

**Exhibit For
SES Americom, LLC
Woodbine, Maryland
GD Satcom 9 Meter Earth Station**

**Compliance with FCC Report & Order (FCC 96-377) for the 13.75 - 14.0 GHz Band
Analysis and Calculations**

1. Background

This Exhibit is presented to demonstrate the extent to which the SES Americom, LLC satellite earth station in Woodbine, Maryland is in compliance with FCC REPORT & ORDER 96-377. The potential interference from the earth station to US Navy shipboard radiolocation operations (RADAR) and the NASA space research activities in the 13.75 - 14.0 GHz Band is addressed in this exhibit. The parameters for the earth station are:

Table 1. Earth Station Characteristics

- Coordinates (NAD83): 39° 22' 36.5" N, 77° 04' 49.4" W
- Satellite Location for Earth Station: (12° W) and (142° W)
- Frequency Band: 13.75-14.0 GHz for uplink
- Polarizations: H,V
- Emissions: N0N, 648KG7W, 6M00G7W, 10M0G7W, 20M0G7W, 50M2G7W, 72M0G7W, 152MG7W, 240MG7W
- Modulation: Digital
- Maximum Aggregate Uplink EIRP:
 - 45.9 dBW for the N0N Carrier
 - 68.0 dBW for the 648 kHz Carriers
 - 71.0 dBW for the 6 MHz Carriers
 - 73.2 dBW for the 10 MHz Carriers
 - 82.9 dBW for the 20 MHz Carriers
 - 85.0 dBW for the 50.2 MHz Carriers
 - 85.0 dBW for the 72 MHz Carriers
 - 85.0 dBW for the 152 MHz Carriers
 - 85.0 dBW for the 240 MHz Carriers
- Transmit Antenna Characteristics
 - Antenna Size: 9.0 meters in Diameter
 - Antenna Type/Model: GD Satcom
 - Gain: 59.9 dBi
- RF power into Antenna Flange: No Modulation (N0N)
-14.0 dBW or -14.0 dBW/4 kHz (Maximum)

Summary of Coordination Issues:

- 1) Potential Impact to Government Radiolocation (Shipboard Radar)
- 2) Potential Impact to NASA Data Relay Satellite Systems (TDRSS)

2. Potential Impact to Government Radiolocation (Shipboard Radar)

Radiolocation operations (RADAR) may occur anywhere in the 13.4 - 14 GHz frequency band aboard ocean going United States Navy ships. The Federal Communication Commission (FCC) order 96-377 allocates the top 250 MHz of this 600 MHz band to the Fixed Satellite Service (FSS) on a co-primary basis with the radiolocation operations and provides for an interference protection level of -167 dBW/m²/4 kHz.

The closest distance to the shoreline from the Woodbine earth station is approximately 65.9 km Southeast toward the Chesapeake Bay. The calculation of the power spectral density at this distance is given by:

	<u>NON</u>	<u>648 kHz</u>	<u>6 MHz</u>	<u>10 MHz</u>	<u>20 MHz</u>	<u>50.2MHz</u>	<u>72MHz</u>	<u>152MHz</u>	<u>240MHz</u>
Clear Sky EIRP (dBW):	45.9	68.0	71.0	73.2	82.9	85.0	85.0	85.0	85.0
Carrier Bandwidth:	CW	648 kHz	6 MHz	10 MHz	20 MHz	50.2 MHz	72 MHz	152 MHz	240 MHz
PD at antenna Input: (dBW/4 kHz)	-14.0	-14.0	-20.7	-20.7	-14.0	-15.9	-17.5	-20.7	-22.7
Transmit Antenna Gain:					59.9 dBi				
Antenna Gain Horizon:					FCC Reference Pattern				
Antenna Elevation Angle:					10.5°				

The proposed earth station will radiate interference toward the Chesapeake Bay according to its off-axis side-lobe performance. A conservative analysis, using FCC standard reference pattern, results in off-axis antenna gains of -10.0 dBi toward the Chesapeake Bay.

The signal density at the shoreline, through free space is:

NON Carriers (CW Carrier)

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m²).

$$\begin{aligned} &= -14.0 \text{ dBw/4 kHz} + (-10.0) \text{ dBi} - 10 \cdot \log[4\pi \cdot (65900\text{m})^2] \\ &= -131.3 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 63.0 \text{ dB}) \\ &= -194.3 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

648 kHz Carriers

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m²).

$$\begin{aligned} &= -14.0 \text{ dBw/4 kHz} + (-10.0) \text{ dBi} - 10*\log[4\Pi*(65900\text{m})^2] \\ &= -131.3 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 63.0 \text{ dB}) \\ &= -194.3 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

6 MHz Carriers

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m²).

$$\begin{aligned} &= -20.7 \text{ dBw/4 kHz} + (-10.0) \text{ dBi} - 10*\log[4\Pi*(65900\text{m})^2] \\ &= -138.0 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 63.0 \text{ dB}) \\ &= -201.0 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

10 MHz Carriers

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m²).

$$\begin{aligned} &= -20.7 \text{ dBw/4 kHz} + (-10.0) \text{ dBi} - 10*\log[4\Pi*(65900\text{m})^2] \\ &= -138.0 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 63.0 \text{ dB}) \\ &= -201.0 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

20 MHz Carriers

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m²).

$$\begin{aligned} &= -14.0 \text{ dBw/4 kHz} + (-10.0) \text{ dBi} - 10*\log[4\Pi*(65900\text{m})^2] \\ &= -131.4 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 63.0 \text{ dB}) \\ &= -194.4 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

50.2 MHz Carriers

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m²).

$$\begin{aligned} &= -15.9 \text{ dBw/4 kHz} + (-10.0) \text{ dBi} - 10*\log[4\Pi*(65900\text{m})^2] \\ &= -133.3 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 63.0 \text{ dB}) \\ &= -196.3 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

72 MHz Carriers

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m²).

$$\begin{aligned} &= -17.5 \text{ dBw/4 kHz} + (-10.0) \text{ dBi} - 10*\log[4\Pi*(65900\text{m})^2] \\ &= -134.9 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses } (\sim 63.0 \text{ dB}) \\ &= -197.9 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

152 MHz Carriers

PF_D = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBW-m²).

$$\begin{aligned} &= -20.7 \text{ dBW/4 kHz} + (-10.0) \text{ dBi} - 10 \cdot \log[4\pi \cdot (65900\text{m})^2] \\ &= -138.0 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses} (\sim 63.0 \text{ dB}) \\ &= -201.0 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

240 MHz Carriers

PF_D = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBW-m²).

$$\begin{aligned} &= -22.7 \text{ dBW/4 kHz} + (-10.0) \text{ dBi} - 10 \cdot \log[4\pi \cdot (65900\text{m})^2] \\ &= -140.1 \text{ dBW/m}^2/4 \text{ kHz} + \text{Additional Path Losses} (\sim 63.0 \text{ dB}) \\ &= -203.1 \text{ dBW/m}^2/4 \text{ kHz} \end{aligned}$$

Our calculations identified additional path losses of approximately 63.0 dB including absorption loss and earth diffraction loss for the actual path profiles from the earth station to the nearest shoreline.

The worst case calculated PF_D including additional path losses to the closest shoreline location is –194.3 dBW/m²/4 kHz for all carriers. This meets the –167 dBW/m²/4 kHz interference criteria of R&O 96-377. Therefore, there should be no interference to the US Navy RADAR from the Woodbine earth station due to the distance and the terrain blockage between the site and the shore.

3. Potential Impact to NASA’s Data Relay Satellite System (TDRSS)

The geographic location of the SES Americom earth station in Woodbine, Maryland is outside the 390 km radius coordination contour surrounding NASA’s White Sands, New Mexico ground station complex. Therefore, the TDRSS space-to-earth link will not be impacted by the SES Americom earth station in Woodbine, Maryland.

The TDRSS space-to-space link in the 13.772 to 13.778 GHz band is assumed to be protected if an earth station produces an EIRP less than 71 dBW/6 MHz in this band. The 9 meter earth station antenna will have an EIRP less than 71 dBW/6 MHz for carriers, CW, 648 kHz, 6 MHz, 152 MHz and 240 MHz carriers in this band. The total EIRP for the CW Carrier is 45.9 dBW and the equivalent EIRP per 6 MHz segment will remain at 45.9 dBW/6 MHz. The total EIRP for the 648 kHz, carriers is 68.0 dBW. The equivalent EIRP per 6 MHz segment will be 67.9 dBW/6 MHz. The total EIRP for the 6 MHz, carriers is 71.0 dBW. The equivalent EIRP per 6 MHz segment will be 70.0 dBW/6 MHz. The total EIRP for the 10 MHz, carriers is 73.2 dBW. The equivalent EIRP per 6 MHz segment will be 71.5 dBW/6 MHz. The total EIRP for the 20 MHz, carriers is 82.9 dBW. The equivalent EIRP per 6 MHz segment will be 79.6 dBW/6 MHz. The total EIRP for the 50.2 MHz, carriers is 85.0 dBW. The equivalent EIRP per 6 MHz segment will be 76.6 dBW/6 MHz. The total EIRP for the 72 MHz, carriers is 85.0 dBW. The equivalent EIRP per 6 MHz segment will be 73.0 dBW/6 MHz. The total EIRP for the 152 MHz, carriers is 85.0 dBW. The equivalent EIRP per 6 MHz segment will be 59.7 dBW/6 MHz. The total EIRP for the

240 MHz, carriers is 85.0 dBW. The equivalent EIRP per 6 MHz segment will be 45.0 dBW/6 MHz.

Therefore, there should not be interference to the TDRSS space-to-space link for the CW carriers, 648 kHz, 6 MHz, 152 MHz and 240 MHz carriers. For the 10 MHz, 20 MHz, 50.2 MHz and 72 MHz carriers, the total EIRP per 6 MHz will exceed the 71.0 dBW/6 MHz level. To avoid interference to the TDRSS space-to-space link the 10 MHz, 20 MHz, 50.2 MHz and 72 MHz carriers will not be used for the transmit spectrum of 13.772 to 13.778 GHz by this earth station.

4. Coordination Issue Result Summary and Conclusions

The results of the analysis and calculations performed in this exhibit indicate that compatible operation between the earth station at the Woodbine facility and the US Navy and NASA systems space-to-earth link are possible for all of the proposed carriers. Operations in NASA systems space-to-space link (13772.0 to 13778.0 MHz) will also be permitted for all of the carriers with the exception of the 36 MHz and 54 MHz emissions.

FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for
SES Americom, Inc.
WOODBINE, MD
Satellite Earth Station

Prepared By:
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147
October 24, 2017

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1. CONCLUSIONS

An interference study considering all existing, proposed and prior coordinated microwave facilities within the coordination contours of the proposed earth station demonstrates that this site will operate satisfactorily with the common carrier microwave environment. Further, there will be no restrictions of its operation due to interference considerations.

2. SUMMARY OF RESULTS

A number of great circle interference cases were identified during the interference study of the proposed earth station. Each of the cases, which exceeded the interference objective on a line-of-sight basis, was profiled and the propagation losses estimated using NBS TN101 (Revised) techniques. The losses were found to be sufficient to reduce the signal levels to acceptable magnitudes in every case.

3. SUPPLEMENTAL SHOWING

Pursuant to Part 25.203(c) of the FCC Rules and Regulations, the satellite earth station proposed in this application was coordinated by Comsearch using computer techniques and in accordance with Part 25 of the FCC Rules and Regulations.

Coordination data for this earth station was sent to the below listed carriers with a letter dated 09/21/2017.

Company

APC Realty and Equipment CO LLC
Adams County Department of Emergency Svc
Affiniti PA, LLC
Altius Communications
Arlington County, VA
B.F. SAUL COMPANY
Believe Wireless, LLC
Blaze Broadband
Business Information Group, Inc.
Business Only Broadband, LLC
CBS Radio Stations Inc.
CBS Television Licenses LLC
Calvert County Government
Calvert, County of
Camp Hill School District
Carlisle Area School District
Chesapeake Television Licensee, LLC
Clearwire Spectrum Holdings III, LLC
Cumberland Valley School District
ECW Wireless, LLC
Enoch Pratt Free Library
Franklin County Dept. of Emergency Servi
George Washington University
Global Telecom & Technology Americas
Home Sales Company, Inc
Lancaster General Hospital
Loudoun, County of
Maryland Port Administration
Maryland, State of - MDOT-MTA
Montgomery, County of
NBC Telemundo License LLC
New Cingular Wireless PCS - Maryland
New Cingular Wireless PCS, LLC - PA
Northern York County School District
Pdp Group, Inc.
PhillieCo, L.P.
Prince William, County of
Radio One Inc
RapidDSL & Wireless, Inc.
Red Rose Transit Authority
Red Zebra Broadcasting Licensee, LLC
Shenandoah Personal Communications, LLC

Shippensburg Area School District
South Western School District
Sprint Spectrum L.P.
Sprintcom, Inc
T-Mobile License LLC
Telecom Transport Management, Inc
Telegia Communications Inc.
Virginia Everywhere, LLC
WKYSFM, Inc.
Washington Cable Systems Inc.
World Class Wireless, LLC
XO Communications, LLC
York Water Co

4. EARTH STATION COORDINATION DATA

This section presents the data pertinent to frequency coordination of the proposed earth station that was circulated to all carriers within its coordination contours.

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 <http://www.comsearch.com>

Date: 10/24/2017
Job Number: 170921COMSGE04

Administrative Information

Status ENGINEER PROPOSAL
Call Sign
Licensee Code P3210
Licensee Name SES Americom, Inc.

Site Information

WOODBINE, MD
Venue Name
Latitude (NAD 83) 39° 22' 36.5" N
Longitude (NAD 83) 77° 4' 49.4" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 189.22 m / 620.8 ft

Link Information

Satellite Type Geostationary
Mode TO - Transmit-Only
Modulation Digital
Satellite Arc 12° W to 142° West Longitude
Azimuth Range 106.4° to 253.5°
Corresponding Elevation Angles 10.5° / 10.6°
Antenna Centerline (AGL) 5.49 m / 18.0 ft

Antenna Information

Transmit - FCC32
Manufacturer GD Satcom
Model 9 meter
Gain / Diameter 62.0 dBi / 9.0 m
3-dB / 15-dB Beamwidth 0.13° / 0.32°

Max Available RF Power (dBW/4 kHz) -14.0
(dBW/MHz) 10.0

Maximum EIRP (dBW/4 kHz) 48.0
(dBW/MHz) 72.0

Interference Objectives: Long Term -151.0 dBW/4 kHz 20%
Short Term -128.0 dBW/4 kHz 0.0025%

Frequency Information

Transmit 18.0 GHz
Emission / Frequency Range (MHz) NON - 225MG7W / 17300.0 - 17800.0

Max Great Circle Coordination Distance 146.7 km / 91.2 mi
Precipitation Scatter Contour Radius 100.0 km / 62.1 mi

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Earth Station Data Sheet

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Coordination Values

WOODBINE, MD

Licensee Name SES Americom, Inc.
Latitude (NAD 83) 39° 22' 36.5" N
Longitude (NAD 83) 77° 4' 49.4" W
Ground Elevation (AMSL) 189.22 m / 620.8 ft
Antenna Centerline (AGL) 5.49 m / 18.0 ft
Antenna Model GD Satcom 9 meter
Antenna Mode Transmit 18.0 GHz
Interference Objectives: Long Term -151.0 dBW/4 kHz 20%
Short Term -128.0 dBW/4 kHz 0.0025%
Max Available RF Power -14.0 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 18.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
0	3.20	106.29	-10.00	100.00
5	2.79	101.32	-10.00	100.00
10	2.45	96.36	-10.00	100.00
15	2.56	91.41	-10.00	100.00
20	2.70	86.46	-10.00	100.00
25	3.02	81.50	-10.00	100.00
30	3.00	76.54	-10.00	100.00
35	2.74	71.60	-10.00	100.00
40	2.41	66.67	-10.00	100.00
45	2.09	61.76	-10.00	100.00
50	1.55	56.88	-10.00	100.00
55	1.18	52.02	-10.00	100.00
60	1.24	47.13	-9.83	100.00
65	1.35	42.24	-8.64	100.00
70	1.31	37.40	-7.32	100.00
75	1.17	32.63	-5.84	100.00
80	1.09	27.92	-4.15	100.00
85	1.05	23.31	-2.19	100.00
90	1.13	18.82	0.13	100.00
95	1.32	14.59	2.90	100.00
100	1.32	11.15	5.82	100.00
105	1.18	9.38	7.69	130.67
110	1.45	9.68	7.35	100.00
115	1.61	12.30	4.76	100.00
120	1.46	15.99	1.90	100.00
125	1.19	19.70	-0.36	100.00
130	0.88	23.33	-2.20	100.00
135	0.43	26.94	-3.76	107.59
140	0.28	30.18	-4.99	115.87
145	0.00	33.32	-6.07	119.09
150	0.00	36.01	-6.91	117.06
155	0.30	38.16	-7.54	108.08
160	0.28	40.22	-8.11	107.88
165	0.49	41.70	-8.50	100.00
170	0.59	42.83	-8.79	100.00
175	0.62	43.55	-8.97	100.00
180	0.65	43.78	-9.03	100.00
185	0.62	43.55	-8.97	100.00

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Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147
(703)726-5500 <http://www.comsearch.com>

Coordination Values

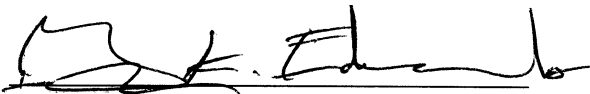
WOODBINE, MD

Licensee Name SES Americom, Inc.
Latitude (NAD 83) 39° 22' 36.5" N
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Antenna Model GD Satcom 9 meter
Antenna Mode Transmit 18.0 GHz
Interference Objectives: Long Term -151.0 dBW/4 kHz 20%
Short Term -128.0 dBW/4 kHz 0.0025%
Max Available RF Power -14.0 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 18.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
190	0.61	42.81	-8.79	100.00
195	0.59	41.61	-8.48	100.00
200	0.51	40.02	-8.06	100.00
205	0.48	38.00	-7.50	100.00
210	0.87	35.30	-6.70	100.00
215	1.00	32.53	-5.81	100.00
220	0.94	29.68	-4.81	100.00
225	0.51	26.89	-3.74	102.37
230	0.79	23.40	-2.23	100.00
235	0.86	19.93	-0.49	100.00
240	0.89	16.38	1.64	100.00
245	0.77	12.93	4.21	111.02
250	0.68	10.48	6.50	120.60
255	0.49	10.20	6.78	146.74
260	0.91	11.65	5.34	108.08
265	1.31	14.76	2.77	100.00
270	1.51	18.80	0.15	100.00
275	1.65	23.23	-2.15	100.00
280	1.84	27.84	-4.12	100.00
285	2.04	32.56	-5.82	100.00
290	2.33	37.33	-7.30	100.00
295	2.65	42.15	-8.62	100.00
300	2.81	47.04	-9.81	100.00
305	2.81	51.96	-10.00	100.00
310	2.80	56.89	-10.00	100.00
315	2.65	61.84	-10.00	100.00
320	3.14	66.75	-10.00	100.00
325	3.53	71.68	-10.00	100.00
330	4.09	76.63	-10.00	100.00
335	4.26	81.59	-10.00	100.00
340	4.30	86.56	-10.00	100.00
345	3.98	91.53	-10.00	100.00
350	4.06	96.50	-10.00	100.00
355	3.47	101.45	-10.00	100.00

5. CERTIFICATION

I HEREBY CERTIFY THAT I AM THE TECHNICALLY QUALIFIED PERSON RESPONSIBLE FOR THE PREPARATION OF THE FREQUENCY COORDINATION DATA CONTAINED IN THIS APPLICATION, THAT I AM FAMILIAR WITH PARTS 101 AND 25 OF THE FCC RULES AND REGULATIONS, THAT I HAVE EITHER PREPARED OR REVIEWED THE FREQUENCY COORDINATION DATA SUBMITTED WITH THIS APPLICATION, AND THAT IT IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: 

Gary K. Edwards
Senior Manager
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: October 24, 2017

COMSEARCH
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1. CONCLUSIONS

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2. SUMMARY OF RESULTS

A number of great circle interference cases were identified during the interference study of the proposed earth station. Each of the cases, which exceeded the interference objective on a line-of-sight basis, was profiled and the propagation losses estimated using NBS TN101 (Revised) techniques. The losses were found to be sufficient to reduce the signal levels to acceptable magnitudes in every case.

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Coordination data for this earth station was sent to the below listed carriers with a letter dated 09/21/2017.

Company

AT&T Corp.
AT&T Wireless Services 3 LLC - NM
Adams County Department of Emergency Svc
Affiniti PA, LLC
Albermarle, County of, Virginia
Allegany County Government
Allfirst Bank
Altius Communications
Argos Engineering, LLC
Atlantic Broadband (Penn), LLC
Atlantic, County of
Baltimore City Department of Public Work
Baltimore County of Maryland
Baltimore Gas and Electric Company
Beasley Media Group, LLC
Bedford County of
Believe Wireless, LLC
Berkeley, County of
Berks County Department of Emergency Ser
Blaze Broadband
Blue Ridge Carriers
Business Only Broadband, LLC
CBS Radio Inc. of Maryland
CBS Radio WLIF, Inc.
Calvert, County of
Cape May County Municipal Utilities Auth
Cape May County, MIS Department
Caroline County, VA
Cellco Partnership - Southern Virginia
Chester, County of
City of Laurel
City of Ocean City, MD
Citynet
Citywisper LLC
Clair Global
Clearwire Spectrum Holdings III, LLC
Clearwire Spectrum Holdings LLC
Comcast of Southeast Pennsylvania, Inc.
Conterra Ultra Broadband, LLC

COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147

(703)726-5500 <http://www.comsearch.com>

Conxx, Inc.
County of Camden
County of Culpeper
County of Westmoreland
County of York
Cumberland, County of (PA)
D&E Communications, Inc.
Dauphin County Emergency Management
Delaware County (PA) Emergency Services
Delaware Division of Communications
Digital Consultants, LLC
ECW Wireless, LLC
Eastern MLG LLC
Egg Harbor Township, Board of Education
Enoch Pratt Free Library
Exelon Generation Company, LLC
FELHC, Inc.
Franklin County Dept. of Emergency Servi
Frederick County
Fulton County of (PA)
Fundamental Broadcasting LLC
GWETA, Inc.
Garden State Transmissions
Global Telecom & Technology Americas
Globecomm License Sub LLC
Gloucester Township
Gloucester, County of
Goochland, County of
Grant, County of
Gray Television Licensee LLC (Gray TV)
Gray Television Licensee, LLC
Greater Boston Radio Inc.
Hampton Road Sanitation District
Hanover, County of
Hardy Cellular Telephone Company
Hardy Telecommunications
Harrisonburg-Rockingham ECC
Hearst Properties Inc
Henrico County
High Mountain Farm, LLC
Kent County Levy Court
King George County
Lancaster County-Wide Communications
Learning Tree Farms
Limitless Mobile, LLC
Local Media TV Philadelphia
Loudoun County Public Schools
Loudoun, County of
Maryland Port Administration
Maryland Public Broadcasting Commission
Maryland State Highway Administration
Maryland, State of - DNR
Maryland, State of - Dept.of Info & Tech
Maryland, State of - MDOT-MTA

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Middle East Broadcasting Networks, Inc.
Millersburg Area School District
Mit Lincoln Laboratory
Montgomery County Of
Montgomery, County of
Morgan, County of
Nelson, County of
Netrepid, Inc.
New Cingular Wireless PCS - Maryland
New Cingular Wireless PCS LLC - DC
New Cingular Wireless PCS LLC - Georgia
New Cingular Wireless PCS LLC - VA
New Cingular Wireless PCS LLC - WV,NC,SC
New Cingular Wireless PCS LLC-DE/NH/RI
New Cingular Wireless PCS, LLC - PA
New Jersey State Police
New Jersey Turnpike Authority-Pkwy Div
New Jersey, State of -NJ Transit
NewConnect
Nextlink Wireless, LLC
Norfolk Southern Railway
Noroc Broadband LLC
Northern Virginia Electric Cooperative
Novac Solutions, Inc
Page County Broadband Authority
Peco Energy Company
Pennsylvania Sports Entertainment Netwo.
Pennsylvania Turnpike Commission
Perry, County of
PhillieCo, L.P.
Pontis Communications, Inc.
Port Networks, Inc
Prince William, County of
Public Broadcasting Service
Qualcomm Inc.
Radio One Inc
Radio One, Inc. - MD
RapidDSL & Wireless, Inc.
Rappahannock Electric Cooperative
Rural Broadband Network Services LLC
Salem County Information Technology
Secom Net
Shenandoah Personal Communications, LLC
Somerset County, Maryland
South Central Task Force (SCTFNET)
South Western School District
Southeastern Pennsylvania Transit Auth
Southern Maryland Electric Cooperative I
Southside Electric Cooperative
Spotsylvania, County of
Sprint Spectrum L.P.
Sprintcom, Inc
St. Mary's County of (MD)
Stafford, County of

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State of Maryland, MIEMSS
State of New Jersey
Sussex County Council
Sussex County Government
Synergy Telecommunications Corp
T-Mobile License LLC
Telecom Transport Management, Inc
Telegia Communications Inc.
Thought Transmissions, LLC
Towerstream Corp.
Townsquare Media Atlantic City III Licen
Two Way Radio Inc.
USCOC of Cumberland, Inc.
Uniti Fiber PEG, LLC
Vector Data Systems, LLC
Verizon New Jersey, Inc.
Verizon Virginia, Inc.
Verizon Wireless (VAW) LLC - Maryland
Verizon Wireless (VAW) LLC - W/B/V Mkts
Verizon Wireless (VAW) LLC-Pennsylvania
Verizon Wireless VAW LLC-Southern VA
Virginia Broadband, LLC
Virginia Electric & Power Company
Virginia Everywhere, LLC
WHYY, Inc.
WV DHHR BPH, Office of Ems, Com. Div.
Warrenton Fauquier Joint Communications
Washington County Board of Education
Washington County Public Schools
Washington Gas Light Company
Washington Suburban Sanitary Commission
West Virginia Radio Corporation
Wicomico Board of Education
Wicomico County
Williamson Enterprise LLC
Winchester, City of
World Class Wireless, LLC
XO Communications, LLC
iSignal

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4. EARTH STATION COORDINATION DATA

This section presents the data pertinent to frequency coordination of the proposed earth station that was circulated to all carriers within its coordination contours.

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Date: 10/24/2017
Job Number: 170921COMSGE03

Administrative Information

Status ENGINEER PROPOSAL
Call Sign
Licensee Code P3210
Licensee Name SES Americom, Inc.

Site Information

WOODBINE, MD

Venue Name
Latitude (NAD 83) 39° 22' 36.5" N
Longitude (NAD 83) 77° 4' 49.4" W
Climate Zone A
Rain Zone 2
Ground Elevation (AMSL) 189.22 m / 620.8 ft

Link Information

Satellite Type Geostationary
Mode TR - Transmit-Receive
Modulation Digital
Satellite Arc 12° W to 142° West Longitude
Azimuth Range 106.4° to 253.5°
Corresponding Elevation Angles 10.5° / 10.6°
Antenna Centerline (AGL) 5.49 m / 18.0 ft

Antenna Information

Receive - FCC32

Transmit - FCC32

Manufacturer	GD Satcom	GD Satcom	
Model	9 meter	9 meter	
Gain / Diameter	58.5 dBi / 9.0 m	59.9 dBi / 9.0 m	
3-dB / 15-dB Beamwidth	0.20° / 0.40°	0.14° / 0.32°	
Max Available RF Power (dBW/4 kHz)		-14.0	
(dBW/MHz)		10.0	
Maximum EIRP (dBW/4 kHz)		45.9	
(dBW/MHz)		69.9	
Interference Objectives:	Long Term	-156.0 dBW/MHz 20%	-151.0 dBW/4 kHz 20%
	Short Term	-146.0 dBW/MHz 0.01%	-128.0 dBW/4 kHz 0.0025%

Frequency Information

Receive 11.0 GHz

Transmit 14.0 GHz

Emission / Frequency Range (MHz) NON - 225MG7W / 10950.0 - 11200.0
NON - 240MG7W / 11450.0 - 12450.0
NON - 240MG7W / 13750.0 - 14500.0

Max Great Circle Coordination Distance 341.1 km / 211.9 mi 154.5 km / 96.0 mi
Precipitation Scatter Contour Radius 528.8 km / 328.5 mi 100.0 km / 62.1 mi

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Coordination Values

WOODBINE, MD

Licensee Name	SES Americom, Inc.		
Latitude (NAD 83)	39° 22' 36.5" N		
Longitude (NAD 83)	77° 4' 49.4" W		
Ground Elevation (AMSL)	189.22 m / 620.8 ft		
Antenna Centerline (AGL)	5.49 m / 18.0 ft		
Antenna Model	FCC Reference 32-25LOG(THETA)		
Antenna Mode	Receive 11.0 GHz		Transmit 14.0 GHz
Interference Objectives:	Long Term	-156.0 dBW/MHz 20%	-151.0 dBW/4 kHz 20%
	Short Term	-146.0 dBW/MHz 0.01%	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power	-14.0 (dBW/4 kHz)		

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 11.0 GHz		Transmit 14.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	3.20	106.29	-10.00	123.87	-10.00	100.00
5	2.79	101.32	-10.00	129.78	-10.00	100.00
10	2.45	96.36	-10.00	136.55	-10.00	100.00
15	2.56	91.41	-10.00	134.21	-10.00	100.00
20	2.70	86.46	-10.00	131.53	-10.00	100.00
25	3.02	81.50	-10.00	126.97	-10.00	100.00
30	3.00	76.54	-10.00	127.32	-10.00	100.00
35	2.74	71.60	-10.00	130.84	-10.00	100.00
40	2.41	66.67	-10.00	137.29	-10.00	100.00
45	2.09	61.76	-10.00	144.48	-10.00	100.00
50	1.55	56.88	-10.00	160.65	-10.00	100.00
55	1.18	52.02	-10.00	175.79	-10.00	100.00
60	1.24	47.13	-9.83	174.64	-9.83	100.00
65	1.35	42.24	-8.64	176.76	-8.64	100.00
70	1.31	37.40	-7.32	184.31	-7.32	100.00
75	1.17	32.63	-5.84	195.43	-5.84	100.00
80	1.09	27.92	-4.15	204.72	-4.15	100.00
85	1.05	23.31	-2.19	212.00	-2.19	100.00
90	1.13	18.82	0.13	220.27	0.13	100.00
95	1.32	14.59	2.90	228.15	2.90	100.00
100	1.32	11.15	5.82	243.58	5.82	104.32
105	1.18	9.38	7.69	322.17	7.69	137.90
110	1.45	9.68	7.35	248.37	7.35	105.58
115	1.61	12.30	4.76	229.33	4.76	100.00
120	1.46	15.99	1.90	219.21	1.90	100.00
125	1.19	19.70	-0.36	216.13	-0.36	100.00
130	0.88	23.33	-2.20	218.99	-2.20	100.00
135	0.43	26.94	-3.76	237.85	-3.76	113.73
140	0.28	30.18	-4.99	246.91	-4.99	122.37
145	0.00	33.32	-6.07	249.58	-6.07	125.72
150	0.00	36.01	-6.91	245.56	-6.91	123.57
155	0.30	38.16	-7.54	232.54	-7.54	114.12
160	0.28	40.22	-8.11	231.44	-8.11	113.87
165	0.49	41.70	-8.50	210.88	-8.50	100.00
170	0.59	42.83	-8.79	204.61	-8.79	100.00
175	0.62	43.55	-8.97	204.87	-8.97	100.00
180	0.65	43.78	-9.03	203.62	-9.03	100.00
185	0.62	43.55	-8.97	205.00	-8.97	100.00

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Coordination Values

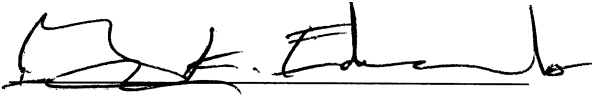
WOODBINE, MD

Licensee Name SES Americom, Inc.
Latitude (NAD 83) 39° 22' 36.5" N
Longitude (NAD 83) 77° 4' 49.4" W
Ground Elevation (AMSL) 189.22 m / 620.8 ft
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Antenna Model FCC Reference 32-25LOG(THETA)
Antenna Mode Receive 11.0 GHz Transmit 14.0 GHz
Interference Objectives: Long Term -156.0 dBW/MHz 20% -151.0 dBW/4 kHz 20%
Short Term -146.0 dBW/MHz 0.01% -128.0 dBW/4 kHz 0.0025%
Max Available RF Power -14.0 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 11.0 GHz		Transmit 14.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.61	42.81	-8.79	203.70	-8.79	100.00
195	0.59	41.61	-8.48	206.00	-8.48	100.00
200	0.51	40.02	-8.06	211.59	-8.06	100.00
205	0.48	38.00	-7.50	216.17	-7.50	100.48
210	0.87	35.30	-6.70	202.77	-6.70	100.00
215	1.00	32.53	-5.81	200.14	-5.81	100.00
220	0.94	29.68	-4.81	204.77	-4.81	100.00
225	0.51	26.89	-3.74	231.14	-3.74	108.25
230	0.79	23.40	-2.23	223.52	-2.23	100.00
235	0.86	19.93	-0.49	227.92	-0.49	100.92
240	0.89	16.38	1.64	237.06	1.64	105.33
245	0.77	12.93	4.21	257.75	4.21	117.83
250	0.68	10.48	6.50	275.68	6.50	127.94
255	0.49	10.20	6.78	341.13	6.78	154.53
260	0.91	11.65	5.34	256.11	5.34	114.83
265	1.31	14.76	2.77	227.78	2.77	100.00
270	1.51	18.80	0.15	209.82	0.15	100.00
275	1.65	23.23	-2.15	198.59	-2.15	100.00
280	1.84	27.84	-4.12	183.94	-4.12	100.00
285	2.04	32.56	-5.82	169.37	-5.82	100.00
290	2.33	37.33	-7.30	151.33	-7.30	100.00
295	2.65	42.15	-8.62	137.98	-8.62	100.00
300	2.81	47.04	-9.81	130.12	-9.81	100.00
305	2.81	51.96	-10.00	130.83	-10.00	100.00
310	2.80	56.89	-10.00	129.63	-10.00	100.00
315	2.65	61.84	-10.00	132.58	-10.00	100.00
320	3.14	66.75	-10.00	124.87	-10.00	100.00
325	3.53	71.68	-10.00	118.06	-10.00	100.00
330	4.09	76.63	-10.00	109.17	-10.00	100.00
335	4.26	81.59	-10.00	106.99	-10.00	100.00
340	4.30	86.56	-10.00	106.55	-10.00	100.00
345	3.98	91.53	-10.00	110.68	-10.00	100.00
350	4.06	96.50	-10.00	109.52	-10.00	100.00
355	3.47	101.45	-10.00	119.12	-10.00	100.00

5. CERTIFICATION

I HEREBY CERTIFY THAT I AM THE TECHNICALLY QUALIFIED PERSON RESPONSIBLE FOR THE PREPARATION OF THE FREQUENCY COORDINATION DATA CONTAINED IN THIS APPLICATION, THAT I AM FAMILIAR WITH PARTS 101 AND 25 OF THE FCC RULES AND REGULATIONS, THAT I HAVE EITHER PREPARED OR REVIEWED THE FREQUENCY COORDINATION DATA SUBMITTED WITH THIS APPLICATION, AND THAT IT IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: 

Gary K. Edwards
Senior Manager
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: October 24, 2017