

MPE Calculation for FCC ID: 2AD9PACN1000 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): $P_{\text{conducted}} = 13.69$ dBm = 23.39 mW

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

Calculation: $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = 13.69$ dBm + 0.88 dBi = 14.57 dBm = 28.64 mW

Power density $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 28.64 / 5026 = 0.0057$ 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): $P_{\text{conducted}} = -0.39$ dBm = 0.91 mW

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

Calculation: $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = -0.39$ dBm + 0.88 dBi = 0.49 dBm = 1.12 mW

Power density $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 1.12 / 5026 = 0.0002$ 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): $P_{\text{conducted}} = 0.7$ dBm = 1.17 mW

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

Calculation: $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = 0.7$ dBm + 0.88 dBi = 1.58 dBm = 1.44 mW

Power density $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 1.44 / 5026 = 0.0003$ 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.