

RF Exposure Evaluation Report

Product : LTE MODULE
Trade mark : GlocalMe
Model/Type reference : GLMM18A02
Serial Number : N/A
Report Number : EED32K00246413
FCC ID : 2AC88-GLMM18A02
Date of Issue : Feb. 22, 2019
47 CFR Part 1.1307
Test Standards : 47 CFR Part 1.1310
KDB447498 D01v06
Test result : PASS

Prepared for:

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2 Version

Version No.	Date	Description
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3 Contents

	Page
1 COVER PAGE.....	1
2 VERSION.....	2
3 CONTENTS.....	3
4 GENERAL INFORMATION.....	4
4.1 CLIENT INFORMATION.....	4
4.2 GENERAL DESCRIPTION OF EUT.....	4
4.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD.....	4
4.4 TEST LOCATION.....	5
4.5 DEVIATION FROM STANDARDS.....	5
4.6 ABNORMALITIES FROM STANDARD CONDITIONS.....	5
4.7 OTHER INFORMATION REQUESTED BY THE CUSTOMER.....	5
5 RF EXPOSURE EVALUATION.....	6
5.1 RF EXPOSURE COMPLIANCE REQUIREMENT.....	6
5.1.1 Limits.....	6
5.1.2 Test Procedure.....	6
5.1.3 EUT RF Exposure Evaluation.....	7
PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS.....	10

4 General Information

4.1 Client Information

Applicant:	HONGKONG UCLOUDLINK NETWORK TECHNOLOGY LIMITED
Address of Applicant:	Suite 603, 6/F, Laws Commercial Plaza, 788 Cheung Sha Wan Road, Kowloon, HongKong
Manufacturer:	HONGKONG UCLOUDLINK NETWORK TECHNOLOGY LIMITED
Address of Manufacturer:	Suite 603, 6/F, Laws Commercial Plaza, 788 Cheung Sha Wan Road, Kowloon, HongKong
Factory:	SHENZHEN CHIHANG TECHNOLOGY CO., LTD
Address of Factory:	1-4/F, Building 5, Detai Industrial Park, Huarong Road, Dalang Street, Longhua, Shenzhen

4.2 General Description of EUT

Product Name:	4G Wireless Data Terminal
Model No.(EUT):	GLMM18A02
Trade Mark:	GlocalMe
EUT Supports Radios application:	4.0 BT Dual mode: 2402MHz to 2480MHz WiFi: IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz GPS: L1:1559MHz to 1610MHz GSM/GPRS/EGPRS 850: Tx: 824-849MHz, Rx: 869-894MHz GSM/GPRS/EGPRS 1900: Tx: 1850-1910MHz, Rx: 1930-1990MHz WCDMA Band 2: Tx: 1850-1910MHz, Rx: 1930-1990MHz WCDMA Band 4: Tx: 1850-1910MHz, Rx: 2110-2155MHz WCDMA Band 5: Tx: 824- 849MHz, Rx: 869 -894MHz LTE Band 2: Tx: 1850-1910MHz, Rx: 1930-1990MHz LTE Band 4: Tx: 1710-1755 MHz, Rx: 2110-2155 MHz LTE Band 5: Tx: 824-849 MHz, Rx: 869-894MHz LTE Band 7: TX:2500-2570 MHz, Rx: 2620-2690 MHz LTE Band 12: Tx: 699-716 MHz, Rx: 729-746 MHz LTE Band 13: Tx: 777-787 MHz, Rx: 746-756 MHz LTE Band 17: Tx: 704-716 MHz, Rx: 734-746 MHz LTE Band 26: Tx: 814-849 MHz, Rx: 859-894 MHz LTE Band 38: Tx: 2570- 2620MHz, Rx: 2570-2620MHz LTE Band 40: Tx:2305-2315 MHz, Rx:2305-2315MHz Tx:2350-2360 MHz, Rx:2350-2360MHz LTE Band 41: Tx: 2535-2655 MHz, Rx: 2535 -2655 MHz

4.3 Product Specification subjective to this standard

Frequency Range:	4.0 BT Dual mode: 2402MHz to 2480MHz WiFi: IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz GPS: L1:1559MHz to 1610MHz GSM/GPRS/EGPRS 850: Tx: 824-849MHz, Rx: 869-894MHz GSM/GPRS/EGPRS 1900: Tx: 1850-1910MHz, Rx: 1930-1990MHz WCDMA Band 2: Tx: 1850-1910MHz, Rx: 1930-1990MHz WCDMA Band 4: Tx: 1850-1910MHz, Rx: 2110-2155MHz WCDMA Band 5: Tx: 824- 849MHz, Rx: 869 -894MHz LTE Band 2: Tx: 1850-1910MHz, Rx: 1930-1990MHz
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	LTE Band 4: Tx: 1710-1755 MHz, Rx: 2110-2155 MHz LTE Band 5: Tx: 824-849 MHz, Rx: 869-894MHz LTE Band 7: TX:2500-2570 MHz, Rx: 2620-2690 MHz LTE Band 12: Tx: 699-716 MHz, Rx: 729-746 MHz LTE Band 13: Tx: 777-787 MHz, Rx: 746-756 MHz LTE Band 17: Tx: 704-716 MHz, Rx: 734-746 MHz LTE Band 26: Tx: 814-849 MHz, Rx: 859-894 MHz LTE Band 38: Tx: 2570- 2620MHz, Rx: 2570-2620MHz LTE Band 40: Tx:2305-2315 MHz, Rx:2305-2315MHz Tx:2350-2360 MHz, Rx:2350-2360MHz LTE Band 41: Tx: 2535-2655 MHz, Rx: 2535 -2655 MHz
Antenna Type:	External Antenna
Power Supply:	DC 3.3V
Firmware version:	GLMM18A01_TSV1.0.000.005.180821_userdebug (manufacturer declare)
Hardware version:	M2_VB (manufacturer declare)
Sample Received Date:	Sep. 10, 2018
Sample tested Date:	Sep. 11, 2018 to Feb. 22, 2019
The tested sample(s) and the sample information are provided by the client.	

4.4 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

4.5 Deviation from Standards

None.

4.6 Abnormalities from Standard Conditions

None.

4.7 Other Information Requested by the Customer

None.

5 RF Exposure Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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

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.

5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit data at lowest, middle and highest channel individually.

5.1.3 EUT RF Exposure Evaluation

Antenna Gain: 1.0dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

BT

Channel	Frequency (MHz)	Tune up limit(dBm)	Gain (dBi)	EIRP* (dBm)	EIRP (mW)	R (cm)	S (mW/cm ²)	Limit (mW/cm ²)	Result
Lowest	2402	5.00	1.0	6.00	3.98	20	0.001	1.0	Pass

Wlan 2.4GHz

Channel	Frequency (MHz)	Tune up limit(dBm)	Gain (dBi)	EIRP* (dBm)	EIRP (mW)	R (cm)	S (mW/cm ²)	Limit (mW/cm ²)	Result
Highest	2462	14.50	1.0	15.50	35.48	20	0.007	1.0	Pass

GSM&WCDMA

Band	Tune up limit(dBm)	Gain (dBi)	EIRP* (dBm)	EIRP (mW)	R (cm)	S (mW/cm ²)	Limit (mW/cm ²)	Result
GSM850	33.00	1.0	34.00	2511.89	20	0.500	0.55	Pass
PCS1900	31.00	1.0	32.00	1584.89	20	0.315	1	Pass
WCDMA Band V	25.00	1.0	26.00	316.23	20	0.063	0.55	Pass
WCDMA Band IV	23.50	1.0	24.50	223.87	20	0.045	1	Pass
WCDMA Band II	24.50	1.0	25.50	281.84	20	0.056	1	Pass

LTE

Band	Tune up limit(dBm)	Gain (dBi)	EIRP* (dBm)	EIRP (mW)	R (cm)	S (mW/cm ²)	Limit (mW/cm ²)	Result
LTE Band 2	23.00	1.0	24.00	251.19	20	0.050	1	Pass
LTE Band 4	24.00	1.0	25.00	316.23	20	0.063	1	Pass
LTE Band 5	24.00	1.0	25.00	316.23	20	0.063	0.55	Pass
LTE Band 7	24.00	1.0	25.00	316.23	20	0.063	1	Pass
LTE Band 12	24.00	1.0	25.00	316.23	20	0.063	0.47	Pass
LTE Band 13	24.00	1.0	25.00	316.23	20	0.063	0.52	Pass
LTE Band 17	24.00	1.0	25.00	316.23	20	0.063	0.47	Pass
LTE Band 26	22.00	1.0	23.00	199.53	20	0.040	0.54	Pass
LTE Band 38	24.00	1.0	25.00	316.23	20	0.063	1	Pass
LTE Band 40	22.00	1.0	23.00	199.53	20	0.040	1	Pass
LTE Band 41	24.00	1.0	25.00	316.23	20	0.063	1	Pass

The product also has multiple transmitters The Simultaneous Transmission Possibilities are as below:

Simultaneous Tx Combination	Configuration
1	GSM+BT
2	WCDMA+BT
3	LTE+BT
4	GSM+WLAN
5	WCDMA+WLAN
6	LTE+WLAN

GSM+BT

Band	S_{GSM} (mW/cm ²)	MPE Ratios _{GSM}	S_{BT} (mW/cm ²)	MPE Ratios _{BT}	R (cm)	MPE Ratios _{SUM}	Limit	Result
GSM850+BT	0.500	0.909	0.001	0.001	20	0.910	1	Pass
PCS1900+BT	0.315	0.315	0.001	0.001	20	0.316	1	Pass

WCDMA+BT

Band	S_{WCDMA} (mW/cm ²)	MPE Ratios _{WCDMA}	S_{BT} (mW/cm ²)	MPE Ratios _{BT}	R (cm)	MPE Ratios _{SUM}	Limit	Result
WCDMA Band V+BT	0.063	0.115	0.001	0.001	20	0.116	1	Pass
WCDMA Band IV +BT	0.045	0.045	0.001	0.001	20	0.046	1	Pass
WCDMA Band II+BT	0.056	0.056	0.001	0.001	20	0.057	1	Pass

LTE+BT

Band	S_{LTE} (mW/cm ²)	MPE Ratios _{LTE}	S_{BT} (mW/cm ²)	MPE Ratios _{BT}	R (cm)	MPE Ratios _{SUM}	Limit	Result
LTE Band 2+BT	0.050	0.050	0.001	0.001	20	0.051	1	Pass
LTE Band 4+BT	0.063	0.063	0.001	0.001	20	0.064	1	Pass
LTE Band 5+BT	0.063	0.115	0.001	0.001	20	0.116	1	Pass
LTE Band 7+BT	0.063	0.063	0.001	0.001	20	0.064	1	Pass
LTE Band 12+BT	0.063	0.134	0.001	0.001	20	0.135	1	Pass
LTE Band 13+BT	0.063	0.121	0.001	0.001	20	0.122	1	Pass
LTE Band 17+BT	0.063	0.134	0.001	0.001	20	0.135	1	Pass
LTE Band 26+BT	0.040	0.074	0.001	0.001	20	0.075	1	Pass
LTE Band 38+BT	0.063	0.063	0.001	0.001	20	0.064	1	Pass
LTE Band 40+BT	0.040	0.040	0.001	0.001	20	0.041	1	Pass
LTE Band 41+BT	0.063	0.063	0.001	0.001	20	0.064	1	Pass

GSM+ WLAN

Band	S_{GSM} (mW/cm ²)	MPE Ratios _{GSM}	S_{WLAN} (mW/cm ²)	MPE Ratios _{WLAN}	R (cm)	MPE Ratios _{SUM}	Limit	Result
GSM850+ Wlan	0.500	0.909	0.007	0.007	20	0.916	1	Pass
PCS1900+ Wlan	0.315	0.315	0.007	0.007	20	0.322	1	Pass

WCDMA+ WLAN

Band	S_{WCDMA} (mW/cm ²)	MPE Ratios _{WCDMA}	S_{WLAN} (mW/cm ²)	MPE Ratios _{WLAN}	R (cm)	MPE Ratios _{SUM}	Limit	Result
WCDMA Band V+Wlan	0.063	0.115	0.007	0.007	20	0.122	1	Pass
WCDMA Band IV +Wlan	0.045	0.045	0.007	0.007	20	0.052	1	Pass
WCDMA Band II+Wlan	0.056	0.056	0.007	0.007	20	0.063	1	Pass

LTE+WLAN

Band	S_{LTE} (mW/cm ²)	MPE Ratios _{LTE}	S_{WLAN} (mW/cm ²)	MPE Ratios _{WLAN}	R (cm)	MPE Ratios _{SUM}	Limit	Result
LTE Band 2+Wlan	0.050	0.050	0.007	0.007	20	0.057	1	Pass
LTE Band 4+Wlan	0.063	0.063	0.007	0.007	20	0.070	1	Pass
LTE Band 5+Wlan	0.063	0.115	0.007	0.007	20	0.122	1	Pass
LTE Band 7+Wlan	0.063	0.063	0.007	0.007	20	0.070	1	Pass
LTE Band 12+Wlan	0.063	0.134	0.007	0.007	20	0.141	1	Pass
LTE Band 13+Wlan	0.063	0.121	0.007	0.007	20	0.128	1	Pass
LTE Band 17+Wlan	0.063	0.134	0.007	0.007	20	0.141	1	Pass
LTE Band 26+Wlan	0.040	0.074	0.007	0.007	20	0.081	1	Pass
LTE Band 38+Wlan	0.063	0.063	0.007	0.007	20	0.070	1	Pass
LTE Band 40+Wlan	0.040	0.040	0.007	0.007	20	0.047	1	Pass
LTE Band 41+Wlan	0.063	0.063	0.007	0.007	20	0.070	1	Pass

Note: Maximum tune up limit declared by manufacturer.

PHOTOGRAPHS OF EUT Constructional Details

Refer to Report No. EED32K00246401 for EUT external and internal photos.

*** End of Report ***

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