RF Exposure evaluation

FCC ID:2A7EH-BM02C

1. Reference

According to §1.1307(b)(1), 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 of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

KDB447498 D01: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies

2. Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0 3.0 – 30 30 – 300 300 – 1500 1500 – 100,000	614 1842/f 61.4 / /	1.63 4.89/f 0.163 / /	(100) * ($900/f^2$)* 1.0 f/300 5	6 6 6 6 6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0 3.0 – 30 30 – 300 300 – 1500 1500 – 100,000	614 824/f 27.5 / /	1.63 2.19/f 0.073 / /	(100) * ($180/f^2$)* 0.2 f/1500 1.0	30 30 30 30 30

F=frequency in MHz

*=Plane-wave equivalent power density

3. MPE Calculation Method

Predication of MPE limit at a given distance
Equation from page 18 of OET Bulletin 65, Edition 97-01

$S=PG/4\pi R^2$

Where: S=power density
P=power input to antenna
G=power gain of the antenna in the direction of interest relative to an isotropic radiator
R=distance to the center of radiation of the antenna

4. Antenna Information

EUT can only use antennas certificated as follows provided by manufacturer;

Antenna No.	Model No. of antenna:	Type of antenna:	Gain of the antenna (Max.)	Frequency range:
2.4GWIFI	/	External antennas	3.28dBi for 2400-2500MHz ANT 1 3.09dBi for 2400-2500MHz ANT 2	

5. Manufacturing Tolerance

ANT 1

2.4GHz WIFI(Peak)

Frequency (MHz)	11b		
	2412	2437	2462
Target (dBm)	15.0	15.0	15.0
Tolerance ± (dB)	1.0	1.0	1.0
Frequency (MHz)	11g		
	2412	2437	2462
Target (dBm)	17.0	17.0	17.0
Tolerance ± (dB)	1.0	1.0	1.0
Frequency (MHz)	11n(HT20)		
	2412	2437	2462
Target (dBm)	17.0	17.0	17.0
Tolerance ± (dB)	1.0	1.0	1.0
Frequency (MHz)	11n(HT40)		
	2422	2437	2452
Target (dBm)	17.0	17.0	17.0
Tolerance ± (dB)	1.0	1.0	1.0

ANT 2

2.4GHz WIFI(Peak)

Frequency (MHz)	11b		
	2412	2437	2462
Target (dBm)	15.0	15.0	15.0
Tolerance ± (dB)	1.0	1.0	1.0
Frequency (MHz)	11g		
	2412	2437	2462
Target (dBm)	17.0	17.0	17.0
Tolerance ± (dB)	1.0	1.0	1.0
Frequency (MHz)	11n(HT20)		
	2412	2437	2462
Target (dBm)	17.0	17.0	17.0
Tolerance ± (dB)	1.0	1.0	1.0
Frequency (MHz)	11n(HT40)		
	2422	2437	2452
Target (dBm)	17.0	17.0	17.0
Tolerance ± (dB)	1.0	1.0	1.0

6. Standalone MPE Result

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, r=20cm, as well as the gain of the used antenna refer to antenna information,the RF power density can be obtained.

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm^2)	MPE Limits (mW/cm^2)
	dBm	mW				
2.4GWIFI ANT 1	18.0	63.0957	3.28	2.1281	0.02672	1.0000
2.4GWIFI ANT 2	18.0	63.0957	3.09	2.0370	0.02557	1.0000

Remark:

1. Output power (Peak) including turn-up tolerance;

2. MPE evaluate distance is 20cm from user manual provide by manufacturer.

Simultaneous Evaluation

2.4G WIFI ANT 1 MPE (mW/cm^2)	2.4G WIFI ANT 2 MPE (mW/cm^2)	MPE	MPE Limits
0.02672	0.02557	0.05229	1.0000

7. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

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