

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for  
**HUGHES NETWORK SYSTEMS LIMITED**  
**LINDON, UT**  
**Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
March 03, 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 02/15/2017.

#### Company

AT&T Mobility Spectrum LLC - Utah  
Alpha Communications Sites  
Alpine School District  
Beehive Telephone Company, Inc.  
Clearwire Spectrum Holdings III, LLC  
Community Wireless of Park City (KPCWFM)  
Digis LLC  
High Speed Utah, LLC  
InnovativeAir, LLC.  
IntelliPOP, LLC  
Intermountain Health Care  
JC Mickelson Inc.  
KSB Industries, LLC  
Mav Media, LLC  
Murray, City of  
New Cingular Wireless PCS LLC-Utah  
Olympic Wireless, LLC  
PacifiCorp  
Peak Wireless Services, LLC  
Prestige Broadband LLC  
Questar Infocomm, Inc.  
Qwest Corporation  
Rapidwave, LLC  
SALT LAKE CITY CORPORATION  
SALT LAKE, COUNTY OF  
Salt Lake City Corporation  
Senawave  
Snyderville Basin Water Reclamation Dist  
Sprint PCS  
Sprint Spectrum L.P.  
Sprintcom, Inc  
Summit Telecom, LLC  
T-Mobile License LLC  
TXOX Communications LLC  
Tanner Memorial Clinic  
UbiquiTel Leasing Company  
Union Pacific Railroad Company  
University of Utah - Education Network  
Utah Broadband LLC  
Utah Communications Authority

Utah Transit Authority, State of Utah  
Vivint Wireless, Inc.  
Vivint, Inc.  
Weber School District

## **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: 03/03/2017  
Job Number: 170215COMSGE06

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### Administrative Information

Status ENGINEER PROPOSAL  
Call Sign E150086  
Licensee Code HUNESY  
Licensee Name HUGHES NETWORK SYSTEMS LIMITED

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### Site Information LINDON, UT

Venue Name  
Latitude (NAD 83) 40° 19' 58.5" N  
Longitude (NAD 83) 111° 43' 43.0" W  
Climate Zone A  
Rain Zone 5  
Ground Elevation (AMSL) 1404.22 m / 4607.0 ft

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### Link Information

Satellite Type Geostationary  
Mode TR - Transmit-Receive  
Modulation Digital  
Satellite Arc 97° W to 97° West Longitude  
Azimuth Range 157.9° to 157.9°  
Corresponding Elevation Angles 40.9° / 40.9°  
Antenna Centerline (AGL) 3.66 m / 12.0 ft

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### Antenna Information

		Receive - FCC32		Transmit - FCC32	
Manufacturer		ASC Signal		ASC Signal	
Model		5.6m		5.6m	
Gain / Diameter		58.6 dBi / 5.6 m		62.0 dBi / 5.6 m	
3-dB / 15-dB Beamwidth		1.00° / 2.00°		0.14° / 0.32°	
Max Available RF Power	(dBW/4 kHz) (dBW/MHz)			-14.0 10.0	
Maximum EIRP	(dBW/4 kHz) (dBW/MHz)			48.0 72.0	
Interference Objectives:	Long Term	-156.0 dBW/MHz	20%	-154.0 dBW/4 kHz	20%
	Short Term	-146.0 dBW/MHz	0.01%	-131.0 dBW/4 kHz	0.0025%

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### Frequency Information

	Receive 18.0 GHz	Transmit 28.0 GHz
Emission / Frequency Range (MHz)	100KG7W - 250MG7W / 18300.0 - 19300.0 100KG7W - 250MG7W / 19700.0 - 20200.0	100KG7W - 250MG7W / 27850.0 - 30000.0
Max Great Circle Coordination Distance	137.6 km / 85.5 mi	105.9 km / 65.8 mi
Precipitation Scatter Contour Radius	100.0 km / 62.1 mi	100.0 km / 62.1 mi



# COMSEARCH

## Earth Station Data Sheet

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### Coordination Values

### LINDON, UT

Licensee Name HUGHES NETWORK SYSTEMS LIMITED  
Latitude (NAD 83) 40° 19' 58.5" N  
Longitude (NAD 83) 111° 43' 43.0" W  
Ground Elevation (AMSL) 1404.22 m / 4607.0 ft  
Antenna Centerline (AGL) 3.66 m / 12.0 ft  
Antenna Model ASC Signal 5.6 meter  
Antenna Mode Receive 18.0 GHz Transmit 28.0 GHz  
Interference Objectives: Long Term -156.0 dBW/MHz 20% -154.0 dBW/4 kHz 20%  
Short Term -146.0 dBW/MHz 0.01% -131.0 dBW/4 kHz 0.0025%  
Max Available RF Power -14.0 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 18.0 GHz		Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	3.95	137.73	-10.00	100.00	-10.00	100.00
5	6.17	136.99	-10.00	100.00	-10.00	100.00
10	8.13	135.40	-10.00	100.00	-10.00	100.00
15	8.65	132.39	-10.00	100.00	-10.00	100.00
20	6.96	127.97	-10.00	100.00	-10.00	100.00
25	6.30	124.06	-10.00	100.00	-10.00	100.00
30	7.63	120.89	-10.00	100.00	-10.00	100.00
35	7.88	117.08	-10.00	100.00	-10.00	100.00
40	8.10	113.15	-10.00	100.00	-10.00	100.00
45	8.73	109.22	-10.00	100.00	-10.00	100.00
50	8.75	105.08	-10.00	100.00	-10.00	100.00
55	10.89	101.14	-10.00	100.00	-10.00	100.00
60	9.84	96.76	-10.00	100.00	-10.00	100.00
65	8.10	92.43	-10.00	100.00	-10.00	100.00
70	7.16	88.25	-10.00	100.00	-10.00	100.00
75	6.05	84.18	-10.00	100.00	-10.00	100.00
80	5.90	80.12	-10.00	100.00	-10.00	100.00
85	4.92	76.24	-10.00	100.00	-10.00	100.00
90	4.02	72.49	-10.00	100.00	-10.00	100.00
95	3.26	68.86	-10.00	100.00	-10.00	100.00
100	2.68	65.34	-10.00	100.00	-10.00	100.00
105	2.66	61.74	-10.00	100.00	-10.00	100.00
110	2.60	58.27	-10.00	100.00	-10.00	100.00
115	2.50	54.98	-10.00	100.00	-10.00	100.00
120	2.35	51.92	-10.00	100.00	-10.00	100.00
125	2.21	49.08	-10.00	100.00	-10.00	100.00
130	2.17	46.44	-9.67	100.00	-9.67	100.00
135	2.16	44.10	-9.11	100.00	-9.11	100.00
140	2.10	42.16	-8.62	100.00	-8.62	100.00
145	1.77	40.91	-8.30	100.00	-8.30	100.00
150	1.57	40.02	-8.06	100.00	-8.06	100.00
155	1.28	39.74	-7.98	100.00	-7.98	100.00
160	0.98	40.00	-8.05	100.00	-8.05	100.00
165	0.83	40.63	-8.22	104.70	-8.22	100.00
170	0.49	41.92	-8.56	118.35	-8.56	100.00
175	0.22	43.58	-8.98	137.35	-8.98	105.58
180	0.00	45.58	-9.47	137.65	-9.47	105.91
185	0.00	47.74	-9.97	136.26	-9.97	104.70

# COMSEARCH

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### Coordination Values

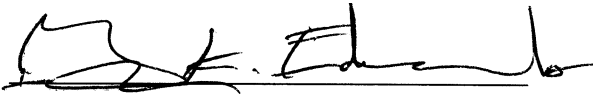
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Short Term -146.0 dBW/MHz 0.01% -131.0 dBW/4 kHz 0.0025%  
Max Available RF Power -14.0 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Receive 18.0 GHz		Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	50.21	-10.00	136.18	-10.00	104.64
195	0.00	52.95	-10.00	136.18	-10.00	104.64
200	0.00	55.91	-10.00	136.18	-10.00	104.64
205	0.00	59.06	-10.00	136.18	-10.00	104.64
210	0.00	62.35	-10.00	136.18	-10.00	104.64
215	0.00	65.78	-10.00	136.18	-10.00	104.64
220	0.00	69.30	-10.00	136.18	-10.00	104.64
225	0.00	72.91	-10.00	136.18	-10.00	104.64
230	0.47	76.48	-10.00	116.71	-10.00	100.00
235	0.00	80.29	-10.00	136.18	-10.00	104.64
240	0.00	84.04	-10.00	136.18	-10.00	104.64
245	0.00	87.81	-10.00	136.18	-10.00	104.64
250	0.00	91.59	-10.00	136.18	-10.00	104.64
255	0.00	95.36	-10.00	136.18	-10.00	104.64
260	0.00	99.11	-10.00	136.18	-10.00	104.64
265	0.00	102.84	-10.00	136.18	-10.00	104.64
270	0.00	106.51	-10.00	136.18	-10.00	104.64
275	0.00	110.13	-10.00	136.18	-10.00	104.64
280	0.00	113.67	-10.00	136.18	-10.00	104.64
285	0.00	117.11	-10.00	136.18	-10.00	104.64
290	0.00	120.43	-10.00	136.18	-10.00	104.64
295	0.00	123.60	-10.00	136.18	-10.00	104.64
300	0.00	126.59	-10.00	136.18	-10.00	104.64
305	0.00	129.37	-10.00	136.18	-10.00	104.64
310	0.00	131.88	-10.00	136.18	-10.00	104.64
315	0.00	134.10	-10.00	136.18	-10.00	104.64
320	0.00	135.96	-10.00	136.18	-10.00	104.64
325	0.00	137.42	-10.00	136.18	-10.00	104.64
330	0.30	138.73	-10.00	129.01	-10.00	100.00
335	0.33	139.31	-10.00	126.64	-10.00	100.00
340	0.35	139.36	-10.00	125.41	-10.00	100.00
345	0.40	138.95	-10.00	121.58	-10.00	100.00
350	0.86	138.43	-10.00	100.00	-10.00	100.00
355	2.08	138.10	-10.00	100.00	-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: March 03, 2017