



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	46.3	42657.9518	2.443	157.3072
Middle	12.5	17.8	46.2	41686.9383	2.475	154.4997
Highest	12.5	17.8	46.1	40738.0277	2.507	151.7532



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3.2 For downlink: 862MHz to 869MHz:

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	2.8767	146.6452
Middle	12.5	17.8	46.6	45708.8189	2.8850	149.8450
Highest	12.5	17.8	46.7	46773.5141	2.8933	151.3626

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	46.5	44668.3592	2.8833	148.1734
Middle	12.5	17.8	46.6	45708.8189	2.8850	149.8450
Highest	12.5	17.8	46.6	45708.8189	2.8867	149.8008

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	42657.9518	2.8827	144.8156
Middle	12.5	17.8	46.4	43651.5832	2.8850	146.4341
Highest	12.5	17.8	46.3	42657.9518	2.8873	144.7002



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3.3 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	46.6	45708.8189	2.899	149.7412
Middle	12.5	17.8	46.6	45708.8189	2.938	145.1073
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	46.6	45708.8189	2.903	142.6565
Middle	12.5	17.8	46.6	45708.8189	2.938	148.4872
Highest	12.5	17.8	46.2	41686.9383	2.973	140.9670

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	2.907	149.2769
Middle	12.5	17.8	46.7	46773.5141	2.938	150.2066
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	46.5	44668.3592	2.938	143.4510
Highest	12.5	17.8	46.3	42657.9519	2.963	142.8398



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3.4 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	46.1	40738.0277	5.0	107.4559
Middle	12.5	17.8	47.0	50118.7233	5.0	118.1874
Highest	12.5	17.8	46.4	43651.5832	5.0	111.2321

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	108.6989
Middle	12.5	17.8	46.7	46773.5141	5.0	115.1410
Highest	12.5	17.8	46.2	41686.9383	5.0	108.7002

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	42657.9518	5.0	109.9588
Middle	12.5	17.8	46.8	47863.0092	5.0	116.4743
Highest	12.5	17.8	46.2	41686.9383	5.0	108.7002

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	5.0	111.2321
Middle	12.5	17.8	46.7	46773.5141	5.0	115.1410
Highest	12.5	17.8	46.4	43651.5832	5.0	111.2321



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3.5 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	46.1	40738.0277	5.0	107.4559
Middle	12.5	17.8	46.5	44668.3592	5.0	112.5210
Highest	12.5	17.8	46.5	44668.3592	5.0	112.5210

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	46.1	40738.0277	5.0	107.4559
Middle	12.5	17.8	46.5	44668.3592	5.0	112.5210
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	46.1	40738.0277	5.0	107.4559
Middle	12.5	17.8	46.4	43651.5832	5.0	111.2321
Highest	12.5	17.8	46.4	43651.5832	5.0	111.2321

Conclusion:

So the recommend use distance away from EUT external antenna is larger than 1.5731 meter.