

RF Exposure evaluation

FCC ID: S8U-IDD-213LA

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 v05r02: 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

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0 .

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 mobile application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum mobile separation distance, $r=20\text{cm}$, as well as the gain of the used antenna as below:

WIFI: 0.5dBi,

WCDMA Band V: 1.21dBi,

WCDMA Band II: 1.46dBi,

LTE band II: 1.46dBi,

LTE band IV: 1.50dBi,

LTE band XII: 1.20dBi,

the RF power density can be obtained.

WIFI

Max. Output Power (dBm)	Antenna Gain (Numeric)	Power Density At 20 cm (mW/cm ²)	Power Density Limit FCC (mW/cm ²)	Test Results
21.15	1.1220	0.0291	1.0000	PASS

WCDMA

Band	Max. Output Power (dBm)	Antenna Gain (Numeric)	Power Density At 20 cm (mW/cm ²)	Power Density Limit FCC (mW/cm ²)	Test Results
Band II	22.69	1.3996	0.0517	1.0000	PASS
Band V	22.74	1.3213	0.0494	0.5577	PASS

LTE

Band	Max. Output Power (dBm)	Antenna Gain (Numeric)	Power Density At 20 cm (mW/cm ²)	Power Density Limit FCC (mW/cm ²)	Test Results
Band II	23.50	1.3996	0.0623	1.0000	PASS
Band IV	23.49	1.4125	0.0628	1.0000	PASS
Band XII	23.49	1.3183	0.0586	0.4717	PASS

The respectively antenna used by WIFI and WCDMA/LTE, Simultaneous transmission can operating at WIFI and WCDMA/LTE.

Simultaneous transmission MPE

Max.Power Density At 20 cm WIFI (mW/cm ²)	Max.Power Density At 20 cm WCDMA/LTE (mW/cm ²)	Max.sum of the MPE ratios	Limit	Test Results
0.0291	0.0628	0.0919	1	PASS

5. Conclusion

The SAR evaluation is not required.