

## Maximum Permissible Exposure

### Applicable Standard

According to §1.1307(b), 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 BT:** The maximum output power for antenna is 4.16dBm (2.61mW) at 2441MHz, 2.9dBi antenna gain(with 1.95 numeric antenna gain.)

**For BLE:** The maximum output power for antenna is -4.84dBm (0.33mW) at 2440MHz, 2.9dBi antenna gain(with 1.95 numeric antenna gain.)

**For WIFI:** The maximum output power for antenna is 14.79dBm (30.13mW) at 2462MHz, 2.9dBi antenna gain(with 1.95 numeric antenna gain.)

**For LTE 2:** The maximum output power for antenna is 23.49dBm (223.36mW) at 1900MHz, 1.9dBi antenna gain(with 1.55 numeric antenna gain.)

**For LTE 4:** The maximum output power for antenna is 23.33dBm (215.28mW) at 1720MHz, 1.9dBi antenna gain(with 1.55 numeric antenna gain.)

**For LTE 5:** The maximum output power for antenna is 23.53dBm (225.42mW) at 829MHz, 1.9dBi antenna gain(with 1.55 numeric antenna gain.)

**For LTE 12:** The maximum output power for antenna is 23.21dBm (209.41mW) at 711MHz, 1.9dBi antenna gain(with 1.55 numeric antenna gain.)

**For LTE 17:** The maximum output power for antenna is 25.01dBm (316.96mW) at 711MHz, 1.9dBi antenna gain(with 1.55 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

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

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

Substituting the MPE safe distance using  $d=20\text{cm}$  into above equation.

Yields:  $S=0.000199 \times P \times G$

Maximum Emissions Level					
Mode	Power(mW)	numeric antenna gain	Power density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
BT	2.61	1.95	0.0010	1.0	Pass
BLE	0.33	1.95	0.0001		
WIFI	30.13	1.95	0.0117		
LTE 2	223.36	1.55	0.0689		
LTE 4	215.28	1.55	0.0664		
LTE 5	225.42	1.55	0.0695		
LTE 12	209.41	1.55	0.0646		
LTE 17	316.96	1.55	0.0978		

The device contain transmitters (LTE & WIFI, LTE & BT) can transmit multiple transmission modes at the same time.

Maximum Emissions Level			
Mode	Power density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
LTE & WIFI	0.1095	1.0	Pass
LTE & BT	0.0988		