

MPE Calculation for FCC ID: 2AD9PACN1400 PRC

Remark: Average $\leq$ Peak, which means that calculating the power density with Peak power is worst case. The worst operation mode generating the highest power in each frequency range is taken for calculation.

#1: WIFI 11bgn(HT20/40) radio, worst case:

Frequency range: **2412-2462** MHz Typical use distance: $d \geq 20$ cm

Power density limit for mobile devices at 2.4 GHz: $S \leq 1$ mW/cm²

Maximum measured conducted power (Peak): $P_{\text{conducted}} = 14.55$ dBm = 28.51 mW

Antenna Gain: $G = 0.88$ dBi = 1.22 on the linear scale

Calculation: $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = 14.55$ dBm + 0.88 dBi = 15.43 dBm = 34.91 mW

Power density $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 34.91 / 5026 = 0.0069$ mW/cm² $< 1 \Rightarrow$ below limit

#2: BLE (40Ch) radio under rule part 15.247, worst case:

Frequency range: **2402-2480** MHz Typical use distance: $d \geq 20$ cm

Power density limit for mobile devices at 2.4 GHz: $S \leq 1$ mW/cm²

Maximum measured conducted power (Peak): $P_{\text{conducted}} = -1.19$ dBm = 0.76 mW

Antenna Gain: $G = 0.88$ dBi = 1.22 on the linear scale

Calculation: $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = -1.19$ dBm + 0.88 dBi = -0.31 dBm = 0.93 mW

Power density $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 0.93 / 5026 = 0.0002$ mW/cm² $< 1 \Rightarrow$ below limit

#3: BT (79 Ch) radio under rule part 15.247, worst case:

Frequency range: **2402-2480** MHz Typical use distance: $d \geq 20$ cm

Power density limit for mobile devices at 2.4 GHz: $S \leq 1$ mW/cm²

Maximum measured conducted power (Peak): $P_{\text{conducted}} = 2.15$ dBm = 1.64 mW

Antenna Gain: $G = 0.88$ dBi = 1.22 on the linear scale

Calculation: $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = 2.15$ dBm + 0.88 dBi = 3.03 dBm = 2.01 mW

Power density $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 2.01 / 5026 = 0.0004$ mW/cm² $< 1 \Rightarrow$ below limit

#4: RFID 13.56 MHz radio, worst case:

Tested under 15.225, with a max. emission of 96.93 dB μ V/m, RF exposure is not applicable.

#5: Single Modular Module under 15.247 with FCC ID: QOQWT32AE (BT (79 Ch) radio), worst case:

Frequency range: **2402-2480** MHz Typical use distance: $d \geq 20$ cm

Power density limit for mobile devices at 2.4 GHz: $S \leq 1$ mW/cm²

Maximum measured conducted power (Peak): $P_{\text{conducted}} = 1.93$ dBm = 1.56 mW

Antenna Gain: $G = 2.05$ dBi = 1.6 on the linear scale (= 2.05 dBi ceramic on-board antenna)

Calculation: $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = 1.93$ dBm + 2.05 dBi = 3.98 dBm = 2.5 mW

Power density $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 2.5 / 5026 = 0.0005$ mW/cm² $< 1 \Rightarrow$ below limit

#6: Single Modular Module with FCC ID: UYI24 (2.4GHz GFSK modulated), worst case:

Tested under 15.249, with a max. emission of 92.08 dB μ V/m, RF exposure is not applicable.

Conclusion: At 20 cm, the sum of powers and the sum of power densities both remain far under the maximum power allowed in 15.247 (1W) and also remain also far below 1 mW/cm².