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IONOSPHERIC DATA IN JAPAN

FOR JULY 1949

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Prepared by THE ELECTRICAL COMMUNICATION LABORATORY

(Denki-Tushin Kenkyujo)

MINISTRY OF TELECOMMUNICATIONS

TOKYO, JAPAN

THE ELECTRICAL COMMUNICATION LABORATORY

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FOREWORD

Although we have had long period of experience on the ionospheric observations in Japan since 1931, it was unable to publish the results of the observations as restricted by the military officials of the past.

Japan is not allowed to become a member of the International Telecommunication Conference. However, in accordance with the Recommendation of C.C.I.R., we send our results of the ionospheric observations and on radio propagation to the main organizations concerned with radio propagation hereafter.

Symbols and presentation in this report were used in accordance with the Recommendation No. 6 of C.C.I.R. Stockholm 1948: Standardization of Symbols and presentation of Results of Ionospheric Soundings Annex 1-5.

We will be very much appreciated to receive the similar publications from the organizations concerned with radio propagation in the world.

June, 1949

Goro Yoshida, Dr. Eng.

Director of

The Electrical Communication Laboratory,

Ministry of Telecommunications,

Tokyo, Japan

SITE OF THE IONOSPHERIC STATIONS

Ionospheric observation is carried out at five stations in Japan.

The stations are situated as follows:

	longitude	latitude	site
Wakkanai	141° 41.1' E	45° 28.6' N	Wakkanai-machi, Soya-gun, Hokkaido
Fukaura	139° 54.1' E	40° 36.6' N	Fukaura-machi, Nishitugaru-gun, Aomori-ken
Shibata	139° 15.8' E	37° 57.0' N	Seiro-mura, Kitakanbara-gun, Niigata-ken
Kokubunji	139° 29.3' E	35° 42.4' N	Koganei-machi, Kitatama-gun, Tokyo-to
Yamagawa	130° 37.7' E	31° 12.5' N	Yamagawa-machi, Ibusuki-gun, Kagoshima-ken

REMARKS ON SYMBOLS

Except both $f_{\min} E$ and $f_{\min} F$, other symbols are used in accordance with recommendation of C.C.I.R. $f_{\min} E$ and $f_{\min} F$ in the table are defined as follows:

- Z_d . Half breadth of the layer, calculated by the method of Booker.
- $f_{\min} E$ Minimum frequency, on which echo reflected from E-layer begins to appear by use of the observation equipment on routine work.
- $f_{\min} F$ Minimum frequency, on which echo reflected from F-layer begins to appear by use of the observation equipment on routine work.

IONOSPHERIC DATA

Wakkanai

Lat. 45°23.6'N
Long. 141°41.1'E

ff₂

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	7.2 ^S	7.4 ^S	7.5	7.7	7.3	(7.7) ^S	8.0	8.7	9.8	(8.7) ^A	7.5	C	C	7.3	7.5	7.5	7.5	6.8	B	B	7.7	7.4 ^B	B	C	
2	S	7.9 ^J	6.7	7.0	S	S	A	6.3 ^N	9.0	9.0	8.6	8.4	7.9 ^J	(8.0) ^T	8.0 ^J	7.7 ^J	7.7 ^J	(7.3) ^T	6.9	7.1 ^P	T	FT	8.4	T	
3	6.9 ^H	6.7	(7.0) ^F	7.2 ^F	(6.4) ^F	C	C	C	C	C	C	C	C	C	C	C	C	C	(7.5) ^T	T	A	8.6	8.7	8.5	
4	8.7	8.4	T	T	7.5	7.6	9.2	8.9	9.6	(9.1) ^T	8.5 ^J	8.3 ^J	8.4	8.6 ^J	8.5	(8.5) ^S	8.5	C	T	T	B	C	N	T	
5	8.0	(7.8) ^T	7.6	6.9	(7.5) ^S	8.9	8.7	8.4	8.5	8.4	6.4	(7.2) ^A	8.0 ^J	8.2 ^J	8.0 ^J	8.1 ^J	8.1 ^J	A	A	A	A	C	A	(7.5) ^T	
6	7.6	7.2	6.7	6.9	7.3 ^F	7.9	8.6	8.9	8.8	T	T	8.3 ^F	A	A	A	7.6	A	T	(6.9) ^P	7.1 ^P	(7.7) ^C	8.3 ^J	6.7 ^F	FT	
7	T	T	7.3	(7.4) ^C	(7.5) ^S	(8.3) ^S	9.0 ^P	S	A	8.7	8.3 ^J	8.1 ^J	7.4	7.5	8.0 ^J	8.5 ^J	8.4 ^J	8.9	8.6 ^J	8.9	9.1 ^S	(8.5) ^T	7.9 ^J	8.2	
8	(8.1) ^T	8.0	T	T	7.0	7.3	8.7	T	AT	AT	A	T	7.0	(7.0) ^A	6.9	6.8	6.6	6.6	7.1	AS	7.5	7.5	7.5	7.4	
9	7.2	6.4	6.3	5.4	6.2	6.2	8.0	C	C	A	AT	T	7.2	6.0	6.0	6.4	AT	A	A	A	A	S	S	7.7	
10	6.6 ^J	5.9 ^K	6.0 ^K	5.8 ^K	5.4 ^K	(6.0) ^S	6.5 ^K	5.6 ^K	5.8 ^K	AT ^K	AK	6.1 ^K	6.2 ^K	5.8 ^K	5.8 ^K	6.3 ^S	T	T	T	AT	ST	FT	FT	T	
11	6.7	6.3	6.0	5.7	5.5	6.8	(8.4) ^T	9.0	C	B	B	6.3	6.4	B	B	6.4	6.1	6.4	6.4	T	T	T	T	7.0	
12	6.5	6.4	6.2	5.5	5.8	5.9	(7.7) ^T	9.4	9.7	A	(9.0) ^T	(8.3) ^T	T	T	C	T	(6.9) ^T	6.3 ^F	6.6	7.5	S	S	7.2	6.9	
13	6.7	6.5	6.4 ^H	6.5 ^H	6.5	7.1 ^J	7.4 ^J	B	10.4 ^J	(10.1) ^C	9.7 ^B	8.9	T	6.9 ^J	7.4	7.2	6.6	7.6	7.2	7.3	7.5	6.0	4.7	5.6 ^H	
14	5.8 ^H	5.4	5.6	5.8 ^F	(6.1) ^F	6.3 ^F	6.3 ^F	6.4	A	A	A	S	S	S	5.2	5.2 ^C	T	AF	T	T	T	T	T	6.6 ^F	5.8
15	5.5 ^F	T	5.1 ^F	5.1 ^F	4.9 ^F	5.4 ^F	7.5	7.5	7.4	6.3	T	T	A	A	6.7	(6.8) ^B	6.9 ^J	6.5	7.4 ^S	6.2	6.5	6.8	6.6	6.8	
16	6.5	6.4	6.2	6.3 ^F	5.9 ^F	6.3 ^F	7.1	6.9 ^J	7.0	7.1	6.5	6.0	6.5	7.0	7.3	(7.2) ^B	7.0	A	A	A	8.3	8.2	7.8	7.3	
17	6.9	6.8	6.0	6.1	6.0	6.7	6.1	C	C	C	C	C	C	C	C	C	6.5	6.6	6.6	6.4	(6.8) ^B	7.1 ^P	B	B	
18	6.3	7.1	6.5	5.8	6.3	7.1	7.0	6.8	6.5	(6.4) ^A	A	A	7.6 ^J	6.6	6.9	6.4	5.9 ^J	6.0	6.1	6.3	6.7	(6.7) ^S	6.7 ^J	6.4	
19	6.6	6.1	6.1	6.2	6.5 ^F	7.1	7.0	7.9 ^P	6.5 ^F	6.2	6.3	6.3 ^J	6.0	(6.0) ^J	(6.0) ^J	(6.7) ^P	6.6	6.5	6.5	6.8	7.3	B	6.3	6.7	
20	6.5	6.1	6.2	6.2	6.1	6.4	6.0	6.3	5.9	5.7 ^F	6.0	6.4	6.5	6.5	AF	6.1	A	A	A	A	C	C	A	7.5	
21	6.5 ^F	6.5 ^F	6.5 ^F	6.6 ^F	6.4 ^F	5.9	7.2	(6.9) ^A	6.6	A	A	A	7.3	6.9	(7.0) ^C	7.0	6.6	7.0	A	A	A	A	A	A	7.5
22	7.2	7.2	7.2	6.1 ^J	6.3 ^J	6.8	T	T	A	A	T	T	A	T	T	T	T	T	C	A	A	A	A	A	7.5
23	6.5 ^F	6.5 ^F	(6.3) ^B	6.5 ^F	6.1 ^F	6.3	7.3	A	A	A	A	T	7.4	8.2 ^J	7.9 ^J	7.1	7.3	6.5	(6.7) ^A	6.9	(6.8) ^T	6.7	7.0	7.0	
24	6.4	6.5 ^F	6.1 ^F	5.9 ^F	4.7	(6.2) ^C	7.6	T	7.7 ^J	T	7.1	(6.8) ^F	6.4 ^S	(6.8) ^C	7.2	T	7.0 ^T	7.6 ^T	7.2	7.3	7.3	7.2	7.4	7.4	
25	7.0	6.8	6.5 ^F	6.5 ^F	6.2 ^F	6.4 ^F	A	A	6.9	A	T	7.0	A	B	7.9 ^J	8.0 ^J	B	7.7 ^T	T	T	T	T	T	B	
26	C	6.6	6.8	5.5	6.8	B	8.9 ^J	A	(9.6) ^J	8.8	B	A	7.2	7.2 ^J	7.2	7.3 ^J	A	T	TS	T	T	T	TF	F	
27	7.0	6.6	6.6 ^F	6.4 ^F	6.0 ^F	6.7	8.1 ^J	8.3 ^J	A	TS	T	T	T	T	T	T	7.9 ^J	7.9 ^J	6.8	6.8	7.0	6.9	6.8	7.4 ^F	
28	7.4	6.9	7.5 ^P	6.8	6.1	6.6	6.9	8.0 ^J	7.5 ^J	7.6 ^T	7.4 ^T	T	T	8.5	7.3	(7.4) ^T	7.4	7.4	T	7.2 ^T	(7.3) ^T	7.3	7.3	7.4	
29	7.3 ^F	TF	TF	TF	(7.4) ^F	8.6	8.3 ^J	7.9 ^J	T	7.7 ^J	C	TS	7.4	8.4 ^J	8.0 ^J	8.4 ^J	7.6 ^J	7.8	8.0 ^J	8.4 ^J	9.2	8.4 ^J	9.2	7.7 ^F	8.2
30	(7.5) ^J	7.0 ^F	6.9	6.6 ^F	6.7 ^F	6.6 ^F	7.6 ^F	6.8	(7.2) ^F	T	A	T	T	T	T	T	8.7 ^J	T	(7.8) ^T	T	TF	TF	(7.7) ^T	(7.3) ^T	
31	6.9 ^F	6.7 ^F	6.9 ^F	6.9	6.4 ^F	(6.8) ^B	7.1	7.3	6.5	6.9	6.8	C	T	7.1	(7.3) ^J	7.0	7.0	6.8	7.7 ^F	7.4	7.0 ^F	6.9	TF	TF	
Median Value	6.9	6.6	6.5	6.4	6.3	6.7	7.6	7.9	7.4	8.0	7.5	7.0	7.2	7.1	7.3	7.2	7.0	6.9	7.0	7.1	7.3	7.3	7.4	7.3	7.4
Count	28	27	28	28	30	27	27	19	21	14	14	13	16	20	22	24	21	18	18	15	16	16	19	21	

W * 1

Sweep 1.0 Mc to 17.0 Mc in 1.5 min

Manned

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IONOSPHERIC DATA

hp F₂

Wakkanai

Lat 45°23.6'N
Long 141°41.1'E

155°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	450 ^S [390] ^S	330	430	330	350	380	380	360	[390] ^A	410	C	C	400	440	400	460	A	B	B	B	300	B	B	B	C
2	S	310 ^T	340	330	S	A	280 ^A	420	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
3	400 ^H	420	[400] ^F	370	340 ^F	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	(500) ^F	A	T	T	T
4	T	T	T	T	T	T	440	430	390	470	T	T	480 ^T	T	T	T	B	C	C	T	B	C	N	T	T
5	400	[400] ^T	390	360	(350) ^S	360	[340] ^P	320	(380) ^B	[410] ^T	A	A	(430) ^T	410 ^T	[440] ^T	460 ^T	350 ^T	A	A	A	A	A	A	300	T
6	410	430	B	B	410	330	420	(400) ^B	T	T	T	T	360 ^T	A	A	B	A	T	(340) ^P	330 ^P	C	T	T	330 ^F	FT
7	T	T	360	[360] ^F	(360) ^F	[370] ^S	410 ^F	S	A	T	390 ^T	500 ^T	360	(410) ^B	380 ^T	390 ^T	T	S	T	400	T	T	400 ^T	360	
8	T	340	T	T	430	T	T	T	A	T	A	T	420	AT	300	300	320	390	360	AS	A	A	410 ^S	400	
9	400	310	B	350	350	320	300	C	C	A	AT	T	B	B	320	300	AT	A	A	A	A	A	400	430	
10	370 ^T	[400] ^K	420 ^K	320 ^K	450 ^K	[430] ^K	400 ^K	400 ^K	500 ^K	AT ^K	AT ^K	A ^K	390 ^K	B ^K	B ^K	400 ^T	T	T	T	A	ST	FT	FT	430	
11	250	310	320	340	340	340	T	T	C	B	B	B	380	B	B	350	B	310	B	T	T	T	T	320	
12	350	350	430	400	450	480	T	(400) ^B	T	A	I	T	T	C	T	T	(300) ^T	BF	(320) ^B	360	S	S	330	350	
13	380	390	390 ^H	400	380	310 ^T	400 ^T	B	420 ^T	[400] ^C	370 ^B	T	T	390 ^T	390	400	380	T	300	360	T	380	410	300	
14	420	440 ^B	440	420 ^F	BF	B	B	420	A	A	S	S	S	G	G	G	T	AT	T	T	T	T	T	400	
15	F	T	B	430 ^F	440 ^F	440 ^F	420	400	410	A	T	T	A	A	A	300	450 ^T	A	A	(320) ^S	320	410	380	420	440
16	430	420	360	360 ^F	380 ^F	350 ^F	350	330 ^T	390	330	380	[390] ^S	400	400	400	B	360	A	A	A	A	380	390	360	
17	(410) ^B	380	410	410	440	420	400	C	C	S	C	C	C	C	C	C	320	330	310	(400) ^B	400 ^B	400 ^P	400	380	
18	420	410	420	460	(420) ^B	430	(470) ^B	420	B	A	A	A	400 ^T	B	B	390	380 ^T	390	370	440	410	[410] ^S	410 ^T	440	
19	430	430	450	430 ^F	400 ^F	T	T	310 ^F	350 ^F	340	A	A	A	(480) ^T	(510) ^T	470 ^P	(410) ^B	350	300	410	300	B	470	T	
20	T	500	410	440	410	480	[470] ^B	450	T	T	T	T	T	T	380	A	A	A	A	A	C	C	A	430	
21	(410) ^B	410 ^F	430 ^F	370 ^F	390 ^F	340	350	(370) ^A	390	A	A	400	410	500	[460] ^F	420	470	A	A	A	A	A	A	A	430
22	470	[450] ^A	420	480 ^T	340 ^T	310	T	T	T	A	T	T	T	A	T	T	T	T	T	C	A	A	AF	AF	
23	AF	370 ^F	[350] ^A	330 ^F	(370) ^F	T	360	A	A	A	A	A	A	400	(410) ^T	(400) ^T	360	310	300	[320] ^A	340	[360] ^T	370	350	
24	340	340 ^F	380 ^F	350 ^F	390	[400] ^C	400	T	360 ^T	T	330	C	S	(310) ^T	[320] ^T	350 ^T	350 ^T	350 ^T	320	300	320	330	390	390	
25	410	370	390 ^F	370 ^F	360 ^F	340 ^F	A	A	350	A	T	380	A	B	410 ^T	390 ^T	B	340 ^F	T	T	T	T	T	B	
26	C	300	300	290	380	B	320 ^T	(300) ^B	(280) ^B	370 ^B	B	A	390	340 ^T	320	360 ^T	A	T	TS	T	T	T	T	F	
27	340	350	320 ^F	410 ^F	370 ^F	310	380 ^T	JB	A	TS	T	T	T	T	T	T	T	B	320	330	320	350	360	410 ^F	
28	340	350	420 ^T	380	410	310	350	330 ^T	430 ^T	400 ^T	390 ^T	T	T	410 ^B	410	T	T	T	T	350 ^T	[370] ^T	380	T	T	
29	400 ^F	FT	FT	FT	FT	(320) ^T	380	340 ^T	390 ^T	T	370 ^T	C	ST	380	(330) ^B	420 ^T	340 ^T	300 ^T	310	370 ^T	390 ^T	[350] ^B	360		
30	BF	370 ^F	380	400 ^T	370 ^F	340 ^F	B	360	(400) ^F	T	A	T	T	T	T	T	360 ^T	I	B	T	FT	FT	420 ^F	[370] ^T	
31	(360) ^F	[370] ^F	390 ^F	360	350 ^F	(330) ^B	310	370	400	390	370	C	T	400	(350) ^T	330	340	340	370 ^F	330	380 ^T	370	FT	FT	
Month Value	400	390	370	380	340	380	380	380	390	(390)	(380)	(390)	400	400	400	400	370	340	340	320	330	380	380	370	400
Count	22	26	25	27	29	24	21	18	16	8	8	5	10	13	18	18	17	10	15	13	13	12	15	16	

Sweep 1.0 Mc to 17.0 Mc in 15 min

Manual

W 2

5

IONOSPHERIC DATA

Wakkanai
 Lat. 45°23.6'N
 Long. 141°41'E

h_p

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	380	320	270	310	290	280	310	320	330	(370) ^A	400	400	(400) ^A	400	420	400	430	400	320	380	250	(310) ^N	300	(300) ^C	
2	300	250	250	260 ^N	250	270	390	(340) ^A	280	390	370	400	350	410	400	400	380	350	270	280	(270)	(330) ^A	380 ^A	300	350
3	300 ^H	320	320	250	290	C	C	C	C	C	C	C	C	C	C	C	C	C	300	270	260	(280) ^F	300	280	
4	310	320	290	320	370	340	400	400	310	350	(350) ^A	410	400	320	320	400	370	(340) ^F	300	260	260	A	240	(250) ^T	
5	340	(310) ^T	280	300	290	300	280	300	360	410	410	(400) ^A	390	400	(400) ^A	400	310	330	A	A	A	A	240	(250) ^T	
6	250 ^A	280	300	290	290	310	380	380	390	450	330	400	320	350	(340) ^A	320	(340) ^A	(350) ^B	320	290	(290) ^A	280	(290) ^A	(290) ^A	
7	AF	AF	(300) ^A	(290) ^F	280	290	280	(230) ^A	260 ^A	330	340	(300) ^A	350	400	330	300	(310) ^A	(310) ^A	320 ^A	310	(350) ^A	(380) ^A	240	260 ^F	
8	250 ^A	300 ^A	310 ^A	290 ^A	350	(260) ^A	(250) ^A	300	(320) ^A	(280) ^A	(240) ^A	(300) ^A	320	(310) ^A	300	300	300	390	270 ^A	280 ^A	(330) ^A	(360) ^A	280	320	
9	280	290	300	310	270	260	260	400 ^K	400 ^K	A	(450) ^A	400	390	300	320	300	A	A	A	A	A	A	370 ^A	290	310
10	310	310 ^K	280 ^K	200 ^K	300 ^K	(350) ^K	400 ^K	400 ^K	500 ^K	(450) ^K	(400) ^K	(400) ^K	390 ^K	380 ^K	450 ^K	360 ^K	250	(280) ^K	A	A	(200) ^A	200	200 ^F	200 ^F	
11	200	240	240	250	280	300	310 ^A	300 ^A	(310) ^C	320	350	370	380	380	380	350	370 ^T	310 ^T	260	240	210 ^A	(210) ^A	210	250	
12	300 ^A	250	310	310	350	(400) ^T	350 ^A	310	400	(360) ^A	310	350 ^T	340	330	C	T	300	(340) ^B	300	300	260	260	280	270	
13	290	300 ^A	290 ^M	280 ^M	310	300	350	310	370 ^A	(360) ^C	340	350 ^T	(350) ^T	(370) ^T	360	360	330	T	280	T	370 ^A	360 ^A	290	(280) ^A	
14	310 ^H	370 ^A	320	330	270	380 ^L	400	400	A	A	S	S	S	S	G	450	330 ^T	A	A	A	A	A	360 ^F	300 ^A	
15	(290) ^F	310 ^F	350	300 ^M	400 ^A	400 ^A	400 ^A	390	400	(500) ^A	380	T	A	A	300 ^A	(400) ^B	490 ^L	(400) ^A	(320) ^A	320	390 ^A	310 ^A	350	350 ^A	
16	(400) ^H	310 ^A	260	250	250	250	270	310	290	320	380	370	400	400	400	380	380	A	A	A	330	300	300	310	
17	370	290	300	310	400	400	380	C	C	C	C	C	C	C	C	C	320 ^B	310 ^L	310	300	290	290	280	280	
18	290	350	300	360	360	400	400	390	300	A	A	A	390	390	(400) ^B	380	370	380	350	400	390	340	350	360	
19	350	310 ^A	330	310	290	320	320	300	340	340	A	A	470 ^A	480	490	470	400	340 ^L	300 ^S	300	280 ^A	280	280	310	
20	(280) ^T	400	300	280	350	380	(380) ^B	(380) ^B	T	T	T	T	T	T	T	A	A	A	A	A	C	C	C	350 ^A	
21	350 ^A	360	340	300 ^A	290	250	340	(360) ^A	380	390	(400) ^A	400	410	500	(460) ^C	410	440 ^T	A	A	A	A	A	A	A	
22	A	A	(300) ^A	(280) ^A	250	290	320	330	A	A	B	380 ^B	300	A	A	A	390	330 ^T	420	A	A	A	AF	AF	
23	AF	310 ^F	(300) ^F	280	300 ^A	T	330	A	A	A	A	A	350	400	370 ^A	380	310	280	280	(270) ^A	260	280 ^A	270	250	
24	250	240	240	250	290 ^A	(280) ^F	260	240	330	A	300	C	S	C	(310) ^S	300	310	280	270	250	240	280	300	320	
25	270	310	300	290	300	300 ^A	A	A	350	(340) ^F	320	380	A	B	380	350	320	320	280	A	A	340 ^A	350 ^A	290	
26	290	200 ^T	220 ^T	200	210	280 ^L	300	(280) ^B	260	300	A	A	390	340	290	360	(350) ^A	330	A	A	290	(300) ^A	310	300	
27	300	300 ^A	240 ^A	240 ^F	300	250	280	AT	AT	400 ^A	(400) ^A	400	380	400	420	350	380	340	320	270	270	270	280	330 ^A	
28	260	240 ^A	250 ^F	250	260 ^A	290	320	290	360 ^A	350	390	400	(380) ^A	360	410	360	280	380 ^L	310	(300) ^A	300	290	300	(300) ^A	
29	(300) ^A	(300) ^A	270	260	270	280	250	290	290	300	360	(370) ^C	370	370	380	370	340	300	300	310	300 ^A	270	(300) ^F		
30	(360) ^M	(300) ^A	300 ^A	300 ^A	320 ^A	290	360	380	380 ^A	A	310	390 ^A	390	380	380	359	310	300	(230) ^T	(300) ^A	(300) ^F	(300) ^F	(320) ^F	310 ^A	
31	300 ^A	280 ^F	290 ^F	(300) ^A	300	280	270	370	400	390	370	(380) ^C	390	400	340	330	340	280	310	270	270	290	300	300 ^A	
Mean Value	300	300	300	290	290	290	320	320	340	360	370	380	390	390	380	360	340	330	330	300	290	290	300	300	
Count	28	29	31	31	31	29	29	25	23	21	21	21	24	24	26	27	28	24	22	20	24	26	28	29	

Sweep 1.0 Mc to 17.0 Mc in 1.5 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

ff₁

Lat. 45°23.6'N
Long. 141°41.1'E

Wakkanai

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						Q	L	A	6.3	(6.0) ^A	5.6 ^A	5.3	(5.3) ^A	5.3	5.0	5.3	4.9	A	A	A				
2						B	B	A	A	5.1 ^T	(5.4) ^T	5.7	5.3	5.6	5.4	5.3	4.8	4.8	A	A				
3						C	C	C	C	C	C	C	C	C	C	C	C	C	C	3.6 ^L	L			
4						3.5 ^T	(4.3) ^T	5.0	5.4	5.3	(5.4) ^A	5.5	5.4	5.2	5.3	4.8	5.4 ^T	C	A	A				
5						L	L	5.0	A	L	A	A	A	5.4	A	A	A	A	A	A				
6						L	5.0	5.0	4.9	5.4	(5.3) ^B	5.1	5.0	5.0 ^A	A	A	A	A	B	L	Q			
7						L	L	A	A	(4.9) ^A	L	A	5.5	5.0	T	A	A	A	A	A				
8						A	A	A	A	A	A	5.2	(5.0) ^A	4.8	4.6	4.6	4.6	4.1 ^J	A	A				
9						Q	A	C	C	A	A	5.2 ^T	5.1 ^J	4.8	A	A	A	A	A	A				
10						C	T	A	4.0	(4.4) ^T	4.8	(4.9) ^A	5.0	4.8	5.2	4.8	4.4	A	A	A				
11						L	A	A	(4.0) ^T	(4.8) ^T	4.8	5.1	4.9	4.9	4.9	4.6	A	A	A	Q				
12						A	A	4.6 ^B	5.0 ^A	A	A	B	B	C	T	B	B	A	L	L				
13						L	4.2	4.4	A	C	(4.8) ^T	T	T	T	4.2	4.2	A	A	L	L				
14						L	A	A	A	A	A	(4.3) ^S	A	(4.4) ^S	(4.6) ^B	(4.5) ^A	A	A	A	A				
15						A	A	A	5.1	A	L	T	A	A	A	(4.6) ^T	L	A	A	A				
16						Q	Q	L	4.6	5.0	4.9	(5.0) ^S	5.1	5.0	L	S	L	A	A	A				
17						3.6 ^J	4.0	4.3	C	C	C	C	C	C	C	C	4.3 ^B	L	A	Q				
18						L	4.3	4.3	4.6	A	A	A	5.0	5.0	B	4.9	4.3 ^B	L	A	A				
19						L	L	A	4.7	4.6	(4.6) ^A	A	A	A	4.7	(4.7) ^S	L	L	S	Q				
20						A	B	4.3 ^B	T	T	5.0 ^T	T	5.3	5.1 ^B	A	A	A	A	A	A				
21						Q	4.3	A	A	A	A	A	5.6	6.0	C	A	A	T	A	A				
22						A	A	A	A	A	B	5.1	L	A	T	A	T	A	A	A				
23						A	T	A	A	A	A	A	A	A	A	L	4.3 ^T	3.9 ^L	Q	A				
24						C	Q	Q	S	S	S	C	S	C	S	T	T	Q	Q	Q				
25						A	A	A	A	A	B	A	A	A	B	B	B	A	A	A				
26						L	L	A	A	A	A	A	A	5.6	A	B	A	T	A	A				
27						A	A	A	A	A	A	4.8	4.9	4.5	4.8	4.6	4.6	L	T	Q				
28						L	L	4.5 ^A	A	T	T	5.3 ^T	A	T	L	L	A	L	A	A				
29						L	Q	Q	T	T	L	C	5.4	4.6	5.2	T	4.8	A	L	L				
30						A	L	4.6	A	T	A	A	A	5.4 ^A	(5.2) ^P	B	4.4 ^T	T	L	A				
31						4.0	4.8	T	4.8	A	A	C	(5.0) ^T	T	T	(4.9) ^P	4.5	A	L	L				
						-	4.3	4.6	4.8	5.0	5.1	5.2	5.0	5.0	4.8	4.6	-	-	-	-				
						3	7	10	11	9	10	12	16	19	11	13	15	4	1					

Mech. or
Vis. or
Count

Sweep 1.0 Mc to 17.0 Mc in 1.5 min

Manual

IONOSPHERIC DATA

h_pF₂

Wakkanai
 Lat. 45°23.0'N
 Long. 141°41.1'E

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						Q	270	260 ^A	280 ^A	A	A	300 ^A	(270) ^A	280	200	260	370	(340) ^A	300 ^A	A				
2						B	A	A	370 ^A	(260) ^A	210	200	220	230	230	320	270	300 ^A	A	A				
3						230	C	C	C	C	C	C	C	C	C	C	C	C	C	A	230			
4						320	240	290	290 ^A	230	A	B	240 ^A	300 ^A	300 ^A	270	310	C	A	A				
5						260	250	220	(270) ^A	310	A	A	A	310 ^A	(300) ^A	(280) ^A	A	A	A	A				
6						260 ^S	300 ^A	290	220	(210) ^B	(200) ^B	280	(270) ^A	250 ^A	A	A	A	(290) ^A	260	Q				
7						200	A ^S	A	A	A	(200) ^A	A	270	200	(210) ^T	220	A	A	A	A				
8						A	A	A	A	A	A	A	200 ^A	(200) ^A	200	200	200	310 ^A	A	A				
9						Q	A	C	C	A	A	(300) ^A	(200) ^A	260	A	A	A	A	A	A				
10						C	T	A	400	A	B	A	A	280	260 ^A	(250) ^A	230	A	A	A				
11						250	A	A	250 ^A	A	A	250 ^A	200	200	220 ^A	270 ^B	240	A	A	A	Q			
12						A	A	250	310	A	A	B	B	C	T	B	250	210	260					
13						230	280	290 ^A	T	C	(220) ^A	T	T	T	T	250	250 ^B	A	A	A				
14						280	A	A	A	A	(290) ^A	(260) ^A	230	230 ^A	320	(280) ^A	A	A	A	A				
15						A	A	310	330	(340) ^A	350	T	A	A	A	A	340	A	A	A				
16						Q	Q	260	210	200	200	200	220	200	250 ^A	200	260 ^B	A	A	A				
17						280	280	290	C	C	C	C	C	C	C	C	C	B	220	250	Q			
18						300	300	300	200	A	A	A	300 ^A	(280) ^B	250 ^B	(240) ^B	280	A	A	A				
19						280	290	A	220	230	A	A	A	A	A	270	300	270 ^A	230	S	Q			
20						A	280 ^A	280	280 ^T	T	T	T	T	T	T	A	A	A	A	A				
21						Q	260	270	A	A	A	A	A	310	280	C	A	T	A	A				
22						A	A	A	A	A	B	270 ^A	A	A	A	A	A	A	A	A				
23						A	T	A	A	A	A	A	A	A	A	B	200	200	Q	A				
24						C	Q	Q	S	S	S	C	S	C	S	230	230	Q	Q	Q				
25						A	A	A	200	A	B	A	A	A	B	270 ^B	B	A	A	A				
26						210	240	A	A	220	A	A	A	A	A	A	220	A	T	A	A			
27						A	A	A	A	A	A	230	220	220 ^T	220	A	A	T	A	A				
28						270	260	250	A	T	T	T	A	T	220	210	(220) ^A	220	A	A				
29						250	250	Q	230	A	T	C	220	290 ^A	230	(280) ^A	230	(250) ^A	270	250				
30						A	310 ^A	260	A	T	T	A	A	A	A	200	(230) ^A	250	(230) ^A	200	A			
31						270	230	220	250	230	A	C	(250) ^T	T	250	220	230	A	280	270				
Median Value						260	280	260	250	230	220	270	230	260	230	250	250	250	260					
Count						15	15	15	15	9	6	9	15	16	17	20	18	12	7					

Sweep 1.0 Mc to 17.0 Mc in 1.5 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

ft

Lat. 45°23.6'N
Long. 141°41.1'E

Wakkanai

135°E Mean Time

Day	00	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 2.8	3.2	A	A	A	3.6	A	A	B	B	A	A	A	A	A				
2						(2.2) ^B	C	A	B	A	A	4.1	A	A	A	A	A	A	A	A	A			
3						A	2.9	3.4	C	C	C	C	C	C	C	C	C	C	C	C	C	(1.5) ^B		
4						2.3	(2.7) ^B	3.3	3.7	3.8	3.8 ^B	[3.6] ^B	3.4	A	A	A	B	3.1 ^J	[2.8] ^C	[2.5] ^B	A			
5						A	A	3.7	3.7 ^B	A	A	A	A	A	A	A	A	A	3.1 ^J	2.7	A			
6						1.8	A	A	3.6	3.8 ^B	A	A	A	A	A	A	3.5 ^A	3.5	[2.9] ^A	2.2 ^J	1.8 ^J			
7						A	2.9	3.1	A	A	A	A	4.1 ^B	4.0	A	B	A	A	A	A	A			
8						A	A	C	A	A	A	A	A	A	A	B	B	3.6	A	A	A			
9						A	A	C	A	A	A	A	A	A	A	A	A	A	A	A	A			
10						C	T	3.1	3.5	A	B	B	4.1 ^J	(3.7) ^J	A	A	A	A	A	A	A			
11						2.2	(2.6) ^J	(2.8) ^A	3.0	3.6	A	A	A	A	A	A	B	A	A	A	A			
12						A	A	A	3.0	3.4	3.0 ^N	B	B	B	C	T	B	2.8	2.2 ^B	A				
13						2.2	2.7	3.0	3.2 ^H	[3.4] ^C	3.6	[3.7] ^B	3.7	T	B	B	3.6	B	A	2.3	B			
14						2.2	A	A	A	3.4 ^B	3.3	3.3	A	A	A	A	3.3 ^J	3.2	2.7	2.2	A			
15						A	A	3.5	3.4	[3.4] ^A	3.3	A	A	A	A	A	A	A	2.8	2.4 ^J	A			
16						2.2	2.4 ^J	A	A	3.3	3.3	A	A	A	A	A	3.4	[3.6] ^A	3.7 ^J	A	A			
17						2.4	2.7	B	C	C	C	C	C	C	C	C	C	A	A	2.4	A			
18						2.2	2.6	3.3	3.7	A	A	A	A	A	3.8	3.6	3.4 ^F	3.4	3.0	2.6	A			
19						1.7	2.1 ^J	A	A	A	A	A	A	A	A	A	A	A	2.0	2.6	B			
20						2.6	2.8	B	B	A	B	A	T	A	A	3.7	3.5	A	A	B	B			
21						2.0	2.6	3.1	3.3	B	A	A	A	A	A	C	3.3	3.2	B	B	A			
22						A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A			
23						2.5	2.8	3.3	A	A	A	A	A	A	B	B	B	A	A	2.5 ^J	A			
24						C	2.5	3.0	S	S	S	C	S	C	S	C	3.7	A	A	2.5	A			
25						B	2.8	3.2	A	B	B	A	A	A	B	B	A	3.5	A	A	A			
26						B	A	2.8	A	A	A	A	A	A	A	A	A	3.5	A	A	A			
27						2.0 ^F	2.5	3.3	A	A	A	A	A	A	3.6 ^T	A	A	3.3	A	A	A			
28						A	2.0	3.1	3.2	3.5	T	B	B	B	3.6 ^J	A	A	A	A	A				
29						(2.2) ^B	3.0	3.2	3.5	3.3	3.4 ^J	[3.7] ^F	3.9	3.6	3.8	3.6	3.3	A	A	A				
30						A	2.5	3.3	3.5	3.6 ^A	A	A	A	A	A	B	A	A	A	A				
31						1.8	2.5	3.0	3.2	A	A	C	T	B	B	A	A	A	2.5	A				
Mean Value						2.2	2.7	3.2	3.5	3.5	3.4	(3.7)	3.9	3.7	-	3.5	3.4	3.0	2.5	-				
Count						16	20	20	14	12	8	5	5	4	4	10	8	12	12	3				

Sweep 1.0 Mc to 13.0 Mc in 1.5 min

Manual

IONOSPHERIC DATA

h_E

Lat. 45°23.6'N
Long. 141°11'E

Wakkanai

135°E Mean Time

Day	00	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 100	A 100	A 100	A 100	A 100	A 100	A 100	A 100	A 100	A 100	A 100	A 100	A 100	A 100	A 100	A 100	A 100	A 100	A 100
2						B 100	B 100	B 100	B 100	B 100	B 100	B 100	B 100	B 100	B 100	B 100	B 100	B 100	B 100	B 100	B 100	B 100	B 100	B 100
3						C 100	C 100	C 100	C 100	C 100	C 100	C 100	C 100	C 100	C 100	C 100	C 100	C 100	C 100	C 100	C 100	C 100	C 100	C 100
4						A 130	A 130	A 130	A 130	A 130	A 130	A 130	A 130	A 130	A 130	A 130	A 130	A 130	A 130	A 130	A 130	A 130	A 130	A 130
5						100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
6						A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
7						100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
8						A	100	100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
9						A	A	C	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
10						C	100	110	100	A	B	B	100	100	A	A	A	A	A	A	A	A	A	A
11						130 ^B	120 ^B	120 ^A	120	120	A	A	A	A	A	A	A	A	A	A	A	A	A	A
12						A	A	A	110	100	B	B	(100) ^B	C	T	100 ^B	120	100	100	100	100	100	100	100
13						100	100	100	100 ^H	100 ^C	100	100	100	100	100	100	100	100	100	100	100	100	100	100
14						100	A	A	A	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
15						A	A	100	110	A	150	A	A	A	A	A	B	130	100	100	100	100	100	100
16						100	100	A	A	100	100	A	A	A	A	A	A	100	100	100	100	100	100	100
17						130 ^B	120	100	C	C	C	C	C	C	C	C	C	A	100	100	100	100	100	100
18						110	110	110	110	A	A	A	A	A	A	100	100	100	100	100	100	100	100	100
19						110	110	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
20						110	100	110	110	A	B	A	100	100	100	100	100	100	100	100	100	100	100	100
21						100	100	100	100	B	120	B	A	A	A	C	120	120	120	120	120	120	120	120
22						A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
23						100	100	100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
24						C	100	100	(100) ^S	100	S	C	100	C	A	100	100	100	100	100	100	100	100	100
25						B	100	100	A	B	B	A	A	B	A	120	120	120	120	120	120	120	120	120
26						B	A	100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
27						100	110	100	(100) ^A	100	(100) ^A	100	(100) ^A	100	A	A	A	A	A	A	A	A	A	A
28						100	100	110	110	130	120	B	B	B	110	A	A	A	A	A	A	A	A	A
29						110	110	110	100	100	100	(110) ^S	110	110	100	110	110	110	110	110	110	110	110	110
30						A	100	100	100	110	A	A	A	A	A	A	B	A	A	A	A	A	A	A
31						100	100	100	100	A	C	100	(100) ^B	100	100 ^B	100	100 ^B	100	100	100	100	100	100	100
Median Value						100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Count						16	21	23	18	13	13	6	11	13	13	16	14	15	15	14	15	15	14	14

Sweep 1.0 Mc to 17.0 Mc in 15 min

Manual

W 7

IONOSPHERIC DATA

fEs

Wakkanai

Lat 45°23.6'N
Long 141°41.1'E

155° E Meant f_{min}

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	3.0	3.6	3.5	3.2	3.3	3.2	4.4	4.8	5.4	7.8	6.6	4.7	7.2	G	G	5.3	4.7	6.7	6.8 ^Y	5.9 ^B	(5.5) ^Y	G	(2.8) ^B	C	
2	(1.8) ^B	G	3.0 ^Y	G	1.7	B	B	(7.2) ^B	5.8	5.7	5.4	G	5.0	4.7	6.3 ^Y	5.3	5.7	4.8	C	(3.4) ^B	G	13.0	(8.2) ^F	4.0 ^F	(8.2) ^T
3	G	G	2.4 ^F	3.2 ^F	3.6 ^F	C	C	C	C	C	C	C	5.0	4.7	5.3	B	G	C	5.5 ^Y	4.4	3.6	C	G	G	
4	2.1 ^B	3.2 ^Y	2.6	1.7	1.8 ^F	3.2 ^B	(4.9) ^Y	3.8	5.8	4.4	5.9	B	5.0	6.4	5.0	4.6	5.4 ^Y	10.9	11.3	10.3	8.8	9.9	7.0	7.1	
5	G	G	G	G	2.8	2.6	3.7	5.7	(9.0) ^B	4.6	6.2	12.0 ^Y	6.4	5.0	7.0	4.6	5.4 ^Y	13.3	(5.2) ^C	4.1	G	(5.2) ^C	5.2	4.4	5.0 ^F
6	4.7	3.4	3.0	3.1	G	S	4.4	G	G	4.0	G	4.9	8.5	8.9	14.4	7.4 ^Y	13.3	(5.2) ^B	4.1	G	(5.2) ^C	5.2	4.4	5.0 ^F	
7	5.0 ^F	6.8 ^F	4.3	C	4.4	3.3	5.4 ^S	6.6	10.5	7.2	4.4	9.6	5.8 ^Y	G	(5.1) ^T	5.2	9.5 ^Y	6.9	6.2	6.0	8.8	6.0 ^Y	4.0	3.8	
8	3.0	3.7	3.6	3.6 ^F	3.6	3.6	7.2	6.2	14.2	10.4	9.7	6.3	7.4	7.4	G	G	6.4	7.2	7.4	7.4	7.0	4.1	2.4	G	
9	3.7	3.2	2.2	1.6	3.4	3.6	4.0	C	C	8.4	(10.6) ^B	5.5	4.6	4.1	9.4	7.0	6.8 ^B	9.8	9.1	9.2	7.5	5.5	3.5	2.3	
10	7.2	3.2 ^Y	1.2	G	3.2 ^Y	C	(4.1) ^Y	4.9	5.2	6.8	B	6.0	6.0	5.2 ^Y	6.2	4.7	4.6	6.1	7.3	7.4	3.4	4.1	G	G	
11	G	G	2.1	G	G	3.2 ^Y	4.9	6.9	4.0 ^T	4.4	5.0	4.6	4.2	4.1	3.9	B	4.2	6.2	4.4	3.5	3.2	4.1	2.5	2.4	
12	5.8	3.5	2.0	2.4	(2.4) ^Y	2.4	4.8 ^Y	(5.0) ^Y	5.2	10.1	6.1	4.2	B	B	C	T	B	3.5	4.7	3.2	2.4	3.7 ^F	2.4	3.2	
13	2.9	3.6	G	G	G	G	4.1	4.4	6.2	C	4.1	B	T	T	B	G	B	4.3	4.0	2.3	7.0 ^Y	3.3 ^Y	2.2	(3.7) ^B	
14	3.4 ^B	5.1	4.6	4.6	2.6	2.4	6.0	5.3	8.6	7.8	7.3	4.3	5.5	4.3	4.7	5.5	6.5	10.4 ^Y	7.3	8.2 ^Y	7.3 ^Y	8.6 ^F	T	2.8	
15	(2.4) ^F	3.6	3.3	4.8	3.4	4.1	4.3	5.5	5.1	10.2	8.5	6.6	10.9	(10.2) ^B	5.8	C	5.0	6.5	7.2	6.4	(6.4) ^Y	4.2	4.4	3.4	
16	3.6	1.8	1.6	1.3	1.5 ^F	G	3.8	4.4	4.4	4.7	4.5	4.2	4.7	4.8	4.2	B	B	10.2	10.4	7.4	4.8	5.0	2.8	G	
17	3.6	G	G	1.7	3.6	3.3	4.4	C	C	C	C	C	C	C	C	C	3.4	4.2	B	2.2	G	G	G	G	
18	G	G	G	G	G	G	2.8	B	(4.8) ^Y	7.0	7.6	(8.5) ^Y	4.6	G	B	B	G	4.1	4.0	4.3 ^Y	1.4	2.0 ^B	1.6	1.6	
19	3.2	3.4	G	G	G	G	3.6	4.7	4.1	3.8	6.2	6.5	7.2	4.2	3.8	3.7	4.3	3.4	S	3.3	5.7	G	2.0	1.9 ^T	
20	G	2.0	G	G	2.8	3.8	(3.8) ^Y	(5.4) ^Y	4.1 ^T	4.1 ^T	B	4.0	B	4.1 ^T	(10.1) ^B	7.2	(10.2) ^B	10.2	10.6	7.0	C	C	C	7.2	7.4
21	5.5	5.3	6.3 ^Y	5.3	1.8	3.7	5.2	9.8	6.7	7.4	10.0	6.0	6.4	6.6 ^Y	C	6.2	6.6	6.4 ^Y	7.1	7.2	7.4	8.2 ^Y	7.2	6.5 ^Y	
22	6.1 ^Y	7.2	4.0	5.3	G	4.2	4.4	6.1	7.5	7.2	4.5	5.5	6.0	12.0	6.7	T	4.0	4.7	6.4 ^C	13.0	11.2	7.4 ^T	6.3 ^F	7.1 ^F	
23	7.4	6.9 ^F	6.1 ^F	5.6	3.6	4.3	3.6	7.4	7.4	7.2	10.6	(9.7) ^B	6.0 ^Y	7.3	7.0	B	3.3	3.2	3.3	7.2	7.2 ^Y	3.6	4.1	4.2	
24	2.4	2.4	G	G	2.0	C	B	3.4	S	7.1	S	C	S	C	4.4	3.8	4.2	3.0	G	4.1	2.1	3.7	2.9	6.4	
25	5.7	4.1	3.7 ^Y	4.0 ^Y	2.7	4.3	10.2	7.0	6.0	9.3	B	6.2	8.8	B	B	B	4.1	5.9	5.3	7.4	6.7	5.6	5.1	3.6	
26	4.0	G	G	G	G	2.6	4.1	5.5	10.0	7.2	7.3	7.2	6.2	6.0	5.2	3.6	7.4	(6.1) ^B	6.2 ^S	6.1 ^T	6.0	6.1	5.3	4.3	
27	3.3	3.3	4.3	4.3 ^F	3.6	4.1	3.6	6.5	9.4	7.6	6.4	5.5	4.4	T	4.5	5.9	3.7 ^T	3.7 ^T	4.2	G	G	1.7	6.8	4.1	
28	3.3	2.4	5.6	4.2	6.0	4.1	4.2	5.8	6.4	4.0 ^T	4.3 ^T	6.9	4.1	T	4.4	4.4	3.6	3.8	4.1	5.5	7.2 ^T	5.0	7.2	6.2	
29	4.8	3.0	2.0	2.0	2.3	G	G	4.0	6.4	4.2 ^T	C	G	4.1	G	4.0	4.2	5.4	7.2 ^Y	4.2	4.2	3.6	2.6	4.2	4.2 ^F	
30	6.4	4.0	3.8	5.5	3.7	4.2	4.5	4.5	6.6	7.2	9.6	7.2	7.2	5.4	4.6	B	3.6	3.5 ^T	4.2	5.8	4.5 ^F	3.6 ^F	4.2	4.8	
31	4.9 ^F	4.2 ^T	(2.4) ^Y	3.6	G	2.4	3.3	4.2	4.5	7.3	7.3	C	T	T	T	B	4.2	5.0 ^Y	G	2.8	3.8	3.6	3.0	3.6	
Mean Value	3.4	3.3	2.4	2.2	2.6	3.3	4.3	5.4	6.0	7.2	6.3	5.8	6.0	4.7	5.1	5.0	4.2	5.4	5.5	5.8	5.9	4.1	3.8	3.7	
Count	31	31	31	30	31	27	28	27	27	28	24	24	24	23	23	18	27	29	29	31	30	29	30	30	

Sweep 1.0 Mc to 11.0 Mc in 1/5 min

Manual

F.-M3000

IONOSPHERIC DATA

135°E Mean Time

Wakkanai

Lat. 45°23.6'N
Long 141°41.1'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	2.5 ^S	[2.7] ^S	2.9	2.5	2.6	[2.7] ^S	2.9	2.6	2.7	[2.6] ^A	2.5	C	C	2.7	2.4	2.7	2.4	2.8	B	B	3.1	2.5 ^B	B	C	
2	S	S	J	3.1	2.9	S	S	A	JN	2.5	2.6	2.4	C	T	T	T	T	2.9	3.1 ^F	T	T	T	T		
3	2.7 ^H	2.5	[2.6] ^F	2.7 ^F	2.8 ^F	C	C	C	C	C	C	C	C	C	C	C	C	C	(2.2) ^F	T	A	(2.5) ^T	(2.5) ^T		
4	T	T	T	2.5	2.7	2.6	2.4	2.6	T	T	T	J	T	T	T	T	B	C	T	T	B	C	N	T	
5	2.9	[2.8] ^T	2.7	2.8	(2.8) ^S	2.8	[2.8] ^B	2.9	B	T	2.5	A	J	J	T	T	J	A	A	A	A	A	N	(2.8) ^T	
6	2.4	2.5	2.5	2.6	2.6	3.0	2.4	2.6	T	T	T	T	J	J	J	2.8	A	T	(2.9) ^F	2.8 ^P	C	T	2.9 ^F	FT	
7	T	T	T	2.7	[2.7] ^C	3.0	S	A	T	T	J	J	J	2.7	2.5 ^B	J	T	S	T	(2.6) ^T	2.6	T	J	T	
8	T	2.7	T	T	2.6	T	T	T	AT	AT	A	T	2.8	12.9 ^A	3.1	3.2	2.9	2.7	2.8	AS	A	2.7 ^S	2.7	2.5	
9	2.6	3.0	B	2.8	2.8	2.9	3.2	C	C	A	AT	T	2.7	3.1	3.1	3.2	AT	A	A	A	A	S	S	2.5	
10	J	2.5 ^K	2.5 ^K	2.9 ^K	2.5 ^K	[2.5] ^S	2.5 ^K	2.6 ^K	2.4 ^K	AT ^K	T ^K	A ^K	2.8 ^K	2.9 ^K	2.9 ^K	J ^K	T ^K	T ^K	T ^K	AT ^K	ST ^K	FT ^K	FT ^K	T ^K	
11	3.3	3.1	3.1	2.8	2.9	2.8	T	T	C	B	B	T	2.9	2.8	B	B	3.0	2.9	2.9	B	T	T	T	3.0	
12	2.9	2.8	2.5 ^H	2.6	2.4	2.4	[2.5] ^T	2.7	2.4	A	T	T	T	2.8	C	T	(3.1) ^T	2.8 ^F	2.9	3.1	S	S	2.9	2.9	
13	2.8	2.7	2.8 ^H	2.7 ^H	2.8	J	J	B	J	C	2.7 ^B	2.6	T	J	2.7 ^B	2.7	2.7	2.7	2.8	2.9	2.4	2.9	2.6	3.0	(2.2) ^T
14	2.5 ^H	2.5	2.4	2.5 ^F	[2.4] ^F	[2.4] ^F	2.5 ^F	2.5	A	A	A	S	S	S	S	2.5	2.7	T	AF	T	T	T	T	2.7	
15	2.4 ^F	T	2.4	2.4 ^F	2.4 ^F	2.4 ^F	2.4 ^F	2.8	J	2.6	A	T	A	A	3.1	C	J	2.7	2.9 ^S	2.9	2.5	2.7	2.5	2.4	
16	2.6	2.6	2.8	2.7 ^F	2.7 ^F	2.7 ^F	2.8	J	3.1	2.9	2.8	2.9	2.9	2.9	2.7	[2.7] ^B	2.8	A	A	A	2.8	2.7	2.8	2.8	
17	B	2.7	2.6	2.6	2.6	2.5	2.7	C	C	C	C	C	C	C	C	C	3.0	3.0	3.1	2.6	(2.7) ^B	2.6 ^P	B	B	
18	2.5	2.6	2.5	2.4	(2.4) ^B	2.4	2.4	2.5	3.3	A	A	A	J	2.8	(2.7) ^B	2.9	J	2.8	2.7	2.4	2.6	S	J	2.5	
19	2.4	2.5	2.5	2.5 ^F	2.6 ^T	T	T	2.7 ^F	2.9 ^F	2.9	A	J	A	J	J	2.5 ^P	2.5	2.9	3.2	2.5	3.1	B	2.3	2.9	
20	2.8	2.3	2.7	2.5	2.6	2.3	2.5	2.4	2.5	[2.5] ^T	2.5	[2.7] ^T	2.9	2.9	2.9	A	A	A	A	A	C	C	C	2.5	
21	2.7 ^F	2.6 ^F	2.4 ^F	2.7 ^F	2.7 ^F	2.9	2.9	[2.8] ^F	2.6	A	A	2.7	2.6	(2.6) ^B	[2.5] ^C	2.5	2.4	2.7	2.7	A	A	C	C	A	2.5
22	2.4	A	2.5	J	3.1	T	T	T	A	T	T	T	T	A	A	T	T	T	T	C	A	A	A	A	A
23	2.7 ^F	2.8 ^F	(2.8) ^B	2.9 ^F	2.7 ^F	2.4	2.8	A	A	A	A	A	T	2.6	JT	JT	2.8	3.1	3.1	(3.0) ^A	A	AF	2.7 ^F	2.4 ^F	
24	2.9	2.9 ^F	2.6 ^F	2.8 ^F	2.6	3.1	C	T	JT	T	2.8	C	S	C	3.0	T	2.9 ^T	2.8 ^T	2.9	3.0	2.9	3.0	2.9	2.8	
25	2.5	2.7	2.7 ^F	2.8 ^F	2.7 ^F	F	A	A	2.9	A	T	2.8	A	B	J	J	B	2.9 ^F	T	T	T	T	T	2.7	
26	C	3.2	3.1	3.2	3.2	B	J	A	J	B	B	A	2.9	J	3.0	J	A	T	ST	T	T	T	T	B	
27	2.9	2.8	3.0 ^F	2.6 ^F	2.7 ^F	3.1	J	J	A	TS	T	T	T	T	T	T	T	JT	3.0	2.9	3.1	2.9	2.8	2.5	
28	2.9	2.8	2.5 ^P	2.6	2.6	3.2	2.8	J	J	2.7 ^T	2.7 ^T	T	T	T	2.7	[2.7] ^T	2.8	T	T	2.9 ^T	[2.8] ^T	2.8	J	T	
29	2.7 ^F	FT	FT	FT	FT	FT	2.7	J	J	T	J	C	ST	2.7	J	J	J	J	J	3.1	J	J	2.9	[2.8] ^F	2.7
30	F	F	2.6	2.5 ^F	2.7 ^F	2.6 ^F	2.5 ^F	2.7	(2.6) ^F	T	A	T	T	T	T	T	T	JT	T	JT	FT	FT	FT	T	
31	2.7 ^F	2.8 ^F	2.7 ^F	2.8	2.9 ^F	[2.9] ^B	2.9	2.8	2.6	2.8	2.8	C	T	2.7	[2.9] ^T	3.1	2.9	2.9	2.6 ^P	2.8	2.7 ^B	2.7	FT	FT	
Mean Value	2.7	2.7	2.6	2.7	2.7	2.8	2.7	2.6	2.6	(2.7)	(2.7)	(2.7)	(2.8)	2.7	2.8	2.7	2.8	2.8	2.9	2.9	2.9	2.8	2.7	2.8	2.7
Count	23	24	26	27	29	23	20	14	13	7	9	7	9	12	14	13	18	13	14	14	13	13	14	18	

Sweep 1.0 Mc to 17.0 Mc in 1.5 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

Lat. 45°23.6'N
Long. 141°41'12"E

f_{min}

Wakkanai

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	1.6	1.7	2.4 ^A	1.6	1.5	1.7	3.1	3.6	A	A	A	A	4.2	4.1	4.1	4.0	4.0	4.0	2.3	3.6 ^A	1.6	1.6	1.5	[1.5] ^C
2	1.5	1.6	E	2.2 ^N	1.8 ^A	3.8	4.4	A	A	A	A	4.1	4.1	4.1	4.7	3.8	4.0	3.2	A	A	A	A	1.5	1.4
3	1.3	1.3	E	E	1.6	2.5 ^A	C	C	C	C	C	C	C	C	C	C	C	3.0 ^A	1.5	A	A	A	2.4	1.3
4	2.2	2.0	1.2	1.2	1.6 ^A	2.0	3.0	3.6	4.0	4.2	A	B	A	A	3.7	4.3	C	C	A	1.6	1.6	[1.5] ^C	1.4	1.3
5	2.1	T	1.3	E	1.8	2.4	3.3	3.6	A	4.8	A	A	A	A	A	3.6	A	A	A	A	A	A	2.2	A
6	E	E	1.3	1.4	1.6	3.8	A	4.0	4.2	5.7	A	4.2	A	A	A	A	A	(3.2) ^A	2.3	3.0 ^A	A	A	A	A
7	AF	AF	A	A	2.1	4.9	A	A	A	A	A	A	4.4	4.1	T	4.0	A	A	A	A	A	A	A	A
8	2.3 ^A	2.1	E	1.4	2.2	A	A	3.7	A	A	A	A	4.3	A	2.6	3.9	3.7	3.6	2.0	A	A	A	1.4	E
9	E	1.4	1.4	1.2	2.2	A	3.2	C	C	A	A	A	3.9	A	A	A	A	A	A	A	A	A	1.6	1.7
10	A	1.7	E	1.1	1.1	C	AT	3.0	3.5	AT	4.8	A	A	4.4	A	A	A	A	A	A	A	1.3	1.2	1.2
11	1.2	1.2	2.3	2.0	1.6	2.2	A	A	3.5	A	A	4.2 ^A	3.8	3.8	4.1	4.2	3.7	A	A	2.9 ^A	A	2.2	2.1	1.4
12	A	1.6	1.8	1.8	2.2	2.0	A	3.5	3.5	A	A	A	5.2	(3.9) ^B	C	T	4.1	3.3	2.3	2.0	1.9	A	1.6	E
13	1.5	1.8 ^A	E	E	1.4	2.3	3.2	4.0	T	C	T	4.0	T	3.9	3.8	4.1	3.6	A	A	A	A	A	2.3	A
14	A	A	A	A	1.6	2.5	A	A	A	A	A	4.1	A	A	3.8	3.9	4.1	3.9 ^A	A	A	A	A	A	A
15	1.2 ^A	E	1.5	E	A	A	A	4.0	4.1	A	4.1	A	A	A	A	A	3.7	A	A	A	A	A	A	A
16	A	1.6	1.2	1.4	1.3	2.2	3.2	3.3	4.1	4.1	4.2	3.8	4.4	4.0	4.2	3.9	4.0	A	A	A	A	A	A	E
17	A	1.2	E	1.5	2.5	3.1	3.9	C	C	C	C	C	C	C	C	5.3	5.3	3.4	2.7	2.4	2.0	1.5	1.5	1.4
18	1.2	E	E	E	1.4	2.2	3.0	3.4	4.1	A	A	A	4.6 ^A	4.3	B	4.1 ^B	(3.5) ^B	3.3	A	A	2.1	2.0	1.2	E
19	1.4	2.0 ^A	F	E	1.4	2.3	2.5	A	3.8	4.1	A	A	A	A	3.7	3.8	A	2.0	5.2 ^S	2.4	A	2.2	1.2	3.4
20	(3.5) ^T	2.3	1.6	E	A	A	A	3.3	3.8	A	A	5.2	5.3	5.3	5.1	A	A	A	A	A	C	C	A	AF
21	A	A	E	A	1.6	2.5	3.0	3.4	A	A	A	A	4.2	4.2	C	A	T	T	A	A	A	A	A	A
22	A	A	A	E	2.0	A	A	A	A	A	3.7	4.4	4.9	A	A	4.1 ^T	A	A	A	A	A	A	A	AF
23	AF	AF	A	1.4	A	A	T	A	A	A	A	A	A	A	3.9	3.4	3.4	3.6	3.3	A	A	A	2.4	2.2
24	1.4	E	1.2	1.1	1.1	C	4.1	3.4	5.3 ^S	A	5.7	(5.7) ^S	5.6 ^S	[5.9] ^F	6.1 ^S	3.8	3.8	3.3	2.6	A	2.0	A	A	A
25	E	A	A	A	1.4	A	A	A	3.9	A	5.5	A	A	6.3	5.5	4.1	5.8	A	A	A	A	A	A	A
26	A	1.3	2.0	1.7	2.3	2.1	5.1	A	A	4.0	A	A	A	A	A	4.0	A	T	A	A	A	A	A	A
27	1.2	A	A	AF	2.0	2.0	A	A	A	A	4.1	4.2	4.3	4.0	4.4	4.3 ^T	4.8 ^T	A	A	1.9	1.8	1.5	1.5	A
28	2.1	1.2	2.1	A	A	2.3	2.4	3.4	A	5.3 ^T	5.3 ^T	A	5.3 ^T	3.9	3.5	3.2 ^A	3.2	A	1.4	1.3	1.7	1.4	A	
29	A	A	E	E	1.5	2.3	3.2	4.0	4.1	5.2 ^T	5.5 ^T	(4.8) ^C	4.1	4.1	3.9	4.2	4.0	A	4.0	A	A	1.6	1.4	AF
30	A	A	A	A	A	A	A	4.0	A	T	A	A	A	3.9	3.9	3.9	A	A	A	A	1.5	1.5	1.4	A
31	A	E	1.4	A	1.4	2.4	2.6	3.8	3.8	3.7	A	C	4.3 ^T	(4.5) ^T	4.1	3.9	3.7	A	2.7	1.9	A	A	A	A
Mean Value	1.4	1.4	1.2	1.2	1.6	2.3	3.2	3.6	4.0	(4.2)	4.2	4.3	4.2	4.1	4.0	3.9	3.9	3.3	2.7	2.0	(1.8)	1.6	1.5	1.4
Count	18	21	24	23	26	21	16	18	15	9	9	11	15	18	22	20	20	11	12	11	9	11	19	14

Sweep 1.0 Mc to 17.0 Mc in 1.5 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyūjo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

f_oF min

155°E Mean Time
Wakkanai
Lat. 45°23.6'N
Long. 141°41'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	1.8	E	1.3	1.4	E	1.2	1.2	1.3	2.2	2.4	2.4	2.0	2.5	2.6	2.5	2.4	2.2	2.1	1.6	2.1	(1.4) ^B	G	(2.1) ^B	(1.8) ^C
2	(1.4) ^B	G	E	G	E	B	B	1.2	1.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	1.8	1.6 ^B	1.5	1.5	G	
3	G	E	E	E	1.2	B	C	C	C	C	C	C	C	C	C	C	C	C	2.2	G	1.7	2.1	2.2	2.2
4	3	G	E	E	E	1.5	2.3	1.5 ^B	2.4	2.6	3.2	(2.6) ^B	2.0 ^B	2.9	3.3	(3.3) ^B	3.2	(2.2) ^F	1.2	1.1	1.6	C	G	G
5	G	G	G	G	E	(1.6) ^B	E	E	E	3.4	2.0	2.1	3.6	3.8	3.4	2.3	2.2	2.1	2.1	2.3	1.6	1.6	2.2	E
6	E	E	1.2	E	E	1.5	2.2	2.0	2.1	2.2	2.3	2.1	2.3	2.2	2.2	1.7	2.2	1.8	1.8	1.3	2.0	2.0 ^B	F	
7	E	E	E	E	E	1.2	1.4	1.5	1.5	2.2	2.1	3.8	2.4	2.2	2.2	2.2	2.2	2.0	1.8	2.3	1.5	1.8	2.0	1.6
8	1.3	E	E	E	E	1.4	2.0	2.2	2.2	2.2	2.2	2.0	2.2	2.2	2.5	2.6	1.9	2.0	1.3	E	1.2	1.5	1.8	G
9	E	E	E	E	E	1.5	1.2	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	1.9	1.7	1.6	1.7	1.5	1.6
10	1.6	1.4	E	E	E	C	E	2.0	1.7	1.4	B	3.6	2.4	2.2	2.4	3.0	3.2	2.4	2.0	2.0	1.4	1.4	G	G
11	G	G	1.4	G	G	2.0	2.2	2.0	2.1	2.2	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	1.4	1.5 ^B	2.1	(1.4) ^B	2.1
12	1.5 ^B	2.1	1.6	1.4	1.6	2.0	2.0	2.4	2.2	2.2	2.3	3.4	(2.9) ^B	2.4	C	T	2.3	2.2	1.1	E	E	F	1.3	E
13	E	E	E	E	E	1.4	1.4	1.5	E	C	2.3	2.2	2.3	3.0	2.2	2.4	1.8	1.8	1.4	1.5 ^B	1.5	1.5	1.5	E
14	1.1	E	E	E	E	1.6	1.7	1.7	2.1	1.5	1.6	1.6	2.1	2.2	2.1	2.2	1.4	2.0	2.0	1.6	1.6	1.5	2.9 ^F	E
15	1.2 ^F	E	E	E	E	1.2	1.6	1.4	1.5	1.7	2.2	2.1	2.4	(2.2) ^B	2.4	3.2	3.0	2.0	1.8	1.8	1.6	1.8	1.8	E
16	E	E	E	E	E	1.1	1.5	1.5	2.1	2.1	2.0	2.4	2.6	2.6	2.4	2.2	2.4	2.0	1.2	1.6	1.6	1.4	E	G
17	E	G	1.2	2.0 ^B	1.6	1.6	C	C	C	C	C	C	C	C	C	C	2.1	2.2	1.8	1.7	G	G	G	G
18	G	G	G	G	G	1.4	2.2	2.2	2.2	2.4	3.0	2.2	2.2	2.2	1.4	E	1.4	1.5	1.4	1.6	E	1.3	1.2	E
19	E	E	E	E	E	1.4	1.5	2.0	2.3	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.0	1.5	2.1	2.1	2.0	G	1.2	E
20	G	1.7	G	G	E	1.4	1.6	1.6	2.2	2.0	B	3.4	3.1	3.3	3.4	2.2	1.8	1.5	1.8	1.7	C	1.5	1.2	E
21	1.1	E	E	E	E	1.2	1.5	1.5	1.5	3.6	3.2	3.4	3.5	3.6	(3.2) ^C	2.8	2.4	3.2	3.2	1.5	1.5	1.6	1.6	1.5
22	1.6	1.6	1.4	1.3	1.6	1.6	2.2	2.2	2.2	2.5	3.7	3.3	3.2	3.1	2.2	3.0	2.2	1.4	3.3	1.3	1.3	E	1.3	1.2
23	E	E	E	E	E	1.6	E	E	1.3	1.6	2.9	2.2	2.3 ^B	3.1	2.1	3.9	2.2	2.2	1.9	1.3	1.5	1.4	1.3	1.2
24	1.2	E	G	G	E	C	1.4	E	S	1.5	S	C	1.9	(1.5) ^C	2.1	2.0	2.0	1.8	1.4	1.2	E	E	E	E
25	E	E	E	E	E	2.2	2.4	2.2	2.3	4.3	(3.7) ^B	3.3	3.2	(2.8) ^B	2.3	2.2	2.2	2.2	1.3	1.3	1.3	1.3	1.3	1.3
26	1.3	G	G	G	G	2.1	2.0	2.0	2.0	2.4	2.2	2.0	2.4	2.2	2.2	2.2	2.2	2.1	1.8	1.4	1.4	1.4	1.4	E
27	E	E	E	E	E	E	2.1	1.6	2.0	2.0	2.2	2.3	2.4	2.2	2.2	2.2	2.2	2.1	1.4	1.4	1.4	1.4	1.4	E
28	E	E	E	E	E	E	1.2	2.0	2.1	2.2	2.2	3.8	4.2	3.8	3.5	2.2	2.0	1.5	1.5	1.5	G	1.5	1.5	E
29	1.4	E	E	E	E	1.4	G	2.2	1.9	1.9	2.4	(2.4) ^C	2.3	(2.5) ^B	2.3	2.2	2.1	1.6	1.5	1.6	1.2	1.4	1.4	1.5
30	E	E	E	E	E	E	1.8	1.9	2.0	2.2	2.3	2.5	3.2	3.2	(3.0) ^B	2.8	2.1	E	E	1.5	1.5	1.5	1.5	E
31	E	E	E	E	E	E	1.4	1.4	1.6	2.2	2.3	(2.7) ^C	3.0	(3.5) ^B	3.1	2.5	1.6	1.4	1.4	E	E	E	E	E
Median Value	E	E	E	E	E	1.5	1.5	1.8	2.1	2.2	2.3	2.4	2.4	2.4	2.3	2.2	2.2	2.0	1.8	1.5	1.5	1.5	1.5	E
Count	31	31	31	30	31	27	29	28	27	28	26	28	29	29	28	28	30	30	31	31	30	29	31	31

Hourly

Sweep 1.0 Mc to 11.0 Mc in 1.5 min

W 11

IONOSPHERIC DATA

f_oF_2

LT. 40°36.6'N
Long 139°54.1'E

Fukaura

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	8.4	8.4	8.0	7.5 ^P	7.9	7.9 ^P	8.3	9.3	9.9	9.2	(7.9) ^A	(8.3) ^A	8.7	7.9	8.1	A	A	C	F	A	9.5 ^Z	(9.7) ^Z	9.6	9.1	9.1
2	9.2	9.0	8.7	8.4	8.1	8.2	9.0	10.3	9.8	9.8	9.5	9.7	(9.4) ^B	9.8	(9.2) ^B	9.3	9.0	8.6	8.4	8.4	8.8	8.3 ^H	9.1	8.3	8.1
3	(9.1) ^J	8.5 ^P	9.3	7.7	8.2	8.4	9.9 ^P	10.4 ^Z	9.8 ^H	8.8	(8.7) ^T	8.6	9.1	9.3	9.4	9.1	9.6	8.4	8.4	8.4	8.4	8.0	8.6	8.5	9.2 ^H
4	(9.3) ^J	(9.4) ^J	8.0	7.9	7.9	9.0	9.6	10.5	10.5	9.5	9.5	9.0	9.6	10.2	10.5	10.4	9.6	A	A	9.5	9.6	9.6	10.5	10.7	9.1
5	10.7	10.0	8.3	8.5	9.4	9.0	9.2	9.5	9.6	9.9	9.2	A	A	9.3	9.3	(9.3) ^A	9.3 ^P	8.7	8.7	9.1	9.1	9.2 ^X	9.4	9.4	9.4
6	8.8 ^X	7.9	8.0 ^Z	(7.8) ^Z	7.8 ^Z	8.0	9.4	9.9	9.5	9.5	9.5	9.7	9.0	9.2	(8.6) ^H	9.2	8.8	8.4	8.4	9.0	9.3	8.6	9.0	8.4	8.4
7	8.4	7.5	7.9 ^J	6.7	7.7	7.4	8.6	8.7	(8.6) ^A	8.4	9.0	9.3	9.0 ^F	8.6	8.5	9.2	9.4	9.4	9.4	8.4	9.9 ^P	9.3	9.5	9.5	9.5
8	8.6 ^J	7.8	7.7	7.2	7.9 ^Z	8.7	C	C	C	C	C	C	C	C	C	C	C	C	8.1	8.4	(8.6) ^F	(9.2) ^T	9.8	9.8	9.8
9	(9.1) ^C	8.3	7.8	6.4	6.1	7.2	8.5	(8.1) ^A	(7.7) ^S	(7.6) ^A	7.4	7.1	7.0	7.5	7.2 ^H	7.4	7.6	6.9	6.3	7.1	AS	A	A	(7.4) ^A	7.4
10	A	A	(6.7) ^A	6.8 ^F	F	7.0	7.9	(8.7) ^J	9.5	9.2 ^H	(8.3) ^A	7.4 ^J	6.5	7.0	7.4	7.8	8.0	8.1	7.7	7.2	7.5	7.9	7.4	7.3	7.3
11	7.2	6.9	6.8	6.5	5.8	7.4	8.3	8.5	9.0	7.6	6.9	7.0	7.9	8.5	8.6	7.4	6.8	7.2	7.5	8.0	8.3	8.0	7.6 ^E	7.5	7.5
12	7.1	7.0	6.8	6.7	6.2	6.9	8.6	10.1	10.8	9.2	9.5	9.2	9.2	9.6	8.6	8.2	8.3	7.6	7.2	8.1	8.6	(8.6) ^C	8.6	7.8	7.8
13	7.3	7.0	7.0	7.0	6.1	6.4	7.5	9.3	(9.5) ^C	9.6	9.3	9.3	9.6	9.6	9.3	9.5	9.2	8.3	8.3	9.7	8.8	7.6	5.9	5.8	(5.8) ^A
14	5.7	5.7	(6.2) ^J	(6.0) ^J	(6.2) ^J	6.0 ^Z	6.5	6.0	5.8 ^F	A	A	5.7 ^J	5.7	5.7	5.6	5.8	5.4	6.3	5.3	6.2	6.4	A	A	A	F
15	6.0	(5.9) ^F	(5.8) ^F	5.3 ^F	(5.9) ^F	5.6	5.9	9.5	9.4	(8.0) ^A	8.0	A	A	A	A	8.0 ^J	8.8 ^J	7.2	7.1	6.4	6.5	7.5	7.6	(7.2) ^F	7.2
16	7.0	(6.8) ^F	SE	F	F	6.5	7.8	7.5	8.4	7.8	8.1 ^H	7.4	7.6	8.2	8.9	9.0	8.1	7.8	(7.8) ^A	7.7	8.0	(8.6) ^F	8.4	7.5	7.5
17	7.5 ^F	(7.1) ^F	(7.2) ^F	6.8	6.3	6.3 ^F	6.8	7.2	6.6	6.5	6.5	6.0	6.9	7.4	7.7	7.6 ^H	7.7	(7.7) ^C	7.6	(7.4) ^C	(7.1) ^B	7.5	7.3	7.0	7.0
18	6.8	6.8	7.0	6.0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	8.0 ^P	8.4	8.2	7.2	7.1	6.7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	7.7	6.9	6.7	6.2	6.1	5.6	7.8	8.5	(7.2) ^S	6.9	7.2	7.2	7.7	(8.2) ^B	8.8	9.7 ^F	8.6 ^F	7.7	7.5	7.6	7.3	7.3	7.1	6.5	6.5
24	6.7	7.6	7.6	6.6	6.2	6.8	(8.3) ^C	9.8	9.1	S	C	B	C	9.1	8.9 ^J	8.6 ^J	8.5	8.2	8.2	8.1	7.8	7.9	8.0	7.8	7.8
25	7.5	7.2	7.0	6.6	6.4	7.2	8.8	10.2 ^J	7.3	(7.6) ^F	7.8	(8.1) ^J	8.4	8.0	9.3	(9.4) ^C	9.4	8.8	8.4	7.9	7.7	8.2	8.0	7.3	7.3
26	8.0	7.8	7.4	6.8	6.9	7.6	(8.8) ^C	9.9	10.0 ^V	9.2	9.4	9.4	9.6	9.7	9.5	8.6	8.2	(8.1) ^A	8.0	8.4	8.6	8.7	9.0 ^R	(9.3) ^F	9.3
27	9.1 ^F	9.6	6.5	(7.2) ^H	6.8 ^V	8.5	8.8	9.4	8.5	8.0	8.5	9.0	9.1	8.3	8.5	8.1	8.0	8.3	(8.3) ^A	8.3	(8.1) ^B	7.8	7.6	9.7	9.7
28	7.4	6.9	6.7	6.8	F	6.6	8.0	8.8	8.5	8.5	8.2	8.7 ^P	(10.7) ^B	9.8	9.0	8.7	8.0	7.8	7.6	7.9	7.2	7.9	7.8	7.8	
29	7.8 ^F	7.4	7.2	7.1 ^Z	7.0	7.5	(8.5) ^C	9.4 ^P	8.5	8.7	8.8	8.9	(9.0) ^F	9.1	9.0	8.8	9.0	8.6	7.9	7.5	8.4	8.4	8.4	7.6	7.6
30	7.9	8.4	8.4	7.3	6.8	6.6	6.8	6.8	7.6	8.1	8.4	8.6	8.8	9.3	9.4	9.6	9.2	9.4	8.9	8.4 ^S	8.5	(9.0) ^S	7.9	8.1	8.1
31	7.7 ^P	7.7 ^P	7.6	7.5 ^P	7.2	7.4	8.7 ^P	8.6 ^P	8.3	A	A	9.0	8.9 ^H	9.1	8.9	8.2	7.3	7.4	8.4	7.6	7.3	7.5	7.5	7.5	7.5
Median Value	7.8	7.6	7.5	6.8	6.8	7.2	8.5	9.3	9.0	8.7	8.5	8.7	9.0	9.1	8.9	8.8	8.3	8.1	8.1	8.1	8.2	8.0	8.0	8.0	7.8
Count	27	27	27	27	24	27	26	26	25	22	22	22	22	24	24	24	24	23	24	24	26	25	25	27	27

Sweep 1.0 Mc to 17.0 Mc in 1.5 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denkitsu-shin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

hp F₂

Fukaura

Lat. 40°36.6'N
Long. 139°54.1'E

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	400	370	350	330	310	300	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310
2	370	340	340	340	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
3	400	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370
4	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
5	400	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
6	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
7	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
8	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
9	380	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370
10	A	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	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
12	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
13	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
14	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
15	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
16	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
17	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
18	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370
23	320	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
24	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
25	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370
26	450	380	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370
27	380	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360
28	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370
29	410	370	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360
30	420	400	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360
31	400	420	400	380	350	320	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310
Mean Value	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370	370
Count	27	26	26	26	24	27	26	25	24	20	19	20	21	23	23	23	23	23	22	23	24	25	25	25	27

Sweep - 1.0 Mc to 1.0 Mc in 1.5 min

Manual

F 2

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
 (Denki-tsushin Kenkyujo) Gotanda Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

h_pF₂ 135°E Mean Time Fukaura Lat 41.566 N Long 139°54.1E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	300	300	300	290	300	290	290	(260) ^A	(300) ^A	380	A	A	390	410	400	A	A	A	250	(240) ^A	330 ^A	330	330	330	
2	300	310	280	260	270	260	260	(320) ^A	(320) ^A	(360) ^A	350	(350) ^A	(350) ^A	370	(390) ^A	350	320	310 ^A	310 ^A	300 ^A	A	A ^H	A ^H	280	
3	290	290	250	280	320	290	280	(280) ^A	(300) ^A	310 ^H	350	380	380	270	270	350	330	320 ^A	280	280	260	290	290	290	290
4	330	270	260	300	300	290	290	(290) ^A	(290) ^A	390	400	380	(350) ^A	(350) ^A	340	350	310	A	A	250	270	240	310	300	
5	290	290	290	250	280	270	290	310	300	340	(340) ^B	330	(340) ^A	340	350	(340) ^A	320	320	310	270	310	280	280	(270) ^A	
6	260 ^F	290	320	260	260	280	300	320	320	350	380	(380) ^A	(380) ^A	350	330	320	320	300	300	290	290 ^A	290	290	320	
7	300	310	300	270	260	260	260	(320) ^A	(320) ^A	360	360	330	380	380	380	320	320 ^A	290 ^A	280	270	270	270	270	290	
8	280	290	300	280	270	300	270	C	C	C	C	C	C	C	C	C	320	300	300	300	290	270	270	290	
9	(280) ^F	280	280	290	320	280	(300) ^H	A	A	A	A	(380) ^A	410	(350) ^A	380	350	350	290	310	(300) ^A	(350) ^A	A	A	A	
10	A	A	A	310	310	(290) ^A	300	(290) ^A	(270) ^A	(350) ^H	(270) ^A	320	380	350	350	350	290	310	280	(280) ^A	(290) ^A	(300) ^A	270	(300) ^A	
11	280	280	280	280	280	300	310	300	300	300	(370) ^A	400	370	330	300	300	330	310	300	370	250	270	350	270	
12	280	290	290	280	250	250	310	300	300	300	300	320	340	340	300	330	320	320	250	250	270	270	270	270	
13	270	290	310	290	280	290	280	290	250	(270) ^C	210	330	350	350	350	350	330	330	330	250	220	230	270	270	
14	310	320	390	300	270	270	340	400	G	A	A	G	G	A	A	G	400	350	A	A	A	A	A	(300) ^A	
15	300	330	320	320	280	240	250	280	250	(300) ^A	(330) ^B	A	A	A	A	A	A	A	(290) ^A	(290) ^A	280	(290) ^A	280	330	
16	260	320	300	270	290	280	270	300	300	310	310	370	400	350	340	330	290	300	(300) ^A	(300) ^A	300	270	350	300	
17	310	310	290	290	290	310	420	360	380	320	G	420	370	370	350	350	330	(310) ^C	(310) ^C	(300) ^A	290	350	280	300	
18	310	300	300	300	C	C	300	280	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	300	
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
22	A	A	270	290	300	250	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
23	290	300	280	280	290	260	300	300	290	(330) ^B	310	420	430	(410) ^A	380	330	320	300	300	290	290	(300) ^A	300	(320) ^A	
24	(320) ^A	300	290	290	280	(380) ^C	270	250	300	(340) ^A	320	(370) ^C	350	350	350	350	310	(300) ^A	(270) ^A	250	250	280	310	350	
25	300	260	280	310	290	300	290	340 ^H	C	A	A	A	330	280	310	(300) ^C	280	(290) ^A	290	270	(270) ^A	270	270	310	
26	310	290	280	270	300	280	260	250	290	(330) ^A	(370) ^A	350	320	350	350	330	(310) ^A	(300) ^A	280	270	270	300	300	290	
27	290	270	300	300	280	250	240	250	350	(350) ^A	350	380	360	360	360	330	340	330	(320) ^A	300	280	280	290	300	
28	310	300	290	290	250	260	290	250	260	340	(370) ^B	(370) ^A	350	350	360	360	320	300	300	240	260	290	260	270	
20	(300)	(310)	270	300	290	260	280	280	310	330	350	(350) ^A	340	(350) ^A	340	350	300	300	300	240	260	270	280	300	
30	300	A	A	A	260	250	270	320	(330) ^A	330	A	A	350	(340) ^A	320	330	330	300	270	A	A	260 ^A	300	290	
31	300	300	280	280	280	(300) ^A	280	I	350	A	A	340	300	(320) ^A	(320) ^A	(310) ^A	320	300	250	270	290	300	250		
Median Value	300	300	290	290	270	270	290	320	300	340	370	370	350	350	340	320	310	300	280		270	290	290	300	
Count	25	25	27	27	27	24	24	24	24	21	19	20	24	23	23	23	22	22	24	24	22	23	23	26	

Sweep 15.0 Mc to 11.0 Mc in 1.5 min

K: actual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denkikatsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

Lat. 40°36.6'N
Long. 139°54.1'E

Fukaura

fti

155°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						Q	L	A	A	A	A	A	A	5.7	5.6	A	A	Q	A					
2						L	L	(5.1) ^J	A	A	A	(5.0) ^A	A	A	(5.4) ^B	(5.7) ^B	A	A	A	A				
3						L	L	A	A	A	(5.4) ^B	5.8	(5.4) ^B	(5.7) ^B	A	A	5.2	A	A	Q				
4						L	L	A	A	A	(5.6) ^A	L	A	(5.6) ^A	A	A	A	A	A	A				
5						L	L	A	A	A	A	A	A	A	A	A	A	L	L	L				
6						A	L	(4.2) ^J	(5.6) ^J	A	A	A	A	A	5.6	A	4.7	L	L	Q				
7						A	L	(4.8) ^J	(5.3) ^A	5.8	A	A	A	A	5.5	5.3	4.6	L	L	A				
8						L	L	C	C	C	C	C	C	C	C	C	C	C	C	A				
9						A	A	A	A	A	A	(4.8)	(4.9) ^A	(5.0) ^A	5.4	4.2	4.2	A	A	A				
10						A	4.3 ^A	A	A	A	A	A	5.6	5.2	5.1	5.1	4.7	4.3	A	A				
11						L	A	L	A	A	L	S	5.2	5.4	4.9	A	B	(4.4) ^B	A	A				
12						Q	4.3	(4.8) ^L	5.2	(5.2) ^B	5.2	F	A	F	F	4.8	4.8	L	L	L				
13						2.8 ^A	Q	Q	C	A	(5.3) ^B	5.4	5.5	5.2	4.8	(4.5) ^B	4.5	4.5	A	A				
14						Q	3.8	4.2	A	A	A	A	A	A	A	A	4.5	4.2	A	A				
15						Q	Q	4.6	A	A	A	A	A	A	A	A	A	A	A	A				
16						L	L	L	5.3 ^L	(5.2) ^B	B	A	5.6	5.3	5.2	(4.8) ^F	4.4	A	A	A				
17						4.0	4.6	(5.1) ^A	(5.2) ^L	5.2	(5.3) ^A	(5.4) ^A	5.4	5.2	5.3 ^B	(4.3) ^F	L	C	L	C				
18						C	Q	4.7	A	C	C	C	C	C	C	C	C	C	C	C				
19						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
20						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
21						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
22						Q	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
23						Q	L	B	B	B	(5.2) ^J	5.5	5.8	(5.6) ^A	5.3	(5.2) ^A	A	A	A	A				
24						Q	C	L	5.0	A	A	A	C	6.0	(5.7) ^A	5.0 ^J	A	A	A	A				
25						3.3	(4.2) ^A	5.0	L	C	A	A	A	A	B	C	B	A	L	A				
26						Q	A	A	A	A	A	B	B	A	A	A	L	A	Q	A				
27						Q	Q	A	L	5.5	(5.7) ^A	5.5	(5.4) ^A	(5.0) ^B	(5.1) ^A	5.2	4.4 ^B	A	A	A				
28						Q	Q	4.2	A	A	A	A	B	B	5.4	5.2	4.9	A	L	L				
29						Q	Q	Q	L	A	(5.6) ^B	(5.5) ^C	(5.5) ^C	5.3	5.7	5.4	A	Q	Q					
30						Q	Q	4.7	A	A	A	A	A	5.5	A	B	L	L	A	A				
31						Q	Q	A	A	A	A	A	A	A	A	A	A	L	L	Q				
Mean Value						4.3	4.8	(5.3)	5.2	(5.3)	(5.6)	5.5	5.4	5.3	5.2	4.5	4.4							
Count						3	6	11	6	5	6	7	11	15	14	14	6							

Sweep 1.0 Mc to 17.0 Mc in 1.5 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

Lat 40°36.6'N
Long 139°34.1'E

h_F

Fukaura

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1						Q	260	A	A	A	A	A	A	A	A	A	A	C	Q	A					
2						240	240	230	A	A	A	A	A	A	A	A	A	A	A	A	A				
3						270	260	A	A	A	B	A	A	B	B	B	270	A	A	Q	A				
4						A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
5						220	230	250	A	A	B	A	A	A	A	A	A	240	240	230	A				
6						A	220	(240) ^A	A	A	A	A	A	A	A	A	210	(240) ^A	240 ^A	Q	A				
7						A	A	A	A	A	A	A	A	B	A	210	250	A	A	A	A				
8						260	A	C	C	C	C	C	C	C	C	C	C	C	280	270	A				
9						A	A	A	A	A	A	A	(210) ^A	(230) ^A	(250) ^A	230	230	A	A	A	A				
10						250	240	A	A	A	A	A	A	A	A	230	(240) ^A	A	A	A	A				
11						A	A	A	A	A	220 ^A	210	(240) ^A	260	(180) ^B	A	A	A	250	A	A				
12						Q	250	250	A	A	A	B	B	A	B	B	B	B	250	250	210				
13						A	Q	Q	C	A	210	B	B	A	A	A	210	(300) ^B	A	A	A				
14						Q	270	260	A	A	A	A	A	A	A	A	A	230	A	A	A				
15						Q	Q	220	A	A	B	A	A	A	A	A	A	A	A	A	A				
16						250	230	240	A	B	B	A	A	A	A	A	A	240	(260) ^A	A	A				
17						250	250	A	A	A	C	C	C	C	C	240	(230) ^A	(220) ^A	270	C	C				
18						C	Q	A	A	C	C	C	C	C	C	C	C	C	C	C	C				
19						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
20						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
21						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
22						Q	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
23						Q	250	240	B	B	B	A	A	A	A	A	A	A	A	A	A				
24						Q	C	230	220	A	A	B	C	A	A	A	260	A	A	A	A				
25						250	(240) ^A	230	A	C	A	A	A	A	B	B	C	B	B	270 ^A	A				
26						Q	A	A	A	A	B	B	B	B	B	A	280	B	A	Q	A				
27						Q	Q	A	A	A	A	A	A	A	A	A	240	A	A	A	A				
28						Q	Q	200	A	A	A	A	B	B	B	B	230	240	A	A	280				
29						Q	Q	240	A	A	B	B	C	B	290 ^A	A	A	A	Q	Q	A				
30						Q	Q	260	A	A	A	A	A	A	A	A	B	B	A	A	A				
31						Q	Q	A	A	A	A	A	A	A	A	A	A	A	270	280	Q				
Median Value	250	250	240										240	230	230	210	210	250	270						
Count	8	12	13						2	2	1	3	3	5	9	10	10	7	7	4					

Sweep 1.0 Mc to 17.0 Mc in 15 min Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyujo) Gotanda, Shinagawaku, Tokyo, Japan

IONOSPHERIC DATA

ft

Day	135° E Mean Time											Fukaura					Log				
	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1		A	2.4 (3.0) ^J	3.3 ^J	3.7	A	A	A	A	A	A	A	A	C	2.7	A					
2	(1.5) ^J	2.0	2.6 (3.2) ^J	3.2 (3.4) ^J	3.5	3.6 ^B	A	A	A	A	A	A	B	A	A	A					
3	1.5 ^J	(2.2) ^A	(2.8) ^A	3.3	A	A	A	A	A	3.8	3.6 (3.4) ^J	3.2	2.9 ^J	A	B						
4		A	3.2	3.2	A	A	A	A	A	A	A	A	A	A	A	2.1	A				
5	1.2	2.0	2.5	3.6	3.6	A	B	3.5	3.6	A	A	A	A	A	A	A	B				
6		A	(2.9) ^J	3.2	3.6	A	A	3.8	4.0	3.8 ^B	3.9 (3.6) ^A	3.2	3.2 (3.0) ^A	2.5 ^J	A						
7		A	2.8 (3.1) ^A	3.4	A	A	A	A	3.7 ^B	3.5	3.2 ^J	3.0	A	A	A						
8		A	2.9	C	C	C	C	C	C	C	C	C	C	C	A	B					
9		A	A	A	A	A	A	A	A	A	A	A	A	A	A	2.8	A				
10		(1.9) ^B	2.6	3.0	3.4	3.6	A	A	4.0	A	A	A	A	A	A	2.7	B				
11		B	2.6	3.1 (3.2) ^A	A	A	A	A	A	A	A	A	A	A	A	(3.2) ^B	(2.3) ^A				
12		B	2.6	A	A	A	A	A	A	A	A	A	A	A	A	2.8	2.4	2.1			
13		B	2.8	2.8 ^A	3.3	B	B	B	B	A	A	A	A	A	A	3.5	B	2.4 ^A	B		
14		(2.0) ^B	A	A	3.5	A	A	A	A	A	A	A	A	A	A	B	3.2	A	A		
15		B	2.7	3.1 (3.4) ^A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
16		1.8	2.8	3.2	A	A	A	A	A	A	A	A	A	A	A	3.5 (2.2) ^A	A	A			
17		(1.7) ^B	2.9	3.0	A	A	A	A	A	A	A	A	A	A	A	A	C				
18		C	A	3.0	3.4	C	C	C	C	C	C	C	C	C	C	C	C	C			
19		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
20		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
21		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
22		B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
23		B	A	3.2 (3.2)	3.6	3.8	A	A	A	A	A	A	A	A	A	A	A	A			
24		(2.0) ^B	2.7	3.3	3.8	A	A	B	C	A	A	A	A	3.4	A	A	A				
25		A	(2.2) ^J	3.1	A	C	A	A	A	A	A	A	A	B	B	B	A				
26		B	2.7	A	A	B	B	B	B	B	B	B	B	B	B	(3.0) ^R	2.5	A			
27		(2.0) ^J	2.6	3.2 (3.0) ^A	B	A	B	B	B	B	B	B	A	3.4	A	A	A				
28		2.0	(2.8) ^A	3.3	3.2 ^N	B	B	B	B	B	B	B	A	A	B	(2.5) ^A	B				
29		2.1	B	A	A	(3.6) ^J	B	B	C	B	A	A	A	A	A	2.2 (2.1) ^B	A				
30		(2.0) ^B	(2.7) ^R	3.5	B	B	B	B	A	A	A	A	A	B	B	A	A				
31		A	A	A	3.2	A	A	B	A	A	A	A	A	A	A	A	A				
Median Value		(2.0)	2.7	3.2	3.4	3.6	-	-	-	-	-	-	3.3	3.0	2.5	-					
Count		3	12	20	20	17	6	2	3	4	4	4	4	6	9	10	2				

Sweep 1.0 Mc to 17.0 Mc in 1.5 min Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
 (Denki-tsushun Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

Lat. 40° 36.6' N
 Long. 139° 34.1' E

h_p

Fukaura

135° E Mean Time

Day	00	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	110	110	110	110	(110) ^A	A	A	A	A	A	A	C	120	A				
2					B	B	110	110	110	110	(110)	100	110	110	110	100	100	A	A	A				
3					B	A	120	120	A	A	A	A	A	110	110	110	110	110	A	B				
4						A	110	110	A	A	A	A	A	A	A	A	A	A	A	A				
5					E	110	110	110	110	120	110	110	110	A	A	A	A	110	B	B				
6						A	110	110	110	A	110	110	100	100	100	(100)	100	110	110	A				
7						A	110	(110) ^A	110	(110)	110	(110)	110	110	110	110	110	A	A	A				
8						B	110	C	C	C	C	C	C	C	C	C	C	C	A	B				
9						A	A	A	A	A	A	A	A	A	110	110	110	120	A	A				
10						B	110	120	120	120	(120) ^A	110	A	A	A	A	A	A	110	B				
11						B	120	120	110	A	A	A	A	A	A	A	A	110	120	B				
12						B	100	110	A	A	A	A	A	A	A	A	120	110	110	110				
13						B	A	120	110	110	110	110	110	110	A	110	110	(120) ^A	120	B				
14						B	A	A	110	A	A	A	A	A	A	A	110	110	A	A				
15						B	110	120	110	A	A	A	A	A	A	A	110	110	A	A				
16						110	110	110	A	A	A	A	A	A	A	A	A	110	110	A	A			
17						120	110	110	A	A	A	A	A	A	110	A	A	A	C	A	C			
18						C	A	110	110	C	C	C	C	C	C	C	C	C	C	C	C			
19						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
20						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
21						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
22						B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
23						B	A	120	110	110	110	A	A	A	A	A	A	A	A	A	A			
24						B	110	110	110	A	A	A	A	A	A	A	110	110	A	A	A			
25						A	130	120	A	C	A	A	B	B	B	C	B	B	B	A	A			
26						B	110	A	A	B	B	B	B	B	B	B	B	110	110	120	A			
27						B	120	110	120	B	B	B	B	B	B	A	120	A	A	A	A			
28						110	110	(110) ^A	110	110 ^B	B	B	B	B	B	A	A	B	130 ^B	B				
29						BH	B	A	A	100	B	B	C	B	A	B	A	A	100	B	B			
30						B	110	110	120	B	B	B	A	A	A	A	B	B	B	A	A			
31						A	A	A	110	A	A	A	A	A	A	A	A	A	A	A	A			
Median Value							110	110	110	110	110	110	110	110	110	110	110	110	110	120				
Count					1	4	20	21	17	9	7	9	6	6	7	7	12	10	9	1				

Sweep 1.0 Mc to 17.0 Mc in 1.5 min

Manual

FES

Fukaaura

Lat. 40°36.6'N
Long. 139°34.1'E

IONOSPHERIC DATA

155°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	3.4	4.6	4.0	4.2	3.0	3.2	3.6	5.0	6.6	7.4	(9.4) ^B	8.3	6.2	5.0	5.4	10.6	11.6	C	9.0	11.7	9.2	4.7	3.7	2.4	
2	3.0	5.4	3.6	3.6	2.8	2.4	4.6	4.7	9.8	7.2	9.6	5.7	7.0	5.4	7.6	6.2	7.6	7.0	6.2	6.6	5.8	7.6	5.6	2.8	
3	2.6	3.0	2.4	2.4	2.4	2.4	4.3	5.0	7.8	6.8	4.6	5.0	4.6	4.6	4.6	4.2	4.2	4.8	4.0	2.8	3.0	6.6	4.3	6.6	
4	6.4	3.0	4.8	7.6	8.4	4.8	7.0	5.7	9.4	5.8	6.6	5.6	6.6	7.8	(7.6) ^B	6.6	7.3	10.5	11.0	6.0	4.2	4.3	5.0	3.2	
5	3.0	3.0	3.0	2.4	1.4	3.5	4.0	5.8	6.2	10.3	5.4	10.8	1.20	6.2	7.0	12.2	10.8	5.0	4.4	6.2	(7.2) ^B	5.4	7.2	9.8	
6	5.4	4.4	7.6	5.0	4.0	4.0	4.4	6.0	10.6	8.6	7.2	10.4	5.7	4.4	4.2	4.1	6.8	4.8	4.2	4.2	7.6	8.0	6.8	5.9	
7	5.0	5.0	5.0	4.0	3.4	4.0	4.4	6.0	10.6	8.6	7.2	10.4	5.7	4.4	4.2	4.1	6.8	4.8	4.2	4.2	7.6	8.0	6.8	5.9	
8	3.8	4.8	3.6	5.0	4.8	2.4	4.4	C	C	C	C	C	C	C	C	C	C	C	3.0	4.4	7.5	5.0	5.0		
9	C	3.0	5.0	5.0	3.4	5.0	6.1	9.0	8.3	8.4	8.0	7.2	5.9	11.7	11.7	10.5	6.2	5.4	5.2	5.4	7.1	7.5	10.5	7.1	
10	10.5	10.7	7.4	4.8	3.2	3.6	4.8	(10.8) ^B	8.2	9.5	8.9	7.6	5.8	5.4	5.2	5.0	4.8	4.4	5.0	5.1	5.0	8.6	4.4	4.7	
11	5	2.8	3.0	3.0	2.8	3.0	4.0	4.6	9.7	6.6	4.8	4.4	5.4	4.2	4.2	4.0	4.0	4.0	4.2	4.4	4.4	4.0	3.4	3.5	
12	2.6	6	2.3	3.6	3.5	3.6	3.8	5.6	5.6	5.3	5.2	3.1	6.4	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	3.6	
13	3.4	3.1	4.4	3.7	3.7	3.3	3.1	3.0	C	6.0	10.3	6.7	4.8	10.5	6.4	5.4	4.8	6.3	6.0	5.6	6.0	7.0	8.0	3.2	
14	3.7	3.2	5.8	5.5	2.7	3.4	3.9	4.7	6.0	7.6	10.3	6.7	4.8	10.5	6.4	5.4	4.8	6.3	6.0	5.6	6.0	7.0	8.0	3.2	
15	4.2	4.8	5.2	3.4	3.2	3.2	4.6	4.4	5.1	7.2	4.4	11.8	11.8	11.6	11.8	7.2	8.3	7.6	7.3	5.4	4.8	5.5	8.0	5.6	
16	2.2	4.8	7.6	3.6	3.2	3.0	6	5.0	5.9	4.0	4.5	5.4	5.4	7.1	5.5	9.6	4.2	6.2	9.3	5.1	5.6	5.5	6.4	3.6	
17	2.8	3.2	3.4	4.0	3.5	3.0	6	5.0	4.2	5.6	5.4	5.4	6.0	4.8	4.8	5.0	4.2	4.2	4.0	C	5.4	4.2	4.2	2.6	
18	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
22	5.2	4.9	3.4	2.8	2.8	2.3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	7.4	6.8	6.2	
23	3.6	4.0	2.4	5	5	5	3.4	4.0	3.6	4.0	4.2	5.5	7.2	7.6	5.2	5.8	7.0	6.0	5.8	5.2	6.0	7.2	4.0	4.0	
24	4.4	3.6	2.8	2.6	5	5	3.7	3.8	5	(5.0) ^B	5.0	4.6	C	7.2	7.4	4.4	4.2	4.7	7.2	3.4	4.1	2.3	4.5	9.0	
25	4.2	5.2	5	3.4	3.4	2.3	4.4	5	4.6	C	7.3	11.8	6.4	B	B	C	8.2	8.3	8.0	5.6	(6.4) ^B	5	5	5	
26	5	5	5	5	5	5	2.2	4.4	7.0	7.0	7.0	6.0	4.7	7.8	6.6	4.3	6.0	9.8	3.5	6.2	3.4	3.4	2.6	5.0	
27	5.4	5.0	5.0	4.8	5	5	3.8	5.6	8.3	7.2	5.5	6.2	6.4	6.4	B	5.3	4.5	3.4	9.2	6.4	9.0	2.5	5	5	
28	4.0	5.0	5.0	4.0	5	5	3.4	4.3	2.8	6.0	5.6	5.4	B	B	B	3.7	4.1	4.8	5.0	2.9	3.6	(4.2) ^B	5	5	
29	4.2	5.0	2.5	3.4	2.4	2.6	3.6	(3.2) ^B	4.1	5.8	B	B	C	B	5.6	6.2	8.8	8.6	2.8	5	2.4	5	5	5.0	
30	5.0	6.0	6.0	4.0	2.4	B	(3.7)	4.5	5.8	6.4	8.4	9.7	6.0	9.0	9.8	B	4.3	4.8	6.4	8.3	4.6	3.4	2.4	5	
31	4.5	4.2	4.0	4.0	4.0	4.0	(3.8) ^B	5.0	6.0	(11.2) ^B	10.0	(5.0) ^B	4.8	7.0	5.8	5.2	5.2	3.8	4.4	3.4	3.0	5	2.4	3.0	
Median Value	3.8	4.4	3.6	3.6	3.0	3.0	4.0	5.0	6.6	6.8	6.6	6.1	6.0	6.7	5.8	5.3	5.2	5.0	5.1	5.2	5.4	5.5	4.6	4.2	
Count	27	27	28	28	27	26	27	26	25	24	23	22	21	22	22	22	23	23	23	26	25	27	27	28	28

Sweep 1.0 Mc to 17.0 Mc in 1.5 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyuu) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

F₂-M3000

Fukaura

Lat. 40°36.6'N
Long. 139°34.1'E

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	2.7	2.7	2.8	2.9 ^F	2.7	2.7 ^P	3.0	2.6	3.0	2.7	(2.9) ^A	(2.8) ^A	2.8	2.7	2.8	A	A	C	F	A	2.5 ^Z	(2.5) ^Z	2.6	2.7
2	2.7	2.7	2.8	2.8 ^F	2.8	2.8	2.7	2.7	J	2.8	2.6	2.7	(2.6) ^B	2.6	(2.7) ^B	2.9	2.7	2.8	2.9	3.0	2.7	2.6 ^H	2.4 ^F	2.8
3	JF	2.7 ^P	2.9	2.6	2.5 ^F	2.7	2.7 ^P	2.7 ^Z	2.9 ^Z	2.7	2.8 ^T	2.6	2.7	3.3	3.0	2.8 ^P	2.8	2.8	2.7	2.9	2.9	2.7	2.7	2.5 ^F
4	F	JF	3.0	2.6	2.7	2.8	2.7	2.8	3.0	2.5	J	2.7	2.6	2.7	2.8	2.8	2.8 ^P	2.9	A	2.8	2.6	2.5	2.5	2.7
5	2.8	2.8	2.9	2.8	2.6 ^F	3.1	2.8	2.9	2.8	2.8	J	A	A	2.8	2.8	(2.8) ^A	2.8 ^P	2.9	2.9	2.8	2.8	2.7 ^Z	2.6 ^Z	(2.8) ^A
6	2.8 ^Z	2.8	2.8 ^F	(2.8) ^F	(2.8) ^F	2.9	2.8	2.9	2.9 ^A	2.9	2.9	2.7	2.7	2.7	2.8	2.8	2.9	2.8	2.8	2.7	2.9	2.8 ^P	2.6	2.7
7	2.7	2.7	JF	3.0	2.9	2.9	2.9	3.3	(3.0) ^A	2.7	2.7	2.7	2.6	2.6	2.7	2.7	2.9	2.6	2.7 ^H	2.9	2.8 ^P	2.6	2.6	2.6
8	2.9	2.6	2.7	2.8 ^F	2.6 ^F	2.9	C	C	C	C	C	C	C	C	C	C	C	C	C	3.0	2.9	2.6	2.6	2.6
9	(2.7)	2.8	2.9	2.8	2.7	2.9	2.8 ^H	(3.3) ^A	3.3	A	A	J	2.9	2.9	2.9	2.9	3.0	3.1	3.1	2.8	2.6 ^P	2.5	2.5	2.6
10	A	A	(2.8) ^F	F	F	2.8	3.3	(3.3) ^A	3.3	(3.6) ^A	A	J	2.9	2.9	2.8	2.9	2.8	3.0	3.0	2.9	2.8	2.8	2.8	2.8
11	2.7	2.9	2.8	2.8	2.9	2.7	3.0	3.1	3.0	3.1	2.6	2.8	2.7	2.8	2.9	2.8	2.8	2.9	3.0	2.9	2.9	(2.8) ^C	2.8	2.9
12	J	2.8	2.7	2.9	2.8	2.7	2.8	2.8	3.0	2.9	3.0	2.7	2.8	2.8	3.0	2.9	2.8	2.9	3.1	2.9	2.9	(2.8) ^C	2.8	2.9
13	2.8	2.8	2.6	2.6	2.9	2.9	2.9	(2.8) ^C	2.8	2.8	2.7	2.8	2.7	2.7	2.7	2.7	2.8	2.8	3.0	2.9	2.9	(2.8) ^C	2.8	2.9
14	2.8	2.6	JF	JF	JF	2.6	2.9	2.7	J	A	A	J	2.5	2.5	2.8	2.6	2.7	2.7	J	2.8	3.0	2.8	A	F
15	2.6	JF	JF	2.5	2.8	2.8	2.1	3.1	(2.9) ^A	2.7	A	A	A	A	A	J	2.8	3.0	3.1	2.9	2.7	2.5	2.8	F
16	2.8	2.5	2.8	F	F	2.9	3.1	3.2	2.9	3.2	2.6 ^H	2.7	2.7	2.8	2.7	2.8	3.0	2.9	(2.9) ^A	2.9	2.7	JF	2.9	2.8
17	2.7	(2.6) ^F	(2.7)	2.8	2.7	2.6 ^R	2.6	2.8	3.0	3.2	2.4	2.7	2.8	2.7	2.8	2.7	3.0	(3.0) ^C	3.1	(3.0) ^C	3.0	2.5	2.7	2.8
18	2.7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	2.7	2.9	2.8	2.8	2.7	3.0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	3.0	2.8	2.8	2.8	2.8	2.8	3.0	3.0	3.0	3.0	2.7	2.7	2.6	2.8	2.7	2.6 ^F	JH	3.1	3.1	3.1	2.9	2.8	2.8	2.7
24	2.8	2.7	2.9	2.9	2.7	(2.8) ^C	3.0	3.0	3.0	F	C	B	C	2.8	J	J	2.9	2.9	3.0	2.7	2.7	2.7	2.7	2.7
25	2.6	2.6	2.5	2.8	2.8	2.7	2.9	J	2.8	(2.8) ^C	2.9	(2.8) ^C	2.7	2.7	2.7	(2.8) ^C	3.0	2.9	3.0	2.8	2.9	2.5	2.5	2.5
26	2.4	2.7	3.0	2.7	2.6	2.7	(2.7)	2.8	3.0	2.9	2.5	2.6	2.7	2.8	2.8	2.8	2.8	(2.8) ^A	2.9	2.7	2.6	2.6	2.7	(2.6) ^F
27	(2.6) ^F	3.0 ^F	2.7	(2.5) ^V	2.9	3.0	3.1	2.7	2.8	2.7	2.8	2.7	2.6	2.6	2.7	2.7	2.7	3.0	(2.9) ^A	2.9	J	J	2.7	2.6
28	2.9	2.8	2.7	2.7	2.9	2.8	2.9	2.8	3.0	2.9	2.6	2.5 ^P	(2.6) ^B	2.7	2.9	2.8	2.9	3.0	2.8	2.9	2.7	2.9	2.7	2.6
29	2.7	2.7	2.7	2.7	2.7	3.0	(3.0) ^C	3.0 ^P	2.8	2.8	2.7	2.8	(2.7) ^C	2.7	2.7	2.8	2.8	3.0	2.9	2.8	2.8	2.7	2.8	2.7
30	2.5	2.6	2.7	2.8	2.8	3.0	2.9	2.7	2.8	2.8	2.8	2.8	2.8	2.8	(2.7) ^A	2.8	2.7	2.8	2.9	2.8	2.8	2.8	2.7	2.7
31	2.7	2.7	2.7	2.7	2.8	3.1	3.0	2.8	2.8	A	A	2.7	2.7	2.7	2.8	2.9	2.9	2.8	3.1	3.1	2.9	2.5	2.8	2.8
Median Value	2.7	2.7	2.8	2.8	2.7	2.8	2.8	2.9	2.9	2.8	2.7	2.7	2.7	2.7	2.8	2.8	2.9	2.9	2.9	2.9	2.8	2.7	2.7	2.7
Chart	24	25	24	25	24	27	26	24	21	20	19	20	22	24	23	22	23	22	24	25	25	22	25	27

Sheep J.O. Mc to 17.0 Mc in 15 min Manual

ff min

Fukaura
 Lot 4P-36CN
 Long 139 541 E

IONOSPHERIC DATA

135° E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	3.0 ^A	2.4 ^A	1.8	1.8	1.8 ^A	2.6 ^A	3.0 ^A	A	A	A	A	A	A	A	A	A	A	C	A	A	1.9	1.8	A	1.8
2	1.8	1.8 ^A	2.0	1.8	2.0	2.2	3.0	3.6	A	A	A	A	A	A	A	A	A	A	2.6 ^A	A	A	1.8	A	1.8
3	1.8	2.0	1.8	2.0	2.2	2.3	2.9	A	A	5.4	5.4	5.4	A	5.4	5.7	5.6	3.8 ^A	A	A	2.4 ^A	2.0	2.0	2.0	2.0
4	2.0 ^A	2.0	2.0	2.0	2.0	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	1.8	A	1.5
5	2.0 ^A	A	A	1.4	1.4	2.0	2.4	3.6 ^A	A	A	7.3	A	A	A	A	A	A	3.1	2.3 ^A	2.0 ^A	2.0 ^A	1.8	1.8	A
6	1.8	2.0	1.8	2.2	2.0	2.0	A	A	A	A	A	A	A	A	A	A	A	A	3.1	2.3	A	3.0 ^A	3.0 ^A	2.0
7	A	2.0	2.0	2.6 ^A	2.4 ^A	2.8	A	A	A	A	A	A	A	5.0	A	3.8	A	A	A	A	A	2.8 ^A	2.4	2.6 ^A
8	2.6 ^A	2.2	2.0	2.0	2.0	2.4	A	C	C	C	C	C	C	C	C	C	C	C	A	A	A	2.0	2.0	1.8
9	2.0	1.8	2.2 ^A	1.8	A	3.0 ^A	A	A	A	A	A	A	A	A	4.5	A	A	A	A	A	A	A	A	A
10	A	A	A	A	1.4	2.0	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
11	2.0	2.0	2.0	2.0	2.2	2.2	A	A	A	A	4.4 ^A	A	A	A	3.8	(3.8) ^B	A	A	A	A	2.8	2.0	1.9	2.0
12	2.0	1.8	1.9	1.9	2.0	2.6	3.0	A	A	A	5.3	A	A	A	6.2	5.3	4.5	3.2	2.5	A	A	C	2.4	2.0
13	1.4	2.0	2.0	2.0	2.0	2.8	3.0	3.0	C	A	5.3	5.4	5.4	5.4	5.5	A	3.7	4.5	A	A	A	C	2.4	2.0
14	2.0	2.0	A	2.0	2.0	2.2	2.4	2.4	A	A	A	A	5.2	A	A	A	3.6	A	A	A	A	A	A	A
15	A	2.7	2.2	1.9	1.8	2.2	3.4	3.7	A	A	6.0	A	A	A	A	A	A	A	A	A	A	A	A	A
16	2.0	A	A	A	1.4	2.0	2.9	3.1	A	5.2	(6.0) ^S	A	A	A	A	A	A	A	A	A	2.4	A	2.2	2.4
17	2.0	2.0	2.0	2.0	2.0	2.2	3.0	A	A	A	A	A	A	A	A	A	A	A	A	C	2.0	2.2	2.0	2.0
18	2.0	2.0	2.0	2.0	C	C	3.5	A	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	A	A	2.2	1.2	2.5	1.9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
23	2.2	A	1.4	1.5	1.4	2.0	3.0 ^A	3.6	5.4	5.4	5.6	A	5.8	A	A	A	A	A	A	A	2.4	A	2.4	A
24	A	1.9	1.8	1.6	2.0	2.2	2.8	3.3	3.9	A	6.4	A	A	A	A	A	A	A	A	A	2.1	1.9	2.0	A
25	1.9	1.8	1.6	1.8	1.7	1.7	3.5	3.2	A	C	A	A	5.6	5.4	C	A	A	A	3.6	A	A	1.3	1.3	1.5
26	1.6	1.8	1.8	1.8	1.8	2.1	A	A	A	A	5.2	A	5.2	A	A	4.7	A	2.9	A	A	2.0	2.5	2.2	2.0
27	3.0	A	A	A	2.0	2.7	3.0	A	A	A	A	A	A	5.0	A	3.9	A	A	A	A	A	2.0	2.0	1.8
28	A	A	A	A	1.4	2.2	3.1 ^A	3.9 ^A	A	A	A	A	7.2	5.5	5.3	4.2	4.0 ^A	A	A	2.8 ^A	1.7	(2.5) ^B	1.7	1.7
29	A	A	1.7	1.8	1.8	2.1	2.9	3.8	A	5.4	5.2	(5.2) ^C	5.2	A	4.6 ^A	A	A	A	2.4	2.2	2.0	2.0	2.0	2.0
30	2.2	A	A	A	1.8	2.0	2.9	3.8	A	A	A	A	A	A	A	5.4	5.0	A	A	A	A	2.4 ^A	2.3	1.8
31	A	2.0	2.0	2.0	A	2.6 ^A	A	A	A	A	A	5.4	A	A	A	A	A	A	A	2.2	2.0	1.7	1.5	A
Median Value	2.0	2.0	2.0	1.9	2.0	2.2	3.0	3.6	-	(5.4)	(5.4)	(5.2)	(5.2)	(5.5)	(5.3)	(4.6)	(4.0)	(3.2)	(2.6)	(2.3)	2.0	2.0	2.0	2.0
Count	19	19	21	23	25	26	18	12	2	2	9	6	7	6	7	9	8	5	6	7	13	18	19	18

Sweep I.Q. Mc to I.F.O. Mc in ~1.5 min Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

Lat 40°36.6'N
Long 139°41'E

Fukaura

135°E Mean Time

fE min

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	2.6	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.7	2.2	2.2	2.4	2.0	2.0	2.0	2.0	2.0	2.0	1.8	1.8	1.8	1.8	1.8	1.8
2	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.9	1.9	2.1	1.9	2.0	2.0	2.0	2.0	1.8	1.8	2.0	1.8	1.8	1.8	1.8	1.8
3	1.3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.8	2.0	2.4	2.3	2.0	2.0	2.2	2.0	2.0	2.0	2.0	1.8	1.7	1.5	1.8	1.8
4	1.8	B	B	B	B	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.0	2.0	2.0	2.0	2.0	1.8	1.7	1.8	1.5	1.8	1.8
5	1.2	1.4	1.4	2.0	E	2.0	1.8	1.8	2.0	2.2	2.2	2.3	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.8	1.8	1.8
6	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	2.0	2.2	2.2	2.3	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
7	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.7	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.8	2.0	2.0	2.0
8	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.8	1.8	2.0	2.0	2.0	1.8
9	1.8	1.8	1.4	4	1.4	1.8	2.0	2.0	1.8	1.8	2.0	2.4	2.3	1.9	1.9	2.0	1.9	2.1	2.7	1.9	1.8	2.0	1.9	1.9
10	1.3	1.4	1.4	1.4	1.4	1.3	1.8	1.8	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.8	1.7	2.0	1.5	2.0
11	2.0	2.0	2.0	2.0	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.4	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
12	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.8	1.8	1.8	2.2	2.3	2.2	2.3	2.2	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8
13	1.4	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.4	2.2	2.2	2.2	2.2	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8
14	1.8	1.8	1.8	1.8	1.8	2.0	2.0	1.9	1.9	1.9	2.2	2.3	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	1.4	1.8	1.7	1.8
15	1.6	1.7	1.8	1.7	1.4	1.4	1.5	1.8	2.0	2.0	2.0	2.0	2.2	2.6	2.1	2.1	2.0	2.2	2.0	2.0	2.0	2.0	2.0	2.0
16	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.6	2.0	2.0	2.0	2.3	2.0	2.0	2.0	2.0	2.0	2.0
17	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.6	2.0	2.0	2.0	2.3	2.0	2.0	2.0	2.0	2.0	2.0
18	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.6	2.0	2.0	2.0	2.3	2.0	2.0	2.0	2.0	2.0	2.0
19	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.6	2.0	2.0	2.0	2.3	2.0	2.0	2.0	2.0	2.0	2.0
20	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.6	2.0	2.0	2.0	2.3	2.0	2.0	2.0	2.0	2.0	2.0
21	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.6	2.0	2.0	2.0	2.3	2.0	2.0	2.0	2.0	2.0	2.0
22	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.6	2.0	2.0	2.0	2.3	2.0	2.0	2.0	2.0	2.0	2.0
23	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
24	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
25	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
26	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
27	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
28	1.6	1.4	1.6	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
29	1.8	1.6	2.2	1.8	1.8	2.2	2.8	2.7	2.9	4.1	B	B	B	B	3.4	3.8	2.8	2.8	2.9	2.3	1.7	1.8	1.7	1.8
30	2.0	1.8	1.8	1.8	2.0	1.8	1.8	2.2	2.7	4.4	5.1	5.0	2.8	1.8	2.6	B	3.5	2.7	1.7	1.7	1.7	1.7	1.7	2.3
31	1.6	1.8	1.8	1.8	1.8	2.0	1.6	2.0	2.2	2.4	2.8	2.0	3.0	5.0	3.2	2.6	2.6	2.2	2.2	2.0	1.7	1.7	1.7	1.7
Median Value	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.0	2.2	2.3	2.3	2.2	2.2	2.0	2.0	2.0	2.0	1.9	1.8	1.8	1.8	1.8
Count	28	27	27	28	27	26	27	26	25	25	24	24	23	22	23	23	25	25	26	26	27	28	28	28

Sweep 110 Mc To 13.0 Mc In 13 min Manual

IONOSPHERIC DATA

37°57'0"N
139°13'5"E
Shibata

f_oF₂

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	4.2	4.3	4.6	4.5	4.8	4.9	10.1	C	C	C	C	C	C	C	C	C	C	8.8	8.7	9.3	9.2	AF	F	F	
2	4.4	(4.1)	4.2	4.3	4.6	4.6	8.6	4.6	(4.6)	4.3	4.8	4.5	4.5	4.5	4.7	10.0	9.5	9.2	8.9	8.3	8.1	8.3	8.5	8.6	
3	8.5	(8.6)	(8.6)	(7.8)	7.7	8.7	9.7	10.2	9.9	A	A	8.8	(9.1)	9.4	9.6	8.4	8.9	8.5	8.5	8.9	8.4	8.8	9.2	4	F
4	(4.5)	4.5	4.5	FN	SF	F	9.6	10.9	10.7	8.8	(9.0)	9.2	10.1	10.6	11.0	11.0	10.0	9.2	10.0	9.3	8.9	C	F	F	
5	(4.2)	11.5	9.2	8.7	F	8.1	9.2	8.9	9.8	A	A	9.3	9.3	9.6	A	A	9.9	9.1	9.0	9.2	9.1	8.8	9.0	9.4	
6	8.7	9.0	8.6	7.9	7.6	7.7	8.7	9.8	9.4	9.2	9.5	9.7	9.4	9.6	9.3	9.6	10.3	9.0	9.2	9.6	9.1	8.5	9.0	9.0	
7	9.0	8.3	8.4	(7.8)	6.9	7.2	8.4	8.7	8.4	8.3	8.8	9.8	9.6	9.6	9.3	9.8	9.4	9.0	9.7	10.0	9.3	9.4	9.7	9.4	
8	9.2	8.1	8.3	8.1	7.9	8.8	9.9	C	C	C	C	C	C	C	C	C	C	8.8	8.4	8.6	9.0	8.7	SF	SF	
9	9.0	9.0	8.1	7.4	(7.1)	(7.9)	8.7	8.8	(8.6)	8.4	8.0	8.0	8.0	8.0	8.2	7.9	7.7	7.4	6.6	7.1	8.6	(8.8)	9.0	(8.1)	
10	7.1	A	F	F	S	6.9	8.9	(7.9)	6.9	(7.0)	7.8	7.9	7.5	8.0	8.4	8.9	8.8	8.3	7.7	7.5	7.3	8.3	7.6	7.4	
11	7.1	7.1	7.5	6.6	6.2	6.5	8.9	9.5	9.1	7.4	7.1	7.5	8.2	9.4	9.0	8.0	7.1	7.4	7.1	8.0	8.0	7.4	7.7	7.2	
12	7.1	6.7	6.3	6.3	6.1	6.6	8.2	9.6	10.0	9.0	9.8	9.2	9.6	10.3	9.7	9.1	8.0	8.0	7.9	8.2	(8.4)	8.6	8.6	8.0	
13	7.0	7.1	6.6	6.8	7.2	7.3	8.9	9.4	9.6	8.7	9.6	9.6	10.2	10.1	10.1	10.2	9.1	9.0	10.1	9.7	7.7	5.8	5.1	6.0	
14	5.7	(5.6)	F	F	F	(6.4)	6.5	A	A	A	B	A	5.9	(6.1)	6.2	6.0	5.8	6.2	6.4	5.9	A	S	S	S	
15	5.1	F	F	F	F	5.6	5.4	7.2	C	C	C	C	C	C	C	C	C	7.9	7.7	A	A	6.4	6.5	S	
16	6.7	6.7	SF	SF	6.2	6.5	(7.1)	7.7	7.9	7.5	C	C	C	8.6	9.2	9.2	(8.4)	7.6	7.4	7.9	(7.5)	7.1	F	F	
17	7.6	(7.6)	7.4	(6.9)	6.4	6.4	7.5	7.2	6.6	6.6	6.3	6.3	7.1	7.9	8.0	8.0	8.4	8.1	7.7	7.2	7.1	7.4	F	S	
18	6.9	6.9	6.9	6.5	6.3	7.6	8.7	8.4	7.0	7.6	C	S	C	8.3	8.2	7.5	7.2	6.9	7.1	7.4	7.5	7.5	8.0	8.2	
19	7.3	7.1	7.0	6.9	6.8	7.1	8.4	9.7	9.2	8.7	8.3	8.9	9.6	9.9	9.6	8.1	9.0	8.3	8.3	8.3	8.3	8.3	8.0	8.3	
20	7.8	7.2	7.0	6.6	6.8	7.4	7.3	(7.5)	7.8	7.8	9.1	9.5	9.6	9.4	(8.7)	7.2	7.7	8.0	8.3	9.1	7.4	7.6	7.7	7.9	
21	7.7	7.4	7.3	7.3	7.5	7.4	7.8	8.2	7.6	7.6	9.0	9.1	8.8	C	C	C	C	7.7	7.5	7.8	7.9	7.8	7.7	7.9	
22	F	F	F	F	F	8.3	8.8	C	C	C	C	C	C	C	C	C	C	C	C	8.1	8.9	8.8	7.7	8.0	
23	FS	S	7.0	6.5	5.7	7.0	7.4	8.5	7.8	(7.8)	7.8	7.8	8.5	9.5	9.6	B	B	8.8	(7.9)	7.4	A	S	S	S	
24	S	S	8.0	(7.2)	6.8	7.4	8.8	(7.0)	8.0	8.0	7.8	8.5	S	8.7	9.1	S	S	S	8.8	(7.9)	7.4	S	S	S	
25	S	7.5	6.7	6.5	S	S	S	S	S	7.8	(8.4)	9.0	8.8	9.2	10.0	10.1	10.1	9.1	S	A	S	F	F	F	
26	F	F	F	F	F	7.2	9.1	(10.1)	9.1	8.7	9.1	10.1	10.7	10.5	10.8	9.6	8.4	8.0	7.9	S	S	S	S	S	
27	SF	8.3	SF	SF	7.0	7.6	9.0	9.7	C	C	9.7	9.7	(9.5)	9.2	9.1	8.3	8.5	8.5	(8.3)	(8.2)	(8.0)	S	S	S	
28	S	S	7.3	7.3	(6.5)	(7.2)	8.1	9.5	8.4	8.0	8.5	9.0	10.4	10.3	9.5	8.2	8.3	7.8	7.9	S	S	S	S	S	
29	(8.2)	8.0	7.2	7.1	7.1	7.9	8.7	C	C	C	C	C	C	C	C	C	9.8	10.1	9.0	B	B	B	B	(8.1)	
30	S	FS	FS	S	6.3	6.9	(7.1)	S	8.6	9.0	9.3	9.6	10.4	10.4	10.4	10.4	10.0	10.0	9.4	(9.0)	8.6	8.4	8.2	8.1	
31	S	C	8.2	6.3	6.4	7.5	9.1	(9.0)	8.8	9.0	9.0	(8.7)	9.6	9.6	S	S	S	8.2	8.2	8.2	F.S	S	(7.5)	(7.5)	
Median Value	7.8	7.8	7.5	7.2	6.8	7.4	8.7	9.2	8.7	8.2	8.9	9.1	9.4	9.4	9.3	8.9	8.5	8.4	8.3	8.5	8.1	8.2	8.1	8.1	
Count	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	

Sweep 1.0 Mc to 17.0 Mc in 1.5 min. Manual

S 1

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyujo) Gotanda, Shimagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

Shibata
37°37.0'N
139°15.8'E

hr F.

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	S	S	290	370F	360	320	370	C	C	C	C	C	C	C	C	C	C	C	340	320	300	A	AF	F	F
2	380F (340)	350F	300	300	300	300	290	340	310 (330)	350	360	370	370	360	350	350	310	310	310	400	360	360	350	360	360
3	350F	330F	310F	350F	340F	320	300	300	320	A	A	420	380	340	360	360	360	370	310	300	320	340	360	320	320
4	(320)F	310F	FN	SF	SF	F	320	300	270	320 (320)	A	A	380	350	340	340	360	370	310	300	310	C	F	F	F
5	(300)F	300F	290F	330	F	360F	320	350	360	A	A	360	360	350	340	A	300	310	310	300	320	320	360	320	
6	340F	320	330	300	300	300	320	300	290	320	300 (340)	380	330	350	340	A	300	210	340	320	300	340	360	350	
7	330	320F	310F	290F	270	300	290	300	290	340	320	320	360	360	350	320	300	330	330	310	300	320	350	300	
8	290	400	350F	310F	320	320	320	C	C	C	C	C	C	C	C	C	C	210	300	310	310	310	SF	SF	
9	320F	320F	290F	310	340F	(330)	310	300	A	310	350	310	370	360	310	320	290	300	310	370	330	320	330	310	
10	380	(350)	(350)	400F	(380)	360	360	AF	A	340	350	310	360	330	330	310	300	280	290	280	330	360	330	310	
11	340P	340	320	330	320	370	310	280	A	(300)	340	330	360	310	310	310	300	320	210	290	280	310	370	320	
12	320	340	300	300	290	310	350	350	280	350	340	330	320	310	240	300	290	290	240	200	300	310	370	300	
13	320	330	310	340	310	310	280	300	300	320	350 (350)	340	350	350	340	340	340	360	290	290	250	360	300	370	
14	370F (360)F	F	F	F	(360)F	350F	A	A	A	A	A	A	A	A	A	A	A	A	320	360	360	A	S	S	
15	SF	F	F	F	(330)F	290	C	C	C	C	C	C	C	C	C	C	C	A	(300)	A	A	390	S	SF	
16	310F	360F	SF	SF	320	280	(290)	290	200	300	C	C	C	C	320	310	310	360	(320)	390	360	360	F	F	
17	340F	320	320	320	320	320	320	(300)F	320	300F	A	G	G	G	330	360	320	280	290	270	260	290	F	S	
18	370	360	320	370	370	350	310	280	310F	320	C	S	C	340	370	320	300	310	290	300	310	350	410	310	
19	340	270	250	280	280	280	320	310	290	330	340	370	360	330	340	310	310	310	310	310	C	B	F	340	
20	290F	280F	330	340F	290	270	290	A	A	340	320	310	340	300	(320)	340	260	290	(300)	290	210	(350)	390	380	
21	340	210	320	330	270	280	290	290	360	390	350	330	C	C	C	C	C	300	290	290	320	380	390	F	
22	F	F	F	F	F	340F	350	C	C	C	C	C	C	C	C	C	A	C	310	280	360	A	S	(380)	
23	FS	S	240F	320F	320	290	290	280	290	(310)	220	400	380	380	370	B	B	310	(290)	A	S	S	S	S	
24	S	S	280	(300)	350	330	300	(260)	(340)	340	330	360	S	310	340	S	S	S	S	S	S	S	S	S	
25	S	330	300	300	S	S	S	S	S	330	(320)	310	340	340	240	260	300	300	S	A	S	F	F	F	
26	F	F	F	F	F	350	340	(240)	(320)	350	330	340	(200)	330	330	310	320	320	300	300	S	S	S	S	
27	SF	250	310	SF	310	310	340	300	350P	(320)	350	400	350	350	310	330	320	320	310	(390)	(340)	S	S	S	
28	S	S	330	300	300	(300)	290	340P	C	C	C	C	C	C	C	C	320	280	300	300	S	S	(360)	(360)	
29	(360)	320	300	350	300	300	280	C	C	C	C	C	C	C	C	C	330	320	310	310	B	B	B	S	
30	S	FS	FS	S	300P	(310)	310	(340)	(320)	300	320	(320)	310	320	(320)	310	330	310	250	(310)	320	330	330	310	
31	S	C	210	240	300	280	(290)	280	360	340	340	(220)	310	310	S	S	S	320	270	280	FS	S	(370)	(350)	
Median Value	340	340	320	320	310	310	300	300	300	330	340	350	360	360	340	320	310	310	310	350	300	320	350	360	360
Count	20	22	23	23	26	24	30	22	21	21	20	23	23	24	23	21	23	24	28	23	21	18	16	17	

Sweep 1.0-Mc to 1.7-Mc in 1.5 min

Manual

IONOSPHERIC DATA

h_pF₂

Shibata

Lat 37°37.0'N
Long 139°15.8'E

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	280	250 ^A	230 ^A	230	280	290	300	C	C	C	C	C	C	C	C	C	C	220	280 ^A	280 ^A	(240) ^A	AF	AF	270 ^A	
2	280	270	270 ^A	240 ^A	230	280	300	300	260	(300) ^A	330	330	320	350	330	330	300 ^A	A	250 ^A	280 ^A	A	320 ^A	310 ^A	280	
3	280	260	220	250	280	240 ^F	(270) ^A	(300) ^A	240	240 ^A	(320) ^A	350	(340) ^A	320	330	300	310	280	260 ^H	(270) ^A	230 ^A	270 ^A	270	280	
4	(300) ^A	240	(300) ^A	240 ^A	(300) ^A	220 ^F	240 ^A	240 ^A	240 ^A	270	(250) ^A	330	330	320	300	310 ^A	A	A	(240) ^A	250 ^A	270 ^A	(240) ^A	310 ^F	(300) ^A	
5	260	220	220	270 ^A	250 ^F	220	260	250	260 ^H	A	A	340	310	310	A	A	300 ^A	290	240	240	240	250	(300) ^A	260	
6	260	270	(250) ^A	250	(300) ^A	240	230	250	280	280	310	380	320	330	310	310	280	300	300	270	250	260	270	280	240 ^A
7	260	300 ^A	300 ^A	250	240	220	250	230	280	260	310	300	310	330	300	300	300	310	260	310	260	230	250	240	(300) ^A
8	250	300 ^A	280 ^F	230	240	260	250	C	C	C	C	C	C	C	C	C	C	290	260	240	230 ^F	(300) ^A	300 ^A	300 ^A	
9	270	280	260	250	280	250	230	270 ^F	(280) ^A	290	310	300	360	330	300	310	270	280	290	240	240	280	(240) ^A	290	230
10	320	360	310 ^A	300 ^A	340	240	210	(230) ^A	300 ^A	(330) ^A	350	300	360	330	320	300	280	280	280	250	240	300 ^A	240	290	230
11	280	260	270	220	270	270	270	260 ^A	250	(300) ^A	280	270	340	300	290	290	310	300	270	270	230	220	230	280	280
12	260	250	260	260	270	270	270	250	260	240	240	310	300	(300) ^A	280	280	290	280	270	260	260	(300) ^A	250	230 ^F	
13	240	250	270	270	270	280	240	250	270	310	310	(310) ^A	300	320	320	320	310	330	250	210	260	240 ^A	(350) ^A	290 ^A	(300) ^A
14	310 ^A	(280) ^A	(230) ^A	(230) ^A	250 ^F	290 ^K	310 ^K	A ^K	A ^K	A ^K	510 ^K	(470) ^A	430 ^A	(410) ^A	390 ^A	340 ^K	340 ^K	340 ^K	300 ^K	280 ^K	320 ^K	A ^K	A ^K	A ^K	A ^K
15	290 ^A	(280) ^A	A ^K	A ^K	(300) ^A	260	240	C	C	C	C	C	C	C	C	C	A	(200) ^A	A	A	250	290	(230) ^A	(350) ^A	
16	270	290	250 ^A	230	270	240	230	250	280	300 ^A	C	C	C	320	310	300	(200) ^A	340 ^A	300 ^A	240	240 ^F	(300) ^A	260	(300) ^A	
17	(300) ^A	280	280	(300) ^A	260	300	310	280	240 ^F	300	A	G	400	330	350	300	300	280	260 ^F	250 ^F	240	240 ^F	240	290	
18	240	260	270	270	240	250	290	280	300	200	C	S	C	320	300	310	300	310	280	270	220	220	300	260	
19	260	280	240	300 ^A	270	220	230	240	230	240	240 ^H	350	340	(320) ^A	220	360	300	300	290	C	C	C	220	A	280
20	220	220	240	260	240 ^F	260	260	(280) ^A	(200) ^A	(200) ^A	360	300	310	300	300	(200) ^A	300	300	240	(270) ^A	240 ^A	(230) ^A	(300) ^A	(200) ^A	
21	(300) ^A	(320) ^A	260	220	230	260	260	280	240 ^F	300	350	330	320	C	C	C	C	C	300	270	260	220 ^H	300 ^A	280	
22	(300) ^A	(300) ^A	240	280	270	260	260 ^F	C	C	C	C	C	C	C	C	C	C	A	C	280	250	220	220	310	
23	280	250	230	250	210	210	220	270	(240) ^A	(310) ^A	320	400	380	320	(320) ^A	(320) ^A	290	270	270	A	AF	S	AS	AS	
24	AS	AS	(230) ^A	230	(270) ^A	270	240	250	220	(280) ^A	240 ^S	320	300	300	270	320	220	310	270	(270) ^A	270 ^S	260 ^F	S	S	
25	S	(300) ^A	(300) ^A	(300) ^A	300	290	250	220	S	S	C	310	340	330	330	330	280	290	A	A	(250) ^A	(300) ^A	280	(240) ^A	
26	300 ^A	270	250	240	280	300	270	260	(240) ^A	310	(300) ^A	330 ^F	300 ^A	300	(300) ^A	300	280	310	270	280	300	220 ^H	300 ^A	280	
27	260	220	A	260	260	230	240	230	C	C	C	340	330	330	310	270	310	290	290 ^F	(280) ^A	260 ^F	(280) ^A	270		
28	(300) ^A	240	240	250	240	240	240	230	280	(310) ^A	330	370	330	300	300	300	300	240	300	AF	250	240	270	270	
29	280	(300) ^A	280	250	270	290	260	C	C	C	C	C	C	C	C	C	310	300 ^A	270	240	260	270	230	240	
30	290	240	280	250	220	240	(260) ^A	250	300	(300) ^A	300	300	300	300	300	300	300	300	260	240	260	240	260	250	
31	260	(250) ^A	240	230	250	270	A	A	300 ^H	(300) ^A	300	330	300	(290) ^A	300	300	300	300	300 ^A	260	250	280	290	270	
Median Value	280	280	260	250	270	260	260	270	300	310	330	330	320	310	300	300	300	300	270	270	250	250	280	290	280
Count	24	30	24	30	31	31	31	24	22	22	20	24	24	25	24	24	25	28	28	24	26	28	28	26	28

Sweep 1.2 Mc to 15.0 Mc in 1.5 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denkitsu-shin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

f_oF_2

Lat. 37°57.0'N
Long 139°15.8'E

Shibata

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					L	L	L	C	C	C	C	C	C	C	C	C	C	(4.8) ^L	AF	AF				
2					F	A	L	A	A	A	L	A	A	A	5.3	5.4	A	A	A	A				
3					L	A	A	A	A	A	A	A	A	5.8 ^J	5.7 ^J	5.3	(5.0) ^J	4.3	F	A				
4					Q	L	A	A	A	6.1	A	A	5.8 ^J	5.5	(5.5) ^A	A	A	A	A	A				
5					Q	L	L	L	4.5	A	A	6.1	5.4	A	A	A	A	4.7 ^J	A	A				
6					Q	L	L	L	L	A	A	A	A	A	A	5.5	(4.5)	4.3	L	L	L			
7					Q	L	L	Q	A	A	5.4	5.0	5.1	5.3	5.0	A	A	L	A	A				
8					L	L	L	C	C	C	C	C	C	C	C	C	C	3.9	L	A				
9					L	L	L	A	4.8	5.2	(5.3) ^A	5.4	5.5 ^J	5.2	4.9	4.8	L	L	A	A				
10					Q	A	4.2 ^F	A	A	A	5.0	(5.0) ^J	5.0	4.7	L	L	L	L	A	A				
11					L	A	A	A	A	4.9	4.7	5.2	4.9	(4.9) ^B	A	L	L	A	3.8	A				
12					L	L	L	L	L	A	4.8	5.4	A	A	A	A	L	4.6	(4.2) ^J	(3.9) ^F	L			
13					L	L	L	L	A	4.9 ^L	5.0	(5.0) ^A	5.0	5.2	4.8	4.8	4.8	4.8	4.7	A	A			
14					L	3.9	A	A	4.5 ^F	4.7	(4.8) ^A	4.8	(4.8) ^A	4.7	4.7	4.7	4.7	4.7	L	A	A			
15					L	L	L	C	C	C	C	C	C	C	C	C	C	A	A	A				
16					Q	L	L	L	A	A	C	C	C	4.8 ^J	5.0	A	A	A	A	A				
17					L	4.1 ^F	4.3	(4.7) ^A	5.0	(5.2) ^A	5.4	5.5 ^J	A	B	5.0	4.8	4.8	4.5	4.2	L				
18					Q	A	(4.0) ^F	4.9 ^L	5.1	(5.1) ^L	5.1	(5.2) ^L	5.2	5.0	4.7 ^L	4.7 ^L	4.7 ^L	4.5 ^L	A	A				
19					Q	L	L	L	4.3	5.0 ^B	5.2	5.4	5.2	(5.4) ^F	5.3	4.8	4.7	L	L	C				
20					L	L	L	A	A	5.2	5.5	5.5	5.7	A	A	A	4.6	A	A	A				
21					Q	4.0 ^F	L	A	B	B	5.1	5.3	C	C	C	C	C	L	4.0	Q				
22					Q	L	L	C	C	C	C	C	C	C	C	C	C	A	C	L	L			
23					Q	Q	L	A	A	(5.2)	(5.7) ^J	(5.5) ^A	5.2	A	A	A	A	A	A	A				
24					Q	3.9 ^J	A	S	S	S	S	S	5.7 ^S	A ^J	S	S	S	S	A	A	S			
25					L	S	S	S	C	A	6.2 ^J	(5.4) ^J	5.2	(5.1) ^S	5.0	A	A	A	A	A				
26					L	L	L	L	A	L	L	5.6	A	A	A	(5.0) ^A	4.8	L	L	L				
27					Q	L	L	L	C	C	C	L	(5.8) ^J	(5.5) ^A	5.2	L	(5.1) ^L	(4.3) ^J	FL	C				
28					Q	L	L	L	A	5.4	(5.6) ^A	(5.8) ^A	5.6	5.4	5.4	(5.0) ^A	4.5	L	AF					
29					L	L	L	C	C	C	C	C	C	C	C	C	5.0	A	L	L				
30					Q	L	S	4.8	A	A	A	5.3	B	B	L	A	A	A	A	Q				
31					Q	A	A	A	5.7	(5.5) ^S	(5.2) ^L	5.4	5.5	(5.4) ^S	5.0	5.0	5.0	A	L	Q				
Medium Value					-	-	-	4.8	5.0	5.2	5.3	5.4	5.4	5.4	5.2	4.9	4.8	4.5	-					
Count					4	3	5	9	13	17	17	1.9	1.9	1.9	1.7	1.3	1.6	1.0	4					

Sweep 1.0 Mc to 11.0 Mc in 1.5 min

Manual

h_{F1}

IONOSPHERIC DATA

135°E Mean Time

Shibata

Lot 37 37.0 N
Long 139 15.8 E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						250	200	C	C	C	C	C	C	C	C	C	C	C	220	(230) ^A	A			
2						230	(210) ^A	(220) ^A	A	A	A	A	A	250	200 ^A	A	A	A	A	A	A			
3						220	A	A	A	A	A	A	A	A	A	A	210	200 ^A	220 ^A	220 ^A	A			
4						Q	220	A	A	230	A	A	A	250	A	A	A	A	A	A	A			
5						Q	230	220	A	A	240	300	300	A	A	A	A	A	220	A	A			
6						Q	210	220	220	A	A	A	240	(230) ^A	210	210	210	210	220	220	220			
7						Q	220	Q	A	A	200	140	200	200	200	A	A	230 ^A	A	A	A			
8						230	210	C	C	C	C	C	C	C	C	C	C	C	C	210	210	A		
9						230	200	A	A	200 ^A	240 ^A	270	A	A	A	A	220	(240) ^A	260	A	A			
10						Q	A	210	A	A	A	300	(220) ^A	200	210	200	200	210	210	210	210			
11						220	A	A	A	A	190	170	200	190	220	(220) ^A	210	(230) ^A	240	A	A			
12						240	230	210	200	(200) ^A	200	200	200	A	A	A	A	250 ^A	260	220	240			
13						230	210	220	(210) ^A	200 ^A	200	(200) ^A	200	(200) ^A	190	190	(210) ^A	220	220	A	A			
14						A	A	A	A	A	230 ^A	230 ^A	220	(210) ^A	(200) ^A	220	(260) ^A	A	A	A	A			
15						220	220	C	C	C	C	C	C	C	C	C	C	C	C	A	A			
16						Q	210	230	A	A	C	C	C	C	C	A	A	A	A	A	A			
17						260	230	220	(210) ^A	200	(200) ^A	200	A	A	A	240	210 ^A	(260) ^A	210	240	A			
18						Q	A	A	210 ^A	A	C	170	(140) ^A	210	210	220	200	220	220	A	A			
19						Q	200	220	200	200	200	200	A	A	A	200	210	210	220	230	C			
20						240	240	A	A	200	210	200	220	A	A	A	220	A	A	A	A			
21						Q	230 ^A	250	A	B	B	B	C	C	C	C	C	C	200	220	Q			
22						Q	230 ^A	C	C	C	C	C	C	C	C	C	C	C	C	220	220			
23						Q	Q	240	(260) ^A	A	A	A	A	A	A	A	A	A	A	A	A			
24						Q	200	A	S	S	S	S	S	A	S	S	S	S	A	A	S			
25						260	S	S	S	S	C	A	A	A	B	A	S	(240) ^A	A	A	A			
26						280	250	230	(220) ^A	210	A	A	A	A	A	A	220	220 ^A	240	260	A			
27						Q	210	200	C	C	C	A	A	A	A	250 ^A	B	210	(230) ^A	250 ^A	C			
28						Q	220	200	A	A	180	A	A	A	A	210	200	(210) ^A	210	250 ^A	AF			
29						240	220	C	C	C	C	C	C	C	C	C	C	A	A	250	240			
30						Q	210	S	A	A	A	A	A	A	210	B	210	A	A	A	Q			
31						Q	A	A	A	200	200	200	240	200	(200) ^A	200 ^A	A	A	250	Q				
Mean						240	220	220	210	200	200	200	200	210	200	220	210	220	230	240				
Count						14	23	14	8	9	11	13	9	11	12	11	17	18	15	6				

Sweep 1.0 Mc to 1.10 Mc in 1.5 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

Lat 17°57'0"N Long 139°15'8"E
Shibata

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	4.2					1.20 ^A	3.0	C	C	C	C	C	C	C	C	C	C	(3.0) ^A	2.7	(1.5) ^B				
2						2.3	N	3.3	3.5	3.8	A	A	4.1	B	A	3.1 ^B	A	A	A	A				
3						2.1 ^A	A	A	A	A	A	A	A	B	B	A	3.6	3.0	A	A				
4						1.1 ^B	2.7	3.2	3.5	(3.6) ^A	3.6	A	A	A	A	3.5	A	A	A	A	B			
5						2.2 ^A	2.6	3.0	3.5	3.8	3.7	(3.8) ^A	3.9	3.8	3.7 ^B	3.6 ^B	3.4	2.6	A	A				
6						A	A	A	A	3.4	3.8	B	B	B	B	3.5	3.4 ^F	3.0	A	A				
7						A	2.6	3.1	3.4	A	A	(3.4) ^B	A	B	B	3.7	3.4	2.8	(2.3) ^A	A				
8						A	A	C	C	C	C	C	C	C	C	C	C	3.0 ^B	A	A				
9						A	A	A	A	A	A	A	4.1	4.2	4.0	3.5	3.4	3.1	2.3	A				
10						(2.8) ^B	3.0	3.2 ^F	3.5	(3.6) ^A	3.6	3.6	3.6	(3.8) ^A	3.6	(3.4) ^A	3.1	A	A	A				
11						A	2.5	3.0	A	A	A	A	A	A	A	3.6 ^B	A	B	3.0	2.5	A			
12						1.7	2.6 ^F	3.1	3.5 ^F	3.5	3.6	A	A	A	A	A	A	A	A	AF	A			
13						1.7	2.4	2.9	3.2	A	A	A	A	A	A	B	3.4	3.2	2.1	A	A			
14						1.8	2.2 ^F	(2.6) ^A	3.0	(3.3) ^A	3.5	3.5	A	A	A	3.5	3.5	1	3.2 ^A	2.9	A			
15						2.0	2.7	C	C	C	C	C	C	C	C	C	C	3.0	A	A	A			
16						A	A	3.1	3.6	3.6	C	C	C	C	A	A	3.8	3.5	2.2	2.7	A			
17						2.1	2.4 ^F	3.0	3.4 ^F	3.5 ^B	3.5 ^B	3.5 ^B	3.5 ^B	3.5 ^B	(3.5) ^B	3.4 ^B	A	A	A	A	A			
18						A	A	3.2 ^F	A	3.2	C	A	A	A	A	3.5 ^B	(3.3) ^A	3.0	A	A				
19						1.8	2.7	A	A	A	A	A	A	A	A	A	A	3.4	(3.0) ^A	2.5 ^F	C			
20						2.1	2.7 ^F	3.1 ^F	3.4	(3.6) ^A	3.8	(3.8) ^A	3.7	3.7	(3.8) ^A	3.9	3.8	3.7	3.1	A	A			
21						F	A	F	C	A	B	B	B	C	C	C	C	2.9	A	A				
22						A	AF	C	C	3.5	A	A	A	A	A	4.0	A	A	A	A	A			
23						2.0	2.6	3.0	3.5	A	A	A	A	A	A	S	S	S	B	A	S			
24						A	A	A	S	S	C	B	B	B	B	S	S	B	F	A	A			
25						2.0 ^T	2.5	F	S	S	C	A	A	A	A	A	A	3.6	A	A	A			
26						1.8 ^F	A	AF	A	A	A	A	A	A	A	A	A	3.0	A	A	A			
27						A	2.5 ^F	A	C	C	C	3.7	A	A	A	3.4	3.0	A	A	C	A			
28						1.8 ^F	(2.7) ^A	3.2	3.5	3.7	A	B	B	B	B	A	B	A	B	A	A			
29						A	(2.7) ^F	C	C	C	C	C	C	C	C	C	C	A	A	2.6	1.7 ^B			
30						A	2.9	3.2	3.5	(3.7) ^A	A	A	A	A	A	B	B	A	A	A	A			
31						A	A	A	A	A	A	A	A	A	A	S	A	A	A	A	A			
Median Value						2.0	2.6	3.1	3.5	3.6	3.6	3.7	3.8	3.8	3.6	3.5	3.4	3.0	2.5	-				
Count						16	19	16	14	13	8	7	6	5	9	12	16	15	7	2				

Sweep 1.0 Mc to 11.0 Mc in 1.5 min Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
 (Denkikatsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

h_E

Shibata

Lat. 37°57.0'N
 Long. 139°15.8'E

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1						(100)A	100A	C	C	C	C	C	C	C	C	C	C	100	100	B					
2						(100)A	100	100	100	100	A	100	B	B	100	A	A	A	A	A					
3						110A	100	100	100	100	A	A	100	100	A	A	100	100	A	A					
4						B	100	100	100	(100)A	100	A	A	A	100	A	A	A	A	B					
5						100A	100	100	100	100	100	100	100	100	100	100	100	100	100	A					
6						A	A	A	A	110	100	100	100	100	100	100	100	100	A	B					
7						A	100	100	100	A	100	(100)A	(100)A	100	100	100	100	100	100	A					
8						A	A	C	C	C	C	C	C	C	C	C	C	100	A	B					
9						A	A	A	A	A	A	A	100	100	100	100	100	100	100	A					
10						A	100	100	100	(100)A	100	100	100	100	100	100	100	100	100	A					
11						A	100	100	100	A	100	A	A	A	A	100	A	B	100	A					
12						120	100	100	100	100	100	A	A	A	A	A	A	A	AF	A					
13						120	100	100	100	A	A	A	A	A	A	100	100	100	100	A					
14						120	100	(100)A	100	100	100	100	A	A	100	100	100	100	100	A					
15						110	100	C	C	C	C	C	C	C	C	C	C	100	A	A					
16						A	A	A	100	100	C	C	C	C	C	A	100	100	100	100	A				
17						140	100	100	100	100	100	100	100	100	100	A	A	A	A	F					
18						A	A	100	(100)A	100	C	A	C	A	A	100	(100)A	100	A						
19						110	100	A	A	A	A	A	A	A	A	A	100	100	100	A					
20						130	100	100	100	(100)A	100	100	100	100	100	100	100	100	100	A					
21						100	(100)A	100	100	100	(100)A	100	100	C	C	C	C	100	A	A					
22						A	AF	C	C	C	C	C	C	C	C	C	C	100	C	A					
23						100	100	100	100	100	A	A	A	A	A	100	A	A	A	A					
24						A	A	A	S	S	S	S	S	B	S	S	S	S	100	A	S				
25						100	100	100	100	S	C	B	100	100	100	100	100	100	100	100	A				
26						100	A	A	A	A	A	A	100	100	A	A	100	A	A	A					
27						A	100	A	C	C	C	100	A	A	A	100	100	100	A	C					
28						(120)F	100	100	100	100	A	B	B	B	B	A	A	100	A	A					
29						A	100	C	C	C	C	C	C	C	C	C	C	A	100	B					
30						A	100	100	100	100	A	A	A	A	100	B	A	A	A	A					
31						A	A	A	A	A	A	A	A	A	A	100	A	A	A	A					
Mean Value						110	100	100	100	100	100	100	100	100	100	100	100	100	100	100					
Count						16	22	18	18	15	9	10	11	10	14	14	17	19	8						

Sweep 1.0 Mc to 11.0 Mc in 1.5 min Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
 (Denki-tsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

Lat 37°57.0'N Long 139°15.8'E
 Station Shibata
 135°E Mean Time

fes

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	3.6 F	2.9 F	2.7	G	G	2.6	(2.5) Y	C	C	C	C	C	C	C	C	C	C	4.1	5.9	(9.4) F	13.3	10.7	7.9	7.1	
2	3.5	3.4	4.1	3.3	3.0 Y	3.0	(10.1) B	6.1	6.8	12.5 F	6.6	10.4	7.1 B	5.1	6.2	10.4	(10.5) B	9.2	9.2	9.4	6.6	7.4 F	9.0	6.8	
3	3.2	2.9	3.0	2.6	3.0	3.8	6.3	9.4	(9.6) B	10.3	12.8 B	14.4	13.3 F	6.2	5.1	5.1	4.0	3.5	3.4	(5.7) C	4.1	3.5	4.3	9.8 Y	
4	5.2 F	5.1	7.4	10.4 F	8.8	4.2	4.2	5.2	8.7	5.6	11.0	7.4	7.2	5.4	6.3	(12.4) S	9.5	11.8	6.4	5.3	4.3 F	C	3.9	4.8	
5	4.0	(2.5) F	2.8	4.4	2.8 F	3.3	4.8	5.3	6.6	12.4	16.1	14.2	10.3	9.2	15.3	14.0	9.5 B	4.3	4.2	4.4	4.8	4.8	6.4	6.3	
6	5.7	3.7	(5.8) B	4.4	8.9	4.6	3.4	4.3	5.2	5.2	6.9	(10.6) B	4.9	7.8	6.2	5.6	5.4	4.3	3.7	2.8	4.2	4.3	4.5	5.4	
7	5.0	4.5	2.1	6.6	4.5	4.3	G	5.0	6.7	6.0	13.2	G	4.3	B	G	5.8	9.4	4.0 Y	5.4	5.6	3.5	4.1	4.5	5.8 B	
8	3.7	4.6	3.5	2.5	2.9	2.2	2.7	C	C	C	C	C	C	C	C	C	C	3.5	3.6	3.1	2.9	7.5 Y	3.9	6.9 Y	
9	5.1	3.2	5.5	4.0	3.4	(4.2) F	(7.4) Y	(4.1) F	7.4	7.4	8.5 F	6.3	6.7	9.6	5.2	5.7	5.4	4.7	5.0	(4.6) B	(3.9) F	5.1 F	10.4	5.1	
10	12.6	11.4	7.9	5.6	5.7	(5.5) F	8.1	(13.6) B	(12.9) B	11.1 F	7.3	6.6	7.3	6.4	6.4	5.5	(6.4) F	5.4 Y	7.4	5.8	5.5	5.8	6.2	4.3	
11	2.0	2.4	3.0	1.1	1.7	2.7	5.4 B	9.4 B	6.4	10.1	8.7	B	5.2 Y	6.2	3.7	5.7	4.9 Y	5.8	3.8	3.4	3.9	3.4	3.7 Y	3.5	
12	3.0	3.5	3.3	3.5	2.9	2.4	4.6	4.8	5.1	6.3	5.5	5.4	10.6	9.2 B	4.5 B	5.2	3.8	5.9	4.8	4.4	4.7	6.8	2.3	3.5	
13	3.1	3.2	2.9	G	2.7	2.0	3.6	3.7	5.2	7.3	5.9	10.0	9.4	9.3	B	G	B	4.4	7.1	5.3	3.7	4.6	5.1 Y	5.5	
14	5.9	4.4 B	5.9	5.5	2.7	4.1	4.1	(10.1) F	12.7 B	8.9 Y	5.3	12.9 F	7.5	10.6 F	4.5	4.1 F	4.0	5.6	4.9	4.2	15.3	4.2	(9.1) Y	7.5 F	
15	3.1 F	4.3	4.2 F	4.5 F	4.2	3.4 Y	4.2	C	C	C	C	C	C	C	C	C	10.3 F	8.8	10.1	7.3	7.4	5.8	9.2	6.3	
16	2.4	7.7	5.4	5.2	1.9	4.0	3.0	4.8	6.6	6.4	C	C	C	8.1	7.2 F	8.8	8.6 Y	(4.9) Y	8.7	7.3	8.9 Y	3.4	4.4	7.3	
17	4.8	4.4	4.7	4.0	G	2.8 F	3.9 F	3.4	5.1	5.2	6.3	5.1 Y	5.2	5.7	4.9	5.8	2.9	5.8 Y	G	4.6 F	3.7	2.8	5.4 F	3.2 F	
18	2.6 Y	G	G	2.5 Y	G	3.1 F	4.3 Y	(9.4) F	7.2 F	4.8	C	3.9	C	5.2 Y	5.1 B	B	4.4	4.5	5.1	7.0 Y	C	3.2	2.9	G	
19	3.6	3.4	4.1	3.1	2.7	2.7	3.5 F	5.2	4.7	4.1	4.3	4.2	7.4 F	7.5 F	B	3.8 F	3.5	2.9	C	C	C	3.3	5.9	4.1	
20	2.4	3.4	2.4	2.8	1.4	2.8 F	5.6	8.9 B	8.6 F	6.3	5.3	6.7	G	6.2	4.9 F	8.0 Y	4.0	6.5	8.4	7.3	5.2	7.4	4.3	4.0	
21	4.2	(5.1) B	3.6 F	3.1	2.6	2.7 F	3.8 B	7.8	7.2	(7.3) Y	(6.4) F	B	(5.2) Y	C	C	C	C	4.7	4.1	(4.6) B	3.5	4.7	7.0	6.1	
22	6.8	5.6	3.9 F	3.4	2.4 F	2.7	4.7	C	C	C	C	C	C	C	C	C	10.6	C	2.8	3.0	3.6	9.2	(8.1) Y	5.7	
23	3.7	3.0	2.0	1.8	G	G	3.3	6.3	6.6	(11.6) B	8.0	(6.7) B	9.1 F	9.8	6.6 F	4.0	5.8	4.4 Y	6.9	7.1	6.2	(6.2) Y	3.4	3.4	
24	3.3	2.3	3.4	2.1	2.4	2.4	3.2	6.3	S	S	S	S	S	S	S	S	S	5.4 Y	5.7	S	S	2.9	(3.5) S	3.1	
25	5.4	4.6	5.2	5.3	G	G	3.0	S	S	S	C	(11.0) B	6.9	4.4	6.3	4.4	4.7	8.9	7.1 F	(12.2) F	3.8	5.2	2.6	4.3	
26	3.4	3.0	3.0	3.1	(7.0) F	2.9 F	4.2	6.4	10.9	8.4	8.1	5.5	10.0	10.0	11.1	5.2	5.6	2.9	3.9	3.4 B	3.4	4.6	5.2	3.1	
27	4.0	3.7	4.6	3.1	3.4	3.2	2.9	(7.5) Y	C	C	C	6.2	7.8	6.0	4.6	C	5.3	5.2	5.3	C	4.2	7.0	4.0 F	2.9 F	
28	2.9	(2.6) F	G	2.4	3.2	3.5	4.2	4.3	6.4	7.4	6.6 B	7.4	7.1	5.7	5.2	4.8	9.5	5.6	4.2	5.9	(5.8) B	5.1	3.0 F	2.8 F	
29	3.1	5.4 Y	5.4	3.0	4.0	3.0	3.2 F	C	C	C	C	C	C	C	C	C	4.4	7.4	G	G	2.9	2.6	(2.1) B	2.9 F	
30	4.5	5.2	5.2	2.4 F	3.0 F	3.1 F	G	S	4.8	6.4	4.5 Y	9.5	8.0	4.5	B	B	4.3	6.4	5.5	5.5	4.5	4.4	2.7	2.4 F	
31	2.4 F	C	3.9 F	4.5	4.6	5.0 B	7.2	10.2	7.3	6.2	4.7	6.2	(5.2) F	4.3	5.3	S	(4.6) B	5.3	4.4	5.5	4.8	3.3	2.8	2.3	
Mean Value	3.7	3.6	3.9	3.1	2.9	3.0	4.1	6.2	6.7	7.3	6.9	6.7	7.2	6.2	6.2	5.7	5.5	5.6	5.1	5.3	4.3	4.7	4.5	4.5	4.3
Count	31	30	31	31	31	31	31	24	23	23	21	22	23	24	22	20	26	30	31	28	29	30	31	31	

F₂-M3000

135° E Mean Time

Shibata

Lat. 37°37.0'N
Long. 139°15.8'E

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	2.8	(2.8) ^S	3.1	2.7 ^F	2.8	2.9	2.8 ^F	C	C	C	2.8	2.8	2.7	2.7	2.8	2.8	C	2.8	2.8	3.0	(2.8) ^S	AF	F	F	F	F
2	2.6 ^F	F	JF	3.0	3.0	2.8	2.9	2.9	2.4	(2.8) ^A	2.8	2.8	2.7	2.8	2.8	2.8	3.0	3.0	3.0	J	J	2.7	(2.7) ^F	2.8	2.8	
3	2.8 ^F	2.9 ^F	JF	JF	2.8 ^F	2.9	3.0	2.4	2.4	A	A	2.8	1.2.8 ^A	2.4	2.9	3.0	2.9	3.1	3.0	3.2	2.9	2.8	2.8	2.8	2.8	2.8
4	(2.8) ^S	2.4 ^F	FN	SF	SF	F	3.0	3.1	3.3	2.8	(2.7) ^A	2.7	2.7	2.8	2.8	2.9	2.9	2.8	3.0	3.2	2.9	C	F	F	F	
5	JF	(3.1) ^F	2.4 ^F	SF	3.3 ^F	2.8	2.8	2.8	2.8	A	A	2.7	2.8	2.8	A	A	3.0	3.0	3.0	3.0	2.9	3.0	3.0	2.8	2.8	3.0
6	2.7 ^F	3.0	2.9	3.0	3.1	2.8	3.1	3.2	3.2	2.8	3.0	2.7	2.7	2.9	2.8	2.9	3.0	3.1	2.9	3.0	3.1	2.8	2.8	2.8	2.8	2.8
7	2.8	2.4 ^F	3.0 ^F	3.1 ^F	3.2	3.1	3.2	3.1	3.1	2.8	2.9	2.8	2.7	2.8	2.8	2.9	3.0	2.9	2.9	3.1	3.0	3.0	2.8	2.8	2.8	3.0 ^F
8	3.1	2.8	JF	3.1 ^F	2.9	2.9	C	C	C	C	C	C	C	C	C	C	C	3.0	3.0	3.0	2.9	2.9	2.9	2.9	2.9	SF
9	2.8	(2.8) ^A	(2.8) ^F	JF	S	3.2	3.2	(3.2) ^A	3.2	(3.1) ^A	2.9	3.0 ^P	2.9	2.9	3.0	3.0	3.1	3.2	3.2	3.3	2.7	2.8	(2.8) ^F	3.0 ^F	3.0 ^F	3.0 ^F
10	2.8 ^P	2.8	2.9 ^F	JF	JF	3.1	3.1	(3.2) ^F	3.2	3.2	3.2	2.8	2.9	2.9	3.1	3.1	3.0	3.1	3.2	3.2	3.2	2.8	3.1	2.8	2.8	3.1
11	2.8 ^P	2.8	2.9 ^F	JF	JF	3.1	3.1	(3.2) ^F	3.2	3.2	2.8	2.8	2.9	2.9	3.1	3.1	3.2	3.2	3.1	3.2	3.2	3.1	2.8	2.8	2.8	3.1
12	2.9	3.0	2.9	3.2	3.2	(2.9) ^B	2.8	2.8	3.2	2.7	2.8	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.8	3.3	2.8	2.8	2.8	2.8	2.8	3.0
13	3.0	2.9	3.0	2.9	2.9	3.1	3.1	3.1	3.1	2.8	2.7	2.9	2.9	2.9	2.8	2.8	2.9	2.9	3.1	3.0	J	A	S	S	S	SF
14	2.9 ^F	JF	F	JF	JF	3.1	3.1	3.1	A	A	B	A	2.7	1.2.8 ^A	2.9	2.9	2.9	2.9	3.1	3.0	J	A	S	S	S	SF
15	SF	F	F	(2.4) ^F	3.1	3.2	C	C	C	C	C	C	C	C	C	C	3.1	3.3	A	A	JF	J	S	S	SF	
16	JF	JF	SF	SF	(2.6) ^F	3.1	(3.1) ^S	3.2	3.1	3.2	C	C	C	C	3.0	3.1	3.1	3.2	3.1	3.0	B	JF	F	F	F	
17	JF	JF	JF	SF	J	2.7	2.8	(2.8) ^F	2.9	3.1 ^F	A	G	2.8	2.9	2.9	3.1	3.1	3.2	3.2	3.3	2.7	2.7	2.7	2.7	2.7	F
18	2.7	2.8	2.9	2.8	2.7	2.7	3.0 ^F	3.2 ^F	3.1 ^F	C	C	S	C	C	3.0	3.0	3.3	3.2	3.1	(3.0) ^S	2.9	2.8	2.8	2.8	2.8	3.0
19	2.9	2.8	2.9	2.7	2.8	3.1	2.9	2.9	3.1	2.9	2.6 ^H	2.8	2.8	2.9	2.9	2.9	3.1	2.9	3.0	C	C	C	B	F	JF	
20	3.1	3.3 ^F	JF	2.8 ^F	2.7 ^F	3.1	3.4	(3.3) ^A	3.3	2.8	2.8	3.0	2.9	2.9	3.0	(3.0) ^A	3.0	3.2	3.1	3.0	3.2	3.0	2.8	2.7	2.7	J
21	2.8	2.7	2.9	2.9	3.2	3.2 ^P	3.3	3.0	3.0	2.8	2.9	2.9	2.9	2.9	C	C	C	3.2	3.2	3.2	2.9 ^H	J	2.7	2.7	F	
22	F	F	F	F	F	2.6	2.7	C	C	C	C	C	C	C	C	C	A	C	3.0	3.2 ^P	3.1	A	S	S	JF	
23	F ₂	S	(3.2) ^F	JF	2.9	3.0	3.1 ^F	JF	(3.0) ^S	(3.0) ^A	3.0	2.8	2.7	2.8	2.7	2.8	B	B	3.0	(3.2) ^S	A	S	S	S	S	
24	S	S	3.2	(2.9) ^P	2.8	2.8 ^P	3.1	(3.3)	(3.2)	2.8	3.0	2.8	S	J	2.8	2.8	S	S	S	S	S	S	S	S	S	
25	S	2.9 ^P	JF	JF	S	S	S	S	S	S	(2.9) ^F	3.0	2.9	2.8	2.8	2.8	3.2	3.1	S	A	S	F	F	F	F	
26	F	F	F	F	F	2.7	2.9	(2.9) ^S	(2.8) ^A	2.8	2.7	2.9	3.3	3.0	3.0	2.9 ^P	2.9	J	F	S	S	S	S	S	S	
27	SF	3.2	SF	SF	(2.9) ^S	3.1	3.0	3.4 ^P	C	C	C	2.7	(2.7) ^B	2.8	2.8	2.9	2.9	2.9	(3.0) ^F	C	J	S	S	S	S	
28	S	2.8	3.0	(3.0) ^F	(2.9) ^S	3.1	3.0 ^P	3.1	3.0 ^P	3.1	2.8	2.6	2.8	2.8	3.0	3.0	(3.0) ^B	J	3.3	3.1	S	S	S	(2.7) ^S	(2.8) ^S	
29	(2.8) ^S	J	3.5	3.2	3.1	(3.1) ^B	3.3	C	C	C	C	C	C	C	C	C	3.0	3.1	3.0	B	B	B	B	B	S	
30	S	FS	FS	S	3.0 ^P	2.9	(2.9) ^S	(2.9) ^S	(3.2) ^S	3.0	(2.9) ^S	2.9	3.2	(3.0) ^B	2.9	2.9	2.9	3.0 ^S	3.1	(3.0) ^S	2.9	J	2.8	2.8	2.9	
31	S	C	J	3.1	3.0 ^P	3.1 ^P	3.2	(3.0) ^A	2.9	2.9 ^H	3.0 ^P	(2.9) ^S	(2.9) ^S	3.0	S	S	S	J	3.1	(3.2) ^B	FS	S	(2.8) ^S	(2.9) ^S		
Mean Value	2.8	2.9	2.9	3.0	3.0	3.0	3.1	3.1	3.1	2.8	2.9	2.8	2.8	2.9	2.9	2.9	3.0	3.1	3.0	3.1	3.0	2.8	2.8	2.8	2.8	
Count	16	18	15	17	21	26	29	23	22	21	19	23	23	24	22	22	23	27	27	20	18	13	15	13	13	

Sweep 1.0 Mc To 1.7 Mc In 1.5 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denkikatsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

f_{min}

Shibata
Lat. 37°37.0'N
Long. 139°15.8'E

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	2.2	2.0	2.2	1.3	1.1	2.1	3.0	C	C	C	C	C	C	C	C	C	C	3.5	3.0 ^A	AF	2.6 ^F	AF	A	2.4 ^A
2	1.4	1.3	2.7 ^F	2.7 ^F	1.2	2.3	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	2.6
3	2.0	2.4	1.9	1.6	1.5	2.2	A	A	A	A	A	A	A	A	A	A	3.4	A	A	A	AF	A	2.0	1.7
4	2.3	A	1.7	2.8	A	2.8	A	A	A	A	A	A	A	A	A	A	A	A	A	AF	AF	C	A	A
5	2.8 ^A	E	1.7	AF	1.3	2.2	3.3 ^F	3.3	4.5	A	A	A	A	4.9	A	A	A	A	3.2	A	2.6	2.3	2.8	1.8
6	1.6	A	A	A	A	2.2	2.4	3.3	A	A	A	A	A	A	4.7	A	3.7	2.1	3.2	2.1	A	A	1.8	A
7	A	A	A	A	A	2.4	(2.6) ^B	4.2	A	A	4.2	4.3	4.3	4.1	4.2	A	A	A	A	A	A	A	2.2	A
8	1.6	A	A	1.2	1.4	2.0	2.3	C	C	C	C	C	C	C	C	C	C	3.2	2.3	2.3	2.4 ^F	A	A	A
9	A	1.6	1.8	A	2.0 ^A	2.0	2.6 ^F	A	A	A	A	A	A	4.3	4.3	4.0	3.1 ^A	3.3	A	A	2.0	A	A	A
10	A	A	A	A	A	A	A	A	A	A	A	4.4	A	4.5	4.3	4.0	3.1 ^A	3.3	A	2.5	A	2.2	A	2.0
11	1.5	1.2	2.0	E	1.5	2.0	A	A	A	A	4.1	4.1	4.3	4.1	3.6	A	3.9	A	A	A	A	1.9	A	2.0
12	2.2	2.0	2.2	A	1.9	1.9	A	3.3	4.1	A	4.3	4.5	4.3	4.1	3.6	A	3.9	A	A	2.4	A	A	1.5	1.5 ^F
13	1.3 ^F	1.4	1.4	1.2	1.6	2.0	2.6	3.0	A	A	4.3 ^A	A	A	A	4.0	3.7	(3.4) ^B	3.3	A	2.4	A	A	A	A
14	A	A	(1.8) ^A	A	1.8 ^F	A	1.8 ^F	A	4.3	A	4.3	4.3	4.5	A	4.3	4.2	(4.1) ^B	A	A	A	A	A	A	A
15	A	A	A	A	A	A	A	A	C	C	C	C	C	C	C	C	A	A	A	A	2.0	A	A	A
16	1.3	A	A	2.0	1.2	2.4	3.0	C	A	A	C	C	C	C	C	C	A	A	A	A	A	A	A	A
17	A	1.5	1.6	A	1.6	2.1 ^F	2.4 ^F	3.4	3.7	4.2	A	A	A	A	A	A	A	A	A	2.7	1.9	2.1	1.7	2.0
18	1.7	1.3	1.1	1.3	E	A	A	A	A	A	C	4.2	(4.3) ^A	4.3	4.4	4.2	3.5	A	A	A	2.3 ^A	1.9	A	1.4
19	1.6	1.4	A	1.4	1.4	1.9	2.9	A	3.5	4.1	4.2	4.2	A	A	4.1	4.9	3.8	3.4	2.7	C	C	1.6	A	A
20	1.6	1.6	1.3	1.5	1.5	2.1	3.4	A	A	A	4.4	4.1	4.4	A	A	A	3.9	A	A	A	2.2 ^A	A	A	A
21	A	A	1.4	1.2	1.2	2.0	A	A	A	A	6.3	4.5	A	C	C	C	C	3.2	3.1	A	1.7	A	A	AF
22	AF	A	2.0	(1.9) ^F	1.4	1.4	A	C	C	C	C	4.5	A	C	C	C	A	A	A	2.8	2.5	2.4	A	A
23	1.7	A	1.7	1.5	1.4	2.0	3.4	A	A	A	A	A	A	(4.9) ^A	A	A	A	A	A	A	AF	AS	A	A
24	A	A	A	A	1.6	2.3	2.9	A	5.0 ^S	5.6 ^S	5.0 ^S	5.7	6.0	A	6.2	5.7	5.9	6.1	A	6.7 ^S	4.7	2.5	S	2.8
25	A	A	A	A	1.7	2.2	4.2 ^S	5.2	(4.3) ^F	5.0	C	A	A	A	6.0	A	6.1	A	A	A	A	A	A	1.5 ^A
26	A	1.2	1.2	1.4	1.2 ^F	1.8	2.6	4.1	A	A	A	4.9 ^A	A	A	A	4.5 ^A	4.2	A	3.0	2.0	A	A	1.6	E
27	AF	(2.0) ^F	AF	2.0 ^A	1.6	2.1	2.8	3.7	C	C	C	C	A	A	4.6	A	3.6	A	A	AF	AF	AF	1.5	A
28	A	1.3	1.4	F	1.2	1.4	2.7	A	A	A	4.2	A	A	A	4.4	4.3	A	3.7	AF	AF	1.4	1.6	1.4	1.2
29	1.5	A	A	1.8 ^F	1.4	1.4	2.8	C	C	C	C	C	C	C	A	AF	2.7	1.7	1.5	1.6	1.6	1.6	1.7	A
30	AF	A	A	1.5	1.7	AF	3.4	S	A	A	A	A	A	A	6.2	5.4	3.9	A	A	AF	AF	1.6	1.5	1.6 ^F
31	1.7 ^F	C	AF	AF	AF	AF	A	A	A	A	4.3	A	4.5	4.3	A	(4.4) ^S	A	A	(2.6) ^A	A	AF	A	1.9	1.5
Median Value	1.6	1.5	1.7	1.5	1.5	2.1	2.8	3.4	(4.2)	(4.3)	4.3	4.4	(4.4)	4.4	4.4	4.4	3.9	3.3	2.8	(2.3)	2.1	2.0	1.8	1.7
Count	16	16	17	17	25	26	21	10	6	5	11	10	7	8	12	12	13	11	12	9	13	12	12	17

Sweep 14.0 Mc to 17.0 Mc in 1.5 min

Manual

IONOSPHERIC DATA

Lat. 37°57.0'N
Long. 139°15.8'E

f_oF min

Shibata

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	25
1	1.2	E	E	G	G	1.6	1.6	C	C	C	C	C	C	C	C	C	C	2.1	1.8	1.6	1.4	1.4	1.5	E
2	1.4	1.3	E	E	E	1.5	1.7	2.0	2.1	2.1	(2.3) ^B	2.2	3.2	4.1	3.5	2.1	2.1	1.6	1.7	1.5	1.5	1.5	1.5	1.4
3	1.4	E	E	E	E	1.5	2.0	2.2	2.2	2.2	2.2	2.3	3.2	3.2	2.1	2.2	2.0	2.0	1.8	1.5	1.6	1.5	1.4	1.4
4	1.4	1.6	E	E	E	1.6	1.6	1.9	2.0	2.2	2.2	(2.6) ^B	2.4 ^B	2.4 ^B	2.3 ^B	2.3	2.0	1.7	1.5	1.7	1.6	(1.6) ^F	1.5	1.1
5	1.2	(2.2) ^F	E	E	E	1.4	1.6	1.7	2.0	2.3	2.6	3.3	2.2	2.3	2.2	2.0	1.9	1.9	1.9	1.5	1.5	1.5	1.5	E
6	1.2	E	E	E	E	1.3	2.0	2.0	(2.4) ^B	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.0	1.6	1.7	1.6	1.5	1.5	1.4	1.3
7	1.1	E	E	E	E	1.4	1.5	1.6	1.7	2.1	2.4	3.1	3.2	2.5	2.6	2.1	2.1	1.6	1.5	1.4	1.4	1.4	1.4	1.2
8	1.1	E	E	E	E	1.2	1.4	1.5	C	C	C	C	C	C	C	C	C	2.2	1.5	1.3	1.4	1.4	1.4	1.4
9	1.2	E	1.3	E	E	1.4	1.5	1.5	2.0	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.0	1.5	1.5	1.3	1.4	1.4	1.5	E
10	1.3	1.4	E	E	E	1.4	E	1.5	1.6	1.7	2.2	2.2	2.3	2.2	2.2	1.8	2.1	1.7	1.5	1.5	1.5	1.5	1.5	1.2
11	1.2	E	E	E	E	1.3	1.5	1.7	1.5	1.6	2.1	2.3	2.2	2.2	2.3	2.2	2.4	1.8	1.5	1.5	1.5	1.5	1.5	1.2
12	1.4	1.1	1.3	E	E	1.4	1.5	1.6	2.0	2.0	2.2	2.4	2.3	2.9	2.2	2.2	2.2	1.7	1.5	1.5	1.5	1.5	1.6	1.2
13	1.2	E	1.1	G	E	1.5	1.5	2.0	2.1	2.1	2.1	2.2	2.3	2.1	2.1	2.1	2.0	1.9	1.4	1.5	1.5	1.4	1.5	1.2
14	1.1	E	E	E	E	1.4	1.5	1.6	1.7	2.0	2.1	2.0	2.2	2.3	2.1	2.1	2.1	1.8	1.8	1.6	1.6	1.6	1.6	1.4
15	1.1	E	E	E	E	1.5	1.4	C	C	C	C	C	C	C	C	C	2.0	1.6	1.8	1.5	1.5	1.4	1.5	1.1
16	E	E	E	E	E	1.4	1.5	1.5	1.6	2.1	C	C	C	2.1	2.1	2.2	2.3	2.2	2.0	1.7	1.5	1.5	1.5	1.5
17	1.4	1.5	1.4	G	G	1.5	1.5	1.9	2.0	2.2	2.3	2.3	2.3	2.6	2.1	2.3	2.1	1.9	1.8	1.6	1.6	1.6	1.4	1.4
18	1.3	G	G	E	G	1.5	1.7	2.0	2.0	2.3	(2.2) ^F	2.1	(2.2) ^F	2.2	2.2	2.2	1.8	1.8	1.8	1.5	1.4	1.4	1.4	G
19	1.2	E	E	E	E	1.5	1.6	1.5	1.7	2.1	2.1	2.2	2.1	2.1	2.2	2.0	1.9	1.5	1.6	C	C	1.6	1.5	1.5
20	1.4	2.0	1.3	E	E	1.5	1.5	1.6	2.0	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.1	2.0	1.6	1.6	1.6	1.6	1.4	1.4
21	1.2	E	E	E	E	1.2	1.5	1.6	2.0	2.2	2.3	2.2	2.5	C	C	C	C	1.8	1.7	1.4	1.4	1.4	1.5	1.6
22	1.4	1.2	1.1	E	E	1.4	1.4	C	C	C	C	C	C	C	C	C	2.1	1.9	1.7	1.5	1.4	1.4	1.5	1.4
23	1.3	1.3	1.2	1.1	G	1.5	1.6	1.6	2.0	2.3	2.3	2.3	2.3	2.1	2.1	2.1	2.3	2.0	1.7	1.6	1.5	1.6	1.6	1.6
24	1.6	1.3	1.3	1.2	1.5	1.5	1.7	1.6	S	S	S	S	S	4.2	S	S	S	2.5	2.6	(2.5) ^F	2.3	2.5	2.3	2.6
25	1.4	1.4	1.4	1.4	G	1.5	1.6	1.9	2.3	S	C	2.5	2.4	2.3	2.3	2.3	1.9	2.4	1.5	1.3	1.4	1.4	1.5	1.4
26	1.3	1.4	1.2	1.4	F	1.5	1.5	1.5	1.6	1.9	2.4	2.2	2.2	2.3	2.4	2.2	2.2	1.6	1.5	1.4	1.5	1.6	1.4	E
27	E	E	E	E	E	1.5	1.6	1.6	C	C	C	2.5	2.9	2.3	2.2	2.0	2.1	2.0	1.6	(1.6) ^F	1.6	1.4	1.5	E
28	1.2 ^F	1.1	G	E	E	1.7	1.5	1.6	1.7	2.1	2.1	4.3	4.2	4.2	(3.0) ^F	2.5	1.7	1.7	1.5	1.5	1.4	1.6	1.4	1.2
29	1.2	1.1	E	E	E	1.4	1.5	C	C	C	C	C	C	C	C	C	1.8	1.6	1.5	1.7	1.5	1.6	1.5	1.3
30	1.3	E	E	(1.2) ^F	1.4 ^F	1.4	1.6	1.7	2.1	2.1	2.1	2.2	2.4	2.2	2.4	(2.5) ^F	2.5	2.3	1.4	1.4	1.4	1.4	1.5	1.4 ^F
31	1.2 ^F	C	E	E	E	1.4	1.5	1.8	1.9	1.9	2.1	2.9	2.2	3.5	2.4	2.4	1.8	1.6	1.9	1.5	1.4	1.5	1.4	1.5
Median Value	1.2	E	E	E	E	1.5	1.5	1.7	2.0	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.1	1.8	1.7	1.5	1.5	1.5	1.5	1.3
Count	31	30	31	31	31	30	31	26	24	23	22	24	24	25	24	24	27	31	31	30	30	31	30	30

Manual

Sweep 1.0- Mc to 1.1 Mc in 1.5 min

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
 (Denki-tsushin Kenkyujo) Gotanda, Shimadzu-ku, Tokyo, Japan

Lat. 35 42.4 N
 Long. 139 29.3 E

Kokubunji, Tokyo

IONOSPHERIC DATA

ft₂

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	9.4F 10.0F	10.1J	7.8	8.0	8.7	10.2	10.7	9.2	8.8H	8.2	8.8	A	A	A	9.4P	9.7	9.5	9.4	9.2	2.1A	8.6	AF	AF	(11.3)F
2	F	F	F	F	7.9P	7.9	8.6	2.5	9.0	9.5	A	A	A	10.8A	10.6	10.4	10.3	9.9	9.8J	8.0	8.1	8.3	8.7	8.7
3	8.9	9.5I	8.4I	8.3I	7.0F	8.7F	10.1F	10.0	A	A	9.2	9.8J	(10.0)A	10.2	10.0	9.0	8.8	9.1	8.8	8.8	8.5	S	S	S
4	S	S	9.6S	(9.4)F	9.1I	(9.5)F	9.8	11.0	8.8	8.8	8.8	9.5	10.5	11.1	11.4	10.3	10.5	9.9	9.0	9.0	9.0	9.3	10.0	11.1
5	10.8	12.3	9.2I	8.5F	8.5F	9.1I	9.6F	9.7	10.0	10.4	9.2	9.2	9.5	10.0	10.4	10.5	10.2	10.3	9.4P	(9.2)B	9.0	9.2P	9.1	9.5S
6	9.0	9.7J	8.8	8.5	7.5	8.1	7.8	10.2	9.9	9.4	9.6	9.6	9.7	10.0	10.0	10.2	10.0	10.0	10.0	9.7	9.0	8.8P	9.1	9.4
7	(9.2)B	8.9	9.1I	8.1	7.2I	7.9J	8.4	8.6	7.9	8.3	9.0	9.8	10.1	9.7	9.6	(9.7)A	9.5	9.6	10.0J	B	A	10.4	10.8	9.6F
8	9.6	9.3	(9.4)B	9.4	8.4	8.9	10.1	10.7	9.4	9.2	10.0	(9.9)A	9.8	9.4	9.2	9.5	9.2	9.0	8.7	8.8	8.6	8.7	(8.2)F	9.4F
9	9.4	9.4I	8.4F	7.6	7.5	5.8N	9.3	8.5H	(8.6)A	8.6	8.6	8.7	8.4	8.8	9.2	8.8	8.2	7.7	6.8	(7.6)B	8.4	8.4	8.1F	7.0J
10	(7.1)A	7.1I	F	F	F	7.3	8.5	8.2	6.9	7.8	8.1	8.4	8.5	9.0	(9.5)B	9.9	9.8	(8.9)A	7.9F	(7.7)A	7.5	(7.8)F	8.0J	(7.8)B
11	7.5I	7.5I	7.1I	6.8F	6.0I	6.9I	9.0S	9.8J	(8.6)A	7.3J	C	C	C	9.8	(9.1)C	8.4P	7.5	8.0J	8.5	8.7	7.7I	7.0	7.4	7.6
12	7.4	6.6	6.6	6.5	6.0	6.3	9.0	9.6	9.2	8.8	9.3	9.5	10.1	10.9J	10.8	9.7	8.7	8.4	(8.4)S	8.4S	8.5S	8.3I	(8.5)C	8.6S
13	8.0F	7.3	7.1	7.1J	7.2	F	F	10.1	C	C	9.3	9.2	10.4	10.6	10.5	11.2	9.6	9.8	10.4	9.9	7.4	6.1K	6.1K	6.0K
14	5.9K	5.8K	AK	FK	BK	CK	BK	AK	AK	AK	SK	AK	AK	6.7K	6.8K	6.4K	6.0K	6.3K	5.8K	6.0K	6.1K	6.1K	AK	AK
15	6.6	5.7	5.7I	5.7I	6.3F	5.6	7.2	9.0	7.4	6.9	A	A	8.2	8.8	8.8	8.8	8.4	8.3J	7.2	6.7	6.5	6.4I	AF	FS
16	6.7I	7.3F	7.2I	(6.0)S	5.9F	6.6	6.8	7.9B	(7.8)S	7.7I	(7.6)F	7.5H	8.4	9.3P	9.9	9.4	(8.8)A	8.2	8.2	8.3S	7.9S	8.0I	8.4I	7.3I
17	(8.3)F	7.2I	7.4I	7.3I	6.1	6.9	7.1	7.6	7.4	6.4	6.5	6.5	7.2	8.0	8.0	8.7	8.9	8.7	8.6	7.1	6.7	7.1	7.2	7.3
18	6.9	7.0	(6.2)S	5.3B	6.5F	B	8.8	S	A	7.9J	8.0	8.3	9.0	9.4	8.8	8.2	8.2	7.3	(7.4)S	7.4S	7.6	7.5	7.8	8.5
19	7.3	6.9J	6.9	6.9F	6.7	7.2	7.7	(8.3)S	8.9	9.3	8.9	9.6	10.3	10.5	10.5	10.0	9.7	9.2	C	B	7.9	7.5	7.3	(8.3)C
20	9.3F	8.5	7.3F	6.5I	8.0F	7.9I	(7.4)C	6.9	7.5	8.3	10.2	10.4	10.3	9.8	8.5	(8.3)A	8.0	7.9	(8.6)A	9.2	(8.4)A	7.6I	7.5J	7.8
21	6.8	7.7I	7.5S	7.8	7.5	8.4	7.5	8.9B	7.9	7.6	9.0	9.4	9.4	9.2	9.2	9.0	8.2	8.2	7.5	7.7	7.8	7.9	7.9	8.2
22	8.0F	8.4P	9.0F	8.0F	6.8	7.0P	8.6	10.5	8.7	8.6	9.6	10.0	10.2	10.6	9.9	9.1	9.2	9.1	(9.6)S	8.7	B	B	B	7.8
23	8.5	8.6	C	C	6.0	6.4F	8.1F	8.3F	7.0	8.0	8.0	(8.6)A	9.1	9.9	9.9	10.6	10.2	9.3	8.8	7.8	7.4P	7.0F	(7.2)F	7.8P
24	7.8	7.8F	8.3J	7.5S	6.3	6.9	9.0	9.9	7.5	7.9	8.3	9.0	10.7	10.4	9.7	9.0	9.0	9.2	9.6	9.3	8.1	8.3	8.0	9.4
25	8.3	7.9I	6.9	6.7	6.4	7.5	9.6	9.6P	7.5I	8.4	(8.7)A	9.0J	9.4	10.3	11.3	11.1	10.8J	9.6	8.9	A	7.0I	8.3I	8.4	
26	7.8	8.1	8.2J	7.4	6.8F	6.9	9.7	9.9	(9.3)A	8.6	9.5	10.1	11.7P	11.7	11.9	10.6	8.9	8.1	8.0	9.0	8.7	9.5	9.6	9.6
27	9.8	7.5F	6.7	6.5	8.5	8.5	9.6	9.6	8.4	8.4	9.1	10.2	(10.1)C	9.9	9.8	(9.5)S	9.2	8.4	8.5	8.4	8.1	8.2	8.5	7.9
28	7.5	7.4	7.6	7.3	6.6	6.9	8.7	(8.4)C	8.0	8.0	8.8	B	B	11.4	10.4	9.9J	8.9	8.2	8.5	8.3	8.5	8.1	7.2	C
29	C	C	C	C	C	C	C	C	9.0	9.0	8.3	9.2	N	(9.5)A	9.9	10.0	10.2	9.2	8.6	8.4	8.8	8.7	8.6	8.0
30	B	A	A	5.1	6.2	6.7	(7.3)T	7.8	8.9	9.5	10.1	10.3	10.4H	11.1	11.3	11.1	10.6	10.6	10.9	(9.9)S	9.0S	9.1S	9.2	9.0
31	8.7	8.2	8.2	(7.4)T	6.6	7.5P	9.0	8.8	8.9	8.7	9.3	10.1	10.3	10.4	9.9	9.2J	7.9	8.6	8.4	8.5	7.2	7.4F	7.4	7.9
Mean Value	8.0	7.8	7.6	7.4	6.7	7.3	9.0	9.5	8.6	8.5	9.0	9.5	9.8	10.0	9.9	9.7	9.2	8.9	8.6	8.5	8.1	8.1	8.2	8.3
Count	27	27	25	25	27	27	29	29	27	28	25	26	26	30	31	31	31	31	30	28	28	28	26	27

Sweep 1.0 Mc to 17.0 Mc in 1E-min Manual

IONOSPHERIC DATA

hp F₂

Kokubunji, Tokyo

Lat. 35°42.4'N
Long. 139°28.3'E

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	370 F	340 F	270 J	280	480	460	390	350	310	310 H	A	A	A	A	360 P	380	360	330	310	310 P	310	A F	A E	(350) F
2	F	F	F	F	300 P	290	320	300	290	310	A	A	A	A	360	360	360	(350) A	340 J	380	350	370	S	300
3	360	340 F	370 F	350 F	290 F	310 F	340 F	290	A	A	A	A	A	A	A	340	330	320	320	280	370	S	S	S
4	340	S	S	S F	J F	F	300	290	310	360	(380) A	390	390	360	360	340	350	330	290	300	330	360	430	370
5	340	320	320 J	B F	B F	270	330 F	270 F	340	310	300	(320) A	330	310	320	310	280	300	290 P	(290) B	280	320 P	310	(310) S
6	300	(290) J	310	310	320	340	300	290	360	340	340	350	370	370	360	350	320	330	310	310	330	340	370	350
7	(350) B	350 F	310 F	280 A	260 F	270 J	240	260	(290) A	300	350	320	330	320	320	(300) A	280	290	J A	B	A	350	350	320
8	330	370	(340) B	300	280	270	320	250	280	330	320	(320) A	300	320	300	300	290	280	270	300	330	330	(350) F	420 J
9	310	370 F	300 F	300	270	320 N	330	410 H	(410) A	410	370	340	450 B	370	350	340	320	330	330	(340) B	340	320 B	330 F	340 J
10	(330) A	310 J	F	F	F	270	240	250	250	350	330	340	340	340	(390) B	310	290	(280) A	270 P	(320) A	360	(350) F	350 T	(350) B
11	360 F	390 F	320 F	350 F	350 S	330 F	350 S	340 J	(320) A	300 J	C	C	C	C	330	(310) C	290 P	310	300 J	260	300 S	310 S	320	390
12	380	310	320	300	290	330	310	280	240	320	350	340	310	310 J	360	310	310	300	(300) S	300 S	330 S	400 F	C	S
13	370 S	350	380	360 J	350	F	F	290	C	C	410	390	360	350	370	340	360	440	270	250	270	380	360	380 F
14	390	380 F	A	F	B	C	B	A	A	A	A	S	A	430	(440) S	360	340	420	300	300	320	330	A	A
15	390	390	410 F	410 F	400 F	300 B	300	270	250	270	A	A	A	360	340	320	310	310	290 J	300	260	300	360 F	F S
16	310 F	300 F	340 S	(340) S	330 F	280	260	290 B	(290) S	270 P	(340) A	380 H	350	360 F	320	300	(310) A	310	290	280 S	310 S	350 F	320 F	330
17	(350) F	360 F	350 F	350 F	380	370	290	320	250	290	(330) B	360	370	340	340	330	320	360	280	280	360	360	370	380
18	380	350	(350) S	310 B	340 F	(340) B	310	S	A	360 J	350	370	320	320	340	330	320	320	310	(310) S	300 S	370	380	310
19	330	340 J	330	360 F	350 F	250	280	(280) S	270	330	370	370	350	330	340	350	340	310	C	B	310	390	400	(380) C
20	350 F	350	370	370 F	350 F	270	300	320	320	360	340	330	310	330	320	300	280	280	(270) A	250	(310) A	360	370	340
21	340	360	400	420	340	280	320	300	350	(390) A	420	330	330	320	310	320	290	280	270	250	340	380	370	340
22	370 F	360 F	340	340 F	330	310	320	310	(360) B	400	340	B	B	320	330	330	300	290	(270) S	250	B	B	B	370
23	340	T	C	C	440	420 F	380 F	370 F	370	300	370	(370) A	370	350	360	350	330	310	280	290	330 B	370 F	(430) F	400 P
24	430	440	340 J	350 S	400	370	320	370	260	360	350	360	340	320	330	320	330	300	290	300	290	360	350	350
25	340	350 F	340	350	370	330	300	260 P	240 J	360	A	J	360	340	340	330	(310) B	280	280	A	A	350 F	340 J	340
26	330	340	340 J	350	390 F	350	310	290	(330) A	370	360	390	(380) A	360	360	320	350	320	340	350	340	390	370	340
27	310	310 F	320	300	310	280	280	250	260	360	330	320	(320) C	310	330	(320) S	310	280	270	290	340	340 S	320	320
28	330	310	320	290	290	270	250	(250) C	240	350 B	360	B	B	320	320	320 J	300	290	300	280	320	340	340	C
29	C	C	C	C	C	C	C	250	260	260	260	N	(330) A	330	330	320	320	320	280	280	340	340	320	350
30	B	A	A	280	270	280	(300) T	310	(300) B	290	300	330	360 H	350	350	360	310	300	300	(290) S	330 S	340 S	340	330
31	350	350	B	T	300	310 J	270	270	300	320	340	330	320	320	320	280	320	290	270	260	320	330 F	350	330
Median Value	340	350	340	340	340	310	300	290	290	330	350	340	350	330	340	320	320	300	290	290	330	350	350	350
Count	27	26	23	23	260	27	29	29	27	28	23	23	24	28	30	31	31	31	29	28	28	28	25	26

Sweep 1.0... Mc to 17.0 Mc. n. 15 mib. Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

h_pF₂

Kokubunji, Tokyo

Lat. 35 42.4'N
Long. 139 29.1'E

135° E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	280	230	210	200	360	300	330	320	270	270H	A	A	A	A	350	360	340	300	270	300	(300)F	(300)F	(370)A	(270)A	
2	(260)A	250	250	250	240	(250)A	(260)A	(270)A	(270)A	250	A	A	A	A	A	A	340	A	A	(240)A	(280)A	(300)A	(300)A	(300)A	
3	300A	240	240	250	240	250	260	270	A	A	A	A	A	A	A	310	300	280	280F	240F	(300)F	(300)F	(300)F	(320)F	
4	330A	(290)A	(250)A	(260)A	240	230	240	270	250	290	A	A	350	320	310	(310)A	320A	300	270	230A	270	300	310	(300)A	
5	(280)A	260	230F	(260)A	280	230	250	230	260	300A	270	(290)A	300	300A	290	280	240	260	260	230	230	230	270	250	
6	240	240	250	230	260	(300)A	260	250	260	310	310	300	350	360	330	340	290	290A	250	250	240	270	270	270	
7	(310)S	(280)A	270	(250)S	(250)F	230	220	230	(350)A	(300)A	330	300	300	300	300	(280)A	250	280A	(290)A	270A	(270)A	(290)A	250	250	
8	260	260	250	230	220	220	230	240	250	280	300	(290)A	280	300	300	280	270	230	230	220	240	250	(270)A	280F	
9	260F	320	220	250	220	260	260	250H	(320)A	380	310	340	(360)B	270	320	310	320	250	300	330	260	230	266	(270)A	
10	(280)A	290A	280A	280A	250	200A	240F	240F	250	350A	320	330	330	330	320	310	270	(260)A	250	(260)A	266	(310)A	(320)A	300	
11	290A	270	240	250	280	290	280	A	A	280	C	C	C	300	(290)A	280	300	280	260	240	200	290	270	260	
12	260	240	240	230	220	200	220	240	300	270	320	280	290	280	300	290	300	270	280	260	260	(300)F	(270)C	230	
13	260	260	290	280	290	290	240	240	C	350	340	310	310	310	320	330	310	340	240	230	240	250	300	340F	
14	320	320	(310)A	300	220	C	B	A	240M	A	A	260	(350)A	430	440	360	340	320	270	280	290A	(300)A	A	A	
15	(300)A	310	360	(400)F	290	240	250	240	230	270	A	A	350A	330	320	300	300	270	230	260F	(260)F	250A	A	A	
16	240F	240	A	A	240	220	270	270	270	(250)F	260H	260	340	340	340	270	(270)A	270	250A	240	250A	310A	260	(270)A	
17	290F	250A	250	250	250	230	260	310	250	290A	350	360	370	340	340	320	300	270	260	220	240	260	250	300	
18	270	260	240	250	270	250	260	240	(290)A	330	350	350	310	300	310	320	300	300	280	260	240	260	260	230	
19	240	270	250	270A	260	240	260	290	240	260	310	350	320	300	310	310	290	280	(270)C	250	230	270	300	(280)A	
20	250	220	220	280	260	220	(240)C	250A	(270)A	290	310	300	300	(290)A	280	(290)A	300	270	(250)A	230	(270)A	300A	280	260	
21	300	310	300	250	240	250	280	270	320	(430)A	410	310	320	320	310	310	280	240	230	240	240	300	300	280	
22	270	290	290	240	250	240	280	270	230	370	320	330	(320)B	300	320	320	270	270	260	230	(300)A	(300)A	350A	300A	
23	310	270	C	C	320	310	330	360	350	290	370	(270)A	370	310	340	320	270	270	240	(230)A	(300)A	(310)A	(330)A	(300)A	
24	310A	310A	260	260	290	330	230	230	200F	360	350A	350	350	320	320	310	300	280	250	210	200	300	250	280F	
25	280	260	240	260	280	300	260	240	A	(340)A	350	310	300	310	300	310	260	270	250	(250)A	(280)A	(300)A	250	270	
26	260	(270)A	260	280	300	300	290	280	(300)A	320	350	350	(340)A	320	330	290	290	310A	260A	290	(320)A	290	290	290	
27	260	180	220	250	220	220	210	230	240A	300	280	300	(310)C	310	310	290	290	250	250	220F	250	250	260	250	
28	250	250	240	250	220	250	210	(230)C	(350)A	340	340	320	320	310	300	300	290	250	270	220	250	230	260	C	
29	C	C	C	C	C	C	210	220	240	250	(290)N	320	340	320	320	310	280	230	340A	250	250	250	220	220	
30	250	A	A	200	210	220	220	230	290B	(270)B	250	(290)A	320A	320	320	320	280	280	250F	220F	240	250	260	260	
31	240	250	220	190	220	250	210	300	230	240	320	300	290	290	260	260	300	280	240	230	220	260	270	260	
Median Value	280	260	250	250	250	250	250	250	260	290	320	320	330	320	310	310	290	280	250	240	250	260	270	280	280
Count	30	29	27	26	29	29	30	29	28	27	23	25	27	28	29	30	31	30	30	28	240	250	270	280	

Scale 10. Mc to 110. Mc in 15 min

f_p

IONOSPHERIC DATA

Kokubunji, Tokyo

Lat. 35°42.4'N
Long. 139°29.3'E

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1						Q	L	L	A	A	A	A	A	A	A	5.3	5.3	(4.7)L	L	A						
2						Q	F	A	A	A	A	A	A	A	A	A	5.4	AF	AF	A						
3						A	Q	L	L	A	A	A	A	A	A	5.5	A	L	A	A						
4						AF	A	A	5.3	A	A	A	A	A	5.3	(5.0)A	4.0	(4.6)L	L	L						
5						A	A	A	4.9	(5.1)L	5.3	(5.5)A	(5.7)B	5.6	5.1	5.1	L	A	3.5A	Q						
6						3.4	L	L	A	A	5.6	5.2	(5.3)L	5.4	5.4	A	L	A	A	A						
7						A	L	L	4.9	5.4	A	A	5.4	5.6	5.4	5.1	5.2	4.1	3.5	A						
8						A	L	L	A	4.5	5.0	5.2	A	A	(5.4)	5.2	4.9	4.1	3.7	A						
9						Q	AF	AF	L	A	A	A	A	A	A	5.1	5.0	A	A	A						
10						A	A	A	A	A	C	C	C	5.6F	(5.3)C	5.0B	4.9	4.5	F	Q						
11						Q	A	4.5	4.8	5.2	5.7	5.4	5.0	5.3	5.5	(5.3)A	5.0	L	A	A						
12						L	Q	4.5	C	A	A	A	5.1	(5.1)A	(5.0)B	(4.8)B	4.5	A	A	A						
13						C	A	A	4.7	A	A	A	A	5.2	5.0	4.9	B	A	A	A						
14						Q	A	4.4	(4.7)A	4.9A	A	A	A	A	5.0	5.0	4.7	L	A	A						
15						Q	Q	L	L	L	L	4.8	5.1	(5.1)A	5.1	A	A	Q	A	A						
16						Q	L	L	5.0	(5.2)A	5.4	5.4	5.4	5.3	5.0	5.0	5.0	4.2	3.9	L	A					
17						Q	L	4.6	A	A	5.4A	B	B	5.2	A	B	L	4.6	L	A						
18						Q	L	5.0	4.8	(4.9)L	5.3	5.6	(5.2)A	5.6	(5.3)A	5.2	4.9	L	4.6	C	L					
19						L	C	A	A	A	5.5	5.7	5.4	(5.0)A	5.4	A	A	A	A	A						
20						Q	L	4.7	5.1	(5.2)A	5.7	5.4	5.6	5.4A	5.4	4.9	4.7	4.1	AF	A						
21						Q	L	A	B	6.0	A	A	B	B	B	5.4	B	B	B	B						
22						Q	L	L	A	A	(5.7)N	A	A	5.7	5.6	5.6	5.1	4.7	3.6	A						
23						A	Q	A	A	6.1	(5.8)A	5.4	5.8	5.9F	5.9F	4.9	L	L	L	Q						
24						L	A	A	4.4	A	A	A	A	5.3	B	5.6	5.4	A	AF	A						
25						A	L	A	A	A	5.1	5.7	(5.8)A	5.9	5.6A	5.3	4.7	A	A	A						
26						Q	Q	L	A	5.6	5.4	A	C	5.6	5.5	5.0	5.1	A	A							
27						L	Q	C	A	(5.5)A	(5.7)L	5.9	(5.8)A	5.7	(5.5)A	5.3	L	L	L							
28						C	Q	A	A	5.0	L	N	5.6	A	5.4	5.2	5.0	L	A	A						
29						Q	L	B	A	A	A	B	A	B	5.4	B	A	L	AF	Q						
30						T	Q	Q	5.0A	5.0	5.6	5.5	5.9	(5.8)B	5.6	5.4	5.4	L	L							
31						-		4.6	4.9	5.2	5.5	5.5	5.4	5.5	5.4	5.2	5.0	4.6	3.6							
						1		6	11	13	15	14	14	22	25	24	18	11	5							
Mean Value																										
Count																										

Sweep 1.0 Mc to 17.0 Mc in 1.5 min Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
 (Denki-tsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

Lat. 35°42'N
 Long. 139°29.3'E

h_{fr}

135°E Mean Time

Kokubunji, Tokyo

IONOSPHERIC DATA

Day	00	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 290	A	A	A	A	A	A	A	A	A	200	(270)A	Z30	Z10	A				
2						Z20	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
3						G 250	A	A	A	A	A	A	A	A	A	240	A	AF	AF	A				
4						A G	220	Z10	A	A	A	A	Z10	A	A	(200)A	A	230	A	A				
5						AF A	A	A	A	A	A	A	A	A	A	(200)A	190	Z00	Z10	A				
6						A A	A	A	Z30	Z20	Z20	(210)A	190	Z20	Z10	Z10	250	(240)A	Z30	G				
7						A 200	170	A	A	A	180	180	180	180	180	190	A	A	A	A				
8						A 200	Z00	180	Z00	A	A	190	190	190	190	190	190	210	Z20	A				
9						A 240	Z30	A	A	A	Z20	190	A	A	A	A	240	240	Z20	Z30	A			
10						G AF	AF	220	(220)A	(220)A	A	A	A	A	A	Z00	Z00	A	A	A				
11						A 230A	AF	A	A	A	C	C	C	C	Z50	(220)C	Z00	240	Z20	Z20	G			
12						G A	A	Z10	A	A	A	250	A	N	A	A	A	A	A	A	(200)A			
13						Z70	G	220	C	A	A	A	Z00	A	A	B	Z20	Z30	A	A				
14						C A	A	A	Z30	A	A	A	A	A	A	Z70A	Z00	Z20	B	A	A			
15						G A	A	240	A	A	A	A	A	A	A	A	240	Z10	Z10	A	A			
16						G (240)A	240	(240)A	Z30	A	160	190	A	A	A	A	A	A	G	A				
17						G 230	Z30	Z20	(210)A	Z00	Z00	Z00	(230)A	Z50	A	300	(260)A	Z20	Z10	A				
18						G 230	220	A	A	(210)A	190	A	(200)A	B	A	B	Z00	Z20	Z20	A				
19						G 220	190	Z10	Z20	180	180	A	A	A	A	Z00	Z00	Z30	Z30	(230)C	Z30			
20						A C	A	A	A	A	Z00	Z20	Z00	(210)A	Z10	A	A	A	A	A				
21						G 240	240	A	A	A	Z90	Z10	Z00	Z20	(220)A	(210)A	Z00	Z00	AF	A				
22						G 220	(210)A	Z00	190	A	A	A	B	B	B	Z00	A	B	B	B				
23						G 270S	310	A	A	N	A	A	A	A	A	Z00	Z00	Z10	Z20	A				
24						A G	A	A	Z40	(260)A	Z70A	Z00	Z80A	Z10	190	260	Z00	Z00	G					
25						Z80	A	A	190	A	A	A	A	(220)A	A	A	(240)A	A	A	AF				
26						A 260	A	A	A	(260)A	Z90	A	A	A	A	(250)A	Z20	A	A	A				
27						G 210	G	Z10	(210)A	Z00	170	A	C	Z30	(220)A	Z10	Z10	A	A					
28						Z30	G	C	A	A	A	A	A	A	A	A	Z10	Z10	Z20					
29						C G	A	A	Z00	N	Z20	(220)A	Z20	(220)A	Z10	Z10	Z20	Z30	Z10	A				
30						G 200	(210)B	Z20	A	A	B	A	A	B	A	B	A	Z40	A	AF	G			
31						Z40	G	G	Z00	A	180	190	190	(190)A	190	B	180	Z00	Z30					
Mean						Z40	Z30	Z20	Z10	Z10	Z20	Z00	Z00	Z20	Z10	Z10	Z20	Z20	Z20	Z20				
Count						5	14	17	14	11	15	13	12	14	16	21	20	19	15	2				

Sheep 1.0 Mc to 17.0 Mc in 1.5 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

Day	135°E Mean Time											Kokubunji, Tokyo					20	21	22	23	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15					16
1						2.2	2.8	3.4	3.7	3.9	4.0	4.1	3.8	3.5	3.7	3.8 ^B	(3.5) ^B	3.2	2.6	B	
2						A	2.7	A	A	A	A	A	A	A	A	A	A	A	A	A	
3						A	3.3 ^A	(3.6) ^A	(3.7) ^A	(3.8) ^B	3.9	4.0	3.9	3.7	3.7	3.5	A	A	A	A	
4						A	2.6	3.4	3.6	3.8	3.9	4.0 ^B	4.1	4.1	3.9	3.5	3.4	3.0	2.8	B	
5						A	(2.5) ^F	3.2 ^F	3.5	3.8	3.9 ^B	4.0 ^B	4.1	4.1	3.9	3.5	3.4	3.0	2.8	B	
6						A	A	A	A	3.7	3.6	3.7	4.1	4.0	3.8	3.6	3.4	3.0	(2.2) ^A	(1.4) ^B	
7						2.0 ^J	2.5	3.2	(3.4) ^A	3.6	A	A	4.2	(4.1) ^A	3.9	3.6 ^A	3.3	A	A	A	
8						A	2.6 ^A	3.5	A	A	A	A	3.8 ^A	A	A	A	A	2.9	A	A	
9						A	A	A	A	A	A	A	4.2	4.2	3.7	3.4	3.0	3.0	2.4	A	
10						B	2.3	A	A	A	(3.6) ^F	3.8	A	A	A	A	A	A	A	A	
11						A	2.7	2.9 ^F	A	A	C	C	C	C	(3.8) ^J	(3.7) ^C	(3.6) ^A	(2.4) ^B	3.1	A	A
12						1.8	A	A	A	A	3.6	A	A	A	A	A	A	A	A	1.8	
13						A	2.5	2.8 ^A	C	C	A	3.6	3.8	A	B	B	3.3	2.9	2.4	A	
14						C	2.4	A	A	A	3.6	3.6	3.8	A	B	3.9	B	3.0 ^A	2.3	A	
15						2.0	2.4	3.0	3.4 ^B	3.8	A	A	A	A	A	A	A	3.0 ^A	A	A	
16						1.6	2.6	3.7	3.6	3.6	A	B	A	S	3.2	3.8	3.8	2.6	A	A	
17						2.1	2.6	3.1	3.2	3.4 ^A	3.4 ^J	3.6	4.0	A	A	A	A	A	A	A	
18						B	(3.0) ^F	3.2	A	A	3.7 ^A	3.7	A	A	A	A	A	A	3.1 ^J	2.4	A
19						1.9	2.4 ^J	A	AF	3.9	4.0	4.0	A	A	A	AF	A	A	C	1.8 ^J	
20						A	A	A	A	3.6 ^A	(3.7) ^A	A	A	3.8	3.8	3.6	3.4	A	A	A	
21						2.3 ^F	A	3.0	3.4	3.7	A	A	A	A	A	A	3.1	A	A	A	
22						1.7	2.7	3.1	3.4	3.6	(3.8) ^B	(4.0) ^B	B	B	B	3.6	B	B	B	B	
23						2.0 ^B	2.5	3.0	A	A	A	A	A	A	A	A	A	A	2.5	A	
24						A	2.8	A	A	(3.6) ^F	3.5 ^J	3.9	A	A	A	3.7	A	A	A	2.6 ^J	(1.8) ^B
25						A	2.4	2.8 ^J	(3.2) ^B	3.6	3.6	B	A	A	A	3.8	3.5	A	2.4	1.5	
26						2.0 ^A	2.4 ^A	A	A	A	A	A	A	A	A	A	3.2	A	A	A	
27						1.7	2.7	3.3	3.2	3.9	3.6	A	C	4.0	3.7 ^A	3.6	A	A	A	A	
28						1.6	2.6 ^A	(3.2) ^C	3.7	3.8	3.8	B	B	B	A	B	A	A	A	A	
29						C	2.6 ^F	A	A	A	A	A	A	A	A	A	A	A	A	A	
30						(2.0) ^A	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B
31						A	2.0 ^J	A	A	3.7	(4.0) ^F	A	A	A	B	B	A	A	A	A	
Mean						2.0	2.6	3.2	3.4	3.7	3.7	3.9	3.9	4.0	3.7	3.6	3.4	3.0	2.4	1.8	
Standard						1.4	2.4	1.8	1.3	1.8	1.8	1.3	1.0	0.9	1.0	1.3	1.4	1.1	1.0	0.5	
Count																					

Sweep 1.0 Mc to 17.0 Mc in 1.5 min. Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
 (Denki Tsushin Kenkyujo) Gotanda, Shinagawa-ku Tokyo Japan

IONOSPHERIC DATA

h_pF

Kokubunji, Tokyo Lat. 35 42 N
 Long. 139 29 E

135° E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						110	110	110	100	100	100	100	100	100	100	(120)B	100	100	100	110				
2						A	100	A	A	A	A	A	A	A	A	A	A	A	A	A	A			
3						A	100	(100)A	(100)A	100	100	100	100	100	100	(100)A	100	A	A	A	A			
4						A	100	100	100	100	100	100	100	100	100	100	A	A	A	A	A			
5						A	100	100	100	100	90	90	90	90	90	100	100	100	100	100	B			
6						A	A	(110)A	100	100	100	100	100	100	100	100	100	100	100	A	B			
7						100	100	(110)A	100	B	B	B	100	100	100	100A	100	A	A	A				
8						A	90A	A	A	A	A	A	90	A	A	A	A	100A	A	A	A			
9						A	A	A	A	100A	(100)A	100	120B	110	110	110	100	100	100	A	A			
10						B	100	(100)A	A	A	100	100	A	A	A	A	A	A	A	A	A			
11						A	100	100	100	A	C	C	100	(100)C	100	(100)B	100	A	A	B				
12						100	A	A	A	A	90	A	A	A	A	A	A	A	A	A	90			
13						A	100	100	C	C	A	100	100	A	B	B	100	100	100	100	A			
14						C	100	A	A	A	100	100	(100)A	100	100	100	100	90	100	A	A			
15						100A	100	100	90	100	100A	A	A	A	A	A	90	(100)A	100	A	B			
16						100	100	100	100	90	(90)A	(90)B	(100)A	100	100	100	100	100	100	A	A			
17						100	100	100	100	100	100	100	100	100	100	100	A	A	A	A	A			
18						100	100	100	A	A	110	100	(110)A	110	A	A	A	100A	100	100	A			
19						100	100	(110)A	100	100	100	100	100	100	100	100	(100)A	100	(100)C	100				
20						A	A	A	90	100	100	100A	100A	100	100	100	100	A	A	A	A			
21						130	(120)A	100	120	120B	A	A	A	A	A	A	A	100	100	A	A			
22						90	90	90	100	100	(100)B	100	B	B	B	100	100	B	B	B	B			
23						(130	120	130	A	100	100	A	A	A	A	A	A	A	120A	A	A			
24						A	100A	A	A	100	100	100	A	A	A	A	100	A	100	B	A			
25						100	100	100	100	100	100	(100)B	110	100	100	100	90	100	90	90				
26						100	110	A	A	A	A	A	A	A	A	A	100	A	A	A	A			
27						90	100	100	100	100	100	B	C	100	100	100	100	100	100	A	A			
28						(110)B	100	(100)C	100	100	100	B	B	B	B	100	100	100	100	A	A			
29						C	100A	A	A	90	A	A	A	A	A	A	A	A	A	A	A			
30						100	100	B	B	90	A	B	110	110	B	B	B	B	B	B	B			
31						A	100	A	A	100	100	100A	100A	(100)B	100	A	A	A	A	A	A			
Median Value						100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100			
Count						16	27	21	17	20	23	18	18	18	15	18	20	15	10	3				

Sweep 1.0 Mc to 17.0 Mc in 1.5 min Manual

IONOSPHERIC DATA

Lat. 35°42'N
Long. 139°23'E

Kokubunji, Tokyo

fES

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	3.9F	3.6	G	(2.0)Y	2.4	3.0	3.9	4.3	7.2	5.3	8.6	10.6	14.0	14.4	(12.4)B	B	(4.5)B	G	4.8	(1.3)B	8.4	1.3	8.8	9.9
2	8.2	(3.4)Y	3.6B	3.2Y	2.8	3.9	8.0	7.8B	8.0	7.6B	16.0	16.0	(15.0)B	(11.6)F	3.4	3.4	11.4	(12.4)B	(10.4)B	5.2	9.0	6.5	9.6	6.8
3	5.2	3.2	3.4	3.0	3.2	4.0	6.6	7.0	16.2	(14.6)B	16.2	(10.2)B	14.4B	16.4B	12.0B	5.6	5.1	6.8	7.6	4.8	4.2	4.7	3.8	3.6
4	5.8	5.4	5.4	5.6	3.0	4.4	3.8	5.0	4.7	6.0	9.0B	(1.9)B	(9.5)B	5.3	(1.8)B	(14.7)B	14.2	5.6	7.4	6.6	4.8	4.6	4.8	4.8
5	8.6	8.6	5.6	4.8	5.2	4.5	6.4B	5.2	5.0	8.0	6.8	8.6	(1.3)B	(1.3)B	5.5	6.8	4.3Y	5.4	3.0	3.0B	3.3	6.1	5.7	6.6
6	5.6	3.4	5.8	6.1	6.8	7.2	4.5	4.5	5.5	5.6	5.7	7.2	5.6	G	4.8	4.9	8.2B	7.4	6.8	2.6	G	3.8	4.0	3.0
7	B	6.0	7.2	7.4Y	6.6Y	3.2	3.8	4.0	1.35	6.6	5.8	8.0	4.8	G	5.2	1.55	(8.2)Y	9.6	12.4B	(9.5)B	9.6	8.8	6.2	5.8
8	3.8	2.2	(5.4)B	3.5	5.4	7.4	5.3	4.1	4.2	4.8	8.6	(1.8)B	4.7	5.6	5.7	4.4	4.0	3.6	3.8	3.8	2.9	2.7	7.7	6.8
9	6.6	6.1	4.0	4.2	4.8	5.0	3.0	6.4	1.35B	7.8	5.8F	5.4	5.8	7.4	6.6	8.6	G	4.0	4.2	6.2	3.0	4.0	4.6	4.8
10	1.30F	6.4F	5.6	6.4	4.8	4.6	6.5	9.2	6.2	(9.0)B	7.6	7.2	6.8	7.4	7.0	6.4	6.0	14.8	7.4B	9.4	5.4	6.2	7.6	6.0
11	6.8	3.8	3.6	4.6	4.7	5.2	4.0	1.2B	(1.30)B	(9.0)B	C	C	C	4.6	C	4.0	4.6	8.4	5.0	3.6	3.0	3.8	4.0	5.8
12	3.4	3.8	3.6	2.7	2.2	2.4	5.7	4.8	5.4	8.3	7.2	8.4	6.4	7.4	5.6	(10.4)B	(7.3)B	8.1	7.4	4.2	3.8	5.6	C	4.2
13	4.4	6.5	7.0	4.6	2.2	C	3.8	7.2	10.0	9.7	9.6	7.0	9.5	8.0	B	B	3.8	5.8	7.6	8.8	6.4	3.2	4.2	6.6
14	4.2	6.5	7.0	4.6	2.2	C	3.8	7.2	10.0	9.7	9.6	7.0	9.5	8.0	B	B	3.8	5.8	7.6	8.8	6.4	3.2	4.2	6.6
15	7.4	8.3	6.1	5.7	3.0	3.5	4.7	4.8	5.7	5.8	(1.30)B	10.2	8.2	7.8	(9.2)Y	7.0	8.6	4.8	5.4	5.8	5.8F	6.0	7.6	5.8
16	4.4	G	7.4	5.0	5.4	G	3.0	4.8	5.6	7.0F	5.4	4.2	7.4	12.0	6.0	9.4B	8.7	6.5	6.2	7.2	7.2Y	5.1F	5.0	8.6
17	5.2F	8.9F	4.8	5.2	2.3	G	3.8	4.5	5.2	6.2	6.3	5.8	6.0	6.6	5.6	5.6	4.5	5.6	4.0B	4.0B	4.0	3.0	2.8	4.3
18	G	3.6	3.0Y	2.8	2.2	2.6	4.4	4.6	1.38B	6.4	5.3	4.8	4.8B	4.2B	6.2	4.4B	4.3	4.8	6.2	6.6	6.8	3.3	5.6	3.0
19	4.2	3.2	3.8F	3.8	2.8	G	3.4	5.2	4.8F	G	G	G	(9.3)Y	(9.7)F	7.1	5.3	5.2	4.4	C	2.4	3.0	3.8	4.8	(5.6)C
20	3.6	3.2	3.8	3.8	2.8	3.0	(2.2)C	5.8B	7.9	5.6	6.4	4.8	4.3	(10.5)B	8.2	(1.36)F	5.8	7.2F	(10.0)B	5.8	10.4	7.2	4.0	3.8
21	4.6	4.8	3.2	2.6	2.6	2.8F	3.8	5.5	5.7	6.8	5.8	6.5	4.3	10.3	7.6	7.0	5.2F	4.8F	5.7	6.4	6.4	4.2	4.2	3.6
22	5.2	7.0	5.5	4.7	3.2	2.8	3.8	7.0	4.2	10.6	7.0	8.6	B	B	B	5.4	4.8	4.8	B	B	6.7	4.4	4.8	4.7
23	4.4	T	C	C	2.8	G	2.8	4.4	7.2	6.7	4.8	11.8F	7.6	10.2F	7.6	4.8F	4.4	4.6	3.4	7.0	6.6	5.2	3.6F	3.8
24	3.9	5.6	5.2	4.2	3.4	5.0	5.2	8.0	5.7F	5.2	7.5	5.3	7.6	6.4	5.8	4.6	5.6	4.6	5.8Y	G	3.8	4.2	3.2	3.4
25	6.0	3.6	3.0	3.0	3.0	3.6	5.6	5.6	5.0	7.4	1.36	12.2B	(1.38)B	6.0	5.2B	5.8	5.7	6.8	5.2	9.4	8.6	6.6	3.9	3.0
26	4.2	8.7	5.4	7.1	4.5F	4.4	3.6	6.2	15.2	15.0	10.4	10.5	1.39	8.4	6.2	4.4	5.4	6.4F	4.0	5.4B	6.4	3.6	3.6F	3.9
27	4.0F	3.5	3.4	3.5	3.4	4.5Y	4.0	4.7	8.2	5.2	4.6	7.0Y	C	8.4	7.0	5.8	5.4	6.0	4.8	4.8	4.0	4.0	3.8	3.4
28	3.0	3.2	3.8	3.4	2.6Y	G	4.0	C	5.6	6.8	7.2	5.7Y	6.4	6.3	5.6Y	5.6	4.2	3.6	4.0	4.0	8.2	4.2	3.8	C
29	C	C	C	C	C	3.6F	5.6F	B	4.6	5.4	4.1B	5.0	12.0	5.9F	(8.8)B	5.7	10.0	6.2	5.4	9.0	6.4	3.6	2.8	3.0
30	6.7	7.0F	5.7	4.6	4.2	G	G	B	4.8	6.8	9.4	9.3	8.4	7.2	5.8	B	6.0	5.2	6.4	6.4Y	6.6	3.4	3.4	3.4
31	3.4Y	2.5Y	3.4	5.6	T	T	T	4.2	4.6	4.5	4.2	6.2	5.8	3.4Y	B	4.2	4.6	4.1	4.9	4.8F	3.6	3.0F	2.8Y	3.6F
Median Value	4.4	3.8	4.0	4.2	3.0	3.4	3.9	5.2	5.7	6.8	6.9	7.2	7.5	7.4	6.4	5.8	5.3	5.6	5.4	6.0	5.8	4.4	4.2	4.5
Count	2.9	2.9	2.9	2.9	2.9	2.8	3.0	2.9	3.0	3.0	3.0	3.0	2.8	3.0	2.6	2.8	2.9	3.1	2.9	3.0	3.1	3.1	3.0	3.0

Sweep 1.0 Mc to 17.0 Mc in 1.5 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denkitsu-shin Kenkyujo) Gotanda, Shinagawa-ku Tokyo, Japan

IONOSPHERIC DATA

F₂-M3000

Kokubunji, Tokyo

Lat. 35°42.4'N
Long. 139°29.3'E

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	28F	29F	(31)J	32	23	24	26	28	29	30H	A	A	A	A	28F	27	29	29	30	31AF	30	AF	AF	JFF	
2	F	F	F	F	31F	31	29	30	31	29	A	A	A	A	28	29	28	30	J	31	28	28	27	27	
3	27	JF	JF	JF	32F	30F	28F	31	A	A	A	26	J	A	A	29	29	(30)S	28	32	28	S	S	S	
4	S	S	J	S	JF	F	30	30	30	27	27	26	27	28	28	29	28	29	31	30	29	28	26	27	
5	28	29	JF	BF	BF	32	JF	32F	32	31	32	29	30	30	28	29	29	29	32F	(31)B	31	30F	31	(31)S	
6	31	J	31	31	30	28	32	31	27	28	30	28	27	27	27	29	29	30	30	30	29	29F	28	28	
7	(28)B	29F	JF	33	JF	J	35	31	28	30	28	29	29	29	(30)A	31	31	31	J	B	A	28	27F	31F	
8	30	28	(30)B	31	32	32	29	35	33	27	30	(30)A	30	29	31	31	32	32	32	31	30	28	(29)F	JF	
9	31	JF	31F	30	34	30N	29	28H	(27)A	26	27	29	25	28	27	29	30	30	(31)A	31F	(29)A	28	F	J	
10	A	JF	F	F	F	33	35	35	35	30	30	30	29	29	(31)C	32	32	J	31	34	J	30S	29	26	
11	JF	JF	JF	F	J	J	28S	J	A	J	C	C	C	C	29	29	29	31	(30)S	30S	S	J	F	C	
12	27	30	30	31	31	29	30	32	34	29	29	29	27	27	28	28	28	28	26	33	32	26	29	(27)F	
13	28	28	27	J	20	F	F	31	C	C	25	27	27	28	27	28	28	26	32	33	32	26	29	(27)F	
14	27	JF	A	F	B	C	B	A	A	A	A	S	A	A	25	27	29	30	31	33	31	30	A	A	
15	25	26	JF	JF	26F	30	30	33	34	34	A	A	28	28	28	30	30	30	J	30	33	(31)F	JF	FS	
16	JF	31F	SF	S	30F	32	33	J	S	J	F	F	27	28	28P	30	30	(30)A	30	32	32S	30S	28SF	JF	
17	F	JF	JF	JF	27	27	31	31	36	31	29	29	30	31	30	30	31	32	32	32	32	27	27	28	
18	28	30	S	J	29F	B	28B	S	A	J	30	29	31	30	29	30	31	32	S	J	J	29	27	30	
19	29	29	30	28F	29	32	33	(33)S	32	28	27	28	27	29	28	28	28	30	30	C	B	30	27	26	
20	28F	29	28F	JF	35F	JF	C	29	30	28	29	29	29	30	(32)A	32	32	33	(34)A	34	(31)A	27	J	28	
21	29	27S	26	27	28	32	29	31B	29	27	25	28	28	29	29	30	31	31	32	33	28	27	27	29	
22	26	(28)B	29	28	30	30	29	29	29	27	28	28	28	28	28	29	29	31	32	(33)S	36	B	B	26	
23	30	T	C	C	25	25F	27F	26F	28	33	29	(28)A	27	28	27	28	30	30	30	31	B	F	(25)F	26F	
24	26	25F	28J	28S	27	27	30	33	32	28	29	28	29	29	30	31	31	31	32	30	31	21	21	28	
25	29	28F	30	29	28	29	31	34F	J	28	A	J	29	28	28	29	J	32	31	A	A	J	J	29	
26	30	29	J	28	JF	35	30	31	(29)A	27	27	26	(27)A	27	28	29	29	28	28	28	29	26	27	30	
27	30	29F	30	31	31	31	31	34	33	27	28	29	(30)C	30	28	(31)S	32	32	32	32	29	29S	30	30	
28	30	30	30	40	32	33	33	(33)C	33	(31)B	B	B	B	30	J	31	31	31	31	31	29	29	28	C	
29	C	C	C	C	C	C	33	33	35	32	N	30	(30)A	29	29	30	29	32	32	29	31	28	30	28	
30	B	A	A	32	32	32	(30)T	30	29	32	30	29	28H	28	28	28	30	30	30	(31)S	28S	28PS	29	29	
31	29	29	T	T	30	J	33	32	31	30	28	29	30	30	30	32	30	32	33	33	29	30F	29	30	
Median Value	28	29	30	31	30	30	30	31	31	29	29	29	29	29	30	30	30	30	29	31	32	31	29	28	28
Count	23	19	14	15	23	22	21	21	24	25	22	24	25	27	30	30	30	30	29	27	26	24	22	21	22

SWEEP 1.0 Mc TO 17.0 Mc in 1.5 min

Manuji

IONOSPHERIC DATA

ff min

Kokubumji, Tokyo

Lat. 35°42.4'N
Long. 139°29.3'E

135°E Mean Time

Day	00	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 1.2	E 1.2	E 1.2	E 1.2	E 1.8	Z 3.5	3.7	A	A	A	A	A	A	A	A	4.4	A	3.5	2.9	A	A	A	A	A
2	A 2.0	E 2.0	E 2.0	E 2.0	A 2.0	A 2.6	2.9	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
3	A 3.0	E 3.0	E 3.0	E 3.0	A 3.0	A 3.4	3.4	4.1	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
4	A 4.0	E 4.0	E 4.0	E 4.0	A 4.0	A 4.4	4.4	4.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
5	A 5.0	E 5.0	E 5.0	E 5.0	A 5.0	A 5.4	5.4	5.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
6	Z 6.0	E 6.0	E 6.0	E 6.0	A 6.0	A 6.4	6.4	6.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
7	A 7.0	E 7.0	E 7.0	E 7.0	A 7.0	A 7.4	7.4	7.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
8	A 8.0	E 8.0	E 8.0	E 8.0	A 8.0	A 8.4	8.4	8.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
9	A 9.0	E 9.0	E 9.0	E 9.0	A 9.0	A 9.4	9.4	9.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
10	A 10.0	E 10.0	E 10.0	E 10.0	A 10.0	A 10.4	10.4	10.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
11	A 11.0	E 11.0	E 11.0	E 11.0	A 11.0	A 11.4	11.4	11.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
12	A 12.0	E 12.0	E 12.0	E 12.0	A 12.0	A 12.4	12.4	12.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
13	A 13.0	E 13.0	E 13.0	E 13.0	A 13.0	A 13.4	13.4	13.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
14	A 14.0	E 14.0	E 14.0	E 14.0	A 14.0	A 14.4	14.4	14.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
15	A 15.0	E 15.0	E 15.0	E 15.0	A 15.0	A 15.4	15.4	15.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
16	A 16.0	E 16.0	E 16.0	E 16.0	A 16.0	A 16.4	16.4	16.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
17	A 17.0	E 17.0	E 17.0	E 17.0	A 17.0	A 17.4	17.4	17.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
18	A 18.0	E 18.0	E 18.0	E 18.0	A 18.0	A 18.4	18.4	18.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
19	A 19.0	E 19.0	E 19.0	E 19.0	A 19.0	A 19.4	19.4	19.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
20	A 20.0	E 20.0	E 20.0	E 20.0	A 20.0	A 20.4	20.4	20.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
21	A 21.0	E 21.0	E 21.0	E 21.0	A 21.0	A 21.4	21.4	21.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
22	A 22.0	E 22.0	E 22.0	E 22.0	A 22.0	A 22.4	22.4	22.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
23	A 23.0	E 23.0	E 23.0	E 23.0	A 23.0	A 23.4	23.4	23.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
24	A 24.0	E 24.0	E 24.0	E 24.0	A 24.0	A 24.4	24.4	24.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
25	A 25.0	E 25.0	E 25.0	E 25.0	A 25.0	A 25.4	25.4	25.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
26	A 26.0	E 26.0	E 26.0	E 26.0	A 26.0	A 26.4	26.4	26.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
27	A 27.0	E 27.0	E 27.0	E 27.0	A 27.0	A 27.4	27.4	27.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
28	A 28.0	E 28.0	E 28.0	E 28.0	A 28.0	A 28.4	28.4	28.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
29	A 29.0	E 29.0	E 29.0	E 29.0	A 29.0	A 29.4	29.4	29.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
30	A 30.0	E 30.0	E 30.0	E 30.0	A 30.0	A 30.4	30.4	30.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
31	A 31.0	E 31.0	E 31.0	E 31.0	A 31.0	A 31.4	31.4	31.4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Station Value Count	1.5	1.4	1.4	1.2	1.6	2.1	2.8	3.6	3.8	4.1	4.4	4.2	4.4	4.6	4.5	4.2	3.8	3.4	2.7	2.0	1.9	2.0	2.0	1.6
Sweep	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Sweep 1.0 Mc to 17.0 Mc in 1.5 min Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsunshin Kenkyujo) Gotanda, Shinagawa-ku Tokyo, Japan

IONOSPHERIC DATA

Kokubunji, Tokyo
Lat. 35 42.4 N
Long. 139 29.3 E

f_E min

135°E Mean Time

Day	00	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	1.2	G	E	E	1.2	1.5	1.9	1.7	1.7	2.4	2.6	2.5	2.4	2.3	3.6	2.0	1.8	1.8	1.8	1.8	1.5	1.6	1.5
2	1.6	1.5	1.1	1.5	1.5	1.6	1.6	1.8	1.8	1.8	1.7	1.7	1.8	2.6	2.4	2.5	2.3	E	E	E	E	E	E	E
3	E	E	E	E	1.2	1.4	1.7	2.0	1.7	2.4	2.4	2.4	2.3	2.2	2.4	1.7	1.6	1.7	1.2	1.2	1.2	1.2	E	E
4	E	E	E	E	E	1.3	1.2	1.5	1.7	2.0	2.1	2.6	2.4	2.3	2.1	1.9	1.6	1.4	1.2	1.2	1.2	1.6	1.6	E
5	E	1.2	1.2	E	E	1.5	1.3	1.4	1.8	2.2	2.6	2.4	2.6	2.4	2.4	1.8	1.5	1.2	1.2	1.2	1.2	1.2	1.2	1.2
6	E	E	E	E	E	1.3	1.4	1.8	2.2	2.3	2.4	2.4	2.6	2.3	2.3	1.7	1.2	1.4	1.2	1.4	G	1.8	1.3	1.2
7	1.2	1.2	1.4	E	E	1.6	1.2	1.4	1.8	2.3	3.6	3.4	2.6	2.2	2.2	2.0	2.0	1.8	1.2	1.6	1.5	1.6	1.2	E
8	E	E	E	E	E	1.1	1.4	1.5	1.6	1.9	2.1	2.4	2.3	2.1	2.1	2.0	1.6	1.6	1.6	2.0	1.4	1.5	1.7	1.4
9	E	E	E	E	E	1.2	1.4	1.5	1.4	1.8	1.8	2.2	2.4	3.2	2.4	2.0	1.8	1.6	1.2	1.2	1.4	1.2	1.2	1.1
10	E	E	E	E	E	1.6	1.3	1.3	1.3	1.6	1.8	2.2	2.1	2.4	2.1	2.0	2.0	1.8	1.6	1.3	1.4	1.4	1.4	1.4
11	1.4	1.4	1.2	E	E	1.2	1.6	1.5	1.4	1.8	C	C	C	2.8	(2.3)C	1.8	3.8	1.6	1.2	1.6	1.5	1.6	1.6	1.6
12	1.6	E	E	E	E	E	1.2	1.3	1.6	1.9	2.1	2.0	2.4	2.9	2.3	1.9	2.2	1.2	1.1	1.2	1.2	1.3	(1.3)C	1.2
13	1.2	1.2	E	E	E	E	1.2	1.5	1.3	C	C	2.6	2.4	2.0	2.4	B	1.8	1.9	1.8	1.4	1.2	1.2	1.2	E
14	E	E	E	E	E	E	C	1.2	1.4	1.8	1.9	2.0	2.5	2.3	2.7	2.3	2.0	1.3	1.3	1.4	1.3	1.2	1.5	1.3
15	1.2	1.1	E	E	E	E	1.4	1.2	1.5	1.8	2.0	2.1	2.3	2.1	1.9	1.8	1.6	1.5	1.5	1.5	1.6	1.5	1.5	1.6
16	1.2	E	E	E	E	E	1.2	1.6	1.4	1.6	2.0	2.2	2.4	2.4	2.8	2.6	2.7	1.6	1.3	1.4	1.4	1.4	1.3	1.2
17	E	E	1.1	E	E	E	1.2	1.2	1.8	2.0	2.0	2.4	2.6	3.4	2.6	2.3	1.7	1.5	1.2	1.2	1.2	1.2	1.2	E
18	G	1.2	E	E	E	1.2	1.1	1.6	1.8	2.2	2.6	2.6	2.4	2.6	3.1	2.4	1.8	1.6	1.2	E	E	E	E	E
19	E	E	E	E	E	E	1.1	1.5	1.4	1.5	1.7	1.7	1.6	2.4	2.5	2.1	1.8	(1.7)C	1.6	1.6	1.6	1.6	1.6	1.2
20	1.2	1.3	1.2	1.2	1.3	1.2	1.2	1.7	1.2	1.8	1.9	2.4	2.3	2.3	1.8	2.2	1.8	1.6	1.3	1.3	1.1	E	E	E
21	E	E	E	E	E	E	1.5	1.5	1.2	1.8	(1.8)B	2.0	2.6	2.8	1.8	1.8	1.7	1.5	1.3	1.3	1.3	1.3	1.3	E
22	E	E	E	E	E	1.1	1.2	1.1	1.2	2.4	3.8	4.0	B	B	B	2.0	2.4	4.2	B	B	B	2.2	2.4	2.0
23	2.6	T	C	C	C	E	1.5	1.5	2.4	2.6	2.4	2.4	2.2	2.4	2.2	1.8	1.7	1.4	1.4	1.5	1.2	1.2	1.2	1.2
24	E	E	E	E	E	E	1.1	1.2	E	1.6	2.2	2.5	3.2	2.6	2.5	1.6	2.2	2.0	1.8	G	1.5	1.3	1.2	1.2
25	1.2	1.2	1.2	1.2	1.2	1.2	1.6	1.3	1.7	2.0	2.2	4.2	2.7	3.4	3.2	2.0	1.6	2.2	1.4	1.3	1.2	1.2	1.5	1.3
26	F	1.2	1.2	1.2	E	1.1	1.8	1.9	1.3	1.6	2.2	2.4	2.2	2.2	2.0	2.2	2.2	1.9	1.3	1.3	1.3	1.2	1.3	1.2
27	1.1	E	E	E	E	1.2	1.3	1.3	1.8	2.4	2.4	3.8	(3.3)C	2.8	2.6	3.0	2.1	1.5	1.3	1.3	1.3	1.2	1.2	1.2
28	1.2	E	1.2	1.2	1.8	1.4	1.6	(1.9)C	2.2	2.2	2.6	4.4	4.1	4.4	3.7	2.7	1.8	1.6	1.2	1.2	E	1.1	1.2	C
29	C	C	C	C	C	C	1.2	1.5	2.2	2.3	3.2	3.4	3.6	3.8	3.5	3.2	2.4	1.8	1.8	1.5	1.4	1.4	1.4	1.2
30	1.6	1.3	1.3	1.2	1.3	1.4	1.7	B	4.2	2.6	2.4	(3.1)B	2.6	2.6	4.1	(4.0)B	3.8	3.0	2.5	2.4	2.4	2.4	2.4	2.4
31	1.4	1.4	1.2	1.2	1.2	1.4	1.6	1.6	2.0	2.5	2.4	3.3	2.4	4.3	2.2	2.0	1.9	1.3	1.3	1.3	1.3	1.3	1.3	1.1
Median Value	E	E	E	E	E	1.2	1.4	1.5	1.7	2.0	2.2	2.4	2.4	2.6	2.3	2.0	1.8	1.6	1.3	1.3	1.3	1.3	1.3	1.2
Count	30	29	29	29	30	29	31	30	30	30	30	30	29	30	29	30	31	31	30	30	31	31	31	30

Sweep 1.0 Mc to 17.0 Mc in 1.5 min

Manual

Kokubunji, Tokyo

LOT. 35 42.4 N
139 29.3 E

IONOSPHERIC DATA

135°E Mean Time

Z_o

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	60F	70F	(60)J	100	120	130	130	100	120	110 ^H	A	A	A	A	(140) ^P	100	100	100	120	70 ^A	80	AF	AF	(70) ^E	
2	F	F	F	110 ^P	120	130	130	100	210	130	A	A	A	A	160	110	120	(120) ^A	120 ^J	120	100	120	140	90	
3	130	110 ^E	120 ^E	130 ^E	90 ^F	140 ^F	160 ^F	110	A	A	A	A	A	A	A	110	140	130	130	90	100	S	S	S	
4	S	S	JS	SE	JE	F	110	90	100	140	(130)	120	80	100	100	110	110	90	90	120	110	100	90	120	
5	90	110	90 ^E	BE	BE	130	130 ^E	150 ^F	70	100	90	(100) ^A	110	90	120	90	90	100	60 ^P	(80) ^B	100	90 ^P	60	(70) ^S	
6	70	(60) ^J	60	70	80	140	80	100	90	140	110	140	130	120	130	90	140	140	140	110	120	70	100	90	
7	(90) ^B	80F	60 ^J	70 ^A	60 ^J	80 ^J	50	80	(100) ^A	130	110	110	120	140	140	(130) ^A	110	110	JA	B	A	90	110	60	
8	80	80	(90) ^B	90	70	110	100	50	80	150	100	(90) ^A	120	180	100	120	90	90	120	80	70	120	(80) ^F	120 ^E	
9	70	90 ^E	140 ^F	110	100	110 ^N	120	60 ^H	(90) ^A	120	140	100	90 ^B	70	120	80	90	100	100	(130) ^F	150	90 ^B	100 ^F	70 ^J	
10	(60) ^A	50 ^E	F	F	F	70	90	80	100	50	110	80	120	130	(130) ^B	120	120	(110) ^A	100 ^P	(90) ^A	70	(70) ^F	70 ^J	(70) ^J	
11	60 ^E	80 ^E	90 ^E	110 ^F	70 ^S	100 ^E	110 ^S	60 ^J	(60) ^A	50 ^J	C	C	90	90	(90) ^C	90 ^P	60	90 ^J	100	100	100 ^S	90 ^S	100	100	
12	90	100	100	90	80	100	110	120	170	100	100	100	90	80 ^J	80	70	70	100	(120) ^S	130 ^S	100 ^S	90 ^F	C	S	
13	100 ^E	80	90	40 ^J	80	F	F	110	C	C	150	90	110	100	100	120	120	100	90	80	120	140	110	120	100 ^F
14	80	80 ^J	A	F	B	C	B	A	A	A	A	S	A	80	(80) ^S	70	80	40	40	110	80	60	A	A	
15	150	150	120 ^E	60 ^E	120 ^F	110 ^B	130	150	110	70	A	A	A	80	100 ^P	100	90	140	60 ^J	90	120	120 ^E	AF	FS	
16	60 ^E	100 ^F	130 ^E	(90) ^S	50 ^F	50	90	50 ^T	(60) ^S	60 ^J	(70) ^A	80 ^H	90	30	40	80	90	(140) ^A	190	100	100 ^S	110 ^S	100 ^E	60 ^A	
17	(60) ^F	60 ^F	50 ^F	70 ^F	100	90	110	80	50	110	(100) ^B	90	30	40	80	90	60	60	70	120	140	120	70	110	
18	70	40	(60) ^J	70 ^B	70 ^F	(80) ^B	80	S	A	80 ^J	70	80	80	100	100	90	50	60	(70) ^S	80 ^S	90	110	110	80	
19	120	70 ^J	70	90 ^F	60	70	70	(100) ^S	120	170	130	130	110	110	110	110	110	150	C	B	100	80	120	(110) ^C	
20	100 ^F	110	90	110 ^E	100 ^F	170	(140) ^C	110	100	110	100	100	130	100	90	(90) ^A	80	60	(80) ^A	90	(120) ^A	150	80	60	
21	80	130	80	80	110	90	100	100	80	(110) ^A	140	150	80	120	100	100	140	100	190	100	140	110	120	100	
22	150 ^F	130 ^E	100 ^F	120 ^F	60	80	100	110	(90) ^B	60	110	B	B	70	120	90	110	70	(70) ^S	70	B	B	B	120	
23	60	T	C	C	C	110	120 ^F	90 ^F	160 ^F	90	60	(60) ^A	60	110	100	110	70	50	70	110	90 ^B	40 ^F	(100) ^F	90 ^P	
24	80	90 ^F	100 ^J	130 ^S	90	110	100	130	130	100	90	110	80	110	100	70	70	120	90	100	110	120	70	130	
25	120	80 ^E	70	120	70	140	90	60 ^P	70 ^J	140	A	J	70	110	120	110	(100) ^B	90	110	A	A	110 ^F	80 ^T	110	
26	120	100	70 ^J	120	60 ^F	110	130	70	(100) ^A	120	170	130	(130) ^A	130	100	120	100	90	120	160	80	130	110	50	
27	90	130 ^F	80	90	70	140	110	130	130	120	160	130	(140) ^F	140	130	(110) ^S	80	110	120	80	100	100 ^S	100	120	
28	70	90	70	50	60	70	150	(150) ^C	150	130 ^B	90	B	B	90	80 ^J	110	110	110	120	140	150	100	120	C	
29	C	C	C	C	C	C	90	100	70	120	N	90	(100) ^A	110	100	80	110	90	80	100	70	100	70	120	
30	B	A	A	80	90	90	(100) ^T	100	(90) ^B	80	130	90	90 ^H	100	110	130	100	100	100	110	(120) ^S	110 ^S	100	100	
31	100	60	B	J	90	110 ^J	100	140	160	140	130	80	80	90	70	110	90	60	80	80	100	90 ^P	110	90	
Median Value	80	90	90	90	80	110	100	100	100	110	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Count	27	26	23	23	26	27	29	29	27	28	23	23	24	28	30	31	31	31	31	29	28	28	25	26	

Sweep J.0. Mc to L.0 Mc in 15 min Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyujo) Gotanda, Shinagawa-ku Tokyo, Japan

IONOSPHERIC DATA

ff₂

Yamagawa
Lat 31 12.5'N
Long 140 21.7'E

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	105	113	114	94	81	77	95	110	109	111	112	120	108	95	96	96	115	116	110	101	91	82	83	93
2	103	110	114	T	C	77	A	S	95	98	96	100	103	108	111	114	102	107	98	90	90	89	92	93
3	S	15	F	84	F	88	89	103	87	86	A	A	95	98	103	108	105	98	106	94	93	90	92	97
4	95	95	87	78	85	86	95	92	99	97	93	95	105	109	112	117	110	113	113	104	90	93	97	99
5	105	S	S	94	81	82	90	97	103	94	96	97	98	102	100	111	109	114	113	101	93	97	99	102
6	95	99	89	89	80	80	76	90	91	91	94	96	97	104	101	118	112	100	107	101	90	91	C	C
7	51	S	94	44	84	66	67	80	80	80	87	91	99	106	108	118	106	103	105	94	93	90	86	89
8	92	91	98	99	83	84	90	97	90	99	98	100	103	110	113	115	119	101	103	94	96	87	95	S
9	51	87	93	88	75	76	76	80	72	88	99	95	96	90	99	87	90	89	80	81	85	82	70	C
10	F	I	F	C	78	78	72	81	73	71	77	60	90	97	A	A	104	95	88	90	82	75	82	85
11	86	84	75	76	65	63	75	96	83	77	74	91	105	94	98	101	103	101	99	97	A	A	78	79
12	79	78	89	82	85	85	85	87	87	84	A	A	102	103	106	103	100	96	95	92	82	78	82	84
13	80	75	78	85	83	82	87	101	90	86	81	93	99	106	110	S	S	119	111	103	79	61	62	63
14	K	S	K	63	63	63	63	68	73	102	B	A	C	88	86	98	99	66	66	70	162	54	50	51
15	A	K	S	58	56	58	58	77	82	85	S	68	78	88	98	100	99	98	96	54	A	71	63	65
16	66	64	S	S	50	50	58	68	70	60	66	79	84	90	98	98	96	101	111	117	111	104	103	100
17	86	75	F	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
19	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	87	84	86	82	82	85	71	68	81	83	44	C	C	C	C	C	S	104	121	117	102	86	82	87
21	89	78	81	84	68	64	77	75	70	71	80	94	95	96	102	89	90	92	101	95	76	75	73	84
22	85	83	92	94	80	75	79	80	76	67	77	76	100	124	117	114	113	106	103	95	96	81	87	80
23	93	93	86	73	67	F	74	86	90	73	74	88	100	109	104	109	101	103	103	98	82	52	85	88
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	94	91	83	75	63	59	91	84	81	74	83	97	105	118	115	123	110	100	99	106	97	94	91	91
27	96	87	82	74	65	62	88	88	86	90	91	98	104	117	121	120	109	98	89	88	90	84	87	80
28	82	83	92	94	80	75	79	80	76	67	77	76	100	124	117	114	113	106	103	95	96	81	87	80
29	93	98	91	84	84	80	80	80	86	79	78	82	90	103	98	114	104	111	120	125	101	94	88	89
30	73	78	83	81	72	60	65	85	100	104	100	98	109	113	116	115	120	125	123	116	5	5	5	100
31	101	87	87	86	78	71	79	80	97	87	92	104	111	112	110	114	113	103	106	98	87	83	86	100
Mean Value	91	87	87	83	76	73	77	86	87	86	87	95	102	103	106	112	104	103	103	96	90	82	86	87
Count	21	22	22	24	26	26	26	27	26	21	22	25	26	25	24	24	25	27	27	26	24	25	26	24

Sweep 1.2 Mc to 15.8 Mc in 1.5 min

Manual

Y I

Yamagawa

Lat 31 12' N
Long 139 37' E

h_p F.

IONOSPHERIC DATA

135° E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	23	
1	400	340	300	330 ^S	380 ^P	400 ^P	330 ^P	320	340 ^J	370 ^S	390	490	450	410	450	410	420	390	360	350	340	370	400	
2	440	390	310	T	340 ^P	A	S	(320) ^P	(370) ^A	410 ^H	(420) ^S	A	430	420	(410) ^A	390	A	A	A	420	350	430 ^T	(400) ^C	
3	360 ^S	F5	F	350	370 ^F	440 ^F	310	320	320	380	A	A	450	370	(380) ^C	390	400	370	(350) ^T	390	410	390	380	
4	390 ^J	390	320	340	350	340	310	320	320	360	360	460	410	(400) ^C	380	400	380 ^P	370	350	340	400	400	390	
5	340	S	S	340	370	370	330	(320) ^S	300	320	430	(430) ^C	420	400	420	360	400	360	320	330	340	340	370	390
6	390	360	340	370 ^F	320	380	(390) ^B	320	320	320	350	390	340	420	400	490	390	380	350	300	310	440	C	
7	SF	S	370	320	340	320	290	290	330	330	370	400	390	400	380	380	400	370	340	320 ^P	310	320	(320) ^A	
8	330	360	330	310	300	320	340	300	350	370	320	380	390	380	390	360	350	330	330	340	340	380	410	S
9	SF	340	350	340	400	400	340	300	400	460	(430) ^A	390 ^S	390	410 ^S	350	340	320	360	360	350	330 ^R	(330) ^S	320	C
10	F	F	F	C	390	320	290	320	280	370	S	S	390 ^P	390 ^P	A	A	320	320	310	340	320	(370) ^S	420	(420) ^T
11	370 ^P	370	390	370 ^F	340	340	310	330	300	410	410	400 ^S	340	350	390	(370) ^A	350	300	(300) ^A	290	A	A	420	420
12	280	370	320	300	350	330	340	340	440	A	A	A	370	(360) ^A	340	(350) ^A	360	330	320	310	340	330	400	390
13	370	430	(410) ^S	390 ^F	360 ^F	330 ^F	310	290	290	(340) ^A	390	370	400	410	410 ^T	S	S	330	(310) ^S	280	300	410	S	S
14	A	S	390	380	320	320	(350) ^F	290	470	B	B	A	C	510	520	480	410	G	350	290	(390) ^S	380	360 ^S	A
15	A	S	SF	390	400	390 ^T	270	270	(290) ^S	300 ^S	(370) ^S	430	(410) ^A	390	390	360	(370) ^A	370	310	5A	A	390 ^S	380	390
16	310 ^T	340	S	S	300	260	250	250	300	400	390	400	400	400	360	390	380	390	320	310	290	280	280	(300) ^F
17	320 ^P	320	F	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
19	(380) ^S	380	380	390	480	320	300	280	(360) ^A	440	410	430	360	430	430	400	(370) ^S	330	340	(360) ^S	370	400	410	420
20	360	320	380	360	370	330	280	290	(330) ^F	370	410	C	C	C	C	C	C	340	310	280	370	430	410	410
21	390	320	360	320	320	310	280	280	310	390	(380) ^S	360	370	310	360	(350) ^P	340	370	390	340	390	420	410	340
22	(340) ^S	340	420	(400) ^T	330	(390) ^F	310	340	(380) ^T	410	A	C	390	390	390	380	380	350	340	310	400	340	(450) ^S	400
23	(360) ^S	320	330	340	430	(390) ^F	320	380	320	310	360	450	410	420	480	430	390	340	300	300	350	410	420	C
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	350	(370) ^A	350	310	310	340	280	310	300	300	300	410	390	390	390	370	360	380	380	320	320	360	400	370
27	340	390 ^H	330	330	320	310	300	250	310	400	450	410	510	390	380	360	330	340	350	340	350	370	380	400
28	370	360	380	340	300	310	280	260	(300) ^S	310	A	A	B	(400) ^S	440	380	390	340	360	320	350	470	440	410
29	290	370	330	340	360	300	280	270	340	280	320	430	440	400	(400) ^A	420	380	350	320	310	320	300	290	290
30	290	300	310	380 ^T	310	390	340	310	340	360	370	400	420	410	(400)	390	380	370	320	300	S	S	330	330
31	360	370	340	340	340	320	310	360	280	360	300	400	390	370	370	380	350	350	360	(320) ^P	340	400	410	400
Mechan Value	360	360	340	340	350	330	310	300	320	370	380	410	400	400	390	380	380	360	340	320	340	390	400	390
Count	23	22	22	24	25	27	26	26	27	26	21	20	24	26	25	24	24	26	26	26	24	25	24	22

(Sweep 1.6 Mc in 1.5 min)

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denka-tsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

h f:

Lat 125°N
Long 130°37.7'E
Yamagawa

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	320	300	250	(280) ^S	(300) ^A	320	300	270	300	300	310 ^H	(420) ^A	(400) ^A	380	420	390 ^H	380	350	310	290	240	240	290	300	320
2	(320) ^A	(310) ^A	260	250	C	A	(240) ^A	250	250	(280) ^H	300	400	400	390	(360) ^A	(330) ^C	A	A	A	S	280	290	320	(310) ^C	
3	320	290	(310) ^A	(320) ^A	330	(320) ^A	260	280	280	(280) ^H	A	A	420	370	(370) ^C	370	350	340	(360) ^A	270	290	300	290	290	
4	290	300	280	290	290	300	280	240	240	280	250	440	390	(380) ^C	360	360	340	(300) ^A	300	280	240	300	320	290	
5	270	240	A	A	A	280	A	280	250	300	320	(350) ^C	380	380	380	330	370	320	290	270	(300) ^A	300	270	300	
6	300	300	280	(300) ^A	270	280	270	270	250	300	300	350	390	390	390	400	340	350	300	250	250	270	C	C	
7	360	(300) ^A	(330) ^A	250	280	(280) ^A	250	250	(270) ^C	290	360	340	350	360	370	330	370	350	320	310	300	290	310	(310) ^A	
8	310	320	300	280	240	280	270	250	310	330	300	370	380	350	350	350	320	310	290	260	280	250	300	340	
9	300	250	270	250	310	360	300	300	400	(340) ^A	(360) ^A	380	380	380	340	330	280	300	300	290	300	250	240	290	
10	(360) ^A	300	240	270	300	280	260	260	280	350	S	S	(360) ^A	380	(340) ^A	300	300	300	(300) ^A	260	270	(300) ^S	320	310	
11	300	270	260	270	270	250	270	210	390	390	(390) ^L	380	330	320	350	(350) ^A	340	A	A	210 ^A	A	A	A	330	
12	300	310	280	250	320	270	300	300	300	410	A	A	350	(330) ^A	310	(310) ^A	300 ^A	310	(300) ^A	290 ^A	300	(300) ^A	300	(330) ^A	
13	300	(300) ^A	290	290	290	280	280	260	270	(280) ^A	290 ^S	260	240	400	400	350	270	320	220	220	220	280	(310) ^A	(340) ^A	
14	(350) ^A	310	370 ^K	340 ^K	240	240	280	240	430	B	A	A	C	470	500	450	370	380 ^K	(330) ^A	(290) ^S	(330) ^S	300 ^N	350 ^A	A	
15	A	K	340 ^A	310 ^A	300 ^N	270	250	260	270	280	(260) ^S	340	(360) ^A	380	360	350	(350) ^C	340	380	A	A	A	300	300	340
16	270	300	270	260	270	280	230	240	240	300	(400) ^L	390	380	380	340	360	360	370	310	260	250	250	240	260	
17	280	290	(320) ^A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	(380) ^S	310	C	C	C	C	C	(360) ^A	
19	320	320	320	290	340	270	270	260	300	(350) ^A	400	420	340	(370) ^B	390	350	(330) ^C	300	280	280	(200) ^A	300	310	320	
20	300	290	320	330	330	310	250	250	(280) ^A	300	380	C	C	C	C	C	C	320	270	240	(300) ^A	(310) ^A	300	340	
21	(250) ^A	(290) ^A	250	240	230	210	240	250	270	320	450	350	370	290	350	(330) ^B	300	330	350	300	260	350	350	340	
22	340	310	290	300	280 ^F	300	300	330	(370) ^C	400	A	C	380	360	360	360	340	310	320	280	240	(300) ^B	A	A	
23	280	260	250	230	220 ^H	280	270	270	300	300	A	440	370	380	400	390	380	300	280	270	290	260	C	C	
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
26	(300) ^A	(300) ^A	270	280	280	300	270	290	250	300	390	400	360	380	370	350	340	330	330	300	260	250	300	300	
27	280	250 ^H	250	250	240	260	220	290	360	A	A	A	A	370	(360) ^A	340	310	300	300	300	300	300	280	(300) ^A	
28	(20) ^A	(200) ^A	300	260	210	220	260	230	260	A	A	A	B	360	370	360	340	320	280	260	260	270	320	300	
29	300	280	280	280	280	250	250	260	260	300	430	(400) ^A	400	400	400	390	260	380	290	270	290	(300) ^A	280	270	
30	270	260 ^H	250	270	240	300	300	300	320	360	390	360	370	370	370	370	350	340	300	260	300	300	300	270	
31	270	300	270	250	240	240	270	240	280	280	320	370	360	330	330	360	320	320	270	270	220	280	320	300	
Median Value	300	300	280	270	280	260	260	280	300	320	319	319	370	380	370	350	340	320	300	270	280	260	260	320	320
Count	27	28	27	26	26	25	26	27	27	26	19	20	23	26	26	26	26	26	26	25	25	26	26	27	24

Sweep 1/2 - Mc to 18.5 - Mc in 1.5 - min

Manual

Electrical Communication Laboratory Japanese Ministry of Telecommunications
 (Denkikatsushin Kenkyujo) Gotanda Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

Yamagawa
 31°12.5'N
 130°37.7'E

f_oF₂

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
						L	L	L	4.5	(4.5) ^B	4.5	B	A	A	5.8	S	S	L	L	L					
						A	A	L	L	L	A	A	A	5.8	A	A	A	A	A	A	A				
						A	Q	A	L	L	A	A	A	5.6 ^C	C	A	A	L	L	L	L				
						Q	Q	Q	L	L	A	(6.2) ^A	5.6 ^A	(5.5) ^C	5.4	5.2	A	A	A	A	L				
						A	A	Q	L	L	B	C	5.4	(5.9) ^B	(6.2) ^B	A	A	A	L	Q					
						L	L	L	L	L	A	L	5.6	A	L	5.1	L	L	L	L	L				
						A	A	L	L	L	A	L	5.4	5.6	5.2	A	A	A	A	A	A				
						Q	L	L	L	5.2	5.2	6.2	5.7	5.2	A	A	4.9	A	L	Q	Q				
						L	L	L	L	5.7	A	(5.2) ^A	(5.4) ^B	5.6	5.2	5.2	L	L	Q	L	L				
						L	L	L	L	4.8 ^A	A	A	A	A	B	A	(4.8) ^A	A	A	A	A				
						Q	A	A	L	A	L	5.2	5.1	A	A	A	A	A	A	A	A				
						A	3.0	L	L	L	A	A	A	A	A	A	A	A	A	A	A				
						L	L	L	L	L	A	A	A	A	A	A	5.0	4.8	4.6	3.9	L				
						Q	L	L	Q	4.7	A	A	C	A	A	4.5	4.3	4.4	5.6	A	A				
						Q	L	L	L	L	4.9	A	5.8	A	C	(5.2) ^A	A	A	A	A	A				
						Q	L	L	A	A	L	5.3	(5.4) ^A	5.5	A	5.6	4.3	3.8	4.2	L	L				
						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
						L	L	L	4.4	(5.1) ^A	5.7	5.8	5.3	5.0	5.8	5.2	C	L	S	A					
						A	Q	Q	A	A	5.4	C	C	C	C	C	C	C	A	Q					
						Q	Q	A	A	L	5.7	6.3 ^J	L	A	A	5.6	5.6	A	A	A	A				
						A	L	L	C	5.8	A	C	A	A	A	5.4	5.2	L	A	A	Q				
						Q	L	L	L	L	A	5.5	5.8	5.2	5.4	(5.0) ^L	4.6	L	L	L	L				
						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
						Q	L	3.7	A	L	(5.9) ^L	6.2	5.8	A	L	(5.3) ^L	L	L	L	L	L				
						Q	L	Q	Q	L	A	A	A	6.0	(5.8) ^A	(5.5) ^A	5.2	4.6	4.2	L	L				
						Q	L	Q	Q	A	A	A	B	B	5.7	5.4	5.2	L	L	A	A				
						Q	L	Q	A	L	(6.0) ^L	(5.9) ^A	5.8 ^A	A	L	L	L	L	(4.1) ^L	Q	L				
						L	L	L	L	L	L	L	5.7	A	A	B	A	(5.2) ^L	L	A	A				
						Q	Q	L	L	L	L	L	L	L	S	5.8	5.3	(4.8) ^L	L	Q	L				
						-	-	-	-	5.0	5.4	5.9	5.6	5.6	5.6	5.4	5.0	4.8	-	-	-				
						1	2	3	6	7	10	15	12	11	16	11	11	11	4	-	-				
Mean Value																									
Contd.																									

Sweep 1/2 Mc to 18.5 Mc in 1.5 min Manual

Y 4

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
 (Denki-tsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

h_pF₁

Yamagawa
 Lat. 31°12.5'N
 Long. 130°37.7'E

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1						300	280	230	220	(210) ^A	200	A	A	A	220	(240) ^S	290	290	240					
2						A	A	220	220	A	A	A	220	A	A	A	A	A	A	A				
3						A	Q	A	230	230	A	A	A	A	A	A	210	A	A	A				
4						Q	Q	Q	200	A	A	A	A	A	C	250	210	A	A	A				
5						A	A	Q	240	210	(210) ^C	200	B	B	A	A	A	A	A	250	Q			
6						A	A	240	Q	250	(230) ^A	210	A	A	A	A	B	A	A	250	A			
7						A	A	(220)	(240) ^C	250	250	(260) ^A	260	200	220	(230) ^B	A	A	A	270	A			
8						Q	240	220	230	210	220	(240) ^A	250	200	200	(200) ^A	200	220	(220) ^A	Q				
9						330	250	210	240	A	A	200	200	(270) ^A	B	B	260	Q	250	A				
10						260	240	250	230	A	A	A	A	A	A	A	A	A	A	A				
11						Q	A	A	250	A	A	A	250	A	A	A	A	A	A	A				
12						A	250	230	240	330	A	A	A	(220) ^A	220	A	A	A	A	A				
13						250	240	220	250	A	A	A	A	A	A	A	(230) ^A	220	260	210				
14						Q	A	Q	Q	A	A	A	A	A	(230) ^A	A	(220) ^A	250	(230) ^A	250				
15						Q	240	250	230	240	200	200	(220) ^A	(240) ^A	A	A	A	A	A	A				
16						Q	Q	210	(190) ^A	(230) ^A	(260) ^A	270	210	A	A	280	250	(230) ^A	250	230				
17						A	A	A	A	A	C	C	C	C	C	C	C	C	C	C				
18						A	A	A	A	A	C	C	C	C	C	A	250	270	A	C				
19						250	240	230	(220) ^A	A	A	220	220	240	230	220	(230) ^C	230	230	A				
20						A	Q	Q	A	A	A	A	C	C	C	C	C	(240) ^A	A	Q				
21						Q	A	A	A	240	220	240	A	A	(200) ^B	240	A	A	A	A				
22						A	250	260	(260) ^C	250	A	C	A	A	A	230	240	A	A	Q				
23						Q	250	250	(230) ^A	210	A	A	(210) ^A	200	210	210	A	A	230	A				
24						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
25						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
26						Q	250	210	(210) ^A	200	210	220	(220) ^A	A	A	A	(230) ^B	230	250	280				
27						Q	230	Q	Q	A	A	A	A	A	A	A	A	A	A	A				
28						Q	230	Q	Q	A	A	A	B	B	A	220	240	240	240	A				
29						Q	A	Q	A	A	240	240	A	A	A	A	270	220	230	Q				
30						230	240	260	240	250	220	(220) ^A	210	220	A	A	A	A	A	A				
31						Q	Q	Q	240	220	210	210	230	B	230	220	(230) ^A	240	240	Q				
Median Value						260	240	230	230	240	220	220	220	220	220	220	240	240	250	250				
Count						6	14	16	19	15	12	13	13	9	10	11	14	12	15	6				

Sweep 1-2 Mc in 15 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
 (Denki-tsushin/Kenkyujo) Gotanda, Shinagawaku, Tokyo, Japan

h_E Yamagawa Lat. 31°12.5'N
 Long 139°37.7'E

IONOSPHERIC DATA

135°E Mean Time

Day	00	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	150	100	A	A	A	A	110	110	110	B	B	110	110	110					
2						A	A	A	100	100	A	A	A	100	A	A	A	A	A	A	A				
3						A	A	A	A	A	110	A	A	110	110	100	100	100	A	A	A				
4						A	A	A	100	A	A	A	A	C	100	110	A	A	A	A	A				
5						A	A	110	(110) ^A	110	110	(110) ^C	100	100	A	A	A	A	A	A	A				
6						A	A	A	A	A	100	A	A	A	A	A	A	A	A	A	A				
7						A	A	A	C	100	A	A	100	100	100	100	A	A	A	A	A				
8						A	A	A	A	A	100	A	A	A	A	A	A	A	A	A	A				
9						B	A	A	100	A	A	A	A	A	A	100	100	100	100	110	110				
10						B	120	A	A	A	A	A	A	A	100	A	A	A	A	A	A				
11						B	100	A	A	A	100	100	100	100	A	A	A	B	A	100	A				
12						A	A	100	100	100	A	A	A	A	A	A	A	A	A	A	A				
13						A	A	100	A	A	A	A	A	A	A	A	A	A	100	110	A				
14						A	A	A	A	100	100	100	C	A	A	A	A	A	100	100	A				
15						A	100	100	100	(100) ^A	100	100	100	100	100	100	A	C	A	A	B				
16						A	C	C	C	100	100	100	100	100	100	100	100	A	A	B	B				
17						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
18						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
19						B	A	100	A	A	A	A	A	A	(100) ^A	120	100	(100) ^C	100	A	A				
20						A	100	100	100	100	100	C	C	C	C	C	C	C	100	A	A				
21						G	110	A	A	A	A	A	A	A	A	B	110	100	A	A	A				
22						A	A	A	C	A	A	C	A	A	A	A	A	A	A	A	A				
23						B	(150) ^B	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
24						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
25						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
26						A	A	A	A	A	A	A	A	A	A	A	A	100	100	A	A				
27						E	100	A	A	A	A	A	A	A	100	100	100	A	A	A	A				
28						E	120	110	110	110	A	A	B	B	B	A	A	A	A	A	A				
29						A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
30						B	150	100	(100) ^A	100	100	A	B	B	A	B	B	A	A	A	A				
31						B	110	110	A	A	100	A	A	A	A	A	A	A	100	110	B				
Mean Value						-	110	100	100	100	100	100	100	100	100	100	100	100	100	110	-				
Count						2	11	10	9	10	10	5	6	6	10	8	8	5	8	6	2				

Sweep 12 Micro 18.5 Mc in 15 min Manual

IONOSPHERIC DATA

30.12.71
UT Long 139°37.7E
Yamagawa

fEs

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	19	20	21	22	23	
1	4.8	3.7	8.2	4.4	5.2	2.0	G	3.9	6.5	4.2	5.2	11.3	13.0	6.0	5.2	B	4.3	4.6	4.0	3.8	5.0	2.4	5.0	7.8
2	8.4	8.0	7.7	8.8	C	7.0	8.8	7.2	4.2	(1.5.5) B	6.2	10.0	8.2	6.0	13.4	7.6	13.4	14.0	12.0	(6.0) S	3.6	4.6	5.2	C
3	7.0	4.0	8.0	7.0	5.2	3.8	3.8	5.6	5.6	4.2	10.2	13.0	8.2	5.2	C	8.6	5.7	5.4	8.4	4.2	2.0	4.6	4.2	3.2
4	2.0	4.2	3.0	(6.7) Y	2.9	2.4	3.1	4.0	4.5	6.6	6.4	6.6	5.2	C	5.2	6.0	7.2	8.2	5.8	8.0	4.8	5.8	3.6	2.2
5	3.2	6.8	5.2	5.6	4.2	5.2	6.0	4.2	3.1	4.2	(5.3) Y	C	G	5.8	5.8	5.2	6.7	4.6	7.4	5.2	6.1	3.8	3.8	4.4
6	5.2	4.0	4.8	4.6	8.2	5.2	5.8	5.0	4.2	5.2	6.8	5.3	6.4	6.6	5.0	4.6	4.2	4.2	3.8	2.6	2.7	C	C	C
7	6.0	5.0	(6.2) Y	3.0	5.8	4.8	4.8	4.8	C	5.2	5.8	2.2	5.2	4.7	G	4.2	11.0	8.8	6.8	6.6	7.2	6.8	6.1	4.2
8	6.5	5.4	3.8	3.0	3.8	4.0	3.8	4.4	4.4	4.8	4.8	6.8	5.2	5.0	7.0	6.0	6.4	(6.8) B	5.8	3.4	4.2	G	4.0	3.0
9	(3.0) B	G	4.2	3.6	2.0	G	2.6	3.0	4.6	6.2	10.8	6.8	5.4	4.8	4.8	G	5.8	4.8	G	3.8	5.2	4.2	5.6	Y
10	5.2	4.8	1.8	C	2.8	2.6	3.4	5.2	5.2	7.2	6.8	6.4	8.6	6.4	16.2	12.7	6.4	6.4	6.0	4.8	5.4	6.6	5.2	5.6
11	5.2	4.0	3.8	3.8	3.8	G	4.6	5.6	5.0	8.5	(4.6) B	4.4	10.4	5.4	12.0	5.4	9.6	11.2	8.0	9.6	10.4	4.4	3.7	C
12	3.8	4.2	4.2	4.6	5.9	3.7	3.2	3.5	4.6	4.1	1.5.4	1.3.6	7.2	15.7	7.8	10.6	6.2	7.0	6.6	5.7	5.2	4.2	4.8	4.8
13	3.8	4.6	4.6	3.2	3.8	4.0	3.3	3.6	(7.4) Y	4.0	7.3	9.2	10.2	7.6	6.8	5.2	4.4	3.2	3.2	3.0	4.2	2.6	4.2	4.6
14	1.8	7.4	6.0	4.2	3.8	4.2	4.2	5.2	6.4	5.2	8.4	9.8	C	5.9	4.6	5.2	4.9	5.0	5.0	5.0	3.6	4.2	5.0	5.0
15	8.4	7.6	5.1	3.4	4.6	3.8	G	4.0	3.4	4.8	4.8	4.0	(12.4) B	6.3	10.2	7.2	C	7.6	6.2	9.8	10.0	8.2	4.8	4.6
16	7.4	7.6	3.8	5.4	3.0	3.6	3.0	4.2	4.6	5.2	5.4	4.3	7.0	8.8	6.0	5.6	5.0	4.4	4.1	3.8	2.9	4.2	4.2	3.3
17	2.9	3.1	7.4	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	4.2	4.2	C	C	C	C	C	C
19	4.2	4.2	5.2	4.2	4.0	3.6	4.2	4.6	8.2	9.3	11.0	4.2	4.2	4.8	G	G	C	4.0	4.2	C	C	C	5.8	4.2
20	2.8	4.2	4.4	3.8	3.8	3.8	3.2	6.8	8.0	6.4	10.4	C	C	C	C	C	C	5.6	5.0	3.4	7.0	5.4	4.2	3.8
21	3.0	4.2	3.2	3.8	G	G	2.8	4.2	6.8	6.8	8.2	5.8	5.4	10.0	B	5.2	8.4	10.4	9.9	7.2	4.4	4.4	4.0	9.8
22	5.0	4.8	4.8	5.5	4.6	4.0	4.1	4.2	C	6.0	9.8	B	(9.0) B	8.4	6.6	4.2	4.2	6.2	7.6	4.0	2.8	2.0	3.4	3.6
23	2.4	5.2	1.9	G	G	G	3.0	3.8	4.3	5.0	5.8	5.8	4.8	5.3	4.5	7.0	7.6	6.8	4.2	4.8	5.2	4.0	2.4	C
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	5.2	10.2	4.0	3.4	3.0	2.4	3.5	3.7	6.0	5.6	5.0	5.2	6.0	7.6	8.6	4.6	G	4.6	4.0	3.8	3.2	3.0	2.8	C
27	2.8	2.4	G	G	2.2	2.7	2.6	4.2	4.8	8.1	8.6	7.8	9.8	6.2	11.8	10.4	5.2	5.4	4.2	3.8	5.4	3.8	4.8	6.6
28	3.4	3.8	3.0	3.2	G	G	2.5	G	4.2	5.4	6.6	11.0	6.2	5.6	5.4	5.4	(4.2) Y	5.4	3.4	3.2	4.6	3.2	2.2	2.4
29	2.2	2.2	2.8	2.6	3.8	3.2	4.5	6.2	6.4	5.0	4.8	5.4	6.0	5.6	8.6	5.8	4.2	(8.2) Y	3.4	4.4	4.8	4.8	4.6	4.2
30	3.2	4.2	G	G	G	G	G	3.8	4.8	5.2	6.7	5.2	7.4	7.8	1.3.8	8.8	5.6	5.4	4.2	6.4	7.8	4.2	4.0	3.4
31	(4.6) Y	(4.8) Y	3.6	G	3.0	G	2.6	3.2	4.7	4.6	5.4	5.4	4.2	B	5.4	4.4	3.8	4.2	G	B	3.1	2.4	3.0	2.7
Median Values	4.7	4.2	4.2	3.8	3.8	3.6	3.2	4.2	4.8	5.2	6.7	6.1	6.4	6.0	5.9	5.5	5.4	5.4	5.0	4.6	5.0	4.2	4.2	4.2
Count	28	28	28	26	26	27	27	27	25	27	27	24	25	24	24	26	25	28	27	26	27	28	28	25

Sweep 1.2 Mc to 18.5 Mc in 15 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
Denki-tsushin Kenkyūjo, Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

F₂-M3000

Yamagawa
UT 30°12.5'N
Long 139°37.7'E

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	26	28	F	3.2	3.0	S	IP	IP	J	S	2.8	2.5	P	2.6	2.4	H	2.5	2.7	2.8	2.7	2.9	2.8	2.8	2.7
2	26	27	J	2.9	3.0	P	A	A	S	A	2.5	H	2.5	2.5	2.6	A	2.7	2.7	2.7	2.6	2.7	2.5	2.5	2.6
3	(27)Z	(28)	F	(28)	3.0	R	3.0	3.0	A	A	2.6	R	2.6	2.8	2.7	C	2.6	2.7	2.7	2.8	2.6	2.7	2.7	2.7
4	J	2.7	2.9	3.1	2.9	3.0	P	3.1	2.9	2.7	(26)	P	2.6	2.5	2.6	C	2.8	2.7	2.8	2.9	2.6	2.6	2.6	2.8
5	2.9	S	2.7	2.7	2.8	3.0	(3.1)	S	3.1	2.9	2.6	(26)	C	2.4	2.5	C	2.7	2.8	2.8	2.8	3.0	2.7	2.7	2.6
6	2.7	2.8	2.7	J	2.5	(26)	B	3.0	3.0	J	2.7	2.6	2.5	2.5	2.7	H	2.7	2.9	2.9	3.2	3.0	2.7	C	C
7	S	2.9	3.0	3.2	3.0	C	3.2	(3.0)	C	2.9	2.7	2.6	2.6	2.7	2.7	(2.8)	2.7	2.8	2.9	3.2	3.2	3.2	3.1	A
8	S	2.9	3.1	3.0	P	3.1	2.8	3.1	2.8	2.8	2.7	2.7	2.6	2.6	2.6	2.8	2.8	2.7	2.8	2.8	2.8	2.7	2.5	S
9	S	2.8	2.8	2.8	2.6	2.6	J	3.0	2.8	2.3	J	2.5	2.7	2.7	3.0	2.9	2.7	(28)	(28)	2.8	2.9	R	3.0	C
10	F	F	J	C	2.8	3.0	2.1	2.9	3.3	2.7	(27)	S	2.8	P	F	A	2.4	3.0	3.0	2.7	3.0	2.5	2.5	2.4
11	2.7	2.8	2.8	2.7	Z	2.8	2.9	3.0	2.9	3.1	2.6	2.5	J	2.8	2.7	A	2.8	3.2	(3.2)	3.2	A	A	2.6	2.6
12	2.7	2.8	3.1	S	3.3	2.9	3.1	3.0	2.8	2.5	A	A	2.7	(28)	A	2.9	2.7	3.0	3.1	3.0	3.1	3.0	2.8	2.8
13	2.7	2.6	(26)	K	2.6	2.8	2.9	3.2	3.2	(2.9)	2.7	2.7	(26)	A	J	S	S	J	S	3.2	J	2.7	K	J
14	A	S	K	2.8	K	3.0	2.9	J	2.4	B	B	A	C	2.4	2.3	2.4	2.7	2.8	2.8	3.1	(2.9)	2.7	K	2.8
15	A	S	K	2.7	K	2.6	F	3.3	3.5	J	3.5	2.6	(27)	A	2.6	2.7	(2.7)	C	3.0	3.0	3.1	A	2.5	2.8
16	J	3.0	S	2.7	S	2.7	P	3.1	3.5	3.0	2.6	2.7	2.6	2.7	2.8	2.6	2.8	2.8	3.0	3.0	3.2	3.3	3.1	(3.1)
17	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
19	S	2.8	2.7	(26)	P	2.5	3.1	3.1	3.1	2.7	AN	2.5	2.7	J	2.5	2.5	(2.7)	C	2.9	2.9	(2.8)	2.7	2.8	2.6
20	2.9	J	2.7	2.7	2.7	2.8	2.9	3.3	3.0	J	2.7	2.6	C	C	C	C	C	2.8	3.1	3.3	2.8	2.5	2.7	2.6
21	2.7	3.0	2.8	2.9	3.0	3.4	3.2	3.2	3.0	2.5	2.8	2.8	C	3.0	2.9	2.7	2.9	2.8	2.7	3.0	2.6	2.5	2.5	2.6
22	(26)	F	(26)	F	(26)	F	(26)	3.1	3.0	(2.8)	C	2.6	A	C	2.6	2.7	2.7	2.8	3.0	3.1	2.7	2.7	(2.7)	2.7
23	(27)	2.7	2.4	2.8	2.5	2.7	3.0	3.1	3.1	2.0	2.8	2.4	2.5	2.6	2.5	2.6	2.8	2.8	3.0	3.1	2.7	2.6	2.5	C
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	2.8	3.0	2.7	2.8	3.0	J	2.9	3.2	3.1	3.1	2.9	2.5	2.6	2.7	2.6	2.7	2.7	2.6	(2.7)	2.9	2.9	2.7	2.6	2.8
27	2.9	2.9	2.9	3.0	3.0	3.0	3.1	3.4	3.3	3.0	3.0	2.5	2.4	2.6	2.7	2.7	2.9	2.8	2.9	2.8	P	2.7	2.7	2.7
28	2.8	2.7	J	B	3.0	3.1	3.3	3.3	3.0	J	B	2.6	2.5	2.8	2.5	2.8	2.7	2.8	2.7	(2.8)	3.0	2.7	2.5	2.6
29	2.4	2.7	2.9	2.9	2.7	3.0	3.3	3.4	3.4	3.4	2.9	2.6	2.6	(2.5)	2.6	2.7	2.9	3.2	3.2	3.1	3.1	3.3	3.2	
30	3.2	3.3	3.0	2.9	3.0	2.7	2.8	3.1	2.9	2.8	2.7	2.5	2.6	2.6	(2.6)	A	2.7	2.7	2.9	3.1	3.1	3.1	3.1	2.9
31	2.8	2.7	2.5	2.9	3.0	2.8	3.0	2.9	3.2	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.7	(2.9)	3.1	2.8	3.0	2.5	2.6
Mean Value	2.7	2.8	2.8	2.5	2.8	2.9	3.0	3.1	3.0	2.7	2.7	2.6	2.6	2.7	2.7	2.7	2.7	2.8	2.9	3.0	2.9	2.7	2.7	2.7
Count	1.9	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.0	2.1	2.1	2.0	2.4	2.4	2.4	2.4	2.5	2.6	2.6	2.6	2.3	2.3	2.4	2.1

Sweep 1.2 Mc to 18.5 Mc in 15 min

Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

fE min

Lat. 31°12.5'N
Long. 130°37.7'E

Yamagata

135°E Mean Time

Day	00	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	2.0	2.2	S	2.0	1.8	2.1	3.0	4.5	2.6	2.5	A	A	A	A	4.5	A	4.2	A	2.2	2.2	1.6	2.4	2.0
2	A	A	A	A	C	A	A	3.2	3.5	A	A	A	A	5.2	A	5.2	A	A	S	2.1	2.1	2.0	2.0	[2.2] C
3	2.4	1.6	A	A	2.8	2.0	2.4	A	3.6	4.0	A	A	6.6	5.6	(5.0) C	4.4	4.1	4.7	A	2.0	A	1.8	A	2.0
4	1.5	1.6	2.0	2.4	A	A	A	3.2	4.8	A	A	A	C	C	5.4	5.2	A	A	A	2.1	1.6	1.8	1.5	C
5	1.4	3.0	A	A	A	A	A	3.6	3.5	4.2	3.8	[4.2] C	4.6	A	A	4.4	A	2.4	2.6	2.2	1.4	C	C	C
6	2.4	2.2	2.0	2.0	A	A	A	A	A	A	A	A	A	A	A	4.4	A	A	2.4	2.6	2.2	1.6	C	C
7	A	A	A	A	A	A	A	A	C	A	A	A	4.6	4.3	4.6	4.6	A	A	A	A	A	2.6	A	A
8	A	A	2.6	A	3.0	2.4	2.4	2.0	4.4	3.8	4.0	A	4.8	4.2	3.8	A	A	A	2.5	2.2	1.5	1.6	2.0	
9	1.5	1.6	2.0	2.0	A	1.6	1.8	1.6	3.2	A	A	4.4	4.2	4.6	5.4	4.8	5.2	4.4	A	A	2.2	3.0	3.0	
10	A	A	1.3	[1.4] C	1.4	1.4	2.2	2.6	3.2	A	A	A	A	A	A	A	A	4.4	2.6	A	A	S	2.8	2.4
11	2.4	2.2	2.0	2.0	2.0	1.9	A	A	A	A	A	A	4.7	A	A	A	A	A	A	A	A	2.0	2.0	2.0
12	2.2	2.4	A	2.2	A	A	2.5	2.6	A	3.8	A	A	A	A	A	A	A	3.4	3.2	2.6	1.8	2.1	A	A
13	2.2	A	1.6	1.7	3.6	A	2.1	2.7	A	A	A	A	A	A	A	A	A	4.3	2.7	A	A	2.7	A	A
14	A	2.0	A	A	2.0	A	A	A	A	A	A	A	C	A	4.2	A	A	A	A	A	A	2.5	A	A
15	A	A	A	A	2.0	2.2	2.1	2.8	A	A	4.1	4.2	A	(4.5) A	A	4.4	3.9	3.4	A	A	A	C	C	C
16	A	3.3	2.2	1.8	1.4	2.2	2.2	2.8	A	A	A	4.3	A	A	C	C	C	C	C	C	C	C	C	C
17	2.5	2.2	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
19	A	A	2.4	2.0	2.2	1.8	A	2.6	3.8	A	A	4.6	4.4	4.6	5.0	4.2	A	3.6	A	A	2.0	A	A	2.0
20	1.8	2.0	A	2.0	2.2	1.8	A	3.8	A	A	A	A	C	C	C	C	C	A	A	2.0	A	2.0	1.6	A
21	A	2.0	1.6	1.3	1.6	1.5	2.0	A	A	A	4.4	A	4.8	A	4.2	4.4	A	A	A	A	2.6	A	A	A
22	1.4	A	A	A	1.8	2.0	2.3	2.5	C	A	A	A	A	A	A	A	A	A	A	A	2.4	3.0	A	A
23	1.6	1.8	1.5	1.7	1.6	1.5	2.2	3.0	3.8	4.2	A	A	4.6	(5.3) B	A	A	A	3.1	A	A	A	1.6	1.6	C
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	A	A	A	1.4	1.6	1.9	2.9	A	A	A	A	4.4	4.8	A	A	4.2	4.2	A	A	2.6	A	2.0	2.0	A
27	1.6	1.6	1.5	1.6	1.7	1.7	2.4	A	3.2	A	A	A	A	A	5.8	5.5	A	3.6	2.8	A	1.6	A	A	
28	1.8	A	1.8	2.0	1.4	1.4	2.1	3.2	3.8	4.6	A	A	B	7.8	A	4.6	4.2	3.8	3.0	A	(1.5) A	2.2	1.5	1.4
29	1.4	1.4	2.0	1.8	2.2	1.8	A	A	A	4.4	4.4	4.6	A	5.9	A	6.1	4.0	A	3.4	A	A	A	A	A
30	1.8	A	1.5	1.4	1.5	1.5	2.3	3.1	A	4.2	4.6	A	4.2	A	A	A	A	3.0	A	A	A	2.2	1.8	1.8
31	1.6	1.8	1.6	E	1.5	1.6	2.2	2.9	3.4	A	4.2	4.4	A	(6.4) B	4.4	4.2	3.6	3.2	2.2	1.5	1.5	1.8	1.5	
Mean Value	1.8	2.0	2.0	1.8	1.8	1.8	2.2	2.9	3.6	(4.2)	(4.2)	(4.4)	4.6	4.9	5.0	4.4	(4.2)	3.0	2.6	2.2	2.0	2.0	1.8	2.0
Count	17	17	17	17	19	18	17	18	13	9	8	8	11	10	11	18	8	9	12	10	13	21	15	15

Sweep 1.2 Mc to 18.5 Mc in 1.5 min Manual

Electrical Communication Laboratory, Japanese Ministry of Telecommunications
(Denki-tsushin Kenkyujo) Gotanda, Shinagawa-ku, Tokyo, Japan

IONOSPHERIC DATA

Lat. 31°12.5'N
Long 130°37.7'E

Yamagawa

f_F min

135°E Mean Time

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	1.5	1.4	1.4	1.4	1.6	1.8	1.8	1.8	2.2	2.0	2.5	3.5	3.0	2.0	2.0	B	3.6	1.9	1.7	1.8	1.5	2.0	1.6	1.5
2	1.4	1.4	1.5	1.4	1.4	1.4	1.4	1.4	1.6	2.0	2.2	2.2	2.5	2.1	2.2	2.4	2.2	1.8	1.8	1.8	1.7	1.6	2.6	[2.0] ^C
3	1.6	1.6	1.4	1.4	1.6	1.6	1.8	2.2	1.8	2.2	2.3	2.6	2.2	3.0	[2.6] ^C	2.2	2.0	2.0	2.0	1.7	1.8	1.8	1.8	1.8
4	1.5	1.6	1.4	1.3	E	E	1.8	1.8	1.7	2.0	2.1	2.3	2.2	2.4	2.6	2.3	2.0	1.8	1.6	1.6	1.4	1.5	1.4	2.0
5	1.4	1.4	1.6	1.4	1.4	1.8	1.6	1.8	1.8	2.0	2.0	1.8	1.6	2.2	2.2	2.2	1.8	1.8	1.8	1.4	1.4	1.4	1.4	1.4
6	1.4	1.4	2.0	1.4	1.4	1.4	1.6	1.4	2.0	1.8	2.0	2.1	2.2	2.4	3.0	3.0	2.0	1.8	1.8	1.4	2.4	1.6	C	C
7	1.4	1.5	1.4	1.4	1.5	1.4	1.6	1.4	[1.6] ^C	1.8	2.0	2.2	2.2	2.1	2.2	2.4	2.1	2.0	1.8	1.7	1.4	1.4	1.3	1.3
8	E	E	1.8	1.4	1.5	1.4	1.4	1.4	1.6	1.8	2.0	2.1	2.1	2.2	2.2	2.3	1.9	1.6	1.5	1.6	1.4	G	1.4	5
9	1.3	E	1.6	1.4	1.6	1.6	1.6	1.5	1.7	2.0	2.0	2.0	2.2	2.1	2.2	2.2	2.2	2.2	2.0	1.4	1.5	1.4	1.4	1.4
10	1.4	1.4	1.4	C	E	(2.0)	1.4	1.5	1.8	1.8	1.8	2.2	2.2	2.4	2.4	2.2	2.2	1.8	1.8	1.6	1.5	1.4	1.4	1.4
11	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.6	2.0	2.0	2.4	2.4	2.4	2.8	2.1	2.0	3.2	2.2	1.6	1.5	1.5	1.6	1.5	1.8
12	1.6	1.4	1.4	1.4	1.5	1.3	1.6	2.0	1.8	1.8	2.1	3.2	2.6	2.3	2.2	2.1	2.0	1.6	1.6	1.5	1.5	1.5	1.4	1.4
13	1.4	1.5	1.7	1.6	1.3	1.4	1.5	1.4	1.6	1.6	2.0	2.0	2.2	2.4	2.4	2.2	2.2	1.5	1.8	1.8	1.5	1.5	1.4	1.4
14	1.6	1.4	1.7	1.6	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.1	[2.7] ^C	3.3	3.0	3.3	3.2	1.5	1.5	1.5	1.6	1.6	1.5	1.5
15	1.5	1.4	1.3	1.3	1.3	1.5	1.4	1.5	2.0	2.0	2.3	2.2	2.3	2.1	2.2	2.3	(2.3) ^C	2.2	1.8	1.8	2.0	1.6	1.6	1.6
16	1.4	1.6	1.6	1.5	1.4	1.5	1.5	1.4	1.8	2.0	2.0	2.1	2.0	2.2	2.2	2.2	2.2	2.0	2.7	2.0	1.9	1.8	1.6	1.5
17	1.5	1.4	1.6	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	2.5	2.2	2.2	C	C	C	C	1.8
19	1.6	1.6	1.4	1.4	1.4	1.6	1.4	1.6	2.1	2.5	2.1	2.2	2.2	2.8	2.8	2.1	[2.0] ^C	1.9	1.8	1.6	1.6	1.4	1.5	1.6
20	1.4	1.4	1.4	1.4	1.4	1.5	1.4	1.4	1.8	1.9	1.8	C	C	C	C	C	C	2.2	1.6	1.4	1.4	1.5	1.6	1.4
21	1.5	1.4	1.4	1.3	G	G	1.6	1.4	1.6	1.8	2.4	3.0	2.4	3.0	B	2.4	2.1	2.4	2.5	2.0	2.0	1.8	1.5	1.5
22	1.4	1.5	1.5	1.5	1.4	E	E	1.5	[1.7] ^C	1.8	2.1	[2.5] ^C	2.9	2.2	2.8	3.4	2.1	2.0	1.8	1.6	1.6	1.6	1.6	1.5
23	1.6	1.6	1.5	G	G	B	1.5	1.5	2.0	2.1	2.2	2.4	2.8	3.0	4.0	3.9	2.0	2.0	1.4	2.0	1.5	1.6	1.6	C
24	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	1.4	1.5	1.6	E	E	E	1.7	1.7	1.6	1.7	2.2	2.2	3.2	2.8	2.6	2.8	2.2	2.0	2.0	1.8	1.4	1.6	1.7	2.0
27	1.5	1.6	G	G	1.7	1.7	1.7	1.5	1.8	3.1	3.0	3.8	3.4	2.5	2.6	3.4	2.1	2.1	2.2	1.5	1.6	1.4	1.4	1.5
28	1.3	1.4	1.6	1.4	G	G	1.6	1.7	1.6	2.2	2.4	2.8	5.4	5.0	4.3	2.5	2.2	2.0	1.8	1.6	1.6	1.5	1.5	1.8
29	1.4	1.4	1.5	1.4	1.6	1.6	1.7	1.6	1.6	2.2	2.2	3.2	3.6	3.5	2.0	2.0	2.0	2.0	2.0	1.8	1.6	1.6	1.6	1.4
30	1.6	1.4	G	G	B	1.7	1.7	1.7	2.2	2.2	2.2	2.2	4.2	4.2	3.6	6.2	4.0	2.6	1.8	1.5	1.4	1.6	1.6	1.4
31	1.4	1.6	2.0	G	2.2	B	1.6	1.7	1.7	2.1	2.2	2.2	2.6	B	3.2	3.0	2.2	2.8	1.8	B	1.5	1.7	1.5	2.0
Mean Value	1.4	1.4	1.5	1.4	1.4	1.5	1.6	1.6	1.8	2.0	2.1	2.2	2.5	2.4	2.4	2.4	2.2	2.0	1.8	1.6	1.5	1.6	1.5	1.5
Count	2.7	2.9	2.9	2.6	2.7	2.2	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.5	2.5	2.6	2.7	2.8	2.7	2.6	2.7	2.8	2.8	2.6

Sweep 1.2 Mc to 18.5 Mc in 15 min

Manual

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