

SAR evaluation

MPE Calculation Method

$$E \text{ (V/m)} = (30 \cdot P \cdot G)^{0.5} / d$$

$$\text{Power Density: } P_d \text{ (W/m}^2\text{)} = E^2 / 377$$

E = Electric Field (V/m)

P = Peak RF output Power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$P_d = (30 \cdot P \cdot G) / (377 \cdot d^2)$$

From the peak EUT RF output power, the minimum mobile separation distance, $d=0.2\text{m}$, as well as the gain of the used antenna, the RF power density can be obtained.

Calculated Result and Limit (WORSE CASE IS AS BELOW)

WIFI:

Directional Antenna Gain (Numeric)	Peak Output Power (mW)	Power Density (S)(mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
1.122 (0.5dBi)	19.4536 (12.89dBm@2437MHz)	0.00434	1	Complies

Zigbee:

Field strength =104.61dBuV/m @3m

$$\text{So EIRP} = \{ [10^{(104.61/20)} / 10^6 \times 3]^2 / 30 \} \times 1000 \text{ mW} = 8.672 \text{ mW}$$

EIRP (mW)	Power Density (S)(mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
8.672	0.00173	1	Complies

Conclusion:

$$0.00434 + 0.00173 = 0.00607 < 1$$