F-851

IONOSPHERIC DATA IN JAPAN

FOR NOVEMBER 2019

VOL. 71 NO.11

CONTENTS

≪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

NOV.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												C	C	C	C									
2										C	C	C	C	C	C	C								
3																								
4																								
5														55	51	50	49	38	32	36	37	32	32	32
6	34	34	34	31	32	34	32	52	60	58	61	61	66	60	56	54	50	A	32	A	46	A	A	A
7	51	46	47	35	46	48	34	53	61	A	65	A	62	56	48	58	58	A	A	34	36	38	38	40
8	37	31	32	34	28	29	28	46	55	55	62	64	60	52	52	50	55	38	35	29	35	37	37	32
9	34	32	29	41	32	32	30	47	60	56	56	60	54	54	53	55	52	A		28	31	34	34	32
10	31	32	32	31	29	28	28	19	50	56	53	60	56	52	53	56	37	29	34	34	34	A	37	44
11	47	45	46	34	46	51	51	44	52	53	50	58	54	56	47	54	48	26	34	31	23	N	36	34
12	34	32	29	32	34	22	26	49		66	65	59	67	56	55	54	54	30	36	34	34	32	34	34
13	34	34	34	34	34	34	27	42	36	51	61	57	58	54	64	48	59	26	28	29	49	26	A	32
14	31	30	31	31	31	34	26	45	55	54	29	59	63	54	53	50	47	28	A	26	189	28	32	34
15	32	34		34	36	42	32	42	51	55	54	57	55	48	57	50	44	A	29	32	34	40	47	39
16	36	36	34	31	32	38	40	49	46	56	54	64	62	54	50	51	48	32	32	40	47	54	48	47
17	34	31	31	29	32	35	28	39	29	51	54	55	60	51	55	34		59		31	35	32	34	32
18	32	32	34	34	32	29	32	43	54	49	55	58	66	57	56	52	38	30		29	28	A	32	31
19	31	34	32	35	31	31		50	52	51	57	57	57	54	50	36	44	28	26	26	31	34	34	
20	34	37	34	32	31	30	25	41	46	54	55	54	29	51		47	38		29	29	34	37	43	38
21	38	37	42	40	34	31		43	45	54	42	55	53	51	49	46	40	32	29	34	40	36	37	47
22	51	52	47	50	50	50	48	52	54	67	66	74	64	55	50	71	54	42	42	51	54	50	52	50
23	42	52	54	55	54	54	41	52	55	A	78	86	78	56	60	52	52	42	A	A	48	A	46	A
24	A	42	42	34	34	34	28	40	50	35	53	72	A	60	57	51	45	28	32	34	36	36	34	36
25	36	38	40	38	40	35	28	44	51	34	67	67	57	57	52	48	45	31	23	34	34	32	36	40
26	40	37	36	34	31	32	39	42	54	N	64	66	58	58	50	54	40	N	29		34	34	36	50
27	39	34	36	36	34	31	39	44	49	51	63	60	55	60	51	51	49	30	28	28	34	32	42	34
28	31	28	32	28	33	32	26	46	49	58	55	56	57	52	70	56	49	32	A	43	49	53	53	54
29	32		33	53	50	52	52	52	51	63	63	56	57	56	54	51	47	30	34	40	43	48	51	52
30	52	52	52	51	28	28	25	37	51	62	55	59	55	56	51	49	38	A	A	36	34	32	34	32
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	24	24	24	25	25	25	23	25	24	22	25	24	24	26	25	26	25	19	18	23	26	21	24	23
MED	34	34	34	34	33	34	30	44	51	54	56	59	58	55	53	51	48	30	32	34	35	34	36	36
U Q	39	40	42	39	38	40	39	49	54	58	63	64	62	56	56	54	52	38	34	36	46	39	44	47
L Q	32	32	32	31	31	30	27	42	49	51	54	57	55	52	50	49	42	28	29	29	34	32	34	32

HOURLY VALUES OF fEs AT Wakkanai

NOV.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												C	C	C	C									
2										C	C	C	C	C	C	C								
3																								
4																								
5														G	G	48	G	27	G	27	G	G	G	G
6	G	G	G	G	G	29	33	G	36	48	49	G	G	G	40	50	27	57	49	60	54	56	43	43
7	40	28	G	G	24	G	G	39	43	72	74	92	76	50	34	G	G	44	58	30	29	59	39	28
8	G	35	G	26	30	G	G	G	45	42	G	G	G	40	32	34	40	31	30	G	G	G	G	G
9	G	G	G	G	G	G	G	28	32	33	G	G	G	35	35	39	35	29	G	G	G	G	G	G
10	G	G	G	G	G	G	G	30	37	G	44	G	36	G	35	G	G	G	32	G	27	38	32	G
11	28	G	G	G	G	28	27	30	38	39	44	G	38	43	35	32	G	G	G	36	41	33	G	G
12	G	G	G	G	G	G	G	25		44	45	37	34	G	G	31	G	G	25	G	30	G	G	G
13	G	G	G	G	G	11	57	44	48	39	109	44	37	G	32	28	G	G	G	G	G	26	33	34
14	G	G	G	G	G	11	G	G	52	59	36	56	59	35	32	35	G	G	55	34	G	G	28	G
15	G	G		G	G	G	G	109	52	G	57	41	43	34	41	29	29	59	26	G	29	G	G	G
16	G	G	G	G	G	G	115	44	49	36	34	35	45	52	G	G	26	G	G	G	G	28	G	G
17	G	G	G	G	G	11	G	40	33	34	37	36	35	50	G	128		G		G	G	G	26	G
18	G	G	G	G	G	G	G	40	50	60	35	151	G	47	58	41	36	25		G	33	34	G	G
19	29	41	32	27	27	27		G	32	38	39	36	36	34	31	G	41	G	G	G	G	G	G	
20	G	24	131	27	26	G	G	G	G	33	40	36	35	35		48	56		G	G	G	G	G	26
21	G	G	G	G	G	G		G	31	35	50	35	35	37	34	31	55	G	G	29	44	G	34	29
22	G	G	G	G	G	G	G	G	33	40	116	37	34	36	31	33	44	40	93	27	26	35	32	G
23	G	G	G	G	G	G	41	41	32	86	92	44	34	G	34	40	G	28	58	136	125	79	32	82
24	81	27	30	G	G	G	G	G	40	40	50	46	85	44	40	40	48	G	G	26	26	G	32	30
25	G	24	24	G	G	94	G	35	40	41	43	G	34	33	G	29	23	34	G	26	122	G	G	G
26	G	G	G	G	G	G	G	28	29	35	39	34	34	G	G	G	39	22	G		28	G	G	G
27	G	G	G	G	117	G	G	28	40	36	110	G	34	54	32	33	32	G	32	27	G	G	G	G
28	G	G	G	G	G	G	G	154	48	52	37	34	35	33	36	G	11	G	55	26	31	48	32	G
29	26		26	26	G	33	159	48	32	34	34	34	34	G	G	G	48	G	27	G	11	G	26	G
30	G	G	G	G	G	G	32	39	38	60	81	35	35	48	G	G	11	49	49	37	28	G	G	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	24	24	25	25	25	23	25	24	25	25	25	25	26	25	26	25	25	24	25	26	26	26	25
MED	G	G	G	G	G	G	G	30	38	39	44	35	35	35	32	32	27	G	26	26	26	G	G	G
U Q	G	12	G	G	G	11	32	40	46	50	65	42	37	44	35	40	40	32	49	29	31	34	32	27
L Q	G	G	G	G	G	G	G	G	32	34	36	G	34	G	G	G	G	G	G	G	G	G	G	G

HOURLY VALUES OF fmin AT Wakkanai

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

HOURLY VALUES OF foF2 AT Kokubunji

NOV.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	41	47	34	34	36		32	50	51	61	58	70	74	68	55	50	59	51	28	32	A	30	25	A
2	30	30	31	30	26		30	46	50	59	54	68	59	64	63	64	51	39	30	31	34	34	26	31
3	A	28	27	30	25		32	52	47	51	49	66	64	58	59	53	51	36	26	A	A	A	A	30
4	28	27	A	30	34		30	N	53	54	61	62	57	65	67	51	54	39	31	30	30	34	28	32
5	32	21	27	23	28	26	37	50	44	55	58	52	49	70	59	58	50	41	A	A	37	35	A	A
6	32	32	31	31	32	31	A	53	63	58	60	53		66	59	54	48	38	35	23	A	A	A	30
7	34	35	34	34	34	N	34	47	53	58	69	58	59	65	59	45	55	36	36	A	27	30	32	34
8	31	30	27	N	26	N	34	44	47	54	55	53	54	57	57	54	53	42	30	34	28		28	28
9	A	27	30	27	30		32	54	N	52	56	55	54	67	58	55	45	A	28	34	21	27	30	25
10	48	58	27	26	N		29	46	52	52	54	55	47	47	54	51	55	35	N	A	A	27	A	A
11	28	27	58	24	32	34	31	49	51	49	58	56	A	52	57	51	N	39	A	A	A	30	30	26
12	27	36	34	32	26		28	40	55	54	80	88	63	65	55	A	45	A	A	A	34	32	32	31
13	31	30	27	32	37	N	26	42	47	56	46	64	58	55	60	51	49	38		27	30		27	26
14	28	31	31	28	32	N	28	45	52	49	55	58	60	58	51	51	45	34	23	A	30	A	N	28
15	28	27	26	27	35	A	27	45	55	40	55	57	49	55	54	49	48	N	26	28	32	30	30	32
16	31	31	30	28	27	N	26	42	51	53	57	50	47	51	60	58	48	A	A	A	A	A	36	34
17	32	23	26	25	26	N	25	42	47	56	48	58	53	64	55	50	50	38		30	34	32	A	A
18	28	A	28	27	N	N	26	48	54	49	58	51	58	61	54	51	50	26	N	27	N		N	27
19	28	28	A	31	27	58	27	44	53	53	55	62	57	58	55	53	48	34		A	26	26	27	27
20	27		27	26	25	24			48	49	56	54	53	55	57	57	48	26	N	25	27	27	32	32
21	30	27	28	28	26	26	28	46	49	49	59	62	50	51	54	49	41	32	27		27	26	27	26
22	30	A	A	A	26			50	55	58	67	68	59	63	53	49	49	34	A	32	32	A	A	A
23	A	A	32	34	34	31	27	45	54	65	82	71	65	59	51	55	49	36	45		39	42	58	34
24	30	30	30	A	26	26	32	54	52	74	71	90	67	60	57	A		A	A	A	34		27	32
25	31	28	27	28			N	50	64	66	67	79	62	55	54	52	48		A	27	32	A	32	28
26	32	A	28	27	31		N	48	55	64	62	61	56	53	64	54	48	A	A	30	26	27	28	28
27	28	26	21	21	28	A		44	54	48	61	69	N	55	60	55	51	32	N	30	A	A	26	26
28	27	26	26	N	26			41	51	52	58	64	57	65	59	73	54	32	30		30	A	A	24
29	24	30	25	27	27	A	N	45	53	48	61	67	58	50	65	50	C	C	A	A		30	A	A
30	31	31	34	27	27	N		38	44	45	56	65	58	56	51	45	47	30	27	A	32	A	30	28
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	27	25	27	26	27	8	21	28	29	30	30	30	27	30	30	28	27	22	14	15	21	17	20	24
MED	30	30	28	28	27	28	29	46	52	54	58	62	58	58	57	52	49	36	29	30	30	30	29	28
U Q	32	31	31	31	32	32	32	50	54	58	61	68	60	65	59	55	51	39	31	32	34	33	32	32
L Q	28	27	27	27	26	26	27	44	48	49	55	55	53	55	54	50	48	32	27	27	27	27	27	26

HOURLY VALUES OF fEs AT Kokubunji

NOV.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	29	29	29	G	11		131	49	33	42	G	42	G	39	G	48	42	29	G	G	54	55	G	87
2	G	31	49	G	G		28	29	39	40	G	38	G	G	G	G	G	30	23	G	G	G	G	G
3	31	25	G	G	G		G	G	G	G	39	39	42	G	G	G	31	33	32	41	43	49	37	G
4	G	G	29	G	11		24	31	42	G	37	G	50	49	G	G	G	24	24	26	G	30	G	G
5	23	G	G	G	G	G	G	33	34	G	51	38	G	G	44	34	34	40	40	39	39	35	41	34
6	G	G	G	G	G	54	70	G	G	42	108	G		G	G	G	G	G	39	39	85	44	32	G
7	G	G	G	G	G	G	G	27	37	G	G	G	87	G	40	114	38	G	G	33	G	G	G	G
8	G	G	29	G	G	G	G	48	36	37	37	G	G	G	40	40	39	24	G	G	G		29	27
9	31	28	G	G	G		G	29	33	40	G	G	43	G	G	37	33	31	G	G	31	G	G	G
10	G	G	G	G	G		G	G	32	G	G	37	G	170	G	32	G	34	G	29	39	28	29	30
11	G	G	G	G	G	G	G	47	142	G	45	G	41	41	47	43	29	24	36	60	45	27	30	G
12	G	G	G	G	G		90	G	G	35	40	53	51	49	53	57	50	42	32	44	33	G	G	G
13	G	G	G	G	11	29	G	29	41	G	G	37	G	G	G	G	29	40		G	G		G	G
14	G	G	G	G	G	28	G	27	54	G	G	G	G	G	G	G	G	G	28	40	25	33	G	G
15	G	G	G	G	G	29	G	27	G	G	38	G	G	G	40	49	45	34	G	G	G	G	G	G
16	G	G	G	G	28	G	G	45	47	38	39	44	45	37	40	G	35	28	26	39	38	31	32	G
17	G	G	G	G	G	G	G	38	88	45	37	40	38	G	G	G	G	G		34	33	33	43	51
18	G	39	G	G	G	G	G	27	34	37	G	G	G	G	G	40	28	33	G	G	G		G	G
19	G	27	31	G	G	G	G	G	34	G	39	40	37	G	G	31	39	29		29	G	G	G	G
20	G	G	G	G	G	G			G	35	40	G	G	36	34	36	27	34	G	25	G	G	G	G
21	G	G	G	G	G	G	G	G	31	44	42	38	40	40	36	32	41	G	G		G	G	39	G
22	26	32	28	28	G			G	31	47	51	56	40	44	37	37	43	G	40	G	G	26	55	35
23	59	29	G	G	G	G	G	28	33	38	41	57	40	42	37	31	29	G	31		G	G	G	G
24	G	24	28	32	G	28	G	G	34	45	43	42	43	40	47	85		49	44	35	21		G	G
25	G	G	G	G			G	26	32	38	39	G	G	G	38	32	G		45	23	29	40	G	28
26	26	33	G	27	G		G	G	31	G	38	G	39	53	40	G	G	36	29	G	G	G	G	G
27	G	G	G	G	11	26		34	G	36	38	40	46	52	39	G	G	34	G	G	28	29	G	G
28	G	G	G	G	G			41	G	37	40	G	G	36	40	34	G	G	G		G	38	53	28
29	G	G	G	G	G	27	G	29	32	35	50	38	G	39	G	G	C	C	41	34	G	G	32	28
30	G	G	G	G	G	G		33	31	34	G	G	G	41	G	G	G	21	G	45	31	33	G	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	29	19	25	29	30	30	30	30	29	30	30	30	28	28	27	27	30	26	30	30
MED	G	G	G	G	G	G	G	28	33	36	38	37	37	36	35	32	29	29	24	29	11	28	G	G
U Q	G	27	G	G	G	28	G	33	37	40	41	40	42	41	40	40	38	34	36	39	33	33	32	28
L Q	G	G	G	G	G	G	G	G	31	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G

HOURLY VALUES OF fmin AT Kokubunji

NOV.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	14	14	15	14		14	14	15	15	17	22	22	18	17	14	18	13	13	13	14	14	13	14
2	14	13	13	13	13		14	13	15	14	17	21	31	31	17	18	13	14	14	14	18	13	14	14
3	13	14	14	15	14		14	13	13	14	17	17	17	17	14	14	14	14	13	13	13	14	13	13
4	13	13	14	13	14		14	14	13	15	15	24	18	15	20	25	20	14	15	14	17	13	17	17
5	14	14	14	15	14	17	14	14	14	14	14	15	35	14	21	13	14	15	14	14	14	14	14	14
6	14	14	14	14	14	13	14	20	14	14	15	21		20	17	17	20	14	15	14	13	14	14	20
7	20	14	14	14	14	15	14	18	18	14	20	17	14	20	15	15	14	17	17	18	15	14	13	17
8	14	14	14	14	14	14	13	14	14	15	20	33	15	14	13	14	14	14	18	14	13		17	17
9	18	13	15	14	13		14	14	13	13	13	17	17	28	17	23	14	14	14	20	14	14	13	14
10	14	14	14	17	14		15	17	14	18	18	18	20	20	14	14	21	14	22	14	13	17	15	13
11	14	17	14	14	14	15	13	15	14	14	17	18	20	20	22	14	13	14	13	14	14	14	15	14
12	14	15	15	14	14		18	17	14	14	13	20	13	14	13	15	13	13	13	14	14	14	13	14
13	14	17	13	15	14	14	13	14	14	15	30	17	21	20	14	18	13	14		17	14		14	14
14	14	14	14	14	14	13	14	14	13	13	17	18	20	17	14	25	20	20	13	13	14	14	17	14
15	15	14	14	14	14	13	14	15	13	20	14	14	20	17	14	13	14	15	18	14	20	14	14	13
16	14	14	14	14	14	14	18	18	14	13	17	15	13	20	18	14	14	14	17	14	13	14	14	17
17	14	14	14	14	14	14	14	17	14	14	14	13	14	13	13	15	20	15		14	14	13	14	13
18	14	14	14	14	14	14	14	14	14	14	14	18	18	14	15	14	14	17	20	14	14		14	15
19	14	14	13	13	14	14	14	17	14	15	18	18	15	14	14	14	13	13		13	14	15	14	14
20	13	18	15	18	15	14			13	14	17	20	17	15	17	14	20	14	14	14	14	15	15	14
21	14	15	14	14	15	15	17	20	14	13	15	17	15	14	13	14	20	14	14		15	15	14	14
22	14	13	14	14	15			17	13	14	14	14	14	13	14	13	14	13	13	14	14	14	13	13
23	14	14	15	13	14	15	15	14	13	13	13	14	15	17	17	14	18	21	13		13	13	14	13
24	14	14	13	14	15	14	15	18	14	14	14	14	14	17	15	14		14	14	14	13		14	13
25	13	13	14	14			14	17	14	14	14	14	18	17	13	13	20		13	13	14	13	14	14
26	13	13	18	17	14		14	18	14	15	13	18	17	14	13	14	14	14	14	15	14	15	14	15
27	13	14	13	17	14	14		14	14	14	14	14	17	17	17	14	18	14	20	14	13	14	14	14
28	14	13	14	14	14			13	14	14	14	15	14	14	15	13	14	14	14		13	15	13	14
29	14	14	14	14	15	14	14	14	14	14	14	15	14	17	14	24	C	C	13	14	14	14	14	14
30	18	14	14	13	17	14		17	13	13	15	14	31	18	21	23	18	14	20	17	14	15	14	14
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	29	19	25	29	30	30	30	30	29	30	30	30	28	28	27	27	30	26	30	30
MED	14	14	14	14	14	14	14	15	14	14	15	17	17	17	15	14	14	14	14	14	14	14	14	14
U Q	14	14	14	15	14	15	14	17	14	15	17	18	20	20	17	17	20	14	17	14	14	15	14	14
L Q	14	14	14	14	14	14	14	14	13	14	14	14	14	14	14	14	14	14	13	14	13	14	14	14

HOURLY VALUES OF foF2 AT Yamagawa

NOV.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	34	36	40	34	46	39	26	48	48	51	63	72	75	71	71	69	68	50	42	29	32	34	A	A
2	A	29	A	29	34	B	B	40	A	44	59	69	64	65	75	67	52	44	37	30	A	A	34	A
3	30	A	28	28	32	N		47	54	50	51	57	61	60	61	66	54	44	34	34	29	A	A	A
4	A	A	A	26		N	N	43	39	50	51	66	57	61	70	77	58	44	A	A	34	35	34	29
5	31	30	32	30	31	29	30	54	48	54	59	45	A	55	66	71	57	N	37	A	34	A	34	A
6	29	28	28	25	31	32	29	66	54	55	67	56	46	66	79	C	51	48	42	42	N	30	A	34
7	30	31	30	29	29	28	B	42	54	55	64	73	71	63	67	67	55	51	36	37	28	30	32	31
8	31	31	28	A	28	25	N	46	52	52	51	56	59	61	58	66	55	44		29	A	A	N	28
9	31	31	30	A	28	30	N	48	49	A	54	66	60	64	82	58	54	47	32	A	34	28	29	32
10	31	31	31	28	28	26	N	50	54	52	48	62	52	59	70	54	35	44	49	28	31	32	N	A
11	28	28	29	28	36	A	N	39	48	35	47	59	58	58	70	57	34	27	A	A	A	A	A	28
12	31	32	34	32	26	23	B	41	51	54	71	84	66	60	65	55	52	48	42	30	34	A	32	34
13	34	32	30	34	43	N	B	39	50	51	56	64	65	54	62	54	54	48	28	B	28	30	31	30
14	30	30	30	32	29	N	N	41	54	52	51	66	58	50	61	59	54	29	34	28	26	31	30	29
15	29	29	28	29	34	28	N	39	47	54	53	A	A	A	46	54	55	43	A	A	30	32	31	32
16	31	29	26	29	31		B	42	46	A	36	48	54	48	64	59	44	29	A	N	26	32	30	30
17	N	29	26	28	31	29		38	34	53	59	62	62	68	57	A	50	45	34	26	32	31	A	A
18	26	29	29	28	31	28	B	26	47	55	49	55	56	55	54	54	57	45	32	A	29	N	N	26
19	26	26	28	A	25	A	A	38	47	51	54	58	44	55	55	63	55	42	A	A	N	B	28	29
20	29	29	28	28	26	28	B	37	46	51	50	45	58	58	51	52	54	45	A	19	34	34	34	34
21	34	31	30	29	189	189	B	40	51	55	56	55	54	53	62	54	50	52	34	28	30	30	30	N
22	28	N	28	28	29	N	N	38	54	55	55	65	66	66	49	54	45	47	40	35	16	N	29	32
23	A	A	32	A	31	28	29	38	52	64	44	68	47	60	50	55	55	48	32	34	34	32	34	31
24	31	29	30	28	28	B	25	42	54	67	68	49	80	64	53	55	51	N	49	34	38	28	30	35
25	36	31	32	36	30	B	25	38	65	76	67	72	64	A	66	56	54	42	31	26	28	N	32	B
26	A	A	A	26	A	A	A	34	50	59	36	55	57	43	70	55	53	42	34	25		26	29	28
27	28	28	28	28	31	A	B	34	47	48	54	60	58	58	66	33	54	44	29		26	N	26	28
28	30	31	32	32	30	29	A	36	52	52	54	55	64	60	66	70	58	48	31	34	26	B	A	A
29	28	26	28	28	31	B	A	38	36	48	54	67	63	64	74	54	56	42	34	A	N	N	A	26
30	26	28	25	28	29	28	B	34	27	47	50	58	56	54	58	55	54	44	36	49	A	28	A	26
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	25	27	26	28	16	6	30	29	28	30	29	28	28	30	28	30	28	23	19	22	17	19	21
MED	30	29	29	28	31	28	28	40	50	52	54	60	58	60	64	56	54	44	34	30	30	31	31	30
U Q	31	31	31	30	31	29	29	43	54	55	59	66	64	64	70	66	55	48	40	34	34	32	34	32
L Q	28	28	28	28	28	28	25	38	47	50	50	55	56	55	57	54	51	42	32	28	28	29	29	28

HOURLY VALUES OF fEs AT Yamagawa

NOV.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	G	48	38	32	33	30	G	26	35	42	50	59	55	49	G	36	34	32	G	11	G	G	56	57
2	40	30	41	G	G	B	B	34	80	50	48	41	44	176	40	42	39	29	36	29	46	29	G	36
3	27	40	32	26	29	G	G	28	32	36	40	43	G	42	38	38	46	44	G	26	G	29	27	40
4	55	40	43	G		G	G	46	32	40	50	45	40	57	59	52	36	58	60	41	35	26	G	G
5	G	G	G	G	G	G	G	34	34	39	43	51	57	41	44	44	35	44	32	49	G	41	45	29
6	G	G	G	G	G	G	G	36	49	41	174	43	41	41	40	C	31	G	G	20	G	27	39	27
7	G	27	G	G	G	11	B	167	45	41	41	G	50	40	39	46	46	46	11	32	G	G	G	G
8	G	G	G	35	G	G	G	48	32	43	38	44	43	38	51	50	110	46	G	28	43	49	G	G
9	G	G	G	26	G	G	G	38	48	69	40	45	G	39	43	40	32	29	29	60	G	25	G	G
10	G	G	G	G	G	G	G	46	30	G	40	41	40	46	43	36	41	30	29	31	G	G	G	26
11	26	G	G	G	11	26	G	109	45	36	45	44	45	43	41	44	40	33	33	40	29	34	59	G
12	G	G	G	G	G	G	B	29	35	G	37	40	52	41	40	36	G	28	41	G	G	45	G	G
13	G	G	G	G	11	11	B	28	33	35	42	45	G	G	40	39	G	25	20	B	G	G	G	G
14	G	G	G	G	G	G	G	31	49	42	44	50	150	G	56	34	34	33	21	G	G	G	G	G
15	G	G	G	G	G	34	G	28	149	42	42	48	56	61	40	42	38	27	28	25	G	G	G	G
16	G	G	G	G	G		B	45	48	60	G	40	43	45	39	46	52	30	40	G	G	G	G	G
17	G	G	G	G	G	11	G	29	40	41	44	G	G	45	42	54	43	28	33	G	G	25	34	32
18	G	G	G	27	G	G	B	28	34	40	41	40	G	106	45	38	33	28	11	26	G	G	G	G
19	G	G	G	38	26	43	24	37	G	34	G	42	44	42	37	34	35	28	48	28	G	B	G	G
20	G	G	G	G	G	G	B	40	30	G	40	39	104	43	45	56	45	32	25	28	26	33	26	27
21	G	G	G	G	G	G	B	G	29	G	49	50	40	44	41	35	G	G	35	G	G	G	G	G
22	G	G	G	26	24	G	G	G	G	39	42	45	48	44	51	145	74	41	35	G	23	G	G	G
23	40	49	28	31	26	G	G	G	30	44	52	49	52	41	43	45	33	28	32	32	25	G	G	G
24	G	25	G	G	23	B	G	G	31	38	43	55	56	50	60	40	G	G	28	23	G	G	G	30
25	28	G	G	G	G	B	G	26	34	36	41	47	77	89	50	G	49	35	11	G	G	G	G	B
26	59	39	28	G	30	31	28	34	93	37	44	55	40	41	48	50	38	G	23	G		G	G	G
27	G	G	G	G	25	31	B	24	G	34	147	40	40	45	57	40	30	33	33	G	G	G	G	G
28	G	G	G	G	G	32	24	34	45	34	48	44	43	46	44	45	36	G	38	G	G	B	116	116
29	39	G	G	G	G	B	26	36	40	38	45	47	46	49	42	76	50	53	35	36	22	24	41	G
30	G	G	G	G	G	G	B	28	33	39	39	43	61	69	39	G	G	G	27	32	40	G	35	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	29	25	20	30	30	30	30	30	30	30	30	29	30	30	30	29	29	28	30	29
MED	G	G	G	G	G	G	G	32	34	39	42	44	44	44	42	42	36	30	29	26	G	G	G	G
U Q	26	25	G	26	23	28	G	38	45	42	48	48	55	49	48	48	45	35	35	32	24	28	34	28
L Q	G	G	G	G	G	G	G	28	31	35	40	41	40	41	40	36	32	27	20	G	G	G	G	G

HOURLY VALUES OF fmin AT Yamagawa

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

HOURLY VALUES OF foF2 AT Okinawa

NOV.2019

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	A	A	A	36	A	A	N	46	51	53	55	82	91	85	97	110	105	111	63	42	A	32	A	A
2	A	26	28	34	26	B	B	40	51	53	56	77	83	56	86	80	59	50	A	38	B	28	30	N
3	26	26	26	26	30	A	B	39	73	54	50	55	65	61	44	65	56	52	40	A	A	A	A	A
4	26	A	A	33	26	59		19	50	48	56	52	71	61	72	84	69	50	40	30	30	A	A	25
5	30	31	29	31	28	N	B	42	51	50	64	75	64	51	69	74	65	55	41	40	34	34	37	31
6	A	28	32	30	31	34	B	41	55	52	58	82	66	68	74	68	54	50	41	42	37	26	28	A
7	A	A	26	29	32	N	B	40	51	54	64	80	82	81	77	66	65	54	51	45	A	31	34	28
8	32	30	30	30	A	20	N	44	54	52	57	66	66	68	62	70	60	50	32	34	32	26	A	A
9	A	34	32	28	28	N	N	41	53	55	60	74	82	85	99	78	57	54	44	35	32	A	34	40
10	37	32	31	49	28	28	B	43	54	51	51	60	64	70	86	57	64	55	41	29	30	31	26	B
11	B	N	26	B	N		B	40	45	51	52	54	70	65	67	65	53	51	40	A	34	41	52	46
12	46	37	34	39	B	A	A	42	50	63	75	91	69	65	66	66	52	54	44	A	34	34	32	34
13	36	34	32	37	43	B	B	38	48	55	65	82	90	94	78	A	55	51	A	30	29	30	34	29
14	31	31	31	30	B	B	B	38	54	A	60	65	82	65	65	60	60	54	40	32	29	29	34	28
15	28	28	26	28	31	N	B	39	54	50	52	53	A	A	62	60	49	30	44	29	28	32	30	29
16	34	31		28	29	N	N	39	47	48	50	61	54	69	75	64	63	50	41	29	N	26	28	N
17	28	28	28	26	30	N	N	37	44	48	56	66	80	75	69	57	51	45	41	36	34	32	31	N
18	29	B	B	A	A	28	N	34	50	47	58	54	62	56	59	60	64	53	40	49	28	31	30	31
19		26	25	25	29	N	A	40	47	52	56	65	57	60	69	69	56	44	34	30	N	28	26	28
20	29	28	A	A	28	26	N	40	49	49	53	54	56	57	62	63	53	60	37	28	32	29	31	A
21	29	30	28	N	N	B	B	40	52	55	54	54	65	60	66	71	72	65	48	37	32	28	26	30
22	29	29	26	30	29	A	B	38	54	53	54	72	69	69	A	A	A	46	49	A	32	N	28	31
23	28	A	A	A	A	A	A	42	50	58	71	67	64	64	A	64	60	51	52	A	A	A	49	A
24	32	31	30	28	29	N	B	40	63	78	82	64	79	86	55	55	53	60	A	A	41	35	29	30
25	32	A	A	36	28	B	N		65	72	76	78	80	86	67	60	54	50	37	28	A	34	34	28
26	26	59	26	B	N	N	A	36	50	54	70	60	52	71	84	64	56	50	A	A	30	26	N	28
27	28	28	B	28	20	B	B	32	46	51	62	60	66	72	76	66	54	34	18	A	A	A	N	N
28	N	26	29	30	34	A	B	34	51	55	52	54	67	78	75	72	75	64	44	37	34	25	N	N
29	N	26	28	30	34	N	B	37	53	51	50	70	90	96	111	102	79	64	48	35	26	N		59
30	59	28	28	29	32	B	B	34	44	47	73	54	65	63	50	58	55	54	42	A	A	B	25	26
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	23	22	24	21	6		29	30	29	30	30	29	29	28	28	29	30	26	21	20	22	22	18
MED	29	29	28	30	29	28		40	51	52	56	65	67	68	69	66	57	52	41	35	32	30	30	30
U Q	33	31	31	33	31	34		41	54	55	64	75	81	79	77	71	64	55	44	39	34	32	34	31
L Q	28	28	26	28	28	26		37	49	50	53	54	64	61	63	60	54	50	40	29	29	28	28	28

HOURLY VALUES OF fEs AT Okinawa

NOV.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	107	47	108	G	58	32	G	144	36	57	49	51	53	40	38	40	33	G	53	34	26	G	150	27
2	56	G	G	39	33	B	B	30	35	40	41	45	43	48	41	70	46	41	50	25	B	G	G	G
3	G	G	G	G	G	35	B	28	32	35	178	G	46	44	G	45	37	48	33	36	39	43	46	35
4	24	69	39	39	35	G		125	140	42	42	39	89	68	55	G	52	46	28	23	G	45	38	G
5	25	G	G	G	G	G	B	24	31	40	45	44	G	39	55	44	43	40	26	G	G	27	G	G
6	26	G	G	G	G	G	B	G	31	59	49	47	54	46	41	39	34	G	146	35	157	G	G	47
7	40	28	G	G	25	24	B	G	49	54	43	45	44	G	60	36	70	G	11	39	149	29	G	G
8	G	G	G	26	113	G	G	G	34	38	44	45	47	66	44	44	38	34	38	27	G	33	54	39
9	39	27	G	29	G	G	G	G	46	42	44	46	56	46	50	47	35	48	24	G	G	33	26	G
10	G	G	G	G	G	G	B	91	31	35	40	47	45	39	45	54	38	32	36	29	25	25	G	B
11	B	G	G	B	38	G	B	33	G	41	48	50	50	50	56	44	40	37	28	31	G	G	28	34
12	26	G	27	23	B	29	24	34	35	41	64	48	61	55	53	41	42	33	33	41	31	G	G	G
13	G	G	G	G	40	B	B	31	31	35	44	46	49	50	50	77	46	33	54	28	G	G	G	G
14	G	G	G	G	B	B	B	G	G	70	86	96	101	67	42	41	45	28	11	G	G	G	G	G
15	G	G	G	G	G	G	B	110	36	41	41	47	117	78	109	92	39	34	25	33	G	G	G	G
16	G	G	G	G	G	G	G	26	33	48	G	44	58	48	44	37	33	31	36	G	G	G	G	G
17	G	G	G	G	G	G	G	39	30	88	42	44	45	G	59	G	46	G	11	35	G	28	26	G
18	G	B	B	28	40	G	11	30	38	59	41	46	54	43	54	38	34	32	38	29	G	G	G	G
19		G	G	G	G	G	31	G	32	34	G	41	46	64	G	46	39	38	G	G	G	G	G	G
20	G	G	28	27	G	G	G	40	G	G	G	45	44	48	57	47	34	48	39	91	26	G	G	34
21	G	G	G	G	G	B	B	G	G	40	G	42	115	44	46	36	35	G	43	26	G	23	G	G
22	G	G	G	G	24	40	B	31	34	G	40	44	61	50	67	59	60	38	39	39	27	G	G	G
23	G	46	48	36	29	53	38	G	32	40	161	86	148	60	73	57	38	52	40	58	41	91	72	48
24	39	G	G	G	G	25	B	G	31	40	54	49	51	62	60	70	60	54	38	39	35	24	G	G
25	G	34	36	G	G	B	G		30	G	G	G	G	39	41	48	36	G	30	24	27	25	G	G
26	G	G	G	B	G	G	27	25	31	36	41	69	52	47	46	36	50	48	90	30	24	G	G	G
27	G	95	B	G	G	B	B	11	G	34	G	38	45	60	49	52	50	39	25	28	40	24	G	G
28	G	G	G	G	G	25	B	145	41	54	46	46	57	38	62	40	58	54	38	29	20	G	G	G
29	G	G	G	G	G	11	B	G	G	36	40	46	43	45	48	35	39	31	46	34	G	G	G	G
30	G	G	G	G	G	B	B	35	40	39	44	47	50	53	42	G	40	32	32	40	30	B	G	G
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	28	28	28	23	12	29	30	30	30	30	30	30	30	30	30	30	30	30	29	29	30	29
MED	G	G	G	G	G	G	G	28	32	40	42	46	50	48	50	44	40	34	36	30	20	G	G	G
U Q	25	14	G	24	31	25	25	37	36	48	48	47	58	60	57	52	46	46	40	36	30	27	26	14
L Q	G	G	G	G	G	G	G	G	30	35	40	44	45	43	42	37	36	31	26	25	G	G	G	G

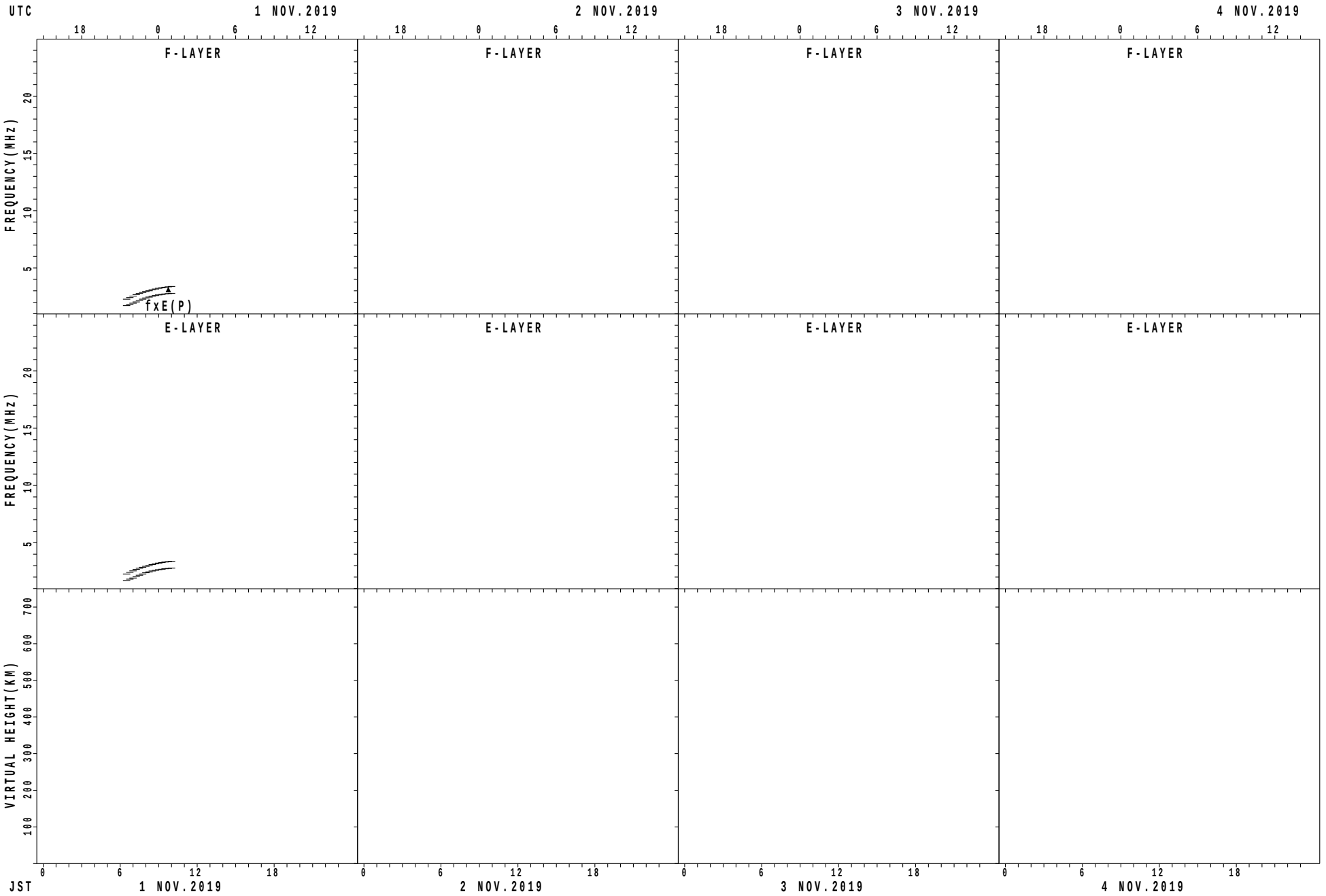
HOURLY VALUES OF fmin AT Okinawa

NOV.2019

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

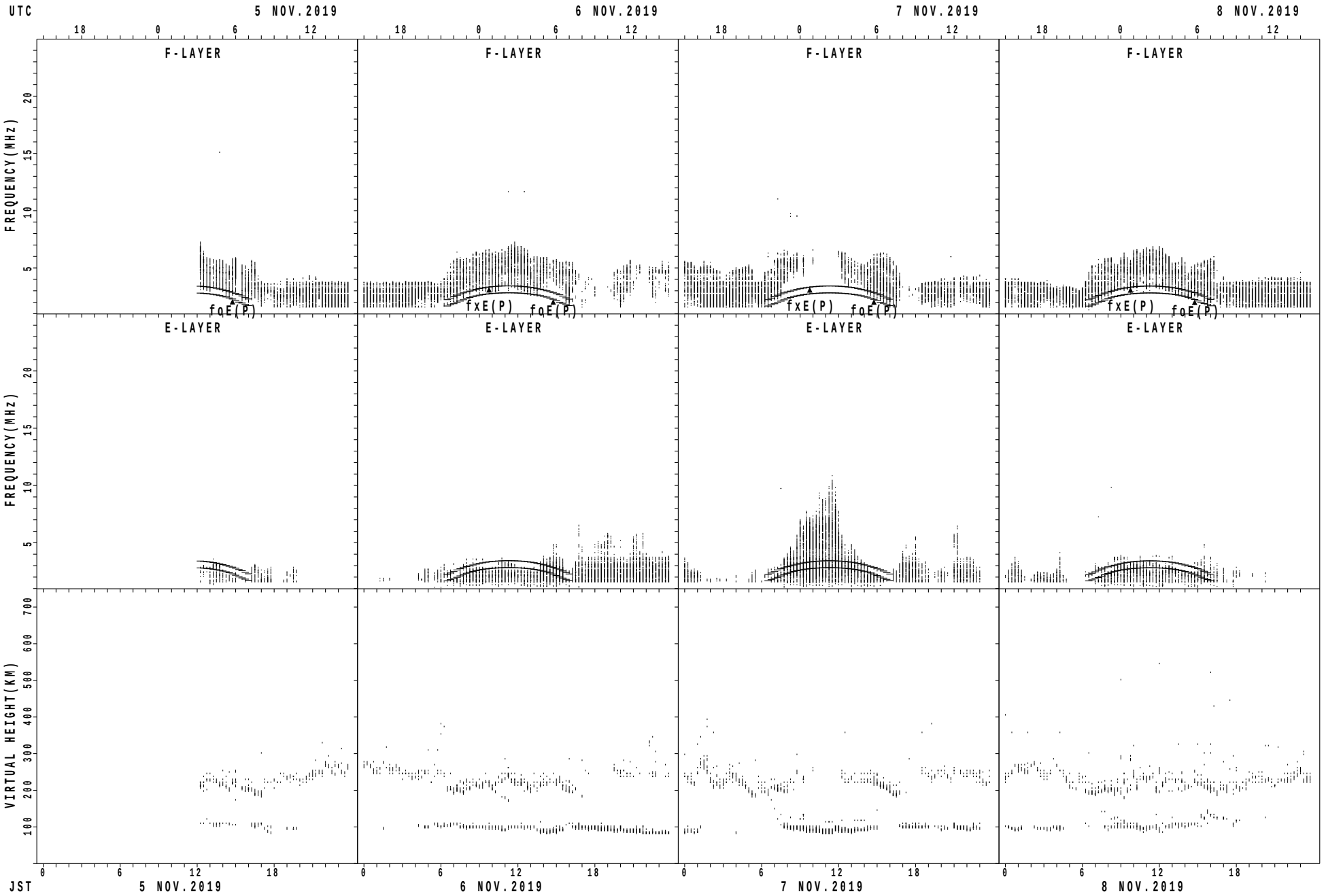
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	14	14	14	14	14	14	15	15	14	15	15	15	17	17	17	14	20	15	14	15	16	14	17
2	15	15	14	14	14	B	B	14	14	14	14	16	16	17	14	14	14	14	14	14	B	15	14	15
3	15	14	14	14	14	15	B	15	14	14	14	16	17	15	15	18	15	14	14	14	15	14	14	14
4	14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

SUMMARY PLOTS AT Wakkanai



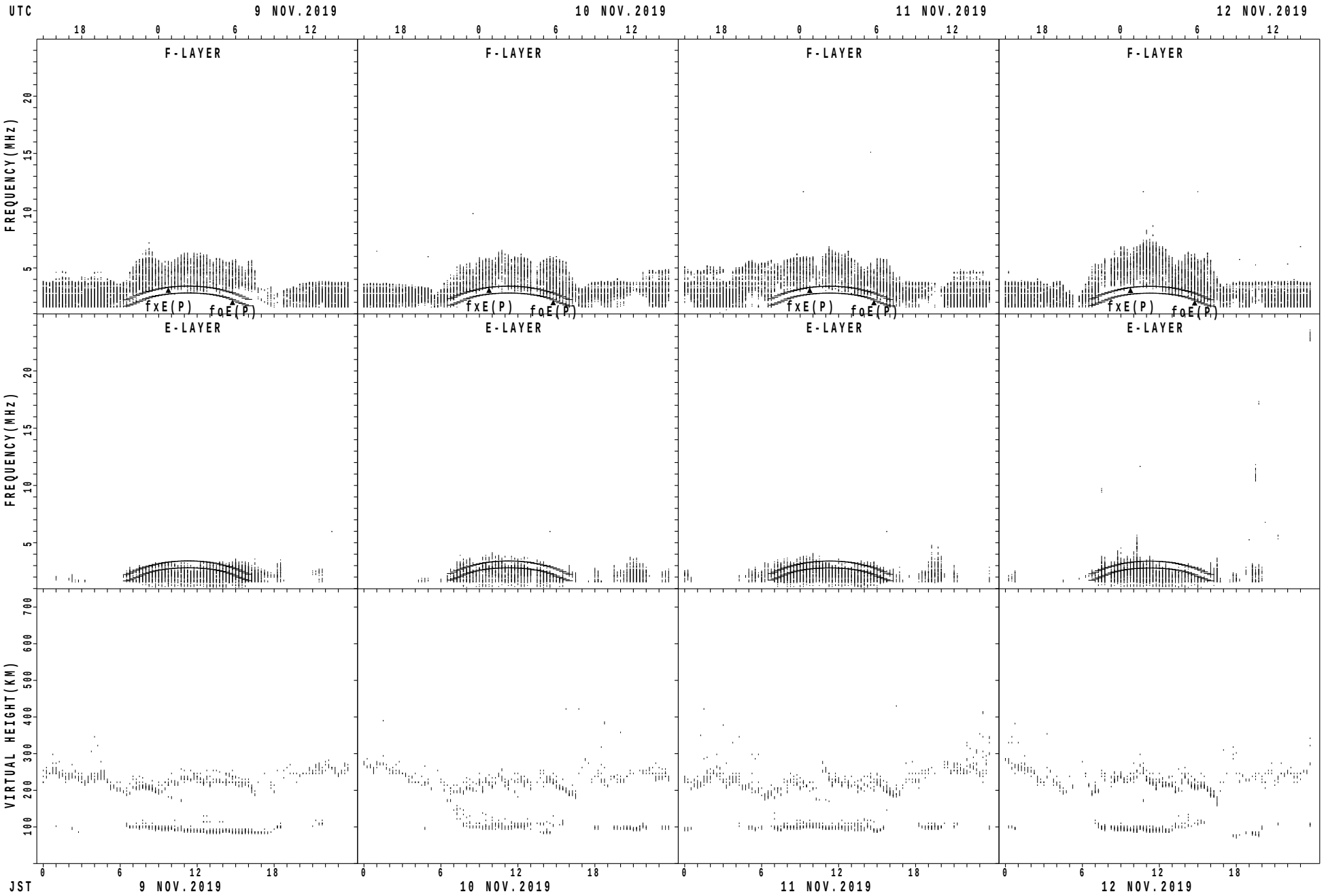
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



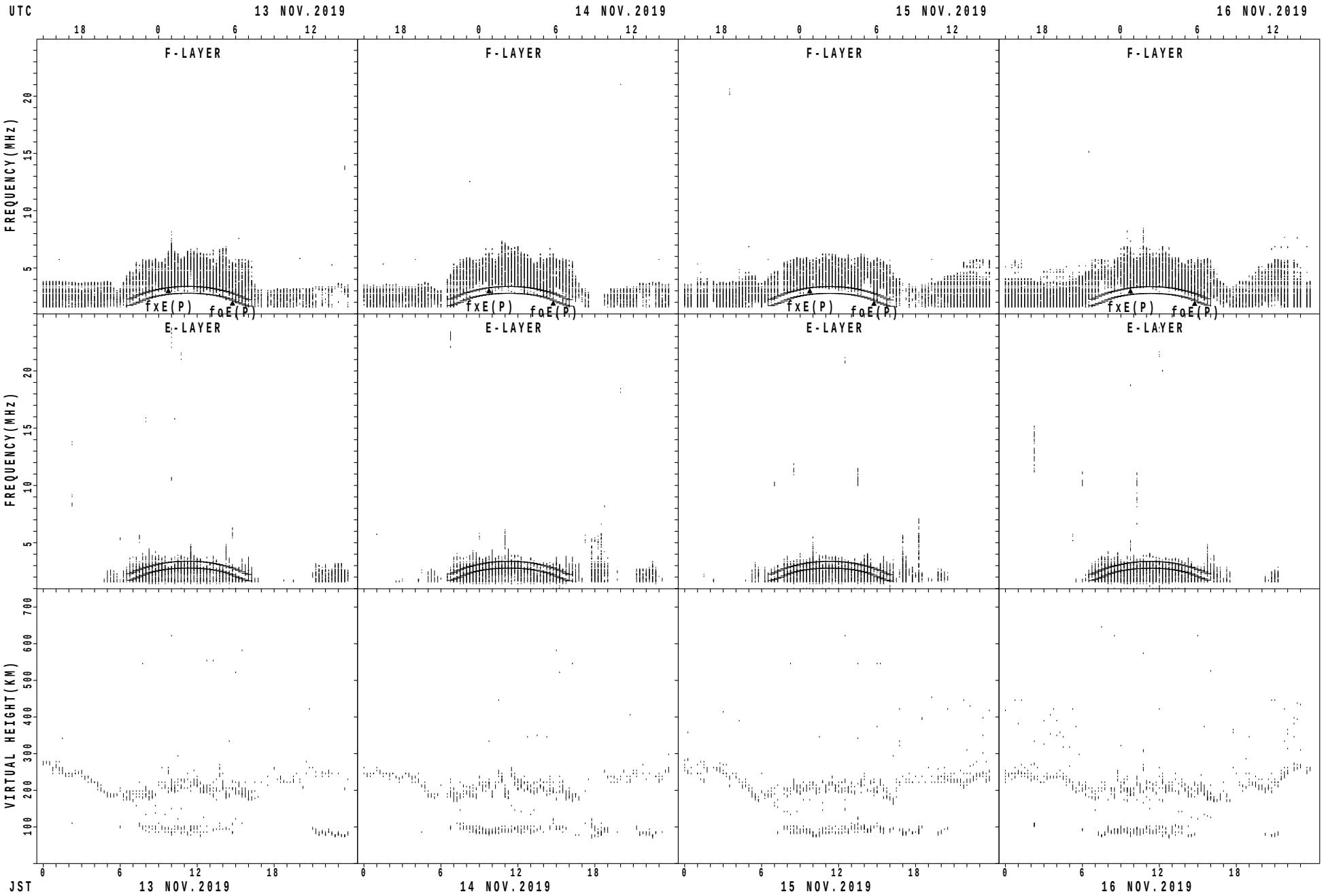
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



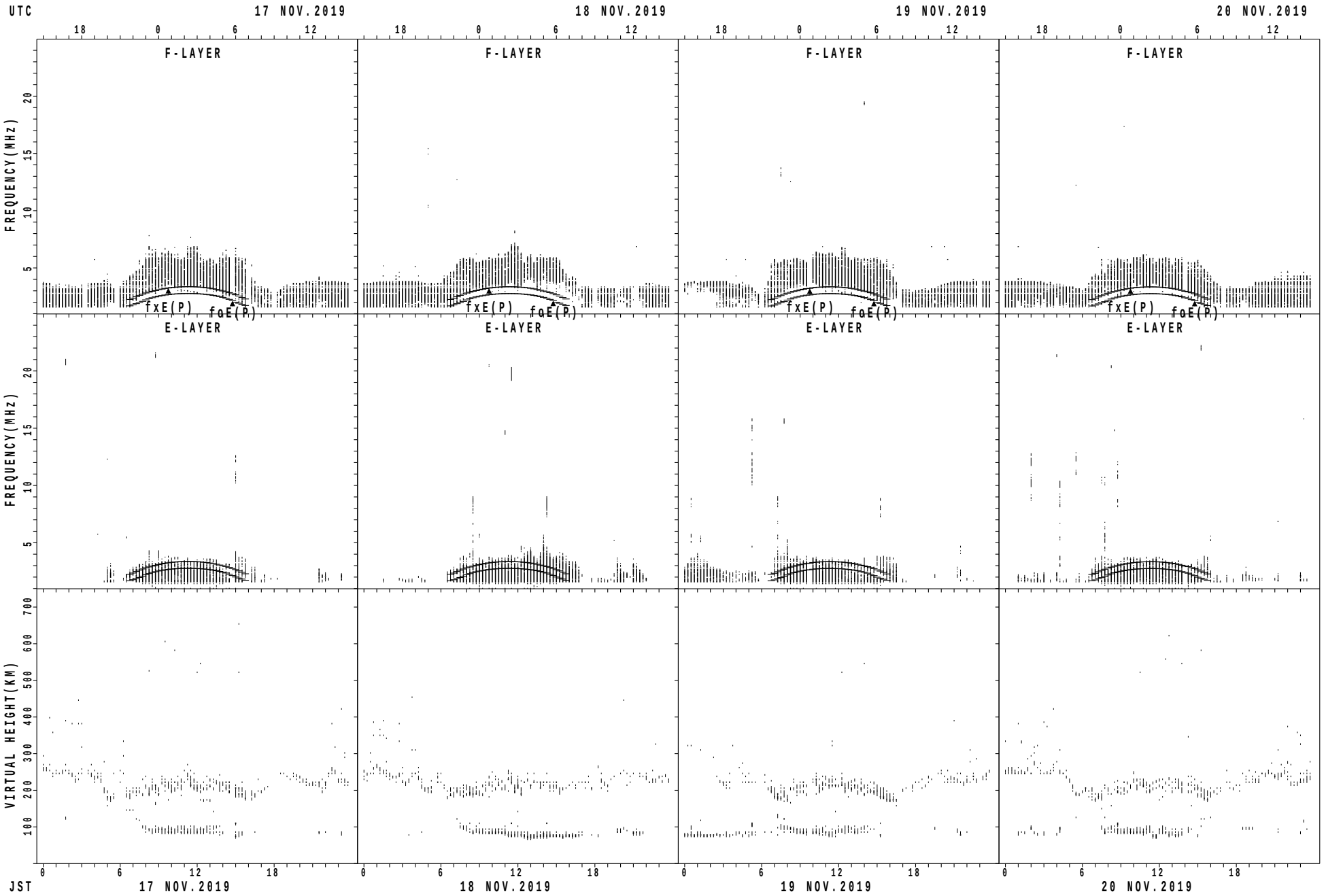
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



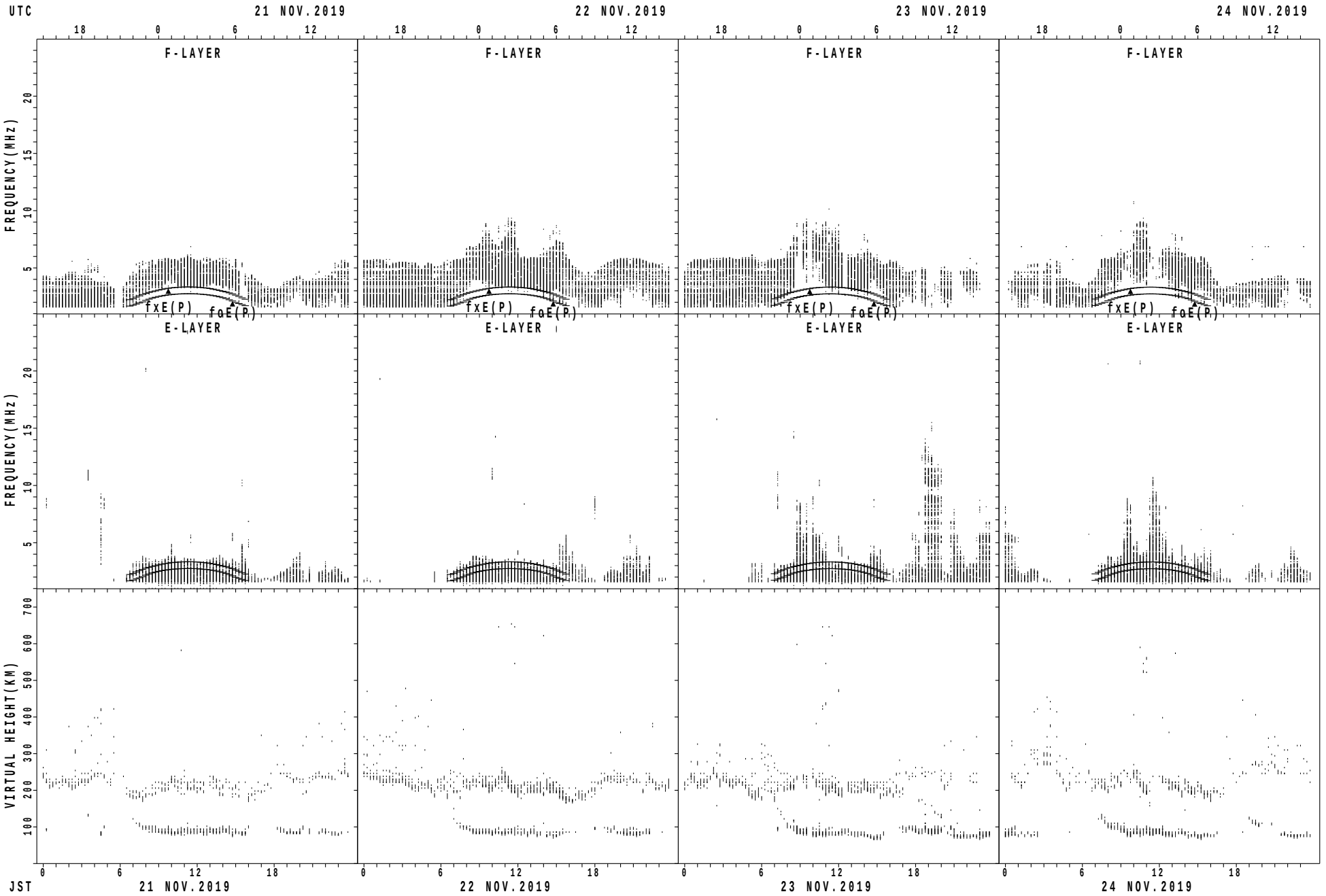
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



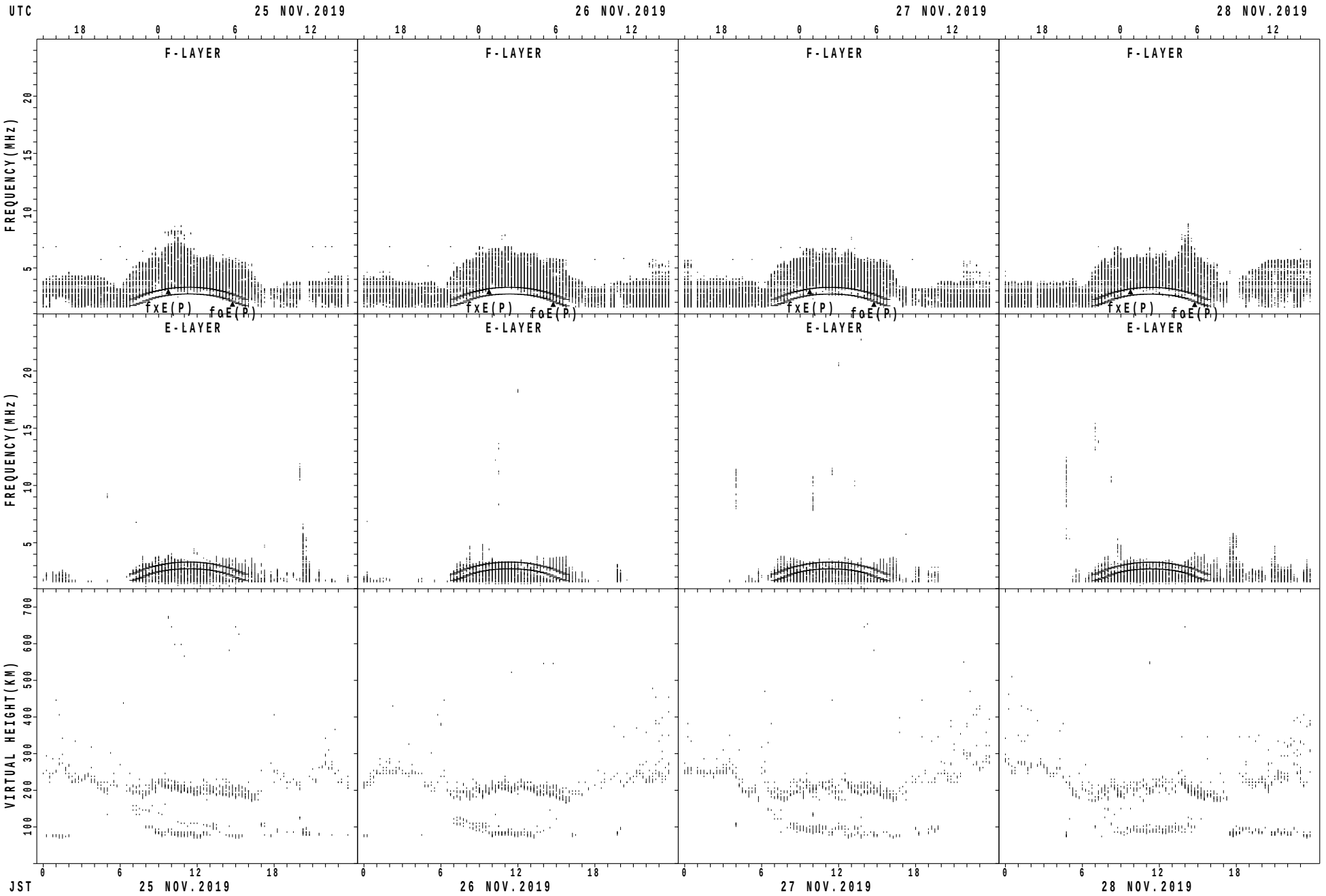
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai

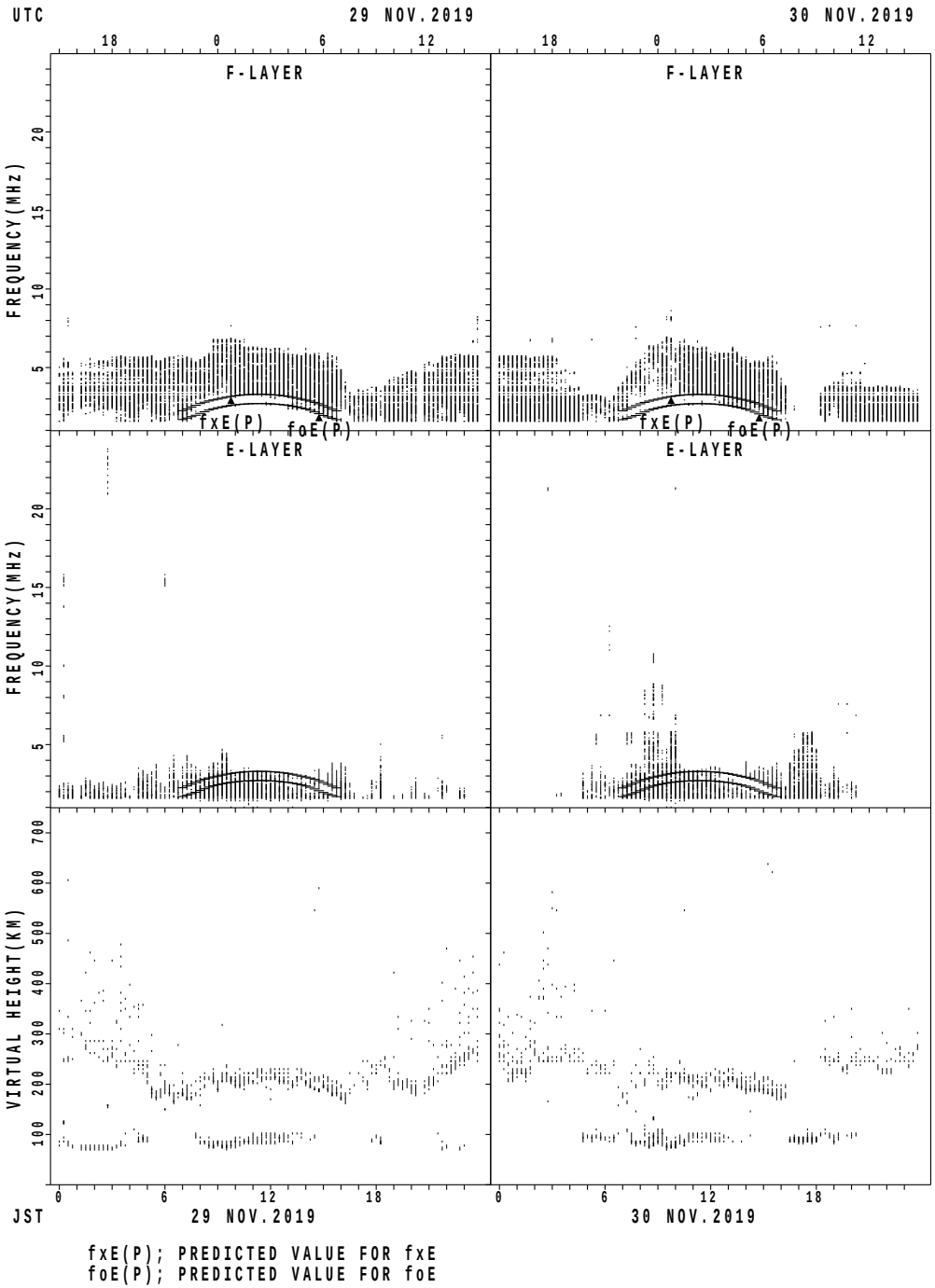


fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

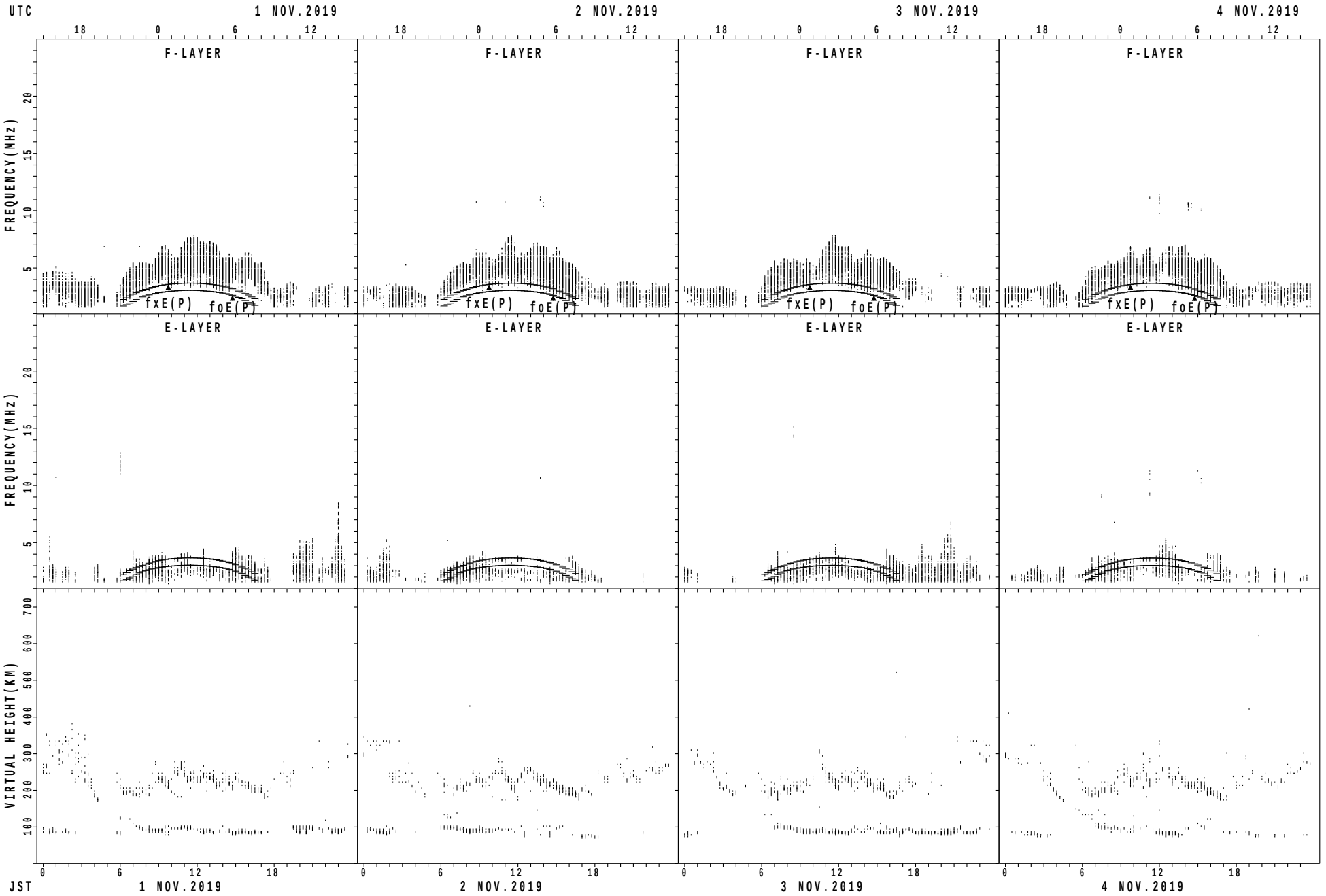
SUMMARY PLOTS AT Wakkanai



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

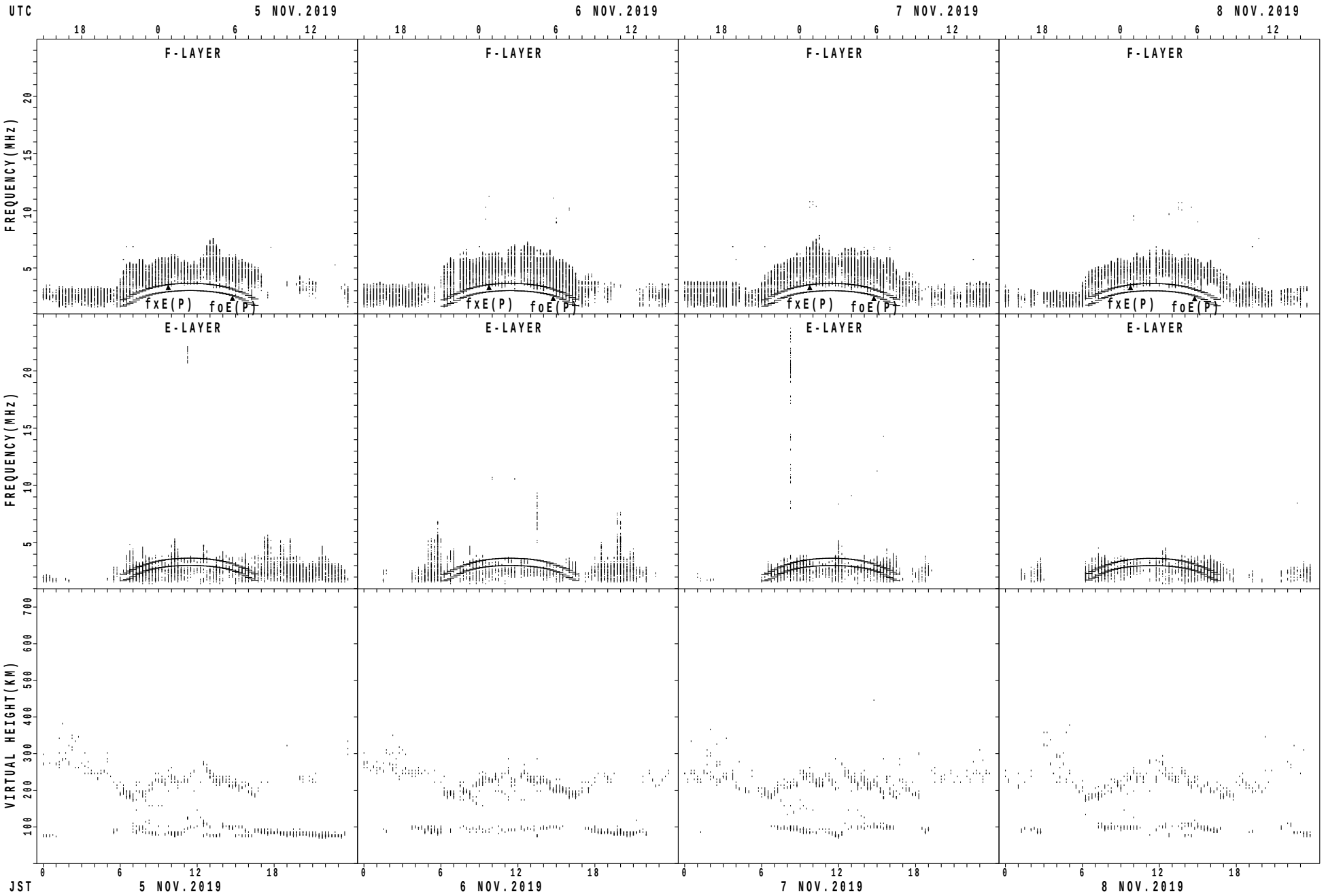

SUMMARY PLOTS AT Wakkanai
UTC
29 NOV.2019
30 NOV.2019
18
0
6
12
F-LAYER
FREQUENCY(MHz)
5
10
15
20
fxE(P)
foE(P)
E-LAYER
VIRTUAL HEIGHT(KM)
100
200
300
400
500
600
700
JST
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



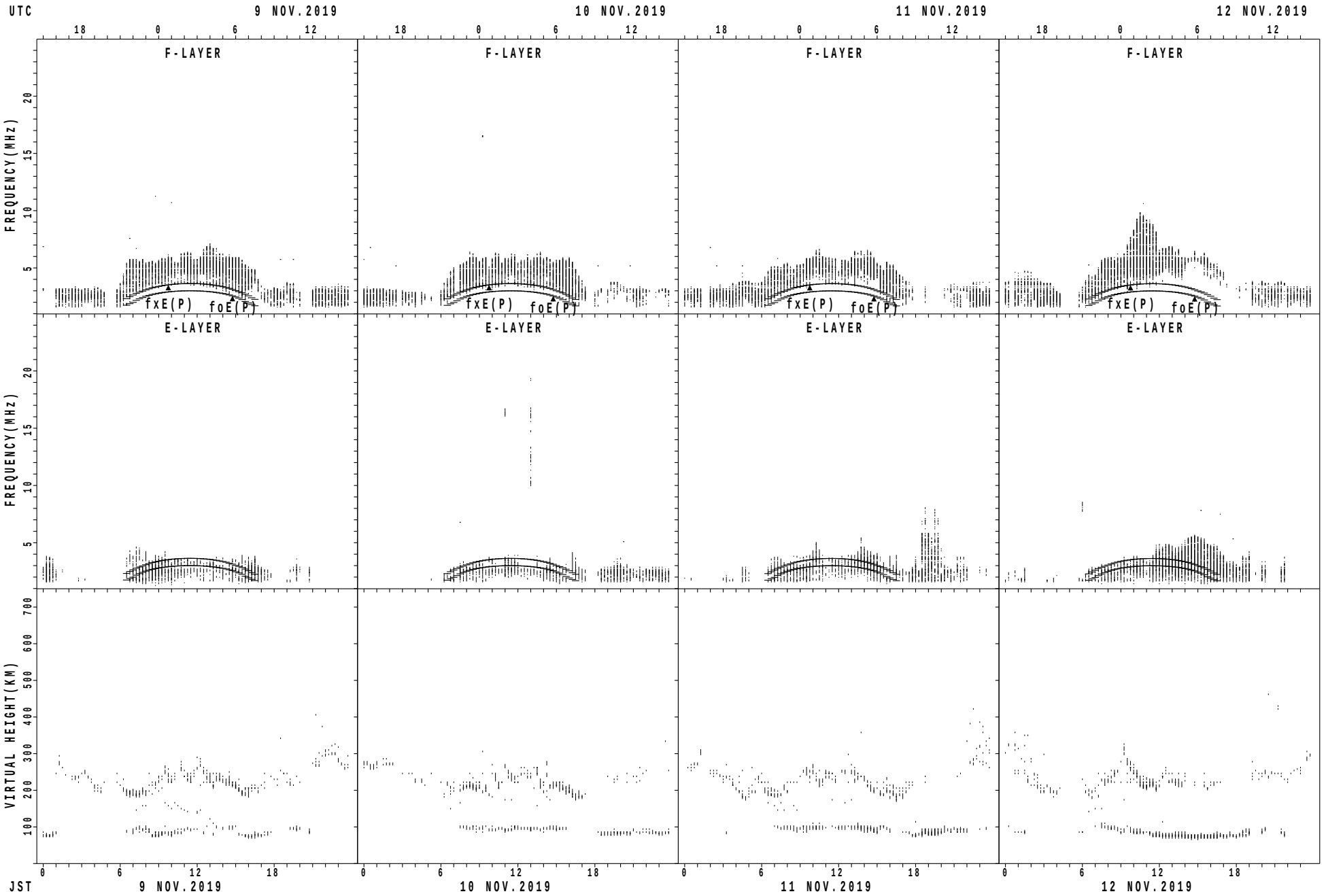
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



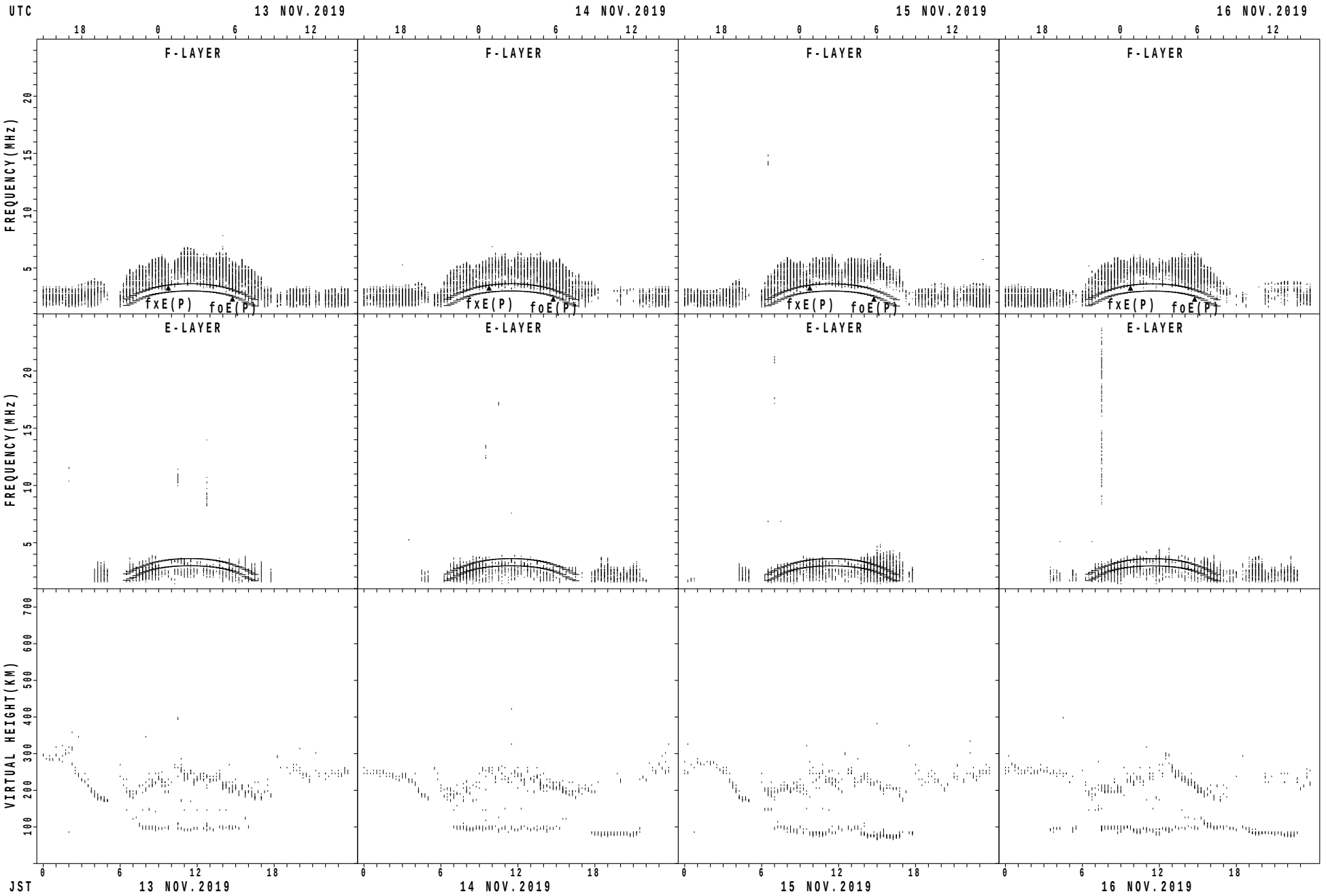
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



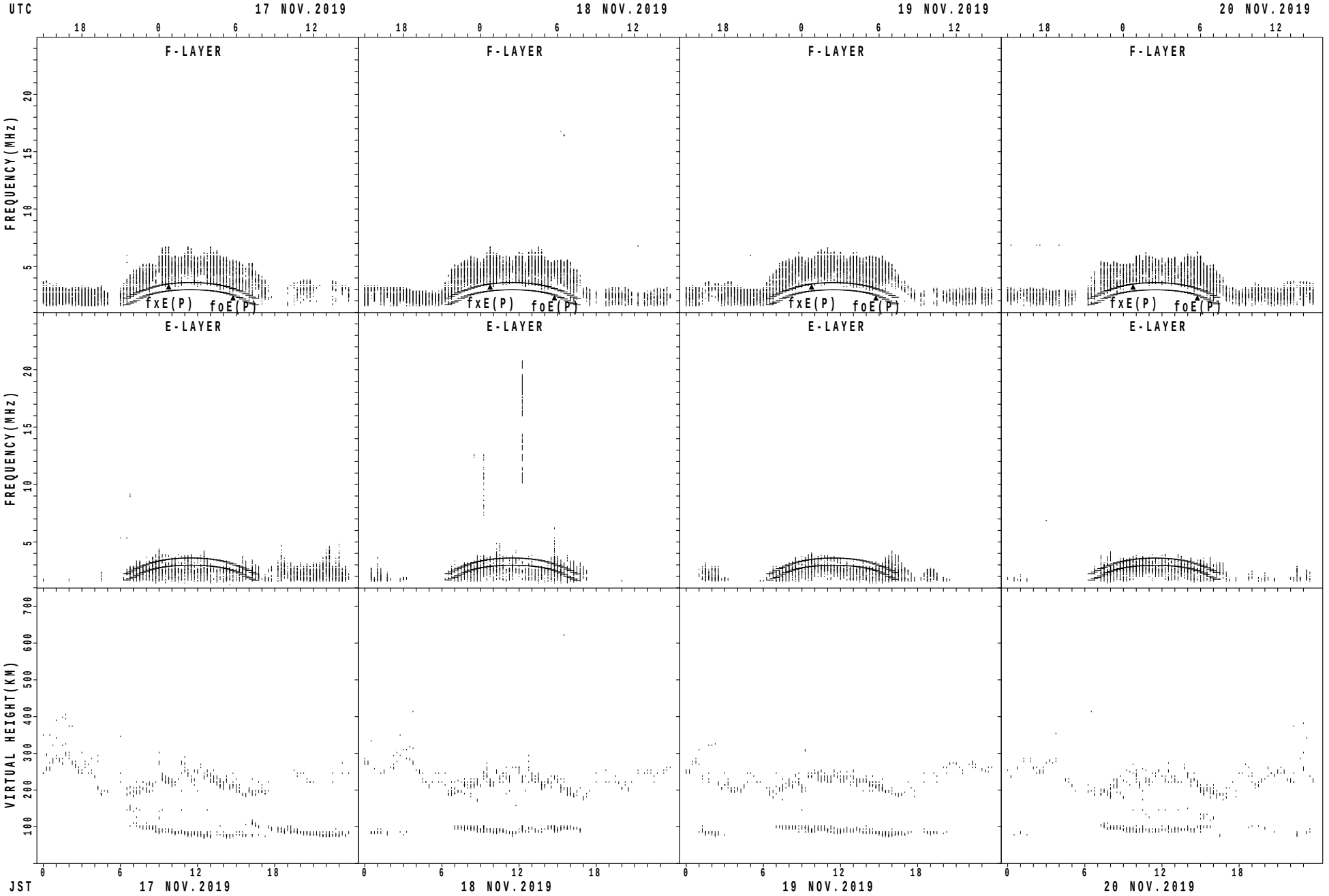
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



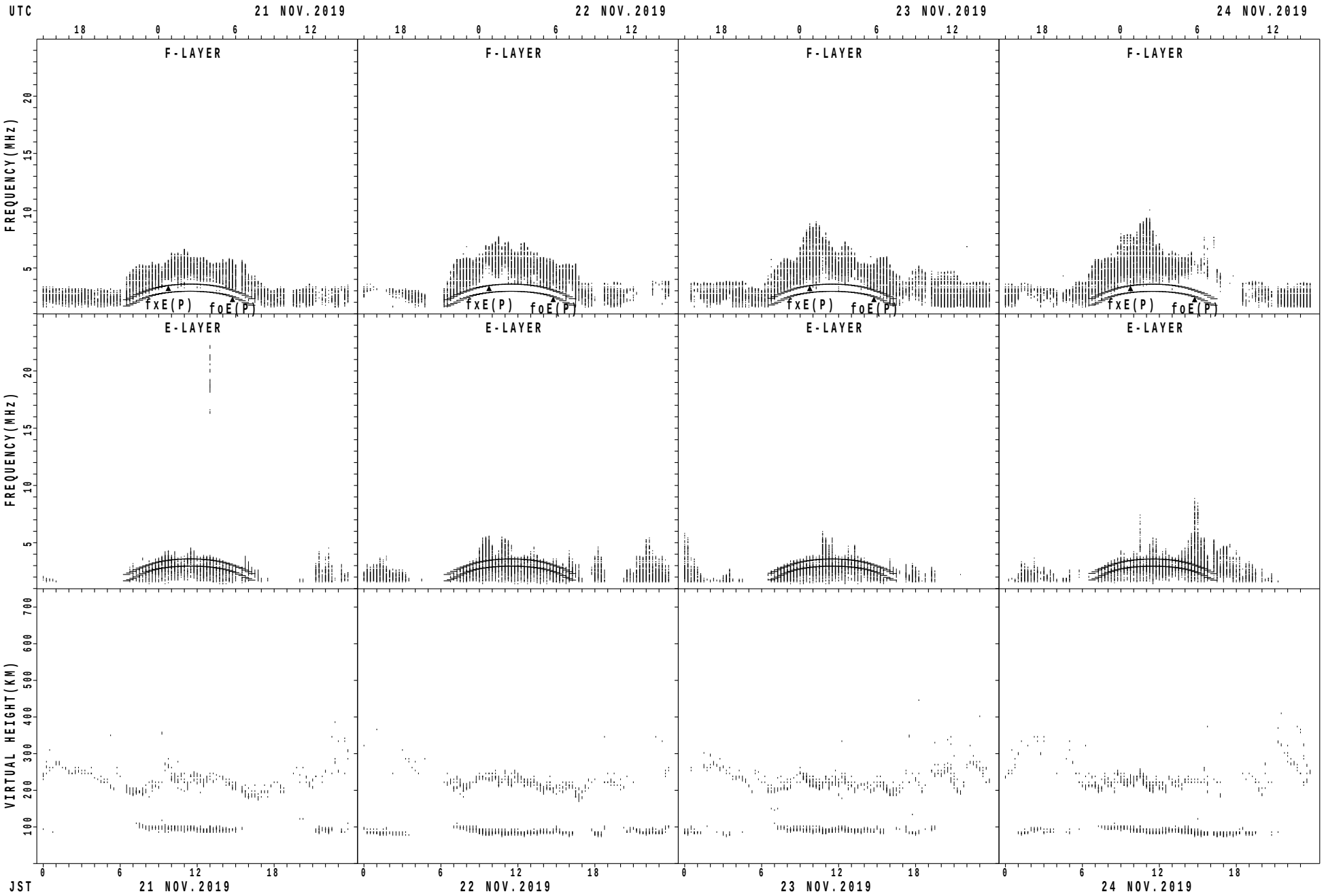
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



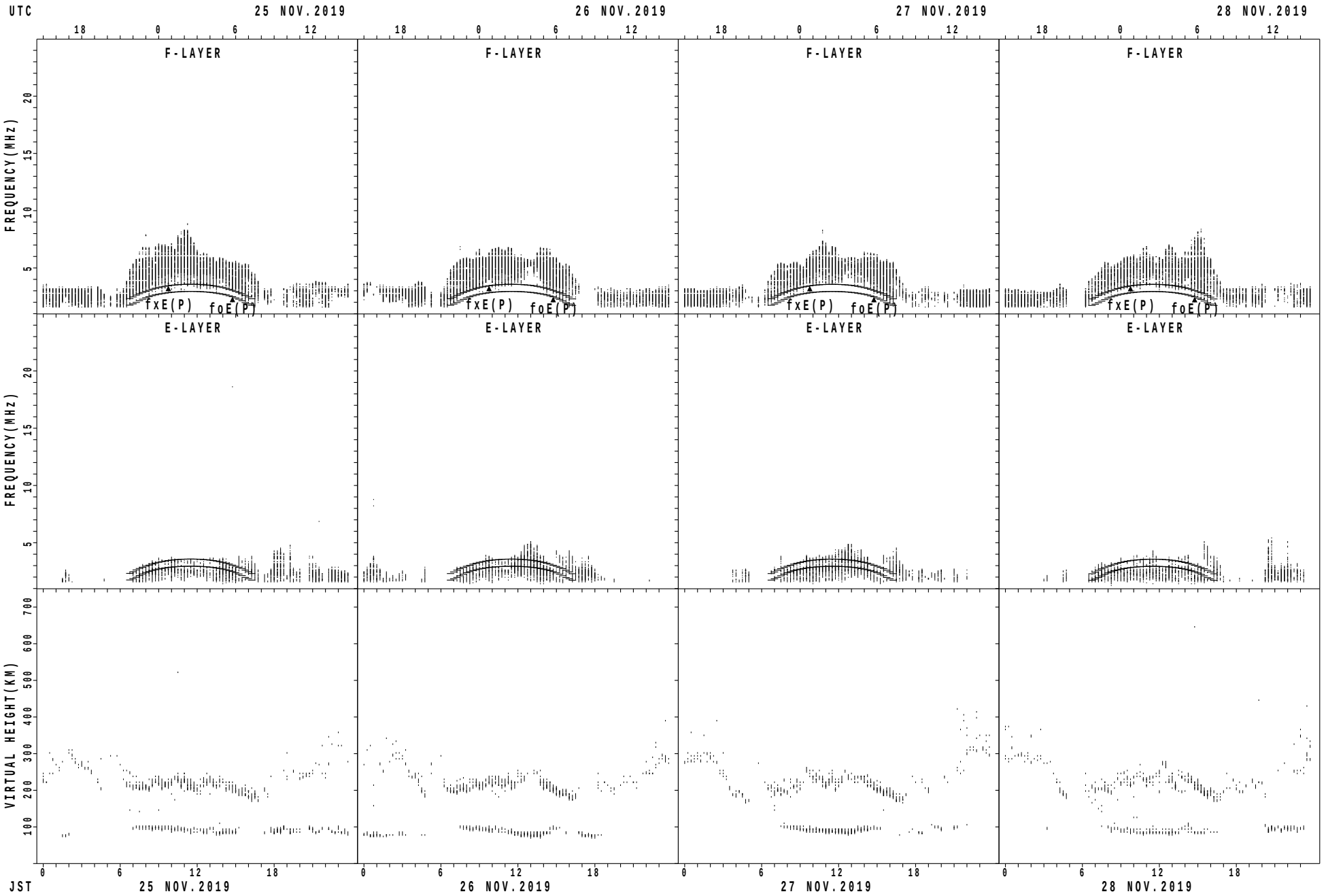
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



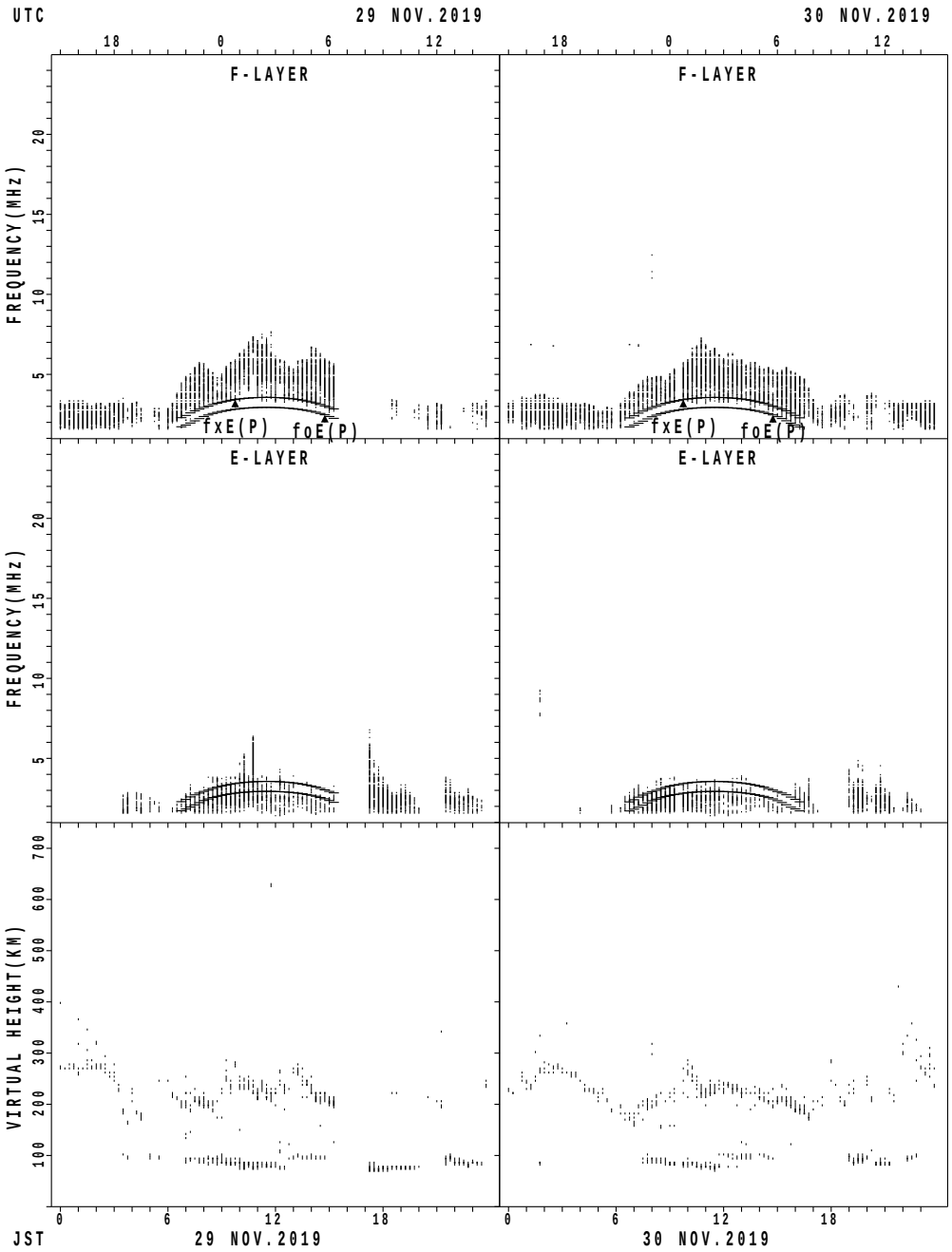
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



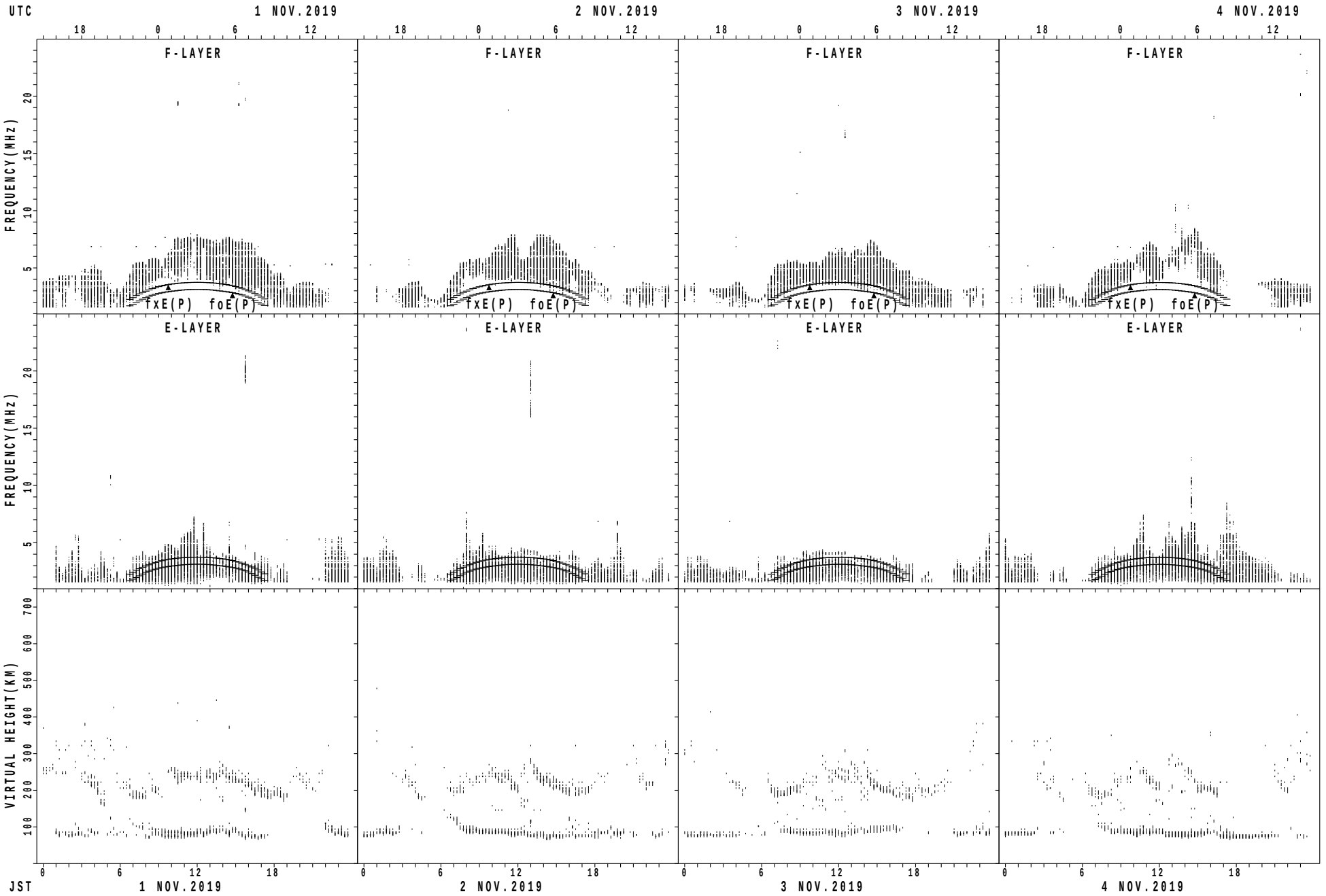
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



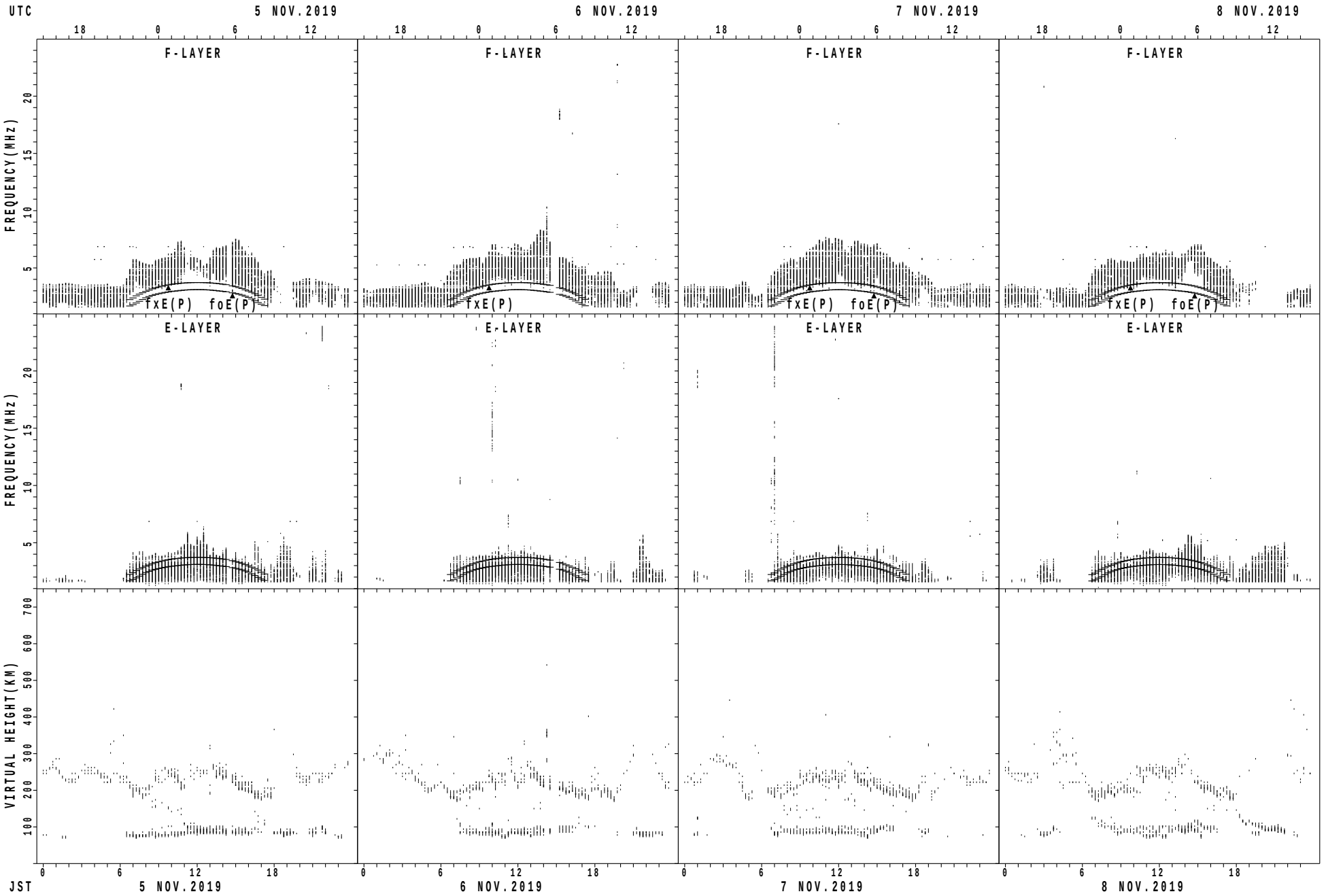
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



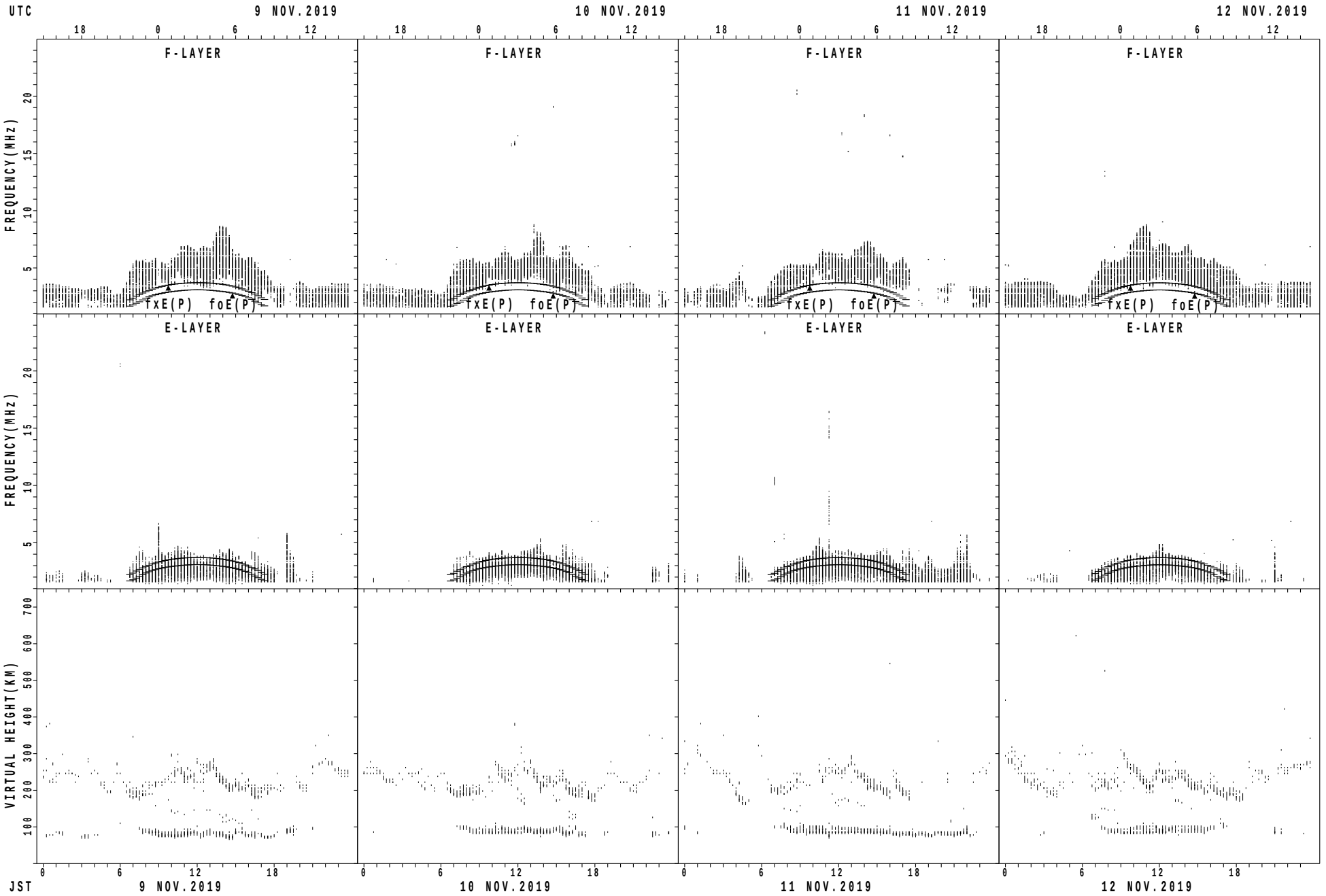
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



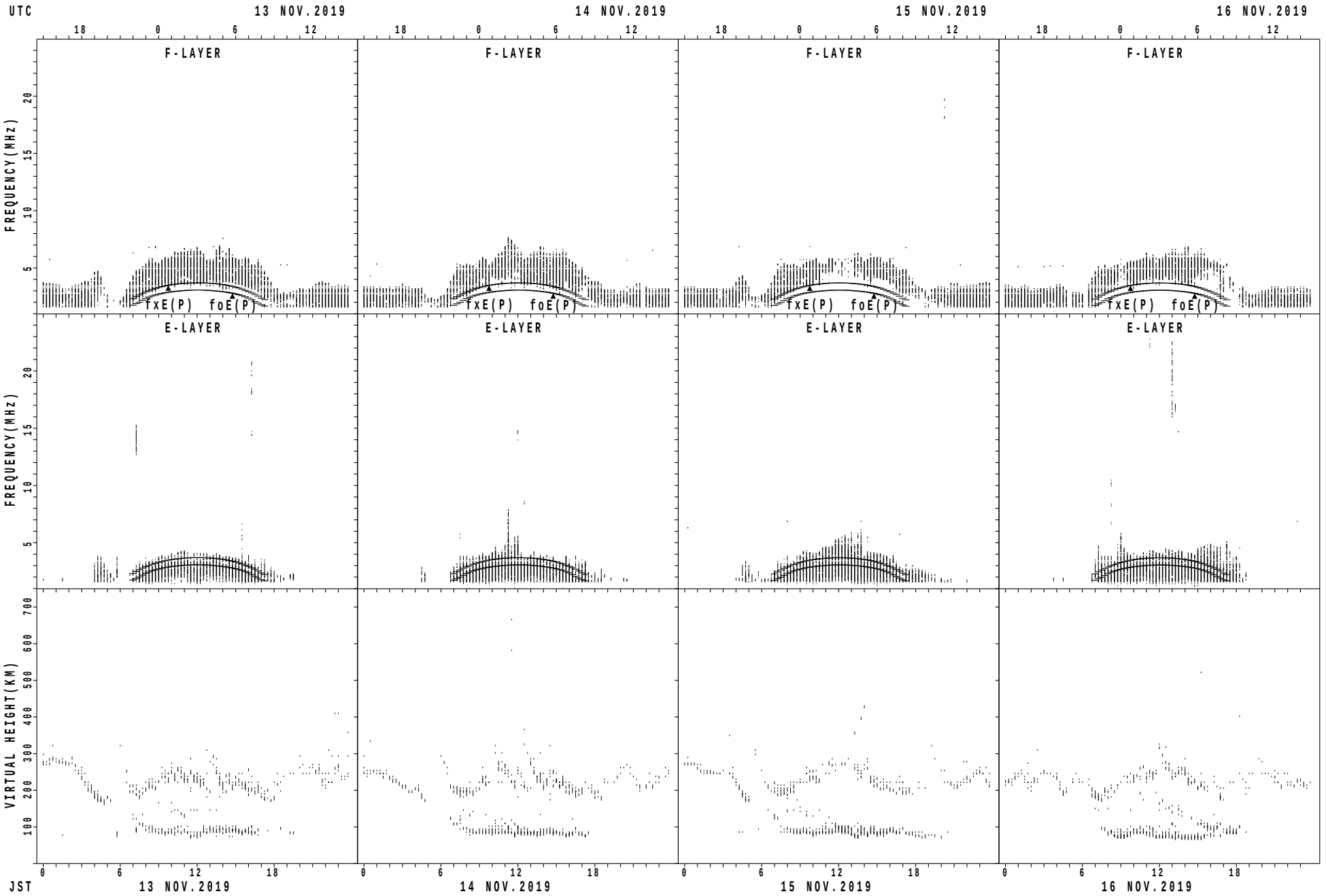
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



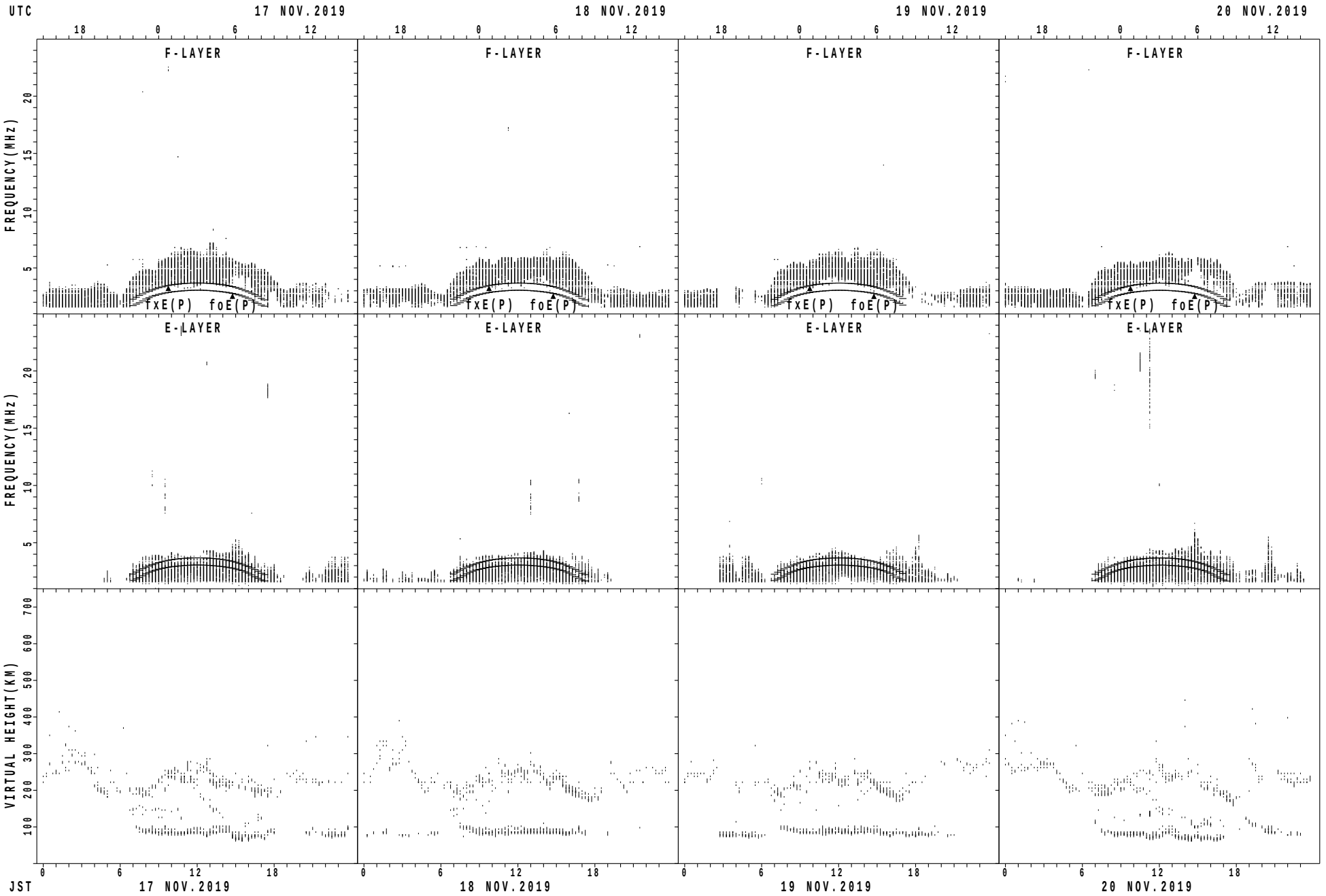
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



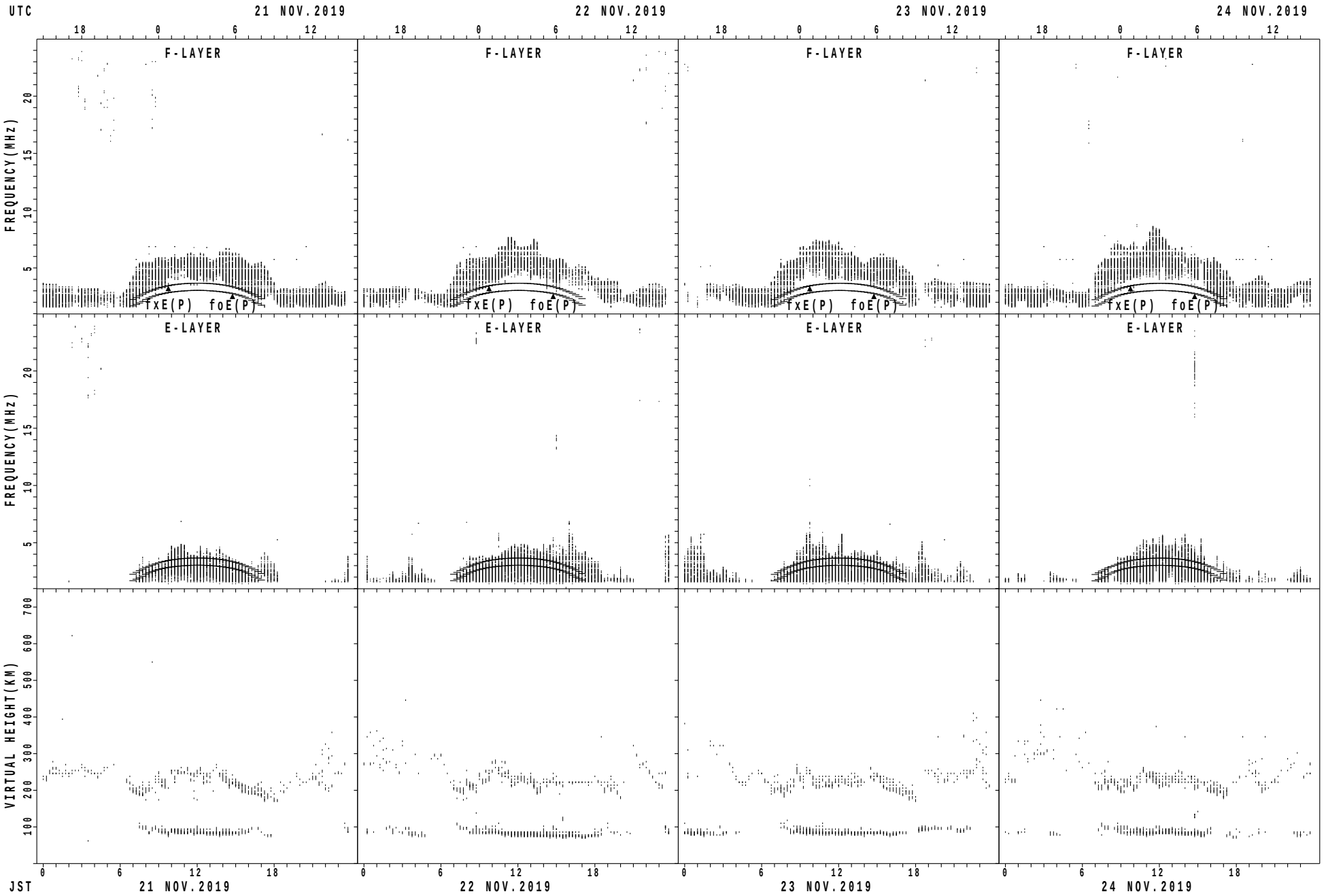
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



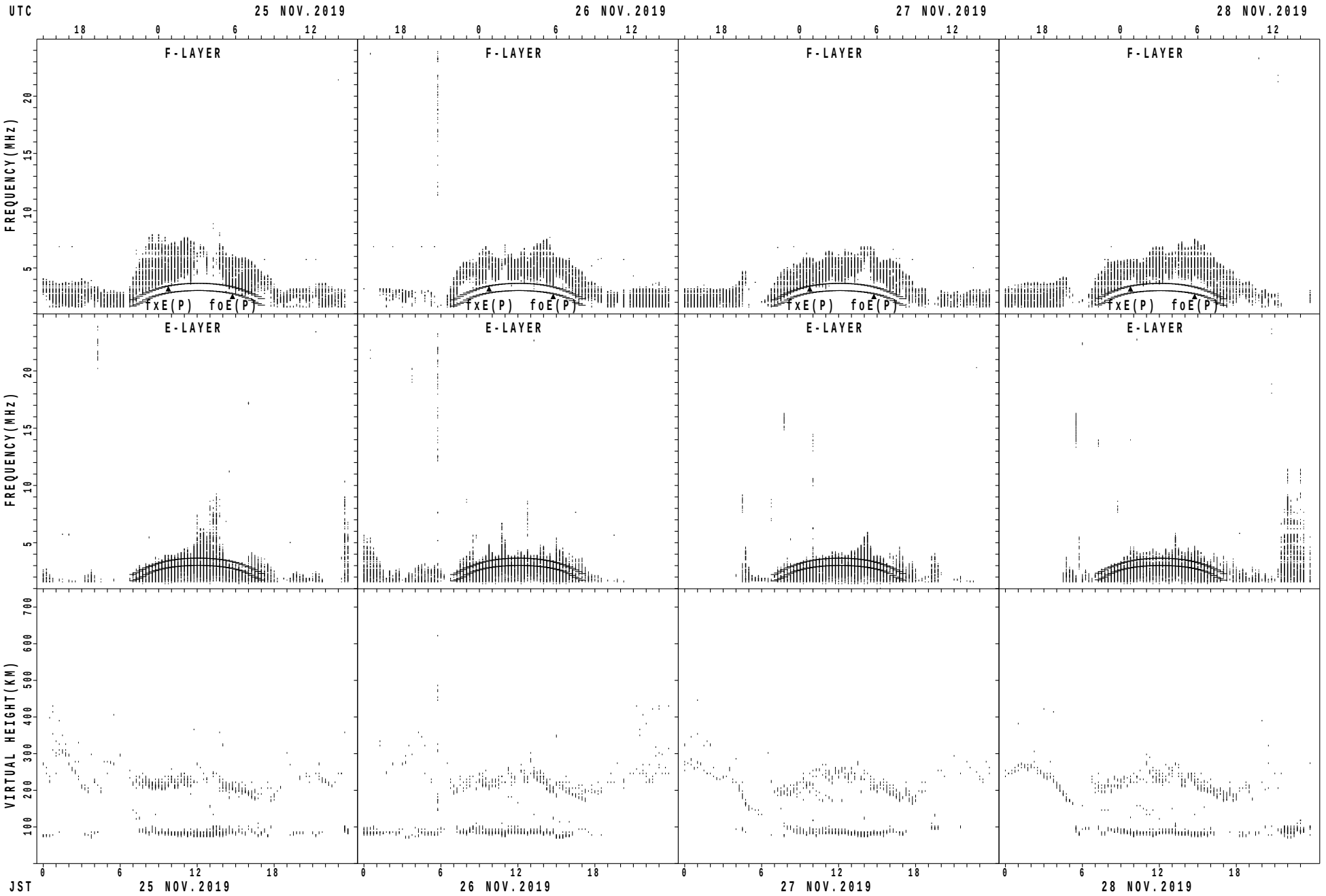
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



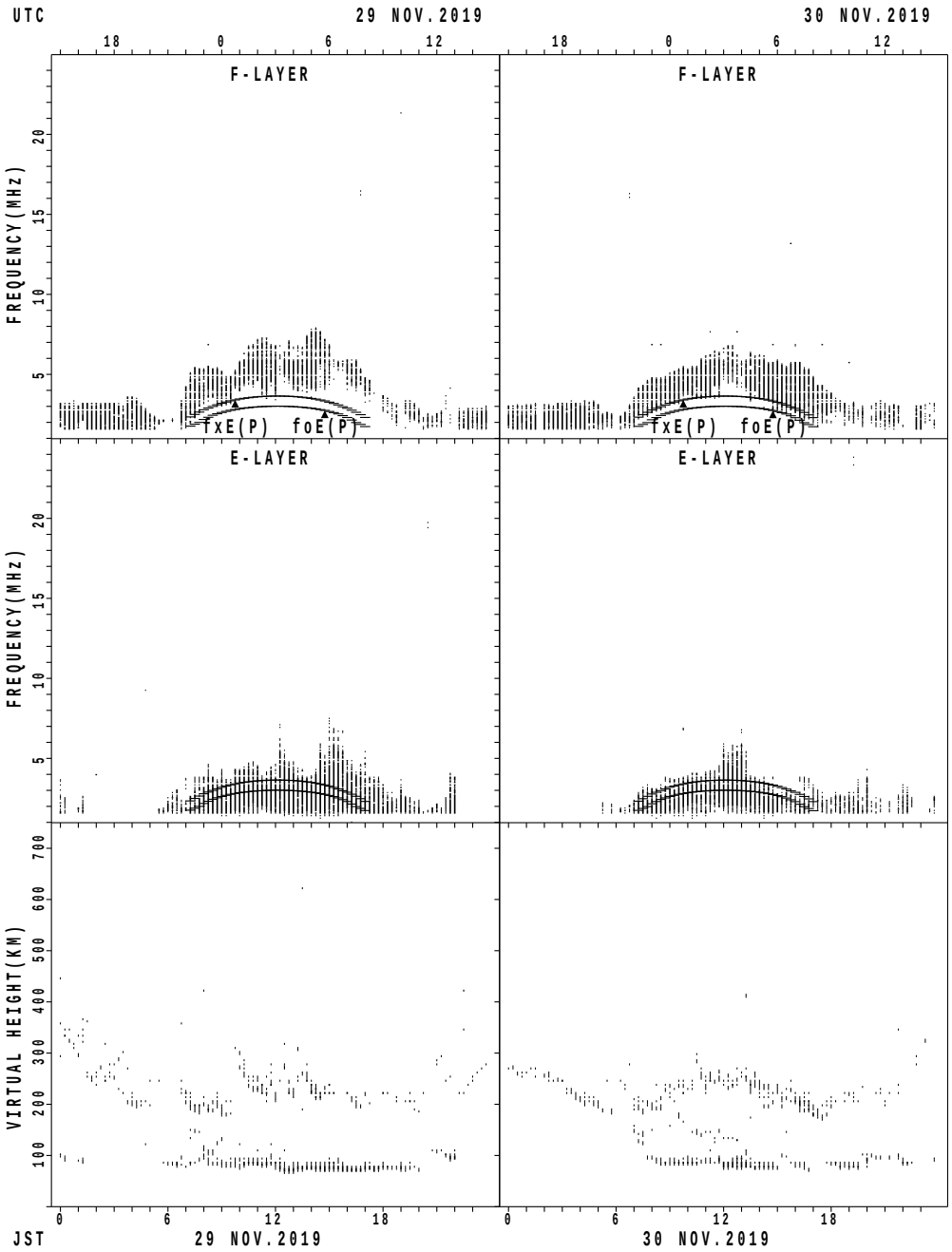
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



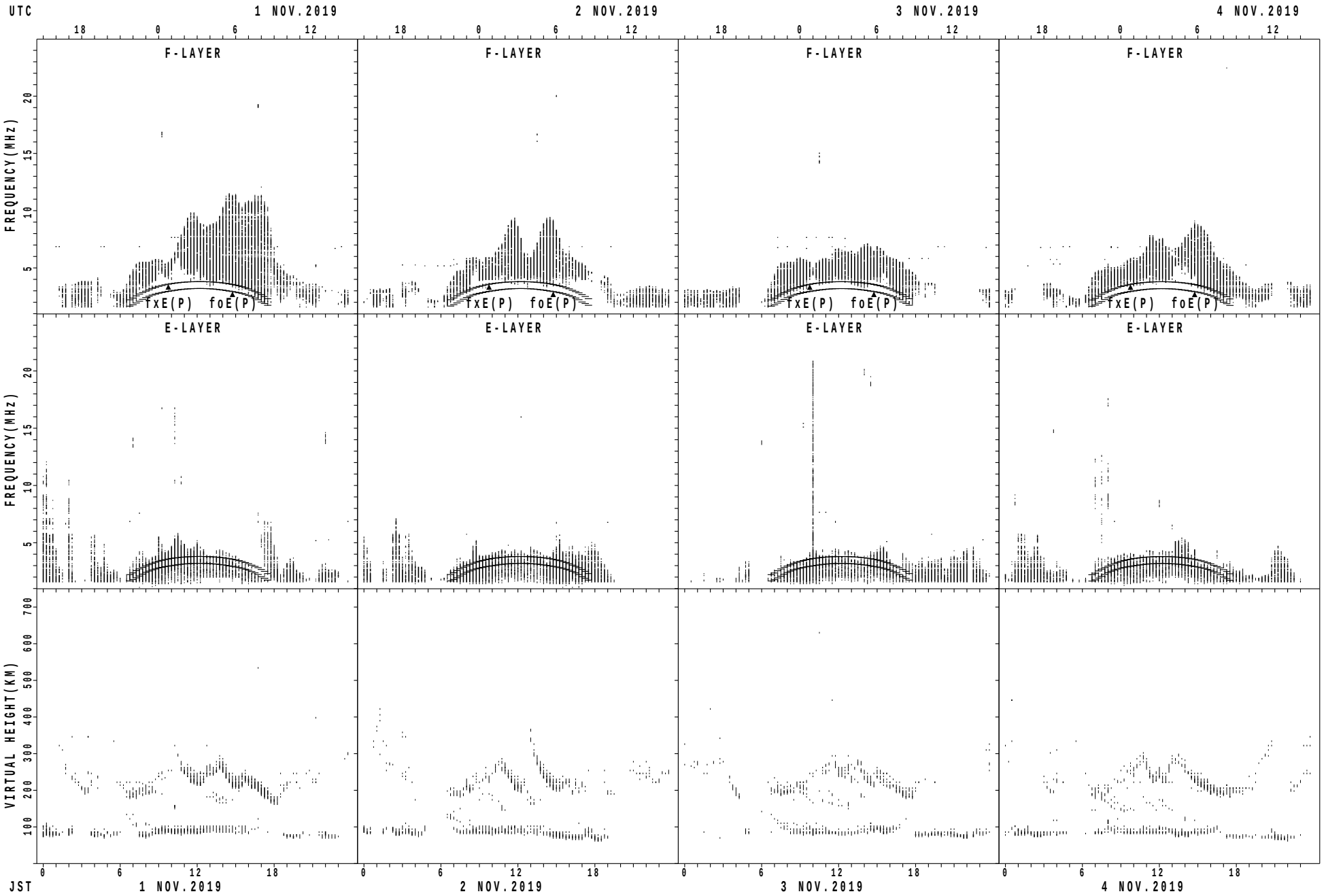
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



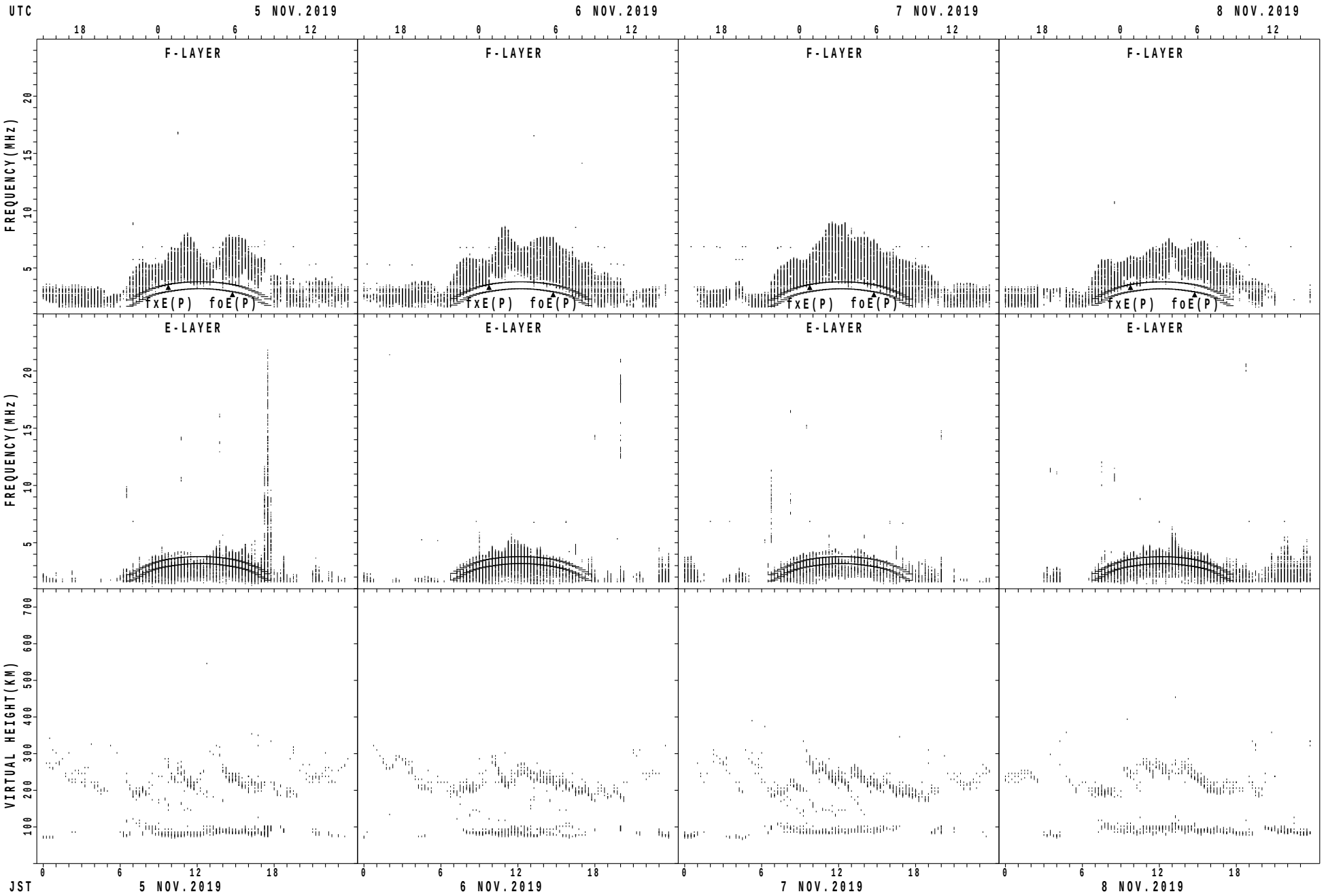
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



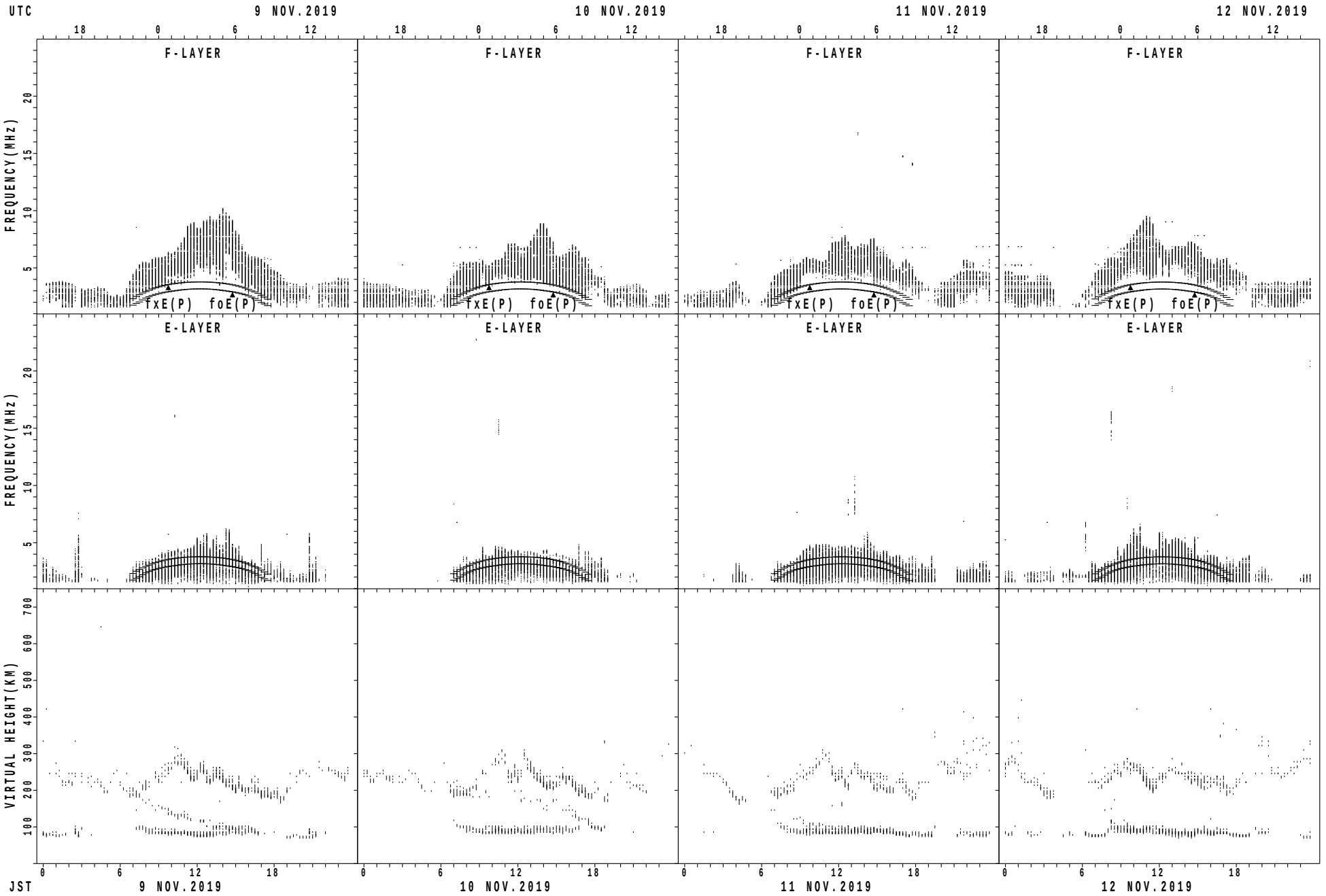
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



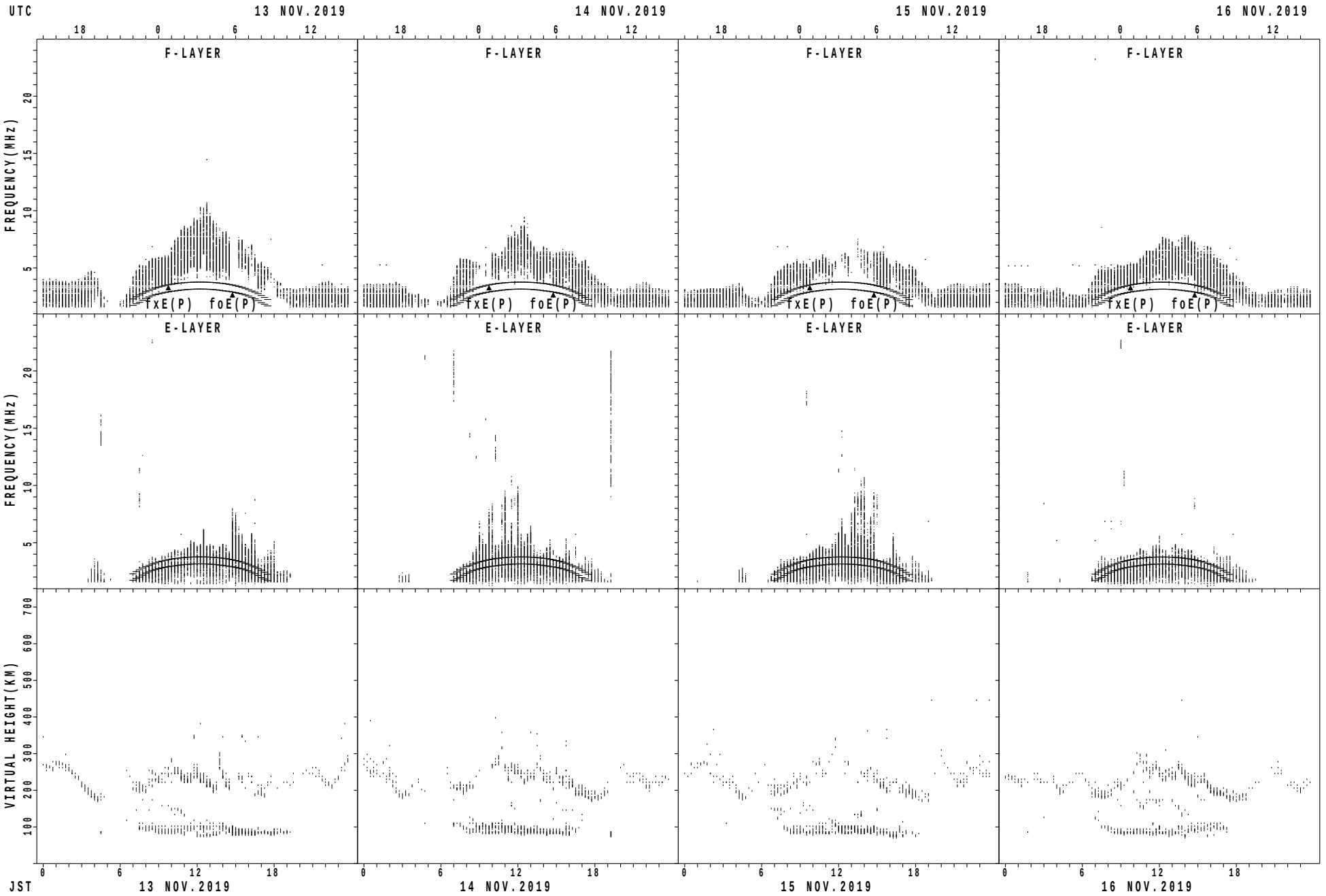
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



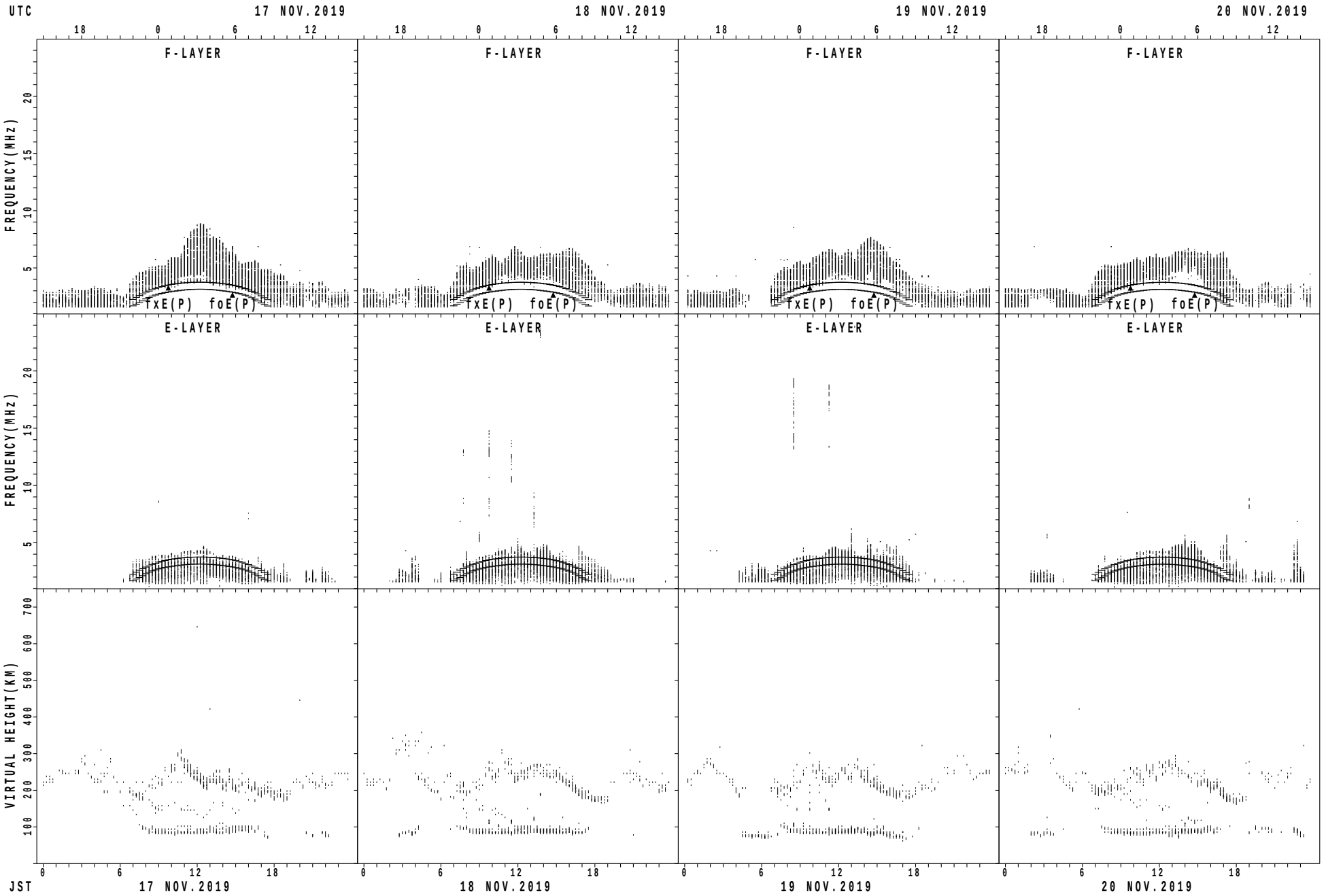
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



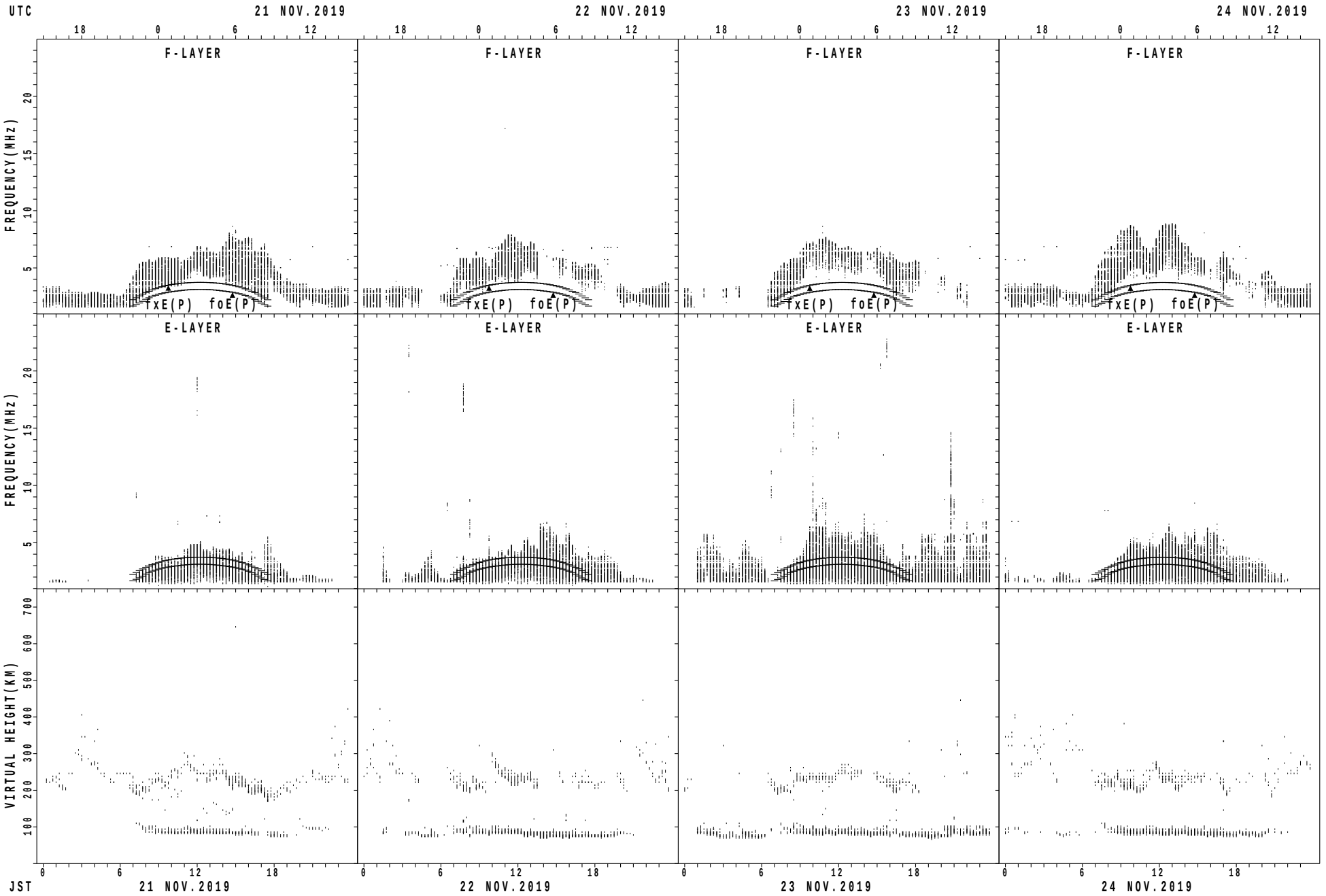
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



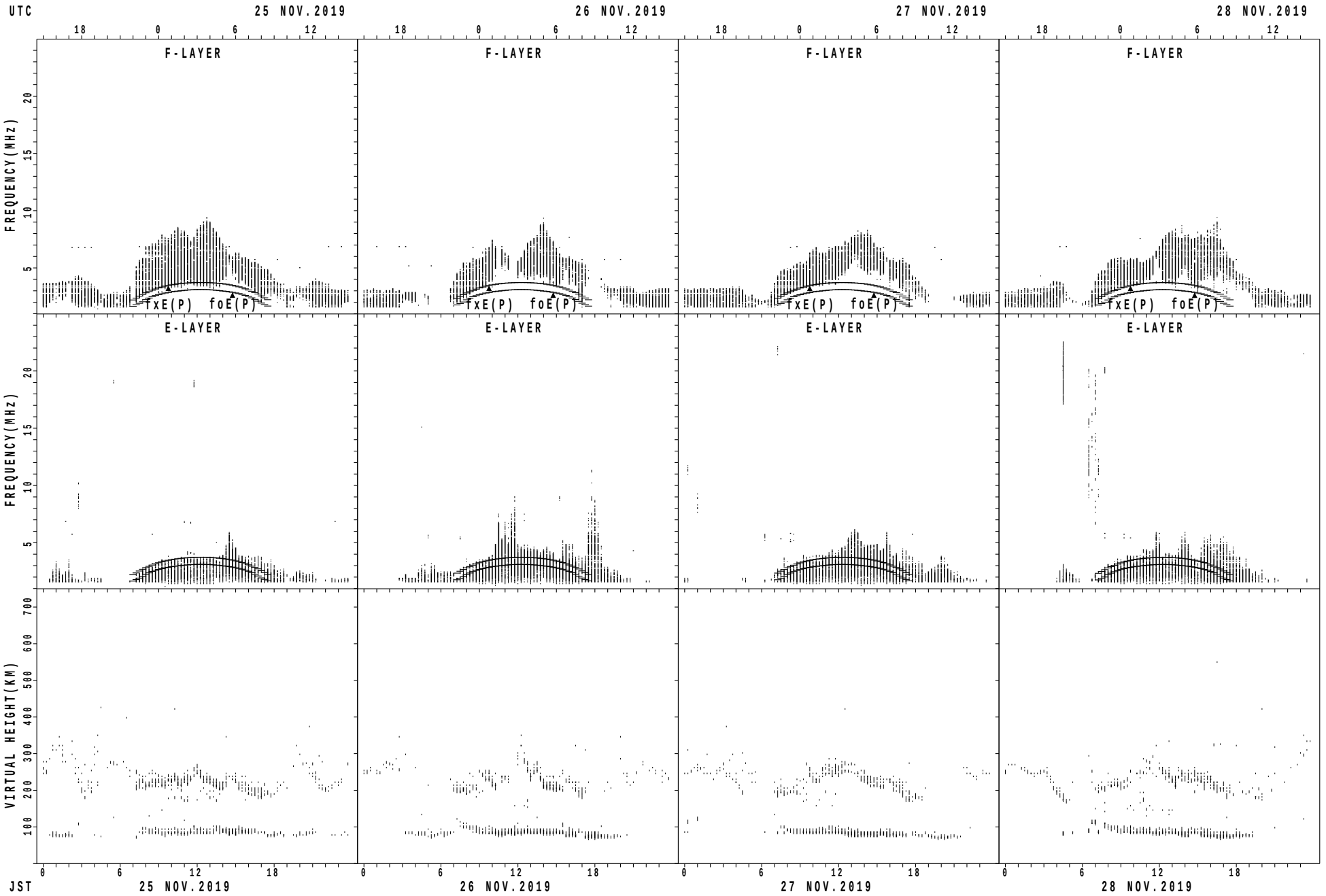
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



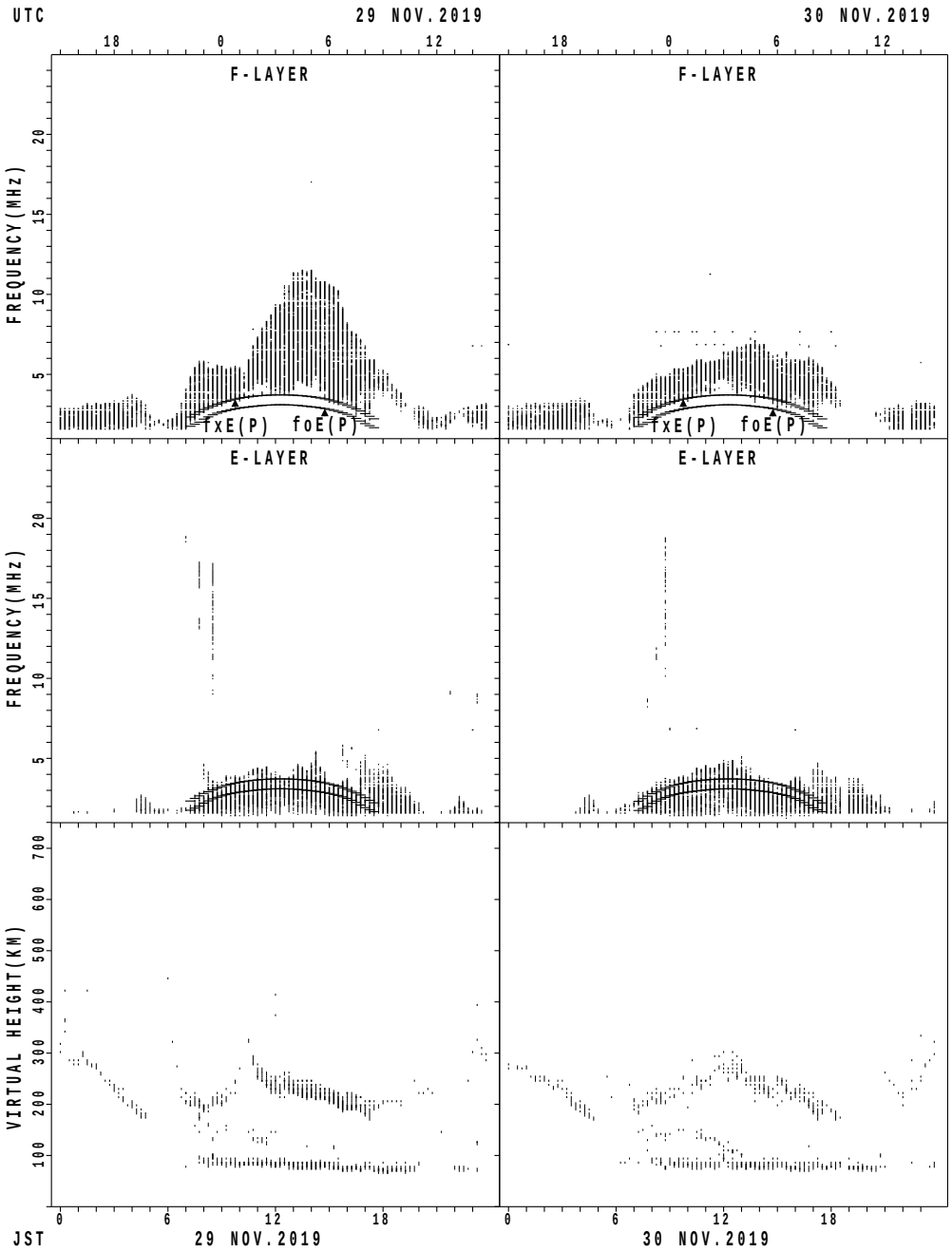
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

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

NOV.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			2	6	14	11	7	1	3	1								
MED						208			242	220	225	222	216	216	242	208								
U Q						104			262	248	248	236	250	108	264	104								
L Q						104			222	208	216	204	210	108	222	104								

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	5	6	5	4	5	5	7	17	23	23	23	18	21	18	17	18	15	11	13	13	15	10	12	7
MED	89	84	79	82	89	101	105	151	125	95	93	101	101	104	97	93	129	101	97	93	97	95	88	87
U Q	120	89	90	90	102	121	153	167	155	107	107	107	113	155	107	107	173	111	102	104	105	95	89	97
L Q	81	83	77	78	81	86	95	114	101	89	85	93	94	89	89	79	89	89	93	89	89	87	81	81

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	7	9			5	8	5								
MED									204	248	240			244	238	224								
U Q									102	270	254			250	241	232								
L Q									102	234	223			233	223	218								

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	7	10	7	3	1	7	5	20	23	19	21	16	15	16	16	18	17	18	15	17	15	15	12	9
MED	83	88	89	83	95	171	99	131	99	93	93	93	89	91	95	95	91	90	85	87	89	91	89	89
U Q	91	89	95	89	47	173	133	160	107	125	100	160	97	110	101	107	104	171	95	95	97	95	93	92
L Q	81	87	83	81	47	95	93	106	93	91	89	87	81	85	89	89	82	81	83	84	83	83	81	84

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										3	4				8	10	2	1						
MED										248	228				230	228	228	214						
U Q										250	247				242	234	250	107						
L Q										210	219				226	218	206	107						

h'Es

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	8	8	6	8	8	7	4	26	27	26	28	28	25	28	29	27	25	24	22	17	9	12	10	10
MED	89	86	82	81	84	167	89	139	125	107	101	95	93	94	89	91	89	83	87	85	87	89	89	83
U Q	95	89	87	85	88	175	93	163	149	137	128	109	111	134	113	99	107	96	167	91	99	95	99	87
L Q	80	82	81	81	82	81	84	121	101	89	88	87	87	89	82	83	81	81	83	81	81	86	81	81

MONTHLY MEDIANS OF h'F AND h'Es

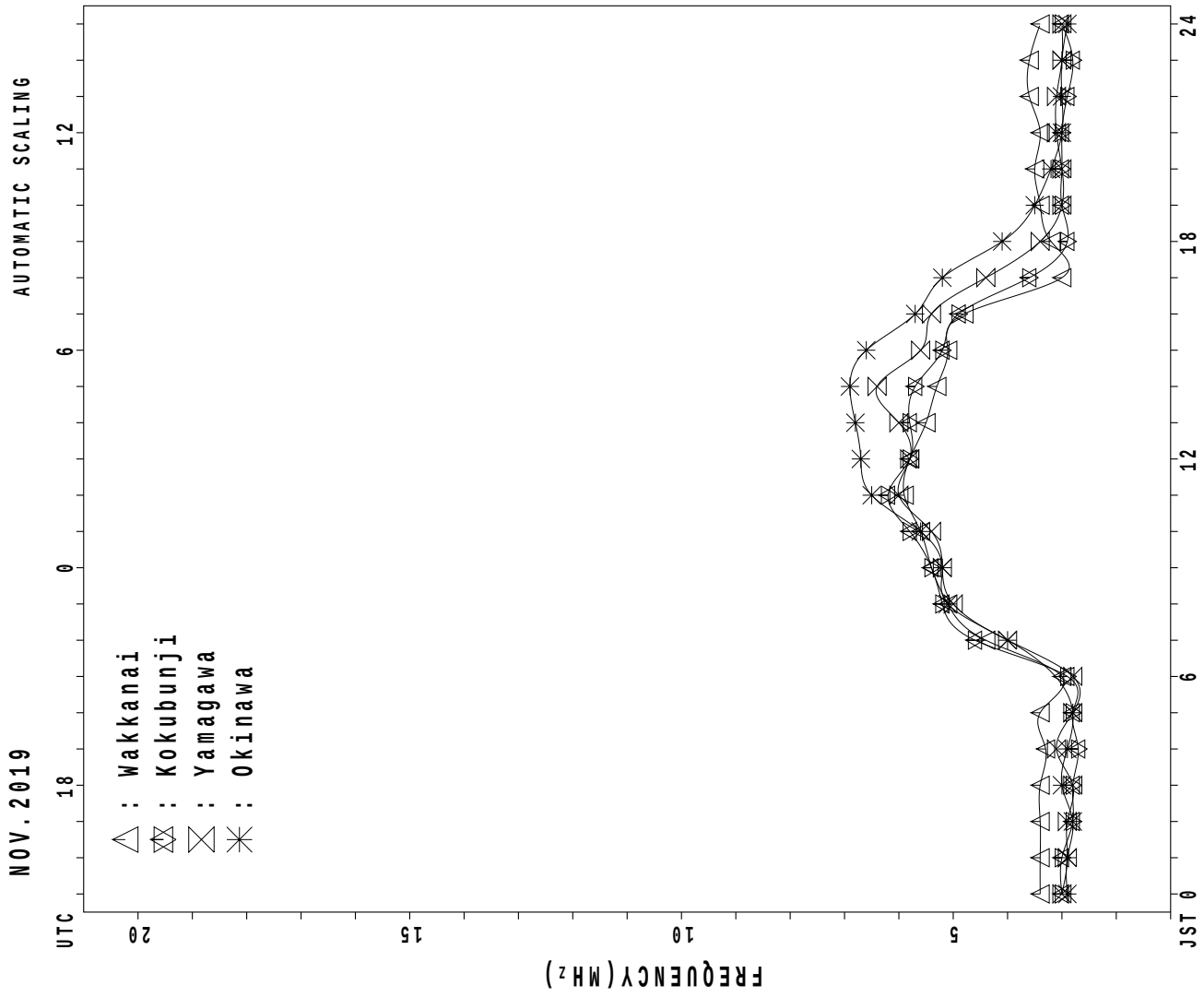
NOV.2019 135E MEAN TIME(UTC+9H) AUTOMATIC SCALING

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									2	3	9					19	8	5						
MED									239	228	248					230	210	210						
U Q									244	252	273					236	224	219						
L Q									234	226	217					214	205	197						

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	9	7	6	8	10	8	4	18	24	27	24	28	28	28	28	27	29	24	26	25	14	13	8	7
MED	83	85	83	87	88	83	82	128	122	119	110	107	98	95	91	95	89	89	85	81	82	89	86	85
U Q	93	95	89	89	105	91	87	155	131	157	153	134	119	109	107	131	101	128	95	173	87	93	90	89
L Q	75	81	81	83	83	82	76	95	104	95	95	96	92	89	86	89	83	81	81	80	79	78	77	81


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

IONOSPHERIC DATA STATION Wakkanai

NOV.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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C							X 38	X 42	X 44	44	X 39	44
6	X 40	X 39	X 39	X 40	X 40	X 39													X 38	X 46	X 50	58	A	55
7	58	54	57	52	53	54													X 34	X 39	X 42	X 45	X 44	X 45
8	X 43	41	40	X 37	X 34	X 33													42	X 39	X 39	X 43	50	52
9	51	49	49	51	48	44													X 33	X 32	X 36	X 39	X 39	41
10	X 38	X 37	X 37	X 35	X 33	X 31													X 39	X 39	X 40	X 45	X 43	X 50
11	X 49	X 49	F 56	55	51	X 57													X 40	X 36	X 33	40	40	41
12	X 40	39	X 39	X 37	X 41	X 32												X 33	X 38	X 39	X 40	X 39	X 40	X 39
13	X 39	X 40	X 40	X 39	X 39	X 40	X 35												X 32	X 32	X 34	X 34	X 34	37
14	X 36	X 34	X 37	X 36	X 35	X 37													X 30	X 33	X 33	X 37	X 38	X 38
15	X 37	46	C	X 39	44	48	38												X 34	38	X 39	X 45	54	58
16	58	46	46	53	46	46	44	58										38	X 35	X 45	X 53	59	59	58
17	44	37	37	X 32	37	X 40	X 33												X 29	X 34	X 37	X 37	X 39	43
18	X 38	40	X 40	53	50	43	39												X 31	X 34	X 34	X 34	X 38	X 35
19	X 38	X 37	X 37	X 39	X 36	X 35													X 32	X 32	X 35	X 38	X 38	X 39
20	X 40	X 40	X 39	39	X 35	X 35													X 33	X 33	X 39	45	51	45
21	X 43	X 42	53	X 44	53	40													X 32	X 38	X 44	46	46	55
22	60	60	54	58	58	X 53		58											X 46	X 55	X 59	X 60	X 55	X 53
23	X 49	X 59	X 59	X 59	X 59	66	55	58										56	52	X 48	X 53	X 46	X 54	X 40
24	X 41	X 53	56	56	57	X 37													X 37	X 37	X 40	X 43	44	42
25	43	46	49	44	X 44	X 39													X 35	X 39	X 39	X 39	X 41	X 45
26	X 45	44	48	45	38	38													X 33	X 35	X 39	45	43	55
27	X 58	48	47	47	F	X 39													X 31	X 33	44	X 35	58	47
28	38	X 37	38	41	38	41		54											X 39	X 49	54	X 57	58	68
29	58	C	54	57	57	58	58												38	44	50	54	57	57
30	58	58	58	44	X 33	X 32												A	X 31	42	47	X 39	X 40	X 37
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	24	24	25	24	25	7	4										3	26	26	26	26	25	26
MED	X 43	43	46	44	42	X 40	39	58										38	X 34	X 38	X 40	X 44	X 43	45
U Q	54	49	54	53	52	47	55	58										56	X 38	X 42	X 47	46	54	55
L Q	X 38	X 39	X 39	X 39	X 36	X 36	X 35	56										X 33	X 32	X 34	X 37	X 39	X 39	X 40

IONOSPHERIC DATA STATION Wakkanai

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

NOV.2019 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

NOV.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							C	C	C	C	C	C	C	C	C	C	C	C						
2							C	C	C	C	C	C	C	C	C	C	C	C						
3							C	C	C	C	C	C	C	C	C	C	C	C						
4							C	C	C	C	C	C	C	C	C	C	C	C						
5							C	C	C	C	C	C	L	L	L	L								
6										L	L	L	L	L										
7										A		A	L	A	L									
8								204		A	L	L	L	L										
9								L	L	L	L	L	L	L	L									
10										L	L	364	L	L	L									
11									L	L	L	L	L		L									
12							L		A	L	L	L	372	L		L								
13									L	L	L	L	L	L	L	L								
14									288	L	L	372	L	L	L	220								
15								L		L	L	L	L	L	L	L								
16											L	392	L	L	L	L								
17										L	L	L	L	L	L									
18									L	L	L	L	L											
19									L	L	L	L	L	L		L								
20									L	L	L	364	L			L								
21										L	L	260	364	L		L								
22									L	L	L	L	L	L	L									
23								L				L	L	L										
24								L	L	L	L	376	L	L										
25								212			L	L	352	332		L								
26										U 316	L U 348	L 380	320											
27											L	L	L	L	L	L								
28								L			L	L	L	L	L									
29									L		L	L	L	U L 352	L	196								
30									L	L	L	L	L	L										
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								2	1	1	1	7	4	2		2								
MED								208	288	U L 316	U L 348	372	358	342		208								
U Q												380	368											
L Q												364	336											

NOV.2019 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

NOV.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							C	C	C	C	C	C	C	C	C	C	C	C						
2							C	C	C	C	C	C	C	C	C	C	C	C						
3							C	C	C	C	C	C	C	C	C	C	C	C						
4							C	C	C	C	C	C	C	C	C	C	C	C						
5							C	C	C	C	C	C	276	264	248	220	180	192						
6							A	196	A	248	272	276	276	264	248	A	A	A						
7							216	180	204	A	A	A	A	A	A	220	A	A						
8							236	184	228	268	212	280	284	260	256	216	168	A						
9							192	192	228	256	264	276	272	284	212	232	A	A						
10							S	180	224	256	260	280	268	260	244	220	B	B						
11							B	A	216	256	248	268	276	244	228	228	B	B						
12							B	192	A	192	248	A 312	272	252	240	208	B							
13								208	220	252	272	268	268	264	236	208	B	B						
14							B	240	240	256	272	284	284	264	240	220	220	B						
15							B	236	212	248	260	256	284	260	252	196	A	A						
16							B	196	216	228	264	272	272	260	220	212	248	B 76						
17								176	236	260	260	284	276	252	208	208	A	156						
18							B	184	212	256	264	288	280	A	A	A	A	A						
19							196	B	236	264	264	272	272	248	248	208	B	B						
20							B	172	208	248	272	272	280	264	228	192	A	212						
21							B	176	212	252	276	276	264	184	212	168	A	B						
22							B	196	208	228	228	256	260	240	240	216	A	228						
23							B	B 216	A	A	252	280	240	240	A	240	A							
24							B	180	216	256	272	248	A	244	244	A	A	B						
25							B	196	196	224	256	268	268	248	228	8 140	B	B						
26							B	U L 212	224	236	A	276	240	240	220	204	B	B						
27							B	204	220	A	U R 228	272	272	244	236	200	A	180						
28							B	192	188	240	252	264	276	252	240	192	B	B						
29							B	B 200	244	252	272	268	240	212	208	216		B						
30							B	172	192	248	256	260	260	244	220	200	B	B						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							4	21	23	22	22	24	24	24	24	22	6	6						
MED							206	192	216	250	260	272	272	252	238	208	218	186						
U Q							226	200	224	256	272	278	278	262	244	220	240	212						
L Q							194	180	208	240	252	266	268	244	220	200	180	156						

NOV.2019 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

NOV.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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	32	31	28	26	J A 16	J A 25	32	J A 24	J A 25	22	E S 16	20
6	19	34	23	20	28	28	J A 27	J A 23	34	29	30	J A 31	31	28	J A 35	J A 36	J A 19	J A 71	J A 60	J A 53	J A 51	J A 51	47	J A 44
7	J A 30	J A 27	21	20	J A 23	E B 16	23	23	J A 36	J A 65	72	J A 85	J A 76	J A 42	J A 27	24	24	J A 49	J A 62	J A 27	J A 28	J A 61	J A 35	J A 31
8	E S 170	35	23	J A 45	J A 29	24	25	20	27	33	J A 31	J A 32	34	34	J A 30	26	J A 36	J A 26	32	33	E B 14	22	36	31
9	26	24	J A 21	J A 29	20	23	27	J A 22	26	26	30	31	28	J A 31	J A 30	J A 34	J A 31	29	26	28	22	32	21	E B 16
10	E S 16	20	20	27	22	22	21	J A 28	30	30	36	35	J A 30	30	28	25	32	J A 21	37	26	35	J A 31	32	30
11	28	E B 13	22	22	24	29	29	J A 27	38	32	J A 38	38	G	30	J A 28	J A 24	E B 15	E B 16	E B 15	J A 58	J A 41	J A 26	E B 16	E B 16
12	E B 16	28	20	25	25	20	20	29	J A 40	J A 48	J A 38	J A 31	36	33	28	J A 23	E B 16	E B 16	28	E B 16	32	J A 98	E B 16	E B 16
13	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	22	27	32	30	31	31	J A 37	26	J A 23	E B 16	E B 16	E B 16	18	E B 16	26	33	J A 32
14	E B 16	22	J A 51	25	20	20	E B 16	31	32	30	J A 28	34	34	30	26	27	J A 33	J A 26	J A 55	J A 55	30	J A 25	27	26
15	18	21	C	E B 16	E B 16	21	21	26	27	29	J A 52	33	31	29	J A 35	J A 24	J A 24	J A 56	24	25	28	E B 16	E B 16	21
16	E B 16	E B 16	E B 16	E B 16	20	E B 16	E B 16	23	J A 47	37	28	35	32	31	27	J A 26	G	E B 16	20	20	18	30	E B 16	E B 16
17	19	19	E B 16	E B 16	22	E B 16	E B 16	21	28	29	36	37	36	30	23	J A 31	35	E B 16	20	E B 16	E B 16	E B 16	29	E B 16
18	20	20	20	24	23	20	E B 16	J A 19	24	J A 37	28	J A 44	32	J A 55	J A 54	J A 37	37	28	22	19	33	33	26	25
19	32	J A 37	32	26	26	J A 27	21	24	33	37	40	38	J A 28	29	32	G 21	E B 84	E B 16	20	J A 27	J A 52	26	27	23
20	20	24	J A 143	26	26	20	J A 52	J A 26	J A 26	27	J A 32	J A 29	J A 29	G 26	J A 27	J A 31	32	J A 25	20	23	23	23	E B 16	30
21	21	J A 23	E B 16	20	E B 16	E B 16	E B 16	22	26	J A 28	J A 44	G	35	J A 29	J A 26	J A 26	J A 52	E B 16	22	28	J A 39	22	J A 31	29
22	20	23	J A 26	E B 16	E B 16	E B 17	E B 16	G	J A 25	39	31	31	34	J A 33	25	J A 29	J A 29	G	E B 16	28	28	J A 33	J A 32	24
23	20	20	17	20	E B 16	E B 16	E B 16	E B 16	26	J A 79	J A 85	45	J A 29	25	J A 28	J A 46	J A 29	30	J A 52	117	61	J A 73	31	J A 62
24	J A 84	25	29	23	24	24	E B 15	G	J A 35	J A 33	J A 42	J A 42	J A 77	J A 42	J A 35	J A 40	J A 31	23	20	27	27	26	33	30
25	21	26	27	27	E B 16	E B 15	J A 45	G	26	J A 38	34	38	J A 30	J A 27	23	J A 22	J A 27	J A 28	23	30	23	26	19	E B 16
26	28	28	20	E B 16	20	33	E B 16	29	J A 25	28	J A 31	J A 31	J A 27	28	G	G	E B 16	23	23	E B 16	J A 30	25	E B 16	E B 16
27	E B 16	E B 16	E B 16	E B 16	J A 111	20	E B 16	J A 48	25	J A 29	27	34	28	28	24	J A 31	J A 31	21	35	27	27	23	E B 16	E B 16
28	E B 16	E B 16	E B 16	E B 16	19	65	E B 16	J A 152	22	28	31	31	G	28	28	J A 30	37	E B 16	J A 63	31	34	J A 49	32	25
29	26	C	32	30	J A 27	J A E 32	E B 17	E B 16	J A 25	J A 60	J A 53	J A 29	J A 29	25	25	G	30	18	34	24	24	J A 25	28	28
30	E B 15	E B 16	E B 16	E B 16	E B 16	33	31	19	J A 35	J A 60	J A 77	34	J A 29	J A 25	J A 27	G 18	E B 16	J A 41	51	38	28	E B 15	E B 15	E B 15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	24	24	25	25	25	25	25	25	25	25	25	26	26	26	26	26	26	26	26	26	26	26	26
MED	20	22	20	20	22	20	E B 17	23	27	32	34	34	31	30	28	J A 26	30	23	25	27	28	26	27	24
U Q	27	26	26	26	26	28	26	J A 28	J A 34	J A 38	J A 43	38	34	J A 33	J A 30	J A 31	33	J A 28	J A 37	31	J A 34	J A 33	32	J A 30
L Q	E B 16	E B 18	E B 16	E B 16	E B 16	E B 16	E B 16	19	26	29	30	31	29	28	26	G 23	E B 16	E B 16	20	23	23	23	E B 16	E B 16

NOV.2019 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

NOV.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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	30	29	26	24	G 12	G 15	16	E B 16	E B 16	E B 16	E S 16	E S 16
6	E S 16	E S 16	E B 16	E S 16	E S 16	16	18	G 17	21	26	29	28	30	G 26	27	24	16	14	15	15	E B 16	18	A A 47	E A 21
7	E S 16	E S 15	E B 16	E S 15	E S 15	E B 16	E B 15	22	34	A A 65	47	A A 85	25	36	24	G 22	22	19	19	16	E B 16	E B 16	16	E B 16
8	E S 170	E S 17	E B 15	13	13	E S 15	E S 15	19	24	30	29	31	31	29	G 24	25	17	22	E S 16	E B 14	E B 14	E B 14	E S 15	E S 16
9	E B 15	E B 15	E B 14	E B 14	E B 14	E B 14	G 14	G 18	G 18	G 22	27	28	G 26	G 24	24	G 22	18	16	E S 16	E B 15	E B 15	E B 15	15	E B 16
10	E S 16	E B 16	E S 15	E B 15	E S 15	E A 15	E S 16	21	27	27	32	30	29	28	G 24	G 21	E B 15	E B 16	E B 16	E B 16	E B 16	18	E B 15	E B 15
11	E B 15	E B 13	E B 15	E B 15	E B 15	E B 15	E B 15	18	G 22	28	29	28	G	26	26	G 22	E B 15	E B 16	E B 15	E B 16	16	E B 16	E B 16	E B 16
12	E B 16	E B 17	E B 16	E B 16	E B 16	E B 16	E B 16	G A 18	A 40	26	30	G 30	G 27	G 25	27	22	E B 16	E B 16	E B 17	E B 16	E B 17	16	E B 16	E B 16
13	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G 19	24	29	29	28	30	28	26	G 20	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
14	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G 22	G 22	G 25	G 25	29	30	28	25	G 21	G 16	E B 16	16	E B 16	16	E B 16	16	E B 16
15	E B 16	E B 16	C	E B 16	E B 16	E B 16	E B 16	G 17	26	26	G 25	31	30	28	G 24	23	17	21	16	E B 16	16	E B 16	E B 16	E B 16
16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G 18	24	25	G 26	G 26	28	28	24	G 20	G	E B 16	E B 15	E B 15	E B 15	E B 16	E B 16	E B 16
17	E B 17	E B 17	E B 16	E B 16	E B 16	E B 16	E B 16	19	25	G 26	G 26	G 27	G 26	G 24	22	22	16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
18	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G 15	23	G 21	G 26	G 26	G 26	25	27	24	20	E B 16	E B 16	E B 16	E B 16	19	E B 16	E B 16
19	E B 16	19	18	E B 16	E B 16	16	E B 16	16	G 22	G 26	27	G 27	G 27	27	G 22	G 19	E B 84	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
20	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G 16	G 20	G 24	G 21	G 23	G 25	G 25	G 22	20	E B 17	E B 17	E B 17	E B 17	E B 17	E B 17	E B 16	E B 17
21	E B 17	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	19	24	G 24	G 21	G	28	22	26	18	E B 17	E B 16	16	18	25	E B 16	E B 16	E B 16
22	E B 16	E B 16	E B 16	E B 16	E B 16	E B 17	E B 16	G	23	30	28	28	G 26	26	G 23	G 22	17	G	E B 16	E B 17	E B 17	17	E B 17	E B 17
23	E B 17	E B 17	E B 17	E B 17	E B 16	E B 16	E B 16	E B 16	24	38	23	27	G 26	25	G 24	22	E B 16	20	20	17	E B 17	21	E B 16	17
24	19	E B 16	E B 17	E B 17	E B 17	17	E B 15	G	G 20	27	G 27	28	28	27	26	22	22	E B 16	E B 16	E B 17	E B 17	E B 17	E B 17	E B 17
25	E B 16	E B 16	E B 16	E B 16	E B 16	E B 15	E B 16	G	23	29	31	29	G 27	26	G 21	G 19	16	E B 16	E B 16	E B 16	16	E B 18	E B 16	E B 16
26	E B 16	E B 17	E B 17	E B 16	E B 17	E B 17	E B 16	G 20	G 20	24	29	29	G 24	G 24	G	G	E B 16	E B 16	E B 17	E B 16	E B 17	E B 17	E B 16	E B 16
27	E B 16	E B 16	E B 16	E B 16	E B 17	E B 17	E B 16	G 20	G 22	29	26	G 25	G 26	27	G 22	G 19	22	G 16	16	E B 16	E B 16	16	E B 16	E B 16
28	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G 18	20	25	28	28	G	26	26	20	17	E B 16	E B 16	E B 16	16	16	E B 16	E B 16
29	E B 17	C	E B 17	16	16	E B 16	E B 17	E B 16	G 20	26	G 25	G 25	G 25	G 24	22	G	G 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
30	E B 15	E B 16	E B 16	E B 16	E B 16	E B 16	E B 17	G 16	22	26	G 18	G 26	G 24	G 23	23	G 16	E B 16	A A 41	E B 16	17	E B 16	E B 15	E B 15	E B 15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	24	24	25	25	25	25	25	25	25	25	25	26	26	26	26	26	26	26	26	26	26	26	26
MED	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G 18	23	26	27	28	G 27	26	G	G 22	E G 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
U Q	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G 20	24	29	29	30	29	28	26	22	17	16	16	16	E B 17	17	E 16	E 16
L Q	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G 16	G 20	G 25	G 25	G 26	G 26	G 25	G 23	G 20	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16

NOV.2019 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

NOV.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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	15	12	14	15	14	16	14	14	16	15	E S 16	16
6	E S 16	E S 16	15	15	E S 15	E S 15	14	E S 15	14	12	12	13	13	13	13	13	13	13	13	14	16	E S 16	E S 15	E S 15
7	E S 16	E S 15	16	15	15	E S 16	15	12	14	14	14	14	14	14	14	14	14	14	14	14	15	15	16	16
8	E S 170	E S 15	E S 15	12	13	E S 15	15	15	14	14	12	14	14	12	14	13	13	15	15	14	14	15	15	16
9	14	16	14	14	15	15	15	14	14	14	12	12	12	12	12	13	13	12	15	15	15	14	15	16
10	16	16	15	15	14	15	16	15	14	13	14	14	14	14	12	12	14	14	15	15	13	15	15	15
11	15	13	15	15	15	14	14	15	12	12	15	15	15	15	15	15	15	16	15	16	16	16	16	16
12	16	16	16	16	16	16	15	15	14	16	13	14	12	14	14	15	16	16	16	16	16	16	16	16
13	16	16	16	16	16	16	16	16	16	15	16	13	16	14	16	16	16	16	16	16	16	16	16	17
14	16	16	16	16	16	16	16	16	16	15	15	15	10	14	12	10	18	17	16	16	16	16	16	16
15	16	142	C	16	16	16	16	16	16	16	15	15	13	14	14	14	10	15	15	16	16	16	16	16
16	16	16	16	16	16	16	16	16	11	15	12	12	10	11	10	15	15	16	14	16	16	16	16	16
17	16	16	16	16	15	16	16	16	14	14	12	9	11	10	12	11	16	16	16	16	16	16	16	16
18	16	16	16	16	16	16	16	16	14	8	10	10	14	12	12	14	16	16	16	16	16	16	16	16
19	16	16	16	16	16	15	15	16	15	14	14	12	12	12	11	11	84	16	16	16	16	16	16	15
20	16	16	15	15	16	16	16	16	14	9	15	12	12	12	9	15	16	16	15	16	16	16	16	16
21	16	16	16	16	16	16	16	16	14	12	12	14	12	10	13	10	17	16	16	16	16	16	16	16
22	16	16	16	16	16	17	16	16	16	10	15	15	14	13	10	15	16	16	16	16	16	16	16	16
23	16	16	16	15	16	16	16	16	16	14	16	14	16	14	12	16	16	16	17	17	16	16	16	16
24	16	16	16	16	15	15	15	16	16	16	16	16	15	15	16	16	16	16	16	16	16	16	16	16
25	16	16	16	16	16	15	16	16	14	14	13	14	15	13	13	15	16	16	17	16	16	18	16	16
26	16	16	16	16	16	16	16	15	15	13	16	14	14	12	14	16	16	17	16	16	16	16	16	16
27	16	16	16	16	16	16	16	16	16	16	16	16	14	10	10	16	17	16	15	15	16	16	16	16
28	16	16	16	16	16	16	16	16	16	16	16	15	13	15	15	15	16	16	16	16	16	16	16	16
29	17	C	17	16	16	16	17	16	14	16	15	15	15	16	15	15	18	16	16	16	16	16	16	16
30	15	16	16	16	16	16	16	16	15	14	15	14	16	17	16	15	16	16	16	16	15	15	15	15
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	24	24	25	25	25	25	25	25	25	25	25	26	26	26	26	26	26	26	26	26	26	26	26
MED	16	16	16	16	16	16	16	16	14	14	15	14	14	13	13	15	16	16	16	16	16	16	16	16
U Q	16	16	16	16	16	16	16	16	16	16	16	15	15	14	14	15	16	16	16	16	16	16	16	16
L Q	16	16	16	15	15	15	15	15	14	12	12	12	12	12	12	13	14	16	15	15	16	16	16	16

IONOSPHERIC DATA STATION Wakkanai

NOV.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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	R 393	374	373	376	380	387	355	328	326	F 334	333	F 316
6	316	328	329	326	330	349	343	397	390	377	392	349	370	397	369	384	373	407	329	340	U R 349	F 323	A	F 323
7	F 310	229	195	200	F 341	404	334	362	386	A	355	A	372	367	353	373	371	396	343	323	312	333	Z 344	Z 337
8	342	F 315	F 315	353	297	366	349	395	378	348	370	373	365	362	398	361	382	345	F 345	321	340	336	F	F
9	F 317	F 311	F 305	F 320	F 329	F 350	377	373	375	401	367	364	349	380	366	370	370	368	384	330	320	311	311	F 311
10	299	303	335	343	349	373	346	399	379	379	378	382	373	377	345	361	367	329	329	338	356	356	331	326
11	351	348	F	F	250	350	362	370	375	383	398	345	372	379	338	383	380	348	360	362	360	F	F	F 323
12	293	F 316	319	349	369	365	316	397	A	357	351	365	356	367	354	374	390	326	306	327	338	351	307	292
13	289	297	324	329	330	390	363	386	400	377	388	353	374	387	385	376	387	367	348	348	358	328	338	F 318
14	299	321	330	339	340	391	354	386	380	376	376	412	385	383	368	352	390	322	344	345	345	337	323	318
15	302	F 299	C	305	F 318	F 332	F 351	364	394	383	382	372	366	352	351	362	385	351	335	F 331	300	297	F 263	F 304
16	F 316	F 297	F 328	F 305	F 272	F 326	F 325	F 386	376	381	389	350	338	373	384	354	377	F 335	350	324	341	F 347	F 245	F 240
17	F 258	F 310	F 287	272	F 308	339	325	394	373	374	376	331	366	372	339	388	386	340	305	333	325	326	316	F 296
18	279	F 314	298	F 313	F 283	F 357	F 352	371	375	385	356	338	382	383	371	393	377	320	340	371	346	347	306	323
19	289	293	309	339	316	350	321	389	413	376	330	360	343	387	375	385	395	347	336	337	345	314	314	287
20	281	293	276	F 275	302	350	363	411	386	353	357	361	384	347	359	386	389	327	375	375	297	F 297	F 293	F 307
21	304	312	F 353	298	F 297	F 348	250	386	392	365	382	356	376	357	389	388	364	337	321	326	379	F 319	F 295	F 301
22	F 271	F 279	F	F 294	F 345	324	322	F 344	345	358	363	340	361	389	354	374	367	370	343	324	328	345	340	333
23	350	314	321	321	321	F 333	F 368	F 365	336	333	351	386	399	365	358	370	353	F 335	F 333	329	313	312	309	356
24	336	311	F 286	F 285	F 272	335	352	358	384	375	335	387	365	377	381	371	402	373	316	314	321	296	F 307	F 307
25	F 307	F 296	F 312	F 284	336	353	332	381	359	363	360	380	377	378	384	393	378	351	347	344	344	344	268	290
26	298	F 290	F 286	F 304	F 285	F 334	297	361	379	391	365	368	363	363	390	387	388	372	335	355	357	F 297	F 300	F 299
27	274	F 317	F 318	F 305	F 300	330	260	381	394	354	376	361	354	390	363	361	389	363	363	335	F 311	277	F 258	
28		276	F 262	F 279	F 263	F	300	F 368	383	370	343	380	343	331	365	376	376	330	327	342	F 335	324	F	F
29	F	C	F 318	F	F	F 331	F 335	386	371	386	372	379	365	368	369	380	411	332	F 310	F	F 347	F 338	F 312	F
30	F	F	F	F 287	273	378	363	392	337	390	359	386	355	362	399	383	338	A	379	F	F	305	294	295
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	22	23	21	23	24	24	25	25	24	24	25	24	26	26	26	26	26	25	26	24	25	25	22	22
MED	300	310	F 315	305	312	350	343	386	379	376	367	364	366	374	368	376	380	347	342	334	340	326	308	F 309
U Q	316	315	326	329	333	366	358	393	388	383	380	380	376	383	384	385	389	369	350	344	348	341	323	323
L Q	289	293	F 286	F 285	F 284	F 334	322	366	374	360	356	352	356	363	354	370	371	331	329	326	320	308	F 294	296

IONOSPHERIC DATA STATION Wakkanai

NOV.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							C	C	C	C	C	C	C	C	C	C	C	C						
2							C	C	C	C	C	C	C	C	C	C	C	C						
3							C	C	C	C	C	C	C	C	C	C	C	C						
4							C	C	C	C	C	C	C	C	C	C	C	C						
5							C	C	C	C	C	C	L	L	L	L								
6										L	L	L	L	L										
7										A		A	L	A	L									
8								423		A	L	L	L	L										
9								L	L	L	L	L	L	L	L									
10										L	L	402	L	L	L									
11									L	L	L	L	L		L									
12							L		A	L	L	L	399	L		L								
13									L	L	L	L	L	L	L	L								
14									404	L	L	393	L	L	L									
15								L		L	L	L	L	L	L	L								
16											L	392	L	L	L	L								
17										L	L	L	L	L	L									
18									L	L	L	L	L											
19									L	L	L	L	L	L		L								
20									L	L	L	419	L			L								
21										L	L	546	393	L		L								
22									L	L	L	L	L	L	L									
23								L				L	L	L										
24								L	L	L	L	406	L	L										
25											L	L	410	384		L								
26										U 392	L U 417	L 379	432											
27											L	L	L	L	L	L								
28								L			L	L	L	L	L									
29									L		L	L	L	U L 404	L									
30									L	L	L	L	L	L										
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	1	1	1	7	4	2										
MED								423	404	U L 392	L U 417	402	404	394										
U Q												419	421											
L Q												392	396											

NOV.2019 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

NOV.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							C	C	C	C	C	C	C	C	C	C	C	C						
2							C	C	C	C	C	C	C	C	C	C	C	C						
3							C	C	C	C	C	C	C	C	C	C	C	C						
4							C	C	C	C	C	C	C	C	C	C	C	C						
5							C	C	C	C	C	C	226	242	250	230								
6										224	216	248	232	222										
7										A		A	244	238	232									
8								210		220	254	236	254	244										
9								222	224	220	238	252	252	230	244									
10										234	242	232	244	244	248									
11									216	228	228	270	240		240									
12							276		A	252	266	252	242	238		236								
13									212	224	224	236	238	228	220	220								
14									226	234	208	206	224	222	222	198								
15								208		218	218	218	226	222	248	226								
16											220	238	266	228	228	214								
17										210	228	252	228	240	256									
18									218	224	224	224	234											
19									200	222	234	244	250	230		218								
20									218	218	254	230	242			232								
21										234	234	252	232	232		216								
22									248	250	232	248	224	224	232									
23								232				222	218	232										
24								244	220	244	252	226	238	224										
25											230	230	224	224	224									
26										224	236	222	238											
27											230	230	226	220	220	226								
28								226			226	226	250	242	242									
29									222		222	232	240	240	232	236								
30									242	224	224	224	238	238										
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	6	11	18	23	24	26	22	15	11								
MED							276	224	220	224	230	232	238	231	232	226								
U Q								232	226	234	238	248	244	240	248	232								
L Q								210	216	220	224	225	226	224	224	216								

NOV.2019 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

NOV.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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	244	196	214	218	218	202	232	232	232	Q 240	252	Q 262
6	260	260	260	252	240	240	232	208	216	196	204	196	214	198	224	220	220	198	200	232	240	222	A	222
7	228	246	Q 232	Q 214	252	202	208	230	216	A	252	A	200	A	200	230	220	220	220	218	240	246	242	228
8	228	246	268	230	256	212	228	188	210	A	188	202	196	202	220	240	214	202	222	222	230	216	Q 226	Q 260
9	Q 224	252	240	232	232	232	206	200	218	212	198	198	216	212	212	220	218	216	200	248	242	254	276	Q 236
10	274	274	260	242	218	212	228	214	224	220	214	194	194	214	214	236	206	252	240	214	228	222	240	240
11	240	226	Q 248	Q 230	Q 230	222	212	204	204	204	196	194	196	232	194	236	210	210	226	228	240	Q 244	Q 262	248
12	Q 284	Q 268	256	220	226	248	236	216	A	206	198	214	196	204	252	206	202	196	258	222	220	232	Q 252	Q 242
13	Q 258	Q 268	246	250	222	194	206	200	200	186	196	204	202	198	224	194	194	208	228	228	228	256	238	Q 254
14	256	256	250	238	238	204	204	194	186	186	196	196	A	196	212	200	200	236	228	234	234	246	228	Q 228
15	Q 258	Q 238	C	Q 248	Q 234	212	184	178	212	212	168	206	192	192	226	208	196	218	236	236	236	Q 236	Q 230	Q 242
16	Q 250	Q 250	Q 232	Q 232	Q 240	230	Q 206	192	196	214	188	188	200	200	200	182	200	204	208	238	224	224	Q 244	Q 262
17	Q 266	Q 246	Q 248	Q 248	Q 238	Q 182	224	208	234	190	190	198	198	202	204	204	190	204	266	232	246	210	Q 210	Q 236
18	Q 236	Q 264	244	Q 230	Q 246	Q 208	Q 226	202	194	194	194	196	208	220	220	214	188	254	232	214	242	220	Q 234	260
19	Q 244	258	258	232	248	220	268	200	186	194	186	198	198	198	210	210	188	212	232	232	252	240	238	Q 250
20	Q 250	Q 262	Q 256	Q 256	268	230	190	194	166	188	212	182	190	226	226	194	206	212	220	248	Q 248	Q 244	Q 244	Q 230
21	Q 246	Q 230	Q 230	Q 230	Q 236	Q 224	Q 202	204	198	198	198	184	198	208	208	204	204	204	248	220	202	250	Q 250	254
22	Q 254	Q 230	Q 230	Q 234	206	226	228	212	212	222	188	200	186	208	202	210	198	198	218	238	234	218	218	212
23	222	228	240	240	224	Q 208	Q 192	182	240	240	224	206	206	178	228	210	226	206	250	258	Q 212	A	236	190
24	218	228	Q 270	Q 280	258	234	234	206	230	214	214	214	196	188	216	216	198	198	244	252	244	Q 264	Q 264	240
25	244	252	Q 246	240	230	208	254	212	212	220	204	196	188	188	188	208	208	210	240	224	216	234	Q 260	Q 222
26	212	250	Q 250	Q 262	260	204	218	204	220	200	188	188	188	232	212	212	204	192	222	222	218	Q 234	Q 222	Q 234
27	Q 246	256	240	Q 254	Q 240	192	190	206	206	236	194	194	194	214	196	194	204	222	238	220	240	Q 240	Q 296	Q 264
28	Q 286	Q 282	264	Q 264	Q 256	Q 224	198	194	208	202	180	194	200	202	220	198	216	214	214	214	Q 240	240	Q 230	Q 234
29	Q 258	C	258	260	Q 250	Q 212	Q 190	206	180	220	190	190	190	200	216	218	206	214	Q 226	206	Q 194	212	Q 252	Q 270
30	Q 256	Q 230	Q 288	Q 252	264	224	202	202	202	216	182	182	182	192	210	210	194	A	202	218	Q 250	Q 250	Q 234	Q 256
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	25	24	24	25	25	25	25	25	24	23	25	24	25	25	26	26	26	25	26	26	26	25	25	26
MED	Q 250	251	249	Q 240	240	212	208	204	209	206	196	196	196	202	213	210	204	210	228	228	235	240	Q 240	Q 241
U Q	Q 258	Q 261	259	Q 253	254	228	228	208	217	220	204	201	201	213	220	218	214	217	240	236	242	246	Q 252	Q 256
L Q	232	Q 234	Q 240	Q 231	230	206	200	194	197	194	188	192	191	196	204	204	198	202	220	220	224	222	Q 230	230

NOV.2019 h'F (KM)

IONOSPHERIC DATA STATION Wakkanai

NOV.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							C	C	C	C	C	C	C	C	C	C	C	C						
2							C	C	C	C	C	C	C	C	C	C	C	C						
3							C	C	C	C	C	C	C	C	C	C	C	C						
4							C	C	C	C	C	C	C	C	C	C	C	C						
5							C	C	C	C	C	C	114	114	110	116	112	B						
6							A	S	A	118	118	118	118	118	104	A	A	A						
7							108	114	106	A	A	A	A	A	A	116	A	A						
8							144	130	114	114	114	120	114	114	120	124	144	A						
9							106	116	108	112	112	112	110	100	106	106	A	A						
10							S	154	116	116	110	118	118	108	108	124	B	B						
11							B	A	114	114	114	114	114	114	114	112	B	B						
12							B	138	A	116	118	A	118	118	118	128	B							
13								E A 142	108	102	112	112	112	102	114	122	B	B						
14							B	116	116	108	108	114	114	114	114	114	102	B						
15							B	100	114	114	114	114	114	114	114	114	A	A						
16							B	116	114	114	114	114	106	96	104	112	B 114	B						
17								130	114	114	114	114	114	114	106	106	A	196						
18							B	116	116	116	106	106	106	A	A	A	A	A						
19							106	B	122	108	108	108	108	108	108	108	B	B						
20							B	B	108	108	108	108	108	108	108	108	A	106						
21							B	B	114	104	104	110	110	100	100	100	A	B						
22							B	130	108	108	108	108	108	108	108	108	A	88						
23							B	B	108	A	A	108	104	104	104	A	108	A						
24							B	B	98	116	106	106	A	106	106	A	A	B						
25							B	140	108	108	104	104	104	104	104	A	B	B						
26							B	132	120	112	A	112	90	94	112	136	B	B						
27							B	110	114	A	104	104	104	104	104	104	A	90						
28							B	B	98	98	98	110	110	110	110	110	B	B						
29							B	B	B	98	106	106	106	106	112	130	100	B						
30							B	108	108	108	108	108	108	108	108	126	B	B						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							4	16	22	22	22	23	24	24	24	21	6	4						
MED							107	120	114	112	108	110	110	108	108	114	110	98						
U Q							126	135	114	114	114	114	114	114	113	124	114	151						
L Q							106	115	108	108	106	108	106	104	105	108	102	89						

NOV.2019 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

NOV.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	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5	C	C	C	C	C	C	C	C	C	C	C	C	142	200	126	170	102	114	114	104	104	94	S	104
6	104	98	100	132	118	116	116	116	114	166	166	104	164	170	100	100	112	112	112	112	108	104	104	100
7	100	100	100	104	92	B	110	158	112	112	108	100	108	104	104	154	128	120	120	114	108	108	108	112
8	S	106	106	106	106	110		168	148	118	118	106	140	128	112	150	140	128	126	110	B	102	120	94
9	120	112	102	102	102	102	100	110	172	108	108	154	100	100	102	102	102	96	100	100	100	112	104	B
10	S	96	96	98	102	102	102	108	140	152	126	126	116	116	116	110	114	92	108	108	112	112	112	112
11	112	B	102	Q 102	118	112	112	112	112	118	116	110	G	168	120	104	B	B	B	112	112	112	B	B
12	B	114	108	108	108	120	128	128	112	112	104	104	104	120	176	122	B	B	86	B	102	102	B	B
13	B	B	B	B	B	B	B	116	140	140	144	136	116	84	138	138	B	B	B	86	B	Q 100	100	100
14	B	94	94	94	94	94	B	110	110	164	96	122	152	134	158	106	92	90	110	110	96	122	98	98
15	98	102	C	B	B	100	100	104	152	152	90	140	140	150	108	118	102	98	98	98	98	B	B	98
16	B	B	B	B	92	B	B	92	108	108	134	102	150	150	140	92	G	B	118	106	100	92	B	B
17	98	130	B	B	86	B	B	144	120	108	98	166	156	166	128	88	88	B	108	B	B	B	100	B
18	98	98	98	98	92	92	B	128	148	90	116	98	152	90	90	90	90	94	94	86	102	102	102	102
19	92	92	92	92	92	92	92	112	112	102	102	102	102	152	126	138	B	B	112	96	96	96	96	96
20	96	96	108	102	96	96	114	100	88	148	104	104	104	88	88	88	98	90	100	100	112	112	B	92
21	110	90	B	102	B	B	B	114	142	126	100	G	G	102	102	102	110	B	110	104	102	114	94	94
22	94	94	96	B	B	B	B	G	112	104	104	178	104	104	118	92	98	G	B	98	98	104	110	90
23	90	90	90	94	B	B	B	B	146	104	102	102	92	124	94	94	94	108	110	110	110	100	92	104
24	104	100	92	92	104	94	B	G	124	108	108	108	104	94	102	92	92	88	86	126	126	112	90	90
25	88	88	88	84	B	B	86	G	140	96	126	126	84	112	108	90	90	114	84	108	100	100	100	B
26	88	88	88	B	88	88	B	130	130	112	94	94	108	164	G	G	B	90	84	B	108	108	B	B
27	B	B	B	B	110	80	B	100	142	108	102	114	116	168	134	86	86	G	104	104	102	96	B	B
28	B	B	B	B	80	120	B	110	146	146	122	158	G	158	122	102	92	B	98	98	98	98	98	98
29	94	C	94	82	96	110	B	B	100	88	88	110	90	110	166	G	94	94	98	98	98	102	88	92
30	B	B	B	B	B	106	108	150	100	116	98	106	88	106	86	96	B	110	106	106	104	B	B	B
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	16	18	17	16	18	17	11	20	25	25	25	24	23	26	25	24	19	16	23	23	23	23	17	17
MED	98	97	96	100	96	102	108	113	124	112	104	109	108	122	116	102	98	97	106	104	102	102	100	98
U Q	104	102	102	103	106	111	114	129	144	143	120	131	142	158	131	120	110	113	112	110	108	112	106	103
L Q	93	92	92	93	92	93	100	109	112	106	99	103	102	104	102	92	92	91	98	98	98	100	95	93

IONOSPHERIC DATA STATION Wakkanai

NOV. 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																								
2																								
3																								
4																								
5													H 1	CL 11	C 1	H 1	LC 11	L 4	F 1	F 2	F 2	F 1		F 1
6	F 1	F 1	F 1	F 1	F 1	F 3	L 4	LC 11	L 1	H 1	H 1	LC 11	HC 11	H 1	L 2	L 2	L 1	L 3	F 1	F 4	F 4	F 3	F 3	F 4
7	F 3	F 2	F 1	F 1	F 1		LC 11	C 1	C 5	C 4	C 2	C 3	C 2	L 3	L 3	HL 21	L 1	L 4	F 3	F 2	F 2	F 3	F 3	F 1
8		F 2	F 2	F 1	F 2	F 1	LC 11	H 1	HL 21	C 3	C 2	LH 21	H 2	C 2	LC 11	H 2	C 1	L 1	F 1	F 1		F 1	F 1	F 1
9	F 1	F 1	F 3	F 2	F 1	F 1	L 2	L 5	H 1	CL 21	LC 21	HL 11	LC 21	LC 21	LC 21	L 2	L 1	L 2	FF 11	F 1	F 1	F 1	F 2	
10		F 1	F 1	F 1	F 1	F 1	L 1	LC 11	C 2	C 2	C 2	C 2	C 1	C 2	C 2	C 2	L 1	L 1	F 2	F 1	F 2	F 2	F 1	F 1
11	F 1		F 1	F 1	F 1	F 1	L 1	L 2	L 3	C 2	C 3	LC 21		H 2	C 2	L 2				F 2	F 2	F 2		
12		F 1	F 1	F 1	F 1	F 1	LL 11	C 1	L 5	L 5	L 3	L 3	L 2	CL 21	C 2	L 3			F 1		F 1	F 1		
13								C 1	C 2	C 2	C 2	C 2	C 2	C 1	C 2	C 3				F 1		F 1	F 2	F 3
14		F 1	F 1	F 1	F 1	F 1		C 2	C 2	HC 11	L 2	C 2	C 2	C 2	C 2	C 2	C 1	L 1	F 2	F 2	F 2	F 1	FQ 21	FQ 11
15	F 1	F 1				F 1	L 1	LC 11	C 2	C 2	L 3	C 2	C 2	C 2	C 2	C 2	L 1	L 4	F 3	F 1	F 2			F 1
16					F 1			C 1	LC 32	LC 22	C 2	C 2	HL 21	HL 21	HL 21	LC 11			F 1	F 1	F 1	FF 21		
17	F 1	F 1			F 1			C 1	C 2	C 3	L 2	C 2	HL 21	HL 21	CL 21	LC 22	L 1		F 1				F 1	
18	F 1	F 1	F 1	F 1	F 2	F 1		C 1	HL 21	LC 21	CL 21	LC 12	HL 21	L 3	L 2	L 3	L 3	L 1	L 2	L 2	F 2	F 4	F 1	F 1
19	F 3	F 4	F 3	F 2	F 2	F 2	L 1	L 1	C 3	C 3	C 2	C 2	C 2	C 2	C 2	CL 21			F 1	F 1	F 1	F 1	F 1	F 2
20	F 1	F 2	F 2	F 2	F 2	F 2	L 1	LH 11	LC 22	HC 11	LC 22	C 2	LC 21	LC 22	LC 22	LC 11	L 1	L 1	F 1	F 2	F 1	F 1		FQ 11
21	F 1	F 1		F 1				C 1	CL 21	CL 21	C 3		C 2	C 3	C 2	C 3	L 1		F 1	F 4	F 8	F 5	F 2	F 2
22	F 1	F 1	F 1						CL 31	C 4	C 3	HL 22	C 2	LC 22	C 2	C 2	L 1			F 1	FF 21	FQ 31	FQ 11	F 1
23	F 1	F 1	F 1	F 1					CL 21	L 6	L 4	C 2	LC 21	CL 22	L 3	L 4	LC 11	L 2	F 4	F 4	FF 21	FF 42	F 2	F 4
24	F 5	F 1	F 2	F 2	F 1	F 1			C 3	LC 21	LC 32	C 2	LQ 21	LC 21	L 3	LL 21	L 2	L 1	F 1	F 1	F 1	F 1	F 2	F 3
25	F 1	F 2	F 2	F 1			L 1		H 2	LC 22	CL 22	CL 22	LC 11	CL 21	CL 11	L 3	L 1	LL 11	F 1	F 1	F 2	F 3	F 1	
26	FF 11	F 2	F 1		F 1	F 1		C 1	C 2	C 2	C 3	LC 21	CL 21	HL 13				L 1	F 1		F 1	F 1		
27					F 1	F 1		LC 11	H 2	L 3	C 2	C 2	C 2	HL 11	HL 21	LC 11	L 2	C 1	F 2	F 1	F 1	F 1		
28					F 1	F 1		L 1	C 1	C 1	C 2	CL 21		CL 21	C 2	LC 11	L 1		FQ 21	F 1	F 3	F 3	FQ 21	FQ 11
29	FQ 21		F 2	FF 21	F 1	F 1			LC 21	LC 22	LC 22	C 2	LC 12	C 2	H 2		C 1	L 1	FF 11	F 1	F 1	F 1	F 1	FF 11
30						L 2	L 1	H 1	LC 22	C 2	C 3	C 2	LC 11	C 1	LC 11	CL 21		L 8	FQ 11	FQ 21	FQ 11			
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

NOV. 2019 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV.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	48	54	51	43	X 40														X 35	X 38	X 34	X 36	X 36	X 36
2	X 34	X 35	40	X 36	X 31														X 36	X 37	X 40	X 39	X 36	X 37
3	X 36	X 34	X 34	X 35	X 32	X 27													X 44	A	A	X 33	X 34	X 34
4	X 33	X 33	X 33	X 33	X 36													X 44	X 38	X 36	X 40	X 40	X 37	X 39
5	X 37	X 36	X 33	X 32	X 33	X 33													X 34	X 39	X 44	X 44	X 36	40
6	X 36	X 37	39	X 36	X 36	X 36													X 42	X 41	X 38	X 34	X 38	X 36
7	X 39	X 39	X 38	X 38	X 39	X 31													X 44	X 35	X 38	X 38	X 38	X 38
8	X 36	X 36	X 31	34	X 30	X 27												X 49	X 34	X 40	X 33	X 31	X 32	X 34
9	X 34	X 34	X 34	X 33	X 35	X 30													X 34	X 38	X 31	X 32	X 34	39
10	40	X 32	X 32	X 32	X 29	X 26												X 40	X 31	X 37	X 38	X 34	X 32	X 33
11	X 33	X 35	X 34	X 36	X 37	44													X 36	X 35	X 36	X 35	X 36	41
12	44	48	51	40	X 30	X 26												X 49	X 36	X 40	X 39	X 37	X 37	X 38
13	X 36	X 36	X 33	X 37	X 43	X 31													X 28	X 34	X 35	X 34	X 33	X 34
14	X 35	X 36	X 36	X 34	X 36	X 30												X 42	X 37	X 33	X 36	X 35	X 36	X 36
15	X 34	X 31	X 31	X 35	X 40	X 30	X 33												X 33	X 36	X 39	X 36	X 36	X 37
16	X 36	X 36	X 34	X 34	X 32	X 30													X 29	X 34	X 40	X 36	44	X 38
17	X 36	39	34	38	35	X 27													X 31	X 34	X 38	X 37	X 36	38
18	X 34	36	X 34	34	32	32	32												X 30	X 34	X 34	X 30	X 31	X 34
19	X 34	X 34	39	X 35	X 34	X 31	X 32											X 39	X 30	X 30	X 32	X 32	X 34	X 34
20	X 34	X 33	X 32	X 31	X 30	X 31													X 31	X 36	X 34	X 36	X 38	X 36
21	X 36	X 34	X 34	X 34	X 33	X 32													X 33	X 31	X 33	X 37	X 32	35
22	38	X 34	X 32	X 32	X 32	X 30													X 40	X 38	X 40	X 36	38	X 38
23	X 37	X 37	X 38	X 38	X 38	X 37												X 42	X 50	48	53	48	38	X 36
24	38	38	X 36	X 34	X 32	X 30												A	X 35	X 40	X 39	34	39	X 38
25	X 36	X 34	X 32	X 33	X 34	X 26	X 30												A	X 33	X 37	X 38	38	38
26	X 37	X 37	X 34	X 34	X 35	X 28	X 30											X 37	X 36	X 36	X 33	X 34	X 34	X 34
27	38	37	X 32	X 34	X 34	X 27	X 27											X 38	X 32	X 35	X 32	X 30	40	35
28	X 32	35	X 31	X 30	X 33	X 26												X 38	X 36	X 34	41	X 32	39	39
29	40	38	37	35	X 32	A											C	C	A	X 34	X 33	X 34	X 29	X 33
30	X 36	X 36	40	X 32	X 32	X 30												X 37	X 33	X 36	X 38	X 37	X 34	X 33
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	26	6											11	28	29	29	30	30	30
MED	X 36	X 36	X 34	X 34	X 34	X 30	X 31											X 40	X 34	X 36	X 38	X 36	X 36	X 36
U Q	38	37	38	X 36	X 36	X 31	X 32											X 44	X 36	X 38	X 40	X 37	38	38
L Q	X 34	X 34	X 32	X 33	X 32	X 27	X 30											X 38	X 32	X 34	X 34	X 34	X 34	X 34

NOV.2019 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

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

IONOSPHERIC DATA STATION Kokubunji

NOV.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	L	U L 424	U L 408	U L 416	L	A								
2										L	L	U L 400	L	L	L									
3										L	L	408		U L 396	L									
4									A	L	A	U L 404	444	L	L	L								
5									L	L	L	U L 416	U L 420	A	A	L								
6										L			U L 416		L									
7										L	U L 416	L	L	L	L									
8											L	L	L	372	A	A								
9									L	L		A	A	A		A								
10									L		U L 456	U L 436	L	L	L	L								
11										L	U L 420	L	L	372	A									
12									L	L	U L 408	U L 412	A	A	A	A								
13										L	L	A	A	A	A									
14											L	L	U L 412	L										
15									L	L	L	L		U L 392	L									
16												U L 448	U L 400	U L 396										
17										A	A	U L 404	L	A										
18										L	L	412	A	A										
19											U L 412	U L 416	L	L	L									
20										L	A	L	L	A	A									
21											L	L	L	L	L									
22										L	A	A	L	L										
23										L	L		L	L										
24											L	L	L	L										
25										L	L	U L 400	L	L	L									
26										L	L	L	L	A										
27									L		L	L	L		A									
28											L	U L 404	L	L	L									
29										U L 388	L			U L 428	U L 356			C	C					
30											U L 412	L	L	A	L	L								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										1	6	13	6	7	1									
MED										U L 388	U L 414	U L 412	U L 414	U L 396	U L 356									
U Q											U L 420	U L 420	420	U L 416										
L Q											U L 412	U L 404	U L 408	372										

NOV.2019 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV. 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						B	B	U A 204	U R 264	A	A	A	A	R	R	A	A	B						
2						B	B	A	A	A	R	R	R	R	A	R	U R 192	B						
3							B	U R 212	U R 260	288	A	A	A	R	U R 268	U R 244	R	B						
4						B	B	A	A	A	A	R	U A 340	A	U R 284	R	A							
5							B	U R 216	U A 264	U A 316	U A 316	U R 316	U A 312	A	A	A	A	B						
6							B	U R 188	256	U A 280	A	A	A	U A 292	R	U R 248	R	B						
7							B	U R 200	256	296	304	U R 316	A	A	A	A	A	B						
8							B	U A 196	A	U A 304	A	R	A	A	A	A	B							
9							B	U A 188	A	A	296	A	A	A	U A 280	A	A	B						
10							B	U R 228	U A 248	U A 280	U R 316	A	A	R	U R 276	U R 248	R							
11							B	176	U A 240	U A 284	A	A	A	A	A	A	B	B						
12							B	U A 192	240	A	A	R	A	A	A	A	A							
13							B	U R 224	244	A	R	U A 308	312	U A 280	U A 260	A	B	B						
14							B	U A 192	256	U A 284	U R 316	U A 320	U R 344	A	R	U R 232	B							
15								U R 204	244	U R 296	U R 300	308	A	U R 300	A	A	A	B						
16							B	B	A	A	A	A	A	R	A	A	A	B						
17							B	A	A	U A 284	A	A	U R 320	U A 280	U A 276	A	B	B						
18								U R 212	A	A	U R 312	A	300	U A 276	U R 272	A	B	B						
19								U R 192	U A 264	300	A	A	R	U R 308	U R 276	A	B							
20							B	U A 172	U R 260	U R 296	320	A	U A 312	308	280	A	U R 192	B						
21							B	U R 208	R	304	A	A	A	A	A	A	U R 176	B						
22							B	U A 196	U A 268	A	A	A	A	A	A	A	A	B						
23							B	U A 168	U A 248	A	A	A	A	A	A	A	B							
24							B	U R 180	U R 268	A	A	A	A	A	A	A	A							
25								U A 180	A	U A 276	A	R	R	R	A	U R 252	R	B						
26								B	R	U A 252	A	R	A	A	A	U R 236	B							
27								B	U R 240	A	A	A	A	A	A	U A 220	B							
28							B	B	228	U A 308	A	A	A	U A 292	A	A	B							
29							B	B	U A 244	U R 284	U A 288	U A 304	296	A	U R 256	U A 224	C	C						
30							B	B	248	A	U A 304	A	U A 284	A	R	U R 224	B							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								21	20	17	10	6	9	8	10	9	3							
MED								U R 196	U 252	U A 288	U 308	U 312	U 312	U A 292	U R 276	U R 236	U R 192							
U Q								U R 210	U 262	U A 302	U R 316	U 316	U R 330	U R 304	U 280	U R 248	U R 192							
L Q								U A 184	244	U A 282	U 300	308	298	U A 280	U R 268	U A 224	U R 176							

NOV. 2019 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV.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 29	J A 26	J A 27	E B 16	21	E B 16	J A 24	23	G	J A 38	34	J A 38	34	G	G	J A 43	J A 38	J A 24	E B 15	E B 16	J A 51	J A 52	J A 40	J A 83
2	J A 26	J A 28	J A 50	J A 27	22	E B 15	J A 26	28	J A 35	J A 36	G	G	G	G	32	G	G	J A 28	J A 24	20	E B 17	22	E B 15	E B 15
3	J A 25	J A 20	20	21	E B 15	E B 13	E B 15	G	29	32	J A 35	J A 36	J A 42	G	G	G	G	J A 33	J A 29	J A 38	J A 49	J A 72	J A 32	23
4	20	22	J A 28	J A 27	20	22	J A 21	25	J A 38	J A 36	38	G	39	J A 48	G	G	24	24	23	J A 21	E B 16	E B 28	22	22
5	24	21	21	E B 16	E B 16	23	J A 27	G	30	35	36	G	36	39	J A 40	30	J A 34	J A 54	J A 50	J A 36	J A 36	J A 34	J A 51	J A 32
6	J A 26	23	24	E B 16	J A 22	J A 48	J A 65	G	30	33	35	34	34	34	G	G	G	E B 16	J A 47	J A 36	J A 82	J A 48	J A 29	J A 25
7	E B 16	J A 23	21	21	E B 15	E B 16	E B 15	G	32	34	36	G	J A 50	34	36	J A 40	J A 32	J A 26	J A 26	J A 44	E B 16	E B 15	E B 15	E B 15
8	E B 16	J A 22	J A 29	J A 26	18	E B 16	E B 16	25	31	32	37	G	37	32	35	J A 36	J A 34	J A 24	E B 15	J A 25	J A 23	E B 16	J A 26	J A 30
9	J A 26	J A 28	21	21	E B 15	E B 15	21	23	J A 30	J A 38	36	37	37	35	32	30	J A 30	J A 27	24	22	J A 33	23	E B 15	E B 15
10	21	22	E B 16	E B 16	E B 16	20	20	G	28	34	G	38	J A 39	G	G	G	G	E B 16	E B 15	J A 27	J A 33	J A 25	J A 29	J A 27
11	22	22	J A 24	22	E B 16	E B 16	E B 16	22	29	33	J A 41	34	36	33	J A 43	J A 46	J A 24	24	J A 31	J A 54	J A 48	J A 32	J A 24	J A 26
12	20	22	22	21	E B 16	E B 16	J A 31	23	29	J A 30	J A 38	G	J A 47	J A 46	J A 50	J A 52	J A 44	J A 37	J A 28	J A 42	J A 34	23	J A 22	E B 16
13	E B 16	E B 16	E B 15	E B 15	E B 16	E B 16	E B 15	G	31	34	G	38	36	33	32	26	23	E B 16	E B 15	E B 15	E B 15	E B 16	E B 16	E B 16
14	E B 16	E B 16	E B 15	E B 16	E B 15	E B 15	E B 16	25	29	35	35	35	G	35	G	G	E B 17	24	J A 23	J A 37	J A 20	J A 30	20	E B 17
15	20	20	E B 16	E B 15	E B 16	E B 16	E B 16	G	28	G	35	37	35	G	34	J A 47	J A 44	J A 25	J A 20	20	20	E B 17	24	21
16	E B 15	E B 16	E B 16	E B 16	J A 25	21	E B 16	26	30	37	37	36	J A 39	G	34	30	J A 31	J A 26	J A 23	J A 36	J A 40	J A 28	J A 29	25
17	21	E B 16	22	E B 16	E B 15	E B 15	E B 16	24	32	38	J A 36	J A 37	J A 35	33	31	J A 35	22	J A 20	J A 35	J A 32	J A 33	J A 33	J A 45	J A 49
18	E B 15	J A 35	21	23	E B 16	E B 15	E B 15	G	28	J A 35	G 28	36	37	35	G	J A 35	22	E B 15	E B 15	E B 16	19	19	E B 16	E B 16
19	E B 16	J A 25	J A 31	21	E B 16	E B 16	20	G	31	33	33	J A 40	G	G	G	27	J A 34	J A 27	E B 16	J A 24	22	E B 16	E B 16	E B 15
20	20	23	E B 15	20	E B 15	E B 16	E B 16	22	G	G	37	36	35	35	32	29	G	E B 16	E B 16	J A 22	J A 22	20	22	E B 16
21	J A 23	20	E B 16	E B 15	E B 16	E B 15	E B 16	G	G	33	J A 38	J A 35	J A 39	J A 36	J A 31	J A 29	20	E B 16	E B 15	E B 15	21	19	J A 34	J A 22
22	J A 30	J A 32	J A 26	J A 24	23	E B 16	E B 16	G	G	J A 43	J A 50	J A 52	J A 36	J A 39	J A 34	26	J A 41	E B 15	J A 46	20	E B 16	B J 24	J A 75	J A 32
23	J A 54	J A 28	20	21	19	J A 27	E B 16	22	27	J A 34	J A 39	J A 53	J A 36	J A 38	J A 35	J A 28	21	J 20	J A 26	J A 30	E B 16	E B 16	E B 16	E B 15
24	21	J A 26	J A 32	J A 26	19	J A 35	J A 23	G	G	J A 40	J A 43	J A 40	J A 42	J A 38	J A 44	J A 74	J A 65	J A 44	J A 48	J A 34	22	23	E B 16	E B 16
25	E B 16	E B 16	23	21	E B 16	20	E B 16	21	28	32	J A 40	33	G	G	J A 36	J A 32	G	E B 18	J A 40	J A 30	J A 26	39	23	J A 29
26	J A 25	J A 33	22	J A 24	20	E B 19	E B 16	E B 16	G	29	J A 34	G	J A 34	J A 47	J A 36	G	E B 15	J A 34	J A 26	E B 16	E B 16	E B 15	E B 16	E B 16
27	E B 15	E B 16	E B 16	E B 16	E B 15	E B 14	E B 16	23	G	J A 35	J A 35	J A 39	J A 42	J A 49	J A 39	29	E B 17	24	25	22	J A 24	25	J A 31	E B 15
28	18	E B 16	E B 16	J A 22	20	E B 15	E B 16	E B 15	28	34	33	33	34	34	32	30	J A 25	22	20	E B 16	J A 23	J A 47	J A 48	J A 28
29	E B 16	E B 16	20	19	21	J A 23	21	24	28	J A 34	34	37	35	34	31	27	C	C	J A 50	J A 32	J A 26	E B 16	J A 30	J A 25
30	E B 16	20	E B 16	E B 15	22	E B 16	E B 14	E B 15	31	33	G	J A 34	33	34	G	G	E B 17	20	E B 15	J A 47	J A 31	J A 32	23	23
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	30	30	30	30	30	30
MED	20	22	21	21	E B 16	E B 16	E B 16	G	29	34	36	36	36	34	32	29	23	J A 24	J A 24	J A 26	J A 23	24	24	22
U Q	J A 25	J A 26	J A 24	J A 22	20	20	J A 21	23	31	J A 36	J A 38	J A 38	J A 39	J A 38	J A 36	J A 35	J A 34	J A 27	J A 31	J A 36	J A 33	J A 32	J A 31	J A 27
L Q	E B 16	E B 16	E B 16	E B 16	E B 16	E B 15	E B 16	G	G 27	33	G 34	G 33	34	G	G	G	G	E B 17	E B 16	E B 20	E B 19	E B 17	E B 16	E B 16

NOV.2019 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV.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 16	E B 17	E B 16	E B 16	E B 16	E B 16	17	22	G	31	32	32	30	G	G	38	35	19	E B 15	E B 16	24	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 15	16	24	27	30	G	G	G	G	30	G	G	18	E B 16	E B 16	E B 17	E B 15	E B 15	E B 15
3	20	16	E B 15	E B 15	E B 15	E B 13	E B 15	G	28	30	31	31	33	G	G	G	G	23	22	A A 38	A A 49	21	22	E B 15
4	E B 16	E B 16	E B 16	E B 16	E B 16	18	18	24	33	31	36	G	37	34	G	G	20	E B 16	E B 16	18	E B 16	21	E B 16	E B 16
5	E B 16	E B 16	E B 16	E B 16	E B 16	E B 17	E B 16	G	28	33	34	G	34	35	32	27	26	22	20	20	21	20	19	20
6	E B 16	E B 16	E B 17	E B 16	E B 16	E B 16	20	G	28	32	33	32	32	32	G	G	G	E B 16	E B 16	20	22	20	18	E B 16
7	E B 16	E B 16	17	E B 16	E B 15	E B 16	E B 15	G	30	33	34	G	34	31	32	28	22	18	E B 16	E B 16	E B 16	E B 15	E B 15	E B 15
8	E B 16	E B 16	16	E B 16	E B 16	E B 16	E B 16	22	28	32	33	G	34	30	34	30	27	18	E B 15	E B 16	E B 16	E B 16	E B 15	E B 16
9	20	E B 16	E B 16	E B 16	E B 15	E B 15	E B 16	G 18	23	30	34	36	36	33	30	29	22	19	E B 16	E B 16	16	E B 16	E B 15	E B 15
10	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G	27	32	G	34	34	G	G	G	G	E B 16	E B 15	E B 16	20	E B 16	E B 16	17
11	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	20	27	31	33	33	33	33	35	34	21	E B 16	20	21	21	E B 16	18	E B 16
12	E B 16	E B 16	E B 16	16	E B 16	E B 16	E B 16	22	28	29	30	G	36	35	34	46	39	32	22	23	E B 16	E B 16	E B 16	E B 16
13	E B 16	E B 16	E B 15	E B 15	E B 16	E B 16	E B 15	G	30	32	G	36	34	31	30	25	21	E B 16	E B 15	E B 15	E B 15	E B 16	E B 16	E B 16
14	E B 16	E B 16	E B 15	E B 16	E B 15	E B 15	E B 16	23	27	32	33	33	G	32	G	G	E B 17	E B 16	E B 15	21	E B 16	19	E B 16	E B 17
15	E B 16	E B 16	E B 16	E B 15	E B 16	E B 16	E B 16	G	27	G	33	34	33	G	30	27	28	18	17	16	E B 17	E B 17	16	E B 16
16	E B 15	E B 16	E B 16	E B 16	E B 15	16	E B 16	23	27	32	33	32	32	G	33	28	26	19	E B 16	20	27	21	18	E B 16
17	E B 16	E B 16	E B 16	E B 16	E B 15	E B 15	E B 16	24	30	37	32	34	G 21	32	31	28	20	16	E B 16	E B 16	E B 16	19	22	18
18	E B 15	E B 16	E B 16	E B 17	E B 16	E B 15	E B 15	G	26	32	G 24	34	36	33	G	27	20	E B 15	E B 15	E B 16	E B 16	E B 16	E B 16	E B 16
19	E B 16	E B 16	17	E B 16	E B 16	E B 16	16	G	30	32	32	31	G	G	G	26	22	18	E B 16	18	E B 16	E B 16	E B 16	E B 15
20	E B 16	E B 16	E B 15	E B 15	E B 15	E B 15	E B 16	21	G	G	34	34	34	34	31	27	G	E B 16	E B 16	E B 16	E B 16	E B 16	E B 15	E B 16
21	E B 16	E B 15	E B 16	E B 15	E B 16	E B 15	E B 16	G	G	31	31	32	31	30	28	23	19	E B 16	E B 15	E B 15	E B 16	E B 16	16	E B 17
22	E B 16	19	18	E B 16	E B 15	E B 16	E B 16	G	G	31	39	44	31	30	27	24	24	E B 15	20	E B 16	E B 16	18	20	18
23	18	20	E B 16	E B 16	E B 16	16	E B 16	20	26	29	30	34	30	30	27	23	18	E B 16	17	16	E B 16	E B 16	E B 16	E B 15
24	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G	G	32	30	31	31	32	34	34	25	A A 44	22	E B 16	E B 16	E B 16	E B 16	E B 16
25	E B 16	E B 16	E B 16	E B 15	E B 16	E B 15	E B 16	19	26	31	31	31	G	G	26	G 20	G	E B 18	A A 40	E B 16	E B 16	E B 15	E B 15	E B 16
26	E B 16	21	E B 16	17	E B 16	E B 19	E B 16	E B 16	G	27	30	G	30	41	26	G	E B 15	21	19	E B 16	E B 16	E B 15	E B 16	E B 16
27	E B 15	E B 16	E B 16	E B 16	E B 15	E B 14	E B 16	20	G	25	28	30	32	39	32	26	E B 17	E B 15	E B 16	E B 16	E B 16	E B 16	E B 16	E B 15
28	E B 16	E B 16	E B 16	E B 16	E B 16	E B 15	E B 16	E B 15	26	G 30	31	32	31	31	31	27	18	E B 15	E B 16	E B 16	16	E B 16	E B 15	E B 16
29	E B 16	E B 16	E B 16	E B 16	E B 16	A A E 23	E B 16	20	27	G 22	32	34	32	32	30	26	C	C	A A 50	20	E B 16	E B 16	E B 19	E B 16
30	E B 16	E B 16	E B 16	E B 15	E B 15	E B 16	E B 14	E B 15	27	31	G	28	31	33	G	G	E B 17	E B 15	E B 15	E B 16	E B 16	19	E B 16	E B 16
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	30	30	30	30	30	30
MED	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G	27	31	32	32	32	32	30	26	20	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
U Q	E B 16	16	16	E B 16	E B 16	16	16	22	28	32	33	34	34	33	32	28	24	19	20	20	17	19	18	16
L Q	E B 16	E B 16	E B 16	E B 16	E B 15	E B 15	E B 16	G	G 23	G	G 30	G 28	G 30	G	G	G	G	E B 16	E B 15	E B 16	E B 16	E B 16	E B 16	E B 16

NOV.2019 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

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

IONOSPHERIC DATA STATION Kokubunji

NOV.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	F	F	F	399	342	388	419	402	364	366	357	368	373	364	356	384	394	336	346	358	320	306	323
2	309	299	F	320	359	377	375	380	388	390	352	373	376	328	371	383	403	370	324	328	321	331	334	319
3	308	323	321	353	400	350	350	399	401	383	375	359	385	388	352	373	398	379	377	A	A	328	340	301
4	299	306	322	325	378	392	371	405	399	357	396	377	338	373	380	372	392	373	348	343	341	358	333	307
5	318	321	296	319	325	308	393	410	406	373	390	380	348	362	367	379	377	390	315	335	346	367	316	F
6	296	311	F	321	332	352	380	381	404	374	359	347	363	372	379	378	391	356	365	339	383	325	322	354
7	340	338	295	341	342	378	378	391	383	358	373	354	356	371	374	393	375	337	386	323	346	358	327	315
8	316	362	340	F	337	369	377	392	389	389	352	340	347	362	367	382	411	370	317	366	368	337	332	330
9	333	333	345	350	367	361	367	406	411	371	372	365	350	376	357	398	405	366	371	358	379	320	313	F
10	F	318	338	352	369	388	364	364	386	395	354	340	374	352	378	371	384	381	327	353	367	345	330	320
11	370	304	322	313	365	F	365	400	400	378	364	366	383	356	370	394	391	376	352	375	334	349	297	F
12	F	F	F	F	415		355	374	368	327	335	375	327	367	383	388	384	395	328	334	318	335	333	337
13	308	308	304	351	408	434	356	384	383	377	406	361	361	373	372	393	397	400	396	327	323	331	331	334
14	345	325	328	318	371	421	385	399	402	361	362	374	359	362	376	372	373	377	394	348	360	342	341	294
15	306	327	306	310	380	420	345	391	399	397	366	384	376	368	370	384	393	404	321	350	358	332	326	319
16	305	318	316	321	344	346	340	400	408	392	392	335	361	348	368	394	391	373	370	322	337	348	F	330
17	311	F	F	F	F	389	339	392	395	351	383	343	338	378	400	394	376	376	314	322	326	370	296	F
18	302	F	307	F	F	F	F	410	358	354	358	373	374	368	379	376	408	410	358	352	375	337	347	321
19	331	325	F	360	373	337	359	367	387	391	366	387	375	361	368	375	390	406	340	332	345	331	311	335
20	331	329	334	334	347	378	356	390	400	378	358	388	360	364	369	401	386	387	337	347	341	329	343	307
21	314	331	331	343	343	359	344	386	387	394	371	376	370	371	368	393	403	358	330	334	330	353	345	F
22	F	316	350	334	318	308	326	369	394	352	364	362	359	383	406	384	388	363	353	350	349	316	F	327
23	344	328	307	334	339	336	327	368	387	341	358	355	377	372	382	365	376	350	343	F	F	F	F	297
24	F	F	297	306	334	318	360	378	360	367	367	376	385	387	383	378	378	A	310	328	391	F	F	325
25	312	328	283	299	317	338	325	356	381	371	374	356	362	347	372	395	392	393	A	350	323	325	F	F
26	319	331	331	304	338	477	314	384	378	382	373	377	356	366	384	396	403	336	341	350	337	347	316	291
27	F	F	304	315	379	403	334	393	378	377	361	382	378	363	376	390	379	392	352	391	327	324	F	F
28	288	F	286	310	365	440	359	386	399	367	375	384	356	365	367	378	405	375	364	332	F	353	F	F
29	F	F	F	F	374	A	364	391	407	374	364	380	371	313	375	397	C	C	A	381	370	380	317	331
30	359	339	F	342	347	362	372	378	372	360	338	375	355	382	379	390	397	381	312	363	339	364	295	290
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	22	22	24	28	26	29	30	30	30	30	30	30	30	30	30	29	28	28	28	27	28	23	22
MED	314	325	318	323	362	366	359	390	392	374	366	373	362	368	373	384	391	376	342	346	345	337	327	320
U Q	333	331	331	342	376	392	374	399	401	383	374	377	375	373	379	394	400	392	364	352	367	353	334	330
L Q	306	316	304	314	338	342	342	378	383	360	358	356	356	362	368	376	382	368	326	332	330	328	313	307

IONOSPHERIC DATA STATION Kokubunji

NOV.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	L	U L 393	U L 396	U L 383	L	A								
2										L	L	U L 427	L	L	L									
3										L	L	425		U L 393	L									
4									A	L	A	U L 428	372	L	L	L								
5									L	L	L	U L 406	U L 408	A	A	L								
6										L			U L 422		L									
7										L	U L 381	L	L	L	L									
8											L	L	L	409	A	A								
9									L	L		A	A	A		A								
10									L		U L 373	U L 409	L	L	L	L								
11										L	U L 377	L	L	458	A									
12									L	L	U L 391	U L 402	A	A	A	A								
13										L	L	A	A	A	A									
14											L	L	U L 388	L										
15									L	L	L	L		U L 385	L									
16												U L 394	U L 456	U L 402										
17										A	A	U L 418	L	A										
18										L	L	418	A	A										
19											U L 388	U L 394	L	L	L									
20										L	A	L	L	A	A									
21											L	L	L	L	L									
22										L	A	A	L	L										
23										L	L		L	L										
24											L	L	L	L										
25										L	L	U L 425	L	L	L									
26										L	L	L	L	A										
27									L		L	L	L		A									
28											L	U L 396	L	L	L									
29										U L 415	L			U L 393	U L 388			C	C					
30											U L 384	L	L	A	L	L								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										1	6	13	6	7	1									
MED										U L 415	U L 382	U L 409	U L 402	U L 393	U L 388									
U Q											U L 388	U L 425	U L 422	409										
L Q											U L 377	U L 395	388	U L 385										

NOV.2019 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV.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										252	240	252	226	236	248	232								
2										238	244	234	232	260	234									
3										224	240	256		240	250									
4									220	256	216	240	286	236	226	232								
5									206	246	232	242	258	244	230	236								
6										220			242		236									
7										250	238	250	260	232	244									
8											252	252	258	238	250	224								
9									206	246		246	254	236		214								
10									228		286	276	242	250	228	230								
11										248	244	248	236	256	232									
12									238	280	260	216	226	234	240	224								
13										244	236	246	232	242	218									
14											262	246	246	246										
15									218	232	260	232		252	248									
16												318	262	256										
17										274	226	262	256	230										
18										248	228	236	250	238										
19											254	234	242	246	246									
20										250	256	230	254	244	244									
21											240	244	242	246	246									
22										252	234	240	242	232										
23										262	234		226	236										
24											232	226	228	226										
25										240	240	238	216	238	234									
26										228	238	236	244	240										
27									232		242	226	234		232									
28											230	232	246	238	242									
29										254	252			266	242			C	C					
30											274	226	238	238	220	226								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									7	20	27	27	27	28	21	8								
MED									220	248	240	240	242	239	240	228								
U Q									232	253	254	250	254	246	246	232								
L Q									206	239	234	232	232	236	231	224								

NOV.2019 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV.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 250	E B 258	E B 268	E B 242	184	178	204	194	202	198	196	190	196	198	200	A	210	196	202	212	E A 262	228	E B 258	E A 266
2	E B 276	E B 288	E B 236	214	198	194	202	198	198	204	182	184	184	192	198	208	198	190	214	224	E B 242	226	E B 238	E B 244
3	E A 262	E A 272	E B 260	202	194	220	202	200	196	186	180	180	212	186	196	208	198	196	206	A	A	E A 300	E A 302	E B 276
4	E B 276	E B 268	E B 252	228	194	228	208	198	A	190	A	190	216	E A 228	198	194	194	182	210	E A 238	222	218	E B 238	E B 244
5	E B 248	E B 254	E B 260	E B 242	E B 232	E B 230	194	194	172	192	196	176	182	A	A	206	200	190	208	E A 254	214	214	E A 268	E A 318
6	E B 266	E B 248	E B 250	E B 234	E B 240	218	216	188	202	182	228	198	192	220	194	202	190	196	194	220	208	E A 258	220	204
7	E B 224	224	E B 236	222	210	196	190	196	198	192	212	194	196	198	198	220	198	198	194	E B 238	E B 226	218	214	E B 232
8	E B 234	198	E A 230	E B 272	212	218	202	186	196	206	196	188	192	188	A	A	196	186	202	200	192	208	E B 254	E B 238
9	E A 246	E B 238	E B 226	E B 222	216	202	214	190	172	196	206	A	A	A	218	A	190	206	202	220	206	E B 270	E B 280	E B 280
10	E B 258	E B 256	E B 262	E B 230	220	200	206	196	172	208	190	184	202	188	192	198	194	184	E B 232	210	208	222	214	E A 258
11	E B 234	E B 262	E B 250	222	208	184	210	190	204	198	194	208	180	198	A	204	194	188	202	216	E A 256	232	E A 278	E B 274
12	E B 250	E B 230	206	200	196	218	216	202	206	198	200	170	A	A	A	A	206	206	E A 270	E A 262	E B 238	E B 234	216	E B 240
13	E B 278	E B 284	E B 270	E B 230	192	182	224	196	204	192	186	A	A	A	A	206	196	188	194	E B 246	E B 250	E B 222	E B 226	E B 238
14	E B 240	E B 240	E B 240	E B 232	224	192	200	188	202	202	212	186	200	196	204	210	194	196	192	228	210	E A 236	E B 230	E B 252
15	E B 244	E B 268	E B 262	E B 250	200	176	216	200	200	198	200	198	206	186	210	196	198	182	E A 240	218	198	214	228	E B 230
16	E B 238	E B 238	E B 242	E B 254	236	216	216	196	212	200	210	180	180	184	224	206	196	194	210	E A 262	E A 278	212	224	208
17	226	E B 274	E B 266	E B 240	226	200	214	196	204	A	A	196	198	A	218	204	202	202	196	E B 248	220	204	E A 280	226
18	E B 250	E B 252	E B 254	E B 278	E B 244	208	214	196	190	194	194	190	A	A	210	216	196	178	200	210	198	212	224	E B 234
19	E B 246	E B 258	E A 266	200	202	222	208	188	208	206	186	194	184	204	202	202	192	184	194	E A 258	E B 246	E B 252	E B 258	E B 252
20	E B 256	E B 262	E B 262	E B 256	E B 256	214	196	196	196	206	A	192	200	A	A	204	196	186	E B 218	E B 216	206	E B 246	228	E B 256
21	E B 230	E B 256	E B 252	E B 250	E B 244	218	220	194	198	200	202	204	198	198	186	202	186	190	208	194	224	208	210	E B 246
22	E B 276	E A 294	E A 248	E B 258	E B 252	E B 268	E B 256	210	200	198	A	A	202	202	204	198	200	186	220	204	208	E A 242	E A 300	E A 246
23	212	E A 254	E B 250	E B 254	228	216	220	200	208	202	198	222	196	206	202	206	194	192	216	222	E B 232	208	E B 238	E B 254
24	224	E B 260	E B 282	E B 298	E B 236	E B 264	208	216	220	220	188	182	190	188	220	210	204	A	E A 278	232	192	E B 264	E B 276	E B 240
25	226	E B 250	E B 296	E B 260	E B 230	E B 266	E B 252	214	202	206	196	186	192	186	200	206	192	192	A	230	226	E B 242	226	E B 268
26	E B 256	E A 264	E B 244	E A 262	E B 230	192	E B 236	198	202	192	198	194	190	A	216	198	188	226	228	206	210	218	E B 244	E B 272
27	E B 266	E B 276	E B 284	E B 230	188	180	E B 236	194	190	196	192	198	196	226	A	208	198	174	202	198	214	226	E B 296	E B 304
28	E B 276	E B 284	E B 276	E B 276	222	186	E B 238	180	204	216	194	184	194	200	192	212	190	184	202	E B 210	204	E B 238	E B 266	E B 230
29	E B 254	E B 260	E B 264	E B 250	200	A	224	200	204	184	218	218	200	180	206	206	C	C	A	208	216	E B 204	E A 292	E B 250
30	224	E B 236	E B 246	E B 258	E B 246	206	186	178	202	208	198	184	204	A	184	190	196	178	E B 238	196	214	210	E B 268	E B 246
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	29	30	30	29	29	26	27	26	21	23	26	29	28	28	29	29	30	30	30
MED	E B 249	E B 258	E B 253	E B 242	U 208	204	210	196	202	198	196	190	196	197	202	206	196	190	204	214	210	216	E 241	E B 246
U Q	E B 262	E B 268	E B 266	E B 258	E B 236	219	E B 220	200	204	206	202	198	200	203	210	208	198	196	E 219	E A 238	E B 235	E B 242	E A 276	E B 266
L Q	234	E B 248	E B 244	228	200	192	202	190	196	192	192	184	190	187	196	202	193	184	201	209	207	212	226	E B 238

NOV.2019 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

NOV.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						B	B	120	118	A	110	A	A	112	112	A	A	B						
2						B	B	120	A	A	120	112	112	108	108	108	112	B						
3							B	116	114	114	A	A	A	116	106	110	112	B						
4						B	B	116	120	A	110	110	112	A	108	112	108							
5							B	120	122	114	108	112	108	108	108	108	A	B						
6							B	112	110	110	110	112	112	110	110	110	110	B						
7							B	110	110	110	112	110	A	110	110	A	A	B						
8							B	110	A	120	120	116	110	108	108	110	B							
9							B	122	A	A	108	108	112	112	116	118	A	B						
10							B	116	112	110	110	110	A	108	114	128	118							
11							B	118	114	116	110	A	A	116	A	A	B	B						
12							B	118	118	A	A	118	A	A	A	A	A							
13							B	114	114	120	118	110	108	108	116	116	B	B						
14							B	114	122	118	116	122	116	116	114	112	B							
15								122	122	112	100	110	110	112	114	A	A	B						
16							B	B	118	116	A	A	A	116	118	120	A	B						
17							B	116	118	122	A	A	114	108	108	A	B	B						
18								126	A	A	116	A	114	112	114	A	B	B						
19								114	112	112	A	A	116	112	110	112	B							
20							B	126	122	120	116	116	120	116	108	116	122	B						
21							B	122	128	124	A	A	A	A	A	A	112	B						
22							B	124	122	A	A	A	A	A	A	124	A	B						
23							B	116	116	A	A	A	A	A	A	A	B							
24							B	120	116	A	A	A	A	A	A	A	A							
25								116	112	112	A	116	110	108	A	108	114	B						
26								B	110	110	A	112	A	A	A	110	B							
27								B	108	A	A	A	A	A	A	114	B							
28							B	B	120	120	118	114	A	116	120	118	B							
29							B	B	116	116	114	108	108	110	108	114	C	C						
30							B	B	110	114	112	A	116	118	116	114	B							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								24	26	20	18	17	16	22	21	20	8							
MED								117	116	115	112	112	112	112	110	113	112							
U Q								121	120	120	116	116	115	116	115	117	116							
L Q								115	112	112	110	110	110	108	108	110	111							

NOV.2019 h'E (KM)

IONOSPHERIC DATA STATION Kokubunji

NOV.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	94	94	B	94	B	90	138	G	98	124	102	100	G	G	92	92	92	B	B	96	98	106	96
2	94	94	94	92	92	B	98	130	94	100	G	G	G	G	126	G	G	80	80	80	B	88	B	B
3	86	86	86	86	B	B	B	G	164	148	100	100	100	G	G	G	G	96	96	94	94	94	88	88
4	96	96	94	94	90	90	130	124	122	102	134	G	140	88	G	G	118	92	92	86	B	86	88	84
5	84	82	82	B	B	94	100	G	120	152	136	G	134	114	114	112	96	94	92	86	86	82	82	78
6	88	94	94	B	92	98	96	G	132	154	128	116	120	144	G	G	G	B	102	98	96	88	82	84
7	B	92	90	90	B	B	B	G	144	150	142	G	88	120	124	102	104	106	106	96	B	B	B	B
8	B	90	90	100	104	B	B	136	104	146	120	G	110	120	118	114	98	94	B	94	100	B	102	94
9	84	84	100	100	B	B	106	138	102	88	136	134	130	130	126	128	90	88	88	90	98	96	B	B
10	86	86	B	B	B	86	100	G	158	126	G	120	98	G	G	G	G	B	B	84	84	88	86	82
11	96	94	94	94	B	B	B	134	142	124	116	100	104	114	106	102	102	98	88	92	92	92	94	94
12	96	96	108	98	B	B	94	154	160	98	98	G	86	84	92	84	82	82	82	88	98	100	122	B
13	B	B	B	B	B	B	B	G	144	126	G	144	140	142	132	120	120	B	B	B	B	B	B	B
14	B	B	B	B	B	B	B	146	150	146	150	150	G	126	G	G	B	102	96	90	90	92	92	B
15	86	86	B	B	B	B	B	G	160	G	146	150	124	G	112	80	82	86	88	128	116	B	102	102
16	B	B	B	B	100	110	B	128	126	108	100	94	96	G	132	108	102	102	104	100	94	92	92	104
17	80	B	90	B	B	B	B	132	116	134	96	90	86	152	144	88	116	110	104	98	96	88	86	88
18	B	90	90	90	B	B	B	G	104	102	100	98	158	142	G	104	102	B	B	B	114	92	B	B
19	B	92	92	92	B	B	92	G	158	146	92	96	G	G	G	120	88	88	B	88	86	B	B	B
20	92	94	B	92	B	B	B	140	G	G	148	118	150	142	146	126	G	B	B	106	104	104	90	B
21	88	90	B	B	B	B	B	G	G	158	104	102	94	94	96	100	142	B	B	B	120	116	98	100
22	102	94	94	94	90	B	B	G	G	92	92	92	94	94	94	132	88	B	86	96	B	92	96	92
23	94	92	100	92	90	100	B	140	140	102	94	94	100	100	100	102	138	96	92	94	B	B	B	B
24	120	98	92	94	92	92	102	G	G	100	98	96	96	94	96	90	88	88	88	90	90	86	B	B
25	B	B	84	90	B	88	B	130	134	156	100	142	G	G	96	92	G	B	96	98	96	100	100	98
26	90	84	84	80	80	B	B	B	G	138	104	G	92	86	86	G	B	94	90	B	B	B	B	B
27	B	B	B	B	B	B	B	138	G	114	108	102	100	100	100	154	B	92	92	114	106	106	116	B
28	96	B	B	98	98	B	B	B	146	144	128	124	96	128	118	124	116	102	94	B	136	100	102	100
29	B	B	96	108	100	98	102	142	152	96	150	142	128	120	168	138	C	C	80	84	84	B	96	92
30	B	84	B	B	94	B	B	B	144	144	G	92	132	124	G	G	B	90	B	102	102	100	108	104
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	19	22	20	18	13	9	11	15	23	28	26	23	26	22	21	22	19	21	21	24	23	22	21	17
MED	90	92	93	93	92	94	100	138	142	126	112	102	100	120	114	106	102	94	92	94	96	92	96	94
U Q	96	94	94	98	99	99	102	140	152	146	136	134	130	130	129	124	116	100	96	98	104	100	102	100
L Q	86	86	90	90	90	89	94	130	120	101	100	96	96	94	96	92	88	88	88	88	90	88	88	86

IONOSPHERIC DATA STATION Kokubunji

NOV.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	F2	F2	F2		F2		L2	H2		L2	C1	L2	L2			L3	L3	L3			F2	F2	F1	F3
2	F1	F2	F2	F2	F1		L2	C2	L2	L2					C1			L2	F3	F1		F1		
3	F4	F2	F1	F1					H1	H2	L2	L2	L2					L2	F4	F5	F5	F5	F4	F2
4	F1	F2	F2	F2	F1	L2	H2	C2	C2	L2	C1		HL12	L2			C1	L1	F1	F2		F4	F1	F2
5	F2	F2	F2			F2	L1		C2	HL12	HL12		H1	CL12	C2	CL12	L3	L2	F2	F3	F2	F3	F3	F2
6	F1	F1	F1		F2	F2	L3		H1	H1	C1	C1	C1	H1					F2	F3	F6	F3	F3	F1
7		F1	F2	F1					H2	H1	H1		L2	C1	C2	L3	L3	L2	F1	F1				
8		F1	F2	F2	F1			H2	L3	H2	C1		C2	C1	CL22	C3	L4	F2		F3	F1		F2	F2
9	F2	F2	F1	F1			L2	CL22	L2	L2	H1	C1	C1	C1	C2	C2	L3	L2	F1	F1	F1	F1		
10	F2	F1				F1	L1		H1	H1		C1	L2							F3	F4	F2	F3	F2
11	F1	F1	F1	F1				H2	H2	C1	C2	L1	L1	C1	L2	L3	L2	L1	F3	F4	F3	F3	F2	F1
12	F2	F2	F2	F1			L2	H2	H2	L2	L2		L3	L3	L3	L3	L3	L5	F4	F3	F2	F2	F2	
13									H2	C1		H2	H2	H2	H1	C2	C2							
14								H2	H2	H2	H2	H2		C2				F1	F1	F4	F3	F4	F2	
15	F2	F1							H2		H1	HL12	C1		C2	L3	L3	L2	F2	F1	F1		F1	F1
16					F3	F1		H2	C2	C2	L2	L1	L2		C2	C2	L4	L2	F2	F3	F6	F6	F4	F2
17	F1		F2					C2	C2	H2	L2	L2	L1	HL12	H1	LH11	CL12	CL11	F2	F4	F3	F4	F6	F4
18		F2	F3	F2					L2	L2	L2	L2	H1	H1		L2	L2				F1	F1		
19		F2	F2	F2			F2		H1	H2	L2	L2				CL22	L3	F3		F5	F3			
20	F2	F2		F1				H2			H1	C1	H1	H1	H2	C2				F1	F2	F1	F3	
21	F1	F1								H1	L2	L1	L1	L2	L3	L2	H2				F2	F1	F4	F2
22	F2	F2	F4	F2	F1					L2	L3	L3	L3	L2	L3	CL12	L4		F4	F1		F4	F6	F3
23	F3	F2	F1	F2	F2	F1		H3	H2	L2	L2	L2	L2	L2	L2	L2	H2	F1	F4	F4				
24	F1	F2	F2	F2	F2	F2	L1			L2	L2	L2	L2	L2	L4	L3	L3	L5	F4	F3	F1	F3		
25			F4	F1		F2		C1	C2	H2	L2	HL12			L2	L2			F5	F2	F3	F3	F1	F2
26	F3	F5	F2	F2	F1					H1	L1		L3	L3	L2			F2	F2					
27								H2		L2	L2	L2	L2	L3	L2	C2		F1	F2	F2	F3	F3	F1	
28	F1			F2	F1				H2	H1	C1	CL12	L1	CL11	C1	CL12	CL11	F1	F1		F1	F2	F2	F2
29			F1	F1	F1	F3	L2	HL33	HL22	L2	HL13	HL22	CL12	C1	H1	H2			F5	F2	F2		F2	F2
30		F1			F2				H2	H1		L2	H1	C1				F1		F2	F2	F2	F1	F2
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

NOV.2019 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

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

NOV.2019 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

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

NOV.2019 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

NOV. 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											A	A	U L 432	U L 424	U L 416									
2												L	U L 428	U L 436	U L 404									
3										L	U L 424	U L 428	U L 420	U L 456	U L 456	L								
4								U L 216			A	A	U L 428	A	A		L							
5											U L 416	A	A	U L 432	L	A								
6											L	L	412	U L 416		C	L							
7										L	L	U L 432	U L 404	U L 448	U L 408									
8												L	L	L	A									
9											420		U L 452	U L 408		L								
10												U L 428	U L 424	E A 416	L									
11												U L 416	U L 404	U L 428	U L 376	A								
12										U L 452	L	U L 408	A	L	U L 392		L							
13											L	A	A	U L 464	L									
14										U L 432	U L 432	U L 416	L	420	U L 400	L								
15										A	A	A	A	U L 420	L	L								
16									U L 288		U L 384	U L 428	U L 456	U L 380	A									
17									L	L	A	L	L	A	L	A								
18										U L 444		U L 416	U L 432	U L 424	A	L								
19											L	U L 424	U L 400	U L 444	L	L								
20									L			L	U L 408	L	A	A	A							
21									L	L	A	A	U L 416	L	U L 408									
22										L	L	U L 428	A	U L 384										
23										L	U L 424	L	L	L	L									
24											L	A	A	A	A									
25									L		U L 420	U L 420		A	A									
26										L	L	A	U L 468	U L 444	A									
27											L	L	U L 432	U L 432	A									
28										L	A	U L 420	U L 416	L	L	L								
29											U L 408	A	U L 412	A	U L 384									
30												L	U L 408	L	L	L								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	1	3	8	12	19	18	9									
MED								U L 216	U L 288	U L 444	U L 420	U L 422	U L 420	U L 426	U L 404									
U Q										U L 452	U L 424	U L 428	U L 432	U L 444	U L 412									
L Q										U L 432	U L 412	U L 416	U L 408	U L 416	U L 388									

NOV. 2019 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

NOV. 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 R 192	U R 240	A	A	A	A	A	U R 312	U A 284	U R 248	U R 200						
2								A	A	A	A	A	A	A	A	U R 284	A	U R 208		B				
3								B	U R 252	R	A	U R 324	U R 324	U A 328	U R 304	A	U A 236	U R 164						
4							B	B	U A 228	U A 272	A	U A 320	A	A	A	A	A	A						
5								B	A	U A 276	U A 304	A	A	A	A	A	A	U A 180						
6							B	B	U R 232	272	A	A	A	A	U R 308	C	U R 244	B						
7								U R 184	U A 224	U A 272	U A 292	U A 312	A	A	U A 296	A	U R 248	B						
8								U R 192	A	A	U A 300	A	A	U R 320	A	A	U A 248	U A 184	B					
9								B	U A 240	A	U A 304	U A 304	316	U A 300	A	U A 264	U R 236	B						
10								B	U A 236	U A 268	A	A	A	A	U A 292	U R 268	A	B						
11								U R 184	U A 232	U A 276	A	A	U A 328	U A 320	304	A	A	B						
12								B	U A 224	U R 276	U R 300	R	A	A	U A 296	U A 280	U R 224	B						
13								B	U A 240	U A 280	U A 304	A	A	U A 304	A	A	U R 264	B						
14								B	U A 228	U A 260	A	U A 308	A	U A 304	U R 284	U R 260	A	A						
15								B	U A 204	U A 268	U A 288	U A 316	A	A	A	A	A	180						
16								B	U A 220	A	U A 308	U A 312	324	A	U A 312	U A 272	A	A						
17								B	U R 228	U A 276	U A 288	312	U R 316	U A 320	A	A	A	B						
18								B	U R 236	U R 268	U A 280	U A 304	U A 308	U A 296	A	A	U A 232	B						
19								B	U A 216	U A 264	U A 296	A	A	A	U R 292	U R 272	A							
20								B	U R 216	U R 264	292	U A 304	304	304	A	A	A	B						
21								B	U R 220	U A 276	A	A	A	A	A	U A 268	U R 224	B						
22								B	U A 216	U A 288	A	A	A	A	A	A	A	A						
23								B	U A 232	A	A	A	A	U R 332	A	A	A							
24								B	U R 224	R	A	A	A	A	A	A	U R 216	B						
25								B	U R 228	A	A	A	A	A	A	U R 264	U A 200	B						
26								B		A	A	A	U A 312	A	A	A	A							
27								B	U R 220	U R 268	U R 292	A	A	A	A	A	U R 236	A						
28								U R 172	A	R	A	U A 296	A	A	A	A	A	B						
29								B	A	A	U A 284	A	A	A	U A 288	A	A	A						
30								U R 176	U A 204	U A 264	U A 276	A	A	A	U R 304	U R 280	A	B						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								6	24	18	15	11	8	10	12	11	13	6						
MED								U R 184	U A 228	U A 272	U A 292	U A 312	U 316	U A 312	U 300	U R 272	U R 236	U 182						
U Q								U R 192	U R 234	U R 276	U A 304	U A 316	U 324	U R 320	U R 306	U R 280	U R 248	U R 200						
L Q								U R 176	U A 220	U A 268	U A 288	U A 304	U A 310	U A 304	U 292	U R 264	U R 224	180						

NOV. 2019 foE (0.01MHz)

IONOSPHERIC DATA STATION Yamagawa

NOV.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	20	J A 49	J A 38	J A 28	J A 32	J A 30	22	G	G	J A 40	J A 44	J A 56	J A 54	J A 46	G	34	G	J A 32	E B 16	19	J A 23	20	J A 55	J A 56
2	J A 39	J A 29	J A 38	J A 28	21	E B 14	21	26	J A 78	J A 47	J A 54	J A 38	J A 42	J A 50	J A 44	J A 50	30	J A 33	J A 33	J A 28	J A 43	J A 26	J A 30	J A 35
3	J A 30	J A 36	J A 30	J A 24	J A 26	21	23	22	J A 28	G	J A 42	G	G	36	G	32	26	G	J A 22	J A 23	E B 17	B J 23	J A 23	J A 37
4	J A 54	J A 36	J A 41	22	J A 36	J A 34	19	24	29	36	J A 46	38	J A 38	J A 55	J A 59	J A 46	30	J A 56	J A 47	J A 38	J A 38	25	20	22
5	22	22	22	22	22	E B 15	22	J A 33	J A 31	35	37	42	J A 54	J A 41	J A 41	J A 40	J A 34	21	J A 28	J A 50	24	J A 40	J A 42	J A 26
6	E B 16	22	J A 22	E B 15	E B 16	E B 16	20	G	G	33	42	J A 45	J A 39	35	G	C	G	E B 16	21	E B 16	21	J A 23	J A 36	J A 28
7	J A 23	J A 27	E B 16	E B 16	20	J A 28	J A 23	G	28	34	36	34	J A 48	35	34	J A 44	G	22	E B 16	J A 29	24	J A 29	E B 16	J A 38
8	21	J A 32	E B 16	J A 31	J A 31	E B 16	19	G	32	36	33	37	37	G	J A 46	J A 45	31	25	20	J A 25	J A 40	J A 54	J A 34	22
9	22	J A 25	J A 24	J A 28	J A 28	E B 16	E B 14	E B 17	G	J A 62	37	37	35	34	37	35	26	J A 27	J A 27	J A 55	J A 26	J A 26	E B 16	E B 16
10	E B 16	J A 26	E B 16	22	E B 16	E B 16	E B 16	E B 16	26	31	36	36	36	J A 44	33	G	33	J A 25	E B 16	23	E B 16	E B 16	E B 15	19
11	J A 30	J A 27	E B 16	21	J A 26	E B 14	E B 16	G	29	33	38	J A 39	G	36	35	37	33	J A 27	J A 29	J A 37	J A 24	J A 37	J A 52	22
12	23	21	23	23	E B 16	E B 15	20	J A 25	30	G	G	G	J A 50	J A 37	34	31	G	21	E B 15	21	21	J A 51	E B 16	23
13	J A 28	E B 16	22	E B 16	E B 16	E B 15	E B 16	22	28	32	36	38	36	34	J A 35	J A 36	G	E B 15	20	22	22	E B 15	E B 15	E B 16
14	E B 16	E B 16	E B 16	E B 16	E B 16	E B 15	E B 15	J A 27	28	35	35	39	J A 52	36	G	G	27	J A 28	23	E B 16	19	E B 16	E B 16	E B 15
15	E B 16	22	22	E B 15	22	22	22	20	27	34	36	40	J A 52	J A 56	J A 43	J A 38	J A 34	J A 28	J A 31	23	20	21	21	21
16	E B 16	E B 16	24	E B 17	E B 16	E B 15	B J 25	A E 16	G	J A 54	G	36	37	J A 46	36	J A 43	J A 47	J A 34	A E 40	E B 16	E B 15	E B 16	E B 16	E B 16
17	E B 16	E B 16	14	E B 14	E B 16	E B 16	E B 16	23	G	36	38	34	G	40	36	J A 52	J A 39	22	J A 30	J A 29	23	J A 24	J A 32	J A 32
18	J A 34	J A 27	20	J A 26	22	J A 24	21	22	G	G	34	35	36	36	38	J A 35	G	J A 25	20	24	E B 15	E B 15	E B 16	E B 16
19	E B 16	E B 16	E B 16	J A 38	J A 22	J A 40	J A 28	E B 15	28	32	34	J A 40	J A 39	J A 40	G	G	J A 33	27	J A 46	J A 26	20	23	E B 16	E B 16
20	22	23	23	E B 15	E B 15	19	E B 16	20	G	33	34	34	39	36	38	J A 54	J A 40	J A 29	J A 23	J A 23	J A 21	J A 27	J A 22	J A 24
21	E B 17	E B 16	19	E B 16	E B 16	E B 16	E B 16	E B 15	G	30	J A 44	J A 47	J A 37	J A 38	J A 44	30	G	23	J A 26	E B 15	19	E B 17	19	19
22	20	22	J A 27	J A 27	J A 26	J A 29	E B 15	E B 15	27	34	J A 39	J A 40	J A 45	J A 40	J A 45	J A 44	J A 72	J A 40	J A 32	J A 29	22	20	22	E B 16
23	J A 36	J A 48	J A 30	J A 28	28	20	E B 16	20	27	J A 42	J A 52	J A 50	J A 49	G	J A 40	J A 42	J A 29	A E 29	B J 15	J A 29	J A 26	21	J A 24	E B 16
24	20	23	E B 16	20	23	E B 17	20	E B 16	G	G	J A 42	J A 54	J A 54	J A 45	J A 56	J A 36	G	20	22	22	22	22	20	J A 25
25	J A 25	E B 16	19	E B 16	24	E B 16	19	20	J A 28	34	J A 39	J A 46	J A 72	J A 68	J A 51	G	24	J A 29	E B 16	21	23	24	20	22
26	J A 62	J A 39	J A 24	23	J A 29	J A 29	24	E B 15	J A 38	30	J A 40	J A 49	G	J A 40	J A 45	J A 46	J A 38	J A 32	J A 26	21	19	E B 15	19	E B 16
27	E B 16	E B 16	E B 15	E B 15	B J 23	A J 27	22	24	G	G	G	J A 36	35	J A 41	J A 54	J A 37	G	J A 29	E B 16	22	26	22	22	J A 24
28	20	E B 14	E B 15	E B 16	E B 16	20	22	G	26	G	J A 44	39	38	39	37	J A 44	28	J A 23	J A 21	23	23	22	J A 111	J A 53
29	J A 54	23	E B 16	E B 16	E B 15	E B J 16	A 25	18	J A 38	33	37	40	37	J A 46	36	J A 75	J A 45	J A 50	J A 33	J A 34	21	23	J A 40	E B 16
30	E B 16	E B 16	E B 15	20	E B 16	E B 16	E B 15	G	26	32	34	38	37	J A 55	J A 34	G	27	J A 24	J A 25	J A 28	J A 42	J A 25	J A 34	22
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30
MED	22	22	21	20	22	E B 16	20	G	27	33	37	38	38	J A 40	37	J A 37	28	J A 27	J A 23	23	22	23	22	22
U Q	J A 30	J A 27	J A 24	J A 26	J A 26	J A 24	22	22	29	J A 36	J A 42	J A 42	J A 49	J A 46	J A 44	J A 44	J A 34	J A 29	J A 30	J A 29	J A 24	J A 26	J A 34	J A 26
L Q	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 17	G	G 30	34	36	36	36	G 34	G 32	G	22	E B 20	21	20	E B 20	E B 16	E B 16

NOV.2019 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

NOV.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	E B 16	16	20	F 16	E B 16	E B 16	16	G	G	27	39	41	35	31	G	32	G	G 17	E B 16	E B 16	E B 16	E B 16	E B 16	22
2	18	E B 16	E B 16	E B 16	E B 16	E B 14	E B 16	24	23	28	37	33	32	32	31	G 22	27	21	19	19	20	18	E B 15	18
3	E B 16	E B 16	E B 16	E B 16	E B	16	E B 16	20	G 18	G	30	G	G	34	G	30	25	G	16	E B 17	E B 17	E B 17	E B 16	21
4	A A 54	22	E B 16	E B 16	E B 16	E B 16	E B 15	E B 15	27	33	40	36	32	46	47	32	27	21	A A 47	A A 38	E B 16	E B 16	E B 17	E B 16
5	E B 16	E B 16	E B 16	E B 15	E B 15	E B 15	E B 15	E B 16	18	33	35	36	38	32	30	33	28	20	23	18	E B 16	20	E B 16	E B 16
6	E B 16	E B 16	E B 16	E B 15	E B 16	E B 16	E B 15	G	G	32	31	31	31	32	G	C	G	E B 16	16	E B 16	14	E B 16	E B 16	E B 16
7	16	E B 16	E B 16	E B 16	E B 16	15	E B 16	G	26	33	34	33	32	32	32	28	G	22	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
8	E B 16	17	E B 16	19	E B 16	E B 16	E B 16	G	26	32	31	36	34	G	34	32	28	22	18	18	A A 40	A A 54	E B 16	E B 17
9	E B 17	E B 15	E B 16	E B 16	E B 16	E B 16	E B 14	E B 17	G	40	36	34	34	33	34	31	24	18	16	A A 55	E B 16	E B 16	E B 16	E B 16
10	E B 16	E B 17	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	25	30	32	34	34	34	31	G	27	20	E B 16	E B 16	E B 16	E B 16	E B 15	18
11	E B 16	E B 16	E B 16	E B 16	16	E B 14	E B 16	G	27	30	35	34	G	34	33	35	30	21	21	A A 37	18	23	20	E B 16
12	E B 16	E B 16	E B 16	E B 16	E B 16	E B 15	E B 16	18	27	G	G	G	40	33	32	29	G	19	E B 15	E B 16	E B 16	16	E B 16	E B 16
13	E B 16	E B 16	E B 15	E B 16	E B 16	E B 15	E B 16	19	26	31	34	35	35	34	31	29	G	E B 15	E B 16	E B 16	E B 15	E B 15	E B 15	E B 16
14	E B 16	E B 16	E B 16	E B 16	E B 16	E B 15	E B 15	22	25	32	34	36	32	33	G	G	26	23	16	E B 16	E B 16	E B 16	E B 16	E B 15
15	E B 16	E B 15	E B 16	E B 15	E B 16	15	E B 16	20	23	34	34	37	43	35	32	26	20	19	E B 15	E B 16	E B 16	E B 17	E B 17	E B 16
16	E B 16	E B 16	E B 16	E B 17	E B 16	E B 15	E B 16	E B 16	G	25	G	35	35	34	35	37	35	19	22	E B 16	E B 15	E B 16	E B 16	E B 16
17	E B 16	E B 16	E B 14	E B 14	E B 16	E B 16	E B 16	E B 20	G	32	34	33	G	37	34	36	32	21	21	E B 15	E B 15	E B E B 15	18	18
18	16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 20	G	G	33	33	34	34	34	28	G	18	16	16	E B 15	E B 15	E B 16	E B 16
19	E B 16	E B 16	E B 16	19	16	20	E B 16	E B 15	26	30	32	35	32	32	G	G	26	21	A A 46	19	E B 16	E B 16	E B 16	E B 16
20	E B 16	E B 16	E B 16	E B 15	E B 15	E B 16	E B 16	E B 15	G	29	33	33	37	34	35	46	33	19	17	E B 16	E B 16	16	E B 16	E B 16
21	E B 17	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 15	G	30	40	39	32	30	30	28	G	E B 17	E B 17	E B 15	16	E B 17	E B 15	E B 16
22	E B 15	E B 15	E B 15	E B 16	E B 16	E B 16	E B 15	E B 15	27	G 28	32	33	38	34	34	28	24	24	20	E B 16	E B 16	E B 16	E B 16	E B 16
23	17	16	E B 16	E B 16	E B 16	16	E B 16	16	24	28	28	31	32	G	30	29	24	E B 16	E B 15	E B 16	16	16	16	E B 16
24	15	17	E B 16	E B 16	E B 16	E B 17	E B 15	E B 16	G	G	31	39	39	39	42	28	G	16	E B 16	E B 16	16	16	E B 16	19
25	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	18	G 20	25	32	34	34	40	31	G	23	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 17
26	16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 15	34	26	33	40	G	32	35	39	19	E B 16	16	15	E B 16	E B 15	16	E B 16
27	E B 16	E B 16	E B 15	E B 15	E B 16	A A 27	18	16	G	G	G	30	31	34	43	26	G	23	E B 16	E B 15	E B 16	E B 16	E B 16	E B 16
28	E B 16	E B 14	E B 15	E B 16	E B 16	E B 16	E B 16	G	23	G	36	35	34	34	31	26	22	14	E B 15	E B 16	E B 15	E B 15	A A 111	17
29	E B 16	E B 15	E B 16	E B 16	E B 15	E B 16	E B 16	16	30	30	36	37	32	34	32	32	35	E B 16	20	18	16	16	23	E B 16
30	E B 16	E B 16	E B 15	E B 15	E B 16	E B 16	E B 15	G	24	31	33	34	35	27	G 22	G	23	19	18	18	A A 42	16	E B 16	E B 16
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	30	30	30	30	30	30	30	30
MED	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G	23	30	33	34	34	34	32	29	24	19	16	E B 16	E B 16	E B 16	E B 16	E B 16
U Q	16	16	E B 16	E B 16	E B 16	16	16	18	26	32	35	36	35	34	34	32	27	21	20	18	16	16	16	17
L Q	E B 16	E B 16	E B 16	E B 16	E B 16	E B 15	E B 15	E B 16	G	G	31	33	32	32	G 30	G 26	G	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16

NOV.2019 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

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

NOV.2019 fmin (0.1MHz)

IONOSPHERIC DATA STATION Yamagawa

NOV.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	F	F	F	F	F	F	361	389	403	403	336	362	356	356	332	350	365	384	360	381	339	372	317	324
2	F	F	316	335	371	371	303	396	380	387	354	353	398	326	366	379	399	370	367	324	327	325	363	340
3	309	F	293	297	371	407	342	385	388	382	349	357	346	331	333	368	386	374	333	379	360	315	331	323
4	A	332	332	347	346	339	340	385	405	364	319	364	390	331	354	390	389	389	A	A	304	329	342	F
5	317	296	347	331	335	F	F	406	389	355	356	375	369	318	357	370	382	392	388	310	339	362	337	318
6	302	324	315	F	F	382	348	390	376	391	378	345	389	352	375	C	384	377	D 345	389	331	308	338	330
7	350	350	305	302	301	F	368	395	381	353	376	359	385	328	372	376	377	384	349	384	302	335	357	322
8	331	338	349	292	314	302	349	395	387	388	356	361	355	364	349	375	389	388	340	343	A	A	296	342
9	F	F	321	347	337	384	338	383	383	383	343	376	345	334	371	363	362	374	344	A	361	317	303	315
10	329	328	337	350	350	351	344	384	380	388	367	362	362	355	373	351	387	385	355	311	350	366	332	332
11	315	294	318	323	401	411	350	391	395	382	375	362	373	336	368	388	400	404	373	A	321	329	320	326
12	314	312	349	360	387	358	E 295	345	386	311	329	368	348	376	378	377	354	355	372	329	329	321	303	311
13	292	310	309	323	392	390	322	378	360	358	343	365	378	333	373	372	387	386	371	320	313	316	348	F
14	292	311	338	370	370	370	311	371	398	335	336	352	356	342	367	379	378	395	361	333	301	341	347	346
15	313	327	327	326	358	398	335	382	398	377	363	362	347	336	349	368	388	367	343	346	314	347	F	309
16	350	328	F	331	338	357	335	392	378	378	384	380	334	363	367	378	395	389	388	362	324	343	365	377
17	360	309	290	F	F	F	346	392	405	356	369	369	347	371	361	371	368	368	372	323	358	326	329	312
18	318	279	270	296	294	371	336	383	377	369	375	362	342	343	367	361	388	408	375	302	335	341	336	333
19	342	331	325	318	367	352	369	380	384	361	355	372	381	310	372	379	390	409	A	351	315	325	310	327
20	F	302	301	301	304	375	334	383	393	384	372	372	355	366	347	373	373	378	383	323	342	323	349	349
21	321	332	328	323	346	313	334	380	376	360	373	355	361	384	365	372	396	381	406	331	359	332	F	302
22	322	F	F	293	345	321	320	368	372	372	343	334	364	378	367	366	372	371	349	345	407	304	315	347
23	323	334	314	312	360	327	351	342	366	371	381	383	386	387	360	348	376	366	344	344	334	334	339	F
24	323	302	F	F	F	282	316	353	370	373	384	370	380	383	390	384	354	388	346	307	333	330	298	304
25	324	F	281	346	347	288	F	344	352	386	365	377	339	365	394	372	399	402	375	309	340	343	343	321
26	323	325	299	313	319	F	390	347	386	376	378	349	309	332	380	391	393	394	384	341	370	302	F	F
27	F	F	304	315	343	A	336	364	386	365	375	358	364	363	365	392	393	404	404	381	364	324	332	332
28	323	329	304	316	362	400	334	378	383	384	367	339	364	354	345	381	374	391	384	380	347	324	A	F
29	F	F	331	322	372	F	328	377	394	414	338	363	375	333	365	392	385	397	376	352	395	320	358	324
30	309	324	330	335	375	361	349	367	382	382	356	363	371	322	366	370	380	385	380	355	A	387	334	314
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	22	26	26	26	23	28	30	30	30	30	30	30	30	30	29	30	30	28	27	28	29	26	25
MED	322	324	317	323	348	361	337	382	384	376	364	362	363	348	366	373	386	386	372	343	337	329	335	324
U Q	329	331	331	335	371	384	349	390	393	384	375	370	378	365	372	380	390	394	382	362	358	342	347	336
L Q	313	309	304	312	337	327	331	368	377	361	343	357	347	332	357	368	374	374	348	323	322	320	317	314

NOV.2019 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

NOV. 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											A	A	U L 408	U L 398	U L 391									
2												L	U L 423	U L 416	U L 374									
3										L	U L 386	U L 417	U L 411	U L 370	U L 360	L								
4								U L 462			A	A	U L 406	A	A		L							
5											U L 394	A	A	U L 394	L	A								
6											L	L	431	U L 416		C	L							
7										L	L	U L 403	U L 395	U L 388	U L 398									
8												L	L	L	A									
9											394		U L 376	U L 425		L								
10												U L 381	U L 401	E A 427	L									
11												U L 403	U L 429	U L 383	U L 405	A								
12										U L 341	L	U L 415	A	L	U L 396		L							
13											L	A	A	U L 371	L									
14										U L 373	U L 377	U L 390	L	390	U L 442	L								
15										A	A	A	A	U L 378	L	L								
16									U L 455		U L 442	U L 394	U L 370	U L 469	A									
17									L	L	A	L	L	A	L	A								
18										U L 347		U L 394	U L 395	U L 389	A	L								
19											L	U L 400	U L 433	U L 391	L	L								
20									L			L	U L 425	L	A	A	A							
21									L	L	A	A	U L 425	L	U L 389									
22										L	L	U L 378	A	U L 436										
23										L	U L 382	L	L	L	L									
24											L	A	A	A	A									
25									L		U L 381	U L 396		A	A									
26										L	L	A	U L 376	U L 373	A									
27											L	L	U L 386	U L 391	A									
28										L	A	U L 396	U L 384	L	L	L								
29											U L 376	A	U L 402	A	U L 391									
30												L	U L 396	L	L	L								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	1	3	8	12	19	18	9									
MED								U L 462	U L 455	U L 347	U L 384	U L 396	U L 402	U L 391	U L 391									
U Q										U L 373	U L 394	U L 403	U L 425	U L 416	U L 402									
L Q										U L 341	U L 379	U L 392	U L 386	U L 383	U L 382									

NOV. 2019 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

NOV.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											266	238	240	238	252									
2												262	216	278	222									
3										218	262	260	248	280	290	230								
4								220			E A 284	236	236	E A 272	246		224							
5											262	224	240	318	248	238								
6											240	246	222	242		C	222							
7										258	242	240	224	284	244									
8												258	256	266	266									
9											290		288	268		242								
10												242	258	266	224									
11												250	244	274	232	224								
12										318	270	220	260	240	248		246							
13											268	240	234	292	226									
14										306	306	256	256	276	230	240								
15										228	240	238	E A 282	288	276	236								
16									208		242	242	310	244	244									
17									216	280	244	242	254	236	244	232								
18										246		252	272	276	240	258								
19											264	240	232	314	248	228								
20									218			252	258	254	244	238	228							
21									230	254	240	248	252	230	244									
22										244	272	256	240	240										
23										244	242	224	230	230	250									
24											222	242	222	232	220									
25									238		238	232		242	220									
26										238	238	E A 244	326	286	230									
27											238	250	250	260	236									
28										232	238	290	244	262	230	228								
29											286	242	222	234	230									
30												254	254	272	246	244								
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	5	12	23	29	29	30	27	12	4							
MED								220	218	245	243	242	246	265	244	237	226							
U Q									234	269	270	253	258	278	248	241	237							
L Q									212	235	240	239	233	240	230	229	223							

NOV.2019 h'F2 (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

NOV.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 B 250	E B 244	E A 270	228	208	218	198	190	190	190	A	A	192	176	174	226	208	202	202	190	E B 230	210	E B 240	E A 314
2	E A 292	E B 284	246	E B 230	200	206	E B 332	194	208	206	E A 242	202	182	158	194	214	200	202	202	228	E A 238	E A 254	210	E B 240
3	E B 254	E B 258	E B 274	E B 254	190	196	E B 274	196	196	196	174	170	172	192	190	190	202	194	196	194	204	E B 252	E B 250	E A 290
4	A	E A 296	246	222	218	E B 262	262	166	194	220	A	A	180	A	A	204	192	192	A	A	E B 262	232	206	E B 258
5	E B 242	E B 246	212	222	E B 240	220	220	198	194	210	206	A	A	196	208	A	208	190	198	E A 252	230	E A 230	E A 230	E B 252
6	E B 272	E B 272	E B 272	E B 234	228	208	208	186	186	202	200	196	176	176	222	C	194	188	200	192	204	E B 250	E B 242	E B 242
7	214	204	E B 264	E B 274	E B 232	186	E B 236	194	200	200	208	184	186	184	190	212	202	192	182	188	E B 240	E B 240	218	218
8	E B 240	224	214	E A 268	240	218	216	186	198	206	192	194	190	202	A	224	210	190	200	222	A	A	E B 254	224
9	224	230	236	E B 228	E B 244	200	210	200	200	212	212	228	198	190	224	194	202	190	188	A	206	E B 236	E B 262	E B 254
10	E B 242	E B 242	228	228	E B 228	214	E B 230	200	196	194	180	190	190	184	192	194	198	192	184	E B 232	222	210	210	E A 254
11	E B 250	E B 278	E B 254	E B 236	196	188	E B 272	200	204	208	202	196	172	202	198	A	192	198	210	A	E A 252	E A 254	E A 250	E B 242
12	E B 262	E B 248	208	200	188	E B 214	E B 298	210	216	204	198	180	A	184	206	208	186	194	186	E B 234	E B 234	226	E B 236	E B 256
13	E B 260	E B 272	E B 266	E B 236	194	188	E B 254	202	210	210	220	A	A	198	192	216	200	194	188	206	E B 260	E B 252	214	E B 248
14	E B 240	E B 244	226	212	214	188	E B 264	198	198	206	206	206	188	186	186	192	200	194	196	206	E B 240	E B 230	208	212
15	E B 254	E B 254	E B 254	E B 250	218	184	E B 234	202	196	A	A	A	A	206	204	208	206	194	194	202	E B 230	212	218	E B 246
16	216	240	206	E B 236	224	204	198	192	174	200	192	192	192	174	A	214	202	190	214	216	228	E B 230	220	216
17	E B 214	E B 238	E B 238	E B 268	218	186	E B 190	186	186	206	A	208	184	A	190	A	208	196	196	E B 220	220	206	212	E A 234
18	214	E B 262	E B 258	E B 270	E B 244	202	214	196	204	174	202	208	196	202	A	202	208	194	188	E B 234	208	208	E B 224	E B 230
19	220	E B 234	E B 228	E A 266	210	E A 260	230	200	200	212	198	190	170	192	194	194	194	198	A	224	E B 244	E B 254	E B 254	254
20	E B 244	E B 254	E B 254	E B 264	E B 248	202	216	190	186	198	204	188	192	192	A	A	A	192	192	224	216	E B 236	222	220
21	E B 232	E B 240	E B 240	E B 250	E B 238	E B 252	E B 264	202	188	208	A	A	188	186	184	218	200	200	174	196	210	216	208	E B 232
22	E B 252	E B 258	E B 258	E B 258	E B 244	E B 266	E B 270	212	222	204	194	194	A	188	188	216	212	212	212	212	186	E B 274	E B 266	212
23	E A 240	228	E B 264	E B 284	224	224	E B 236	206	206	210	202	202	194	190	186	222	210	202	192	208	210	214	230	E B 256
24	222	E A 276	E B 272	E B 290	E B 248	E B 268	E B 254	216	216	204	198	A	A	A	A	202	202	192	194	220	198	210	E B 252	E A 244
25	E B 258	E B 240	E B 268	212	212	E B 228	E B 266	216	214	216	186	186	206	A	A	206	198	192	186	E B 240	226	226	E B 226	E B 232
26	E B 258	E B 268	E B 254	E B 266	E B 266	E B 238	E B 238	202	206	200	200	A	182	184	A	206	206	188	188	196	208	E B 232	224	E B 242
27	E B 246	E B 254	E B 248	228	214	A	E A 366	200	200	198	196	196	186	192	A	210	200	186	180	192	E B 250	E B 250	E B 252	214
28	E B 246	E B 256	E B 256	E B 234	214	178	182	198	206	200	A	204	202	200	196	196	196	184	186	188	196	228	A	E A 290
29	E B 268	E B 266	226	E B 252	206	194	E B 320	208	206	196	E A 238	A	192	A	212	208	210	190	198	212	186	E A 262	E A 254	E B 242
30	E B 264	E B 256	E B 252	E B 240	208	208	E B 248	194	198	210	204	210	204	206	200	196	210	186	186	194	A	196	214	E B 252
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	30	30	30	29	30	30	30	29	24	21	24	25	21	25	29	30	28	27	28	29	29	30
MED	E B 246	E B 254	E B 253	E B 238	210	198	E B 237	199	200	204	200	196	189	190	194	208	202	192	193	204	U 210	E 230	E 226	E B 242
U Q	E B 258	E B 266	E B 264	E B 266	E B 240	E B 226	E B 266	202	206	210	206	205	193	199	205	215	208	196	199	E B 224	E B 239	E B 251	E B 251	E 254
L Q	228	240	228	228	208	191	216	194	194	199	195	189	182	184	189	196	198	190	186	194	207	213	214	230

NOV.2019 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

NOV.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								108	114	A	A	A	A	A	112	112	112	112						
2								128	A	A	A	A	A	A	A	108	108	120		B				
3								B	124	112	A	112	112	114	114	112	112	104						
4							B	B	108	108	A	116	A	A	A	A	116	A						
5								B	A	118	122	124	A	A	A	A	A	124						
6							B	B	110	110	110	A	A	A	116	C	114	B						
7								118	120	116	114	108	104	108	110	A	118	B						
8								120	118	112	112	114	112	112	112	112	112	114	B					
9								B	120	A	122	114	110	104	104	104	110	B						
10								B	118	112	114	112	112	A	118	116	120	B						
11								116	120	122	116	116	116	116	110	112	112	B						
12								B	116	116	116	E B 112	A	A	114	114	114	B						
13								B	120	120	116	106	106	106	A	A	106	B						
14								B	112	112	112	110	A	112	112	112	112	A						
15								B	112	116	118	118	112	112	A	A	A	124						
16								B	118	A	114	114	110	A	110	104	104	A						
17								B	114	118	114	114	114	118	114	A	102	B						
18								B	112	114	112	114	108	116	118	118	116	B						
19								B	114	114	112	A	A	A	112	112	A							
20								B	114	114	110	108	108	104	104	104	106	B						
21								B	110	110	A	A	A	A	A	112	112	B						
22								B	110	114	A	A	A	A	A	A	A	A						
23								B	104	A	A	A	A	104	A	A	A							
24								B	114	112	A	A	A	A	A	A	112	B						
25								B	112	A	A	A	A	A	A	112	114	B						
26								B		A	A	A	110	A	A	A	A							
27								B	110	114	108	A	A	A	A	A	114	A						
28								124	128	114	A	112	110	112	112	A	112	B						
29								B	120	120	118	114	114	A	116	A	A	A						
30								132	120	112	112	116	116	A	116	114	106	B						
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								7	27	23	19	19	16	13	18	16	23	6						
MED								120	114	114	114	114	111	112	112	112	112	117						
U Q								128	120	116	116	116	113	115	116	113	114	124						
L Q								116	112	112	112	112	109	105	110	110	108	112						

IONOSPHERIC DATA STATION Yamagawa

NOV.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	94	90	90	88	88	92	92	G	G	92	92	90	94	94	G	154	G	86	B	90	98	92	106	98
2	84	96	96	104	104	B	138	132	102	102	102	102	96	96	94	94	124	88	88	88	88	88	86	84
3	86	86	88	86	86	84	84	130	100	G	96	G	G	150	G	120	132	G	86	84	B	94	94	90
4	98	94	94	94	100	116	152	112	148	148	90	130	106	96	94	94	108	92	88	82	82	82	92	92
5	92	94	94	90	90	B	100	98	94	142	142	120	104	104	104	102	100	126	94	96	96	96	96	86
6	B	88	88	B	B	B	90	G	G	132	124	86	96	98	G	C	G	B	98	B	88	88	88	88
7	88	92	B	B	90	92	90	G	142	140	142	122	112	114	134	98	G	138	B	96	92	92	B	88
8	86	86	B	90	92	B	90	G	118	114	120	110	108	G	114	118	146	148	146	128	110	108	112	92
9	92	96	100	94	94	B	B	B	G	94	142	134	130	142	122	122	144	94	94	96	96	102	B	B
10	B	102	B	90	B	B	B	B	138	138	114	114	116	108	144	G	132	96	B	96	B	B	B	88
11	100	98	B	96	94	B	B	G	144	140	114	110	G	144	156	108	106	96	90	90	90	90	94	94
12	90	86	90	88	B	B	154	136	134	G	G	G	100	100	154	144	G	L 106	B	84	84	90	B	90
13	90	B	90	B	B	B	B	122	136	140	140	128	128	140	100	100	G	B	100	100	100	B	B	B
14	B	B	B	B	B	B	B	110	124	124	116	116	104	116	G	G	128	90	90	B	116	B	B	B
15	B	110	94	B	94	94	94	122	134	146	138	122	108	108	98	98	100	98	98	98	88	88	84	92
16	B	B	108	B	B	B	100	B	G	88	G	148	148	86	134	122	112	108	104	B	B	B	B	B
17	B	B	B	B	B	B	B	138	G	138	138	138	G	148	130	82	104	126	100	106	108	108	92	92
18	102	104	94	90	90	100	90	142	G	G	138	136	132	126	122	108	G	96	94	92	B	B	B	B
19	B	B	B	86	86	88	88	B	154	152	152	96	96	96	G	G	98	98	94	92	90	90	B	B
20	106	90	88	B	B	92	B	92	G	150	154	154	150	146	130	120	116	82	100	112	110	100	94	92
21	B	B	88	B	B	B	B	B	G	170	100	96	96	96	96	152	G	94	94	B	126	B	112	102
22	110	110	110	98	98	98	B	B	160	132	104	104	96	96	96	96	92	92	92	102	102	102	102	B
23	94	94	94	92	94	90	B	90	160	102	102	100	100	G	98	98	98	98	B	98	98	98	96	B
24	96	96	B	96	96	B	94	B	G	G	94	94	94	94	94	94	G	88	86	86	86	90	86	86
25	86	B	86	B	84	B	98	138	98	94	94	94	92	92	92	G	146	88	B	90	90	86	90	100
26	92	94	94	100	96	88	92	B	92	96	96	92	G	92	92	84	84	92	92	88	88	B	98	B
27	B	B	B	B	98	154	144	134	G	G	G	104	104	104	88	88	G	88	B	112	112	106	100	98
28	90	B	B	B	B	100	98	G	134	G	84	136	116	110	114	98	116	110	106	104	104	100	100	100
29	102	94	B	B	B	B	96	162	128	124	116	110	104	86	134	94	84	84	84	84	84	112	112	B
30	B	B	B	90	B	B	B	G	144	154	164	120	130	98	98	G	114	104	98	94	98	98	98	98
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	20	20	18	17	18	13	19	15	20	24	27	28	26	28	25	24	21	27	23	26	26	23	21	20
MED	92	94	94	90	94	92	94	130	134	135	116	112	104	102	104	99	112	96	94	95	96	94	96	92
U Q	99	97	94	96	96	100	100	138	144	144	140	129	116	121	132	120	130	106	100	100	104	102	101	98
L Q	89	90	88	89	90	89	90	110	110	102	96	98	96	96	95	94	99	88	90	88	88	90	91	88

NOV.2019 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

NOV.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	F1	F2	F7	F6	F3	F2	F1			L4	L5	L5	L4	L2		H2		L3		F1	F1	F1	F2	F6
2	F3	F1	F4	F1	F1		F1	C4	L3	L2	LC32	LC21	L2	L2	L2	L2	CL22	L2	F2	F3	F3	F3	F1	F3
3	F2	F2	F2	F2	F2	F1	F2	C3	L2		L2			H1		C2	C2		F1	F1		F3	F3	F6
4	F7	F8	F7	F3	F2	F4	HL12	H1	H2	H2	L5	H2	L2	L5	L7	L3	C4	L4	F9	F9	F4	F2	F1	F1
5	F1	F2	F3	F2	F2		F3	L3	L4	H2	H2	C2	L2	L2	L3	L3	L5	CL23	F3	F3	F1	F3	F3	F2
6		F1	F1				L1			H2	C2	L2	L2	L2					F1		F1	F2	F3	F3
7	F1	F1			F1	F1	F1		H2	H2	H2	C2	C2	C1	H2	L3		H2		F2	F2	F1		F1
8	F1	F1		F2	F2		F1		C3	C2	C2	C2	C2		C4	C3	H3	H3	H2	F3	F8	F8	F3	F3
9	F2	F2	F1	F1	F2					L5	HL25	CL25	H2	H2	CL23	CL33	H2	L3	L2	F5	F5	F2		
10		F1		F1					H2	H2	C2	C2	C2	L2	HL23		CL23	L3		F2				F3
11	F2	F2		F1	F1				H3	H3	C2	C2		H2	H2	C4	C4	L5	F9	F9	F5	F7	F5	F2
12	F2	F1	F1	F2			F2	C2	H2				L3	L3	H1	H2		L5		F1	F1	F2		F1
13	F1		F1					C2	H2	H2	H2	C3	C1	C1	L2	L3			F2	F2	F1			
14								C3	H3	H3	C2	C2	L2	C2			CL23	L3	F1		F1			
15		F1	F1		F2	F1	F2	C2	C2	H2	HL23	C3	C4	C3	L2	L2	L4	L3	F3	F2	F3	F1	F2	F1
16			F1				F1			L4		H1	H2	L2	H2	CL33	C6	L6	F4					
17								H3		H2	H3	H2		H2	C2	L5	CL23	CL22	F5	F2	F2	F3	F5	F5
18	F1	F1	F2	F2	F2	F1	F2	H2			H2	H2	H2	C2	C3	C3		L2	F1	F2				
19				F3	F3	F6	F2		H4	H2	H2	L3	L2	L2			L3	L5	F7	F7	F1	F1		
20	F1	F2	F1			F2		L1		H1	H2	H2	H2	H2	C2	C7	C3	LC21	F3	F1	F2	F3	F3	F2
21			F1							H3	L3	L4	L2	L2	L3	H2		L1	F1		F1		F1	F1
22	F1	F2	F1	F2	F2	F2			H3	H3	L2	L4	L5	L4	L4	L5	L4	L5	F5	F2	F3	F1	F1	
23	F7	F5	F3	F2	F2	F1		L1	H3	L3	L3	L3	L3		L3	L3	L4	L3		F2	F2	F1	F2	
24	F5	F5		F2	F2		F1				L3	L4	L4	L2	L4	L4		L1	F2	F2	F1	F2	F2	F6
25	F9		F1		F2		F1	C3	L3	L2	L5	L4	L4	L5	L4		H2	L2		F2	F2	F4	F3	F1
26	F6	F6	F4	F3	F3	F2	F2		L4	L2	L2	L6		L2	L4	L8	L3	L2	F1	F1	F2		F1	
27					F1	F5	F2	HL11				L2	L2	L3	L5	L2		L4		F1	F2	F1	F2	F1
28	F1					F2	F3		C2		L3	H2	C4	C3	C3	L3	C3	L1	F2	F2	F1	F2	F4	F5
29	F2	F2					F3	HL22	CL62	C2	C3	C3	C2	L5	CL22	L3	L7	L6	F5	F4	F1	F5	F8	
30				F2					H3	H2	H2	C2	CL22	LC21	L2		C2	L2	F1	F3	F5	F2	F3	F2
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

NOV.2019 TYPES OF Es

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

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

NOV.2019 fxI (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

NOV.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	28	27	30	34	31	22	23	45	50	52	55	82	90	83	R 99	109	104	110	66	43	33	32	30	26
2	26	26	27	F 30	F 28	18	17	39	55	51	56	75	82	55	85	78	58	50	41	37	25	27	30	28
3	26	26	25	25	29	A	16	40	50	54	48	53	62	61	66	65	55	51	40	33	A	24	A	26
4	26	26	27	30	F 24	F 18	18	42	48	47	54	65	70	58	72	82	68	49	39	30	29	32	34	28
5	30	28	30	29	28	23	22	43	50	49	63	74	59	51	68	72	62	55	40	39	33	36	37	31
6	30	28	30	30	31	30	24	40	56	52	57	81	64	68	73	67	57	49	41	42	37	26	28	29
7	32	30	26	27	31	F 22	22	40	50	52	64	78	83	72	73	67	62	52	50	H 46	28	31	33	29
8	32	30	30	28	27	26	23	44	52	52	56	60	65	67	62	69	60	48	44	35	32	26	26	27
9	F 28	32	31	27	28	25	22	40	50	54	58	74	82	H 90	98	78	57	53	43	36	32	32	34	38
10	38	32	31	27	27	26	20	41	50	50	50	60	63	69	84	56	62	56	40	30	31	31	26	22
11	23	23	25	27	33	16	J B 15	38	45	50	51	52	67	59	66	62	52	51	38	H 29	32	39	F 42	F 34
12	F	31	33	34	18	A	20	41	54	60	V 72	92	69	62	64	Z 64	50	54	43	34	32	34	32	33
13	34	34	34	38	41	16	J B 16	38	48	56	63	80	88	94	77	66	54	51	37	30	29	31	34	29
14	31	30	31	28	20	17	16	38	54	47	58	70	80	69	64	60	60	51	39	Z 31	28	31	33	28
15	26	26	27	28	30	21	16	38	49	48	51	54	54	50	63	59	50	46	44	30	26	32	29	29
16	31	31	27	27	28	22	21	39	46	47	49	60	66	68	74	V 62	63	48	38	28	24	26	28	29
17	27	26	27	26	28	23	21	36	43	48	56	66	79	77	68	56	51	43	41	35	32	32	30	25
18	28	25	23	24	26	27	23	35	48	48	56	53	61	56	58	59	62	52	38	28	28	30	32	30
19	26	25	25	25	28	22	18	36	45	51	56	60	56	58	68	68	54	43	34	31	26	27	26	27
20	28	28	27	26	26	25	21	38	48	49	52	54	54	56	61	58	58	60	35	27	32	30	31	31
21	30	30	26	25	24	22	22	39	51	54	53	51	63	60	65	70	70	64	48	36	32	28	27	F 27
22	27	27	27	29	28	A	22	37	54	H 59	53	70	68	68	59	54	53	46	48	32	31	22	27	30
23	28	24	28	27	30	A	24	42	48	58	70	72	62	60	56	63	60	49	52	A	38	28	31	26
24	28	30	29	F 28	F 27	F 24	F 20	38	62	79	81	61	78	84	66	55	50	60	41	34	40	32	28	28
25	32	31	33	38	27	23	22	36	64	70	75	78	79	84	66	59	53	46	36	28	30	33	31	27
26	26	26	26	24	23	21	A	35	47	53	70	58	52	69	84	62	55	49	A	30	27	25	23	27
27	27	27	28	26	27	21	J B 17	32	44	50	61	59	65	72	75	65	52	56	37	24	A	21	24	24
28	25	27	28	30	35	20	J B 16	34	50	56	52	53	66	77	74	72	73	62	42	33	24	24	22	22
29	24	25	26	28	32	20	18	36	54	50	49	70	H 88	109	111	101	79	62	48	33	26	21	24	25
30	26	27	28	29	31	19	18	32	42	46	50	53	58	62	64	57	55	56	41	26	24	25	25	26
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	30	30	30	26	29	30	30	30	30	30	30	30	30	30	30	30	29	29	28	30	29	30
MED	28	27	28	28	28	22	20	38	50	52	56	63	66	68	68	64	58	51	41	32	30	30	30	28
U Q	30	30	30	30	31	24	22	40	54	54	63	74	79	77	75	70	62	56	44	36	32	32	32	29
L Q	26	26	26	26	27	20	17	36	48	49	52	54	62	59	64	59	53	49	38	30	26	26	26	26

NOV.2019 foF2 (0.1MHz)

IONOSPHERIC DATA STATION Okinawa

NOV.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										L	U L 452	428	440	U L 444	424	L	L							
2									L	L 384	U L 440	L 412	440	U L 420	L 424		L							
3										L	U L 404	L 428	420	428	400	U L 376	L							
4									L	A	L 416	416	432	424	408	408	L	L						
5									L	L	412	416	428	L 436	L 412	400	A							
6								204	L		L 424	420	432	L 424	392		L							
7											L 404	432	440	436	424	L	L	240						
8											U L 400	424	436	A	424	396	L							
9										U L 392	U L 420	416	436	408	408	A	L							
10										L	U L 420	416	424	416	L		L							
11										L	412	U L 420	424	L 420	412	L								
12									L	L	A	412	A	A	A	L	L							
13										L	U L 432	L 408	420	A	A	A								
14									L	L	L 412	A	432	420	L 420	L 400	L							
15											U L 408	416	A	U L 420	A	392	U L 332							
16									L	L	U L 404	412	424	416	396	L								
17											U L 388	420	424	420	412	L 296								
18								176			408	408	416	L 420	404	L	L							
19										L	408	416	408	L 428	404	L 392	L							
20									L	L	U L 408	404	U L 420	L 448	A	A	L							
21										L	L 412	U L 428	A	416	400	L	L							
22									256	L	L 392	404	424	L	A	A	L							
23									L	L	A	412	420	L 420	U L 428	L 380	L							
24										L	L	412	L	L 436	L 400	L	A							
25									L	L	420	428	440	420	L 408	A	A							
26												428	U L 448	L 428	412	L	L	L						
27										L	420	416	420	436	A	388	L							
28										L	L 392	400	420	408	408	L	L							
29										L	U L 408	412	424	416	400	392	L							
30											U L 392	L	A	L 436	408	396	L							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								2	1	2	26	28	25	26	23	11	2	1						
MED								190	256	388	L 410	416	424	420	408	392	314	240						
U Q											U L 420	422	436	L 436	420	400								
L Q											U L 404	412	420	420	400	L 388								

NOV.2019 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

NOV.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								184	248	A	U A 300	U A 316	U A 316	U A 304	308	292	252	180	B					
2								A	A	U A 272	292	A	308	324	A	A	A	A	A					
3								A	256	280	A	320	316	320	308	288	A	188	B					
4								180	232	280	A	A	A	A	A	280	A	A	A					
5								168	220	A	U A 288	316	A	320	308	A	A	A	B					
6								B	212	260	U A 324	A	U A 336	320	296	272	A	192	B					
7								B	236	276	300	A	A	320	300	284	244	184						
8								A	240	276	300	312	U A 304	316	308	308	A	A	B					
9								A	236	276	300	A	A	312	296	280	248	A	B					
10								A	236	256	292	U A 320	328	A	312	288	A	180	A					
11								A	196	252	300	A	A	A	A	A	A	A						
12								A	U A 232	A	312	U A 320	316	304	288	A	A	A	A					
13								B	232	276	304	A	336	A	312	A	A	A	A					
14								B	208	272	296	312	336	312	A	284	A	A	B					
15								A	220	264	288	304	316	U A 320	300	296	A	A	B					
16								172	216	272	292	304	A	U A 296	A	A	A	A	B					
17								A	228	272	A	A	A	316	304	280	244	A	B					
18								B	228	264	284	304	U A 308	304	A	A	A	A	B					
19								A	208	268	280	304	U A 308	A	304	284	A	A	B					
20								B	200	268	280	300	300	288	300	292	232	172	B	J K 136				
21								B	220	272	296	304	U A 320	A	A	A	236	A	B					
22								B	A	276	284	A	A	A	A	A	A	A	A					
23								B	232	A	A	A	A	A	A	A	A	A	A					
24								B	232	U A 256	U A 288	A	U A 312	A	A	A	A	A	A					
25								B	A	264	292	300	312	316	U A 296	A	A	180	B					
26								B	200	272	288	U A 292	A	A	A	A	A	A						
27								B	212	264	288	304	312	A	A	A	A	A	B					
28								B	220	268	292	308	A	A	A	260	A	A	A					
29								B	A	252	284	300	A	A	A	276	A	A	A			J K 120		
30								B	188	236	276	296	312	304	A	284	A	A	A					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								4	26	26	26	19	18	17	15	16	6	7		1		1		
MED								176	224	270	292	304	314	316	304	284	244	180		J K 136		J K 120		
U Q								182	232	276	300	U A 316	320	320	308	290	248	188						
L Q								170	212	264	288	300	U A 308	304	296	280	236	180						

NOV.2019 foE (0.01MHz)

IONOSPHERIC DATA STATION Okinawa

NOV. 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 109	J A 42	J A 102	E B 16	J A 53	J A 31	20	G	J A 33	J A 50	J A 43	J A 45	J A 47	35	G	33	28	22	19	J A 28	J A 19	J A 22	J A 31	J A 20
2	J A 52	E B 16	J A 16	J A 43	J A 32	J A 22	20	23	30	J A 35	35	J A 39	36	G	34	J A 66	31	J A 36	J A 48	J A 20	E B 16	E B 16	E B 16	E B 16
3	18	J A 17	J A 18	21	E B 16	J A 30	E B 16	23	G	G	J A 211	G	33	G	G	36	30	22	J A 26	J A 29	J A 32	J A 40	J A 40	J A 32
4	J A 18	J A 63	J A 36	J A 36	J A 32	J A 20	J A 16	G	G	35	35	35	37	37	38	32	26	20	J A 21	J A 18	J A 16	J A 42	J A 32	J A 16
5	J A 20	J A 20	18	J A 18	E B 16	18	J A 19	J A 16	25	34	34	37	33	37	33	36	J A 39	J A 38	J A 22	E B 16	J A 18	J A 26	J A 20	J A 21
6	J A 20	J A 17	E B 16	J A 16	20	J A 17	18	E B 16	24	J A 54	J A 42	J A 41	J A 47	40	36	33	30	G	E B 16	E B 16	E B 16	J A 17	E B 16	J A 51
7	J A 34	J A 22	E B 16	J A 18	J A 26	J A 20	J A 16	E B 16	28	35	37	38	37	34	36	32	G	G	E B 16	J A 24	J A 43	J A 22	20	J A 17
8	J A 17	18	E B 16	J A 21	J A 32	E B 16	E B 16	J A 20	27	31	36	38	40	J A 60	37	J A 40	J A 30	J A 30	J A 32	J A 22	J A 22	J A 27	J A 48	J A 32
9	J A 36	J A 23	J A 16	J A 31	J A 16	20	E B 16	19	29	32	37	38	J A 52	J A 44	J A 45	J A 41	27	21	J A 18	J A 21	J A 16	J A 29	J A 22	E B 16
10	E B 16	E B 16	E B 16	E B 16	20	J A 18	E B 16	18	26	30	J A 37	J A 41	J A 39	J A 37	38	35	30	25	J A 30	E B 16	J A 18	J A 18	E B 16	E B 16
11	E B 16	J A 17	J A 15	E B 16	E B 16	E B 16	17	19	26	37	J A 40	J A 51	J A 47	J A 44	J A 52	J A 38	J A 37	J A 31	J A 22	J A 25	E B 16	J A 22	J A 25	J A 30
12	J A 22	J A 18	J A 22	J A 21	E B 16	J A 22	J A 18	J A 27	J A 29	J A 37	J A 58	J A 41	J A 54	J A 49	J A 45	34	J A 37	J A 28	J A 26	J A 35	J A 26	E B 16	E B 16	J A 18
13	20	E B 16	E B 16	E B 16	E B 16	E B 16	E B 17	J A 14	28	30	37	40	42	44	43	78	J A 41	J A 27	J A 50	J A 22	20	E B 16	E B 16	E B 16
14	E B 16	E B 16	E B 16	E B 16	E B 16	20	E B 16	J A 24	27	J A 64	J A 79	J A 90	J A 94	J A 66	36	G 28	J A 34	20	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
15	E B 16	18	E B 16	E B 16	E B 16	E B 16	E B 16	20	28	32	37	40	J A 55	J A 71	J A 104	G	J A 36	J A 27	J A 22	E B 16	19	E B 16	E B 16	E B 16
16	E B 16	E B 16	20	J A 18	E B 16	E B 16	B J A 18	25	26	33	35	37	J A 57	40	38	32	28	J A 25	E B 16	J A 18	E B 16	E B 16	E B 16	E B 16
17	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	18	29	35	36	38	39	38	35	33	G	19	20	E B 16	E B 16	B J A 23	J A 22	18
18	E B 16	19	18	J A 27	J A 42	18	E B 16	J A 14	31	33	34	40	J A 51	J A 38	J A 48	J A 32	J A 28	J A 27	J A 17	J A 17	19	J A 17	19	E B 16
19	18	E B 16	E B 16	E B 16	E B 16	J A 18	J A 26	18	28	32	33	35	J A 40	J A 59	G	J A 39	J A 34	J A 32	J A 26	J A 18	E B 16	E B 16	18	E B 16
20	E B 16	E B 16	B J 22	A J A 22	18	E B 16	E B 16	E B 16	23	31	35	36	37	41	J A 52	J A 42	28	21	J A 16	K J A 14	J A 20	J A 22	20	J A 29
21	E B 16	19	19	E B 16	E B 16	E B 16	E B 16	E B 16	25	33	32	39	J A 46	J A 39	40	34	J A 28	J A 20	J A 25	J A 21	19	J A 17	19	E B 16
22	19	E B 16	J A 16	J A 16	A J A 23	J A 36	J A 19	J A 21	J A 32	31	33	J A 38	J A 38	J A 44	J A 62	J A 52	J A 53	J A 33	J A 33	J A 40	J A 21	16	19	E B 16
23	E B 16	J A 52	J A 46	J A 21	J A 30	J A 49	J A 36	E B 16	G	J A 38	J A 90	J A 80	J A 56	J A 56	J A 67	J A 54	J A 32	J A 46	J A 34	J A 52	J A 38	J A 86	J A 81	J A 42
24	J A 42	22	E B 16	20	J A 17	J A 18	19	20	G	34	J A 52	J A 43	J A 45	J A 61	J A 62	J A 47	J A 54	J A 35	J A 33	J A 40	J A 30	20	20	E B 16
25	E B 16	J A 29	J A 35	19	24	18	17	19	J A 24	G	G	G	G	G	36	J A 42	J A 30	J A 20	J A 25	J A 18	J A 22	22	19	19
26	19	E B 16	E B 16	22	J A 17	J A 18	J A 26	18	24	31	34	J A 63	J A 40	38	J A 39	J A 30	J A 44	J A 22	J A 86	J A 24	J A 18	17	18	18
27	20	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	24	G	33	34	J A 39	J A 56	J A 44	J A 45	J A 46	J A 33	J A 24	J A 22	J A 42	24	20	18
28	18	E B 16	E B 16	E B 16	B J A 17	20	E B 17	E B 16	26	G	33	39	J A 50	34	J A 60	G	J A 52	J A 52	J A 33	J A 26	J A 16	J A 16	E B 16	E B 16
29	E B 16	19	18	19	18	E B 16	20	18	24	30	35	39	36	J A 38	J A 42	G	J A 32	J A 27	J A 44	J A 36	J A 18	K J A 12	19	19
30	J A 17	E B 16	E B 16	E B 16	E B 16	18	19	19	27	32	34	40	J A 45	J A 46	J A 40	30	J A 33	J A 25	J A 26	J A 33	J A 25	20	20	E B 16
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	18	17	16	18	17	18	17	18	26	32	36	39	J A 41	40	40	34	J A 32	J A 26	J A 25	J A 22	J A 19	J A 19	19	16
U Q	J A 20	J A 20	J A 19	J A 21	J A 24	J A 20	J A 19	20	28	J A 35	J A 40	J A 41	J A 50	J A 49	J A 48	J A 42	J A 37	J A 32	J A 33	J A 28	J A 22	J A 23	J A 22	J A 20
L Q	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	16	24	31	34	37	37	37	36	32	28	21	19	E B 17	E B 16	E B 16	E B 16	E B 16

NOV. 2019 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

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

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

H / D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	20	E B 16	E B 16	E B 16	22	E B 16	E B 16	G	27	30	37	36	37	34	G	33	28	21	E B 16	24	E B 16	E B 16	20	E B 16
2	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	21	26	32	34	33	36	G	34	32	28	32	31	E B 16	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	A A 30	E B 16	20	G	G	32	G	32	G	G	34	29	22	22	25	A A 32	21	A A 40	18
4	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G	G	34	34	35	36	36	35	32	26	19	20	E B 16	E B 16	E B 16	21	E B 16
5	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	24	34	34	36	33	35	32	36	34	29	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
6	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	24	G 22	36	35	36	38	32	32	28	G	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
7	21	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	28	34	37	37	36	33	36	30	G	G	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
8	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	19	27	30	35	36	37	45	34	32	27	22	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
9	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	19	29	30	36	37	38	39	35	40	26	20	E B 16	E B 16	E B 16	18	E B 16	E B 16
10	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	17	25	30	33	35	36	33	35	35	30	23	29	E B 16	E B 16	E B 16	E B 16	E B 16
11	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	18	25	33	34	34	34	35	36	32	31	25	18	E B 16	E B 16	E B 16	E B 16	20
12	E B 16	E B 16	E B 16	E B 16	E B 16	A A 22	E B 16	24	26	31	45	37	47	46	44	30	30	24	25	32	E B 16	E B 16	E B 16	E B 16
13	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 17	E B 16	27	30	36	39	40	42	42	55	36	21	29	18	E B 16	E B 16	E B 16	E B 16
14	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	16	27	32	36	41	36	36	34	G 26	27	20	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
15	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	20	28	30	34	35	42	36	42	G	26	20	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	19	25	32	34	36	38	40	38	30	28	20	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
17	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	18	29	35	34	36	38	36	34	31	G	19	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
18	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	30	32	34	38	36	36	34	28	26	20	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
19	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	18	27	31	32	34	38	36	G	G 25	26	20	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
20	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	22	31	34	35	36	40	44	38	27	20	E B 16	K 14	E 17	E B 16	E B 16	20
21	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	25	32	32	38	43	35	36	33	G 21	19	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
22	E B 16	E B 16	E B 16	E B 16	E B 16	A A 36	E B 16	E B 16	23	30	32	32	33	37	52	42	30	25	25	22	E B 16	E B 16	E B 16	E B 16
23	E B 16	E B 16	E B 16	17	18	A A 49	E B 16	E B 16	G	29	42	36	35	35	32	30	27	20	21	A A 52	23	E B 16	E B 16	22
24	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	G	29	40	36	41	37	33	33	36	22	24	18	E B 16	E B 16	E B 16	E B 16
25	E B 16	E B 16	19	E B 16	E B 16	E B 16	E B 16	E B 16	23	G	G	G	G	G	33	38	29	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
26	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	A A 26	E B 16	23	28	34	37	33	34	36	28	25	18	A A 86	18	E B 16	E B 16	E B 16	E B 16
27	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	23	G	33	33	33	40	40	36	32	20	E B 16	18	A A 42	E B 16	E B 16	E B 16
28	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 17	E B 16	25	G	33	37	36	33	32	G	29	21	21	17	E B 16	E B 16	E B 16	E B 16
29	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	24	30	34	38	35	34	33	G	25	18	33	18	E B 16	K 12	E B 16	E B 16
30	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	26	32	33	39	44	34	30	30	28	20	21	19	E B 16	E B 16	E B 16	E B 16
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	25	30	34	36	36	36	34	32	28	20	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16
U Q	E B 16	E B 16	E B 16	E B 16	E B 16	16	E B 16	18	27	32	36	37	38	38	36	35	30	22	24	18	16	E B 16	E B 16	16
L Q	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16	23	G 29	33	35	35	34	32	G 30	26	19	E B 16	E B 16	E B 16	E B 16	E B 16	E B 16

NOV.2019 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

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

IONOSPHERIC DATA STATION Okinawa

NOV. 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	309	325	334	371	338	301	367	398	390	386	321	345	367	321	R 327	329	340	369	353	349	298	353	347	319
2	295	316	316	F 351	F 411	377	311	395	387	391	329	340	384	306	353	394	375	379	370	388	328	325	319	343
3	320	331	315	342	393	A	B	382	397	390	375	359	364	350	370	349	388	386	383	354	A	317	A	324
4	343	357	300	372	F 364	F 353	345	406	400	348	369	344	363	334	344	367	391	372	388	366	313	317	357	331
5	308	327	346	366	363	390	334	396	398	370	375	371	381	327	347	363	388	395	371	355	311	356	316	324
6	313	320	327	314	344	378	352	376	392	375	342	377	338	346	364	378	364	390	349	362	400	320	341	338
7	322	342	322	318	378	F 322	368	385	384	392	352	348	350	326	360	386	371	382	370	H 333	364	331	354	318
8	344	335	344	338	326	344	358	366	391	359	356	355	337	359	340	369	388	383	365	347	370	367	288	314
9	F 305	324	347	344	369	383	386	391	383	367	331	338	331	H 349	364	397	373	408	367	350	321	320	318	326
10	296	326	337	344	347	368	325	385	394	375	346	341	376	341	378	376	353	368	384	350	330	360	402	343
11	320	321	338	352	418	430	B	389	393	360	368	335	358	347	365	378	400	371	409	H 329	297	315	F 340	F 324
12	F	321	344	398	389	A	317	356	377	356	V 328	374	371	354	366	Z 375	392	378	371	403	301	324	315	324
13	318	308	314	353	401	U B 434	B	366	369	373	328	353	352	360	351	348	346	396	378	335	315	328	355	335
14	316	329	341	381	390	U B 372	U B 303	352	390	383	361	357	346	370	362	364	379	375	388	Z 368	336	334	362	356
15	338	321	342	342	369	389	U B 399	384	400	384	351	367	336	339	379	379	377	387	394	375	308	323	328	322
16	339	356	347	355	380	383	354	390	404	387	371	352	367	359	359	V 347	408	391	363	346	326	333	352	366
17	348	316	322	304	357	347	390	405	391	373	365	346	357	318	386	389	369	384	378	372	332	343	366	326
18	340	339	356	324	330	403	411	372	412	357	372	357	366	350	363	353	375	401	401	375	315	328	333	379
19	338	335	324	340	385	381	362	381	404	377	361	381	369	385	368	389	405	407	362	354	339	334	329	337
20	332	339	321	334	333	370	344	393	399	394	365	361	339	353	375	382	398	390	402	323	331	349	330	345
21	347	354	344	324	321	352	342	385	374	379	368	342	377	363	357	347	375	381	358	377	329	339	367	F 303
22	336	348	317	347	356	A	319	362	395	H 376	346	358	370	369	378	369	367	365	388	380	339	306	308	317
23	394	296	322	322	336	A	350	390	374	360	369	388	374	371	346	373	382	365	379	A	336	307	328	351
24	305	331	317	F 317	F 348	F 306	F 325	347	359	376	382	377	353	372	386	377	359	389	366	354	308	343	308	321
25	323	301	295	343	338	314	342	350	377	368	369	364	345	365	384	375	385	398	379	355	316	332	374	338
26	333	328	330	325	342	383	A	385	377	361	388	393	322	361	385	394	384	387	A	339	307	352	328	340
27	343	322	341	334	379	369	B	375	394	378	376	347	352	334	356	365	370	401	389	381	A	343	336	331
28	327	320	338	331	391	432	B	364	367	398	368	353	348	374	353	353	373	384	392	388	431	325	371	321
29	316	320	320	358	382	407	308	379	406	397	353	340	H 318	312	353	363	378	396	386	390	333	314	332	323
30	317	324	335	350	380	330	354	391	382	370	354	348	351	348	367	364	369	401	395	347	319	354	362	330
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	30	30	30	30	26	24	30	30	30	30	30	30	30	30	30	30	30	29	29	28	30	29	30
MED	323	326	332	342	366	374	348	384	391	376	363	354	355	350	364	371	376	386	379	355	327	332	336	328
U Q	340	335	342	353	385	389	364	391	398	386	369	367	369	363	375	379	388	396	388	376	336	343	360	340
L Q	314	320	320	325	342	347	325	366	377	367	346	345	345	334	353	363	369	378	366	347	312	320	324	322

IONOSPHERIC DATA STATION Okinawa

NOV. 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										L	U L 376	401	383	U L 398	411	L	L							
2									L	L 417	U L 406	L 432	398	U L 445	L 377		L							
3										L	U L 430	L 408	436	389	406	U L 427	L							
4									L	A	L 385	430	396	403	430	386	L	L						
5									L	L	403	419	392	L 410	L 401	387	A							
6								452	L		L 381	393	405	L 403	434		L							
7											L 367	374	394	409	393	L	L	440						
8											U L 406	396	388	A	397	377	L							
9										U L 396	U L 384	385	390	434	416	A	L							
10										L	U L 396	402	408	416	L		L							
11										L	392	U L 418	421	L 446	400	L								
12									L	L	A	403	A	A	A	L	L							
13										L	U L 372	A	A	A	A	A								
14									L	L	L 393	A	394	406	L 408	L 400	L							
15											U L 389	407	A	U L 397	A	390	U L 428							
16									L	L	U L 418	412	401	A	A	L								
17											U L 408	372	371	394	385	L	453							
18								457			381	A 401	398	L 395	393	L	L							
19										L	404	411	447	L 394	410	L 391	L							
20									L	L	U L 421	440	U L 424	L 375	A	A	L							
21										L	L 397	U L 394	A	417	409	L	L							
22									459	L	L 416	414	400	L	A	A	L							
23									L	L	A	405	410	L 404	U L 385	L 377	L							
24										L	L	429	L	L 384	L 398	L	A							
25									L	L	392	391	381	399	L 390	A	A							
26												397	U L 398	L 407	A 387	L	L	L						
27										L	382	421	425	A 365	A	A 405	L							
28										L	L 424	436	382	397	398	L	L							
29										L	U L 392	A 353	389	400	404	391	L							
30											U L 414	L	A	L 364	389	386	L							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								2	1	2	26	27	24	25	22	11	2	1						
MED								454	459	406	L 394	405	398	L 400	399	390	440	440						
U Q											U L 408	419	409	410	409	L 400								
L Q											L 384	394	390	L 394	390	386								

NOV. 2019 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

NOV.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										222	U L 306	262	230	254	268	226	230							
2									226	218	266	268	220	350	248		226							
3										220	240	264	256	242	244	250	218							
4									212	214	254	274	250	286	266	230	204	202						
5									204	242	246	242	232	316	264	242	212							
6								206	214		284	224	242	244	236		216							
7											264	262	244	250	236	218	222	200						
8											244	268	274	242	274	240	212							
9										240	276	274	248	230	238	210	214							
10										228	284	290	240	268	226		248							
11										254	254	310	240	256	236	218								
12									236	252	264	226	238	268	244	230	218							
13										238	294	234	252	224	250	260								
14									212	230	260	268	250	230	242	256	220							
15											270	240	298	282	242	236	210							
16									210	220	250	268	252	246	244	232								
17											266	272	242	236	220	214	218							
18								190			248	270	242	272	250	258	226							
19										236	264	234	242	232	238	218	200							
20									220	216	258	266	274	274	240	228	212							
21										242	250	284	242	242	258	232	208							
22									212	220	292	248	230	242	A 240	234	230							
23									212	242	232	228	230	236	276	238	224							
24										228	220	224	252	234	220	230	218							
25									222	232	238	234	256	234	216	228	206							
26												228	316	242	220	214	216	194						
27										242	242	258	254	268	240	224	226							
28										220	248	272	270	232	242	240	222							
29										218	262	268	242	236	230	220	204							
30											L 246	262	276	274	246	246	232							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								2	11	22	29	30	30	30	30	27	27	3						
MED								198	212	229	258	263	246	243	242	230	218	200						
U Q									222	242	268	270	256	268	250	240	226	202						
L Q									212	220	246	234	240	236	236	220	212	194						

NOV.2019 h'F2 (KM)

IONOSPHERIC DATA STATION Okinawa

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

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	332	276	244	208	250A	320	208	196	200	190	220EA	196	214	196	176	220	198	204	174	204	208	228	224	256
2	302	278	250	208	178	266EB	390EB	200	214	186	184	160	200	176	204	214	202	210	218EA	190	246	248	242	224
3	258	252	256	240	196	A	B	204	204	208	176	176	170	226	182	190	202	198	194	230EA	A	336EA	A	284
4	246	248	304	210	224	268EB	288EB	194	172	A	196	176	192	202	194	212	200	186	196	200	260	260	220	218
5	248	256	226	224	208	194	250	194	190	206	198	196	192	188	182	228	A	212	204	190	256	216	240	240
6	272	288	256	270	230	204	216	170	170	208	218	200	214	234	190	218	212	202	176	184	186	270	234	234
7	EA 266	236	262	260	208	266	218	190	200	216	A	238	196	186	212	192	188	184	196	180	198	232	208	216
8	226	224	238	236	270	218	210	196	196	196	208	198	208	A	208	206	208	206	190	206	196	224	296	288
9	278	240	222	226	214	194	214	196	214	188	236	230	234	204	196	A	196	194	184	192	224	236	260	240
10	242	236	232	216	242	196	270	196	202	196	192	196	198	180	222	220	224	208	196	174	240	216	194	254
11	280	286	242	222	182	192EB	B	200	206	220	210	200	180	186	204	210	204	216	182	190	264	248	216	260EA
12	234	254	214	188	216	A	272	218	224	228	A	204	A	A	A	226	206	222	214	238EA	242	242	242	258
13	262	264	256	214	182	218EB	B	216	208	194	234	A	A	A	A	A	220	202	208	208	254	246	220	228
14	262	238Q	234Q	188	196	272EB	422EB	216	194	200	214	A	202	192	178H	174H	214	202	190	188	228	230	212	216
15	230	256	248	220	198	204	270EB	202	208	202	220	200	A	212	A	192	186	202	186	176	262	232	220	250
16	238	224	218	216	210	212	230	196	182	206	194	206	224	A	A	198	208	202	178	188	244	248	210	200
17	220	250	244	264	220	202	192	184	210	228	206	246	A	216	212	206	174	196	184	182	212	220	198	236
18	230	218	216	260	238	204	176	174	200	216	216	232EA	216	212	214	198	214	194	182	174	254	234	222	200
19	248	242	258	236	198	218	266	214	202	216	190	170	186	224	180	202	192	184	194	200	202	224	254	236
20	248	252	264	254	254	206	230	204	184	204	190	176	194	EA 230	A	A	204	196	176	244	238	206	240	EA 244
21	226	220	228	278	270	236	248	210	208	224	190	220	A	196	A 212	218	202	210	180	192	208	226	214	252
22	226	238	268	242	210	A	282	224	178	206	198	192	176	A	A	A	214	210	206	206	196	292	266	226
23	198	278	236	248	246	A	244	212	196	216	A	200	198	202	182	EA 222	210	208	196	A	242	250	244	A 246
24	308	238	262	266	224	280	302	222	224	224	A	186	A	A 228	202	210	A	212	204	204	236	200	248	254
25	248	296	246	194	214	260	252	220	214	196	184	182	174	194	208	A	A	196	182	202	254	244	200	218
26	246	250	260	250	252	206	A	208	204	186	226	EA 222	184	178	A	204	196	182	A	A 184	248	216	Q 262	Q 242
27	238	256	248	258	212	226	B	192	204	186	208	180	170	EA 262	A	A	214	198	174	208	A	252	244	252
28	248	262	250	256	198	174	B	216	212	210	208	202	214	184	210	194	210	204	180	176	182	250	214	284
29	Q 290	280	266	228	200	186	368EB	210	202	208	198	A	208	198	192	202	198	192	200	182	218	290	254	250
30	266	262	248	232	192	276EB	282EB	202	210	228	200	A	A	234	202	208	202	198	186	EA 226	242	234	204	242
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	26	24	30	30	29	26	26	23	25	22	24	27	30	29	29	28	30	29	30
MED	248	252	248	234	213	210	U 234	202	203	206	201	198	198	199	202	206	204	202	188	191	239	234	224	241
U Q	266	264	258	256	238	266EB	282EB	214	210	216	216	206	214	225	210	218	212	208	198	206	251	250	246	254
L Q	234	238	234	216	198	202	217	196	196	196	192	182	184	187	182	198	198	196	181	183	208	224	213	226

NOV.2019 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

NOV. 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								112	112	A	104	104	104	104	108	106	106	106	B					
2								A	A	110	106	A	104	104	A	A	A	A	A					
3								A	98	104	A	102	102	102	102	104	A	106	B					
4								134	100	104	A	A	A	A	A	104	A	A	A					
5								114	106	A	106	106	A	106	104	A	A	A	B					
6								B	100	102	106	A	102	102	108	106	A	88	B					
7								B	106	106	104	A	A	106	102	102	102	114						
8								A	108	108	104	104	104	104	104	106	A	A	B					
9								A	110	108	108	A	A	108	108	106	106	A	B					
10								A	106	102	104	104	104	A	108	108	A	120	A					
11								A	100	106	106	A	A	A	A	A	A	A						
12								A	100	A	104	104	104	104	104	A	A	A	A					
13								B	110	110	110	A	104	A	110	A	A	A	A					
14								B	106	106	106	104	106	104	A	108	A	A	B					
15								A	106	106	106	106	106	110	104	106	A	A	B					
16								122	104	104	104	104	A	104	A	A	A	A	B					
17								A	102	102	A	A	A	108	108	108	106	A	B					
18								B	100	102	102	102	102	102	A	A	A	A	B					
19								A	102	102	104	102	102	A	102	102	A	A	B					
20								B	102	106	102	102	102	102	106	106	108	104	B	E				
21								B	104	104	104	104	104	A	A	A	108	A	B					
22								B	A	112	106	A	A	A	A	A	A	A	A					
23								B	106	A	A	A	A	A	A	A	A	A	A					
24								B	106	106	104	A	104	A	A	A	A	A	A					
25								B	A	100	100	100	100	100	100	A	A	126	B					
26								B	104	104	102	102	A	A	A	A	A	A						
27								B	100	102	102	102	102	A	A	A	A	A	B					
28								B	104	104	104	106	A	A	A	102	A	A	A					
29								B	A	102	102	102	A	A	A	102	A	A	A			B		
30								B	102	100	102	106	108	110	A	102	A	A	A					
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								4	26	26	26	19	18	17	15	16	6	7						
MED								118	104	104	104	104	104	104	104	106	106	106						
U Q								128	106	106	106	104	104	107	108	106	108	120						
L Q								113	100	102	102	102	102	102	102	102	106	104						

NOV. 2019 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

NOV.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	108	92	94	B	94	96	92	G	88	100	104	102	102	104	G	160	156	140	94	88	86	84	84	82
2	100	B	78	98	96	118	142	136	120	110	106	104	104	G	158	92	138	108	82	80	B	B	B	B
3	84	84	92	80	B	94	B	130	G	G	92	G	112	G	G	104	100	138	92	92	92	92	86	92
4	92	94	94	88	92	104	100	G	G	156	154	162	166	150	126	186	148	122	86	86	84	84	80	82
5	80	94	82	92	B	92	90	90	132	174	162	158	112	108	160	98	98	96	92	B	116	96	84	82
6	80	80	B	88	82	84	88	B	134	90	130	130	108	168	110	156	130	G	B	B	B	88	B	94
7	88	88	B	88	84	84	B	B	168	152	174	142	140	170	134	120	G	G	B	98	100	96	82	86
8	86	80	B	88	88	B	B	90	116	130	108	110	106	122	134	104	102	98	96	92	114	102	98	94
9	92	90	88	98	82	82	B	166	164	154	138	138	120	120	116	106	110	138	92	84	84	94	88	B
10	B	B	B	B	88	84	B	146	158	130	124	106	106	104	154	166	154	130	108	B	90	90	B	B
11	B	94	94	B	B	B	156	146	166	130	120	112	106	100	102	102	102	94	94	90	B	112	94	92
12	90	90	90	92	B	92	92	88	154	136	108	108	102	100	100	100	96	96	90	92	94	B	B	86
13	86	B	B	B	B	B	B	B	166	154	152	132	128	120	116	98	96	120	96	94	96	B	B	B
14	B	B	B	B	B	102	B	96	140	108	112	106	102	102	102	98	98	128	B	B	B	B	B	B
15	B	110	B	B	B	B	B	142	136	144	140	122	112	108	100	G	90	90	88	B	134	B	B	B
16	B	B	94	94	B	B	106	134	134	166	160	182	106	170	146	142	144	106	B	86	B	B	B	B
17	B	B	B	B	B	B	B	148	168	182	144	146	136	138	162	138	G	154	82	B	B	90	90	82
18	B	84	110	94	94	88	B	B	138	154	146	122	100	132	102	102	102	96	98	92	92	92	94	B
19	84	B	B	B	B	84	86	170	174	160	150	110	102	104	G	104	98	96	80	94	B	B	124	B
20	B	B	90	92	98	B	B	B	138	170	170	164	146	128	120	126	144	130	98	E	100	102	90	90
21	B	84	86	B	B	B	B	B	170	166	162	176	102	102	142	152	98	94	88	90	120	106	102	B
22	106	B	104	96	96	90	90	92	98	148	106	102	100	96	90	90	90	90	90	90	92	90	90	B
23	B	98	96	88	84	90	84	B	G	122	100	104	104	104	98	98	94	94	94	88	88	130	100	96
24	98	98	B	98	92	90	92	122	G	108	102	102	100	100	102	98	94	94	94	94	90	96	90	B
25	B	86	86	86	86	108	104	82	122	G	G	G	G	G	102	100	98	94	90	90	94	92	90	88
26	88	B	B	100	92	90	90	122	118	122	106	100	100	100	98	98	98	94	88	88	86	94	100	100
27	94	B	B	B	B	B	B	B	158	G	178	150	104	98	96	94	94	92	92	88	88	86	104	104
28	78	B	B	B	92	90	B	B	162	G	154	150	96	146	94	G	90	90	90	90	92	104	B	B
29	B	80	84	102	98	B	160	100	164	144	142	132	142	92	94	G	90	90	84	86	90	B	86	84
30	88	B	B	B	B	92	90	92	164	144	146	134	120	112	90	160	90	94	92	88	88	108	108	B
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	18	17	16	18	17	20	16	19	26	26	29	28	29	27	27	27	28	28	26	23	23	22	21	16
MED	88	90	91	92	92	90	92	122	147	144	140	126	106	108	102	104	98	96	92	90	92	94	90	89
U Q	94	94	94	98	95	95	105	146	164	156	154	148	120	132	134	142	120	125	94	92	100	102	100	94
L Q	84	84	86	88	85	86	90	92	132	122	107	106	102	100	98	98	94	94	88	88	88	90	86	83

NOV.2019 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

NOV. 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	FF 14	F 3	F 2		F 4	F 2	F 1		LC 22	C 1	C 2	C 2	C 2	C 1		HL 11	H 1	H 1	L 1	F 3	F 2	F 1	F 2	F 1
2	F 2		F 1	F 1	F 3	F 1	F 1	HL 21	CL 22	C 2	C 2	C 1	C 2		HC 11	L 1	HL 12	CL 22	L 4	F 1				
3	F 1	F 1	F 1	F 1		F 1		HC 21			LC 11		C 1			C 2	C 2	H 1	L 4	F 4	F 3	F 3	F 6	F 3
4	F 2	F 2	F 4	F 2	F 2	F 1	F 1			H 1	HC 11	HC 11	HC 11	HL 11	CL 12	H 1	HL 11	CL 11	L 2	F 2	F 2	F 3	F 5	F 1
5	F 2	FF 11	F 1	F 1		F 1	F 1	L 1	H 1	HC 11	HC 11	HC 11	CL 11	C 1	H 1	L 1	L 4	L 2	L 1		F 1	F 1	F 1	F 1
6	F 1	F 1		F 1	F 1	F 2	F 1		H 1	LH 12	HC 11	HC 11	C 1	HC 11	C 1	HC 11	HC 11					F 1		F 2
7	F 3	F 1		F 1	F 2	F 1			H 1	H 1	H 1	HC 11	H 1	H 1	H 1	C 1				F 1	F 1	F 1	F 1	F 1
8	F 1	F 1		F 3	F 2			L 2	C 1	H 1	C 2	C 1	C 2	C 2	HC 11	C 1	C 1	L 1	L 1	F 1	F 2	F 3	FQ 21	F 2
9	F 2	F 1	F 1	F 1	F 1	F 1		H 1	H 1	H 1	HL 11	HL 11	CLH 22	CL 11	C 2	C 2	C 1	H 2	L 1	F 1	F 1	FF 21	F 1	
10					F 1	F 1		H 1	H 1	HC 11	C 1	C 1	C 2	C 1	H 1	H 1	HC 11	H 2	C 6		F 1	F 1		
11		F 1	F 1				F 1	H 2	H 2	H 2	C 2	C 1	C 1	C 1	C 2	C 1	CH 21	L 4	L 4	F 3		F 1	F 1	FQ 21
12	FQ 11	FQ 11	FQ 11	F 1		F 3	F 2	L 5	H 2	HC 11	C 5	C 2	C 4	C 4	C 2	CH 11	LH 31	L 2	L 3	F 8	F 2			F 1
13	F 1							C 1	H 1	H 1	HC 11	HC 11	C 1	CL 11	C 2	L 4	L 4	CL 24	L 4	F 2	F 1			
14						F 1		LH 11	HC 11	C 2	C 3	C 3	C 2	C 2	C 1	L 1	L 2	C 1						
15		F 1						H 1	H 2	HC 11	HC 21	C 1	C 3	C 2	C 3		L 2	LC 21	L 1		F 1			
16			F 1	F 1			F 1	H 1	H 2	H 1	H 1	HC 11	CH 22	HC 21	HC 21	HC 11	HC 11	C 2		F 1				
17								HL 11	H 1	HH 12	HC 21	HC 21	H 1	H 1	H 1	H 1		H 1	L 1			F 2	F 2	F 1
18		F 1	F 1	F 1	F 2	F 1		H 1	H 2	H 1	H 1	C 2	CH 11	HC 11	C 1	C 1	C 2	L 1	L 1	FF 11	FF 11	F 1	F 1	
19	F 1					F 1	F 4	HL 11	HC 12	H 1	H 1	C 1	C 2	CH 11		C 1	L 2	LL 11	L 1	F 1			F 1	
20			F 4	F 3	F 1				HC 11	HL 11	H 1	HC 11	HC 11	CL 11	C 2	C 2	HL 11	H 1	L 1	K 1	F 4	F 1	F 2	F 5
21		F 3	F 1						H 1	H 2	H 1	HC 11	C 2	CH 11	HC 11	HL 22	LH 31	LH 11	L 3	F 3	FF 11	F 1	F 1	
22	F 1		F 1	F 3	F 2	F 4	F 1	L 1	L 3	H 2	CH 11	C 2	C 1	L 4	L 8	L 5	LC 41	L 7	L 5	F 3	F 3	F 2	F 2	
23		F 2	FQ 31	F 4	F 3	F 3	F 2			C 1	C 5	C 2	C 2	C 2	L 2	LQ 31	L 4	L 3	L 5	F 5	F 5	FF 14	FF 33	F 5
24	F 4	F 2		F 1	F 2	F 2	F 1	C 1		C 2	C 4	C 2	C 2	C 2	CQ 21	LQ 41	L 7	L 4	LQ 41	F 4	F 5	F 2	F 1	
25		F 3	F 6	F 1	F 1	F 1	F 1	L 1	CL 13						C 1	C 3	L 2	L 2	L 2	F 2	F 2	F 1	F 1	F 1
26	F 1			F 2	F 3	F 2	F 1	CL 21	C 1	C 1	C 2	C 3	LQ 11	C 2	L 2	L 2	L 4	LH 11	LQ 51	F 4	F 2	F 1	F 1	F 1
27	F 2								H 2		H 1	HC 11	C 2	L 3	L 3	L 5	L 5	L 3	L 2	F 5	F 4	F 2	F 1	F 1
28	F 1				F 1	F 1			H 2		H 1	H 1	L 3	HL 11	L 2		LQ 31	LQ 41	LQ 31	F 2	FF 11	F 1		
29		F 1	F 1	F 1	F 1		F 1	C 1	HC 11	H 1	H 1	HL 11	HL 12	L 4	L 4		L 4	L 2	L 8	F 4	F 1	K 1	F 2	F 2
30	F 1					F 1	F 2	L 1	H 2	H 2	H 1	H 2	C 2	CL 11	L 2	H 1	L 2	L 2	L 2	F 3	F 3	FF 11	F 1	
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

NOV. 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

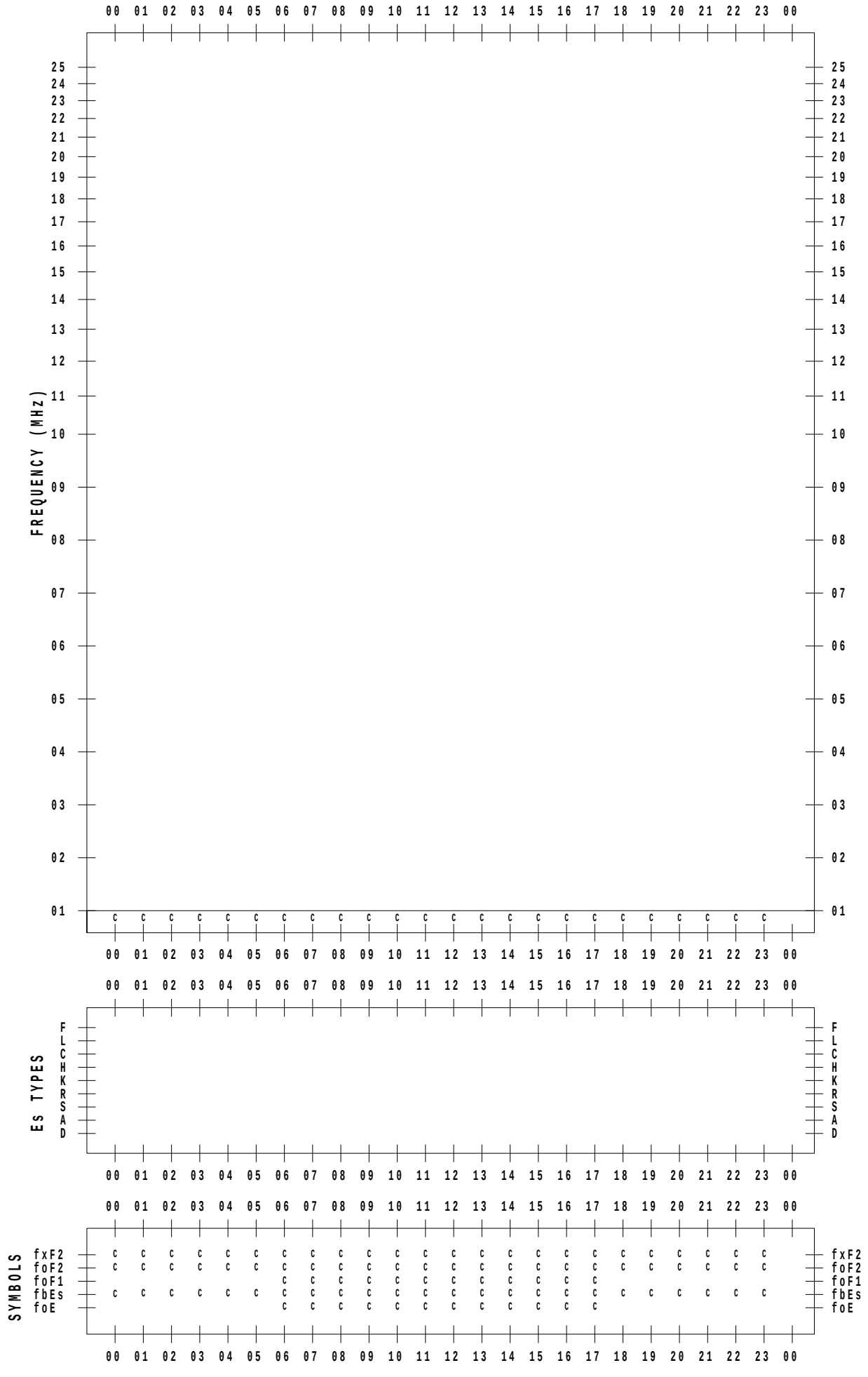
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/ 1

135 °E MEAN TIME



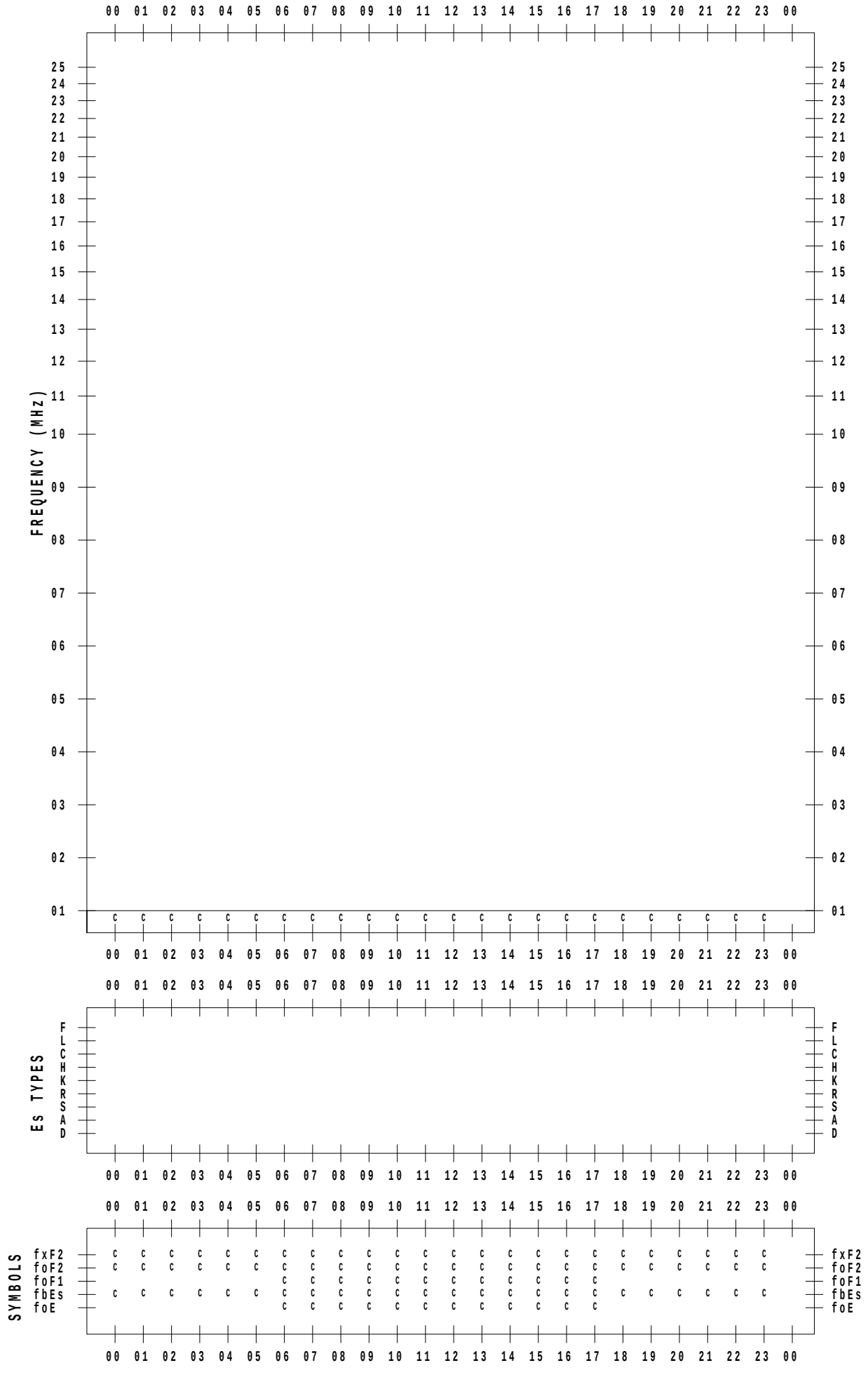
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/ 2

135 °E MEAN TIME



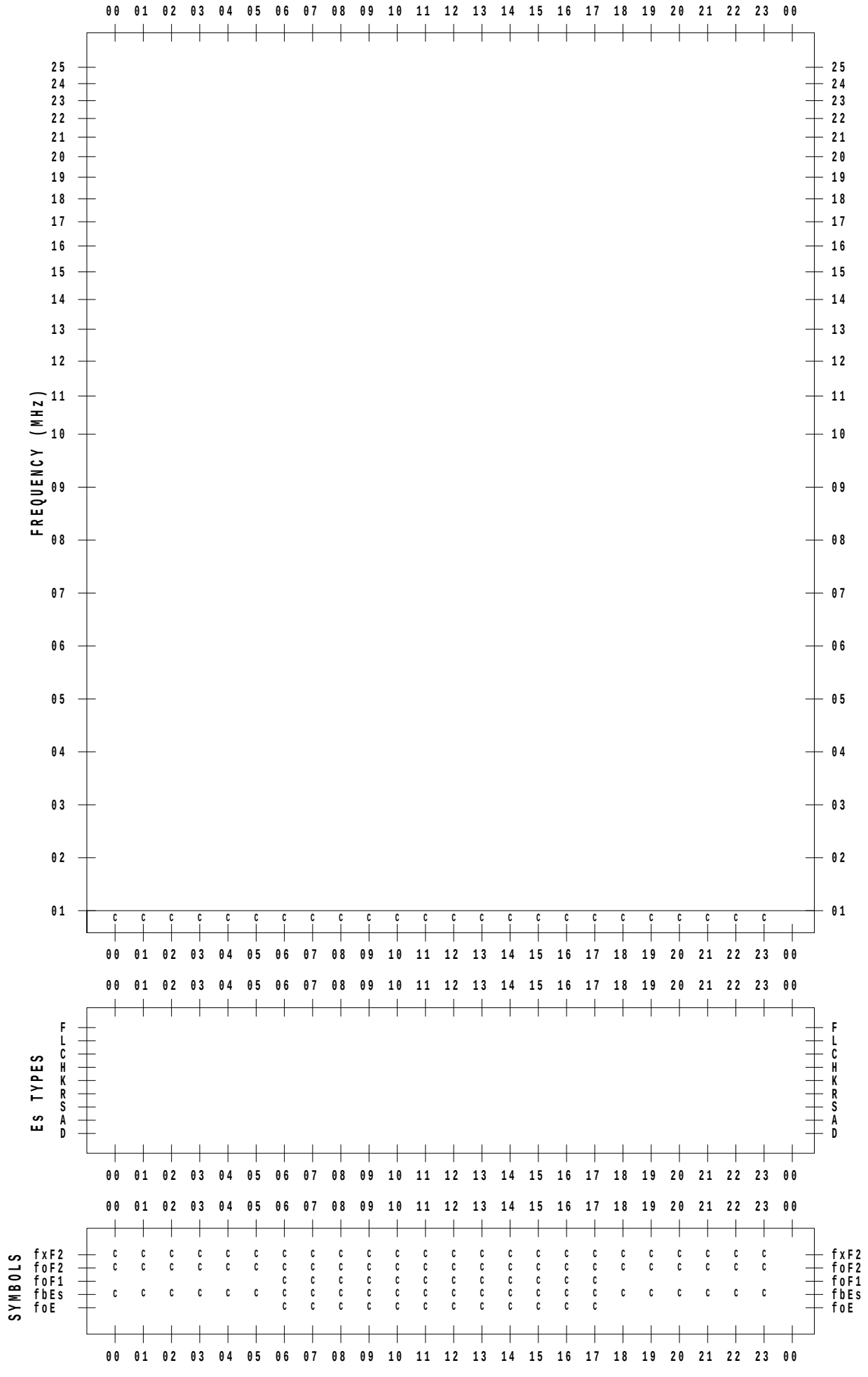
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/ 3

135 °E MEAN TIME



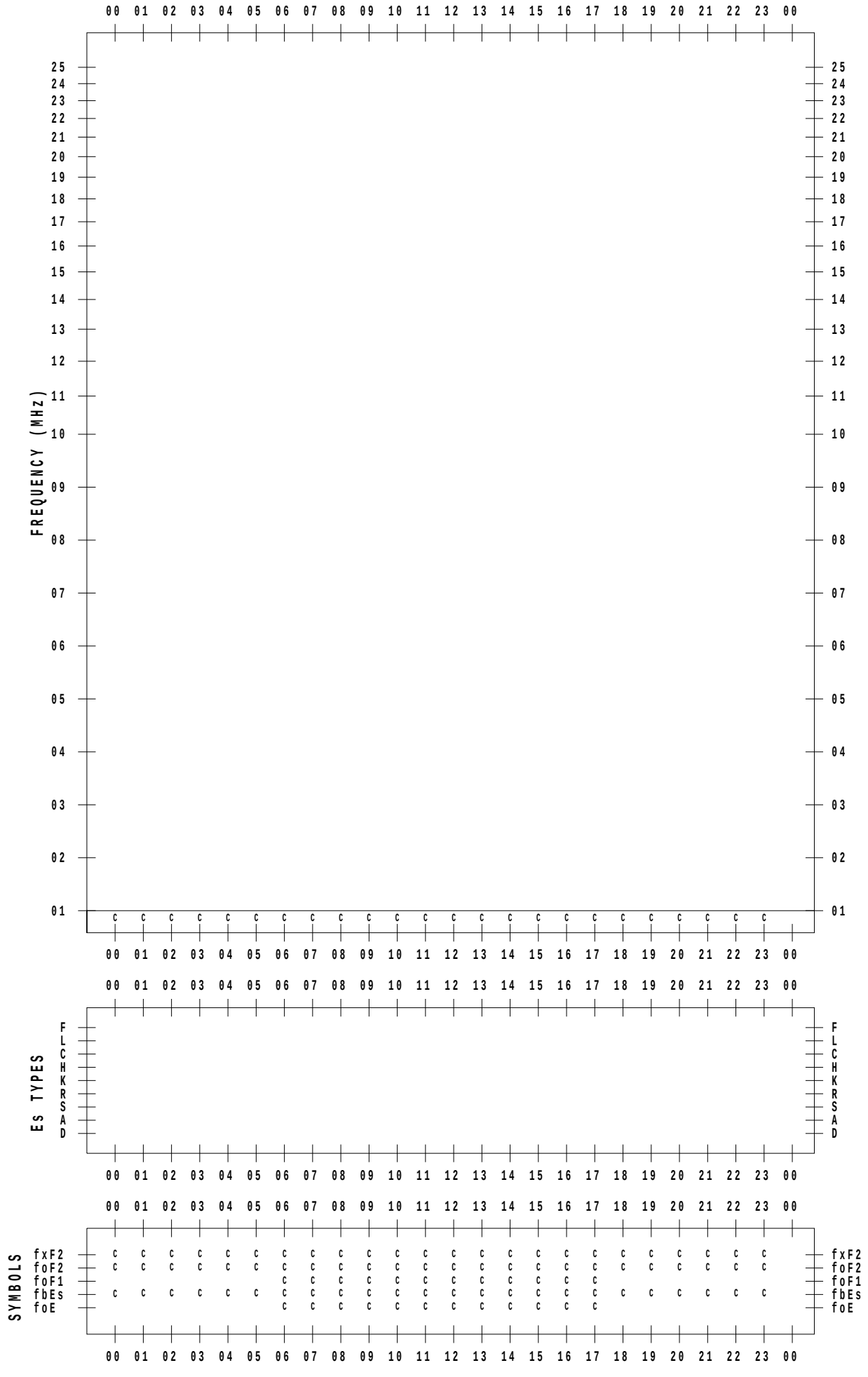
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/ 4

135 °E MEAN TIME



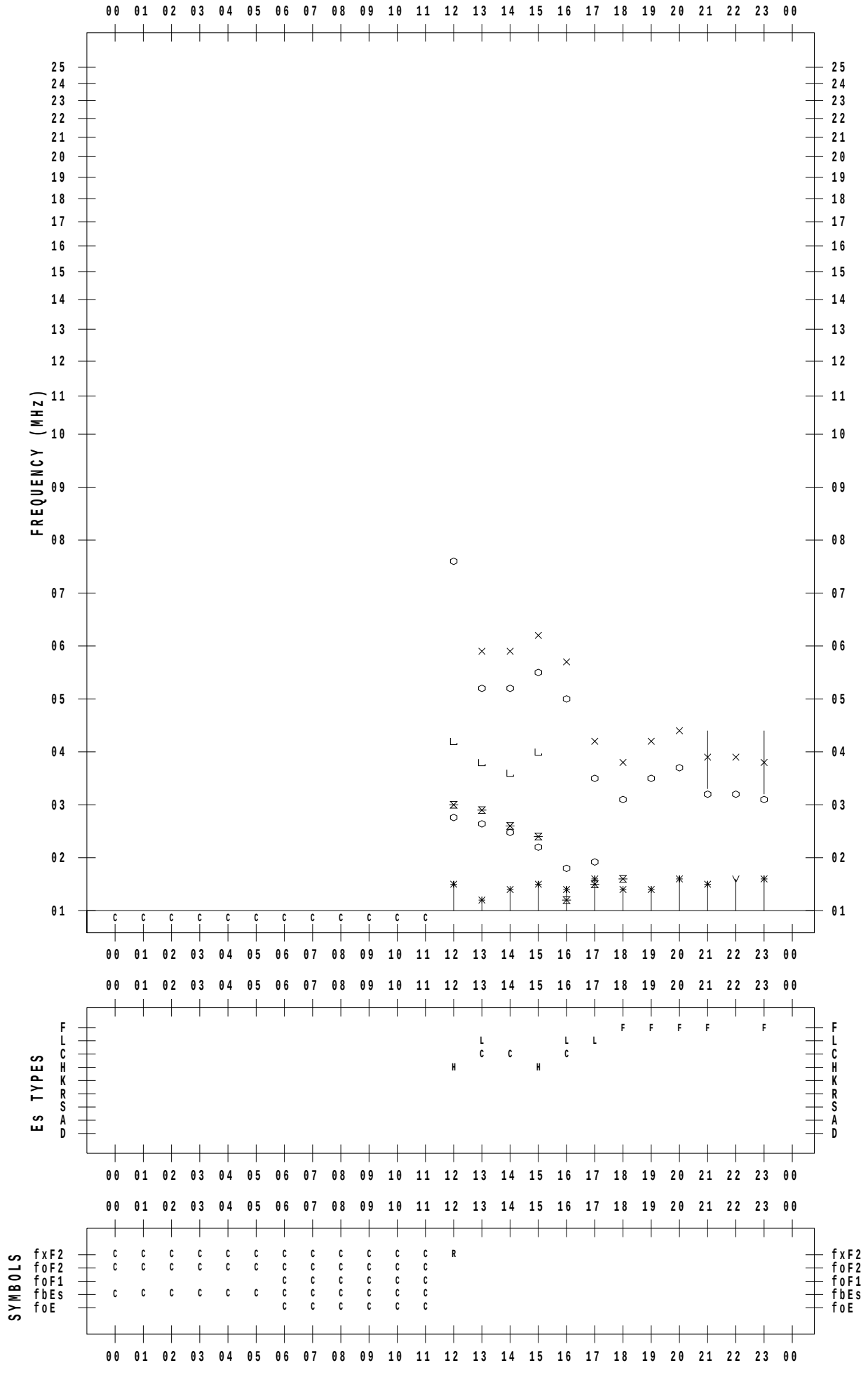
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/ 5

135 °E MEAN TIME



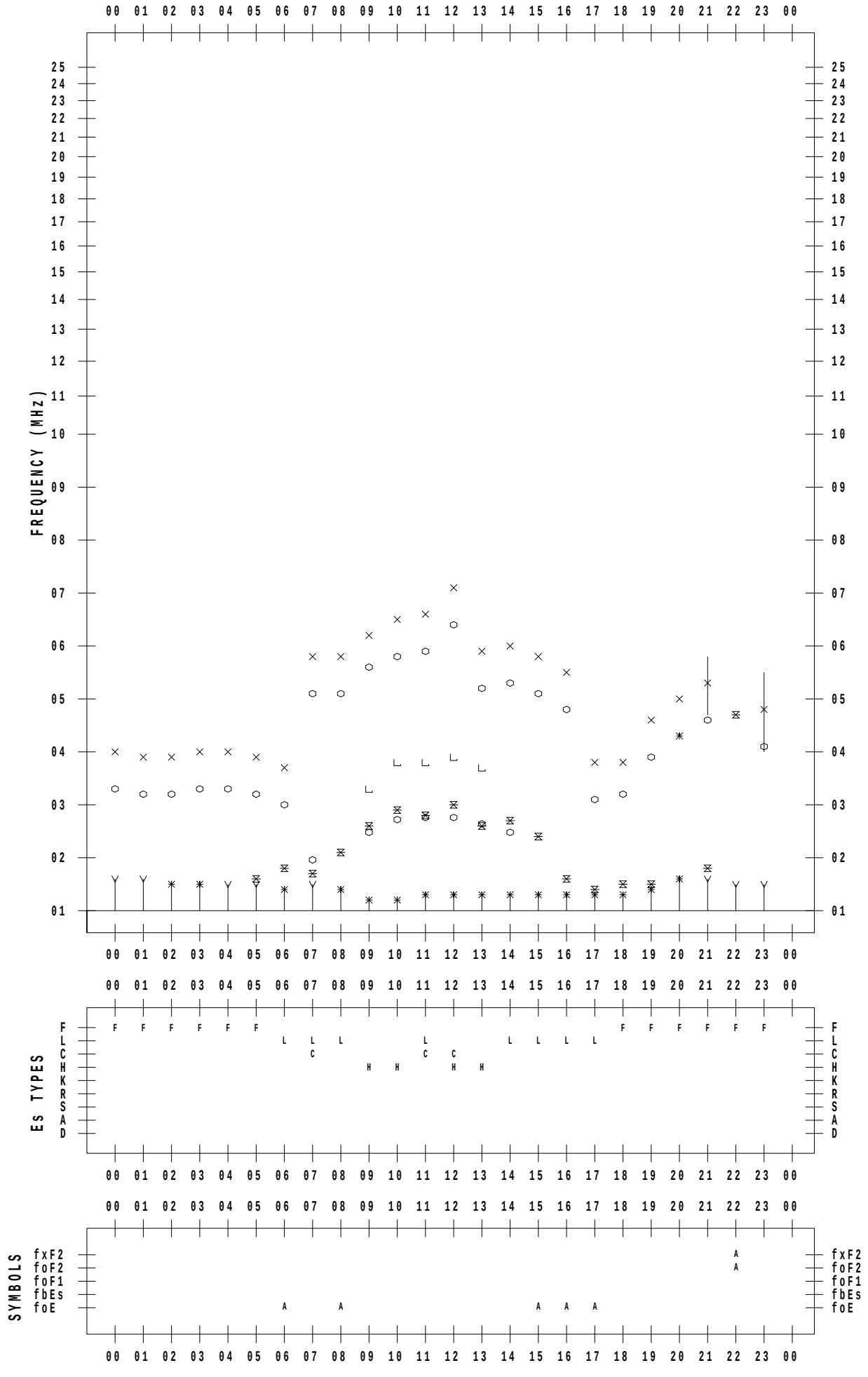
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/ 6

135 °E MEAN TIME



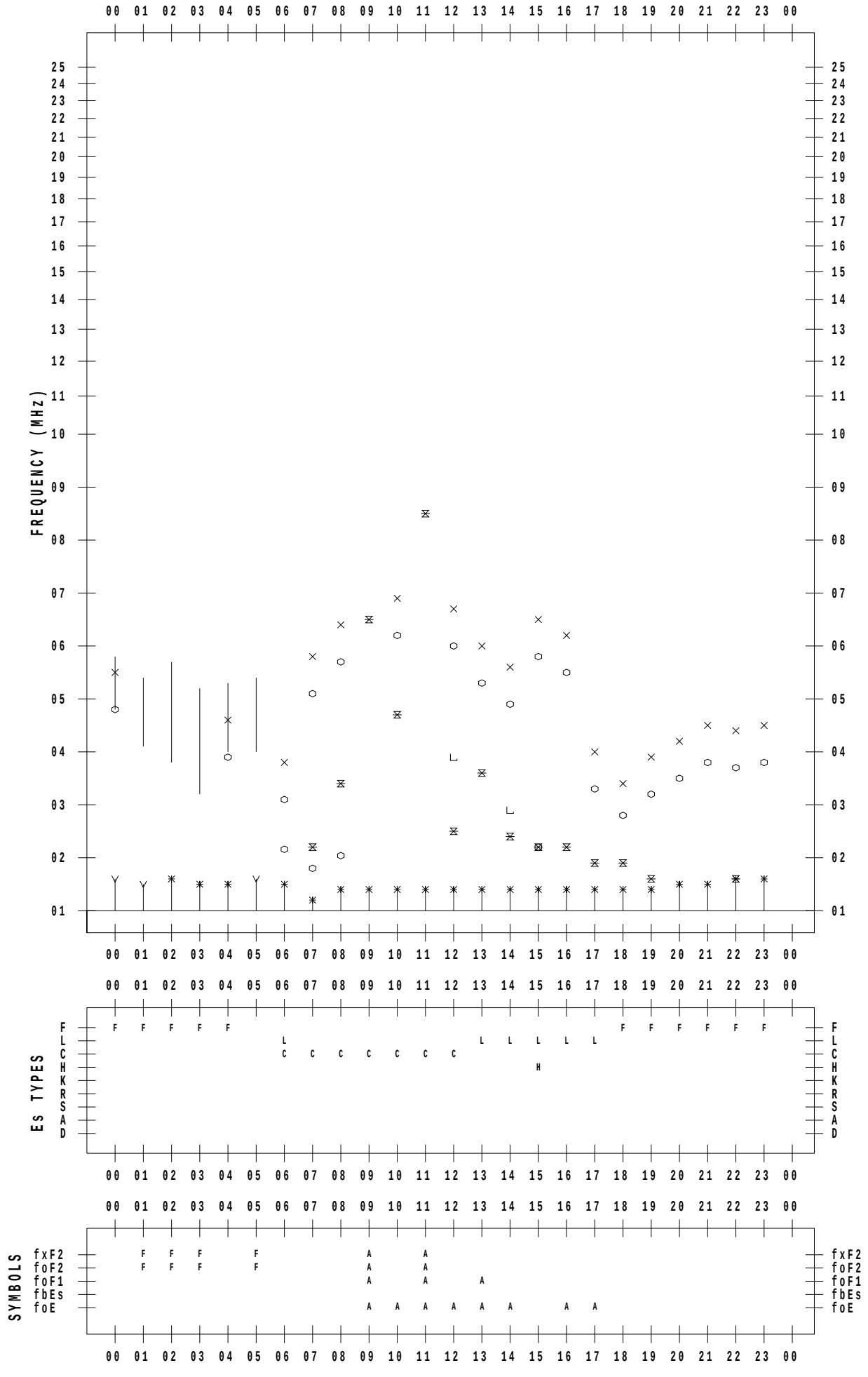
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/ 7

135 °E MEAN TIME



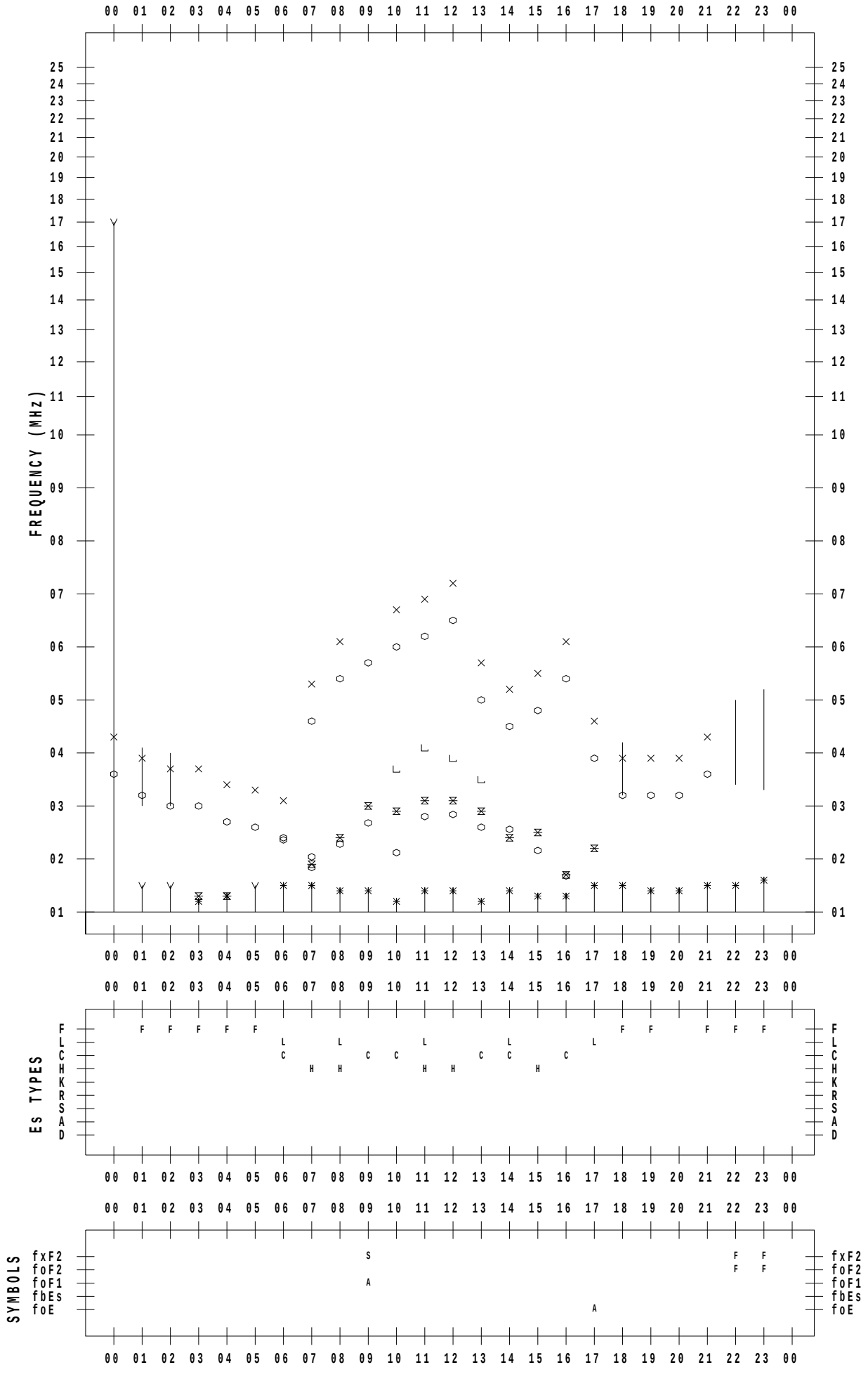
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/ 8

135 °E MEAN TIME



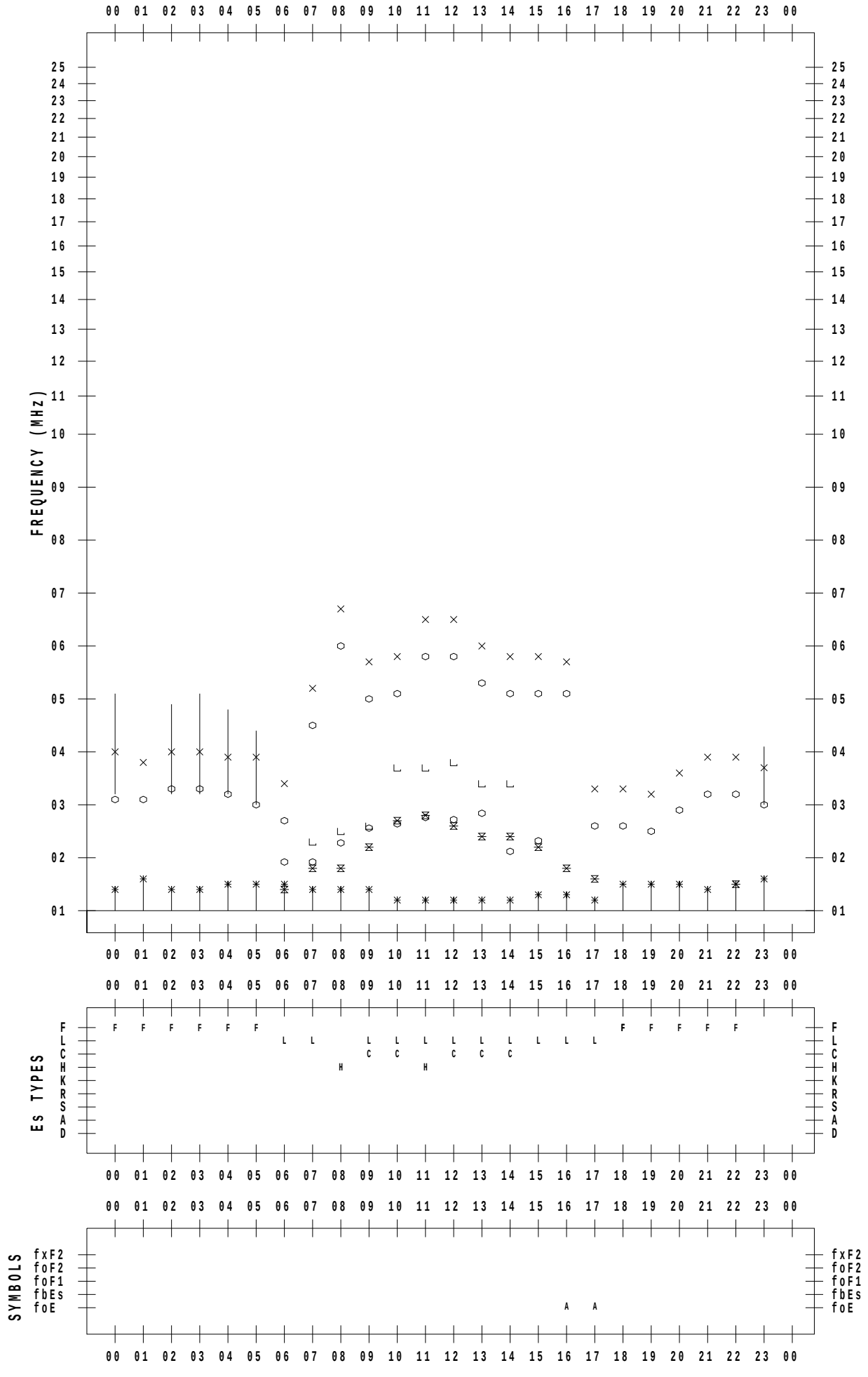
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/ 9

135 °E MEAN TIME



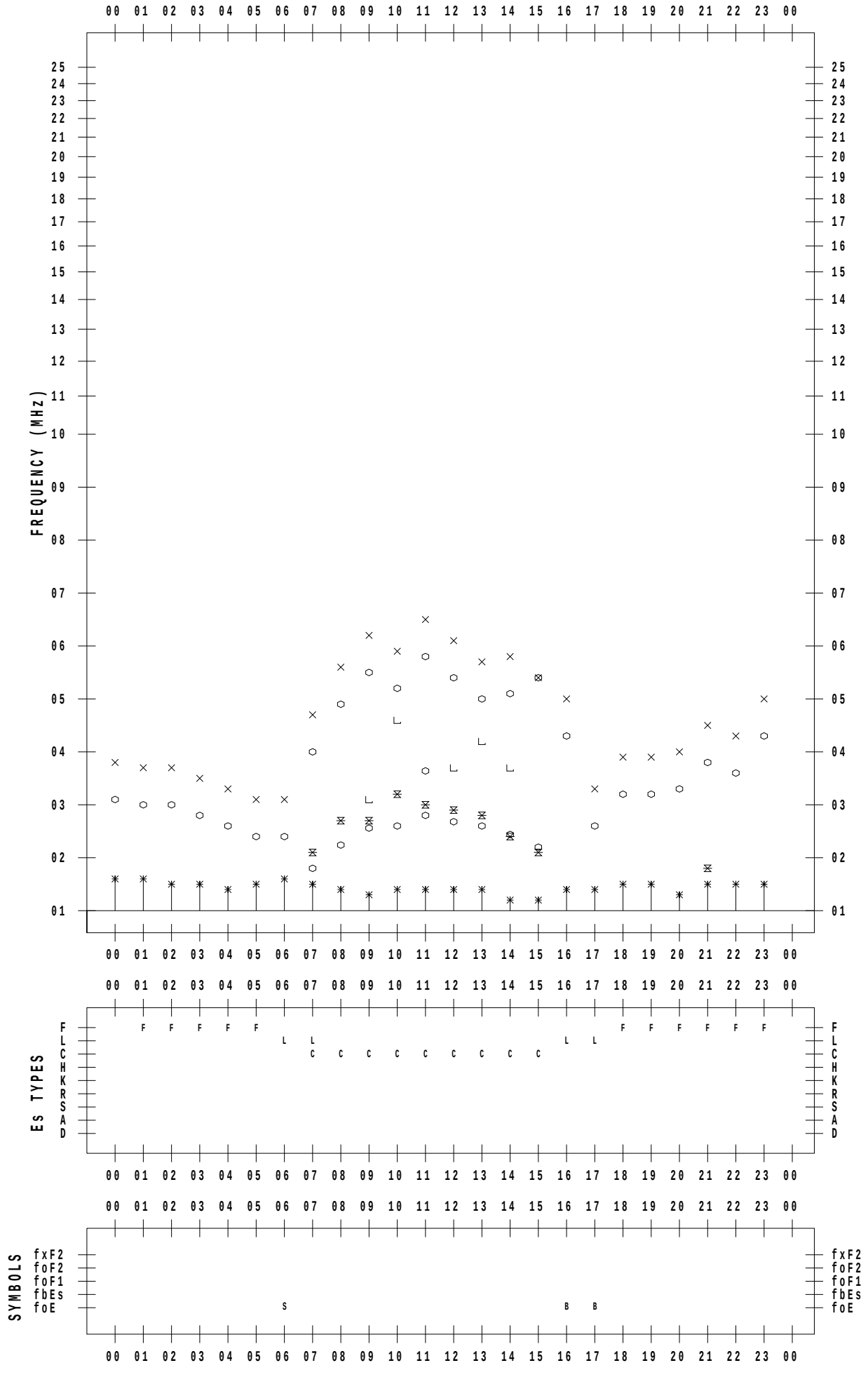
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/10

135 °E MEAN TIME



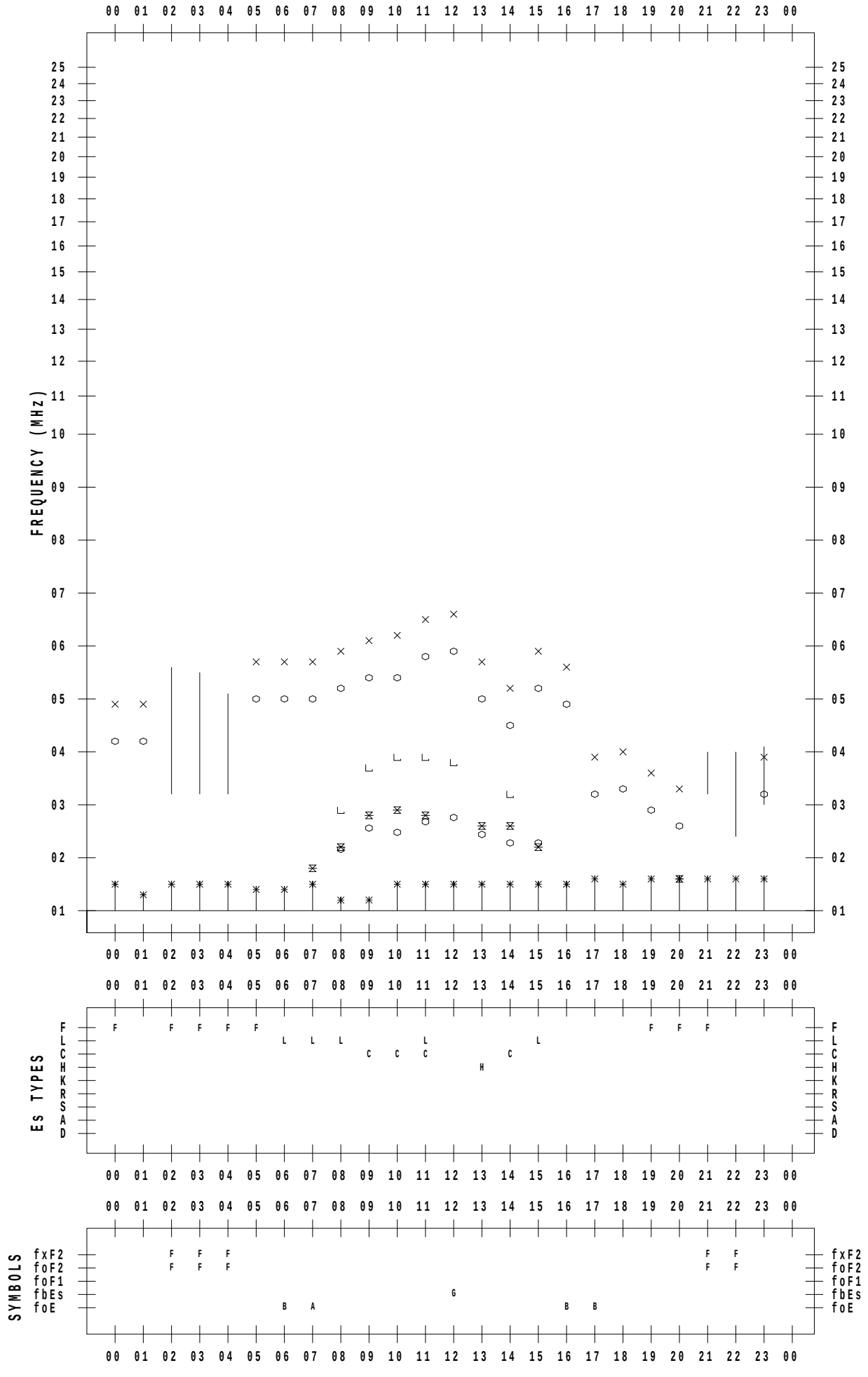
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/11

135 °E MEAN TIME



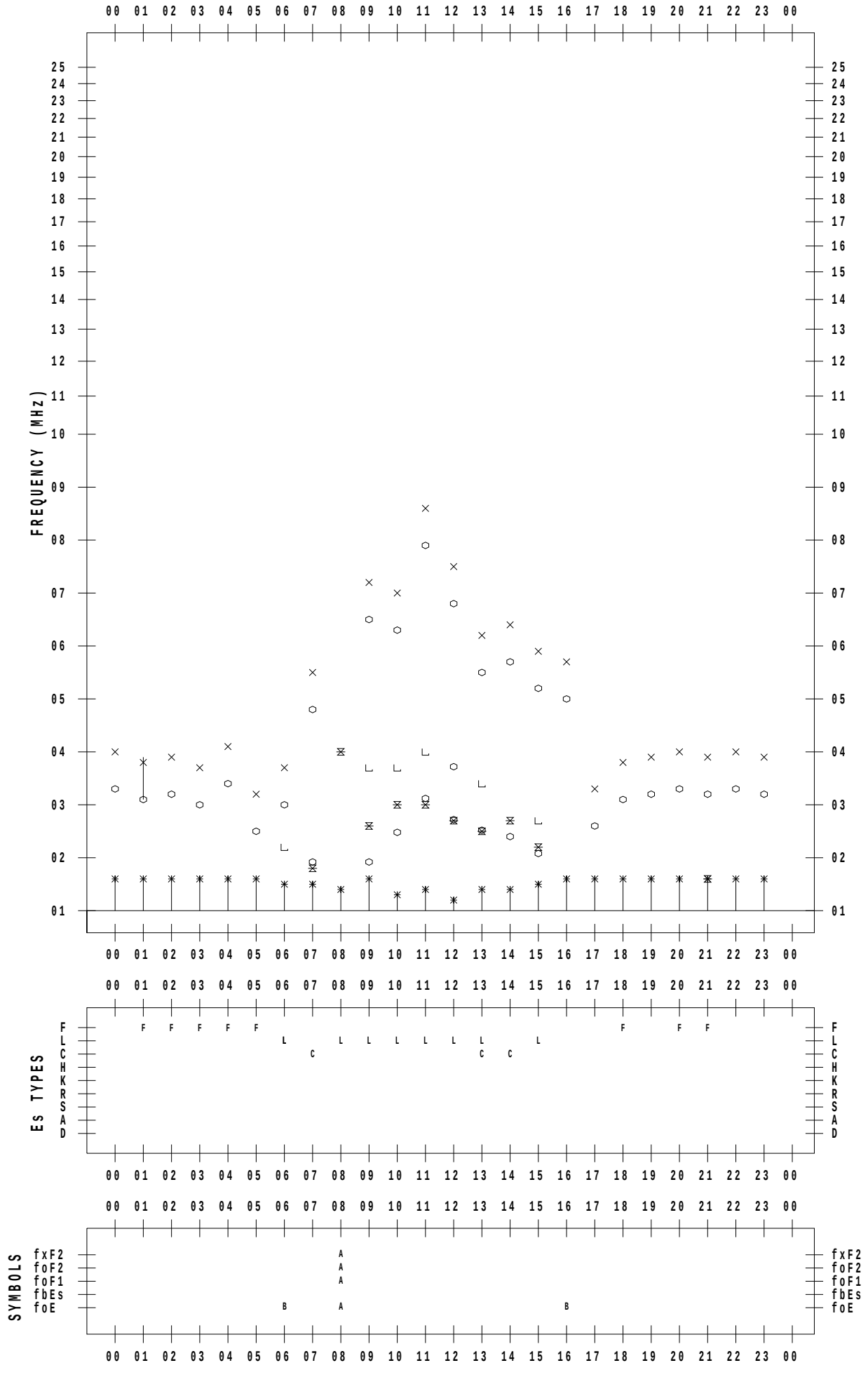
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/12

135 °E MEAN TIME



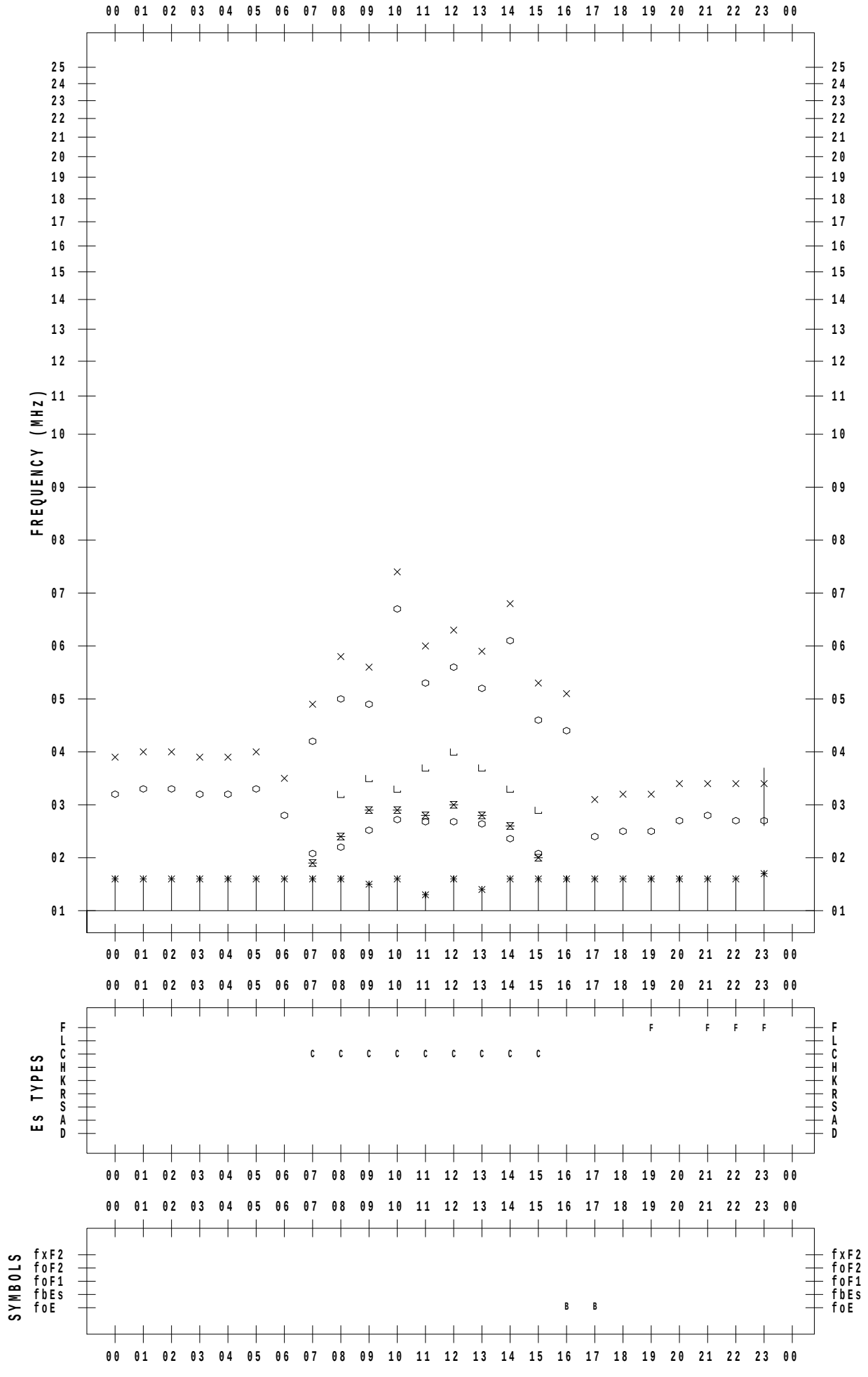
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/13

135 °E MEAN TIME



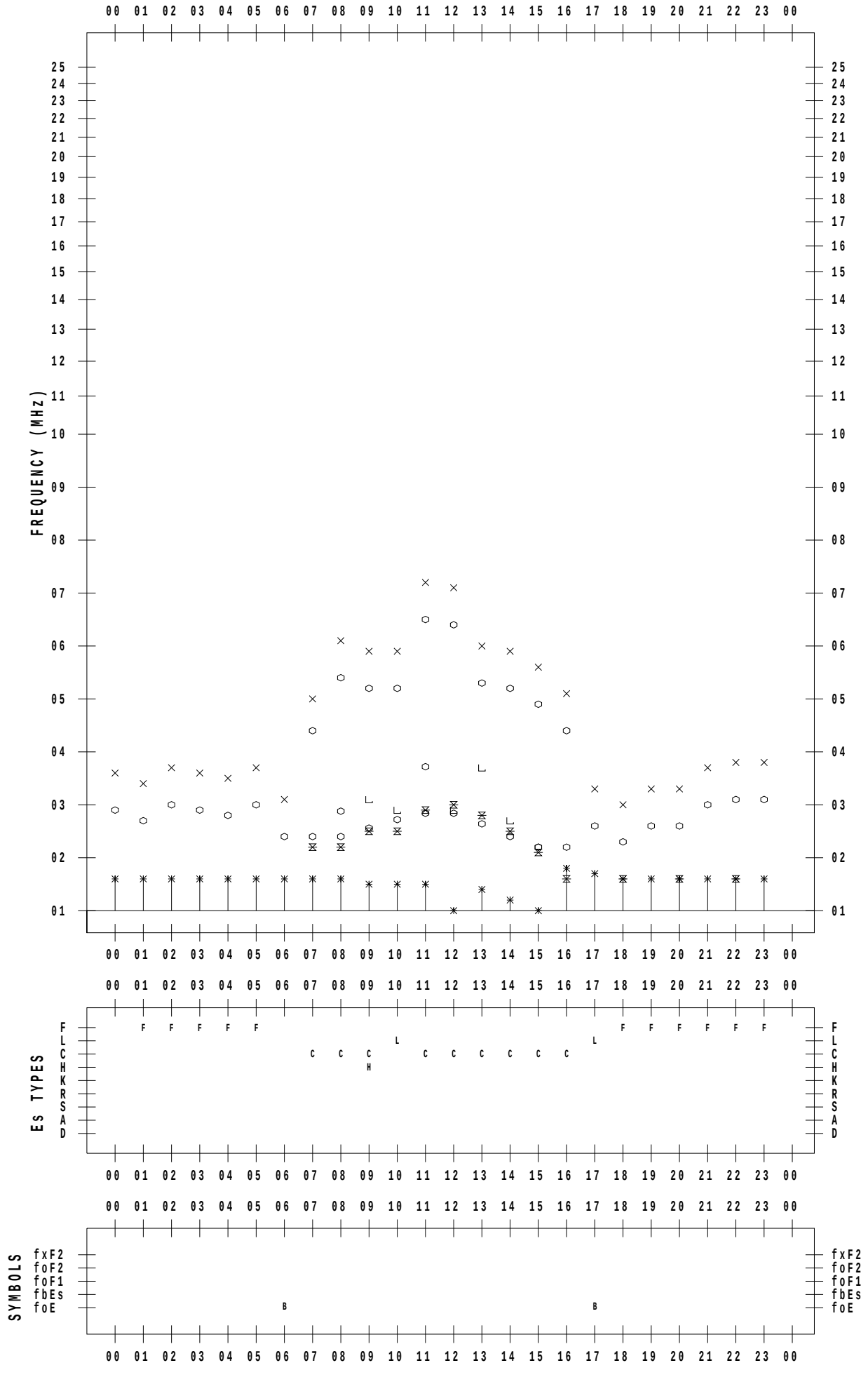
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/14

135 °E MEAN TIME



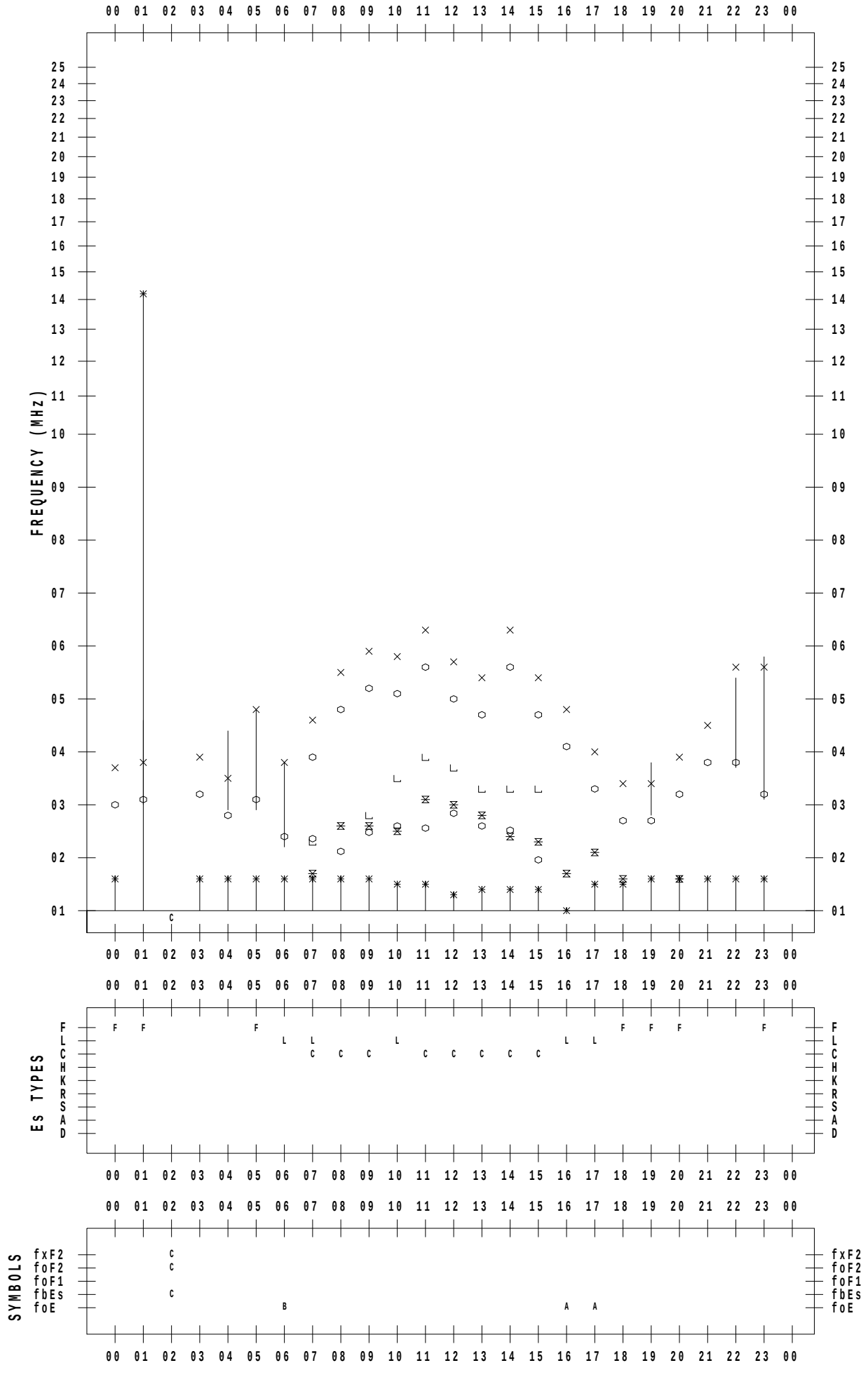
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/15

135 °E MEAN TIME



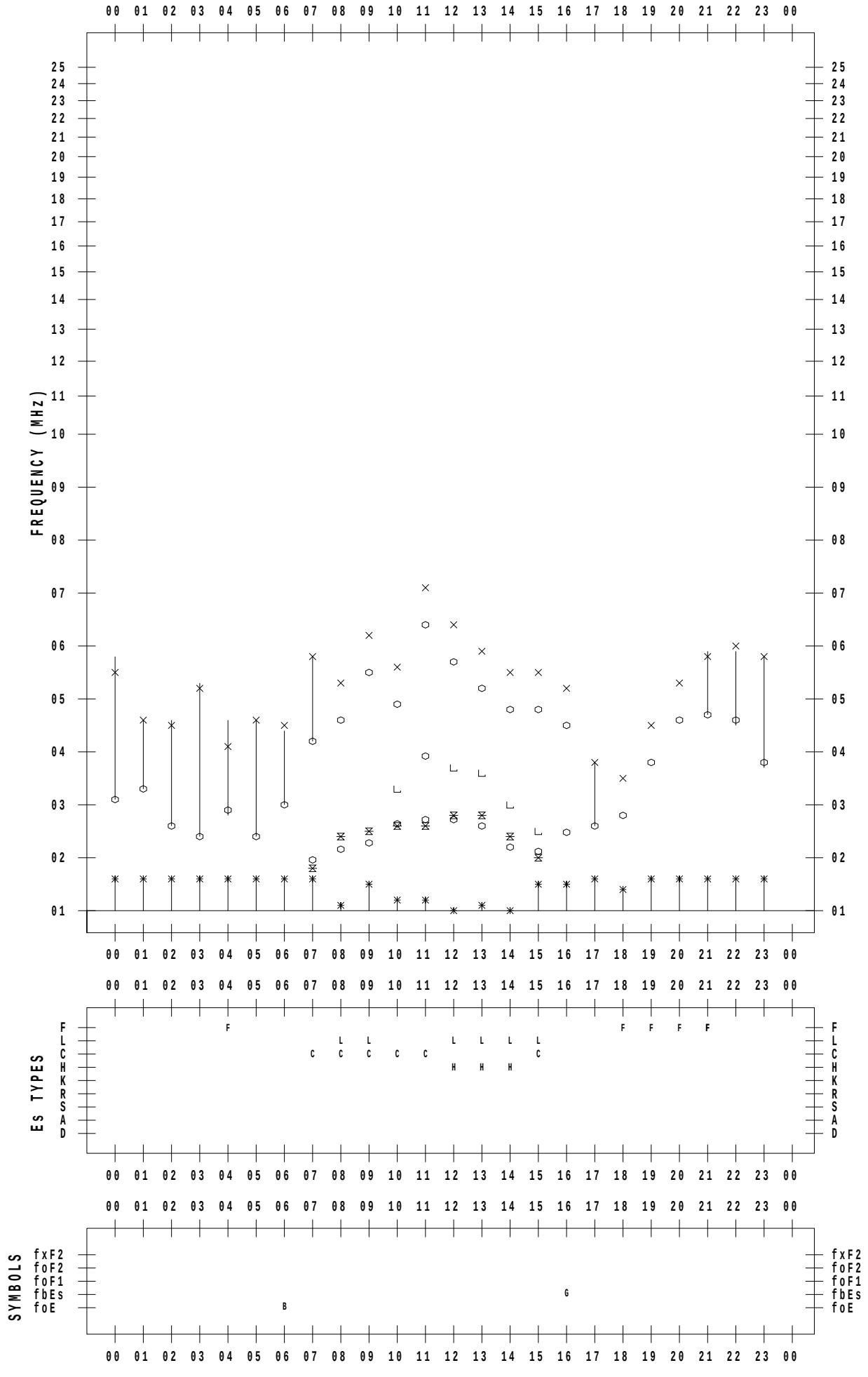
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/16

135 °E MEAN TIME



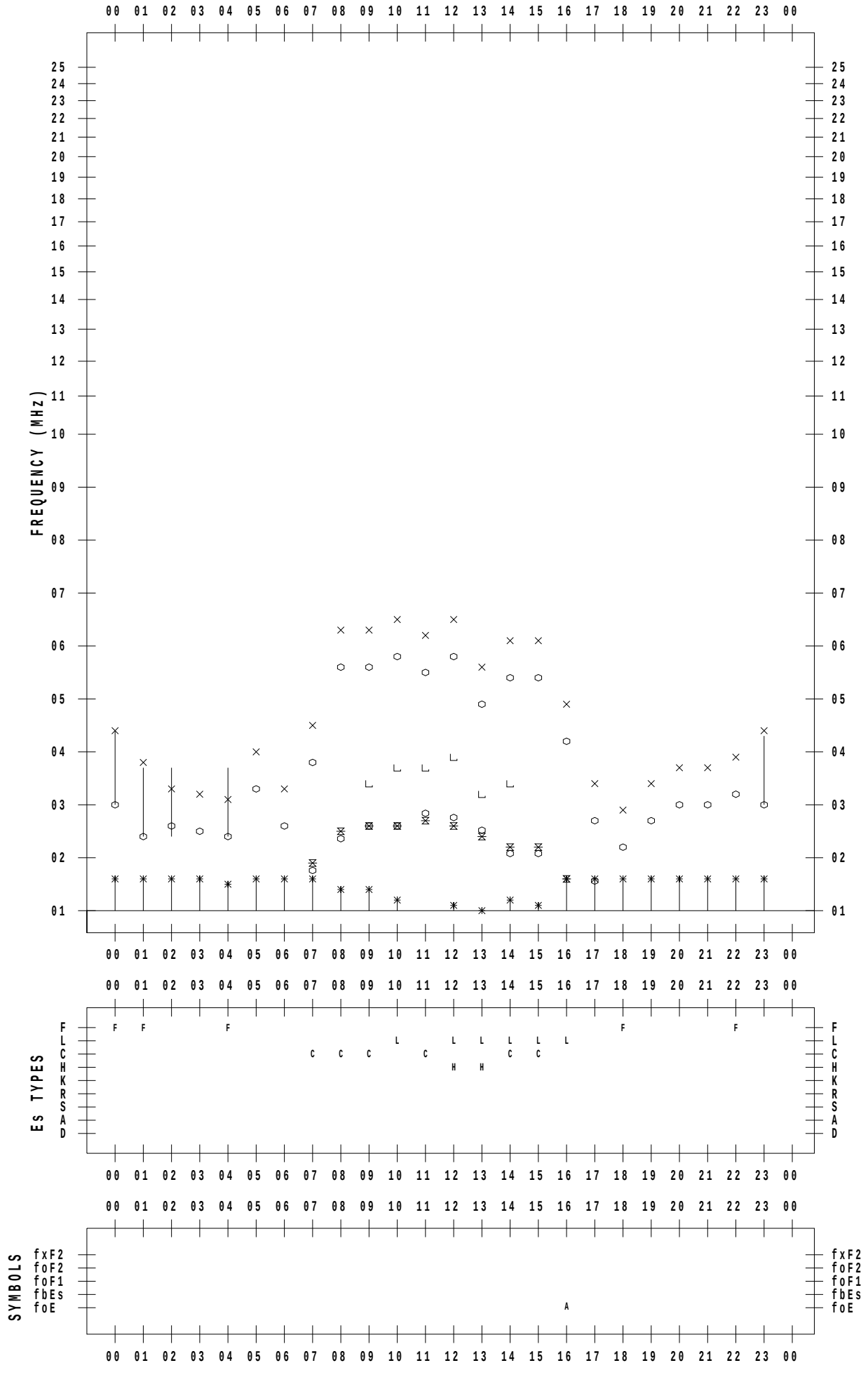
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/17

135 °E MEAN TIME



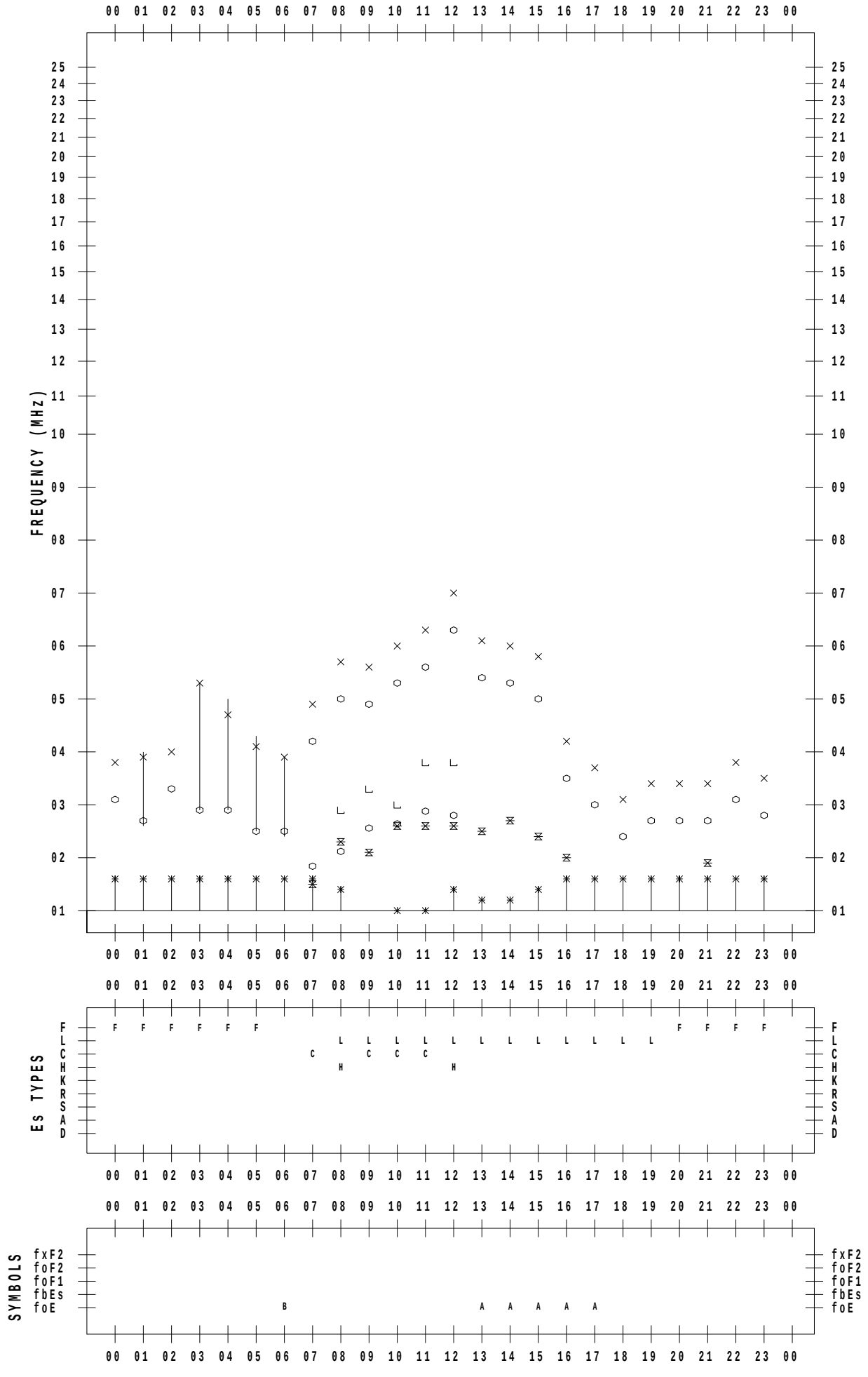
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/18

135 °E MEAN TIME



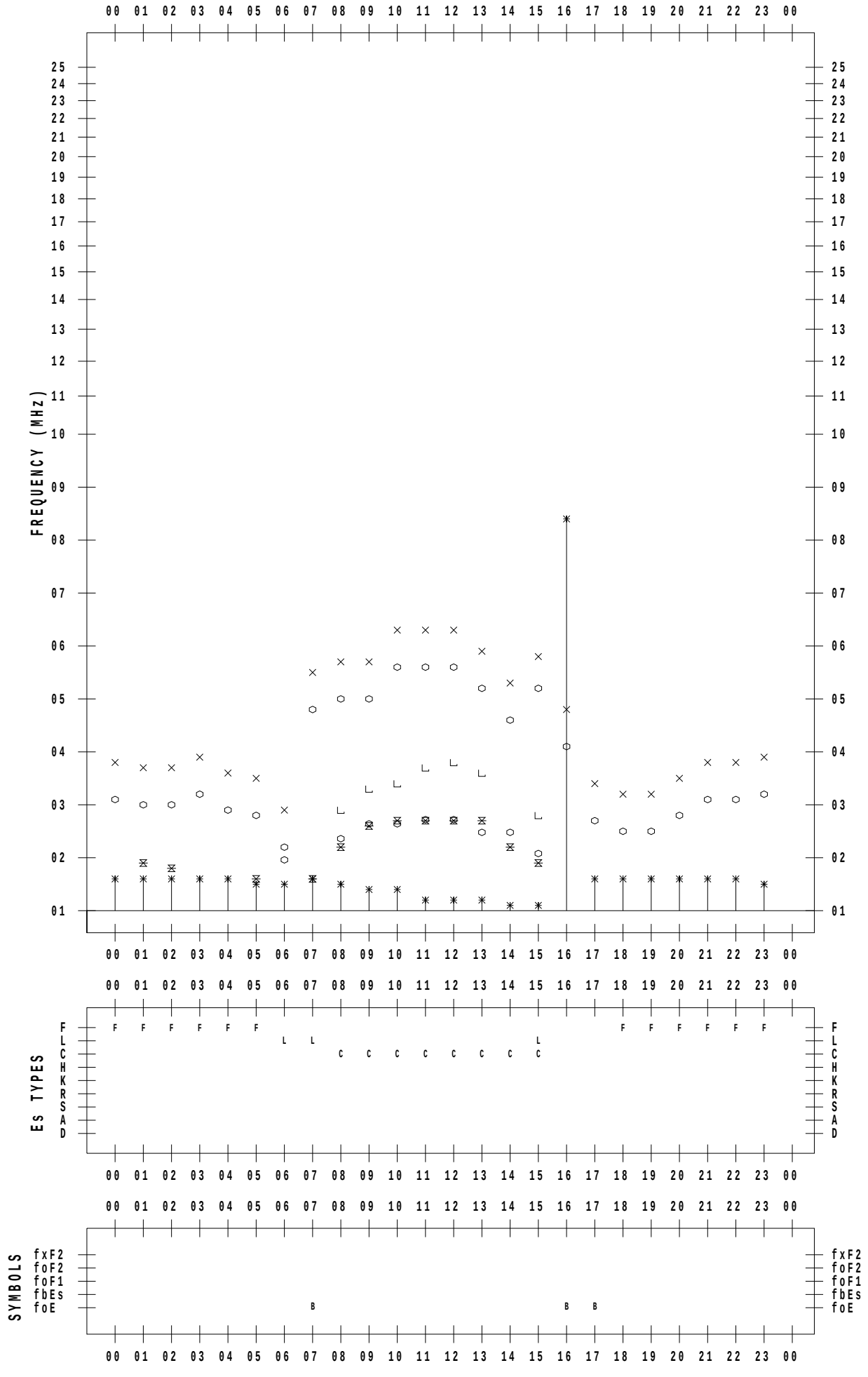
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/19

135 °E MEAN TIME



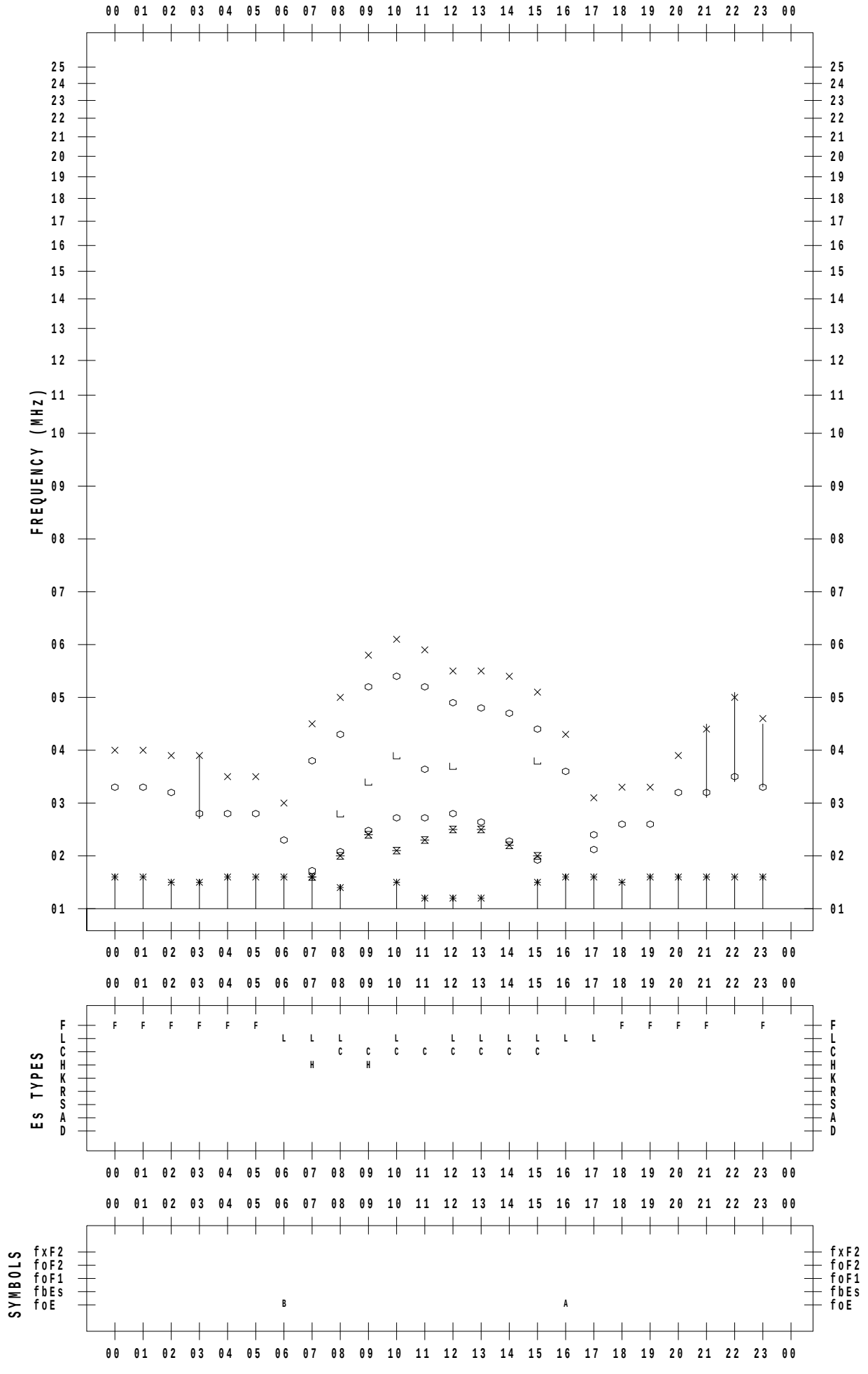
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/20

135 °E MEAN TIME



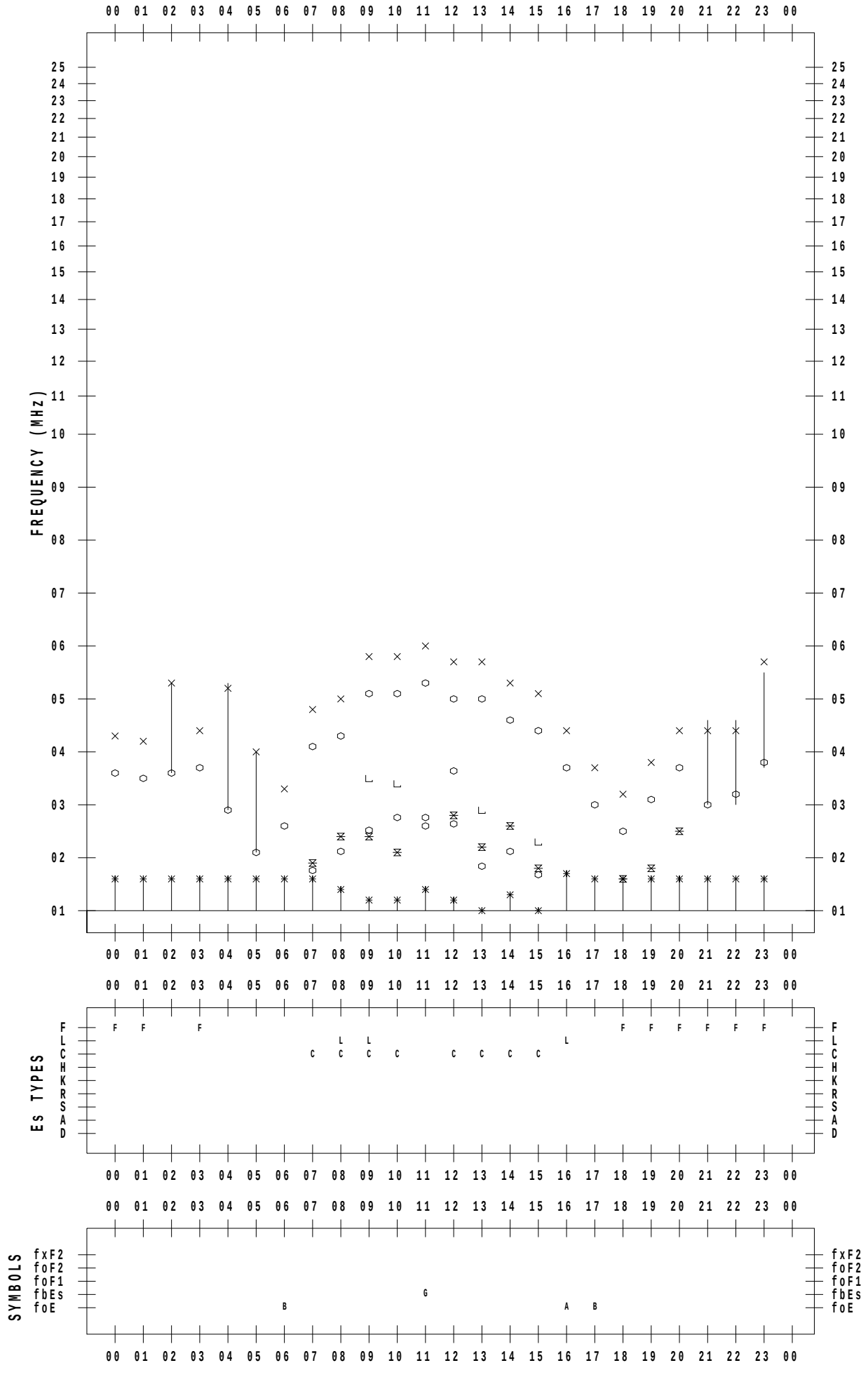
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/21

135 °E MEAN TIME



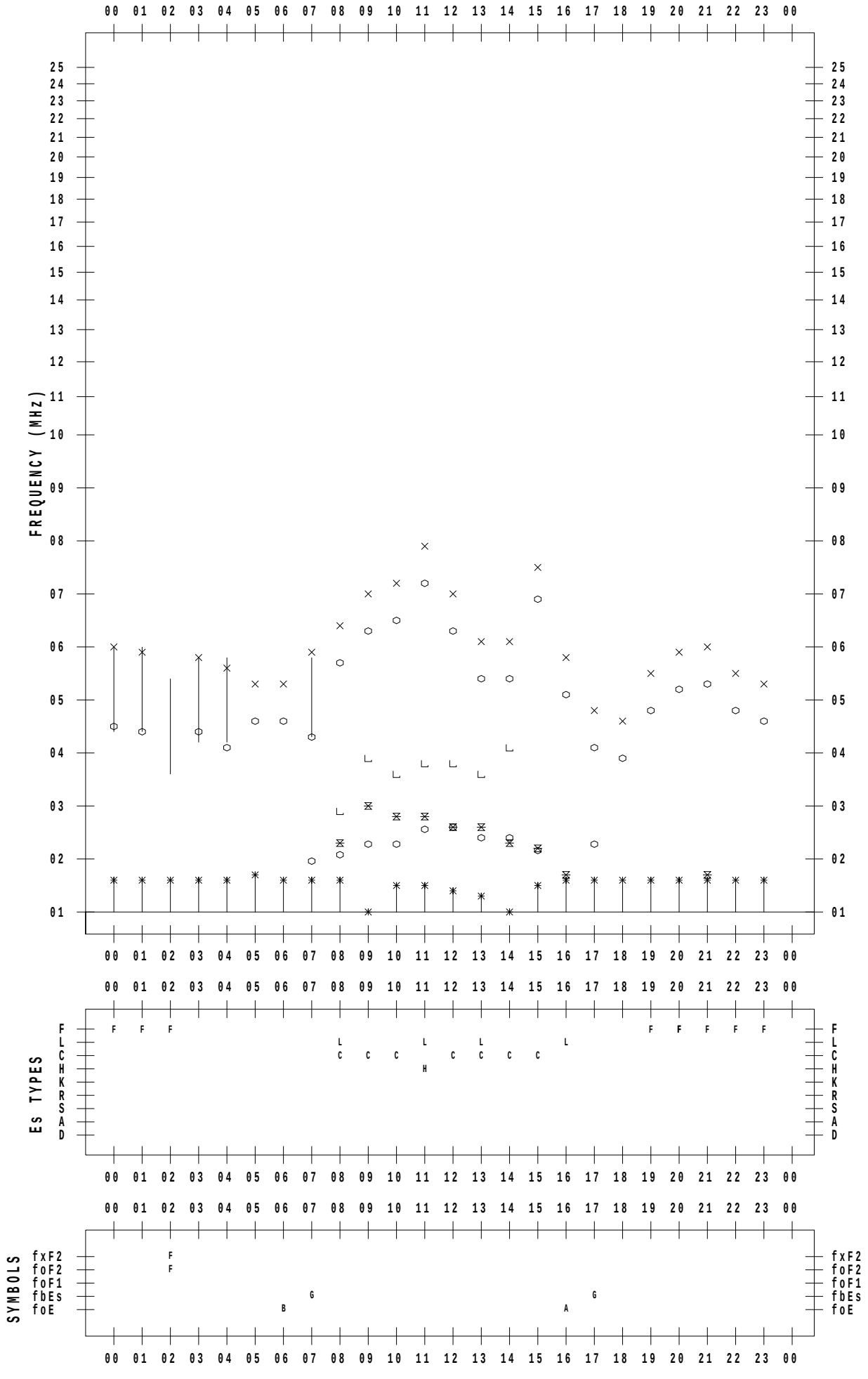
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/22

135 °E MEAN TIME



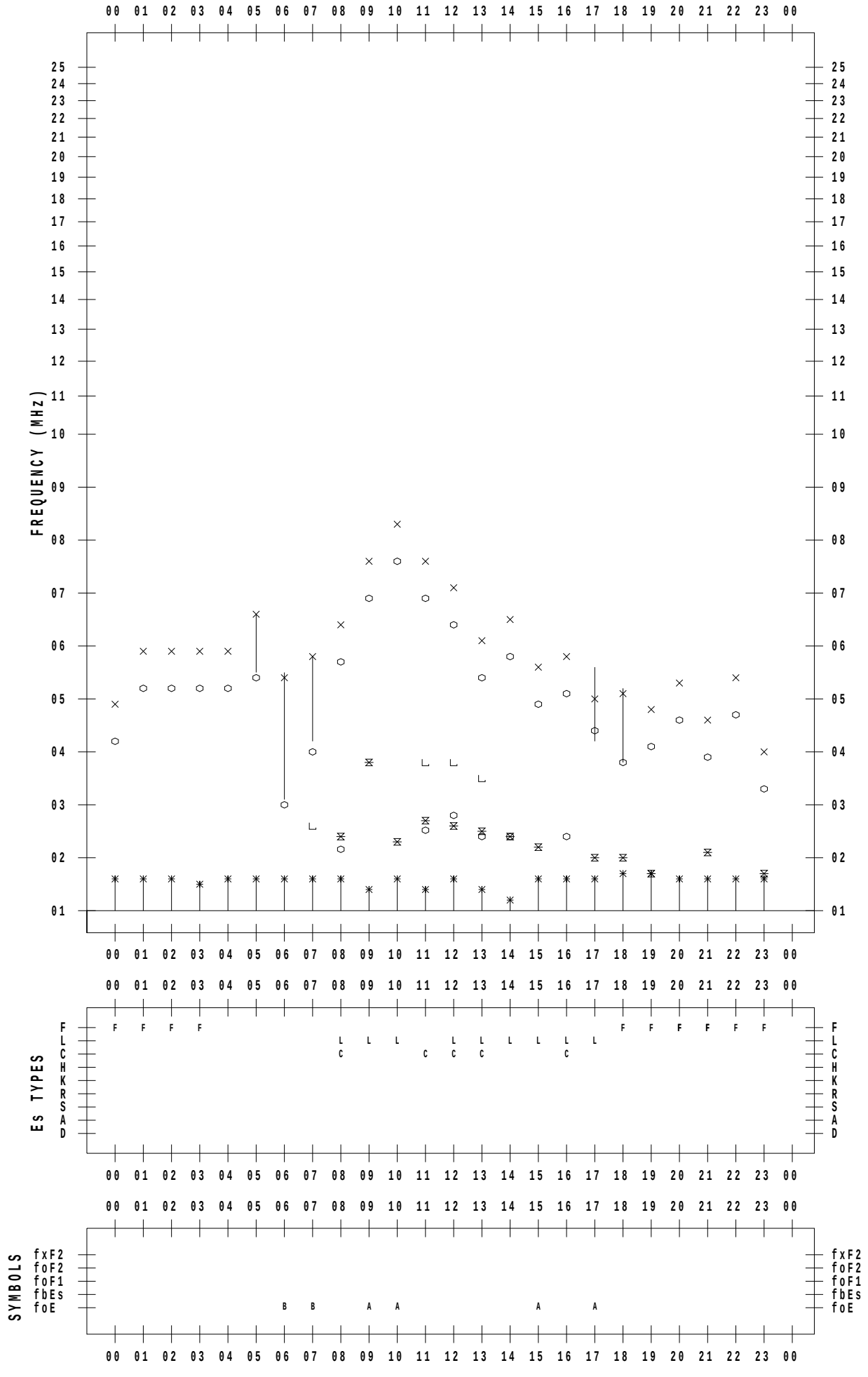
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/23

135 °E MEAN TIME



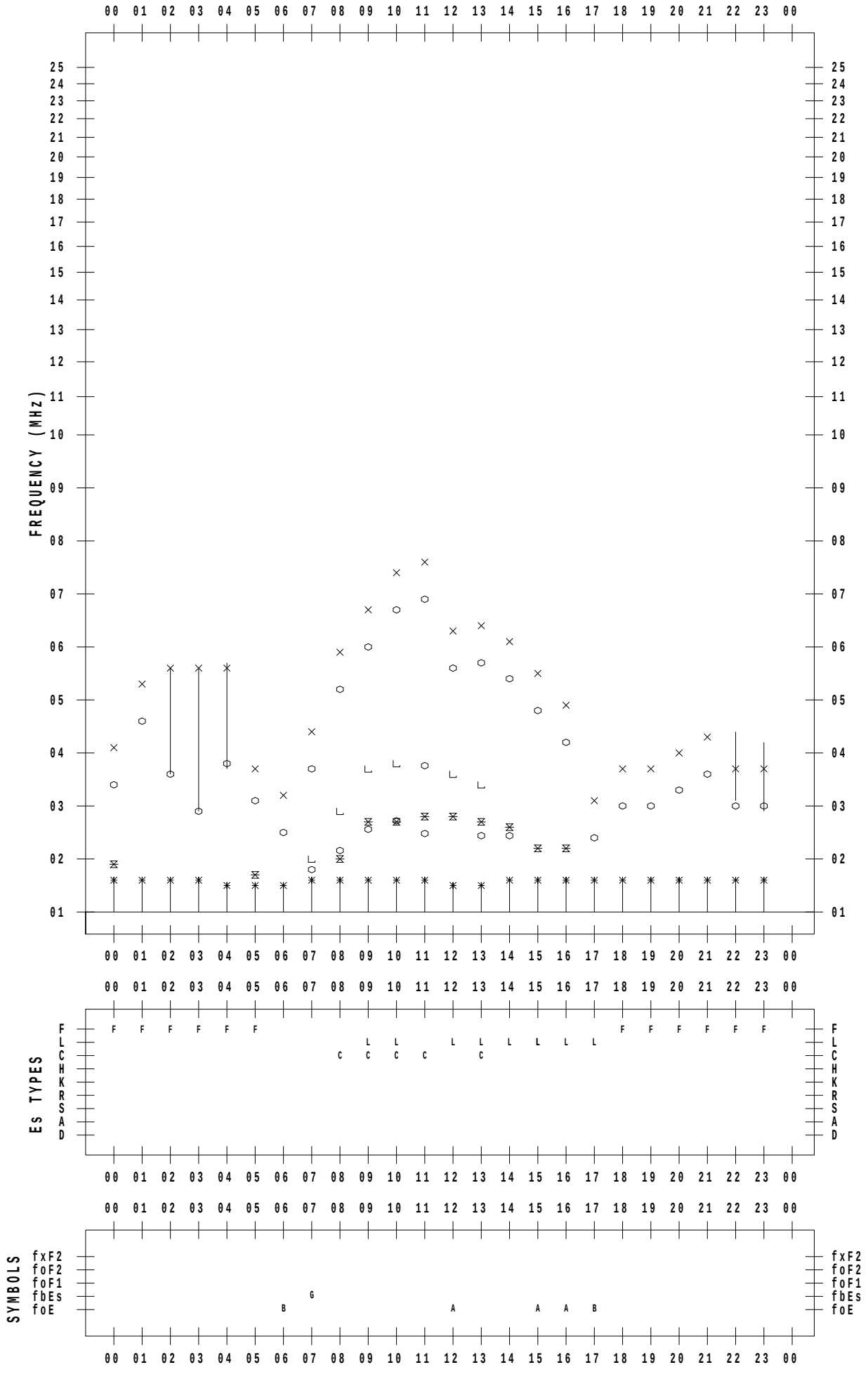
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/24

135 °E MEAN TIME



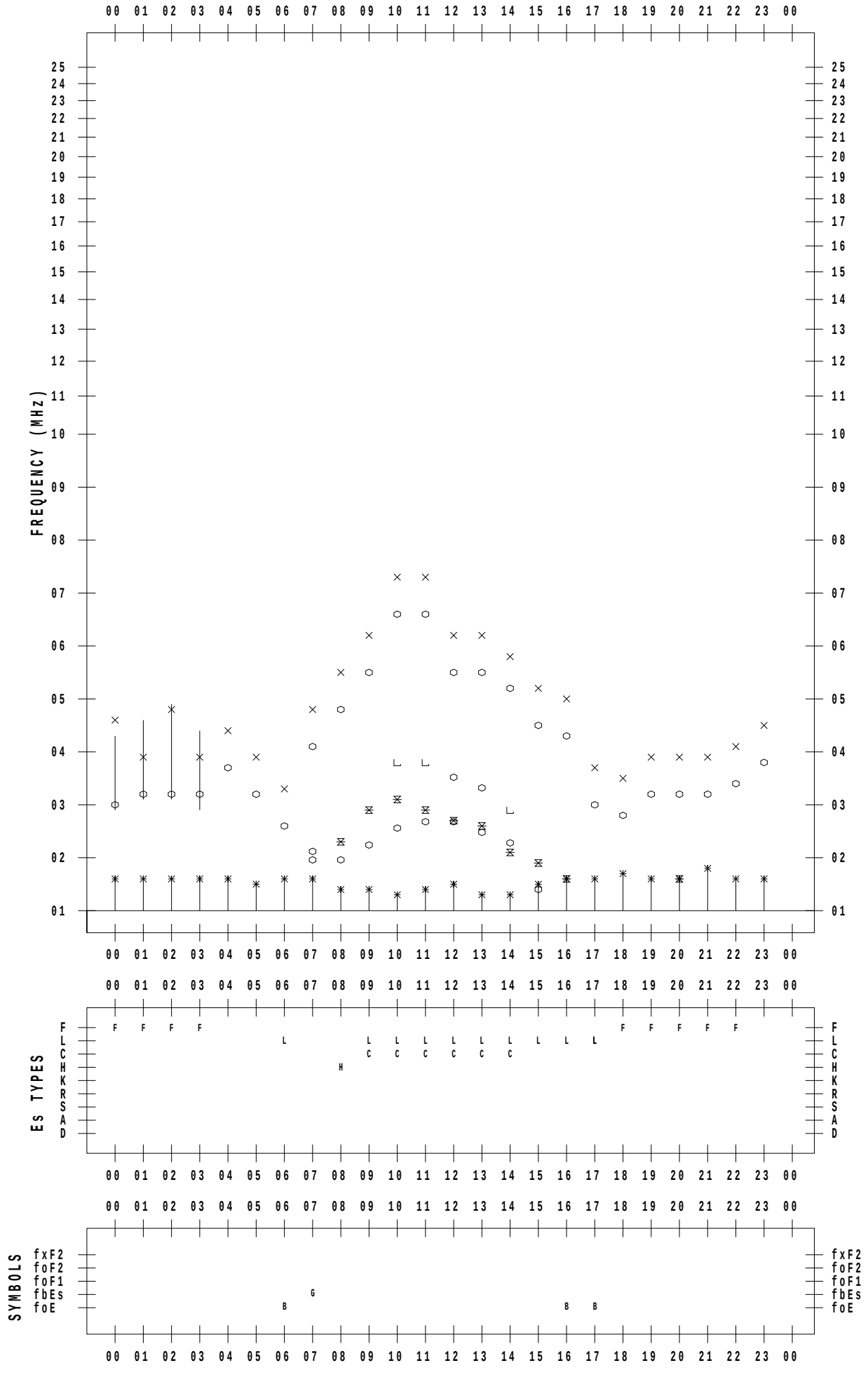
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/25

135 °E MEAN TIME



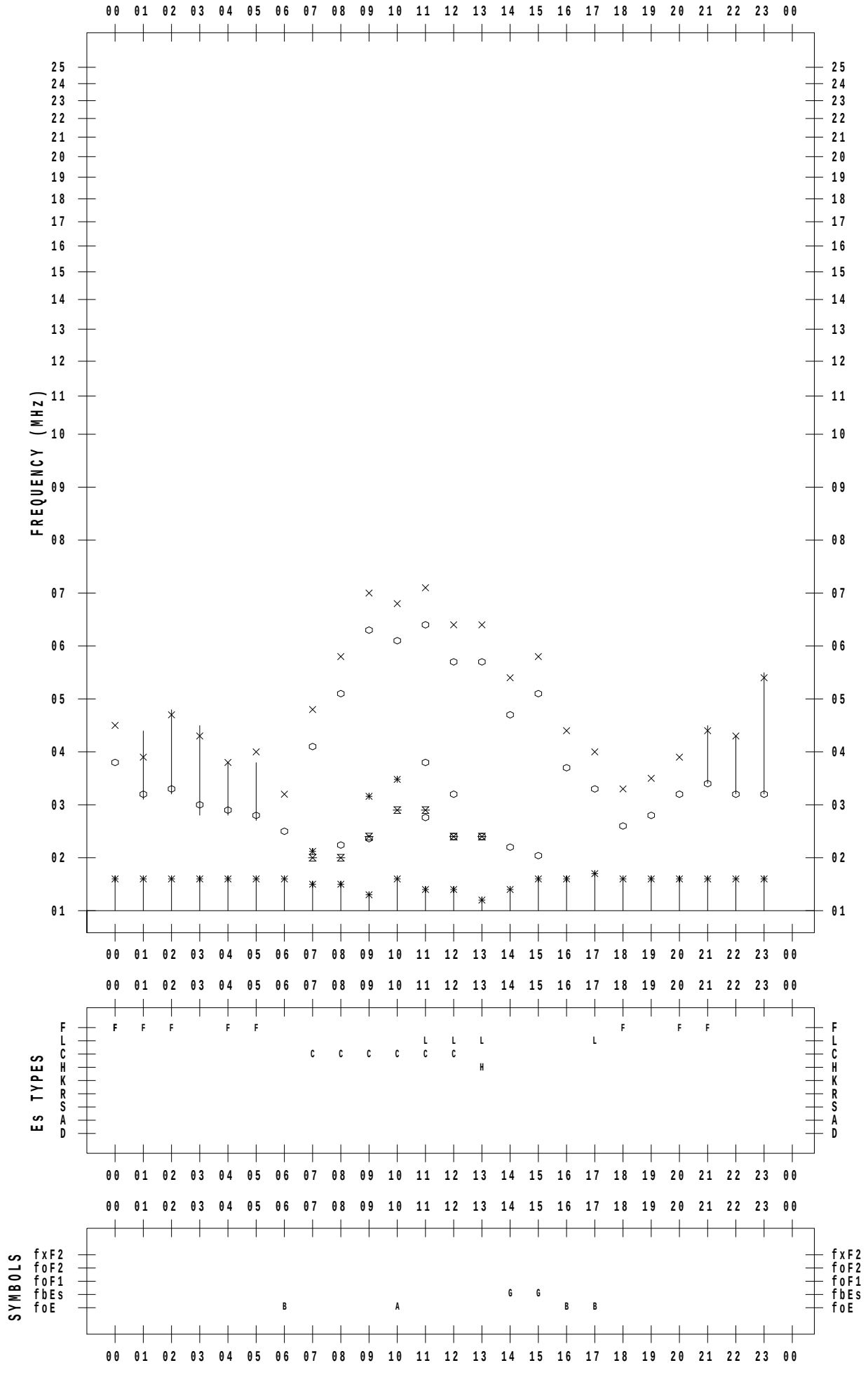
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/26

135 °E MEAN TIME



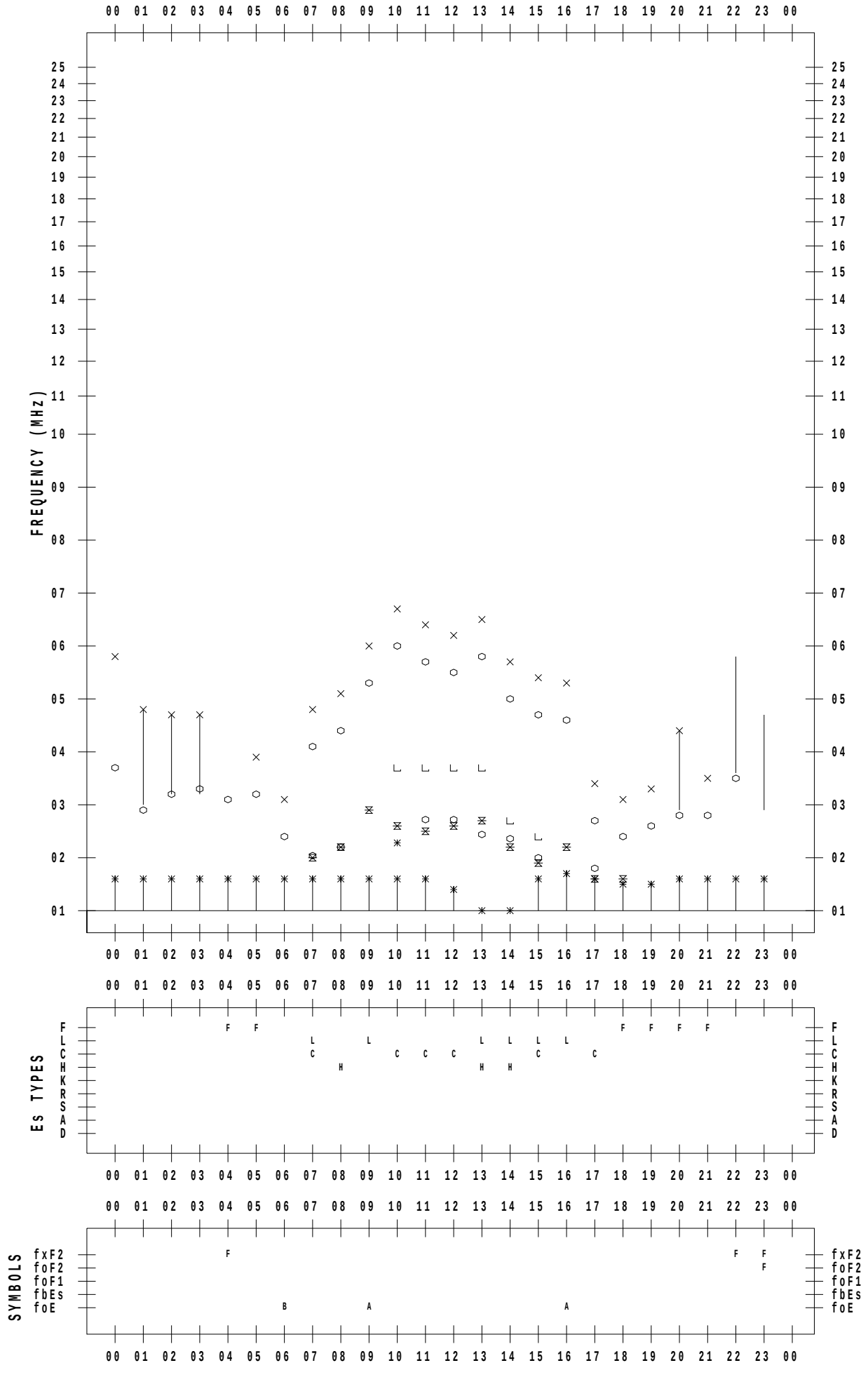
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/27

135 °E MEAN TIME



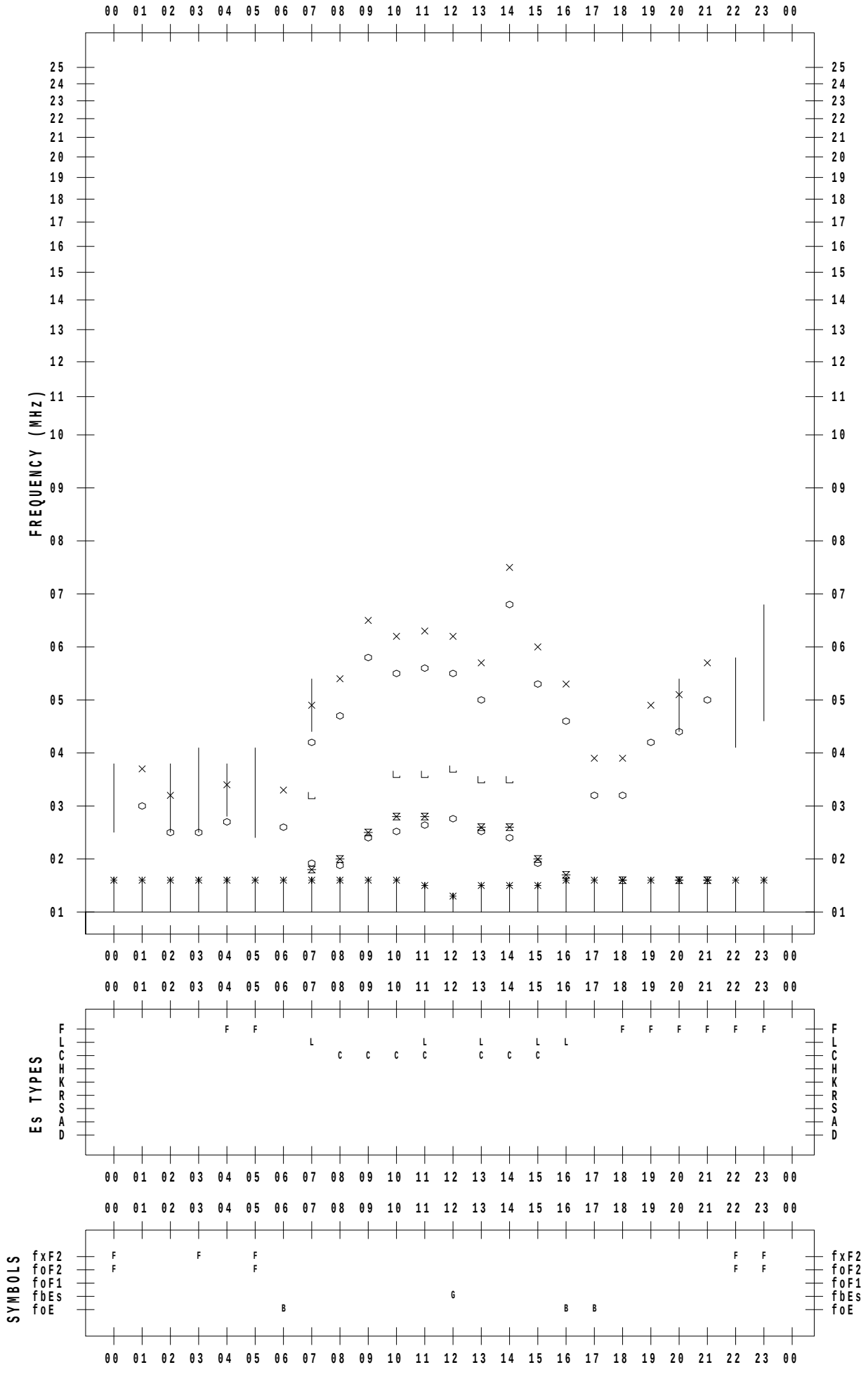
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/28

135 °E MEAN TIME



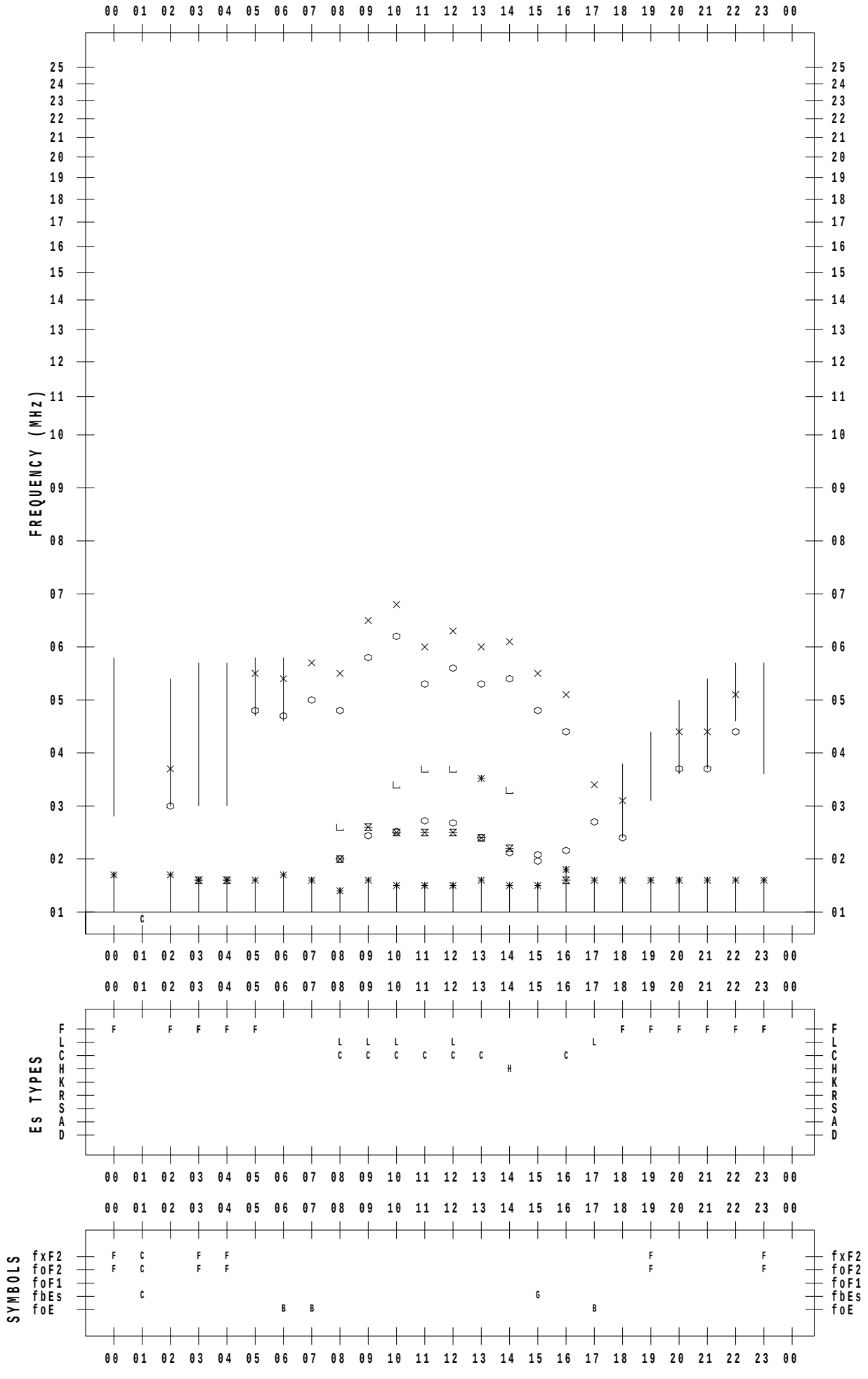
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/29

135 °E MEAN TIME



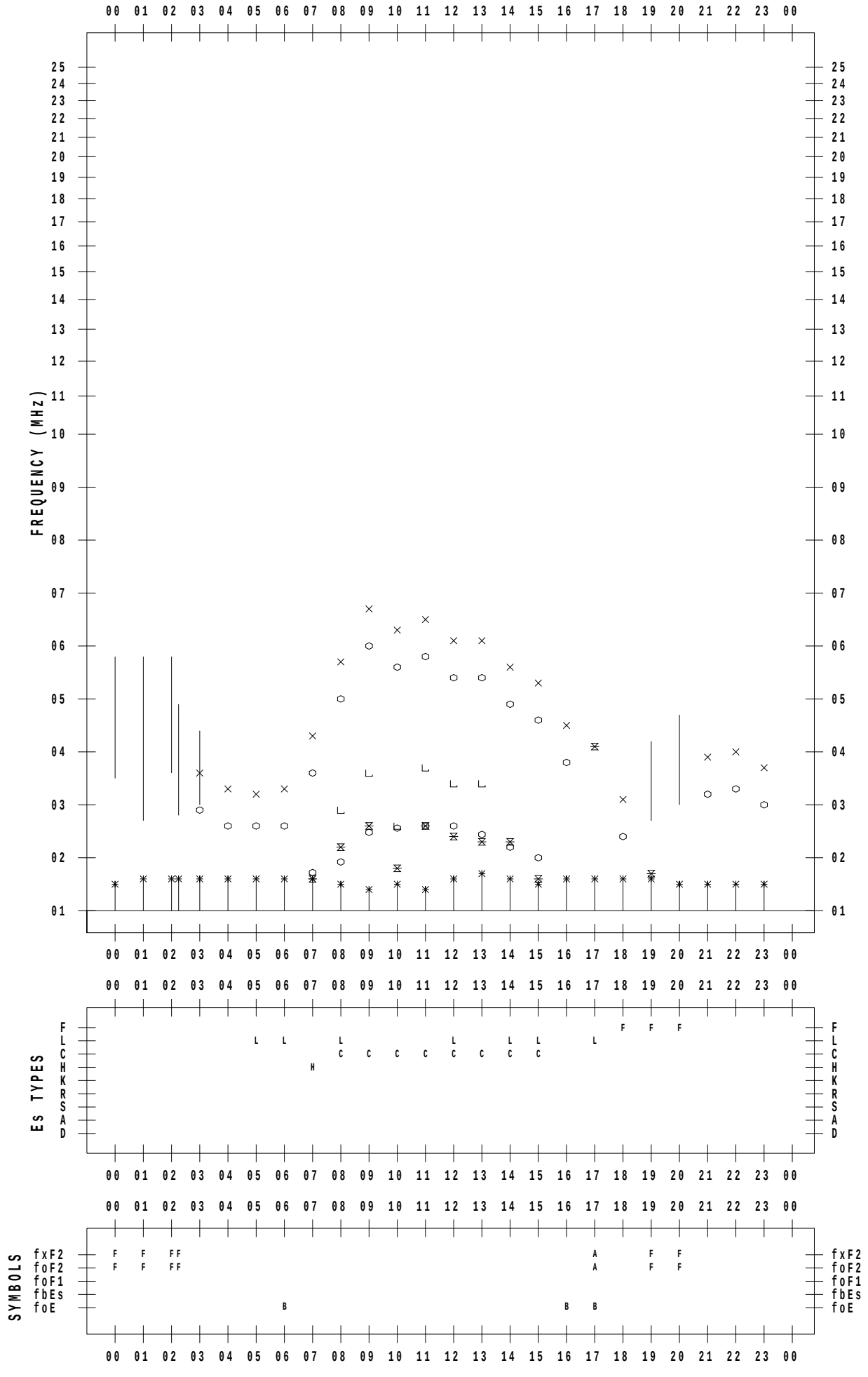
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2019/11/30

135 °E MEAN TIME



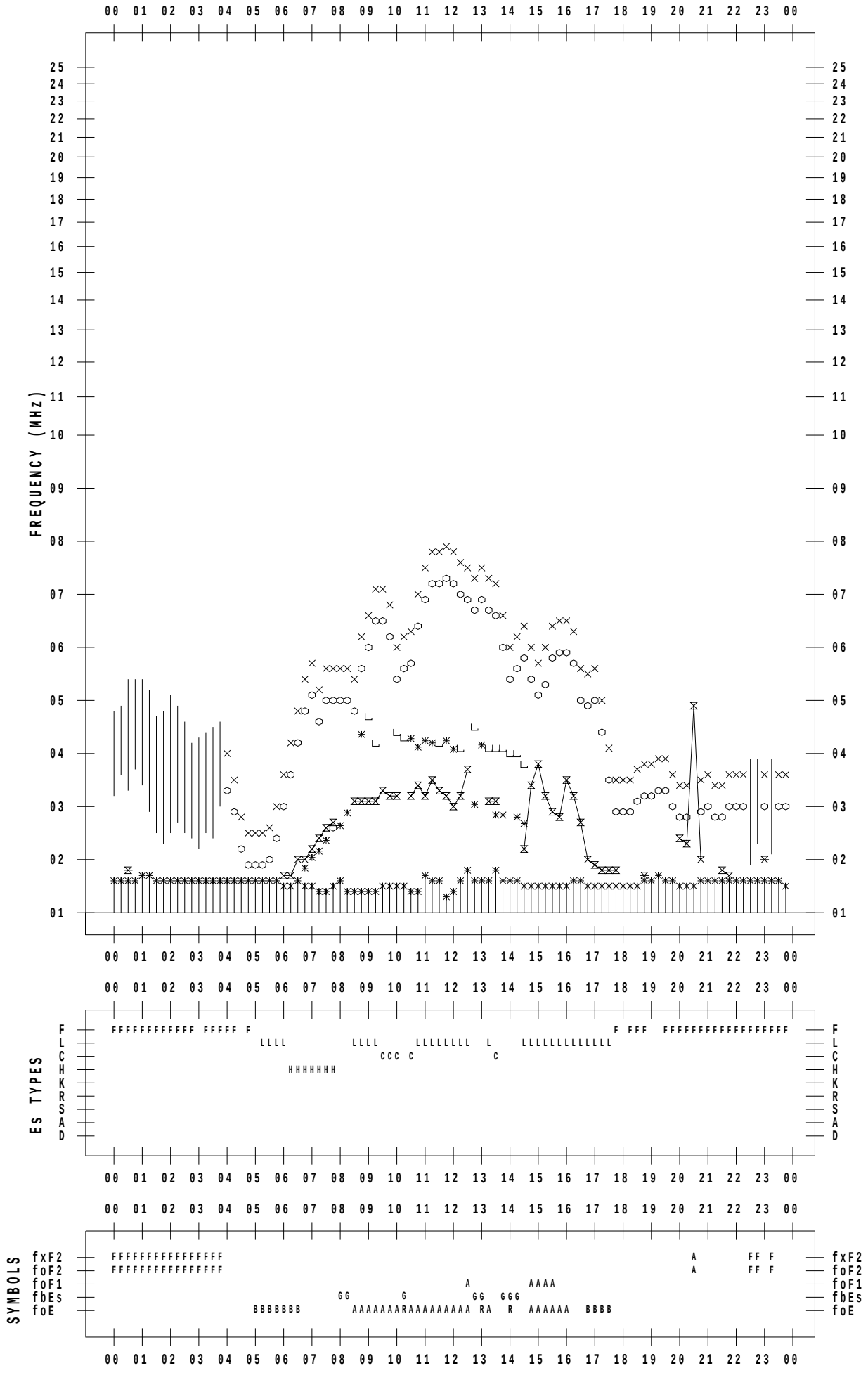
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/ 1

135 °E MEAN TIME



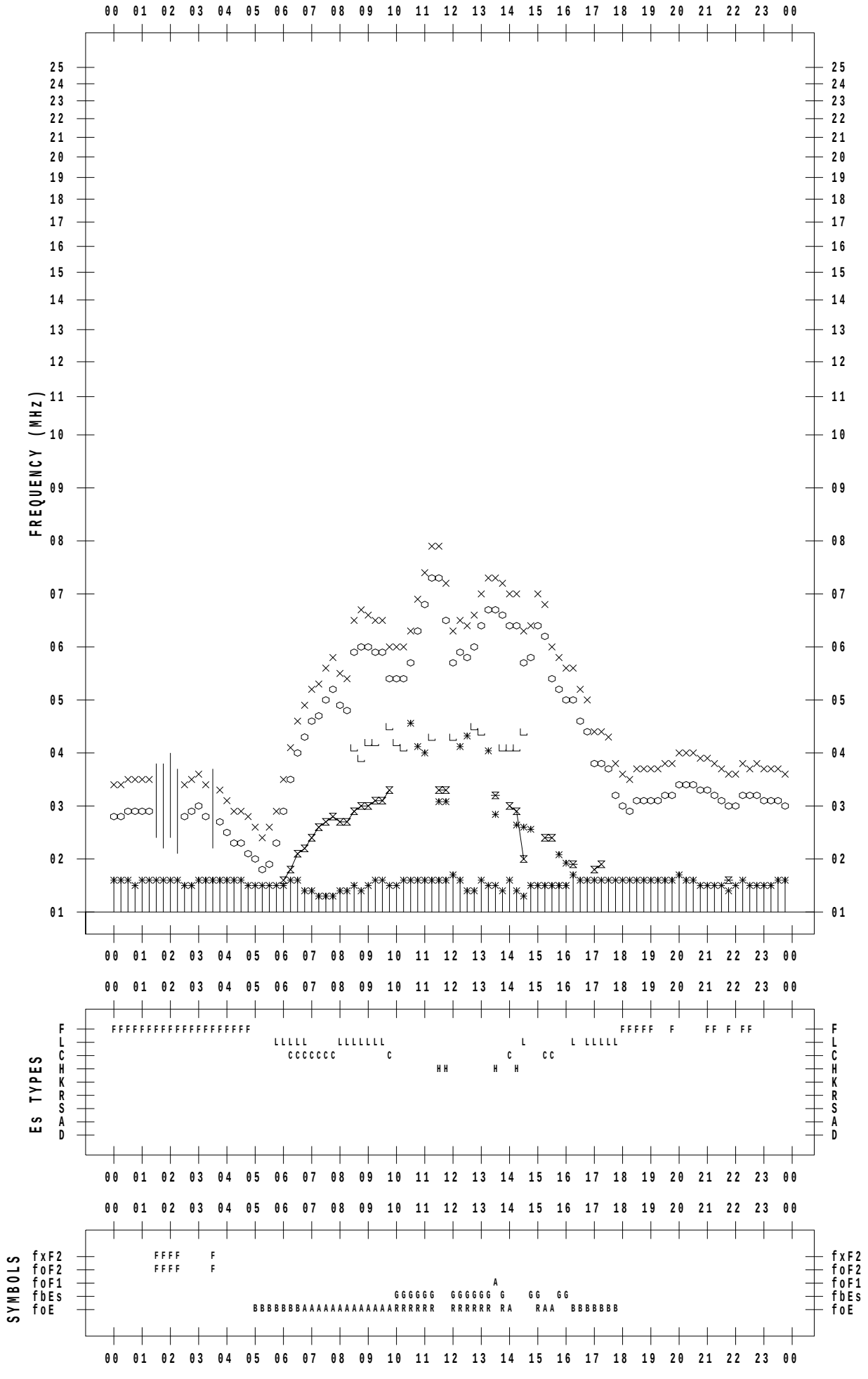
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/ 2

135 °E MEAN TIME



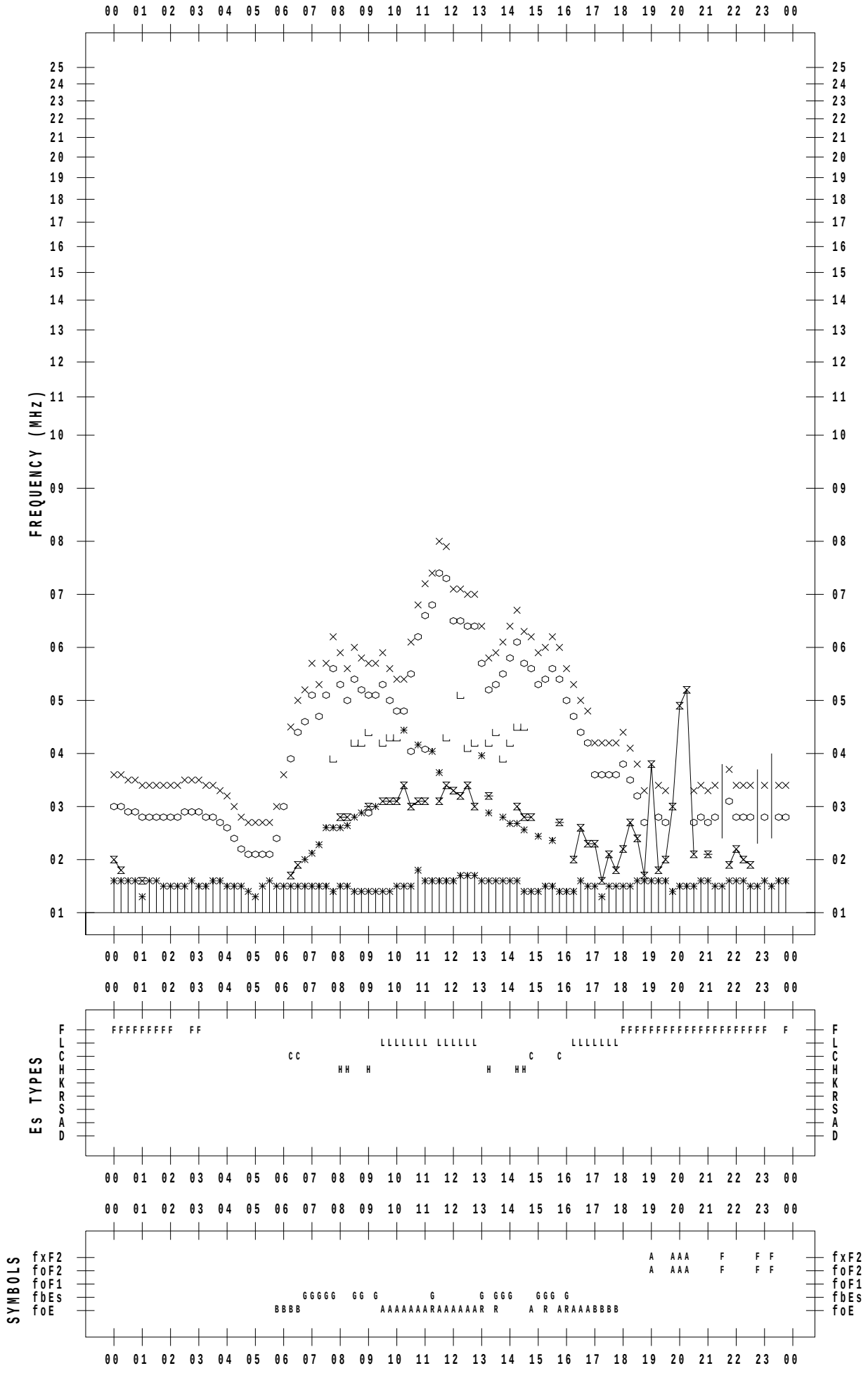
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/ 3

135 °E MEAN TIME



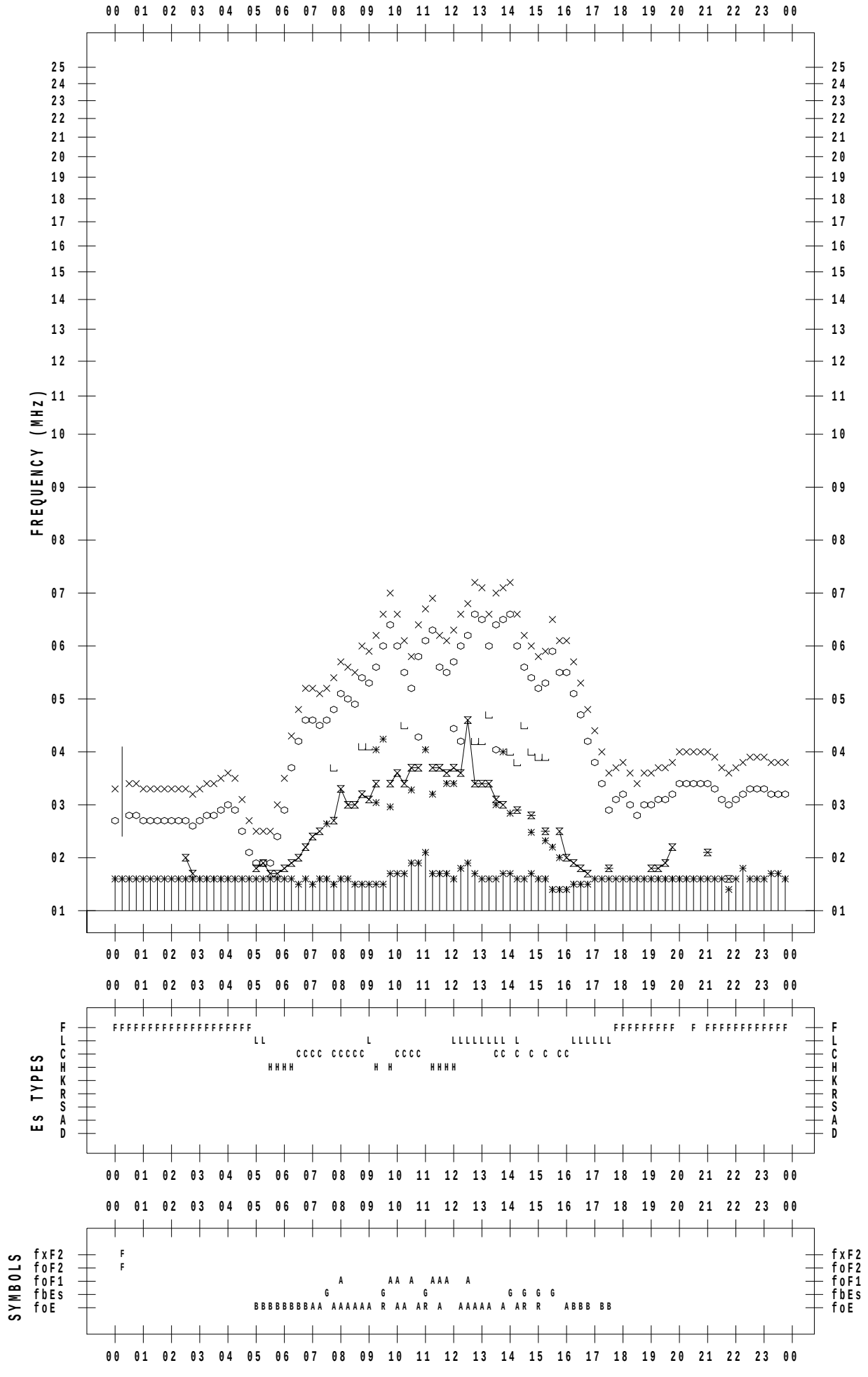
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/ 4

135 °E MEAN TIME



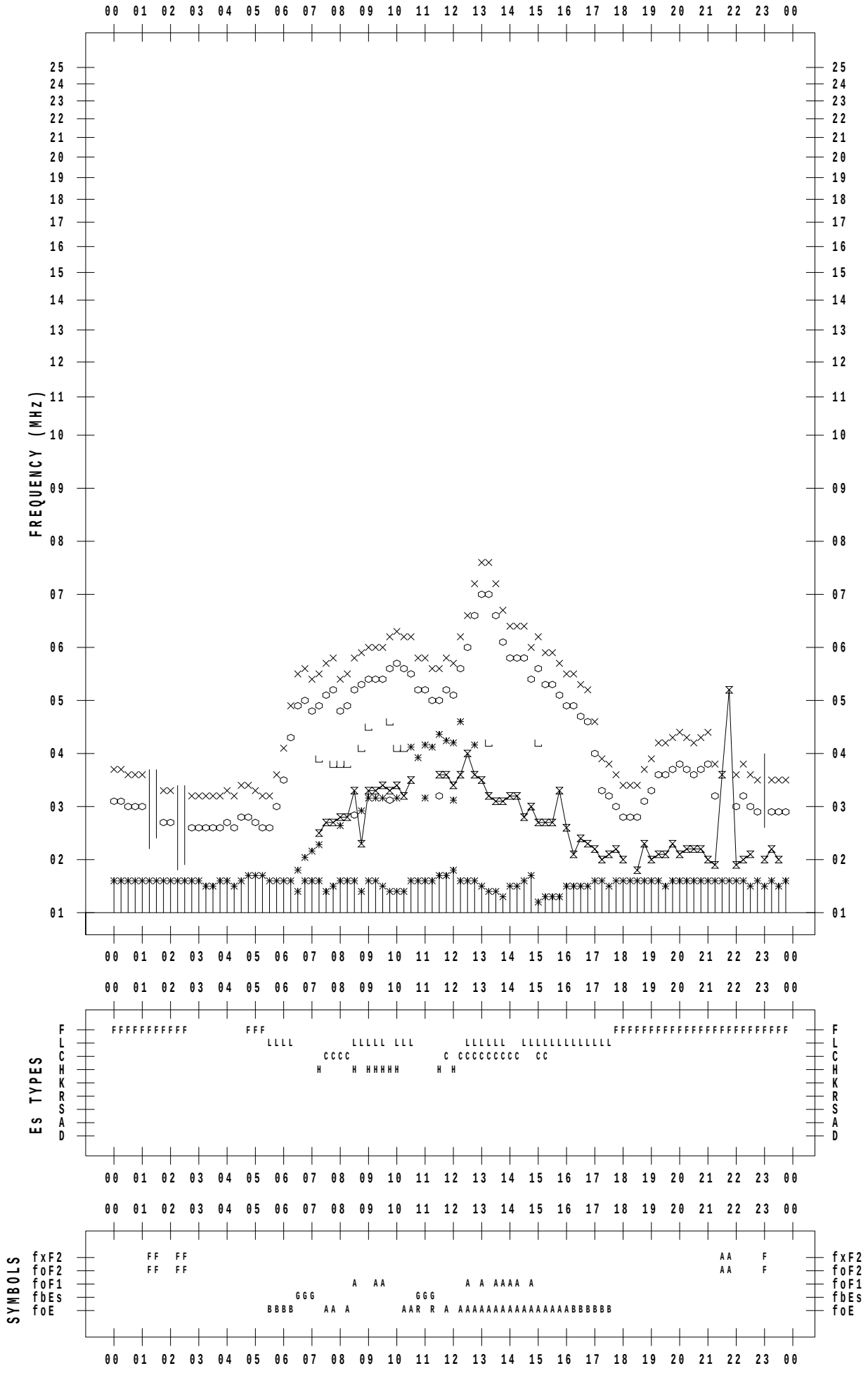
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/ 5

135 °E MEAN TIME



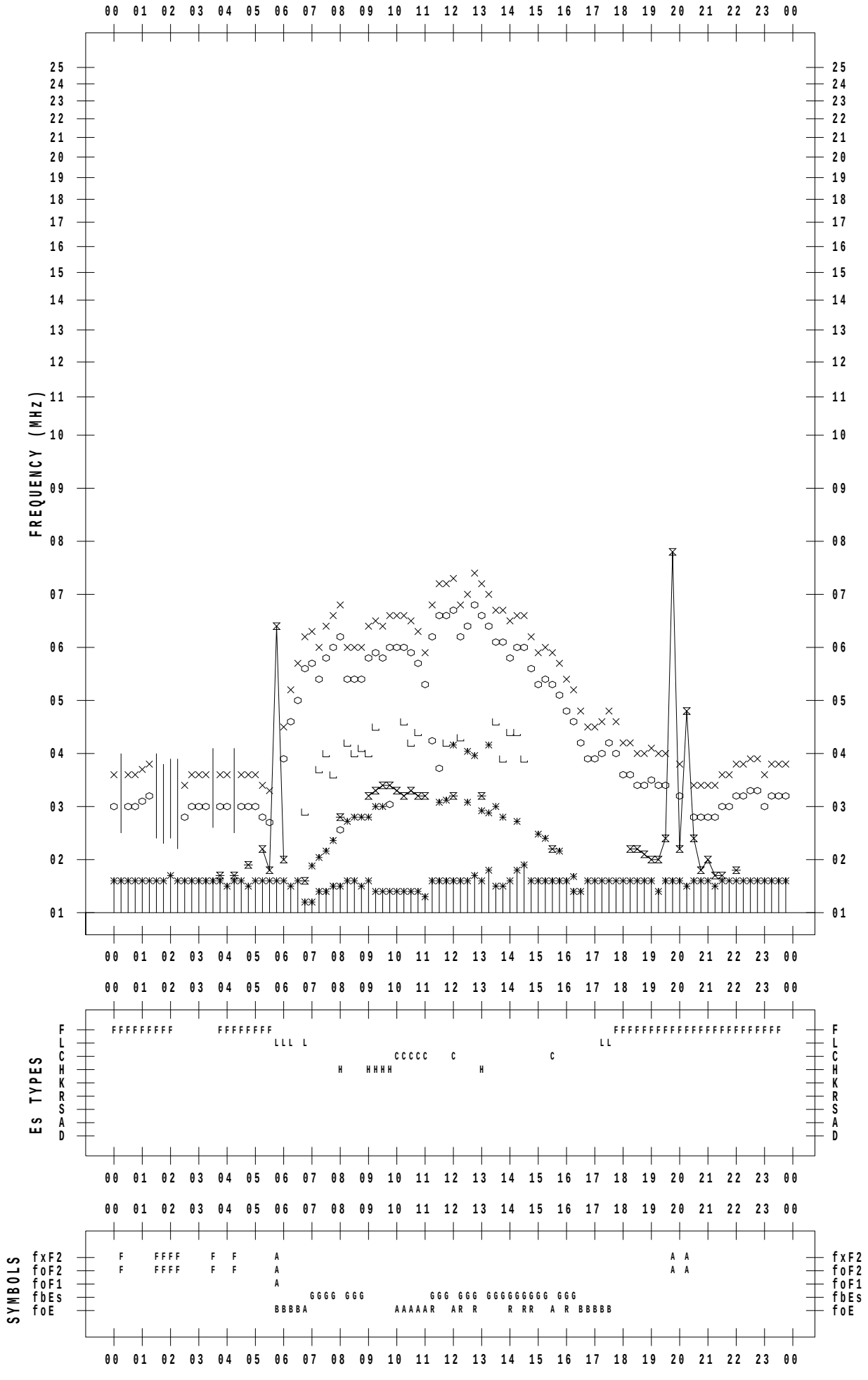
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/ 6

135 °E MEAN TIME



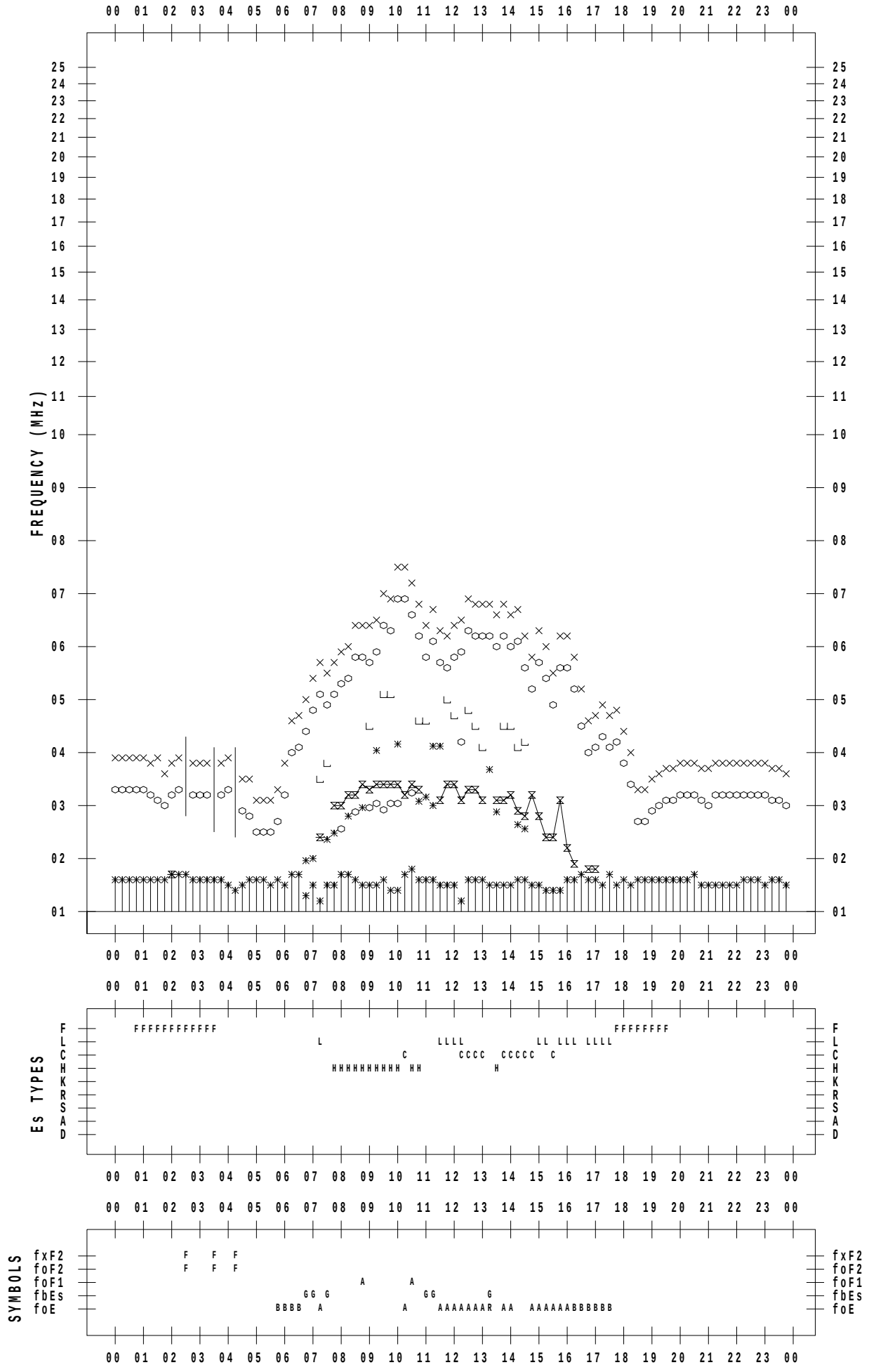
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/ 7

135 °E MEAN TIME



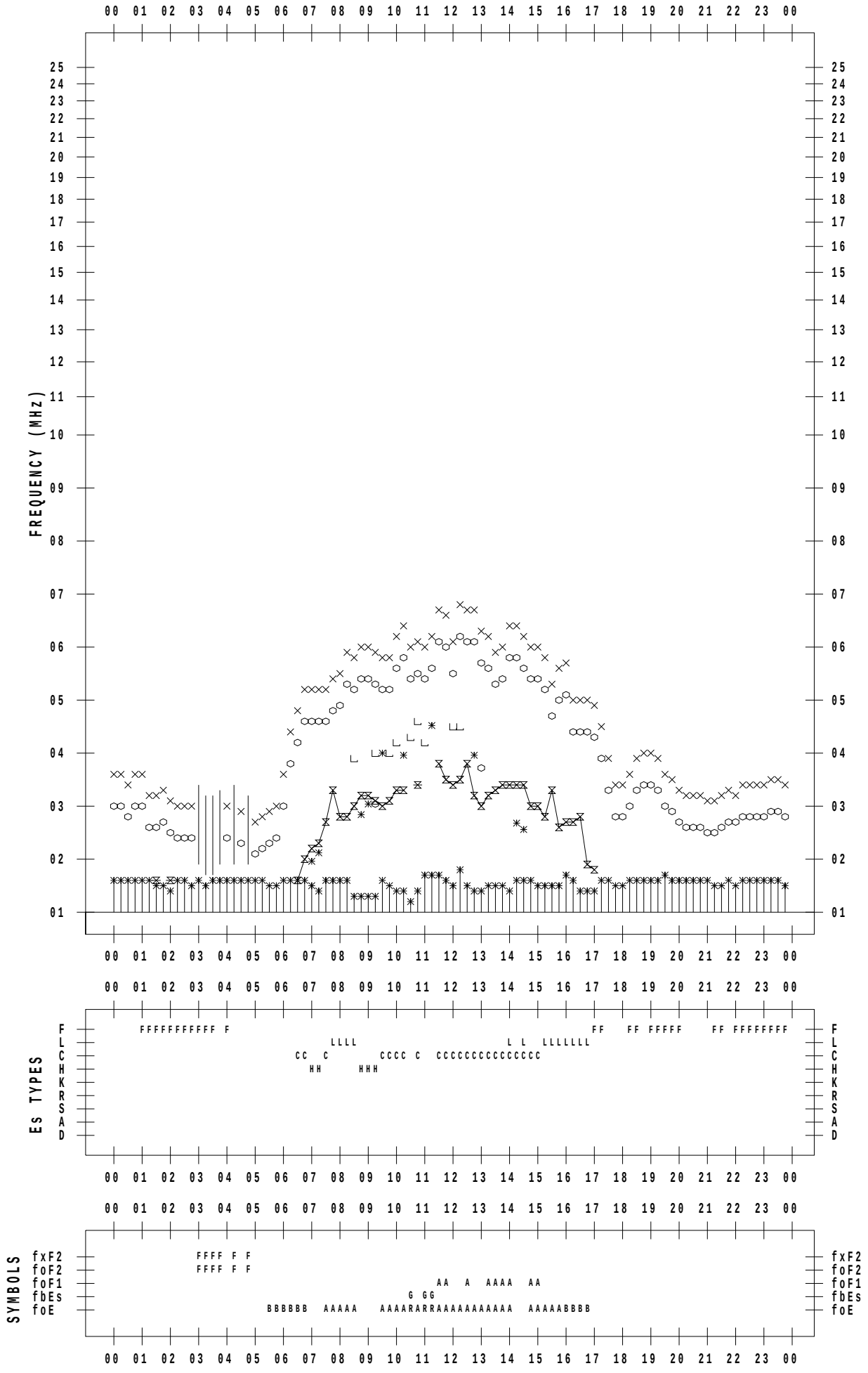
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/ 8

135 °E MEAN TIME



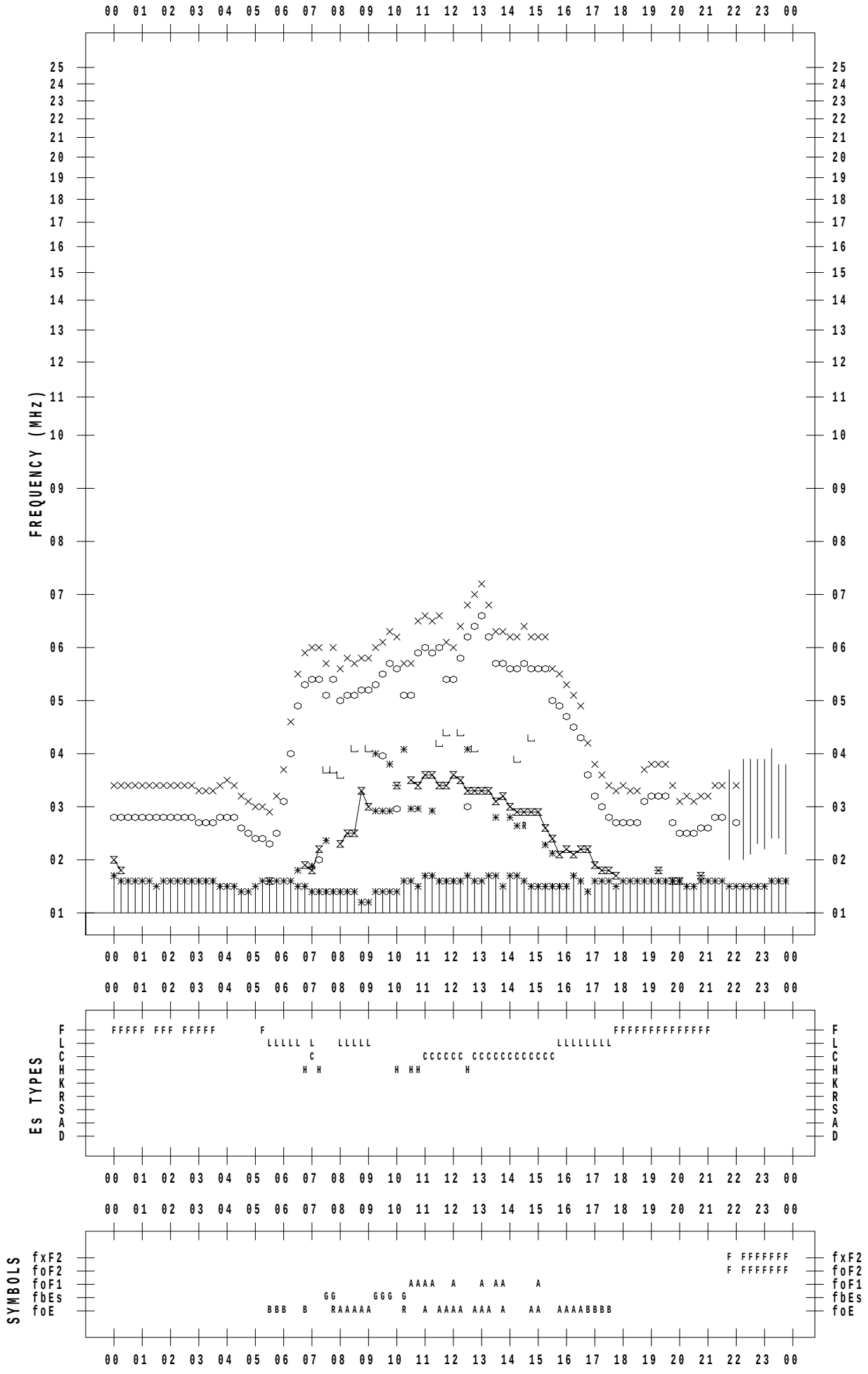
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/ 9

135 °E MEAN TIME



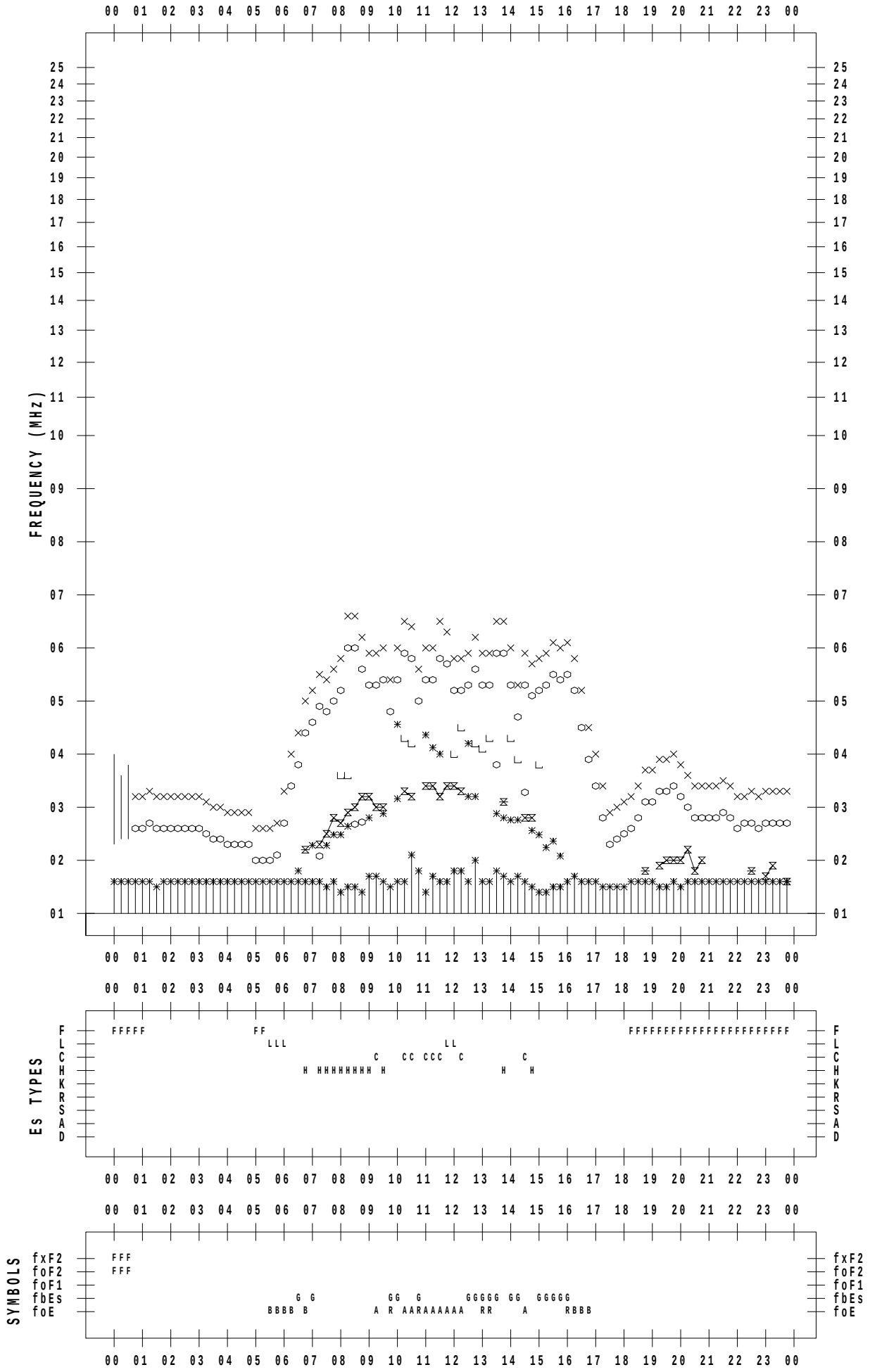
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/10

135 °E MEAN TIME



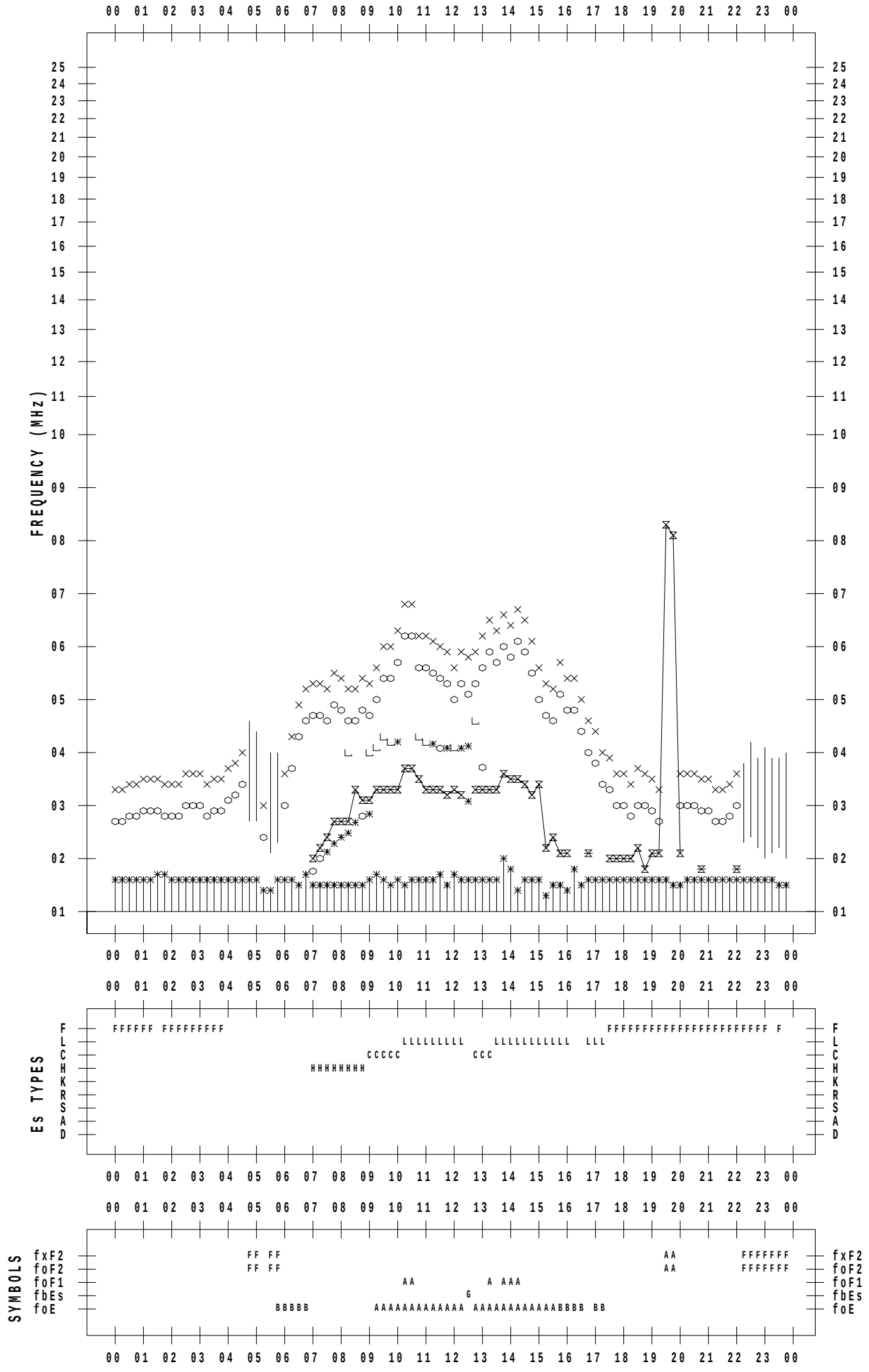
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/11

135 °E MEAN TIME



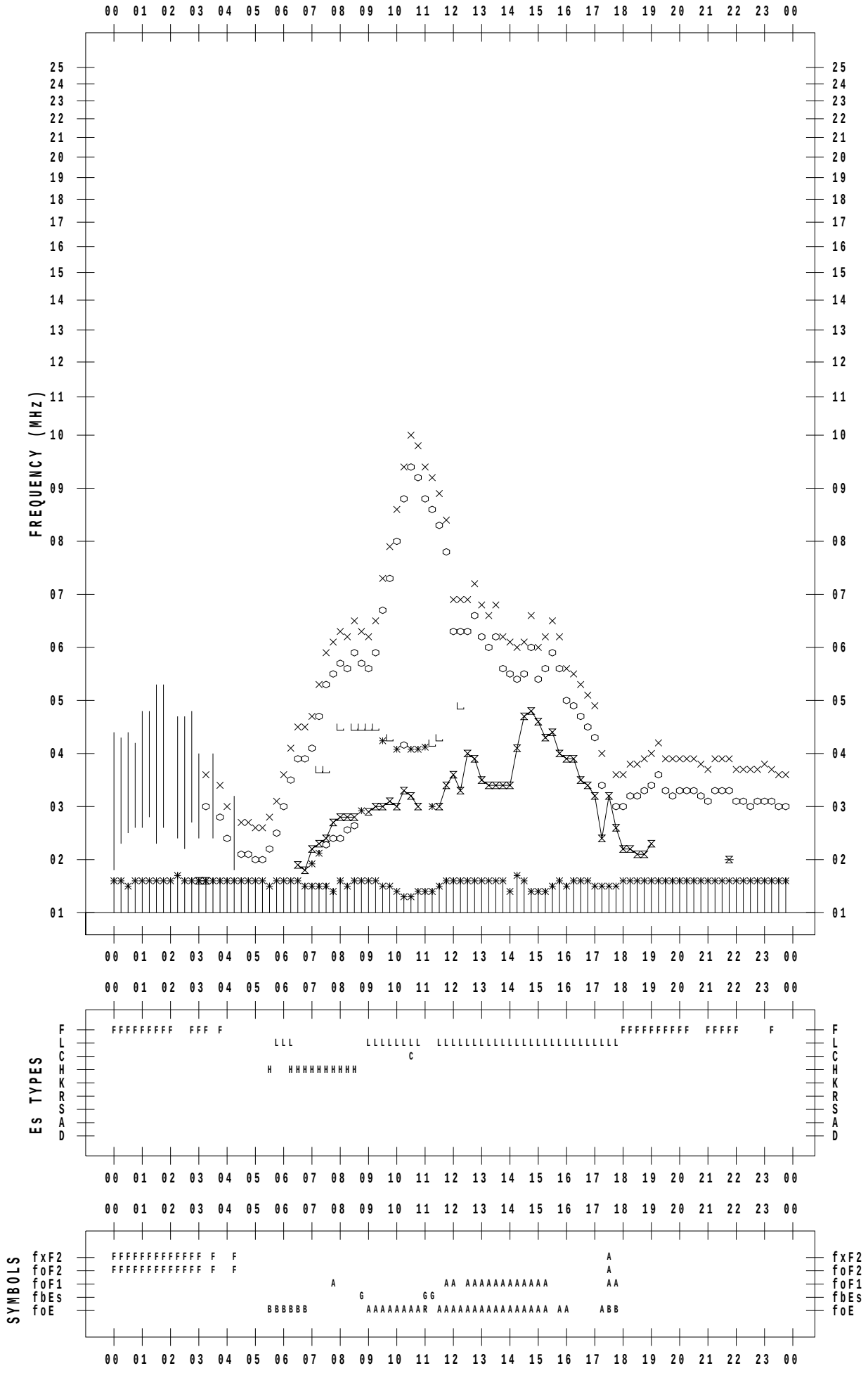
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/12

135 °E MEAN TIME



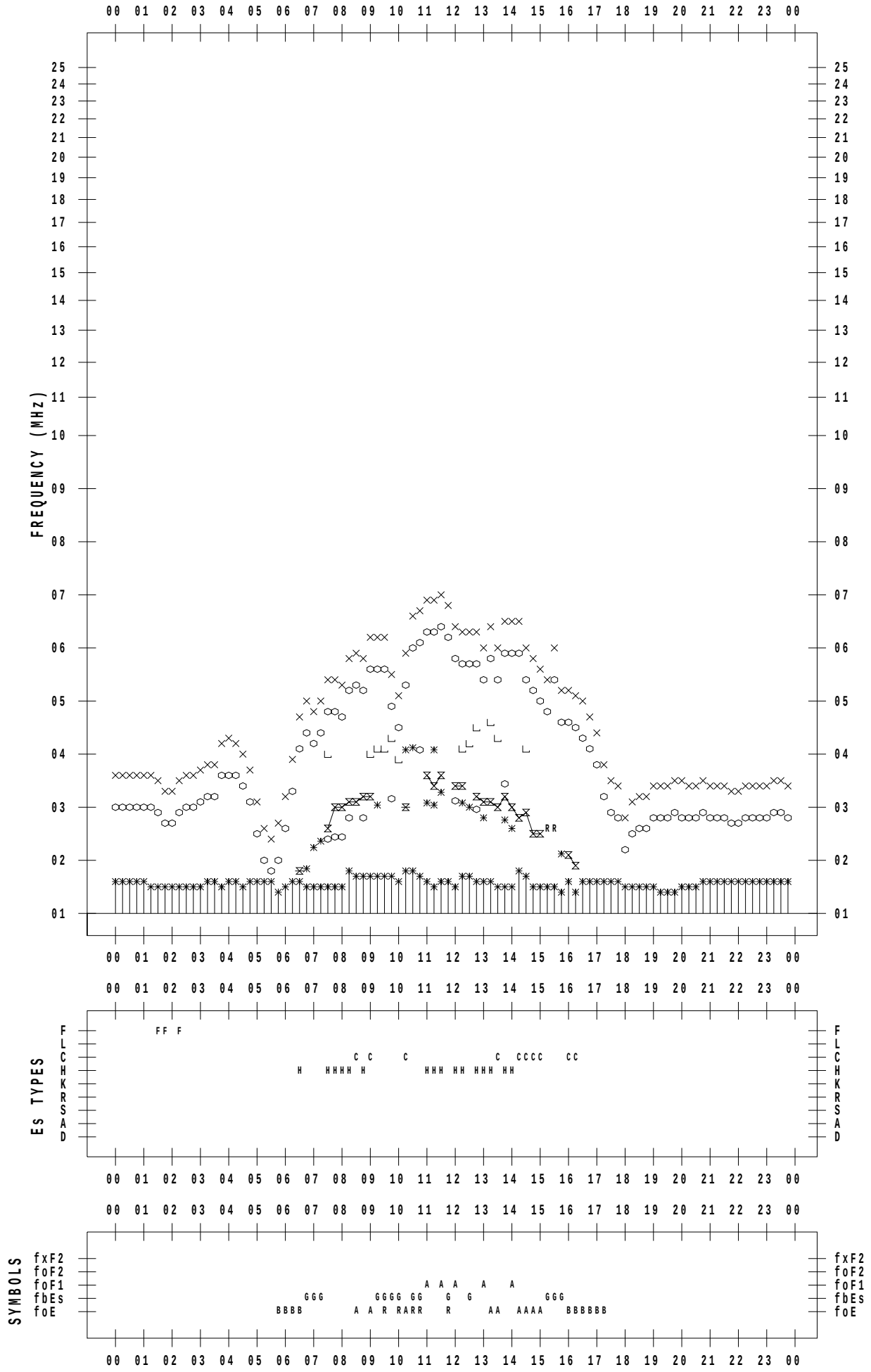
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/13

135 °E MEAN TIME



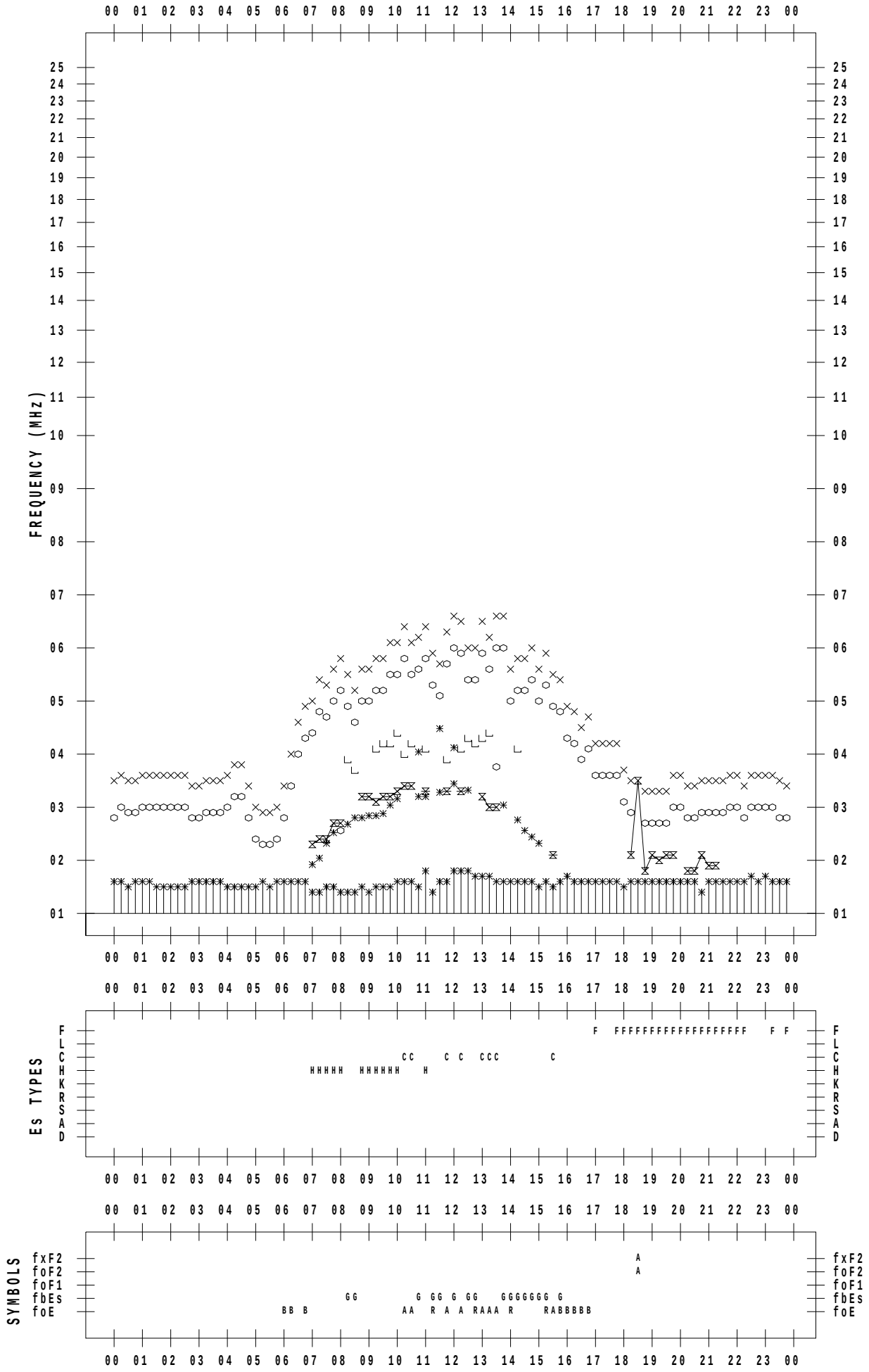
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/14

135 °E MEAN TIME



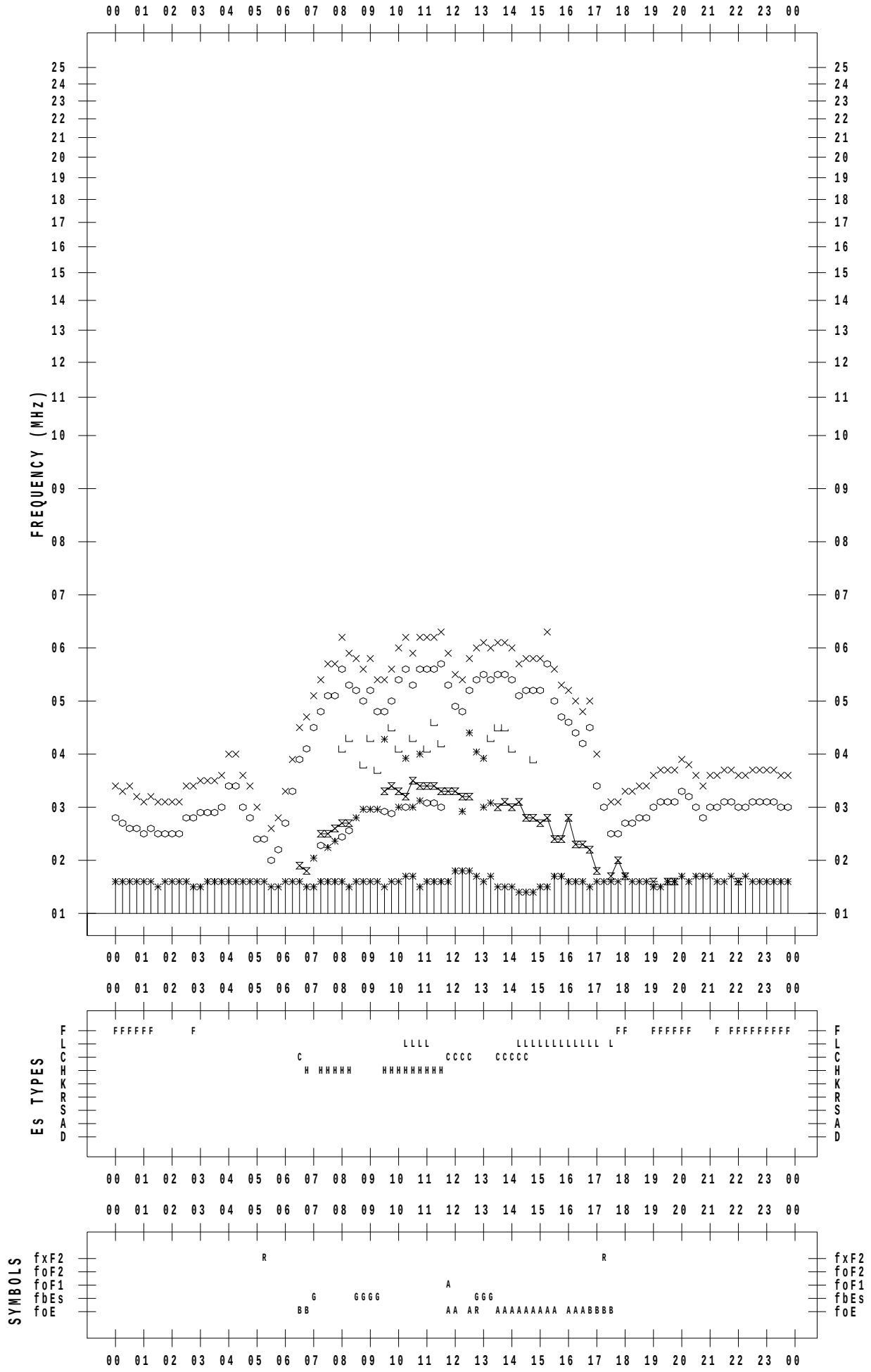
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/15

135 °E MEAN TIME



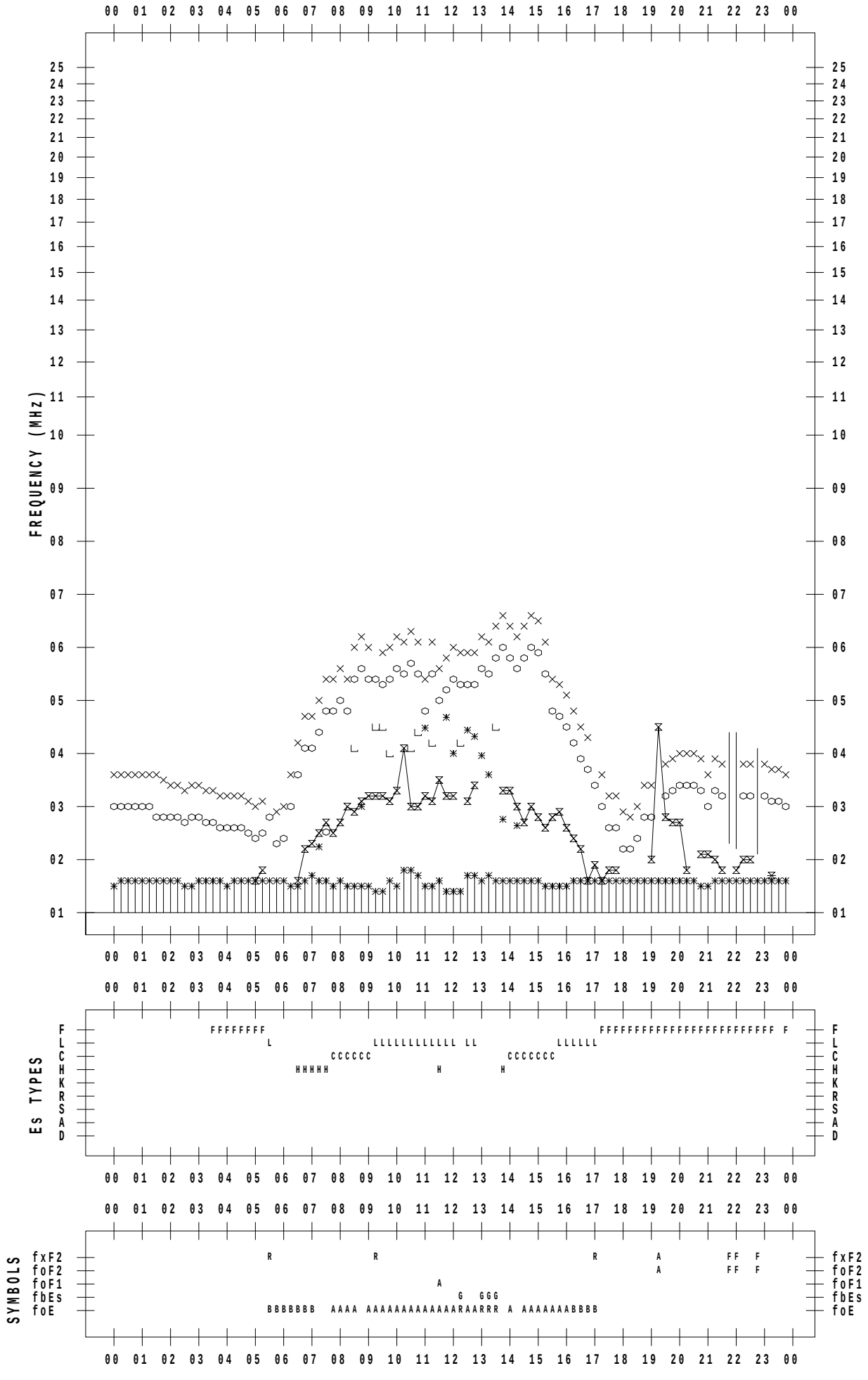
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/16

135 °E MEAN TIME



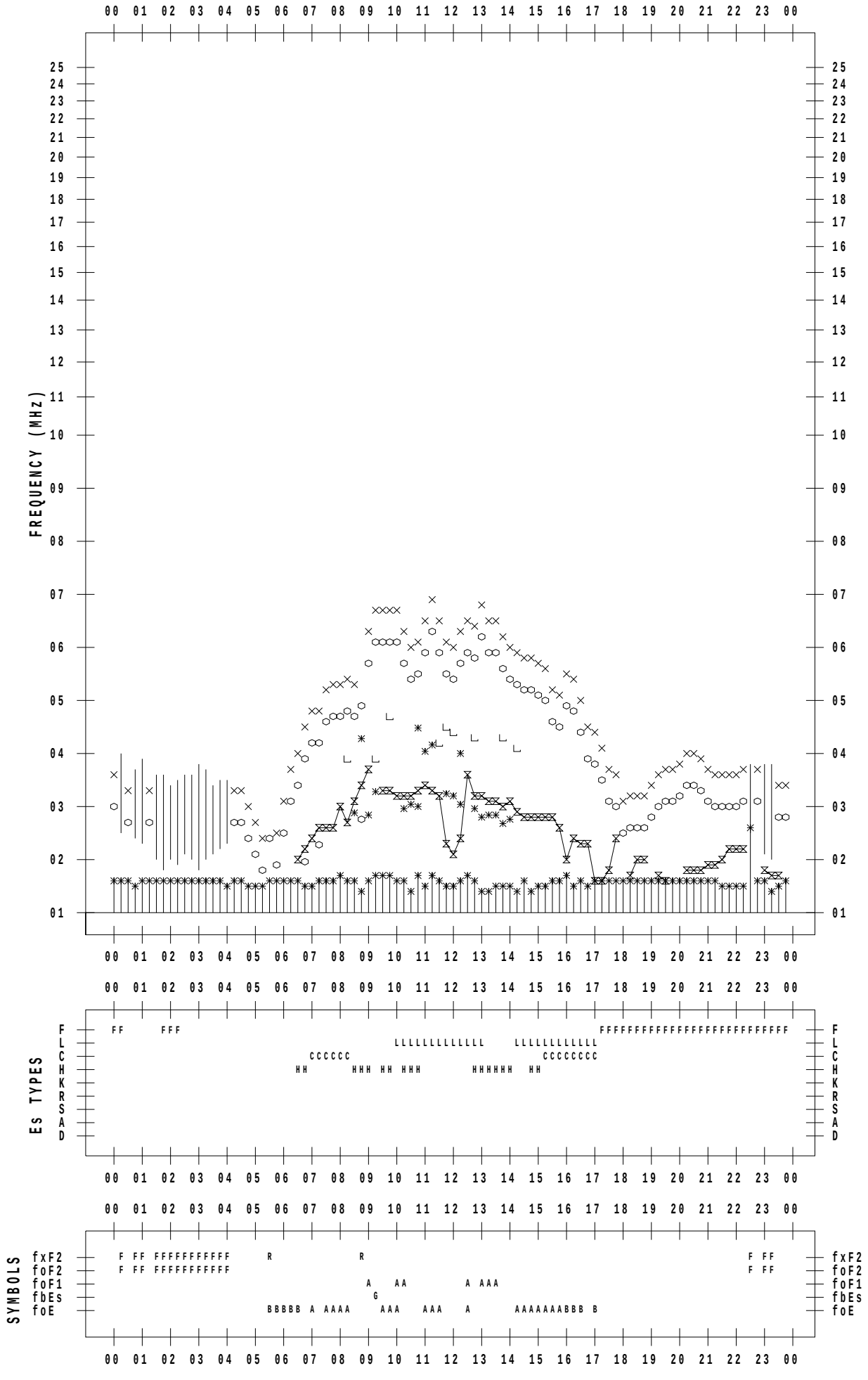
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/17

135 °E MEAN TIME



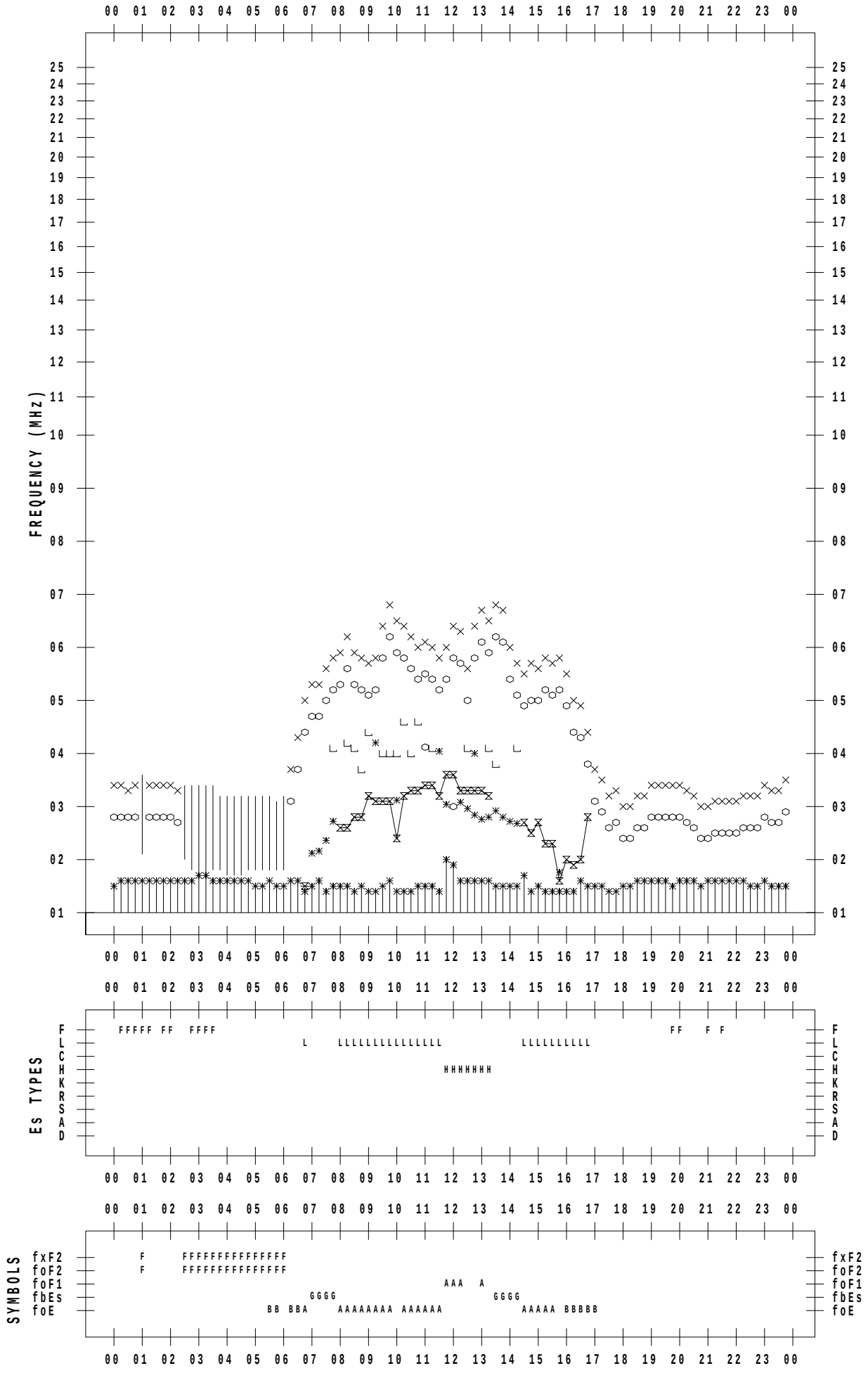
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/18

135 °E MEAN TIME



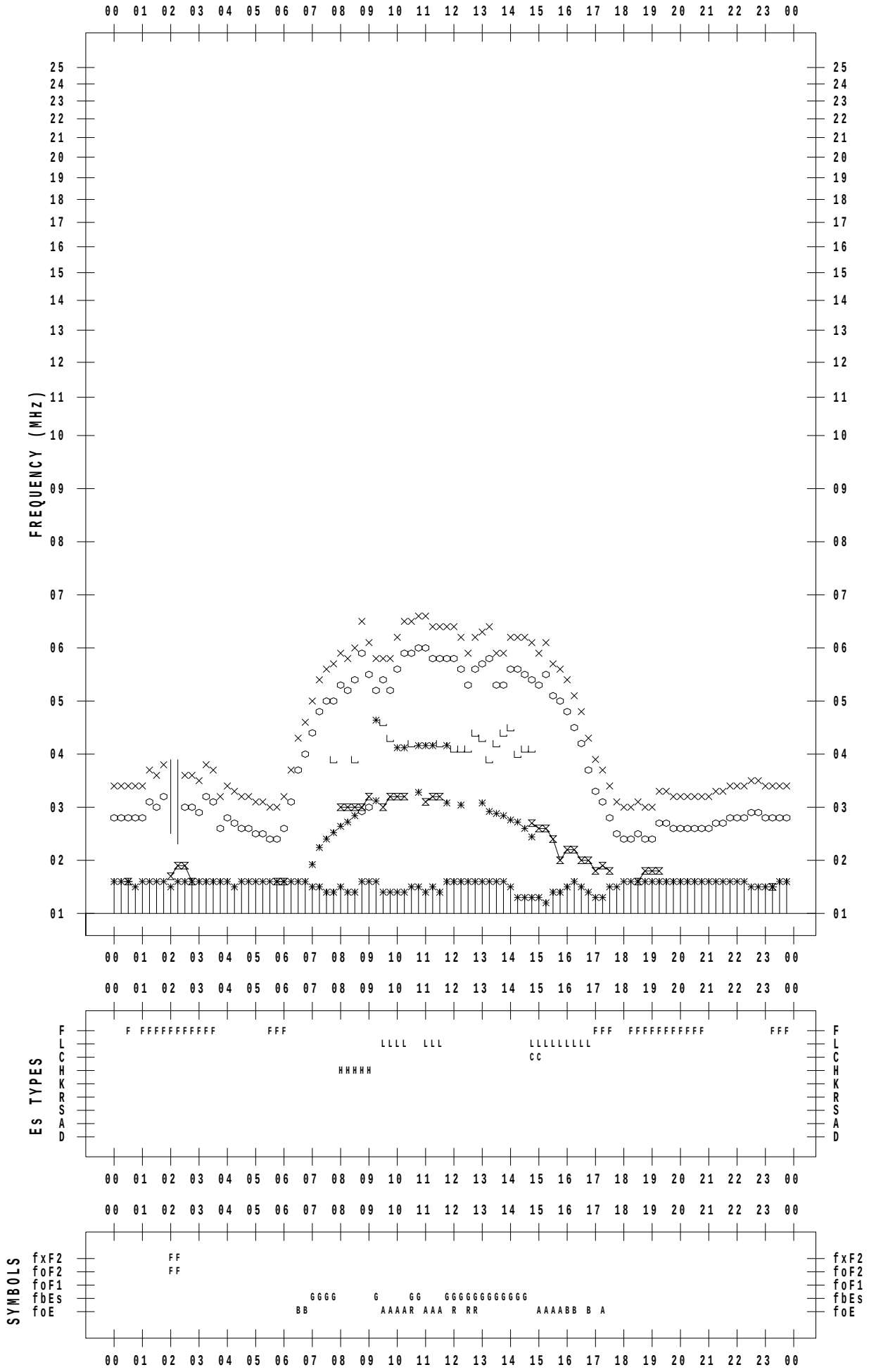
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/19

135 °E MEAN TIME



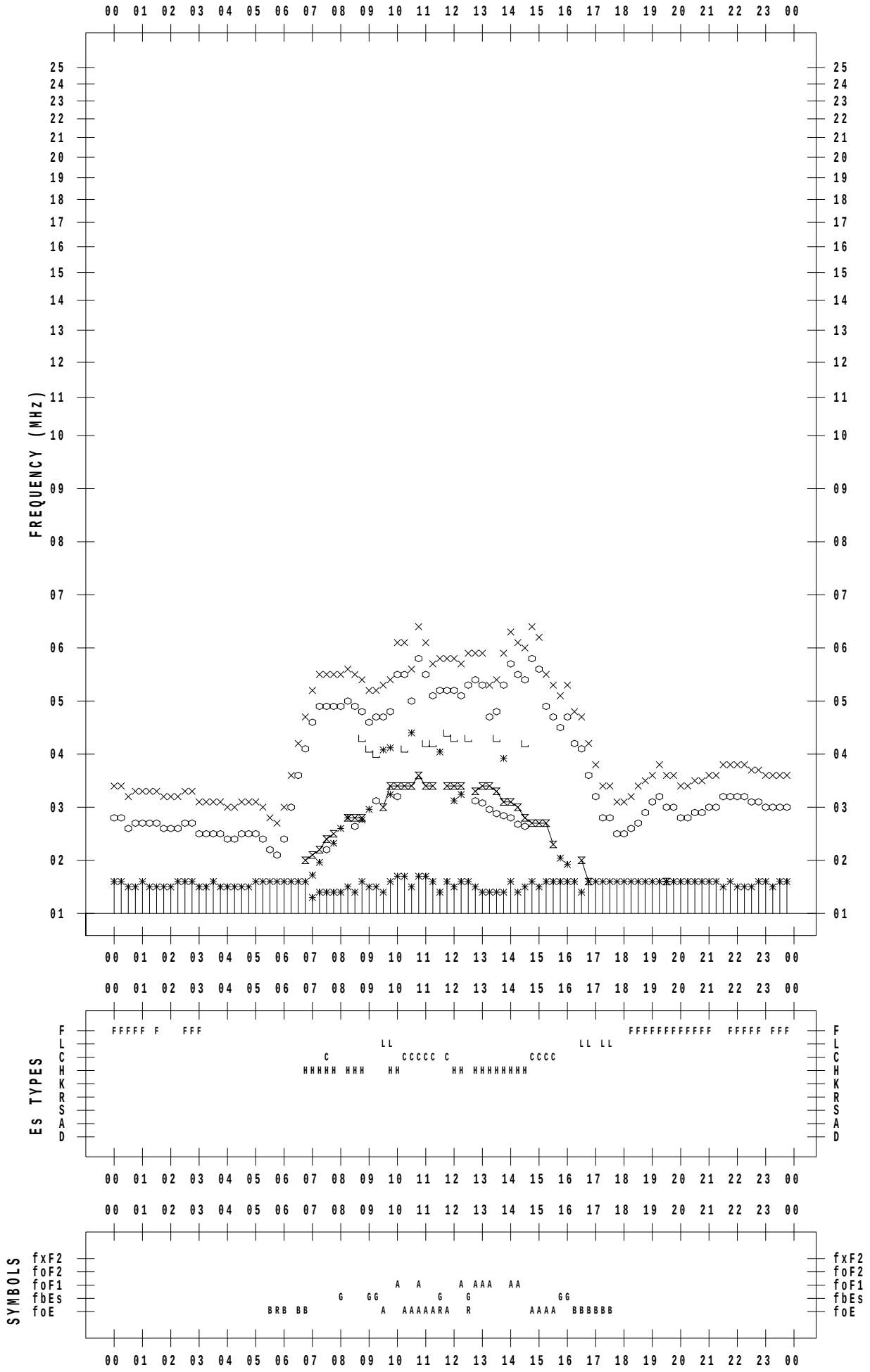
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/20

135 °E MEAN TIME



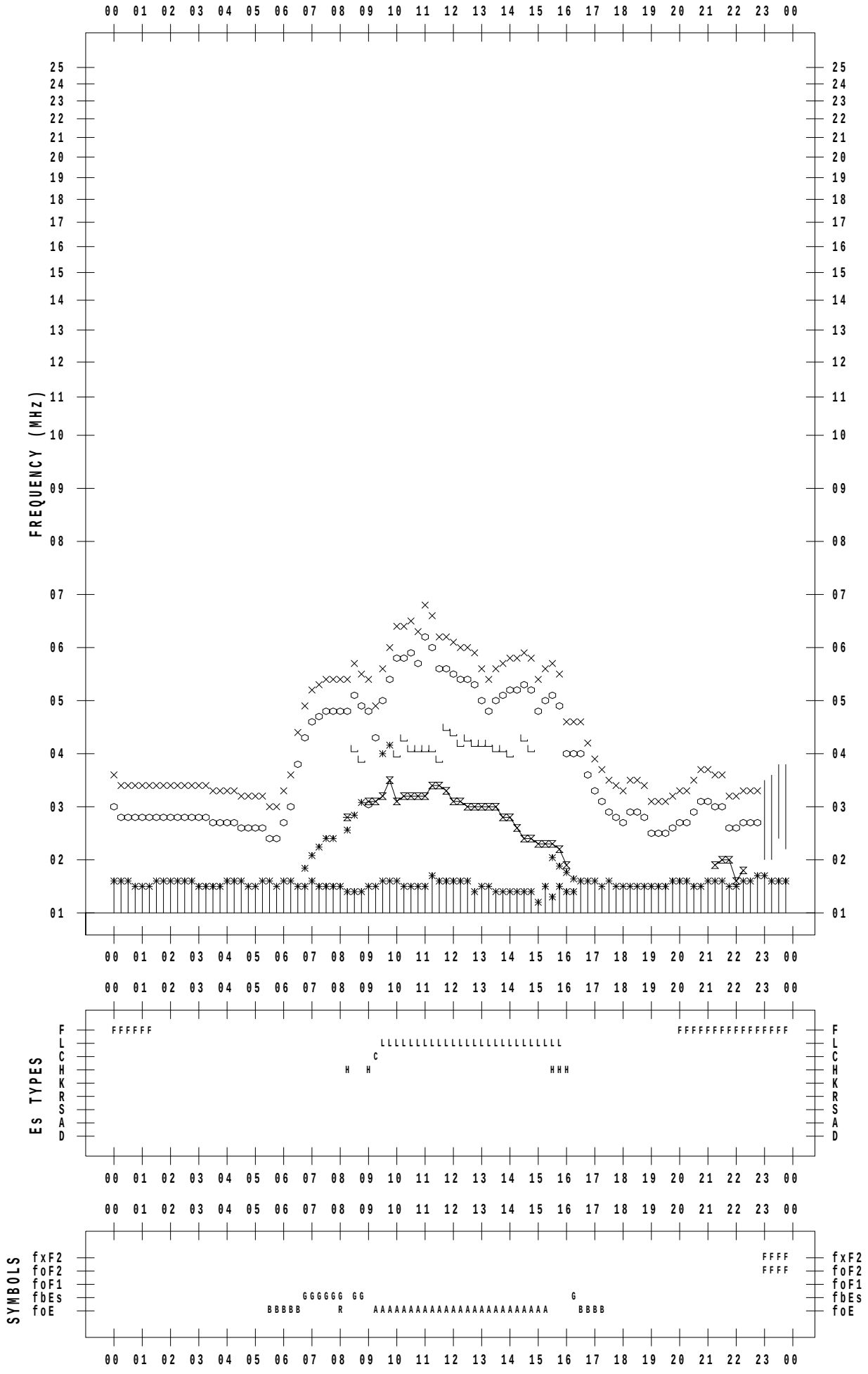
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/21

135 °E MEAN TIME



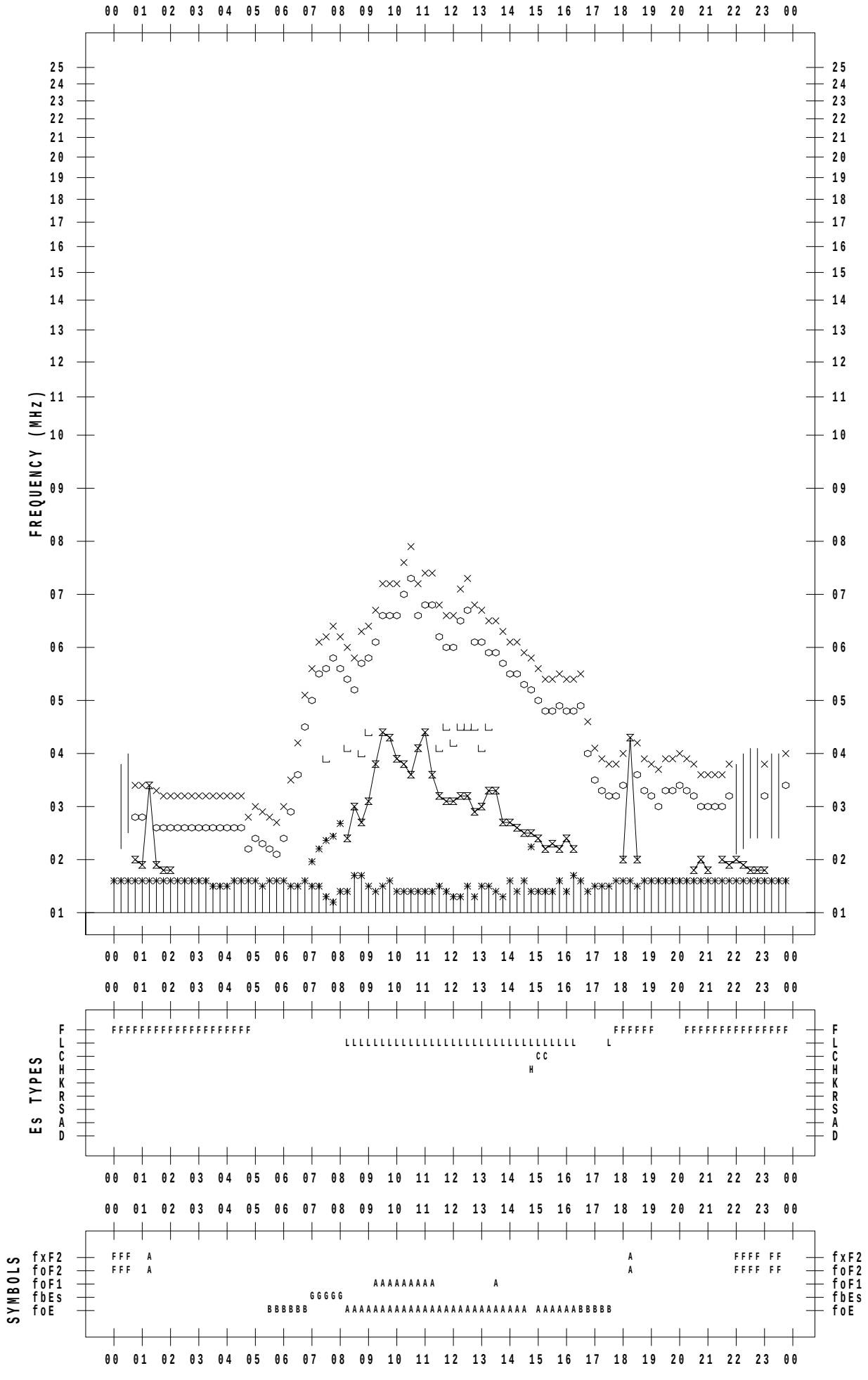
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/22

135 °E MEAN TIME



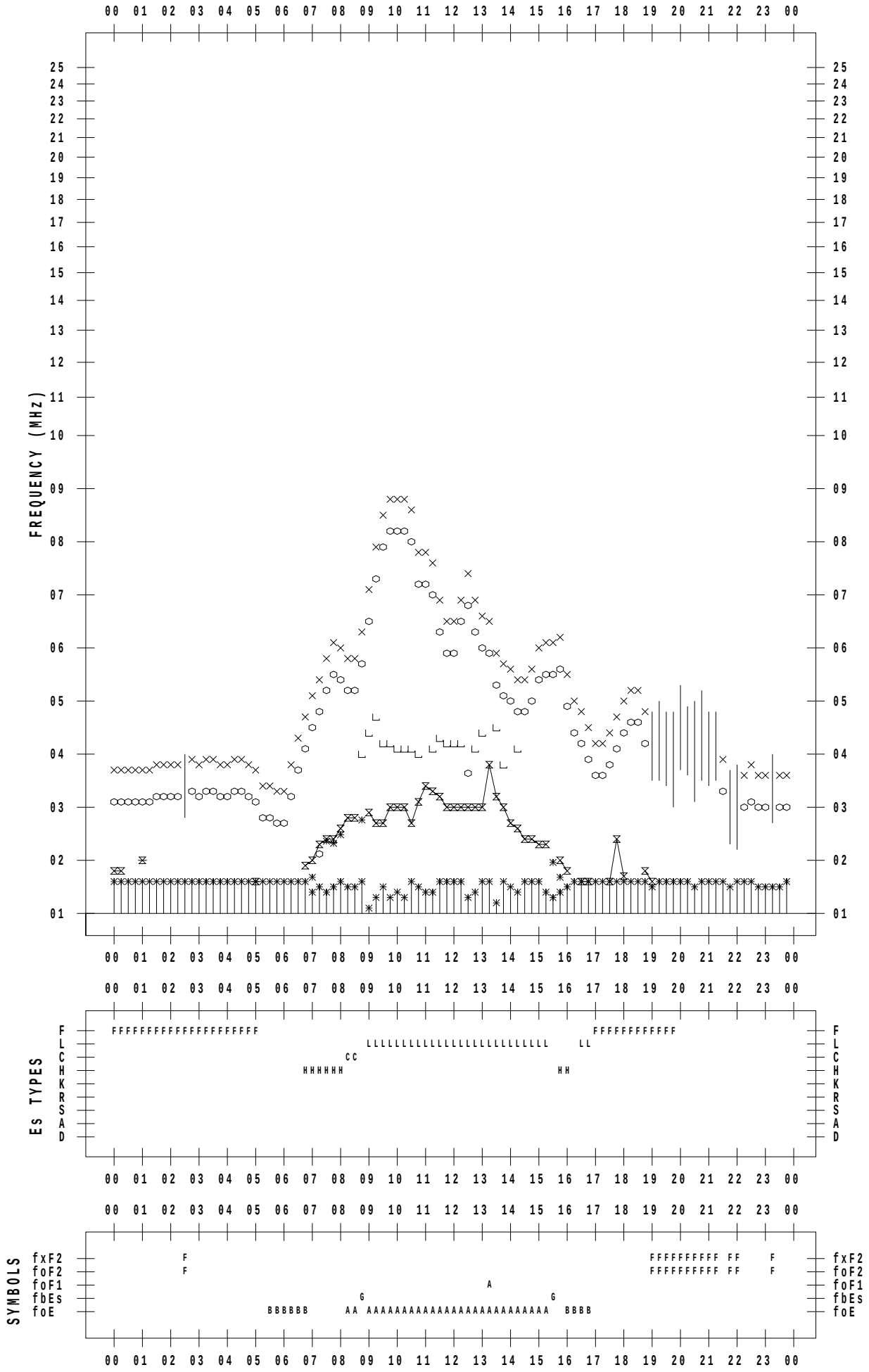
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/23

135 °E MEAN TIME



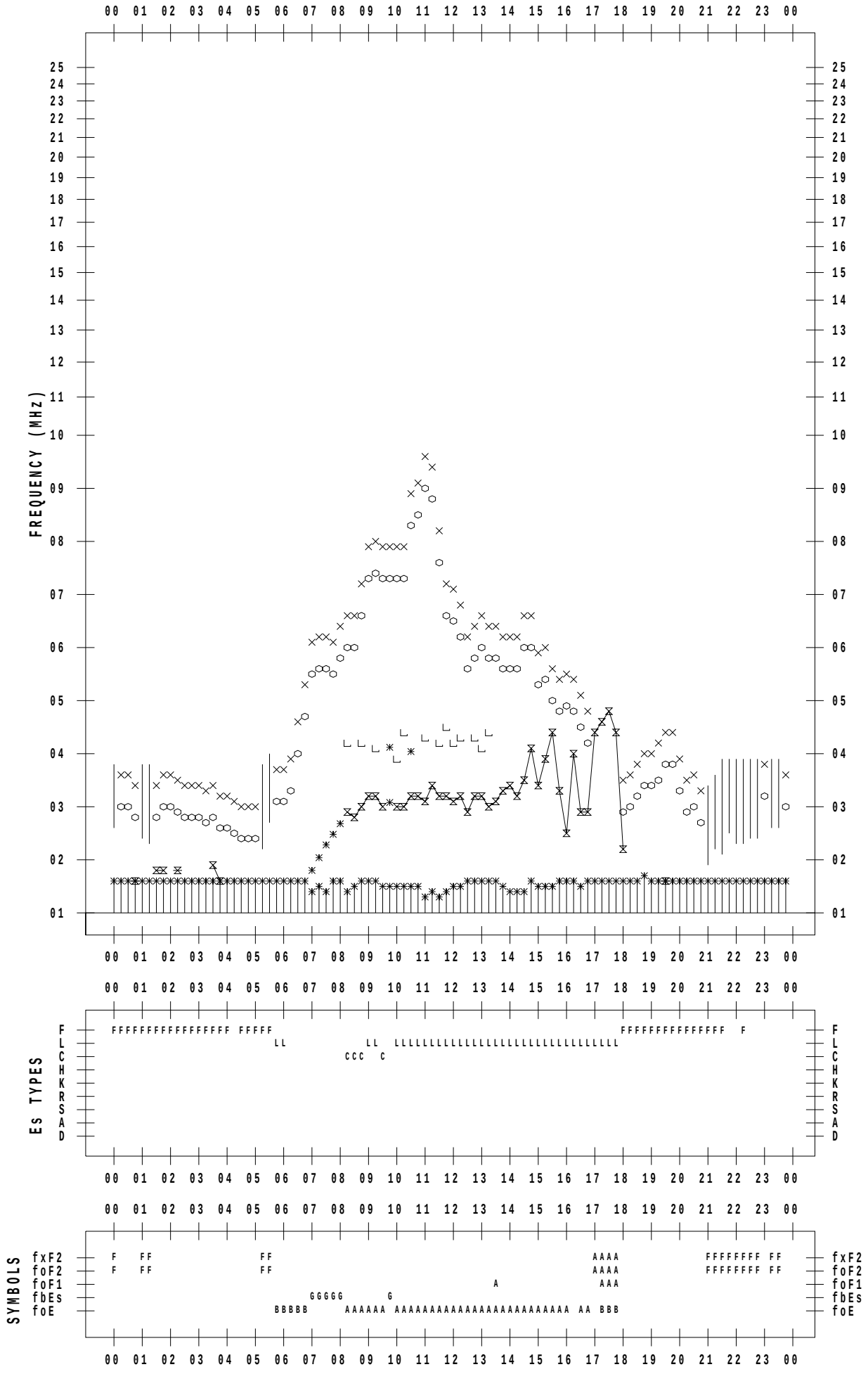
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/24

135 °E MEAN TIME



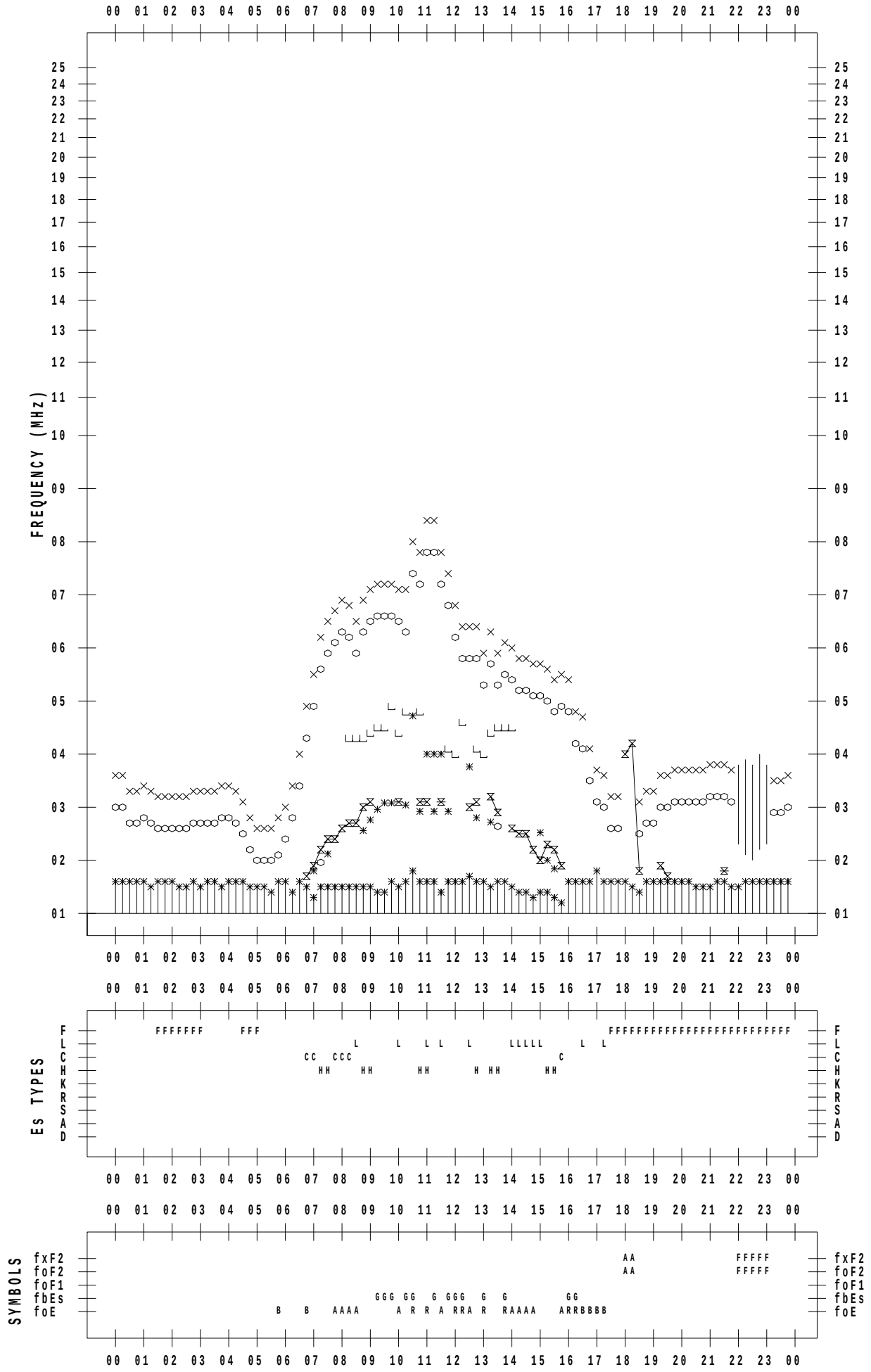
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/25

135 °E MEAN TIME



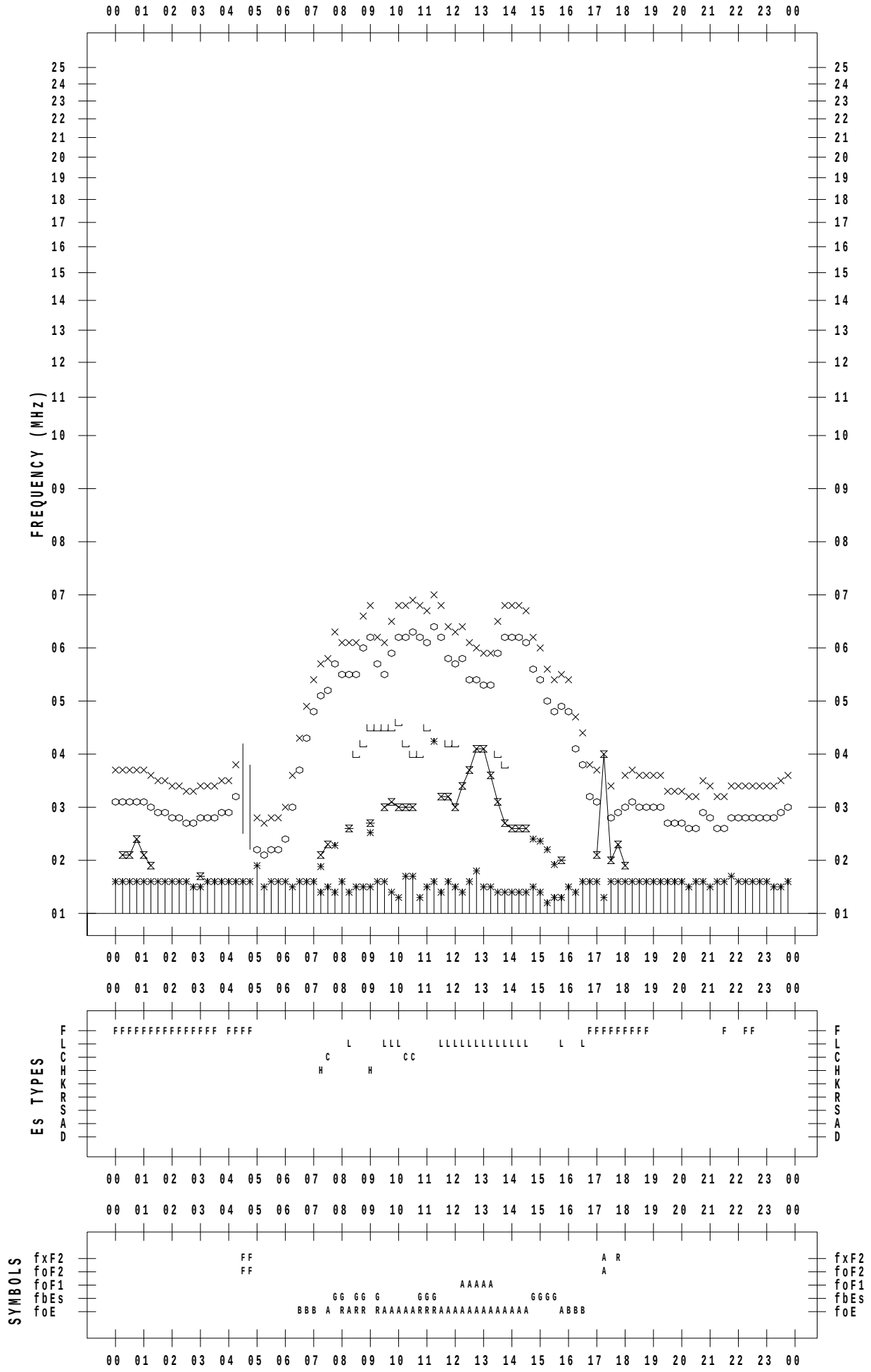
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/26

135 °E MEAN TIME



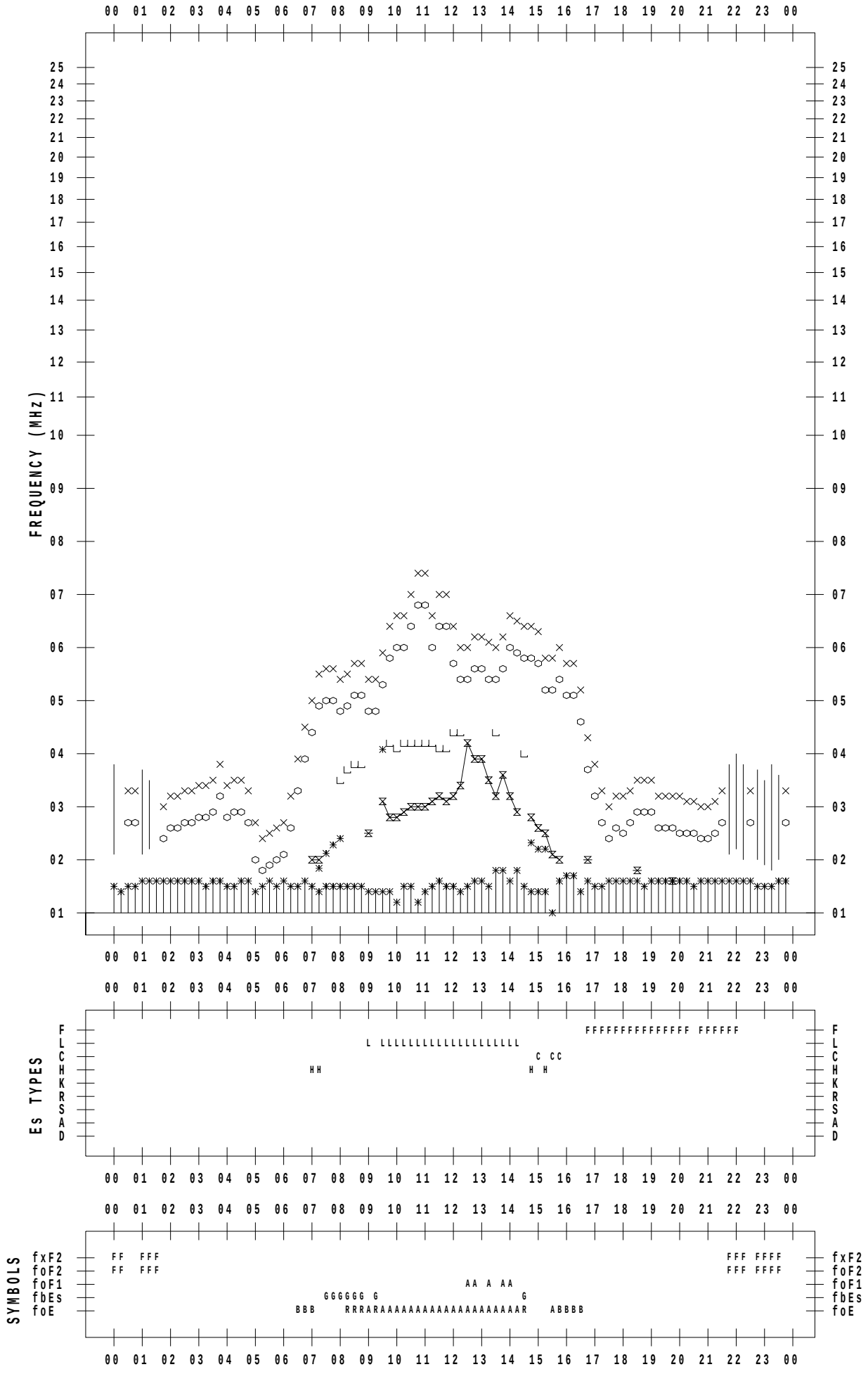
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/27

135 °E MEAN TIME



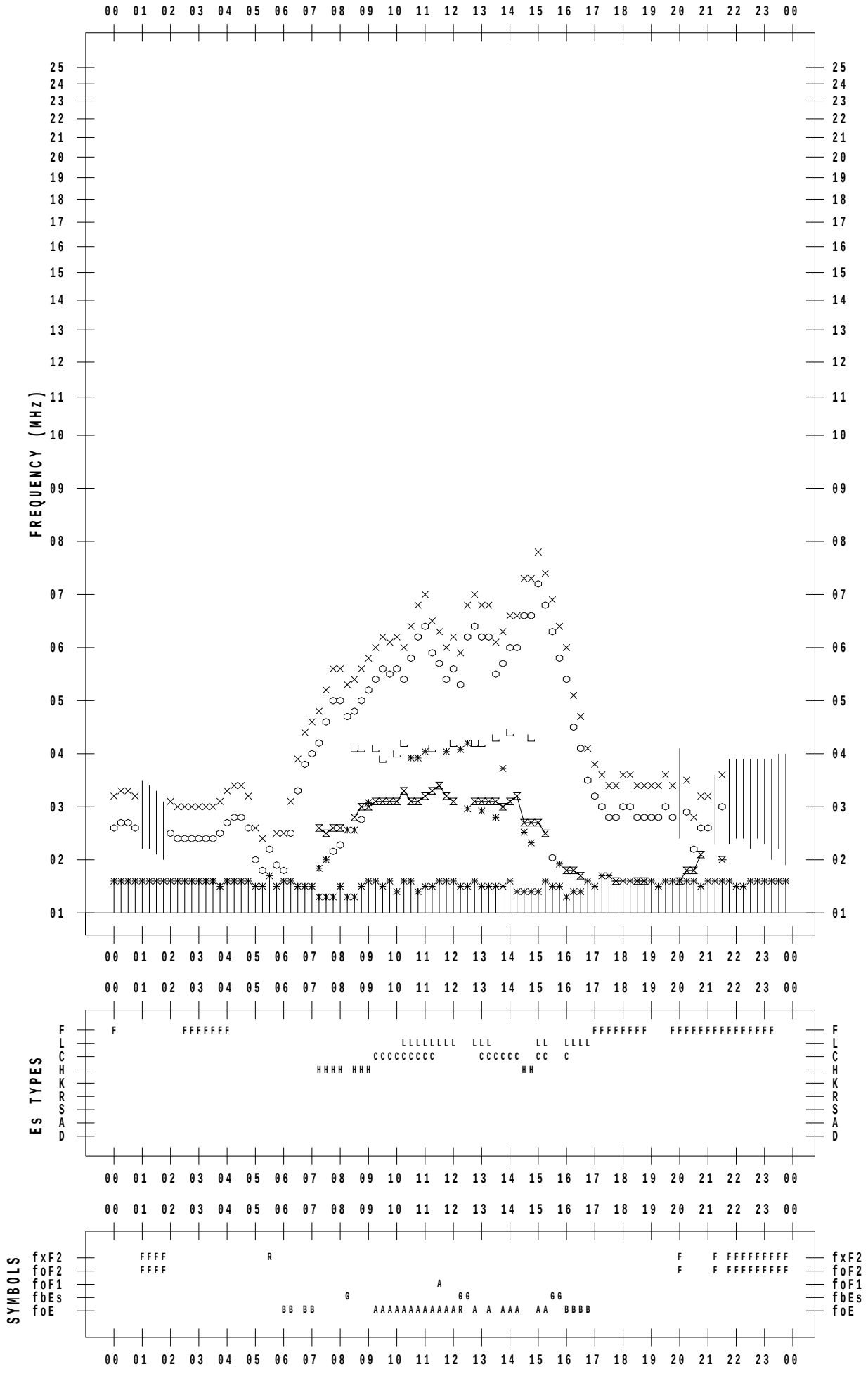
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/28

135 °E MEAN TIME



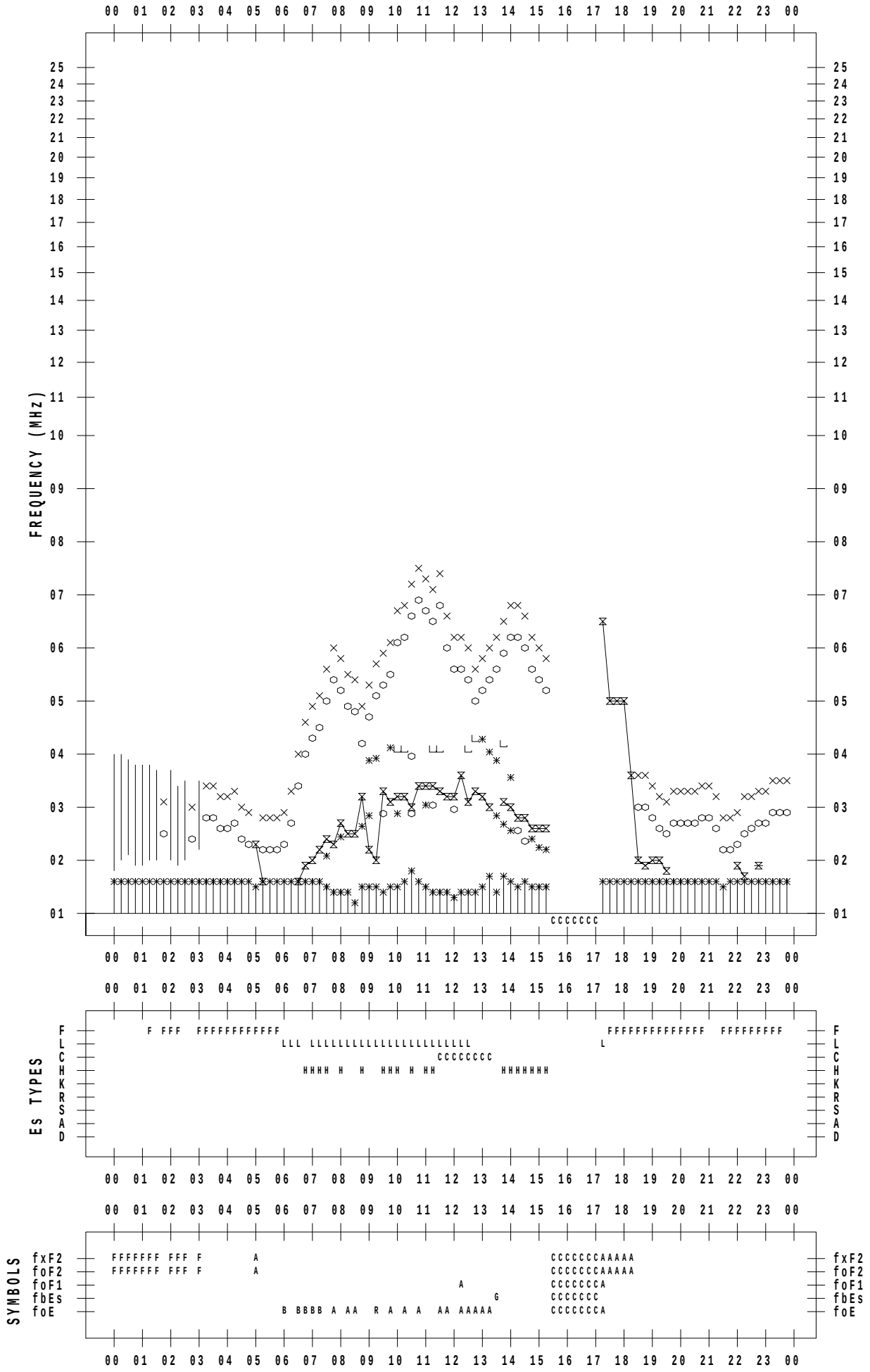
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/29

135 °E MEAN TIME



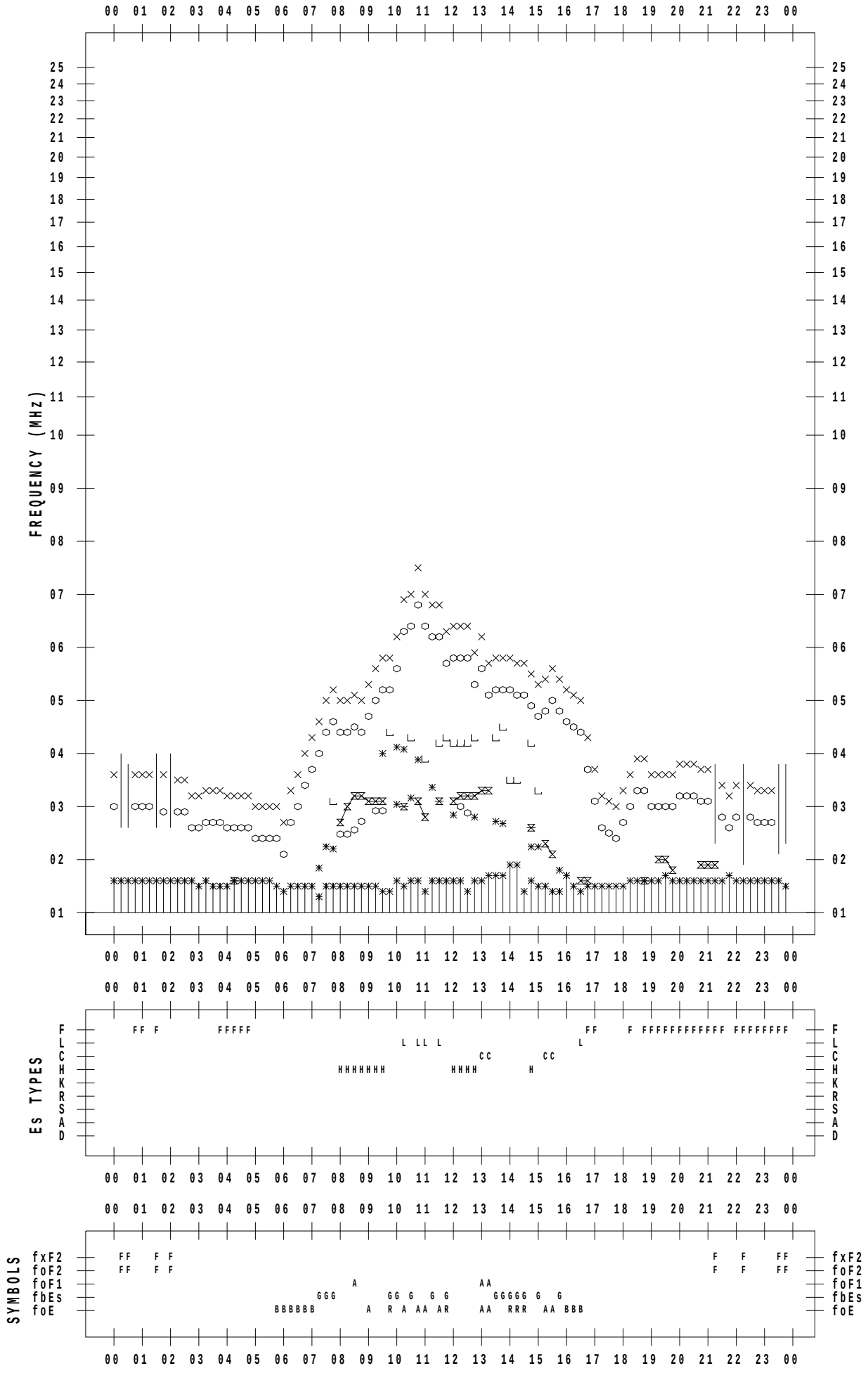
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2019/11/30

135 °E MEAN TIME



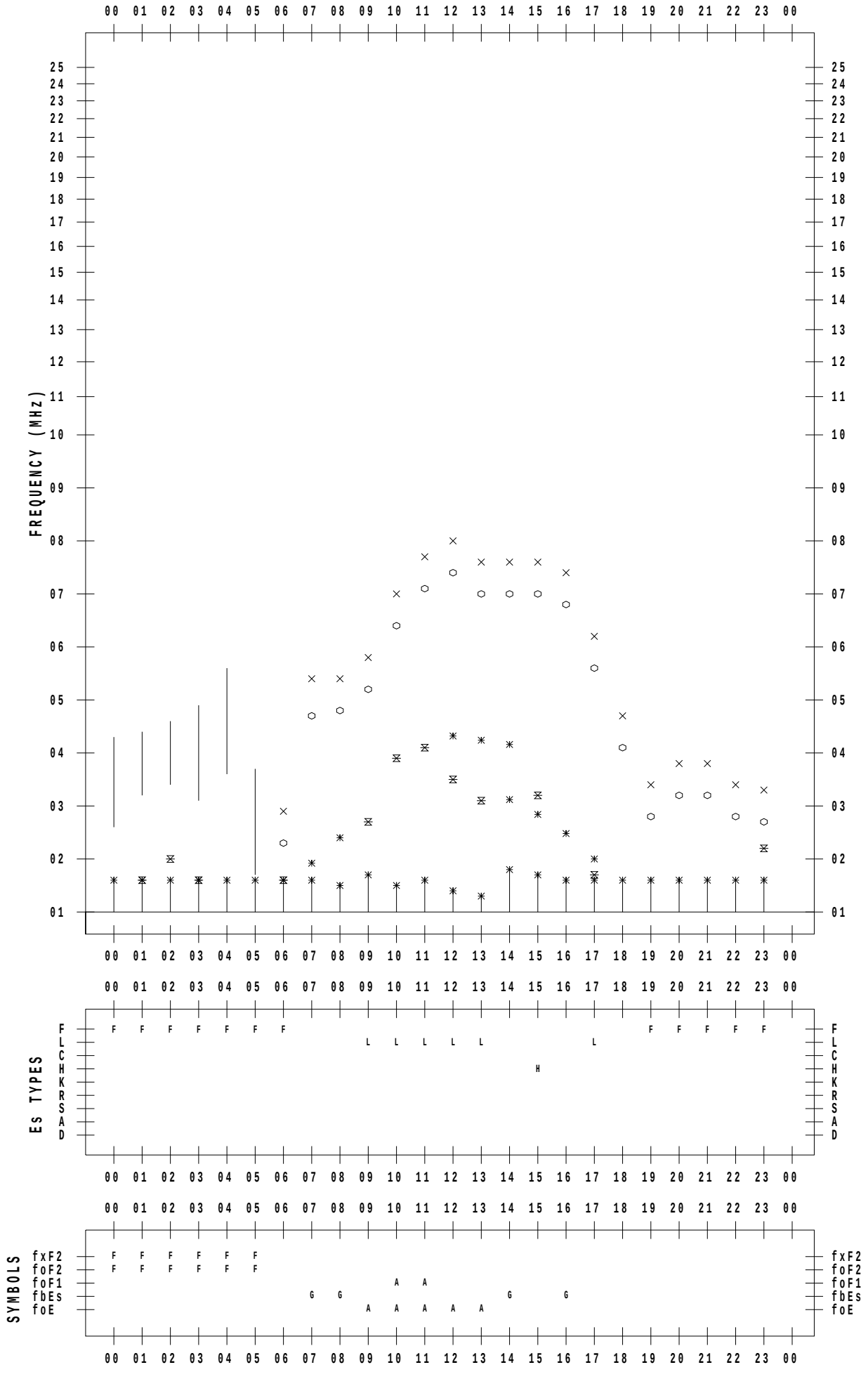
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/ 1

135 °E MEAN TIME



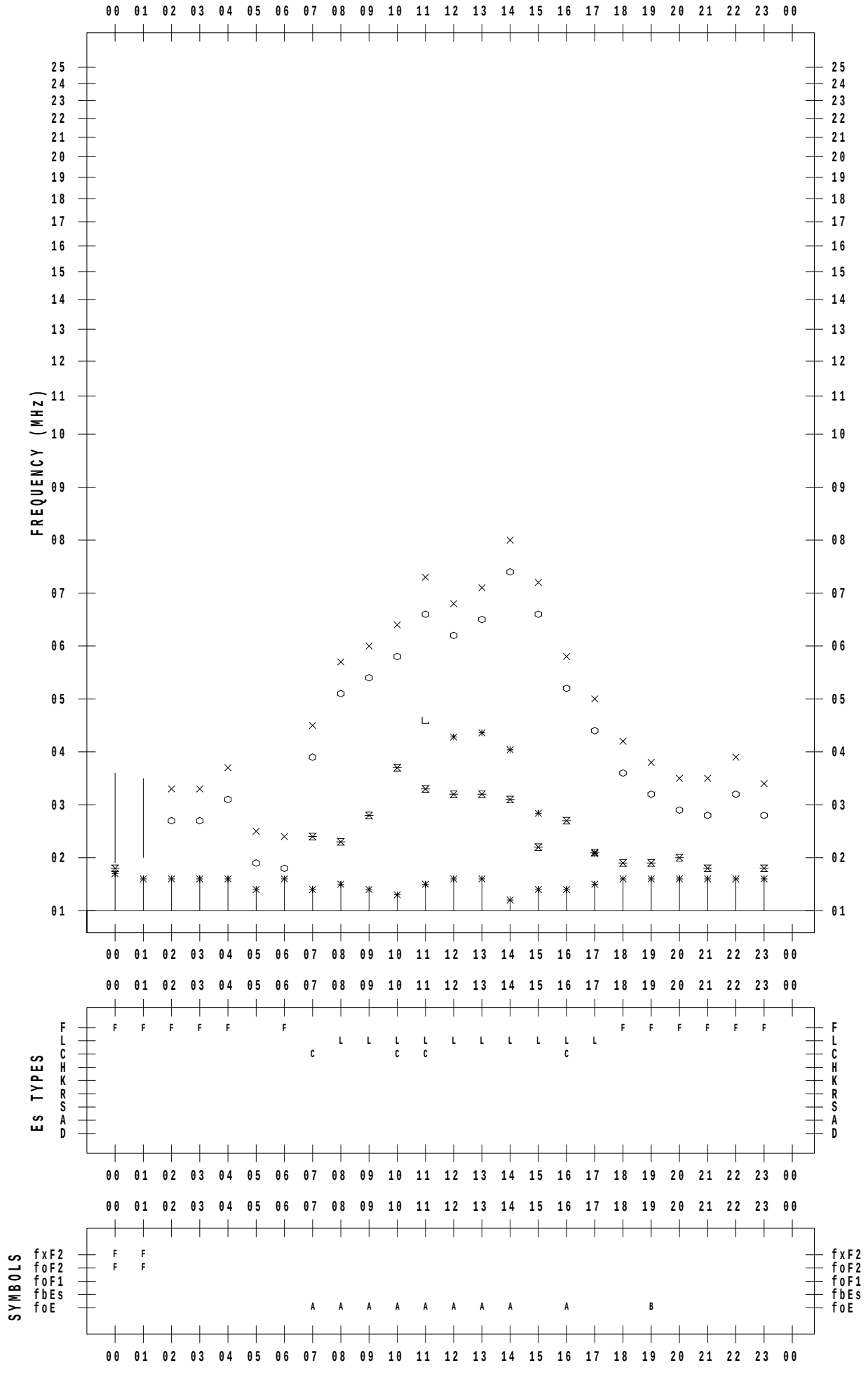
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/ 2

135 °E MEAN TIME



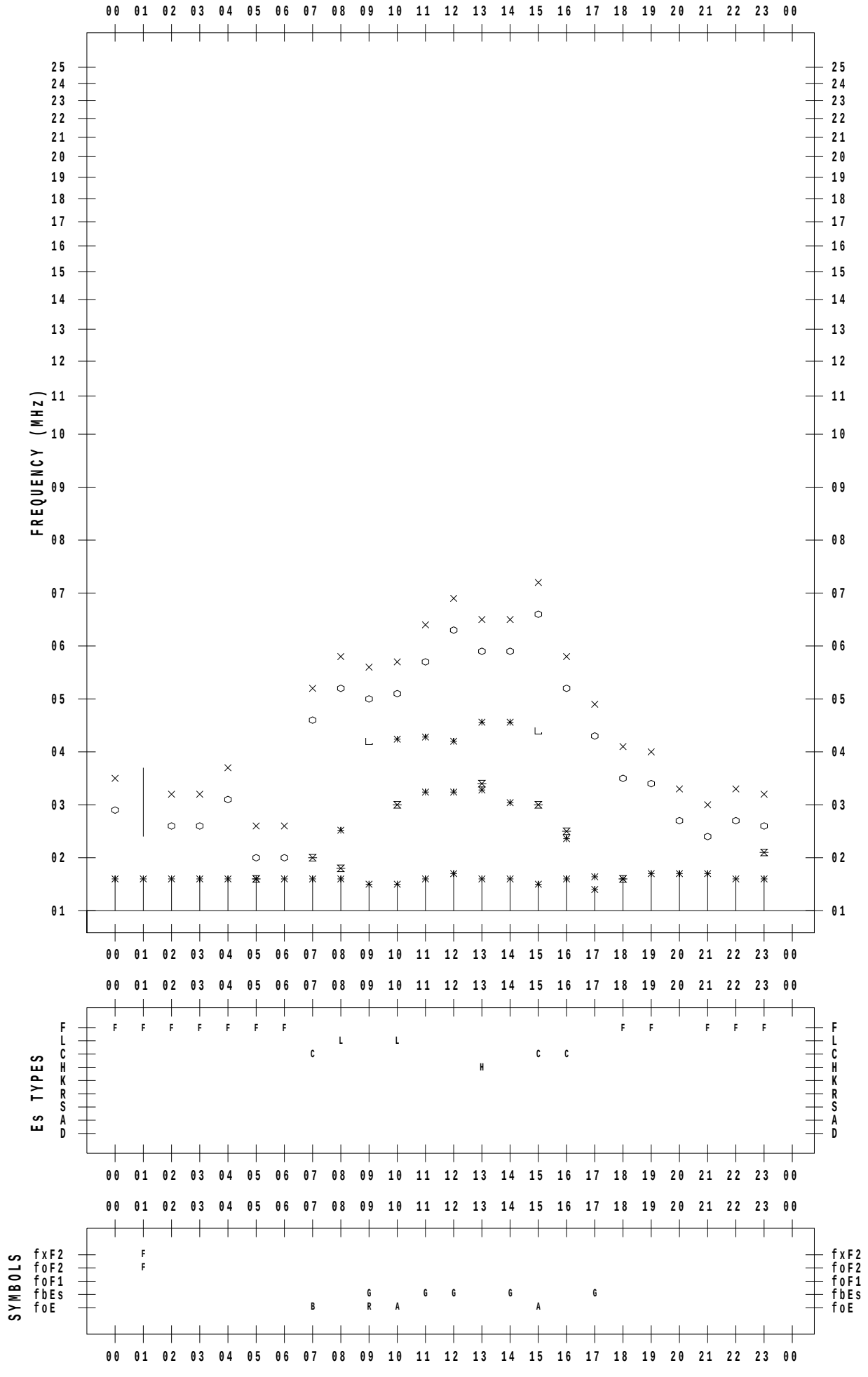
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/ 3

135 °E MEAN TIME



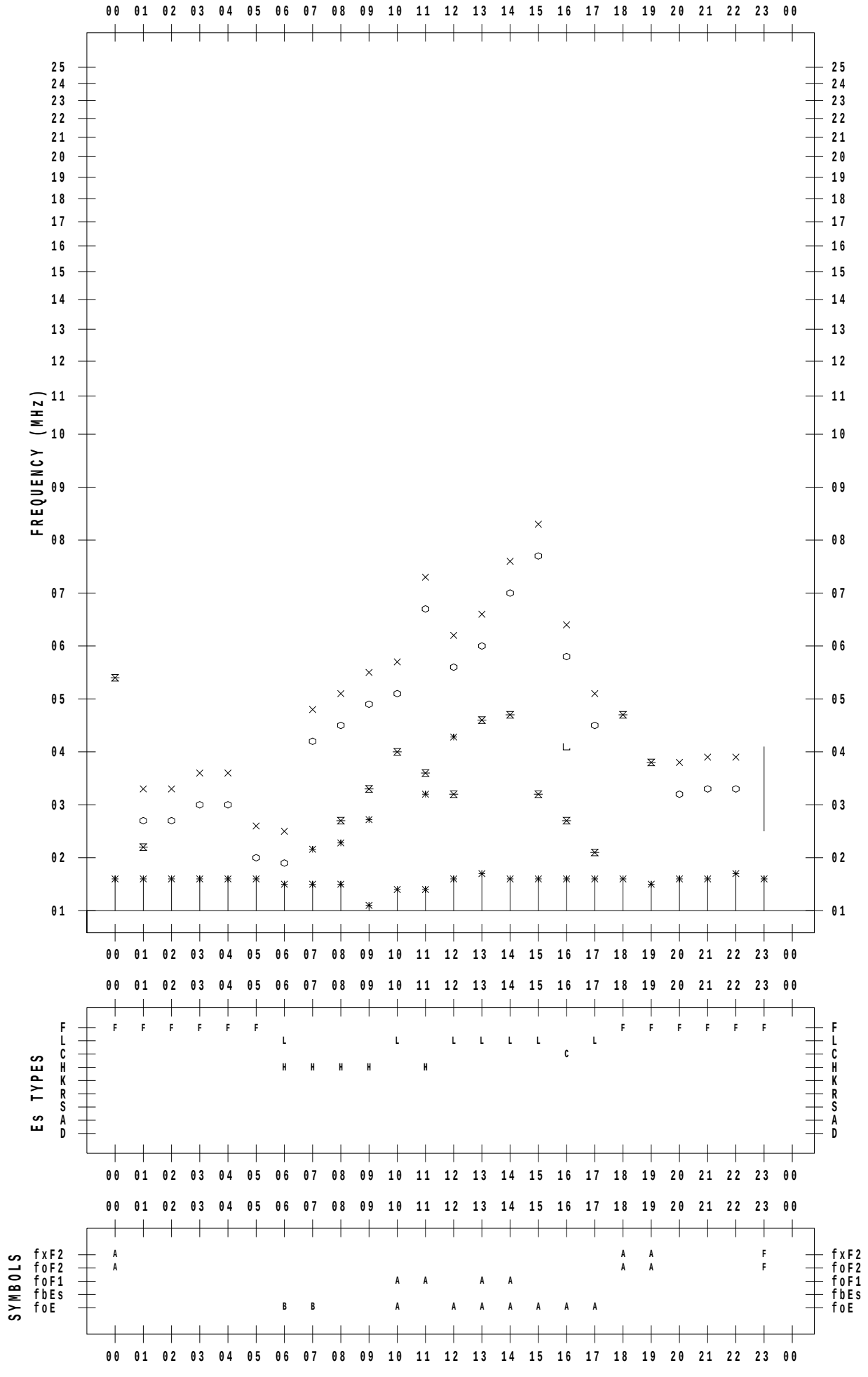
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/ 4

135 °E MEAN TIME



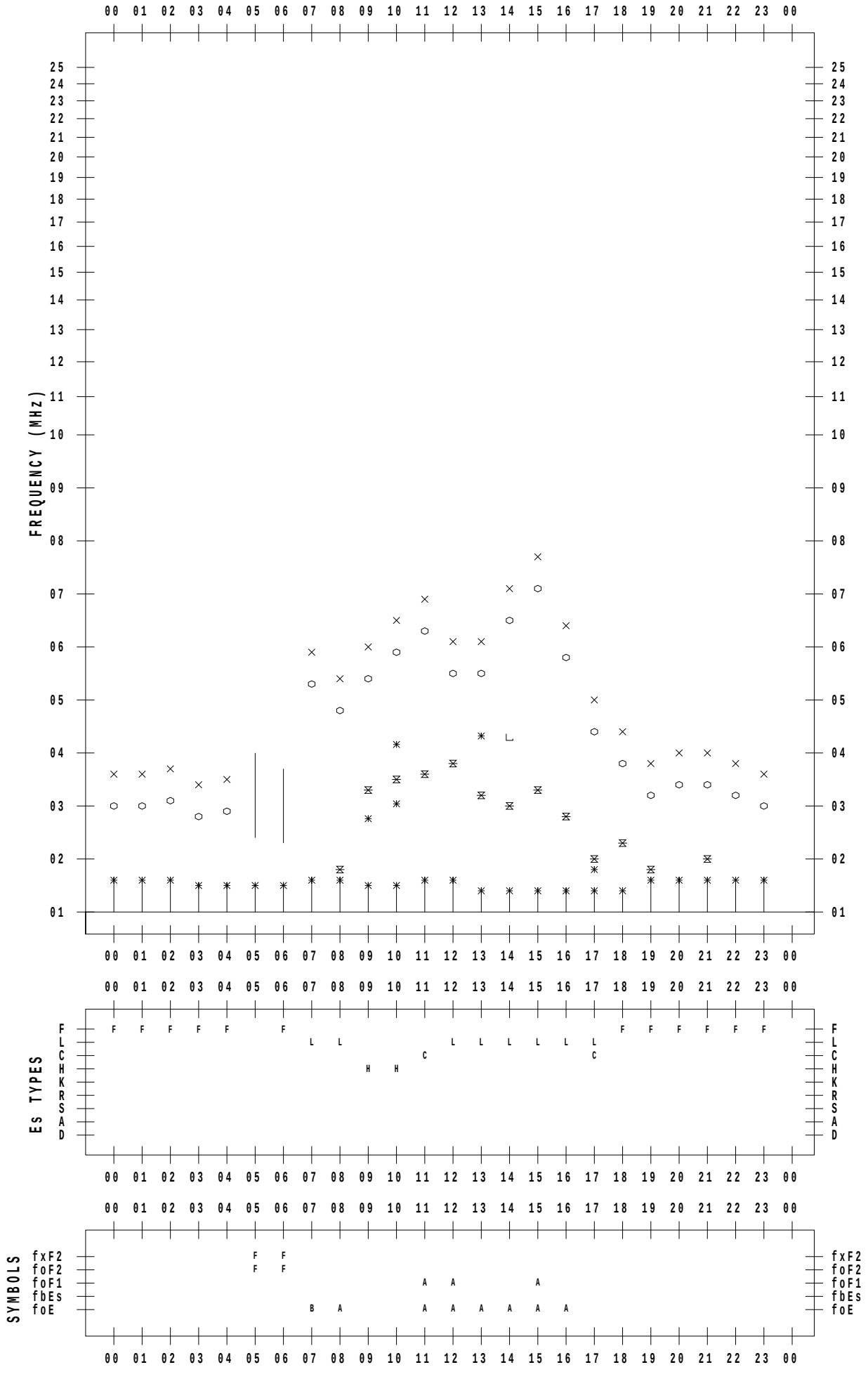
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/ 5

135 °E MEAN TIME



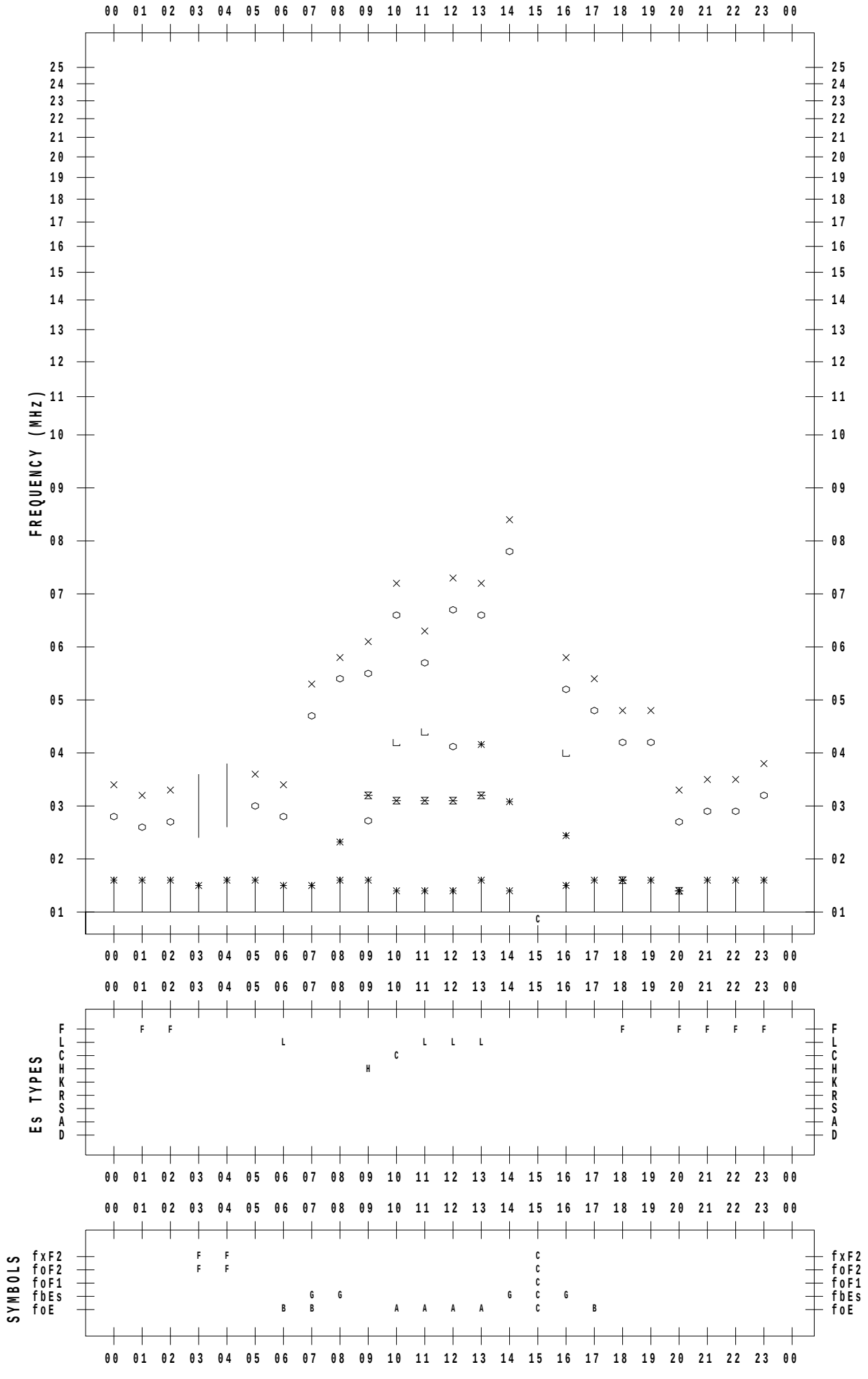
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/ 6

135 °E MEAN TIME



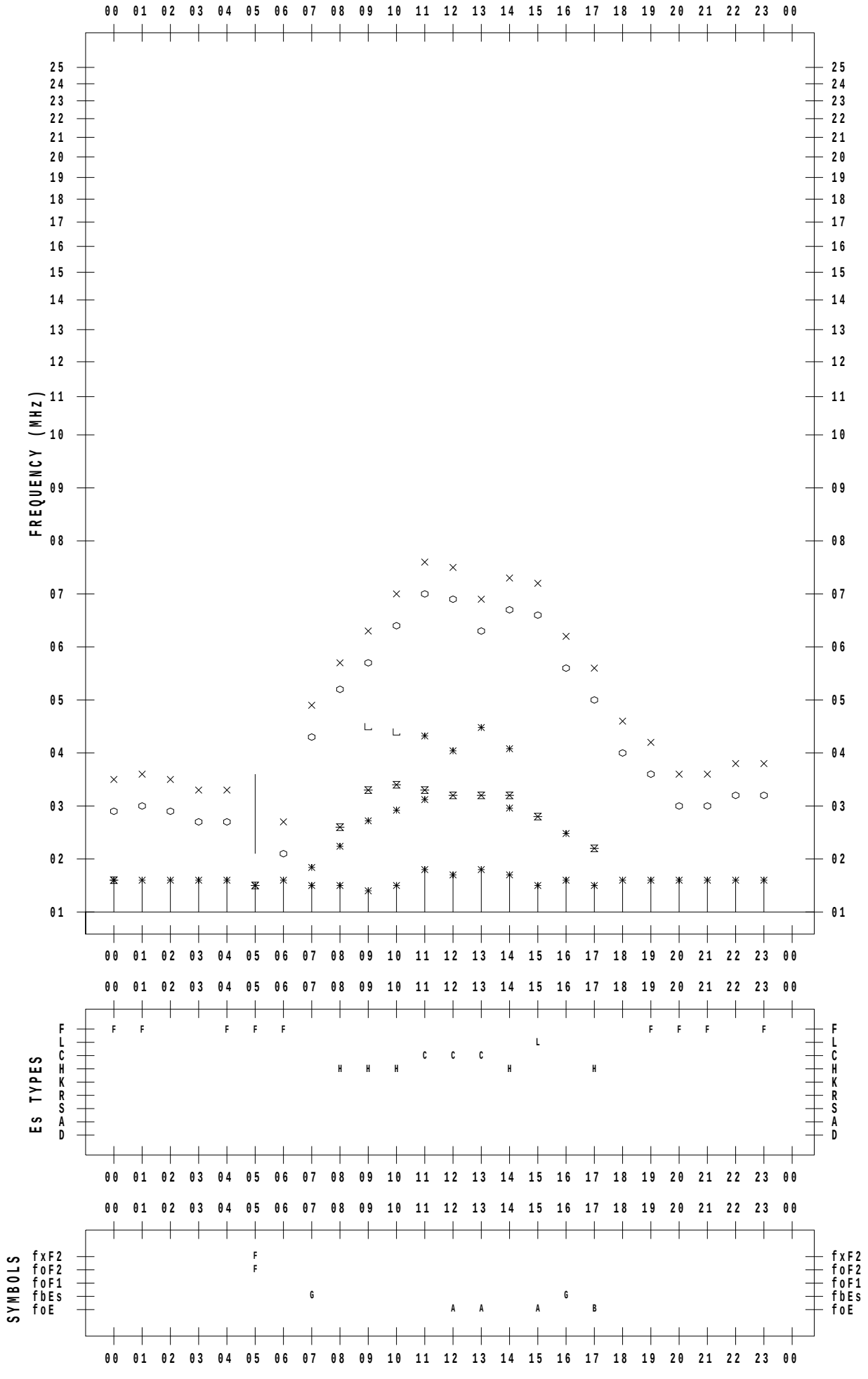
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/ 7

135 °E MEAN TIME



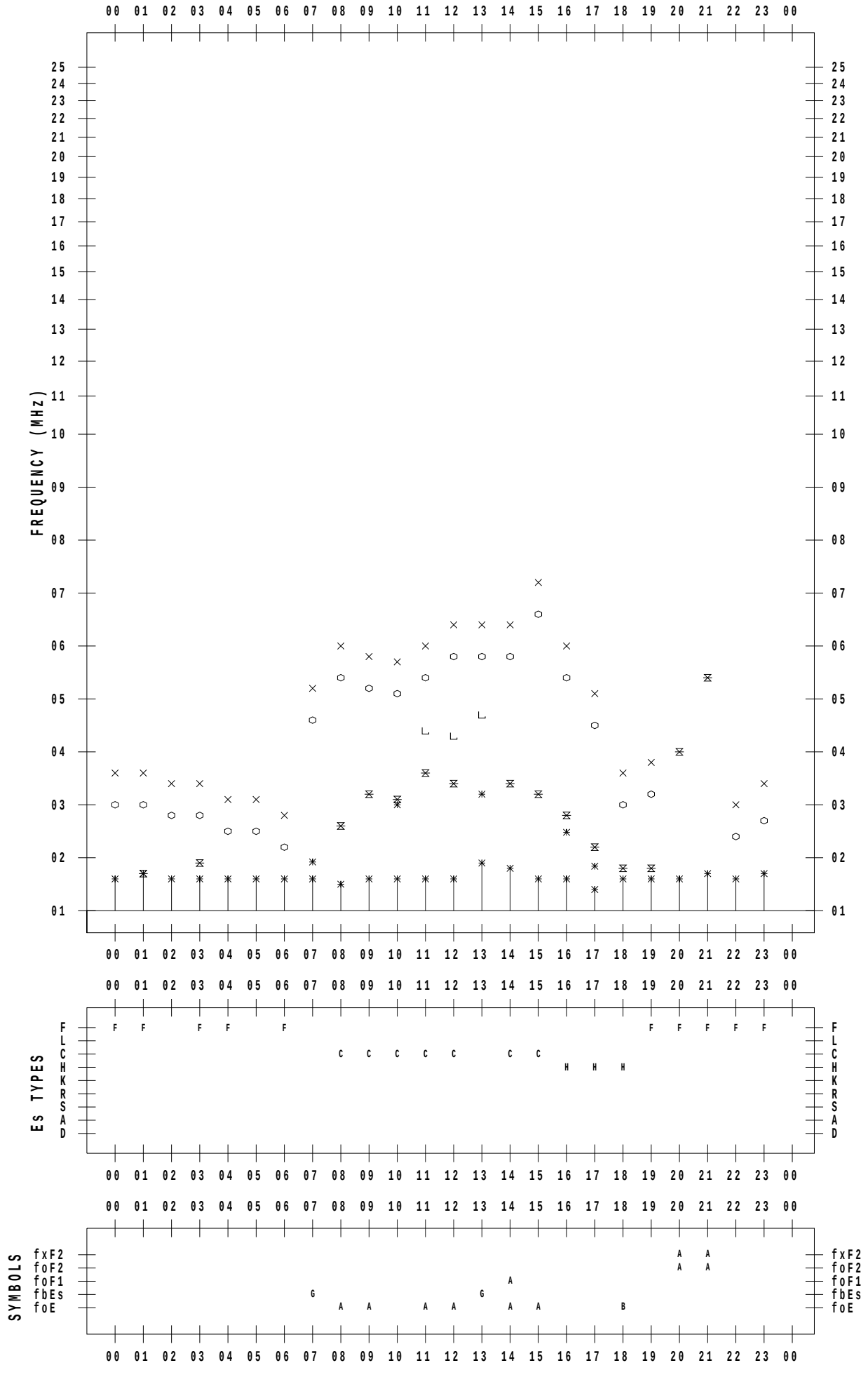
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/ 8

135 °E MEAN TIME



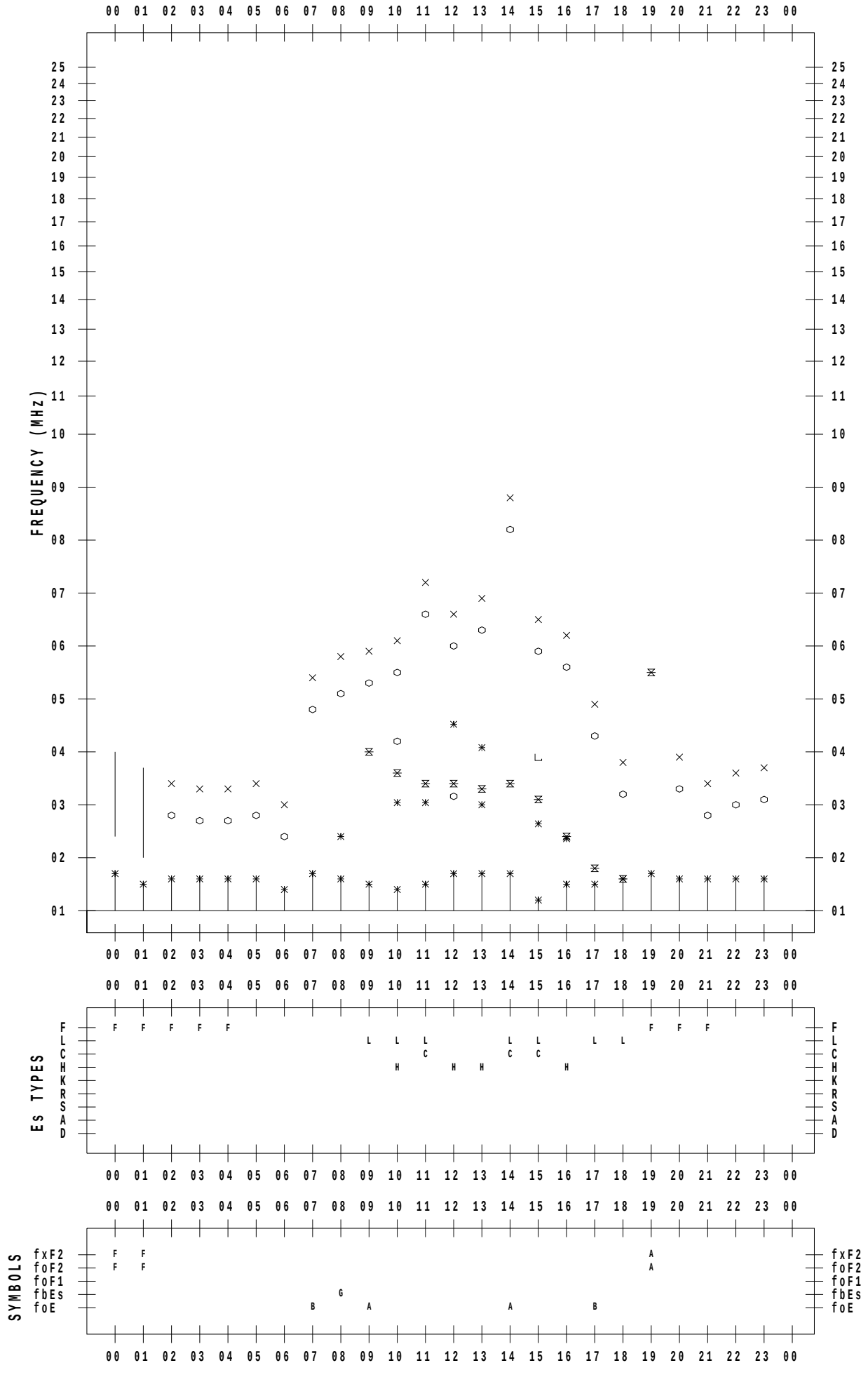
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/ 9

135 °E MEAN TIME



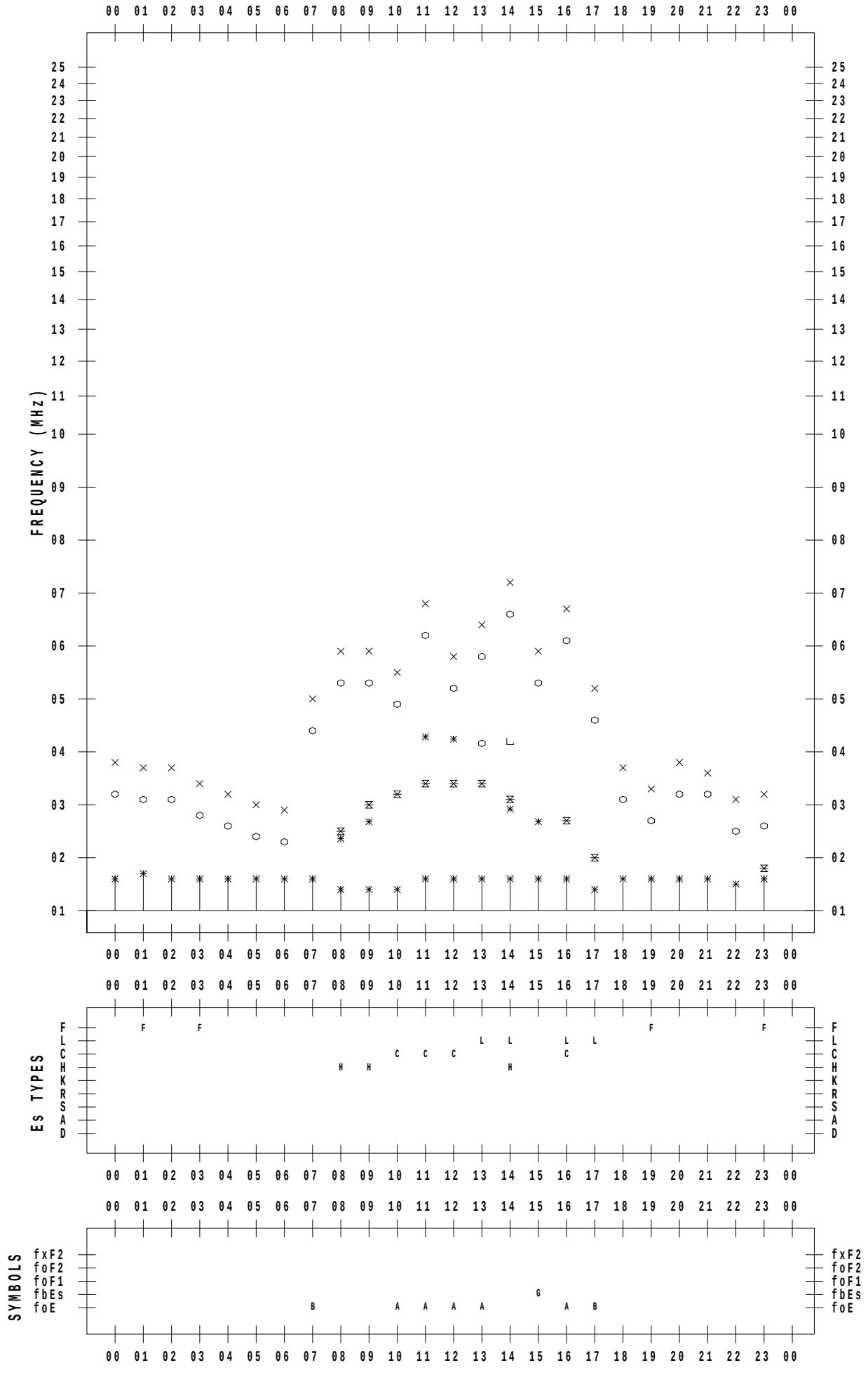
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/10

135 °E MEAN TIME



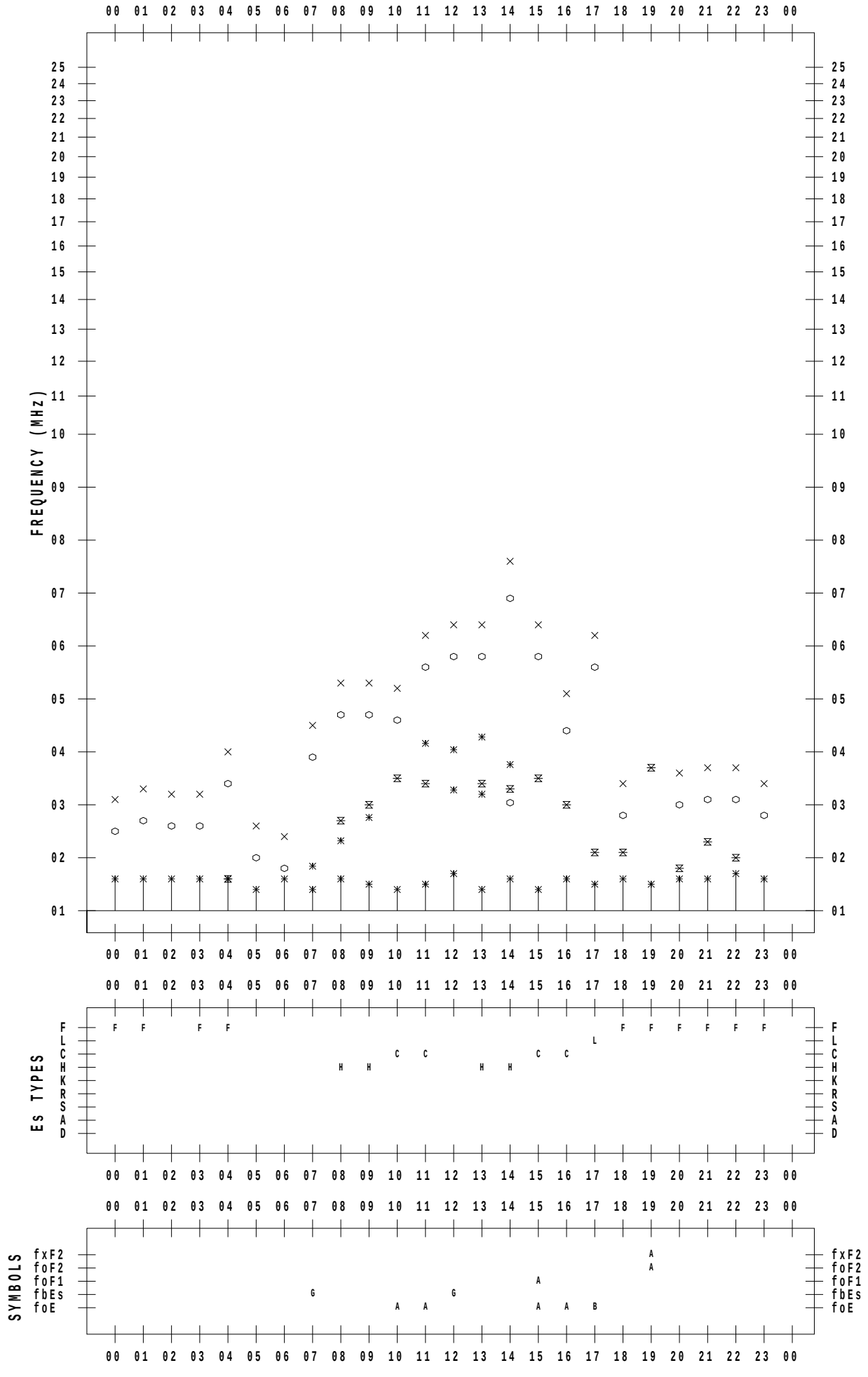
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/11

135 °E MEAN TIME



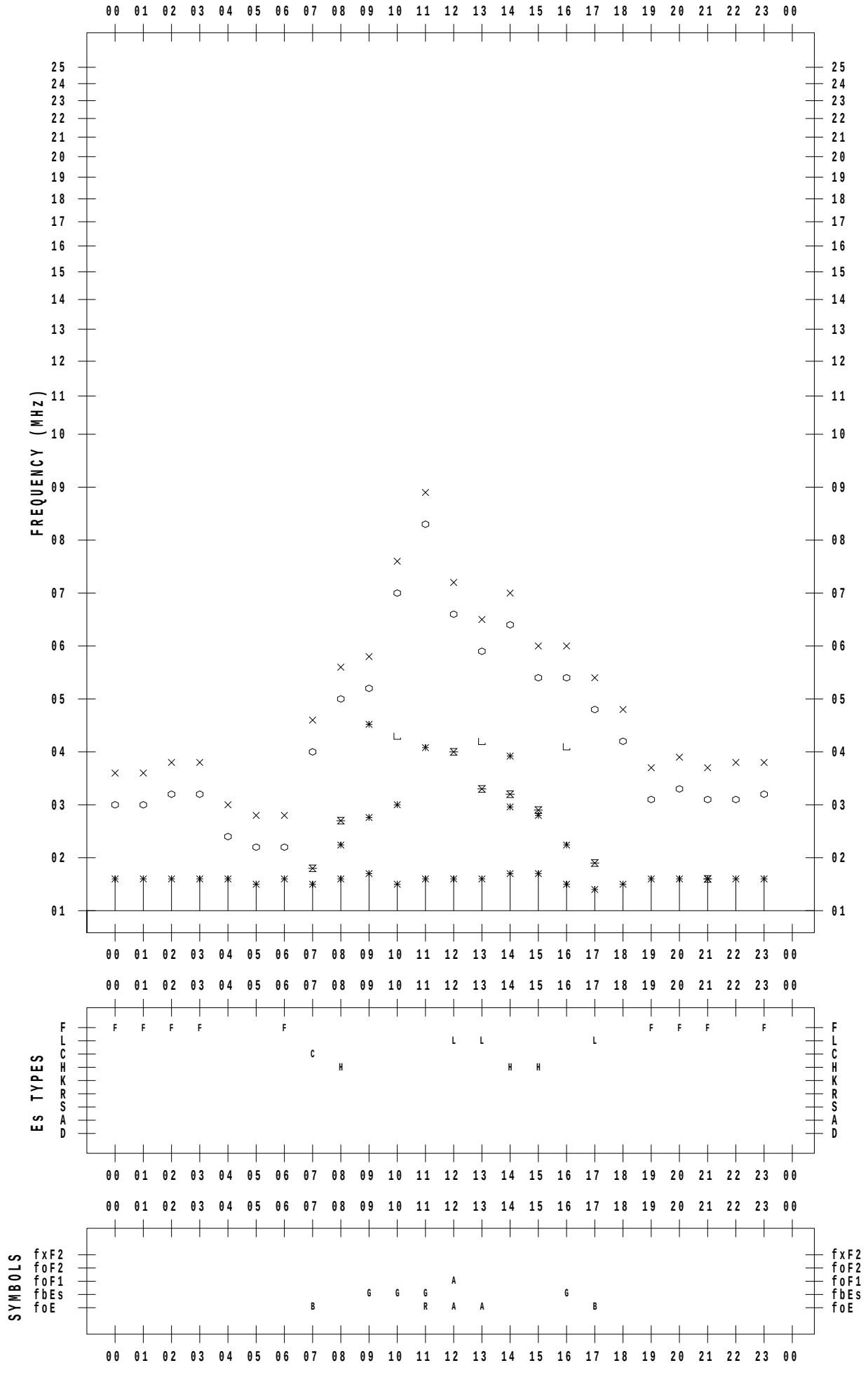
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/12

135 °E MEAN TIME



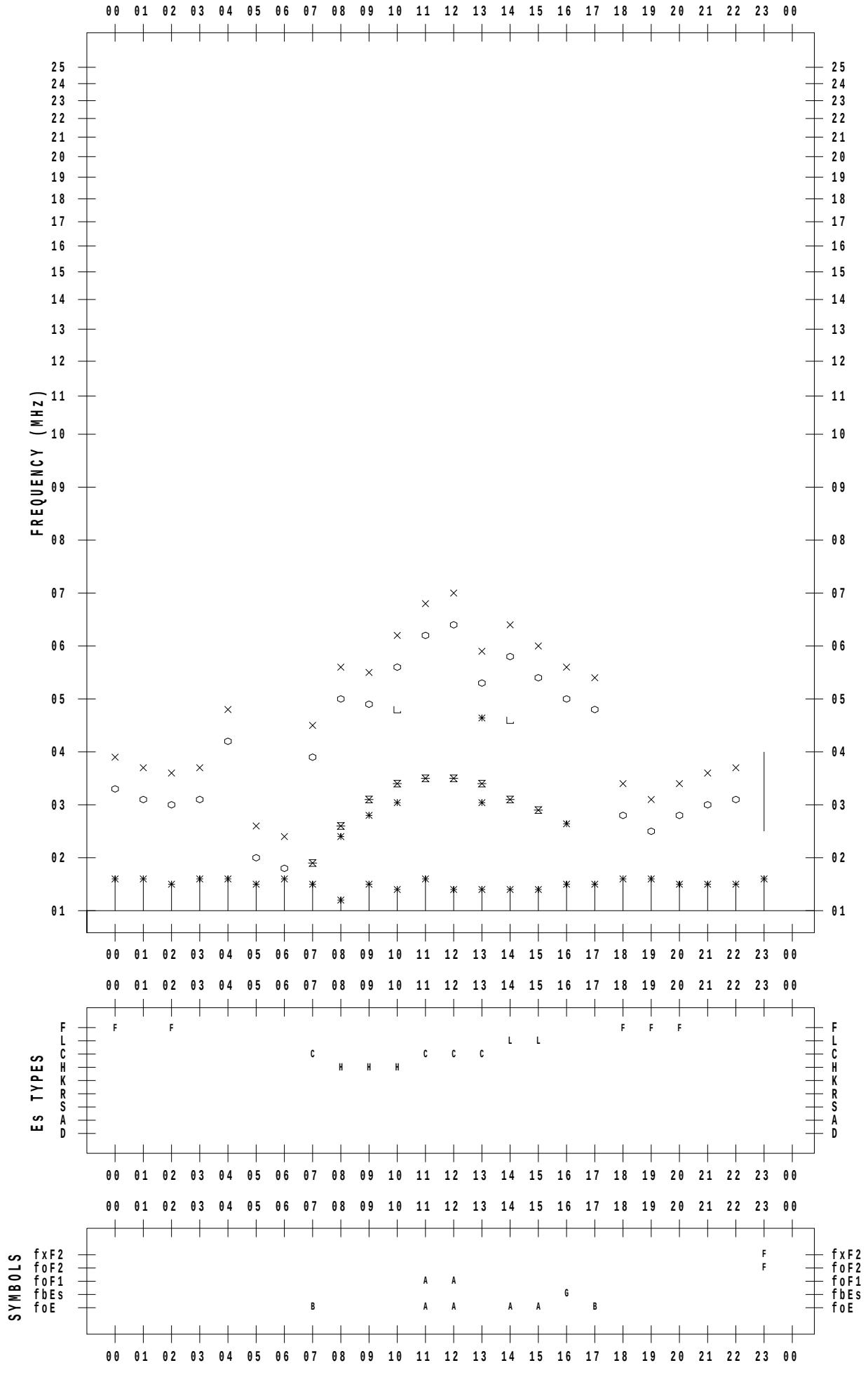
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/13

135 °E MEAN TIME



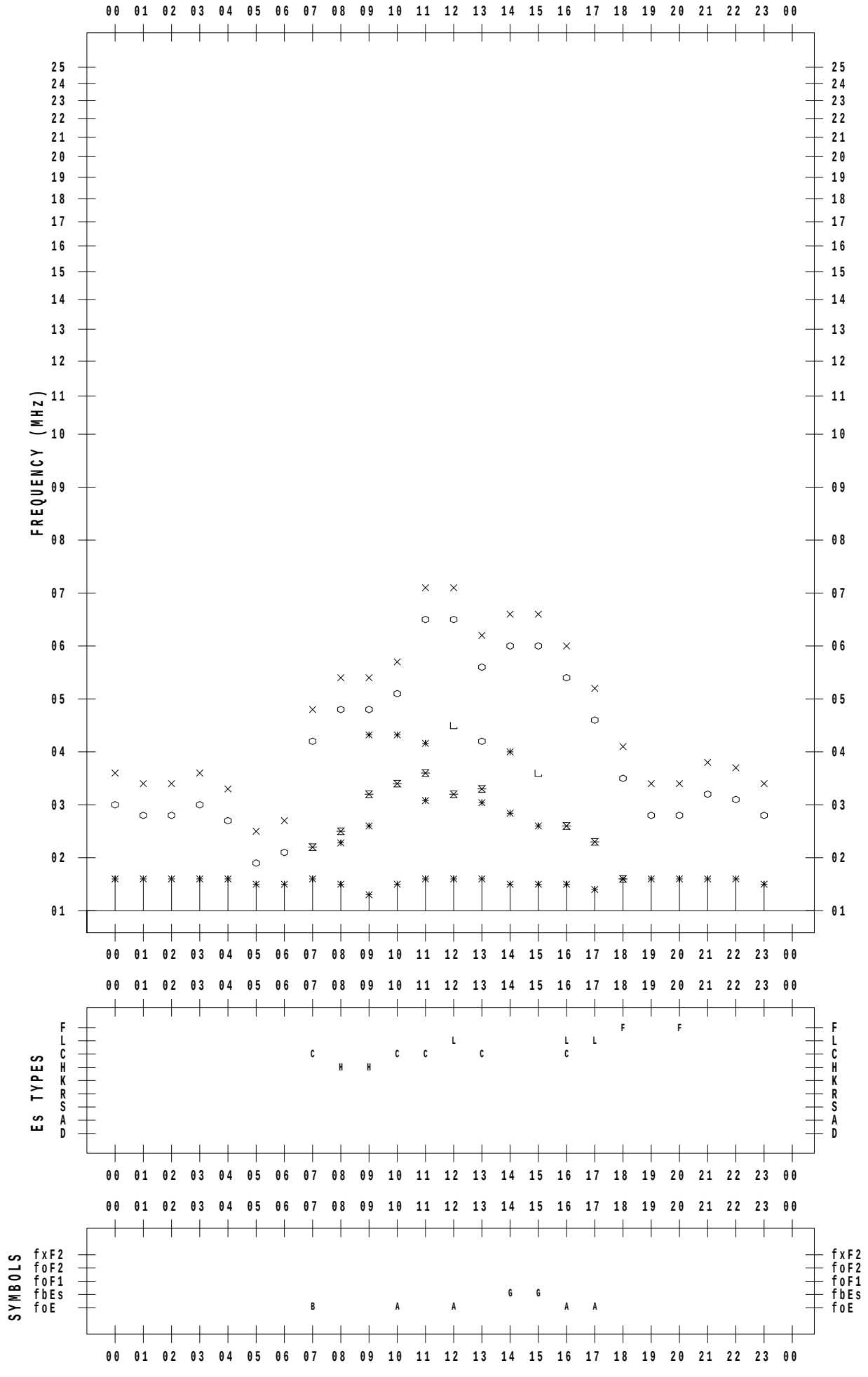
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/14

135 °E MEAN TIME



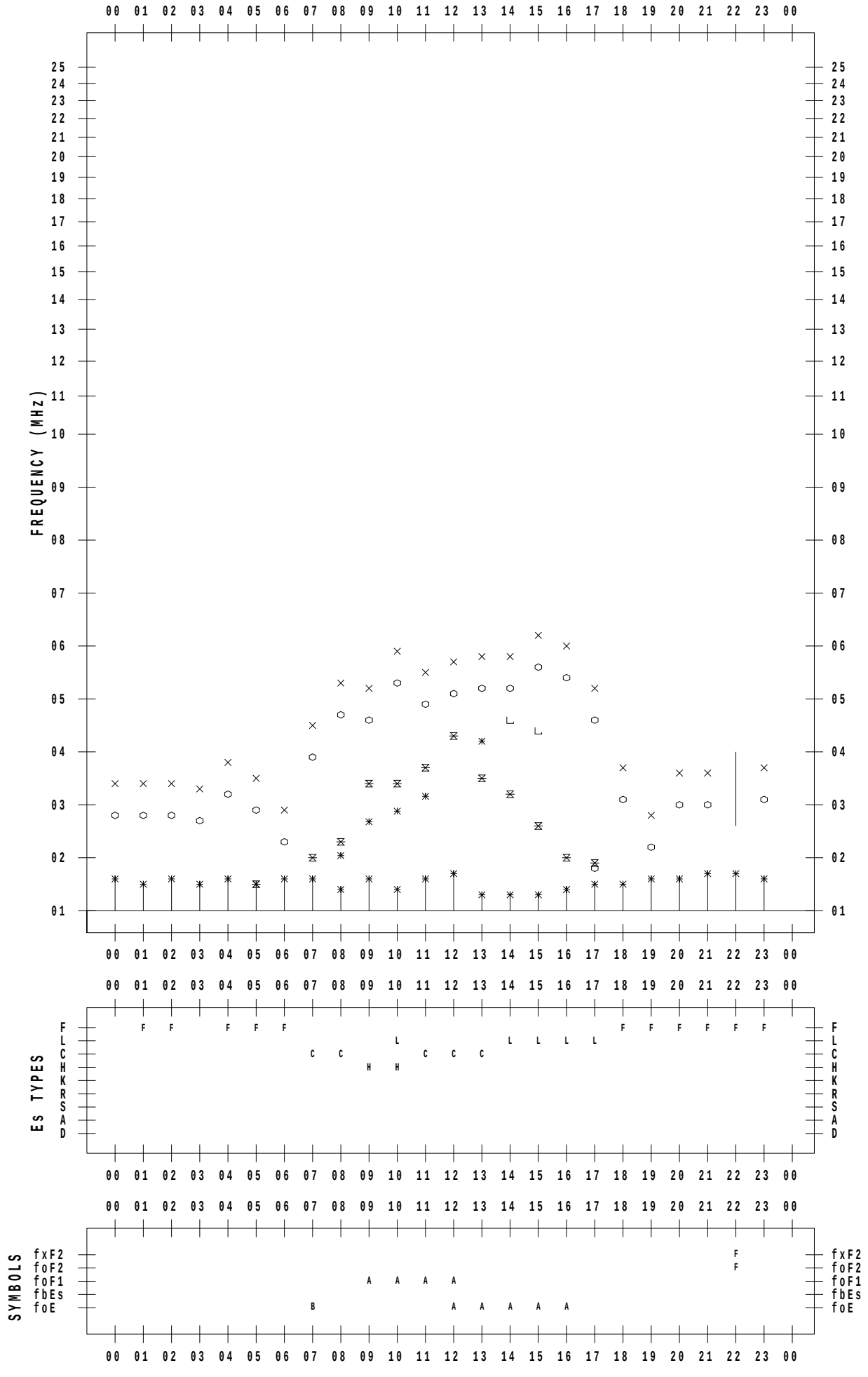
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/15

135 °E MEAN TIME



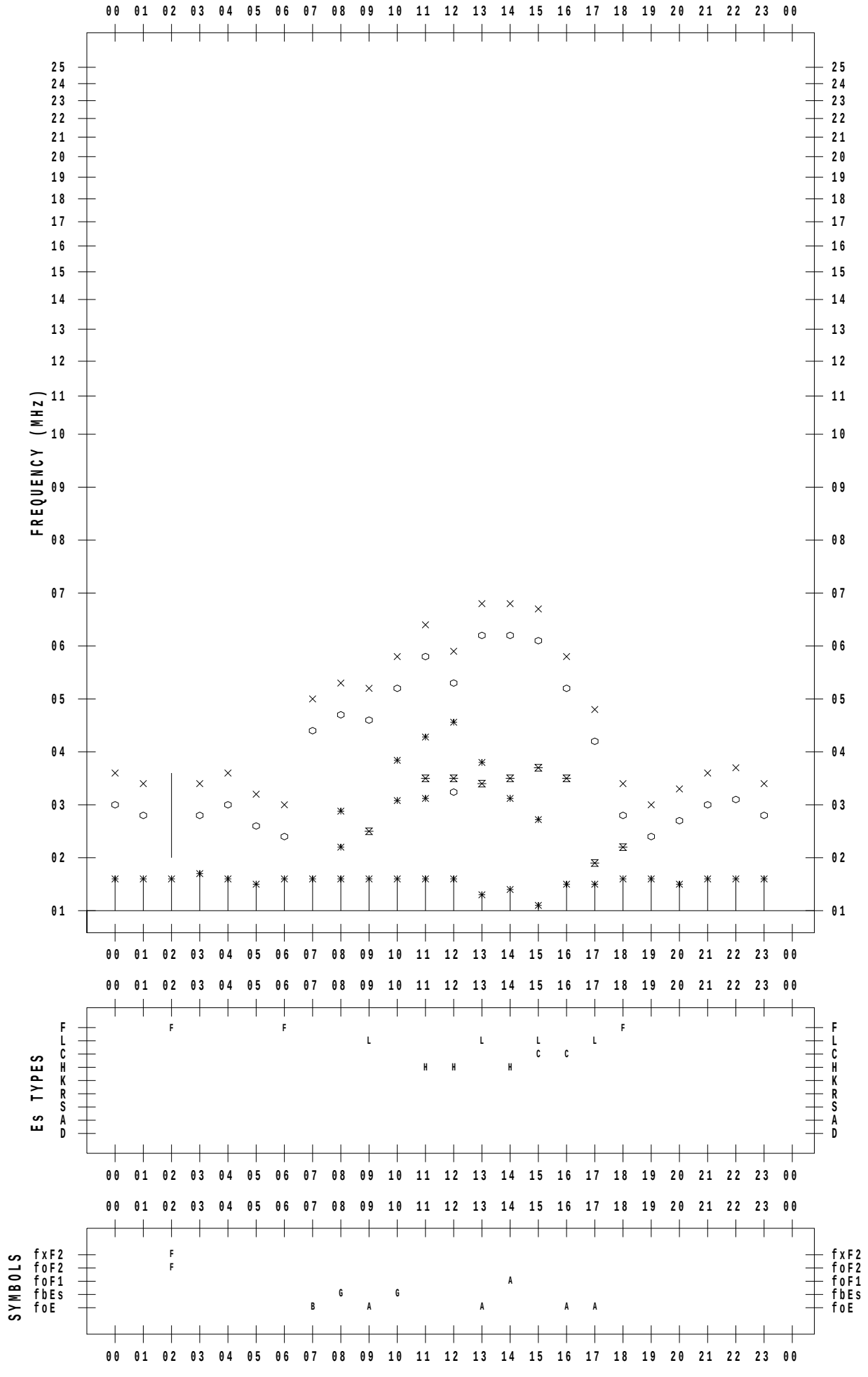
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/16

135 °E MEAN TIME



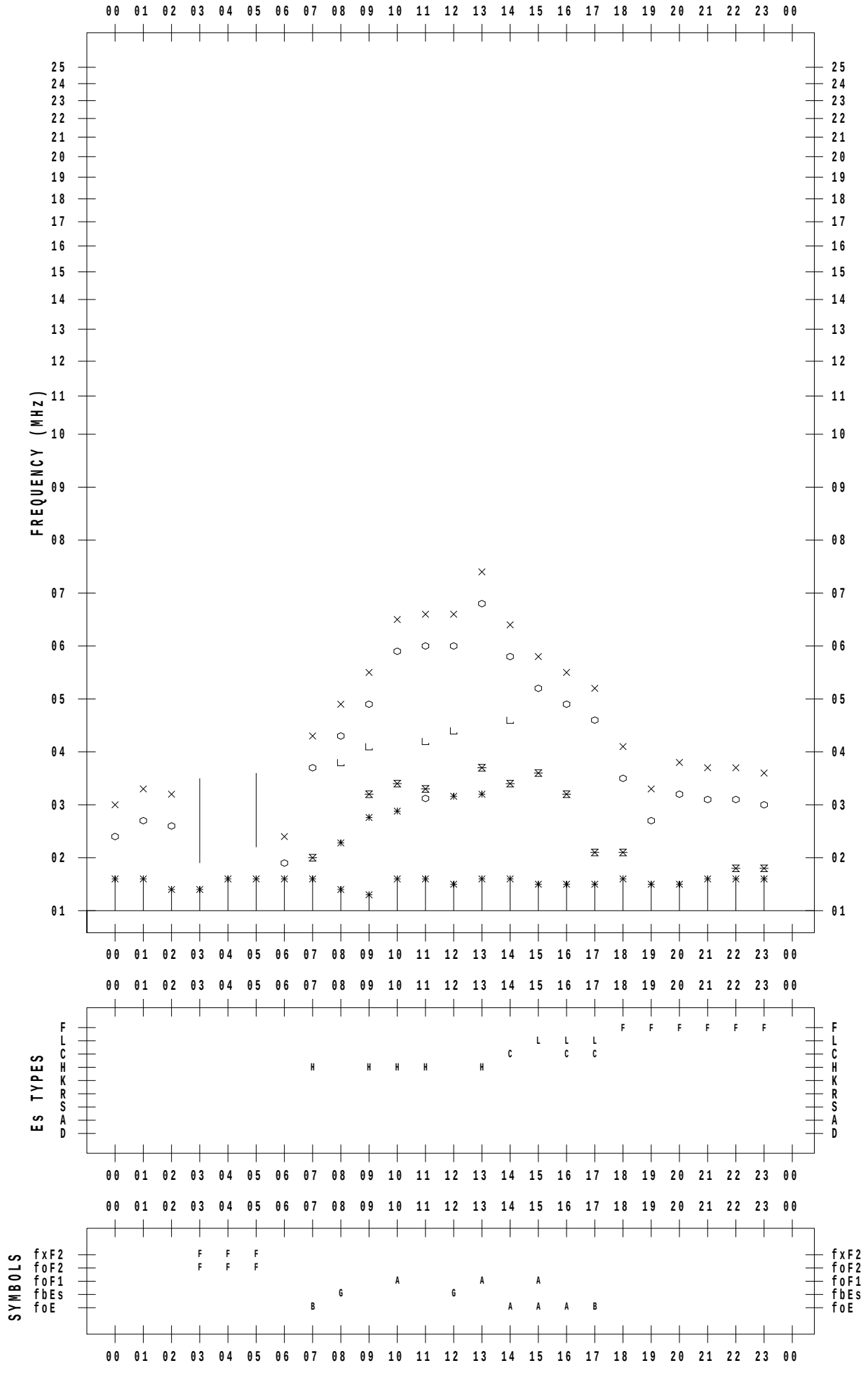
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/17

135 °E MEAN TIME



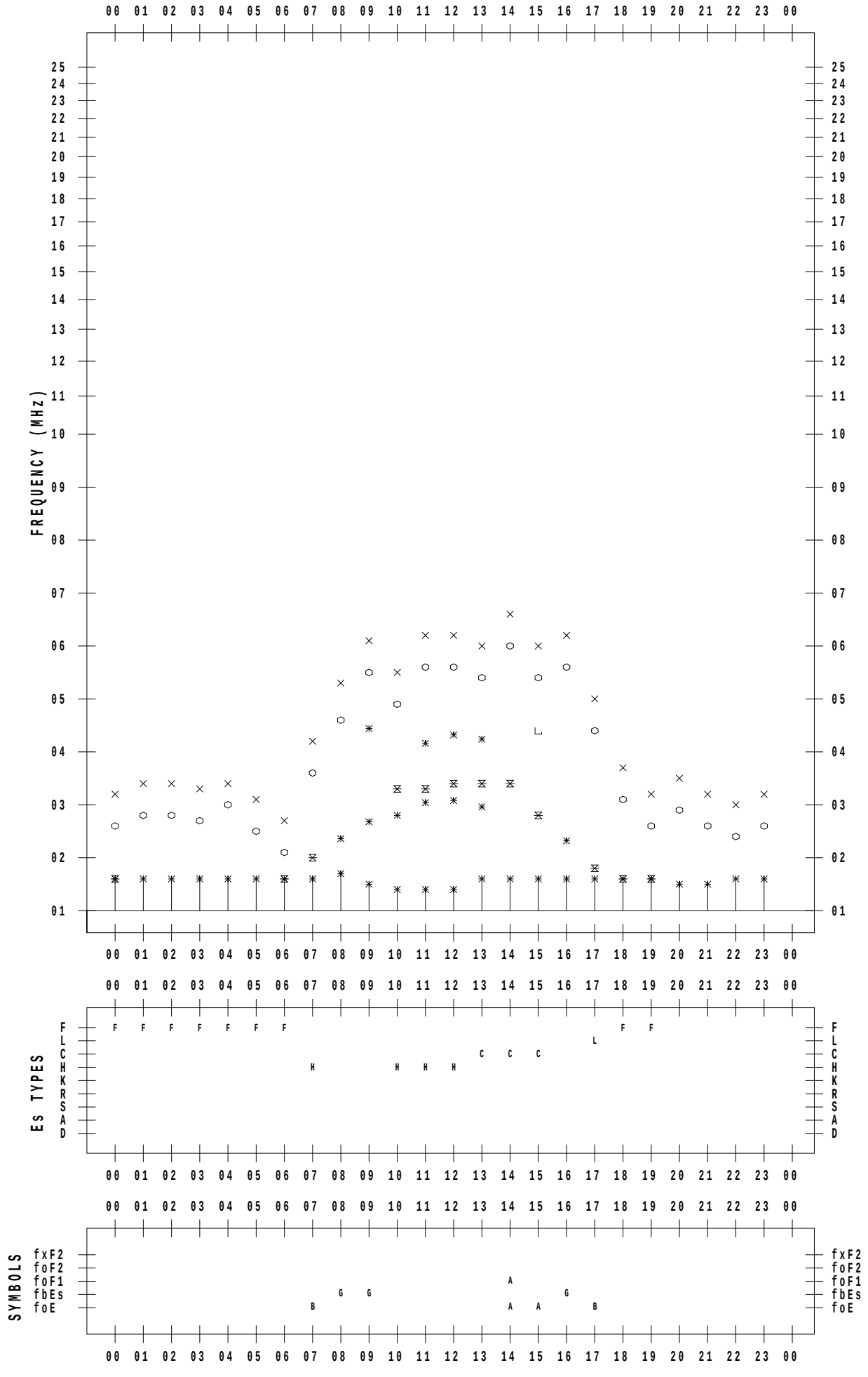
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/18

135 °E MEAN TIME



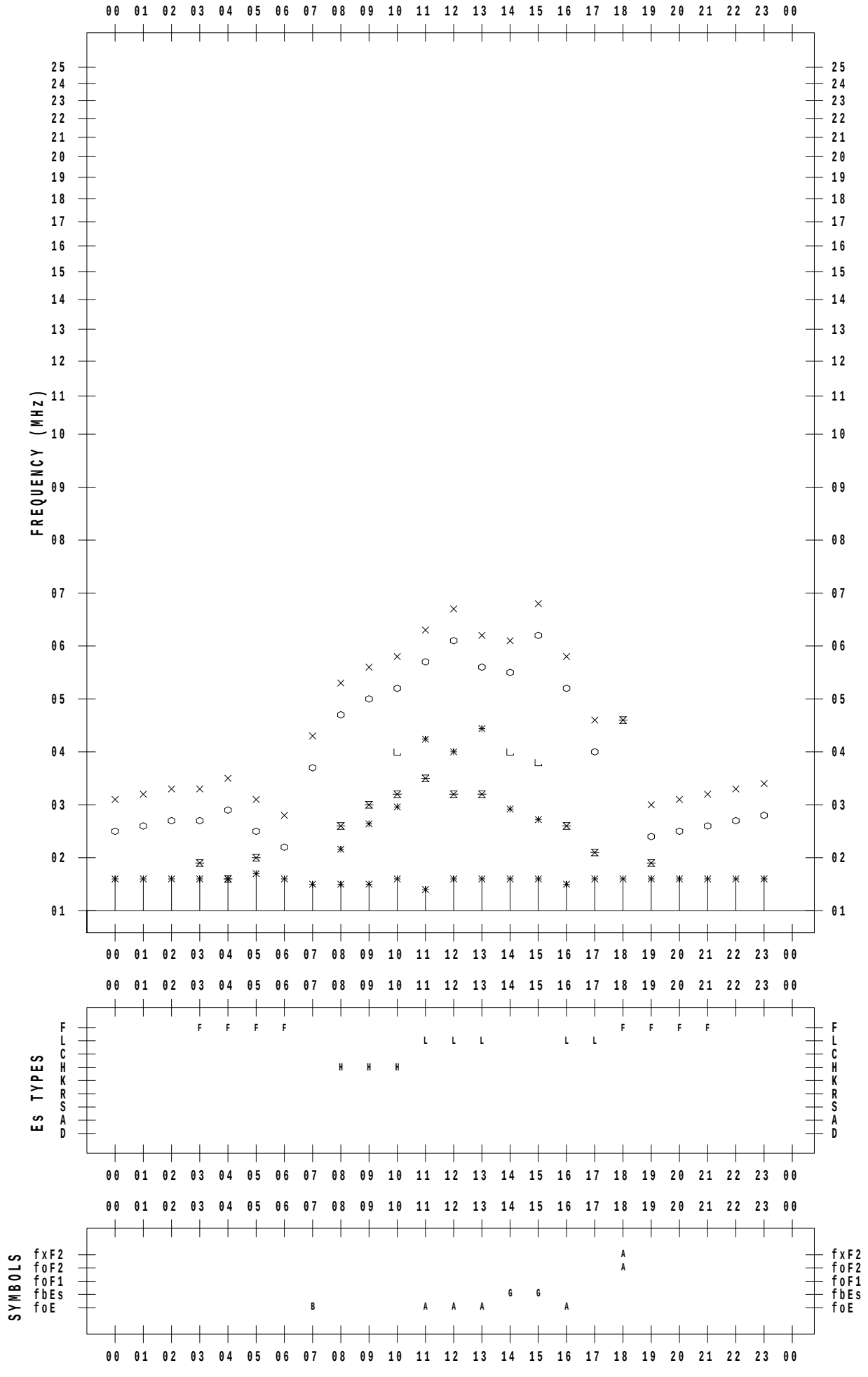
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/19

135 °E MEAN TIME



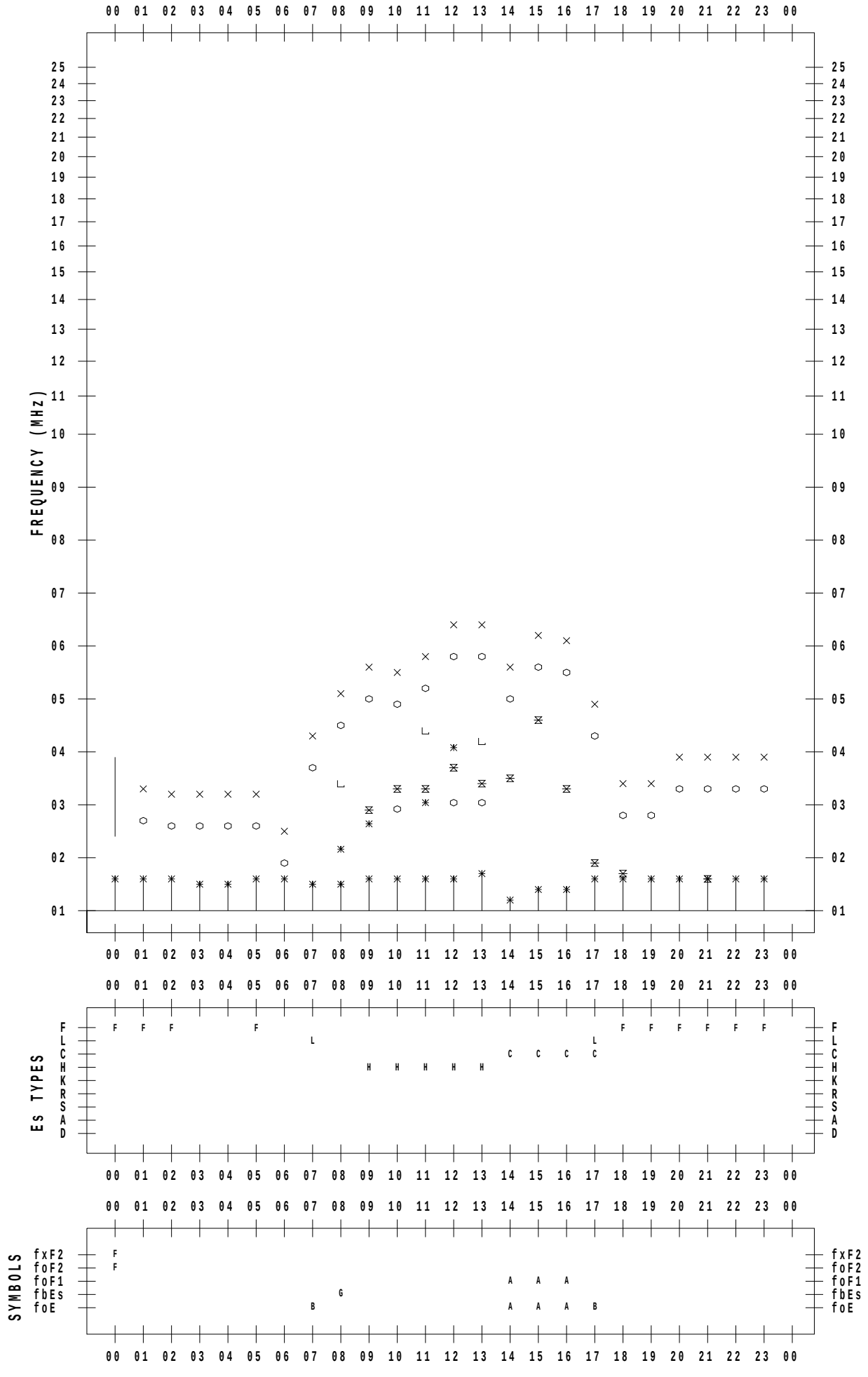
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/20

135 °E MEAN TIME



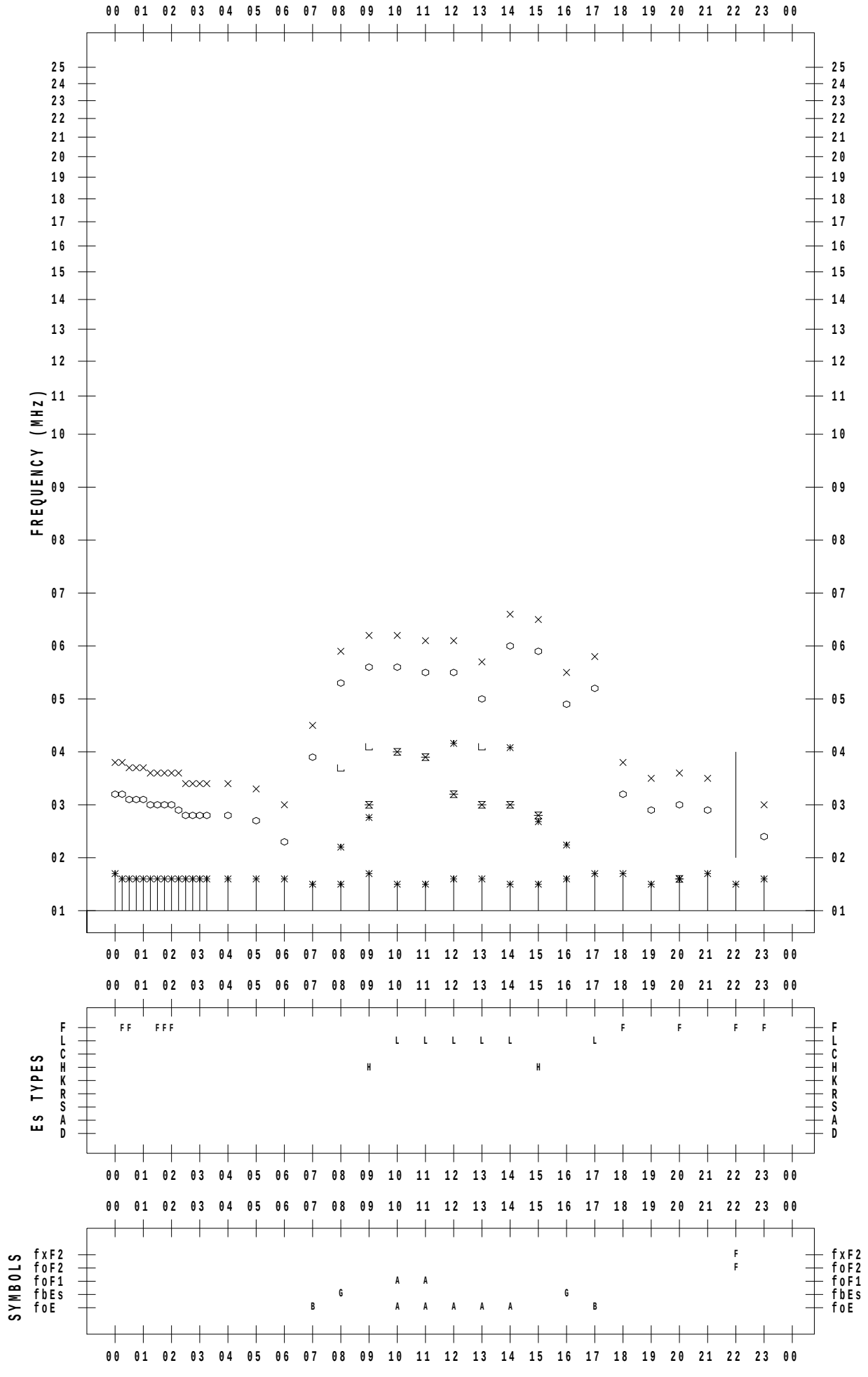
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/21

135 °E MEAN TIME



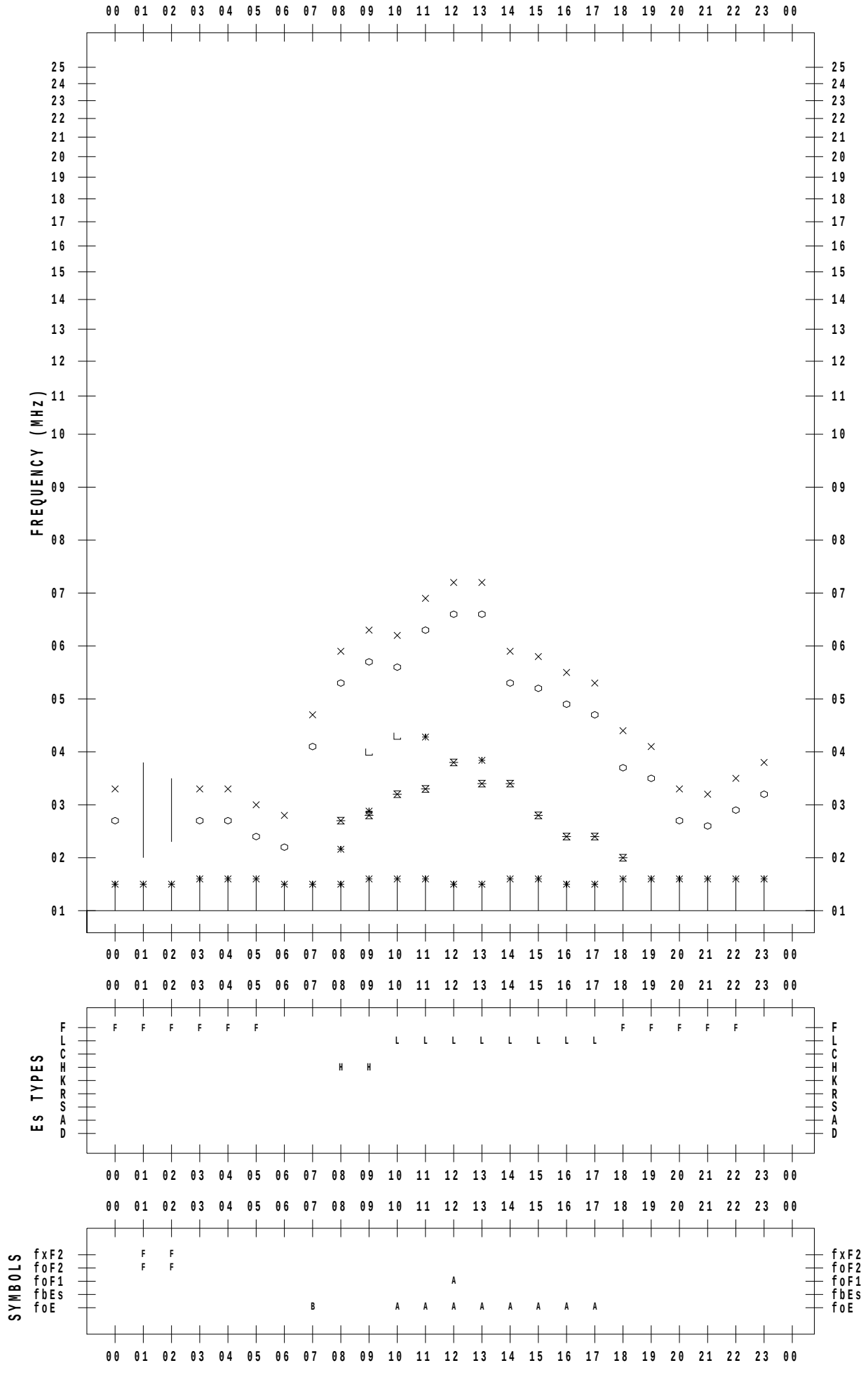
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/22

135 °E MEAN TIME



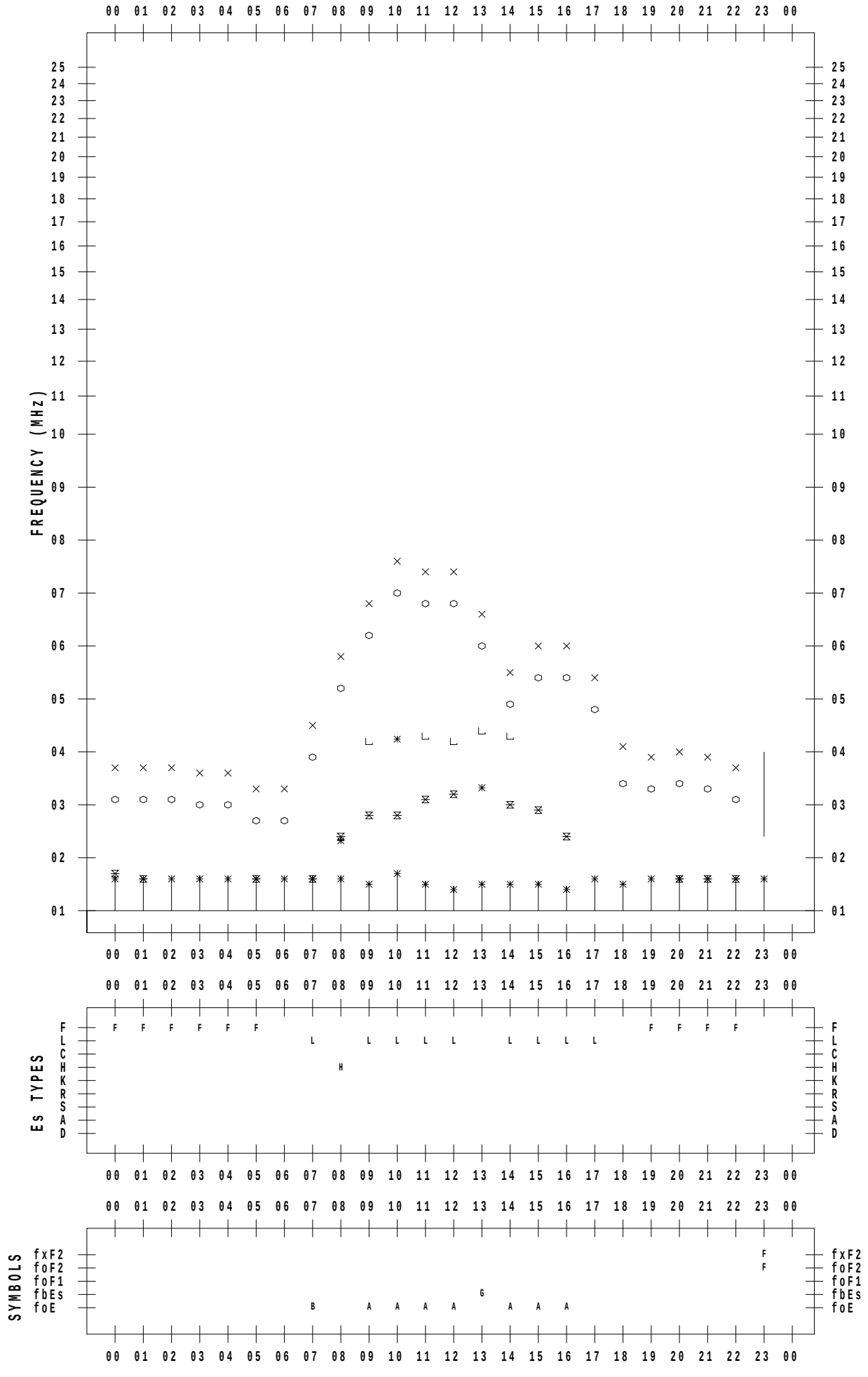
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/23

135 °E MEAN TIME



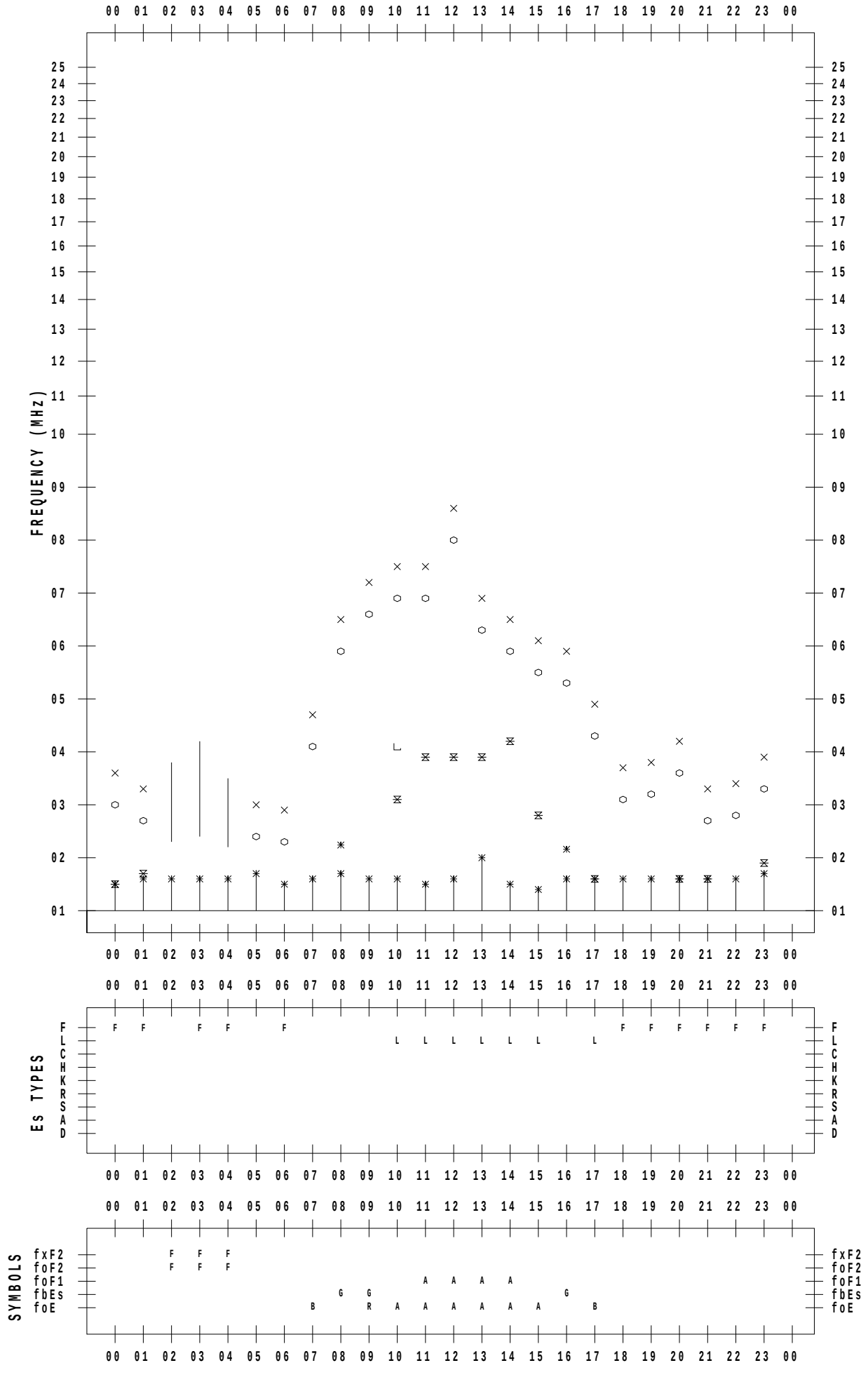
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/24

135 °E MEAN TIME



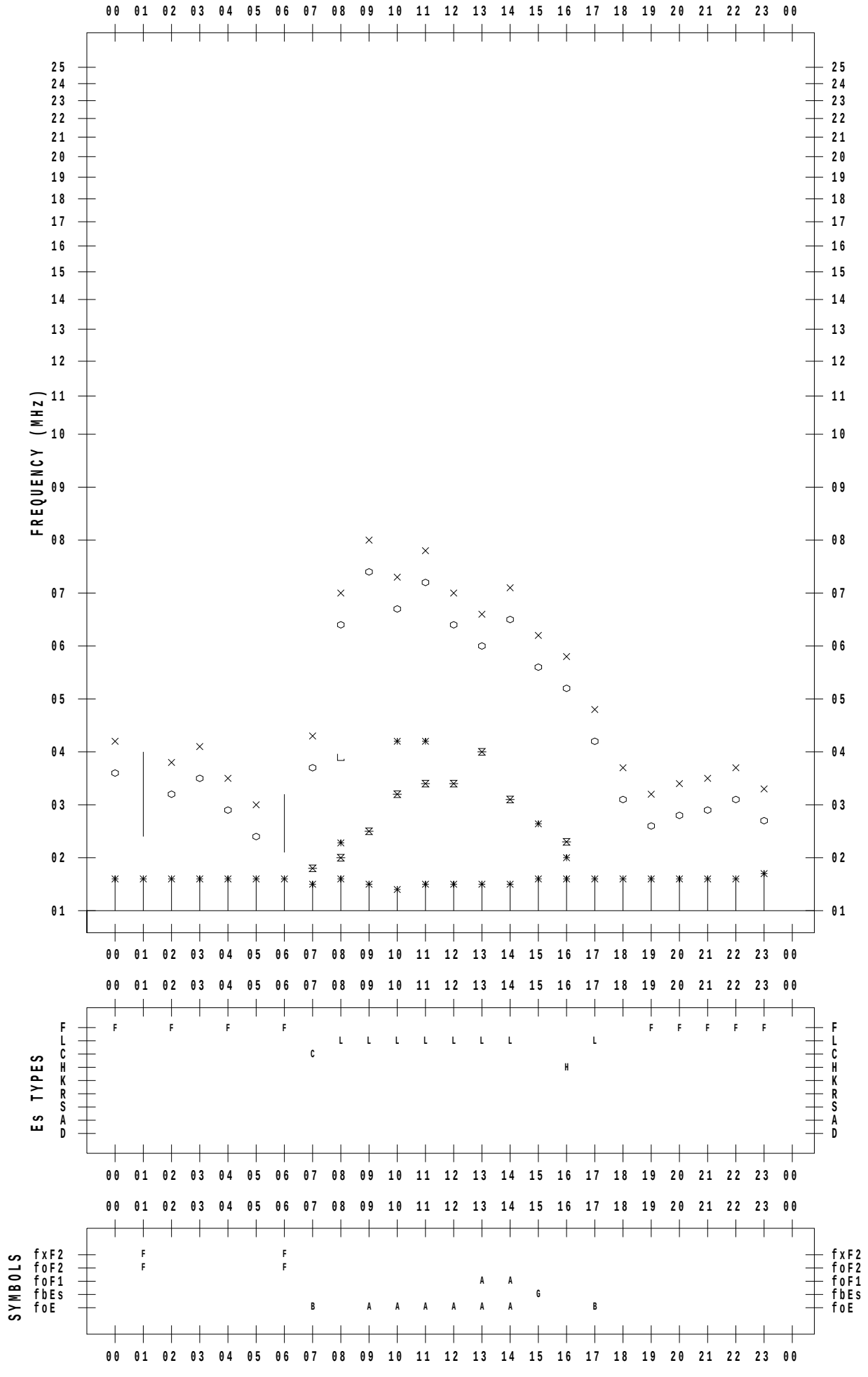
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/25

135 °E MEAN TIME



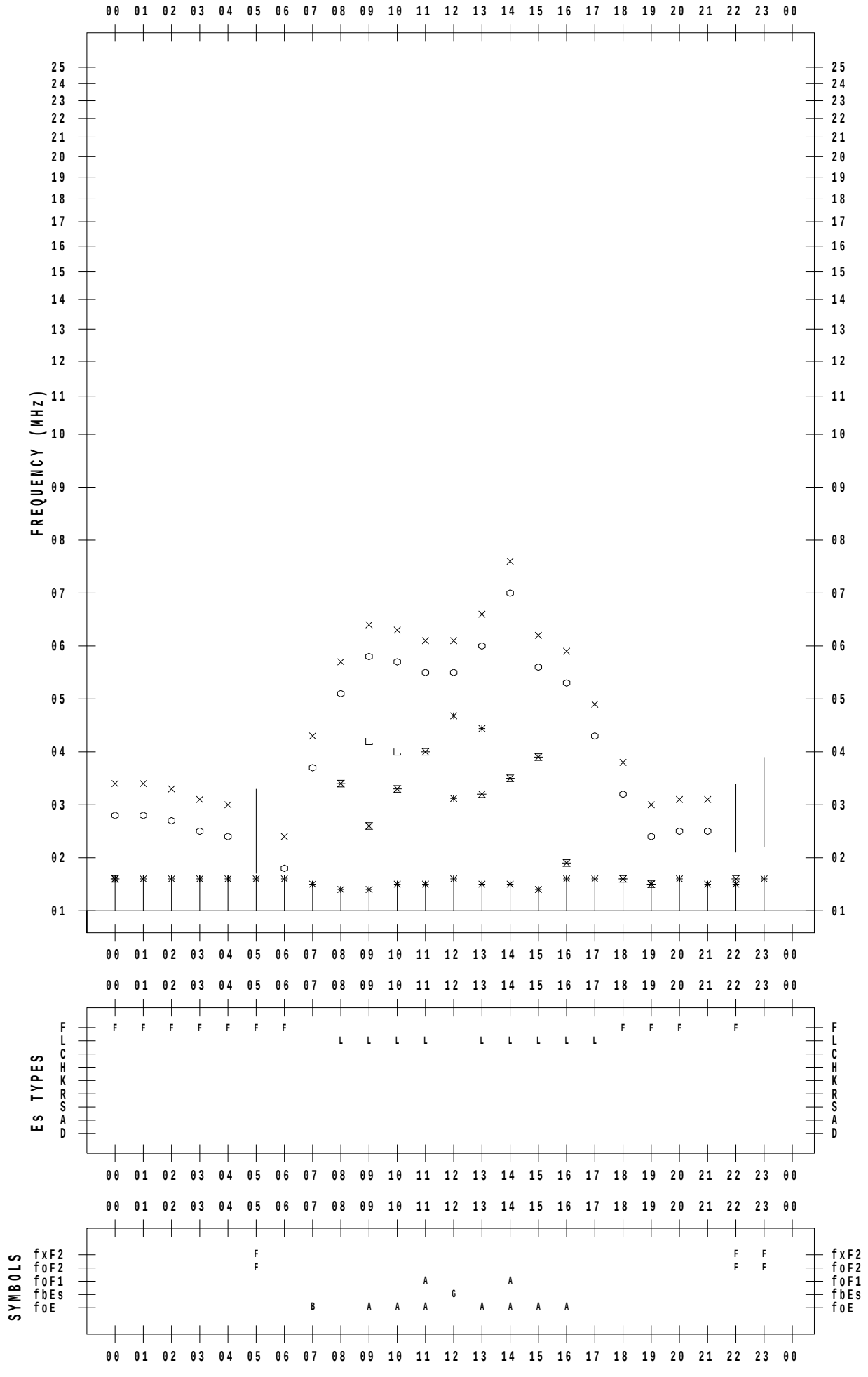
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/26

135 °E MEAN TIME



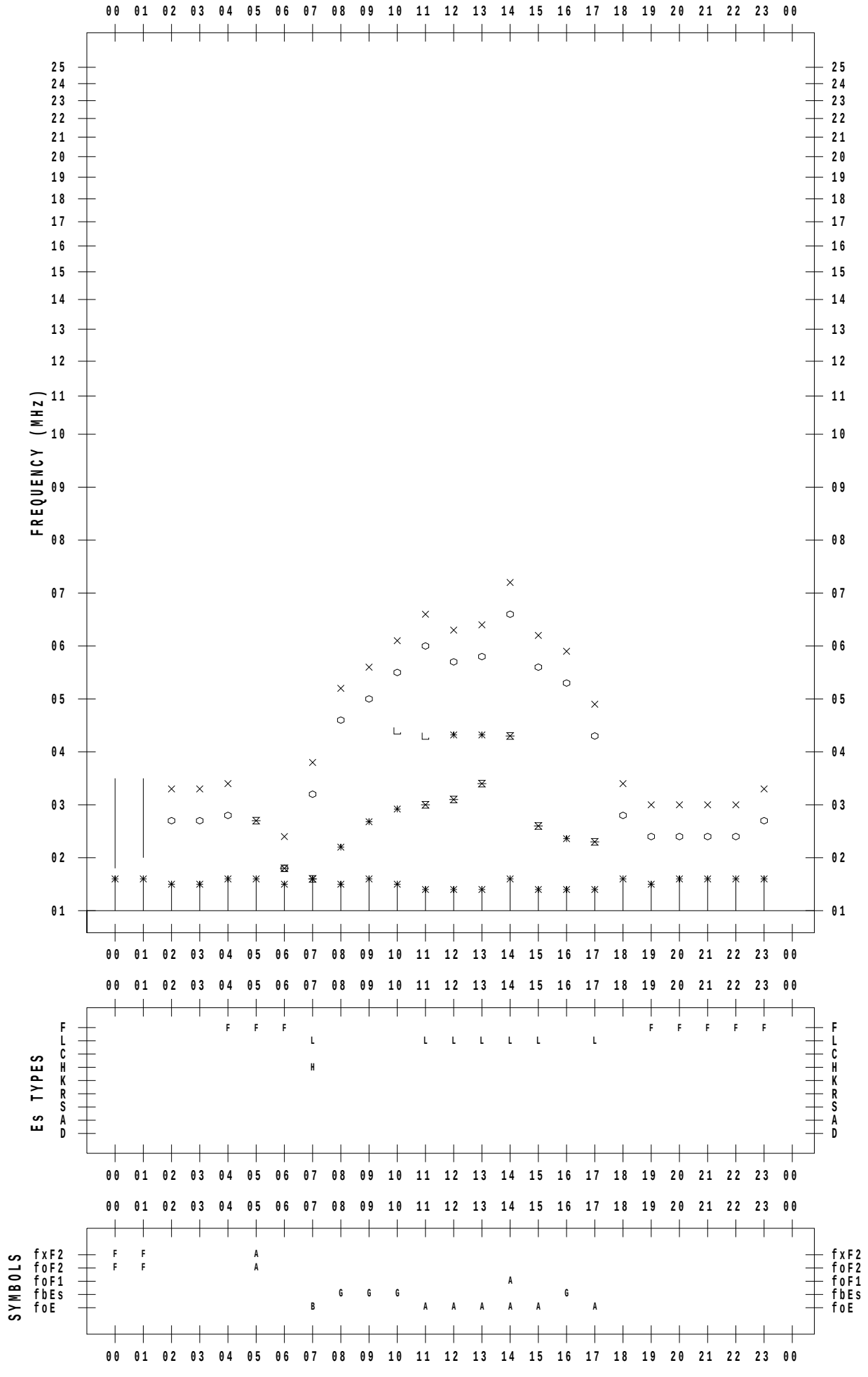
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/27

135 °E MEAN TIME



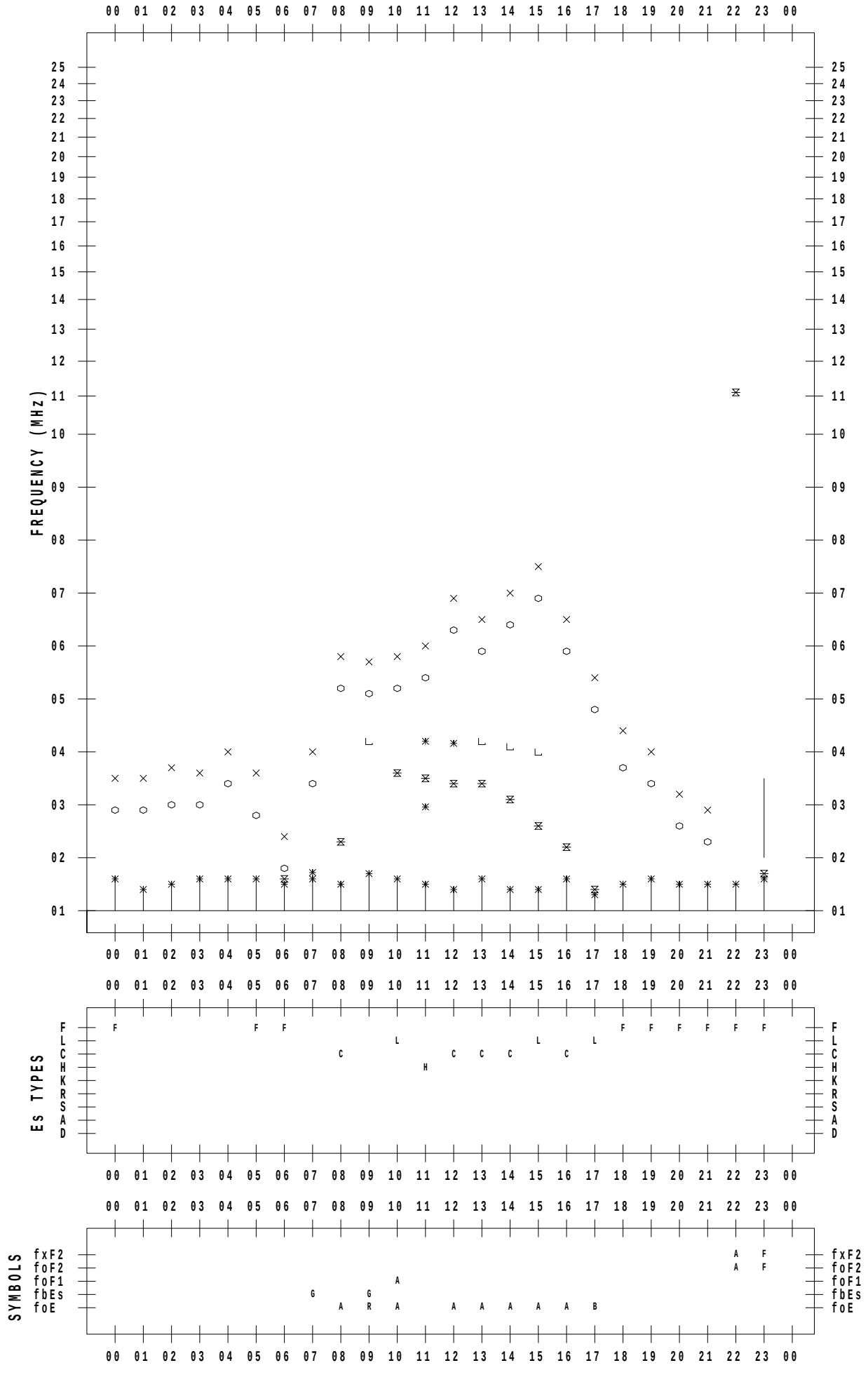
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/28

135 °E MEAN TIME



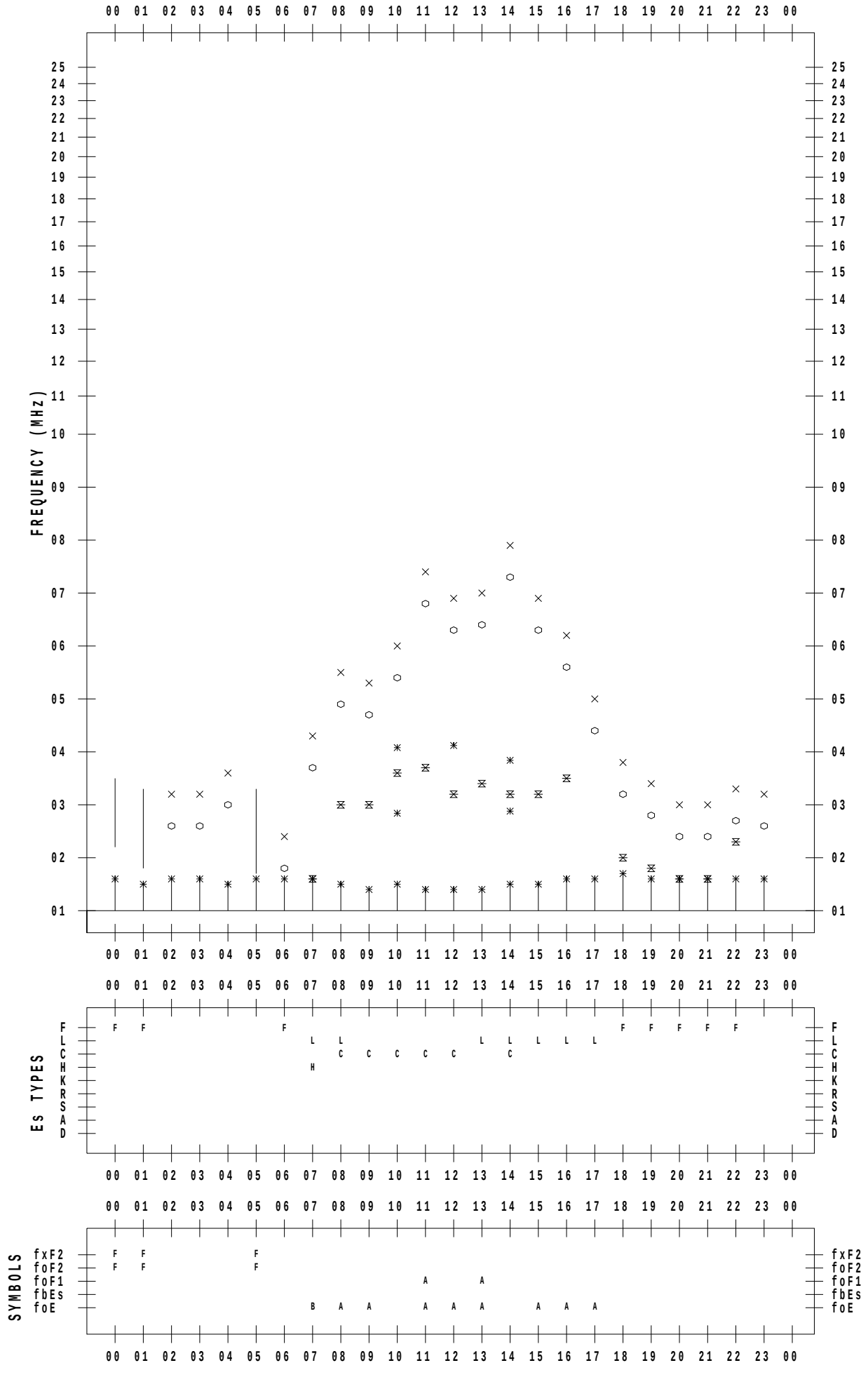
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/29

135 °E MEAN TIME



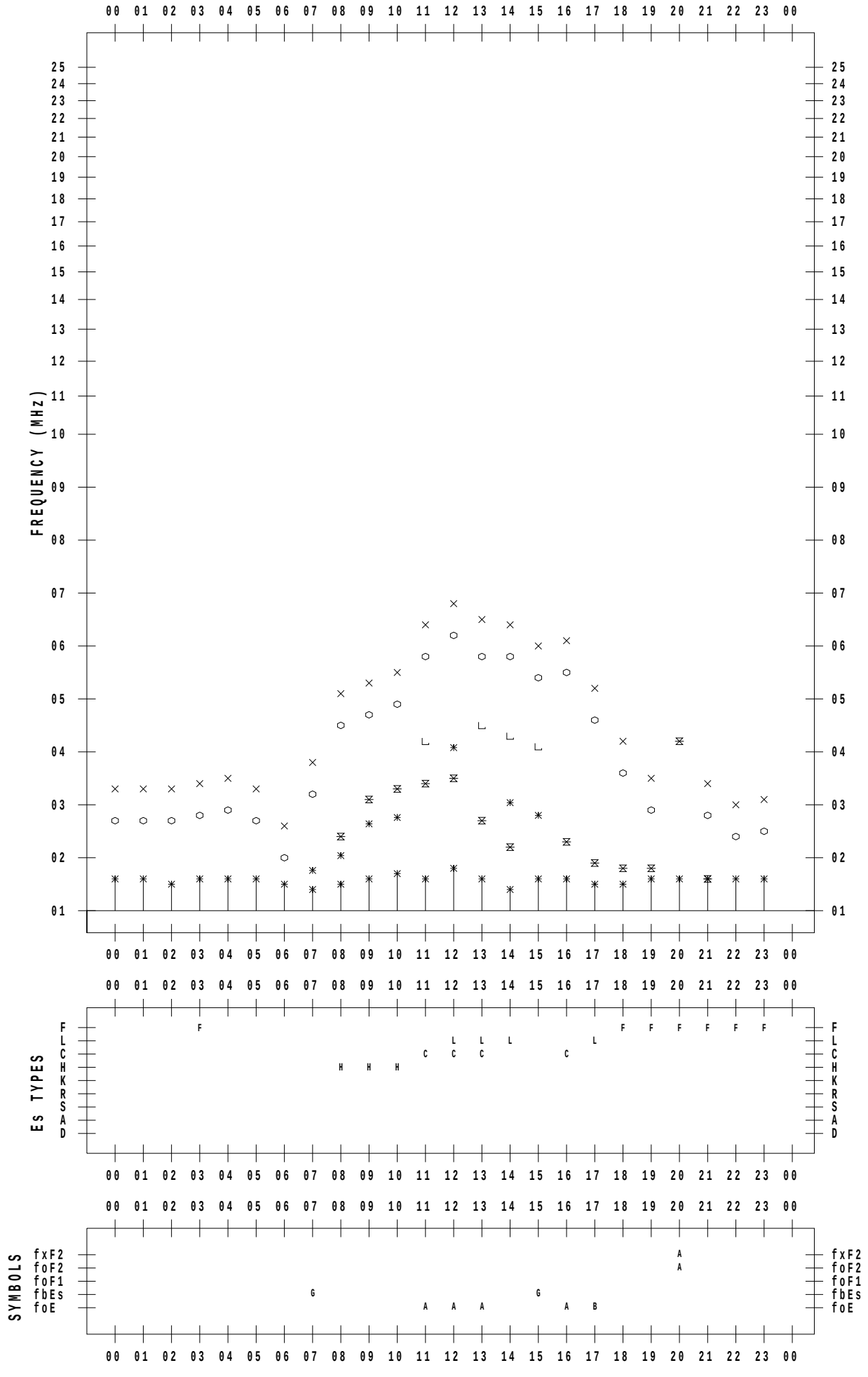
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Yamagawa

DATE : 2019/11/30

135 °E MEAN TIME



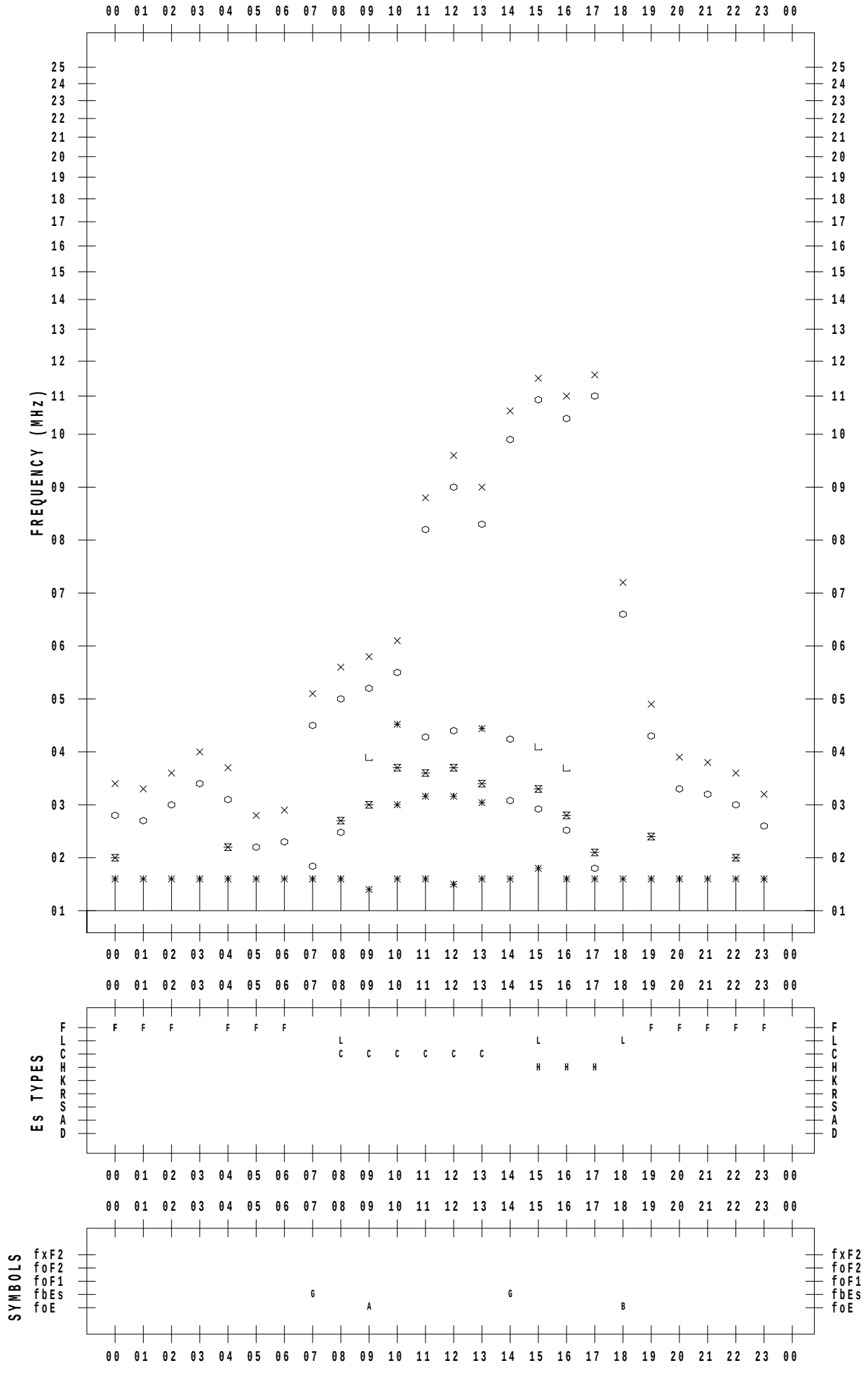
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/ 1

135 °E MEAN TIME



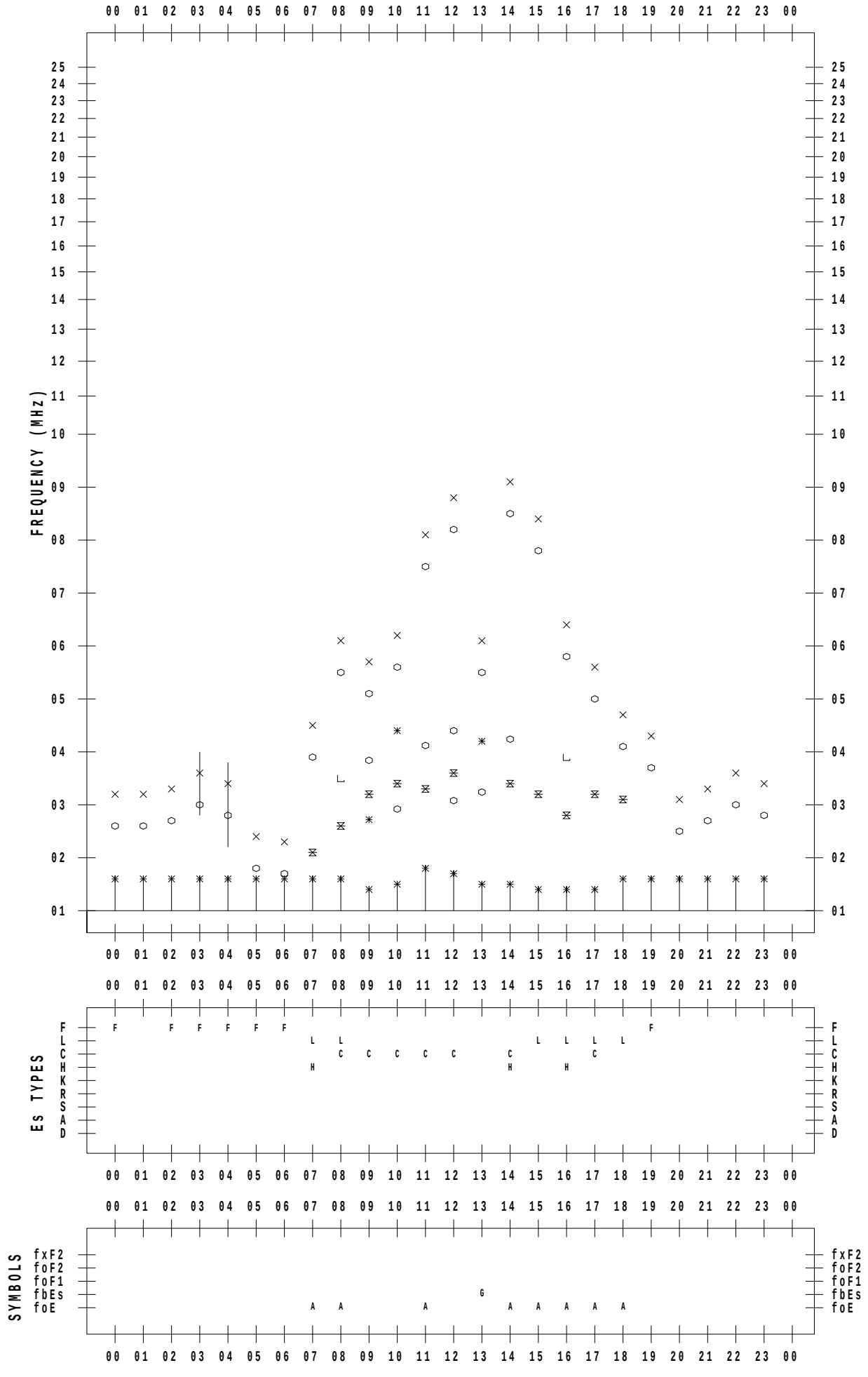
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/ 2

135 °E MEAN TIME



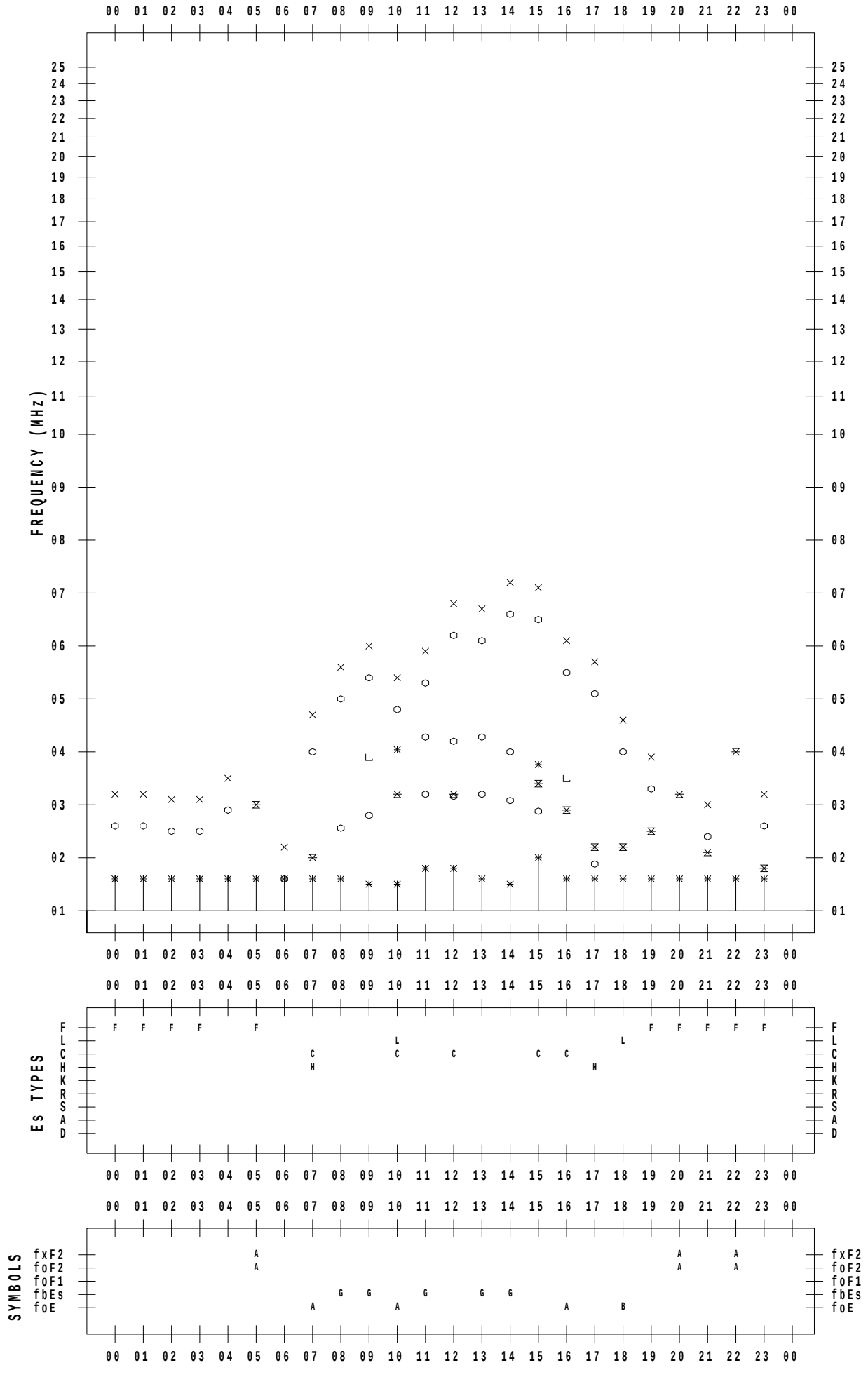
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/ 3

135 °E MEAN TIME



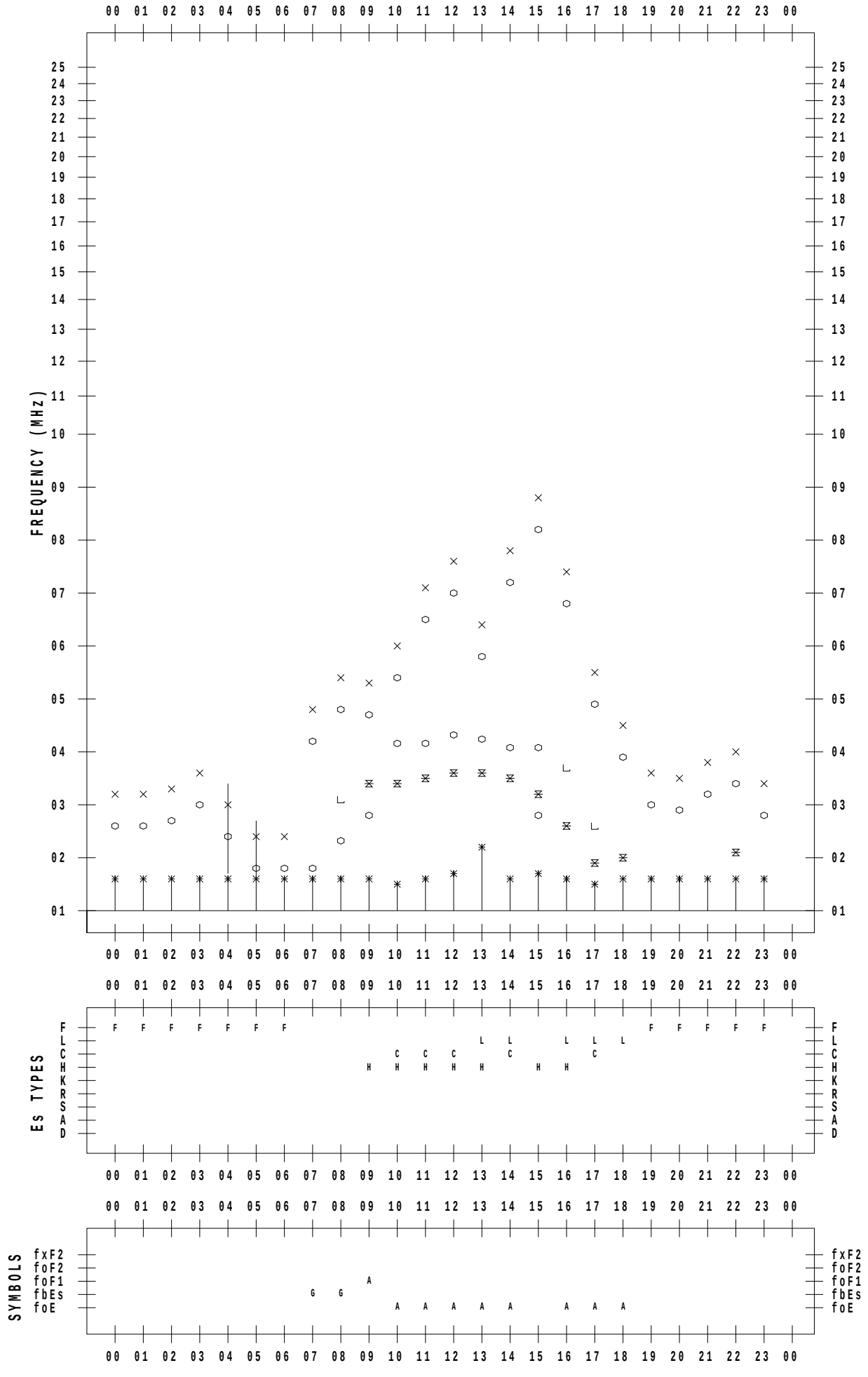
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/ 4

135 °E MEAN TIME



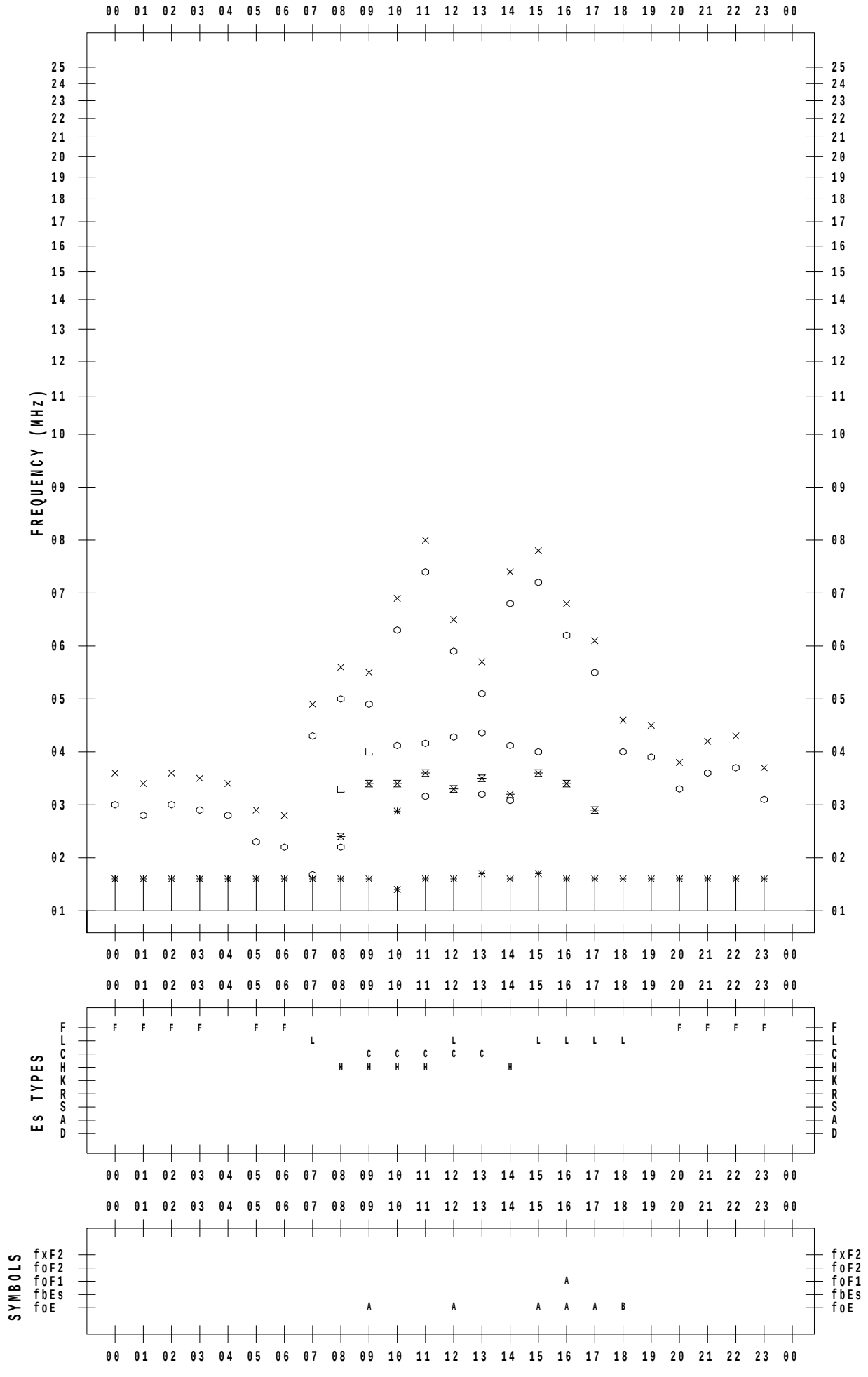
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/ 5

135 °E MEAN TIME



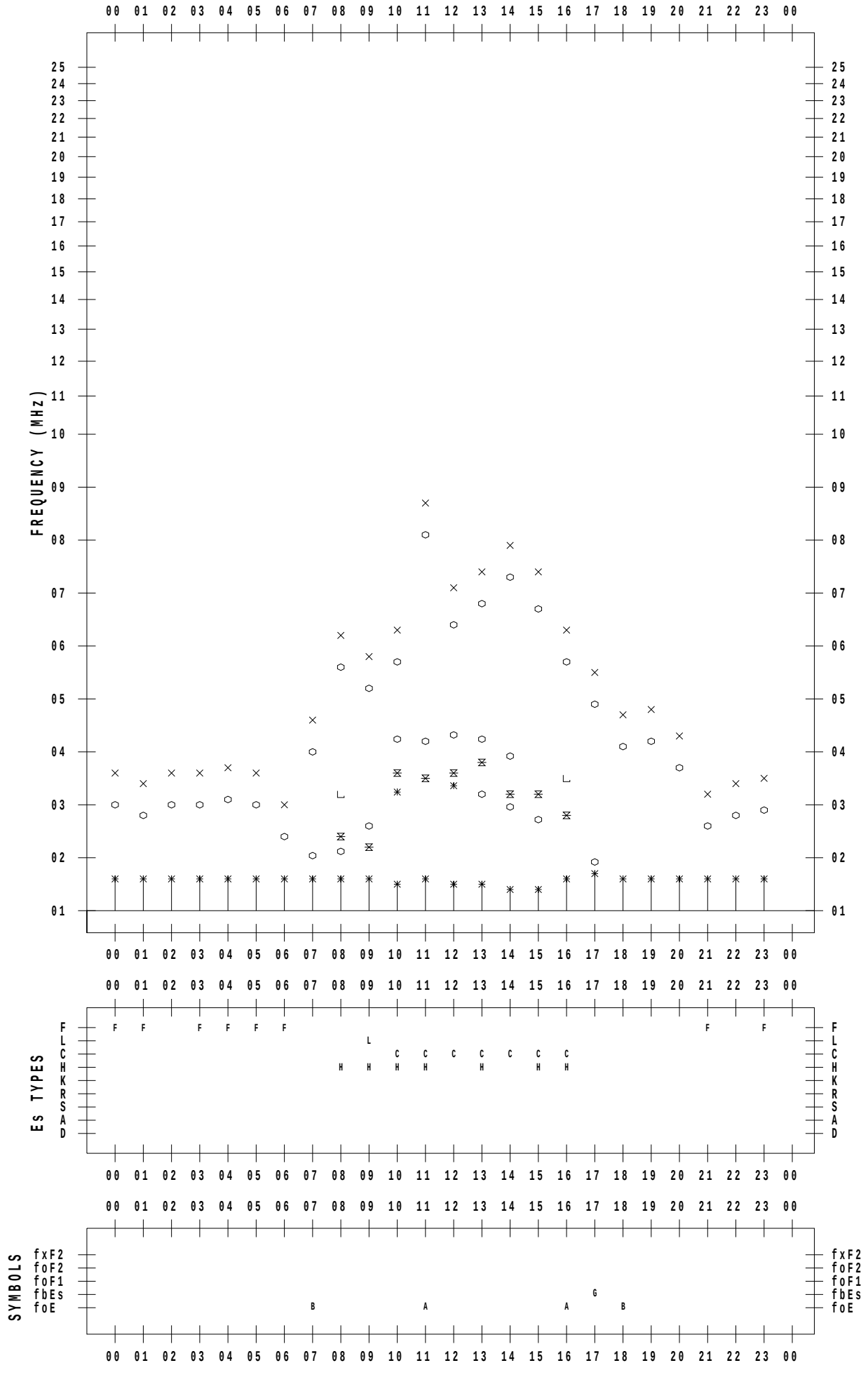
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/ 6

135 °E MEAN TIME



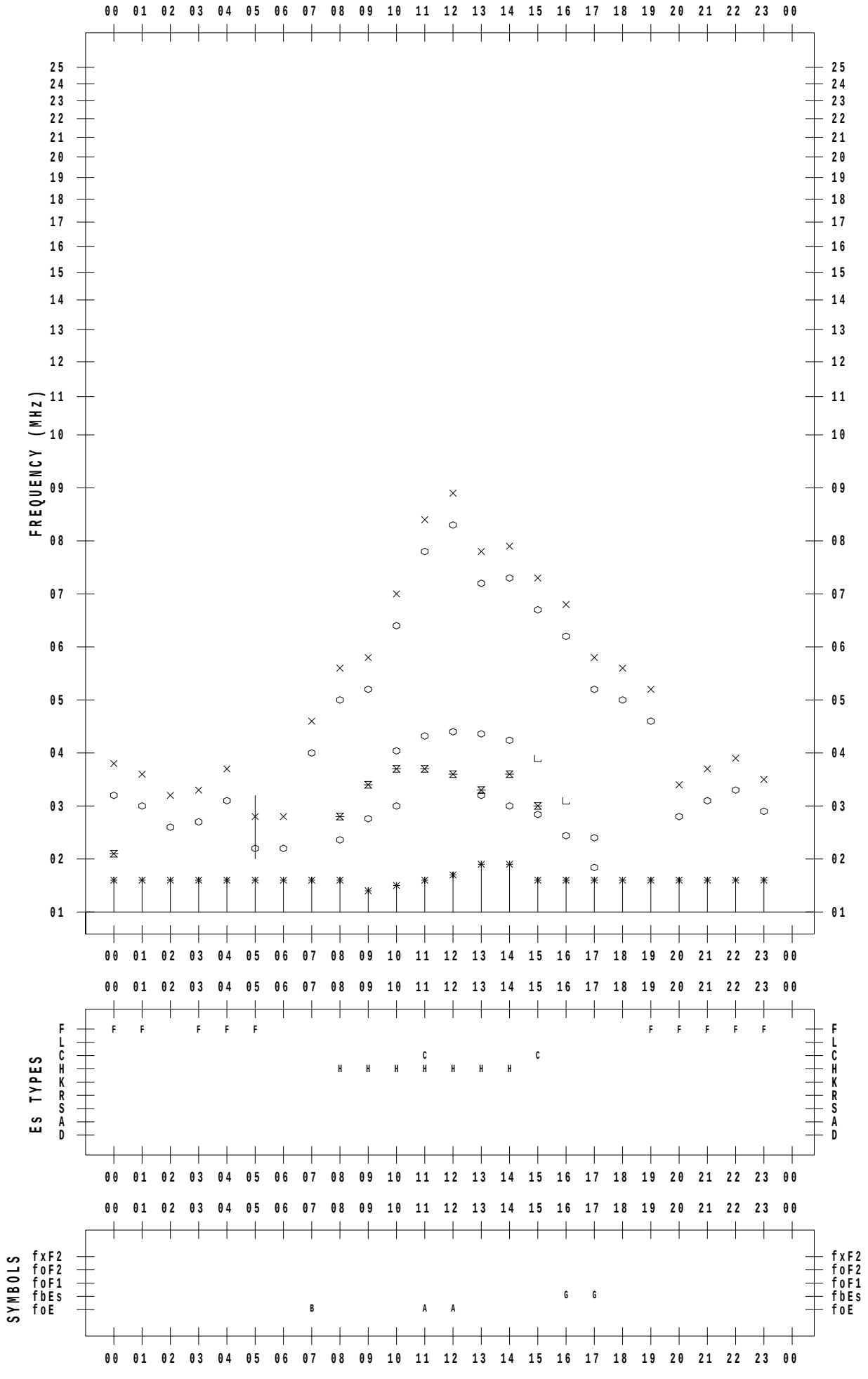
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/ 7

135 °E MEAN TIME



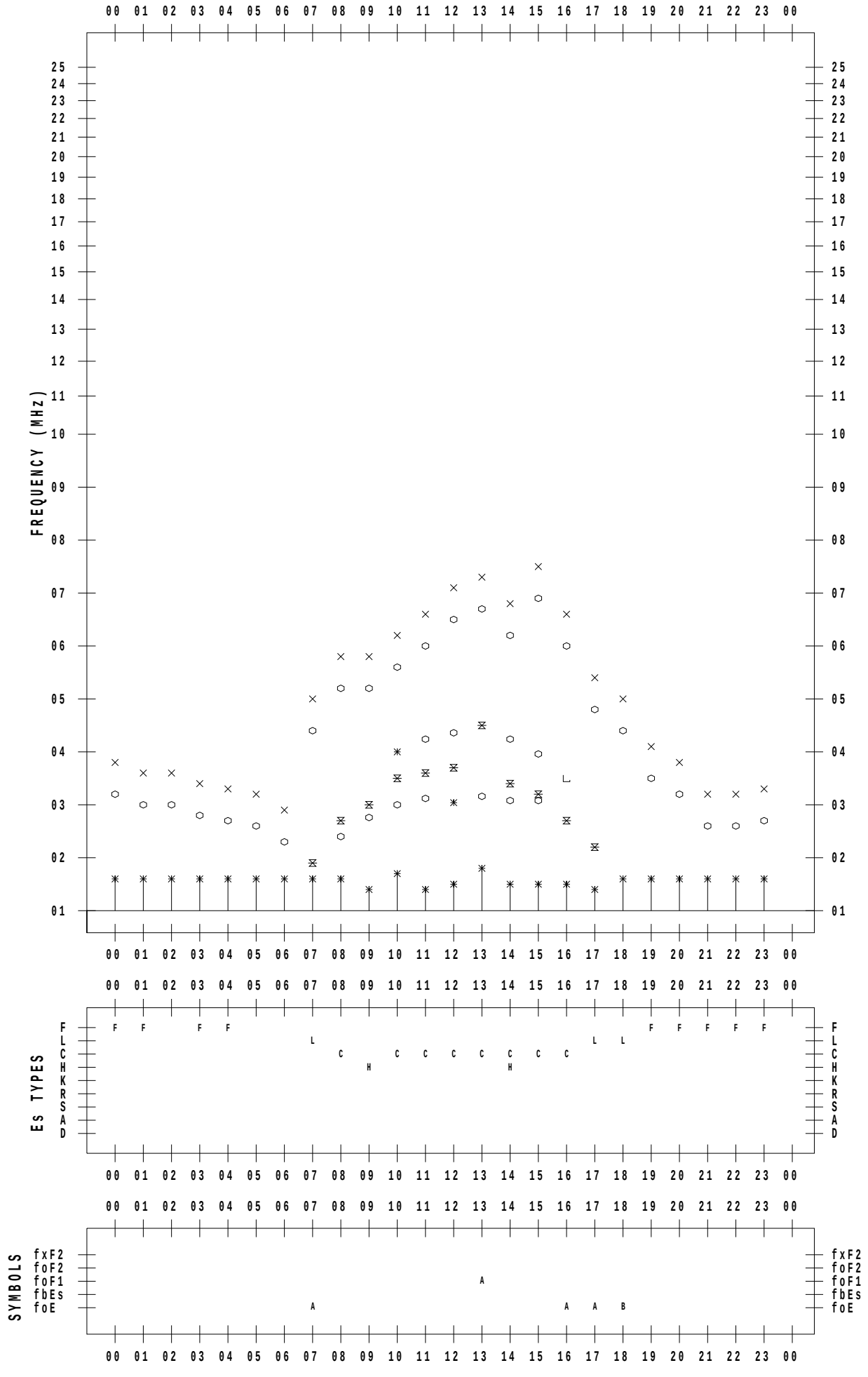
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/ 8

135 °E MEAN TIME



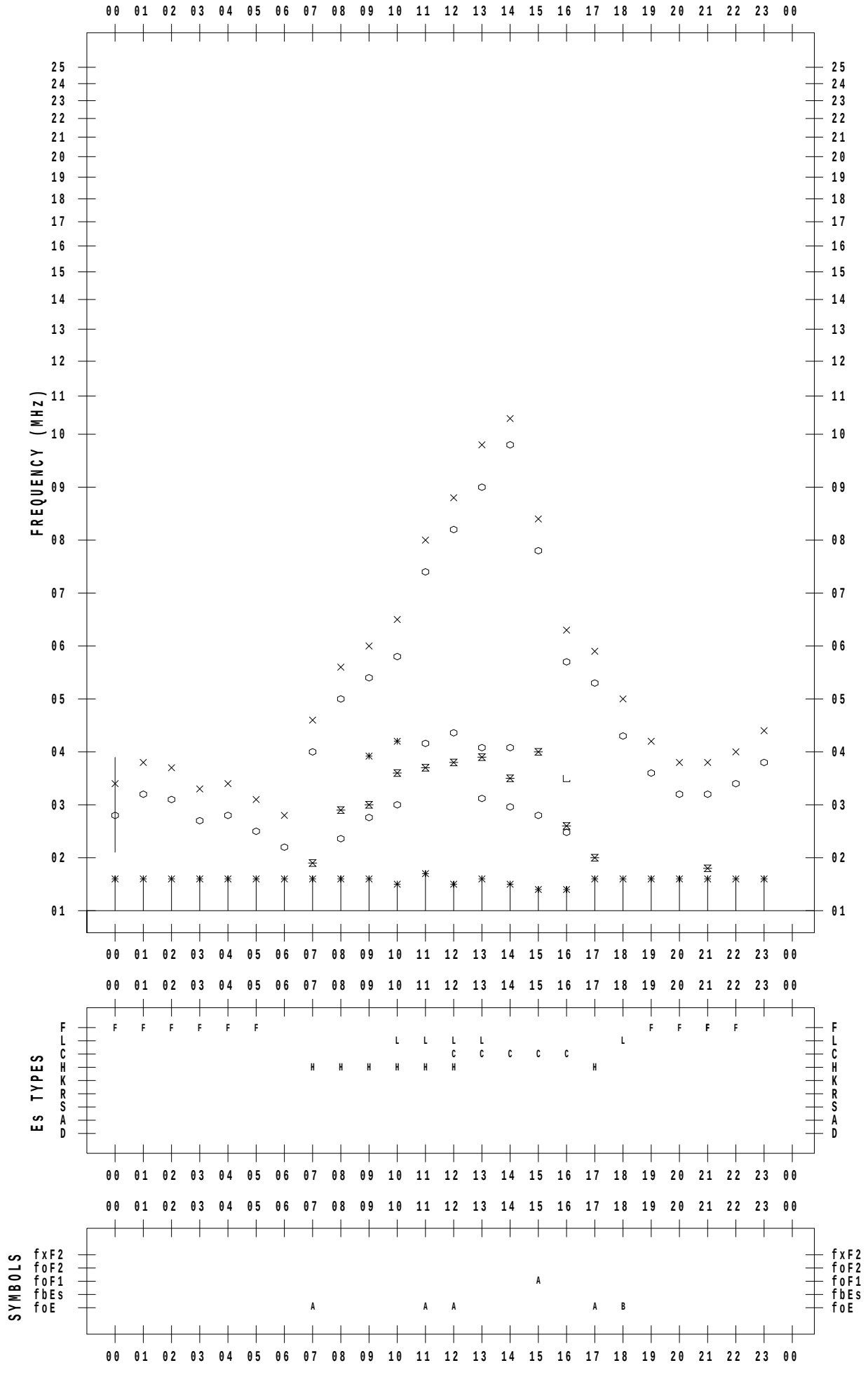
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/ 9

135 °E MEAN TIME



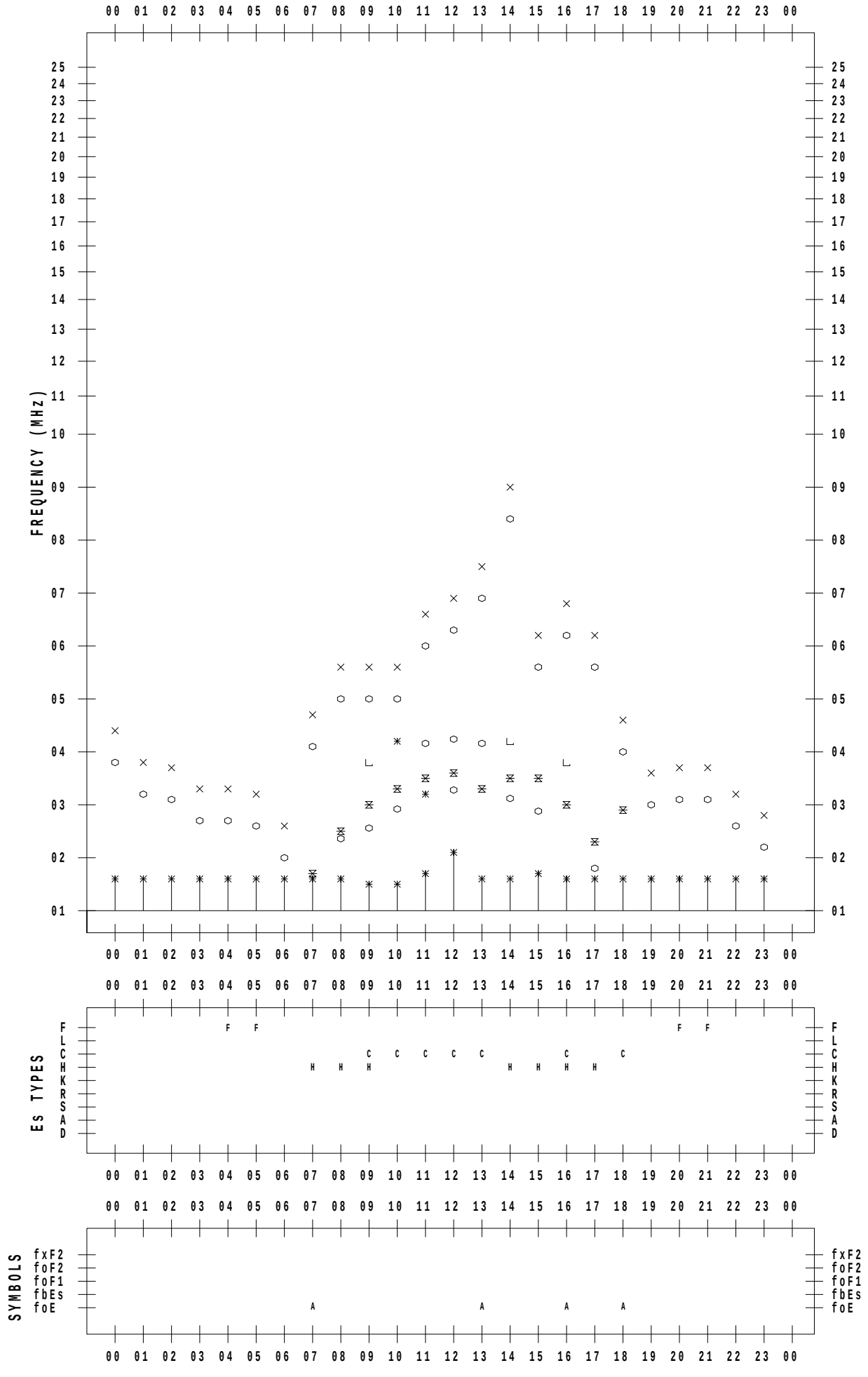
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/10

135 °E MEAN TIME



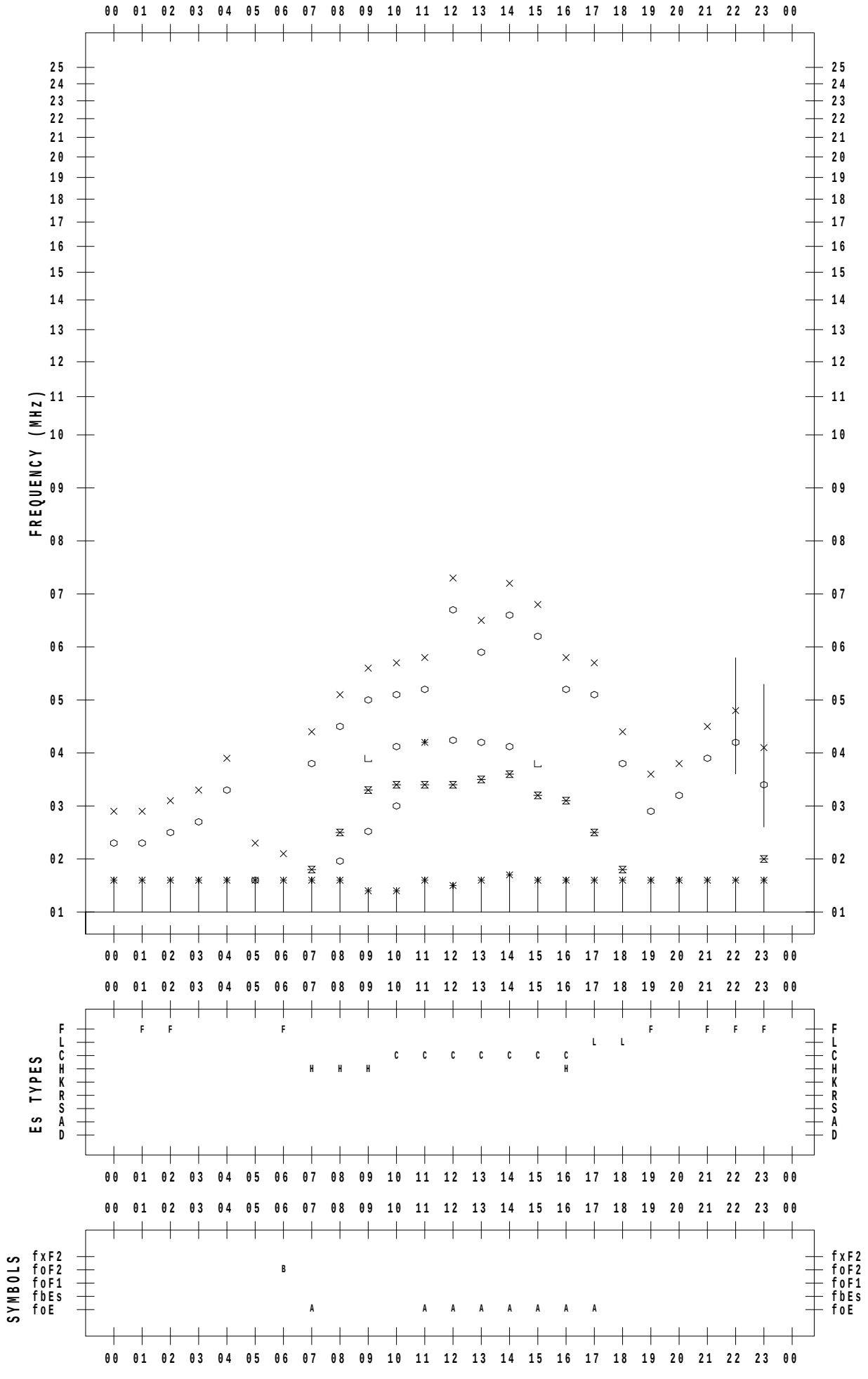
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/11

135 °E MEAN TIME



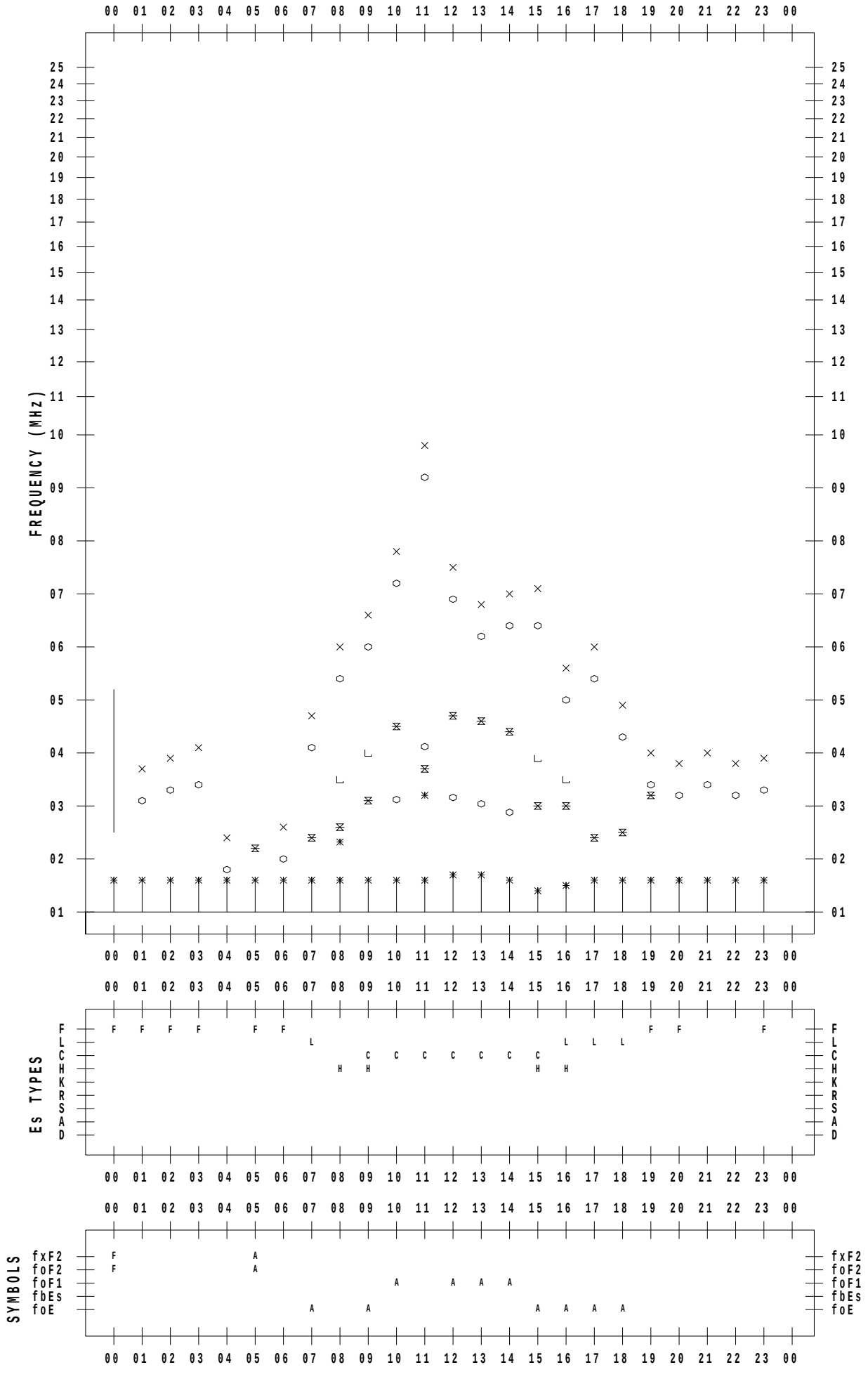
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/12

135 °E MEAN TIME



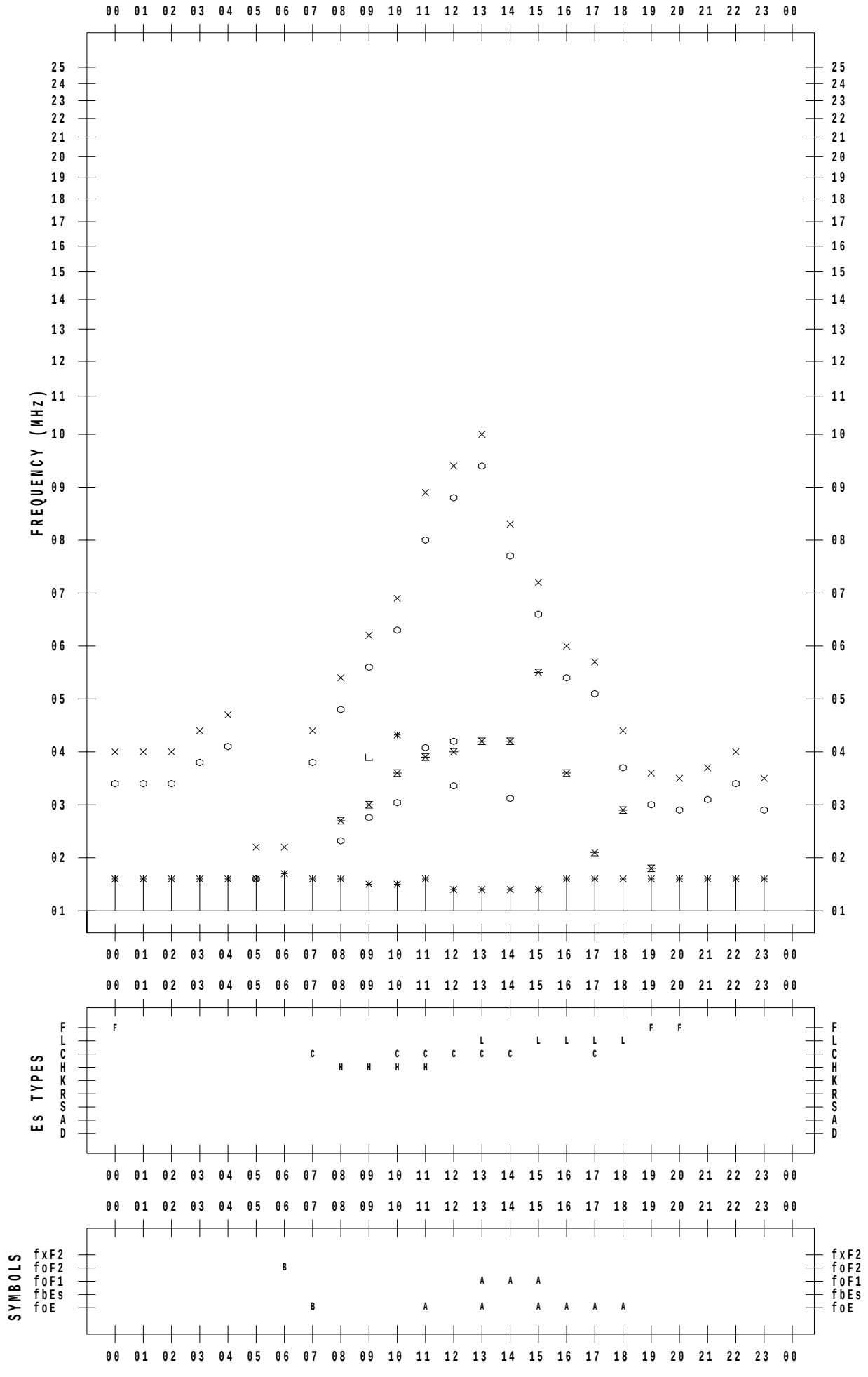
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/13

135 °E MEAN TIME



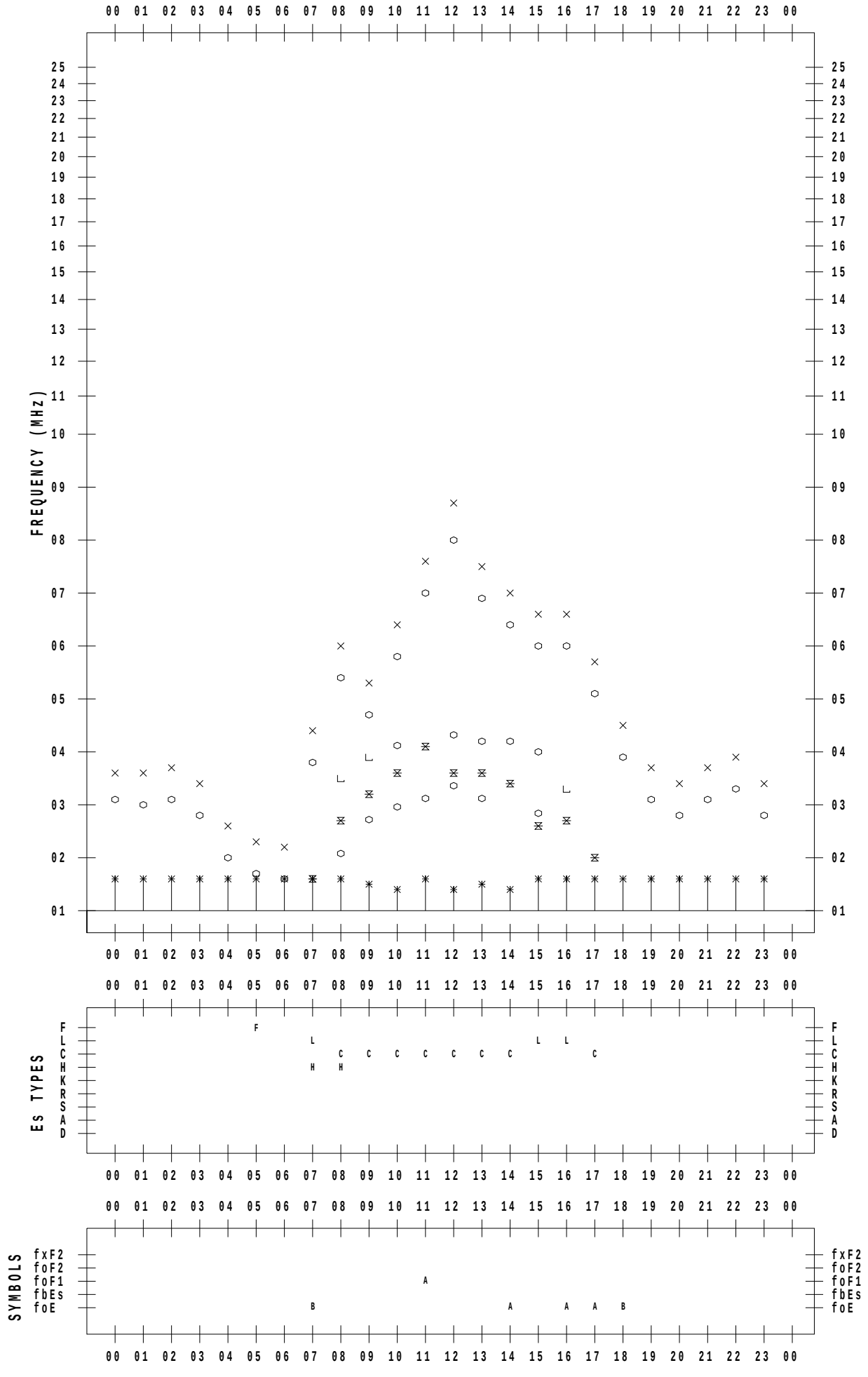
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/14

135 °E MEAN TIME



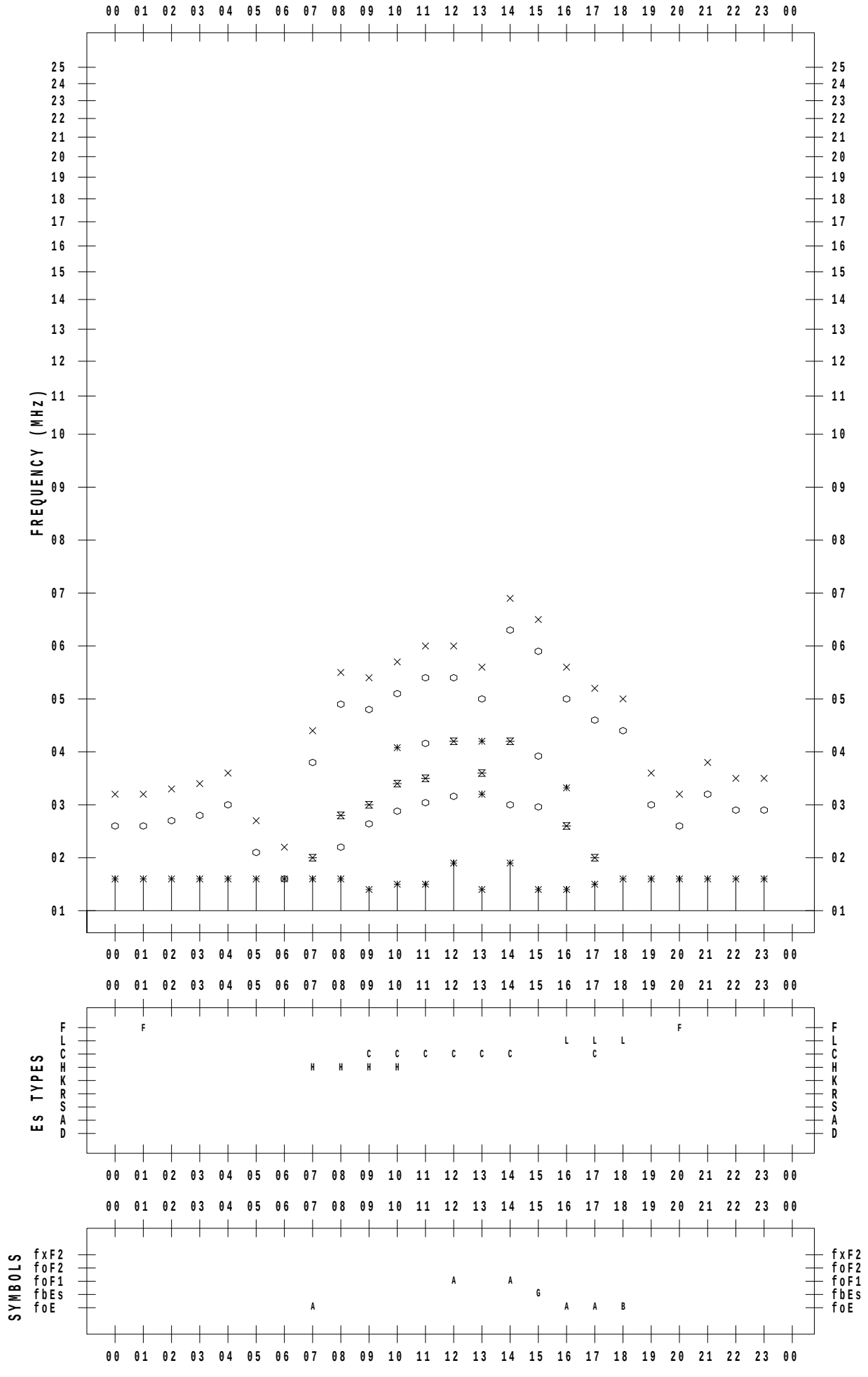
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/15

135 °E MEAN TIME



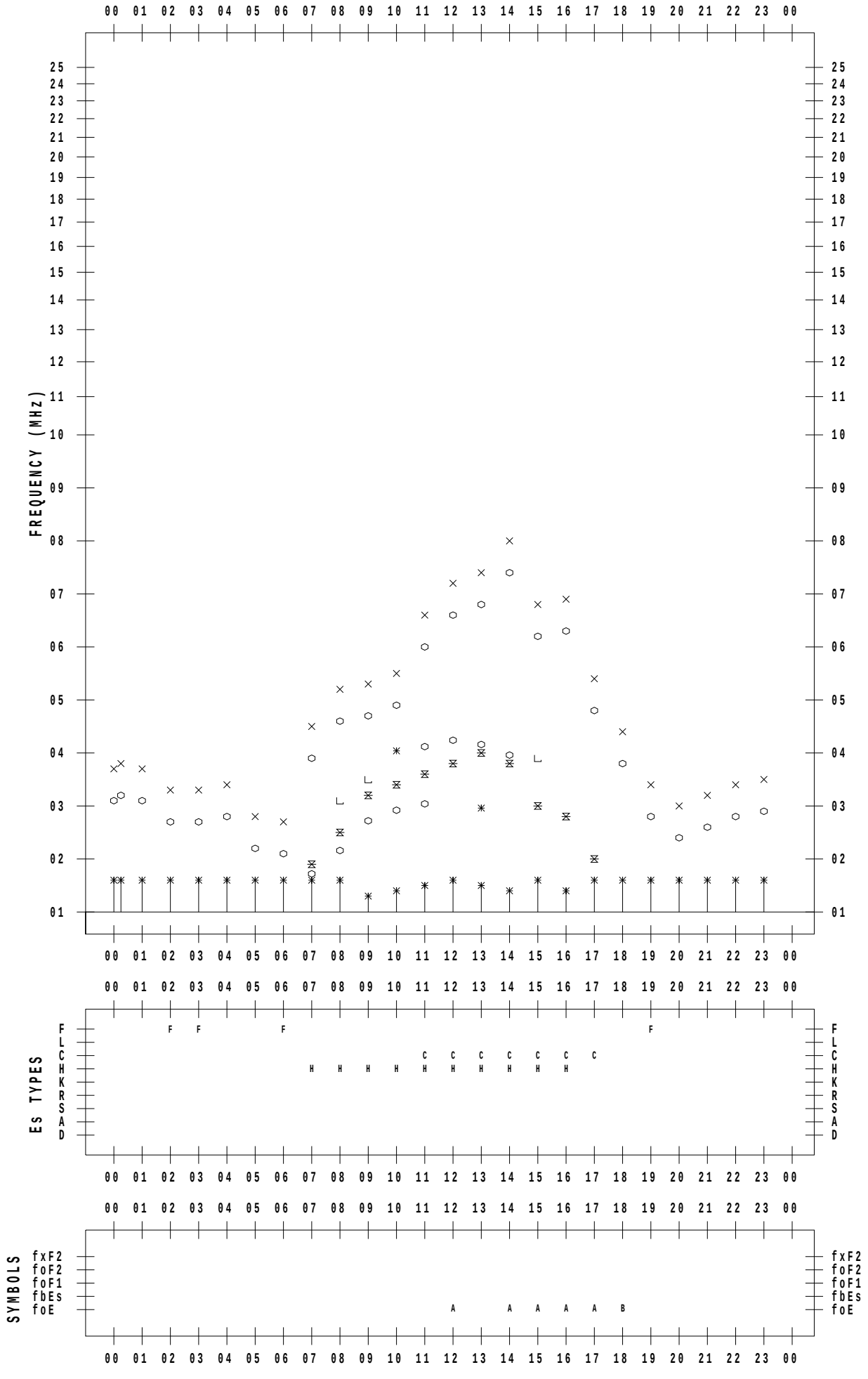
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/16

135 °E MEAN TIME



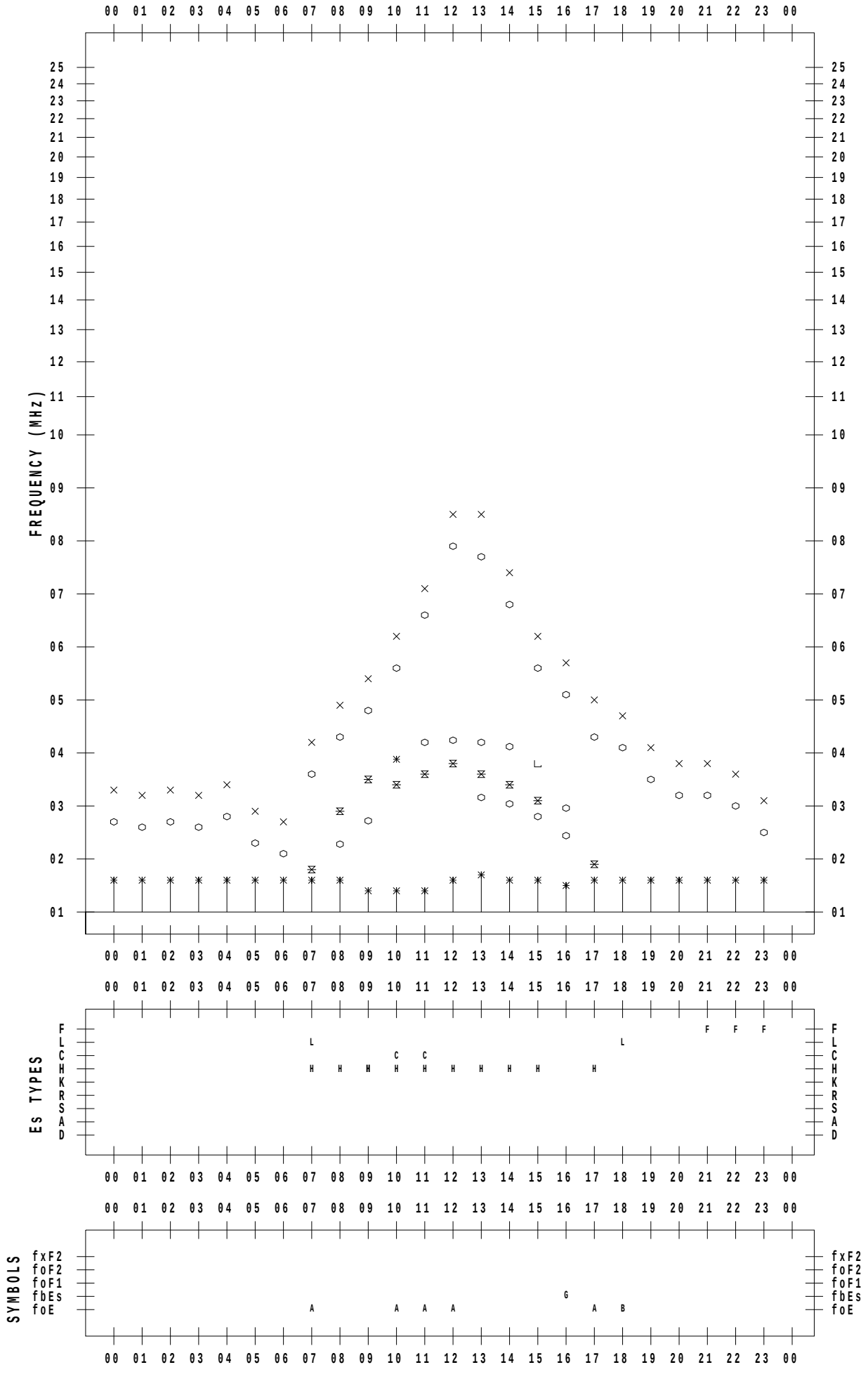
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/17

135 °E MEAN TIME



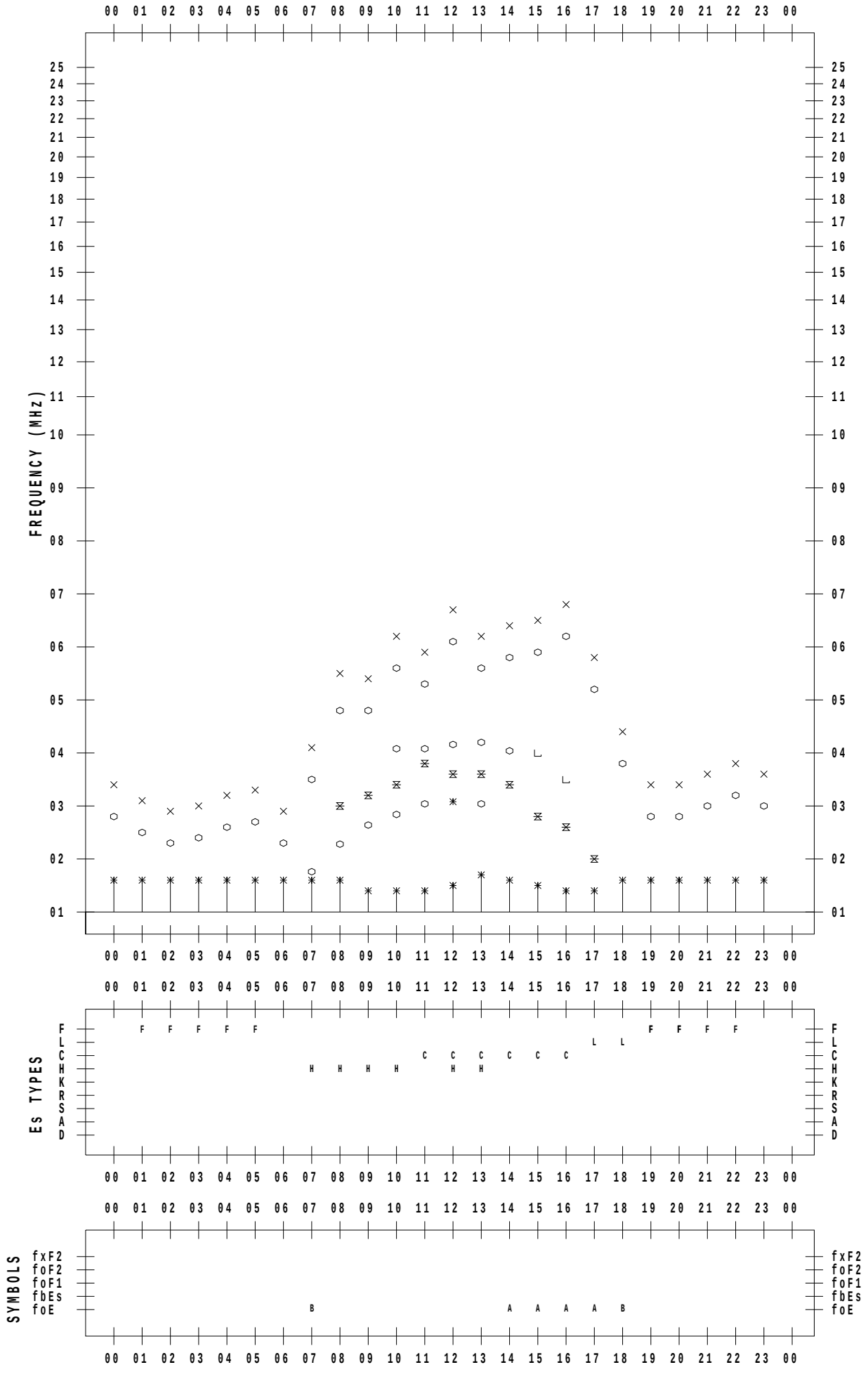
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/18

135 °E MEAN TIME



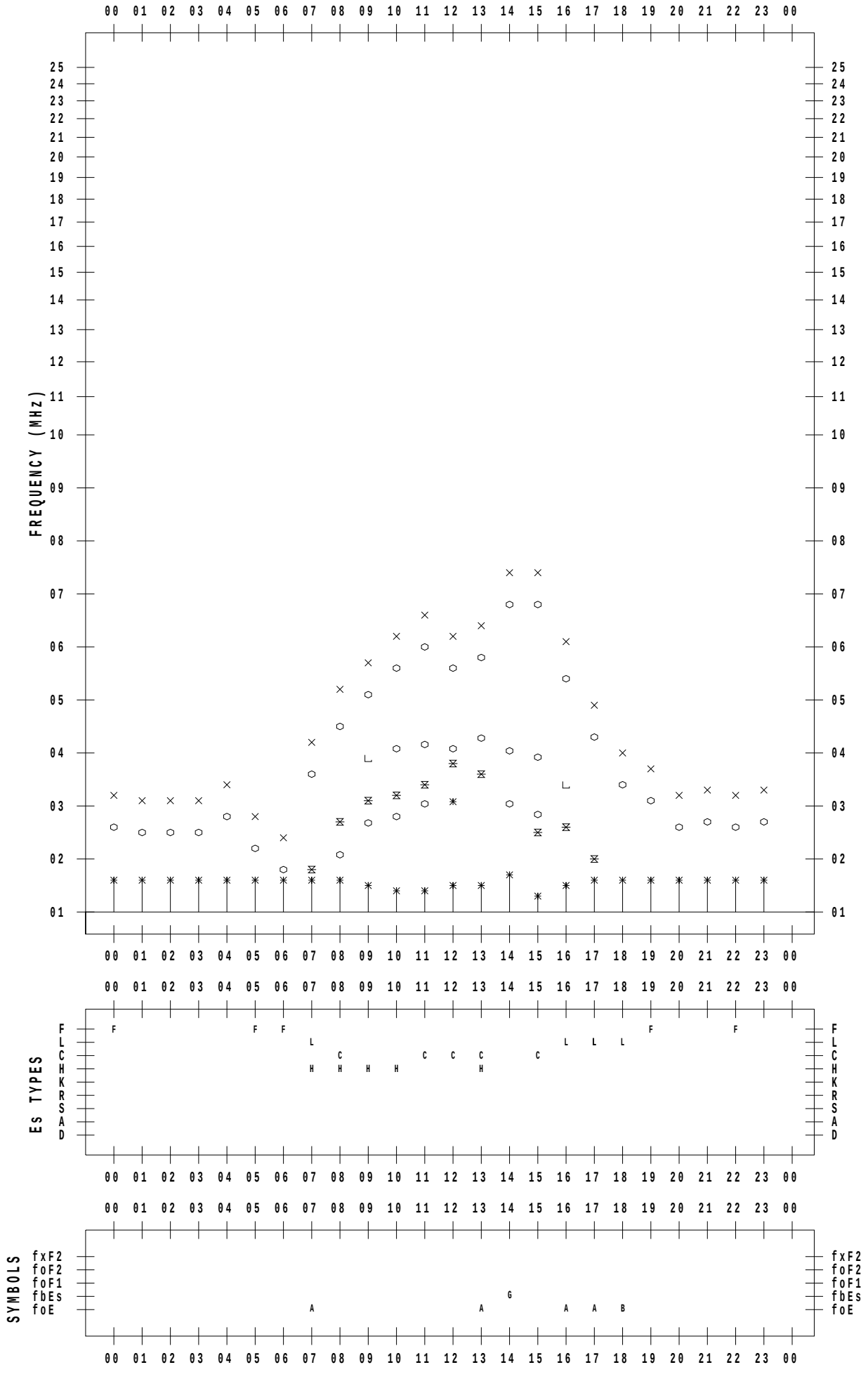
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/19

135 °E MEAN TIME



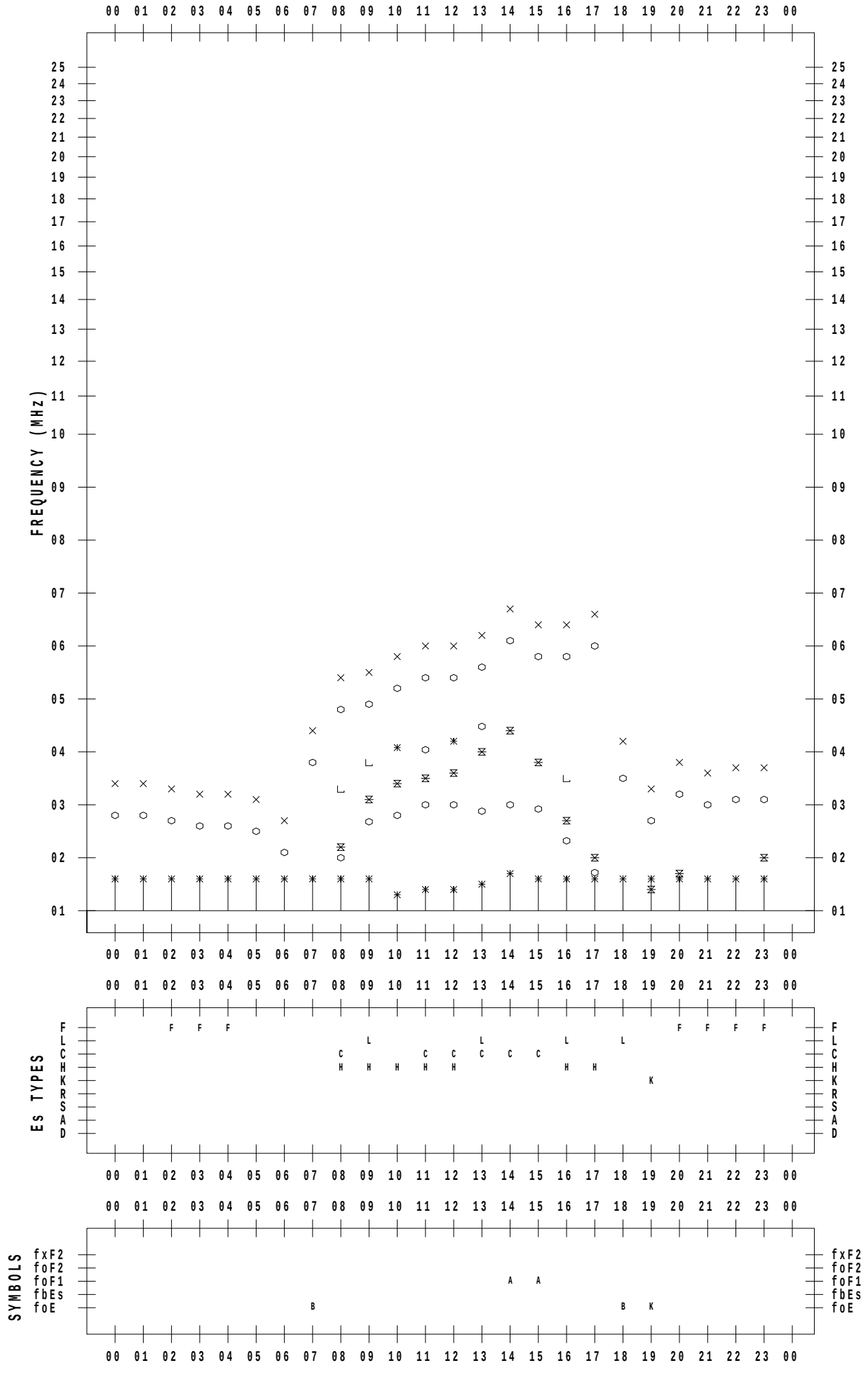
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/20

135 °E MEAN TIME



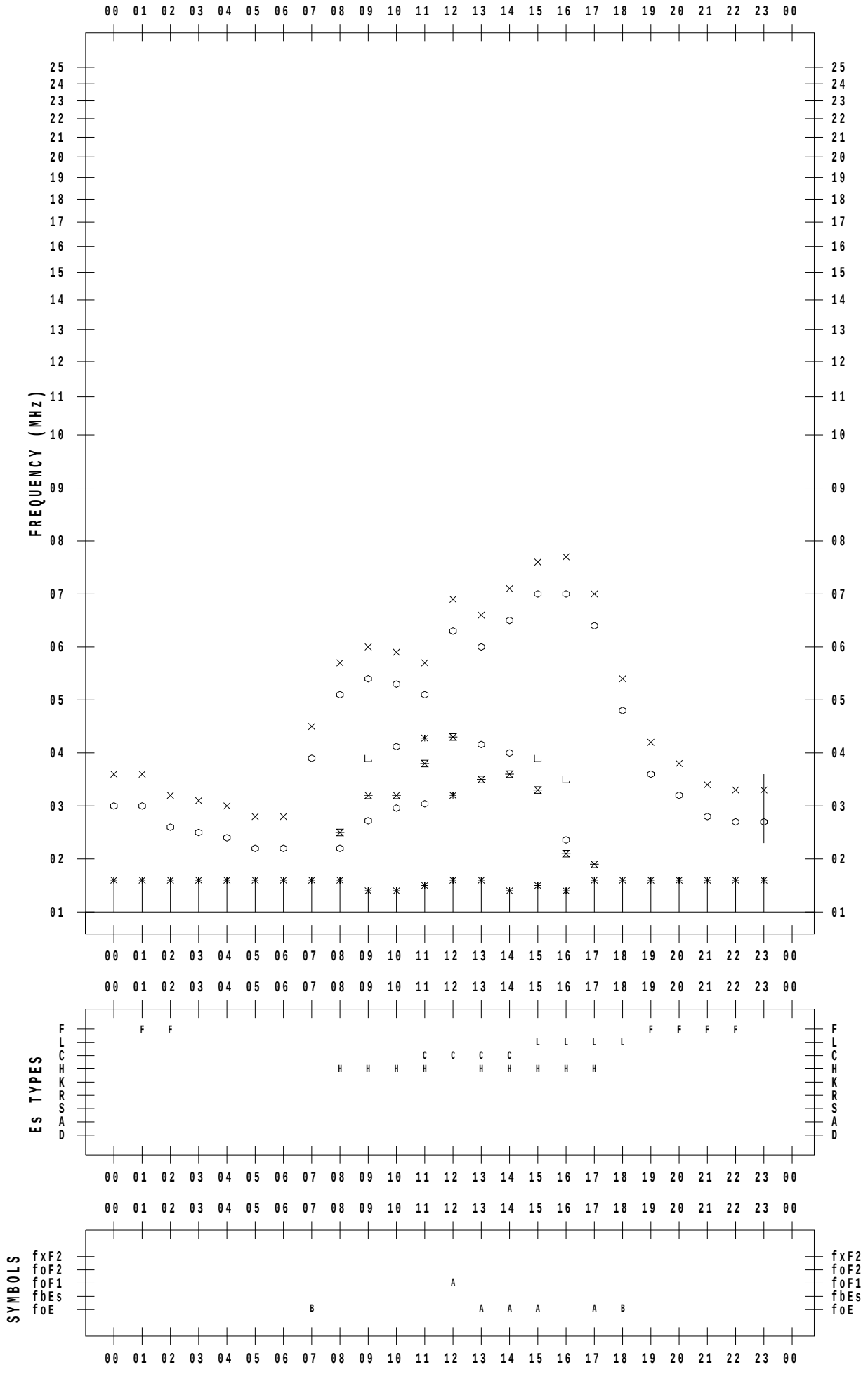
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/21

135 °E MEAN TIME



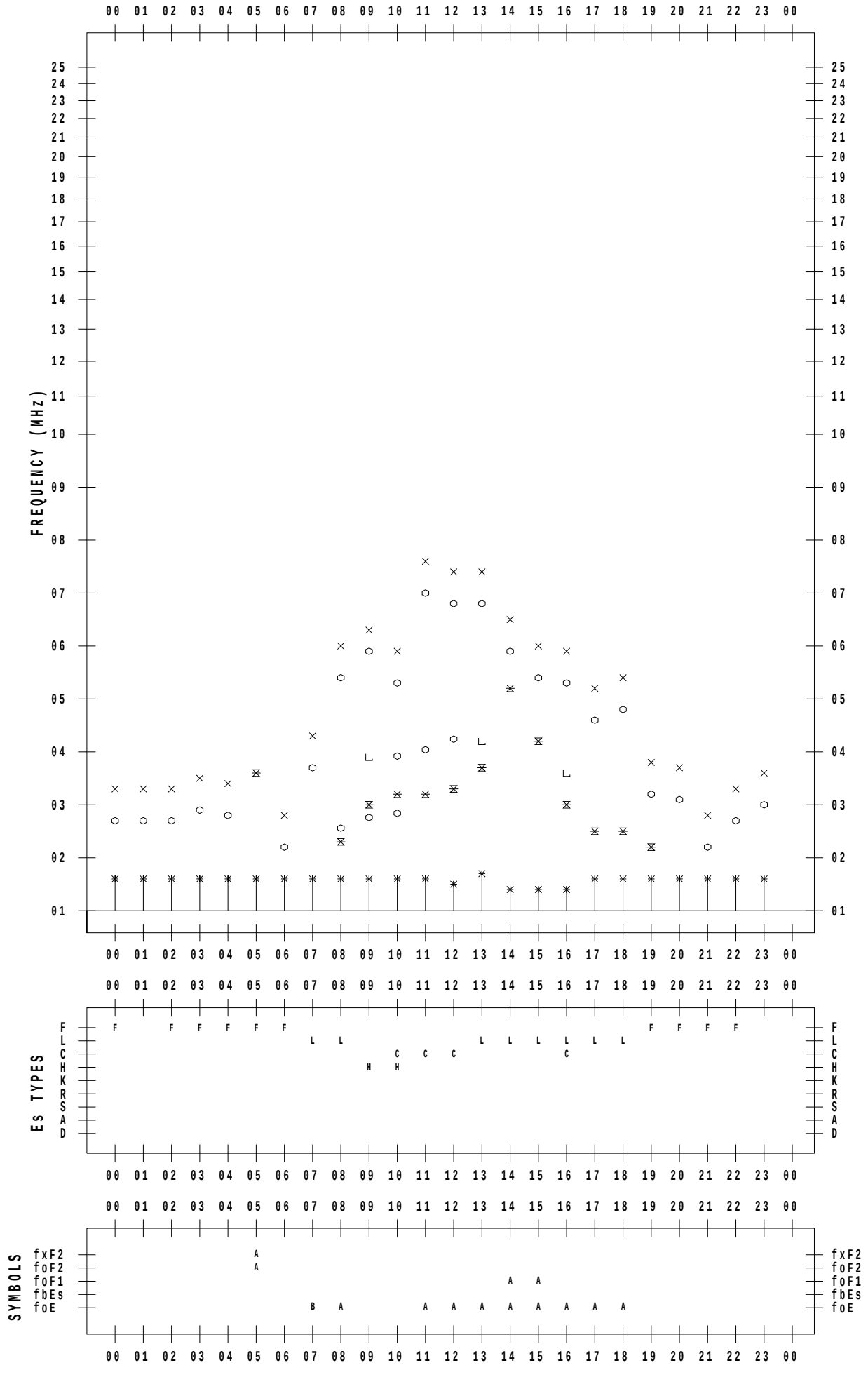
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/22

135 °E MEAN TIME



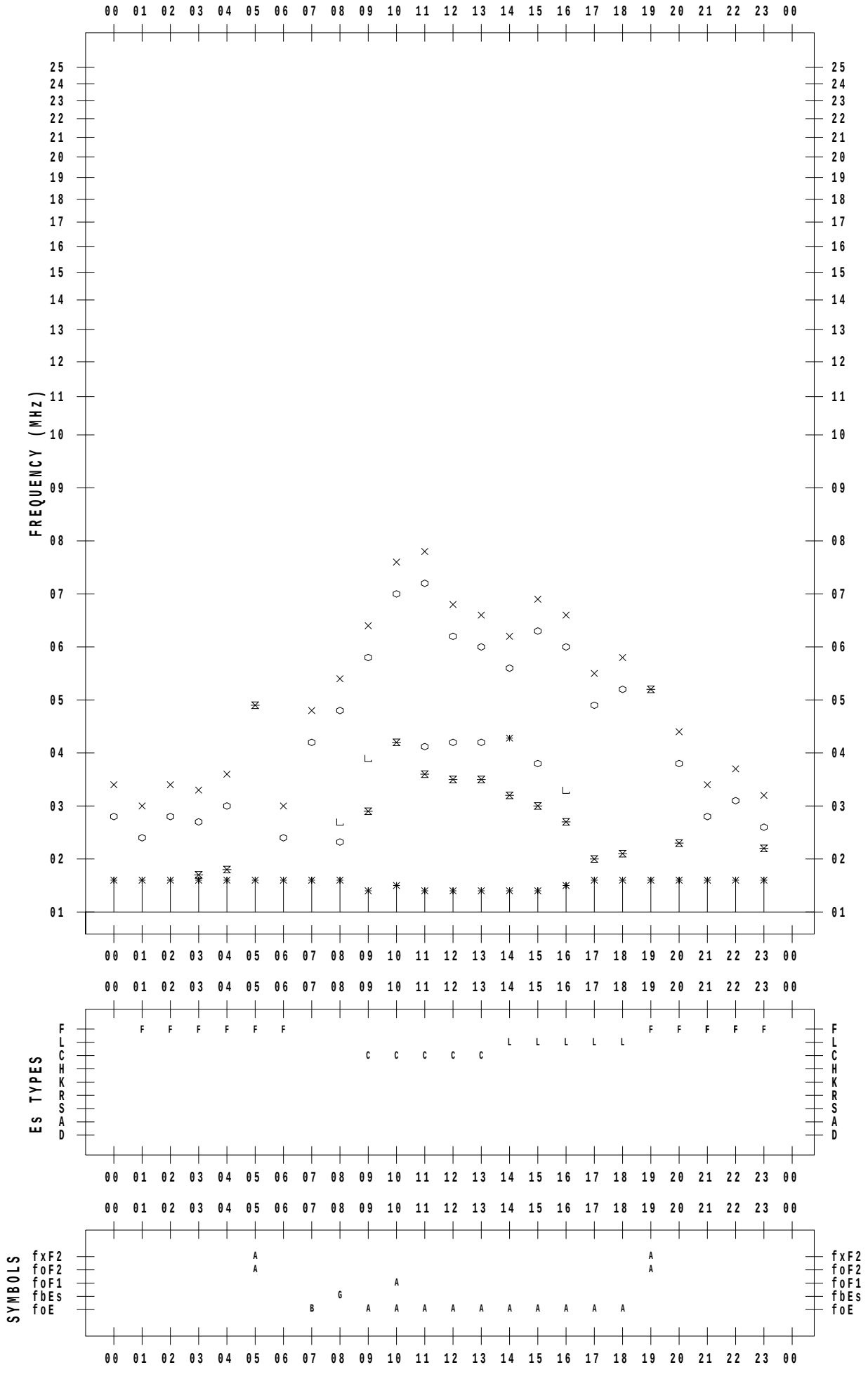
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/23

135 °E MEAN TIME



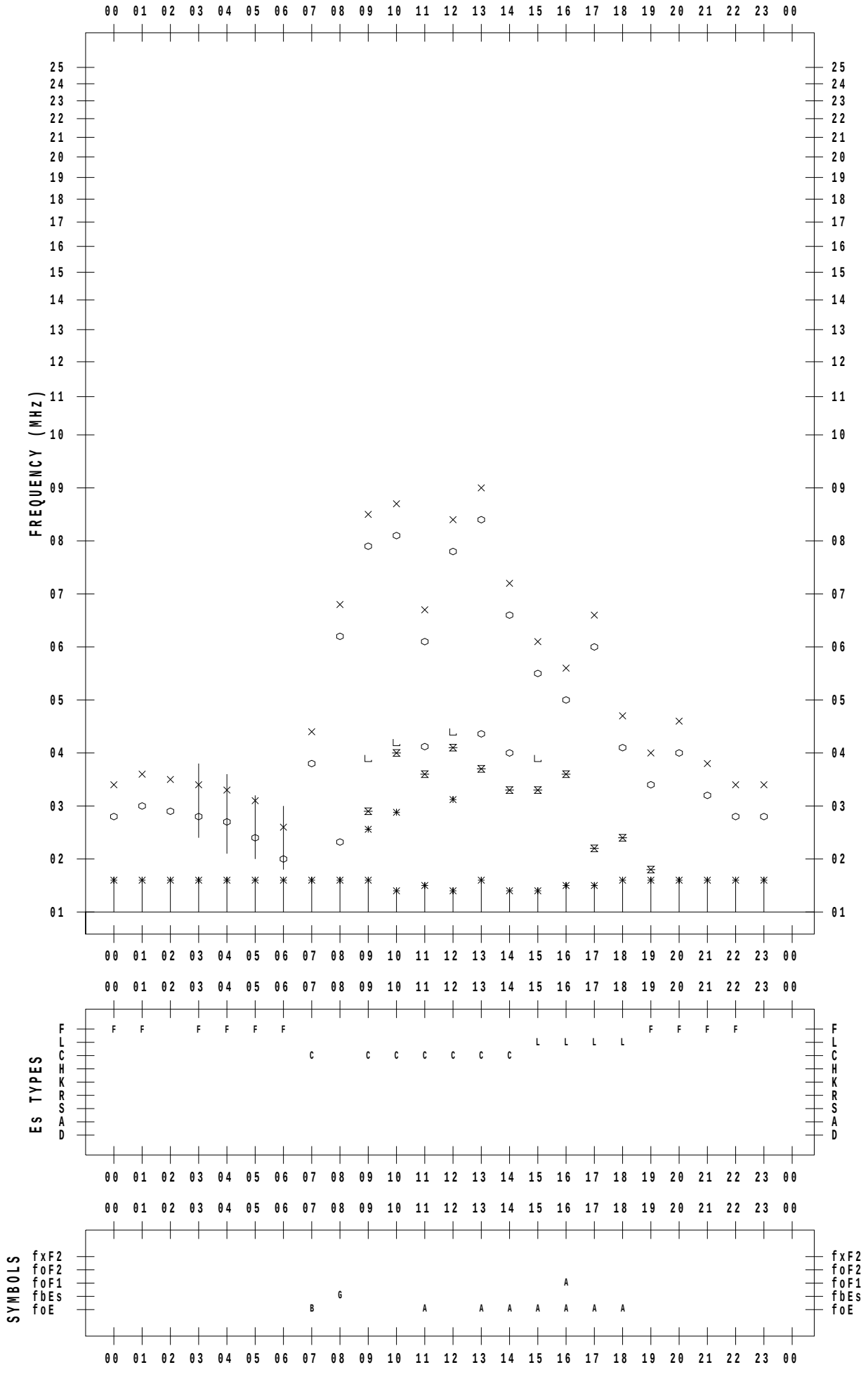
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/24

135 °E MEAN TIME



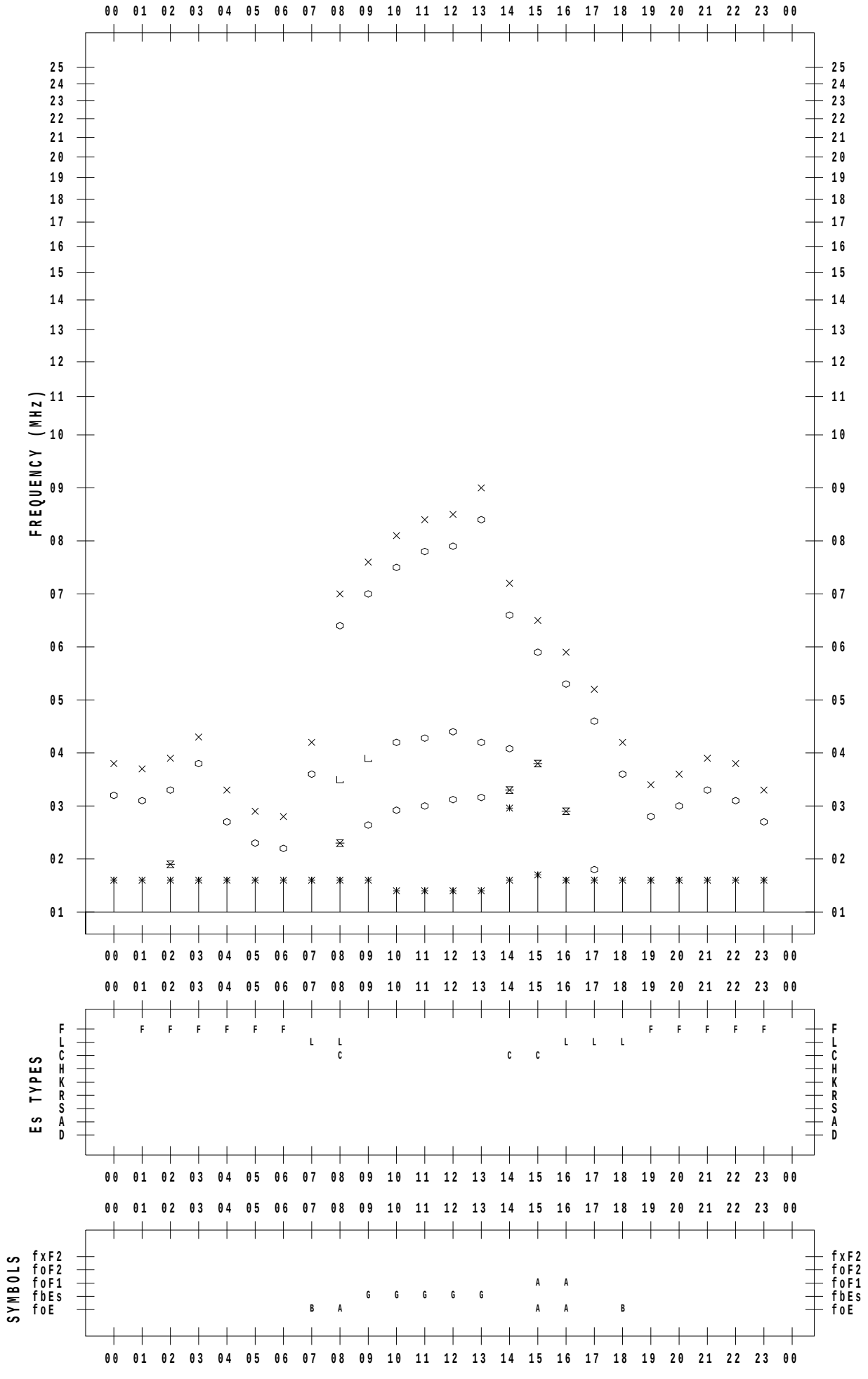
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/25

135 °E MEAN TIME



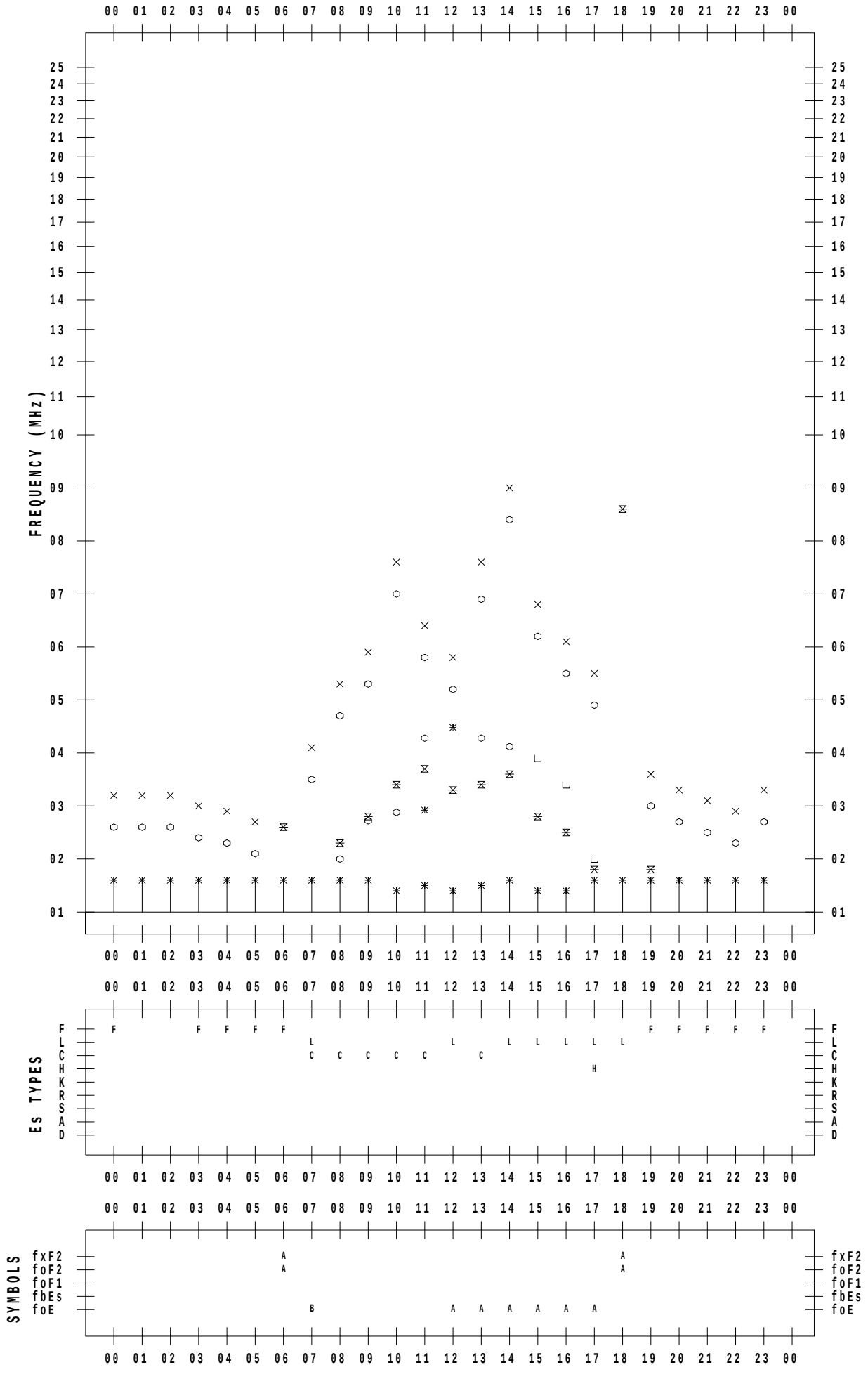
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/26

135 °E MEAN TIME



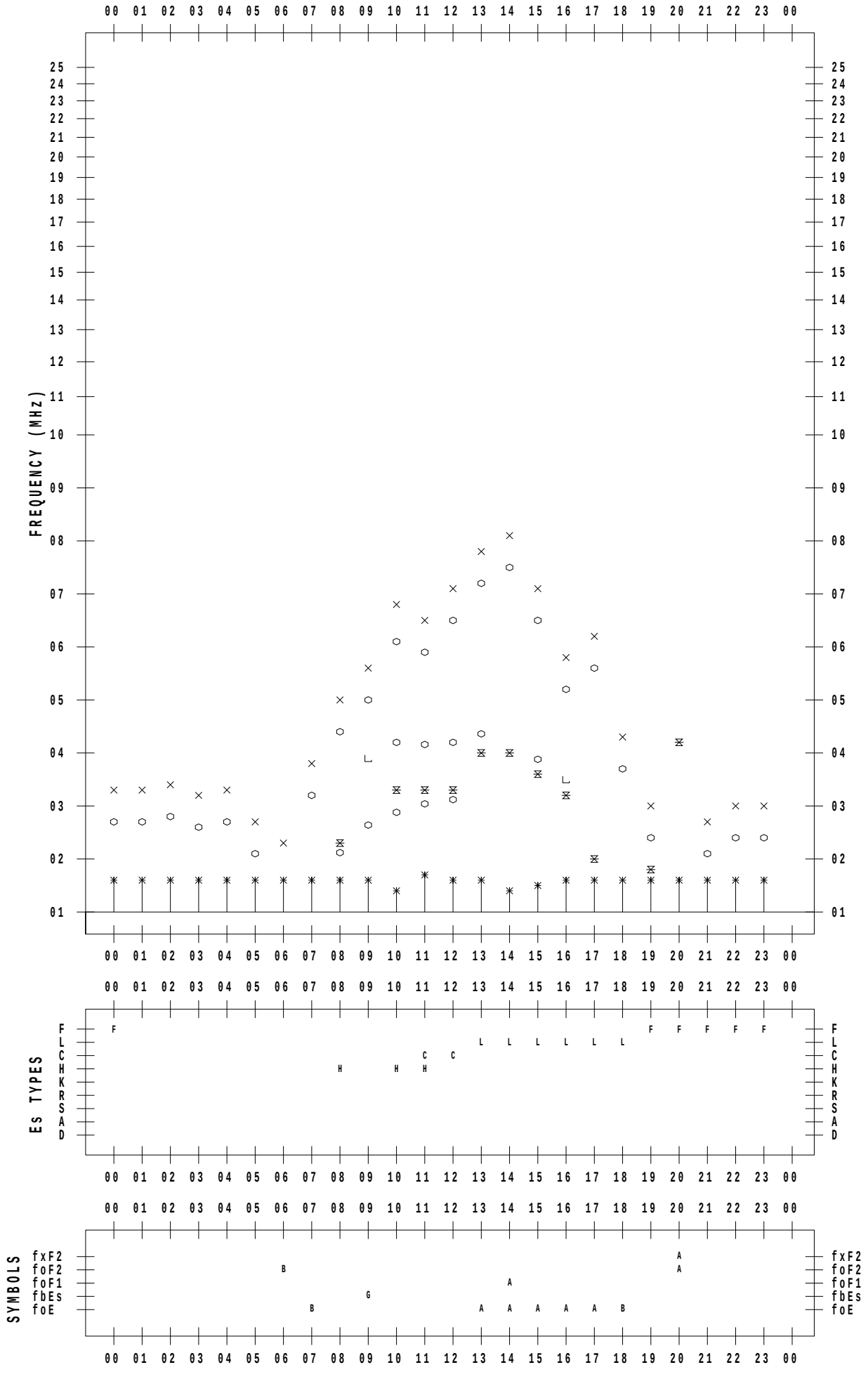
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/27

135 °E MEAN TIME



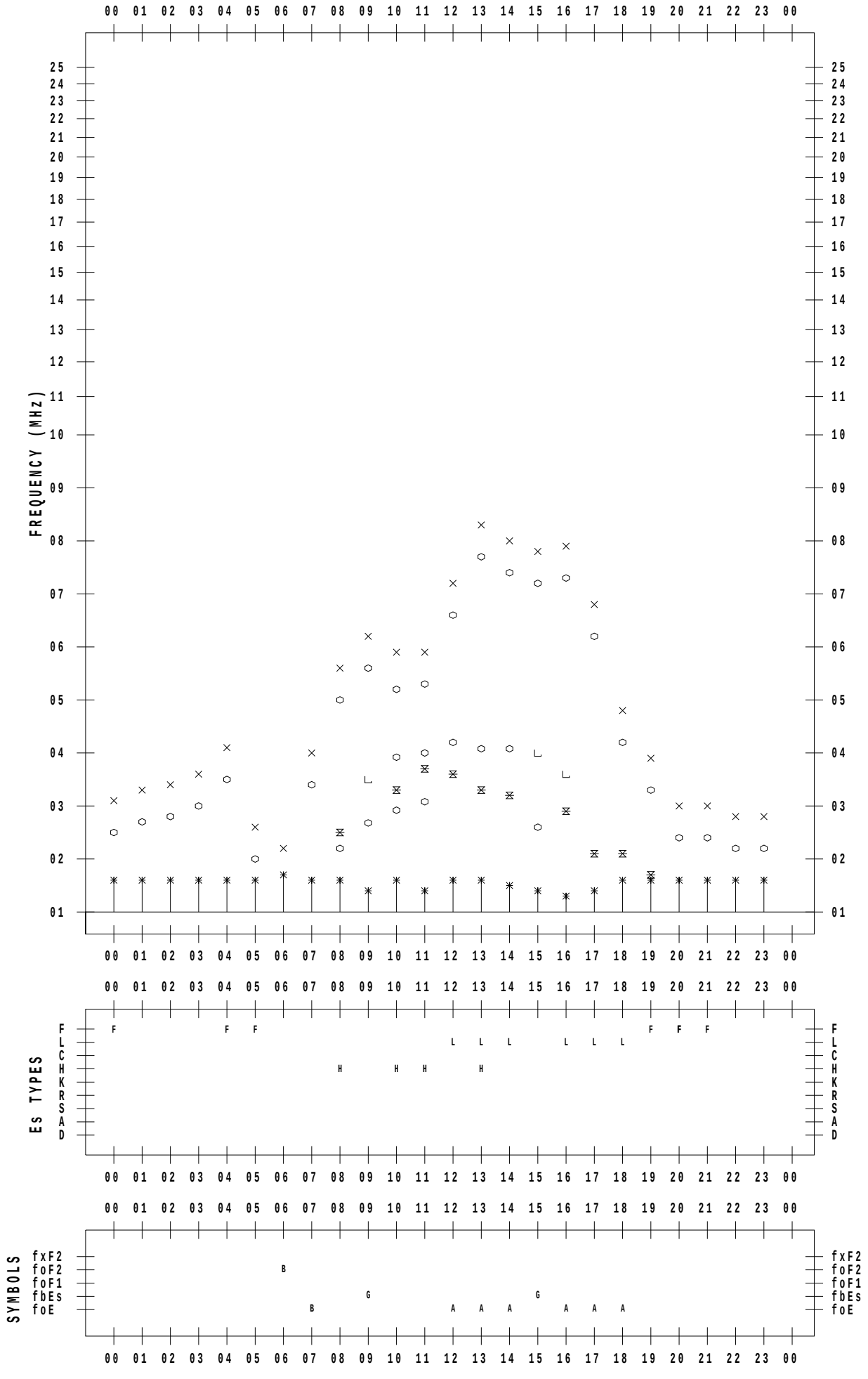
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/28

135 °E MEAN TIME



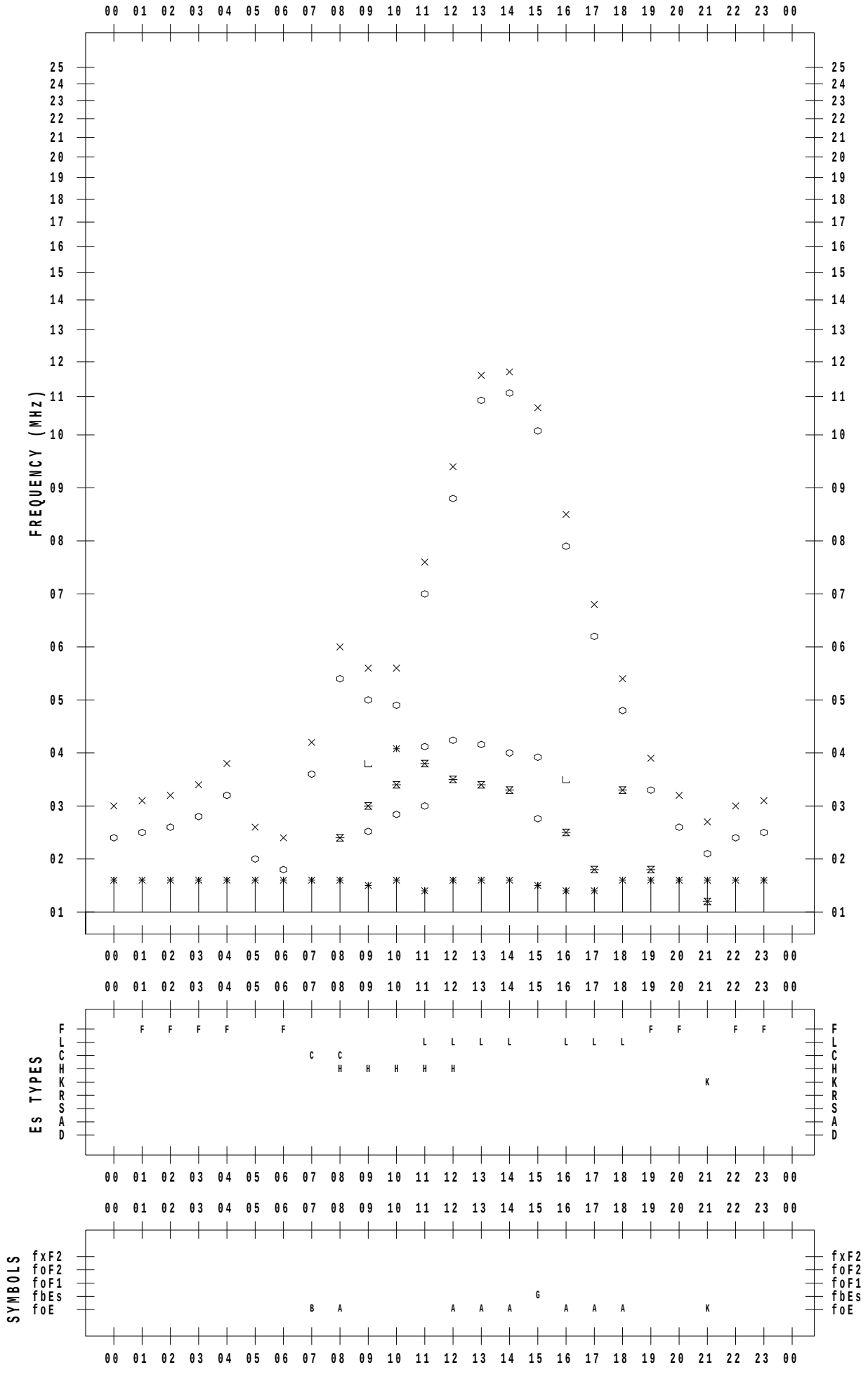
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/29

135 °E MEAN TIME



f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2019/11/30

135 °E MEAN TIME