	202	E A 238	222
2	E B 246	E A 264	E B 244	220	222	E A 236	202	204	204	A	202	198	A	184	186	196	198	194	222	210	218	E B 250	E B 256	E B 252
3	E B 244	E B 234	226	E B 196	E B 210	216	216	212	202	200	190	182	188	E A 250	A	216	A	A	A	E A 240	224	224	E A 280	E A 258
4	206	224	E B 232	198	E B 240	E A 228	208	A	A	202	182	182	A	A	A	A	A	A	A	218	216	198	E A 250	E A 240
5	E A 258	E A 288	E A 298	E B 236	E B 256	A	A	A	A	A	204	A	184	194	198	198	204	A	A	E B 236	212	210	216	228
6	E A 250	E B 246	224	E B 238	E B 242	222	228	202	210	A	186	186	186	184	218	A	A	A	A	A	A	A	E A 248	E A 252
7	226	E A 234	E B 240	E A 256	E B 244	206	210	224	A	A	A	A	A	232	228	218	A	A	A	E A 246	218	212	E A 246	E A 270
8	E A 272	E A 298	E A 316	A	214	204	A	A	208	A	A	A	A	A	A	A	A	A	A	224	208	208	192	226
9	E B 236	E B 264	E B 254	222	218	218	A	A	A	A	A	A	A	180	194	214	218	A	A	E A 272	E A 244	232	E A 252	A
10	A	A	E A 262	E B 234	E B 262	214	214	A	A	A	A	A	A	206	196	A	A	A	A	E A 262	220	226	A	E A 250
11	A	A	E A 256	220	202	208	206	A	A	A	A	A	208	204	192	214	224	206	208	E B 266	222	E A 284	E A 348	E A 328
12	E A 350	E A 284	212	E A 294	E B 310	E A 274	A	A	A	A	A	222	R	R 398	A	194	218	A	A	A	E A 234	202	E A 276	A
13	E A 268	A	A	E A 320	A	216	206	A	A	A	A	A	A	206	184	196	E A 240	E A 232	A	236	226	A	A	A
14	228	E A 278	E A 274	E A 284	E B 264	218	A	A	A	A	A	A	A	A	208	200	212	214	220	188	184	E A 378	A	E A 320
15	A	E A 320	E B 258	E A 318	E A 326	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E A 298	A	A	A	A
16	E B 292	E B 256	E A 256	220	E B 238	212	214	A	A	A	A	A	A	192	208	196	224	A	A	E A 324	E A 290	222	A	A
17	E B 238	E A 316	E A 264	222	204	204	E A 236	A	A	A	A	A	A	A	A	A	208	220	A	E A 234	202	214	E A 264	A
18	E A 252	E A 282	E B 234	E B 236	E B 260	E A 244	A	A	A	A	A	A	A	A	A	232	A	210	A	228	204	204	E A 238	E A 268
19	E B 262	E A 254	E B 240	E B 246	E B 234	230	210	190	A	A	A	A	A	A	208	202	218	A	222	E A 238	228	212	216	228
20	A	E A 324	E A 292	E A 292	E B 260	A	A	A	A	A	E A 302	A	A	216	A	A	212	A	A	E A 250	A	E A 308	E A 306	A
21	A	A	A	E A 278	E A 258	A	224	A	A	A	A	A	A	A	A	A	A	A	220	218	E A 230	208	E A 240	E A 302
22	E A 292	E A 292	E B 268	224	E A 234	A	A	A	A	A	A	A	A	A	A	214	A	A	A	E A 242	A	A	A	E A 240
23	E A 292	E B 246	E A 286	A	A	A	A	A	A	A	A	A	A	A	A	210	A	A	A	E A 250	216	208	204	E A 256
24	210	220	E B 244	A	E A 306	194	A	A	A	A	A	190	A	194	196	E A 236	A	216	A	222	232	206	218	E A 276
25	220	228	E B 236	E B 230	E A 244	212	206	A	A	A	A	186	176	A	A	182	194	A	A	E A 246	E A 246	188	224	E A 288
26	228	E A 238	E A 276	E A 320	A	216	A	A	A	A	A	184	A	A	194	192	204	A	A	E A 236	222	E A 250	A	E A 302
27	E A 240	E A 254	E A 280	214	E B 236	202	194	A	A	A	A	A	A	A	A	A	204	196	198	E A 330	E A 274	E A 232	A	A
28	A	A	E A 250	E B 246	226	206	A	A	A	A	A	A	A	A	A	A	A	A	A	E A 264	E A 250	E A 258	E A 234	224
29	E A 264	232	226	224	E B 236	220	A	A	A	182	A	A	A	A	A	208	A	A	A	A	222	E A 254	E A 252	220
30	216	E A 254	E A 236	226	218	A	A	212	A	A	A	A	A	A	A	A	A	A	228	E A 318	226	E A 274	228	E A 306
31	A	E A 306	250	220	E A 276	208	208	A	202	A	A	A	A	A	A	A	A	E A 276	220	230	192	200	218	E A 300
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	26	29	28	28	24	16	7	6	4	7	9	5	13	13	19	14	10	8	28	27	27	23	23
MED	E 248	E A 260	E 254	E 235	E 239	212	210	204	206	198	188	186	186	199	196	204	211	207	220	E A 241	217	208	E A 240	E A 256
U Q	E A 270	E A 290	E A 271	E A 281	E B 260	E A 221	215	212	210	201	204	198	198	224	208	216	218	E A 220	222	E A 265	E A 234	E A 250	E A 256	E A 300
L Q	228	238	236	221	221	206	206	202	202	189	186	183	180	188	193	196	204	198	214	229	216	206	218	228

MAY 2019 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 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

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							114	114	A	A	108	A	108	A	A	A	108	112	B					
2							A	A	A	A	A	A	A	110	110	110	112	114	B					
3							116	112	112	A	112	A	116	112	112	108	110	A	B					
4							A	A	A	A	A	112	A	A	A	A	A	A	B					
5							A	A	A	A	A	A	A	A	112	A	112	A	B					
6						B	A	A	A	A	A	A	A	A	108	A	A	A	B					
7						B	112	110	A	A	A	110	112	114	110	106	A	A	B					
8						B	A	A	A	A	A	A	108	A	A	A	A	A	B					
9						B	A	A	A	A	A	A	A	108	108	108	112	A	A					A
10							A	A	A	A	A	A	A	A	110	A	A	A	B					
11							A	A	A	A	A	A	112	112	112	112	110	110	B					
12							A	A	A	A	A	110	110	110	110	110	110	A	B					
13							A	110	A	A	A	A	A	112	108	108	108	108	B					
14							A	A	A	A	A	A	A	A	A	108	112	112	B					
15							A	A	A	A	A	A	A	A	A	A	A	A	B					
16						B	A	A	A	A	A	A	A	110	110	114	110	A	B					
17							114	A	A	A	A	A	A	A	A	A	112	110	B					
18							118	A	A	A	A	A	A	A	A	108	A	A	B					
19							A	108	A	110	A	A	A		A	112	116	A	A					
20							A	A	A	A	A	A	A		110	108	112	A	B					
21							112	A	A	A	A	A	A	A	A	A	A	A	B					
22						B	114	A	A	A	A	A	A	A	A	114	110	A	B					
23						B	A	A	A	A	A	A	A	A	A	112	118	A	B					
24							A	A	A	A	A	A	A	A	108	A	A	A	A					
25						118	116	A	A	A	A	A	A	A	A	112	110	108	B					
26						B	A	A	A	A	A	A	A	A	A	110	A	A	B					
27						108	112	A	A	A	A	A	A	A	A	A	112	A	A					
28							A	A	A	A	A	A	A	A	A	A	A	A	A					
29						112	A	A	A	A	A	A	A	A	A	110	A	A	B	A				
30						B		A	A	A	A	A	A	A	A	A	A	A	B					
31						B	114	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	10	5	1	1	2	3	6	8	13	17	17	7						
MED						112	114	110	112	110	110	110	111	111	110	110	112	110						
U Q						118	116	113				112	112	112	111	112	112	112						
L Q						108	112	109				110	108	110	108	108	110	108						

MAY 2019 h'E (KM)

IONOSPHERIC DATA STATION Kokubunji

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

IONOSPHERIC DATA STATION Kokubunji

MAY 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

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	F4	F4	F2	F5	F1	F2	C5	C2	L3	L2		L2	CL12	L2	L4	L1	C1	C2	L5	F6	F6	F2	F4	
2		F3	F2	F3	F4	F3	L2	L2	L2	L4	L2	L1	L2						L4	F3	F2	F2		F2
3	F3	F2	F3			F3	C3	C3	C2	L1		L1		C2	C2	C1	CL22	L3	L3	F3	F4	F2	F5	F5
4	F3	F3	F1	F2	F2	F2	L2	L2	L2	L2	L1		L2	L3	L5	L4	L3	L3	L4	F3	F5	F5	F6	F6
5	F5	F4	F5	F2		F8	L5	L4	L3	L3	L2	L2	L2	L2	HL12	L2	CL12	L3	L3	F5	F4	F3	F2	F2
6	F2	F1	F1	F3		L3	L3	L2	L2	L2	L1	L2	L2	L1	C1	L4	L4	L3	L6	F5	F5	F4	F4	F5
7	F4	F2	F2	F4			C2	C2	L2	L3	L3	C1	C1	H1	H1	C1	L3	L3	L5	F5	F4	F4	F6	F7
8	F6	F7	F5	F9	F6	L5	L4	L2	L2	L3	L4	L3	C1	L2	L3	L3	L3	L4	L4	F3	F5	F5		
9	F1	F3	F3	F3	F3	L3	L3	L4	L4	L3	L3	L3	L2	C1	C1	C1	C2	L5	L5	F8	F8	F8	F7	F5
10	F9	F7	F5	F3	F2	F6	L3	L4	L4	L4	L4	L3	L3	L1	C1	L4	L3	L5	L5	F7	F4	F4	F6	F6
11	F5	F7	F4	F1			L2	L5	L5	L4	L4	L2	C1	C1				C2	C2	F1	F4	F6	F6	F7
12	F9	F6	F4	F2	F2	F3	L3	L3	L3	L2	L3	C1	C1	C1	C2		H2	L5	L5	F7	F7	F2	F4	F5
13	F2	F5	F6	F7	F7	F3	L2	C2	L3	L4	L4	L3	L2	C1			C2	C3	L4	F4	F3	F5	F7	F8
14	F3	F5	F5	F5	F2	F3	L4	L5	L3	L2	L2	L2	L2	L3	L1			C1	L3	F5	F3	F7	F6	F5
15	F7	F5	F3	F6	F4	F6	L4	L4	L3	L4	L3	L3	L3	L3	L3	L3	L4	L4	L5	F8	F6	F7	F5	F6
16	F3	F2	F2	F2	F1	C2	L3	L3	L3	L3	L2	L2	L2	H1		C1	C1	L2	L6	F5	F5	F6	F7	F8
17	F4	F4	F3	F3	F2	F2	C2	L3	L3	L4	L4	L3	L2	L3	L3	L3	C2	C1	L5	F5	F2	F3	F4	F5
18	F5	F4	F5	F2	F2	F2	C4	L3	L2	L2	L3	L3	L3	L2	L1	C1	L4	L3	L5	F4	F3	F3	F8	F4
19	F2	F3	F2	F2	F2	F3	L3	C1	L2	L2	L2	L2	L2	L2	L1	C1	C1	L2	L3	F7	F5	F5	F3	F3
20	F6	F5	F5	F4		F6	L4	L3	L3	L3	L2	L2	L2	L1	C1	C2	C2	L3	L5	F7	F7	F6	F6	F8
21	F7	F9	F8	F5	F4	F4	C3	L3	L3	L3	L3	L2	L2	L2	L2	L2	L3	L3	L2	F4	F6	F4	F5	F6
22	F3	F5	F2	F5	F4	L3	CL32	L3	L2	L2	L2	L3	L3	L2	L2	H1	C2	L3	L5	F4	F5	F6	F5	F5
23	F7	F3	F3	F6	F4	L5	L7	L4	L4	L3	L4	L3	L3	L2	L2	C2	C2	L3	L5	F6	F5	F3	F2	F2
24	F4	F5	F2	F4	F3	F2	L4	L4	L3	L4	L1	L2	L2	L2	H1	L2	L1	L2	L3	F3	F4	F3	F3	F5
25	F2		F2	F2	F2		C2	L3	L3	L2	L2	L2	L1	L2	L2		H1	C2	L5	F4	F4	F4	F5	F8
26	F6	F5	F5	F7	F5	C3	L3	L5	L3	L2	L3	L2	L2	L2	L1		L2	L4	L4	F6	F4	F6	F7	F5
27	F4	F6	F5	F3	F2	C2	C2	L3	L3	L3	L3	L2	L3	L3	L3	L2		L2	L3	F3	F5	F4	F7	F7
28	F6	F6	F5	F2	F2	F3	L3	L4	L4	L5	L4	L2	L4	L4	L3	L4	L3	L2	L3	F4	F5	F4	F6	F4
29	F3	F2	F2	F2	F2	C2	L4	L4	L3	L2	L3	L4	L3	L3	L3	C1	L4	L4	L4	F5	F6	F7	F5	F5
30	F6	F3	F4	F7	F4	L4	L3	L2	L2	L4	L4	L4	L2	L2	L2	L2	L3	L3	L3	F6	F4	F8	F7	F5
31	F7	F7	F5	F5	F3	CL12	C3	L3	L3	L3	L2	L3	L3	L2	L2	LL32	L4	L2	L2	F1	F1	F2	F7	F6
	00	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																								

MAY 2019 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 38	X 38	X 36	X 35	X 37	X 33															X 62	X 60	56	X 52
2	X 48	X 46	X 42	X 41	X 41	X 31														X 61	X 60	X 51	X 51	X 49
3	X 50	X 48	X 47	X 43	X 27	X 26														X 67	X 74	X 68	X 58	X 56
4	X 52	X 50	X 43	45	X 35	X 36					A									X 78	X 78	X 75	X 44	X 50
5	X 44	X 41	X 36	44	40	X 34				A											X 70	X 54	X 46	X 44
6	48	48	43	X 35	X 32	X 31														X 76	X 80	X 63	X 50	57
7	58	50	48	46	42	40														X 74	X 79	X 70	X 50	X 50
8	48	A	A	X 44	X 43	X 30														A	X 78	A	55	55
9	49	49	45	X 38	X 37	X 33														X 64	X 68	A	X 57	60
10	A	A	X 42	X 39	42	41														X 79	X 79	X 54	A	48
11	46	45	47	58	48	41														X 66	A	A	59	X 59
12	X 53	X 53	X 58	X 50	X 46	X 42														X 56	X 56	X 50	X 38	42
13	X 40	42	X 38	A	X 32	X 35														X 70	X 76	X 45	X 40	X 37
14	40	A	A	X 38	X 31	37														X 102	O X 49	A	X 33	A
15	36	A	41	A	43	A														X 57	X 59	A	X 48	54
16	43	47	46	48	37	X 33														X 60	X 72	A	A	A
17	49	A	42	A	42	33														X 80	X 81	A	A	A
18	39	A	A	44	A	36														A	X 88	X 66	X 54	A
19	A	X 38	40	42	X 34	X 34														X 66	X 74	X 58	X 46	X 40
20		X 36	X 34	X 32	X 34	X 35														X 74	X 59	X 50	X 47	A
21	A	46	X 39	X 39	X 31	38														X 84	X 82	X 44	X 41	X 36
22	A	X 31	A	A	A	35														X 67	70	X 66	61	61
23	57	54	A	40	38	X 34														X 66	X 70	60	X 54	A
24	A	42	X 32	X 30	42	42														X 60	X 62	A	X 44	A
25	48	X 44	48	44	42	42														X 76	92	X 54	X 38	A
26	41	40	A	A	X 33	X 31														X 78	X 74	X 64	X 50	X 48
27	58	59	48	42	39	X 35														X 62	X 68	X 66	X 58	X 55
28	X 57	56	59	57	48	X 34														X 64	X 63	X 61	X 49	58
29	58	54	A	40	X 34	X 34														X 88	X 78	X 70	X 68	X 64
30	62	66	60	X 49	40	43									A	A					X 77	X 66	A	A
31	A	A	X 42	A	50	48									A					X 83	X 84	X 56	X 43	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	24	24	24	25	29	30														26	30	23	27	22
MED	48	46	42	X 42	X 39	X 35														X 68	X 74	X 60	X 50	X 53
U Q	55	52	48	46	42	40														X 78	X 79	X 66	X 56	57
L Q	42	X 42	X 40	X 38	X 34	X 33														X 64	X 63	X 54	X 44	X 48

MAY 2019 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

MAY 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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	32	32	30	29	30	27	40	48	48	47	57	A	57	61	70	72	72	76	64	56	56	54	F	46
2	43	40	36	35	35	25	45	48	53	50	50	52	59	77	85	89	94	78	60	55	54	45	44	43
3	44	42	41	37	21	20	41	51	50	49	47	52	64	82	70	56	55	55	57	61	68	61	52	50
4	46	44	37	F	29	30	44	56	57	52	A	64	57	53	A	A	63	60	62	72	72	69	38	44
5	38	35	30	F	F	28	44	54	A	A	A	53	60	61	64	59	A	A	A	A	64	48	40	38
6	F	F	F	29	26	25	43	53	56	53	54	50	55	60	A	A	62	A	64	70	74	57	44	F
7	F	F	F	F	F	F	49	47	55	54	57	56	62	66	70	64	64	71	70	68	73	64	44	44
8	F	A	A	38	37	24	36	60	77	A	A	A	56	54	52	54	60	72	A	A	72	A	F	F
9	F	F	F	32	31	27	40	50	60	58	60	54	55	55	52	59	73	81	64	58	62	A	51	F
10	A	A	36	33	F	F	46	49	48	A	52	A	A	55	63	77	78	77	76	73	73	48	A	F
11	F	F	F	F	F	F	45	53	69	60	A	64	68	74	70	80	87	80	61	60	A	A	F	53
12	47	47	52	44	40	35	34	A	A	A	44	A	A	A	52	56	56	52	50	50	50	44	32	F
13	34	F	32	A	26	29	45	54	48	A	49	A	57	59	54	55	60	60	56	64	70	39	34	31
14	F	A	A	32	25	F	46	A	A	A	A	A	A	63	69	87	80	94	102	96	43	A	27	A
15	F	A	F	A	F	A	46	A	A	A	A	A	A	A	48	50	50	53	A	51	52	A	42	F
16	F	F	F	F	F	27	43	46	A	A	A	A	49	51	56	60	57	54	A	54	66	A	A	A
17	F	A	F	A	F	F	40	46	52	A	A	A	A	62	65	A	66	65	65	74	75	A	A	A
18	F	A	A	F	A	F	41	55	A	52	49	A	A	50	55	58	69	70	68	A	82	60	48	A
19	A	32	F	F	28	28	44	48	A	48	A	A	A	54	48	48	48	48	50	60	68	52	39	34
20	A	30	28	26	28	29	42	53	52	52	A	A	A	50	52	59	69	68	63	67	53	44	41	A
21	A	F	33	33	25	F	45	A	A	A	A	A	A	A	A	54	62	63	67	78	76	38	35	30
22	A	25	A	A	A	F	41	A	A	A	A	A	A	A	A	46	47	A	A	61	F	62	F	F
23	F	F	A	F	F	28	A	A	A	A	A	A	A	A	A	A	56	58	58	60	64	F	48	A
24	A	F	26	24	F	F	40	A	A	A	A	A	56	65	65	75	82	77	60	54	57	A	38	A
25	F	38	F	F	F	F	A	48	A	A	A	50	54	A	A	50	56	58	A	70	F	48	32	A
26	F	F	A	A	27	25	41	41	A	A	A	A	A	A	A	54	68	81	76	72	68	58	44	42
27	F	F	F	F	F	29	46	44	A	A	A	A	A	A	A	A	57	60	60	56	62	60	52	49
28	51	F	F	F	F	28	32	A	A	A	A	A	A	A	A	A	51	54	57	58	57	55	43	F
29	F	F	A	F	28	28	41	56	A	54	A	A	A	A	60	60	66	68	75	82	72	64	62	58
30	F	F	F	43	F	F	47	57	56	A	A	A	A	A	A	A	74	66	A	69	71	60	A	A
31	A	A	36	A	F	F	44	A	A	A	A	A	A	54	A	63	64	56	63	77	77	51	37	F
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	8	10	12	13	15	18	29	22	14	12	10	9	14	20	20	24	30	28	24	28	28	22	23	13
MED	44	36	34	33	28	28	43	50	54	52	51	53	57	60	62	59	64	66	63	62	68	54	42	44
U Q	46	42	36	38	31	29	45	54	57	54	57	60	60	64	70	68	72	76	68	72	72	60	48	50
L Q	36	32	30	29	26	25	40	48	50	50	49	51	55	54	52	54	56	57	59	57	57	48	37	36

IONOSPHERIC DATA STATION Yamagawa

MAY 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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	UL 440	416	A	432	440	432	420	400	372	L					
2									A	A	UL 444	A	436	428	420	416	376	A	L					
3									L	UL 416	UL 436	436	444	424	420	416	UL 416	UL 392	A					
4									L	A		UL 436	444	UL 444	A	A	UL 404	A						
5								L	A		A	A	A	432	A	A	A	A	A	A				
6								A	A	416	A	UL 436	436	436	A	A	A	A	A					
7								L	UL 488	A	432	448	452	436	436	420	412	A	A					
8								A		A	A	A	A	448	436	428	412	A	A					
9								A	A	A	440	A	UL 448	A	432	432	A	A	A					
10								A	A	A	A	A	A	444	UL 440	420	408	380	A					
11								L	404	A	A	448	A	UL 440	440	428	UL 408	L	L					
12							A	A	A	A	UL 408	A	A	A	UL 432	408	A	L	A					
13							L	L	UL 416	A	440	A	436	444	432	416	396	UL 372	A					
14								A	A	A	A	A	A	A	A	432	408	A	A					
15								A	A	A	A	A	A	A	412	A	A	A	A					
16								A	A	A	A	A	436	428	A	416	400	A	A					
17								A	A	A	A	A	A	440	A	A	A	A	A					
18								A	A	A	A	A	A	436	428	428	A	A	A					
19								A	A	UL 436	A	A	A	A	A	416	408	A	A					
20	A						L	A	A	464	A	A	A	A	A	416	400	A	A					
21								A	A	A	A	A	A	A	A	A	UL 404	364	A					
22							UL 336	A	A	A	A	A	A	A	A	408	A	A	A					
23							A	A	A	A	A	A	A	A	A	A	A	A	A					
24								A	A	A	A	A	A	A	A	UL 424	A	A	A					
25							A	A	A	A	A	UL 428	448	A	A	A	396	A	A					
26								A	A	A	A	A	A	A	A	A	A	A	A					
27								A	A	A	A	A	A	A	A	A	404	376	L					
28							A	A	A	A	A	A	A	A	A	A	388	368	340					
29								A	A	A	A	A	A	A	428	412	400	380	344					
30									L	A	A	A	A	A			A	A	A	A				
31								A	A	A	A	A	A	A		420	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		3	5	7	6	10	14	13	19	18	8	2					
MED							UL 336		UL 416	UL 436	436	436	440	438	432	420	404	374	342					
U Q									UL 488	452	440	448	448	444	436	428	408	380						
L Q									404	416	416	436	436	432	424	416	400	370						

MAY 2019 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

MAY 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

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							U A 196	A	A	A	A	A	A	A	A	U R 332	A	U R 268	R	B				
2							A	A	A	A	A	A	A	U R 352	U A 336	U A 316	U R 284	U A 248	A					
3							192	R	A	A	A	A	A	A	U A 332	U A 324	A	A	A					
4							B	A	A	A		A	A	A	A	A	A	A	A					
5							B	A	A		A	A	A	A	A	A	A	A	A	A				
6							B	A	A	A	A	A	A	A	A	A	A	A	A					
7							A	A	A	A	A	A	U A 392	A	U A 340	U A 332	U A 300	U A 264	A					
8							192	A	A	A	A	A	U A 352	A	A	A	296	A	A					
9							B	A	A	A	A	A	A	A	A	U R 340	U A 300	A	A					
10							U A 172	A	A	A	A	A	A	A	A	A	U A 300	A	A					
11							B	A	A	A	A	A	A	A	A	A	U A 292	U R 272	U A 212					
12							A	A	A	A	A	A	A	A	A	A	A	A	A					
13							B	A	A	A	A	A	A	A	U R 344	A	A	U A 252	A					
14							B	A	A	A	A	A	A	A	A	A	A	A	A					
15							A	A	A	A	A	A	A	A	328	A	A	A	A					
16							A	A	A	A	A	A	A	A	A	A	U A 288	A	A					
17							A	A	A	A	A	A	A	A	A	A	A	A	A					
18							A	A	A	A	A	A	A	A	A	A	U A 328	A	A					
19							U A 232	A	A	A	A	A	A	A	A	A	U A 300	A	A					
20	A						A	A	A	A	A	A	A	A	A	A	A	A	A					
21							A	A	A	A	A	A	A	A	A	A	296	A	A					
22							A	A	A	A	A	A	A	A	A	328	U R 296	A	A					
23							A	A	A	A	A	A	A	A	U A 356	A	U A 316	A	A					
24							A	A	A	A	A	A	A	A	A	A	A	A	A					
25							A	A	A	A	A	A	A	A	A	A	296	A	A					
26							A	A	A	A	A	A	A	A	A	A	A	A	A					
27							A	A	A	A	A	A	A	A	A	A	A	A	A					
28							A	A	A	A	A	A	A	A	A	A	U R 304	A	U R 220					
29							A	A	A	A	A	A	A	A	A	A	U R 296	U R 272	A					
30							A	A	A	A	A	A	A	A			A	A	A	A				
31							A	A	A	A	A	A	A	A		A	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							5						2	1	6	6	15	6	2					
MED							U A 192						U A 372	U R 352	U A 338	U 330	U A 296	U 266	U 216					
U Q							U A 214								U 344	U R 332	U A 300	U R 272						
L Q							182								332	U A 324	U 296	U A 252						

MAY 2019 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

MAY 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

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	JA 87	JA 53	JA 42	JA 58	JA 64	JA 45	G	30	JA 52	JA 65	JA 46	JA 79	JA 53	JA 45	JA 45	G	34	G	G	JA 19	JA 26	JA 51	JA 45	JA 53
2	24	JA 32	JA 26	JA 26	22	EB 16	24	JA 39	JA 56	JA 48	JA 42	JA 48	36	G	38	37	G	35	25	EB 16	23	EB 16	JA 32	JA 33
3	JA 26	20	EB 15	EB 16	EB 16	EB 15	G	G	34	JA 44	JA 44	JA 57	JA 44	JA 43	37	36	JA 44	JA 49	JA 48	JA 56	JA 35	JA 45	JA 36	JA 32
4	JA 45	JA 43	JA 35	JA 28	22	22	JA 29	JA 38	JA 40	JA 54	JA 56	JA 52	JA 46	JA 53	104	76	JA 65	JA 52	JA 40	JA 30	JA 28	83	100	47
5	JA 30	JA 36	20	23	24	24	22	JA 40	JA 85	JA 86	JA 84	JA 47	JA 64	JA 74	JA 65	JA 66	100	160	188	86	46	34	33	22
6	JA 45	22	EB 15	JA 26	JA 34	22	JA 29	JA 42	JA 47	JA 45	JA 54	JA 46	JA 49	JA 49	71	108	JA 53	JA 63	JA 100	111	98	165	52	56
7	JA 39	26	JA 28	JA 27	JA 45	21	24	JA 54	JA 68	65	JA 54	JA 58	G	JA 44	42	39	35	36	JA 38	JA 34	JA 22	JA 43	JA 52	JA 42
8	JA 89	JA 87	110	JA 53	JA 49	21	26	JA 42	JA 56	82	JA 96	JA 60	46	42	42	42	34	JA 43	JA 86	JA 128	JA 199	JA 122	JA 65	JA 47
9	JA 50	JA 50	JA 31	JA 26	JA 26	22	JA 26	JA 51	JA 54	54	JA 47	JA 58	JA 53	JA 49	45	G	JA 46	JA 62	JA 54	JA 46	JA 48	84	65	65
10	JA 65	JA 52	JA 44	JA 35	JA 39	JA 51	25	JA 40	JA 51	JA 69	JA 52	JA 105	JA 194	JA 47	JA 61	JA 54	34	34	JA 37	JA 38	JA 40	JA 25	JA 52	JA 66
11	JA 81	26	JA 66	JA 30	JA 52	JA 33	26	30	JA 41	JA 62	JA 95	JA 54	JA 104	JA 86	40	JA 38	JA 43	G	26	JA 34	JA 72	JA 61	JA 62	JA 54
12	JA 46	JA 43	JA 50	JA 42	JA 86	JA 34	JA 42	109	JA 63	JA 78	JA 55	JA 155	JA 80	JA 138	JA 50	JA 128	JA 93	JA 86	JA 42	JA 39	JA 33	JA 108	JA 34	JA 89
13	JA 30	JA 31	26	JA 51	JA 36	JA 62	JA 28	JA 34	JA 41	JA 51	JA 58	JA 97	JA 50	JA 40	G	JA 40	34	33	JA 36	JA 29	JA 47	JA 53	JA 36	JA 27
14	JA 40	JA 65	JA 65	JA 54	JA 32	JA 28	JA 41	JA 70	JA 70	JA 100	JA 79	JA 68	JA 72	JA 69	JA 62	JA 42	JA 39	JA 68	JA 75	JA 44	JA 30	JA 41	JA 108	JA 111
15	JA 86	JA 64	JA 83	JA 53	JA 46	JA 96	JA 54	JA 52	JA 270	JA 195	JA 123	JA 110	JA 83	JA 61	JA 40	JA 48	JA 50	JA 56	JA 64	JA 79	JA 44	JA 104	JA 76	JA 110
16	JA 136	JA 67	JA 76	JA 33	JA 29	JA 36	JA 31	JA 47	JA 101	JA 80	JA 84	JA 91	JA 63	JA 45	JA 57	JA 53	JA 39	JA 43	JA 82	JA 138	JA 234	JA 138	JA 108	JA 102
17	JA 54	JA 55	JA 44	JA 74	JA 69	JA 50	JA 32	JA 50	JA 50	JA 78	JA 103	JA 91	JA 70	JA 53	JA 59	JA 83	JA 55	JA 54	JA 56	JA 53	JA 152	JA 103	JA 106	JA 111
18	JA 66	JA 44	JA 62	JA 54	JA 51	JA 37	JA 25	JA 51	JA 101	JA 50	JA 54	JA 88	JA 72	JA 45	JA 44	JA 48	JA 42	JA 43	JA 61	JA 104	JA 44	JA 46	JA 42	JA 64
19	JA 54	JA 55	JA 44	JA 40	JA 46	JA 30	JA 25	JA 46	JA 64	JA 44	JA 65	JA 66	JA 71	JA 59	JA 54	JA 38	JA 38	JA 44	JA 43	JA 45	JA 34	JA 32	JA 44	JA 35
20	JA 88	JA 34	JA 28	JA 28	EB 16	JA 19	JA 30	JA 53	JA 90	JA 45	JA 220	JA 65	JA 109	JA 69	JA 63	JA 52	JA 47	JA 56	JA 55	JA 49	JA 38	JA 38	JA 26	JA 48
21	JA 65	JA 42	JA 85	JA 84	JA 86	JA 28	JA 34	JA 54	JA 72	JA 66	JA 91	JA 89	JA 88	JA 300	JA 72	JA 98	JA 36	JA 36	JA 40	JA 32	JA 64	JA 54	JA 54	JA 35
22	JA 40	JA 53	JA 75	JA 48	JA 38	JA 42	JA 40	JA 74	JA 71	JA 77	JA 90	JA 93	JA 125	JA 196	JA 146	JA 40	JA 53	JA 84	JA 201	JA 72	JA 154	JA 89	JA 54	JA 54
23	JA 50	JA 46	JA 52	JA 38	JA 37	EB 16	JA 40	JA 62	JA 80	JA 96	JA 140	JA 204	JA 126	JA 111	JA 52	JA 55	JA 50	JA 50	JA 78	JA 133	JA 111	JA 113	JA 54	JA 49
24	JA 54	JA 29	JA 55	JA 34	JA 31	24	JA 36	JA 61	JA 88	JA 89	JA 164	JA 196	JA 145	JA 124	JA 87	JA 54	JA 73	JA 58	JA 63	JA 43	JA 138	JA 104	JA 88	JA 54
25	44	JA 27	JA 34	JA 34	JA 36	JA 39	JA 63	JA 56	JA 74	JA 68	JA 81	JA 48	JA 121	JA 70	JA 90	JA 89	JA 38	JA 58	JA 130	JA 63	JA 122	JA 64	JA 127	JA 54
26	JA 42	JA 61	JA 53	JA 39	JA 54	JA 40	JA 37	JA 56	JA 80	JA 92	JA 146	JA 163	JA 122	JA 120	JA 107	JA 66	JA 42	JA 54	JA 45	JA 52	JA 33	JA 33	JA 50	JA 29
27	JA 34	JA 32	JA 39	JA 35	JA 51	JA 35	JA 36	JA 52	JA 73	JA 65	JA 65	JA 166	JA 126	JA 100	JA 146	JA 109	JA 58	JA 65	JA 45	JA 36	JA 53	JA 36	JA 41	JA 41
28	JA 35	JA 35	JA 30	24	JA 27	JA 23	JA 46	JA 78	JA 123	JA 110	JA 164	JA 235	JA 235	JA 225	JA 107	JA 46	G	JA 36	G	JA 36	JA 32	JA 44	JA 43	JA 49
29	JA 39	JA 72	JA 65	JA 53	JA 46	JA 46	JA 43	JA 66	JA 56	JA 55	JA 88	JA 110	JA 204	JA 131	JA 44	JA 37	G 26	J 27	G 35	JA 61	JA 33	JA 49	JA 88	JA 119
30	JA 68	JA 41	JA 53	JA 44	JA 36	JA 36	JA 27	JA 41	JA 54	JA 73	JA 110	JA 72	JA 93	JA 197	JA 159	JA 206	JA 63	JA 66	JA 86	JA 78	JA 122	JA 85	JA 124	JA 90
31	JA 78	JA 106	JA 53	JA 101	JA 37	JA 23	JA 30	JA 87	JA 96	JA 161	JA 171	JA 70	JA 109	JA 73	JA 85	JA 43	JA 48	JA 42	JA 52	JA 69	JA 110	JA 52	JA 31	JA 52
	00	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	JA 50	JA 43	JA 44	JA 38	JA 37	JA 30	JA 30	JA 51	JA 68	JA 68	JA 84	JA 79	JA 80	JA 69	JA 59	JA 48	JA 43	JA 50	JA 52	JA 49	JA 46	JA 53	JA 52	JA 53
U Q	JA 68	JA 55	JA 65	JA 53	JA 51	JA 40	JA 40	JA 61	JA 85	JA 86	JA 110	JA 110	JA 122	JA 120	JA 87	JA 76	JA 53	JA 62	JA 78	JA 78	JA 111	JA 103	JA 88	JA 66
L Q	JA 39	JA 32	JA 30	JA 28	JA 29	JA 22	JA 25	JA 40	JA 52	JA 54	JA 54	JA 58	JA 53	JA 45	JA 44	JA 39	JA 35	JA 36	JA 38	JA 36	JA 33	JA 41	JA 41	JA 41

MAY 2019 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

MAY 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

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	21	24	23	18	26	E B 15	G	27	32	34	38	A A 79	35	39	36	G	30	G	G	16	19	21	28	39
2	E B 16	21	19	E B 16	E B 16	E B 16	23	26	48	40	35	42	34	G	36	34	G	32	24	E B 16	E B 16	E B 16	18	E B 16
3	E B 16	E B 16	E B 15	E B 16	E B 16	E B 15	G	G	31	35	33	37	36	34	36	33	33	30	39	20	20	23	20	E B 15
4	20	20	20	E B 16	E B 16	E B 17	24	24	32	45	A A 56	36	36	36	A A 104	A A 76	34	46	28	24	22	42	22	22
5	21	E B 15	E B 15	E B 16	E B 16	E B 16	20	28	A A 85	A A 86	A A 84	41	46	36	53	55	A A 100	A A 160	A A 188	A A 86	27	22	19	E B 16
6	20	E B 15	E B 15	E B 16	E B 16	E B 16	22	38	41	35	46	41	40	37	A A 71	A A 108	42	A A 63	38	31	18	21	21	21
7	28	17	E B 15	E B 15	16	E B 16	20	27	44	51	36	36	G	35	40	38	33	36	33	28	E B 16	E B 15	E B 16	32
8	20	A A 87	A A 110	25	E B 16	E B 15	23	32	50	A A 82	A A 96	A A 60	44	40	40	37	32	36	A A 86	A A 128	22	A A 122	22	26
9	E B 16	19	E B 16	18	18	E B 16	20	44	44	44	40	49	43	43	36	G	41	55	48	39	35	A A 84	40	24
10	A A 65	A A 52	E B 16	20	E B 16	E B 16	22	33	43	A A 69	43	A A 105	A A 194	40	38	35	33	31	30	27	31	19	A A 52	16
11	22	E B 16	20	E B 16	E B 16	21	22	28	33	48	A A 95	39	45	35	38	32	G 26	G	23	28	A A 72	A A 61	24	25
12	E B 16	E B 16	23	20	E B 16	16	25	A A 109	A A 63	A A 78	37	A A 155	A A 80	A A 138	36	36	49	27	26	31	24	E B 15	19	E B 16
13	E B 16	E B 16	18	A A 51	22	22	22	27	32	A A 51	38	A A 97	38	36	G	34	33	30	32	23	28	28	24	20
14	21	A A 65	A A 65	19	19	19	18	A A 70	A A 70	A A 100	A A 79	A A 68	A A 72	52	54	34	38	59	59	39	26	A A 41	22	A A 111
15	E B 16	A A 64	25	A A 53	20	A A 96	39	A A 52	A A 270	A A 195	A A 123	A A 110	A A 83	A A 61	36	42	37	46	A A 64	31	34	A A 104	E B 16	18
16	23	30	20	20	17	18	23	40	A A 101	A A 80	A A 84	A A 91	38	38	45	35	35	35	A A 82	20	E B 16	A A 138	A A 108	A A 102
17	27	A A 55	26	A A 74	23	18	19	39	37	A A 78	A A 103	A A 91	A A 70	38	44	A A 83	44	39	38	32	45	A A 103	A A 106	A A 111
18	E B 16	A A 44	A A 62	E B 16	A A 51	E B 16	22	38	A A 101	41	41	A A 88	A A 72	37	36	36	40	36	36	A A 104	E B 17	34	21	A A 64
19	A A 54	25	21	20	19	E B 15	24	34	A A 64	34	A A 65	A A 66	A A 71	42	43	35	35	38	36	37	22	27	19	20
20	A A 88	16	E B 17	E B 16	E B 16	E B 16	23	35	36	36	A A 220	A A 65	A A 109	44	42	34	32	42	45	39	27	30	E B 15	A A 48
21	A A 65	29	20	19	19	18	21	A A 54	A A 72	A A 66	A A 91	A A 89	A A 88	A A 300	A A 72	43	34	31	31	E B 16	58	28	20	22
22	A A 40	E B 16	A A 75	A A 48	A A 38	20	25	A A 74	A A 71	A A 77	A A 90	A A 93	A A 125	A A 196	A A 146	38	43	A A 84	A A 201	51	23	39	33	38
23	25	27	A A 52	20	F 21	E B 16	A A 40	A A 62	A A 80	A A 96	A A 140	A A 204	A A 126	A A 111	A A 52	A A 55	45	37	34	25	24	21	22	A A 49
24	A A 54	E B 16	18	E B 16	E B 16	E B 16	23	A A 61	A A 88	A A 89	A A 164	A A 196	44	44	38	37	54	47	54	24	22	A A 104	24	A A 54
25	E B 16	E B 16	20	18	18	E B 16	A A 63	36	A A 74	A A 68	A A 81	38	40	A A 70	A A 90	40	36	46	A A 130	35	63	36	20	A A 54
26	E B 16	E B 16	A A 53	A A 39	19	20	24	35	A A 80	A A 92	A A 146	A A 163	A A 122	A A 120	A A 107	41	39	41	28	28	E B 16	E B 16	20	E B 16
27	E B 16	E B 16	E B 16	19	18	18	23	36	A A 73	A A 65	A A 65	A A 166	A A 126	A A 100	A A 146	A A 109	34	28	24	19	26	22	32	21
28	16	E B 16	E B 16	E B 16	20	E B 16	22	A A 78	A A 123	A A 110	A A 164	A A 235	A A 235	A A 225	A A 107	A A 46	G	28	G	23	20	20	22	20
29	25	20	A A 65	20	19	20	32	45	A A 56	42	A A 88	A A 110	A A 204	A A 131	38	31	G 24	G 22	28	50	24	29	30	20
30	37	E B 16	21	E B 16	21	21	22	34	33	A A 73	A A 110	A A 72	A A 93	A A 197	A A 159	A A 206	46	52	A A 86	63	30	30	A A 124	A A 90
31	A A 78	A A 106	23	A A 101	20	E B 17	22	A A 87	A A 96	A A 161	A A 171	A A 70	A A 109	51	A A 85	37	41	35	35	60	24	29	18	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	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	21	19	20	19	18	E B 16	22	36	A A 63	A A 68	A A 84	A A 79	A A 71	43	43	37	35	36	36	31	24	29	22	24
U Q	A A 37	A A 30	A A 26	A A 20	20	19	24	A A 54	A A 80	A A 86	A A 110	A A 110	A A 109	A A 111	A A 85	A A 46	42	46	A A 59	39	30	A A 42	30	A A 49
L Q	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	21	28	37	42	41	42	40	37	36	34	33	30	28	23	E B 20	21	19	E B 20

MAY 2019 fbEs (0.1MHz)

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IONOSPHERIC DATA STATION Yamagawa

MAY 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

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

IONOSPHERIC DATA STATION Yamagawa

MAY 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	325	300	316	321	316	401	383	399	373	324	364	A	319	316	318	311	318	348	360	341	316	336	F	308
2	312	338	325	300	300	324	365	397	378	340	329	313	278	302	315	313	334	366	357	342	337	312	304	293
3	308	307	350	386	402	319	341	371	369	349	281	278	295	336	348	338	337	340	329	310	324	340	324	317
4	300	312	314	F	317	312	355	379	371	409	A	354	327	310	A	A	345	339	306	319	330	373	309	327
5	315	313	279	F	F	324	354	354	A	A	A	310	318	335	329	336	A	A	A	A	349	355	304	317
6	F	317	F	333	357	319	352	E 365	368	364	340	317	321	337	A	A	344	A	334	315	337	345	301	F
7	F	F	F	F	F	F	384	401	327	338	348	306	321	330	330	344	313	321	311	314	354	352	365	309
8	F	A	A	367	370	331	330	365	394	A	A	A	329	317	312	318	317	345	A	A	336	A	F	F
9	F	F	F	338	356	355	350	344	352	339	350	349	308	332	292	306	314	348	342	315	307	A	310	F
10	A	A	342	347	F	F	381	386	363	A	338	A	A	294	294	305	314	318	319	329	362	354	A	F
11	F	F	F	F	F	F	338	329	348	350	A	315	292	298	278	298	332	363	323	290	A	A	F	296
12	300	303	318	282	276	274	260	A	A	A	265	A	A	A	306	322	284	327	353	337	337	350	326	F
13	267	F	310	A	330	338	346	349	331	A	285	A	314	326	309	314	331	331	322	322	362	356	301	287
14	F	A	A	293	340	F	367	A	A	A	A	A	A	314	279	313	276	306	324	358	348	A	294	A
15	F	A	F	A	F	A	366	A	A	A	A	A	A	A	311	294	315	347	A	326	322	A	319	F
16	F	F	F	F	F	346	358	366	A	A	A	A	279	283	303	319	337	335	A	316	303	A	A	A
17	F	A	F	A	F	F	323	323	338	A	A	A	A	308	325	A	292	294	309	337	350	A	A	A
18	F	A	A	F	A	F	352	373	A	362	322	A	A	268	315	302	304	301	298	A	343	348	330	A
19	A	292	F	F	313	339	392	404	A	306	A	A	A	296	280	302	301	317	327	319	353	353	330	311
20	A	324	313	280	306	323	344	377	354	344	A	A	A	296	289	304	317	328	330	367	311	325	295	A
21	A	F	344	351	328	F	374	A	A	A	A	A	A	A	A	298	295	322	325	336	391	322	302	336
22	A	338	A	A	A	F	336	A	A	A	A	A	A	A	A	294	291	A	A	325	F	326	F	F
23	F	F	A	F	F	349	A	A	A	A	A	A	A	A	A	A	322	334	308	325	342	F	314	A
24	A	F	370	320	F	F	339	A	A	A	A	A	312	304	313	308	323	344	344	340	326	A	326	A
25	F	337	F	F	F	F	A	356	A	A	A	326	331	A	A	308	307	307	A	329	F	398	302	A
26	F	F	A	A	321	380	355	345	A	A	A	A	A	A	A	290	306	327	338	327	367	358	331	301
27	F	F	F	F	F	360	411	382	A	A	A	A	A	A	A	A	329	328	310	302	318	329	305	313
28	320	F	F	F	F	354	371	A	A	A	A	A	A	A	A	A	310	316	329	325	330	337	328	F
29	F	F	A	F	348	348	364	369	A	340	A	A	A	A	308	299	310	299	318	339	334	318	313	330
30	F	F	F	357	F	F	365	370	384	A	A	A	A	A	A	A	329	321	A	324	324	321	A	A
31	A	A	297	A	F	F	353	A	A	A	A	A	A	303	A	322	331	295	306	324	341	355	324	F
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	8	11	12	13	15	18	29	22	14	12	10	9	14	20	20	24	30	28	24	28	28	22	23	13
MED	310	313	317	333	328	338	355	370	366	342	334	315	316	309	310	308	316	328	324	325	337	346	313	311
U Q	318	337	343	354	356	354	369	382	373	356	348	338	321	328	316	318	331	342	336	337	350	355	326	322
L Q	300	303	312	296	313	323	342	354	348	338	285	308	295	297	293	300	306	316	310	318	324	326	302	298

IONOSPHERIC DATA STATION Yamagawa

MAY 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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	UL 394	418	A	403	419	383	395	380	374	L					
2									A	A	UL 393	A	401	408	417	420	453	A	L					
3									L	UL 407	UL 416	416	408	430	425	428	UL 393	UL 362	A					
4									L	A		UL 400	402	UL 390	A	A	UL 380	A						
5								L	A		A	A	A	407	A	A	A	A	A	A				
6								A	A	429	A	UL 392	427	422	A	A	A	A	A					
7								L	UL 355	A	428	405	429	446	383	424	402	A	A					
8								A		A	A	A	A	387	403	412	399	A	A					
9								A	A	A	414	A	UL 407	A	422	402	A	A	A					
10								A	A	A	A	A	A	426	UL 417	401	408	391	A					
11								L	392	A	A	395	A	UL 417	417	393	UL 366	L	L					
12							A	A	A	A	UL 399	A	A	A	UL 405	430	A	L	A					
13							L	L	UL 380	A	415	A	420	412	424	405	404	UL 397	A					
14								A	A	A	A	A	A	A	A	405	375	A	A					
15								A	A	A	A	A	A	A	422	A	A	A	A					
16								A	A	A	A	A	412	420	A	393	413	A	A					
17								A	A	A	A	A	A	416	A	A	A	A	A					
18								A	A	A	A	A	A	445	445	416	A	A	A					
19								A	A	UL 418	A	A	A	A	A	427	363	A	A					
20	A						L	A	A	384	A	A	A	A	A	383	395	A	A					
21								A	A	A	A	A	A	A	A	A	UL 376	405	A					
22							UL 379	A	A	A	A	A	A	A	A	446	A	A	A					
23							A	A	A	A	A	A	A	A	A	A	A	A	A					
24								A	A	A	A	A	A	A	A	UL 383	A	A	A					
25							A	A	A	A	A	UL 393	417	A	A	A	401	A	A					
26								A	A	A	A	A	A	A	A	A	A	A	A					
27								A	A	A	A	A	A	A	A	A	388	413	L					
28							A	A	A	A	A	A	A	A	A	A	396	381	379					
29								A	A	A	A	A	A	A	397	413	424	387	351					
30									L	A	A	A	A	A			A	A	A	A				
31								A	A	A	A	A	A	A		393	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		3	5	7	6	10	14	13	19	18	8	2					
MED							UL 379		UL 380	UL 407	415	398	410	418	417	405	396	389	365					
U Q									392	424	418	405	420	426	423	424	404	401						
L Q									UL 355	389	UL 399	UL 393	403	408	400	393	380	378						

MAY 2019 M(3000)F1 (0.01)

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MAY 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

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									246	350	266	A	336	316	296	290	272	248	248					
2									E A 254	E A 282	312	338	376	310	290	276	254	222	234					
3									254	292	422	422	326	264	242	286	296	286	270					
4									248	E A 256		264	296	344	A	A	264	264						
5								262	A		A	340	314	294	E A 294	E A 334	A	A	A	A				
6								246	248	258	298	348	330	292	A	A	270	A	272					
7								230	328	E A 328	286	324	308	308	282	282	302	280	260					
8								246		A	A	A	318	332	346	326	312	256	A					
9								E A 292	264	256	268	E A 286	350	308	384	342	286	250	E A 244					
10								232	E A 286	A	306	A	A	356	342	294	280	270	252					
11								304	254	254	A	308	316	316	354	324	260	242	278					
12							E A 470	A	A	A	484	A	A	A	354	320	E A	304	244					
13							260	250	296	A	416	A	328	316	340	326	278	278	278					
14								A	A	A	A	A	A	E A 322	E A 364	286	334	E A 294	264					
15								A	A	A	A	A	A	A	376	E A 366	320	E A 274	A					
16								E A 274	A	A	A	A	440	418	340	310	294	278	A					
17								E A 314	300	A	A	A	A	314	290	A	E A 294	302	280					
18								242	A	268	324	A	A	426	342	342	298	300	300					
19								232	A	382	A	A	A	352	E A 406	372	358	326	300					
20	A						294	248	270	274	A	A	A	E A 378	392	338	288	260	E A 258					
21								A	A	A	A	A	A	A	A	356	320	288	274					
22							294	A	A	A	A	A	A	A	A	386	E A 404	A	A					
23							A	A	A	A	A	A	A	A	A	A	298	286	280					
24								A	A	A	A	A	350	306	308	296	E A 264	244	E A 314					
25							A	264	A	A	A	330	330	A	A	378	326	E A 310	A					
26								E A 272	A	A	A	A	A	A	A	370	316	264	252					
27								232	A	A	A	A	A	A	A	A	304	284	278					
28							E A 248	A	A	A	A	A	A	A	A	A	338	318	284					
29								E A 246	A	282	A	A	A	A	314	346	318	318	272					
30									240	A	A	A	A	A			270	E A 296	A	E A 322				
31								A	A	A	A	A	A	E A 378		304	276	338	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							5	17	13	12	10	9	14	20	20	24	29	28	23	1				
MED							U 277	245	254	270	309	330	329	314	334	324	295	279	272	E A 322				
U Q							382	E A 273	291	310	416	344	350	354	359	351	319	301	280					
L Q							254	237	248	257	286	297	316	308	295	295	274	262	252					

MAY 2019 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

MAY 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

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	E A 280	E A 306	E A 304	226	E A 294	192	192	192	188	182	192	A	184	190	216	196	192	200	190	210	226	222	E A 288	E A 322
2	E B 248	E A 272	E A 266	E B 244	210	230	214	212	A	A	188	A	188	188	194	194	192	A	192	208	206	E B 230	250	E B 268
3	E B 254	216	210	198	190	E B 304	236	210	194	196	188	188	186	186	200	190	200	210	A	E A 254	232	218	218	230
4	E A 238	E A 238	E A 254	212	224	E B 238	236	214	204	A	A	198	194	194	A	A	206	A	E A 254	240	218	216	E A 282	E A 248
5	E A 258	E B 254	E B 270	220	220	218	206	198	A	A	A	A	A	186	A	A	A	A	A	A	214	204	E A 254	E B 240
6	E A 266	E B 230	E B 262	E B 246	214	E B 240	218	A	A	182	A	E A 246	220	190	A	A	A	A	A	E A 240	222	210	E A 276	284
7	E A 250	228	E B 242	E B 242	E A 242	E B 242	204	204	268	A	180	180	180	180	222	208	208	A	A	230	218	210	210	E A 306
8	E A 240	A	A	E A 238	196	E B 258	212	A	200	A	A	A	A	200	208	218	198	A	A	A	218	A	232	E A 284
9	E B 244	E A 244	E B 242	222	220	220	204	A	A	A	202	A	214	A	190	190	A	A	A	E A 254	E A 278	A	E A 324	222
10	A	A	222	222	E B 258	E B 234	206	A	A	A	A	A	A	200	184	184	184	208	A	226	206	198	A	E B 270
11	E A 340	258	E A 240	200	200	E A 254	218	210	208	A	A	206	A	202	200	200	200	198	210	E A 274	A	A	E A 302	E A 302
12	E B 250	E B 250	216	E A 286	E B 286	E A 286	A	A	A	A	E A 242	A	A	A	204	200	A	200	A	E A 240	228	208	E A 240	E B 298
13	E B 278	E B 276	E A 276	A	E A 314	E A 270	210	198	194	A	194	A	190	188	186	186	192	192	A	228	210	208	E A 276	E A 296
14	E A 308	A	A	E A 308	E A 278	E B 254	214	A	A	A	A	A	A	A	A	208	E A 252	A	A	216	190	A	E A 372	A
15	E B 308	A	E A 322	A	E A 294	A	242	A	A	A	A	A	A	A	204	A	A	A	A	E A 252	E A 244	A	E B 242	E A 314
16	E A 314	E A 314	E A 256	242	E A 240	232	218	A	A	A	A	A	208	206	A	204	200	A	A	E A 264	E B 250	A	A	A
17	E A 276	A	E A 308	A	E A 222	E A 290	218	A	A	A	A	A	A	198	A	A	A	A	A	222	222	A	A	A
18	E B 242	A	A	E B 230	A	226	216	A	A	A	A	A	A	190	178	188	A	A	A	A	190	220	220	A
19	A	E A 336	E A 300	E A 254	E A 280	218	198	A	A	188	A	A	A	A	A	188	E A 258	A	A	E A 258	212	198	216	E A 252
20	A	252	E B 252	E B 254	E B 254	220	212	A	A	192	A	A	A	A	A	210	206	A	A	206	212	E A 264	E B 252	A
21	A	E A 298	228	E A 228	E A 290	E A 250	228	A	A	A	A	A	A	A	A	A	228	208	A	212	208	E A 264	E A 262	E A 284
22	A	E B 250	A	A	A	E A 292	186	A	A	A	A	A	A	A	A	206	A	A	A	E A 284	E A 238	E A 236	E A 250	E A 308
23	E A 262	E A 286	A	E A 256	E A 300	218	A	A	A	A	A	A	A	A	A	A	A	A	A	E A 260	226	E A 238	E A 234	A
24	A	E B 234	E A 240	E B 256	E B 284	E B 230	220	A	A	A	A	A	A	A	A	E A 230	A	A	A	230	226	A	E A 238	A
25	226	210	E A 292	E A 256	214	E B 236	A	A	A	A	A	E A 236	210	A	A	A	208	A	A	E A 236	218	202	E A 250	A
26	E B 268	E B 294	A	A	E A 284	226	208	A	A	A	A	A	A	A	A	A	A	A	A	224	188	188	224	E B 248
27	E B 264	E B 260	E B 260	E A 248	E A 254	208	208	A	A	A	A	A	A	A	A	A	208	196	196	220	E A 256	232	E A 266	E A 266
28	218	E B 240	E B 234	234	232	206	A	A	A	A	A	A	A	A	A	A	196	214	202	226	228	216	220	E A 294
29	E A 294	E A 294	A	E A 256	E A 254	E A 242	232	A	A	A	A	A	A	A	E A 240	194	194	192	196	E A 236	222	232	E A 250	E A 236
30	E A 318	236	E A 236	198	E A 238	E A 238	226	222	194	A	A	A	A	A	A	A	A	A	A	A	E A 242	E A 238	A	A
31	A	A	E A 272	A	E A 256	228	214	A	A	A	A	A	A	A	A	218	A	A	A	E A 280	208	202	E A 248	E A 318
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	24	24	25	29	30	27	9	8	5	7	6	10	14	13	19	18	10	7	27	30	23	27	22
MED	E A 263	E A 253	E A 255	E A 242	E A 254	E A 235	214	210	197	188	190	193	192	190	200	198	200	200	196	U 223	216	210	E A 250	E A 284
U Q	E A 287	E A 290	E A 274	E A 255	E A 284	E A 254	220	213	206	194	202	E A 236	210	200	212	208	208	208	210	E A 254	E A 228	E A 232	E A 276	E A 302
L Q	E 246	237	238	222	220	220	206	198	194	182	188	188	186	188	188	190	194	196	192	222	210	204	232	E 248

MAY 2019 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

MAY 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

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							114	114	114	A	A	A	A	A	A	110	112	114	114	B				
2							114	112	A	A	A	A	A	112	112	112	112	112	112					
3							122	116	116	A	A	A	A	A	114	114	114	110	A					
4							B	A	A	A		A	A	A	A 110	A	A	A	A					
5							B	A	A		A	A	A	A	A	A	A	A	A	A				
6							B	A	A	A	A	A	A	A	A	A	A	A	A					
7							120	A	A	A	A	A	110	A	110	110	110	108	A					
8							106	A	A	A	A	A	114	114	114	110	110	A	A					
9							B	A	A	A	A	A	A	A	A	110	110	A	A					
10							110	A	A	A	A	A	A	A	A	A	G 112	112	A					
11							B	114	A	A	A	A	A	A	114	A	114	114	114					
12							A	A	A	A	A	A	A	A	A	A	A	A	A					
13							B	A	A	A	A	A	A	A	114	A	A	114	A					
14							B	A	A	A	A	A	A	A	A	114	114	A	A					
15							A	A	A	A	A	A	A	A	106	110	A	A	A					
16							108	A	A	A	A	A	A	A	A	A	108	A	A					
17							A	A	A	A	A	A	A	A	A	A	A	A	A					
18							114	108	A	A	A	A	A	A	A	A	114	A	A					
19							116	116	A	A	A	A	A	A	A	116	118	A	A					
20	A						A	A	A	A	A	A	A	A	A	A	112	A	A					
21							A	A	A	A	A	A	A	A	A	A	110	110	A					
22							A	A	A	A	A	A	A	A	A	108	108	A	A					
23							A	A	A	A	A	A	A	A	112	108	106	A	A					
24							A	A	A	A	A	A	A	A	A	A	A	A	A					
25							A	A	A	A	A	A	A	A	A	A	112	A	A					
26							A	A	A	A	A	A	A	A	A	A	110	110	A					
27							A	A	A	A	A	A	A	A	A	A	A	A	A					
28							A	A	A	A	A	A	A	A	A	A	112	A	112					
29							A	A	A	A	A	A	A	A	A	A	110	110	A					
30							A	A	A	A	A	A	A	A			A	A	A	A				
31							A	A	A	A	A	A	A	A		A	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							9	6	2				2	2	9	11	20	10	4					
MED							114	114	115				112	113	112	110	112	111	113					
U Q							118	116							114	114	113	114	114					
L Q							109	112							110	110	110	110	112					

MAY 2019 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

MAY 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	92	92	92	92	92	92	G	118	116	100	96	96	96	98	98	G	108	G	G	102	100	92	92	92
2	92	90	86	82	90	B	118	118	96	98	98	98	98	G	128	142	G	136	126	B	98	B	92	92
3	84	100	B	B	B	B	G	G	124	102	102	98	98	96	126	132	122	114	100	96	96	96	96	92
4	92	84	82	82	82	82	102	102	100	94	92	94	94	94	94	94	100	96	94	92	92	92	88	88
5	88	84	90	98	98	110	110	96	94	92	92	92	90	92	80	80	82	82	80	82	82	80	88	94
6	90	86	B	88	88	104	102	102	92	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
7	86	86	90	90	90	90	132	100	100	92	92	92	G	98	134	140	132	116	104	102	102	102	100	92
8	92	92	90	90	100	140	128	106	100	96	94	94	120	114	114	114	138	102	92	92	88	90	90	90
9	90	90	88	86	86	90	100	100	96	96	96	92	92	92	92	G	110	104	98	98	94	94	94	94
10	94	94	94	88	88	96	114	102	100	98	96	96	88	100	98	96	132	128	100	100	94	94	92	90
11	88	88	88	88	88	88	112	112	102	84	84	88	88	88	110	94	92	G	116	116	102	102	100	100
12	92	90	90	90	90	90	90	90	90	90	90	86	86	86	86	86	86	86	86	80	80	92	84	86
13	102	98	98	92	92	92	92	92	100	98	98	88	88	88	G	88	124	124	118	102	94	94	94	94
14	84	82	82	82	82	82	102	96	94	94	94	94	94	86	86	118	118	98	98	98	98	96	98	96
15	92	94	94	94	90	90	104	104	94	84	84	84	92	98	118	116	106	106	100	100	96	92	92	92
16	92	92	90	90	88	88	116	96	96	90	90	88	88	88	84	84	122	104	102	102	102	102	90	90
17	90	90	90	90	88	88	106	106	106	96	94	94	94	94	92	88	88	102	98	98	98	98	98	92
18	100	96	88	88	88	88	116	114	100	98	92	92	90	92	90	90	126	116	104	94	94	88	106	96
19	96	96	96	96	96	96	118	118	102	100	96	94	90	90	90	114	114	98	98	94	94	94	94	94
20	94	94	94	94	B	94	102	100	96	96	92	92	92	92	90	84	124	102	102	96	96	96	96	94
21	84	84	84	84	84	84	104	102	102	94	94	92	92	86	86	90	112	112	106	104	94	92	92	92
22	90	88	88	88	88	88	94	94	94	94	94	82	82	82	82	154	132	102	92	90	88	88	88	88
23	92	84	84	82	80	B	96	96	94	92	92	92	86	104	122	114	112	104	98	84	86	92	92	92
24	86	86	84	84	80	84	96	92	90	90	90	88	88	86	86	86	86	82	80	90	90	90	90	90
25	94	106	94	88	80	88	98	98	96	96	88	88	88	88	86	86	132	102	96	96	96	96	96	94
26	92	92	92	86	86	86	84	84	84	84	84	82	82	82	82	82	118	112	96	96	96	96	96	96
27	94	92	90	90	90	90	106	106	100	98	94	94	88	88	88	88	94	96	96	96	94	92	82	82
28	82	82	82	82	84	96	94	94	94	92	92	88	88	82	82	84	G	88	G	86	86	86	86	86
29	86	86	86	86	86	98	98	98	98	100	96	92	100	82	82	82	84	84	88	88	88	88	88	88
30	88	98	98	98	98	96	106	106	98	96	96	96	90	90	90	90	96	86	86	84	84	84	84	84
31	84	84	84	84	84	84	104	104	92	92	92	92	88	88	88	88	88	86	86	86	86	86	86	86
	00	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	29	30	29	28	29	30	31	31	31	31	30	30	30	29	29	29	29	30	31	30	31	31
MED	92	90	90	88	88	90	104	101	96	96	94	92	90	90	90	90	112	102	98	96	94	92	92	92
U Q	92	94	93	90	90	96	113	106	100	98	96	94	94	96	98	114	124	112	102	100	96	96	96	94
L Q	86	86	85	84	84	88	97	96	94	92	92	88	88	86	86	86	93	92	92	90	88	90	88	88

IONOSPHERIC DATA STATION Yamagawa

MAY 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

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	F8	F9	F6	F9	F8	F6		C3	C2	L2	L3	L5	L2	L2	L2		C1			L1	F3	F7	F9	F7
2	F2	F4	F5	F1	F1		C3	C4	L6	L3	L2	L3	L1		C1	H2		H2	C3		F1		F5	F2
3	F2	F1							C1	L3	L2	L2	L1	L2	C1	C1	C2	C4	L7	F4	F7	F8	F3	F5
4	F3	F6	F4	F1	F1	F1	L6	L3	L3	L6	L5	L2	L2	L2	L7	L5	L4	L8	L6	F6	F9	F7	F6	F6
5	F5	F3	F1	F1	F1	F1	C4	L3	L6	L4	L3	L3	L4	L3	L5	L6	L8	L9	L9	F9	F9	F3	F3	F2
6	F4	F1		F1	F1	F1	L3	L5	L4	L3	L4	L2	L3	L2	L5	L6	L3	L5	L8	F8	F5	F3	F3	F5
7	F9	F3	F2	F2	F3	F2	C2	L5	L6	L7	L3	L3		L2	C1	H2	H1	C2	L6	F8	F2	F2	F2	F9
8	F6	F8	F8	F8	F2	F1	C4	L4	L6	L6	L5	L3	C2	C1	C2	C2	H1	L6	L8	F8	F6	F6	F5	F8
9	F3	F5	F2	F2	F3	F1	L5	L4	L5	L4	L3	L4	L3	L3	L2		C3	L7	L7	F9	F9	F8	F9	F9
10	F7	F9	F3	F5	F4	F3	C3	L5	L4	L6	L4	L3	L6	L2	L2	L2	H1	C3	L6	F8	F7	F5	F9	F6
11	F9	F6	F9	F3	F4	F9	C4	C4	L3	L5	L5	L3	L4	L3	C1	L2	L2		C2	F8	F6	F8	F8	F5
12	F3	F2	F6	F2	F2	F4	L5	L7	L7	L5	L2	L6	L5	L3	L2	L2	L5	L5	L6	F9	F7	F2	F5	F3
13	F2	F2	F4	F9	F9	F8	L3	L4	L2	L5	L3	L5	L2	L2		L2	CL22	CL22	C5	F5	F4	F7	F7	F2
14	F5	F8	F8	F7	F5	F3	L4	L8	L8	L7	L5	L4	L4	L4	L4	C1	C3	L7	L8	F6	F8	F9	F8	F7
15	F5	F9	F8	F8	F6	F7	L5	L5	L8	L6	L4	L6	L5	L3	C2	C2	L4	L7	L8	F8	F7	F8	F8	F6
16	F6	F6	F4	F4	F2	F2	C3	L9	L5	L6	L4	L5	L3	L3	L5	L2	C2	L5	L8	F4	F6	F8	F7	F7
17	F8	F6	F5	F9	F7	F4	L5	L6	L6	L5	L6	L6	L4	L3	L3	L8	L6	L4	L8	F9	F5	F5	F8	F8
18	F2	F8	F8	F5	F5	F2	C4	C7	L8	L4	L3	L5	L3	L2	L1	L2	CL22	CL43	L5	F9	F3	F6	FF24	F9
19	F9	F9	F6	F6	F6	F1	C3	C3	L7	L3	L4	L3	L4	L3	L3	CL22	C2	L3	L4	F9	F5	F6	F7	F6
20	F6	F3	F2	F2		F1	L5	L4	L4	L3	L3	L2	L3	L3	L3	L2	C2	L7	L6	F6	F8	F9	F4	F9
21	F8	F9	F6	F6	F5	F2	L4	L8	L6	L5	L8	L7	L6	L5	L6	L4	C2	C2	L7	F2	F7	F6	F8	F6
22	F9	F7	F7	F7	F5	F3	L5	L8	L7	L6	L5	L6	L8	L8	L6	H1	C3	L7	L7	F9	F6	F8	F9	F7
23	F9	F9	F9	F7	F9		L8	L8	L9	L6	L8	L4	L6	L2	C3	C3	C3	L3	L6	F7	F7	F6	F6	F7
24	F9	F2	F3	F3	F2	F1	L3	L8	L8	L6	L5	L5	L4	L3	L4	L3	L7	L9	L9	F8	F5	F5	F6	F8
25	F4	F4	F5	F2	F6	F2	L7	L7	L5	L6	L6	L3	L3	L3	L5	L3	H2	L6	L9	F9	F7	F4	F5	F9
26	F6	F3	F5	F5	F4	F3	L7	L4	L6	L6	L6	L5	L4	L4	L3	L3	CL23	CL33	L4	F8	F4	F4	F2	F2
27	F2	F2	F5	F4	F3	F2	L3	L5	L7	L5	L6	L5	L6	L5	L5	L4	L5	L2	L2	F3	F4	F7	F9	F2
28	F3	F2	F2	F2	F4	F1	L4	L8	L7	L7	L7	L5	L5	L5	L7	L3		L3		F4	F4	F4	F5	F5
29	F9	F5	F6	F5	F3	F7	L8	L8	L6	L3	L7	L7	L3	L5	L3	L2	L3	L2	L4	F9	F8	F9	F8	F4
30	F7	F3	F3	F1	F9	F6	L2	L4	L3	L4	L6	L4	L7	L7	L4	L4	L4	L5	L8	F7	F9	F8	F6	F9
31	F9	F9	F7	F7	F5	F2	L6	L5	L5	L5	L5	L4	L9	L5	L6	L4	L3	L5	L5	F6	F4	F6	F3	F8
	00	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																								

MAY 2019 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	47	41	35	36	X 38	A															X 66	X 60	X 49	X 48
2	X 49	X 45	X 44	X 42	X 37	X 30															X 71	X 62	X 61	X 59
3	X 60	X 61	X 68	X 45	X 26	X 24															X 71	X 68	X 58	X 54
4	X 52	X 52	X 50	X 44	X 32	X 31															X 85	X 66	X 46	X 44
5	X 44	X 43	X 40	X 40	X 34	X 29															X 73	A	X 40	X 44
6	X 36	X 33	O X 32	A	X 27	X 25															X 81	X 56	X 49	58
7	54	57	47	44	39	38															X 96	X 85	X 44	44
8	44	47	47	46	32	X 28															101	X 80	55	58
9	A	50	48	45	41	A															X 68	X 60	X 59	59
10	59	53	48	44	X 38	X 33															X 89	X 55	X 44	X 42
11	X 39	45	47	44	35	38															X 78	X 64	X 60	X 58
12	X 59	X 54	X 57	X 51	X 50	X 47															X 58	X 44	45	47
13	44	39	X 32	38	X 32	X 28															X 76	X 45	X 39	X 38
14	X 39	X 38	X 36	X 34	34	X 33															A	A	X 31	A
15	A	A	A	X 30	X 28	X 33															X 58	X 60	X 53	58
16	60	59	58	48	46	36															X 68	A	A	A
17	58	A	A	A	X 33	A															X 78	A	A	A
18	A	A	A	A	A	A															X 98	X 60	X 49	55
19	58	55	42	A	X 33	X 36				C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C													A	A	A	A
21	X 43	A	43	A	A	X 33															X 74	X 39	X 36	X 35
22	35	34	A	A	27	X 24															X 73	A	X 54	58
23	59	51	48	44	X 34	32															X 79	X 72	A	A
24	44	44	A	A	31																X 60	X 44	X 45	52
25	52	47	42	47	42	36															X 87	A	A	X 32
26	A	A	X 32	39	39	30															X 73	X 56	X 48	52
27	49	48	44	44	O X 30	X 23															X 71	X 68	X 68	68
28	62	X 58	X 53	X 53	X 47																X 72	X 61	X 46	X 44
29	47	47	48	47	X 36	A															X 79	X 65	X 61	X 60
30	X 54	57	57	X 42	A																X 86	X 78	X 71	X 54
31	59	57	57	58	50																X 76	A	X 47	53
	00	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	25	23	27	21															28	22	25	25
MED	50	48	47	44	X 34	X 32															X 75	X 60	X 49	X 53
U Q	59	56	X 52	47	39	36															X 83	X 68	X 58	58
L Q	X 44	44	X 41	40	X 32	X 28															X 71	X 56	X 44	X 44

IONOSPHERIC DATA STATION Okinawa

MAY 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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 35	F 30	F 26	F 27	32	A	37	45	45	A	56	58	64	76	81	90	95	90	68	63	60	54	43	42
2	43	39	38	36	31	24	41	46	A	47	56	59	82	102	116	119	121	105	101	77	65	56	55	53
3	54	55	62	39	20	18	36	60	51	48	51	59	78	86	76	65	60	57	63	66	65	62	52	48
4	46	46	44	38	26	25	40	55	54	A	56	72	85	74	78	84	74	64	67	74	79	60	40	38
5	38	37	34	34	28	23	40	51	66	55	51	62	76	84	90	83	76	72	82	77	67	A	34	38
6	30	27	26	A	21	19	38	49	A	A	57	68	A	72	A	70	76	76	77	85	75	50	43	F 48
7	F 45	F 44	F 38	F 35	F 32	F 30	42	47	51	54	A	63	A	85	88	89	86	84	86	92	90	79	39	F 37
8	F 37	F 38	F 36	F 35	F 23	22	34	74	59	A	A	A	59	71	A	A	78	85	A	80	F 93	74	F 39	F 42
9	A	F 38	F 38	F 30	F 26	A	36	51	65	60	62	56	70	75	72	78	93	101	80	70	62	54	53	F 51
10	F 52	F 42	F 39	F 36	32	27	46	46	48	52	A	59	62	67	78	88	94	93	89	92	83	49	38	36
11	33	F 33	F 39	F 28	F 25	F 24	38	51	65	A	62	64	75	76	70	86	96	82	77	74	72	58	54	52
12	53	48	51	45	44	41	36	41	A	A	A	A	A	A	54	59	62	61	60	62	52	38	F 34	F 34
13	F 32	F 28	26	F 30	26	22	40	46	47	51	54	56	65	A	63	64	67	71	69	75	70	39	33	32
14	33	32	30	28	F 25	27	42	49	49	A	A	A	A	73	83	96	92	92	A	A	A	A	25	A
15	A	A	A	24	22	27	41	A	A	A	A	A	A	A	56	A	56	A	A	A	52	54	47	F 47
16	F 48	F 46	F 44	F 35	F 32	F 26	40	49	A	A	A	A	A	56	60	71	73	60	50	J R 62	J R 62	A	A	A
17	F 48	A	A	A	27	A	41	58	60	A	56	A	58	75	A	85	88	89	92	96	72	A	A	A
18	A	A	A	A	A	A	41	47	50	A	A	A	50	A	A	73	79	84	87	94	92	54	43	F 42
19	F	F 38	F	A	27	30	44	48	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	56	46	A	48	50	54	55	68	81	85	A	A	A	A	A	A
21	37	A	F 32	A	A	27	40	43	49	56	49	A	A	50	54	65	72	83	84	95	68	33	30	29
22	F 27	F 27	A	A	F 18	18	38	53	51	52	A	45	46	52	63	55	52	56	A	70	67	A	48	F 47
23	F	F	F 33	F 28	28	F 20	A	56	A	A	A	A	A	48	48	50	59	62	62	67	73	U R 66	A	A
24	F 38	F 31	A	A	F 23	22	38	A	A	A	A	53	64	74	85	97	104	99	68	60	54	38	39	F 41
25	F 35	F 32	F 32	F 28	F 27	F 26	39	52	53	46	A	A	57	59	59	64	71	72	76	83	81	A	A	26
26	A	A	26	F 24	F 22	F 19	33	42	48	56	57	49	E G 43	47	53	60	74	88	86	77	67	50	42	F 38
27	F 28	F 26	F 27	F 26	24	18	36	39	48	A	A	A	56	55	A	A	60	A	A	66	65	62	62	F 59
28	F 53	52	47	47	41	28	39	58	44	A	A	A	A	A	A	A	59	68	72	72	66	55	41	38
29	F 32	F 31	F 30	F 32	30	A	44	A	A	A	A	A	51	66	72	70	74	77	87	84	73	59	55	54
30	48	F 46	F 44	36	A	26	46	53	52	A	A	68	78	93	107	A	104	86	83	84	80	72	65	48
31	F 39	F 42	F 39	F 39	F 38	32	41	52	50	49	60	A	52	63	73	76	80	74	80	H 88	70	A	41	F 43
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	24	24	23	27	25	29	27	22	13	13	16	21	25	24	25	30	28	24	27	28	22	25	25
MED	F 38	F 38	F 37	F 34	27	25	40	49	51	52	56	59	62	72	72	73	76	82	78	77	69	54	42	42
U Q	F 48	45	42	36	32	27	41	53	56	56	58	64	76	76	82	87	92	88	86	85	77	62	52	48
L Q	F 33	F 31	30	F 28	F 23	21	38	46	48	48	52	54	52	56	58	64	67	70	68	67	65	50	38	38

MAY 2019 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

MAY 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

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	424	432	A	A	424	416	396	380	L					
2									A	A	A	432	A	428	424	424	404	376						
3								L	L		436	436	428	432	432	A	412	396						
4										A	A	440	440	432	424	424	404	L 400	U L 344					
5									404	L 432	A	A	A	A	A	432	A	A						
6								L	A	A	A	A	A	A	A	A	A	A	L					
7									A	A	A	A	A	448	A	A	A	A		A				
8								A		A	A	A	A	A	A	A	A	A	A					
9								U L 388	400	436	432	452	456	440	436	436	400	384	L					
10								L		A	A	440	448	A	A	A	408	384	L					
11								U L 384	A	A	444	452	444	448	440	420	404	396	L					
12							272	U L 352	A	A	A	A	A	A	432	428	428	392	L					
13									400	412	424	436	432	A	432	A	A	A	A					
14								L		A	A	A	A	A	A	A	A	A	A	A				
15								A	A	A	A	A	A	A	A	A	A	A	A	A				
16								A	A	A	A	A	A	432	420	416	396	A	U L 348					
17								A	A	A	504	A	A	A	A	A	400	376						
18									392	A	A	A	436	A	A	A	404	A						
19								L	A	C	C	C	C	C	C	C	C	C	C	C				
20							C	C	384	U L 396	A	432	424	424	420	A	388	A	A	A				
21								L	L 396	408	424	A	A	428	A	A	392	A						
22								A	A	A	A	432	440	432	420	A	A	A	A					
23							A	A	A	A	A	A	A	424	416	412	388	380	A					
24								A	A	A	A	A	432	A	A	A	A	380						
25								A	A	U L 420	A	A	A	A	428	A	U A 392	A	A					
26								U L 364	380	408	420	428	432	432	408	A	A	364	A					
27							L	A	A	A	A	A	A	A	A	A	A	A	A					
28								L		A	A	A	A	A	A	A	A	364	352					
29								A	A	A	A	A	428	432	424	412		A	A					
30									A	A	A	A	A	A	A	A	A	A						
31								U L 364	L 412	A	A	A	440	A	424	412	392	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	5	8	7	8	11	13	13	16	11	16	13	3					
MED							272	U L 364	398	412	428	436	436	432	424	420	400	380	U L 348					
U Q								U L 386	402	432	440	440	442	436	432	428	404	394	352					
L Q								U L 358	388	408	424	432	430	428	420	412	392	376	U L 344					

MAY 2019 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

MAY 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

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	200	A	300	A	A	A	A	A	312	292	260	208	B				
2							A	224	A	A	A	A	A	340	340	312	288	256	A	A				
3							A	A	A	A	A	A	A	U A 340	336	316	296	260	A	A				
4							A	A	A	A	A	A	A	352	336	320	296	268	A	A				
5							A	A	276	A	A	A	A	A	A	A	304	248	A	A				
6							A	204	272	288	300	328	336	352	336	A	A	A	A	B				
7							A	A	A	A	A	A	A	A	A	A	A	A	A	A				
8							A	A	U A 280	A	A	340	U A 364	352	340	332	304	264	A	A				
9							A	A	A	A	A	A	A	A	A	A	300	264	A	B				
10							A	A	A	A	A	A	348	348	336	320	304	264	204	A				
11							A	A	A	A	A	A	A	A	328	A	A	264	A	B				
12							A	A	U A 264	A	A	A	A	356	A	A	288	256	216	A				
13							A	A	A	316	324	336	A	A	A	A	300	252	204	A				
14							A	U A 232	U A 280	316	328	340	A	U A 332	A	332	300	264	212	A				
15							A	A	A	A	A	A	A	A	A	316	296	252	U A 188	A				
16							A	A	A	A	A	A	A	A	336	A	292	260	216	A				
17							168	U A 240	U A 296	312	320	A	A	A	A	A	312	276	240	A				
18							A	220	244	A	A	A	A	A	A	A	A	264	216	A				
19							A	A	A	C	C	C	C	C	C	C	C	C	C	C				
20							C	C	A	A	A	A	A	A	336	A	300	260	200	A				
21							A	A	280	300	A	A	A	332	328	316	292	260	212	A				
22							A	A	A	A	A	A	272	A	344	A	300	264	A	A				
23						B	A	200	256	A	A	A	A	336	332	312	280	272	220	A				
24						B	A	236	276	A	A	A	A	A	A	A	A	A	A	A				
25						B	A	208	268	296	U A 292	A	A	A	A	320	300	268	204	A				
26						B	A	220	A	A	A	A	A	340	328	312	284	260	200	A				
27							A	U A 220	276	312	A	348	A	A	324	300	A	A	A	A				
28						B	A	220	280	300	308	A	A	A	A	A	A	256	184	B				
29							A	224	276	308	A	A	328	A	A	A	A	A	A	A				
30						B	A	224	268	A	A	A	A	332	328	304	A	A	220	A				
31						B	A	A	248	A	296	A	A	A	A	A	296	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	14	16	10	7	5	5	12	15	14	21	23	16					
MED							168	220	276	304	308	340	336	340	336	316	296	260	210					
U Q								224	U A 280	312	324	344	356	352	336	320	300	264	216					
L Q								208	266	300	296	332	300	334	328	312	292	256	202					

MAY 2019 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

MAY 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

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	J A 25	J A 28	J A 39	J A 24	J A 38	J A 45	J A 41	J A 35	J A 44	J A 110	J A 84	J A 49	J A 48	J A 70	39	G	G	G	G	J A 20	J A 25	J A 20	J A 29	J A 51
2	J A 87	J A 66	J A 33	J A 27	J A 36	J A 32	J A 31	J A 49	J A 63	J A 52	J A 68	J A 44	47	41	36	35	J A 34	G	J A 30	J A 44	20	E B 16	J A 18	E B 16
3	E B 16	J A 21	E B 16	E B 16	E B 16	E B 16	J A 22	J A 28	J A 41	J A 44	J A 48	J A 47	J A 53	38	43	J A 49	38	J A 42	J A 43	J A 46	J A 51	J A 39	J A 47	J A 33
4	J A 21	J A 27	J A 20	J A 22	J A 32	E B 16	J A 27	77	J A 110	J A 188	J A 110	J A 268	J A 41	40	40	37	G	J A 38	J A 38	J A 29	J A 27	20	J A 20	J A 18
5	J A 18	J A 34	J A 62	J A 22	J A 46	J A 26	J A 30	J A 32	J A 38	J A 71	J A 108	J A 139	J A 56	J A 52	J A 49	J A 43	J A 56	J A 60	J A 64	J A 38	J A 72	J A 75	J A 63	J A 51
6	J A 38	J A 52	J A 32	J A 51	J A 21	J A 24	J A 26	28	J A 88	J A 64	J A 52	J A 146	J A 107	J A 69	J A 118	J A 167	J A 84	J A 50	J A 29	J A 16	J A 33	J A 86	J A 87	J A 53
7	J A 32	J A 36	J A 52	J A 41	J A 32	J A 49	J A 36	J A 44	J A 48	J A 53	J A 82	J A 80	J A 122	J A 48	J A 46	J A 62	J A 57	J A 47	J A 37	J A 24	J A 26	E B 16	E B 16	J A 31
8	J A 36	J A 66	J A 125	J A 72	J A 33	J A 22	J A 25	J A 52	J A 63	J A 61	J A 70	J A 64	J A 58	J A 60	J A 87	J A 86	J A 47	J A 52	J A 100	J A 54	J A 52	J A 71	J A 58	J A 63
9	J A 65	J A 66	J A 53	J A 48	J A 26	J A 53	J A 40	J A 38	J A 36	J A 36	J A 39	J A 44	J A 42	J A 40	J A 56	J A 38	J A 34	J A 33	J A 24	J A 20	J A 52	J A 62	J A 63	J A 52
10	J A 87	J A 66	J A 64	J A 65	J A 39	J A 66	J A 22	J A 44	J A 48	J A 50	J A 83	J A 40	J A 46	J A 48	J A 50	J A 104	J A 59	J A 33	J A 32	J A 28	J A 18	J A 46	J A 33	J A 38
11	J A 42	J A 53	J A 36	J A 54	J A 36	J A 42	J A 36	J A 38	J A 49	J A 62	J A 55	J A 49	40	J A 47	36	J A 34	30	G 24	J A 29	E B 16	J A 38	J A 53	J A 53	J A 53
12	J A 38	J A 87	J A 87	J A 22	J A 71	J A 88	J A 48	J A 30	J A 56	J A 66	J A 74	J A 85	J A 84	J A 97	J A 53	37	G	J A 31	J A 25	J A 23	J A 22	J A 37	J A 32	J A 33
13	J A 28	J A 38	J A 31	J A 40	J A 43	J A 34	J A 34	J A 39	J A 62	37	J A 45	J A 41	J A 42	J A 81	43	J A 58	J A 53	J A 71	J A 71	J A 22	20	21	J A 33	J A 41
14	J A 19	J A 35	J A 33	J A 33	J A 18	18	J A 21	J A 29	J A 36	J A 63	J A 104	J A 94	J A 141	J A 80	J A 79	J A 67	J A 82	J A 69	J A 220	J A 140	J A 122	J A 67	J A 25	J A 63
15	J A 38	J A 39	J A 30	J A 52	J A 27	J A 26	J A 32	J A 91	J A 229	J A 176	J A 186	J A 293	J A 264	J A 213	J A 50	J A 93	J A 76	J A 87	J A 110	J A 100	J A 84	J A 54	J A 65	J A 52
16	J A 52	J A 41	J A 33	E B 16	19	J A 20	J A 27	J A 53	J A 73	J A 72	J A 81	J A 132	J A 85	J A 60	J A 52	J A 38	36	J A 62	J A 42	J A 122	J A 140	J A 140	J A 110	J A 85
17	J A 86	J A 87	J A 84	J A 53	J A 41	J A 50	J A 33	J A 53	J A 66	J A 77	J A 59	J A 110	J A 75	J A 105	J A 80	J A 90	G	J A 53	J A 122	J A 204	J A 105	J A 66	J A 110	J A 86
18	J A 105	J A 52	J A 81	J A 81	J A 43	J A 38	J A 40	J A 38	J A 33	J A 78	J A 140	J A 53	J A 63	J A 67	J A 82	J A 50	J A 37	J A 52	J A 53	J A 46	J A 18	J A 17	J A 35	J A 33
19	J A 40	J A 42	J A 50	J A 53	J A 48	J A 33	J A 20	J A 33	J A 70	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	J A 62	J A 42	J A 61	42	43	44	42	J A 52	J A 52	J A 66	J A 80	J A 70	J A 107	J A 120	J A 64	J A 53
21	J A 53	J A 66	J A 52	J A 52	J A 50	J A 37	J A 26	J A 32	J A 36	J A 44	J A 158	J A 109	J A 194	J A 43	J A 48	J A 70	J A 43	J A 54	J A 50	J A 33	J A 50	J A 26	J A 32	J A 46
22	J A 32	J A 21	J A 33	J A 33	J A 16	J A 20	J A 25	J A 62	J A 142	J A 85	J A 82	J A 65	J A 38	J A 37	G	J A 67	J A 53	J A 86	J A 108	J A 55	J A 167	J A 161	J A 108	J A 42
23	J A 22	J A 39	J A 22	J A 27	J A 20	J A 30	J A 53	J A 47	J A 86	J A 90	J A 90	J A 102	J A 86	J A 45	J A 43	J A 42	J A 40	J A 49	J A 66	J A 65	J A 52	J A 139	J A 62	J A 62
24	J A 52	J A 50	J A 53	J A 53	J A 63	J A 49	J A 42	J A 66	J A 78	J A 88	J A 109	J A 52	J A 70	J A 67	J A 118	J A 100	J A 58	J A 56	J A 114	J A 49	J A 27	J A 34	J A 41	J A 46
25	J A 30	J A 31	J A 36	J A 26	J A 32	J A 31	J A 36	J A 52	J A 65	J A 40	J A 110	J A 137	J A 132	J A 139	J A 54	J A 43	J A 40	J A 52	J A 74	J A 89	J A 86	J A 74	J A 120	J A 52
26	J A 71	J A 50	J A 49	J A 24	J A 17	E B 16	J A 27	J A 33	J A 52	J A 68	J A 59	J A 64	J A 38	J A 43	J A 42	J A 71	J A 40	J A 34	J A 45	J A 64	J A 42	J A 36	J A 15	J A 15
27	J A 26	J A 30	J A 37	J A 37	J A 91	J A 31	J A 35	J A 65	J A 60	J A 123	J A 134	J A 101	J A 160	J A 72	J A 84	J A 70	J A 267	J A 196	J A 167	J A 62	J A 41	J A 52	J A 53	J A 41
28	J A 32	J A 23	J A 22	J A 20	J A 18	E B 16	J A 22	J A 36	J A 51	J A 70	J A 84	J A 202	J A 220	J A 90	J A 122	J A 161	J A 50	J A 33	J A 26	J A 22	E B 16	J A 19	J A 19	J A 17
29	J A 29	J A 27	J A 19	J A 40	J A 27	J A 64	J A 42	J A 66	J A 191	J A 268	J A 225	J A 102	J A 41	J A 45	J A 38	J A 44	J A 72	J A 55	J A 55	J A 32	J A 42	J A 51	J A 38	J A 59
30	J A 85	J A 51	J A 34	J A 42	J A 64	J A 29	J A 36	J A 63	J A 64	J A 61	J A 75	J A 87	J A 102	J A 70	J A 82	J A 144	J A 108	J A 82	J A 86	J A 62	J A 38	J A 62	J A 52	J A 29
31	J A 22	J A 42	J A 49	J A 18	J A 19	E B 16	J A 30	J A 88	J A 52	J A 66	J A 64	J A 70	J A 63	J A 89	J A 53	J A 39	J A 38	J A 81	J A 54	J A 48	J A 35	J A 134	J A 49	J A 46
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	31	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	J A 37	J A 42	J A 36	J A 38	J A 32	J A 31	J A 32	J A 44	J A 62	J A 66	J A 82	J A 82	J A 63	J A 60	J A 50	J A 55	J A 45	J A 52	J A 54	J A 46	J A 42	J A 52	J A 48	J A 46
U Q	J A 53	J A 53	J A 53	J A 52	J A 43	J A 45	J A 36	J A 62	J A 73	J A 85	J A 109	J A 110	J A 107	J A 80	J A 80	J A 86	J A 58	J A 66	J A 86	J A 64	J A 72	J A 74	J A 63	J A 53
L Q	J A 26	J A 31	J A 32	J A 24	J A 20	E B 20	J A 26	J A 33	J A 48	J A 52	J A 61	J A 49	J A 43	J A 44	J A 42	J A 39	J A 36	J A 34	J A 32	J A 24	J A 26	J A 26	J A 32	J A 33

MAY 2019 foEs (0.1MHz)

IONOSPHERIC DATA STATION Okinawa

MAY 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

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	E B 16	E B 16	E B 16	E B 16	19	A A 45	29	32	38	A A 110	37	38	46	60	38	G	G	G	G	E B 14	19	E B 16	E B 16	20
2	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	22	41	A A 63	40	47	36	46	40	36	34	30	G	25	19	E B 16	E B 16	E B 16	E B 16
3	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	19	26	34	36	37	37	38	36	42	44	36	34	33	39	31	29	30	E B 16
4	E B 16	E B 16	E B 16	E B 16	20	E B 16	22	39	44	A A 188	44	41	37	39	38	35	G	36	24	21	25	E B 16	E B 16	E B 16
5	E B 16	20	18	E B 16	21	E B 16	24	27	31	40	48	58	54	46	47	42	51	56	56	29	E B 16	A A 75	20	E B 16
6	E B 16	E B 16	22	A A 51	E B 16	E B 16	24	26	A A 88	A A 64	46	47	A A 107	68	A A 118	49	56	40	23	E B 16	32	E B 16	21	20
7	E B 16	E B 16	22	E B 16	E B 16	E B 16	24	41	38	49	A A 82	57	A A 122	41	42	57	49	44	35	20	23	E B 16	E B 16	E B 16
8	21	E B 16	E B 16	18	E B 16	E B 16	20	41	50	A A 61	A A 70	A A 64	51	54	A A 87	A A 86	47	42	A A 100	27	21	29	20	E B 16
9	A A 65	E B 16	28	24	E B 16	A A 53	20	28	32	33	36	37	40	40	38	36	33	30	23	E B 16	18	21	E B 16	35
10	24	E B 16	20	E B 16	28	E B 16	21	29	38	41	A A 83	37	43	45	45	52	35	32	29	27	E B 16	28	26	24
11	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	26	29	42	A A 62	42	40	38	37	35	32	30	G 22	24	E B 16	23	34	21	E B 16
12	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	21	27	A A 56	A A 66	A A 74	A A 85	A A 84	A A 97	40	36	G	G 22	24	16	20	25	26	E B 16
13	E B 16	E B 16	19	25	21	E B 14	24	32	32	34	38	40	37	A A 81	42	56	52	67	66	19	E B 16	E B 16	22	E B 16
14	E B 16	19	E B 16	E B 16	E B 16	E B 16	19	28	33	A A 63	A A 104	A A 94	A A 141	57	52	60	67	61	A A 220	A A 140	A A 122	A A 67	21	A A 63
15	A A 38	A A 39	A A 30	20	E B 16	E B 16	29	A A 91	A A 229	A A 176	A A 186	A A 293	A A 264	A A 213	43	A A 93	40	A A 87	A A 110	A A 100	30	38	26	E B 16
16	E B 16	22	22	E B 16	E B 16	E B 16	23	41	A A 73	A A 72	A A 81	A A 132	A A 85	36	39	34	33	49	30	35	E B 16	A A 140	A A 110	A A 85
17	20	A A 87	A A 84	A A 53	E B 16	A A 50	31	39	43	A A 77	46	A A 110	56	68	A A 80	57	G	30	81	49	63	A A 66	A A 110	A A 86
18	A A 105	A A 52	A A 81	A A 81	A A 43	A A 38	35	32	33	A A 78	A A 140	A A 53	42	A A 67	A A 82	48	36	48	52	40	E B 16	E B 16	23	20
19	20	28	20	A A 53	21	19	20	29	A A 70	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	31	35	A A 61	41	41	40	41	42	32	64	A A 80	A A 70	A A 107	A A 120	A A 64	A A 53
21	32	A A 66	28	A A 52	A A 50	21	20	27	32	35	37	A A 109	A A 194	40	45	50	38	40	41	26	20	E B 16	18	E B 16
22	19	E B 16	A A 33	A A 33	E B 16	E B 16	22	35	41	47	A A 82	36	36	35	G	44	42	50	A A 108	46	28	A A 161	28	28
23	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	A A 53	42	A A 86	A A 90	A A 90	A A 102	A A 86	40	38	39	34	35	49	51	20	42	A A 62	A A 62
24	33	21	A A 53	A A 53	19	E B 16	28	A A 66	A A 78	A A 88	A A 109	44	40	50	46	78	42	33	46	28	E B 16	E B 16	21	20
25	22	22	21	21	21	E B 16	25	32	43	36	A A 110	A A 137	46	51	40	42	39	41	55	41	17	A A 74	A A 120	E B 16
26	A A 71	A A 50	21	E B 16	E B 16	E B 16	20	32	34	40	40	38	37	42	38	51	40	32	37	61	29	22	E B 16	E B 16
27	E B 16	19	E B 16	E B 16	E B 16	E B 16	20	33	41	A A 123	A A 134	A A 101	50	46	A A 84	A A 70	44	A A 196	A A 167	26	29	36	35	28
28	20	E B 16	E B 16	E B 16	E B 16	E B 16	20	31	39	A A 70	A A 84	A A 202	A A 220	A A 90	A A 122	A A 161	42	28	25	E B 16	E B 16	E B 16	E B 16	E B 16
29	E B 16	E B 16	E B 16	22	E B 16	A A 64	34	A A 66	A A 191	A A 268	A A 225	A A 102	40	40	36	36	42	54	55	28	39	29	22	21
30	22	18	E B 16	E B 16	A A 64	E B 16	26	46	45	A A 61	A A 75	57	57	58	76	A A 144	75	66	47	48	36	20	34	19
31	E B 16	23	E B 16	E B 16	E B 16	E B 16	22	29	38	43	46	A A 70	39	59	39	34	34	40	44	36	28	A A 134	30	28
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	31	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	E B 16	E B 16	18	E B 16	E B 16	E B 16	22	32	41	A A 62	A A 72	57	46	46	42	46	38	40	45	28	22	28	22	20
U Q	22	A A 22	A A 22	A A 25	21	A A 16	26	41	A A 63	A A 78	A A 90	A A 102	A A 85	A A 60	A A 52	A A 57	44	54	A A 66	46	30	A A 66	A A 30	A A 28
L Q	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	20	29	34	40	44	40	40	40	38	36	33	32	25	E B 19	E B 16	E B 16	E B 18	E B 16

MAY 2019 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

MAY 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

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

IONOSPHERIC DATA STATION Okinawa

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F 311	F 316	F 316	F 312	389	A	401	403	371	A	352	318	290	306	295	314	334	367	343	338	340	342	303	301
2	294	316	325	337	362	371	395	393	A	A 346	338	285	279	305	313	319	351	350	344	344	321	316	299	307
3	311	340	377	389	425	308	343	375	385	352	285	279	304	336	337	330	333	328	323	312	325	333	334	308
4	314	312	337	378	329	346	350	378	370	A	303	315	329	310	308	343	341	319	308	327	347	355	311	307
5	306	306	308	341	353	353	352	341	381	369	289	308	305	313	319	318	296	297	334	358	366	A	330	298
6	321	308	296	A	332	344	358	368	A	A	336	308	A	A	A	297	307	320	324	327	381	341	321	F 308
7	F 302	F 306	F 315	F 330	F 292	F 347	368	370	363	347	A	312	A	309	320	301	295	296	309	327	354	398	327	F 310
8	F 317	F 303	F 318	F 344	F 294	309	326	380	422	A	A	A	308	320	A	A	296	317	A	323	F 324	378	F 323	F 301
9	A	F 312	F 367	F 339	F 349	A	372	349	363	333	354	313	294	303	263	283	317	347	337	305	327	315	322	F 303
10	F 325	F 311	F 316	F 308	383	302	397	377	341	337	A	313	300	278	291	306	328	326	325	348	380	336	315	303
11	300	F 304	F 336	F 342	F 323	F 343	336	319	365	A	328	287	289	296	261	301	334	316	305	300	303	323	317	289
12	311	306	309	297	296	293	284	331	A	A	A	A	A	A	307	314	308	324	349	351	334	330	F 291	F 290
13	F 296	F 286	313	F 318	315	349	364	326	343	331	308	294	312	A	312	303	322	323	325	328	372	321	300	313
14	313	305	331	317	F 297	362	367	376	355	A	A	A	A	297	285	315	307	296	A	A	A	A	294	A
15	A	A	A	323	315	373	366	A	A	A	A	A	A	A	308	A	325	A	A	A	297	304	309	F 294
16	F 313	F 303	F 322	F 305	F 347	F 351	383	368	A	A	A	A	A	302	296	294	319	346	319	J R 334	J R 349	A	A	A
17	F 299	A	A	A	337	A	349	367	365	A	277	A	U A 260	294	A	307	310	310	329	353	411	A	A	A
18	A	A	A	A	A	A	389	347	353	A	A	A	267	A	A	288	294	301	303	346	375	335	288	F 301
19	F	F 289	F	A	346	362	395	404	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	374	368	A	268	285	302	268	289	335	361	A	A	A	A	A	A
21	320	A	F 347	A	A	375	376	363	347	358	334	A	A	270	278	294	295	314	334	362	395	325	311	303
22	F 310	F 300	A	A	F 343	347	351	391	362	337	A	300	258	286	302	310	296	302	A	322	364	A	329	F 322
23	F	F	F 321	F 322	307	F 336	A	383	A	A	A	A	A	274	268	293	310	303	306	315	359	U R 336	A	A
24	F 308	F 317	A	A	F 339	331	338	A	A	A	A	297	286	297	299	307	315	346	343	331	337	327	332	F 318
25	F 314	F 336	F 331	F 340	F 329	F 307	352	364	365	324	A	A	312	311	295	284	293	301	307	347	409	A	A	296
26	A	A	342	F 332	F 334	F 317	365	334	351	340	364	319	G	255	282	281	295	331	338	357	350	346	312	F 328
27	F 301	F 313	F 312	F 343	349	357	383	365	328	A	A	A	325	301	A	A	317	A	A	316	304	322	307	F 310
28	F 316	297	307	333	360	356	332	387	408	A	A	A	A	A	A	A	282	292	304	318	354	356	323	313
29	F 306	F 287	F 333	F 313	331	A	375	A	A	A	A	A	273	291	294	281	281	293	321	348	343	317	301	314
30	306	F 301	F 346	354	A	336	378	399	367	A	A	245	269	278	301	A	328	303	306	316	322	321	334	318
31	F 294	F 355	F 318	F 304	F 307	357	382	374	336	315	330	A	277	A 268	283	292	301	287	296	H 326	381	A	268	F 306
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	24	24	23	27	25	29	27	22	13	13	16	21	24	24	25	30	28	24	27	28	22	25	25
MED	F 310	F 306	F 322	F 332	334	347	366	370	364	340	330	304	289	299	296	301	310	316	324	328	350	332	312	307
U Q	F 314	F 314	F 336	342	349	357	382	383	371	355	345	313	306	308	308	314	328	330	336	348	374	342	325	313
L Q	F 302	F 302	314	F 313	F 315	324	350	349	351	332	296	286	271	282	282	290	296	301	306	318	326	321	300	301

IONOSPHERIC DATA STATION Okinawa

MAY 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

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	402	419	A	A	440	408	391	380	L					
2									A	A	A	428	A	400	405	393	381	381						
3								L	L		401	428	430	441	A	A	388	374						
4										A	A	A 401	425	414	424	406	398	L 357	U L 362					
5									380	L 386	A	A	A	A	A	A	A	A						
6								L	A	A	A	A	A	A	A	A	A	A	L					
7									A	A	A	A	A	A 334	A	A	A	A		A				
8								A		A	A	A	A	A	A	A	A	A	A					
9								U L 364	399	397	427	417	420	411	405	407	402	384	L					
10								L		A	A	427	A	A	A	A	412	376	L					
11								U L 365	A	A	A	A 407	419	404	408	410	390	381	L					
12							322	U L 364	A	A	A	A	A	A	400	398	387	359	L					
13									429	396	431	413	445	A	A	A	A	A	A					
14								L		A	A	A	A	A	A	A	A	A	A	A				
15								A	A	A	A	A	A	A	A	A	A	A	A	A				
16								A	A	A	A	A	A	441	418	403	397	A	U L 376					
17								A	A	A	A	A	A	A	A	A	417	369						
18									399	A	A	A	A 404	A	A	A	384	A						
19								L	A	C	C	C	C	C	C	C	C	C	C	C				
20							C	C	407	U L 451	A	A 381	A 415	415	A	A	414	A	A	A				
21								L	L 386	391	421	A	A	A 391	A	A	A	A						
22								A	A	A	A	429	428	425	414	A	A	A	A					
23							A	A	A	A	A	A	A	436	439	429	432	A	A					
24								A	A	A	A	A	425	A	A	A	A	387						
25								A	A	U L 406	A	A	A	A	402	A	A	A	A					
26								U L 385	396	A	A	443	447	A	446	A	A	396	A					
27							L	A	A	A	A	A	A	A	A	A	A	A	A					
28								L		A	A	A	A	A	A	A	A	384	368					
29								A	A	A	A	A	395	A 384	423	407	A	A	A					
30									A	A	A	A	A	A	A	A	A	A						
31								U L 397	A 368	A	A	A	420	A	422	435	421	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	5	8	6	5	11	12	12	13	10	14	12	3					
MED							322	U L 365	398	396	421	419	422	412	418	407	398	380	U L 368					
U Q								U L 391	403	U L 406	429	428	429	430	432	410	414	384	U L 376					
L Q								U L 364	383	391	402	A 407	417	A 396	405	403	388	372	U L 362					

MAY 2019 M(3000)F1 (0.01)

IONOSPHERIC DATA STATION Okinawa

MAY 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

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									248	A	270	326	358	318	324	286	264	220	238					
2									A	E A 254	304	380	356	306	270	266	226	234						
3								230	238		420	400	316	268	268	284	294	288						
4										A	360	304	264	300	302	258	258	286	286					
5									232	256	E A 412	A 368	314	292	274	262	282	296						
6								242	A	A	308	302	A	E A 458	A	324	296	276	262					
7									242	A 286	A	A 346	A	296	280	280	304	302		234				
8								230		A	A	A	350	290	A	A	302	270	A					
9								282	248	292	260	338	330	306	366	328	292	244	234					
10								212		294	A	334	350	368	332	294	266	264	254					
11								306	238	A	292	364	344	316	398	304	264	258	256					
12							372	298	A	A	A	A	A	A	360	326	298	286	248					
13									290	318	358	370	322	A	320	342	290	E A 350	E A 354					
14								236		A	A	A	A	340	340	290	302	310	A	A				
15								A	A	A	A	A	A	A	344	A	310	A	A	A				
16								A 246	A	A	A	A	A	376	360	318	280	268	308					
17								234	240	A	438	A	E A 518	E A 388	A	306	294	288						
18									276	A	A	A	472	A	A	334	330	300						
19								214	A	C	C	C	C	C	C	C	C	C	C	C				
20							C	C	244	262	A	482	420	376	442	338	264	246	A	A				
21								232	292	260	306	A	A	446	414	352	322	286						
22								230	264	E A 320	A	404	528	406	318	338	376	E A 356	A					
23							A	242	A	A	A	A	A	452	460	392	322	306	318					
24								A	A	A	A	380	364	328	316	310	274	236						
25								256	248	334	A	A	332	332	350	352	326	314	298					
26								324	288	290	258	350	G	528	408	390	340	258	250					
27							214	E A 260	326		A	A	A	E A 318	374	A	A	318	A	A				
28								218		A	A	A	A	A	A	A	370	322	284					
29								A	A	A	A	A	448	346	326	362	350	320	268					
30									A 248	A	A	E A 446	376	342	304	A	262	318						
31								244	318	354	294	A	436	E A 458	338	322	302	326	280					
	00	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	19	17	12	13	16	21	25	24	25	30	28	15	1				
MED							293	239	248	290	305	362	353	335	335	322	297	286	265	234				
U Q								260	289	319	386	390	442	397	363	340	322	312	298					
L Q								230	241	261	281	336	326	306	310	288	274	261	250					

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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	278	288	Q 278	268	204	A	204	206	A	A	208	194	A	A	188	184	188	200	200	216	222	208	236	298
2	276	270	248	220	204	212	204	E A 240	A	A	A	178	A	E A 234	208	202	196	184	220	214	208	222	258	268
3	254	232	192	176	184	320	224	206	216	192	210	182	188	170	A	A	218	E A 244	284	274	252	222	228	242
4	250	266	238	190	E A 266	242	230	216	240	A	A	A 234	172	218	204	204	202	A 264	226	244	222	190	204	272
5	268	296	250	230	232	240	236	204	208	A	A	A	A	A	A	A	A	A	252	216	194	A	A 220	276
6	244	302	E A 354	A	236	264	218	204	A	A	A	A	A	A	A	A	A	A	216	226	200	218	268	288
7	266	266	266	242	280	228	222	E A 250	A	A	A	A	A	A	A	A	A	A	278	A	206	188	204	250
8	292	308	250	236	278	282	224	A	200	A	A	A	A	A	A	A	A	A	A	240	218	194	232	272
9	A	260	238	E A 264	214	A	224	202	202	186	190	192	202	210	208	202	202	208	208	230	214	230	242	Q 300
10	240	268	256	280	240	268	208	202	236	A	A	188	E A 292	A	A	A	192	222	234	222	196	226	284	A 298
11	304	272	222	242	242	242	A 240	230	A	A	A	E A 218	206	208	190	182	180	210	218	256	258	A 224	250	298
12	248	278	256	264	268	270	270	226	A	A	A	A	A	A	244	212	H 186	194	222	226	224	240	E A 362	286
13	308	298	A 324	E A 314	E A 318	236	228	226	H 192	206	194	214	172	A	A	A	A	A	A	236	186	202	E A 328	264
14	268	276	268	258	302	218	224	210	204	A	A	A	A	A	A	A	A	A	A	A	A	A	E A 344	A
15	A	A	A	E A 302	268	202	220	A	A	A	A	A	A	A	A	A	A	A	A	A	E A 288	E A 296	E A 268	292
16	266	282	262	242	220	222	210	A	A	A	A	A	A	182	A 214	194	200	A	E A 248	252	208	A	A	A
17	260	A	A	A	242	A	258	A	A	A	E A 370	A	A	A	A	A	200	232	E A 292	230	210	A	A	A
18	A	A	A	A	A	A	222	210	198	A	A	A	E A 236	A	A	A	232	A	292	234	188	190	286	276
19	280	E A 342	E A 322	A	E A 252	216	206	204	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	200	178	A	A 258	A 228	226	E A 352	A	204	A	A	A	A	A	A	A
21	E A 312	A	E A 292	A	A	E A 230	194	192	216	212	194	A	A	A 242	A	A	E A 290	A	258	214	186	238	294	318
22	E A 296	296	A	A	268	284	214	A	A	A	A	200	170	188	204	A	A	A	A	260	212	A	238	276
23	Q 282	304	Q 244	248	238	238	A	A	A	A	A	A	A	194	184	218	194	E A 244	A	E A 282	218	214	A	A
24	E A 314	278	A	A	A 272	276	A 264	A	A	A	A	A	202	A	A	A	A	220	234	242	216	224	266	246
25	236	236	E A 244	244	E A 288	272	232	A	A	192	A	A	A	A 234	A	A	A	A	A	232	184	A	A	316
26	A	A	288	266	260	Q 268	192	228	216	A	A	176	176	E A 270	200	A	A	226	A	244	198	212	232	270
27	278	300	246	226	240	286	186	A	A	A	A	A	A	A	A	A	A	A	A	244	A 262	246	E A 288	258
28	234	264	270	228	206	206	212	212	210	A	A	A	A	A	A	A	A	214	210	234	204	188	210	242
29	294	290	252	244	256	A	226	A	A	A	A	A	238	E A 268	206	202	A	A	A	216	234	242	262	262
30	282	288	214	212	A	246	222	232	A	A	A	A	A	A	A	A	A	A	274	258	238	226	236	206
31	260	234	226	246	240	216	220	212	E A 252	A	A	A	210	A	202	178	190	A	A	230	188	A	E A 342	E A 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	26	25	25	23	27	25	29	20	14	6	6	11	13	12	14	10	15	13	18	26	28	22	25	25
MED	269	278	250	243	241	242	222	210	208	192	198	193	195	U 202	204	202	198	215	229	234	210	221	U 245	274
U Q	292	297	A 274	264	268	271	229	227	216	206	210	A 218	A 232	E A 238	A 214	204	204	A 238	274	244	223	230	E A 287	296
L Q	254	266	241	228	232	220	209	204	200	186	194	182	174	191	200	184	190	204	218	226	197	202	232	260

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MAY 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

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	98	A	100	A	A	A	A	A	100	100	100	102	B				
2							A	102	A	A	A	A	A	102	102	102	102	102	A	A				
3							A	A	A	A	A	A	A	100	100	100	102	108	A	A				
4							A	A	A	A	A	A	A	108	108	106	106	104	A	A				
5							A	A	102	A	A	A	A	A	A	A	A	100	A	A				
6							A	100	100	100	100	100	100	100	100	A	A	A	A	B				
7							A	A	A	A	A	A	A	A	A	A	A	A	A	A				
8							A	A	100	A	A	104	108	A	A	102	102	102	A	A				
9							A	A	A	A	A	A	A	A	A	A	108	108	A	B				
10							A	A	A	A	A	A	108	108	108	106	106	106	106	A				
11							A	A	A	A	A	A	A	A	102	A	A	104	A	B				
12							A	A	104	A	A	A	A	104	A	A	104	104	104	A				
13							A	A	A	104	104	104	A	A	A	A	104	104	110	A				
14							A	110	106	106	106	106	A	102	A	102	102	104	106	A				
15							A	A	A	A	A	A	A	A	A	106	106	106	102	A				
16							A	A	A	A	A	A		A	104	A	102	104	102	A				
17							106	108	108	104	102	A	A	A	A	A	108	108	106	A				
18							A	106	104	A	A	A	A	A	A	A	A	108	104	A				
19							A	A	A	C	C	C	C	C	C	C	C	C	C	C				
20							C	C	A	A	A	A	A	A	A	A	104	104	104	A				
21							A	A	108	104	A	A	A	104	104	104	104	102	102	A				
22							A	A	A	A	A	A	100	A	102	A	106	106	A	A				
23						B	A	104	102	A	A	A	A	102	102	102	102	100	104	A				
24						B	A	106	106	A	A	A	A	A	A	A	A	A	A	A				
25						B	A	100	104	104	100	A	A	A	A	104	106	106	106	A				
26						B	A	106	A	A	A	A	A	102	102	106	106	104	102	A				
27							A	102	104	104	A	102	A	A	102	102	A	A	A	A				
28						B	A	102	104	104	104	A	A	A	A	A	A	104	102	B				
29							A	102	104	104	A	A	104	A	A	A	A	A	A	A				
30						B	A	106	106	A	A	A	A	102	102	102	A	A	104	A				
31						B	A	A	106	A	100	A	A	A	A	A	100	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	14	16	10	7	5	5	11	13	14	20	23	16					
MED							106	103	104	104	102	104	104	102	102	102	104	104	104					
U Q								106	106	104	104	105	108	104	104	106	106	106	106					
L Q								102	103	104	100	101	100	102	102	102	102	102	102					

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MAY 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	102	96	98	98	92	92	92	108	108	98	102	106	130	102	114	G	G	G	G	86	82	90	98	98
2	98	96	94	94	90	98	96	102	102	96	96	98	122	126	140	136	102	G	88	104	88	B	88	B
3	B	86	B	B	B	B	104	106	100	98	98	106	102	104	128	108	122	112	106	98	98	92	92	92
4	86	86	86	86	90	B	104	102	100	100	98	124	108	138	130	130	G	104	100	96	92	98	92	98
5	112	102	108	104	100	100	112	116	102	92	88	96	90	92	92	92	114	102	96	96	102	96	96	96
6	94	94	92	82	130	106	108	118	94	94	100	134	110	102	102	102	94	98	98	98	96	96	98	94
7	92	90	90	92	92	92	98	98	98	98	94	92	90	94	92	90	88	86	84	84	84	B	B	102
8	102	102	98	96	96	142	94	106	102	102	102	102	126	118	110	106	116	118	96	94	92	100	96	92
9	100	104	98	96	96	90	90	98	94	100	96	96	94	166	96	124	124	114	104	98	96	98	98	98
10	98	92	92	96	96	96	122	98	104	102	96	130	110	110	108	104	104	144	114	98	102	96	96	96
11	96	96	92	92	92	94	92	96	108	98	100	98	94	96	142	96	94	94	104	B	98	104	100	100
12	98	98	102	96	96	96	96	114	102	102	102	100	100	108	108	174	G	94	188	88	84	84	84	100
13	86	112	98	96	98	94	92	92	94	134	112	112	96	90	156	122	116	110	102	100	90	90	96	94
14	92	88	82	82	96	84	110	110	106	102	100	100	94	96	98	114	114	106	104	98	98	96	94	94
15	94	92	94	104	100	100	110	102	114	96	92	114	94	96	118	104	108	102	98	98	98	94	94	94
16	94	92	84	B	94	92	108	100	94	92	92	90	90	88	104	90	120	102	104	98	104	98	92	100
17	94	94	90	90	90	124	116	110	104	100	102	90	94	90	90	92	G	112	102	110	96	96	100	118
18	94	88	90	90	88	92	120	104	108	102	114	104	92	88	92	96	146	110	102	96	96	96	82	86
19	90	98	96	92	94	92	136	130	104	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	96	98	88	162	148	130	126	116	122	102	96	96	96	98	96	92
21	92	90	88	90	90	92	124	122	114	108	116	96	98	116	106	106	116	108	102	96	96	96	94	94
22	96	94	90	92	88	110	108	100	98	98	92	106	100	98	G	98	120	110	98	98	106	94	96	96
23	112	92	92	92	92	114	106	100	98	94	94	94	98	114	118	124	126	116	104	98	96	94	94	94
24	108	88	84	84	102	82	108	104	100	98	98	98	98	90	96	92	96	90	100	98	96	96	92	92
25	86	86	84	80	96	112	116	112	102	102	98	96	96	94	94	158	154	122	102	98	98	96	94	94
26	90	86	82	82	80	B	88	118	116	104	104	96	156	124	122	112	116	116	102	98	98	98	84	84
27	90	86	86	90	108	104	108	102	104	98	98	98	112	94	96	94	96	96	92	92	90	86	84	86
28	84	84	84	82	82	B	116	106	102	102	96	98	94	94	92	92	90	108	100	88	B	96	86	82
29	88	110	90	98	92	92	110	100	100	100	98	98	148	130	140	126	86	114	104	106	98	96	96	96
30	96	98	96	90	92	92	114	104	106	104	98	100	98	102	98	98	100	104	100	96	96	92	92	90
31	86	90	94	92	118	B	108	100	100	96	96	92	94	92	90	90	116	106	86	86	86	92	94	92
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	29	28	29	25	30	30	31	30	30	30	30	30	29	29	26	28	29	29	29	28	29	29
MED	94	92	92	92	94	94	108	104	102	99	98	98	98	100	106	104	115	107	102	98	96	96	94	94
U Q	98	98	96	96	97	105	114	110	106	102	102	106	110	116	124	123	120	113	104	98	98	97	96	98
L Q	90	88	86	88	90	92	96	100	98	98	96	96	94	94	95	93	96	102	97	95	91	93	92	92

IONOSPHERIC DATA STATION Okinawa

MAY 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

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	F3	F2	F2	F2	F2	F7	L5	C3	C3	C4	C2	C2	HC11	C4	CL11					L2	F4	F2	F2	F4
2	F3	F4	F3	F2	F3	F2	L3	C7	C5	L4	L5	L1	CL11	CL11	HL11	HL11	CL11		LH31	CL45	F1		F1	
3		F3					C2	C3	C2	L2	L2	C1	C1	C1	C1	C2	C2	C4	C4	L3	F7	FF54	F6	F3
4	F2	F2	F1	F1	F3		C7	C7	C6	C6	LQ31	CL12	C1	H1	H1	H1		C2	CQ31	L2	F4	F1	F2	F2
5	F1	FF42	FF22	F2	F3	F2	C5	C2	C1	LQ31	LQ31	LQ51	L3	L3	L3	L2	CL51	CL61	L8	L9	F2	F9	F5	F5
6	F3	F3	FQ31	FQ31	F1	F2	C3	CC11	L7	L4	C4	HL22	C6	C2	C6	C2	L4	L3	L2	L1	F8	F3	F3	FF24
7	FF42	F2	F4	F2	F2	F2	L4	L5	LQ41	LQ41	L6	LQ41	L7	L2	L3	L6	L5	L3	L3	L4	F4			F1
8	F3	F2	F4	F3	F2	F1	L2	CL84	C5	C5	C4	C4	C2	C2	C4	C6	C2	C4	L8	L6	F4	FF16	FF26	F2
9	F9	FF23	F5	F5	F2	F5	L4	L3	L2	L1	L1	L2	L1	HL11	LH21	CL11	CL11	C2	C1	L2	F5	F4	F4	F7
10	F4	F4	F2	F2	F6	F3	C1	LC31	C3	C3	L5	HL11	C1	C2	C2	C3	C2	H1	C4	L5	F2	F9	F9	F7
11	F3	F2	F4	F2	F3	F2	L6	L3	CL32	L3	L2	L1	L1	LH11	H1	L1	L1	L1	C1		F5	F2	F4	F4
12	F3	F2	F2	F2	F3	F3	L3	C2	C4	C5	C5	C5	C5	C4	CL21	HL11		L1	H1	L3	F6	F5	F4	FF23
13	FQ21	FF11	F8	F6	F8	FQ91	L6	L5	L2	HL11	C1	C1	L1	L5	HL11	CL41	C3	CL71	CL81	C1	F1	F2	F6	F2
14	F2	F6	F2	F2	F1	F1	C1	C1	C1	C6	C6	C7	L7	L4	L4	CL32	C7	C8	C8	L8	F6	F9	F5	F8
15	F6	F9	F9	FF36	F2	F3	CH51	C5	CL17	LQ61	LQ51	CQ61	LQ81	LQ41	CL22	C4	C3	C6	L7	L8	F4	F6	F2	F3
16	FF23	FF14	F2		F1	F1	C3	C8	L8	L6	L6	LQ41	LQ31	L1	CL11	L1	C1	C6	C4	L7	F3	FQ31	F6	F6
17	F4	F7	F9	F5	F3	FF41	C5	C4	C4	C6	C3	L7	L4	L3	L3	L5		C1	C6	CL37	F3	F3	F9	FF13
18	F6	F9	F6	F3	F2	F5	CL25	C2	C2	CL63	CL54	CL14	L2	L5	L6	L4	HL11	C2	C8	L6	F4	F1	F4	F3
19	F3	F7	F2	F2	FF22	F3	HL11	HL12	C6															
20									L3	L1	L4	HL11	HL11	HL11	CL12	CL21	C1	C7	L9	L9	F5	F7	FQ81	F4
21	F5	F5	FQ41	FQ41	FQ31	FQ31	CL21	C1	CH11	C1	CL12	L6	L5	C1	C2	C3	C2	C3	C7	L5	F3	F3	F4	F7
22	F2	F2	F7	F4	F1	FF11	C3	C5	L5	L5	L4	C1	C1	L1		LH12	C3	C7	L8	L9	FF14	F5	F6	F6
23	F2	F3	F2	F4	F1	C2	C8	C8	L7	L5	L3	L3	L2	C1	C1	C2	C2	C3	C3	L9	F4	F5	F7	F5
24	FF14	F3	F6	F3	FF22	LC21	CL42	CQ81	CQ81	LQ51	L7	L3	L2	L4	L3	L7	L4	L3	C5	L5	F3	F2	F4	F3
25	F5	F6	F5	F4	FF13	CL22	C6	C3	C4	C2	L7	L5	L4	LQ51	LH21	H1	H1	C4	C8	L4	F3	F9	F5	FQ31
26	F5	FQ61	F4	F2	F1		LC21	C3	CL23	C2	CL24	L3	HL11	C1	C1	C3	C2	C2	C8	L7	F3	F4	F1	F1
27	F2	F3	F3	F1	FF11	FF12	C2	C4	C4	L8	L7	L6	CL31	L3	L4	L6	L6	LQ91	LQ51	LQ31	FQ41	F5	F9	F6
28	F7	F2	F4	F2	F1		C2	C3	C4	C4	L5	L7	L5	L4	L6	C7	L4	C1	C4	L1		F1	F1	F2
29	F2	F1	F1	F5	F2	FQ41	C8	C8	C5	C5	LQ41	LQ31	HC11	H1	H1	CL12	LC42	CL35	CL53	CL36	FF83	F9	F7	F4
30	F4	F3	F3	F3	F6	L3	C6	C4	C6	CL42	L7	C4	L5	C3	L6	L9	LQ61	C8	C5	L7	F8	F3	F5	F4
31	F2	F3	F1	F1	F1		C3	C3	C6	L3	L3	L5	L2	L4	L3	L2	CL12	CL24	LQ61	L7	F8	FF53	F8	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																								

MAY 2019 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

f-PLOTS OF IONOSPHERIC DATA

KEY OF f-PLOT	
	SPREAD
	foF2,foF1,foE
	fxF2
	DOUBTFUL foF2,foF1,foE
	fbEs
	ESTIMATED foF1
	fmin
	GREATER THAN
	LESS THAN

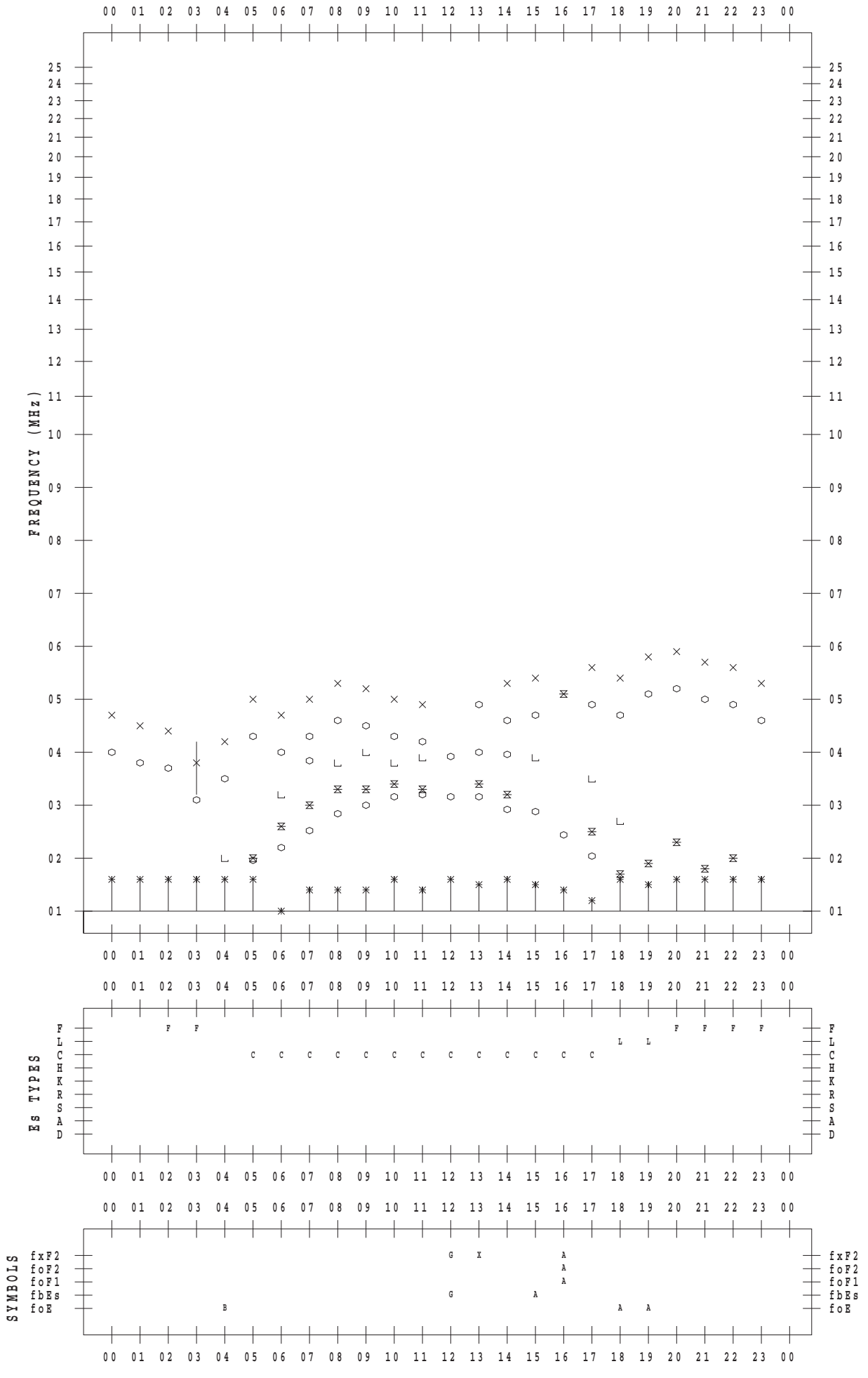
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/ 1

135 °E MEAN TIME



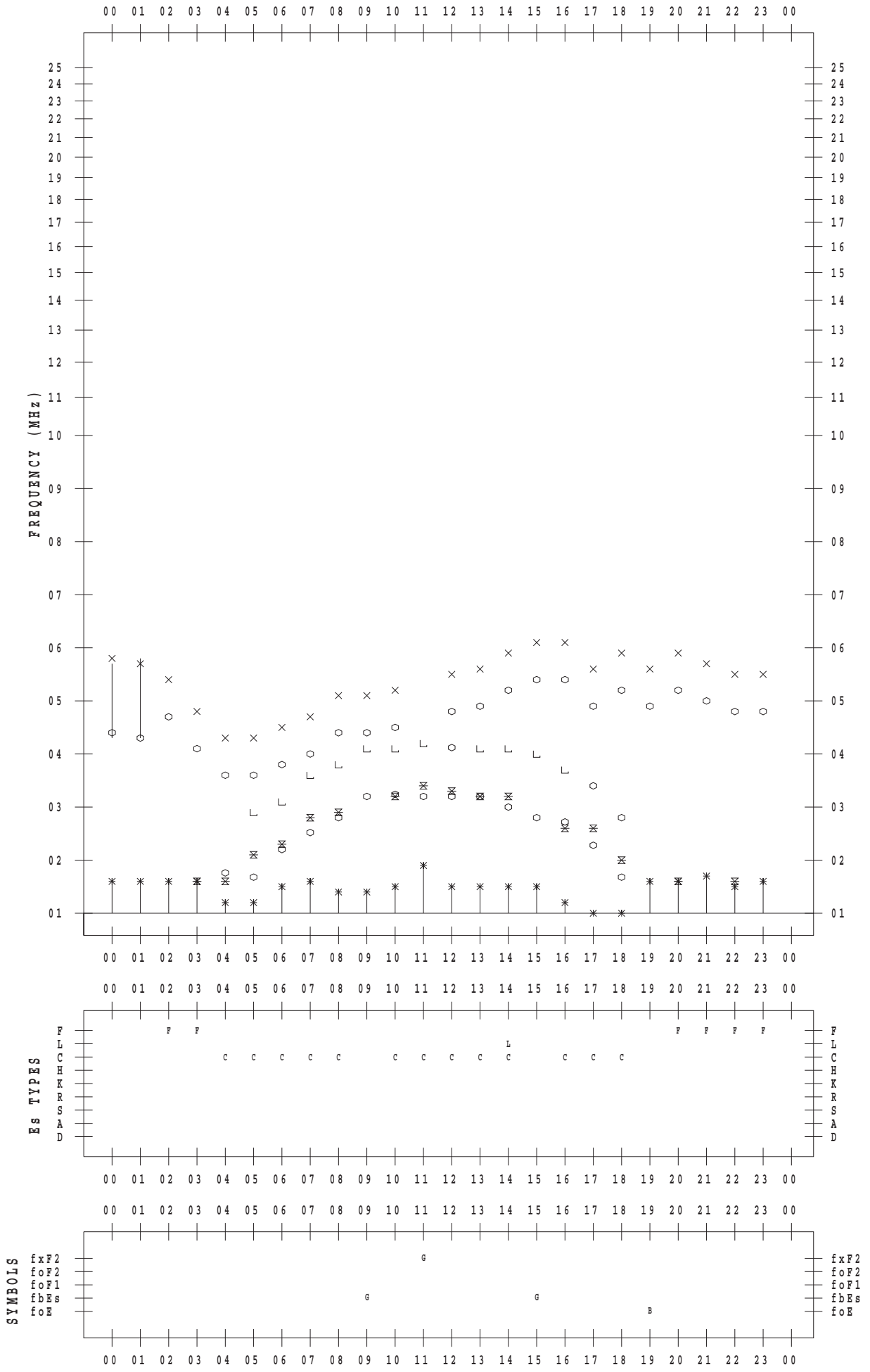
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/ 2

135 °E MEAN TIME



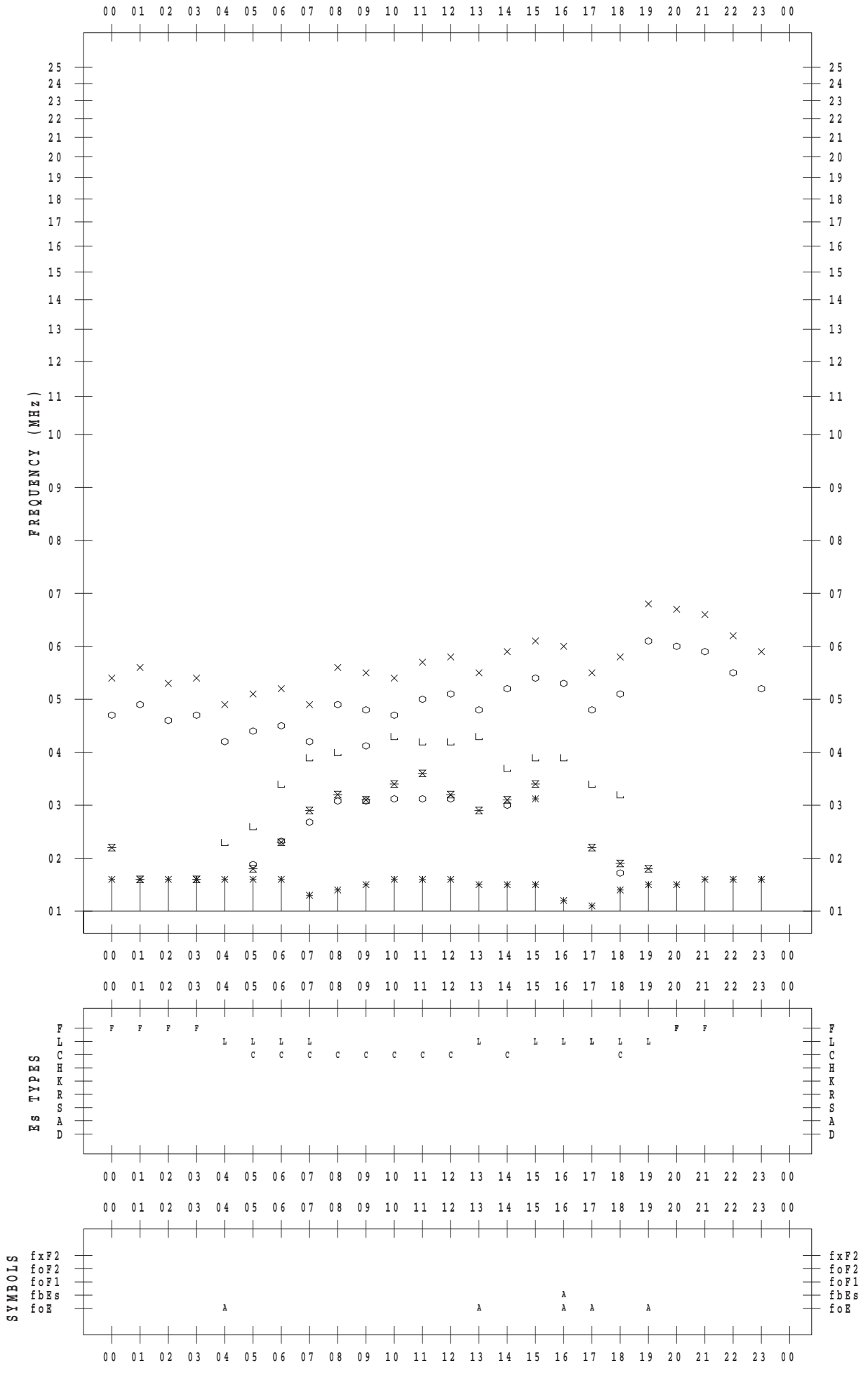
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/ 3

135 °E MEAN TIME



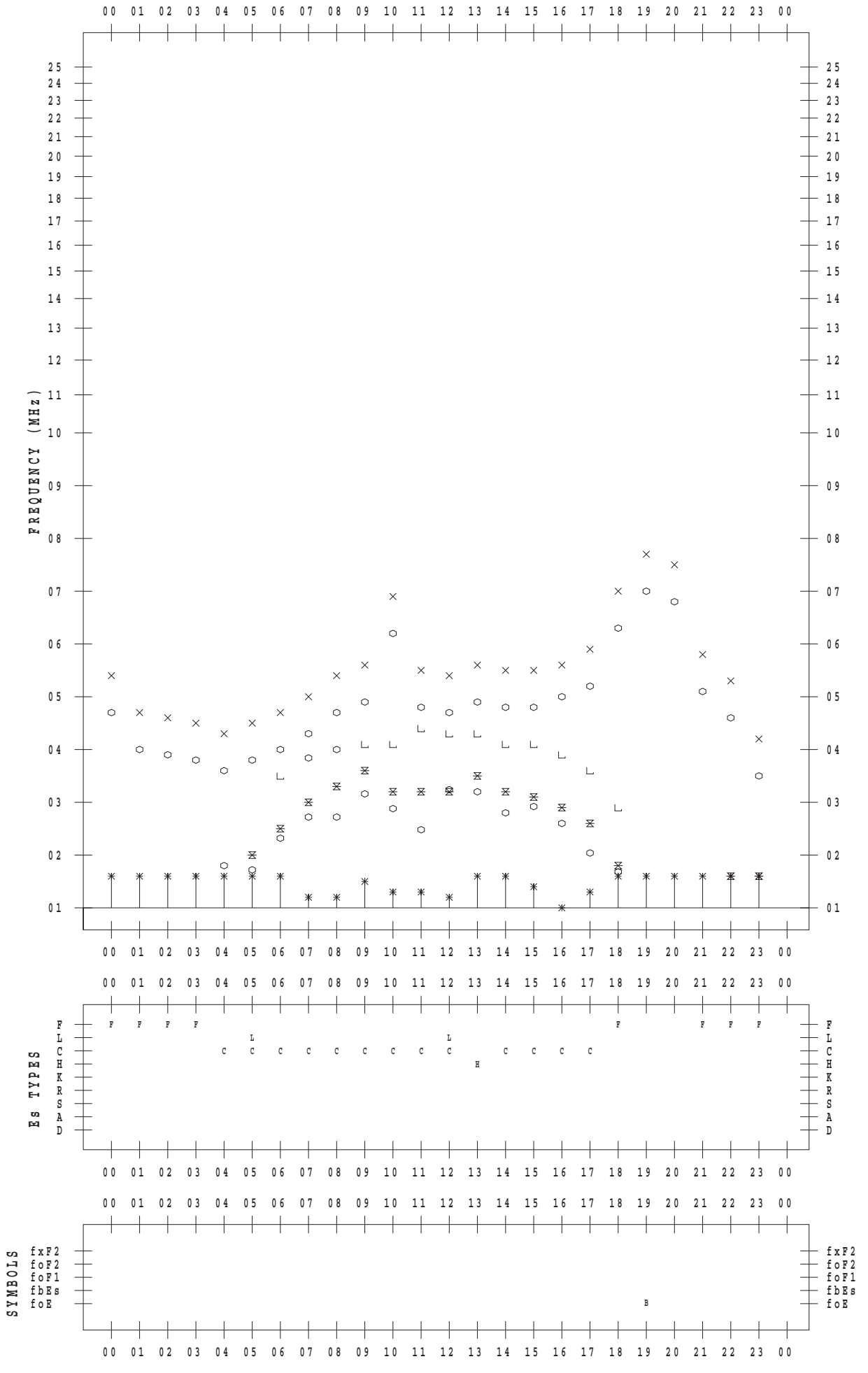
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/ 4

135 °E MEAN TIME



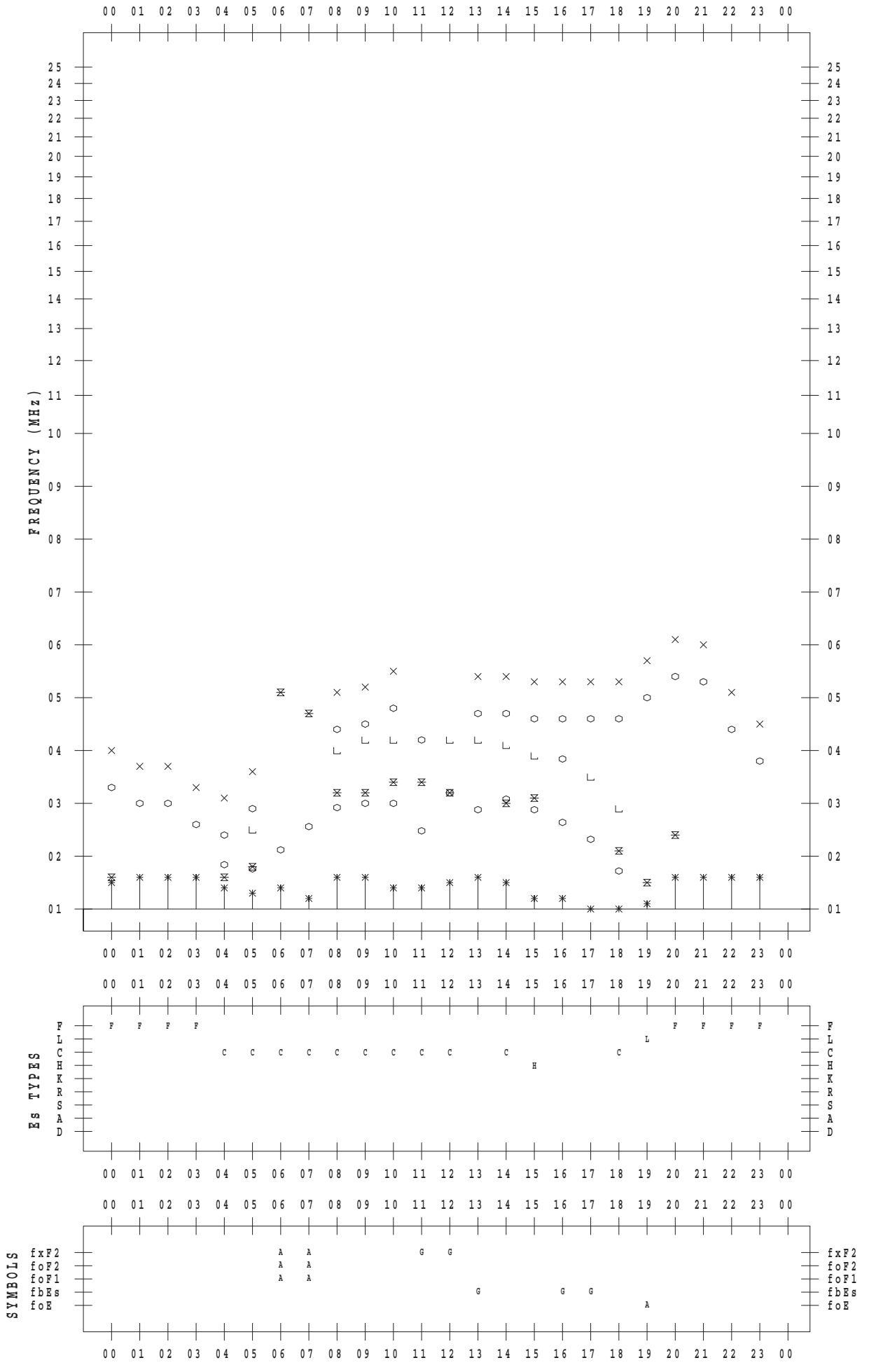
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/ 5

135 °E MEAN TIME



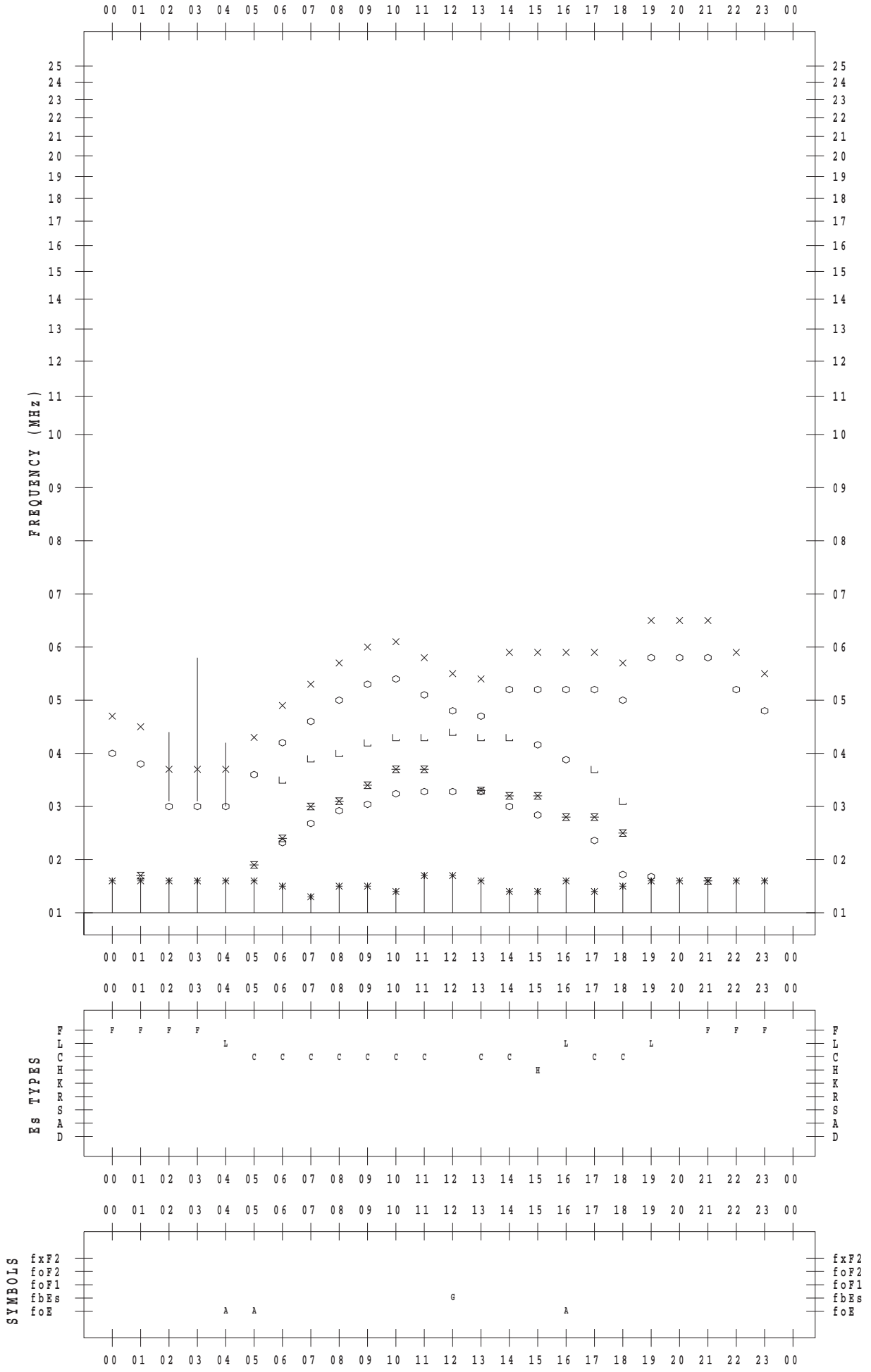
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/ 6

135 °E MEAN TIME



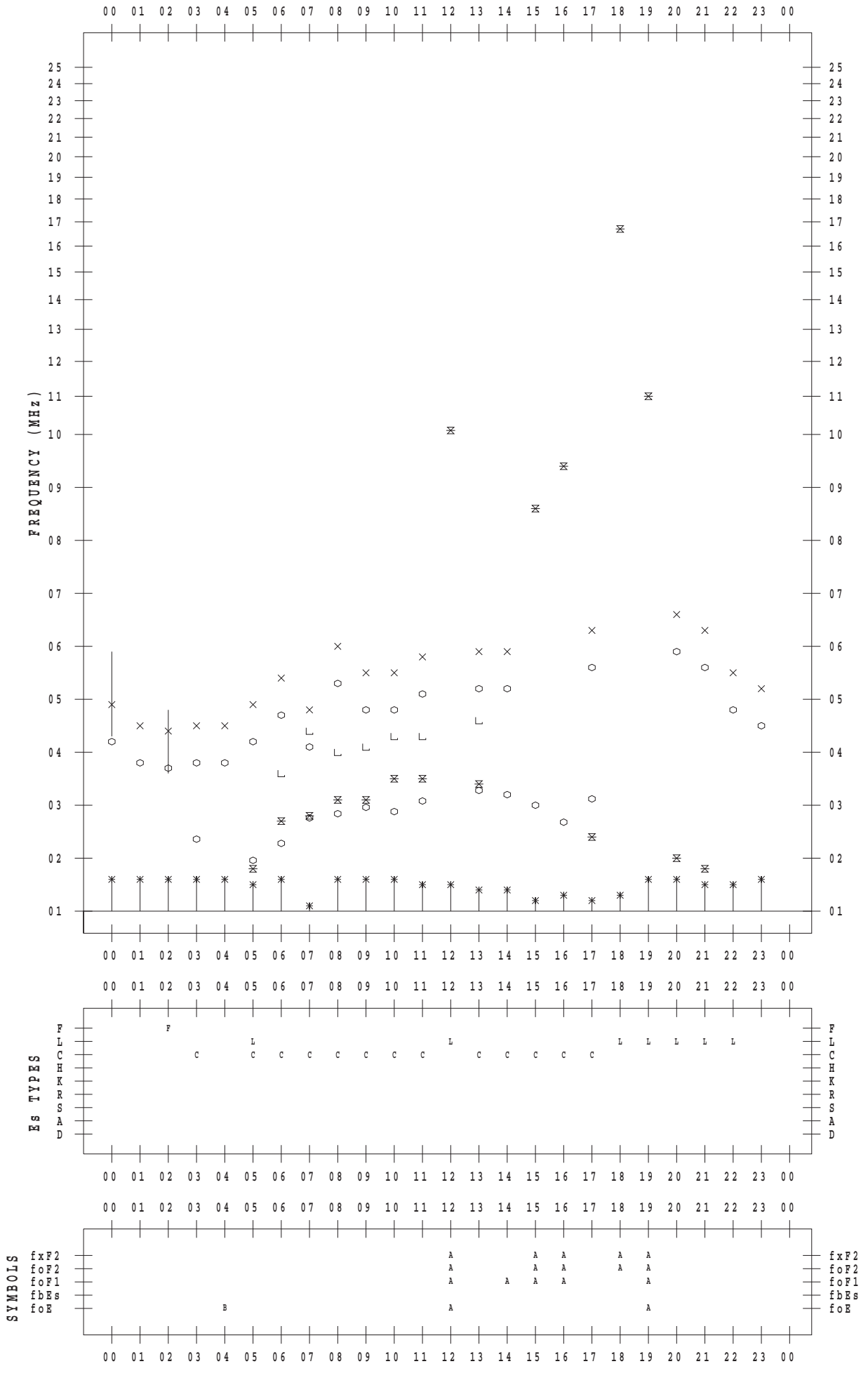
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/ 7

135 °E MEAN TIME



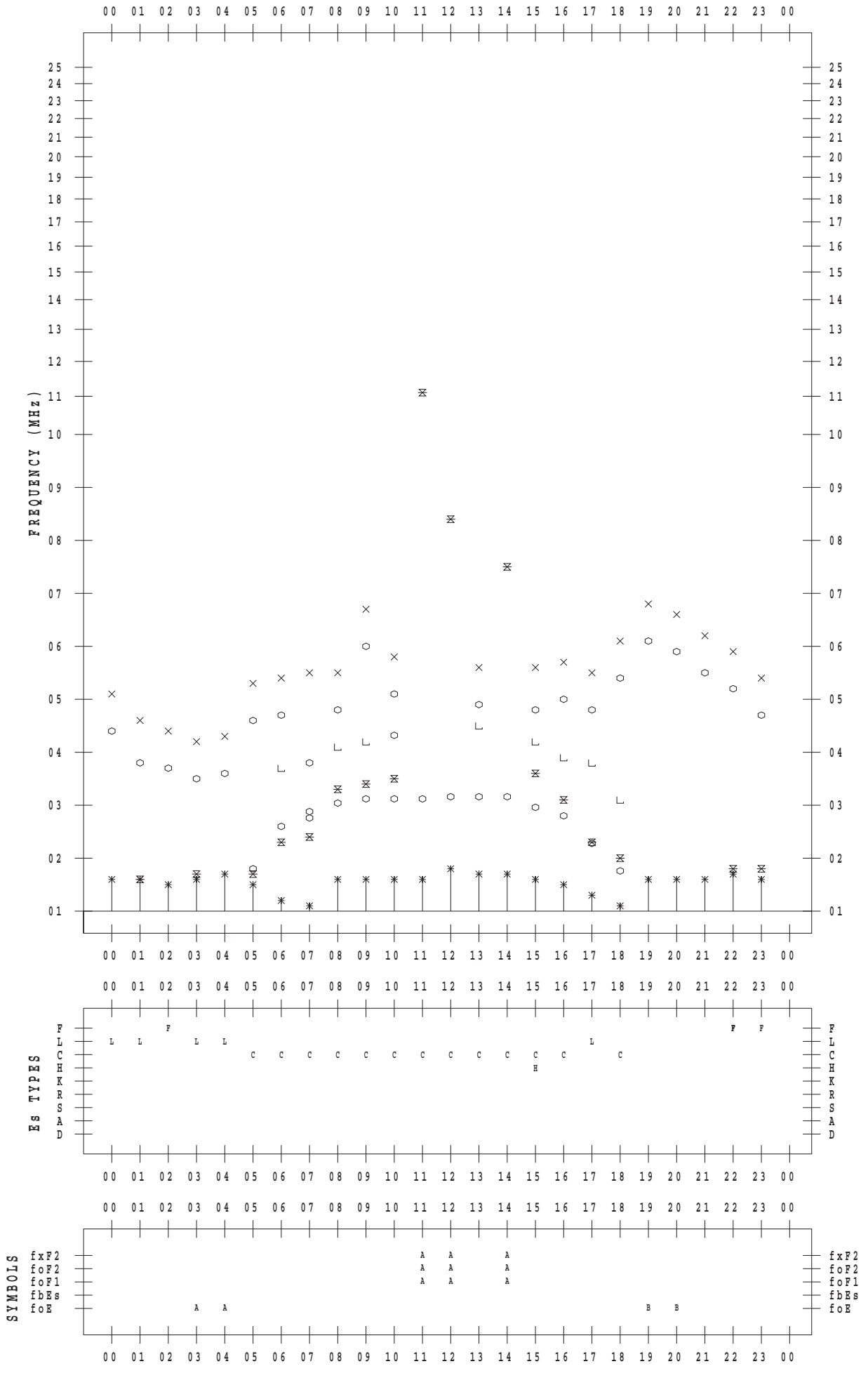
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/ 8

135 °E MEAN TIME



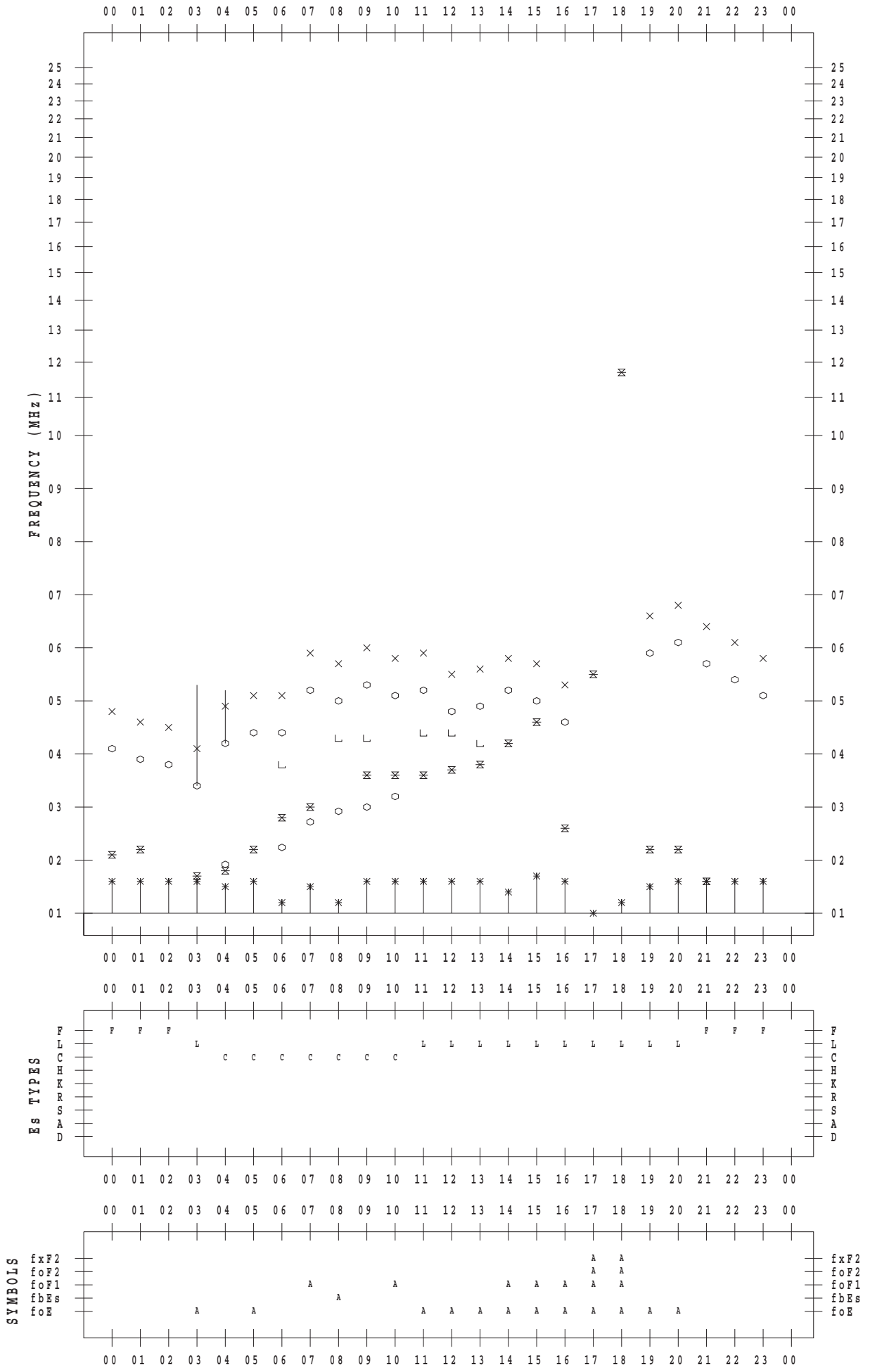
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/ 9

135 °E MEAN TIME



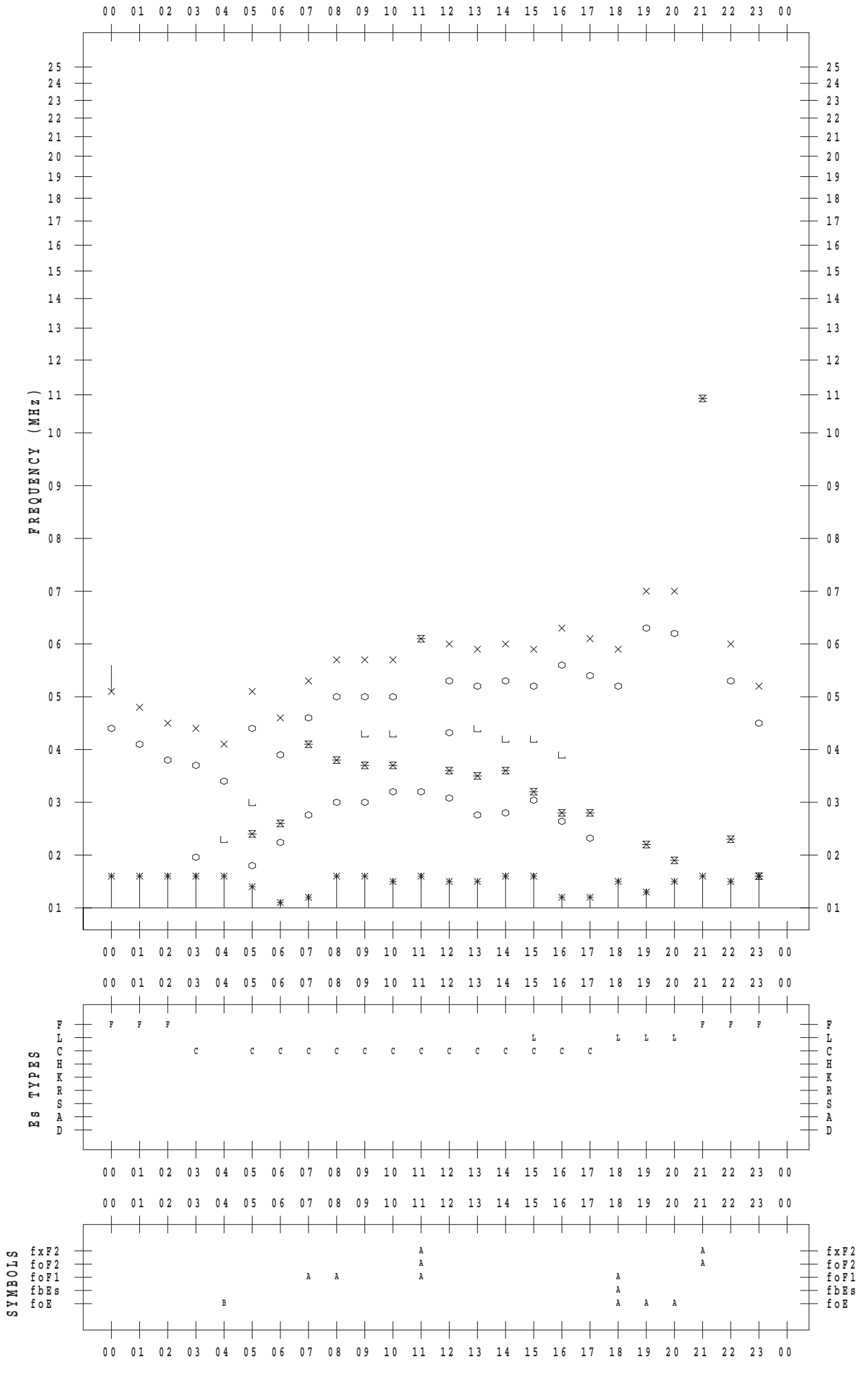
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/10

135 °E MEAN TIME



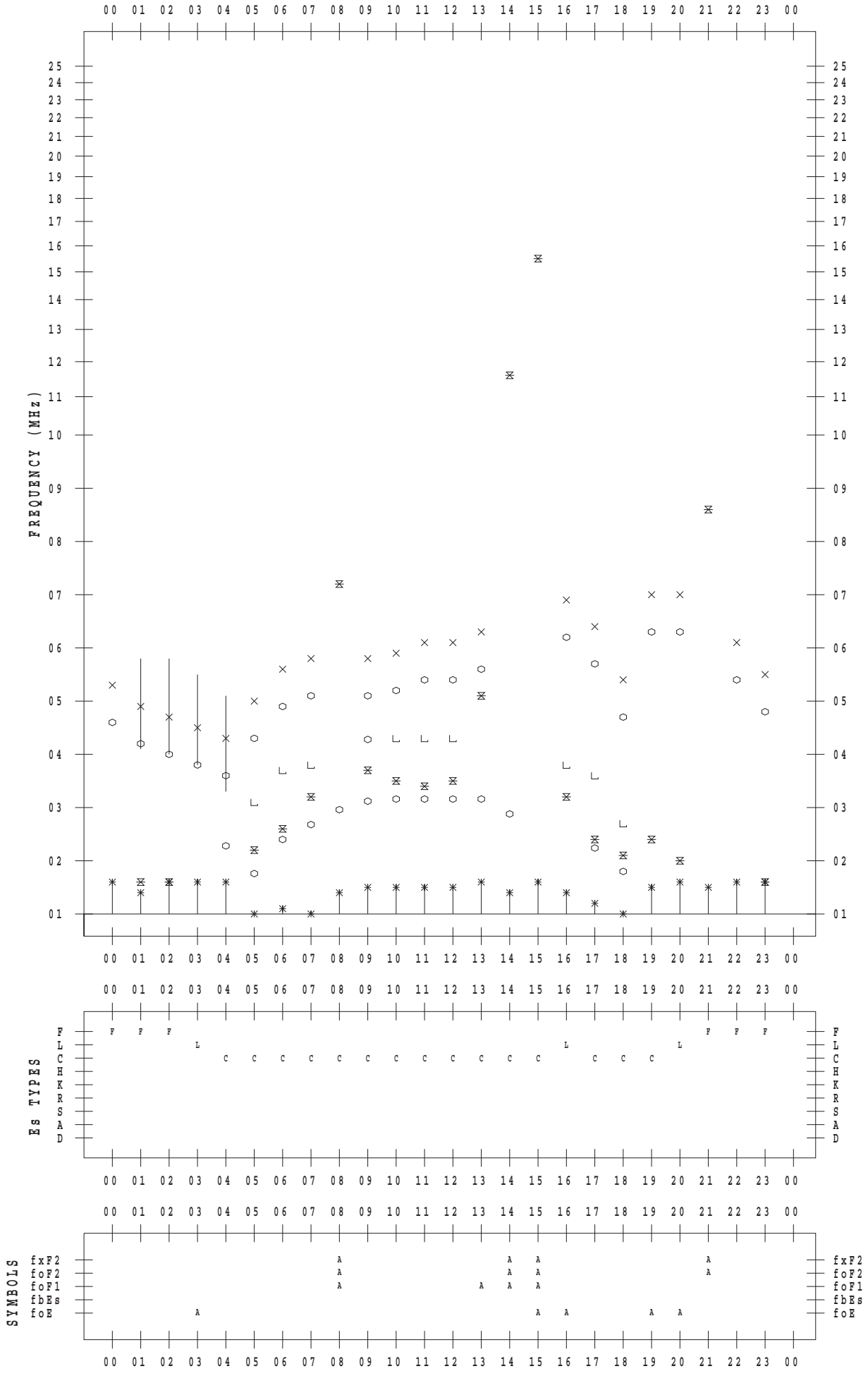
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/11

135 °E MEAN TIME



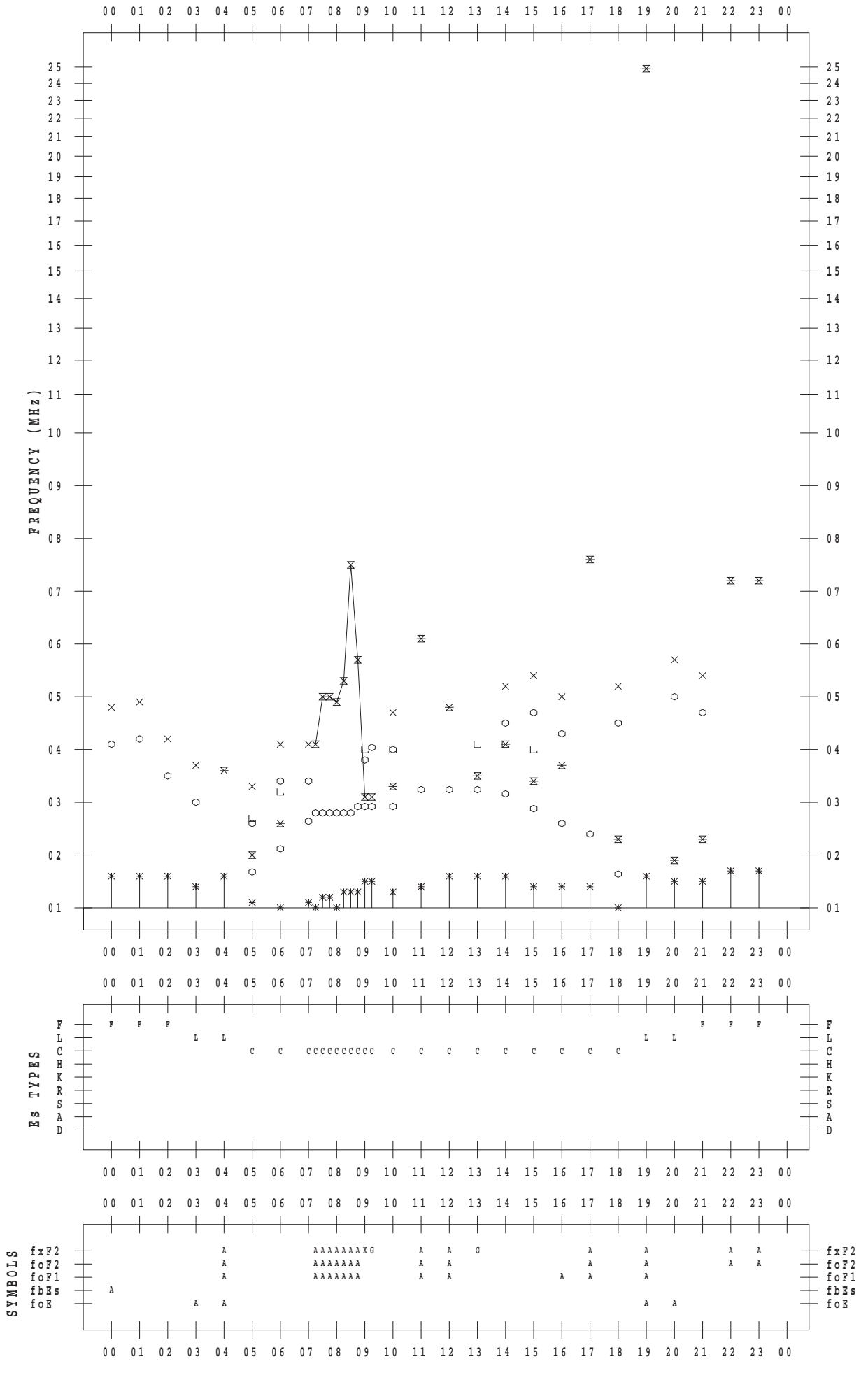
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/12

135 °E MEAN TIME



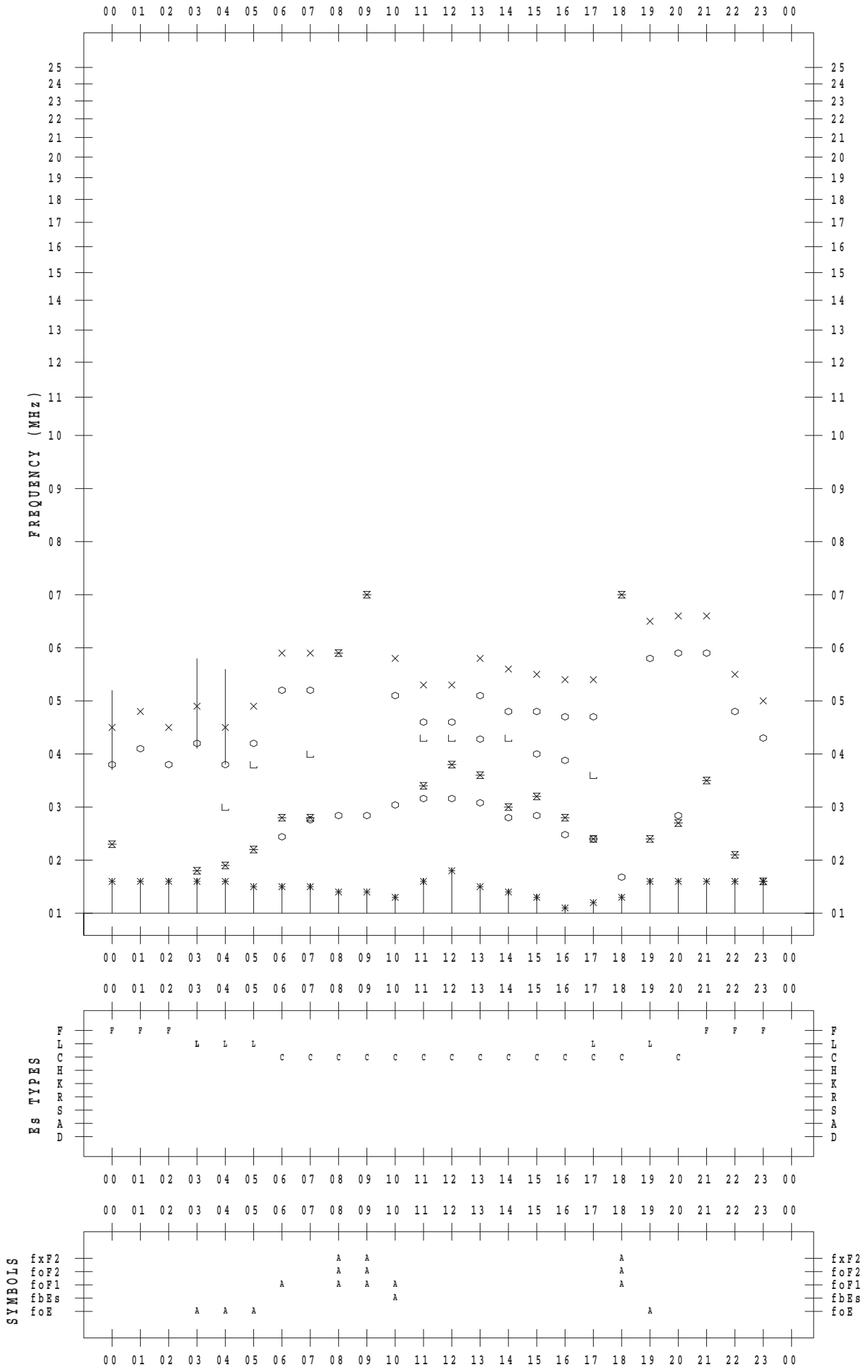
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/13

135 °E MEAN TIME



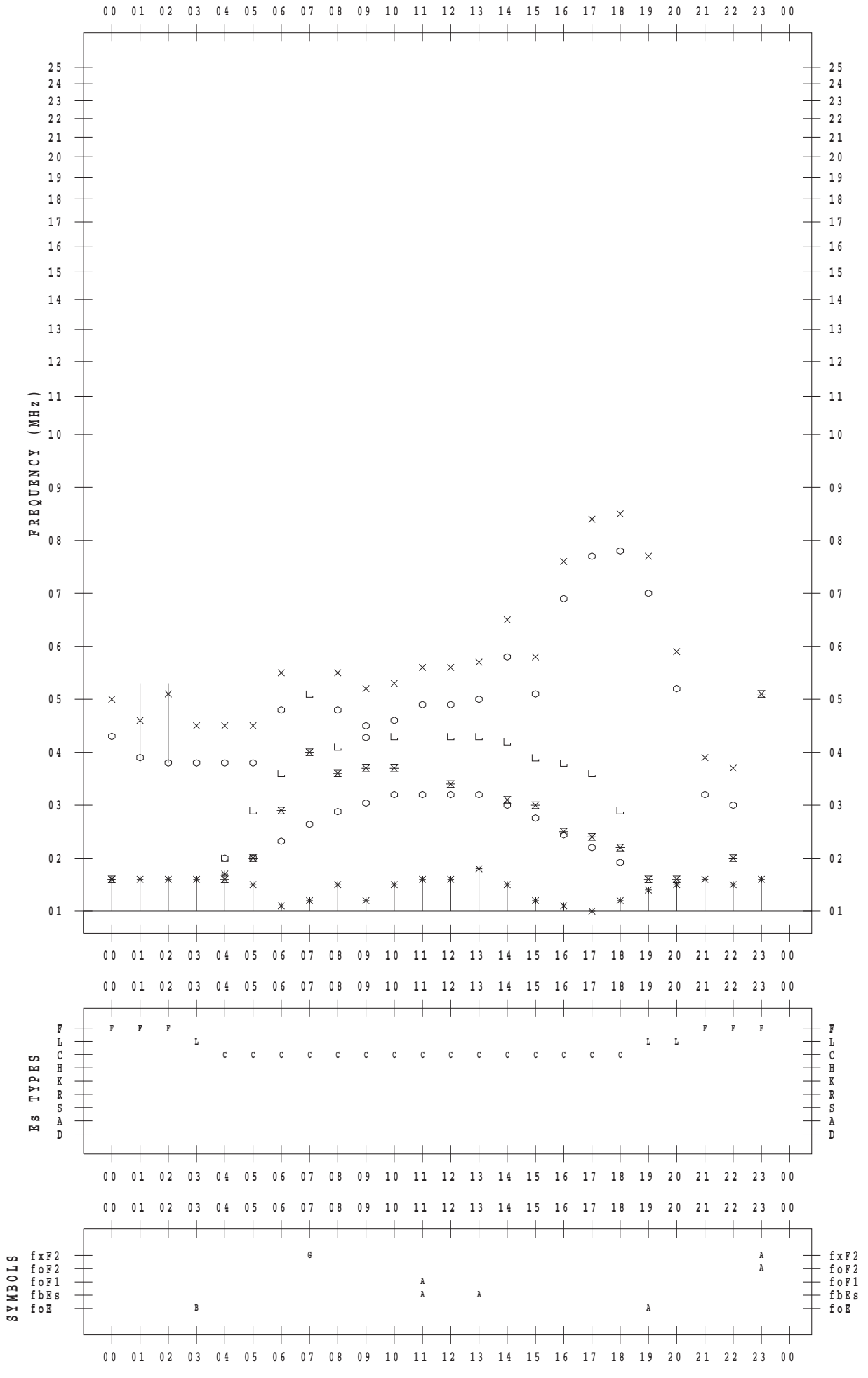
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/14

135 °E MEAN TIME



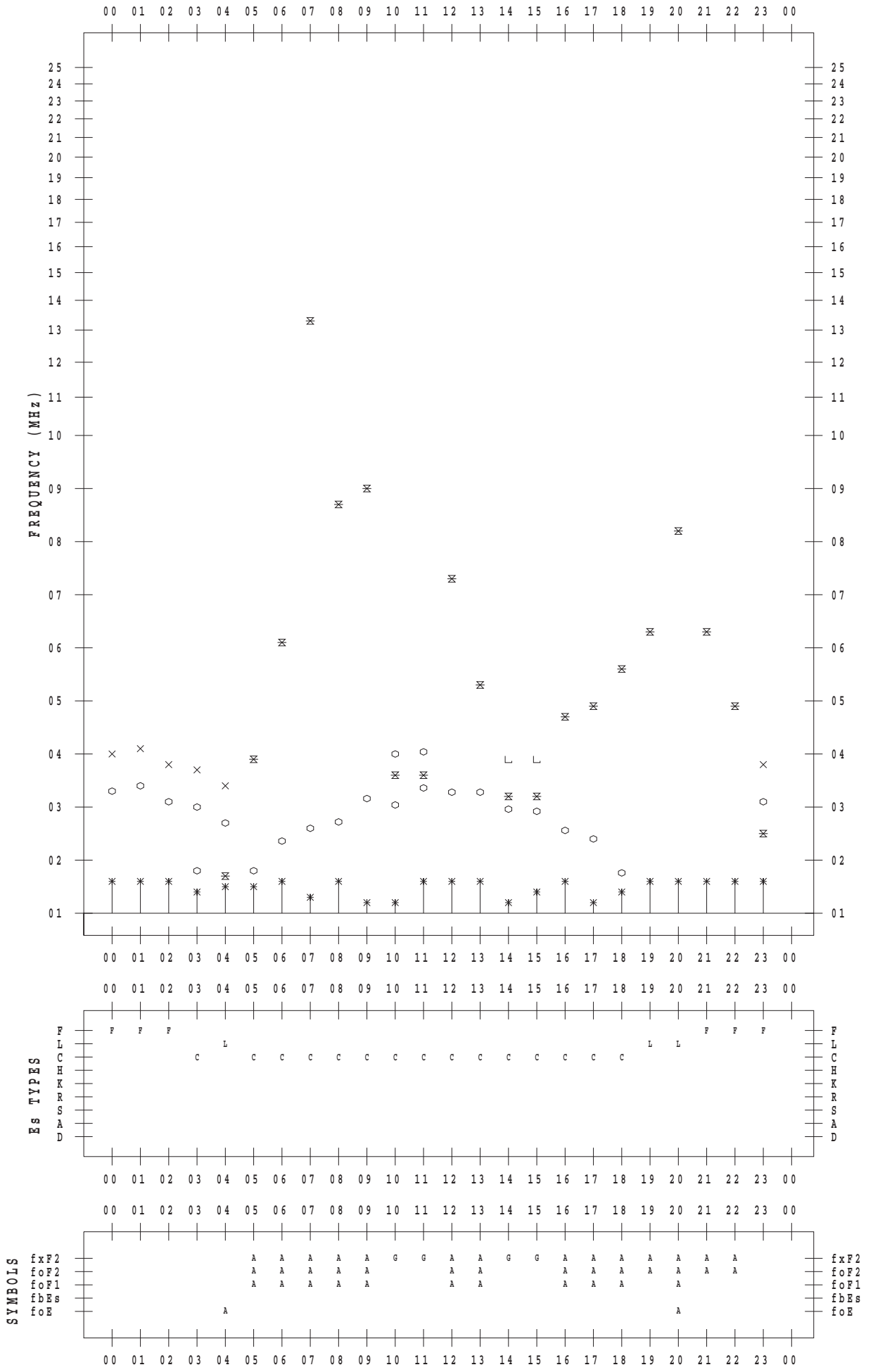
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/15

135 °E MEAN TIME



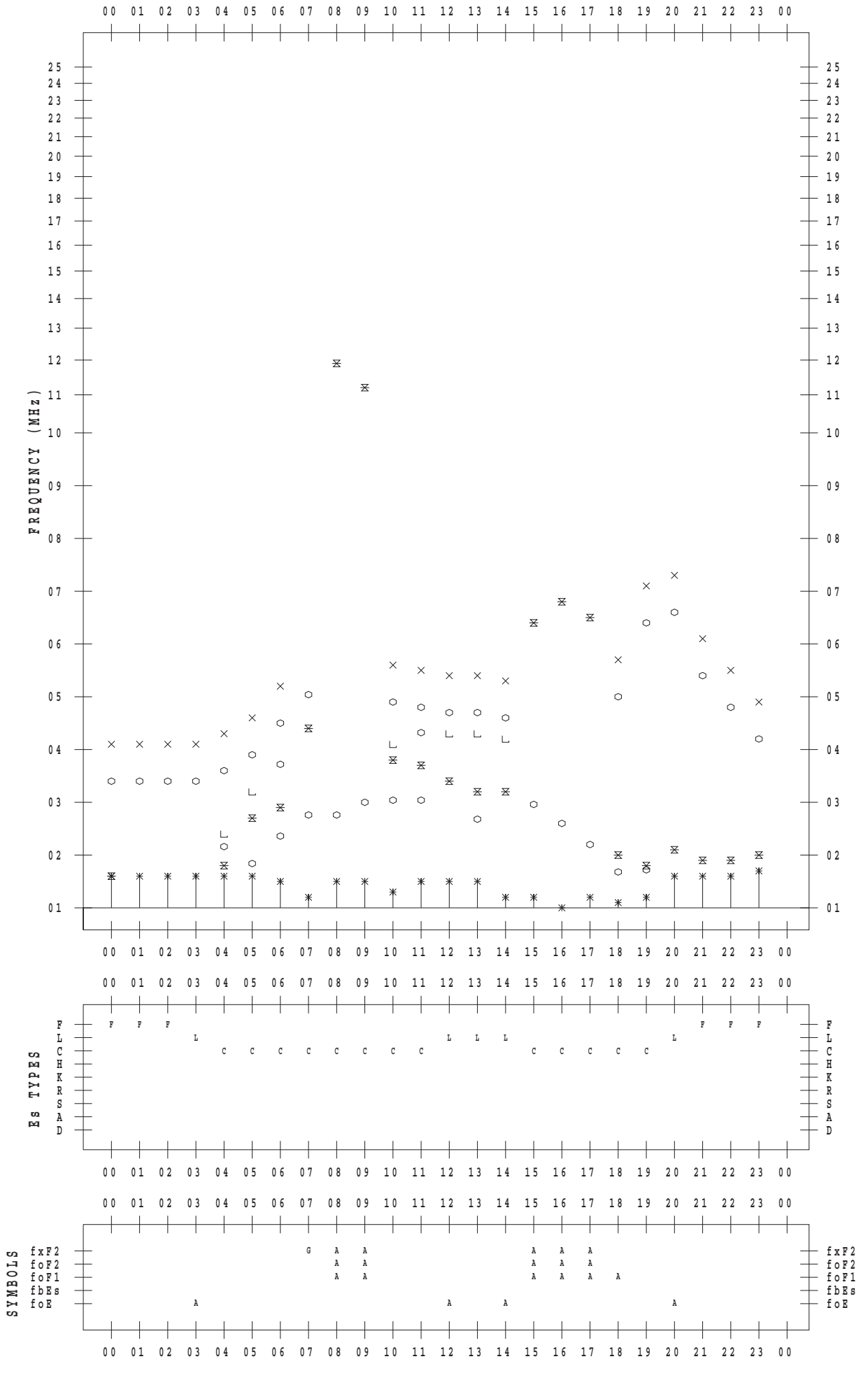
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/16

135 °E MEAN TIME



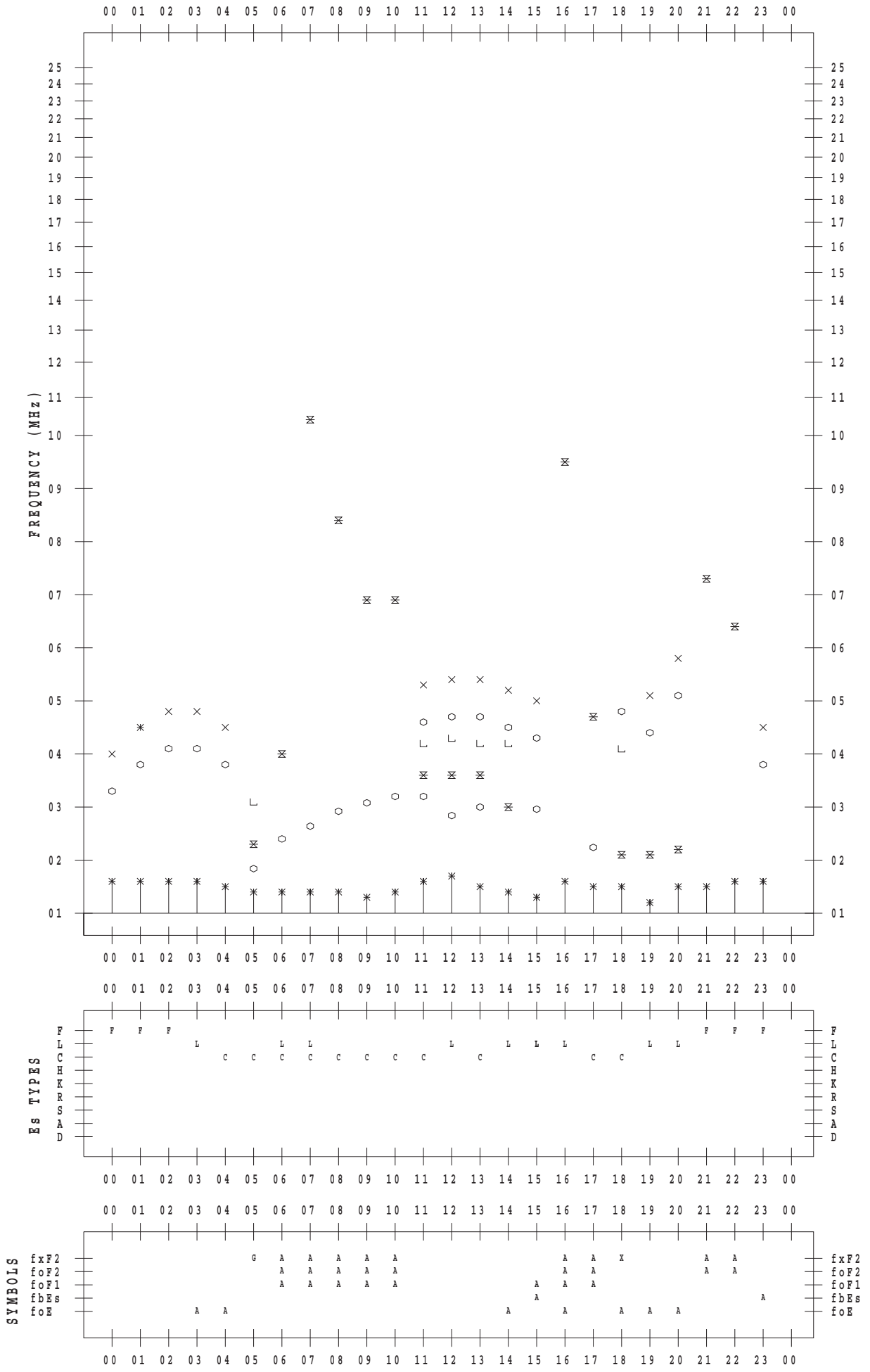
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/17

135 °E MEAN TIME



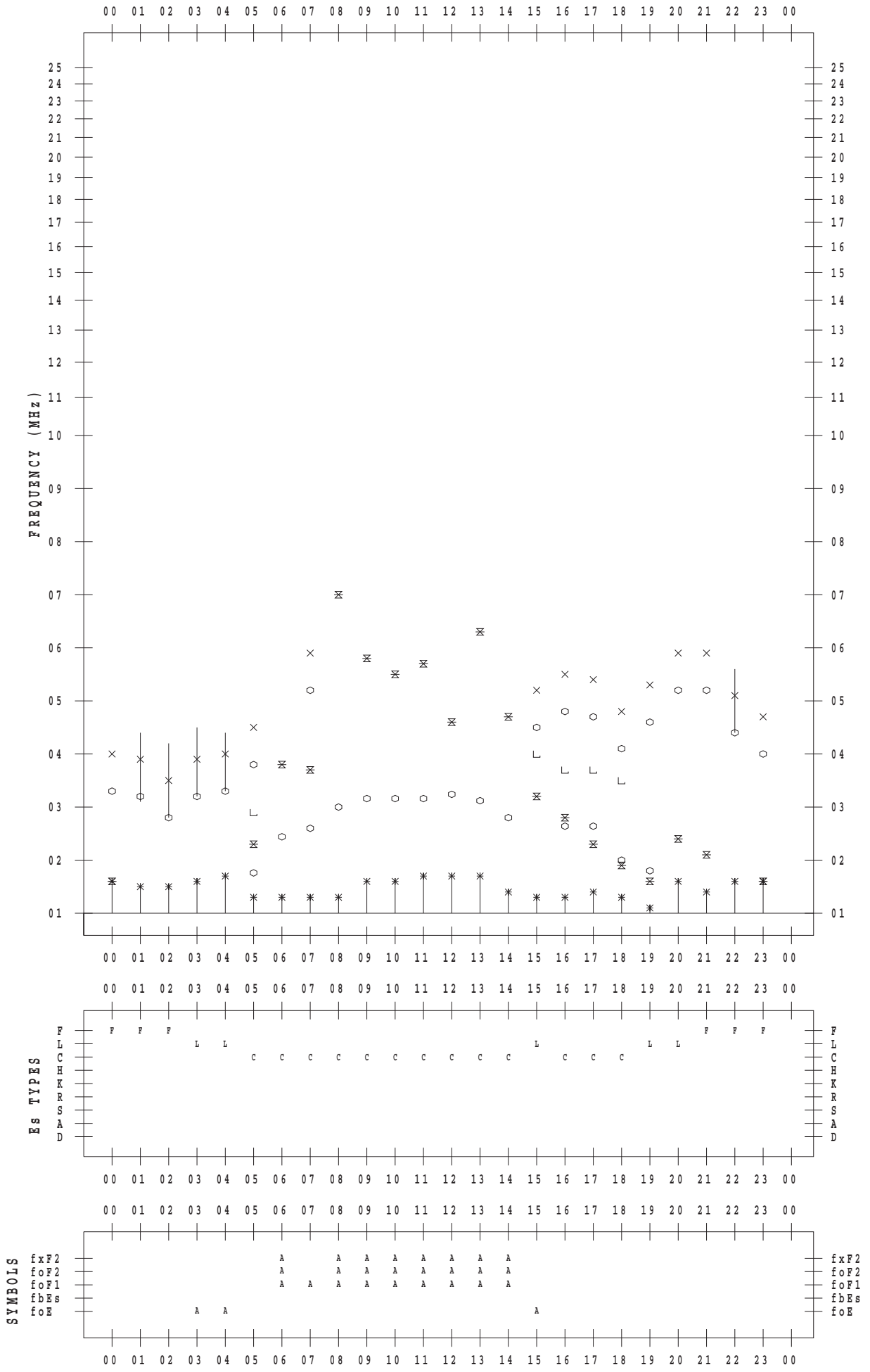
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/18

135 °E MEAN TIME



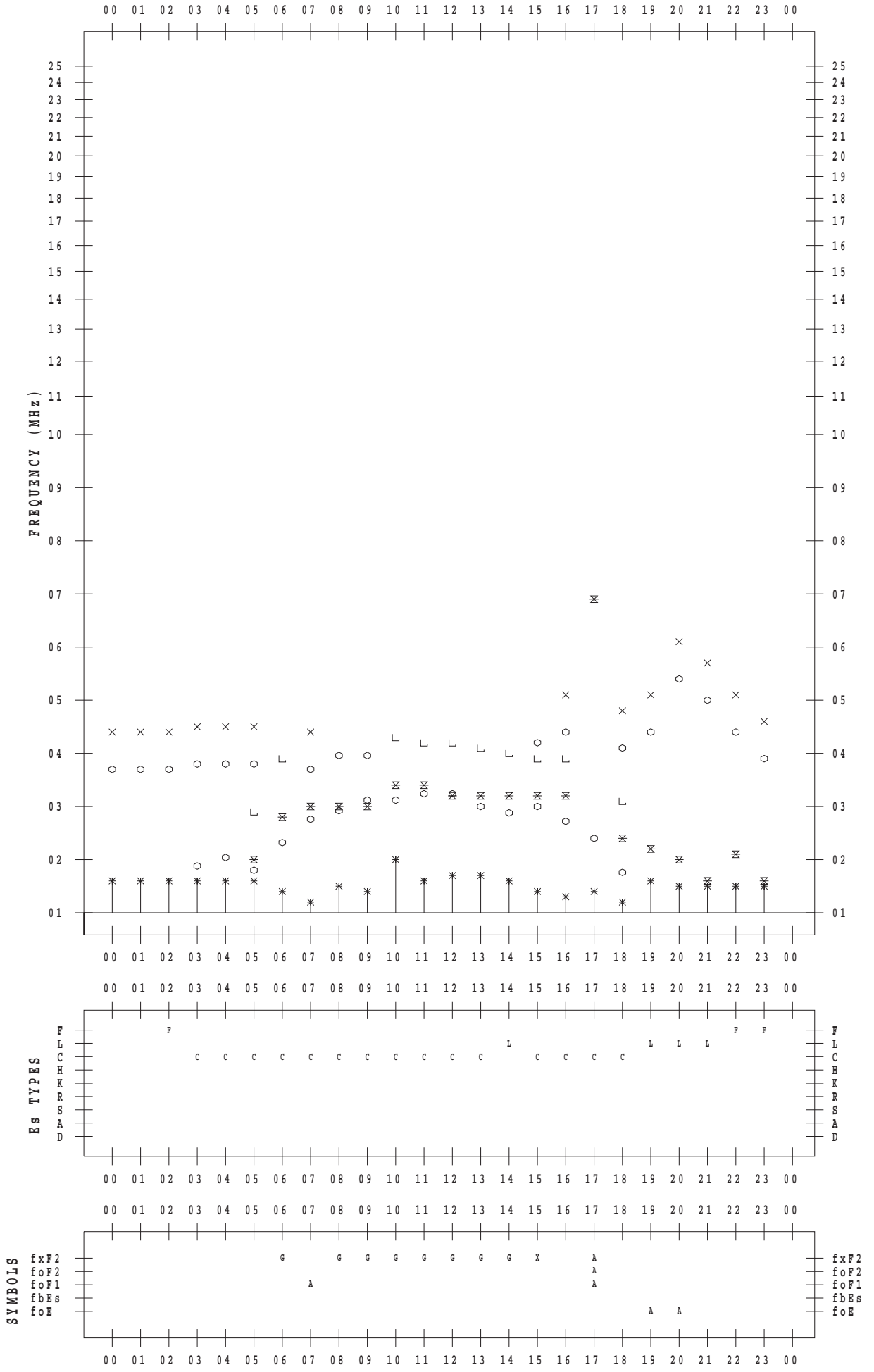
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/19

135 °E MEAN TIME



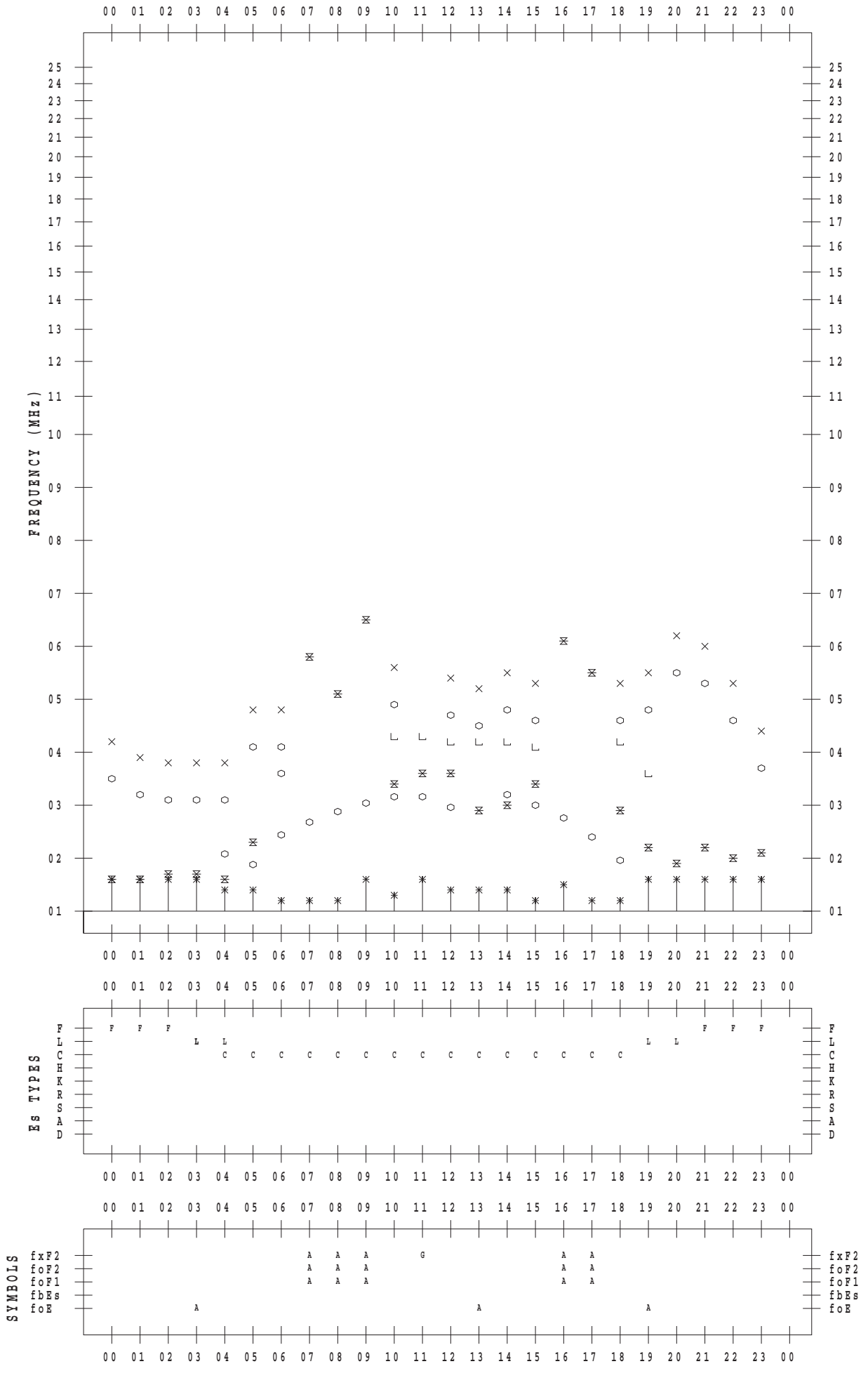
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/20

135 °E MEAN TIME



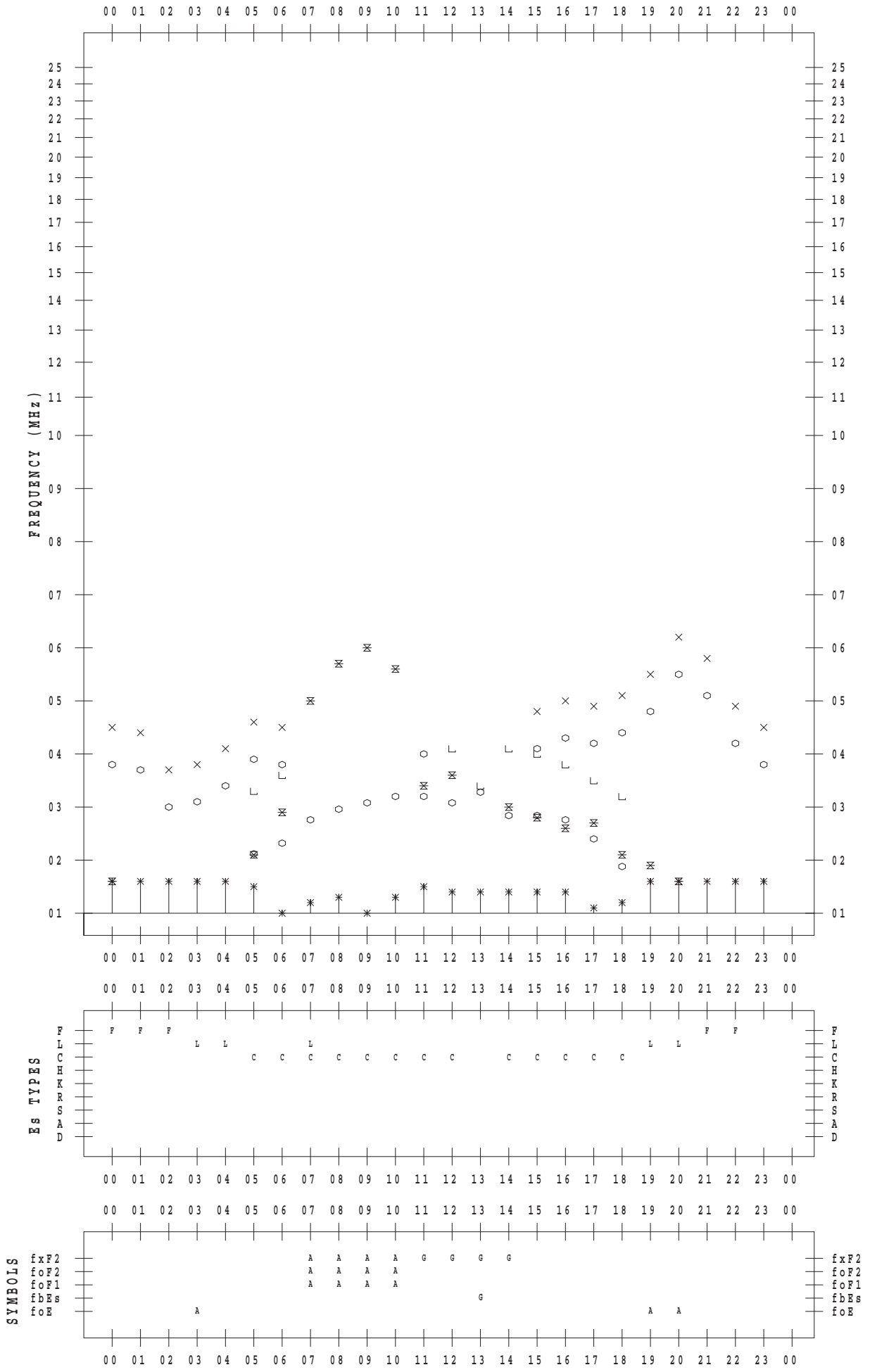
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/21

135 °E MEAN TIME



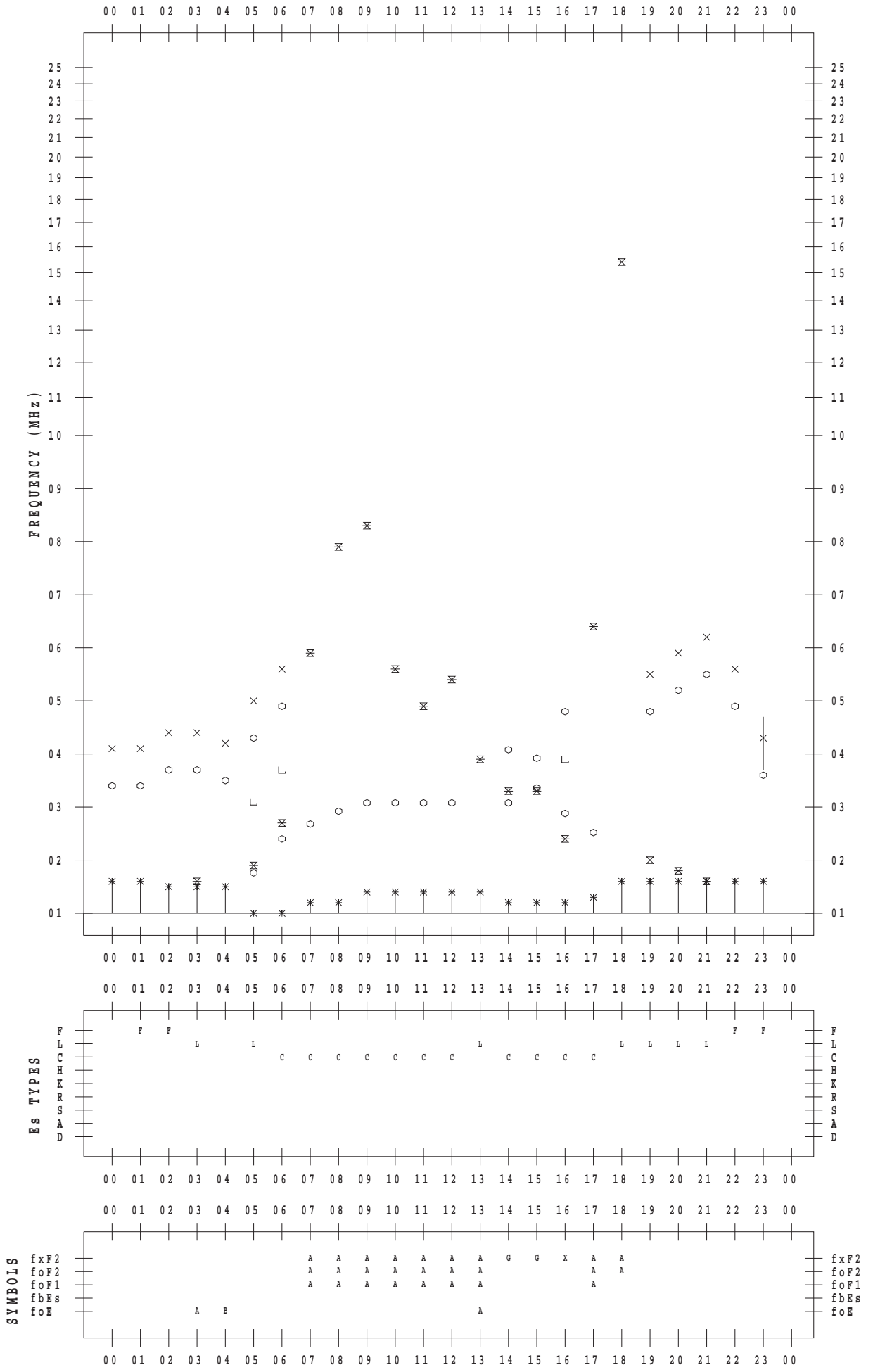
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/22

135 °E MEAN TIME



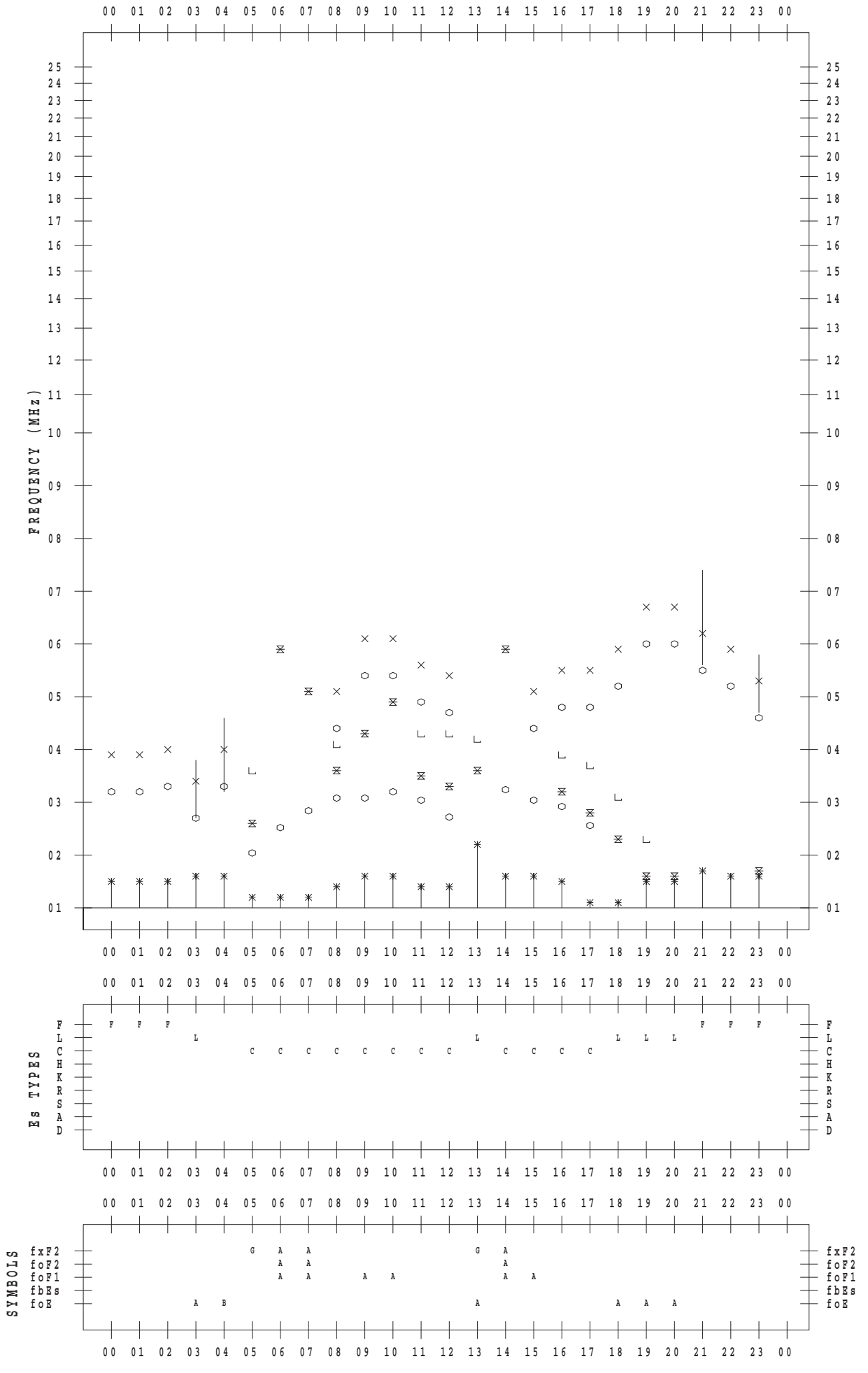
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/23

135 °E MEAN TIME



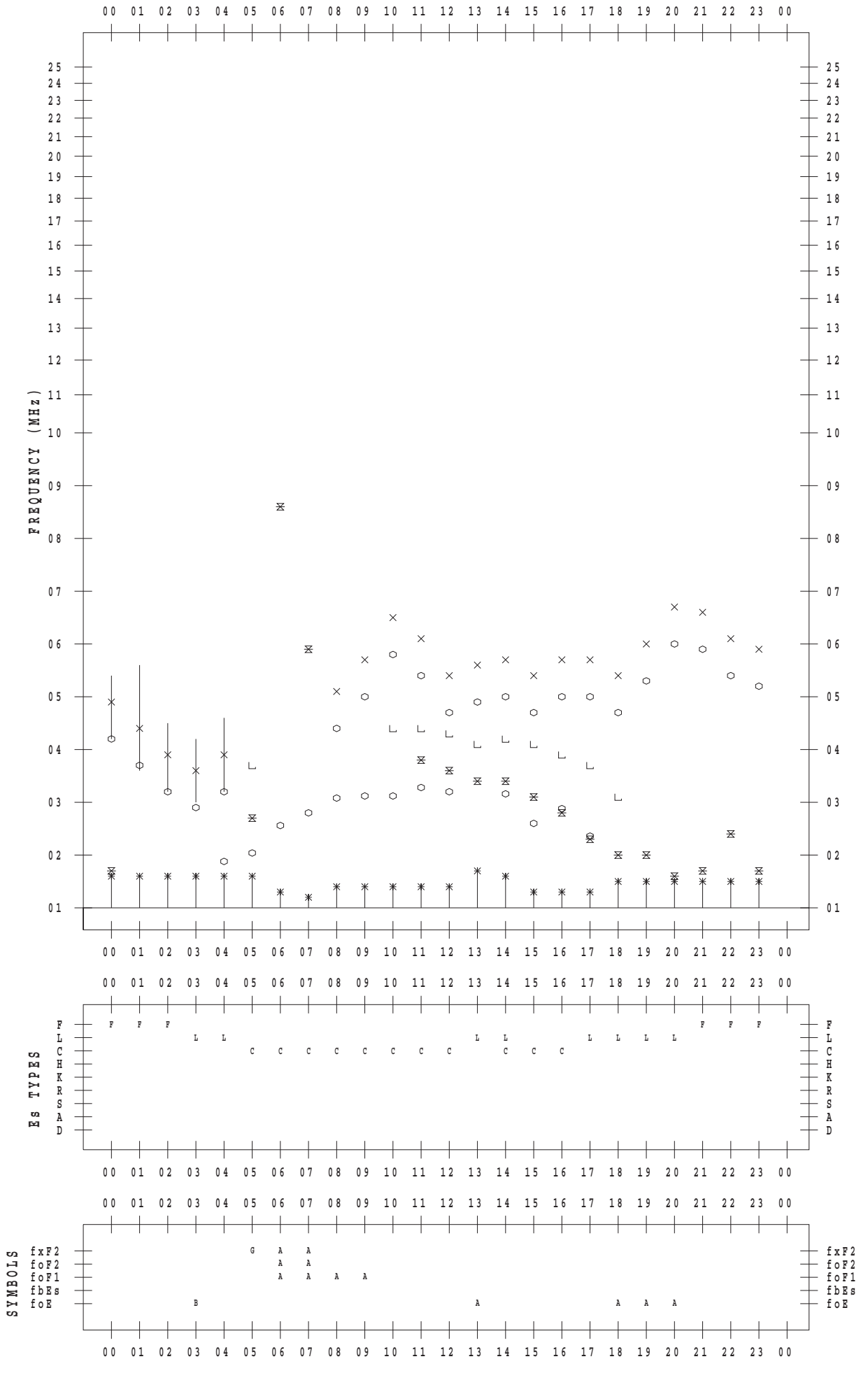
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/24

135 °E MEAN TIME



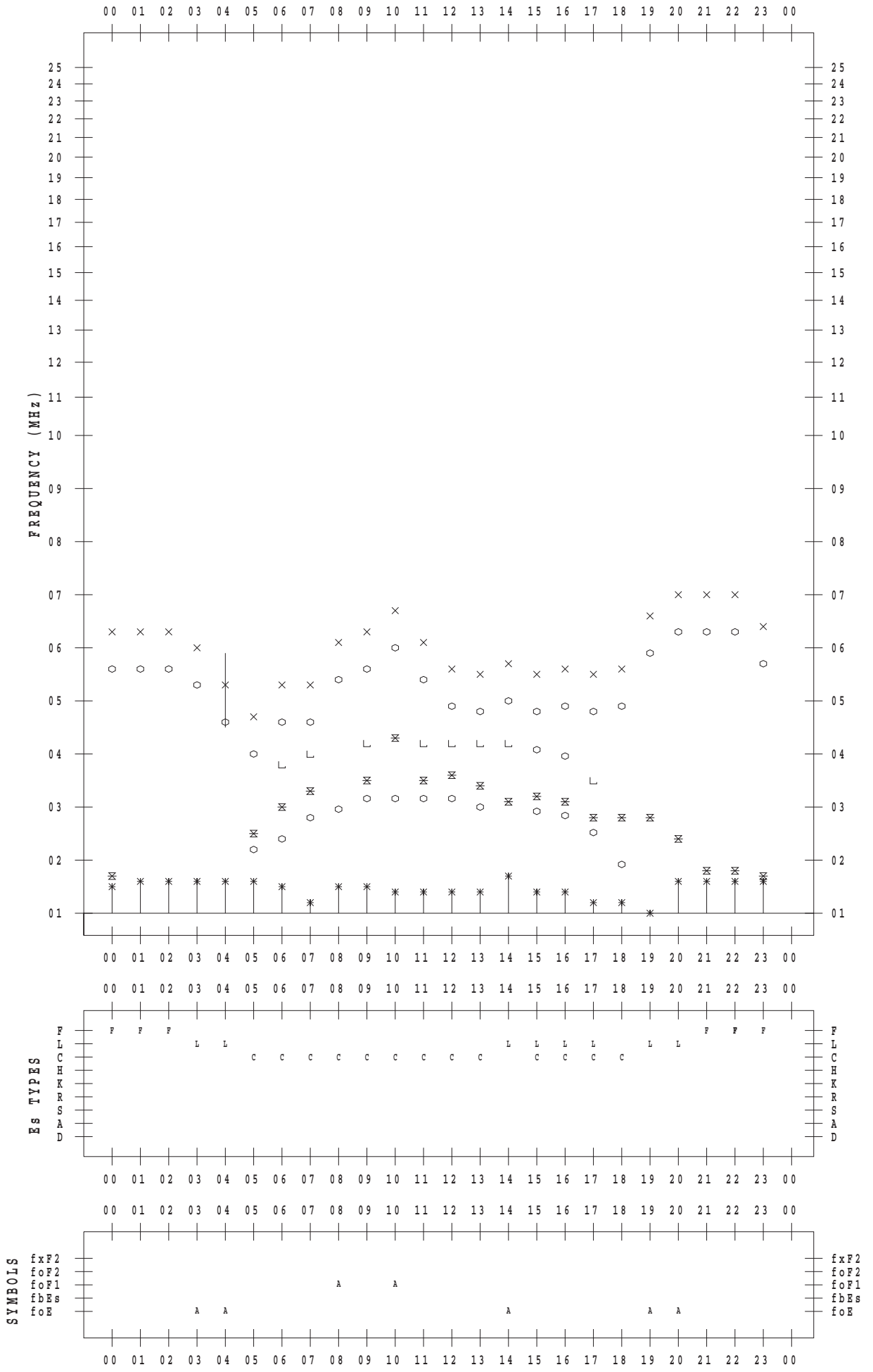
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/25

135 °E MEAN TIME



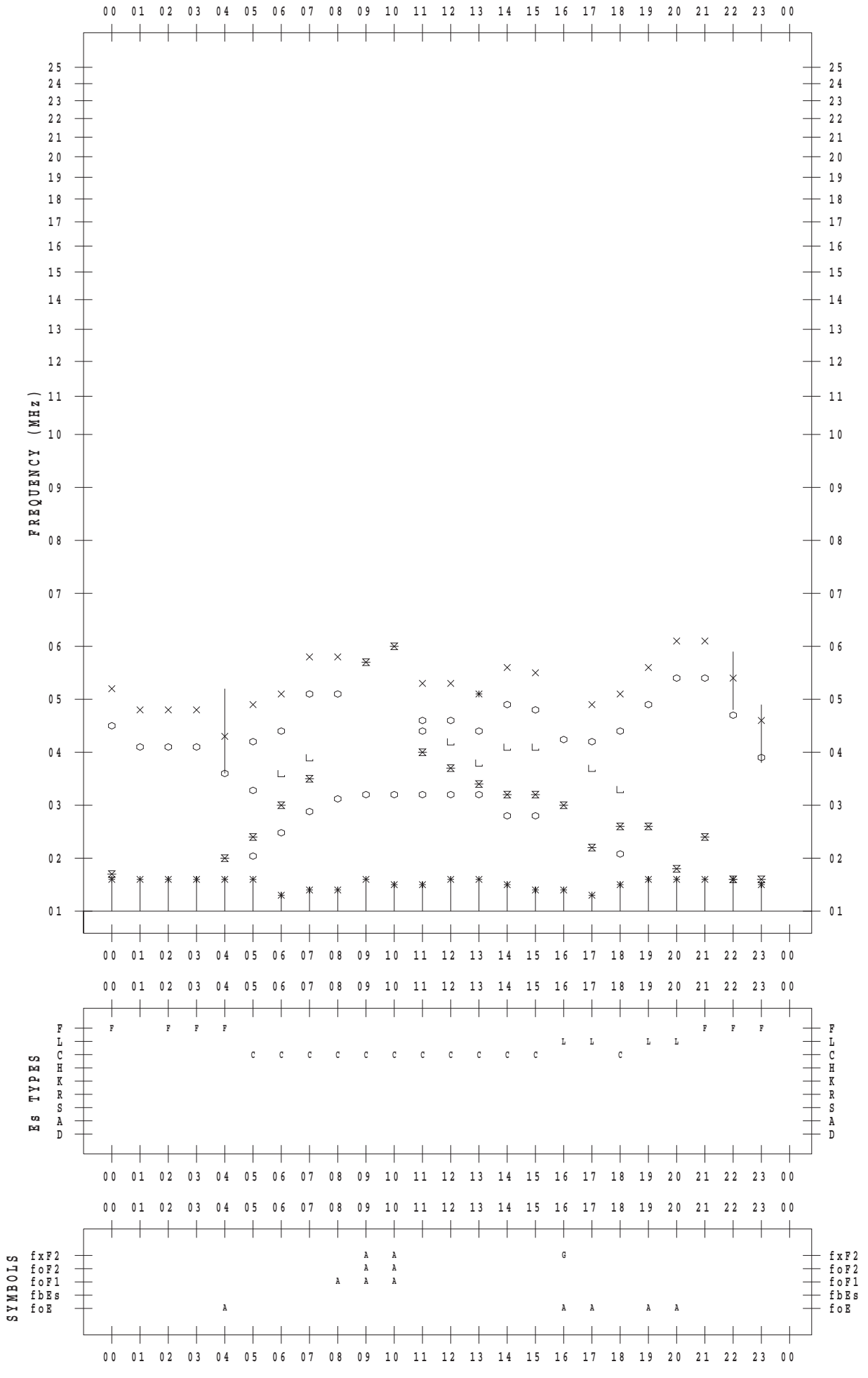
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/26

135 °E MEAN TIME



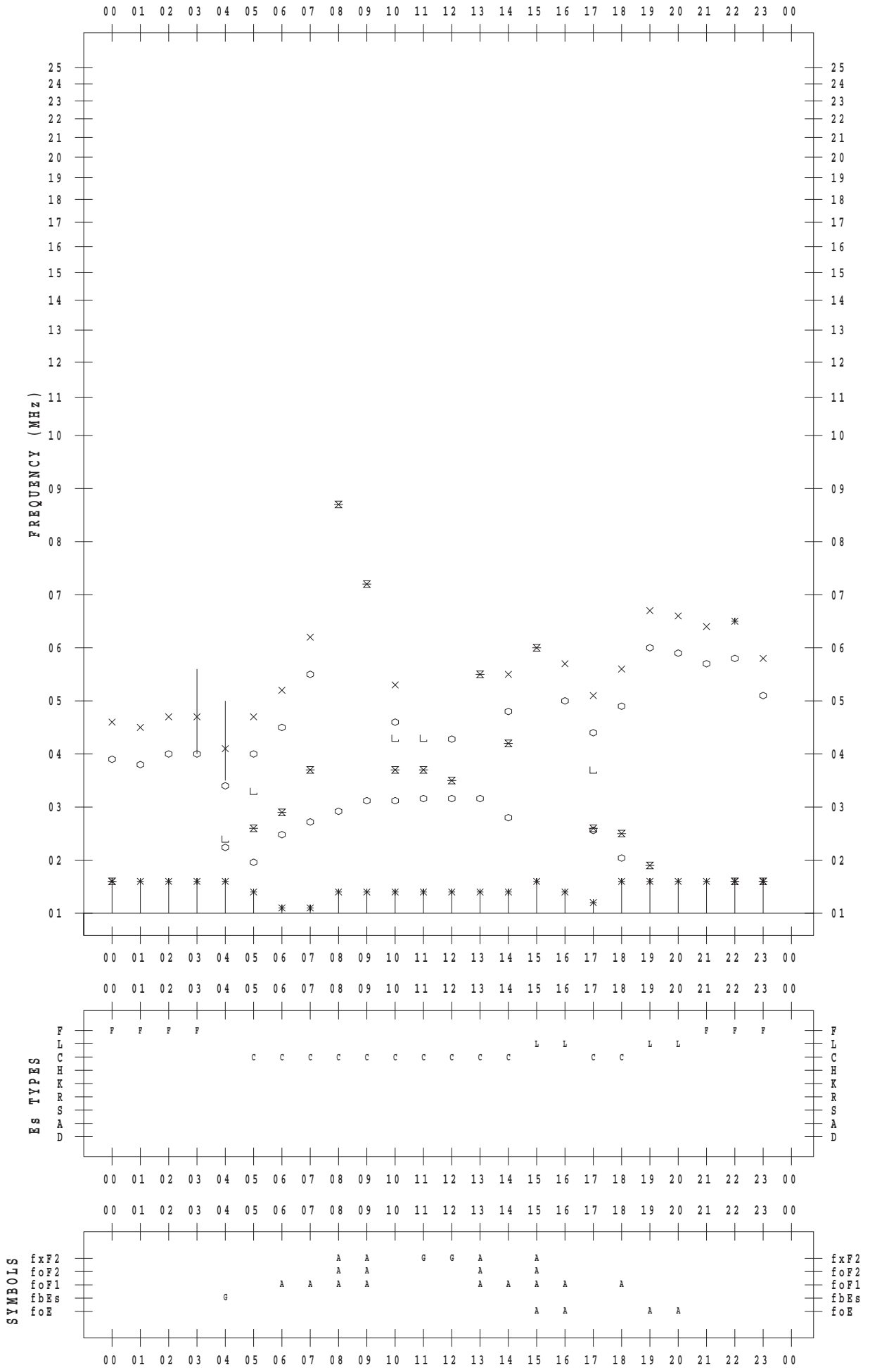
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/27

135 °E MEAN TIME



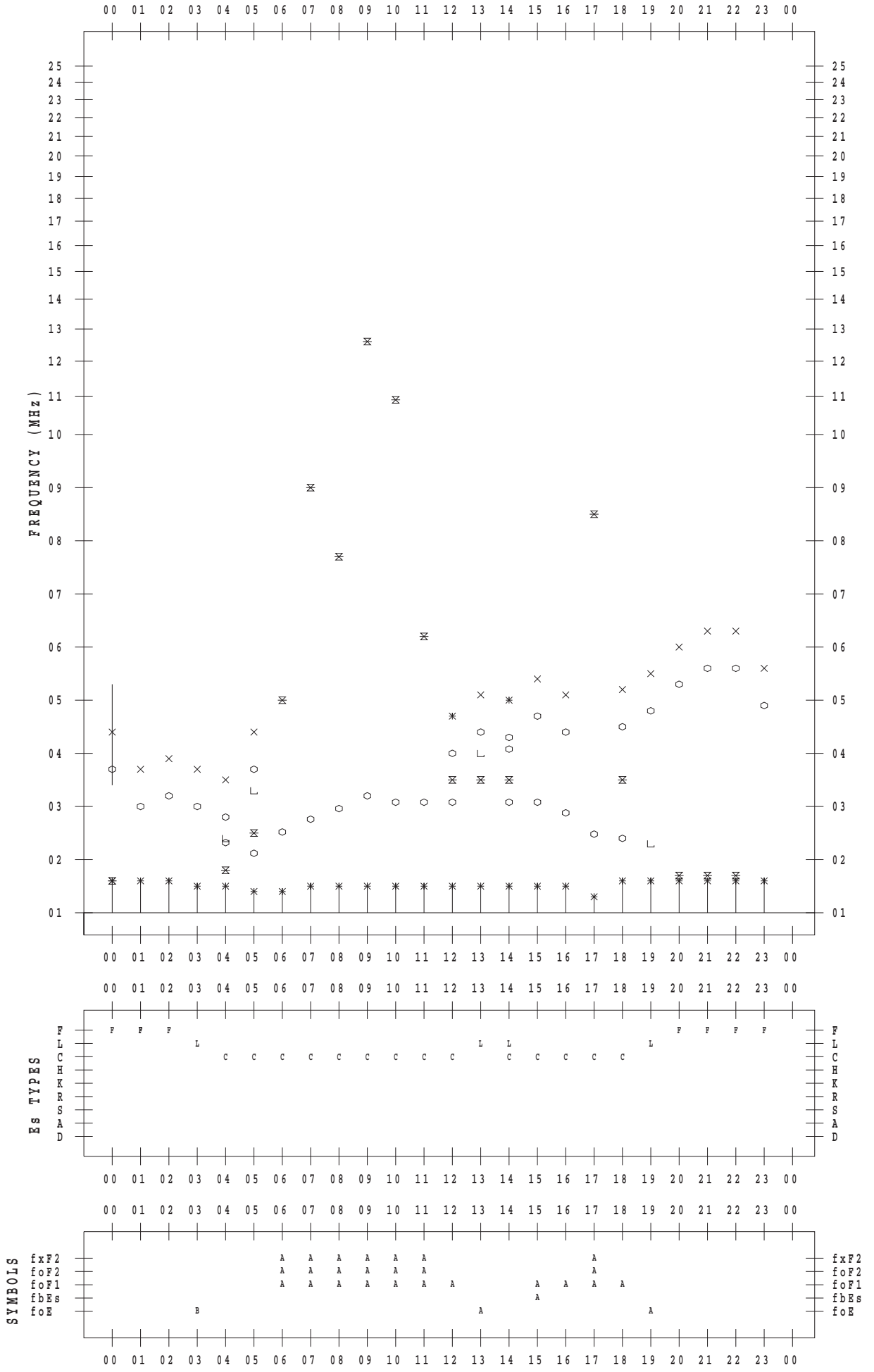
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/28

135 °E MEAN TIME



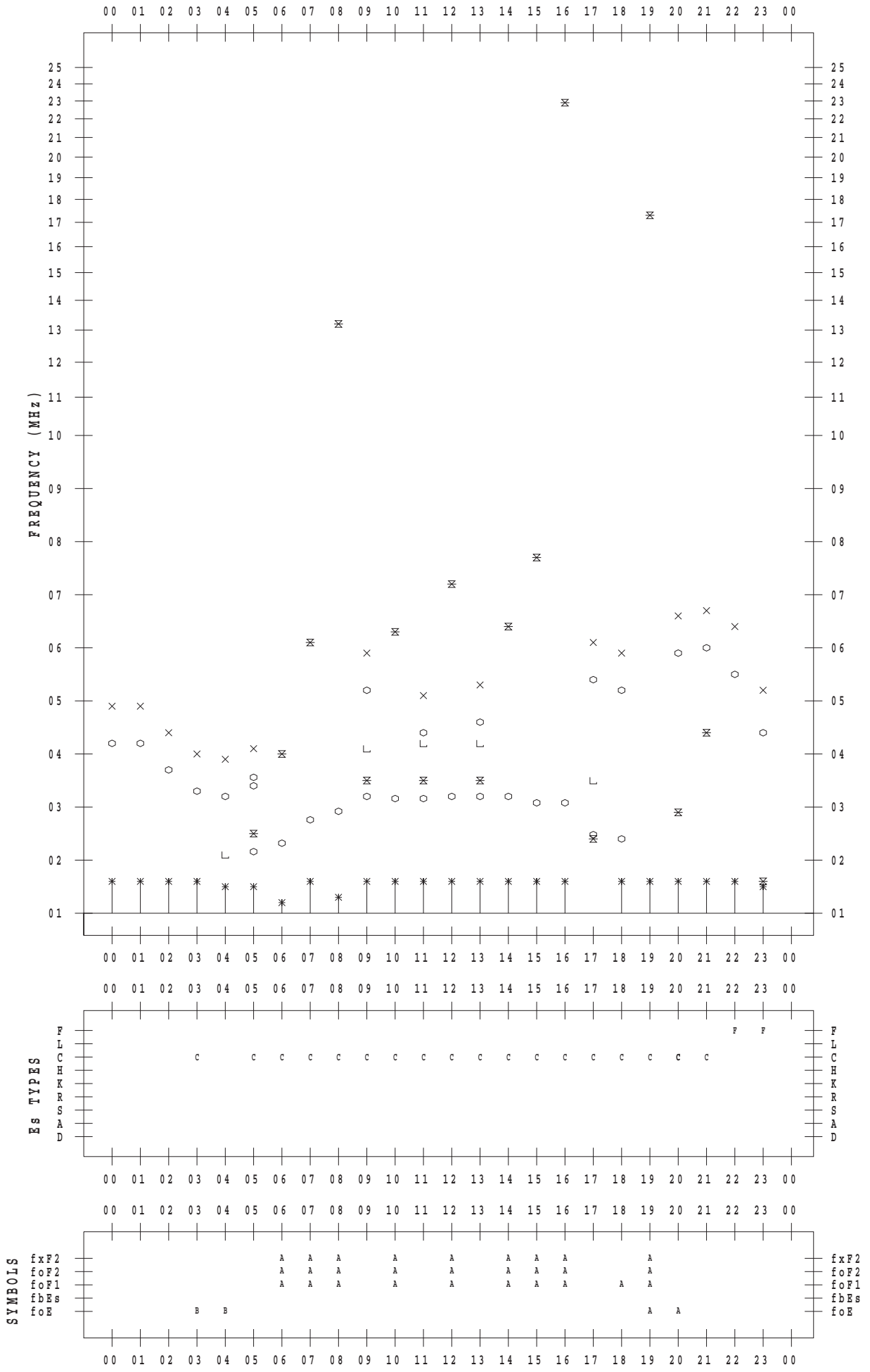
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/29

135 °E MEAN TIME



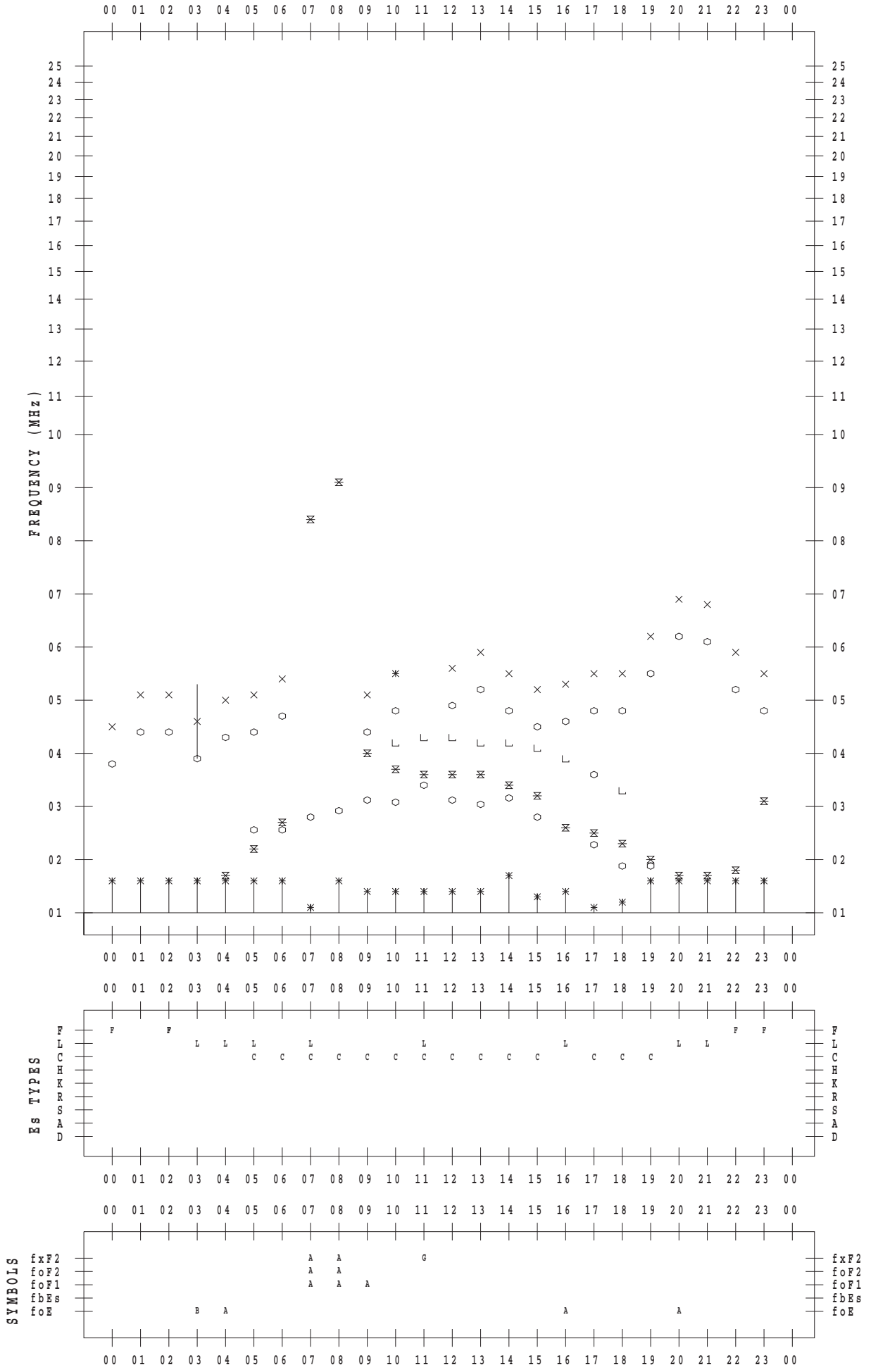
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/30

135 °E MEAN TIME



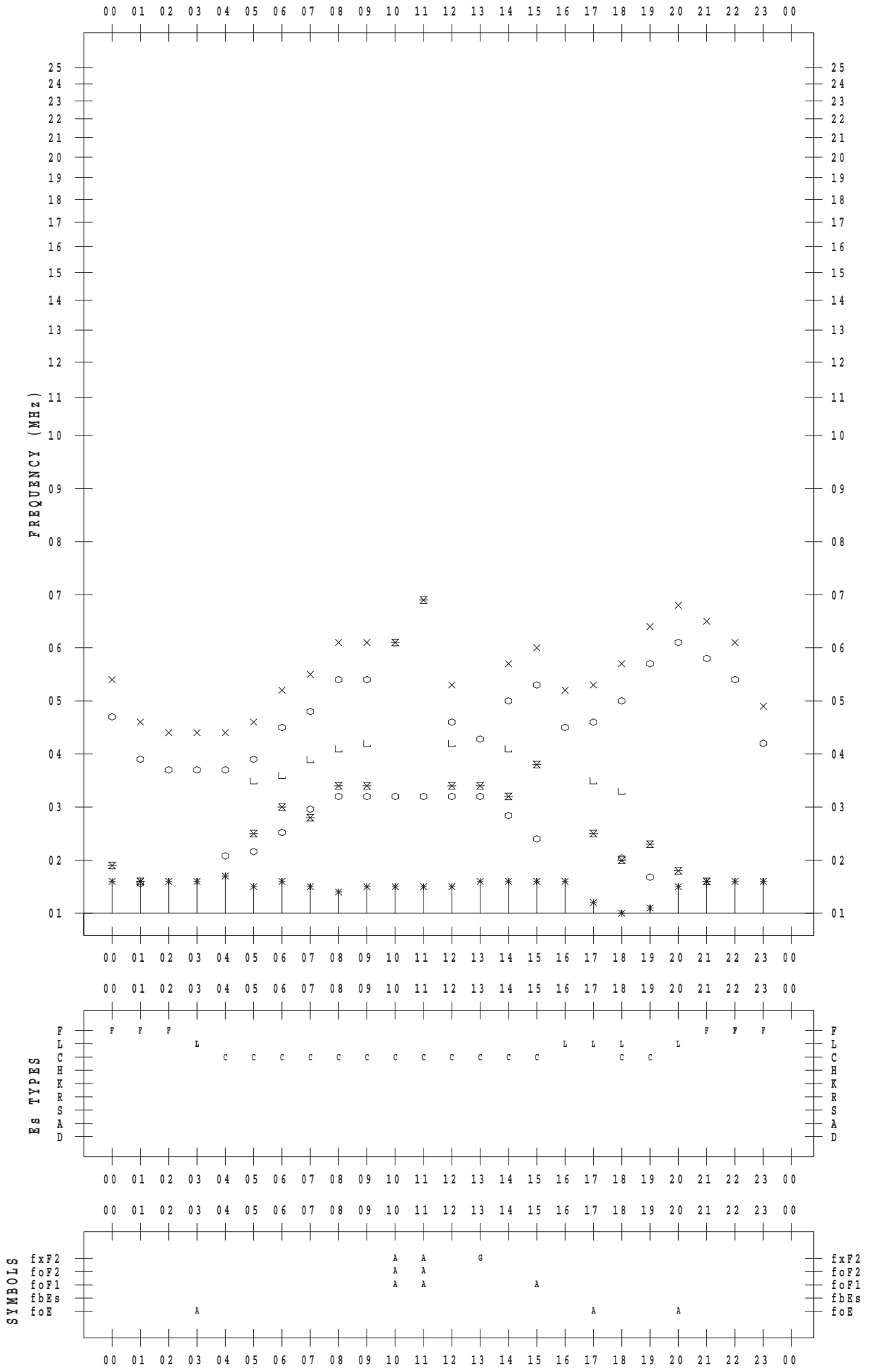
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/ 5/31

135 °E MEAN TIME



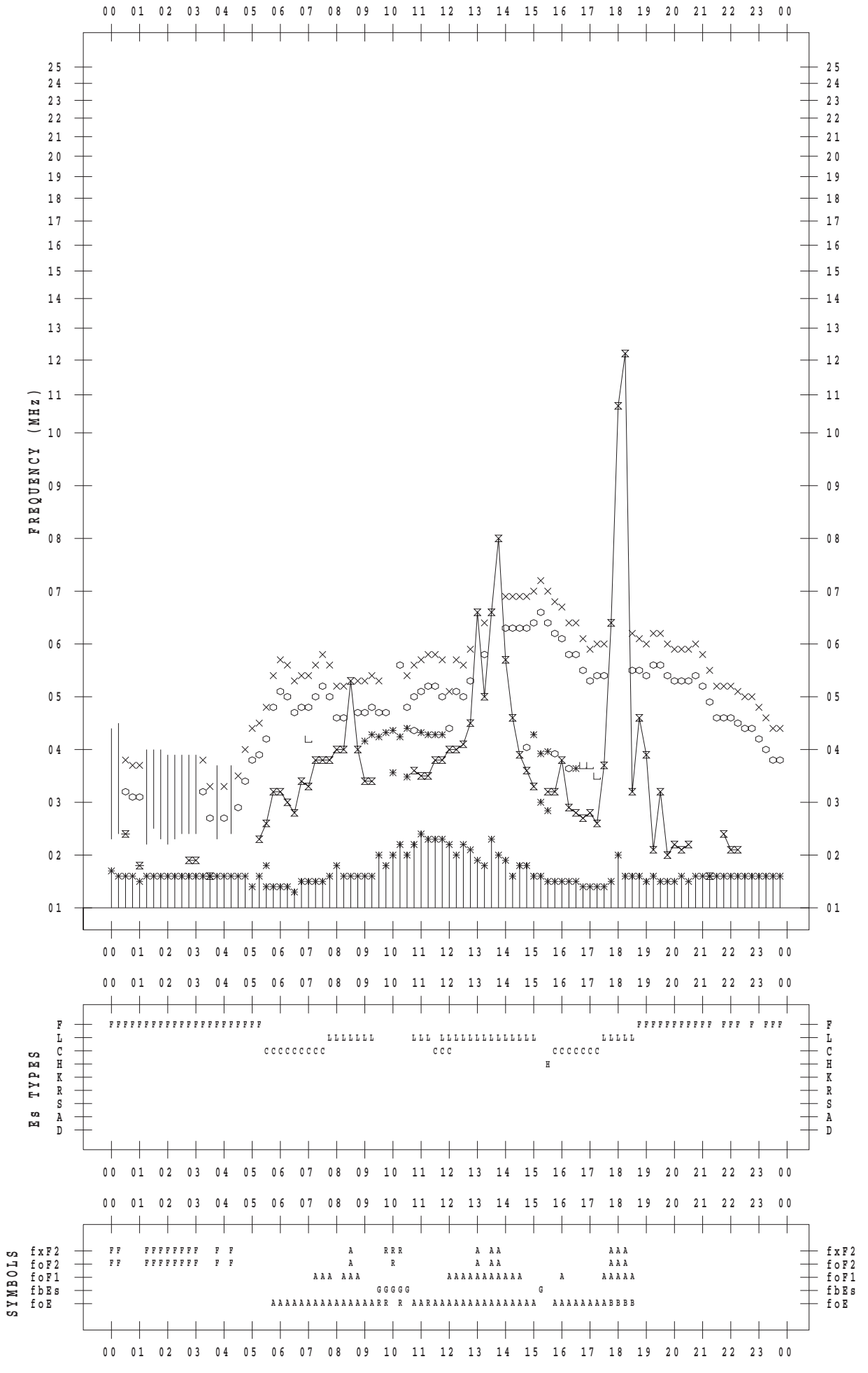
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/ 1

135 °E MEAN TIME



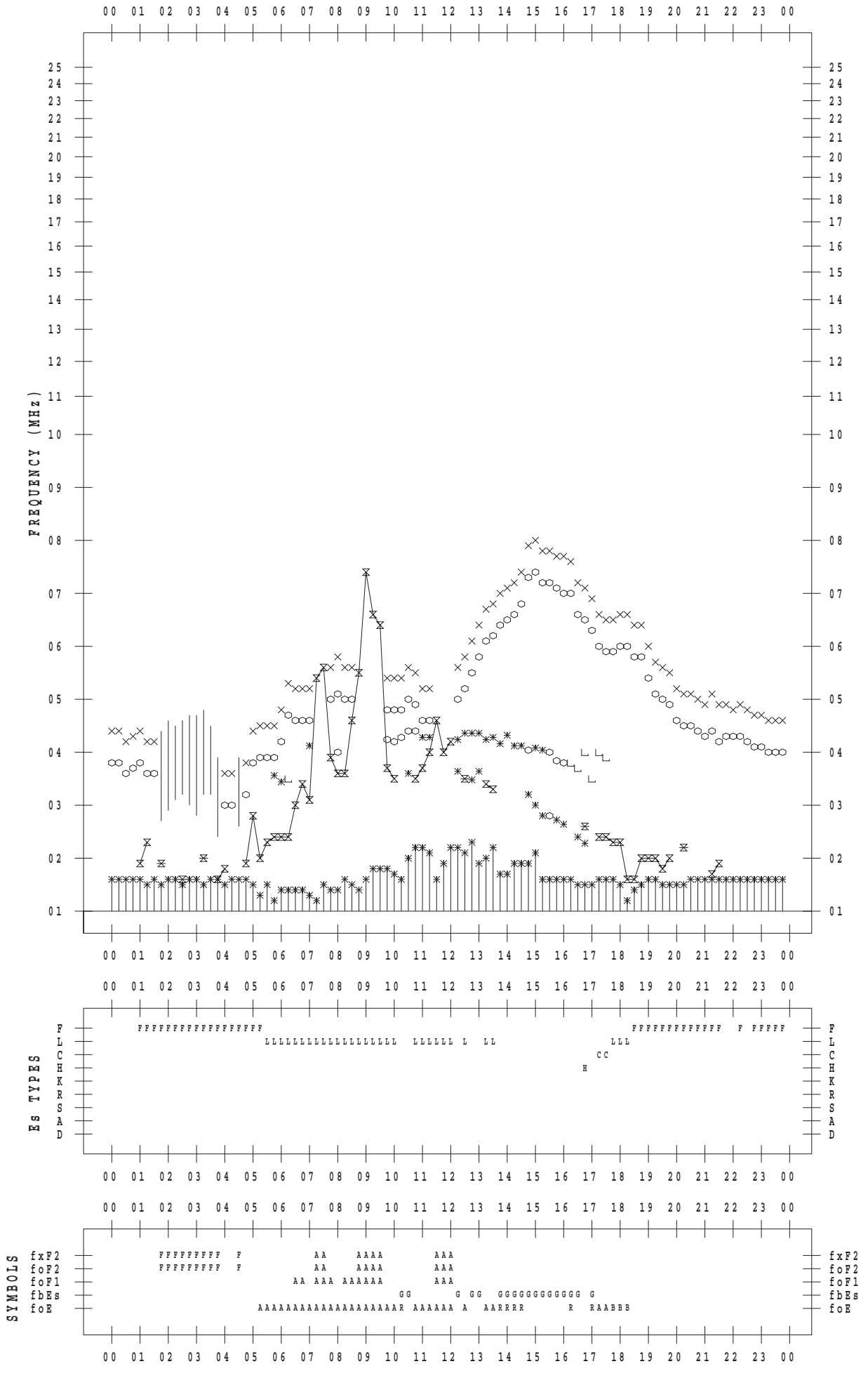
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/ 2

135 °E MEAN TIME



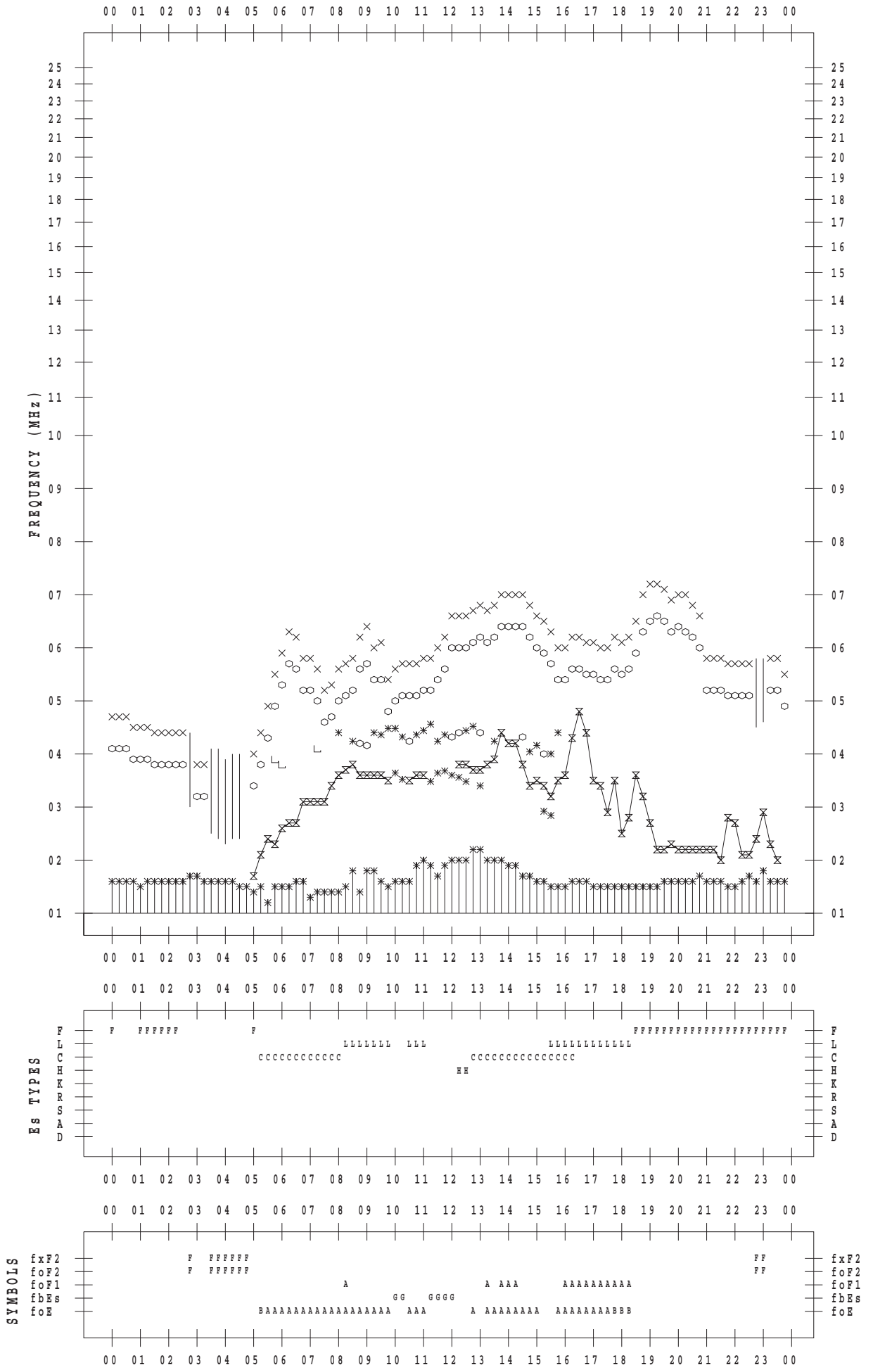
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/ 3

135 °E MEAN TIME



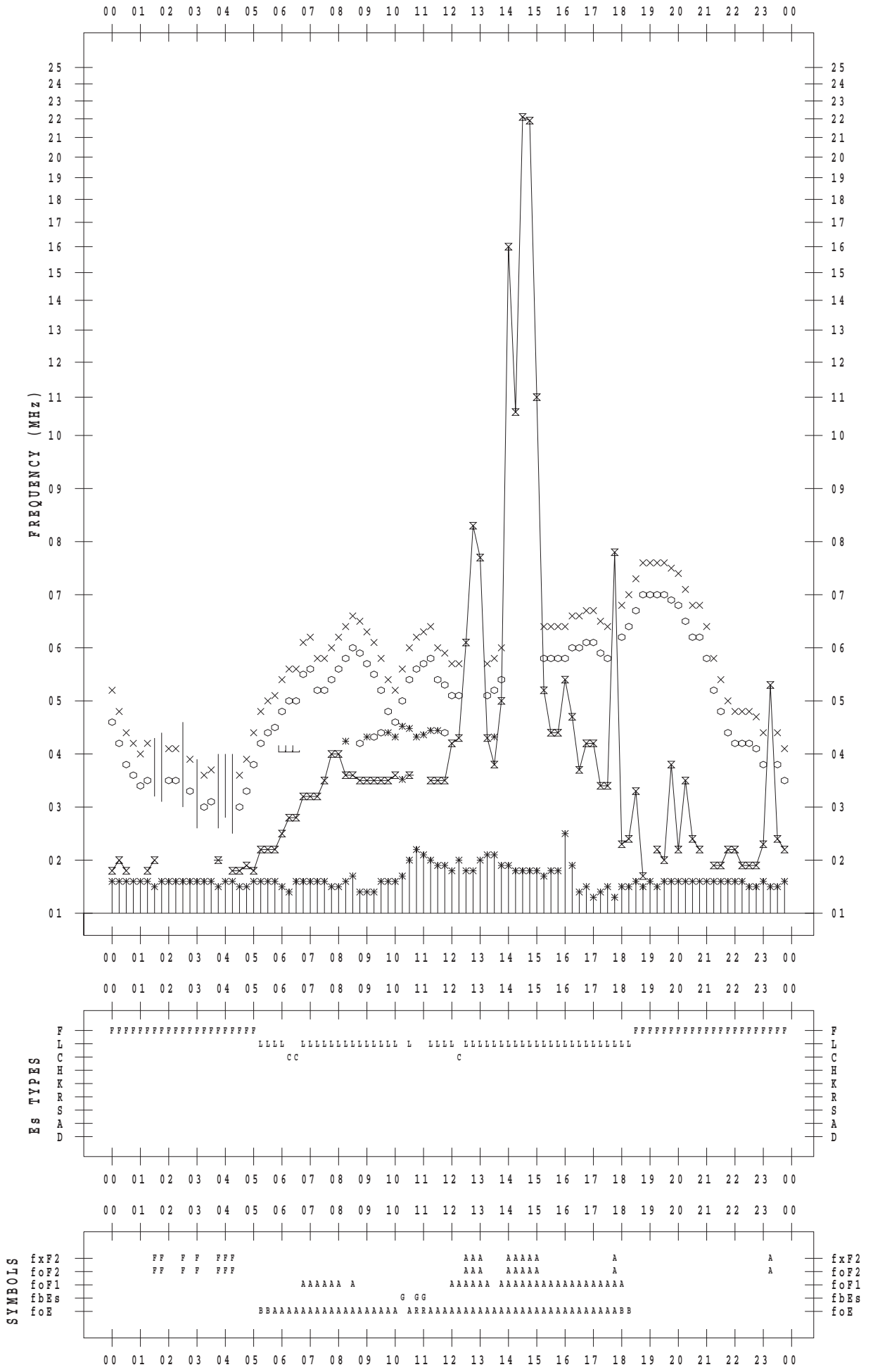
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/ 4

135 °E MEAN TIME



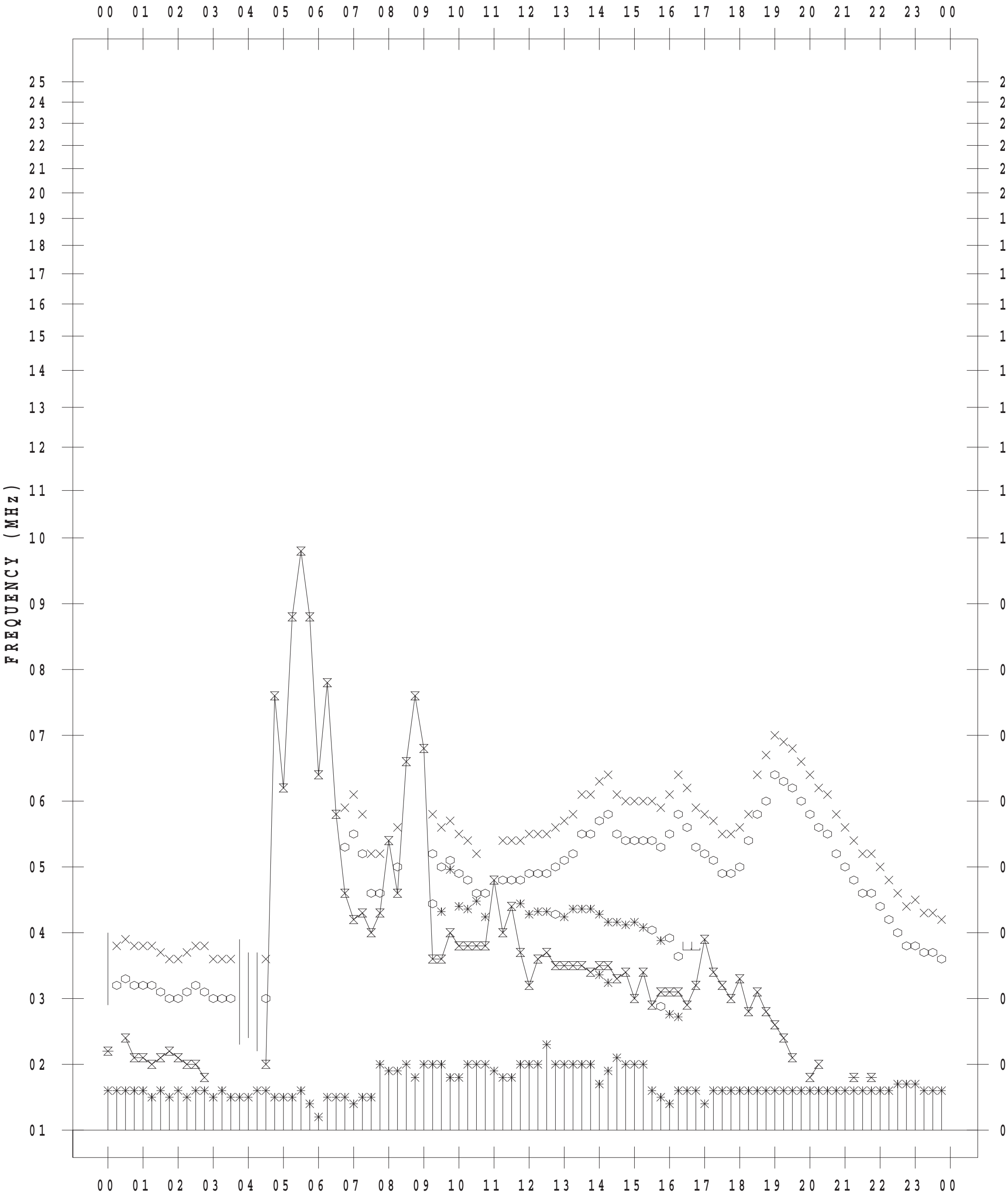
f-PLOT DATA

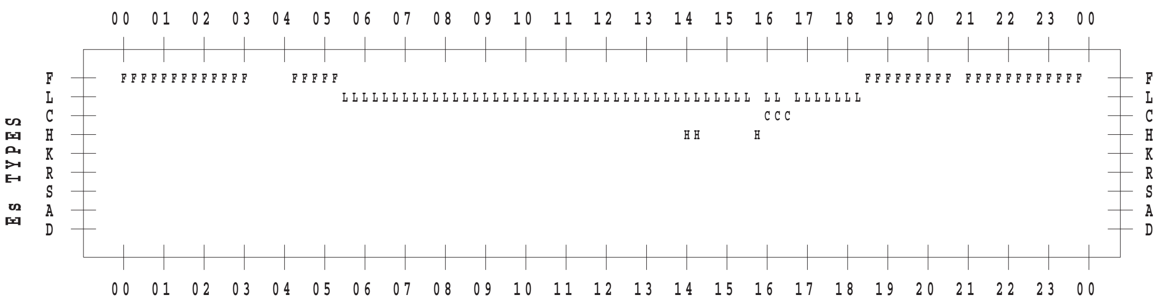
SCALER : I.NISHIMUTA

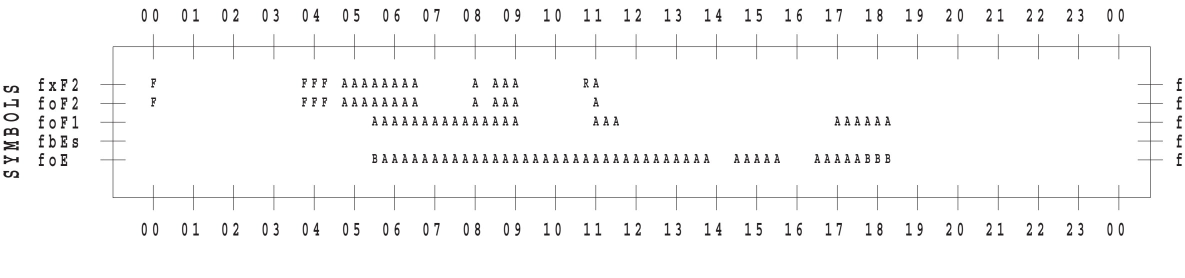
STATION : Kokubunji

DATE : 2019/ 5/ 5

135 °E MEAN TIME







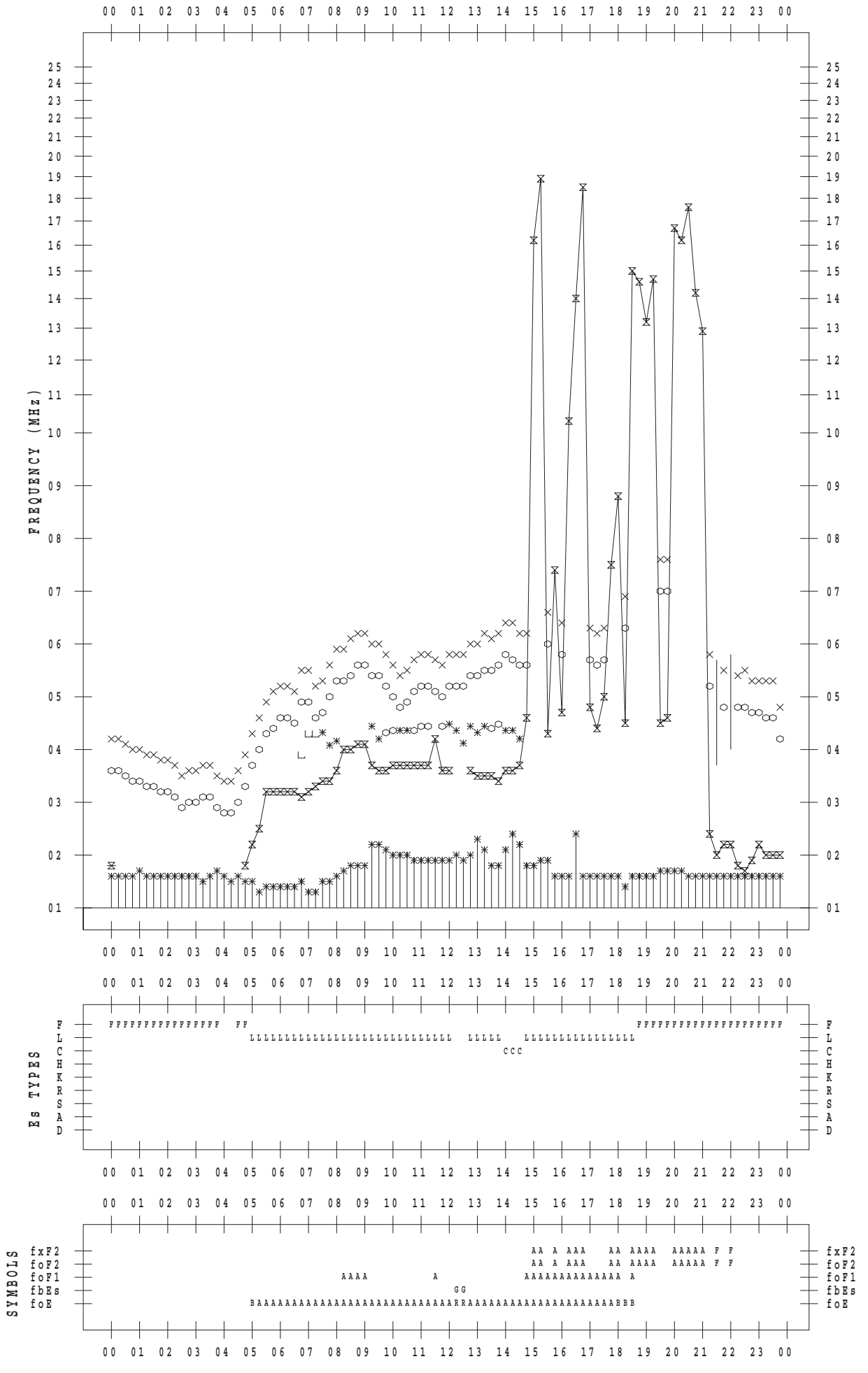
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/ 6

135 °E MEAN TIME



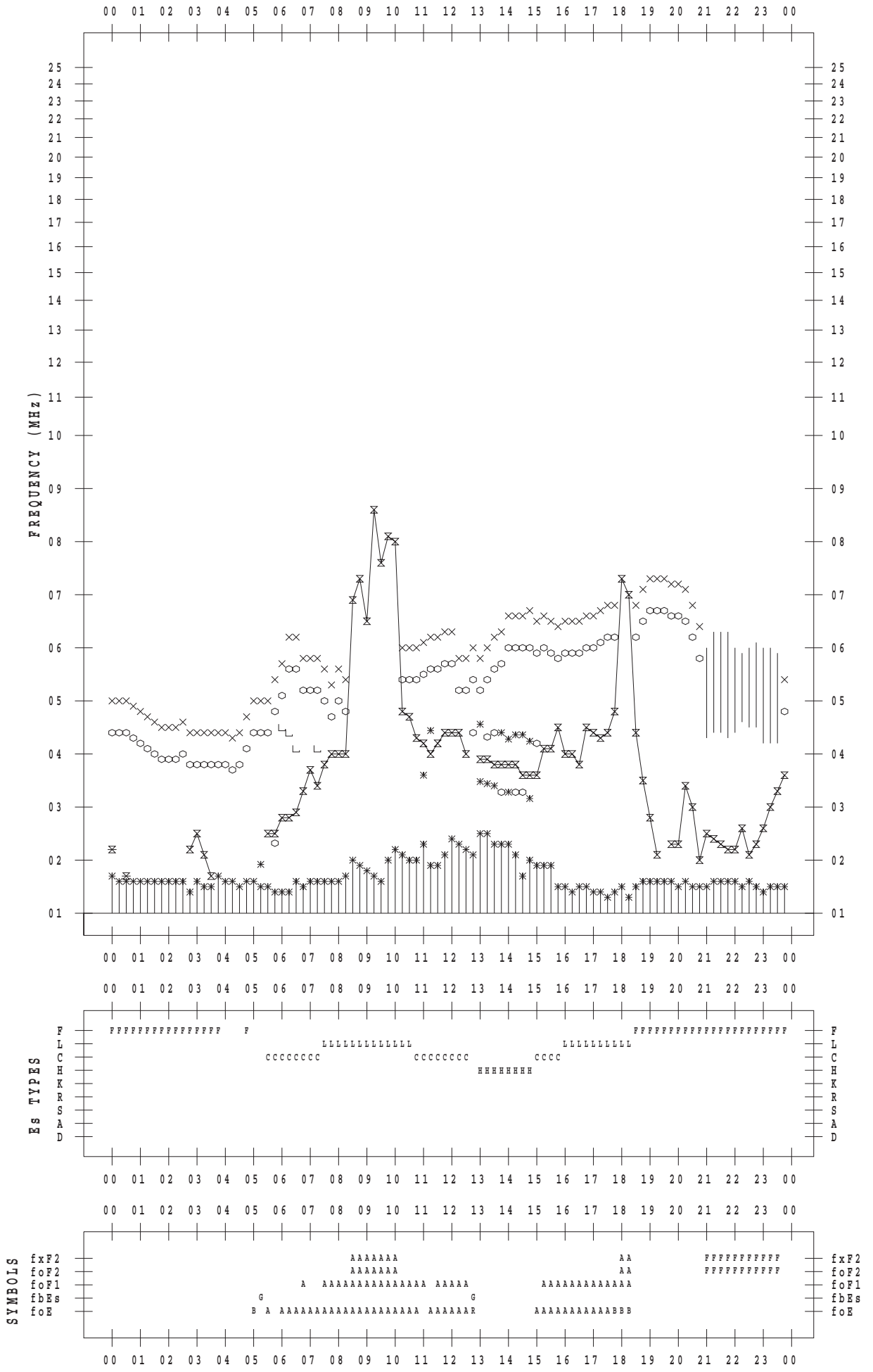
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/ 7

135 °E MEAN TIME



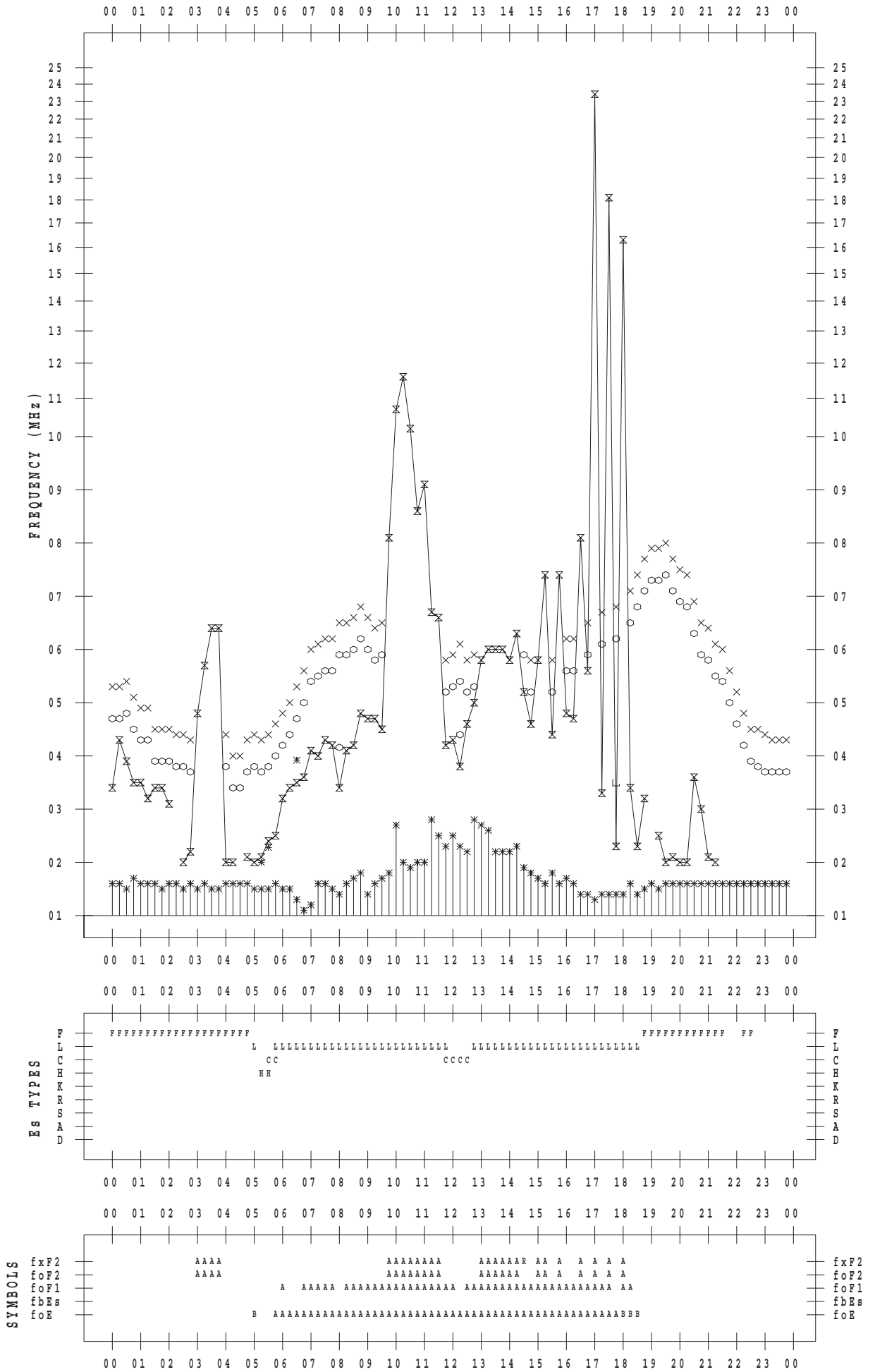
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/ 8

135 °E MEAN TIME



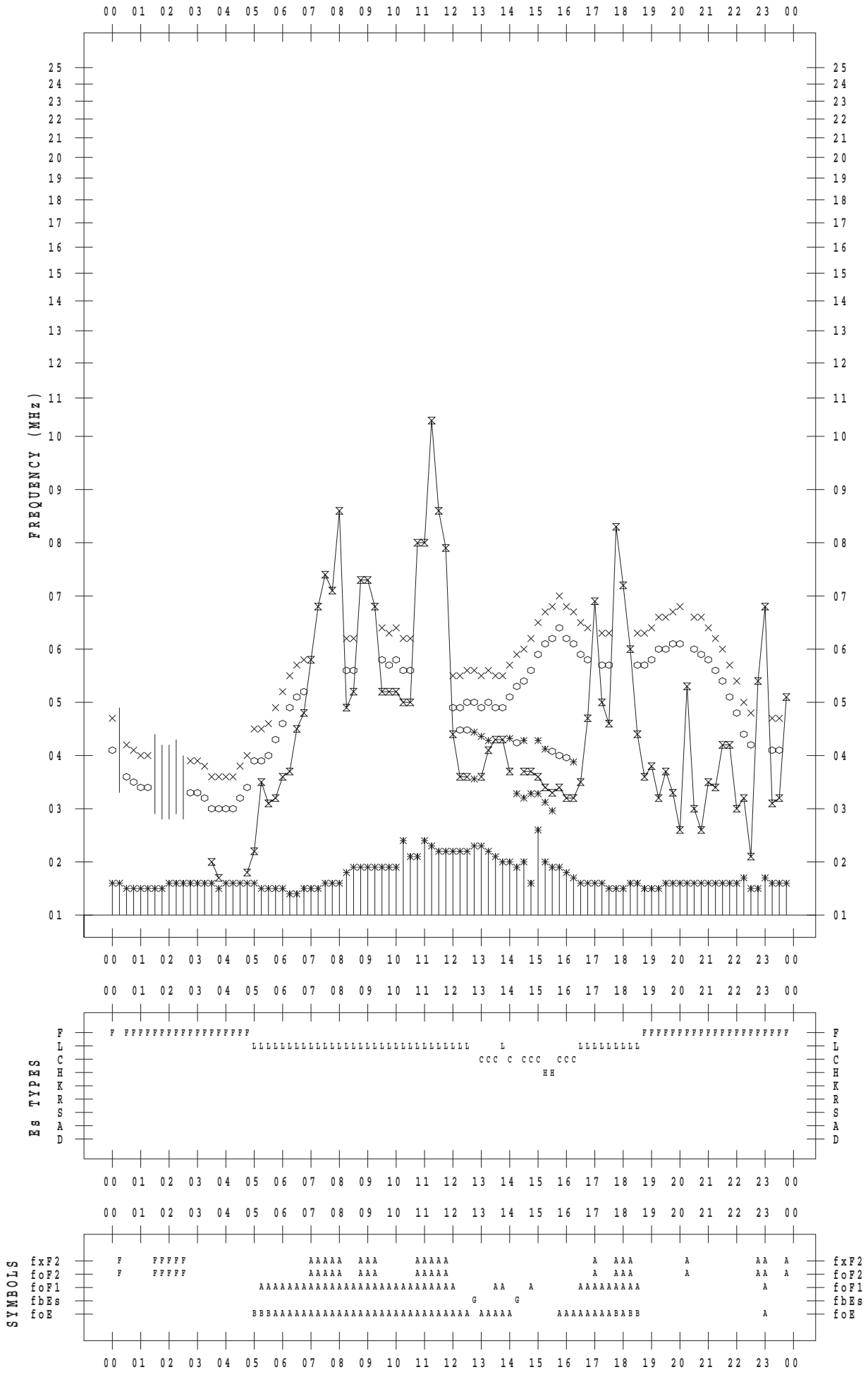
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/ 9

135 °E MEAN TIME



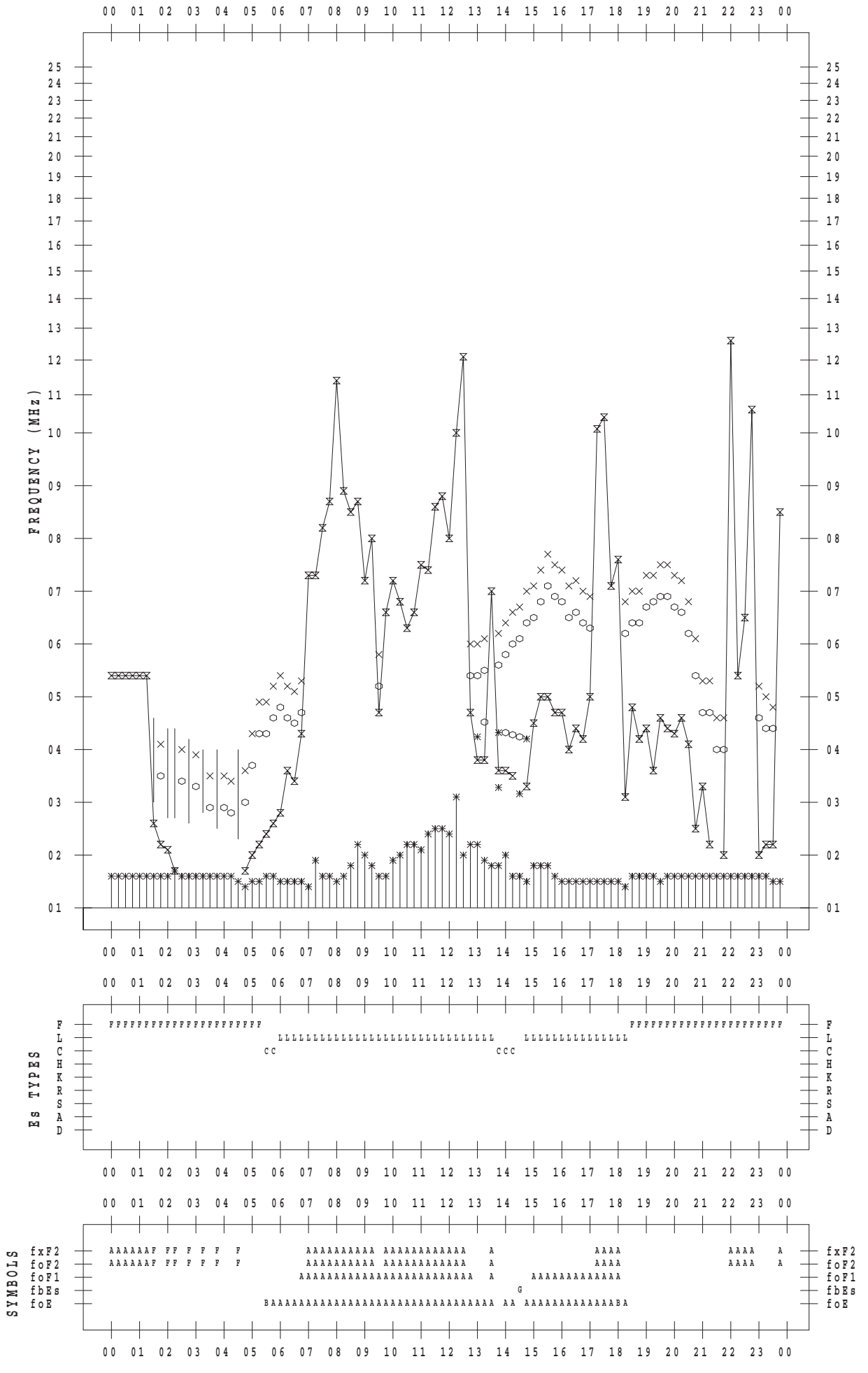
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/10

135 °E MEAN TIME



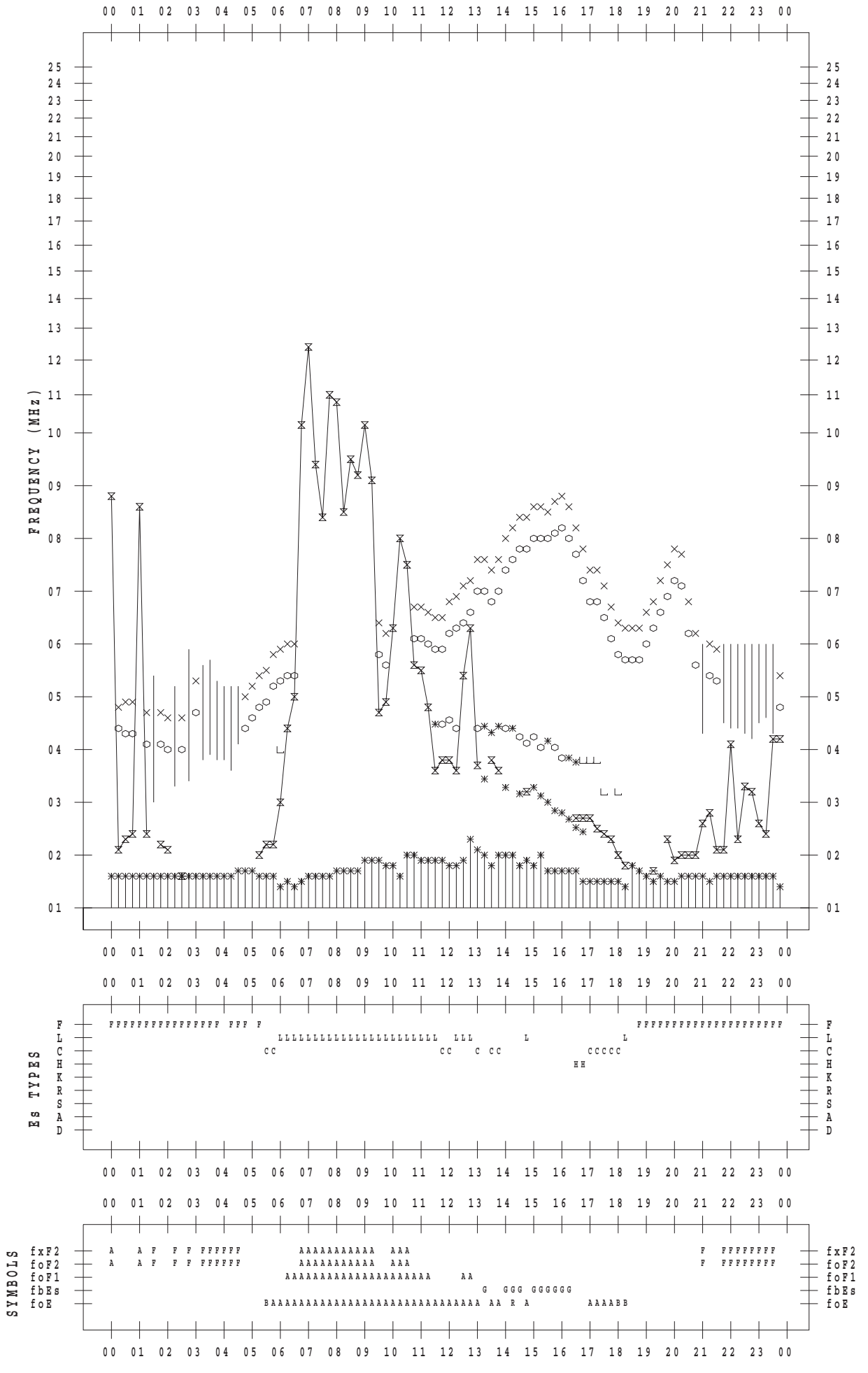
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/11

135 °E MEAN TIME



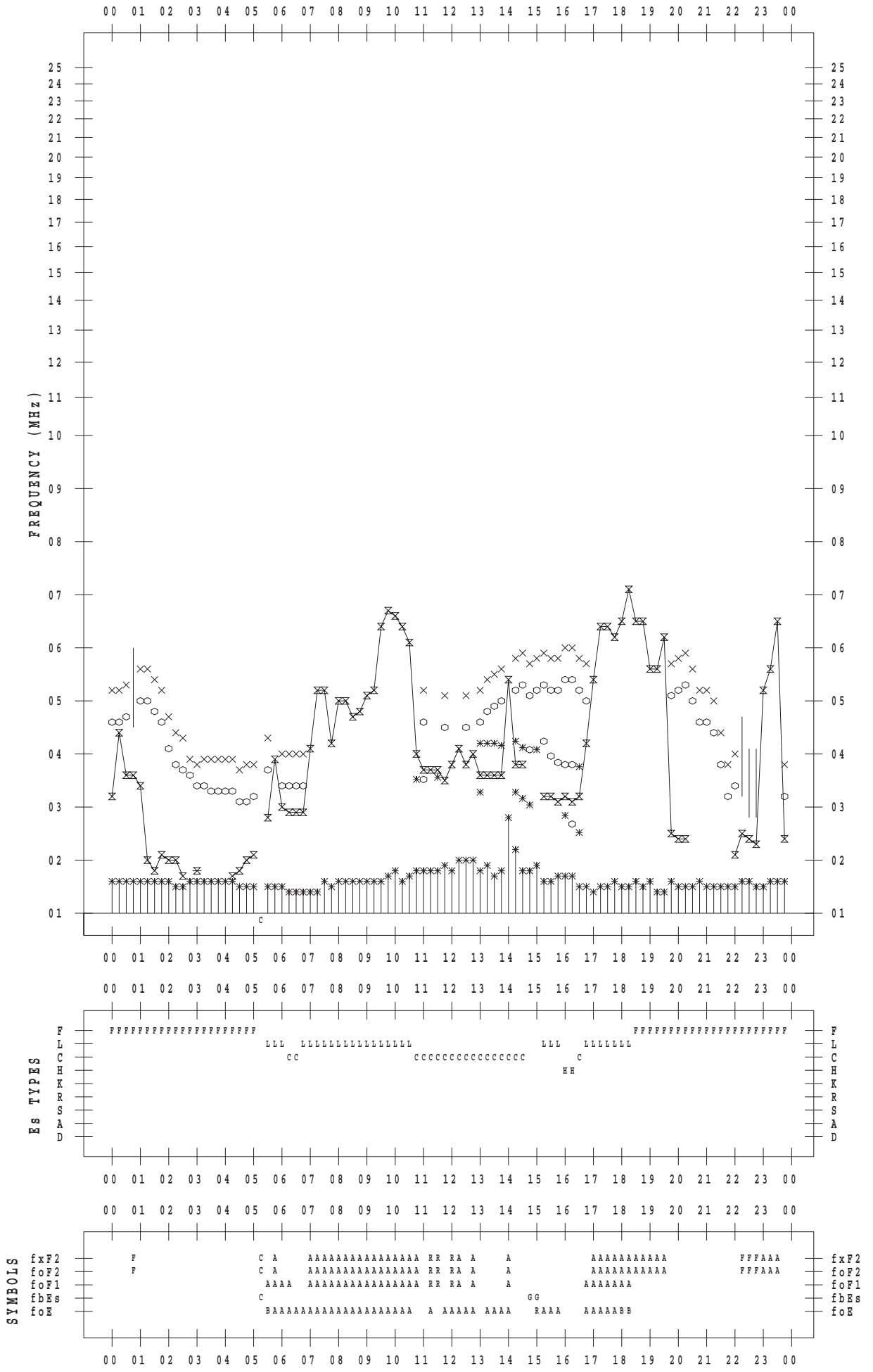
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/12

135 °E MEAN TIME



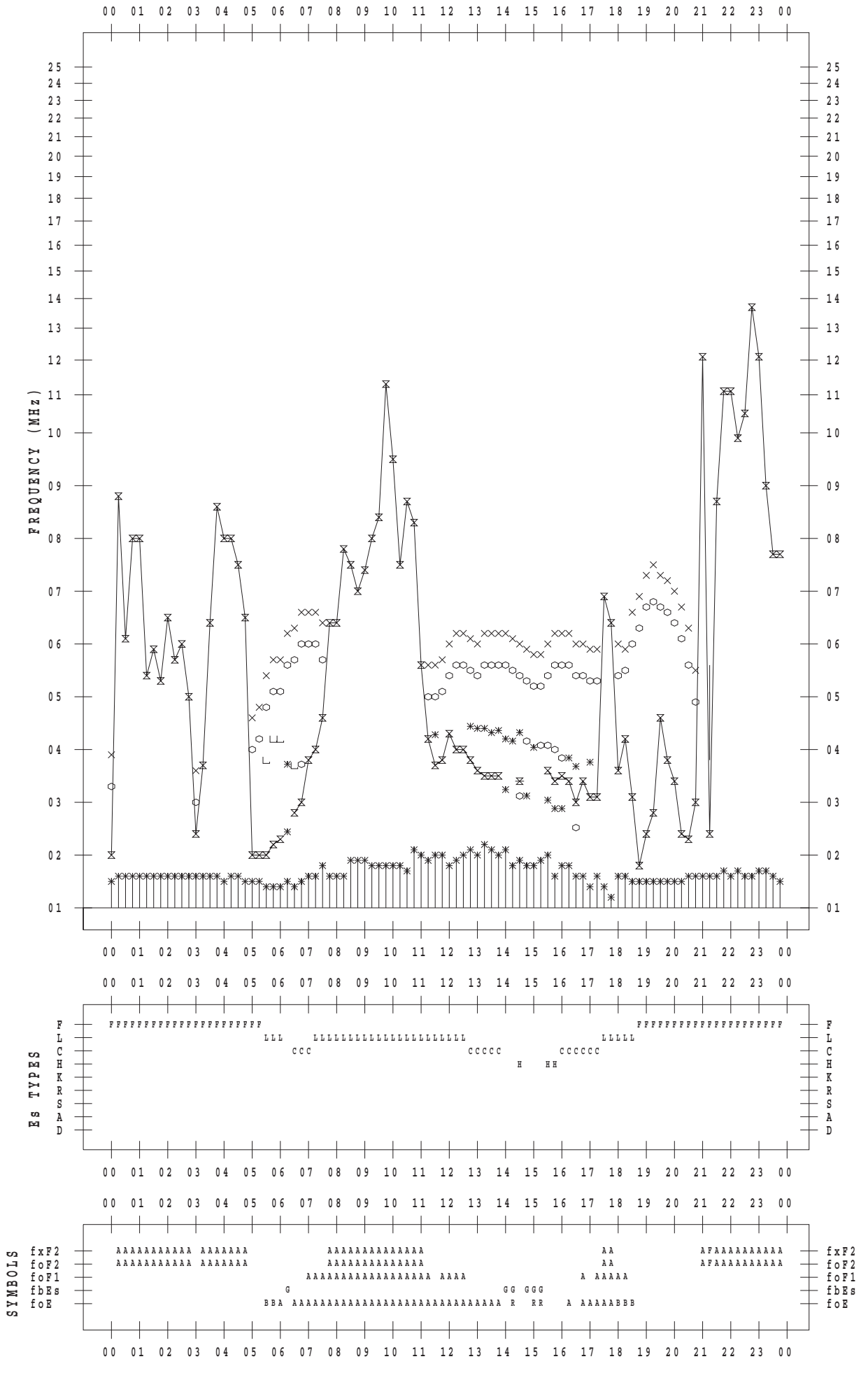
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/13

135 °E MEAN TIME



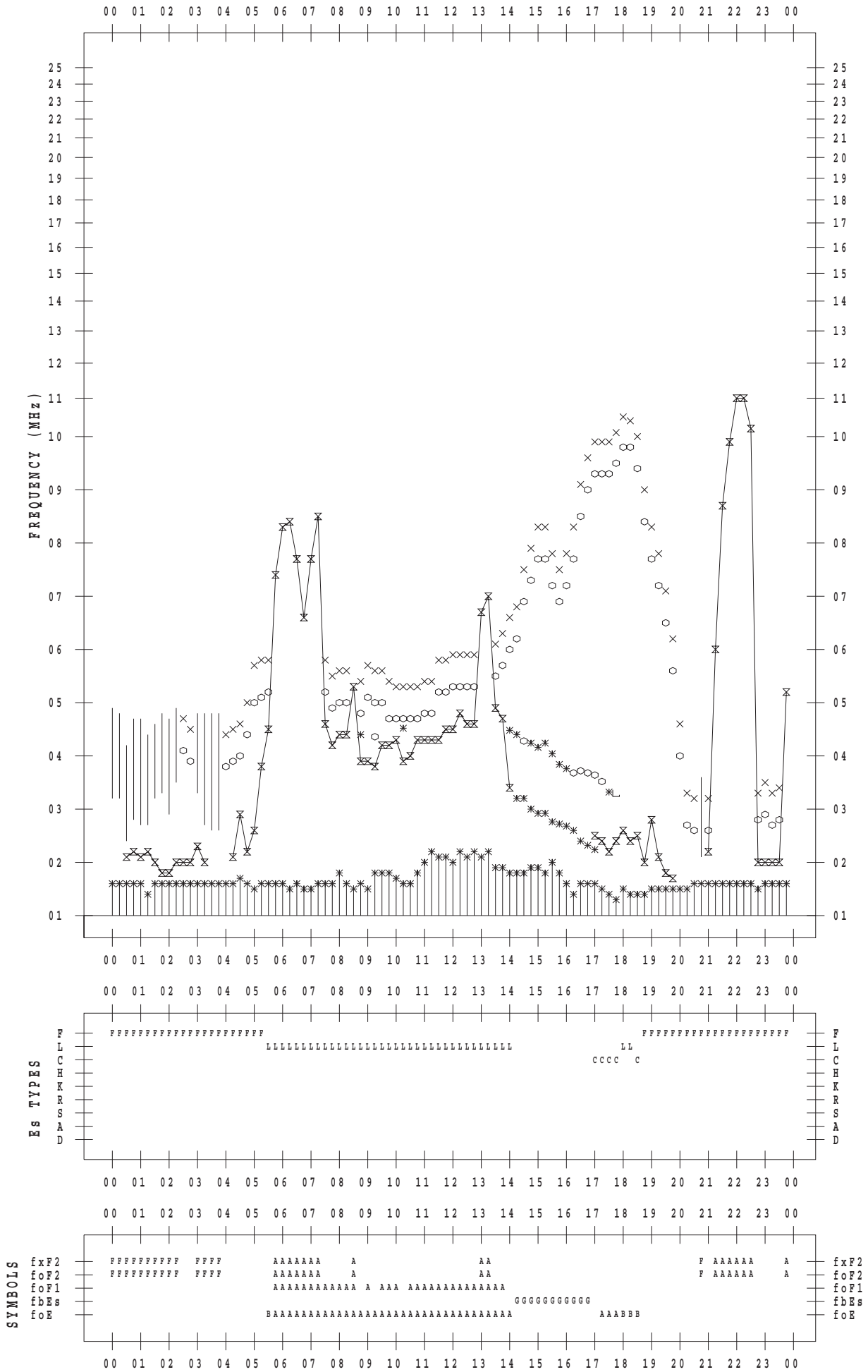
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/14

135 °E MEAN TIME



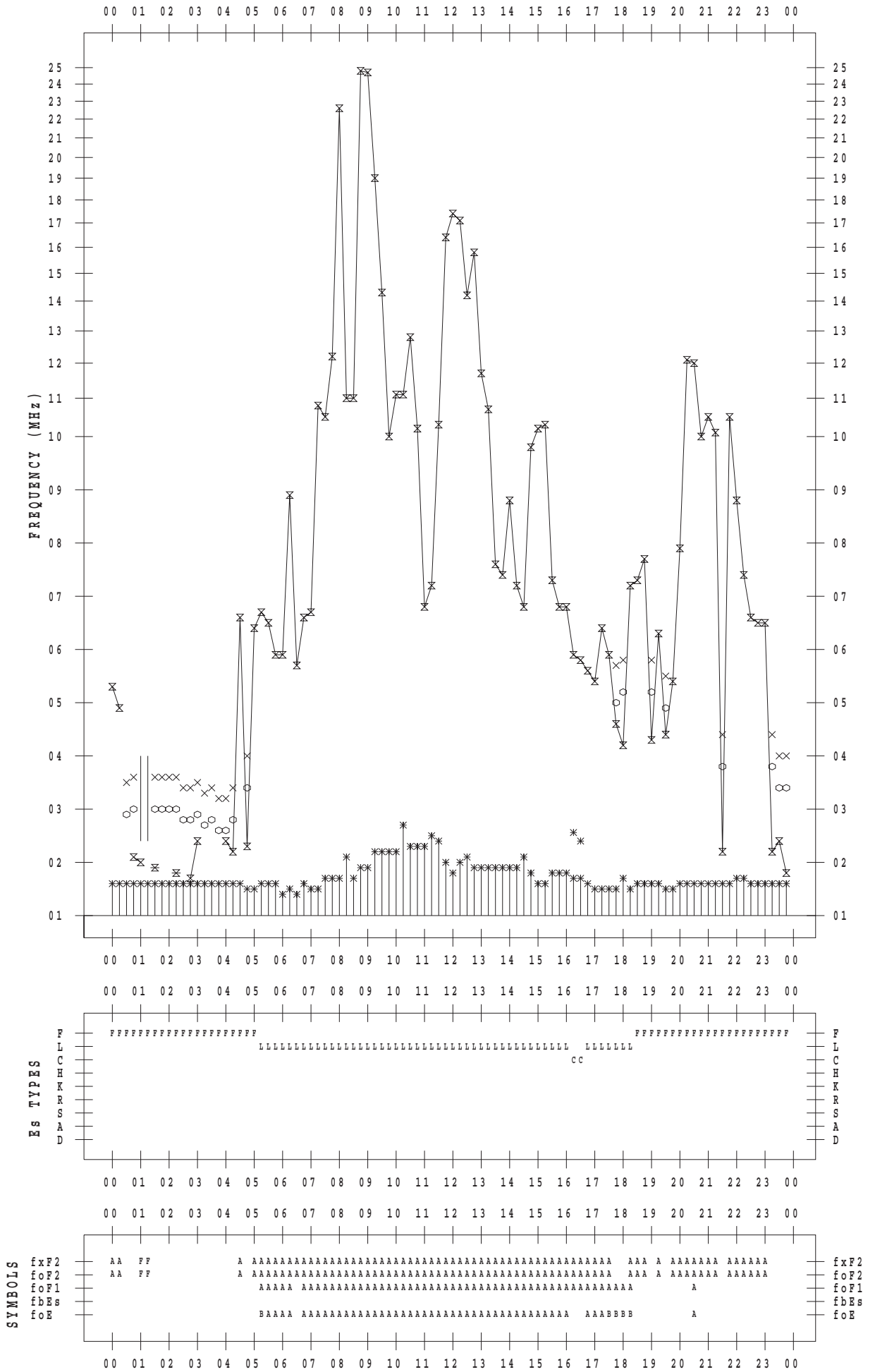
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/15

135 °E MEAN TIME



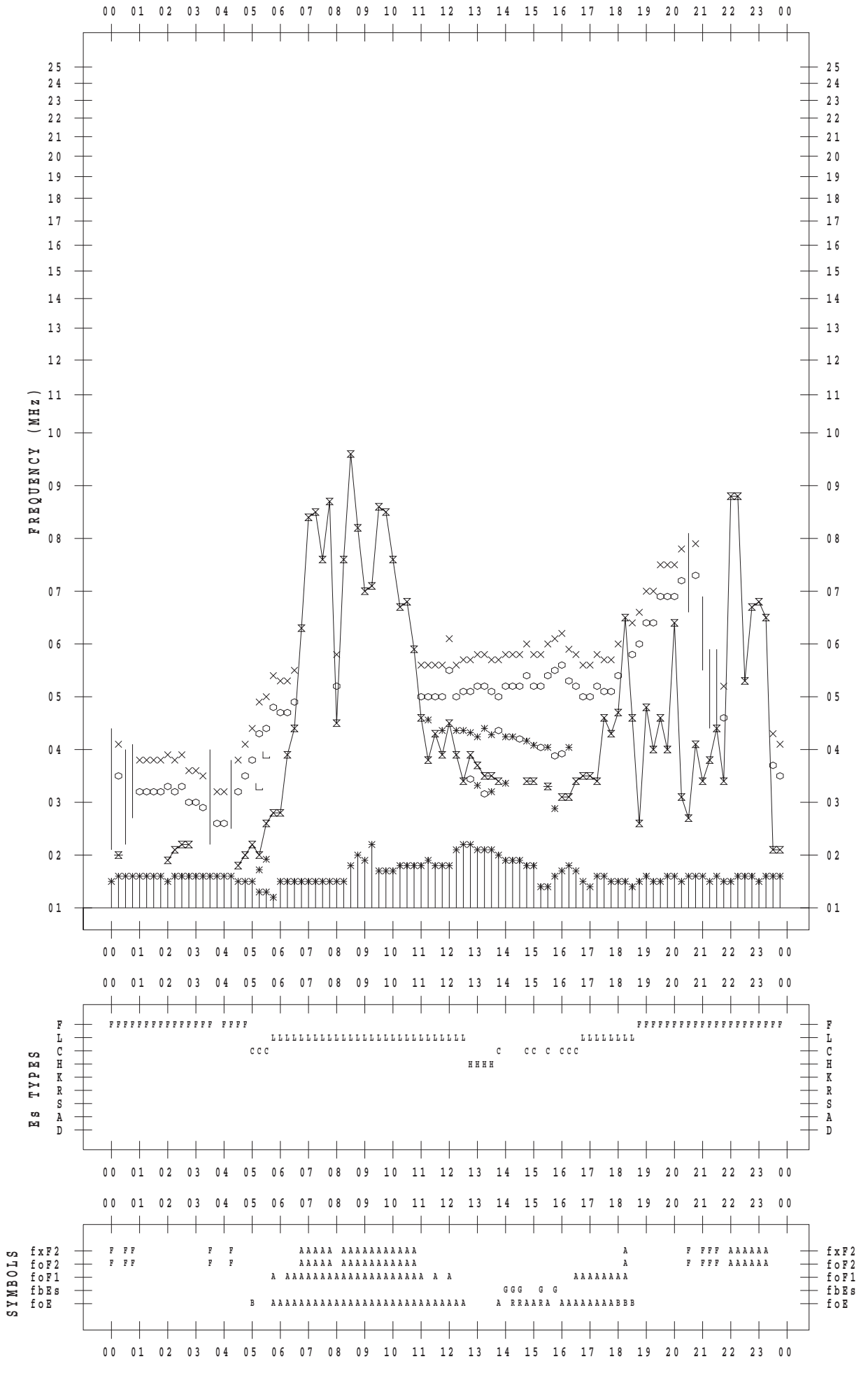
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/16

135 °E MEAN TIME



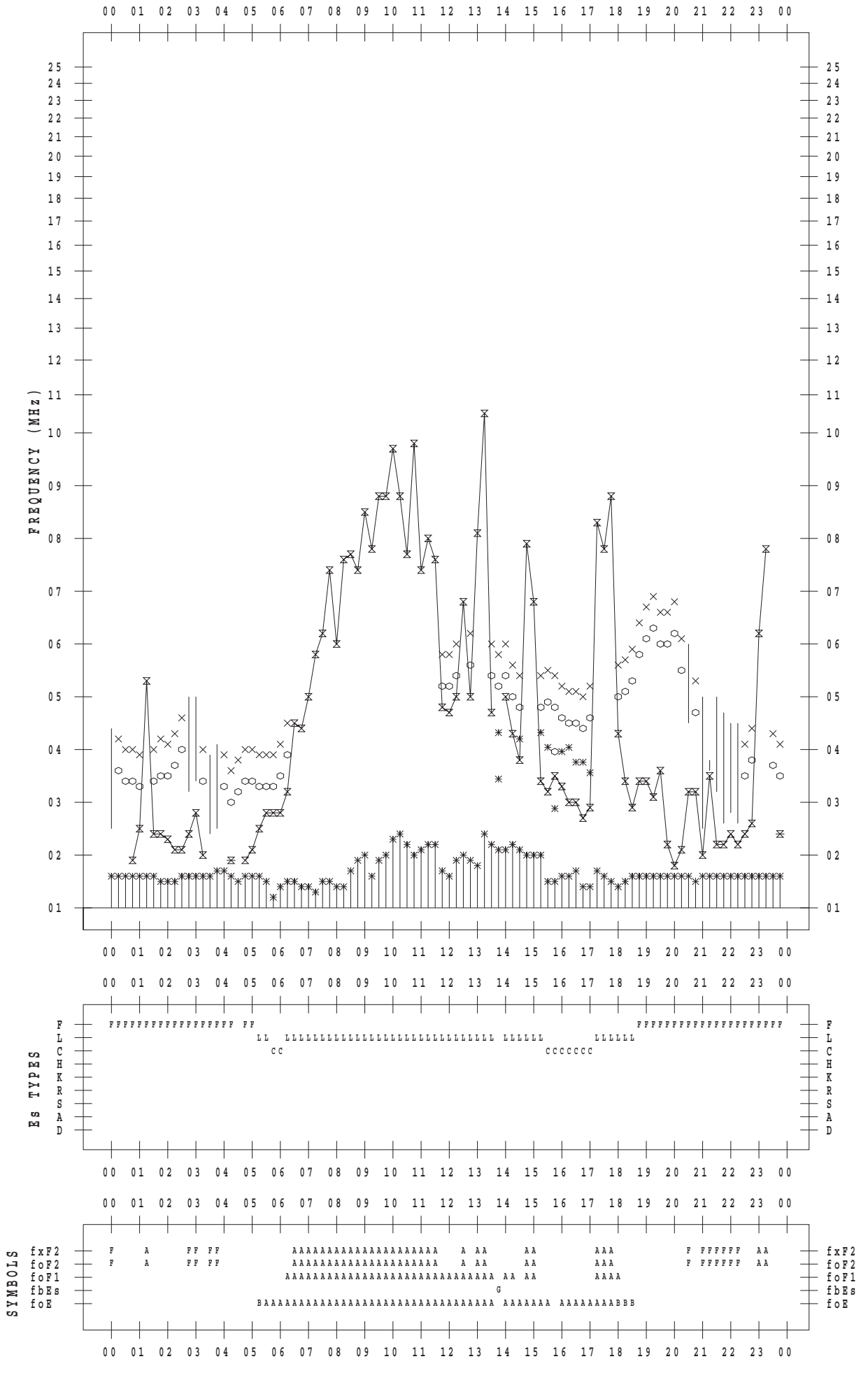
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/17

135 °E MEAN TIME



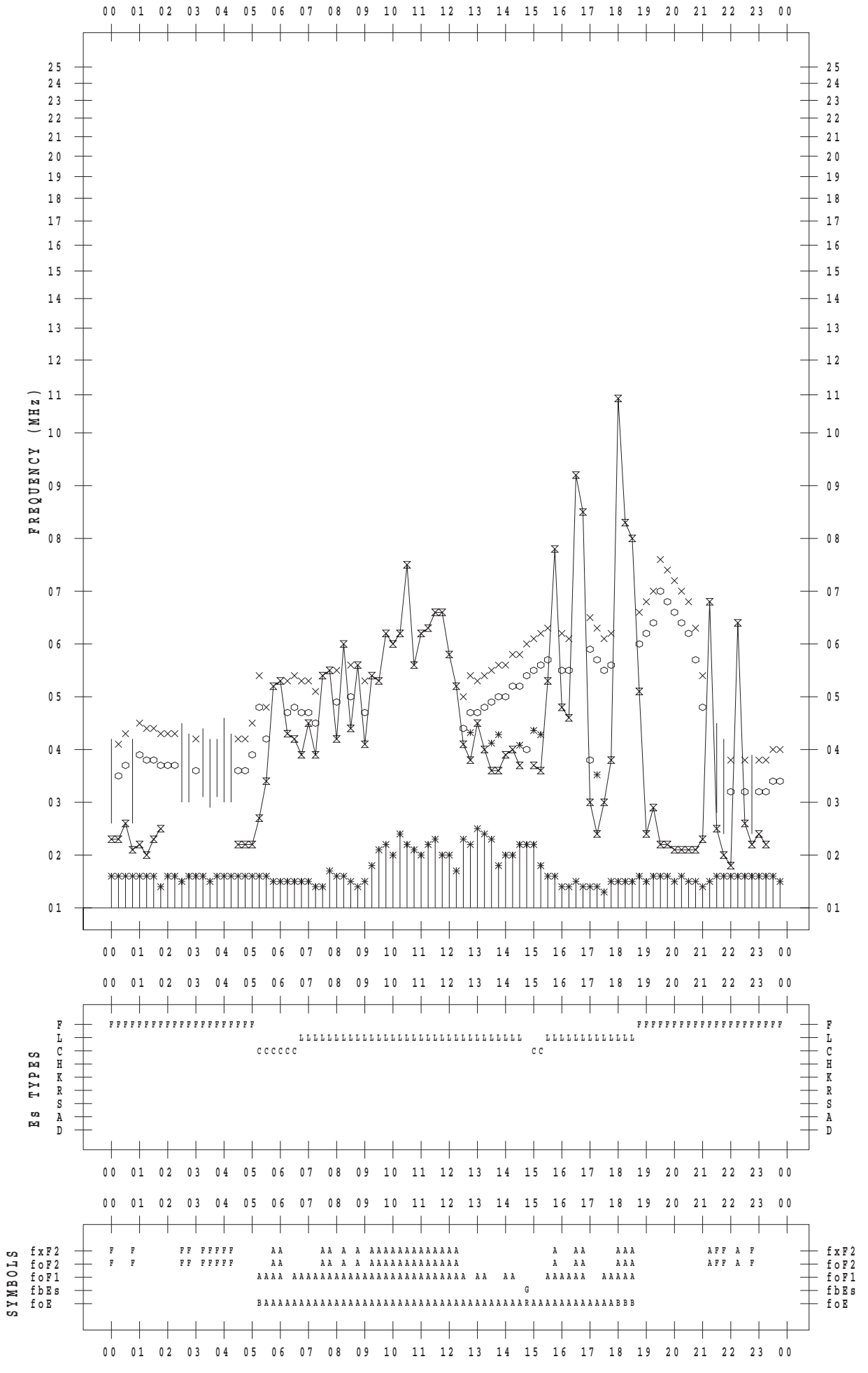
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/18

135 °E MEAN TIME



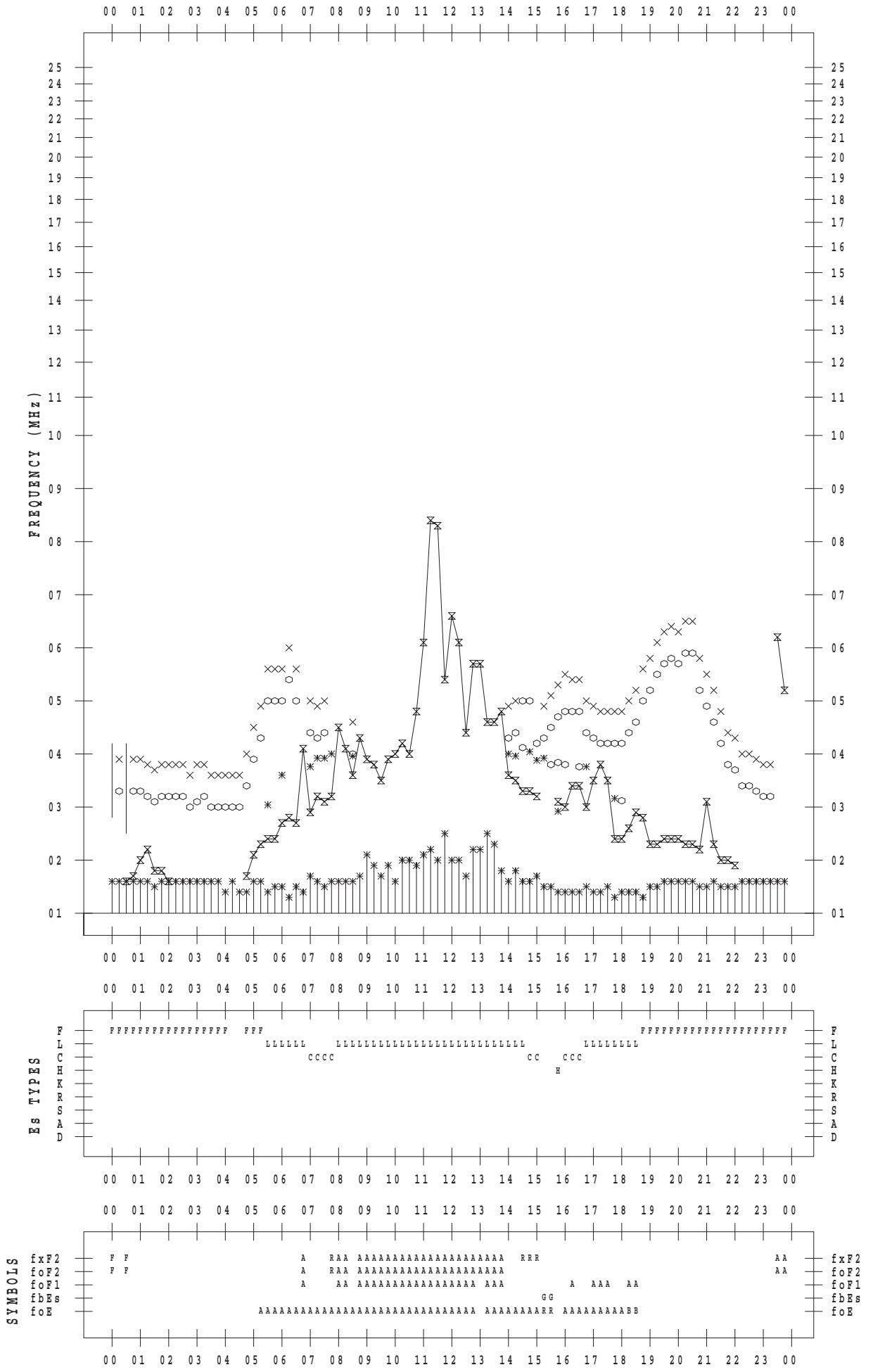
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/19

135 °E MEAN TIME



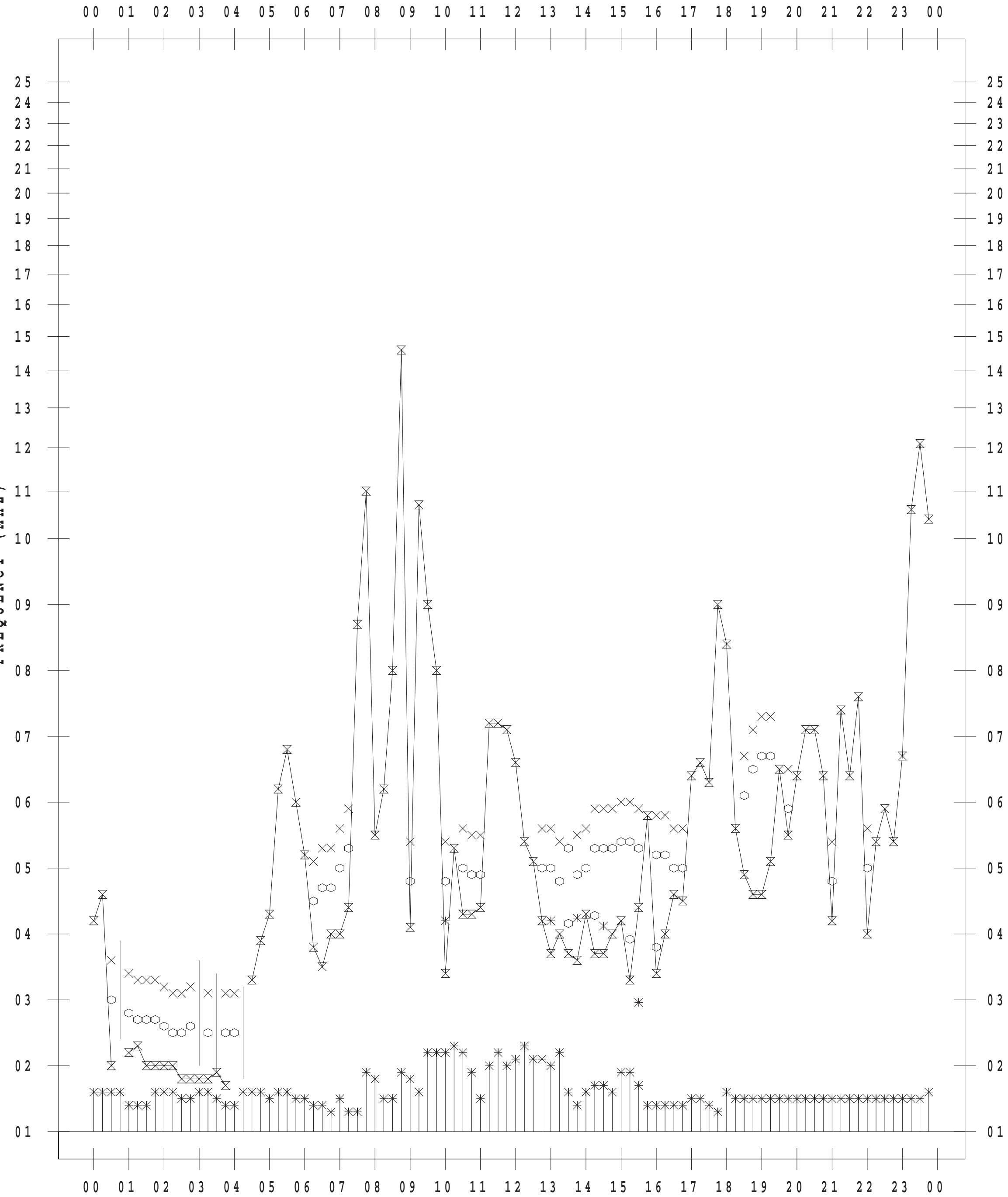
f-PLOT DATA

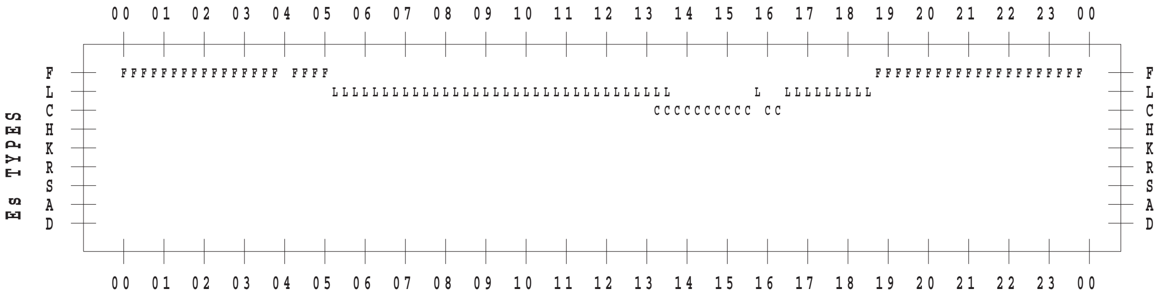
SCALER : I.NISHIMUTA

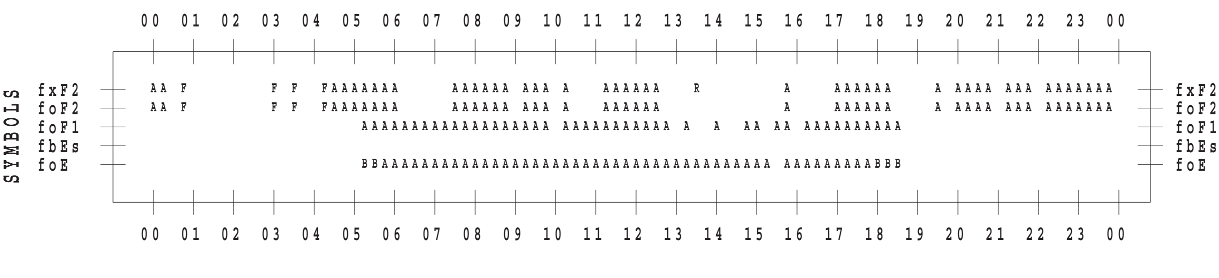
STATION : Kokubunji

DATE : 2019/ 5/20

135 °E MEAN TIME







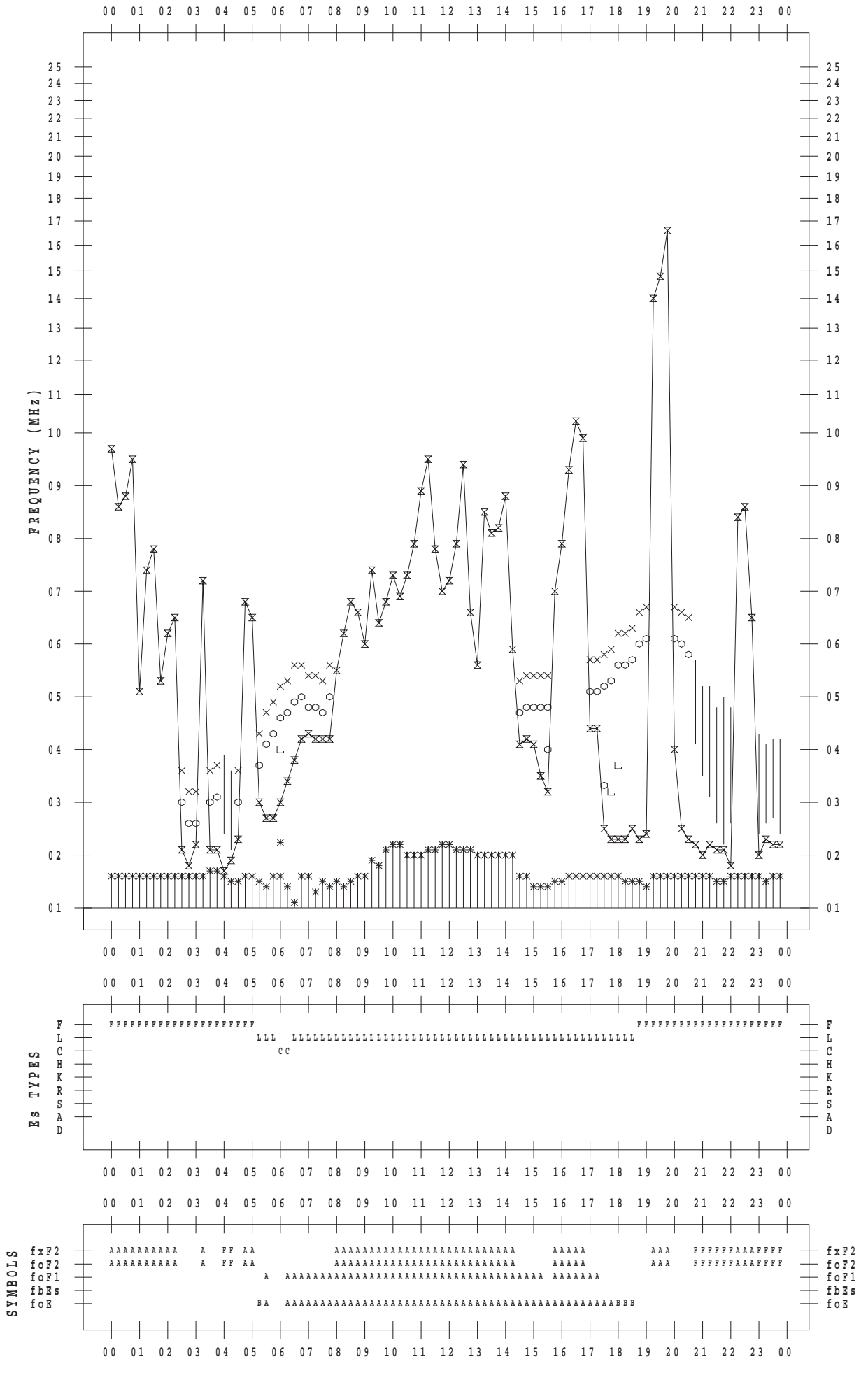
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/21

135 °E MEAN TIME



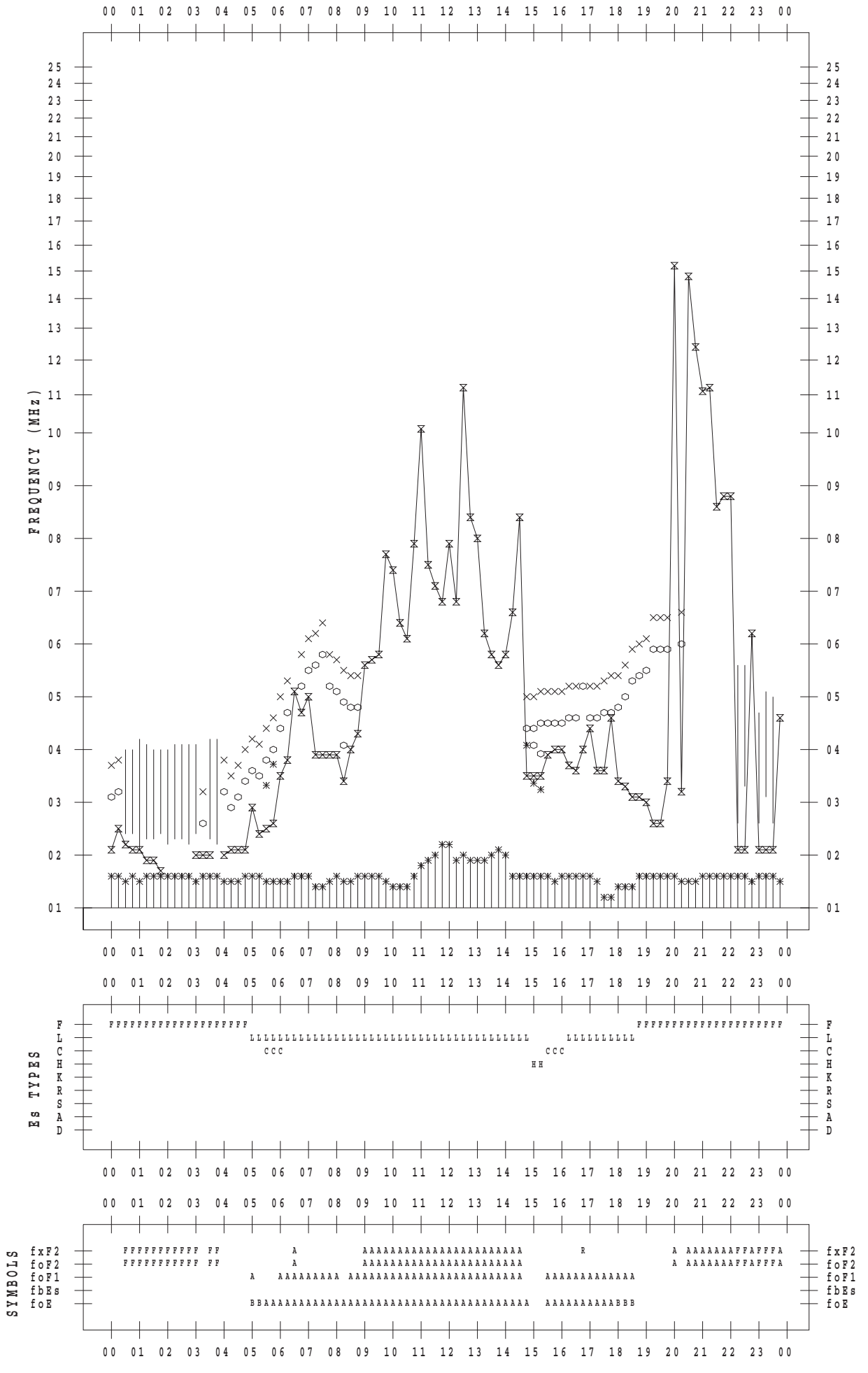
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/22

135 °E MEAN TIME



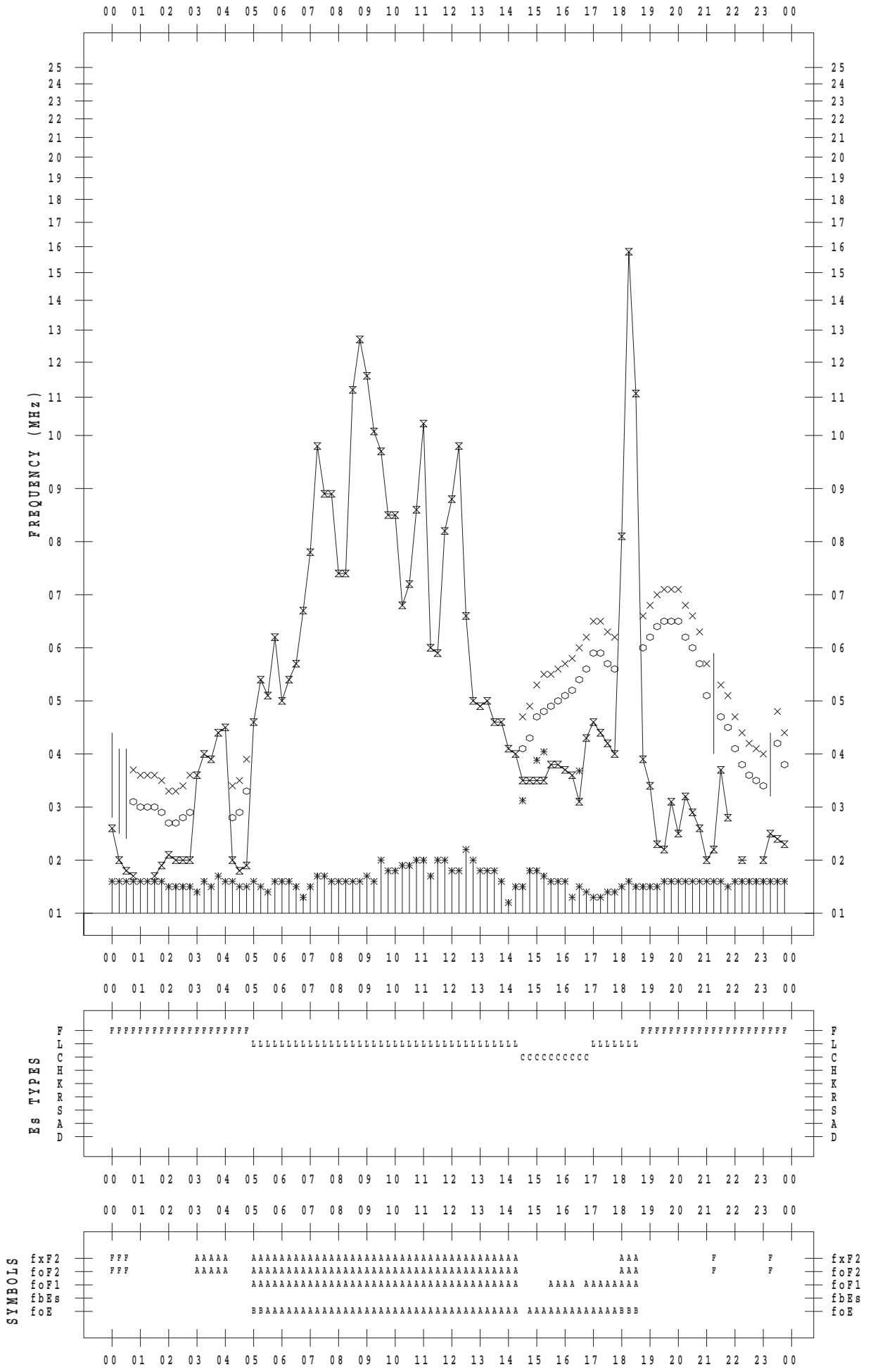
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/23

135 °E MEAN TIME



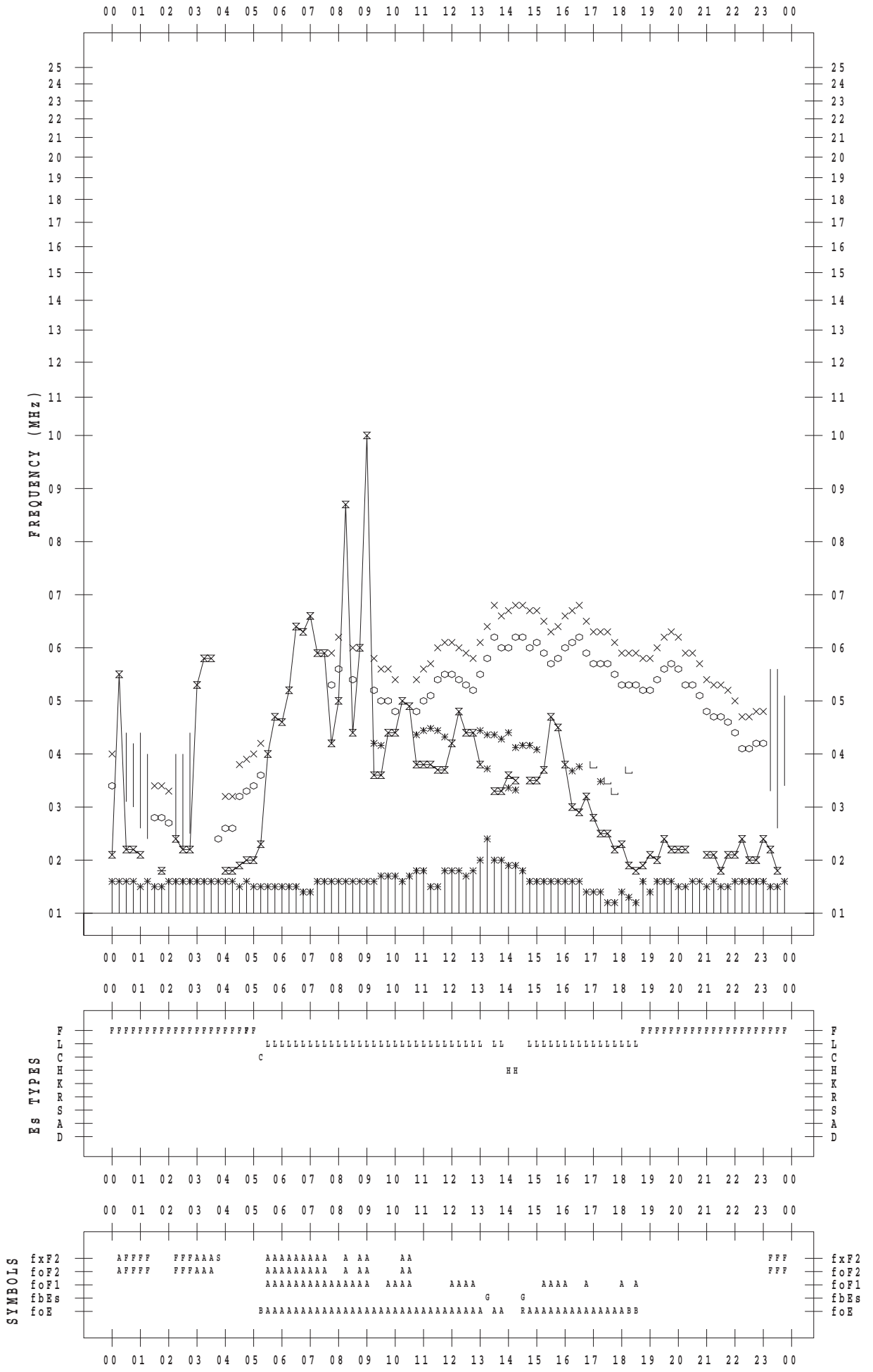
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/24

135 °E MEAN TIME



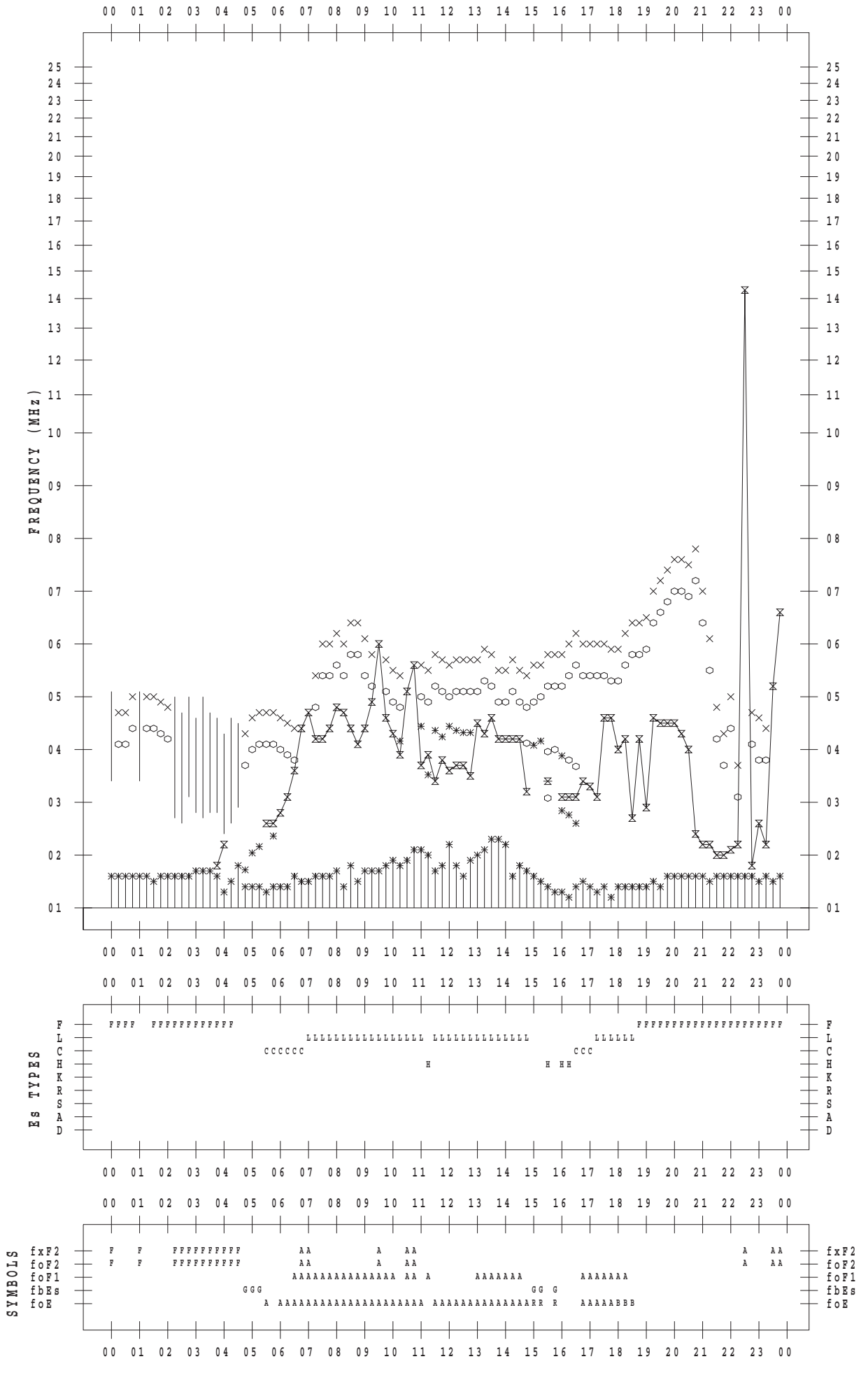
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/25

135 °E MEAN TIME



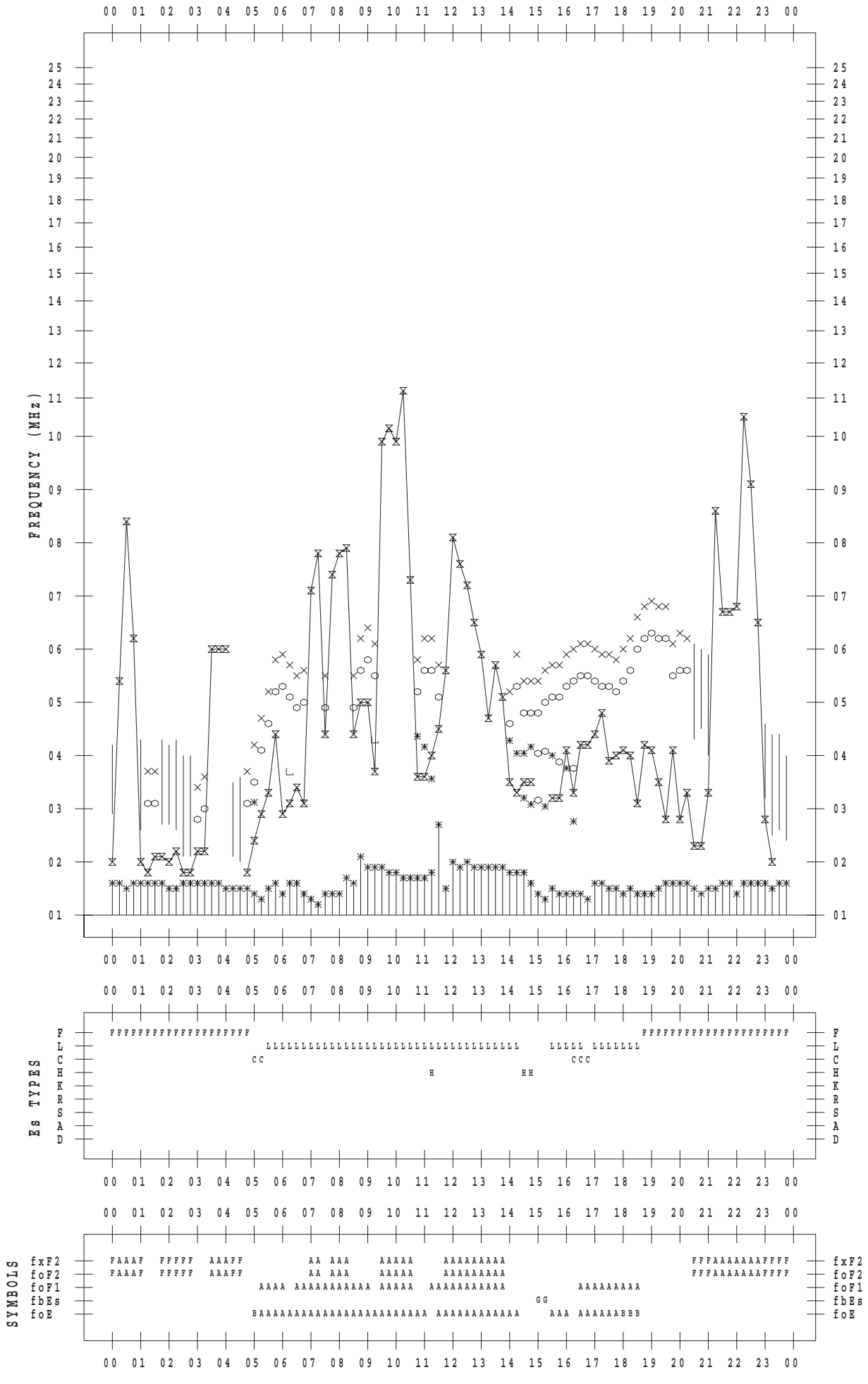
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/26

135 °E MEAN TIME



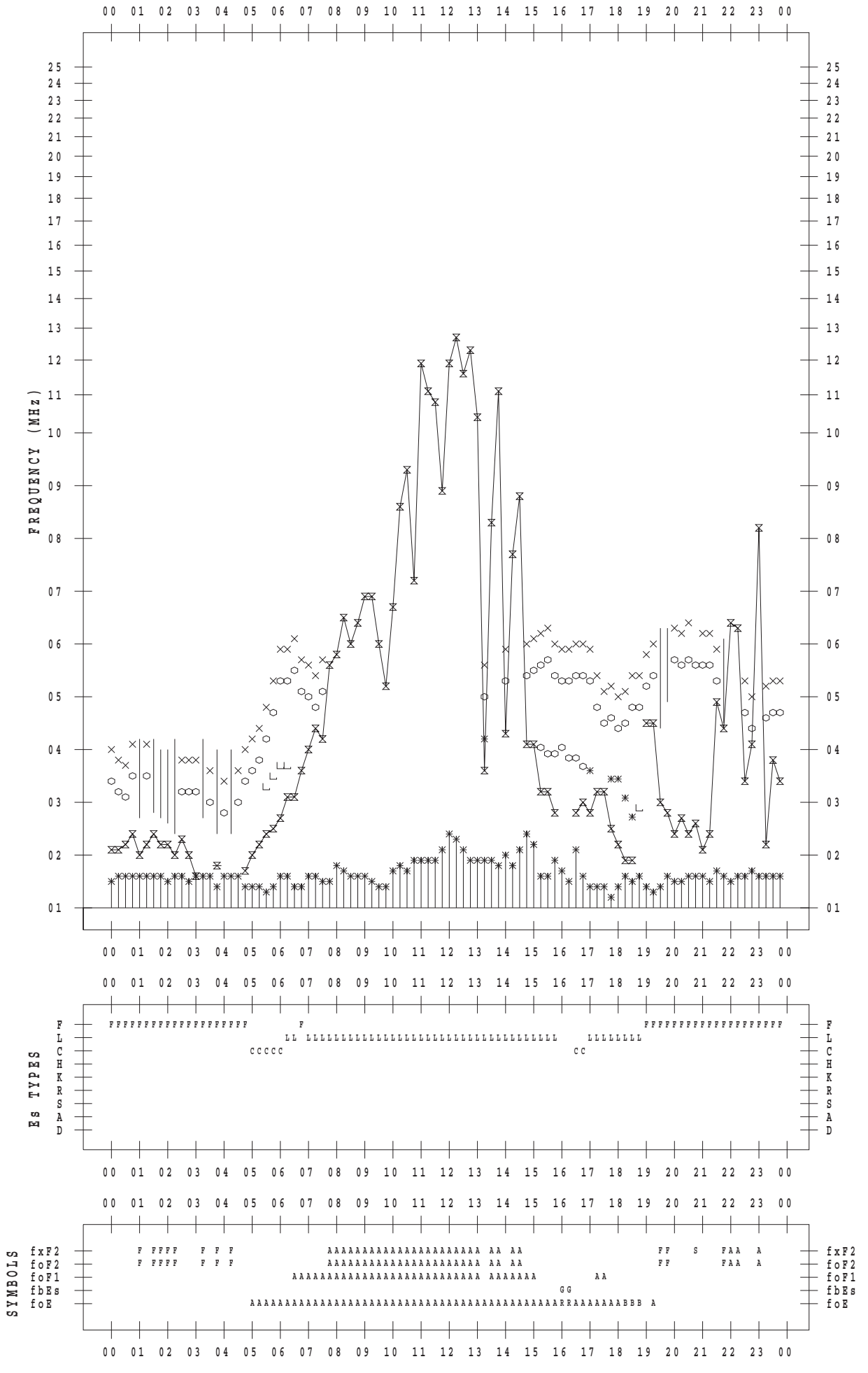
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/27

135 °E MEAN TIME



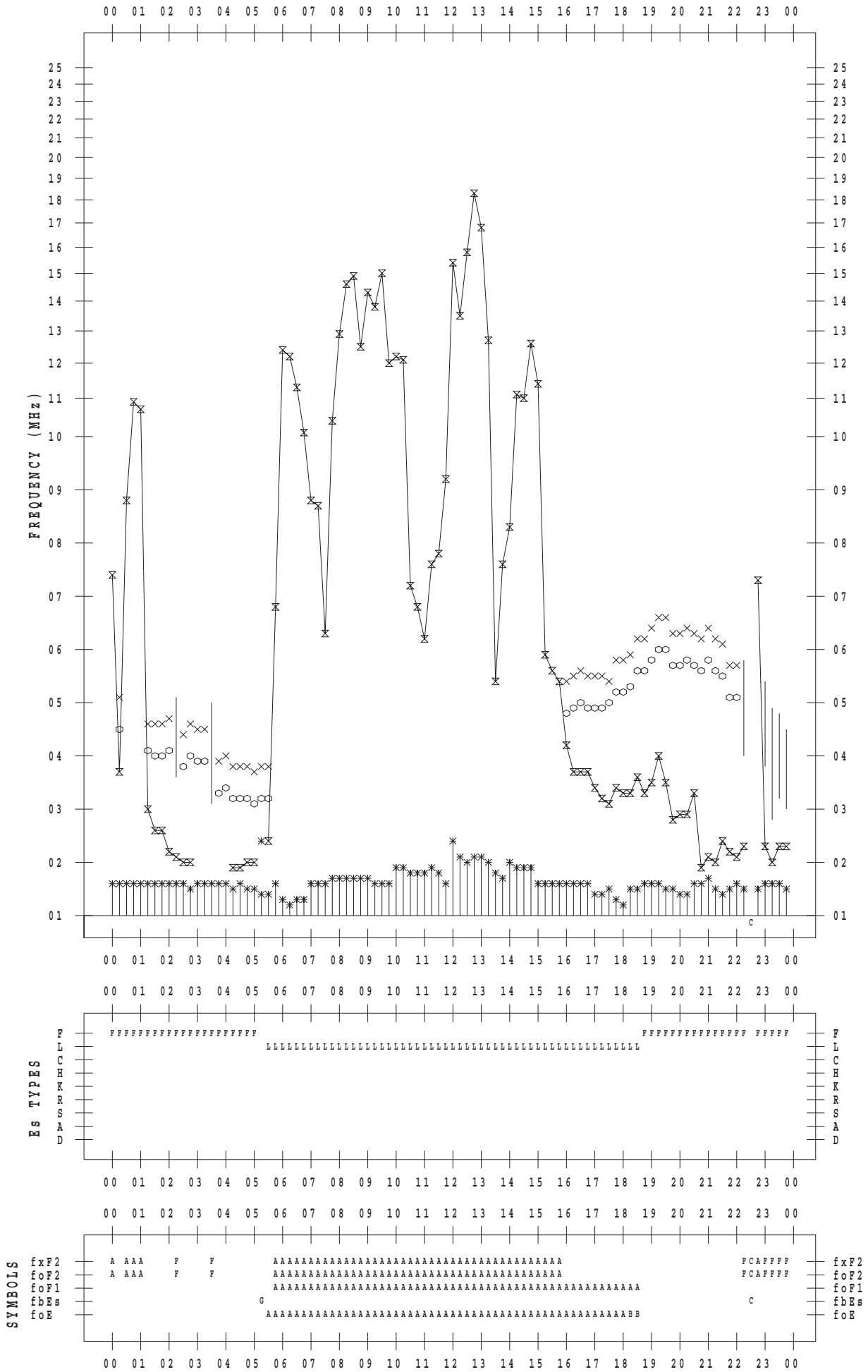
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/28

135 °E MEAN TIME



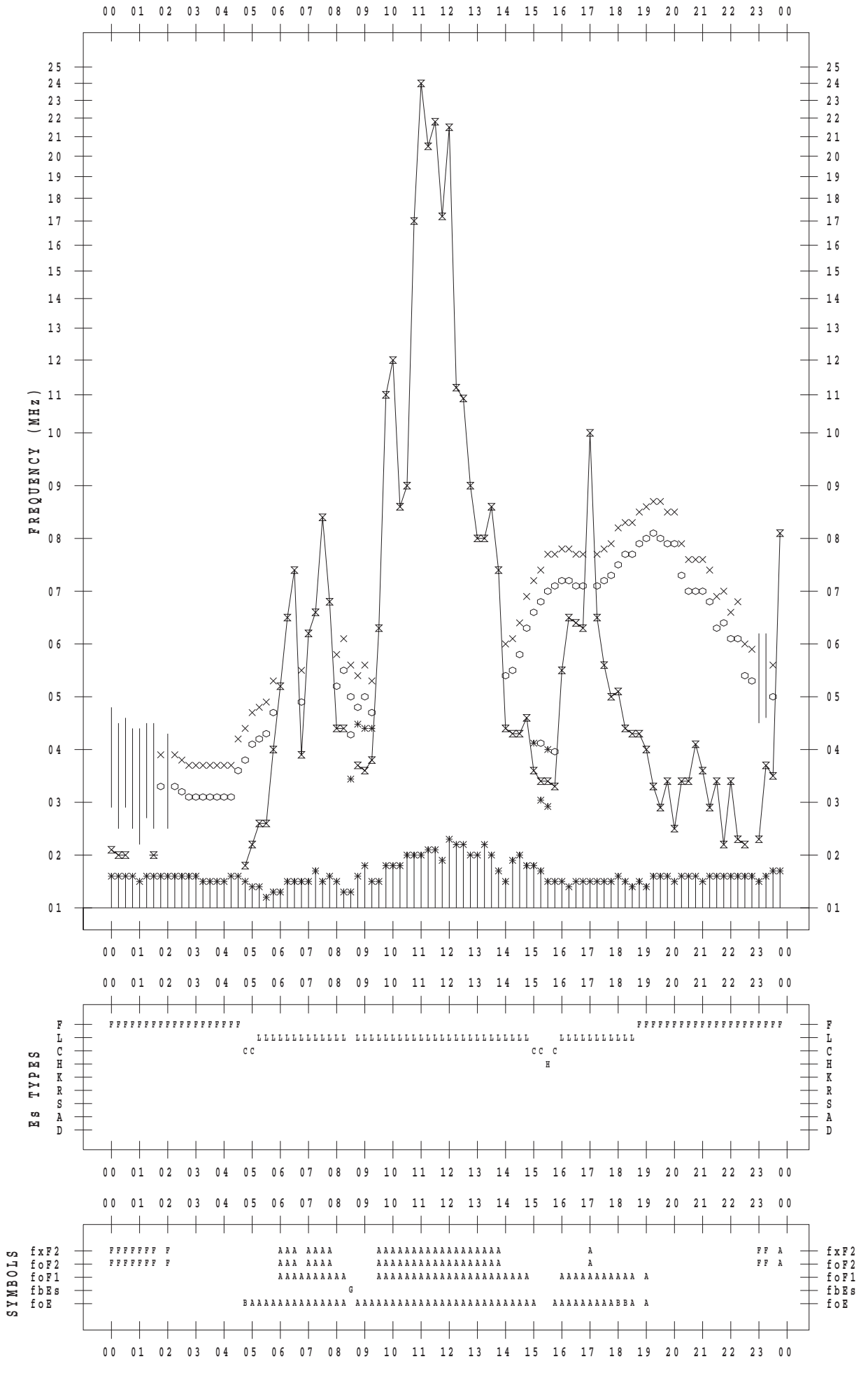
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/29

135 °E MEAN TIME



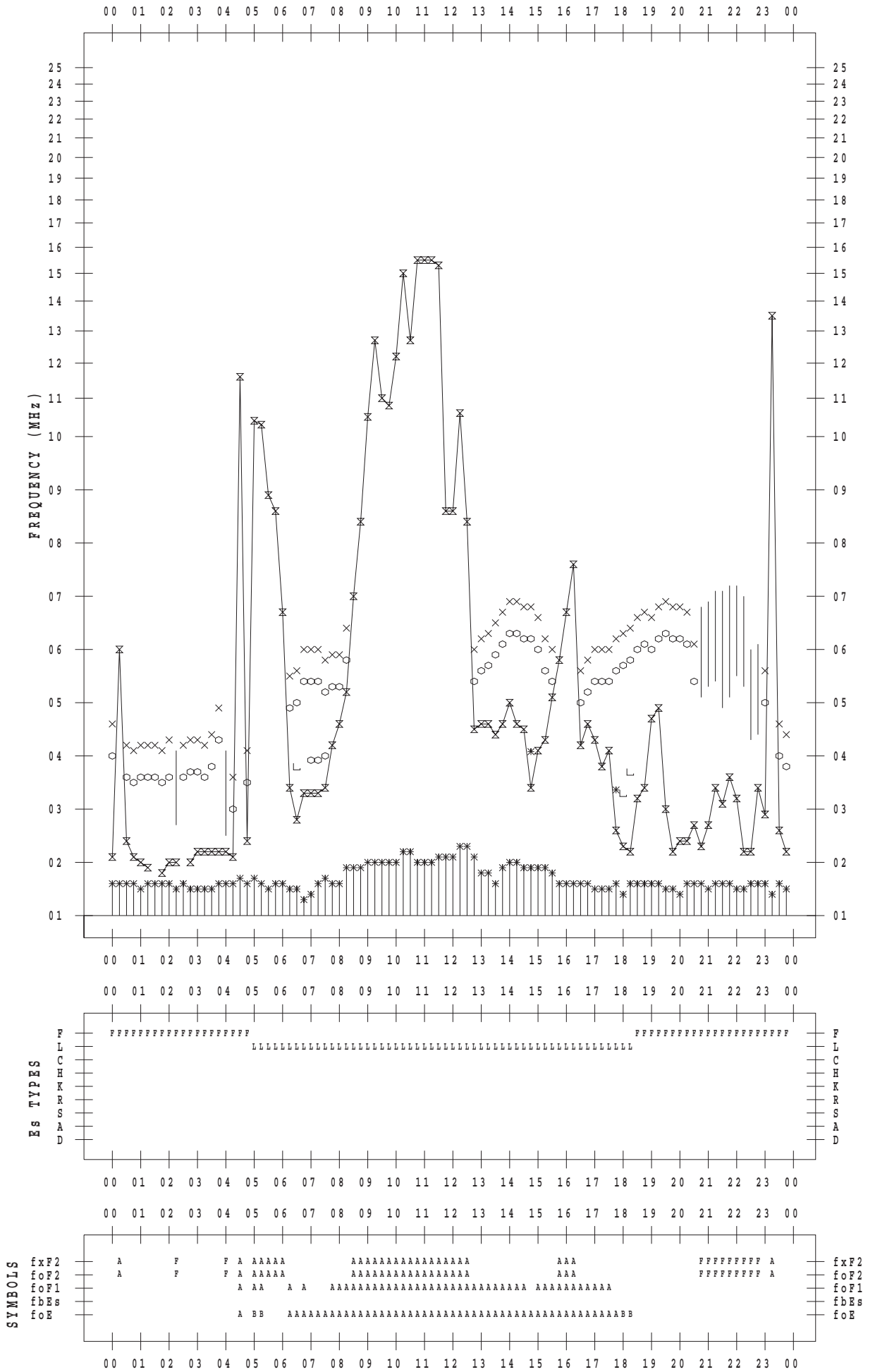
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/ 5/30

135 °E MEAN TIME

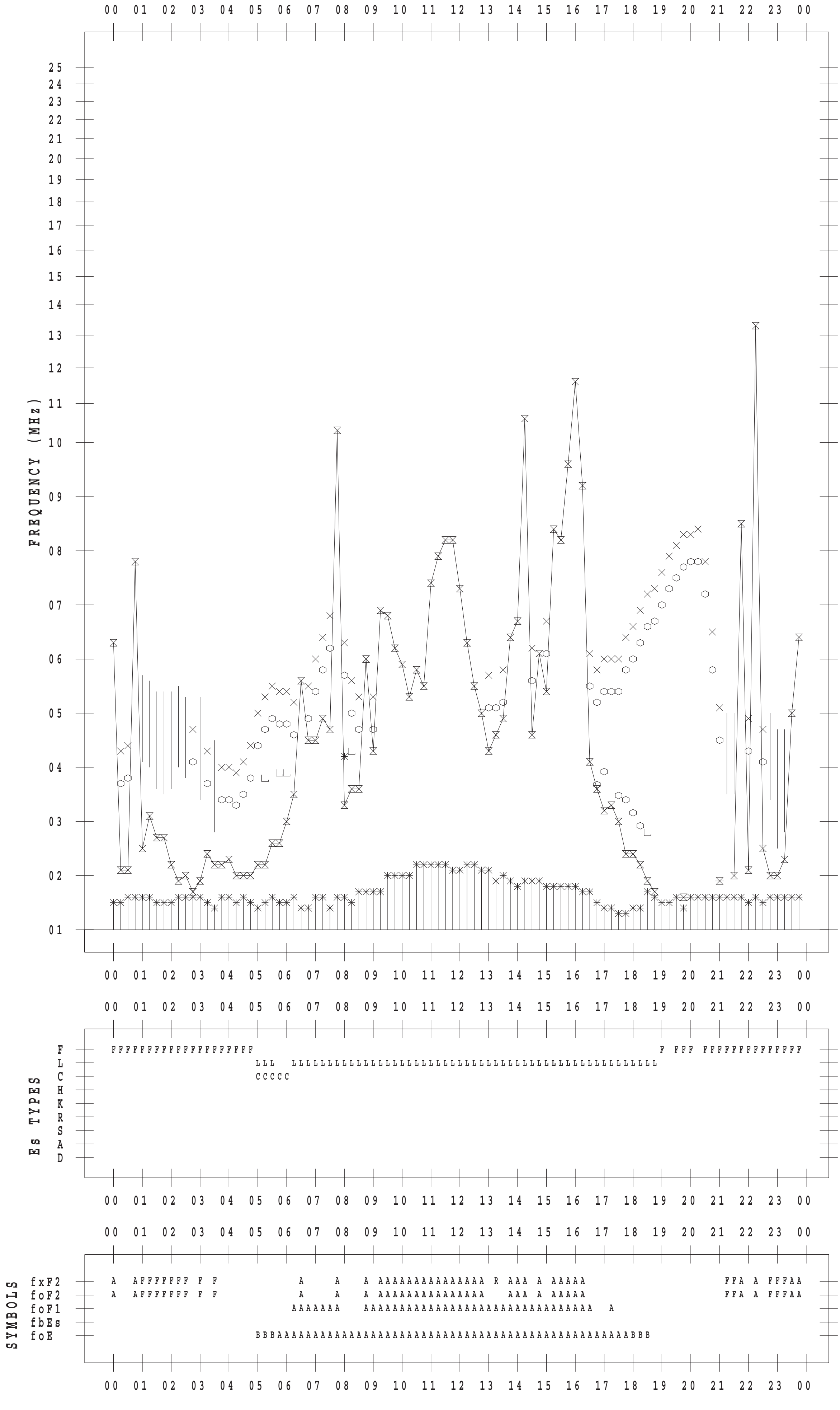


f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji DATE : 2019/ 5/31

135 °E MEAN TIME



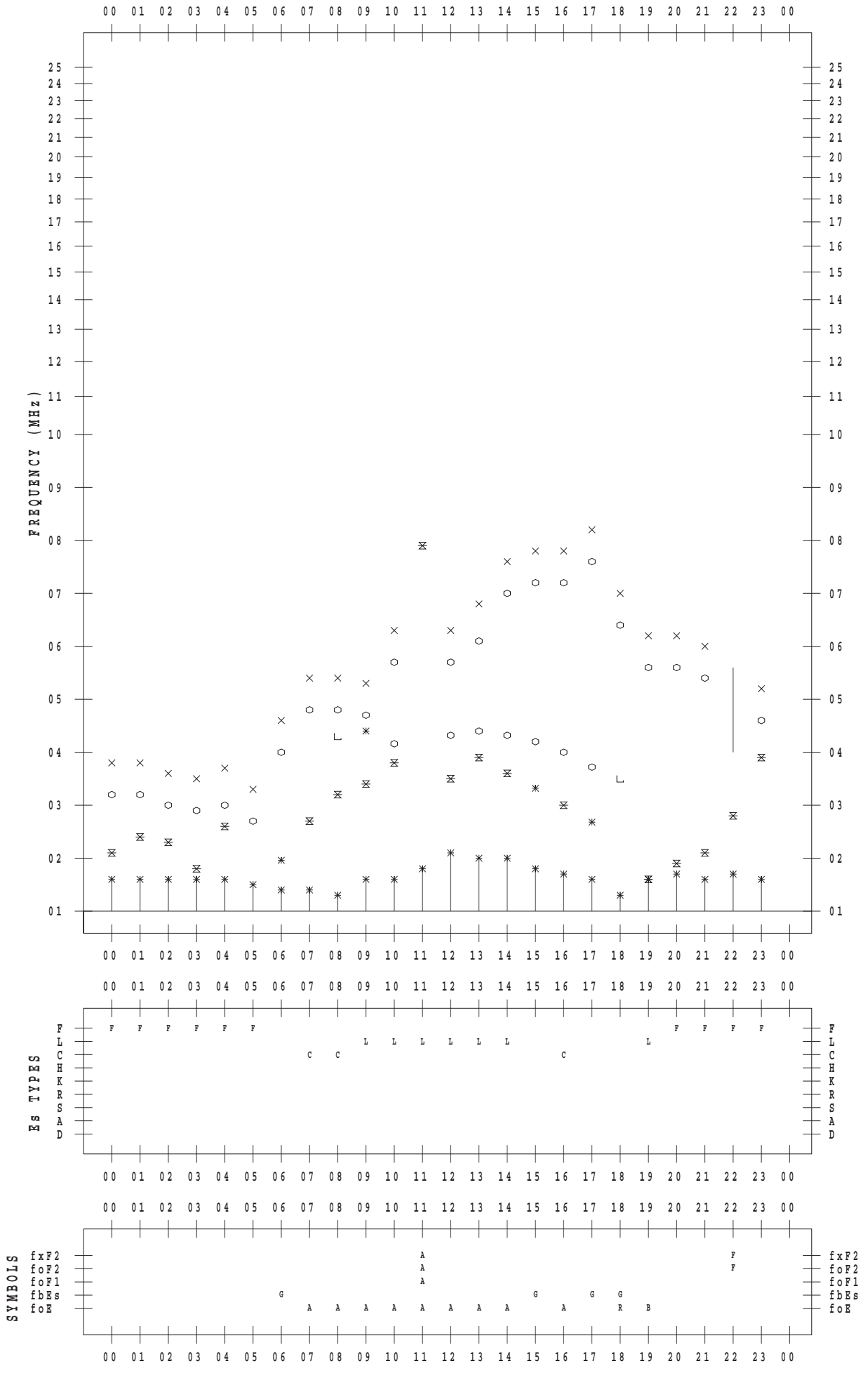
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/ 1

135 °E MEAN TIME



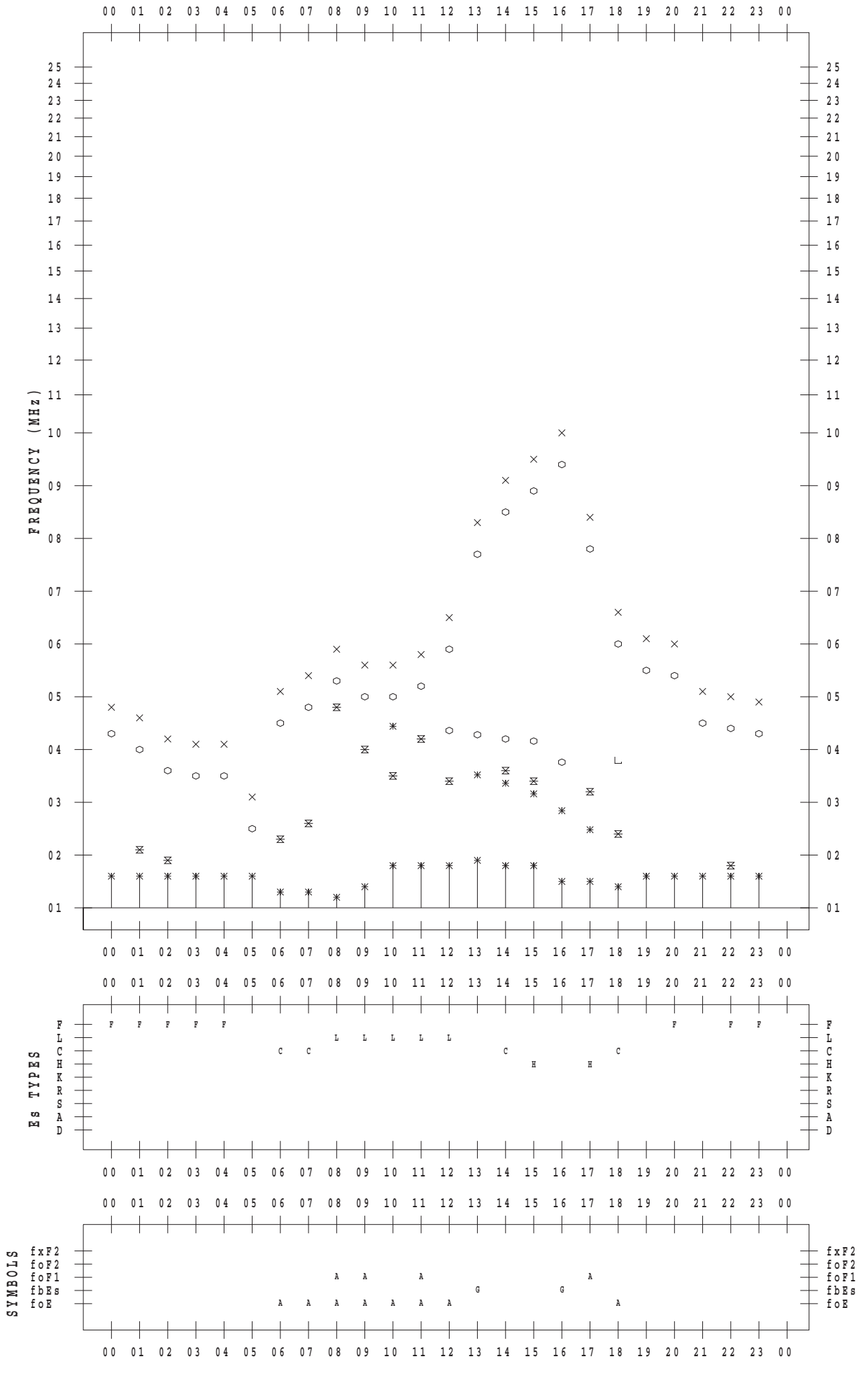
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/ 2

135 °E MEAN TIME



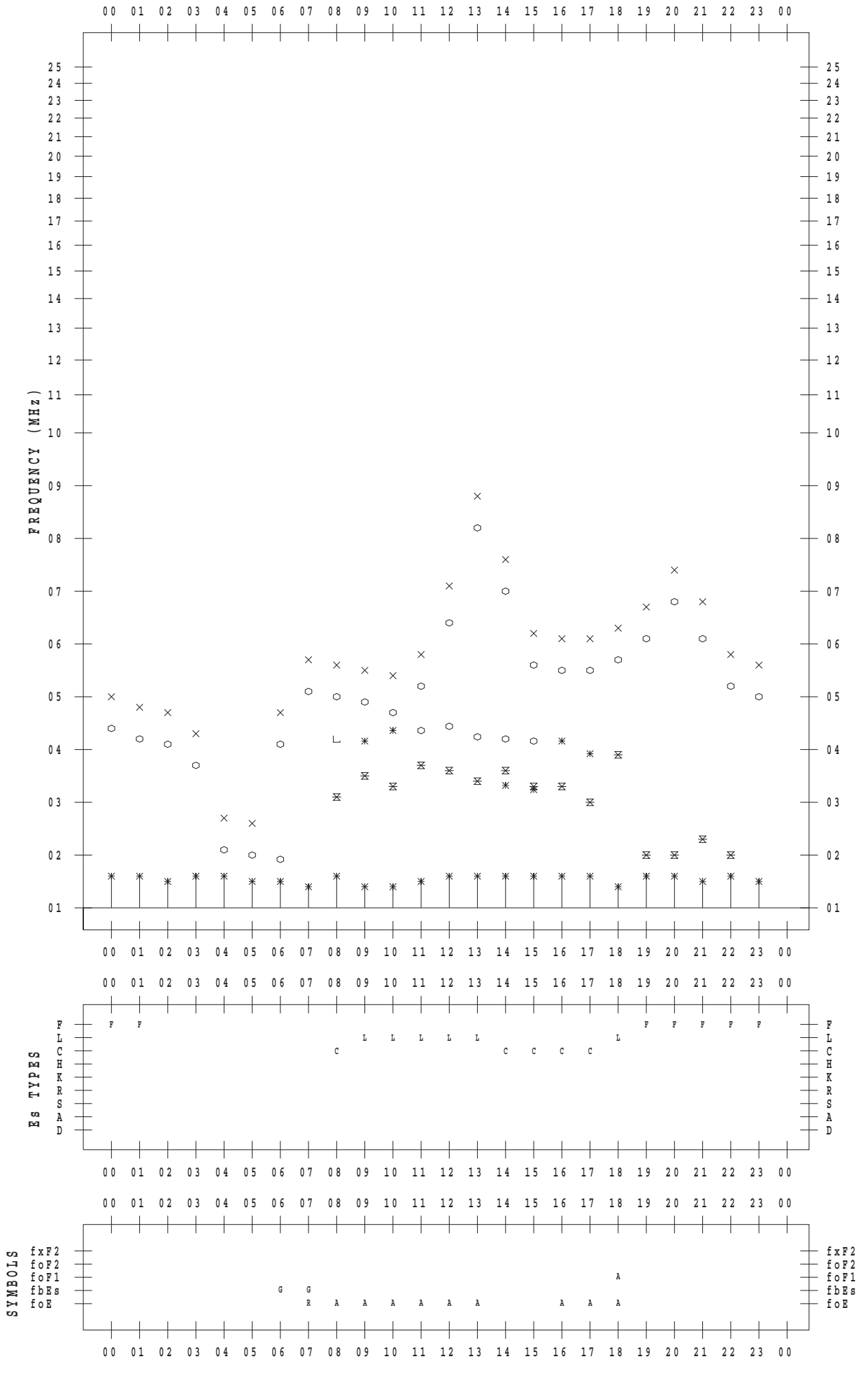
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/ 3

135 °E MEAN TIME



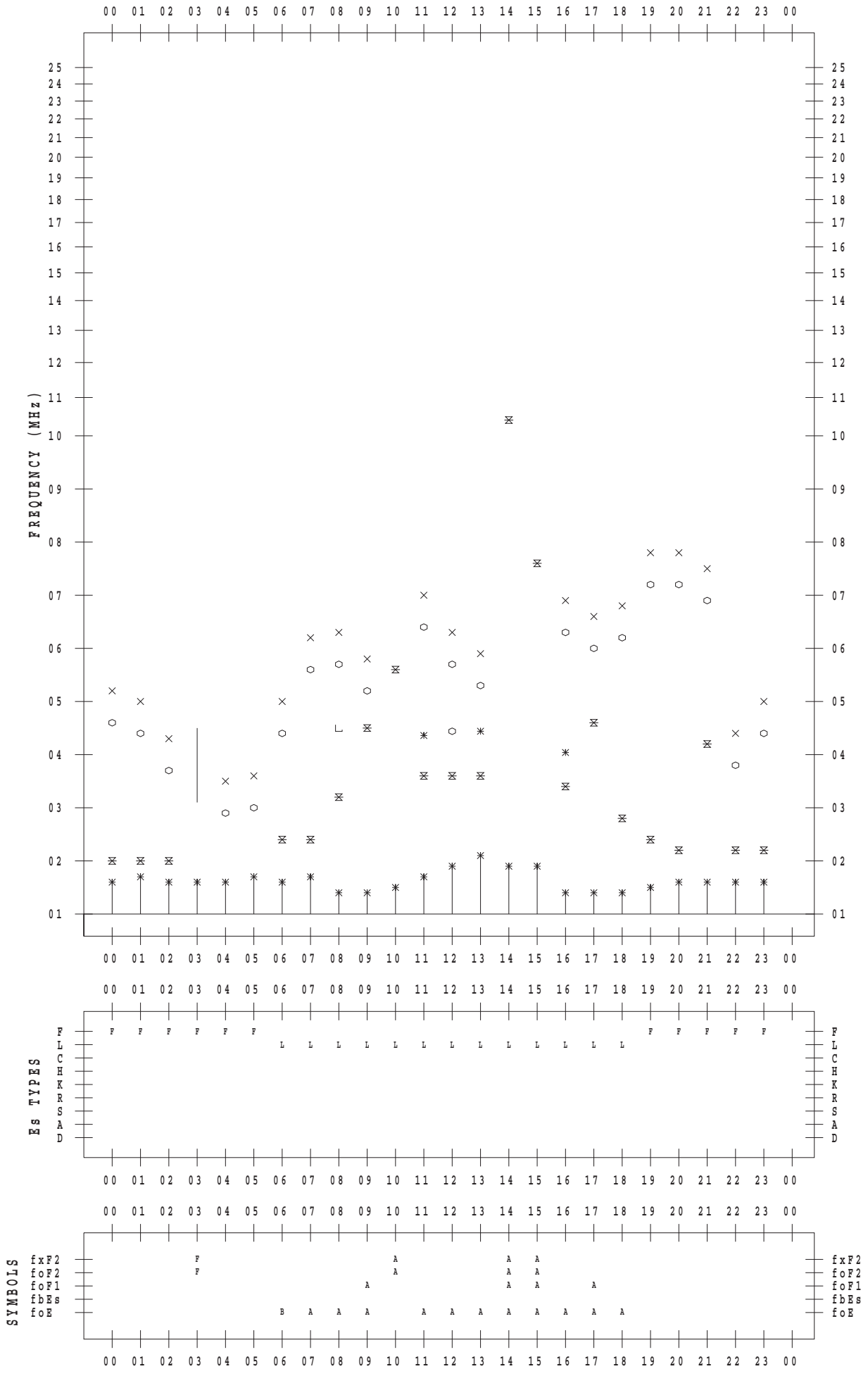
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/ 4

135 °E MEAN TIME



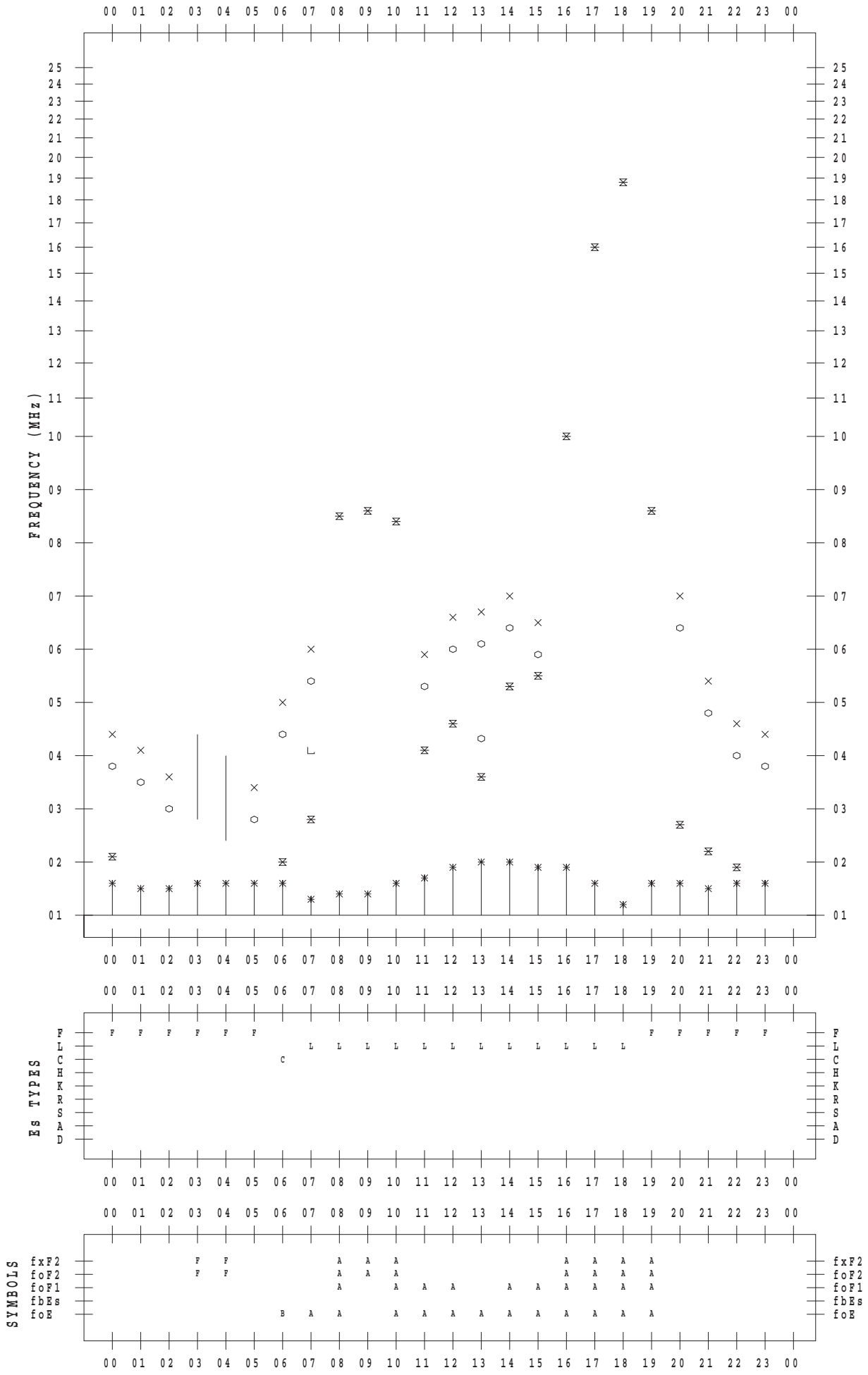
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/ 5

135 °E MEAN TIME



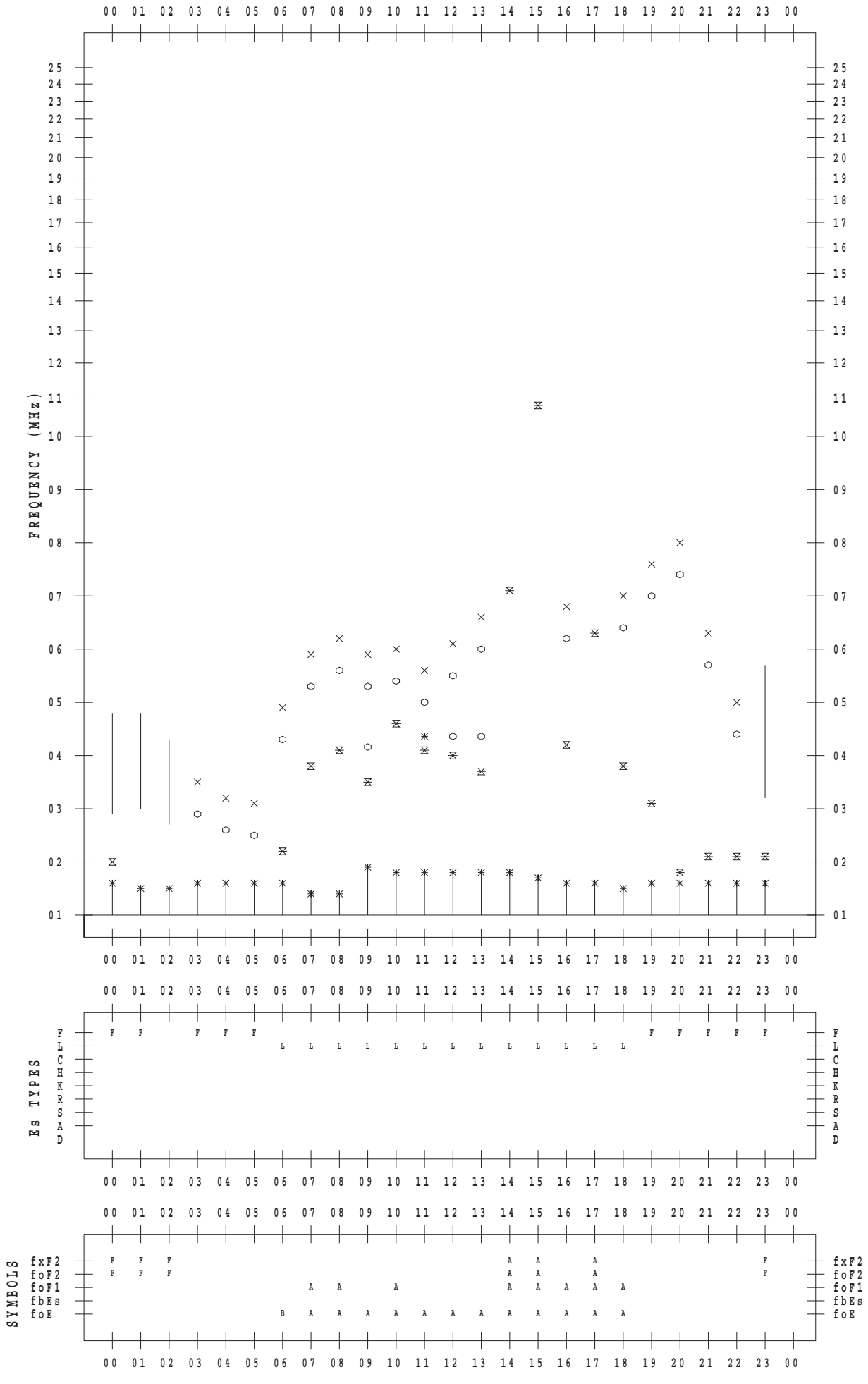
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/ 6

135 °E MEAN TIME



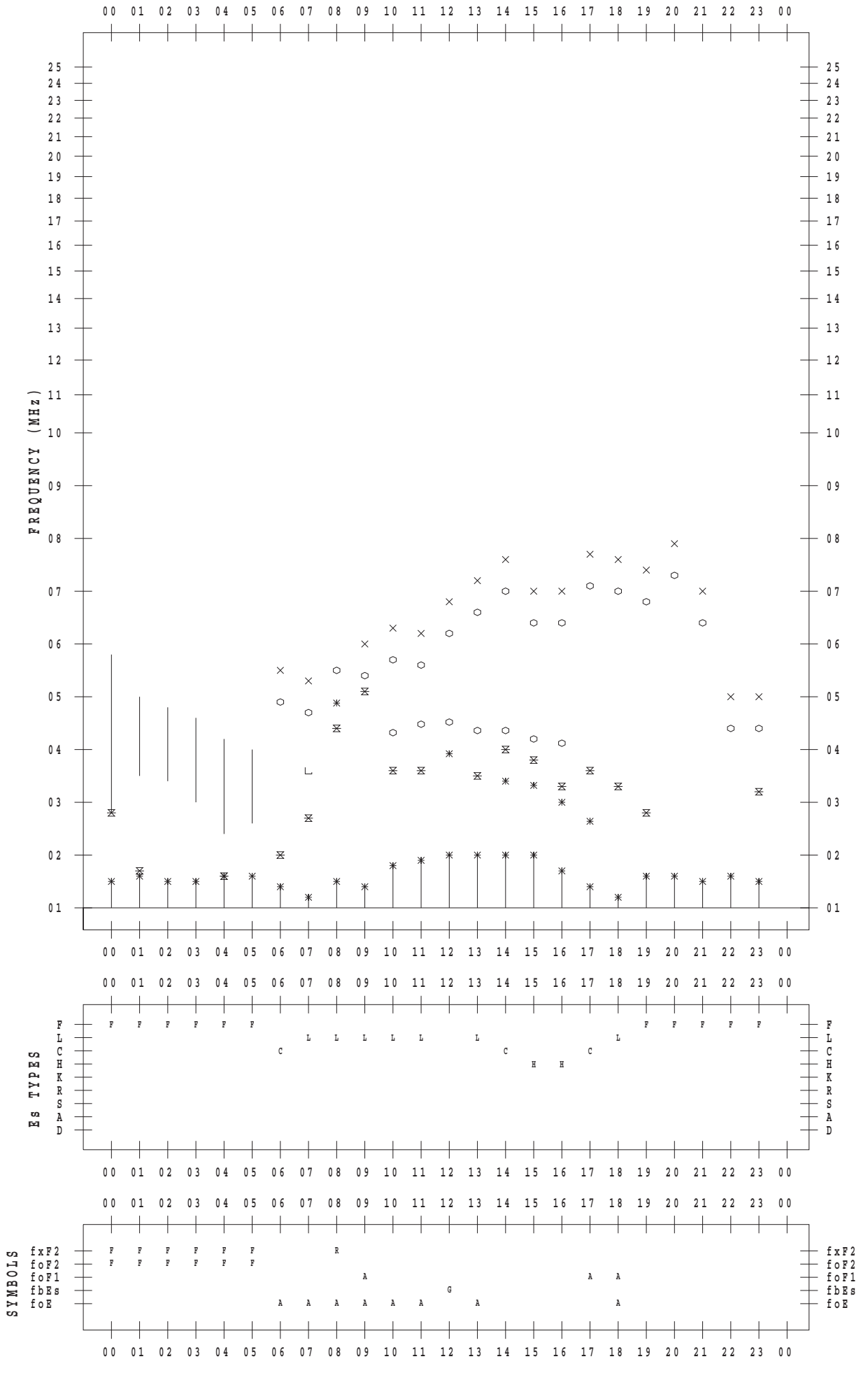
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/ 7

135 °E MEAN TIME



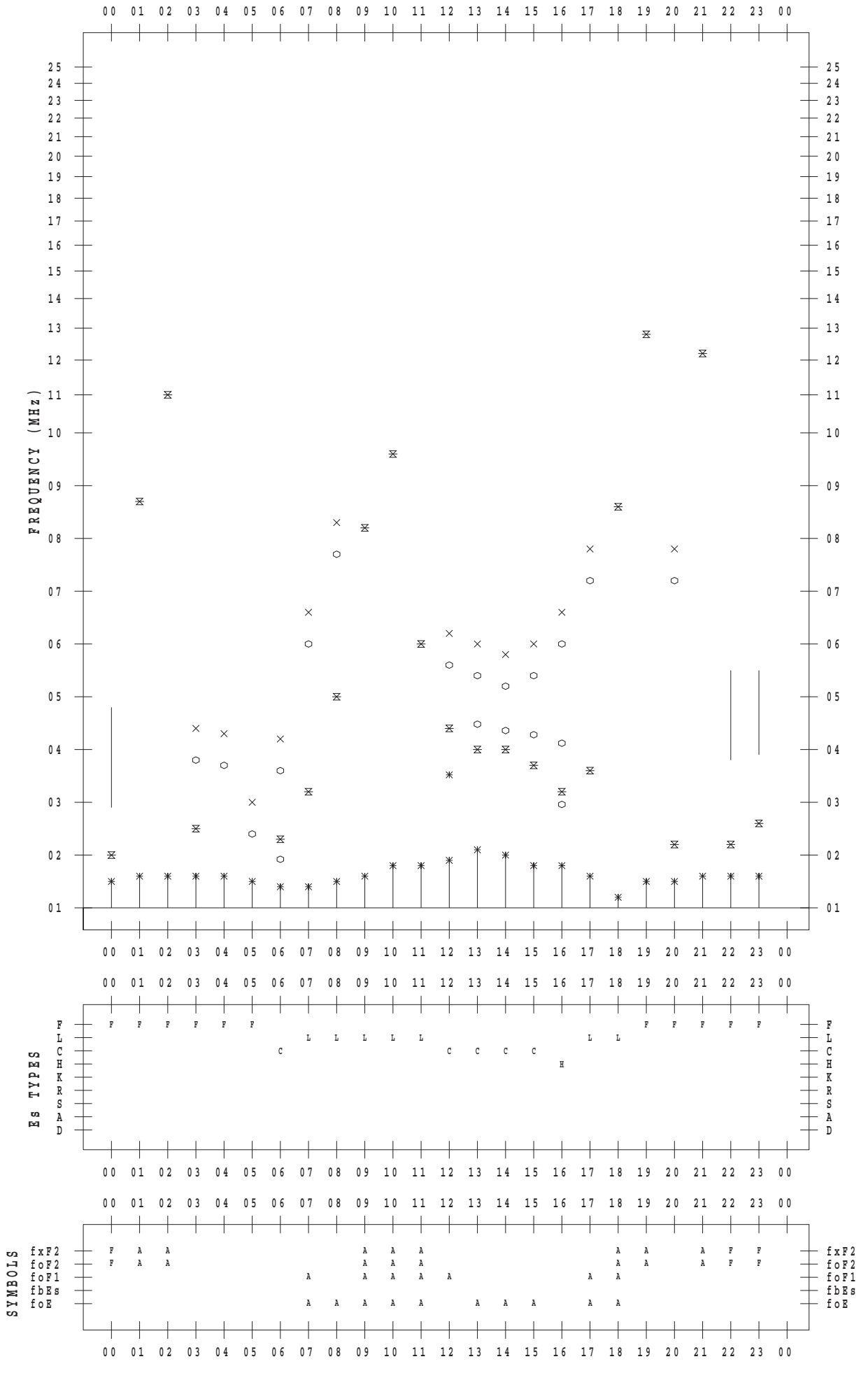
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/ 8

135 °E MEAN TIME



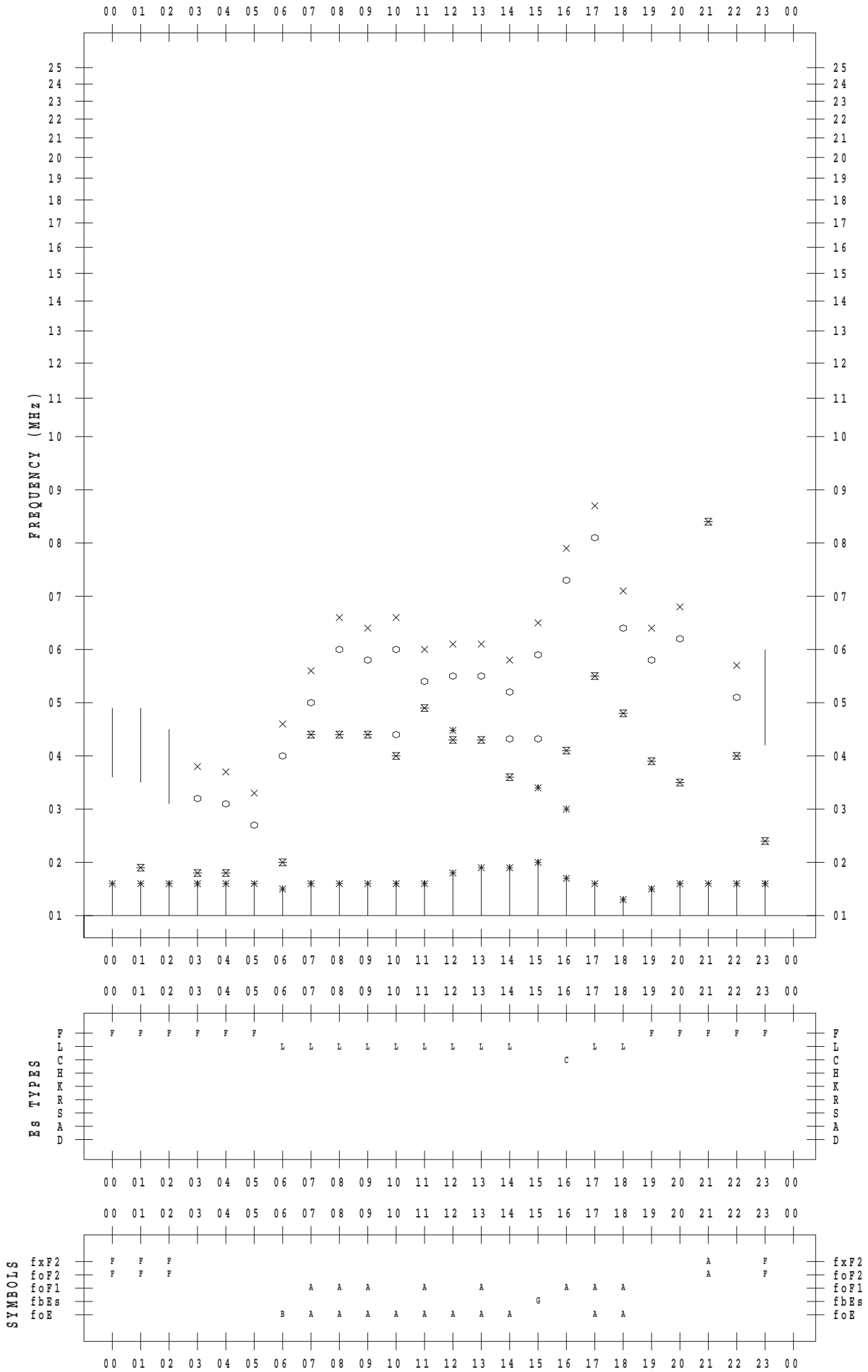
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/ 9

135 °E MEAN TIME



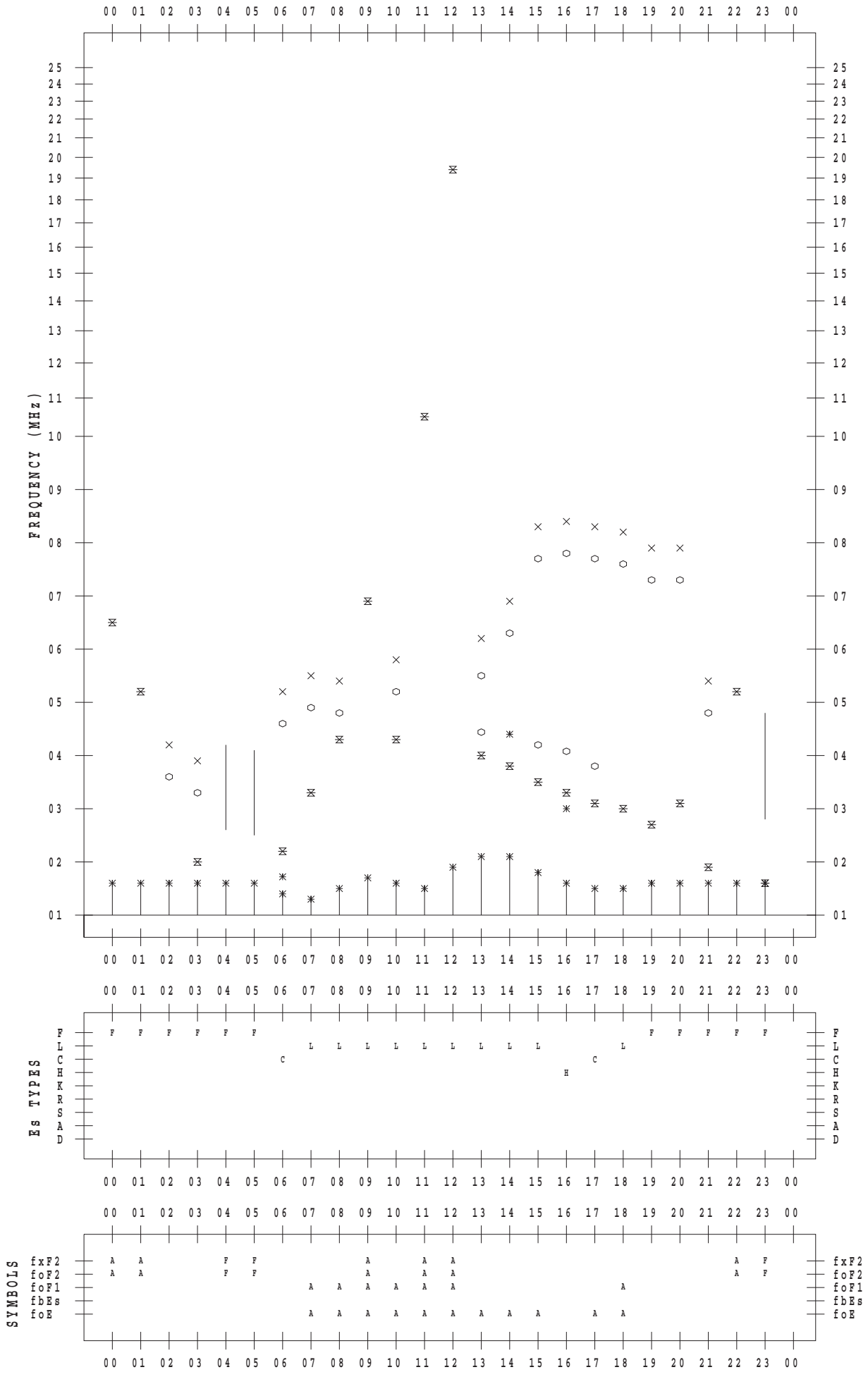
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/10

135 °E MEAN TIME



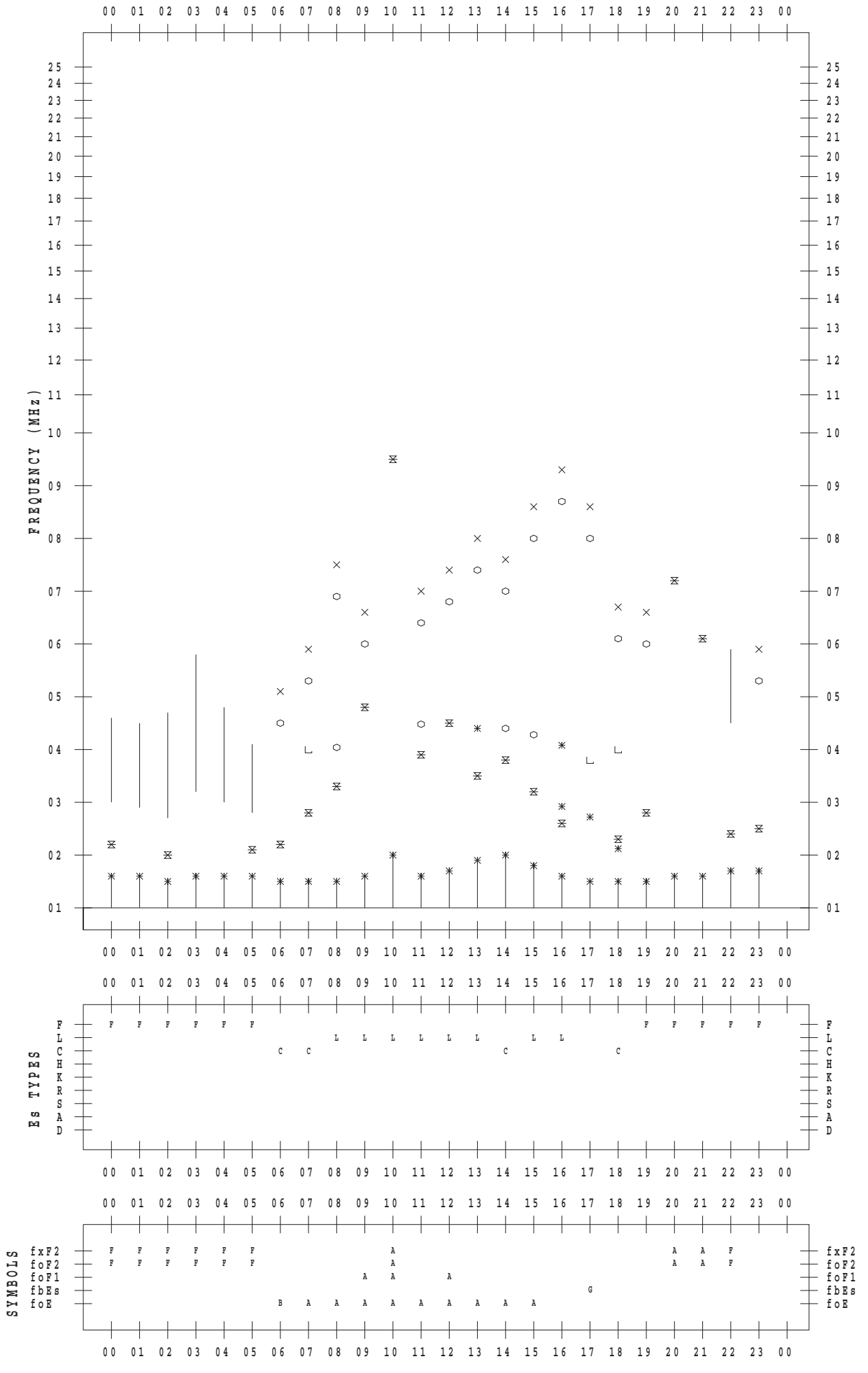
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/11

135 °E MEAN TIME



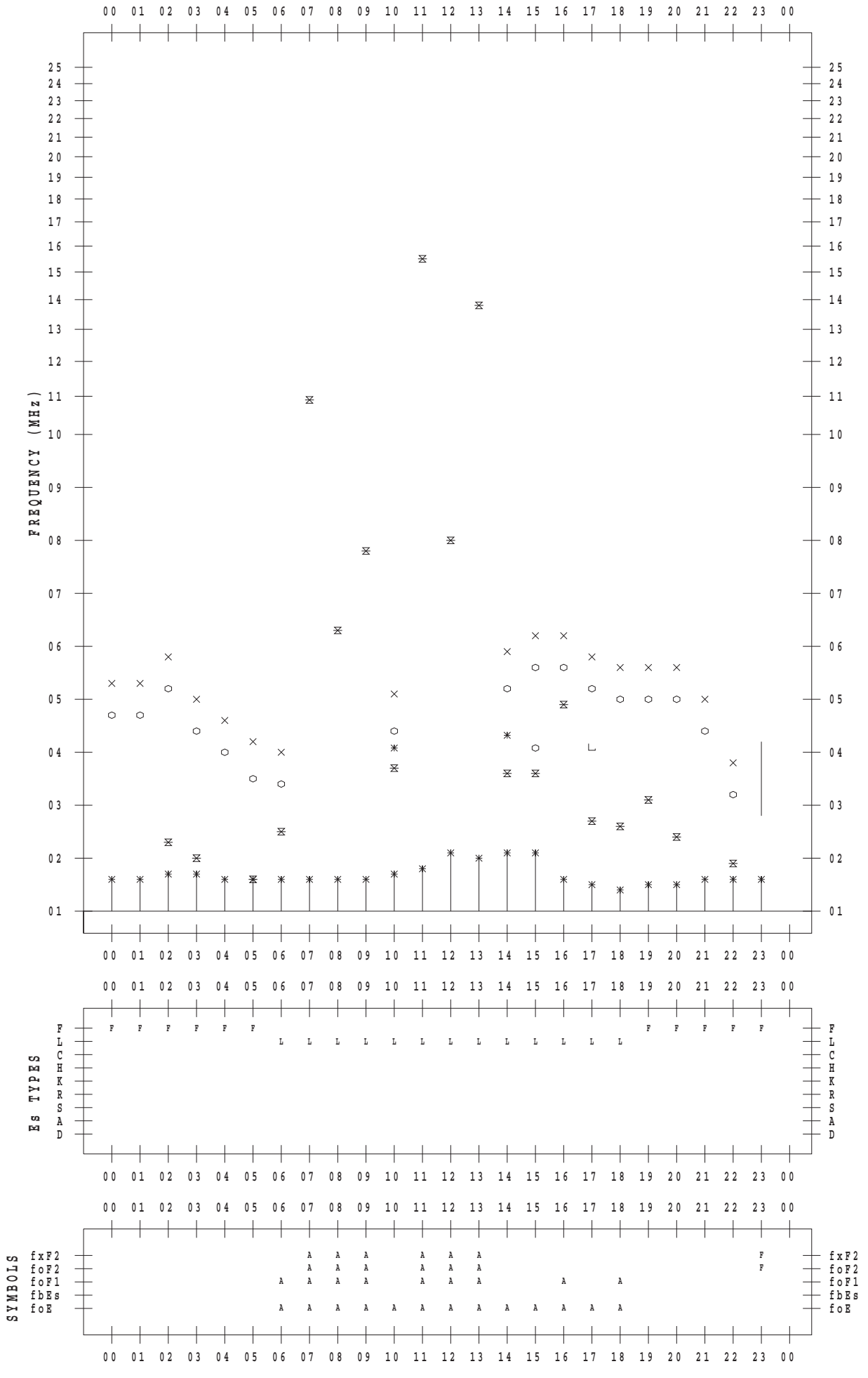
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/12

135 °E MEAN TIME



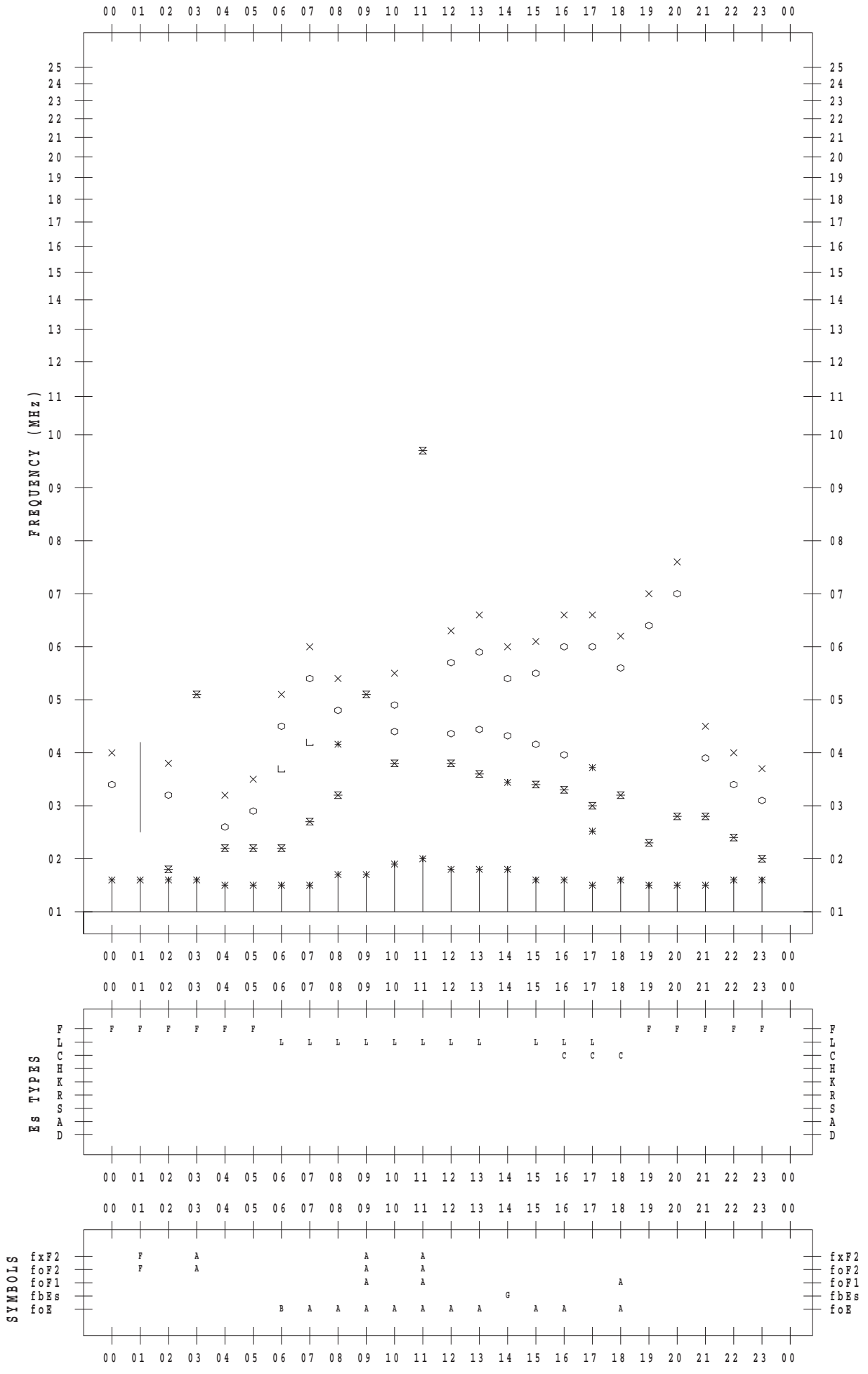
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/13

135 °E MEAN TIME



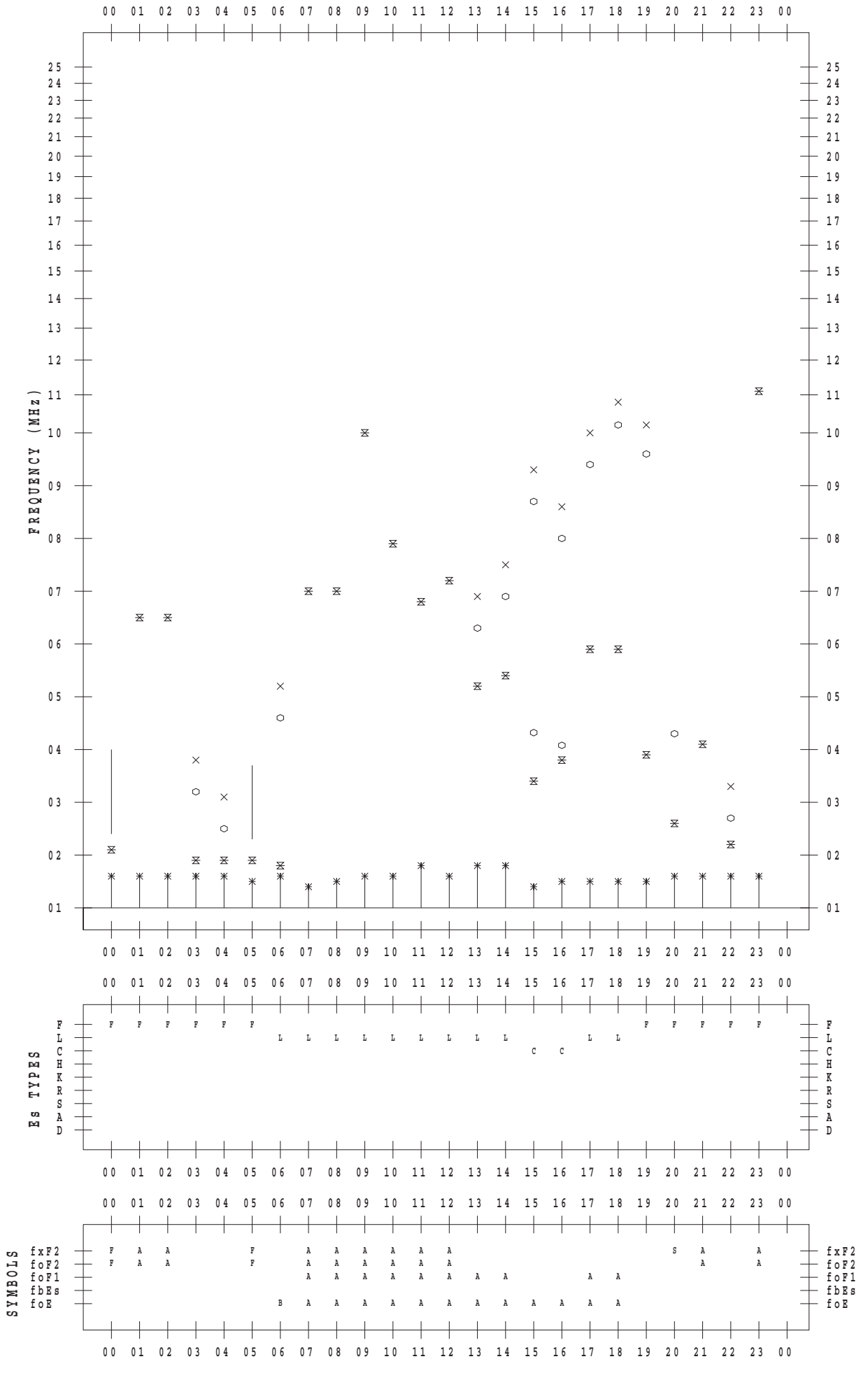
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/14

135 °E MEAN TIME



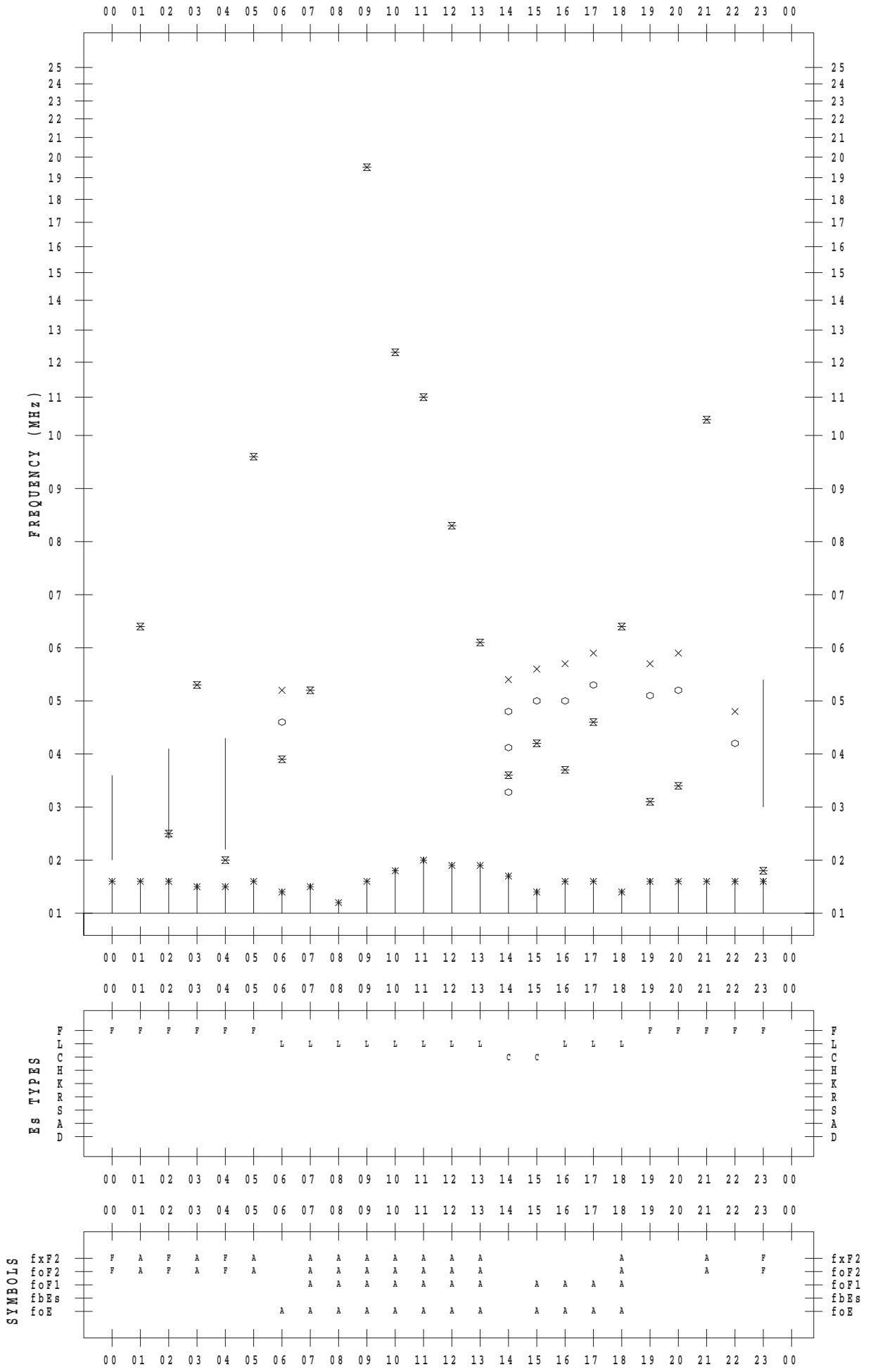
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/15

135 °E MEAN TIME



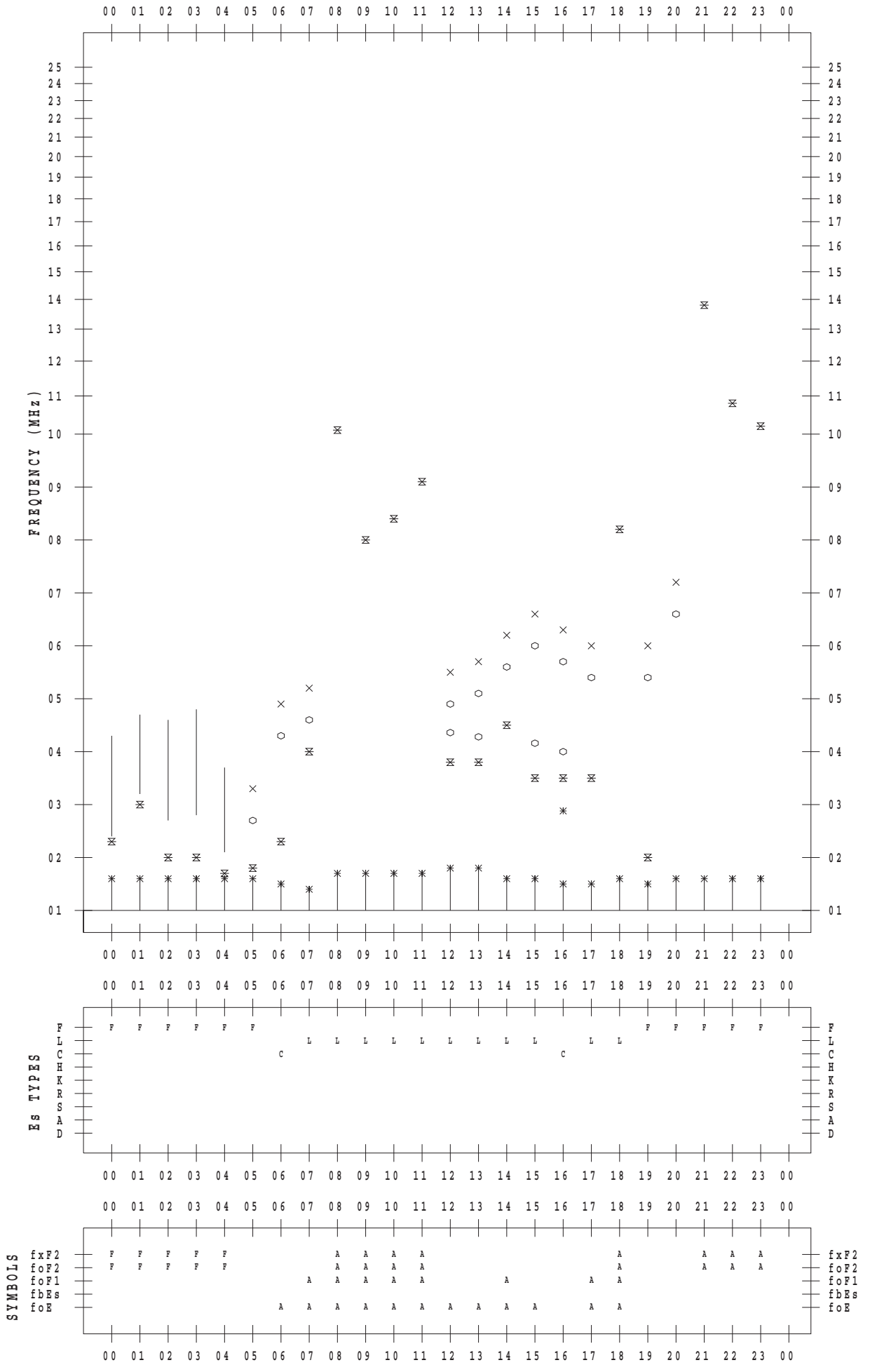
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/16

135 °E MEAN TIME



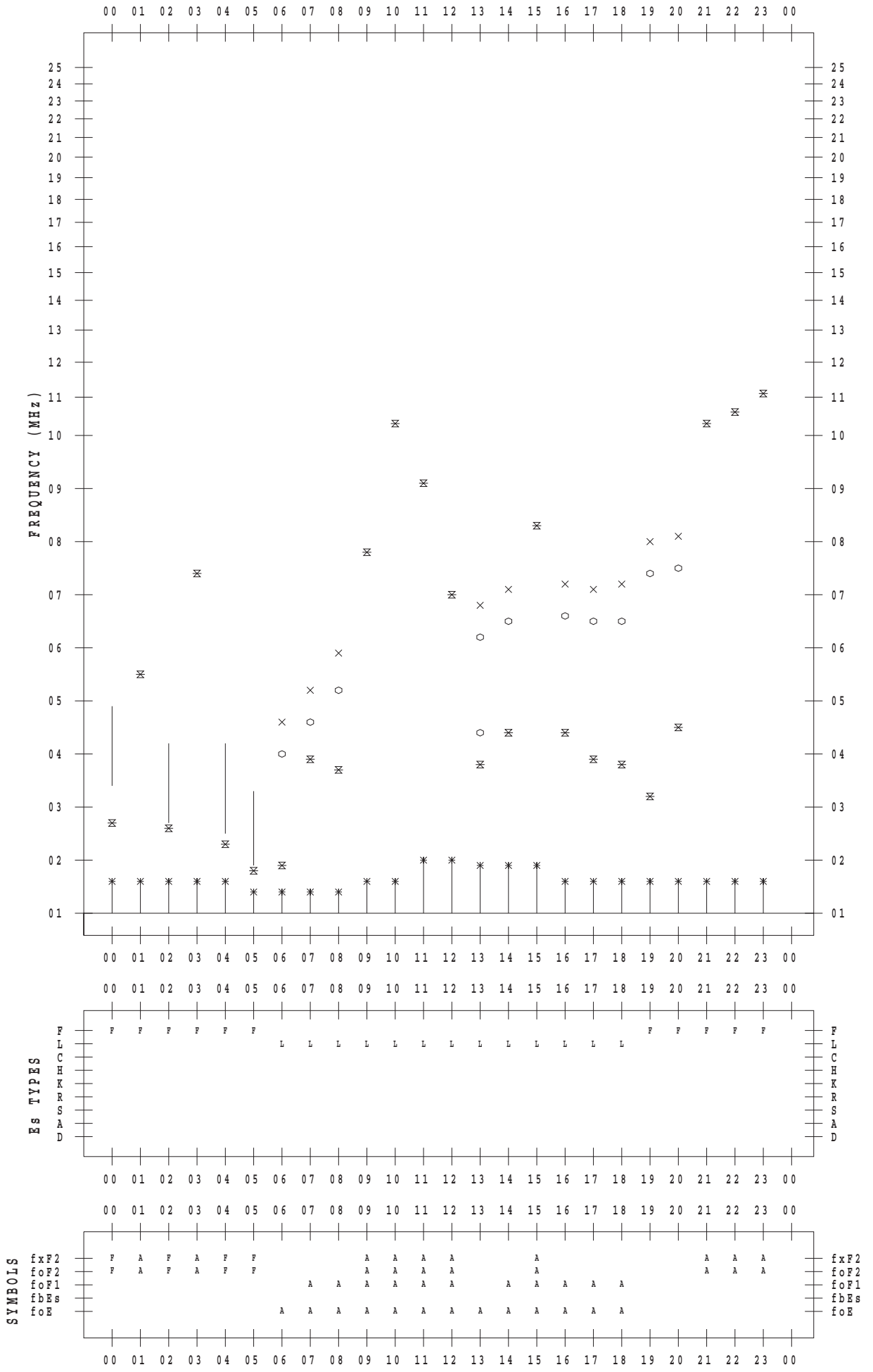
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/17

135 °E MEAN TIME



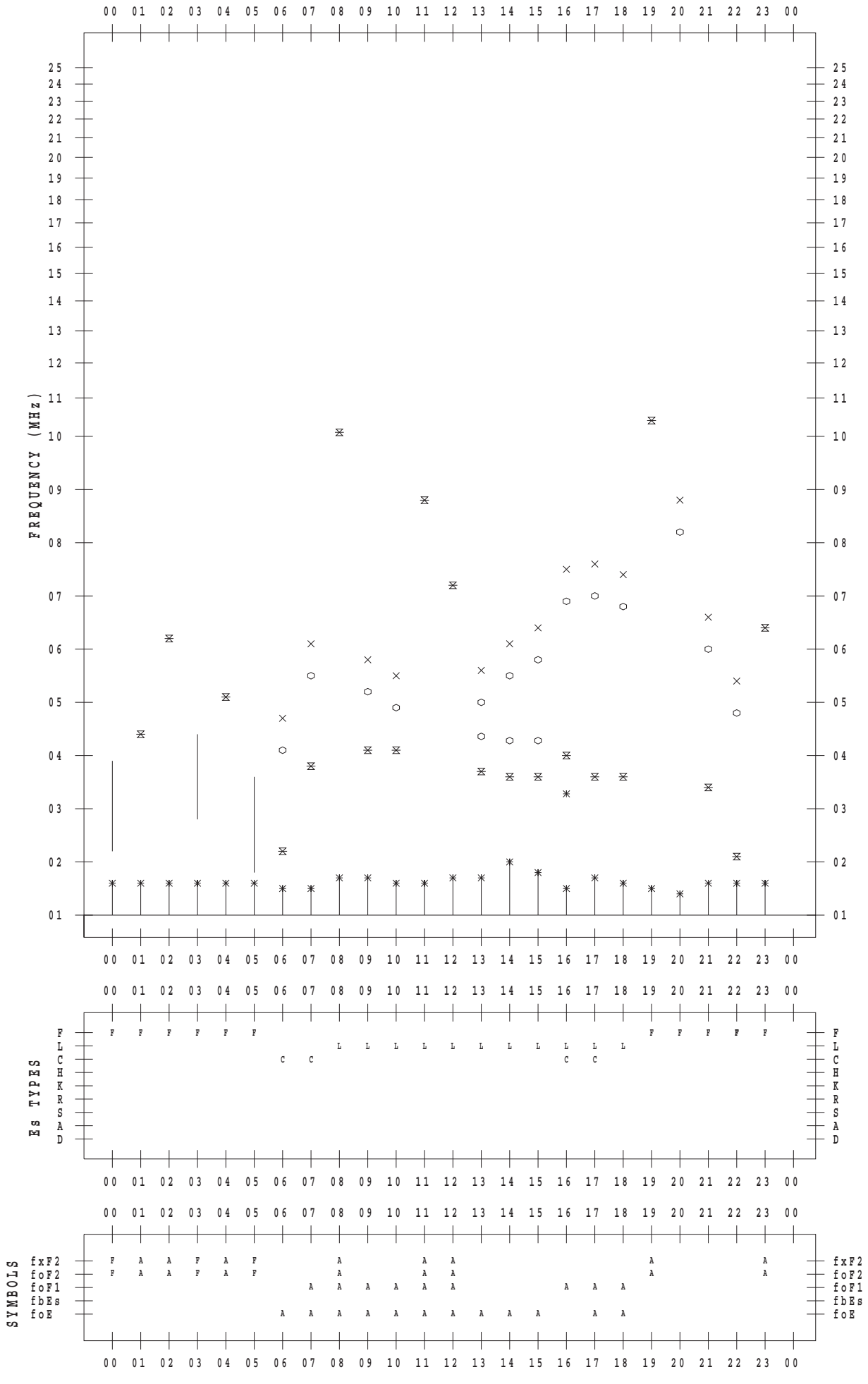
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/18

135 °E MEAN TIME



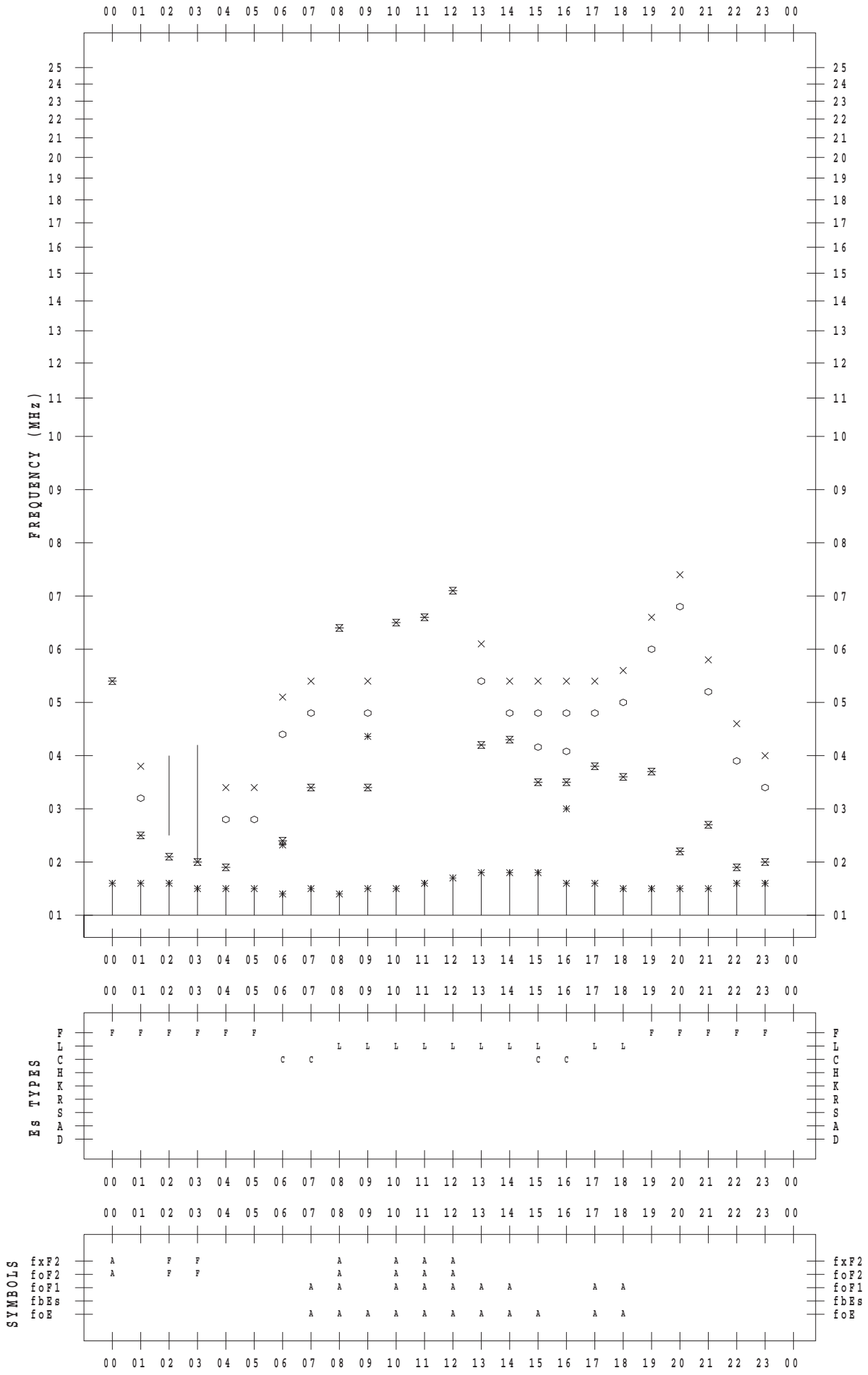
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/19

135 °E MEAN TIME



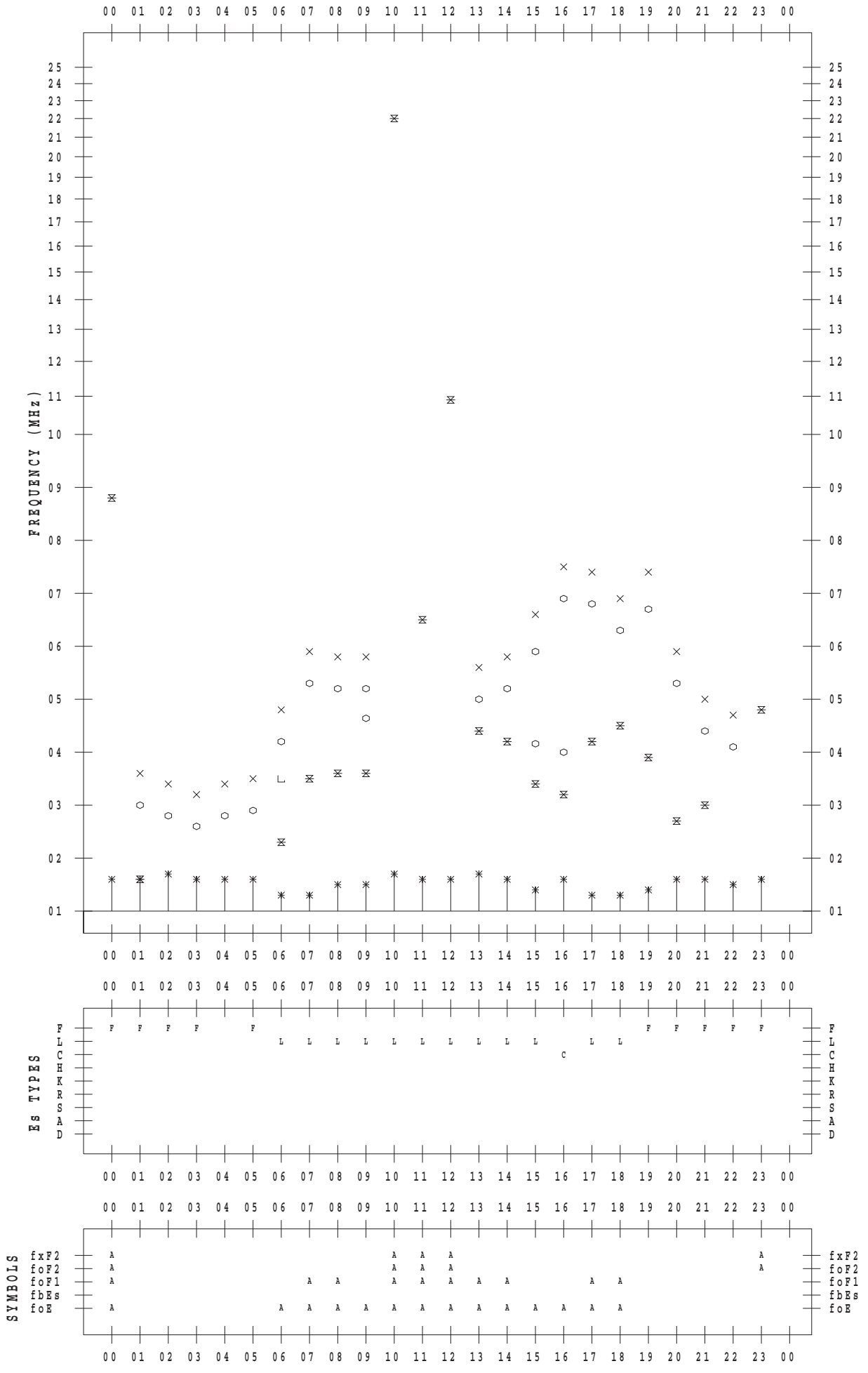
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/20

135 °E MEAN TIME



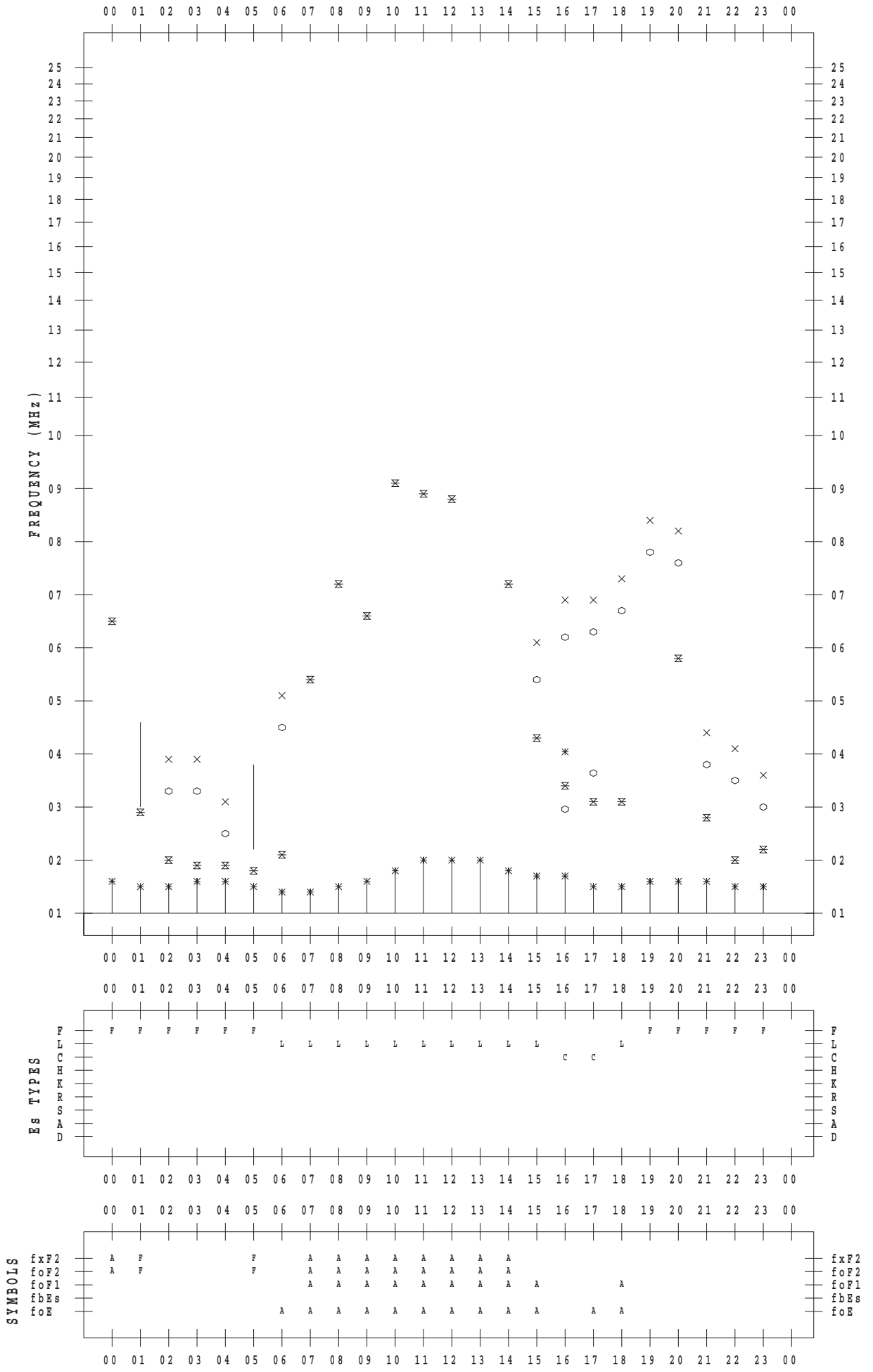
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/21

135 °E MEAN TIME



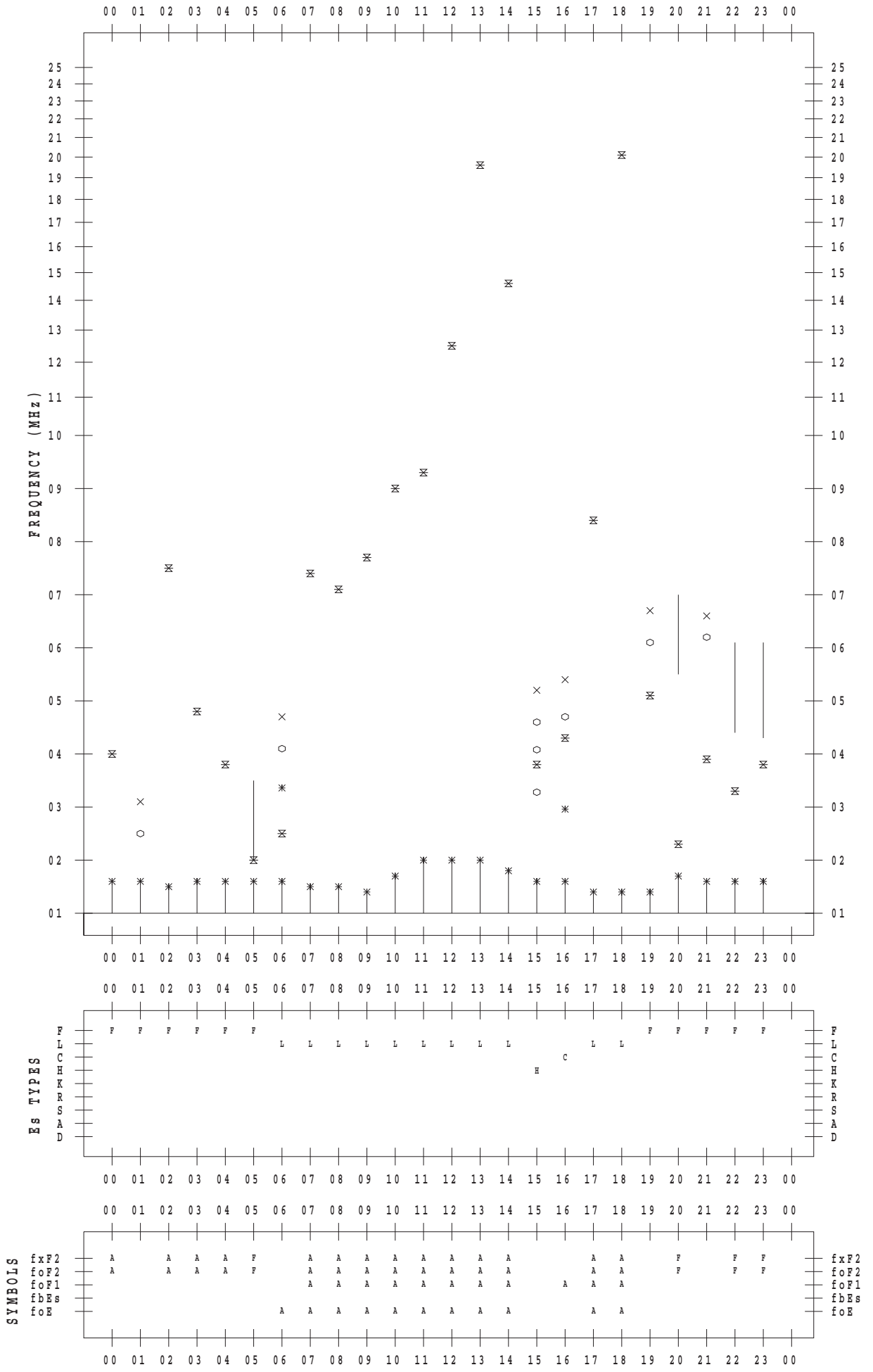
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/22

135 °E MEAN TIME



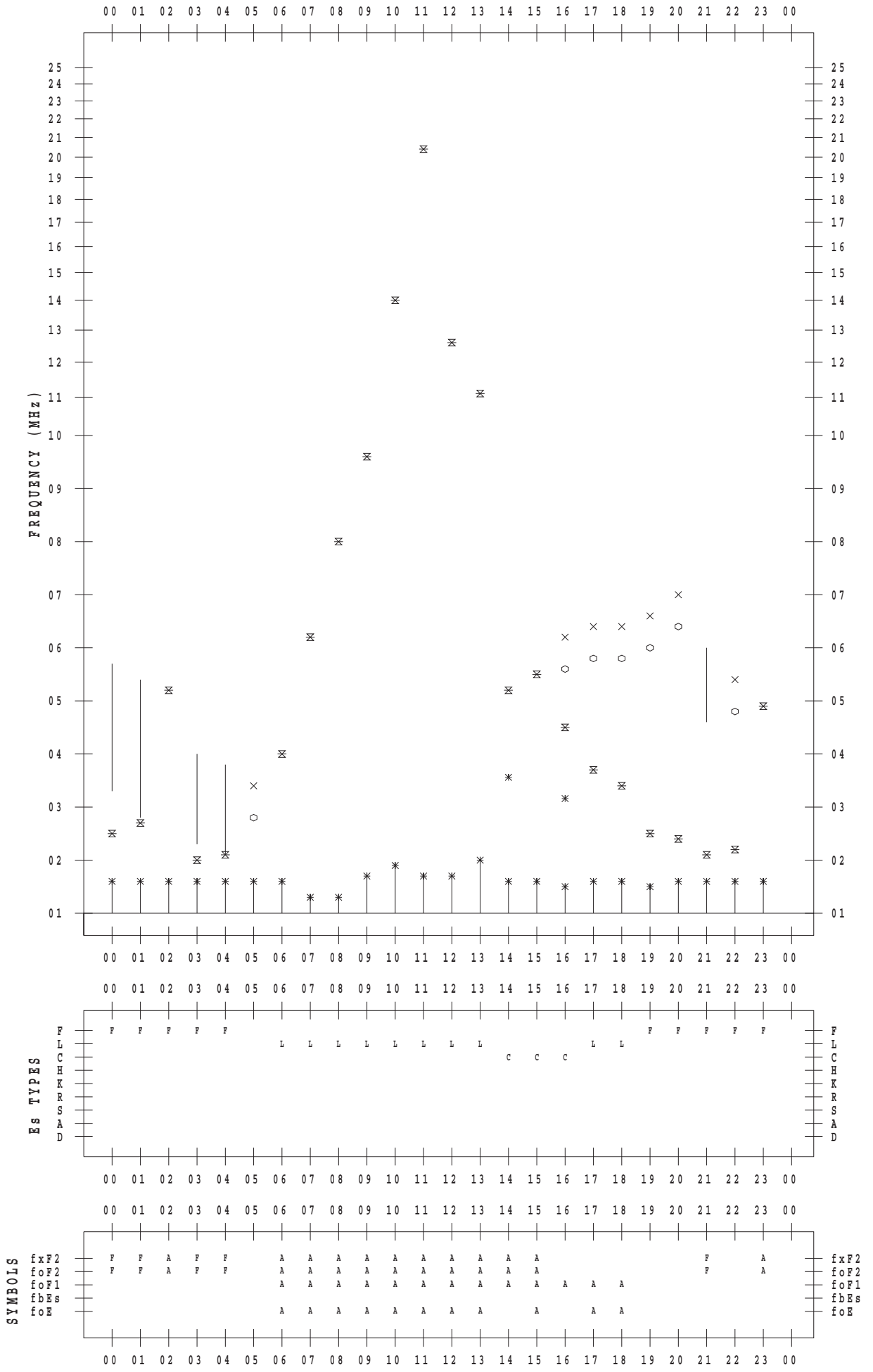
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/23

135 °E MEAN TIME



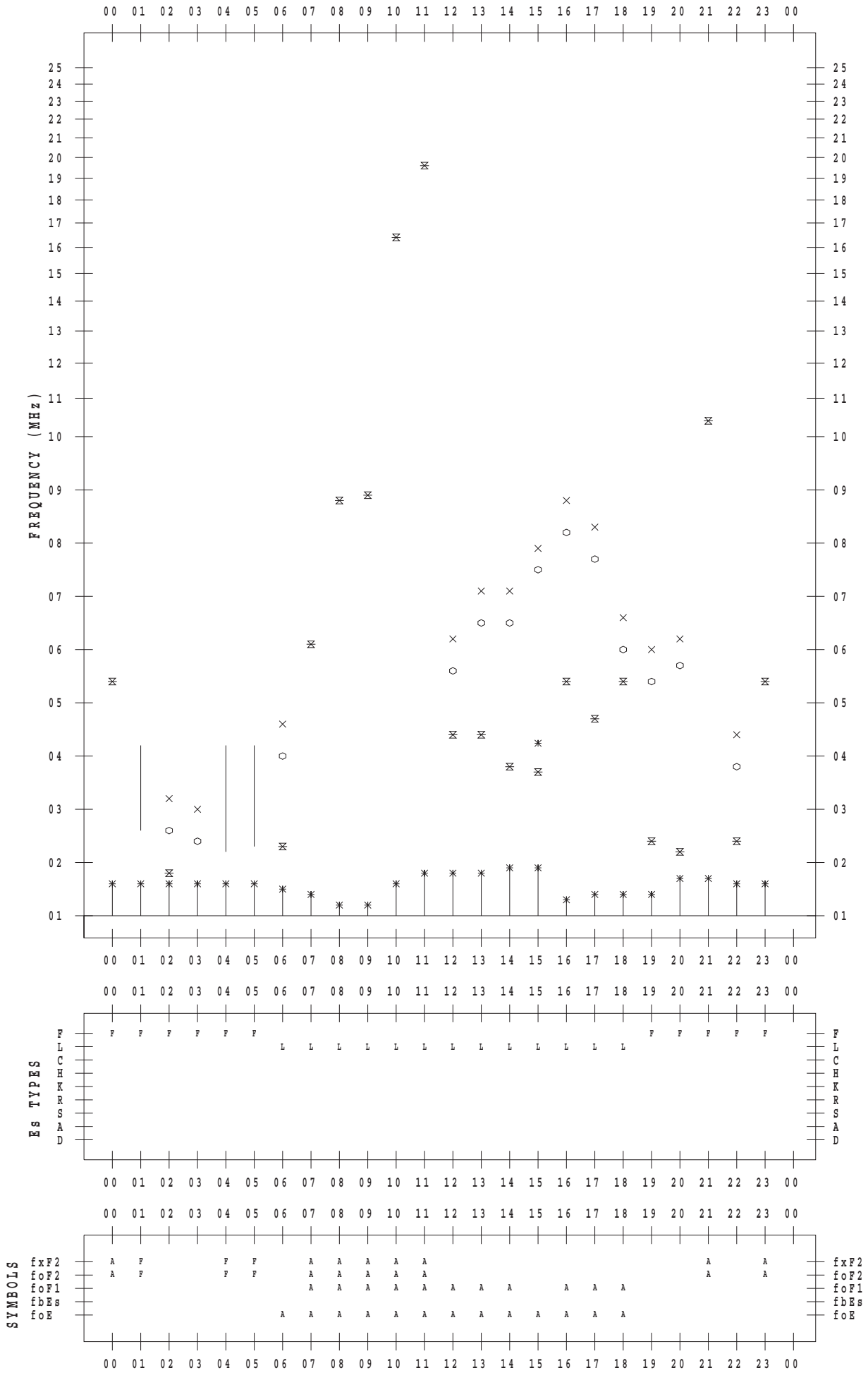
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/24

135 °E MEAN TIME



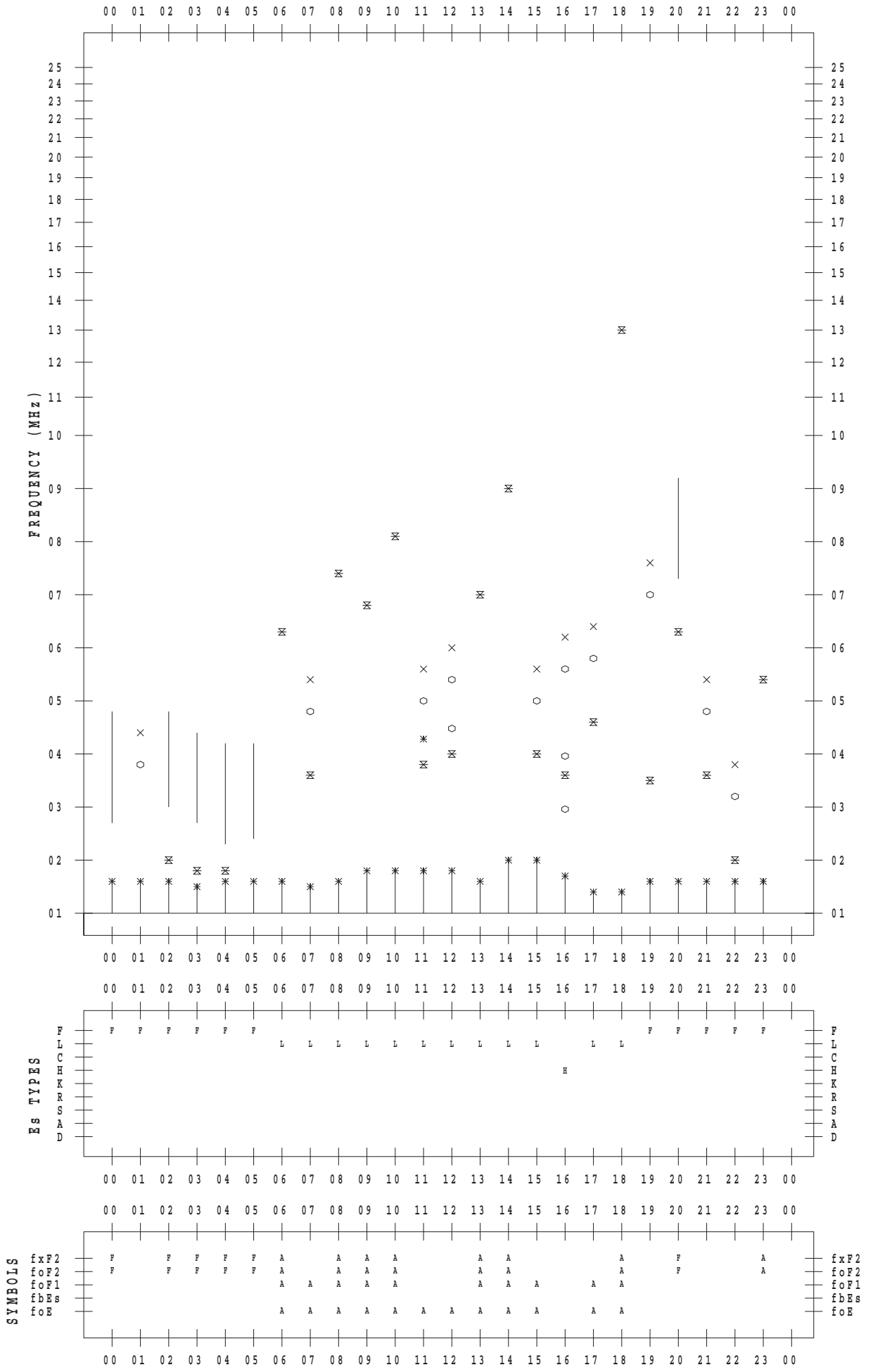
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/25

135 °E MEAN TIME



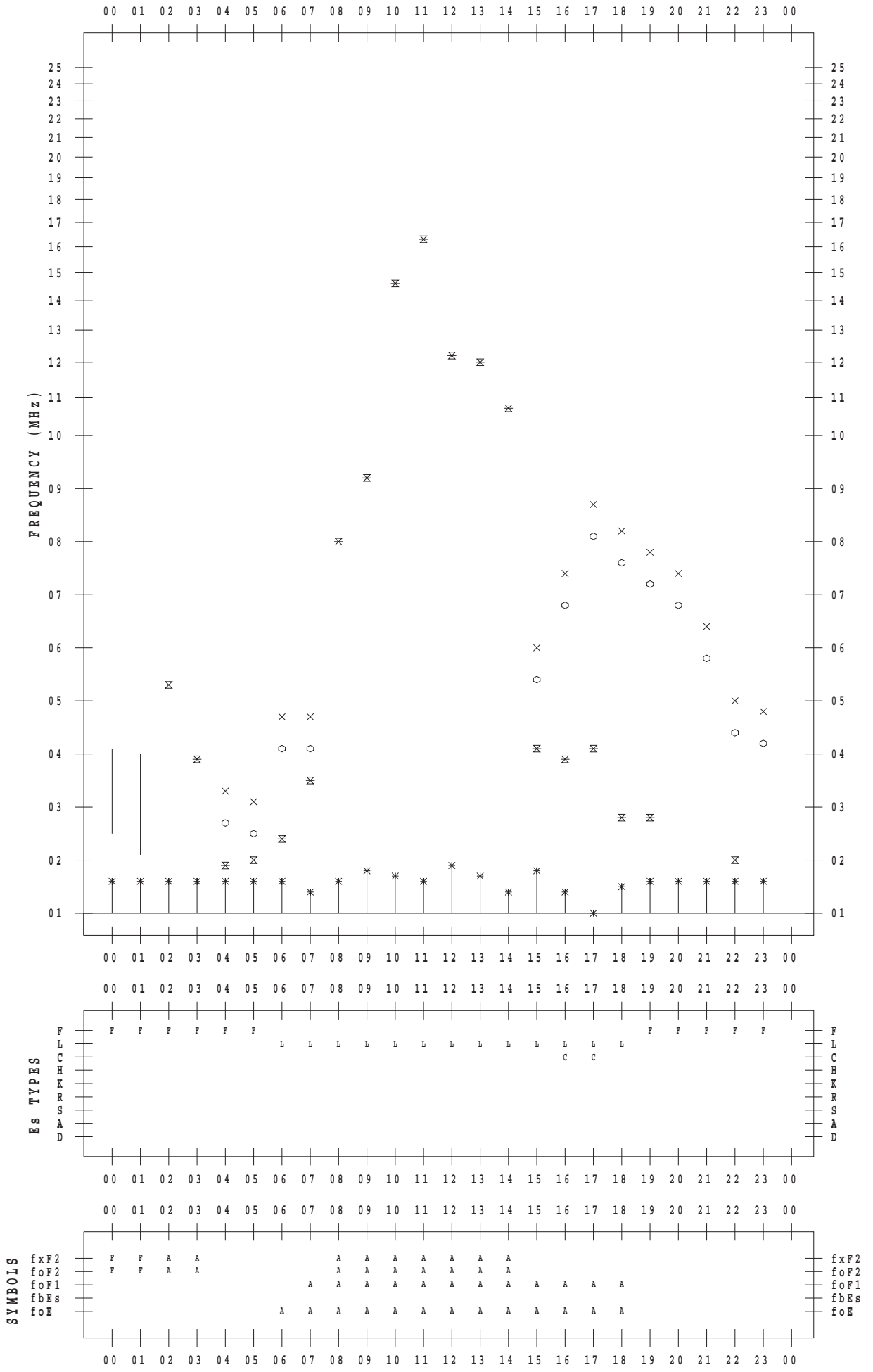
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/26

135 °E MEAN TIME



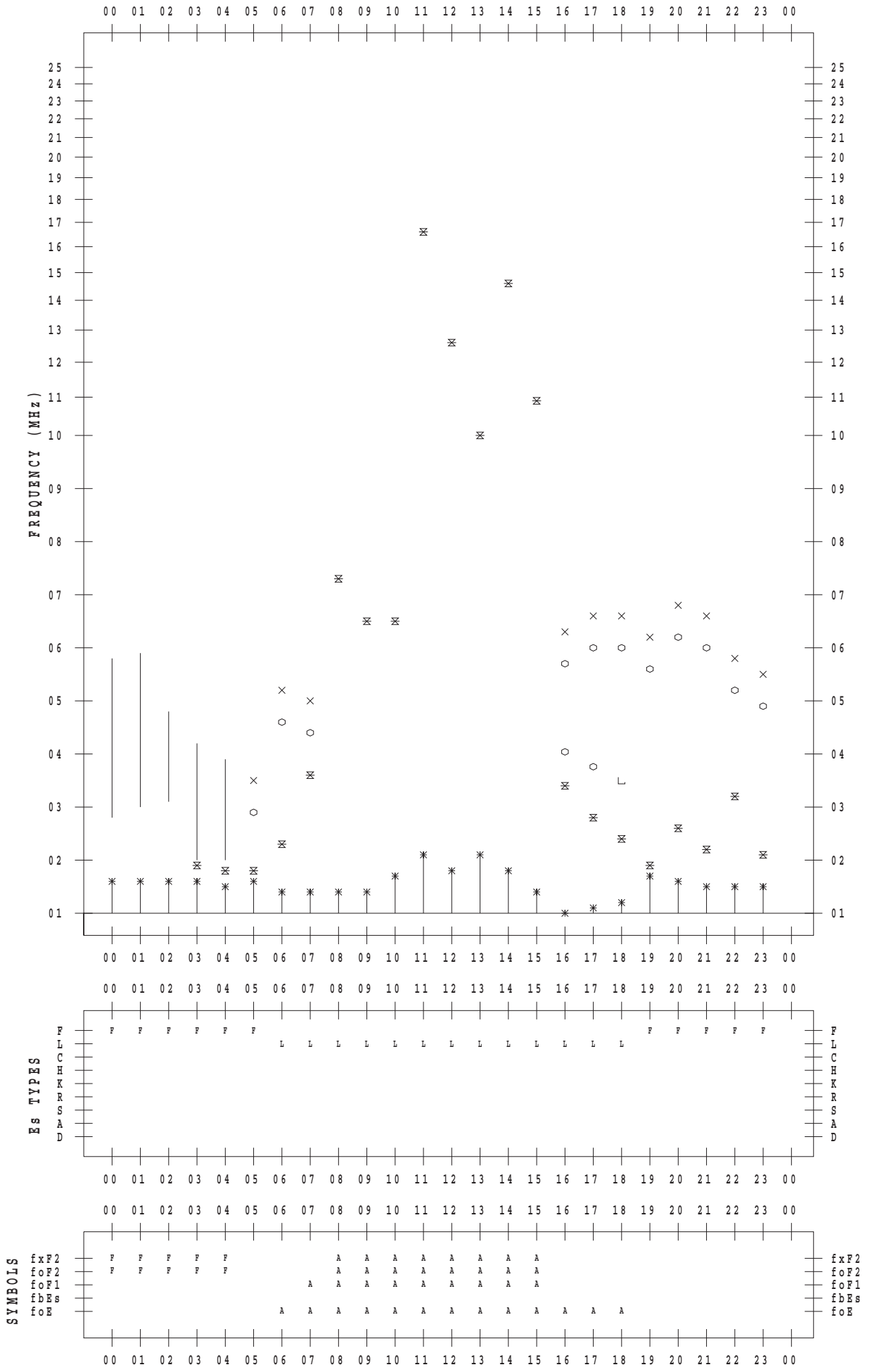
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/27

135 °E MEAN TIME



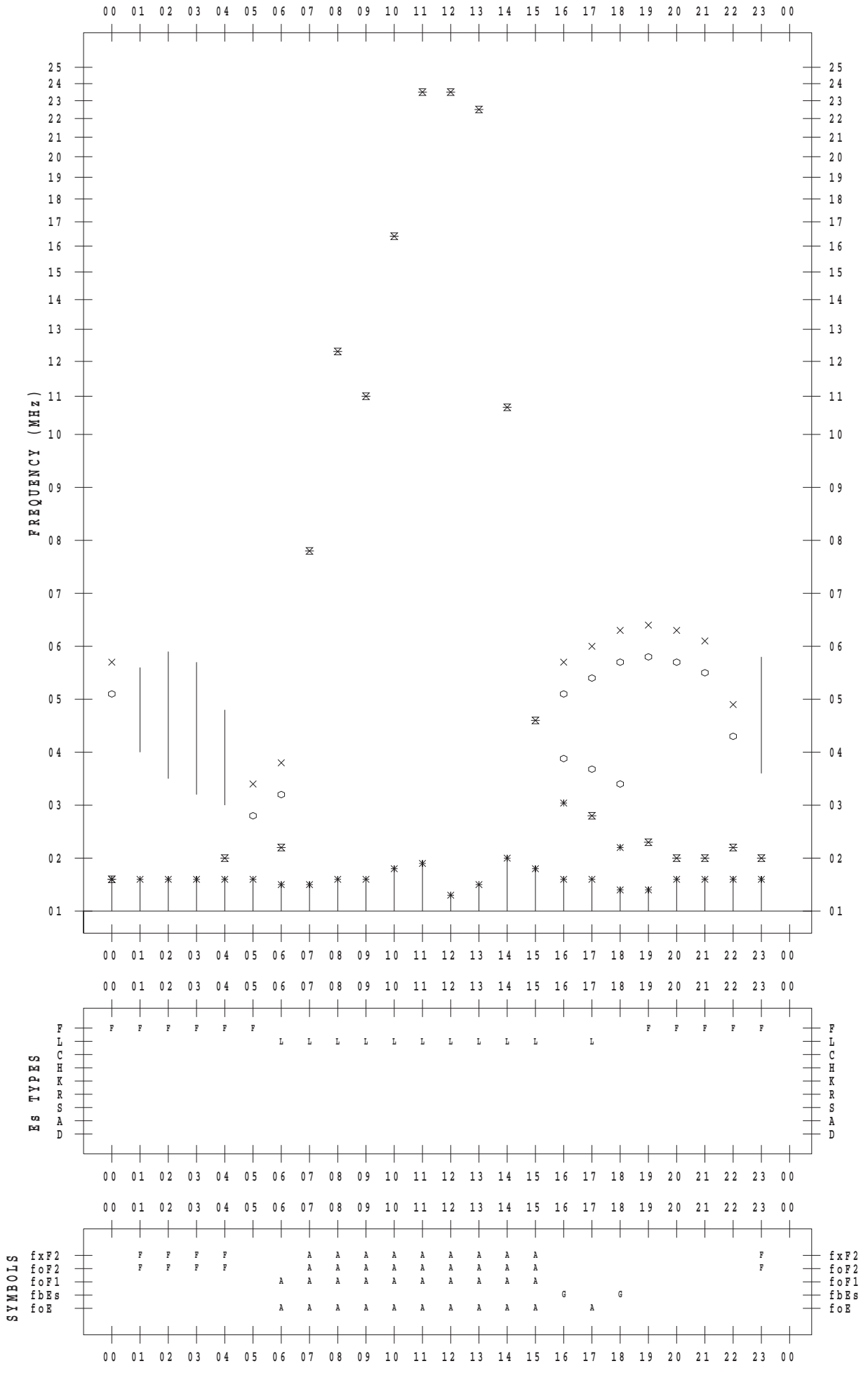
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/28

135 °E MEAN TIME



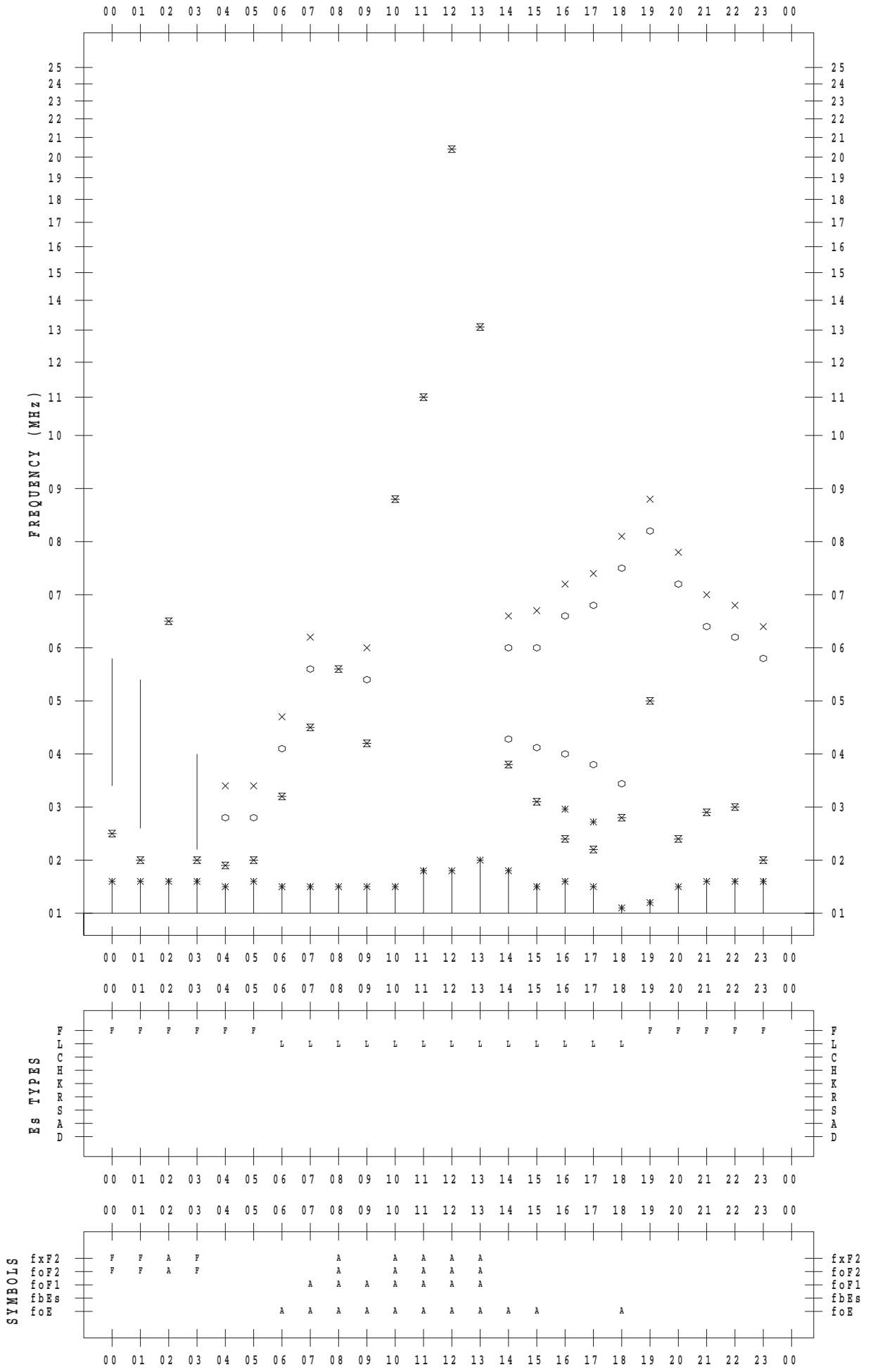
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/29

135 °E MEAN TIME



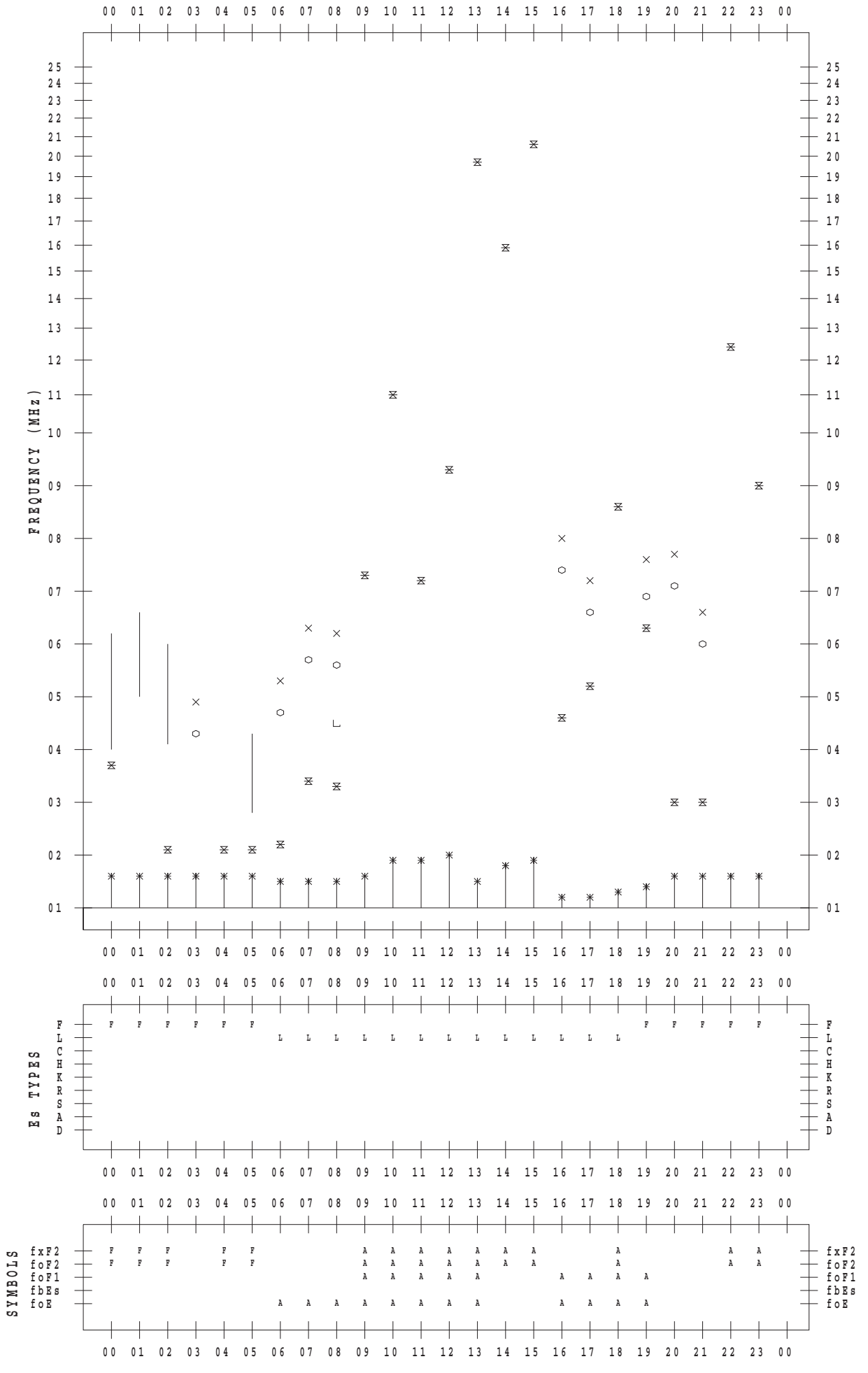
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/30

135 °E MEAN TIME



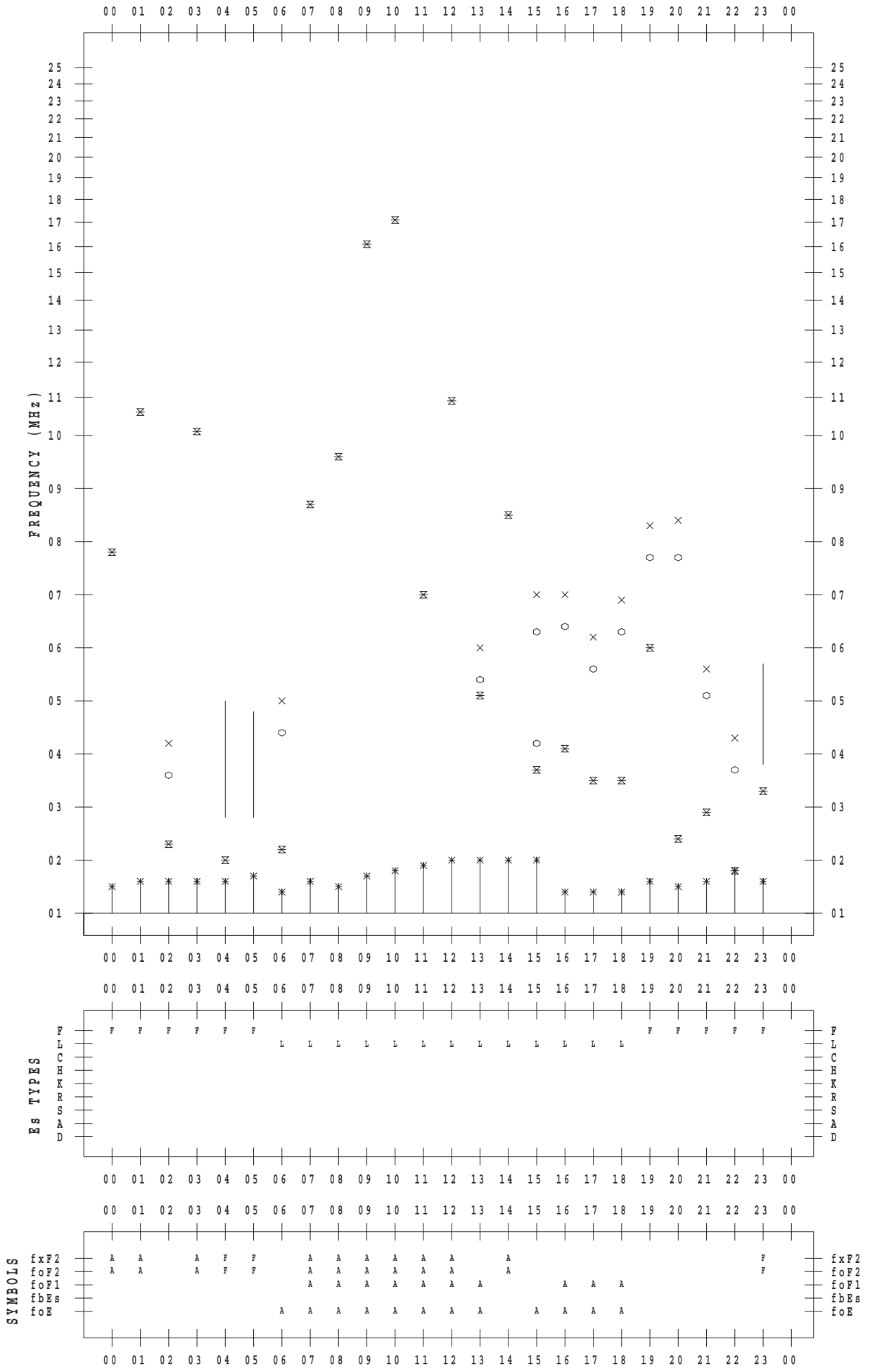
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/ 5/31

135 °E MEAN TIME



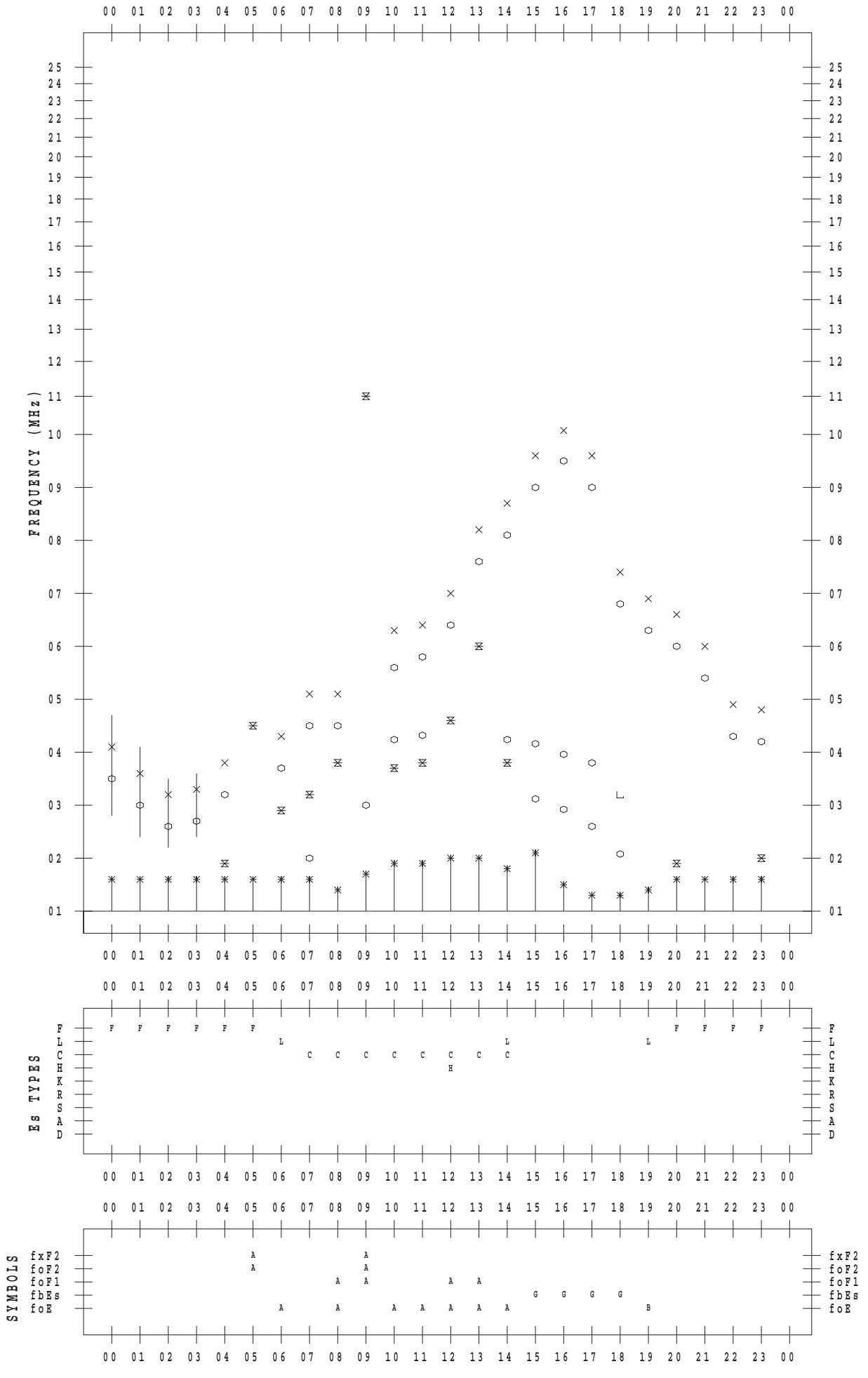
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/ 1

135 °E MEAN TIME



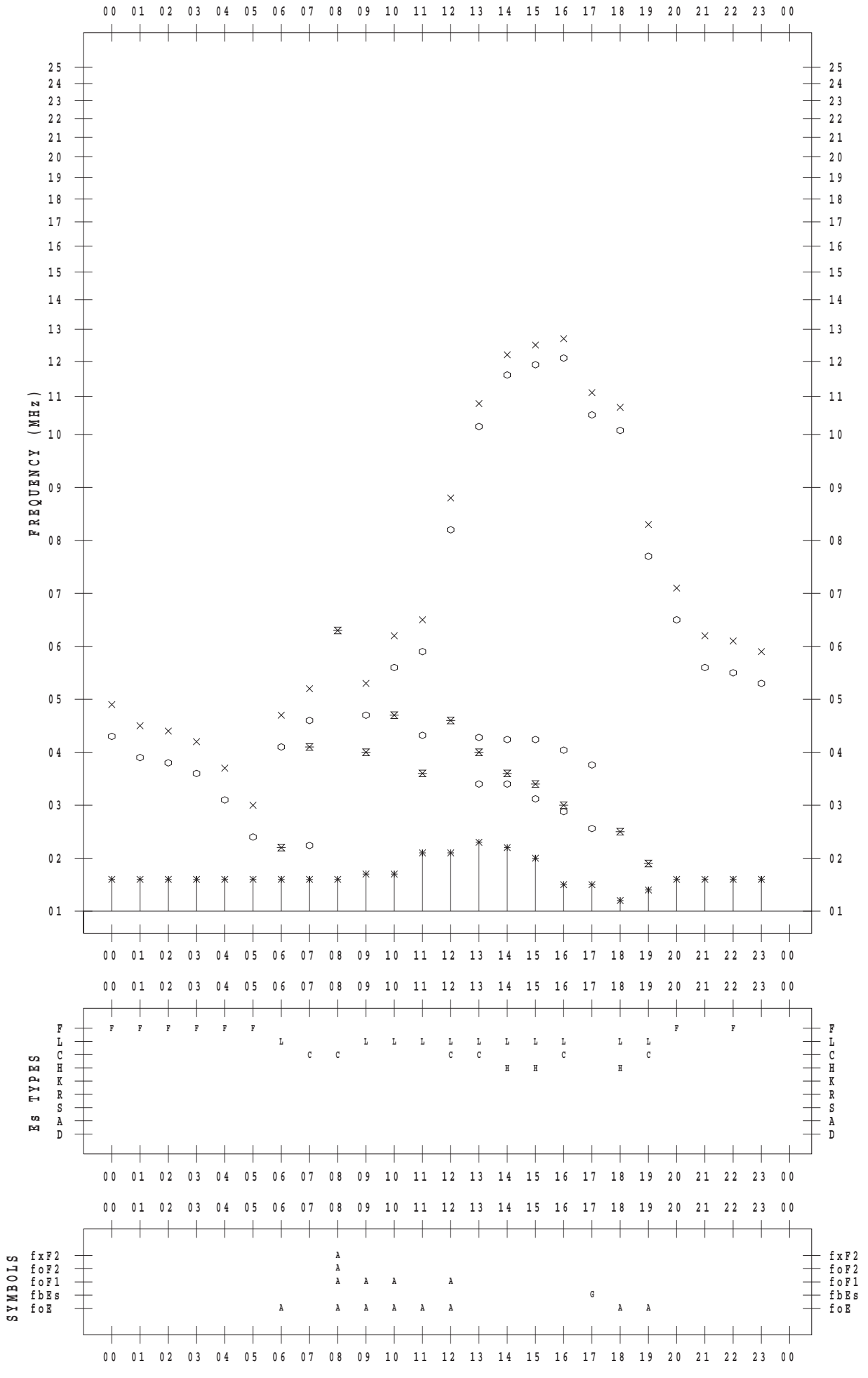
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/ 2

135 °E MEAN TIME



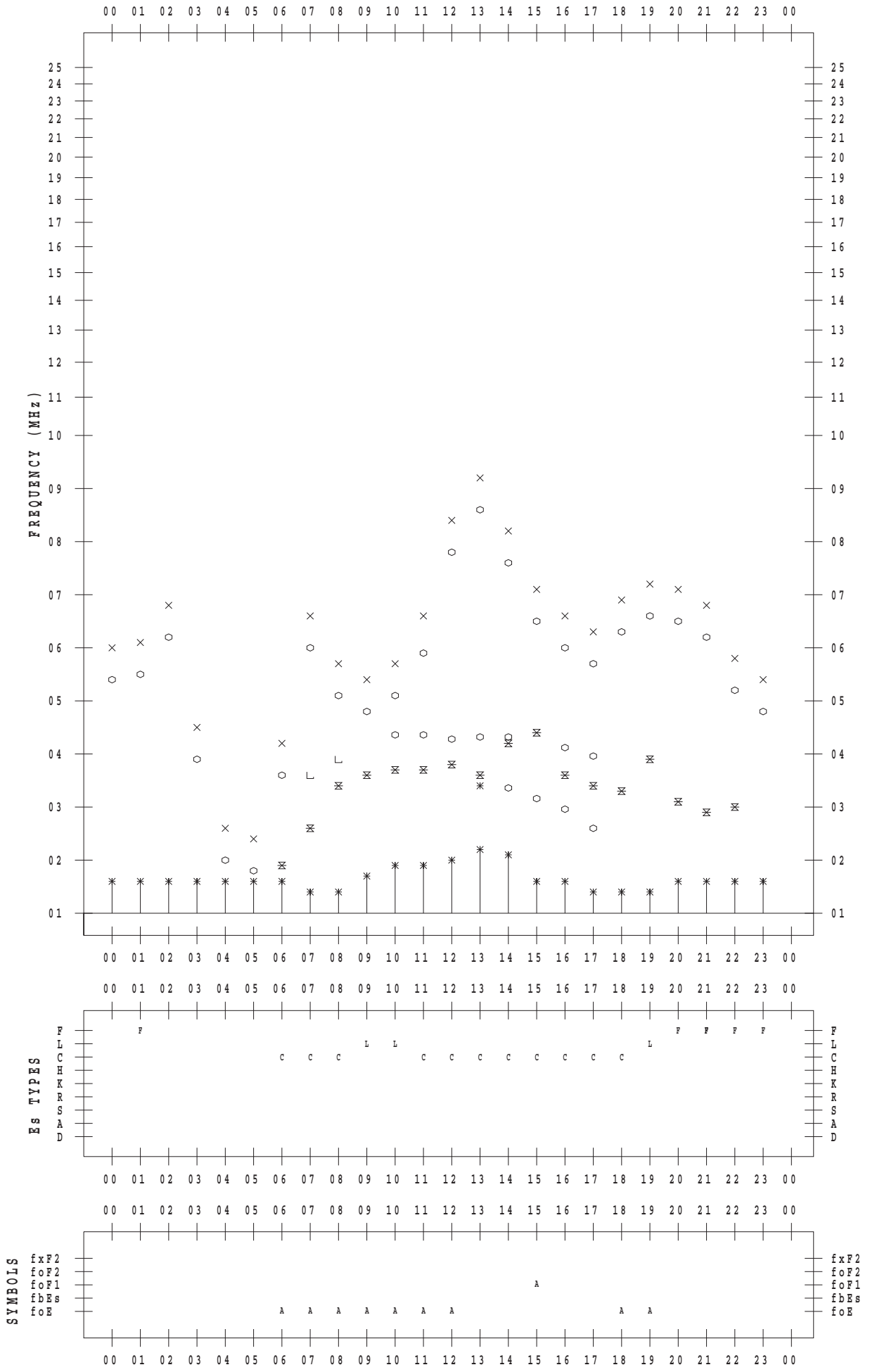
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/ 3

135 °E MEAN TIME



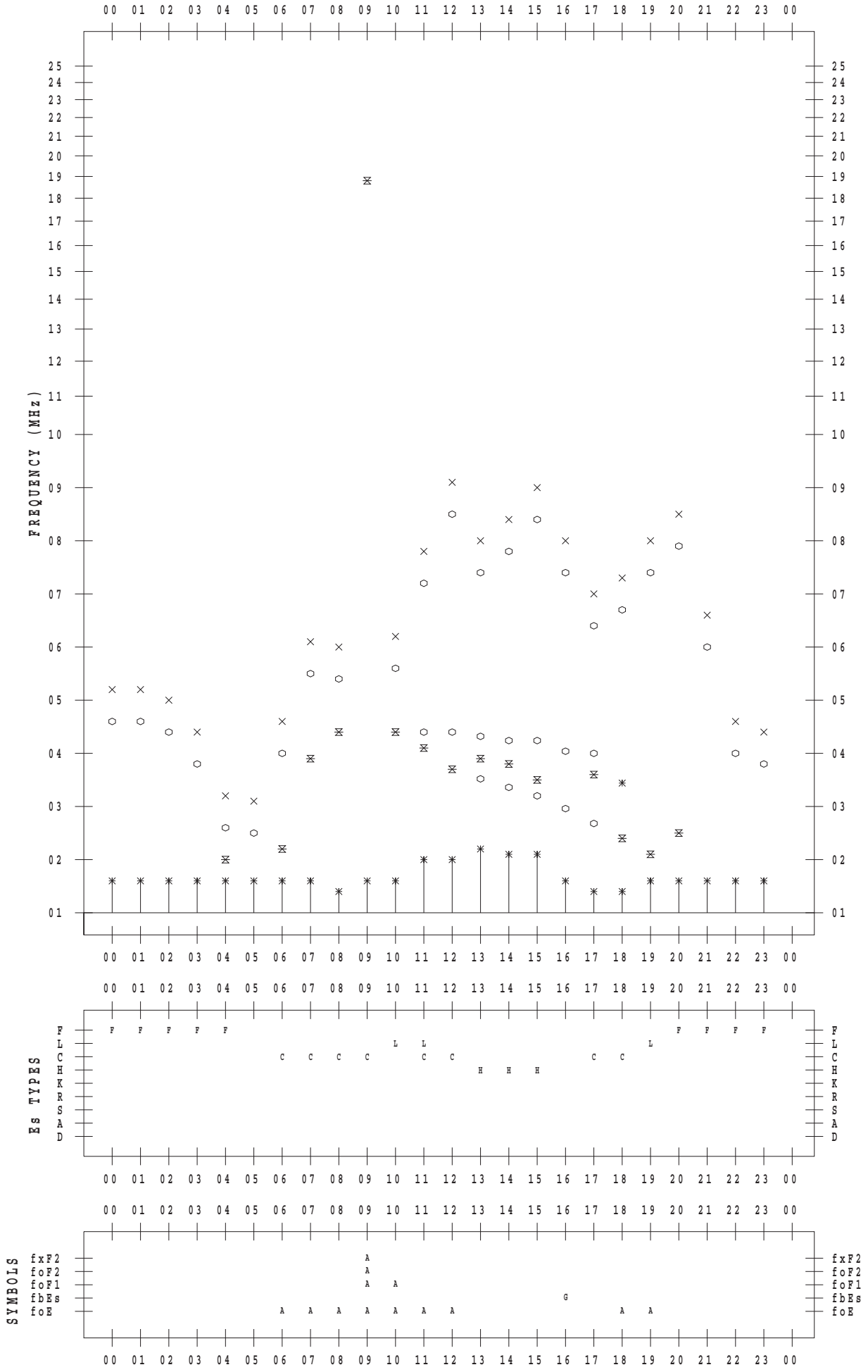
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/ 4

135 °E MEAN TIME



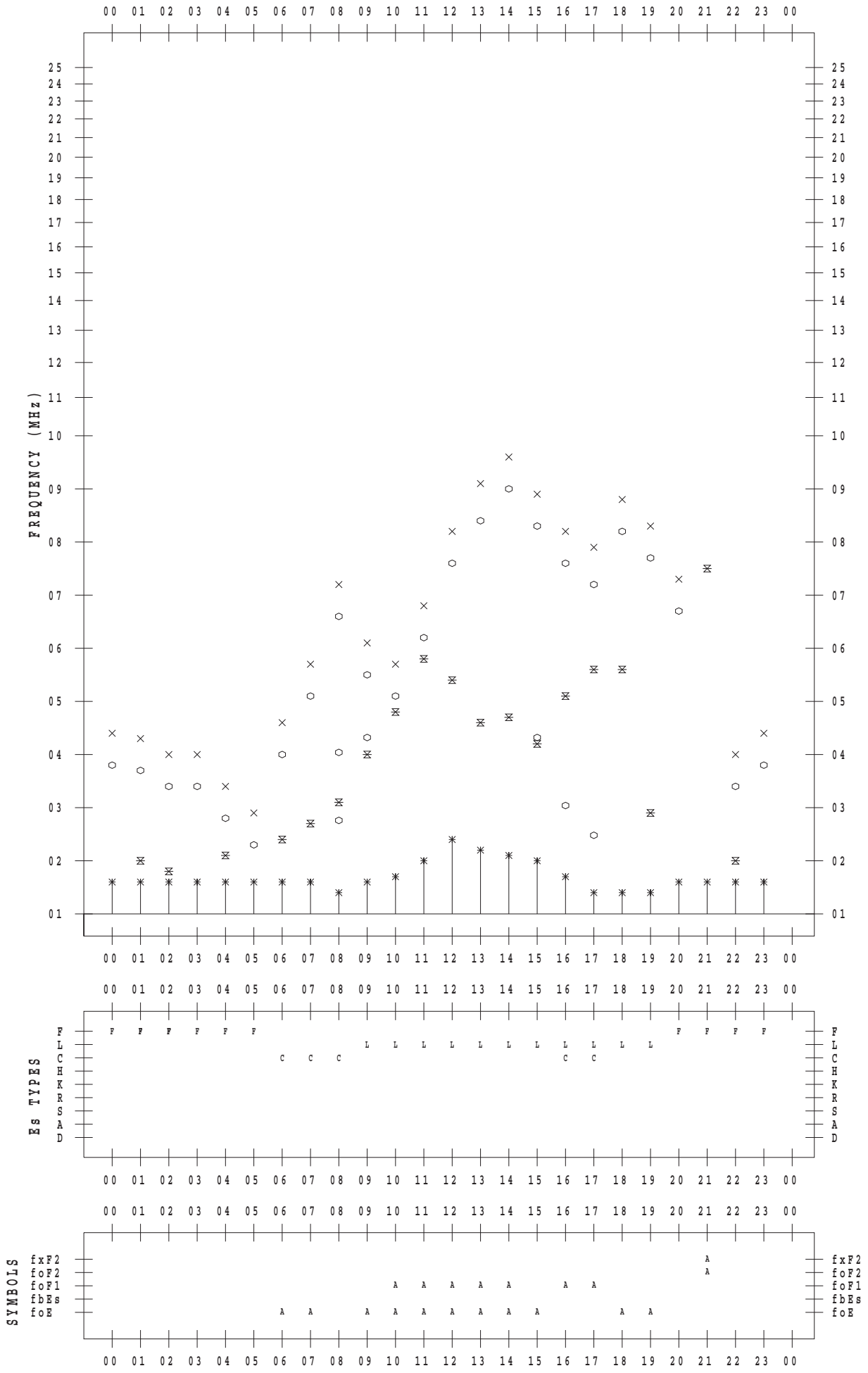
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/ 5

135 °E MEAN TIME



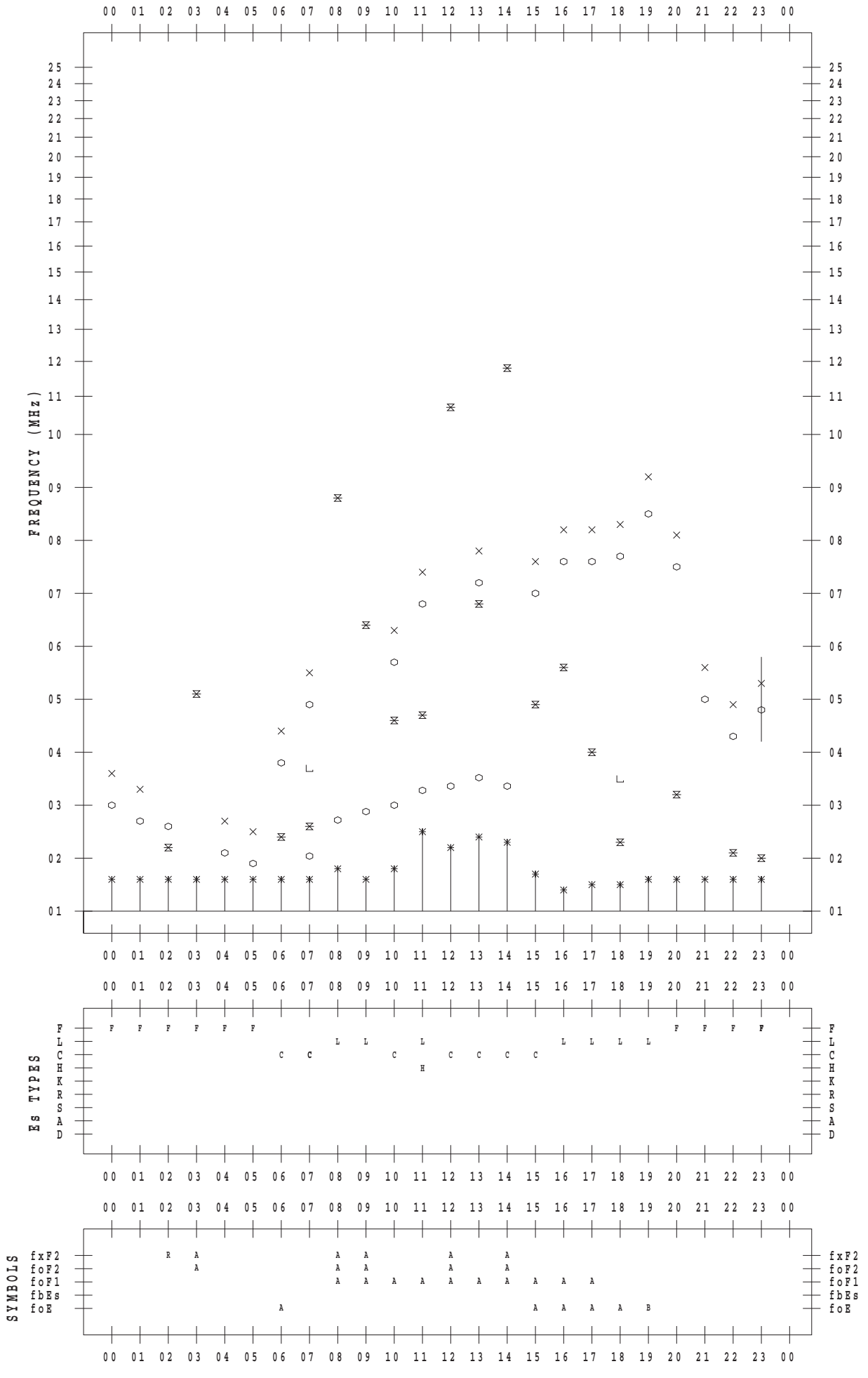
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/ 6

135 °E MEAN TIME



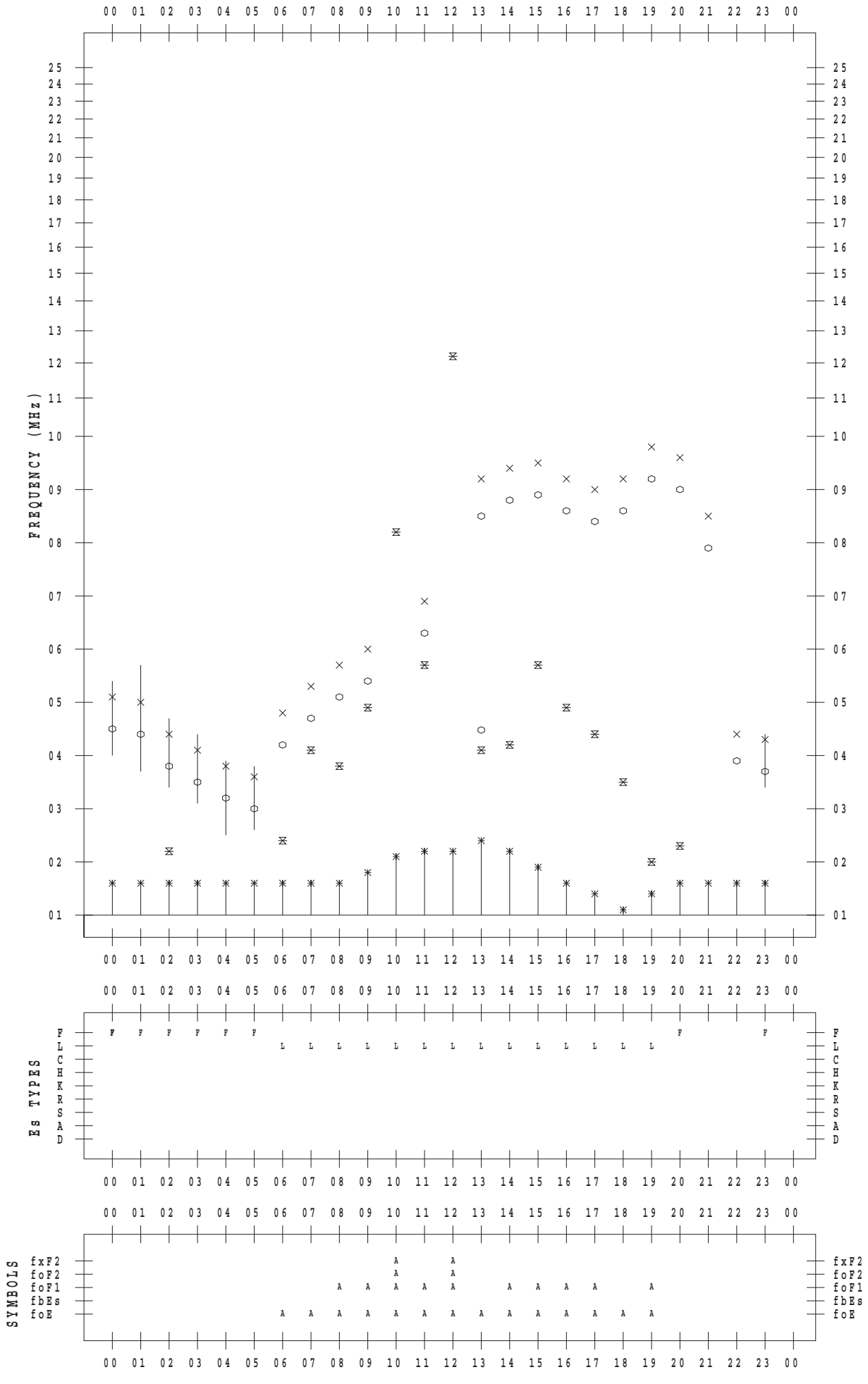
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/ 7

135 °E MEAN TIME



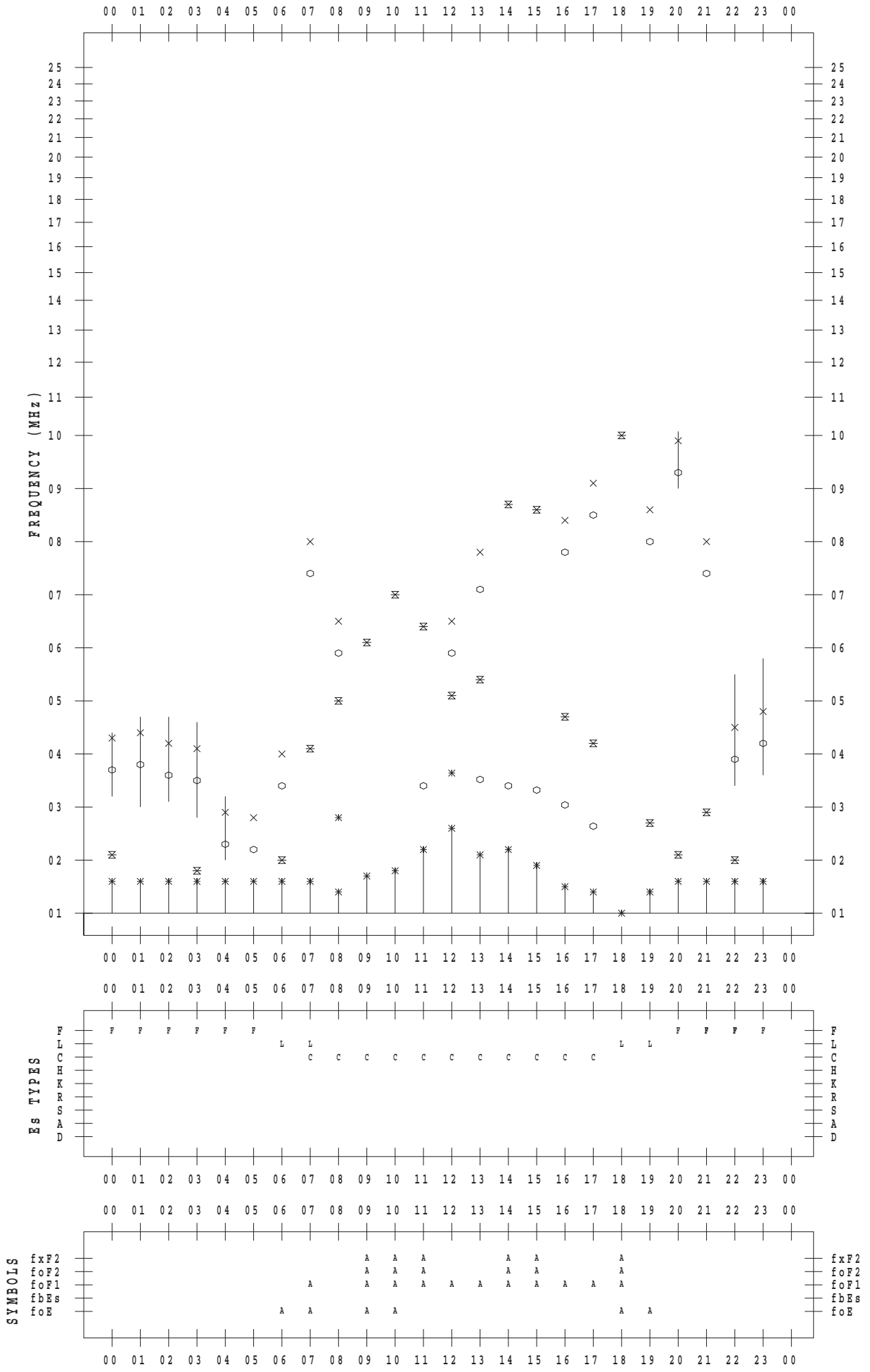
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/ 8

135 °E MEAN TIME



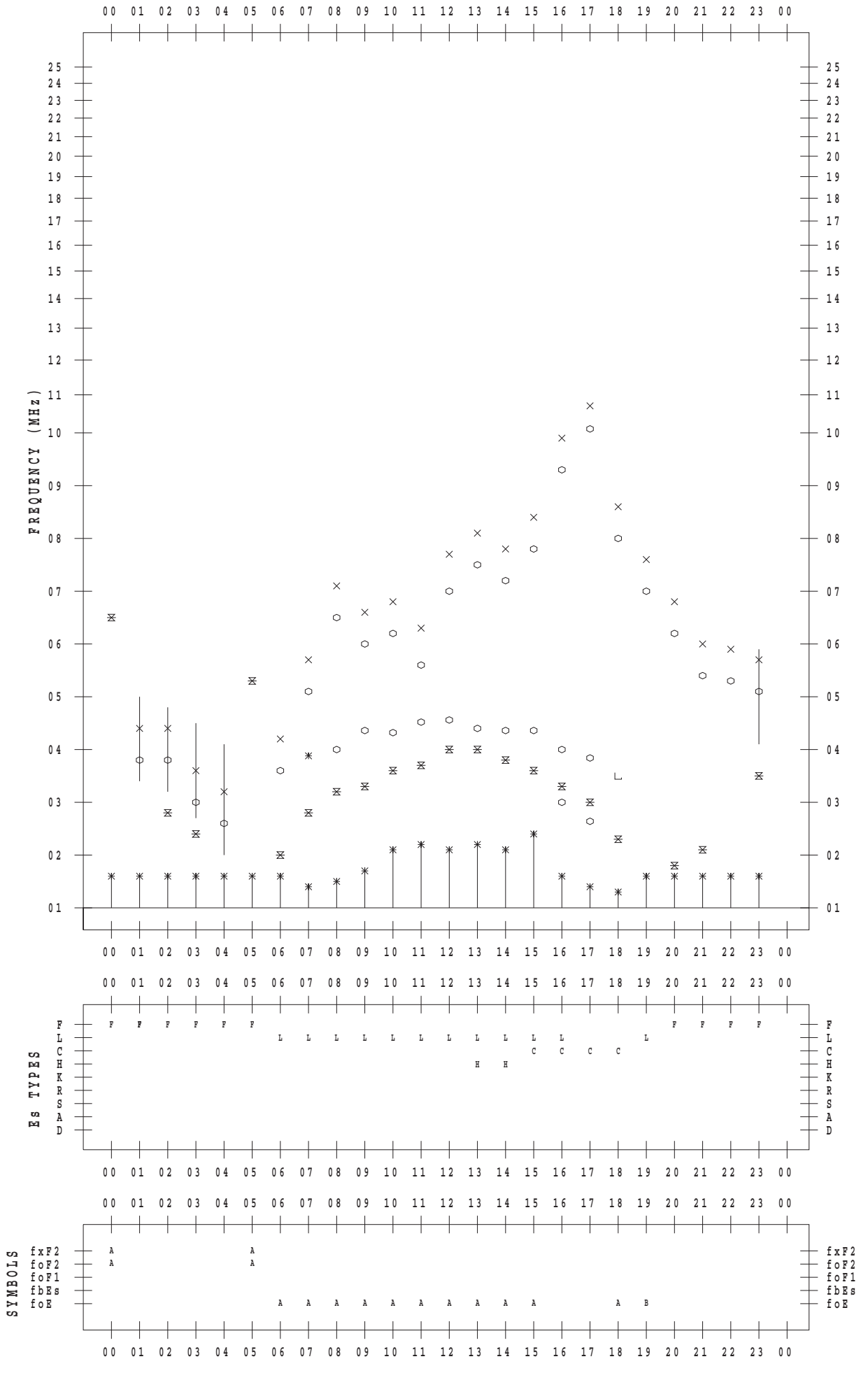
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/ 9

135 °E MEAN TIME



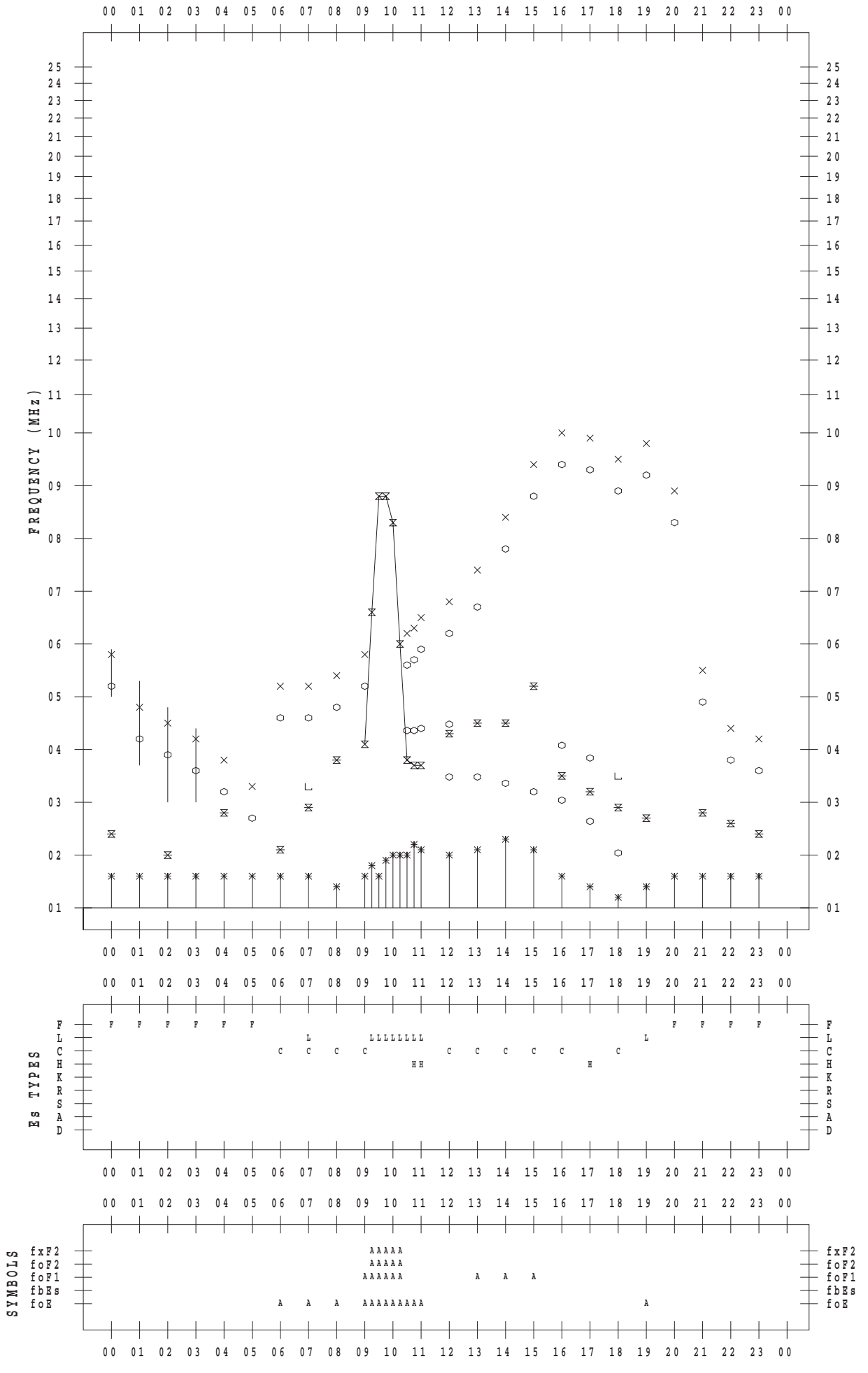
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/10

135 °E MEAN TIME



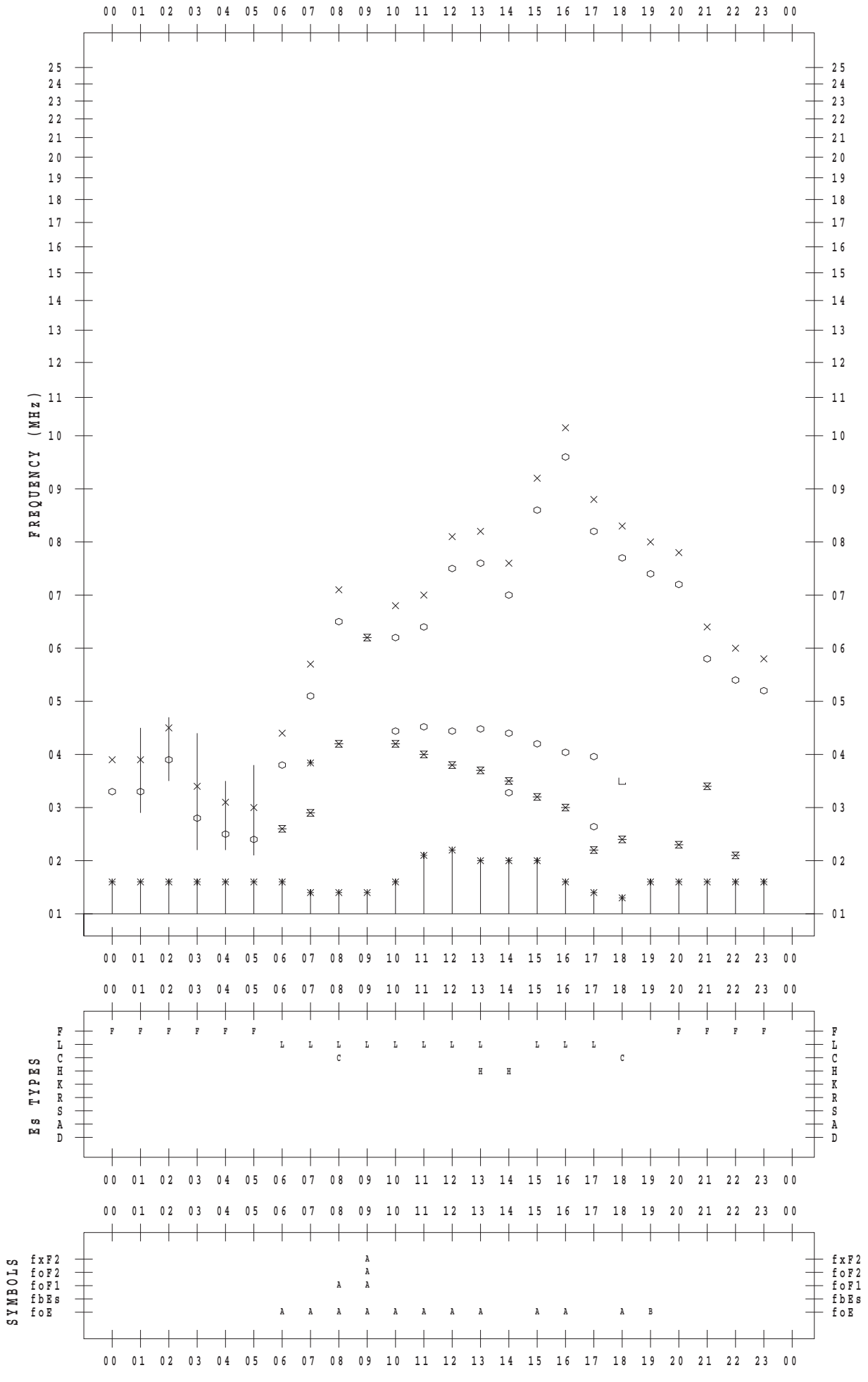
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/11

135 °E MEAN TIME



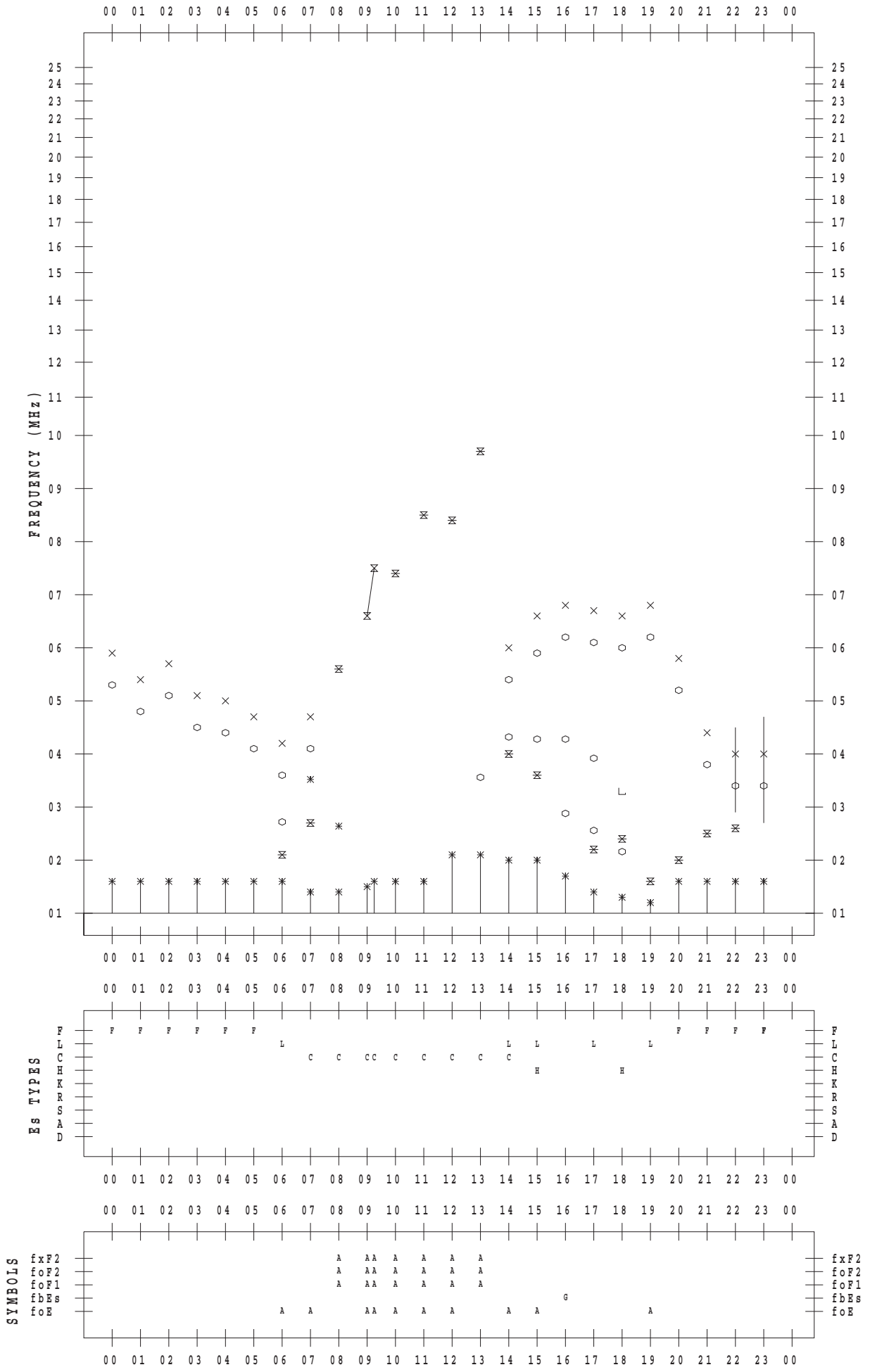
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/12

135 °E MEAN TIME



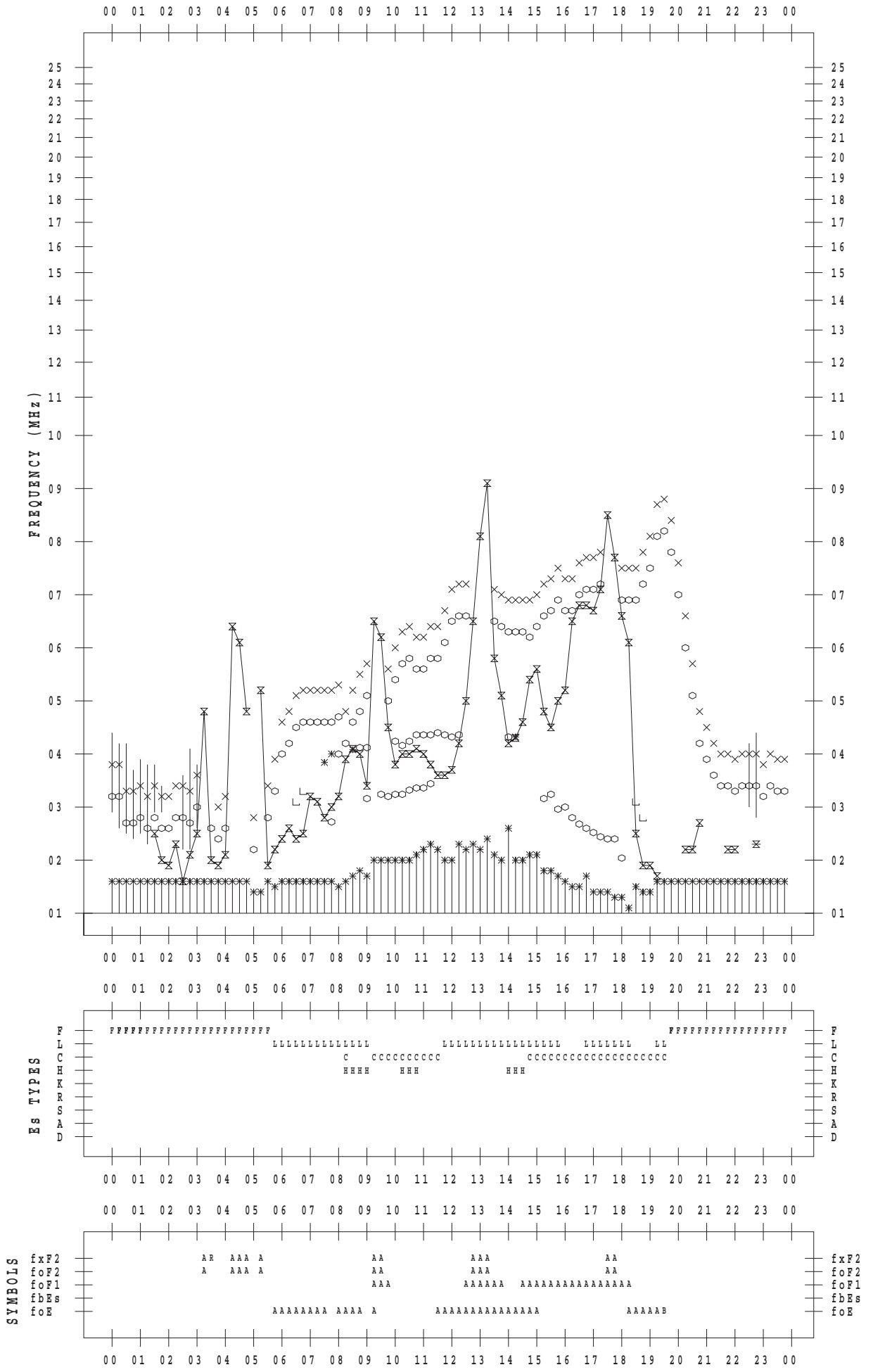
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/13

135 °E MEAN TIME



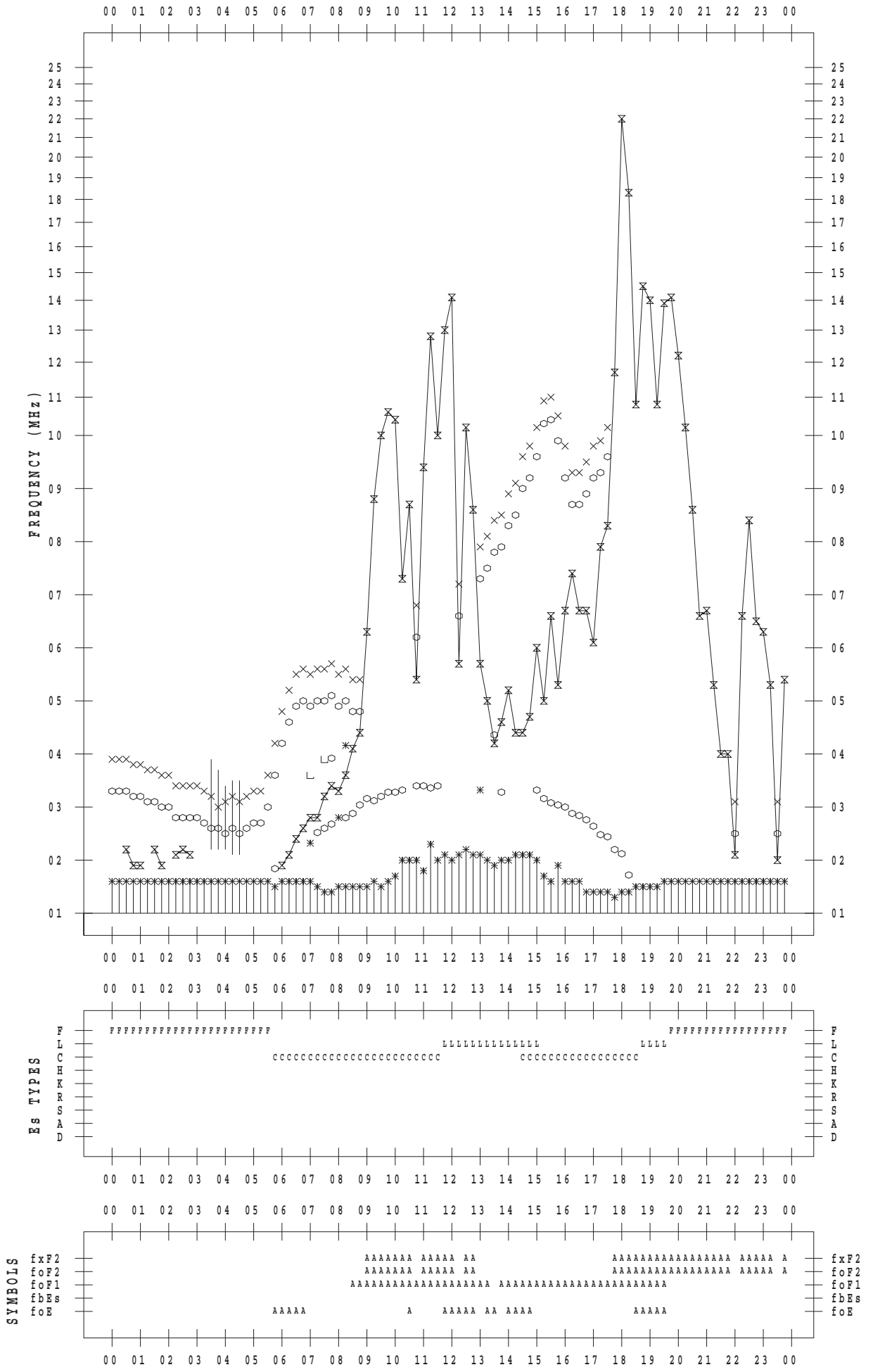
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/14

135 °E MEAN TIME



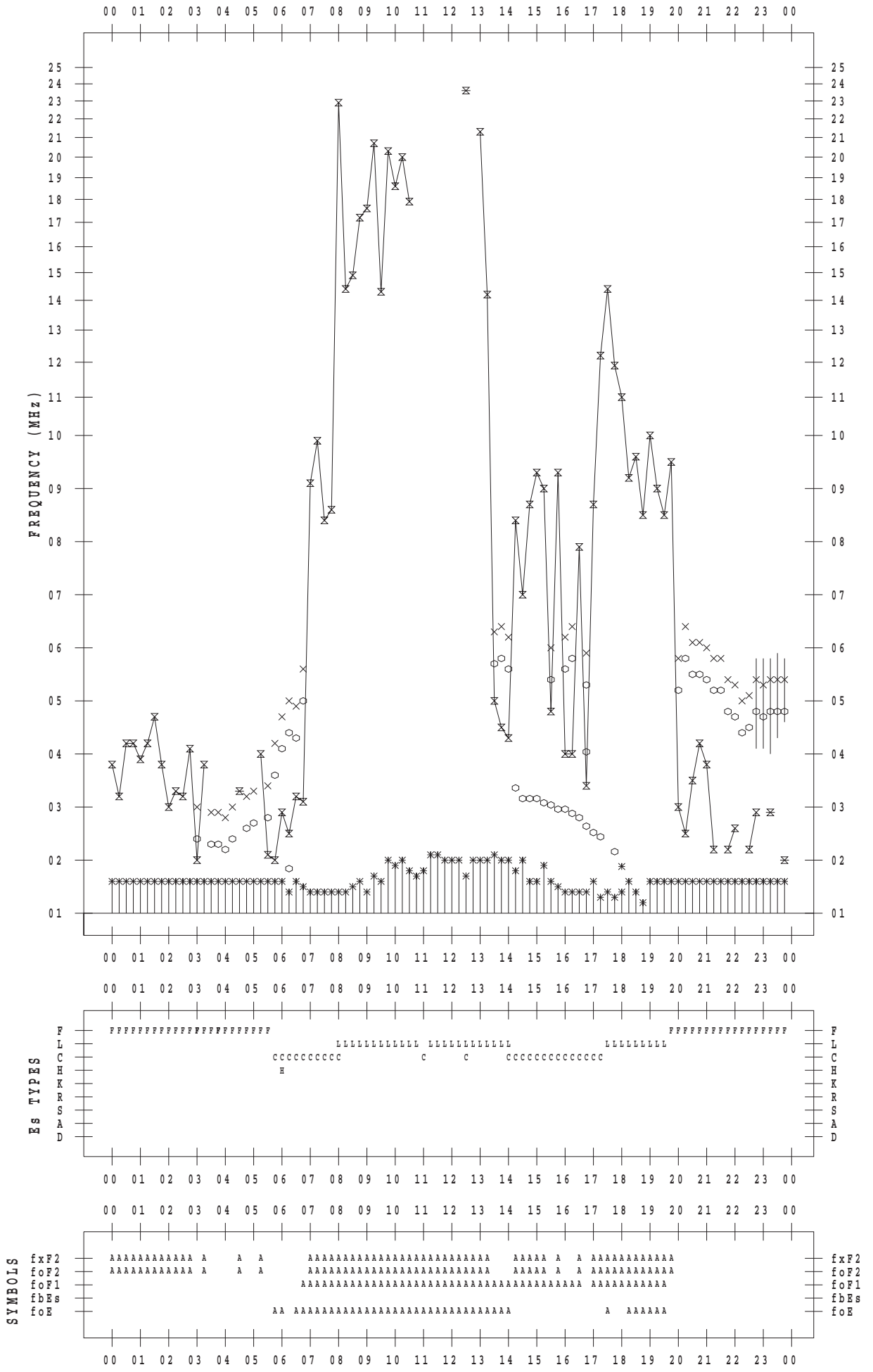
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/15

135 °E MEAN TIME



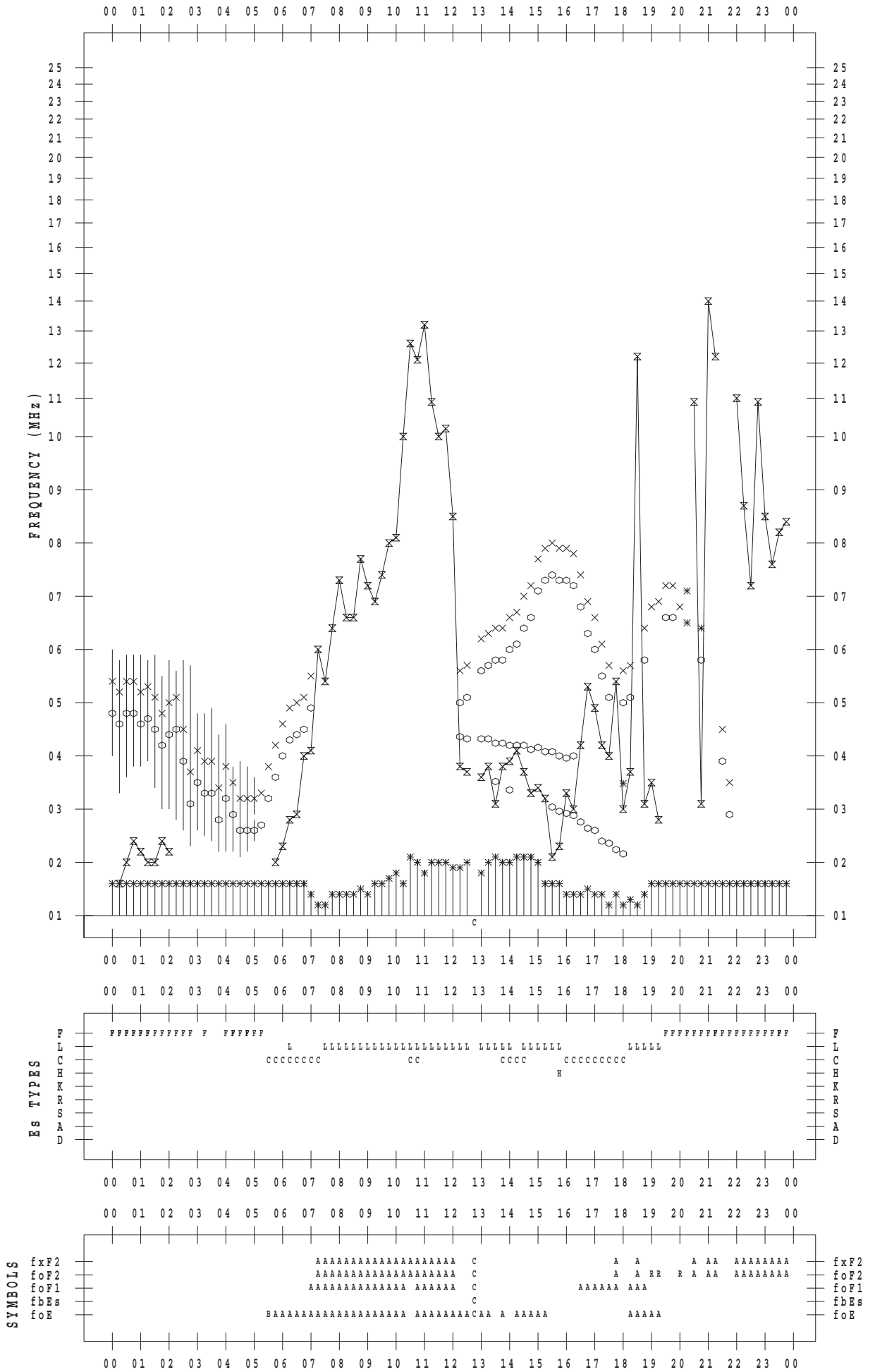
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/16

135 °E MEAN TIME



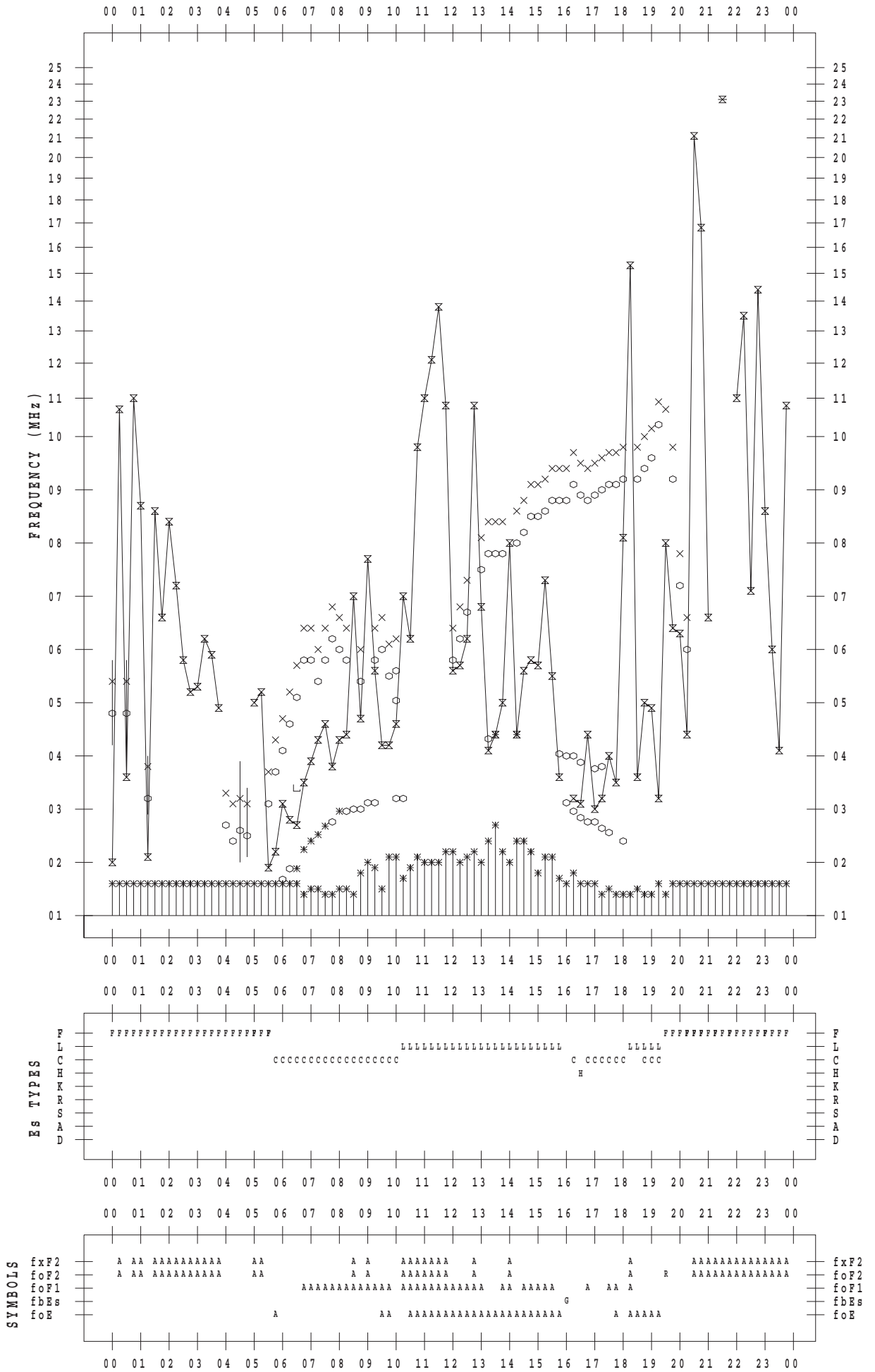
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/17

135 °E MEAN TIME



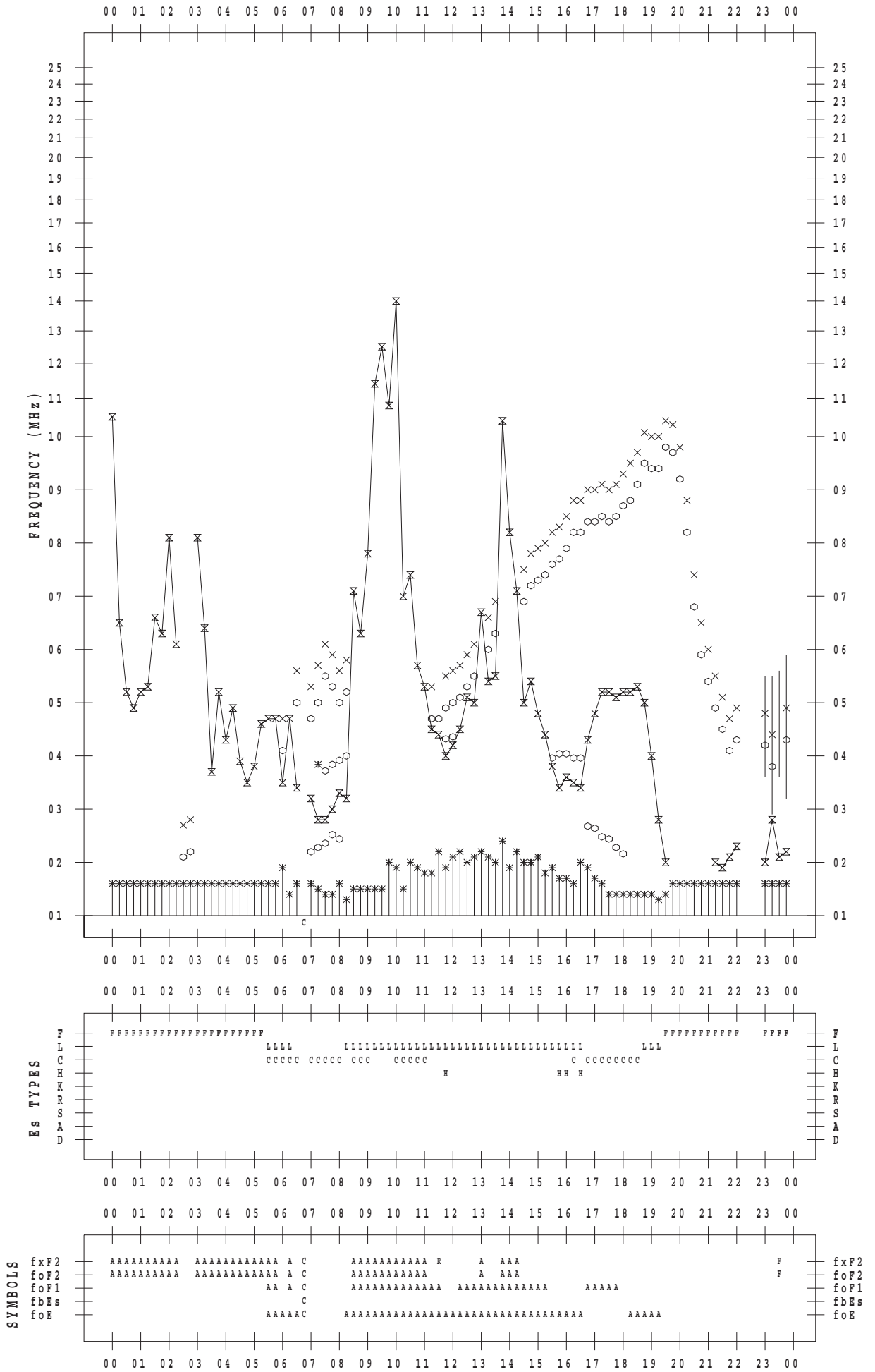
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/18

135 °E MEAN TIME



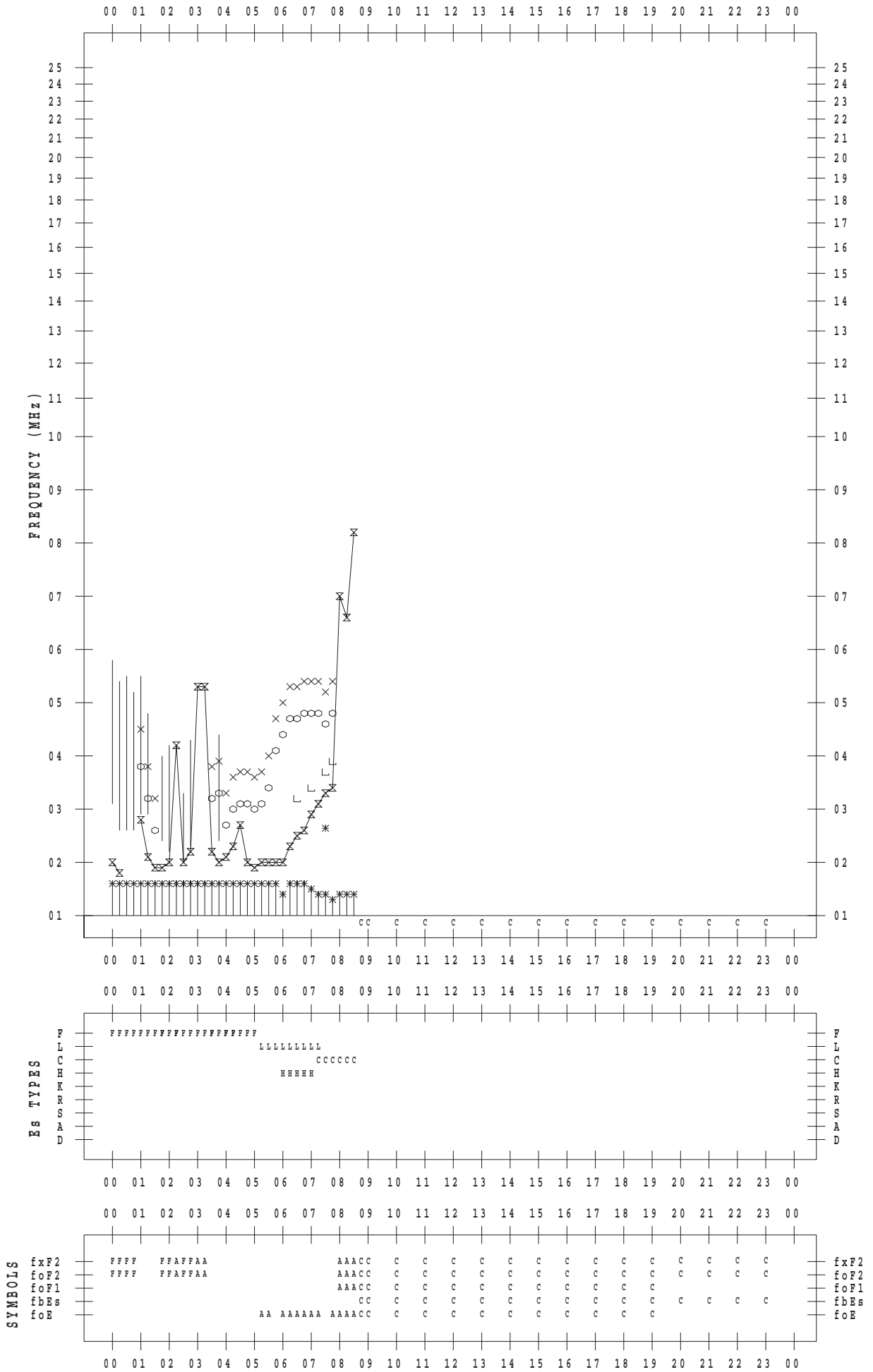
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/19

135 °E MEAN TIME



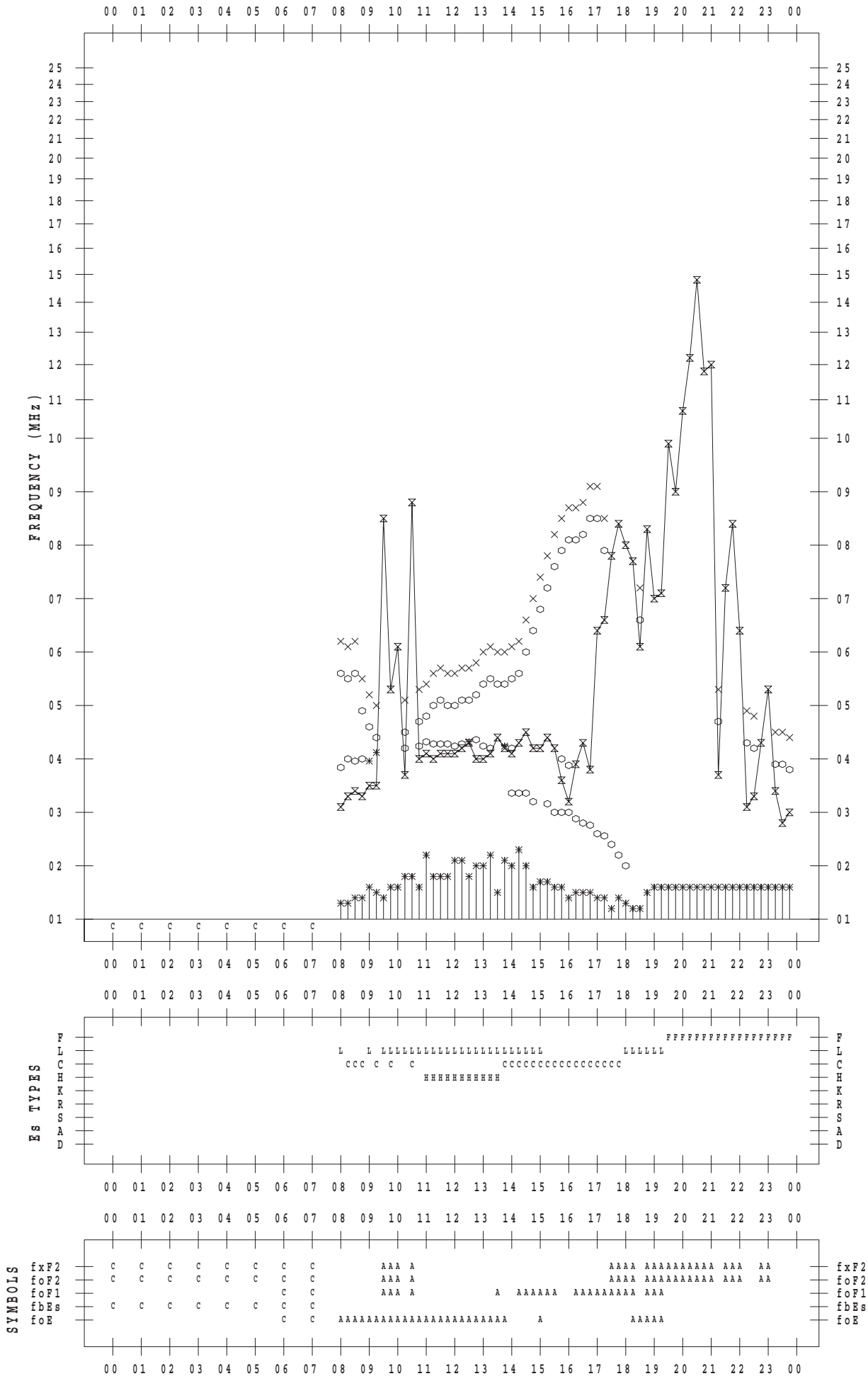
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/20

135 °E MEAN TIME



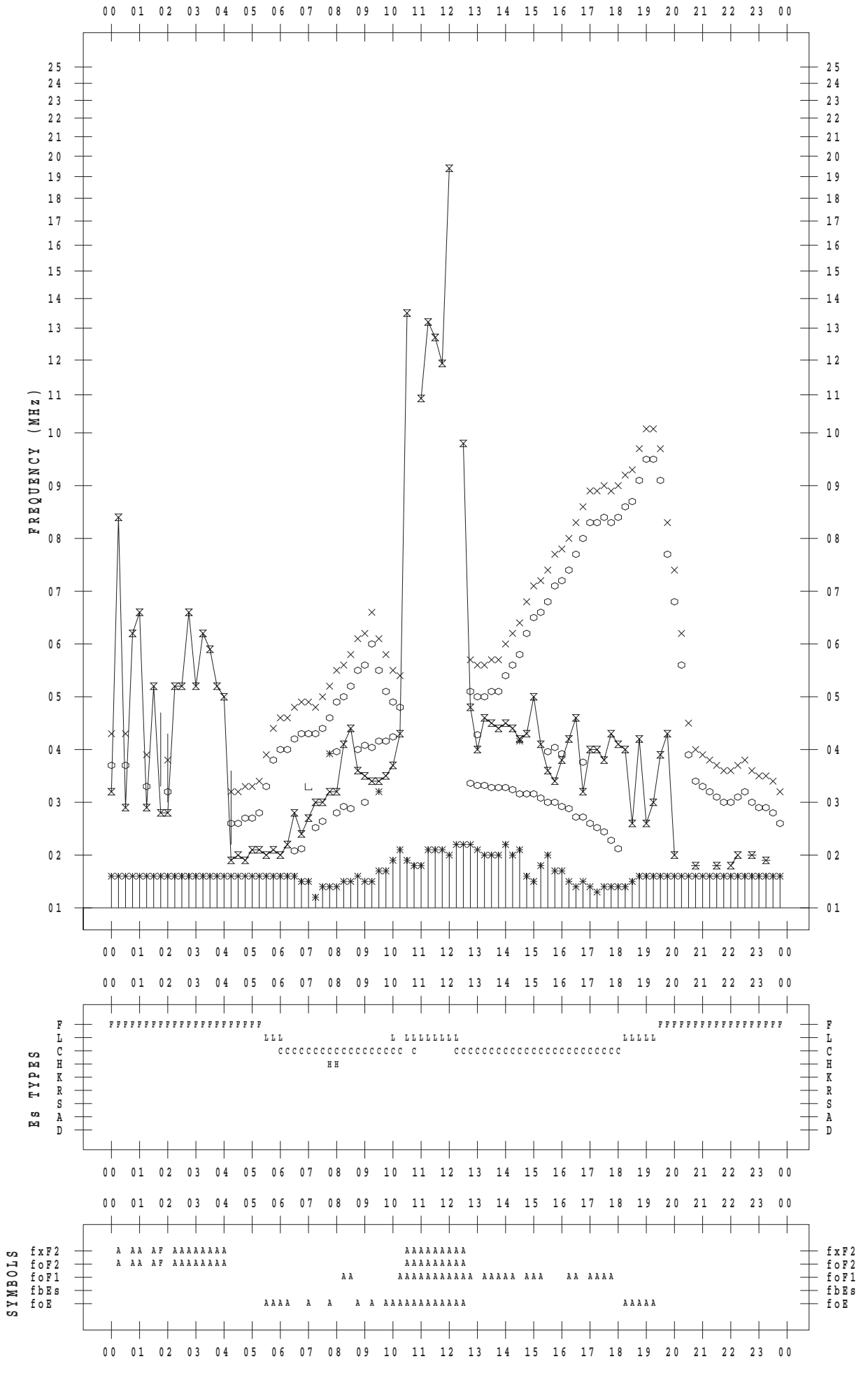
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/21

135 °E MEAN TIME



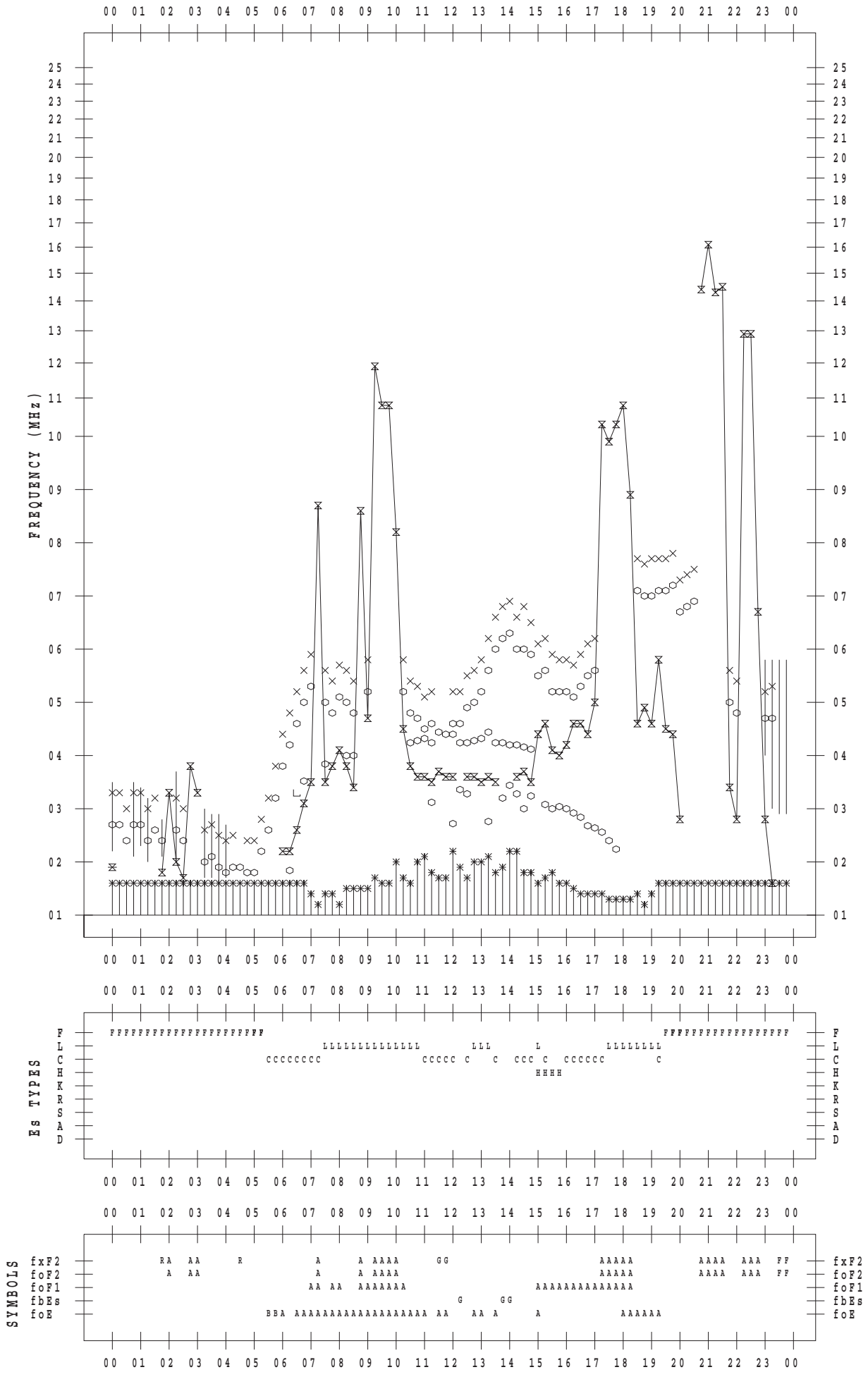
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/22

135 °E MEAN TIME



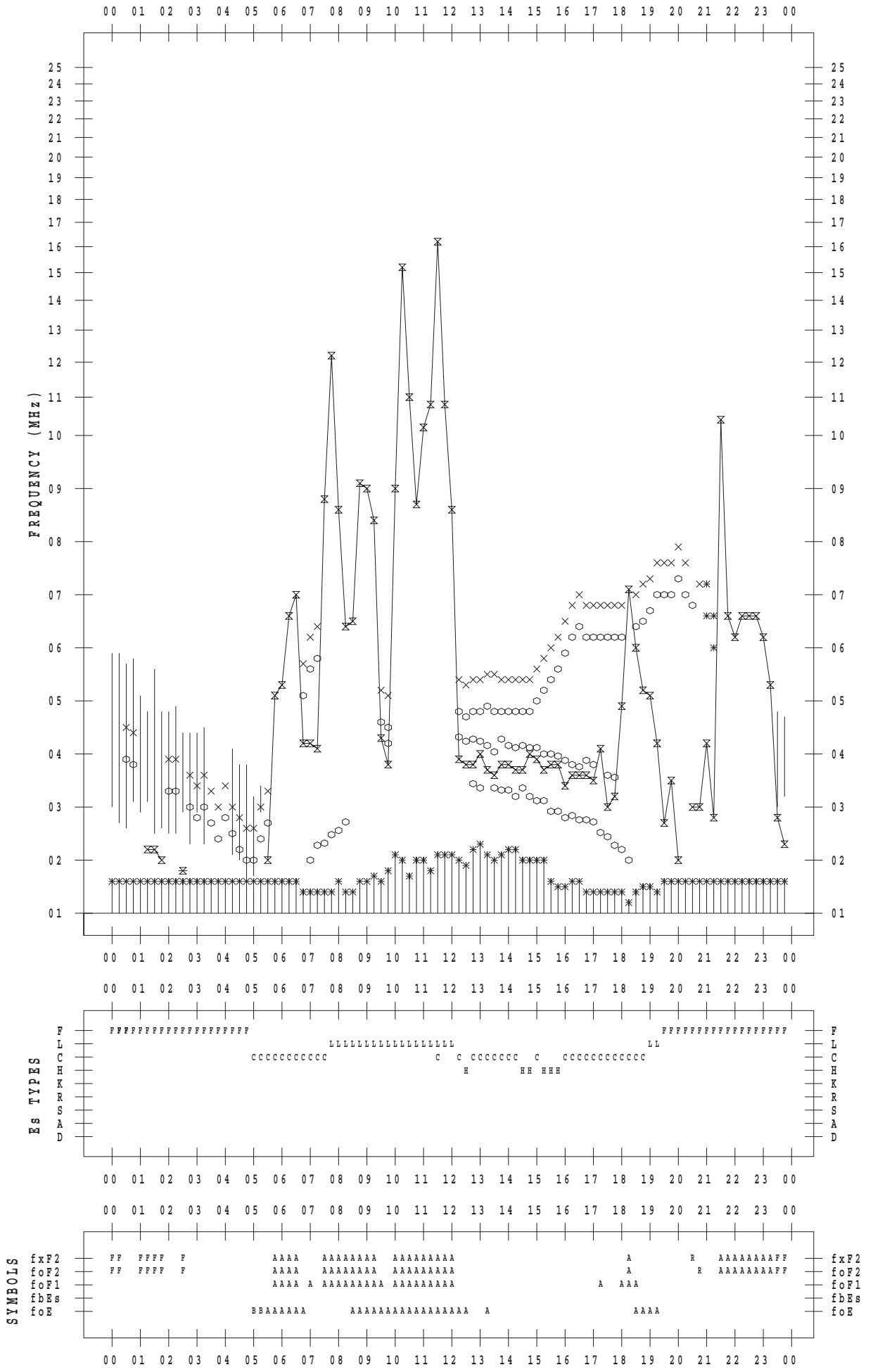
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/23

135 °E MEAN TIME



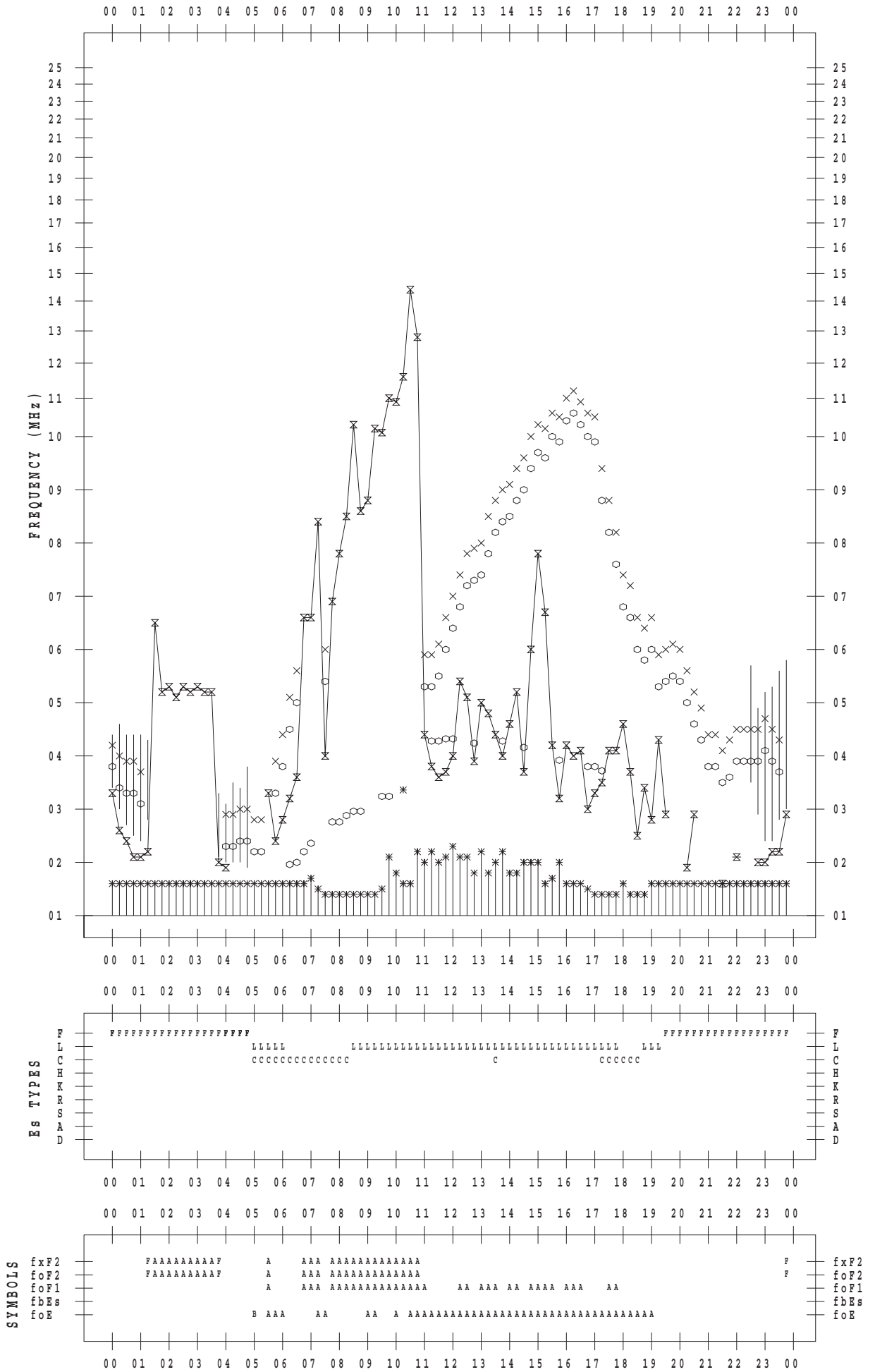
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/24

135 °E MEAN TIME



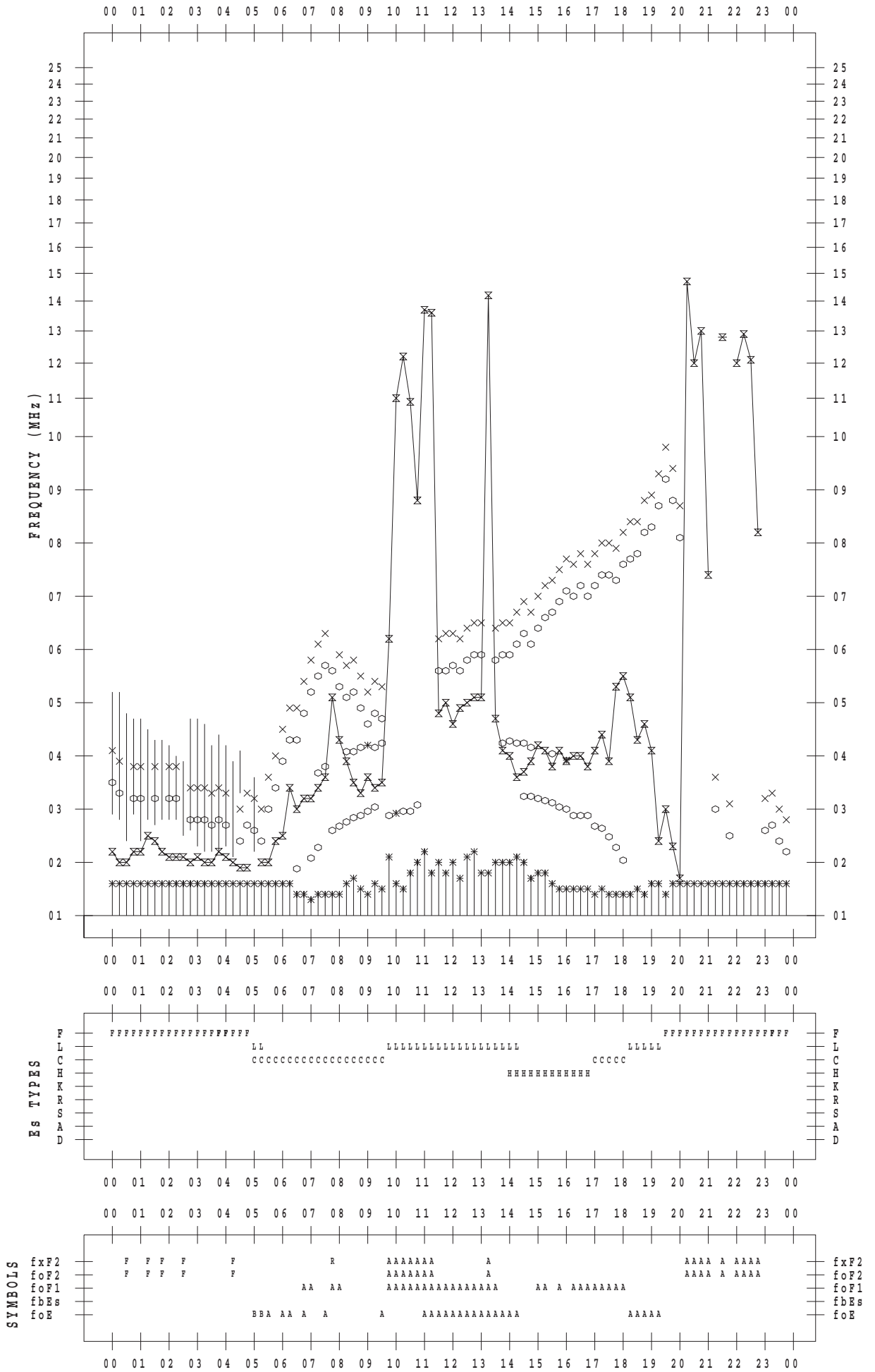
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/25

135 °E MEAN TIME



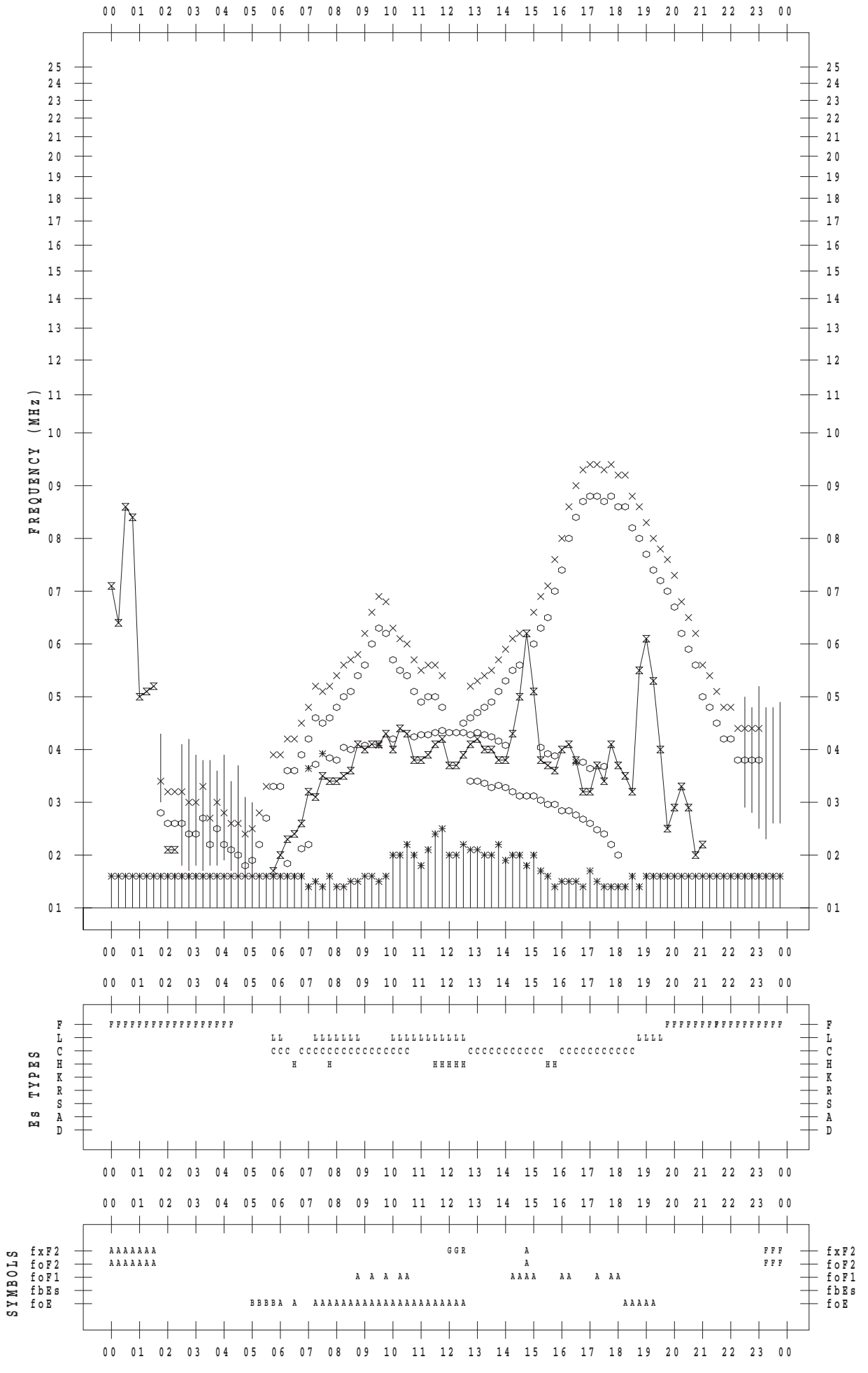
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/26

135 °E MEAN TIME



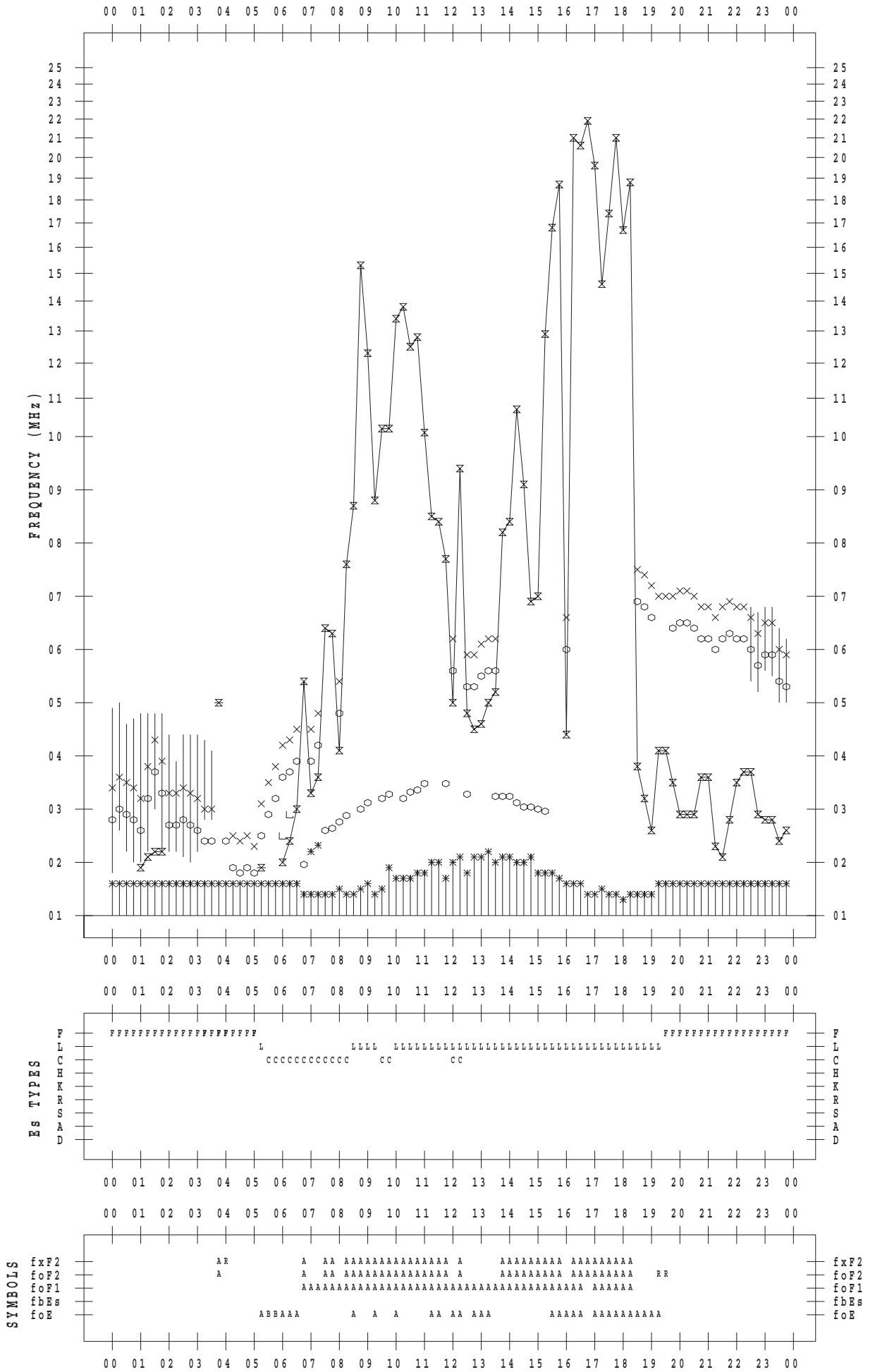
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/27

135 °E MEAN TIME



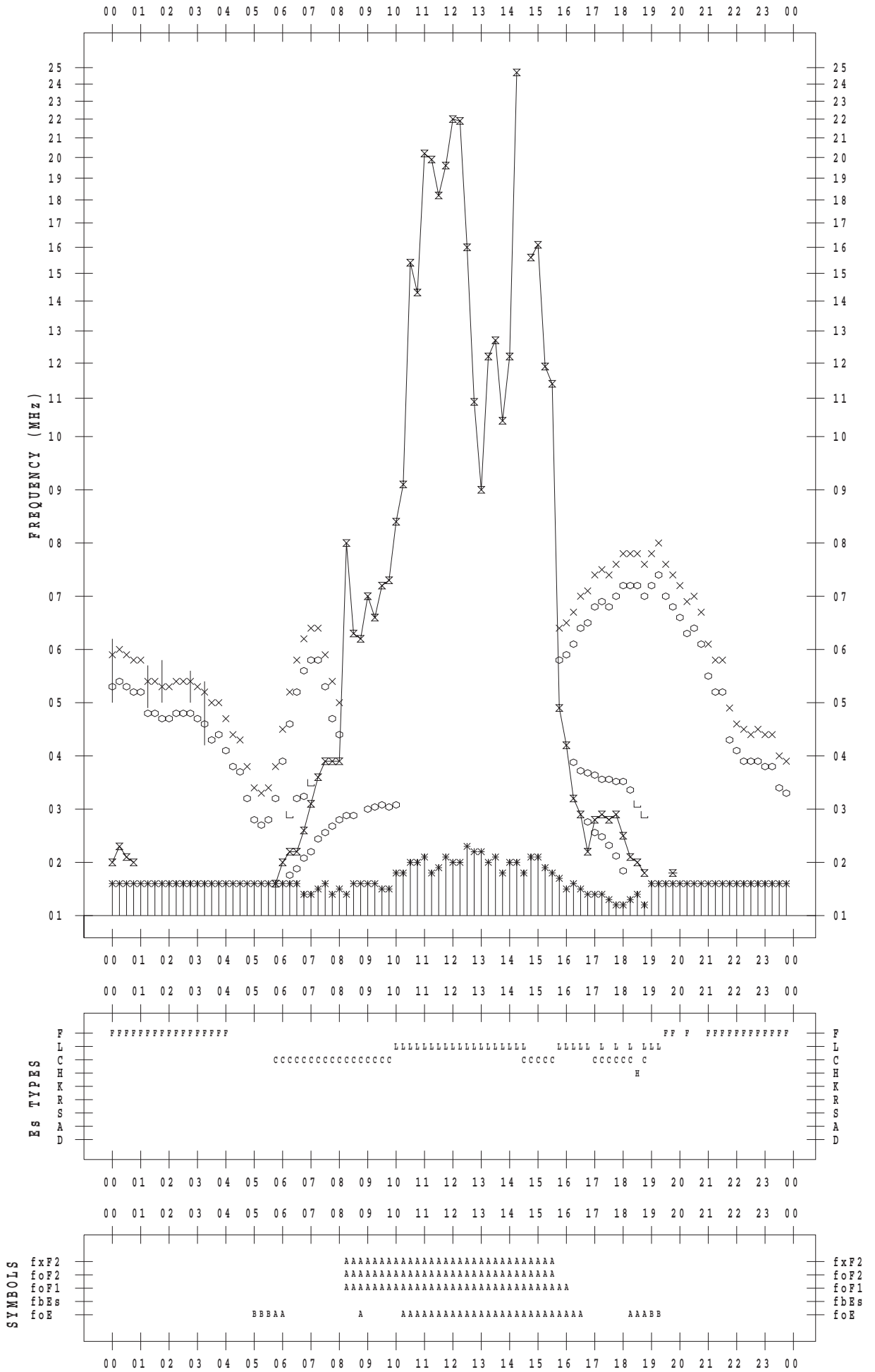
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/28

135 °E MEAN TIME



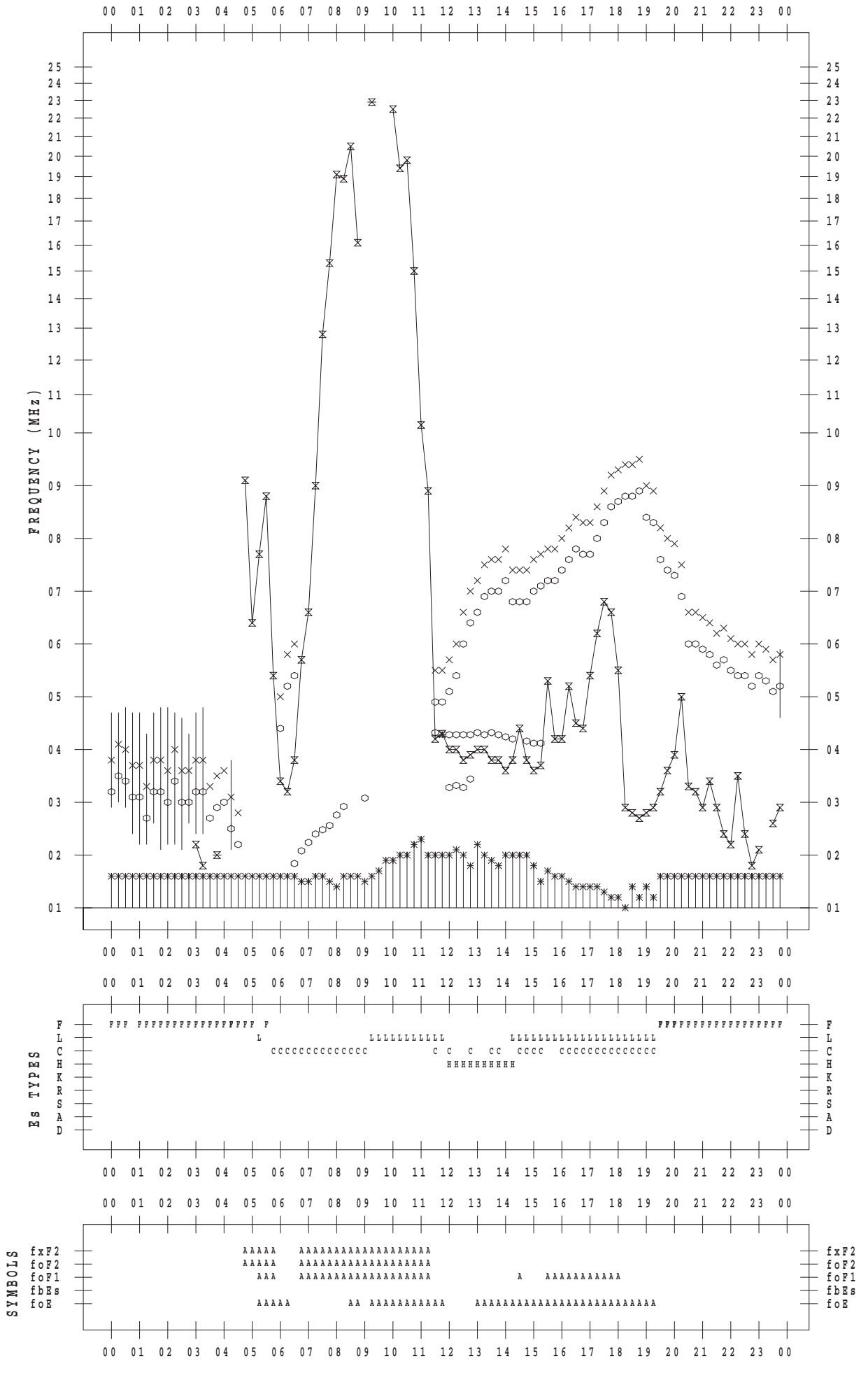
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/29

135 °E MEAN TIME



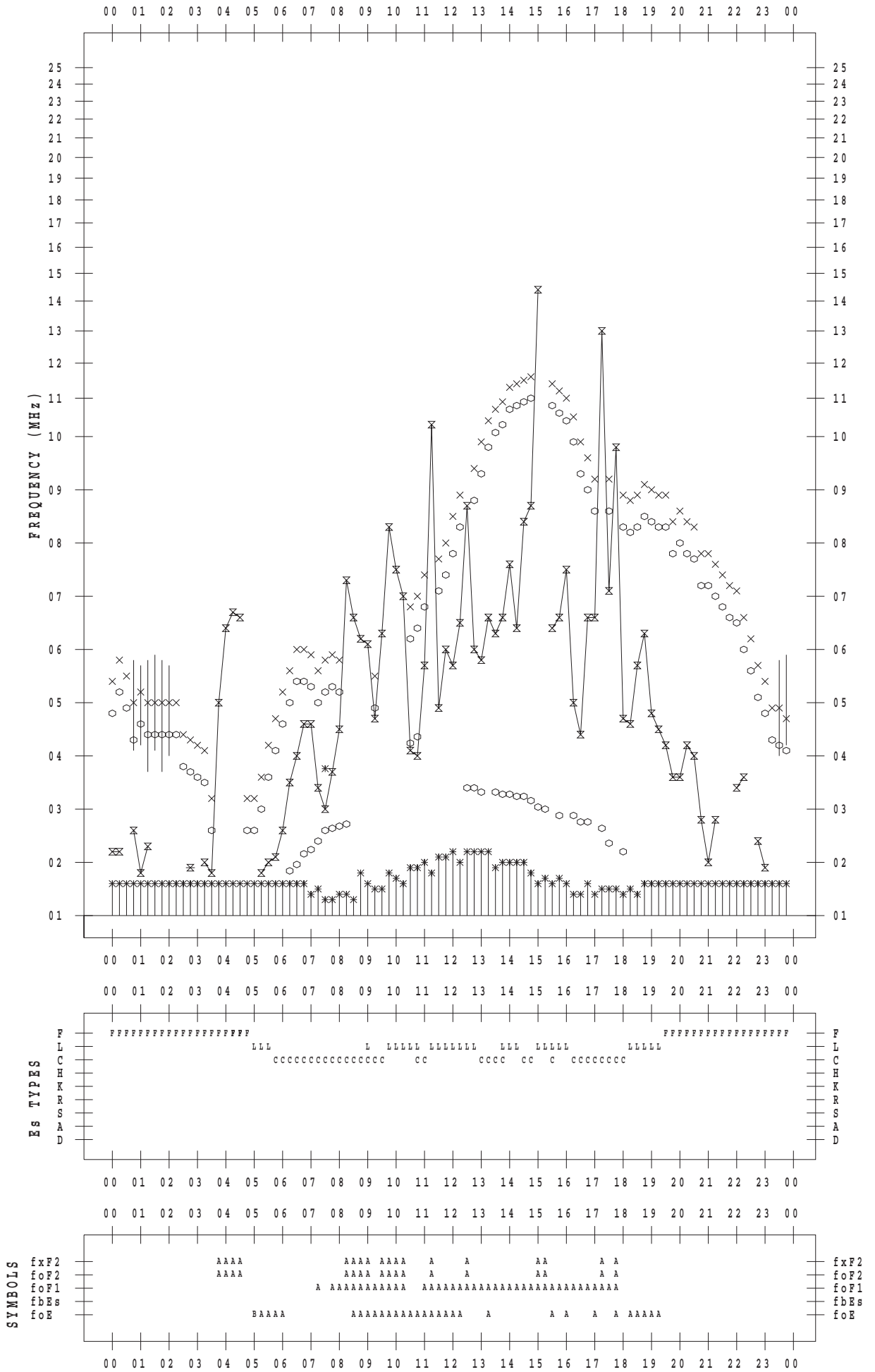
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/30

135 °E MEAN TIME



f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/ 5/31

135 °E MEAN TIME