

FCC Maximum Permissible Exposure (MPE) Report

Report Number	:	68.912.24.0031.01A	Date of Issue:	<u>2024-09-23</u>
Model	:	EG25-G		
Product Type	:	LTE Module		
Applicant	:	Suzhou Inovance Technology Co., Ltd.		
Address	:	No. 52, Tian E Dang Road, Wuzhong District, 215104 , Suzhou City, Jiangsu Province, P.R. China		
Manufacturer	:	Suzhou Inovance Technology Co., Ltd.		
Address	:	No. 52, Tian E Dang Road, Wuzhong District, 215104 , Suzhou City, Jiangsu Province, P.R. China		
Test Result	:	<input checked="" type="checkbox"/> Positive	<input type="checkbox"/> Negative	
Total pages including Appendices	:	8		

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park,
Guankou Erlu, Nantou, Nanshan District,
Shenzhen, 518052 China

FCC Designation Number: CN5009

FCC Registration No.: 514049

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3 Description of the Equipment Under Test

Product: LTE Module

Model no.: EG25-G

FCC ID: 2BKRZ-WL432EG25G

RF Transmission Frequency:

BAND	TX	RX
GSM850	824 to 849 MHz	869 to 894 MHz
GSM1900	1850 to 1910 MHz	1930 to 1990 MHz
UMTS BAND II	1850 to 1910 MHz	1930 to 1990 MHz
UMTS BAND IV	1710 to 1755 MHz	2110 to 2155 MHz
UMTS BAND V	824 to 849 MHz	869 to 894 MHz
LTE BAND 2	1850 to 1910 MHz	1930 to 1990 MHz
LTE BAND 4	1710 to 1755 MHz	2110 to 2155 MHz
LTE BAND 5	824 to 849 MHz	869 to 894 MHz
LTE BAND 7	2500 to 2570 MHz	2620 to 2690 MHz
LTE BAND 12	699 to 716 MHz	729 to 746 MHz

Modulation: GMSK, 8PSK for GSM
QPSK, 16 QAM for WCDMA
QPSK, 16 QAM for LTE

Antenna Type: Linear antenna

Antenna Gain: GSM850: 2.066dBi
GSM1900: 1.496dBi
WCDMA BAND II: 1.496dBi
WCDMA BAND VI: 1.963dBi
WCDMA BAND V: 2.066dBi
LTE BAND 2: 1.496dBi
LTE BAND 4: 1.963dBi
LTE BAND 5: 2.066dBi
LTE BAND 7: 2.994dBi
LTE BAND 12: 0.366dBi

Description of the EUT: The EUT is a LTE Module supports GSM, WCDMA and LTE functions

NOTE 1: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

4 General Information

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Prepared By
Project Engineer

2024-09-23

Henry Chen

Date

Name



Signature



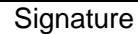
Approved By
Project Manager

2024-09-23

Alan Xiong

Date

Name



Signature

5 RF Exposure Requirements

An estimation of MPE in this application for product is used to ensure if it complies with the rules of the standard in the regulation list above.

Maximum permissible exposure (MPE) refers to the RF energy that is acceptable for human exposure. It is broken down into two categories, Occupational/controlled and General population/uncontrolled.

Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

A rough estimation of the expected exposure in power flux density on a given point can be made with the following equation:

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

Where:

S = power density

P = power input to the antenna

G = numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R= distance to the centre of radiation of the antenna

EIRP = P*G

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user. Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the user's manual. Therefore, the S of the device is calculated with R=20cm, and if it is below the limit S, then we can conclude the device complies with the rules.

6 FCC MPE Limits

According to subpart 15.247(i) and subpart §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.

We analysis if it complies with the limits for General population/uncontrolled exposure. The FCC MPE limits for field strength and power density are given in 47CFR 1.1310 (Table below) and KDB447498 D01 v06. These limits are generally based on recommended exposure guidelines published by the National Council on Radiation Protection and Measurements (NCRP), and also partly based on guidelines recommended by the American National Standards Institute (ANSI) in Section 4.1 of ANSI/IEEE C95.1.

(B) Limits for General Population/uncontrolled Exposure				
Frequency Range(MHz)	Electric Field Strength(E)(V/m)	Magnetic Field Strength(H)(A/m)	Power Density (S)(mW/cm ²)	Averaging Time (minute) E ² , H ² or S
0.3-1.34	614	1.63	(100)*	30
1.34-30	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

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0

7 RF Exposure Evaluation (FCC)

7.1 Calculation of Power Density for Single Transmission

Mode	Frequency (MHz)	EIRP(ERP) (dBm)	EIRP (mW)	R (cm)	S (mW/cm ²)	Limit (mW/cm ²)	MPE Ratio
GSM	824.2	32.67	1849.269	20	0.3679	0.5495	36.79003
GSM1900	1850.2	31.25	1333.521	20	0.265296	1.0000	26.52957
WCDMA B2	1852.4	25.47	352.3709	20	0.070102	1.0000	7.010196
WCDMA B6	1712.4	25.82	381.9443	20	0.075985	1.0000	7.59854
WCDMA B5	826.4	24.00	251.1886	20	0.049972	0.5509	4.997239
LTE B2	1850.7	26.23	419.759	20	0.083508	1.0000	8.35084
LTE B4	1710.7	26.91	490.9079	20	0.097663	1.0000	9.766302
LTE B5	824.7	24.14	259.4179	20	0.05161	0.5498	5.160956
LTE B7	2502.5	26.87	486.4072	20	0.096768	1.0000	9.676764
LTE B12	699.7	25.41	347.5362	20	0.06914	0.4665	6.914012
LTE B13	779.5	26.43	439.5416	20	0.087444	0.5197	8.744403
LTE B25	1850.7	26.14	411.1497	20	0.081796	1.0000	8.179564
LTE B26(814-824)	814.7	24.07	255.2701	20	0.050784	0.5431	5.078438
LTE B26(824-849)	824.7	24.32	270.3958	20	0.053794	0.5498	5.379354
LTE B38	2572.5	25.94	392.6449	20	0.078114	1.0000	7.811423
LTE B41	2498.5	26.86	485.2885	20	0.096545	1.0000	9.654508

7.2 Conclusion

According to the table above, the calculated power density S is below the limit value of 1 mW/cm², therefore, the product complies with the requirements.