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 2.4G WIFI
1) The maximum output power for Module 1 is 12.29 dBm (16.94mW) at 2437MHz, (with 2.9 dBi antenna gain (1.95 numeric antenna gain))
2) The maximum output power for Module2 antenna 1 is 15.14 dBm (32.66mW) at 2437MHz, (with 2.9 dBi antenna gain (1.95 numeric antenna gain))
3) The maximum output power for Module2 antenna 2 is 15.95 dBm (39.36mW) at 2462MHz, (with 2.9 dBi antenna gain (1.95 numeric antenna gain))
4) 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 $E = \sqrt{\dfrac{30 \times P \times G}{d}}$ & $S = \dfrac{E^2}{3770}$

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

Maximum Permissible Exposure
Module1 output power=16.94mW
Module2 Antenna 1 output power=32.66mW
Module2 Antenna 2 output power=39.36mW
Numeric Antenna gain=1.95 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 1.95 gain
         S=Power density in mW/cm2
Total Power density=0.007+0.013+0.015=0.035 mW/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 Module1 is 9.89 dBm (9.75mW) at 5200MHz, (with 5 dBi antenna gain (3.2 numeric antenna gain))
2) The maximum output power for Module2 antenna 1 is 10.72 dBm (11.80mW) at 5240MHz, (with 5 dBi antenna gain (3.2 numeric antenna gain))
3) The maximum output power for Module2 antenna 2 is 10.21 dBm (10.50mW) at

5200MHz, (with 5 dBi antenna gain (3.2 numeric antenna gain))

Maximum Permissible Exposure

    Module1 output power=9.75mW

    Module2 Antenna 1 output power=11.80mW

    Module 2 Antenna 2 output power=10.50mW

    Numeric Antenna gain=3.2 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

Total Power density=0.006+0.008+0.007=0.021 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

4) The maximum output power for Module1 is 11.34 dBm (13.61mW) at 5825MHz, (with 5 dBi antenna gain (3.2 numeric antenna gain))

5) The maximum output power for Module2 antenna 1 is 12.31 dBm (17.02mW) at 5745MHz, (with 5 dBi antenna gain (3.2 numeric antenna gain))

6) The maximum output power for Module2 antenna 2 is 12.37 dBm (17.26mW) at 5200MHz, (with 5 dBi antenna gain (3.2 numeric antenna gain))

Maximum Permissible Exposure

    Module1 output power=13.61mW

    Module2 Antenna 1 output power=17.02mW

    Module 2 Antenna 2 output power=17.26mW

    Numeric Antenna gain=3.2 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

Total Power density=0.008+0.010+0.011=0.029 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.)

If 2.4G wifi and 5G wifi operate simultaneously,

Total power density=0.035+0.021+0.029=0.085 mW/cm2.

For 2.4G BT

The maximum output power is -2.262 dBm (0.59mW) at 2441MHz, (with 2.9 dBi antenna gain (1.95 numeric antenna gain))

Numeric Antenna gain=1.95 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

Total Power density=0.0002 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.)