

Ka-Band Earth Station – Mandale, NC

Frequency Coordination Report

28 GHz



Prepared on Behalf of
SPACE EXPLORATION
HOLDINGS

October 6, 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 Mandale, NC, 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 four of this report. The earth station coordination was finalized on October 5, 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 Mandale, NC 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	Statewide: NC
Frontier	Nationwide

A notification letter and datasheets for the Ka-Band earth station in Mandale, NC 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 three 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
T-Mobile	Market Based
US Cellular	Market Based
Verizon	Market Based

No objections were received from the UMFUS incumbents within coordination distance.



4. Earth Station Coordination Data

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



Job Number: 200827COMSGE06

Administrative Information

Status ENGINEER PROPOSAL
 Call Sign
 Licensee Code SPACEX
 Licensee Name Space Exploration Holdings

Site Information

MANDALE, NC
 Venue Name
 Latitude (NAD 83) 35° 53' 43.3" N
 Longitude (NAD 83) 79° 13' 29.6" W
 Climate Zone A
 Rain Zone 1
 Ground Elevation (AMSL) 155.11 m / 508.9 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) (dBW/MHz)	-39.8 -15.8
Maximum EIRP	(dBW/4 kHz) (dBW/MHz)	9.7 33.7
Interference Objectives:	Long Term Short Term	-156.0 dBW/MHz 20% -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 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



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Coordination Values	MANDALE, NC		
Licensee Name	Space Exploration Holdings		
Latitude (NAD 83)	35° 53' 43.3" N		
Longitude (NAD 83)	79° 13' 29.6" W		
Ground Elevation (AMSL)	155.11 m / 508.9 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)		

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	0.90	96.37	-3.00	262.00	-3.00	125.00
5	1.19	91.37	-3.00	262.00	-3.00	125.00
10	1.82	86.37	-3.00	262.00	-3.00	125.00
15	1.94	81.37	-3.00	262.00	-3.00	125.00
20	2.22	76.38	-3.00	262.00	-3.00	125.00
25	2.49	71.39	-3.00	262.00	-3.00	125.00
30	2.68	66.40	-3.00	262.00	-3.00	125.00
35	2.75	61.40	-3.00	262.00	-3.00	125.00
40	2.81	56.41	-3.00	262.00	-3.00	125.00
45	2.79	51.42	-3.00	262.00	-3.00	125.00
50	2.79	46.43	-3.00	262.00	-3.00	125.00
55	2.83	41.45	-3.00	262.00	-3.00	125.00
60	3.00	36.47	-3.00	262.00	-3.00	125.00
65	3.11	31.51	-3.00	262.00	-3.00	125.00
70	3.20	26.55	-3.00	262.00	-3.00	125.00
75	3.08	21.58	-3.00	262.00	-3.00	125.00
80	2.75	16.59	-3.00	262.00	-3.00	125.00
85	2.93	11.73	-3.00	262.00	-3.00	125.00
90	2.84	6.97	-3.00	262.00	-3.00	125.00
95	2.82	3.12	-3.00	262.00	-3.00	125.00
100	2.57	4.44	-3.00	262.00	-3.00	125.00
105	2.63	9.02	-3.00	262.00	-3.00	125.00
110	2.72	13.89	-3.00	262.00	-3.00	125.00
115	2.56	18.80	-3.00	262.00	-3.00	125.00
120	2.32	23.74	-3.00	262.00	-3.00	125.00
125	2.40	28.72	-3.00	262.00	-3.00	125.00
130	2.19	33.69	-3.00	262.00	-3.00	125.00
135	1.98	38.67	-3.00	262.00	-3.00	125.00
140	1.90	43.66	-3.00	262.00	-3.00	125.00
145	1.70	48.65	-3.00	262.00	-3.00	125.00
150	1.65	53.65	-3.00	262.00	-3.00	125.00
155	1.78	58.65	-3.00	262.00	-3.00	125.00
160	1.75	63.64	-3.00	262.00	-3.00	125.00
165	1.67	68.64	-3.00	262.00	-3.00	125.00
170	1.55	73.64	-3.00	262.00	-3.00	125.00
175	1.29	78.63	-3.00	262.00	-3.00	125.00
180	1.21	83.63	-3.00	262.00	-3.00	125.00
185	0.90	88.63	-3.00	262.00	-3.00	125.00



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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)			

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	0.84	93.63	-3.00	262.00	-3.00	125.00
195	1.06	98.63	-3.00	262.00	-3.00	125.00
200	1.25	103.63	-3.00	262.00	-3.00	125.00
205	1.53	108.62	-3.00	262.00	-3.00	125.00
210	1.80	113.62	-3.00	262.00	-3.00	125.00
215	1.77	118.62	-3.00	262.00	-3.00	125.00
220	1.74	123.61	-3.00	262.00	-3.00	125.00
225	1.65	128.61	-3.00	262.00	-3.00	125.00
230	1.61	133.61	-3.00	262.00	-3.00	125.00
235	1.50	138.61	-3.00	262.00	-3.00	125.00
240	1.32	143.61	-3.00	262.00	-3.00	125.00
245	1.21	148.61	-3.00	262.00	-3.00	125.00
250	1.28	153.60	-3.00	262.00	-3.00	125.00
255	1.33	158.59	-3.00	262.00	-3.00	125.00
260	1.49	163.57	-3.00	262.00	-3.00	125.00
265	1.67	168.51	-3.00	262.00	-3.00	125.00
270	1.83	173.38	-3.00	262.00	-3.00	125.00
275	2.17	177.45	-3.00	262.00	-3.00	125.00
280	2.28	175.72	-3.00	262.00	-3.00	125.00
285	2.35	171.06	-3.00	262.00	-3.00	125.00
290	2.32	166.18	-3.00	262.00	-3.00	125.00
295	2.26	161.24	-3.00	262.00	-3.00	125.00
300	1.96	156.29	-3.00	262.00	-3.00	125.00
305	1.64	151.33	-3.00	262.00	-3.00	125.00
310	0.90	146.36	-3.00	262.00	-3.00	125.00
315	0.73	141.36	-3.00	262.00	-3.00	125.00
320	0.46	136.37	-3.00	262.00	-3.00	125.00
325	0.34	131.37	-3.00	262.00	-3.00	125.00
330	0.32	126.37	-3.00	262.00	-3.00	125.00
335	0.38	121.37	-3.00	262.00	-3.00	125.00
340	0.32	116.37	-3.00	262.00	-3.00	125.00
345	0.32	111.37	-3.00	262.00	-3.00	125.00
350	0.35	106.37	-3.00	262.00	-3.00	125.00
355	0.37	101.37	-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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