RF Exposure evaluation

FCC ID: 2AXAT-EH-032BT

Exposure category: General population/uncontrolled environment

EUT Type: Production Unit

Device Type: Mobile Device

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. Antenna Information

EH-032BT can only use antennas certificated as follows provided by manufacturer;

Internal Identification	Antenna Identification in Internal photos	Antenna type and antenna number	Operate frequency band	Maximum antenna gain
Antenna BT	2.4G	Ceramic Antenna	2.4GHz – 2.5 GHz	2.0 dBi

5. Conducted power

[BT]

Mode	Channel	Frequency	Peak Conducted Output Power (dBm)
GFSK	00	2402	6.041
	39	2441	8.354
	78	2480	8.557
π /4DQPSK	00	2402	3.802
	39	2441	6.695
	78	2480	6.871
8DPSK	00	2402	4.186
	39	2441	7.005
	78	2480	7.192

6. Manufacturing Tolerance

[BT]

GFSK			
Channel	Channel 00	Channel 39	Channel 78
Target (dBm)	6.0	8.0	8.0
Tolerance ±(dB)	1.0	1.0	1.0
π/4DQPSK			
Channel	Channel 00	Channel 39	Channel 78
Target (dBm)	3.0	6.0	6.0

Tolerance ±(dB)	1.0	1.0	1.0
8DPSK			
Channel	Channel 00	Channel 39	Channel 78
Target (dBm)	4.0	7.0	7.0
Tolerance ±(dB)	1.0	1.0	1.0

7. 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 WIFI antenna is 0dBi, the gain of BT antenna is 0dBi.the RF power density can be obtained.

[BT]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm^2)	MPE Limits (mW/cm^2)
	dBm	mW				
GFSK	9.0	7.9433	2.00	1.5849	0.0025	1.0000
π /4DQPSK	7.0	5.0119	2.00	1.5849	0.0016	1.0000
8DPSK	8.0	6.3096	2.00	1.5849	0.0020	1.0000

Remark:

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

2. Output power was adjust to duty cycle at 100% if measured duty cycle less than 98%;

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

8. Conclusion

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

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