Titan 8025-8400 MHz ("X-band") Protection Showings for PFD on the surface of the Earth and at the GSO Arc

Power Flux Density ("PFD") towards the Earth

8025-8400 MHz

The Commission's rules do not specify a PFD limit for the 8025-8400 MHz band. However, rule No. 21.16 of the International Telecommunication Union (ITU) Radio Regulations does. Aethero has calculated the maximum PFD levels for transmissions from Titan in accordance with these ITU PFD limits. Aethero's operations will also be consistent with the ITU Recommendation SA.1157-1 in order to protect adjacent band deep-space research operations.

Figures 5-8 below represents the maximum transmitted EIRP at both the nominal orbit altitude of 510km and the worst-case altitude of 350 km, for the X-band downlinks.

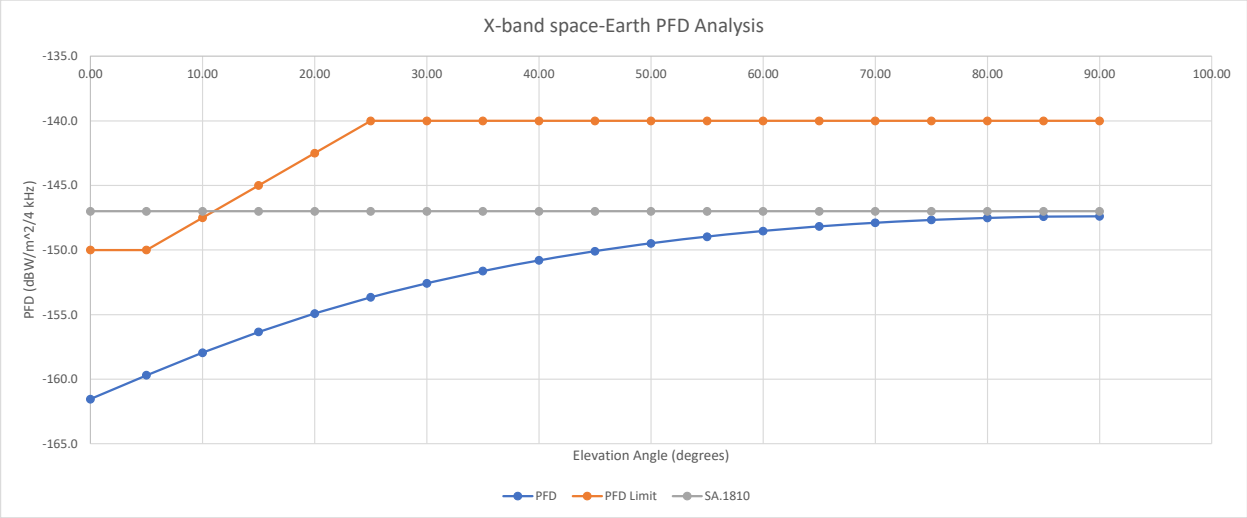

Figure 1 X-band PFD from 510 km Orbit Altitude with EIRP of 22.6 dBW over a Bandwidth of 170 MHz

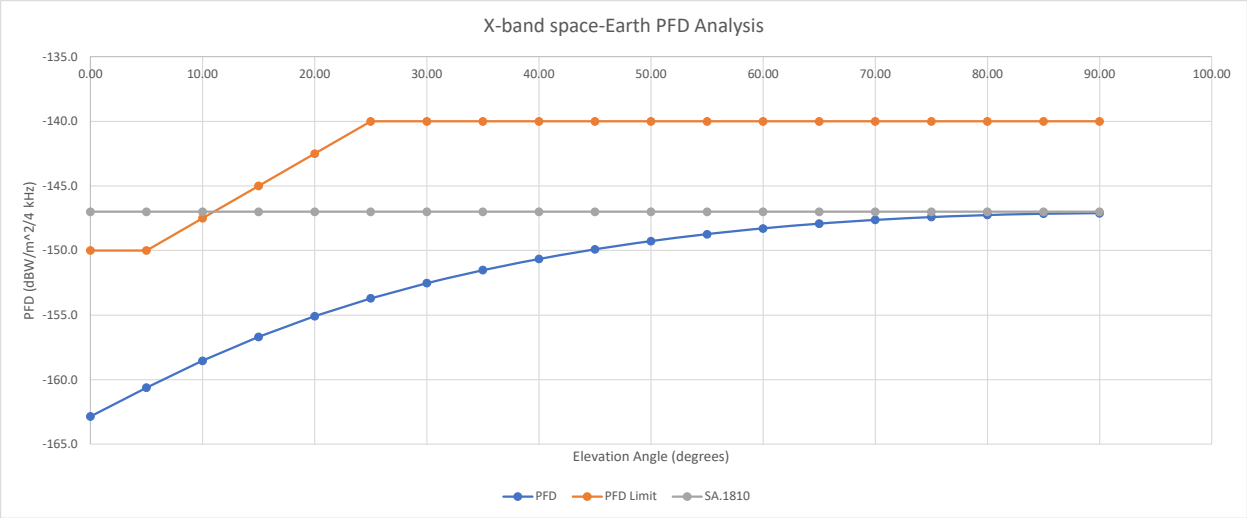

Figure 2 X-band PFD from 350 km Orbit Altitude with EIRP of 19.6 dBW over a Bandwidth of 170 MHz

Titan will have the ability to reduce the power and power density of its downlink transmissions as it descends in altitude. Aethero will actively manage and reduce power as needed to ensure compliance with applicable PFD limits.

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Protection of GSO Networks by NGSO Systems

X-band

No. 22.5 of the ITU Radio Regulations specifies that in the frequency band 8025-8400 MHz, which the EESS (using

non-geostationary satellites) shares with the fixed-satellite service (Earth-to-space) and the meteorological-satellite

service (Earth-to-space), the maximum PFD produced at the geostationary satellite orbit ("GSO") by any EESS space

station shall not exceed -174 dB(W/m2) in any 4 kHz band. The calculation below shows that the PFD produced by

the proposed transmissions does not exceed the limit in No. 22.5, even in the worst possible hypothetical case.

The PFD at the GSO produced by the transmission is:

PFD [dBW/m2 /4 kHz] = EIRP (dBW) - 71 - 20log10(D) - 10log10(BW) - 24

Where:

• EIRP is the Maximum EIRP of the transmission, in dBW;

• D is distance between the transmitting satellite and GSO, in km; and

• BW is the symbol bandwidth of the transmission, in MHz.

The closest distance between the TITAN satellite and the GSO is 35,786 - 610 = 35,176 km for the highest possible satellite orbit of 6101 km. A worst-case hypothetical assumption that the satellite antenna is radiating at its peak EIRP toward the GSO, to assure that the worst-case PFD is computed. The highest PFD producing emission from 610 km orbit altitude is 22.6 dBW EIRP which produces a maximum EIRP density of -22.4 dBW/4 kHz and results in a PFD at the GSO arc of -184.1 dBW/m2/4 kHz which is over 10 dB below the protection criteria.