

CURIE Power Calculations

The following table summarizes the values for the CURIE mission beams.

Beam	Tx Power, W/dBW	Connect or Loss, DBi	Power at Antenna Terminal, W/dBW	Antenna Gain, dBi (Same for Tx and Rx)	ERP, W / dBW	EIRP, W / dBW	Bandwidth, kHz	Power Density, dB(W/Hz)
916 MHz Down	2 / 3.01	0.1	1.95 / 2.91	5	5.6 / 7.49	9.2 / 9.64	200	-43.4
2395 / 2397 MHz Down	1 / 0	0.2	0.95 / -0.2	6.7	2.71 / 4.33	4.44 / 6.48	1620	-55.5
2397 MHz Down, SDR	1 / 0	0.2	0.95 / -0.2	6.7	2.71 / 4.33	4.44 / 6.48	1000	-53.5
916 MHz Up	4 / 6.02	0.25	3.77 / 5.77	Dish gain, includes aperture efficiency (65%) 27.3dB. Feed efficiency 60% =-2dB, overall gain dish+feed= 25.3dB	779 / 28.9	1277 / 31.1	200	-21.9
2397 MHz Up	5 / 6.99	0.5	4.46 / 6.49	Dish gain with aperture efficiency (65%) included: 35.7dB Feed efficiency 60% =-2dB, overall gain dish+feed= 33.7dB	6375 / 38.0	10455 / 40.2.	200	-12.8

Calculation of Power Spectral Density for Each Beam

PSD, Power Spectral Density, db(W/Hz). For Spacecap, must be between -200 and -10.

Method from FCC:

$$\text{PSD} = \text{EIRP (dBW)} - 10 * \text{Log}_{10}(\text{bandwidth in Hertz})$$

Beam	EIRP dBW	Bandwidth, kHz	10*Log10 of Bandwidth in Hz	PSD, db(W/Hz)
916 MHz Down	9.64	200	53	-43.4
2395 / 2397 MHz Down	6.48	1620	62	-55.5
2395 / 2397 MHz Down, SDR	6.48	1000	60	-53.5
916 MHz Up	31.1	200	53	-21.9
2397 MHz Up	40.2	200	53	-12.8