

**RF Exposure Compliance Requirement**

**Model no.: CS03,CS04**

**1. Standard requirement**

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

**(a) Limits for Occupational / Controlled Exposure**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm <sup>2</sup> )	Averaging Times  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f <sup>2</sup> )*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100000	--	--	5	6

**(b) Limits for General Population / Uncontrolled Exposure**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm <sup>2</sup> )	Averaging Times  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	F/1500	30
1500-100000	--	--	1.0	30

Note: f=frequency in MHz; \*Plane-wave equivalent power density

**2. MPE Calculation Method**

$E (V/m) = (30 * P * G)^{0.5} / d$     Power Density:  $Pd(W/m^2) = E^2 / 377$

E=Electric Field (V/m)

P=Peak 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

$Pd = (30 * P * G) / (377 * d^2)$

From the peak 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.

**3. Calculated Result and Limit**

13.56 RFID:

E=50.4dB  $\mu$  V/m@3m(max. value provided by client), antenna gain = 0dBi

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
13.56	1	-44.8	0.000033	0.000000007	0.98	Complies

MPE ratio:

$0.000000007 (mW/cm^2) / 0.98(mW/cm^2) = 0.0000000071$

WIFI:

Peak Output Power = 12.52dBm(max.value declared by client), antenna gain = 3.75dBi

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
2412-2462	2.37	12.52	17.86	0.0084	1	Complies

MPE ratio:

$0.0084 (mW/cm^2) / 1(mW/cm^2) = 0.0084$

Bluetooth:

Peak Output Power = 1.81dBm(max.value declared by client), antenna gain = 3.75dBi

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
2402-2480	2.37	1.81	1.52	0.00072	1	Complies

MPE ratio:

$0.00072 \text{ (mW/cm}^2\text{)}/1\text{(mW/cm}^2\text{)} = 0.00072$

The sample support one Bluetooth& WIFI modular and one antenna, Not need consider simultaneous Transmission of Bluetooth& WIFI.The maximum MPE ratio of WIFI was selected as the evaluation.

Sum of the MPE ratio for all simultaneously transmitting antennas of NFC and WIFI:

$0.0000000071+0.0084 = 0.0084000071 < 1$

According to MPE test Exclusion condition in KDB 447498 (D01) General RF Exposure Guidance D01 v06, the MPE report is not required.

Test Location:

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch

All tests were performed at:

Room102/104, No 203, KeZhu Road, Science City, GETDD Guangzhou, China