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Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C.

Federal Communications Commission  
Office of the Secretary

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In re

Application of GE American Communications,  
Inc. for Orbital Reassignment of Satcom IR  
to 131° W.L.

File Nos. Domestic Facilities Div.  
Satellite Radio Branch  
65-DSS-ML-90  
64-DSS-MISC-90

and

Application of GE American Communications,  
Inc. for Interim Assignment of Satcom C-1  
to 139° W.L.

REPLY OF  
GE AMERICAN COMMUNICATIONS, INC.

GE American Communications, Inc. (GE Americom) hereby responds to the Comments filed by Hughes Communications Galaxy, Inc. (HCG) in the above-captioned proceeding. In those Comments, HCG states that operation of GE Americom's C-1 satellite at its assigned location of 137° W.L. may cause harmful interference to HCG 's Galaxy I satellite located at 133° W.L.

The applications filed by GE Americom in this proceeding request authority to locate and operate its Satcom IR satellite at 131° W.L. and its C-1 satellite temporarily at 139° W.L. More particularly, GE Americom seeks authorization to move Satcom IR from 139° W.L. to 131° W.L. in order to replace the aging Satcom IIIR. To

accomplish this move with no disruption to customers now receiving service on Satcom IR, GE Americom proposes in the second application to operate its Satcom C-1 satellite for an interim six-month period at 139° W.L. before permanently positioning that satellite to its assigned location at 137° W.L.

No party has opposed GE Americom's applications. Only HCG has filed comments. However, HCG's comments do not address the interim operation of Satcom C-1 at 139° W.L. but are instead directed at the operation of Satcom C-1 at 137° W.L. approval for which was granted by the Commission last January. Therefore, there being no opposition or comment relevant to the subject applications of GE Americom, there is no reason for a delay in approval of the satellite moves requested in those applications. Specifically, since HCG's comments do not concern the temporary location of Satcom C-1 at 139°, those comments should not be permitted to delay the processing of GE Americom's applications.

While HCG did not object to or comment on the temporary location of Satcom C-1 at 139° W.L., it has raised a concern about potential interference to Galaxy I from Satcom C-1 at its permanently assigned location of 137° W.L. However, at the time GE Americom applied for permanent assignment at 137° W.L., HCG did not object.

Indeed, HCG then declared the exchange of orbital assignments that would place C-1 at 137° to be presumptively in the public interest. HCG's position on this point bears quotation:

"Nor does HCG object to the exchange of orbit assignments between C-1 and Aurora II. Indeed, as HCG previously mentioned, this exchange of orbit assignments upon the mutual consent of both parties is presumptively in the public interest."\*

The time for HCG to have objected to potential interference from Satcom C-1 at 137° W.L. was eighteen months ago when GE Americom asked the Commission for an assignment to that location. In short, HCG's concerns about the operation of Satcom C-1 at 137° W.L. are both tardy and misplaced.

The concerns also have no factual foundation. GE Americom is confident that HCG's Galaxy I satellite at 133° W.L. and Satcom C-1 at 137° W.L. can operate without causing harmful interference to one another. Attached is a Technical Showing demonstrating in detail that the operation of Satcom C-1 at 137° W.L. will not cause excessive or harmful interference to Galaxy I at 133° W.L.

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\* Response of Hughes Communications Galaxy, Inc., dated May 26, 1989 at 2 (emphasis added).

The Technical Showing further shows that Satcom C-1 is fully compliant with the Commission's 2° spacing requirements. Since Satcom C-1 and Galaxy I operate at similar power levels at 4° separation, any potential interference between these satellites should be easily addressable through coordination. Further, GE Americom is prepared to fully cooperate with HCG in coordinating the operations of the satellites in order to assure this result.

HCG's essential concern seems to be that small uplink antennas transmitting to C-1 will be operated improperly and so cause interference to Galaxy I. HCG argues that, despite HCG's failure to earlier raise this concern, GE Americom must now require uplink operators transmitting to C-1 to reduce their power should that be necessary to avoid harmful interference to Galaxy I. GE Americom has always been willing to take reasonable action to avoid interference to other satellites. It has done so believing that to be part of the general responsibility of all space station licensees. HCG has the same responsibility. HCG is in no superior position to GE Americom in this regard.

As support for its position that Satcom C-1 must yield to Galaxy 1 HCG cites American Telephone and Telegraph Company, 5 FCC Rcd 1590 (1990). In that case, however, the Commission was dealing with a satellite capable of operating at 20 watts of C-band and 120 watts of Ku-band power - hardly comparable to C-1. Moreover, what the Commission stated was that if interference resulted and coordination among satellite operators was not successful, AT&T "will be required to reduce its power levels to those routinely authorized." The Commission reached a similar result in the other case cited by HCG.\* In that case, NexSat proposed to operate at very high power density levels, and the Commission stated that if those levels caused interference, NexSat "will be required to reduce its power density levels to those that are routinely authorized". C-1's power level conforms to what is routinely authorized and will be confined to that for which it was authorized - the same level to which HCG did not previously object.

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\* 1988 Orbit Assignment Reconsideration Order, 5 FCC Rcd 179, 180 (1990).

As stated earlier GE Americom is fully prepared to coordinate the operation of Satcom C-1 with that of Galaxy I should any problem arise. Coordination of inter-satellite operations is not, however, solely GE Americom's burden. Cooperation must be mutual, with each operator working in good faith to eliminate harmful interference.

GE Americom has, as HCG states, discussed the mutual operation of C-1 and Galaxy I. We have provided HCG with technical information regarding C-1 and its predicted performance levels.\* To the extent necessary for successful coordination of the satellites, we would expect to continue these discussions with HCG.

In conclusion and to put this matter in its proper perspective, we point out that HCG's comments respecting the operation of Satcom C-1 at 137° are clearly misplaced in response to GE Americom's request to temporarily relocate Satcom C-1 at 139° W.L. HCG's comments therefore should not be permitted to delay the Commission's action on GE Americom's request to temporarily relocate Satcom C-1 to 139° W.L.

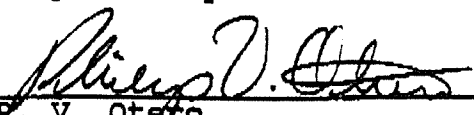
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\* The C-1 technical data which HCG characterizes as "somewhat inconsistent" is apparently data based on C-1's predicted performance prior to its recent refurbishment. As the Commission is aware, C-1 was initially authorized as a ground spare in 1979.

We also note again that GE Americom is willing cooperatively to coordinate the operations of C-1 with those of Galaxy 1. In these circumstances, there is no reason to place any special condition or qualification on GE Americom's operation of C-1 at its permanently assigned location - least of all in the context of GE Americom's application to operate temporarily further away from Galaxy at 139° W.L.

GE Americom urges the Commission to act as quickly as possible on our pending requests. Launch of C-1 is scheduled for November 20, 1990, and Satcom IR should begin its move to 131° W.L. to replace Satcom IIIR as soon as Satcom C-1 is operational at 139° W.L. This is scheduled to occur in early January.

Respectfully submitted

  
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November 20, 1990

TECHNICAL SHOWING

POTENTIAL INTERFERENCE

FROM

GE AMERICOM'S SATCOM C-1 SATELLITE

AT 137° WEST LONGITUDE

INTO

HUGHES COMMUNICATIONS' GALAXY I SATELLITE



## 1.0 INTRODUCTION

This Technical Showing demonstrates that operation of GE Americom's Satcom C-1 satellite at 137° West Longitude will not cause excessive or harmful interference into Hughes Communications' Galaxy I satellite.

It is shown in the analysis presented in this document that worst-case interference from Satcom C-1 will result in a single entry carrier-to-interference ratio into Galaxy I that conforms to the standards established by the FCC's 2<sup>nd</sup> Spacing Advisory Committee.

It is further demonstrated that use of uplink earth station antennas less than 9.0 meters in diameter or of transportable earth station antennas to access Satcom C-1 will not result in excessive or harmful interference into the Galaxy I satellite.

## 2.0 UPLINK INTERFERENCE

### 2.1 UPLINK INTERFERING ANTENNA DIAMETER OF 9.0 METERS

The minimum saturation flux density (SFD) required to saturate a transponder on the Galaxy I satellite is

-96<sup>dBW</sup>/m<sup>2</sup>. The maximum saturation flux density required to saturate a transponder on the C-1 satellite is -81<sup>dBW</sup>/m<sup>2</sup>. Therefore, for a 9.0 meter diameter antenna accessing Satcom C-1, and for a 4° separation between the satellites (Satcom C-1 at its assigned orbital slot of 137° West Longitude, and Galaxy I at its assigned orbital slot of 133° West Longitude), the uplink single entry carrier-to-interference ratio, C/I<sub>up</sub>, for interference into Galaxy I may be calculated as follows:

Wanted Flux Density =	-96.0 dBW/m <sup>2</sup>
Interfering Flux Density =	-81.0 dBW/m <sup>2</sup>
Transmit Antenna Gain Discrimination =	39.0 dB
	C/I <sub>up</sub> = 24.0 dB

This is the same value of C/I<sub>up</sub> derived in the Technical Statement submitted to the Federal Communications Commission by Hughes Communications Galaxy, Inc.

2.2 UPLINK INTERFERING ANTENNA DIAMETER LESS THAN 9.0 METERS

In its Technical Statement Hughes Communications Galaxy, Inc. declares, with reference to carrier-to-interference ratio, "This ratio would be even lower, and interference into Galaxy I would be even greater, if smaller earth

stations are used to access Satcom C-1. Therefore, the use of small (less than 9 meters in diameter) and transportable earth stations greatly increases the risk of unacceptable interference into Galaxy I." This claim is incorrect. The Federal Communications Commission has analyzed the use of small earth stations to uplink television channels and has issued a Declaratory Order on this subject.<sup>1</sup> In this Declaratory Order the FCC described its analysis, "Specifically, the updated analysis indicates that when the power transmitted into an antenna smaller than 9 meters used for full transponder services is limited to that transmitted into a 9 meter antenna, the interference levels caused into adjacent satellites are no worse than those caused by earth stations operating with 9 meter antennas." The Declaratory Order limits the video power into a 6 GHz antenna less than 9 meters in diameter to 26.5 dBW in order for the license application for that antenna to be processed routinely. The FCC comments concerning this

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1. Routine Licensing of Earth Stations in the 6 GHz and 14 GHz Bands, 2FCC Rcd 2149 (1987)

power limitation, "By limiting the power transmitted into earth station antennas smaller than 9 meters at 6 GHz to 450 watts (26.5 dBW) for full transponder services, earth stations can be operated with satellites spaced 2° apart. Thus, 6 GHz antennas that do not exceed this power limitation and comply with the performance standards given in 47C.F.R. # 25.209 will be routinely processed."

For an antenna 4.5 meters in diameter conforming to the restrictions of the FCC's Declaratory Order and accessing Satcom C-1, the single entry uplink carrier-to-interference ratio,  $C/I_{up}$ , may be calculated as follows:

$$\begin{array}{r} \text{Wanted Flux Density} = -96.0 \text{ dBW/m}^2 \\ \text{Interfering Flux Density} = -89.5 \text{ dBW/m}^2 \\ \text{Transmit Antenna Gain Discrimination} = 33.0 \text{ dB} \\ \hline C/I_{up} = 26.5 \text{ dB} \end{array}$$

In this case, because of the limitation of power into the uplink antenna, there is actually less interference (greater  $C/I_{up}$ ) into Galaxy I from a 4.5 meter diameter than from an antenna 9.0 meters in diameter. In the analysis presented in this Technical Showing, the worse case interference value ( $C/I_{up} = 24.0 \text{ dB}$ ) will be used.

3.0

### DOWNLINK INTERFERENCE

For equal EIRP levels transmitted from the interfering and interfered-with satellites, single entry downlink carrier-to-interference ratio,  $C/I_{\text{down}}$ , is just equal to the gain discrimination of the receive earth station antenna. For a 5.0 meter antenna receiving television transmissions from Galaxy I,  $C/I_{\text{down}} = 30.0$  dB. The value for this parameter that was derived in Hughes Communications Galaxy's Technical Statement is  $C/I_{\text{down}} = 29.0$  dB. The reason for this difference is that in its calculation Hughes assumed a receive antenna gain of 43 dB, corresponding to a very low antenna efficiency of 45% at 4.0 GHz. GE Americom, based on its broad experience, assumed a receive antenna gain of 44 dB, corresponding to a more reasonable antenna efficiency of 55% at 4.0 GHz.

4.0

### TOTAL INTERFERENCE

The total single entry carrier-to-interference ratio,  $C/I_{\text{total}}$ , is given by  $C/I_{\text{total}} = C/I_{\text{up}} \ominus C/I_{\text{down}}$ . For interference into Galaxy I at 133° West Longitude from Satcom C-1,  $C/I_{\text{total}}$  would be:

$$C/I_{\text{total}} = 24.0 \ominus 30.0 = 23.0 \text{ dB}$$

1432R

The question of appropriate protection ratios has been addressed by the Advisory Committee for the Implementation of Reduced Orbital Spacings Between United States Domestic Fixed-Satellites (2° Spacing Advisory Committee) of the Federal Communications Commission. In its Phase One Report, the 2° Spacing Advisory Committee recommended that for interference from television into television the single entry cofrequency ratio of carrier to interference ( $C/I_{total}$  in this analysis) be in the range 22.0 dB to 28.0 dB. The 2° Spacing Advisory Committee further recommended,

"The single entry cofrequency protection ratio for point to multipoint (Cable, SMATV, and Direct to Home) transmission shall be  $C/I_{se} = 22.0$  dB. The single entry cofrequency protection ratio for point-to-point transmission shall be a maximum of  $C/I_{se} = 28.0$  dB."

That is, for transmissions, through Galaxy I, which Hughes Communications Galaxy characterizes in its Comments as "...one of the primary satellites utilized by the cable television industry...", the appropriate protection ratio criterion is  $C/I_{total} = 22.0$  dB. It can be seen that interference from Satcom C-1 at 137°

West Longitude into Galaxy I would satisfy the protection ratio criterion established by the FCC's 2° Spacing Advisory Committee.

The value of  $C/I_{\text{total}}$  calculated in the Technical Statement of Hughes Communications Galaxy is 22.0 dB. While slightly smaller than the value calculated by GE American Communications (for reasons explained above in Section 3.0), this carrier-to-interference ratio also satisfies the protection ratio criterion established by the FCC's 2° Spacing Advisory Committee.

CERTIFICATE OF SERVICE

I, Wanda Latta, hereby certify that on this 20th day of November, 1990, a copy of the foregoing Reply of GE American Communications, Inc. was delivered to the following:

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