

Ka-Band Earth Station – Kuparuk, AK

Frequency Coordination Report

28 GHz



Prepared on Behalf of
SPACE EXPLORATION
HOLDINGS

August 27, 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 Kuparuk, AK, 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 August 27, 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 Kuparuk, AK 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 |
|----------------------------------|----------------------------|
| Alascom, Inc. | Statewide: AK |
| The Alaska Wireless Network, LLC | Statewide: AK |
| Frontier | Nationwide |

A notification letter and datasheets for the Ka-Band earth station in Kuparuk, AK 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 two 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 |
|--------------|----------------------------|
| Arctic Slope | Market Based |
| T-Mobile | 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 Kuparuk, AK. This data was circulated to all incumbent licensees in the shared 28 GHz frequency ranges.



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Job Number: 200629COMSGE01

Administrative Information

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

Site Information

VENUE: KUPARUK, AK
 Venue Name:
 Latitude (NAD 83): 70° 19' 3.6" N
 Longitude (NAD 83): 148° 56' 28.3" W
 Climate Zone: A
 Rain Zone: 2
 Ground Elevation (AMSL): 6.0 m / 19.7 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 |



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| | | | |
|------------------------------------|----------------------------|-------------------|--------------------------|
| Coordination Values | KUPARUK, AK | | |
| Licensee Name | Space Exploration Holdings | | |
| Latitude (NAD 83) | 70° 19' 3.6" N | | |
| Longitude (NAD 83) | 148° 56' 28.3" W | | |
| Ground Elevation (AMSL) | 6.0 m / 19.7 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 | 0.00 | 40.05 | -3.00 | 262.00 | -3.00 | 125.00 |
| 5 | 0.00 | 36.37 | -3.00 | 262.00 | -3.00 | 125.00 |
| 10 | 0.00 | 32.98 | -3.00 | 262.00 | -3.00 | 125.00 |
| 15 | 0.00 | 29.99 | -3.00 | 262.00 | -3.00 | 125.00 |
| 20 | 0.00 | 27.53 | -3.00 | 262.00 | -3.00 | 125.00 |
| 25 | 0.00 | 25.75 | -3.00 | 262.00 | -3.00 | 125.00 |
| 30 | 0.00 | 24.80 | -3.00 | 262.00 | -3.00 | 125.00 |
| 35 | 0.00 | 24.78 | -3.00 | 262.00 | -3.00 | 125.00 |
| 40 | 0.23 | 25.91 | -3.00 | 262.00 | -3.00 | 125.00 |
| 45 | 0.00 | 27.43 | -3.00 | 262.00 | -3.00 | 125.00 |
| 50 | 0.00 | 29.87 | -3.00 | 262.00 | -3.00 | 125.00 |
| 55 | 0.00 | 32.84 | -3.00 | 262.00 | -3.00 | 125.00 |
| 60 | 0.00 | 36.21 | -3.00 | 262.00 | -3.00 | 125.00 |
| 65 | 0.00 | 39.89 | -3.00 | 262.00 | -3.00 | 125.00 |
| 70 | 0.00 | 43.78 | -3.00 | 262.00 | -3.00 | 125.00 |
| 75 | 0.00 | 47.85 | -3.00 | 262.00 | -3.00 | 125.00 |
| 80 | 0.00 | 52.04 | -3.00 | 262.00 | -3.00 | 125.00 |
| 85 | 0.00 | 56.32 | -3.00 | 262.00 | -3.00 | 125.00 |
| 90 | 0.00 | 60.68 | -3.00 | 262.00 | -3.00 | 125.00 |
| 95 | 0.00 | 65.10 | -3.00 | 262.00 | -3.00 | 125.00 |
| 100 | 0.00 | 69.55 | -3.00 | 262.00 | -3.00 | 125.00 |
| 105 | 0.00 | 74.05 | -3.00 | 262.00 | -3.00 | 125.00 |
| 110 | 0.00 | 78.56 | -3.00 | 262.00 | -3.00 | 125.00 |
| 115 | 0.00 | 83.09 | -3.00 | 262.00 | -3.00 | 125.00 |
| 120 | 0.00 | 87.63 | -3.00 | 262.00 | -3.00 | 125.00 |
| 125 | 0.00 | 92.17 | -3.00 | 262.00 | -3.00 | 125.00 |
| 130 | 0.00 | 96.71 | -3.00 | 262.00 | -3.00 | 125.00 |
| 135 | 0.00 | 101.25 | -3.00 | 262.00 | -3.00 | 125.00 |
| 140 | 0.00 | 105.76 | -3.00 | 262.00 | -3.00 | 125.00 |
| 145 | 0.00 | 110.25 | -3.00 | 262.00 | -3.00 | 125.00 |
| 150 | 0.00 | 114.71 | -3.00 | 262.00 | -3.00 | 125.00 |
| 155 | 0.00 | 119.13 | -3.00 | 262.00 | -3.00 | 125.00 |
| 160 | 0.00 | 123.49 | -3.00 | 262.00 | -3.00 | 125.00 |
| 165 | 0.00 | 127.78 | -3.00 | 262.00 | -3.00 | 125.00 |
| 170 | 0.00 | 131.98 | -3.00 | 262.00 | -3.00 | 125.00 |
| 175 | 0.00 | 136.05 | -3.00 | 262.00 | -3.00 | 125.00 |
| 180 | 0.00 | 139.95 | -3.00 | 262.00 | -3.00 | 125.00 |
| 185 | 0.00 | 143.63 | -3.00 | 262.00 | -3.00 | 125.00 |



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| 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% |
| | Short Term | -146.0 dBW/MHz | 0.01% |
| 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 | 0.00 | 147.02 | -3.00 | 262.00 | -3.00 | 125.00 |
| 195 | 0.00 | 150.01 | -3.00 | 262.00 | -3.00 | 125.00 |
| 200 | 0.00 | 152.47 | -3.00 | 262.00 | -3.00 | 125.00 |
| 205 | 0.00 | 154.25 | -3.00 | 262.00 | -3.00 | 125.00 |
| 210 | 0.00 | 155.20 | -3.00 | 262.00 | -3.00 | 125.00 |
| 215 | 0.00 | 155.22 | -3.00 | 262.00 | -3.00 | 125.00 |
| 220 | 0.00 | 154.31 | -3.00 | 262.00 | -3.00 | 125.00 |
| 225 | 0.00 | 152.57 | -3.00 | 262.00 | -3.00 | 125.00 |
| 230 | 0.00 | 150.13 | -3.00 | 262.00 | -3.00 | 125.00 |
| 235 | 0.00 | 147.16 | -3.00 | 262.00 | -3.00 | 125.00 |
| 240 | 0.00 | 143.79 | -3.00 | 262.00 | -3.00 | 125.00 |
| 245 | 0.00 | 140.11 | -3.00 | 262.00 | -3.00 | 125.00 |
| 250 | 0.00 | 136.22 | -3.00 | 262.00 | -3.00 | 125.00 |
| 255 | 0.00 | 132.15 | -3.00 | 262.00 | -3.00 | 125.00 |
| 260 | 0.00 | 127.96 | -3.00 | 262.00 | -3.00 | 125.00 |
| 265 | 0.00 | 123.68 | -3.00 | 262.00 | -3.00 | 125.00 |
| 270 | 0.00 | 119.32 | -3.00 | 262.00 | -3.00 | 125.00 |
| 275 | 0.00 | 114.90 | -3.00 | 262.00 | -3.00 | 125.00 |
| 280 | 0.00 | 110.45 | -3.00 | 262.00 | -3.00 | 125.00 |
| 285 | 0.00 | 105.96 | -3.00 | 262.00 | -3.00 | 125.00 |
| 290 | 0.00 | 101.44 | -3.00 | 262.00 | -3.00 | 125.00 |
| 295 | 0.00 | 96.91 | -3.00 | 262.00 | -3.00 | 125.00 |
| 300 | 0.00 | 92.37 | -3.00 | 262.00 | -3.00 | 125.00 |
| 305 | 0.00 | 87.83 | -3.00 | 262.00 | -3.00 | 125.00 |
| 310 | 0.00 | 83.29 | -3.00 | 262.00 | -3.00 | 125.00 |
| 315 | 0.00 | 78.75 | -3.00 | 262.00 | -3.00 | 125.00 |
| 320 | 0.00 | 74.24 | -3.00 | 262.00 | -3.00 | 125.00 |
| 325 | 0.00 | 69.75 | -3.00 | 262.00 | -3.00 | 125.00 |
| 330 | 0.00 | 65.29 | -3.00 | 262.00 | -3.00 | 125.00 |
| 335 | 0.00 | 60.87 | -3.00 | 262.00 | -3.00 | 125.00 |
| 340 | 0.00 | 56.51 | -3.00 | 262.00 | -3.00 | 125.00 |
| 345 | 0.00 | 52.22 | -3.00 | 262.00 | -3.00 | 125.00 |
| 350 | 0.00 | 48.02 | -3.00 | 262.00 | -3.00 | 125.00 |
| 355 | 0.00 | 43.95 | -3.00 | 262.00 | -3.00 | 125.00 |



5. Contact Information

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

| | |
|-----------------|---|
| Contact person: | Dennis Jimeno |
| Title: | Engineer III, Telecommunications |
| Company: | Comsearch |
| Address: | 19700 Janelia Farm Blvd., Ashburn, VA 20147 |
| Telephone: | 703-726-5858 |
| Fax: | 703-726-5599 |
| Email: | DJimeno@Comsearch.com |
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