Exhibit 1

Supplemental Information Regarding Earth Stations

Applicant:	**Space Exploration Technologies Corp. (SpaceX)**
Confidential Treatment:	**This Exhibit is subject to the Applicant's Request for Confidential Treatment pursuant to Sections 0.457(d) and 0.459 of the FCC Rules.**
Proprietary Information:	**This document constitutes commercial information provided by the Applicant in confidence under FCC Rules. It consists of information which the Applicant considers to be proprietary, competition-sensitive, and exempt from disclosure under applicable law (including without limitation the Freedom of Information Act, 5 U.S.C. § 552).**

Telemetry and Command Stations

The characteristics of the Ku band telemetry and command stations proposed for this experimental authorization are summarized in the table below. SpaceX is working with partners to realize the Ku and Ka band telemetry and control system with ground stations around the world, including Brewster (WA) USA, Cordoba Argentina, Tromsø Norway, and Awarua New Zealand. The telemetry and control link can be active for up to 2.5 hours per day (12 minutes per orbit), though a more typical value will be 60 minutes per day.

Station Name	BR1	CD1	TR1	AW1
Organization	SpaceX	SpaceX	SpaceX	SpaceX
Latitude (deg)	48.1	-31.5	69.7	-46.5
Longitude (deg)	-119.7	-64.5	18.9	168.4
Diameter (m)	5	5	5	5
Ka Rx Antenna Gain (dBi)	57	57	57	57
Ku Rx Antenna Gain (dBi)	52	52	52	52
Ku Tx Antenna Gain (dBi)	56	56	56	56
Ku Tx Half Power Beamwidth (deg)	0.22	0.22	0.22	0.22
TX Power (W)	40	40	40	40
TX ERP (KW)	9706	9706	9706	9706
TX EIRP (dBW)	72	72	72	72
RX Figure of Merit (dB/K)	31	31	31	31

Table 1. Ku/Ka Telemetry and Command Stations

The X and S band system will have the option to use the entire KSAT ground network consisting of stations all over the world, including Tromso Norway, Svalbard Norway, Antarctica, Singapore, South Africa, Dubai, and Mauritius. This global network has been used extensively for SpaceX missions in support of the Falcon 9 launch vehicle and Dragon spacecraft. This allows SpaceX to use existing infrastructure to support this demonstration. While the entire network of stations will be available at any given time, the SpaceX Washington ground station ("RED1") will be used for the majority of ground passes and only use KSAT stations to supplement for additional operational needs. The S- or X-band link can be active for up to 2.5 hours per day (10 minutes per orbit), though a more typical value will be 60 minutes per day.

Station Name	RED1	SG25	SG42	TG2	TG6	TR3	TR4	MA1	DU1	HA1	SI1
Organization	SpaceX	KSAT	KSAT	KSAT	KSAT	KSAT	KSAT	KSAT	KSAT	KSAT	KSAT
Diameter (m)	3.7	13	3.7	10	5.4	7.3	3.7	7.3	7.3	7.3	9.1
Latitude (deg)	47.7	78.2	78.2	69.7	69.7	-70	-70	-20.5	25.2	-25.9	1.4
Longitude (deg)	-122.1	15.4	15.4	18.9	18.9	2.5	2.5	57.5	55.5	27.7	103.8
Transmit (S-Band)											
Antenna Gain (dBi)	35	46	35	44	38	41	35	41	41	41	43
Antenna Full Beamwidth (deg)	2.7	0.8	2.7	1.0	1.9	1.4	2.7	1.4	1.4	1.4	1.1
TX Power (W)	63	5	63	8	32	16	63	16	16	16	16
TX ERP (KW)	122	122	122	122	122	122	122	122	122	122	122
TX EIRP (dBW)	53	53	53	53	53	53	53	53	53	53	53
Receive (X-Band)											
Antenna Gain (dBi)	47	58	47	56	50	53	47	53	53	53	55
Antenna Full Beamwidth (deg)	0.7	0.2	0.7	0.3	0.5	0.3	0.7	0.3	0.3	0.3	0.3
RX Figure of Merit (dB/K)	25	36	25	32	31	33	25	32	33	33	34

Table 2. X/S Band Telemetry and Command Stations

For the earth stations with command (uplink) capability, the ERP levels are derived as follows:

- For each ground station, the maximum transmit power will be selected based on the antenna gain to maintain a fixed EIRP of 53 dBW, or ERP of 122 kW
- The amount of EIRP SpaceX will authorize for radiation for commanding purposes is listed in the EIRP row in dBW
- The calculation for ERP is derived from the instructions stated here: https://apps.fcc.gov/eas/comments/GetPublishedDocument.html?id=204&tn=255011 Basically ERP is 10^((EiRP – 2.15)/10) Watts

The 'TX ERP (KW)' is what should be authorized for licensing since this is the planned operating ERP required. The actual transmit power listed in the earth station data and the gain of the reflector combined would give the maximum capability of the earth station, but the requirements for mission operation are much less than the capabilities of the earth station.

Broadband Test Stations

For the broadband downlink, SpaceX is utilizing ground terminal locations exclusively in the continental United States. The ground stations include six fixed locations, and three transportable ground stations:

1. SpaceX Headquarters: Hawthorne, California
2. Tesla Motors Headquarters: Fremont, California
3. SpaceX Test Center: McGregor, Texas
4. SpaceX Brownsville: Brownsville, Texas
5. SpaceX Redmond: Redmond, Washington
6. SpaceX Brewster: Brewster, Washington
7. SpaceX Broadband Test Van 1: Transportable
8. SpaceX Broadband Test Van 2: Transportable
9. SpaceX Broadband Test Van 3: Transportable

The satellites will transmit exclusively when over these ground stations (elevations between 40° and 90°), which results in transmission times of approximately 10 minutes each day. Each ground station is equipped with up-to four phased array and/or parabolic antennas with the characteristics outlined below. Additionally, the Ku-band Telemetry and Control antennas can be used for broadband tests.

Antenna	ES-A	ES-B	ES-C	ES-D	ES-E
Diameter (m) *	N/A	N/A	1.2	1.6	5.0
Transmit					
Antenna Gain (dBi)	33	37	36	46	56
Antenna Full Beamwidth (deg)	3.5	2	2.4	0.9	0.22
TX Power (W)	2.8	2.8	2.8	10	40
TX ERP (kW)	3.4	8.6	6.8	242.7	9706
TX EIRP (dBW)	37.5	41.5	40.5	56	72
Receive					
Antenna Gain (dBi)	33	37	36	44	52
Antenna Full Beamwidth (deg)	3.5	2	2.4	1.1	0.3
RX Figure of Merit (dB/K)	8.4	12.4	11.4	19.4	31

Table 3. Broadband Ground Antenna Parameters

Data Requirements for Operational Earth Station Certification (SpaceX Stations)

Antenna Characteristics

Item	***Model "SpaceX Telem Ku/Ka"***	***Model "SpaceX Telem X"***	***Model "ES-A"***	***Model "ES-B"***	***Model "ES-C"***	***Model "ES-D"***	***Model "ES-E"***
The antenna nomenclature/name model number and manufacturer	CGC Technology T450	Orbital Systems 3.7 Meter	SpaceX	SpaceX	SpaceX	SpaceX	CGC Technology T450
The antenna type (e.g. parabolic reflector, horn, slot, cassegrain parabolic, etc)	Cassegrain parabolic	Prime focus parabolic	Phased Array	Phased Array	TBD	Parabolic	Cassegrain parabolic
The range of frequencies for which it is designed	All operating frequencies per frequency plan	2.0 – 2.1 GHz Uplink 7.2 – 8.4 GHz Downlink	All operating frequencies per frequency plan	All operating frequencies per frequency plan	All operating frequencies per frequency plan	All operating frequencies per frequency plan	All operating frequencies per frequency plan
The polarization	RHCP/LHCP	RHCP/LHCP	RHCP	RHCP	RHCP	RHCP	RHCP/LHCP
The maximum gain and 3 dB beamwidth	Uplink (Ku): 56 dBi 0.22 deg Downlink (Ku): 52 dBi 0.3 deg Downlink (Ka): 57 dBi 0.2 deg	Uplink: 38.9 dBi, 1.7 deg Downlink: 46.8 dBi, 0.8 deg	33 dBi @ 3.5 deg full beam	37 dBi @ 2 deg full beam	36 dBi at 2.4 deg full beam	46 dBi at 0.9 deg full beam	Uplink: 56 dBi 0.22 deg Downlink: 52 dBi 0.3 deg
The maximum gain of the first side lobe and the angular displacement from the main beam	TBD	TBD	TBD	TBD	TBD	TBD	TBD
The front to back gain ratio of the antenna	TBD	TBD	TBD	TBD	TBD	TBD	TBD
The diameter of the antenna if a parabolic reflector is being used	5m	3.7m	N/A	N/A	1.2m	1.6m	5m

The range of azimuth angles the antenna is capable of scanning horizontally	360 deg	360 deg	360 deg	360 deg	360 deg	360 deg	360 deg
The range of elevation angles the antenna is capable of scanning vertically	0 to 90 deg	0 – 90 deg	40 to 90 deg	40 to 90 deg	40 to 90 deg	40 to 90 deg	40 to 90 deg
The scanning method employed by the antenna (e.g. raster, spiral, tracking, etc)	None - through telemetry	None - through telemetry	N/A	N/A	N/A	N/A	None - through telemetry

Transmission

Item	***Model "SpaceX Command"***	***Model "ES-A"***	***Model "ES-B"***	***Model "ES-C"***	***Model "ES-D"***	***Model "ES-E"***
The transmitter nomenclature/name model number and manufacturer	USRP X310	TBD (SpaceX)	TBD (SpaceX)	TBD (SpaceX)	TBD (SpaceX)	TBD (SpaceX)
The frequency stability	+/- 2e-8; optional external 10 MHz and GPS input	10ppm	10ppm	10ppm	10ppm	10ppm
The spurious emission level	-60 dBc	-60dBc over the tunable range of the transmitter	-60dBc over the tunable range of the transmitter	-60dBc over the tunable range of the transmitter	-60dBc over the tunable range of the transmitter	-60dBc over the tunable range of the transmitter
The harmonic emission levels (2nd, 3rd, and others)	-25 dBc	-60dB suppression	-60dB suppression	-60dB suppression	-60dB suppression	-60dB suppression
The transmitter power delivered to the antenna terminals	46 dBm	2.8 W / 15.625MHz 2.8 W / 31.25MHz 2.8/ 62.5MHz	2.8 W 15.625MHz 2.8 W / 31.25MHz 2.8W / 62.5MHz	2.8 W / 15.625MHz 2.8W / 31.25MHz 2.8 W / 62.5MHz	10 W / 15.625MHz 10 W / 31.25MHz 10 W / 62.5MHz	46 dBm

		2.8 W / 125 MHz 5.6 W / 250MHz	2.8 W / 125 MHz 5.6 W / 250MHz	2.8 W / 125 MHz 5.6 W / 250MHz	10 W / 125 MHz 20 W / 250MHz	
The frequency range through which the transmitter is capable of being tuned	5.85 – 14.5 GHz	13.0-13.25 GHz and 14.0-14.5 GHz continuously adjustable via synthesizer	13.0-13.25 GHz and 14.0-14.5 GHz continuously adjustable via synthesizer	13.0-13.25 GHz and 14.0-14.5 GHz continuously adjustable via synthesizer	13.0-13.25 GHz and 14.0-14.5 GHz continuously adjustable via synthesizer	13.0-13.25 GHz and 14.0-14.5 GHz continuously adjustable via synthesizer
The emission designators for the types of emission capable of being used by the transmitter	41M4D7W 13M5D7W 2M7D7W	240M8D7W 120M8D7W 62M5D7W 31M3D7W 15M6D7W	240M8D7W 120M8D7W 62M5D7W 31M3D7W 15M6D7W	240M8D7W 120M8D7W 62M5D7W 31M3D7W 15M6D7W	240M8D7W 120M8D7W 62M5D7W 31M3D7W 15M6D7W	240M8D7W 120M8D7W 62M5D7W 31M3D7W 15M6D7W
The modulation format and data rate for each emission capable of being used by the transmitter, including detailed information concerning the deviation ratio, max modulation frequency, and digital pulse format as appropriate	Uplink: BPSK 1 – 15.36 Mbps Downlink: SS-OQPSK 0.050 – 15.36 Mbps	BPSK to 64QAM	BPSK to 64QAM	BPSK to 64QAM	BPSK to 64QAM	BPSK to 64QAM
		240 120 60 30 15 Msym/sec	240 120 60 30 15 Msym/sec	240 120 60 30 15 Msym/sec	240 120 60 30 15 Msym/sec	240 120 60 30 15 Msym/sec
		240 MHz 120 MHz 60 MHz 30 MHz 15 MHz necessary bandwidth	240 MHz 120 MHz 60 MHz 30 MHz 15 MHz necessary bandwidth	240 MHz 120 MHz 60 MHz 30 MHz 15 MHz necessary bandwidth	240 MHz 120 MHz 60 MHz 30 MHz 15 MHz necessary bandwidth	240 MHz 120 MHz 60 MHz 30 MHz 15 MHz necessary bandwidth
For each emission designator the emission bandwidth at the -3, -20, -40, -60 dB levels for each emission capable of being used by the transmitter	<= 2.6 MHz	TBD	TBD	TBD	TBD	TBD

Reception

Item	***Model "SpaceX Telem"***	***Model "ES-A"***	***Model "ES-B"***	***Model "ES-C"***	***Model "ES-D"***	***Model "ES-E"***
The receiver nomenclature/name model number and manufacturer	USRP X310	SpaceX Broadband Modem	SpaceX Broadband Modem	SpaceX Broadband Modem	SpaceX Broadband Modem	SpaceX Broadband Modem
The frequency stability	+/- 2e-8; optional external 10 MHz and GPS input	10ppm	10ppm	10ppm	10ppm	10ppm
The spurious rejection level	60dB	60dB	60dB	60dB	60dB	60dB
The image rejection level	80 dB	TBD	TBD	TBD	TBD	TBD
The adjacent channel selectivity	Set by digital filter which is adjusted to accommodate bitrate and modulation type	TBD	TBD	TBD	TBD	TBD
Indicate whether the local oscillator is tuned above, below, or either above or below the associated mixer input signal	LO tuned below	TBD	TBD	TBD	TBD	TBD
The method of tuning (e.g. PLL Synthesizer, Voltage Controlled Oscillator, etc)	PLL synthesizer, derived from 10 MHz internal/external reference	PLL Synthesizer	PLL Synthesizer	PLL Synthesizer	PLL Synthesizer	PLL Synthesizer
The frequency range through which the receiver is capable of being tuned	10.7 – 12.75 GHz	All operating frequencies per frequency plan	All operating frequencies per frequency plan	All operating frequencies per frequency plan	All operating frequencies per frequency plan	All operating frequencies per frequency plan
The emission designators identifying the types of emission for which this receiver is designed	41M4D7W	240M8D1W	240M8D1W	240M8D1W	240M8D1W	240M8D1W

For each frequency band the RF selectivity bandwidths at the -3, -20, -60 dB levels	Set by external filter selected during build.	TBD	TBD	TBD	TBD	TBD
For each emission designator the IF selectivity bandwidths at the -3, -20, -60 dB levels for the narrowest IF amplifier	This is a direct conversion receiver, with a 0Hz IF and a complex baseband filter. (estimated) -3 dBc = 40 MHz - 20 dBc = 46 MHz - 60 dBc = 52 MHz	TBD	TBD	TBD	TBD	TBD