

# Ka-Band Earth Station – Schriever AFB, CO

## Frequency Coordination Report

28 GHz



Prepared on Behalf of  
Harris Corporation

June 9, 2014





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## 1. Summary of Results

On behalf of Harris Corporation, Comsearch performed a coordination notice for all existing and proposed terrestrial licenses within the coordination contour of their proposed Ka-Band earth station at Schriever AFB, CO, transmitting at 28 GHz<sup>1</sup>. Prior notification letters were sent to the licensees and a copy of the notification data is provided in section four of this report. The earth station coordination was finalized on May 21, 2014.

No objections were received from any of the incumbent 28 GHz licensees. Our notification to the LMDS incumbents was performed under the assumption that the earth stations would be operating on a secondary basis to LMDS Block A operations and a contact at Harris Corporation has been provided in case any concerns may arise in the future.

## 2. 28 GHz Common Carrier and LTTS Coordination

In accordance with FCC Rules and Regulations, the Ka-Band earth station at Schriever AFB, CO prior-coordinated by Comsearch. A notification letter and datasheet for this earth station were sent to the following 28 GHz common carrier fixed microwave licensee on April 15, 2014. This licensee is authorized to operate temporary fixed operations from 27.5 – 29.5 GHz on a nationwide basis.

Licensee	Authorized Geographic Area
GTE Southwest Inc. dba Verizon	Continental US

A notification letter and datasheet for the Ka-Band earth station at Schriever AFB, CO were also sent to the following 28 GHz local television transmission licensee on April 15, 2014. This licensee is authorized to operate temporary fixed operations from 27.5 – 29.5 GHz on a nationwide basis.

Licensee	Authorized Geographic Area
Information Super Station, LLC	Continental US

No objections were received from the common carrier or local television transmission service incumbents.

<sup>1</sup> The proposed earth station will operate in the 28.3 – 28.6 GHz and 29.2 – 30.0 GHz portions of the Ka-Band.



### **3. 28 GHz LMDS Coordination**

A Notification letter was sent to the following 28 GHz LMDS licensee on April 15, 2014. The proposed earth station will operate on frequencies that overlap Block A of the LMDS service. The total frequency allocation for Block A of the LMDS spectrum appears below.

**Block A:** 27.500-28.350 GHz  
29.100-29.250 GHz  
31.075-31.225 GHz

<b>Licensee</b>	<b>Market</b>	<b>Market Name</b>
BTA Associates, LLC	BTA110	Denver, CO

No objections were received from the LMDS incumbent.



## 4. Earth Station Coordination Data

This section presents the data pertinent to the proposed Ka-Band earth station at Schriever AFB, CO. This data was circulated to all incumbent licensees in the shared 28 GHz frequency ranges.

Date: 05/21/2014  
 Job Number: 140415COMSGE01

### Administrative Information

Status: ENGINEER PROPOSAL  
 Call Sign:  
 Licensee Code: HARRCO  
 Licensee Name: HARRIS CORPORATION

### Site Information

**SCHRIEVER AF, CO**  
 Venue Name:  
 Latitude (NAD 83): 38° 47' 53.2" N  
 Longitude (NAD 83): 104° 31' 54.1" W  
 Climate Zone: A  
 Rain Zone: 2  
 Ground Elevation (AMSL): 1904.63 m / 6248.8 ft

### Link Information

Satellite Type: Geostationary  
 Mode: TR - Transmit-Receive  
 Modulation: Digital  
 Satellite Arc: 43° W to 169° West Longitude  
 Azimuth Range: 108.8° to 253.3°  
 Corresponding Elevation Angles: 13.3° / 11.1°  
 Antenna Centerline (AGL): 2.74 m / 9.0 ft

### Antenna Information

	<b>Receive - FCC32</b>	<b>Transmit - FCC32</b>
Manufacturer	ASC Signal	ASC Signal
Model	4.9 Meter	4.9 Meter
Gain / Diameter	58.1 dBi / 4.9 m	60.1 dBi / 4.9 m
3-dB / 15-dB Beamwidth	0.23° / 0.51°	0.16° / 0.35°

Max Available RF Power	(dBW/4 kHz)	-19.6
	(dBW/MHz)	4.4

Maximum EIRP	(dBW/4 kHz)	40.5
	(dBW/MHz)	64.5

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

	<b>Receive 18.0 GHz</b>	<b>Transmit 29.0 GHz</b>
Emission / Frequency Range (MHz)	19M2G7W / 18300.0 - 18800.0 19M2G7W / 19700.0 - 20200.0	19M2G7W / 28350.0 - 28600.0 19M2G7W / 29250.0 - 30000.0

Max Great Circle Coordination Distance	181.2 km / 112.6 mi	116.4 km / 72.3 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi	100.0 km / 62.1 mi



## **5. Contact Information**

For questions or information regarding the 28 GHz Frequency Coordination Report, please contact:

Contact person:	Joanna Lynch
Title:	Manager, Spectrum & Data Solutions
Company:	Comsearch
Address:	19700 Janelia Farm Blvd., Ashburn, VA 20147
Telephone:	703-726-5711
Fax:	703-726-5599
Email:	<a href="mailto:jlynch@comsearch.com">jlynch@comsearch.com</a>
Web site:	<a href="http://www.comsearch.com">www.comsearch.com</a>



# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for  
**HARRIS CORPORATION  
SCHRIEVER AFB, CO  
(18 GHz Receive)  
Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
May 21, 2014



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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 04/15/2014.

Company

City of Colorado Springs  
Clearwire Spectrum Holdings III, LLC  
Comcast of Colorado/Pennsylvania/WV LLC  
County of Pueblo  
Directlink, LLC  
El Paso County Information Technologies  
Fundamental Holdings, Corp.  
LP Broadband, Inc.  
Memorial Health System  
Memorial Hospital  
NSAC, LLC  
New Cingular Wireless PCS LLC -Colorado  
PCI BROADBAND  
Qwest Corporation  
State of Colorado  
T-Mobile License LLC  
University of Colorado Health



## **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.

1.

## 2. COMSEARCH

### Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147

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

Date: 05/21/2014  
Job Number: 140415COMSGE01

#### Administrative Information

Status: ENGINEER PROPOSAL  
Call Sign:  
Licensee Code: HARRCO  
Licensee Name: HARRIS CORPORATION

#### Site Information

#### SCHRIEVER AF, CO

Venue Name:  
Latitude (NAD 83): 38° 47' 53.2" N  
Longitude (NAD 83): 104° 31' 54.1" W  
Climate Zone: A  
Rain Zone: 2  
Ground Elevation (AMSL): 1904.63 m / 6248.8 ft

#### Link Information

Satellite Type: Geostationary  
Mode: TR - Transmit-Receive  
Modulation: Digital  
Satellite Arc: 43° W to 169° West Longitude  
Azimuth Range: 108.8° to 253.3°  
Corresponding Elevation Angles: 13.3° / 11.1°  
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#### Receive - FCC32

#### Transmit - FCC32

Manufacturer	ASC Signal	ASC Signal
Model	4.9 Meter	4.9 Meter
Gain / Diameter	58.1 dBi / 4.9 m	60.1 dBi / 4.9 m
3-dB / 15-dB Beamwidth	0.23° / 0.51°	0.16° / 0.35°
Max Available RF Power (dBW/4 kHz)		-19.6
		(dBW/MHz) 4.4
Maximum EIRP (dBW/4 kHz)		40.5
		(dBW/MHz) 64.5
Interference Objectives:	Long Term	-156.0 dBW/MHz 20%
	Short Term	-146.0 dBW/MHz 0.01%
		-151.0 dBW/4 kHz 20%
		-128.0 dBW/4 kHz 0.0025%

#### Frequency Information

#### Receive 18.0 GHz

#### Transmit 29.0 GHz

Emission / Frequency Range (MHz)	19M2G7W / 18300.0 - 18800.0	19M2G7W / 28350.0 - 28600.0
	19M2G7W / 19700.0 - 20200.0	19M2G7W / 29250.0 - 30000.0
Max Great Circle Coordination Distance	181.2 km / 112.6 mi	116.4 km / 72.3 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi	100.0 km / 62.1 mi

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## 2. COMSEARCH

### Earth Station Data Sheet

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

#### Coordination Values

#### SCHRIEVER AFB, CO

Licensee Name	HARRIS CORPORATION		
Latitude (NAD 83)	38° 47' 53.2" N		
Longitude (NAD 83)	104° 31' 54.1" W		
Ground Elevation (AMSL)	1904.63 m / 6248.8 ft		
Antenna Centerline (AGL)	2.74 m / 9.0 ft		
Antenna Model	ASC Signal 4.9 Meter		
Antenna Mode	Receive 18.0 GHz		Transmit 29.0 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	-19.6 (dBW/4 kHz)		

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 18.0 GHz		Transmit 29.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	1.08	106.40	-10.00	100.00	-10.00	100.00
5	0.94	103.44	-10.00	100.00	-10.00	100.00
10	0.87	98.56	-10.00	100.00	-10.00	100.00
15	0.88	93.68	-10.00	100.00	-10.00	100.00
20	0.86	88.80	-10.00	100.00	-10.00	100.00
25	0.81	83.92	-10.00	101.24	-10.00	100.00
30	0.84	79.04	-10.00	100.00	-10.00	100.00
35	0.71	74.17	-10.00	105.28	-10.00	100.00
40	0.60	69.32	-10.00	109.99	-10.00	100.00
45	0.52	64.47	-10.00	113.28	-10.00	100.00
50	0.42	59.64	-10.00	120.41	-10.00	100.00
55	0.25	54.85	-10.00	131.75	-10.00	100.00
60	0.00	50.11	-10.00	136.18	-10.00	100.00
65	0.00	45.36	-9.42	137.79	-9.42	100.00
70	0.00	40.66	-8.23	141.16	-8.23	100.00
75	0.00	36.02	-6.91	145.01	-6.91	100.00
80	0.00	31.47	-5.45	149.46	-5.45	100.00
85	0.00	27.07	-3.81	154.64	-3.81	100.00
90	0.00	22.89	-1.99	161.14	-1.99	102.49
95	0.00	19.08	-0.02	167.80	-0.02	107.22
100	0.00	15.92	1.95	174.59	1.95	111.94
105	0.00	13.86	3.46	179.91	3.46	115.56
110	0.00	13.40	3.82	181.21	3.82	116.43
115	0.00	14.71	2.81	177.63	2.81	114.01
120	0.00	17.38	1.00	171.30	1.00	109.66
125	0.00	20.84	-0.97	164.56	-0.97	104.93
130	0.00	24.31	-2.64	158.97	-2.64	100.92
135	0.00	27.64	-4.04	153.91	-4.04	100.00
140	0.00	30.81	-5.22	150.18	-5.22	100.00
145	0.00	33.78	-6.22	147.11	-6.22	100.00
150	0.00	36.50	-7.06	144.57	-7.06	100.00
155	0.00	38.95	-7.76	142.51	-7.76	100.00
160	0.00	41.05	-8.33	140.86	-8.33	100.00
165	0.00	42.76	-8.78	139.59	-8.78	100.00
170	0.00	44.03	-9.09	138.70	-9.09	100.00
175	0.00	44.81	-9.28	138.16	-9.28	100.00
180	0.00	45.07	-9.35	137.98	-9.35	100.00
185	0.00	44.81	-9.28	138.16	-9.28	100.00

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2. COMSEARCH

Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147

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

**Coordination Values**

**SCHRIEVER AFB, CO**

Licensee Name HARRIS CORPORATION  
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 Ground Elevation (AMSL) 1904.63 m / 6248.8 ft  
 Antenna Centerline (AGL) 2.74 m / 9.0 ft  
 Antenna Model ASC Signal 4.9 Meter  
 Antenna Mode Receive 18.0 GHz Transmit 29.0 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 -19.6 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 18.0 GHz		Transmit 29.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	44.03	-9.09	138.70	-9.09	100.00
195	0.00	42.76	-8.78	139.59	-8.78	100.00
200	0.32	40.77	-8.26	131.21	-8.26	100.00
205	0.47	38.56	-7.65	122.61	-7.65	100.00
210	0.67	35.97	-6.90	114.86	-6.90	100.00
215	0.76	33.19	-6.03	113.40	-6.03	100.00
220	0.81	30.21	-5.00	114.11	-5.00	100.00
225	0.84	27.03	-3.80	115.84	-3.80	100.00
230	0.89	23.68	-2.36	117.92	-2.36	100.00
235	0.91	20.21	-0.64	121.69	-0.64	100.00
240	0.91	16.65	1.47	127.63	1.47	100.00
245	0.90	13.14	4.04	135.19	4.04	100.00
250	0.84	10.78	6.19	145.50	6.19	100.00
255	0.82	10.40	6.57	161.46	6.57	105.22
260	0.86	12.20	4.85	140.01	4.85	100.00
265	0.88	15.46	2.27	130.64	2.27	100.00
270	0.90	19.46	-0.23	123.36	-0.23	100.00
275	1.04	23.78	-2.41	112.18	-2.41	100.00
280	1.12	28.34	-4.31	105.12	-4.31	100.00
285	1.10	33.05	-5.98	101.27	-5.98	100.00
290	1.11	37.81	-7.44	100.00	-7.44	100.00
295	1.10	42.63	-8.74	100.00	-8.74	100.00
300	1.22	47.46	-9.91	100.00	-9.91	100.00
305	1.35	52.31	-10.00	100.00	-10.00	100.00
310	1.30	57.21	-10.00	100.00	-10.00	100.00
315	1.28	62.12	-10.00	100.00	-10.00	100.00
320	1.25	67.03	-10.00	100.00	-10.00	100.00
325	1.20	71.95	-10.00	100.00	-10.00	100.00
330	1.13	76.87	-10.00	100.00	-10.00	100.00
335	1.13	81.79	-10.00	100.00	-10.00	100.00
340	1.09	86.71	-10.00	100.00	-10.00	100.00
345	1.12	91.64	-10.00	100.00	-10.00	100.00
350	1.06	96.56	-10.00	100.00	-10.00	100.00
355	1.09	101.48	-10.00	100.00	-10.00	100.00

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## 2. COMSEARCH

### Earth Station Data Sheet

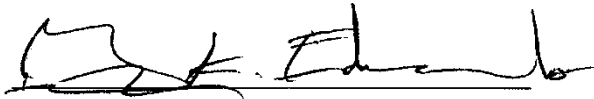
19700 Janelia Farm Boulevard, Ashburn, VA 20147

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

## 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: May 21, 2014