SGS-CSTC Standards Technical Services Co., Ltd.

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

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm^2)	Averaging Times $|E|^2$, $|H|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100000			5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm^2)	Averaging Times $|E|^2$, $|H|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/500	30
1500-100000			1.0	30

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

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2. MPE Calculation Method

$$S\ (mW/cm^2) = P*G/4Pi*R^2$$

S= Power Density (mW/cm^2)

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: 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	13	19.952	-1.33	0.736	1.7392	0.8199
Middle	13	19.952	-0.43	0.906	1.7630	1.1997
Highest	13	19.952	-1.98	0.634	1.7868	1.0036

3.2 For Uplink: 824MHz to 849MHz:

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	13	19.952	16.12	40.926	1.6492	6.2798
Middle	13	19.952	17.70	58.884	1.6730	7.4773
Highest	13	19.952	16.11	40.832	1.6968	6.1828

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3.3 For downlink: 1930MHz ~ 1990MHz

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	13	19.952	-0.59	0.873	1.0	1.1776
Middle	13	19.952	-0.08	0.982	1.0	1.2490
Highest	13	19.952	-0.35	0.923	1.0	1.2109

3.4 For Uplink: 1850MHz ~ 1910MHz

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	13	19.952	16.83	48.195	1.0	8.7498
Middle	13	19.952	17.78	59.979	1.0	9.7611
Highest	13	19.952	17.1	51.286	1.0	9.0261

Conclusion:

So the recommend use distance away from EUT external antenna is larger than 9.7611 centimeter.