

Attachment B

Ground Station Exhibit

Ground Station Exhibit

Table 1. List of ground stations.

Licensee	Location	Latitude	Longitude	Dish Size (m)	Uplink Frequencies	Downlink Frequencies	Purpose
Leaf	Peterborough, Australia	32° 57' 43" S	138° 50' 58" E	3.7	S	S, X	Primary
Leaf	Nangetty, Western Australia	29° 00' 37" S	115° 20' 32" E	3.7	S	S, X	Primary
KSAT	Mingenew, Australia	29° 00' 39" S	115° 20' 29" E	3.7	S	S, X	Primary
Leaf	Absheron, Azerbaijan	40° 27' 59" N	49° 29' 10" E	3.7	S	S, X	Primary
Leaf	Punta Arenas, Chile	53° 02' 30" S	70° 50' 45" W	3.7	S	S, X	Primary
KSAT	Punta Arenas, Chile	52° 56' 08" S	70° 52' 24" W	3.7, 3.9	S	S, X	Primary
AnySignal	Punta Arenas, Chile	53° 07' 03" S	70° 53' 39" W	3.7	S	UHF, S, X	Backup
KSAT	Punta Arenas, Chile	52° 56' 32" S	70° 50' 59" W	5.4	S	S, X	Primary
Leaf	Santiago, Chile	33° 21' 53" S	70° 46' 20" W	3.7	S	S, X	Primary
Leaf	Blonduos, Iceland	65° 38' 50" N	20° 14' 21" W	3.9	S	S, X	Primary
AnySignal	Selfoss, Iceland	64° 03' 04" N	20° 25' 18" W	3.7	S	UHF, S, X	Backup
Leaf	Kandy, Sri Lanka	07° 16' 27" N	80° 43' 29" E	3.7	S	S, X	Primary
Leaf	Mon Loisir, Mauritius	20° 08' 22" S	57° 41' 13" E	3.9	S	S, X	Primary
KSAT	Bel Ombre, Mauritius	20° 30' 02" S	57° 27' 03" E	3.7	S	S, X	Primary
Leaf	La Paz, Mexico	24° 05' 59" N	110° 23' 11" W	3.7	S	S, X	Primary
Leaf	Awarua, New Zealand	46° 31' 41" S	168° 22' 45" E	3.7	S	S, X	Primary
KSAT	Awarua, New Zealand	46° 31' 42" S	168° 22' 44" E	3.7, 3.9	S	S, X	Primary
AnySignal	Awarua, New Zealand	46° 31' 44" S	168° 22' 51" E	3.7	S	UHF, S, X	Backup
Leaf	Santa Maria, Azores, Portugal	36° 59' 51" N	25° 08' 14" W	3.7	S	S, X	Primary
Leaf	Pretoria, South Africa	25° 51' 37" S	28° 27' 13" E	3.7	S	S, X	Primary
AnySignal	Pretoria, South Africa	25° 45' 08" S	28° 14' 23" E	3.7	S	UHF, S, X	Backup
KSAT	Hartebeesthoek, South Africa	25° 53' 10" S	27° 42' 22" E	3.7	S	S, X	Primary
Leaf	Nova Scotia, Canada	45° 19' 04" N	61° 02' 09" W	3.7	S	S, X	Primary
Leaf	Al Ain, UAE	24° 11' 56" N	55° 41' 00" E	3.7	S	S, X	Primary
Leaf	Talkeetna, AK, United States	62° 19' 55" N	150° 01' 57" W	3.7	S	X	Primary

AnySignal	Colorado Springs, CO, United States	38° 50' 25" N	104° 43' 15" W	3.7	S	UHF, X	Backup
AnySignal	Torrance, CA, United States	33° 50' 02" N	118° 18' 48" W	3.7	S	UHF, X	Backup
AnySignal	Pitea, Sweden	65° 20' 16" N	21° 25' 31" E	3.7	S	UHF, S, X	Backup
AnySignal	Umea, Sweden	63° 49' 20" N	20° 15' 17" E	3.7	—	UHF	Backup
AnySignal	North Pole, AK, United States	64° 46' 34" N	147° 22' 52" W	3.7	S	UHF, X	Backup
KSAT	Jeju, South Korea	33° 23' 14" N	126° 19' 01" E	3.7	S	S, X	Primary
KSAT	Puertollano, Spain	38° 40' 20" N	04° 09' 46" W	3.7	S	S, X	Primary
KSAT	Athens, Greece	37° 50' 43" N	22° 37' 26" E	3.7	S	S, X	Primary
KSAT	Tromso, Norway	69° 39' 44" N	18° 56' 29" E	3.0	S	S, X	Primary
KSAT	Fairbanks, AK, United States	64° 49' 04" N	147° 43' 30" W	3.9	S	X	Primary
KSAT	Puunene, HI, United States	20° 49' 02" N	156° 27' 17" W	3.7	S	X	Primary
KSAT	Dublin, Ireland	53° 24' 24" N	06° 13' 28" W	5.4	S	S, X	Primary
KSAT	Singapore, Singapore	01° 18' 59" N	103° 42' 03" E	5.4	S	S, X	Primary
KSAT	Stockholm, Sweden	59° 38' 57" N	16° 35' 05" E	5.4	S	S, X	Primary
KSAT	Sydney, Australia	32° 10' 31" S	148° 36' 56" E	5.4	S	S, X	Primary
KSAT	Cape Town, South Africa	34° 01' 39" S	18° 43' 07" E	5.4	S	S, X	Primary
KSAT	Columbus, OH, United States	40° 06' 03" N	83° 11' 51" W	5.4	S	X	Primary
KSAT	Boardman, OR, United States	45° 51' 16" N	119° 37' 55" W	5.4	S	X	Primary
KSAT	Kapolei, HI, United States	21° 20' 12" N	158° 05' 24" W	5.4	S	X	Primary
KSAT	Deadhorse, AK, United States	70° 12' 14" N	148° 28' 24" W	5.4	S	X	Primary
Northwood	Bismarck, ND, United States	46° 52' 56" N	100° 48' 17" W	2.4	S	X	Primary
Northwood	Loring, ME, United States	46° 56' 01" N	67° 54' 34" W	2.4	S	X	Primary
Northwood	Kihei, HI, United States	20° 44' 44" N	156° 26' 13" W	2.4	S	X	Primary
Northwood	Vodno, Bulgaria	43° 51' 41" N	27° 09' 03" E	2.4	S	S, X	Primary
Northwood	Neu Poserin, Germany	53° 33' 15" N	12° 13' 27" E	2.4	S	S, X	Primary
Northwood	Rio Gallegos, Argentina	51° 40' 03" S	69° 15' 51" W	2.4	S	S, X	Primary

Table 2. Ground station antenna RF specifications.

	Leaf 3.7 m	Leaf 3.9 m	KSAT 3.7 m	AnySignal 3.7 m	KSAT 5.4 m	Northwood 2.4 m
Polarization	RHCP	RHCP	RHCP	RHCP	RHCP	RHCP
UHF Downlink						
Frequency Range (MHz)	N/A	N/A	N/A	400.15 – 401	N/A	N/A
G/T (dB/K)	N/A	N/A	N/A	-8	N/A	N/A
Beamwidth (deg)	N/A	N/A	N/A	30	N/A	N/A
S-Band Uplink						
Frequency Range (MHz)	2025 – 2110	2025 – 2110	2025 – 2110	2025 – 2110	2025 – 2110	2025 – 2110
EIRP (dBW)	50	45	45	51.8	50	50.6
Frequency Tolerance (ppm)	0.025	0.025	0.025	0.025	0.025	0.025
Beamwidth (deg)	2.76	2.3	2.71	4.0	1.9	3.9
S-Band Downlink						
Frequency Range (MHz)	2200 – 2290	2200 – 2290	2200 – 2290	2200 – 2290	2200 – 2290	2200 – 2290
Receive Gain (dBi)	34.6	37.7	34.66	31.2	38.4	32.6
G/T (dB/K)	12.53	12.6	12	12	17.1	9
Beamwidth (deg)	2.4	2.1	2.5	3.1	1.74	5.3
Efficiency (%)	70	70	60	70	60	65
X-Band Downlink						
Frequency Range (MHz)	8450 – 8500	8450 – 8500	8450 – 8500	8450 – 8500	8450 – 8500	8450 – 8500
Receive Gain (dBi)	47.0	49.5	47.6	43.7	51.1	40.0
G/T (dB/K)	24.65	26.5	26.2	27.57	29.8	23
Beamwidth (deg)	0.6	0.576	0.66	0.85	0.49	1.0

Efficiency (%)	70	70	60	70	60	65
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Notes:

1. G/T values reported at 5° elevation.
2. KSAT Fairbanks uses a 3.9 m dish; KSAT Tromso uses a 3.0 m dish. Table 2 specs reflect the primary 3.7 m KSATlite configuration.
3. Northwood stations at Bismarck, Loring, and Kihei receive X-band only (no S-band downlink at those sites).