

Application Purpose

Harris Corporation ("Harris") hereby submits this FCC Form 312 application for a proposed 3.8 meter transmit/receive C Band earth station to be located in Old Town, Florida. This application is a resubmission of its Form 312 application made with the Commission on June 07, 2013¹ under File No. SES-LIC-20130607-00474.

On August 12, 2013 the Commission dismissed File No. SES-LIC-20130607-00474 without prejudice to refiling² for the following reasons:

- *Harris lists the Total Input Power at antenna flange in Item E38 of its Schedule B as 0.071 Watts for the digital emission designator 64K0G7W listed in Item E47. However, the RF Radiation Hazard study provided as part of Harris's application lists the input power at antenna flange as 0.067 Watts. Furthermore, the stated maximum input power of 0.071 Watts (-11.5dBW) does not appear to be sufficient to close the link with SES-2. Therefore, if Harris elects to re-file this application, it must confirm that the power requested is sufficient to close the link with SES-2, submit a link budget in support of such a confirmation, and update the frequency coordination.*
- *Harris lists, in Items E54-58 of Schedule B, the eastern and western limits of the satellite arc, the range of antenna elevation angles, and the range of antenna azimuth angles. Specifically, Harris lists the antenna azimuth angle in the western limit as 252.0 degrees. However, our computations show the antenna azimuth angle in the western limit should be 251.5 degrees.*

Harris has corrected the relevant portions of FCC Form 312, Schedule B within this application. As requested, Harris is also supplying the link budget demonstrating that the power level noted within the application is sufficient to close the link with SES-2.

Because this submission only supplies the corrected information as noted, an additional application fee is not required pursuant to 47 C.F.R. § 1.1111(d).

¹ Which in turn was a resubmission of a Form 312 application filed by Harris on January 31, 2013 under File No. SES-LIC-20130131-00129.

² See DA 13-1746, released August 12, 2013.

SES WORLD SKIES LINK BUDGET ANALYSIS



Prepared by:	kavanaugh	Date:	7-Sep-12
Customer Name:	<insert prospect name>		
Project Name:			

Scenario name: FTI-SAT CTY C BAND SOM STATION

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Spacecraft: SES-2
Orbital location: 273 ° E longitude

Transponder information

Transponder ID: 13C
Start frequency (UD): MHz 6167.0/3942.0
Bandwidth: MHz 36.0
Saturated EIRP: dBW 43.6
Saturated flux density: dBW/m² -90.5
G/T: dB/K 3.5
Input back-off: dB 5.5
Output back-off: dB 4.0
Operational mode: Multi carrier
Inclined orbit: 0.0
ALC mode, Range: dB No, 0.0

Resource usage summary

Required bandwidth: MHz 0.20
Equivalent EIRP: dBW 17.1
EIRP margin: dB 6.0
Total
Number of carriers: 2
EIRP: dBW 11.1
PEB of carriers: MHz 0.05
Allocated bandwidth: MHz 0.160
Bandwidth margin: MHz 0.040

Calculation type: Clear Sky + Worse of Up & Downlink Fades
Analysis target: Transponder Resource

Earth stations

Tx earth station ID:	USA-SOM-008	USA-AGH-0038N
Earth station city:	Somis , California	Cross City , FL
Antenna diameter:	m 9.00	3.80
Latitude:	deg. N 41.83	29.63
Longitude:	deg. E -120.63	276.87
Antenna elevation angle:	degrees 30.9	55.2
Antenna azimuth angle (E of N):	degrees 135.1	187.8
Uplink aspect correction:	dB 1.2	1.1
Tracking capability (yes/no):	no	no

Receive earth station ID:	USA-AGH-0038N	USA-SOM-008
Earth station city:	Cross City , FL	Somis , California
Antenna diameter:	m 3.80	9.00
Latitude:	deg. N 29.63	41.83
Longitude:	deg. E 276.87	-120.63
Antenna elevation angle:	degrees 55.2	30.9
Antenna azimuth angle (E of N):	degrees 187.8	135.1
Rx E/S G/T clear sky:	dB/K 21.9	29.7
Downlink aspect correction:	dB 1.2	2.8
Tracking capability (yes/no):	no	no

CARRIER

Carrier ID:	C:USA-SOM-008>USA-AGH-0038N	C:USA-AGH-0038N>USA-SOM-008
Part of topology:	Duplex (2)	Duplex (2)
Information rate:	Mbps 0.096	0.096
Overhead rate:	kbps 0.0	0.0
FEC inner coding:	0.750	0.750
RS outer coding (if used):	n/a	n/a
Coding type:	Turbo Coding	Turbo Coding
Transmission rate:	Mbps 0.128	0.128
Modulation scheme:	QPSK	QPSK
Symbol rate:	Msp/s 0.064	0.064
Allocated bandwidth:	MHz 0.080	0.080
Noise bandwidth:	MHz 0.064	0.064
Desired threshold Eb/No:	dB 6.1	6.1
Frame length:	n/a	n/a
Pilot insertion:	n/a	n/a

BANDWIDTH REQUIREMENTS

Allocated bandwidth:	MHz 0.080	0.080
Calculated PEB, one carrier:	MHz 0.030	0.020
PEB/ABW ratio:	0.378	0.250
Required bandwidth, one carrier:	MHz 0.08	0.08
Number of carriers (multiplier):	1	1
Total BW per carrier type:	MHz 0.10	0.10

SES WORLD SKIES LINK BUDGET ANALYSIS

LINK BUDGET			
		Clear sky	Clear sky
Earth station transmit EIRP/carrier:	dBW	37.4	35.2
Transmit pointing loss:	dB	0.25	0.25
Uplink path loss:	dB	200.0	199.6
Uplink aspect correction:	dB	1.2	1.1
Uplink atmospheric loss:	dB	0.08	0.06
Uplink rain margin, if used:	dB	0.3	1.2
Target uplink availability:	%	99.98	99.98
Availability calculated for:		Annual	Annual
Per carrier flux density:	dBW/m ²	-126.8	-128.6
Transponder saturation flux density:	dBW/m ²	-90.5	-90.5
Transponder beam centre G/T:	dB/K	3.5	3.5
C/T uplink (thermal):	dBW/K	-160.5	-162.4
C/N uplink:	dB	20.0	18.2
C/T uplink (interference prior to ASI):	dBW/K	-150.5	-150.5
C/I uplink (prior to ASI):	dB	30.0	30.0
Carrier input back-off:	dB	36.3	38.1
Carrier output back-off:	dB	34.8	36.6
Carrier downlink EIRP at BC:	dBW	8.9	7.1
Calculated power equivalent bandwidth:	MHz	0.030	0.020
Receive pointing loss:	dB	0.25	0.25
Downlink atmospheric loss:	dB	0.05	0.08
Downlink aspect correction:	dB	1.2	2.8
Downlink path loss:	dB	195.7	196.1
Downlink rain margin, if used:	dB	0.2	2.0
Target downlink availability:	%	99.98	100.00
Rx E/S G/T clear sky:	dB/K	21.9	29.7
Rx E/S G/T degraded:	dB/K	n/a	n/a
C/T downlink (thermal):	dBW/K	-166.4	-162.5
C/N downlink:	dB	14.1	18.1
C/T downlink (interference prior to ASI):	dBW/K	-162.4	-162.4
C/I downlink (prior to ASI):	dB	18.1	18.1
C/(N+I) total prior ASI:	dB	11.9	13.3
C/I adjacent spacecraft interference:	dB	12.4	12.6
C/(N+I) total:	dB	9.1	9.9
Eb/No total, clear sky:	dB	7.3	8.1
MARGINS			
Implementation margin:	dB	1.0	1.0
Required threshold C/(N+I):	dB	8.9	8.9
Desired threshold Eb/No:	dB	6.1	6.1
Threshold margin:	dB	0.2	1.0
Margins shown for:		Clear Sky	Clear Sky
Link availability:	%	99.964	99.979
Power density and ITU Limits			
Uplink			
On-axis power spectral density:	dBW/Hz	-64.3	-59.1
Off-axis EIRP density per 4 KHz:	dBW/4 kHz	-11.21	-6.00
ITU limit -3 degrees:	dBW/4 kHz	20.07	20.07
Margin to ITU limit:	dB	31.3	26.1
Downlink			
On-axis power spectral density:	dBW/Hz	-39.2	-41.0
PSD at earth's surface per 4 kHz:	dBW/4 kHz	-165.45	-167.67
ITU limit per 4 kHz:	dBW/4 kHz	-152.00	-152.00
Margin to ITU limit:	dB	13.5	15.7
Interference and Intermodulation			
Earth station intermodulation:	dB	33.0	33.0
Transponder intermodulation:	dB	20.0	20.0
Adjacent carrier interference:	dB	27.0	27.0
Co-channel interference:	dB	26.0	26.0
Adjacent channel interference:	dB	33.0	33.0
Terrestrial interference uplink:	dB	33.0	33.0
Terrestrial interference downlink:	dB	33.0	33.0
ASI uplink:	dBW/Hz	-43.0	-43.0
ASI downlink:	dBW/Hz	-30.0	-30.0
HPA Sizing			
Earth Station:		USA-SOM-008	USA-AGH-0038N
Antenna diameter:	m	9.0	3.8
Total number of carriers:		1	1
Total EIRP required:	dBW	37.4	35.2
Peak antenna gain:	dB	53.7	46.2
UPC:	dB	n/a	n/a
Post HPA losses:	dB	0.0	0.0
HPA type:		SSPA	SSPA
HPA mode:		Multi carrier	Single carrier
Required backoff:	dB	4.0	1.0
Additional margin:	dB	0.0	0.0
Required HPA size:	Watts	0.1	0.1
Recommended HPA size:	Watts	1.0	1.0

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Prepared by: kavanaught	Date: 7-Sep-12
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Project Name:

Scenario name: FTI-SAT CTY C BAND SOM STATION

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Orbital location:	273 ° E longitude	
Transponder ID		13C
Start frequency (UD):	MHz	6167.0/3942.0

Earth Station:		USA-AGH-0038N
Antenna diameter:	m	3.8
Total number of carriers:		1
Total EIRP required:	dBW	35.2
Peak antenna gain:	dBi	46.2
UPC:	dB	n/a
Post HPA losses:	dB	0.0
HPA type:		SSPA
HPA mode:		Single carrier
Required backoff:	dB	1.0
Additional margin:	dB	0.0
Required HPA size:	Watts	0.1
Recommended HPA size:	Watts	1.0

Earth Station:		USA-SOM-008
Antenna diameter:	m	9.0
Total number of carriers:		1
Total EIRP required:	dBW	37.4
Peak antenna gain:	dBi	53.7
UPC:	dB	n/a
Post HPA losses:	dB	0.0
HPA type:		SSPA
HPA mode:		Multi carrier
Required backoff:	dB	4.0
Additional margin:	dB	0.0
Required HPA size:	Watts	0.1
Recommended HPA size:	Watts	1.0