

Information on Over-the-Horizon Radar

Part IX

Missile Detection at Altitude

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September 1966

NAVAL RESEARCH LABORATORY
Washington, D.C.

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Report Documentation Page				Form Approved OMB No. 0704-0188	
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1. REPORT DATE SEP 1966		2. REPORT TYPE		3. DATES COVERED 00-00-1966 to 00-00-1966	
4. TITLE AND SUBTITLE Information on Over-the-Horizon Radar, Part IX -Missile Detection at Altitude				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Research Laboratory, Washington, DC, 20375				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 63	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

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ABSTRACT

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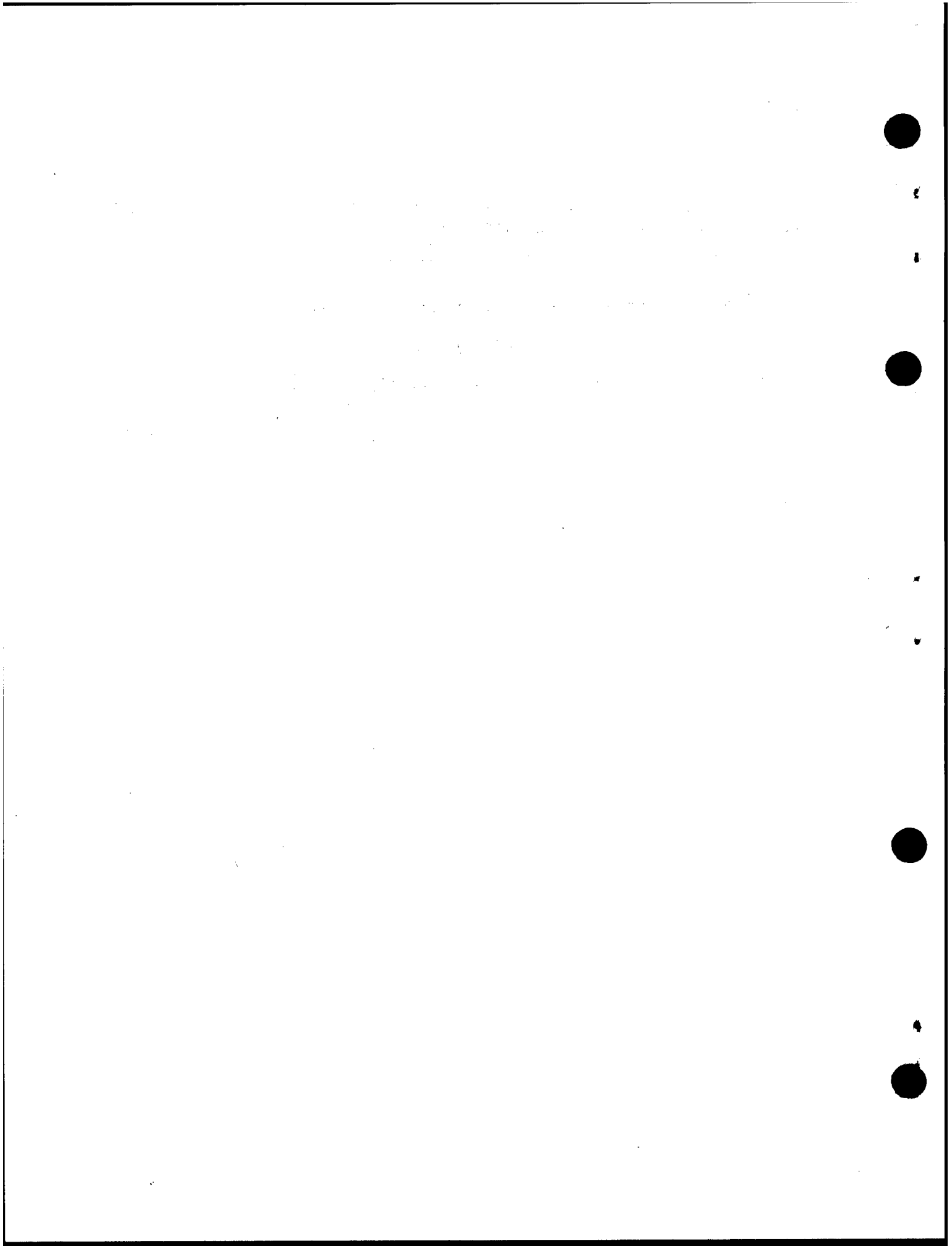
The report gives expected OTH radar performance for a site on Cyprus viewing the area around Lake Balkhash.

PROBLEM STATUS

This is an interim report on a phase of the problem; work is continuing.

AUTHORIZATION

USAF MIPR (30-602) 64-3412 to the
Naval Research Laboratory,
dated 26 March 1964
NRL Problem 53R02-42



MISSILE DETECTION AT ALTITUDE (Unclassified Title)

INTRODUCTION

The case considered is of a radar on Cyprus viewing missile launches from the Lake Balkhash region. The radar location is taken as 35°N 33°E and the target as 46°N 73°E giving a great circle ground range of 1917 naut. mi. and forward and reverse bearings of 58 and 264 degrees true. ITSA long-range ionospheric data have been used with the prediction methods of ESSA Technical Report ITSA-1 (1) and the radar application of such methods as is described in an NRL report (2). The operating period of 1968-1970 with an estimated average sunspot number (SSN) of 110 is examined for three months, June, September and December being representative of summer, equinoxes and winter. A frequency complement composed of channels at nominally 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 26, and 30 Mc has been assumed available. Target altitudes considered are 0, 50, 100, and 150 km. The signal absorbing layer has been considered slightly below 100 km. After some study of the Cyprus sites it was decided to deny launch angles below 2 degrees in the analysis. The controlling noise was taken as that given in CCIR Report 322 except that noise power was not allowed to drop below a threshold set by a median level, $N_m = 148 + 12.6 \ln (f\text{Mc}/3)$ db, below a watt.

RESULTS

The results are given in the form of diurnal graphs of % Time, S/N, ϕ , and f.

% Time is a measure of radar effective operating time and also it has been called Total Reliability. In effect it is a combined reliability computed from individual reliabilities based upon the fading signal, fluctuating noise and probability of ionospheric support for the better frequencies in the complement. An implicit assumption is that the radar is frequency and launch angle flexible, that existing propagation conditions are known and the radar is properly operated.

S/N is the ratio in db of output signal to noise at the monthly median MUF.

ϕ is the vertical launch angle in degrees for the monthly median MUF path. Except where noted angles below two degrees have been denied.

f is the median MUF for the month given in megacycles per second.

Time is given in local hours at the radar site.

The modes considered are as sketched in Fig. 1, and on the diurnal graphs the mode for the median MUF is indicated. All percent time curves have been computed with the requirement that the output signal-to-noise be 10 db or better. The product, (radiated power over a watt) (antenna gain over a free space isotrope)² (signal processing time over a second) (target radar

area over a square meter) or $PG^2T\sigma = 133$ may be broken down as follows:

P = 200 kw average or	53 db
G^2	50 db
T = 20 sec or	13 db
$\sigma = 50$ sq meters or	17 db
	<u>133 db</u>

For another example the $PG^2T\sigma = 113$ can be broken down into:

P = 50 kw average or	47 db
G^2	50 db
T = 0.8 sec or	-1 db
$\sigma = 50$ sq meters or	17 db
	<u>113 db</u>

If it is desired to designate 13 db as the required output signal-to-noise ratio, the analysis is applicable with 3 db added to $PG^2T\sigma$; for the two examples given above say make the average powers 400 kw and 100 kw respectively.

Figures 2 through 13 are the diurnal graphs of Total Reliability or Percent Time of effective operation (% Time), output median signal to median noise ratio (S/N) for the median MUF, launch angle (ϕ) in degrees for the median MUF, and frequency (f) in megacycles per second for the median MUF. The median MUF mode is indicated between the % Time and S/N plots. For the most part these curves show a marked decrease in radar capability during midday - except for the higher altitude targets in winter. The effective operating times are summarized in Fig. 14 by daily averages. The $PG^2T\sigma = 133$ radar circuit shows daily effective times of near 50% and above. The $PG^2T\sigma = 113$ circuit is never effective more than 11% of the time.

The somewhat superior performance indicated for targets at altitude may seem surprising. This altitude superiority is due in part to there being more available modes, that is 1F-, 1F+, 2F- and 2F+, than either 1F or 2F only for the near surface target. If launch angles down to zero degrees had been permitted the near surface target detection capability would be considerably enhanced. This is shown by an example in Fig. 15 as a comparative diurnal plot, and also in Fig. 14 the average for June at 0 km and all launch angles permitted is given in parentheses.

Figure 16 gives composite plots of the median MUF and its launch angle. The more important thing illustrated is that if coverage is desired over the altitude range between 0 and 150 km, two frequencies and launch angles are required an appreciable part of the time. Such operation might be satisfactorily achieved with a single radar by alternating between two frequencies and launch angles every 10 to 20 seconds with near zero switching time required. For the years considered an overall

frequency span running from 10 to 30 Mc/s is required. The antenna should be capable of launch angles up to 15 degrees.

The results of the computations for the $PG^2T\sigma = 133$ radar circuit are tabulated in an Appendix. These tables can provide a more detailed exhibit of the study; preceding the tables some manual computations are provided for illustration.

CONCLUSIONS

The problem that has been considered is that of missile skin tracking at about 1900 naut. mi. The percent time of expected effective operation has been displayed for three radar circuit cases, $PG^2T\sigma = 133$, 123, and 113 db. The 113-db radar circuit is thought to be comparable to the existing radar installation refitted with 25-db gain antennas; the 133-db case is similar to that for a radar with an AN/FPS-95 capability. The 113-db case promises little effective operating time. A frequency and azimuth sector abbreviated AN/FPS-95, preferably with two transmitters, should provide effective operation more than half of the time.

[REDACTED]

REFERENCES

1. D. L. Lucas and G. W. Haydon, "Predicting Statistical Performance Indexes for High Frequency Ionospheric Telecommunication Systems," (U), ESSA Technical Report ITSA-1, 1966 UNCLASSIFIED
2. J. M. Headrick, D. L. Lucas and E. N. Zettle, "HF Sky Wave Radar Performance" (U), NRL Report to be published in 1966 [REDACTED]

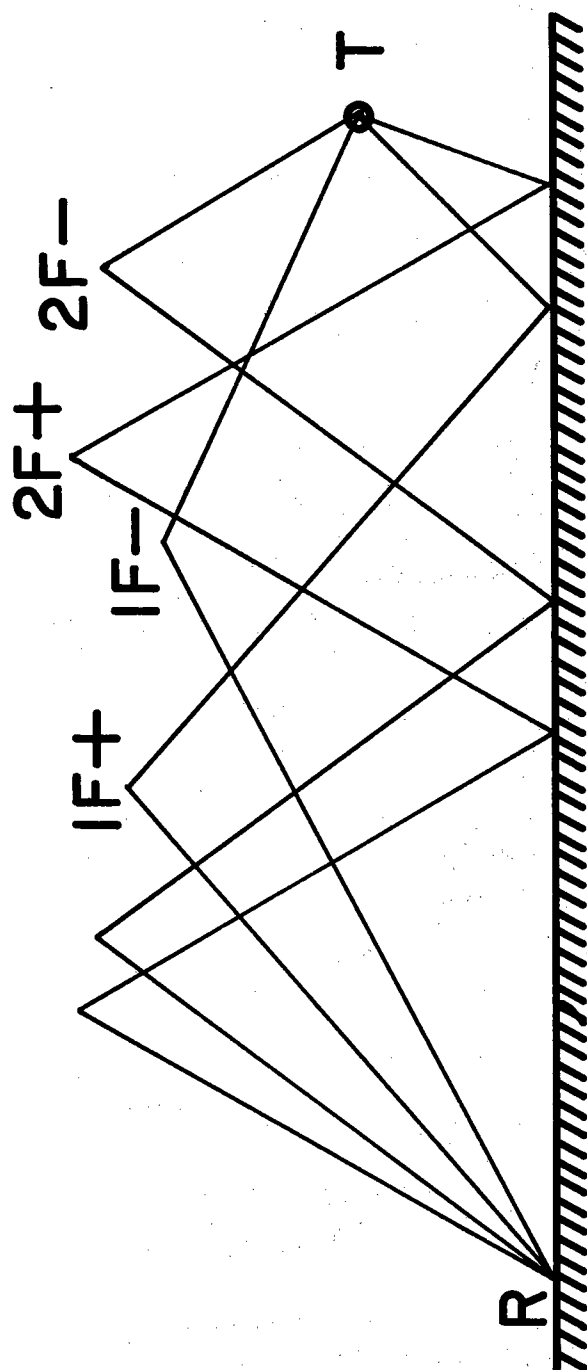


Fig. 1 - The transmission modes considered for targets at altitudes greater than zero are sketched for F-layer reflection

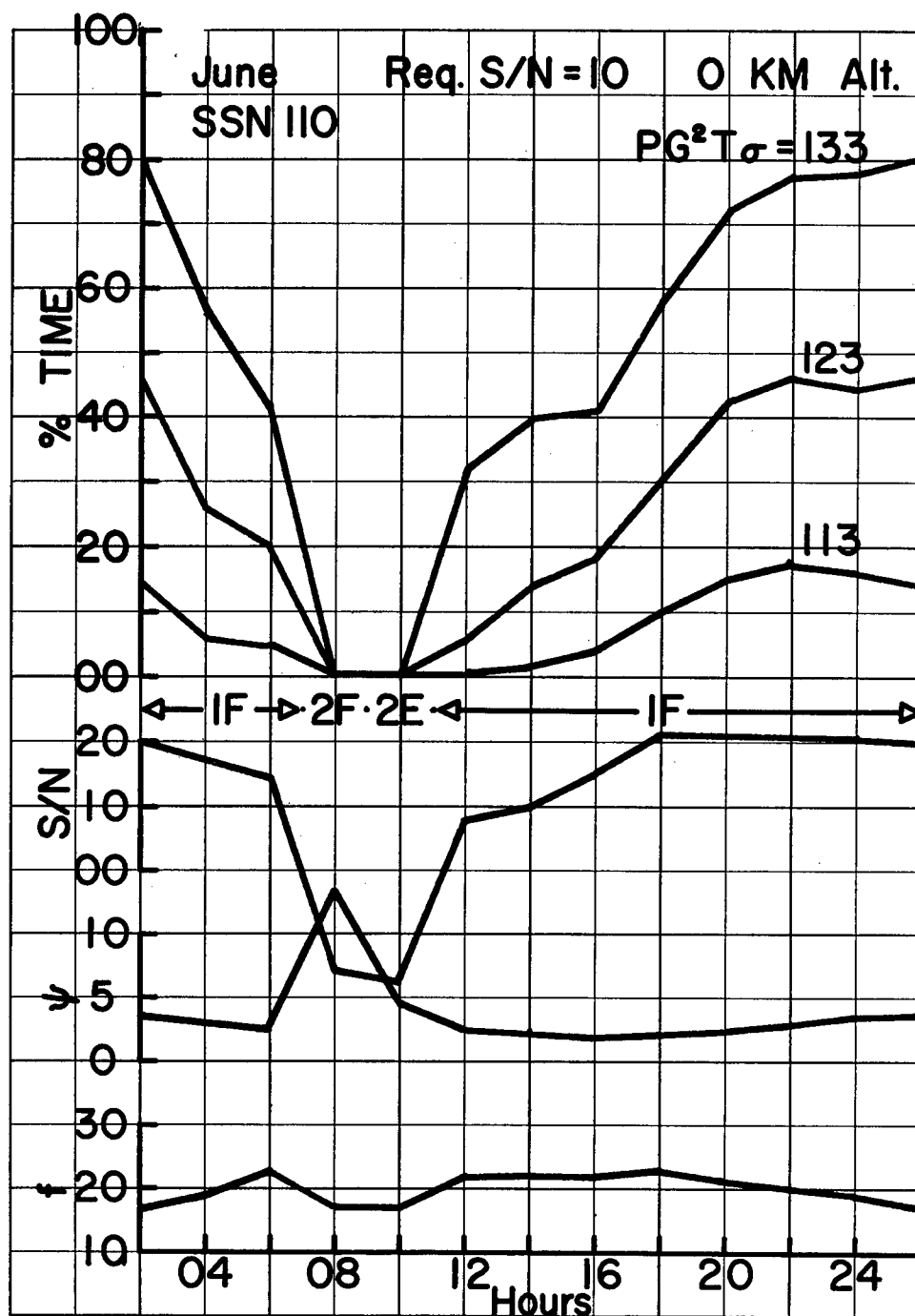


Fig. 2 - Percent time of effective operations for three values of PG^2T_σ , the median MUF (f) for the designated month in Mc/s, the signal-to-noise ratio (S/N) at the median MUF in db for $PG^2T_\sigma = 133$, the vertical launch angle (ϕ) in degrees for the median MUF path, and the transmission mode for the median MUF path are given versus local hour of day at the radar site.

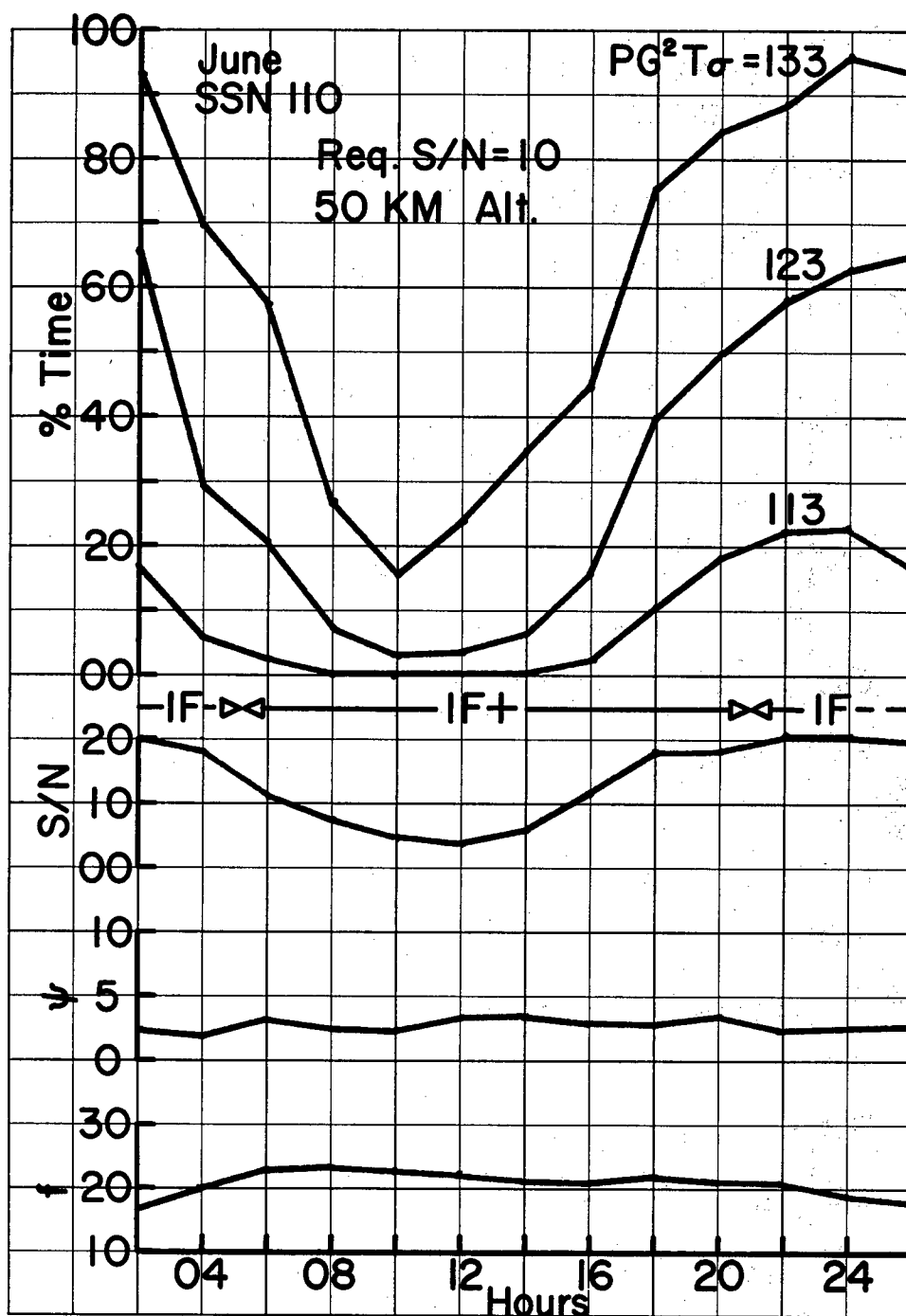


Fig. 3 - Percent time of effective operations for three values of PG^2T_σ , the median MUF (f) for the designated month in Mc/s, the signal-to-noise ratio (S/N) at the median MUF in db for $PG^2T_\sigma = 133$, the vertical launch angle (ϕ) in degrees for the median MUF path, and the transmission mode for the median MUF path are given versus local hour of day at the radar site.

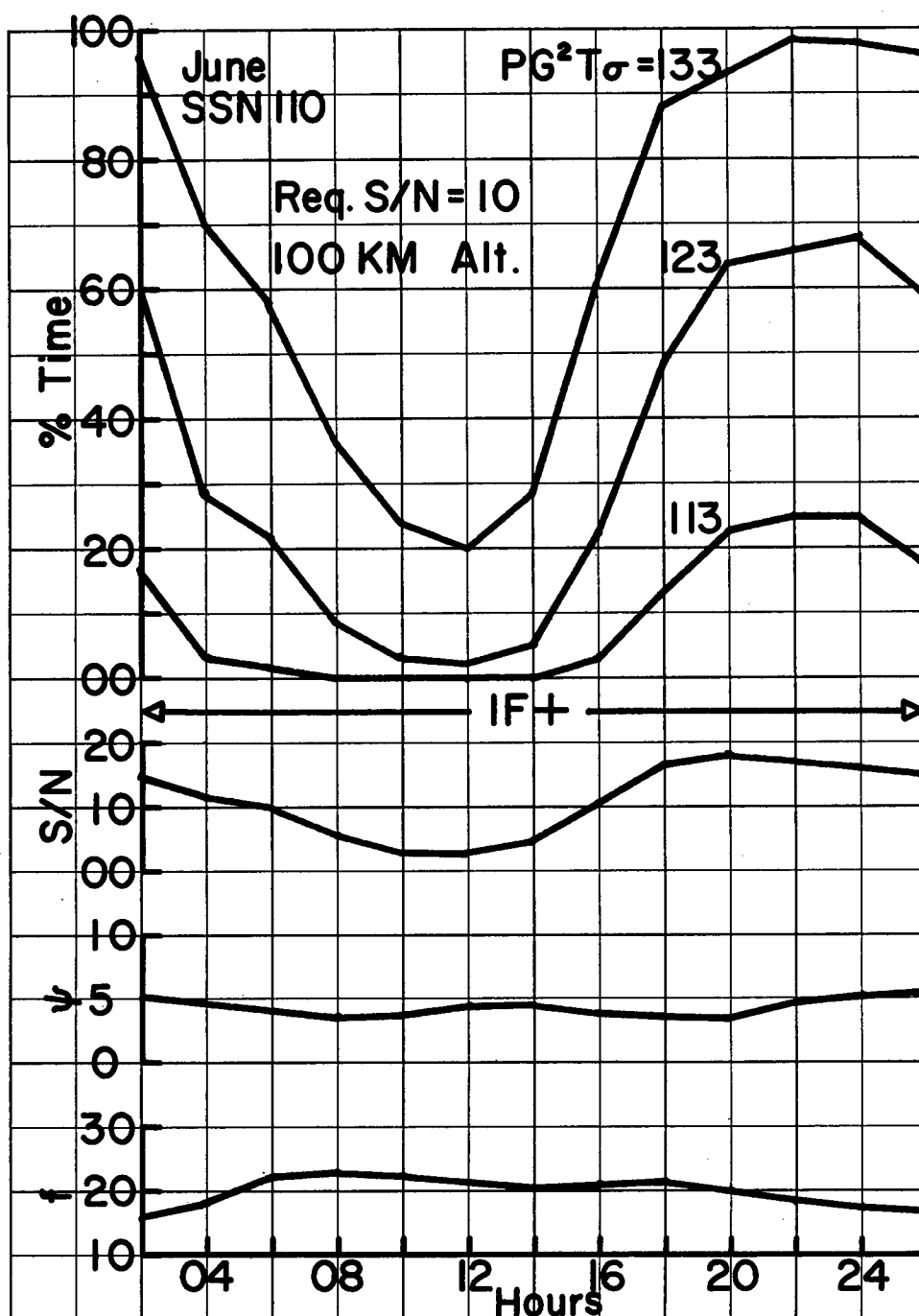


Fig. 4 - Percent time of effective operations for three values of $PG^2T\sigma$, the median MUF (f) for the designated month in Mc/s, the signal-to-noise ratio (S/N) at the median MUF in db for $PG^2T\sigma = 133$, the vertical launch angle (ϕ) in degrees for the median MUF path, and the transmission mode for the median MUF path are given versus local hour of day at the radar site.

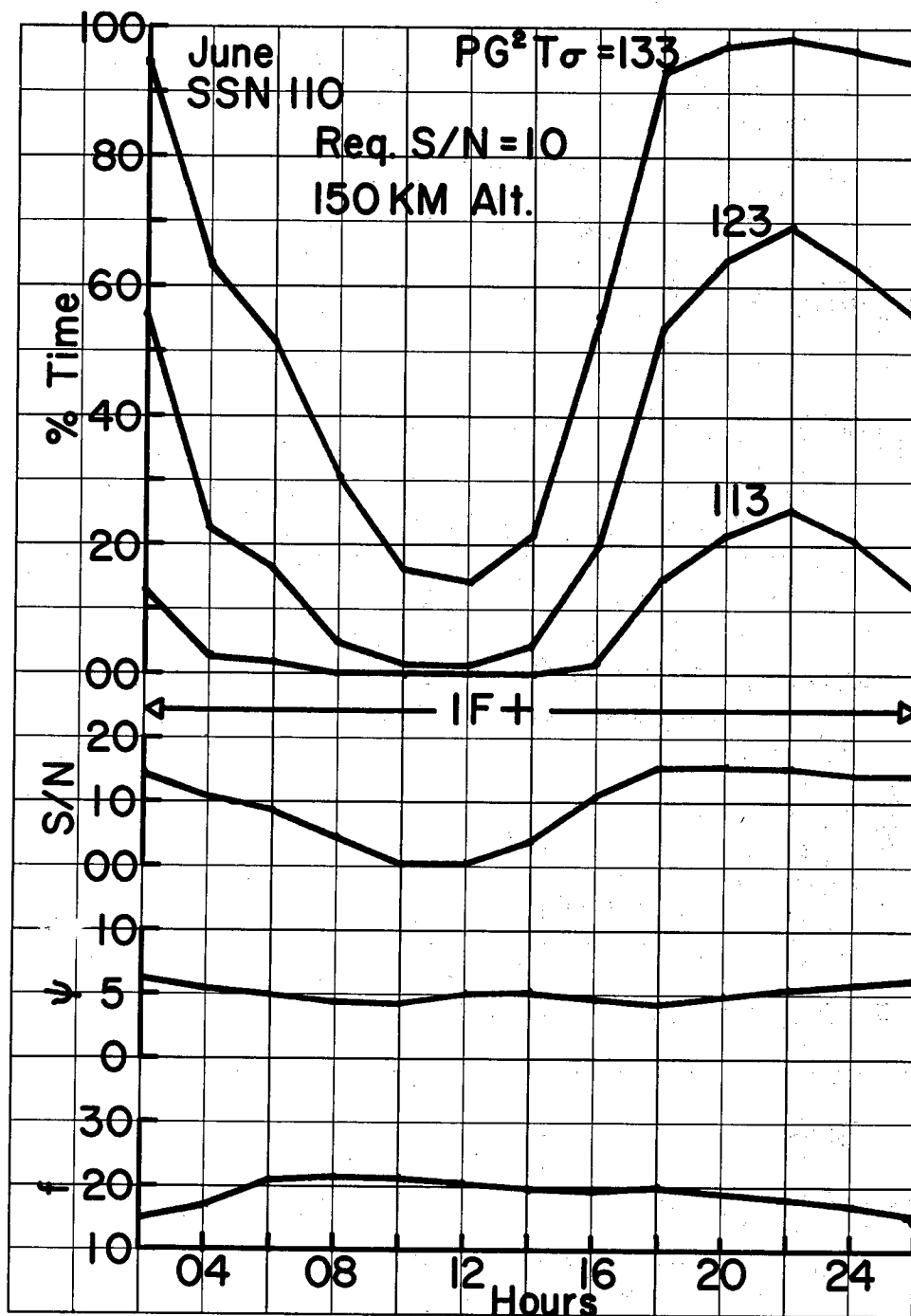


Fig. 5 - Percent time of effective operations for three values of PG^2T_σ , the median MUF (f) for the designated month in Mc/s, the signal-to-noise ratio (S/N) at the median MUF in db for $PG^2T_\sigma = 133$, the vertical launch angle (ϕ) in degrees for the median MUF path, and the transmission mode for the median MUF path are given versus local hour of day at the radar site.

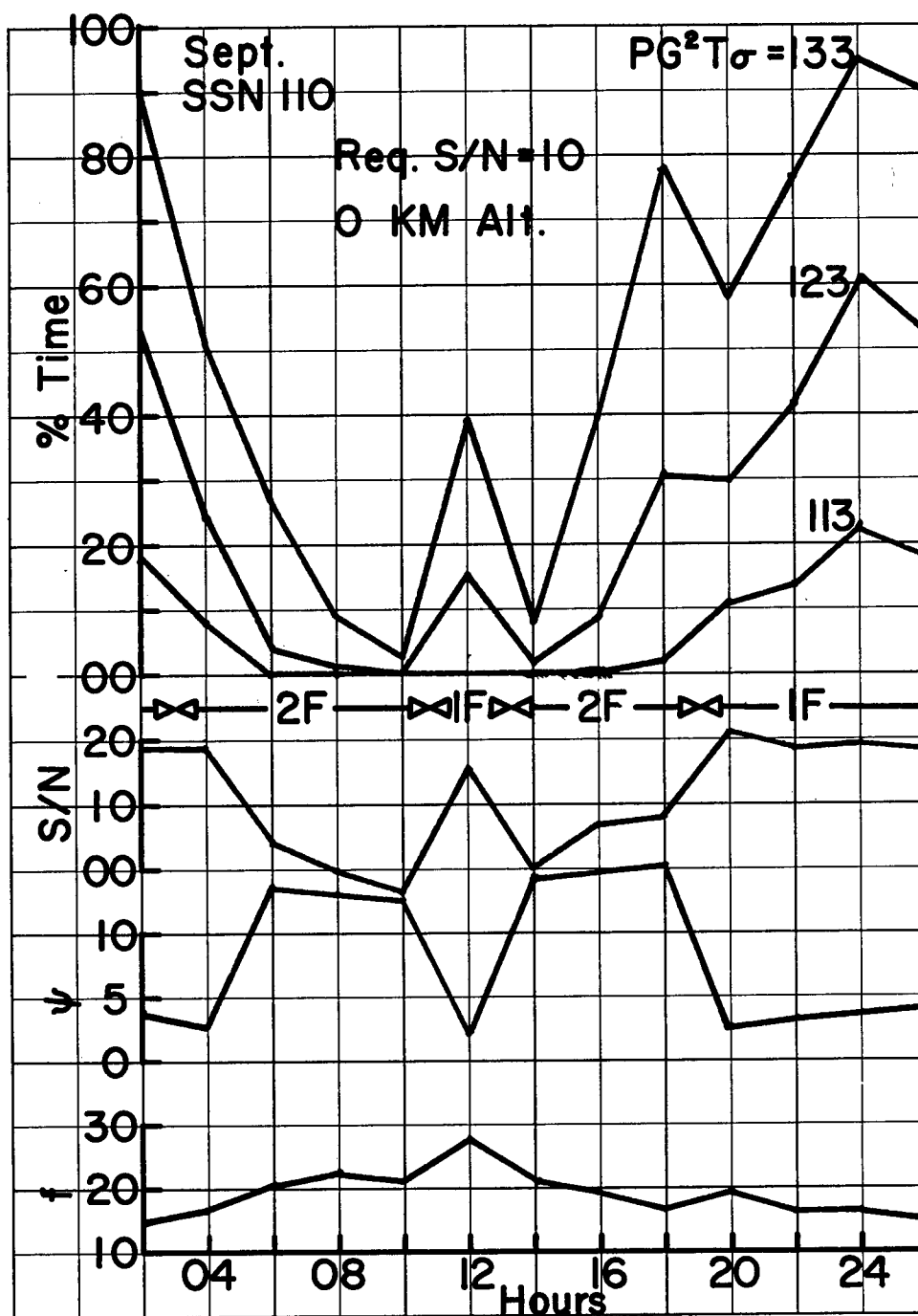


Fig. 6 - Percent time of effective operations for three values of $PG^2T\sigma$, the median MUF (f) for the designated month in Mc/s, the signal-to-noise ratio (S/N) at the median MUF in db for $PG^2T\sigma = 133$, the vertical launch angle (ϕ) in degrees for the median MUF path, and the transmission mode for the median MUF path are given versus local hour of day at the radar site.

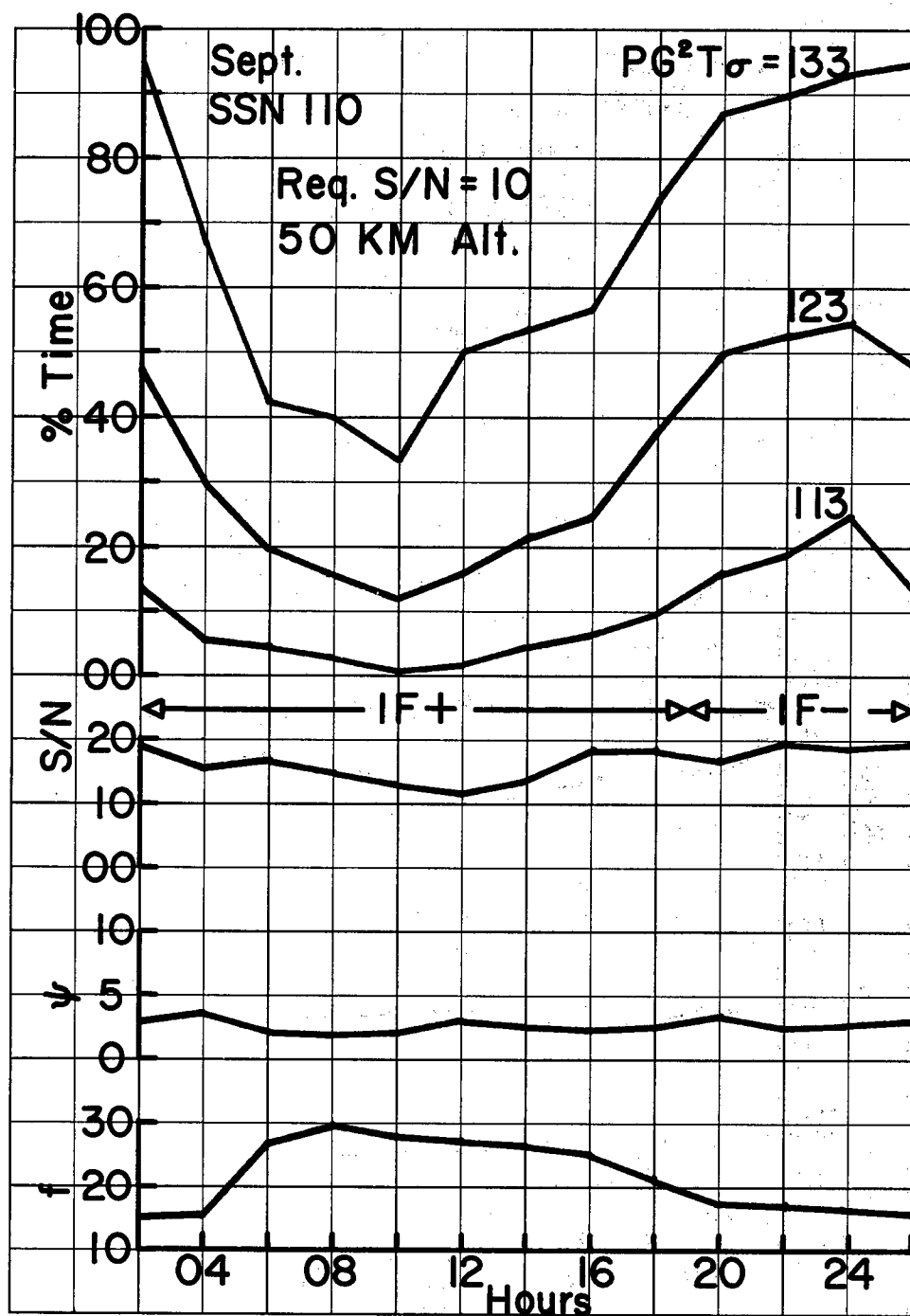


Fig. 7 - Percent time of effective operations for three values of PG^2T_σ , the median MUF (f) for the designated month in Mc/s, the signal-to-noise ratio (S/N) at the median MUF in db for $PG^2T_\sigma = 133$, the vertical launch angle (φ) in degrees for the median MUF path, and the transmission mode for the median MUF path are given versus local hour of day at the radar site.

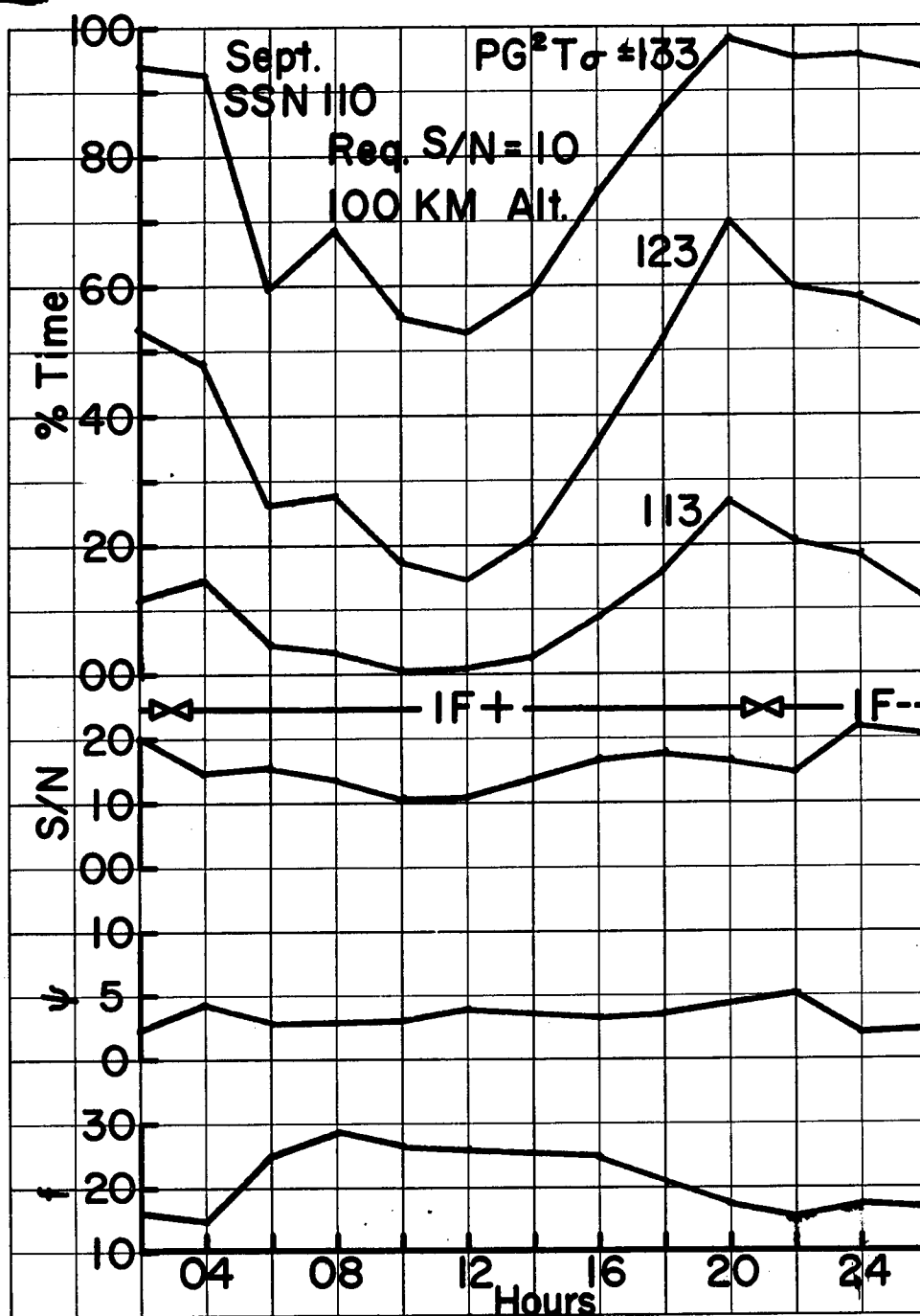


Fig. 8 - Percent time of effective operations for three values of PG^2T_σ , the median MUF (f) for the designated month in Mc/s, the signal-to-noise ratio (S/N) at the median MUF in db for $PG^2T_\sigma = 133$, the vertical launch angle (ϕ) in degrees for the median MUF path, and the transmission mode for the median MUF path are given versus local hour of day at the radar site.

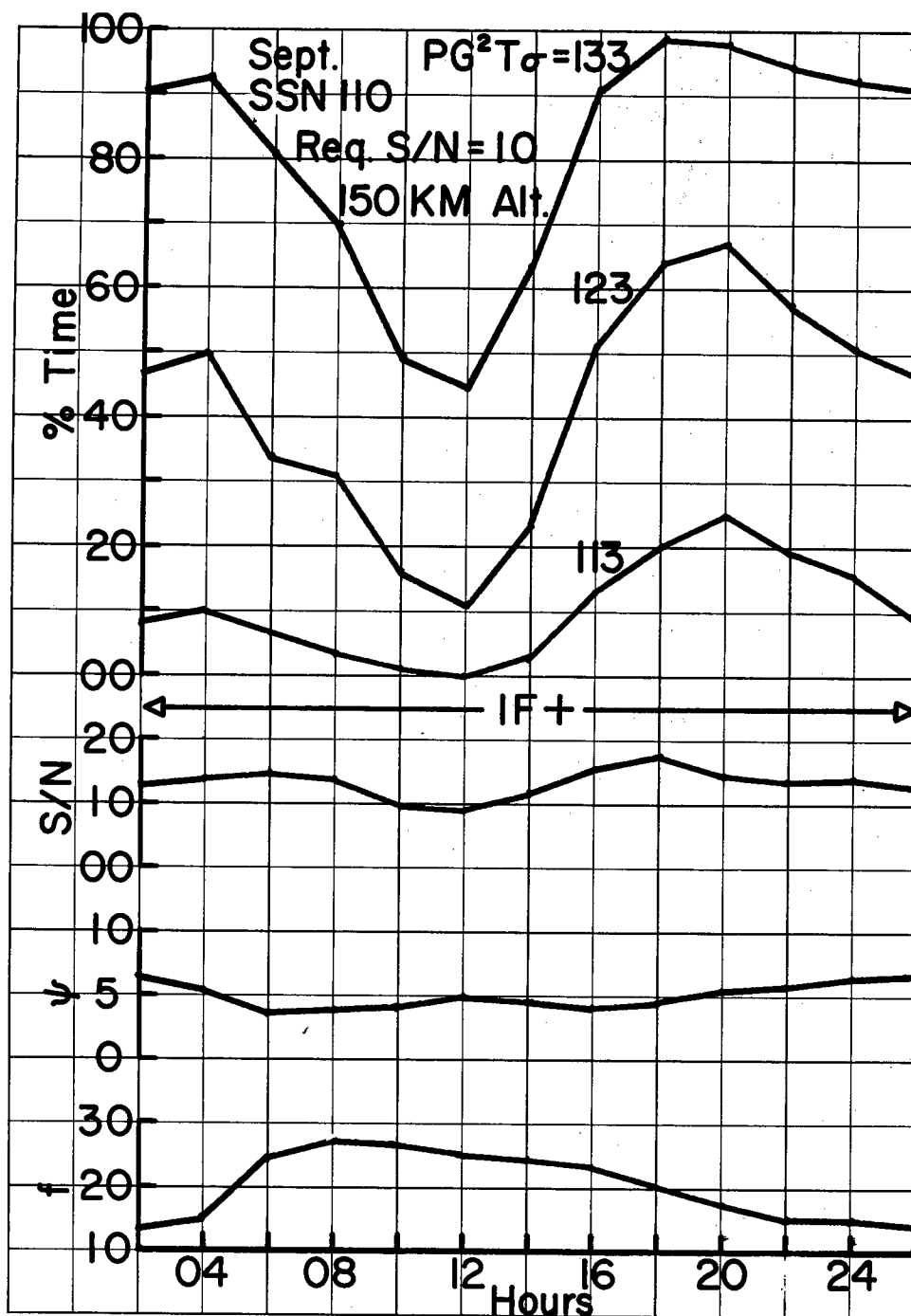


Fig. 9 - Percent time of effective operations for three values of PG^2T_σ , the median MUF (f) for the designated month in Mc/s, the signal-to-noise ratio (S/N) at the median MUF in db for $PG^2T_\sigma = 133$, the vertical launch angle (ϕ) in degrees for the median MUF path, and the transmission mode for the median MUF path are given versus local hour of day at the radar site.

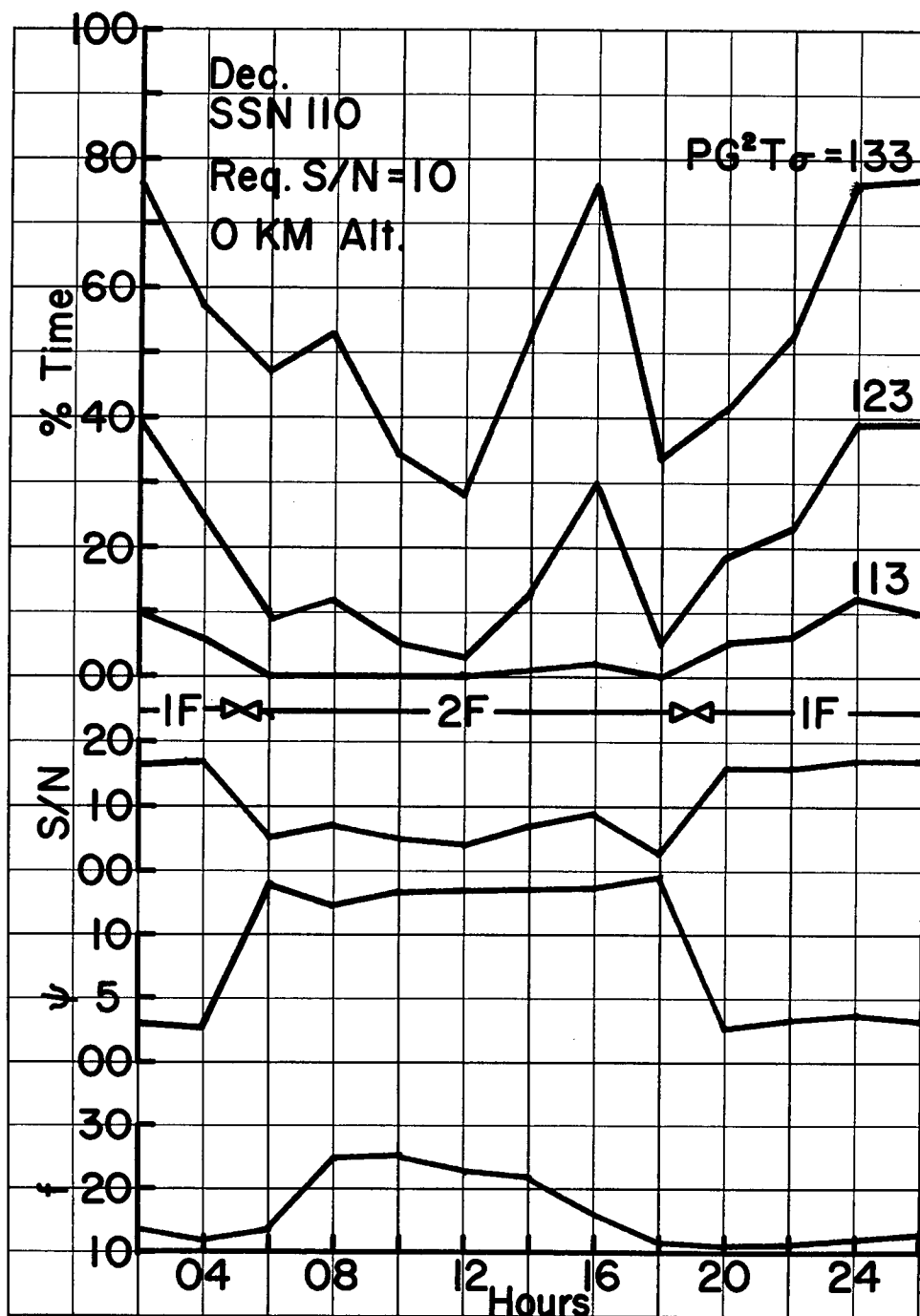


Fig. 10 - Percent time of effective operations for three values of PG^2T_σ , the median MUF (f) for the designated month in Mc/s, the signal-to-noise ratio (S/N) at the median MUF in db for $PG^2T_\sigma = 133$, the vertical launch angle (ϕ) in degrees for the median MUF path, and the transmission mode for the median MUF path are given versus local hour of day at the radar site.

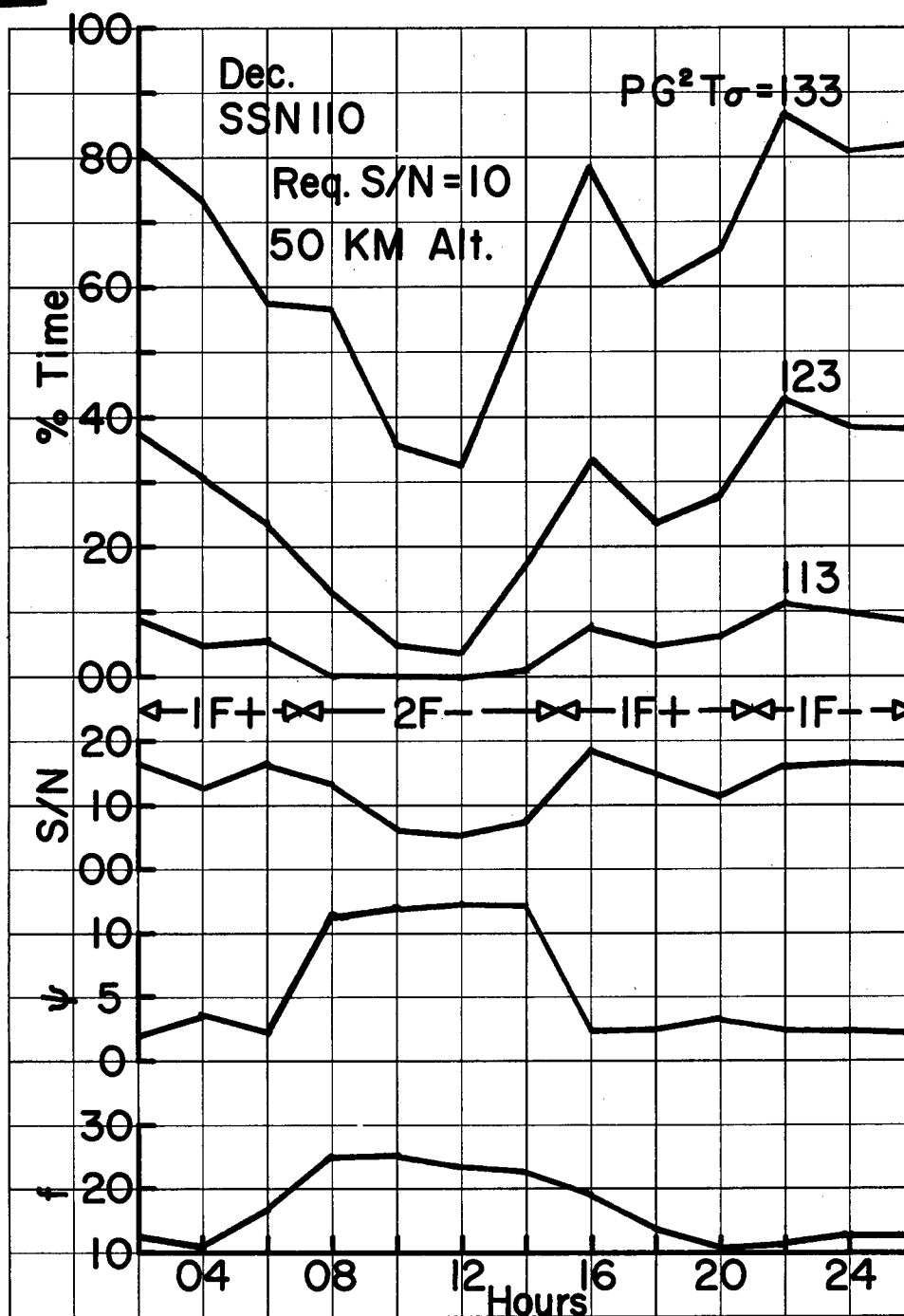


Fig. 11 - Percent time of effective operations for three values of $PG^2T\sigma$, the median MUF (f) for the designated month in Mc/s, the signal-to-noise ratio (S/N) at the median MUF in db for $PG^2T\sigma = 133$, the vertical launch angle (φ) in degrees for the median MUF path, and the transmission mode for the median MUF path are given versus local hour of day at the radar site.



Fig. 12 - Percent time of effective operations for three values of PG^2T_σ , the median MUF (f) for the designated month in Mc/s, the signal-to-noise ratio (S/N) at the median MUF in db for $PG^2T_\sigma = 133$, the vertical launch angle (ϕ) in degrees for the median MUF path, and the transmission mode for the median MUF path are given versus local hour of day at the radar site.

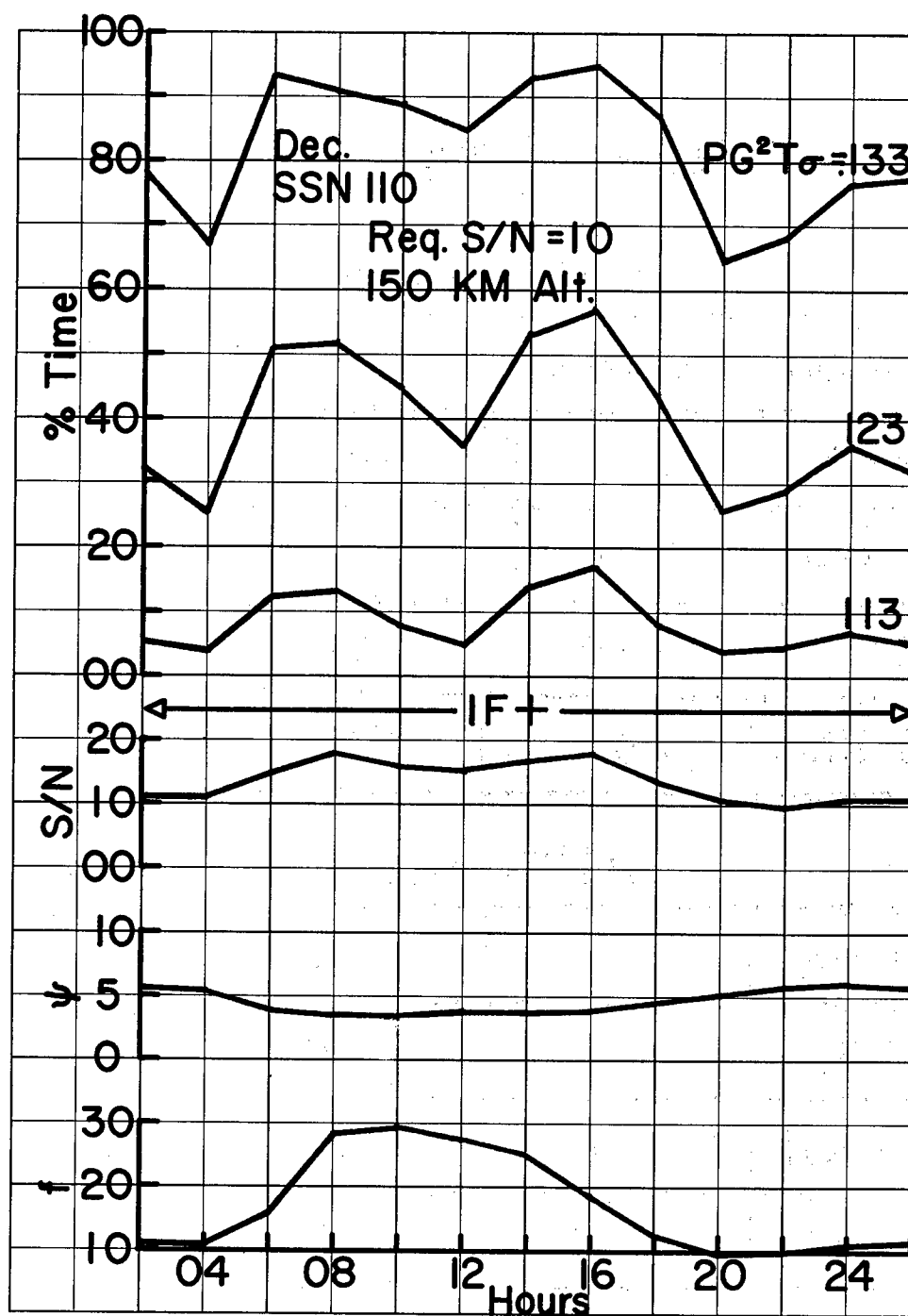


Fig. 13 - Percent time of effective operations for three values of $PG^2T\sigma$, the median MUF (f) for the designated month in Mc/s, the signal-to-noise ratio (S/N) at the median MUF in db for $PG^2T\sigma = 133$, the vertical launch angle (ϕ) in degrees for the median MUF path, and the transmission mode for the median MUF path are given versus local hour of day at the radar site.

Percent Time in Day

$$PG^2T_{\sigma} = 133$$

Target Alt.	June	Sept.	Dec
0 KM	48 (72)*	48	52
50 KM	59	65	64
100 KM	64	78	79
150 KM	61	80	82

$$PG^2T_{\sigma} = 113$$

0 KM	7	6	4
50 KM	8	9	5
100 KM	9	11	7
150 KM	9	10	9

*** All launch angles permitted.**

Fig. 14 - Effective operating time is given by daily average

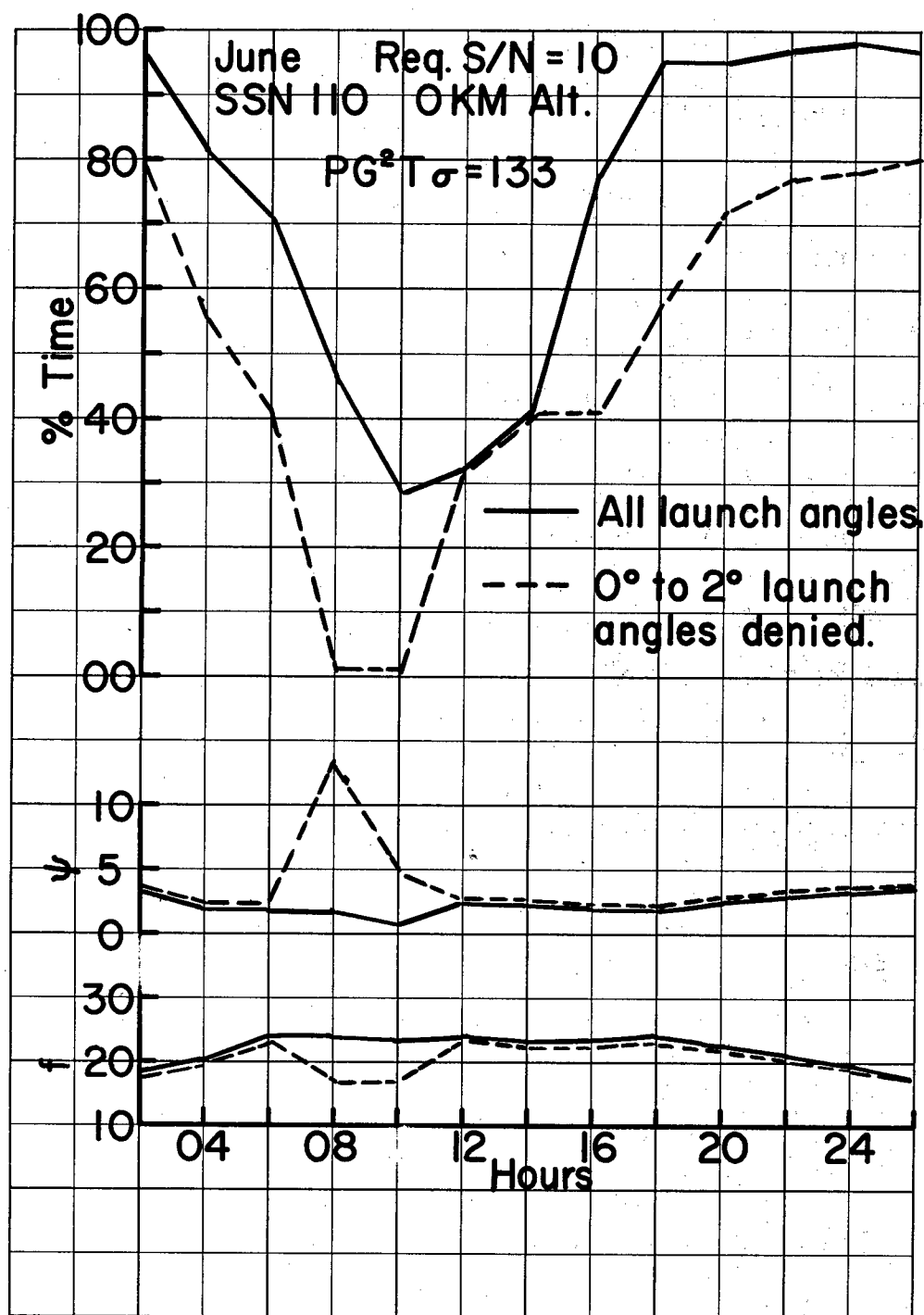


Fig. 15 - A comparison between the case where all launch angles are permitted and where the first two degrees are denied

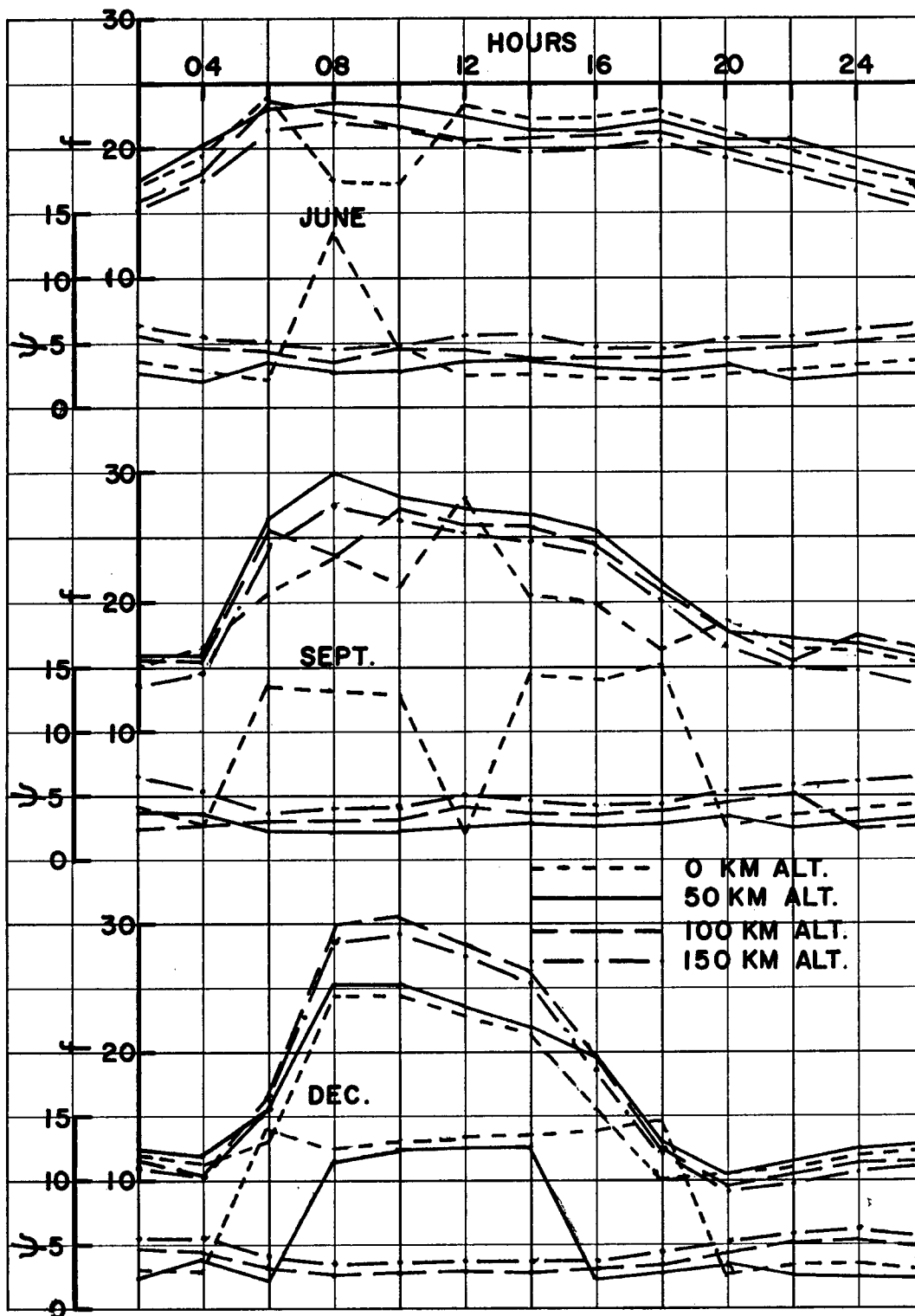


Fig. 16 - The median MUF and its launch angle are shown as combined plots for the altitudes considered

APPENDIX

Prediction Expalnation and Set of Tables

The problem brief will be stated. The predictions were computed for June, September, and December, sunspot number 110 using the following parameters:

- a. Height of target - (0, 50, 100, and 150 km)
- b. Gain of antenna - (25 db)
- c. Target radar area (SIGMA) - (1000 sq. meters)
This area was a computational convenience to go with the noise tabulation which was in power in a 1-cps band. The specified parameter in fact is the (radar area) (integration time) product which would be 1000 m²sec.
- d. 3 Mc/s man-made noise - (-148 dbw)
- e. Required signal-to-noise ratio - (10 db)
- f. Power - (200 kw)
- g. Minimum acceptable angle of takeoff and arrival - (2 degrees)

A description of the body of the print-out follows:

1. MUF: Monthly median Maximum Usable Frequency
2. MODE: The mode contributing most to the overall probability that at least one sky-wave path exists
3. ANGLE: The average takeoff and arrival angle associated with the above mode
4. C.PROB.: The overall probability that at least one mode is present to produce the quasi-minimum loss for the circuit
5. NOISE: The predominant noise (atmospheric, man-made or cosmic) (db < 1 watt in a 1-cps bandwidth)
6. FS.LOSS: The free space loss between isotropic radiators (two ways)
7. P.LOSS: The propagation losses two ways (ionospheric quasi-minimum and ground losses)
8. S/N.DB: The received signal power in the occupied bandwidth relative to the noise in a 1-cps bandwidth
9. S/N.PROB: The probability that the available signal-to-noise exceeds the required signal-to-noise considering only the fluctuation of the signal and noise (ionospheric probability of support not included)
10. T.REL.: The total combined reliability of the frequency complement

One set of computation results is shown in the following tables, those for PG²Tv = 133 db and a required output signal-to-noise ratio of 10 db.

An approximate manual solution for one hour will be given. The relation used is

$$\left[\frac{s}{n} \right] = \frac{PG^2T\sigma\lambda^2}{NL(4\pi)3R^4}$$

The computations were for $\sigma = 1000$ and $T = 1$, however any $\sigma T = 1000$ is valid, and the examples in the body of the report were taken as $\sigma = 50 \text{ m}^2$ and $T = 20 \text{ sec}$, since 50 m^2 is an appropriate estimate of the missile skin radar area and 20 sec is about all the signal processing time that can be effective. Since the free space spreading loss as given in the tables is $\text{FS.LOSS} = (4\pi R/\lambda)^4$, that is, the two-way spreading loss between two isotropes, the radar equation will be rearranged:

$$\left[\frac{s}{n} \right] = \frac{PG^2T\sigma}{NL} \left(\frac{\lambda}{4\pi R} \right)^4 \frac{4\pi}{\lambda^2}$$

or using db

$$\left[\frac{s}{n} \right]_{\text{db}} = 10 \log P + 20 \log G + 10 \log \sigma T - 10 \log N - 10 \log L - \text{FS.LOSS} \\ - 10 \log \frac{\lambda^2}{4\pi}$$

The specified parameters set

$$\begin{aligned} 10 \log P &= 53 \\ 20 \log G &= 50 \quad \text{and} \\ 10 \log \sigma T &= 30 \end{aligned}$$

Consider the case for June, 12 hours, and 0 km altitude at the MUF.

$$-10 \log N = 172 \text{ from the table}$$

As a matter of interest this happened to be the median noise level set by specifying a rural noise threshold.

$$10 \log L = 13 + 9$$

The 13 is taken from the table and is the quasi-minimum loss plus ground reflection loss where appropriate. The 9 is the excess system loss which though not printed out in the table was used in the computations. This excess system loss is the factor that randomly varies giving the fluctuating signal description. Its median value for the problem here under study remained approximately 9 db at all times.

FS.LOSS = 261 from the table

$$10 \log \frac{\lambda^2}{4\pi} \approx 12 \text{ at } 22.2 \text{ Mc/s}$$

So:

$$\begin{aligned} \left[\frac{s}{n} \right]_{\text{db}} &= 53 + 50 + 30 + 172 - 13 - 9 - 261 - 12 \\ &= 10 \text{ db} \end{aligned}$$

This is the value that the computer printed out in the table.

An example of determining Total Reliability (T.REL) or % Time of effectiveness will be given for the same time block that the above output signal-to-noise ratio was computed. By inspection the highest best frequency of the complement is 21 Mc/s, and the reliability at that frequency can be computed

$$\begin{aligned} R_1 &= (C \text{ PROB}) (S/N \text{ PROB}) \\ &= (0.63)(0.44) = 0.28 \end{aligned}$$

Another reliability is computed selecting the best case from frequencies more than 15% above that of R_1 . This turns out to be at 26 Mc/s.

$$R_2 = (0.12)(0.73) = 0.09$$

Similarly a reliability is computed for the best case among frequencies at least 15% below that of R_1 . This is for 17 Mc/s and gives

$$R_3 = (0.92)(0.19) = 0.18$$

It has been assumed that these reliabilities from frequencies 15% or more apart are independent thus

$$\begin{aligned} T.REL &= R_1 + R_2 + R_3 - R_1R_2 - R_2R_3 - R_3R_1 + R_1R_2R_3 \\ &= 0.28 + 0.09 + 0.18 - 0.02 - 0.02 - 0.05 + 0.0 \\ &= 0.46 \text{ or } 46\% \end{aligned}$$

This compares with the computer printout of 47%.

1 JUN SSN= 110 26.019
 TRANSMITTER TO 0 KM TARGET AZIMUTHS N.MILES
 35.00N - 33.00E 46.00N - 73.00E 57.5 264.3 1917.1
 SIGMA= 1000 SQ. METERS ANT= 25DB
 OFF AZIMUTH 0 DEG. MIN. ANGLE= 2 DEG. OFF AZIMUTH 0 DEG.
 PWR=200.00KW 3 MC/S MAN. NOISE = -148 DBW REQ.S/N= 10DB
 OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30		
2	19.5	1 F	2 E	2 F	2 F	2 F	2 F	2 F	2 F	-	1 F	1 F	1 F	-	MODE	
		30	32	145	125	126	134	140	171	-	26	29	29	-	ANGLE	
		50	99	99	99	97	88	67	29	-	56	24	5	-	C.PROB.	
		124	121	128	126	126	127	128	131	-	124	124	124	-	DELAY	
		170	148	154	158	161	163	165	167	-	170	171	172	-	NOISE	
		259	226	236	241	246	249	252	255	-	258	260	262	-	FS.LOSS	
		5	257	80	54	38	29	24	21	-	6	5	4	-	P. LOSS	
		17	-239	-62	-34	-17	-8	-2	0	-	17	18	19	-	S/N..DB	
		87	0	0	0	0	3	12	18	-	86	89	92	-	S/N..PROB.	
															56 =T.REL.	
4	23.9	1 F	2 E	2 E	2 E	2 E	2 E	2 F	2 F	2 F	2 F	2 F	2 F	1 F	1 F	MODE
		23	30	31	33	36	40	122	129	147	155	155	155	20	20	ANGLE
		50	99	99	99	99	99	90	76	54	34	18	8	35	14	C.PROB.
		123	120	121	121	121	121	126	127	128	129	129	129	123	123	DELAY
		173	148	154	158	161	163	165	167	169	170	171	172	174	175	NOISE
		262	226	235	240	245	249	252	255	257	259	261	262	264	266	FS.LOSS
		9	575	268	155	101	55	43	35	29	25	23	21	7	6	P. LOSS
		15	-557	-248	-134	-79	-34	-22	-13	-6	-2	0	1	17	19	S/N..DB
		78	0	0	0	0	0	0	1	5	11	15	21	85	90	S/N..PROB.
																42 =T.REL.
6	17.6	2 F	-	2 E	2 E	2 E	2 E	2 E	2 E	2 F	2 F	2 F	2 F	-	-	MODE
		136	-	31	32	33	35	38	44	129	139	139	139	-	-	ANGLE
		50	-	99	99	99	99	99	99	57	37	20	9	-	-	C.PROB.
		127	-	120	121	121	121	121	121	127	127	127	127	-	-	DELAY
		169	-	154	158	161	163	165	167	169	170	171	172	-	-	NOISE
		257	-	235	240	245	248	252	254	257	259	261	262	-	-	FS.LOSS
		37	-	402	232	151	106	60	49	40	34	29	26	-	-	P. LOSS
		-15	-	-382	-211	-130	-85	-39	-27	-17	-11	-6	-3	-	-	S/N..DB
		0	-	0	0	0	0	0	0	0	1	4	8	-	-	S/N..PROB.
																0 =T.REL.
8	17.2	2 E	-	2 E	2 E	2 E	2 E	2 E	2 E	2 E	2 F	2 F	2 F	-	-	MODE
		49	-	31	32	33	34	36	40	47	134	134	134	-	-	ANGLE
		99	-	99	99	99	99	99	99	99	30	14	5	-	-	C.PROB.
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		257	-	235	240	245	248	251	255	257	259	260	262	-	-	FS.LOSS
		44	-	471	272	177	125	93	56	45	38	33	30	-	-	P. LOSS
		-21	-	-452	-251	-156	-103	-70	-33	-22	-15	-10	-6	-	-	S/N..DB
		0	-	0	0	0	0	0	0	0	0	1	4	-	-	S/N..PROB.
																0 =T.REL.

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
10	23.2														
	1 F	- 2 E	2 E	2 E	2 E	2 E	2 E	2 E	2 F	1 F	2 F	1 F	-	-	MODE
	25	- 31	32	33	35	37	1	156	24	150	23	-	-	-	ANGLE
	50	- 99	99	99	99	99	99	43	82	9	52	-	-	-	C.PROB.
	123	- 120	121	121	121	121	121	129	123	128	123	-	-	-	DELAY
	172	- 154	158	161	163	165	167	169	170	171	172	-	-	-	NOISE
	262	- 235	240	245	248	252	255	257	258	261	262	-	-	-	FS.LOSS
	15	- 453	261	170	120	64	52	41	22	31	16	-	-	-	P. LOSS
	8	-433	-240	-149	-98	-43	-30	-18	0	-8	7	-	-	-	S/N..DB
	45	- 0	0	0	0	0	0	0	15	2	40	-	-	-	S/N..PROB.
															32 =T.REL.
12	22.2														
	1 F	2 E	2 E	2 E	2 E	2 E	2 E	2 F	1 F	2 F	1 F	1 F	1 F	-	MODE
	26	30	31	32	34	36	41	142	21	156	20	21	21	-	ANGLE
	50	99	99	99	99	99	99	62	92	9	63	40	12	-	C.PROB.
	124	120	120	121	121	121	121	128	123	129	123	123	123	-	DELAY
	172	148	154	158	161	163	165	167	169	170	171	172	174	-	NOISE
	261	226	235	240	245	249	252	255	256	259	260	262	264	-	FS.LOSS
	13	754	351	203	132	66	52	42	21	30	14	12	10	-	P. LOSS
	10	-736	-331	-182	-111	-45	-31	-20	1	-7	8	11	14	-	S/N..DB
	51	0	0	0	0	0	0	0	19	4	44	60	73	-	S/N..PROB.
															47 =T.REL.
14	22.2														
	1 F	2 E	2 E	2 E	2 F	2 F	2 F	2 F	2 F	2 F	-	-	-	-	MODE
	21	31	32	34	126	117	121	133	152	152	-	-	-	-	ANGLE
	50	99	99	99	99	98	89	68	37	13	-	-	-	-	C.PROB.
	123	120	121	121	126	126	126	127	129	129	-	-	-	-	DELAY
	172	148	154	157	159	162	165	167	169	170	-	-	-	-	NOISE
	261	226	235	241	246	249	252	255	257	259	-	-	-	-	FS.LOSS
	7	436	203	118	58	45	35	28	24	22	-	-	-	-	P. LOSS
	16	-418	-184	-98	-40	-25	-13	-6	-1	0	-	-	-	-	S/N..DB
	82	0	0	0	0	0	0	5	12	17	-	-	-	-	S/N..PROB.
															41 =T.REL.
16	22.9														
	1 F	2 E	2 F	2 F	2 F	2 F	2 F	2 F	2 F	2 F	-	-	-	-	MODE
	20	33	112	104	105	110	117	128	154	154	-	-	-	-	ANGLE
	50	99	99	99	99	99	97	82	48	16	-	-	-	-	C.PROB.
	123	121	125	125	125	125	126	127	129	129	-	-	-	-	DELAY
	172	146	151	154	158	162	165	167	169	170	-	-	-	-	NOISE
	261	226	235	241	245	249	252	255	257	259	-	-	-	-	FS.LOSS
	2	139	52	34	25	20	17	15	15	14	-	-	-	-	P. LOSS
	21	-122	-36	-17	-7	0	4	6	7	8	-	-	-	-	S/N..DB
	95	0	0	0	2	14	30	37	38	44	-	-	-	-	S/N..PROB.
															58 =T.REL.

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
18	2.4														
	1 F	2 F	2 F	2 F	2 F	2 F	2 F	2 F	2 F	-	1 F	1 F	-	-	MODE
	26	119	112	113	117	124	133	152	167	-	24	26	-	-	ANGLE
	50	99	99	99	99	99	91	63	25	-	55	27	-	-	C.PROB.
	124	126	125	125	126	126	127	129	130	-	123	124	-	-	DELAY
	171	143	149	153	158	163	165	167	169	-	171	172	-	-	NOISE
	260	227	235	241	246	249	252	255	257	-	260	262	-	-	FS.LOSS
	1	60	33	22	17	15	14	13	13	-	1	1	-	-	P. LOSS
	21	-48	-19	-7	0	5	7	8	8	-	21	22	-	-	S/N..DB
	96	0	0	3	16	32	42	45	43	-	95	97	-	-	S/N..PROB.
															72 =T.REL.
20	20.0														
	1 F	2 F	2 F	2 F	2 F	2 F	2 F	2 F	2 F	1 F	1 F	1 F	-	-	MODE
	30	125	119	121	126	134	148	173	173	24	30	30	-	-	ANGLE
	50	99	99	99	99	94	76	39	6	63	32	8	-	-	C.PROB.
	124	126	126	126	126	127	128	131	131	123	124	124	-	-	DELAY
	171	143	148	154	159	163	165	167	169	170	171	172	-	-	NOISE
	259	227	235	241	246	249	252	255	257	258	260	262	-	-	FS.LOSS
	2	59	32	22	17	15	14	14	13	2	1	1	-	-	P. LOSS
	21	-46	-19	-6	0	5	6	7	8	21	21	22	-	-	S/N..DB
	94	0	0	4	16	35	39	41	43	95	95	97	-	-	S/N..PROB.
															77 =T.REL.
22	18.4														
	1 F	2 F	2 F	2 F	2 F	2 F	2 F	2 F	1 F	1 F	1 F	-	-	-	MODE
	35	132	128	131	137	148	171	182	26	35	35	-	-	-	ANGLE
	50	99	99	99	98	87	57	13	69	39	10	-	-	-	C.PROB.
	124	127	126	127	127	128	131	132	124	124	124	-	-	-	DELAY
	170	148	152	156	161	163	165	167	169	170	171	-	-	-	NOISE
	258	227	235	241	246	249	253	255	256	258	260	-	-	-	FS.LOSS
	2	57	32	22	17	15	15	14	2	2	1	-	-	-	P. LOSS
	21	-40	-15	-4	2	4	5	6	20	21	21	-	-	-	S/N..DB
	94	0	0	7	22	32	35	38	93	95	95	-	-	-	S/N..PROB.
															78 =T.REL.
24	17.2														
	1 F	2 F	2 F	2 F	2 F	2 F	2 F	1 F	1 F	1 F	-	-	-	-	MODE
	37	134	130	134	142	158	185	23	35	37	-	-	-	-	ANGLE
	50	99	99	99	93	72	32	75	52	17	-	-	-	-	C.PROB.
	124	127	127	127	128	129	132	123	124	124	-	-	-	-	DELAY
	169	148	154	158	161	163	165	167	169	170	-	-	-	-	NOISE
	257	227	236	241	246	250	253	254	256	258	-	-	-	-	FS.LOSS
	2	57	32	22	18	16	15	3	2	2	-	-	-	-	P. LOSS
	20	-40	-13	-2	2	4	5	19	20	21	-	-	-	-	S/N..DB
	93	0	1	11	23	30	34	92	93	95	-	-	-	-	S/N..PROB.
															80 =T.REL.

6 JUN SSN= 110 26.019
 TRANSMITTER TO 50 KM TARGET AZIMUTHS N.MILES
 35.00N - 33.00E 46.00N 73.00E 57.5 264.3 1917.1
 SIGMA= 1000 SQ. METERS ANT= 25DB
 OFF AZIMUTH 0 DEG. MIN. ANGLE= 2 DEG. OFF AZIMUTH 0 DEG.
 PWR=200.00KW 3 MC/S MAN. NOISE = -148 DBW REQ.S/N= 10DB

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
2	20.2														
1F+	2E-	2F+	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	1F+	-	-	-	MODE
20	24	152	110	110	124	137	21	27	38	38	-	-	-	-	ANGLE
50	99	99	99	99	90	71	66	70	47	15	-	-	-	-	C.PROB.
123	120	129	126	126	126	127	123	124	124	124	-	-	-	-	DELAY
171	148	154	158	161	163	165	167	169	170	171	-	-	-	-	NOISE
259	226	236	241	246	249	252	254	256	258	260	-	-	-	-	FS.LOSS
5	255	87	55	38	29	24	11	9	9	8	-	-	-	-	P. LOSS
18	-237	-69	-35	-18	-8	-2	11	13	14	15	-	-	-	-	S/N..DB
88	0	0	0	0	3	12	59	57	74	79	-	-	-	-	S/N..PROB.
															70 =T.REL.
4	23.1														
1F+	2E-	2E-	2E-	2E-	2E-	2E-	2E-	1F+	2F-	2F-	1F+	1F+	1F+	1F+	MODE
33	23	23	25	27	30	37	20	132	146	23	32	30	30	30	ANGLE
50	99	99	99	99	99	99	96	59	39	68	51	29	10	10	C.PROB.
124	120	120	120	120	120	121	123	127	128	123	124	124	124	124	DELAY
172	148	154	158	161	163	165	167	169	170	171	172	174	175	175	NOISE
262	226	235	241	245	249	252	254	257	259	260	262	264	266	266	FS.LOSS
12	565	265	155	102	56	44	22	29	25	13	12	10	8	8	P. LOSS
11	-547	-245	-134	-81	-35	-23	0	-6	-2	10	11	14	17	17	S/N..DB
60	0	0	0	0	0	0	18	5	11	53	60	73	84	84	S/N..PROB.
															59 =T.REL.
6	23.5														
1F+	-	2E-	2E-	2E-	2E-	2E-	2E-	2F-	2F-	2F-	1F+	1F+	1F+	1F+	MODE
27	-	23	24	25	27	29	33	116	129	129	25	22	22	22	ANGLE
50	-	99	99	99	99	99	99	63	42	25	54	33	12	12	C.PROB.
124	-	120	120	120	120	120	121	125	127	127	123	123	123	123	DELAY
173	-	154	158	161	163	165	167	169	170	171	172	174	175	175	NOISE
262	-	235	241	245	248	252	254	257	259	260	262	264	266	266	FS.LOSS
15	-	396	230	151	108	61	50	41	34	30	16	13	10	10	P. LOSS
8	-	-376	-209	-130	-86	-40	-28	-18	-11	-7	7	11	14	14	S/N..DB
41	-	0	0	0	0	0	0	0	1	3	40	57	72	72	S/N..PROB.
															29 =T.REL.
8	23.1														
1F+	-	2E-	2E-	2E-	2E-	2E-	2E-	2E-	2F-	1F+	1F+	-	-	-	MODE
27	-	23	23	24	26	28	30	34	124	22	27	-	-	-	ANGLE
50	-	99	99	99	99	99	99	99	36	68	51	-	-	-	C.PROB.
124	-	120	120	120	120	120	120	121	126	123	124	-	-	-	DELAY
172	-	154	158	161	163	165	167	169	170	171	172	-	-	-	NOISE
262	-	235	241	245	248	252	254	257	259	260	262	-	-	-	FS.LOSS
18	-	464	269	177	126	75	57	47	39	21	18	-	-	-	P. LOSS
5	-	-444	-249	-155	-104	-54	-35	-23	-16	2	5	-	-	-	S/N..DB
33	-	0	0	0	0	0	0	0	0	22	32	-	-	-	S/N..PROB.
															16 =T.REL.

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
10	22.4														
	1F+	-	2E-	2E-	2E-	2E-	2E-	2E-	2E-	1F+	1F+	1F+	1F+	1F+	MODE
	35	-	23	24	25	26	28	31	37	31	30	27	27	27	ANGLE
	50	-	99	99	99	99	99	99	99	78	62	45	22	5	C.PROB.
	124	-	120	120	120	120	120	120	121	124	124	124	124	124	DELAY
	172	-	154	158	161	163	165	167	169	170	171	172	174	175	NOISE
	261	-	235	241	245	248	252	255	257	258	260	262	264	266	FS.LOSS
	19	-	446	259	170	121	65	53	43	24	21	18	14	12	P. LOSS
	4	-	426	238	148	-99	-44	-31	-20	-1	2	5	9	13	S/N..DB
	27	-	0	0	0	0	0	0	0	11	22	32	46	67	S/N..PROB.
														24	T.REL.
12	21.4														
	1F+	2E-	2E-	2E-	2E-	2E-	2E-	2E-	1F+	1F+	1F+	1F+	1F+	1F+	MODE
	36	22	23	24	25	28	31	37	29	27	33	30	30	30	ANGLE
	50	99	99	99	99	99	99	99	89	75	54	30	7	7	C.PROB.
	124	120	120	120	120	120	120	121	124	124	124	124	124	124	DELAY
	171	148	154	158	161	163	165	167	169	170	171	172	174	174	NOISE
	260	226	235	241	245	249	252	255	256	258	260	262	264	264	FS.LOSS
	16	740	346	201	133	66	54	43	23	19	17	14	12	12	P. LOSS
	6	-722	-327	-181	-111	-46	-32	-21	-0	3	6	9	12	12	S/N..DB
	38	0	0	0	0	0	0	0	14	26	37	49	63	63	S/N..PROB.
															34 T.REL.
14	21.4														
	1F+	2E-	2E-	2E-	2F-	2E-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	1F+	MODE
	30	23	24	26	122	35	112	121	143	143	28	28	28	28	ANGLE
	50	99	99	99	99	99	91	73	45	18	55	31	7	7	C.PROB.
	124	120	120	120	126	121	125	126	128	128	124	124	124	124	DELAY
	171	148	154	157	159	162	165	167	169	170	171	172	174	174	NOISE
	260	226	235	241	246	249	252	254	257	259	260	262	264	264	FS.LOSS
	10	429	202	119	59	46	36	29	24	22	10	9	8	8	P. LOSS
	12	-411	-182	-99	-40	-25	-14	-7	-1	0	12	14	16	16	S/N..DB
	66	0	0	0	0	0	0	4	12	17	65	75	82	82	S/N..PROB.
															44 T.REL.
16	22.1														
	1F+	2E-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	1F+	MODE
	29	25	107	97	98	101	107	117	137	146	23	29	29	29	ANGLE
	50	99	99	99	99	99	98	87	57	23	65	37	8	8	C.PROB.
	124	120	125	124	124	124	125	126	127	128	123	124	124	124	DELAY
	172	146	151	154	158	162	165	167	169	170	171	172	174	174	NOISE
	261	226	235	241	245	249	252	254	257	259	260	262	264	264	FS.LOSS
	5	139	53	35	25	20	17	15	14	14	5	5	4	4	P. LOSS
	18	-123	-37	-17	-7	0	4	7	8	8	18	18	20	20	S/N..DB
	88	0	0	0	2	14	30	40	42	44	89	90	93	93	S/N..PROB.
															75 T.REL.

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
18	20.6														
	1F+	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	-	-	MODE
	35	113	105	106	109	115	124	139	158	26	35	35	-	-	ANGLE
	50	99	99	99	99	99	94	70	32	74	44	18	-	-	C.PROB.
	124	125	125	125	125	125	126	127	129	124	124	124	-	-	DELAY
	171	143	149	153	158	163	165	167	169	170	171	172	-	-	NOISE
	260	226	235	241	245	249	252	255	257	258	260	262	-	-	FS.LOSS
	4	61	33	22	17	15	13	13	13	4	4	4	-	-	P. LOSS
	18	-49	-19	-7	0	6	7	8	9	19	18	19	-	-	S/N..DB
	89	0	0	3	16	36	42	45	46	91	89	92	-	-	S/N..PROB.
															85 =T.REL.
20	20.7														
	1F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F-	1F-	-	-	MODE
	21	119	112	114	118	125	137	165	26	36	21	21	-	-	ANGLE
	50	99	99	99	99	95	80	49	78	54	45	16	-	-	C.PROB.
	123	126	125	125	126	126	127	130	124	124	123	123	-	-	DELAY
	171	143	148	154	159	163	165	167	169	170	171	172	-	-	NOISE
	260	227	235	241	246	249	252	255	256	258	260	262	-	-	FS.LOSS
	2	60	33	22	17	15	14	14	4	5	1	1	-	-	P. LOSS
	21	-48	-20	-6	1	5	7	7	18	18	21	22	-	-	S/N..DB
	95	0	0	4	19	35	42	41	88	89	95	97	-	-	S/N..PROB.
															89 =T.REL.
22	19.1														
	1F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	1F-	1F-	-	-	-	-	MODE
	26	126	120	123	129	139	22	28	37	25	26	-	-	-	ANGLE
	50	99	99	99	99	90	96	84	62	51	18	-	-	-	C.PROB.
	124	126	126	126	127	127	123	124	124	123	124	-	-	-	DELAY
	170	148	152	156	161	163	165	167	169	170	171	-	-	-	NOISE
	258	227	235	241	246	249	252	254	256	258	260	-	-	-	FS.LOSS
	2	59	32	22	17	15	5	5	5	2	1	-	-	-	P. LOSS
	21	-41	-15	-4	2	5	16	17	17	21	21	-	-	-	S/N..DB
	95	0	0	7	22	35	84	86	85	95	95	-	-	-	S/N..PROB.
															97 =T.REL.
24	17.8														
	1F-	2F-	2F-	2F-	1F+	1F+	1F+	1F-	1F-	-	-	-	-	-	MODE
	28	127	122	126	134	21	26	34	22	28	-	-	-	-	ANGLE
	50	99	99	99	94	96	88	70	59	27	-	-	-	-	C.PROB.
	124	126	126	126	127	123	124	124	123	124	-	-	-	-	DELAY
	169	148	154	158	161	163	165	167	169	170	-	-	-	-	NOISE
	257	227	235	241	246	249	252	254	256	258	-	-	-	-	FS.LOSS
	2	59	32	22	17	7	6	5	2	2	-	-	-	-	P. LOSS
	20	-41	-13	-2	2	14	15	16	20	21	-	-	-	-	S/N..DB
	94	0	1	11	23	76	80	83	93	95	-	-	-	-	S/N..PROB.
															94 =T.REL.

11 JUN SSN= 110 26.019
 TRANSMITTER TO 100KM TARGET AZIMUTHS N.MILES
 35.00N - 33.00E 46.00N - 73.00E 57.5 264.3 1917.1
 SIGMA= 1000 SQ. METERS ANT= 25DB
 OFF AZIMUTH 0 DEG. MIN. ANGLE= 2 DEG. OFF AZIMUTH 0 DEG.
 PWR=200.00KW 3 MC/S MAN. NOISE = -148 DBW REQ.S/N= 10DB

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
2	18.2														
	1F+	2E+	2F+	2F-	1F+	1F+	1F+	1F+	1F+	1F+	1F+	-	-	-	MODE
	47	48	154	111	24	23	25	30	38	46	46	-	-	-	ANGLE
	50	99	99	99	99	98	94	83	64	35	8	-	-	-	C.PROB.
	125	121	129	125	123	123	123	124	124	125	125	-	-	-	DELAY
	169	148	154	158	161	163	165	167	169	170	171	-	-	-	NOISE
	258	226	236	241	245	249	252	254	256	258	260	-	-	-	FS.LOSS
	10	309	87	44	25	18	14	11	10	9	9	-	-	-	P. LOSS
	12	-291	-68	-24	-3	3	7	10	12	13	14	-	-	-	S/N..DB
	66	0	0	0	9	27	41	53	62	69	75	-	-	-	S/N..PROB.
															70 =T.REL.
4	22.3														
	1F+	2E+	2E+	2E+	2F+	2E-	2E-	1F+	1F+	1F+	1F+	1F+	1F+	1F+	MODE
	42	46	47	50	152	21	25	28	25	28	35	39	39	39	ANGLE
	50	99	99	99	99	99	99	95	89	78	62	45	24	7	C.PROB.
	125	121	121	121	129	120	120	124	123	124	124	125	125	125	DELAY
	172	148	154	158	161	163	165	167	169	170	171	172	174	175	NOISE
	261	226	235	241	246	249	252	254	256	258	260	262	264	266	FS.LOSS
	13	688	322	187	78	45	36	22	18	15	13	12	10	8	P. LOSS
	10	-670	-302	-167	-57	-24	-14	0	4	7	9	11	14	16	S/N..DB
	52	0	0	0	0	0	0	15	28	40	48	60	73	81	S/N..PROB.
															58 =T.REL.
6	22.7														
	1F+	-	2E+	2E+	2E+	2E+	2E-	2E-	1F+	1F+	1F+	1F+	1F+	1F+	MODE
	37	-	47	48	50	53	58	22	27	28	30	31	31	31	ANGLE
	50	-	99	99	99	99	99	99	99	80	65	48	27	9	C.PROB.
	124	-	121	121	121	122	122	120	120	124	124	124	124	124	DELAY
	172	-	154	158	161	163	165	167	169	170	171	172	174	175	NOISE
	261	-	235	241	245	248	252	254	256	258	260	262	264	266	FS.LOSS
	17	-	481	279	183	130	49	41	34	22	19	16	13	11	P. LOSS
	6	-	-462	-259	-162	-108	-27	-18	-10	1	4	7	10	14	S/N..DB
	36	-	0	0	0	0	0	0	1	18	28	40	51	72	S/N..PROB.
															36 =T.REL.
8	22.3														
	1F+	-	2E+	2E+	2E+	2E+	2E-	2E-	2E-	1F+	1F+	1F+	1F+	1F+	MODE
	38	-	46	47	49	51	55	21	23	28	33	29	29	29	ANGLE
	50	-	99	99	99	99	99	99	99	99	62	44	22	5	C.PROB.
	124	-	121	121	121	122	122	120	120	120	124	124	124	124	DELAY
	172	-	154	158	161	163	165	167	169	170	171	172	174	175	NOISE
	261	-	235	241	245	248	252	254	256	258	260	262	264	266	FS.LOSS
	20	-	564	327	214	152	75	45	38	25	21	18	15	12	P. LOSS
	3	-	-545	-306	-193	-130	-54	-23	-15	-2	1	4	9	12	S/N..DB
	24	-	0	0	0	0	0	0	0	9	19	29	46	61	S/N..PROB.
															24 =T.REL.

		OPERATING FREQUENCIES														
GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30		
10	21.6															
	1F+	-	2E+	2E+	2E+	2E+	2E+	2E-	2E-	1F+	1F+	1F+	1F+	-	MODE	
	45	-	47	48	49	52	56	21	25	40	42	37	37	-	ANGLE	
	50	-	99	99	99	99	99	99	99	73	56	38	17	-	C.PROB.	
	125	-	121	121	121	122	122	120	120	125	125	124	124	-	DELAY	
	171	-	154	158	161	163	165	167	169	170	171	172	174	-	NOISE	
	261	-	235	241	245	248	252	254	257	258	260	262	264	-	FS.LOSS	
	20	-	542	314	206	146	52	43	35	24	21	18	15	-	P. LOSS	
	3	-	522	293	184	124	30	21	12	1	2	5	9	-	S/N..DB	
	23	-	0	0	0	0	0	0	0	11	22	32	46	-	S/N..PROB.	
														20	T.REL.	
12	20.6															
	1F+	-	2E+	2E+	2E+	2E+	2E-	2E-	1F+	1F+	1F+	1F+	-	-	MODE	
	45	-	47	48	51	55	21	25	37	37	39	39	-	-	ANGLE	
	50	-	99	99	99	99	99	99	66	69	45	22	-	-	C.PROB.	
	125	-	121	121	122	122	120	120	124	124	125	125	-	-	DELAY	
	171	-	154	158	161	163	165	167	169	170	171	172	-	-	NOISE	
	260	-	235	241	245	249	252	254	256	258	260	262	-	-	FS.LOSS	
	17	-	421	244	160	74	43	35	23	20	17	15	-	-	P. LOSS	
	5	-	401	224	139	53	21	13	0	3	6	8	-	-	S/N..DB	
	33	-	0	0	0	0	0	1	14	26	37	45	-	-	S/N..PROB.	
														28	T.REL.	
14	20.7															
	1F+	2E+	2E+	2E+	2F-	2E-	1F+	1F+	1F+	1F+	1F+	1F+	-	-	MODE	
	39	46	48	51	119	24	26	22	24	30	37	37	-	-	ANGLE	
	50	99	99	99	99	99	99	95	86	69	46	22	-	-	C.PROB.	
	125	121	121	122	125	120	124	123	123	124	124	124	-	-	DELAY	
	171	148	154	157	159	162	165	167	169	170	171	172	-	-	NOISE	
	260	226	235	241	246	249	252	254	256	258	260	262	-	-	FS.LOSS	
	11	522	245	143	47	37	22	17	14	12	11	10	-	-	P. LOSS	
	11	504	226	124	28	16	0	4	8	10	12	13	-	-	S/N..DB	
	58	0	0	0	0	0	12	30	42	52	65	71	-	-	S/N..PROB.	
														62	T.REL.	
16	21.3															
	1F+	2E+	2F-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	-	-	MODE	
	38	50	101	89	90	93	98	107	122	26	36	38	-	-	ANGLE	
	50	99	99	99	99	99	99	91	66	81	55	26	-	-	C.PROB.	
	124	121	124	123	123	124	124	124	126	124	124	124	-	-	DELAY	
	171	146	151	154	158	162	165	167	169	170	171	172	-	-	NOISE	
	260	226	235	241	245	249	252	254	257	258	260	262	-	-	FS.LOSS	
	6	168	42	28	21	16	14	13	12	5	5	5	-	-	P. LOSS	
	17	152	26	11	2	3	7	9	10	17	17	18	-	-	S/N..DB	
	87	0	0	0	8	23	41	48	50	86	87	90	-	-	S/N..PROB.	
														88	T.REL.	

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
18	19.9														
	1F+	2F-	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	1F+	1F+	-	-	MODE
	44	107	97	98	101	106	114	23	29	37	44	44	-	-	ANGLE
	50	99	99	99	99	99	96	98	88	65	33	11	-	-	C.PROB.
	125	125	124	124	124	124	125	123	124	124	125	125	-	-	DELAY
	171	143	149	153	158	163	165	167	169	170	171	172	-	-	NOISE
	259	226	235	241	245	249	252	254	256	258	260	262	-	-	FS.LOSS
	5	49	27	19	15	13	12	5	5	5	5	5	-	-	P. LOSS
	18	-36	-13	-3	2	8	9	17	18	18	18	18	-	-	S/N..DB
	88	0	0	8	22	44	49	86	88	89	89	90	-	-	S/N..PROB.
															97 T.REL.
20	18.7														
	1F+	2F-	2F-	2F-	2F-	1F+	1F+	1F+	1F+	1F+	1F+	-	-	-	MODE
	48	113	104	106	110	21	24	29	36	47	47	-	-	-	ANGLE
	50	99	99	99	99	99	97	90	72	44	13	-	-	-	C.PROB.
	125	125	124	124	125	123	123	124	124	125	125	-	-	-	DELAY
	170	143	148	154	159	163	165	167	169	170	171	-	-	-	NOISE
	258	226	235	241	245	249	252	254	256	258	260	-	-	-	FS.LOSS
	6	48	27	19	15	7	6	5	5	5	5	-	-	-	P. LOSS
	17	-35	-13	-2	3	14	15	17	17	17	17	-	-	-	S/N..DB
	85	0	1	9	25	76	80	86	85	86	87	-	-	-	S/N..PROB.
															99 T.REL.
22	17.2														
	1F+	2F-	1F+	1F+	1F+	1F+	1F+	1F+	1F+	1F+	-	-	-	-	MODE
	52	120	23	22	23	26	31	37	49	52	-	-	-	-	ANGLE
	50	99	99	99	99	99	94	80	54	18	-	-	-	-	C.PROB.
	126	126	123	123	123	124	124	124	125	126	-	-	-	-	DELAY
	169	148	152	156	161	163	165	167	169	170	-	-	-	-	NOISE
	257	226	235	241	245	249	252	254	257	259	-	-	-	-	FS.LOSS
	6	47	20	12	9	7	6	6	6	6	-	-	-	-	P. LOSS
	16	-29	-3	5	11	13	15	16	16	17	-	-	-	-	S/N..DB
	82	0	10	32	58	71	80	83	81	86	-	-	-	-	S/N..PROB.
															98 T.REL.
24	16.1														
	1F+	2F-	1F+	1F+	1F+	1F+	1F+	1F+	1F+	-	-	-	-	-	MODE
	54	121	24	23	25	29	35	45	54	-	-	-	-	-	ANGLE
	50	99	99	99	99	95	85	64	30	-	-	-	-	-	C.PROB.
	126	126	123	123	123	124	124	125	126	-	-	-	-	-	DELAY
	168	148	154	158	161	163	165	167	169	-	-	-	-	-	NOISE
	256	226	235	241	245	249	252	254	257	-	-	-	-	-	FS.LOSS
	6	47	20	12	9	7	6	6	6	-	-	-	-	-	P. LOSS
	15	-29	-1	7	11	13	15	15	16	-	-	-	-	-	S/N..DB
	78	0	12	39	58	71	80	79	81	-	-	-	-	-	S/N..PROB.
															96 T.REL.

16 JUN SSN= 110 26.019
 TRANSMITTER TO 150KM TARGET AZIMUTHS N.MILES
 35.00N - 33.00E 46.00N - 73.00E 57.5 264.3 1917.1
 SIGMA= 1000 SQ. METERS ANT= 25DB
 OFF AZIMUTH 0 DEG. MIN. ANGLE= 2 DEG. OFF AZIMUTH 0 DEG.
 PWR=200.00KW 3 MC/S MAN. NOISE = -148 DBW REQ.S/N= 10DB
 OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
2	17.7														
	1F+	-	2F+	2F-	1F+	1F+	1F+	1F+	1F+	1F+	-	-	-	-	MODE
	56	-	158	105	32	31	34	40	50	55	-	-	-	-	ANGLE
	50	-	99	99	99	98	92	79	58	24	-	-	-	-	C.PROB.
	126	-	129	124	124	124	124	125	125	126	-	-	-	-	DELAY
	169	-	154	158	161	163	165	167	169	170	-	-	-	-	NOISE
	257	-	236	241	245	249	252	254	257	259	-	-	-	-	FS.LOSS
	10	-	86	45	25	18	14	12	11	10	-	-	-	-	P. LOSS
	11	-	-68	-24	-4	2	7	10	12	13	-	-	-	-	S/N..DB
	59	-	0	0	7	24	41	53	62	69	-	-	-	-	S/N..PROB.
															64 T.REL.
4	21.6														
	1F+	-	-	-	2F+	2F-	2F-	1F+	1F+	1F+	1F+	1F+	1F+	1F+	MODE
	51	-	-	-	155	100	98	35	34	38	47	48	48	48	ANGLE
	50	-	-	-	99	98	95	94	86	73	55	39	19	19	C.PROB.
	125	-	-	-	129	125	124	124	124	124	125	125	125	125	DELAY
	171	-	-	-	161	163	165	167	169	170	171	172	174	174	NOISE
	261	-	-	-	240	249	252	254	256	258	260	262	264	264	FS.LOSS
	14	-	-	-	77	45	36	23	18	16	14	12	11	11	P. LOSS
	9	-	-	-	-57	-24	-14	0	4	7	9	10	13	13	S/N..DB
	49	-	-	-	0	0	0	15	28	40	48	54	68	68	S/N..PROB.
															52 T.REL.
6	22.0														
	1F+	-	-	-	-	2F+	2F-	2F-	1F+	1F+	1F+	1F+	1F+	1F+	MODE
	47	-	-	-	-	141	96	43	37	42	41	41	41	41	ANGLE
	50	-	-	-	-	85	88	88	76	59	42	22	6	6	C.PROB.
	125	-	-	-	-	128	124	125	124	125	125	125	125	125	DELAY
	172	-	-	-	-	165	167	169	170	171	172	174	175	175	NOISE
	261	-	-	-	-	252	254	257	258	260	262	264	266	266	FS.LOSS
	18	-	-	-	-	67	41	26	22	19	16	14	11	11	P. LOSS
	5	-	-	-	-	-45	-19	-3	0	4	6	10	13	13	S/N..DB
	30	-	-	-	-	0	0	7	15	28	36	51	67	67	S/N..PROB.
															31 T.REL.
8	21.5														
	1F+	-	-	-	-	2F+	2F-	2F-	1F+	1F+	1F+	1F+	1F+	1F+	MODE
	48	-	-	-	-	148	105	96	46	45	39	39	39	39	ANGLE
	50	-	-	-	-	82	86	70	73	55	37	16	16	16	C.PROB.
	125	-	-	-	-	128	124	124	125	125	124	124	124	124	DELAY
	171	-	-	-	-	165	167	169	170	171	172	174	174	174	NOISE
	261	-	-	-	-	252	254	256	258	260	262	264	264	264	FS.LOSS
	21	-	-	-	-	74	46	39	25	22	19	15	15	15	P. LOSS
	1	-	-	-	-	-53	-23	-15	-2	1	4	8	8	8	S/N..DB
	19	-	-	-	-	0	0	0	9	19	29	42	42	42	S/N..PROB.
															17 T.REL.

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
10	20.8														
	1F+	-	-	-	-	-	2F+	2F-	2F-	1F+	1F+	1F+	1F+	-	MODE
	54	-	-	-	-	-	156	110	113	48	46	46	46	-	ANGLE
	50	-	-	-	-	-	78	80	61	67	49	31	12	-	C.PROB.
	126	-	-	-	-	-	129	125	125	125	125	125	125	-	DELAY
	171	-	-	-	-	-	165	167	169	170	171	172	174	-	NOISE
	260	-	-	-	-	-	252	254	257	259	260	262	264	-	FS.LOSS
	21	-	-	-	-	-	71	44	36	24	21	18	15	-	P. LOSS
	1	-	-	-	-	-	-50	-21	-13	-1	2	4	8	-	S/N..DB
	18	-	-	-	-	-	0	0	0	11	22	29	42	-	S/N..PROB.
														15	T.REL.
12	19.9														
	1F+	-	-	-	-	-	2F+	2F-	2F-	1F+	1F+	1F+	1F+	-	MODE
	54	-	-	-	-	-	156	112	111	45	48	48	48	-	ANGLE
	50	-	-	-	-	-	94	93	79	82	61	36	15	-	C.PROB.
	126	-	-	-	-	-	129	125	125	125	125	125	125	-	DELAY
	171	-	-	-	-	-	163	165	167	169	170	171	172	-	NOISE
	259	-	-	-	-	-	250	252	254	257	259	260	262	-	FS.LOSS
	19	-	-	-	-	-	73	44	36	23	20	17	15	-	P. LOSS
	4	-	-	-	-	-	-52	-22	-13	-0	3	5	8	-	S/N..DB
	28	-	-	-	-	-	0	0	1	14	26	33	45	-	S/N..PROB.
														22	T.REL.
14	20.0														
	1F+	-	-	-	-	-	2F+	2F-	1F+	1F+	1F+	1F+	1F+	-	MODE
	48	-	-	-	-	-	141	96	33	30	34	41	46	46	ANGLE
	50	-	-	-	-	-	99	99	98	94	82	62	37	15	C.PROB.
	125	-	-	-	-	-	128	124	124	124	124	125	125	125	DELAY
	171	-	-	-	-	-	159	162	165	167	169	170	171	172	NOISE
	259	-	-	-	-	-	246	249	252	254	256	258	260	262	FS.LOSS
	12	-	-	-	-	-	65	37	22	18	15	13	11	10	P. LOSS
	11	-	-	-	-	-	-46	-17	-0	4	8	10	11	12	S/N..DB
	56	-	-	-	-	-	0	0	12	30	42	52	59	65	S/N..PROB.
														56	T.REL.
16	20.6														
	1F+	-	2F-	1F+	2F-	2F-	1F+	1F+	1F+	1F+	1F+	1F+	1F+	-	MODE
	47	-	97	22	82	84	21	24	29	37	46	46	46	-	ANGLE
	50	-	99	99	99	99	99	99	92	73	44	18	18	-	C.PROB.
	125	-	124	123	123	123	123	123	124	124	125	125	125	-	DELAY
	171	-	151	154	158	162	165	167	169	170	171	172	172	-	NOISE
	260	-	235	241	245	249	252	254	256	258	260	262	262	-	FS.LOSS
	6	-	43	21	21	16	8	7	6	6	6	6	6	-	P. LOSS
	16	-	-27	-3	-2	3	13	15	16	16	16	17	17	-	S/N..DB
	82	-	0	6	8	23	71	79	81	82	83	87	87	-	S/N..PROB.
														94	T.REL.

		OPERATING FREQUENCIES															
GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30			
18	19.3	1F+	2F-	1F+	1F+	1F+	1F+	1F+	1F+	1F+	1F+	1F+	-	-	MODE		
	52	102	22	21	22	24	27	32	38	50	52	52	-	-	ANGLE		
	50	99	99	99	99	99	99	96	83	55	24	6	-	-	C.PROB.		
	126	124	123	123	123	123	124	124	124	125	126	126	-	-	DELAY		
	170	143	149	153	158	163	165	167	169	170	171	172	-	-	NOISE		
	259	226	235	241	245	249	252	254	256	259	260	262	-	-	FS.LOSS		
	6	49	20	12	9	7	6	5	5	6	5	5	-	-	P. LOSS		
	16	-37	-6	2	8	14	15	16	17	17	17	17	-	-	S/N..DB		
	83	0	4	22	44	81	80	83	85	86	87	87	-	-	S/N..PROB.		
															98	=T.REL.	
20	18.1	1F+	2F-	1F+	1F+	1F+	1F+	1F+	1F+	1F+	1F+	-	-	-	MODE		
	56	107	26	25	26	29	33	38	47	56	56	-	-	-	ANGLE		
	50	99	99	99	99	99	96	86	65	32	7	-	-	-	C.PROB.		
	126	125	124	123	124	124	124	124	125	126	126	-	-	-	DELAY		
	169	143	148	154	159	163	165	167	169	170	171	-	-	-	NOISE		
	258	226	235	241	245	249	252	254	257	259	260	-	-	-	FS.LOSS		
	6	49	20	13	9	7	6	6	6	6	6	-	-	-	P. LOSS		
	16	-36	-7	3	9	13	15	16	17	16	17	-	-	-	S/N..DB		
	84	0	4	24	47	71	80	83	85	82	87	-	-	-	S/N..PROB.		
															99	=T.REL.	
22	16.7	1F+	2F-	1F+	1F+	1F+	1F+	1F+	1F+	1F+	-	-	-	-	MODE		
	60	114	30	30	31	35	39	47	60	60	-	-	-	-	ANGLE		
	50	99	99	99	99	99	92	74	44	10	-	-	-	-	C.PROB.		
	126	125	124	124	124	124	125	125	126	126	-	-	-	-	DELAY		
	168	148	152	156	161	163	165	167	169	170	-	-	-	-	NOISE		
	256	226	235	241	245	249	252	254	257	259	-	-	-	-	FS.LOSS		
	7	48	20	13	9	7	7	6	7	6	-	-	-	-	P. LOSS		
	15	-30	-3	5	11	13	14	15	16	16	-	-	-	-	S/N..DB		
	80	0	10	32	58	71	76	79	81	82	-	-	-	-	S/N..PROB.		
															97	=T.REL.	
24	15.6	1F+	2F-	1F+	1F+	1F+	1F+	1F+	1F+	-	-	-	-	-	MODE		
	62	115	31	31	33	37	44	56	62	-	-	-	-	-	ANGLE		
	50	99	99	99	99	94	81	58	20	-	-	-	-	-	C.PROB.		
	126	125	124	124	124	124	125	126	126	-	-	-	-	-	DELAY		
	168	148	154	158	161	163	165	167	169	-	-	-	-	-	NOISE		
	255	226	235	241	245	249	252	254	257	-	-	-	-	-	FS.LOSS		
	7	48	21	13	9	8	7	7	7	-	-	-	-	-	P. LOSS		
	15	-30	-1	6	11	13	14	14	15	-	-	-	-	-	S/N..DB		
	77	0	12	36	58	71	76	75	77	-	-	-	-	-	S/N..PROB.		
															95	=T.REL.	

1 SEP SSN= 110 26.019
 TRANSMITTER TO 0 KM TARGET AZIMUTHS N.MILES
 35.00N - 33.00E 46.00N - 73.00E 57.5 264.3 1917.1
 SIGMA= 1000 SQ. METERS ANT= 25DB
 OFF AZIMUTH 0 DEG. MIN. ANGLE= 2 DEG. OFF AZIMUTH 0 DEG.
 PWR=200.00KW 3 MC/S MAN. NOISE = -148 DBW REQ.S/N= 10DB
 OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
2	16.5														
1	F	2 F	2 F	2 F	2 F	2 F	2 F	-	1 F	1 F	-	-	-	-	MODE
28		122	116	120	128	145	168	-	27	27	-	-	-	-	ANGLE
50		99	99	99	97	74	27	-	41	12	-	-	-	-	C.PROB.
124		126	126	126	127	128	130	-	124	124	-	-	-	-	DELAY
168		148	154	158	161	163	165	-	169	170	-	-	-	-	NOISE
256		227	235	241	245	249	253	-	256	258	-	-	-	-	FS.LOSS
3		72	39	26	25	17	16	-	3	2	-	-	-	-	P. LOSS
19		-55	-20	-5	1	3	4	-	20	20	-	-	-	-	S/N..DB
92		0	0	6	20	27	30	-	93	93	-	-	-	-	S/N..PROB.
															51 =T.REL.
4	20.7														
2	F	2 E	2 E	2 E	2 F	2 F	2 F	2 F	2 F	2 F	2 F	2 F	-	-	MODE
136		31	32	35	111	100	99	102	108	118	137	137	-	-	ANGLE
50		99	99	99	99	99	97	92	82	66	46	20	-	-	C.PROB.
127		120	121	121	125	124	124	124	125	126	127	127	-	-	DELAY
171		148	154	158	161	163	165	167	169	170	171	172	-	-	NOISE
260		226	235	241	246	249	252	254	257	259	261	262	-	-	FS.LOSS
19		385	180	105	55	42	33	27	23	20	18	17	-	-	P. LOSS
4		-367	-161	-84	-34	-21	-12	-5	-0	2	4	5	-	-	S/N..DB
29		0	0	0	0	0	1	6	14	23	30	34	-	-	S/N..PROB.
															27 =T.REL.
6	23.1														
2	F	2 E	2 E	2 E	2 E	2 E	2 E	2 F	2 F	2 F	2 F	2 F	2 F	-	MODE
132		30	31	32	34	37	41	101	101	106	114	131	134	-	ANGLE
50		99	99	99	99	99	99	96	91	82	68	51	17	-	C.PROB.
127		120	120	121	121	121	121	124	124	125	125	127	127	-	DELAY
172		148	154	158	161	163	165	167	169	170	171	172	174	-	NOISE
262		226	235	240	245	248	252	254	256	258	260	262	264	-	FS.LOSS
23		680	317	184	120	85	52	43	35	30	26	23	20	-	P. LOSS
0		-661	-298	-163	-98	-63	-30	-20	-12	-7	-3	0	3	-	S/N..DB
16		0	0	0	0	0	0	0	0	3	8	14	23	-	S/N..PROB.
															9 =T.REL.
8	21.6														
2	F	-	2 E	2 E	2 E	2 E	2 E	2 E	2 F	2 F	2 F	2 F	2 F	-	MODE
129		-	31	32	33	35	38	42	104	109	122	131	131	-	ANGLE
50		-	99	99	99	99	99	99	89	76	56	30	5	-	C.PROB.
127		-	120	121	121	121	121	121	125	125	126	127	127	-	DELAY
172		-	154	158	161	163	165	167	169	170	171	172	174	-	NOISE
261		-	235	240	245	248	251	254	256	258	260	262	264	-	FS.LOSS
28		-	391	226	148	104	77	50	42	35	30	26	23	-	P. LOSS
-4		-	-372	-205	-126	-82	-55	-28	-18	-12	-6	-3	1	-	S/N..DB
5		-	0	0	0	0	0	0	0	0	4	8	17	-	S/N..PROB.
															3 =T.REL.

		OPERATING FREQUENCIES																
GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30				
10	28.0																	
	1 F	2 E	2 E	2 E	2 E	2 E	2 E	2 E	2 F	2 F	2 F	2 F	-	-	MODE			
	22	30	31	32	34	36	39	47	125	136	153	153	-	-	ANGLE			
	50	99	99	99	99	99	99	99	83	65	40	15	-	-	C.PROB.			
	123	120	120	121	121	121	121	121	126	127	129	129	-	-	DELAY			
	175	148	154	158	161	163	165	167	169	170	171	172	-	-	NOISE			
	265	226	235	240	245	248	252	254	257	259	261	262	-	-	FS.LOSS			
	9	800	372	215	140	99	56	46	38	32	28	25	-	-	P. LOSS			
	15	-782	-353	-194	-119	-77	-35	-24	-15	-9	-5	-2	-	-	S/N..DB			
	77	0	0	0	0	0	0	0	0	1	5	9	-	-	S/N..PROB.			
																		39 =T.REL.
12	20.4																	
	2 F	2 E	2 E	2 E	2 E	2 F	2 F	2 F	2 F	2 F	2 F	2 F	-	-	MODE			
	146	31	31	33	36	116	111	112	118	129	148	148	-	-	ANGLE			
	50	99	99	99	99	99	99	96	86	67	38	9	-	-	C.PROB.			
	128	120	121	121	121	126	125	125	126	127	128	128	-	-	DELAY			
	171	148	154	158	161	163	165	167	169	170	171	172	-	-	NOISE			
	260	226	235	240	245	249	252	254	257	259	261	262	-	-	FS.LOSS			
	23	571	266	154	101	56	44	36	30	26	23	21	-	-	P. LOSS			
	-0	-553	-247	-133	-79	-35	-23	-14	-7	-3	0	2	-	-	S/N..DB			
	15	0	0	0	0	0	0	0	4	9	15	24	-	-	S/N..PROB.			
																		8 =T.REL.
14	19.9																	
	2 F	2 E	2 E	2 F	2 F	2 F	2 F	2 F	2 F	2 F	2 F	-	-	-	MODE			
	141	32	35	102	96	97	100	105	113	128	142	-	-	-	ANGLE			
	50	99	99	99	99	99	99	94	83	62	28	-	-	-	C.PROB.			
	128	121	121	124	124	124	124	125	125	126	128	-	-	-	DELAY			
	171	148	154	158	161	163	165	167	169	170	171	-	-	-	NOISE			
	260	226	235	241	245	249	252	254	257	259	261	-	-	-	FS.LOSS			
	16	253	118	57	40	30	24	20	18	16	15	-	-	-	P. LOSS			
	7	-235	-99	-37	-19	-9	-3	1	4	6	7	-	-	-	S/N..DB			
	38	0	0	0	0	3	10	20	28	36	41	-	-	-	S/N..PROB.			
																		39 =T.REL.
16	16.6																	
	2 F	2 F	2 F	2 F	2 F	2 F	2 F	2 F	2 F	2 F	-	-	-	-	MODE			
	152	110	101	102	105	110	117	129	153	153	-	-	-	-	ANGLE			
	50	99	99	99	99	99	94	76	42	10	-	-	-	-	C.PROB.			
	129	125	124	124	125	125	126	127	129	129	-	-	-	-	DELAY			
	168	148	153	157	161	163	165	167	169	170	-	-	-	-	NOISE			
	257	226	235	241	245	249	252	255	257	259	-	-	-	-	FS.LOSS			
	13	62	33	22	17	14	13	12	13	12	-	-	-	-	P. LOSS			
	8	-44	-15	-3	3	6	8	9	9	10	-	-	-	-	S/N..DB			
	45	0	0	8	26	37	45	48	46	52	-	-	-	-	S/N..PROB.			
																		78 =T.REL.

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
18	18.5														
	1 F	2 F	2 F	2 F	2 F	2 F	2 F	2 F	-	1 F	1 F	-	-	-	MODE
	28	123	117	119	125	135	155	168	-	27	27	-	-	-	ANGLE
	50	99	99	99	99	91	61	16	-	39	10	-	-	-	C.PROB.
	124	126	126	126	126	127	129	130	-	124	124	-	-	-	DELAY
	170	146	151	156	161	163	165	167	-	170	171	-	-	-	NOISE
	258	227	235	241	246	249	252	255	-	258	260	-	-	-	FS.LOSS
	2	59	32	22	17	15	14	14	-	2	1	-	-	-	P. LOSS
	21	-44	-16	-4	2	5	6	7	-	21	21	-	-	-	S/N..DB
	94	0	0	8	25	35	39	41	-	95	95	-	-	-	S/N..PROB.
															58 =T.REL.
20	16.5														
	1 F	2 F	2 F	2 F	2 F	2 F	2 F	1 F	1 F	1 F	-	-	-	-	MODE
	34	132	127	132	140	158	179	23	33	33	-	-	-	-	ANGLE
	50	99	99	99	94	69	24	71	40	10	-	-	-	-	C.PROB.
	124	127	126	127	128	129	131	123	124	124	-	-	-	-	DELAY
	168	146	152	157	161	163	165	167	169	170	-	-	-	-	NOISE
	256	227	235	241	246	250	253	254	256	258	-	-	-	-	FS.LOSS
	2	58	32	22	17	16	15	3	2	2	-	-	-	-	P. LOSS
	19	-42	-15	-3	2	4	5	19	20	21	-	-	-	-	S/N..DB
	92	0	0	10	25	32	35	92	93	95	-	-	-	-	S/N..PROB.
															77 =T.REL.
22	16.2														
	1 F	2 F	2 F	2 F	2 F	2 F	1 F	1 F	1 F	1 F	-	-	-	-	MODE
	38	137	134	139	149	169	20	29	38	38	-	-	-	-	ANGLE
	50	99	99	99	92	64	89	68	34	7	-	-	-	-	C.PROB.
	124	127	127	127	128	130	123	124	124	124	-	-	-	-	DELAY
	168	148	154	158	161	163	165	167	169	170	-	-	-	-	NOISE
	256	227	236	241	246	250	252	254	256	258	-	-	-	-	FS.LOSS
	2	57	31	22	18	16	4	3	2	2	-	-	-	-	P. LOSS
	20	-39	-12	-2	2	4	17	19	20	21	-	-	-	-	S/N..DB
	94	0	1	13	25	32	87	92	93	95	-	-	-	-	S/N..PROB.
															95 =T.REL.
24	15.1														
	1 F	2 F	2 F	2 F	2 F	2 F	1 F	1 F	1 F	-	-	-	-	-	MODE
	41	140	138	144	157	192	26	40	40	-	-	-	-	-	ANGLE
	50	99	99	99	80	45	84	52	16	-	-	-	-	-	C.PROB.
	125	128	127	128	129	133	124	125	125	-	-	-	-	-	DELAY
	167	148	154	158	161	163	165	167	169	-	-	-	-	-	NOISE
	254	227	236	242	246	250	252	254	256	-	-	-	-	-	FS.LOSS
	3	56	31	22	18	16	4	3	2	-	-	-	-	-	P. LOSS
	19	-39	-12	-2	2	3	17	19	20	-	-	-	-	-	S/N..DB
	92	0	1	11	23	27	87	92	93	-	-	-	-	-	S/N..PROB.
															90 =T.REL.

6 SEP SSN= 110 26.019
 TRANSMITTER TO 50 KM TARGET AZIMUTHS N.MILES
 35.00N - 33.00E 46.00N - 73.00E 57.5 264.3 1917.1
 SIGMA= 1000 SQ. METERS ANT= 25DB
 OFF AZIMUTH 0 DEG. MIN. ANGLE= 2 DEG. OFF AZIMUTH 0 DEG.
 PWR=200.00KW 3 MC/S MAN. OISE = -148 DBW REQ.S/N= 10DB

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
2	16.0														
	1F+	2F-	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	-	-	-	-	MODE
	36	116	109	112	120	134	160	29	36	36	-	-	-	-	ANGLE
	50	99	99	99	97	79	35	67	30	6	-	-	-	-	C.PROB.
	124	125	125	125	126	127	129	124	124	124	-	-	-	-	DELAY
	168	148	154	158	161	163	165	167	169	170	-	-	-	-	NOISE
	255	226	235	241	245	249	252	254	256	258	-	-	-	-	FS.LOSS
	6	74	39	26	20	16	15	6	6	5	-	-	-	-	P. LOSS
	16	-56	-20	-6	1	3	5	16	17	17	-	-	-	-	S/N..DB
	82	0	0	5	20	27	34	83	85	86	-	-	-	-	S/N..PROB.
															67 T.REL.
4	26.5														
	1F+	2E-	2E-	2E-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	MODE
	21	23	24	26	107	93	91	93	98	106	121	128	128	128	ANGLE
	50	99	99	99	99	99	98	94	85	72	54	29	5	5	C.PROB.
	123	120	120	120	125	124	124	124	124	125	126	126	126	126	DELAY
	174	148	154	158	161	163	165	167	169	170	171	172	174	174	NOISE
	264	226	235	241	245	249	252	254	256	258	260	262	264	264	FS.LOSS
	7	380	180	106	56	43	34	28	23	20	18	17	15	15	P. LOSS
	17	-362	-160	-85	-35	-22	-12	-5	-0	2	4	6	8	8	S/N..DB
	86	0	0	0	0	0	1	6	14	23	30	37	43	43	S/N..PROB.
															43 T.REL.
6	29.8														
	1F+	2E-	2E-	2E-	2E-	2E-	2F-	2E-	2F-	2F-	2F-	2F-	2F-	2F-	MODE
	21	22	23	24	25	28	103	37	93	96	102	114	124	124	ANGLE
	50	99	99	99	99	99	99	99	93	85	73	57	25	25	C.PROB.
	123	120	120	120	120	120	125	121	124	124	124	125	126	126	DELAY
	175	148	154	158	161	163	165	167	169	170	171	172	174	174	NOISE
	266	226	235	241	245	248	252	254	256	258	260	262	264	264	FS.LOSS
	8	668	313	183	121	86	53	43	36	30	26	23	20	20	P. LOSS
	15	-650	-294	-162	-99	-64	-31	-21	-13	-7	-3	0	3	3	S/N..DB
	80	0	0	0	0	0	0	0	0	3	8	14	23	23	S/N..PROB.
															40 T.REL.
8	28.2														
	1F+	-	2E-	2E-	2E-	2F-	2E-	2E-	2E-	2F-	2F-	2F-	2F-	2F-	MODE
	21	-	23	24	25	26	28	32	38	98	107	121	121	121	ANGLE
	50	-	99	99	99	99	99	99	99	81	63	40	9	9	C.PROB.
	123	-	120	120	120	120	120	121	121	124	125	126	126	126	DELAY
	175	-	154	158	161	163	165	167	169	170	171	172	174	174	NOISE
	265	-	235	241	245	248	252	254	256	258	260	262	264	264	FS.LOSS
	11	-	386	225	148	105	68	51	43	36	30	26	23	23	P. LOSS
	13	-	-366	-204	-126	-84	-46	-28	-19	-12	-7	-3	1	1	S/N..DB
	68	-	0	0	0	0	0	0	0	0	3	8	17	17	S/N..PROB.
															34 T.REL.

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
10	27.1														
	1F+	2E-	2E-	2E-	2E-	2E-	2E-	2E-	1F+	2F-	2F-	2F-	1F+	1F+	MODE
	32	22	23	24	25	27	30	34	25	124	143	144	27	29	ANGLE
	50	99	99	99	99	99	99	99	98	70	49	21	59	19	C.PROB.
	124	120	120	120	120	120	120	121	123	126	128	128	124	124	DELAY
	174	148	154	158	161	163	165	167	169	170	171	172	174	175	NOISE
	264	226	235	241	245	248	252	254	256	259	261	262	264	266	FS.LOSS
	12	785	367	214	141	100	57	47	24	33	28	25	12	10	P. LOSS
	12	-767	-348	-193	-119	-78	-36	-25	-1	-9	-5	-2	11	15	S/N..DB
	65	0	0	0	0	0	0	0	10	1	5	9	57	77	S/N..PROB.
														50	T.REL.
12	26.7														
	1F+	2E-	2E-	2E-	2E-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	1F+	MODE
	28	23	23	25	27	112	103	104	108	117	136	139	24	25	ANGLE
	50	99	99	99	99	99	99	97	89	73	50	16	57	10	C.PROB.
	124	120	120	120	120	125	125	125	125	126	127	127	123	123	DELAY
	174	148	154	158	161	163	165	167	169	170	171	172	174	175	NOISE
	264	226	235	241	245	249	252	254	257	259	261	262	264	266	FS.LOSS
	9	561	264	154	102	57	45	37	30	26	23	21	9	8	P. LOSS
	14	-543	-244	-133	-80	-36	-24	-14	-7	-3	0	2	15	17	S/N..DB
	75	0	0	0	0	0	0	0	4	9	15	24	78	84	S/N..PROB.
														54	T.REL.
14	25.6														
	1F+	2E-	2E-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	-	MODE
	23	24	27	96	89	89	91	96	103	114	133	133	22	-	ANGLE
	50	99	99	99	99	99	99	96	87	69	41	10	43	-	C.PROB.
	123	120	120	124	124	124	124	124	125	125	127	127	123	-	DELAY
	174	148	154	158	161	163	165	167	169	170	171	172	174	-	NOISE
	263	226	235	241	245	249	252	254	256	259	260	262	264	-	FS.LOSS
	5	251	119	58	41	31	25	20	18	16	15	14	5	-	P. LOSS
	19	-232	-99	-38	-20	-9	-3	1	5	6	7	8	19	-	S/N..DB
	90	0	0	0	0	3	10	20	31	36	41	45	91	-	S/N..PROB.
														57	T.REL.
16	21.6														
	1F+	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	1F+	-	-	MODE
	23	105	94	94	97	101	108	118	141	144	24	28	-	-	ANGLE
	50	99	99	99	99	99	96	81	52	16	57	27	-	-	C.PROB.
	124	125	124	124	124	124	125	126	128	128	123	124	-	-	DELAY
	171	148	153	157	161	163	165	167	169	170	171	172	-	-	NOISE
	260	226	235	241	245	249	252	254	257	259	260	262	-	-	FS.LOSS
	4	63	34	22	17	14	13	12	12	12	3	4	-	-	P. LOSS
	19	-45	-16	-3	3	6	8	9	10	10	19	19	-	-	S/N..DB
	92	0	0	8	26	37	45	48	50	52	92	92	-	-	S/N..PROB.
														74	T.REL.

		OPERATING FREQUENCIES																
GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30				
18	17.8	1F+	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	1F+	-	-	-	MODE			
	36	117	110	112	117	126	142	21	30	36	36	-	-	-	ANGLE			
	50	99	99	99	99	93	67	87	63	27	5	-	-	-	C.PROB.			
	124	126	125	125	126	126	128	123	124	124	124	-	-	-	DELAY			
	169	146	151	156	161	163	165	167	169	170	171	-	-	-	NOISE			
	257	226	235	241	246	249	252	254	256	258	260	-	-	-	FS.LOSS			
	5	60	33	22	17	15	14	5	5	5	4	-	-	-	P. LOSS			
	17	-45	-17	-4	3	5	7	17	18	18	18	-	-	-	S/N..DB			
	87	0	0	8	28	35	42	86	88	89	89	-	-	-	S/N..PROB.			
															88 =T.REL.			
20	17.1	1F-	2F-	2F-	2F-	2F-	1F+	1F+	1F-	1F-	-	-	-	-	MODE			
	25	125	120	124	132	147	25	34	24	25	-	-	-	-	ANGLE			
	50	99	99	99	95	74	87	64	52	18	-	-	-	-	C.PROB.			
	123	126	126	126	127	128	123	124	123	123	-	-	-	-	DELAY			
	169	146	152	157	161	163	165	167	169	170	-	-	-	-	NOISE			
	256	227	235	241	246	249	252	254	256	258	-	-	-	-	FS.LOSS			
	2	59	32	22	17	15	6	5	2	2	-	-	-	-	P. LOSS			
	20	-43	-15	-3	2	4	15	16	20	21	-	-	-	-	S/N..DB			
	93	0	0	10	25	32	80	83	93	95	-	-	-	-	S/N..PROB.			
															90 =T.REL.			
22	16.8	1F-	2F-	2F-	2F-	1F+	1F+	1F+	1F-	1F-	-	-	-	-	MODE			
	29	131	127	131	140	24	30	40	29	29	-	-	-	-	ANGLE			
	50	99	99	99	94	97	85	61	46	13	-	-	-	-	C.PROB.			
	124	127	126	127	128	123	124	125	124	124	-	-	-	-	DELAY			
	168	148	154	158	161	163	165	167	169	170	-	-	-	-	NOISE			
	256	227	235	241	246	249	252	254	256	258	-	-	-	-	FS.LOSS			
	2	58	32	22	17	7	6	6	2	2	-	-	-	-	P. LOSS			
	19	-41	-13	-2	2	14	15	16	20	21	-	-	-	-	S/N..DB			
	92	0	1	13	25	76	80	83	93	95	-	-	-	-	S/N..PROB.			
															94 =T.REL.			
24	15.6	1F-	2F-	1F+	1F+	1F+	1F+	1F+	1F-	1F-	-	-	-	-	MODE			
	32	134	20	20	23	28	36	26	31	-	-	-	-	-	ANGLE			
	50	99	99	99	99	96	78	61	24	-	-	-	-	-	C.PROB.			
	124	127	123	123	123	124	124	124	124	-	-	-	-	-	DELAY			
	168	148	154	158	161	163	165	167	169	-	-	-	-	-	NOISE			
	255	227	235	241	245	249	252	254	256	-	-	-	-	-	FS.LOSS			
	3	57	20	12	9	7	6	3	2	-	-	-	-	-	P. LOSS			
	20	-40	-1	7	11	13	14	19	20	-	-	-	-	-	S/N..DB			
	93	0	12	39	58	71	76	92	93	-	-	-	-	-	S/N..PROB.			
															95 =T.REL.			

11 SEP SSN= 110 26.019
 TRANSMITTER TO 100KM TARGET AZIMUTHS N.MILES
 35.00N - 33.00E 46.00N - 73.00E 57.5 264.3 1917.1
 SIGMA= 1000 SQ. METERS ANT= 25DB
 OFF AZIMUTH 0 DEG. MIN. ANGLE= 2 DEG. OFF AZIMUTH 0 DEG.
 PWR=200.00KW 3 MC/S MAN. NOISE = -148 DBW REQ.S/N= 10DB
 OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
2	15.4														
	1F+	2F-	2F-	2F-	2F-	1F+	1F+	1F+	1F+	-	-	-	-	-	MODE
	45	110	101	104	111	23	29	41	45	-	-	-	-	-	ANGLE
	50	99	99	99	98	98	87	88	21	-	-	-	-	-	C.PROB.
	125	125	124	124	125	123	124	125	125	-	-	-	-	-	DELAY
	167	148	154	158	161	163	165	167	169	-	-	-	-	-	NOISE
	255	226	235	241	245	249	252	254	257	-	-	-	-	-	FS.LOSS
	7	58	32	21	17	8	7	7	6	-	-	-	-	-	P. LOSS
	15	-41	-13	-1	3	13	14	15	16	-	-	-	-	-	S/N..DB
	80	0	1	12	26	71	76	79	81	-	-	-	-	-	S/N..PROB.
															93 =T.REL.
4	25.5														
	1F+	2E+	2E+	2E+	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	1F+	MODE
	30	47	48	52	104	86	83	84	88	95	106	118	28	28	ANGLE
	50	99	99	99	99	99	98	95	88	77	60	38	44	9	C.PROB.
	124	121	121	122	124	123	123	123	123	124	124	125	124	124	DELAY
	174	148	154	158	161	163	165	167	169	170	171	172	174	175	NOISE
	263	226	235	241	245	249	252	254	256	258	260	262	264	266	FS.LOSS
	7	462	218	128	44	35	27	23	19	17	16	15	7	6	P. LOSS
	16	-444	-198	-107	-23	-13	-5	0	3	6	7	8	17	18	S/N..DB
	81	0	0	0	0	1	7	15	25	36	41	45	85	88	S/N..PROB.
															60 =T.REL.
6	28.7														
	1F+	-	2E+	2E+	2E+	2F+	2F-	2E-	2F-	2F-	2F-	2F-	1F+	1F+	MODE
	30	-	47	48	51	133	99	25	84	86	91	100	20	28	ANGLE
	50	-	99	99	99	99	99	99	94	88	78	64	69	37	C.PROB.
	124	-	121	121	122	127	124	120	123	123	123	124	123	124	DELAY
	175	-	154	158	161	163	165	167	169	170	171	172	174	175	NOISE
	266	-	235	241	245	249	252	254	256	258	260	262	264	266	FS.LOSS
	10	-	381	222	146	71	42	35	29	25	22	16	10	9	P. LOSS
	14	-	-361	-201	-125	-50	-20	-12	-5	-1	1	3	13	16	S/N..DB
	74	-	0	0	0	0	0	0	0	4	11	19	25	68	S/N..PROB.
															69 =T.REL.
8	27.2														
	1F+	-	2E+	2E+	2E+	2E+	2E+	2E-	2E-	1F+	2F-	2F-	1F+	1F+	MODE
	31	-	47	48	50	52	57	22	26	21	94	109	26	27	ANGLE
	50	-	99	99	99	99	99	99	99	96	70	51	60	21	C.PROB.
	124	-	121	121	121	122	122	120	120	123	124	125	124	124	DELAY
	174	-	154	158	161	163	165	167	169	170	171	172	174	175	NOISE
	265	-	235	241	245	248	252	254	256	258	260	262	264	266	FS.LOSS
	12	-	469	273	179	127	67	41	34	21	25	22	13	10	P. LOSS
	11	-	-450	-252	-158	-166	-46	-18	-11	2	-1	1	11	14	S/N..DB
	69	-	0	0	0	0	0	0	0	1	21	11	19	57	S/N..PROB.
															56 =T.REL.

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
10	26.1														
	1F+	-	2E+	2E+	2E+	2F+	2E+	2E-	2E-	1F+	1F+	1F+	1F+	1F+	MODE
	41	-	47	48	50	151	20	23	29	26	26	29	40	38	ANGLE
	50	-	99	99	99	99	99	99	99	94	87	76	51	12	C.PROB.
	125	-	121	121	122	129	120	120	120	124	124	124	125	124	DELAY
	174	-	154	158	161	163	165	167	169	170	171	172	174	175	NOISE
	264	-	235	241	245	249	252	254	256	258	260	262	264	266	FS.LOSS
	13	-	446	259	170	77	46	38	25	20	17	15	13	11	P. LOSS
	11	-	427	239	149	-56	-24	-15	-1	2	5	8	11	14	S/N..DB
	57	-	0	0	0	0	0	0	10	21	32	44	57	72	S/N..PROB.
														53	T.REL.
12	25.8														
	1F+	2E+	2E+	2E+	2E+	2F-	2F-	1F+	2F-	2F-	1F+	1F+	1F+	-	MODE
	37	46	47	50	53	107	96	22	99	106	20	25	35	-	ANGLE
	50	99	99	99	99	99	99	99	92	79	88	76	47	-	C.PROB.
	124	121	121	121	122	125	124	123	124	124	123	123	124	-	DELAY
	174	148	154	158	161	163	165	167	169	170	171	172	174	-	NOISE
	264	226	235	241	245	249	252	254	256	258	260	262	264	-	FS.LOSS
	10	683	320	187	123	45	36	22	25	22	13	11	10	-	P. LOSS
	14	-665	-301	-166	-101	-24	-15	0	-2	1	10	12	14	-	S/N..DB
	73	0	0	0	0	0	0	18	10	20	53	65	73	-	S/N..PROB.
														59	T.REL.
14	24.7														
	1F+	2E+	2E+	2F-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	-	MODE
	32	48	53	91	81	81	83	87	93	102	120	24	31	-	ANGLE
	50	99	99	99	99	99	99	97	90	75	53	67	29	-	C.PROB.
	124	121	122	123	123	123	123	123	124	124	125	123	124	-	DELAY
	173	148	154	158	161	163	165	167	169	170	171	172	174	-	NOISE
	263	226	235	241	245	249	252	254	256	258	260	262	264	-	FS.LOSS
	6	304	143	46	33	25	20	17	15	14	13	6	6	-	P. LOSS
	17	-286	-124	-26	-12	-3	1	5	8	9	9	17	18	-	S/N..DB
	87	0	0	0	1	10	21	33	42	47	48	87	88	-	S/N..PROB.
														75	T.REL.
16	20.8														
	1F+	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	1F+	-	MODE
	37	100	86	86	89	93	98	107	124	27	36	36	36	-	ANGLE
	50	99	99	99	99	99	97	86	60	73	47	17	17	-	C.PROB.
	124	124	123	123	123	123	124	125	126	124	124	124	124	-	DELAY
	171	148	153	157	161	163	165	167	169	170	171	172	172	-	NOISE
	260	226	235	241	245	249	252	254	257	258	260	262	262	-	FS.LOSS
	4	50	27	18	14	12	11	11	11	4	4	4	4	-	P. LOSS
	18	-32	-9	0	6	8	10	11	11	19	18	19	19	-	S/N..DB
	89	0	2	16	36	45	54	59	56	91	89	92	92	-	S/N..PROB.
														88	T.REL.

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
18	17.2	1F+	2F-	2F-	2F-	2F-	1F+	1F+	1F+	1F+	1F+	-	-	-	MODE
	45	111	102	104	109	20	25	31	43	44	-	-	-	-	ANGLE
	50	99	99	99	99	99	96	82	54	17	-	-	-	-	C.PROB.
	125	125	124	124	125	123	123	124	125	125	-	-	-	-	DELAY
	169	143	151	156	161	163	165	167	169	170	-	-	-	-	NOISE
	257	226	235	241	245	249	252	254	257	258	-	-	-	-	FS.LOSS
	6	48	27	19	15	7	6	5	5	5	-	-	-	-	P. LOSS
	17	-32	-11	0	5	14	15	16	17	17	-	-	-	-	S/N..DB
	85	0	2	16	34	76	80	83	85	86	-	-	-	-	S/N..PROB.
															99 =T.REL.
20	15.4	1F+	2F-	1F+	1F+	1F+	1F+	1F+	1F+	1F+	-	-	-	-	MODE
	51	119	23	22	24	28	34	46	50	-	-	-	-	-	ANGLE
	50	99	99	99	99	96	83	57	19	-	-	-	-	-	C.PROB.
	125	125	123	123	123	124	124	125	125	-	-	-	-	-	DELAY
	167	143	152	157	161	163	165	167	169	-	-	-	-	-	NOISE
	255	226	235	241	245	249	252	254	257	-	-	-	-	-	FS.LOSS
	6	47	20	12	9	7	6	6	6	-	-	-	-	-	P. LOSS
	15	-31	-3	6	11	13	15	15	16	-	-	-	-	-	S/N..DB
	80	0	9	38	58	71	80	79	81	-	-	-	-	-	S/N..PROB.
															96 =T.REL.
22	17.4	1F-	2F-	1F+	1F+	1F+	1F+	1F+	1F+	1F-	-	-	-	-	MODE
	20	125	26	26	28	32	39	52	55	20	-	-	-	-	ANGLE
	50	99	99	99	99	95	81	53	16	22	-	-	-	-	C.PROB.
	118	126	124	124	124	124	125	126	126	118	-	-	-	-	DELAY
	169	148	154	158	161	163	165	167	169	170	-	-	-	-	NOISE
	256	227	235	241	245	249	252	254	257	258	-	-	-	-	FS.LOSS
	1	46	20	13	9	7	7	7	6	1	-	-	-	-	P. LOSS
	22	-29	-1	7	11	13	14	15	16	22	-	-	-	-	S/N..DB
	96	0	14	40	58	71	76	79	81	96	-	-	-	-	S/N..PROB.
															96 =T.REL.
24	16.2	1F-	2F-	1F+	1F+	1F+	1F+	1F+	1F-	1F-	-	-	-	-	MODE
	23	127	28	28	31	37	46	57	23	23	-	-	-	-	ANGLE
	50	99	99	99	99	94	72	31	35	8	-	-	-	-	C.PROB.
	119	126	124	124	124	124	125	126	119	119	-	-	-	-	DELAY
	163	148	154	158	161	163	165	167	169	170	-	-	-	-	NOISE
	255	227	235	241	245	249	252	255	256	258	-	-	-	-	FS.LOSS
	1	46	20	13	9	8	7	7	1	1	-	-	-	-	P. LOSS
	21	-28	-1	7	11	13	14	14	22	22	-	-	-	-	S/N..DB
	95	0	12	39	58	71	76	75	96	96	-	-	-	-	S/N..PROB.
															94 =T.REL.

16 SEP SSN= 110 26.019
 TRANSMITTER TO 150KM TARGET AZIMUTHS N.MILES
 35.00N - 33.00E 46.00N - 73.00E 57.5 264.3 1917.1
 SIGMA= 1000 SQ. METERS ANT= 25DB
 OFF AZIMUTH 0 DEG. MIN. ANGLE= 2 DEG. OFF AZIMUTH 0 DEG.
 PWR=200.00KW 3 MC/S MAN. NOISE = -148 DBW REQ.S/N= 10DB
 OPERATING FREQUENCIES
 GMT MUF 3 5 7 9 11 13 15 17 19 21 23 26 30
 2 14.9
 1F+ 2F- 1F+ 1F+ 1F+ 1F+ 1F+ 1F+ 1F+ - - - - - MODE
 53 104 24 24 27 31 39 53 53 - - - - - ANGLE
 50 99 99 99 99 97 82 48 13 - - - - - C.PROB.
 126 124 123 123 124 124 124 126 126 - - - - - DELAY
 167 148 154 158 161 163 165 167 169 - - - - - NOISE
 254 226 235 241 245 249 252 254 257 - - - - - FS.LOSS
 7 60 25 15 11 8 7 7 7 - - - - - P. LOSS
 14 -42 -5 4 9 12 13 14 16 - - - - - S/N..DB
 74 0 6 29 47 66 71 75 81 - - - - - S/N..PROB.
 93 =T.REL.
 4 24.6
 1F+ - - 1F- 2F- 2F- 2F- 2F- 2F- 1F+ 1F+ 1F+ 1F+ 1F+ MODE
 39 - - 23 96 79 75 76 79 21 25 30 37 37 ANGLE
 50 - - 0 99 99 99 96 91 88 78 63 34 5 C.PROB.
 124 - - 0 124 123 122 122 123 123 123 124 124 124 DELAY
 173 - - 158 161 163 165 167 169 170 171 172 174 175 NOISE
 263 - - 241 245 249 252 254 256 258 260 262 264 266 FS.LOSS
 8 - - 97 45 35 28 23 19 11 9 9 8 7 P. LOSS
 15 - - -72 -24 -14 -6 0 3 12 13 14 16 18 S/N..DB
 79 - - 0 0 0 5 15 25 64 70 75 82 88 S/N..PROB.
 81 =T.REL.
 6 27.8
 1F+ - - - - 2F+ 2F- 2F- 1F+ 1F+ 1F+ 1F+ 1F+ 1F+ MODE
 40 - - - - 138 93 80 26 21 21 24 32 37 ANGLE
 50 - - - - 99 99 98 98 95 89 81 63 27 C.PROB.
 125 - - - - 127 124 123 124 123 123 123 124 124 DELAY
 175 - - - - 163 165 167 169 170 171 172 174 175 NOISE
 265 - - - - 249 252 254 256 258 260 262 264 266 FS.LOSS
 11 - - - - 70 42 35 21 17 15 13 11 9 P. LOSS
 14 - - - - -49 -21 -13 1 5 8 10 13 15 S/N..DB
 72 - - - - 0 0 0 17 31 44 54 68 77 S/N..PROB.
 70 =T.REL.
 8 26.3
 1F+ - - - - 2F+ 2F- 2F- 1F+ 1F+ 1F+ 1F+ 1F+ MODE
 41 - - - - 133 91 80 29 26 28 39 37 ANGLE
 50 - - - - 98 99 96 95 88 77 53 13 C.PROB.
 125 - - - - 127 123 123 124 124 124 125 124 DELAY
 174 - - - - 165 167 169 170 171 172 174 175 NOISE
 264 - - - - 252 254 256 258 260 262 264 266 FS.LOSS
 13 - - - - 67 41 35 21 18 16 13 11 P. LOSS
 10 - - - - -45 -18 -11 1 5 7 10 14 S/N..DB
 52 - - - - 0 0 1 18 32 40 51 72 S/N..PROB.
 49 =T.REL.

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
10	25.3														
	1F+	-	-	-	-	2F+	2F-	2F-	1F+	1F+	1F+	1F+	1F+	1F+	MODE
	50	-	-	-	-	153	111	99	41	34	35	40	47	47	ANGLE
	50	-	-	-	-	99	99	97	97	93	84	70	41	7	C.PROB.
	125	-	-	-	-	129	125	124	125	124	124	125	125	125	DELAY
	173	-	-	-	-	163	165	167	169	170	171	172	174	175	NOISE
	263	-	-	-	-	249	252	254	256	258	260	262	264	266	FS.LOSS
	14	-	-	-	-	77	46	38	25	21	18	15	13	11	P. LOSS
	9	-	-	-	-	-56	-24	-16	-1	2	5	7	10	13	S/N..DB
	49	-	-	-	-	0	0	0	10	21	32	40	51	67	S/N..PROB.
														45	T.REL.
12	24.9														
	1F+	-	-	-	2F+	2F-	2F-	1F+	1F+	1F+	1F+	1F+	1F+	-	MODE
	46	-	-	-	151	103	89	29	26	27	30	36	43	-	ANGLE
	50	-	-	-	99	99	99	99	98	94	84	69	33	-	C.PROB.
	125	-	-	-	129	124	123	124	124	124	124	124	125	-	DELAY
	173	-	-	-	161	163	165	167	169	170	171	172	174	-	NOISE
	263	-	-	-	246	249	252	254	256	258	260	262	264	-	FS.LOSS
	11	-	-	-	78	46	37	22	18	15	13	12	10	-	P. LOSS
	12	-	-	-	-57	-24	-15	0	4	7	9	11	13	-	S/N..DB
	65	-	-	-	0	0	0	15	28	40	48	60	68	-	S/N..PROB.
														64	T.REL.
14	23.9														
	1F+	-	-	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	1F+	1F+	-	MODE
	41	-	-	86	74	73	74	77	83	22	28	36	40	-	ANGLE
	50	-	-	99	99	99	99	98	93	90	78	59	17	-	C.PROB.
	125	-	-	123	122	122	122	123	123	124	124	124	125	-	DELAY
	173	-	-	158	161	163	165	167	169	170	171	172	174	-	NOISE
	262	-	-	241	245	249	252	254	256	258	260	262	264	-	FS.LOSS
	7	-	-	47	33	25	20	17	15	8	7	7	6	-	P. LOSS
	16	-	-	-26	-12	-4	1	5	8	15	16	16	17	-	S/N..DB
	82	-	-	0	1	8	21	33	42	78	83	84	85	-	S/N..PROB.
														91	T.REL.
16	20.1														
	1F+	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	1F+	1F+	1F+	1F+	-	MODE
	45	95	79	78	81	84	20	24	29	38	45	45	45	-	ANGLE
	50	99	99	99	99	99	99	96	86	65	34	9	9	-	C.PROB.
	125	124	123	123	123	123	123	123	124	124	125	125	125	-	DELAY
	171	148	153	157	161	163	165	167	169	170	171	172	172	-	NOISE
	259	226	235	241	245	249	252	254	256	258	260	262	262	-	FS.LOSS
	5	50	28	18	14	12	5	5	5	5	5	5	5	-	P. LOSS
	18	-33	-9	0	6	9	16	17	18	18	17	18	18	-	S/N..DB
	88	0	2	16	36	49	84	86	88	89	87	90	90	-	S/N..PROB.
														99	T.REL.

OPERATING FREQUENCIES														
GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30
18	16.7	1F+	2F-	1F+	1F+	1F+	1F+	1F+	1F+	1F+	-	-	-	-
		53	105	25	24	26	29	33	41	53	53	-	-	-
		50	99	99	99	99	99	94	76	42	10	-	-	-
		126	124	123	123	124	124	124	125	126	126	-	-	-
		168	146	151	156	161	163	165	167	169	170	-	-	-
		256	226	235	241	245	249	252	254	257	259	-	-	-
		6	49	20	12	9	7	6	6	6	6	-	-	-
		15	-33	-4	5	11	13	15	16	16	16	-	-	-
		80	0	8	34	58	71	80	83	81	82	-	-	-
														MODE
														ANGLE
														C.PROB.
														DELAY
														NOISE
														FS.LOSS
														P. LOSS
														S/N..DB
														S/N..PROB.
														98 =T.REL.
20	15.0	1F+	2F-	1F+	1F+	1F+	1F+	1F+	1F+	-	-	-	-	-
		59	113	30	30	32	37	44	59	59	-	-	-	-
		50	99	99	99	99	95	79	49	12	-	-	-	-
		126	125	124	124	124	124	125	126	126	-	-	-	-
		167	146	152	157	161	163	165	167	169	-	-	-	-
		254	226	235	241	245	249	252	255	257	-	-	-	-
		7	48	20	13	9	8	7	7	7	-	-	-	-
		14	-32	-3	6	11	13	14	14	16	-	-	-	-
		74	0	9	38	58	71	76	75	81	-	-	-	-
														MODE
														ANGLE
														C.PROB.
														DELAY
														NOISE
														FS.LOSS
														P. LOSS
														S/N..DB
														S/N..PROB.
														95 =T.REL.
22	14.7	1F+	2F-	1F+	1F+	1F+	1F+	1F+	1F+	-	-	-	-	-
		63	119	34	33	36	41	49	63	63	-	-	-	-
		50	99	99	99	99	94	76	44	9	-	-	-	-
		127	125	124	124	124	125	125	127	127	-	-	-	-
		167	148	154	158	161	163	165	167	169	-	-	-	-
		254	226	235	241	245	249	252	255	257	-	-	-	-
		7	47	21	13	10	8	7	7	7	-	-	-	-
		14	-30	-1	6	10	12	14	14	15	-	-	-	-
		74	0	14	37	52	66	76	75	77	-	-	-	-
														MODE
														ANGLE
														C.PROB.
														DELAY
														NOISE
														FS.LOSS
														P. LOSS
														S/N..DB
														S/N..PROB.
														93 =T.REL.
24	13.7	1F+	2F-	1F+	1F+	1F+	1F+	1F+	1F+	-	-	-	-	-
		66	121	35	36	39	45	57	65	-	-	-	-	-
		50	99	99	99	99	92	64	23	-	-	-	-	-
		127	126	124	124	125	125	126	127	-	-	-	-	-
		166	148	154	158	161	163	165	167	-	-	-	-	-
		253	226	235	241	245	249	252	255	-	-	-	-	-
		8	47	21	13	10	8	8	7	-	-	-	-	-
		13	-29	-1	6	10	12	13	14	-	-	-	-	-
		69	0	12	36	52	66	71	75	-	-	-	-	-
														MODE
														ANGLE
														C.PROB.
														DELAY
														NOISE
														FS.LOSS
														P. LOSS
														S/N..DB
														S/N..PROB.
														91 =T.REL.

OPERATING FREQUENCIES															
GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
10	22.9	2 F	2 E	2 E	2 E	2 F	2 F	2 F	2 F	2 F	2 F	2 F	-	-	MODE
	134	31	32	34	37	102	97	97	100	106	115	135	-	-	ANGLE
	50	99	99	99	99	99	99	99	99	99	86	49	-	-	C.PROB.
	127	120	121	121	121	124	124	124	124	125	125	127	-	-	DELAY
	172	148	154	158	161	163	165	167	169	170	171	172	-	-	NOISE
	262	226	235	241	245	249	252	254	256	258	260	262	-	-	FS.LOSS
	18	437	204	119	78	47	37	30	25	22	20	18	-	-	P. LOSS
	4	-418	-185	-98	-56	-26	-15	-8	-2	0	3	4	-	-	S/N..DB
	29	0	0	0	0	0	0	2	8	15	25	29	-	-	S/N..PROB.
															28 =T.REL.
12	21.4	2 F	2 E	2 E	2 F	2 F	2 F	2 F	2 F	2 F	2 F	2 F	-	-	MODE
	135	32	35	100	91	91	93	97	103	112	128	136	-	-	ANGLE
	50	99	99	99	99	99	99	99	98	87	58	15	-	-	C.PROB.
	127	121	121	124	124	124	124	124	125	125	126	127	-	-	DELAY
	171	148	154	158	161	163	165	167	169	170	171	172	-	-	NOISE
	261	226	235	241	245	249	252	254	256	258	260	262	-	-	FS.LOSS
	15	256	120	58	41	31	25	21	18	16	15	14	-	-	P. LOSS
	7	-237	-100	-38	-20	-10	-3	1	5	6	7	8	-	-	S/N..DB
	42	0	0	0	0	2	10	20	31	36	41	45	-	-	S/N..PROB.
															53 =T.REL.
14	15.6	2 F	2 E	2 F	2 F	2 F	2 F	2 F	2 F	-	-	-	-	-	MODE
	139	44	91	92	95	101	110	127	139	-	-	-	-	-	ANGLE
	50	99	99	99	99	99	95	65	10	-	-	-	-	-	C.PROB.
	127	121	124	124	124	124	125	126	127	-	-	-	-	-	DELAY
	168	148	154	158	161	163	165	167	169	-	-	-	-	-	NOISE
	255	226	235	241	245	249	252	255	257	-	-	-	-	-	FS.LOSS
	13	63	34	22	17	14	13	12	12	-	-	-	-	-	P. LOSS
	9	-45	-15	-2	3	6	8	9	10	-	-	-	-	-	S/N..DB
	46	0	0	11	26	37	45	48	50	-	-	-	-	-	S/N..PROB.
															76 =T.REL.
16	10.1	2 F	2 F	2 F	2 F	2 F	-	-	-	-	-	-	-	-	MODE
	149	112	105	111	126	149	-	-	-	-	-	-	-	-	ANGLE
	50	99	99	99	87	22	-	-	-	-	-	-	-	-	C.PROB.
	128	125	125	125	126	128	-	-	-	-	-	-	-	-	DELAY
	162	148	154	158	161	163	-	-	-	-	-	-	-	-	NOISE
	248	226	235	241	246	249	-	-	-	-	-	-	-	-	FS.LOSS
	16	61	33	22	17	15	-	-	-	-	-	-	-	-	P. LOSS
	3	-43	-14	-2	2	4	-	-	-	-	-	-	-	-	S/N..DB
	27	0	0	11	23	30	-	-	-	-	-	-	-	-	S/N..PROB.
															34 =T.REL.

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
18	10.7														
	1 F	2 F	2 F	2 F	2 F	1 F	-	-	-	-	-	-	-	-	MODE
	27	126	126	144	167	26	-	-	-	-	-	-	-	-	ANGLE
	50	99	99	85	8	39	-	-	-	-	-	-	-	-	C.PROB.
	124	126	126	128	130	124	-	-	-	-	-	-	-	-	DELAY
	163	148	154	158	161	163	-	-	-	-	-	-	-	-	NOISE
	248	227	235	242	246	249	-	-	-	-	-	-	-	-	FS.LOSS
	5	58	32	22	18	5	-	-	-	-	-	-	-	-	P. LOSS
	16	-41	-13	-2	1	16	-	-	-	-	-	-	-	-	S/N..DB
	82	0	1	13	22	84	-	-	-	-	-	-	-	-	S/N..PROB.
															41 =T.REL.
20	11.0														
	1 F	2 F	2 F	2 F	2 F	1 F	1 F	-	-	-	-	-	-	-	MODE
	34	135	136	154	180	34	34	-	-	-	-	-	-	-	ANGLE
	50	99	99	86	13	50	6	-	-	-	-	-	-	-	C.PROB.
	124	127	127	129	132	124	124	-	-	-	-	-	-	-	DELAY
	163	148	154	150	161	163	165	-	-	-	-	-	-	-	NOISE
	249	227	236	242	246	249	252	-	-	-	-	-	-	-	FS.LOSS
	5	57	31	22	18	5	3	-	-	-	-	-	-	-	P. LOSS
	16	-40	-12	-2	1	16	17	-	-	-	-	-	-	-	S/N..DB
	84	0	2	13	22	84	87	-	-	-	-	-	-	-	S/N..PROB.
															52 =T.REL.
22	12.0														
	1 F	2 F	2 F	2 F	2 F	1 F	1 F	-	-	-	-	-	-	-	MODE
	35	135	134	147	181	26	34	-	-	-	-	-	-	-	ANGLE
	50	99	99	96	37	77	23	-	-	-	-	-	-	-	C.PROB.
	124	127	127	128	132	124	124	-	-	-	-	-	-	-	DELAY
	164	148	154	158	161	163	165	-	-	-	-	-	-	-	NOISE
	250	227	236	242	246	249	252	-	-	-	-	-	-	-	FS.LOSS
	4	57	31	22	18	5	3	-	-	-	-	-	-	-	P. LOSS
	17	-40	-12	-2	1	16	17	-	-	-	-	-	-	-	S/N..DB
	87	0	2	13	22	84	87	-	-	-	-	-	-	-	S/N..PROB.
															76 =T.REL.
24	12.3														
	1 F	2 F	2 F	2 F	2 F	1 F	1 F	-	-	-	-	-	-	-	MODE
	31	130	129	140	175	20	31	-	-	-	-	-	-	-	ANGLE
	50	99	99	93	48	76	31	-	-	-	-	-	-	-	C.PROB.
	124	127	127	127	131	123	124	-	-	-	-	-	-	-	DELAY
	165	148	154	158	161	163	165	-	-	-	-	-	-	-	NOISE
	251	227	235	241	246	249	252	-	-	-	-	-	-	-	FS.LOSS
	4	58	31	22	18	5	4	-	-	-	-	-	-	-	P. LOSS
	17	-40	-13	-2	1	16	17	-	-	-	-	-	-	-	S/N..DB
	85	0	1	11	20	84	87	-	-	-	-	-	-	-	S/N..PROB.
															77 =T.REL.

6 DEC SSN= 110 26.019
 TRANSMITTER TO 50 KM TARGET AZIMUTHS N.MILES
 35.00N - 33.00E 46.00N - 73.00E 57.5 264.3 1917.1
 SIGMA= 1000 SQ. METERS ANT= 25DB
 OFF AZIMUTH 0 DEG. MIN. ANGLE= 2 DEG. OFF AZIMUTH 0 DEG.
 PWR=200.00KW 3 MC/S MAN. NOISE = -148 DBW REQ.S/N= 10DB
 OPERATING FREQUENCIES
 GMT MUF 3 5 7 9 11 13 15 17 19 21 23 26 30
 2 10.9
 1F+ 2F- 2F- 2F- 1F+ 1F+ - - - - - - - - - - MODE
 37 120 117 130 22 36 - - - - - - - - - - ANGLE
 50 99 99 88 88 46 - - - - - - - - - - C.PROB.
 124 126 126 127 123 124 - - - - - - - - - - DELAY
 163 148 154 158 161 163 - - - - - - - - - - NOISE
 249 227 235 241 245 249 - - - - - - - - - - FS.LOSS
 8 60 32 22 9 8 - - - - - - - - - - P. LOSS
 13 -42 -13 -2 12 13 - - - - - - - - - - S/N..DB
 70 0 1 11 63 71 - - - - - - - - - - S/N..PROB.
 74 =T.REL.
 4 16.9
 1F+ 2E- 2F- 2F- 2F- 2F- 2F- 2F- 1F+ 1F+ - - - - - MODE
 22 26 95 92 95 103 120 133 22 22 - - - - - ANGLE
 50 99 99 99 99 97 68 17 48 11 - - - - - C.PROB.
 123 120 124 124 124 125 126 127 123 123 - - - - - DELAY
 169 148 154 158 161 163 165 167 169 170 - - - - - NOISE
 256 226 235 241 245 249 252 255 256 258 - - - - - FS.LOSS
 5 116 47 30 22 18 15 14 5 4 - - - - - P. LOSS
 17 -98 -28 -10 -1 3 5 7 18 18 - - - - - S/N..DB
 85 0 0 2 13 27 34 40 88 89 - - - - - S/N..PROB.
 58 =T.REL.
 6 25.5
 2F- 2E- 2E- 2E- 2F+ 2F- 2F- 2F- 2F- 2F- 2F- 2F- 2F- - MODE
 117 23 24 26 119 90 83 82 84 87 91 99 117 - ANGLE
 50 99 99 99 99 99 99 99 99 99 96 83 42 - C.PROB.
 126 120 120 120 126 124 123 123 123 123 124 124 126 - DELAY
 174 148 154 158 161 163 165 167 169 170 171 172 174 - NOISE
 264 226 235 240 246 249 252 254 256 258 260 262 264 - FS.LOSS
 14 336 159 94 57 39 31 26 22 19 17 15 14 - P. LOSS
 9 -317 -140 -74 -36 -18 -9 -3 1 4 6 7 9 - S/N..DB
 45 0 0 0 0 0 2 7 17 27 36 40 46 - S/N..PROB.
 57 =T.REL.
 8 25.5
 2F- 2E- 2E- 2E- 2E- 2F- 2F- 2F- 2F- 2F- 2F- 2F- 2F- - MODE
 122 23 23 25 27 108 92 88 88 91 96 103 122 - ANGLE
 50 99 99 99 99 99 99 99 99 99 99 89 38 - C.PROB.
 126 120 120 120 120 125 124 124 124 124 124 125 126 - DELAY
 174 148 154 158 161 163 165 167 169 170 171 172 174 - NOISE
 264 226 235 241 245 249 252 254 256 258 260 262 264 - FS.LOSS
 17 463 219 128 85 49 40 33 27 23 21 18 17 - P. LOSS
 7 -445 -199 -108 -63 -28 -18 -10 -4 -0 2 4 7 - S/N..DB
 37 0 0 0 0 0 0 1 5 13 22 29 38 - S/N..PROB.
 36 =T.REL.

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
10	23.7														
	2F-	2E-	2E-	2E-	2F+	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	-	MODE
	125	23	24	25	124	96	89	89	91	96	103	116	126	-	ANGLE
	50	99	99	99	99	99	99	99	99	99	93	65	8	-	C.PROB.
	126	120	120	120	126	124	124	124	124	124	125	126	126	-	DELAY
	173	148	154	158	161	163	165	167	169	170	171	172	174	-	NOISE
	262	226	235	241	246	249	252	254	256	258	260	262	264	-	FS.LOSS
	17	430	203	119	67	48	38	31	26	22	20	18	16	-	P. LOSS
	6	-412	-183	-99	-47	-26	-16	-8	-2	0	3	5	7	-	S/N..DB
	34	0	0	0	0	0	0	2	8	15	25	32	38	-	S/N..PROB.
														33	T.REL.
12	22.1														
	2F-	2E-	2E-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	-	-	MODE
	126	24	26	95	84	83	85	88	93	100	112	127	-	-	ANGLE
	50	99	99	99	99	99	99	99	99	92	69	29	-	-	C.PROB.
	126	120	120	124	123	123	123	124	124	124	125	126	-	-	DELAY
	172	148	154	158	161	163	165	167	169	170	171	172	-	-	NOISE
	261	226	235	241	245	249	252	254	256	258	260	262	-	-	FS.LOSS
	15	253	120	59	42	31	25	21	18	16	15	14	-	-	P. LOSS
	8	-235	-101	-39	-21	-10	-3	1	5	7	8	8	-	-	S/N..DB
	43	0	0	0	0	2	10	20	31	40	44	45	-	-	S/N..PROB.
														57	T.REL.
14	19.9														
	1F+	2E-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	-	1F+	-	-	-	MODE
	21	33	83	84	87	92	100	113	130	-	21	-	-	-	ANGLE
	50	99	99	99	99	99	97	75	22	-	21	-	-	-	C.PROB.
	123	121	123	123	123	124	124	125	127	-	123	-	-	-	DELAY
	170	148	154	158	161	163	165	167	169	-	171	-	-	-	NOISE
	259	226	235	241	245	249	252	254	257	-	260	-	-	-	FS.LOSS
	3	64	35	23	17	14	12	12	12	-	3	-	-	-	P. LOSS
	19	-46	-15	-2	3	6	8	10	10	-	20	-	-	-	S/N..DB
	92	0	0	11	26	37	45	53	50	-	94	-	-	-	S/N..PROB.
														79	T.REL.
16	13.1														
	1F+	2F-	2F-	2F-	2F-	2F-	1F+	1F+	-	-	-	-	-	-	MODE
	26	106	98	103	115	141	25	26	-	-	-	-	-	-	ANGLE
	50	99	99	99	91	31	52	9	-	-	-	-	-	-	C.PROB.
	124	125	124	125	125	128	123	124	-	-	-	-	-	-	DELAY
	165	148	154	158	161	163	165	167	-	-	-	-	-	-	NOISE
	252	226	235	241	246	249	252	254	-	-	-	-	-	-	FS.LOSS
	6	62	34	22	17	15	6	5	-	-	-	-	-	-	P. LOSS
	15	-45	-14	-2	3	5	15	17	-	-	-	-	-	-	S/N..DB
	80	0	0	11	26	34	80	86	-	-	-	-	-	-	S/N..PROB.
														60	T.REL.

		OPERATING FREQUENCIES															
GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30			
18	10.3																
	1F+	2F-	2F-	2F-	1F+	1F+	-	-	-	-	-	-	-	-	MODE		
	36	120	118	133	23	35	-	-	-	-	-	-	-	-	ANGLE		
	50	99	99	90	89	26	-	-	-	-	-	-	-	-	C.PROB.		
	124	126	126	127	123	124	-	-	-	-	-	-	-	-	DELAY		
	162	148	154	158	161	163	-	-	-	-	-	-	-	-	NOISE		
	248	227	235	241	245	249	-	-	-	-	-	-	-	-	FS.LOSS		
	8	60	32	22	9	7	-	-	-	-	-	-	-	-	P. LOSS		
	12	-42	-13	-2	11	13	-	-	-	-	-	-	-	-	S/N..DB		
	67	0	1	13	58	71	-	-	-	-	-	-	-	-	S/N..PROB.		
															66	T.REL.	
20	11.4																
	1F-	2F-	2F-	1F+	1F+	1F-	1F-	-	-	-	-	-	-	-	MODE		
	26	128	128	20	28	21	25	-	-	-	-	-	-	-	ANGLE		
	50	99	99	99	92	62	11	-	-	-	-	-	-	-	C.PROB.		
	124	127	126	123	124	123	123	-	-	-	-	-	-	-	DELAY		
	164	148	154	158	161	163	165	-	-	-	-	-	-	-	NOISE		
	249	227	235	241	245	249	252	-	-	-	-	-	-	-	FS.LOSS		
	5	58	32	12	9	5	4	-	-	-	-	-	-	-	P. LOSS		
	17	-41	-13	7	11	16	17	-	-	-	-	-	-	-	S/N..DB		
	85	0	1	40	58	84	87	-	-	-	-	-	-	-	S/N..PROB.		
															87	T.REL.	
22	12.4																
	1F-	2F-	2F-	2F-	1F+	1F+	1F-	-	-	-	-	-	-	-	MODE		
	26	128	127	138	25	37	26	-	-	-	-	-	-	-	ANGLE		
	50	99	99	97	98	67	34	-	-	-	-	-	-	-	C.PROB.		
	124	127	126	127	123	124	124	-	-	-	-	-	-	-	DELAY		
	165	148	154	158	161	163	165	-	-	-	-	-	-	-	NOISE		
	251	227	235	241	245	249	252	-	-	-	-	-	-	-	FS.LOSS		
	4	58	32	22	9	8	4	-	-	-	-	-	-	-	P. LOSS		
	17	-41	-13	-2	11	13	17	-	-	-	-	-	-	-	S/N..DB		
	85	0	1	13	58	71	87	-	-	-	-	-	-	-	S/N..PROB.		
															81	T.REL.	
24	12.8																
	1F-	2F-	2F-	2F-	1F+	1F+	1F-	1F-	-	-	-	-	-	-	MODE		
	23	124	121	131	21	31	22	22	-	-	-	-	-	-	ANGLE		
	50	99	99	95	95	69	44	6	-	-	-	-	-	-	C.PROB.		
	123	126	126	127	123	124	123	123	-	-	-	-	-	-	DELAY		
	165	148	154	158	161	163	165	167	-	-	-	-	-	-	NOISE		
	251	227	235	241	245	249	252	254	-	-	-	-	-	-	FS.LOSS		
	4	59	32	22	9	7	4	3	-	-	-	-	-	-	P. LOSS		
	17	-42	-13	-2	12	13	17	19	-	-	-	-	-	-	S/N..DB		
	86	0	1	11	63	71	87	92	-	-	-	-	-	-	S/N..PROB.		
															82	T.REL.	

11 DEC SSN= 110 26.019
 TRANSMITTER TO 100KM TARGET AZIMUTHS N.MILES
 35.00N - 33.00E 46.00N - 73.00E 57.5 264.3 1917.1
 SIGMA= 1000 SQ. METERS ANT= 25DB
 OFF AZIMUTH 0 DEG. MIN. ANGLE= 2 DEG. OFF AZIMUTH 0 DEG.
 PWR=200.00KW 3 MC/S MAN. NOISE = -148 DBW REQ.S/N= 10DB
 OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
2	10.5														
	1F+	2F-	1F+	1F+	1F+	1F+	-	-	-	-	-	-	-	-	MODE
	46	114	21	23	31	45	-	-	-	-	-	-	-	-	ANGLE
	50	99	99	99	83	33	-	-	-	-	-	-	-	-	C.PROB.
	125	125	123	123	124	125	-	-	-	-	-	-	-	-	DELAY
	163	148	154	158	161	163	-	-	-	-	-	-	-	-	NOISE
	248	226	235	241	245	249	-	-	-	-	-	-	-	-	FS.LOSS
	8	47	20	12	9	8	-	-	-	-	-	-	-	-	P. LOSS
	12	-30	-1	7	11	12	-	-	-	-	-	-	-	-	S/N..DB
	63	0	12	39	58	66	-	-	-	-	-	-	-	-	S/N..PROB.
															76 =T.REL.
4	16.3														
	1F+	2E+	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	-	-	-	-	MODE
	31	51	89	84	87	94	107	22	30	30	-	-	-	-	ANGLE
	50	99	99	99	99	99	78	78	34	5	-	-	-	-	C.PROB.
	124	122	123	123	123	124	124	123	124	124	-	-	-	-	DELAY
	168	148	154	158	161	163	165	167	169	170	-	-	-	-	NOISE
	256	226	235	241	245	249	252	254	256	258	-	-	-	-	FS.LOSS
	6	140	38	25	18	15	13	6	6	5	-	-	-	-	P. LOSS
	16	-122	-18	-4	2	5	8	16	17	17	-	-	-	-	S/N..DB
	83	0	0	7	23	34	45	83	85	86	-	-	-	-	S/N..PROB.
															78 =T.REL.
6	29.7														
	1F+	2E+	2E+	2E+	2F+	2F-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	MODE	
	24	46	48	51	123	84	76	74	75	77	81	87	103	23	ANGLE
	50	99	99	99	99	99	99	99	99	99	98	90	57	46	C.PROB.
	123	121	121	122	126	123	122	122	122	123	123	123	124	123	DELAY
	175	148	154	158	161	163	165	167	169	170	171	172	174	175	NOISE
	266	226	235	241	245	249	252	254	256	258	260	262	264	266	FS.LOSS
	5	408	193	114	62	31	25	21	18	16	14	13	12	5	P. LOSS
	18	-390	-174	-94	-35	-10	-3	1	5	7	9	10	11	19	S/N..DB
	90	0	0	0	0	1	8	18	30	39	48	54	57	90	S/N..PROB.
															83 =T.REL.
8	30.2														
	1F+	2E+	2E+	2E+	2F+	2F-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	MODE	
	28	46	47	49	53	120	86	80	80	82	86	91	109	27	ANGLE
	50	99	99	99	99	99	99	99	99	99	99	95	57	53	C.PROB.
	124	121	121	121	122	126	123	123	123	123	123	123	125	124	DELAY
	176	148	154	158	161	163	165	167	169	170	171	172	174	175	NOISE
	266	226	235	241	245	248	252	254	256	258	260	262	264	266	FS.LOSS
	7	563	265	156	103	46	32	26	22	19	17	16	14	7	P. LOSS
	18	-545	-246	-135	-82	-24	-10	-4	0	3	6	7	9	18	S/N..DB
	88	0	0	0	0	0	1	6	14	24	36	40	46	88	S/N..PROB.
															68 =T.REL.

OPERATING FREQUENCIES															
GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
10	28.3	1F+	2E+	2E+	2E+	2F+	2-	1F+	2F-	2F-	2F-	2F-	2F-	1F+	1F+
		29	46	48	51	130	91	21	80	82	86	92	101	20	28
		50	99	99	99	99	99	99	99	99	99	97	79	85	19
		124	121	121	122	127	123	123	123	123	123	123	124	123	124
		175	148	154	158	161	163	165	167	169	170	171	172	174	175
		265	226	235	241	246	249	252	254	256	258	260	262	264	266
		7	523	247	144	67	38	22	25	21	18	16	15	7	7
		17	-505	-227	-124	-46	-17	0	-2	2	4	6	8	17	18
		85	0	0	0	0	0	14	9	20	27	36	44	85	88
															86
															T.REL.
12	26.3	1F+	2E+	2E+	2F-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	-	MODE
		29	48	52	90	77	75	76	79	83	89	99	117	27	ANGLE
		50	99	99	99	99	99	99	99	99	95	80	48	54	C.PROB.
		124	121	122	123	122	122	122	123	123	123	124	125	124	DELAY
		174	148	154	158	161	163	165	167	169	170	171	172	174	NOISE
		264	226	235	241	245	249	252	254	256	258	260	262	264	FS.LOSS
		6	307	145	47	34	25	20	17	15	13	13	13	5	P. LOSS
		18	-289	-126	-26	-12	-4	1	5	8	9	10	10	18	S/N..DB
		89	0	0	0	1	8	21	33	42	47	53	54	88	S/N..PROB.
															72
															T.REL.
14	19.1	1F+	2E-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	1F+	-	-	-	MODE
		30	23	76	76	79	83	90	101	121	28	29	-	-	ANGLE
		50	99	99	99	99	99	99	84	39	53	8	-	-	C.PROB.
		124	120	122	122	123	123	124	124	126	124	124	-	-	DELAY
		170	148	154	158	161	163	165	167	169	170	171	-	-	NOISE
		258	226	235	241	245	249	252	254	257	258	260	-	-	FS.LOSS
		4	50	28	18	14	12	11	10	11	4	4	-	-	P. LOSS
		18	-33	-8	1	6	9	10	11	12	18	19	-	-	S/N..DB
		89	0	3	20	36	49	54	59	62	89	92	-	-	S/N..PROB.
															89
															T.REL.
16	12.6	1F+	2F-	2F-	2F-	2F-	1F+	1F+	-	-	-	-	-	-	MODE
		35	101	90	94	105	22	34	-	-	-	-	-	-	ANGLE
		50	99	99	99	95	89	38	-	-	-	-	-	-	C.PROB.
		124	124	123	124	124	123	124	-	-	-	-	-	-	DELAY
		165	148	154	158	161	163	165	-	-	-	-	-	-	NOISE
		251	226	235	241	245	249	252	-	-	-	-	-	-	FS.LOSS
		6	49	27	18	15	7	6	-	-	-	-	-	-	P. LOSS
		15	-31	-8	1	5	14	15	-	-	-	-	-	-	S/N..DB
		78	0	3	20	32	76	80	-	-	-	-	-	-	S/N..PROB.
															85
															T.REL.

		OPERATING FREQUENCIES														
GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30		
18	9.9															
	1F+	2F-	1F+	1F+	1F+	1F+	-	-	-	-	-	-	-	-	MODE	
	44	113	21	24	33	43	-	-	-	-	-	-	-	-	ANGLE	
	50	99	99	99	82	16	-	-	-	-	-	-	-	-	C.PROB.	
	125	125	123	123	124	125	-	-	-	-	-	-	-	-	DELAY	
	162	148	154	158	161	163	-	-	-	-	-	-	-	-	NOISE	
	247	226	235	241	245	249	-	-	-	-	-	-	-	-	FS.LOSS	
	9	47	20	12	9	8	-	-	-	-	-	-	-	-	P. LOSS	
	11	-30	-1	7	11	12	-	-	-	-	-	-	-	-	S/N..DB	
	59	0	15	40	58	66	-	-	-	-	-	-	-	-	S/N..PROB.	
															73	T.REL.
20	10.3															
	1F+	2F-	1F+	1F+	1F+	1F+	-	-	-	-	-	-	-	-	MODE	
	51	122	26	29	38	51	-	-	-	-	-	-	-	-	ANGLE	
	50	99	99	99	87	27	-	-	-	-	-	-	-	-	C.PROB.	
	126	126	124	124	124	125	-	-	-	-	-	-	-	-	DELAY	
	162	148	154	158	161	163	-	-	-	-	-	-	-	-	NOISE	
	248	226	235	241	245	249	-	-	-	-	-	-	-	-	FS.LOSS	
	9	46	20	13	10	8	-	-	-	-	-	-	-	-	P. LOSS	
	11	-29	-1	7	10	12	-	-	-	-	-	-	-	-	S/N..DB	
	61	0	15	40	52	66	-	-	-	-	-	-	-	-	S/N..PROB.	
															73	T.REL.
22	11.2															
	1F+	2F-	1F+	1F+	1F+	1F+	1F+	-	-	-	-	-	-	-	MODE	
	52	122	25	27	34	49	51	-	-	-	-	-	-	-	ANGLE	
	50	99	99	99	96	56	8	-	-	-	-	-	-	-	C.PROB.	
	126	126	123	124	124	125	126	-	-	-	-	-	-	-	DELAY	
	164	148	154	158	161	163	165	-	-	-	-	-	-	-	NOISE	
	249	226	235	241	245	249	252	-	-	-	-	-	-	-	FS.LOSS	
	8	46	20	13	9	8	7	-	-	-	-	-	-	-	P. LOSS	
	13	-29	-1	7	11	12	13	-	-	-	-	-	-	-	S/N..DB	
	67	0	15	40	58	66	71	-	-	-	-	-	-	-	S/N..PROB.	
															84	T.REL.
24	11.5															
	1F+	2F-	1F+	1F+	1F+	1F+	1F+	-	-	-	-	-	-	-	MODE	
	48	118	23	24	30	42	48	-	-	-	-	-	-	-	ANGLE	
	50	99	99	99	93	61	11	-	-	-	-	-	-	-	C.PROB.	
	125	125	123	123	124	125	125	-	-	-	-	-	-	-	DELAY	
	164	148	154	158	161	163	165	-	-	-	-	-	-	-	NOISE	
	250	226	235	241	245	249	252	-	-	-	-	-	-	-	FS.LOSS	
	8	47	20	12	9	8	7	-	-	-	-	-	-	-	P. LOSS	
	13	-29	-1	7	11	12	14	-	-	-	-	-	-	-	S/N..DB	
	68	0	12	39	58	66	76	-	-	-	-	-	-	-	S/N..PROB.	
															84	T.REL.

16 DEC SSN= 110 26.019
 TRANSMITTER TO 150KM TARGET AZIMUTHS N.MILES
 35.00N - 33.00E 46.00N - 73.00E 57.5 264.3 1917.1
 SIGMA= 1000 SQ. METERS ANT= 25DB
 OFF AZIMUTH 0 DEG. MIN. ANGLE= 2 DEG. OFF AZIMUTH 0 DEG.
 PWR=200.00KW 3 MC/S MAN. NOISE = -148 DBW REQ.S/N= 10DB

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
2	10.2														
	1F+	2F-	1F+	1F+	1F+	1F+	-	-	-	-	-	-	-	-	MODE
	54	108	28	31	41	53	-	-	-	-	-	-	-	-	ANGLE
	50	99	99	98	73	23	-	-	-	-	-	-	-	-	C.PROB.
	126	125	124	124	125	126	-	-	-	-	-	-	-	-	DELAY
	162	148	154	158	161	163	-	-	-	-	-	-	-	-	NOISE
	248	226	235	241	245	249	-	-	-	-	-	-	-	-	FS.LOSS
	9	48	20	13	10	9	-	-	-	-	-	-	-	-	P. LOSS
	11	-31	-1	6	10	12	-	-	-	-	-	-	-	-	S/N..DB
	60	0	12	36	52	66	-	-	-	-	-	-	-	-	S/N..PROB.
															67 =T.REL.
4	15.7														
	1F+	-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	-	-	-	-	-	MODE
	40	-	82	76	78	84	24	33	39	-	-	-	-	-	ANGLE
	50	-	99	99	99	99	96	68	21	-	-	-	-	-	C.PROB.
	125	-	123	122	123	123	123	124	125	-	-	-	-	-	DELAY
	168	-	154	158	161	163	165	167	169	-	-	-	-	-	NOISE
	255	-	235	241	245	249	252	254	256	-	-	-	-	-	FS.LOSS
	7	-	38	25	18	15	7	7	6	-	-	-	-	-	P. LOSS
	15	-	-19	-4	2	6	14	15	16	-	-	-	-	-	S/N..DB
	77	-	0	7	23	37	76	79	81	-	-	-	-	-	S/N..PROB.
															93 =T.REL.
6	28.6														
	1F+	-	-	-	2F+	2F-	1F+	2F-	2F-	2F-	2F-	2F-	1F+	1F+	MODE
	33	-	-	-	126	79	21	66	66	68	71	76	23	32	ANGLE
	50	-	-	-	99	99	99	99	99	99	99	95	82	32	C.PROB.
	124	-	-	-	126	123	123	122	122	122	122	122	123	124	DELAY
	175	-	-	-	161	163	165	167	169	170	171	172	174	175	NOISE
	265	-	-	-	246	249	252	254	256	258	260	261	264	266	FS.LOSS
	6	-	-	-	56	32	18	21	18	15	14	13	6	6	P. LOSS
	18	-	-	-	-35	-10	3	1	5	7	9	10	18	19	S/N..DB
	89	-	-	-	0	1	25	18	30	39	48	54	88	90	S/N..PROB.
															91 =T.REL.
8	29.1														
	1F+	-	-	-	-	2F+	2F-	1F+	2F-	2F-	2F-	2F-	1F+	1F+	MODE
	37	-	-	-	-	125	80	24	71	73	76	80	25	35	ANGLE
	50	-	-	-	-	99	99	99	99	99	99	98	91	33	C.PROB.
	124	-	-	-	-	126	123	123	122	122	122	123	123	124	DELAY
	175	-	-	-	-	163	165	167	169	170	171	172	174	175	NOISE
	266	-	-	-	-	249	252	254	256	258	260	261	264	266	FS.LOSS
	8	-	-	-	-	55	32	19	22	19	17	15	8	7	P. LOSS
	16	-	-	-	-	-34	-10	3	0	4	6	8	16	17	S/N..DB
	83	-	-	-	-	0	1	24	14	27	36	44	82	84	S/N..PROB.
															89 =T.REL.

OPERATING FREQUENCIES

GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30	
10	27.3														
	1F+	-	-	-	2F+	2F-	1F+	2F-	2F-	2F-	2F-	1F+	1F+	1F+	MODE
	38	-	-	-	134	86	29	72	73	76	81	23	32	37	ANGLE
	50	-	-	-	99	99	99	99	99	99	99	98	73	8	C.PROB.
	124	-	-	-	127	123	124	122	122	122	123	123	124	124	DELAY
	174	-	-	-	161	163	165	167	169	170	171	172	174	175	NOISE
	265	-	-	-	246	249	252	254	256	258	260	262	264	266	FS.LOSS
	8	-	-	-	66	38	22	25	21	18	16	9	8	7	P. LOSS
	15	-	-	-	-45	-17	0	-2	2	5	7	14	16	17	S/N..DB
	80	-	-	-	0	0	14	9	20	31	40	75	82	84	S/N..PROB.
														85	T.REL.
12	25.4														
	1F+	-	-	2F-	2F-	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	-	MODE
	37	-	-	86	69	67	68	70	74	79	21	27	37	-	ANGLE
	50	-	-	99	99	99	99	99	99	98	96	82	37	-	C.PROB.
	124	-	-	123	122	122	122	122	122	123	123	124	124	-	DELAY
	173	-	-	158	161	163	165	167	169	170	171	172	174	-	NOISE
	263	-	-	241	245	249	251	254	256	258	260	262	264	-	FS.LOSS
	6	-	-	47	34	26	20	17	15	13	7	6	6	-	P. LOSS
	17	-	-	-27	-13	-4	1	5	8	10	16	17	18	-	S/N..DB
	88	-	-	0	1	8	21	33	42	52	83	87	88	-	S/N..PROB.
														93	T.REL.
14	18.5														
	1F+	2F+	2F-	2F-	2F-	2F-	2F-	1F+	1F+	1F+	-	-	-	-	MODE
	38	119	68	68	70	74	80	21	29	38	-	-	-	-	ANGLE
	50	99	99	99	99	99	99	97	79	34	-	-	-	-	C.PROB.
	124	126	122	122	122	122	123	123	124	124	-	-	-	-	DELAY
	170	148	154	158	161	163	165	167	169	170	-	-	-	-	NOISE
	258	226	235	241	245	249	252	254	256	258	-	-	-	-	FS.LOSS
	5	51	28	18	14	12	10	5	5	5	-	-	-	-	P. LOSS
	18	-33	-9	1	6	9	11	17	18	18	-	-	-	-	S/N..DB
	88	0	2	20	36	49	60	86	88	89	-	-	-	-	S/N..PROB.
														95	T.REL.
16	12.2														
	1F+	2F-	2F-	2F-	1F+	1F+	1F+	-	-	-	-	-	-	-	MODE
	43	96	82	86	24	32	43	-	-	-	-	-	-	-	ANGLE
	50	99	99	99	99	83	26	-	-	-	-	-	-	-	C.PROB.
	125	124	123	123	123	124	125	-	-	-	-	-	-	-	DELAY
	165	148	154	158	161	163	165	-	-	-	-	-	-	-	NOISE
	251	226	235	241	245	249	252	-	-	-	-	-	-	-	FS.LOSS
	7	50	28	18	9	7	7	-	-	-	-	-	-	-	P. LOSS
	14	-32	-8	1	11	13	14	-	-	-	-	-	-	-	S/N..DB
	72	0	3	20	58	71	76	-	-	-	-	-	-	-	S/N..PROB.
														87	T.REL.

		OPERATING FREQUENCIES														
GMT	MUF	3	5	7	9	11	13	15	17	19	21	23	26	30		
18	9.6															
	1F+	2F-	1F+	1F+	1F+	1F+	-	-	-	-	-	-	-	-	MODE	
	52	108	28	32	44	52	-	-	-	-	-	-	-	-	ANGLE	
	50	99	99	99	73	9	-	-	-	-	-	-	-	-	C.PROB.	
	126	125	124	124	125	126	-	-	-	-	-	-	-	-	DELAY	
	162	148	154	158	161	163	-	-	-	-	-	-	-	-	NOISE	
	247	226	235	241	245	249	-	-	-	-	-	-	-	-	FS.LOSS	
	10	48	20	13	10	8	-	-	-	-	-	-	-	-	P. LOSS	
	11	-31	-1	6	10	12	-	-	-	-	-	-	-	-	S/N..DB	
	56	0	15	37	52	66	-	-	-	-	-	-	-	-	S/N..PROB.	
															64 =T.REL.	
20	9.9															
	1F+	2F-	1F+	1F+	1F+	1F+	-	-	-	-	-	-	-	-	MODE	
	59	116	34	37	48	59	-	-	-	-	-	-	-	-	ANGLE	
	50	99	99	99	81	18	-	-	-	-	-	-	-	-	C.PROB.	
	126	125	124	124	125	126	-	-	-	-	-	-	-	-	DELAY	
	162	148	154	158	161	163	-	-	-	-	-	-	-	-	NOISE	
	247	226	235	241	246	249	-	-	-	-	-	-	-	-	FS.LOSS	
	10	47	21	13	10	9	-	-	-	-	-	-	-	-	P. LOSS	
	10	-30	-1	6	10	11	-	-	-	-	-	-	-	-	S/N..DB	
	53	0	15	37	52	60	-	-	-	-	-	-	-	-	S/N..PROB.	
															68 =T.REL.	
22	10.8															
	1F+	2F-	1F+	1F+	1F+	1F+	-	-	-	-	-	-	-	-	MODE	
	60	116	33	35	43	59	-	-	-	-	-	-	-	-	ANGLE	
	50	99	99	99	94	45	-	-	-	-	-	-	-	-	C.PROB.	
	126	125	124	124	125	126	-	-	-	-	-	-	-	-	DELAY	
	163	148	154	158	161	163	-	-	-	-	-	-	-	-	NOISE	
	249	226	235	241	245	249	-	-	-	-	-	-	-	-	FS.LOSS	
	9	47	21	13	10	9	-	-	-	-	-	-	-	-	P. LOSS	
	11	-30	-1	6	10	11	-	-	-	-	-	-	-	-	S/N..DB	
	59	0	15	37	52	60	-	-	-	-	-	-	-	-	S/N..PROB.	
															77 =T.REL.	
24	11.1															
	1F+	2F-	1F+	1F+	1F+	1F+	-	-	-	-	-	-	-	-	MODE	
	57	112	30	32	39	55	56	-	-	-	-	-	-	-	ANGLE	
	50	99	99	99	90	53	6	-	-	-	-	-	-	-	C.PROB.	
	126	125	124	124	124	126	126	-	-	-	-	-	-	-	DELAY	
	163	148	154	158	161	163	165	-	-	-	-	-	-	-	NOISE	
	249	226	235	241	245	249	252	-	-	-	-	-	-	-	FS.LOSS	
	9	48	20	13	10	9	8	-	-	-	-	-	-	-	P. LOSS	
	11	-30	-1	6	10	11	13	-	-	-	-	-	-	-	S/N..DB	
	61	0	12	36	52	60	71	-	-	-	-	-	-	-	S/N..PROB.	
															78 =T.REL.	