Generic Constellation Coordination Information

1. Coordination Status

What is the procedural status of the satellite mission?
Pending subject to coordination

What are you seeking for consent?
Pre-coordination discussions

Parties of a coordination agreement:

PlanetiQ
Daniel Smith
15000 W. 6th Ave. Ste. 202
Golden, CO 80401
dsmith@planetiq.com
(720) 427-9711

NOAA, NASA, USAF
Note: PlanetiQ will follow-up coordination with each agency

2. Orbit Planes

Generic (GNOMES)	# of Sats	Orbit	MLTDN	Launch date
GNOMES-3	1	650 km, 98.0 deg	11:00	Mar-Apr 2022

3. Frequency Band Plan

Payload Data downlink:

- X-band, Space to Earth
- One to three downlink contacts per orbit
- Single channel, interleaved with telemetry downlink

	Frequency	Band width	EIRP	Antenna type	Beam width	Emission Designator
Channel 1	8260 MHz	20 MHz	7 dBW max	Patch	Hemi-spherical	20M0G1D

- Payload beam antenna pattern:

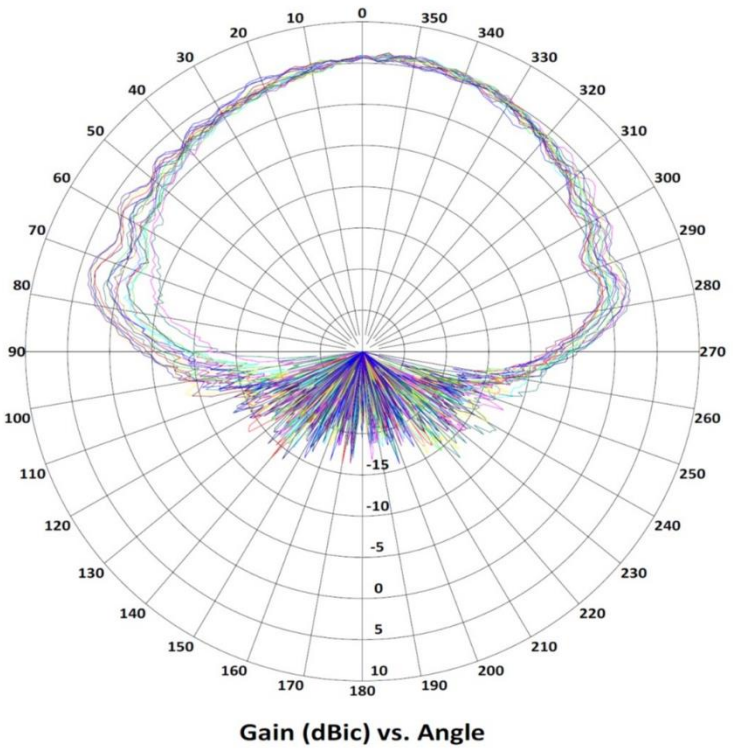


Figure 1. Payload transmission beam pattern at X-band

- Payload beam spectral emission. (include spectral plot of emission including out of band energy)

Telemetry downlink:

- X-band, Space to Earth
- One or three downlink contacts per orbit
- Single channel, interleaved with payload data downlink

	Frequency	**Band width**	**EIRP**	**Antenna type**	**Beam width**	**Emission Designator**
Channel 1	8260 MHz	20 MHz	7 dBW max	Patch	Hemi-spherical	20M0G1D

- Telemetry beam antenna pattern:

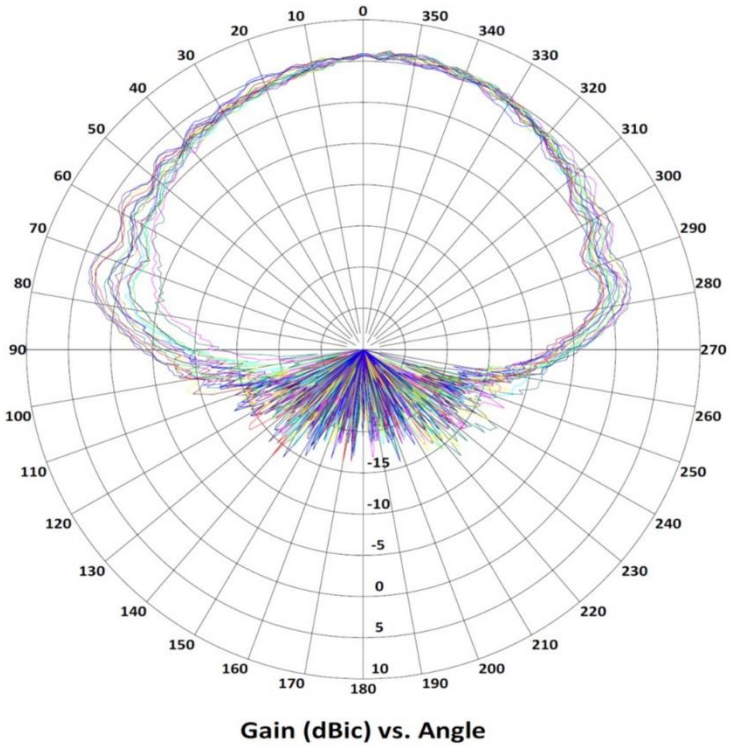


Figure 2. Telemetry transmission bean pattern at X-band (same at payload beam pattern)

- Telemetry beam spectral emission. (include spectral plot of emission including out of band energy)

Command Uplink:

- S-band, Earth to Space
- One or two downlink contacts per orbit
- Only one channel selected per contact.

	Frequency	Band width	Receive gain	Antenna type	Beam width	Emission Designator
Channel 1	2081 MHz	200 kHz	5 dBi max	Patch	Hemi-spherical	200KG1D

- Command beam receive antenna pattern

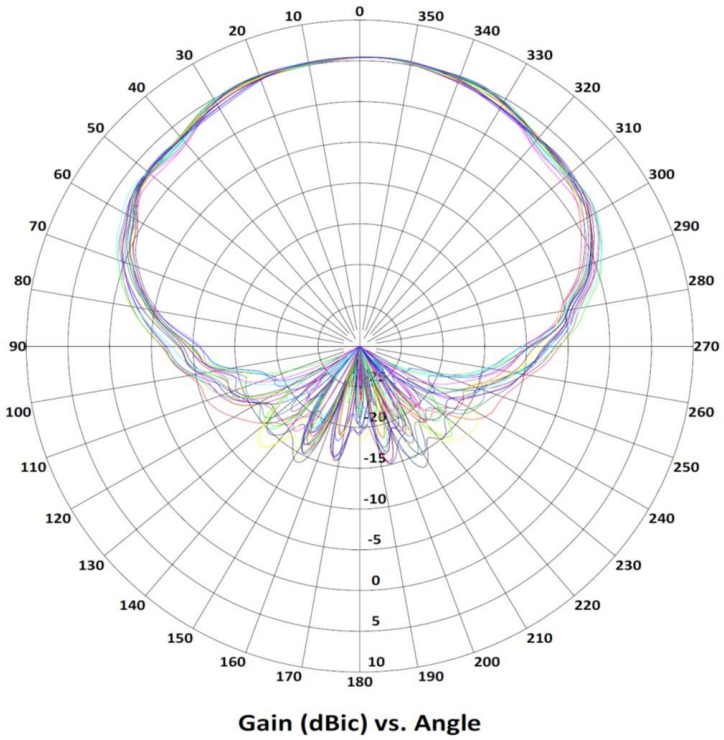


Figure 3. Command receive beam pattern at S-band

- Command beam spectral emission:

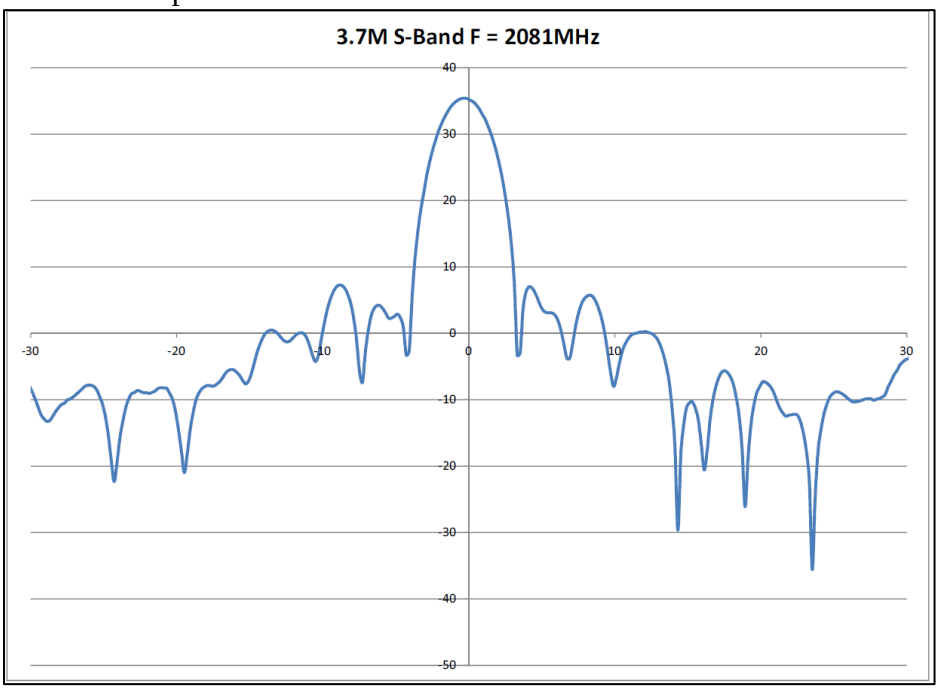
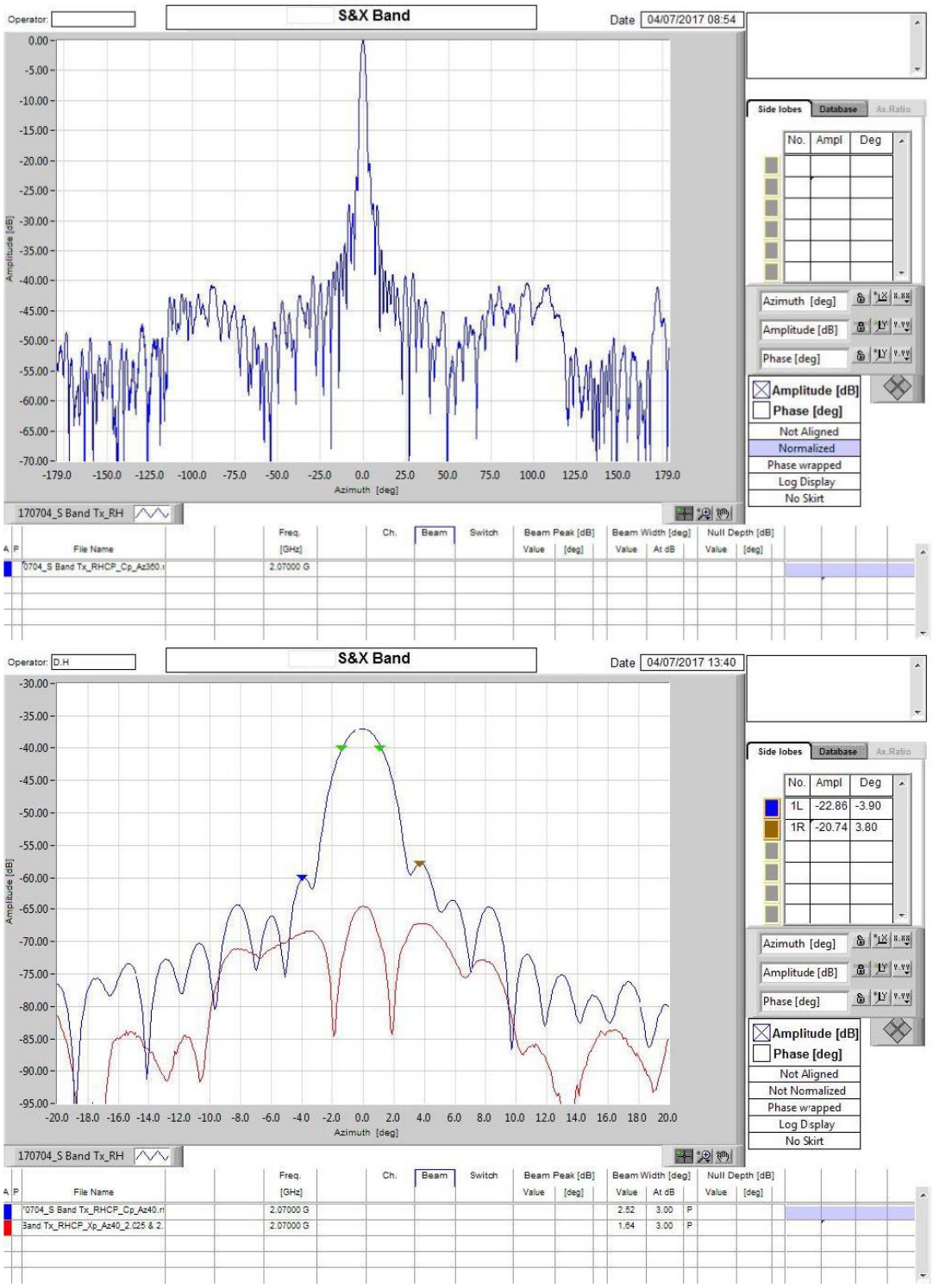


Figure 4. KSAT 3.7 m spectral emission at S-band



Graph 2 – S-Band Tx RHCP ±180° CP; ±20° CP & XP @2070MHz

Figure 5. ATLAS 3.7 m spectral emission at S-band

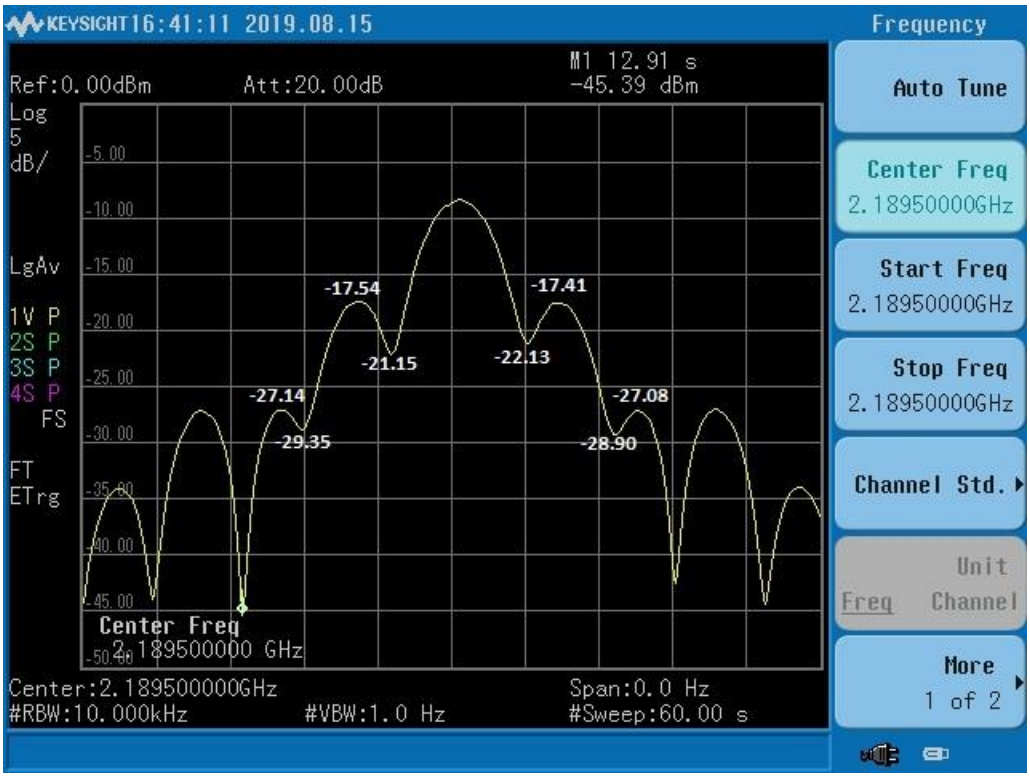


Figure 6. ATLAS 7.6 m spectral emission at S-band

4. Ground Station Description

Station Locations	X/S-band Antennas	Lat, Long, Alt
Svalbard, Norway	3.7 m	78.2294, 15.4078, 480 m
Troll, Antarctica	3.7 m	-72.0111, 2.5539, 1365 m
Harmon, Guam	3.7 m	13.5125, 144.8247, 45 m
Dubai, United Arab Emirates	7.6 m	24.7754, 55.3477, 65 m

5. Antenna Characteristics

3.7 m X/S Antenna (KSAT)	Gain	Beamwidth (3 dB)	Direction	Noise Temp	EIRP
X-band	36.78 dBi	1.4 deg	Receive	95 K	N/A
S-band	27.8 dBi	2.55 deg	Transmit	N/A	44.8 dBW

3.7 m X/S Antenna (ATLAS)	Gain	Beamwidth (3 dB)	Direction	Noise Temp	EIRP
X-band	46.5 dBi	0.7 deg	Receive	141 K @ 5°	N/A
S-band	35.4 dBi	2.6 deg	Transmit	N/A	52 dBW

7.6 m X/S Antenna (ATLAS)	Gain	Beamwidth (3 dB)	Direction	Noise Temp	EIRP
X-band	53.4 dBi	0.32 deg	Receive		N/A
S-band	41.5 dBi	2.7 deg	Transmit	N/A	53.8 dBW

6. Interference Mitigation Strategy

PlanetiQ plans to use multiple strategies for interference mitigation with incumbent operators:

- Our orbit locations and times of communication with ground stations will be well known and predicted well ahead of time.
- Our chosen ground stations are sufficiently far from the DSN ground stations to avoid any possible interference with assets utilizing those in Earth orbit or from interplanetary locations.
- The power levels of our X-band transmission system are adjustable on orbit by ground commands, and can be changed, if needed and with sufficient notice.
- Our on-board storage is large enough to store data from multiple passes, to be downlinked at another location at a different time.
- Our satellite is highly autonomous, and doesn't require commanding at every ground station pass.