

FCC ID:2AX5VHBHYBNA1

Maximum Permissible Exposure (MPE)

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

$$E \text{ (V/m)} = \frac{\sqrt{30 * P * G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

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.

Operation Frequency: GFSK: 905 MHz~926.5MHz

Antenna Type: Antenna 1: Planar Inverted F- Antenna (ocw=120k)

Antenna 2: Planar Inverted F- Antenna (ocw=120k)

Antenna 3: Planar Inverted F- Antenna(ocw=140k)

Antenna 4: Planar Inverted F- Antenna(ocw=140k)

Antenna gain: Antenna1:-2 dBi

Antenna2:-2 dBi

Antenna3:-2 dBi

Antenna4:-2 dBi

R=20cm

SRD

ant 1

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain		(mW/cm2)	(mW/cm2)
				(dBm)	(mW)	(dBi)	Numeric		
905.00	GFSK-120K	17.329	17±1	18	63.096	-2.00	0.63	0.0079	0.60
915.85		16.863	17±1	18	63.096	-2.00	0.63	0.0079	0.61
926.50		16.388	17±1	18	63.096	-2.00	0.63	0.0079	0.62

ant 2

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
905.00	GFSK-120K	14.189	14±1	15	31.623	-2.00	0.63	0.0040	0.60
915.85		14.249	14±1	15	31.623	-2.00	0.63	0.0040	0.61
926.50		14.333	14±1	15	31.623	-2.00	0.63	0.0040	0.62

ant 3

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
905.00	GFSK-120K	13.749	13.5±1	14.5	28.184	-2.00	0.63	0.0035	0.60
915.85		13.374	13.5±1	14.5	28.184	-2.00	0.63	0.0035	0.61
926.50		13.404	13.5±1	14.5	28.184	-2.00	0.63	0.0035	0.62

ant 4

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
905.00	GFSK-120K	13.464	13.5±1	14.5	28.184	-2.00	0.63	0.0035	0.60
915.85		13.085	13.5±1	14.5	28.184	-2.00	0.63	0.0035	0.61
926.50		12.8	13.5±1	14.5	28.184	-2.00	0.63	0.0035	0.62

Conclusion:

For the max result : $0.0079 \leq 0.60$ for Max Power Density, compliance RF exposure..

Note: This product does not support simultaneous delivery.

GSM/LTE

GSM/LTE Antenna Type: Planar Inverted F- Antenna antenna

Antenna Gain: GSM/WCDMA: -1.5dBi

LTE:-1.5 dBi

modulation	Max		Antenna		Evaluation result	Power density
	tune-up power		Gain		(mW/cm2)	(mW/cm2)
	(dBm)	(mW)	(dBi)	Numeric		
WCDMA B2	22.74	187.932	-1.5	0.71	0.0265	1
WCDMA B4	21.82	152.055	-1.5	0.71	0.0214	1
WCDMA B5	21.92	155.597	-1.5	0.71	0.0219	0.56
LTE Band 2	23.1	204.174	-1.5	0.71	0.0288	1
LTE Band 4	22.48	177.011	-1.5	0.71	0.0249	1
LTE Band 12	23.76	237.684	-1.5	0.71	0.0335	0.55

SIMULTANEOUS TRANSMISSIONS

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE. To comply with the MPE, the fraction of the MPE in terms of E^2 , H^2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity. In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^n \frac{S_i}{MPE_i} \leq 1$$

Max. SIMULTANEOUS TRANSMISSIONS MODE

Band	SISO					MIMO		Verdict
	Max power	Antenna	Separation distance (cm)	Evaluation result	Power density	Evaluation result	Power density Limits	
	(dBm)	Gain		(mW/cm2)	(mW/cm2)			
		(dBi)						
SRD ant1 905 +LTE B 12	17.329	-2	20	0.010755	0.60	0.103799	1	PASS
	23.76	-1.5	20	0.047285	0.55			

Signature:

Date: 2024-12-15



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