AD NUMBER

AD800619

LIMITATION CHANGES

TO:

Approved for public release; distribution is unlimited. Document partially illegible.

FROM:

**Distribution authorized to U.S. Gov't. agencies and their contractors;
Administrative/Operational Use; NOV 1964. Other requests shall be referred to Army Electronics Laboratory, Fort Monmouth, NJ. Document partially illegible.**

AUTHORITY

ecom, usa ltr, 29 nov 1971

Ionospheric Data Report – April 1964

IONOSPHERIC DATA: BANGKOK, THAILAND

Compiled by: VICHAI T. NIMIT

Prepared for:

U.S. ARMY ELECTRONICS LABORATORIES
FORT MONMOUTH, NEW JERSEY

CONTRACT DA-36-039-AMC-00040(E)
ORDER NO. 5384-PM-63-91

STANFORD RESEARCH INSTITUTE

MENLO PARK, CALIFORNIA

STANFORD RESEARCH INSTITUTE
MENLO PARK, CALIFORNIA

(9) Ionospheric Data Report, for April 1964,

(11) November 1964

(12) 21 p.

(6) IONOSPHERIC DATA: BANGKOK, THAILAND

Prepared for:

U.S. ARMY ELECTRONICS LABORATORIES
FORT MONMOUTH, NEW JERSEY

(15) CONTRACT DA-36-039-AMC-00040(E), ARPA Order-371
ORDER NO. 3384-PM-63-91
PR&C NO. 64-ELN/D-6034
ARPA ORDER NO. 371

(10) VICHAI T. NIMIT

(16) SRI Project 4240

SPONSORED BY THE ADVANCED RESEARCH PROJECTS AGENCY
FOR THE
THAI-U.S. MILITARY RESEARCH AND DEVELOPMENT CENTER
SUPREME COMMAND HEADQUARTERS
BANGKOK, THAILAND

(332500)

Copy No. 32

B

CONTENTS

ILLUSTRATIONS

I INTRODUCTION

Ionospheric observations are being carried out at the Laboratory of the Military Research and Development Center at Bangkok, Thailand, a joint United States-Thailand organization. A Model C-2 vertical-incidence sounder supplied and operated by the United States Army Radio Propagation Agency has been installed there. Table I gives pertinent information about the site.

Table I

VERTICAL-INCIDENCE SOUNDER SITE
AT BANGKOK, THAILAND

Geographic		Geomagnetic	
Latitude	Longitude	Latitude	Longitude
13.73°N	100.57°E	2.5°N	169.83°E

Dip angle: 10°N

Distance from dip equator: 450 km

Equipment:

Instrument: Type C2 (automatic)

PRF: 60 pps

Frequency sweep time: 30 sec

Frequency sweep range: 1 to 25 Mc

Pulse duration: 50 μsec

Peak pulse power: approximately 10 kw.

The cooperation and participation of staff members of the Thailand Ministry of Defense and the support of the United States Advanced Research

Projects Agency, the United States Army Electronics Laboratories, and the United States Army Radio Propagation Agency made it possible for the data presented in this report to be accumulated.

II TERMINOLOGY AND SYMBOLS

The terminology and symbols used in this data report are in accordance with the conventions established by the World Wide Soundings Committee.[1]

A. TERMINOLOGY

f_oF_2 f_oF_1 f_oE	The ordinary wave critical frequency for the F_2 and F_1 layers and the E region, respectively.
f_oE_s	The ordinary wave top frequency corresponding to the highest frequency at which a mainly continuous E_s trace is observed.
f_bE_s	The blanketing frequency of an E_s layer, i.e., the lowest ordinary wave frequency at which the E_s layer begins to become transparent. (This is usually determined from the minimum frequency at which reflections from layers at greater heights are observed.)
f_{min}	The frequency below which no echoes are observed.
M(3000)F_2	The maximum usable frequency factor for a path of 3000 km for transmission by the F_2 layer.
h'F_2	The minimum virtual height of the ordinary wave trace for the highest stable stratification in the F region.
h'F	The most significant F-region virtual height parameter, that for the lowest F-region stratification. (Thus h'F is identical with the current h'F_2 when F-region stratification is absent, i.e., at night, and with current h'F_1 when F_1 stratification is present.)

[1] W. R. Piggott and K. Rawer, URSI Handbook of Ionogram Interpretation and Reduction of the World Wide Sounding Committee (Elsevier Publishing Company, Amsterdam, London, New York, 1961).

B. DESCRIPTIVE LETTERS

Certain effects observed on ionograms may make it difficult or impossible to obtain accurate numerical values. The descriptive letters listed below, when used alone indicate, in general, the presence of a phenomenon that may have influenced the measurement. Qualifying letters (Sec. C) indicate the nature of the uncertainty.

- A A lower thin layer present, e.g., E_s
- B Absorption in the vicinity of f_{min}.
- C Any non-ionospheric reason
- D The upper limit of the normal frequency range
- E The lower limit of the normal frequency range
- F Spread echoes present
- G Ionization density of the layer too small for measurement
- H Stratification present
- L No sufficiently definite cusp between layers of the trace
- M Ordinary and extraordinary components indistinguishable
- N Conditions such that the measurement cannot be interpreted
- O Measurement referring to the ordinary component
- R Attenuation in the vicinity of a critical frequency
- S Interference or atmospherics
- T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful
- V Forked trace
- W Echo lying outside the height range recorded
- X Measurement referring to the extraordinary component
- Y Intermittent trace
- Z Third magneto-ionic component present.

C. QUALIFYING LETTERS

- D Greater than. . .
- E Less than. . .

I An interpolated value

J Ordinary component characteristic deduced from the extraordinary component

O Extraordinary component characteristic deduced from the ordinary component

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

U Uncertain numerical value

Z Measurement deduced from the third magneto-ionic component.

D. DESCRIPTION OF STANDARD TYPES OF E_s

The eight standard types of E_s are identified by lower-case letters: f, l, c, h, q, r, a, and s. These letters suggest the corresponding names, flat, low, cusp, high, equatorial, retardation, auroral, and slant, respectively, but are not restrictive. The letter n is used to designate an E_s trace that does not correspond to one of the eight types. The classifications are:

f An E_s trace showing no appreciable increase of height with frequency, usually relatively solid at most latitudes. (This classification may be used only at night; it appears that flat E_s traces observed in the daytime are classified according to their virtual height: h or l.)

l A flat E_s trace at or below the normal E-region minimum virtual height in the day or below the E-region minimum virtual height at night.

c An E_s trace showing a relatively symmetrical cusp at or below $f_o E$. (This is usually continuous with the normal E trace, although when the deviative absorption is large, part or all of the cusp may be missing—usually a daytime type.)

h An E_s trace showing a discontinuity in height with the normal E-region trace at or above $f_o E$ and an asymmetrical cusp. (The low-frequency end of the E_s trace lies clearly above the high-frequency end of the normal E trace—usually a daytime type.)

q An E_s trace that is diffuse and nonblanketing over a wide frequency range, the spread being most pronounced at the upper edge of the trace. (This type is common in daytime in the vicinity of the magnetic equator.)

r An E_s trace that is nonblanketing over part or all of its frequency range, showing an increase in virtual height at the high-frequency

end similar to group retardation. (This is distinguished from the usual group retardation—as in the case of an occulting thick E region—by the lack of group retardation in the F traces at corresponding frequencies and the lack of complete blanketing.)

a An E_s pattern having a well-defined flat or gradually rising lower edge with stratified and diffuse (spread) traces present above it. (These sometimes extend over several hundred kilometers of virtual height.)

s A diffuse E_s trace that rises steadily with frequency, usually emerging from another type of E_s trace. (The rising trace alone is classified as s; the horizontal trace is classified separately. At high latitudes, the slant trace usually starts to rise from a horizontal E_s trace, such as l or f, at frequencies that greatly exceed the E-region critical frequency, e.g., about 6 Mc; whereas at low latitudes it usually rises from equatorial-type E_s, q, c, or h, at frequencies near the regular E critical frequency. Type s is never used to determine f_o E unless echoes clearly identifiable as E_s echoes are seen.)

n An E trace that cannot be classified as one of the standard types. (This must not be used for intermediate cases between any two classes. A choice should always be made whenever possible, even if it is doubtful.)

E. MULTIPLE REFLECTIONS FROM E_s

When the ionogram shows the presence of multiple reflections from E_s, the number of traces seen will be recorded with the letter indicating the type.

Characteristic: f_{min}

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
April 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	018*	E014S	017	017	012	S	E017S	E027S	029	030	039	039	040	039
2	C	C	C	C	C	C	C	C	C	028	030	C	030	038
3	E016S	E016S	017	018	015	E015S	E018S	E023S	E029S	031	C	039	040	E039S
4	020	017	020	018	B	B	E017S	E027S	E027S	029	E028S	029	030	E029S
5	E018S	E014S	020	022	012	E016S	E025S	E022S	E024S	E027S	E028S	E030S	E030S	E028S
6	E017S	017	020	020	020	017	E018S	E027S	032	034	032	E029S	E031S	030
7	E018S	019	014	018	012	E022S	E017S	E017S	E025S	E028S	030	029	030	E028S
8	E017S	024	022	020	021	021	024	E027S	030	029	E031S	E030S	040	039
9	019	021	022	021	023	B	E027S	E028S	E024S	029	030	E027S	049	040
10	022	018	021	020	020	020	021	027	029	034	040	031	030	030
11	025	020	013	015	014	E022S	E022S	E026S	030	040	047	052	056	061
12	025	024	018	019	022	B	E023S	027	027	030	031	030	030	031
13	020	019	018	019	015	B	021	C	C	C	C	C	C	C
14	027	025	020	013	B	B	030	029	028	029	030	C	C	C
15	C	C	C	C	C	C	C	C	C	C	C	C	C	C
16	E021S	020	015	019	E016S	019	E021S	E025S	E025S	E030S	E030S	E028S	035	034
17	E025S	E018S	E017S	E016S	E014S	E015S	E026S	E032S	E024S	E028S	E028S	E030S	E027S	E027S
18	E017S	E015S	016	015	017	E014S	E019S	026	024	E030S	E030S	E027S	033	036
19	E014S	E014S	E019S	E017S	E015S	022	E025S	024	E025S	E030S	E030S	020	E035S	E034S
20	013	015	016	016	016	017	018	021	E028S	E026S	E029S	E032S	E035S	E025S
21	021	030	016	019	014	016	021	040	036	049	039	E039S	042	040
22	018	018	019	016	016	015	019	025	029	E037S	026	029	027S	E027S
23	C	C	C	C	C	C	C	C	C	C	040	C	C	C
24	E016S	016	014	015	E011S	016	E017S	E023S	028	033	034	033	032	033
25	016	E013S	020	E014S	E015S	018	020	028	022	030	040	031	041	032
26	C	C	C	C	C	C	C	C	C	C	E0265	040	044	042
27	C	C	C	C	C	C	C	C	032	032	029	028	029	E030S
28	023	024	020	018	012	021	026	025	027	032	030	030	030	031
29	018	020	023	021	B	B	021	024	032	031	E032S	E029S	032	056
30	019	025	026	026	025	024	031	035	030	029	031	035	033	032
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Median	018	018	018	018	015	017	021	026	028	030	030	030	032	033
Count	25	25	25	25	22	18	25	24	25	26	27	25	26	26
UQ	021	021	020	020	018	021	025	027	030	032	032	033	040	039
LQ	017	015	016	016	013	015	018	024	025	029	029	029	030	030
QR	4	6	4	4	5	6	7	3	5	3	3	4	10	9

* Tabulation of 018 = 1.8 Mc.

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

April 1964

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
029	030	039	039	040	039	036	035	E023S	E019S	C	C	C	C	C	C
C	028	030	C	030	038	031	028	E025S	E020S	E019S	E017S	E023S	E017S	E018S	E017S
E029S	031	C	039	040	E039S	037	028	029	E030S	E018S	E017S	E020S	E018S	E017S	E017S
E027S	029	E028S	029	030	E029S	030	E024S	E025S	E029S	E024S	E020S	E017S	E017S	E019S	E017S
E024S	E027S	E028S	E030S	E030S	E028S	E025S	E025S	E023S	E020S	E020S	E017S	E017S	E018S	E018S	E020S
032	034	032	E029S	E031S	030	028	E024S	E025S	E025S	E020S	E018S	E020S	E020S	E018S	E017S
E025S	E028S	030	029	030	E028S	E026S	E025S	E022S	E029S	E026S	E023S	E025S	E023S	E020S	E022S
030	029	E031S	E030S	040	039	E040S	033	033	E023S	E026S	E026S	E025S	E023S	E024S	021
E024S	029	030	E027S	049	040	E026S	035	E033S	E031S	E026S	E029S	E027S	E029S	E025S	021
029	034	040	031	030	030	027	024	026	E026S	E026S	E026S	E024S	022	E022S	022
030	040	047	052	056	061	048	036	032	031	028	E025S	E026S	026	027	E028S
027	030	031	030	030	031	030	028	032	E025S	E025S	E024S	E028S	020	E022S	022
C	C	C	C	C	C	C	050	035	E031S	E026S	E028S	E023S	C	E025S	025
028	029	030	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
025S	E030S	E030S	E028S	035	034	E025S	031	E026S	E027S	E022S	E025S	E020S	E020S	E025S	E020S
024S	E028S	E028S	E030S	E027S	E027S	029	E029S	E034S	E029S	E026S	E027S	E024S	E019S	E018S	E020S
024	E030S	E030S	E027S	033	036	E024S	024	025	E021S	E020S	E018S	E021S	E020S	E017S	E016S
025S	E030S	E030S	020	E035S	E034S	030	E030S	E026S	E025S	E019S	E022S	E024S	E020S	E016S	E016S
028S	E026S	E029S	E032S	E035S	E025S	031	023	E025S	E028S	E016S	E017S	E020S	020	024	019
036	049	039	E039S	042	040	E037S	036	E037S	E028S	E029S	E025S	E026S	E024S	E026S	024
029	E037S	026	029	027S	E027S	C	C	C	C	C	C	C	C	C	C
C	C	040	C	C	C	C	C	029	E016S	E017S	E015S	E015S	E017S	E020S	E019S
028	033	034	033	032	033	030	029	030	E020S	E026S	E022S	E017S	E023S	E025S	021
022	030	040	031	041	032	041	028	032	E021S	E028S	E025S	E030S	E025S	E025S	018
C	C	E0265	040	044	042	055	032	026	030	026	C	C	C	C	C
032	032	029	028	029	E030S	059	036	031	028	E025S	E019S	029	026	026	030
027	032	030	030	030	031	E031S	E030S	E030S	E030S	E028S	E022S	026	021	019	021
032	031	E032S	E029S	032	056	055	055	029	025	023	C	023	026	022	026
030	029	031	035	033	032	E031S	C	C	C	C	E022S	021	E016S	020	021
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
028	030	030	030	032	033	030	029	027	027	025	022	023	020	021	020
25	26	27	25	26	26	25	25	25	25	24	24	26	25	25	25
030	032	032	033	040	039	037	035	032	029	026	025	026	023	025	022
025	029	029	029	030	030	027	025	025	023	020	018	020	018	018	017
5	3	3	4	10	9	10	10	7	6	6	7	6	5	7	5

B

Characteristic: f_oF2

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
April 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	067*	074	070	034	017	S	R	060	080	084	076	078	072	073
2	C	C	C	C	C	C	C	C	C	U087C	U081C	C	068	078
3	075	075	045	031	020	A	029	065	077	D090S	C	070	073	083
4	055	049	035	022	B	B	033	063	075	069	065	A	068	070
5	075	085	061	D056S	041	026	033	068	085	085	D072R	072	076	079
6	074	D075S	J058S	U037S	023	A	038	065	D075S	D075S	075	067	070	077
7	D086S	D087S	J060S	044	032	J020R	034M	063	072	085	D075S	D075S	068	075
8	087	D105R	F	A	D032R	A	A	056	074	086	D074R	071	069	072
9	D046S	051	U041S	028	A	B	033	U056S	068	067	065	057	065	072
10	070	064	044	032	026	A	038	061	071	078	070	071	072	080
11	063	059	D027S	D018A	A	A	037	065	071	D075R	U070M	U066M	062	D070R
12	064	047	032	023	A	B	045	065	D072R	078	A	A	063	067
13	075	F	061	037	026	B	036	C	C	C	C	C	C	C
14	F	059	F	022	B	B	040	059	D070R	070	060	C	C	C
15	C	C	C	C	C	A	C	C	C	C	C	C	C	C
16	F	F	F	F	F	U040F	040	U072C	U062S	U079S	D092R	062	057	U067C
17	D048S	U063S	U051S	023	A	A	U043S	U078C	065	U068S	060	U058S	065	084
18	F	F	F	U061F	047	029	U042S	067	D065S	U080S	D085R	U075S	071	076
19	D046S	D040S	045	035	032	035	045	067	083	095	093	055	093	090
20	U063S	U075F	051	032	020	U020S	055	065	082	083	080	D075S	084	070
21	065	090	F	041	035	030	037	081	070	D070R	070	061	070	U067S
22	U051S	050	037	033	025	018	045	065	070	066	067	070	075	081
23	-	-	-	-	-	-	-	-	-	-	079	-	-	-
24	U055S	U051S	U042S	031	028	A	037	064	071	069	058	065	063	080
25	U041S	D044S	D055S	034	022	E020B	042	058	071	078	D087R	085	085	090
26	-	-	-	-	-	-	-	-	-	-	D080R	070	072	078
27	-	-	-	-	-	-	-	-	088	083	072	070	A	070
28	U045S	F	F	F	F	D030R	048	081	081	088	090	083	079	094
29	U063S	060	047	A	B	B	036	066	077	D085R	D096R	086	082	084
30	047	F	A	A	A	A	040	062	080	U087S	080	U078C	074	A
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Median	063	062	048	033	026	028	038	065	072	080	075	070	071	077
Count	22	20	18	20	15	10	23	24	25	26	26	23	25	25
UQ	074	075	058	037	032	030	045	067	080	085	081	075	076	082
LQ	048	050	041	025	022	020	036	062	070	070	070	065	067	070
QR	26	25	17	12	10	10	9	5	10	15	11	10	9	12

* Tabulation of 067 = 6.7 Mc.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
April 1964

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	080	084	076	078	072	073	082	095	D088S	D088S	C	C	C	C	C	C
	C	U087C	U081C	C	068	078	087	D090S	D089S	D088S	D087S	U087S	D077S	071	D065S	070
	077	D090S	C	070	073	083	095	D095S	D095S	D088S	D085S	D090S	D070S	082	075	065
	075	069	065	A	068	070	080	087	087	088	U088S	D085S	D082S	088	D080S	080
	085	085	D072R	072	076	079	083	087	D089S	D087S	D086S	D090S	D088S	D088S	083	D075S
	D075S	D075S	075	067	070	077	085	090	D087S	D088S	D085S	D087S	D087S	D087S	D087S	D087S
	072	085	D075S	D075S	068	075	085	U090S	D092S	D085S	D086S	D086S	U086S	084	083	083
	074	086	D074R	071	069	072	083	093	D095S	D086S	D090S	D090S	D090S	U077S	066	057
S	068	067	065	057	065	072	075	087	U090S	D085S	D085S	D073S	D085S	D087S	077	074
	071	078	070	071	072	080	072	08[illegible]	D100S	D092S	D094S	D090S	073	D056S	J062S	D052R
	071	D075R	U070M	U066M	062	D070R	079	084	086	D095S	D095S	D081R	D082R	079	065	054
	D072R	078	A	A	063	067	071	076	080	092	095	088	074	078	F	F
	C	C	C	C	C	C	C	085	088	D090S	D090S	D092S	080	C	F	F
	D070R	070	060	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	F	F
C	U062S	U079S	D092R	062	057	U067C	U080R	D082R	D085R	D080S	D085S	U078C	U060S	U051S	D050S	D039S
C	065	U068S	060	U058S	065	084	085	084	U095S	D095S	D095S	D097S	094	088	084	F
	D065S	U080S	D085R	U075S	071	076	090	095	D095S	D095S	D095S	D097S	081	D070S	065	U055S
	083	095	093	055	093	090	089	090	080	096	D094S	092	U075F	U070S	060	U060S
	082	083	080	D075S	084	070	092	098	U100S	093	D095S	D082S	D095S	090	079	068
	070	D070R	070	061	070	U067S	092	085	088	088	090	094	094	085	082	061
	070	066	067	070	075	081	-	-	-	-	-	-	-	-	-	-
	-	-	079	-	-	-	-	-	-	D095S	D080S	D100S	D095S	U090S	075	061
	071	069	058	065	063	080	080	087	087	092	D102S	D086S	U07[illegible]S	U073S	U090S	U056S
	071	078	D087R	085	085	090	095	D100R	100	U110S	D095S	D100S	D111S	078	D060S	D052S
	-	-	D080R	070	072	078	080	102	098	111	U105S	-	-	-	-	-
	088	083	072	070	A	070	065	075	081	088	D093S	D104S	080	U073C	055	045
	081	088	090	083	079	094	085	101	092	102	D120S	101	099	068	D059S	061
	077	D085R	D096R	086	082	084	086	086	D090R	D093R	D090R	C	D095R	095	066	054
	080	U087S	080	U078C	074	A	082	C	C	C	C	U085C	070	U065S	F	F
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	072	080	075	070	071	077	083	087	089	091	090	090	085	078	070	061
	25	26	26	23	25	25	25	25	25	26	25	24	25	24	22	21
	030	085	081	075	076	082	090	094	095	095	095	093	094	088	082	072
	070	070	070	065	067	070	080	084	085	088	086	086	074	070	062	054
	10	15	11	10	9	12	10	10	10	7	9	7	20	18	20	18

B

Characteristic: M(3000)F2

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
April 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	320*	350	400	400	380	S	R	340	340	300	280	270	270	280
2	C	C	C	C	C	C	C	C	C	U280C	U230C	C	270	270
3	330	380	370	350	360	A	350	355	350	S	C	260	270	285
4	330	360	385	380	B	B	340	340	290	260	270	A	270	280
5	340	375	350	S	390	390	340	360	350	290	R	270	270	280
6	320	S	S	U380S	390	A	310	360	C	S	250	270	250	270
7	S	S	S	370	350	R	290M	350	320	280	S	S	270	270
8	340	R	F	A	R	A	A	360	350	315	R	270	270	280
9	S	375	U380S	380	A	B	305	U340S	340	260	260	280	275	280
10	370	360	370	360	370	A	360	360	330	280	260	265	295	285
11	340	390	S	A	A	A	365	365	320	R	U250M	U265M	265	R
12	350	390	355	355	A	B	350	305	R	265	A	A	260	275
13	330	F	385	355	400	B	390	C	C	C	C	C	C	C
14	F	370	F	400	B	B	360	350	R	255	255	C	C	C
15	C	C	C	C	C	A	C	C	C	C	C	C	C	C
16	F	F	F	F	F	F	345	U350C	U350C	U310S	R	255	270	U280C
17	S	U370S	U420S	390	A	A	S	U350C	320	U260S	260	U300S	290	275
18	F	F	F	F	390	375	U345S	340	R	U230S	R	U255S	255	270
19	S	S	320	320	330	340	340	325	320	295	255	245	275	285
20	U345S	U370F	380	350	365	U395S	340	330	295	270	270	-	285	270
21	310	355	F	340	350	400	360	360	320	-	260	275	265	U270S
22	U300S	310	330	360	375	290	320	335	265	275	260	260	280	275
23	-	-	-	-	-	-	-	-	-	-	265	-	-	-
24	U315S	U460S	U390S	395	375	A	345	340	350	275	300	280	280	280
25	U295S	S	S	370	385	E350B	370	380	350	310	R	280	R	275
26	-	-	-	-	-	-	-	-	-	-	R	325	260	310
27	-	-	-	-	-	-	-	-	280	280	225	275	A	235
28	U290S	F	F	F	F	-	355	355	330	290	250	260	270	285
29	U325S	370	390	A	B	B	350	340	320	R	R	270	280	275
30	295	F	A	A	A	A	360	360	330	U300S	260	U260C	265	A
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Median	328	370	380	370	375	375	347	350	330	280	260	270	270	275
Count	18	15	14	17	14	7	22	24	21	21	18	21	24	24
UQ	340	380	390	385	390	395	360	360	350	297	265	277	277	280
LQ	310	360	355	352	360	340	340	340	320	262	250	260	265	270
QR	30	20	35	33	30	55	20	20	30	35	15	17	12	10

Tabulation of 320 = factor of 3.2.

A

IONOSPHERIC DATA

weep: 1 Mc to 25 Mc in 0.5 minute

April 1964

	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	300	280	270	270	280	290	320	S	S	C	C	C	C	C	C
	U280C	U230C	C	270	270	260	S	S	S	S	U290S	S	U290S	S	310
	S	C	260	270	285	300	S	S	S	S	S	S	325	310	330
	260	270	A	270	280	270	275	290	290	U280S	S	S	315	S	330
	290	R	270	270	280	260	280	S	S	S	S	S	S	330	S
	S	250	270	250	270	280	290	S	S	S	S	S	S	S	S
	280	S	S	270	270	280	U300S	S	S	S	S	U295S	310	320	330
	315	R	270	270	280	290	310	S	S	S	S	S	U360S	340	340
	260	260	280	275	280	270	310	U320S	S	S	S	S	S	340	340
	280	260	265	295	285	300	305	S	S	S	S	340	S	S	R
	R	U250M	U265M	265	R	295	305	310	S	S	R	R	320	290	315
	265	A	A	260	275	295	R	R	325	365	315	350	305	F	F
	C	C	C	C	C	C	305	320	S	S	S	325	C	F	F
	255	255	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	F	F
C	U310S	R	255	270	U280C	R	R	R	S	S	U335C	U330S	U330S	S	S
	U260S	260	U300S	290	275	390	290	S	S	S	S	310	310	305	F
	U230S	R	U255S	255	270	280	330	S	S	S	S	310	S	310	U275S
	295	255	245	275	285	285	270	270	295	-	300	U290F	U285S	300	U290S
	270	270	-	285	270	290	300	U300S	300	-	-	-	340	320	300
	-	260	275	265	U270S	290	290	280	290	315	320	330	330	330	320
	275	260	260	280	275	-	-	-	-	-	-	-	-	-	-
	-	265	-	-	-	-	-	-	S	S	S	S	U350S	400	325
	275	300	280	280	280	270	300	310	320	S	S	U350S	U350S	U340S	U310S
	310	R	280	R	275	280	R	310	U320S	S	S	S	320	S	S
	-	R	325	260	310	285	285	280	300	310	-	-	-	-	-
	280	225	275	A	235	275	285	300	310	S	S	340	U310C	310	280
	290	250	260	270	285	250	245	U290S	S	S	320	300	300	S	300
	R	R	270	280	275	280	305	R	R	R	C	R	355	320	320
	U300S	260	U260C	265	A	265	C	C	C	C	U315C	305	U320S	F	F
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	280	260	270	270	275	280	300	300	300	340	315	310	320	320	317
	21	18	21	24	24	24	20	12	9	4	7	13	19	15	16
	297	265	277	277	280	290	305	310	320	365	320	335	340	340	330
	262	250	260	265	270	270	285	285	292	315	300	300	310	310	310
	35	15	17	12	10	20	20	25	28	50	20	35	30	30	30

B

Characteristic: $h'F_2$

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

April 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	1
1	-	-	-	-	-	-	-	-	-	-	320*	320	320	330	3
2	-	-	-	-	-	-	-	-	-	-	U290s	C	320	310	3
3	-	-	-	-	-	-	-	-	-	280	-	320	325	320	3
4	-	-	-	-	-	-	-	-	-	-	U340S	A	E350A	330	3
5	-	-	-	-	-	-	-	-	-	-	320	320	330	310	3
6	-	-	-	-	-	-	-	-	-	-	310	340	E3505S	320	3
7	-	-	-	-	-	-	-	-	-	-	-	340	E330A	340	3
8	-	-	-	-	-	-	-	-	-	-	305	330	350	315	3
9	-	-	-	-	-	-	-	-	-	300	350	350	E350S	320	3
10	-	-	-	-	-	-	-	-	-	-	340	335	320	310	3
11	-	-	-	-	-	-	-	-	-	-	350	360	E390B	E350B	3
12	-	-	-	-	-	-	-	-	-	E350A	A	A	E370A	E420A	3
13	-	-	-	-	-	-	-	C	C	C	C	C	C	C	
14	-	-	-	-	-	-	-	-	290	330	E400A	-	350	E330A	E3
15	-	-	-	-	-	-	-	-	-	340	370	370	365	350	3
16	-	-	-	-	-	-	-	-	-	-	330	360	350	340	3
17	-	-	-	-	-	-	-	-	-	-	340	360	340	340	2
18	-	-	-	-	-	-	-	-	-	-	350	350	330	340	3
19	-	-	-	-	-	-	-	-	-	300	310	320	330	315	3
20	-	-	-	-	-	-	-	-	-	320	320	340	320	330	3
21	-	-	-	-	-	-	-	-	210	300	350	350	360	350	3
22	-	-	-	-	-	-	-	-	-	-	350	350	340	330	
23	-	-	-	-	-	-	-	-	-	-	320	-	-	-	
24	-	-	-	-	-	-	-	-	-	330	360	320	330	340	3
25	-	-	-	-	-	-	-	-	-	-	320	310	320	330	3
26	-	-	-	-	-	-	-	-	-	-	335	340	340	-	3
27	-	-	-	-	-	-	-	-	-	330	350	350	A	400	4
28	-	-	-	-	-	-	-	-	-	290	310	330	330	300	E3
29	-	-	-	-	-	-	-	-	-	-	310	330	305	310	3
30	-	-	-	-	-	-	-	-	260	-	320	340	340	-	3
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Median	-	-	-	-	-	-	-	-	210	310	338	340	335	330	3
Count	-	-	-	-	-	-	-	-	3	11	26	24	27	26	
UQ	-	-	-	-	-	-	-	-	290	330	350	350	350	340	3
LQ	-	-	-	-	-	-	-	-	260	297	320	320	324	315	3
QR	-	-	-	-	-	-	-	-	30	33	30	30	26	25	

* Tabulation of 320 = 320 km.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

April 1964

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-	-	320*	320	320	330	310	300	-	-	-	-	-	-	-	-
-	-	U290s	C	320	310	320	290	-	-	-	-	-	-	-	-
-	280	-	320	325	320	290	-	-	-	-	-	-	-	-	-
-	-	U340S	A	E350A	330	320	300	-	-	-	-	-	-	-	-
-	-	320	320	330	310	300	E290A	-	-	-	-	-	-	-	-
-	-	310	340	E3505S	320	300	-	-	-	-	-	-	-	-	-
-	-	-	340	E330A	340	320	300	-	-	-	-	-	-	-	-
-	-	305	330	350	315	305	295	-	-	-	-	-	-	-	-
-	300	350	350	E350S	320	310	290	-	-	-	-	-	-	-	-
-	-	340	335	320	310	325	295	-	-	-	-	-	-	-	-
-	-	350	360	E390B	E350B	310	280	-	-	-	-	-	-	-	-
-	E350A	A	A	E370A	E420A	320	E300A	E280A	-	-	-	-	-	-	-
C	C	C	C	C	C	C	300	-	-	-	-	-	-	-	-
290	330	E400A	-	350	E330A	E310A	300	-	-	-	-	-	-	-	-
-	340	370	370	365	350	325	315	-	-	-	-	-	-	-	-
-	-	330	360	350	340	300	-	-	-	-	-	-	-	-	-
-	-	340	360	340	340	290	-	-	-	-	-	-	-	-	-
-	-	350	350	330	340	330	-	-	-	-	-	-	-	-	-
-	300	310	320	330	315	305	-	E300A	250	-	-	-	-	-	-
-	320	320	340	320	330	310	-	-	-	-	-	-	-	-	-
210	300	350	350	360	350	310	-	-	-	-	-	-	-	-	-
-	-	350	350	340	330		-	-	-	-	-	-	-	-	-
-	-	320	-	-	-	-	-	-	-	-	-	-	-	-	-
-	330	360	320	330	340	335	285	-	-	-	-	-	-	-	-
-	-	320	310	320	330	330	310	-	-	-	-	-	-	-	-
-	-	335	340	340	-	330	-	-	-	-	-	-	-	-	-
-	330	350	350	A	400	400	300	-	-	-	-	-	-	-	-
-	290	310	330	330	300	E340A	320	300	-	-	-	-	-	-	-
-	-	310	330	305	310	320	300	290	-	-	-	-	-	-	-
260	-	320	340	340	-	348	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
210	310	338	340	335	330	315	300	-	-	-	-	-	-	-	-
3	11	26	24	27	26	27	18	-	-	-	-	-	-	-	-
290	330	350	350	350	340	326	300	-	-	-	-	-	-	-	-
260	297	320	320	324	315	305	290	-	-	-	-	-	-	-	-
30	33	30	30	26	25	21	10	-	-	-	-	-	-	-	-

B

Characteristic: h'F

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

April 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	240*	220	190	180	230	S	E300A	E210A	200	200	200	190	190	180
2	C	C	C	C	C	C	C	C	C	200	200	C	180	190
3	E240S	200	190	220	240	A	E260S	220	220	200	C	170	E200B	175
4	240	220	210	230	B	B	E250S	E230S	E200A	E200A	200	A	A	A
5	220	210	210	210	190	210	250	210	250	200	200	E180A	E250A	A
6	250	200	200	200	E230B	A	E250S	E220S	200	E260C	E250A	E170A	200	E200A
7	E230S	200	180	200	200	E330S	E390A	E220A	200	E200A	170	E180A	A	A
8	E235S	200	200	A	235	A	A	E220S	210	270	E200A	E200S	E195B	175
9	235	220	200	215	A	B	E300S	E220S	210	E200A	E200S	A	B	200
10	200	190	200	220	220	A	230	E220A	E260A	E215A	A	E195A	E170A	A
11	230	200	180	E230A	A	A	240	E218S	E210S	E320B	B	B	B	B
12	235	200	210	250	A	B	230	210	E210A	A	A	A	A	A
13	250	220	199	200	200	B	E390A	C	C	C	C	C	C	C
14	272	215	190	220	B	B	248	210	A	E230A	A	C	B	A
15	C	C	200	200	E250A	A	C	C	C	190	190	170	E180A	E180A
16	320	290	230	200	190	200	225	212	220	E230S	E220A	190	E200B	190
17	290	218	190	210	A	A	220	220	200	E210A	200	E200A	E180A	A
18	300	250	230	210	200	200	250	220	210	E250A	E210A	E200A	180	E210B
19	275	250	270	285	265	250	230	E250A	E250A	200	E230A	E200A	A	A
20	250	212	200	210	240	200	220	E210A	E230A	E200A	E200A	A	180	E200A
21	270	230	200	220	230	200	230	220	-	B	200	E200S	200	E200S
22	300	280	240	220	208	260	230	E215A	E210A	E210S	E200A	E200A	A	A
23	-	-	-	-	-	-	-	-	-	-	200	-	-	-
24	270	250	300	200	220	A	230	220	E220A	A	E210A	A	190	E200A
25	310	270	330	208	215	E300B	220	210	200	180	220	180	200	A
26	-	-	-	-	-	-	-	-	-	-	200	200	B	250
27	-	-	-	-	-	-	-	-	250	-	170	210	A	A
28	350	310	280	280	270	260	250	230	E200A	-	190	E200A	A	A
29	240	200	300	A	B	B	240	220	205	E210A	190	E200A	E190A	B
30	280	300	A	A	A	A	250	230	A	E230A	200	190	A	A
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Median	250	216	200	210	220	210	240	220	210	200	200	195	190	185
Count	25	25	25	23	18	10	24	24	22	22	23	20	26	13
UQ	270	250	210	220	238	260	250	220	220	230	210	200	200	200
LQ	235	200	192	220	300	300	230	210	200	200	200	175	180	180
QR	44	50	18	20	38	60	20	10	20	30	10	25	20	20

* Tabulation of 240 = 240 km.

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
April 1964

	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
00	200	200	190	190	180	180	180	180	E210A	C	C	C	C	C	C
	200	200	C	180	190	200	200	E180A	E200A	220	260	250	E270S	300	E250S
0	200	C	170	E200B	175	180	170H	180	E230S	E270S	E250S	220	250	E250S	240
0A	E200A	200	A	A	A	200	180	210	E220S	U230S	E250A	240	E210S	200	220
0	200	200	E180A	E250A	A	A	A	E260A	E210A	E230A	250	220	210	230	250
0	E260C	E250A	E170A	200	E200A	180	180	190	E200A	230	E260A	260	E240S	240	230
C	E200A	170	E180A	A	A	180	E200A	190	200	E230S	260	E270S	250	E240S	E240S
0	270	E200A	E200S	E195B	175	E200S	170	195	E210S	E230S	E235S	220	230	230	250
0	E200A	E200S	A	B	200	E200A	200	200	E240S	250	250	E220S	E220S	E230S	240
0A	E215A	A	E195A	E170A	A	A	A	E230A	E230A	230	230	230	240	250	258
0S	E320B	B	B	B	B	B	E210B	210	235	230	230	230	240	290	280
0A	A	A	A	A	A	-	-	-	E220A	230	240	298	305	270	270
	C	C	C	C	C	C	B	200	220	230	250	260	C	U250F	280
	E230A	A	C	B	A	A	175	E200A	220	230	250	250	C	C	C
	190	190	170	E180A	E180A	E190A	E195A	E200B	215	230	230	240	250	270	310
0	E230S	E220A	190	E200B	190	A	190	200	220	230	220	220	240	290	340
0	E210A	200	E200A	E180A	A	A	E240A	E200B	E210S	240	250	250	240	260	300
0	E250A	E210A	E200A	180	E210B	E190A	200	210	210	230	240	230	245	250	300
0A	200	E230A	E200A	A	A	E200A	200	A	A	230	260	270	270	300	310
0A	E200A	E200A	A	180	E200A	E200A	E200A	E190A	E210S	230	240	220	240	260	270
	B	200	E200S	200	E200S	190	190	E230S	210	240	230	220	220	215	250
0A	E210S	E200A	E200A	A	A	-	-	-	-	-	-	-	-	-	-
	-	200	-	-	-	-	-	-	-	-	-	-	-	-	-
0A	A	E210A	A	190	E200A	E200A	185	200	210	220	225	220	210	240	270
0	180	220	160	200	A	A	A	250	260	240	220	218	230	270	280
	-	200	200	B	250	B	250	220	220	220	-	-	-	-	-
0	-	170	210	A	A	B	200	200	210	230	215	220	240	280	350
0A	-	190	E200A	A	A	A	A	A	E230A	220	220	240	250	300	270
5	E210A	190	E200A	E190A	B	B	B	A	220	225	C	230	217	230	260
	E230A	200	190	A	A	A	C	C	C	C	235	310	240	250	320
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	200	200	195	190	195	190	195	200	212	230	240	230	240	250	270
2	22	23	20	26	13	14	20	23	27	27	26	25	25	26	26
0	230	210	200	200	200	200	200	210	220	230	250	250	249	270	290
0	200	200	175	180	180	180	180	190	210	229	228	220	220	230	250
0	30	10	25	20	20	20	20	20	10	1	22	30	29	40	40

B

Characteristic: f_0F1

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

April 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
1	-	-	-	-	-	-	-	-	L	L	045*	045	045	045	045
2	-	-	-	-	-	-	-	-	-	L	U044L	C	045	045	045
3	-	-	-	-	-	-	-	-	L	043	C	045	045	044	045
4	-	-	-	-	-	-	-	-	L	L	046	A	A	A	045
5	-	-	-	-	-	-	-	L	L	L	045	045	S	A	A
6	-	-	-	-	-	-	-	-	L	L	045	045	S	S	044
7	-	-	-	-	-	-	-	-	L	L	L	046	A	A	045
8	-	-	-	-	-	-	-	-	L	L	045	045	046	045	044
9	-	-	-	-	-	-	-	L	L	043	044	A	B	045	044
10	-	-	-	-	-	-	-	L	L	L	A	045	045	A	A
11	-	-	-	-	-	-	-	L	L	L	B	B	B	B	B
12	-	-	-	-	-	-	-	-	L	A	A	A	A	A	A
13	-	-	-	-	-	-	-	C	C	C	C	C	C	C	C
14	-	-	-	-	-	-	-	L	A	042	A	C	B	A	A
15	-	-	-	-	-	-	-	-	-	C	C	C	C	C	C
16	-	-	-	-	-	-	-	L	L	L	U050S	042	039	U040C	A
17	-	-	-	-	-	-	-	L	L	L	040	U045S	U041S	A	A
18	-	-	-	-	-	-	-	L	L	L	U045S	U041S	040	U042S	045
19	-	-	-	-	-	-	-	L	L	044	045	030	A	A	045
20	-	-	-	-	-	-	-	L	L	045	045	A	042	032	045
21	-	-	-	-	-	-	-	-	L	B	047	045	U046S	040	050
22	-	-	-	-	-	-	-	A	A	L	045	045	A	A	-
23	-	-	-	-	-	-	-	-	-	-	045	L	-	-	-
24	-	-	-	-	-	-	-	-	L	A	045	A	040	048	045
25	-	-	-	-	-	-	-	-	L	L	045	045	043	A	A
26	-	-	-	-	-	-	-	-	-	-	045	045	B	L	B
27	-	-	-	-	-	-	-	-	L	A	045	043	A	A	B
28	-	-	-	-	-	-	-	-	L	A	045	045	A	A	A
29	-	-	-	-	-	-	-	L	L	L	045	048	045	B	B
30	-	-	-	-	-	-	-	-	A	L	045	046	A	A	A
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Median	-	-	-	-	-	-	-	-	-	-	045	045	044	044	045
Count	-	-	-	-	-	-	-	-	-	-	22	19	13	10	13
UQ	-	-	-	-	-	-	-	-	-	-	045	045	045	045	045
LQ	-	-	-	-	-	-	-	-	-	-	045	445	040	040	044
QR	-	-	-	-	-	-	-	-	-	-	0	5	5	5	1

* Tabulation of 045 = 4.5 Mc.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

April 1964

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
L	L	045*	045	045	045	045	U045L	L	L	-	-	-	-	-	-
-	L	U044L	C	045	045	045	044	L	L	-	-	-	-	-	-
L	043	C	045	045	044	045	L	L	-	-	-	-	-	-	-
L	L	046	A	A	A	045	U044L	L	L	-	-	-	-	-	-
L	L	045	045	S	A	A	A	L	-	-	-	-	-	-	-
L	L	045	045	S	S	044	L	L	L	-	-	-	-	-	-
L	L	L	046	A	A	045	U043L	L	L	-	-	-	-	-	-
L	L	045	045	046	045	044	U043L	L	L	-	-	-	-	-	-
L	043	044	A	B	045	044	043	L	-	-	-	-	-	-	-
L	L	A	045	045	A	A	A	L	L	-	-	-	-	-	-
L	L	B	B	B	B	B	043	L	L	-	-	-	-	-	-
L	A	A	A	A	A	A	A	A	L	-	-	-	-	-	-
C	C	C	C	C	C	C	B	L	-	-	-	-	-	-	-
A	042	A	C	B	A	A	C	L	L	-	-	-	-	-	-
-	C	C	C	C	C	C	C	L	L	-	-	-	-	-	-
L	L	U050S	042	039	U040C	A	L	L	L	-	-	-	-	-	-
L	L	040	U045S	U041S	A	A	L	L	L	-	-	-	-	-	-
L	L	U045S	U041S	040	U042S	045	L	L	L	-	-	-	-	-	-
L	044	045	030	A	A	045	L	A	A	-	-	-	-	-	-
L	045	045	A	042	032	045	L	L	-	-	-	-	-	-	-
L	B	047	045	U046S	040	050	L	L	L	-	-	-	-	-	-
A	L	045	045	A	A	-	-	-	-	-	-	-	-	-	-
-	-	045	L	-	-	-	-	.	L	-	-	-	-	-	-
L	A	045	A	040	048	045	042	L	L	-	-	-	-	-	-
L	L	045	045	043	A	A	A	L	-	-	-	-	-	-	-
-	-	045	045	B	L	B	L	L	L	-	-	-	-	-	-
L	A	045	043	A	A	B	043	L	L	-	-	-	-	-	-
L	A	045	045	A	A	A	A	A	L	-	-	-	-	-	-
L	L	045	048	045	B	B	B	A	L	-	-	-	-	-	-
A	L	045	046	A	A	A	C	C	C	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	045	045	044	044	045	043	-	-	-	-	-	-	-	-
-	-	22	19	13	10	13	9	-	-	-	-	-	-	-	-
-	-	045	045	045	045	045	044	-	-	-	-	-	-	-	-
-	-	045	445	040	040	044	043	-	-	-	-	-	-	-	-
-	-	0	5	5	5	1	1	-	-	-	-	-	-	-	-

B

Characteristic: M(3000)F1

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minu

April 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	-	-	-	-	-	-	-	-	L	L	390*	400	410	410
2	-	-	-	-	-	-	-	-	-	L	L	C	400	400
3	-	-	-	-	-	-	-	-	L	400	C	410	410	420
4	-	-	-	-	-	-	-	-	L	L	390	A	A	A
5	-	-	-	-	-	-	-	L	L	L	400	410	S	A
6	-	-	-	-	-	-	-	-	L	L	390	400	S	S
7	-	-	-	-	-	-	-	-	L	L	L	390	A	A
8	-	-	-	-	-	-	-	-	L	L	380	380	400	420
9	-	-	-	-	-	-	-	L	L	390	400	A	B	400
10	-	-	-	-	-	-	-	L	L	L	A	410	430	A
11	-	-	-	-	-	-	-	L	L	L	B	B	B	B
12	-	-	-	-	-	-	-	-	L	A	A	A	A	A
13	-	-	-	-	-	-	-	C	C	C	C	C	C	C
14	-	-	-	-	-	-	-	L	A	380	A	C	B	A
15	-	-	-	-	-	-	-	-	-	C	C	C	C	C
16	-	-	-	-	-	-	-	L	L	L	U395S	420	450	U400C
17	-	-	-	-	-	-	-	L	L	L	395	U400S	U420S	A
18	-	-	-	-	-	-	-	L	L	L	U400S	U405S	405	U405S
19	-	-	-	-	-	-	-	L	L	390	395	415	A	A
20	-	-	-	-	-	-	-	L	L	385	395	A	420	425
21	-	-	-	-	-	-	-	-	L	B	370	390	U395S	410
22	-	-	-	-	-	-	-	A	A	L	375	380	A	A
23	-	-	-	-	-	-	-	-	-	-	415	-	-	-
24	-	-	-	-	-	-	-	-	L	A	390	A	420	400
25	-	-	-	-	-	-	-	-	L	L	400	415	430	A
26	-	-	-	-	-	-	-	-	-	-	400	435	B	L
27	-	-	-	-	-	-	-	-	L	A	410	430	A	A
28	-	-	-	-	-	-	-	-	L	A	385	410	A	A
29	-	-	-	-	-	-	-	L	L	L	400	360	410	B
30	-	-	-	-	-	-	-	-	A	L	400	420	A	A
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Median	-	-	-	-	-	-	-	-	-	390	395	410	410	407
Count	-	-	-	-	-	-	-	-	-	5	21	19	13	10
UQ	-	-	-	-	-	-	-	-	-	390	400	415	425	420
LQ	-	-	-	-	-	-	-	-	-	385	390	390	402	400
QR	-	-	-	-	-	-	-	-	-	5	10	25	23	20

* Tabulation of 390 = factor of 3.9.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

April 1964

09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
L	390*	400	410	410	400	U385L	L	L	-	-	-	-	-	-
L	L	C	400	400	395	390	L	L	-	-	-	-	-	-
400	C	410	410	420	390	L	L	-	-	-	-	-	-	-
L	390	A	A	A	400	U370L	L	L	-	-	-	-	-	-
L	400	410	S	A	A	A	L	-	-	-	-	-	-	-
L	390	400	S	S	410	L	L	L	-	-	-	-	-	-
L	L	390	A	A	400	U395L	L	L	-	-	-	-	-	-
L	380	380	400	420	400	U400L	L	L	-	-	-	-	-	-
390	400	A	B	400	400	390	L	-	-	-	-	-	-	-
L	A	410	430	A	A	A	L	L	-	-	-	-	-	-
L	B	B	B	B	B	390	L	L	-	-	-	-	-	-
A	A	A	A	A	A	A	A	L	-	-	-	-	-	-
C	C	C	C	C	C	B	L	-	-	-	-	-	-	-
380	A	C	B	A	A	C	L	L	-	-	-	-	-	-
C	C	C	C	C	C	C	L	L	-	-	-	-	-	-
L	U395S	420	450	U400C	A	L	L	L	-	-	-	-	-	-
L	395	U400S	U420S	A	A	L	L	L	-	-	-	-	-	-
L	U400S	U405S	405	U405S	400	L	L	L	-	-	-	-	-	-
390	395	415	A	A	380	L	A	A	-	-	-	-	-	-
385	395	A	420	425	400	L	L	-	-	-	-	-	-	-
B	370	390	U395S	410	420	L	L	L	-	-	-	-	-	-
L	375	380	A	A	-	-	-	-	-	-	-	-	-	-
-	415	-	-	-	-	-	-	L	-	-	-	-	-	-
A	390	A	420	400	400	410	L	L	-	-	-	-	-	-
L	400	415	430	A	A	A	L	-	-	-	-	-	-	-
-	400	435	B	L	B	L	L	L	-	-	-	-	-	-
A	410	430	A	A	B	400	L	L	-	-	-	-	-	-
A	385	410	A	A	A	A	A	L	-	-	-	-	-	-
L	400	360	410	B	B	B	A	L	-	-	-	-	-	-
L	400	420	A	A	A	C	C	C	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
390	395	410	410	407	400	395	-	-	-	-	-	-	-	-
5	21	19	13	10	13	9	-	-	-	-	-	-	-	-
30	400	415	425	420	400	400	-	-	-	-	-	-	-	-
385	390	390	402	400	398	378	-	-	-	-	-	-	-	-
5	10	25	23	20	2	22	-	-	-	-	-	-	-	-

B

Characteristic: f_0E

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
April 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
1	–	–	–	–	–	–	–	–	B	A	R	B	B	B	R
2	–	–	–	–	–	–	–	–	–	A	A	C	A	B	–
3	–	–	–	–	–	–	–	–	–	B	C	B	B	S	B
4	–	–	–	–	–	–	–	–	A	A	A	A	A	A	A
5	–	–	–	–	–	–	–	–	A	A	A	A	A	A	A
6	–	–	–	–	–	–	–	–	B	A	A	A	A	A	A
7	–	–	–	–	–	–	–	–	A	A	A	A	A	A	A
8	–	–	–	–	–	–	–	–	A	A	A	A	A	B	B
9	–	–	–	–	–	–	–	S	A	A	A	A	B	B	A
10	–	–	–	–	–	–	–	S	B	A	A	A	A	A	A
11	–	–	–	–	–	–	–	A	A	B	B	B	B	B	B
12	–	–	–	–	–	–	–	–	–	A	A	A	A	A	A
13	–	–	–	–	–	–	–	C	C	C	C	C	C	C	C
14	–	–	–	–	–	–	–	–	A	A	A	C	B	A	A
15	–	–	–	–	–	–	–	–	–	A	A	A	A	A	A
16	–	–	–	–	–	–	–	A	A	S	A	A	B	B	A
17	–	–	–	–	–	–	–	A	A	A	A	A	A	A	A
18	–	–	–	–	–	–	–	B	R	A	A	A	B	B	A
19	–	–	–	–	–	–	–	A	A	A	A	A	A	A	A
20	–	–	–	–	–	–	–	A	A	A	A	A	A	A	A
21	–	–	–	–	–	–	–	–	B	B	B	S	B	B	S
22	–	–	–	–	–	–	–	A	A	S	A	A	A	A	–
23	–	–	–	–	–	–	–	–	–	–	B	–	–	–	–
24	–	–	–	–	–	–	–	–	A	A	A	A	A	A	A
25	–	–	–	–	–	–	–	–	A	A	B	A	B	A	A
26	–	–	–	–	–	–	–	–	–	–	A	B	B	B	B
27	–	–	–	–	–	–	–	–	A	A	A	A	A	A	B
28	–	–	–	–	–	–	–	–	A	A	A	A	A	A	A
29	–	–	–	–	–	–	–	A	A	A	A	A	A	B	B
30	–	–	–	–	–	–	–	–	A	A	A	A	A	B	A
31	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Median	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Count	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
UQ	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
LQ	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
QR	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

A

IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in 0.5 minute

April 1964

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
B	A	R	B	B	B	R	B	R	A	-	-	-	-	-	-
-	A	A	C	A	B	-	-	-	A	-	-	-	-	-	-
-	B	C	B	B	S	B	-	-	-	-	-	-	-	-	-
A	A	A	A	A	A	A	A	-	S	-	-	-	-	-	-
A	A	A	A	A	A	A	A	A	-	-	-	-	-	-	-
B	A	A	A	A	A	A	A	-	-	-	-	-	-	-	-
A	A	A	A	A	A	A	A	A	S	-	-	-	-	-	-
A	A	A	A	B	B	B	B	B	S	-	-	-	-	-	-
A	A	A	A	B	B	A	B	S	-	-	-	-	-	-	-
B	A	A	A	A	A	A	A	A	-	-	-	-	-	-	-
A	B	B	B	B	B	B	B	B	B	-	-	-	-	-	-
-	A	A	A	A	A	A	A	A	A	-	-	-	-	-	-
C	C	C	C	C	C	C	B	B	S	-	-	-	-	-	-
A	A	A	C	B	A	A	A	A	A	-	-	-	-	-	-
-	A	A	A	A	A	A	A	B	A	-	-	-	-	-	-
A	S	A	A	B	B	A	B	A	S	-	-	-	-	-	-
A	A	A	A	A	A	A	A	S	S	-	-	-	-	-	-
R	A	A	A	B	B	A	A	A	A	-	-	-	-	-	-
A	A	A	A	A	A	A	A	A	A	-	-	-	-	-	-
A	A	A	A	A	A	A	A	A	-	-	-	-	-	-	-
B	B	B	S	B	B	S	B	S	S	-	-	-	-	-	-
A	S	A	A	A	A	-	-	-	-	-	-	-	-	-	-
-	-	B	-	-	-	-	-	-	A	-	-	-	-	-	-
A	A	A	A	A	A	A	A	-	-	-	-	-	-	-	-
A	A	B	A	B	A	A	A	A	-	-	-	-	-	-	-
-	-	A	B	B	B	B	A	A	B	-	-	-	-	-	-
A	A	A	A	A	A	B	B	B	B	-	-	-	-	-	-
A	A	A	A	A	A	A	A	A	A	-	-	-	-	-	-
A	A	A	A	A	B	B	B	A	A	-	-	-	-	-	-
A	A	A	A	A	A	A	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

B

Characteristic: h'E

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
April 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
1	-	-	-	-	-	-	-	-	B	A	110*	B	B	B	11
2	-	-	-	-	-	-	-	-	-	A	A	C	A	B	10
3	-	-	-	-	-	-	-	-	100	B	C	B	B	S	B
4	-	-	-	-	-	-	-	-	A	A	A	A	A	A	A
5	-	-	-	-	-	-	-	120	A	A	A	A	A	A	A
6	-	-	-	-	-	-	-	-	B	A	A	A	A	A	A
7	-	-	-	-	-	-	-	-	A	A	A	A	A	A	A
8	-	-	-	-	-	-	-	-	A	A	A	A	B	B	B
9	-	-	-	-	-	-	-	S	100	A	A	A	B	B	A
10	-	-	-	-	-	-	-	S	B	B	B	A	A	A	A
11	-	-	-	-	-	-	-	S	B	B	B	B	B	B	B
12	-	-	-	-	-	-	-	-	-	A	A	A	A	A	A
13	-	-	-	-	-	-	-	C	C	C	C	C	C	C	C
14	-	-	-	-	-	-	-	-	A	A	A	C	B	A	A
15	-	-	-	-	-	-	-	-	-	A	A	A	100	A	B
16	-	-	-	-	-	-	-	S	S	150	A	A	B	B	A
17	-	-	-	-	-	-	-	A	A	S	A	A	A	A	A
18	-	-	-	-	-	-	-	B	E170A	-	A	A	B	B	A
19	-	-	-	-	-	-	-	A	A	A	A	A	A	A	A
20	-	-	-	-	-	-	-	A	A	A	A	-	A	A	A
21	-	-	-	-	-	-	-	-	B	B	B	S	B	B	S
22	-	-	-	-	-	-	-	A	A	S	A	A	A	A	-
23	-	-	-	-	-	-	-	-	-	-	B	-	-	-	-
24	-	-	-	-	-	-	-	-	A	A	A	A	A	A	A
25	-	-	-	-	-	-	-	-	A	A	B	A	B	A	A
26	-	-	-	-	-	-	-	-	-	-	A	B	B	B	B
27	-	-	-	-	-	-	-	-	A	A	A	A	A	A	B
28	-	-	-	-	-	-	-	-	A	A	A	B	A	A	A
29	-	-	-	-	-	-	-	A	A	A	A	A	A	B	B
30	-	-	-	-	-	-	-	-	A	A	A	A	A	A	A
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Median	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Count	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UQ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LQ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Tabulation of 110 = 110 km.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

April 1964

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
B	A	110*	B	B	B	115	B	100	A	-	-	-	-	-	-
-	A	A	C	A	B	100	100	100	A	-	-	-	-	-	-
100	B	C	B	B	S	B	100	100	-	-	-	-	-	-	-
A	A	A	A	A	A	A	A	105	S	-	-	-	-	-	-
A	A	A	A	A	A	A	A	A	-	-	-	-	-	-	-
B	A	A	A	A	A	A	A	-	-	-	-	-	-	-	-
A	A	A	A	A	A	A	A	E100B	S	-	-	-	-	-	-
A	A	A	A	B	B	B	B	B	S	-	-	-	-	-	-
100	A	A	A	B	B	A	B	S	-	-	-	-	-	-	-
B	B	B	A	A	A	A	A	A	-	-	-	-	-	-	-
B	B	B	B	B	B	B	B	B	B	-	-	-	-	-	-
-	A	A	A	A	A	A	A	A	A	-	-	-	-	-	-
C	C	C	C	C	C	C	B	B	S	-	-	-	-	-	-
A	A	A	C	B	A	A	A	A	A	-	-	-	-	-	-
-	A	A	A	100	A	B	A	B	A	-	-	-	-	-	-
S	150	A	A	B	B	A	B	A	S	-	-	-	-	-	-
A	S	A	A	A	A	A	A	S	S	-	-	-	-	-	-
170A	-	A	A	B	B	A	A	A	A	-	-	-	-	-	-
A	A	A	A	A	A	A	A	A	A	-	-	-	-	-	-
A	A	A	-	A	A	A	A	A	-	-	-	-	-	-	-
B	B	B	S	B	B	S	B	S	S	-	-	-	-	-	-
A	S	A	A	A	A	-	-	-	-	-	-	-	-	-	-
-	-	B	-	-	-	-	-	-	A	-	-	-	-	-	-
A	A	A	A	A	A	A	A	-	-	-	-	-	-	-	-
A	A	B	A	B	A	A	A	A	-	-	-	-	-	-	-
-	-	A	B	B	B	B	A	A	B	-	-	-	-	-	-
A	A	A	A	A	A	B	B	B	B	-	-	-	-	-	-
A	A	A	B	A	A	A	A	A	A	-	-	-	-	-	-
A	A	A	A	A	B	B	B	A	A	-	-	-	-	-	-
A	A	A	A	A	A	A	C	C	C	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

B

Characteristic: fbEs

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

April 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	
1	B	S	B	B	B	S	023*	S	B	-	G	B	B	B	
2	C	C	C	C	C	C	C	C	C	-	-	C	-	B	
3	S	S	B	B	B	-	-	025	S	B	C	B	B	S	
4	B	B	-	B	B	B	025	-	033	039	037	-	050	048	C
5	S	S	B	B	B	-	S	-	042	-	-	040	044M	050M	C
6	S	B	B	B	-	-	S	S	B	-	040	036	-	040	
7	S	B	B	B	-	S	031	029	030	037	035	036	050	050	
8	S	B	B	-	B	-	-	S	033	042	-	-	B	B	
9	B	B	B	B	-	B	S	S	032	036	-	042	B	B	C
10	B	B	B	B	-	-	025	034	043	038	047	041	036M	050	C
11	B	B	B	017	-	-	023	028	032	B	B	B	B	B	
12	B	B	B	B	-	B	024	B	035	053	-	-	054	046	C
13	B	B	B	B	-	B	030	C	C	C	C	C	C	C	
14	B	B	B	B	B	B	B	M	048	037	051	C	B	C	
15	C	C	B	B	C	C	C	C	C	C	C	C	C	C	
16	S	B	B	B	S	B	S	U025S	030	U039S	U045M	036	B	B	C
17	S	S	S	S	-	-	M	U034M	U030M	035	033	U040M	U036S	042	C
18	S	S	B	B	019	016M	025M	B	029	040M	035M	037M	B	B	C
19	S	S	S	S	S	B	025M	040M	040	035M	041M	026M	052M	050M	C
20	016M	017M	-	B	B	B	026	027	040	037M	040M	042M	040M	028	C
21	B	B	B	B	019	B	B	B	B	B	B	S	B	B	
22	B	B	B	B	B	B	022	028	034	S	037	041	050M	050M	
23	-	-	-	-	-	-	-	-	-	-	B	-	-	-	
24	S	B	B	B	020	M	019M	030	031M	044M	039M	046M	040M	043M	C
25	021M	019M	020M	S	S	B	022	B	034	037	B	034	B	046	C
26	-	-	-	-	-	-	-	-	-	-	040	B	B	B	
27	-	-	-	-	-	-	-	-	043M	050	031	033	-	050	
28	B	B	B	021	015	028	030	036	036	046	035	040	036	046	C
29	-	026	025	-	B	B	B	028	033	039	041	040	040	B	
30	B	B	-	-	-	-	044	B	036	038M	044	040	044	-	
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Median	018	019	022	021	019	-	025	028	034	038	040	040	044	047	C
Count	2	3	2	1	4	-	15	12	21	18	17	17	13	14	
UQ	021	026	025	000	019	-	030	034	040	042	042	041	050	050	C
LQ	016	017	020	000	015	-	023	028	032	037	035	036	038	043	C
QR	5	9	5	0	4	-	7	6	8	5	7	5	12	7	

* Tabulation of 023 = 2.3 Mc.

IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in 0.5 minute

April 1964

09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-	G	B	B	B	G	B	031	028	C	C	C	C	C	C
-	-	C	-	B	G	G	029	028	025	028	S	S	-	S
B	C	B	B	S	B	G	G	S	050	-	-	-	-	025
039	037	-	050	048	040	033	-	-	S	025	025	S	S	S
-	-	040	044M	050M	050	045	042	028	026	020	S	-	-	-
-	040	036	-	040	-	03[illegible]	030	028	024	029	-	S	-	-
037	035	036	050	050	-	037	-	S	-	028	S	030	-	-
042	-	-	B	B	B	B	B	S	S	S	S	S	S	B
036	-	042	B	B	037	B	S	S	-	S	S	S	S	B
038	047	041	036M	050	036	046	036	030	S	S	S	B	S	033
B	B	B	B	B	B	B	B	B	B	S	S	027	B	S
053	-	-	054	046	052	052	047	034	027M	027	S	024	S	B
C	C	C	C	C	C	B	B	-	-	S	S	C	-	-
037	051	C	B	C	C	C	C	C	C	B	C	C	C	C
C	C	C	C	C	C	C	B	C	B	B	B	B	S	B
U039S	U045M	036	B	B	031	B	029	S	031	-	S	S	S	S
035	033	U040M	U036S	042	050	039	S	S	S	S	S	S	S	S
040M	035M	037M	B	B	036	036	031	026M	030M	M	S	S	M	-
035M	041M	026M	052M	050M	038	033	050	045	021	S	S	S	025M	031M
037M	040M	042M	040M	028	034	037M	035	S	026M	021M	S	B	B	B
B	B	S	B	B	S	B	S	S	S	S	S	S	S	B
S	037	041	050M	050M	-	-	-	-	-	-	-	-	-	-
-	B	-	-	-	-	-	-	029	025	S	S	S	S	S
044M	039M	046M	040M	043M	040	032	033	028	U026S	S	030	S	S	021
037	B	034	B	046	045	-	039	040	035	027	B	B	B	B
-	040	B	B	B	B	043	036	B	B	-	-	-	-	-
050	031	033	-	050	B	B	B	B	027	028	B	B	B	B
046	035	040	036	046	047	051	050	034	M	032	B	028	034	-
039	041	040	040	B	B	B	033	031	031	C	B	-	B	029
038M	044	040	044	-	-	-	-	-	-	B	B	025	B	B
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
038	040	040	044	047	040	037	035	029	026	028	027	027	028	027
18	17	17	13	14	13	13	15	13	14	10	2	5	2	4
042	042	041	050	050	048	045	042	034	031	028	030	029	034	033
037	035	036	038	043	036	034	031	028	025	025	025	024	025	021
5	7	5	12	7	12	11	11	6	6	3	5	5	9	12

B

Characteristic: f_oE_s

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

April 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Date \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
1	B	S	B	B	B	S	028*	S	B	034	G	B	B	B	G
2	C	C	C	C	C	C	C	C	C	036	037	C	037	B	G
3	S	S	B	B	B	026	026	030	S	B	C	B	B	S	B
4	B	B	-	B	B	B	033	037	040	043	040	090	080	075	075
5	S	S	B	B	B	019	S	031	065	035	037	040	049M	053M	065
6	S	B	B	B	026	040	S	S	B	036	041	042	035	041	039
7	S	B	B	B	014	S	042	045	039	037	035	037	065	055	040
8	S	B	B	070	B	034	042	S	044	047	045	039	B	B	B
9	B	B	B	B	030	B	S	S	036	043	037	042	B	B	037
10	B	B	B	B	025	033	042	041	044M	038	051	046	047M	054	036
11	B	B	B	027	031	026	026	028	032	B	B	B	B	B	B
12	B	B	B	B	027	B	024	B	037	064	078	079	065	055	065
13	B	B	B	B	028	B	040	C	C	C	C	C	C	C	C
14	B	B	B	B	B	B	B	043M	060	042	052	C	B	C	C
15	C	C	B	B	C	C	C	C	C	C	C	C	C	C	C
16	S	B	B	B	S	B	S	U029S	030	U039S	U049M	036	B	B	031
17	S	S	S	S	027	040	U043M	U060M	U040M	035	034	U055M	U040S	051	072
18	S	S	B	B	019	025M	042M	B	035	050M	052M	043M	B	B	036
19	S	S	S	S	S	B	030M	052M	045	042M	055M	036M	065M	058M	038
20	029M	035M	027	B	B	B	029	036	049	055M	054M	075M	075M	028	034
21	B	B	B	B	050	B	B	B	B	B	B	S	B	B	S
22	B	B	B	B	B	B	022	028	034	S	043	045	073M	075M	-
23	-	-	-	-	-	-	-	-	-	-	B	-	-	-	-
24	S	B	B	B	014	028M	035M	041	043M	051M	078M	046M	040M	055M	041
25	035M	035M	045M	S	S	B	022	B	036	038	B	034	B	046	045
26	-	-	-	-	-	-	-	-	-	-	045	B	B	B	B
27	-	-	-	-	-	-	-	-	050M	050	031	033	084	055	B
28	B	B	B	021	015	030	047	036	043	067	060	070	036	046	047
29	025	040	025	027	B	B	B	028	034	039	043	040	040	B	B
30	B	B	042	030	031	044	044	B	036	038M	045	050	044	084	041
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Median	029	035	026	027	027	030	034	037	040	040	045	042	048	055	040
Count	3	3	4	5	13	11	18	15	21	22	22	20	16	15	16
UQ	035	040	045	050	030	040	042	043	044	050	053	052	069	058	056
LQ	025	035	025	024	017	026	026	030	035	037	038	037	040	046	036
QR	10	5	20	6	13	14	16	13	9	13	15	15	29	12	20

* Tabulation of 028 = 2.8 Mc.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
April 1964

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
B	034	G	B	B	B	G	B	033	040	C	C	C	C	C	C
C	036	037	C	037	B	G	G	029	030	037	037	S	S	037	S
S	B	C	B	B	S	B	G	G	S	065	034	034	037	041	030
040	043	040	090	080	075	075	037	035	021	S	027	030	S	S	S
065	035	037	040	049M	053M	065	068	067	040	037	026	S	020	035	030
B	036	041	042	035	041	039	037	036	035	038	030	029	S	021	023
039	037	035	037	065	055	040	037	035	S	030	029	S	039	030	035
044	047	045	039	B	B	B	B	B	S	S	S	S	S	S	B
036	043	037	042	B	B	037	B	S	S	037	S	S	S	S	B
044M	038	051	046	047M	054	036	046	036	031	S	S	S	B	S	037
032	B	B	B	B	B	B	B	B	B	B	S	S	034	B	S
037	064	078	079	065	055	065	062	047	037	037M	033	S	024	S	B
C	C	C	C	C	C	C	B	B	034	031	S	S	C	037	030
060	042	052	C	B	C	C	C	C	C	C	B	C	C	C	C
C	C	C	C	C	C	C	C	B	C	B	B	B	B	S	B
030	U039S	U049M	036	B	B	031	B	034	S	034	026	S	S	S	S
U040M	035	034	U055M	U040S	051	072	047	S	S	S	S	S	S	S	S
035	050M	052M	043M	B	B	036	043	032	040M	035M	021M	S	S	029M	020
045	042M	055M	036M	065M	058M	038	033	051	051	035	S	S	S	085M	070M
049	055M	054M	075M	075M	028	034	050M	035	S	026M	025M	S	B	B	B
B	B	B	S	B	B	S	B	S	S	S	S	S	S	S	B
034	S	043	045	073M	075M	-	-	-	-	-	-	-	-	-	-
-	-	B	-	-	-	-	-	-	034	027	S	S	S	S	S
043M	051M	078M	046M	040M	055M	041	032	034	029	U050S	S	035	S	S	032
036	038	B	034	B	046	045	053	039	050	046	034	B	B	B	B
-	-	045	B	B	B	B	060	046	B	B	-	-	-	-	-
050M	050	031	033	084	055	B	B	B	B	036	036	B	B	B	B
043	067	060	070	036	046	047	066	067	057	039M	035	B	031	038	029
034	039	043	040	040	B	B	B	033	029	031	C	B	035	B	029
036	038M	045	050	044	084	041	-	-	-	-	B	B	030	B	B
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
040	040	045	042	048	055	040	046	035	035	037	030	030	033	037	030
21	22	22	20	16	15	16	14	17	15	18	13	4	8	9	11
044	050	053	052	069	058	056	060	046	040	038	034	035	036	039	035
035	037	038	037	040	046	036	037	034	030	031	026	029	02[illegible]	029	029
9	13	15	15	29	12	20	23	12	10	7	8	6	9	10	6

B

Characteristic: $h'E_s$

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
April 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Date \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	1
1	B	S	B	B	B	S	110*	S	B	100	G	B	B	B	
2	C	C	C	C	C	C	C	C	C	100	100	C	100	B	
3	S	S	B	B	B	100	100	100	S	B	C	B	B	S	
4	B	B	100	B	B	B	090	115	100	100	100	100	100	100	1
5	S	S	B	B	B	110	S	120	100	100	100	100	115	110	0
6	S	B	B	B	110	100	S	S	B	100	100	100	100	100	1
7	S	B	B	B	110	S	090	100	100	100	100	100	100	100	1
8	S	B	B	100	B	100	100	S	100	100	100	100	B	B	
9	B	B	B	B	110	B	S	S	100	100	100	100	S	B	0
10	B	B	B	B	115	115	110	110	110	115	120	095	100	100	0
11	B	B	B	118	110	110	115	127	122	B	B	B	B	B	
12	B	B	B	B	115	B	120	B	095	100	099	095	099	098	0
13	B	B	B	B	112	B	105	C	C	C	C	C	C	C	
14	B	B	B	B	B	B	B	100	100	100	100	C	B	099	0
15	C	C	B	B	115	110	C	C	C	098	095	100	100	099	0
16	S	B	B	B	S	B	S	150	150	140	095	100	B	B	0
17	S	S	S	S	-	-	100	100	100	113	100	100	095	099	1
18	S	S	B	B	110	100	105	B	100	100	100	090	B	B	0
19	S	S	S	S	S	B	100	-	100	-	100	100	100	100	1
20	114	100	100	B	B	B	098	095	090	100	095	085	090	090	0
21	B	B	B	B	105	B	B	B	B	B	B	S	B	B	
22	B	B	B	B	B	B	110	110	110	S	095	095	088	090	
23	-	-	-	-	-	-	-	-	-	-	B	-	-	-	
24	S	B	B	B	110	110	108	110	110	109	108	110	110	100	1
25	100	080	115	S	S	B	120	B	100	100	B	090	B	120	1
26	-	-	-	-	-	-	-	-	-	-	090	B	B	B	B
27	-	-	-	-	-	-	-	-	110	110	105	100	095	090	B
28	B	B	B	100	100	100	100	100	100	097	090	090	095	095	0
29	100	100	100	100	B	B	B	110	110	100	100	100	100	B	B
30	B	B	100	100	100	100	100	B	100	090	098	098	100	099	0
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Median	100	100	100	100	110	100	103	110	100	100	100	100	100	099	0
Count	3	3	5	5	13	11	18	14	21	22	23	21	17	17	1
UQ	114	000	107	109	114	110	110	115	110	100	100	100	100	100	1
LQ	100	000	100	100	108	100	100	110	100	100	095	095	095	097	0
QR	14	0	7	9	6	10	10	5	10	0	5	5	5	3	1

* Characteristic of 110 = 110 km.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

April 1964

8	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
B	100	G	B	B	B	G	B	090	090	C	C	C	C	C	C
C	100	100	C	100	B	G	G	110	090	090	090	S	S	120	S
S	B	C	B	B	S	B	G	G	S	080	080	110	100	105	090
00	100	100	100	100	100	100	090	100	100	S	090	090	S	S	S
00	100	100	100	115	110	090	090	100	090	090	090	S	120	100	100
B	100	100	100	100	100	100	090	100	100	090	090	080	S	130	120
00	100	100	100	100	100	100	095	090	S	100	090	S	100	100	090
00	100	100	100	B	B	B	B	B	S	S	S	S	S	S	B
00	100	100	100	S	B	090	B	S	S	100	S	S	S	S	B
10	115	120	095	100	100	090	090	090	090	S	S	S	B	S	098
22	B	B	B	B	B	B	B	B	B	B	S	S	100	B	S
95	100	099	095	099	098	098	098	095	080	090	090	S	125	S	B
C	C	C	C	C	C	C	B	B	120	110	S	S	C	115	118
00	100	100	C	B	099	090	090	090	090	090	B	090	C	C	C
C	098	095	100	100	099	099	099	B	090	B	B	B	B	S	B
50	140	095	100	B	B	092	B	095	S	095	090	S	S	S	S
00	113	100	100	095	099	100	100	S	S	S	S	S	S	S	S
00	100	100	090	B	B	090	090	090	090	080	090	S	S	130	100
00	-	100	100	100	100	100	110	098	099	090	S	S	S	120	110
90	100	095	085	090	090	090	090	088	S	090	090	S	B	B	B
B	B	B	S	B	B	S	B	S	S	S	S	S	S	S	B
10	S	095	095	088	090	-	-	-	-	-	-	-	-	-	-
-	-	B	-	-	-	-	-	-	118	100	S	S	S	S	S
10	109	108	110	110	100	100	100	110	100	130	S	080	S	S	-
00	100	B	090	B	120	120	100	118	090	100	090	B	B	B	B
-	-	090	B	B	B	B	100	100	B	B	-	-	-	-	-
10	110	105	100	095	090	B	B	B	B	090	090	B	B	B	B
00	097	090	090	095	095	090	080	080	080	100	080	B	112	118	145
10	100	100	100	100	B	B	B	100	090	090	C	B	118	B	100
00	090	098	098	100	099	090	C	C	C	C	B	B	060	B	B
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
00	100	100	100	100	099	095	092	097	090	090	090	090	106	118	105
21	22	23	21	17	17	18	16	18	17	19	13	5	8	9	10
10	100	100	100	100	100	100	100	100	100	100	090	095	119	125	118
00	100	095	095	095	097	090	090	090	090	090	090	080	100	102	100
10	0	5	5	5	3	10	10	10	10	10	0	15	19	23	18

B

Characteristic: Type of Es

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minut
April 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	-	-	-	-	-	-	f	-	f	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	f	f	-	f	-
3	-	-	-	-	f3	f	f	-	-	-	-	-	-	-
4	-	-	f	-	-	-	f	f	f	f	f	f2	f	f
5	-	-	-	-	-	f	-	c	f	f	f	f	cf	cf
6	-	-	-	-	f	f2	-	-	f	f	f	f	f	f
7	-	-	-	-	f	-	f4	f	f	f	f	f	f	f
8	-	-	-	f2	-	f4	f3	f	f	f	f	f	-	-
9	-	-	-	-	f	-	-	c	f	f	f	f	-	-
10	-	-	-	-	f	f	f	c	c	c	c	f	f	f
11	-	-	-	f	f2	f	f	c	c	-	-	-	-	-
12	-	-	-	-	f	-	c	f	f	f	f	f	f	f
13	-	-	-	-	f	-	f	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	f	f	f	f	-	-	f
15	-	-	-	-	f	f	-	-	-	f	f	f	c	f
16	-	-	-	-	-	-	-	h	h	h	f	f	-	-
17	-	-	-	-	f2	f4	f	f	f	c	f	f	f	f
18	-	-	-	-	f	f	f	-	f	f	f	f	-	-
19	-	-	-	-	-	-	f	f2	f	f	f	f	f2	f2
20	f2	f2	f	-	-	-	f	f	f2	f2	f	f2	f	f
21	-	-	-	-	f2	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	f	c	c	-	f	f	f2	f2
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	f	f	f	f	c	c	c	c	c	f
25	f	f	f	-	-	-	f	-	f	f	-	f	-	c
26	-	-	-	-	-	-	-	-	-	-	f	-	-	-
27	-	-	-	-	-	-	-	-	c	c	f	f	f2	f
28	-	-	-	f	f	f	f	f	f	f2	f	f	f	f
29	f	f	f	f	-	-	-	c	f	f	f	f	-	-
30	-	-	f	f	f	f	f	-	f	f	f	f	f	f3
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Median	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Count	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UQ	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LQ	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QR	-	-	-	-	-	-	-	-	-	-	-	-	-	-

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
April 1964

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
ℓ	–	–	–	–	–	–	–	ℓ	ℓ	–	–	–	–	–	–
–	ℓ	ℓ	–	ℓ	–	–	–	c	ℓ	f	f2	–	–	f2	–
–	–	–	–	–	–	–	–	–	–	f2	f2	f	f	f	f
ℓ	ℓ	ℓ	ℓ2	ℓ	ℓ	ℓ	ℓ	c	c	–	f	f	–	–	–
ℓ	ℓ	ℓ	ℓ	cℓ	cℓ	ℓc	ℓc	cℓ2	ℓ	f	f	–	f	f3	f
–	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	f	f	f	–	f	f
ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	c	f	f	–	f2	f	f2
ℓ	ℓ	ℓ	ℓ	–	–	–	–	–	–	–	–	–	–	–	–
c	ℓ	ℓ	ℓ	–	–	ℓ	–	–	–	f	–	–	–	–	–
c	c	c	ℓ	ℓ	ℓ	ℓ	ℓ2	ℓ	ℓ	–	–	–	–	–	–
c	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	-2	ℓ	ℓ	f	f	–	f	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	f	–	–
ℓ	ℓ	ℓ	–	–	ℓ	ℓ	ℓ	ℓ	c	f	–	f	–	f	f
–	ℓ	ℓ	ℓ	c	ℓ	c	ℓ	–	ℓ	f2	f	f	–	–	–
h	h	ℓ	ℓ	–	–	ℓ	–	ℓ	–	–	–	–	–	–	–
ℓ	c	ℓ	ℓ	ℓ	ℓ	ℓ	–	–	–	f	f	–	–	–	–
ℓ	ℓ	ℓ	ℓ	–	–	ℓ	–	–	–	–	–	–	–	–	–
ℓ	ℓ	ℓ	ℓ	ℓ2	ℓ2	c	c	ℓh	ℓc	f	f	–	–	f	f
ℓ2	ℓ2	ℓ	ℓ2	ℓ	ℓ	ℓ	ℓ	ℓ2	ℓ3	f	–	–	–	f2	f2
–	–	–	–	–	–	–	–	–	–	f	–	–	–	–	–
c	–	ℓ	ℓ	ℓ2	ℓ2	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
c	c	c	c	c	ℓ	ℓ	–	ℓ	c	ℓ	–	–	–	–	–
ℓ	ℓ	–	ℓ	–	c	c	cℓ	c	ℓ	f	–	f	–	–	f
–	–	ℓ	–	–	–	–	ℓ	ℓ	f	f	–	–	–	–	–
c	c	c	ℓ	ℓ2	ℓ	–	–	–	–	–	–	–	–	–	–
ℓ	ℓ2	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ2	ℓ3	f	f	–	–	–	–
ℓ	ℓ	ℓ	ℓ	ℓ	–	–	–	ℓ	ℓ	f	f	–	f	f	f
ℓ	ℓ	ℓ	ℓ	ℓ	ℓ3	ℓ	–	–	–	f2	–	–	f	–	f
–	–	–	–	–	–	–	–	–	–	–	–	–	f	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

B

MEDIAN VALUES APRIL 1964

Hour Local	fmin (Mc)	foF2 (Mc)	M(3000)F2	h'F2 (km)	h'F (km)	foF1 (Mc)	M(3000)F1	foE * (Mc)	h'E * (km)	fbEs (Mc)	foEs (Mc)	h'Es (km)
00	1.8	6.3	3.28	-	250	-	-	-	-	-	-	-
01	1.8	6.2	3.70	-	216	-	-	-	-	-	-	-
02	1.8	4.8	3.80	-	200	-	-	-	-	-	-	100
03	1.8	3.3	3.70	-	210	-	-	-	-	-	2.7	100
04	1.5	2.6	3.75	-	220	-	-	-	-	-	2.7	110
05	1.7	2.8	3.75	-	210	-	-	-	-	-	3.0	100
06	2.1	3.8	3.47	-	240	-	-	-	-	2.5	3.4	103
07	2.6	6.5	3.50	-	220	-	-	-	-	2.8	3.7	110
08	2.8	7.2	3.30	-	210	-	-	-	-	3.4	4.0	100
09	3.0	8.0	2.80	310	200	-	3.90	-	-	3.8	4.0	100
10	3.0	7.5	2.60	338	200	4.5	3.95	-	-	4.0	4.5	100
11	3.0	7.0	2.70	340	195	4.5	4.10	-	-	4.0	4.2	100
12	3.2	7.1	2.70	335	190	4.4	4.10	-	-	4.4	4.8	100
13	3.3	7.7	2.75	330	195	4.4	4.07	-	-	4.7	5.5	99
14	3.0	8.3	2.80	315	190	4.5	4.00	-	-	4.0	4.0	95
15	2.9	8.7	3.00	300	195	4.3	3.95	-	-	3.7	4.6	92
16	2.7	8.9	3.00	-	200	-	-	-	-	3.5	3.5	97
17	2.7	9.1	3.00	-	212	-	-	-	-	2.9	3.5	90
18	2.5	9.0	3.40	-	230	-	-	-	-	2.6	3.7	90
19	2.2	9.0	3.15	-	240	-	-	-	-	2.8	3.0	90
20	2.3	8.5	3.10	-	230	-	-	-	-	-	-	90
21	2.0	7.8	3.20	-	240	-	-	-	-	2.7	3.3	106
22	2.1	7.0	3.20	-	250	-	-	-	-	-	3.7	118
23	2.0	6.1	3.17	-	270	-	-	-	-	-	3.0	105

* Insufficient data for reliable median.

IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS
BANGKOK, THAILAND
APRIL 1964

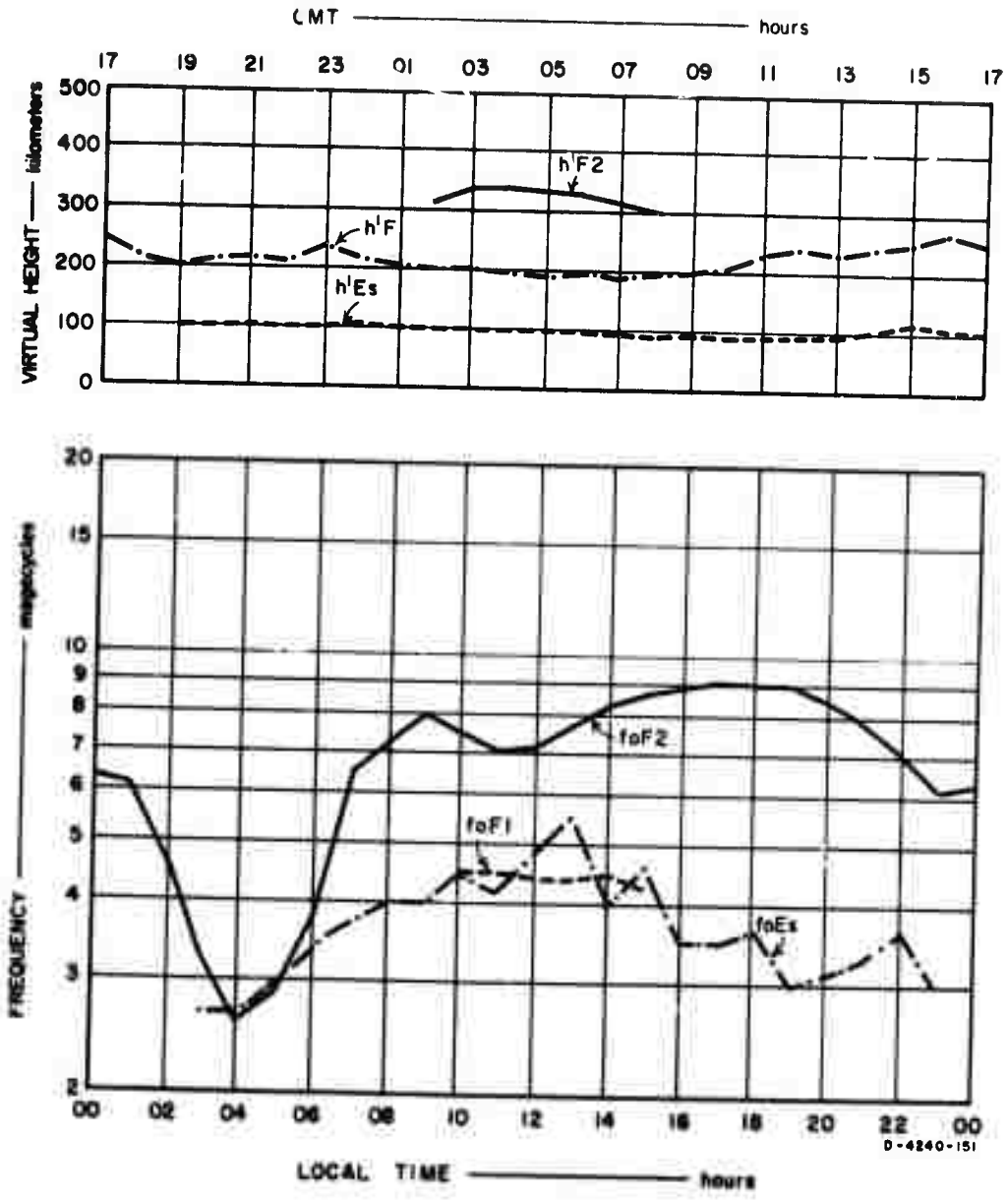

FIG. 1 SUMMARY GRAPHS

STANFORD RESEARCH INSTITUTE

MENLO PARK
CALIFORNIA

Regional Offices and Laboratories

Southern California Laboratories
820 Mission Street
South Pasadena, California 91031

Washington Office
808–17th Street, N.W.
Washington, D.C. 20006

New York Office
270 Park Avenue, Room 1770
New York, New York 10017

Detroit Office
1025 East Maple Road
Birmingham, Michigan 48011

European Office
Pelikanstrasse 37
Zurich 1, Switzerland

Japan Office
Nomura Security Building, 6th Floor
1–1 Nihonbashidori, Chuo-ku
Tokyo, Japan

Retained Representatives

Toronto, Ontario, Canada
Cyril A. Ing
67 Yonge Street, Room 710
Toronto 1, Ontario, Canada

Milan, Italy
Lorenzo Franceschini
Via Macedonio Melloni, 49
Milan, Italy