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.

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

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 2.4G WIFI

1) The maximum output power for Module BL-M7668BU2 is 17.42dBm (55.21mW) at 2437MHz, (with 5dBi antenna gain (3.16 numeric antenna gain))

2) The maximum output power for Module BL-M8822BU3 is 16.47dBm (44.36mW) at 2437MHz, (with 5dBi antenna gain (3.16 numeric antenna gain))

Maximum Permissible Exposure

Module BL-M7668BU2 output power=55.21mW

Module BL-M8822BU3 output power=44.36mW

Numeric Antenna gain=3.16 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 3.16 gain

S=Power density in mW/cm2

Module BL-M7668BU2 Power density=0.033mW/cm2

Module BL-M8822BU3 Power density=0.028mW/cm2

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

For 5G WIFI

U-NII-1 Band

1) The maximum output power for Module BL-M7668BU2 is 13.58dBm (22.80mW) at 5200MHz, (with 5dBi antenna gain (3.16 numeric antenna gain))
2) The maximum output power for Module BL-M8822BU3 is 10.03dBm (10.07mW) at 5180MHz, (with 5dBi antenna gain (3.16 numeric antenna gain))

Maximum Permissible Exposure

Module BL-M7668BU2 output power=22.80mW

Module BL-M8822BU3 output power=10.07mW

Numeric Antenna gain=3.16 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

Module BL-M7668BU2 Power density=0.014 mW/cm2

Module BL-M8822BU3 Power density=0.006 mW/cm2

(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.)

U-NII-3 Band

3) The maximum output power for Module BL-M7668BU2 is 11.78dBm (15.07mW) at 5825MHz, (with 5 dBi antenna gain (3.16 numeric antenna gain))
4) The maximum output power for Module BL-M8822BU3 is 11.66dBm (14.66mW) at 5825MHz, (with 5 dBi antenna gain (3.16 numeric antenna gain))

Maximum Permissible Exposure

Module BL-M7668BU2 output power=15.07mW

Module BL-M8822BU3 output power=14.66mW

Numeric Antenna gain=3.16 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

Module BL-M7668BU2 Power density=0.009mW/cm2

Module BL-M8822BU3 Power density=0.009mW/cm2

(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:

1) The maximum output power is 3.38dBm (2.18mW) at 2440MHz, (with 5dBi antenna gain (3.16 numeric antenna gain))

Maximum Permissible Exposure

Output power=2.18mW

Numeric Antenna gain=3.16 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

Power density=0.001mW/cm2 (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.)

If 2.4GHz and 5GHz operate simultaneously,
Module BL-M7668BU2 Total power density=0.033/1+0.014/1+0.001/1=0.048<1.0
Module BL-M8822BU3 Total power density=0.028/1+0.006/1=0.034<1.0