

RF EXPOSURE EVALUATION

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

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

MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 * P * G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Average RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 * P * G}{377 * D^2}$$

From the EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

Measurement Result

GSM850/GSM1900

Antenna Type: PIFA Antenna

Antenna gain: 3 dBi,

Operating Mode	Maximum turn up power	Frame-Avg Power	Frame-Avg Power	Evaluation result	Power density Limits
	(dBm)	(dBm)	(mW)	(mW/cm ²)	(mW/cm ²)
GSM 850	33.00	23.97	249.46	0.0993	0.5659
GSM 1900	31.00	21.97	157.40	0.0627	1.0000

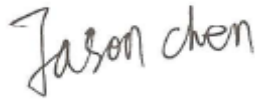
Note: The frame-averaged power is linearly scaled the maximum turn up power over 8 time slots.

The calculated method are shown as below:

Frame-averaged power = Maximum turn up power (1 TS) - 9.03 dB

Conclusion:

For the max result : $0.0993 \leq 0.5659$ for Max Power Density, compliance the RF Exposure.



Signature:

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