

RF Exposure evaluation

FCC ID: 2BLXD-ACOM664L

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

ACOM664L-64-EG91 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:
LTE	/	External antenna	Band 2: 1.79dBi Band 4: 1.68dBi Band 5/26-B: 0.52dBi Band 12: -1.84dBi Band 13: 171dBi Band 25: 1.92dBi Band 26-A: -1.57dBi	

5. Manufacturing Tolerance

LTE	Max Power(dBm)	Target (dBm)	Tolerance ±(dB)
Band2	23.81	23.0	1.0
Band4	24.09	24.0	1.0
Band5	24.78	24.0	1.0
Band12	24.56	24.0	1.0
Band13	24.05	24.0	1.0
Band25	23.64	23.0	1.0
Band26-A	23.94	23.0	1.0
Band26-B	24.7	24.0	1.0

6. Standalone MPE Result

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 120 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, r=120cm, 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)	MPE Limits (Ratio)
	dBm	mW					
Band2	24.00	251.1886	1.79	1.5101	0.0021	1.00	0.0021
Band4	25.00	316.2278	1.68	1.4723	0.0026	1.00	0.0026
Band5	25.00	316.2278	0.52	1.1272	0.0020	0.55	0.0036
Band12	25.00	316.2278	-1.84	0.6546	0.0011	0.47	0.0024
Band13	25.00	316.2278	1.71	1.4825	0.0026	0.52	0.0050
Band25	24.00	251.1886	1.92	1.5560	0.0022	1.00	0.0022
Band26-A	24.00	251.1886	-1.57	0.6966	0.0010	0.54	0.0018
Band26-B	25.00	316.2278	0.52	1.1272	0.0020	0.55	0.0036

Remark:

1. Output power including turn-up tolerance;
2. MPE evaluate distance is 120cm from user manual provide by manufacturer.

Simultaneous Evaluation

LTE MPE (Ratio)	Antenna number (N)	simultaneous MPE (Ratio)	MPE Limits
0.005	64	0.319	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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