Maximum Permissible Exposure

Applicable Standard

According to §1.1307(b)(5), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

Remark: 1) For WIFI: The maximum output power for antenna is 17.11dBm (51.40mW) at 2472MHz, 3.29dBi antenna gain(with 2.13 numeric antenna gain.)

For BDR+EDR: The maximum output power for antenna is 2.91dBm (1.95mW) at 2441MHz, 3.29dBi antenna gain(with 2.13 numeric antenna gain.)

For BLE: The maximum output power for antenna is 5.66dBm (3.68mW) at 2480MHz, 3.29dBi antenna gain(with 2.13 numeric antenna gain.)

2) For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20cm, even if the calculation indicate that the MPE distance would be lesser.

Calculation

Given $E = \dfrac{\sqrt{30 \times P \times G}}{d}$ & $S = \dfrac{E^2}{3770}$

Where E = Field Strength in Volts / meter
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power Density in milliwatts / square centimeter

For WIFI:

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output power=51.40mW

Numeric Antenna gain=2.13

Substituting the MPE safe distance using d=20cm into above equation.

Yields:

$S=0.000199*P*G$

Where P=Power in mW

G=Numeric antenna gain

S=Power density in mW/cm^2

Power density=0.0218mW/cm^2

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm^2 even if the calculation indicates that the power density would be larger.)

For BDR+EDR

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output power=1.95mW

Numeric Antenna gain=2.13

Substituting the MPE safe distance using d=20cm into above equation.

Yields:

S=0.000199*P*G

Where   P=Power in mW

G=Numeric antenna gain

S=Power density in mW/cm²

<u>*Power density=0.0008mW/cm²*</u>

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm² even if the calculation indicates that the power density would be larger.)

For BLE

Maximum Permissible Exposure

output power=3.68mW

Numeric Antenna gain=2.13

Substituting the MPE safe distance using d=20cm into above equation.

Yields:

S=0.000199*P*G

Where   P=Power in mW

G=Numeric antenna gain

S=Power density in mW/cm²

<u>*Power density=0.0016mW/cm²*</u>

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm² even if the calculation indicates that the power density would be larger.)

Result: Because the result of power density is lower than the limit, so the device is exempt from SAR.