



RF Exposure Evaluation Report

APPLICANT : Gosuncn Technology Group Co., Ltd.
EQUIPMENT : LTE Module
BRAND NAME : GOSUNCN
MODEL NAME : GM500-U1G_A
FCC ID : 2APNR-GM500U1G
STANDARD : 47 CFR Part 2.1091
FCC KDB 447498 D01 v06

We, Sporton International (ShenZhen) Inc., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International (ShenZhen) Inc., the test report shall not be reproduced except in full.

Hank Huang

Reviewed by: Hank Huang / Supervisor

Johnny Chen



Approved by: Johnny Chen / Manager

Sporton International (ShenZhen) Inc.

1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055

People's Republic of China



Table of Contents

1. ADMINISTRATION DATA	4
1.1. Testing Laboratory	4
2. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	5
3. MAXIMUM RF AVERAGE OUTPUT TUNE UP POWER AMONG PRODUCTION UNITS	6
4. RF EXPOSURE LIMIT INTRODUCTION	7
5. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION	8
5.1. Standalone Power Density Calculation	8
5.2. Collocated Power Density Calculation.....	8



Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA0D0333	Rev. 01	Initial issue of report.	Dec. 31, 2020



1. Administration Data

1.1. Testing Laboratory

Sporton International (Shenzhen) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Testing Laboratory		
Test Firm	Sporton International (Shenzhen) Inc.	
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595	
Test Site No.	FCC Designation No.	FCC Test Firm Registration No.
	CN1256	421272

Applicant	
Company Name	Gosuncn Technology Group Co., Ltd.
Address	6F, 2819 KaiChuang Blvd., Science Town, Huangpu District, Guangzhou City, Guangdong, China.

Manufacturer	
Company Name	Gosuncn Technology Group Co., Ltd.
Address	6F, 2819 KaiChuang Blvd., Science Town, Huangpu District, Guangzhou City, Guangdong, China.



2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	LTE Module
Brand Name	GOSUNCN
Model Name	GM500-U1G_A
FCC ID	2APNR-GM500U1G
Wireless Technology and Frequency Range	WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 13: 779.5 MHz ~ 784.5 MHz LTE Band 25: 1850.7 MHz ~ 1914.3 MHz LTE Band 26: 814.7 MHz ~ 848.3 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ (16QAM uplink is not supported) LTE: QPSK, 16QAM, 64QAM(Downlink only)
HW Version	GM500-U1G_A.H01
SW Version	GM500U1GV1.0B01
EUT Stage	Identical Prototype

Remark:

- The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Comments and Explanations:

- The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.
- The maximum RF output tune up power, antenna gain also the safe distance used for evaluate RF exposure were declared by manufacturer.



3. Maximum RF average output tune up power among production units

<WCDMA>

Mode		Maximum Average power(dBm)
WCDMA	Band II	24.50
	Band V	24.50

<LTE>

Mode		Maximum Average power(dBm)
LTE	Band 2	24.50
	Band 4	24.50
	Band 5	24.50
	Band 12	24.50
	Band 13	24.50
	Band 25	24.50
	Band 26	24.50



4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
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
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	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

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
WCDMA Band 2	1852.4	8.0	24.50	32.500	1778.279	0.354	1.000
WCDMA Band 5	826.4	9.0	24.50	33.500	2238.721	0.446	0.551
LTE Band 2	1850.7	8.0	24.50	32.500	1778.279	0.354	1.000
LTE Band 4	1710.7	5.0	24.50	29.500	891.251	0.177	1.000
LTE Band 5	824.7	9.0	24.50	33.500	2238.721	0.446	0.550
LTE Band 12	699.7	9.0	24.50	33.500	2238.721	0.446	0.466
LTE Band 13	779.5	9.0	24.50	33.500	2238.721	0.446	0.520
LTE Band 25	1850.7	8.0	24.50	32.500	1778.279	0.354	1.000
LTE Band 26	814.7	9.0	24.50	33.500	2238.721	0.446	0.543

Note:

- For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.

5.2. Collocated Power Density Calculation

General Note:

- This MPE analysis is applicable to any collocated transmitters with EIRP for WLAN is less than or equal to 27.0dBm and EIRP for Bluetooth is less than or equal to 22.0dBm.
- A maximum antenna gain of 7dBi for WLAN and 5dBi for Bluetooth has been assumed for all collocated antennas.

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
WCDMA Band 2	1852.4	7.5	24.50	32.000	1584.893	0.315	1.000	0.315
WCDMA Band 5	826.4	8.0	24.50	32.500	1778.279	0.354	0.551	0.642
LTE Band 2	1850.7	7.5	24.50	32.000	1584.893	0.315	1.000	0.315
LTE Band 4	1710.7	5.0	24.50	29.500	891.251	0.177	1.000	0.177
LTE Band 5	824.7	8.0	24.50	32.500	1778.279	0.354	0.550	0.644
LTE Band 12	699.7	8.5	24.50	33.000	1995.262	0.397	0.466	0.851
LTE Band 13	779.5	8.5	24.50	33.000	1995.262	0.397	0.520	0.764
LTE Band 25	1850.7	7.5	24.50	32.000	1584.893	0.315	1.000	0.315
LTE Band 26	814.7	8.0	24.50	32.500	1778.279	0.354	0.543	0.652
WLAN2.4GHz Band	2412	5.0	20.00	25.000	316.228	0.063	1.000	0.063
WLAN5GHz Band	5180	7.0	20.00	27.000	501.187	0.100	1.000	0.100
Bluetooth	2402	5.0	17.00	22.000	158.489	0.032	1.000	0.032



WWAN Power Density / Limit	WLAN Power Density / Limit	Bluetooth Power Density / Limit	Σ (Power Density / Limit) of WWAN + WLAN + Bluetooth
0.851	0.100	0.032	0.983

Note:

1. For collocation analysis, LTE band 12 are chosen for summation due to the highest (power density/limit) among all WWAN wireless modes.
2. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + WLAN + Bluetooth.
3. Considering the WWAN module collocation with the WLAN and Bluetooth transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 3 collocated transmitters is compliant.



Conclusion:

Based on 47 CFR §2.1091 and FCC KDB 447498 D01 v06, the analysis concludes that this product when transmitting in standalone within a host device, is compliant with the FCC RF exposure requirements in mobile exposure condition, provided the conducted power and antenna gain do not exceed the limits for each given frequency band per wireless technology as follow table:

Device	Band	Frequency (MHz)	Maximum Conducted Power (dBm)	Standalone Maximum Antenna Gain (dBi)	Collocated Maximum Antenna Gain (dBi)
GM500-U1G_A	WCDMA Band 2	1852.4	24.50	8.0	7.5
	WCDMA Band 5	826.4	24.50	9.0	8.0
	LTE Band 2	1850.7	24.50	8.0	7.5
	LTE Band 4	1710.7	24.50	5.0	5.0
	LTE Band 5	824.7	24.50	9.0	8.0
	LTE Band 12	699.7	24.50	9.0	8.5
	LTE Band 13	779.5	24.50	9.0	8.5
	LTE Band 25	1850.7	24.50	8.0	7.5
	LTE Band 26	814.7	24.50	9.0	8.0
Collocated Transmitters	WLAN2.4GHz	2412	20.00		5.0
	WLAN5GHz	5180	20.00		7.0
	Bluetooth	2402	17.00		5.0

-----THE END-----