Ka-Band Earth Station – Warren, MO

Frequency Coordination Report

28 GHz

Prepared on Behalf of
SPACE EXPLORATION
HOLDINGS

April 9, 2020

COMSEARCH®
A CommScope Company

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1. Summary of Results

On behalf of SPACE EXPLORATION HOLDINGS, Comsearch performed a coordination notice under Section 25.203(c) and Section 25.136(a)(4) of the FCC's rules for all existing and proposed terrestrial licenses within the coordination contours of their proposed Ka-Band earth station in Warren, MO, 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 9, 2020.

No objections were received from any of the incumbent 28 GHz licensees.

2. 28 GHz Common Carrier and LTTS Coordination

In accordance with FCC Rules and Regulations, the Ka-Band earth station in Warren, MO was prior-coordinated by Comsearch. A notification letter and datasheets for this earth station were sent to the following 28 GHz common carrier fixed microwave licensees. These licensees are authorized to operate temporary fixed operations from 27.5 – 29.5 GHz on a nationwide basis or local basis.

Licensee	Authorized Geographic Area
AT&T	Illinois
Frontier	Continental US

A notification letter and datasheets for the Ka-Band earth station in Warren, MO were also sent to the following 28 GHz local television transmission licensee. 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.

[1] The proposed earth station will operate in the 27.5 – 29.1 GHz & 29.5 – 30.0 GHz portion of the Ka-Band.

3. 28 GHz UMFUS Coordination

There were four 28 GHz UMFUS licensees identified within the coordination distance of the proposed earth station. The proposed earth station will operate on frequencies that overlap Channel L1 & L2 of the UMFUS service. The total frequency allocation for Channels L1 & L2 of the UMFUS spectrum appears below.

Channel: **L1** 27.500 - 27.925 GHz
L2 27.925 - 28.350 GHz

Licensee	Authorized Geographic Area
Adams Telcom	Market-Based
T-Mobile	Market-Based
US Cellular	Market-Based
Verizon	Market-Based

No objections were received from the UMFUS incumbents.

4. Earth Station Coordination Data

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

Job Number:		200128COMSGE17		
Administrative Information				
Status		ENGINEER PROPOSAL		
Call Sign				
Licensee Code		SPACEX		
Licensee Name		Space Exploration Holdings		
Site Information		**WARREN, MO**		
Venue Name				
Latitude (NAD 83)		38° 38' 6.6" N		
Longitude (NAD 83)		91° 6' 57.7" W		
Climate Zone		A		
Rain Zone		2		
Ground Elevation (AMSL)		173.13 m / 568.0 ft		
Link Information				
Satellite Type		Low Earth Orbit		
Mode		TR - Transmit-Receive		
Modulation		Digital		
Minimum Elevation Angle		25.0°		
Azimuth Range		0.0° to 360°		
Antenna Centerline (AGL)		0.91 m / 3.0 ft		
Antenna Information		**Receive - FCC32**		**Transmit - FCC32**
Manufacturer		SpaceX		SpaceX
Model		1.47 meter		1.47 meter
Gain / Diameter		46.9 dBi / 1.5 m		49.5 dBi / 1.5 m
3-dB / 15-dB Beamwidth		0.77° / 1.70°		0.49° / 1.17°
Max Available RF Power	(dBW/4 kHz)			-39.8
	(dBW/MHz)			-15.8
Maximum EIRP	(dBW/4 kHz)			9.7
	(dBW/MHz)			33.7
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 18.0 GHz**		**Transmit 28.0 GHz**
Emission / Frequency Range (MHz)		62M5D7W - 480MD7W / 17800.0 - 18600.0 62M5D7W - 480MD7W / 18800.0 - 19300.0		62M5D7W - 480MD7W / 27500.0 - 29100.0 62M5D7W - 480MD7W / 29500.0 - 30000.0
Max Great Circle Coordination Distance		262.0 km / 162.8 mi		125.0 km / 77.7 mi
Precipitation Scatter Contour Radius		100.0 km / 62.1 mi		100.0 km / 62.1 mi

Coordination Values	**WARREN, MO**		
Licensee Name	Space Exploration Holdings		
Latitude (NAD 83)	38° 38' 6.6" N		
Longitude (NAD 83)	91° 6' 57.7" W		
Ground Elevation (AMSL)	173.13 m / 568.0 ft		
Antenna Centerline (AGL)	0.91 m / 3.0 ft		
Antenna Model	SpaceX 1.47 meter		
Antenna Mode	Receive 18.0 GHz		Transmit 28.0 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		-39.8 (dBW/4 kHz)	

	Transmit 28.0 GHz		Receive 18.0 GHz			
Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
0	0.00	89.32	-3.00	262.00	-3.00	125.00
5	0.00	84.38	-3.00	262.00	-3.00	125.00
10	0.00	79.45	-3.00	262.00	-3.00	125.00
15	0.00	74.52	-3.00	262.00	-3.00	125.00
20	0.00	69.60	-3.00	262.00	-3.00	125.00
25	0.00	64.68	-3.00	262.00	-3.00	125.00
30	0.00	59.77	-3.00	262.00	-3.00	125.00
35	0.00	54.86	-3.00	262.00	-3.00	125.00
40	0.00	49.97	-3.00	262.00	-3.00	125.00
45	0.00	45.10	-3.00	262.00	-3.00	125.00
50	0.00	40.25	-3.00	262.00	-3.00	125.00
55	0.00	35.43	-3.00	262.00	-3.00	125.00
60	0.00	30.66	-3.00	262.00	-3.00	125.00
65	0.00	25.97	-3.00	262.00	-3.00	125.00
70	0.00	21.42	-3.00	262.00	-3.00	125.00
75	0.00	17.09	-3.00	262.00	-3.00	125.00
80	0.00	13.23	-3.00	262.00	-3.00	125.00
85	0.00	10.38	-3.00	262.00	-3.00	125.00
90	0.00	9.48	-3.00	262.00	-3.00	125.00
95	0.00	11.02	-3.00	262.00	-3.00	125.00
100	0.00	14.24	-3.00	262.00	-3.00	125.00
105	0.00	18.26	-3.00	262.00	-3.00	125.00
110	0.00	22.66	-3.00	262.00	-3.00	125.00
115	0.00	27.27	-3.00	262.00	-3.00	125.00
120	0.00	31.98	-3.00	262.00	-3.00	125.00
125	0.00	36.76	-3.00	262.00	-3.00	125.00
130	0.00	41.59	-3.00	262.00	-3.00	125.00
135	0.00	46.45	-3.00	262.00	-3.00	125.00
140	0.00	51.33	-3.00	262.00	-3.00	125.00
145	0.00	56.22	-3.00	262.00	-3.00	125.00
150	0.00	61.13	-3.00	262.00	-3.00	125.00
155	0.00	66.05	-3.00	262.00	-3.00	125.00
160	0.00	70.97	-3.00	262.00	-3.00	125.00
165	0.00	75.89	-3.00	262.00	-3.00	125.00
170	0.00	80.82	-3.00	262.00	-3.00	125.00
175	0.00	85.75	-3.00	262.00	-3.00	125.00
180	0.00	90.69	-3.00	262.00	-3.00	125.00
185	0.00	95.62	-3.00	262.00	-3.00	125.00

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Antenna Mode	Receive 18.0 GHz		Transmit 28.0 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		-39.8 (dBW/4 kHz)	

	Transmit 28.0 GHz		Receive 18.0 GHz			
Azimuth (°)	Horizon Elevation (°)	Antenna Discrimination (°)	Horizon Gain (dBi)	Coordination Distance (km)	Horizon Gain (dBi)	Coordination Distance (km)
190	0.00	100.55	-3.00	262.00	-3.00	125.00
195	0.00	105.48	-3.00	262.00	-3.00	125.00
200	0.00	110.40	-3.00	262.00	-3.00	125.00
205	0.00	115.32	-3.00	262.00	-3.00	125.00
210	0.00	120.23	-3.00	262.00	-3.00	125.00
215	0.00	125.14	-3.00	262.00	-3.00	125.00
220	0.00	130.03	-3.00	262.00	-3.00	125.00
225	0.00	134.90	-3.00	262.00	-3.00	125.00
230	0.00	139.75	-3.00	262.00	-3.00	125.00
235	0.00	144.57	-3.00	262.00	-3.00	125.00
240	0.00	149.34	-3.00	262.00	-3.00	125.00
245	0.00	154.03	-3.00	262.00	-3.00	125.00
250	0.00	158.58	-3.00	262.00	-3.00	125.00
255	0.00	162.91	-3.00	262.00	-3.00	125.00
260	0.00	166.77	-3.00	262.00	-3.00	125.00
265	0.00	169.62	-3.00	262.00	-3.00	125.00
270	0.00	170.52	-3.00	262.00	-3.00	125.00
275	0.00	168.98	-3.00	262.00	-3.00	125.00
280	0.00	165.76	-3.00	262.00	-3.00	125.00
285	0.00	161.74	-3.00	262.00	-3.00	125.00
290	0.00	157.34	-3.00	262.00	-3.00	125.00
295	0.00	152.73	-3.00	262.00	-3.00	125.00
300	0.00	148.02	-3.00	262.00	-3.00	125.00
305	0.00	143.24	-3.00	262.00	-3.00	125.00
310	0.00	138.41	-3.00	262.00	-3.00	125.00
315	0.00	133.55	-3.00	262.00	-3.00	125.00
320	0.00	128.67	-3.00	262.00	-3.00	125.00
325	0.00	123.78	-3.00	262.00	-3.00	125.00
330	0.00	118.87	-3.00	262.00	-3.00	125.00
335	0.00	113.95	-3.00	262.00	-3.00	125.00
340	0.00	109.03	-3.00	262.00	-3.00	125.00
345	0.00	104.11	-3.00	262.00	-3.00	125.00
350	0.00	99.18	-3.00	262.00	-3.00	125.00
355	0.00	94.25	-3.00	262.00	-3.00	125.00

5. Contact Information

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

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