RF Exposure evaluation

FCC ID:2ARQB-SM200

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	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	/	/	f/300	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	($180/f^2$)*	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 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. 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 LTE antenna is 7dBi, the gain of the BT antenna is 0dBi, the RF power density can be obtained.

Band	Frequency (MHz)	Max. Output Power (dBm)	Max. Output Power (mW)	Antenna Gain (Numeric)	Power Density At 20 cm (mW/cm^2)	Power Density Limit FCC (mW/cm^2)	Test Results
LTE band 2	1850.7	21.69	147.5707	5.0119	0.1471	1.0000	PASS
LTE band 4	1710.7	22.35	171.7908	5.0119	0.1713	1.0000	PASS
LTE band 5	836.5	23.33	215.2782	5.0119	0.2146	0.5577	PASS
LTE band 12	707.5	23.09	203.7042	5.0119	0.2031	0.4665	PASS
LTE band 13	779.5	23.11	204.6445	5.0119	0.2040	0.5197	PASS
LTE band 14	790.5	23.39	218.2730	5.0119	0.2176	0.5270	PASS
LTE band 17	706.5	23.19	208.4491	5.0119	0.2078	0.4710	PASS
LTE band 25	1850.7	21.12	129.4196	5.0119	0.1290	1.0000	PASS
LTE band 26	824.7	23.90	245.4709	5.0119	0.2448	0.5498	PASS
LTE band 66	1710.7	22.87	193.6422	5.0119	0.1931	1.0000	PASS
BLE	2480	8.16	6.5464	1.0000	0.0013	1.0000	PASS

5. Conclusion

The SAR evaluation is not required.