

Ka-Band Earth Station – 4 US Locations

Frequency Coordination Report

28 GHz



Prepared on Behalf of
Hughes Network
Systems Limited

August 29, 2017



COMSEARCH
A CommScope Company

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1. Summary of Results

On behalf of Hughes Network Systems, Comsearch performed a coordination notice for all existing and proposed terrestrial licenses within the respective coordination contours of four proposed Ka-Band earth stations, located throughout the United States, all of which will transmit at 28 GHz¹. Prior-notification letters were sent to the licensees and a copy of the notification data is provided in section eighteen of this report. The earth station coordination was finalized on August 28, 2017.

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 station would be operating on a secondary basis to LMDS Block A operations and a contact at Hughes Network Systems has been provided in case any concerns may arise in the future.

2. Driggs, Idaho

28 GHz Common Carrier and LTTS Coordination

A notification letter and datasheet for the Ka-Band earth station in Driggs, Idaho were sent to the following 28 GHz common carrier fixed microwave licensee on July 27, 2017. This licensee is authorized to operate temporary fixed operations from 27.5 to 29.5 GHz on a nationwide basis.

Licensee	Authorized Geographic Area
Frontier	Continental US

A notification letter and datasheet for the Ka-Band earth station in Driggs, Idaho were also sent to the following 28 GHz local television transmission licensee on July 27, 2017. This licensee is authorized to operate temporary fixed operations from 27.5 to 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.

¹ The proposed earth stations will operate in the 27.5 – 28.6 GHz portion of the Ka-Band.

28 GHz LMDS Coordination

The proposed earth station will operate on frequencies that overlap Block A of 28 GHz LMDS services. 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

No active LMDS services were found within the coordination contour of the Driggs, Idaho earth station.

3. Reno, Nevada

28 GHz Common Carrier and LTTS Coordination

A notification letter and datasheet for the Ka-Band earth station in Reno, Nevada were sent to the following 28 GHz common carrier fixed microwave licensees on July 27, 2017. These licensees are authorized to operate temporary fixed operations from 27.5 to 29.5 GHz on a nationwide or statewide basis.

Licensee	Authorized Geographic Area
Crosslink Networks	Statewide: California
Frontier	Continental US

A notification letter and datasheet for the Ka-Band earth station in Reno, Nevada were also sent to the following 28 GHz local television transmission licensee on July 27, 2017. This licensee is authorized to operate temporary fixed operations from 27.5 to 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.

28 GHz LMDS Coordination

A Notification letter was sent to the following 28 GHz LMDS licensees on July 27, 2017. 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

Licensee	Market	Market Name
Nextlink Wireless	BTA389 ²	Sacramento, CA
T-Mobile	BTA389	Sacramento, CA
Verizon ³	BTA389	Sacramento, CA

No objections were received from the LMDS incumbents.

4. Taos, New Mexico

28 GHz Common Carrier and LTTS Coordination

A notification letter and datasheet for the Ka-Band earth station in Taos, New Mexico were sent to the following 28 GHz common carrier fixed microwave licensee on July 27, 2017. This licensee is authorized to operate temporary fixed operations from 27.5 to 29.5 GHz on a nationwide basis.

Licensee	Authorized Geographic Area
Frontier	Continental US

² The Sacramento, California Basic Trading Area (BTA) has been partitioned between Nextlink Wireless and T-Mobile.

³ Verizon is leasing LMDS spectrum from Nextlink Wireless in the Sacramento, California BTA.

A notification letter and datasheet for the Ka-Band earth station in Taos, New Mexico were also sent to the following 28 GHz local television transmission licensee on July 27, 2017. This licensee is authorized to operate temporary fixed operations from 27.5 to 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.

28 GHz LMDS Coordination

A Notification letter was sent to the following 28 GHz LMDS licensee on July 27, 2017. 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

Licensee	Market	Market Name
Nextlink Wireless	BTA008	Albuquerque, NM
Verizon ⁴	BTA008	Albuquerque, NM
Vivint Wireless ⁵	BTA008	Albuquerque, NM

No objections were received from the LMDS incumbents.

⁴ Verizon is leasing spectrum from Nextlink Wireless in the Albuquerque, NM BTA.

⁵ Vivint Wireless is leasing spectrum from Nextlink Wireless in the Albuquerque, NM BTA.

5. Yuma, Arizona

28 GHz Common Carrier and LTTS Coordination

A notification letter and datasheet for the Ka-Band earth station in Yuma, Arizona were sent to the following 28 GHz common carrier fixed microwave licensees on July 27, 2017⁶. These licensees are authorized to operate temporary fixed operations from 27.5 to 29.5 GHz on a nationwide or statewide basis.

Licensee	Authorized Geographic Area
Crosslink Networks	Statewide: California
Frontier	Continental US

A notification letter and datasheet for the Ka-Band earth station in Yuma, Arizona were also sent to the following 28 GHz local television transmission licensee on July 27, 2017. This licensee is authorized to operate temporary fixed operations from 27.5 to 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.

⁶ A subsequent revision was issued July 28, 2017, reflected in Section 6.

28 GHz LMDS Coordination

A Notification letter was sent to the following 28 GHz LMDS licensees on July 27, 2017. 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

Licensee	Market	Market Name
DISH Network	BTA347	Phoenix, AZ
Nextlink Wireless	BTA262 ⁷	Los Angeles, CA
Nextlink Wireless ⁸	BTA347	Phoenix, AZ
T-Mobile	BTA262	Los Angeles, CA
TelePacific Communications ⁹	BTA262	Los Angeles, CA
Verizon ¹⁰	BTA262	Los Angeles, CA

No objections were received from the LMDS incumbents.

⁷ The Los Angeles, California BTA has been partitioned between Nextlink Wireless and T-Mobile.

⁸ Nextlink Wireless is leasing LMDS spectrum from DISH Network in the Phoenix, Arizona BTA.

⁹ TelePacific Communications is leasing LMDS spectrum from Nextlink Wireless in the Los Angeles, California BTA.

¹⁰ Verizon is leasing LMDS spectrum from Nextlink Wireless in the Los Angeles, California BTA.



6. Earth Station Coordination Data

This section presents the data pertinent to the proposed Ka-Band earth stations. This data was circulated to all incumbent licensees in the shared 28 GHz frequency ranges.

COMSEARCH**Earth Station Data Sheet**

19700 Janelia Farm Boulevard, Ashburn, VA 20147
 (703)726-5662 <http://www.comsearch.com>

Date: 07/25/2017
 Job Number: <PCNJobCode>

Administrative Information

Status ENGINEER PROPOSAL
 Call Sign <PCNCallSign>
 Licensee Code HUNESY
 Licensee Name HUGHES NETWORK SYSTEMS LIMITED

Site Information**DRIGGS, ID**

Venue Name
 Latitude (NAD 83) 43° 44' 53.9" N
 Longitude (NAD 83) 111° 6' 49.5" W
 Climate Zone A
 Rain Zone 5
 Ground Elevation (AMSL) 1868.41 m / 6129.9 ft

Link Information

Satellite Type Geostationary
 Mode TO - Transmit-Only
 Modulation Digital
 Satellite Arc 95.2° W to 95.2° West Longitude
 Azimuth Range 157.6° to 157.6°
 Corresponding Elevation Angles 37.1° / 37.1°
 Antenna Centerline (AGL) 5.49 m / 18.0 ft

Antenna Information**Transmit - FCC32**

Manufacturer General Dynamics
 Model 9.2 meter
 Gain / Diameter 66.1 dBi / 9.2 m
 3-dB / 15-dB Beamwidth 0.08° / 0.16°

Max Available RF Power (dBW/4 kHz) -59.0
 (dBW/MHz) -35.0

Maximum EIRP (dBW/4 kHz) 7.1
 (dBW/MHz) 31.1

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

Frequency Information**Transmit 28.0 GHz**

Emission / Frequency Range (MHz) 450MG7W - 470MG7W / 27500.0 - 28600.0

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

COMSEARCH**Earth Station Data Sheet**

19700 Janelia Farm Boulevard, Ashburn, VA 20147
 (703)726-5662 <http://www.comsearch.com>

Coordination Values**DRIGGS, ID**

Licensee Name HUGHES NETWORK SYSTEMS LIMITED
 Latitude (NAD 83) 43° 44' 53.9" N
 Longitude (NAD 83) 111° 6' 49.5" W
 Ground Elevation (AMSL) 1868.41 m / 6129.9 ft
 Antenna Centerline (AGL) 5.49 m / 18.0 ft
 Antenna Model General Dynamics 9.2 meter
 Antenna Mode Transmit 28.0 GHz
 Interference Objectives: Long Term -151.0 dBW/4 kHz 20%
 Short Term -128.0 dBW/4 kHz 0.0025%
 Max Available RF Power -59.0 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	137.53	-10.00	100.00
5	0.00	135.10	-10.00	100.00
10	0.24	132.51	-10.00	100.00
15	0.31	129.52	-10.00	100.00
20	0.37	126.30	-10.00	100.00
25	0.45	122.90	-10.00	100.00
30	0.53	119.35	-10.00	100.00
35	0.61	115.67	-10.00	100.00
40	0.65	111.88	-10.00	100.00
45	0.66	108.01	-10.00	100.00
50	0.63	104.07	-10.00	100.00
55	0.62	100.10	-10.00	100.00
60	0.67	96.11	-10.00	100.00
65	0.72	92.09	-10.00	100.00
70	0.80	88.06	-10.00	100.00
75	0.89	84.03	-10.00	100.00
80	0.96	80.01	-10.00	100.00
85	0.99	76.01	-10.00	100.00
90	1.53	71.93	-10.00	100.00
95	1.52	68.01	-10.00	100.00
100	1.77	64.06	-10.00	100.00
105	1.68	60.32	-10.00	100.00
110	1.32	56.82	-10.00	100.00
115	1.56	53.19	-10.00	100.00
120	1.52	49.86	-10.00	100.00
125	1.36	46.84	-9.77	100.00
130	0.94	44.29	-9.16	100.00
135	0.51	42.14	-8.62	100.00
140	0.46	40.08	-8.07	100.00
145	0.49	38.40	-7.61	100.00
150	0.45	37.29	-7.29	100.00
155	0.38	36.77	-7.14	100.00
160	0.28	36.87	-7.17	100.00
165	0.00	37.70	-7.41	100.00
170	0.00	38.81	-7.72	100.00
175	0.00	40.42	-8.16	100.00
180	0.00	42.47	-8.70	100.00
185	0.00	44.90	-9.31	100.00

COMSEARCH**Earth Station Data Sheet**

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Coordination Values		DRIGGS, ID
Licensee Name		HUGHES NETWORK SYSTEMS LIMITED
Latitude (NAD 83)		43° 44' 53.9" N
Longitude (NAD 83)		111° 6' 49.5" W
Ground Elevation (AMSL)		1868.41 m / 6129.9 ft
Antenna Centerline (AGL)		5.49 m / 18.0 ft
Antenna Model		General Dynamics 9.2 meter
Antenna Mode		Transmit 28.0 GHz
Interference Objectives: Long Term		-151.0 dBW/4 kHz 20%
Short Term		-128.0 dBW/4 kHz 0.0025%
Max Available RF Power		-59.0 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	47.65	-9.95	100.00
195	0.00	50.67	-10.00	100.00
200	0.00	53.90	-10.00	100.00
205	0.00	57.32	-10.00	100.00
210	0.00	60.87	-10.00	100.00
215	0.00	64.54	-10.00	100.00
220	0.00	68.31	-10.00	100.00
225	0.00	72.15	-10.00	100.00
230	0.00	76.04	-10.00	100.00
235	0.00	79.98	-10.00	100.00
240	0.00	83.95	-10.00	100.00
245	0.00	87.93	-10.00	100.00
250	0.00	91.92	-10.00	100.00
255	0.00	95.90	-10.00	100.00
260	0.00	99.87	-10.00	100.00
265	0.00	103.81	-10.00	100.00
270	0.00	107.70	-10.00	100.00
275	0.00	111.55	-10.00	100.00
280	0.00	115.31	-10.00	100.00
285	0.00	118.99	-10.00	100.00
290	0.00	122.55	-10.00	100.00
295	0.00	125.97	-10.00	100.00
300	0.00	129.21	-10.00	100.00
305	0.00	132.24	-10.00	100.00
310	0.00	135.00	-10.00	100.00
315	0.00	137.44	-10.00	100.00
320	0.00	139.51	-10.00	100.00
325	0.00	141.14	-10.00	100.00
330	0.00	142.27	-10.00	100.00
335	0.00	142.85	-10.00	100.00
340	0.00	142.86	-10.00	100.00
345	0.00	142.30	-10.00	100.00
350	0.00	141.19	-10.00	100.00
355	0.00	139.58	-10.00	100.00

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Date: 07/25/2017
 Job Number: <PCNJobCode>

Administrative Information

Status ENGINEER PROPOSAL
 Call Sign <PCNCallSign>
 Licensee Code HUNESY
 Licensee Name HUGHES NETWORK SYSTEMS LIMITED

Site Information**RENO, NV**

Venue Name
 Latitude (NAD 83) 39° 30' 53.0" N
 Longitude (NAD 83) 119° 28' 25.6" W
 Climate Zone A
 Rain Zone 3
 Ground Elevation (AMSL) 1494.98 m / 4904.8 ft

Link Information

Satellite Type Geostationary
 Mode TO - Transmit-Only
 Modulation Digital
 Satellite Arc 95.2° W to 95.2° West Longitude
 Azimuth Range 144.7° to 144.7°
 Corresponding Elevation Angles 37.8° / 37.8°
 Antenna Centerline (AGL) 5.49 m / 18.0 ft

Antenna Information**Transmit - FCC32**

Manufacturer General Dynamics
 Model 9.2 meter
 Gain / Diameter 66.1 dBi / 9.2 m
 3-dB / 15-dB Beamwidth 0.08° / 0.16°

Max Available RF Power (dBW/4 kHz) -59.0
 (dBW/MHz) -35.0

Maximum EIRP (dBW/4 kHz) 7.1
 (dBW/MHz) 31.1

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

Frequency Information**Transmit 28.0 GHz**

Emission / Frequency Range (MHz) 450MG7W - 470MG7W / 27500.0 - 28600.0

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

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Coordination Values	RENO, NV
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Latitude (NAD 83)	39° 30' 53.0" N
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Antenna Model	General Dynamics 9.2 meter
Antenna Mode	Transmit 28.0 GHz
Interference Objectives: Long Term	-151.0 dBW/4 kHz 20%
Short Term	-128.0 dBW/4 kHz 0.0025%
Max Available RF Power	-59.0 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	130.12	-10.00	100.00
5	0.00	127.03	-10.00	100.00
10	0.54	124.01	-10.00	100.00
15	0.77	120.63	-10.00	100.00
20	1.35	117.22	-10.00	100.00
25	1.82	113.61	-10.00	100.00
30	1.78	109.73	-10.00	100.00
35	1.24	105.69	-10.00	100.00
40	1.62	101.79	-10.00	100.00
45	3.32	97.96	-10.00	100.00
50	4.83	93.92	-10.00	100.00
55	6.37	89.72	-10.00	100.00
60	6.55	85.45	-10.00	100.00
65	6.03	81.24	-10.00	100.00
70	5.38	77.11	-10.00	100.00
75	4.56	73.12	-10.00	100.00
80	3.67	69.27	-10.00	100.00
85	3.69	65.30	-10.00	100.00
90	4.76	61.02	-10.00	100.00
95	5.53	56.84	-10.00	100.00
100	5.49	53.07	-10.00	100.00
105	5.59	49.38	-10.00	100.00
110	4.42	46.65	-9.72	100.00
115	4.70	43.31	-8.92	100.00
120	3.63	41.27	-8.39	100.00
125	3.16	39.24	-7.84	100.00
130	3.96	36.56	-7.07	100.00
135	5.16	33.92	-6.26	100.00
140	6.29	31.84	-5.58	100.00
145	7.30	30.53	-5.12	100.00
150	7.55	30.70	-5.18	100.00
155	9.62	29.89	-4.89	100.00
160	10.11	31.37	-5.41	100.00
165	9.71	34.20	-6.35	100.00
170	10.84	36.34	-7.01	100.00
175	8.72	41.05	-8.33	100.00
180	9.87	43.89	-9.06	100.00
185	9.70	47.75	-9.97	100.00

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Coordination Values**RENO, NV**

Licensee Name HUGHES NETWORK SYSTEMS LIMITED
 Latitude (NAD 83) 39° 30' 53.0" N
 Longitude (NAD 83) 119° 28' 25.6" W
 Ground Elevation (AMSL) 1494.98 m / 4904.8 ft
 Antenna Centerline (AGL) 5.49 m / 18.0 ft
 Antenna Model General Dynamics 9.2 meter
 Antenna Mode Transmit 28.0 GHz
 Interference Objectives: Long Term -151.0 dBW/4 kHz 20%
 Short Term -128.0 dBW/4 kHz 0.0025%
 Max Available RF Power -59.0 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
190	9.33	51.84	-10.00	100.00
195	8.54	56.16	-10.00	100.00
200	7.49	60.59	-10.00	100.00
205	6.85	64.88	-10.00	100.00
210	7.15	68.96	-10.00	100.00
215	6.14	73.35	-10.00	100.00
220	5.39	77.65	-10.00	100.00
225	7.07	81.70	-10.00	100.00
230	8.68	85.92	-10.00	100.00
235	8.37	90.28	-10.00	100.00
240	7.56	94.60	-10.00	100.00
245	6.43	98.80	-10.00	100.00
250	4.67	102.78	-10.00	100.00
255	5.42	107.05	-10.00	100.00
260	5.74	111.25	-10.00	100.00
265	4.96	115.09	-10.00	100.00
270	4.94	119.05	-10.00	100.00
275	5.84	123.29	-10.00	100.00
280	5.47	126.92	-10.00	100.00
285	4.12	129.81	-10.00	100.00
290	3.65	132.87	-10.00	100.00
295	4.16	136.31	-10.00	100.00
300	4.88	139.69	-10.00	100.00
305	5.21	142.47	-10.00	100.00
310	5.25	144.60	-10.00	100.00
315	5.00	145.93	-10.00	100.00
320	4.59	146.47	-10.00	100.00
325	3.73	145.90	-10.00	100.00
330	3.31	145.12	-10.00	100.00
335	2.72	143.60	-10.00	100.00
340	1.88	141.33	-10.00	100.00
345	1.47	139.04	-10.00	100.00
350	0.77	136.16	-10.00	100.00
355	0.65	133.45	-10.00	100.00

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 (703)726-5662 <http://www.comsearch.com>

Date: 07/25/2017
 Job Number: <PCNJobCode>

Administrative Information

Status ENGINEER PROPOSAL
 Call Sign <PCNCallSign>
 Licensee Code HUNESY
 Licensee Name HUGHES NETWORK SYSTEMS LIMITED

Site Information**TAOS, NM**

Venue Name
 Latitude (NAD 83) 36° 23' 14.6" N
 Longitude (NAD 83) 105° 35' 17.3" W
 Climate Zone A
 Rain Zone 2
 Ground Elevation (AMSL) 2112.05 m / 6929.3 ft

Link Information

Satellite Type Geostationary
 Mode TO - Transmit-Only
 Modulation Digital
 Satellite Arc 95.2° W to 95.2° West Longitude
 Azimuth Range 162.8° to 162.8°
 Corresponding Elevation Angles 46.4° / 46.4°
 Antenna Centerline (AGL) 5.49 m / 18.0 ft

Antenna Information**Transmit - FCC32**

Manufacturer General Dynamics
 Model 9.2 meter
 Gain / Diameter 66.1 dBi / 9.2 m
 3-dB / 15-dB Beamwidth 0.08° / 0.16°

Max Available RF Power (dBW/4 kHz) -59.0
 (dBW/MHz) -35.0

Maximum EIRP (dBW/4 kHz) 7.1
 (dBW/MHz) 31.1

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

Frequency Information**Transmit 28.0 GHz**

Emission / Frequency Range (MHz) 450MG7W - 470MG7W / 27500.0 - 28600.0

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

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Coordination Values

Licensee Name HUGHES NETWORK SYSTEMS LIMITED
 Latitude (NAD 83) 36° 23' 14.6" N
 Longitude (NAD 83) 105° 35' 17.3" W
 Ground Elevation (AMSL) 2112.05 m / 6929.3 ft
 Antenna Centerline (AGL) 5.49 m / 18.0 ft
 Antenna Model General Dynamics 9.2 meter
 Antenna Mode Transmit 28.0 GHz
 Interference Objectives: Long Term -151.0 dBW/4 kHz 20%
 Short Term -128.0 dBW/4 kHz 0.0025%
 Max Available RF Power -59.0 (dBW/4 kHz)

TAOS, NM

HUGHES NETWORK SYSTEMS LIMITED

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
0	0.48	131.69	-10.00	100.00
5	0.52	130.17	-10.00	100.00
10	0.53	128.30	-10.00	100.00
15	0.54	126.14	-10.00	100.00
20	0.50	123.70	-10.00	100.00
25	0.54	121.09	-10.00	100.00
30	0.64	118.33	-10.00	100.00
35	0.65	115.35	-10.00	100.00
40	0.57	112.21	-10.00	100.00
45	0.84	109.09	-10.00	100.00
50	1.88	106.07	-10.00	100.00
55	3.01	102.86	-10.00	100.00
60	3.24	99.33	-10.00	100.00
65	3.95	95.77	-10.00	100.00
70	4.35	92.10	-10.00	100.00
75	4.99	88.37	-10.00	100.00
80	4.83	84.64	-10.00	100.00
85	4.47	80.97	-10.00	100.00
90	4.25	77.35	-10.00	100.00
95	3.71	73.89	-10.00	100.00
100	3.62	70.41	-10.00	100.00
105	4.63	66.59	-10.00	100.00
110	5.27	62.92	-10.00	100.00
115	5.64	59.42	-10.00	100.00
120	5.70	56.20	-10.00	100.00
125	5.76	53.16	-10.00	100.00
130	6.20	50.05	-10.00	100.00
135	5.86	47.75	-9.97	100.00
140	4.66	46.52	-9.69	100.00
145	4.17	45.15	-9.37	100.00
150	4.20	43.72	-9.02	100.00
155	3.61	43.33	-8.92	100.00
160	3.67	42.78	-8.78	100.00
165	3.33	43.08	-8.86	100.00
170	2.39	44.44	-9.19	100.00
175	1.75	45.91	-9.55	100.00
180	1.33	47.54	-9.93	100.00
185	2.16	48.41	-10.00	100.00

COMSEARCH**Earth Station Data Sheet**

19700 Janelia Farm Boulevard, Ashburn, VA 20147
 (703)726-5662 <http://www.comsearch.com>

Coordination Values

Licensee Name HUGHES NETWORK SYSTEMS LIMITED
 Latitude (NAD 83) 36° 23' 14.6" N
 Longitude (NAD 83) 105° 35' 17.3" W
 Ground Elevation (AMSL) 2112.05 m / 6929.3 ft
 Antenna Centerline (AGL) 5.49 m / 18.0 ft
 Antenna Model General Dynamics 9.2 meter
 Antenna Mode Transmit 28.0 GHz
 Interference Objectives: Long Term -151.0 dBW/4 kHz 20%
 Short Term -128.0 dBW/4 kHz 0.0025%
 Max Available RF Power -59.0 (dBW/4 kHz)

TAOS, NM

HUGHES NETWORK SYSTEMS LIMITED

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
190	2.05	50.47	-10.00	100.00
195	0.67	53.76	-10.00	100.00
200	0.60	56.23	-10.00	100.00
205	0.63	58.85	-10.00	100.00
210	0.56	61.72	-10.00	100.00
215	0.42	64.76	-10.00	100.00
220	0.36	67.88	-10.00	100.00
225	0.31	71.10	-10.00	100.00
230	0.00	74.47	-10.00	100.00
235	0.00	77.80	-10.00	100.00
240	0.00	81.19	-10.00	100.00
245	0.00	84.61	-10.00	100.00
250	0.00	88.05	-10.00	100.00
255	0.00	91.50	-10.00	100.00
260	0.00	94.94	-10.00	100.00
265	0.00	98.36	-10.00	100.00
270	0.00	101.75	-10.00	100.00
275	0.00	105.09	-10.00	100.00
280	0.00	108.37	-10.00	100.00
285	0.00	111.55	-10.00	100.00
290	0.00	114.64	-10.00	100.00
295	0.00	117.60	-10.00	100.00
300	0.00	120.40	-10.00	100.00
305	0.00	123.02	-10.00	100.00
310	0.00	125.44	-10.00	100.00
315	0.00	127.60	-10.00	100.00
320	0.20	129.67	-10.00	100.00
325	0.26	131.30	-10.00	100.00
330	0.29	132.56	-10.00	100.00
335	0.41	133.53	-10.00	100.00
340	0.38	133.94	-10.00	100.00
345	0.39	133.98	-10.00	100.00
350	0.44	133.64	-10.00	100.00
355	0.47	132.87	-10.00	100.00

COMSEARCH**Earth Station Data Sheet**

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Date: 07/27/2017
 Job Number: <PCNJobCode>

Administrative Information

Status ENGINEER PROPOSAL
 Call Sign <PCNCallSign>
 Licensee Code HUNESY
 Licensee Name HUGHES NETWORK SYSTEMS LIMITED

Site Information YUMA, AZ

Venue Name
 Latitude (NAD 83) 32° 42' 59.4" N
 Longitude (NAD 83) 114° 37' 9.1" W
 Climate Zone A
 Rain Zone 5
 Ground Elevation (AMSL) 54.1 m / 177.5 ft

Link Information

Satellite Type Geostationary
 Mode TO - Transmit-Only
 Modulation Digital
 Satellite Arc 95.2° W to 95.2° West Longitude
 Azimuth Range 146.9° to 146.9°
 Corresponding Elevation Angles 46.5° / 46.5°
 Antenna Centerline (AGL) 5.49 m / 18.0 ft

Antenna Information Transmit - FCC32

Manufacturer General Dynamics
 Model 9.2 meter
 Gain / Diameter 66.1 dBi / 9.2 m
 3-dB / 15-dB Beamwidth 0.08° / 0.16°

Max Available RF Power (dBW/4 kHz) -59.0
 (dBW/MHz) -35.0

Maximum EIRP (dBW/4 kHz) 7.1
 (dBW/MHz) 31.1

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

Frequency Information Transmit 28.0 GHz

Emission / Frequency Range (MHz) 450MG7W - 470MG7W / 27500.0 - 28600.0

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

COMSEARCH**Earth Station Data Sheet**

19700 Janelia Farm Boulevard, Ashburn, VA 20147
 (703)726-5662 <http://www.comsearch.com>

Coordination Values**YUMA, AZ**

Licensee Name HUGHES NETWORK SYSTEMS LIMITED
 Latitude (NAD 83) 32° 42' 59.4" N
 Longitude (NAD 83) 114° 37' 9.1" W
 Ground Elevation (AMSL) 54.1 m / 177.5 ft
 Antenna Centerline (AGL) 5.49 m / 18.0 ft
 Antenna Model General Dynamics 9.2 meter
 Antenna Mode Transmit 28.0 GHz
 Interference Objectives: Long Term -151.0 dBW/4 kHz 20%
 Short Term -128.0 dBW/4 kHz 0.0025%
 Max Available RF Power -35.0 (dBW/4 kHz)

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	125.18	-10.00	100.00
5	0.00	122.76	-10.00	100.00
10	0.00	120.14	-10.00	100.00
15	0.00	117.34	-10.00	100.00
20	0.00	114.38	-10.00	100.00
25	0.00	111.31	-10.00	100.00
30	0.00	108.12	-10.00	100.00
35	0.00	104.86	-10.00	100.00
40	0.00	101.53	-10.00	100.00
45	0.00	98.15	-10.00	100.00
50	0.00	94.73	-10.00	100.00
55	0.00	91.30	-10.00	100.00
60	0.00	87.86	-10.00	100.00
65	0.00	84.43	-10.00	100.00
70	0.00	81.02	-10.00	100.00
75	0.00	77.65	-10.00	100.00
80	0.00	74.34	-10.00	100.00
85	0.00	71.09	-10.00	100.00
90	0.00	67.93	-10.00	100.00
95	0.00	64.88	-10.00	100.00
100	0.00	61.96	-10.00	100.00
105	0.00	59.20	-10.00	100.00
110	0.00	56.63	-10.00	100.00
115	0.00	54.27	-10.00	100.00
120	0.00	52.16	-10.00	100.00
125	0.00	50.34	-10.00	100.00
130	0.00	48.84	-10.00	100.00
135	0.00	47.70	-9.96	100.00
140	0.00	46.93	-9.79	100.00
145	0.00	46.57	-9.70	100.00
150	0.00	46.62	-9.72	100.00
155	0.25	46.84	-9.77	100.00
160	0.00	47.94	-10.00	100.00
165	0.00	49.18	-10.00	100.00
170	2.43	48.67	-10.00	100.00
175	2.54	50.62	-10.00	100.00
180	1.64	53.61	-10.00	100.00
185	1.60	56.16	-10.00	100.00

COMSEARCH**Earth Station Data Sheet**

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Coordination Values**YUMA, AZ**

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Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Transmit 28.0 GHz	
			Horizon Gain (dBi)	Coordination Distance (km)
190	1.39	59.01	-10.00	100.00
195	1.42	61.89	-10.00	100.00
200	0.80	65.24	-10.00	100.00
205	0.55	68.47	-10.00	100.00
210	0.51	71.70	-10.00	100.00
215	0.29	75.06	-10.00	100.00
220	0.25	78.42	-10.00	100.00
225	0.22	81.82	-10.00	100.00
230	0.00	85.27	-10.00	100.00
235	0.00	88.70	-10.00	100.00
240	0.00	92.14	-10.00	100.00
245	0.00	95.57	-10.00	100.00
250	0.00	98.98	-10.00	100.00
255	0.00	102.35	-10.00	100.00
260	0.00	105.66	-10.00	100.00
265	0.00	108.91	-10.00	100.00
270	0.00	112.07	-10.00	100.00
275	0.00	115.12	-10.00	100.00
280	0.00	118.04	-10.00	100.00
285	0.00	120.80	-10.00	100.00
290	0.00	123.37	-10.00	100.00
295	0.00	125.73	-10.00	100.00
300	0.00	127.84	-10.00	100.00
305	0.00	129.66	-10.00	100.00
310	0.00	131.16	-10.00	100.00
315	0.00	132.30	-10.00	100.00
320	0.00	133.07	-10.00	100.00
325	0.23	133.66	-10.00	100.00
330	0.21	133.59	-10.00	100.00
335	0.22	133.13	-10.00	100.00
340	0.00	132.06	-10.00	100.00
345	0.00	130.82	-10.00	100.00
350	0.00	129.24	-10.00	100.00
355	0.00	127.35	-10.00	100.00



7. 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
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