

260665

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BEFORE PROCEEDING

APPROVED BY OMB 3060-0589

FEDERAL COMMUNICATIONS COMMISSION
REMITTANCE ADVICE

PAGE NO. 1 OF 1

SPECIAL USE
ORIGINAL
FCC USE ONLY
FCC/MELLOW
SEP 06 2000

(1) LOCKBOX # 358210

SECTION A - PAYER INFORMATION

(2) PAYER NAME (if paying by credit card, enter name exactly as it appears on your card) Hogan & Hartson, L.L.P.		(3) TOTAL AMOUNT PAID (dollars and cents) \$ 640.00
(4) STREET ADDRESS LINE NO. 1 Columbia Square		
(5) STREET ADDRESS LINE NO. 2 555 Thirteenth Street, N.W.		
(6) CITY Washington	(7) STATE DC	(8) ZIP CODE 20004
(9) DAYTIME TELEPHONE NUMBER (Include area code) 202-637-5767	(10) COUNTRY CODE (if not in U.S.A.)	

IF PAYER NAME THE AND APPLICANT NAME ARE DIFFERENT
IF MORE THAN ONE APPLICANT, USE CONTINUATION SHEETS (FORM 159-C)

SECTION B - APPLICANT INFORMATION

(11) APPLICANT NAME (if paying by credit card, enter name exactly as it appears on your card) GE American Communications, Inc.		
(12) STREET ADDRESS LINE NO. 1 Four Research Way		
(13) STREET ADDRESS LINE NO. 2		
(14) CITY Princeton	(15) STATE NJ	(16) ZIP CODE 08540-6684
(17) DAYTIME TELEPHONE NUMBER (Include area code) 609-987-4000	(18) COUNTRY CODE (if not in U.S.A.)	

KS29 SAT-STA-20000906-00130
GE AMERICAN COMMUNICATIONS, INC.
SATCOM SN-4

COMPLETE SECTION C FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEETS (FORM 159-C)

SECTION C - PAYMENT INFORMATION

(19A) FCC CALL SIGN/OTHER ID	(20A) PAYMENT TYPE CODE (PTC)	(21A) QUANTITY	(22A) FEE DUE FOR (PTC) IN BLOCK 20A	FCC USE ONLY
Satcom SN-4	C R Y	1	\$ 640.00	
(23A) FCC CODE 1		(24A) FCC CODE 2		
(19B) FCC CALL SIGN/OTHER ID	(20B) PAYMENT TYPE CODE (PTC)	(21B) QUANTITY	(22B) FEE DUE FOR (PTC) IN BLOCK 20B	FCC USE ONLY
			\$	
(23B) FCC CODE 1		(24B) FCC CODE 2		
(19C) FCC CALL SIGN/OTHER ID	(20C) PAYMENT TYPE CODE (PTC)	(21C) QUANTITY	(22C) FEE DUE FOR (PTC) IN BLOCK 20C	FCC USE ONLY
			\$	
(23C) FCC CODE 1		(24C) FCC CODE 2		
(19D) FCC CALL SIGN/OTHER ID	(20D) PAYMENT TYPE CODE (PTC)	(21D) QUANTITY	(22D) FEE DUE FOR (PTC) IN BLOCK 20D	FCC USE ONLY
			\$	
(23D) FCC CODE 1		(24D) FCC CODE 2		

HOGAN & HARTSON
L.L.P.

KARIS A. HASTINGS
COUNSEL
DIRECT DIAL (202) 637-5767
INTERNET KAH@DC2.HHLAW.COM

COLUMBIA SQUARE
555 THIRTEENTH STREET, NW
WASHINGTON, DC 20004-1109
TEL (202) 637-5600
FAX (202) 637-5910

September 6, 2000

BY HAND DELIVERY

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
International Bureau-Satellites
P.O. Box 358210
Pittsburgh, PA 15251-5210

KS29 SAT-STA-20000906-00130
GE AMERICAN COMMUNICATIONS, INC.
SATCOM SN-4

EXPEDITED ACTION REQUESTED

**Re: Request of GE American Communications, Inc. for
Special Temporary Authority to Operate Satcom SN-4 at
172° E.L.**

Dear Ms. Salas:

Attached on behalf of GE American Communications, Inc. ("GE Americom") is a request for Special Temporary Authority to permit GE Americom to operate its Satcom SN-4 spacecraft at 172° E.L. for a period of up to six months. Grant of the requested STA will serve the public interest by permitting GE Americom to use Satcom SN-4 to initiate service from the 172° E.L. location, which is assigned to GE Americom's recently-acquired subsidiary, Columbia Communications Corporation ("Columbia").

GE Americom seeks expedited action on this STA request to permit GE Americom to initiate service at the 172° E.L. location as soon as possible.

HOGAN & HARTSON L.L.P.

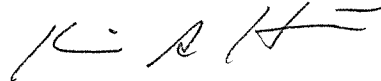
Ms. Magalie Roman Salas

September 6, 2000

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Enclosed are a completed Form 159 and a check in the amount of \$640 payable to the Federal Communications Commission for the required filing fee. Please address any questions regarding this request to the undersigned.

Respectfully submitted,



Karis A. Hastings
Counsel for GE American
Communications, Inc.

Enclosures

cc: Columbia, Maryland Operations Center
Cassandra Thomas
Fern Jarmulnek
Michael McCain
Kathleen Campbell

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of Application by)
)
GE AMERICAN COMMUNICATIONS, INC.) File No.
)
For Special Temporary Authority to)
Operate Satcom SN-4 at 172° E.L.)

APPLICATION OF GE AMERICAN COMMUNICATIONS, INC.

GE American Communications, Inc. ("GE Americom") respectfully requests special temporary authority to operate GE Americom's Satcom SN-4 spacecraft at 172° E.L. for a period of up to six months. Grant of this application will serve the public interest by promoting efficient use of orbital resources and permitting the initiation of new services to users. GE Americom seeks expedited action on the instant request so that services can commence as soon as possible.

Satcom SN-4 was originally assigned to the 101° W.L. orbital location. In November 1999, the Commission authorized GE Americom to launch GE-4 into the 101° W.L. position and simultaneously granted GE Americom's application for re-assignment of Satcom SN-4 to 72° W.L.¹ Once GE-4 was operational, GE Americom began drifting SN-4 towards the 72° W.L. position. However,

¹ *GE American Communications, Inc.*, 15 FCC Rcd 3385 (Sat. & Radicomm. Div. 1999).

GE Americom subsequently requested and was granted special temporary authority to operate Satcom SN-4 at 81.1° W.L.² GE Americom has an application pending before the Commission to replace Satcom SN-4 with a new spacecraft to be launched into the 72° W.L. orbital location in October of this year.³

GE Americom now proposes to operate Satcom SN-4 temporarily at 172° E.L. That location is assigned to Columbia Communications Corporation (“Columbia”) for a new C/Ku-band hybrid satellite.⁴ Pursuant to authority granted by the Commission,⁵ GE Americom and Columbia recently consummated a merger, and Columbia is now a wholly-owned subsidiary of GE Americom.

Grant of the requested special temporary authority will permit the use of Satcom SN-4 to initiate C- and Ku-band services from the 172° E.L. location pending construction and launch of a new spacecraft into that orbital position. Thus, the requested authority is in the public interest because it will accelerate the delivery of services from the 172° E.L. orbital position and permit efficient use of the Satcom SN-4 spacecraft to meet customer needs.

² See Letter of Thomas S. Tycz to Karis A. Hastings dated March 28, 2000, File No. SAT-STA-20000120-00050.

³ See File Nos. SAT-LOA-19971227-00230; SAT-AMD-20000510-00089.

⁴ See *Columbia Communications Corporation*, 14 FCC Rcd 3318 (Int’l Bur. 1999).

⁵ See *GE American Communications, Inc. et al.*, DA 00-1332 (Int’l Bur. rel. June 27, 2000).

Operating Satcom SN-4 at 172° E.L. will not cause harmful interference to adjacent satellites. GE Americom will coordinate its proposed operations with PanAmSat, which operates PAS-2 at 169° E.L., and with INTELSAT, which operates INTELSAT 802 at 174° E.L. Attached hereto is an analysis demonstrating that GE Americom's proposed operation of Satcom SN-4 at 172° E.L. will not result in harmful interference to these adjacent spacecraft.

For the reasons given above, GE Americom requests special temporary authority for a period of up to six months to operate Satcom SN-4 at the 172° E.L. position.

GE Americom hereby certifies that no party to this application is subject to a denial of federal benefits pursuant to § 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. § 862.

Respectfully submitted,

GE AMERICAN COMMUNICATIONS, INC.

By: Nancy J. Eskenazi

Nancy J. Eskenazi
Associate General Counsel
GE American Communications, Inc.
Four Research Way
Princeton, NJ 08540

Of Counsel

Peter A. Rohrbach
Karis A. Hastings
Hogan & Hartson L.L.P.
555 Thirteenth Street, N.W.
Washington, D.C. 20004-1109
(202) 637-5600

September 6, 2000

Attachment A

Interference Analysis SN-4 at 172E

A.1 Introduction

It is shown in this Attachment that the SN-4 satellite in the orbital slot of 172.0° East Longitude will not cause excessive or harmful interference.

Interference into SCPC Carriers

As described below, usually the worst case of adjacent satellite interference is that in which a saturated analog video carrier is co-frequency and co-polarized with respect to the interfered-with single channel per carrier (SCPC) traffic on the adjacent, interfered-with satellite. This general result and conclusion is consistent with results which would be obtained from any spacecraft regardless of power levels and coverage patterns located anywhere in the orbital arc.

The region experiencing the greatest interference in the SCPC transponder is that region immediately adjacent to the center frequency of the video carrier. Satellite operators universally recognize this fact, and it is general operational practice not to assign SCPC traffic to these high energy density regions of video transmissions. Indeed in the revised Part 25 rules for C-Band the FCC indicates that no protection will be afforded for narrow band carriers located within ± 1 MHz of the center frequency of the video carrier. The amount of frequency offset from the center of the interfering video carrier required to achieve a desired protection ratio is determined by the robustness of the SCPC carriers. In addition, to reduce adjacent satellite interference the Federal Communications Commission has mandated domestically polarization interleaving between adjacent satellites in C-Band.

A.2 Frequency Offsets of SCPC Carriers

The issue of frequency offsets of SCPC carriers to minimize adjacent satellite interference from analog video carriers was previously addressed by the Advisory Committee for the Implementation of Reduced Orbital Spacing Between United States Domestic Fixed-Satellites To The Federal Communications Commission (FCC 2° Spacing Advisory Committee). The Phase One Report of this Committee, published in September, 1985, recommended that SCPC carriers should not be assigned within ± 1.0 MHz of the center frequencies of the interfering video carriers, and cautioned that SCPC carriers placed within ± 3.0 MHz of the video carriers be designed with sufficient protection to withstand the high level of interference to be encountered in this region.

SCPC carriers that are not robust and not designed with sufficient protection to withstand the high energy transmissions of video on adjacent satellites will require frequency offsets greater than the ± 1.0 MHz or ± 3 MHz recommended by the 2^o Spacing Advisory Committee.

TABLE C-1

PROTECTION RATIOS

COMMUNICATIONS TRAFFIC MODE	SINGLE-ENTRY CO-FREQUENCY PROTECTION RATIO
1. Frequency Modulated Television (FM-TV)	$C/I_{se} = 22.0 \text{ dB to } 28.0 \text{ dB}^1$
2. Frequency Division Multiplexed Frequency Modulated (FDM-FM)Channels	Interference from an adjacent satellite shall contribute a maximum of 1000 picowatts of noise in the worst baseband channel.
3. Digital Data Channels – Full Transponder Power Occupying Full Transponder Bandwidth	$E_B/I_o = 25 \text{ dB}$
4. Single Channel Per Carrier(SCPC) T1 (1.544 MBps)Digital Data	$E_B/I_o = 20 \text{ dB}$
5. Single Channel Per Carrier(SCPC) 56 KBps Digital Data	$E_B/I_o = 20 \text{ dB}$
6. Frequency Modulated Single Channel per Carrier (FM-SCPC)Message Voice Service	Interference from an adjacent satellite shall contribute a maximum of 1000 picowatts of noise in the worst baseband channel.
7. Frequency Modulated Single Channel per Carrier (FM-SCPC) Program Audio	$C/I_{se} = 24 \text{ dB}$
8. Spread Spectrum Channels	$E_B/I_o = 20 \text{ dB}^2$

A.3 Interference into Adjacent Satellites

At the time of the operation of SN-4 at 172°E the satellite immediately adjacent with a 2.0° separation is Intelsat 802 at 174°E. It is expected that satellites with greater orbital separation should experience lesser interference levels. It should be noted that at Ku-band there does not appear to be any overlap in frequency in the Ku-band downlink between Intelsat and the SN-4 spacecraft. Interference issues on uplinks are usually easier to resolve and should be of a limited nature. The detailed analysis provided herein is for the C-band, where there is overlap between both the up and downlink frequencies of the networks.

The analysis was performed using the Sharp Asia analysis program. Data used in the analysis for the Intelsat satellite was obtained from the Intelsat Intersystem Coordination Manual Condensed List of Intelsat Carrier Parameters IICM-316 Rev 6. In addition C/I requirements for Intelsat are assumed to be C/N+12.2 dB as provided in the ICMC. The analysis utilized the minimum values given by Intelsat, thus the analysis should represent a worst case situation for the respective satellites.

In GE's analysis the sidelobe performance of the interfering uplink antenna and of all of the receive antennas was assumed to conform to a 29-25 log θ characteristic. The angle of separation between spacecraft is the geocentric angle. Power levels for the GE spacecraft are assumed to be over land areas.

The Sharp analysis shows the GE spacecraft is compatible with the Intelsat spacecraft and the few minor shortfalls in C/I protection ratios usually related to FM video into small data carriers or operation of excessively small dishes as listed in the IICM. These shortfalls can be accounted for by coordination between the parties.

A.3.1 Interference into TV-FM Carriers

The following Sharp analysis shows the expected interference from GE SN-4 into the Intelsat satellite minimum level TV-FM carriers. The carriers listed for the Intelsat satellite are carriers as listed for Intelsat 7 and Intelsat 8 C-Band Global and Hemispheric beams. The analysis shows that for all GE SN-4 carriers except for FM-TV negligible interference exists into the Intelsat satellite. FM-TV at maximum levels can cause some interference into FM-TV operated at minimum levels on the subject satellites. Some coordination will be required to avoid this worst case situation.

Table 1: Domestic Satellite R.F. Carrier Listing - 6 / 4 GHz

Carrier Number	Signal Type & (channels)	Bandwidth (MHz)	E.S. Antennas (m) up/down	EIRP (dBW) up/down
1: SN4	TV/FM (1)	36.000	15.0/13.0	80.6/32.0
2: SN4	QPSK/ 60 MBPS	34.230	15.0/13.0	80.6/32.0
3: SN4	QPSK/ 40 MBPS	24.000	15.0/10.0	80.6/32.0
4: SN4	QPSK/ 4 MBPS (8)	2.700	15.0/10.0	71.6/24.0
5: SN4	QPSK/ 1.544 MBPS (15)	1.029	9.0/ 8.0	63.0/20.2
6: I7G	TV/FM (1)	30.000	10.0/15.0	75.6/29.7
7: I7G	TV/FM (1)	20.000	15.0/10.0	77.1/25.0
8: I8G	TV/FM (1)	30.000	10.0/15.0	75.6/29.7
9: I8G	TV/FM (1)	20.000	15.0/10.0	77.1/25.0
10: I7H	TV/FM (1)	30.000	15.0/ 9.0	72.2/32.3
11: I7H	TV/FM (1)	20.000	15.0/ 3.7	86.2/32.3
12: I8H	TV/FM (1)	30.000	15.0/13.0	77.4/29.0
13: I8H	TV/FM (1)	20.000	15.0/ 5.8	87.4/29.0

T Y	C A R C O M - P A N Y	R F B A N D - W I D T H (M H z)	N O . O F C H A N	C O D E R A T E / M O D . I N D E X	B O T M O D . F R E Q . (M H z)	T O P M O D . F R E Q . (M H z)	A V E . T A L K E R N O I S E L E V E L (d B m 0)	P R E M P H A	C P A N D F	L I N K	P A R A M E T E R S	13:08:38	5-SEP-00	T R A N S P O N D E R F R E Q U E N C Y				E A R T H S T A T I O N				S A T E L L I T E				E A R T H S T A T I O N			
														U P (G H z)	D N (G H z)	U (G H z)	D (G H z)	P (m)	N (m)	U (d B m)	D (d B m)	R E C E I V E R G A I N (d B)	T R A N S M I T T E R G A I N (d B)	U (d B m)	D (d B m)	R E C E I V E R T E M P (K)	T R A N S M I T T E R T E M P (K)	U (d B m)	D (d B m)
1	SN4	1	36.000	1	2.560	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	13.0	53.0	120				
2	SN4	2	34.290	1	.875	.000	.000	.0	.0	4	60.000	.000	6.165	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	13.0	53.0	120				
3	SN4	2	24.000	1	.750	.000	.000	.0	.0	4	40.000	.000	6.165	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	10.0	49.8	120				
4	SN4	2	2.700	8	.000	.000	.000	.0	.0	4	4.000	3.600	6.165	3.940	0	1	13.8	15.0	57.8	23.0	750.	24.0	10.0	49.8	120				
5	SN4	3	1.029	15	.750	.000	.000	.0	.0	4	1.544	1.300*	6.165	3.940	0	1	9.9	9.0	53.1	23.0	750.	20.2	8.0	47.9	120				
6	I7G	1	30.000	1	2.559	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	4	5	22.0	10.0	53.6	21.0	891.	29.7	15.0	53.5	75				
7	I7G	1	20.000	1	2.238	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	4	5	19.7	15.0	57.4	21.0	891.	25.0	10.0	50.3	75				
8	I8G	1	30.000	1	2.559	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	4	5	22.0	10.0	53.6	21.0	891.	29.7	15.0	53.5	75				
9	I8G	1	20.000	1	2.238	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	4	5	19.7	15.0	57.4	21.0	891.	25.0	10.0	50.3	75				
10	I7H	1	30.000	1	2.559	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	4	5	14.8	15.0	57.4	22.6	513.	32.3	9.0	49.2	75				
11	I7H	1	20.000	1	2.238	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	4	5	28.8	15.0	57.4	22.6	513.	32.3	3.7	41.7	75				
12	I8H	1	30.000	1	2.559	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	4	5	20.0	15.0	57.4	22.6	513.	29.0	13.0	52.3	75				
13	I8H	1	20.000	1	2.238	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	4	5	30.0	15.0	57.4	22.6	513.	29.0	5.8	45.3	75				

T H E R M A L N O I S E S U M M A R Y

SINGLE ENTRY INTERFERENCE OBJ+ IMPAIR-

MENT

CAR- RIER	COM- PANY	EARTH-TO-SPACE		SPACE-TO-EARTH		C/No - UP	C/N - UP	DN TOTAL	UP	DN TOTAL	LINK THERMAL NOISE	S/N (dB)	Eb/No (dB)	S/I (dB)	C/In (dB)	C/Itv (dB)	GRADE
		PATH LOSS* (dB)	RCV G/T (dB/K)	PATH LOSS* (dB)	RCV G/T (dB/K)												
1	SN4	80.6	200.1	-5.8	32.0	196.4	32.2	103.3	96.4	95.6	27.8	20.8	20.0	59.2	21.9	28.0	<4.52>
2	SN4	80.6	200.1	-5.8	32.0	196.4	32.2	103.3	96.4	95.6	28.0	21.1	20.3		27.4		
3	SN4	80.6	200.1	-5.8	32.0	196.3	29.0	103.3	93.3	92.9	29.5	19.5	19.1		27.2		
4	SN4	71.6	200.1	-5.8	24.0	196.3	29.0	94.3	85.3	84.8	30.0	21.0	20.5		20.0		
5	SN4	63.0	200.1	-5.8	20.2	196.3	27.1	85.7	79.6	78.7	25.6	19.5	18.5		21.2		
6	I7G	75.6	200.1	-8.5	29.7	196.4	34.7	95.6	96.6	93.1	20.8	21.9	18.3	60.8	23.5	29.6	<4.56>
7	I7G	77.1	200.1	-8.5	25.0	196.4	31.5	97.1	88.7	88.2	24.1	15.7	15.1	56.5	20.8	26.5	<4.44>
8	I8G	75.6	200.1	-8.5	29.7	196.4	34.7	95.6	96.6	93.1	20.8	21.9	18.3	60.8	23.5	29.6	<4.56>
9	I8G	77.1	200.1	-8.5	25.0	196.4	31.5	97.1	88.7	88.2	24.1	15.7	15.1	56.5	20.8	26.5	<4.44>
10	I7H	72.2	200.1	-4.5	32.3	196.3	30.4	96.2	95.0	92.6	21.4	20.3	17.8	55.2	17.9	24.0	<4.40>
11	I7H	86.2	200.1	-4.5	32.3	196.2	22.9	110.2	87.6	87.6	37.2	14.6	14.6	54.0	18.3	24.0	<4.35>
12	I8H	77.4	200.1	-4.5	29.0	196.4	33.5	101.4	94.7	93.9	26.6	20.0	19.1	55.2	17.9	24.0	<4.40>
13	I8H	87.4	200.1	-4.5	29.0	196.3	26.5	111.4	87.8	87.8	38.4	14.8	14.8	54.0	18.3	24.0	<4.35>

*** FOOTNOTES ***

LINK PARAMETERS

SIGNAL TYPE INDEX	POLARIZATION TYPE INDEX	POLARIZATION ISOLATION MATRIX (dB)					
		0	1	2	3	4	5
0 = FDM/FM	0 = HORIZONTAL	.0	10.0	.0	6.9	3.0	3.0
1 = TV/FM	1 = VERTICAL						
2 = DIGITAL	2 = 20 DEG CANTED HORIZONTAL	D 1	10.0	.0	6.9	.0	3.0
3 = SCPC/PSK	3 = 20 DEG CANTED VERTICAL	E 2	.0	6.9	.0	10.0	3.0
4 = SCPC/FM	4 = LEFT-HAND CIRCULAR	I 3	6.9	.0	10.0	.0	3.0
5 = CSSB/AM	5 = RIGHT-HAND CIRCULAR	R 4	1.5	1.5	1.5	1.5	6.0
6 = SS/PSK		D 5	1.5	1.5	1.5	1.5	6.0

SPECTRA ASSUMED FOR INTERFERENCE INTO SCPC & PSK

TV/FM: FCC ADVISORY COMMITTEE

FDM/FM: GAUSSIAN, EXCEPT FOR THOSE MARKED WITH "+" UNDER SIGNAL TYPE

* INDICATES SCPC AND SMALL FDM/FM CARRIERS WHOSE TRANSPONDER FREQUENCY PLANS AVOID +/- 1.0 MHz AT THE TRANSPONDER CENTER.

"PLAN" UNDER CHANNEL SPACING INDICATES A FIXED FREQUENCY PLAN.

THERMAL NOISE SUMMARY

* PATH LOSSES INCLUDE FREE SPACE LOSS FOR A 10 DEGREE ELEVATION ANGLE, CLEAR SKY ATMOSPHERIC LOSSES, AND ANTENNA POINTING LOSSES IN THE RANGE OF 0.0-0.5 dB. POINTING LOSSES ARE INCLUDED ONLY FOR THE THERMAL NOISE C/N, NOT IN INTERFERENCE CALCULATIONS.

UPLINK LOSSES = 199.6 + .2 dB + Pointing Loss
 DOWNLINK LOSSES = 196.1 + .1 dB + Pointing Loss

+ THE TV/FM INTERFERENCE OBJECTIVE IS EITHER THE S/I OR C/I VALUE(S) WITHOUT THE "=" THE VALUE(S) WITH THE "=" ARE FOR COMPARISON ONLY. IF THE S/I HAS THE "=", THEN THE C/I OBJECTIVE IS USED AND THE S/I IS THE EQUIVALENT LEVEL FROM A CO-CHANNEL TV/FM INTERFERER.

IF THE C/Is HAVE "=", THEN THE S/I OBJECTIVE IS USED AND THE C/Is INDICATE THE EQUIVALENT SINGLE ENTRY LEVELS IN FOR A NOISE-LIKE INTERFERER (C/In) AND FOR A CO-CHANNEL TV/FM INTERFERER (C/Itv). CCIR Rec. 500-1 IMPAIRMENT GRADES ARE GIVEN FOR THE AGGREGATE TV/FM C/I = C/Itv - 4 dB INTO A "REASONABLY CRITICAL STILL SCENE". THE IMPAIRMENT GRADES ARE:

- 5.0 = IMPERCEPTIBLE (Never achieved)
- 4.6 = JUST PERCEPTIBLE OR JUST UNPERCEPTIBLE (Highest achievable grade)
- 4.3 = APPROXIMATE GRADE FOR CATV AGGREGATE OBJECTIVE OF 18 dB
- 4.0 = PERCEPTIBLE, BUT NOT ANNOYING
- 3.0 = SLIGHTLY ANNOYING
- 2.0 = ANNOYING
- 1.0 = VERY ANNOYING

W A N T E D SINGLE ENTRY MARGIN (dB) (2.00 DEGREE SPACING)
 Antenna Patterns as given ; A = Geocentric Angle

	INTERFERING												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	2.3	8.4	8.4	7.6	8.7	7.2	10.9	7.2	10.9	6.0	2.7	8.2	3.0
2	2.9	2.9	2.9	2.1	3.2	7.8	11.5	7.8	11.5	6.6	3.3	8.8	3.6
3	.5	1.5	.5	.6	.7	5.5	9.7	5.5	9.7	3.7	1.8	6.5	2.9
4	-.5	9.5	8.2	7.7	8.3	4.5	8.6	4.5	8.6	2.9	.6	5.5	1.4
5	-5.1	6.1	4.8	3.0	4.1	-.3	3.4	-.3	3.4	-1.2	-4.9	.8	-4.8
6	-.7	5.8	5.4	4.8	5.9	-.5	2.8	-.5	2.8	-.6	-5.7	.8	-6.0
7	-3.5	3.8	2.7	2.6	2.5	-2.8	1.6	-2.8	1.6	-5.0	-6.1	-2.0	-4.3
8	-.7	5.8	5.4	4.8	5.9	-.5	2.8	-.5	2.8	-.6	-5.7	.8	-6.0
9	-3.5	3.8	2.7	2.6	2.5	-2.8	1.6	-2.8	1.6	-5.0	-6.1	-2.0	-4.3
10	2.5	8.9	8.6	8.0	9.1	2.4	5.6	2.4	5.6	3.1	-3.1	3.9	-3.7
11	-2.0	5.3	4.2	4.0	3.9	-1.2	3.4	-1.2	3.4	-3.8	-3.9	-.5	-.8
12	4.2	10.6	10.3	9.5	10.6	4.6	8.5	4.6	8.5	3.3	.3	5.7	.7
13	-1.7	5.6	4.5	4.3	4.2	-.9	3.8	-.9	3.8	-3.5	-3.6	-.2	-.4

5-SEP-00

13:08:38

COMBINATIONS FAILING TO MEET SINGLE ENTRY INTERFERENCE OBJECTIVES (dB)
(2.00 DEGREE SPACING) Antenna Patterns as given ; A = Geocentric Angle

WANTED LINK	INTERFERING LINK -->												
	1	2	3	4	5	6	7	8	9	0	1	2	3
SN4 1													
SN4 2													
SN4 3													
SN4 4													
SN4 5													
I7G 6													
I7G 7													
I8G 8													
I8G 9													
I7H 10													
I7H 11													
I8H 12													
I8H 13													

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13:08:38

LOWEST C/I RATIO IN: "U"=Uplink, "D"=Downlink, "0"=Equal
(2.00 DEGREE SPACING) Antenna Patterns as given; A = Geocentric Angle

WANTED LINK	1	2	3	4	5	6	7	8	9	0	1	2	3
SN4											1	1	1
SN4											1	1	1
SN4											0	1	2
SN4													3
SN4													
I7G													
I7G													
I8G													
I8G													
I7H													
I7H													
I8H													
I8H													

FAILURE SUMMARY*
(NUMBER)

	S A T E L L I T E S P A C I N G			
	DEG	DEG	DEG	DEG
2.00	.00	.00	.00	.00
DEG	DEG	DEG	DEG	DEG
TOTAL COMBINATIONS	169	169	169	169
TOTAL FAILURES	49	0	0	0

FAILS BY:

.0 - 1.5 dB	20
1.5 - 2.5 dB	4
2.5 - 3.5 dB	6
3.5 - 4.5 dB	8
4.5 - 5.5 dB	5
5.5 - 6.5 dB	6
6.5 - 7.5 dB	0
7.5 - 8.5 dB	0
8.5 - 9.5 dB	0
MORE THAN 9.5 dB	0

(PERCENT)

	S A T E L L I T E S P A C I N G			
	DEG	DEG	DEG	DEG
2.00	.00	.00	.00	.00
DEG	DEG	DEG	DEG	DEG
TOTAL COMBINATIONS	29.0 %	.0 %	.0 %	.0 %
TOTAL FAILURES	11.8 %	2.4 %	3.6 %	4.7 %

FAILS BY:

.0 - 1.5 dB	11.8 %
1.5 - 2.5 dB	2.4 %
2.5 - 3.5 dB	3.6 %
3.5 - 4.5 dB	4.7 %
4.5 - 5.5 dB	3.0 %

5.5 - 6.5 dB
 6.5 - 7.5 dB
 7.5 - 8.5 dB
 8.5 - 9.5 dB
 MORE THAN 9.5 dB

* Antenna Patterns as given ; A = Geocentric Angle

The following Sharp analysis shows the expected interference from GE SN-4 into the Intelsat satellite "maximum" level TV-FM. The carriers listed for the Intelsat satellite are carriers on the Intelsat 7 and Intelsat 8 C-Band Global and Hemispheric beams.

The analysis shows that a potential for harmful interference to and from these carriers exists. Review of the Intelsat carriers listed shows that the FM-Video carriers listed as "maximum" have very low EIRP into small diameter receiving dishes. Intelsat's carriers also use very high EIRP on the uplinks that could cause harmful interference into adjacent satellites. Neither of these situations is conducive to the efficient use of the GSO orbital arc and will require coordination to resolve if these carriers exist.

Table 1: Domestic Satellite R.F. Carrier Listing - 6 / 4 GHz

Carrier Number	Signal Type & (channels)	Bandwidth (MHz)	E.S. Antennas (m) up/down	EIRP (dBW) up/down
1: SN4	TV/FM (1)	36.000	15.0/13.0	80.6/32.0
2: SN4	QPSK/ 60 MBPS	34.290	15.0/13.0	80.6/32.0
3: SN4	QPSK/ 40 MBPS	24.000	15.0/10.0	80.6/32.0
4: SN4	QPSK/ 4 MBPS (8)	2.700	15.0/10.0	71.6/24.0
5: SN4	QPSK/ 1.544 MBPS (15)	1.029	9.0/ 8.0	63.0/20.2
6: I7G	TV/FM (1)	30.000	10.0/10.0	84.3/32.9
7: I8G	TV/FM (1)	30.000	10.0/10.0	84.3/32.9
8: I7H	TV/FM (1)	20.000	15.0/ 4.5	87.0/32.3
9: I7H	TV/FM (1)	20.000	15.0/ 3.7	90.0/32.3
10: I8H	TV/FM (1)	30.000	15.0/ 7.5	87.0/29.0
11: I8H	TV/FM (1)	30.000	15.0/ 7.5	90.0/29.0

T Y P E	C A R C O M P A N Y	R F B A N D W I D T H (M H z)	N O. O F C H A N	C O D E M O D.	B O T M O D.	T O P M O D.	A V E. T A L K E R N O I S E (d B m 0)	P R E M P H	D A T A R A T E (M B P S)	C H A N S P A C E (M H z)	T R A N S P O N D E R F R E Q U E N C Y		P O L		E A R T H S T A T I O N		S A T E L L I T E		E A R T H S T A T I O N						
											U P (G H z)	D N (G H z)	U	D	P O W R (d B W)	D I A M (m)	G A I N (d B)	R E C E I V E R T E M P (K)	B I R P (d B W)	D I A M (m)	G A I N (d B)	R E C E I V E R T E M P (K)	B I R P (d B W)	D I A M (m)	G A I N (d B)
1	SN4	1	36.000	1	2.560	.025	4.200	.0	12.8	0	.000	6.165	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	13.0	53.0	120	
2	SN4	2	34.290	1	.875	.000	.000	.0	.0	4	60.000	.000	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	13.0	53.0	120	
3	SN4	2	24.000	1	.750	.000	.000	.0	.0	4	40.000	.000	6.165	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	10.0	49.8	120
4	SN4	2	2.700	8	.000	.000	.000	.0	.0	4	4.000	3.600	6.165	3.940	0	1	13.8	15.0	57.8	23.0	750.	24.0	10.0	49.8	120
5	SN4	3	1.029	15	.750	.000	.000	.0	.0	4	1.544	1.300*	6.165	3.940	0	1	9.9	9.0	53.1	23.0	750.	20.2	8.0	47.9	120
6	I7G	1	30.000	1	2.559	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	4	5	30.0	10.0	54.3	21.0	891.	32.9	10.0	50.5	75
7	I8G	1	30.000	1	2.559	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	4	5	30.0	10.0	54.3	21.0	891.	32.9	10.0	50.5	75
8	I7H	1	20.000	1	2.238	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	4	5	30.0	15.0	57.0	22.6	513.	32.3	4.5	37.0	75
9	I7H	1	20.000	1	2.238	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	4	5	33.0	15.0	57.0	22.6	513.	32.3	3.7	37.0	75
10	I8H	1	30.000	1	2.559	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	4	5	30.0	15.0	57.0	22.6	513.	29.0	7.5	41.5	75
11	I8H	1	30.000	1	2.559	.025	4.200	.0	12.8	0	.000	.000	6.165	3.940	4	5	33.0	15.0	57.0	22.6	513.	29.0	7.5	41.5	75

13:10:32 5-SEP-00

THERMAL NOISE SUMMARY

SPACE-TO-EARTH

EARTH-TO-SPACE

CAR- RIER	COM- PANY	EARTH-TO-SPACE		SPACE-TO-EARTH		C/No - (dB-Hz)	C/N - (dB)	LINK THERMAL NOISE		S/I (dB)	C/In (dB)	C/Itv (dB)	IMPAIR- MENT GRADE				
		PATH LOSS* (dB)	RCV G/T (dB/K)	PATH LOSS* (dB)	RCV G/T (dB/K)			S/N (dB)	Eb/No (dB)					S/N (dB)	Eb/No (dB)		
1	SN4	80.6	200.1	-5.8	32.0	196.4	32.2	103.3	96.4	95.6	27.8	20.8	20.0	59.2	=21.9	=28.0	<4.52>
2	SN4	80.6	200.1	-5.8	32.0	196.4	32.2	103.3	96.4	95.6	28.0	21.1	20.3	57.3	27.4		
3	SN4	80.6	200.1	-5.8	32.0	196.3	29.0	103.3	93.3	92.9	29.5	19.5	19.1	17.8	27.2		
4	SN4	71.6	200.1	-5.8	24.0	196.3	29.0	94.3	85.3	84.8	30.0	21.0	20.5	16.9	20.0		
5	SN4	63.0	200.1	-5.8	20.2	196.3	27.1	85.7	79.6	78.7	25.6	19.5	18.5	18.8	20.0		
6	I7G	84.3	200.1	-8.5	32.9	196.4	31.7	104.3	96.8	96.1	29.5	22.1	21.4	16.8	21.2		
7	I8G	84.3	200.1	-8.5	32.9	196.4	31.7	104.3	96.8	96.1	29.5	22.1	21.4	58.6	23.5	=29.6	<4.56>
8	I7H	87.0	200.1	-4.5	32.3	196.2	18.2	111.0	82.9	82.9	38.0	9.9	9.9	58.6	23.5	=29.6	<4.56>
9	I7H	90.0	200.1	-4.5	32.3	196.2	18.2	114.0	82.9	82.9	41.0	9.9	9.9	45.6	18.5	=24.2	<4.36>
10	I8H	87.0	200.1	-4.5	29.0	196.2	22.7	111.0	84.1	84.1	36.2	9.4	9.4	45.6	18.5	=24.2	<4.36>
11	I8H	90.0	200.1	-4.5	29.0	196.2	22.7	114.0	84.1	84.1	39.2	9.4	9.4	46.6	18.1	=24.2	<4.41>

*** FOOTNOTES ***

LINK PARAMETERS

SIGNAL TYPE INDEX	POLARIZATION TYPE INDEX	POLARIZATION ISOLATION MATRIX (dB)					
		0	1	2	3	4	5
0 = FDM/FM	0 = HORIZONTAL	.0	10.0	.0	6.9	3.0	3.0
1 = TV/FM	1 = VERTICAL						
2 = DIGITAL	2 = 20 DEG CANTED HORIZONTAL	D 1	10.0	.0	6.9	.0	3.0
3 = SCPC/PSK	3 = 20 DEG CANTED VERTICAL	E 2	.0	6.9	.0	10.0	3.0
4 = SCPC/FM	4 = LEFT-HAND CIRCULAR	I 3	6.9	.0	10.0	.0	3.0
5 = CSSB/AM	5 = RIGHT-HAND CIRCULAR	E 4	1.5	1.5	1.5	1.5	.0
6 = SS/PSK		D 5	1.5	1.5	1.5	1.5	6.0

SPECTRA ASSUMED FOR INTERFERENCE INTO SCPC & PSK

TV/FM: FCC ADVISORY COMMITTEE

FDM/FM: GAUSSIAN, EXCEPT FOR THOSE MARKED WITH "+" UNDER SIGNAL TYPE

* INDICATES SCPC AND SMALL FDMA CARRIERS WHOSE TRANSPONDER FREQUENCY PLANS AVOID +/- 1.0 MHz AT THE TRANSPONDER CENTER.

"PLAN" UNDER CHANNEL SPACING INDICATES A FIXED FREQUENCY PLAN.

THERMAL NOISE SUMMARY

* PATH LOSSES INCLUDE FREE SPACE LOSS FOR A 10 DEGREE ELEVATION ANGLE, CLEAR SKY ATMOSPHERIC LOSSES, AND ANTENNA POINTING LOSSES IN THE RANGE OF 0.0-0.5 dB. POINTING LOSSES ARE INCLUDED ONLY FOR THE THERMAL NOISE C/N, NOT IN INTERFERENCE CALCULATIONS.

UPLINK LOSSES = 199.6 + .2 dB + Pointing Loss
 DOWNLINK LOSSES = 196.1 + .1 dB + Pointing Loss

+ THE TV/FM INTERFERENCE OBJECTIVE IS EITHER THE S/I OR C/I VALUE(S) WITHOUT THE "=" THE VALUE(S) WITH THE "=" ARE FOR COMPARISON ONLY. IF THE S/I HAS THE "=", THEN THE C/I OBJECTIVE IS USED AND THE S/I IS THE EQUIVALENT LEVEL FROM A CO-CHANNEL TV/FM INTERFERER.

IF THE C/Is HAVE "=", THEN THE S/I OBJECTIVE IS USED AND THE C/Is INDICATE THE EQUIVALENT SINGLE ENTRY LEVELS IN FOR A NOISE-LIKE INTERFERER (C/In) AND FOR A CO-CHANNEL TV/FM INTERFERER (C/Itv). CCIR Rec. 500-1 IMPAIRMENT GRADES ARE GIVEN FOR THE AGGREGATE TV/FM C/I = C/Itv - 4 dB INTO A "REASONABLY CRITICAL STILL SCENE". THE IMPAIRMENT GRADES ARE:

- 5.0 = IMPERCEPTIBLE (Never achieved)
- 4.6 = JUST PERCEPTIBLE OR JUST UNPERCEPTIBLE (Highest achievable grade)
- 4.3 = APPROXIMATE GRADE FOR CATV AGGREGATE OBJECTIVE OF 18 dB
- 4.0 = PERCEPTIBLE, BUT NOT ANNOYING
- 3.0 = SLIGHTLY ANNOYING
- 2.0 = ANNOYING
- 1.0 = VERY ANNOYING

SINGLE ENTRY MARGIN (dB) (2.00 DEGREE SPACING)
Antenna Patterns as given ; A = Geocentric Angle

		INTERFERING										
		2	3	4	5	6	7	8	9	10	11	
W	1	2.3	8.4	8.4	7.6	8.7	1.8	1.8	2.0	.0	3.0	.5
A	2	2.9	2.9	2.1	3.2	2.4	2.4	2.4	2.6	.6	3.6	1.1
N	3	.5	1.5	.5	.6	.7	1.0	1.0	1.3	-.2	2.9	.8
T	4	-.5	9.5	8.2	7.7	8.3	-.2	-.2	.1	-1.7	1.4	-.8
E	5	-5.1	6.1	4.8	3.0	4.1	-5.8	-5.8	-5.6	-7.8	-4.8	-7.3
D	6	1.4	7.9	7.5	6.6	7.7	-2.1	-2.1	-1.7	-2.9	.3	-1.5
	7	1.4	7.9	7.5	6.6	7.7	-2.1	-2.1	-1.7	-2.9	.3	-1.5
	8	-6.9	.4	-.7	-.9	-1.0	-9.3	-9.3	-8.7	-8.8	-5.5	-5.6
	9	-6.9	.4	-.7	-.9	-1.0	-9.3	-9.3	-8.7	-8.7	-5.4	-5.5
	10	-5.7	.8	.4	-.6	.5	-8.1	-8.1	-7.5	-7.6	-4.3	-4.4
	11	-5.7	.8	.4	-.6	.5	-8.1	-8.1	-7.5	-7.5	-4.2	-4.3

5-SEP-00

13:10:32

COMBINATIONS FAILING TO MEET SINGLE ENTRY INTERFERENCE OBJECTIVES (dB)
(2.00 DEGREE SPACING) Antenna Patterns as given ; A = Geocentric Angle

WANTED LINK	INTERFERING LINK -->										
	1	2	3	4	5	6	7	8	9	0	1
SN4 1											1
SN4 2											
SN4 3											1
SN4 4				1	1	2	1				
SN4 5				6	6	8	5	7			
I7G 6				2	2	2	3	2			
I8G 7				2	2	2	3	2			
I7H 8			1	1	1	9	9	9	5	6	
I7H 9			1	1	1	9	9	9	5	5	
I8H 10			6	1	8	8	8	4	4		
I8H 11			6	1	8	8	8	4	4		

5-SEP-00

13:10:32

LOWEST C/I RATIO IN: "U"=Uplink, "D"=Downlink, "0"=Equal
(2.00 DEGREE SPACING) Antenna Patterns as given; A = Geocentric Angle

WANTED LINK	INTERFERING LINK -->										
	1	2	3	4	5	6	7	8	9	0	1
SN4 1											U
SN4 2											
SN4 3											U
SN4 4				D		D	D	U	U		U
SN4 5				D		U	U	U	U		U
I7G 6						D	D	D	D		U
I8G 7						D	D	D	D		U
I7H 8				D		D	D	D	D	D	D
I7H 9				D		D	D	D	D	D	D
I8H 10				D		D	D	D	D	D	D
I8H 11				D		D	D	D	D	D	D

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FAILURE SUMMARY*
(NUMBER)

	S A T E L L I T E S P A C I N G			
	DEG	DEG	DEG	DEG
2.00	.00	.00	.00	.00
DEG	DEG	DEG	DEG	DEG
TOTAL COMBINATIONS	121	121	121	121
TOTAL FAILURES	60	0	0	0

FAILS BY:

- .0 - 1.5 dB 14
- 1.5 - 2.5 dB 9
- 2.5 - 3.5 dB 2
- 3.5 - 4.5 dB 4
- 4.5 - 5.5 dB 5
- 5.5 - 6.5 dB 6
- 6.5 - 7.5 dB 3
- 7.5 - 8.5 dB 9
- 8.5 - 9.5 dB 8
- MORE THAN 9.5 dB 0

(PERCENT)

	S A T E L L I T E S P A C I N G			
	DEG	DEG	DEG	DEG
2.00	.00	.00	.00	.00
DEG	DEG	DEG	DEG	DEG
TOTAL FAILURES	49.6 %	.0 %	.0 %	.0 %

FAILS BY:

- .0 - 1.5 dB 11.6 %
- 1.5 - 2.5 dB 7.4 %
- 2.5 - 3.5 dB 1.7 %
- 3.5 - 4.5 dB 3.3 %
- 4.5 - 5.5 dB 4.1 %

5.5 - 6.5 dB 5.0 %
6.5 - 7.5 dB 2.5 %
7.5 - 8.5 dB 7.4 %
8.5 - 9.5 dB 6.6 %
MORE THAN 9.5 dB .0 %

* Antenna Patterns as Given ; A = Geocentric Angle

A.3.2 Interference into Digital TV Carriers

The following Sharp analysis shows the expected interference from GE SN-4 into the Intelsat satellite minimum level Digital TV carriers. The carriers listed for the Intelsat satellite are carriers on the Intelsat 7 and Intelsat 8 C-Band Global and Hemispheric beams. The analysis shows that for all GE SN-4 carriers except for FM-TV negligible interference exists into the Intelsat satellites with receive dish sizes larger than 2.4 meters.

The minimum carrier parameters list reception of digital carriers into dishes as small as 1.4 meters at C-band. This dish size is excessively small and is very susceptible to adjacent satellite interference. In fact other Intelsat minimum level carriers at the same orbital separation as GE SN-4 cause even greater interference levels into these antennas. A 1.4-meter dish has a 10-dB beamwidth of 7.2 degrees. These dishes can not function properly in a 2-degree orbital environment and can result in a very inefficient use of the orbital arc. It is thus not unexpected that higher levels of interference exist for these dishes.

Table 1: Domestic Satellite R.F. Carrier Listing - 6 / 4 GHz

Carrier Number	Signal Type & (channels)	Bandwidth (MHz)	E.S. Antennas (m) up/down	EIRP (dBW) up/down
1: SN4	TV/FM (1)	36.000	15.0/13.0	80.6/32.0
2: SN4	QPSK/ 60 MBPS	34.290	15.0/13.0	80.6/32.0
3: SN4	QPSK/ 40 MBPS	24.000	15.0/10.0	80.6/32.0
4: SN4	QPSK/ 4 MBPS (8)	2.700	15.0/10.0	71.6/24.0
5: SN4	QPSK/ 1.544 MBPS (15)	1.029	9.0/ 8.0	63.0/20.2
6: I7G	QPSK/ 6.600 MBPS (5)	5.727	15.0/ 5.0	64.4/27.5
7: I7G	QPSK/ 6.600 MBPS (4)	8.590	15.0/ 1.4	84.7/31.6
8: I7G	QPSK/ 34 MBPS	29.501	15.0/ 8.2	70.7/34.0
9: I8G	QPSK/ 6.600 MBPS (5)	5.727	15.0/ 6.2	64.0/27.0
10: I8G	QPSK/ 23 MBPS	29.935	15.0/ 2.4	90.7/32.5
11: I7H	QPSK/ 23 MBPS	29.935	15.0/ 5.6	65.9/34.0
12: I7H	QPSK/ 6.600 MBPS (4)	8.590	15.0/ 1.4	86.2/32.8
13: I8H	QPSK/ 23 MBPS	29.935	15.0/ 4.5	65.5/37.5

		EARTH-TO-SPACE				SPACE-TO-EARTH				THERMAL NOISE SUMMARY				SINGLE ENTRY INTERFERENCE OBJ+ IMPAIR- MENT GRADE			
		PATH RCV		PATH RCV		C/No - (dB-Hz)		C/N - (dB)		LINK THERMAL NOISE		S/I (dB)		C/In C/Itv (dB)			
CAR- RIER PANY	COM- PANY	EIRP (dBW)	LOSS* (dB)	G/T (dB/K)	EIRP (dBW)	LOSS* (dB)	G/T (dB/K)	UP	DN	TOTAL	UP	DN	TOTAL	(pWOp)	(dB)	(dB)	
1	SN4	80.6	200.1	-5.8	32.0	196.4	32.2	103.3	96.4	95.6	27.8	20.8	20.0	59.2	=21.9	=28.0<4.52>	
2	SN4	80.6	200.1	-5.8	32.0	196.4	32.2	103.3	96.4	95.6	28.0	21.1	20.3	27.4	27.4		
3	SN4	80.6	200.1	-5.8	32.0	196.3	29.0	103.3	93.3	92.9	29.5	19.5	19.1	16.9	27.2		
4	SN4	71.6	200.1	-5.8	24.0	196.3	29.0	94.3	85.3	84.8	30.0	21.0	20.5	18.8	20.0		
5	SN4	63.0	200.1	-5.8	20.2	196.3	27.1	85.7	79.6	78.7	25.6	19.5	18.5	16.8	21.2		
6	I7G	64.4	200.1	-8.5	27.5	196.2	24.3	84.4	84.2	81.3	16.8	16.6	13.7	13.1	21.1		
7	I7G	84.7	200.1	-8.5	31.6	196.2	13.0	104.7	77.0	77.0	35.4	7.7	7.7	8.8	18.1		
8	I7G	70.7	200.1	-8.5	34.0	196.3	28.8	90.7	95.1	89.4	16.0	20.4	14.7	14.0	21.1		
9	I8G	64.0	200.1	-8.5	27.0	196.3	26.2	84.0	85.5	81.7	16.4	17.9	14.1	13.5	21.1		
10	I8G	90.7	200.1	-8.5	32.5	196.2	17.5	110.7	82.4	82.4	35.9	7.6	7.6	8.8	18.1		
11	I7H	65.9	200.1	-4.5	34.0	196.3	25.3	89.9	91.6	87.7	15.1	16.8	12.9	14.0	18.1		
12	I7H	86.2	200.1	-4.5	32.8	196.2	13.0	110.2	78.2	78.2	40.9	8.9	8.9	10.0	18.1		
13	I8H	65.5	200.1	-4.5	37.5	196.2	23.2	89.5	93.1	87.9	14.7	18.3	13.2	14.3	18.1		

*** FOOTNOTES ***

LINK PARAMETERS

SIGNAL TYPE INDEX	POLARIZATION TYPE INDEX	POLARIZATION ISOLATION MATRIX (dB)						
		0	1	2	3	4	5	
0 = FDM/FM	0 = HORIZONTAL	0	.0	10.0	.0	6.9	3.0	3.0
1 = TV/FM	1 = VERTICAL							
2 = DIGITAL	2 = 20 DEG CANTED HORIZONTAL	D 1	10.0	.0	6.9	.0	3.0	3.0
3 = SCPC/PSK	3 = 20 DEG CANTED VERTICAL	E 2	.0	6.9	.0	10.0	3.0	3.0
4 = SCPC/FM	4 = LEFT-HAND CIRCULAR	I 3	6.9	.0	10.0	.0	3.0	3.0
5 = CSSE/AM	5 = RIGHT-HAND CIRCULAR	E 4	1.5	1.5	1.5	1.5	.0	6.0
6 = SS/PSK								
		5	1.5	1.5	1.5	1.5	6.0	.0

SPECTRA ASSUMED FOR INTERFERENCE INTO SCPC & PSK

TV/FM: FCC ADVISORY COMMITTEE

FDM/FM: GAUSSIAN, EXCEPT FOR THOSE MARKED WITH "+" UNDER SIGNAL TYPE

* INDICATES SCPC AND SMALL FDMA CARRIERS WHOSE TRANSPONDER FREQUENCY PLANS AVOID +- 1.0 MHz AT THE TRANSPONDER CENTER.

"PLAN" UNDER CHANNEL SPACING INDICATES A FIXED FREQUENCY PLAN.

THERMAL NOISE SUMMARY

* PATH LOSSES INCLUDE FREE SPACE LOSS FOR A 10 DEGREE ELEVATION ANGLE, CLEAR SKY ATMOSPHERIC LOSSES, AND ANTENNA POINTING LOSSES IN THE RANGE OF 0.0-0.5 dB. POINTING LOSSES ARE INCLUDED ONLY FOR THE THERMAL NOISE C/N, NOT IN INTERFERENCE CALCULATIONS.

UPLINK LOSSES = 199.6 + .2 dB + Pointing Loss
 DOWNLINK LOSSES = 196.1 + .1 dB + Pointing Loss

* THE TV/FM INTERFERENCE OBJECTIVE IS EITHER THE S/I OR C/I VALUE(S) WITHOUT THE "=" THE VALUE(S) WITH THE "=" ARE FOR COMPARISON ONLY. IF THE S/I HAS THE "=", THEN THE C/I OBJECTIVE IS USED AND THE S/I IS THE EQUIVALENT LEVEL FROM A CO-CHANNEL TV/FM INTERFERER.

IF THE C/Is HAVE "=", THEN THE S/I OBJECTIVE IS USED AND THE C/Is INDICATE THE EQUIVALENT SINGLE ENTRY LEVELS IN FOR A NOISE-LIKE INTERFERER (C/In) AND FOR A CO-CHANNEL TV/FM INTERFERER (C/Itv). CCIR Rec. 500-1 IMPAIRMENT GRADES ARE GIVEN FOR THE AGGREGATE TV/FM C/I = C/Itv - 4 dB INTO A "REASONABLY CRITICAL STILL SCENE". THE IMPAIRMENT GRADES ARE:

- 5.0 = IMPERCEPTIBLE (Never achieved)
- 4.6 = JUST PERCEPTIBLE OR JUST UNPERCEPTIBLE (Highest achievable grade)
- 4.3 = APPROXIMATE GRADE FOR CAIV AGGREGATE OBJECTIVE OF 18 dB
- 4.0 = PERCEPTIBLE, BUT NOT ANNOYING
- 3.0 = SLIGHTLY ANNOYING
- 2.0 = ANNOYING
- 1.0 = VERY ANNOYING

SINGLE ENTRY MARGIN (dB) (2.00 DEGREE SPACING)
 Antenna Patterns as given ; A = Geocentric Angle

W A N T E D	1	2	3	4	5	6	7	8	9	10	11	12	13
1	2.3	8.4	8.4	7.6	8.7	10.0	4.5	10.5	10.5	6.1	10.6	3.1	7.1
2	2.9	2.9	2.9	2.1	3.2	4.5	-8	5.0	5.0	.6	5.1	-2.1	1.6
3	.5	1.5	.5	.6	.7	3.5	-3	2.5	2.1	.2	2.6	-1.6	-.9
4	-5	9.5	8.2	7.7	8.3	10.6	5.4	10.2	10.5	7.3	10.3	4.1	6.8
5	-5.1	6.1	4.8	3.0	4.1	6.8	1.3	7.4	7.3	2.5	7.5	-.1	4.0
6	-3.5	3.2	1.9	2.1	2.9	1.5	-6.0	.7	1.3	-6.0	.9	-7.4	-2.6
7	-12.7	-7.4	-8.5	-9.0	-8.7	-9.9	-13.8	-11.6	-11.7	-10.1	-11.6	-15.0	-15.1
8	5.0	5.4	5.0	4.6	5.8	5.7	-3.9	5.7	5.7	-5.0	6.1	-5.3	2.7
9	-2.9	3.8	2.5	2.8	3.6	2.8	-5.9	2.0	3.3	-6.2	2.2	-7.3	-1.2
10	-1.1	-.8	-1.1	-2.2	-1.1	-4.7	-6.7	-4.6	-4.6	-3.2	-4.6	-7.9	-8.1
11	3.6	4.0	3.6	3.3	4.4	4.9	-5.6	5.0	5.0	-6.8	5.5	-7.1	2.1
12	-11.5	-6.2	-7.3	-7.8	-7.5	-8.7	-12.6	-10.4	-10.5	-8.9	-10.4	-13.8	-13.9
13	3.7	4.0	3.7	3.4	4.5	6.0	-5.8	6.1	6.1	-7.1	6.8	-7.3	3.5

COMBINATIONS FAILING TO MEET SINGLE ENTRY INTERFERENCE OBJECTIVES (dB)
 (2.00 DEGREE SPACING) Antenna Patterns as given ; A = Geocentric Angle
 INTERFERING LINK -->

WANTED LINK	1	2	3	4	5	6	7	8	9	0	1	2	3
SN4 1											1	1	1
SN4 2												1	
SN4 3													2
SN4 4													1
SN4 5													
I7G 6													1
I7G 7													6
I7G 8													7
I8G 9													3
I8G 10													6
I7H 11													5
I7H 12													7
I8H 13													1

5-SEP-00

13:01:51

LOWEST C/I RATIO IN: "U"=Uplink, "D"=Downlink, "0"=Equal
(2.00 DEGREE SPACING) Antenna Patterns as given; A = Geocentric Angle

WANTED		INTERFERING LINK -->												
LINK		1	2	3	4	5	6	7	8	9	0	1	2	3
SN4	1													
SN4	2													U
SN4	3													D D
SN4	4													D
SN4	5													D
I7G	6													U
I7G	7													U U D
I7G	8													U U D
I8G	9													U U D
I8G	10													U U D
I7H	11													U U
I7H	12													U U
I8H	13													U U

FAILURE SUMMARY*
(NUMBER)

	S A T E L L I T E S P A C I N G					
	2.00 DEG	.00 DEG	.00 DEG	.00 DEG	.00 DEG	.00 DEG
TOTAL COMBINATIONS	169	169	169	169	169	169
TOTAL FAILURES	66	0	0	0	0	0

FAILS BY:

- .0 - 1.5 dB 10
- 1.5 - 2.5 dB 3
- 2.5 - 3.5 dB 4
- 3.5 - 4.5 dB 1
- 4.5 - 5.5 dB 7
- 5.5 - 6.5 dB 7
- 6.5 - 7.5 dB 9
- 7.5 - 8.5 dB 5
- 8.5 - 9.5 dB 4
- MORE THAN 9.5 dB 16

(PERCENT)

	S A T E L L I T E S P A C I N G					
	2.00 DEG	.00 DEG	.00 DEG	.00 DEG	.00 DEG	.00 DEG
TOTAL FAILURES	39.1 %	.0 %	.0 %	.0 %	.0 %	.0 %

FAILS BY:

- .0 - 1.5 dB 5.9 %
- 1.5 - 2.5 dB 1.8 %
- 2.5 - 3.5 dB 2.4 %
- 3.5 - 4.5 dB .6 %
- 4.5 - 5.5 dB 4.1 %

5.5 - 6.5 dB 4.1 %
6.5 - 7.5 dB 5.3 %
7.5 - 8.5 dB 3.0 %
8.5 - 9.5 dB 2.4 %
MORE THAN 9.5 dB 9.5 %

* Antenna Patterns as given ; A = Geocentric Angle

The following Sharp analysis shows the expected interference from GE SN-4 into the Intelsat satellite "maximum" level Digital TV carriers. The carriers listed for the Intelsat satellite are carriers on the Intelsat 7 and Intelsat 8 C-Band Global and Hemispheric beams. The analysis shows that for all GE SN-4 carriers except for FM-TV negligible interference exists into the Intelsat satellite with receive dish sizes larger than 2.4 meters.

The maximum carrier parameters list reception of digital carriers into dishes as small as 1.4 meters at C-band. This dish size is excessively small and is very susceptible to adjacent satellite interference. In fact other Intelsat maximum level carriers at the same orbital separation as GE SN-4 cause even greater interference levels into these antennas. A 1.4-meter dish has a 10-dB beamwidth of 7.2 degrees. These dishes can not function properly in a 2-degree orbital environment and can result in a very inefficient use of the orbital arc. It is thus not unexpected that higher levels of interference exist for these dishes.

In addition, Intelsat lists uplink EIRP levels into 4.5-meter dishes as high as 88.6 dBW. This requires an input power level to the antenna of 40.9 dBW. This level is not a likely situation as an 11-Kilowatt amplifier would be required. Power levels of this magnitude can cause significant interference into adjacent satellites. Coordination with carriers of this size on Intelsat will be required.

Table 1: Domestic Satellite R.F. Carrier Listing - 6 / 4 GHz

Carrier Number	Signal Type & (channels)	Bandwidth (MHz)	E. S. Antennas (m) up/down	EIRP (dBW) up/down
1: SN4	TV/FM (1)	36.000	15.0/13.0	80.6/32.0
2: SN4	QPSK/ 60 MBPS	34.290	15.0/13.0	80.6/32.0
3: SN4	QPSK/ 40 MBPS	24.000	15.0/10.0	80.6/32.0
4: SN4	QPSK/ 4 MBPS (8)	2.700	15.0/10.0	71.6/24.0
5: SN4	QPSK/ 1.544 MBPS (15)	1.029	9.0/ 8.0	63.0/20.2
6: I7G	QPSK/ 34 MBPS	29.501	4.5/ 5.9	88.6/33.0
7: I7G	QPSK/ 6.600 MBPS (5)	5.727	4.5/ 1.5	81.5/33.0
8: I7G	QPSK/ 34 MBPS	29.501	4.5/ 6.2	88.6/32.5
9: I8G	QPSK/ 6.600 MBPS (5)	5.727	4.5/ 1.7	81.5/32.5
10: I7H	QPSK/ 34 MBPS	29.501	4.5/ 7.4	88.6/34.0
11: I7H	QPSK/ 6.600 MBPS (5)	5.727	4.5/ 1.4	81.5/39.5
12: I8H	QPSK/ 34 MBPS	29.501	4.5/ 5.4	88.6/37.5
13: I8H	QPSK/ 6.600 MBPS (5)	5.727	4.5/ 1.4	81.5/43.0

13:00:10 5-SEP-00

P A R A M E T E R S

L I N K C F A N D P

T Y P E	C A R P A N Y	R F B A N D W I D T H (M H z)	N O . O F C H A N	C O D E R A T E / M O D . I N D E X	B O T M O D . F R E Q . (M H z)	T O P M O D . F R E Q . (M H z)	A V E . T A L K E R N O I S E A L E V E L (d B m 0)	P R E M P H	D A T A R A T E (M B P S)	C H A N . S P A C E (M H z)	T R A N S P O N D E R F R E Q U E N C Y (G H z)		P O L E A R T H S T A T I O N		T R A N S M I T T E R		R E C E I V E R		E A R T H S T A T I O N					
											U P	D N	U	D	P	N	P O W R (d B W)	D I A M (m)	G A I N (d B)	T E M P (K)	E I R P (d B W)	D I A M (m)	G A I N (d B)	T E M P (K)
1	SN4	1	36.000	1	2.560	.025	4.200	.0	12.8	0	.000	.000	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	13.0	53.0	120
2	SN4	2	34.290	1	.875	.000	.000	.0	.0	4	60.000	.000	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	13.0	53.0	120
3	SN4	2	24.000	1	.750	.000	.000	.0	.0	4	40.000	.000	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	10.0	49.8	120
4	SN4	2	2.700	8	.000	.000	.000	.0	.0	4	4.000	3.600	3.940	0	1	13.8	15.0	57.8	23.0	750.	24.0	10.0	49.8	120
5	SN4	3	1.029	15	.750	.000	.000	.0	.0	4	1.544	1.300*	3.940	0	1	9.9	9.0	53.1	23.0	750.	20.2	8.0	47.9	120
6	I7G	2	29.501	1	.692	.000	.000	.0	.0	4	34.00035.401	.000	3.940	4	5	40.9	4.5	47.7	21.0	891.	33.0	5.9	45.5	100
7	I7G	3	5.727	5	.692	.000	.000	.0	.0	4	6.600	6.872	3.940	4	5	33.8	4.5	47.7	21.0	891.	33.0	1.5	33.8	100
8	I7G	2	29.501	1	.692	.000	.000	.0	.0	4	34.00035.401	.000	3.940	4	5	40.9	4.5	47.7	21.0	891.	32.5	6.2	46.0	100
9	I8G	3	5.727	5	.692	.000	.000	.0	.0	4	6.600	6.872	3.940	4	5	33.8	4.5	47.7	21.0	891.	32.5	1.7	34.9	100
10	I7H	2	29.501	1	.692	.000	.000	.0	.0	4	34.00035.401	.000	3.940	4	5	40.9	4.5	47.7	22.6	513.	34.0	7.4	47.7	100
11	I7H	3	5.727	5	.692	.000	.000	.0	.0	4	6.600	6.872	3.940	4	5	33.8	4.5	47.7	22.6	513.	39.5	1.4	33.0	100
12	I8H	2	29.501	1	.692	.000	.000	.0	.0	4	34.00035.401	.000	3.940	4	5	40.9	4.5	47.7	22.6	513.	37.5	5.4	45.0	100
13	I8H	3	5.727	5	.692	.000	.000	.0	.0	4	6.600	6.872	3.940	4	5	33.8	4.5	47.7	22.6	513.	43.0	1.4	33.0	100

EARTH-TO-SPACE		SPACE-TO-EARTH		THERMAL NOISE		SUMMARY		SINGLE ENTRY INTERFERENCE		5-SEP-00												
CAR- RIER	COM- PANY	EIRP (dBW)	LOSS* (dB)	RCV G/T	EIRP (dBW)	LOSS* (dB)	RCV G/T	C/N - (dB)	UP	DN	TOTAL	UP	DN	TOTAL	LINK THERMAL NOISE	S/N (dB)	Eb/No (dB)	S/I (dB)	C/In (dB)	C/Itv (dB)	MENT GRADE	
1	SN4	80.6	200.1	-5.8	32.0	196.4	32.2	103.3	96.4	95.6	27.8	20.8	20.0	57.3	17.8	59.2	21.9	27.4	27.4	27.4	28.0	<4.52>
2	SN4	80.6	200.1	-5.8	32.0	196.4	32.2	103.3	96.4	95.6	28.0	21.1	20.3		16.9							
3	SN4	80.6	200.1	-5.8	32.0	196.3	29.0	103.3	93.3	92.9	29.5	19.5	19.1		18.8							
4	SN4	71.6	200.1	-5.8	24.0	196.3	29.0	94.3	85.3	84.8	30.0	21.0	20.5		16.8							
5	SN4	63.0	200.1	-5.8	20.2	196.3	27.1	85.7	79.6	78.7	25.6	19.5	18.5		15.4							
6	I7G	88.6	199.8	-8.5	33.0	196.3	25.5	108.9	90.8	90.7	34.2	16.1	16.0		11.0							
7	I7G	81.5	199.8	-8.5	33.0	196.2	13.8	101.8	79.2	79.2	34.2	11.6	11.6		15.4							
8	I7G	88.6	199.8	-8.5	32.5	196.3	26.0	108.9	90.8	90.7	34.2	16.1	16.0		11.6							
9	I8G	81.5	199.8	-8.5	32.5	196.2	14.9	101.8	79.8	79.8	34.2	12.2	12.2		18.6							
10	I7H	88.6	199.8	-4.5	34.0	196.3	27.7	112.9	94.0	93.9	38.2	19.3	19.2		16.7							
11	I7H	81.5	199.8	-4.5	39.5	196.2	13.0	105.8	84.9	84.9	38.2	17.3	17.3		19.5							
12	I8H	88.6	199.8	-4.5	37.5	196.2	25.0	112.9	94.9	94.8	38.2	20.2	20.1		20.1							
13	I8H	81.5	199.8	-4.5	43.0	196.2	13.0	105.8	88.4	88.3	38.2	20.8	20.7		20.1							

*** FOOTNOTES ***

LINK PARAMETERS

SIGNAL TYPE INDEX	POLARIZATION TYPE INDEX	POLARIZATION ISOLATION MATRIX (dB)						
		INTERFERING SENSE						
		0	1	2	3	4	5	
0 = FDM/FM	0 = HORIZONTAL	0	.0	10.0	.0	6.9	3.0	3.0
1 = TV/FM	1 = VERTICAL							
2 = DIGITAL	2 = 20 DEG CANTED HORIZONTAL	D 1	10.0	.0	6.9	.0	3.0	3.0
3 = SCPC/PSK	3 = 20 DEG CANTED VERTICAL	E 2	.0	6.9	.0	10.0	3.0	3.0
4 = SCPC/FM	4 = LEFT-HAND CIRCULAR	I 3	6.9	.0	10.0	.0	3.0	3.0
5 = CSSB/AM	5 = RIGHT-HAND CIRCULAR	E 4	1.5	1.5	1.5	1.5	.0	6.0
6 = SS/PSK		D 5	1.5	1.5	1.5	1.5	6.0	.0

SPECTRA ASSUMED FOR INTERFERENCE INTO SCPC & PSK

TV/FM: FCC ADVISORY COMMITTEE

FDM/FM: GAUSSIAN, EXCEPT FOR THOSE MARKED WITH "+" UNDER SIGNAL TYPE

* INDICATES SCPC AND SMALL FDMA CARRIERS WHOSE TRANSPONDER FREQUENCY PLANS AVOID +- 1.0 MHZ AT THE TRANSPONDER CENTER.

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THERMAL NOISE SUMMARY

* PATH LOSSES INCLUDE FREE SPACE LOSS FOR A 10 DEGREE ELEVATION ANGLE, CLEAR SKY ATMOSPHERIC LOSSES, AND ANTENNA POINTING LOSSES IN THE RANGE OF 0.0-0.5 dB. POINTING LOSSES ARE INCLUDED ONLY FOR THE THERMAL NOISE C/N, NOT IN INTERFERENCE CALCULATIONS.

UPLINK LOSSES = 199.6 + .2 dB + Pointing Loss
 DOWNLINK LOSSES = 196.1 + .1 dB + Pointing Loss

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IF THE C/Is HAVE "=", THEN THE S/I OBJECTIVE IS USED AND THE C/Is INDICATE THE EQUIVALENT SINGLE ENTRY LEVELS IN FOR A NOISE-LIKE INTERFERER (C/In) AND FOR A CO-CHANNEL TV/FM INTERFERER (C/Itv). CCIR Rec. 500-1 IMPAIRMENT GRADES ARE GIVEN FOR THE AGGREGATE TV/FM C/I = C/Itv - 4 dB INTO A "REASONABLY CRITICAL STILL SCENE". THE IMPAIRMENT GRADES ARE:

- 5.0 = IMPERCEPTIBLE (Never achieved)
- 4.6 = JUST PERCEPTIBLE OR JUST UNPERCEPTIBLE (Highest achievable grade)
- 4.3 = APPROXIMATE GRADE FOR CATV AGGREGATE OBJECTIVE OF 18 dB
- 4.0 = PERCEPTIBLE, BUT NOT ANNOYING
- 3.0 = SLIGHTLY ANNOYING
- 2.0 = ANNOYING
- 1.0 = VERY ANNOYING

SINGLE ENTRY MARGIN (dB) (2.00 DEGREE SPACING)
 Antenna Patterns as given ; A = Geocentric Angle

W
A
N
T
E
D

		INTERFERING												
		1	2	3	4	5	6	7	8	9	10	11	12	13
1	2.3	8.4	8.4	8.4	7.6	8.7	-1.9	-1.7	-0.9	-1.6	-1.0	-4.3	-1.3	-6.6
2	2.9	2.9	2.9	2.1	3.2	-6.4	-7.2	-6.4	-7.1	-6.5	-9.8	-6.8	-12.1	-12.1
3	.5	1.5	.5	.6	.7	-6.1	-6.1	-6.0	-5.9	-6.2	-9.8	-6.9	-12.6	-12.6
4	-.5	9.5	8.2	7.7	8.3	.7	.4	.8	.5	.6	-3.0	.1	-5.6	-5.6
5	-5.1	6.1	4.8	3.0	4.1	-4.7	-5.5	-4.7	-5.4	-4.8	-7.8	-5.1	-10.0	-10.0
6	5.4	5.8	5.4	4.4	5.4	.9	-4.1	1.2	-3.6	.2	-10.2	-2.4	-13.6	-13.6
7	-13.5	-6.8	-8.1	-8.3	-7.5	-10.5	-16.0	-10.0	-15.5	-11.5	-22.5	-14.9	-26.0	-26.0
8	5.4	5.8	5.4	4.4	5.4	.9	-4.1	1.2	-3.6	.2	-10.2	-2.4	-13.6	-13.6
9	-12.4	-5.7	-7.1	-7.3	-6.5	-9.5	-15.0	-9.0	-14.5	-10.5	-21.4	-13.9	-24.9	-24.9
10	8.5	8.9	8.5	7.5	8.6	2.6	-1.3	2.8	-.9	2.1	-7.1	.0	-10.5	-10.5
11	-7.8	-1.1	-2.4	-2.6	-1.9	-5.3	-10.4	-4.8	-9.9	-6.1	-16.8	-9.4	-20.3	-20.3
12	9.3	9.7	9.3	8.3	9.4	2.9	-.7	3.1	-.3	2.5	-6.4	.6	-9.7	-9.7
13	-4.3	2.4	1.0	.9	1.6	-2.4	-7.1	-2.0	-6.6	-3.2	-13.4	-6.1	-16.8	-16.8

5-SEP-00

13:00:10

COMBINATIONS FAILING TO MEET SINGLE ENTRY INTERFERENCE OBJECTIVES (dB)
(2.00 DEGREE SPACING) Antenna Patterns as given ; A = Geocentric Angle

WANTED LINK	INTERFERING LINK -->												
	1	2	3	4	5	6	7	8	9	0	1	2	3
SN4 1					1	2	1	2	1	4	1	7	
SN4 2					6	7	6	7	6	*	7	*	
SN4 3					6	6	6	6	6	*	7	*	
SN4 4	1												6
SN4 5	5				5	6	5	5	5	8	5	*	
I7G 6					4	4	*	2	*				
I7G 7	*	7	8	8	*	*	*	*	*	*	*	*	*
I7G 8					4	4	*	2	*				
I8G 9	*	6	7	7	6	*	*	9	*	*	*	*	*
I7H 10					1	1	1	7	*				
I7H 11	8	1	2	3	2	5	*	5	*	6	*	9	*
I8H 12					1	1	1	6	*				
I8H 13	4				2	7	2	7	3	*	6	*	

5-SEP-00

13:00:10

LOWEST C/I RATIO IN: "U"=Uplink, "D"=Downlink, "0"=Equal
(2.00 DEGREE SPACING) Antenna Patterns as given; A = Geocentric Angle

WANTED LINK	INTERFERING LINK -->												
	1	2	3	4	5	6	7	8	9	0	1	2	3
SN4 1						U	U	U	U	U	D	U	D
SN4 2						U	U	U	U	D	U	D	U
SN4 3						U	U	U	U	D	U	D	U
SN4 4											D		
SN4 5						U	U	U	U	D	U	D	U
I7G 6										D	D	D	D
I7G 7						D	D	D	D	D	D	D	D
I7G 8						D	D	D	D	D	D	D	D
I8G 9						D	D	D	D	D	D	D	D
I7H 10						D	D	D	D	D	D	D	D
I7H 11						D	D	D	D	D	D	D	D
I8H 12										D	D	D	D
I8H 13										D	D	D	D

FAILURE SUMMARY*
(NUMBER)

S A T E L L I T E S P A C I N G

2.00 DEG	.00 DEG	.00 DEG	.00 DEG	.00 DEG
169	169	169	169	169
102	0	0	0	0

TOTAL COMBINATIONS
TOTAL FAILURES

FAILS BY:

.0 - 1.5 dB	10
1.5 - 2.5 dB	8
2.5 - 3.5 dB	3
3.5 - 4.5 dB	6
4.5 - 5.5 dB	8
5.5 - 6.5 dB	15
6.5 - 7.5 dB	11
7.5 - 8.5 dB	5
8.5 - 9.5 dB	2
MORE THAN 9.5 dB	34

(PERCENT)

S A T E L L I T E S P A C I N G

2.00 DEG	.00 DEG	.00 DEG	.00 DEG	.00 DEG
60.4 %	.0 %	.0 %	.0 %	.0 %

TOTAL FAILURES

FAILS BY:

.0 - 1.5 dB	5.9 %
1.5 - 2.5 dB	4.7 %
2.5 - 3.5 dB	1.8 %
3.5 - 4.5 dB	3.6 %
4.5 - 5.5 dB	4.7 %

5.5 - 6.5 dB 8.9 %
6.5 - 7.5 dB 6.5 %
7.5 - 8.5 dB 3.0 %
8.5 - 9.5 dB 1.2 %
MORE THAN 9.5 dB 20.1 %

* Antenna Patterns as Given ; A = Geocentric Angle

A.3.3 Interference into IDR Data Carriers

The following Sharp analysis shows the expected interference from GE SN-4 into the Intelsat satellite minimum level IDR data carriers. The carriers listed for Intelsat satellite are carriers on the Intelsat 7 and Intelsat 8 C-Band Global and Hemispheric beams.

The analysis shows that some potential for interference exists for minimum carrier levels into the smallest dish size listed in the carrier parameter list. However it should be noted that the analysis indicates that Intelsat's own minimum carriers in a 2 degree orbital environment would cause more interference into Intelsat's carriers than would the levels proposed by GE for GE SN-4.

Table 1: Domestic Satellite R.F. Carrier Listing - 6 / 4 GHz

Carrier Number	Signal Type & (channels)	Bandwidth (MHz)	E.S. Antennas (m) up/down	EIRP (dBW) up/down
1: SN4	TV/FM (1)	36.000	15.0/13.0	80.6/32.0
2: SN4	QPSK/ 60 MBPS	34.290	15.0/13.0	80.6/32.0
3: SN4	QPSK/ 40 MBPS	24.000	15.0/10.0	80.6/32.0
4: SN4	QPSK/ 4 MBPS (8)	2.700	15.0/10.0	71.6/24.0
5: SN4	QPSK/ 1.544 MBPS (15)	1.029	9.0/ 8.0	63.0/20.2
6: I7G	QPSK/ 64 KBPS (500)	.042	4.5/15.0	50.5/-3.6
7: I7G	QPSK/ 64 KBPS (500)	.042	4.5/ 4.5	60.6/ 6.3
8: I7G	QPSK/ 64 KBPS (500)	.042	4.5/15.0	49.1/-2.2
9: I7G	QPSK/ 64 KBPS (500)	.042	4.5/ 4.5	58.8/ 6.7
10: I8G	QPSK/ 64 KBPS (500)	.042	4.5/15.0	47.0/ -5
11: I8G	QPSK/ 64 KBPS (500)	.042	4.5/ 4.5	62.4/ 6.6

13:03:28 5-SEP-00

P A R A M E T E R S

L I N K C P A N D P

T Y P E	C A R C O M - P A N Y	R F B A N D - W I D T H (M H z)	N O . O F C H A N	C O D E R A T E / M O D . I N D E X	B O T M O D . F R E Q . (M H z)	T O P M O D . F R E Q . (M H z)	A V E . T A L K E R L E V E L (d B m 0)	P R E M P H A I S E W E I G H (d B)	D A T A R A T E (M B P S)	C H A N . S P A C E (M H z)	T R A N S P O N D E R F R E Q U E N C Y (G H z)		P O L E A R T H S T A T I O N		-- S A T E L L I T E --		- E A R T H S T A T I O N								
											U P	D N	U	D	P	N	R E C E I V E R G A I N (d B)	T E M P (K)	X M T R R E C E I V E R D I A M (m)	E I R P G A I N (d B)	T E M P (K)	D I A M (m)	R E C E I V E R G A I N (d B)	T E M P (K)	
1	SN4	1	36.000	1	2.560	.025	4.200	.0	12.8	.0	.000	6.165	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	13.0	53.0	120	
2	SN4	2	34.290	1	.875	.000	.000	.0	.0	4	60.000	.000	6.165	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	13.0	53.0	120
3	SN4	2	24.000	1	.750	.000	.000	.0	.0	4	40.000	.000	6.165	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	10.0	49.8	120
4	SN4	2	2.700	8	.000	.000	.000	.0	.0	4	4.000	3.600	6.165	3.940	0	1	13.8	15.0	57.8	23.0	750.	24.0	10.0	49.8	120
5	SN4	3	1.029	15	.750	.000	.000	.0	.0	4	1.544	1.300*	6.165	3.940	0	1	9.9	9.0	53.1	23.0	750.	20.2	8.0	47.9	120
6	I7G	3	.042	500	.692	.000	.000	.0	.0	4	.064	.060*	6.165	3.940	4	5	3.8	4.5	46.7	21.0	891.	-3.6	15.0	53.5	100
7	I7G	3	.042	500	.692	.000	.000	.0	.0	4	.064	.060*	6.165	3.940	4	5	13.9	4.5	46.7	21.0	891.	6.3	4.5	41.8	100
8	I7G	3	.042	500	.692	.000	.000	.0	.0	4	.064	.060*	6.165	3.940	4	5	2.4	4.5	46.7	21.0	891.	-2.2	15.0	53.5	100
9	I7G	3	.042	500	.692	.000	.000	.0	.0	4	.064	.060*	6.165	3.940	4	5	12.1	4.5	46.7	21.0	891.	6.7	4.5	41.8	100
10	I8G	3	.042	500	.692	.000	.000	.0	.0	4	.064	.060*	6.165	3.940	4	5	.3	4.5	46.7	21.0	891.	-5	15.0	53.5	100
11	I8G	3	.042	500	.692	.000	.000	.0	.0	4	.064	.060*	6.165	3.940	4	5	15.7	4.5	46.7	21.0	891.	6.6	4.5	41.8	100

13:03:28 5-SEP-00

THERMAL NOISE SUMMARY

SPACE-TO-EARTH IMPAIR-
SINGLE ENTRY INTERFERENCE OBJ+

CAR- RIER	COM- PANY	EARTH-TO-SPACE		SPACE-TO-EARTH		C/No - (dB-Hz)	C/N - (dB)	LINK THERMAL NOISE		S/I (dB)	C/In (dB)	C/Itv (dB)	MENT GRADE						
		EIRP (dBW)	LOSS* G/T (dB/K)	EIRP (dBW)	LOSS* G/T (dB/K)			S/N (dB)	EB/NO (dB)										
1	SN4	80.6	200.1	-5.8	32.0	196.4	32.2	103.3	96.4	95.6	27.8	20.8	20.0	57.3	17.8	59.2	21.9	28.0	4.52
2	SN4	80.6	200.1	-5.8	32.0	196.4	32.2	103.3	96.4	95.6	28.0	21.1	20.3	57.3	17.8	27.4			
3	SN4	80.6	200.1	-5.8	32.0	196.3	29.0	103.3	93.3	92.9	29.5	19.5	19.1	57.3	16.9	27.2			
4	SN4	71.6	200.1	-5.8	24.0	196.3	29.0	94.3	85.3	84.8	30.0	21.0	20.5	57.3	18.8	20.0			
5	SN4	63.0	200.1	-5.8	20.2	196.3	27.1	85.7	79.6	78.7	25.6	19.5	18.5	57.3	16.8	21.2			
6	I7G	50.5	199.8	-8.5	-3.6	196.4	33.5	70.8	62.1	61.6	24.6	15.9	15.3	57.3	13.5	24.2			
7	I7G	60.6	199.8	-8.5	6.3	196.2	21.8	80.9	60.5	60.5	34.7	14.3	14.2	57.3	12.4	24.2			
8	I7G	49.1	199.8	-8.5	-2.2	196.4	33.5	69.4	63.5	62.5	23.2	17.3	16.3	57.3	14.4	24.2			
9	I7G	58.8	199.8	-8.5	6.7	196.2	21.8	79.1	60.9	60.8	32.9	14.7	14.6	57.3	12.8	24.2			
10	I8G	47.0	199.8	-8.5	-5	196.4	33.5	67.3	65.2	63.1	21.1	19.0	16.9	57.3	15.1	24.2			
11	I8G	62.4	199.8	-8.5	6.6	196.2	21.8	82.7	60.8	60.8	36.5	14.6	14.5	57.3	12.7	24.2			

*** FOOTNOTES ***

LINK PARAMETERS

SIGNAL TYPE INDEX	POLARIZATION TYPE INDEX	POLARIZATION ISOLATION MATRIX (dB)					
		INTERFERING SENSE 0	1	2	3	4	5
0 = FDM/FM	0 = HORIZONTAL	.0	10.0	.0	6.9	3.0	3.0
1 = TV/FM	1 = VERTICAL	D 1	10.0	.0	6.9	.0	3.0
2 = DIGITAL	2 = 20 DEG CANTED HORIZONTAL	E	2	.0	6.9	.0	3.0
3 = SCPC/PSK	3 = 20 DEG CANTED VERTICAL	I	R 3	6.9	.0	10.0	.0
4 = SCPC/FM	4 = LEFT-HAND CIRCULAR	E	D 4	1.5	1.5	1.5	.0
5 = CSSB/AM	5 = RIGHT-HAND CIRCULAR		5	1.5	1.5	1.5	6.0
6 = SS/PSK							.0

SPECTRA ASSUMED FOR INTERFERENCE INTO SCPC & PSK

TV/FM: FCC ADVISORY COMMITTEE

FDM/FM: GAUSSIAN, EXCEPT FOR THOSE MARKED WITH "+" UNDER SIGNAL TYPE

* INDICATES SCPC AND SMALL FDM CARRIERS WHOSE TRANSPONDER FREQUENCY PLANS AVOID +/- .0 MHz AT THE TRANSPONDER CENTER.

"PLAN" UNDER CHANNEL SPACING INDICATES A FIXED FREQUENCY PLAN.

THERMAL NOISE SUMMARY

* PATH LOSSES INCLUDE FREE SPACE LOSS FOR A 10 DEGREE ELEVATION ANGLE, CLEAR SKY ATMOSPHERIC LOSSES, AND ANTENNA POINTING LOSSES IN THE RANGE OF 0.0-0.5 dB. POINTING LOSSES ARE INCLUDED ONLY FOR THE THERMAL NOISE C/N, NOT IN INTERFERENCE CALCULATIONS.

UPLINK LOSSES = 199.6 + .2 dB + Pointing Loss
 DOWNLINK LOSSES = 196.1 + .1 dB + Pointing Loss

+ THE TV/FM INTERFERENCE OBJECTIVE IS EITHER THE S/I OR C/I VALUE(S) WITHOUT THE "=" THE VALUE(S) WITH THE "=" ARE FOR COMPARISON ONLY. IF THE S/I HAS THE "=", THEN THE C/I OBJECTIVE IS USED AND THE S/I IS THE EQUIVALENT LEVEL FROM A CO-CHANNEL TV/FM INTERFERER.

IF THE C/Is HAVE "=", THEN THE S/I OBJECTIVE IS USED AND THE C/Is INDICATE THE EQUIVALENT SINGLE ENTRY LEVELS IN FOR A NOISE-LIKE INTERFERER (C/In) AND FOR A CO-CHANNEL TV/FM INTERFERER (C/Itv). CCIR Rec. 500-1 IMPAIRMENT GRADES ARE GIVEN FOR THE AGGREGATE TV/FM C/I = C/Itv - 4 dB INTO A "REASONABLY CRITICAL STILL SCENE". THE IMPAIRMENT GRADES ARE:

- 5.0 = IMPERCEPTIBLE (Never achieved)
- 4.6 = JUST PERCEPTIBLE OR JUST UNPERCEPTIBLE (Highest achievable grade)
- 4.3 = APPROXIMATE GRADE FOR CATV AGGREGATE OBJECTIVE OF 18 dB
- 4.0 = PERCEPTIBLE, BUT NOT ANNOYING
- 3.0 = SLIGHTLY ANNOYING
- 2.0 = ANNOYING
- 1.0 = VERY ANNOYING

SINGLE ENTRY MARGIN (dB) (2.00 DEGREE SPACING)
Antenna Patterns as given ; A = Geocentric Angle

W A N T E D	INTERFERING										
	1	2	3	4	5	6	7	8	9	10	11
1	2.3	8.4	8.4	7.6	8.7	9.2	-.9	10.3	.7	11.8	-2.6
2	2.9	2.9	2.9	2.1	3.2	3.7	-6.4	4.8	-4.8	6.3	-8.2
3	.5	1.5	.5	.6	.7	4.5	-5.5	5.5	-4.1	6.5	-7.2
4	-.5	9.5	8.2	7.7	8.3	12.3	2.3	13.4	3.8	14.5	.6
5	-5.1	6.1	4.8	2.9	4.1	8.9	-1.2	10.1	.4	11.6	-3.0
6	-9.9	1.3	-.1	-2.4	-2.0	.2	-9.9	1.0	-8.5	1.6	-11.4
7	-11.3	-.1	-1.4	-3.9	-3.5	4.9	-5.1	4.0	-5.0	2.6	-5.8
8	-8.9	2.3	1.0	-1.3	-.9	-.8	-10.9	.2	-9.4	1.4	-12.6
9	-11.0	.3	-1.1	-3.5	-3.1	4.6	-5.3	4.0	-5.1	2.9	-6.2
10	-8.1	3.1	1.8	-.4	.0	-2.7	-12.8	-1.4	-11.1	.2	-14.5
11	-11.0	.2	-1.1	-3.6	-3.2	5.5	-4.5	4.5	-4.5	3.0	-5.1

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COMBINATIONS FAILING TO MEET SINGLE ENTRY INTERFERENCE OBJECTIVES (dB)
 (2.00 DEGREE SPACING) Antenna Patterns as given ; A = Geocentric Angle

WANTED LINK	1	2	3	4	5	6	7	8	9	0	1
SN4 1											1
SN4 2											1
SN4 3											0
SN4 4											1
SN4 5											1
I7G 6	*										3
I7G 7	*	1	2	2	*	9	*				3
I7G 8	9	1	1	4	4	5	5	6			*
I7G 9	*	1	1	1	1	*	9	*			*
I8G 10	8	1	4	3	5	5	5	6			6
I8G 11	*	1	3	3	* 1	*					*
		1	4	3	4	5	5	5			5

13:03:28 5-SEP-00

LOWEST C/I RATIO IN: "U"=Uplink, "D"=Downlink, "0"=Equal
(2.00 DEGREE SPACING) Antenna Patterns as given; A = Geocentric Angle

WANTED LINK	INTERFERING LINK -->										
	1	2	3	4	5	6	7	8	9	0	1
SN4 1											U
SN4 2											U
SN4 3											U
SN4 4											U
SN4 5											U
I7G 6											U
I7G 7											U
I7G 8											U
I7G 9											U
I8G 10											U
I8G 11											U

FAILURE SUMMARY*
(NUMBER)

		S A T E L L I T E S P A C I N G					
2.00		.00		.00		.00	
DEG		DEG		DEG		DEG	
TOTAL COMBINATIONS	121	121	121	121	121	121	121
TOTAL FAILURES	55	0	0	0	0	0	0
FAILS BY:							
.0 - 1.5 dB	13						
1.5 - 2.5 dB	2						
2.5 - 3.5 dB	5						
3.5 - 4.5 dB	6						
4.5 - 5.5 dB	8						
5.5 - 6.5 dB	4						
6.5 - 7.5 dB	1						
7.5 - 8.5 dB	2						
8.5 - 9.5 dB	3						
MORE THAN 9.5 dB	11						

(PERCENT)

		S A T E L L I T E S P A C I N G					
2.00		.00		.00		.00	
DEG		DEG		DEG		DEG	
TOTAL FAILURES	45.5 %	.0 %	.0 %	.0 %	.0 %	.0 %	.0 %
FAILS BY:							
.0 - 1.5 dB	10.7 %						
1.5 - 2.5 dB	1.7 %						
2.5 - 3.5 dB	4.1 %						
3.5 - 4.5 dB	5.0 %						
4.5 - 5.5 dB	6.6 %						

5.5 - 6.5 dB 3.3 %
6.5 - 7.5 dB .8 %
7.5 - 8.5 dB 1.7 %
8.5 - 9.5 dB 2.5 %
MORE THAN 9.5 dB 9.1 %

* Antenna Patterns as given ; A = Geocentric Angle

The following Sharp analysis shows the expected interference from GE SN-4 Intelsat satellite "maximum" level IDR data carriers. The carriers listed for the Intelsat satellite are carriers on the Intelsat 7 and Intelsat 8 C-Band Global and Hemispheric beams. The analysis shows that there is a low probability of interference into these carriers from GE SN-4.

However, the analysis shows that a potential for interference exists from the analyzed Intelsat uplinks into GE. The Intelsat uplinks show excessive input power into 5-meter uplink antennas. The listed uplink EIRP of 90.6 dBW would require an input power to the antenna of 41.7 dBW or almost 15 Kilowatts. This is not a likely situation and if actually implemented can cause interference over a very large portion of the orbital arc. Coordination would be required with these uplinks if they exist.

Table 1: Domestic Satellite R.F. Carrier Listing - 6 / 4 GHz

Carrier Number	Signal Type & (channels)	Bandwidth (MHz)	E.S. Antennas (m) up/down	EIRP (dBW) up/down
1: SN4	TV/FM (1)	36.000	15.0/13.0	80.6/32.0
2: SN4	QPSK/ 60 MBPS	34.290	15.0/13.0	80.6/32.0
3: SN4	QPSK/ 40 MBPS	24.000	15.0/10.0	80.6/32.0
4: SN4	QPSK/ 4 MBPS (8)	2.700	15.0/10.0	71.6/24.0
5: SN4	QPSK/ 1.544 MBPS (15)	1.029	9.0/ 8.0	63.0/20.2
6: I7G	QPSK/ 49.500 MBPS	35.870	5.0/ 5.0	89.4/33.0
7: I7G	QPSK/ 8.030 MBPS (5)	5.817	5.0/ 5.0	81.5/33.0
8: I8G	QPSK/ 49.500 MBPS	35.870	5.0/11.0	90.6/34.0
9: I8G	QPSK/ 10.350 MBPS (4)	7.485	5.0/ 5.0	82.6/34.0
10: I7H	QPSK/ 49.500 MBPS	35.870	5.0/ 5.0	89.4/37.0
11: I8H	QPSK/ 34.500 MBPS	24.897	5.0/ 5.0	87.9/43.0

P A R A M E T E R S

L I N K
CPAND P

T Y	RF BAND- WIDTH (MHz)	NO. OF CHAN	CODE RATE/ MOD.	BOT MOD.	TOP MOD.	AVE. TALKER LEVEL (dBm0)	PREMP NOISE WEIGH (dB)	DATA RATE (Mbps)	CHAN. SPACE (MHz)	TRANSPONDER FREQUENCY		POL		EARTH STATION TRANSMITTER		--SATELLITE--		-EARTH STATION RECEIVER				
										UP (GHz)	DN (GHz)	U	D	P	N	POWR (dBW)	DIAM (m)	GAIN (dB)	RECEIVER TEMP (K)	EIRP (dBW)	DIAM (m)	GAIN (dB)
1	SN4 36.000	1	2.560	.025	4.200	.0	12.8	.0	.000	6.165	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	13.0	53.0	120
2	SN4 34.290	1	.875	.000	.000	.0	.0	4	60.000	.000	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	13.0	53.0	120
3	SN4 24.000	1	.750	.000	.000	.0	.0	4	40.000	.000	3.940	0	1	22.8	15.0	57.8	23.0	750.	32.0	10.0	49.8	120
4	SN4 2.700	8	.000	.000	.000	.0	.0	4	4.000	3.600	3.940	0	1	13.8	15.0	57.8	23.0	750.	24.0	10.0	49.8	120
5	SN4 3 1.029	15	.750	.000	.000	.0	.0	4	1.544	1.300*	3.940	0	1	9.9	9.0	53.1	23.0	750.	20.2	8.0	47.9	120
6	I7G 2 35.870	1	.692	.000	.000	.0	.0	4	49.50041.875	6.165	3.940	4	5	41.7	5.0	47.7	21.0	891.	33.0	5.0	44.3	100
7	I7G 3 5.817	5	.692	.000	.000	.0	.0	4	8.030 6.971	6.165	3.940	4	5	33.8	5.0	47.7	21.0	891.	33.0	5.0	44.3	100
8	I8G 2 35.870	1	.692	.000	.000	.0	.0	4	49.50041.875	6.165	3.940	4	5	42.9	5.0	47.7	21.0	891.	34.0	11.0	51.0	100
9	I8G 3 7.485	4	.692	.000	.000	.0	.0	4	10.350 8.739	6.165	3.940	4	5	34.9	5.0	47.7	21.0	891.	34.0	5.0	44.3	100
10	I7H 2 35.870	1	.692	.000	.000	.0	.0	4	49.50041.875	6.165	3.940	4	5	41.7	5.0	47.7	22.6	513.	37.0	5.0	44.3	100
11	I8H 3 24.897	1	.692	.000	.000	.0	.0	4	34.50029.064	6.165	3.940	4	5	40.2	5.0	47.7	22.6	513.	43.0	5.0	44.3	100

EARTH-TO-SPACE		SPACE-TO-EARTH		THERMAL NOISE SUMMARY				SINGLE ENTRY INTERFERENCE OBJ+ IMPAIRMENT						
CAR- RIER PANY	EIRP (dBW)	PATH LOSS* (dB)	RCV G/T	EIRP (dBW)	PATH LOSS* (dB)	RCV G/T	C/No - (dB-Hz)	C/N - (dB)	LINK THERMAL NOISE S/N	Sb/No (dB)	S/I (dB)	C/In (dB)	C/Itv (dB)	GRADE
							DN	UP	TOTAL	DN	UP	TOTAL		
1	SN4	80.6	200.1	-5.8	32.0	196.4	32.2	103.3	96.4	95.6	27.8	20.8	20.0	59.2 =21.9 =28.0<4.52>
2	SN4	80.6	200.1	-5.8	32.0	196.4	32.2	103.3	96.4	95.6	28.0	21.1	20.3	27.4
3	SN4	80.6	200.1	-5.8	32.0	196.3	29.0	103.3	93.3	92.9	29.5	19.5	19.1	27.2
4	SN4	71.6	200.1	-5.8	24.0	196.3	29.0	94.3	85.3	84.8	30.0	21.0	20.5	20.0
5	SN4	63.0	200.1	-5.8	20.2	196.3	27.1	85.7	79.6	78.7	25.6	19.5	18.5	21.2
6	I7G	89.4	199.8	-8.5	33.0	196.2	24.3	109.7	89.7	89.7	34.2	14.2	14.1	24.2
7	I7G	81.5	199.8	-8.5	33.0	196.2	24.3	101.8	89.7	89.4	34.2	22.1	21.8	24.2
8	I8G	90.6	199.8	-8.5	34.0	196.4	31.0	110.9	97.2	97.0	35.4	21.7	21.5	24.2
9	I8G	82.6	199.8	-8.5	34.0	196.2	24.3	102.9	90.7	90.4	34.2	22.0	21.7	24.2
10	I7H	89.4	199.8	-4.5	37.0	196.2	24.3	113.7	93.7	93.7	38.2	18.2	18.1	24.2
11	I8H	87.9	199.8	-4.5	43.0	196.2	24.3	112.2	99.7	99.5	38.2	25.7	25.5	24.2

*** FOOTNOTES ***

LINK PARAMETERS

SIGNAL TYPE INDEX	POLARIZATION TYPE INDEX	POLARIZATION ISOLATION MATRIX (dB)						
		0	1	2	3	4	5	
0 = FDM/FM	0 = HORIZONTAL	0	.0	10.0	.0	6.9	3.0	3.0
1 = TV/FM	1 = VERTICAL							
2 = DIGITAL	2 = 20 DEG CANTED HORIZONTAL	D 1	10.0	.0	6.9	.0	3.0	3.0
3 = SCPC/PSK	3 = 20 DEG CANTED VERTICAL	E 2	.0	6.9	.0	10.0	3.0	3.0
4 = SCPC/FM	4 = LEFT-HAND CIRCULAR	I 3	6.9	.0	10.0	.0	3.0	3.0
5 = CSSB/AM	5 = RIGHT-HAND CIRCULAR	E 4	1.5	1.5	1.5	1.5	.0	6.0
6 = SS/PSK								

SPECTRA ASSUMED FOR INTERFERENCE INTO SCPC & PSK

TV/FM: FCC ADVISORY COMMITTEE

FDM/FM: GAUSSIAN, EXCEPT FOR THOSE MARKED WITH "+" UNDER SIGNAL TYPE

* INDICATES SCPC AND SMALL FDM CARRIERS WHOSE TRANSPONDER FREQUENCY PLANS AVOID +/- 1.0 MHz AT THE TRANSPONDER CENTER.

"PLAN" UNDER CHANNEL SPACING INDICATES A FIXED FREQUENCY PLAN.

THERMAL NOISE SUMMARY

* PATH LOSSES INCLUDE FREE SPACE LOSS FOR A 10 DEGREE ELEVATION ANGLE, CLEAR SKY ATMOSPHERIC LOSSES, AND ANTENNA POINTING LOSSES IN THE RANGE OF 0.0-0.5 dB. POINTING LOSSES ARE INCLUDED ONLY FOR THE THERMAL NOISE C/N, NOT IN INTERFERENCE CALCULATIONS.

UPLINK LOSSES = 199.6 + .2 dB + Pointing Loss
 DOWNLINK LOSSES = 196.1 + .1 dB + Pointing Loss

+ THE TV/FM INTERFERENCE OBJECTIVE IS EITHER THE S/I OR C/I VALUE(S) WITHOUT THE "=" THE VALUE(S) WITH THE "=" ARE FOR COMPARISON ONLY. IF THE S/I HAS THE "=", THEN THE C/I OBJECTIVE IS USED AND THE S/I IS THE EQUIVALENT LEVEL FROM A CO-CHANNEL TV/FM INTERFERER.

IF THE C/Is HAVE "=", THEN THE S/I OBJECTIVE IS USED AND THE C/Is INDICATE THE EQUIVALENT SINGLE ENTRY LEVELS IN FOR A NOISE-LIKE INTERFERER (C/In) AND FOR A CO-CHANNEL TV/FM INTERFERER (C/Itv). CCIR Rec. 500-1 IMPAIRMENT GRADES ARE GIVEN FOR THE AGGREGATE TV/FM C/I = C/Itv - 4 dB INTO A "REASONABLY CRITICAL STILL SCENE". THE IMPAIRMENT GRADES ARE:

- 5.0 = IMPERCEPTIBLE (Never achieved)
- 4.6 = JUST PERCEPTIBLE OR JUST UNPERCEPTIBLE (Highest achievable grade)
- 4.3 = APPROXIMATE GRADE FOR CATV AGGREGATE OBJECTIVE OF 18 dB
- 4.0 = PERCEPTIBLE, BUT NOT ANNOYING
- 3.0 = SLIGHTLY ANNOYING
- 2.0 = ANNOYING
- 1.0 = VERY ANNOYING

W A N T E D SINGLE ENTRY MARGIN (dB) (2.00 DEGREE SPACING)
Antenna Patterns as given ; A = Geocentric Angle

	INTERFERING										
	1	2	3	4	5	6	7	8	9	10	11
1	2.3	8.4	8.4	7.6	8.7	-1.7	-1.7	-2.9	-1.8	-2.0	-2.3
2	2.9	2.9	2.9	2.1	3.2	-7.1	-7.2	-8.3	-7.3	-7.4	-7.8
3	.5	1.5	.5	.6	.7	-6.1	-6.1	-7.2	-6.3	-6.6	-9.1
4	-5.5	9.5	8.2	7.7	8.3	1.2	.7	.1	.0	.8	-1.8
5	-5.1	6.1	4.8	3.0	4.1	-4.2	-5.0	-5.4	-5.0	-4.5	-6.2
6	1.1	1.1	1.1	.1	1.1	-3.0	-8.7	-4.1	-8.7	-6.1	-11.5
7	.9	7.6	6.2	6.1	6.8	-.4	-3.0	-1.5	-3.4	-1.8	-6.9
8	8.7	8.7	8.7	7.7	8.8	1.5	-1.9	.4	-2.0	-.3	-4.3
9	1.9	7.7	6.5	6.8	6.6	-.2	-2.0	-1.3	-3.0	-1.6	-6.9
10	5.0	5.0	5.0	4.0	5.1	-.7	-5.1	-1.8	-5.2	-3.0	-7.7
11	10.7	11.6	10.7	10.4	12.2	.9	.2	-.2	-.3	.1	-3.0

5-SEP-00

13:07:16

COMBINATIONS FAILING TO MEET SINGLE ENTRY INTERFERENCE OBJECTIVES (dB)
(2.00 DEGREE SPACING) Antenna Patterns as given ; A = Geocentric Angle

WANTED LINK	INTERFERING LINK --->										
	1	2	3	4	5	6	7	8	9	0	1
SN4 1						2	2	3	2	2	2
SN4 2						7	7	8	7	7	8
SN4 3						6	6	7	6	7	9
SN4 4	1										2
SN4 5	5					4	5	5	5	4	6
I7G 6						3	9	4	9	6	*
I7G 7						1	3	2	3	2	7
I8G 8						2	2	2	1	4	
I8G 9						1	2	1	3	2	7
I7H 10						1	5	2	5	3	8
I8H 11							1	1			3

5-SEP-00

13:07:16

LOWEST C/I RATIO IN: "U"=Uplink, "D"=Downlink, "0"=Equal
(2.00 DEGREE SPACING) Antenna Patterns as given; A = Geocentric Angle

WANTED LINK	INTERFERING LINK -->										
	1	2	3	4	5	6	7	8	9	0	1
SN4 1	U	U	U	U	U	U	U	U	U	U	U
SN4 2	U	U	U	U	U	U	U	U	U	U	U
SN4 3	U	U	U	U	U	U	U	U	U	U	D
SN4 4	D										
SN4 5	D										
I7G 6	U	U	U	U	U	U	U	U	U	U	U
I7G 7	D	D	D	D	D	D	D	D	D	D	D
I8G 8	U	D	U	D	U	D	U	D	U	D	U
I8G 9	U	D	U	D	U	D	U	D	U	D	U
I7H 10	U	D	U	D	U	D	U	D	U	D	U
I8H 11									U	U	D

FAILURE SUMMARY*
(NUMBER)

	S A T E L L I T E S P A C I N G					
	2.00 DEG	.00 DEG	.00 DEG	.00 DEG	.00 DEG	.00 DEG
TOTAL COMBINATIONS	121	121	121	121	121	121
TOTAL FAILURES	58	0	0	0	0	0
FAILS BY:						
.0 - 1.5 dB	8					
1.5 - 2.5 dB	13					
2.5 - 3.5 dB	7					
3.5 - 4.5 dB	4					
4.5 - 5.5 dB	6					
5.5 - 6.5 dB	5					
6.5 - 7.5 dB	8					
7.5 - 8.5 dB	3					
8.5 - 9.5 dB	3					
MORE THAN 9.5 dB	1					

(PERCENT)

	S A T E L L I T E S P A C I N G					
	2.00 DEG	.00 DEG	.00 DEG	.00 DEG	.00 DEG	.00 DEG
TOTAL FAILURES	47.9 %	.0 %	.0 %	.0 %	.0 %	.0 %
FAILS BY:						
.0 - 1.5 dB	6.6 %					
1.5 - 2.5 dB	10.7 %					
2.5 - 3.5 dB	5.8 %					
3.5 - 4.5 dB	3.3 %					
4.5 - 5.5 dB	5.0 %					

5.5 - 6.5 dB	4.1 %
6.5 - 7.5 dB	6.6 %
7.5 - 8.5 dB	2.5 %
8.5 - 9.5 dB	2.5 %
MORE THAN 9.5 dB	.8 %

* Antenna Patterns as given ; A = Geocentric Angle