

Narrative
SSC Space (dba USN) Support TTC & Data Downlink
Operations of Pixxel's Firefly from its Alaska Station
Antennas GAIA-1 and GAIA-2

Pixxel's Firefly constellation is a commercial hyperspectral Earth-observation mission owned and operated by Pixxel, a California-based company with strong roots in Bengaluru, India, founded by Awais Ahmed and Kshitij Khandelwal. Conceived as a "health monitor for the planet," Firefly is designed to provide daily global coverage with unprecedented spectral detail, enabling monitoring of agriculture, climate, water quality, and industrial activity.

The satellite's commercial-, ITU- and constellation-name is Firefly, owned and operated by Pixxel (<https://pixxel.space/firefly>), World's Highest-Resolution Hyperspectral Satellites. Not to be confused with Firefly Blue Ghost or Firefly Elytra

The constellation was launched in two phases during 2025: the first three satellites were deployed on January 14, 2025 aboard SpaceX's Transporter-12 rideshare mission from Vandenberg Space Force Base, and another three satellites followed on August 26–27, 2025 aboard a Falcon 9 NAOS mission, also from Vandenberg. Together these six spacecraft form Phase 1 of Firefly, establishing Pixxel's first operational commercial fleet.

Each Firefly satellite is a ~50 kg class spacecraft equipped with advanced hyperspectral sensors capable of capturing more than 135 narrow spectral bands in the visible and near-infrared range (450–900 nm) with a spatial resolution of about 5 meters and a swath width of 40 kilometers. Operating in sun-synchronous orbit at altitudes around 550–589 kilometers with an inclination of 97.65°, the constellation achieves revisit times of less than seven days within $\pm 30^\circ$ latitude and less than four days above or below that range, effectively enabling daily global coverage. Each satellite is designed for a multi-year operational lifetime, typically three to five years, and Firefly is intended to scale to a 24-satellite constellation to achieve true daily hyperspectral monitoring worldwide.

This application is to support TTC operations, including initial testings, for a period of 180 days commencing on Oct. 1st, 2026.

The frequency coordination report will be provided as soon as it is ready.

Uplink Parameters

Polarization¹ and Frequencies²					(C6a)
Beam Designation	Polarization	Center Freq. [MHz]	Min Freq. [MHz]	Max Freq. [MHz]	Occupied BW [kHz]
SBTC	M	2100	2094.7	2105.3	600

Data Rate and Modulation³

Beam Designation	Design. of Emission ⁴ (C7a)	Data Rate ⁵		Modulation	PCM code
SBTC	600KG2D--	512	kbps	GMSK	NRZ-L

Earth Station Output Power	
Output EIRP (C10d3 + C8a1/C8b1)	Click here to enter text. dBW
Output power at the Antenna Feed (C8a1/C8b1)	20 dBW

Downlink Parameters

Polarization ¹ and Frequencies ² (C6a)					
Beam Designation	Polarization	Center Freq. [MHz]	Min Freq. [MHz]	Max Freq. [MHz]	Occupied BW [kHz]
BEACON	M	2243	2237.7	2248.3	600
SBTM	M	2243	2237.7	2248.3	600
XBDATA01	M	8200	8100	8300	200000
XBDATA02	M	8200	8175	8225	50000

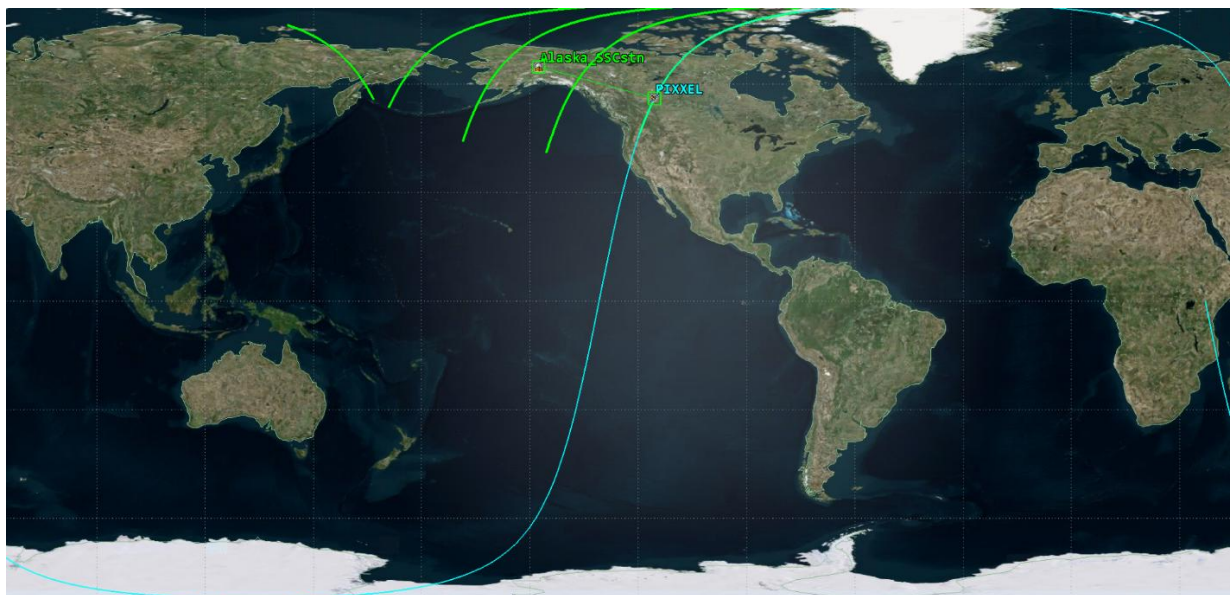
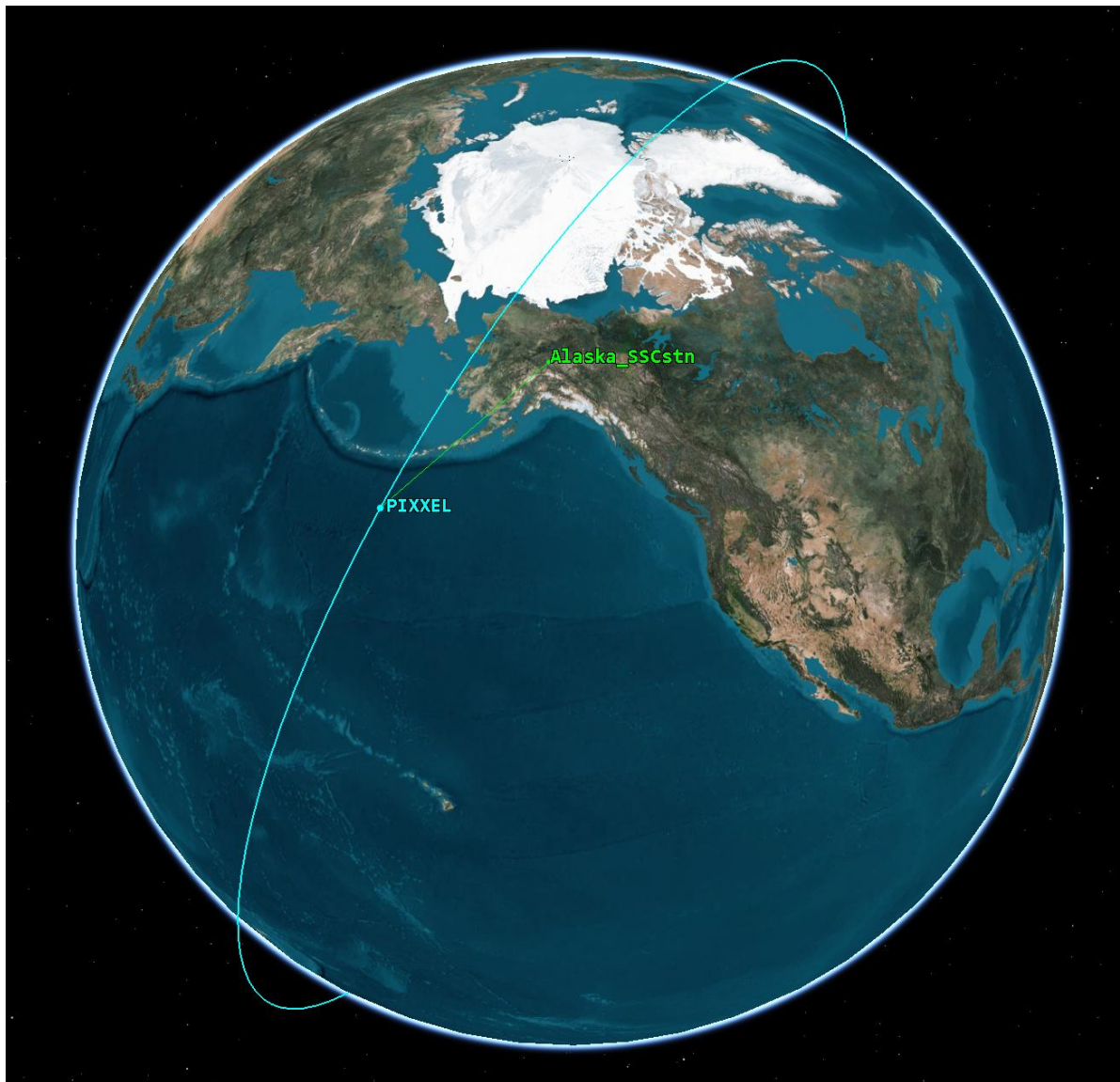
Data Rate and Modulation ³					
Beam Designation	Design. of Emission ⁴ (C7a)	Data Rate ⁵ (not in ITU)		Modulation (not in ITU)	TM Subcarrier Freq. (not in ITU)
BEACON	600KG2D--	D/L DR	Unit.	D/L Modulation	TM Subc Freq.kHz
SBTM	600KG2D--	512	kbps	GMSK	2238000kHz
XBDATA01	200MG2D--	700	Mbps	DVB-S2X	8100000kHz
XBDATA02	50M0G2D--	700	Mbps	DVB-S2X	8100000kHz

Satellite EIRP and Maximum Power Density
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Beam Designation	Satellite EIRP (C8a1/C8b1 + B3a1)	Maximum Power Density (C8a2/C8b2)
BEACON	6.4 dBW	-57.8 dBW/Hz
SBTM	6.4 dBW	-57.8 dBW/Hz
XBDATA01	24.8 dBW	-76 dBW/Hz
XBDATA02	16.2 dBW	-72.2 dBW/Hz

Spacecraft Output Power	
Maximum spacecraft output power (C8a1/C8b1)	19.8 dBW
Maximum downlink EIRP (C8a1/C8b1 + B3a1)	19.8 dBW

PIXXEL's FIREFLY Visibility from Alaska and Access Summary Report



6 Jul 2026 09:48:19

Facility-Alaska_SSCstn-To-Satellite-PIXXEL's FIREFLY Access Summary Report

Alaska_SSCstn-To-PIXXEL's FIREFLY - Alaska SSC Earth Stn

Access (sec)	Start Time (YYYY:MM:DD)	Stop Time (YYYY:MM:DD)	Duration
1	2026:09:01:10:49:14.544	2026:09:01:10:55:13.497	358.953
2	2026:09:01:19:02:35.104	2026:09:01:19:12:24.177	589.073
3	2026:09:01:20:37:57.166	2026:09:01:20:50:23.268	746.103
4	2026:09:01:22:13:35.606	2026:09:01:22:26:03.840	748.234
5	2026:09:01:23:49:07.693	2026:09:02:00:00:05.386	657.693
6	2026:09:02:01:24:09.348	2026:09:02:01:33:16.605	547.257
7	2026:09:02:02:58:08.225	2026:09:02:03:06:53.084	524.859
8	2026:09:02:04:31:19.056	2026:09:02:04:41:36.592	617.536
9	2026:09:02:06:04:56.650	2026:09:02:06:17:01.739	725.089
10	2026:09:02:07:39:59.628	2026:09:02:07:52:40.126	760.498
11	2026:09:02:09:17:06.108	2026:09:02:09:28:11.505	665.397
12	2026:09:02:10:57:31.507	2026:09:02:11:02:38.482	306.975
13	2026:09:02:19:10:11.656	2026:09:02:19:20:21.603	609.947
14	2026:09:02:20:45:36.456	2026:09:02:20:58:07.455	750.999
15	2026:09:02:22:21:15.063	2026:09:02:22:33:38.734	743.671
16	2026:09:02:23:56:45.756	2026:09:03:00:07:34.052	648.296
17	2026:09:03:01:31:43.485	2026:09:03:01:40:44.285	540.800
18	2026:09:03:03:05:36.772	2026:09:03:03:14:25.724	528.952
19	2026:09:03:04:38:46.818	2026:09:03:04:49:13.899	627.081
20	2026:09:03:06:12:29.543	2026:09:03:06:24:40.946	731.403
21	2026:09:03:07:47:41.072	2026:09:03:08:00:19.520	758.447
22	2026:09:03:09:24:59.352	2026:09:03:09:35:49.150	649.798
23	2026:09:03:11:05:55.006	2026:09:03:11:09:57.545	242.539
24	2026:09:03:17:44:22.344	2026:09:03:17:46:25.188	122.844
25	2026:09:03:19:17:48.459	2026:09:03:19:28:17.489	629.030
26	2026:09:03:20:53:15.625	2026:09:03:21:05:50.607	754.982
27	2026:09:03:22:28:54.289	2026:09:03:22:41:12.816	738.527
28	2026:09:04:00:04:23.426	2026:09:04:00:15:02.219	638.793
29	2026:09:04:01:39:16.989	2026:09:04:01:48:12.014	535.025
30	2026:09:04:03:13:04.815	2026:09:04:03:21:58.652	533.837
31	2026:09:04:04:46:14.623	2026:09:04:04:56:51.261	636.638
32	2026:09:04:06:20:02.828	2026:09:04:06:32:20.036	737.207
33	2026:09:04:07:55:23.127	2026:09:04:08:07:58.677	755.550
34	2026:09:04:09:32:53.593	2026:09:04:09:43:26.292	632.699
35	2026:09:04:11:14:32.489	2026:09:04:11:17:03.233	150.743
36	2026:09:04:17:51:22.120	2026:09:04:17:55:08.700	226.580
37	2026:09:04:19:25:25.453	2026:09:04:19:36:11.916	646.463
38	2026:09:04:21:00:54.673	2026:09:04:21:13:32.745	758.072
39	2026:09:04:22:36:33.262	2026:09:04:22:48:46.105	732.843
40	2026:09:05:00:12:00.686	2026:09:05:00:22:29.935	629.249
41	2026:09:05:01:46:49.844	2026:09:05:01:55:39.825	529.981
42	2026:09:05:03:20:32.403	2026:09:05:03:29:31.860	539.457

43	2026:09:05:04:53:42.510	2026:09:05:05:04:28.664	646.155
44	2026:09:05:06:27:36.525	2026:09:05:06:39:58.993	742.468
45	2026:09:05:08:03:05.823	2026:09:05:08:15:37.589	751.766
46	2026:09:05:09:40:48.883	2026:09:05:09:51:02.882	613.999
47	2026:09:05:17:58:38.973	2026:09:05:18:03:33.740	294.767
48	2026:09:05:19:33:02.582	2026:09:05:19:44:04.942	662.360
49	2026:09:05:21:08:33.573	2026:09:05:21:21:13.876	760.303
50	2026:09:05:22:44:11.982	2026:09:05:22:56:18.619	726.637
51	2026:09:06:00:19:37.523	2026:09:06:00:29:57.225	619.702
52	2026:09:06:01:54:22.041	2026:09:06:02:03:07.761	525.719
53	2026:09:06:03:27:59.565	2026:09:06:03:37:05.333	545.768
54	2026:09:06:05:01:10.514	2026:09:06:05:12:06.082	655.568
55	2026:09:06:06:35:10.658	2026:09:06:06:47:37.822	747.164
56	2026:09:06:08:10:49.163	2026:09:06:08:23:16.244	747.082
57	2026:09:06:09:48:45.303	2026:09:06:09:58:38.863	593.560
58	2026:09:06:18:06:02.232	2026:09:06:18:11:50.998	348.766
59	2026:09:06:19:40:39.803	2026:09:06:19:51:56.635	676.832
60	2026:09:06:21:16:12.326	2026:09:06:21:28:54.037	761.712
61	2026:09:06:22:51:50.434	2026:09:06:23:03:50.385	719.951
62	2026:09:07:00:27:13.910	2026:09:07:00:37:24.133	610.223
63	2026:09:07:02:01:53.564	2026:09:07:02:10:35.863	522.298
64	2026:09:07:03:35:26.353	2026:09:07:03:44:39.048	552.695
65	2026:09:07:05:08:38.670	2026:09:07:05:19:43.506	664.836
66	2026:09:07:06:42:45.240	2026:09:07:06:55:16.495	751.255
67	2026:09:07:08:18:33.178	2026:09:07:08:30:54.625	741.447
68	2026:09:07:09:56:42.936	2026:09:07:10:06:14.156	571.219
69	2026:09:07:18:13:29.031	2026:09:07:18:20:03.343	394.312
70	2026:09:07:19:48:17.081	2026:09:07:19:59:47.033	689.952
71	2026:09:07:21:23:50.919	2026:09:07:21:36:33.235	762.316
72	2026:09:07:22:59:28.601	2026:09:07:23:11:21.421	712.820
73	2026:09:08:00:34:49.830	2026:09:08:00:44:50.699	600.869
74	2026:09:08:02:09:24.421	2026:09:08:02:18:04.160	519.739
75	2026:09:08:03:42:52.809	2026:09:08:03:52:12.997	560.188
76	2026:09:08:05:16:07.011	2026:09:08:05:27:20.914	673.904
77	2026:09:08:06:50:20.291	2026:09:08:07:02:55.017	754.726
78	2026:09:08:08:26:17.887	2026:09:08:08:38:32.718	734.830
79	2026:09:08:10:04:41.880	2026:09:08:10:13:48.667	546.787
80	2026:09:08:18:20:58.083	2026:09:08:18:28:12.064	433.981
81	2026:09:08:19:55:54.382	2026:09:08:20:07:36.178	701.796
82	2026:09:08:21:31:29.346	2026:09:08:21:44:11.486	762.140
83	2026:09:08:23:07:06.484	2026:09:08:23:18:51.752	705.268
84	2026:09:09:00:42:25.262	2026:09:09:00:52:16.966	591.703
85	2026:09:09:02:16:54.609	2026:09:09:02:25:32.684	518.075
86	2026:09:09:03:50:18.990	2026:09:09:03:59:47.158	568.168
87	2026:09:09:05:23:35.564	2026:09:09:05:34:58.295	682.731
88	2026:09:09:06:57:55.825	2026:09:09:07:10:33.378	757.553
89	2026:09:09:08:34:03.318	2026:09:09:08:46:10.516	727.198
90	2026:09:09:10:12:42.268	2026:09:09:10:21:22.270	520.001
91	2026:09:09:18:28:28.692	2026:09:09:18:36:17.878	469.186
92	2026:09:09:20:03:31.681	2026:09:09:20:15:24.115	712.435

93	2026:09:09:21:39:07.590	2026:09:09:21:51:48.820	761.231
94	2026:09:09:23:14:44.071	2026:09:09:23:26:21.401	697.330
95	2026:09:10:00:50:00.192	2026:09:10:00:59:42.976	582.783
96	2026:09:10:02:24:24.135	2026:09:10:02:33:01.458	517.323
97	2026:09:10:03:57:44.929	2026:09:10:04:07:21.500	576.570
98	2026:09:10:05:31:04.357	2026:09:10:05:42:35.632	691.275
99	2026:09:10:07:05:31.859	2026:09:10:07:18:11.561	759.702
100	2026:09:10:08:41:49.482	2026:09:10:08:53:47.993	718.511
101	2026:09:10:10:20:44.278	2026:09:10:10:28:54.811	490.533
102	2026:09:10:18:36:00.427	2026:09:10:18:44:21.225	500.798
103	2026:09:10:20:11:08.953	2026:09:10:20:23:10.875	721.922
104	2026:09:10:21:46:45.645	2026:09:10:21:59:25.247	759.602
105	2026:09:10:23:22:21.341	2026:09:10:23:33:50.395	689.054
106	2026:09:11:00:57:34.598	2026:09:11:01:07:08.777	574.179
107	2026:09:11:02:31:53.010	2026:09:11:02:40:30.498	517.488
108	2026:09:11:04:05:10.685	2026:09:11:04:14:56.012	585.327
109	2026:09:11:05:38:33.422	2026:09:11:05:50:12.914	699.492
110	2026:09:11:07:13:08.411	2026:09:11:07:25:49.562	761.151
111	2026:09:11:08:49:36.418	2026:09:11:09:01:25.136	708.718
112	2026:09:11:10:28:48.143	2026:09:11:10:36:26.070	457.927
113	2026:09:11:18:43:32.995	2026:09:11:18:52:22.407	529.412
114	2026:09:11:20:18:46.179	2026:09:11:20:30:56.492	730.313
115	2026:09:11:21:54:23.503	2026:09:11:22:07:00.791	757.287
116	2026:09:11:23:29:58.282	2026:09:11:23:41:18.756	680.474
117	2026:09:12:01:05:08.457	2026:09:12:01:14:34.411	565.954
118	2026:09:12:02:39:21.251	2026:09:12:02:47:59.829	518.578
119	2026:09:12:04:12:36.297	2026:09:12:04:22:30.666	594.370
120	2026:09:12:05:46:02.778	2026:09:12:05:57:50.127	707.348
121	2026:09:12:07:20:45.493	2026:09:12:07:33:27.371	761.878
122	2026:09:12:08:57:24.153	2026:09:12:09:09:01.926	697.773
123	2026:09:12:10:36:54.179	2026:09:12:10:43:55.715	421.536
124	2026:09:12:18:51:06.204	2026:09:12:19:00:21.633	555.430
125	2026:09:12:20:26:23.340	2026:09:12:20:38:40.994	737.654
126	2026:09:12:22:02:01.152	2026:09:12:22:14:35.457	754.305
127	2026:09:12:23:37:34.889	2026:09:12:23:48:46.516	671.627
128	2026:09:13:01:12:41.746	2026:09:13:01:21:59.926	558.180
129	2026:09:13:02:46:48.880	2026:09:13:02:55:29.444	520.563
130	2026:09:13:04:20:01.810	2026:09:13:04:30:05.448	603.638
131	2026:09:13:05:53:32.452	2026:09:13:06:05:27.255	714.803
132	2026:09:13:07:28:23.124	2026:09:13:07:41:04.979	761.855
133	2026:09:13:09:05:12.719	2026:09:13:09:16:38.333	685.614
134	2026:09:13:10:45:02.899	2026:09:13:10:51:23.260	380.361
135	2026:09:13:18:58:39.902	2026:09:13:19:08:19.065	579.163
136	2026:09:13:20:34:00.420	2026:09:13:20:46:24.403	743.983
137	2026:09:13:22:09:38.593	2026:09:13:22:22:09.279	750.686
138	2026:09:13:23:45:11.144	2026:09:13:23:56:13.698	662.554
139	2026:09:14:01:20:14.446	2026:09:14:01:29:25.371	550.925
140	2026:09:14:02:54:15.929	2026:09:14:03:02:59.364	523.435
141	2026:09:14:04:27:27.273	2026:09:14:04:37:40.328	613.056
142	2026:09:14:06:01:02.465	2026:09:14:06:13:04.295	721.830

143	2026:09:14:07:36:01.323	2026:09:14:07:48:42.373	761.051
144	2026:09:14:09:13:02.156	2026:09:14:09:24:14.332	672.176
145	2026:09:14:10:53:15.127	2026:09:14:10:58:47.887	332.760
146	2026:09:14:19:06:13.966	2026:09:14:19:16:14.829	600.863
147	2026:09:14:20:41:37.404	2026:09:14:20:54:06.745	749.341
148	2026:09:14:22:17:15.802	2026:09:14:22:29:42.263	746.461
149	2026:09:14:23:52:47.032	2026:09:15:00:03:40.345	653.313
150	2026:09:15:01:27:46.542	2026:09:15:01:36:50.790	544.248
151	2026:09:15:03:01:42.419	2026:09:15:03:10:29.574	527.154
152	2026:09:15:04:34:52.715	2026:09:15:04:45:15.290	622.574
153	2026:09:15:06:08:32.838	2026:09:15:06:20:41.235	728.397
154	2026:09:15:07:43:40.100	2026:09:15:07:56:19.552	759.452
155	2026:09:15:09:20:52.498	2026:09:15:09:31:49.887	657.389
156	2026:09:15:11:01:32.439	2026:09:15:11:06:08.024	275.585
157	2026:09:15:19:13:48.319	2026:09:15:19:24:09.028	620.709
158	2026:09:15:20:49:14.277	2026:09:15:21:01:48.041	753.764
159	2026:09:15:22:24:52.783	2026:09:15:22:37:14.432	741.650
160	2026:09:16:00:00:22.538	2026:09:16:00:11:06.485	643.947
161	2026:09:16:01:35:18.013	2026:09:16:01:44:16.230	538.217
162	2026:09:16:03:09:08.390	2026:09:16:03:18:00.069	531.679
163	2026:09:16:04:42:18.181	2026:09:16:04:52:50.309	632.128
164	2026:09:16:06:16:03.588	2026:09:16:06:28:18.058	734.470
165	2026:09:16:07:51:19.471	2026:09:16:08:03:56.500	757.030
166	2026:09:16:09:28:43.795	2026:09:16:09:39:24.974	641.179
167	2026:09:16:11:09:58.723	2026:09:16:11:13:19.794	201.071
168	2026:09:16:17:47:33.440	2026:09:16:17:50:39.159	185.718
169	2026:09:16:19:21:22.887	2026:09:16:19:32:01.740	638.853
170	2026:09:16:20:56:51.032	2026:09:16:21:09:28.321	757.289
171	2026:09:16:22:32:29.525	2026:09:16:22:44:45.805	736.279
172	2026:09:17:00:07:57.645	2026:09:17:00:18:32.148	634.502
173	2026:09:17:01:42:48.850	2026:09:17:01:51:41.729	532.879
174	2026:09:17:03:16:33.884	2026:09:17:03:25:30.851	536.967
175	2026:09:17:04:49:43.717	2026:09:17:05:00:25.379	641.662
176	2026:09:17:06:23:34.745	2026:09:17:06:35:54.753	740.008
177	2026:09:17:07:58:59.460	2026:09:17:08:11:33.209	753.748
178	2026:09:17:09:36:36.108	2026:09:17:09:46:59.532	623.424
179	2026:09:17:11:18:55.860	2026:09:17:11:20:01.319	65.458
180	2026:09:17:17:54:42.641	2026:09:17:17:59:07.727	265.087
181	2026:09:17:19:28:57.614	2026:09:17:19:39:53.043	655.429
182	2026:09:17:21:04:27.651	2026:09:17:21:17:07.602	759.951
183	2026:09:17:22:40:06.008	2026:09:17:22:52:16.400	730.392
184	2026:09:18:00:15:32.336	2026:09:18:00:25:57.372	625.035
185	2026:09:18:01:50:19.036	2026:09:18:01:59:07.330	528.294
186	2026:09:18:03:23:58.942	2026:09:18:03:33:01.896	542.954
187	2026:09:18:04:57:09.347	2026:09:18:05:08:00.467	651.120
188	2026:09:18:06:31:06.314	2026:09:18:06:43:31.324	745.010
189	2026:09:18:08:06:40.088	2026:09:18:08:19:09.670	749.582
190	2026:09:18:09:44:29.489	2026:09:18:09:54:33.520	604.031
191	2026:09:18:18:02:01.128	2026:09:18:18:07:25.631	324.503
192	2026:09:18:19:36:32.451	2026:09:18:19:47:42.984	670.533

193	2026:09:18:21:12:04.120	2026:09:18:21:24:45.897	761.777
194	2026:09:18:22:47:42.238	2026:09:18:22:59:46.234	723.996
195	2026:09:19:00:23:06.599	2026:09:19:00:33:22.198	615.599
196	2026:09:19:01:57:48.567	2026:09:19:02:06:33.071	524.505
197	2026:09:19:03:31:23.608	2026:09:19:03:40:33.193	549.585
198	2026:09:19:05:04:35.110	2026:09:19:05:15:35.573	660.463
199	2026:09:19:06:38:38.321	2026:09:19:06:51:07.747	749.426
200	2026:09:19:08:14:21.361	2026:09:19:08:26:45.863	744.502
201	2026:09:19:09:52:24.027	2026:09:19:10:02:06.864	582.838
202	2026:09:19:18:09:24.157	2026:09:19:18:15:37.630	373.473
203	2026:09:19:19:44:07.360	2026:09:19:19:55:31.623	684.263
204	2026:09:19:21:19:40.438	2026:09:19:21:32:23.235	762.797
205	2026:09:19:22:55:18.192	2026:09:19:23:07:15.339	717.147
206	2026:09:20:00:30:40.402	2026:09:20:00:40:46.661	606.259
207	2026:09:20:02:05:17.427	2026:09:20:02:13:58.988	521.561
208	2026:09:20:03:38:47.919	2026:09:20:03:48:04.718	556.799
209	2026:09:20:05:12:01.035	2026:09:20:05:23:10.665	669.631
210	2026:09:20:06:46:10.782	2026:09:20:06:58:44.015	753.233
211	2026:09:20:08:22:03.312	2026:09:20:08:34:21.776	738.464
212	2026:09:20:10:00:19.804	2026:09:20:10:09:39.487	559.683
213	2026:09:20:18:16:49.925	2026:09:20:18:23:45.527	415.601
214	2026:09:20:19:51:42.307	2026:09:20:20:03:19.001	696.694
215	2026:09:20:21:27:16.597	2026:09:20:21:39:59.623	763.026
216	2026:09:20:23:02:53.861	2026:09:20:23:14:43.731	709.870
217	2026:09:21:00:38:13.732	2026:09:21:00:48:10.805	597.074
218	2026:09:21:02:12:45.628	2026:09:21:02:21:25.119	519.491
219	2026:09:21:03:46:11.933	2026:09:21:03:55:36.463	564.530
220	2026:09:21:05:19:27.161	2026:09:21:05:30:45.735	678.574
221	2026:09:21:06:53:43.710	2026:09:21:07:06:20.127	756.417
222	2026:09:21:08:29:45.962	2026:09:21:08:41:57.406	731.443
223	2026:09:21:10:08:16.937	2026:09:21:10:17:11.279	534.342
224	2026:09:21:18:24:17.529	2026:09:21:18:31:50.241	452.712
225	2026:09:21:19:59:17.268	2026:09:21:20:11:05.158	707.889
226	2026:09:21:21:34:52.573	2026:09:21:21:47:35.089	762.516
227	2026:09:21:23:10:29.241	2026:09:21:23:22:11.430	702.189
228	2026:09:22:00:45:46.578	2026:09:22:00:55:34.668	588.090
229	2026:09:22:02:20:13.168	2026:09:22:02:28:51.478	518.310
230	2026:09:22:03:53:35.683	2026:09:22:04:03:08.398	572.714
231	2026:09:22:05:26:53.503	2026:09:22:05:38:20.767	687.264
232	2026:09:22:07:01:17.125	2026:09:22:07:13:56.073	758.948
233	2026:09:22:08:37:29.328	2026:09:22:08:49:32.723	723.395
234	2026:09:22:10:16:15.569	2026:09:22:10:24:42.110	506.541
235	2026:09:22:18:31:46.435	2026:09:22:18:39:52.309	485.874
236	2026:09:22:20:06:52.206	2026:09:22:20:18:50.127	717.922
237	2026:09:22:21:42:28.375	2026:09:22:21:55:09.646	761.271
238	2026:09:22:23:18:04.321	2026:09:22:23:29:38.468	694.147
239	2026:09:23:00:53:18.906	2026:09:23:01:02:58.304	579.398
240	2026:09:23:02:27:40.060	2026:09:23:02:36:18.091	518.031
241	2026:09:23:04:00:59.228	2026:09:23:04:10:40.507	581.280
242	2026:09:23:05:34:20.101	2026:09:23:05:45:55.744	695.643

243	2026:09:23:07:08:51.041	2026:09:23:07:21:31.836	760.795
244	2026:09:23:08:45:13.433	2026:09:23:08:57:07.717	714.284
245	2026:09:23:10:24:15.903	2026:09:23:10:32:11.791	475.888
246	2026:09:23:18:39:16.298	2026:09:23:18:47:52.098	515.800
247	2026:09:23:20:14:27.111	2026:09:23:20:26:33.949	726.839
248	2026:09:23:21:50:03.981	2026:09:23:22:02:43.313	759.333
249	2026:09:23:23:25:39.076	2026:09:23:23:37:04.863	685.787
250	2026:09:24:01:00:50.705	2026:09:24:01:10:21.746	571.040
251	2026:09:24:02:35:06.312	2026:09:24:02:43:44.974	518.662
252	2026:09:24:04:08:22.603	2026:09:24:04:18:12.769	590.166
253	2026:09:24:05:41:46.980	2026:09:24:05:53:30.665	703.685
254	2026:09:24:07:16:25.474	2026:09:24:07:29:07.413	761.939
255	2026:09:24:08:52:58.315	2026:09:24:09:04:42.374	704.059
256	2026:09:24:10:32:18.200	2026:09:24:10:39:40.073	441.873
257	2026:09:24:18:46:46.881	2026:09:24:18:55:49.852	542.971
258	2026:09:24:20:22:01.959	2026:09:24:20:34:16.646	734.687
259	2026:09:24:21:57:39.383	2026:09:24:22:10:16.107	756.725
260	2026:09:24:23:33:13.509	2026:09:24:23:44:30.644	677.135
261	2026:09:25:01:08:21.951	2026:09:25:01:17:45.042	563.091
262	2026:09:25:02:42:31.944	2026:09:25:02:51:12.144	520.200
263	2026:09:25:04:15:45.860	2026:09:25:04:25:45.159	599.299
264	2026:09:25:05:49:14.154	2026:09:25:06:01:05.502	711.348
265	2026:09:25:07:24:00.439	2026:09:25:07:36:42.793	762.354
266	2026:09:25:09:00:44.001	2026:09:25:09:12:16.663	692.662
267	2026:09:25:10:40:22.848	2026:09:25:10:47:06.562	403.715
268	2026:09:25:18:54:18.021	2026:09:25:19:03:45.747	567.727
269	2026:09:25:20:29:36.735	2026:09:25:20:41:58.244	741.510
270	2026:09:25:22:05:14.582	2026:09:25:22:17:48.050	753.467
271	2026:09:25:23:40:47.594	2026:09:25:23:51:55.836	668.242
272	2026:09:26:01:15:52.621	2026:09:26:01:25:08.241	555.619
273	2026:09:26:02:49:56.985	2026:09:26:02:58:39.599	522.614
274	2026:09:26:04:23:09.041	2026:09:26:04:33:17.662	608.621
275	2026:09:26:05:56:41.651	2026:09:26:06:08:40.254	718.604
276	2026:09:26:07:31:35.953	2026:09:26:07:44:17.968	762.015
277	2026:09:26:09:08:30.523	2026:09:26:09:19:50.561	680.038
278	2026:09:26:10:48:30.454	2026:09:26:10:54:30.675	360.221
279	2026:09:26:19:01:49.578	2026:09:26:19:11:39.927	590.349
280	2026:09:26:20:37:11.421	2026:09:26:20:49:38.777	747.356
281	2026:09:26:22:12:49.557	2026:09:26:22:25:19.150	749.592
282	2026:09:26:23:48:21.326	2026:09:26:23:59:20.478	659.152
283	2026:09:27:01:23:22.706	2026:09:27:01:32:31.388	548.682
284	2026:09:27:02:57:21.459	2026:09:27:03:06:07.344	525.884
285	2026:09:27:04:30:32.182	2026:09:27:04:40:50.250	618.068
286	2026:09:27:06:04:09.493	2026:09:27:06:16:14.909	725.416
287	2026:09:27:07:39:12.036	2026:09:27:07:51:52.925	760.889
288	2026:09:27:09:16:17.925	2026:09:27:09:27:24.040	666.115
289	2026:09:27:10:56:42.078	2026:09:27:11:01:51.352	309.274
290	2026:09:27:19:09:21.463	2026:09:27:19:19:32.506	611.044
291	2026:09:27:20:44:46.010	2026:09:27:20:57:18.255	752.244
292	2026:09:27:22:20:24.308	2026:09:27:22:32:49.430	745.122

293	2026:09:27:23:55:54.686	2026:09:28:00:06:44.598	649.912
294	2026:09:28:01:30:52.181	2026:09:28:01:39:54.529	542.348
295	2026:09:28:03:04:45.400	2026:09:28:03:13:35.374	529.974
296	2026:09:28:04:37:55.321	2026:09:28:04:48:22.907	627.585
297	2026:09:28:06:11:37.696	2026:09:28:06:23:49.457	731.761
298	2026:09:28:07:46:48.692	2026:09:28:07:59:27.662	758.970
299	2026:09:28:09:24:06.235	2026:09:28:09:34:57.066	650.831
300	2026:09:28:11:04:59.922	2026:09:28:11:09:06.397	246.475
301	2026:09:28:17:43:27.048	2026:09:28:17:45:31.879	124.831
302	2026:09:28:19:16:53.589	2026:09:28:19:27:23.573	629.984
303	2026:09:28:20:52:20.478	2026:09:28:21:04:56.712	756.234
304	2026:09:28:22:27:58.826	2026:09:28:22:40:18.909	740.083
305	2026:09:29:00:03:27.660	2026:09:29:00:14:08.221	640.561
306	2026:09:29:01:38:21.028	2026:09:29:01:47:17.702	536.674
307	2026:09:29:03:12:08.844	2026:09:29:03:21:03.683	534.840
308	2026:09:29:04:45:18.511	2026:09:29:04:55:55.611	637.100
309	2026:09:29:06:19:06.291	2026:09:29:06:31:23.882	737.591
310	2026:09:29:07:54:25.950	2026:09:29:08:07:02.164	756.215
311	2026:09:29:09:31:55.522	2026:09:29:09:42:29.597	634.076
312	2026:09:29:11:13:30.579	2026:09:29:11:16:09.220	158.640
313	2026:09:29:17:50:22.783	2026:09:29:17:54:09.833	227.049
314	2026:09:29:19:24:25.903	2026:09:29:19:35:13.198	647.295
315	2026:09:29:20:59:54.821	2026:09:29:21:12:34.169	759.348
316	2026:09:29:22:35:33.098	2026:09:29:22:47:47.605	734.507
317	2026:09:30:00:11:00.230	2026:09:30:00:21:31.392	631.163
318	2026:09:30:01:45:49.241	2026:09:30:01:54:40.950	531.709
319	2026:09:30:03:19:31.835	2026:09:30:03:28:32.260	540.426
320	2026:09:30:04:52:41.773	2026:09:30:05:03:28.352	646.579
321	2026:09:30:06:26:35.281	2026:09:30:06:38:58.178	742.897
322	2026:09:30:08:02:03.827	2026:09:30:08:14:36.423	752.595
323	2026:09:30:09:39:45.825	2026:09:30:09:50:01.594	615.770

Global Statistics

Min Duration	179	2026:09:17:11:18:55.860	2026:09:17:11:20:01.319	65.458
Max Duration	215	2026:09:20:21:27:16.597	2026:09:20:21:39:59.623	763.026
Mean Duration			621.509	
Total Duration			200747.285	

Flux Density impinging on the ground in Alaska from Pixxel's Firefly Spacecraft

The Flux density is calculated as:

$$\text{flux density} = EIRP / (4\pi RSE^2)$$

where RSE is the distance from spacecraft to the ground,
and EIRP is the Effective Isotropic Radiated Power of the spacecraft.

Data from the spacecraft vendor indicates that the nominal EIRP of Pixxel's Firefly spacecraft is 6,4 dBW (S-band), 24,8 & 16,2 dBW (X-band). The closest distance to earth during an overhead pass is = 565,3 km.

Converting 6.4 dBW to scalar watts = 4.365158 Watts transmitted at 2243 MHz.

Therefore:

$$\text{S-band flux density} = 4.365158 / (4\pi(565300)^2)$$

$$\text{Flux density} = 1.0865 \times 10^{-12} \text{ Watts/meter}^2$$

Or

$$\text{Flux density} = 1.0865 \times 10^{-13} \text{ mW/cm}^2$$

Data from the spacecraft vendor indicates that the nominal EIRP of Pixxel's Firefly spacecraft is 24,8 and 16,2 dBW (X-band). The closest distance to earth during an overhead pass is = 565,3 km.

Converting 24.8 dBW to scalar watts = 302 Watts transmitted at 8200 MHz.

Converting 16.2 dBW to scalar watts = 41.68 Watts transmitted at 8200 MHz.

Therefore:

$$\text{X-band flux density} = 302 / (4\pi(565300)^2)$$

$$\text{Flux density} = 7.51 \times 10^{-11} \text{ Watts/meter}^2$$

Or

$$\text{Flux density} = 7.51 \times 10^{-12} \text{ mW/cm}^2 \text{ and likewise} = 5.02 \times 10^{-12} \text{ mW/cm}^2 \text{ for the 16.2 dBW}$$

Inclination: 97.65 ° degrees

Apogee: 565,3 km

Perigee: 565,3 km

Number of Orbital Planes: 1

Waiver
Exhibit C
PETITION FOR WAIVER OF SECTION 25.137 AND 25.114 AND OF
THE U.S. TABLE OF FREQUENCY ALLOCATIONS

I. TO THE EXTENT THEY APPLY, GOOD CAUSE EXISTS FOR A WAIVER OF CERTAIN PORTIONS OF SECTIONS 25.137 AND 25.114

SSC Space (dba USN) is provided limited legal and technical information for the Matop-SG Firefly Satellites (owned and operated by Pixxel).¹Pursuant to Section 25.137 of the Federal Communications Commission's ("Commission" or "FCC") rules, the same technical information required by Section 25.114 for U.S.-licensed space station, and certain legal information, must be submitted by earth station applicants "requesting authority to operate with a non-U.S. licensed space station to serve the United States..."² USN seeks authority to support TT&C and data downlink operations of Firefly, and not commercial service to the United States, and thus believes that Section 25.137 does not apply.

To the extent the Commission determines, however, that USN's request for authority to provide TT&C and data downlink support on a special temporary basis is a request to serve the United States with a non-U. S.-licensed satellite, USN respectfully requests a waiver of Sections 25.137 and 25.114 of the Commission's rules, to the extent that USN has not herein provided the information required by these rules.³ The Commission may grant a waiver for good cause shown.⁴ A waiver is therefore appropriate if special circumstances warrant a deviation from the general rule, and such a deviation will serve the public interest. The US public interest is supported by benefiting from the collected data.

In this case, good cause for a waiver of portions of Section 25.114 exists. USN seeks authority to conduct TT&C and data downlink support for Firefly satellites. Thus, any information sought by Section 25.114 that is not relevant to the support – e.g., antenna patterns, energy and propulsion and orbital debris - USN does not have. In addition, USN would not easily be able to obtain such information because USN is not the operator of the Firefly satellites, nor is USN in contractual privity with that operator. Rather, USN has contracted with Swedish Space Corporation, Solna Sweden (SSC) to support the TT&C in S-band and data downlink operations in X-Band of the Firefly satellites.

¹ FCC Form 312 Section B

² 47 C.F.R. § 25.137(a)

³ 47 C.F.R. §§25.137 and 25.114

⁴ 47 C.F.R. §1.3

Because it is not relevant to the service for which USN seeks authorization, and because obtaining the information would be a hardship, USN seeks a waiver of all the technical and legal information required by Section 25.114, to the extent it is not provided herein. As noted above, USN has provided the required information to the extent that it is relevant to the service for which USN seeks authorization.

Good cause also exists to waive portions of Section 25.137, to the extent the information required is not herein provided. Section 25.137 is designed to ensure that “U.S.-licensed satellite systems have effective competitive opportunities to provide analogous services” in other countries. Here, there is no commercial service being provided by the satellite; USN provides only TT&C and data downlink support. Thus, the purpose of the information required by Section 25.137 is not implicated here. For example, Section 25.137(d) requires earth station applicants requesting authority to operate with a non-U.S.-licensed space station that is not in orbit and operating to post a bond.⁵ The underlying purpose in having to post a bond – i.e., to prevent warehousing of orbital locations by operators seeking to serve the United States – would not be served by requiring USN to post a bond in order to conduct the 180 days support of the Firefly satellites.

It is USN’s understanding that Firefly satellite constellation is licensed by the country of India. The spacecraft is meant to serve advanced Planet health monitoring (agriculture, climate, water quality, and industrial activity).

Thus, the purpose of Section 25.137 – to ensure that U.S. satellite operators enjoy “effective competitive opportunities” to serve foreign markets and to prevent warehousing of orbital locations service the United States – will not be undermined by grant of this waiver request.

Finally, USN notes that it expects to communicate with the Firefly satellite using its U.S. earth station for a period of 180 days. Requiring USN to obtain technical and legal information from an unrelated party, where there is no risk of interference. Given these particular facts, the waiver sought herein is appropriate.

II. GOOD CAUSE EXISTS FOR A WAIVER OF THE UNITED STATES TABLE OF FREQUENCY ALLOCATIONS

USN further requests a waiver of the United States Table of Frequency Allocations (“U.S. Table”) as described in section 2.106 of the rules for the frequency bands 2025 – 2110 MHz (Earth-to-Space) and 2200 – 2290 MHz (Space-to-Earth).⁶ Section footnote US96 allow for non-federal Government use of these bands in the United States on a case-by-case non-interference basis. Such use by USN necessitates a waiver of the U.S. Table.

Good cause exists to grant USN a limited waiver of the U.S. Table to allow support of TT&C and data downlink operations for the Firefly satellites. In considering request for case-by-case spectrum uses, the Commission has indicated that it would generally grant such waivers “where there is little potential for interference into any service authorized under the Table of Frequency Allocations and when the case-by-case operator accepts any interference from authorized services.”⁷ USN will coordinate with other parties operating communication systems in compliance with the Table of Frequency Allocations to ensure that no harmful interference is caused. USN seeks to operate only pursuant to special temporary authorization and thus agrees to accept any interference from authorized services. In summary, USN’s

operation on a non-interference, non-protected basis support waiver of the U.S. Table.

⁵ 47 C.F.R. §25.137(d)(4)

⁶ 47 C.F.R. §2.106

⁷ Previously approved STA's for Universal Space Network SES-STA-20020725-01174; SES-STA-20021112-02008; SES-STA-20040315-00475; SES-STA-20220512-00477

With respect to Space Launch Services

Pursuant to Section 1.3 of the Commission's rules (47 CFR § 1.3), USN respectfully requests a waiver of certain provisions of Part 25 and Part 26 of the Commission's rules to permit the licensing and operation of a satellite earth station using the 2025–2110 MHz, 2200–2290 MHz and 8025–8400 MHz frequency bands for Part 25, telemetry, tracking, and command (TTC) and data downlink operations of its low Earth orbit (LEO) satellite constellation.

Under 47 CFR § 1.3, the Commission may waive its rules for good cause shown. USN submits that:

The proposed earth station will support TT&C and data downlink operations of Firefly, which cannot be accommodated in other bands due to technical/operational constraints. Besides these bands have been used in all previous STA applications for this spacecraft, they are also technically suitable due to their propagation characteristics and compatibility with existing ground infrastructure.

These S-bands have been partially reallocated to space launch services under Part 26. As per 47 CFR § 25 section 2.106, this application would not comply without a waiver due to limitations on non-federal use or non-space launch service in these bands which currently restrict or limit the use of the referenced bands due to the reallocation referenced above.

USN believe this is in the public interest, technically feasible, non-disruptive to existing services, improves earth health monitoring.

It is also consistent with the FCC's goals of promoting innovation, efficient use of spectrum and being in line with FCC orders and rulemakings that support flexible use of these bands (e.g., the FCC's 2023 Report and Order on commercial space launch operations 1).

This request is also consistent with prior FCC-authorized STAs, including:

- Lynk Global, Inc. (File No. SES-STA-20220512-00477), which was granted temporary authority for TT&C in both bands;
- Space Telecommunications, Inc. (CTC-0 CubeSat, File Number: 1082-EX-ST-2024) which was granted temporary authority for TT&C in both bands.
- Geometric Energy Corporation, which received STA for TT&C in these bands for a lunar mission via a UK-based earth station

These precedents demonstrate the FCC's established practice of granting temporary, coordinated use of these bands for TT&C under appropriate conditions.

USN request a waiver to permit temporary earth station operations and continued use of the referenced bands for Part 25 TT&C satellite communications. A waiver is necessary due to the relocation of these bands.

Summary of Technical Information For Coordination with NTIA/FAS/IRAC

Applicant: Universal Space Network, Inc.

File No.: _____

Call Sign: No Call Sign

Special Temporary Authority ("STA")

Purpose of operation: Support TT&C and Data Downlink Operations

Start Date: Oct. 1st, 2026

End Date: March 30th 2027

Site Location: North Pole, AK

GAIA 1

Longitude: 64° 48' 13.3092" N

Latitude: 147° 30' 9.4464" W

GAIA 2

Longitude: 64° 48' 12.6" N

Latitude: 147° 30' 13.4172" W

Transmit frequency: 2094.7 – 2105.3 MHz
 Polarization: M
 Antenna manufacturer: Orbit-CS
 Antenna Size in meter: 3,7 m
 Antenna model:
 Antenna Gain Transmit: 34,5 dBi @ 2100 MHz

<u>Frequency Band</u> (MHz)	<u>Emissions</u>	<u>Max. EIRP</u> (dBW)	<u>Max. EIRP Density</u> (dBW/4KHz)
2094.7-2105.3	600KG2D--	50	28,24

Satellite Commercial & ITU name: Firefly
 ITU: API/A 13664 (BR14) / BR IFIC 3026 (BR20)