

FCC ID: 2AO82-HT003

Maximum Permissible Exposure (MPE)

According to FCC 2.1091, FCC 1.1310 and KDB 447498 D01 General RF Exposure Guidance v06, 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

BT:

Operation Frequency: 2402MHz~2480MHz

Power density limited: 1mW/ cm²

Antenna gain: 0.35dBi;

R=20cm

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
2402	1DH5	4.93	4±1	5	3.162	0.35	1.08	0.0007	1
2441		5.07	5±1	6	3.981	0.35	1.08	0.0009	1
2480		5.14	5±1	6	3.981	0.35	1.08	0.0009	1
2402	2DH5	5.22	5±1	6	3.981	0.35	1.08	0.0009	1
2441		5.4	5±1	6	3.981	0.35	1.08	0.0009	1
2480		5.55	5±1	6	3.981	0.35	1.08	0.0009	1
2402	3DH5	5.41	5±1	6	3.981	0.35	1.08	0.0009	1
2441		5.51	5±1	6	3.981	0.35	1.08	0.0009	1
2480		5.59	5±1	6	3.981	0.35	1.08	0.0009	1

UHF:

Operation Frequency: 903.1-926.9MHz

Antenna gain: Antenna: 1.86dBi

R=20cm

Worse case

Frequency (MHz)	Max Peak level (dBuV/m)	EIRP power (dBm)	conducted power(dBm)
903.1	89.06	-6.14	-8.00

EIRP=E-104.8+20log(D)

conducted power = EIRP-antenna gain

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
		(dBm)		tune-up power		Gain			
				(dBm)	(dBm)	(mW)	(dBi)		
903.10	FM	-8	-8±1	-7	0.200	1.86	1.53	0.0001	0.60

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 E², H² (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

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

Band	Antenna	tune-up power	Antenna	Separati on distance (cm)	Standalone	Standalone	Simultaneous		Verdict
		(dBm)	Gain		Evaluation result(mW/c m2)	Power density Limits(mW/c m2)	Evaluation result	Limit	
			(dBi)				raio		
BT	Ant1	6	0.35	20	0.000858	1	0.000960	1	PASS
UHF	Ant1	-7	1.86	20	0.000061	0.6			

Conclusion:

Conformance to Requirements.

Signature: 

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