FCC ID: 2BN8IUNIRC7RFMD

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)

According to KDB447498 D01 General RF Exposure Guidance V06

According to FCC 2.1091: For purposes of this section, the definitions in § 1.1307(b)(2) of this chapter shall apply. A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the RF source's radiating structure(s) and the body of the user or nearby persons. In this context, the term “fixed location” means that the device is physically secured at one location and is not able to be easily moved to another location while transmitting. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal desktop computer, are considered to be mobile devices if they meet the 20-centimeter separation requirement.

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 (V/m) $= \frac{\sqrt{30 * P * G}}{d}$ Power Density: *Pd* (W/m²) $= \frac{E^2}{377}$

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.

SRD2.4G:

Frequency range：2406.5-2476.5MHz
Antenna Type: Omnidirectional Antenna
Antenna Gain: 4.5dBi
R=20cm
mW=10^(dBm/10)
antenna gain Numeric=10^(dBi/10)= 10^(4.5/10)=2.82

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain (dBi)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
2406.5	SRD2.4G Ant1	22.16	22.5±1	23.5	223.872	4.50	2.82	0.1255	1
2446.5		23.07	22.5±1	23.5	223.872	4.50	2.82	0.1255	1
2476.5		21.83	22.5±1	23.5	223.872	4.50	2.82	0.1255	1
2406.5	SRD2.4G Ant2	21.39	22.0±1	23	199.526	4.50	2.82	0.1119	1
2446.5		22.24	22.0±1	23	199.526	4.50	2.82	0.1119	1
2476.5		21.26	22.0±1	23	199.526	4.50	2.82	0.1119	1

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

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

Band	Antenna	tune-up power (dBm)	Antenna Gain (dBi)	Separation distance (cm)	Evaluation result (mW/cm2)	Power density Limits (mW/cm2)	Evaluation result	Power density Limits	Verdict
SRD2.4G	Ant1	23.5	4.5	20	0.125522	1	0.237394	1	PASS
SRD2.4G	Ant2	23	4.5	20	0.111872	1			

Conclusion:
For the max result : 0.227394 ≤ 1, No SAR is required.

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