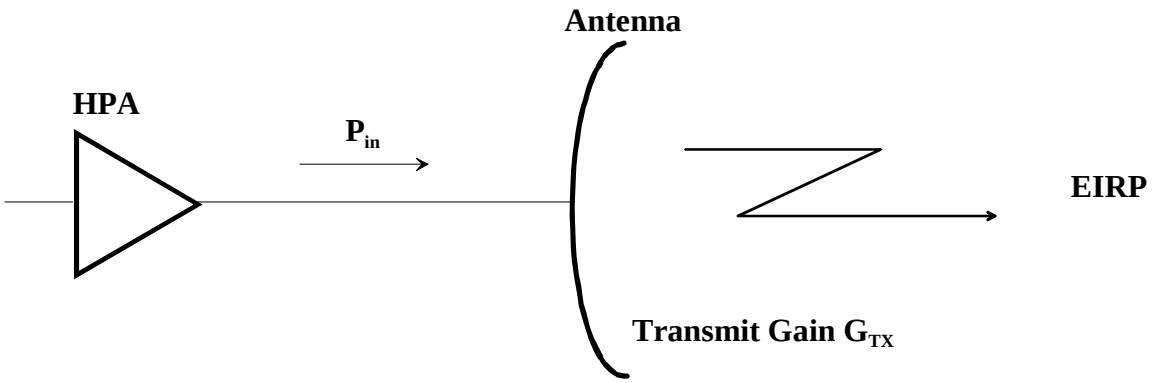
Maximum Allowed EIRP Density for Ku-Band Transmissions



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

CASE A
The cross polarisation discrimination of the transmit antenna at the -1 dB contour of the main lobe is $\geq$ 35 dB

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

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

*Note: *α = 1° or 100λ/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):

31 - 25 Log θ	$\alpha^{*\circ} < \theta \leq 7^\circ$
+10	$7^\circ < \theta \leq 9.2^\circ$
34 - 25 Log θ	$9.2^\circ < \theta \leq 48^\circ$
-8	$48^\circ < \theta$

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

Pin density = (31 - 25 Log θ) dBW/40kHz - (29 - 25 Log θ) dBi = 2 dBW/40kHz

5) **Example**

For an antenna with a gain of 49 dBi (corresponding approximately to a 2.4 m dish-size) the maximum allowed EIRP density at the 0 dB/K satellite reference contour (EIRP0 density) is:

2 dBW/40 KHz+49 dBi= 51 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 < 35 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]
<35	39
34	38.6
33	38.2
32	37.8
31	37.4
30	37
29	36.4
28	35.8
27	35.2
26	34.6
25	34

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 30 dB, for any antenna diameter, the maximum allowed EIRP density at the 0 dB/K satellite reference contour (EIRP0 density) is:

37 dBW/4 KHz = 47 dBW/40 KHz

For an antenna with a gain of 49 dBi (corresponding approximately to a 2.4 m dish-size)

Pin density = 47 – 49 = -2 dBW/40 KHz