Ka-Band Earth Station – Santa Clara, CA

Frequency Coordination Report

28 GHz

Prepared on Behalf of
Hughes Network
Systems Limited

April 18, 2018

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 coordination contours of their proposed Ka-Band earth station in Santa Clara, CA, which will transmit at 28 GHz[1]. 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 April 17, 2018.

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.

TPx Communications have provided conditions for operation, which are outlined in Section 3, below.

2. 28 GHz Common Carrier and LTTS Coordination

In accordance with FCC Rules and Regulations, the Ka-Band earth station in Santa Clara, CA was prior-coordinated by Comsearch. A notification letter and datasheet for this earth station were sent to the following 28 GHz common carrier fixed microwave licensees on June 8, 2017. These licensees are authorized to operate temporary fixed operations from 27.5 – 29.5 GHz over a designated geographic area.

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

A notification letter and datasheet for the Ka-Band earth station in Santa Clara, CA were also sent to the following 28 GHz local television transmission licensee on June 8, 2017. 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

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

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

3. 28 GHz LMDS Coordination

A Notification letter was sent to the following 28 GHz LMDS licensees on June 8, 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
BroadBand One of California	BTA397	Salinas-Monterey, CA
BroadBand One of California	BTA434	Stockton, CA
T-Mobile	BTA389[2]	Sacramento, CA
T-Mobile	BTA404[3]	San Francisco-Oakland-San Jose, CA
TPx Communications[4]	BTA404	San Francisco-Oakland-San Jose, CA
Verizon	BTA303	Modesto, CA
Verizon	BTA389	Sacramento, CA
Verizon	BTA404	San Francisco-Oakland-San Jose, CA

No objections were received from the LMDS incumbents.

TPx Communications have provided the following conditions for operation:

1) Hughes Network Systems must provide TPx at least two business days' advanced notice before the initial turn-up at the Santa Clara location. This notice should include the date and expected time of turn-up and be addressed to Harish Bachuwar (hbachuwar@tpx.com) and Andrew Conn (aconn@tpx.com).

[2] The Sacramento, CA Basic Trading Area (BTA) has been partitioned Verizon Wireless and T-Mobile.

[3] The proposed earth station will be located inside BTA404, which has also been partitioned between Verizon Wireless and T-Mobile.

[4] TPx Communications are leasing LMDS spectrum from Verizon Wireless in the San Francisco—Oakland—San Jose, CA BTA.

2) The initial turn-up of the Santa Clara location must take place after business hours (between 6 p.m. and midnight, Pacific Time) so that TPx can remotely monitor their sectors for any interference issues.

3) If TPx does experience interference at the time of initial turn-up then, Hughes Network Systems must power down and cease transmissions for the Santa Clara location.

4. Earth Station Coordination Data

This section presents the data pertinent to the proposed Ka-Band earth station in Santa Clara, CA. 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:	05/26/2017
Job Number:	<PCNJobCode>

Administrative Information

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

Site Information — SANTA CLARA, CA

Venue Name	
Latitude (NAD 83)	37° 21' 55.5" N
Longitude (NAD 83)	121° 57' 42.2" W
Climate Zone	A
Rain Zone	4
Ground Elevation (AMSL)	16.6 m / 54.5 ft

Link Information

Satellite Type	Geostationary
Mode	TO - Transmit-Only
Modulation	Digital
Satellite Arc	95.2° W to 95.2° West Longitude
Azimuth Range	140.3° to 140.3°
Corresponding Elevation Angles	38.4° / 38.4°
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	**SANTA CLARA, CA**
Licensee Name	HUGHES NETWORK SYSTEMS LIMITED
Latitude (NAD 83)	37° 21' 55.5" N
Longitude (NAD 83)	121° 57' 42.2" W
Ground Elevation (AMSL)	16.6 m / 54.5 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	-59.0 (dBW/4 kHz)

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	127.07	-10.00	100.00
5	0.00	123.84	-10.00	100.00
10	0.00	120.44	-10.00	100.00
15	0.00	116.91	-10.00	100.00
20	0.00	113.27	-10.00	100.00
25	0.00	109.55	-10.00	100.00
30	0.00	105.76	-10.00	100.00
35	0.00	101.92	-10.00	100.00
40	0.00	98.04	-10.00	100.00
45	0.00	94.13	-10.00	100.00
50	0.00	90.22	-10.00	100.00
55	0.00	86.30	-10.00	100.00
60	0.00	82.40	-10.00	100.00
65	0.00	78.51	-10.00	100.00
70	0.00	74.66	-10.00	100.00
75	0.00	70.87	-10.00	100.00
80	0.00	67.14	-10.00	100.00
85	0.00	63.49	-10.00	100.00
90	0.00	59.95	-10.00	100.00
95	0.00	56.53	-10.00	100.00
100	0.00	53.28	-10.00	100.00
105	0.00	50.23	-10.00	100.00
110	0.00	47.41	-9.90	100.00
115	0.00	44.87	-9.30	100.00
120	0.00	42.68	-8.76	100.00
125	0.00	40.89	-8.29	100.00
130	0.00	39.55	-7.93	100.00
135	0.00	38.71	-7.69	100.00
140	0.00	38.40	-7.61	100.00
145	0.00	38.65	-7.68	100.00
150	0.00	39.43	-7.89	100.00
155	0.20	40.53	-8.19	100.00
160	0.24	42.25	-8.65	100.00
165	0.23	44.43	-9.19	100.00
170	0.23	46.94	-9.79	100.00
175	0.22	49.75	-10.00	100.00
180	0.23	52.79	-10.00	100.00
185	0.25	56.03	-10.00	100.00

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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)

Transmit 28.0 GHz

Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.29	59.43	-10.00	100.00
195	0.31	62.97	-10.00	100.00
200	0.32	66.62	-10.00	100.00
205	0.33	70.36	-10.00	100.00
210	0.34	74.16	-10.00	100.00
215	0.36	78.02	-10.00	100.00
220	0.34	81.92	-10.00	100.00
225	0.32	85.85	-10.00	100.00
230	0.34	89.78	-10.00	100.00
235	0.36	93.72	-10.00	100.00
240	0.37	97.64	-10.00	100.00
245	0.35	101.54	-10.00	100.00
250	0.32	105.40	-10.00	100.00
255	0.28	109.21	-10.00	100.00
260	0.22	112.94	-10.00	100.00
265	0.21	116.60	-10.00	100.00
270	0.00	120.05	-10.00	100.00
275	0.00	123.47	-10.00	100.00
280	0.00	126.72	-10.00	100.00
285	0.00	129.77	-10.00	100.00
290	0.00	132.59	-10.00	100.00
295	0.00	135.13	-10.00	100.00
300	0.00	137.32	-10.00	100.00
305	0.00	139.11	-10.00	100.00
310	0.00	140.45	-10.00	100.00
315	0.00	141.29	-10.00	100.00
320	0.00	141.60	-10.00	100.00
325	0.00	141.35	-10.00	100.00
330	0.00	140.57	-10.00	100.00
335	0.00	139.28	-10.00	100.00
340	0.00	137.54	-10.00	100.00
345	0.00	135.39	-10.00	100.00
350	0.00	132.89	-10.00	100.00
355	0.00	130.10	-10.00	100.00

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
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