

RF Exposure Evaluation

Limits

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 KDB 447498 D01 V06 , 1.1307(b) and FCC part 2.1091

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 Exposures				
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
300–1500			f/300	6
1500–100,000			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
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz

Friis transmission formula: $Pd = (Pout * G) / (4 * \pi * r^2)$

Where

Pd = power density in mW/cm², **Pout** = output power to antenna in mW;

G = gain of antenna in linear scale, **Pi** = 3.1416;

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

Test Result of RF Exposure Evaluation

Channel	Output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm ²)	Limit (mW/cm ²)	Result
GSM 850	31.00	1258.93	0.26226	0.6	PASS
GSM1900	28.00	630.96	0.30111	1.2	PASS
WCDMA Band 2	23.00	199.53	0.09522	1.2	PASS
WCDMA Band 4	23.00	199.53	0.09522	1.2	PASS
WCDMA Band 5	23.00	199.53	0.04157	0.6	PASS
LTE Band 2	23.00	199.53	0.09522	1.2	PASS
LTE Band 4	23.00	199.53	0.09522	1.2	PASS
LTE Band 5	23.00	199.53	0.04157	0.6	PASS
LTE Band 25	23.00	199.53	0.09522	1.2	PASS
LTE Band 66	23.00	199.53	0.09522	1.2	PASS

Remark: antenna gain= GSM850: 0.2dBi, GSM1900:3.8dBi, WCDMA Band 2: 3.8dBi, WCDMA Band 4: 3.8dBi, WCDMA Band 5: 0.2dBi, LTE Band 2: 3.8dBi, LTE Band 4: 3.8dBi, LTE Band 5: 0.2dBi, LTE Band 12: 0.2dBi, LTE Band 25: 3.8dBi, LTE Band 66: 3.8dBi
So a SAR test is not required