



645 Harrison St. 4th Flr.
San Francisco, CA 94107
www.planet.com

General Description of the Overall System and Operations:

The V1 satellite will re-use Planet's existing ground station network currently authorized for Planet's Flock satellite system (call sign S2912). Satellite operations and control will be conducted at Planet headquarters in San Francisco California. Imaging operations will be conducted throughout the orbit at daytime over land within the duty cycle limits of the satellite. Image data is stored on board and downlinked at the next available earth station contact. The V1 satellite will conduct space operations (TT&C) in UHF (401.3 MHz space to Earth, 450.0 MHz Earth to space), payload tasking operations in S-band (2056 or 2081 MHz Earth to space) and payload data downlink in X-band (8025-8400 MHz space to Earth). The satellite will also include a developmental X-band Telemetry downlink channel as backup to the UHF channel.

Communication System Technical Characteristics:

Table 2 provides a summary of the communication channels for the V1 satellite.

Channel ID	Center Frequency	Bandwidth Modulation	Polarization	Tx Power	EIRP
Payload Data Downlink Phased Array Dual Polarization Antenna (21 dBi both polarizations, beamwidth 12.7 deg.)					
XPD1R XPD2R XPD3R	8087.5 MHz 8212.5 MHz 8337.5 MHz	96 MHz each channel 16APSK	RHCP	2 W total	21 dBW total
XPD1L XPD2L XPD3L	8087.5 MHz 8212.5 MHz 8337.5 MHz	96 MHz each channel 16APSK	LHCP	2 W total	21 dBW total
Telemetry Data Downlink X-band Patch (5 dBi, beamwidth 70 deg.) / UHF Dipole Antenna (2.15 dBi, beamwidth 70 deg)					
XT1R	8030 MHz	140.8 kHz FSK	RHCP	0.2 W	-5 dBW
XT2R	8375 MHz	140.8 kHz FSK	RHCP	0.2 W	-5 dBW



645 Harrison St. 4th Flr.
San Francisco, CA 94107
www.planet.com

UDCH1	401.3 MHz	16.3 kHz Sunde's FSK	Linear	0.5 W	-1.3 dBW
Command Uplink (Receive) S-band patch (2 dBi, beamwidth 70 deg.) / UHF Dipole (2.15 dBi, beamwidth 70 deg.)					
SUCH1	2081 MHz	1310 kHz MSK	RHCP	n/a	n/a
SUCH2	2056 MHz	1310 kHz MSK	RHCP	n/a	n/a
UUCH1	450 MHz	16.3 kHz Sunde's FSK	Linear	n/a	n/a

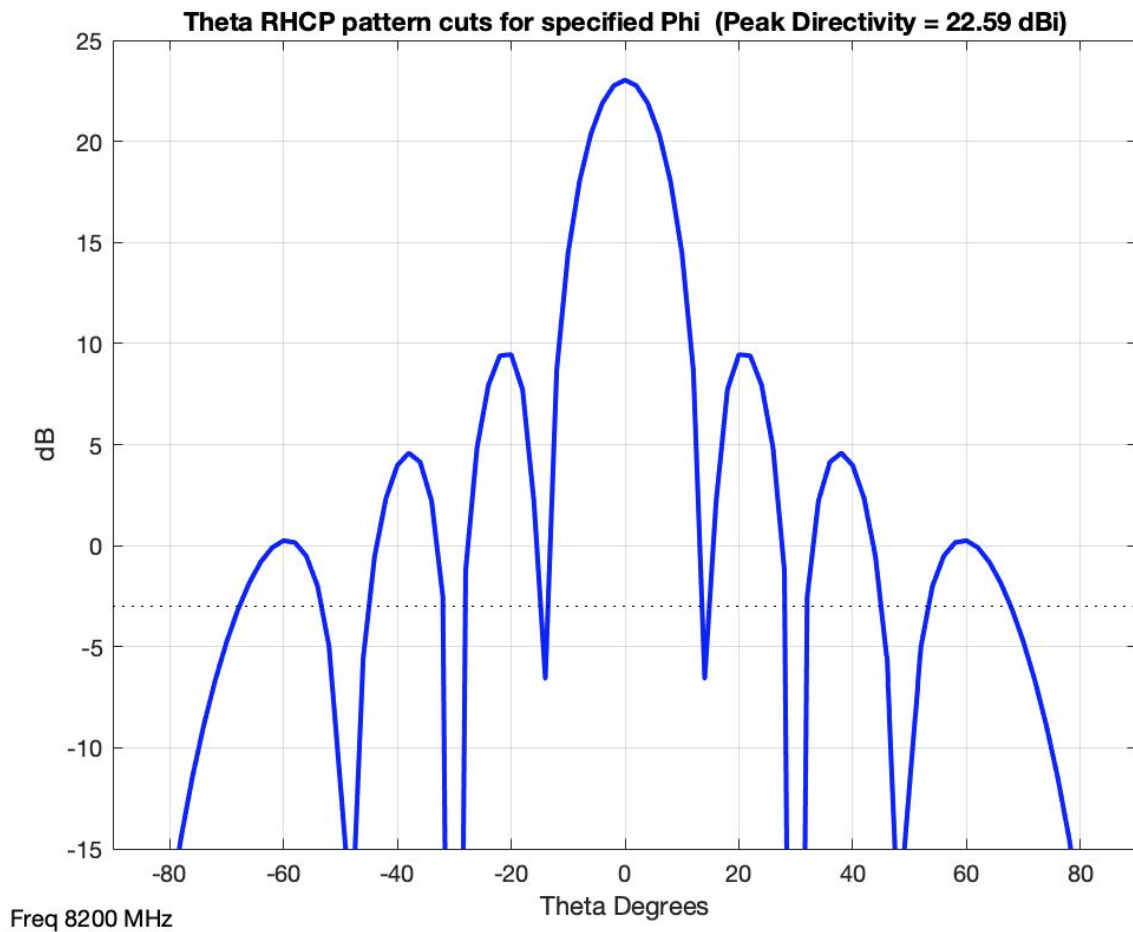
Table 2: Proposed Communication Link Channels



645 Harrison St. 4th Flr.
San Francisco, CA 94107
www.planet.com

Antenna patterns for the Communication Channels

The V1 satellite will use a Planet developed X-band passive phased array antenna for the payload data downlink. The S-band and X-band telemetry and command channel antennas will be widebeam patch antennas. The UHF TT&C channels will be a dipole type antenna. The beam patterns are shown below in Figures 5 through 9 for each respective channel in Table 2.



**Figure 5: Payload Downlink X-band Antenna Beam Pattern,
22.6 dBi directivity, (~21 dBi power gain), 12.7 degree HPBW**



645 Harrison St. 4th Flr.
San Francisco, CA 94107
www.planet.com

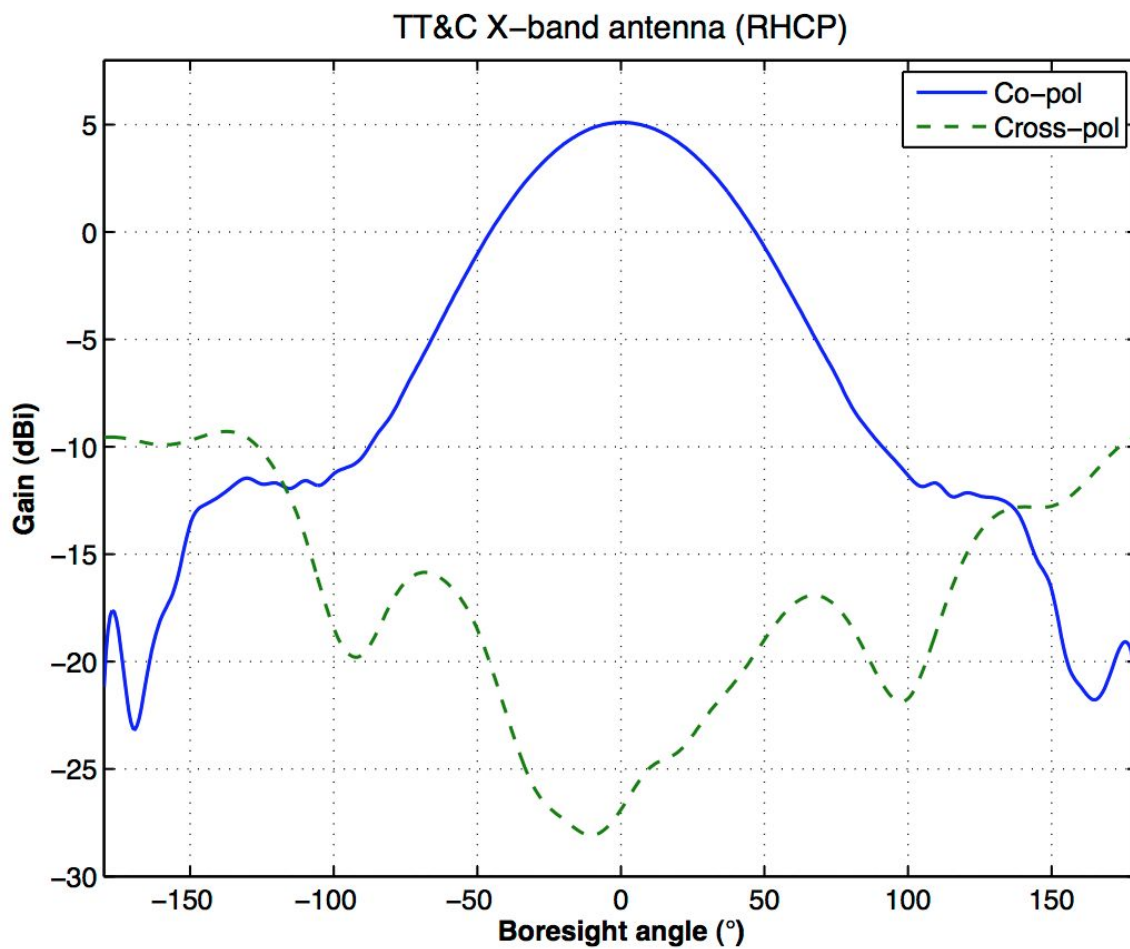


Figure 6: Telemetry Downlink X-band Antenna beam pattern



645 Harrison St. 4th Flr.
San Francisco, CA 94107
www.planet.com

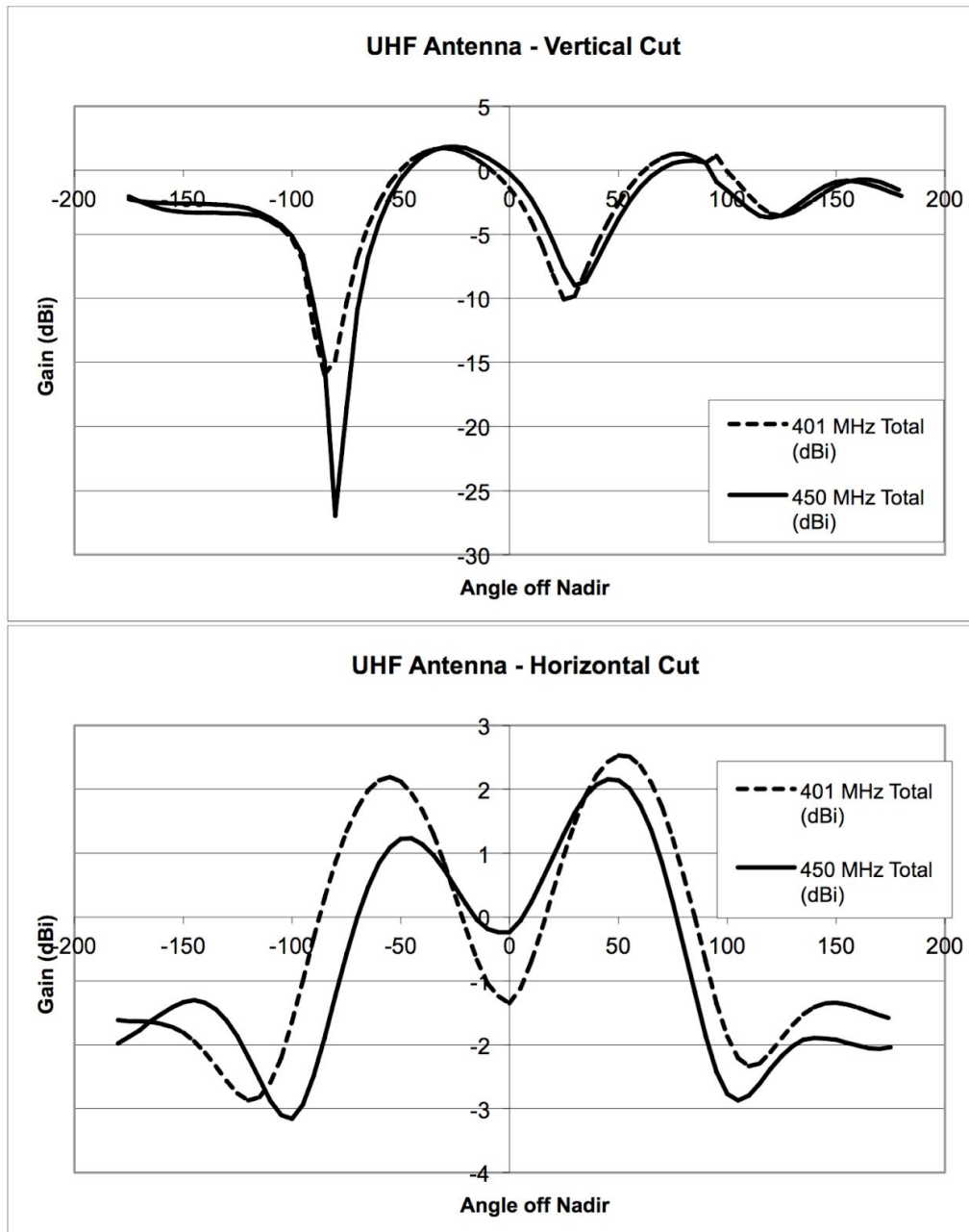


Figure 7: Telemetry Downlink UHF Antenna beam pattern



645 Harrison St. 4th Flr.
San Francisco, CA 94107
www.planet.com

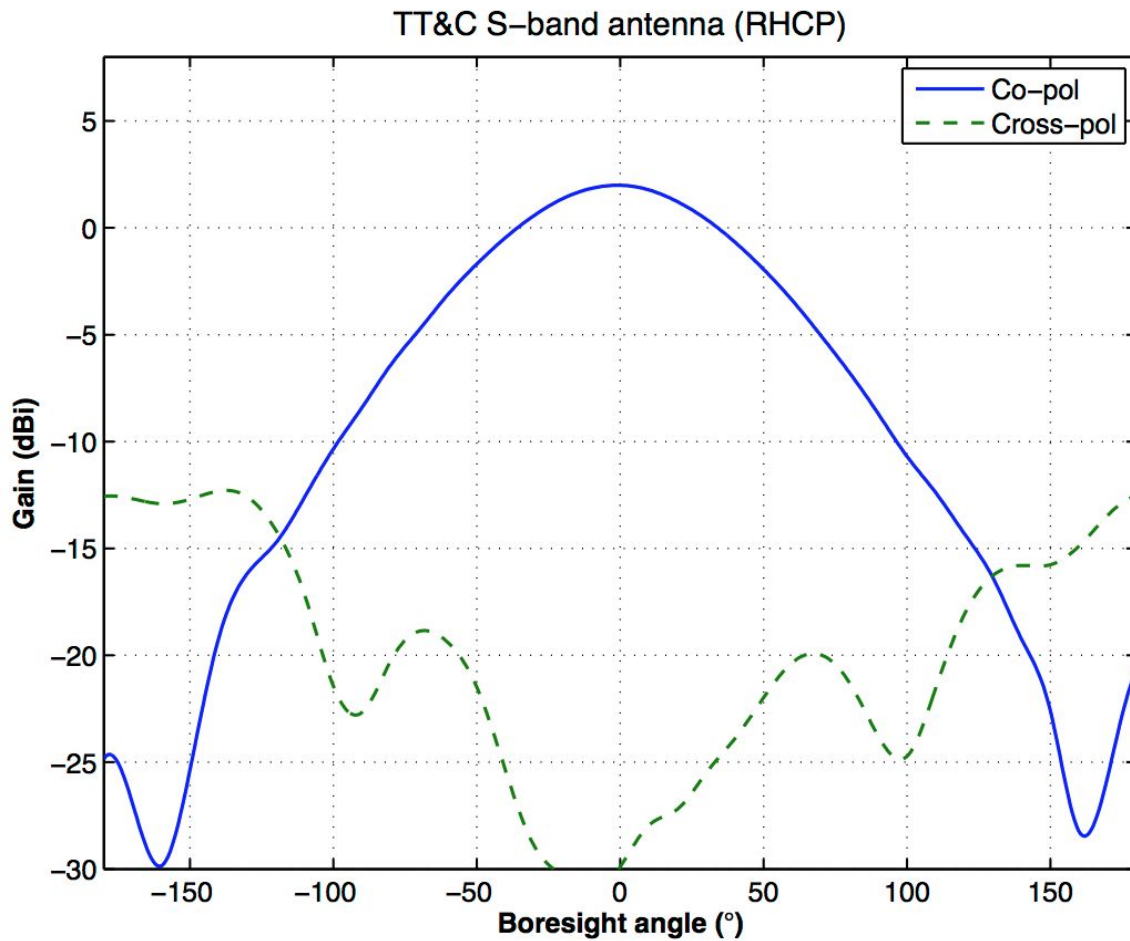


Figure 8: Command Uplink S-band Antenna beam pattern



645 Harrison St. 4th Flr.
San Francisco, CA 94107
www.planet.com

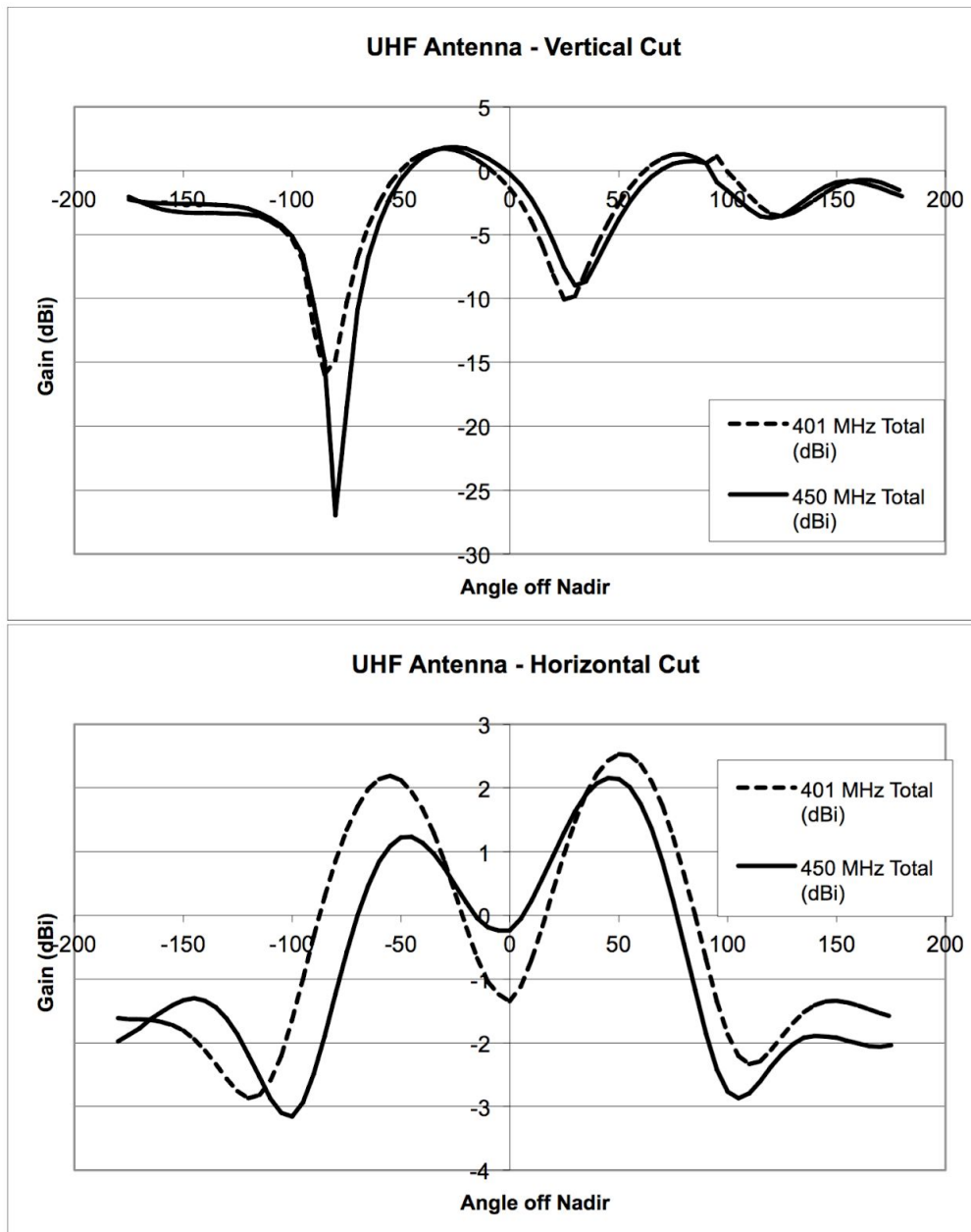


Figure 9: Command Uplink UHF Antenna beam pattern



645 Harrison St. 4th Flr.
San Francisco, CA 94107
www.planet.com

Non-Interference Criterion:

Pursuant to 47 C.F.R. § 5.84 and 5.85, it is understood that a grant of authority for this experimental program will be on a non-exclusive and non-interference basis to both Federal and non-Federal authorized users of the UHF, S-band, and X-band spectrum proposed in this application. Planet currently maintains a coordination agreement for its Flock system (S2912) and SkySat system (S2862) with several entities including NASA, NOAA, other international science missions, and commercial operators that protect these space missions against harmful interference from its Flock satellites and has implemented an operational RFI prediction and avoidance scheme. Planet will utilize this same RFI avoidance methodology for the evaluation satellites to avoid communication channel interference with the governmental space missions, other space system operators, and will coordinate with any other relevant spectrum users as necessary.

If any interference is detected or reported, our operators will cease transmissions immediately. Planet maintains an emergency support line as follows:

Emergency Stop Buzzer contact number:
(415) 683-3322, Planet Mission Operations Emergency Line