ATTACHMENT B

UMFUS Compatibility Showing
(Rifle, CO; Call Sign E170166)

1. Section 25.136(a)(4) assessment – 27.5-28.35 GHz (or "28 GHz")

1.1. Section 25.136(a)(4)(i) – Number of earth stations

Based upon a search of the FCC's IBFS database as of March 2022, no other earth station is licensed or proposed to operate at 28 GHz in the same county (*i.e.,* Garfield County).

1.2. Section 25.136(a)(4)(ii) and (iii) – Population and road/venue/railway/port coverage

1.2.1. Assumptions

Visualyse software was used to determine the area where the proposed 28 GHz gateway operations will generate a power flux density ("PFD"), at 10 meters above ground level, of greater than or equal to −77.6 dBm/m^2/MHz, based upon the technical parameters and assumptions set forth in Table 1 below, including: (i) a maximum power level during worst-case, non-clear sky conditions; (ii) the manufacturer's calculated off-axis gain pattern shown in Figure 1 below; and (iii) estimated clutter loss using the propagation model in ITU-R P.452-16.

Parameter	Value
Latitude/longitude	39° 32' 42.5"N / 107° 45' 42.9"W
Frequency (GHz)	28
Channel bandwidth (MHz)	470
Transmit power (dBW)	5.09
Antenna midline height above ground (m)	7
Antenna size (m)	10
On-axis antenna gain (dBi)	67.91
Worst-case EIRP (dBW)	76
Antenna radiation pattern	Calculated off-axis gain pattern (see Figure 1 below)
Clutter	Recommendation ITU-R P.452-16
Terrain	NASA SRTM data 30-meter resolution (at http://dwtkns.com/srtm30m/)

Table . 28 GHz Technical Parameters and Assumptions1

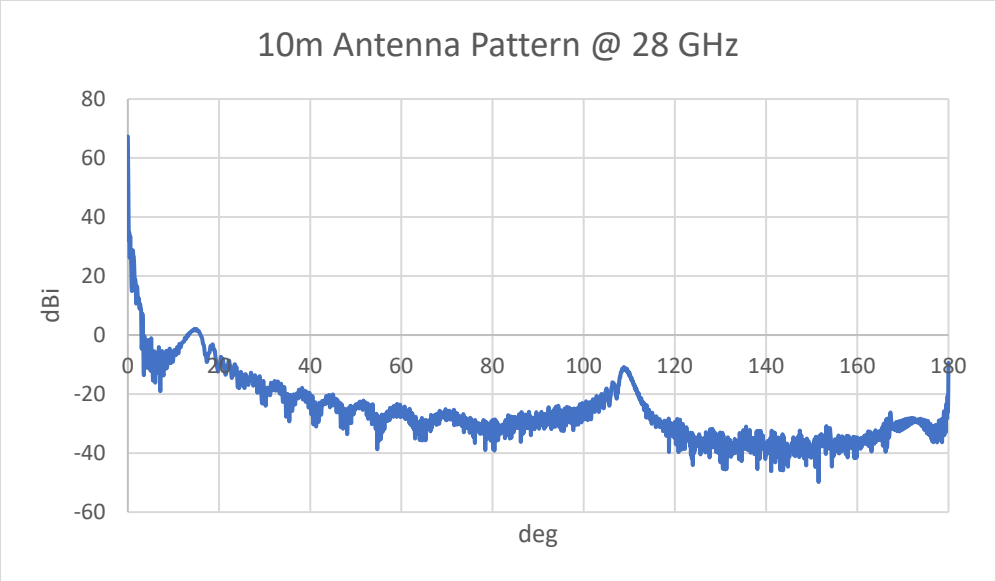

Figure . Manufacturer's Calculated Off-axis Gain Pattern at 28 GHz 1

1.2.2. Results

As shown in Figure 2 below and based upon visual inspection using Google Earth, the 28 GHz PFD contour does not overlap any major road, event venue, urban mass transit route, passenger railroad, or cruise ship port specified in Section 25.136 of the Commission's rules.

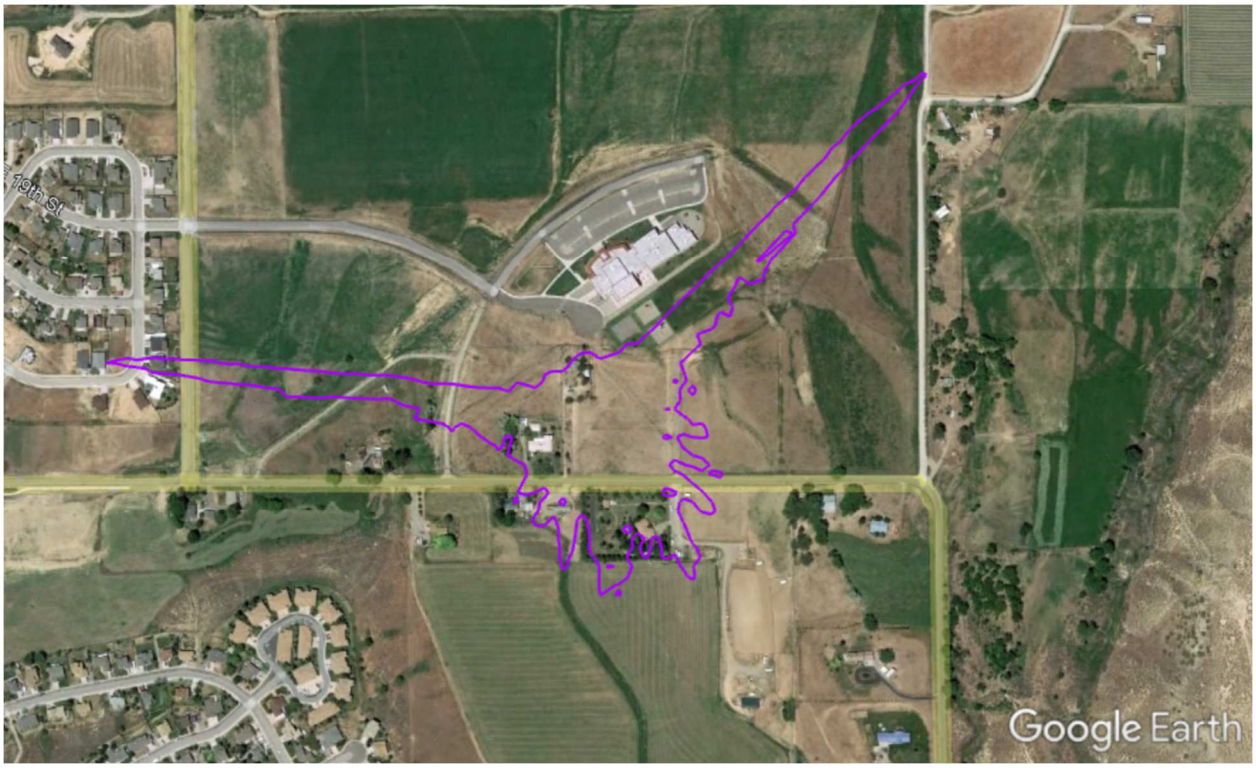

Figure 2. 28 GHz PFD Contour

As shown in Figure 3 and Table 2 below, based on the proportion of census block areas covered, the estimated population covered within the 28 GHz PFD contour is 7, and thus below the applicable limit of 450.

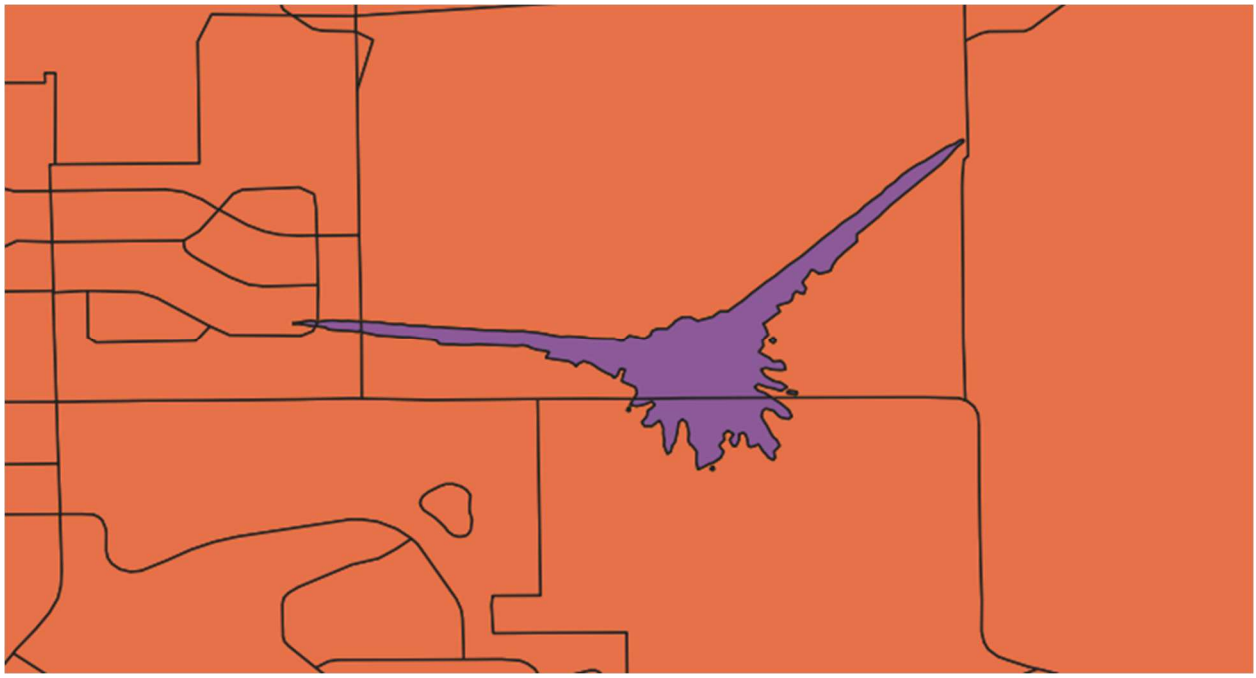

Figure . 28 GHz PFD Contour Overlaid on Census Blocks3

Census Tract	Census Block	Block Area	Covered Area	Block Population	Weighted/Covered Population
952002	1029	354378	13552	152	5.81
952002	1010	32153	157	0	0
952002	1016	56885	860	13	0.20
952001	1088	547282	48145	6	0.53
					7 (Total)

Table . Population Coverage of 28 GHz PFD Contour2

1.3. Section 25.136(a)(4)(iv) – Coordination

As demonstrated in Attachment A (Comsearch Reports), frequency coordination has been successfully completed for the proposed gateway operations at 28 GHz.

2. Section 25.136(d)(4) assessment – 47.2-48.2 GHz (or "47 GHz")

2.1. Section 25.136(d)(4)(i) – Number of earth stations

Based upon a search of the FCC's IBFS database as of March 2022, no other earth station is licensed or proposed to operate at 47 GHz in any of the counties, listed in Table 3 below, within the same Partial Economic Area ("PEA") encompassing Garfield County (*i.e.,* PEA No. 102).

Counties within PEA No. 102	
Chaffee	Lake
Clear Creek	Mesa
Custer	Moffat
Delta	Montrose
Eagle	Ouray
Fremont	Park
Garfield	Pitkin
Grand	Rio Blanco
Gunnison	Routt
Hinsdale	San Miguel
Jackson	Summit

Table 3. PEA Counties

2.2. Section 25.136(d)(4)(ii) and (iii) – Population/road/venue/railway/port coverage

2.2.1. Assumptions

Visualyse software was used to determine the area where the proposed gateway operations at 47 GHz will generate a PFD contour, at 10 meters above ground level, of greater than or equal to −77.6 dBm/m^2/MHz, based upon the technical parameters and assumptions set forth in Table 4 below, including: (i) a maximum power level during worst-case, non-clear sky conditions; (ii) the manufacturer's calculated off-axis gain pattern shown in Figure 4 below; and (iii) estimated clutter loss using the propagation model in ITU-R P.452-16.

Parameter	Value
Latitude/longitude	39° 32' 42.5"N / 107° 45' 42.9"W
Frequency (GHz)	47
Channel bandwidth (MHz)	470
Transmit power (dBW)	0.39
Antenna midline height above ground (m)	7
Antenna size (m)	10
On-axis antenna gain (dBi)	71.61
Worst-case EIRP (dBW)	75
Antenna radiation pattern	Calculated off-axis gain pattern (see Figure 1 below)
Clutter	Recommendation ITU-R P.452-16
Terrain	NASA SRTM data 30-meter resolution (at http://dwtkns.com/srtm30m/)

Table 4. 47 GHz Technical Parameters and Assumptions

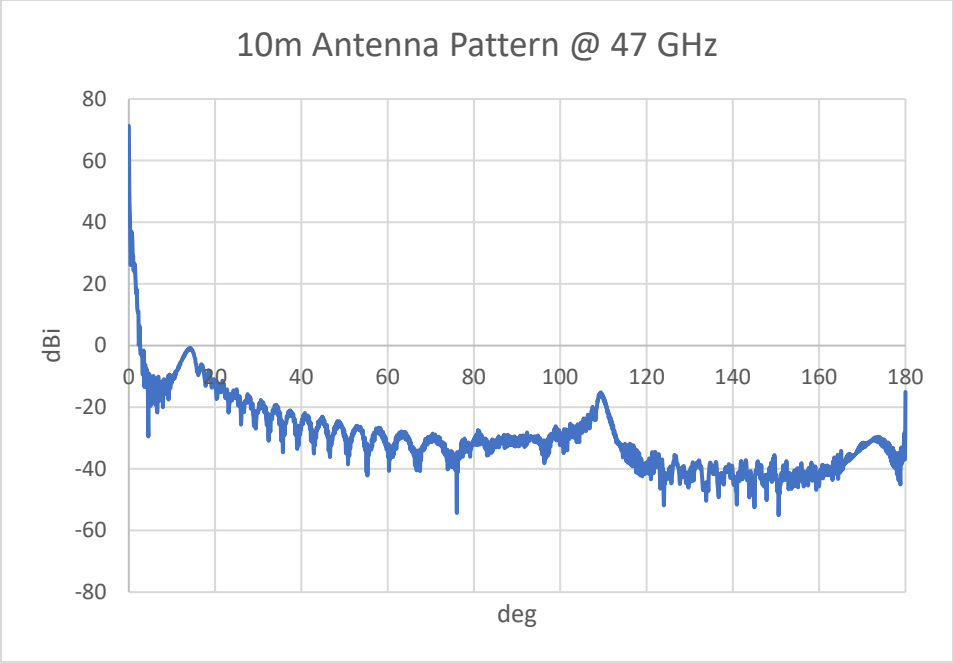

Figure 4. Manufacturer's Calculated Off-axis Gain Pattern at 47 GHz

2.2.2. Results

As shown in Figure 5 below and based upon visual inspection using Google Earth, the 47 GHz PFD contour overlaps approximately 20 meters of State Route 13 and no other major road, event venue, urban mass transit route, passenger railroad, or cruise ship port specified in Section 25.136 of the Commission's rules.

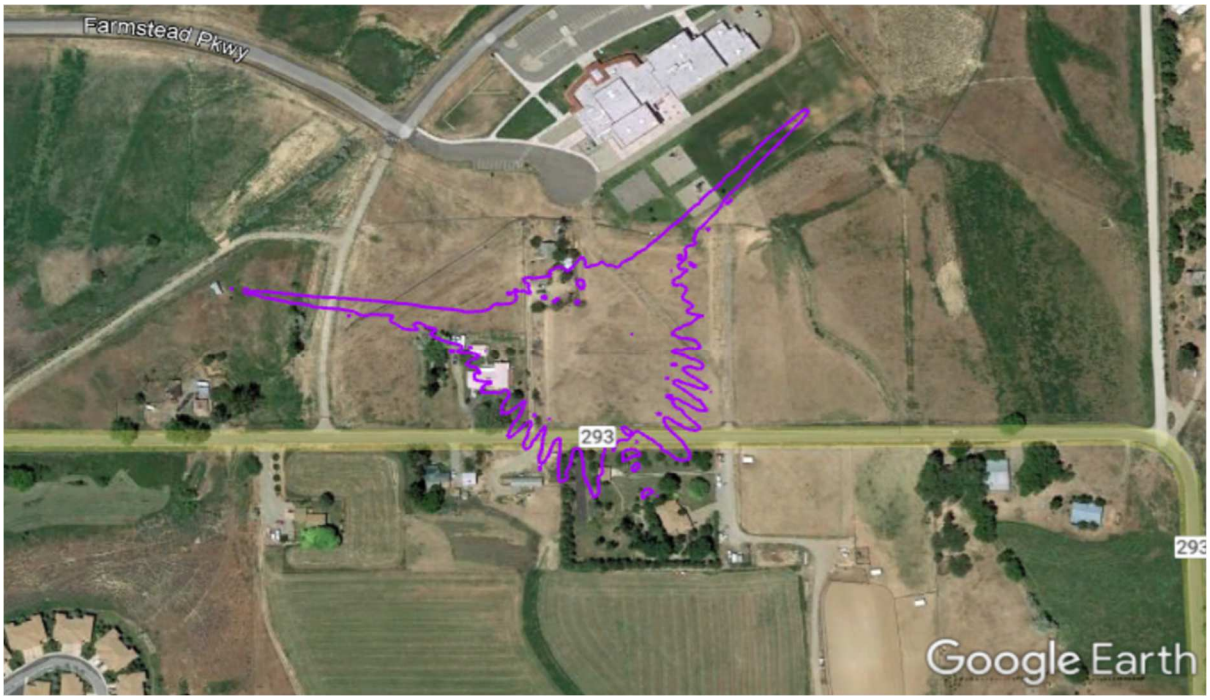

Figure 5. 47 GHz PFD Contour

As shown in Figure 6 and Table 5 below, based on the proportion of census block areas covered, the estimated population covered within the 47 GHz PFD contour is 1, and thus below the FCC's applicable limit.

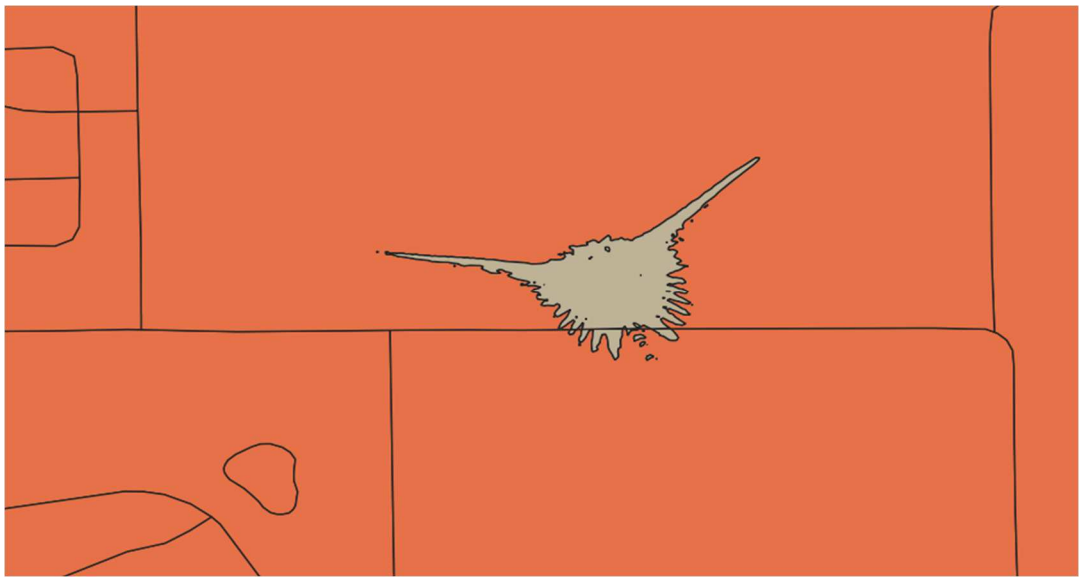

Figure 6. 47 GHz PFD Contour Overlaid on Census Blocks

Census Tract	Census Block	Block Area	Covered Area	Block Population	Weighted/Covered Population
952002	1029	354738	1074	152	0.46
952001	1088	547282	16485	6	0.18
					1 (Total)

Table 5. Population Coverage of 47 GHz PFD Contour

2.3. Section 25.136(d)(4)(iv) – Coordination

As demonstrated in Attachment A (Comsearch Reports), frequency coordination has been successfully completed for the proposed 47 GHz operations.

3. Section 25.136(e) assessment – 50.4-51.4 GHz (or "50 GHz")

50 GHz operations at the currently licensed site are grandfathered under Section 25.136(e)(3) of the Commission's rules, and should remain grandfathered at the new site. As demonstrated in Figure 8 below, PFD contours at both the new and licensed sites are substantially similar, thus showing no significant increase in interference risk to any future UMFUS operations. In any event, as shown below, the proposed operations at the new site are nonetheless consistent with the alternative requirements of Section 25.136(e)(4).

3.1. Section 25.136(e)(4)(i) – Number of earth stations

Based upon a search of the FCC's IBFS database as of March 2022, no other earth station is licensed or proposed to operate at 50 GHz in any of the counties within the same PEA encompassing Garfield County (*i.e.,* PEA No. 102).

3.2. Section 25.136(e)(4)(ii)-(iv) - Population/road/venue/railway/port coverage and coordination

3.2.1. Assumptions

Visualyse software was used to determine the area where 50 GHz operations at the licensed and new Rifle sites will generate a PFD contour, at 10 meters above ground level, of greater than or equal to −77.6 dBm/m^2/MHz, based upon the technical parameters and assumptions set forth in Table 6 below, including: (i) maximum power levels during worst-case, non-clear sky conditions; (ii) the manufacturer's calculated off-axis gain pattern shown in Figure 7 below; and (iii) estimated clutter loss using the propagation model in ITU-R P.452-16.

Parameter	Licensed Site	New Site
Latitude/longitude	39° 32' 54.2"N / 107° 46' 53.9"W	39° 32' 42.5"N / 107° 45' 42.9"W
Frequency (GHz)	50	50
Channel bandwidth (MHz)	470	470
Transmit power (dBW)	0	0
Antenna midline height above ground (m)	7	7
On-axis antenna Gain (dBi)	72	72
Worst-case EIRP (dBW)	75	75
Antenna radiation pattern	Calculated off-axis gain pattern (see Figure 7 below)	Calculated off-axis gain pattern (see Figure 7 below)
Clutter	Recommendation ITU-R P.452-16	Recommendation ITU-R P.452-16
Terrain	NASA SRTM data 30 m resolution	NASA SRTM data 30 m resolution

Table 6. 50 GHz Technical Parameters and Assumptions

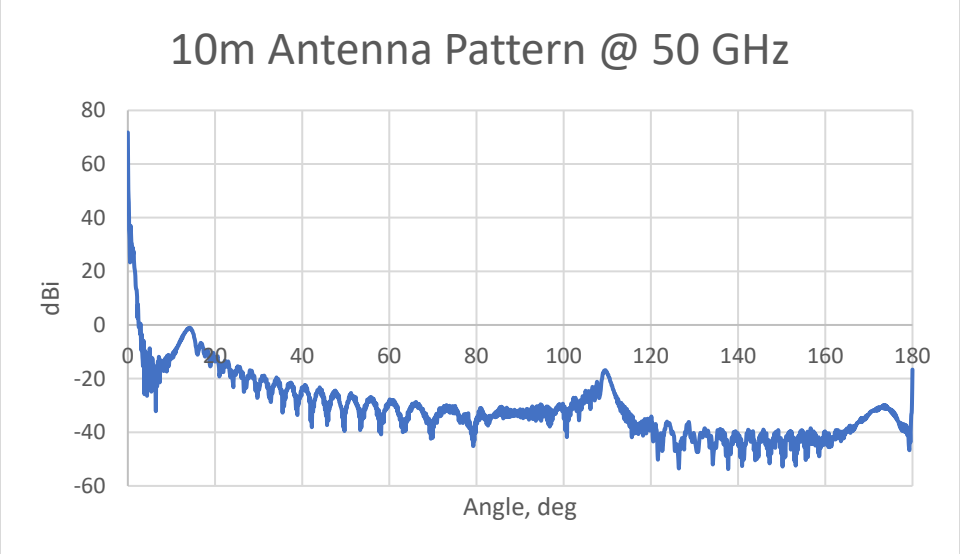

Figure 7. Manufacturer's calculated off-axis gain pattern at 50 GHz

3.2.2. Results

As shown in Figure 8 below, the 50 GHz PFD contours at both the new and licensed sites (shown in red and blue, respectively) are substantially similar. Specifically, based upon visual inspection using Google Earth, neither PFD contour overlaps any major road, event venue, urban mass transit route, passenger railroad, or cruise ship port specified in Section 25.136 of the Commission's rules.

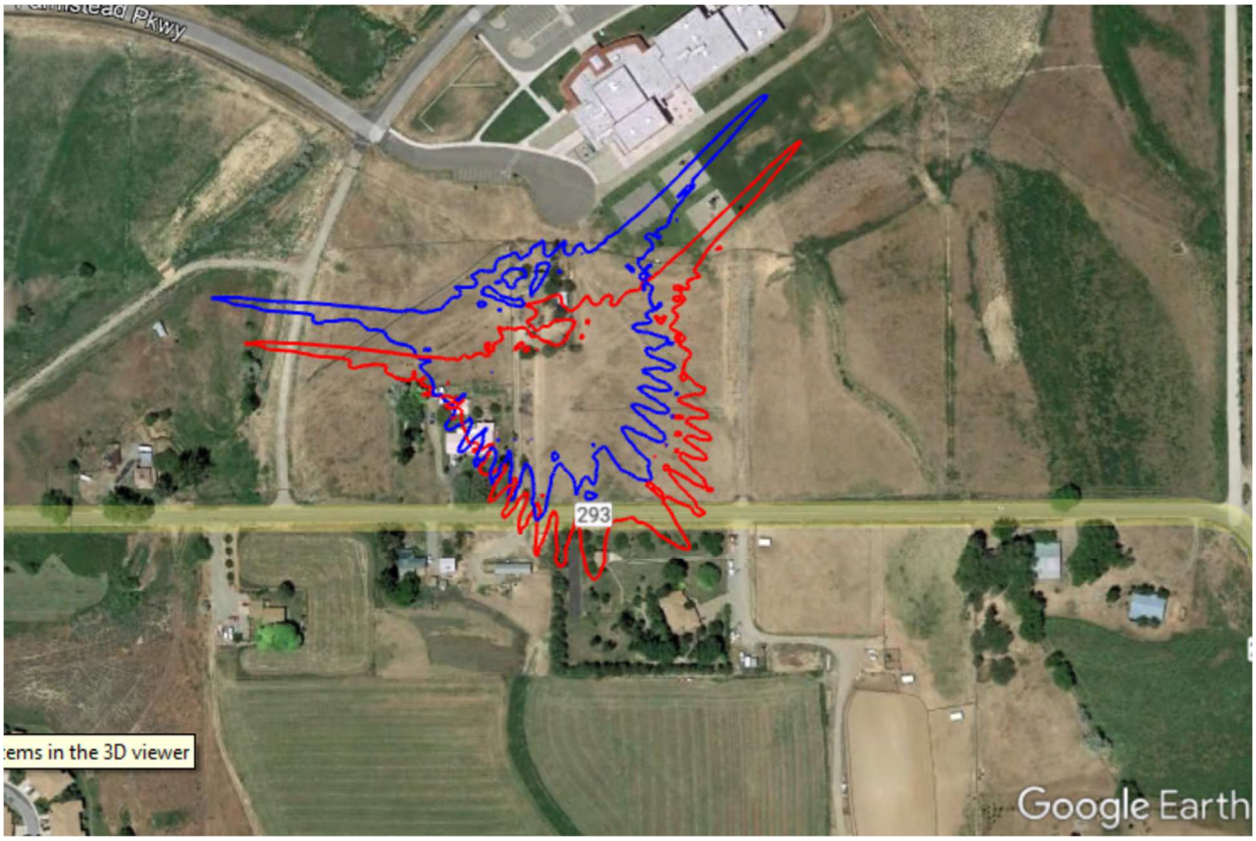

Figure 8. 50 GHz PFD Contours at New and Licensed Sites

Additionally, in view of substantially similar PFD contour coverage at both the new and licensed sites, the population coverage of the 50 GHz PFD contour at the new site is expected to be well below the FCC's applicable limit. Furthermore, frequency coordination is not required as no terrestrial service is licensed in the band.