

IONOSPHERIC DATA IN JAPAN

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



NATIONAL INSTITUTE OF INFORMATION
AND COMMUNICATIONS TECHNOLOGY
TOKYO, JAPAN

INTRODUCTION

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

National Institute of Information and Communications Technology, Japan.

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

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

IONOSPHERE

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

A1. Automatic Scaling

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

The published data consist of tabulations of hourly values of three factors ($foF2$, 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 ionospheric reflections
$h'Es$ $h'F$	Minimum virtual height on the ordinary wave for the Es and F layers, respectively

b. Descriptive Letters

The following descriptive letters are used in the tables.

A Impossible measurement because of the presence of a lower thin layer, for example Es (for $foF2$).

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 automatic data processing system, but existence of film record.

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

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

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

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

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

d. Reliability of Automatic Scaling

The results of the comparison between automatically-scaled values and manually-scaled ones showed that hourly values of $foF2$, 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

fxl	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 replace a numerical value on the monthly tabulation sheets, if necessary.

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

(ii) Qualifying Letters

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

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

M Mode interpretation uncertain.

O Extraordinary component characteristic deduced from the ordinary component. (Used for x-characteristics only.)

T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.

U Uncertain or doubtful numerical value.

Z Measurement deduced from the third magneto-electronic component.

(iii) Description of Types of *Es*

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

The types are:

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

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

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

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

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

HOURLY VALUES OF foF2 AT Wakkanai

MAY 2013

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	63	63	55	33	64	63	61	65	66	66	69	64	69	66	62	70	69	69	70	66	65	64	64	64		
2	67	49	34	32	49	58	61		A	A		62	63	64	66	67	67	66	67	66	63	64	66	63	61	
3	52	52	54	54	60	62	64	66	64	66	64	67	67	64	70	68	69	67	58	65	66	64	66	53		
4	53	34	53	60	62	64	67	67	68	66	69	68	58	70	65	68	N		70	67	66	64	63	66	63	
5	A	60	52	59	58	64	67	69	64	59	69	68	68	68	67	A		68	70	64	67	65	63	63	49	
6	63	63	66	53	66	67	56	69	66	68		68	67	61	60	70	71	71	59		63	66	64	65		
7	64	67	66	62	63	62	63		A	A	A	A	A		64	66	65	64	65	A	A		65	59	64	
8	34	35		34	51	52	66	61	A	A	A	A	A		66	66	64	65	65	66	66	A	65	A		
9	60	53	34	34	60	62	66	66	A	A		61	62	64	69	64	70	68	67	65	66	66	66	63	64	
10	54	59	58		58	68	66	63	61	64		62	65	68	70	65	70	74	70	67	66	66	66	63		
11	66	66	N	62	63	66	71	86	72	68	70	69	69	69	69	69		70	70	47	N		67	65	63	
12	63	64	63	52	61	67	64	67	A		68	67	64	68	66	A	58	67	A		90	67	65	67	66	
13	62	66	59	64	58	62	66	74	70	71	70	67		68	68	48	68	70	70	67	65	67	66	67		
14	66	64	66	64	65	65	67	69	68	64	66		69	69	68	67	70	67	67	67	51	66	66	65		
15	66	66	66	62	N	63	70		A	A				64	60	61	63	66	64	64	66	65	66	63		
16	28	63	63	66	62	67	72	72	70	65	68	66	69	70	70	68	70	79	67	67	67	65	66	66		
17	64	63	62	53	58	67		69	A	C	C	C	C	C	C	C	C		74	69	67	66	65	67	66	
18	67	67	66	63	58	67	70	67	68		C	C	C	C		59	59	71	54		66	67	A	66	66	65
19	63	66	53	52	53		63		A	A	A	A	A		66	67	68	62	67		66	65	A	67	63	
20	52	65	63	61	57	62	61		A	A	A		A	A	A	A	A		61	62		65	A	A	67	
21	A	66	66	A	64	66	67	67	69	65		A		63	66	67	70	68	66		66	65		66	66	
22	54	67	64	69	62	66	70	70	67	69	70	67	70		70	66	70	67	74		A		67	67	66	
23	64	62	64	67	65	62	70	66	A	A		64	61		68	65	A	68	71	66	67	66	65	66	66	
24	66	65	62	64	64	64	67	66	58	67	65	67	64	66	70	66	69	68	67	67	67	65	66	66	66	
25	62	65	63	55	59	56	65	66	A	A		A	A		62		A	A		68	64	65	64	67	53	
26	60	57	54	A	A	63	62	54	A	A			A	A	61	A	60	A		63	66	64	66	66	63	
27	62	52	54	57	64	67		65	A	A	A	A	A		59	A	63	62	62	63	67	63	A	64	66	
28	65	63	64	62	54	51	55	63	60		A	A				60	63	65	64	67	63	64	64	63	63	
29	67	63	52	56	62	64	70	66	A	58		A	A		A	A	A		62	66	66	65	64	65	65	65
30	62	52	52	58	61	62	67	69	64	66	68	65	66		65	67	68	66	66	67	66	65	64	63	63	
31	66	64	63	62	66		67	65	68	70	70		67		62	68	A	70	77	66	67	66	66	66	64	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	29	31	29	28	29	29	29	26	18	17	17	16	18	21	25	24	25	27	28	27	27	26	30	30		
MED	63	63	62	60	61	64	66	66	66	66	68	66	67	66	66	67	68	67	66	66	65	65	66	64		
U Q	66	66	64	62	64	66	68	69	68	68	69	67	69	68	68	68	69	70	69	67	66	66	66	66		
L Q	57	57	53	53	58	62	63	65	64	64	64	63	64	64	62	65	63	66	64	66	64	65	64	63		

HOURLY VALUES OF fEs AT Wakkanai
MAY 2013
LAT. 45° 10.0' N LON. 141° 45.0' E SWEEP 1.0MHz TO 30.0MHz AUTOMATIC SCALING

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	G	G	G	26	25	G	28	54	32	48	54	G	G	45	50	49	38	40	34	G	G	G	G	G	
2	G	G	G	G	G	G	28		41	33	58	60	49	G	34	33	30	26	G	G	G	G	G	28	
3	G	G	G	G	G	33	33	32	39	34	37	59	33	40	38	36	28	36	33	29		G	G	G	G
4	G	G	G	G	G	24	31	37	56	33	35	36	38	35	34	30	35	38	G	G		39	33	G	26
5	28	27	G	G	G	33	34	48	50	36	G	G	36	42	45	71	52	26	35	G	G		31	G	26
6	38	32	36	G	39	33	34	37	39	40		59	42	40	38	33	29	40	37		G	G	G	G	
7	G	G	G	G	G	22	26	74	82	71	50	63	64	52	50	36	60	61	76	70	53	33	71	G	
8	G	G		G	G	24	40	42	57	67	75	73	80	75	59	52	50	39	23	45	58	71	39	48	
9	24	26	G	G	G	32	38	48	52	67	50	50	54	38	35	34	31	26	G	G		28	G	G	40
10	24	25	30		G	24	33	35	42	43		34	36	36	33	34	30	35	35	G		27	G	G	G
11	27	28	26	26	G	35	40	37	46	37	36	39	36	38	35	40		27	38	29	31	G	G	G	
12	G	G	G	G	G	26	45	61	68	58	49	38	G	48	74	35	35	97	147	58	G	G		29	G
13	G	27	G	G	G	34	47	51	60	55	43	42		G	49	49	37	33	65	53	59	43	29	26	
14	G	38	29	G	G	32	40	50	50	55	43		40	G	37	34	31	33	36	47	38	33	29	33	
15	G	G	25	G	G	24	40	38	50	70	40			35	35	32	35	31	34	G	G	G	G	G	
16	27	38	G	24	28	25	26	37	48	42	34	36	42	40	55	68	46	39	34	36	60	45	28	28	
17	G	G	G	G	G	36		64	94		C	C	C	C	C	C	C		53	59	66	60	34	G	66
18	58	50	40	32	39	35	40	53	62		C	C	C	C	50	42	46	40		37	39	73	39	38	34
19	25	G	24	G	G		53	78	63	71	66	73	100	53	59	62	34	33	69	55	66	68	39	27	
20	G	G	G	29	G	32	39	49	55	39		55	41	48	71	59	64	57	53	51	68	60	68	41	
21	60	54	58	56	40	40	49	46	53	34	44		34	G	32	35	49	50	66	43	52		59	29	
22	40	36	G	33	G	28	43	55	50	34	60	59	G	71	52	36	32	52	67	93	69	38	39	24	
23	G	G	G	G	G	25	35	39	75	100	44	53	64	40	61	151	42	58	52	30	36	34	34	33	
24	25	G	G	G	G	26	43	48	46	66	39	38	44	38	40	38	66	58	46	34	28		26	30	
25	G	G	G	G	G	44	40	39	53	68	77	76	40		44	69	81	112	40	38	26	29	28	G	
26	27	G	G	39	51	44	45	42	74	61		G	53	34	43	52	49	74	59	50	47	23	25	26	
27	32	26	G	G	34	40		62	57	50	51	57	73	44	35	32	30	34	33	30	38	40	25	G	
28	G	G	28	G	28	36	49	40	G	48	61	39				32	29	G	38	33	44	40	34	40	
29	G	G	G	G	G	34	45	52	67	51	53	53	33	52	36	38	32	31	35	34	34	32	G	34	
30	G	G	G	G	G	33	37	36	59	56	64	60	32		G	35	41	50	33	G	35	G	25	G	
31	26	G	G	G	G		29	36	41	40	44	35	35		51	58	70	72	40	38	39	G	G	33	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	30	30	31	29	29	30	31	29	25	26	26	26	29	30	29	30	31	30	31	30	31	31	31
MED	G	G	G	G	G	32	40	47	53	50	49	52	40	40	42	37	37	39	37	35	38	32	25	26	
U Q	27	27	25	24	25	35	44	53	62	66	59	59	53	48	51	52	49	57	59	50	58	39	34	33	
L Q	G	G	G	G	G	24	33	37	46	38	39	36	34	35	35	34	31	33	34	G	26	G	G	G	

HOURLY VALUES OF fmin AT Wakkanai

MAY 2013

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	15	15	18	14	14	15	28	17	23	39	38	53	58	39	22	21	18	15	15	14	15	15	15	15	
2	15	16	14	16	22	21	15		20	20	22	24	20	52	21	21	15	14	20	15	14	14	15	14	
3	14	14	14	14	14	15	14	15	16	17	21	21	22	23	22	21	17	15	15	15	15	15	14	15	
4	15	17	14	14	14	15	14	18	17	18	18	23	27	18	20	17	16	14	22	16	14	14	18	14	
5	14	16	15	15	14	16	14	15	16	16	50	53	26	20	18	17	17	14	15	15	14	14	14	16	
6	14	14	16	20	15	14	15	14	15	20		53	33	21	20	17	18	14	16		15	14	15	20	
7	15	15	14	15	14	15	16	15	15	18	22	40	27	24	24	17	15	14	14	15	14	16	15	15	
8	15	15		15	15	15	14	15	16	20	20	42	35	33	21	17	17	15	17	14	14	15	15	14	
9	15	17	15	15	15	14	14	14	21	39	21	39	18	30	22	20	16	14	23	17	16	14	15	14	
10	16	15	15		15	14	14	15	18	20		24	56	28	21	18	17	14	14	15	15	15	14	15	
11	15	15	15	14	15	14	14	14	15	18	18	18	24	27	17	14		15	15	14	14	14	14	15	
12	15	15	15	14	15	14	14	15	17	18	20	50	51	23	20	16	15	14	14	14	14	14	14	18	
13	14	15	14	14	15	16	16	16	18	18	27	34		50	27	21	17	15	14	14	15	14	14	15	
14	14	14	14	14	14	14	14	17	16	20	26		57	54	26	21	16	14	15	14	15	14	15	14	
15	15	15	14	16	17	15	14	14	20	18	20			28	23	20	17	14	14	14	15	15	15	15	
16	15	14	15	16	14	14	14	14	18	17	18	22	21	20	16	15	14	14	14	14	15	14	14	14	
17	14	14	14	15	17	14		23	18	C	C	C	C	C	C	C	C		14	15	14	14	14	15	14
18	14	14	14	14	14	14	14	14	15	C	C	C	C		32	22	22	17		14	14	14	14	14	
19	14	14	14	15	15		14	15	21	20	22	20	38	24	27	21	20	14	14	14	14	14	14	16	
20	18	14	14	14	15	14	15	15	23	21		20	17	21	22	42	17	14	14	14	14	15	14	15	
21	14	14	14	14	14	14	14	14	16	18	28		23	53	22	16	17	15	14	14	14		14	14	
22	15	14	15	14	15	14	14	14	18	18	27	28	54	21	21	18	15	14	14	14	14	14	14	15	
23	15	15	15	14	17	14	14	14	15	18	27	22	20	20	20	20	14	14	14	14	14	14	14	14	
24	14	15	15	15	15	14	14	14	18	32	32	21	33	32	22	16	18	15	14	14	14	15	14	14	
25	14	16	16	16	15	14	14	14	18	33	24	20	21		20	17	16	14	14	14	14	14	14	15	
26	15	14	15	14	14	14	15	15	17	21		17	20	18	20	32	16	14	14	14	14	16	14	15	
27	14	14	14	14	14	14		15	15	21	21	22	22	20	20	18	17	14	14	14	14	14	14	15	
28	14	15	15	14	14	14	14	14	18	20	17	22				21	15	14	14	14	14	14	14	15	
29	14	14	15	14	17	14	14	14	16	17	24	22	22	18	22	17	15	14	14	14	14	14	15	14	
30	14	14	14	14	15	14	14	15	15	18	23	20	22		53	15	17	14	14	17	14	14	15	15	
31	15	14	14	14	17		14	14	15	15	24	16	21		20	17	17	14	14	14	14	15	15	15	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	30	30	31	29	29	30	31	29	25	26	26	26	29	30	29	30	31	30	31	30	31	31	
MED	15	15	14	14	15	14	14	15	17	18	22	22	24	24	21	18	17	14	14	14	14	14	14	15	
U Q	15	15	15	15	15	15	14	15	18	20	27	39	35	32	22	21	17	14	15	15	15	15	15	15	
L Q	14	14	14	14	14	14	14	14	15	18	20	20	21	20	20	17	15	14	14	14	14	14	14	14	

HOURLY VALUES OF foF2 AT Kokubunji

MAY 2013

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	81	77	63	66	66	79	73	69	73	82	92	96	94	102	103	110	112	108	107	101	90	90	81	83	
2	80	86	84	88	78	65	77	82	83	86	96	95	A	107	102	102	100	91	90	83	78	47	76	73	
3	74	73	76	66	57	66	82	75	83	72	82	90	98	103	97	105	105	108	98	87	55	78	66	73	
4	74	67	73	65	55	67	91	80	80	80	86	95	102	100	98	95	102	110	107	88	86	83	83	55	
5	74	45	64	63	53	64	84	100	107	96	88	94	92	90	102	103	100	107	107	88	77	46	66	54	
6	67	67	65	64	66	73	86	85	81	84	84	A	107	108	108	104	102		A	A	87	A	76	82	
7	80	54	63	53		69	74	85	81	A	A	85	84	96	97	95	85	84	90	90	A	A	67	A	
8	A	A	63	A	58	75	71	62	A	A	A	A	73	81	91	101	92	85	82	81	54	55	52	A	
9	53	A	63	50	52	69	72	73	78	83	86	84	86	86	94	97	93	96	88	86	78	78	76	73	
10	78	73	54	52	64	73	85	78	74	69		88	101	98	96	95	91	95	91	97	88	79	84	80	
11	77	76	76	54	66	76	86	78	75	78	88	95	97	96	88	96	95	90	102	110	109	79	76	77	
12	N	75	51	64	67	82	87	80	81	A	90	91	90	91	97	96	A	90	97	88	87	77	82	83	
13	86	81	74	72	74	81	88	A	84	75	73	A	82	94	96	100	95	97	98	98	84	85	87	82	
14	86	A	72	76	66	80	92	90	82	A	A	A	99	104	101	98	91	88	85	88	88	80	85	82	
15	87	86	76	52	73	64	76	67	75	76	75		83	83	79	77	74	72	99	A	78	77	77	74	
16	65	74	72	54	67	78	96	80	74	A	87	92	95	105	103	102	104	95	88	A	77	76	77	77	
17	76	67	67	63	59	63	72	90	90	81	A	94	99	A	A	102	102	101	91	87	80	74	A	80	
18	82	86	A	A	40	64	A	A	A	A		83	N	118	113	116	107	107	107	85	A	A	A	80	71
19	54	67	72	62	57	59	72	74	64	62	A	82	81	96	93	95	86	91	87	90	80	80	A	78	
20	73	77	75	75	64	69	A	64	A	A	A	64	A	A	59		67	66	65	67	72	66	66	54	
21	67	67	66	66	63	67	69	81	A	72	81	78	82	87	93	98	91	81	80	82	A	77	74	74	
22	83	77	72	62	64	73	81	82	90	100	96	87	88	87	94	90	88	83	86	N	83	80	88	85	
23	76	74	72	64	67	77	87	81	84	87	83	A	A	A	95	87	102	96	84	71	64	54	A	N	
24	75	74	66		A	66	87	100	81	74	71	76	77	83	92	A	93	102	102	100	A	87	88	77	
25	77	80	66	74	64	67	68		A	A	A	A	A	A	78	75	81	91	88	78	77	67	54	72	
26	63	58	58	52	50	64	71	62	A	A	A	65	60	A		78	68	A	70	80	78	77	74	73	
27	67	54	53	53	57	77	86	85	73	A	68	A	A	66	76	81	83	87	83	79		70	72	64	
28	71	52	77	A	A	A	64	76	63	A	A	A				A	73	72	72	72	76	63	76	A	
29	73	72	54	64	63	64	81	64	74	71	67	A	A	68	71	75	77	73	73	64	66	54	65		
30	53	54	66	53	61	67	78	75	A	68	68	A	A	A	88	96	95	96	92	88	83	77	55	53	
31	67	54	54	58	57	54	73	75	90	84	81	75	71		A	88	90	100	101	94	83	77	74	76	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	28	30	27	28	30	29	28	24	20	21	19	23	23	27	28	30	29	30	26	26	28	28	26	
MED	74	73	66	63	64	68	81	79	81	79	83	88	90	96	95	96	92	91	89	88	79	77	76	75	
U Q	80	77	73	66	66	76	86	83	83	84	88	94	99	103	101	102	102	100	98	90	86	79	81	80	
L Q	67	62	63	53	57	64	72	73	74	72	74	78	82	86	88	89	85	84	84	80	77	66	66	72	

HOURLY VALUES OF fEs AT Kokubunji
MAY 2013
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	58	G	G	G	G	G	59	51	52	57	G	47	G	51	44	55	51	81	27	60	G	G	G	G
2	G	G	G	G	G	G	25	28	G	G	G	62	79	G	G	115	G	28	G	G	G	42	40	37
3	G	G	G	G	G	G	29	G	G	G	G	100	83	58	49	G	G	G	56	78	G	30	G	29
4	33	25	31	35	34	G	29	G	50	G	G	G	62	G	44	G	G	27	25	28	G	30	23	23
5	G	G	G	G	G	G	25	73	53	53	51	G	G	48	G	G	G	32	24	G	G	G	45	35
6	29	31	24	G	G	28	26	47	52	52	60	98	81	72	113	G	64		117	146	115	102	43	G
7	25	29	G	G	G	G	46	72	74	91	82	61	59	68	56	108	87	77	87	72	114	79	59	90
8	79	128	55	59	45	G	51	59	68	68	86	94	61	72	71	62	51	46	G	29	G	53	53	58
9	50	57	40	32	G	G	29	G	G	G	47	51	G	45	G	G	47	50	59	33	36	50	G	G
10	G	G	G	G	G	28	26	28	G	44	G	G	G	48	57	64	70	71	65	41	35	32	G	G
11	G	G	G	G	G	G	39	54	58	58	G	G	G	G	G	60	66	51	41	41	40	30	24	G
12	G	G	G	G	G	G	G	52	82	124	109	G	G	G	G	75	89	81	47	35	29	49	34	31
13	34	36	28	30	27	29	G	98	74	60	71	51	G	49	58	82	90	47	69	51	26	59	47	114
14	59	82	28	26	32	27	60	56	80	75	80	75	62	52	39	G	G	27	26	G	56	37	39	29
15	34	27	24	G	G	G	G	51	53	75	G		71	59	G	G	45	46	78	114	43	45	59	G
16	45	G	G	G	G	G	30	51	63	70	61	60	52	G	42	G	G	61	61	82	58	30	31	29
17	33	27	G	G	G	30	55	80	85	57	92	48	58	92	117	96	69	46	G	33	38	43	49	61
18	70	95	130	128	42	22	93	90	129	102	59	86	89	45	52	52	83	55	53	61	110	61	40	40
19	26	53	28	G	G	G	G	54	59	64	71	50	51	45	G	G	G	36	52	35	38	25	33	G
20	G	G	G	G	31	58	102	50	52	60	71	50	75	68	46	G	57	48	59	50	37	G	G	28
21	29	33	30	G	G	G	G	47	92	90	61	49	61	56	G	61	G	71	75	51	58	50	57	46
22	G	46	57	59	46	34	G	28	G	51	84	62	G	G	G	G	51	52	44	62	60	40	49	39
23	35	46	36	29	27	22	G	60	67	58	78	81	126	92	81	94	68	53	42	36	61	72	92	60
24	48	40	40		30	G	G	G	50	51	69	51	G	110	52	95	44	37	44	G	113	106	31	G
25	G	G	G	31	G	G	26		47	71	68	86	49	62	45	118	29	G	46	G	G	45	90	
26	40	33	25	G	G	26	G	55	77	109	115	59	52	61	G	G	54	62	59	37	47	40	104	26
27	50	29	G	30	G	25	46	68	52	67	64	49	78	57	G	51	97	26	G	G	G	23	34	
28	50	33	49	80	82	92	60	G	53	53	66	50				74	G	37	40	40	39	34	53	91
29	36	G	G	G	G	G	58	50	56	53	G	65	75	62	57	59	84	70	61	40	29	49	27	
30	G	23	G	G	G	G	30	60	103	G	49	53	81	116	69	G	G	26	G	61	34	29	28	46
31	49	33	26	G	G	22	31	34	70	78	88	G	G		129	113	112	81	44	33	50	46	80	59
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	31	30	30	31	30	30	30	29	29	31	31	30	31	31	30	31	31	30
MED	33	29	24	G	G	G	29	51	57	58	65	51	60	52	46	52	51	48	44	40	38	40	40	32
U Q	49	40	31	30	30	27	51	60	74	75	80	65	78	68	60	75	83	62	61	61	58	50	53	58
L Q	G	G	G	G	G	G	G	29	52	51	47	48	G	45	G	G	G	32	25	33	26	30	24	G

HOURLY VALUES OF fmin AT Kokubunji

MAY 2013

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	13	14	13	13	13	20	22	14	37	39	54	40	53	38	47	35	30	17	13	20	14	14	14	14
2	15	15	13	14	13	14	18	34	39	42	44	43	40	53	42	38	38	20	22	13	14	14	14	13
3	14	17	13	13	13	20	18	18	40	42	53	39	39	43	37	44	38	40	14	13	14	14	13	14
4	14	15	13	13	13	18	18	17	35	44	52	56	42	52	46	51	41	14	14	13	14	14	15	15
5	13	14	13	13	24	18	18	20	36	39	38	52	53	39	52	48	38	20	15	15	14	43	13	13
6	14	14	14	17	13	14	18	20	34	38	38	38	39	38	37	45	36		13	17	13	18	14	14
7	15	13	13	15	13	29	13	14	34	38	40	39	39	37	34	31	31	15	14	14	13	14	35	13
8	13	14	14	14	13	18	13	20	36	38	39	39	39	39	39	36	34	21	22	13	18	14	13	13
9	14	13	13	13	14	22	30	18	43	48	40	40	34	37	48	46	26	14	13	13	14	14	20	17
10	14	14	14	13	13	13	18	17	40	38		55	52	42	39	35	34	14	14	13	13	13	13	15
11	14	14	14	14	14	21	14	18	36	38	54	55	54	39	48	42	36	24	14	14	13	14	15	14
12	20	14	21	14	13	22	33	34	35	40	34	54	53	54	53	39	35	15	15	13	13	13	13	14
13	13	13	13	13	13	13	38	22	38	39	39	43	72	65	39	35	34	18	14	17	14	13	13	14
14	14	13	13	13	13	14	13	34	34	38	42	56	42	39	52	48	17	15	13	15	14	13	13	13
15	13	15	14	14	14	14	39	34	38	39	49		45	36	53	44	21	18	13	14	14	14	13	14
16	14	14	14	14	13	13	13	14	34	37	38	38	38	54	35	47	43	25	13	14	13	13	14	14
17	13	14	14	14	14	15	14	38	36	36	37	41	37	37	36	34	18	13	35	13	15	14	13	14
18	13	13	13	13	13	14	14	37	39	38	37	42	39	39	42	36	36	28	15	13	17	14	13	14
19	14	13	14	14	13	20	18	34	36	38	39	39	39	57	52	46	39	21	15	14	14	14	13	14
20	13	14	33	13	17	14	15	30	35	36	38	38	39	39	39	55	34	30	17	13	13	20	14	14
21	13	14	13	17	18	13	34	21	37	37	40	42	39	39	52	36	42	15	14	15	18	13	13	13
22	14	14	14	13	14	13	14	13	52	34	39	39	58	58	57	50	34	22	13	13	17	13	13	13
23	13	14	14	13	13	14	17	30	36	40	39	40	39	36	30	30	20	14	13	14	13	14	13	14
24	13	13	13		13	35	38	18	21	37	38	38	58	38	37	38	47	18	13	17	13	13	14	13
25	14	13	13	13	14	18	13			37	38	39	38	40	42	34	33	22	33	13	17	15	13	17
26	13	13	15	15	14	17	37	31	36	38	39	42	39	39		53	30	33	14	13	14	14	14	15
27	14	14	17	13	13	14	13	15	39	38	39	38	37	36	55	37	22	18	34	13		39	13	14
28	13	14	14	13	13	13	29	44	37	38	37	37				35	20	30	14	14	13	13	13	13
29	13	14	14	14	18	21	14	15	34	40	53	40	39	39	37	33	29	15	13	13	13	13	13	
30	17	15	14	18	15	22	15	14	34	50	39	38	36	35	37	37	42	18	31	13	15	13	13	14
31	14	13	13	13	13	13	14	17	33	35	35	52	53		31	24	18	13	13	13	13	13	14	13
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	30	31	31	31	30	30	31	30	30	30	29	29	31	31	30	31	31	30	31	31	30
MED	14	14	14	13	13	15	18	20	36	38	39	40	39	39	42	38	34	18	14	13	14	14	13	14
U Q	14	14	14	14	14	20	29	34	38	40	42	43	53	47	52	46	38	22	15	14	14	14	14	14
L Q	13	13	13	13	13	14	14	17	34	37	38	39	39	37	37	35	26	15	13	13	13	13	13	13

HOURLY VALUES OF foF2 AT Yamagawa

MAY 2013

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	88	A	76	77	72	72	81	76	80	83	93	87	96	95	97	112	114	111	117	96	87	86	86	85
2	N	80	78	87	84	58	78	86	80	87	94	96	97	93	98	110	69	111	111	96	78	85	75	85
3	80	87	87	86	71	63	77	87	84	77	86	90	91	98	108	A	113	116	112	95	81	77	74	78
4	80	78	54	81	49	52	83	88	78	86	92	95	98	97	112	113	111	111	110	89	78	84	86	75
5	77	84	83	72	63	54	78	92	96	88	81	89	86	95	96	112	115	116	115	89	78	81	78	78
6	67	79	80	76	74	A	80	76	88	85	87	91	96	104	94	98	108	108	113	73	86	85	A	79
7	85	88	89	81	57	68	80	88	A	80	82	A	96	94	96	96	108	108	113	80	88	78	76	72
8	74	74	72	64	66	75	77	80	A	71	76	83	90	94	98	96	112	113	113	104	84	52	77	77
9	78	73	64	57	57	58	68	73	75	78	80	80	82	88	97	95	107	96	A	90	77	80	77	79
10	77	78	78	77	67	67	77	85	67	70	B	91	79	96	95	91	96	110	111	91	87	84	85	86
11	87	87	88	78	67	76	87	93	76	88	91	96	97	95	95	112	101	96	97	79	79	80	84	89
12	79	87	80	77	67	80	87	83	82	78	75	88	95	101	112	96	110	106	96	88	A	88	83	76
13	87	84	75	76	76	80	88	87	72	A	A	78	81	93	A	A	110	A	108	A	88	86	80	88
14	87	88	86	77	80	80	85	80	77	75	A	A	A	A	A	99	97	110	110	88	87	89	88	79
15	88	N	79	72	74	76	77	81	87	88	A	B	96	98	90	90	88	80	88	88	A	73	A	80
16	54	64	79	76	66	68	70	76	74	75	74	81	87	A	A	97	111	112	107	88	83	86	A	86
17	78	80	67	67	63	60	81	90	87	78	79	86	A	87	96	69	110	113	95	91	85	88	78	77
18	87	85	81	44	A	50	67	82	A	A	A	94	A	A	95	A	97	111	97	88	86	A	A	78
19	75	67	75	67	66	64	74	82	72	65	A	86	91	93	95	95	94	97	115	90	86	87	86	84
20	82	58	78	84	67	71	74	69	66	65	A	76	A	70	70	74	78	78	78	78	74	66	54	70
21	73	52	52	58	52	57	66	72	75	67	71	76	84	88	94	95	94		88	A	87	80	80	81
22	81	86	84	78	78	81	78	82	86	A	86	87	A	81	106	96	91	86	87	88	87	86	80	80
23	80	76	76	75	72	68	74	80	86	88	A	84	88	A	106	70	A	A	92	84	77	76	77	A
24	75	77	74	54	57	58	77	86	72	A	A	A	82	A	90	96	96	107	92	89	86	80	56	87
25	79	87	85	87	78	74	74	62	66	66	67	71	76	75	80	80	83	97	96	86	78	44	72	77
26	77	76	A	62	54	58	71	70	72	A	A	87	A	73	85	97	93	90	88	92	87	46	76	82
27	84	83	77	A	58	54	70	80	73	A	A	A	67	76	83	92	95	97	100	87	77	74	53	72
28	73	74	76	67	58	47	67	71	A	67	67	70	A	A	A	90	77	A	86	78	A	73	76	75
29	78	54	67	67	64	67	81	75	85	83	77	76	76	74	87	91	95	92	90	81	78	73	76	54
30	72	71	54	63	53	52	66	71	68	72	A	A	77	91	94	97	97	113	96	90	78	72	53	66
31	73	76	74	66	53	64	74	84	88	74	76	A	A	72	76	A	94	110	95	88	78	A	80	75
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	30	30	30	30	31	31	28	25	19	24	23	25	27	27	30	27	30	29	28	29	27	30
MED	78	78	78	76	66	66	77	81	78	78	80	86	88	93	95	96	97	108	97	88	84	80	77	78
U Q	84	85	81	78	72	74	81	86	85	85	87	90	96	95	98	98	110	111	111	90	87	86	83	84
L Q	75	73	74	66	57	58	71	75	72	70	75	79	81	78	90	91	94	96	92	85	78	73	75	75

HOURLY VALUES OF fEs AT Yamagawa

MAY 2013

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	70	91	32	30	G	G	32	40	45	70	62	66	64	57	47	51	46	46	47	32	25	27	29	G
2	G	G	25	G	G	G	G	29	33	33	G	G	G	42	43	34	58	39	40	G	G	33	29	G
3	G	G	G	G	G	G	24	40	36	35	G	43	G	61	61	106	46	35	31	G	26	29	27	27
4	G	G	G	34	G	G	33	33	36	33	35	54	45	44	46	65	70	47	32	50	49	43	46	34
5	32	24	G	G	G	G	24	40	49	57	59	34	44	44	42	56	58	53	70	61	54	69	G	28
6	G	G	23	46	39	40	31	44	49	47	54	78	55	54	53	54	62	88	72	62	53	59	78	40
7	112	56	39	59	25	G	53	54	59	40	101	95	104	54	71	54	51	57	82	36	48	28	50	34
8	59	49	65	58	62	55	34	51	100	48	72	68	61	59	82	77	75	67	55	53	46	46	59	36
9	54	40	30	39	29	35	33	40	37	62	52	42	55	50	49	36	G	32	105	77	29	34	32	46
10	32	57	33	29	36	G	33	46	51	45	B	G	60	65	66	56	71	88	78	36	36	50	35	30
11	G	G	G	G	G	G	32	45	61	53	56	54	60	68	71	51	60	69	64	64	73	82	58	79
12	51	53	50	34	28	G	37	63	81	92	46	38	G	46	G	G	64	63	57	84	86	40	33	49
13	59	57	38	38	40	30	24	47	69	80	171	G	G	93	103	143	92	154	94	95	78	36	G	40
14	33	30	44	44	38	30	34	60	51	58	125	84	87	78	185	65	80	42	56	48	104	70	59	69
15	25	31	G	24	24	29	36	49	82	84	86	B	70	82	45	33	50	65	70	81	58	46	43	32
16	27	29	23	49	25	G	31	34	52	54	69	60	76	149	158	72	55	34	54	72	69	79	81	58
17	49	38	26	26	G	G	31	33	48	66	85	84	104	56	78	56	61	59	48	46	G	30	27	G
18	40	50	58	58	51	23	41	44	74	80	88	73	100	114	70	116	79	83	84	45	79	93	83	48
19	34	32	43	39	G	G	25	44	54	58	83	76	61	73	56	39	50	49	46	26	33	G	40	28
20	27	24	G	27	G	G	22	40	47	56	100	63	64	57	50	59	47	32	43	26	G	G	50	49
21	48	40	29	29	27	G	34	42	78	58	72	56	51	34	G	60	55		69	87	84	28	G	G
22	27	58	52	50	36	40	38	46	80	91	83	67	102	80	51	45	61	56	60	40	33	58	89	59
23	58	31	41	31	32	24	33	43	52	62	96	51	66	185	60	77	118	94	79	41	37	46	58	72
24	46	33	39	33	26	25	40	39	50	64	72	52	71	87	64	58	38	49	36	34	26	45	37	59
25	58	35	33	36	33	30	28	36	36	42	56	37	35	65	56	35	33	40	36	G	G	G	40	47
26	35	67	52	40	35	34	36	40	54	67	97	75	84	61	59	50	78	37	49	94	29	50	40	38
27	55	58	G	59	33	G	28	40	48	87	94	125	56	53	48	53	66	84	55	37	54	26	G	30
28	39	48	46	G	G	G	33	56	68	69	64	70	83	93	87	78	75	86	65	58	59	40	35	46
29	44	58	36	26	24	G	36	43	58	73	34	47	58	70	59	69	32	40	64	44	36	79	40	40
30	28	33	25	G	G	G	23	39	34	56	64	65	46	53	55	63	69	83	103	72	61	39	28	34
31	58	33	58	32	41	36	47	103	59	50	56	84	83	46	45	90	63	54	48	50	58	60	70	43
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	30	31	31	31	31	31	31
MED	39	35	33	33	26	G	33	43	52	58	70	62	61	61	56	56	61	55	57	48	48	43	40	40
U Q	55	56	44	44	36	30	36	47	68	70	88	75	83	80	71	72	71	83	72	72	61	59	58	49
L Q	27	29	23	26	G	G	28	40	47	48	56	43	46	53	47	50	50	40	47	36	29	29	29	30

HOURLY VALUES OF fmin AT Yamagawa

MAY 2013

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	14	15	14	15	14	14	15	20	34	38	43	39	39	38	32	23	17	14	14	15	15	15	15
2	15	15	15	14	14	15	21	14	20	23	50	52	48	51	51	20	20	17	14	16	14	15	15	15
3	15	15	15	14	14	15	17	14	17	23	44	59	53	29	39	24	22	15	15	17	15	14	15	14
4	15	15	15	14	14	15	16	15	15	36	27	28	39	52	38	32	22	18	16	14	14	14	14	14
5	14	15	14	16	14	16	18	15	17	18	38	26	51	56	54	22	29	17	14	15	16	14	15	14
6	15	15	15	14	14	15	16	16	20	23	27	38	36	36	30	37	21	16	14	14	15	15	14	14
7	15	15	15	14	15	14	15	15	18	21	23	29	24	36	35	27	23	17	14	14	14	14	14	15
8	14	14	15	14	15	14	14	14	17	18	24	27	28	23	21	21	18	16	14	14	15	14	14	14
9	14	14	14	14	15	14	14	16	21	20	24	40	34	35	30	27	18	15	14	14	14	14	14	14
10	15	14	14	15	14	15	15	14	18	24	B	50	42	40	39	26	20	16	14	15	17	14	14	14
11	15	17	15	16	15	15	15	17	17	16	26	35	34	29	24	21	18	18	16	14	14	14	14	14
12	14	15	14	14	15	14	15	14	16	20	26	26	59	56	49	48	22	16	14	14	15	14	14	14
13	14	14	14	14	14	14	17	15	20	20	35	68	68	45	40	37	23	17	14	14	14	14	15	14
14	14	15	14	14	14	14	15	16	17	20	40	68	53	40	34	29	18	16	14	14	14	15	14	14
15	15	15	14	14	14	14	15	14	17	18	28	B	44	35	35	50	22	18	14	14	15	14	14	14
16	15	15	15	14	14	16	15	16	17	18	21	28	38	38	34	21	18	16	15	14	15	14	14	14
17	14	14	14	14	14	14	15	21	17	21	28	30	33	28	28	23	23	16	21	14	15	14	14	16
18	14	14	14	14	14	16	14	15	17	23	18	38	36	38	35	27	18	21	15	14	14	15	14	14
19	14	14	14	14	14	15	15	15	18	23	26	38	38	32	30	28	17	18	14	17	14	15	14	15
20	14	15	17	14	16	15	14	20	17	24	32	36	27	33	30	40	22	20	14	14	15	15	14	15
21	14	15	14	14	14	15	14	16	16	23	30	27	35	52	55	29	18		14	15	15	15	14	15
22	15	15	14	14	14	14	14	14	14	18	24	22	38	38	38	20	18	15	14	14	15	15	14	14
23	14	14	15	14	14	15	15	14	16	21	22	40	35	28	29	20	18	17	15	14	14	15	14	14
24	14	14	14	14	14	14	14	15	17	20	24	36	35	36	36	33	18	16	16	16	17	14	14	14
25	14	14	15	15	14	15	14	15	15	18	27	27	24	42	39	26	27	16	14	17	17	16	15	15
26	15	14	15	14	14	14	15	15	21	27	21	28	39	38	35	27	21	17	14	14	14	15	15	14
27	14	14	15	14	15	15	14	14	16	18	23	24	26	28	26	18	17	14	14	14	15	14	18	14
28	14	14	14	14	15	17	16	14	18	20	26	27	32	32	30	20	17	16	14	14	14	15	14	14
29	15	15	14	14	14	15	14	14	16	18	52	38	40	36	28	23	20	15	15	15	14	14	14	15
30	15	15	16	16	16	15	14	14	17	17	26	36	34	35	23	22	21	16	15	14	15	14	15	15
31	14	14	14	15	14	15	14	14	16	18	30	28	33	52	38	26	18	17	16	15	14	14	15	15
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	30	31	31	31	31	31	31
MED	14	15	14	14	14	15	15	15	17	20	26	36	36	36	35	26	20	16	14	14	15	14	14	14
U Q	15	15	15	14	15	15	15	16	18	23	32	40	42	42	39	32	22	17	15	15	15	15	15	15
L Q	14	14	14	14	14	14	14	14	16	18	24	27	33	32	30	21	18	16	14	14	14	14	14	14

HOURLY VALUES OF foF2 AT Okinawa

MAY 2013

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	79	103		99	89	84	N	81	81	86	87	90	102	110	118	126	130	133	132	119	125	44	65	53
2	89	129	107	109	109	82	81	105	80	86	98	108	108	108	108	122	129	134	134	131	108	N	88	110
3	49	71	110	104	84	65	76	88	87	87	87	106	113	108	118	126	131	130	130	118	87	88	80	
4	88	86	89	73	76	66	86	99	86	88	88	103	104	109	108	128	122	118	122	108	104	90	102	
5		80	80	87	61	53	78	107	90	85	81	88	104	107	121	131	128	130	A	A	83	73	87	A
6		107	88	82	79	67	72	80	85	88	90	102	108	110	116	123	124	120	124	107	A	A	88	A
7	87	87	88	74	60	38	68	82	81	81	86	89	99	118	120	121	126	126	138	126	88	N	81	78
8	66	75	84	72	76	73	68	72	67	75	88	88	107	118	126	120	126	134	131	125	102	69	80	87
9	55	88	75	77	B	52	77	76	78	76	93	88	103	106	108	108	118	113	106	104	A	87	83	83
10		66	78	76	73	63	67	93	68	66	B	86	110	107	108	106	110	110	A	110	87	88	111	106
11	110		88	89	81	80	88	87	87	102	104	108	128	129	128	130	131	130	130	126	78	A	A	107
12	A	88	88	87	89	105	84	A	82	73	82	88	79	108	110	125	124	123	110	107	A	90	76	84
13		80	87	80	80	83	90	73	67	A	A	B	B	A	131	132	130	127	122	123	107	67	A	87
14	59	49	89		87	88	92	83	82	A	A	B	B	107	118	130	130	127	126	108	85	49	66	108
15	88	89	109	88	87	83	81	87	88	90	A	B	109	118	108	106	106	107	112	88	A	A	A	A
16	A	53	81	74	53	52	66	72	77	76	78	83	100	107	120	130	128	130	121	81	88	88	66	87
17	88	87	83	74	61	66	72	91	79	78	A	87	A	A	A	126	127	114	107	82	82	88	78	A
18	87	55	81	48	41	44	70	84	67	A	92	74	118	A	143	140	133	142	132	130	110	80	78	A
19	A	52	53	62	52	52	72	88	73	72	83	90	103	107	117	113	120	127	128	118	108	A	104	N
20	89	88	87		N	74	76	74	67	A	80	91	88	91	88	97	91	107	107	86	77	66	83	72
21	66	74	A	72	52	58	61	68	76	78	74	72	86	88	106	105	108	106	A	89	A	84	88	82
22	87	88	66	83	69	67	72	82	90	80	87	A	84	89	110	59	88	100	88	88	81	77	85	54
23	59	A	85	72	65	57	59	82	81	84	78	A	A	106	120	119	120	126	108	89	78	86	88	87
24	86	84	N	A	53	52	67	81	70	A	78	80	85	104	107	107	110	110	109	107	102	49	83	69
25	88	53	87	39	74	57	61	71	67	66	B		87	76	84	88	96	108	108	88	74	59	N	67
26	N	78	A	52	A	N	80	72	A	A	76	102	A	A	A	108	107	113	107	107	99	87	86	80
27	A	87	88	84	66	63	64	81	63	A	73	76	A	A	A	90	107	118	109	102	84	87	82	87
28	59	87	87	74	62	53	61	76	82	70	64	80	A	98	102	A	104	107	88	76	109	74	80	A
29	53	76	72	66	62	66	74	80	80	A	A	A	88	90	101	110	107	105	88	82	77	79	A	
30	A	A	76	73	58	49	55	72	77	72		72	81	87	107	106	A	134	130	A	A	80		74
31	87	49	A	72	73	76	89	87	75	71	71	74	78	83	94	110	108	79	74	76	A	A		52
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	21	28	26	27	28	30	30	30	30	23	23	23	24	25	28	31	29	31	28	29	25	24	25	22
MED	87	82	87	74	70	66	72	82	80	78	83	88	102	107	110	119	122	120	116	107	87	82	83	82
U Q	88	88	88	87	80	74	80	88	85	86	88	102	108	109	120	126	128	130	130	118	103	88	88	87
L Q	59	68	80	72	60	53	67	74	70	73	78	80	85	90	107	105	109	108	107	88	79	68	78	72

HOURLY VALUES OF fEs AT Okinawa

MAY 2013

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

D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	G	G	G	G	58	G	G	43	49	52	58	62	66	54	52	63	54	42	50	70	70	G	G	G
2	G	G	28	G	G	G	G	29	G	52	57	61	G	48	G	56	47	43	36	28	40	G	29	G
3	G	G	G	G	G	G	23	28	46	G	G	G	51	73	78	G	57	89	48	G	28	G	G	G
4	G	G	G	G	G	G	G	G	50	G	63	56	62	G	89	G	56	54	103	41	40	35	32	G
5	G	G	G	G	G	G	G	G	46	G	58	52	53	62	70	80	51	96	138	125	58	59	60	26
6	G	G	G	G	G	G	G	25	G	50	53	63	G	48	57	54	64	74	73	52	60	58	40	49
7	30	G	G	G	G	G	24	60	57	54	50	61	62	57	G	G	G	42	40	36	24	35	28	34
8	46	G	26	65	69	G	G	G	G	47	G	46	70	60	61	55	57	72	54	82	59	26	35	34
9	28	48	34	G	B	26	G	54	59	57	61	56	61	59	64	86	63	77	74	65	77	45	41	29
10	G	G	G	G	G	G	G	44	59	48	B	G	G	50	70	67	74	108	115	74	44	30	65	58
11	39	G	34	G	G	G	G	42	50	48	52	G	93	52	G	G	52	52	61	54	54	67	113	69
12	52	46	25	45	G	32	G	136	50	35	G	G	G	G	G	77	71	66	68	57	85	69	30	29
13	G	48	53	G	G	G	G	40	55	76	69	B	B	67	68	G	G	54	78	88	72	59	36	28
14	34	G	G	G	G	G	G	30	38	87	67	B	B	G	G	G	G	G	43	G	G	36	34	G
15	G	G	G	G	G	25	26	53	71	61	89	B	G	68	G	57	G	47	51	64	93	78	68	60
16	58	34	29	G	G	G	G	31	46	G	G	G	G	G	48	G	G	G	G	72	34	25	G	51
17	40	54	36	41	36	G	34	44	53	54	67	72	122	106	108	76	60	44	G	44	34	G	G	25
18	32	28	G	G	G	G	36	58	52	66	83	61	102	130	113	59	G	54	82	60	60	58	57	73
19	77	47	34	G	G	28	24	52	50	60	71	60	72	79	65	G	G	G	28	38	G	29	G	25
20	23	34	G	G	G	G	G	G	42	93	56	50	63	78	84	50	G	32	G	G	G	G	G	G
21	55	35	48	G	36	30	G	27	G	G	52	52	G	G	49	G	68	72	115	57	93	40	56	G
22	G	G	G	50	34	G	G	35	56	67	62	114	102	66	105	137	85	84	83	35	55	59	36	43
23	56	33	34	36	G	G	G	G	55	50	77	104	114	G	G	47	G	40	37	35	28	44	49	34
24	59	59	57	82	34	29	54	65	40	85	60	69	78	68	52	G	61	60	93	58	34	34	G	G
25	G	41	28	24	G	11	G	G	35	G	B	G	50	58	G	G	G	30	36	G	G	G	G	G
26	G	G	59	51	69	G	G	54	58	66	72	110	72	49	79	71	73	50	71	78	46	49	G	26
27	59	50	43	28	G	G	G	33	51	95	70	61	83	174	111	65	36	88	73	59	54	26	G	G
28	G	G	G	G	G	G	G	32	36	55	G	B	G	70	87	82	123	92	95	G	G	G	G	46
29	40	29	33	25	G	28	G	42	50	88	67	128	112	G	G	57	G	G	25	G	G	G	27	44
30	35	40	24	G	G	G	G	26	55	52	G	G	G	66	76	74	82	126	91	88	80	54	26	G
31	26	G	G	52	G	G	35	46	57	50	G	G	G	G	G	57	56	80	74	90	70	84	50	34
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	31	31	31	31	31	29	27	29	31	31	31	31	31	31	31	31	31	31	31
MED	28	G	25	G	G	G	G	35	50	52	58	56	62	58	61	56	54	54	68	57	46	35	30	28
U Q	46	41	34	36	27	11	23	52	55	66	68	63	80	70	79	71	64	80	83	72	60	58	49	44
L Q	G	G	G	G	G	G	G	26	40	47	25	G	G	G	G	G	G	42	37	35	28	G	G	G

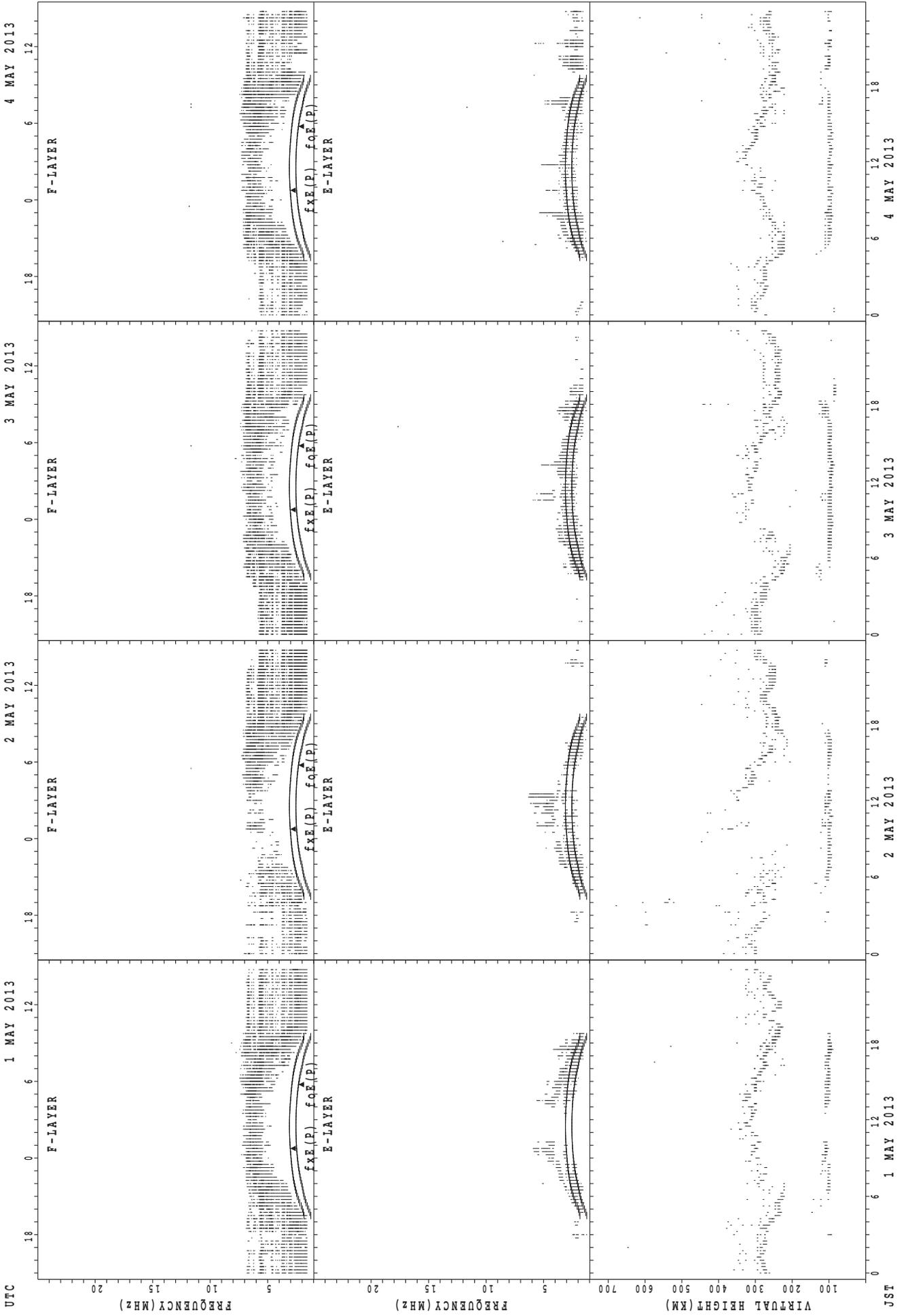
HOURLY VALUES OF fmin AT Okinawa

MAY 2013

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

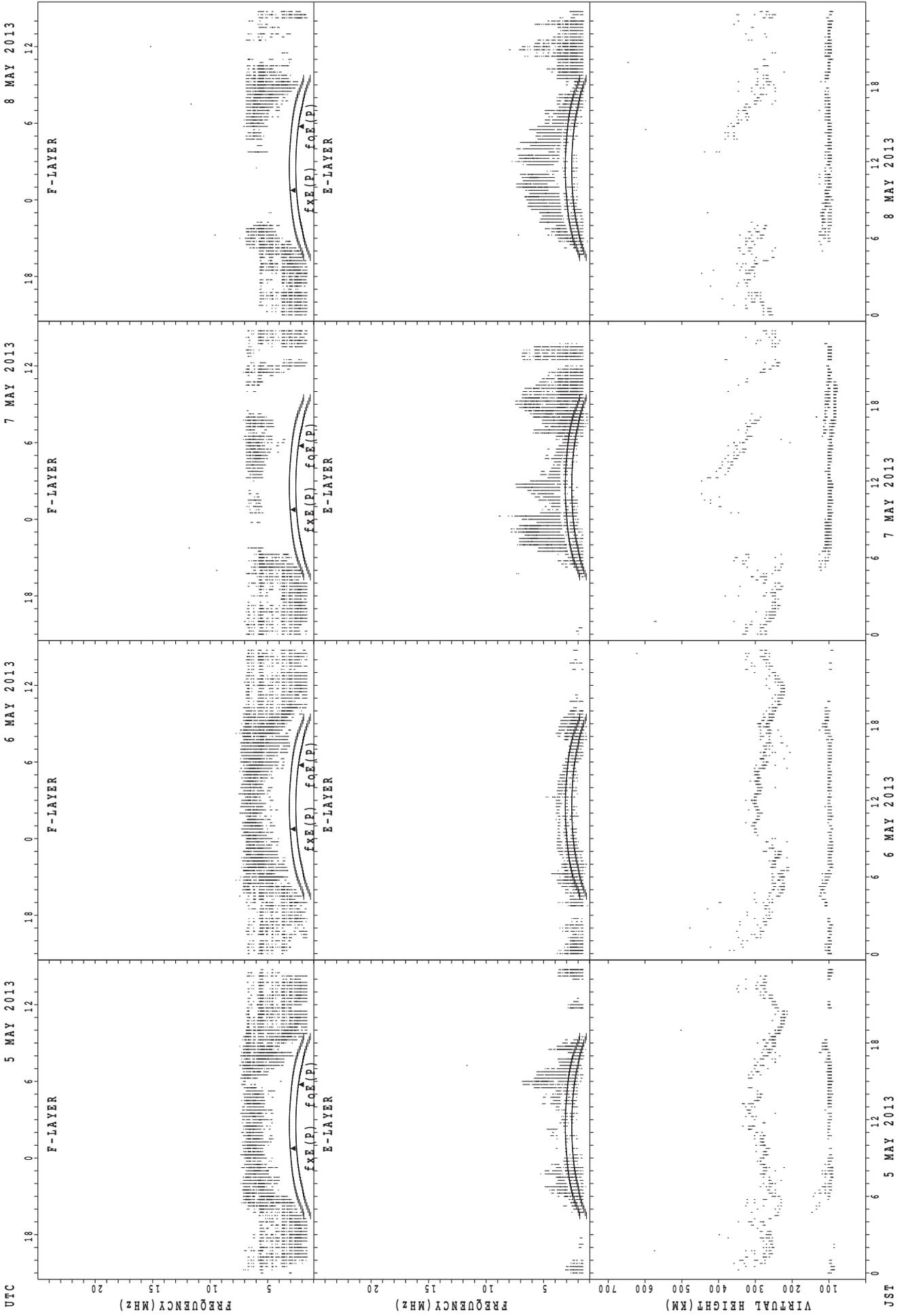
$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	24	17	85	22	16	17	21	20	40	39	42	45	42	44	42	39	38	29	20	18	17	20	23	42	
2	18	23	17	18	18	17	22	22	40	42	43	43	65	42	59	39	44	29	18	16	22	14	15	20	
3	16	21	18	15	16	21	16	20	24	44	47	63	43	46	43	53	35	28	18	23	17	26	42	44	
4	42	36	38	21	44	18	36	34	32	39	40	42	45	62	42	53	38	29	17	15	18	15	16	81	
5	44	14	21	20	21	17	20	29	33	43	42	39	42	43	43	42	39	30	20	20	20	18	15	15	
6	81	34	20	51	18	20	21	18	40	45	40	42	53	42	62	43	39	32	18	14	20	16	17	17	
7	15	17	18	63	38	20	22	29	33	42	60	44	40	39	55	59	43	42	16	18	17	15	64	18	
8	21	38	18	29	20	24	21	28	40	32	59	51	44	42	42	40	32	28	17	24	17	29	16	15	
9	17	14	23	32	B	21	21	18	32	36	39	39	42	32	30	43	38	29	18	20	24	15	15	27	
10	48	16	26	21	16	21	14	15	35	56	B	72	64	42	44	40	39	27	17	20	16	20	16	15	
11	20	66	17	33	26	42	21	17	32	39	39	66	39	39	68	N	42	21	17	15	15	15	14	14	
12	15	15	15	17	26	14	24	18	29	26	54	55	72	58	N	44	39	29	18	15	15	15	15	14	
13	46	16	17	21	16	17	30	27	35	39	42	B	B	53	43	54	50	29	18	18	15	14	15	16	
14	20	32	23	85	15	16	27	30	40	39	48	B	B	62	56	61	47	43	23	33	20	15	15	20	
15	22	18	20	24	22	17	17	20	30	30	40	B		83	40	56	42	51	35	24	15	17	15	14	15
16	15	15	15	15	22	15	20	20	22	44	59	N	62	60	56	60	55	42	27	17	14	14	20	15	
17	15	16	15	14	17	17	17	27	30	38	42	40	44	39	35	34	27	20	42	15	15	20	42	15	
18	17	17	20	28	18	18	18	16	30	35	40	42	46	44	40	39	49	30	22	17	18	17	14	14	
19	15	14	15	20	34	17	17	20	22	36	39	40	45	42	42	59	52	42	18	16	17	46	20	15	
20	15	17	15	72	32	21	28	38	22	38	40	40	40	43	40	43	56	26	29	21	16	43	21	48	
21	17	15	17	18	17	17	24	18	42	47	38	44	63	70	42	50	40	30	16	20	17	15	17	18	
22	66	20	28	21	17	17	29	16	21	40	42	40	43	44	42	43	30	22	18	20	14	14	15	15	
23	15	18	15	15	33	40	27	39	38	54	42	42	40	70	59	40	60	18	23	15	14	16	15	15	
24	15	14	16	16	15	15	16	18	26	36	38	40	44	42	40	50	40	34	16	15	15	15	43	42	
25	20	15	14	15	14	17	23	16	21	42	B	101	62	43	101	53	52	44	18	14	16	42	21	27	
26	27	40	15	14	17	17	28	26	39	40	40	39	42	81	39	30	32	21	16	15	15	15	20	14	
27	14	14	16	18	21	16	22	18	30	39	39	42	39	40	40	33	48	18	16	16	15	16	21	22	
28	40	15	16	21	18	17	21	18	44	40	49	B	58	38	40	33	23	21	18	21	21	41	17	17	
29	15	15	17	15	18	15	35	21	30	40	40	42	40	60	60	40	47	59	35	38	21	18	40	21	
30	17	16	14	18	16	17	22	17	28	38	53	38	40	42	39	36	27	18	20	17	15	29	81	40	
31	27	34	71	16	28	15	16	18	26	33	52	62	56	59	91	40	38	30	21	14	15	18	16	15	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	30	31	31	31	31	31	29	26	29	31	30	30	31	31	31	31	31	31	31	31	
MED	18	17	17	20	18	17	21	20	32	39	42	42	44	43	42	42	40	29	18	17	17	16	17	17	
U Q	27	23	21	28	26	20	27	27	39	42	48	51	60	59	56	53	49	34	22	20	18	20	21	27	
L Q	15	15	15	16	16	17	18	18	26	36	40	40	41	42	40	39	38	22	17	15	15	15	15	15	

SUMMARY PLOTS AT Wakkanai



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

SUMMARY PLOTS AT Wakkanai



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

5 MAY 2013

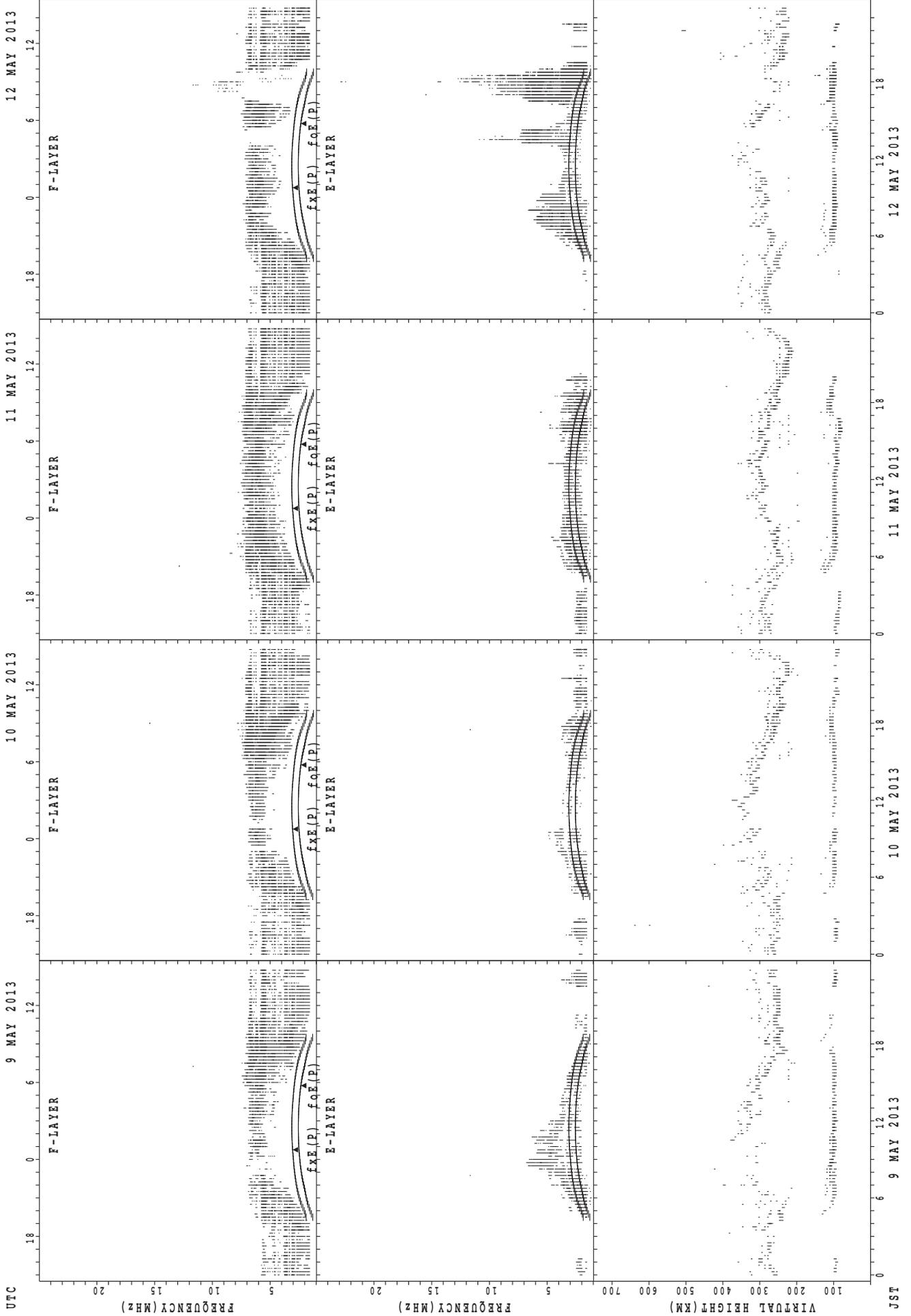
6 MAY 2013

7 MAY 2013

8 MAY 2013

JST

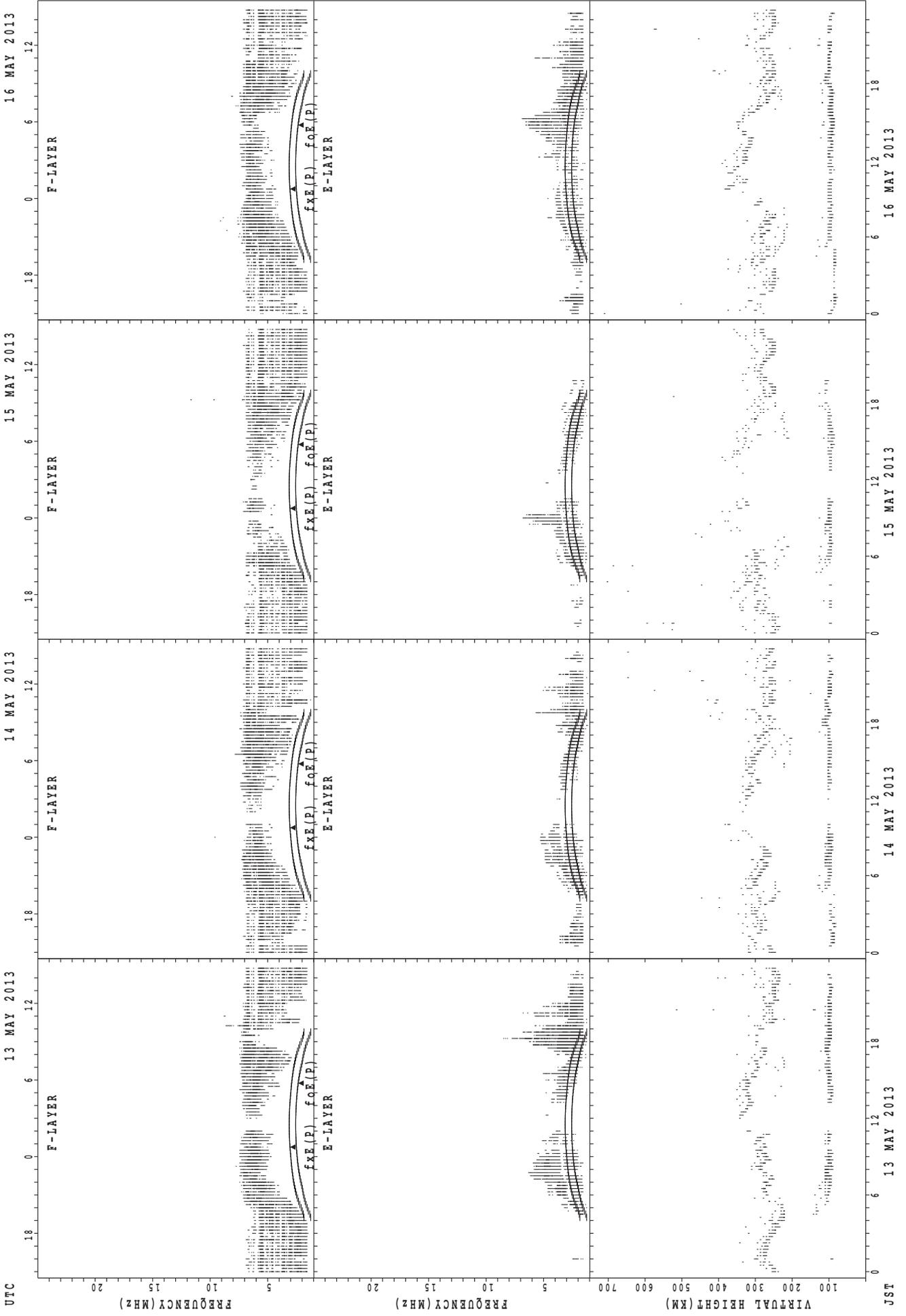
SUMMARY PLOTS AT Wakkanai



fx E(P); PREDICTED VALUE FOR fx E
fo E(P); PREDICTED VALUE FOR fo E

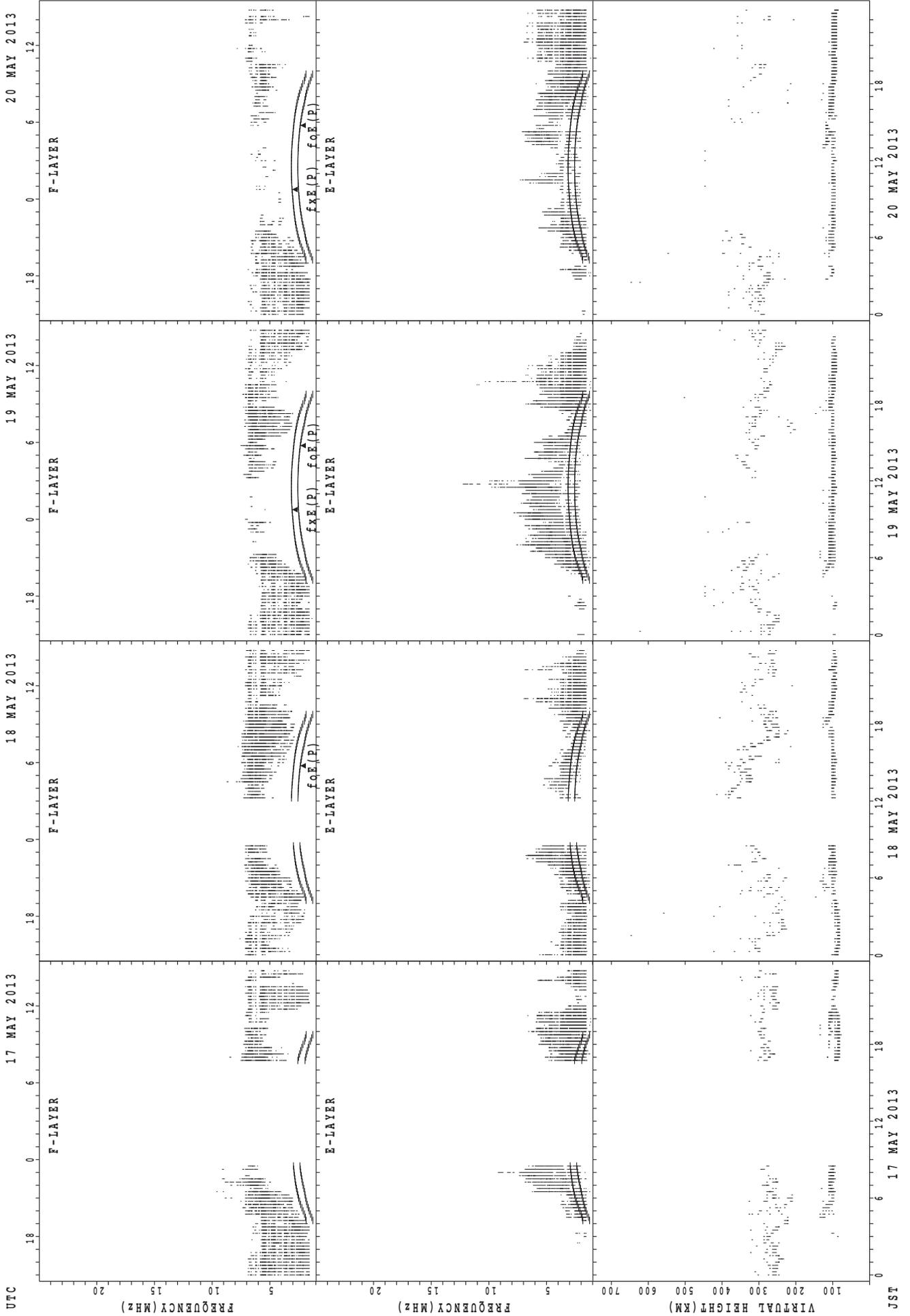
JST

SUMMARY PLOTS AT Wakkanai



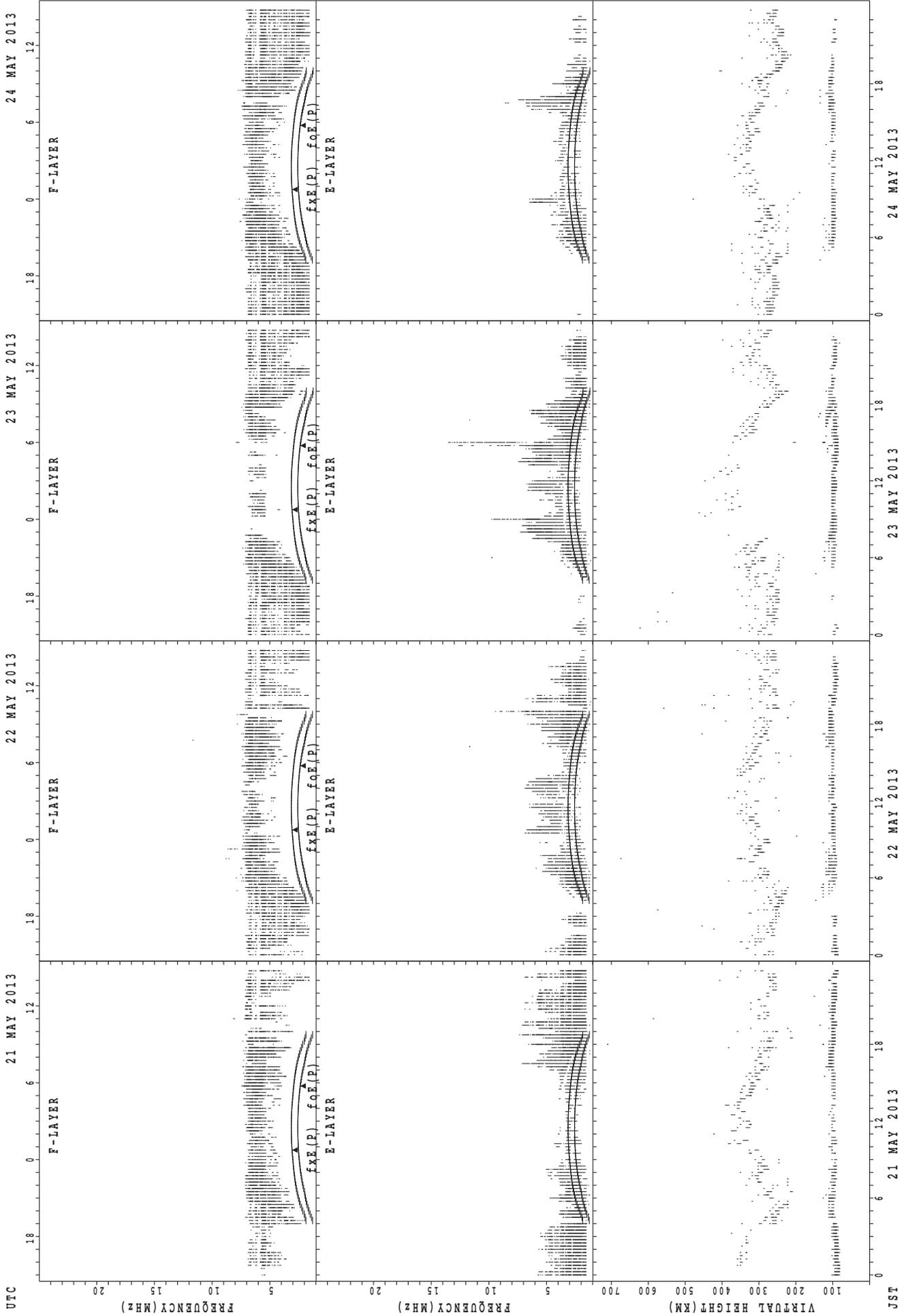
f_xE(P); PREDICTED VALUE FOR f_xE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



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

SUMMARY PLOTS AT Wakkanai

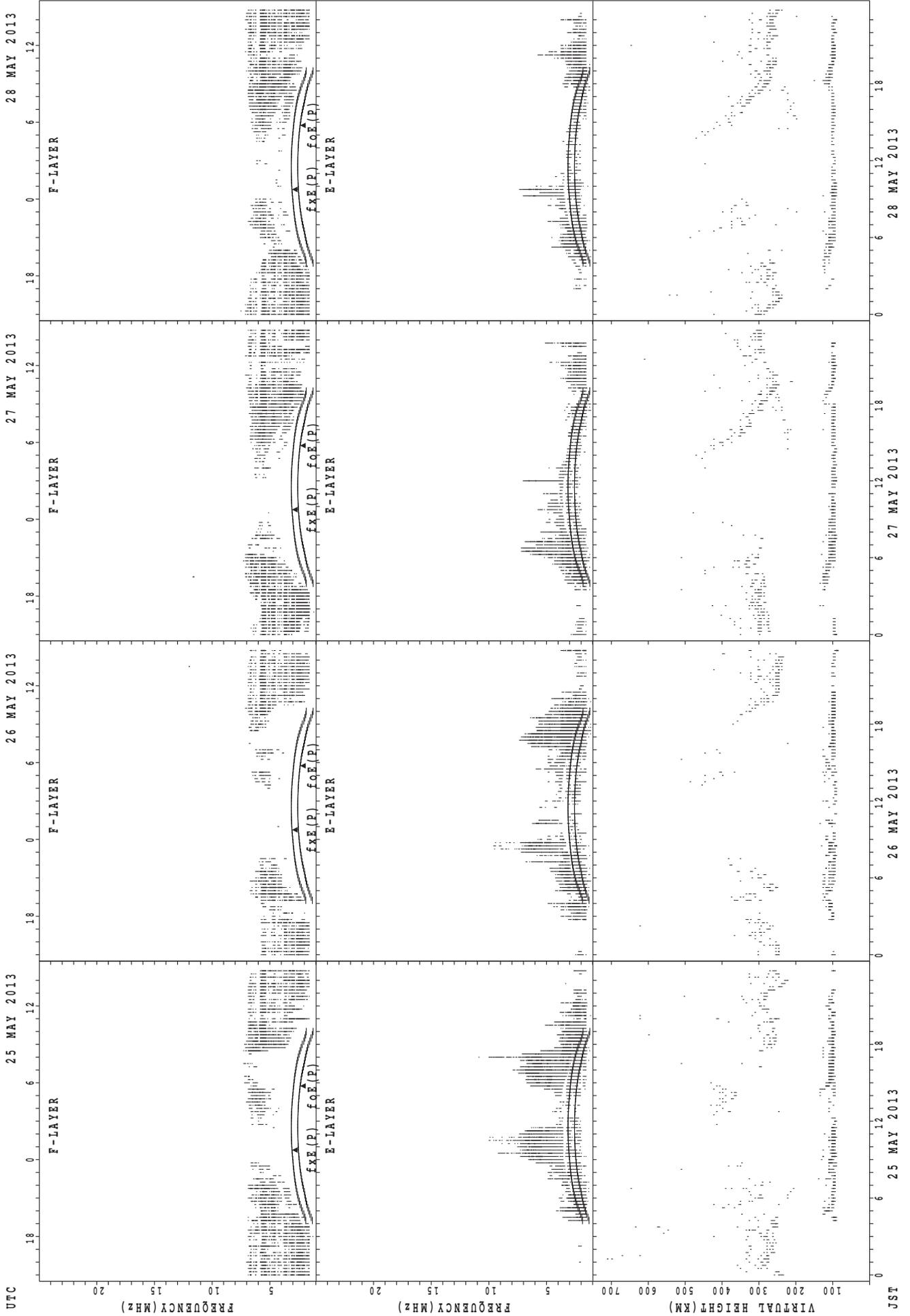


UTC
21 MAY 2013
22 MAY 2013
23 MAY 2013
24 MAY 2013

JST
21 MAY 2013
22 MAY 2013
23 MAY 2013
24 MAY 2013

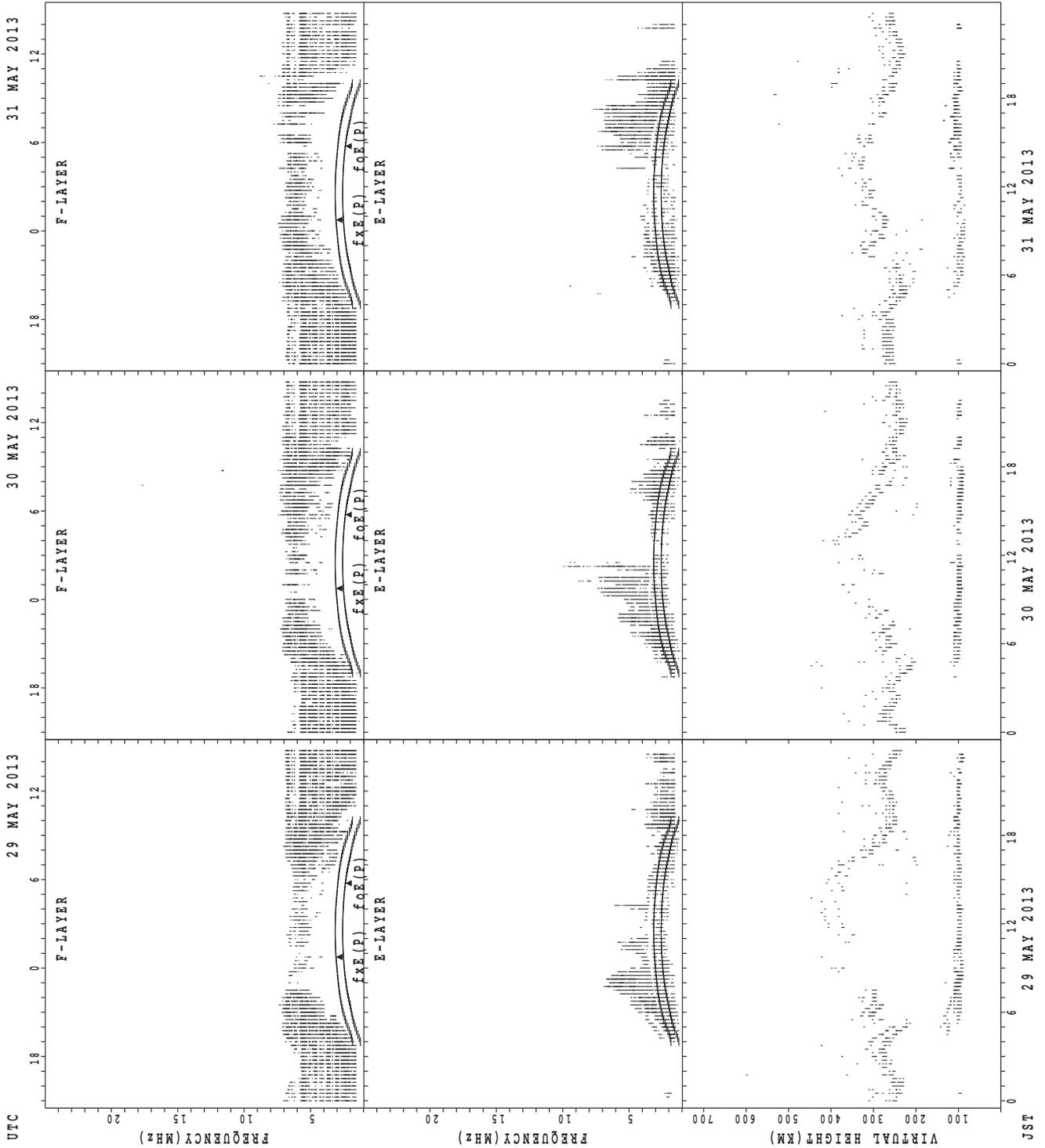
f_xE(P); PREDICTED VALUE FOR f_xE
f_oE(P); PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Wakkanai



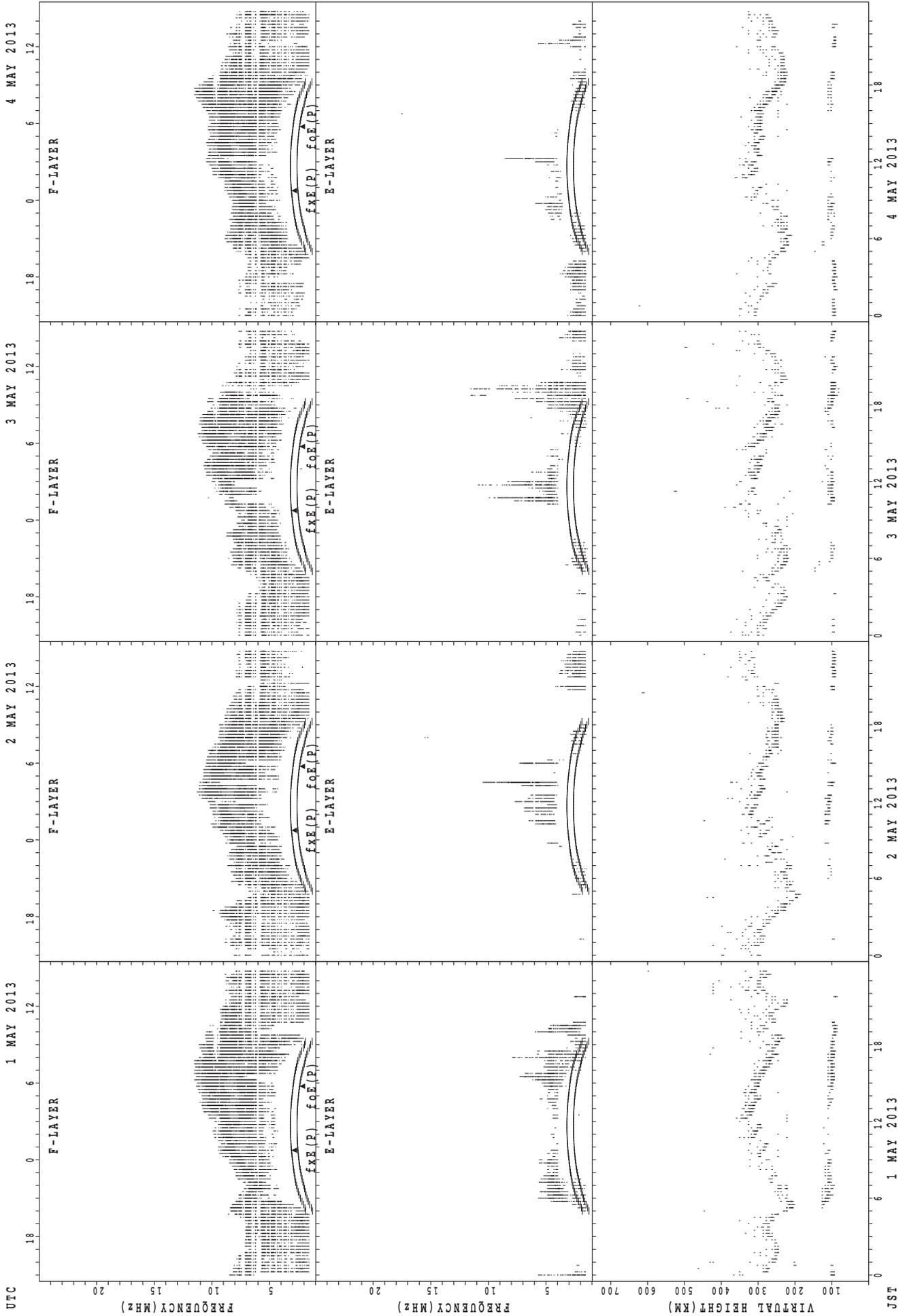
f_{xE}(P); PREDICTED VALUE FOR f_{xE}
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Wakkanai



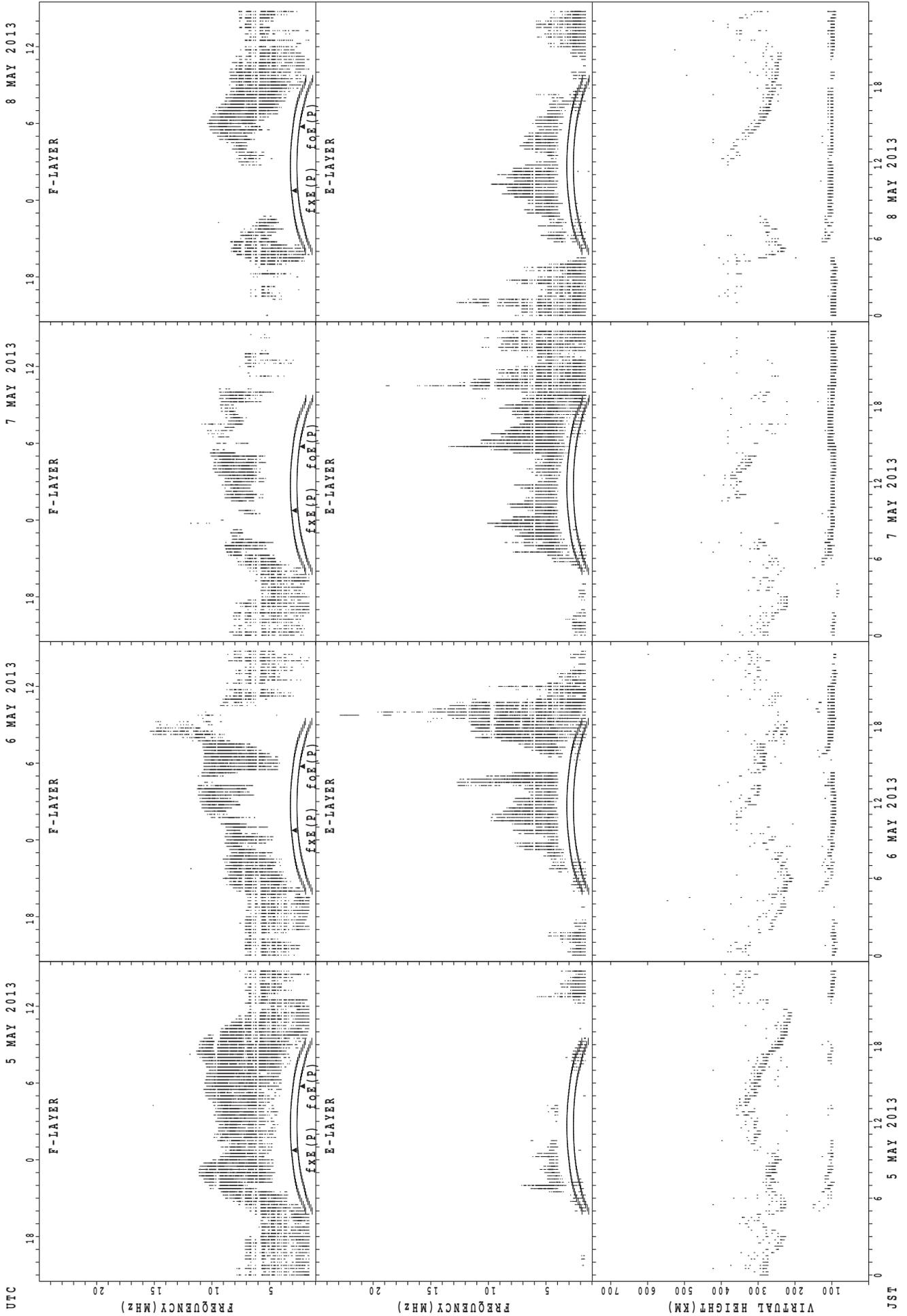
foE(P); PREDICTED VALUE FOR foE
fxE(P); PREDICTED VALUE FOR fxE

SUMMARY PLOTS AT Kokubunji



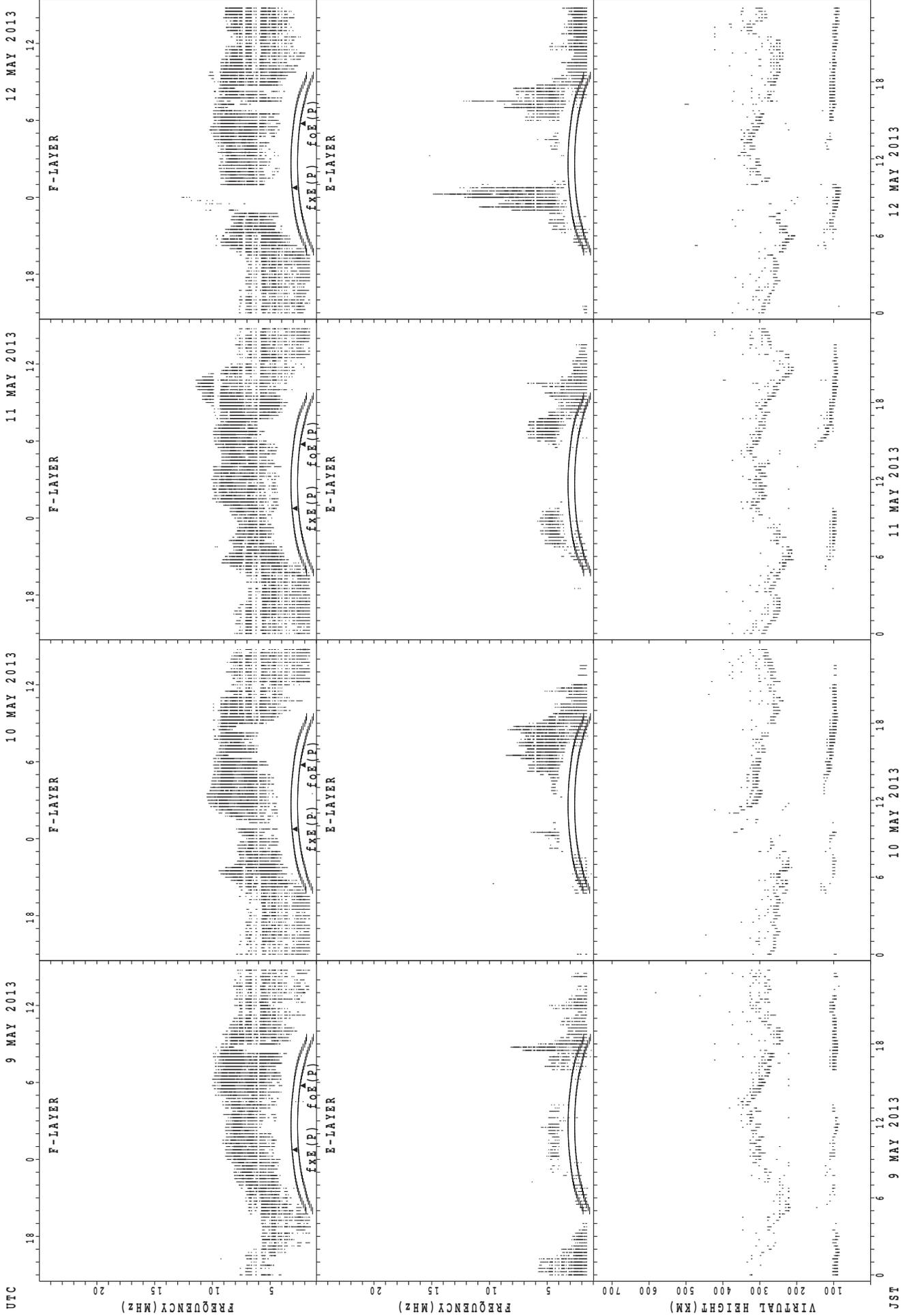
f_xE(P); PREDICTED VALUE FOR f_xE
f_oE(P); PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Kokubunji



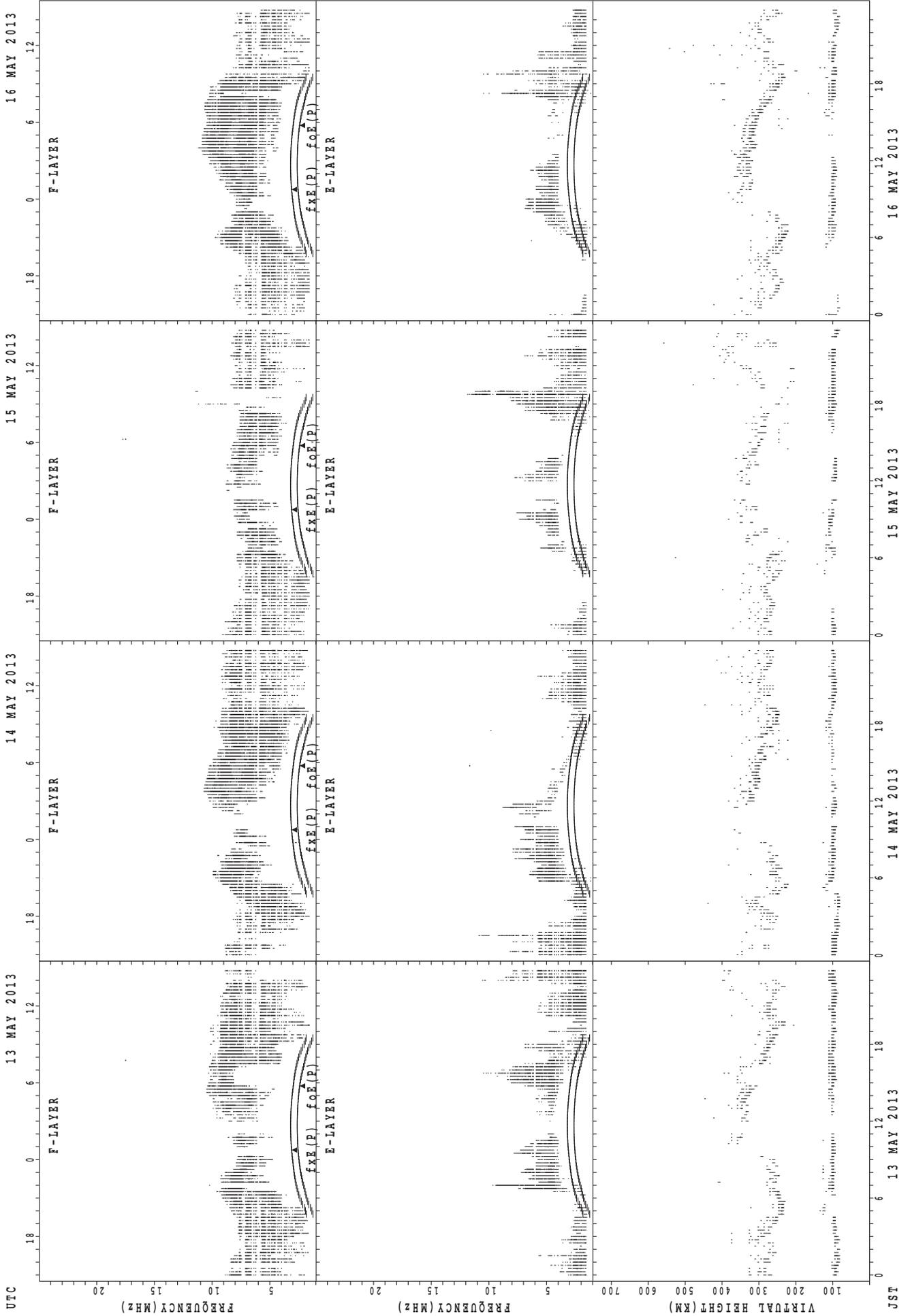
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



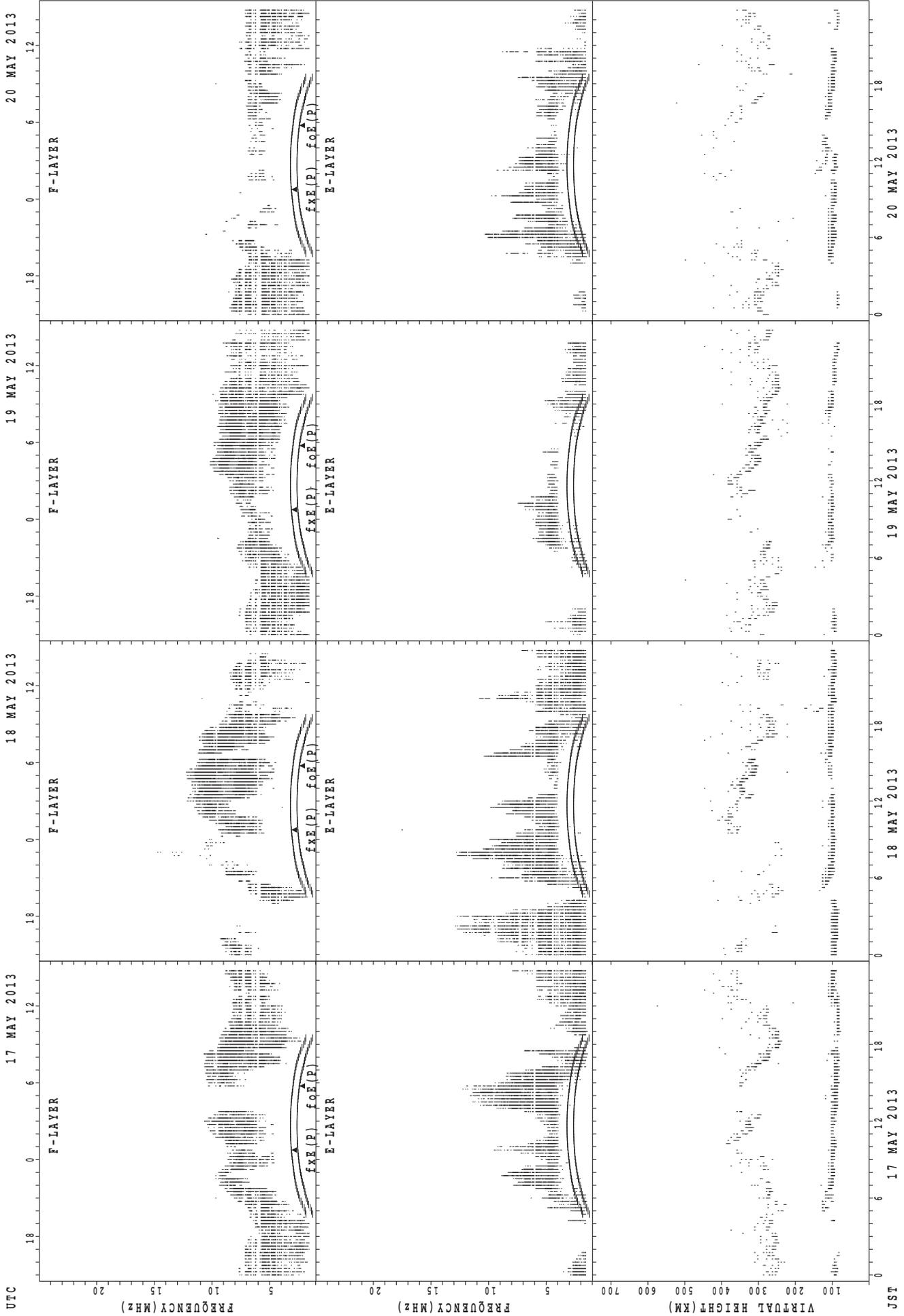
UTC
JST
f_xE(P); PREDICTED VALUE FOR f_xE
f_oE(P); PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Kokubunji



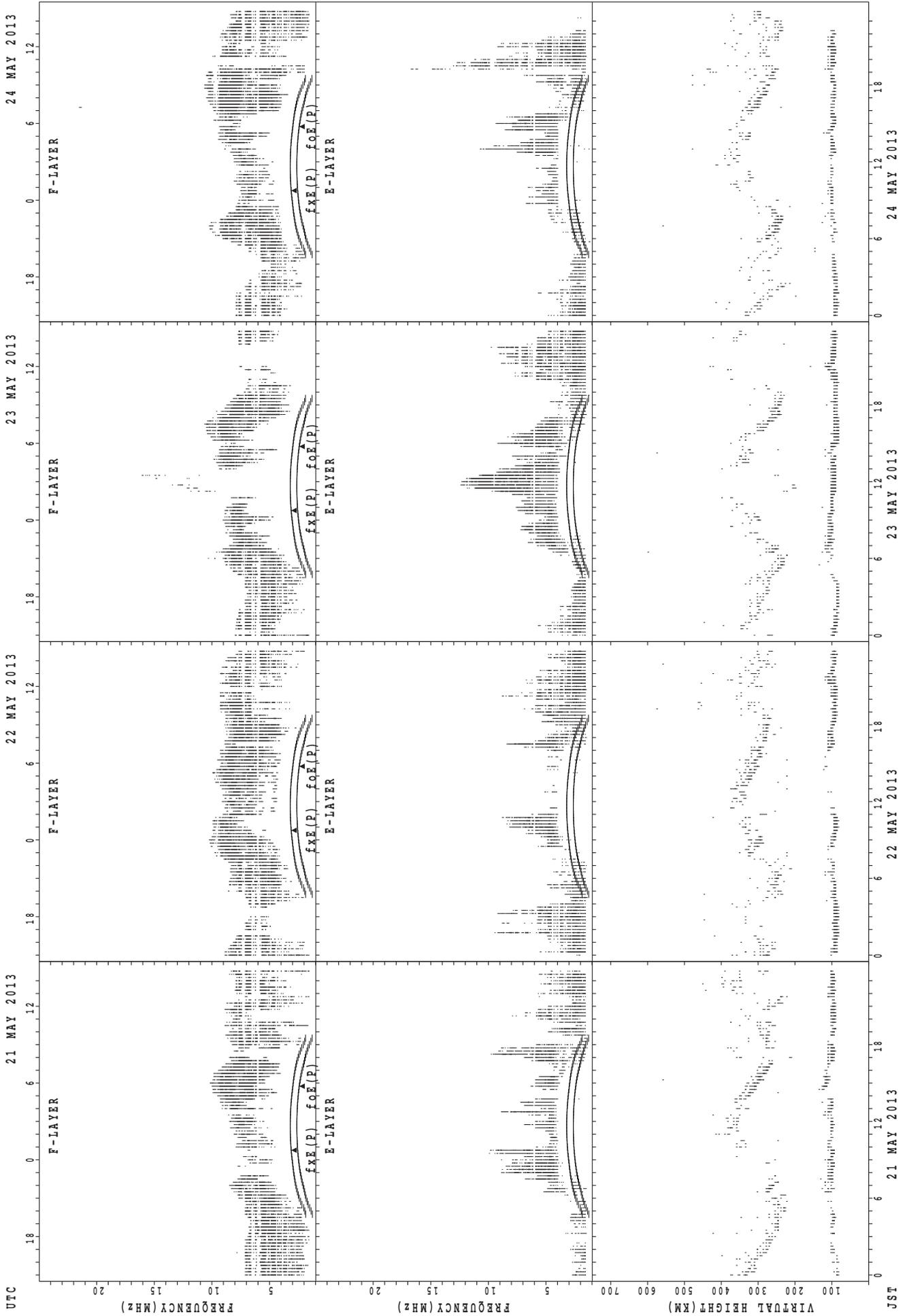
fxE(P); PREDICTED VALUE FOR fxE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Kokubunji



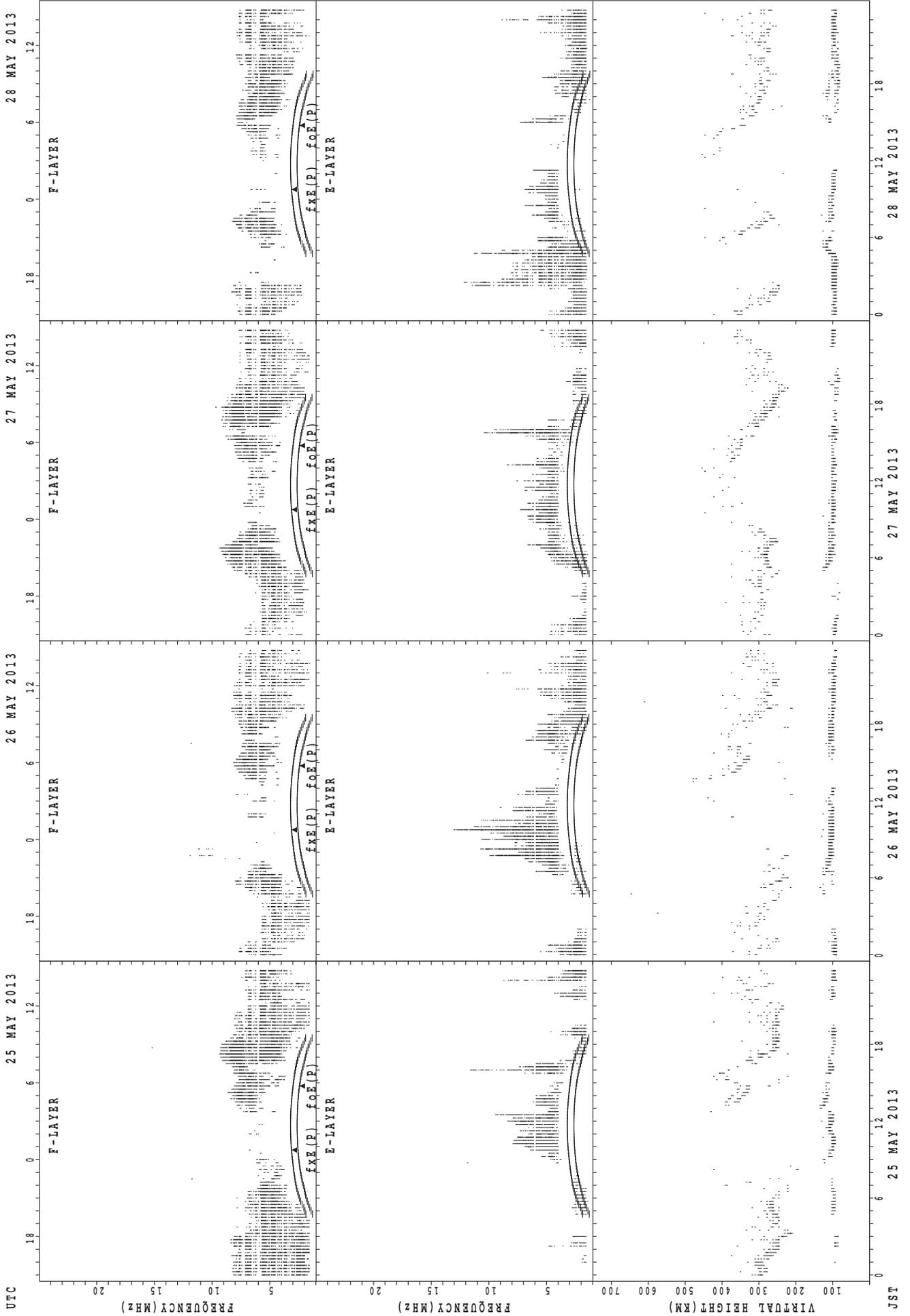
f_xE(P); PREDICTED VALUE FOR f_xE
f_oE(P); PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Kokubunji



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

SUMMARY PLOTS AT Kokubunji

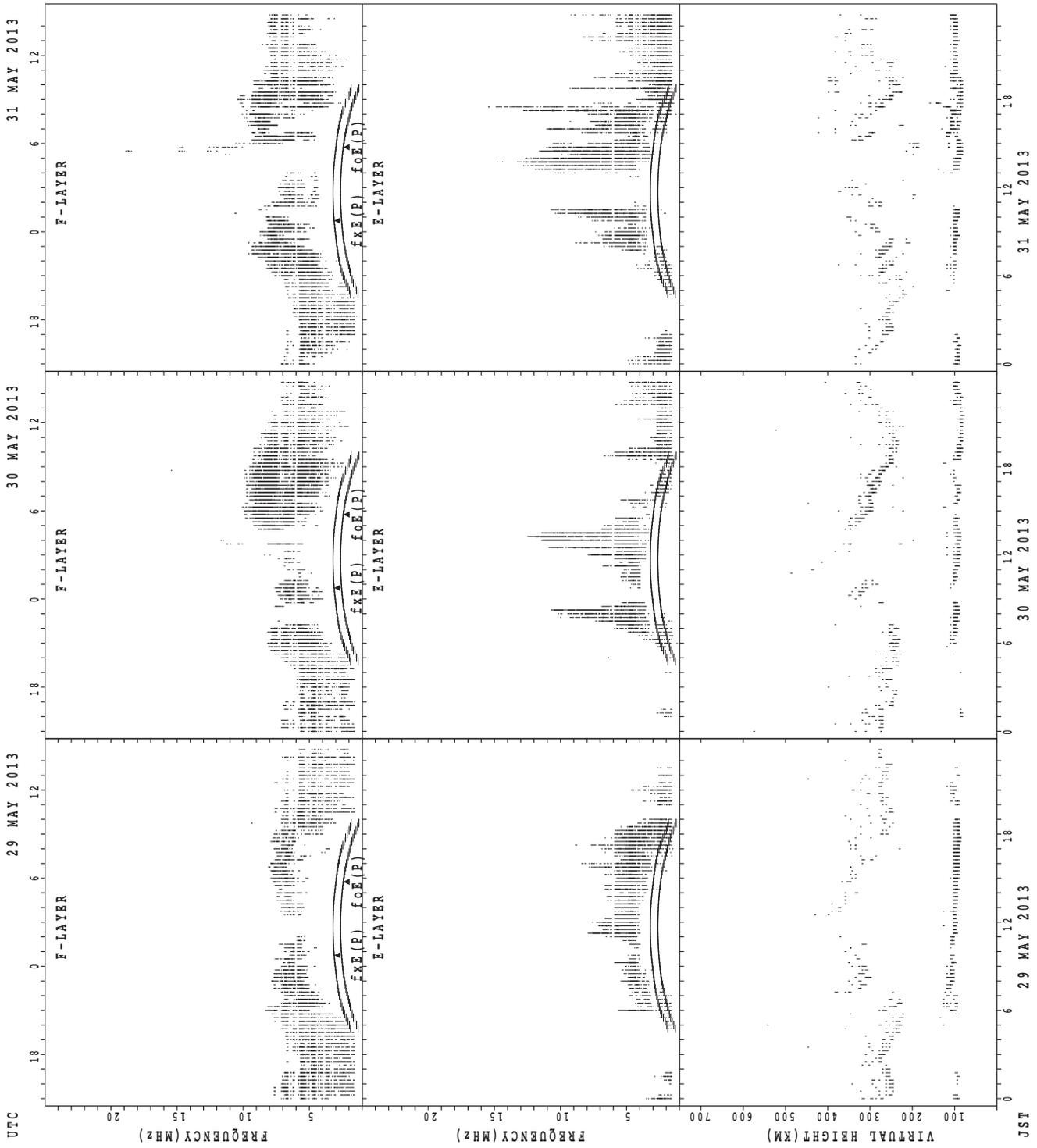


UTC
 25 MAY 2013
 26 MAY 2013
 27 MAY 2013
 28 MAY 2013

JST
 25 MAY 2013
 26 MAY 2013
 27 MAY 2013
 28 MAY 2013

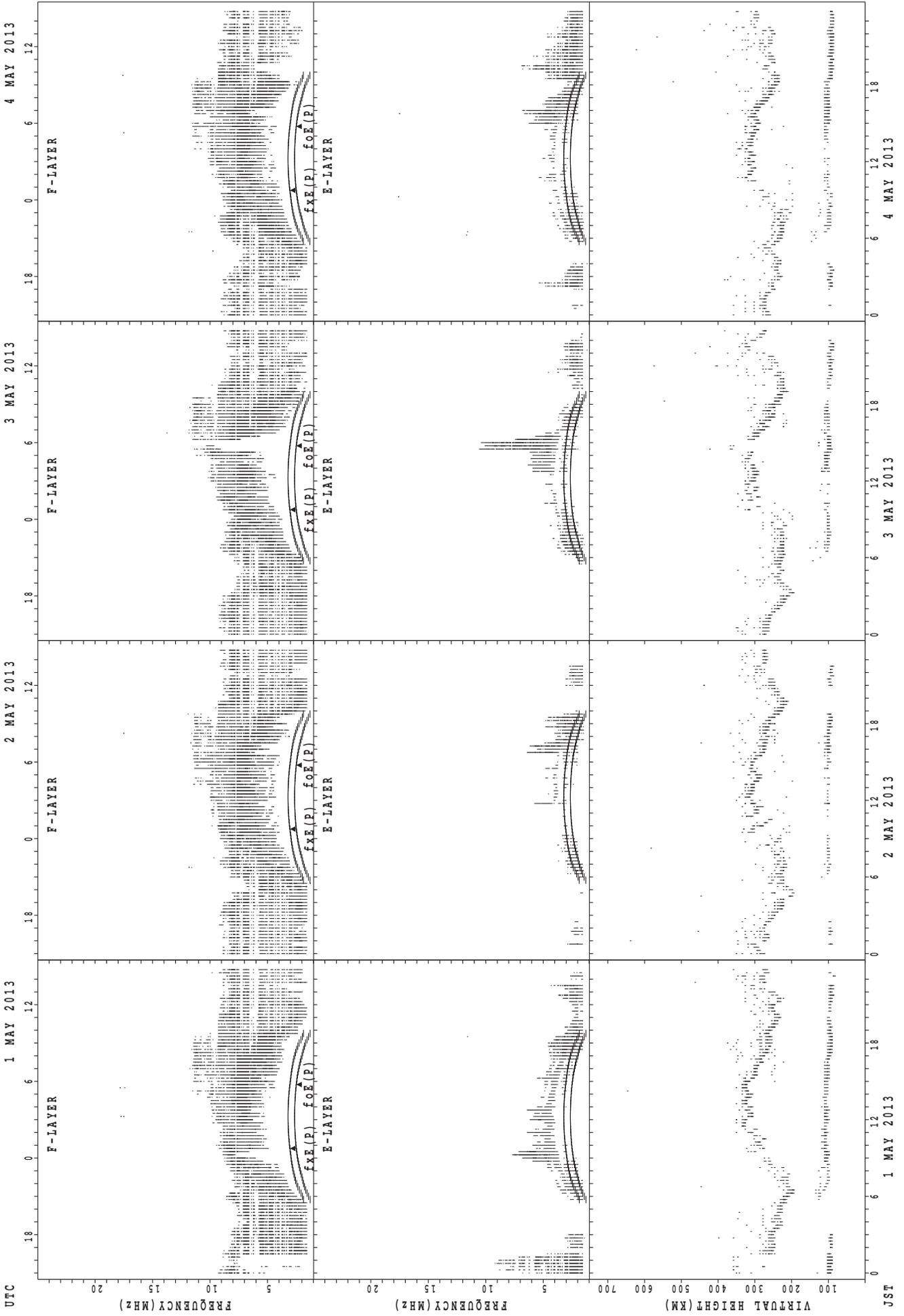
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Kokubunji



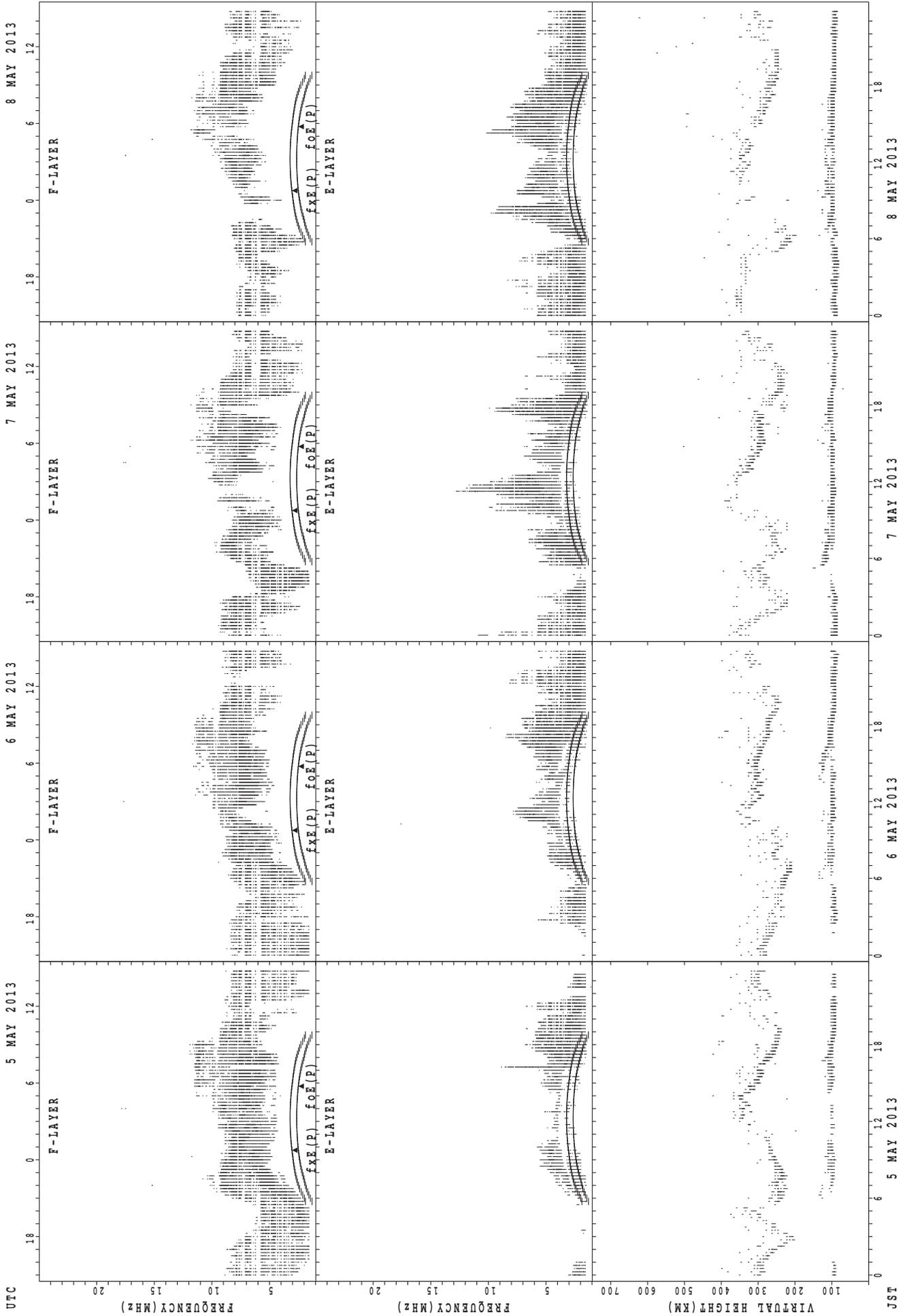
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Yamagawa



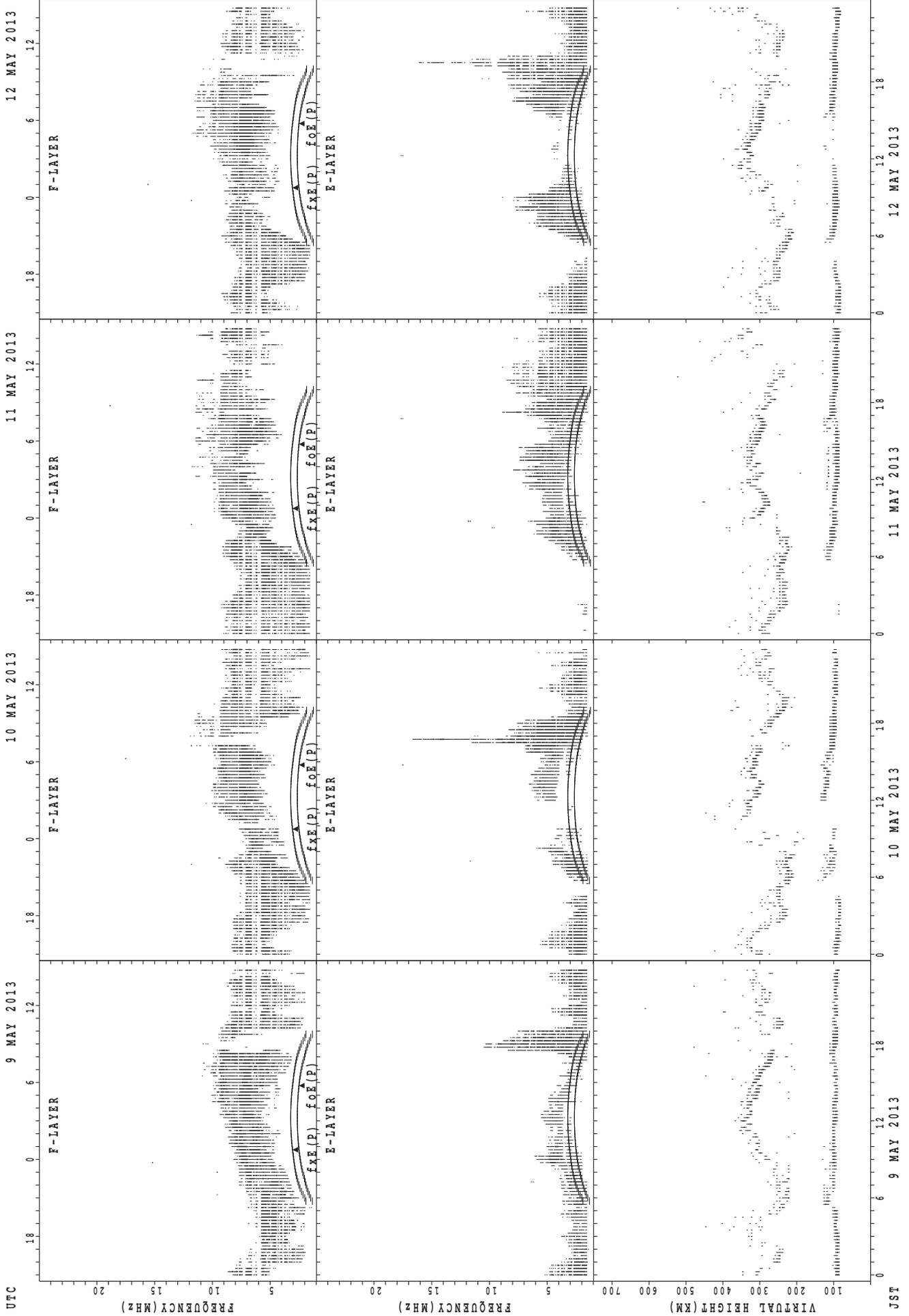
f_xE(P) ; PREDICTED VALUE FOR f_xE
foE(P) ; PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Yamagawa



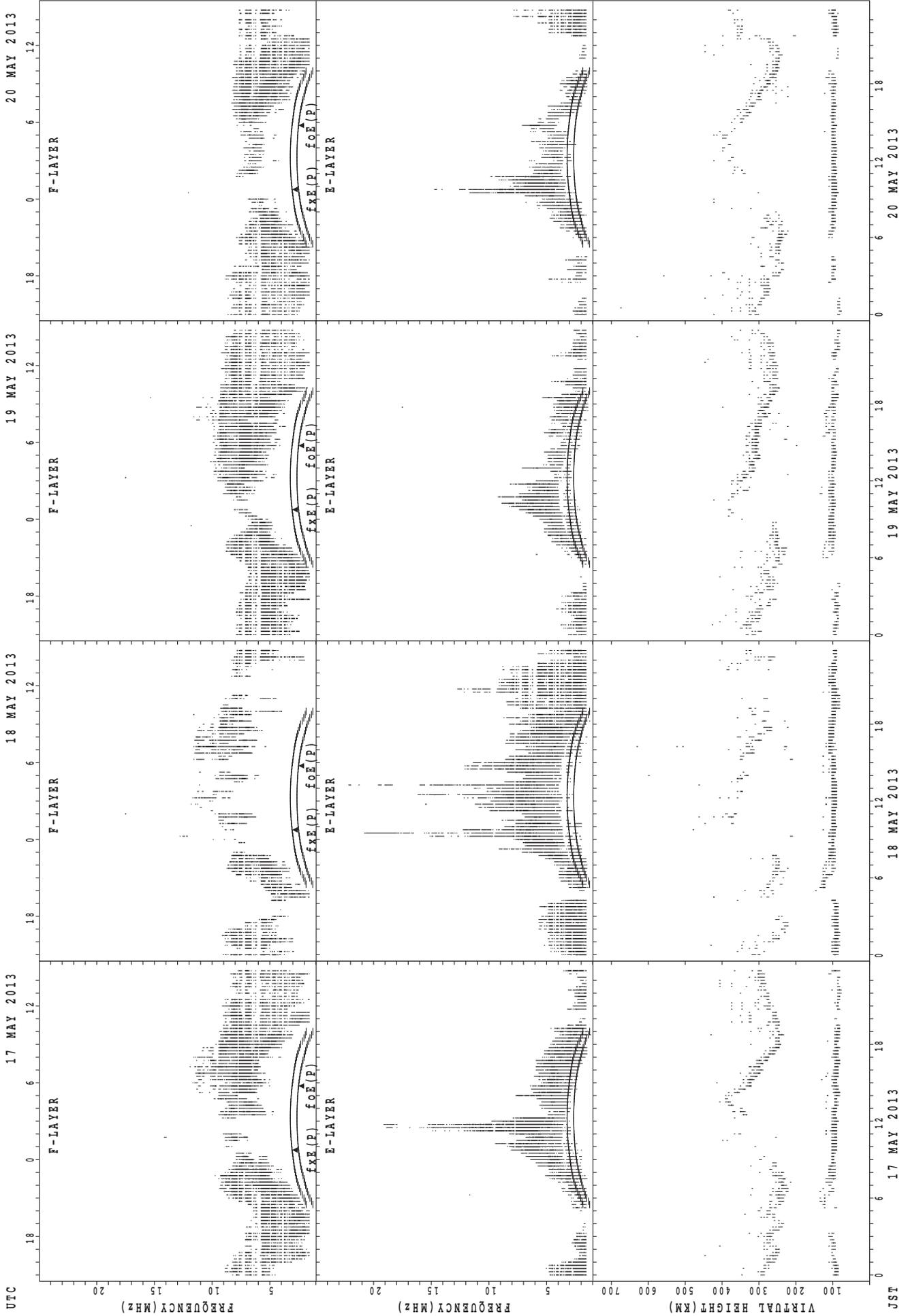
f_xE(P) ; PREDICTED VALUE FOR f_xE
f_oE(P) ; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Yamagawa



foE(P); PREDICTED VALUE FOR foE
 fxE(P); PREDICTED VALUE FOR fxE
 h'E(P); PREDICTED VALUE FOR h'E
 h'foF(P); PREDICTED VALUE FOR h'foF
 h'xF(P); PREDICTED VALUE FOR h'xF

SUMMARY PLOTS AT Yamagawa



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

17 MAY 2013

18 MAY 2013

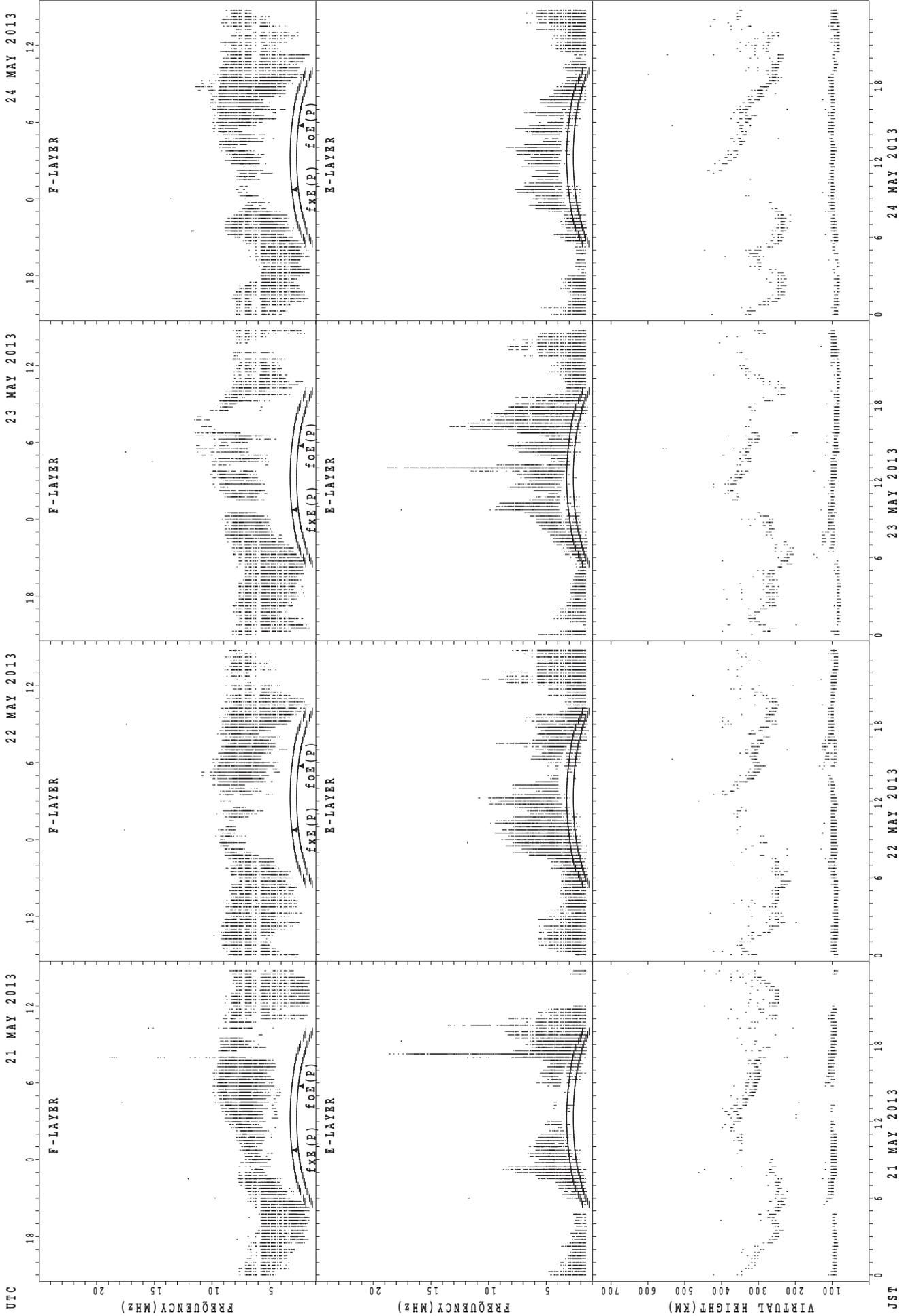
19 MAY 2013

20 MAY 2013

UTC

JST

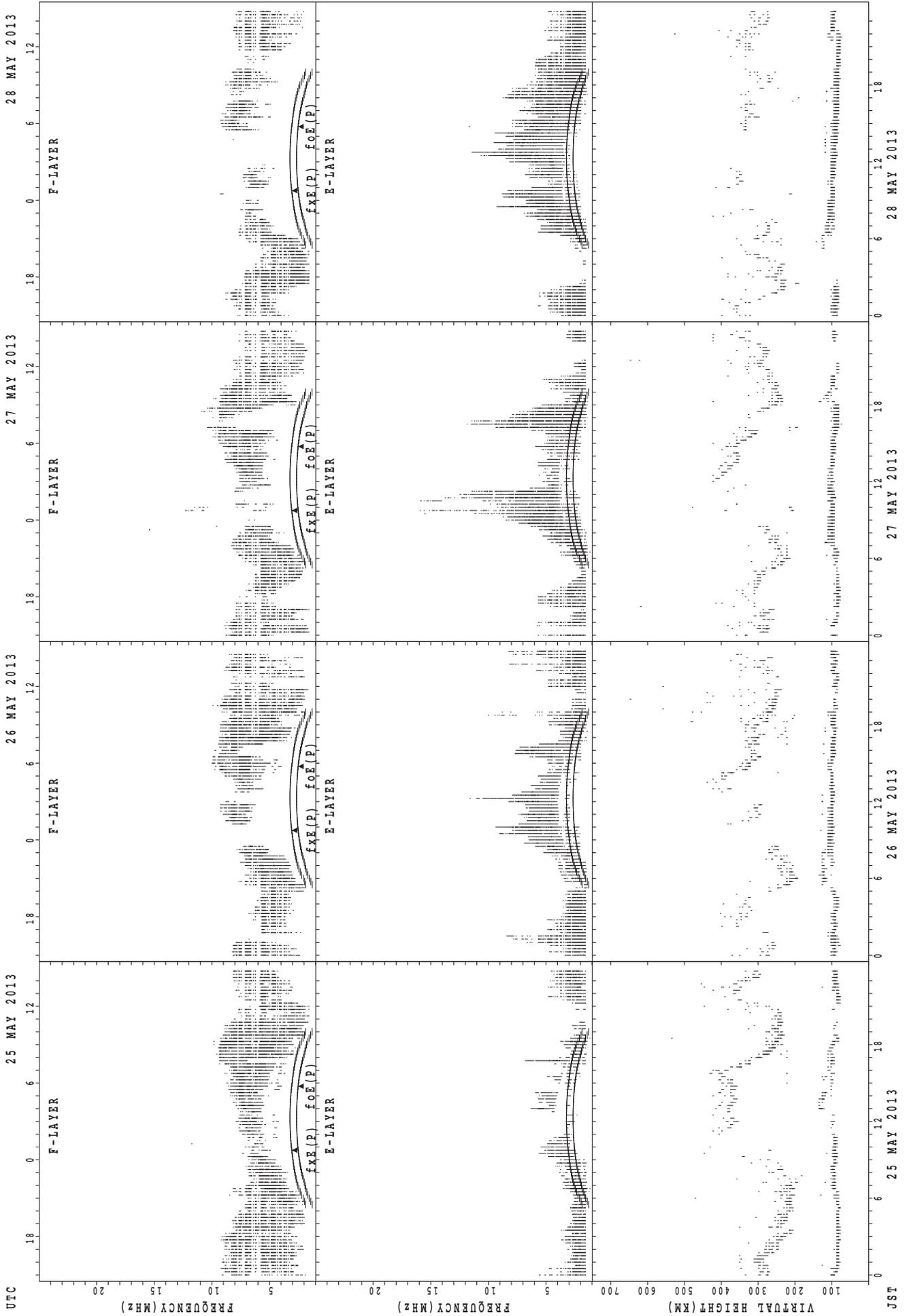
SUMMARY PLOTS AT Yamagawa



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

JST

SUMMARY PLOTS AT Yamagawa



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

28 MAY 2013

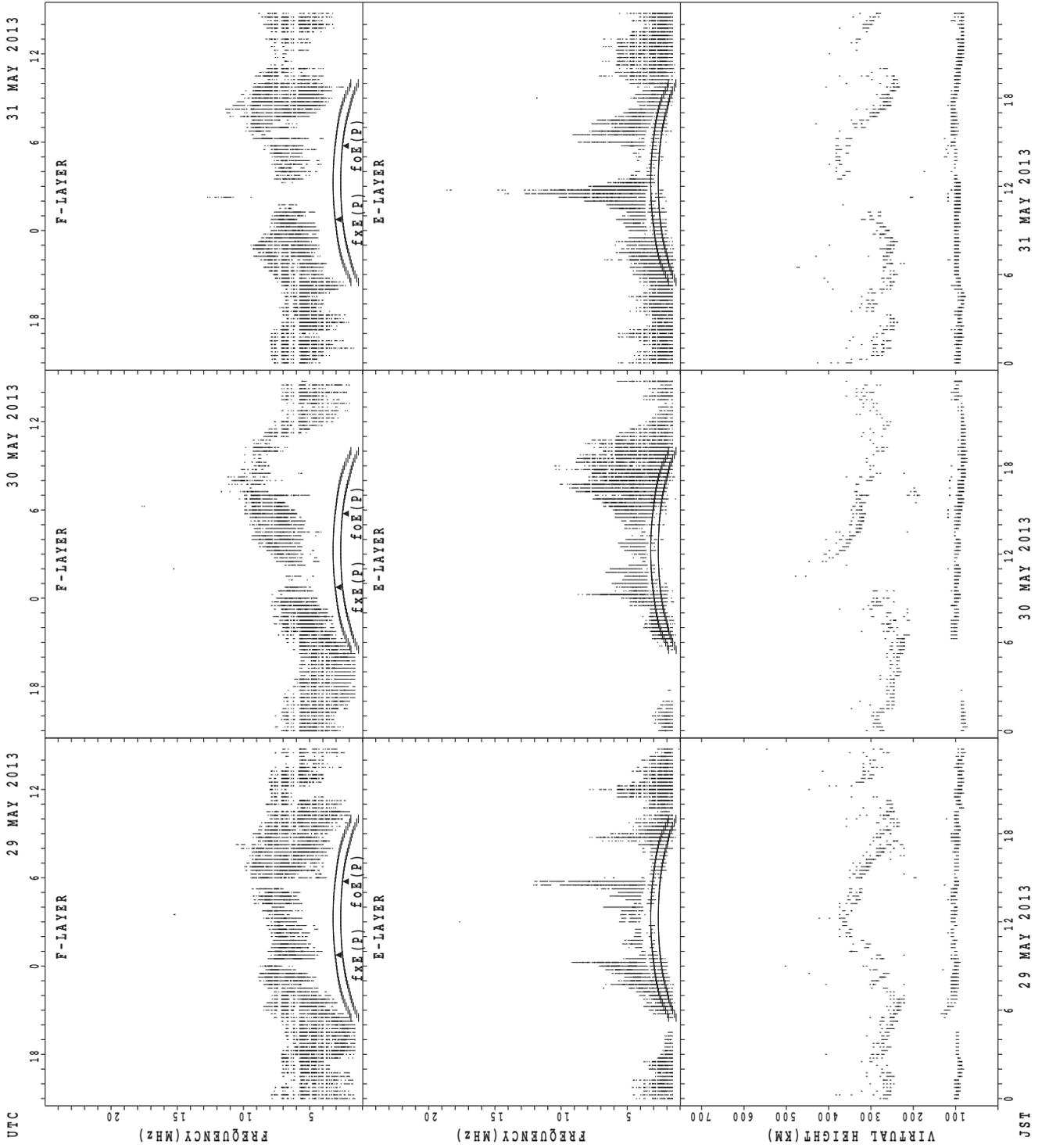
27 MAY 2013

26 MAY 2013

25 MAY 2013

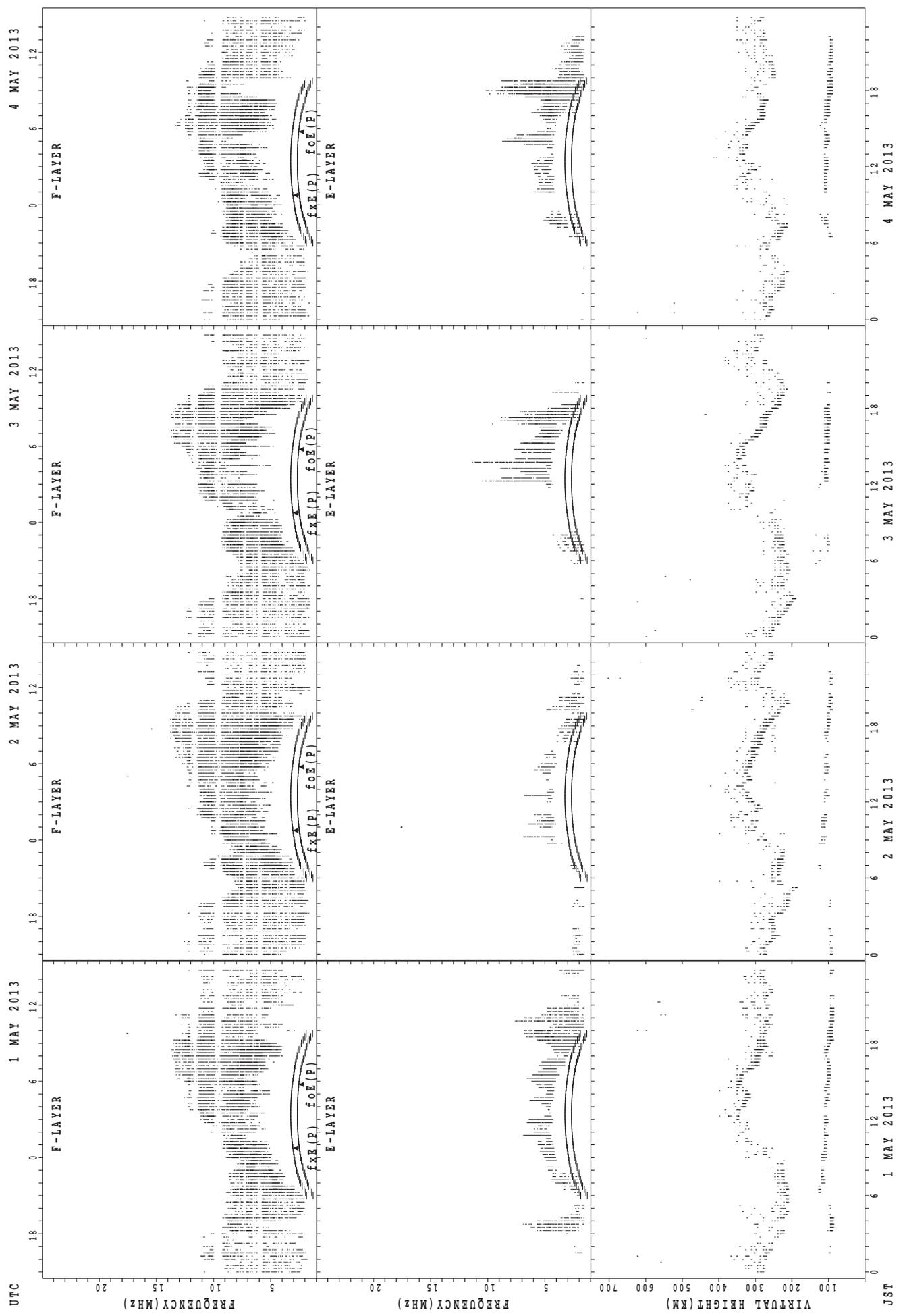
JST

SUMMARY PLOTS AT Yamagawa



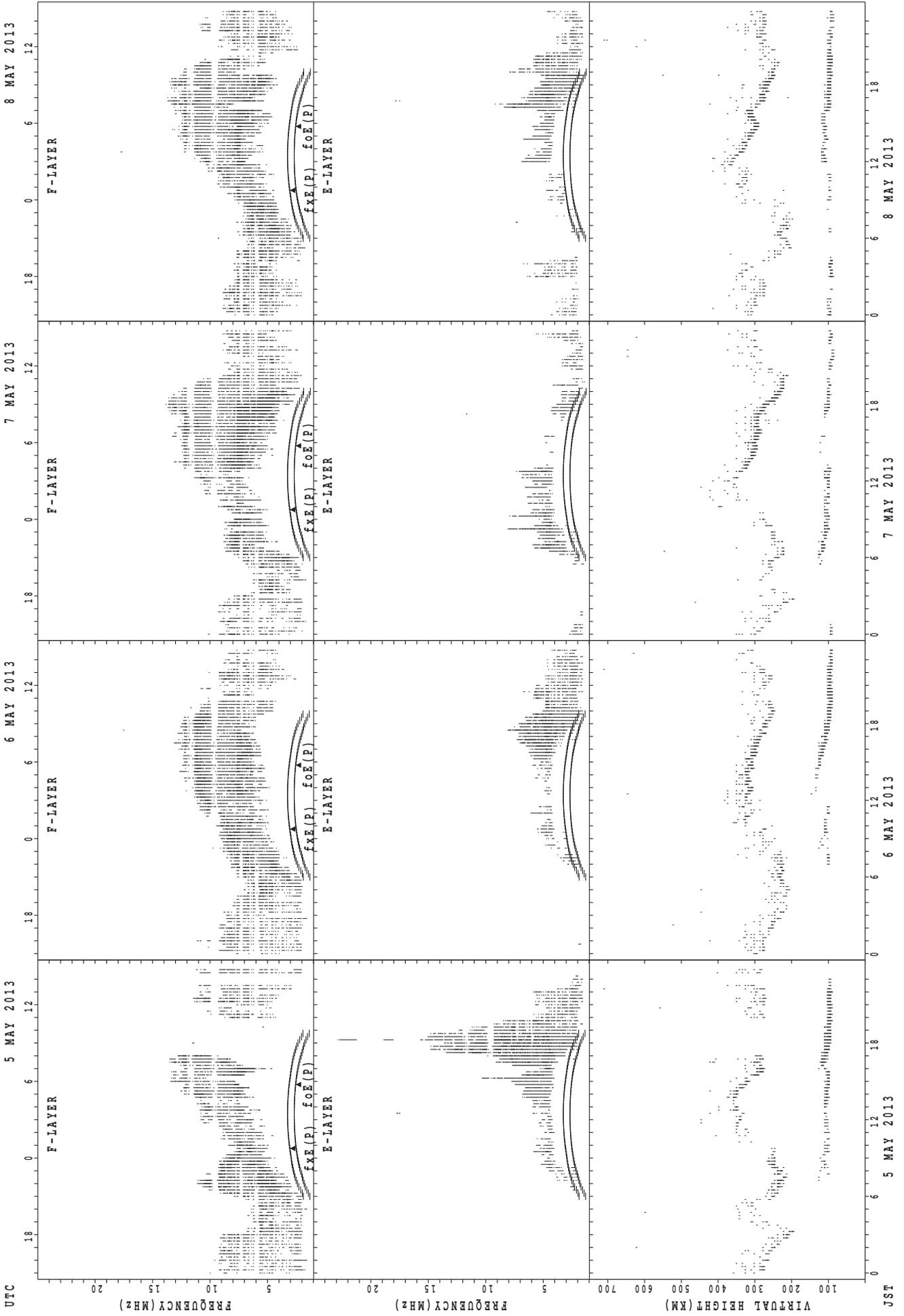
JST
 29 MAY 2013
 30 MAY 2013
 31 MAY 2013
 fxE(P); PREDICTED VALUE FOR fxE
 foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



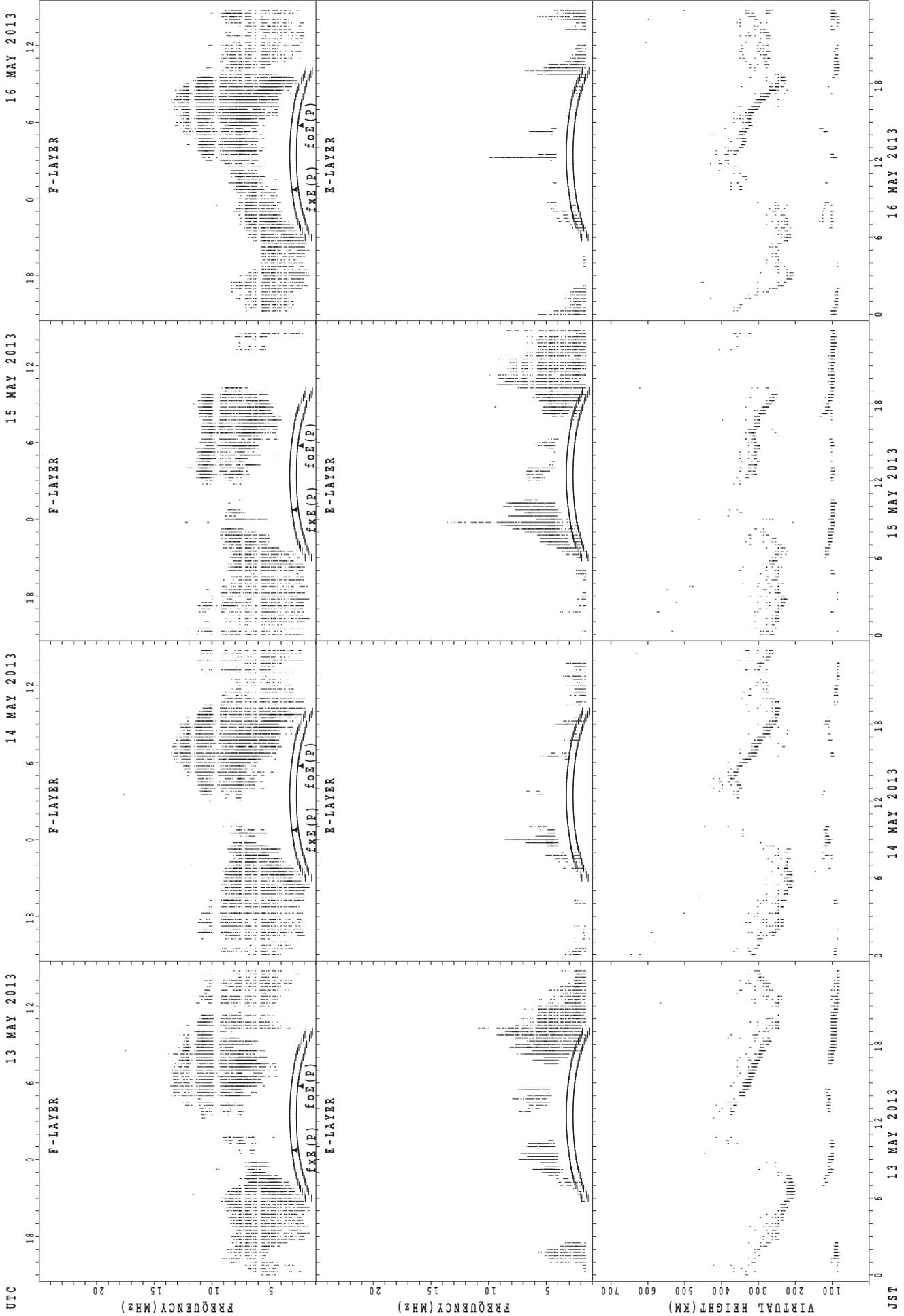
f_xE(P); PREDICTED VALUE FOR f_xE
foE(P); PREDICTED VALUE FOR foE

SUMMARY PLOTS AT Okinawa



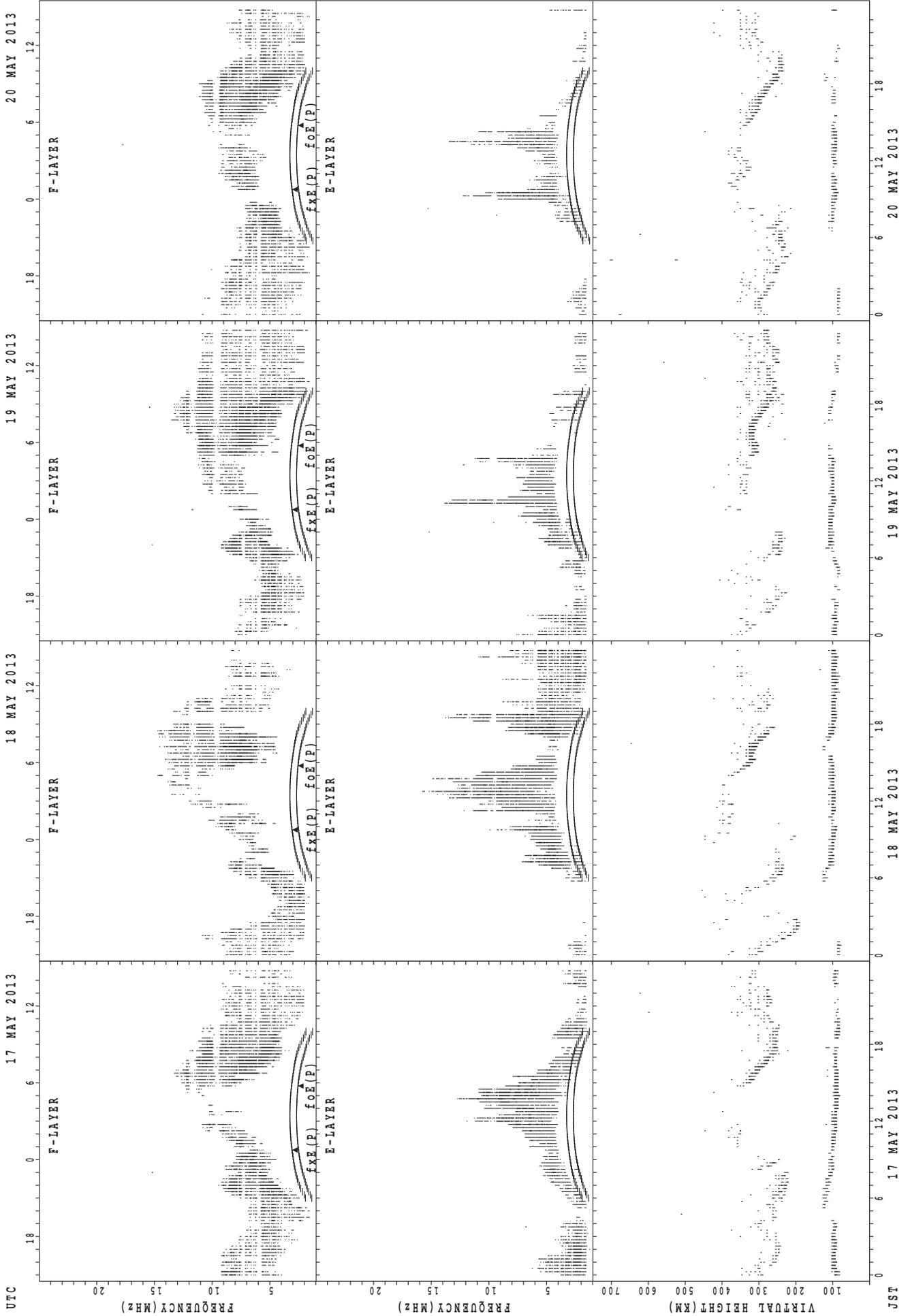
JST 5 MAY 2013 6 MAY 2013 7 MAY 2013 8 MAY 2013
f_xE(P); PREDICTED VALUE FOR f_xE
f_oE(P); PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Okinawa



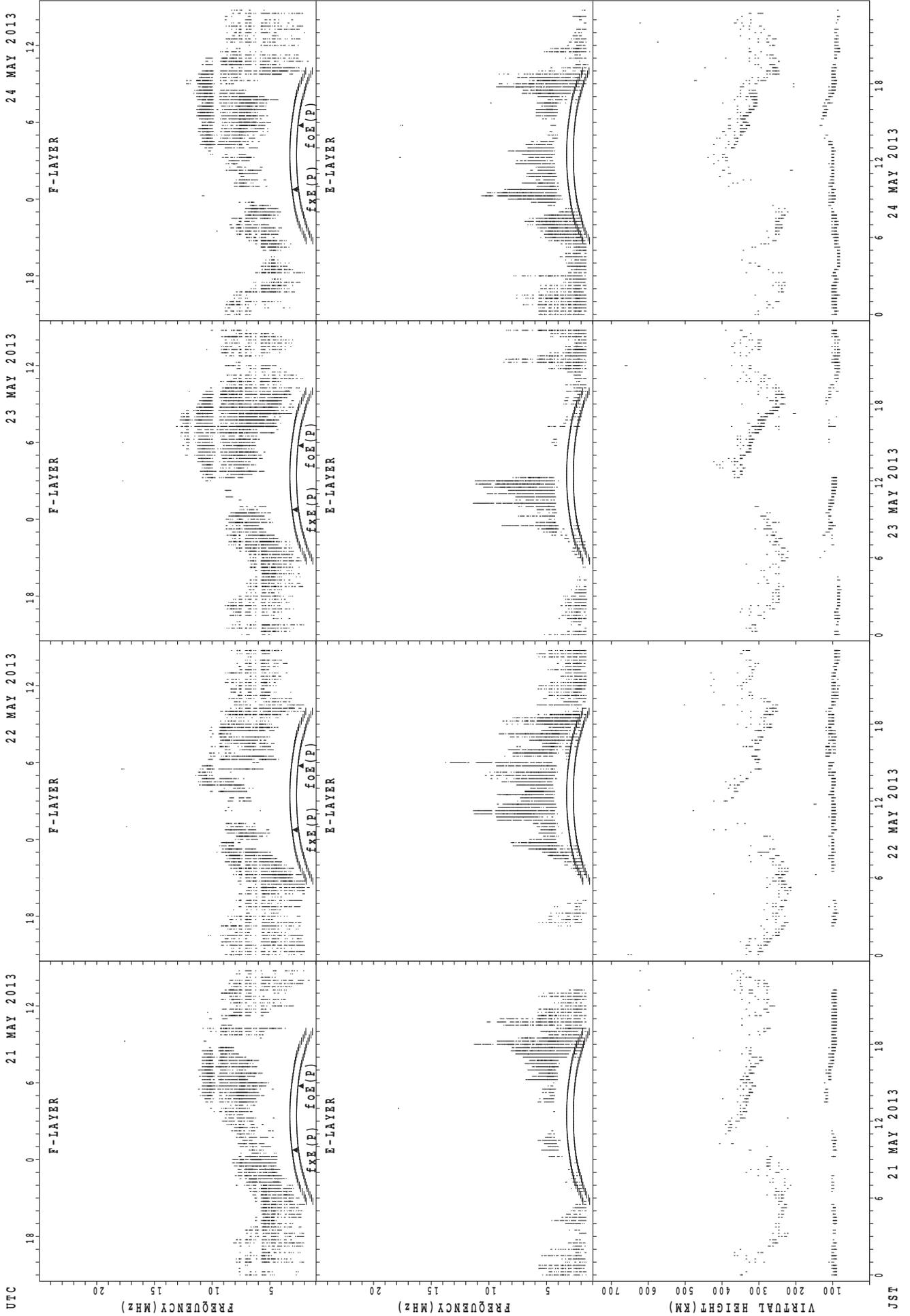
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Okinawa



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

SUMMARY PLOTS AT Okinawa

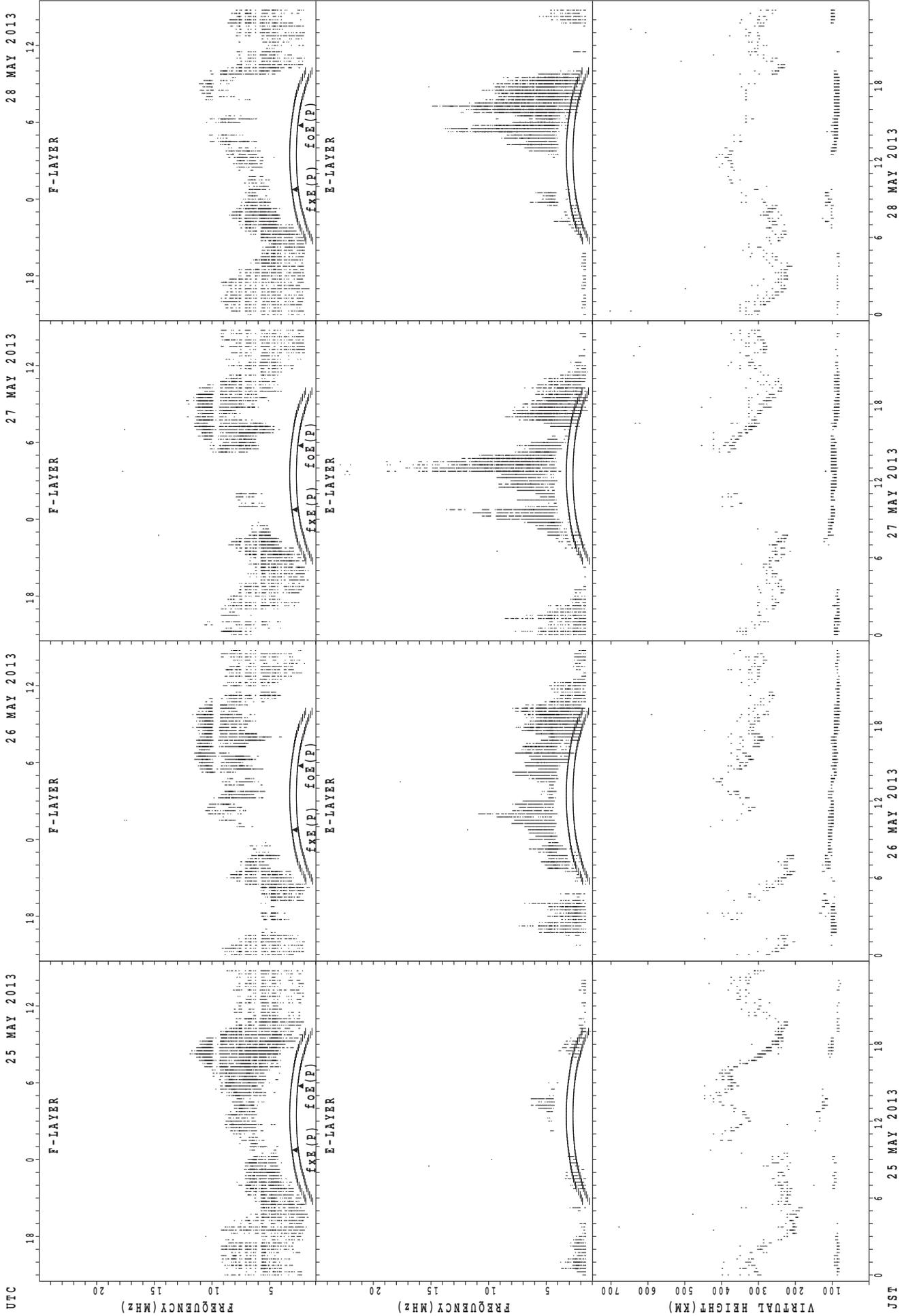


UTC
 21 MAY 2013
 22 MAY 2013
 23 MAY 2013
 24 MAY 2013

JST
 21 MAY 2013
 22 MAY 2013
 23 MAY 2013
 24 MAY 2013

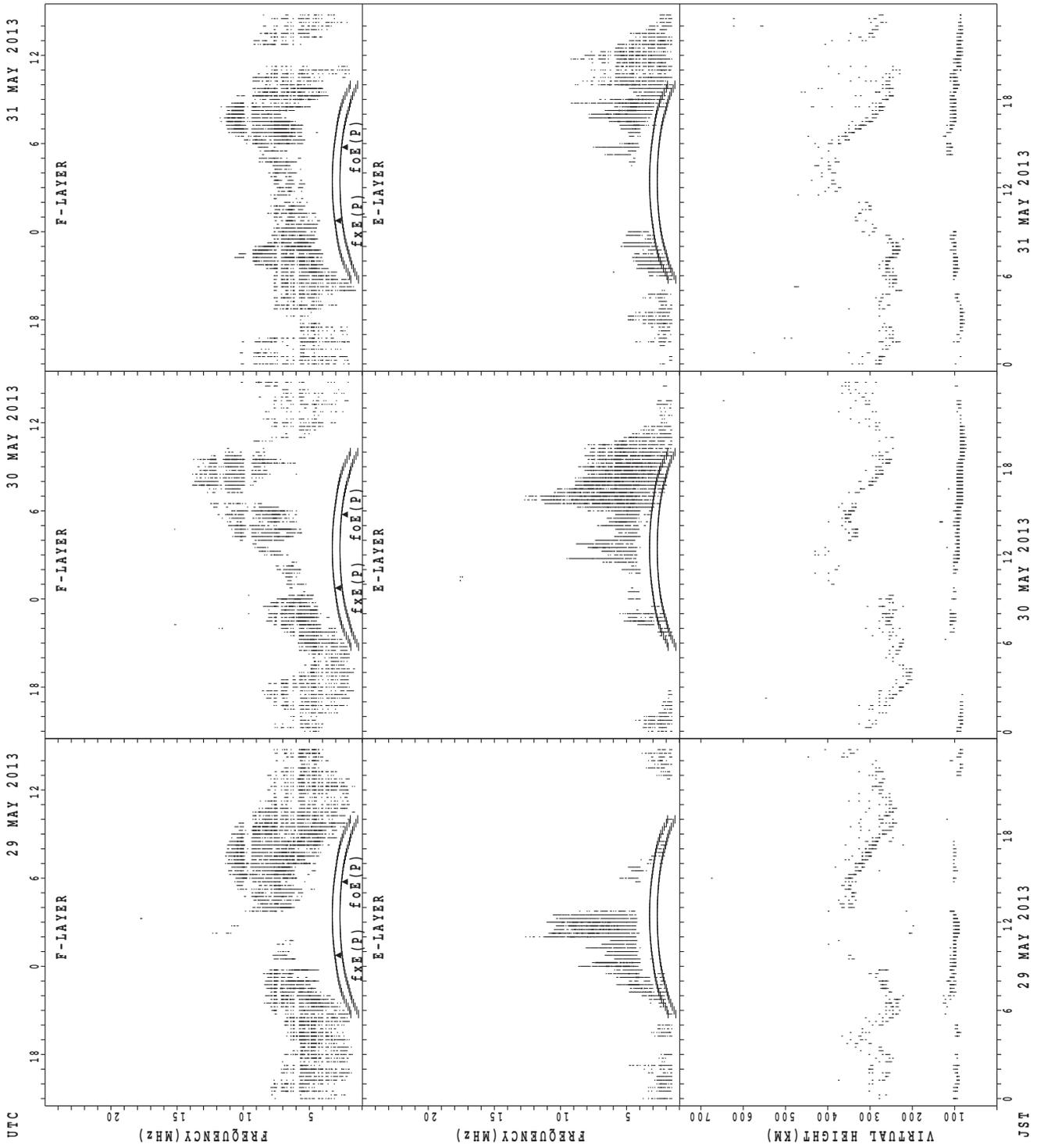
$f_xE(P)$; PREDICTED VALUE FOR f_xE
 $f_oE(P)$; PREDICTED VALUE FOR f_oE

SUMMARY PLOTS AT Okinawa



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

SUMMARY PLOTS AT Okinawa



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

MONTHLY MEDIANS OF h'F AND h'Es
MAY 2013 135E MEAN TIME (UTC+9H) AUTOMATIC SCALING

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

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	4	2	1	1	1	11	19	5									6	24	18	18	12	15	10	5
MED	311	315	284	320	316	310	296	264									274	296	288	277	285	280	297	322
U Q	316	316	142	160	158	336	302	309									280	318	296	286	305	296	304	370
L Q	303	314	142	160	158	278	272	255									270	277	280	266	272	272	278	300

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	14	12	9	8	8	27	28	30	30	29	24	23	23	22	28	30	27	29	28	22	24	18	18	20
MED	97	94	95	95	106	125	113	107	107	103	104	103	101	100	101	101	103	105	109	103	102	99	101	97
U Q	99	97	97	100	114	131	119	111	111	107	107	105	105	103	105	107	109	113	113	107	104	103	105	102
L Q	95	90	89	90	94	115	107	103	103	101	100	99	99	97	99	99	101	103	103	101	100	99	97	95

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	13	6	6	4	1	11	21	25									15	25	26	23	16	12	11	10
MED	336	309	299	309	374	270	254	266									290	274	268	278	281	296	318	321
U Q	351	316	322	318	187	286	279	284									294	293	282	288	303	319	328	338
L Q	332	296	294	298	187	260	239	243									270	263	254	264	267	276	302	318

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	21	20	16	11	10	13	21	26	25	26	23	24	20	23	19	18	21	29	25	26	23	26	26	22
MED	97	95	95	91	95	123	111	107	103	104	101	103	100	103	105	107	105	105	101	97	99	99	97	97
U Q	101	97	97	95	97	130	114	111	106	107	103	105	105	111	113	113	111	111	105	101	103	103	103	103
L Q	95	92	91	91	89	111	107	103	100	99	97	99	97	97	99	101	102	99	97	95	95	97	95	95

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	22	21	17	16	6	6	14	25	23									27	29	26	19	12	12	15
MED	336	318	300	274	302	296	253	254	258									278	262	260	282	319	319	328
U Q	356	334	312	301	328	314	290	271	270									290	271	280	288	334	344	342
L Q	320	306	273	259	270	284	232	242	240									266	246	240	262	303	309	312

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	26	26	24	25	20	13	30	31	31	31	28	27	27	31	29	30	30	30	31	28	27	28	27	27
MED	95	93	93	95	91	95	120	113	107	103	101	101	101	101	103	103	104	103	103	97	97	97	95	95
U Q	97	97	95	96	96	95	131	115	111	107	103	105	105	109	110	107	111	111	105	102	101	97	97	97
L Q	91	91	89	88	89	89	109	107	103	101	98	97	97	97	96	95	97	99	97	95	95	91	91	91

MONTHLY MEDIANS OF h'F AND h'Es
MAY 2013 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	15	20	22	16	11	7	17	28	24									31	28	28	19	13	19	15
MED	302	308	283	273	268	264	260	249	260									286	267	261	284	304	320	314
U Q	336	320	292	295	290	282	270	257	269									294	278	276	290	320	336	346
L Q	288	276	264	261	264	232	242	233	247									274	250	253	262	291	302	296

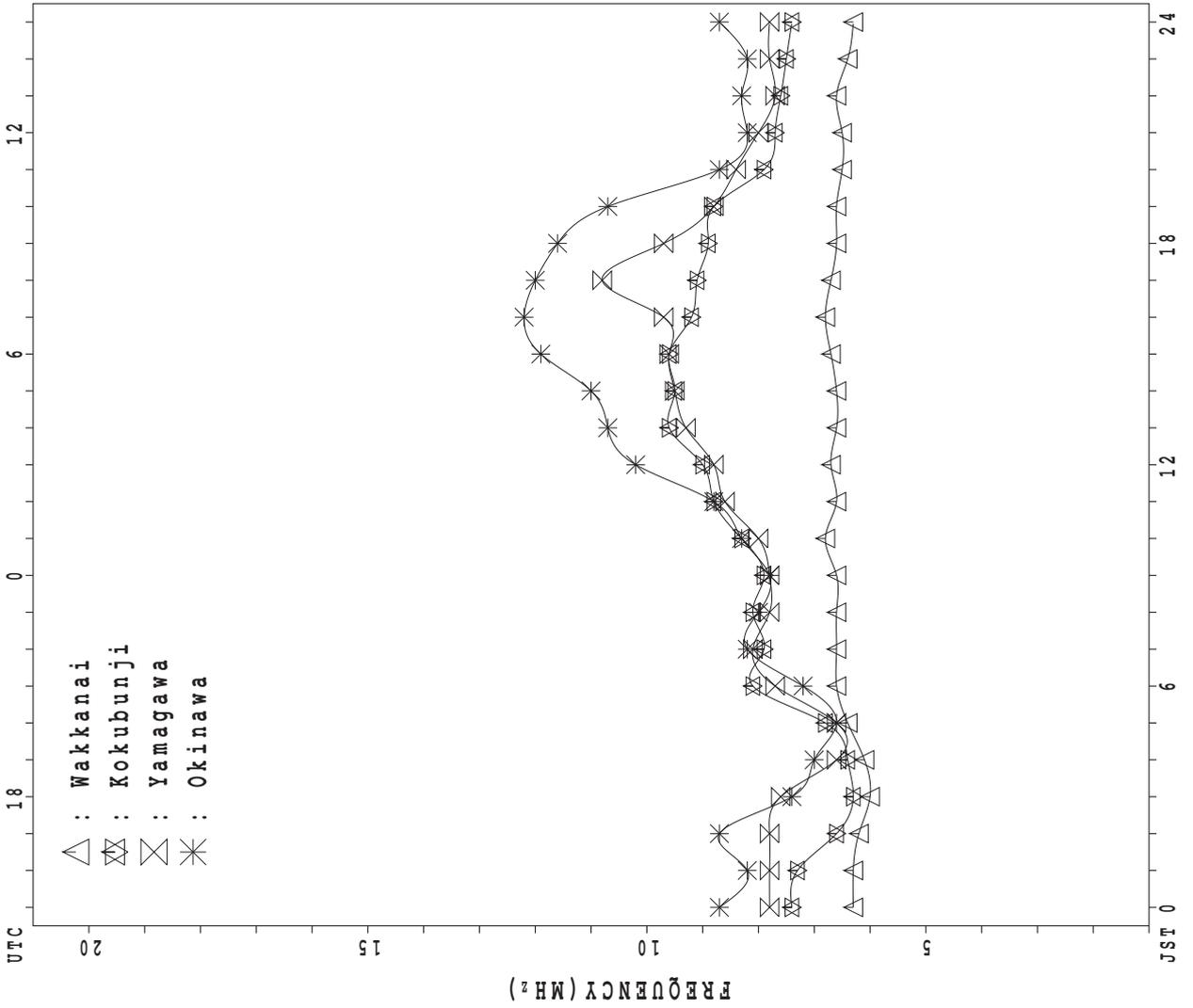
h'Es

	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	18	15	17	11	8	7	8	25	27	25	22	20	20	23	21	20	20	27	28	25	25	23	19	20
MED	95	91	95	95	95	97	120	111	109	105	105	103	103	105	105	103	111	105	103	97	97	97	97	96
U Q	97	99	97	99	97	103	125	115	113	110	111	105	108	111	118	113	112	111	107	103	103	99	99	98
L Q	91	89	87	89	94	87	100	105	105	103	101	99	96	97	97	99	101	99	98	95	94	91	93	91

MONTHLY MEDIANS PLOT OF fOF2

MAY 2013

AUTOMATIC SCALING



UTC

12

6

0

18

20

15

10

5

FREQUENCY (MHz)

JST 0

12

18

24

IONOSPHERIC DATA STATION Wakkanai

MAY 2013 f_{XI} (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X 77	X 75	X 74	X 71										O X 84						O X 86	X 85	X 85	X 84	X 80
2	X 77	X 75	X 73	X 66																	X 77	X 75	74	67
3	67	67	X 63	X 63																X 83	X 82	X 82	X 77	X 73
4	X 69	X 69	X 69	X 68																X 90	X 88	X 84	X 79	X 79
5	X 74	X 75	X 72	X 67																X 84	X 84	X 76	X 74	X 74
6	X 72	X 71	X 73	X 70																X 101	X 96	X 83	X 83	X 82
7	X 82	X 80	X 81	X 70																X 76	X 81	X 81	X 77	X 73
8	X 70	X 62	X 61	X 61																	X 77	X 74	X 73	X 69
9	X 65	X 62	X 60	X 58																X 81	X 82	X 82	X 78	X 79
10	X 73	X 73	X 71	X 68																	X 91	X 84	X 80	X 75
11	X 72	X 72	X 72	X 70																	X 97	X 96	X 82	X 73
12	X 72	X 71	X 69	X 69																	X 95	X 95	X 94	X 83
13	X 75	X 72	X 71	X 70																	X 95	X 92	X 91	X 83
14	X 80	X 77	X 74	X 72																	X 87	X 88	X 88	X 86
15	X 83	X 81	X 75	X 71																	X 79	X 80	X 82	X 79
16	X 75	X 75	X 76	X 74																X 83	X 84	X 84	X 84	X 82
17	X 79	X 75	X 71	X 69						C	C	C	C	C	C	C	C				X 86	X 90	X 88	X 85
18	X 85	X 83	X 83	X 68						C	C	C	C							X 79	X 78	X 86	X 90	X 79
19	X 75	X 75	X 61	X 59																	X 88	X 84	X 83	X 73
20	X 70	X 70	X 68	X 66																	X 78	X 80	X 78	X 77
21	X 70	X 72	X 72	X 71																	X 87	X 90	X 81	X 81
22	X 79	X 79	X 77	X 73																	X 92	X 86	X 86	X 82
23	X 79	X 79	X 79	X 75																	X 77	X 78	X 80	X 80
24	X 81	X 79	X 74	X 69																	X 92	X 86	X 81	X 82
25	X 78	X 75	X 75	X 71																	X 77	X 77	X 78	X 73
26	X 71	X 63	X 65	X 60																	X 81	X 79	X 79	X 72
27	X 69	X 68	X 66	X 66																	X 77	X 77	X 77	X 73
28	X 77	X 77	X 70	X 67																	X 76	X 78	X 77	X 75
29	X 73	X 70	X 66	X 61																	X 74	X 71	X 71	X 71
30	69	68	68	63																	X 85	X 83	X 80	X 77
31	X 76	X 69	X 69	X 68																X 93	X 89	X 82	X 82	X 79
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31										1						10	31	31	31	31
MED	X 75	X 73	X 71	X 68										O X 84						X 84	X 84	X 83	X 80	X 79
U Q	X 79	X 77	X 74	X 71																X 90	X 89	X 86	X 84	X 82
L Q	X 70	X 69	X 68	X 66																X 81	X 78	X 78	X 77	X 73

MAY 2013 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

MAY 2013 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
1	70	68	67	65	64	62	61	65	69	72	U R	77	72	75	77	83	82	82	88	90	79	75	78	76	74				
2	70	68	66	59	60	59	59	51	U R	U Y	68	62	70	73	73	75	72	70	70	68	70	68	63	58					
3	F	F	56	53	56	66	68	73	69	67	71	74	74	74	80	78	77	76	79	76	75	75	70	67					
4	62	61	61	61	60	69	R	75	75	73	76	76	74	79	79	76	R	R	79	83	81	78	72	72					
5	68	68	66	60	57	64	74	75	J R	Y	Y	76	75	75	76	76	75	78	78	78	77	69	67	66					
6	65	64	66	63	64	73	U Y	U R	U R	79	76	U Y	R	Y	U Y	Y	R	U R	U R	85	94	U R	76	75					
7	75	74	74	63	60	61	63	A	A	A	64	63	64	66	69	70	68	69	A	70	74	75	70	66					
8	63	56	54	R	52	56	68	61	U R	54	A	A	A	A	A	65	68	65	67	66	68	70	67	66	62				
9	58	54	54	51	54	58	64	66	Y	64	67	67	69	70	71	73	74	72	70	75	75	75	72	70					
10	66	66	64	61	57	61	64	62	62	68	B	68	71	74	74	74	76	77	77	R	R	74	68						
11	65	65	65	63	63	71	R	R	78	85	78	73	75	81	77	76	81	78	78	78	88	90	89	75	66				
12	65	64	63	62	60	66	71	71	71	72	73	68	70	72	74	U R	76	74	A	A	83	88	88	R	76				
13	68	65	64	63	59	63	72	82	78	84	78	73	72	75	75	75	75	75	75	86	R	91	85	84	76				
14	74	70	67	65	64	70	75	75	68	65	70	70	77	81	75	74	73	75	75	80	80	81	80	R	79				
15	R	76	74	68	V	63	63	65	57	63	62	72	B	68	66	66	63	62	68	67	69	72	74	76	70				
16	69	68	69	67	68	72	R	J R	76	85	77	72	74	73	76	81	78	76	R	79	80	76	76	77	77	75			
17	72	68	65	63	61	72	U R	U Y	84	94	93	C	C	C	C	C	C	C	83	77	79	J R	R	R	81	78			
18	78	77	75	61	57	66	68	75	75	C	C	C	C	J R	J R	R	R	R	85	74	72	71	79	82	R	72			
19	68	68	54	52	50	57	62	60	63	68	62	67	A	74	74	72	69	71	74	R	R	81	78	76	66				
20	63	63	61	59	55	58	59	54	U R	50	50	57	56	60	58	60	62	60	58	61	63	71	74	71	70				
21	64	65	65	63	63	68	71	71	Z	U Y	76	70	68	70	70	72	74	75	73	72	72	75	79	83	74	74			
22	72	72	70	66	68	72	R	J R	J R	81	78	84	75	76	74	72	72	73	74	74	A	85	80	80	R	75			
23	72	72	72	68	64	69	71	72	A	66	66	63	67	66	66	67	70	72	72	70	70	71	73	73					
24	74	72	67	62	61	69	75	74	U R	77	71	71	72	70	72	77	R	R	79	76	80	90	U R	R	75	75			
25	71	68	68	64	59	55	64	64	R	56	A	A	A	62	63	69	70	J R	A	68	68	70	71	71	66				
26	64	56	58	53	54	62	60	54	E	G E	G	R E	G	45	46	49	48	53	60	U R	56	59	A	62	66	75	72	72	65
27	62	F	F	53	59	61	66	72	64	58	59	A E	G	A	49	58	57	62	62	63	64	65	71	70	70	66			
28	70	70	63	60	53	50	54	61	58	58	55	51	55	U R	50	58	62	62	65	64	68	69	71	70	68				
29	66	64	F	54	54	59	67	73	70	63	59	59	62	60	60	59	61	R	60	66	67	62	67	64	64	64			
30	F	F	F	56	59	60	72	76	70	66	70	67	66	66	71	74	76	71	71	72	78	76	73	70					
31	66	62	62	61	66	72	74	68	73	76	76	70	70	68	68	71	U R	70	75	78	86	82	75	75	72				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
CNT	31	31	31	31	31	31	31	30	29	24	24	26	25	29	29	30	30	28	29	30	31	31	31	31	31				
MED	68	66	65	61	60	66	71	71	69	68	70	69	70	72	73	74	73	74	74	76	77	76	74	70					
U Q	72	70	67	63	63	69	R	75	75	77	72	76	73	74	76	76	R	R	77	78	78	83	82	79	76	75			
L Q	64	62	58	59	57	60	64	62	60	63	65	63	64	66	66	68	68	70	68	68	71	71	70	66					

MAY 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

MAY 2013 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								L	U	L	L	L	U	L		L	L	L						
2					L	L	U	L	L	U	R	U	A	A	512	516	512	468	L	L	L			
3								L	U	L	L	L	L	L	L	U	L	U	L	L				
4							L	L	A	L	L	L	L	L	U	L	L	L	L	L				
5							L	L	L	L	U	L		U	L	L	A		L					
6							L	L	L	L	U	L	L	L	U	L	L	L	L	L				
7							U	L	A	A	A	A	A	A	A		A	A	A					
8					U	L	L	U	L	A	A	A	A	A	A	A	488	488	408	L				
9							L	L		A	A	R	L	U	L	L	L	U	L	L				
10					L	U	L	L	U	L	L	B	L	L	L	L	L	L	L	L				
11					L	L	U	L	U	L	L	L	L	L	L	L	U	L	L	L				
12					L	L	A	A	A	L	L	L	U	L	A	L	L	A	A					
13							L	L	A			L	L	B	U	L	U	L	A	L	A			
14					L	L	L	Y	U	L	L	B	U	R	L	L	U	L	U	L	L			
15					U	L	L	L	L	A		B	U	R	L	L	U	L	U	L	L			
16					L	L	L	L	L	L	L	L	L	L	U	L	A	L	L	L				
17					U	L	U	L	A	C	C	C	C	C	C	C	C	C	L	A				
18					L	L	L	A	C	C	C	C	C	R	516	512	504	504	L	L				
19					L	L	A	A	A	A	A	A	A	532	532	U	L	A	U	L	U	L	A	
20					L	L	L	A	A	A	A	U	R	500	500	A	A	A	A	L				
21							L	L	L	L	L	L	L	L	L	L	L	L	L	L				
22					U	L	L	U	L	L	L	L	L	U	L	A	L	L	L	L	A	A		
23					U	A	L	L	A	A	Y	A	A	492	492	512	488	468	A	A				
24					L	L	L	L	A	A	A	A	U	L	L	L	U	R	U	L	L	L	L	L
25					L	L	L	U	R	A	A	A	500	500	500		A	A	A	A				
26					A	L	L	A	A	A	A	476	468	464	516	436	A	A	A					
27					L	A	L	A	A	A	A	492	A	R	476	476	476	444	444	380	L	L		
28					L	L	L	L	A	A	L	L	U	R	R	448	448	L	L	L				
29					396	444	452	468	484	484	U	R	A	484	484	484	476	476	436	L				
30					L	L	L	A	L	L	L	L	L	L	U	L	L	A	U	L	L			
31					L	L	L	A	508	504	500	L	L	L	A	488	496	472	A	A	L			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT					1	7	15	18	15	17	19	19	23	25	26	22	20	8	4					
MED					U	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
U Q					284	376	420	456	488	500	504	516	524	520	516	500	484	440	392					
L Q					388	452	464	496	516	520	540	540	536	532	512	488	448	410						
					L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
					348	408	444	460	484	488	496	500	500	500	484	470	422	326						

MAY 2013 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

MAY 2013 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					B	204	264	304	344	364	U A	B	A		U A	372	344	316	U A	A				
2					B	184	268	308	332	356	372	R	U A	380	376	368	344	304	260	196	B			
3					B	196	264	312	352	360	376	U R	U A	A	A	A		316	264	A				
4					B	216	260	304	U A	336	348	360	R	R	376	356	344	316	264	224				
5					B	200	280	308	336	348		U R	R	368	380	368	356	A	A	268	A			
6					B	212	U A	U A	U A	U A	U A	U A	A	A	A	R	A	R	296	264	196			
7					B	188	256	308	332	360		A	A	A	A	A	A	316	288	A				
8					B	200	264	300	336	368	372	U A	A	A	A	A	A	U A	252	220	A			
9					B	196	264	304	336	368	376	R	A	A	A	A	348	316	236	220				
10					B	212	260	312	328	348	R	U R	R	384	384	376	368	348	316	284	U A	B		
11					B	224	268	312	332	360	376	392	R	A	A	360	340	A	264	228	A			
12					B	224	268	320	328	344	A	U R	R	A	A	A	368	324	280	U A	B			
13					B	212	280	316	U R	340	364	A	A	B	R	U A	A	A	284	220	U A	B		
14					B	232	280	324	340	U A	352	A	B	A	R	A	336	308	264	232	B			
15					B	224	264	312	332	344	A	B	A	U R	372	356	348	312	272	212	A			
16					A	228	276	304	328	348	U R	R	A	A	A	A	A	A	A	A				
17					B	A	260	324	336	C	C	C	C	C	C	C	C	A	A	B				
18					A	204	276	316	348	A	C	C	C	C	A	A	A	A	284	216				
19					B	220	280	320	U A	344	360	U A	U A	U A	A	A	A	324	288	212	A			
20					A	220	A	U A	U A	U A	356	A	A	R	372	376	372	348	292	228	A	B		
21					A	A	280	316	U A	328	364	U A	U R	U R	U R	332	340	324	288	A	A			
22					B	216	292	320	352	360	372	380	A	A	A	A	348	324	296	224	A			
23					168	240	288	320	U A	U A	364	A	A	A	A	A	A	A	336	276	224	B		
24					B	212	272	300	320	A	A	A	A	A	U A	A	A	316	288	228	A			
25					B	U A	236	268	300	332	U A	U A	A	A	U A	372	360	340	316	272	A	B		
26					A	228	256	304	320	348	356	U R	380	368	360	348	320	260	216	A				
27					B	216	272	300	324	U A	344	A	U A	A	U R	360	344	316	272	228	A			
28					A	U A	212	268	300	324	348	U A	U A	U R	U R	372	360	340	316	284	224	A		
29					172	236	276	308	332	344	364	U A	R	376	364	A	U A	340	316	292	216	A		
30					176	244	288	320	344	364	360	U A	A	372	364	356	336	A	A	216	A			
31					164	228	280	316	348	360	368	372	368	372	356	344	312	296	220					
	00	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	29	31	31	31	28	19	15	12	13	16	21	23	28	23					
MED					170	216	268	308	336	358	372	U	372	380	372	360	344	316	274	220				
U Q					174	228	280	316	344	364	376	U A	U R	380	384	374	364	348	324	288	224			
L Q					166	204	264	304	328	348	360	U	364	370	366	356	340	316	264	212				

MAY 2013 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

MAY 2013 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1	E 13	BE 14	BE 14	B 20	J A 18	J A	G	29	34	41	45	47	44	44	44	43	38	32	J A 26	AE 15	BE 15	BE 15	BE 15	BE 14			
2	E 14	BE 14	BE 14	B 23	J A 16	J A	G	37	39	42	50	J A 53	J A 47	41		G	G	27	G	GE 16	BE 13	BE 13	B 15	J A 23			
3	J A 21	J A 15	AE 13	B 15	J A 16	J A		25	30	34	38	41	G 58	46	41	38	36	26	34	27	20	19	18	E B 17			
4	J A 18	20	E 15	BE 15	BE 15	BE 15		24	31	34	49	40	40	G 36	G 34	G 32	27	35	35	G 19	J A 50	J A 69	J A 16	J A 17			
5	J A 24	J A 22	20	20	E 15	BE 15		24	33	38	44	41	G 44		G	J A 42	J A 45	J A 63	J A 45	G 24	J A 28	15	13	22	13	24	
6	J A 36	J A 25	J A 31	J A 14	J A 35		24	32	35	38	38	38	J A 60	43	40	26	33	27	32	32	J A 22	J A 17	13	13	17		
7	J A 17	19	E 15	BE 15	BE 15		20	32	J A 66	J A 71	68	52	J A 56	J A 56	45	44	35	J A 55	J A 54	J A 67	70	52	32	65	50		
8	E 14	BE 14	BE 14	BE 16	BE 15		22	37	40	48	60	67	J A 64	J A 81	68	53	45	44	35	24	40	J A 79	J A 67	J A 36	40		
9	J A 16	J A 18	J A 14	J A 17	J A 16		24	32	40	44	59	52	J A 49	J A 49	40	38	30	30	27	19	18	19	12	15	35		
10	J A 17	J A 16	J A 22	J A 14	AE 13	G	20	30	34	40	44	B	G	G	G	41	28	G	34	33	27	J A 17	J A 18	18	12	18	
11	26	J A 18	24	J A 17	J A 15		27	32	35	38	39	G	G	G		G	J A 39	J A 34	J A 38	44	29	30	25	25	14	14	14
12	E 14	BE 14	BE 14	B 13	J A 13		25	37	J A 54	J A 60	50	43	37	J A 37	J A 44	J A 67	40	34	93	224	63	22	12	22	12		
13	E 16	B 20	J A 14	AE 14	BE 14		26	38	J A 45	J A 51	49	44	43	E 58	G 37	44	43	34	32	J A 59	51	52	37	22	19		
14	J A 13	J A 32	28	22	J A 13		25	33	40	42	46	44	E 59	40	35	37	33	33	30	30	46	J A 31	J A 30	23	30		
15	E 15	B 17	J A 18	J A 16	BE 14		23	34	37	41	61	39	B		G	42	34	33	37	35	29	27	21	J A 16	15	15	15
16	J A 21	J A 32	J A 16	J A 16	J A 21		25	31	37	39	41	40	40	43	43	48	59	38	J A 32	J A 28	28	55	39	24	23		
17	J A 16	AE 14	BE 14	BE 19	E 16		26	30	J A 55	J A 90	C	C	C	C	C	C	C	C	J A 45	J A 51	65	57	26	16	62		
18	J A 54	J A 54	J A 35	J A 30	J A 31		27	33	J A 44	J A 53	C	C	C	C		J A 50	42	40	33	G 24	28	31	66	39	32	29	
19	J A 18	J A 13	J A 15	AE 13	BE 13		28	47	J A 68	J A 54	J A 64	58	J A 65	J A 96	47	J A 51	J A 55	34	32	J A 61	49	66	61	43	22		
20	J A 15	AE 15	B 19	J A 21	J A 19		23	33	41	48	40	40	48	42	49	62	53	57	51	55	63	J A 61	J A 61	J A 63	J A 62		
21	J A 63	J A 45	J A 53	J A 53	J A 33		33	41	37	52	40	43	43	G	G	38	38	40	49	J A 60	47	J A 51	J A 53	J A 59	86		
22	J A 50	J A 27	J A 15	J A 25	AE 14		28	34	J A 47	39	39	J A 54	J A 53	J A 53	J A 63	J A 46	J A 37	36	J A 42	J A 59	95	66	31	30	17		
23	22	21	E 12	B 19	J A 17	G	34	38	J A 66	J A 92	44	46	56	38	J A 59	J A 168	42	J A 51	J A 53	25	29	25	25	25	25		
24	J A 17	AE 13	BE 13	BE 13	BE 14		24	36	40	40	66	40	40	44	39	40	40	J A 60	J A 56	J A 46	28	28	12	19	22		
25	J A 13	J A 15	J A 21	AE 15	BE 15		38	32	37	J A 47	J A 61	69	70	42	42	42	62	J A 73	J A 104	34	31	19	20	20	13		
26	J A 20	J A 14	J A 14	J A 31	J A 52		37	38	38	J A 67	J A 57	40	44	46	41	43	44	40	J A 67	58	47	J A 40	J A 15	23	17		
27	J A 25	J A 24	E 14	BE 14	BE 23		32	50	J A 57	J A 51	45	52	J A 49	J A 65	42	32	30	28	30	26	22	J A 31	J A 42	19	37		
28	19	E 15	B 28	J A 20	22		27	38	37	37	42	J A 57	40	G	G	39	G	G	G	32	32	J A 25	J A 51	J A 36	27	31	
29	E 15	BE 15	BE 15	BE 15	G		27	37	44	66	45	47	46	41	46	39	39	G	33	28	28	28	26	25	25		
30	E 13	BE 13	B 22	J A 13	20		26	36	36	J A 51	J A 49	55	55	G	G	G	35	J A 38	J A 42	25	19	J A 26	12	24	17		
31	J A 20	J A 17	AE 13	BE 13	G		25	30	34	36	40	40	40	40	50	47	J A 52	J A 65	J A 64	J A 32	51	42	14	15	35		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	31	31	31	31	31	31	31	31	31	29	28	28	29	30	30	30	30	30	31	31	31	31	31	31	31		
MED	J A 17	J A 17	15	J A 16	15	25	33	38	47	45	44	46	42	41	42	38	36	33	30	J A 28	J A 31	J A 25	J A 22	J A 23			
UQ	J A 22	J A 22	J A 22	J A 21	20	27	37	44	53	60	52	56	51	45	46	45	44	51	55	49	52	39	27	35			
LQ	E 15	BE 14	BE 14	BE 14	14	23	31	36	39	40	40	40	G	G	G	G	G	G	G	30	27	20	E 19	BE 14	BE 17		

MAY 2013 foEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

MAY 2013 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23								
1	E	B	E	B	E	B	G	27	31	38	42	43	43	U	Y	41	41	G	30	22	E	B	E	B	E	B	E	B	E	B		
2	E	B	E	B	E	B	G	29	35	37	46	52	41	39	G	G	G	23	18	G	E	B	E	B	E	B	E	B	E	B		
3	E	B	E	B	E	B	G	27	30	36	38	G	G	G	37	37	35	23	29	19	18	E	B	E	B	E	B	E	B			
4	E	B	E	B	E	B	G	28	32	44	36	U	Y	G	U	G	G	G	G	G	G	17	17	22	E	B	E	B	E	B		
5	E	B	E	B	E	B	G	30	35	37	40	G	U	Y	G	40	40	50	43	24	24	E	B	E	B	E	B	E	B			
6	20	20	17	E	B	E	G	28	31	32	37	U	Y	G	38	39	39	24	32	G	24	28	25	21	E	B	E	B	E	B		
7	E	B	E	B	E	B	G	26	66	71	68	51	50	50	U	Y	44	42	35	46	47	A	A	67	59	50	16	50	17			
8	E	B	E	B	E	B	G	34	35	44	60	A	A	A	A	A	A	A	A	50	41	39	29	24	34	27	22	24	33			
9	E	B	E	B	E	B	G	29	40	41	53	50	44	42	38	37	28	G	G	G	24	16	16	18	E	B	E	B	E	B		
10	E	B	E	B	E	B	G	28	29	39	41	B	G	G	G	40	24	G	G	G	31	31	26	16	E	B	E	B	E	B		
11	17	13	13	15	15	25	29	32	34	36	G	G	G	G	36	27	34	34	28	24	22	16	14	14	14	14	14	14	14			
12	E	B	E	B	E	B	G	32	50	56	49	41	36	G	G	41	54	38	33	A	A	A	93	22	4	18	E	B	E	B	E	B
13	E	B	E	B	E	B	G	34	38	47	44	42	41	E	B	U	G	37	44	37	33	32	43	43	31	32	22	16	16			
14	12	28	18	E	B	G	30	37	39	39	42	E	B	U	Y	U	U	G	G	G	28	31	28	23	38	28	18	18	21			
15	E	B	E	B	E	B	G	30	32	38	58	38	B	U	Y	G	G	42	33	29	37	33	26	24	19	E	B	E	B	E	B	
16	E	B	E	B	E	B	G	28	32	38	38	38	38	40	40	43	52	33	30	20	21	24	28	17	17	17	17	17	17			
17	E	B	E	B	E	B	G	28	37	85	C	C	C	C	C	C	C	C	C	C	40	45	51	47	22	E	B	13	38			
18	21	24	26	20	20	22	28	39	50	C	C	C	C	43	41	36	32	24	22	24	54	26	26	17	17	17	17	17	17			
19	E	B	E	B	E	B	G	43	58	53	53	53	59	A	A	96	44	42	46	34	31	48	44	44	21	18	16	16	16			
20	E	B	E	B	E	B	G	27	36	43	38	38	41	U	Y	42	42	54	50	51	45	32	29	42	48	32	16	16	16			
21	38	38	37	38	21	28	38	36	38	38	41	40	G	G	U	Y	38	38	38	36	34	28	27	27	27	E	B	12	12			
22	18	21	14	15	14	23	34	41	37	37	50	50	46	51	42	35	35	37	42	A	A	95	40	24	24	E	B	13	13			
23	E	B	E	B	E	B	G	30	30	62	92	43	43	52	38	40	44	39	48	40	19	18	18	18	18	18	18	18	18			
24	E	B	E	B	E	B	G	30	35	35	48	38	37	41	37	39	39	39	31	27	22	17	12	16	22	22	22	22	22			
25	E	B	E	B	E	B	G	32	32	33	43	A	A	A	A	A	40	40	42	57	63	A	A	104	31	24	E	B	13	13		
26	17	E	B	E	B	20	48	35	35	38	46	38	38	44	U	Y	40	44	36	A	A	67	49	37	30	E	B	E	B	E	B	
27	18	E	B	E	B	20	27	39	40	45	41	52	40	A	A	A	A	39	28	G	G	25	26	24	21	26	28	12	16			
28	E	B	E	B	E	B	G	26	32	32	34	36	36	G	G	38	G	G	G	31	29	22	22	20	20	E	B	13	13			
29	E	B	E	B	E	B	G	24	32	41	56	42	43	45	41	41	37	37	G	30	23	21	14	14	14	14	17	17	17			
30	E	B	E	B	E	B	G	15	32	32	49	45	45	45	G	G	G	G	28	30	38	24	18	18	E	B	E	B	E	B		
31	17	E	B	E	B	24	29	32	34	34	34	38	40	46	40	40	40	59	36	29	23	23	14	15	19	19	19	19	19			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23								
CNT	31	31	31	31	31	31	31	31	31	29	28	28	29	30	30	30	30	30	31	31	31	31	31	31	31	31	31	31	31			
MED	E	B	E	B	E	B	G	23	30	35	41	41	42	40	39	40	37	33	31	25	22	18	18	E	B	E	B	E	B			
UQ	17	15	15	16	16	24	32	39	49	51	48	48	45	42	42	41	39	38	40	34	30	22	20	18	18	18	18	18	18			
LQ	E	B	E	B	E	B	G	28	32	37	38	38	G	G	G	G	G	G	G	G	G	18	15	13	13	13	13	13	13			

MAY 2013 fbEs (0.1MHz)

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IONOSPHERIC DATA STATION Wakkanai

MAY 2013 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	13	14	14	14	14	14	14	14	14	19	22	41	30	29	20	17	18	16	16	15	15	15	15	14	
2	14	14	14	14	14	14	14	14	14	17	17	20	19	20	15	15	17	16	16	16	13	13	13	13	
3	15	14	13	13	13	13	13	13	15	15	15	18	17	17	18	17	16	16	16	15	15	15	15	15	
4	15	15	15	15	15	16	15	15	15	15	13	12	18	16	17	18	16	15	12	12	12	15	15	15	
5	15	15	15	15	15	15	15	15	15	16	26	26	19	20	16	14	14	14	14	14	13	13	13	13	
6	12	14	14	14	14	14	14	12	12	12	14	14	21	19	18	17	17	12	12	12	12	13	13	13	
7	14	14	15	15	15	15	15	15	14	15	15	15	24	23	18	17	16	12	12	16	16	14	14	14	
8	14	14	14	16	15	15	16	14	14	14	16	16	18	18	17	17	17	17	18	14	13	13	12	12	
9	12	12	14	13	14	16	16	14	16	16	18	30	19	19	17	17	16	13	12	12	12	12	14	18	
10	16	13	13	13	13	13	13	13	13	13	B	24	22	22	14	14	16	16	17	16	16	12	12	12	
11	13	13	13	15	15	15	13	13	12	11	11	11	16	16	16	16	16	15	15	14	14	14	14	14	
12	14	14	14	14	14	14	15	15	14	15	14	21	22	21	16	14	15	15	14	14	12	12	12	12	
13	16	16	16	14	14	14	14	14	14	15	18	27	58	30	25	14	14	12	12	12	12	12	14	14	
14	12	11	11	11	13	13	13	13	13	16	17	59	34	29	17	16	15	15	13	13	14	14	14	14	
15	15	13	16	15	14	10	10	14	14	14	14	B	28	28	25	20	16	16	15	15	15	15	15	15	
16	12	13	13	13	13	12	12	12	16	15	15	15	15	15	15	15	15	15	13	13	13	13	12	12	
17	11	14	14	14	16	15	16	21	16	C	C	C	C	C	C	C	C		13	13	13	14	14	13	13
18	14	14	14	14	14	14	14	14	14	C	C	C	C		17	17	18	16	15	15	15	12	11	11	11
19	12	12	12	12	13	12	10	10	10	10	18	18	20	20	16	16	17	16	15	12	12	12	12	12	
20	15	15	15	13	12	13	14	14	17	16	18	18	17	16	16	20	15	16	15	15	12	12	12	12	
21	15	15	15	15	15	15	15	15	15	15	15	20	16	14	14	14	14	14	14	16	11	13	12	12	
22	14	14	14	13	14	12	12	15	15	16	15	15	15	15	15	15	15	15	15	13	13	13	13	13	
23	13	13	12	12	12	12	16	16	14	19	21	16	18	17	15	19	15	15	15	15	12	12	12	12	
24	13	13	13	13	14	14	14	14	16	15	17	16	18	18	16	14	13	12	12	12	13	12	12	12	
25	14	14	14	15	15	15	15	12	12	12	12	12	12	12	16	15	15	15	15	15	15	13	13	13	
26	13	13	13	13	13	12	12	12	13	16	14	15	17	16	16	17	16	16	13	13	12	11	11	11	
27	15	15	14	14	14	14	14	17	16	14	18	17	22	15	12	12	17	17	14	12	12	12	12	16	
28	15	15	15	13	13	12	12	12	12	12	14	17	19	18	18	17	16	16	15	14	13	13	13	13	
29	15	15	15	15	15	15	14	16	15	17	17	17	15	15	16	16	16	14	12	13	12	13	13	13	
30	13	13	14	14	14	14	14	14	14	14	15	15	18	21	21	15	15	13	12	12	12	12	12	12	
31	13	13	13	13	13	13	13	12	12	12	15	15	15	14	14	14	14	13	13	12	12	14	15	15	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	31	31	29	29	29	29	30	30	30	30	31	31	31	31	31	31	31	
MED	14	14	14	14	14	14	14	14	14	15	15	17	18	18	16	16	16	15	14	14	13	13	13	13	
U Q	15	15	15	15	15	15	15	15	15	16	18	22	22	21	18	17	16	16	15	15	14	14	14	14	
L Q	13	13	13	13	13	13	13	13	13	14	14	15	16	16	15	14	15	13	12	12	12	12	12	12	

MAY 2013 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

MAY 2013 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1	290	279	283	282	284	298	324	316	313	328	U R	320	318	327	328	331	330	321	V	310	346	299	310	288	284		
2	273	264	274	290	309	304	323	318	U R	308	315	280	305	308	312	307	320	316	316	297	288	295	306	285			
3	F	F	264	275	290	337	335	313	333	302	316	318	318	344	309	324	336	319	327	327	316	325	304	290			
4	288	289	290	287	285	326	R	331	333	321	328	330	320	307	315	315	328	R	343	325	315	328	302	295	296	298	
5	299	276	297	288	282	292	327	348	R	Y	Y	316	320	324	326	325	324	326	326	351	R	326	284	277	297		
6	252	269	282	291	295	343	U Y	U R	U R	301	U Y	R	328	Y	U Y	Y	R	U R	U R	R	314	U R	315	321	300	284	
7	282	287	316	279	290	300	289	A	A	A	285	275	283	282	288	304	301	306	A	288	294	313	283	288			
8	284	287	273	270	287	293	313	342	U R	A	A	A	A	A	A	296	293	308	302	302	292	287	297	289	300		
9	293	292	283	284	308	307	301	311	Y	307	328	301	304	306	324	316	326	331	305	302	303	299	296	311			
10	289	293	299	297	293	294	320	288	314	301	B	301	291	311	307	309	316	312	302	307	303	329	327	291			
11	277	284	277	284	284	308	330	328	346	325	319	327	327	312	316	321	321	310	311	312	321	314	329	287			
12	288	276	281	289	283	303	314	315	313	323	331	318	304	299	313	316	323	A	A	291	310	312	291	291			
13	296	288	284	294	298	300	316	320	313	332	327	309	314	324	293	320	311	312	295	283	303	299	306	306			
14	286	288	292	277	274	282	314	323	338	326	291	317	307	312	319	311	310	305	297	295	312	303	298	297			
15	R	295	275	250	277	288	313	307	310	260	306	B	310	302	302	303	307	303	297	302	290	296	295	289			
16	275	281	281	290	288	319	R	320	R	315	315	300	296	U Y	U R	319	319	294	302	R	319	306	307	302	292	293	292
17	294	301	285	282	292	292	U R	Y	A	C	C	C	C	C	C	C	C	C	320	333	314	314	J R	R	281		
18	281	286	313	287	273	303	310	283	302	C	C	C	C	R	R	R	283	292	308	291	314	284	269	291	273		
19	281	291	281	269	276	277	305	A	285	304	251	291	A	A	A	303	300	310	299	292	296	303	R	R	270		
20	274	274	283	290	270	286	283	257	277	276	275	240	277	287	283	299	295	A	303	289	295	294	291	285	277		
21	281	277	278	285	297	320	306	316	Z	U Y	338	323	288	268	302	294	309	303	311	311	309	298	287	289	322	295	
22	301	288	290	285	293	295	296	295	R	R	J R	333	332	325	313	326	294	302	300	314	316	A	293	312	312	303	
23	279	302	304	289	284	265	300	314	R	A	302	299	272	299	286	281	302	304	322	315	283	281	271	271			
24	287	295	299	285	291	276	312	319	U R	346	313	315	305	296	316	313	313	R	R	313	300	301	309	316	308	306	302
25	291	285	289	284	294	273	313	329	R	A	A	A	A	275	272	285	279	R	A	292	297	307	280	285	283		
26	284	286	283	278	270	321	328	294	A	G	G	R	282	G	259	285	257	275	A	284	283	302	293	294	308		
27	284	F	F	272	271	285	278	303	296	286	240	U R	A	G	A	282	269	277	300	290	291	311	289	285	273	275	
28	274	305	282	295	299	276	255	306	284	304	259	U R	313	287	278	271	283	283	298	298	288	293	285	287	288		
29	299	304	F	293	279	291	298	306	318	301	297	268	304	288	287	289	278	R	290	317	312	309	287	282	282	297	
30	F	F	F	295	294	323	303	327	331	308	314	296	311	298	287	310	299	320	313	313	311	303	309	301	307		
31	304	305	304	292	296	329	332	301	318	326	336	301	303	286	289	315	A	307	306	303	307	319	312	311			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	31	31	31	31	31	31	31	27	25	24	24	26	25	28	28	30	28	27	29	30	31	31	31	31			
MED	286	287	283	285	290	298	314	316	313	310	310	304	304	304	301	306	311	311	306	305	302	297	296	291			
U Q	294	295	295	290	295	308	327	328	327	326	328	318	314	318	313	316	322	318	314	314	310	312	306	300			
L Q	279	279	281	279	283	286	305	301	286	301	286	291	288	287	288	293	300	303	296	295	290	289	287	284			

MAY 2013 M(3000)F2 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

MAY 2013 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23																		
1								L	U	L	L	A		U	L		L	L	L																							
2					L	L	U	L	L	U	R	A	A	3	7	9	3	6	4	3	6	7	3	7	5		L	L	L	L	3	8	6									
3								L	L	U	L	L	L	L	L	L	U	L	U	L	L																					
4							L	L	A	L	L	L	L	L	L	U	L	L	L	L	L	L																				
5							L	L	L	L	U	L		U	L	L	A																									
6							L	L	L	L	U	L	L	L	U	L	Y	L	L	L	L																					
7							U	L	A	A	A	A	A	A	A	A		A	A	A																						
8					U	L	L	U	L	A	A	A	A	A	A	A		U	L	L	L	L																				
9							L	A		A	A	R	L	U	L	L	L	L	U	L	L																					
10					L	U	L	L	U	L	A	B	L	L	U	L	L	L	L	L	L																					
11					L	L	U	L	U	L	L	L	L	L	L	L	L	L	L	L	L	L																				
12					L	L	A	A	A	A	L	L	L	L	A	A	L	L	L	A	A																					
13							L	L	A		L	L	L	B	Y	U	L	L	L	A	L	A																				
14					L	L	U	L	L	A	U	L	L	Y	L	L	L	U	L	U	L	L																				
15					U	L	L	L	L	L	A	B	L	L	U	L	L	L	L	L	L																					
16							L	L	L	L	L	L	L	L	L	L	A	A	L	L	L																					
17							U	L	U	L	A	C	C	C	C	C	C	C	C	L	A																					
18							L	L	L	A	C	C	C	C	R					L	L																					
19					L	L	A	A	A	A	A	A	A	A	A	A	A	U	L	U	L	A																				
20							L		A		U	R	L	L	Y	L	A	A	A	A	L																					
21								L	L	L	L	H	L	L	Y	L	A	A	L	L	L	A																				
22							U	L	L	L	H	L	L	U	L	A	L	L	L	L	L	A																				
23					U	A	L	L	A	A	A	A	A	A	A	A	A	A	A	A	A																					
24							L	L	L	L	A	A	A	U	L	L	L	U	R	U	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L		
25							L	L	L	A	A	A	A	3	9	7	3	8	4	3	5	2																				
26					A			L	A	A	A	A	A	A	A	A	A	A	A	A	A																					
27							L	A	A	A	A	A	A	A	R					L	L																					
28							L		A	A	A	A	L	U	R	R				L	L																					
29							L	L	L	A	A	A	A	3	8	9	3	9	0	3	7	7	3	6	5	3	5	1	3	5	0											
30							L	L	L	A	L	A	L	L	L	L	L	L	L	L	L	L																				
31							L	L	L	A	L	H	L	L	A	A	A	A	A	A	A																					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23																		
CNT					1	7	15	16	14	17	15	17	21	23	25	21	20	8	4																							
MED					U	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L		
U Q					3	5	5	3	6	7	3	6	8	3	8	2	3	7	8	3	7	2	3	6	4	3	5	8	3	6	4	3	6	8								
L Q					3	2	2	4	8	3	4	7	3	6	2	3	5	8	3	6	2	3	6	6	3	5	2	3	5	4	3	4	6	3	4	2	3	4	4	3	3	6

MAY 2013 M(3000)F1 (0.01)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

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MAY 2013 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1								294	294	294	300	300	300	316	318	318	298	292						
2					284	288	288	288	472	404	330	408	354	332	310	282	280	284	L	252				
3								276	270	326	326	326	326	302	314	284	254	264						
4							258	258	258	274	286	300	L	352	332	312	298	288	286	280				
5							260	260	270	284	284		302	308	308	308		286						
6							230	242	242	246	298	298	304	300	300	286	284	284	284					
7							314		A	A	A	E	A	400	424	408	374	362	338	336	306			A
8						312	304	284	430	A	A	A	A	A	A		372	352	348	314	298			
9							286	308	Y	E	A	336	328	346	346	346	320	306	294	272				
10						304	272	286	L	292	338	B	336	366	316	320	320	296	284	274				
11						276	272	272		262	276	284	284	294	304	304	292	292	292	266				
12						276	272	288	A	312	284	286	298	350	340	L	A	316	282					
13							282	280	280	280	282	306	340	320	320	320	310	296	296					
14						310	300	290	280	310	368	342	334	324	316	316	300	300	292					
15					322	310	310	350	E	A	504	318	B	348	354	360	322	322	312					
16						278	286	270	E	A	272	282	378	378	340	338	338	334	320	282	282			
17						266	280	374	E	A	C	C	C	C	C	C	C	C	290	282				
18						304	276	354	318	C	C	C	C		368	326	332	332	268	268				
19					326	334	320	A	394	342	A	E	A	406	A	330	330	324	330	330	330			A
20						334	336	430	Y	E	A	430	430	562	Y	436	416	440	346	E	A	386	338	322
21							286	286	286	286	432	330	358	328	328	302	302							
22						302	324	298	290	304	312	312	312	338	312	312	298	294						A
23						334	300	300	A	A	350	364	416	378	378	378	310	310						
24						310	286	286	286	316	320	364	330	328	328	310	292	298						
25						362	306	306	494	A	A	A	406	406	362	374	346	A	A	276				
26					A		302	372	A	G	G	442	G	508	402	488	386	A	E	A	354			
27						310	310	324	384	604	Y	A	G	A	416	454	382	358	356	308				
28						370	L	456	346	362	348	396	L	340	424	476	452	402	278	316	288			
29							294	294	E	A	372	372	474	366	Y	374	374	394	394	392	318	290		
30						296	L	260	266	286	310	332	298	332	392	326	326	308	264	264				
31							262	268	314	300	280	330	330	344	A	344	320	A	266	284				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT					3	16	28	29	27	25	24	25	26	29	30	30	28	28	22					
MED					322	310	291	288	292	302	322	335	347	340	329	323	310	292	285					
U Q					326	334	308	316	374	360	373	407	374	376	362	346	334	311	298					
L Q					284	292	272	274	280	284	286	303	330	318	318	312	293	284	276					

MAY 2013 h'F2 (KM)

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IONOSPHERIC DATA STATION Wakkanai

MAY 2013 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	274	274	280	280	278	258	238	238	234	AE A 252	AE A 252	AE A 252	A	248	248	246	246	242	240	266	242	258	258	
2	306	306	306	278	282	256	248	244	244	284	A	A	230	220	220	220	220	220	246	264	264	264	264	
3	280	288	302	292	276	236	232	220	220	E A 238	232	234	234	228	228	222	222	224	242	242	242	242	242	
4	268	278	278	278	278	238	234	234	A	202	202	202	220	220	220	H 210	210	224	240	242	242	258	258	
5	284	284	276	276	276	248	A 248	A 246	A 244	A 242	E Y 242	E Y 284	Y 242	218	E A 256	A 256	E A 254	A 254	252	224	236	260	270	
6	344	320	284	270	270	238	232	230	224	A 224	A 224	A 218	218	218	E Y 252	220	220	220	236	244	244	240	256	
7	280	280	272	266	252	252	252	A	A	A	A	A	A	A	252	234	A	A	A	A	A	234	234	
8	260	276	282	286	292	288	252	E A 272	A	A	A	A	A	A	A	E A 272	E A 266	E A 264	E A 264	286	286	286	E A 310	
9	272	272	272	272	272	264	240	A	240	A	AE A 240	AE A 240	240	228	228	216	216	216	238	238	258	258	258	
10	268	268	268	246	258	232	232	226	E A 226	A	B	Y 238	238	216	216	222	222	224	242	242	242	236	236	
11	302	284	284	284	284	258	226	224	A 224	A 222	A 220	210	210	210	E A 204	E A 204	212	214	A 238	238	238	238	230	
12	276	276	278	278	268	254	252	A	A	A	208	196	196	E A 242	E A 242	224	224	A	A	256	256	248	248	
13	264	270	270	266	238	238	238	A 250	AE A 250	A 214	A 214	B	214	E A 258	E A 226	226	226	A	284	272	272	268	260	
14	260	A 304	284	284	270	270	236	AE A 244	AE A 244	A 228	A 228	B	Y 226	Y 270	Y 232	232	234	238	A 290	278	270	270	270	
15	268	252	272	272	284	262	226	204	A 204	202	B 202	E Y 252	238	224	224	224	224	224	250	250	264	266	258	
16	284	290	270	266	278	254	230	230	222	210	210	210	220	220	A	A	220	222	230	238	256	280	276	
17	274	262	262	264	242	242	230	A 236	A	C	C	C	C	C	C	C	C	E A 266	A	A	298	298	A	
18	312	292	242	242	242	248	246	A 246	A	C	C	C	C	E A 292	E A 232	232	232	232	254	254	294	286	286	
19	266	266	266	282	282	272	A	A	A	A	A	A	A	272	A	A	234	234	A	276	276	264	264	
20	276	286	286	286	282	240	228	A 246	A	224	224	AE A 252	AE A 272	258	Y	A	A	A	A	280	A 306	A 332	288	
21	A 342	A 342	A 324	A 324	282	262	262	210	210	210	210	192	H 208	242	Y	242	A	A	A 250	A 262	262	272	272	
22	270	278	278	264	254	240	240	E A 280	H 204	A 182	A	A	248	A	244	212	H 212	A	A	A	278	278	278	
23	280	280	258	258	266	266	252	252	A	A	A	A	216	216	222	A	E B 276	A	A	276	244	266	282	
24	288	278	260	260	260	232	232	232	232	A	A	204	204	240	218	218	E A 238	E A 268	A 232	A 244	250	246	246	
25	252	254	254	254	254	E A 324	A 224	AE A 224	A	A	A	A	224	204	E A 282	A	A	A	A	280	270	270	244	
26	244	250	268	304	A 274	A 236	A 262	A	A	238	238	238	A	A	A	Y	250	A	A	292	292	258	258	
27	310	296	296	296	296	272	A	A	A	A	234	A	206	232	232	232	232	232	232	266	266	278	290	
28	290	260	260	260	260	254	234	234	234	224	198	192	192	192	192	192	200	200	A 258	276	260	272	272	
29	256	256	256	256	256	238	262	A	AE A 272	AE A 480	A	A	180	200	200	200	200	226	226	238	250	250	270	
30	242	244	244	244	244	220	224	AE A 246	AE A 234	A	214	214	214	214	214	214	A	A	A	214	242	242	242	
31	284	278	278	264	264	250	228	216	H 194	H 194	H 184	H 184	184	A	202	E A 252	A	A	AE A 262	262	262	252	252	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	30	31	29	25	16	19	17	20	21	24	23	23	25	22	22	29	29	31	30	31
MED	276	278	272	272	270	253	236	232	224	219	212	210	221	219	223	223	222	226	242	252	264	264	264	262
U Q	288	288	284	284	282	264	248	246	A 237	AE A 246	AE A 230	AE A 238	241	235	E 252	238	E 240	234	254	278	274	276	276	272
L Q	266	266	262	260	256	238	230	224	215	210	203	203	209	215	216	214	215	222	236	242	245	242	252	252

MAY 2013 h'F (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

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MAY 2013 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					B	128	128	122	122	120	118	B			114	114	114	114	A					
2					B	114	116	116	116	114	114	114	114	114	110	110	116	116	116	B				
3					B	136	118	112	112	110	108	108	106				120	120						
4					B	120	120	118	108	108	108	108	A	108	108	108	110	110	110					
5					B	120	118	118	110	110	114	114	112	110	108		A	A	A					
6					B	128	120	112	106	106	106	106			108		A	112	112	112				
7					B	112	112	112	112	112		A	A	112		A	A	112	112	A				
8					B	112	112	112	112	108	108	A	A	A	A	A		108	108	108	A			
9					B	112	112	112	112	112	104		A	A	A		104	116	116	130				
10					B	130	110	110	110	110		B	110	110	110	110	110	110	110	B				
11					B	120	116	106	106	106	106	106	106		106	106		106	106					
12					B	106	106	106	106	106		A	112	114		112	112	112	112	112	B			
13					B	122	122	122	112	112		A		B	A		112		112	112	B			
14					B	112	112	112	108	108			B	A	A	A		112	114	114	116	B		
15					B	110	110	110	110	110	108		B		108	108	108	108	108					
16						112	112	112	110	110	108	108	108	108	108			A						
17					B		118	118	114		C	C	C	C	C	C	C	C		A	B			
18					A	114	114	114	112		C	C	C	C	A	A	A		114	114				
19					B	114	112	112	112	112	112	112		A	A		A		112	114	114			
20						128	120	112	112	110	110			110	110	110	110	110	110	B				
21					A		112	110	110	110	110	110	110	110	110	110	110	112						
22					B	112	112	106	106	106	106	106		A		106	106	106	106	106	A			
23					B	102	102	102	102	102		A	A	A		A	A		116	116	116	B		
24					B	116	116	110	110		110		110		110		A		110	110	110	A		
25					B	118	118	108	108	108	108		108	108	108	108	108	108	108	B				
26					A	108	108	108	108	108	108	108	108	108	108	108	108	108	108	A				
27					B	114	114	114	114	114		A	114	112		112	112	112	112	112				
28						112	112	112	110	110	96	96	96	96	96	96	96	96	96	100	A			
29						138	138	108	108	108	108	108	108	108	108	108	110	110	110					
30					E B	156	138	110	110	110	112	110		A	110	110	110		A	A	A			
31					B	112	110	110	110	110	110	110	104	104	104	104	104	104	104					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT					2	29	31	31	31	28	22	17	17	14	21	20	24	28	24					
MED					147	114	112	112	110	110	108	108	110	108	108	109	110	112	110					
U Q						125	118	114	112	112	110	112	112	110	110	111	113	114	113					
L Q						112	110	110	108	108	108	107	107	108	108	107	108	108	108					

MAY 2013 h'E (KM)

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MAY 2013 h'Es (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	B	B	102	102	G	130	130	124	122	120	120	120	120	114	114	114	114	114	B	B	B	B	B
2	B	B	B	114	100	G	132	122	122	122	122	116	116	184	G	G	104	104	G	B	B	B	120	120
3	120	90	B	128	134	134	134	134	128	128	G	118	118	104	104	104	102	124	124	88	88	88	B	88
4	88	88	B	B	B	134	134	126	112	128	126	G	106	106	106	106	164	132	G	122	112	126	112	108
5	106	104	100	100	B	130	130	130	116	118	G	118	G	118	114	108	108	108	114	114	B	110	B	110
6	108	108	106	106	106	120	120	120	120	116	112	110	110	110	104	104	104	112	112	112	112	B	B	104
7	102	102	B	B	B	118	118	118	120	120	112	110	110	110	110	110	110	110	110	108	108	108	108	124
8	B	B	B	B	B	146	134	132	130	126	118	114	114	112	110	110	110	110	164	118	118	118	114	102
9	94	94	94	110	106	126	124	124	124	114	114	112	104	104	104	104	104	112	112	112	112	B	112	112
10	108	104	98	98	B	100	132	132	124	114	B	G	G	G	G	210	100	152	142	130	122	116	106	106
11	104	104	104	100	140	140	136	126	122	122	G	G	G	110	106	124	90	126	126	122	108	B	B	B
12	B	B	B	100	96	128	122	118	112	114	114	112	114	102	102	204	168	116	118	100	148	104	B	B
13	B	100	100	B	B	128	128	128	118	118	118	118	B	118	106	106	106	118	118	114	114	114	106	106
14	106	106	104	102	102	136	122	114	112	112	112	B	112	108	104	104	160	156	128	108	108	108	108	108
15	B	106	106	106	B	138	132	130	118	110	110	B	110	110	110	200	158	152	142	124	122	B	B	B
16	110	100	94	94	92	136	136	128	120	120	120	120	112	108	108	104	104	104	110	110	110	110	110	110
17	102	B	B	102	B	126	126	120	120	C	C	C	C	C	C	C	C	102	102	114	114	110	110	110
18	110	100	100	100	100	116	120	120	114	C	C	C	C	106	106	106	106	106	112	112	112	112	112	106
19	102	102	102	102	B	122	122	122	122	114	114	110	108	108	108	108	122	122	122	120	120	120	108	108
20	102	B	102	102	116	116	116	116	112	112	112	112	112	128	124	124	120	120	120	114	110	110	110	110
21	106	106	102	102	102	102	102	112	144	134	116	116	G	G	200	132	130	118	118	108	108	108	108	108
22	114	100	100	100	B	134	122	120	120	120	118	106	106	106	106	118	120	120	120	120	116	108	108	108
23	110	110	B	110	98	G	138	122	120	106	106	106	106	106	106	128	128	128	128	126	114	110	110	104
24	104	B	B	B	B	112	112	112	112	112	112	112	112	112	112	180	118	118	118	108	108	B	108	108
25	106	106	106	B	B	122	122	122	122	116	112	112	112	112	112	134	128	120	120	120	120	120	120	120
26	104	104	120	114	114	114	114	114	114	124	124	124	124	124	124	124	124	114	114	108	108	108	108	108
27	98	98	B	B	118	118	118	118	120	120	114	114	106	106	106	106	106	142	140	124	106	106	106	106
28	106	B	124	124	124	124	124	124	124	122	114	114	G	G	198	G	G	230	120	120	114	114	110	110
29	B	B	B	B	G	138	126	126	116	116	116	116	116	112	112	112	G	G	128	128	124	124	106	106
30	B	B	104	104	104	104	112	112	112	112	112	112	G	G	G	112	110	108	134	114	114	B	114	112
31	104	104	B	B	G	136	136	112	112	112	112	112	112	120	120	120	120	120	120	120	116	B	B	116
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	23	21	18	22	17	29	30	31	31	29	25	24	22	26	28	28	28	31	29	29	28	21	23	26
MED	106	104	102	102	104	126	124	122	120	118	114	113	112	110	108	111	116	118	120	114	113	110	110	108
U Q	108	106	106	110	117	135	132	128	122	122	118	117	114	118	117	124	126	128	128	121	116	114	112	110
L Q	102	100	100	100	100	117	120	118	114	113	112	112	108	106	106	106	106	110	114	109	108	108	108	106

MAY 2013 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Wakkanai

MAY 2013 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1				F2	L1		H1	H1	C1	C1	C1	C1	C1	C1	C1	C1	C1	C2	C2					
2				F1	L1	C1		C1	C1	C1	C1	C1	C1	H1			L1	L1					F1	F2
3	F1	F1		F1	C1	CL11	CL11	CL11	C1	C1		C1	C1	L1	L1	L1	L1	C1	C1	F2	F1	F1		F2
4	F1	F1				C1	C1	C2	C1	C1		C1		L1	L1	L1	H1	H1		F2	F5	FF14	F2	F1
5	FF11	F1	F1	F1		C2	C1	C1	C1	C1		C1		C1	C1	C2	C2	L1	L3	F1		F3		F1
6	F3	F4	F3	F1	L2	L2	C1	C1	C1	C1	C1	C1	C1	C1	L1	L1	L2	C6	C6	H6	F1			F2
7	F2	F1				C1	C1	C2	C2	C2	C1	C1	C2	C2	C1	C1	CL22	CL22	CL43	FF22	F4	F2	F5	F1
8						H1	CL11	C2	C2	C2	C2	C2	C2	C3	C2	C1	C2	C3	H1	L6	FF24	FQ41	F6	F8
9	F1	F2	F1	F1	L1	C1	C1	C1	C1	C2	C1	C1	C1	C1	L1	L1	L1	L1	L2	F31	FF31		F1	F3
10	F1	F1	F2	F1		L1	H1	HL11	C1	C1					HL11	L1	HL11	CL11	C1	F3	FF11			F1
11	F1	F2	F2	F2	C1	C2	C2	C2	C2	CL11				L2	L2	C1	LC31	C2	C3	C3	F3			
12				F1	L1	C1	C2	C2	C4	C2	C1	L1	L1	L2	L3	HL11	HL11	C3	C4	LQ31	F1		F2	
13		F2	F1			C1	C1	C2	C1	C2	C1	L1		L1	L2	C1	C1	CL11	C3	L5	F3	FQ41	F4	F2
14	F1	F4	F3	F2	L1	H1	C2	C2	C2	C1	C1		L1	L1	L1	L1	HL11	HL11	C2	L3	F3	F3	F3	F3
15		F1	F2	F1		C1	C2	C1	C2	C2	C1		L1	L1	L1	HL11	HL11	HL11	C2	FF11				
16	F1	F5	F1	F1	L2	HL11	C1	C1	C2	C1	C1	C1	C1	C2	L3	L2	L3	CL12	L4	F3	F3	F2	F2	F2
17	F1			F1		CL21	C1	C1	C2									LQ21	L2	CL33	FF53	F3	F1	F4
18	FQ21	F4	F4	F3	L2	CL22	CL22	CL21	C2					C1	L1	L2	L2	L2	C1	F4	FQ41	FQ41	F3	F3
19	F1	F1	F2	F1		C1	C2	C3	C2	C2	C2	C2	C2	C1	C2	C2	C1	C1	CL32	L3	F4	FQ31	FQ21	F2
20	F2		F1	F2	L1	L2	C1	C2	C2	C1	C1	C1	C1	CL11	C2	C1	C2	C2	C4	L3	F3	F8	F3	F3
21	F4	F4	F4	FQ31	L3	L3	C2	C2	HC11	CL11	C1	C1			H1	H1	C2	C2	C3	L4	FQ51	FQ21	FQ31	F2
22	FF13	F4	F1	F3		H1	C2	C2	C1	C1	C2	C1	C1	C2	C1	C1	C1	C3	C3	C5	F6	F3	F4	F2
23	F1	F2		F1	L1		C1	C1	C2	C2	C1	C1	C2	C1	CQ21	CL22	CL22	CL22	CL52	C3	F5	F4	F3	F2
24	F1					C1	CL21	C2	C1	C2	C1	C1	C1	C1	C1	C1	HL11	C1	C2	C3	F3		F2	F4
25	F1	F1	F1			CL21	CL21	C1	C1	C3	C3	C2	CL11	CL11	C1	C2	C2	C2	C3	L4	FF21	FF21	F2	
26	F3	F1	F1	F3	L4	C2	C2	C1	C2	C1	C2	C1	C1	C1	C1	C2	C3	CL42	CL42	C6	F1	F2	F2	F2
27	F4	F2				C2	C2	C2	C2	C2	C1	C1	C2	C1	L1	L1	L1	HL12	CL21	C2	F6	F4	F1	F2
28	F1		F2	F1	C2	C2	C2	C2	C1	C1	C1	C1			H1			H1	C2	C4	F4	F3	F3	F2
29						CL21	C2	C2	C2	C1	C1	C1	C1	C1	C1	C1		H1	C1	C3	F2	F2	FF11	F3
30			F1	F1	L1	L2	C2	C2	C1	C2	C1	C1			L1	L2	L3	CL22	L2	F5		F2		F1
31	F2	F1				H1	H1	CL11	C1	C1	C1	C1	C1	C1	C1	C1	C2	C2	C3	FF31	F5			F1
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

IONOSPHERIC DATA STATION Kokubunji

MAY 2013 f_{XI} (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

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

MAY 2013 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2013 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	81	77	68	68	67	80	72	68	75	83	92	96	94	104	106	110	112	108	106	100 ^V	94	94	84	86
2	82	86	86	94	81	65	77	83	83	86	97	95	100	107	103	100	99	92	90	85	81	74	76	75
3	74	75	76	66	60	68	78	75	84	72	83	90	97	102	97	103	105	107	98	93	82	77	71	74
4	74	70	72	70	65	75	84	80	79	80	85	96	100	98	98	98	102	109	108	93	88	85	84	78
5	76	72	72	65	60	65	82	100	107	96	89	94	92	93	102	102	100	106	106	96	77	69	70	70
6	70	69	70	69	66	74	83	84	82	84	85	101	106	108	108	103	102	103	^A	^A	87	82	82	84
7	82	80	78	60	59	64	75	84	80	^A	76	86	88	95	96	93	88	84	89	93	84	75	68	63
8	60	63	^F	^F	^F	^F	69	61	^A	^A	^A	^A	74	81	92	99	94	84	82	82	78	69	70	71
9	72	70	62	56	55	65	70	73	78	84	86	85	85	86	94	96	93	96	90	86	81	79	80	80
10	78	72	69	67	66	73	85	79	73	69	78	92	100	98	96	95	92	94	95	96	94	86	88	88
11	80	78	76	66	67	75	86	79	74	77	87	95	97	96	88	94	95	90	101	110	107	82	76	76
12	76	76	73	70	68	82	85	80	83	^A	89	91	90	91	98	96	96	92	96	97	90	85	85	86
13	87	82	74	72	74	80	87	^A	85	76	76	83	90	95	98	100	97	96	96	98	94	93	88	83
14	^F	^F	^F	^F	^F	80	90	90	82	76	82	89	99	103	99	98	91	88	91	90	88	88	87	87
15	87	85	82	72	73	71	75	66	75	76	77	^B	82	84	80	77	74	72	^A	^A	80	78	^F	81
16	77	80	80	74	70	80	94	80	79	75	86	93	99	106	104	102	102	99	95	78	78	77	80	79 ^F
17	78	69	66	64	60	62	78	91	92	84	86	98	102	90	95	102	101	101	92	88	84	80	78	^F
18	^F	^F	^F	^A	^F	62	^A	84	^A	^A	92	108	118	114	120	110	108	107	91	86	80	^F	^F	72
19	^F	^F	^F	65	58	59	70	74	66	69	73	82	82	97	92	95	91	91	94	96	88	84	86	88
20	80	79	^F	^F	^F	69	71	65	62	^A	^A	64	^A	66	64	67	66	65	66	67	70	71	71	67 ^F
21	72	68	^F	65	61	66	73	83	72	72	75	78	82	88	93	98	92	81	80	86	88	86	76	^F
22	^F	76	72	63	64	71	82	83	93	99	97	89	89	90	93	92	89	83	86	90	89	89	91	84
23	78	74	72	70	68	78	88	81	84	86	84	80	^A	91	93	93	101	96	84	71	70	71	^A	72 ^F
24	^F	^F	72	61	60	66	87	98	81	75	72	76	78	86	92	92	96	100	102	98	93	92	90	^F
25	84	81	79	78	66	68	65	60	58	61	65	64	^A	72	81	76	82	89	89	79	78	70	70	72
26	70	66	58	59	54	64	75	62	^A	^A	^A	66	62	^A	71	78	70	^A	74	80	80	78	73	73
27	70	66	62	59	58	76	86	86	73	67	69	66	65	66	74	80	84	87	84	81	75	72	73	70
28	73	79	82	65	53	^A	62	73	62	61	63	63	60	62	65	76	72	70	70	70	76	75	77	71
29	72	71	64	63	64	69	80	66	73	72	67	65	^A	68	71	75	75	72	73	69	71	71	70	66
30	68	68	65	59	60	67	78	76	^A	69	70	65	74	^A	88	96	94	94	94	91	84	77	73	70
31	67	66	64	61	60	60	71	80	90	83	80	76	70	69	^A	88	91	98	99	93	83	77	79	^F
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	26	27	25	27	27	29	30	30	27	25	28	29	27	29	30	31	31	30	29	29	31	30	28	27
MED	76	74	72	65	64	69	78	80	79	76	82	86	90	91	94	96	94	93	91	90	83	78	78	75
U Q	80	79	77	70	67	76	85	84	84	84	86	94	99	100	98	100	101	100	97	96	88	85	84	84
L Q	72	69	66	61	60	65	72	73	73	70	74	71	78	82	88	88	88	84	84	80	78	74	72	71

MAY 2013 foF2 (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2013 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1									A	A	L	L	U	L	L	A	A	A							
2								L		L	L	A	A	U	L	L	A	L							
3									L		U	L	A	A	A	U	L	U	L	L					
4										L	U	L		A	U	L	L	L	L						
5								A	A	A	L	U	L	U	L	U	L	U	L	L	L				
6									A	A	A	A	A	A	A	A	L	A	A	A					
7							A	A	A	A	A	A	A	A	U	L	A	A	A	A					
8								A	A	A	A	A	A	A	A	A	A	A	L						
9									L	L	U	L	A	U	L	U	L	L	A	A	A				
10									L	U	L	U	L	U	L	U	L	A	A	A	A				
11							A	A	A		L	U	L	U	L	U	L	A	A	A	A				
12							A	A	A	U	L	U	L	L	A		L	A	A	A					
13							A	A	A	A	A	A	U	L	U	L	A	A	A	A					
14							A	A	A	A	A	A	A	U	L	U	L	L	L	A					
15							L	L	A	A		B	A	A	A	U	L	L	A	A					
16							L	A		A	A	A	U	L	U	L	L	A	A						
17							A	A	A	L	A	U	L	A	A	A	A	A	A						
18							A	A	A	A	L	A	A	U	L	U	L	A	A	A					
19							L	A	A	U	L	A	U	L	U	L	U	L	L	A	A				
20					A	A	A	U	L	A	A	A	A	A	U	L	A	A	A	A					
21							L	A	A	L	U	L	A	A	A	A	A	A	A						
22							L	L	U	L	L	A	U	L	U	L	U	L	A	A					
23									A	U	L	A	A	A	A	A	A	A	A			A			
24							L	L	L	L	U	L	U	L	U	L	A	A	L	L	L	A			
25							L	U	L	U	L	A	A	A	A	A	4	4	4	A	L	L			
26							A	A	A	A	A	A	U	L	A	U	L	A	A	A					
27						L	A	A	A	A	A	U	L	A	U	L	U	L	A	L	L				
28						A	A		A	U	L	A	U	L	U	L	A	A	A	A					
29							A	U	L	A	4	3	2	5	0	4	4	8	8	A	L	A			
30							L	A	A	U	L	5	3	2	4	8	8	5	2	L	L				
31							L	L	A	U	L	A	U	L	U	L	A	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								3	3	8	8	14	12	16	19	13	2								
MED								U	L	U	L	U	L	U	L	U	L	U	L	U	L	U	L	U	L
U Q								5	3	6	5	3	2	5	7	8	5	5	2	5	0	4	4	6	0
L Q								U	L	U	L	U	L	U	L	U	L	U	L	U	L	U	L	U	L
								4	3	2	4	8	8	5	0	0	2	8	8	4	8	8			

MAY 2013 foF1 (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2013 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						B	A	A	A	A	R	A	A	A	A	A	A	A	A	B				
2						B	R	A	R	R	R	A	A	R	R	A	A	A	A	B				
3						B		A	A	R	A	A	A	A	A	R	R	R	B					
4						B	A	A	A	A	A	A	A	R	A	A	R	R	A					
5						B		A	A	A	A	A	A	A	R	A	A	A	A					
6						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
7						B	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
8						B	A	A	A	A	A	A	A	A	A	A	A	A	A	B				
9						B	R	A	A	A	A	A	A	A	A	R	A	A	B					
10						B	R	A	A	A	R	R	A	A	A	A	A	A	B					
11						U R	A	A	A	A	R	R	R	R	R		A	A	A					
12						196	B	A	A	A	A	A	R	R	A	A	A	A	B					
13						B	A	A	A	A	A	A	A	A	A	A	A	A	B					
14						B	A	A	A	A	A	A	A	A	A	A	R	A	B					
15						B	A	A	A	A	R	B	A	A	A	A	A	A	A					
16						B	A	A		A	A	A	A	R	A	A	A	A	A					
17						B	A	A	A	A	A	A	A	A	A	A	A	A	B					
18						A	A	A	A	A	A	A	A	A	A	A	A	A	B					
19							A	A	A	A	A	A	A	A	R	R	R	A	A					
20						172	B	A	A	A	A	A	A	A	A	A	A	A	B					
21						B	A	A	A	A	A	A	A	A	A	A	A	A	A					
22						B	A	A	A	A	A	A	R	A	R	R	A	A	B					
23						B	A	A	A	A	A	A	A	A	A	A	A	A	B			A		
24						U R	A	R	A	A	A	A	A	A	A	A	A	A	A					
25						200	B	A	R	R	A	A	A	U A	A	A	A	A	B					
26							A	A	A	A	A	A	A	A	A	A	A	A	A					
27							A	A	A	A	A	A	A	A	A	A	A	A	U A					
28							A	A	A	A	A	A	R	A	A	A	R	A	A					
29							B	A	A	A	A	A	A	A	A	A	A	A	A					
30						U A	A	A	A	A	A	A	A	A	A	A	A	R	A					
31						192	B	A	A	A	A	A	R	R	A	A	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						4	2							1		1			1					
MED						U	194	262						U A		336			U A					
U Q						U R	198																	
L Q						182																		

MAY 2013 foE (0.01MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2013 foEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1	J A		E B E B E B			20	J A J A J A	J A J A	J A	J A	G		47	46	45	44	J A J A J A	J A J A J A	J A J A J A	J A J A J A	E B E B E B	E B E B E B	E B E B E B	E B E B E B			
2	E B	15	22	E B E B E B	E B E B E B	16	G	36	G	G	G	J A J A J A	J A J A J A	G	G	J A	69	38	29	26	E B E B E B	E B E B E B	J A J A J A	J A J A J A			
3		22	23	E B E B E B	E B E B E B	15		32	38	41	G	J A J A J A	J A J A J A	J A J A J A	46		G	G	J A J A J A	J A J A J A	E B E B E B	J A J A J A	J A J A J A	J A J A J A			
4	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	30	19	32	37	J A	45	43	44	42	57	J A	45	40		G	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A		
5		20	20	E B E B E B	E B E B E B	15	20	33	J A J A J A	J A J A J A	48	48	44	44	47	G		J A		J A	E B E B E B	E B E B E B	J A J A J A	J A J A J A	J A J A J A		
6	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	E B	21	36	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A		
7	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	E B	40	66	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A		
8	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	E B	14	46	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A		
9	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	E B	21	G	37	42	43	47	51	50	46	44		G	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A		
10	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	E B		G	37	40	44		G	G		J A	59	65	67	67	36	30	32	20	19		
11	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B		G	33	J A J A J A	J A J A J A	J A J A J A		G	G	G	G		J A	53	61	45	38	39	36	28	29	18
12		22	21	E B E B E B	E B E B E B	15	22	34	J A J A J A	J A J A J A	J A J A J A		G	G		50	45	76	85	75	43	31	24	50	32	30	
13	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A	23	34	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
14	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A	23	57	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
15	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	E B	14	23	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
16	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	E B	23	32	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
17	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A	32	50	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
18	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A	23	87	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
19	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	E B	14	21	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
20	E B	16	22	E B E B E B	E B E B E B	J A	52	96	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
21	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A	22	34	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
22	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A	38	31	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
23	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A	22	35	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
24	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A	G	32	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
25		18	20	E B J A E B	J A E B J A	J A	27	33	G	G	46	66	63	81	54	59	J A	45	121	36	23	44	23	15	42	103	
26		38	J A J A J A	J A E B J A	J A E B J A	J A	27	36	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
27	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A	25	44	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
28	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A	89	55	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
29	J A	40	21	J A J A J A	J A E B	J A	22	52	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
30	E B J A	15	21	20	22	21	23	34	J A J A J A	J A J A J A	J A	47	48	75	109	63	36	40	22	G	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
31	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	E B	23	33	J A J A J A	J A J A J A	J A	82		G	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31		
MED	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A		
U Q	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A	J A J A J A		
L Q	22	21	E B E B E B	E B E B E B	E B E B E B	21	32	38	45	47	47	47	46	46	44	40	40	36	26	28	24	27	26	23			

MAY 2013 foEs (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

MAY 2013 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23						
1	34	E B	E B	E B	E B	19	48	41	42	49	G	46	44	43	42	47	42	32	22	52	E B	E B	E B	E B						
2	E B	E B	E B	E B	E B	E B	G	36	G	G	G	55	72	G	G	64	36	27	21	E B	E B	15	36	31	29					
3	E B	15	19	E B	E B	E B	19	30	34	37	G	40	56	59	47	44	G	G	G	43	30	E B	15	19	15	17				
4	21	E B	15	18	25	21	18	29	34	38	41	43	40	55	G	42	39	G	G	22	22	19	E B	15	20	15	15			
5	E B	E B	E B	E B	E B	E B	20	30	64	43	46	45	42	44	45	G	37	36	29	24	15	E B	E B	E B	E B	28	22			
6	20	E B	E B	E B	E B	E B	18	32	36	42	46	51	76	62	62	67	36	56	91	A A	A A	A A	A A	22	26	32	E B	15		
7	21	19	E B	E B	E B	E B	20	36	52	65	A A	65	51	52	57	44	67	79	62	75	46	48	45	38	37					
8	25	22	40	35	31	E B	14	43	A A	A A	A A	A A	A A	A A	A A	53	59	58	55	42	26	22	19	18	26	23	32			
9	18	21	27	E B	E B	E B	19	G	34	38	40	44	48	44	43	38	G	40	38	36	24	30	34	18	E B	15				
10	E B	E B	E B	E B	E B	E B	G	G	35	38	42	G	G	G	G	39	46	48	50	58	58	55	32	26	19	E B	E B	15		
11	E B	E B	E B	E B	E B	E B	30	46	47	46	G	G	G	G	G	52	58	40	34	31	21	20	17	E B	15					
12	18	E B	E B	E B	E B	E B	21	30	43	70	A A	44	G	G	44	43	39	80	51	38	28	19	20	20	18	E B	15			
13	17	18	17	17	18	18	32	A A	95	64	47	61	48	50	47	40	55	42	34	42	48	19	29	27	E B	15				
14	42	18	18	E B	E B	E B	22	53	46	59	60	67	66	55	44	41	38	32	32	24	16	40	18	25	16	E B	15			
15	16	E B	E B	E B	E B	E B	20	30	38	45	65	G	B	54	54	41	40	38	36	A A	A A	A A	A A	36	34	37	E B	15		
16	E B	E B	E B	E B	E B	E B	19	30	41	54	58	51	50	46	G	41	41	39	49	25	38	26	22	19	18					
17	E B	E B	E B	E B	E B	E B	28	47	73	78	43	58	43	45	61	73	59	56	38	23	22	29	26	39	38					
18	49	68	59	A A	A A	18	21	A A	87	72	A A	A A	A A	A A	46	76	80	42	40	41	66	42	44	36	38	41	E B	19		
19	E B	E B	E B	E B	E B	E B	19	27	45	48	48	58	44	43	42	G	G	G	34	34	20	20	17	24	E B	15				
20	E B	E B	E B	E B	E B	E B	29	61	40	40	A A	A A	A A	A A	A A	44	76	59	42	40	45	38	50	40	30	16	E B	18		
21	18	E B	15	20	E B	18	20	31	40	57	42	44	44	54	46	43	53	38	52	34	40	53	21	19	29					
22	E B	15	18	42	39	27	30	29	34	37	40	54	45	G	44	G	G	43	42	42	55	44	31	34	28					
23	E B	15	26	18	18	17	20	30	38	56	45	63	66	A A	121	72	60	64	51	41	32	30	45	36	A A	89	A A	35		
24	20	26	19	21	17	G	30	28	G	41	45	46	44	42	60	52	62	39	31	40	18	41	34	20	E B	15				
25	E B	E B	E B	E B	E B	E B	20	28	G	42	58	58	81	A A	49	55	41	48	29	22	17	16	15	E B	20	17				
26	34	18	E B	E B	E B	E B	24	32	46	A A	A A	A A	A A	A A	52	43	A A	62	40	38	40	A A	62	40	30	26	18	E B	E B	15
27	E B	15	20	18	18	14	22	35	58	44	60	53	42	55	42	39	37	56	30	22	19	22	15	16	E B	E B	E B	15		
28	29	25	22	30	22	A A	89	44	36	44	42	54	43	G	42	38	64	27	G	37	34	29	28	29	E B	15	35			
29	E B	E B	E B	E B	E B	E B	20	44	40	45	44	46	51	A A	77	54	51	50	50	33	28	28	19	24	18	E B	16			
30	E B	15	18	E B	E B	E B	20	31	39	A A	96	37	42	46	68	A A	109	38	35	35	18	G	G	35	26	23	26	36		
31	29	20	E B	E B	E B	E B	21	32	32	52	43	55	G	G	42	126	66	70	45	34	20	21	28	42	27					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23						
CNT	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31		
MED	16	E B	E B	E B	E B	20	31	40	45	46	51	46	52	46	42	41	42	37	34	30	26	23	20	17						
U Q	21	20	18	18	17	21	36	46	63	A A	60	58	55	62	59	51	55	56	45	42	40	36	31	31	29					
L Q	E B	E B	E B	E B	E B	19	30	35	40	42	43	43	43	42	38	37	36	30	23	19	E B	19	18	16	E B	E B	E B	15		

MAY 2013 fbEs (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2013 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	15	16	16	15	15	16	14	12	20	21	20	22	23	21	20	19	18	14	12	14	14	14	14	14
2	15	15	15	14	14	16	15	14	19	18	18	17	28	22	17	22	17	14	14	14	15	14	14	14
3	15	15	14	16	15	14	14	15	14	16	18	22	22	20	16	15	16	13	15	14	15	15	14	15
4	14	15	15	14	15	14	14	14	16	16	14	18	22	21	19	17	14	14	13	14	15	15	15	15
5	15	15	14	15	15	15	16	12	20	20	20	20	20	19	19	19	17	14	14	15	15	15	14	16
6	15	14	15	15	15	14	12	14	20	18	26	24	26	24	28	17	16	14	14	14	16	14	14	15
7	15	15	14	15	15	15	14	13	19	20	23	25	30	27	22	20	14	14	14	14	14	15	18	15
8	15	15	15	14	13	14	12	13	17	21	23	26	24	22	22	21	16	12	12	14	15	15	15	15
9	14	16	14	14	14	16	12	17	16	23	20	18	16	22	20	21	16	14	14	14	15	16	15	15
10	15	15	16	14	14	15	15	14	16	20	23	20	18	19	17	22	17	14	15	15	14	15	16	15
11	15	14	14	15	15	15	14	14	20	17	19	18	20	20	20	16	19	13	14	14	14	15	15	15
12	15	15	14	15	15	15	15	18	16	20	29	22	23	18	22	18	19	14	13	14	14	15	14	14
13	15	15	14	14	13	15	13	16	18	20	23	19	22	24	26	23	20	12	14	14	14	15	14	15
14	16	14	15	14	15	14	13	12	20	18	22	39	35	22	19	19	16	14	14	15	16	14	14	15
15	14	15	15	14	14	14	12	14	16	18	22	B	28	23	19	18	14	14	14	14	15	14	15	15
16	15	15	15	15	13	15	14	15	13	18	20	20	24	20	19	19	15	14	13	14	15	15	15	14
17	15	15	16	15	14	15	13	16	21	19	22	24	21	24	23	19	16	13	12	14	15	14	15	15
18	15	14	14	14	15	14	13	14	16	23	22	22	25	20	19	21	19	15	14	14	14	14	15	15
19	15	15	16	15	14	14	14	15	15	15	24	23	19	20	24	21	18	16	14	14	15	15	15	15
20	16	16	18	14	15	14	15	17	17	19	20	18	20	20	20	19	18	14	13	14	14	15	15	15
21	14	15	14	15	14	14	13	11	16	20	18	16	17	19	18	16	16	15	12	12	15	14	15	14
22	15	15	14	15	14	14	14	14	16	19	20	24	18	20	19	18	13	11	13	15	14	13	14	14
23	15	15	15	15	15	15	12	14	16	16	22	24	25	22	18	23	18	14	14	14	14	15	15	15
24	15	14	14	15	15	14	14	15	18	14	24	22	21	24	21	25	15	13	14	14	16	16	14	15
25	15	15	15	15	14	14	14	16	15	18	20	20	18	20	25	20	20	14	12	15	14	15	15	15
26	14	14	15	15	15	14	16	14	15	18	22	20	20	21	20	14	17	18	14	15	15	15	14	15
27	15	13	14	15	14	14	12	14	17	22	22	22	20	19	20	17	15	14	14	13	16	15	16	15
28	15	15	14	15	14	14	14	15	18	14	20	18	22	20	17	18	17	14	12	13	14	14	15	15
29	16	15	15	15	14	14	14	13	18	23	18	24	23	24	23	21	17	13	13	14	14	14	15	16
30	15	15	15	16	17	15	15	14	14	18	22	18	21	26	22	20	12	12	12	14	14	14	14	15
31	15	14	15	14	15	15	14	13	13	21	23	26	24	19	24	14	12	15	12	14	14	15	14	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	15	15	15	15	15	14	14	14	16	19	22	22	22	21	20	19	16	14	14	14	15	15	15	15
U Q	15	15	15	15	15	15	14	15	19	20	23	24	24	23	22	21	18	14	14	14	15	15	15	15
L Q	15	14	14	14	14	14	13	13	16	18	20	18	20	20	19	17	15	13	12	14	14	14	14	15

MAY 2013 fmin (0.1MHz)

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IONOSPHERIC DATA STATION Kokubunji

MAY 2013 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

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	288	302	295	290	288	342	349	341	319	301	319	299	283	287	284	293	297	306	299	294 ^V	281	292	275	274		
2	263	269	271	303	318	298	342	309	335	288	300	299	295	303	298	309	318	310	325	303	290	302	276	274		
3	277	289	302	304	280	306	335	328	349	316	286	297	296	305	303	300	305	309	301	316	297	293	276	276		
4	277	281	292	309	289	318	351	337	318	294	315	296	301	295	290	302	294	314	329	306	296	284	292	290		
5	285	291	300	303	276	284	295	310	322	331	290	299	289	278	288	292	292	299	321	319 ^A	312	276	270	279		
6	274	268	289	308	303	340	336	342	316	325	291	291	297	300	297	300	297	306			310	284	278	284		
7	285	293	309	305	285	288	304	312	306		278	289	277	285	293	302	300	286	298	303	310	291	279	290		
8	266	299		F	F	F	F	350	344					292	293	296	308	315	314	304	300	298	279	278	281	
9	293	295	303	285	292	335	331	317	312	301	304	300	291	286	294	300	307	308	311	310	285	286	280	289		
10	287	290	290	300	307	309	331	355	328	314	304	269	292	294	298	301	306	308	304	303	304	287	288	280		
11	272	290	293	290	294	325	349	328	320	303	306	307	301	312	291	303	303	288	293	304	330	310	282	290		
12	278	293	291	295	294	308	343	331	319		310	302	286	292	291	299	297	308	306	306	311	306	265	279		
13	292	292	287	286	292	321	327		346	308	273	288	287	279	284	286	290	294	284	303	301	291	290	283		
14		F	F	F	F		310	330	312	323	299	272	282	288	297	295	299	306	305	304	293	288	280	281	284	
15	287	290	286	276	291	290	322	296	332	292	300			306	307	309	314	310	315			284	264	282		
16	260	276	292	287	283	304	339	340	309	291	290	283	282	291	290	287	295	302	318	317	278	275	285	289		
17	302	291	308	290	292	321	304	315	309	295	258	277	285	275	275	287	286	303	308	298	286	291	269	F		
18		F	F	F	A	F	310		310			262	267	278	270	285	279	278	298	299	293	271	F	F	281	
19		F	F	F		256	269	287	304	322	321	284	285	292	284	302	299	308	299	302	292	296	293	278	278	282
20	273	272		F	F		281	296	278	283			287		287	272	300	309	320	313	297	284	274	269	274	
21	259	265		F	289	302	331	336	335	294	297	302	280	284	291	295	307	305	290	288	288	287	303	268	F	
22		F	298	292	286	290	312	326	290	278	294	295	310	286	276	296	292	303	305	293	293	276	278	280	290	
23	279	278	282	290	285	296	310	325	301	305	290	280		279	292	284	307	324	324	303	269	272		267	F	
24		F	F		325	297	281	283	302	332	324	309	300	303	288	277	293	283	282	291	298	297	298	278	292	
25	286	280	291	320	300	322	325	287	240	256	280	268		281	292	277	278	294	307	295	286	276	271	274		
26	286	298	274	286	270	287	331	325		A	A	A	317	282		280	292	284		A	270	287	282	288	276	273
27	291	282	286	277	275	290	300	331	314	318	295	281	295	274	290	280	293	296	314	307	284	281	277	268		
28	267	276	305	288	288		A	294	313	338	304	311	283	261	284	282	297	296	307	302	288	279	273	281	279	
29	288	302	287	291	295	314	330	285	308	307	291	289		296	306	299	314	307	316	306	285	285	298	283		
30	288	293	291	291	305	340	356	352		A	301	335	270	277		291	296	291	297	313	309	302	294	294	296	
31	290	295	299	301	310	323	305	303	341	320	311	331	305	284		A	283	289	297	311	313	299	278	275	F	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	26	27	25	27	27	29	30	30	27	25	28	29	27	29	30	31	31	30	29	29	31	30	28	27		
MED	285	290	292	290	291	310	330	324	319	301	295	289	288	287	292	299	297	305	304	303	288	284	278	281		
U Q	288	295	301	303	300	322	339	335	328	312	305	300	295	296	296	302	306	308	314	306	301	291	284	289		
L Q	273	278	287	286	283	290	304	310	308	294	286	280	283	279	288	287	291	297	298	294	284	278	275	274		

MAY 2013 M(3000)F2 (0.01)

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MAY 2013 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									A	A	L	L	LU	L	L	A	A	A						
2								L		L	L	A	AU	L	L	A	L							
3									L		UL	A	A	AU	LU	L	L							
4										L	LU	L	AU	L	L	L	L	L						
5								A	A	A	LU	LU	LU	LU	LU	LU	L	L						
6									A	A	A	A	A	A	A	L	A	A	A					
7							A	A	A	A	A	A	A	AU	L	A	A	A	A					
8								A	A	A	A	A	A	A	A	A	A	L						
9									L	L	UL	AU	LU	LU	L	L	A	A	A					
10									L		UL	UL	UL	UL	A	A	A	A						
11								A	A	A	LU	LU	LU	LU	L	A	A	A	A					
12								A	A	AU	LU	L	A		L	A	A	A						
13								A	A	A	A	AU	LU	L	A	A	A	A						
14								A	A	A	A	A	A	U	LU	L	L	L	A					
15							L	L	A	A		B	A	A	A	L	A	A						
16							L	A		A	A	A	368	382	U	LU	L	L	A	A				
17							A	A	A	L	AU	L	A	A	A	A	A	A						
18							A	A	A	A	L	A	AU	LU	L	L	A	A	A					
19							L	A	AU	L	AU	L	U	LU	LU	L	L	A	A					
20					A	A	AU	L	A	A	A	A	A	AU	L	A	A	A						
21							L	A	A	L	UL	L	A	A	A	A	A	A						
22							L	L	LU	LU	L	AU	L	U	L		A	A						
23									AU	L	A	A	A	A	A	A	A	A				A		
24							L	L	L	L	LU	LU	LU	L	A	A	L	L	L	A				
25							L	LU	LU	L	A	A	A	A	A	A	A	L	L					
26							A	A	A	A	A	AU	L	AU	L	351	A	A	A					
27						L	A	A	A	A	AU	L	AU	L	U	L	A	L	L					
28						A	A	390	AU	L	AU	L	U	LU	L	A	A	A						
29							AU	L	A	355	A	A	A	A	A	A	A	L	A					
30							L	A	AU	L	368	410	389	A	A	367	375	359	L	L				
31							L	L	AU	L	A	U	LU	L	A	A	A	A						
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								3	3	8	8	14	12	16	19	13	2							
MED								U	L	U	L	U	L	U	L	U	L	367						
U Q								390	367	378	390	369	376	382	374	368								
L Q								U	L	U	L	U	L	U	L	U	L							
								334	358	359	366	351	356	354	346	353								

MAY 2013 M(3000)F1 (0.01)

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MAY 2013 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									240	284	290	314	306	318	312	302	286	270						
2								298		326	308	316	E A 318	292	300	286	276							
3									252		366	300	310	304	290	314	276							
4										276	292	320	314	306	298	300	300	276						
5								E A 264	258	248	306	304	316	318	314	306	296	288						
6									242	262	E A 264	E A 328	306	296	300	292	286	E A 332	A					
7								252	282	E A 316	A 394	E A 338	346	338	318	E A 306	E A 352	E A 318	E A 328					
8								266		A	A	A	A	E A 352	E A 346	318	300	274	268					
9									294	312	302	308	320	314	322	298	286	276	248					
10									278		338	360	314	310	312	304	284	E A 278	E A 262					
11								E A 244	246	304	314	290	304	290	324	306	288	280	284					
12								246	E A 292	A	312	310	312	320	322	302	E A 340	274	262					
13								A	256	256	E A 396	E A 336	330	340	330	308	306	292	272					
14								240	E A 268	E A 300	E A 366	E A 334	316	310	306	300	298	298	260					
15								274	314	E A 282	E A 366	308	B	326	326	318	306	312	288					
16								256	234	E A 330	326	324	326	318	320	314	294	264	248					
17								276	E A 298	E A 314	E A 322	E A 344	332	326	350	E A 374	E A 318	308	276					
18								A 326	A	A	A	E A 350	E A 374	E A 346	E A 342	E A 320	E A 322	E A 310	264	256				
19								292	276	320	E A 368	E A 356	340	360	314	300	298	308	290	278				
20							E A 302	E A 368	E A 300	E A 374	A	A	394	E A 396	E A 414	E A 356	336	296	E A 308					
21								268	264	E A 308	274	338	380	358	326	330	304	284	E A 288					
22								258	274	328	296	314	286	354	360	326	312	296	282					
23									300	296	E A 338	E A 374	E A 370	E A 320	E A 330	290	258			E A 334				
24								288	252	266	316	332	320	362	354	322	346	322	298	270				
25								272	378	480	474	E A 406	E A 430	A	384	344	358	348	302	266				
26								230	260	A	A	A	336	414	A	390	338	354	A	328				
27								304	284	266	E A 288	E A 326	E A 366	E A 402	E A 376	E A 428	E A 360	E A 348	E A 310	290	274			
28								A	346	298	272	350	E A 334	414	472	402	412	E A 348	316	296	290			
29								268	370	318	316	350	E A 348	A	372	334	336	296	302	266				
30								250	240	A	332	290	E A 438	E A 410	A	328	296	300	282	268				
31								298	260	264	284	324	278	330	384	E A 340	E A 324	E A 306	256					
	00	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	16	23	24	23	28	29	27	29	30	31	31	28	19					1
MED						303	272	265	276	304	U 320	327	323	322	320	305	298	285	267			E A 334		
U Q							290	298	315	330	E A 353	374	358	365	330	336	316	297	284					
L Q							257	252	261	284	308	312	314	312	312	300	286	276	260					

MAY 2013 h'F2 (KM)

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MAY 2013 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	E A E B E B E B E B	304 258 240 262 262	220 220 224	A A	214 240 214 210 220	A A	214 210 220	A A	214 232 244 278	E A E B	254 226 268 290	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B	E B E B E B
2	E B E B E B E B E B E B	288 290 288 254 218	202 212 212 234 214 216	A A	214 210 210	A A	214 210 218 218 228 236	220 226 250 252 258	E A E A E A E A	276 282 294 304	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B
3	E B E A E B	282 286 254 220 232	248 224 216 206 214 216	A A	214 214 212 218 240 240	222 234 248 290	E A E A E A E A	272 282 292 302	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B
4	E A E B E B E B E B E B	298 290 268 266 266	228 218 224 212 194 198 194	A A	210 208 218 218 228 236	220 226 250 252 258	E A E A E A E A	272 282 292 302	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B
5	E B E B E B E B E B E B	268 272 250 226 280	242 224	A A	218 202 206 210 198 204 228 224 244	220 210 228 231 263 244	E A E A E A E A	272 282 292 302	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B	E B E B E B E B
6	E A E B E B E B E B E B	296 308 264 252 224	226 216 214	A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A
7	E A E A	276 268 228 216 246	238	A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A
8	E A E A E A E A E A E A	340 278 322 372 344	240 240	A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A
9	E A E A E A E A E A E A	296 272 272 276 262	222 222 222 218 204 212	A A	220 200 206 212	A A	220 200 206 212	A A	220 200 206 212	A A	220 200 206 212	A A	220 200 206 212	A A	220 200 206 212	A A	220 200 206 212	A A	220 200 206 212	A A	220 200 206 212	A A	220 200 206 212	A A	220 200 206 212
10	E B E B E B E B E B E B	274 256 248 246 246	226 228 216 190 218 194 224	200 244	A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A
11	E B E B E B E B E B E B	278 266 240 240 258	236 216	A A	200 198 206 196 204	A A	206 196 204	A A	206 196 204	A A	206 196 204	A A	206 196 204	A A	206 196 204	A A	206 196 204	A A	206 196 204	A A	206 196 204	A A	206 196 204	A A	206 196 204
12	E A E B E B E B E B E B	288 274 260 252 252	228 208	A A	192 212 190	202 220	A A	202 220	A A	202 220	A A	202 220	A A	202 220	A A	202 220	A A	202 220	A A	202 220	A A	202 220	A A	202 220	A A
13	E A E A E A E A E A E A	264 264 256 280 256	240 226	A A	220 196 236	A A	220 196 236	A A	220 196 236	A A	220 196 236	A A	220 196 236	A A	220 196 236	A A	220 196 236	A A	220 196 236	A A	220 196 236	A A	220 196 236	A A	220 196 236
14	E A E B E B E B E B E B	330 276 266 258 288	246 228	A A	222 224 224 212 230	246 292 258 284 264	A A	222 224 224 212 230	246 292 258 284 264	A A	222 224 224 212 230	246 292 258 284 264	A A	222 224 224 212 230	246 292 258 284 264	A A	222 224 224 212 230	246 292 258 284 264	A A	222 224 224 212 230	246 292 258 284 264	A A	222 224 224 212 230	246 292 258 284 264	A A
15	E A E B E B E B E B E B	264 264 264 264 270	236 220 218	192	A A	192	A A	192	A A	192	A A	192	A A	192	A A	192	A A	192	A A	192	A A	192	A A	192	A A
16	E B E B E B E B E B E B	312 266 246 242 270	244 212	A E A A	260	A A	228 194 222 214 218	252 270 276 278 274	A A	252 270 276 278 274	A A	252 270 276 278 274	A A	252 270 276 278 274	A A	252 270 276 278 274	A A	252 270 276 278 274	A A	252 270 276 278 274	A A	252 270 276 278 274	A A	252 270 276 278 274	
17	E B E B E B E B E B E B	240 226 252 246 258	236	A A	216	236	A A	216	236	A A	216	236	A A	216	236	A A	216	236	A A	216	236	A A	216	236	A A
18	E A E A E A E A E A E A	306 316 248	290 236	A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A
19	E B E B E B E B E B E B	280 298 264 274 278	234 230	A A	A E A A	248	220 220 220 198 214 214	244 240 252 290 276	A A	244 240 252 290 276	A A	244 240 252 290 276	A A	244 240 252 290 276	A A	244 240 252 290 276	A A	244 240 252 290 276	A A	244 240 252 290 276	A A	244 240 252 290 276	A A	244 240 252 290 276	
20	E B E B E B E B E B E B	270 280 248 238 246	A A	A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A
21	E A E B E B E B E B E B	326 298 278 256 244	224 222	A A	210 194 228	248	A A	248	A A	248	A A	248	A A	248	A A	248	A A	248	A A	248	A A	248	A A	248	A A
22	E B E A E B E B E B E B	274 256 286 292 276	240 212 202 206 196	A A	204 204 208 206 216	A A	204 204 208 206 216	A A	204 204 208 206 216	A A	204 204 208 206 216	A A	204 204 208 206 216	A A	204 204 208 206 216	A A	204 204 208 206 216	A A	204 204 208 206 216	A A	204 204 208 206 216	A A	204 204 208 206 216	A A	204 204 208 206 216
23	E B E B E B E B E B E B	266 298 262 268 256	242 226 232	A A	218	A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A
24	E A E A	296 284 234 240 282	238 222 212 212 228 222 218 224	232 204 212	A A	254 268 268 238 238	A A	254 268 268 238 238	A A	254 268 268 238 238	A A	254 268 268 238 238	A A	254 268 268 238 238	A A	254 268 268 238 238	A A	254 268 268 238 238	A A	254 268 268 238 238	A A	254 268 268 238 238	A A	254 268 268 238 238	A A
25	E B E B E B E B E B E B	292 282 252 226 252	244 226 198 206 198	A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A
26	E A E A E B E B E B E B	304 238 308 276 276	232	A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A
27	E B E A E A E A E B	266 278 278 278 290	240	A A	216	212 200 216	A A	212 200 216	A A	212 200 216	A A	212 200 216	A A	212 200 216	A A	212 200 216	A A	212 200 216	A A	212 200 216	A A	212 200 216	A A	212 200 216	A A
28	E A E A E A E A E A E A	324 270 242 250 288	A A	A A	220 244	228 204 206 212	228	204 206 212	228	204 206 212	228	204 206 212	228	204 206 212	228	204 206 212	228	204 206 212	228	204 206 212	228	204 206 212	228	204 206 212	228
29	E B E B E B E B E B E B	258 244 250 262 246	228	A A	230 258	A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A	A A A A A A A A
30	E B E A E B E B E B E B	262 256 238 250 260	236 218	A A	202 202 224	A A	200 206 206 212 228 230	234 224 248 286	A A	234 224 248 286	A A	234 224 248 286	A A	234 224 248 286	A A	234 224 248 286	A A	234 224 248 286	A A	234 224 248 286	A A	234 224 248 286	A A	234 224 248 286	A A
31	E A E A E B E B E B E B	292 270 258 256 242	216 226 192	A A	226	186 186 196	A A	186 186 196	A A	186 186 196	A A	186 186 196	A A	186 186 196	A A	186 186 196	A A	186 186 196	A A	186 186 196	A A	186 186 196	A A	186 186 196	A A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	30	31	29	23	15	10	16	14	15	14	16	22	18	11	11	13	29	30	31	30	31	
MED	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
UQ	288	272	256	255	260	235	222	216	210	211	204	218	210	210	210	217	214	222	239	246	254	258	275	276	
LQ	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
	304	286	268	268	278	240	226	224	234	227	216	228	220	217	224	224	228	228	244	268	284	284	304	296	
	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
	268	264	248	242	246	227	216	212	206	203	194	202	204	198	202	214	212	212	230	234	236	248	258	264	

MAY 2013 h'F (KM)

IONOSPHERIC DATA STATION Kokubunji

MAY 2013 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1						B	116	110		A	A	114		112	114		A	A	A	A	B				
2						B	120	116	112	118	124	118		A	118	124		A	A	A	B				
3						B	112	110	120	118	118		A	A	A	A		116	114	116					
4						B	114	114		A	A	A	A		114	114	112	112	120	116					
5						B	112		A	A	A	A		122		116		A	A	A					
6						B	120	116		A	A	A	A		A	A	A	A	A	A	B				
7						B	114		A	A	A	A	A	A	A	A	A	A	A	A	A				
8						B	114		A	A	A	A	A	A	A	A	A	A	A	A	B				
9						B	114	114	118		A	A	A	A	A	A		A	A	B					
10						B	122		A	114	120	120	120		A	124	122	114		A	A	B			
11						120	114		A	A	A	118	118	118	118	120	116	116		A	A				
12						B	114		A	A	A	A		110	114		118		A	A	A	B			
13						B	120		A	A	A	A	A	A	A	A	A	A	A	B					
14						B	A	A	A	A	A	A	A	A	A	A		124	124						
15						B	116	110	114		A	114		B	A	A	A	A		A	A				
16						B	118		A		A	A	A		120		126	118		A	A				
17						B	120		A	A	A	A	A	A	A	A	A	A	A	B					
18						118	114		A	A	A	A	A	A	A	A	A	A	A	B					
19						116	122	118		A	A	A	A	A	A	120	120	112		A	A				
20						B	A	A	A	A	A	A	A	A	A		A	A	A	B					
21						B	116		A	A	A	A	A	A	A	A		112	114		A	A			
22						B	114		A	A	A	A	A		112		118	120		A	A	B			
23						B	116		A	A	A	A	A	A	A	A	A	A	A	B		A			
24						112	114	116	118		A	A	A	A	A	A	A	A	A	A					
25						B	A		114	116	116		A	A	A	118	118	118		A	A	B			
26						120	120	118		A	A	A	A	A	A	A	A	A	A	A					
27						120			A	A	A	A	A	A	A	A	A	A	A						
28						A	114	114		A	A	A	A		A	A		116	116	116					
29						B	116	116		A	A	A	A	A	A	A	A	A	A	A					
30						118	114		A	A	A	A	A	A	A	A	A	A	A	112	110				
31						B	114		A	A	A	A		112	116		A	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT						7	27	13	7	4	6	5	7	7	10	11	9	5	5						
MED						118	114	114	116	118	118	118	116	118	119	116	116	116	116						
U Q						120	120	116	118	119	120	119	118	120	122	120	117	122	117						
L Q						116	114	112	114	117	114	111	112	114	118	114	113	114	113						

MAY 2013 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2013 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	102	100	B	B	B	136	116	116	110	106	G	110	120	112	106	102	102	102	102	96	B	B	B	B	
2	B	102	B	B	B	B	G	132	G	G	G	114	110	G	G	102	106	108	106	B	B	102	100	98	
3	100	100	B	B	B	148	136	110	116	G	112	108	104	112	110	G	G	G	106	106	B	96	98	102	
4	98	98	98	96	96	138	126	120	104	104	104	104	104	G	128	128	G	106	112	102	102	102	96	96	
5	98	98	B	B	B	134	140	104	110	108	108	106	108	108	G	108	110	108	122	B	B	140	104	104	
6	98	98	98	98	B	124	114	118	104	100	102	100	100	100	106	102	118	102	102	102	104	104	96	98	
7	100	100	98	92	92	148	122	108	106	104	104	104	100	100	100	106	104	106	104	104	100	98	100	100	
8	96	102	100	102	98	B	120	106	104	106	106	106	106	106	106	106	106	104	104	104	104	104	104	104	
9	96	96	96	98	98	140	G	122	122	106	104	104	98	102	100	G	104	104	98	98	98	102	102	94	
10	96	B	B	B	B	124	G	104	116	112	G	G	104	122	118	118	106	106	100	98	98	104	102	100	
11	B	B	B	B	B	G	116	104	102	104	G	G	G	G	G	138	122	106	106	100	100	100	100	98	
12	92	92	B	B	B	136	124	104	104	96	96	G	G	110	114	106	108	108	102	100	96	100	98	98	
13	96	94	94	94	94	126	118	104	106	106	100	100	100	104	106	104	104	104	100	96	98	100	100	102	
14	102	98	96	92	92	122	106	102	102	102	102	102	98	100	102	104	116	118	112	110	106	100	102	102	
15	102	102	102	102	B	114	124	118	118	104	G	B	100	98	98	100	118	106	104	104	104	102	102	B	
16	108	90	90	B	B	120	126	104	104	102	104	104	102	G	104	120	116	102	102	98	102	100	102	94	
17	94	94	96	98	98	122	116	104	104	104	100	100	100	100	100	92	90	90	96	88	88	88	100	100	
18	94	98	98	94	94	126	114	102	104	100	100	104	104	104	104	108	104	106	104	104	98	104	98	94	
19	120	96	96	96	B	142	124	118	104	106	106	104	104	104	G	G	G	108	104	104	94	96	94	94	
20	B	90	B	B	106	106	102	102	100	100	100	100	124	114	124	100	108	106	102	102	100	100	94	90	
21	90	94	96	100	100	100	126	106	108	102	104	104	102	106	104	118	116	102	100	98	96	96	102	102	
22	98	96	92	92	90	94	114	108	108	102	94	92	G	104	G	G	110	104	104	100	100	100	102	102	
23	98	96	96	84	90	140	124	108	104	104	100	100	96	98	96	92	90	92	92	94	94	110	100	98	
24	100	92	92	92	92	G	126	96	118	104	106	106	106	102	104	102	100	100	100	100	102	102	100	98	
25	94	96	B	98	B	100	100	G	G	124	104	104	108	126	118	118	108	108	102	98	102	B	102	102	
26	102	102	98	B	102	120	126	116	104	108	108	108	106	106	106	106	104	108	104	104	100	98	100	104	
27	96	98	92	94	92	126	108	104	106	104	104	104	102	102	102	102	102	102	116	98	88	88	96	102	
28	102	98	100	100	96	106	118	120	102	102	102	102	G	104	104	114	94	116	116	98	96	98	98	96	
29	100	98	96	96	B	124	116	118	110	106	110	104	104	104	104	102	100	100	96	96	98	102	110	B	
30	B	92	90	90	90	F	148	118	100	98	98	104	100	94	96	98	108	94	104	G	96	90	86	88	92
31	98	92	96	B	B	118	120	106	102	102	98	G	G	108	96	92	108	104	112	88	98	96	96	100	
	00	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	29	22	20	17	27	28	30	29	29	26	26	26	27	26	27	28	30	30	29	27	29	30	28	
MED	98	98	96	96	94	124	119	106	104	104	104	104	104	104	104	106	106	105	104	100	98	100	100	99	
U Q	102	99	98	98	98	138	125	118	110	106	106	106	106	108	106	114	110	108	106	104	102	102	102	102	
L Q	96	94	94	92	92	118	115	104	104	102	100	100	100	100	100	102	102	102	100	97	96	97	98	96	

MAY 2013 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Kokubunji

MAY 2013 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F4	F3				H2	C3	C2	L2	L2		L1	C2	C1	L2	L2	L2	L2	L2	F4				
2		F2						C2				C2	L2			L2	L2	L2	L2			F5	F5	F5
3	F2	F2				H1	H2	C2	C2		C1	L2	L2	L2	L2			L3	F3		F3	F1	F2	F2
4	F3	F2	F3	F4	F4	H2	C1	CL11	L2	L2	L1	L2	L2		C1	C1		L2	C1	F3	F1	F3	F2	F2
5	F2	F1				H1	H2	L3	L1	L2	L1	L2	L2	L1		L1	L2	L2	C2			F1	F3	F3
6	F2	F2	F2	F2		C2	C2	C2	L2	L2	L2	L2	L2	L2	L2	L2	C2	L4	L4	F5	F2	F3	F3	F2
7	F3	F2	F1	F2	F2	H2	C2	L3	L3	L3	L2	L2	L2	L2	L2	L2	L3	L3	L4	F5	F4	F3	F3	F4
8	F3	F3	F5	F5	F8		C2	L2	L3	L2	L2	L3	L2	L2	L2	L2	L2	L2	L2	F3	F3	F4	F3	F4
9	F4	F3	F5	F2	F2	H2		C2	C2	L2	L2	L2	L2	L2	L2		L2	L2	L3	F3	F4	F3	F3	F1
10	F1					C2		L2	C1	C1			L2	C1	C2	C2	L2	L3	L3	F4	F2	F4	F1	F1
11						C2	L2	L2	L2							H2	C2	L3	L2	F3	F3	F4	F2	F1
12	F2	F2				C1	C2	L2	L2	L3	L2			L2	C2	L2	L2	L2	L3	F3	F6	F5	F2	F3
13	F2	F3	F2	F2	F4	C1	C2	L3	L2	L2	L2	L2	L2	L2	L2	L3	L2	L2	L3	F3	F3	F3	F3	F2
14	F4	F3	F4	F3	F2	CL21	L3	L2	L2	L2	L2	L2	L2	L2	L2	L2	CL11	CL22	C2	F3	F3	F3	F3	F3
15	F3	F2	F2	F1		C2	C2	C2	C2	L2	L2			L2	L2	L1	C2	L2	L5	F5	F5	F4	F4	
16	F2	F2	F1			C1	C1	L2	L2	L2	L2	L2	L2		L2	C1	C1	L2	L2	F3	F5	F3	F2	F3
17	F2	F2	F1	F1	F1	C2	C2	L2	L2	L2	L2	L2	L2	L2	L2	L2	L2	L3	L2	F4	F4	F3	F3	F4
18	F4	F4	F4	F4	F3	C1	C3	L3	L3	L3	L2	L2	L2	L2	L2	L2	L3	L3	L4	FF43	F4	F4	F3	F3
19	F1	F2	F2	F1		H1	CL11	CL21	L2	L2	L2	L2	L2	L2				L2	L3	F3	F3	F2	F4	F2
20		F2			F3	L2	L3	L3	L3	L3	L2	L2	CL22	CL22	C1	L2	L2	L2	L3	F5	F6	F2	F2	F3
21	F2	F2	F3	F2	F3	L2	C1	L2	L2	L2	L2	L2	L1	L2	L2	C2	C2	L2	L2	F3	F4	F3	F2	F5
22	F2	F3	F5	F4	F4	L3	CL11	L2	L2	L2	L2	L2		L1			L2	L3	L3	F4	F4	F4	F4	F3
23	F2	F3	F3	F2	F2	H1	C2	L2	L2	L2	L2	L3	L2	L2	L2	L2	L3	L2	L3	F3	F4	F3	F6	F4
24	F4	F3	F4	F3	F2		CL11	L2	CL11	L2	L2	L2	L1	L5	L2	L2	L2	L2	L2	F2	F3	F3	F2	F1
25	F1	F1		F3		L2	L2			C1	L2	L2	L2	L1	C2	C2	C2	L2	L2	F2	F2		F2	F2
26	F3	F2	F1		F2	C2	C1	C2	L3	L3	L2	L2	L2	L2	L2	L2	L2	L3	L4	F3	F3	F3	F2	F2
27	F2	F3	F2	F2	F1	C2	L2	L2	L2	L2	L2	L2	L2	L2	L2	L2	L2	L2	C1	F3	F3	F2	F1	F2
28	F3	F4	F3	F4	F3	L3	C2	C2	L2	L2	L2	L2		L1	L1	CL21	L1	CL12	CL22	F2	F4	F4	F3	F3
29	F2	F1	F1	F1		C2	C2	C2	L2	L2	L1	L2	L2	L2	L2	L2	L2	L2	L2	F3	F3	F3	F3	
30		F2	F1	F1	F2	H1	C2	L2	L2	L3	L2	L1	L3	L2	L2	L2	L2	L2		F3	F4	F3	F3	F2
31	F2	F3	F2			C2	C2	L2	L2	L2	L2			L2	L2	L3	CL22	L3	CL22	F2	F3	F3	F4	F3
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

IONOSPHERIC DATA STATION Yamagawa

MAY 2013 f_{XI} (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	X 99	X 96	X 90	X 86	X 78																X 115	X 107	X 102	X 102	
2	X 103	X 103	X 98	X 103	X 95																	X 98	X 97	X 97	X 98
3	X 102	X 104	X 104	X 94	X 81																	X 94	X 88	X 86	X 92
4	X 94	X 94	X 95	X 88	X 82															X 112	X 100	X 98	X 98	X 94	
5	X 92	X 92	X 92	X 78	X 69																	X 94	X 92	X 92	X 91
6	X 95	X 90	X 87	X 87	X 79																	X 100	X 97	X 94	X 94
7	X 96	X 106	X 106	X 86	X 70	76																X 102	X 86	X 87	X 84
8	X 82	X 81	X 81	X 76	X 82	82																X 96	X 86	X 92	X 90
9	X 88	X 81	X 70	X 71	X 67	68																X 89	X 90	X 90	X 89
10	X 87	X 84	X 84	X 83	X 74	X 74																X 104	X 98	X 100	X 101
11	X 96	X 94	X 100	X 92	X 79																	X 117	X 87	X 92	X 120
12	X 116	X 103	X 93	X 82	X 81																	X 88	X 104	X 92	X 88
13	X 95	X 92	X 90	X 81	X 81																	X 115	X 100	X 92	X 98
14	X 96	X 97	X 96	X 92	X 86															X 101	X 100	X 102	X 108	X 112	
15	X 108	X 100	X 96	X 86	X 83	83																X 87	X 82	X 85	X 85
16	X 81	X 82	X 88	X 82	X 72																	X 92	X 96	X 94	X 96
17	X 96	X 92	X 76	X 72	X 68																	X 98	X 97	X 94	X 88
18	X 92	X 92	X 90	X 54	X 53															X 100	X 93	X 89	X 90	X 90	
19	X 85	X 85	X 84	X 82	X 75	74																X 104	X 104	X 102	X 98
20	X 91	X 91	X 86	X 92	X 77																	X 80	X 78	X 81	X 78
21	X 78	X 74	X 68	X 64	X 60																	X 96	X 94	X 91	X 88
22	X 89	X 99	X 104	X 88	X 90																	X 94	X 93	X 92	X 92
23	X 90	X 84	X 84	X 82	X 78															X 101	X 84	X 86	X 85	X 85	
24	X 86	X 91	X 86	X 66	X 65																	X 104	X 101	X 92	X 101
25	X 101	X 101	X 97	X 103	X 87																	X 82	X 78	X 79	X 86
26	X 83	X 82	X 64	X 67	X 63															X 100	X 97	X 91	X 90	X 93	
27	X 94	X 93	X 86	X 74	X 68																	X 86	X 84	X 84	X 82
28	X 80	X 84	X 85	X 77	X 66	56																X 78	X 79	X 82	X 82
29	X 82	X 79	X 76	X 72	X 72																	X 85	X 84	X 82	X 80
30	X 76	X 74	X 72	X 71	X 62																	X 92	X 79	X 75	X 76
31	X 83	X 84	X 84	X 75	X 75	75																X 90	X 85	X 90	X 89
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	8														1	4	31	31	31	31
MED	X 92	X 92	X 87	X 82	X 75	74														X 101	X 100	X 94	X 91	X 92	X 90
U Q	X 96	X 97	X 96	X 88	X 81	79															X 106	X 100	X 98	X 94	X 98
L Q	X 83	X 84	X 84	X 72	X 68	71															X 100	X 88	X 85	X 85	X 85

MAY 2013 f_{XI} (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

MAY 2013 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	92	90	84	80 ^F	72	70	82	76	79	84	93	94	103	109	110 ^R	117	122	118	116	116	109	101	96	96		
2	97	97	92	97	89	64	78	87	79	88	98	102	105	113	113	116	116	115	117	115	92	91	91	92		
3	96	98	98	88	75	68	77	86	84	79	85	96 ^R	101	106	109		129	121	124	104	88	82	80	86		
4	88	88	89	82	76	71	82	89	84	86	88	99	105	110	113	114	116	119	116	106	94	92	92	88		
5	86	86	85	72	63	62	79	101	100	92	86	89	92	99	110	117	120	121	119	98	88	86	86	85		
6	89	84	81	81	73	71	82	76	88	85	86	96	111	111	110	110	116	118	113	110	93	91	88	88		
7	90	95 ^F	97 ^F	80 ^F	60 ^F	63 ^F	80	94	84	81	85	100	102	104 ^R	109 ^R	109 ^R	107	109	114	113	96	80	81	78 ^R		
8	76	74	72	59 ^F	66 ^F	72	76	78		70	76	84	93	105 ^R	110	118	116	114	109	107	90	80	86	84 ^R		
9	82	75	64	58 ^F	53 ^F	57 ^F	64	72	74	78	80	83	87	94	101	102	106	99	83 ^U	92	83	84	85	83		
10	81	78	78	77	68	67	76	84	70	70		B	J	R												
11	90	88	94	86	73	74	86	86	76	88	98	101	113	113	112	116	110	109	109	112	111	81	86	108		
12	110	94 ^F	82	76	75	79	92	82	79	78	80	86	100	107	117	113	109	112	107	100	J	R	82	97	86	82
13	89	86	80	76	75	78	89	93	72	68		A	86	95	100	112		117	118	115	115	109	94	86	92	
14	89	91	90	82 ^F	80	80	86	81	77	74		A	A	U	Y		A	113	111	111	111	95	94	94 ^F	94 ^F	106 ^R
15	102	92 ^F	82 ^F	68 ^F	71 ^F	73	77	82	86	88	86		B	102	103	96	94	88	81	86	91	81	76	79	79	
16	75	76	82	76	66	68	71	76	72	78	80	89	96		A	A	114	116	120	106	92	86	90	88	90	
17	90	86	70	66	62	59	78	92	88	77		A	91	96	94	103	115	116	116	101	92	92	91	88	82	
18	86	83 ^V	84	48 ^V	47	48	66	82	78	80	92	99	104		A	118		118	120	107	94	87	83	80	80 ^F	
19	77 ^F	74 ^F	72 ^F	71 ^F	63 ^F	61 ^F	73	82	71	66	76	86	91	94 ^R	98	98	102	108	107	99	98	98	96	92		
20	85	85	80	86	71	70	74	68	64	64	70	74	71	69	72	76	79	79	78	77	74	72	75	72		
21	72	68	62	58	53 ^F	53	65	71	74	68	71	76	84	91	100	101	96	96	92	92	90	89	85	82		
22	83	92 ^V	94 ^F	82	84	81	78	81	88	96	92	90	89	94	106	100	92	88	90	91	88	87	86	86		
23	84	76 ^F	78	72 ^F	72	68	73	79	86	89		A	89	98		A	111	113	116	111	96	86	78	80	76 ^F	76 ^F
24	76 ^F	76 ^F	72 ^F	52 ^F	59	59	76	84	74	70	74	74	85	91	101	101	103	107	111	107	98	95	86	94 ^F	94 ^F	
25	95	96	90	97	79	72	70	67	65	64	67	70	75	75	82	85	92	104	99	88	76	72	73	75		
26	77	76	58	61	57	57	70	68	71	59 ^R	73	88	84	76	87	104	95	92	93	94	91	85	84	87		
27	87	87	80	68	60	59	70	80	72	66	76	78	73	79	86	92	99	102	105	92	80	78	78	76		
28	74	75 ^F	75 ^F	66 ^F	60	46 ^F	68	70	69	68	66	69	64		A	82	90	84	86	86	79	72	73	76 ^V	76	
29	76	70	70	66	66	66	79	77	84	83	79	76	82	86	92	96	103	99	92	84	79	76 ^F	76	74		
30	70	68	66	65	56	54	65	70	69	72	58	68	78	90	98	104	106	114	106	102	86	73	69	70		
31	68 ^F	74 ^F	71 ^F	65 ^F	63 ^F	60	70	83	96	78	75	67	68 ^R	74	79		A	98	112	100	94	84	79	84	80 ^F	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	31	31	31	31	31	31	31	31	30	31	26	29	31	27	29	27	31	31	31	31	31	31	31	31		
MED	86	85	80	72	66	67	76	81	78	78	80	88	95	99	103	104	107	111	107	95	88	85	86	84		
U Q	90	91	89	82	75	72	80	86	84	85	86	95	102	106	110	114	116	118	114	107	94	92	88	92		
L Q	76	75	72	65	60	59	70	76	72	68	74	76	84	90	94	98	98	99	93	92	82	79	79	78		

MAY 2013 foF2 (0.1MHz)

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IONOSPHERIC DATA STATION Yamagawa

MAY 2013 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	A	A	A	L	U	L	L	U	L	L					
2								L		L	L	L	L	U	L	L	L	A	L					
3								L		L	L	L	L	L	L		A	L	L	L				
4								L	L	L	L	L	L	U	L	U	L	A	A	L	L			
5								L	L	L	A	L	L	L	L	U	L	U	L	L	A			
6									L	L	U	L	A	U	L	U	L	U	L	A	A	A		
7									A	L	U	L	A	L	L	A	L	U	L	A	A			
8									A		A	A	L	L	A	A	A	A	A					
9								L	L	L	U	L	L	U	L	L	A	L	L	U	A			
10									L	L	B	L	U	R	U	A	A	A	A	A				
11							L		L	L	L	U	L	L	U	L	A	L	L	A	A			
12								A	A	L	L	L	L	Y	A	U	A	A	A	A				
13									A	A	A	R	B	A	A	A	A	A	L					
14									L	L	A	B	A	A	A	U	A	A	U	L	L			
15									A	A	A	A	B	U	A	A	L	U	L	A	A	A		
16									L	L	L	A	U	L	A	A	A	L	L					
17									L	L	L	A	A	A	L	A	L	A	U	L	A			
18									L	A	A	A	A	A	A	A	A	A	A	A				
19									L	A	U	L	A	U	A	L	L	L	L	L				
20							L	L	L	L	U	A	U	A	U	A	U	A	L	L				
21								L	A	A	L	L	L	L	L	L	L	L	A	A	A			
22									L	A	A	A	L	A	U	A	L	L	L	L				
23									L	L		A	L	L	A	A	A							
24									L	L	A	A	L	U	A	A	A	L	L	L				
25									L	L	U	L	L	U	A	U	A	A	L	L				
26									L		A	A	A	A	A	L	L	A						
27									L	L	A	L	A	R	U	A	U	A	A	U	L			
28							U	L	A	A	A	A	L	A	A	A	A	A	A	A	L			
29									U	L	A	L	U	A	A	U	A	L	L	L				
30								L	U	L	L	L	A	U	A	A	A							
31									U	L	U	L	A	A	A	A	A	A	L	U	L			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	1	4	9	10	14	17	18	21	18	18	8	3					
MED							U	L	U	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
U Q							392	456	466	516	540	550	556	558	536	530	520	480	416					
L Q									L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
									476	530	580	560	564	564	554	552	532	498	512					
									L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
									454	470	524	528	536	540	510	508	508	472	400					

MAY 2013 foF1 (0.01MHz)

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IONOSPHERIC DATA STATION Yamagawa

MAY 2013 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						B	A	292	332	372	384	A	U	A	U	R	U	A	U	A	A			
2						B		200	276	320	344	R		A	U	A	A	A	A	A	B			
3						B		200	292	332	372	R	U	R	R	U	R	A	A	A	B			
4						B		208	276	324	352	U	A	U	A	A	U	A	A	A				
5						B		180	280	316	356	A		A	A	A	U	A	A	U	A	A		
6						A		180	268	328	360	A	A	A	A	A	372	356	296	236	A			
7						B		196	288	324	352	U	A	U	R	A	A	340	300	232	B			
8						A		212	272	316	348	A	A	A	U	A	U	A	U	A	A			
9						A	U	A		U	A	A	A	A	A	A	A		U	A	A			
10								208	284	332	348	R	B	R	U	R			U	A	A			
11						B	A	284	324	344	A	A	A	A	A	A		332	304	248	B			
12						B	A	A	A	A	A	A	R	U	R	U	R		A	A	A			
13						B		244	280	328	340	A	B	B	B	B	A		A	A	A			
14						A		196	288	324	352	A	B	B	A	A	A	A	A	A				
15						A		216	292	336	360	A	B	B	A	A	R				A			
16						B		212	272	328	356	U	A	A	U	A	A	A	A	308	244	A		
17						B		232	300	328	352	A	A	A	A	A	A	A	A	A	A			
18						B	U	A		U	A	A	A	A	A	U	A		A		A			
19						B		224	276	328	364	U	A	A	A	U	A	U	A	U	A	A		
20						B		212	A	A	A	A	A	A	A	A	A		U	A	A			
21						B	A	A	A	A	A	A	U	R	R		U	A	U	A	A			
22						A		280				A	A	A	U	A		U	A	U	A	A		
23						B		208	304	336	364	U	A	U	A	A	A	A	A		B			
24						B	A	A	U	A	U	A	A	U	A	A	A	U	R	A	A	A		
25						A		216	264	304	348	A	R	R	B	R	U	R		A	A			
26						A	A	280	336	360	376	380	B	A	U	A	A	A	A	A				
27						B		220	284	320	356	A	A	A	A	A	A	A	A	A	A			
28						B		216	280	320	356	A	A	A	A	A	A	A	A	A	B			
29						B	A	288	336	356	368	A	A	A	U	A	U	A	A	A	A			
30						B		232	320	344	352	A	A	A	A	A	A	A	A	A	A			
31						A	A	A	A	U	A	A	A	A	R			U	A	U	A	A		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							22	26	26	27	13	6	6	10	11	16	21	18	14					
MED							212	282	326	352	376	384	U	A	U		348	308	244					
U Q							224	288	332	360	380	396	U	R	R	U	R	A	U	A	U	A		
L Q							200	276	320	348	358	380	U	A	U	A	U	A	U	A	U	A		

MAY 2013 foE (0.01MHz)

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IONOSPHERIC DATA STATION Yamagawa

MAY 2013 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1	22	30	18	18	E B	E B	22	31	34	61	52	56	53	48	44	44	38	35	35	25	18	18	18	17			
2	E B	E B	18	E B	E B	E B	G	30	33	G	G	43	42	42	41	40	46	30	30	E B	E B	E B	E B	E B			
3	E B	E B	E B	E B	E B	E B	G	30	33	G	G	G	46	50	46	A A	100	38	29	21	14	E B	16	16			
4	E B	E B	E B	E B	E B	E B	G	28	31	G	G	43	43	43	43	53	55	38	20	G	38	24	23	22			
5	18	E B	E B	E B	E B	E B	21	31	35	45	48	40	40	40	39	40	44	41	52	52	49	34	E B	19			
6	E B	E B	E B	E B	E B	E B	29	22	32	36	36	40	52	47	45	46	45	50	55	55	53	42	41	45	23		
7	19	35	26	24	18	E B	43	43	43	39	39	67	44	44	58	45	39	47	56	19	20	20	34	17			
8	35	30	30	26	26	36	G	40	A A	98	39	60	60	50	49	63	65	59	57	42	30	25	25	18	21		
9	18	20	20	24	18	18	G	24	28	31	42	41	41	44	44	40	37	G	23	32	51	62	20	20	18	26	
10	14	24	20	19	18	E B	E B	23	33	40	G	B	G	52	57	54	44	59	68	50	26	20	37	21	18		
11	E B	E B	E B	E B	E B	E B	21	31	39	39	42	43	45	48	58	42	40	56	54	54	54	54	28	28	28		
12	23	27	27	19	18	E B	27	52	58	41	40	U Y	U G	42	44	40	50	47	46	46	21	19	18	22			
13	30	30	20	20	20	E B	17	37	57	63	A A	A E	E B	58	83	A A	105	135	81	44	39	85	34	17	E B	E B	E B
14	20	20	23	28	24	19	21	37	40	43	A A	A A	A A	78	67	A A	182	56	56	34	26	25	51	41	40	25	
15	17	17	E B	14	17	E B	14	14	25	39	58	72	66	B	56	59	40	G	40	57	53	53	52	18	17	17	
16	16	20	E B	12	18	E B	E B	21	31	37	40	55	50	67	A A	A A	A A	65	42	32	42	62	57	39	36	35	
17	E B	E B	E B	E B	E B	E B	G	G	34	50	A A	81	66	66	49	68	46	49	37	37	30	E B	16	17	15	13	
18	17	22	23	24	29	E B	30	32	64	70	87	65	75	115	61	A A	116	74	77	75	35	34	20	36	20		
19	18	17	17	17	17	17	G	20	33	44	47	70	55	52	60	43	38	39	36	34	18	18	17	16	16		
20	20	E B	E B	E B	E B	E B	24	32	32	36	52	52	41	43	41	49	38	34	26	17	E B	E B	21	25			
21	24	24	20	20	18	E B	22	32	52	48	47	44	44	G	G	48	44	55	56	77	21	18	E B	E B	E B		
22	E B	13	19	29	29	20	26	21	33	62	70	61	47	64	56	46	42	36	39	31	20	20	27	30	30		
23	31	16	22	18	18	16	23	32	38	47	A A	92	44	48	A A	185	42	58	69	68	59	34	28	27	24	49	
24	22	19	19	18	E B	E B	26	26	35	52	57	46	55	76	52	51	35	35	29	26	18	30	20	22			
25	E B	14	17	19	21	19	18	18	30	32	37	47	36	U Y	G	54	49	41	25	G	31	24	17	E B	E B	E B	
26	23	33	26	21	21	20	25	30	41	57	67	67	66	54	49	38	69	31	34	20	20	34	26	18			
27	23	22	E B	12	47	E B	G	30	33	54	48	70	46	44	41	49	38	54	24	23	38	16	E B	14	15		
28	17	16	17	E B	E B	E B	22	44	55	56	55	47	62	A A	89	72	60	60	60	27	28	42	34	20	18		
29	E B	15	16	21	E B	E B	22	32	39	63	40	42	52	58	51	41	G	31	26	20	20	32	27	27			
30	17	17	17	E B	E B	E B	G	G	G	35	51	53	42	50	44	53	41	47	57	50	46	29	16	E B	15		
31	20	18	24	18	17	20	31	34	32	39	50	62	60	44	43	A A	84	54	42	32	27	34	51	26	21		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31		
MED	18	18	19	18	17	E B	22	32	38	43	52	48	49	50	46	46	44	41	37	28	21	23	20	20			
U Q	23	24	23	21	19	18	24	34	52	56	66	60	60	60	58	58	56	55	53	52	42	34	27	25			
L Q	E B	E B	E B	E B	E B	E B	G	30	33	37	41	43	44	44	42	41	38	34	27	20	E B	18	17	16	16		

MAY 2013 fbEs (0.1MHz)

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IONOSPHERIC DATA STATION Yamagawa

MAY 2013 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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	12	14	14	14	13	12	12	12	15	15	24	39	30	30	30	23	22	18	16	16	16	13	13	13
2	13	11	11	14	14	14	14	14	14	14	19	20	24	23	24	24	17	16	16	15	12	12	12	12
3	11	13	13	13	13	13	13	14	14	15	15	25	25	23	20	20	17	17	17	14	14	14	15	12
4	15	15	15	14	14	14	14	14	14	14	16	25	24	35	22	22	16	16	16	11	12	12	12	12
5	12	12	13	13	13	13	13	13	13	14	38	20	24	24	35	17	17	16	16	15	15	15	15	15
6	13	14	11	14	14	14	14	14	14	19	19	24	27	26	25	27	16	15	15	15	13	13	13	13
7	15	15	13	12	11	11	11	14	14	17	16	24	24	24	29	17	17	15	15	14	14	14	14	14
8	13	14	14	11	15	14	13	13	13	17	16	25	25	17	18	15	15	15	15	11	13	13	13	13
9	15	14	14	14	14	14	14	14	20	20	19	22	23	23	23	22	16	16	16	16	12	12	12	12
10	12	14	14	14	14	14	14	13	13	16	B	25	25	25	22	21	17	17	16	14	11	11	11	11
11	16	16	15	15	16	12	12	12	12	12	20	28	25	28	20	20	20	16	16	13	13	13	13	13
12	13	13	15	15	15	15	15	14	14	16	23	21	24	26	18	18	17	17	15	15	14	14	14	14
13	15	15	15	15	15	15	15	15	17	16	34	60	58	43	41	29	18	16	16	15	15	16	15	16
14	14	14	14	14	14	11	12	12	16	16	28	B	51	33	25	21	18	14	11	14	16	16	16	12
15	15	14	14	14	14	14	12	14	12	15	15	B	40	38	34	24	21	18	16	13	13	13	13	13
16	12	12	12	12	13	12	12	12	12	15	17	17	27	19	20	17	16	16	16	17	14	14	14	14
17	13	13	13	13	13	13	13	18	18	17	19	20	20	20	26	18	18	16	18	14	16	12	11	11
18	11	11	12	11	14	16	15	15	15	15	15	35	29	31	22	22	18	16	15	15	11	11	11	12
19	14	14	14	14	14	14	14	14	14	16	20	21	24	26	24	20	20	15	15	15	13	12	12	12
20	12	12	12	12	12	12	12	17	16	17	29	22	22	28	30	35	21	14	14	12	12	12	12	12
21	14	14	14	14	14	14	13	14	14	15	18	19	20	26	29	18	17	16	16	16	15	15	15	15
22	13	13	13	12	13	12	12	12	12	16	17	17	28	28	21	18	17	17	16	14	14	14	14	14
23	12	12	12	12	11	13	13	12	11	16	21	17	29	22	20	20	20	16	16	13	13	13	13	13
24	12	12	12	13	12	12	12	15	15	15	18	20	20	25	29	23	20	15	15	15	13	13	13	13
25	14	14	14	14	12	12	12	12	12	12	27	24	22	40	26	22	20	16	16	12	12	12	12	12
26	11	12	12	14	14	13	15	14	18	18	18	19	40	30	23	22	19	15	16	13	13	12	12	11
27	13	12	12	12	13	12	12	12	12	17	20	20	20	25	20	20	19	14	14	14	14	14	14	15
28	13	12	14	14	14	14	14	14	16	18	18	18	24	23	22	20	14	14	14	12	11	11	11	11
29	15	15	15	15	15	15	15	14	14	14	18	19	28	24	24	24	22	12	12	12	11	12	15	15
30	12	12	12	12	12	12	12	12	14	14	14	23	23	22	23	17	20	15	15	15	15	15	15	15
31	13	12	14	14	11	11	12	12	12	15	19	19	20	22	22	20	15	15	15	14	12	13	13	13
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	13	13	14	14	14	13	13	14	14	16	19	22	24	25	23	20	18	16	16	14	13	13	13	13
U Q	14	14	14	14	14	14	14	14	15	17	23	25	28	30	29	23	20	16	16	15	14	14	14	14
L Q	12	12	12	12	13	12	12	12	12	15	17	19	23	23	21	18	17	15	15	13	12	12	12	12

MAY 2013 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Yamagawa

MAY 2013 M(3000)F2 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	288	277	299	300 ^F	306	306	349	336	324	315	301	299	288	284	294 ^R	297	293	306	291	308	300	310	284	285
2	279	291	283	300	327	328	321	325	313	310	307	305	297	298	299	291	309	305	299	326	304	286	287	299
3	292	298	330	348	296	306	322	346	332	327	304	300 ^R	315	301	288		315	323	316	319	309	293	278	289
4	293	294	306	320	312	290	321	327	337	303	293	298	298	289	284	292	302	329	315	309	295	304	295	279
5	282	283	302	297	271	272	306	324	340	320	299	283	283	285	278	298	303	319	312	336	295	292	281	283
6	276	284	293	302	319	319	338	352	333	325	290	286	291	292	294	294	294	304	307	315	303	286	285	282
7	261	289 ^F	310 ^F	337 ^F	297 ^F	260 ^F	301	321	330	291	278	271	283	306 ^R	318 ^R		299	298	310	318	328	278	277	288
8	280	273	283	293 ^F	286 ^F	307 ^F	319	327		301	300	288	279	285	289	296	302	307	308	315	330	289	286	291 ^R
9	291	297	303	286 ^F	286 ^F	305 ^F	332	329	319	310	300	284	287	288	298	296	304	319		310	290	287	282	288
10	284	278	291	307	308	312	331	332	343	317		270		308	286	299	300	303	311	317	331	290	282	281
11	276	284	316	308	305	321	336	342	302	297	324	292	295	292	286	293	309	286	317	319	334	278	284	256
12	301	297 ^F	288	299	300	316	352	329	348	302	318	294	283	293	295	297	296	304	314	313		317	293	282
13	283	294	293	282	304	324	339	360	363	289		283	294	285	284		300	296	310	310	325	323	294	264
14	290	284	299	312 ^F	294 ^F	313	337	342	329	322			295	290		297	287	293	306	301	284	277	278	295 ^R
15	309	277 ^F	297 ^F	294 ^F	283 ^F	287	295	319	310	303	300		298	312	302	306	311	304	303	315	299	271	266	272
16	268	275	290	324	299	298	329	308	355	310	277	287	278			282	293	311	314	308	280	269	283	285
17	302	313	301	282	295	295	319	340	332	312		298	281	270	271	285	291	306	304	314	287	280	272	280
18	290	297 ^V	341	363 ^V	274	302	311	327	312			287	299		289		294	289	294	306	287	272	301	288
19	278 ^F	262 ^F	270 ^F	263 ^F	281 ^F	287 ^F	293	327	335	301	288	288	292	311 ^R	311	303	293	303	300	309	290	290	285	281
20	269	270	282	303	293	304	323	333	301	278	274	307	286	280	282	299	289	291	296	298	305	277	265	271
21	271	282	297	308	309	322	337	336	324	321	299	293	285	287	294	296	301	303	290	290	294	285	289	276
22	269	281 ^V	310 ^F	315	309	320	316	319	293	312	305	273	271	289	292	297	288	301	294	291	288	271	271	295
23	293	282 ^F	296 ^F	305 ^F	307	298	310	316	322	300		266	276		286	306		310	308	306	282	278	279	280
24	277 ^F	302 ^F	315 ^F	310 ^F	279	279	330	336	324	310	314	267	273	290	289	288	290	299	309	284	297	297	293	267 ^Z
25	292	288	298	324	320	339	337	371	341	310	294	279	293	284	274	264	257	308	323	310	305	275	262	275
26	294	321	270	275	267	280	353	341	342	337	280	305	310	267	263	295	305	299	293	308	304	297	281	282
27	278	289	275	299	290	296	315	313	320	303	276	300	262	273	282	283	297	297	315	309	290	275	289	267
28	280	273 ^F	330 ^F	304 ^F	297	269	302	326	302	336	292	308		281	296	294	285	293	302	295	273	267 ^V	283	
29	297	297	297	298	291	295	332	321	316	319	305	287	277	283	289	287	297	309	307	284	295	276 ^F	287	296
30	288	295	294	299	319	316	337	335	336	321	370	288	267	283	282	281	278	305	304	317	311	286	294	280
31	272 ^F	296 ^F	288 ^F	300 ^F	273 ^F	295 ^F	322	321	334	327	317		283	290	276		288	304	315	299	296	280	284	275 ^F
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	30	30	25	28	29	27	29	26	30	31	30	31	30	31	31	31
MED	283	288	297	302	297	304	323	329	330	310	300	288	286	289	288	296	296	304	308	309	296	285	284	282
U Q	292	297	306	312	308	316	337	340	337	321	306	298	295	293	294	297	302	308	314	315	305	292	289	288
L Q	276	278	288	297	286	290	315	321	316	302	289	283	278	284	282	288	291	298	299	302	290	276	278	275

MAY 2013 M(3000)F2 (0.01)

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IONOSPHERIC DATA STATION Yamagawa

MAY 2013 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									L	A	A	A	L	U	L	L	U	L	L					
2								L		L	L	L	L	L	U	L	L	A	L					
3								L		L	L	L	L	L	L		A	L	L	L				
4								L	L	L	L	L	L	U	L	U	L	A	L	L				
5								L	L	L	A	L	L	L	L	U	L	U	L	L	A			
6									L	L	U	L	A	L	L	A	U	L	A	A	A			
7									A	L	U	L	A	L	L	A	L	U	L	A	A			
8									A		A	A	L	A	A	A	A	A	A					
9								L	L	L	U	L	L	U	L	L	A	L	L	A				
10									L	L	B	L	A	A	A		A	A	A	A				
11							L		L	L	A	U	L	L	A	A	L	L	A	A				
12								A	A	L	L	L	L	A	A	A	A	A	A	A				
13									A	A	A	R	B	A	A	A	A	A	L					
14									L	L	A	B	A	A	A	A	A	A	H	L				
15								A	A	A	A	B	A	A	L	U	L	A	A	A				
16								L	L	L	A	A	A	A	A	A	A	A	L					
17								L	L	L	A	A	A	L	A	A	A	U	L	A				
18								L	A	A	A	A	A	A	A	A	A	A	A	A				
19								L	A	A	A	A	A	A	A	L	L	L	L					
20							L	L	L	L	A	A	A	A	A	A	A	L	L					
21								L	A	A	L	L	L	A	A	A	A	A	A	A	A			
22								L	A	A	A	L	A	A	A	L	L	L	L					
23								L	L		A	L	L	A	A	A	A							
24								L	L	A	A	L	A	A	A	A	L	L	L					
25								L	L	U	L	L	A	A	A	A	L	L	L					
26								L		A	A	A	A	A	A	A	A	A	A					
27								L	L	A	A	A	A	R	A	A	A	U	L					
28							U	L	A	A	A	L	A	A	A	A	A	A	L					
29								U	L	A	L	A	A	A	A	A	A	L	L					
30							L	U	L	L	L	A	A	A	A	A	A							
31								U	L	U	L	A	A	A	A	A	A	L	U	L				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	1	4	9	9	12	12	12	16	14	17	8	2					
MED							U	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
U Q									394	400	366	366	372	370	375	379	353	355						
L Q									L	L	L	L	L	L	L	L	L	L	L					

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MAY 2013 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									272	272 ^A	280	308	336	334	328	328	316	294						
2								252		252	284	288	294	304	304	304	292	290						
3								238		238	294	304	304	304	310		286	268	264					
4								262	246	270	270	314	314	320	320	306	304	284	266					
5								268	256	256	266	274	300	342	342	302	302	286	268					
6									276	282	330	300	314	314	314	314	312	278	278					
7									250	314 ^L	332	348	348	324	322	310	306	302	280					
8									340 ^A	340 ^A	340	344	338	338	308	302	284							
9								260	264	290	302	322	342	344	320	320	312	286						
10									246	272		338	338	310	316	316	310	310	288					
11							256		256	318	278	290	314	316	316	316	314	314	276					
12								258	258	262	266	318	328	328	326	314	300	292	288					
13									258			358	330	376			334	298						
14									266	282			336	326		320	314	308	282					
15								264	266	320	320		336	318	318	310	308	308	304	282				
16								228	234	274	324	336	358			342	324	278						
17								252	252	290		362	360	360	362	344	318	300	266					
18								264	296			372	370		356		324	324						
19								270	264	344	442	348	348	320	320	320	320	304	294					
20							252	268	342	406	426	352	380	396	396	362	352	312	292					
21								272	272	272	348	350	356	356	326	310	310	278	286					
22								270	280	280	298	384	384	356	322	320	320	294	274					
23								246	260			364	364		340	316								
24								252	252	272	302	302	388	370	354	354	352	310	282					
25								224	256	270	372	406	366	382	382	382	382	284	272					
26								246				296	312	392	392	322	314	312						
27								260	274	338	376	370	418	382	360	360	316	298	262					
28							304	274	352	300	380	352			400	328	326	326	294					
29								288	294	336	346	362	362	328	328	328	324	272	272					
30							250	252	256	260	272	366	378	356	336	336	332							
31								256	258	278			416	376	382		330	292	264					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							4	21	27	27	24	28	30	27	28	27	30	29	21	1				
MED							254	260	259	280	306	341	344	338	328	320	315	294	278	282				
U Q							280	268	274	314	344	360	366	370	358	336	324	309	288					
L Q							251	249	256	270	279	306	328	320	320	310	308	284	267					

MAY 2013 h'F2 (KM)

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MAY 2013 h'F (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	278	320 ^A	268	268	250	246	222	222	222		A	A	A	A ^E	270	250	236	236	238 ^A	256	256	256	256	256	272	
2	276	276	276	254	246	210	230	230	230	198	198	208	210	210	210	212		A	226	248	240	236	244	266	266	
3	288	270	248	214	220	230	230	230	222	204	198	210	210		210		A	216	216	230	230	230	230	278	288	
4	258	270	266	232	232	262	252	236	218	214	206	206	206	206	206		A	A	238	238	238	238	252	252	278	
5	306	302	260	212	252	308	252	248	238 ^A		A	A	224	198	198	198	E ^A	E ^A	A	A	A	A	242	268	272	290
6	266	276	276	252	244	262	236	224	232	190	226		A	A	238		E ^A	E ^A	A	A	A	A	252	252	308	
7	294	300	246	236	288	304	262	248		A	222	202		A	202	216		A	A		242	242	242	280	280	
8	324 ^A	338	338	336	320	258	222	222		A	214		A	A	A	A		A	A		248	248	248	262	268	
9	296	268	262	312	300	262	234	228	228	228	224	224	224	224	220	202	202	226		A	E ^A	E ^A	282	264	300	
10	264	302	296	232	234	240	236	236	236	196		B		A	A	E ^A	E ^A	A	A	A	A	242	242	270	270	
11	290	288	260	252	254	254	254	246	238	238	264	218	238		A	A	222	226		A	A	A	254	246	304	
12	262	264	282	262	262	246	214		A	A		A	B	B	A	A	A	A	A		E ^A	E ^A	252	252	280	
13	306	292	292	292	276	238	238	238		A	A	A	B	A	A	A	A	A		A	H	272	310	252	282	
14	270	276	276	274	274	266	232	232	232	232		A	B	A	A	A	A	A		216	232	248	308	310	286	
15	256	262	262	262	262	262	238		A	A	A	B	A	A		236	216	236		A	A	A	270	270	292	
16	304	304	270	246	246	246	220	220	236	234		A	A	A	A	A	E ^A	A	260	242	242	282	328	326	324	
17	300	266	264	264	256	270	250	238	236		A	A	A	A	254	A	A	E ^A	256	A	A	256	256	256	282	
18	286	284	228	228	364 ^E	270	254	238		A	A	A	A	A	A	A	A	A	A	A	A	276	276	292	292	
19	284	290	290	290	278	278	260	242		A	A	A	A	A	A	236	236	236	236	E ^A	A	266	266	266	266	
20	292	292	290	260	260	260	238	238	234	234		A	A		216	248	248		A	A	A	244	244	310	328	
21	322 ^A	322	304	268	268	254	250	248		A	A	244	230	220	200	200		A	A	A	A		250	250	286	
22	288	306	298	246	246	246	238	238		A	A	A	238		A	A	238	238		A	238	246	246	312	310	
23	304	304	292	272	272	272	226	226	240	256		A	A	A	A	A	A	A	E ^A	E ^A	254	262	318	364 ^E		
24	292	280	252	250	272	310	252	232	224		A	A	224		A	A		A	224	A	250	250	250	264	324 ^A	
25	294	294	272	252	252	218	218	218	208	204	E ^A	258	198	198		A	A	200	214	214	222	230	232	348	326	
26	270	262	312	312	312	278	204	204	252		A	A	A	A	A	A	238		A	236	288	282	280	280	280	
27	308	308	280	320	296	296	232	230	226		A	A	A	A	226	226	226		A	232	A	244	270	270	312	
28	304	304	256	256	254	282	256		A	A	A	A	A	A	A	A	A	A	A	A	A	244	260	320	282	
29	272	274	274	274	274	272	244	244	266		E ^A	212	212		A	A	A	212	212	214	214	236	246	342	298	
30	260	260	260	260	234	234	232	212	212	212		A	A	192	232		A	232	278	278	264	264	264	268	282	
31	310	260	260	258	262	262	252	252	210	242		E ^A	A	A	A	H	A	A	A	E ^A	E ^A	256	256	266	332	314
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	31	31	31	31	31	31	31	28	21	17	11	14	14	13	14	14	16	15	20	29	31	31	31	31		
MED	290	288	272	260	261	262	238	234	231	218	209	215	210	220	224	220	232	236	242	250	252	267	280	287		
UQ	304	304	290	274	276	272	252	240	237	234	244	224	224	244	236	238	237	242	261	262	268	292	310	310		
LQ	270	270	260	246	246	246	230	225	222	204	202	208	202	206	210	212	220	216	235	242	246	250	266	280		

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MAY 2013 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						B		116	116	112	112	A	112	112	112	112	112	112	A					
2						B	116	116	116	114	108	108	A	108		108	108	A	A	B				
3						B	114	114	116	116	116	E Y	146	102	102	102	102	A		B				
4						B	120	122	112	112	112	112	112		112	112	112		118					
5						B	110	110	110	110	A	110	A			112	112	112	112		B			
6						A	124	116	114	114	112	A	112	A	A	112	112	112	112					
7						B	112	112	112	112	112	A	112	112	A	A	112	112	112		B			
8						A	108	108	108	108	A	A	A		A	108	108	108	108					
9						A	114	114	114	112		A	A		A	A	112	112	112					
10							128	122	112	112	B	110	110	110	110	110	110	110	110		A			
11						B	A	122	116	112	A		A	A	A		112	112	112		B			
12						B	A		A	A		A	A		112	112	112	112	112		A			
13						B	134	120	112	112	A	B	B	B	B		112	112		A	A	A		
14							116	116	116	112		B	B	A					A					
15						A	108	108	108	108	A	B	B			108	108	108	108		A			
16						B	108	108	108	108	108		A	110	A	A		A	110	110		A		
17						B	126	126	116	116		A	A	A	A		A				A			
18						B	114	114	112	112	112			A	112	112	112	112	112					
19						B	112	112	112	114	114	114	A	A			114	114	114					
20						B	114	A					A		A	A	A		114	114				
21						B		A	A	A	A		A	114	114	116	112	112		A				
22						A	A		A		A	A	A			106	106	106	106	106		A		
23						B	116	114	112	112	100	100	A				A	A	A		B			
24						B	A	A	110	110	110	A	110	A	A		110	110		A	A			
25						A E	A	A	A	A		A	102	B	102	102	106	106		A				
26						A	108	108	108	108	108		B		108	A								
27						B	114	114	114	114		A	A	A		A		A						
28						B	100	100	100	100	100	A	A	A		A	A				B			
29						B	A	116	116	112	112	112	A	112	112	112	112			A	A			
30						B	110	116	114	110		A				A	A		A					
31						A	A		A		A			112	112	112	112	112	112		A			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							22	25	25	26	14	9	8	10	13	17	22	19	16					
MED							114	114	112	112	112	110	112	112	112	112	112	112	112					
U Q							120	116	116	112	112	113	112	112	112	112	112	112	112	113				
L Q							110	109	110	110	108	108	110	110	107	108	108	110	111					

MAY 2013 h'E (KM)

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MAY 2013 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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	94	94	94	94	B	94	130	130	130	122	116	114	114	114	114	112	112	108	104	104	104	104	104	102
2	94	B	94	B	116	B	G	134	138	G	G	130	116	116	116	116	116	114	110	110	B	108	106	B
3	B	B	B	116	96	96	96	142	142	G	128	112	202	118	118	116	110	110	110	110	110	108	108	106
4	96	96	96	96	96	B	140	140	128	128	128	118	118	118	114	114	114	114	114	114	114	102	102	102
5	110	108	108	106	B	B	130	130	118	118	116	116	116	114	114	114	114	114	112	112	104	104	104	100
6	104	B	126	102	100	100	132	124	124	124	114	102	102	102	102	122	122	120	118	108	108	108	108	106
7	104	102	106	106	106	106	118	118	118	118	118	112	116	116	114	128	126	126	124	112	112	112	102	102
8	102	102	94	94	94	94	94	112	112	110	112	112	112	116	116	116	112	112	112	106	106	106	104	104
9	104	104	104	104	102	102	118	118	118	116	110	110	110	110	104	104	104	132	98	94	94	98	94	94
10	106	104	100	98	98	B	126	126	124	G	B	G	124	124	124	124	124	120	118	114	108	108	98	98
11	B	B	94	B	B	B	116	116	116	116	112	108	108	112	108	110	110	110	110	110	108	108	104	104
12	104	100	100	100	100	B	100	100	100	100	100	100	102	124	204	146	120	120	120	116	114	110	102	102
13	100	100	100	100	100	100	114	114	114	112	106	B	B	116	114	108	108	110	140	102	102	102	102	102
14	104	102	100	100	98	98	110	110	120	112	104	104	104	104	122	110	110	110	110	110	110	110	110	110
15	86	86	B	104	104	98	114	114	110	110	104	B	104	102	110	G	164	134	112	112	112	110	110	106
16	102	98	98	98	98	B	124	124	122	116	116	116	116	114	110	110	110	130	128	102	102	102	102	106
17	100	100	100	104	104	130	130	130	120	112	112	106	106	104	104	104	104	104	104	104	102	102	102	102
18	106	106	104	104	104	140	136	130	112	112	106	106	106	104	104	104	104	104	104	104	104	104	104	104
19	106	106	106	106	94	122	122	122	120	120	114	114	114	106	104	104	112	118	118	118	118	108	108	102
20	104	90	B	102	102	B	140	102	102	102	116	106	106	106	106	106	106	128	122	122	94	94	94	94
21	110	110	106	106	106	106	106	106	106	106	106	106	106	G	G	112	112	112	108	106	106	106	B	B
22	94	94	94	94	94	94	94	114	114	114	110	110	110	110	110	114	122	122	120	120	110	110	110	110
23	98	98	98	98	98	96	150	144	120	120	116	116	116	108	106	100	100	100	100	102	102	110	110	108
24	106	90	90	90	90	98	98	98	108	108	108	108	108	108	108	108	108	108	108	108	108	94	94	94
25	96	90	90	90	90	90	90	174	174	152	102	102	G	130	130	140	106	110	110	108	108	B	98	98
26	108	108	108	108	100	100	118	120	120	116	116	112	108	108	108	108	108	108	108	108	144	114	114	114
27	98	98	98	98	98	98	98	128	120	116	110	108	108	108	108	106	104	94	94	112	112	98	98	98
28	110	104	104	104	100	152	152	120	118	116	114	112	108	100	100	100	96	96	96	96	96	96	108	108
29	104	118	100	100	100	100	114	114	114	114	114	114	114	114	112	112	G	112	134	102	102	102	102	102
30	90	90	90	90	B	B	G	112	G	112	110	110	110	104	104	104	104	102	102	98	92	92	92	102
31	96	96	96	96	96	96	96	116	108	108	106	102	124	158	128	122	122	122	118	104	104	104	104	104
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	29	27	28	29	27	22	29	31	30	28	29	28	29	30	30	30	30	31	31	31	30	30	30	29
MED	104	100	100	100	100	99	118	120	118	115	112	110	110	111	110	111	110	112	110	108	106	105	104	102
U Q	106	104	104	104	102	106	130	130	122	118	116	114	116	116	116	116	116	120	118	112	110	108	108	106
L Q	96	94	94	96	96	96	99	114	112	111	106	106	106	106	106	106	106	108	104	104	102	102	102	101

MAY 2013 h'Es (KM)

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MAY 2013 TYPES OF Es 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	F3	F5	F2	F2		L1	C2	C2	C1	C2	C1	C2	C1	C1	C1	C1	C1	C2	L4	L4	F2	F2	F2	F2
2	F1		F2		F1			C1	H1			H1	C1	C1	C1	C1	C2	C2	C3	C1		F2	F5	
3				F1	F1	L1	LH11	H1	H1		C1	L1	HL11	C1	C1	C2	C1	C2	L2	L1	F1	F3	F2	F1
4	F1	F1	F2	F3	F1		C1	C1	C1	C1	C1	C1	C1	C1	C1	C2	C2	C1	L1	F3	F4	F4	F3	F4
5	F4	F1	F1	F1			C1	C1	C1	C2	C1	C1	C1	C1	C1	C2	C3	C7	C3	C5	F5	F5	F1	F5
6	F1		FF12	F3	FQ31	L3	C2	C2	C1	C1	C1	C2	C1	C1	LC11	C1	C3	C5	C7	L8	F8	F8	F6	FF14
7	F3	F6	F6	FF16	F2	LH11	C2	C3	C2	C1	C1	C2	C2	C1	C2	CLH11	CL21	CL22	C8	C8	F5	F6	F7	F3
8	F5	F5	F5	F3	F6	L4	LC11	CL41	C2	C2	CL31	CL31	CL11	CL11	C3	C3	C3	C4	C5	L8	F6	F4	F3	F4
9	F3	F3	F3	F7	F2	L2	C2	C1	C1	C1	C1	C1	C1	L1	L1	L1	L1	C2	C8	C5	F5	F4	F3	F8
10	F3	F4	F3	F4	F3		CL21	C2	C2				C1	C1	C2	C1	C4	C4	C4	L4	F4	F8	F5	F3
11			F1				C2	C2	C2	C2	C1	C1	L2	CL13	L2	L2	CL21	CL51	C6	C6	F6	F6	FQ31	FQ41
12	F4	F5	F5	F3	F3		C5	L4	L3	LQ21	L1	L1	L1	C1	H1	H1	C3	C5	C3	C8	F5	F3	F3	F4
13	F4	F4	F3	F3	F2	L2	L1	CL21	C2	C3	C2			L2	L2	C2	C3	CQ31	HCO13	C5	L5	F3	F1	FF21
14	F5	F4	F4	F4	F3	L4	C2	C5	C1	C1	C4	L1	L1	L3	CL32	C3	CL22	CL22	CL33	FQ81	FQ51	F5	FF52	FF82
15	F1	F3		F1	F1	C3	C2	C2	C2	C3	C2		C1	C1	C1		H1	C2	C4	C4	F8	F8	F4	F4
16	F2	F4	FQ11	FQ31	FQ11		C1	C1	C2	C1	C2	C2	C2	C3	CQ31	C2	L4	H1	CL41	L8	F5	F5	FF34	F6
17	FQ31	FQ21	FQ11	FQ11	F1	C1	L1	C1	C2	C2	C5	L3	L2	L2	L2	L2	L3	L3	L2	L5	F2	F2	F2	F1
18	F3	F3	FQ31	F3	F3	C1	C2	C2	C3	C3	C4	L3	L3	L3	L3	C4	C3	C5	C6	C6	FF32	FF32	F4	F4
19	F4	F4	F5	F3	F2	CL11	C1	CL21	CL21	C1	C3	C2	C1	C1	L1	C1	C2	C2	CL31	CL31	F3	F2	F3	F2
20	F2	F2		F2	F1		HL11	L1	L1	L1	CL11	C2	C1	C2	C1	C1	C1	CL11	CL22	C2	F1	F1	F4	F4
21	F4	F4	F4	F3	F2	L1	C2	C2	C2	C2	L2	L2	L1			CL21	CL21	C3	C5	L5	F3	F3		
22	F2	F6	F6	F6	FQ21	L5	L3	CL12	CL43	C3	C3	C1	C1	L2	C1	CL11	CL11	CQ2	C4	C1	F3	F7	F3	FQ31
23	F4	F3	F3	F2	F2	LQ11	H1	C1	C2	C1	C3	C1	C2	L2	L2	L2	L4	L5	L6	CL23	F5	FF23	F3	F6
24	F3	F3	F4	F3	F2	L1	L3	L2	C1	C2	C2	C1	C2	C3	C2	C2	C1	C2	C2	L4	F2	F5	F3	F5
25	F2	F3	F3	F4	FQ31	L3	L3	HL12	HL12	HL11	L2	L1		C1	C2	H1	L1	CL11	C2	L1	F1		F3	F4
26	F2	F4	F3	F2	F2	L3	C1	CL11	C2	C2	C2	C2	C2	C1	C1	C1	L3	L1	CL33	FF23	FF13	F2	F3	F4
27	F5	F5	F2	F4	F5	L1	L2	C2	C1	C3	C2	C2	C1	C1	C1	C2	L2	LQ21	L2	L2	F6	F2	F1	F3
28	F3	F3	F3	F1	F1	C1	C2	C6	C3	C2	C2	C2	C2	L4	L4	LQ31	L3	L5	LQ31	LQ31	F6	F4	FF22	F3
29	F3	FF13	F3	FQ11	F1	L1	C2	C2	C2	C3	C1	C1	C1	C1	C1	C1		C2	CL23	LC11	L4	L4	F4	F3
30	F2	F2	F2	F1			L2			C1	C2	C2	L1	L1	L2	L3	L3	LQ41	LQ51	LQ51	F4	F3	F2	FF11
31	FQ21	FQ21	FQ31	FQ21	F4	LQ21	L3	CL23	CL23	CL11	CL11	C2	CLQ12	H1	H1	C2	C3	C3	C3	L4	F5	F5	F4	FF24
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																								
MED																								
U Q																								
L Q																								

IONOSPHERIC DATA STATION Okinawa

MAY 2013 f_{XI} (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X	X	X	X	X																X	X	X	X
	128	122	122	114	106																146	134	149	146
2	X	X	X	X	X																X	X	X	X
	150	149	136	138	127																126	121	124	133
3	X	X	X	X	X																X	X	X	X
	148	146	147	118	100																112	103	110	108
4	X	X	X	X	X																X	X	X	X
	117	118	117	109	88																116	114	113	113
5	X	X	X	X	X																X	X	X	X
	112	112	108	94	74																110	129	139	103
6	X	X	X	X	X																X	X	X	X
	123	114	106	104	88																111	114	107	104
7	X	X	X	X	X																X	X	X	X
	105	104	103	83	68																114	103	100	98
8	X	X	X	X	X																X	X	X	X
	96	96	98	83	83																114	112	118	118
9	X	X	X	X	X																X	X	X	X
	110	108	107	86	78																99	97	93	93
10	X	X	X	X	X																X	X	X	X
	95	91	90	88	78																110	111	132	138
11	X	X	X	X	X	X															X	X	X	X
	137	113	146	118	102	94															124	102	118	130
12	X	X	X	X	X																X	X	X	X
	128	123	118	114	121																111	104	94	94
13	X	X	X	X	X																X	X	X	X
	87	98	96	88	87																122	122	122	125
14	X	X	X	X	X																X	X	X	X
	110	123	128	117	106																101	111	122	131
15	X	X	X	X	X																A	A	X	X
	142	128	135	114	103																		89	85
16	X	X	X	X	X																X	X	X	X
	80	82	88	82	68																111	113	112	105
17	X	X	X	X	X																X	X	X	X
	104	106	96	80	75																105	113	114	94
18	X	X	X	X	X																X	X	X	X
	97	110	98	55	48	54															124	94	91	94
19	X	X	X	X	X																X	X	X	X
	90	88	87	82	70	67															130	134	133	128
20	X	X	X	X	X																X	X	X	X
	124	117	108	102	99																83	86	94	90
21	X	X	X	X	X																X	X	X	X
	86	86	85	81	69																110	107	105	100
22	X	X	X	X	X																X	X	X	X
	100	111	107	94	92																90	90	95	91
23	X	X	X	X	X																X	X	X	X
	92	92	97	87	75																107	111	114	104
24	X	X	X	X	X																X	X	X	X
	106	98	82	73	64	61															113	110	100	100
25	X	X	X	X	X																X	X	X	X
	99	99	103	114	90																86	90	88	88
26	X	X	X	X	X																X	X	X	X
	99	87	65	67	63	64															106	96	99	104
27	X	X	X	X	X																X	X	X	X
	110	117	106	94	82																95	100	108	111
28	X	X	X	X	X																X	X	X	X
	110	118	113	93	69																83	82	86	90
29	X	X	X	X	X																X	X	X	X
	82	82	79	73	71																100	90	85	78
30	X	X	X	X	X																X	X	X	X
	86	83	87	91	63																99	101	108	103
31	X	X	X	X	X																X	X	X	X
	109	112	112	100	85																92	96	99	100
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	5															30	30	31	31
MED	X	X	X	X	X																X	X	X	X
	106	110	106	93	82	64															110	106	108	103
U Q	X	X	X	X	X																X	X	X	X
	123	118	117	114	99	80															114	113	118	118
L Q	X	X	X	X	X																X	X	X	X
	95	92	90	82	69	58															99	96	94	94

MAY 2013 f_{XI} (0.1MHz)

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MAY 2013 foF2 (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1	122 ^R	116	116	108	100	88	87	81	81	86	91	100	110	125	128	130	141	141	140	137	140	128	J R	J R		
2	J R	144	155 ^R	130	132	121	87	83	104	84 ^H	98	99	114	115	118	125	128	137	144	149 ^R	152 ^R	120	115	118	127 ^R	
3	R	142	140 ^R	141	112	94	85	76	91	90	88	93	108	117	116	122	132	142	140	136	128	106	97	104	102 ^R	
4	111	112	111	103	82	72	86	98	87	92	94	105	109	116	119 ^R	130	129	122	124	124	110	108	107	107		
5	106	106	102	88	68	67	79	108	96	86	84	97	106	110	120	136	135	131	A	110	104	123 ^R	J R	R	97 ^R	
6	J R	117	108	100	98	82	69	72	81	86	90	95	104	114	116	121 ^R	125	126	130	128	114	105	108	101	98	
7	99	98	97	77	62	70 ^R	75	84	83	84	92	102 ^{J R}	113	126	130	134	130	131	147 ^{U R}	143 ^R	108	97	94	92		
8	90	90	92	77	77	74	68	72	69	76	90	98	108	123	132	130	135	136	138	135	108	106	112	112		
9	R	104	102	101	80	72	69	77	77	79	78	84	96	104	112	114	120	124	114	107	105	93	91	87	87 ^R	
10	89	85	84	82	72	64	73	86	72	68	B	R	99	114	120	118 ^R	113	115	118	126	125	104	105	126	132 ^R	
11	R	131	107 ^{U R}	140	112	96	88	94	92	88	103	108	114	133	140	146 ^{U R}	144 ^{U R}	144	140	135	138	118	96	112	124	
12	122	117	112	108	112	109	86	A	83	79	86	92	107	116	124	128	128	125	117	112	105	98	88	88		
13	81	92	90	82	81	83	94	74	68	A	80	B	111	124	140	144	141	134	130	128	116	116	116	119		
14	J R	104	117 ^{J R}	122	111	100	97	93	84	82	86	90	101 ^{J R}	110	115	120	134	138	137	126	115	95	105	116	125	
15	U R	136	122	129 ^R	108	97	86	81	88	94	89	92	B	115	118	116	109	106	109	112	99	A	A	82	79 ^R	
16	R	74	76	82	76	62	57	65	72	78	75	80	88	104	119	124	129	136	136	124	106	105	107	106	99 ^R	
17	98	100	90	74	69	66	75	93	81	80	82	98	A	114	130	133	118	110	108	99	107	108	U R	88 ^R		
18	91	104	92	49	42	46	65	84	71	77	96	110	128	134	150 ^{U R}	152 ^R	148	152	140	130	118	88	85	88 ^R		
19	F	81	F	F	F	F	58	72	89	74	73	85	98	106	113	119 ^R	114	123	136	134	130	124	128	127	122 ^R	
20	U R	118	111	102	96	93	74	74	69	69	73	80	93	91	94	97	104	106	108	108	92	77	80	88	84	
21	80	80	79	75	63	60	61	66	74	78	74	80	94	101	108	106	109	107	106	105	104	101	99	94		
22	94	105 ^R	101	88	86	71	77	84	94	84	90	90 ^{U R}	96	105	115	A	97	99	95	92	84	84	89	85		
23	86	86	89	81	69	62	66	81	85	85	83	A	107	113	122	126	127	129	114	104	101	105	108	98		
24	100	92	F	R	F	F	68	84	70	78	80	86	96	106	114	114	119	117	120	115	107	104	94	94		
25	93	93	Z	108	84	60	60	74	69	67	68	78	89	82	87	95	98	115	110	94	80	84	82	82		
26	93	81	59	57	F	F	85	72	59	63	79	102	J R	98	95	104	118	116	112	113	114	100	90	93	98 ^R	
27	104	111	100	88	76	64	69	82	63	65	74	80	83	A	96	104	113	119	118	113	89	94	102	105 ^R		
28	R	104	112	107 ^R	87	63	56	62	75	82	71	70	V	74	81	90	100	102	A	105	108	99	77	76	80	84
29	76	76	73	67	F	64	67	74	80	81	76	73	A	A	96	99	104	111	111	105	102	94	84	79	72	
30	80	77 ^R	81	85	57	50	58	71	78	74	65	72	86	104	110	124	135	146	143 ^R	137 ^R	93	95	102	97		
31	U R	103	R	F	F	73	76	97	88	76	76	76	79	82	86	96	111	115	106	94	86	90	93	94		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	31	31	31	31	31	31	31	30	31	30	30	27	29	29	31	30	30	31	30	31	30	30	31	31		
MED	100	104	100	87	75	69	75	83	81	78	84	98	107	115	119	126	128	125	122	114	104	100	102	97		
U Q	117	112	111	108	93	83	83	89	86	86	92	102	114	120	124	130	136	136	135	130	108	107	112	112		
L Q	89	86	84	76	63	60	68	74	71	74	79	86	95	102	108	109	113	114	110	104	93	90	88	88		

MAY 2013 foF2 (0.1MHz)

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IONOSPHERIC DATA STATION Okinawa

MAY 2013 foF1 (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									AU	L	L	A	L	AU	L	A	L	L						
2										L	A	L	A	U	L	U	L	L	L	L				
3								L			U	L	R	L	A	L	U	L	A	L				
4									L	L	L	L	L	AU	L	A	L	L	L	A				
5								L	L	L	L	L	L	A	A	A	U	L	A	A				
6										L	L	AU	L	592		L	L	A	A					
7									A	AU	L	A	L		U	L	L	L	L					
8							L	U	L	L	L	U	L	A	L	A		L	A					
9									A		A			AU	L	A	A	A	A	A				
10								L	A		B	U	L	U	L	A	A	A	A	A				
11								L	L	L	U	L	L	A	A	U	R		L	A				
12								AU	L	L	U	L	U	L	L	L	A	A	A	A				
13									A	A	B	B	A	A			L	L	A					
14									A	A	B	B	L		556	560	560	544	472					
15									A	A	A	B	A	A	544	564	528	504						
16								L	L	L	U	L	576	552	564	576	556	524	476					
17									L	A	A	A	A	A	A	A	A	L						
18									A	A	A	A	A	A	AU	A	L	L	A					
19									A	L	L	A	AU	AU	U	L	U	U	L	L				
20								L	U	L	A	536	532	564		A	A	L	L					
21						224			L	L	L	L	U	L	540	548	516	544	A	A				
22								L	U	L	AU	L	A	A	A	A	A	U	L	A	A			
23								L		L	L	U	A	A	L	L	U	L	U	L				
24								A		AU	L	A	A	A	532	536	A	L	A					
25								L	L	L		U	L	R	U	A	552	528	496	448				
26								A	A	A	A	A	A	A	A	A	A	A	488					
27								L	A	AU	L	A	A	A	AU	A	564	472	A	A				
28								L	L	U	L	U	L		U	A	A	A	A	A				
29									L	A	A	A		AU	B	U	Y	U	A	L	L	L		
30								L	U	L	A	R		A	A	AU	A	A	A	A				
31								L	A	L	U	L	U	L	L	R	L	U	A	A	A			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							1	1	4	2	11	13	10	14	15	20	16	10						
MED							U	L	U	L	U	L	U	L	U	L	U	L	L					
U Q							556		588	566	576	564	576	562	528	492								
L Q							U	L		U	L		512	520	536	528	540	536	528	502	472			

MAY 2013 foF1 (0.01MHz)

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MAY 2013 foE (0.01MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1						B	A	276	324	360	U R	B	B	B	B	A	A	U A	U A	A	A				
2						B	A	256	348		B	B	B	B	B	U R	U R	U A	A	A					
3						B	U A	176	276	328	U R	B	B	A	A	A	B	U A	U A	A	A				
4						B	A	280	320	352	A	U R	B	A	B	B	A	A	A	A	A				
5						B		192	264	316	A	B	B	B	B	B	A		U A	A					
6						B		176	260	328	U A	A	B	B	B	B	U A	A	304	236					
7						B	U A	200	276	316	U R	B	B	A	B	B	B		300		A	A			
8						B	B	264			R	A	A	B	B	U R	U R		A	A	A				
9						A	A	260	332		A	A	B	B	A	A	A		308		A	A			
10						B	A	260	324		A	B	B	B	B	U A	A	U A	U A	A					
11							U A	192	264	320	U R	A	A	A	A	B	B	B	U A	A					
12						A		200			U R	A	B	B	B	B	B	B	304		A	A			
13						B		212	264	316	U R	B	B	B	B	B	U R			A	A				
14						B		180	284	328	U R	B	B	B	B	B	R	B	308	256					
15						A	A	272	324	352		B	B	B	B	B	A	B	U A		A				
16						B		196	268	324	U R	B	B	B	B	B	U R	U R	U R		A				
17						B	A	280	324	340	A	A	A	A	A	A	A	A	A	A	A				
18						B	A	268	312	344	U A	A	A	A	A	A	A	B	U A	A	A				
19						A	A	268	324		A	A	B	B	B	B	U R		A	A	B				
20						B		188	288		A	A	B	A	B	A	A	B	A	A					
21						A	B	276	344	348	U R	A	B	B	B	B	A	A		A					
22						B		200	272		U A	A	A	A	A	A	A	A	U A	A	A				
23						B	U A	192	288	316	B	B	B	A	B	B	U A	U A		A					
24						B	A		A	A	A	A	A	A	B	U R	U A		A	A					
25						B	R	196	284		A	A	R	B	B	B	U R	B	R	A	A				
26						B	A		A		B	B	B	B	B	B	B	A	A	A	A				
27						B	U A	180	264	320	U R	B	B	A	A	A	A	A	A	A	A				
28						B	U A	204	276	324	A	U R	B	B	A	A	A	A	A	A	A				
29						A	A	272	316	360	U A	A	A	A	B	B	A	A	R		A				
30						B		180	276	328	U A	A	B	A	B	A	A	A	A	A	A				
31						B	A		A	A	U R	R	B	B	B	B		R	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT							16	27	24	15	4	1				1	5	11	22	11					
MED							192	272	324	U	U R	U R				U R	U R	352	308	244					
U Q							200	276	328	364	384						U	U R	U A						
L Q							180	264	318	348	374						U R	368	340	300	236				

IONOSPHERIC DATA STATION Okinawa

MAY 2013 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	E 14	BE 14	B 28	J 59	A 63	J 20	J 23	A 36	J 43	A 46	J 50	A 64	J 59	J 56	A 51	J 58	J 48	A 36	J 44	A 65	J 70	A 38	J 25	BE 17	
2	J 29	A 22	J 24	AE 14	B 23	AE 14	20	G 28	25	46	J 56	A 57	58	J 48	AE 45	B 52	46	J 38	A 33	J 22	A 36	J 21	A 28	19	
3	E 14	BE 14	BE 14	BE 14	BE 14	BE 14	23	33	38	46	E 45	B 47	51	J 66	A 72	43	J 51	A 96	A 45	J 20	A 21	AE 14	BE 14	18	
4	J 17	AE 14	B 20	E 14	BE 18	BE 14	22	G 44	J 42	J 60	A 55	J 59	J 46	A 83	52	J 52	A 50	A 103	J 35	A 38	J 30	A 36	AE 14	14	
5	E 19	BE 14	BE 14	BE 14	BE 14	BE 14	G 30	40	42	J 52	A 47	47	J 56	A 65	73	J 51	A 92	A 132	A 124	J 74	A 66	A 66	A 20	20	
6	E 14	B 22	E 14	BE 14	BE 17	BE 14	20	30	36	J 46	A 47	AE 56	49	48	52	J 50	A 58	A 68	A 68	A 46	A 61	A 61	A 49	55	
7	J 33	A 18	A 18	AE 14	BE 14	BE 14	24	J 56	A 54	A 51	A 49	A 55	A 55	A 58	A 47	45	43	37	34	34	22	31	22	38	
8	J 45	A 38	A 41	A 67	AE 65	BE 14	20	22	27	42	43	42	64	54	57	48	54	66	48	76	62	30	38	33	
9	J 44	A 46	A 38	A 21	A 26	A 26	22	J 49	A 52	A 50	A 55	A 49	A 54	A 52	64	83	57	72	69	66	76	40	45	25	
10	J 18	A 23	A 18	A 21	AE 14	BE 14	24	A 37	A 57	A 59	BE 44	BE 48	50	J 66	A 62	69	104	109	69	38	A 35	A 66	A 68	68	
11	J 44	A 22	A 31	A 18	A 19	A 19	18	G 36	A 44	A 42	46	44	88	58	44	46	48	58	60	49	67	83	122	96	
12	J 53	A 45	A 41	A 39	A 26	A 27	136	G 46	42	44	48	46	46	71	64	60	62	50	105	70	29	26	26	26	
13	J 28	A 51	A 52	A 19	AE 14	BE 14	G 33	J 49	A 70	69	BE 77	BE 62	62	46	G 48	A 73	106	93	73	51	30	30	30	30	
14	J 41	A 22	A 32	A 20	A 27	AE 14	23	33	38	81	60	75	58	50	46	34	37	37	17	19	36	30	24	24	
15	J 20	A 19	A 30	A 20	A 19	J 27	26	47	67	61	83	64	62	48	J 52	AE 43	B 40	45	60	88	106	72	87	87	
16	J 72	A 31	A 27	A 18	A 19	BE 14	G 30	38	40	44	47	47	46	48	45	G 20	G 68	G 28	19	23	53	53	53	53	
17	J 48	A 56	A 36	A 43	AE 31	BE 14	28	38	47	48	60	65	122	100	103	69	54	38	32	J 38	A 28	A 20	A 23	29	
18	J 36	A 27	AE 14	BE 14	BE 14	BE 14	31	52	47	60	80	61	107	182	107	54	46	49	78	60	66	55	58	88	
19	J 107	A 52	A 32	A 23	A 24	A 31	24	46	45	54	68	56	67	79	95	42	G 36	J 29	A 34	20	A 24	A 17	27	27	
20	J 18	A 31	A 22	A 21	BE 14	BE 16	41	36	39	88	59	48	58	75	82	55	44	38	29	20	A 20	A 20	19	14	
21	J 54	A 33	A 49	A 18	A 31	AE 28	20	26	G 45	G 52	46	46	49	46	J 62	A 67	109	53	89	41	73	16	16	16	
22	E 18	BE 16	BE 19	BE 51	BE 40	BE 14	G 30	J 50	A 67	A 57	108	123	66	117	137	78	88	106	42	52	58	45	41	41	
23	J 61	A 28	A 29	A 38	A 24	A 16	24	33	J 49	A 52	75	98	107	54	43	46	43	35	31	J 29	A 25	A 49	A 48	28	
24	J 76	A 66	A 65	A 87	A 30	A 29	53	60	38	79	55	63	72	62	52	47	54	53	102	62	38	32	31	22	
25	20	J 44	A 21	A 28	A 19	A 14	15	24	G 35	G 38	34	46	50	59	49	44	38	G 31	J 22	17	16	19	16	16	
26	J 38	A 16	A 68	A 49	A 65	A 35	27	53	J 52	A 60	67	104	67	56	J 73	64	74	44	68	75	42	46	22	21	
27	J 68	A 63	A 40	A 24	A 18	A 18	22	33	J 46	A 90	80	55	76	184	117	59	41	88	69	56	50	22	18	18	
28	20	J 16	A 16	A 20	J 16	A 18	22	31	J 37	A 51	GE 45	45	65	87	77	121	90	96	49	17	17	14	51	51	
29	J 46	A 30	A 38	A 20	A 19	A 24	24	37	J 44	A 84	61	129	107	54	49	58	39	26	G 20	14	14	28	41	41	
30	J 40	A 38	A 18	A 19	BE 14	BE 14	G 31	G 51	A 46	48	52	59	69	74	J 76	126	88	82	79	50	30	30	19	19	
31	J 40	A 21	A 28	A 48	A 29	A 23	29	40	J 52	A 48	42	44	48	46	46	52	50	74	72	87	86	88	46	30	30
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	31	31	31	30	29	31	31	31	31	31	31	31	31	31	31	31	31	
MED	J 38	A 27	A 28	A 20	A 19	A 14	22	33	J 44	A 50	55	54	58	56	57	52	50	50	62	50	42	35	30	27	
UQ	J 48	A 44	A 38	A 39	A 29	A 24	24	46	J 50	A 61	61	64	76	66	82	64	58	74	82	68	70	58	49	41	
LQ	E 19	BE 18	BE 18	BE 18	BE 14	BE 14	G 30	G 38	42	45	46	49	50	48	46	43	37	33	34	J 22	A 21	22	19	19	

IONOSPHERIC DATA STATION Okinawa

MAY 2013 fbEs (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	E B	E B	22	21	28	E B	20	34	41	44	50	58	56	55	50	56	47	36	44	52	40	22	19	E B
2	22	E B	20	E B	19	E B	20	28	25	G	46	55	56	58	47	E B	50	41	35	29	22	29	E B	E B
3	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
4	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
5	17	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
6	E B	18	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
7	22	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
8	22	20	21	29	24	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
9	20	38	25	19	24	22	21	35	51	48	53	48	53	50	58	62	56	70	66	60	61	21	20	19
10	E B	14	19	17	14	14	14	21	33	45	40	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
11	E B	E B	24	16	18	19	17	31	42	40	43	43	76	56	44	46	44	43	46	45	21	37	42	43
12	35	32	30	35	22	20	GA	AA	136	41	G	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
13	20	21	32	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
14	29	20	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
15	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
16	44	25	20	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
17	30	30	21	22	30	E B	25	36	44	43	59	62	AA	AA	AA	99	68	53	38	32	33	24	E B	22
18	26	22	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
19	50	34	23	16	17	25	22	44	41	47	56	55	66	56	46	41	G	36	29	E B	E B	E B	E B	18
20	E B	20	16	19	E B	14	21	32	39	60	48	44	56	67	65	55	44	33	28	20	19	18	E B	E B
21	40	E B	32	E B	24	20	E B	G	G	G	44	46	46	46	48	45	62	64	96	48	49	24	E B	E B
22	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
23	30	22	23	22	18	E B	22	31	44	48	51	55	88	E B	54	43	45	42	33	30	23	20	30	28
24	30	28	22	45	21	26	42	44	37	75	51	61	67	60	49	45	52	47	72	19	24	21	19	21
25	E B	21	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
26	E B	E B	38	23	30	E B	22	42	50	58	65	58	66	UY	56	70	63	74	38	59	57	32	37	20
27	21	21	32	22	E B	14	21	32	42	60	43	54	74	AA	80	56	41	65	58	32	38	17	E B	E B
28	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
29	20	20	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
30	28	34	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
31	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	30	29	31	31	31	31	31	31	31	31	31	31	31	31
MED	20	20	19	E B	E B	E B	21	32	41	46	49	48	58	55	51	50	46	43	44	43	24	24	22	20
U Q	29	22	23	22	23	19	22	40	45	58	56	57	67	60	65	58	56	64	65	57	41	30	28	25
L Q	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B

IONOSPHERIC DATA STATION Okinawa

MAY 2013 fmin (0.1MHz) 135°E MEAN TIME (G.M.T. + 9 H)

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

$\begin{matrix} H \\ D \end{matrix}$	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	14	14	14	14	14	14	14	19	22	26	34	45	42	44	40	38	33	23	14	14	14	14	14	17
2	14	14	14	14	14	14	14	19	22	40	40	44	44	42	45	30	24	20	16	14	14	14	14	14
3	14	14	14	14	14	14	14	16	21	24	45	42	37	45	41	40	23	20	17	14	14	14	14	14
4	14	14	14	14	14	14	14	19	20	24	32	31	43	42	41	41	24	21	18	14	14	14	14	14
5	14	14	14	14	14	14	14	17	18	38	41	40	41	43	43	42	39	20	16	14	14	14	14	14
6	14	14	14	14	14	14	14	19	22	24	32	42	49	43	43	42	24	20	15	14	14	14	14	14
7	14	14	14	14	14	14	14	20	20	30	41	42	33	39	42	41	43	22	15	16	14	14	14	14
8	14	14	14	14	14	14	20	19	17	24	24	33	44	42	26	20	22	18	16	15	14	14	14	14
9	14	14	14	14	14	14	14	17	20	23	34	40	41	32	29	24	26	21	19	15	14	14	14	14
10	14	14	14	14	14	14	14	15	23	27	B	44	48	43	44	32	24	22	15	14	14	14	14	14
11	14	14	14	14	14	14	14	15	19	24	22	38	33	32	44	46	40	20	16	14	14	14	14	14
12	14	14	14	14	14	14	14	14	19	21	28	44	48	46	46	40	37	22	16	14	14	14	14	14
13	14	14	14	14	14	14	14	16	24	36	40	B	77	46	44	46	21	23	17	15	14	14	14	14
14	14	14	14	14	14	14	14	20	22	22	46	75	58	46	46	32	37	20	18	17	14	14	14	14
15	14	14	14	14	14	14	14	20	22	23	39	B	45	42	40	36	43	20	21	14	14	14	14	14
16	14	14	14	14	14	14	14	20	21	23	31	47	41	46	44	29	22	24	15	14	14	14	14	14
17	14	14	14	14	14	14	17	20	20	24	40	38	40	33	32	31	24	17	22	14	14	14	14	14
18	14	14	14	14	14	14	17	15	20	26	38	32	42	42	40	39	38	20	18	14	14	14	14	14
19	14	14	14	14	14	14	14	19	17	30	31	42	42	41	40	39	23	20	17	14	14	14	14	14
20	14	14	14	14	14	14	14	14	21	21	34	33	38	40	38	43	30	24	14	13	14	13	14	14
21	14	14	14	14	14	14	20	15	23	24	24	40	46	43	41	33	23	23	14	14	14	14	14	14
22	14	16	19	14	14	14	15	14	20	20	27	34	43	43	36	24	25	18	15	15	14	14	14	14
23	14	14	14	14	14	14	14	15	18	37	41	41	38	54	42	42	24	16	14	14	14	14	14	14
24	14	14	14	14	14	14	14	19	22	22	26	39	42	42	40	31	22	20	15	14	14	14	14	14
25	14	14	14	14	14	14	14	14	15	22	32	43	44	42	43	24	34	20	20	14	14	14	14	14
26	14	14	14	14	14	14	14	20	20	39	40	41	42	43	37	32	29	21	15	14	14	14	14	14
27	14	14	14	14	14	14	14	16	20	22	39	42	33	33	39	31	24	18	14	14	14	14	14	14
28	14	14	14	14	14	14	17	14	21	23	24	45	43	32	32	31	20	18	16	14	14	14	14	14
29	14	14	14	14	14	14	14	18	16	22	28	32	32	54	46	24	20	21	16	14	14	14	14	14
30	14	14	14	14	14	14	14	16	20	32	42	38	40	35	32	30	21	17	16	14	14	14	14	14
31	14	14	14	14	14	14	14	14	17	22	32	30	44	44	43	41	30	20	17	14	14	14	14	14
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	14	14	14	14	14	14	14	17	20	24	34	41	42	42	41	33	24	20	16	14	14	14	14	14
U Q	14	14	14	14	14	14	14	19	22	30	40	44	44	44	44	41	34	22	17	14	14	14	14	14
L Q	14	14	14	14	14	14	14	15	19	22	28	38	40	40	38	30	23	20	15	14	14	14	14	14

MAY 2013 fmin (0.1MHz)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

MAY 2013 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

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	289	293	300	308	322	311	325	343	340	305	296	276	268	286	289	282	293	298	301	299	314	293		R
2	J R 317	R 304	R 322	R 324	R 329	R 314	R 324	R 313	H 302	R 295	R 291	R 298	R 281	R 293	R 289	R 297	R 309	R J R 308	R 338	R 329	R 269	R 294	R 321	
3	R U R 298	R 329	R 337	R 321	R 305	R 310	R 323	R 332	R 331	R 317	R 283	R 284	R 289	R 283	R 284	R 291	R 312	R 313	R 324	R 319	R 294	R 278	R 269	R 282
4	R 289	R 312	R 311	R 322	R 306	R 301	R 314	R 355	R 324	R 305	R 278	R 280	R 281	R 285	R 286	R 299	R 305	R 304	R 308	R 314	R 307	R 286	R 282	R 278
5	R 289	R 297	R 305	R 343	R 289	R 274	R 299	R 338	R 341	R 337	R 281	R 274	R 276	R 273	R 280	R 296	R 311	R 313	A 310	R 287	R 287	R J R 284	R 301	
6	R 284	R 299	R 322	R 330	R 277	R 303	R 333	R 324	R 315	R 303	R 255	R 263	R 271	R 289	R 299	R 299	R 304	R 300	R U R 320	R 339	R 322	R 275	R 278	R 291
7	R 287	R 289	R 289	R 279	R 298	R 323	R 315	R 338	R 307	R 286	R 274	R 273	R 271	R 289	R 296	R 300	R 300	R 306	R 312	R 335	R 293	R 275	R 281	R 292
8	R 282	R 294	R 316	R 287	R 300	R 295	R 313	R 332	R 322	R 309	R 283	R 281	R 279	R 286	R 292	R 298	R 310	R 314	R 301	R 304	R 292	R 290	R 283	R 278
9	R 285	R 291	R 302	R 325	R 323	R 309	R 312	R 371	R 327	R 301	B 263	R 281	R 279	R 286	R 292	R 298	R 310	R 314	R 301	R 304	R 292	R 290	R 283	R 278
10	R 308	R U R 289	R 346	R 343	R 314	R 311	R 330	R 325	R 289	R 290	R 294	R 278	R 282	R 287	R 298	R 301	R 301	R 311	R 316	R 327	R 346	R 269	R 270	R 291
11	R 299	R 298	R 302	R 307	R 311	R 341	R 342	A 330	R 289	R 281	R 263	R 276	R 283	R 285	R 299	R 305	R 308	R 310	R 303	R 299	R 300	R 291	R 282	
12	R 281	R 289	R 294	R 304	R 317	R 335	R 370	R 379	R 335	A 274	R 274	R 277	R 292	R 298	R 299	R 296	R 308	R 306	R 313	R 316	R 287			
13	J R 295	R 321	R 302	R 316	R 318	R 333	R 331	R 312	R 280	R 269	R 277	R 272	R 277	R 279	R 287	R 293	R 309	R 302	R 303	R 298	R 299	R 280	R 292	
14	R 314	R 318	R 321	R 299	R 283	R 297	R 313	R 303	R 309	R 294	R 284	R 283	R 295	R 297	R 288	R 298	R 299	R 315	R 320	R 299	R 300	R 291	R 282	
15	R 276	R 269	R 314	R 342	R 317	R 305	R 347	R 345	R 333	R 305	R 281	R 272	R 260	R 278	R 281	R 281	R 293	R 304	R 315	R 289	R 278	R 272	R 274	R 286
16	R 285	R 311	R 324	R 300	R 300	R 295	R 326	R 339	R 304	R 309	R 271	R 272	R 260	R 278	R 281	R 281	R 293	R 304	R 315	R 289	R 278	R 272	R 274	R 286
17	R 276	R 325	R 349	R 310	R 264	R 273	R 327	R 357	R 315	R 251	R 255	R 257	R 267	R 275	R 301	R 298	R 305	R 291	R 302	R 284	R 282	R 273	R 279	
18	R 304	R 288	R 312	R 298	R 274	R 283	R 307	R 334	R 337	R 284	R 277	R 281	R 283	R 290	R 296	R 291	R 292	R 296	R 297	R 292	R 303	R 296	R 298	R 295
19	R 281	R 283	R 297	R 285	R 317	R 322	R 330	R 352	R 293	R 267	R 283	R 286	R 287	R 281	R 276	R 284	R 289	R 299	R 308	R 316	R 305	R 264	R 267	R 272
20	R 277	R 267	R 308	R 322	R 315	R 327	R 332	R 315	R 337	R 330	R 277	R 281	R 281	R 284	R 288	R 286	R 285	R 292	R 280	R 282	R 283	R 282	R 290	R 278
21	R 278	R 281	R 321	R 316	R 317	R 324	R 330	R 308	R 319	R 328	R 267	R 276	R 261	R 266	R 296	R 289	R 299	R 299	R 292	R 284	R 264	R 281	R 279	
22	R 282	R 299	R 310	R 323	R 305	R 305	R 307	R 314	R 322	R 302	R 270	R 269	R 273	R 287	R 289	R 300	R 303	R 292	R 290	R 274	R 263	R 272	R 282	
23	R 290	R 331	R 321	R 292	R 306	R 297	R 322	R 348	R 338	R 304	R 278	R 258	R 257	R 270	R 277	R 280	R 289	R 291	R 300	R 302	R 284	R 291	R 276	R 276
24	R 272	R 282	R 284	R 335	R 326	R 361	R 345	R 366	R 339	R 348	R 284	R 276	R 301	R 280	R 259	R 264	R 259	R 298	R 318	R 321	R 273	R 273	R 260	R 269
25	R 300	R 335	R 293	R 275	R 278	R 288	R 355	R 369	R 383	R 292	R 267	R 303	R 262	R 262	R 287	R 298	R 297	R 287	R 309	R 305	R 274	R 273	R 282	
26	R 281	R 294	R 307	R 311	R 309	R 294	R 315	R 346	R 335	R 279	R 283	R 281	R 270	R 266	R 268	R 291	R 302	R 303	R 320	R 309	R 270	R 274	R 277	
27	R 259	R 283	R 288	R 320	R 304	R 287	R 318	R 328	R 338	R 317	R 291	R 287	R 271	R 277	R 279	R 291	R 293	R 303	R 315	R 289	R 283	R 282	R 291	
28	R 290	R 297	R 297	R 294	R 266	R 298	R 319	R 330	R 335	R 327	R 316	R 278	R 277	R 284	R 293	R 298	R 296	R 294	R 295	R 291	R 292	R 269		
29	R 286	R 308	R 310	R 351	R 357	R 318	R 335	R 325	R 341	R 339	R 288	R 283	R 258	R 275	R 275	R 284	R 290	R 315	R U R 324	R 340	R 323	R 282	R 274	R 280
30	R 307	R 304	R 304	R 309	R 299	R 322	R 307	R 332	R 350	R 316	R 292	R 302	R 273	R 269	R 268	R 271	R 290	R 314	R U R 314	R 284	R 282	R 286	R 300	
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	29	31	31	31	31	31	30	31	30	30	27	28	28	31	30	29	31	29	31	30	30	29	29
MED	286	294	308	311	306	309	325	333	330	304	281	278	275	281	285	289	297	303	308	309	294	282	278	282
U Q	298	310	321	323	317	322	333	348	338	317	284	283	282	286	293	298	300	309	315	320	309	291	285	292
L Q	281	287	297	299	298	295	314	325	313	290	274	272	270	276	276	284	290	298	298	299	284	272	272	278

IONOSPHERIC DATA STATION Okinawa

MAY 2013 M(3000)F1 (0.01) 135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									A	U	L	L	A	L	A	A	A	L	L					
2										L	A	L	A	U	L	U	L	A	L	L	L			
3								L			U	L	U	R	L	A	A	H	U	L	A	L		
4									L	L	L	L	L	A	U	L	A	L	L	L	A			
5								L	L	L	L	L	L		A	A	A	A	A	A	A			
6										L	L	A	B			L	L	A	A					
7									A	A	U	L	A	L	L		U	L	L	L	L			
8							L	U	L	L	L	U	L	A	L	A		L	A					
9									A		A	A	A	A	A	A	A	A	A	A	A			
10								L	A		B	U	L	U	L	A	A	A	A	A	A			
11							L	L	L	U	L	H	A	A		U	R		L	A				
12							A	U	L	L	U	L	L	B	B	L	A	A	A	A				
13									A	A	B	B	A	A			L	L	A					
14									A	A	B	B	A			340	331	337	350					
15									A	A	A	B	A	A	A	368	337	341	347					
16								L	L	L	B				A	U	L	U	L	L	L			
17									L	A	A	A	A	A	A	A	A	A	L	L	A			
18									A	L	L	A	A	A	A	A	350	347						
19								A	L	L	A	A	A	U	L	U	L	U	L	L	L			
20							L	U	L	A				A	A	A	A		L	L				
21						B		L	L	L	L	U	L	372	364	383	357	U	L	A	A			
22							L	U	L	A	A	A	A	A	A	A	A	U	L	A	A			
23							L		L	L	A	A	L	L	A	U	L	U	L	L	L			
24							A		A	U	L	A	A	A	A	L	A	L	A	L	A			
25							L	L	L		U	L	A	A			329	356	349	348				
26							A	A	A	A	A	A	A	A	A	A	A	A	L	A				
27							L	A	A	U	L	A	A	A	A	A	A	370	A	A				
28							L	L	U	L	U	L			A	A	A	A	A	A				
29								L	A	A	A	A	B	Y	A			Y	L	L				
30							L	U	L	A	A	H	A	A	A	A	A	A	A	A				
31							L	A	L	U	L	L	A	A	A	A	A	A	A	A				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	4	2	11	12	8	9	13	14	15	10						
MED								U	L	U	L	U	L	U	L	U	L	L	L					
U Q								405	356	352	358	356	359	360	351	340	349	347						
L Q								U	L		U	L												
								377			377	373	372	366	364	356	356	348						
								U	L		U	L			A	A								
								343			335	343	342	342	330	334	339	344						

IONOSPHERIC DATA STATION Okinawa

MAY 2013 h'F2 (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1									226	320	306 ^L	336	352	334	322	348	314	300							
2										276	302	328	310	338	322	316	308	288	274						
3								242			346	326	320	320 ^A	344	338	294	276	248						
4									270	282	272	294 ^L	290	332	334	314	278	280	292						
5								242	236	250	352 ^L	330 ^L	340	340	352	318	282	284							^A
6									290	328	312 ^L	298	314	324	310	304	290								
7									250	268	396	326	370	328	308	304	294	296	272						
8						220	218	248	334 ^L	328	326	362	334	314	300	312	280								
9								248		300 ^A	316	342	330	328	320	288	272	290							
10								222	240		^B	354	336	322	306	336	312	310	310 ^A						
11								242	306 ^L	316	288	376	348	326	326	314	306	296	268						
12								^A	258	266 ^L	318	328	364	324	346	308	298	276	272						
13									^{E A}	382	^{E B}	368	372	344	330	312	296	278							
14									^{E A}	384	336 ^{E B}	346	348	350	364	338	310	290	262						
15									286	262 ^{E A}	398 ^B		342	314	308	316	314	306	270						
16									256	274 ^L	314 ^L	352	386	348	344	328	310	282	246						
17									246	338 ^{E A}	346		^A	^{E A}	412 ^A	330	304	276							
18									^{E A}	398	376	372	386 ^A	366	368	326	316	290	288						
19									248	352 ^L	366	340	334	330	320	308	318	300	286						
20									252	366 ^{E A}	378	368	350	336	352	332	304	292	264						
21							238		254	282	396 ^L	376	360	340	330	322	326	298	402 ^A						
22									250	282	252 ^A	358	422 ^{E A}	394	366	324		306	296	266					
23									262		280	310	412 ^A	404 ^{E A}	344	344	322	302	284	238					
24									244		^{E A}	394	354	378 ^A	388	372	354	338	318	316	308				
25									244	236	238		398	326	366	404	368	374	298	254					
26									224	218	392 ^A	406 ^{E A}	312	338	376 ^Y	390	336	322	294	312					
27									254	228	386 ^{E A}	370	360 ^{E A}	418 ^A	406 ^{E A}	366	324	298	280						
28									260	266	290	278	370	378	374	352 ^A	324		308	284					
29									266	326 ^{E A}	302 ^A		^A	^A	344	340	346	320	292	268	268				
30									278	266	256	388	380	402	350	358	344	332	284	272					
31									260	238	286 ^L	342	310	370	388	382	374	328	282	264					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT							2	15	22	27	29	28	29	29	31	30	30	31	26	1					
MED							229	244	252	277	335	344	347	340	342	327	311	292	272	268					
U Q							260	266	352 ^{E A}	373	374	382	366	358	338	318	298	288							
L Q							242	238	266	308	326	336	329	324	316	304	282	264							

MAY 2013 h'F2 (KM)

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MAY 2013 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

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	276	274	258	224	234	220	214	220	A	230	E A	A E A	A E A	A E A	A	A	250	278	270	258	262	256	270		
2	268	260	248	246	210	198	246	232	228	246	A	A	A	234	212	A	234	234	244	242	212	260	286	264	
3	258	236	216	192	224	210	230	228	228	230	214	E A	A	A E A	A	H E A	A	A	232	224	226	242	280	290	
4	268	252	244	218	210	236	256	230	222	206	E A	A	A	204	A	A E A	A E A	A	A	246	250	262	270	284	
5	280	264	244	208	252	292	252	224	A	226	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
6	278	278	254	228	218	208	236	228	218	204	H	H	A E B	E A E A	306	A	A	A	272	250	284	262	258	304	
7	290	262	236	190	270	250	240	236	A	A	A	A E A	A	A	A	A E A	A E B	A	A	270	252	248	260	272	
8	290	288	270	294	274	222		206	202	228	204	196	A E A	A	A	A	A	A	270	252	248	260	272	266	
9	274	278	244	244	270	246	238	230	A	A	256	258	A	A	A	A	A	A	A	A	278	310	270	294	
10	282	280	258	220	228	236	246	220	A	A	210	B	E B E A	A	A	A	A	A	A	252	232	264	304	288	
11	272	266	228	206	232	232	236	220	A	228	210	206	204	A	A	214	E B E A	A	A	246	214	302	300	294	
12	278	280	256	258	244	218	220		A	218	212	184	204	E B E B	E B	A	A	A	A	262	270	266	242	292	
13	308	300	288	244	242	232	214	208	224		A	A	B	B	A	A	236		A	278	254	242	242	280	
14	304	290	246	234	234	220	212	228	214	A	A	A	B	B	A E B	236	218	218	212	232	248	258	268	274	
15	262	250	242	226	232	246	240	232	A	A	A	B	A	A	A	216	268	264	248	254	A	A	A	A	
16	358	328	256	212	234	240	216	226	208	200	200	250	208	222	310	238	222	204	226	270	270	266	274	290	
17	288	254	246	244	282	250	238	232	218	224	E A	A	A	A	A	A	A	A	236	250	250	266	272	278	
18	306	250	196	198	308	308	250	236	232	A	A	A	A	A	A	A	A	A E A	A	284	262	282	306	322	
19	316	324	252	238	264	306	254	250	A	A	A	A	A	A	A	228	210	214	232	234	260	270	258	246	
20	274	290	266	256	218	222	244	234	218	A	E A	302	208	A	A	A	A E A	A	A	268	230	240	242	240	
21	334	286	276	226	240	234		220	204	218	214	216	232	226	E A	A	A	A	A	284	280	260	264	284	
22	296	274	236	234	234	214	244	210	E A	244	A E A	296	A	A	A	A	A	A	276	254	272	304	296	316	
23	302	280	260	240	240	234	226	222	244	E A	250	A	A	A	B	E A	A	A	A	238	270	304	304	290	
24	278	242	224	292	280	304	254		A	214	A E A	290		A	A	A	262	A	A	246	256	258	246	302	
25	292	302	280	220	202	192	220	216	204	210	196	254		A	A E A	286	218	232	218	214	238	236	256	316	
26	264	202	300	342	306	270	230		A	A	A	A	A	A	A	A	A	A	250	262	254	276	294	276	
27	290	270	256	242	240	256	234	220		A	216		A	A	A	A	A	A	A	242	244	286	280	284	
28	294	268	228	212	208	268	236	232	210	232	210	232	246	A	A	A	A	A	A	252	250	268	292	282	
29	262	268	260	256	294	270	230	222	E A	250	A	A	A	A	B	Y	A		Y	208	248	242	248	264	
30	312	272	248	222	200	240	226	194	H E A	224	A E A	270	220	A	A	A	A	A	A	256	246	276	298	288	
31	272	256	240	260	248	228	238		A	A E A	244	190	208	A	A	A	A	A	A	250	230	342	294	274	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	29	27	22	19	19	15	9	9	15	13	16	14	14	31	30	30	31	31	
MED	282	272	248	234	240	236	236	226	219	218	208	212	E	256	231	E A	226	228	232	242	252	254	266	282	290
U Q	302	286	260	246	270	256	245	232	228	244	266	254	286	270	286	257	266	250	250	262	270	276	298	302	
L Q	272	256	240	218	224	220	226	220	214	210	204	204	224	224	218	218	227	218	232	242	240	260	270	276	

MAY 2013 h'F (KM)

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IONOSPHERIC DATA STATION Okinawa

MAY 2013 h'E (KM)

135°E MEAN TIME (G.M.T. + 9 H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1						B	A	112	110	110	108	B	B	B	B	A	A	108	108						
2						B	A	108	112	B	B	B	B	B	B	112	110	110	A	A					
3						B	126	110	110	116	B	B	A	A	A	B	108	108	A	A					
4						B	A	108	108	112	A	108	B	A	B	B	A	A	A	A					
5						B	126	110	110	A	B	B	B	B	B	B	A	110	110						
6						B	A	110	110	110	A	B	B	B	B	B	110	110	110						
7						B	126	114	108	108	B	B	A	B	B	B	B	108	A	A					
8						B	B	108	A	A	A	A	B	B	B	108	108	108	A	A	A				
9						A	A	108	108	A	A	B	B	A	A	A	A	108	A	A					
10						B	A	108	108	A	B	B	B	B	B	B	116	110	110	110					
11							126	110	110	110	A	A	A	A	B	B	B	110	108						
12						A	106	A	A	110	A	B	B	B	B	B	B	110	A	A					
13						B	124	110	110	B	B	B	B	B	B	B	110	110	A	A					
14						B	130	112	112	108	B	B	B	B	B	A	B	108	112						
15						A	A	112	110	110	B	B	B	B	B	A	B	A	114						
16						B	130	112	110	110	110	B	B	B	B	112	110	108	114						
17						B	A	110	110	110	A	A	A	A	A	A	A	A	A	A					
18						B	A	108	108	108	A	A	A	A	A	A	B	108	A	A					
19						A	A	108	112	A	A	B	B	B	B	B	108	A	A	B					
20						B	A	108	A	A	B	A	B	A	A	B	A	A	112						
21						A	B	112	110	108	A	B	B	B	B	A	A	108	A	A					
22						B	120	114	A	A	A	A	A	A	A	A	A	A	A	A					
23						B	134	108	108	B	B	B	A	B	B	B	108	108	112						
24						B	A	A	A	A	A	A	A	B	A	108	108	108	A	A					
25						B	A	H	A	A	A	B	B	B	B	110	B	110	A	A					
26						B	A	A	110	B	B	B	B	B	B	B	A	A	A	A					
27						B	126	110	110	110	B	B	A	A	A	A	A	A	A	A					
28						B	138	110	110	A	110	B	B	A	A	A	A	A	A	A					
29						A	A	110	110	110	A	A	A	B	B	A	A	110	110						
30						B	112	108	108	A	B	A	B	A	A	A	A	A	A	A					
31						B	A	A	A	A	108	108	B	B	B	B	112	110	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT							14	27	24	15	4	2			1	6	11	20	11						
MED							126	110	110	110	109	108			108	111	110	109	110						
U Q							130	112	110	110	110					112	110	110	112						
L Q							124	108	108	108	108					108	108	108	110						

MAY 2013 h'E (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

MAY 2013 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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	B	B	96	106	96	100	120	116	114	110	110	110	110	114	108	106	104	108	104	100	98	98	100	B
2	96	96	96	B	96	B	112	126	106	114	116	114	114	110	B	110	108	108	104	104	100	100	98	102
3	B	B	B	B	B	B	124	134	130	132	B	108	120	114	112	116	110	106	106	104	104	B	B	96
4	100	B	88	B	86	B	134	G	110	116	112	114	110	112	108	116	106	106	102	102	100	98	98	B
5	94	B	B	B	B	B	G	124	118	116	108	106	106	110	110	110	128	114	108	106	118	100	100	98
6	B	102	B	B	102	B	178	130	134	118	112	108	B	136	134	124	118	116	108	106	102	102	104	100
7	98	102	96	B	B	B	126	120	114	110	114	108	106	118	118	122	B	112	108	106	106	102	94	98
8	102	102	100	98	98	B	B	100	100	100	100	100	116	114	112	114	110	108	104	102	102	102	98	96
9	98	98	98	98	100	100	120	112	110	108	106	102	100	96	122	118	114	110	106	104	104	104	104	102
10	94	94	94	94	B	B	118	110	106	114	B	B	B	132	122	120	116	110	106	104	102	102	102	102
11	98	96	96	94	98	98	112	110	110	110	108	104	98	100	B	B	128	118	108	104	104	104	104	116
12	96	96	92	96	96	102	G	102	102	104	B	B	B	B	B	118	114	108	106	106	102	104	98	96
13	100	100	96	106	B	B	G	118	110	108	108	B	B	112	112	B	G	108	104	102	102	102	104	92
14	98	98	104	100	96	B	136	130	126	112	114	B	B	128	B	104	B	G	112	B	108	96	92	94
15	96	94	108	90	92	102	120	114	110	106	104	B	106	104	108	106	B	134	118	108	106	108	106	106
16	102	94	90	96	90	B	G	152	122	126	122	B	108	B	136	174	G	G	104	96	96	94	112	104
17	110	104	104	104	102	B	122	114	110	108	104	104	102	100	100	98	96	96	116	96	94	94	100	98
18	94	92	B	B	B	B	122	112	110	104	102	104	106	108	108	110	122	116	106	104	104	102	102	102
19	102	100	100	98	98	92	102	112	118	112	110	108	108	108	116	122	G	114	108	102	100	94	96	94
20	90	90	88	88	102	104	118	104	100	100	100	100	102	102	102	102	102	102	126	112	96	92	92	B
21	100	108	102	104	100	100	B	104	G	G	100	104	B	130	120	122	114	108	104	104	102	102	102	102
22	92	B	B	104	100	B	G	128	108	108	102	104	126	106	108	110	116	112	108	112	104	104	104	94
23	96	94	96	88	88	92	132	130	116	114	112	106	102	B	126	110	110	110	120	112	94	104	102	102
24	102	102	102	100	90	90	96	100	114	106	108	108	106	108	116	130	122	110	102	102	96	96	96	96
25	94	94	92	92	92	96	96	98	146	102	102	162	136	126	124	128	112	G	106	92	90	90	88	88
26	110	98	100	118	118	128	102	116	112	110	110	108	106	106	102	98	98	102	96	94	92	92	92	94
27	94	94	90	92	92	92	124	118	110	108	108	106	100	100	104	102	102	98	96	94	94	94	94	94
28	92	92	92	90	90	90	132	122	122	112	G	B	128	102	98	98	94	94	94	96	94	96	B	104
29	104	100	100	98	92	100	120	114	114	110	108	106	106	B	164	104	106	106	G	116	B	B	96	112
30	96	92	88	88	B	B	G	G	108	106	110	106	102	100	98	100	94	94	92	90	88	88	94	94
31	104	96	96	92	90	102	102	102	104	104	130	130	194	186	174	118	112	108	108	104	104	96	94	94
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	26	26	24	23	16	23	29	30	29	28	24	25	27	27	29	25	28	30	30	30	29	29	28
MED	98	96	96	97	96	100	120	116	110	110	108	106	106	110	112	110	110	108	106	104	102	100	98	98
U Q	102	100	100	102	100	102	126	125	118	114	112	108	115	118	122	121	116	112	108	106	104	102	103	102
L Q	94	94	92	92	90	92	104	110	108	106	104	104	102	102	108	104	103	106	104	100	96	94	94	94

MAY 2013 h'Es (KM)

NATIONAL INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY, JAPAN

IONOSPHERIC DATA STATION Okinawa

MAY 2013 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			F1	F1	FF31	L1	C1	C1	C1	C1	C1	C1	C1	C1	C2	C1	C2	C1	L2	L6	F5	F2	FF11		
2	F3	FQ21	F2		F2		C1	C1	L1	C1	C1	C2	C1	C1		C2	C1	C1	L3	L2	F3	F2	F5	F1	
3							C2	H1	HC11	H1		L1	CL11	C1	C2	C1	C1	C1	C4	C2	L2	F1			F1
4	F1		F2		F1		H1		C1	CL11	C1	C1	C2	C1	C2	C1	C2	C2	L5	L2	F3	F5	F2		
5	F1						C1	C1	C1	C1	C1	C1	C1	C1	C1	C2	CL12	C6	C8	C5	FF12	F4	F4	F1	
6		F1			F1		HL11	CL11	HL11	C1	C1	C1		H1	H1	C1	C1	C2	C8	C5	F7	F3	F4	F4	
7	F4	F1	F1				C1	C4	C2	C1	C1	C1	C1	CL11	C1	C1		C1	L2	L1	F2	F4	F2	F4	
8	F2	F1	F2	F3	F2		L1	L1	L1	L1	L1	L1	L1	C1	C1	C1	CL11	C4	C4	L6	F5	F3	F3	F3	
9	FF22	FF32	F3	FF11	F2	L2	C1	C3	C3	C2	L1	L1	L1	L2	CL21	CL11	C1	C2	C4	L8	F5	F4	F3	F2	
10	F1	F2	F1	F1			C2	C2	C2	C1				H1	C1	C2	C2	C3	C6	L6	F6	F6	F4	F4	
11	F2	F1	F2	F1	F1	F1	C1	C1	C1	C1	C1	L1	L2	L1			C1	C1	C3	L2	FF33	F4	F5	FF13	
12	FQ31	FQ31	F3	FF41	F1	L2		L4	L1		L1					C1	C2	C2	C3	C3	F4	F4	F5	F2	
13	F1	F12	FF32	F1			C1	C1	C1	C1	C1			C1	C1			C1	L2	L5	F4	FF32	F32	F2	
14	F2	F2	F1	F1	F2		H1	C1	C1	C2	C1			C1		L1			C1		F1	F3	F4	F1	
15	F2	F2	F1	F2	F1	L1	C1	C1	C2	C3	C2			C1	L1	C1		H1	C2	C2	F8	FQ41	F5	F3	
16	F3	F5	F3	F1	F1		H1	C1	C1	C1	C1			C1	H1	H1			L1	L5	F4	F4	FF21	FF42	
17	FF43	FQ31	FQ31	FQ21	F7		C3	C1	C3	C1	L1	L2	L2	L2	L5	L2	L2	L1	CL11	L2	F3	F2	F1	F2	
18	F2	F2					C2	C3	C2	C4	C4	L2	L3	L2	L3	C1	C1	C2	C5	L5	FF42	F3	FF32	FF51	
19	F8	F5	FQ31	F1	F2	L2	L1	C1	C1	C1	C2	C1	C1	C1	C1	C1		C1	C1	L5	F1	F3	F2	F2	
20	F2	F2	F2	F1		C1	LC11	C1	C1	L3	L1	L1	L1	L3	L2	L1	L1	L1	L1	CL11	CL11	F1	F2	F1	
21	F5	F2	F3	F1	F4	L4		L1			L1	L1		C1	C1	C1	C1	C3	L7	L5	F5	F4	F3	F1	
22	F1			F2	F3			CL11	CL22	C3	L1	L3	CL11	L2	L1	C2	CL21	CL21	C2	C1	FF21	FF22	F2	F3	
23	F3	F3	F4	F3	F2	L1	H1	H1	C1	C1	C1	L3	L3		C1	C1	C1	CL11	CL11	CL22	F2	FF24	FF24	FF23	
24	F3	F3	F3	F4	F3	LQ21	L3	L4	CL11	L3	C2	C2	C2	C2	C1	H1	C1	C2	L5	L3	F3	F4	F3	F3	
25	F1	FQ21	F2	F2	F1	L1	L1	L1	HC11	L1	L1	L1	L1	L1	L1	CL11	C1		C1	L1	F1	F1	F1	F3	
26	F1	F1	F3	FF22	FF31	CL11	L1	C1	C2	C2	C1	C2	C3	C1	L2	L2	L2	L2	L4	L6	F5	F4	F2	F5	
27	F2	FF42	F2	F3	F1	L1	CL11	C1	C1	C2	C2	C2	L2	L3	L2	L2	L1	L3	L4	L5	F4	F2	F1	F1	
28	F5	F2	F1	F2	F3	L1	H1	C1	C1	C1			C1	L2	L2	L2	L4	L3	L3	L2	F1	F1		F3	
29	F3	FQ31	F2	F1	F1	L2	C1	C1	C1	C3	C2	L3	L2		H1	L1	C1	L1	L1	C1			F2	FF12	
30	F2	F3	F2	F1				C2	C2	C1	L1	L1	L1	L2	L2	L2	L3	L5	L6	L4	F5	F1	F1	F1	
31	F1	F1	F2	F4	F2	L2	L2	L2	L1	L1	H1	H1	H1	H1	H1	C1	C2	C2	C2	L4	FF22	FQ41	FQ31	F3	
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT																									
MED																									
U Q																									
L Q																									

f-PLOTS OF IONOSPHERIC DATA

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

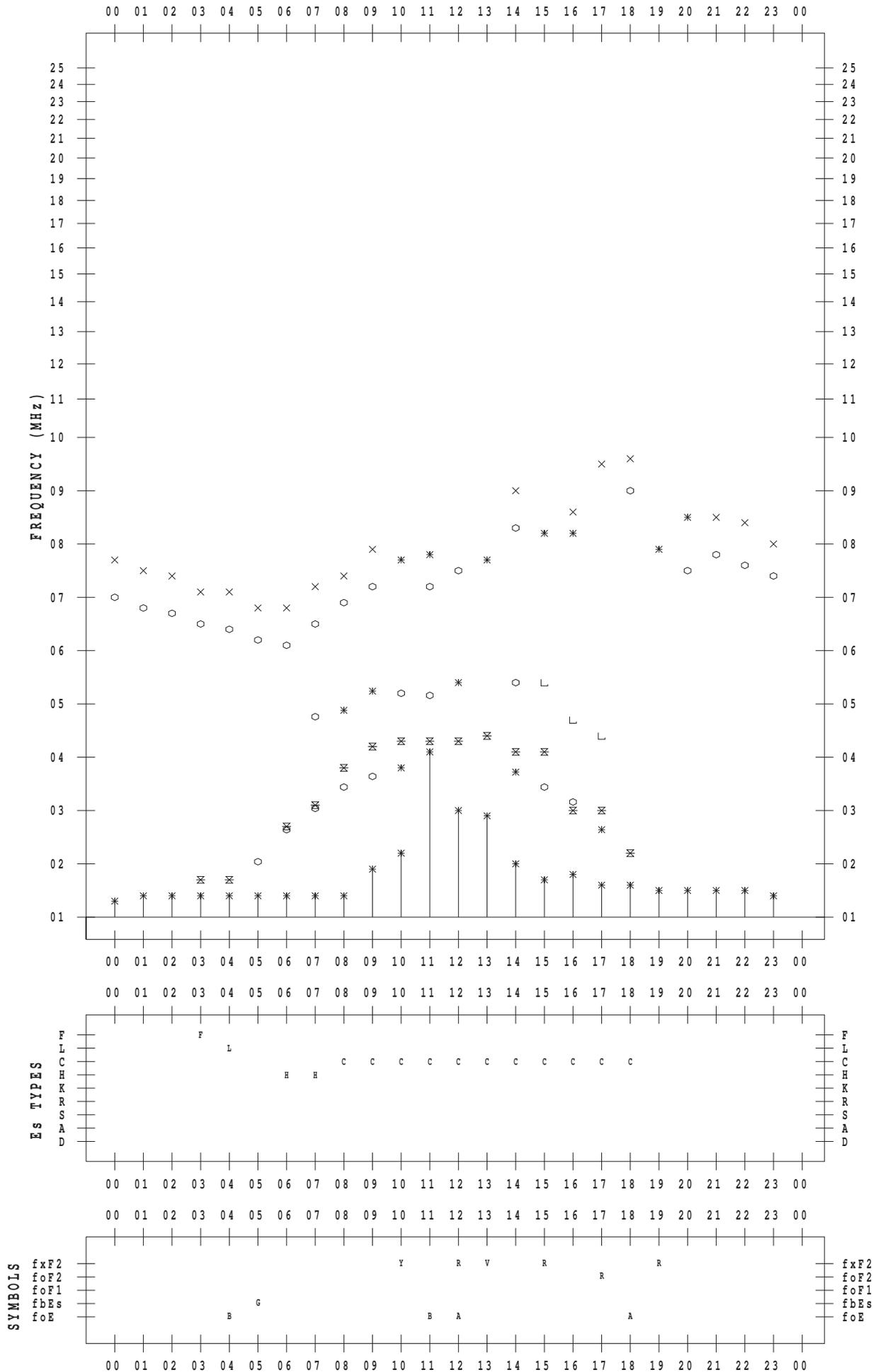
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 5 / 1

135 ° E MEAN TIME



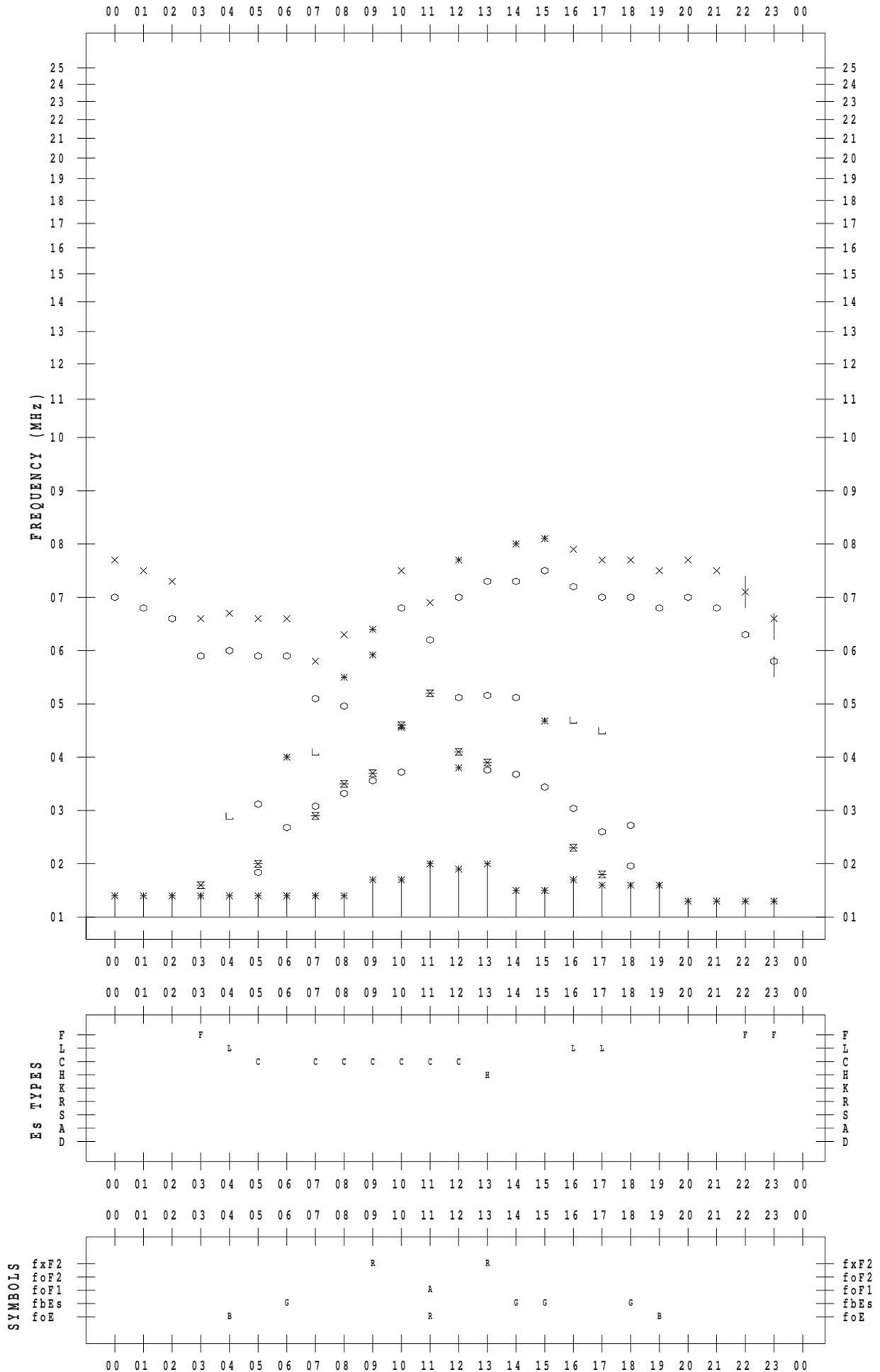
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 5 / 2

135 ° E MEAN TIME



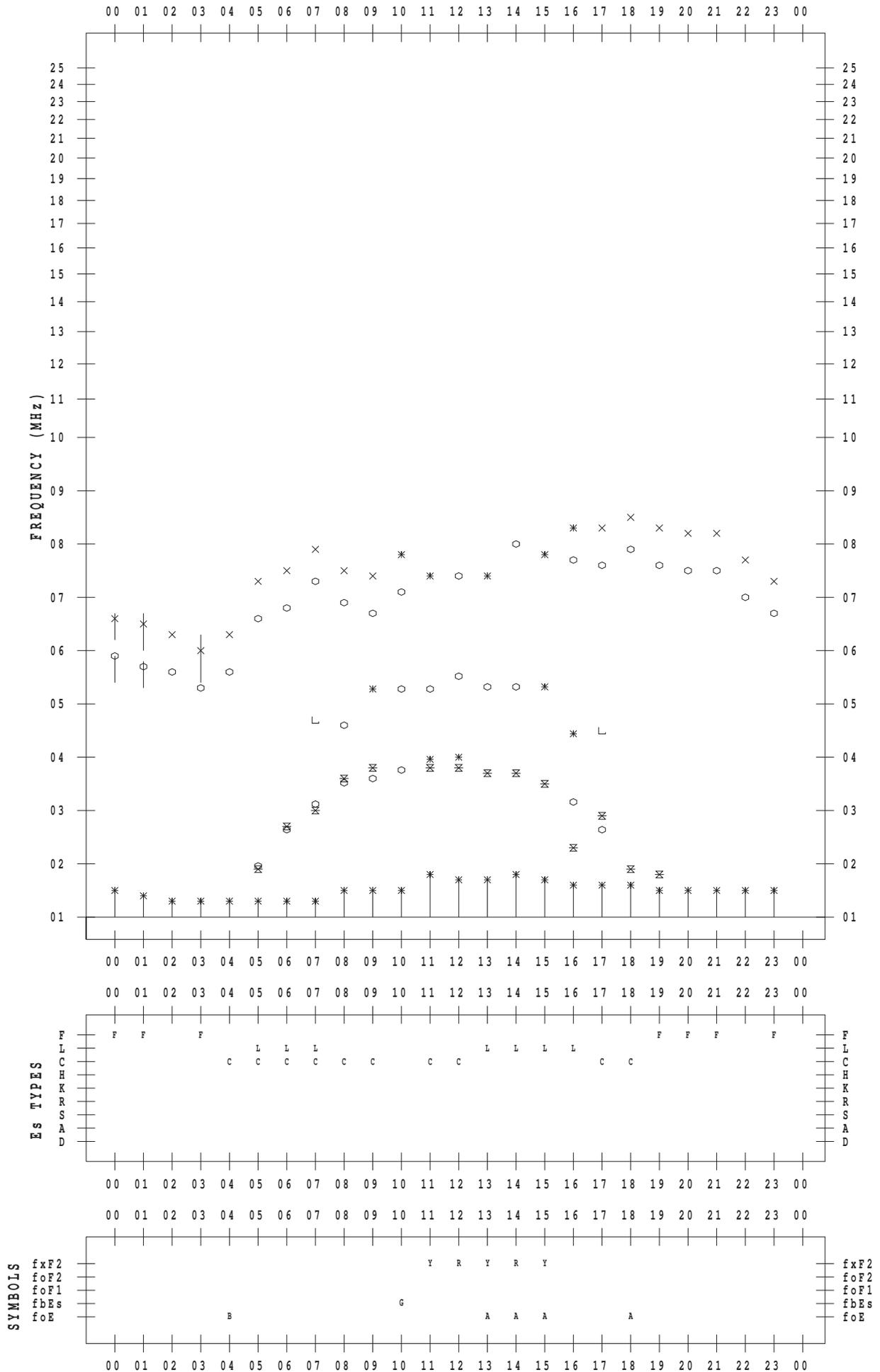
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 5 / 3

135 ° E MEAN TIME



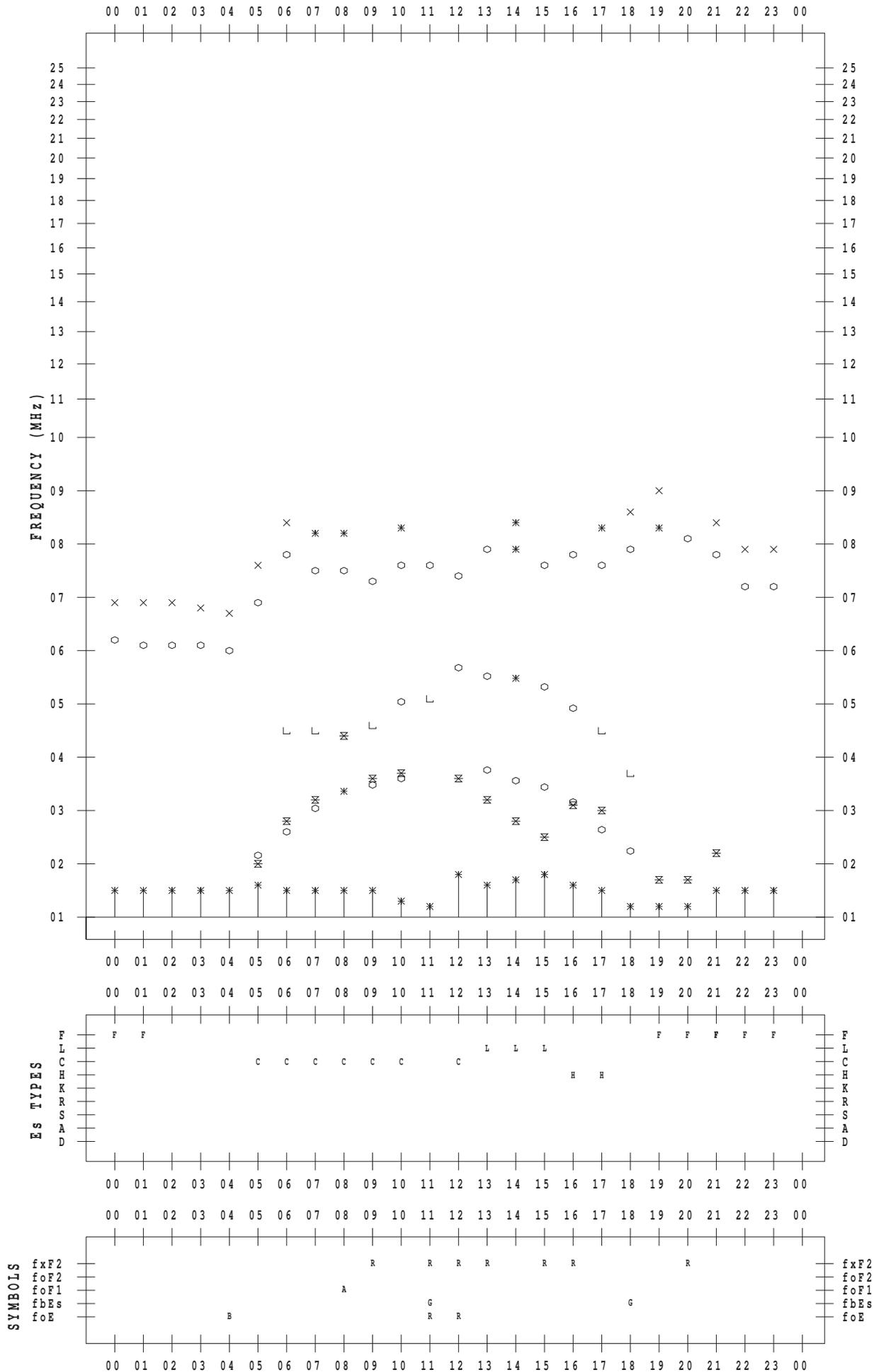
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/ 4

135 ° E MEAN TIME



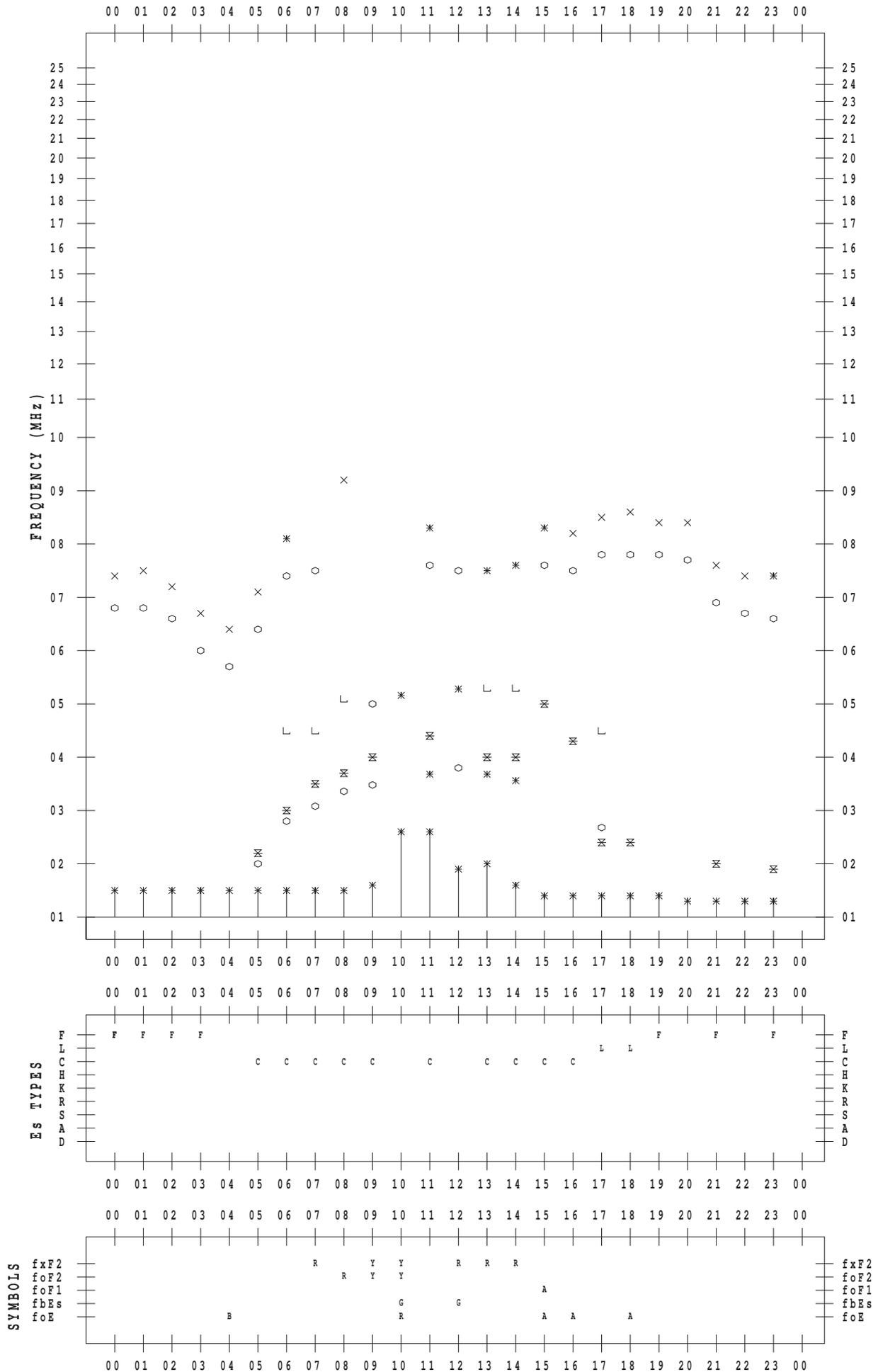
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 5 / 5

135 ° E MEAN TIME



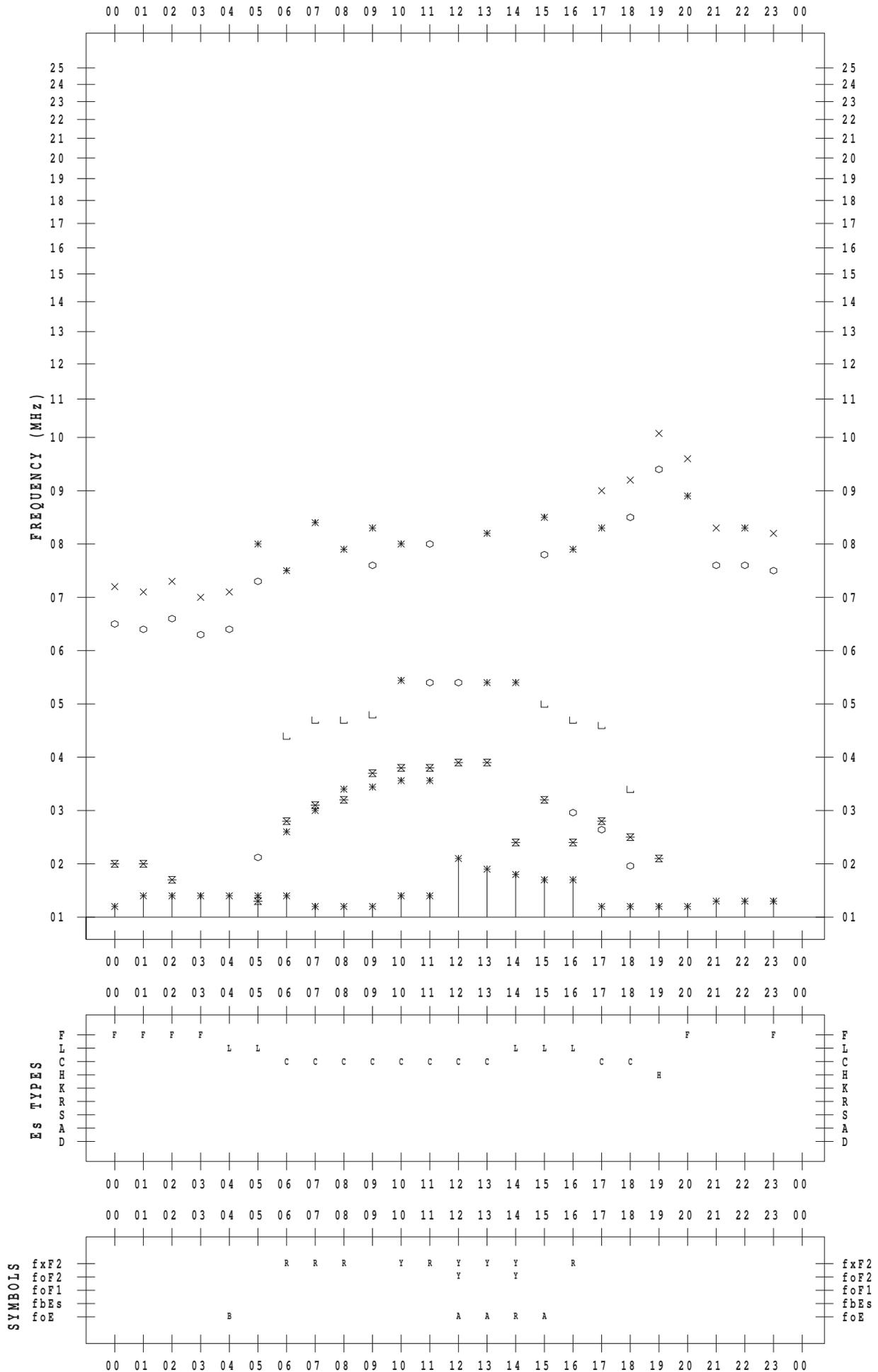
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 5 / 6

135 ° E MEAN TIME



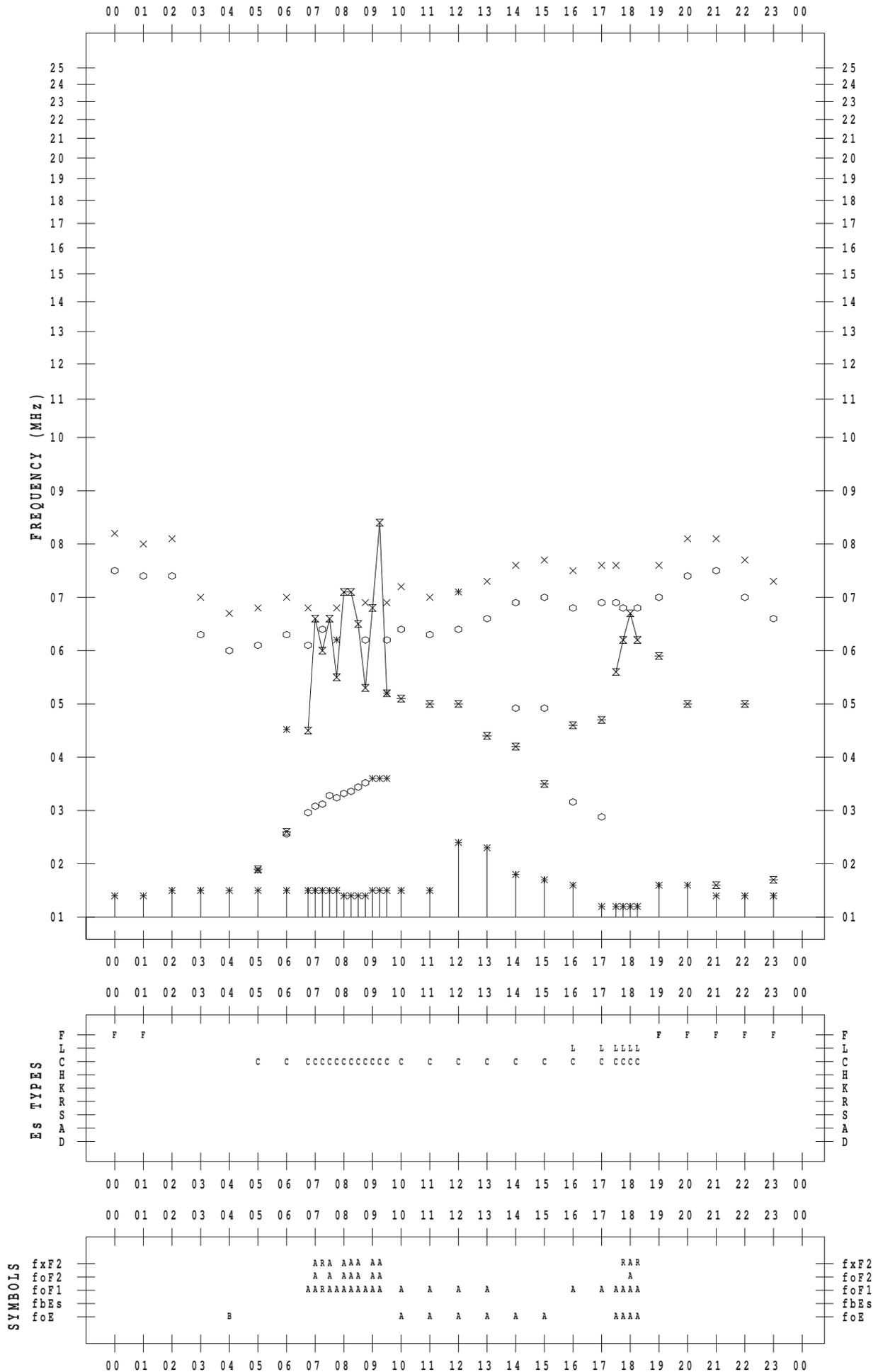
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/ 7

135 ° E MEAN TIME



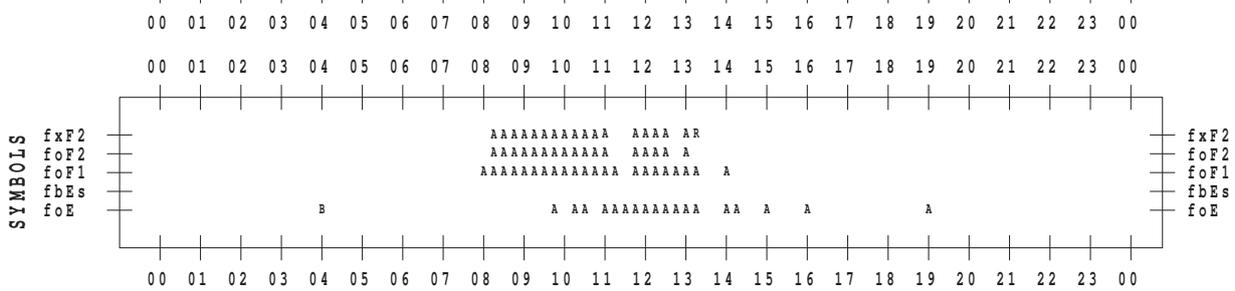
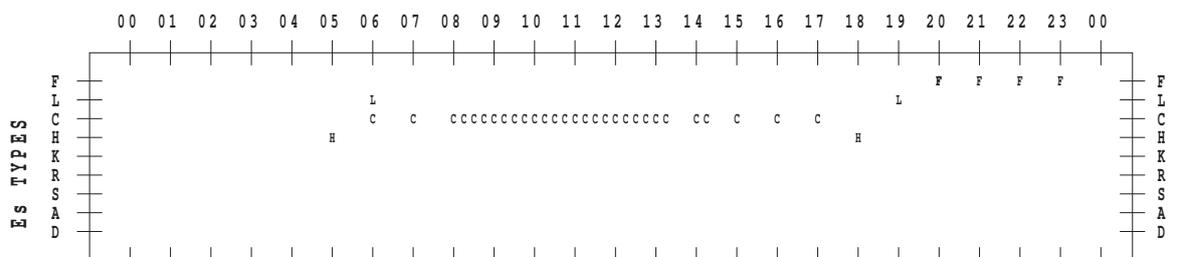
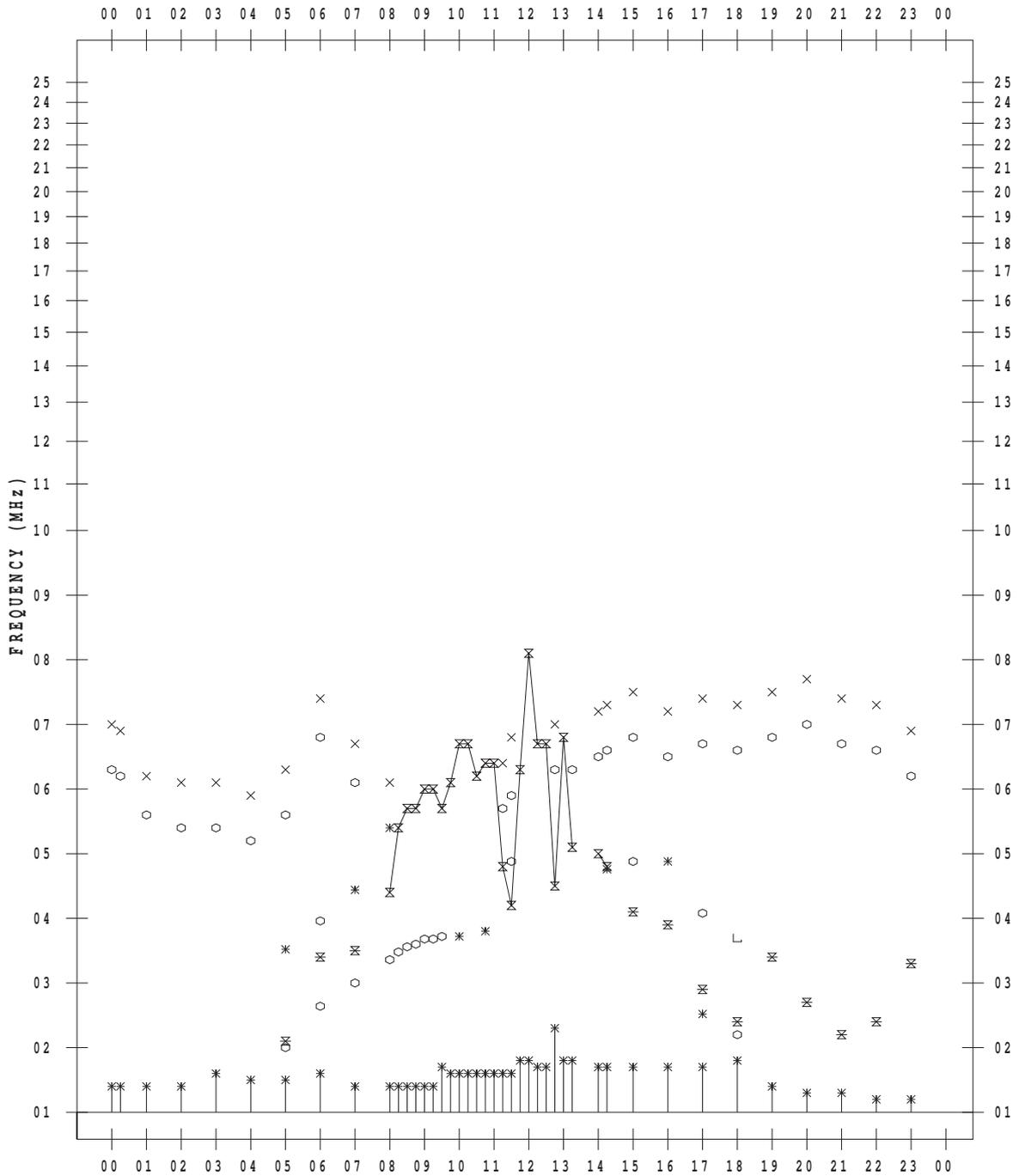
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 5 / 8

135 ° E MEAN TIME



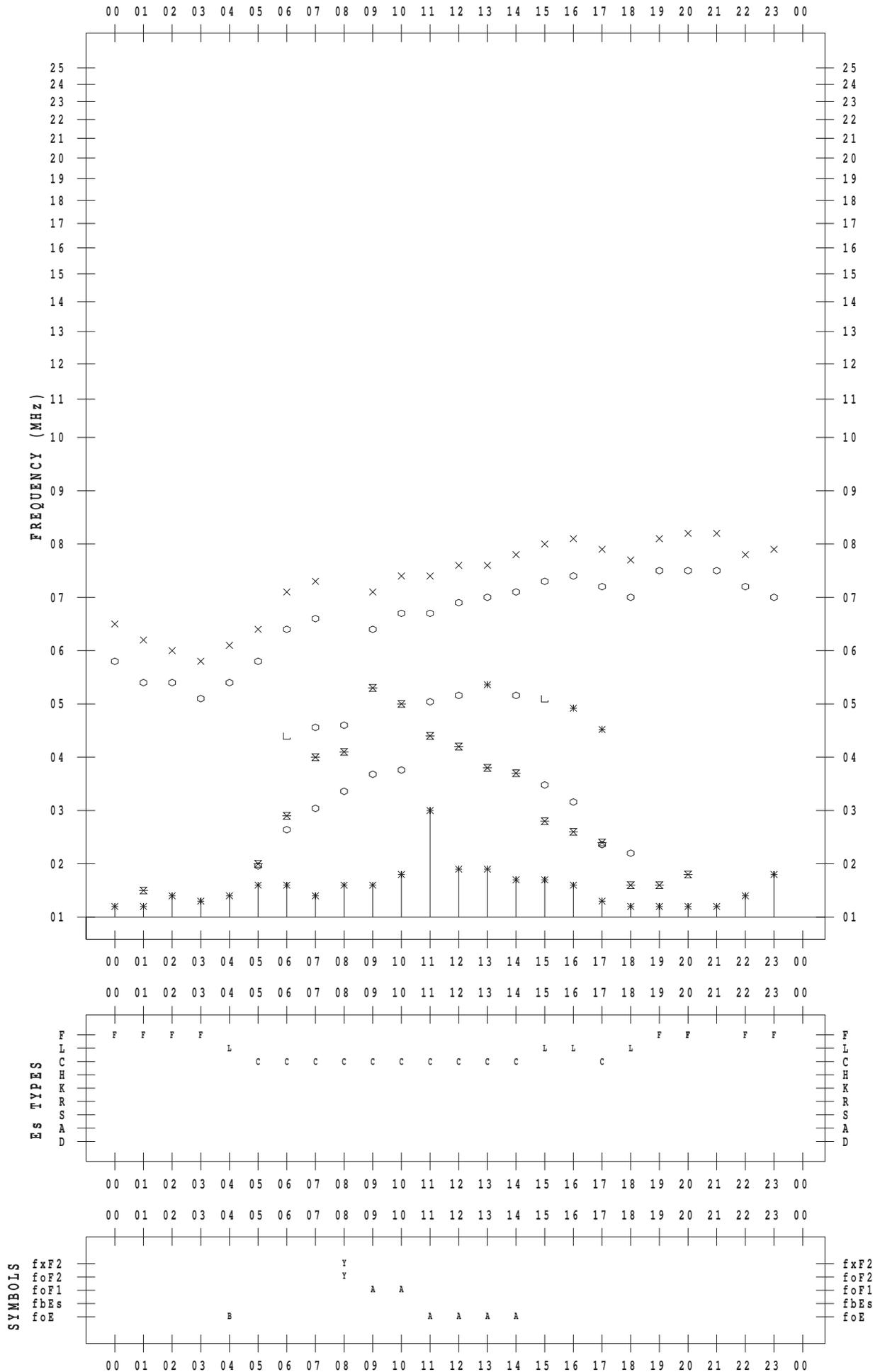
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 5 / 9

135 ° E MEAN TIME



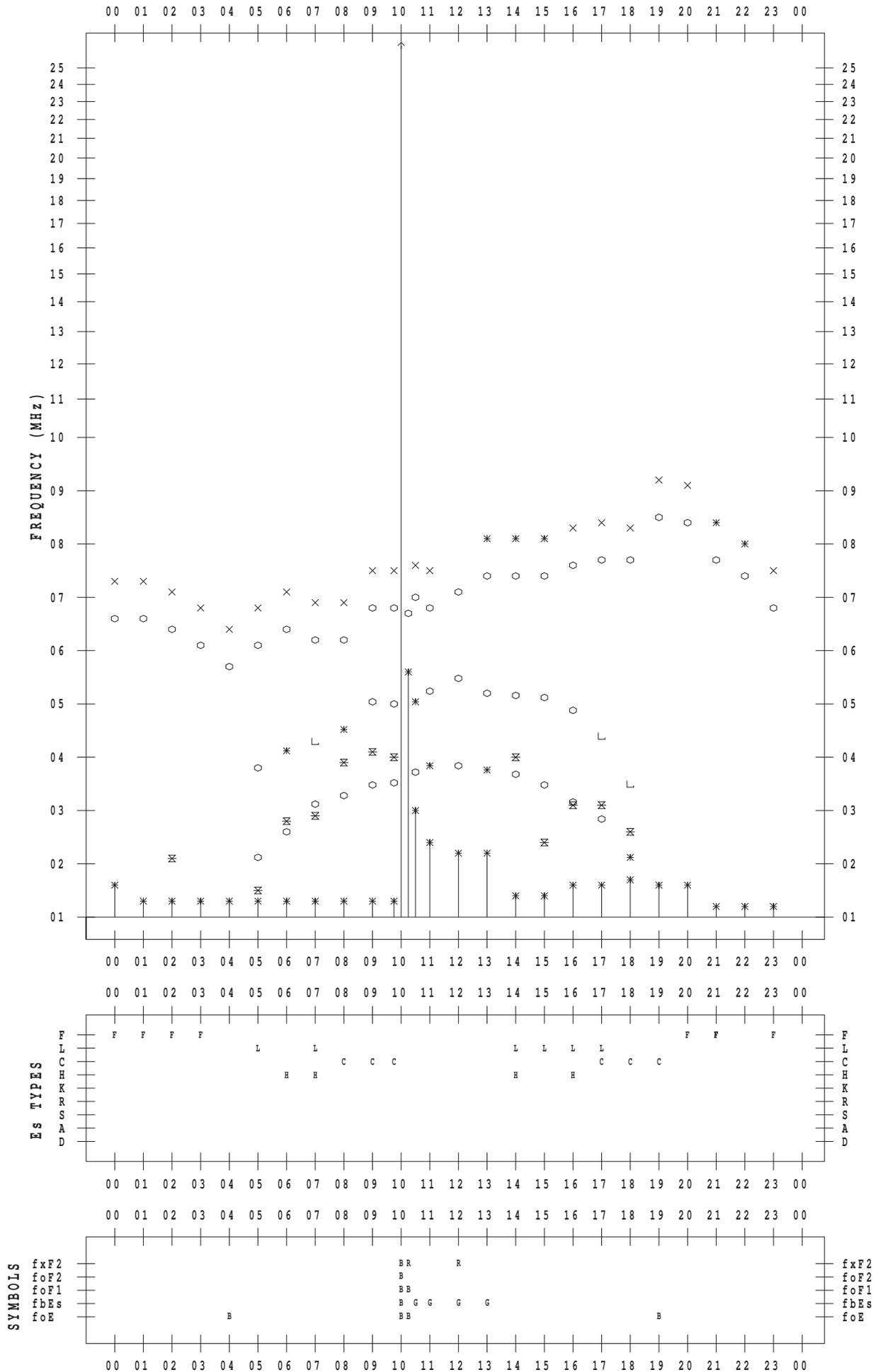
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/10

135 ° E MEAN TIME



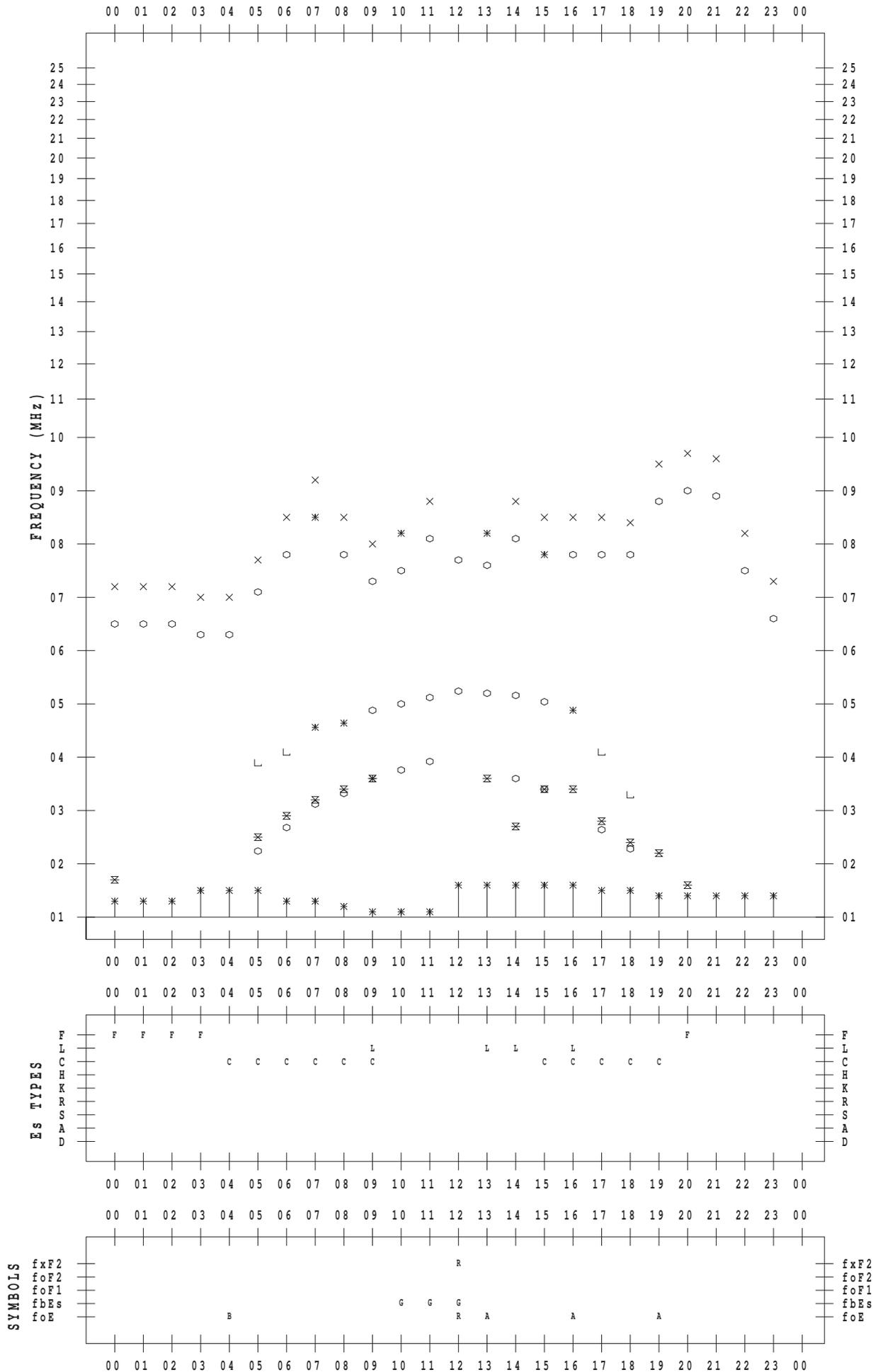
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/11

135 ° E MEAN TIME



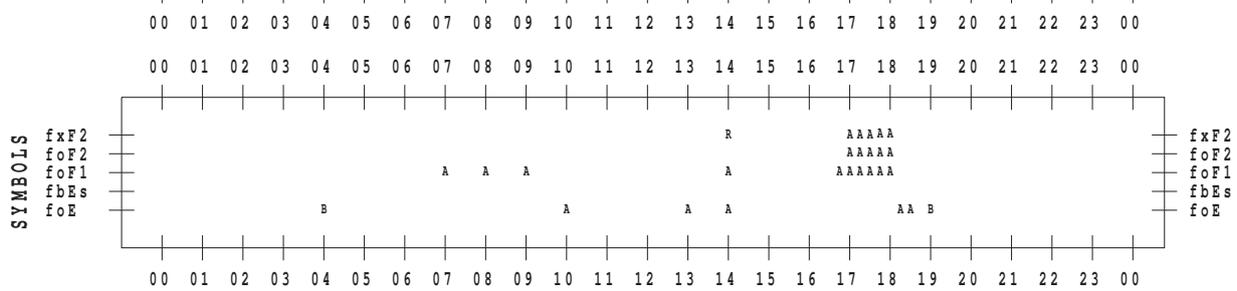
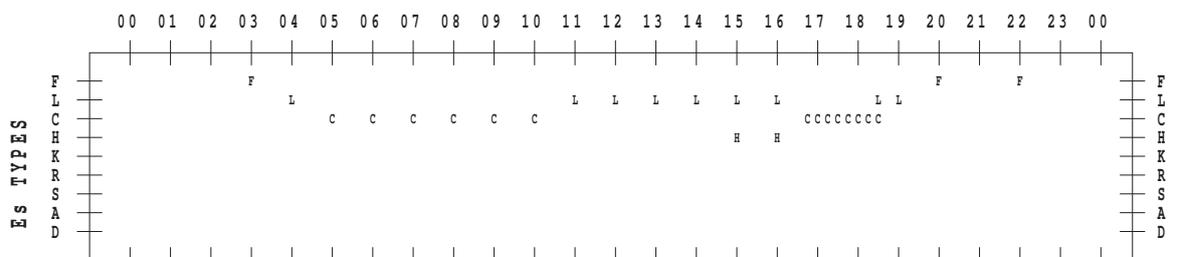
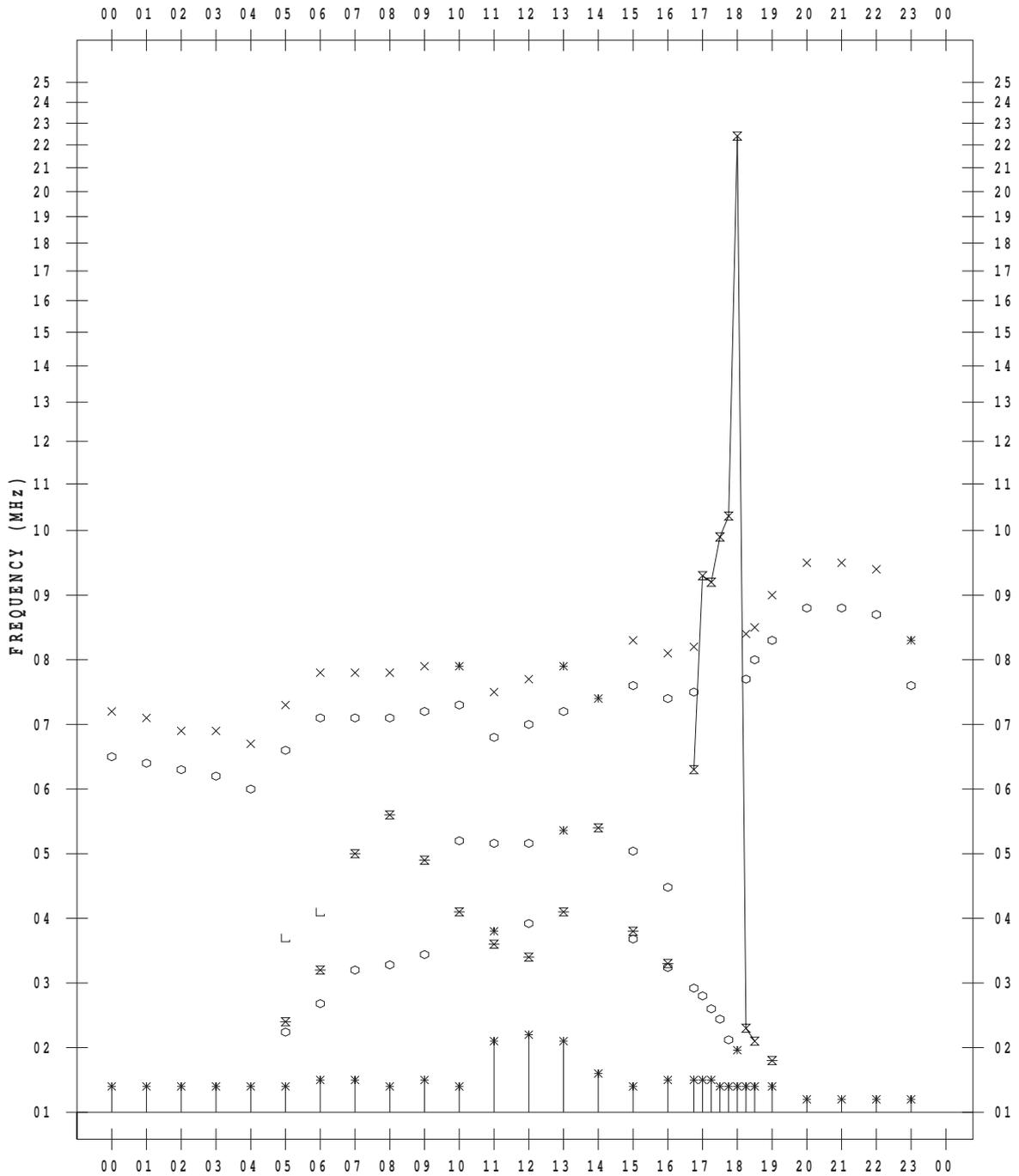
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/12

135 ° E MEAN TIME



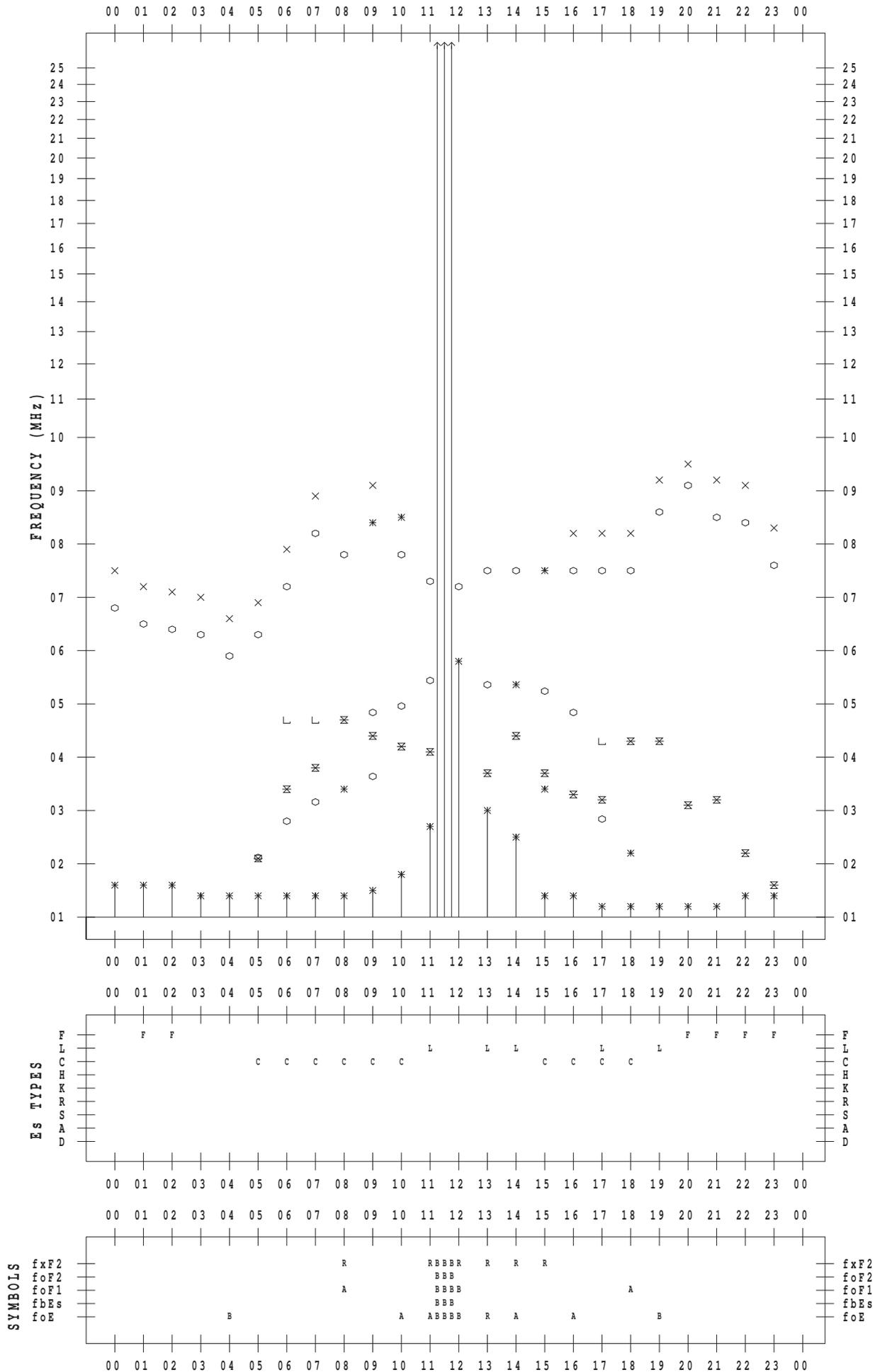
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/13

135 ° E MEAN TIME



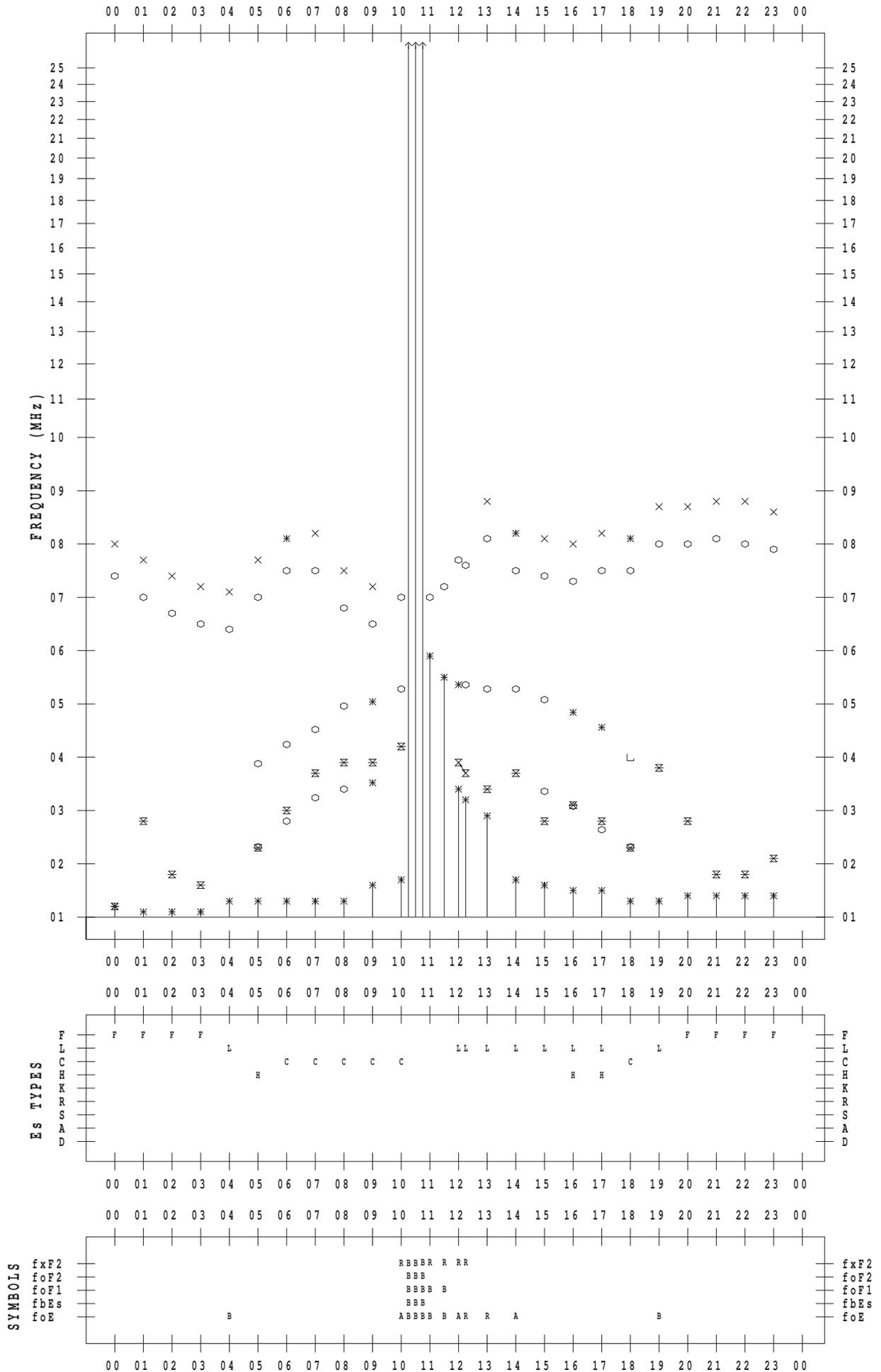
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/14

135 ° E MEAN TIME



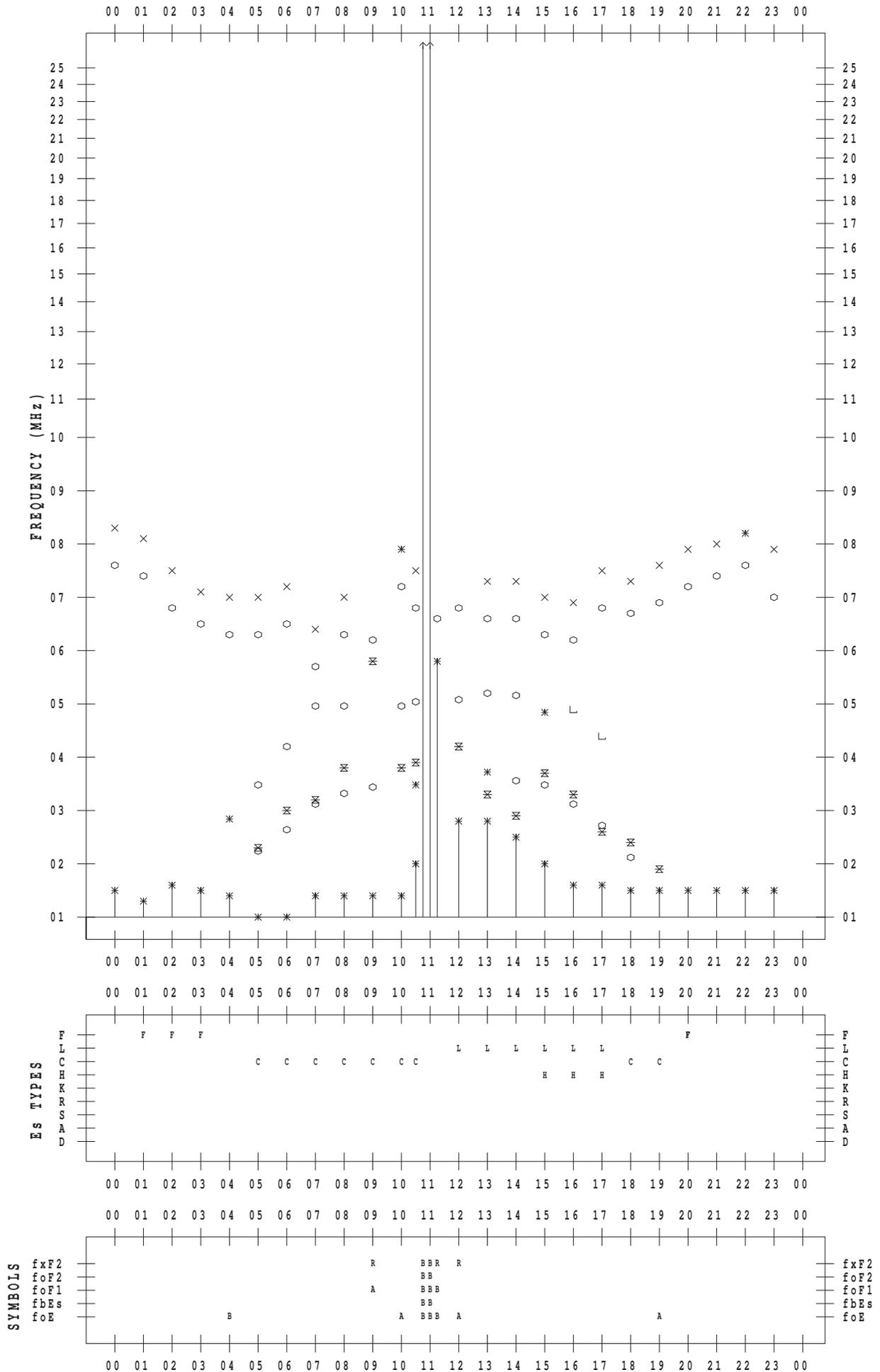
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/15

135 ° E MEAN TIME



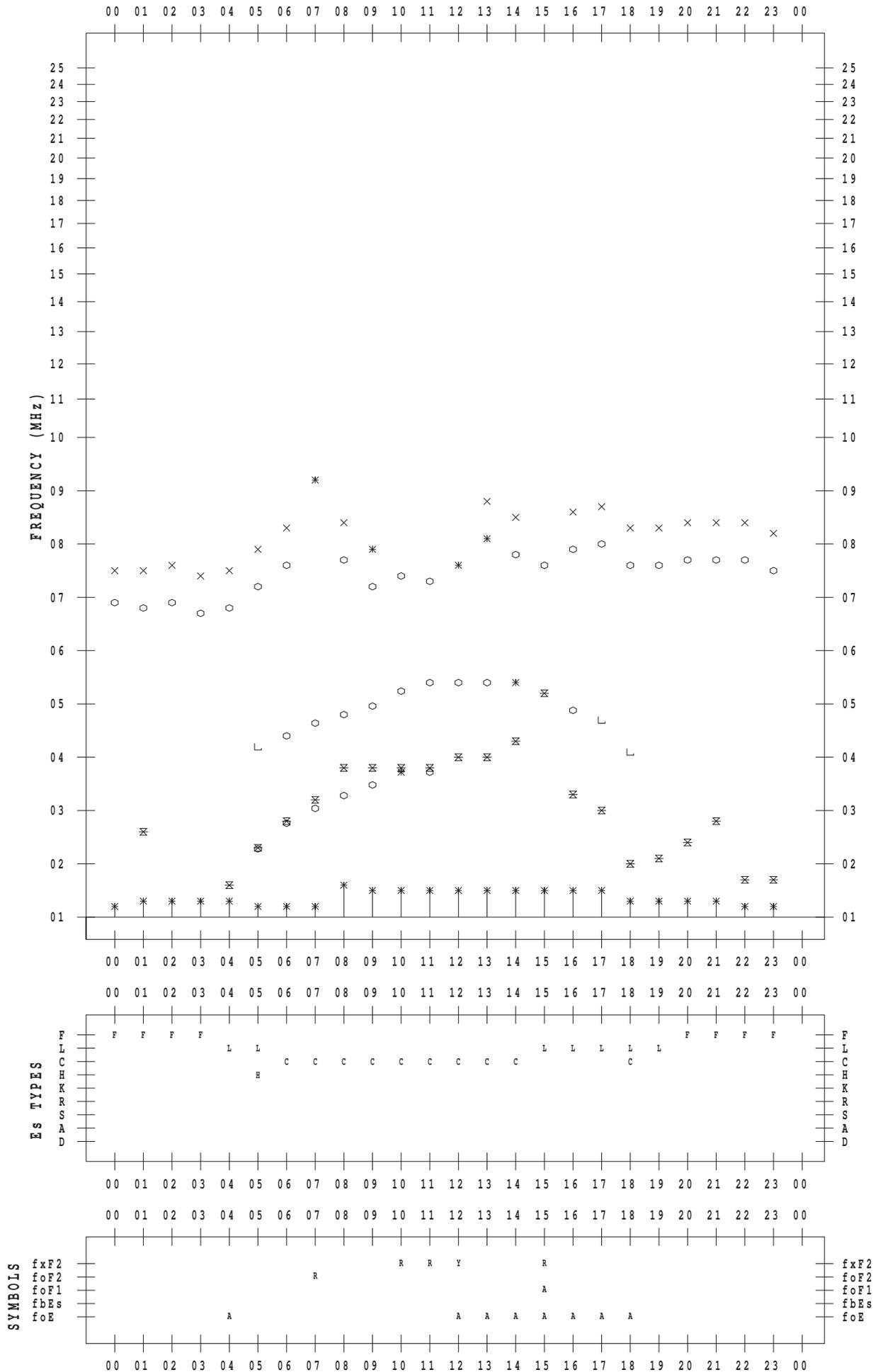
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/16

135 ° E MEAN TIME



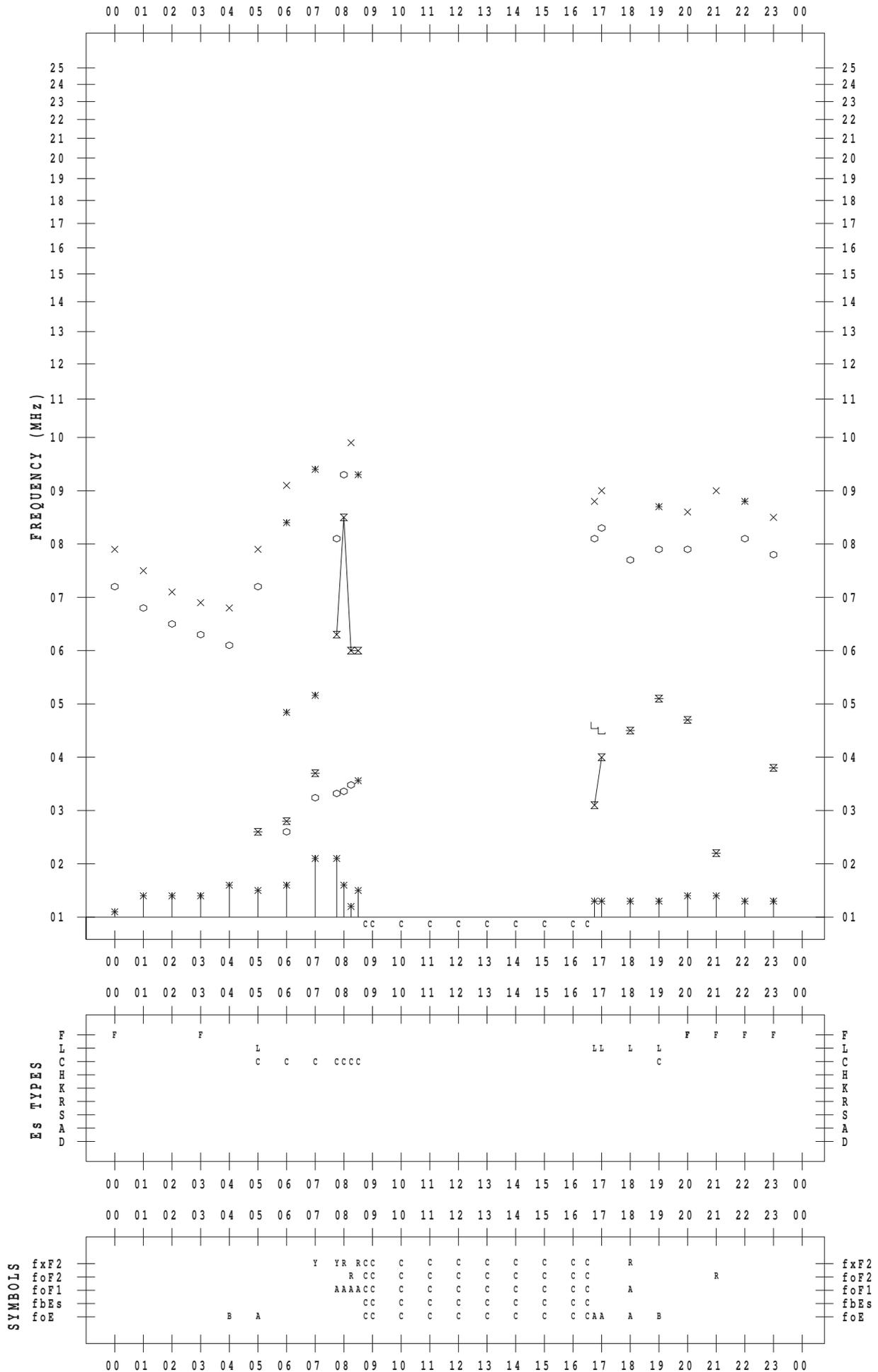
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/17

135 ° E MEAN TIME



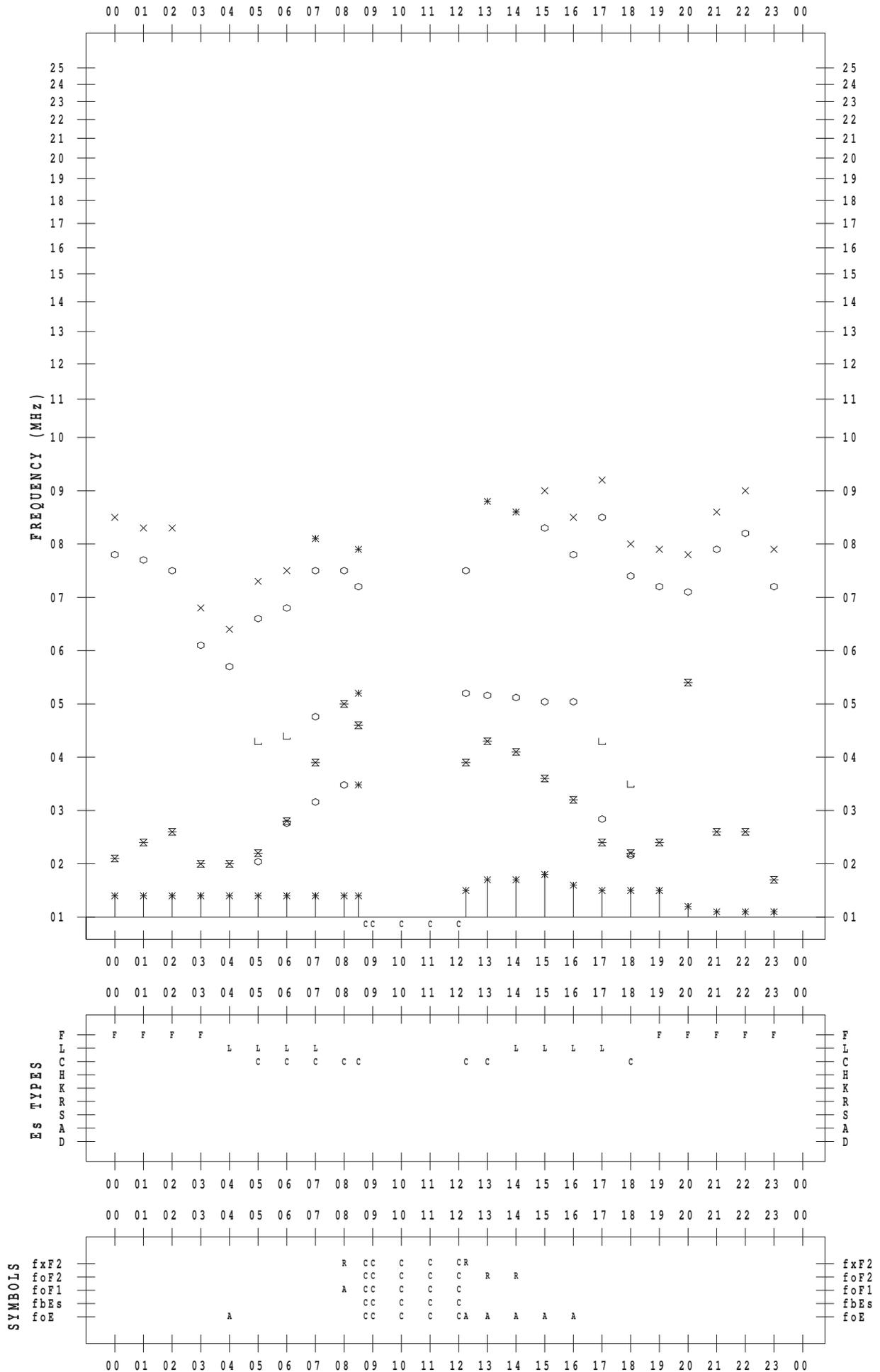
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/18

135 ° E MEAN TIME



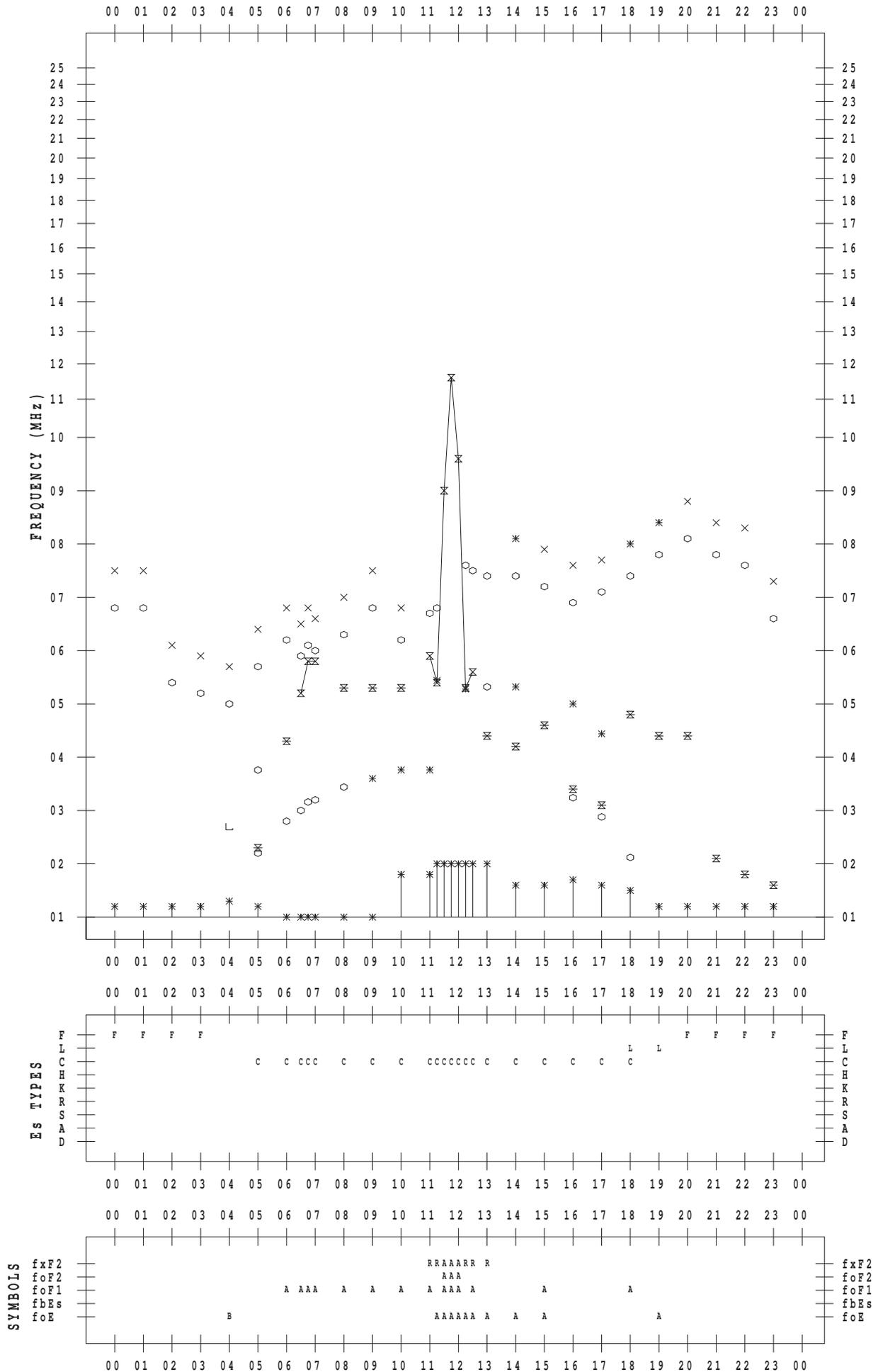
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/19

135 ° E MEAN TIME



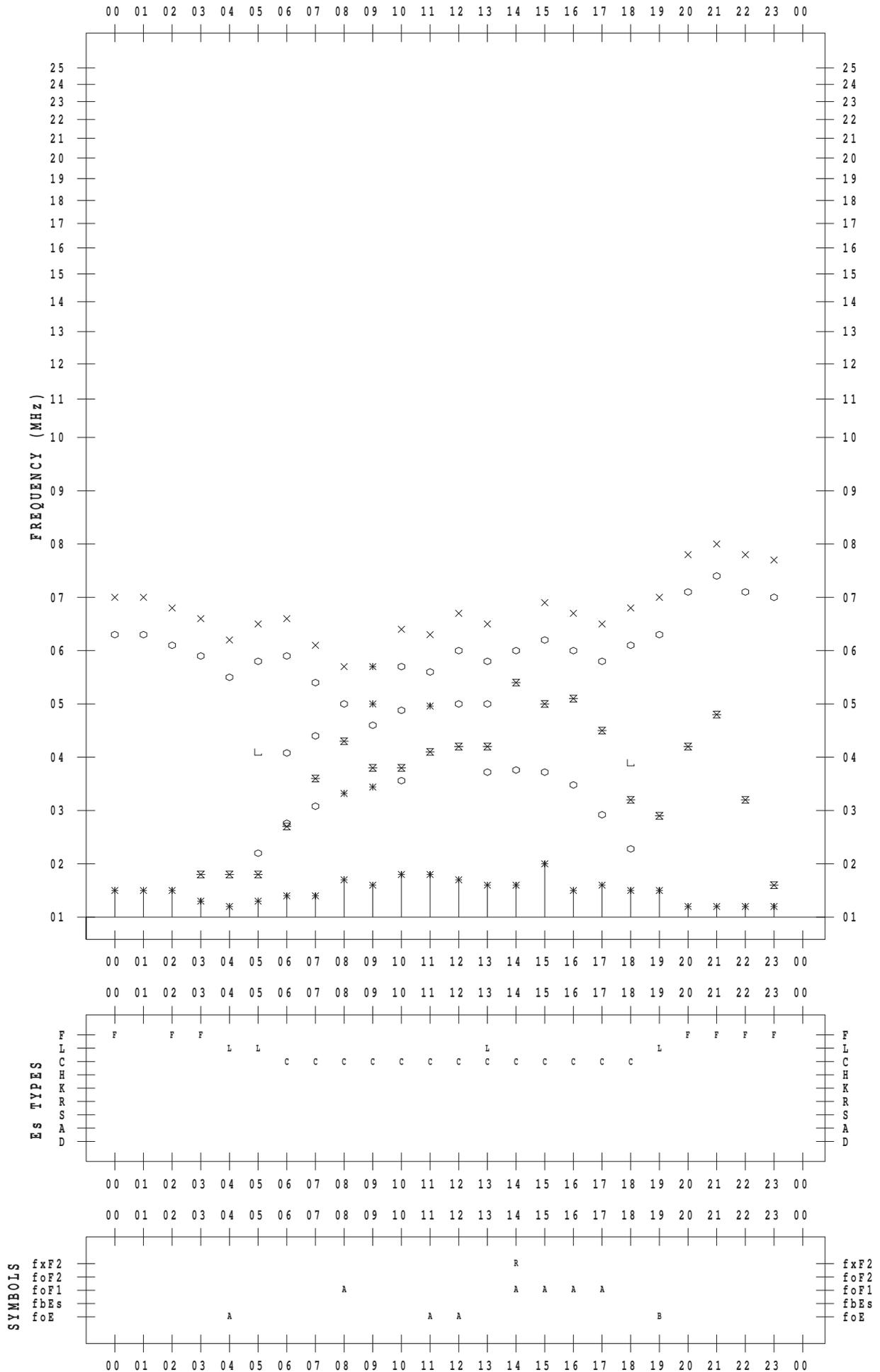
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/20

135 ° E MEAN TIME



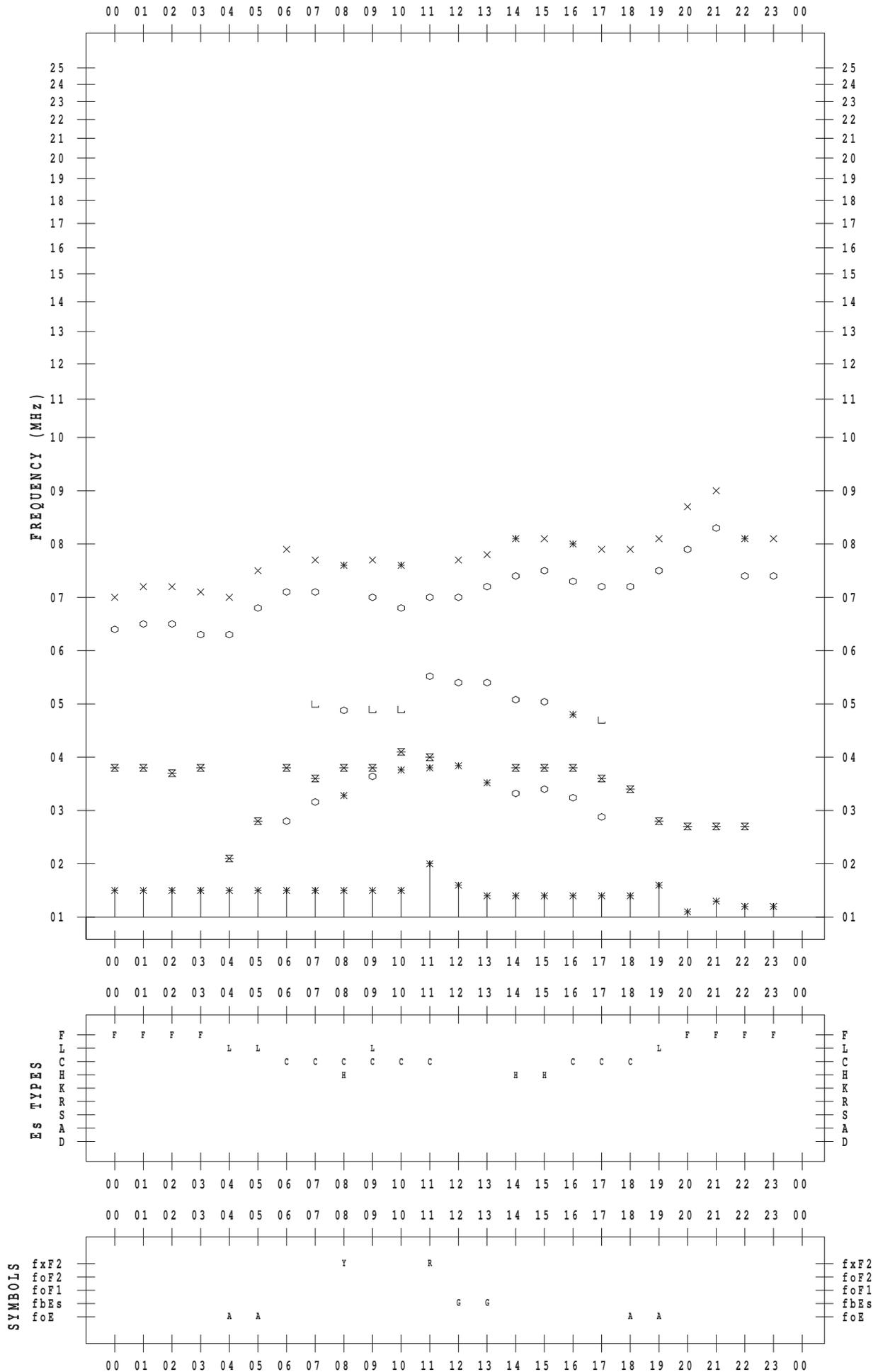
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/21

135 ° E MEAN TIME



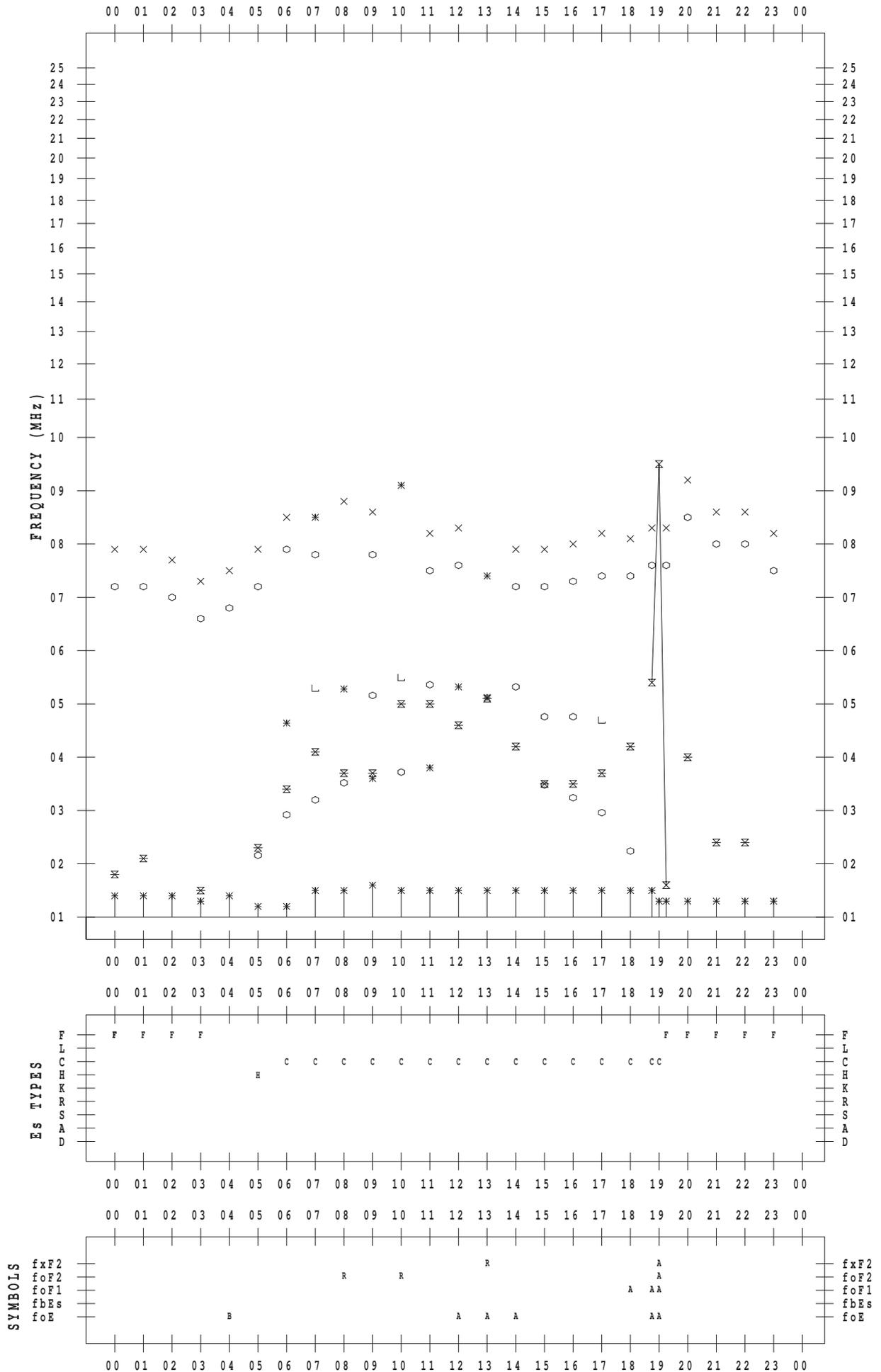
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 5 / 22

135 ° E MEAN TIME



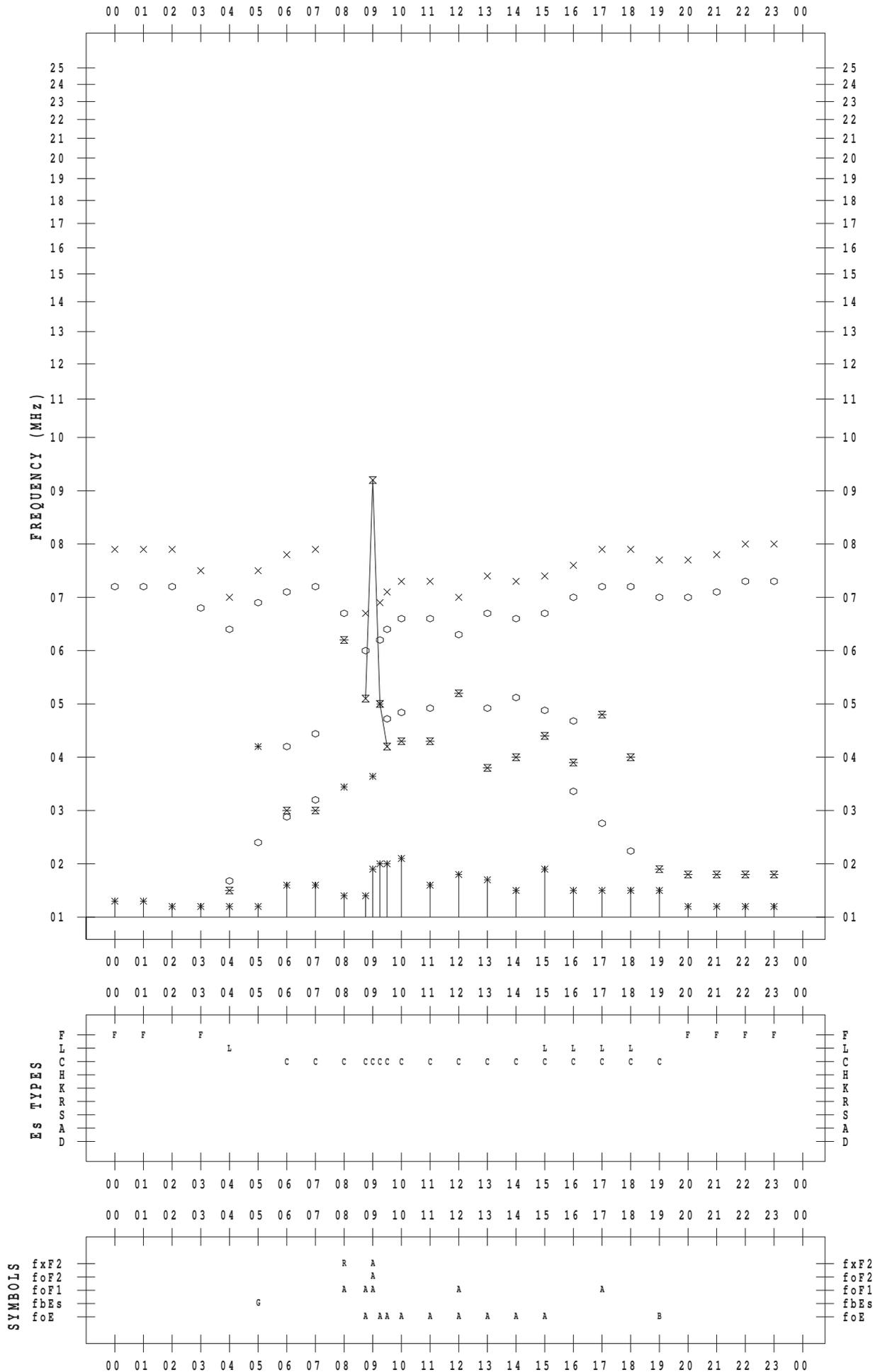
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/23

135 ° E MEAN TIME



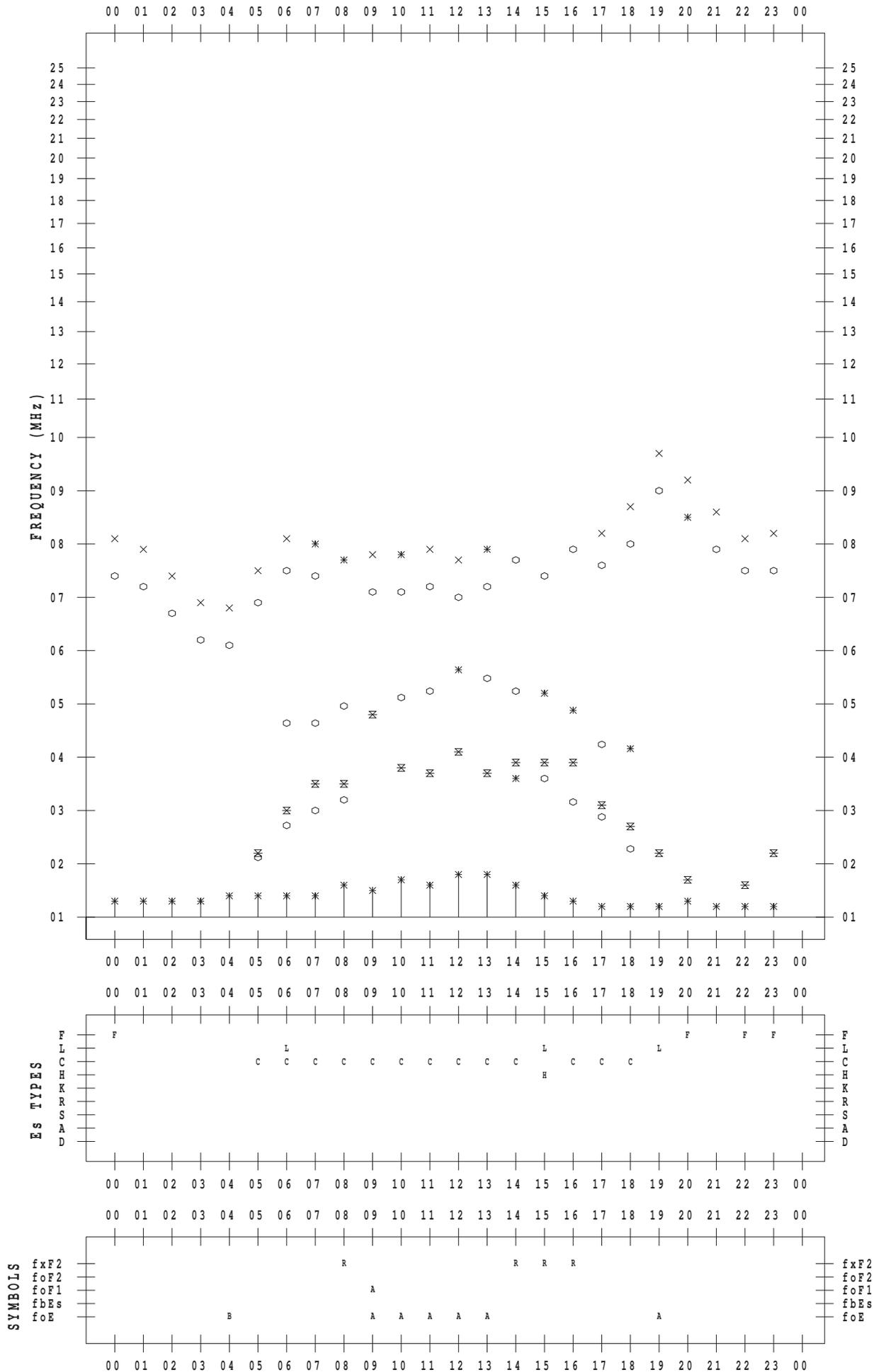
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/24

135 ° E MEAN TIME



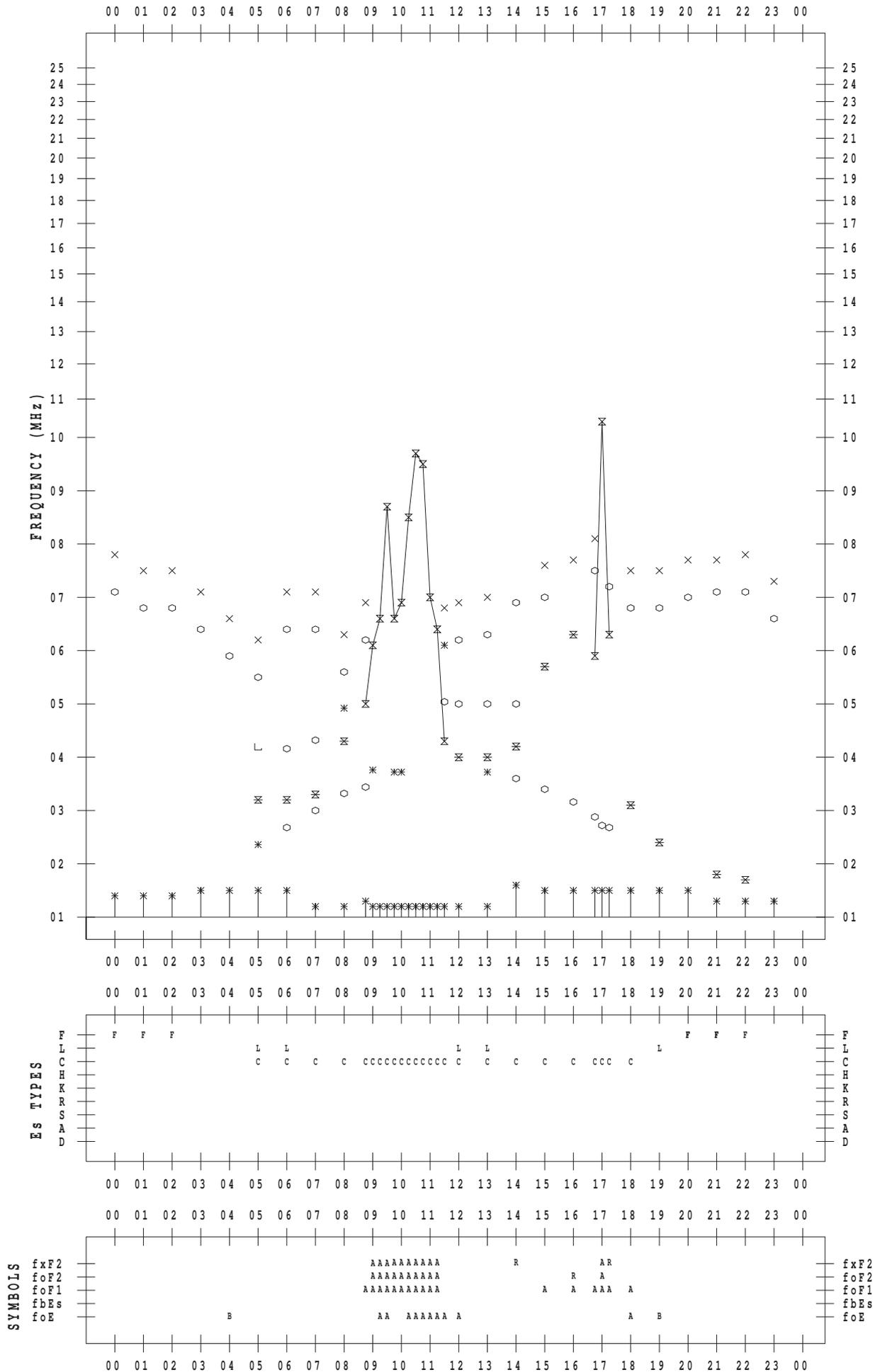
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/25

135 ° E MEAN TIME



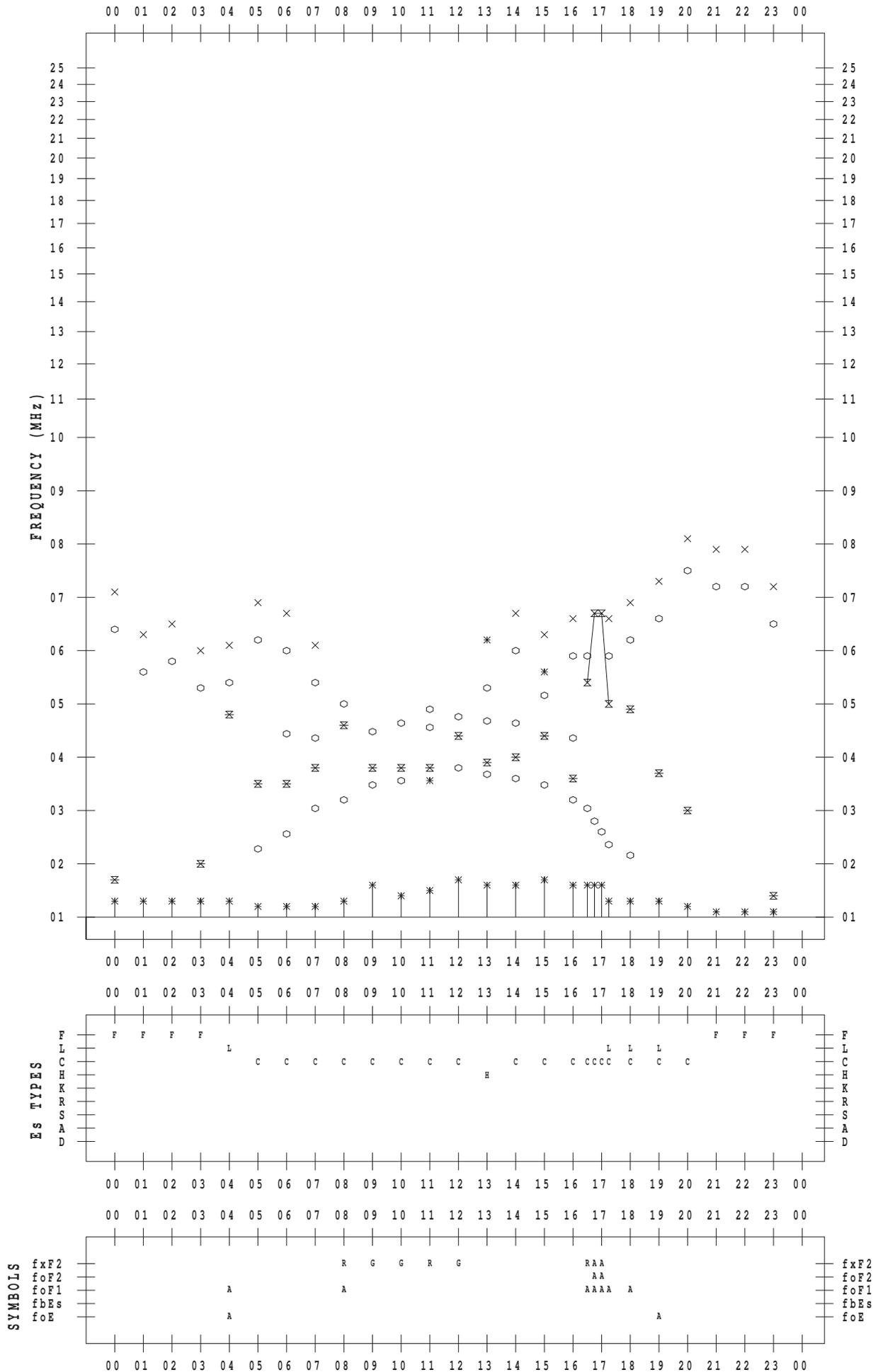
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/26

135 ° E MEAN TIME



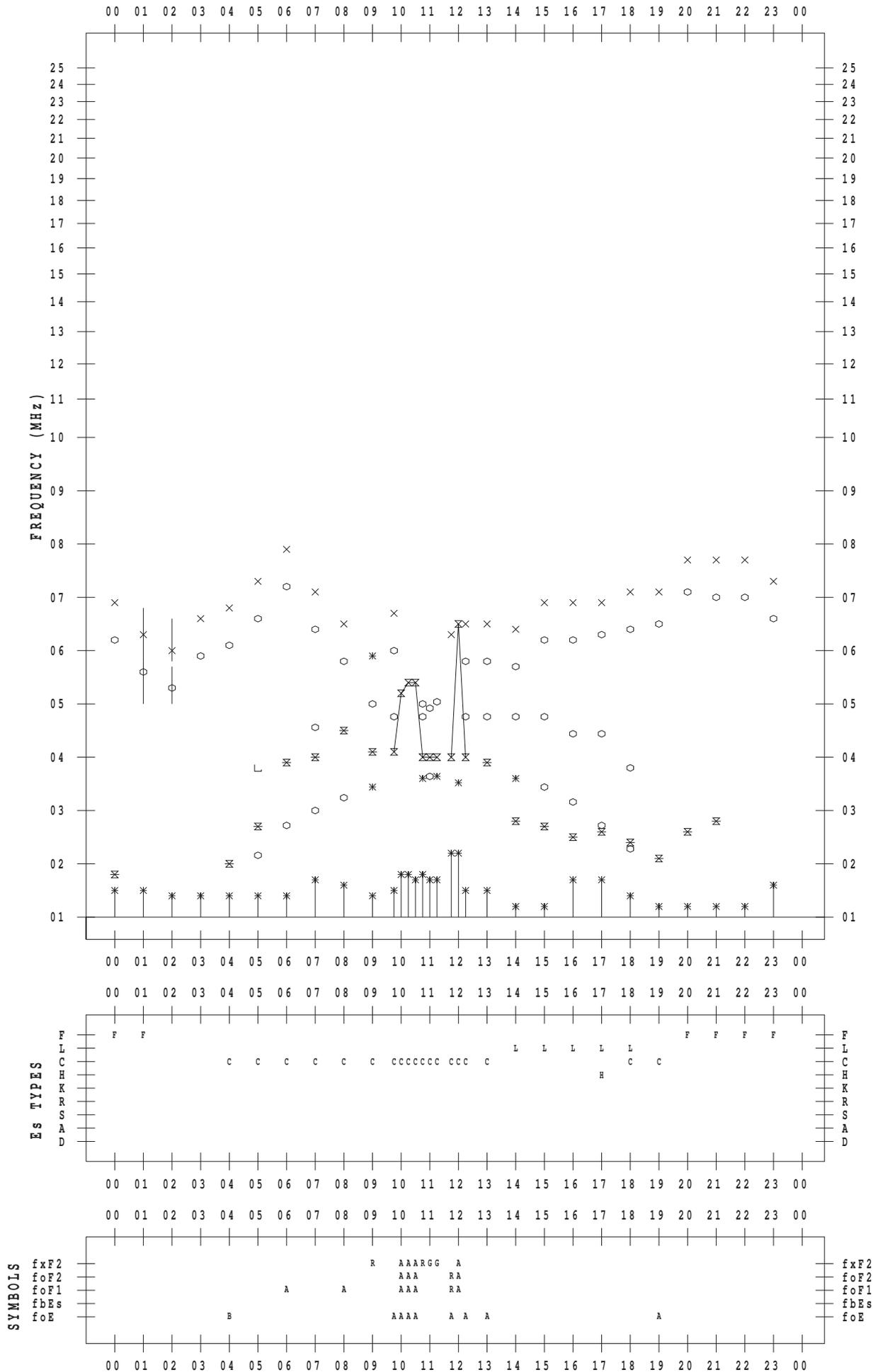
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 5 / 27

135 ° E MEAN TIME



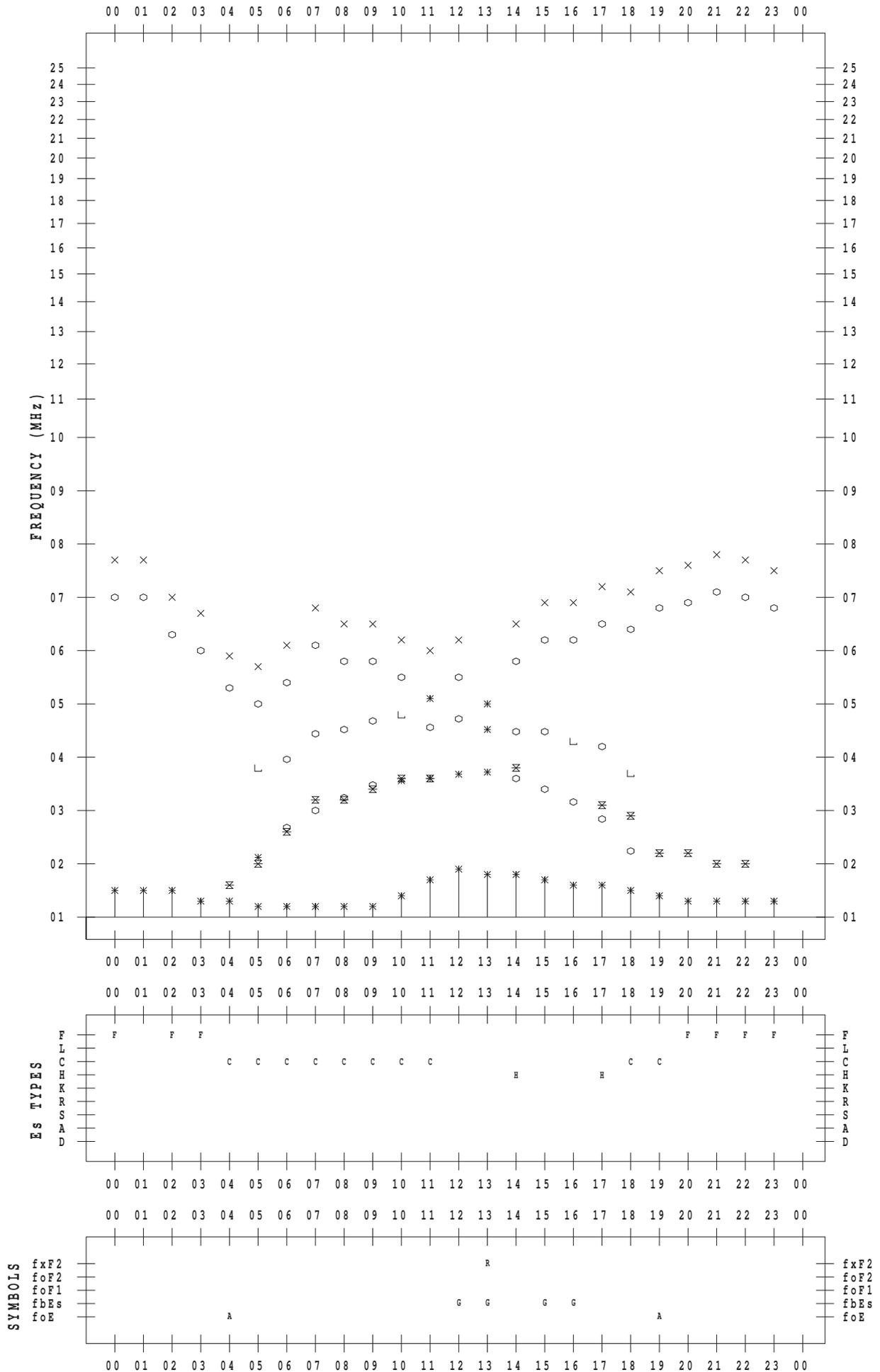
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/28

135 ° E MEAN TIME



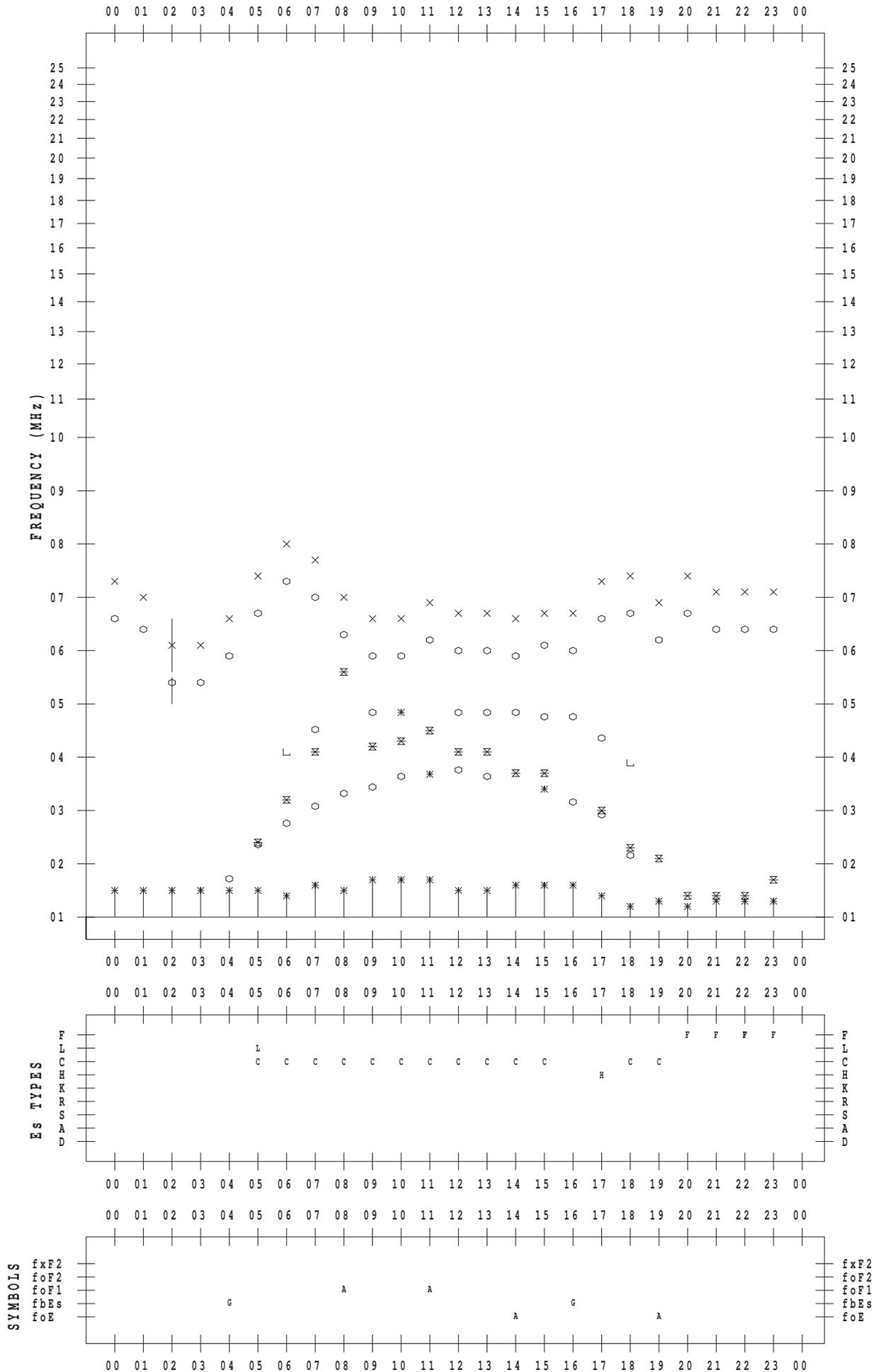
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/29

135 ° E MEAN TIME



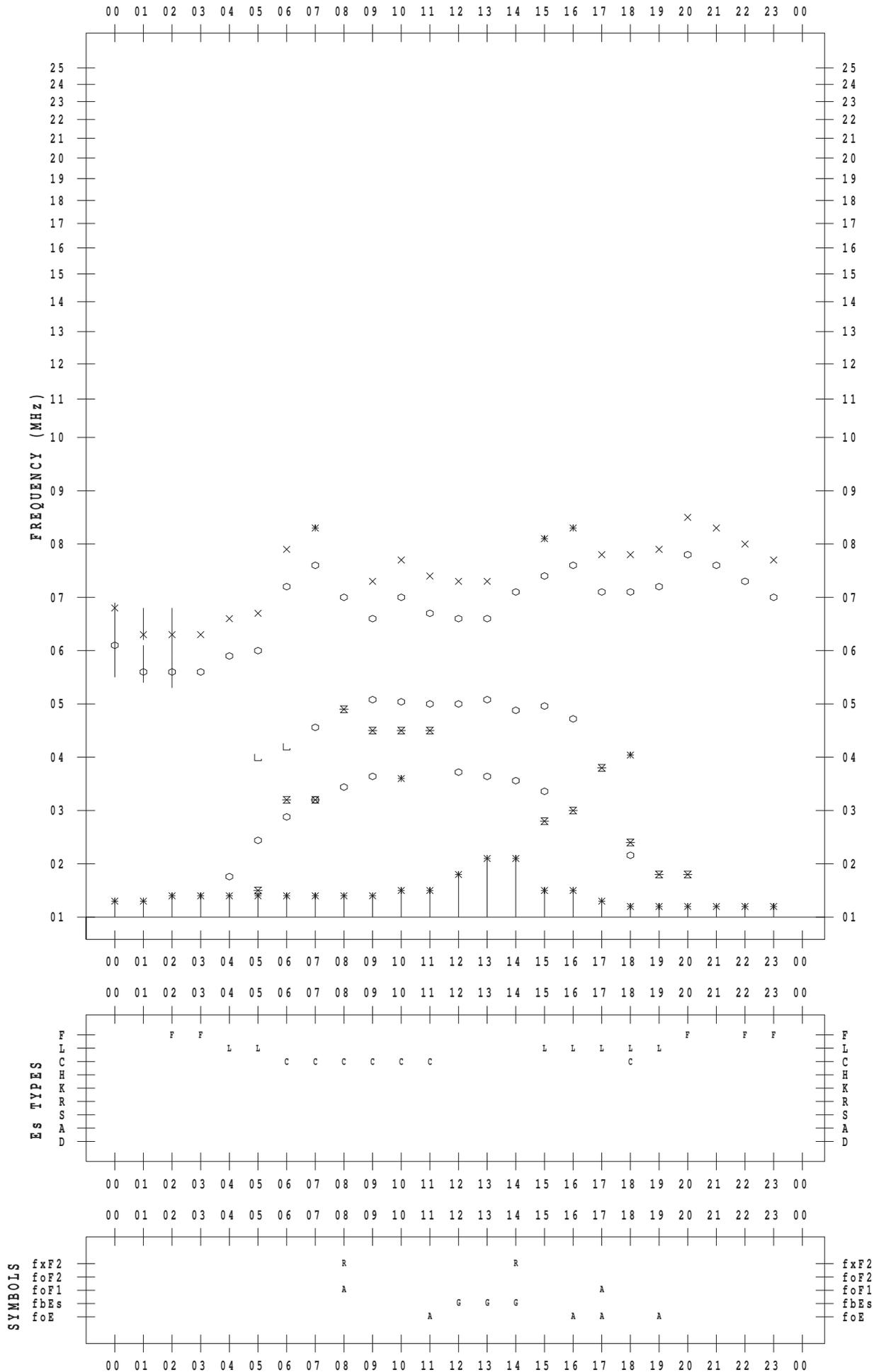
f-PLOT DATA

SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013 / 5 / 30

135 ° E MEAN TIME



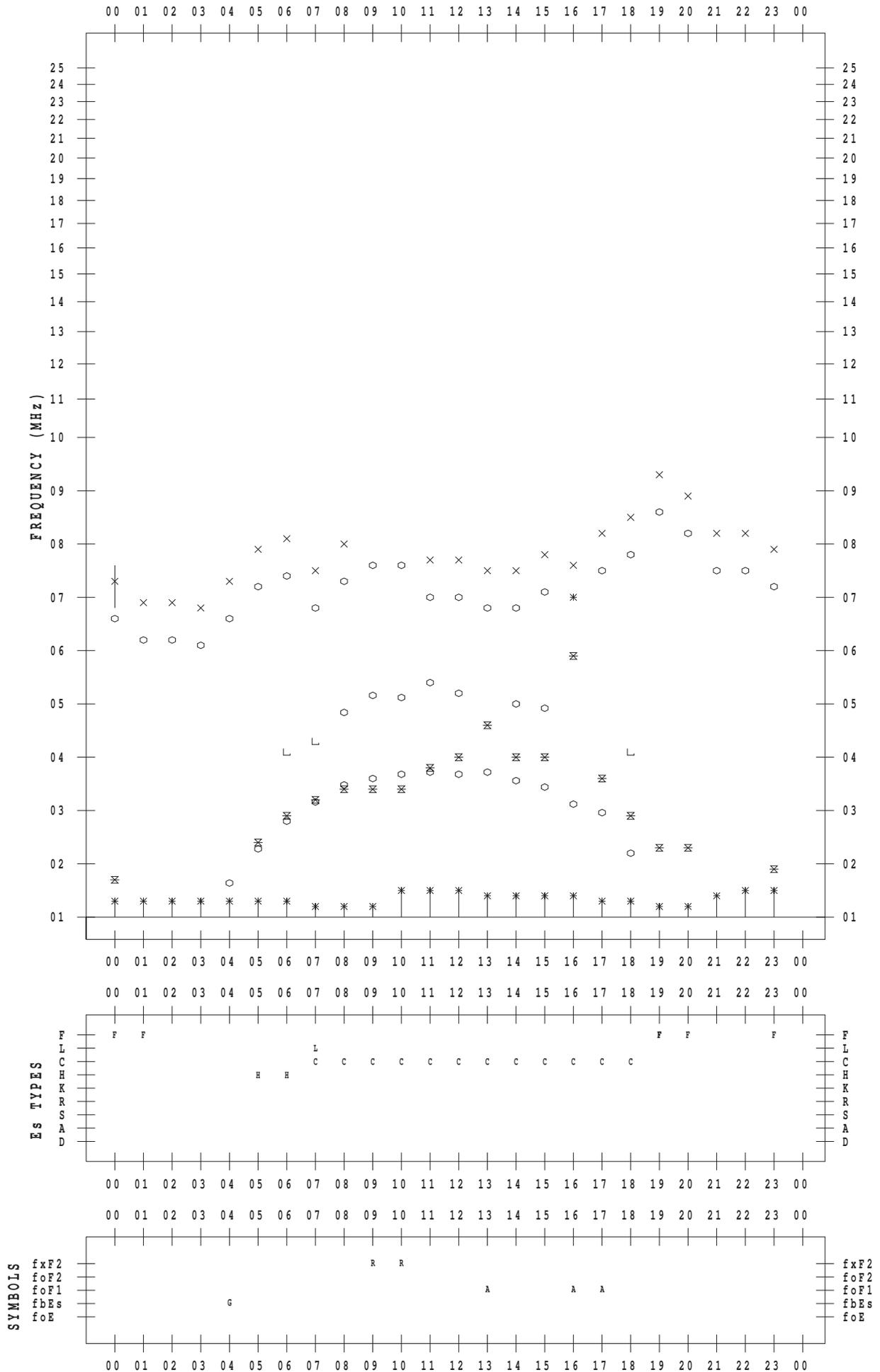
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SCALER : K.FUKUSHIMA

STATION : Wakkanai

DATE : 2013/ 5/31

135 ° E MEAN TIME



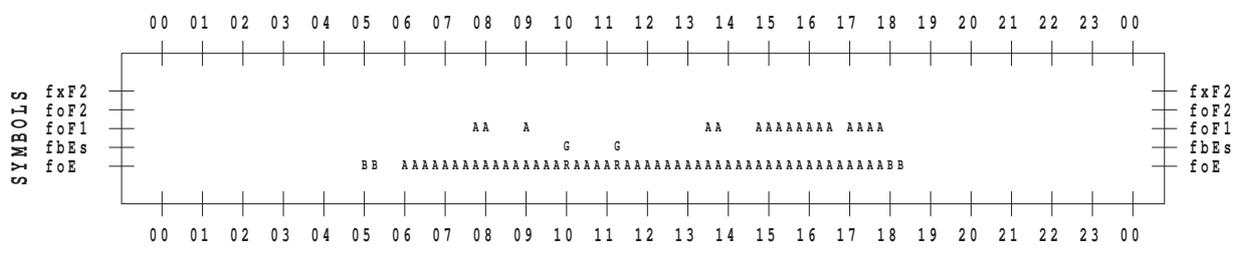
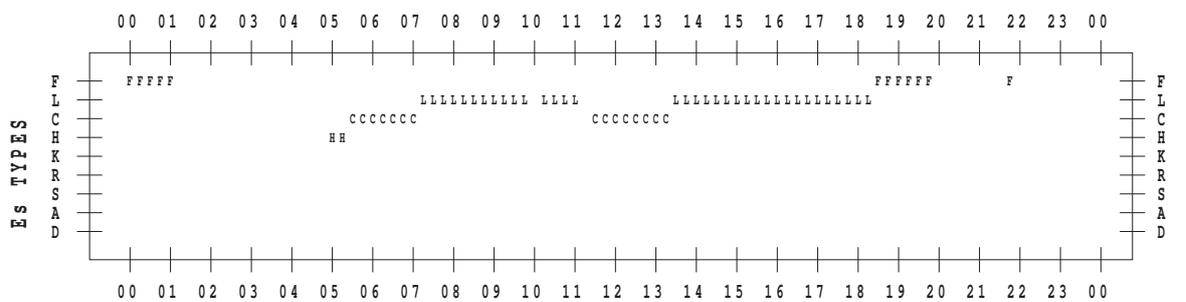
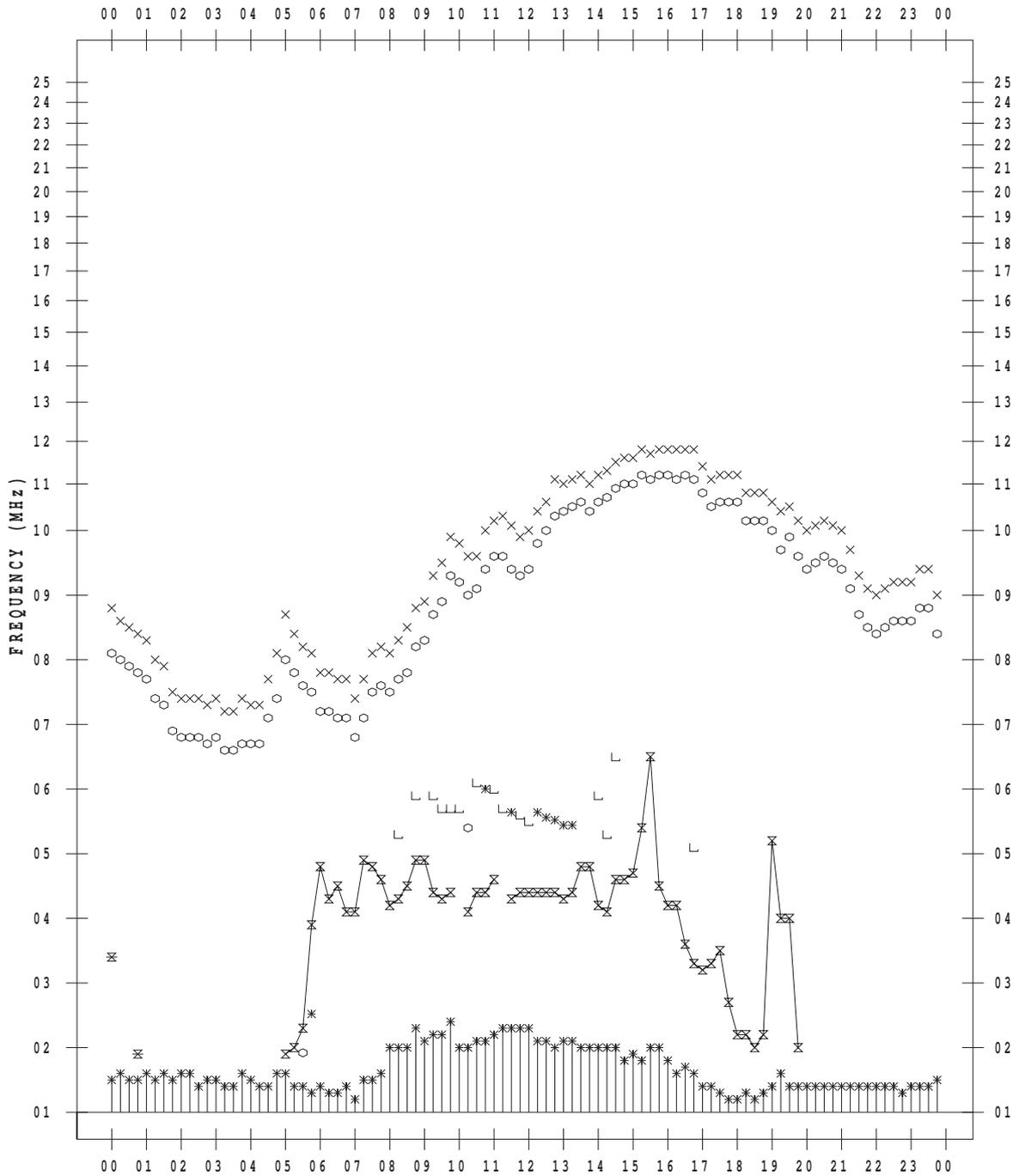
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/ 1

135 ° E MEAN TIME



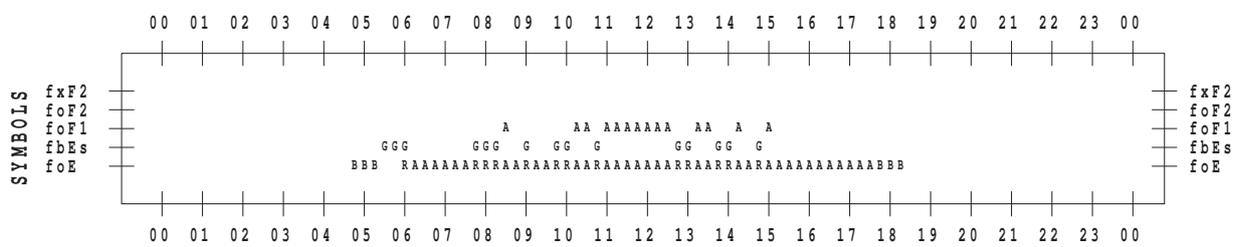
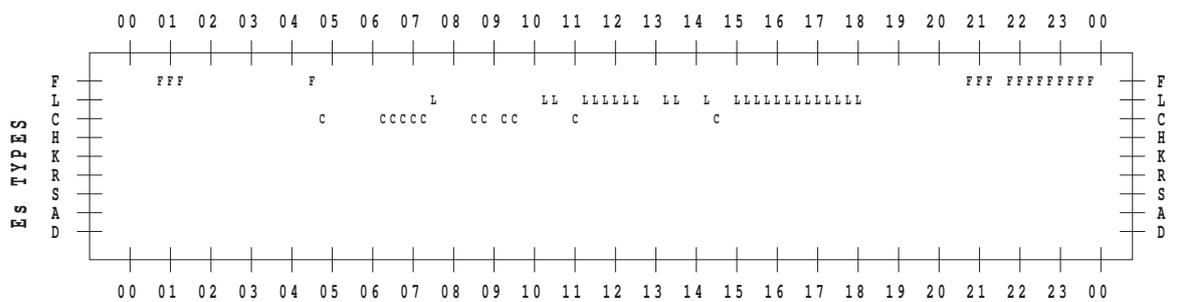
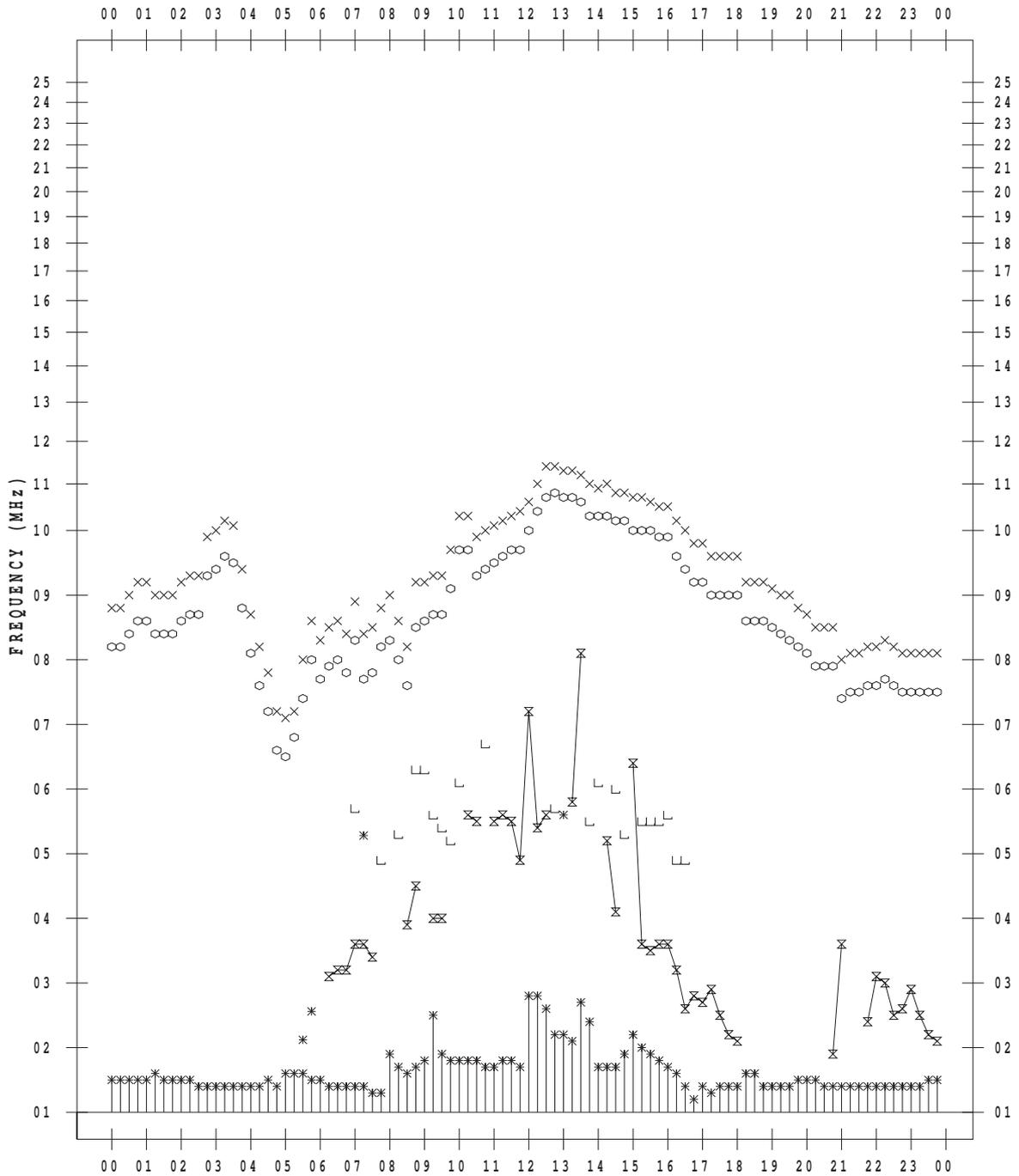
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/ 2

135 ° E MEAN TIME



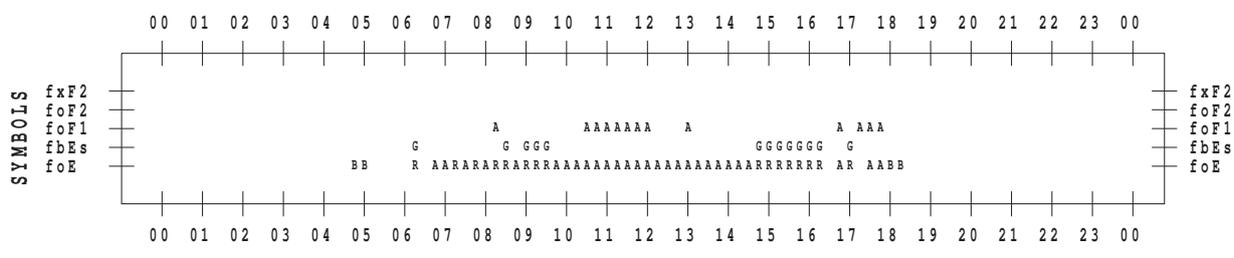
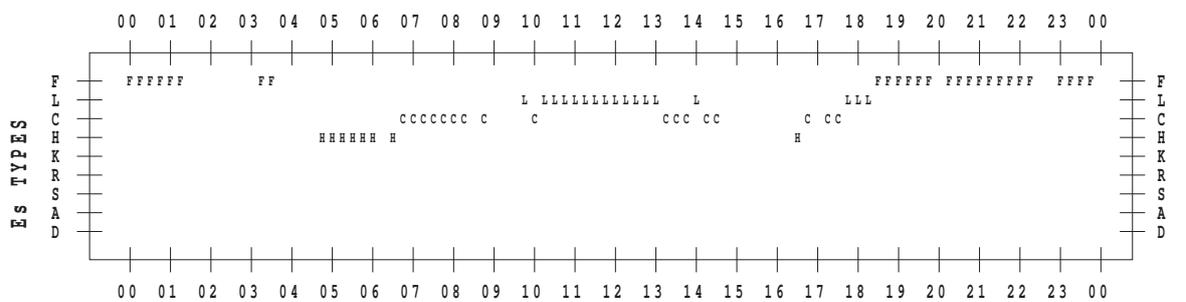
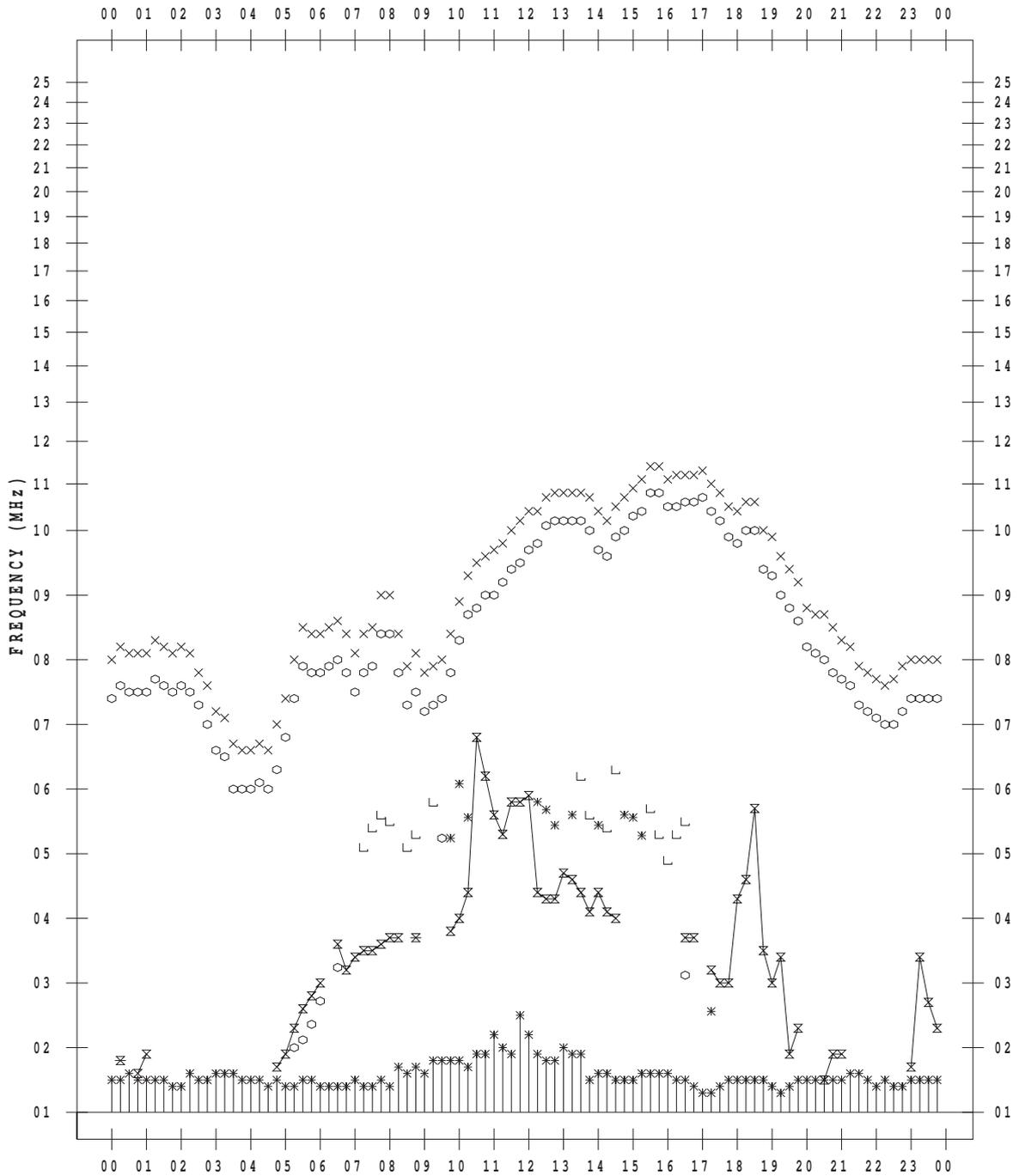
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/ 3

135 ° E MEAN TIME



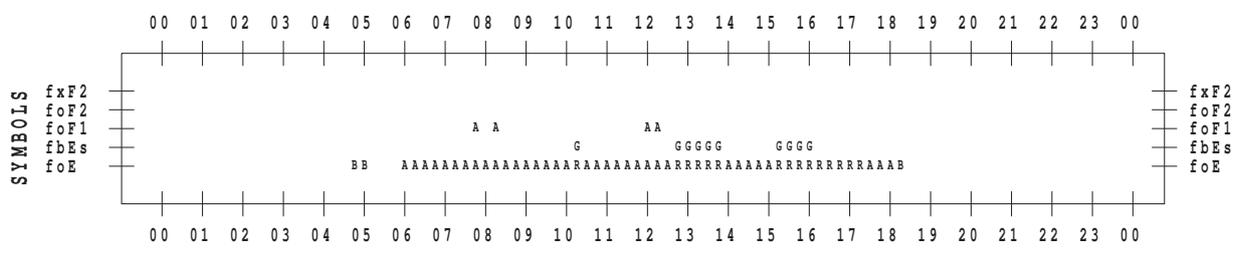
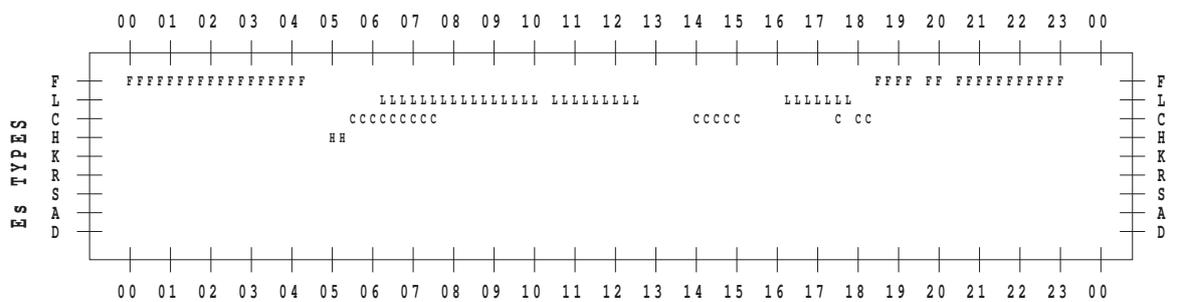
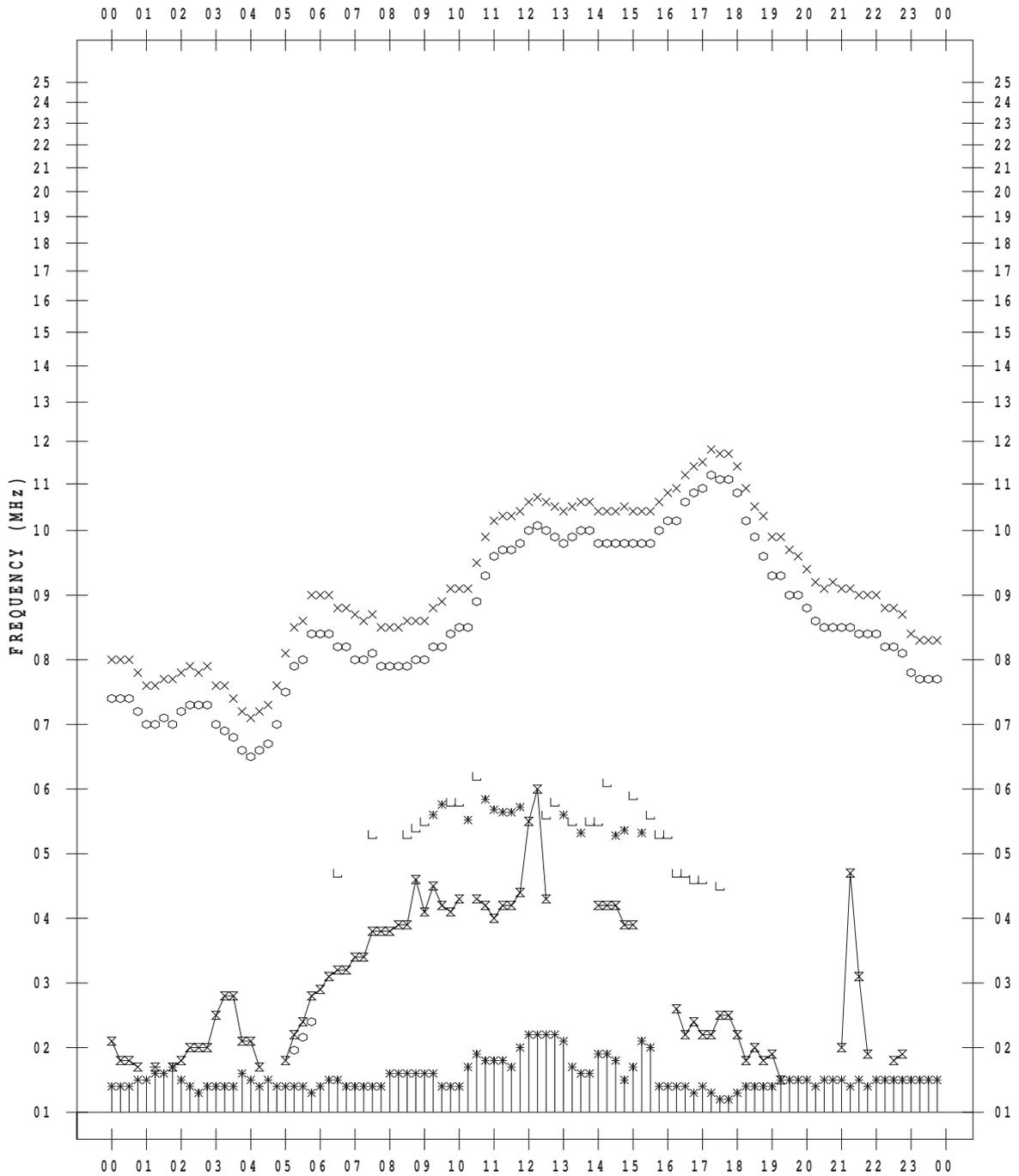
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/ 4

135 ° E MEAN TIME



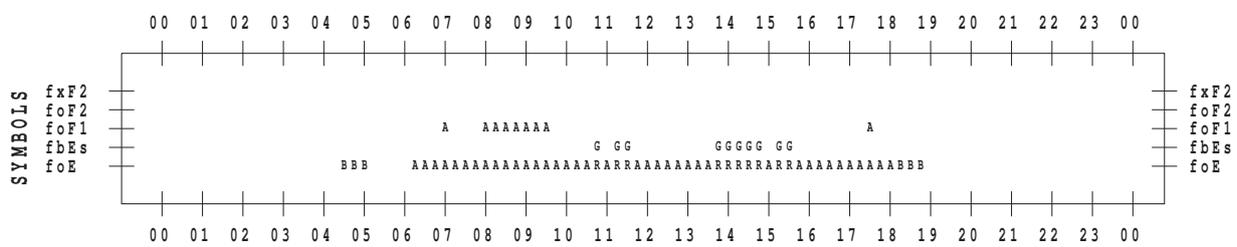
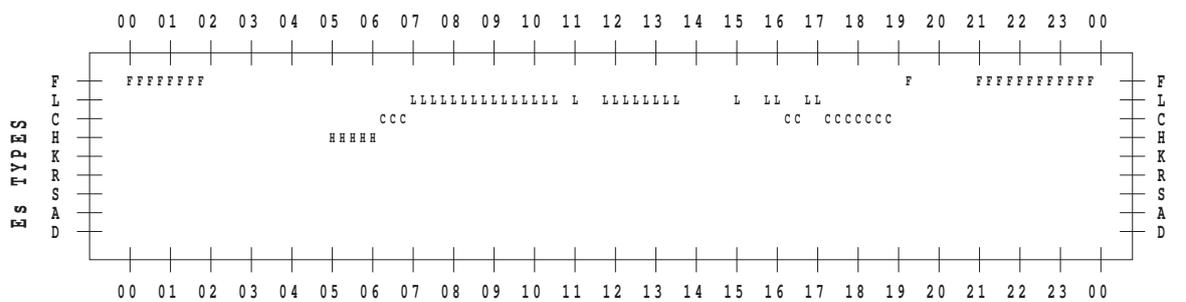
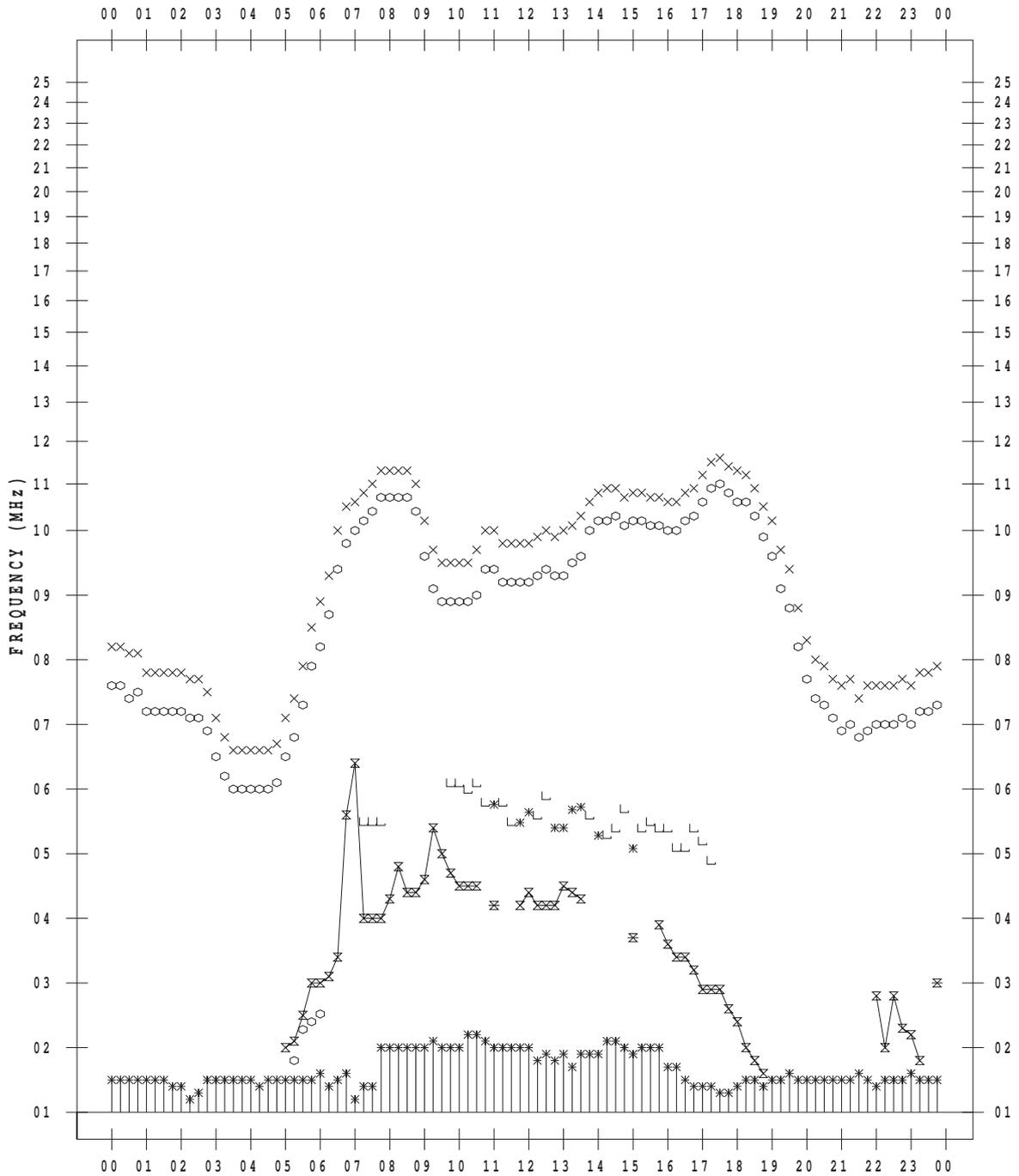
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/ 5

135 ° E MEAN TIME



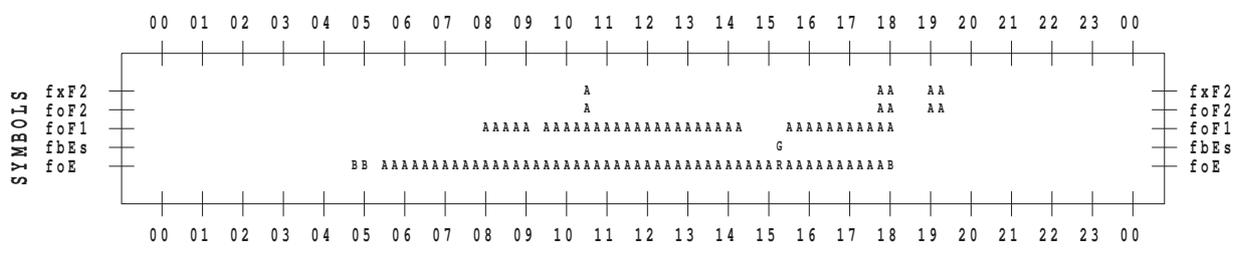
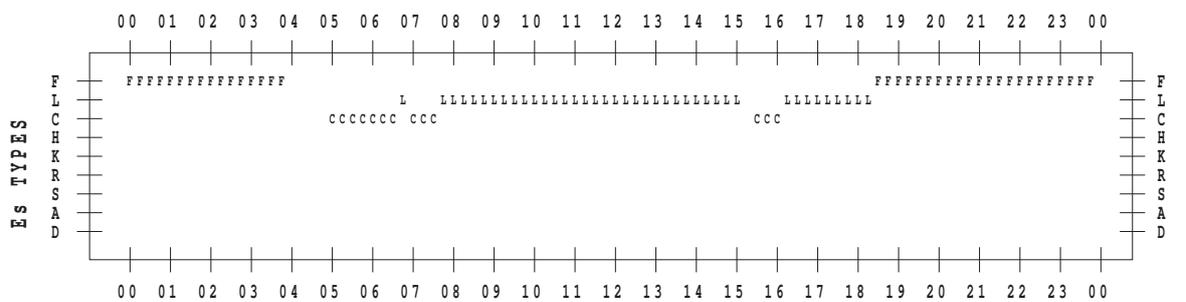
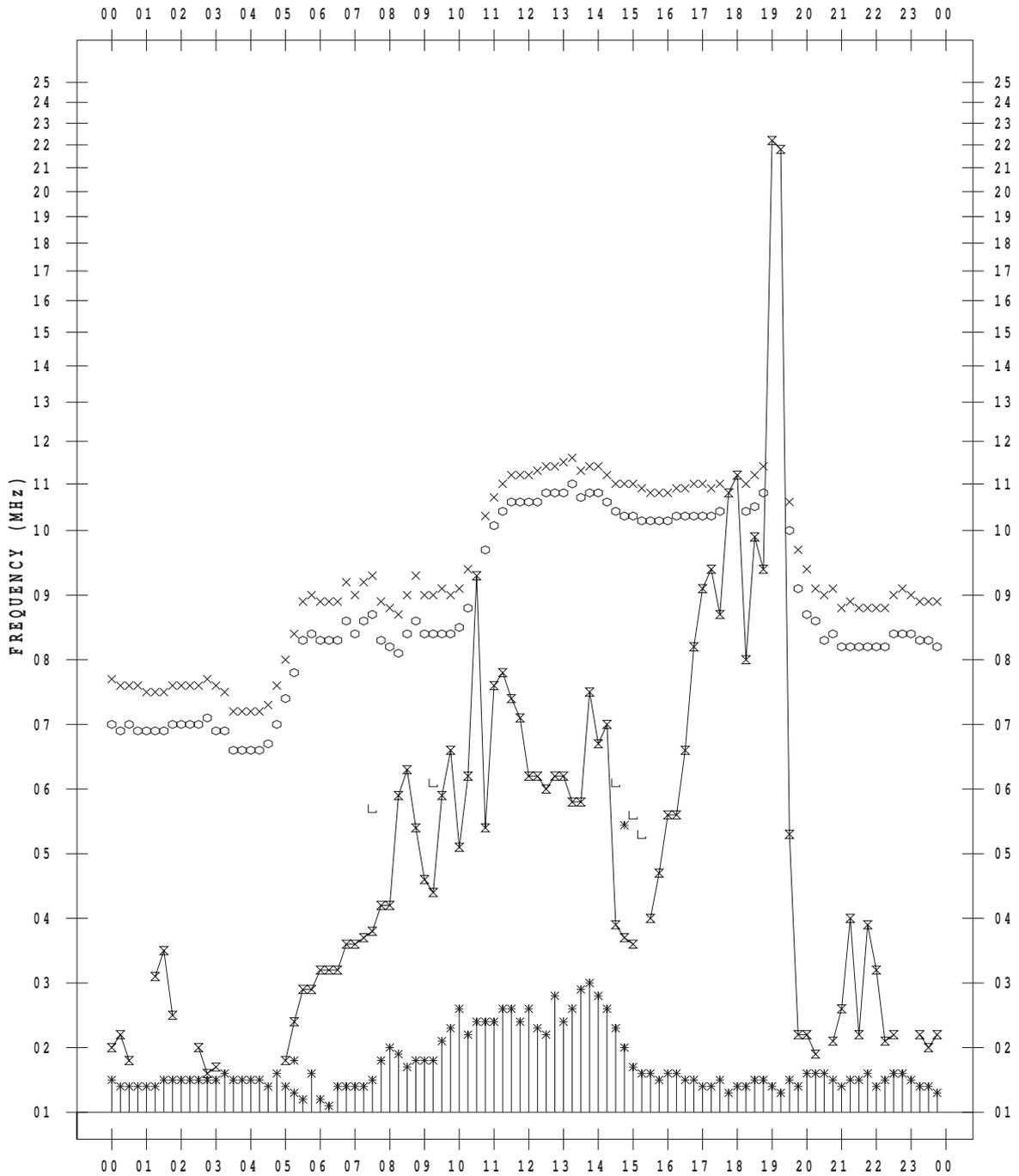
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/ 6

135 ° E MEAN TIME



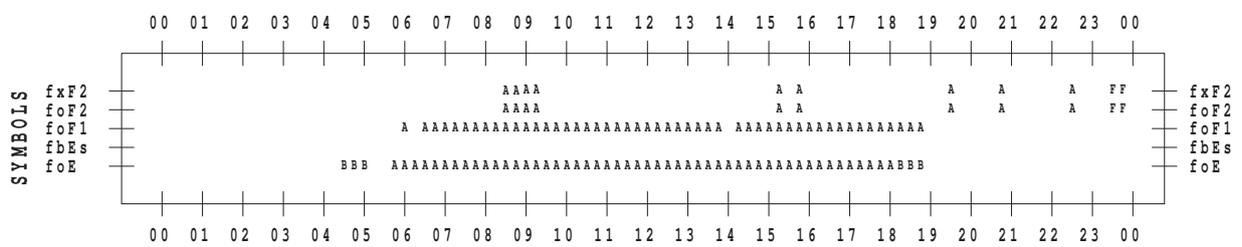
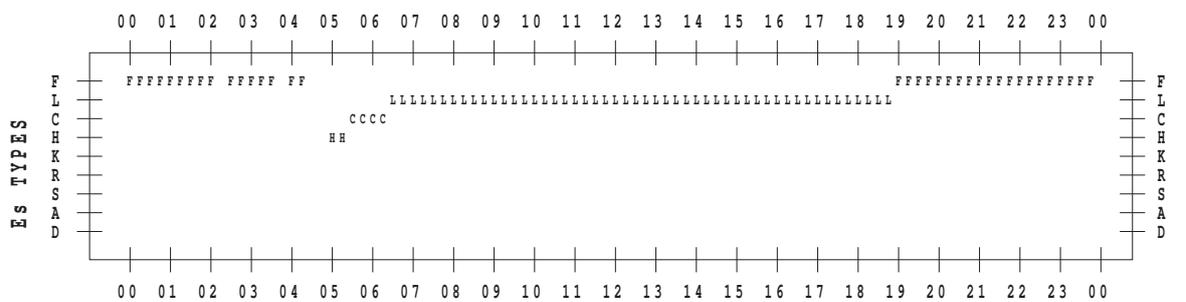
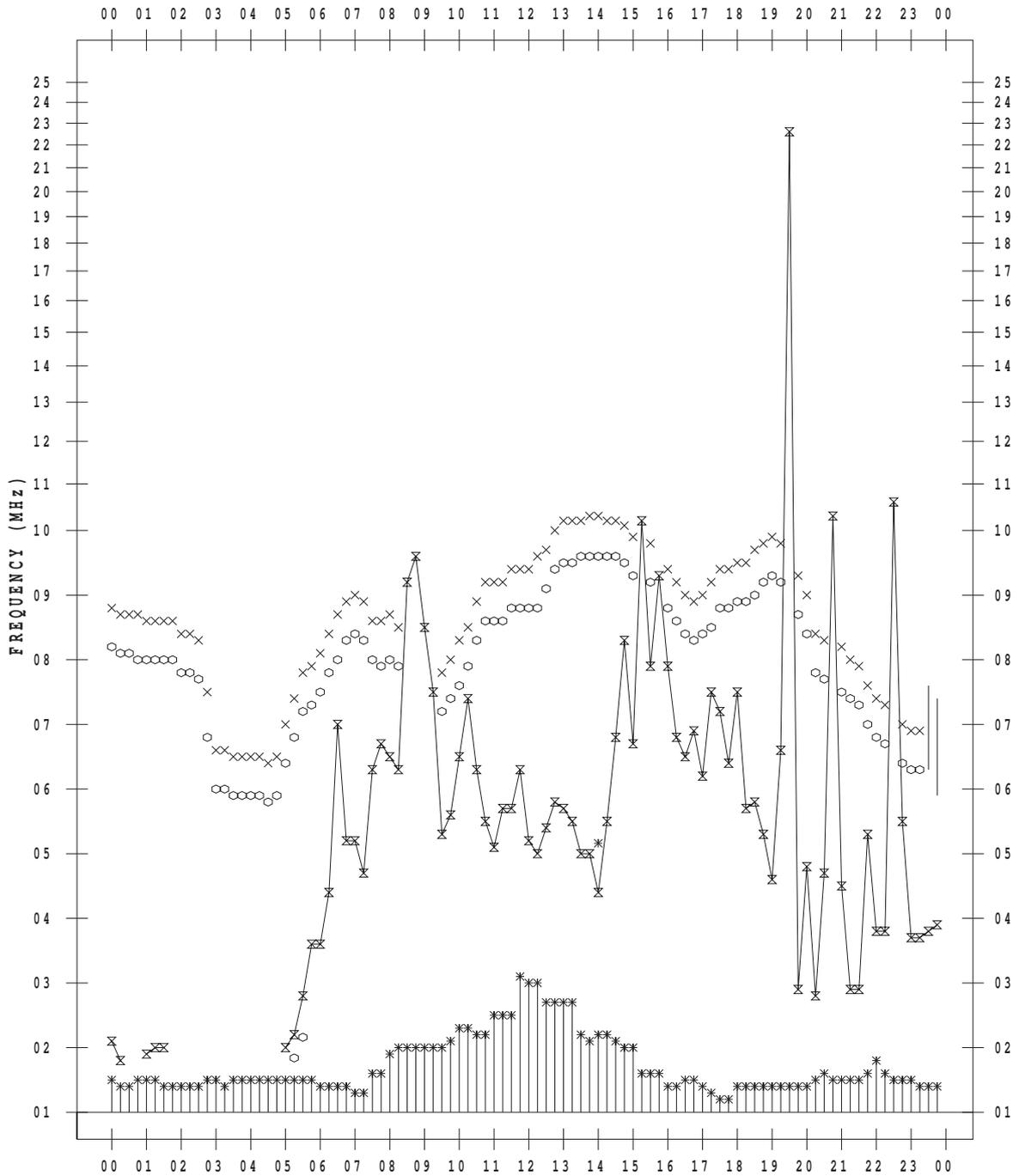
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/ 7

135 ° E MEAN TIME



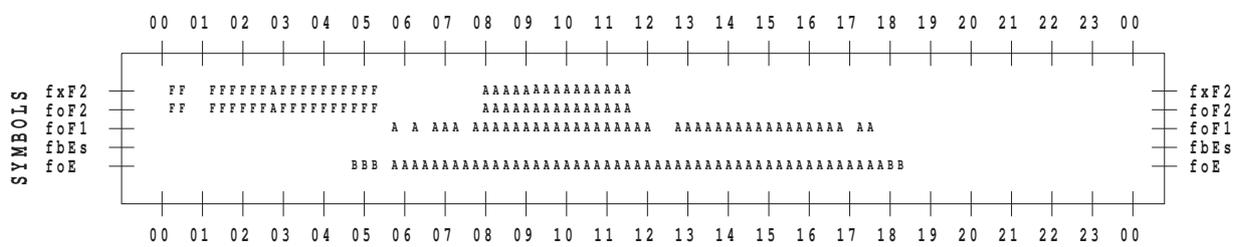
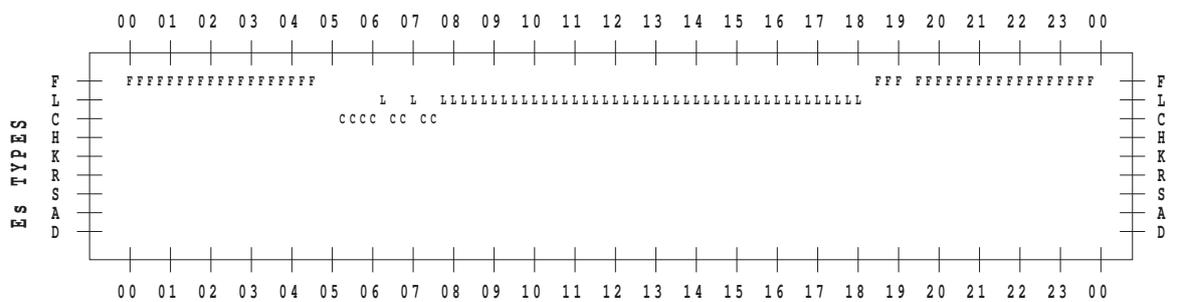
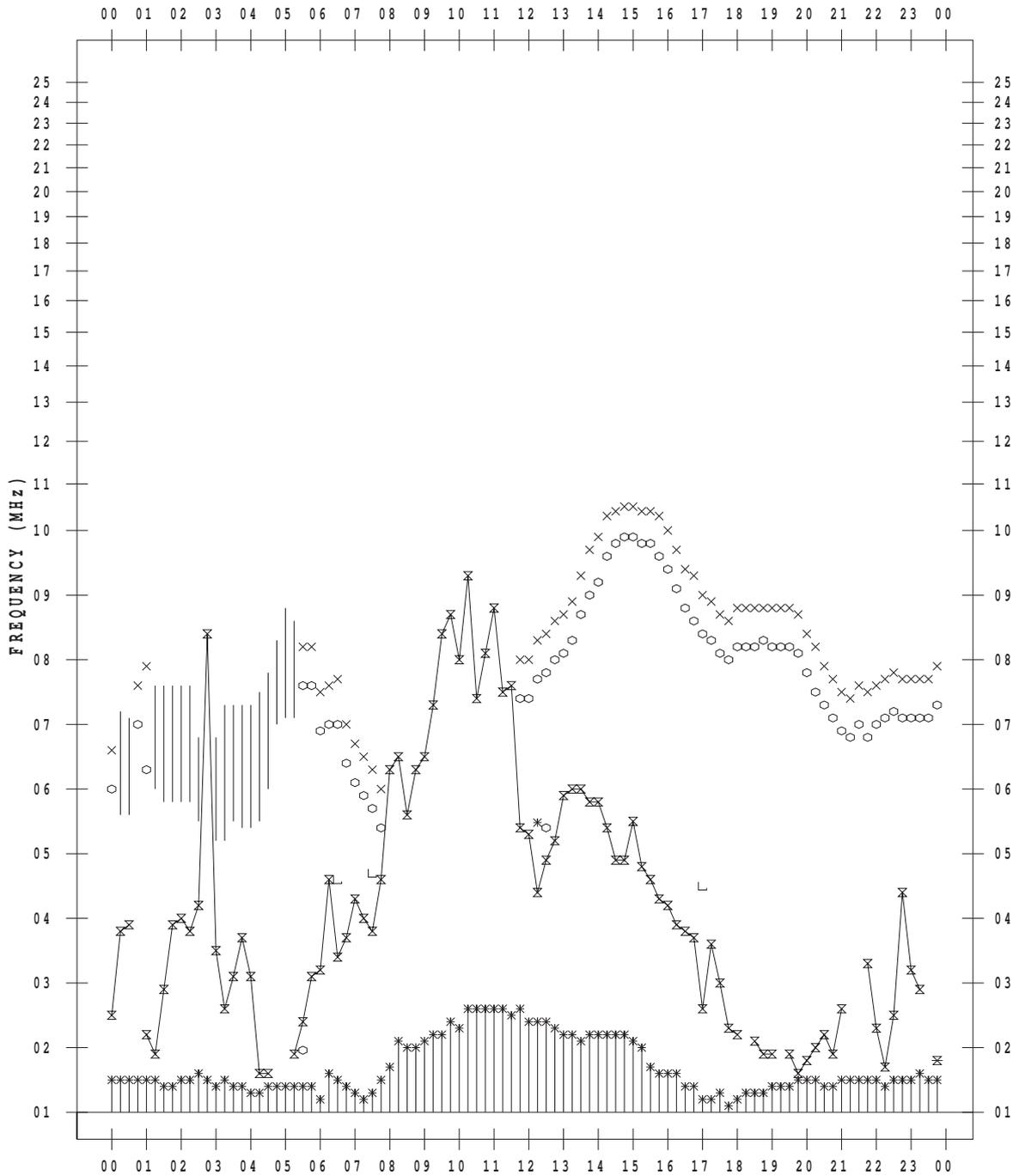
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/ 8

135 ° E MEAN TIME



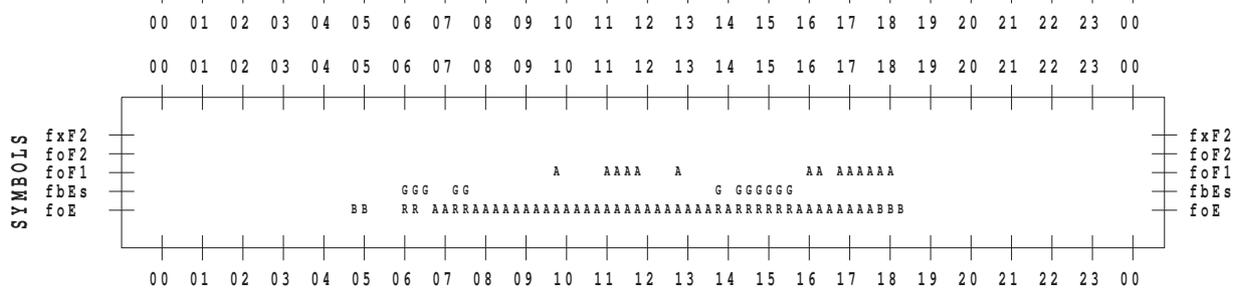
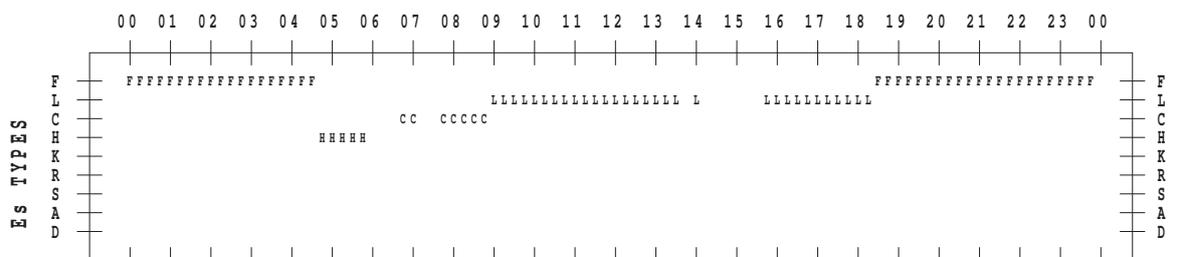
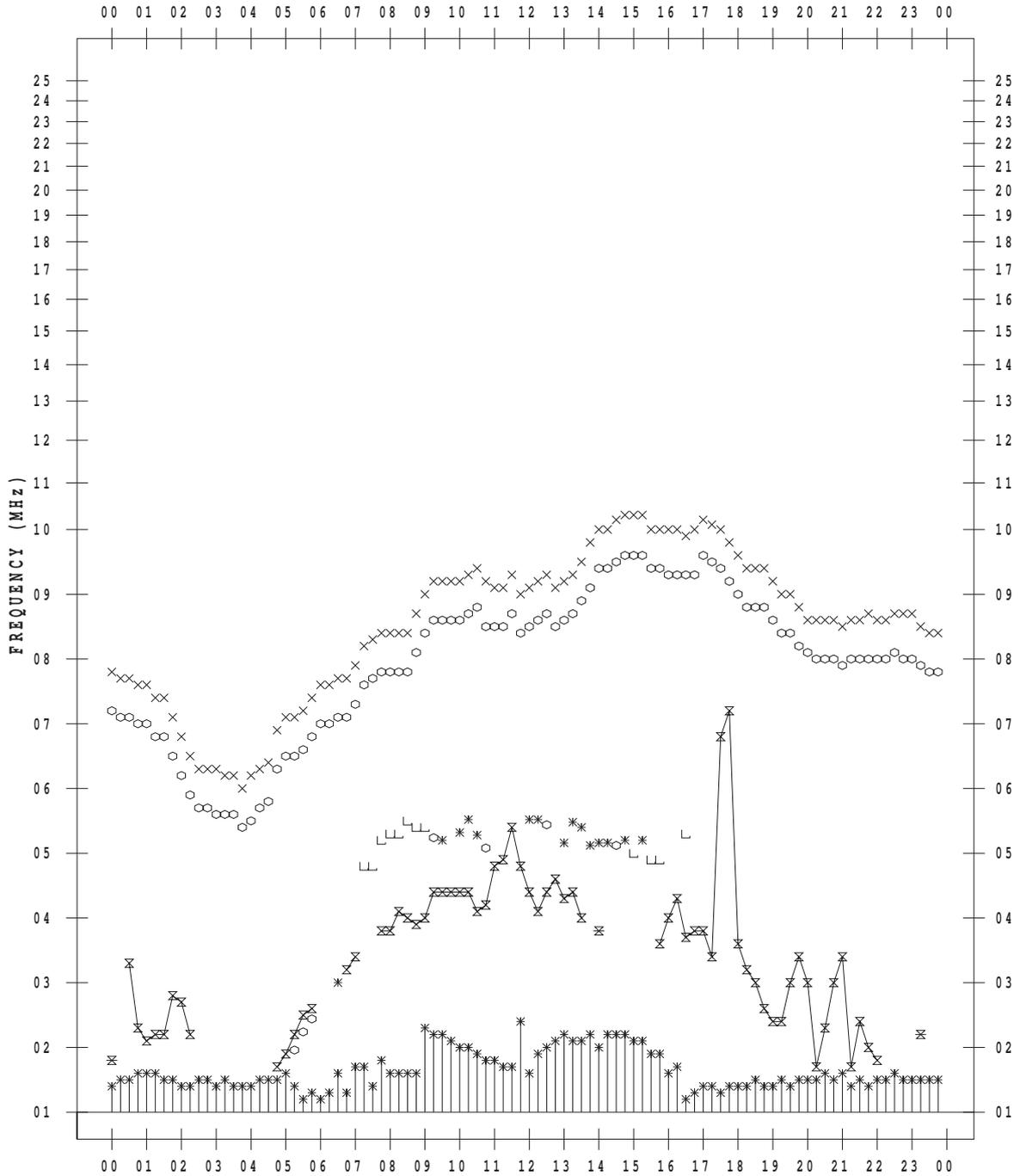
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/ 9

135 ° E MEAN TIME



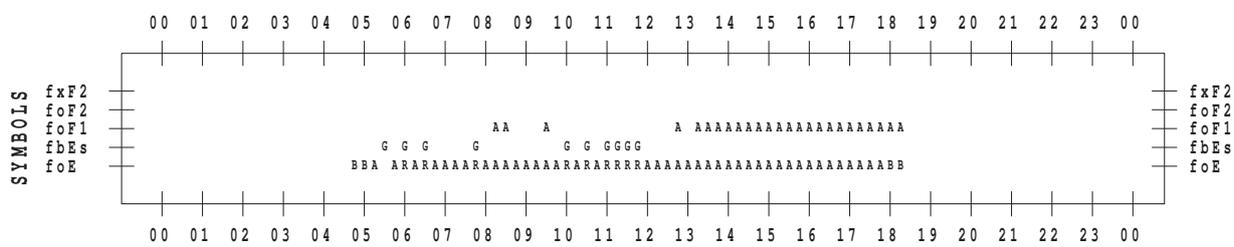
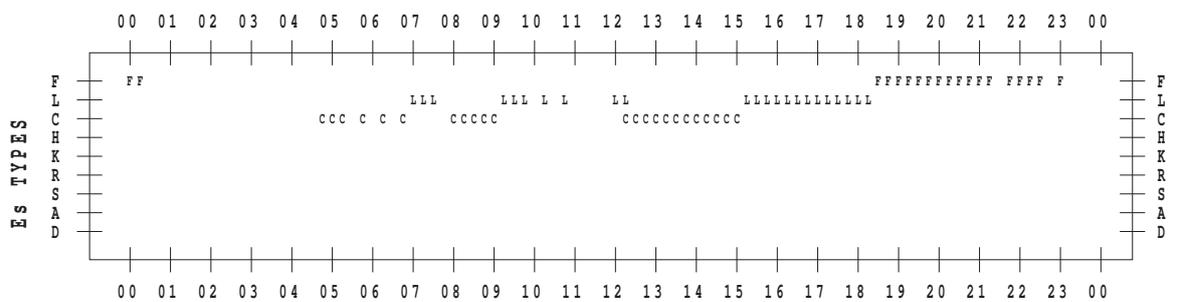
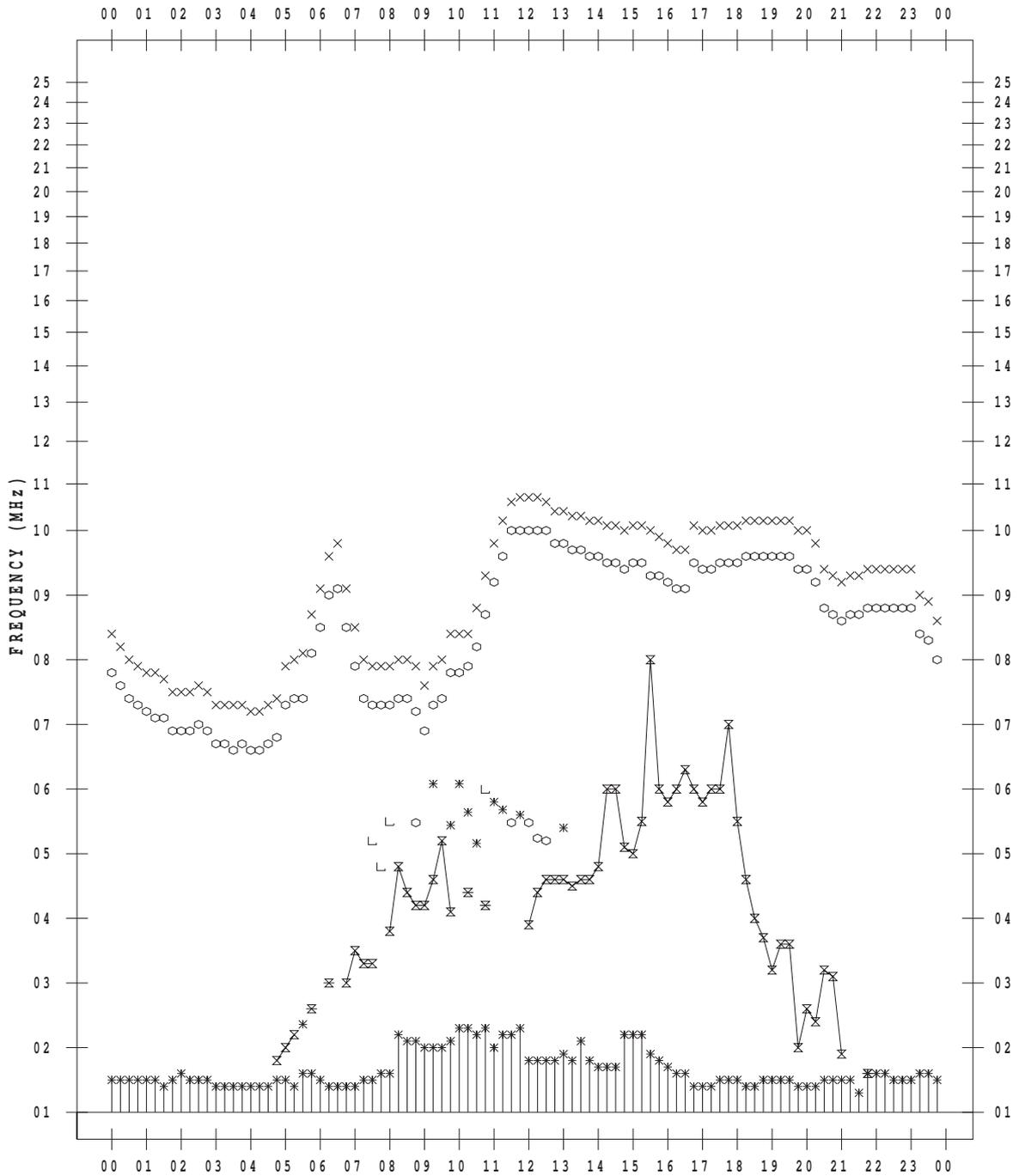
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/10

135 ° E MEAN TIME



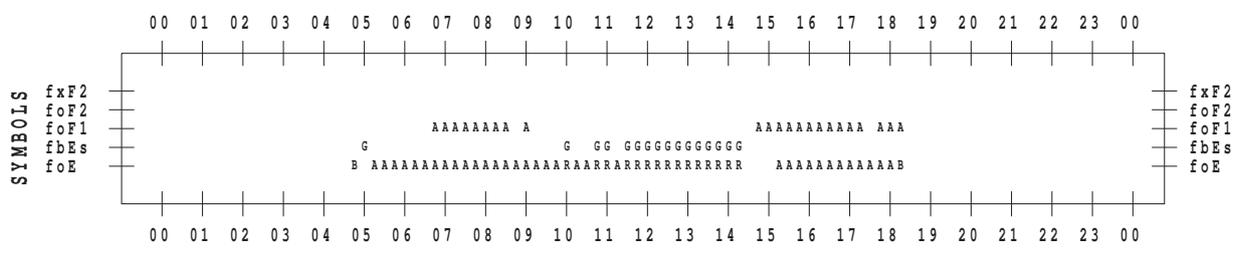
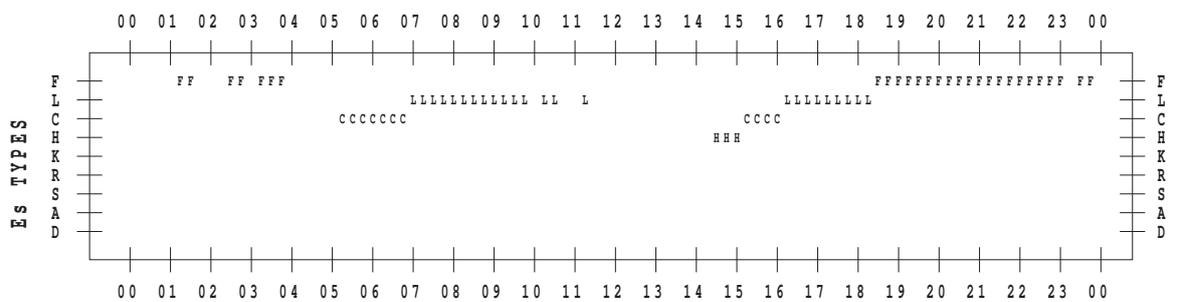
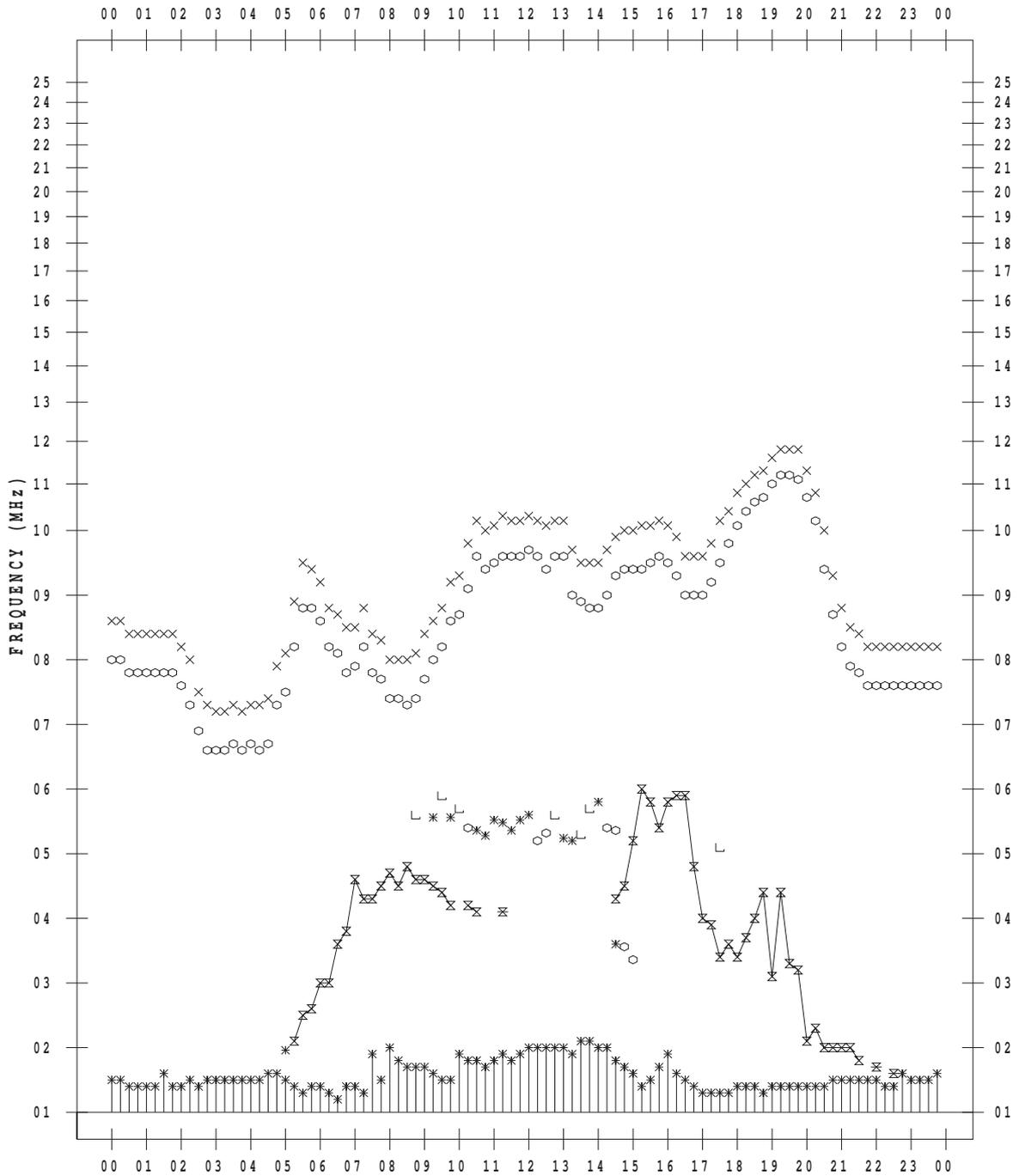
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/11

135 ° E MEAN TIME



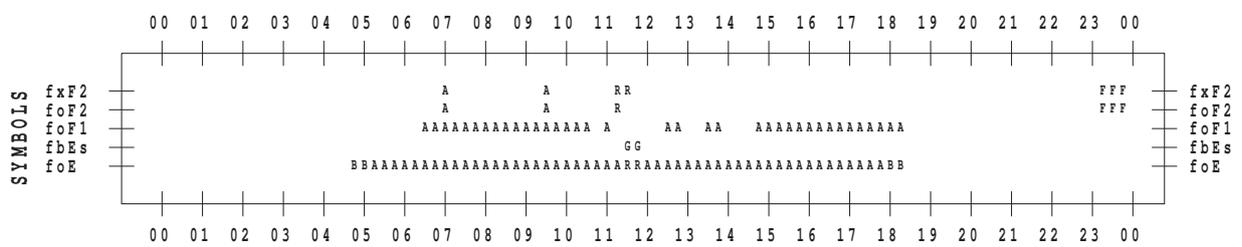
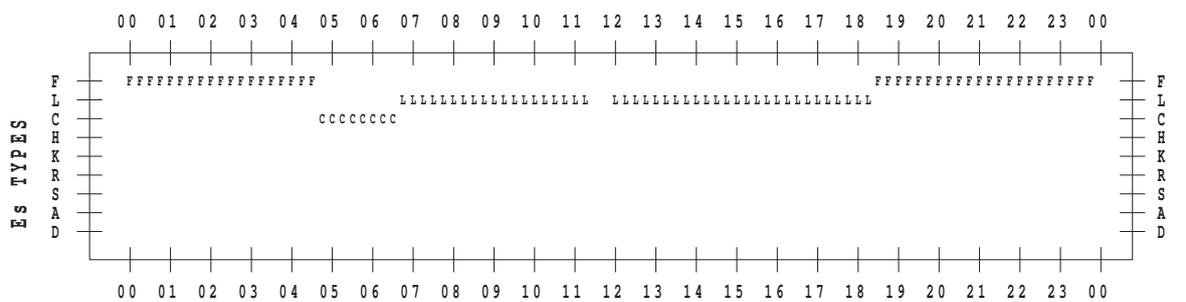
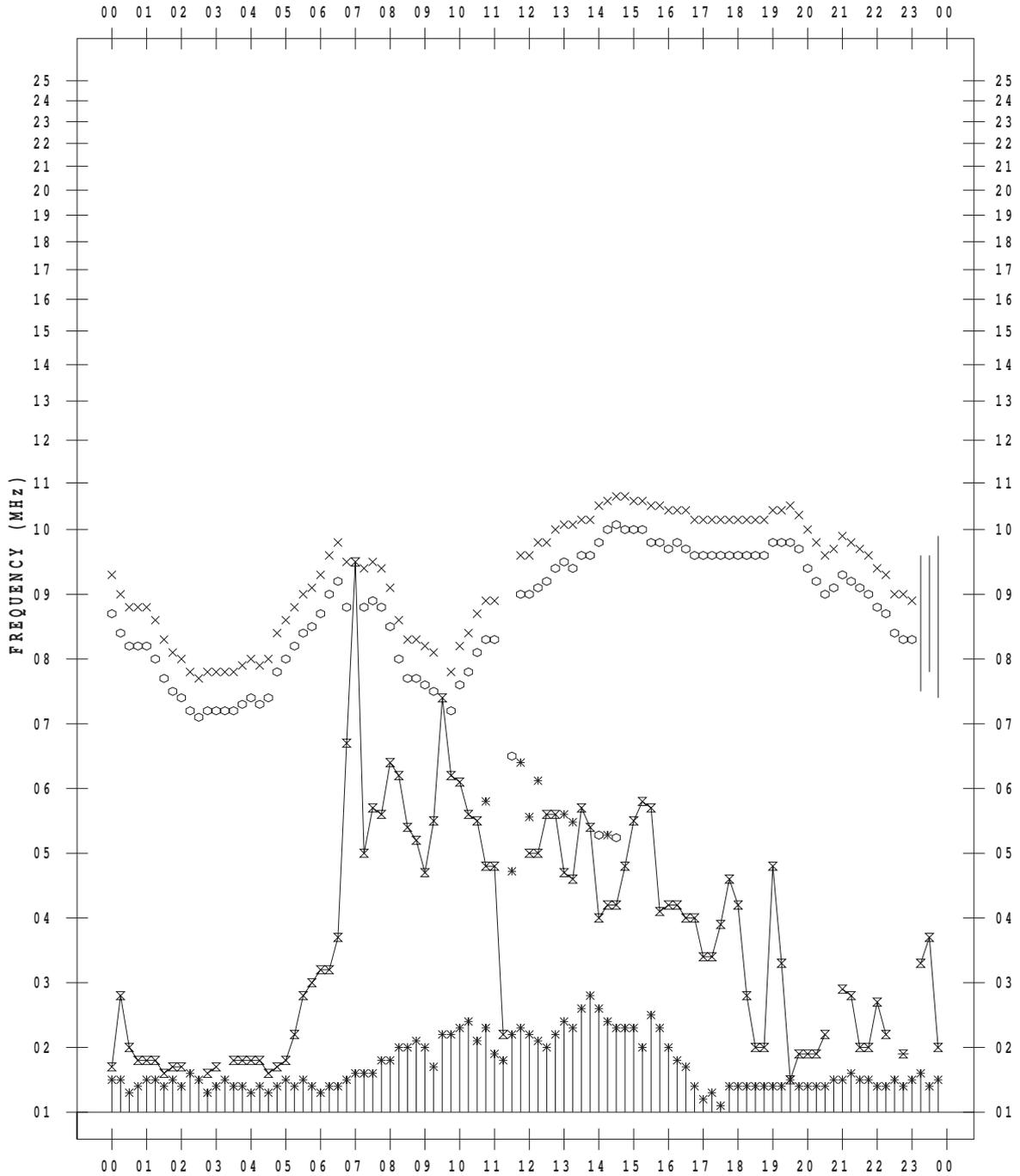
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/13

135 ° E MEAN TIME



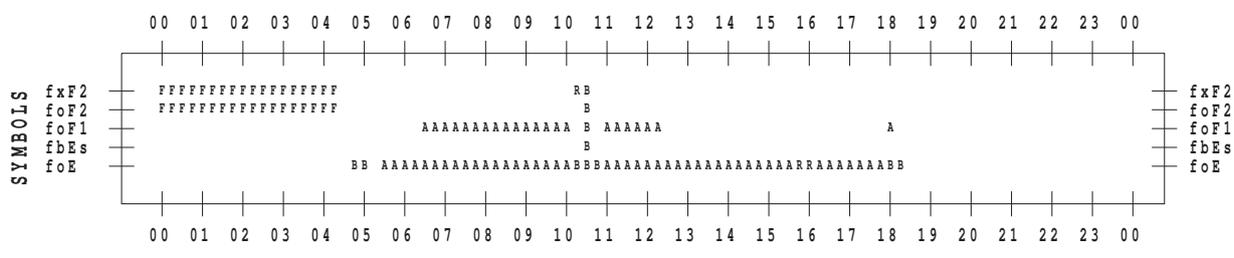
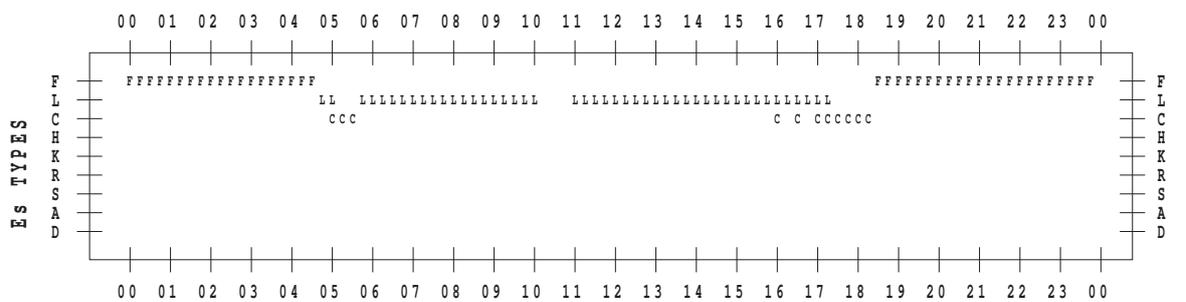
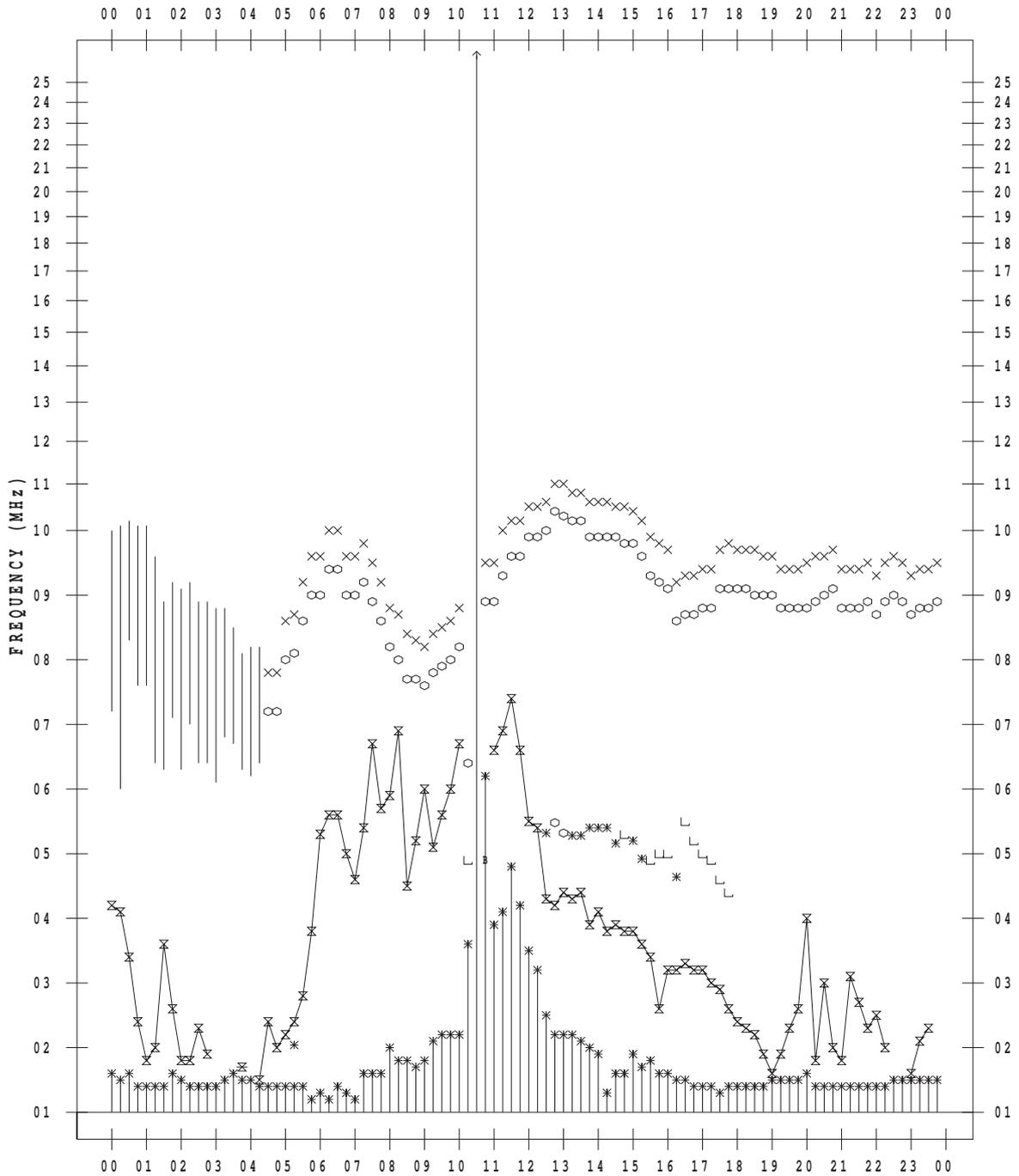
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/14

135 ° E MEAN TIME



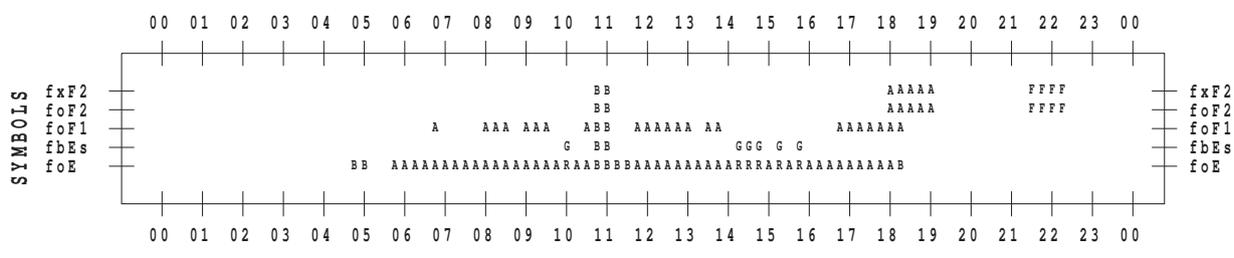
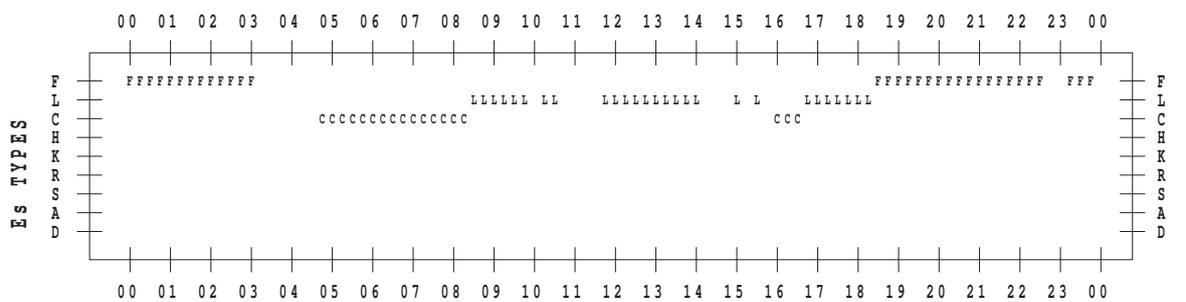
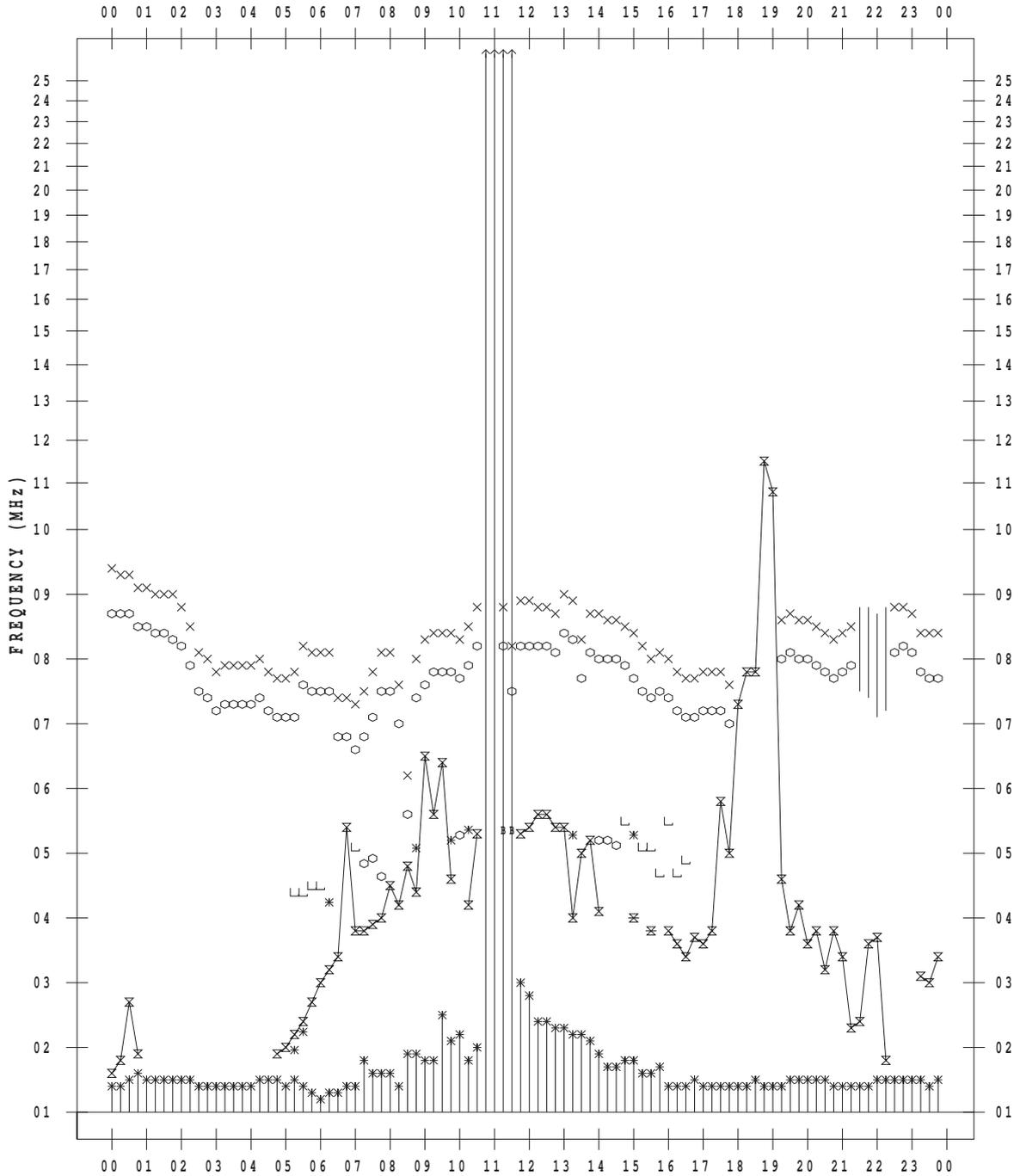
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/15

135 ° E MEAN TIME



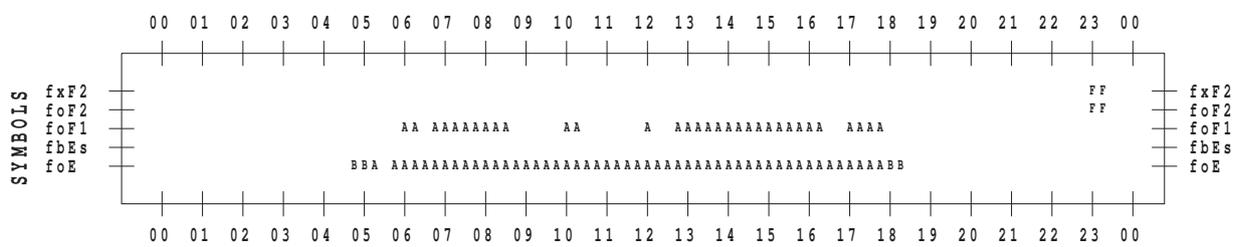
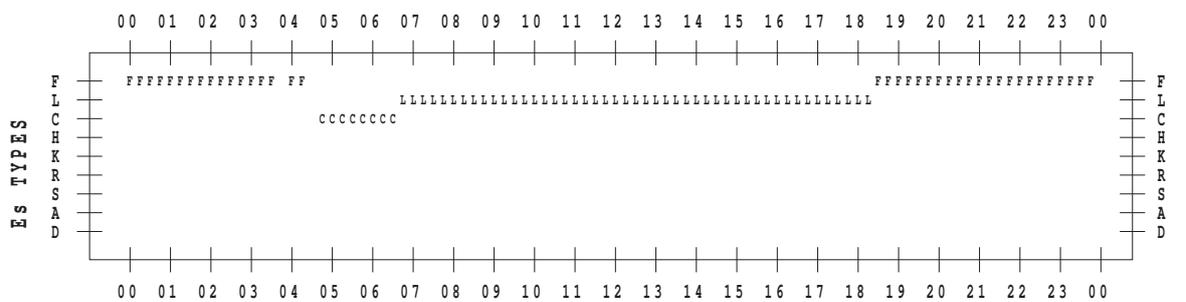
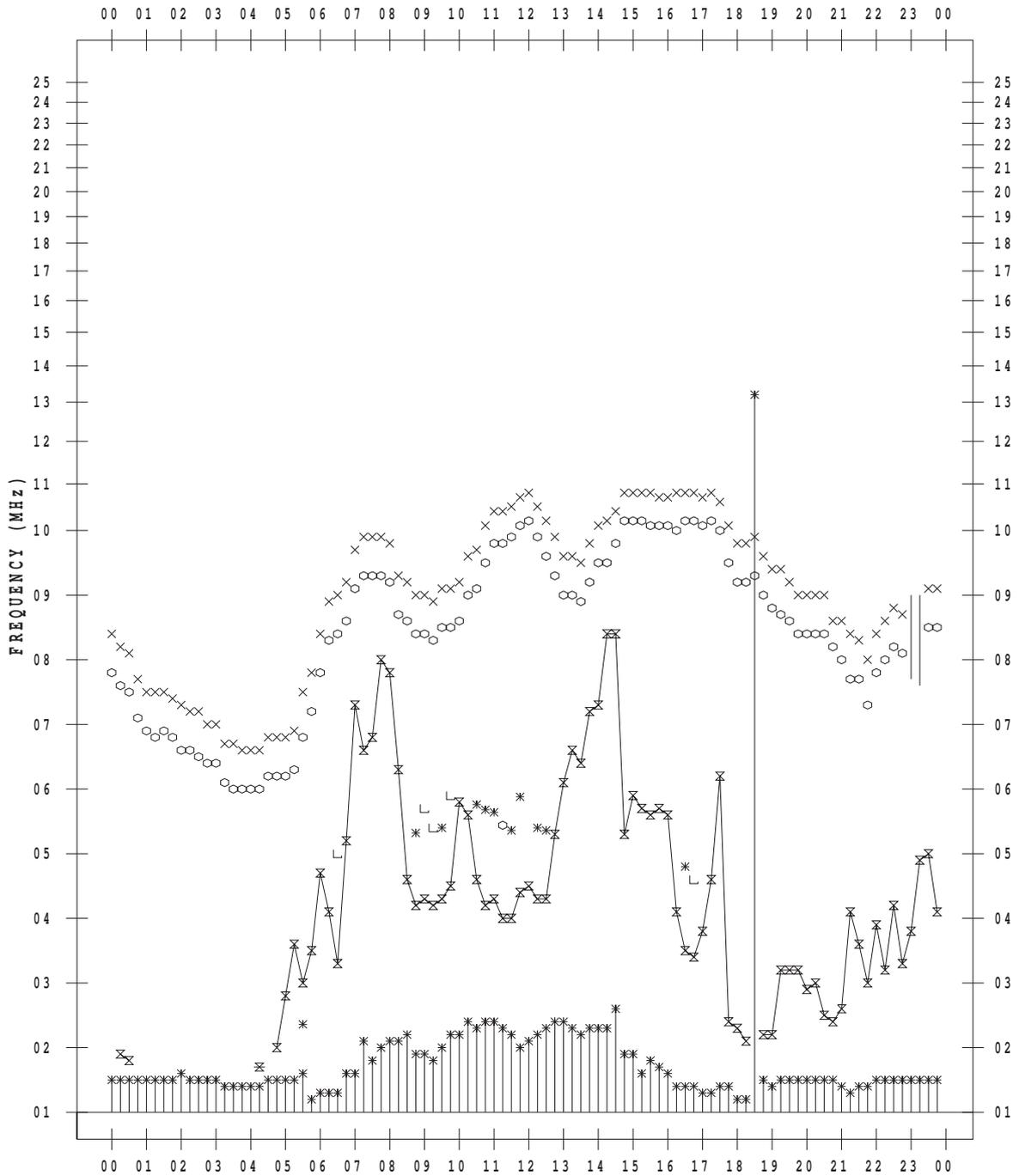
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/17

135 ° E MEAN TIME



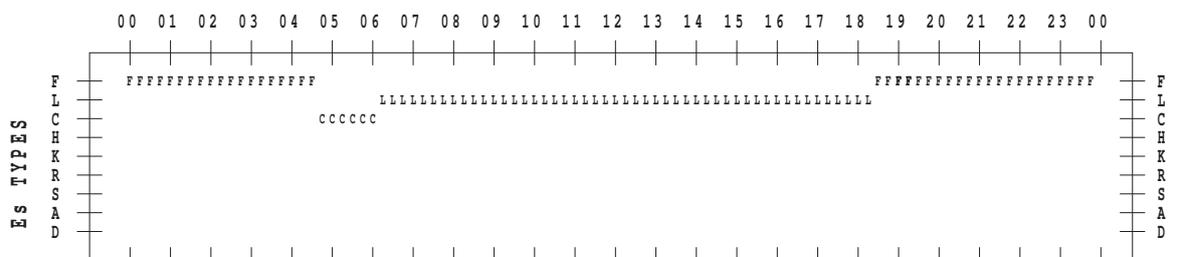
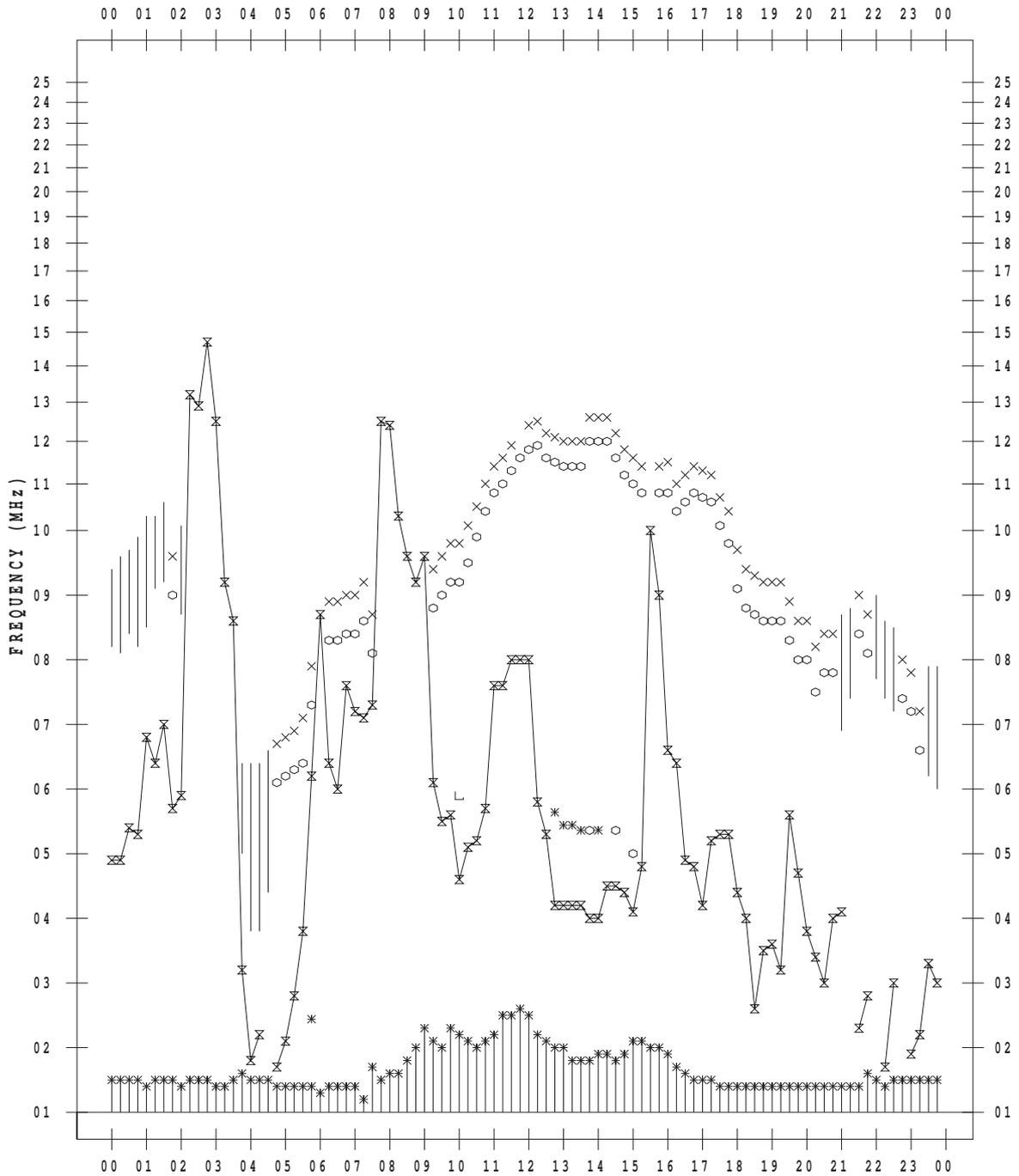
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/18

135 ° E MEAN TIME



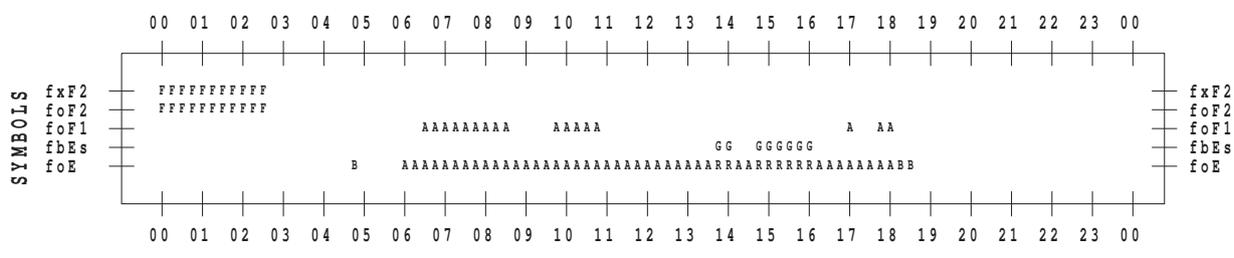
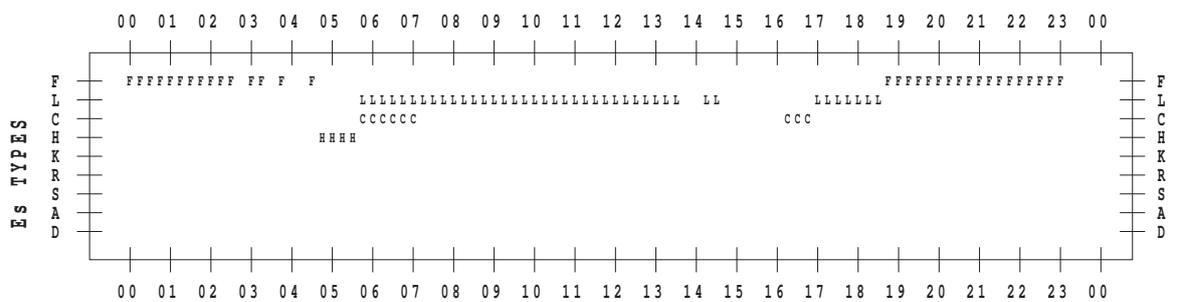
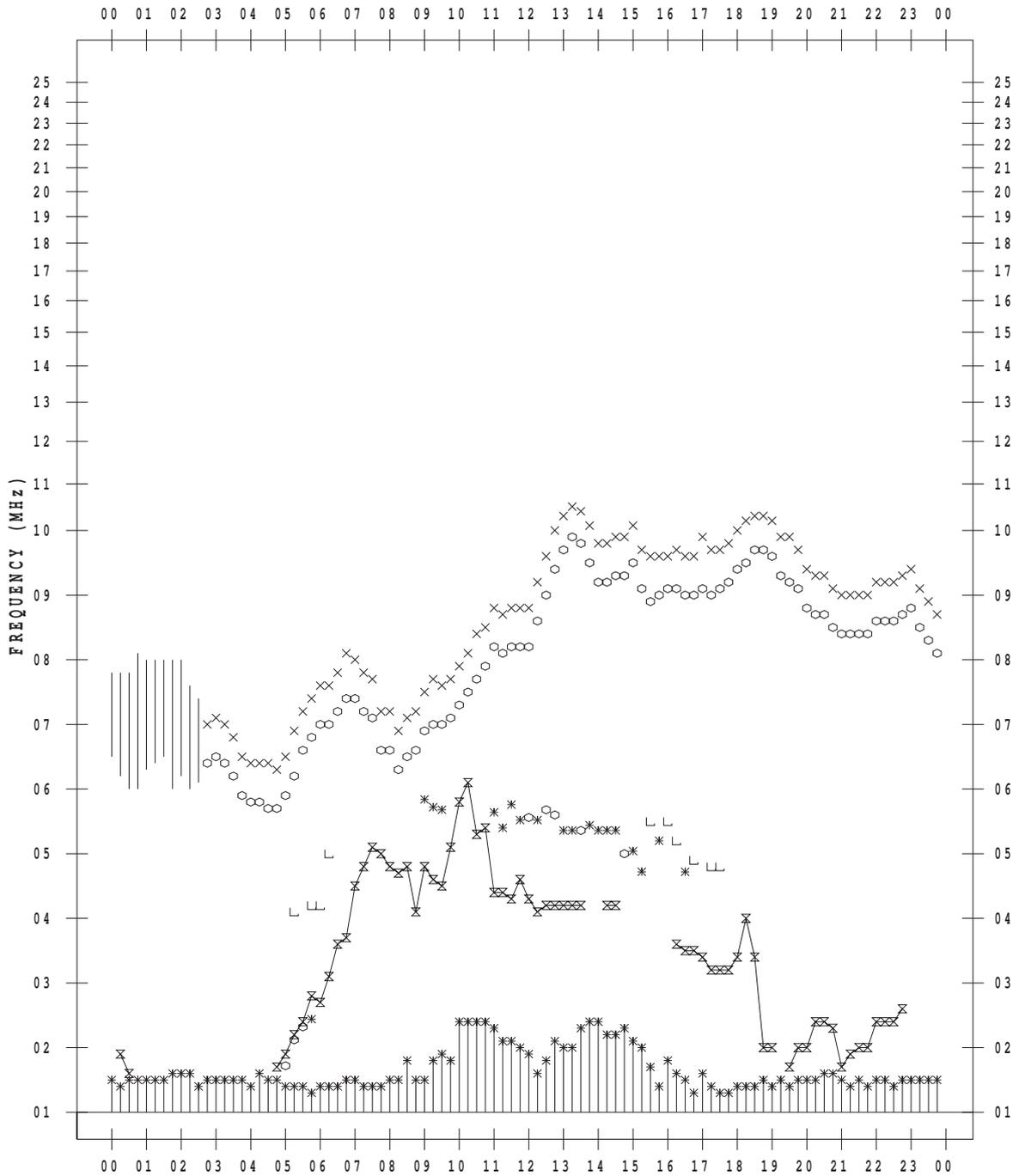
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/19

135 ° E MEAN TIME



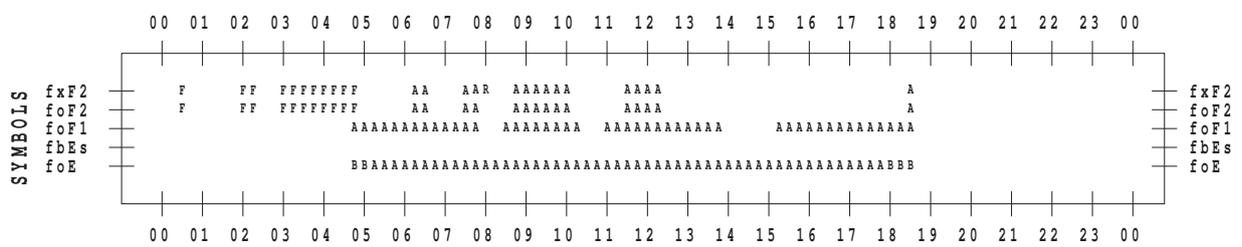
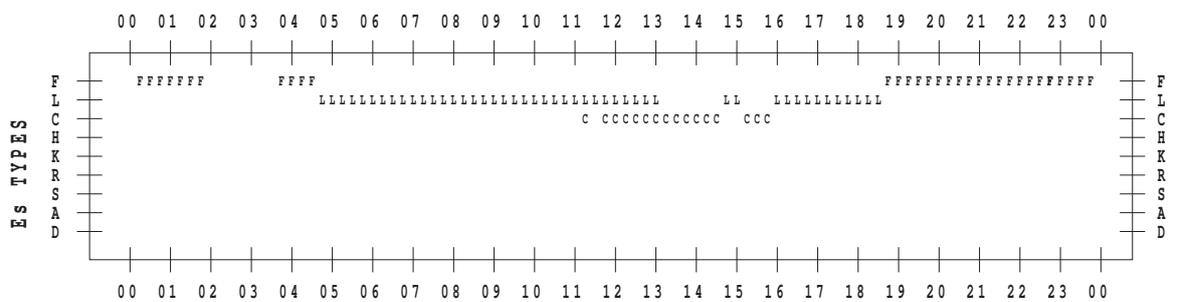
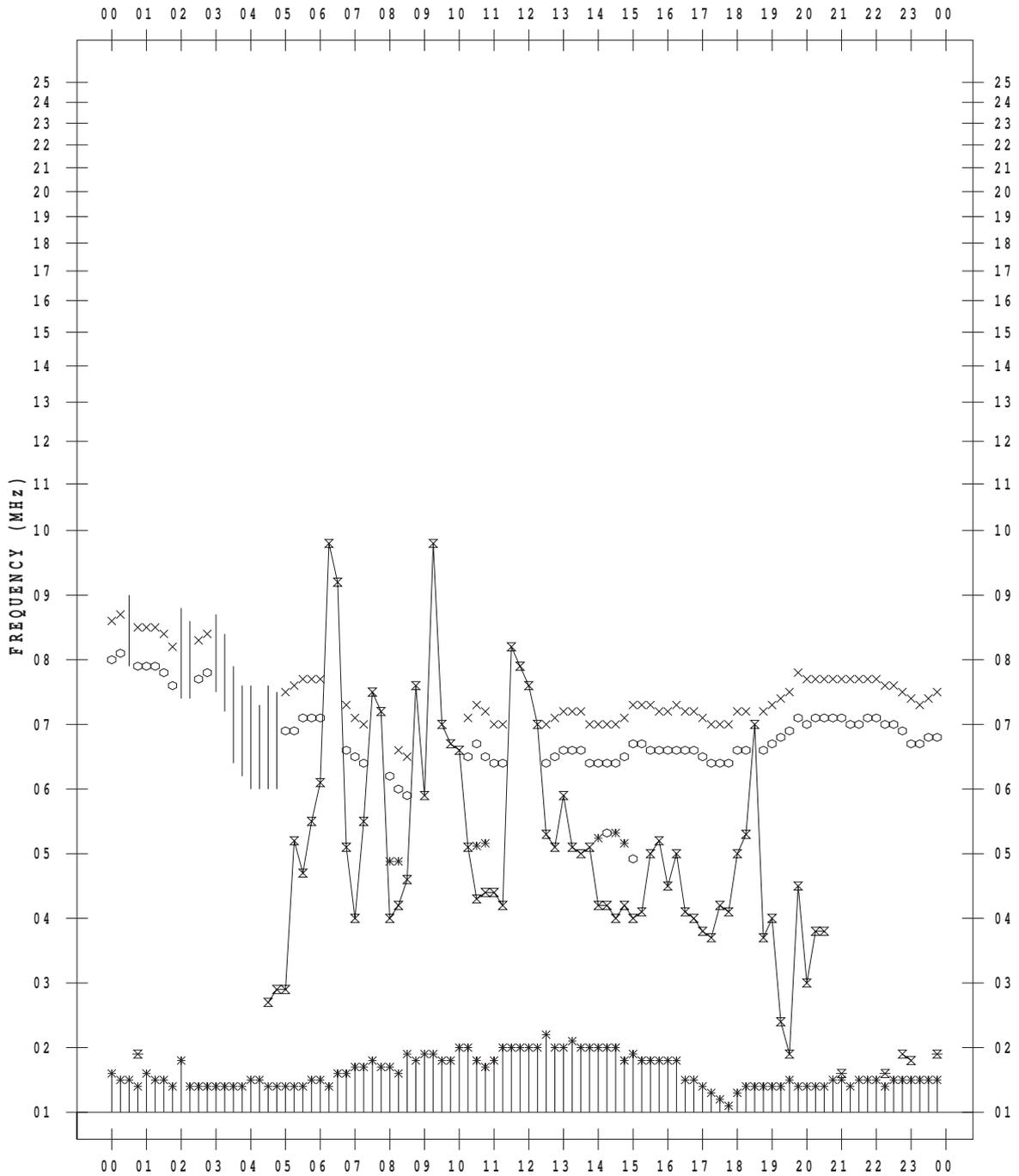
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/20

135 ° E MEAN TIME



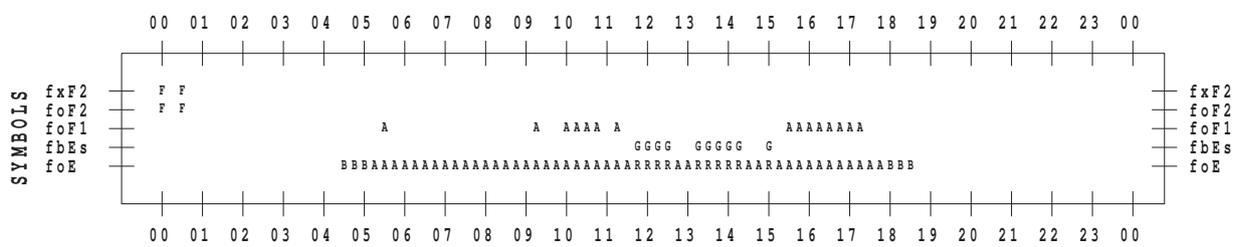
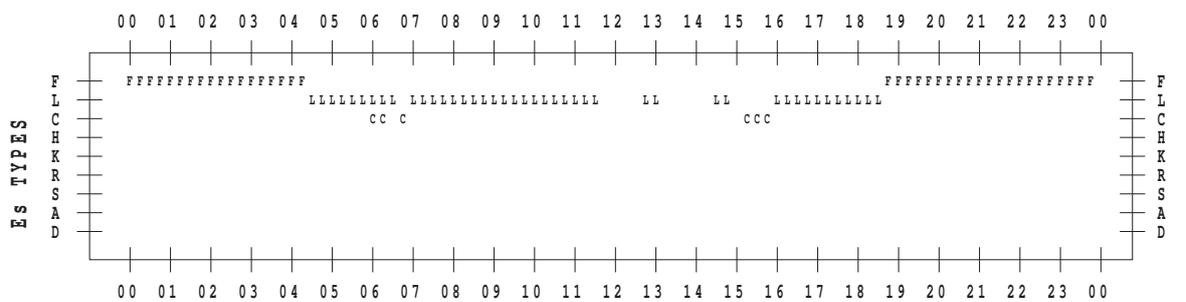
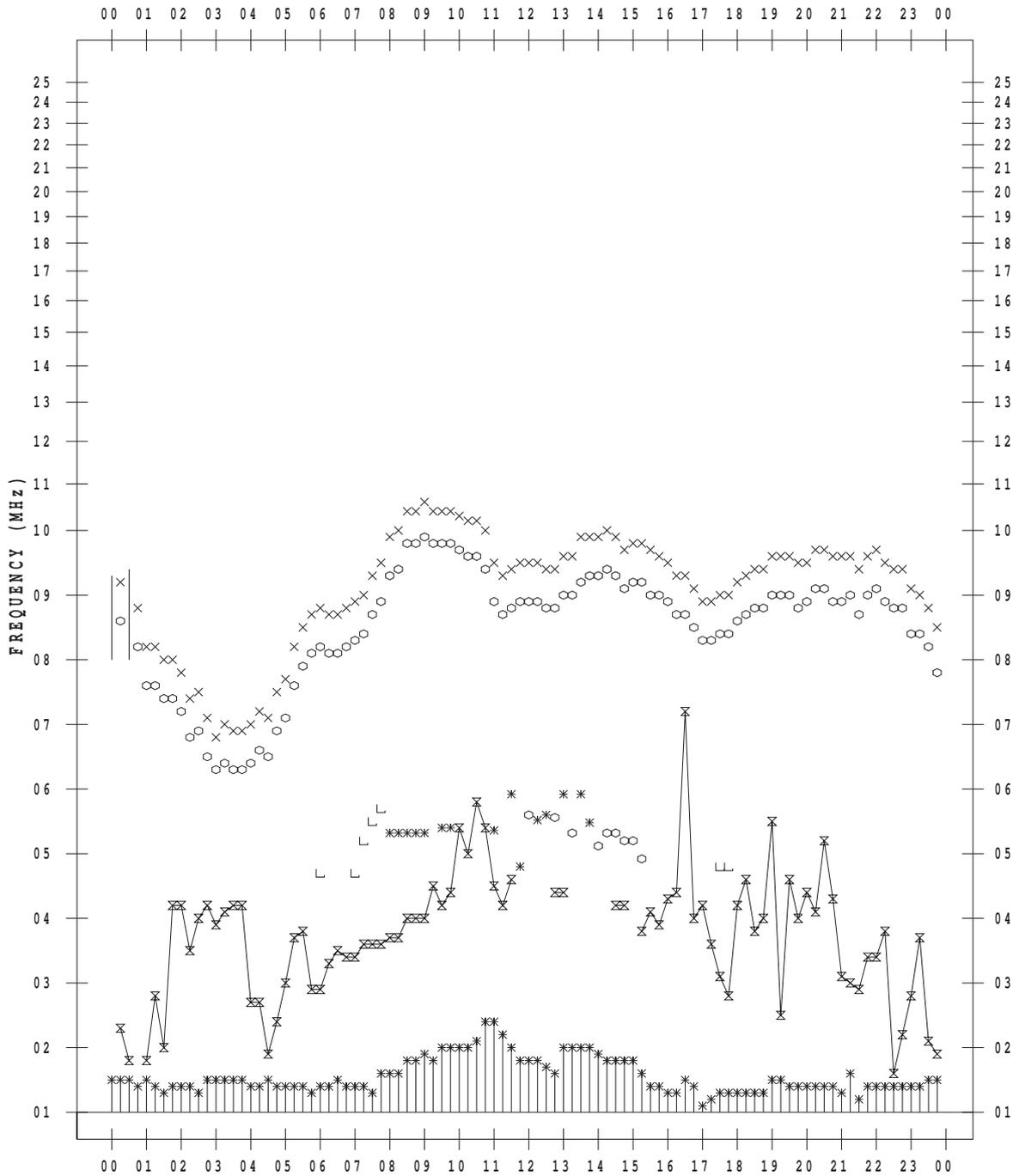
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/22

135 ° E MEAN TIME



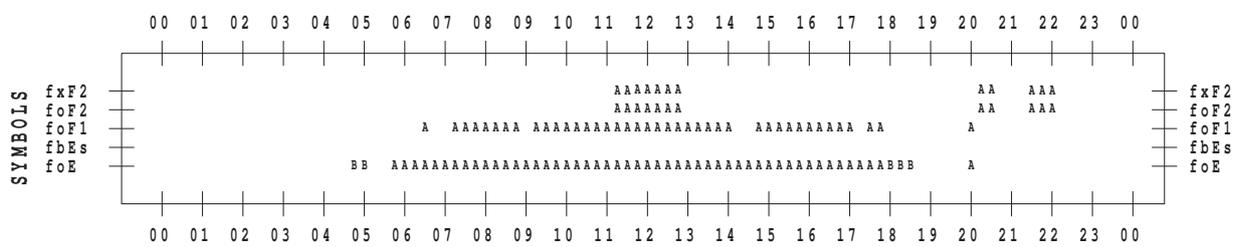
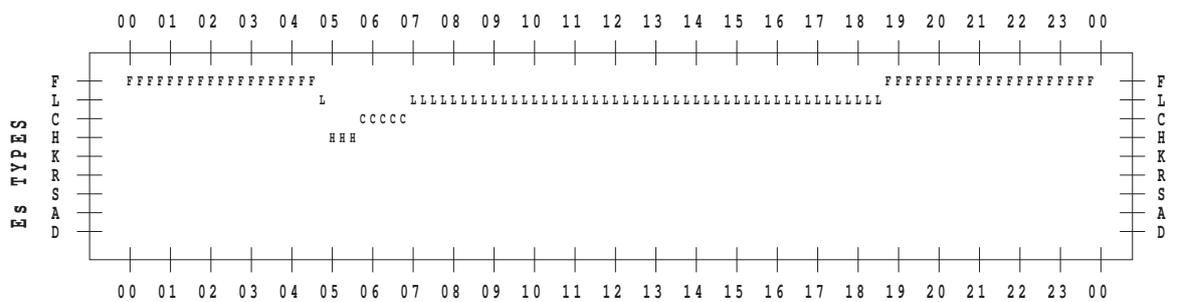
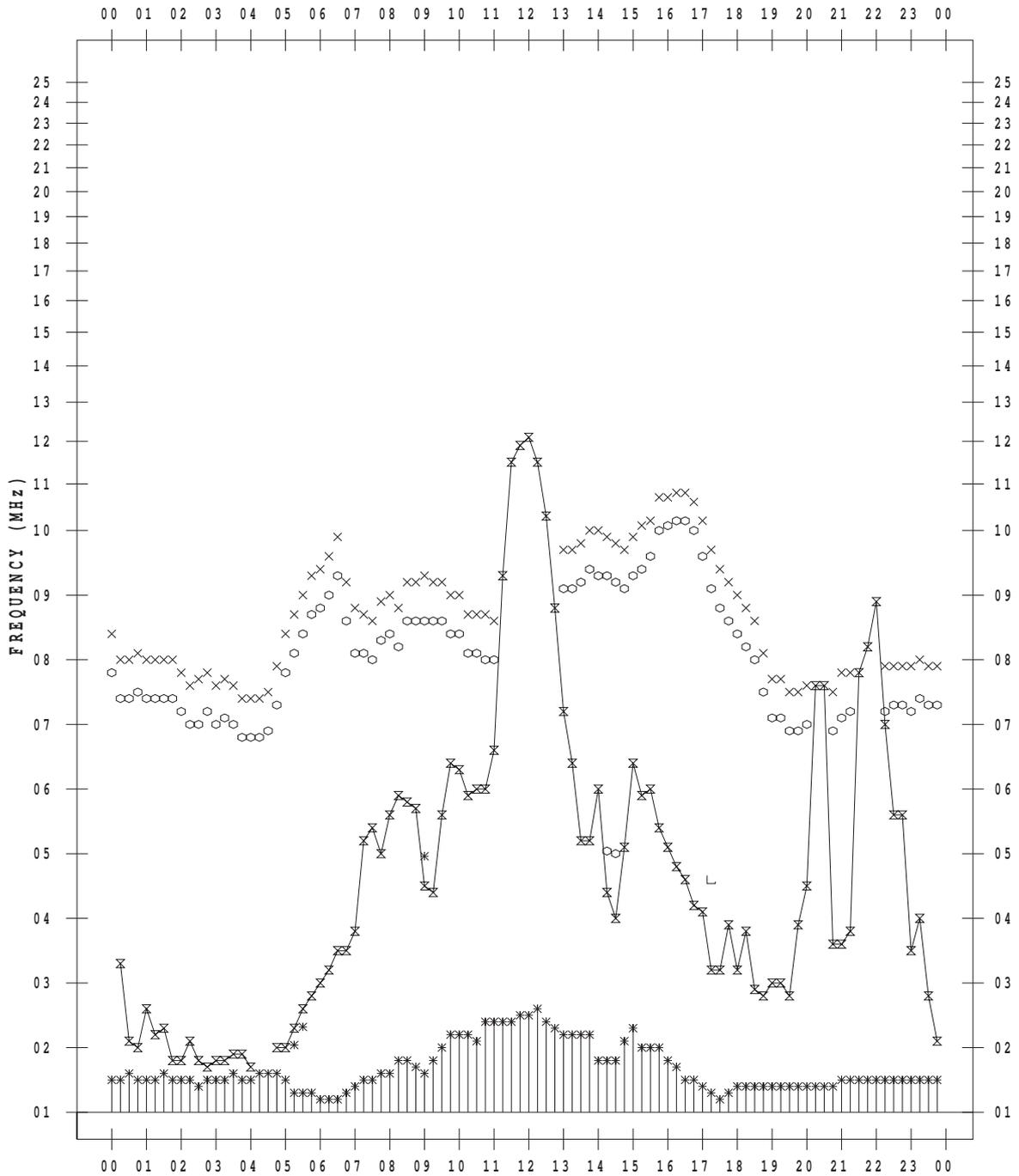
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/23

135 ° E MEAN TIME



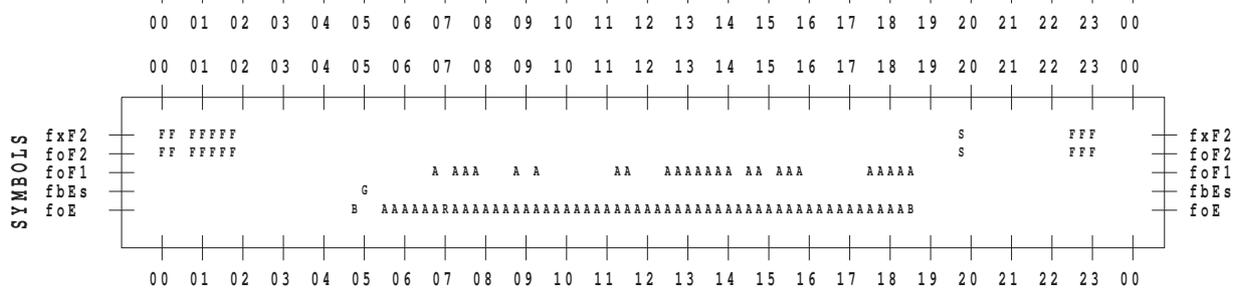
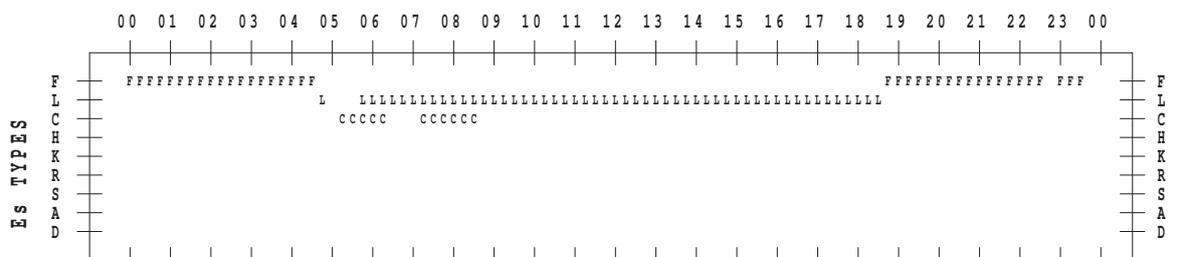
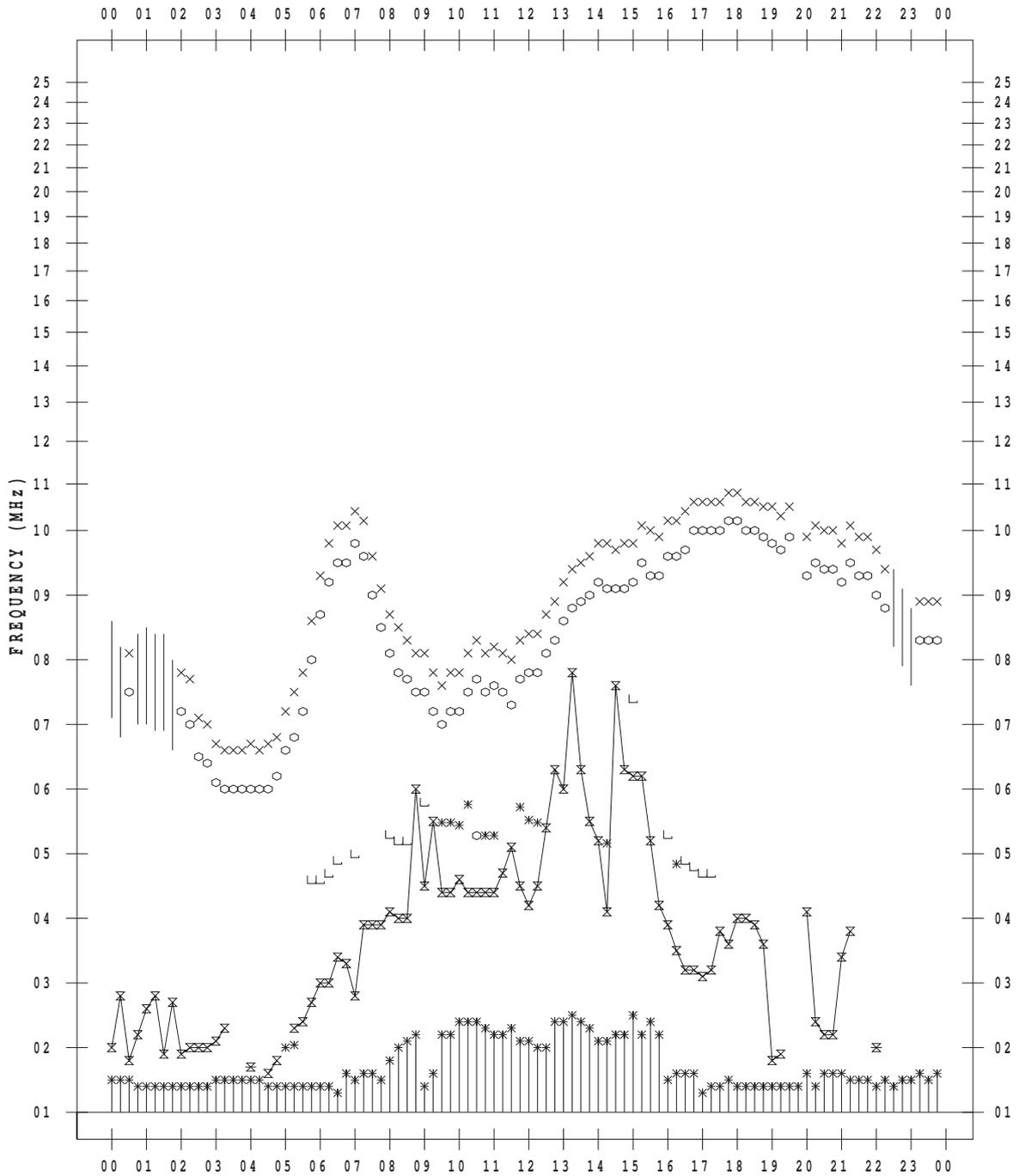
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/24

135 ° E MEAN TIME



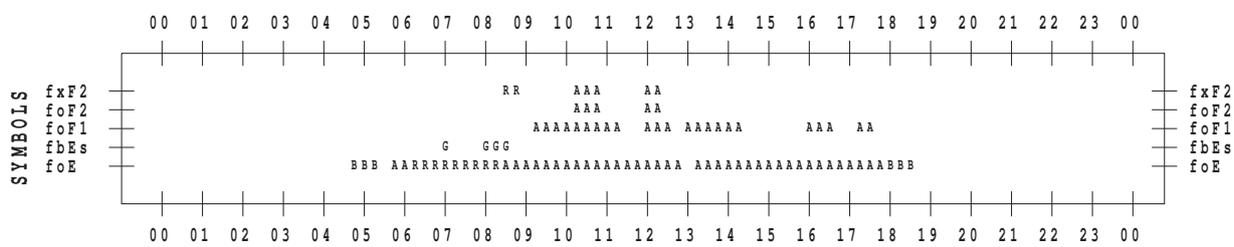
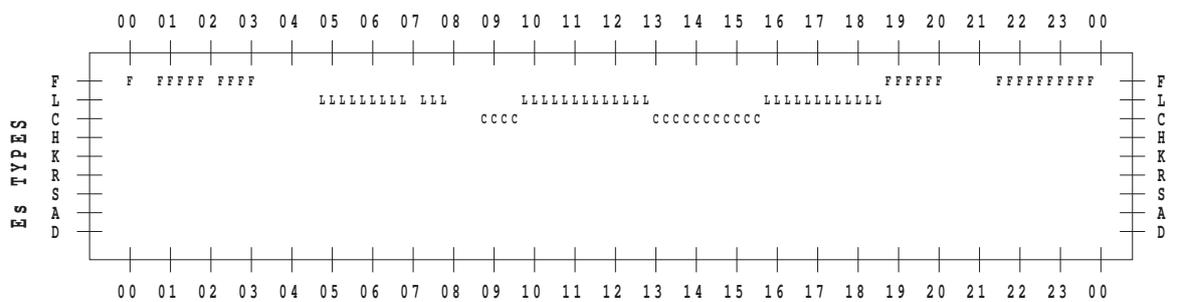
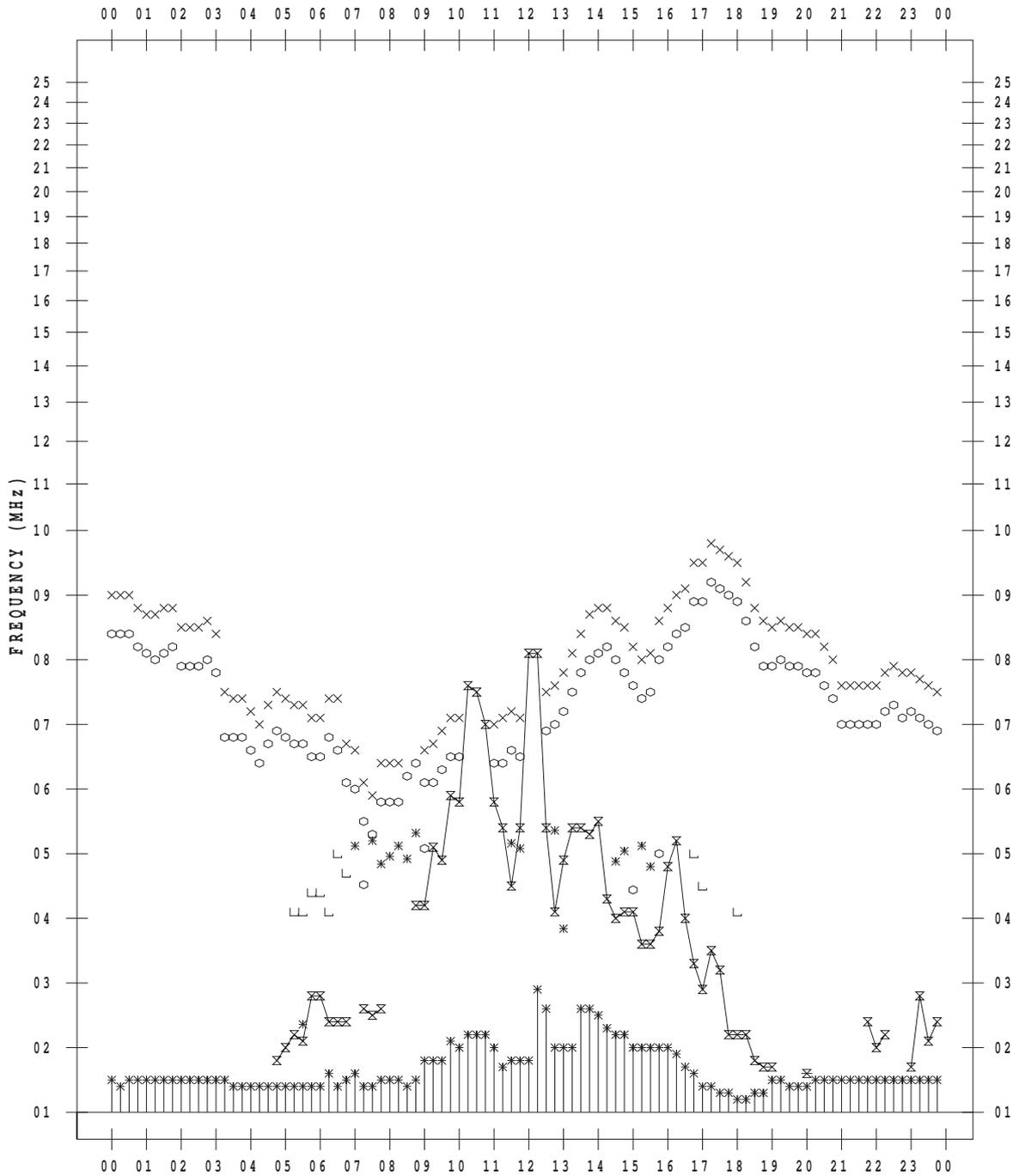
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/25

135 ° E MEAN TIME



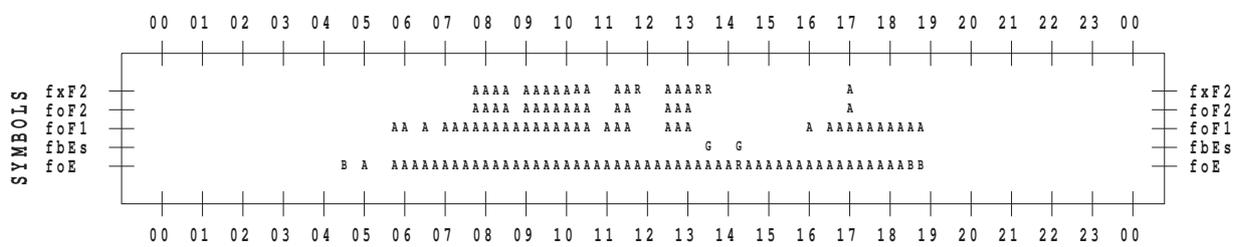
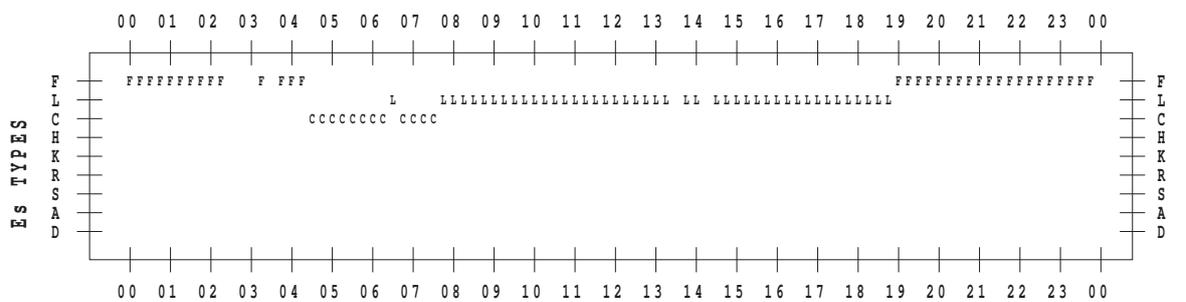
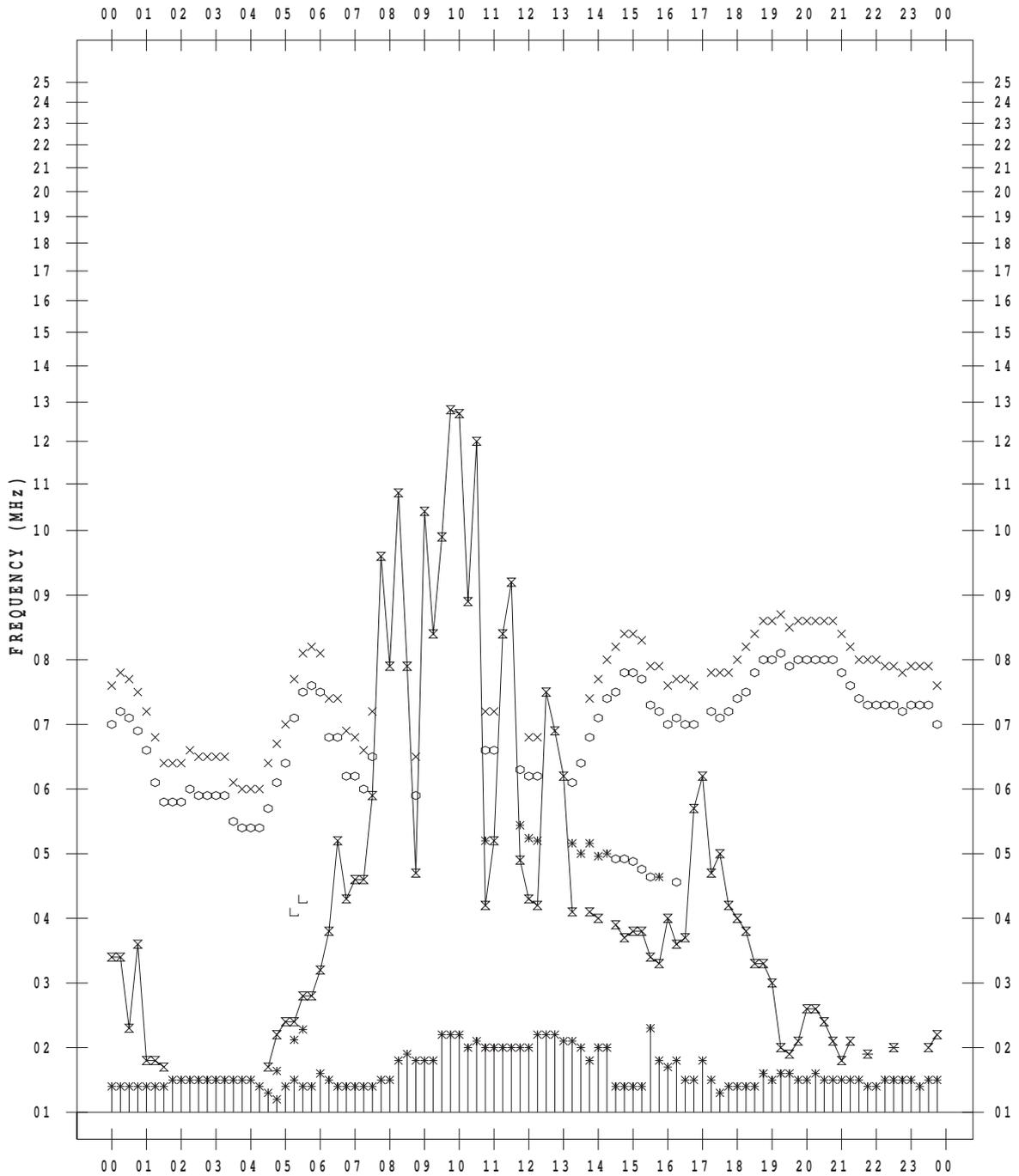
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/26

135 ° E MEAN TIME



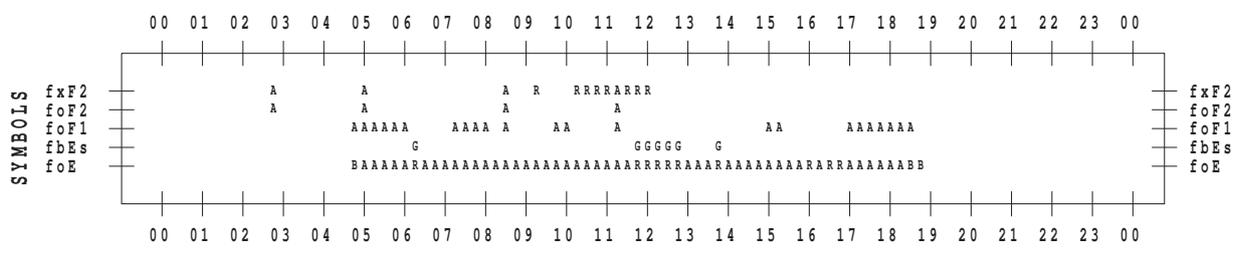
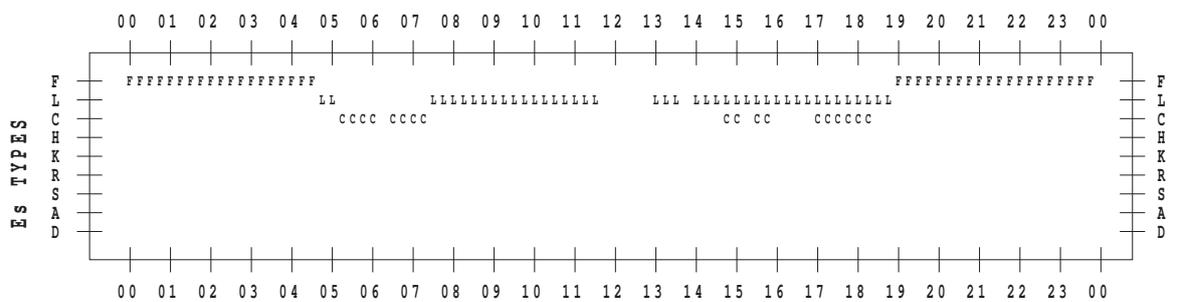
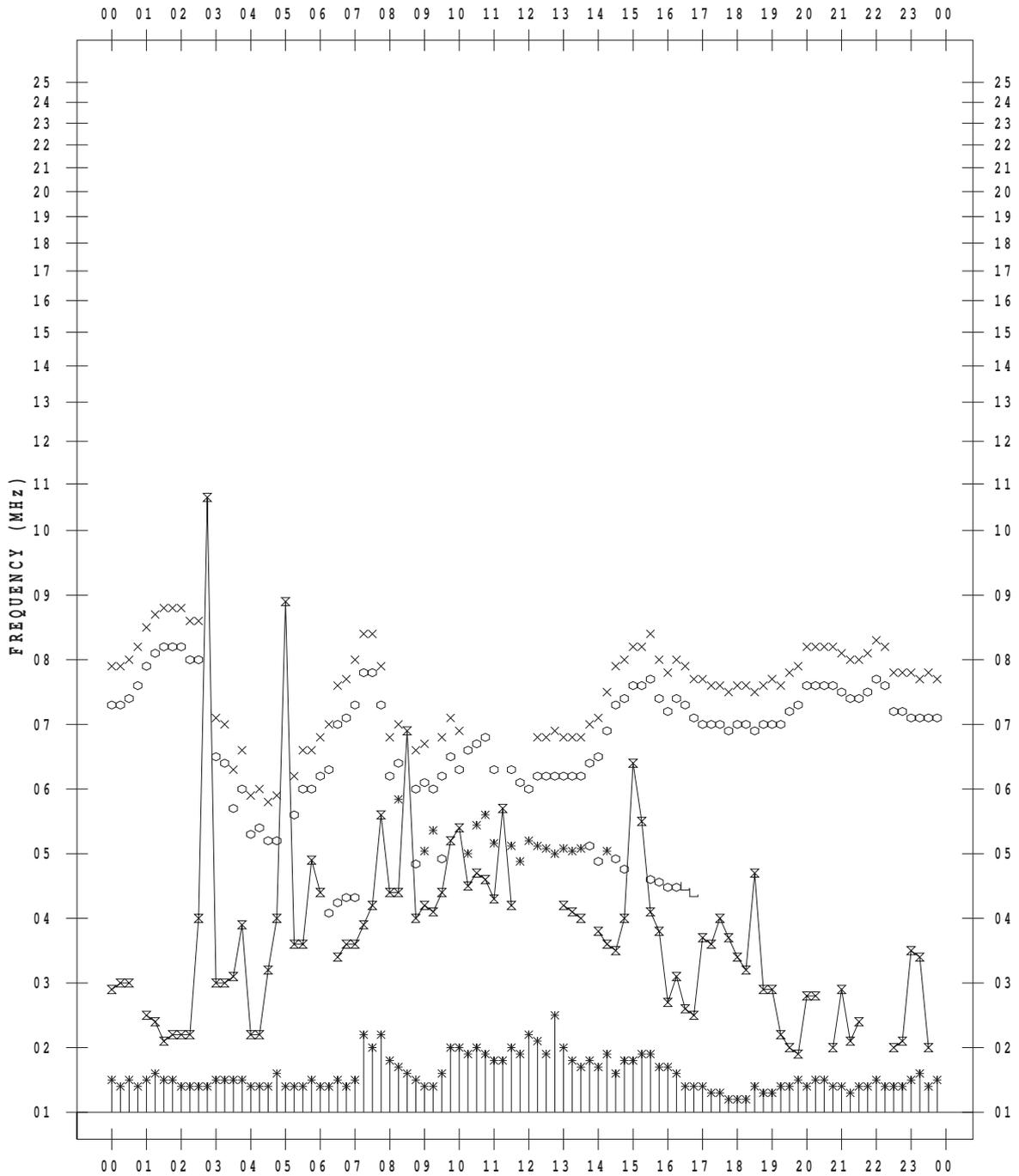
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/28

135 ° E MEAN TIME



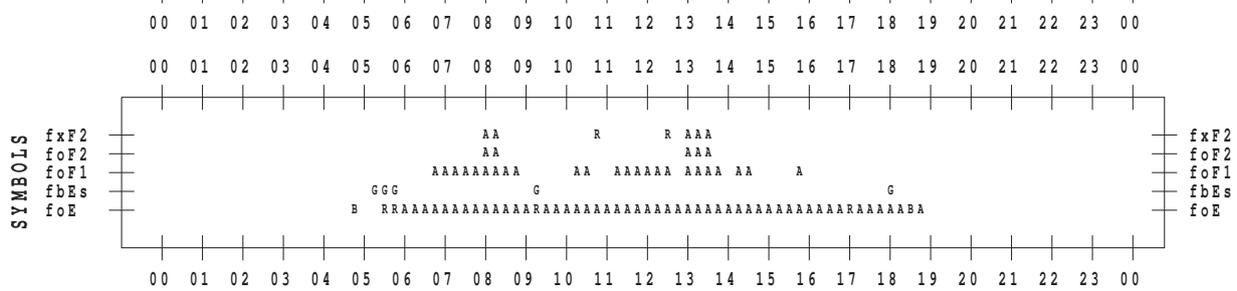
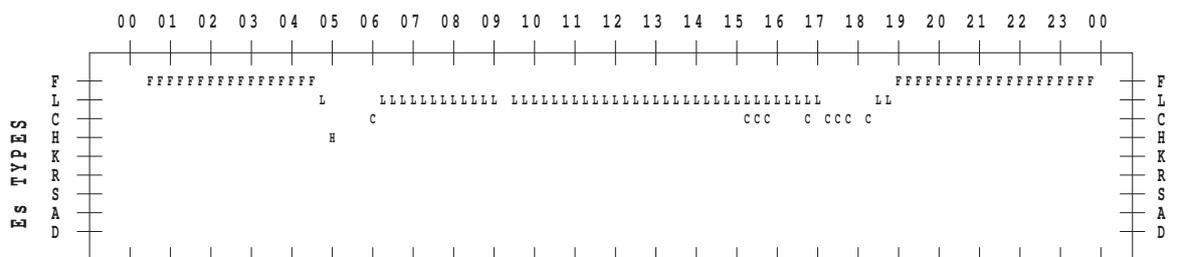
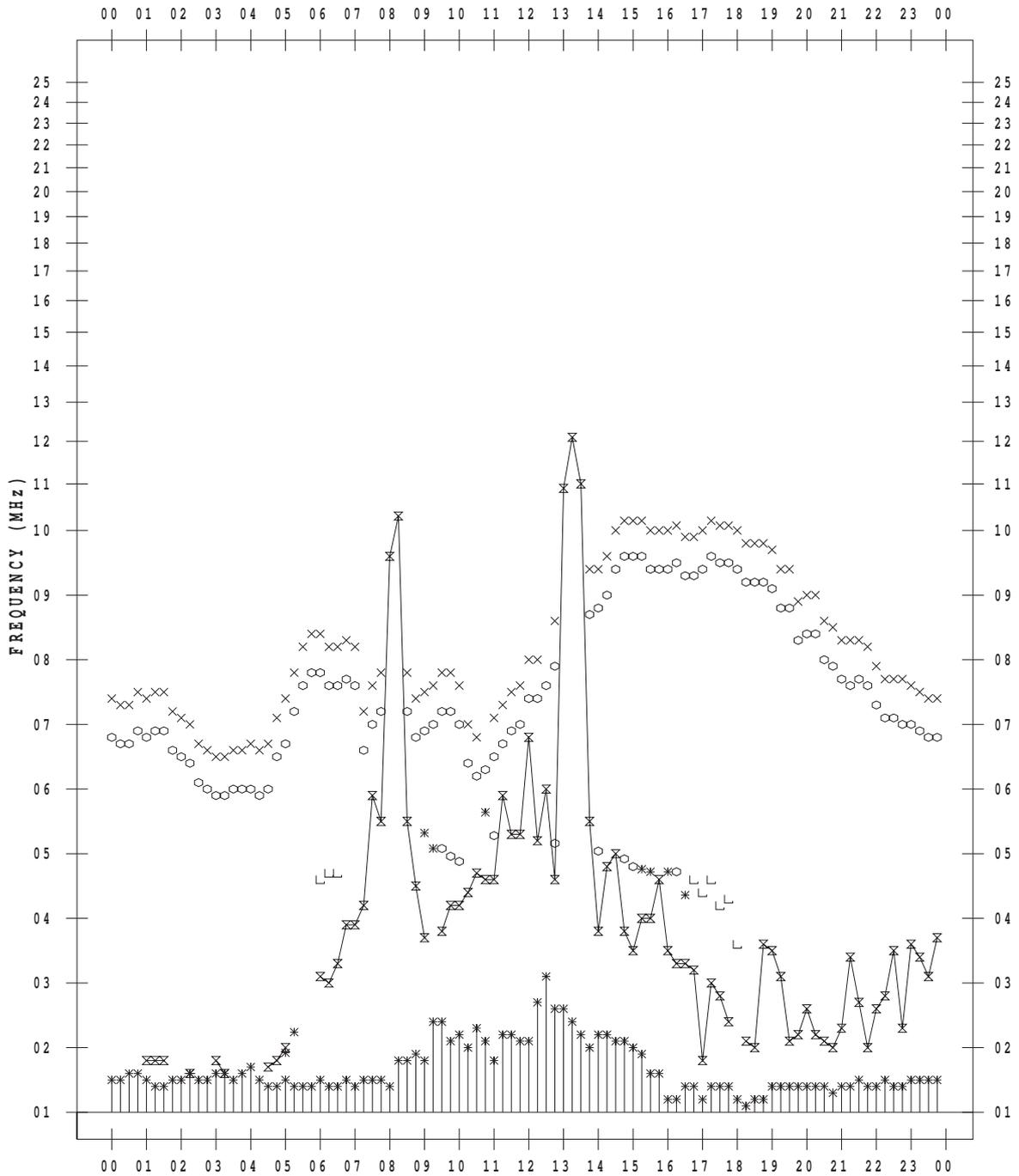
f-PLOT DATA

SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/30

135 ° E MEAN TIME



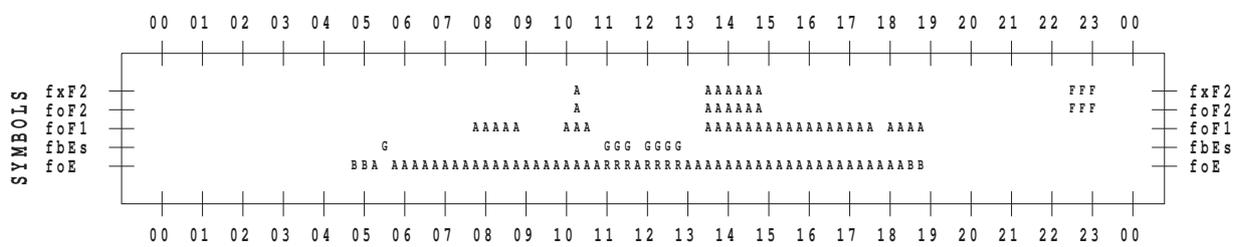
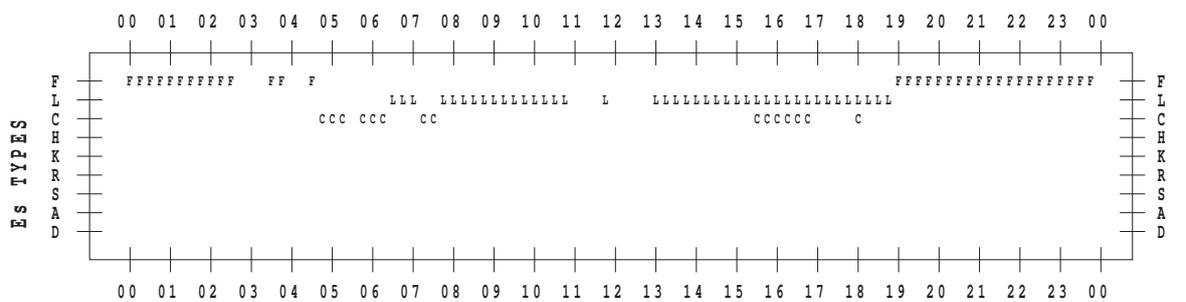
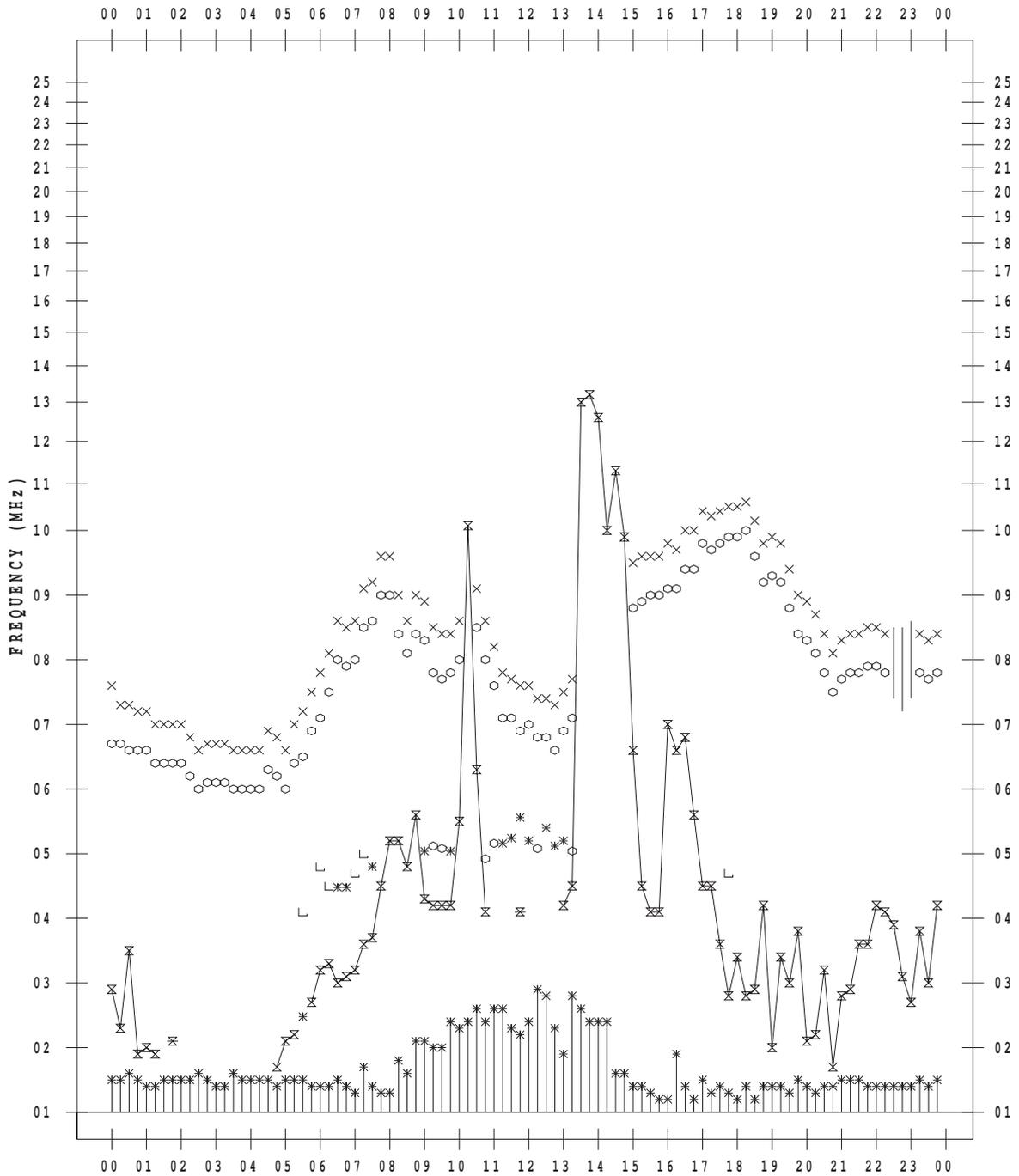
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SCALER : I.NISHIMUTA

STATION : Kokubunji

DATE : 2013/ 5/31

135 ° E MEAN TIME



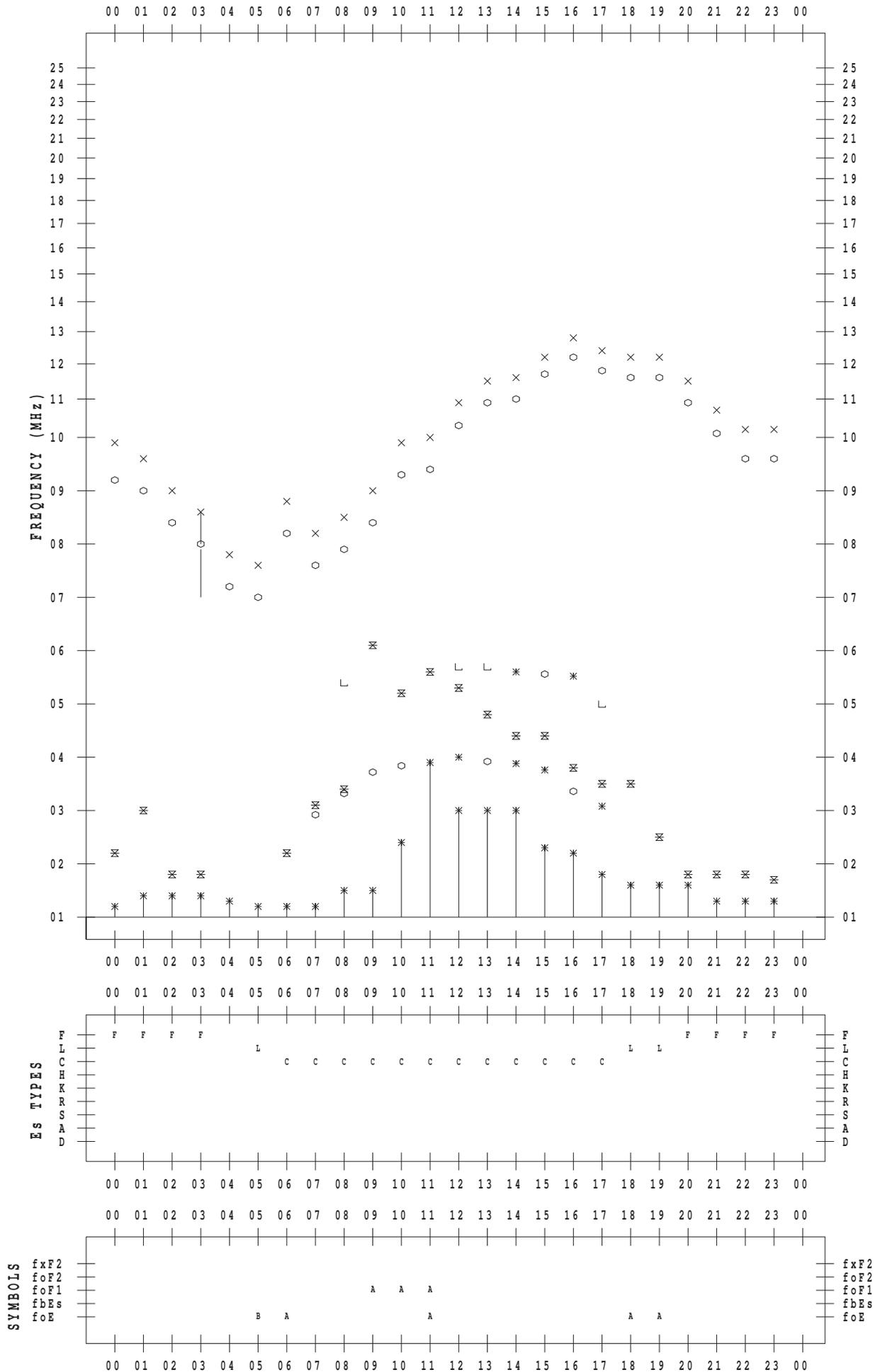
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/ 1

135 ° E MEAN TIME



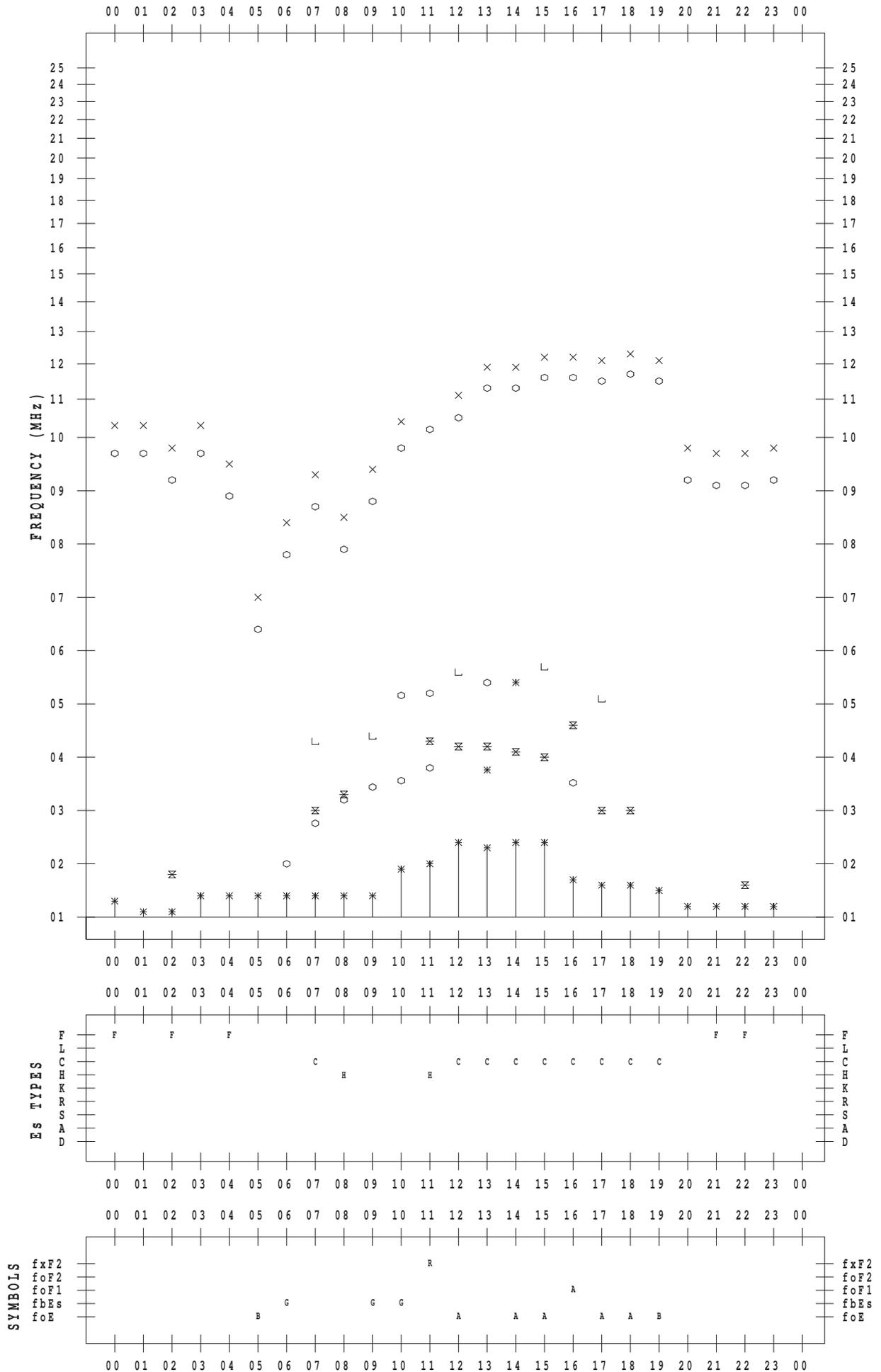
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013 / 5 / 2

135 ° E MEAN TIME



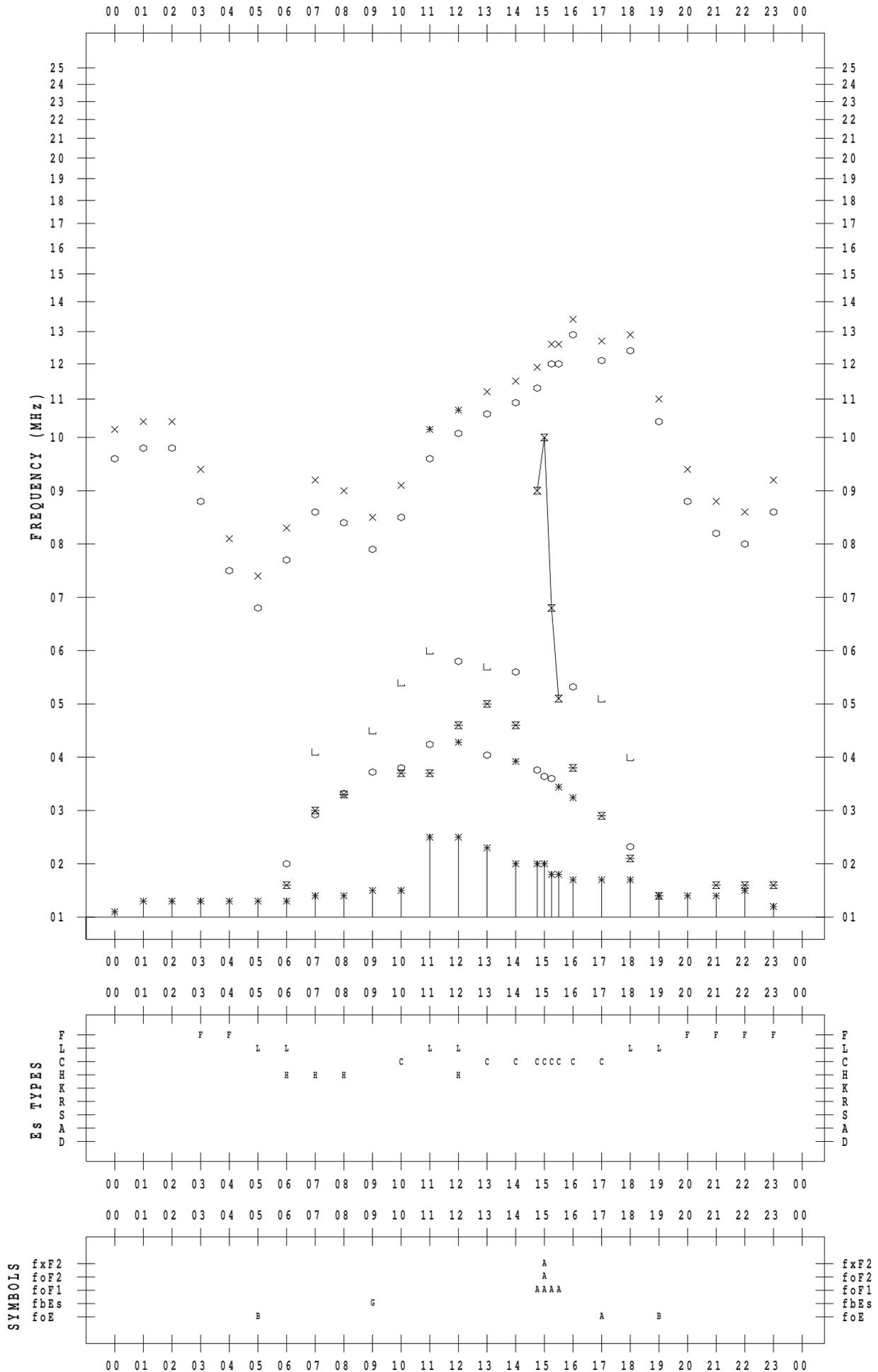
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/ 3

135 ° E MEAN TIME



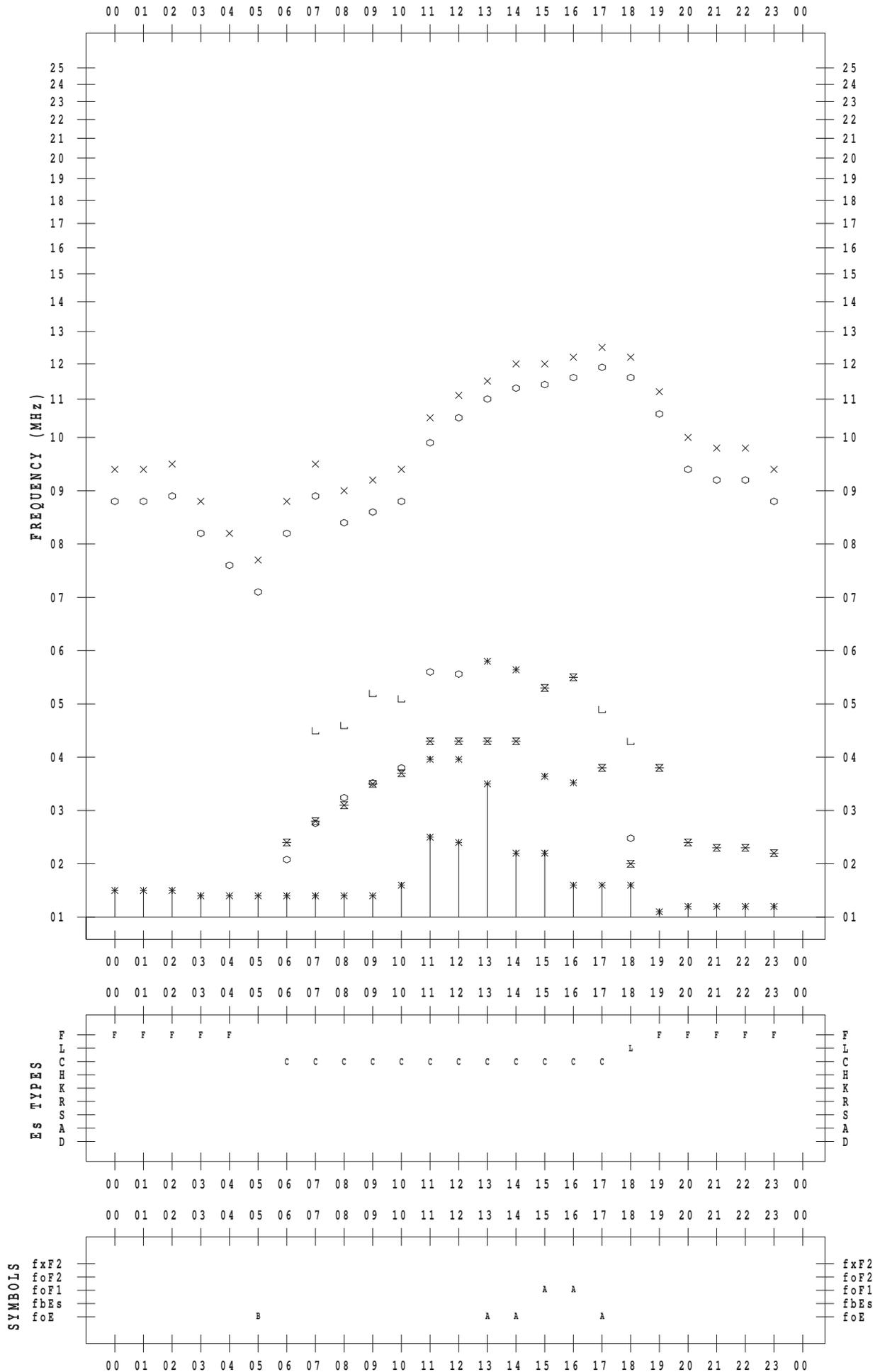
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013 / 5 / 4

135 ° E MEAN TIME



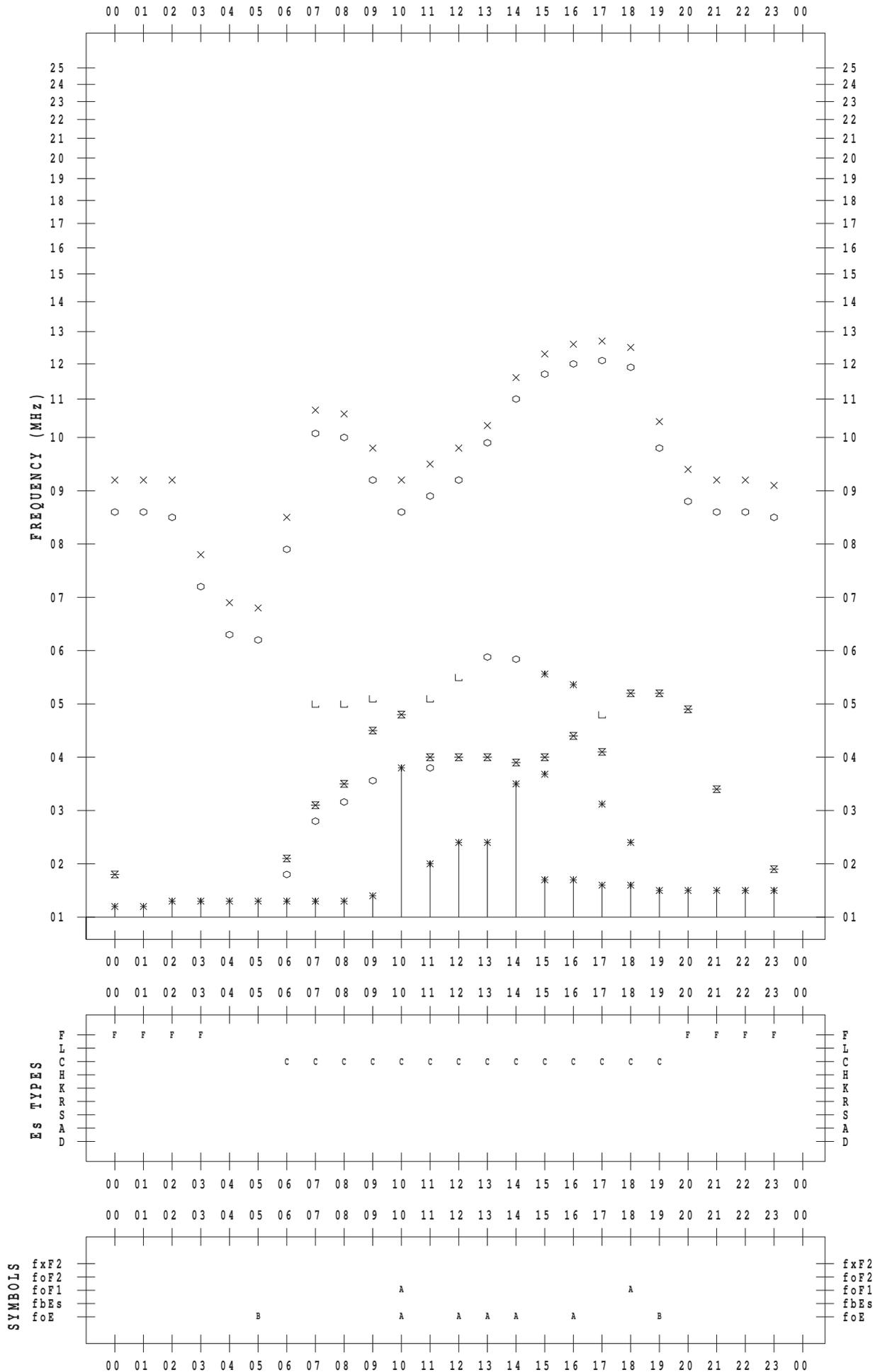
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013 / 5 / 5

135 ° E MEAN TIME



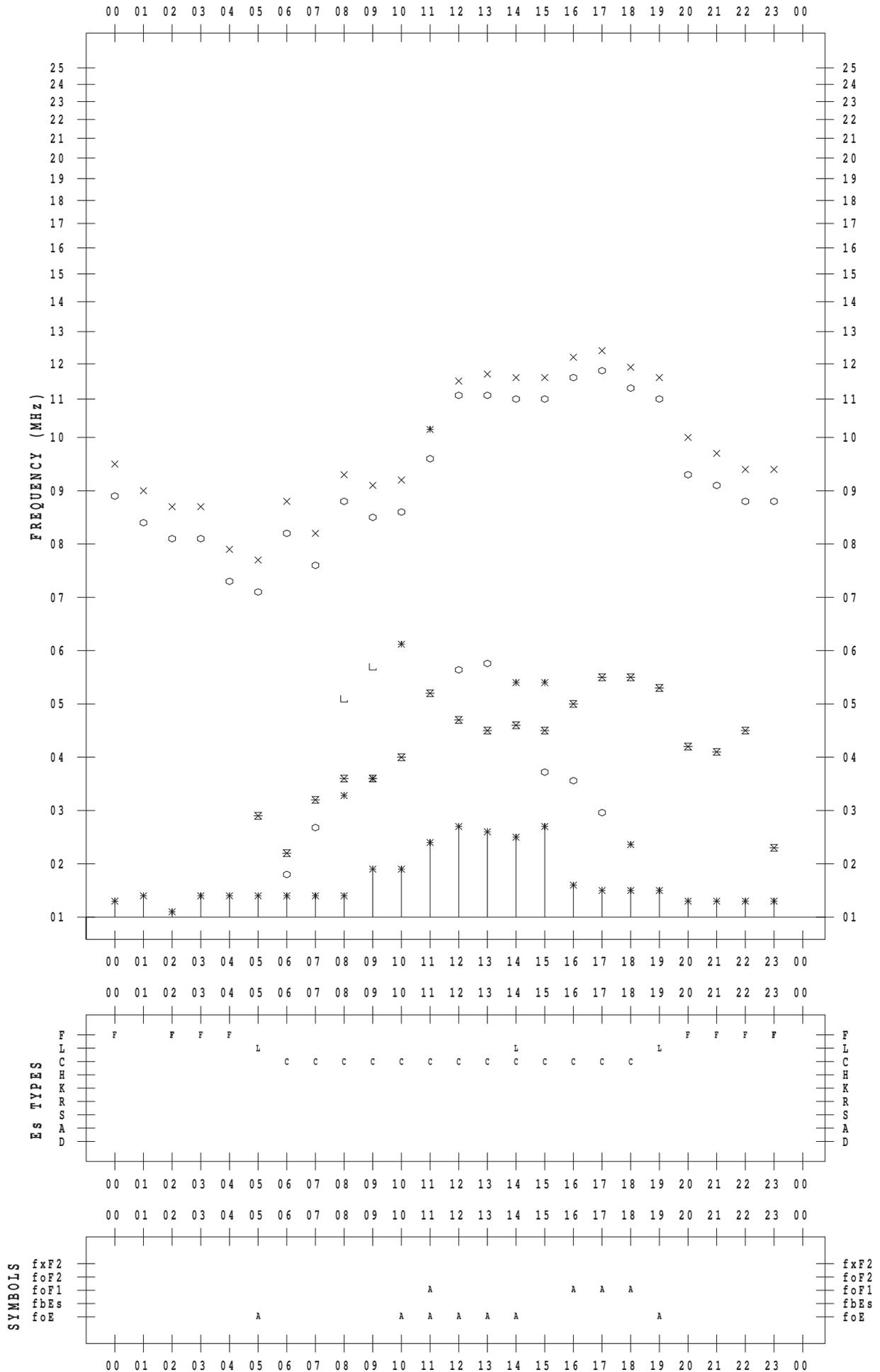
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013 / 5 / 6

135 ° E MEAN TIME



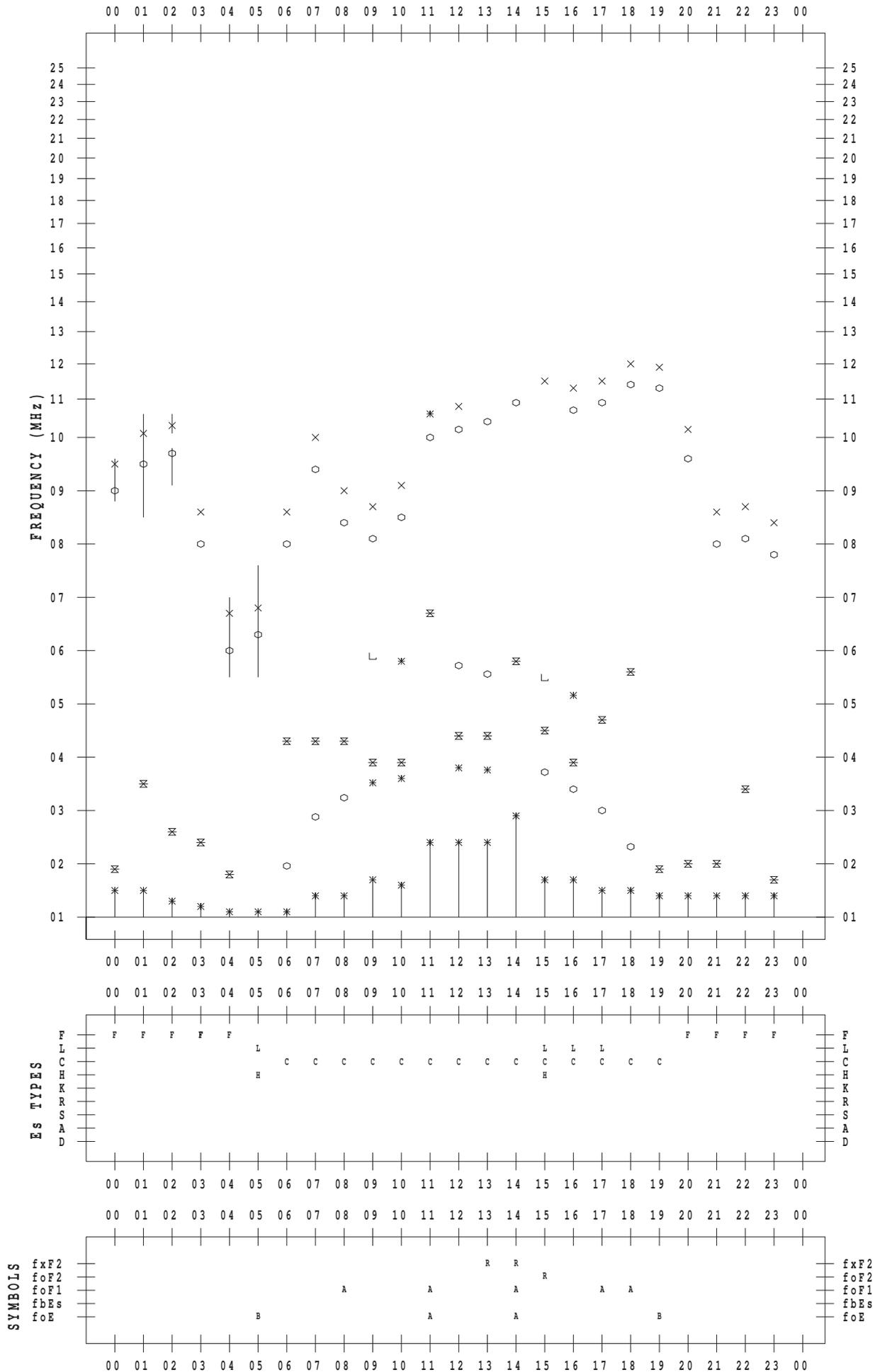
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013 / 5 / 7

135 ° E MEAN TIME



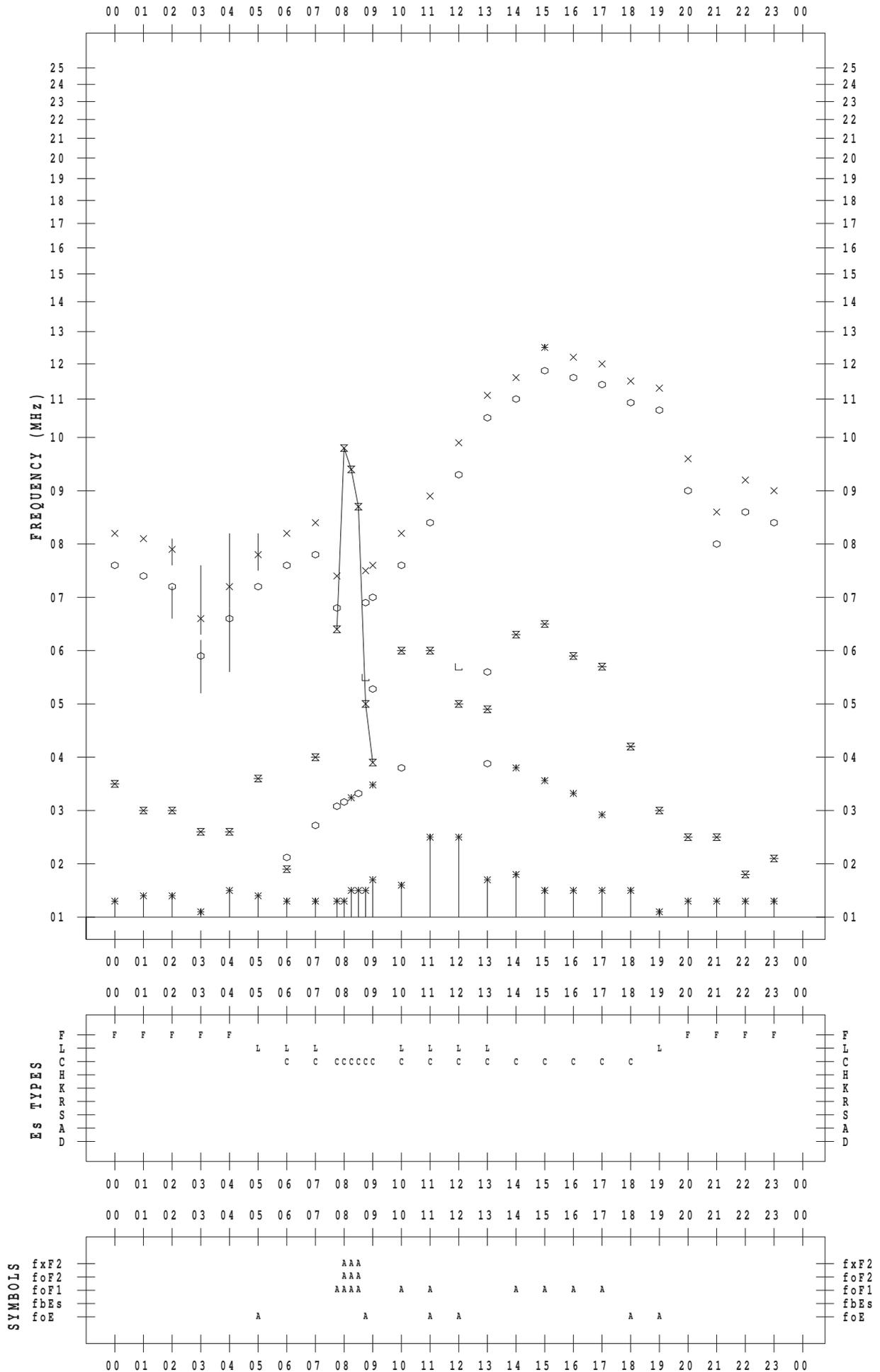
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/ 8

135 ° E MEAN TIME



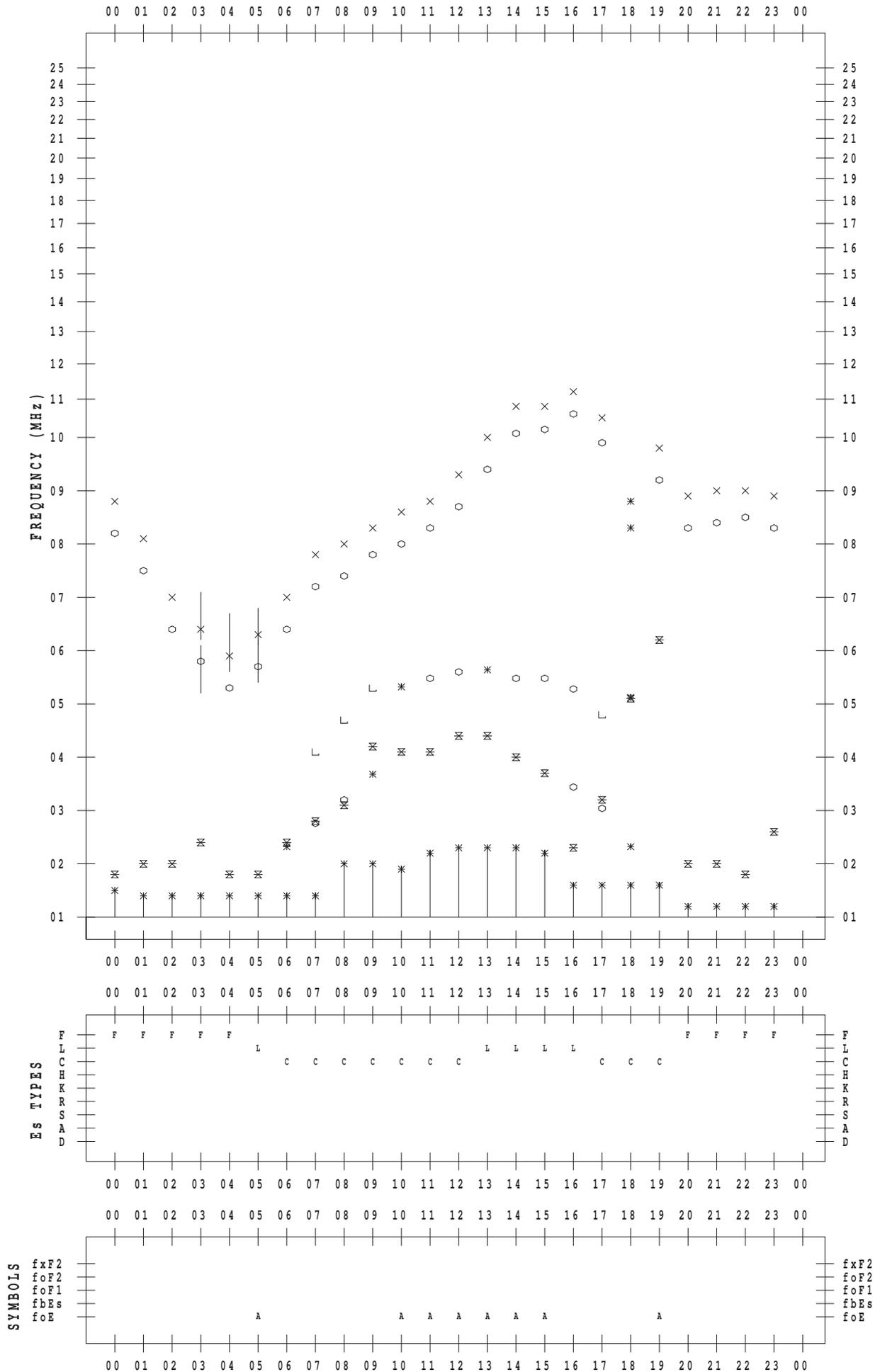
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/ 9

135 ° E MEAN TIME



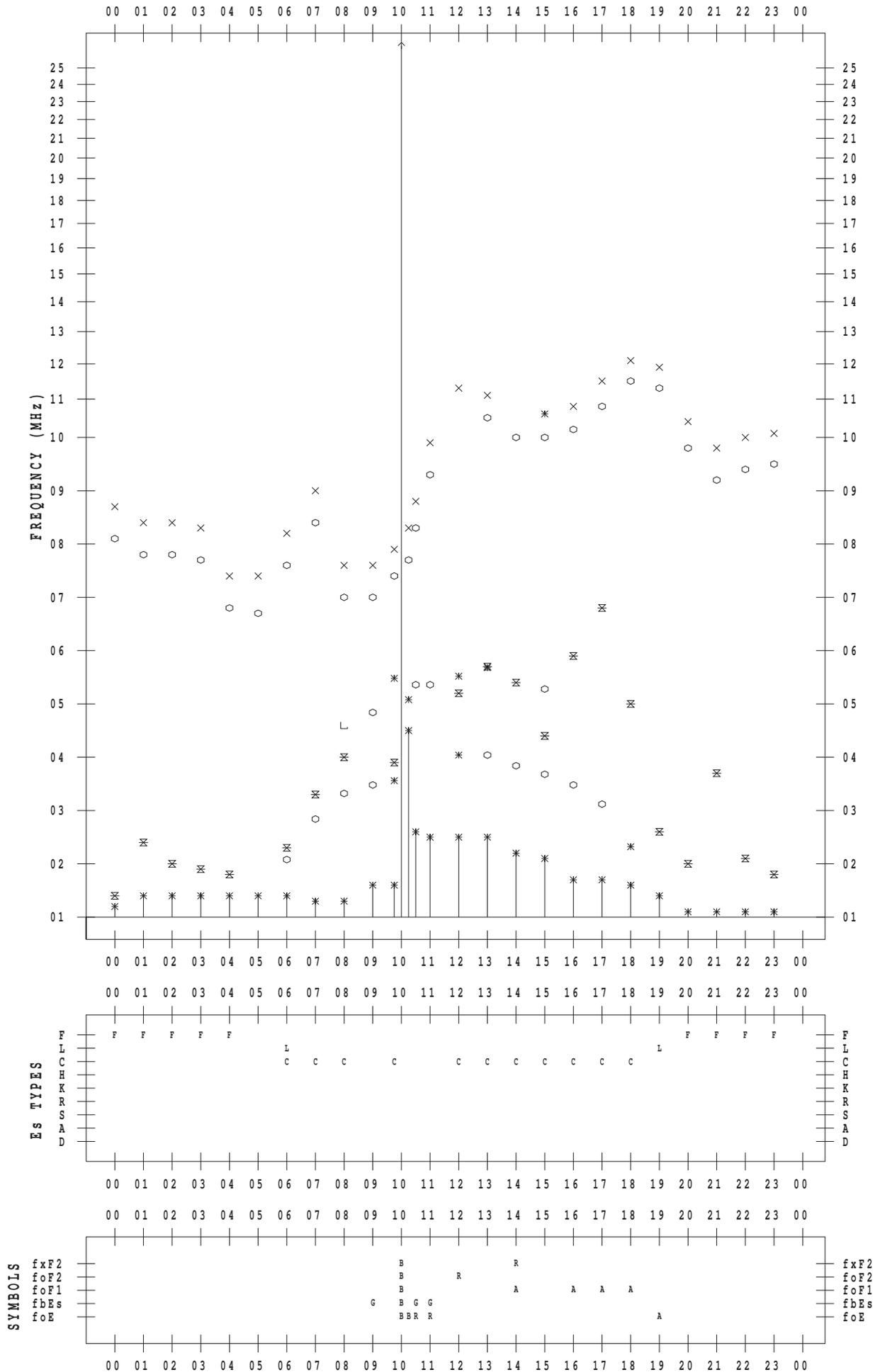
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/10

135 ° E MEAN TIME



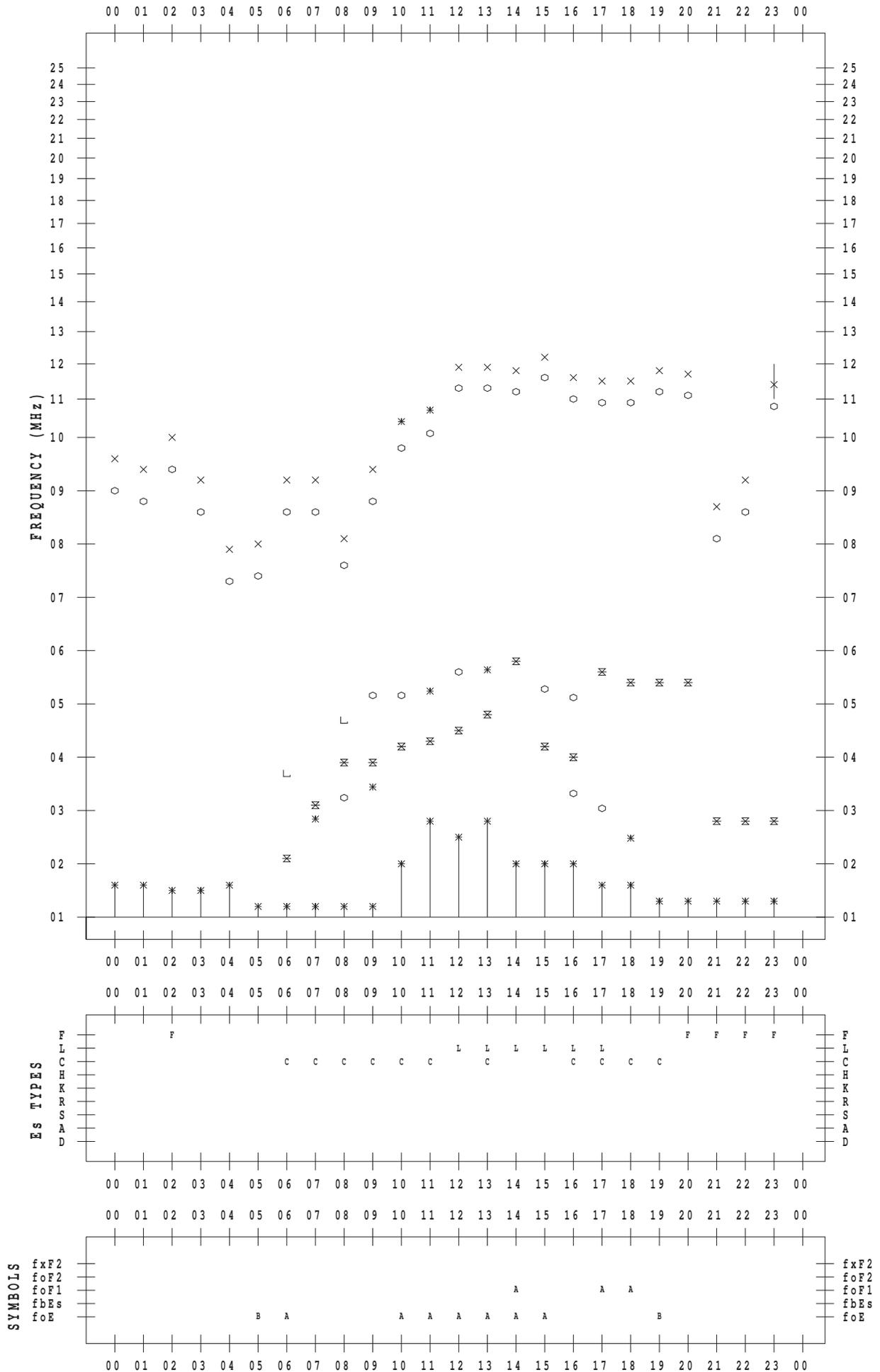
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/11

135 ° E MEAN TIME



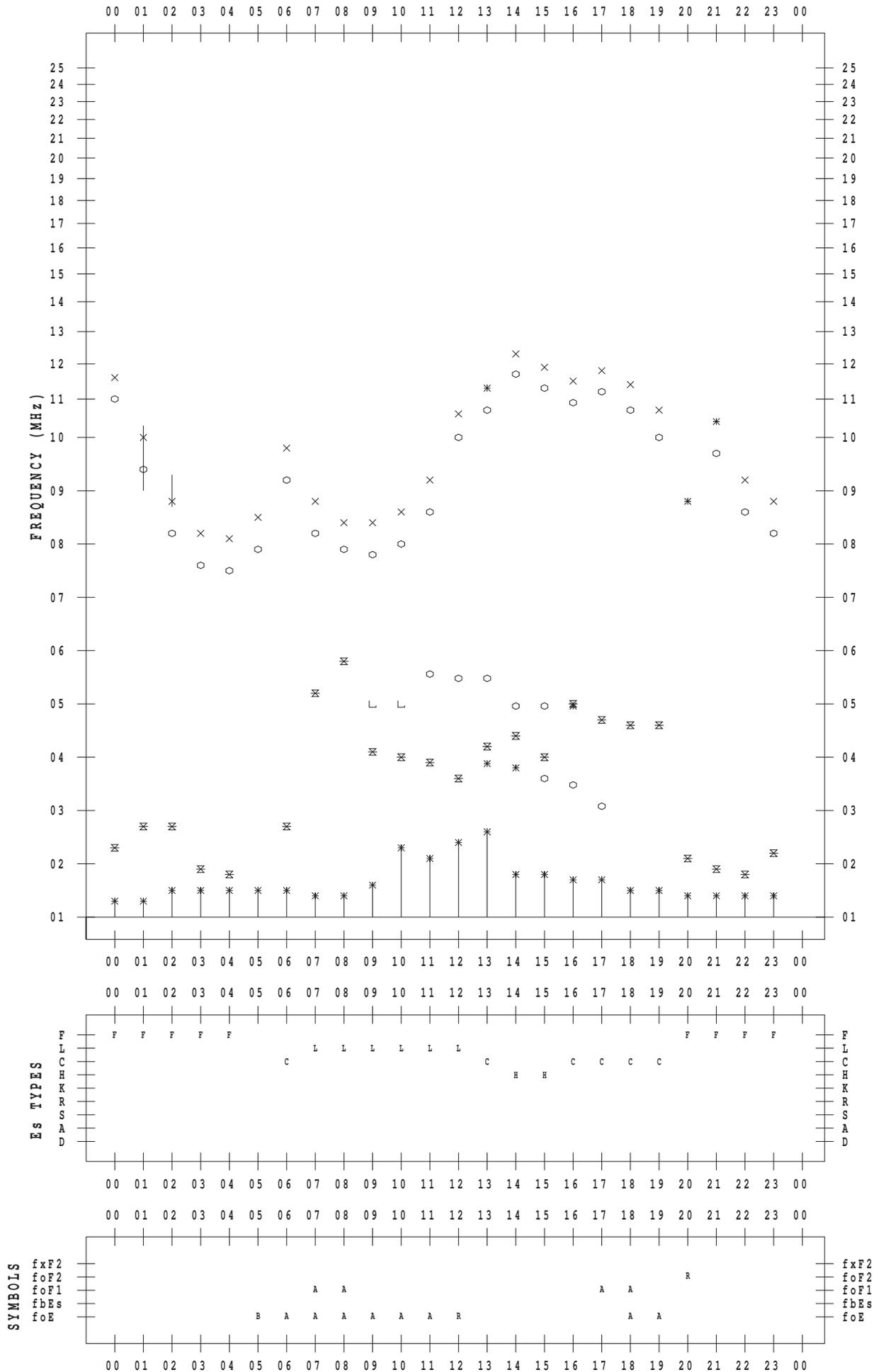
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/12

135 ° E MEAN TIME



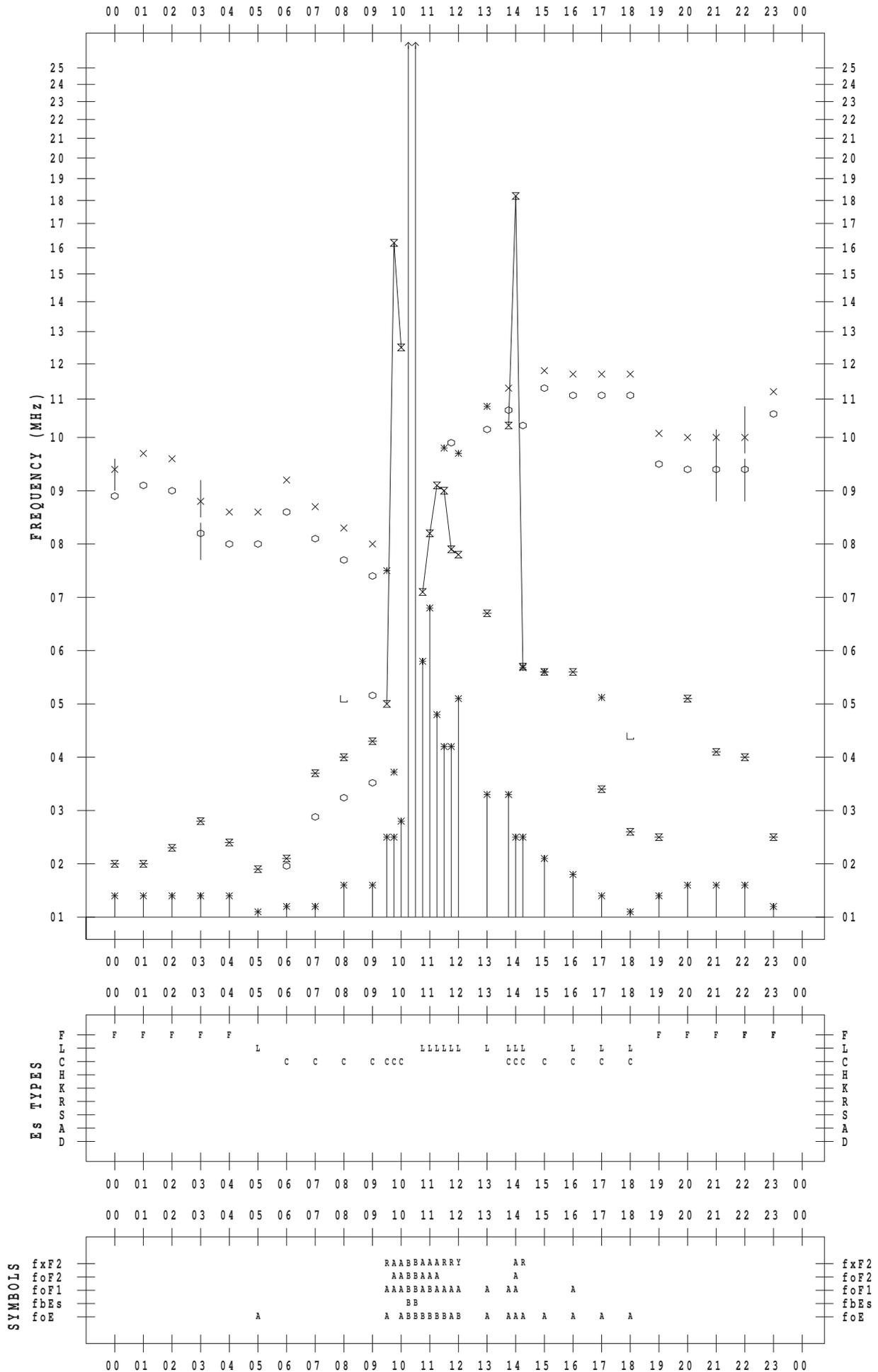
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/14

135 ° E MEAN TIME



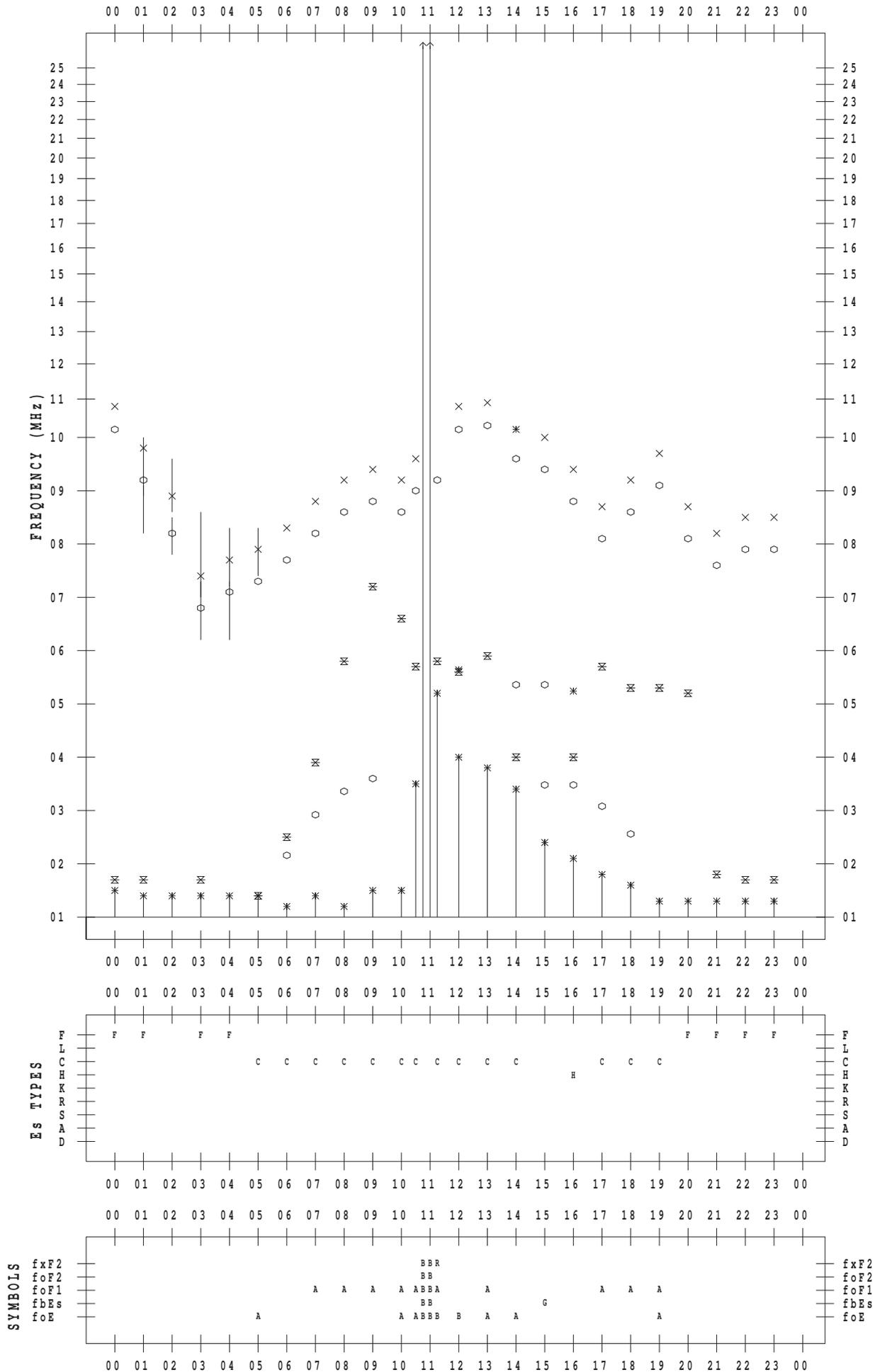
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/15

135 ° E MEAN TIME



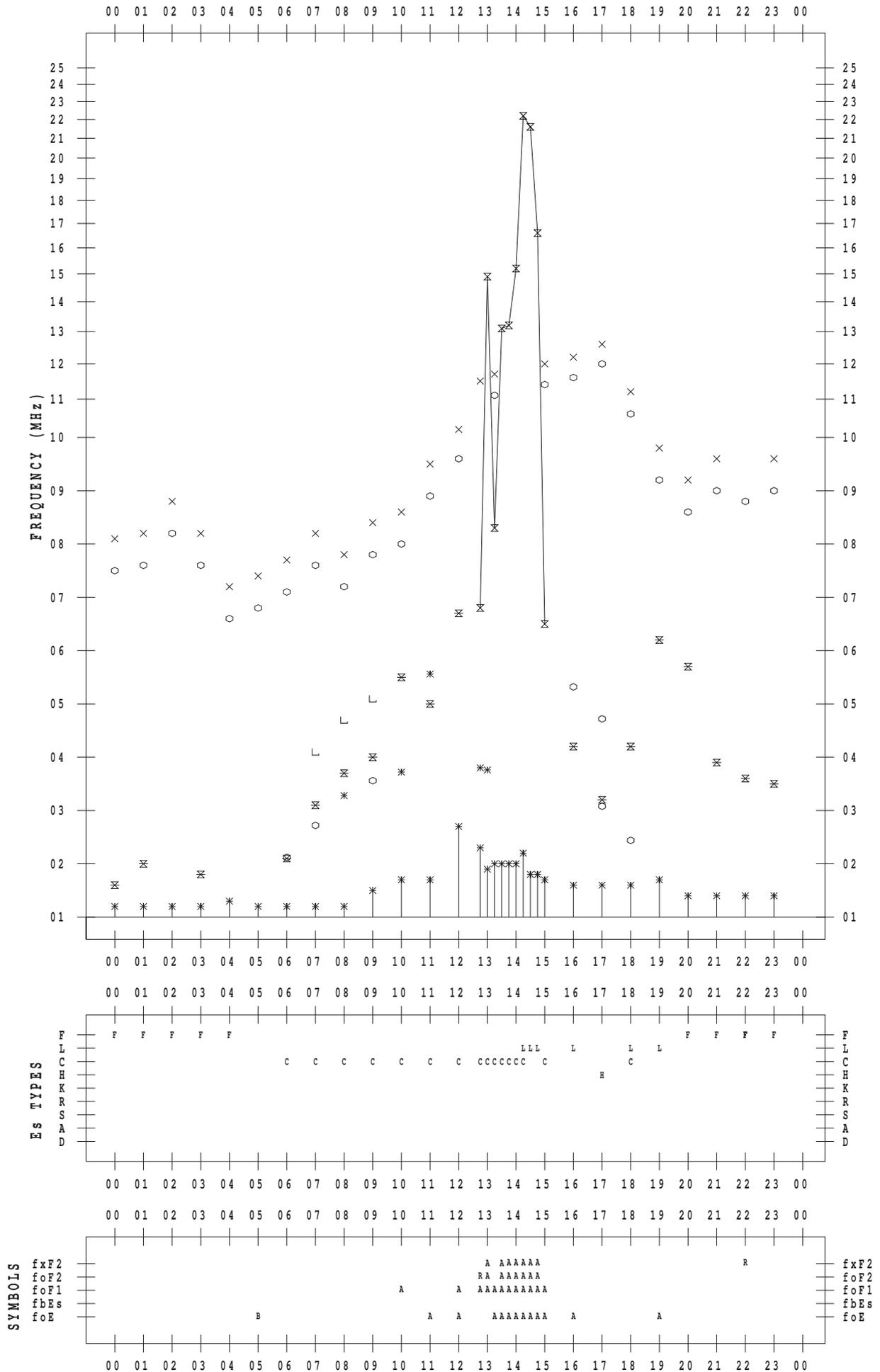
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/16

135 ° E MEAN TIME



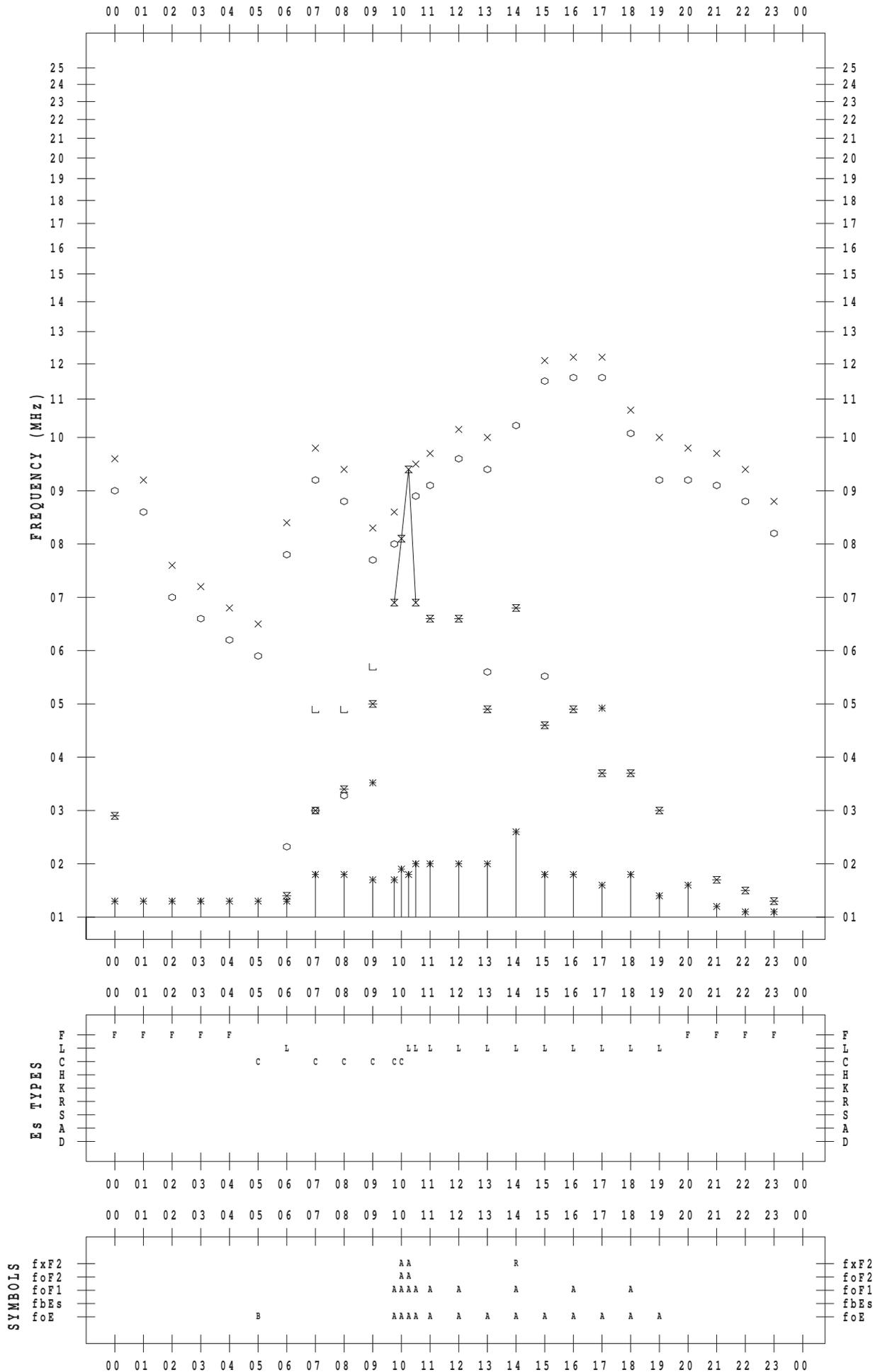
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/17

135 ° E MEAN TIME



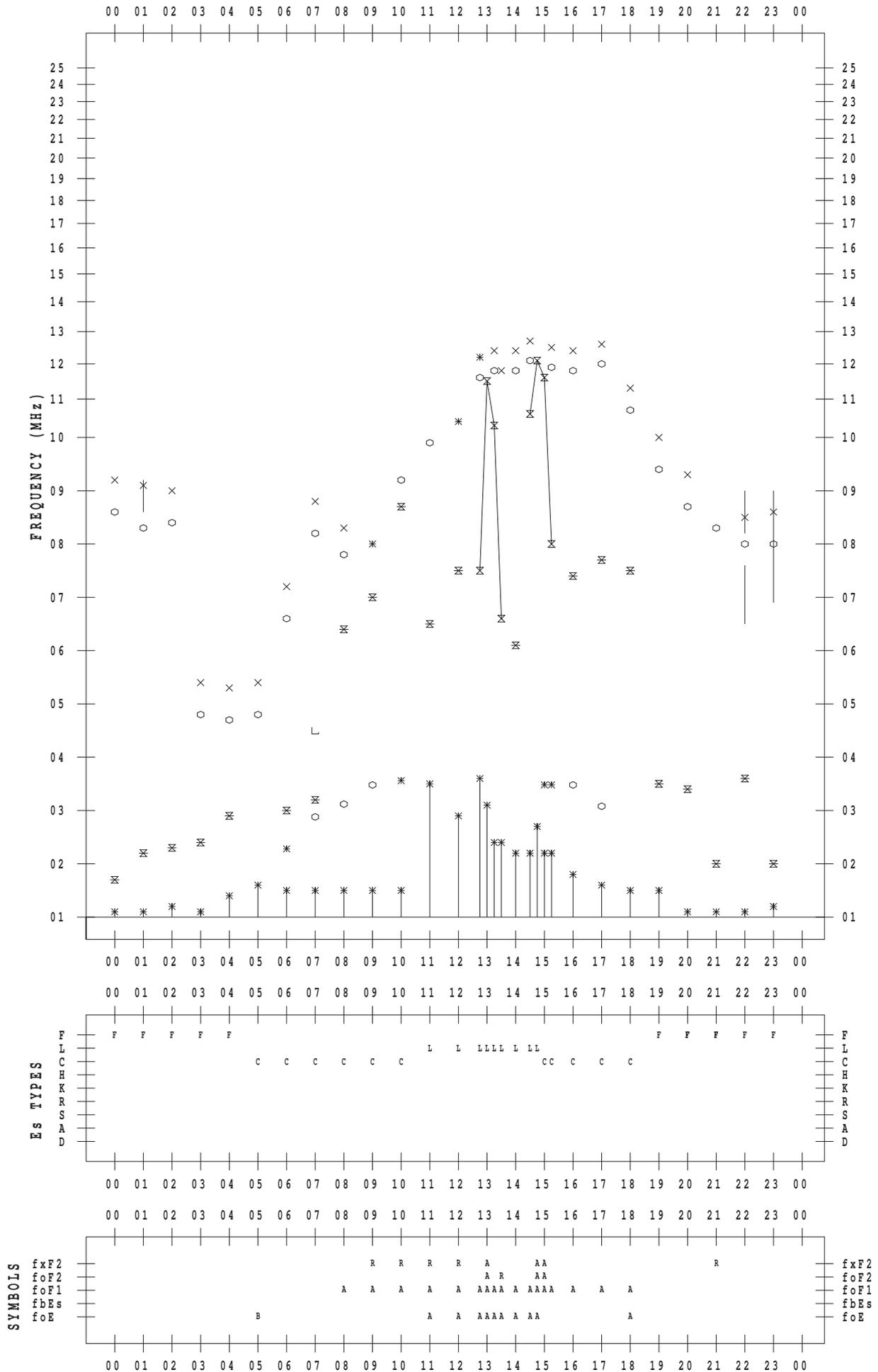
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/18

135 ° E MEAN TIME



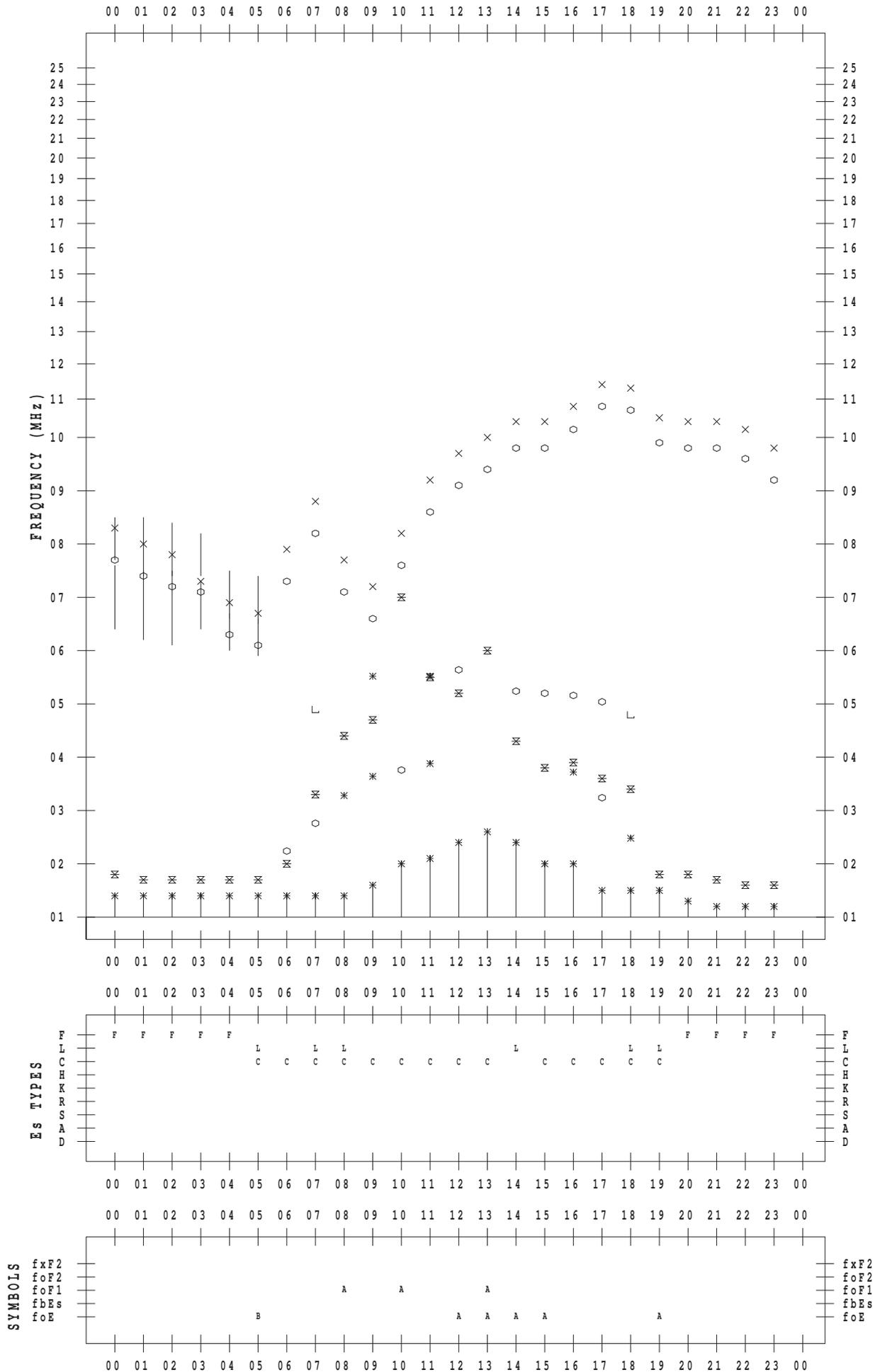
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/19

135 ° E MEAN TIME



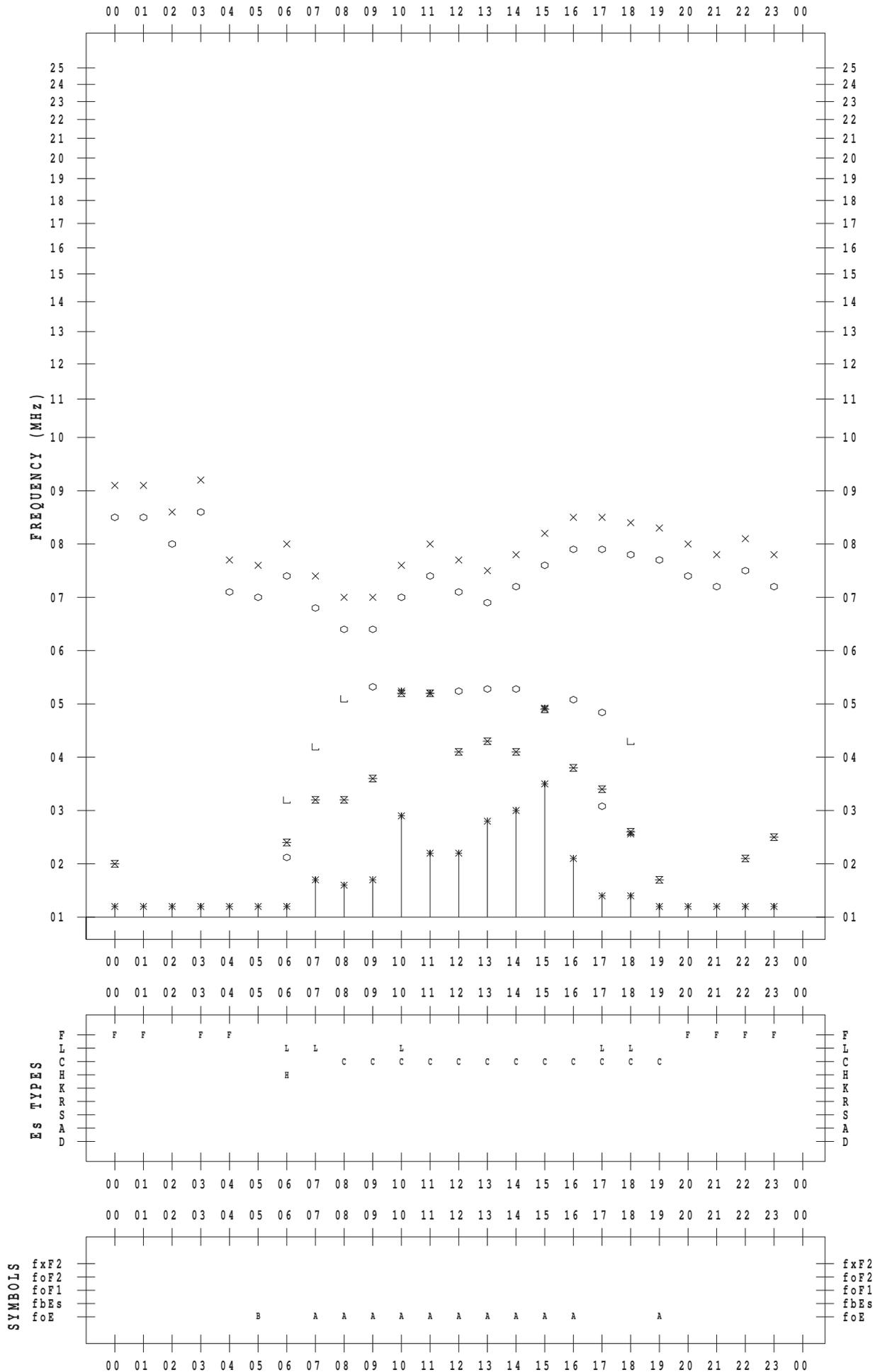
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/20

135 ° E MEAN TIME



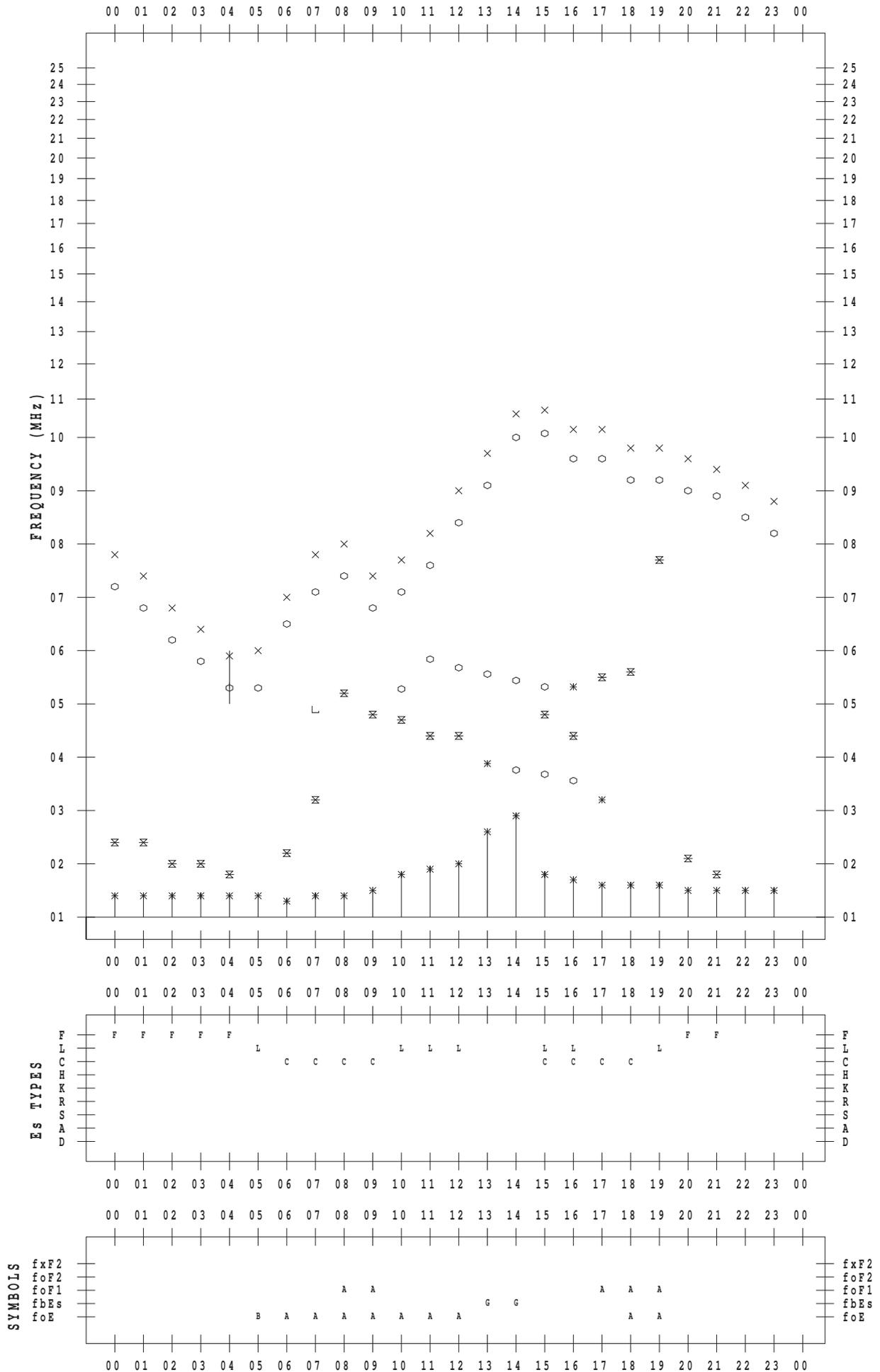
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/21

135 ° E MEAN TIME



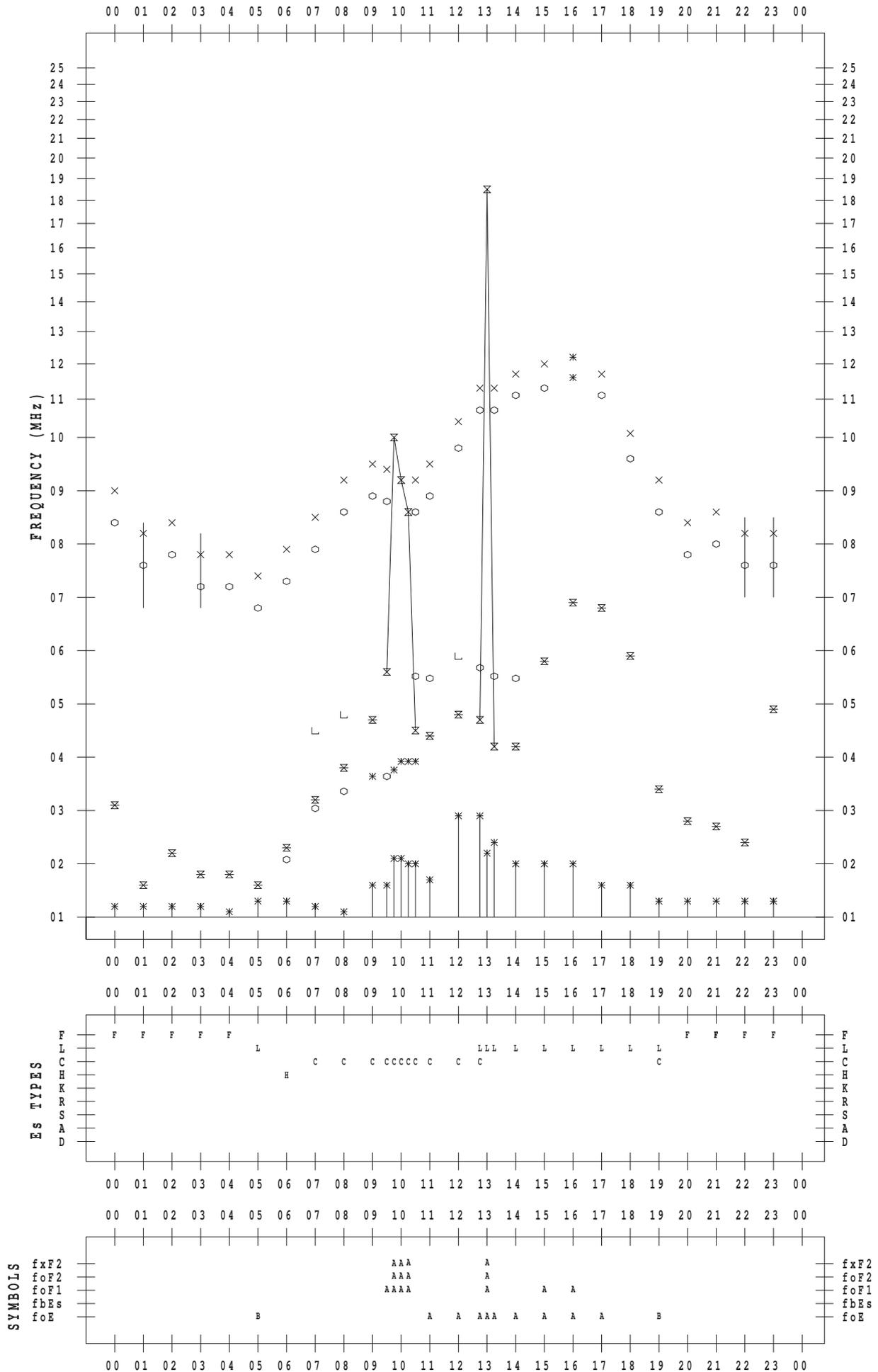
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/23

135 ° E MEAN TIME



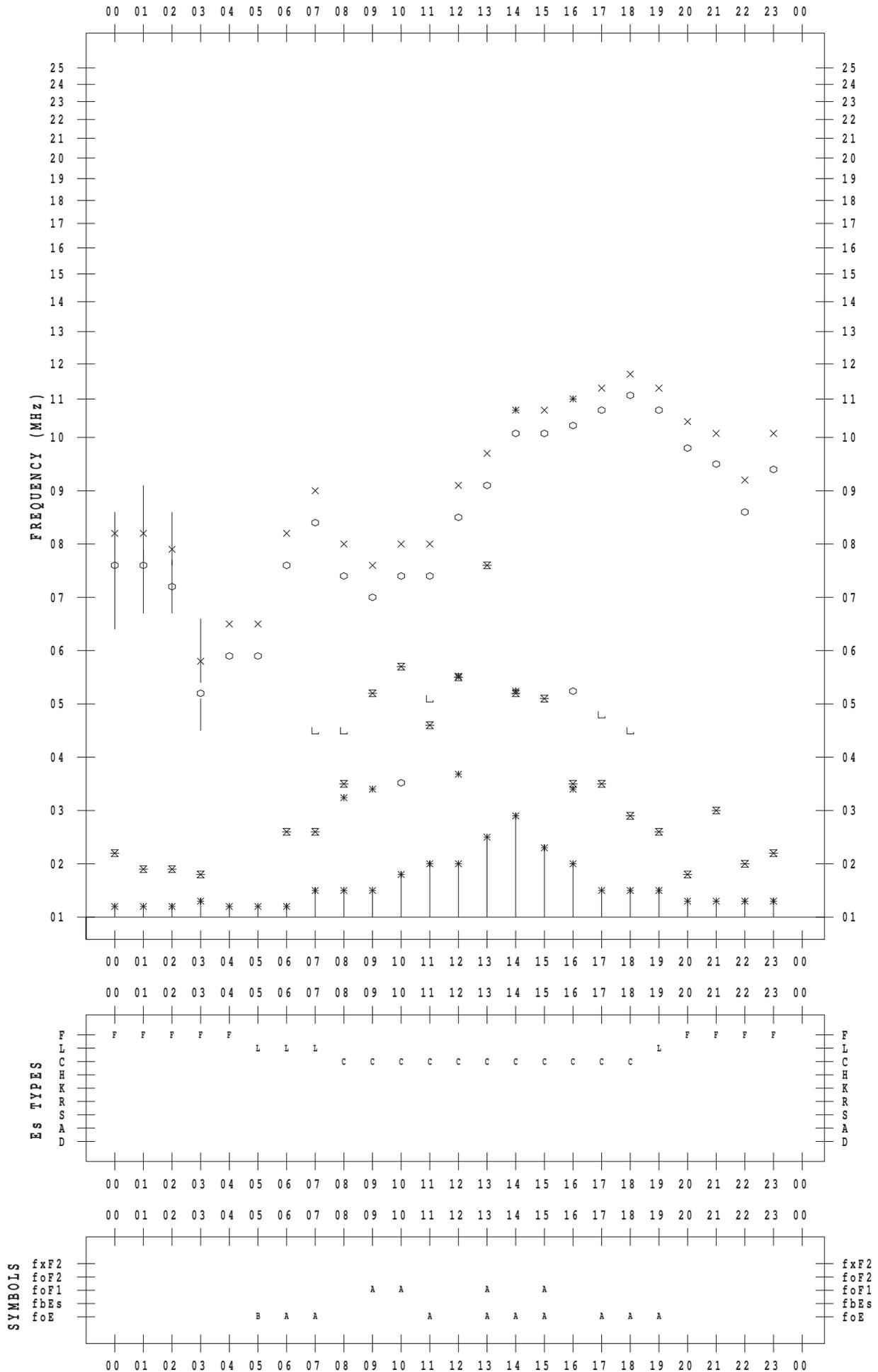
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STATION : Yamagawa

DATE : 2013 / 5 / 24

135 ° E MEAN TIME



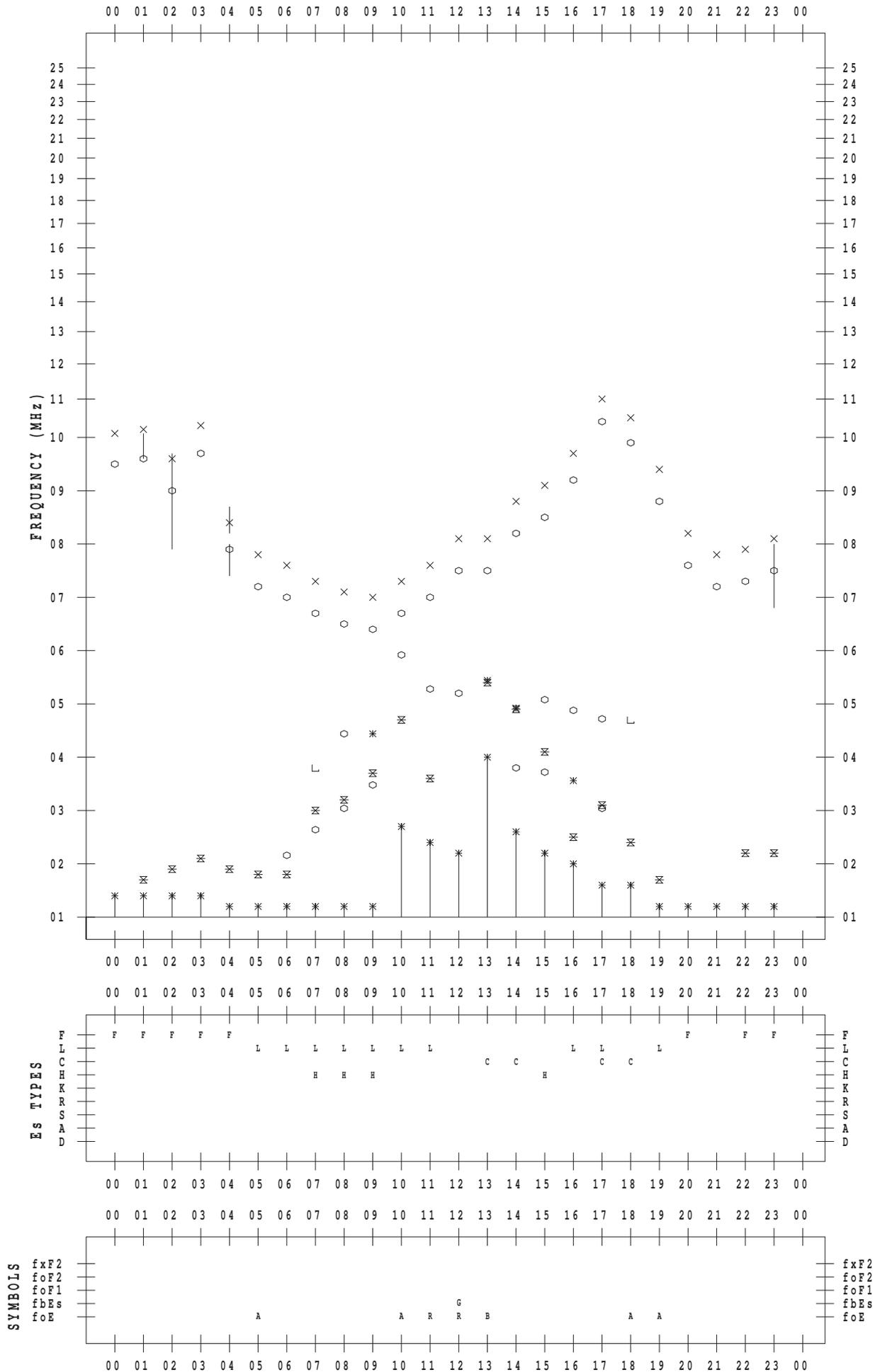
f-PLOT DATA

SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/25

135 ° E MEAN TIME



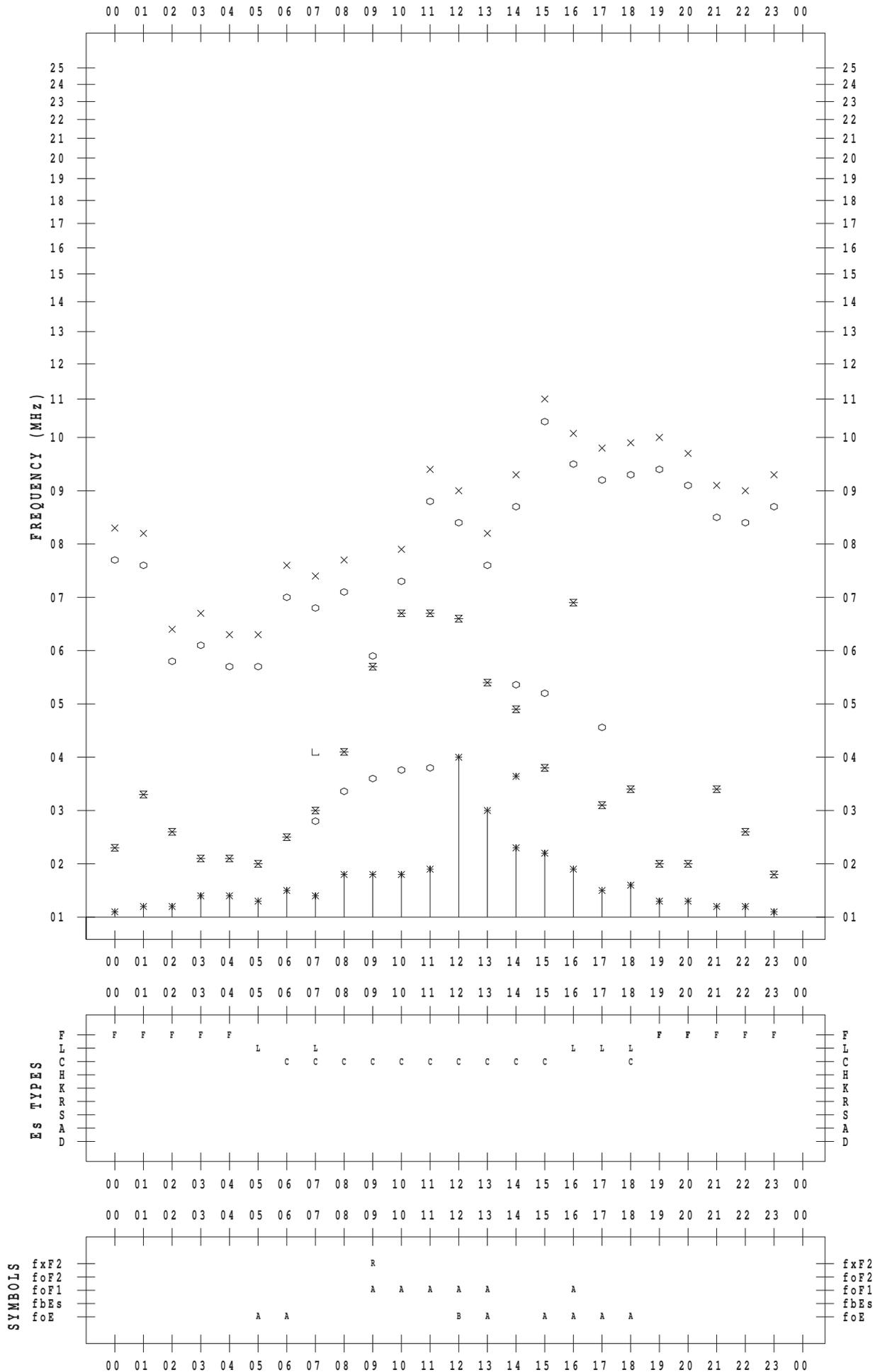
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STATION : Yamagawa

DATE : 2013/ 5/26

135 ° E MEAN TIME



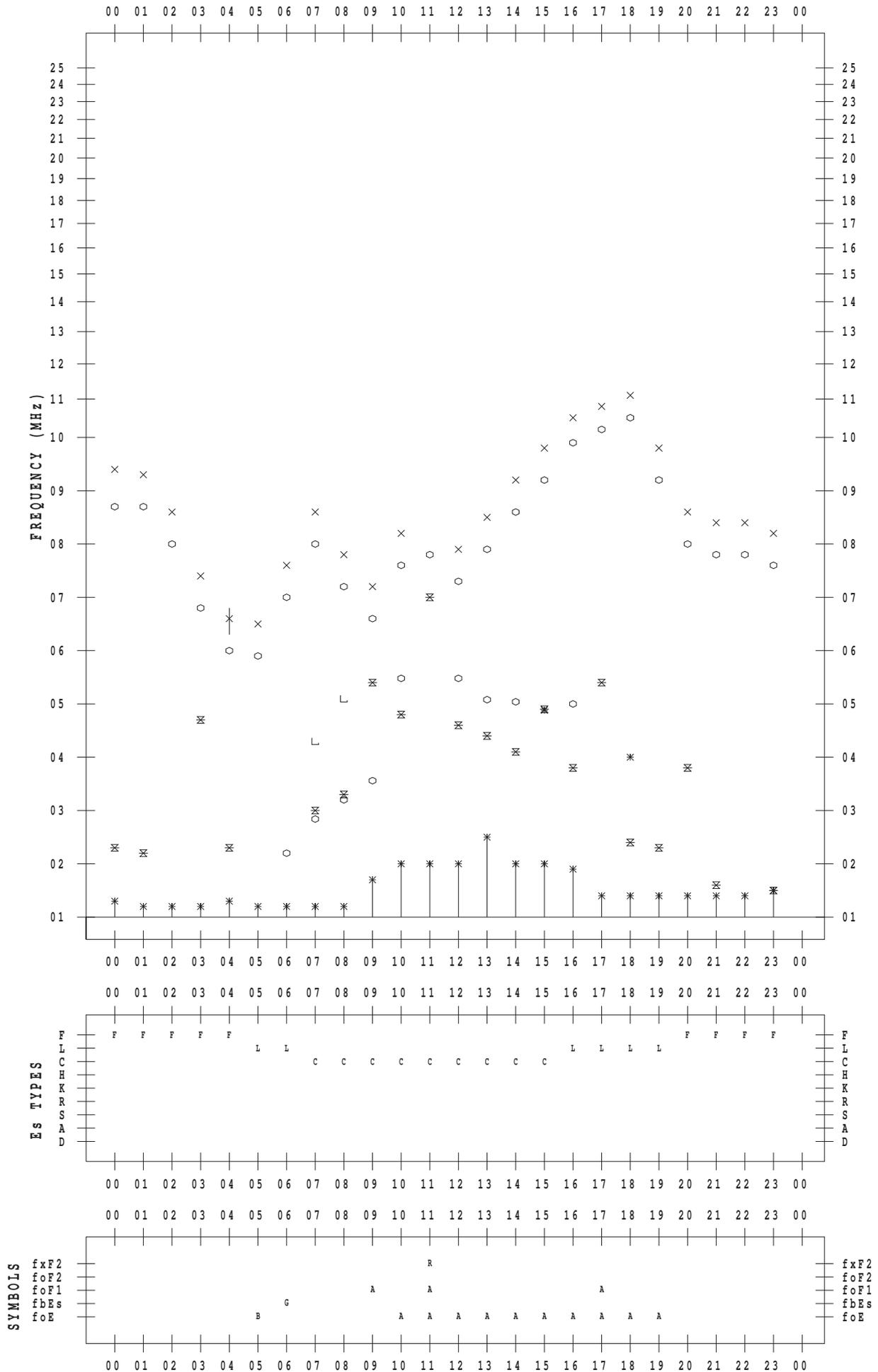
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/27

135 ° E MEAN TIME



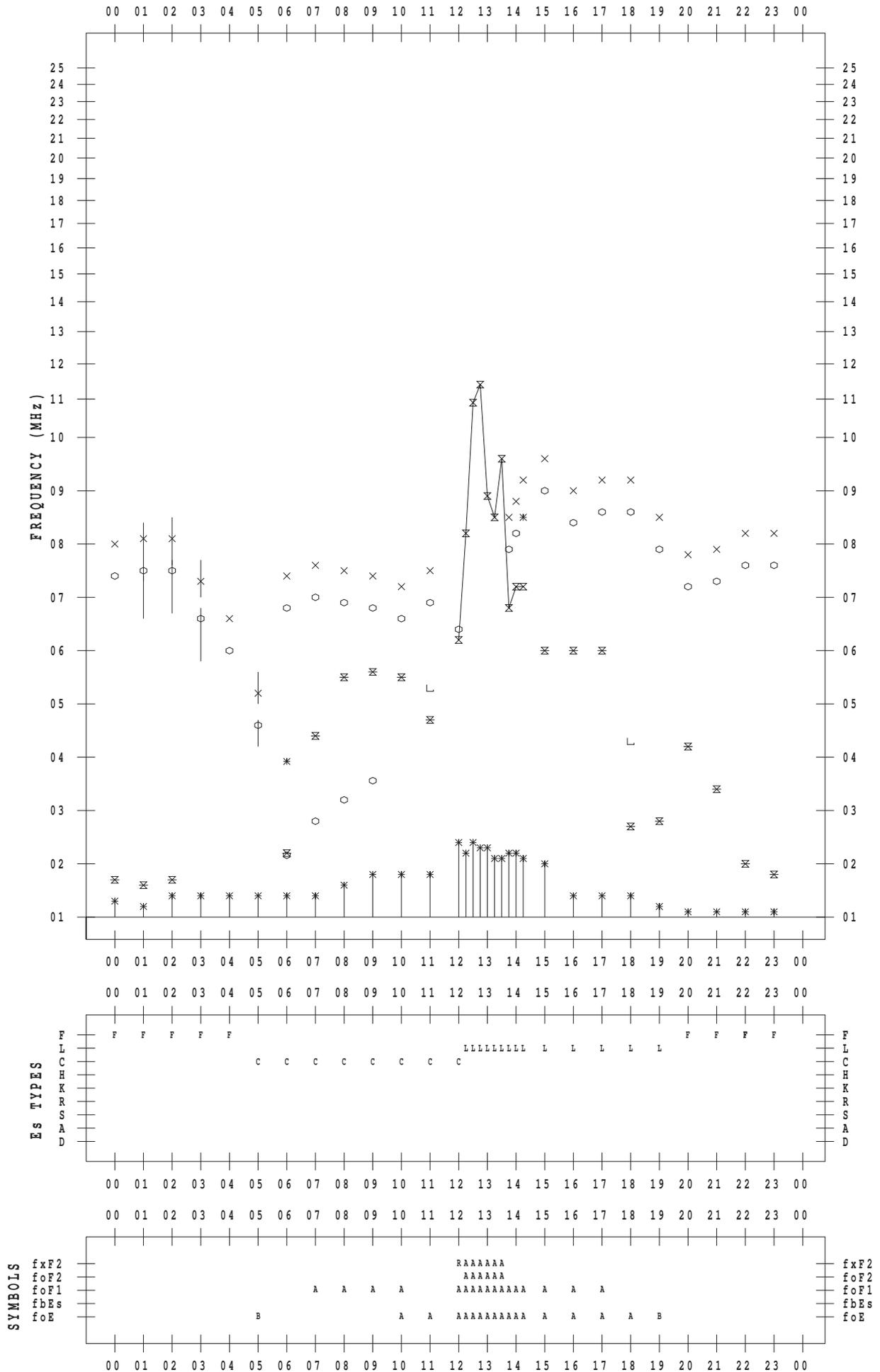
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STATION : Yamagawa

DATE : 2013/ 5/28

135 ° E MEAN TIME



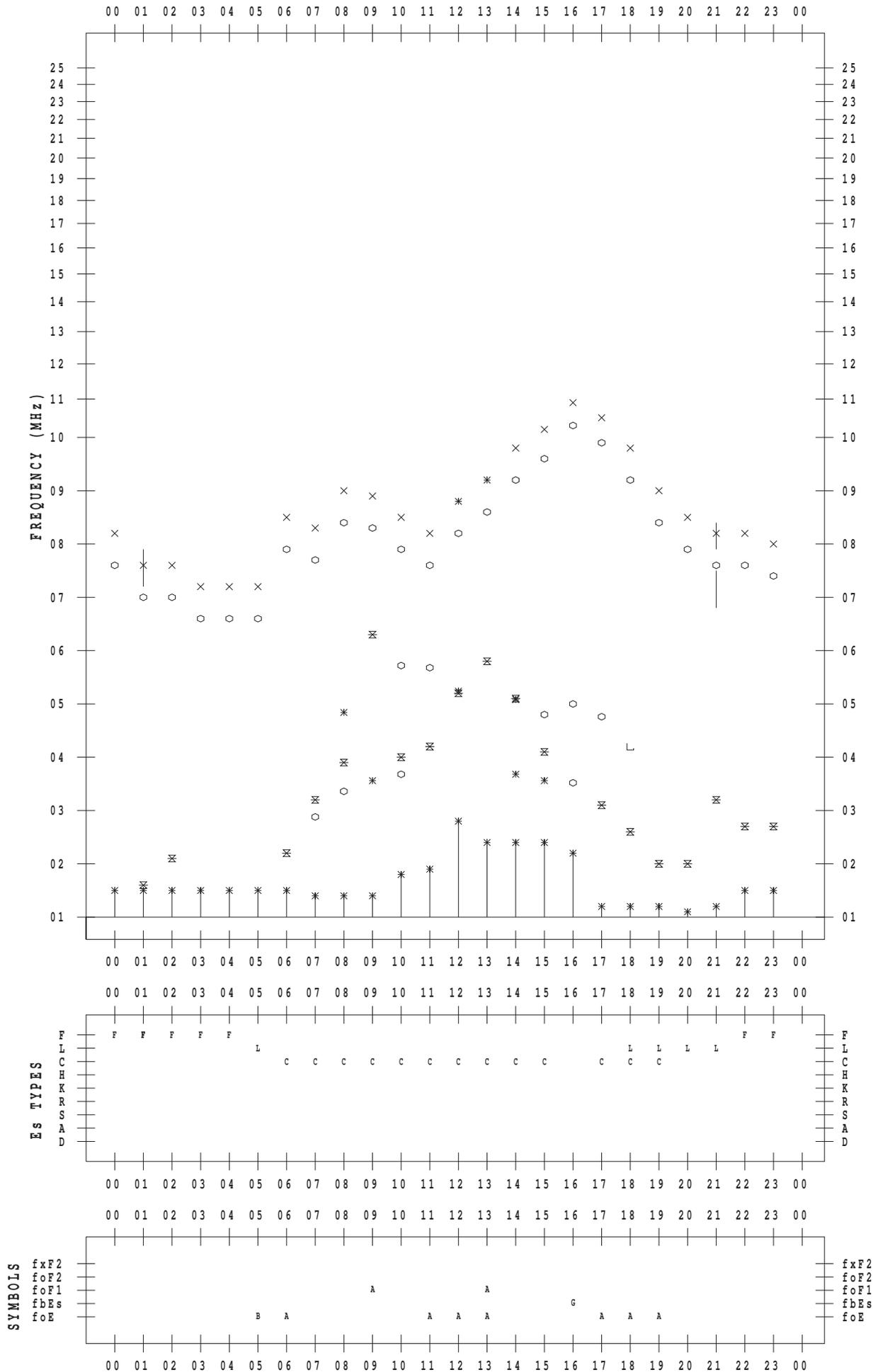
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/29

135 ° E MEAN TIME



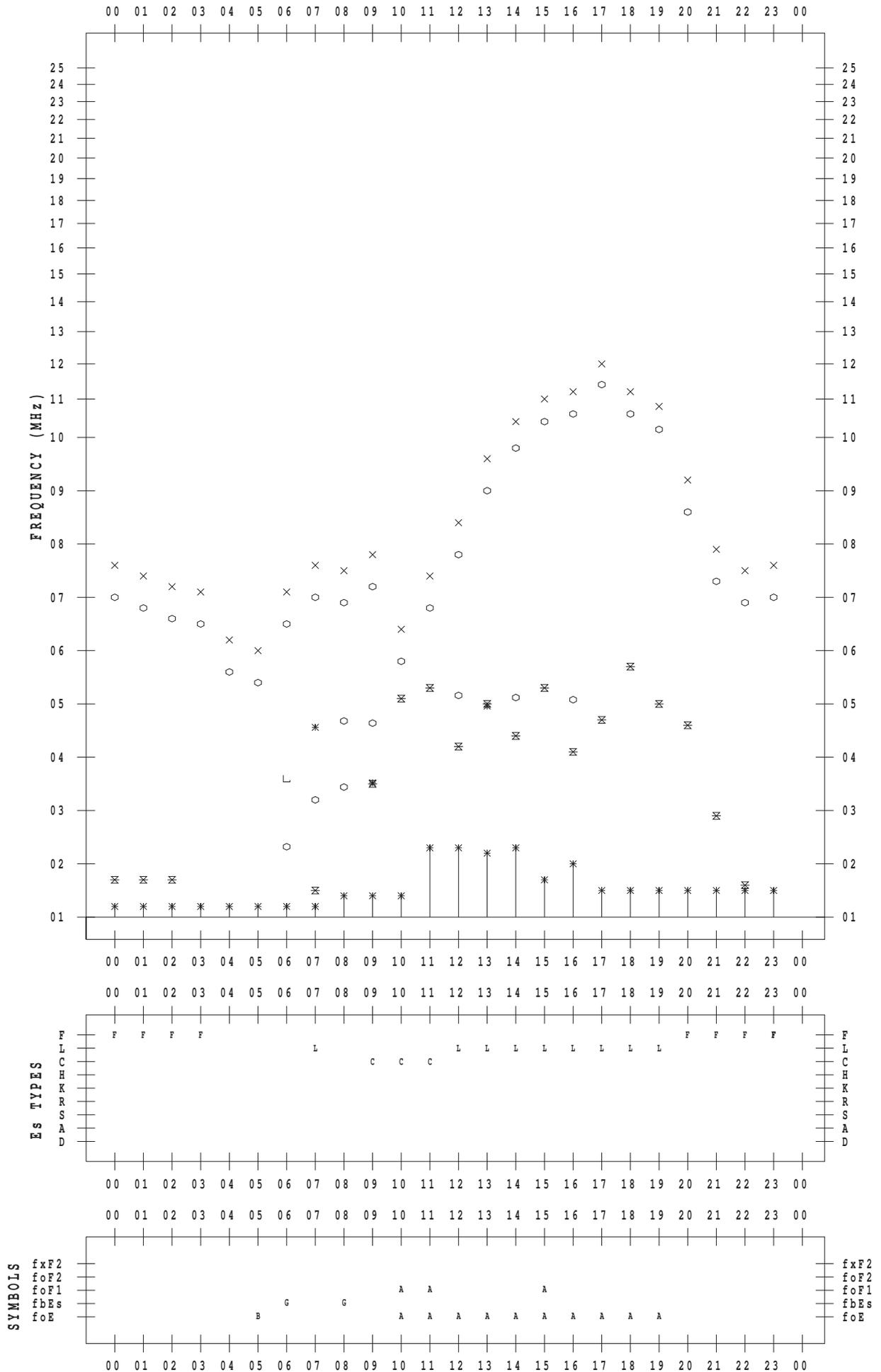
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STATION : Yamagawa

DATE : 2013/ 5/30

135 ° E MEAN TIME



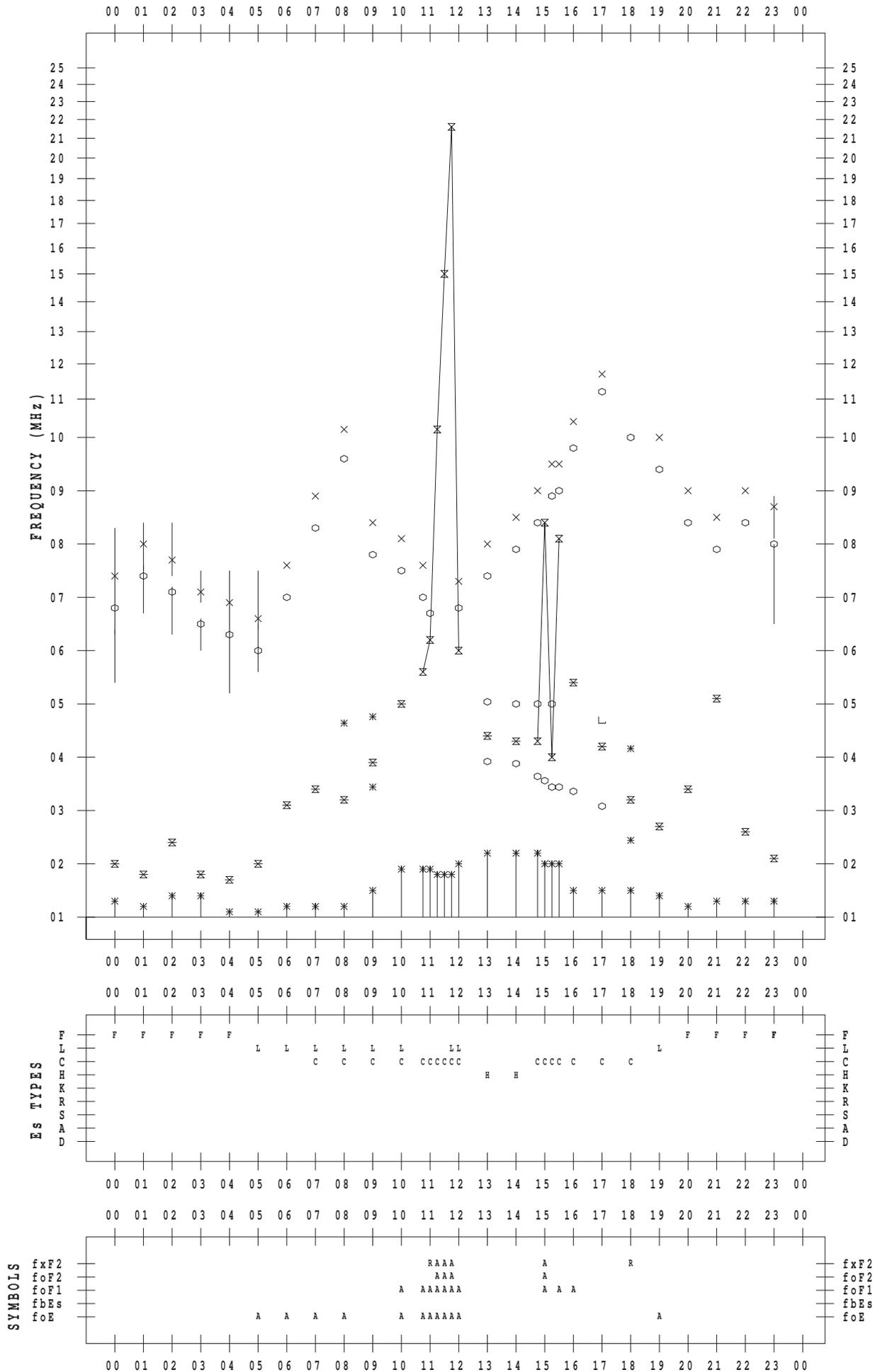
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SCALER : M.NISHIDA

STATION : Yamagawa

DATE : 2013/ 5/31

135 ° E MEAN TIME



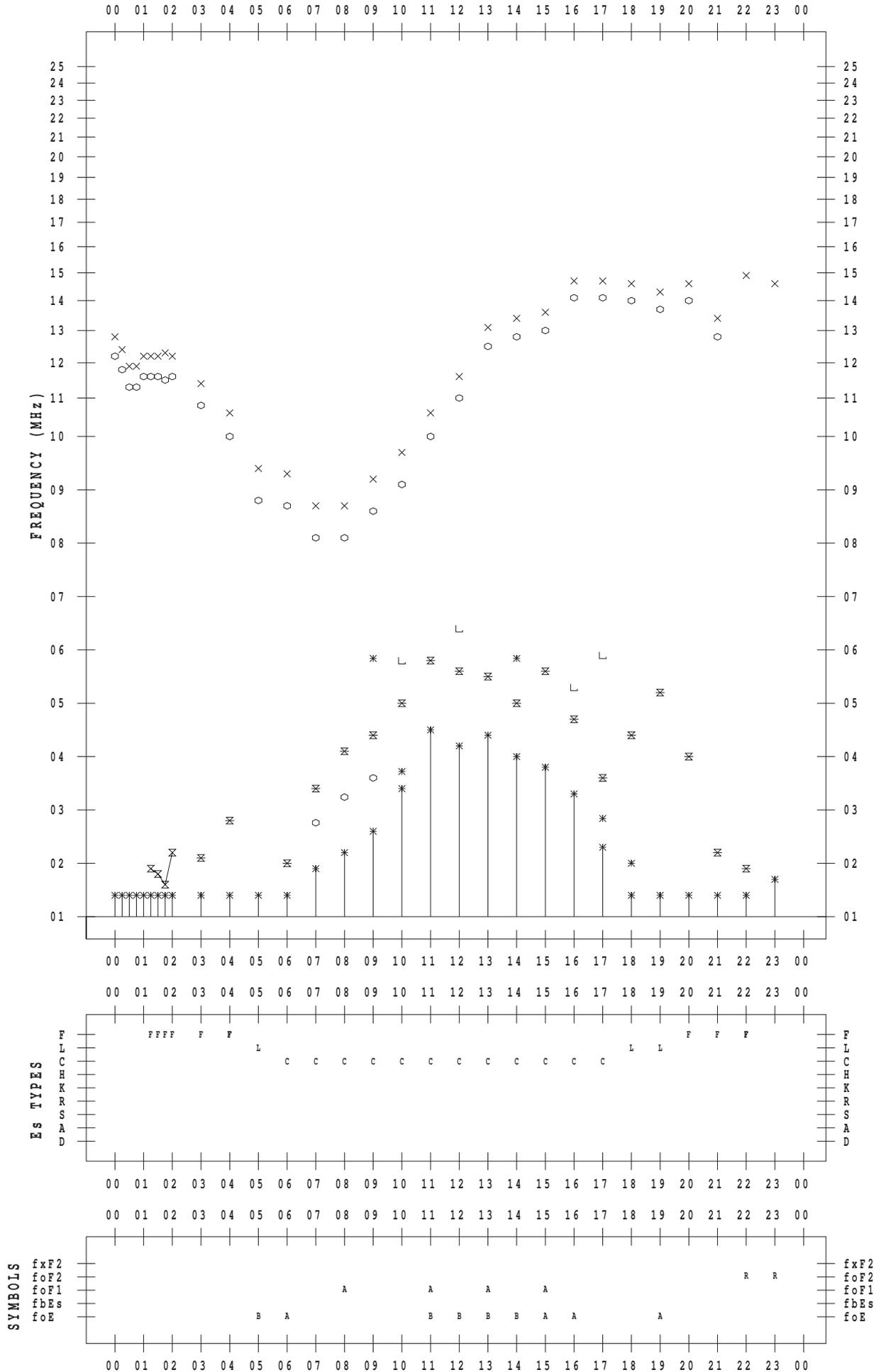
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/ 1

135 ° E MEAN TIME



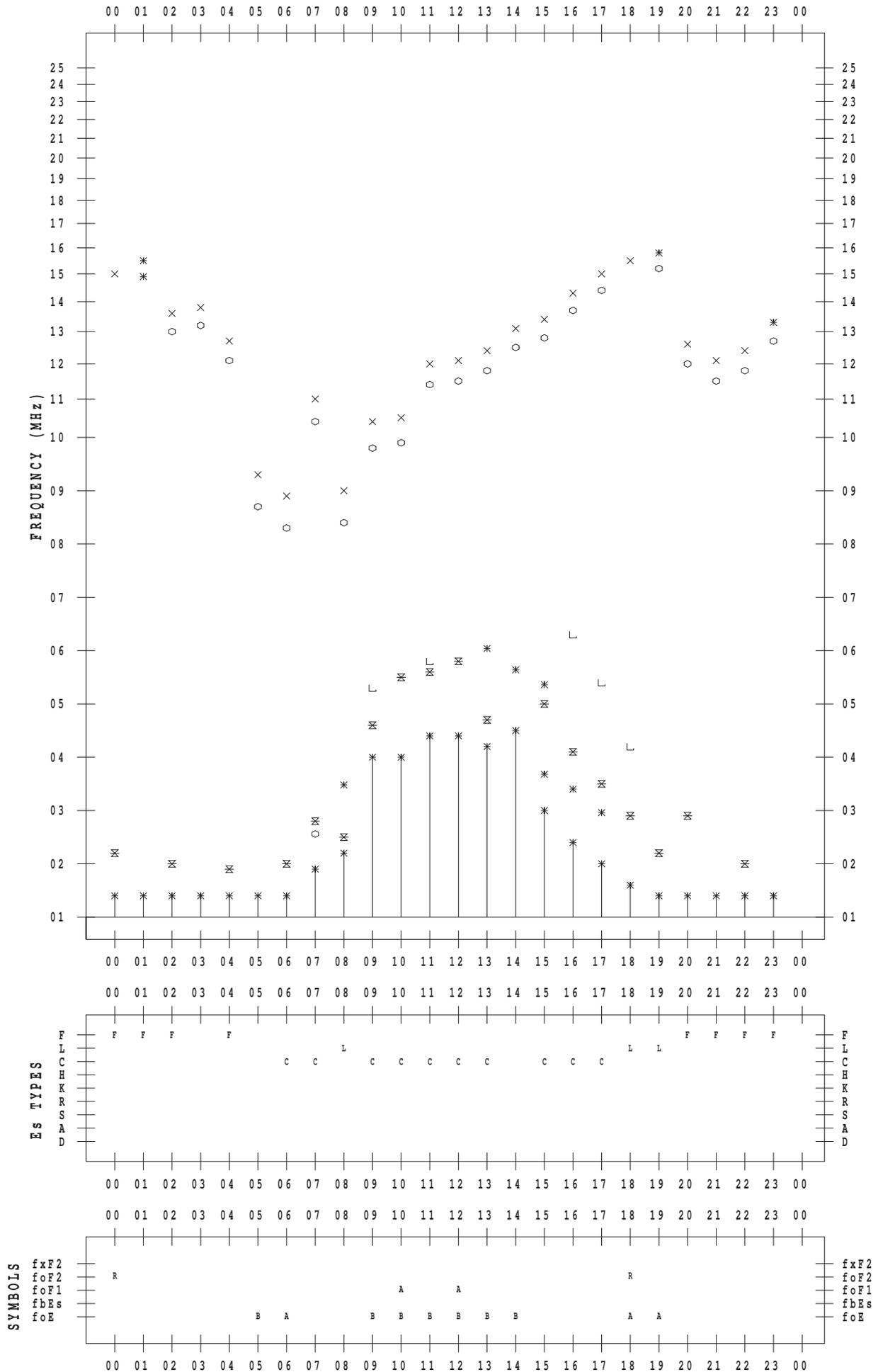
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/ 2

135 ° E MEAN TIME



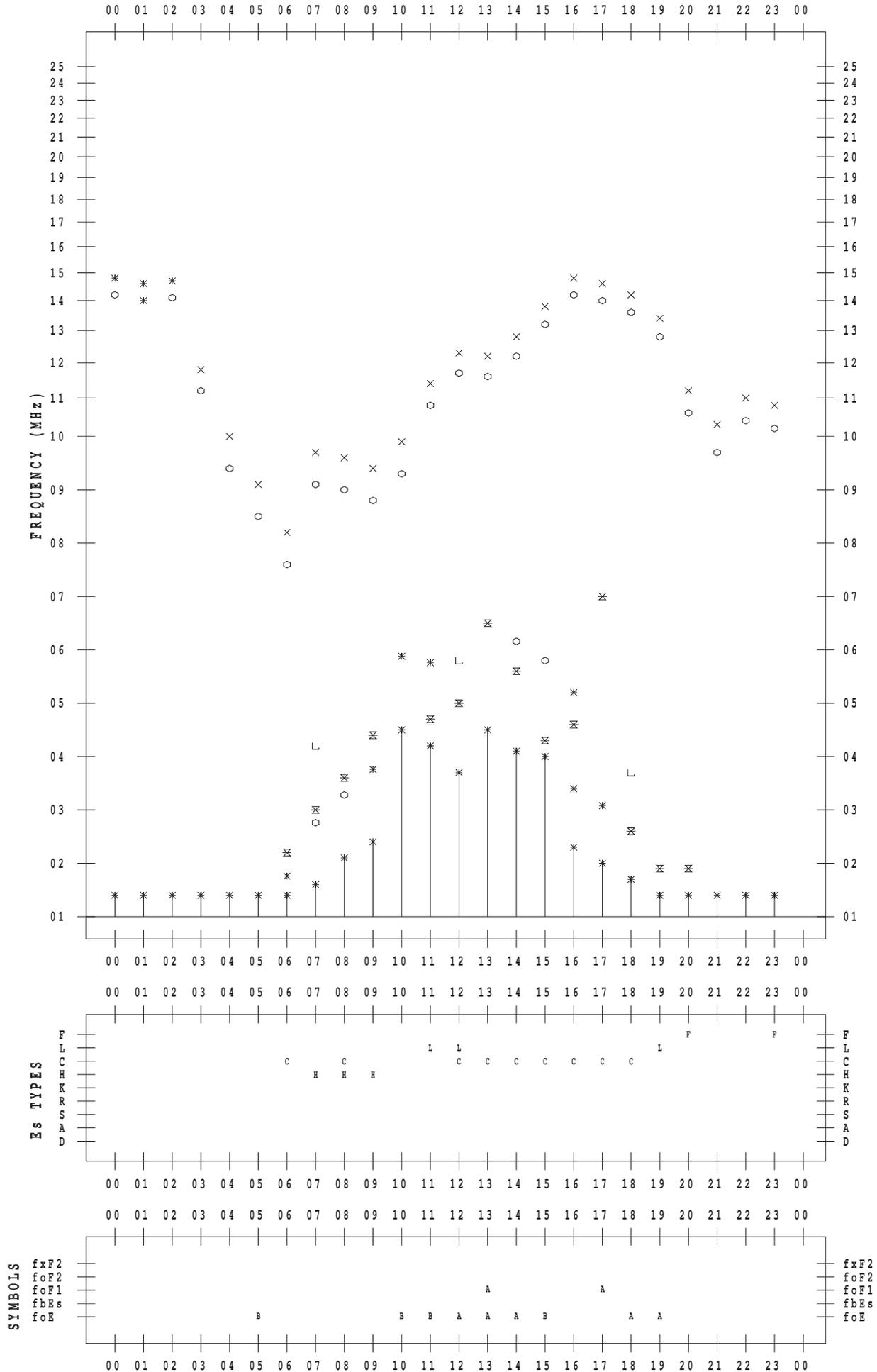
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/ 3

135 ° E MEAN TIME



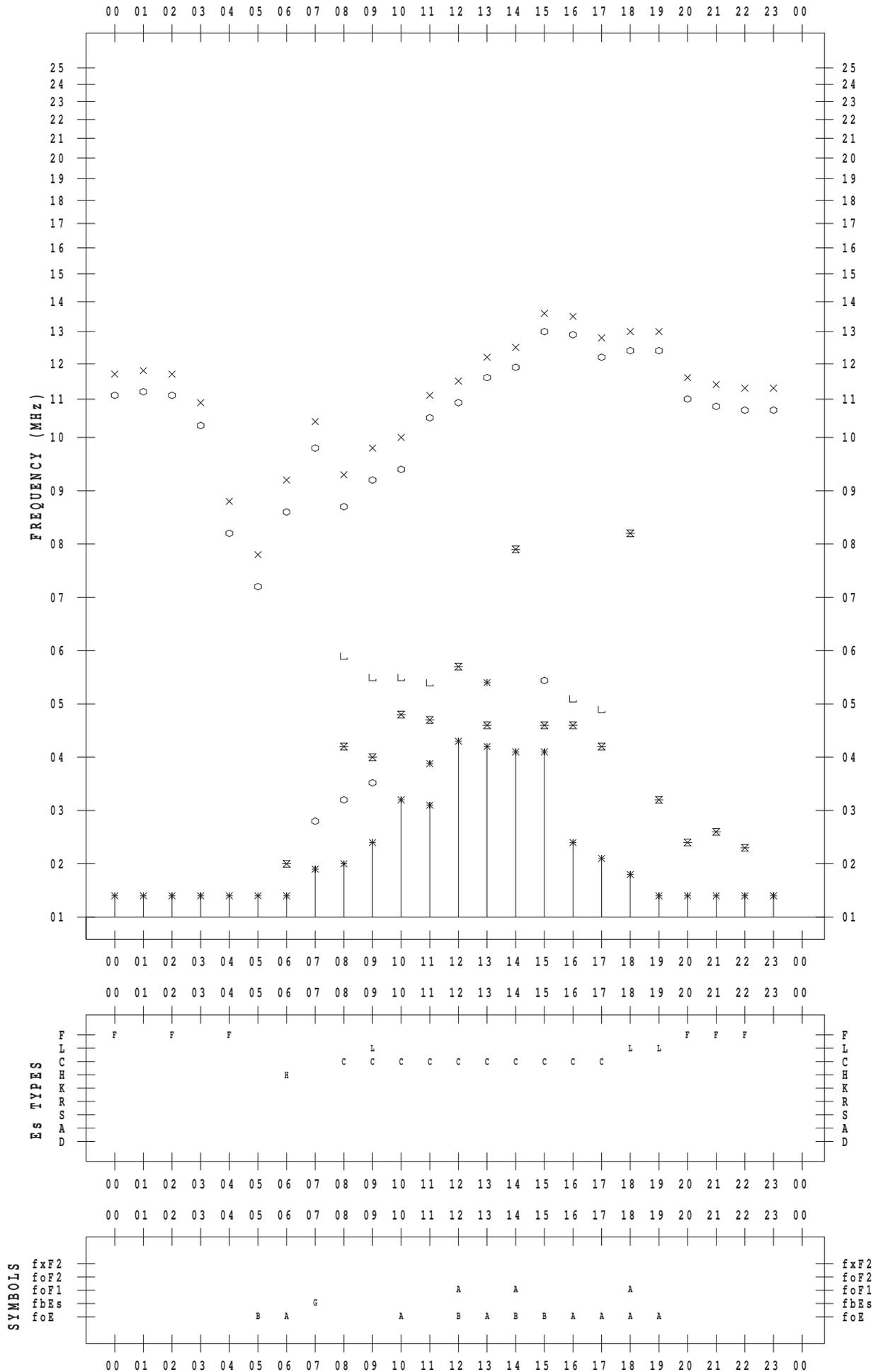
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/ 4

135 ° E MEAN TIME



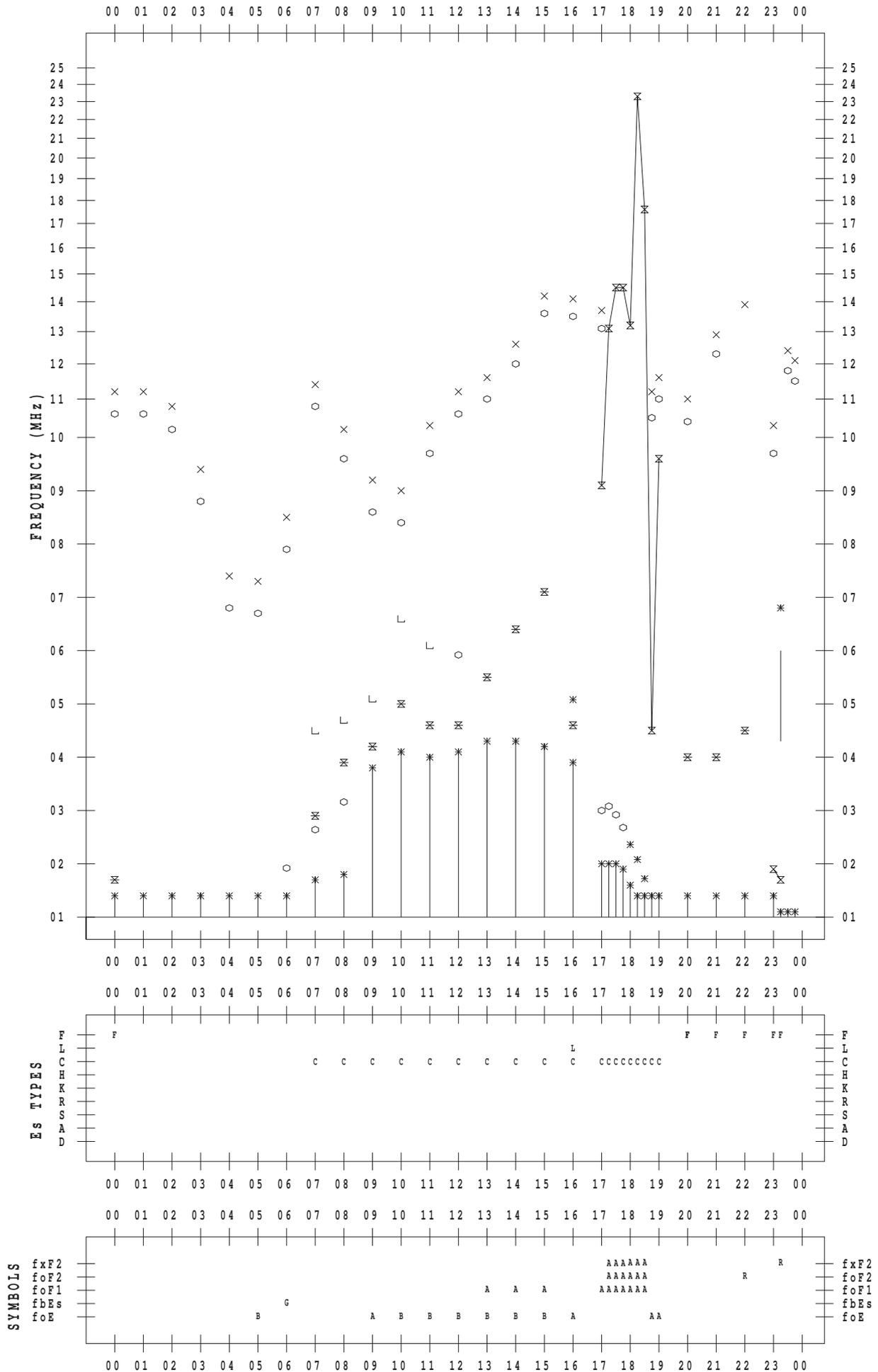
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/ 5

135 ° E MEAN TIME



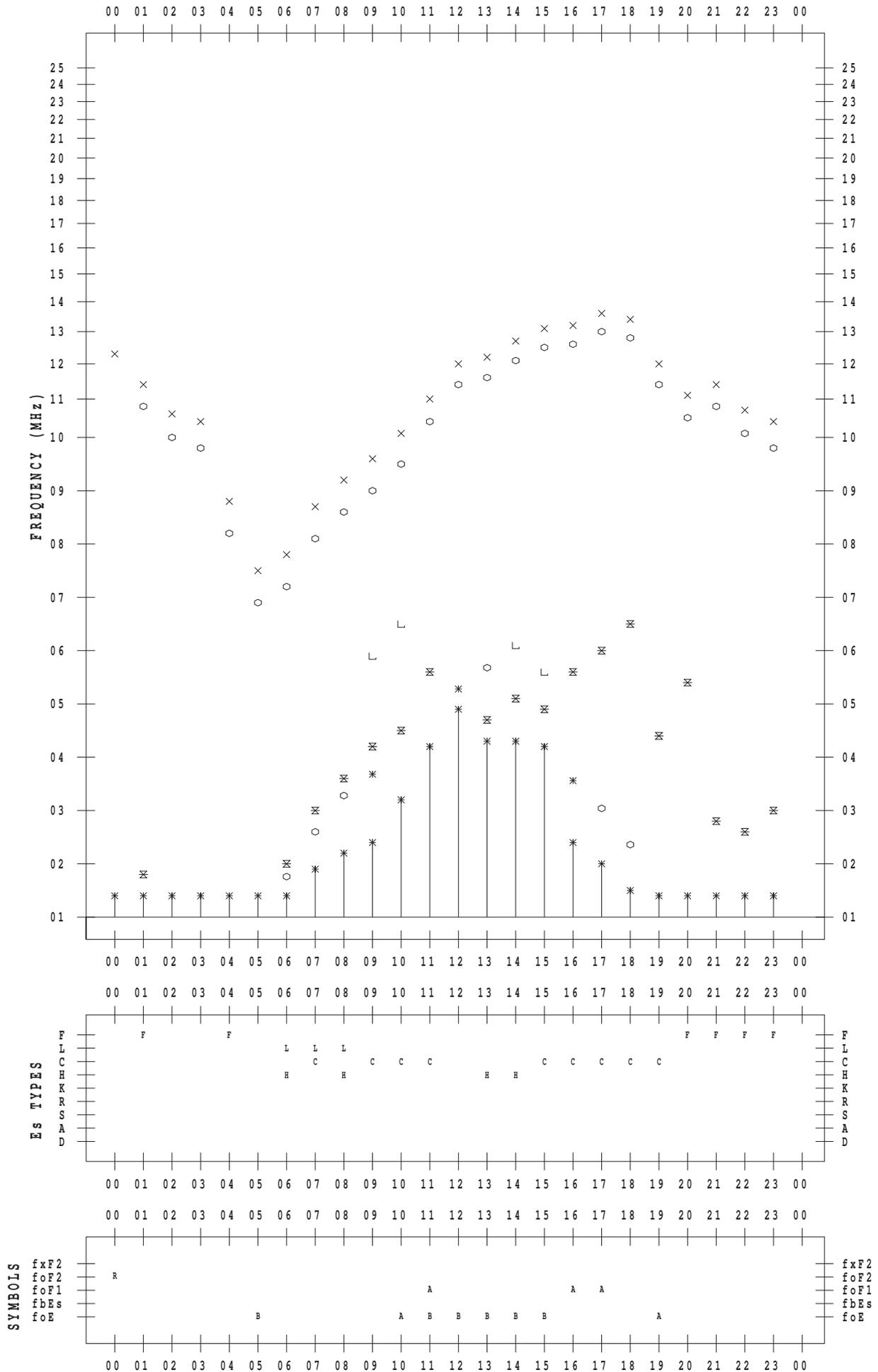
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013 / 5 / 6

135 ° E MEAN TIME



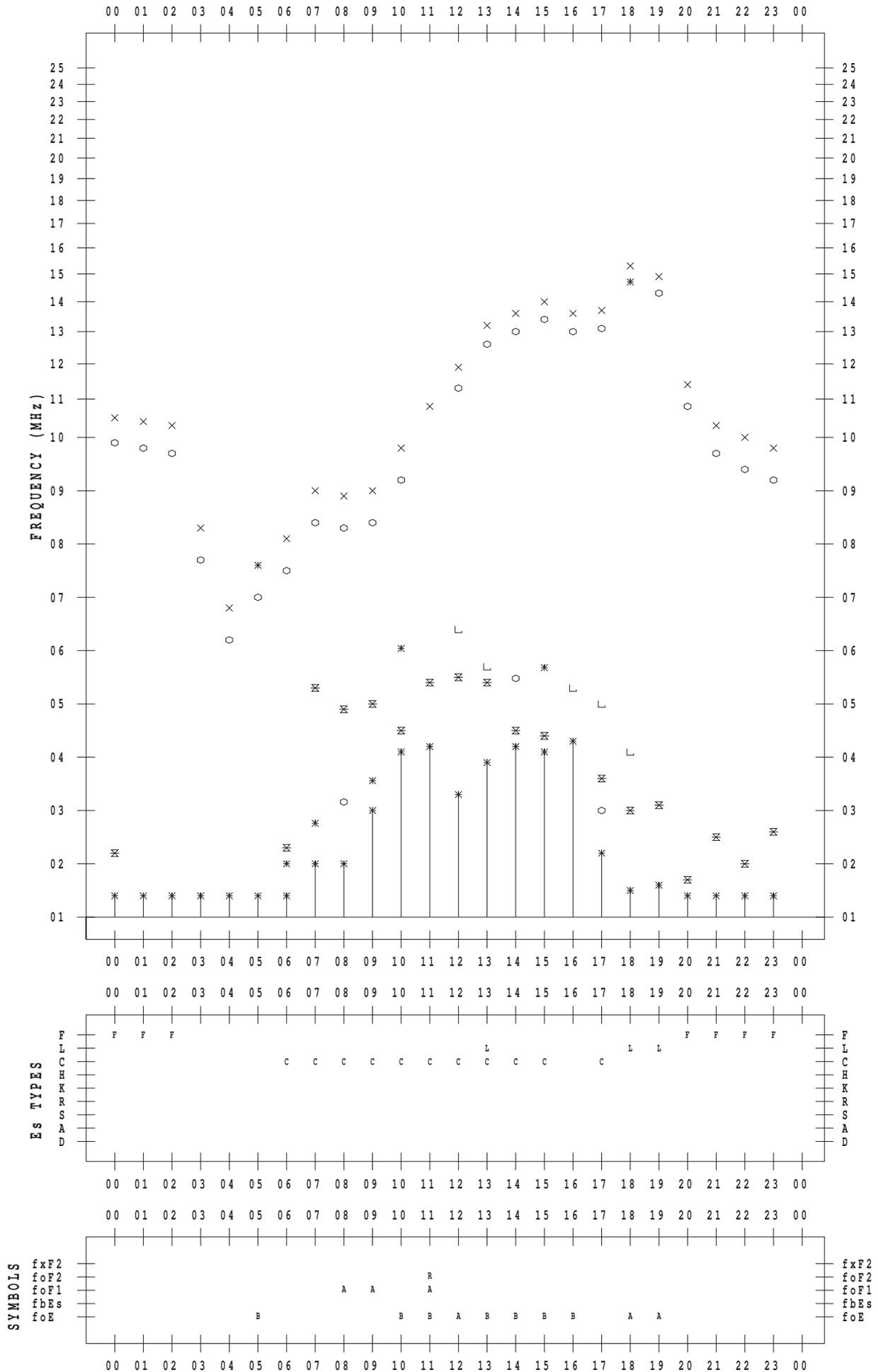
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/ 7

135 ° E MEAN TIME



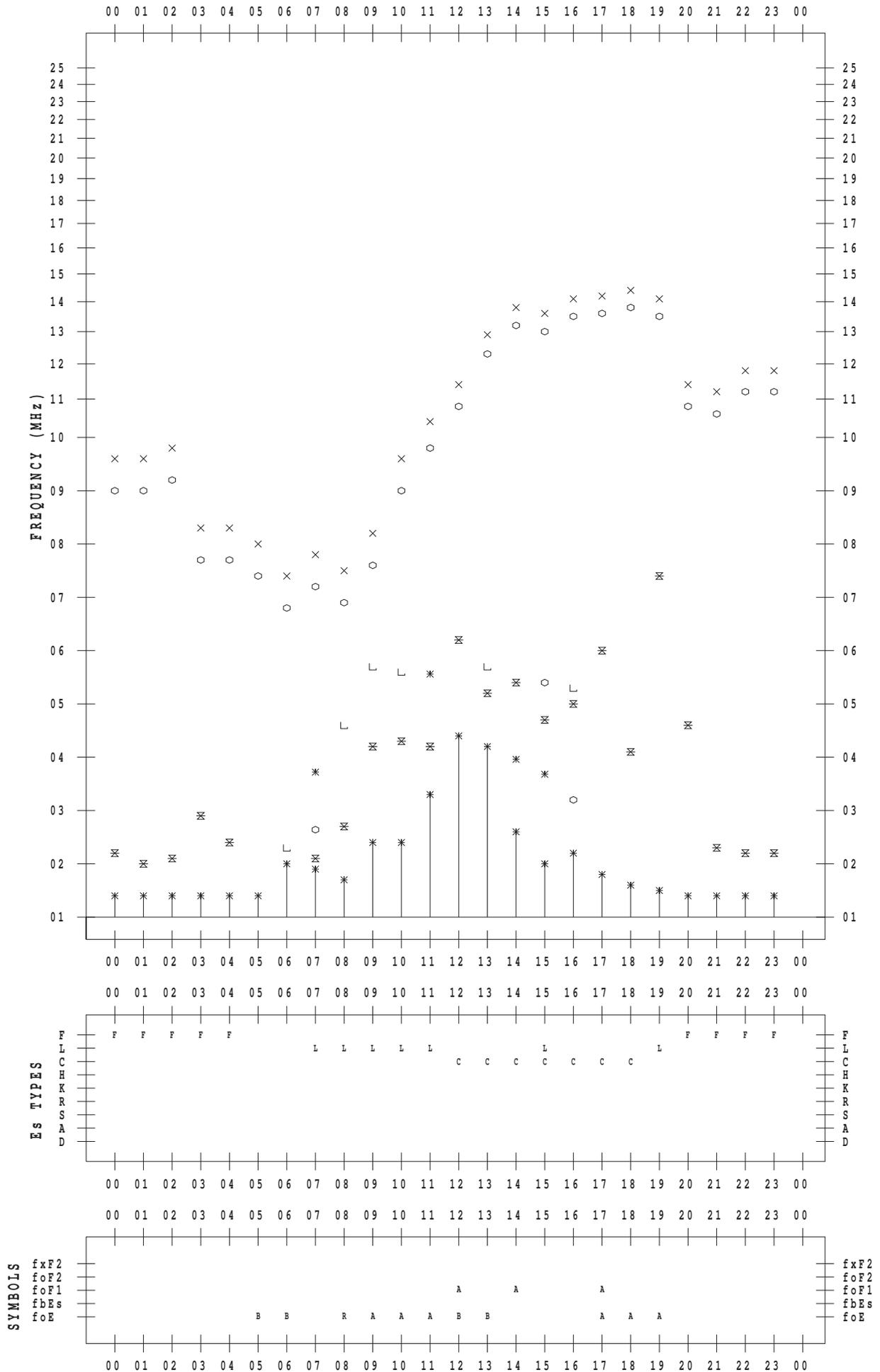
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STATION : Okinawa

DATE : 2013/ 5/ 8

135 ° E MEAN TIME



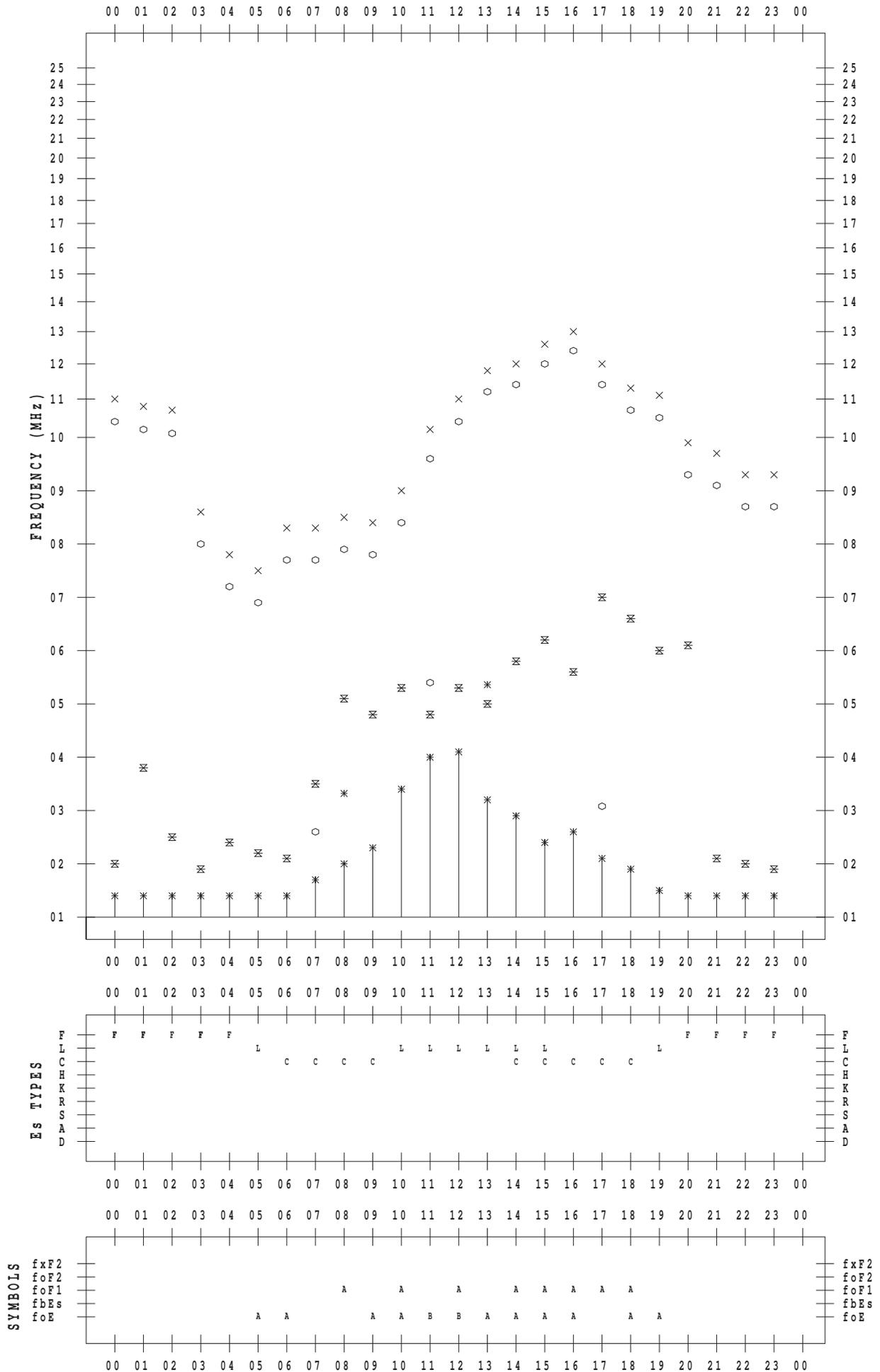
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STATION : Okinawa

DATE : 2013/ 5/ 9

135 ° E MEAN TIME



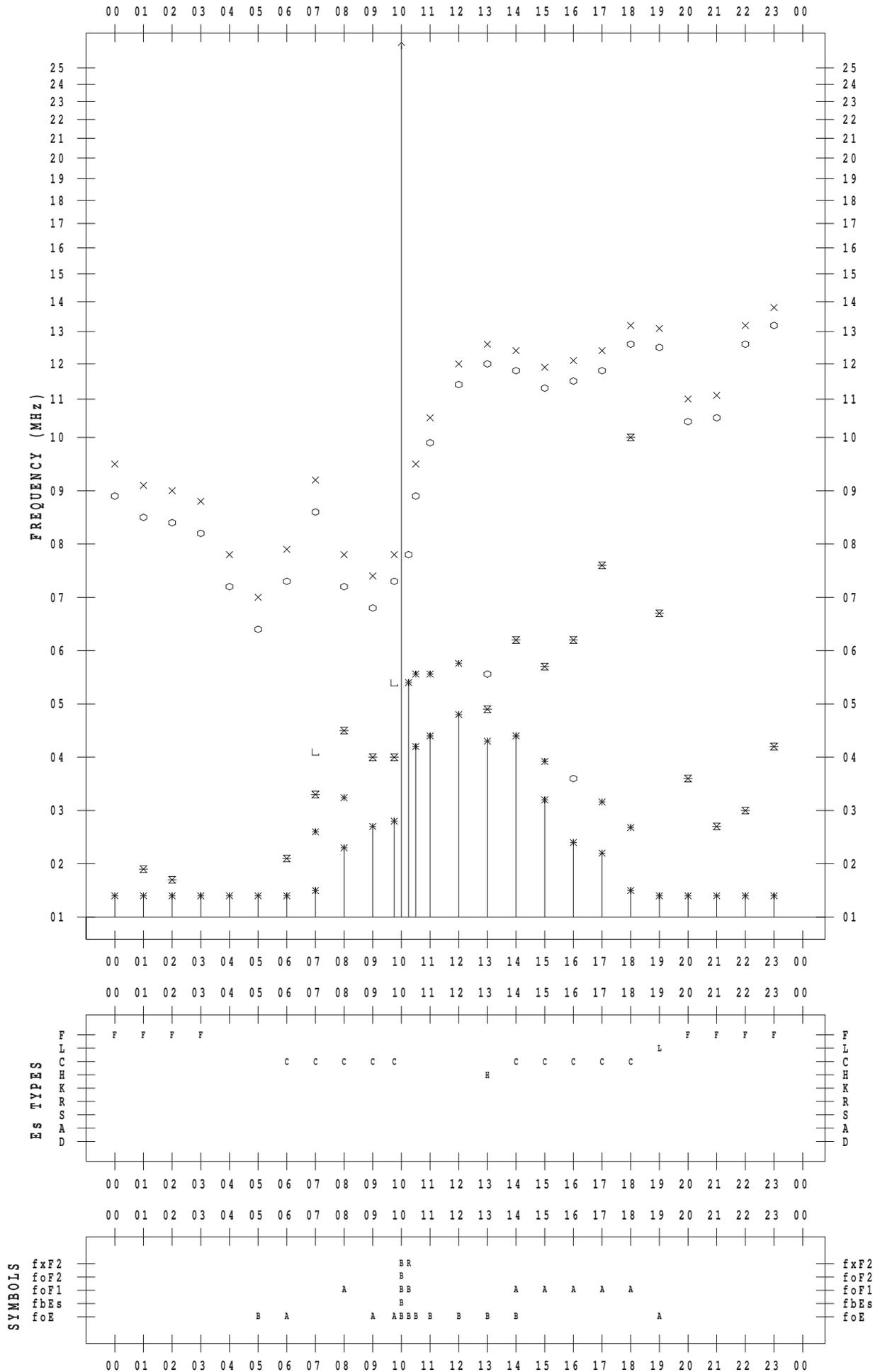
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/10

135 ° E MEAN TIME



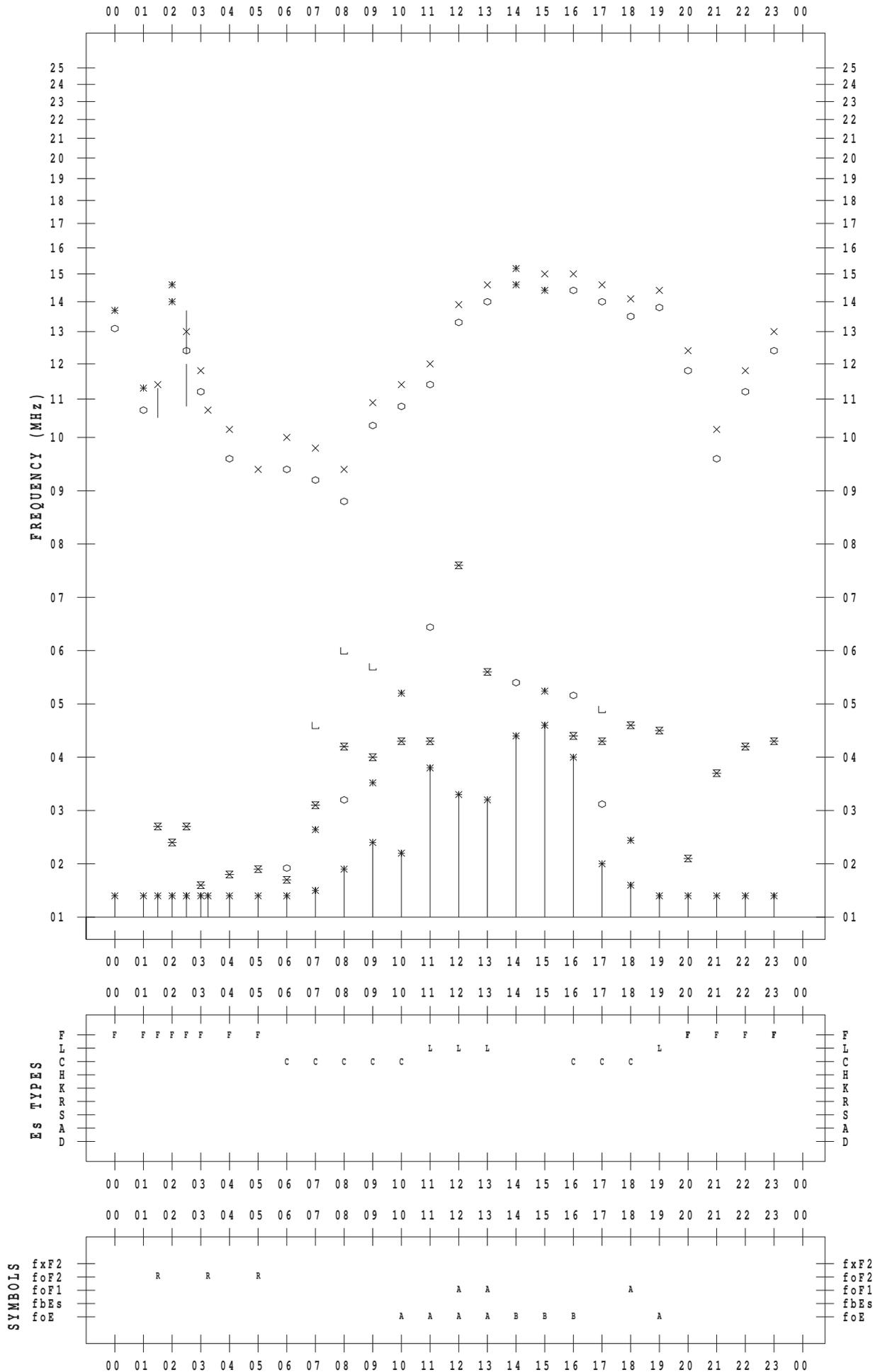
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STATION : Okinawa

DATE : 2013/ 5/11

135 ° E MEAN TIME



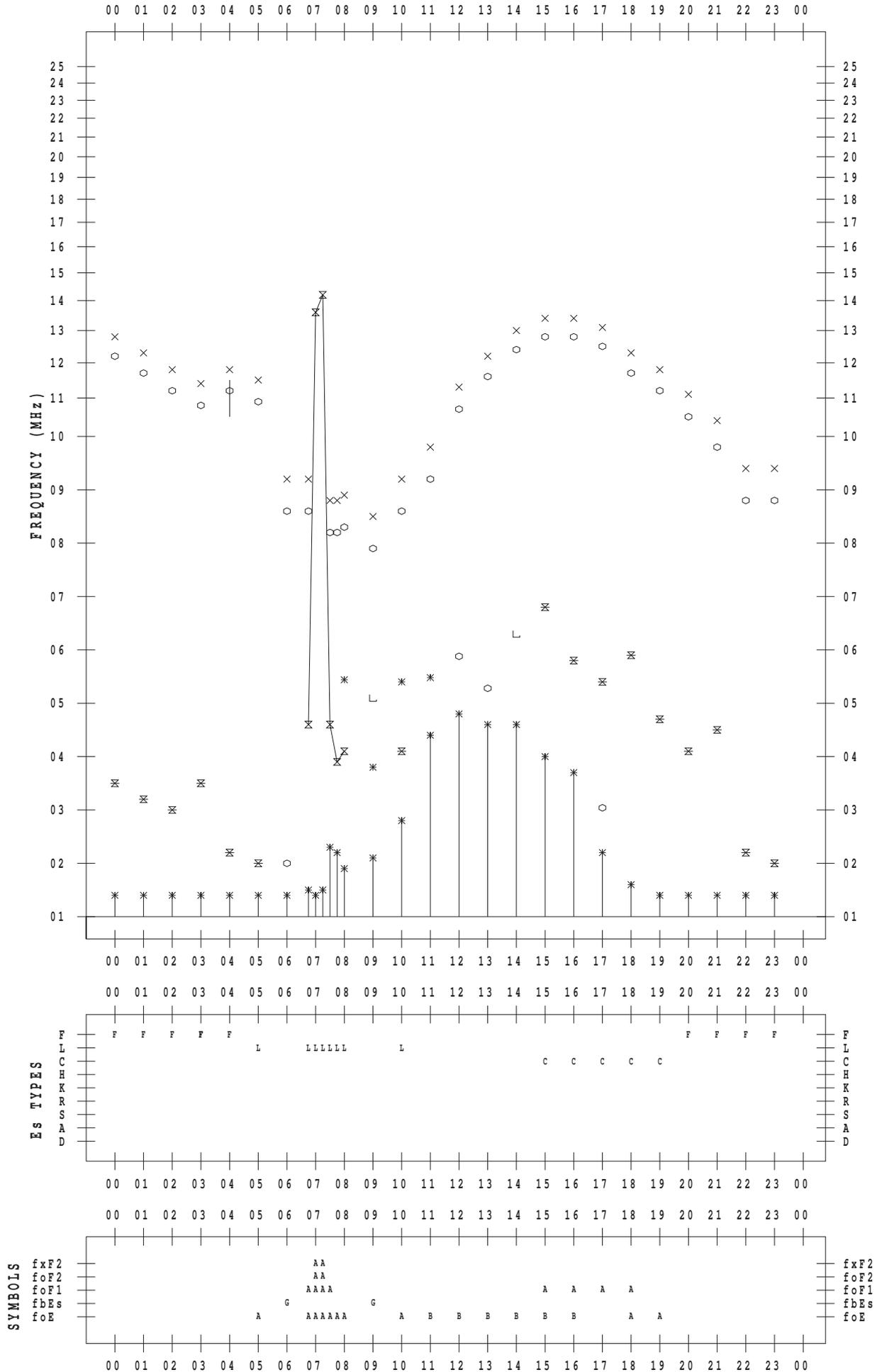
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STATION : Okinawa

DATE : 2013/ 5/12

135 ° E MEAN TIME



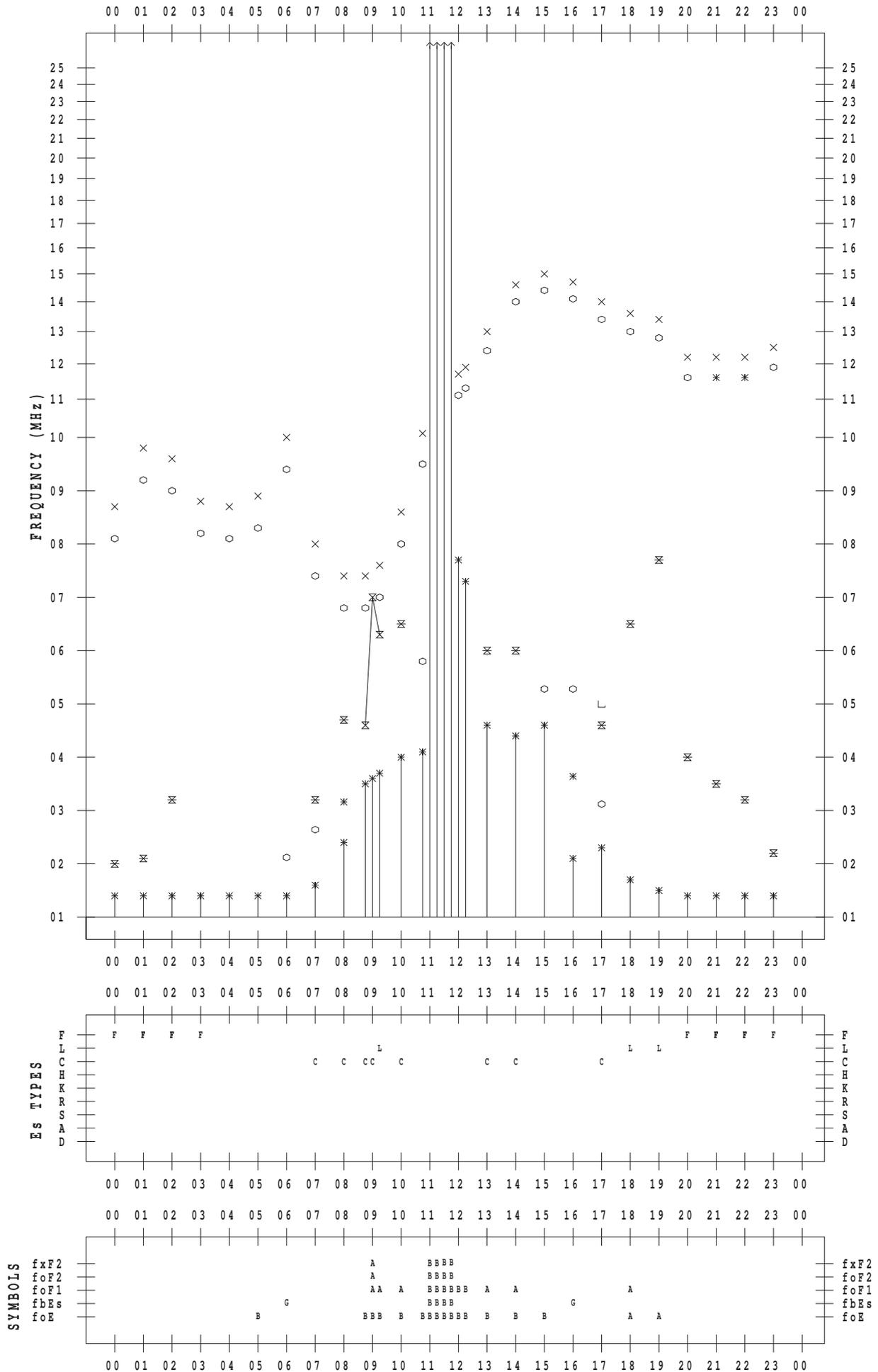
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STATION : Okinawa

DATE : 2013/ 5/13

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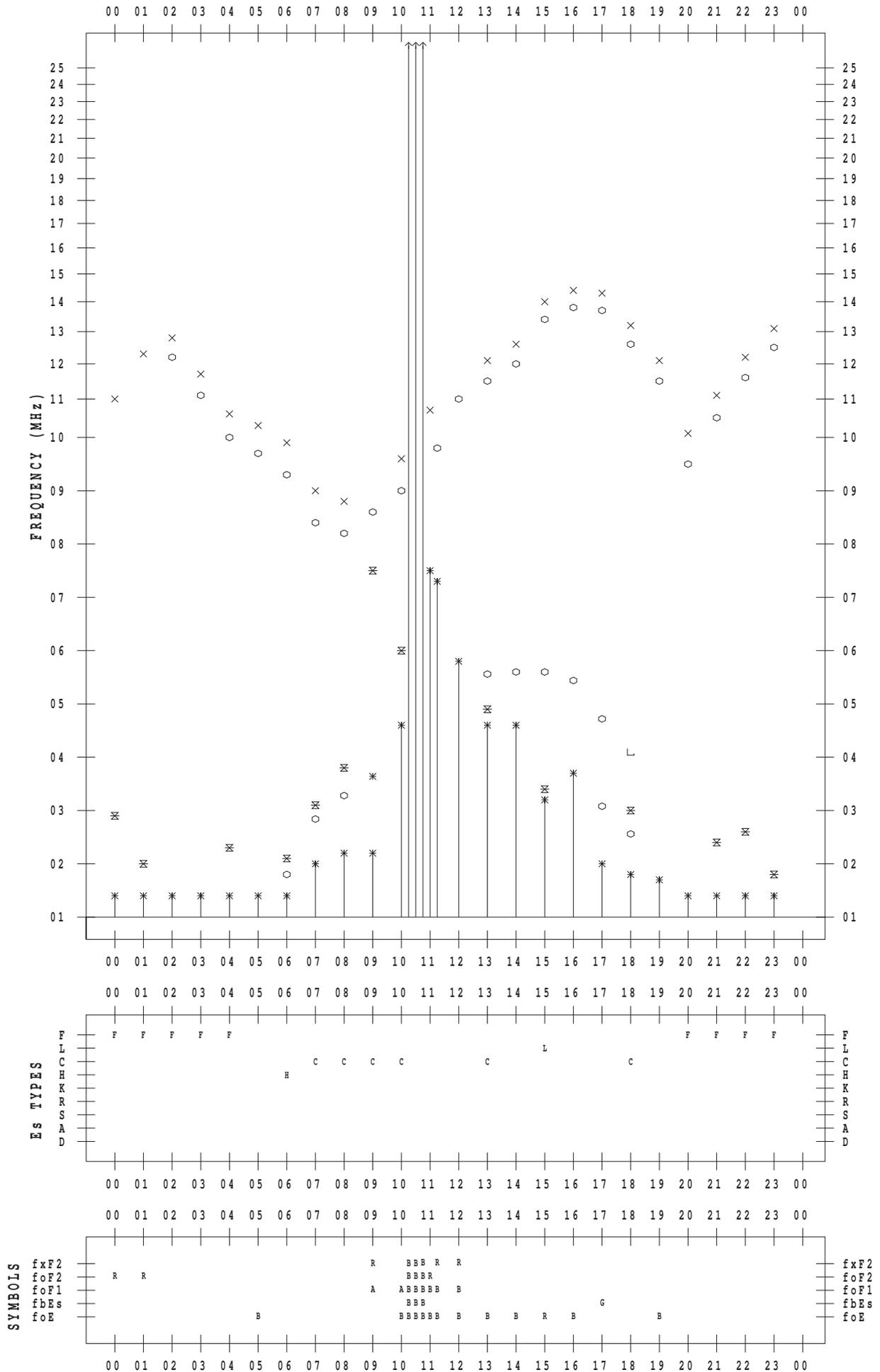
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/14

135 ° E MEAN TIME



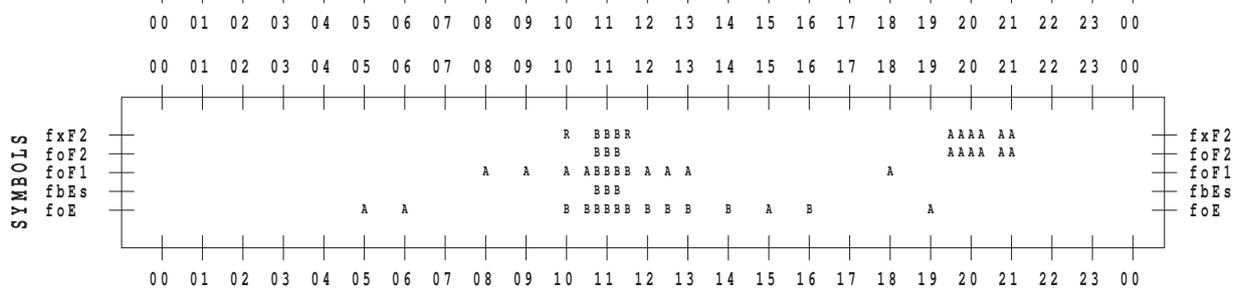
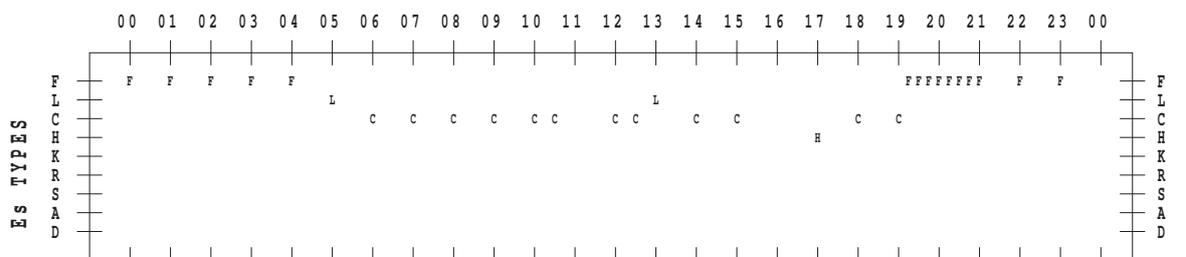
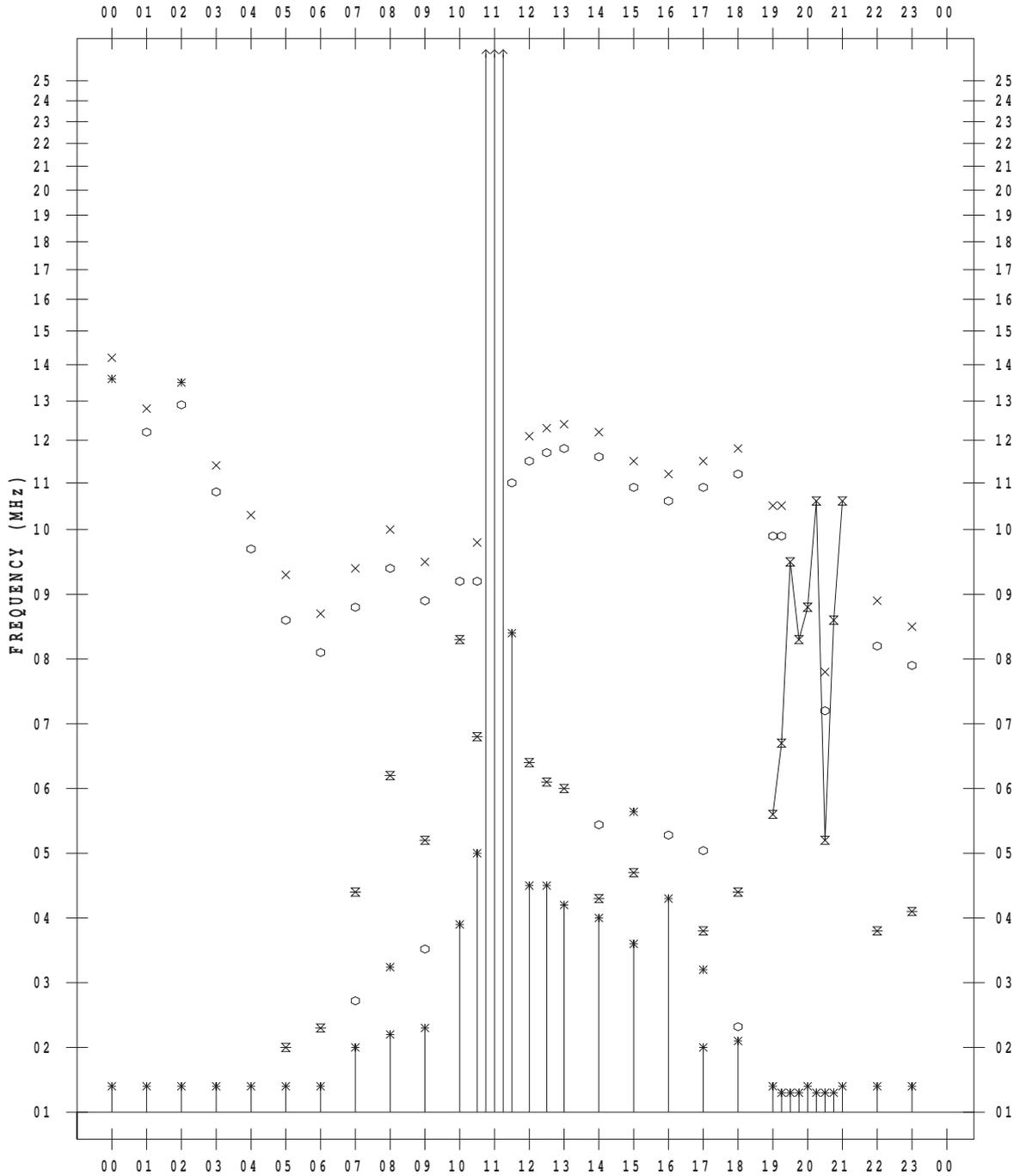
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/15

135 ° E MEAN TIME



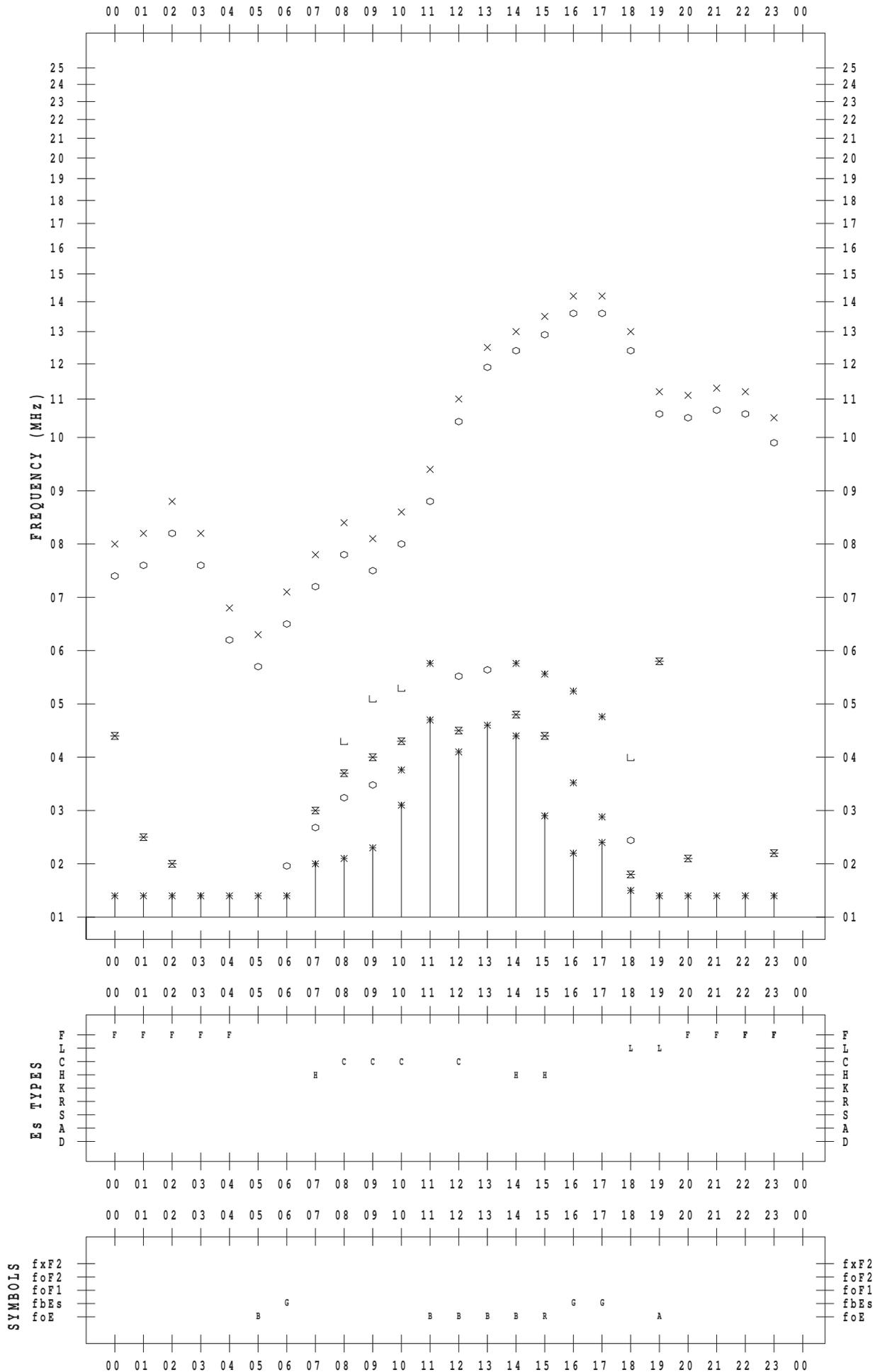
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STATION : Okinawa

DATE : 2013/ 5/16

135 ° E MEAN TIME



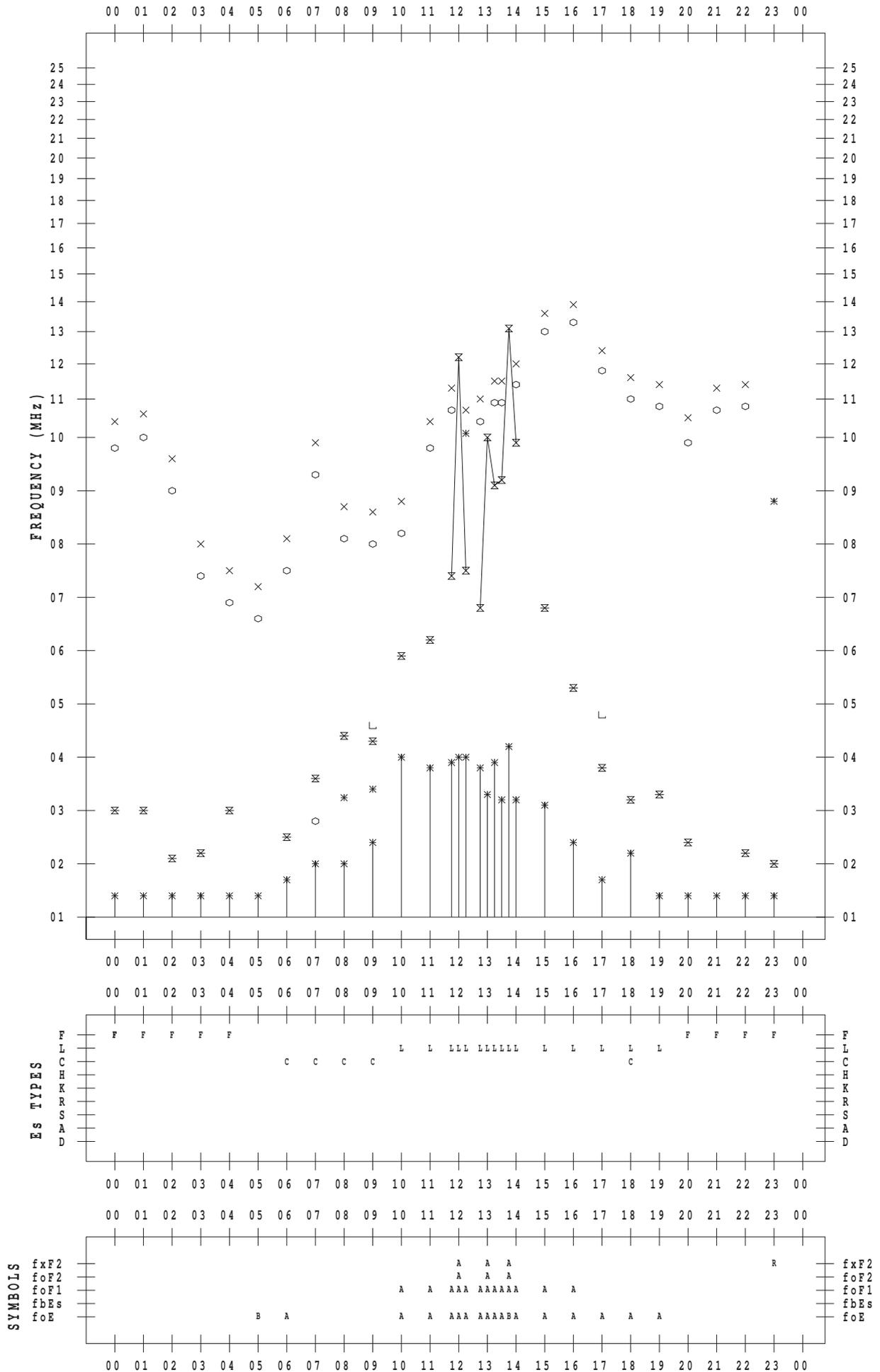
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STATION : Okinawa

DATE : 2013/ 5/17

135 ° E MEAN TIME



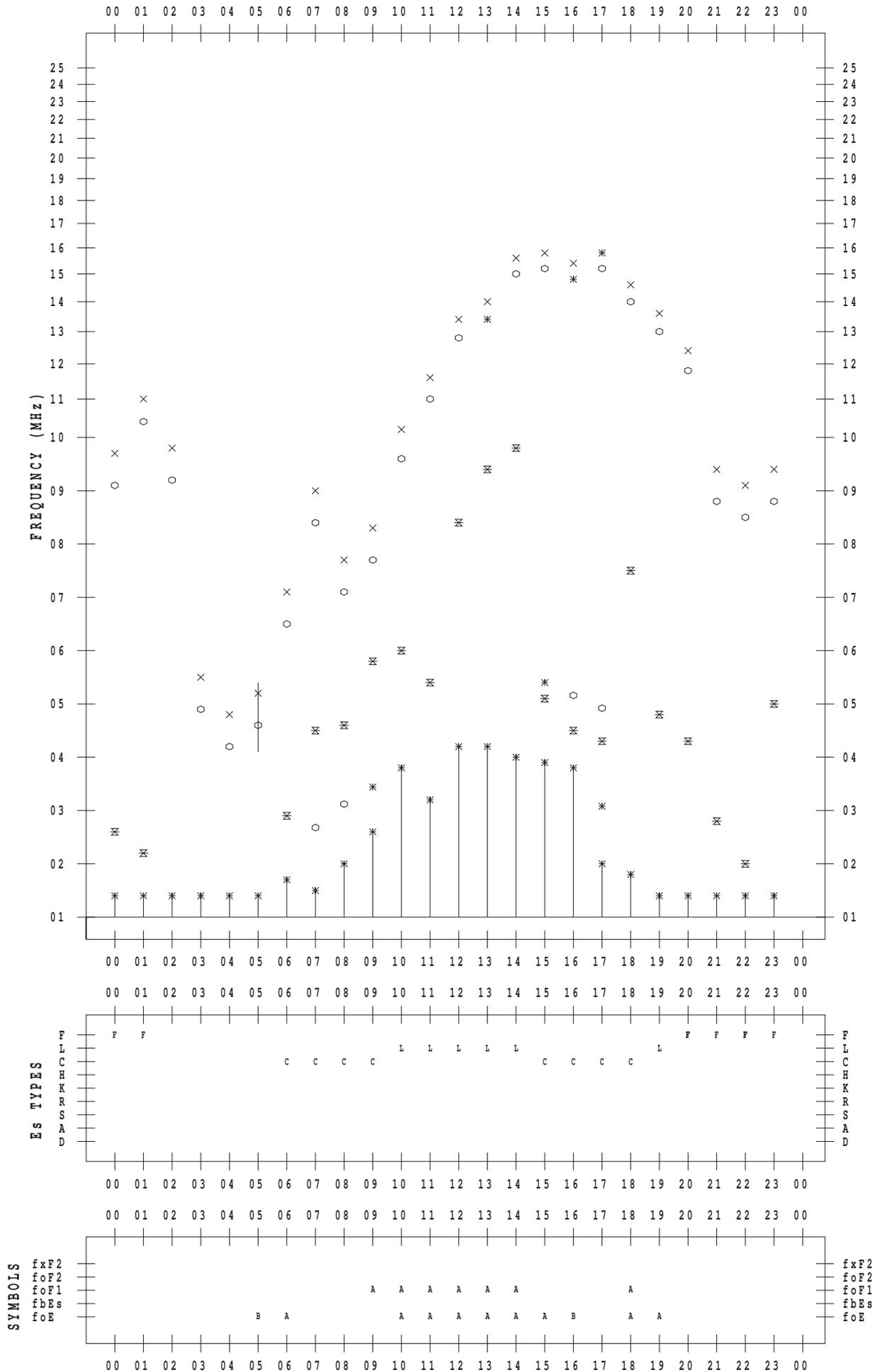
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STATION : Okinawa

DATE : 2013/ 5/18

135 ° E MEAN TIME



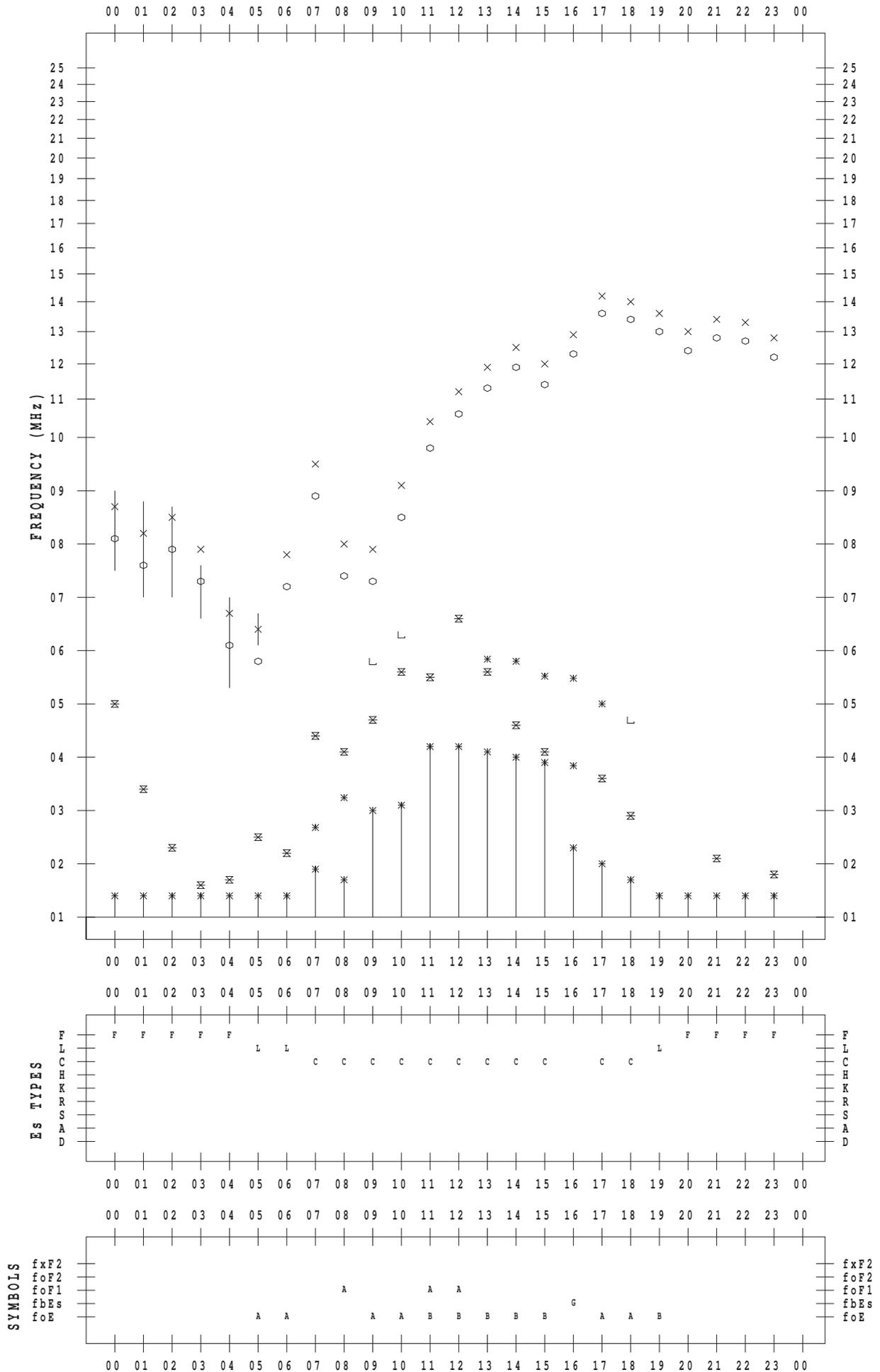
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/19

135 ° E MEAN TIME



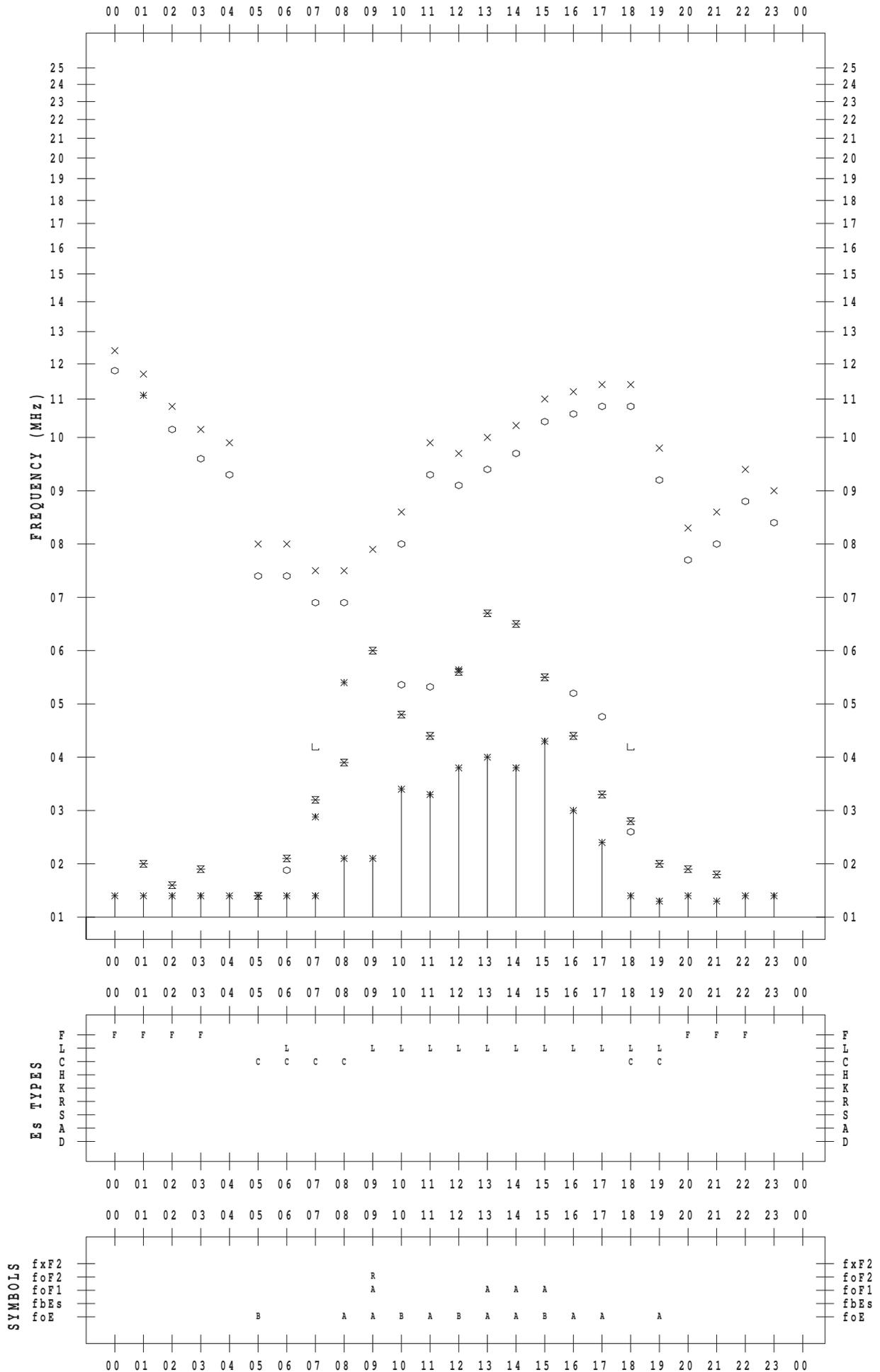
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STATION : Okinawa

DATE : 2013/ 5/20

135 ° E MEAN TIME



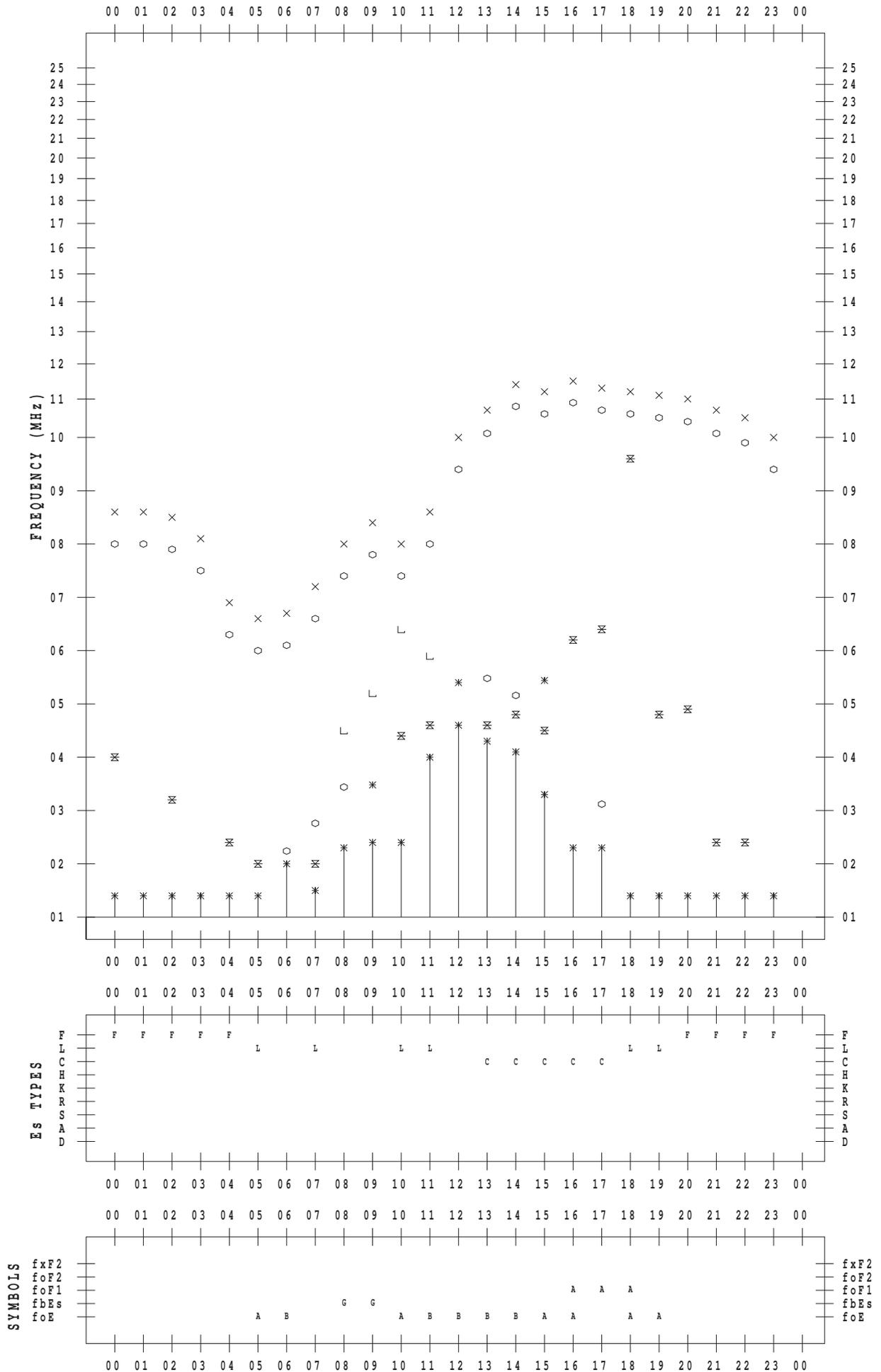
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/21

135 ° E MEAN TIME



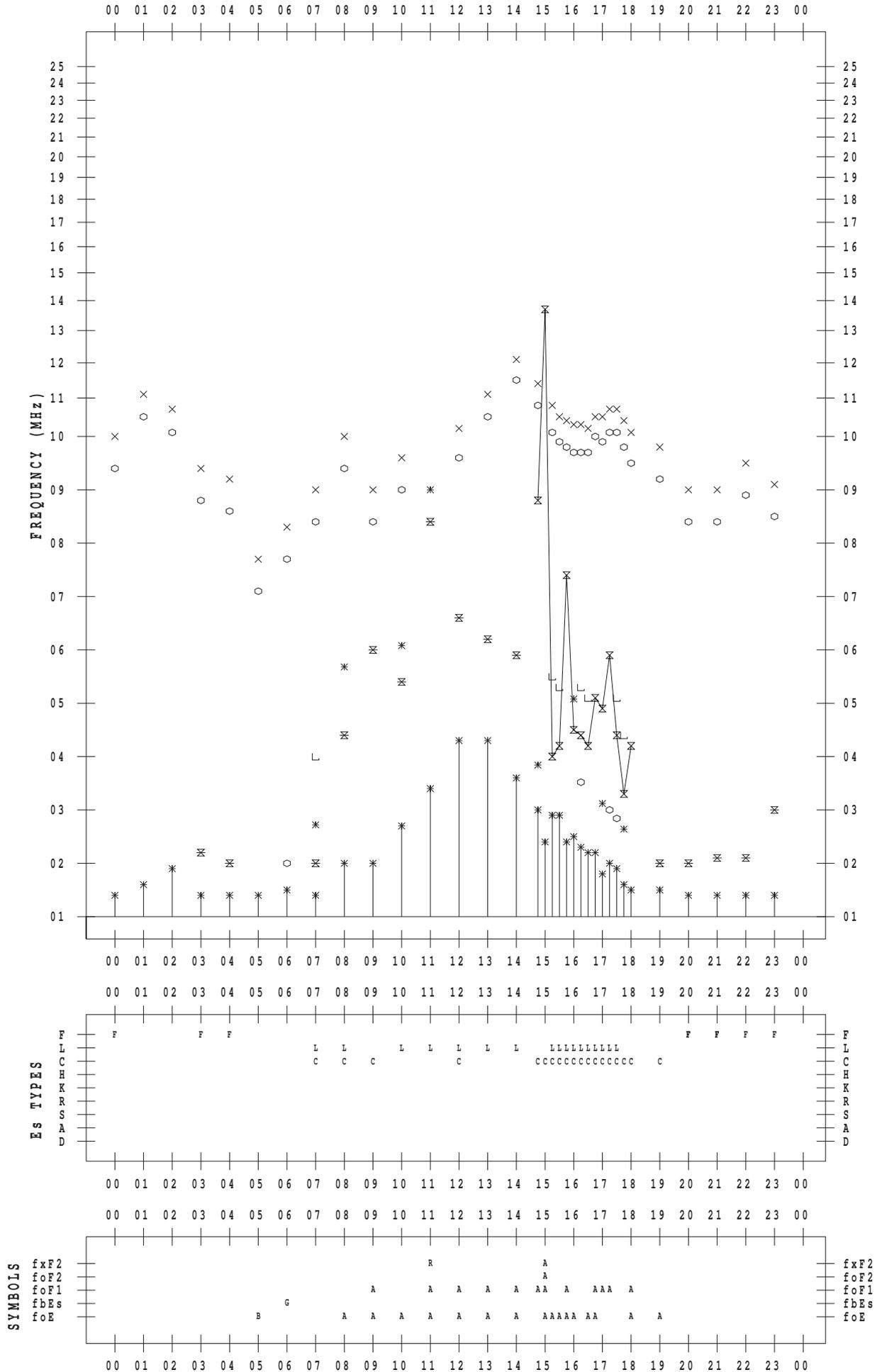
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013 / 5 / 22

135 ° E MEAN TIME



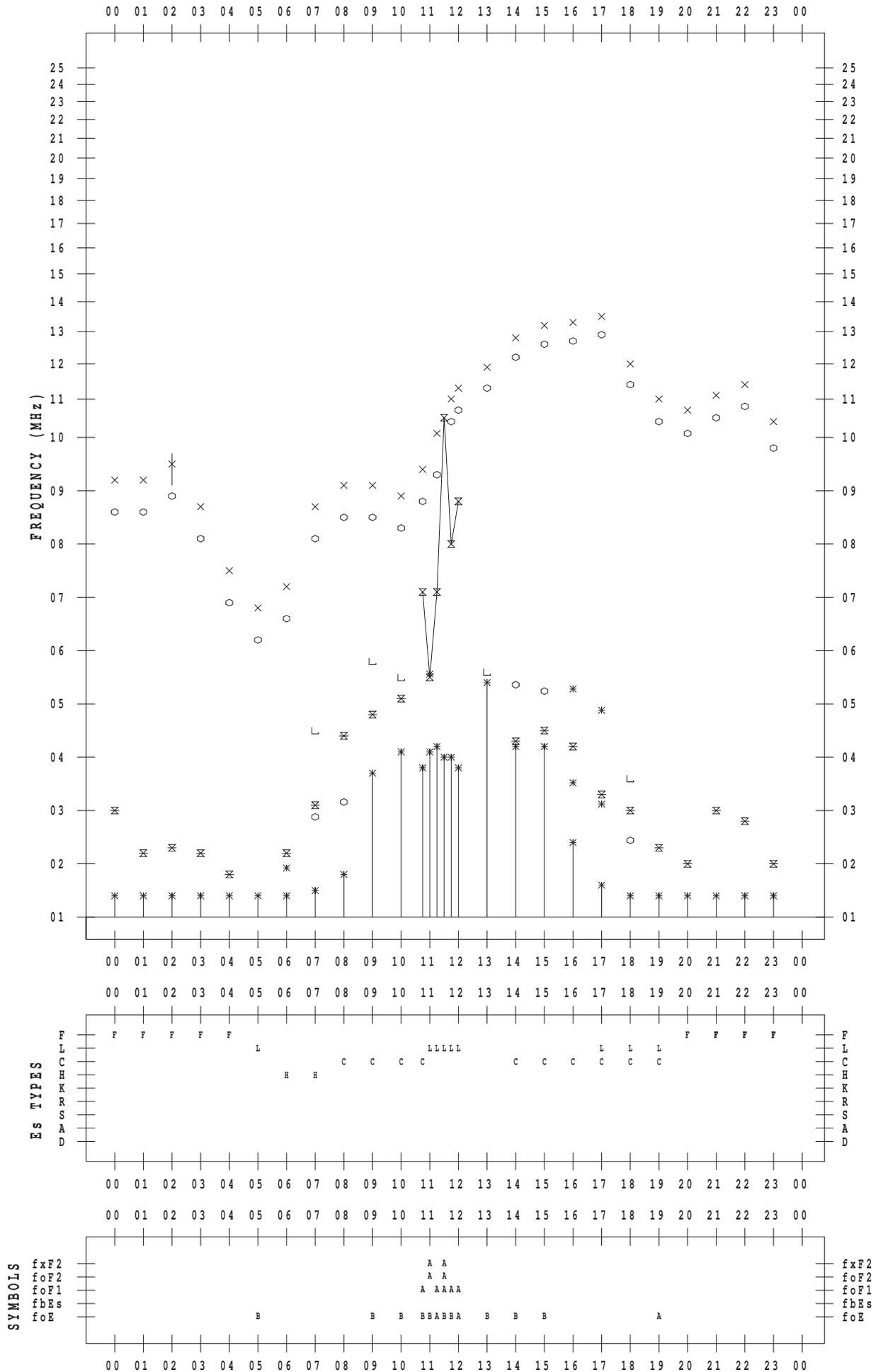
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DATE : 2013/ 5/23

135 ° E MEAN TIME



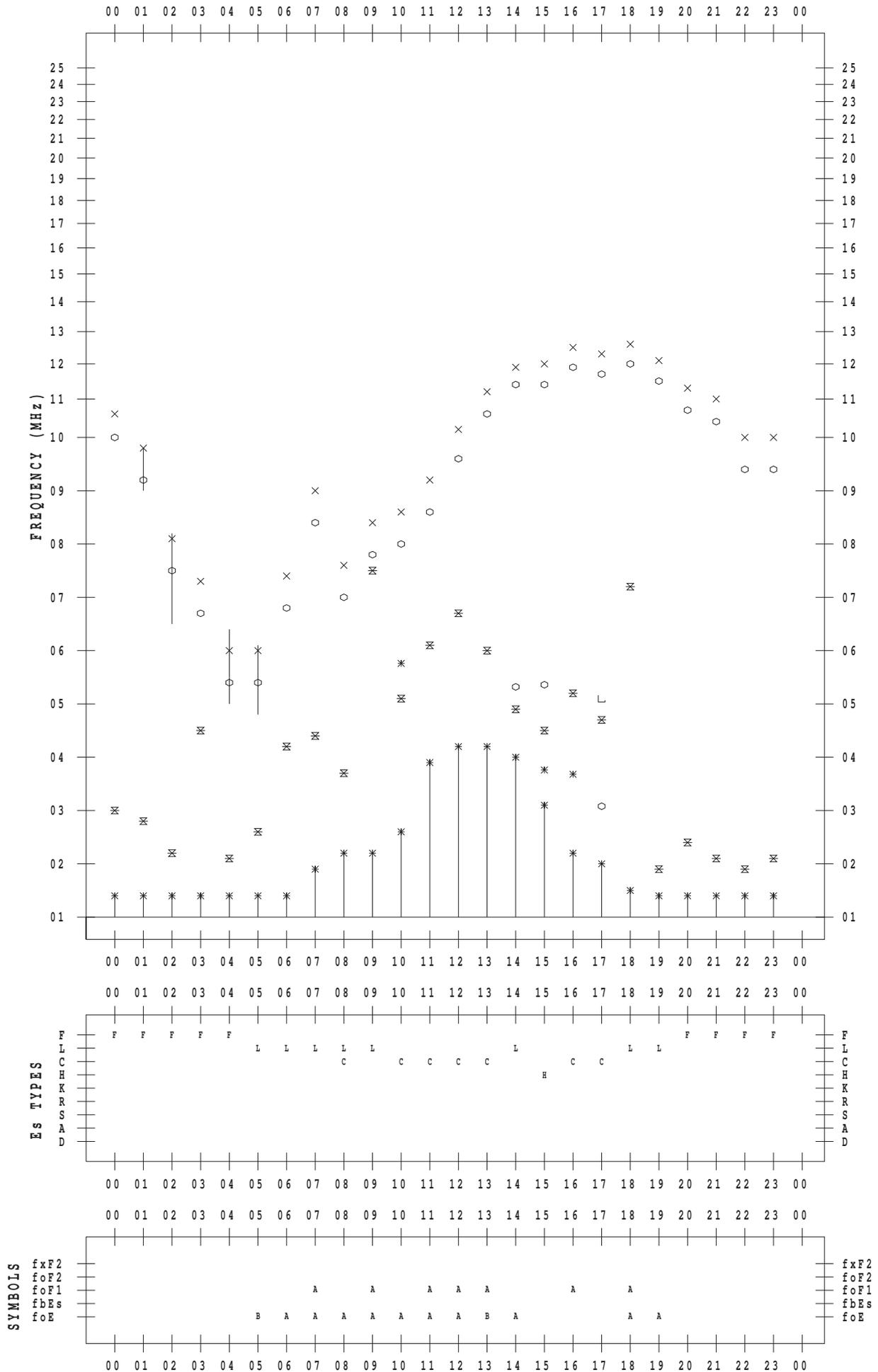
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/24

135 ° E MEAN TIME



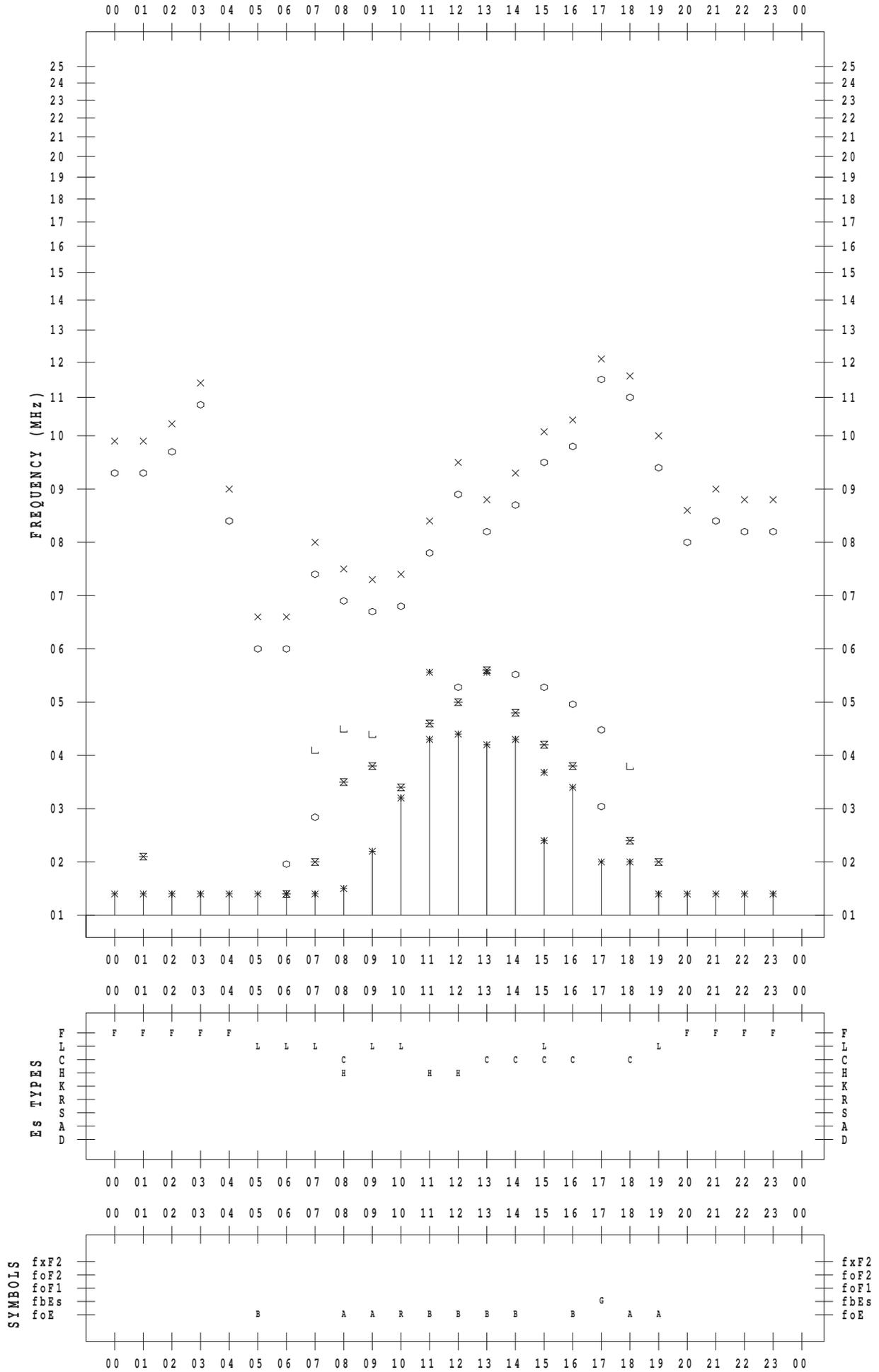
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/25

135 ° E MEAN TIME



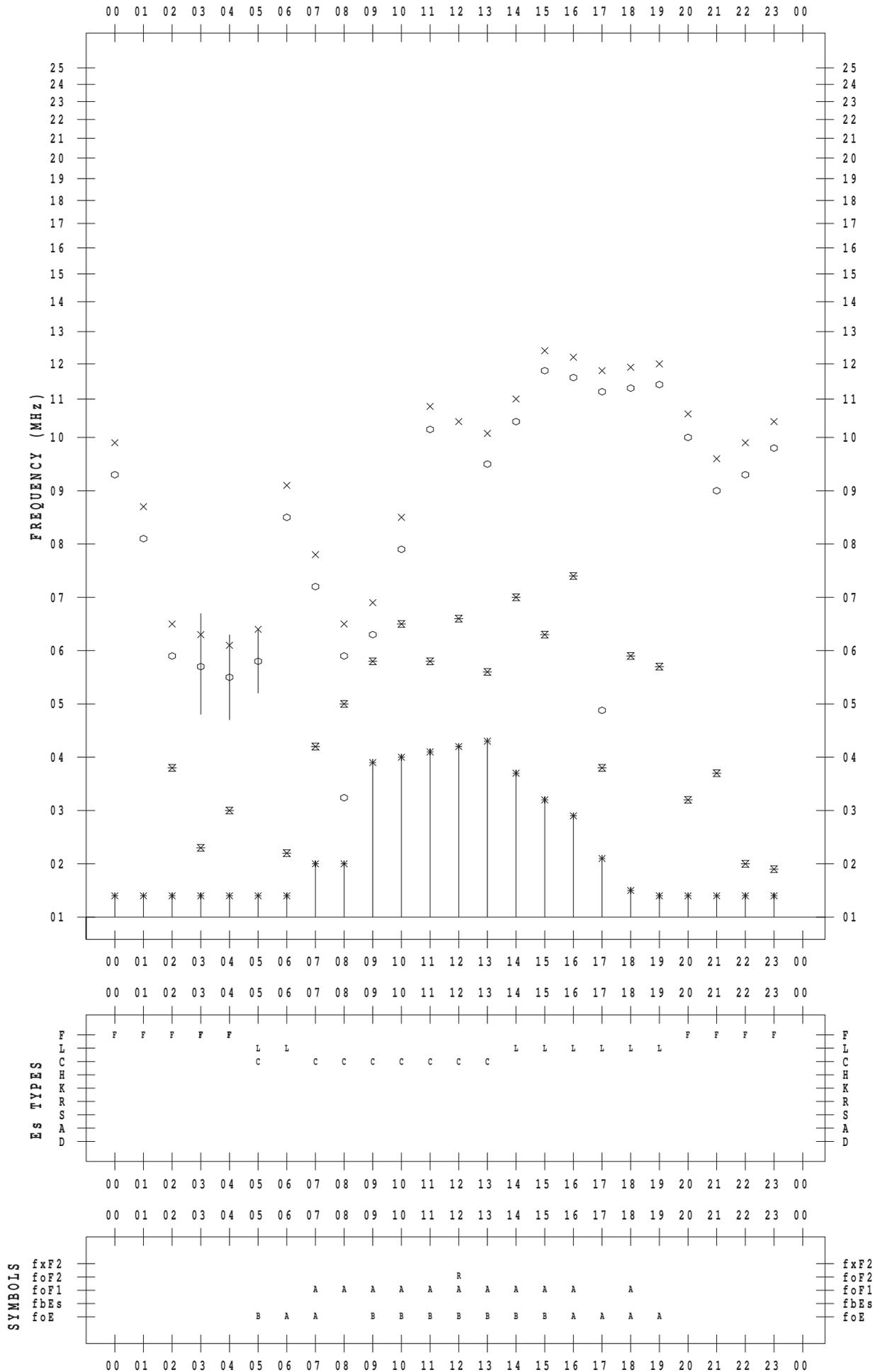
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STATION : Okinawa

DATE : 2013/ 5/26

135 ° E MEAN TIME



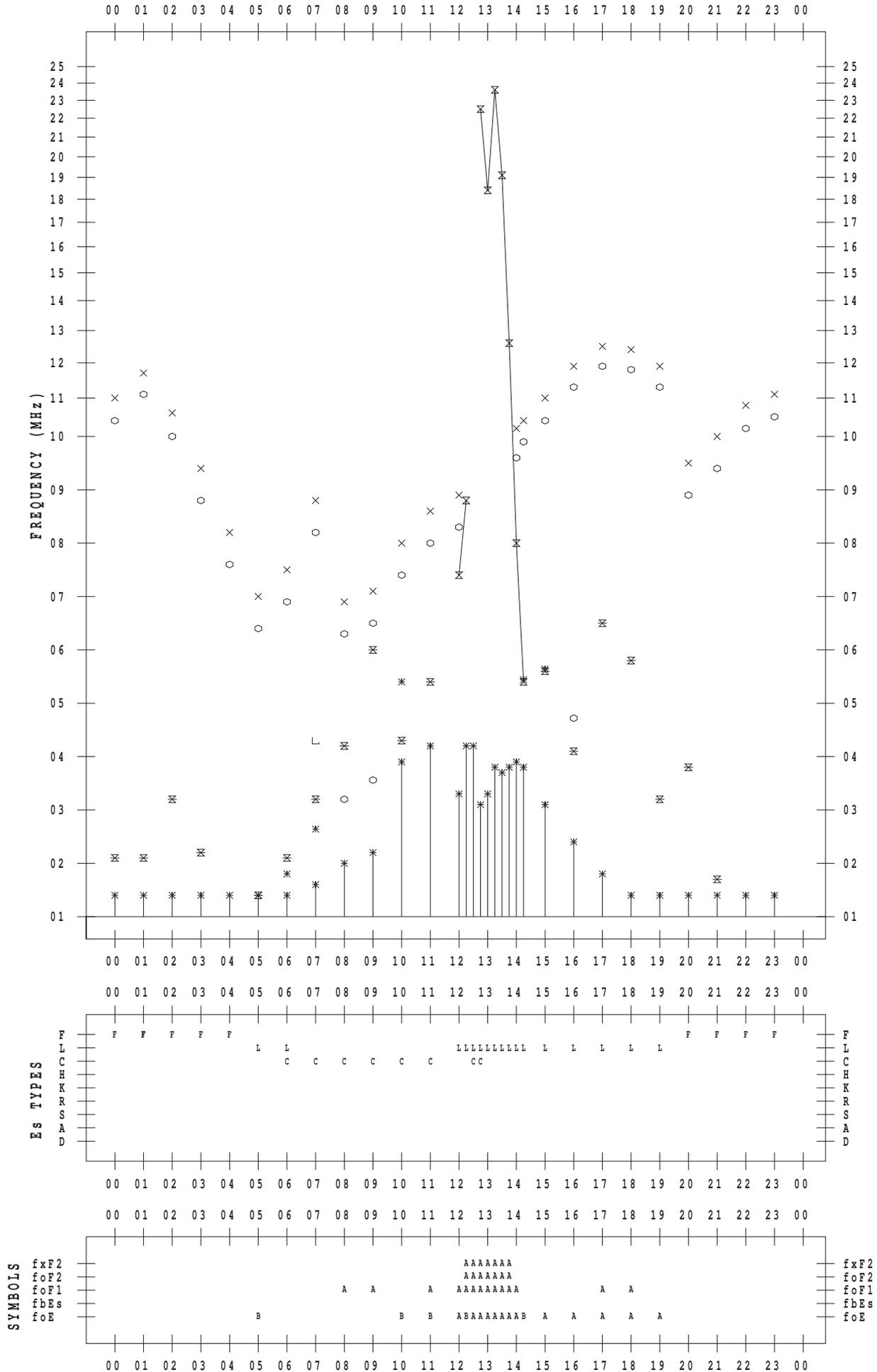
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STATION : Okinawa

DATE : 2013/ 5/27

135 ° E MEAN TIME



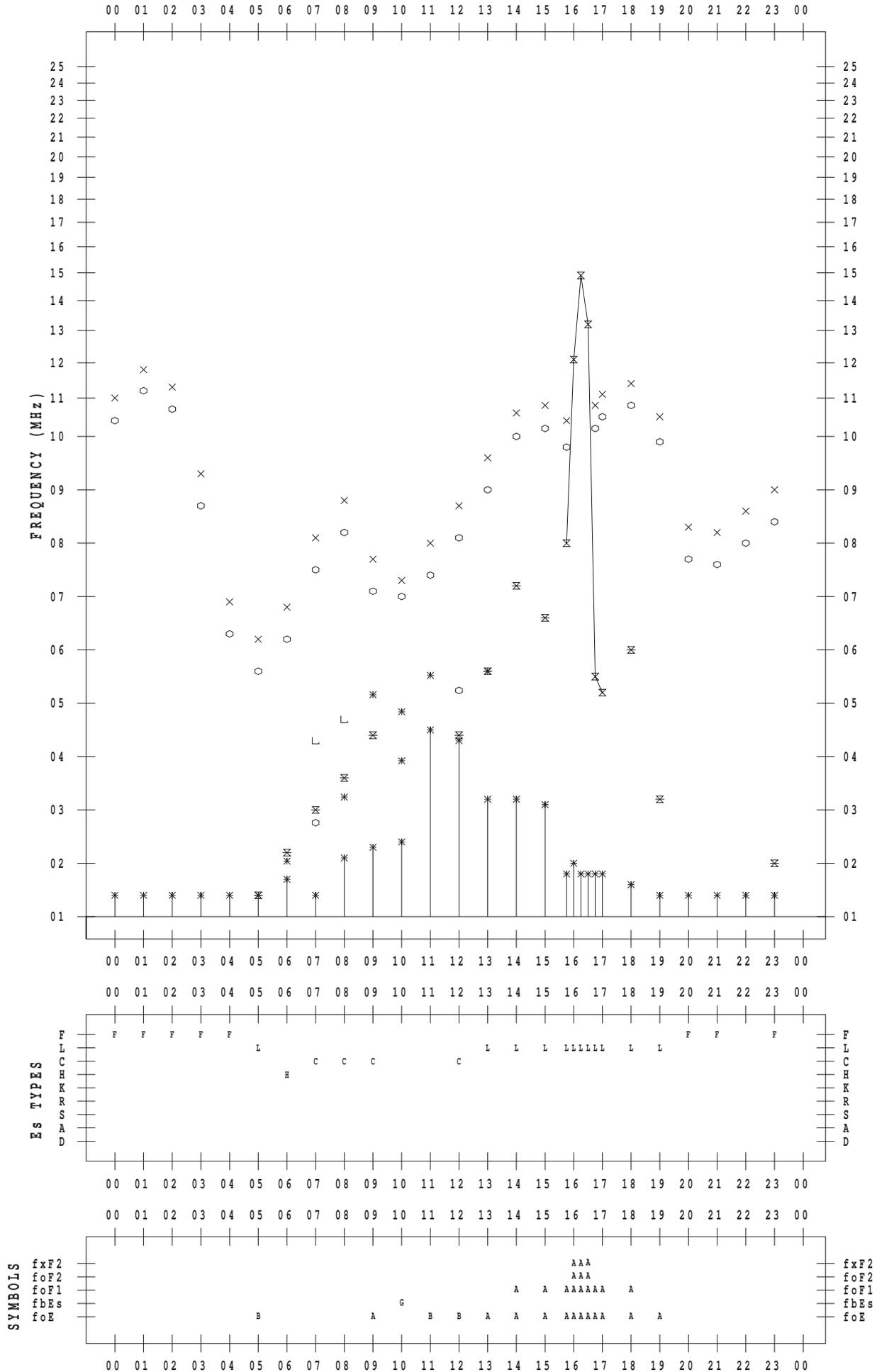
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SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/28

135 ° E MEAN TIME



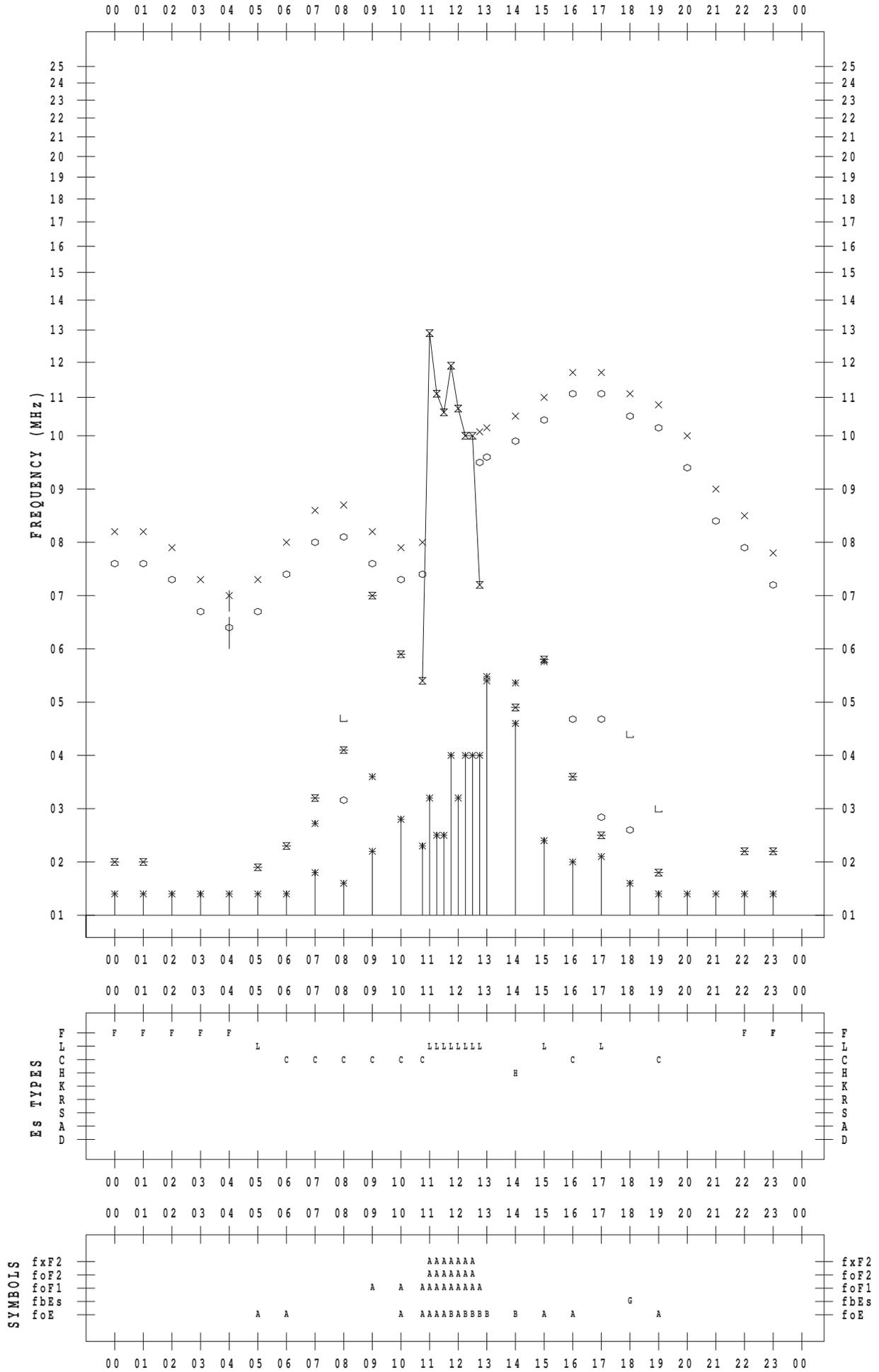
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/29

135 ° E MEAN TIME



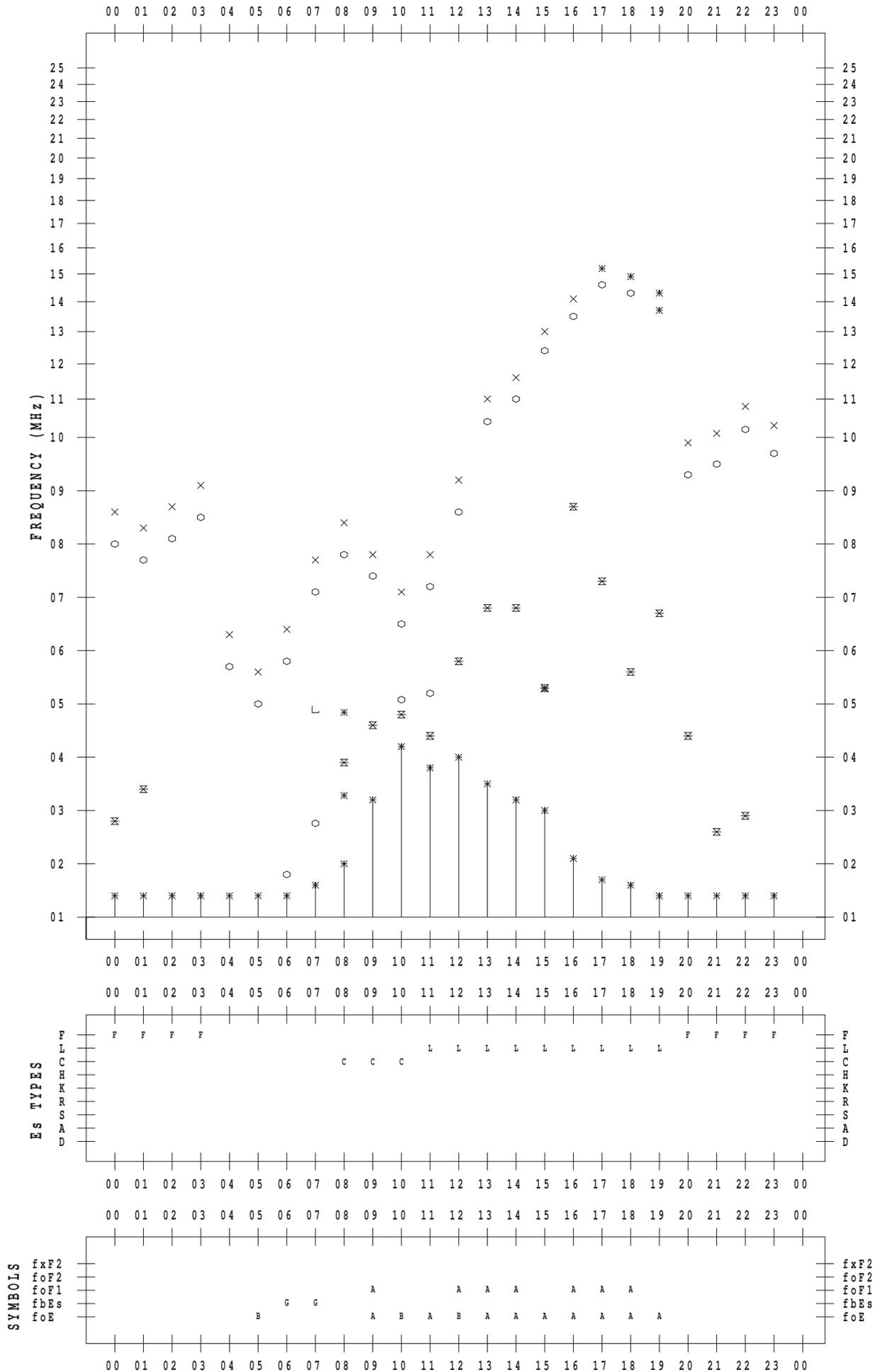
f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/30

135 ° E MEAN TIME



f-PLOT DATA

SCALER : I.YAMAZAKI

STATION : Okinawa

DATE : 2013/ 5/31

135 ° E MEAN TIME

