

## **Exhibit A**

### **Section 25.136 Demonstration**

Pursuant to 47 C.F.R. § 25.115, Intelsat License LLC, as debtor in possession (“Intelsat”), herein seeks authority to operate two identical gateway earth stations (together, the “Brewster Gateways”) co-located in Brewster, WA. The first proposed gateway earth station (“Brewster Gateway 1”) will communicate with Intelsat 40e (S3066) at 91° W.L. The second proposed gateway earth station (“Brewster Gateway 2”) will communicate with Galaxy 30 (S3016) at 125° W.L. as the gateway’s primary point of communication and Intelsat 40e as its secondary point of communication.

Both Brewster Gateways will utilize 9.4-meter antennas and operate in Ka-band, including the 27.5-28.35 GHz frequency band, which may be licensed pursuant to Section 25.136(a)(4) of the Federal Communications Commission’s (“FCC” or “Commission”) rules.<sup>1</sup> This Exhibit addresses the four conditions for earth stations operating in the 27.5-28.35 GHz frequency band as specified in this rule.

#### **I. Section 25.136(a)(4)(i) - Earth Stations per County**

Section 25.136(a)(4)(i) requires that “there are no more than two other authorized earth stations operating in the 27.5-28.35 GHz band within the county where the proposed earth station is located.”<sup>2</sup> The Brewster Gateways will be at the Brewster teleport, which is located in Okanogan County, WA. At the time of this application’s submission, there is only one authorized earth station, Call Sign E160015, in Okanogan County operating in the 27.5-28.35 GHz band (the “Grandfathered Earth Station”).<sup>3</sup> Thus, the limit on the total number of earth stations in Okanogan County operating in the 27.5-28.35 GHz band will not be exceeded.

#### **II. Section 25.136(a)(4)(ii) - Population (Waiver Request)**

Section 25.136(a)(4)(ii) requires that “the area in which the earth station generates a PFD, at 10 meters above ground level, of greater than or equal to  $-77.6 \text{ dBm/m}^2/\text{MHz}$ , together with the similar area of any other earth station authorized pursuant to Section 25.136(a), does not cover, in the aggregate, more than the amount of population of the UMFUS license area within which the earth station is located as noted in table 1 of Section 25.136(a)(4)(ii).”<sup>4</sup> Where the population within the UMFUS license area is between 6,000 and 450,000, the maximum permitted aggregate population within  $-77.6 \text{ dBm/m}^2/\text{MHz}$  PFD contour of earth stations must not exceed 450 people.<sup>5</sup> Okanogan

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<sup>1</sup> 47 C.F.R. § 25.136(a)(4). Unless otherwise stated, all references to rule sections in this document refer to sections in Title 47 of the Code of Federal Regulations.

<sup>2</sup> 47 C.F.R. § 25.136(a)(4)(i).

<sup>3</sup> See *Satellite Communications Services Information; Actions Taken*, Report No. SES-02014, File No. SES-MOD-20170919-01032 (Dec. 6, 2017) (Public Notice). First licensed prior to July 14, 2016, this existing earth station may operate without providing interference protection to stations in the Upper Microwave Flexible Use Service (“UMFUS”) pursuant to Section 25.136(a)(2) of the Commission’s rules. See *Satellite Communications Services Information; Actions Taken*, Report No. SES-01900, File No. SES-LIC-20160330-00358 (Nov. 2, 2016) (Public Notice). See generally 47 C.F.R. § 25.136(a)(2).

<sup>4</sup> 47 C.F.R. § 25.136(a)(4)(i)(ii).

<sup>5</sup> *Id.* § 25.136(a)(4)(i)(ii), Table 1.

County has a population of 42,104 people,<sup>6</sup> and thus the maximum permitted aggregate population within the aggregate PFD contour cannot exceed 450 people.<sup>7</sup> Part of the PFD contour also includes Douglas County, which has a population of 42,938 and therefore also a 450-person limit.<sup>8</sup>

In this case, the PFD contour of the Grandfathered Earth station alone—covering 2,110 people (775 in Okanogan County and 1,335 people in Douglas County)—exceeds the population limit provided in Section 25.136(a)(4)(ii). Intelsat derived the PFD contour of the Grandfathered Earth Station based on the technical parameters of the existing licensee and the antenna pattern defined in Section 25.209 of the Commission’s rules.<sup>9</sup> This PFD contour is shown in Figure 1 below, with the green line in the figure showing the demarcation between the two counties. The population within the PFD contour was calculated by superimposing the contour onto a map of the U.S. census blocks,<sup>10</sup> as shown in Appendix B and using the actual area method.<sup>11</sup>

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<sup>6</sup> See <https://www.census.gov/quickfacts/okanogancountywashington>

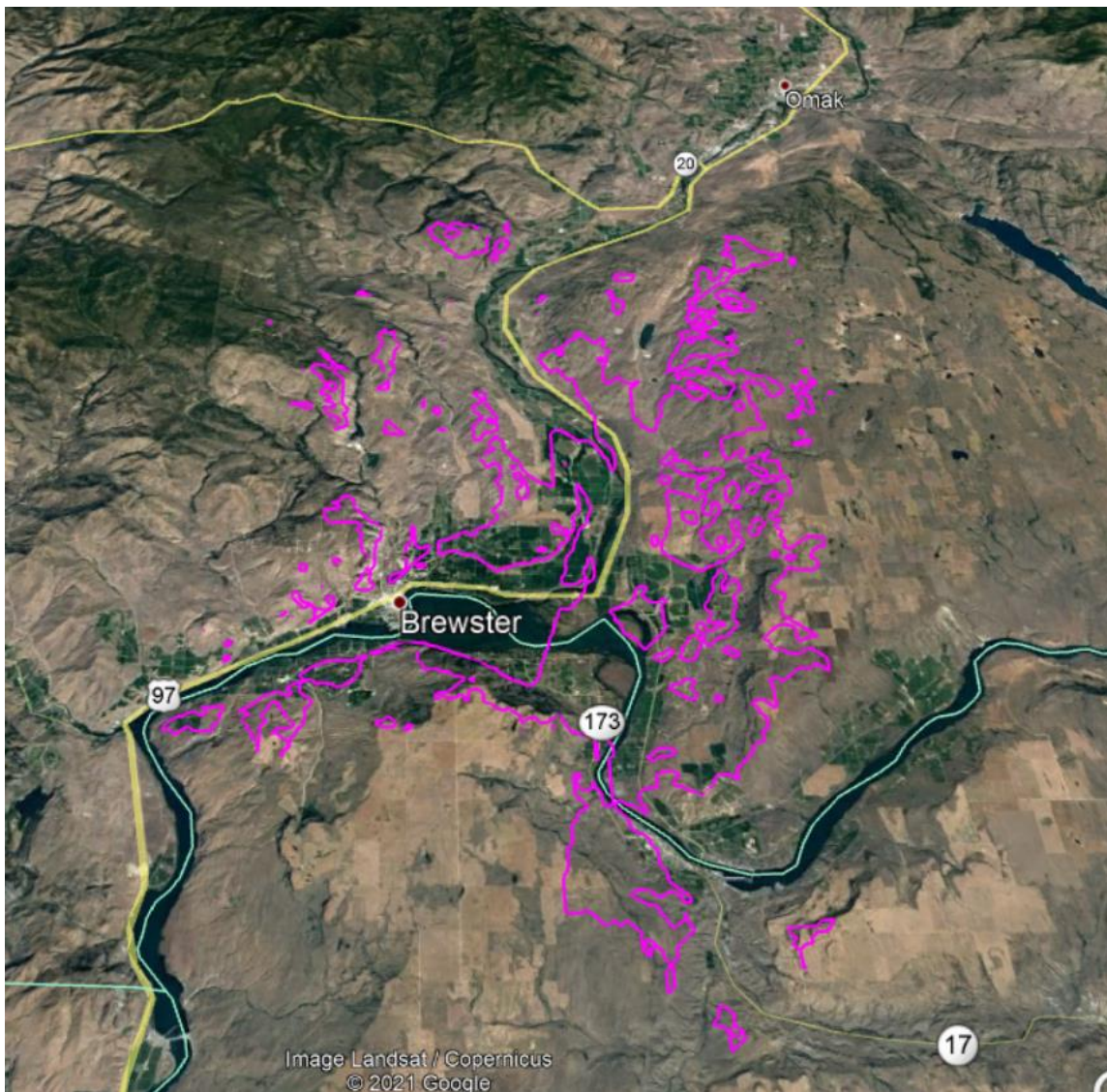
<sup>7</sup> See 47 C.F.R. § 25.136(a)(4)(ii) at Table 1.

<sup>8</sup> See <https://www.census.gov/quickfacts/fact/table/douglascountywashington/PST045219>.

<sup>9</sup> See 47 C.F.R. § 25.209.

<sup>10</sup> See US Census bureau data, <https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.html>.

<sup>11</sup> Under the actual area method the population within the contour is calculated based on the proportion of the census geographic area covered by the PFD contour.



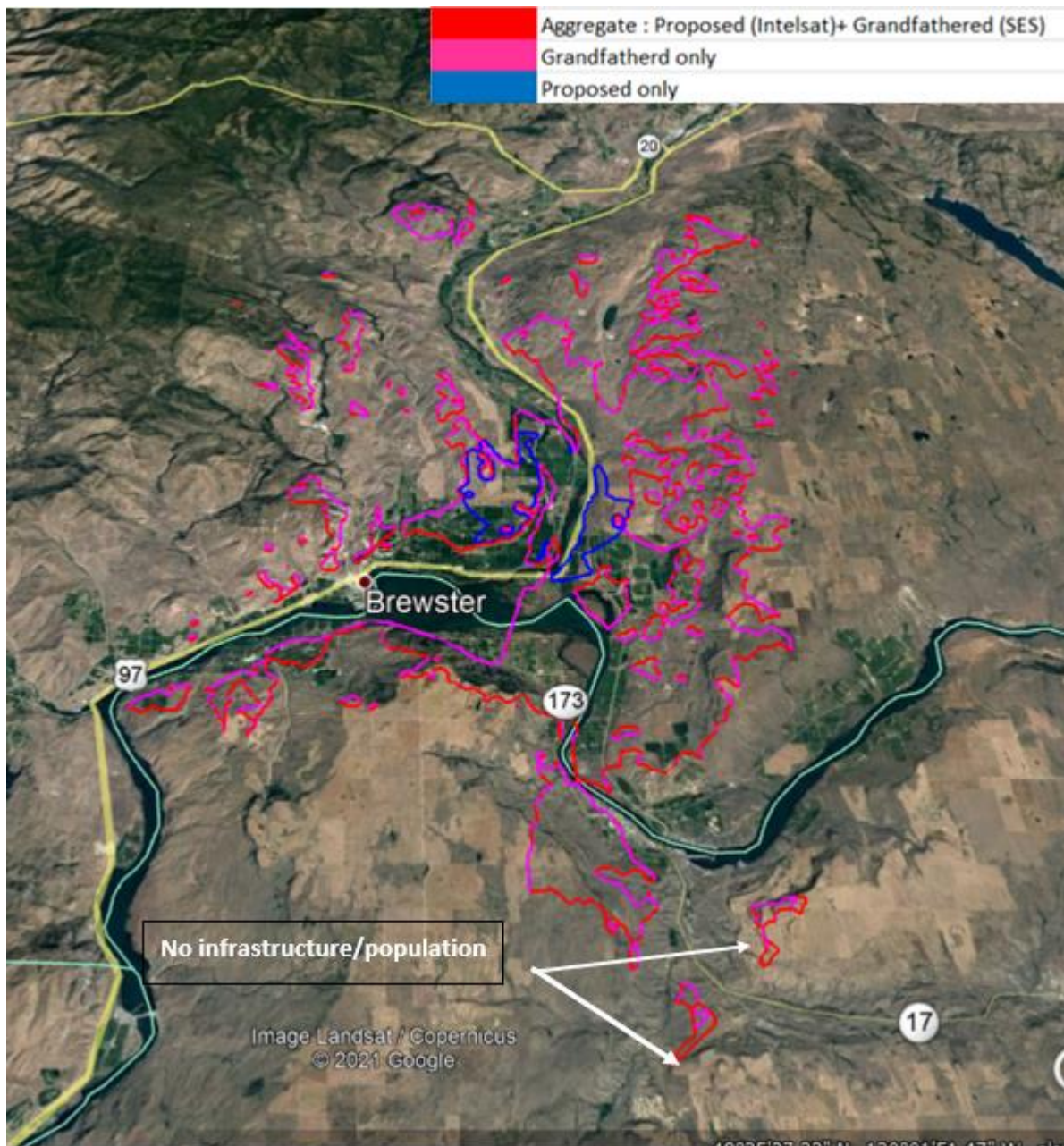
**Figure 1.** PFD Contour for Grandfathered Earth Station (Call Sign E160015)

Combined with the Brewster Gateways, Intelsat calculates that 2,110 people will be covered by the aggregate PFD contour—the same number as covered by the PFD contour of the Grandfathered Earth Station alone. To make this determination, Intelsat calculated an aggregate PFD contour and superimposed the aggregate contour onto the census blocks within the county. Figure 2 below shows PFD contours for the aggregate (red contour), the Grandfathered Earth Station (pink contour), and the proposed Brewster Gateways (blue contour<sup>12</sup>). The aggregate PFD contour expands coverage slightly in the south.<sup>13</sup> As shown in Figure 3 below, however, there is little infrastructure in these extended areas. As a result, the population remains the same for both the Grandfathered Earth Station PFD contour and the aggregate PFD contour.

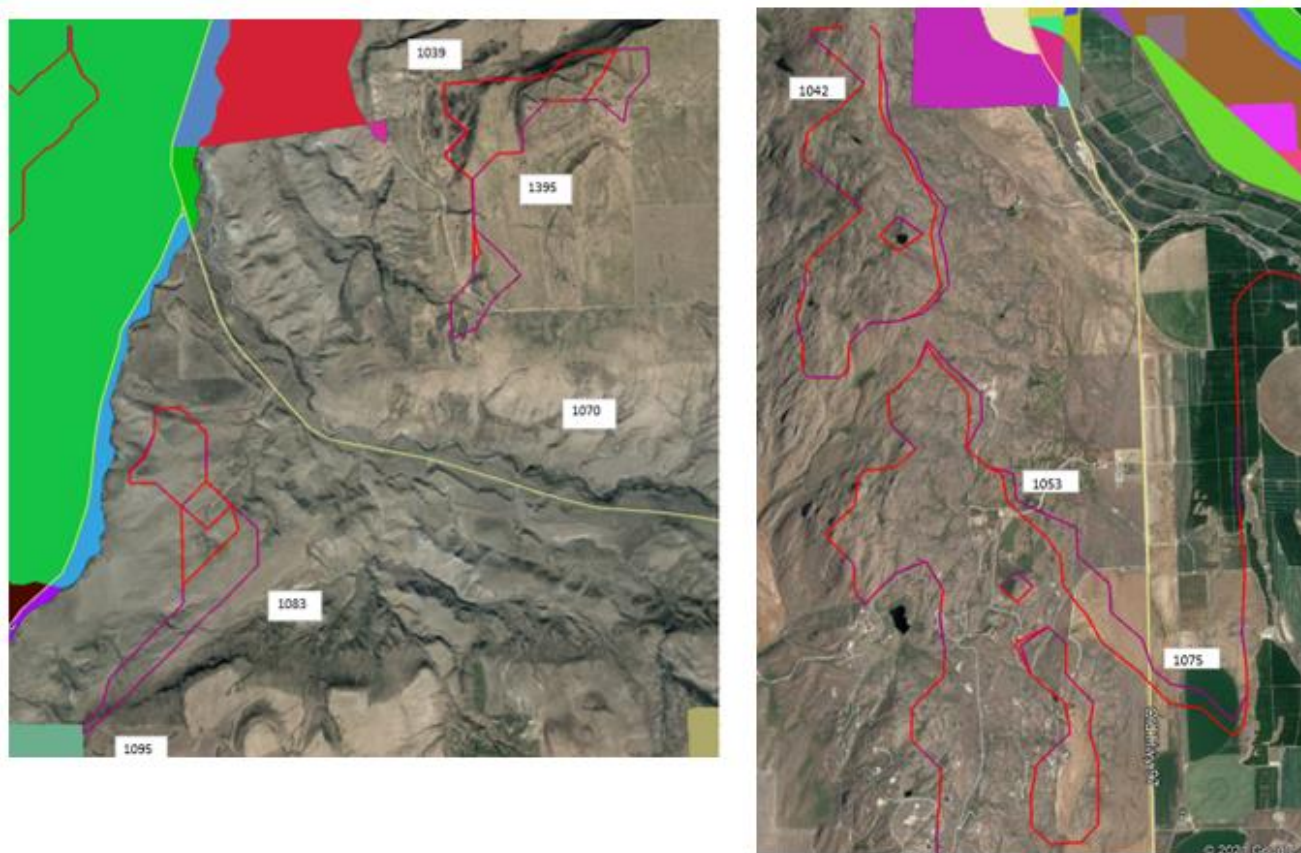
<sup>12</sup> The methodology and parameters used to derive the PFD contour for the proposed earth stations are provided in Appendix A.

<sup>13</sup> The Census blocks that fall between the grandfathered and aggregate contour are 1042, 1053, 1075, 1083, 1095, 1070, 1395, and 1039.





**Figure 2.** PFD Contours for Aggregate, Grandfathered Earth Station, and Proposed Brewster Gateways



**Figure 3.** Census blocks added due to proposed Brewster Gateways [no population impact]

Out of an abundance of caution and to the extent necessary, Intelsat requests waiver of Section 25.136(a)(4)(ii) of the Commission’s rules. The Commission may grant waiver for good cause shown.<sup>14</sup> In determining whether waiver is appropriate, the Commission should “take into account considerations of hardship, equity, or more effective implementation of overall policy.”<sup>15</sup> Good cause exists to waive Section 25.136(a)(4)(ii) because waiver would not undermine the purpose of the rule. Intelsat calculates that the population covered by the aggregate PFD contour and the PFD contour of the Grandfathered Earth Station alone are identical. In adopting Section 25.136, the Commission sought to allow Fixed Satellite Service (“FSS”) gateway operations in the 27.5-28.35 GHz band on a limited basis and in such a manner as to mitigate the impact on the deployment of UMFUS in the band. Section 25.136(a)(4)(ii) in particular sets out to limit the population that would be affected by the deployment of FSS gateway earth stations. Addition of the Brewster Gateways near the Grandfathered Earth Station, which may operate already without providing interference protection to UMFUS stations, will have no impact on the deployment of UMFUS in Okanogan or Douglas Counties. Grant of the requested waiver would therefore serve the public interest by allowing Intelsat to meet ever growing demands for satellite broadband to businesses, government, and individual users without materially changing the environment for UMFUS operations.

<sup>14</sup> 47 C.F.R. § 1.3.

<sup>15</sup> *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969).

### **III. Section 25.136(a)(4)(iii) - Federal Highways & Major Event Venues (Waiver Request)**

Section 25.136(a)(4)(iii), requires that “the area in which the earth station generates a PFD, at 10 meters above ground level, of greater than or equal to  $-77.6 \text{ dBm/m}^2/\text{MHz}$  does not contain any major event venue, urban mass transit route, passenger railroad, or cruise ship port” or, together with the similar area of any other earth station authorized pursuant to Section 25.136(a), any “Interstate, Other Freeways and Expressways, or Other Principal Arterial,” as defined by the Federal Highway Administration (“FHWA”).<sup>16</sup>

The proposed Brewster Gateway PFD contour does not contain any major event venue, urban mass transit route, passenger railroad, or cruise ship port. Additionally, as shown in Figure 2 above, there are no Interstate, Other Freeways and Expressways, or Other Principal Arterial roads in the aggregate PFD contour that were not already included in the PFD contour of the Grandfathered Earth Station. Out of an abundance of caution and to the extent necessary, however, Intelsat requests waiver of Section 25.136(a)(4)(iii) of the Commission’s rules.<sup>17</sup> Good cause exists to waive Section 25.136(a)(4)(iii) because waiver would not undermine the purpose of the rule.<sup>18</sup> The aggregate PFD contour of the grandfathered earth station and the proposed Brewster Gateways do not impact additional roads specified in 25.136(a)(4)(iii) compared with the Grandfathered Earth Station, which may operate already without providing interference protection to UMFUS stations. Grant of the requested waiver would therefore serve the public interest by allowing Intelsat to meet ever growing demands for satellite broadband to businesses, government, and individual users without changing the environment for UMFUS operations.

### **IV. Section 25.136(a)(4)(iv) - Coordination with UMFUS Licensees**

Section 25.136(a)(4)(iv) requires that applicants have “successfully completed frequency coordination with the UMFUS licensees operating within the area in which the earth station generates a PFD, at 10 meters above ground level, of greater than or equal to  $-77.6 \text{ dBm/m}^2/\text{MHz}$  with respect to existing facilities constructed and in operation by the UMFUS licensee.”<sup>19</sup> Intelsat has provided a Frequency Coordination Report, which demonstrates Intelsat’s completion of frequency coordination, as Appendix C.

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<sup>16</sup> 47 C.F.R. § 25.136(a)(4)(iii). *See also* 23 C.F.R. § 470.105(b); Federal Highway Administration, HEPGIS, <https://hepgis.fhwa.dot.gov/fhwagis/>.

<sup>17</sup> *See infra* Section II. The Commission may grant waiver for good cause shown. 47 C.F.R. § 1.3. In determining whether waiver is appropriate, the Commission should “take into account considerations of hardship, equity, or more effective implementation of overall policy.” *WAIT Radio*, 418 F.2d at 1159.

<sup>18</sup> *See id.* In adopting Section 25.136, the Commission sought to allow FSS gateway operations in the 27.5-28.35 GHz band on a limited basis and in such a manner as to mitigate the impact on the deployment of UMFUS in the band. Section 25.136(a)(4)(iii) in particular sets out to limit the effect on federal highways and major event venues from the deployment of FSS gateway earth stations.

<sup>19</sup> 47 C.F.R. § 25.136(a)(4)(iv).

## Appendix A

Intelsat derived the PFD contours using Visualyse Professional.<sup>20</sup> The analysis used the International Telecommunication Union (“ITU”) Recommendation P.525-4 propagation model and ITU Recommendation P.452-16 with a 10% time. To model the received emission by an UMFUS receiver in any possible direction, Intelsat used a reference antenna defined at a 10-meter height above ground, with omni-directional pattern and isotropic receive gain. In the simulations, this reference antenna was moved around the gateway, and the value of received power was measured at each location. The simulation modeled the terrain profile using the NASA Shuttle Radar Topography Mission 3-Arc-Second Digital Terrain Elevation Data.

For the PFD contours, no clutter or polarization loss has been assumed and the power spectral density will not increase to accommodate for rain fade.

The Brewster Gateways were modeled using the following earth station parameters provided in Form 312, Schedule B for the 27.5-28.35 GHz band.

|                            |                              |
|----------------------------|------------------------------|
| <b>Site Location</b>       | Brewster, WA                 |
| <b>County</b>              | Okanogan                     |
| <b>Antenna Coordinates</b> | 48° 8'46.35"N 119°41'48.26"W |

| <b>Parameters</b>       | <b>BRW-A01</b> | <b>BRW-A02</b> |
|-------------------------|----------------|----------------|
| Antenna pointing        | 91W            | 125W           |
| Power density (dBW/MHz) | -10.7          | -10.7          |
| Antenna size (m)        | 9.4            | 9.4            |
| Peak gain (dBi)         | 65.8           | 65.8           |
| Elevation (deg)         | 28.1           | 34.4           |

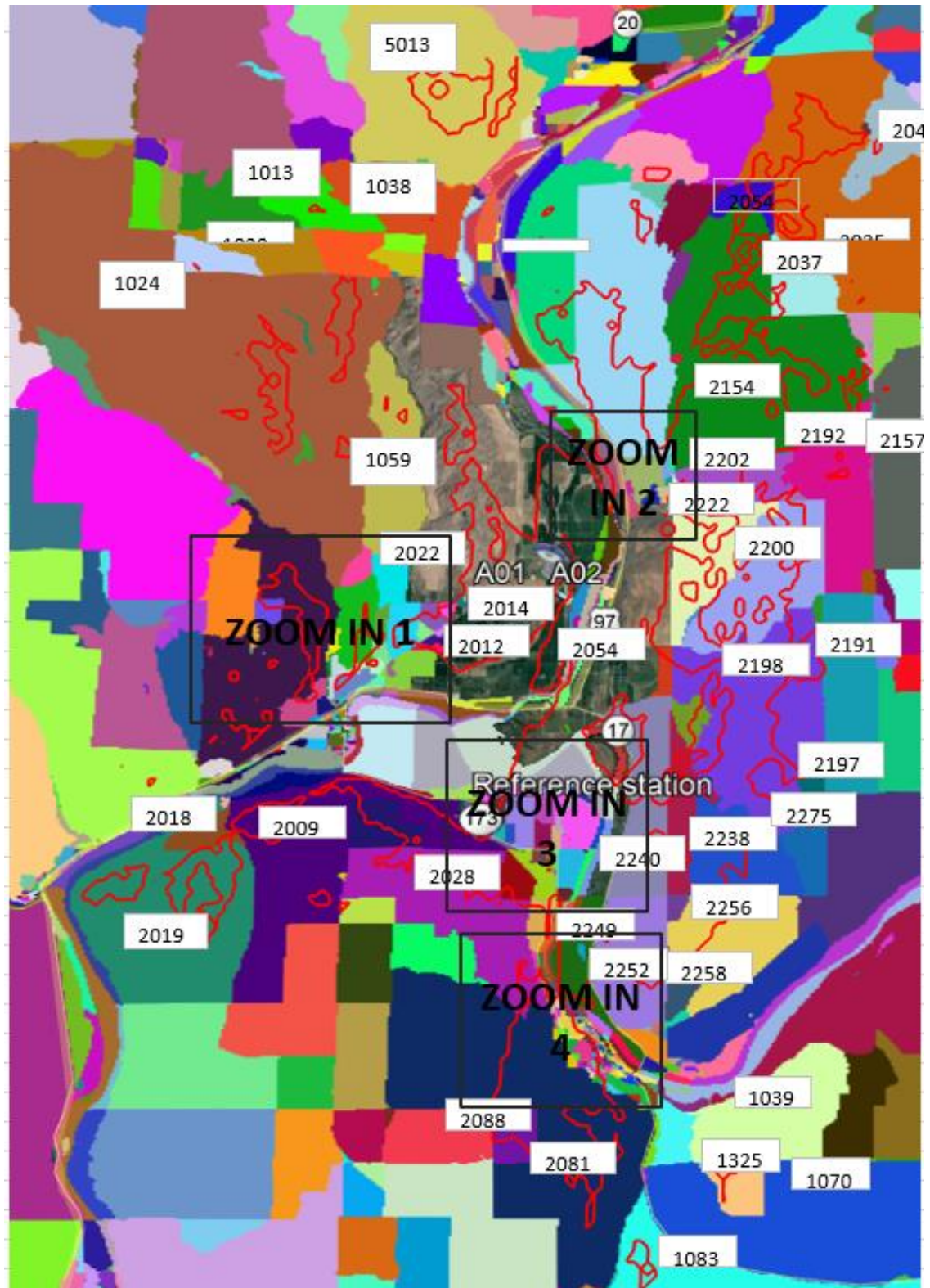
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<sup>20</sup> For more information visit: <https://www.transfinite.com/content/professional>.



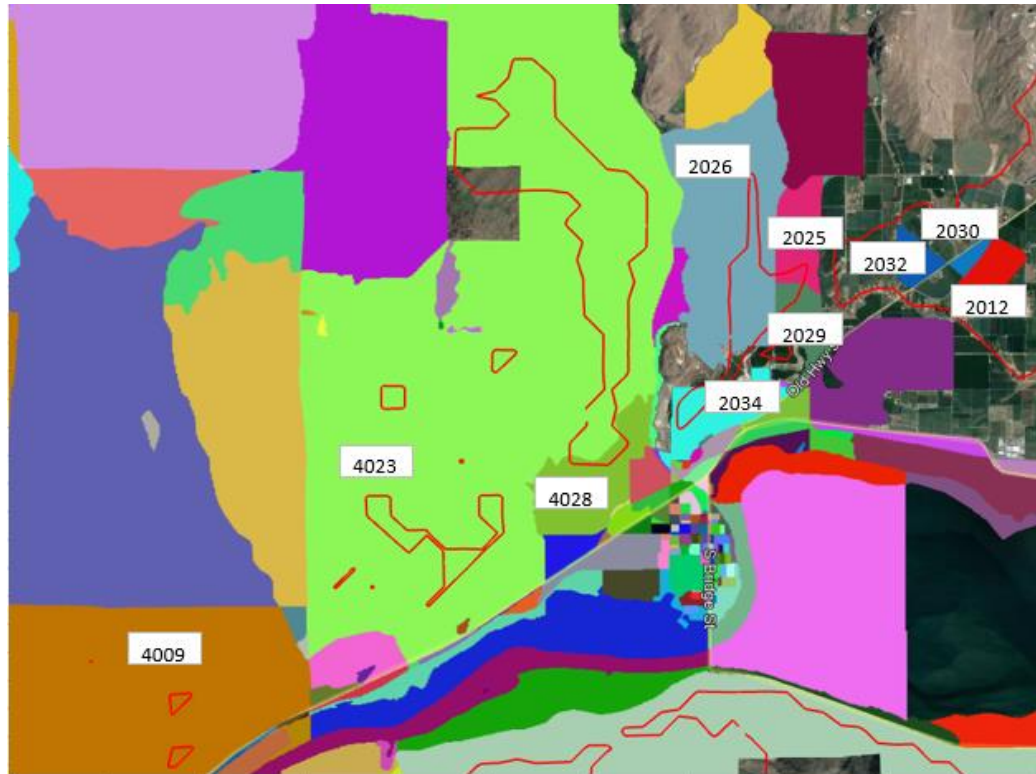
## Appendix B

Figure 1 below has the aggregate PFD contour superimposed with the US census blocks. However due to the large number of census blocks, not all of them can be shown in one image. Different areas of the contours are further zoomed and shown below in Figures 2-5 with the census blocks below.

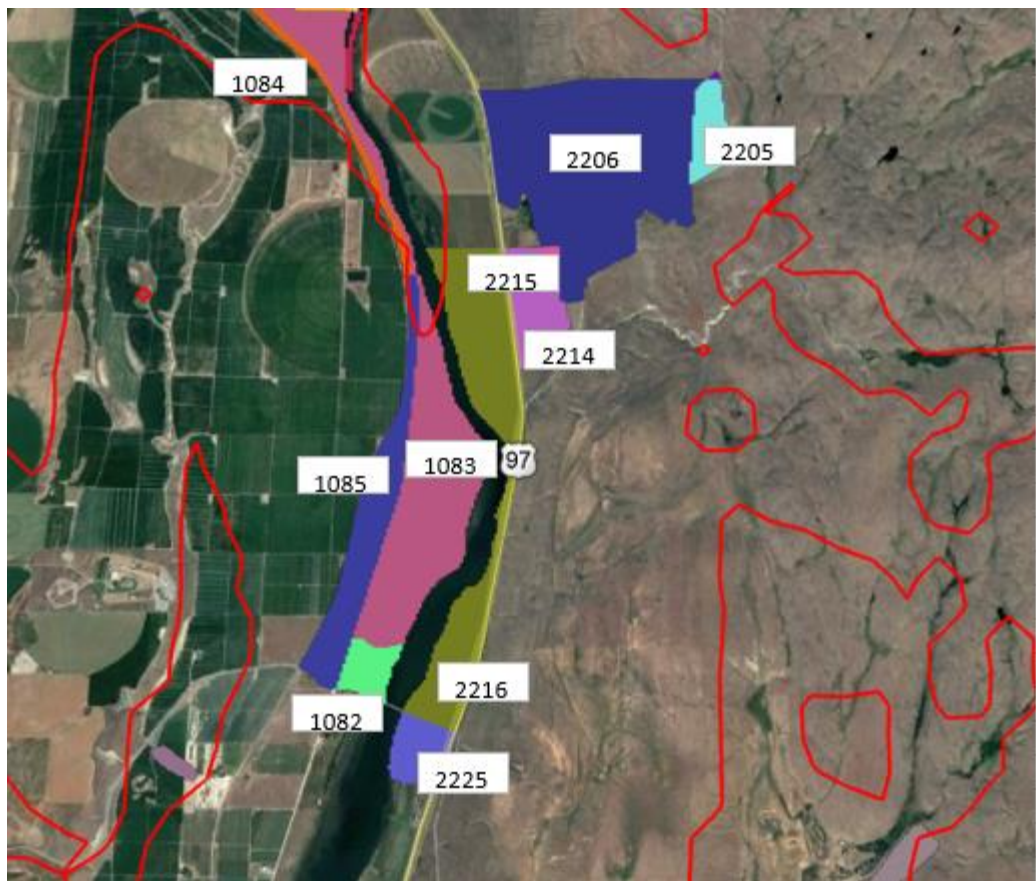




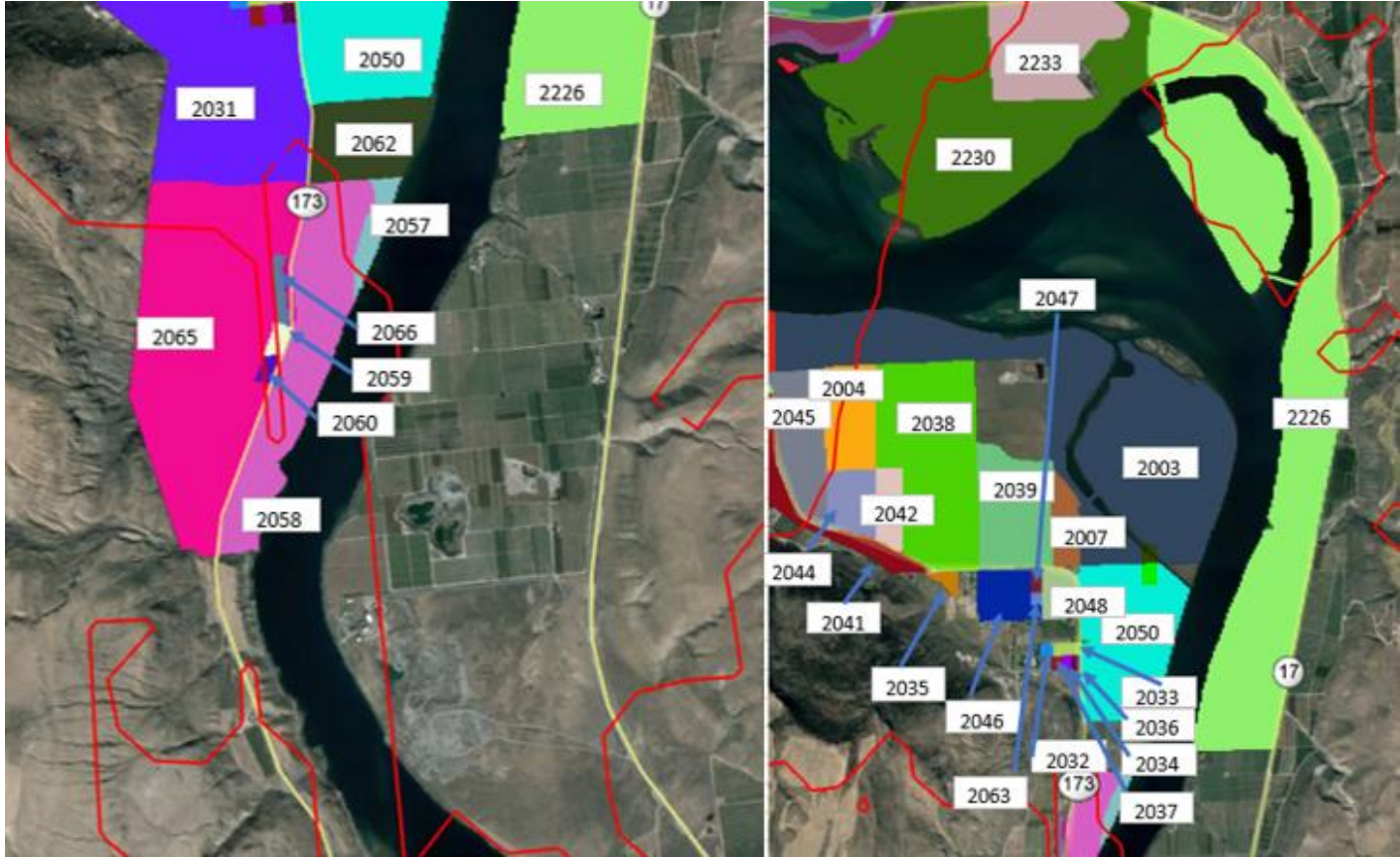
**Figure 1.** Aggregate PFD contour with census blocks overlaid



**Figure 2.** Zoom area 1

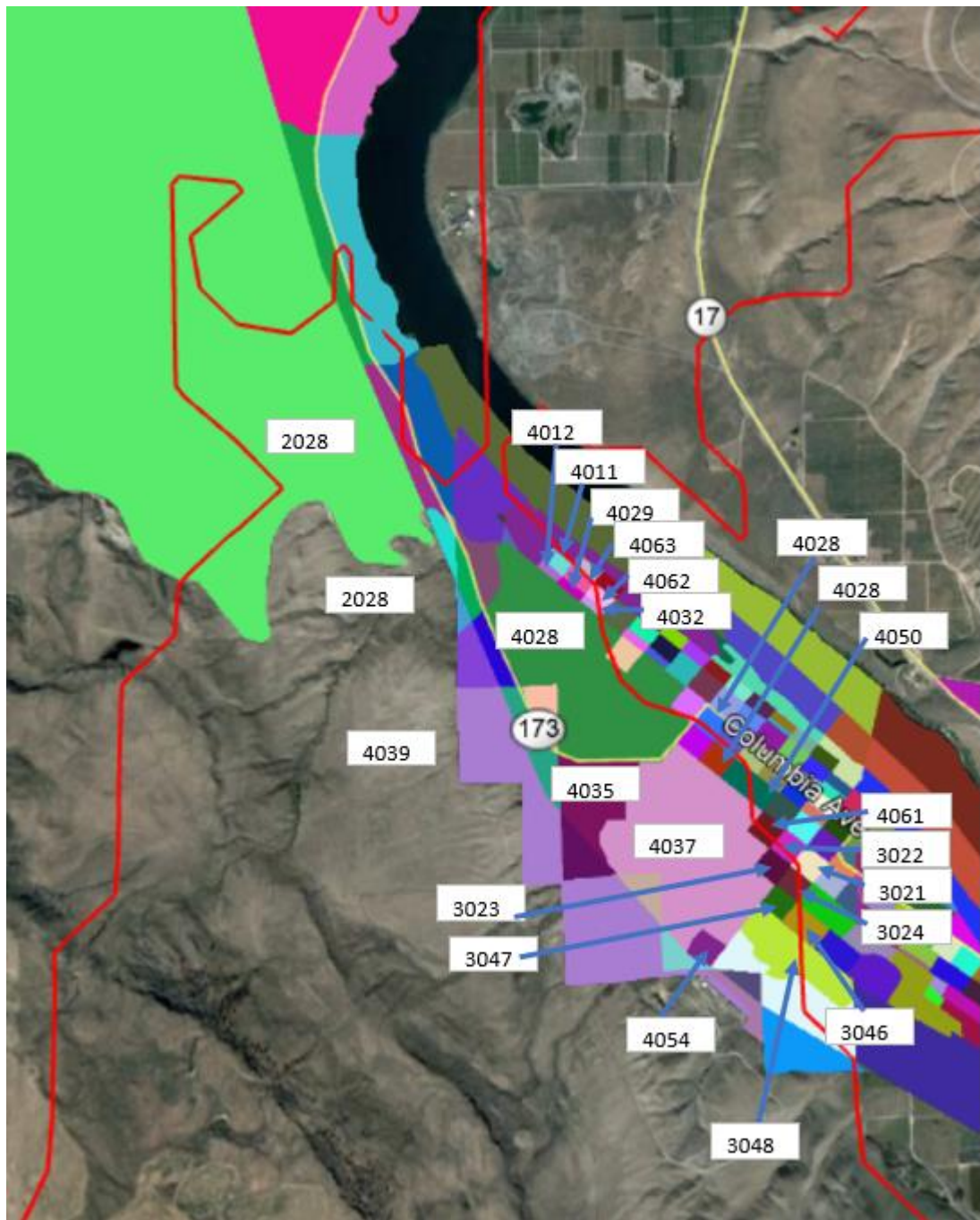


**Figure 3.** Zoom area 2



**Figure 4.** Zoom area 3





**Figure 5.** Zoom area 4



Population and census block data within the grandfathered and aggregate PFD contour is the same. The population per census block/county is provided in the Table below. Population in Okanogan County and Douglas County that falls within the aggregate contour is 775 and 1335, respectively.

| <b>Census block id</b> | <b>Total Population</b> | <b>County</b> | <b>Aggregate Contour Coverage</b> | <b>Population based on aggregate contour coverage</b> |
|------------------------|-------------------------|---------------|-----------------------------------|-------------------------------------------------------|
| <b>Total</b>           | <b>3637</b>             |               |                                   | <b>2110</b>                                           |
| 530471013              | 2                       | Okanogan      | 5%                                | 0                                                     |
| 530471024              | 24                      | Okanogan      | 5%                                | 1                                                     |
| 530471029              | 0                       | Okanogan      | 0%                                | 0                                                     |
| 530471038              | 9                       | Okanogan      | 1%                                | 0                                                     |
| 530171039              | 5                       | Douglas       | 10%                               | 1                                                     |
| 530471042              | 60                      | Okanogan      | 5%                                | 3                                                     |
| 530471050              | 0                       | Okanogan      | 0%                                | 0                                                     |
| 530471051              | 0                       | Okanogan      | 0%                                | 0                                                     |
| 530471052              | 47                      | Okanogan      | 100%                              | 47                                                    |
| 530471053              | 10                      | Okanogan      | 90%                               | 9                                                     |
| 530471059              | 127                     | Okanogan      | 5%                                | 6                                                     |
| 530171070              | 0                       | Douglas       | 0%                                | 0                                                     |
| 530471075              | 33                      | Okanogan      | 78%                               | 26                                                    |
| 530471081              | 0                       | Okanogan      | 0%                                | 0                                                     |
| 530471082              | 4                       | Okanogan      | 100%                              | 4                                                     |
| 530171083              | 0                       | Douglas       | 100%                              | 0                                                     |
| 530471083              | 22                      | Okanogan      | 60%                               | 13                                                    |
| 530471084              | 2                       | Okanogan      | 5%                                | 0                                                     |
| 530471085              | 2                       | Okanogan      | 95%                               | 2                                                     |
| 530171095              | 15                      | Douglas       | 5%                                | 0                                                     |
| 530171325              | 0                       | Douglas       | 0%                                | 0                                                     |
| 530471325              | 0                       | Okanogan      | 0%                                | 0                                                     |
| 530171395              | 0                       | Douglas       | 0%                                | 0                                                     |
| 530472000              | 0                       | Okanogan      | 0%                                | 0                                                     |
| 530472001              | 9                       | Okanogan      | 60%                               | 5                                                     |
| 530472003              | 0                       | Okanogan      | 100%                              | 0                                                     |
| 530172003              | 13                      | Douglas       | 90%                               | 12                                                    |
| 530472004              | 0                       | Okanogan      | 100%                              | 0                                                     |
| 530172004              | 26                      | Douglas       | 75%                               | 20                                                    |
| 530472005              | 0                       | Okanogan      | 0%                                | 0                                                     |
| 530472006              | 0                       | Okanogan      | 0%                                | 0                                                     |
| 530172007              | 84                      | Douglas       | 100%                              | 84                                                    |
| 530172009              | 103                     | Douglas       | 10%                               | 10                                                    |
| 530472011              | 99                      | Okanogan      | 50%                               | 50                                                    |
| 530472012              | 19                      | Okanogan      | 100%                              | 19                                                    |
| 530472013              | 3                       | Okanogan      | 80%                               | 2                                                     |

|           |     |          |      |    |
|-----------|-----|----------|------|----|
| 530472014 | 24  | Okanogan | 70%  | 17 |
| 530472015 | 2   | Okanogan | 100% | 2  |
| 530472016 | 0   | Okanogan | 0%   | 0  |
| 530472018 | 0   | Okanogan | 100% | 0  |
| 530172018 | 33  | Douglas  | 5%   | 2  |
| 530172019 | 56  | Douglas  | 20%  | 11 |
| 530472019 | 10  | Okanogan | 100% | 10 |
| 530472020 | 17  | Okanogan | 90%  | 15 |
| 530472021 | 21  | Okanogan | 60%  | 13 |
| 530472022 | 67  | Okanogan | 60%  | 40 |
| 530472023 | 0   | Okanogan | 0%   | 0  |
| 530472025 | 156 | Okanogan | 15%  | 23 |
| 530472026 | 6   | Okanogan | 20%  | 1  |
| 530472028 | 13  | Okanogan | 20%  | 3  |
| 530472029 | 11  | Okanogan | 30%  | 3  |
| 530472030 | 2   | Okanogan | 100% | 2  |
| 530172031 | 88  | Douglas  | 80%  | 70 |
| 530172032 | 4   | Douglas  | 100% | 4  |
| 530472032 | 4   | Okanogan | 100% | 4  |
| 530172033 | 34  | Douglas  | 100% | 34 |
| 530472033 | 34  | Okanogan | 100% | 34 |
| 530172034 | 15  | Douglas  | 100% | 15 |
| 530472034 | 15  | Okanogan | 100% | 15 |
| 530472035 | 49  | Okanogan | 10%  | 5  |
| 530172035 | 36  | Douglas  | 100% | 36 |
| 530472036 | 0   | Okanogan | 100% | 0  |
| 530172036 | 30  | Douglas  | 100% | 30 |
| 530472037 | 0   | Okanogan | 20%  | 0  |
| 530172037 | 11  | Douglas  | 100% | 11 |
| 530172038 | 57  | Douglas  | 100% | 57 |
| 530472038 | 57  | Okanogan | 100% | 57 |
| 530172039 | 36  | Douglas  | 100% | 36 |
| 530472039 | 36  | Okanogan | 100% | 36 |
| 530472040 | 0   | Okanogan | 0%   | 0  |
| 530172041 | 13  | Douglas  | 20%  | 3  |
| 530472041 | 13  | Okanogan | 20%  | 3  |
| 530172042 | 8   | Douglas  | 100% | 8  |
| 530472042 | 8   | Okanogan | 100% | 8  |
| 530172044 | 12  | Douglas  | 100% | 12 |
| 530172044 | 12  | Douglas  | 100% | 12 |
| 530172045 | 71  | Douglas  | 10%  | 7  |
| 530472045 | 71  | Okanogan | 10%  | 7  |
| 530172046 | 28  | Douglas  | 100% | 28 |
| 530472046 | 28  | Okanogan | 100% | 28 |
| 530172047 | 17  | Douglas  | 100% | 17 |

|           |    |          |      |    |
|-----------|----|----------|------|----|
| 530472047 | 17 | Okanogan | 100% | 17 |
| 530172048 | 4  | Douglas  | 100% | 4  |
| 530472048 | 4  | Okanogan | 100% | 4  |
| 530472049 | 0  | Okanogan | 0%   | 0  |
| 530172050 | 42 | Douglas  | 100% | 42 |
| 530472050 | 42 | Okanogan | 100% | 42 |
| 530172051 | 0  | Douglas  | 100% | 0  |
| 530472051 | 8  | Okanogan | 100% | 8  |
| 530172052 | 0  | Douglas  | 0%   | 0  |
| 530472052 | 53 | Okanogan | 50%  | 27 |
| 530172053 | 0  | Douglas  | 0%   | 0  |
| 530472054 | 7  | Okanogan | 30%  | 2  |
| 530172054 | 0  | Douglas  | 0%   | 0  |
| 530172055 | 0  | Douglas  | 0%   | 0  |
| 530172056 | 0  | Douglas  | 0%   | 0  |
| 530172057 | 9  | Douglas  | 80%  | 7  |
| 530172058 | 72 | Douglas  | 10%  | 7  |
| 530172059 | 16 | Douglas  | 40%  | 6  |
| 530172060 | 32 | Douglas  | 80%  | 26 |
| 530172062 | 2  | Douglas  | 90%  | 2  |
| 530172063 | 6  | Douglas  | 100% | 6  |
| 530172064 | 0  | Douglas  | 0%   | 0  |
| 530172065 | 84 | Douglas  | 10%  | 8  |
| 530172066 | 12 | Douglas  | 1%   | 0  |
| 530172081 | 2  | Douglas  | 30%  | 1  |
| 530172082 | 0  | Douglas  | 0%   | 0  |
| 530172083 | 0  | Douglas  | 0%   | 0  |
| 530172084 | 0  | Douglas  | 0%   | 0  |
| 530172088 | 0  | Douglas  | 0%   | 0  |
| 530472090 | 0  | Okanogan | 0%   | 0  |
| 530472091 | 0  | Okanogan | 0%   | 0  |
| 530472094 | 0  | Okanogan | 0%   | 0  |
| 530472107 | 0  | Okanogan | 0%   | 0  |
| 530472117 | 6  | Okanogan | 20%  | 1  |
| 530472137 | 0  | Okanogan | 0%   | 0  |
| 530472138 | 0  | Okanogan | 0%   | 0  |
| 530472139 | 0  | Okanogan | 0%   | 0  |
| 530472149 | 0  | Okanogan | 50%  | 0  |
| 530472151 | 0  | Okanogan | 0%   | 0  |
| 530472153 | 0  | Okanogan | 100% | 0  |
| 530472154 | 0  | Okanogan | 20%  | 0  |
| 530472157 | 0  | Okanogan | 0%   | 0  |
| 530472191 | 0  | Okanogan | 5%   | 0  |
| 530472192 | 0  | Okanogan | 0%   | 0  |
| 530472197 | 0  | Okanogan | 0%   | 0  |



|           |    |          |      |    |
|-----------|----|----------|------|----|
| 530472198 | 6  | Okanogan | 60%  | 4  |
| 530472199 | 0  | Okanogan | 0%   | 0  |
| 530472200 | 0  | Okanogan | 80%  | 0  |
| 530472201 | 0  | Okanogan | 0%   | 0  |
| 530472202 | 0  | Okanogan | 0%   | 0  |
| 530472203 | 0  | Okanogan | 0%   | 0  |
| 530472204 | 0  | Okanogan | 0%   | 0  |
| 530472205 | 0  | Okanogan | 100% | 0  |
| 530472206 | 6  | Okanogan | 100% | 6  |
| 530472207 | 0  | Okanogan | 0%   | 0  |
| 530472208 | 0  | Okanogan | 0%   | 0  |
| 530472209 | 0  | Okanogan | 0%   | 0  |
| 530472213 | 0  | Okanogan | 0%   | 0  |
| 530472214 | 1  | Okanogan | 100% | 1  |
| 530472215 | 1  | Okanogan | 100% | 1  |
| 530472216 | 6  | Okanogan | 100% | 6  |
| 530472217 | 0  | Okanogan | 0%   | 0  |
| 530472218 | 0  | Okanogan | 0%   | 0  |
| 530472219 | 0  | Okanogan | 0%   | 0  |
| 530472220 | 0  | Okanogan | 0%   | 0  |
| 530472221 | 0  | Okanogan | 0%   | 0  |
| 530472222 | 8  | Okanogan | 80%  | 6  |
| 530472224 | 2  | Okanogan | 90%  | 2  |
| 530472225 | 10 | Okanogan | 100% | 10 |
| 530472226 | 19 | Okanogan | 1%   | 0  |
| 530472227 | 0  | Okanogan | 0%   | 0  |
| 530472228 | 20 | Okanogan | 100% | 20 |
| 530472229 | 16 | Okanogan | 80%  | 13 |
| 530472230 | 46 | Okanogan | 60%  | 28 |
| 530472231 | 0  | Okanogan | 0%   | 0  |
| 530472233 | 6  | Okanogan | 80%  | 5  |
| 530472234 | 0  | Okanogan | 0%   | 0  |
| 530472235 | 0  | Okanogan | 0%   | 0  |
| 530472236 | 0  | Okanogan | 0%   | 0  |
| 530472237 | 0  | Okanogan | 20%  | 0  |
| 530472238 | 3  | Okanogan | 60%  | 2  |
| 530472239 | 0  | Okanogan | 0%   | 0  |
| 530472240 | 5  | Okanogan | 90%  | 5  |
| 530472241 | 0  | Okanogan | 0%   | 0  |
| 530472242 | 0  | Okanogan | 0%   | 0  |
| 530472243 | 0  | Okanogan | 0%   | 0  |
| 530472248 | 0  | Okanogan | 0%   | 0  |
| 530472249 | 45 | Okanogan | 60%  | 27 |
| 530472251 | 0  | Okanogan | 0%   | 0  |

|           |     |          |      |     |
|-----------|-----|----------|------|-----|
| 530472252 | 20  | Okanogan | 60%  | 12  |
| 530472254 | 7   | Okanogan | 1%   | 0   |
| 530472256 | 4   | Okanogan | 30%  | 1   |
| 530472258 | 0   | Okanogan | 20%  | 0   |
| 530472275 | 0   | Okanogan | 0%   | 0   |
| 530173021 | 48  | Douglas  | 10%  | 5   |
| 530173022 | 33  | Douglas  | 25%  | 8   |
| 530173023 | 33  | Douglas  | 100% | 33  |
| 530173024 | 15  | Douglas  | 50%  | 8   |
| 530173046 | 24  | Douglas  | 50%  | 12  |
| 530173047 | 44  | Douglas  | 100% | 44  |
| 530173048 | 31  | Douglas  | 50%  | 16  |
| 530173049 | 0   | Douglas  | 0%   | 0   |
| 530173050 | 0   | Douglas  | 0%   | 0   |
| 530174000 | 0   | Douglas  | 0%   | 0   |
| 530174001 | 0   | Douglas  | 0%   | 0   |
| 530174002 | 0   | Douglas  | 0%   | 0   |
| 530174003 | 0   | Douglas  | 0%   | 0   |
| 530174004 | 0   | Douglas  | 0%   | 0   |
| 530174005 | 0   | Douglas  | 100% | 0   |
| 530174006 | 2   | Douglas  | 100% | 2   |
| 530174008 | 26  | Douglas  | 20%  | 5   |
| 530474009 | 39  | Okanogan | 1%   | 0   |
| 530174010 | 0   | Douglas  | 100% | 0   |
| 530174011 | 11  | Douglas  | 100% | 11  |
| 530174012 | 11  | Douglas  | 100% | 11  |
| 530174017 | 0   | Douglas  | 100% | 0   |
| 530474028 | 37  | Okanogan | 10%  | 4   |
| 530174028 | 361 | Douglas  | 80%  | 289 |
| 530174029 | 11  | Douglas  | 100% | 11  |
| 530174031 | 0   | Douglas  | 0%   | 0   |
| 530174032 | 6   | Douglas  | 75%  | 5   |
| 530174033 | 0   | Douglas  | 0%   | 0   |
| 530174035 | 17  | Douglas  | 100% | 17  |
| 530174036 | 0   | Douglas  | 0%   | 0   |
| 530174037 | 62  | Douglas  | 95%  | 59  |

|           |    |          |      |    |
|-----------|----|----------|------|----|
| 530174038 | 0  | Douglas  | 0%   | 0  |
| 530174039 | 23 | Douglas  | 100% | 23 |
| 530174040 | 21 | Douglas  | 25%  | 5  |
| 530174044 | 13 | Douglas  | 20%  | 3  |
| 530174049 | 46 | Douglas  | 100% | 46 |
| 530174050 | 37 | Douglas  | 60%  | 22 |
| 530174054 | 47 | Douglas  | 100% | 47 |
| 530174061 | 17 | Douglas  | 40%  | 7  |
| 530174062 | 13 | Douglas  | 30%  | 4  |
| 530174063 | 13 | Douglas  | 100% | 13 |
| 530475013 | 39 | Okanogan | 20%  | 8  |

## Appendix C

# Ka-Band Earth Station – Brewster, WA

## Frequency Coordination Report

28 GHz



Prepared on Behalf of  
INTELSAT LICENSE  
LLC

October 5, 2021





## **Table of Contents**

|                                                       |              |
|-------------------------------------------------------|--------------|
| <b>1. Summary of Results</b>                          | <b>- 1 -</b> |
| <b>2. 28 GHz Common Carrier and LTTS Coordination</b> | <b>- 1 -</b> |
| <b>3. 28 GHz UMFUS Coordination</b>                   | <b>- 2 -</b> |
| <b>4. Earth Station Coordination Data</b>             | <b>- 3 -</b> |
| <b>5. Contact Information</b>                         | <b>- 5 -</b> |

## 1. Summary of Results

On behalf of INTELSAT LICENSE LLC, 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 Brewster, WA, which will transmit at 28 GHz<sup>1</sup>. 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, 2021.

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 Brewster, WA 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 |
|----------|----------------------------|
| Frontier | Nationwide                 |

A notification letter and datasheets for the Ka-Band earth station in Brewster, WA 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.

<sup>1</sup> The proposed earth station will operate in the 27.5 – 29.1 GHz & 29.25 – 29.5 GHz portion of the Ka-Band.

### 3. 28 GHz UMFUS Coordination

There were two 28 GHz UMFUS licensees 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

| UMFUS Licensee | Authorized Geographic Area |
|----------------|----------------------------|
| DISH Network   | 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 Brewster, WA. This data was circulated to all incumbent licensees in the shared 28 GHz frequency ranges.



#### Administrative Information

|               |                      |
|---------------|----------------------|
| Status        | ENGINEER PROPOSAL    |
| Call Sign     | BREWSTER             |
| Licensee Code | INTELS               |
| Licensee Name | Intelsat License LLC |

#### Site Information

#### BREWSTER, WA

|                         |                      |
|-------------------------|----------------------|
| Venue Name              |                      |
| Latitude (NAD 83)       | 48° 8' 46.3" N       |
| Longitude (NAD 83)      | 119° 41' 48.3" W     |
| Climate Zone            | A                    |
| Rain Zone               | 5                    |
| Ground Elevation (AMSL) | 384.14 m / 1260.3 ft |

#### Link Information

|                                |                              |
|--------------------------------|------------------------------|
| Satellite Type                 | Geostationary                |
| Mode                           | TR - Transmit-Receive        |
| Modulation                     | Digital                      |
| Satellite Arc                  | 91° W to 125° West Longitude |
| Azimuth Range                  | 143.7° to 187.1°             |
| Corresponding Elevation Angles | 28.2° / 34.5°                |
| Antenna Centerline (AGL)       | 10.0 m / 32.8 ft             |

#### Antenna Information

#### Receive - FCC32

#### Transmit - FCC32

|                                    |                  |                          |
|------------------------------------|------------------|--------------------------|
| Manufacturer                       | ASC              | ASC                      |
| Model                              | 9.4m-Ka          | 9.4m-Ka                  |
| Gain / Diameter                    | 62.0 dBi / 9.4 m | 65.8 dBi / 9.4 m         |
| 3-dB / 15-dB Beamwidth             | 0.50° / 1.00°    | 1.10° / 2.20°            |
| Max Available RF Power (dBW/4 kHz) |                  | -24.6                    |
|                                    |                  | -0.6                     |
| Maximum EIRP (dBW/4 kHz)           |                  | 41.2                     |
|                                    |                  | 65.2                     |
| Interference Objectives:           | Long Term        | -156.0 dBW/MHz 20%       |
|                                    | Short Term       | -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)       | 1M00G7W - 140MG7W / 17800.0 - 18800.0 | 1M00G7W - 140MG7W / 27500.0 - 29100.0 |
|                                        | 1M00G7W - 140MG7W / 19200.0 - 19400.0 | 1M00G7W - 140MG7W / 29250.0 - 29500.0 |
|                                        | 1M00G7W - 140MG7W / 19600.0 - 20200.0 |                                       |
| Max Great Circle Coordination Distance | 153.2 km / 95.2 mi                    | 100.0 km / 62.1 mi                    |
| Precipitation Scatter Contour Radius   | 100.0 km / 62.1 mi                    | 100.0 km / 62.1 mi                    |

## **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                                    |
| Web site:       | <a href="http://www.comsearch.com">www.comsearch.com</a> |

# FREQUENCY COORDINATION AND INTERFERENCE ANALYSIS REPORT

Prepared for  
**Intelsat License LLC**  
**BREWSTER, WA**  
**Satellite Earth Station**

Prepared By:  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147  
September 14, 2021

## TABLE OF CONTENTS

|                                         |    |
|-----------------------------------------|----|
| 1. CONCLUSIONS .....                    | 3  |
| 2. SUMMARY OF RESULTS .....             | 4  |
| 3. SUPPLEMENTAL SHOWING .....           | 5  |
| 4. EARTH STATION COORDINATION DATA..... | 6  |
| 5. CERTIFICATION.....                   | 10 |

## **1. CONCLUSIONS**

An interference study considering all existing, proposed and prior coordinated microwave facilities within the coordination contours of the proposed earth station demonstrates that this site will operate satisfactorily with the common carrier microwave environment. Further, there will be no restrictions of its operation due to interference considerations.



## **2. SUMMARY OF RESULTS**

A number of great circle interference cases were identified during the interference study of the proposed earth station. Each of the cases, which exceeded the interference objective on a line-of-sight basis, was profiled and the propagation losses estimated using NBS TN101 (Revised) techniques. The losses were found to be sufficient to reduce the signal levels to acceptable magnitudes in every case.

### 3. SUPPLEMENTAL SHOWING

Pursuant to Part 25.203(c) of the FCC Rules and Regulations, the satellite earth station proposed in this application was coordinated by Comsearch using computer techniques and in accordance with Part 25 of the FCC Rules and Regulations.

Coordination data for this earth station was sent to the below listed carriers with a letter dated 08/17/2021.

Company

Cellco Partnership - Washington  
CenturyTel of Washington, Inc.  
Colville Confederated Tribes  
Computer 5, Inc.  
Confluence Health  
EcliptixNet Broadband, Inc.  
Medicine Wheel Website Design, Inc.  
Multi Agency Communications Center  
NCI Datacom, Inc.  
New Cingular Wireless PCS LLC-Washington  
Pick Two LLC  
Public Utility District No 1 of Okanogan  
Qwest Corporation  
Sprint Spectrum LLC  
Startouch, Inc.  
Symplified Technologies, LLC  
T-Mobile License LLC  
US Electrodynamics, Inc.  
Washington State of Dept of Transportat  
Washington, State of  
Wavedivision I, LLC  
Wholesail Networks LLC

## **4. EARTH STATION COORDINATION DATA**

This section presents the data pertinent to frequency coordination of the proposed earth station that was circulated to all carriers within its coordination contours.

# COMSEARCH

## Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147  
(703)726-5500 <http://www.comsearch.com>

Date: 09/14/2021  
Job Number: 210817COMSGE05

### Administrative Information

Status ENGINEER PROPOSAL  
Call Sign BREWSTER  
Licensee Code INTELS  
Licensee Name Intelsat License LLC

### Site Information BREWSTER, WA

Venue Name  
Latitude (NAD 83) 48° 8' 46.3" N  
Longitude (NAD 83) 119° 41' 48.3" W  
Climate Zone A  
Rain Zone 5  
Ground Elevation (AMSL) 384.14 m / 1260.3 ft

### Link Information

Satellite Type Geostationary  
Mode TR - Transmit-Receive  
Modulation Digital  
Satellite Arc 91° W to 125° West Longitude  
Azimuth Range 143.7° to 187.1°  
Corresponding Elevation Angles 28.2° / 34.5°  
Antenna Centerline (AGL) 10.0 m / 32.8 ft

### Antenna Information

#### Receive - FCC32

#### Transmit - FCC32

|                                    |                  |                      |                          |
|------------------------------------|------------------|----------------------|--------------------------|
| Manufacturer                       | ASC              | ASC                  |                          |
| Model                              | 9.4m-Ka          | 9.4m-Ka              |                          |
| Gain / Diameter                    | 62.0 dBi / 9.4 m | 65.8 dBi / 9.4 m     |                          |
| 3-dB / 15-dB Beamwidth             | 0.50° / 1.00°    | 1.10° / 2.20°        |                          |
| Max Available RF Power (dBW/4 kHz) | -24.6            | -24.6                |                          |
| (dBW/MHz)                          | -0.6             | -0.6                 |                          |
| Maximum EIRP (dBW/4 kHz)           | 41.2             | 41.2                 |                          |
| (dBW/MHz)                          | 65.2             | 65.2                 |                          |
| 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)       | 1M00G7W - 140MG7W / 17800.0 - 18800.0 | 1M00G7W - 140MG7W / 27500.0 - 29100.0 |
|                                        | 1M00G7W - 140MG7W / 19200.0 - 19400.0 | 1M00G7W - 140MG7W / 29250.0 - 29500.0 |
|                                        | 1M00G7W - 140MG7W / 19600.0 - 20200.0 |                                       |
| Max Great Circle Coordination Distance | 153.2 km / 95.2 mi                    | 100.0 km / 62.1 mi                    |
| Precipitation Scatter Contour Radius   | 100.0 km / 62.1 mi                    | 100.0 km / 62.1 mi                    |

# COMSEARCH

## Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147  
(703)726-5500 <http://www.comsearch.com>

### Coordination Values

### BREWSTER, WA

Licensee Name Intelsat License LLC  
Latitude (NAD 83) 48° 8' 46.3" N  
Longitude (NAD 83) 119° 41' 48.3" W  
Ground Elevation (AMSL) 384.14 m / 1260.3 ft  
Antenna Centerline (AGL) 10.0 m / 32.8 ft  
Antenna Model ASC 9.4 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 -24.6 (dBW/4 kHz)

| Azimuth (°) | Horizon<br>Elevation (°) | Antenna<br>Discrimination (°) | Receive 18.0 GHz      |                               | Transmit 28.0 GHz     |                               |
|-------------|--------------------------|-------------------------------|-----------------------|-------------------------------|-----------------------|-------------------------------|
|             |                          |                               | Horizon<br>Gain (dBi) | Coordination<br>Distance (km) | Horizon<br>Gain (dBi) | Coordination<br>Distance (km) |
| 0           | 0.00                     | 135.27                        | -10.00                | 136.18                        | -10.00                | 100.00                        |
| 5           | 0.76                     | 131.82                        | -10.00                | 103.28                        | -10.00                | 100.00                        |
| 10          | 0.44                     | 127.70                        | -10.00                | 118.48                        | -10.00                | 100.00                        |
| 15          | 0.60                     | 123.65                        | -10.00                | 110.07                        | -10.00                | 100.00                        |
| 20          | 1.59                     | 119.74                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 25          | 0.76                     | 115.23                        | -10.00                | 103.19                        | -10.00                | 100.00                        |
| 30          | 0.36                     | 110.82                        | -10.00                | 124.77                        | -10.00                | 100.00                        |
| 35          | 0.56                     | 106.50                        | -10.00                | 111.77                        | -10.00                | 100.00                        |
| 40          | 0.86                     | 102.14                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 45          | 0.80                     | 97.71                         | -10.00                | 101.72                        | -10.00                | 100.00                        |
| 50          | 1.45                     | 93.30                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 55          | 1.28                     | 88.83                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 60          | 1.61                     | 84.36                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 65          | 1.86                     | 79.87                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 70          | 1.93                     | 75.41                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 75          | 2.16                     | 70.94                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 80          | 2.42                     | 66.47                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 85          | 2.37                     | 62.10                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 90          | 2.54                     | 57.73                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 95          | 2.66                     | 53.43                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 100         | 2.49                     | 49.33                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 105         | 2.17                     | 45.45                         | -9.44                 | 100.00                        | -9.44                 | 100.00                        |
| 110         | 2.05                     | 41.66                         | -8.49                 | 100.00                        | -8.49                 | 100.00                        |
| 115         | 1.88                     | 38.13                         | -7.53                 | 100.00                        | -7.53                 | 100.00                        |
| 120         | 1.99                     | 34.73                         | -6.52                 | 100.00                        | -6.52                 | 100.00                        |
| 125         | 1.59                     | 32.09                         | -5.66                 | 100.00                        | -5.66                 | 100.00                        |
| 130         | 1.03                     | 30.15                         | -4.98                 | 105.39                        | -4.98                 | 100.00                        |
| 135         | 0.53                     | 28.86                         | -4.51                 | 127.22                        | -4.51                 | 100.00                        |
| 140         | 0.31                     | 28.08                         | -4.21                 | 143.92                        | -4.21                 | 100.00                        |
| 145         | 0.00                     | 28.19                         | -4.25                 | 153.23                        | -4.25                 | 100.00                        |
| 150         | 0.00                     | 28.80                         | -4.49                 | 152.48                        | -4.49                 | 100.00                        |
| 155         | 0.00                     | 30.17                         | -4.99                 | 150.89                        | -4.99                 | 100.00                        |
| 160         | 0.00                     | 31.76                         | -5.55                 | 149.15                        | -5.55                 | 100.00                        |
| 165         | 0.00                     | 33.03                         | -5.97                 | 147.85                        | -5.97                 | 100.00                        |
| 170         | 0.00                     | 33.96                         | -6.27                 | 146.93                        | -6.27                 | 100.00                        |
| 175         | 0.00                     | 34.52                         | -6.45                 | 146.39                        | -6.45                 | 100.00                        |
| 180         | 0.00                     | 34.71                         | -6.51                 | 146.21                        | -6.51                 | 100.00                        |
| 185         | 0.00                     | 34.53                         | -6.45                 | 146.38                        | -6.45                 | 100.00                        |

# COMSEARCH

## Earth Station Data Sheet

19700 Janelia Farm Boulevard, Ashburn, VA 20147  
(703)726-5500 <http://www.comsearch.com>

### Coordination Values

### BREWSTER, WA

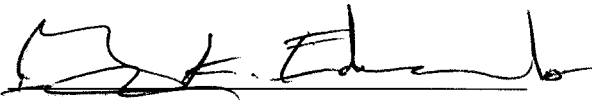
|                                    |                      |       |  |                   |         |
|------------------------------------|----------------------|-------|--|-------------------|---------|
| Licensee Name                      | Intelsat License LLC |       |  |                   |         |
| Latitude (NAD 83)                  | 48° 8' 46.3" N       |       |  |                   |         |
| Longitude (NAD 83)                 | 119° 41' 48.3" W     |       |  |                   |         |
| Ground Elevation (AMSL)            | 384.14 m / 1260.3 ft |       |  |                   |         |
| Antenna Centerline (AGL)           | 10.0 m / 32.8 ft     |       |  |                   |         |
| Antenna Model                      | ASC 9.4 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             |                      |       |  | -24.6 (dBW/4 kHz) |         |

| Azimuth (°) | Horizon<br>Elevation (°) | Antenna<br>Discrimination (°) | Receive 18.0 GHz      |                               | Transmit 28.0 GHz     |                               |
|-------------|--------------------------|-------------------------------|-----------------------|-------------------------------|-----------------------|-------------------------------|
|             |                          |                               | Horizon<br>Gain (dBi) | Coordination<br>Distance (km) | Horizon<br>Gain (dBi) | Coordination<br>Distance (km) |
| 190         | 0.00                     | 34.58                         | -6.47                 | 146.33                        | -6.47                 | 100.00                        |
| 195         | 0.00                     | 35.26                         | -6.68                 | 145.70                        | -6.68                 | 100.00                        |
| 200         | 0.00                     | 36.53                         | -7.07                 | 144.56                        | -7.07                 | 100.00                        |
| 205         | 0.00                     | 38.33                         | -7.59                 | 143.01                        | -7.59                 | 100.00                        |
| 210         | 0.00                     | 40.59                         | -8.21                 | 141.21                        | -8.21                 | 100.00                        |
| 215         | 0.00                     | 43.23                         | -8.90                 | 139.25                        | -8.90                 | 100.00                        |
| 220         | 0.00                     | 46.20                         | -9.62                 | 137.24                        | -9.62                 | 100.00                        |
| 225         | 0.00                     | 49.42                         | -10.00                | 136.18                        | -10.00                | 100.00                        |
| 230         | 0.00                     | 52.85                         | -10.00                | 136.18                        | -10.00                | 100.00                        |
| 235         | 0.00                     | 56.45                         | -10.00                | 136.18                        | -10.00                | 100.00                        |
| 240         | 0.00                     | 60.18                         | -10.00                | 136.18                        | -10.00                | 100.00                        |
| 245         | 0.94                     | 63.71                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 250         | 2.01                     | 67.40                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 255         | 3.21                     | 71.24                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 260         | 2.48                     | 75.56                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 265         | 2.40                     | 79.77                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 270         | 3.30                     | 83.93                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 275         | 3.64                     | 88.20                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 280         | 3.68                     | 92.49                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 285         | 3.64                     | 96.78                         | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 290         | 3.40                     | 101.02                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 295         | 2.90                     | 105.18                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 300         | 1.67                     | 109.09                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 305         | 2.08                     | 113.27                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 310         | 2.58                     | 117.46                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 315         | 1.78                     | 121.13                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 320         | 1.53                     | 124.84                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 325         | 1.67                     | 128.58                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 330         | 1.90                     | 132.23                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 335         | 1.68                     | 135.41                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 340         | 1.98                     | 138.67                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 345         | 1.76                     | 141.22                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 350         | 1.11                     | 142.97                        | -10.00                | 100.00                        | -10.00                | 100.00                        |
| 355         | 0.00                     | 138.87                        | -10.00                | 136.18                        | -10.00                | 100.00                        |



## 5. CERTIFICATION

I HEREBY CERTIFY THAT I AM THE TECHNICALLY QUALIFIED PERSON RESPONSIBLE FOR THE PREPARATION OF THE FREQUENCY COORDINATION DATA CONTAINED IN THIS APPLICATION, THAT I AM FAMILIAR WITH PARTS 101 AND 25 OF THE FCC RULES AND REGULATIONS, THAT I HAVE EITHER PREPARED OR REVIEWED THE FREQUENCY COORDINATION DATA SUBMITTED WITH THIS APPLICATION, AND THAT IT IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: 

Gary K. Edwards  
Senior Manager  
COMSEARCH  
19700 Janelia Farm Boulevard  
Ashburn, VA 20147

DATED: September 14, 2021