Attachment A
Technical Information to Supplement Schedule S

1 SCOPE

This Attachment contains information required by §25.114(d) and other sections of the FCC Part 25 rules that cannot be entered into the Schedule S submission.

2 GENERAL DESCRIPTION

The AMC-16 satellite is a hybrid Ku-/Ka-band satellite authorized by the Commission to operate at the 85°W orbital location. Per Commission approval, EchoStar Satellite Operating Corporation ("ESOC") is assigned the Ku-band payload (including TT&C), while SES Americom, Inc. ("SES") is assigned the Ka-band payload.[1]

The Ku-band payload currently operates as described in the SES 2004 FCC applications.[2] There are three types of Ku-band beams:

1) An uplink beam that operates in both linear polarizations;
2) A downlink beam that operates in both linear polarizations;
3) A second downlink beam that operates in both circular polarizations.

The sole purpose of this application is to request authority to repoint the uplink beam and the circularly and linearly polarized downlink beams towards South America. Accordingly, the information provided herein, and in the associated Schedule S form, pertains only to the uplink beam and the circularly and linearly polarized downlink beams. No other modifications are requested. This includes, but is not limited to, the spacecraft's orbital debris mitigation plan. ESOC incorporates by reference the relevant technical information previously provided in

[1] *See* SAT-ASG-20141020-00111.

[2] *See* File Nos. SAT-RPL-20040227-00024 and SAT-MOD-20040227-00022.

support of the AMC-16 satellite.[3] Commanding of the satellite will take place through the satellite's wide-angle horn receive antennas.

3 PREDICTED SPACE STATION ANTENNA GAIN CONTOURS

The AMC-16 satellite's antenna gain contours for the receive and transmit beams, as required by §25.114(c)(4)(vi)(A), are provided in GXT format and embedded in the associated Schedule S submission.

4 SERVICES TO BE PROVIDED

As proposed, the AMC-16 satellite's Ku-band payload will provide a variety of FSS and DTH services including a range of narrow- and wide-band digital services to the northwest portion of South America. Representative link budgets, which include details of the transmission characteristics, performance objectives and earth station characteristics, are provided in the associated Schedule S submission.

5 MAXIMUM KU-BAND OPERATION LEVELS

The AMC-16 satellite will be operated such that downlink transmissions will not exceed an EIRP density of -18.0 dBW/Hz. No authorized uplink earth station operating with AMC-16 will exceed an uplink input power density of -45.0 dBW/Hz.

The maximum saturation flux density of the uplink beam is -80.6 dBW/m^2.

[3] *See* File Nos. SAT-RPL-20040227-00024, SAT-MOD-20040227-00022 and SAT-MOD-20121224-00221.

6 TWO-DEGREE COMPATIBILITY ANALYSIS

This section demonstrates that AMC-16's Ku-band operations are two-degree compatible.

There are two Ku-band satellites that are immediately adjacent to the AMC-16 satellite:

1) the SES-2 satellite at 87°W, operated by SES; and
2) the AMC-9 satellite at 83°W, operated by SES.

6.1 SES-2 Satellite Network

Table 1 provides a summary of the transmission parameters derived from the AMC-16 link budgets that are embedded in the associated Schedule S submission. Table 2 provides a summary of the transmission parameters of the SES-2 satellite network as contained in the SES-2 application.[4]

Interference from the AMC-16 network into the SES-2 network was calculated and vice versa. Tables 3 and 4 show the results of the interference calculations using the transmission parameters of the two networks. These tables provide the calculated overall C/I margins. The interference calculations assume a 1 dB advantage for topocentric-to-geocentric conversion and assume a conservative 20 dB of uplink and downlink beam isolation between the two networks. The C/I calculations were performed on a per Hz basis.

The overall C/I margins shown in Tables 3 and 4 are all positive, demonstrating the compatibility between the AMC-16 and SES-2 satellite networks in the Ku band.

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[4] *See* SAT-RPL-20110429-00082.

Table 1. AMC-16 Typical Transmission Parameters

Carrier ID	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW)	Rx E/S Gain (dBi)	Single Entry C/I Criterion (dB)
1	0.055	43.2	40.2	23.0	41.7	17.9
2	1.34	46.7	58.0	36.8	47.7	17.9
3	5.0	49.2	66.0	41.9	45.2	18.0
4	6.33	53.0	71.0	43.9	41.7	18.0
5	27.0	57.3	81.6	53.3	37.6	17.9
6	36.0	57.3	82.9	53.3	37.6	17.9

Table 2. SES-2 Transmission Parameters

Carrier ID	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW)	Rx E/S Gain (dBi)	Single Entry C/I Criterion (dB)
1	36.0	57.3	77.3	46.4	39.2	19.0
2	27.0	57.3	77.3	45.1	39.2	19.0
3	6.95	53.0	73.0	32.7	47.7	19.0
4	5.0	53.0	73.0	31.3	47.7	19.0
5	0.1	46.7	66.7	15.5	41.7	19.0
6	1.6	46.7	66.7	25.5	47.7	19.0

Table 3. Overall link C/I margins (dB); AMC-16 interfering into SES-2.

		Interfering Carriers					
	Carrier ID	1	2	3	4	5	6
Wanted Carriers	1	12.0	12.0	12.6	11.7	8.6	9.8
	2	11.9	12.0	12.6	11.6	8.5	9.8
	3	16.2	16.2	16.8	15.9	13.2	14.3
	4	16.5	16.5	17.0	16.2	13.3	14.5
	5	12.0	12.0	12.6	11.7	8.7	9.9
	6	15.4	15.4	15.9	15.1	12.4	13.5

Table 4. Overall link C/I margins (dB); SES-2 interfering into AMC-16.

		Interfering Carriers					
	Carrier ID	1	2	3	4	5	6
Wanted Carriers	1	26.0	25.4	31.3	30.5	25.7	27.7
	2	31.0	30.3	36.0	35.1	29.9	31.9
	3	29.7	29.5	35.5	35.0	31.0	33.1
	4	28.0	28.0	34.4	34.1	31.8	33.9
	5	24.4	24.4	30.9	30.8	29.4	31.5
	6	23.1	23.2	29.7	29.6	28.3	30.3

6.2 AMC-9 Satellite Network

Table 1 provides a summary of the transmission parameters derived from the AMC-16 link budgets that are embedded in the associated Schedule S submission. Table 5 provides a summary of the transmission parameters of the AMC-9 satellite network as contained in the AMC-9 application.[5]

Interference from the AMC-16 network into the AMC-9 network was calculated and vice versa. Tables 6 and 7 show the results of the interference calculations using the transmission parameters of the two networks. These tables provide the calculated overall C/I margins. The interference calculations assume a 1 dB advantage for topocentric-to-geocentric conversion and assume a conservative 20 dB of uplink and downlink beam isolation between the two networks. The C/I calculations were performed on a per Hz basis.

The overall C/I margins shown in Tables 3 and 4 are all positive, demonstrating the compatibility between the AMC-16 and AMC-9 satellite networks in the Ku band.

Table 5. AMC-9 Transmission Parameters

Carrier ID	Bandwidth (MHz)	Tx E/S Gain (dBi)	Uplink EIRP (dBW)	Downlink EIRP (dBW)	Rx E/S Gain (dBi)	Single Entry C/I Criterion (dB)
1	36.0	57.3	77.3	47.7	39.2	19.0
2	6.95	53.0	73.0	34.9	47.7	19.0
3	36.0	57.3	77.3	45.7	47.7	22.1
4	36.0	60.7	80.7	48.6	55.7	28.8
5	0.1	46.7	66.7	17.5	41.7	19.0
6	1.35	46.7	66.7	27.8	47.7	19.0

[5] *See* SAT-AMD-20040421-00084.

Table 6. Overall link C/I margins (dB); AMC-16 interfering into AMC-9.

		Interfering Carriers					
	Carrier ID	1	2	3	4	5	6
Wanted Carriers	1	14.7	14.7	15.1	14.4	12.1	13.0
	2	10.9	10.6	10.9	10.6	10.0	10.2
	3	15.0	14.8	15.1	14.6	13.4	13.9
	4	9.9	9.5	9.8	9.5	9.4	9.4
	5	10.5	10.3	10.6	10.1	8.5	9.2
	6	10.9	10.5	10.8	10.5	9.9	10.2

Table 7. Overall link C/I margins (dB); AMC-9 interfering into AMC-16.

		Interfering Carriers					
	Carrier ID	1	2	3	4	5	6
Wanted Carriers	1	26.7	32.3	28.6	25.9	30.8	31.8
	2	32.6	38.2	34.5	31.8	36.4	37.4
	3	29.5	35.2	31.5	28.7	33.9	34.9
	4	27.0	32.6	29.0	26.1	31.5	32.6
	5	23.1	28.8	25.1	22.2	27.7	28.7
	6	21.9	27.5	23.9	21.0	26.5	27.5

CERTIFICATION OF PERSON RESPONSIBLE FOR PREPARING ENGINEERING INFORMATION

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this application, that I am familiar with Part 25 of the Commission's rules, that I have either prepared or reviewed the engineering information submitted in this application and that it is complete and accurate to the best of my knowledge and belief.

/s/ Stephen D. McNeil

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