

# R.F Exposure/Safety Calculation for CPE8100-PRO-1D-3.X

FCC ID: ARA-CPE81PRO3XA  
IC: 899A-CPE81PRO3XA

The E.U.T. is pole mounted.

Calculation of Maximum Permissible Exposure (MPE) based on FCC Section 1.1309  
& RSS 102, Issue 5 Section 2.5.2 Requirements

- 1) FCC limit at 3660 MHz:  $1 \frac{mW}{cm^2}$
- 2) IC limit at separation distance of  $\geq 3500$  MHz is:  $290 \frac{mW}{cm^2}$

Using table 1 limit for general population/uncontrolled exposures, the above level is an average over 30 minutes.

- 3) The power density produced by the E.U.T. is

$$S = \frac{P_t G_t}{4\pi R^2} \quad R = \sqrt{\frac{P_t G_t}{4\pi S}}$$

$P_t$ - Transmitted Peak Power (worst case)

$G_T$ - Antenna Gain, 15dBi

R- Distance from Transmitter

S- MPE =290mW/cm<sup>2</sup>

- 3) The calculated minimum distance between the EUT antenna and the general public is:

Operation Frequency (MHz)	Modulation	Pt (dBm)	Pt (mW)	Antenna Type	G <sub>T</sub> (dBi)	G <sub>T</sub> numeric	R (cm)	S (mW/cm <sup>2</sup> )
3652.5	QPSK	20.1	102.0	External	15.0	31.6	50	0.102598
	16QAM	20.3	107.0	External	15.0	31.6	50	0.107627
	64QAM	19.8	95.5	External	15.0	31.6	50	0.09606
3675.0	QPSK	20.3	107.0	External	15.0	31.6	50	0.107627
	16QAM	20.0	100.0	External	15.0	31.6	50	0.100586
	64QAM	20.0	100.0	External	15.0	31.6	50	0.100586
3697.5	QPSK	20.1	102.0	External	15.0	31.6	50	0.102598
	16QAM	20.1	102.0	External	15.0	31.6	50	0.102598
	64QAM	20.2	105.0	External	15.0	31.6	50	0.105615

**5MHz Bandwidth**

Operation Frequency (MHz)	Modulation	Pt (dBm)	Pt (mW)	Antenna Type	G <sub>T</sub> (dBi)	G <sub>T</sub> numeric	R (cm)	S (mW/cm <sup>2</sup> )
3655.0	QPSK	24.0	251.0	External	15.0	31.6	50	0.252471
	16QAM	23.7	234.0	External	15.0	31.6	50	0.235371
	64QAM	24.1	257.0	External	15.0	31.6	50	0.258506
3675.0	QPSK	23.9	246.0	External	15.0	31.6	50	0.247441
	16QAM	23.9	246.0	External	15.0	31.6	50	0.247441
	64QAM	23.8	240.0	External	15.0	31.6	50	0.241406
3695.0	QPSK	24.1	257.0	External	15.0	31.6	50	0.258506
	16QAM	24.1	257.0	External	15.0	31.6	50	0.258506
	64QAM	23.9	246.0	External	15.0	31.6	50	0.247441

**10MHz Bandwidth**

Operation Frequency (MHz)	Modulation	Pt (dBm)	Pt (mW)	Antenna Type	G <sub>T</sub> (dBi)	G <sub>T</sub> numeric	R (cm)	S (mW/cm <sup>2</sup> )
3657.5	QPSK	25.6	363.0	External	15.0	31.6	50	0.365127
	16QAM	25.4	347.0	External	15.0	31.6	50	0.349033
	64QAM	25.7	372.0	External	15.0	31.6	50	0.37418
3675.0	QPSK	25.6	363.0	External	15.0	31.6	50	0.365127
	16QAM	25.9	389.0	External	15.0	31.6	50	0.391279
	64QAM	25.6	363.0	External	15.0	31.6	50	0.365127
3692.5	QPSK	25.8	380.0	External	15.0	31.6	50	0.382227
	16QAM	25.7	372.0	External	15.0	31.6	50	0.37418
	64QAM	25.9	389.0	External	15.0	31.6	50	0.391279

**15MHz Bandwidth**

Operation Frequency (MHz)	Modulation	Pt (dBm)	Pt (mW)	Antenna Type	G <sub>T</sub> (dBi)	G <sub>T</sub> numeric	R (cm)	S (mW/cm <sup>2</sup> )
3660.0	QPSK	27.1	513.0	External	15.0	31.6	50	0.516006
	16QAM	26.9	490.0	External	15.0	31.6	50	0.492871
	64QAM	27.1	513.0	External	15.0	31.6	50	0.516006
3675.0	QPSK	27.0	501.0	External	15.0	31.6	50	0.503935
	16QAM	26.9	490.0	External	15.0	31.6	50	0.492871
	64QAM	27.0	501.0	External	15.0	31.6	50	0.503935
3690.0	QPSK	26.8	479.0	External	15.0	31.6	50	0.481807
	16QAM	26.8	479.0	External	15.0	31.6	50	0.481807
	64QAM	26.9	490.0	External	15.0	31.6	50	0.492871

**20MHz Bandwidth**

- 4) The E.U.T. meets the limits of FCC Section 1.1309 and RSS 102, Issue 5 Section 2.5.2.