

## MPE Calculation

FCC: 2AC23-WT31M2311A

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

### WIFI:

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/cm<sup>2</sup>

Maximum measured conducted power (Peak):  $P_{\text{conducted}} = 14.34$  dBm = 27.16 mW

Antenna Gain:  $G = 3$  dBi = 2 on the linear scale

Calculation:  $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = 14.34$  dBm + 3 dBi = 17.34 dBm = 54.2 mW

Power density  $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 54.2 / 5026 = 0.0108$  mW/cm<sup>2</sup>  $< 1 \Rightarrow$  below limit

Frequency range: **2422-2452** MHz

Typical use distance:  $d \geq 20$  cm

Power density limit for mobile devices at 2.4 GHz:  $S \leq 1$  mW/cm<sup>2</sup>

Maximum measured conducted power (Peak):  $P_{\text{conducted}} = 13.27$  dBm = 21.23 mW

Antenna Gain:  $G = 3$  dBi = 2 on the linear scale

Calculation:  $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = 13.27$  dBm + 3 dBi = 16.27 dBm = 42.36 mW

Power density  $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 42.36 / 5026 = 0.0084$  mW/cm<sup>2</sup>  $< 1 \Rightarrow$  below limit

Frequency range: **5180-5240** MHz

Typical use distance:  $d \geq 20$  cm

Power density limit for mobile devices at 2.4 GHz:  $S \leq 1$  mW/cm<sup>2</sup>

Maximum measured conducted power (Peak):  $P_{\text{conducted}} = 17.45$  dBm = 55.59 mW

Antenna Gain:  $G = 3.91$  dBi = 2.46 on the linear scale

Calculation:  $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = 17.45$  dBm + 3.91 dBi = 21.36 dBm = 136.77 mW

Power density  $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 136.77 / 5026 = 0.0272$  mW/cm<sup>2</sup>  $< 1 \Rightarrow$  below limit

Frequency range: **5190-5230** MHz

Typical use distance:  $d \geq 20$  cm

Power density limit for mobile devices at 2.4 GHz:  $S \leq 1$  mW/cm<sup>2</sup>

Maximum measured conducted power (Peak):  $P_{\text{conducted}} = 14.2$  dBm = 26.3 mW

Antenna Gain:  $G = 3.91$  dBi = 2.46 on the linear scale

Calculation:  $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = 14.2$  dBm + 3.91 dBi = 18.11 dBm = 64.71 mW

Power density  $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 64.71 / 5026 = 0.0129$  mW/cm<sup>2</sup>  $< 1 \Rightarrow$  below limit

Frequency range: **5745-5825** MHz

Typical use distance:  $d \geq 20$  cm

Power density limit for mobile devices at 2.4 GHz:  $S \leq 1$  mW/cm<sup>2</sup>

Maximum measured conducted power (Peak):  $P_{\text{conducted}} = 17.34$  dBm = 54.2 mW

Antenna Gain:  $G = 3.91$  dBi = 2.46 on the linear scale

Calculation:  $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = 17.34$  dBm + 3.91 dBi = 21.25 dBm = 133.35 mW

Power density  $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 133.35 / 5026 = 0.0265$  mW/cm<sup>2</sup>  $< 1 \Rightarrow$  below limit

Frequency range: **5755-5795** MHz

Typical use distance:  $d \geq 20$  cm

Power density limit for mobile devices at 2.4 GHz:  $S \leq 1$  mW/cm<sup>2</sup>

Maximum measured conducted power (Peak):  $P_{\text{conducted}} = 14.85$  dBm = 30.55 mW

Antenna Gain:  $G = 3.91$  dBi = 2.46 on the linear scale

Calculation:  $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = 14.85$  dBm + 3.91 dBi = 18.76 dBm = 75.16 mW

Power density  $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 75.16 / 5026 = 0.0150$  mW/cm<sup>2</sup>  $< 1 \Rightarrow$  below limit

**BLE:**Frequency range: **2402-2480** MHzTypical use distance:  $d \geq 20$  cmPower density limit for mobile devices at 2.4 GHz:  $S \leq 1$  mW/cm<sup>2</sup>Maximum measured conducted power (Peak):  $P_{\text{conducted}} = -3.1$  dBm = 0.49 mWAntenna Gain:  $G = 3$  dBi = 2 on the linear scaleCalculation:  $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = -3.1$  dBm + 3 dBi = -0.1 dBm = 0.98 mWPower density  $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 0.98 / 5026 = 0.0002$  mW/cm<sup>2</sup> < 1 => below limit**BT:**Frequency range: **2402-2480** MHzTypical use distance:  $d \geq 20$  cmPower density limit for mobile devices at 2.4 GHz:  $S \leq 1$  mW/cm<sup>2</sup>Maximum measured conducted power (Peak):  $P_{\text{conducted}} = 4.3$  dBm = 2.69 mWAntenna Gain:  $G = 3$  dBi = 2 on the linear scaleCalculation:  $P_{\text{radiated}} = P_{\text{conducted}} + G_{\text{linear}} = 4.3$  dBm + 3 dBi = 7.3 dBm = 5.37 mWPower density  $S = (P_{\text{radiated}}) / (4\pi \times d^2) = 5.37 / 5026 = 0.0011$  mW/cm<sup>2</sup> < 1 => below limit

***Note that WiFi (2.4 or 5G mode) + Bluetooth (BT or BLE mode) can transmit simultaneously, the sum WiFi and Bluetooth powers are far under the limit, whereas the sum of the worst-case power densities of WiFi and Bluetooth is  $0.0272 + 0.0011 = 0.0283$  mW/cm<sup>2</sup>, which is also far below the limit of 1 mW/cm<sup>2</sup>.***