



RF Exposure Compliance Requirement

1. Standard requirement

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radia frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

(a) Limits for Occupational / Controlled Exposure

Table with 5 columns: Frequency Range (MHz), Electric Field Strength (E) (V/m), Magnetic Field Strength (H) (A/m), Power Density (S)(mW/cm²), Averaging Times |E|², |H|² or S (minutes). Rows include frequency ranges from 0.3-3.0 to 1500-100000.

(b) Limits for General Population / Uncontrolled Exposure

Table with 5 columns: Frequency Range (MHz), Electric Field Strength (E) (V/m), Magnetic Field Strength (H) (A/m), Power Density (S)(mW/cm²), Averaging Times |E|², |H|² or S (minutes). Rows include frequency ranges from 0.3-1.34 to 1500-100000.

Note: f=frequency in MHz; *Plane-wave equivalent power density



2. MPE Calculation Method

S (mW/cm²)=P*G/4Pi*R²

S= Power Density (mW/cm²)

P=Peak RF conducted output Power (mW)

G=EUT Antenna numeric gain (numeric)

R= Separation distance between radiator and human body (cm);

R= $\sqrt{(P * G) / 4Pi * S}$

From the maximum EUT RF output power, as well as the gain of the used antenna, according to the RF power density limit above, the minimum distance between the antenna and human body will be calculated.

3. Calculated Result

3.1 For downlink: 728MHz to 757MHz

LTE:

Frequency (MHz) F	Maximum Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
Lowest	12.5	17.8	46.4	43651.5832	2.443	159.1305
Middle	12.5	17.8	46.2	41686.9383	2.475	154.4997
Highest	12.5	17.8	46.3	42657.9519	2.507	155.2880



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3.2 For downlink: 869MHz to 894MHz:

GSM:

Frequency (MHz) F	Maximum Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
Lowest	12.5	17.8	46.1	40738.0277	2.899	141.1208
Middle	12.5	17.8	46.5	44668.3592	2.938	146.7876
Highest	12.5	17.8	46.4	43651.5832	2.978	144.1295

CDMA:

Frequency (MHz) F	Maximum Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
Lowest	12.5	17.8	46.2	41686.9383	2.903	142.6565
Middle	12.5	17.8	46.4	43651.5832	2.938	145.1073
Highest	12.5	17.8	46.5	44668.3592	2.973	145.9210

WCDMA:

Frequency (MHz) F	Maximum Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
Lowest	12.5	17.8	46.3	42657.9519	2.907	144.2091
Middle	12.5	17.8	46.2	41686.9383	2.938	141.8043
Highest	12.5	17.8	46.5	44668.3592	2.970	145.9947

LTE:

Frequency (MHz) F	Maximum Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
Lowest	12.5	17.8	46.3	42657.9519	2.913	144.0605
Middle	12.5	17.8	46.2	41686.9383	2.938	141.8043
Highest	12.5	17.8	46.4	43651.5832	2.963	144.4938



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3.3 For downlink: 1930MHz ~ 1995MHz

GSM:

Frequency (MHz) F	Maximum Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
Lowest	12.5	17.8	46.4	43651.5832	5.0	111.2321
Middle	12.5	17.8	46.3	42657.9519	5.0	109.9588
Highest	12.5	17.8	46.5	44668.3592	5.0	112.5201

CDMA:

Frequency (MHz) F	Maximum Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
Lowest	12.5	17.8	46.2	41686.9383	5.0	108.7002
Middle	12.5	17.8	46.3	42657.9519	5.0	109.9588
Highest	12.5	17.8	46.5	44668.3592	5.0	112.5201

WCDMA:

Frequency (MHz) F	Maximum Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
Lowest	12.5	17.8	46.6	45708.8189	5.0	113.8230
Middle	12.5	17.8	46.3	42657.9519	5.0	109.9588
Highest	12.5	17.8	46.1	40738.0277	5.0	107.4559

LTE:

Frequency (MHz) F	Maximum Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
Lowest	12.5	17.8	46.2	41686.9383	5.0	108.7002
Middle	12.5	17.8	46.4	43651.5832	5.0	111.2321
Highest	12.5	17.8	46.5	44668.3592	5.0	112.5201



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3.4 For downlink: 2110 MHz to 2155MHz

CDMA:

Frequency (MHz) F	Maximum Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
Lowest	12.5	17.8	46.4	43651.5832	5.0	111.2321
Middle	12.5	17.8	46.3	42657.9519	5.0	109.9588
Highest	12.5	17.8	46.1	40738.0277	5.0	107.4559

WCDMA:

Frequency (MHz) F	Maximum Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
Lowest	12.5	17.8	46.2	41686.9383	5.0	108.7002
Middle	12.5	17.8	46.3	42657.9519	5.0	109.9588
Highest	12.5	17.8	46.4	43651.5832	5.0	111.2321

LTE:

Frequency (MHz) F	Maximum Antenna Gain (dBi)	Maximum Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Limit of Power Density (S) (mW/cm ²)	Minimum Distance to human body (cm)
Lowest	12.5	17.8	46.3	42657.9519	5.0	109.9588
Middle	12.5	17.8	46.2	41686.9383	5.0	108.7002
Highest	12.5	17.8	46.1	40738.0277	5.0	107.4559

Conclusion:

So the recommend use distance away from EUT external antenna is larger than 1.5913 meter.