MPE Calculation

FCC ID: 2AC23-WT39M2011

Remark: Average ≤ 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 ≥ 20 cm

Power density limit for mobile devices at 2.4 GHz: S ≤ 1 mW/cm^2

Maximum measured conducted power (Peak): $P_{conducted}$ = **20.44** dBm = 110.66 mW

Antenna Gain: G = **1.45** dBi = 1.4 on the linear scale

Calculation: $P_{radiated} = P_{conducted} + G_{linear}$ = 20.44 dBm + 1.45 dBi = 21.89 dBm = 154.53 mW

Power density S = $(P_{radiated}) / (4\pi \times d^2)$ = 154.53 / 5026 = 0.0307 mW/cm^2 < 1 => below limit

Frequency range: **2422-2452** MHz Typical use distance: d ≥ 20 cm

Power density limit for mobile devices at 2.4 GHz: S ≤ 1 mW/cm^2

Maximum measured conducted power (Peak): $P_{conducted}$ = **22.02** dBm = 159.22 mW

Antenna Gain: G = **1.45** dBi = 1.4 on the linear scale

Calculation: $P_{radiated} = P_{conducted} + G_{linear}$ = 22.02 dBm + 1.45 dBi = 23.47 dBm = 222.33 mW

Power density S = $(P_{radiated}) / (4\pi \times d^2)$ = 222.33 / 5026 = 0.0442 mW/cm^2 < 1 => below limit

Frequency range: **5180-5240** MHz Typical use distance: d ≥ 20 cm

Power density limit for mobile devices at 2.4 GHz: S ≤ 1 mW/cm^2

Maximum measured conducted power (Peak): $P_{conducted}$ = **15.65** dBm = 36.73 mW

Antenna Gain: G = **2.78** dBi = 1.9 on the linear scale

Calculation: $P_{radiated} = P_{conducted} + G_{linear}$ = 15.65 dBm + 2.78 dBi = 18.43 dBm = 69.66 mW

Power density S = $(P_{radiated}) / (4\pi \times d^2)$ = 69.66 / 5026 = 0.0139 mW/cm^2 < 1 => below limit

Frequency range: **5190-5230** MHz Typical use distance: d ≥ 20 cm

Power density limit for mobile devices at 2.4 GHz: S ≤ 1 mW/cm^2

Maximum measured conducted power (Peak): $P_{conducted}$ = **15.23** dBm = 33.34 mW

Antenna Gain: G = **2.78** dBi = 1.9 on the linear scale

Calculation: $P_{radiated} = P_{conducted} + G_{linear}$ = 15.23 dBm + 2.78 dBi = 18.01 dBm = 63.24 mW

Power density S = $(P_{radiated}) / (4\pi \times d^2)$ = 63.24 / 5026 = 0.0126 mW/cm^2 < 1 => below limit

Frequency range: **5745-5825** MHz Typical use distance: d ≥ 20 cm

Power density limit for mobile devices at 2.4 GHz: S ≤ 1 mW/cm^2

Maximum measured conducted power (Peak): $P_{conducted}$ = **15.42** dBm = 34.83 mW

Antenna Gain: G = **2.02** dBi = 1.59 on the linear scale

Calculation: $P_{radiated} = P_{conducted} + G_{linear}$ = 15.42 dBm + 2.02 dBi = 17.44 dBm = 55.46 mW

Power density S = $(P_{radiated}) / (4\pi \times d^2)$ = 55.46 / 5026 = 0.0110 mW/cm^2 < 1 => below limit

Frequency range: **5755-5795** MHz Typical use distance: d ≥ 20 cm

Power density limit for mobile devices at 2.4 GHz: S ≤ 1 mW/cm^2

Maximum measured conducted power (Peak): $P_{conducted}$ = **14.21** dBm = 26.36 mW

Antenna Gain: G = **2.02** dBi = 1.59 on the linear scale

Calculation: $P_{radiated} = P_{conducted} + G_{linear}$ = 14.21 dBm + 2.02 dBi = 16.23 dBm = 41.98 mW

Power density S = $(P_{radiated}) / (4\pi \times d^2)$ = 41.98 / 5026 = 0.0084 mW/cm^2 < 1 => below limit

BLE:

Frequency range: **2402-2480** MHz Typical use distance: d ≥ 20 cm

Power density limit for mobile devices at 2.4 GHz: S ≤ 1 mW/cm^2

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

Antenna Gain: G = **3.96** dBi = 2.49 on the linear scale

Calculation: $P_{radiated} = P_{conducted} + G_{linear}$ = 2.15 dBm + 3.96 dBi = 6.11 dBm = 4.08 mW

Power density S = $(P_{radiated}) / (4\pi \times d^2)$ = 4.08 / 5026 = 0.0008 mW/cm^2 < 1 => below limit

BT:

Frequency range: **2402-2480** MHz Typical use distance: d ≥ 20 cm

Power density limit for mobile devices at 2.4 GHz: S ≤ 1 mW/cm^2

Maximum measured conducted power (Peak): $P_{conducted}$ = **3.8** dBm = 2.4 mW

Antenna Gain: G = **3.96** dBi = 2.49 on the linear scale

Calculation: $P_{radiated} = P_{conducted} + G_{linear}$ = 3.8 dBm + 3.96 dBi = 7.76 dBm = 5.97 mW

Power density S = $(P_{radiated}) / (4\pi \times d^2)$ = 5.97 / 5026 = 0.0012 mW/cm^2 < 1 => below limit

Note that WiFi (2.4 or 5G mode) + Bluetooth (BT or BLE mode) can transmit simultaneously, the sum ot both worst-case power densities is 0.0442+0.0012 = 0.0454 mW/cm^2 = 0.454 W/m^2