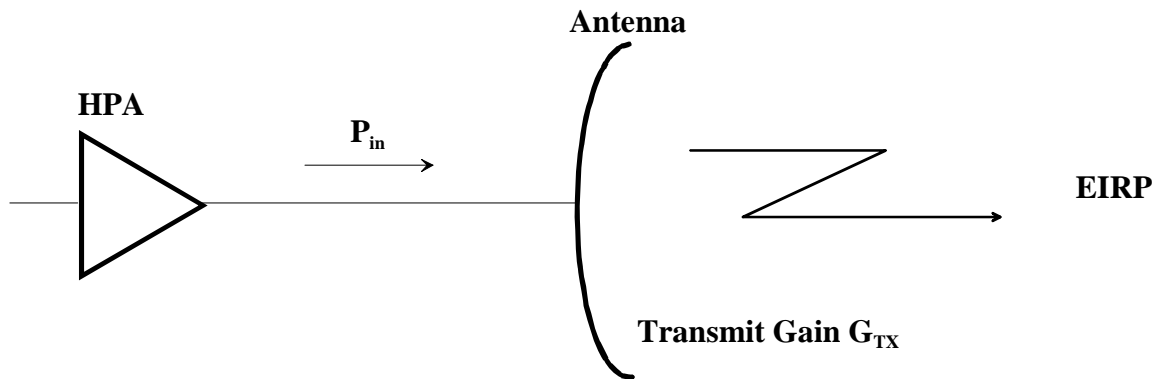


Maximum Allowed EIRP Density for C-Band Transmissions



$$1) \text{ EIRP} = P_{IN} + G_{TX} \Rightarrow P_{IN} = \text{EIRP} - G_{TX}$$

CASE A

The cross polarisation discrimination of the transmit antenna at the -1 dB contour of the main lobe is ≥ 27 dB

2) EESS 502 Specification for Transmit Gain (G_{TX} , expressed in dBi, Para. 4.1 refers):

29 - 25 Log θ	$\alpha^{*o} < \theta \leq 7^{\circ}$
+8	$7^{\circ} < \theta \leq 9.2^{\circ}$
32 - 25 Log θ	$9.2^{\circ} < \theta \leq 48^{\circ}$
-10	$48^{\circ} < \theta$

Note: $\alpha = 1^{\circ}$ or $100\lambda/D$ whichever is the greater, where D is the antenna diameter and λ is the carrier wavelength

3) EESS 502 Specification for maximum off-axis EIRP density at the 0 dB/K satellite reference contour and in the direction of an adjacent satellite (EIRP₀ density expressed in dBW/40 KHz, Para. 6.2 refers):

32 - 25 Log θ	$\alpha^{*o} < \theta \leq 7^{\circ}$
+11	$7^{\circ} < \theta \leq 9.2^{\circ}$
35 - 25 Log θ	$9.2^{\circ} < \theta \leq 48^{\circ}$
-7	$48^{\circ} < \theta$

4) Maximum Allowed Input Power Density to Antenna (for any antenna diameter)

$$\text{Pin density} = (32 - 25 \text{ Log } \theta) \text{ dBW/4kHz} - (29 - 25 \text{ Log } \theta) \text{ dBi} = \underline{3 \text{ dBW/4kHz}=13 \text{ dBW/40 KHz}}$$

5) **Example**

For an antenna with a gain of 49 dBi (corresponding approximately to a 5.6 m dish-size) the maximum allowed EIRP density **anywhere** (EIRP0 density) is:

$$3 \text{ dBW/4 KHz} + 49 \text{ dBi} = 52 \text{ dBW/4 KHz} = 62 \text{ dBW/40 KHz}$$

Note: An antenna side lobe exceeding the specified transmit gain mask by e.g.:3 dB, would lead to a reduction of the above EIRP0 density value by 3 dB etc.

Case B

The cross polarisation discrimination of the transmit antenna at the -1 dB contour of the main lobe is < 27 dB

6) EESS 502 Specification for maximum allowed EIRP density at the 0 dB/K satellite reference contour (EIRP0 density expressed in dBW/4 KHz, Para. 4.2 refers):

Cross polarisation discrimination [dB]	EIRP0 density [dBW/4 KHz]
<27	33
26	32.5
25	32.0
24	31.5
23	30.75
22	30
21	29
20	28
19	27
18	26

7) If Case B applies, the maximum allowed EIRP density will be determined by the lower of the values calculated under case A and case B.

8) **Example**

For an antenna with a cross polarisation of 25 dB, for any antenna diameter, the maximum allowed EIRP density at the 0 dB/K satellite reference contour (EIRP0 density) is:

$$32 \text{ dBW/4 KHz} = 42 \text{ dBW/40 KHz}$$

For an antenna with a gain of 49 dBi (corresponding approximately to a 5.6 m dish-size)

$$\text{Pin density} = 42 - 49 = -7 \text{ dBW/40 KHz}$$