RF Exposure evaluation

FCC ID: UCC-M360-X

Exposure category: General population/uncontrolled environment

EUT Type: Production Unit

Device Type: Fixed Device

1.Reference

According to § 1. 130(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.

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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	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- 1500	/	/	0300	6
1500- 100,000	/	/	*5*	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	614	1.63	(100)*	30
3.0-30	824/f	2. 19/f	(180/F)*	30
30-300	27.5	0.073	0.2	30
300- 1500	/	/	F/1500	30
1500- 100,000	/	/	1.0	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 co 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

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:
2.4G WIFI	/	External Antenna	3.0 dBi for 2412-2462MHz;	
5.2G WIFI	/	External Antenna	3.0 dBi for 5150-5250MHz;	
5.3G WIFI	/	External Antenna	3.0 dBi for 5250-5350MHz;	
5.6G WIFI	/	External Antenna	3.0 dBi for 5470-5725MHz;	
5.8G WIFI	/	External Antenna	3.0 dBi for 5725-5850MHz;	

5.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 above article 4(antenna information), the RF power density can be obtained.

Modulation Type	Max conducted power (dBm)		Antenna Gain (dBi))	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mw			
2.4GWIFI	24.54	284.446	3.0	0.1129	1.0000
5.2G WIFI	21.17	130.918	3.0	0.0520	1.0000
5.3G WIFI	17.83	60.674	3.0	0.0241	1.0000
5.6G WIFI	17.45	55.591	3.0	0.0221	1.0000
5.8G WIFI	25.97	395.367	3.0	0.1569	1.0000

Conclusion: Sum= 0.1129 +0.1569 = 0.2698 < 1, therefore the result is PASS.
2.4Gwifi Ratio = MPE / MPE Limit = 0.1129 / 1 = 0.1129 ;
5.8Gwifi Ratio = MPE / MPE Limit = 0.1569 / 1 = 0.1569 (the worstest case);

Remark:
1.Output power including tum-up tolerance:
2.MPE evaluate distance is 20cm from user manual provide by manufacturer.

6.Conclusion

The measurement results comply with the FCC Limit per47 CFR 2. 1091 for the uncontrolled RF Exposure of mobile device.

-------- THE END OF REPORT--------