FCC TEST REPORT

Product	:	LTE MODULE
Trade mark	:	GlocalMe
Model/Type reference	:	GLMM18A02
Serial Number	:	N/A
Report Number	:	EED32K00246414
FCC ID	:	2AC88-GLMM18A02
Date of Issue	:	Feb. 18, 2019
Test Standards	:	47 CFR Part 15 Subpart B
Test result	:	PASS

Prepared for:

HONGKONG UCLOUDLINK NETWORK TECHNOLOGY LIMITED
Suite 603, 6/F, Laws Commercial Plaza, 788 Cheung Sha Wan Road, Kowloon, HongKong

Prepared by:

Centre Testing International Group Co., Ltd.
Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China
TEL: +86-755-3368 3668
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Tested by:	Peter	Compiled by:	Tom- chen
	Peter		Tom chen
Reviewed by:	Max Liang	Approved by:	Kevin Yang
	Max Liang		Kevin yang
Date:	Feb. 18, 2019		Check No.:3096318232

CENTRE TESTING INTERNATIONAL GROUP CO.,LTD. CTI Report Seal

2 Version

Version No.	Date	Description
00	Feb. 18, 2019	Original

3 Test Summary

Test Item	Test Requirement	Test method	Result
Radiated Emission	47 CFR Part 15B	ANSI C63.4-2014	PASS
Conducted Emission (150KHz to 30MHz)	47 CFR Part 15B	ANSI C63.4-2014	PASS

Remark:
The tested sample(s) and the sample information are provided by the client.

4 Contents

5 General Information

5.1 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

5.2 General Description of EUT

Product Name:	LTE MODULE
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
Power Supply:	DC 3.3V
Antenna Type	External Antenna
Antenna Gain:	-0.5dBi
Firmware version:	GLMM18A01_TSV1.0.000.005.180821_userdebug(manufacturer declare)
Hardware version:	M2_VB(manufacturer declare)

5.3 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 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
Country of Origin:	China
Country of Destination:	USA
Test voltage:	DC 3.3V, AC120V/60Hz
Sample Received Date:	Sep. 10, 2018
Sample tested Date:	Sep. 11, 2018 to Dec. 12, 2018

5.4 Test Environment and Mode

Operating Environment:	
Temperature:	23 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
GPS mode:	Keep the EUT receive the GPS signal.
Bluetooth mode	The EUT wireless linked to the phone, exchanging the data.
Wi-Fi mode	The EUT wireless linked to the router, exchanging the data.
GSM mode:	The EUT connect with the CMW500,exchange the data.
WCDMA mode:	The EUT connect with the CMW500,exchange the data.
LTE mode:	The EUT connect with the CMW500,exchange the data.

5.5 Description of Support Units

The EUT has been tested with associated equipment below.

Associated equipment name		Manufacture	model	serial number	Supplied by	Certification
AE1	phone	Apple	A1367	TTF20120027	CTI	FCC
AE2	Router	Linksys	EA8300	21P10C63728953	CTI	FCC

5.6 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd.

Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China 518101

Telephone: +86 (0) 755 3368 3668 Fax:+86 (0) 755 3368 3385

No tests were sub-contracted.

5.7 Deviation from Standards

None.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.

5.10 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	Radiated Spurious emission	4.3dB (30MHz-1GHz)
		4.5dB (1GHz-12.75GHz)
3	Conduction emission	3.5dB (9kHz to 150kHz)
		3.1dB (150kHz to 30MHz)
4	Temperature	0.64°C
5	Humidity	3.8%
6	DC power voltages	0.026%

6 Equipment List

Conducted disturbance Test					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
Receiver	R&S	ESCI	100435	05-25-2018	05-24-2019
Temperature/ Humidity Indicator	Defu	TH128	/	07-02-2018	07-01-2019
Communication test set	Agilent	E5515C	GB47050534	03-16-2018	03-15-2019
Communication test set	R&S	CMW500	152394	03-16-2018	03-15-2019
LISN	R&S	ENV216	100098	05-10-2018	05-10-2019
LISN	schwarzbeck	NNLK8121	8121-529	05-10-2018	05-10-2019
Voltage Probe	R&S	ESH2-Z3 0299.7810.56	100042	06-13-2017	06-11-2020
Current Probe	R&S	EZ-17 816.2063.03	100106	05-30-2018	05-29-2019
ISN	TESEQ	ISN T800	30297	02-06-2018	02-05-2019

3M Semi/full-anechoic Chamber					
Equipment	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm-dd-yyyy)**	**Cal. Due date (mm-dd-yyyy)**
3M Chamber & Accessory Equipment	TDK	SAC-3	---	06-04-2016	06-03-2019
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-401	10-27-2017	10-28-2018
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-401	10-28-2018	10-27-2019
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	07-30-2018	07-29-2019
Microwave Preamplifier	Agilent	8449B	3008A02425	08-21-2018	08-20-2019
Microwave Preamplifier	Tonscend	EMC051845SE	980380	01-19-2018	01-18-2019
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1869	04-25-2018	04-23-2021
Horn Antenna	ETS-LINDGREN	3117	00057410	06-05-2018	06-03-2021
Double ridge horn antenna	A.H.SYSTEMS	SAS-574	6042	06-05-2018	06-04-2021
Pre-amplifier	A.H.SYSTEMS	PAP-1840-60	6041	06-05-2018	06-04-2021
Loop Antenna	ETS	6502	00071730	06-22-2017	06-21-2019
Spectrum Analyzer	R&S	FSP40	100416	05-11-2018	05-10-2019
Receiver	R&S	ESCI	100435	05-25-2018	05-24-2019
Receiver	R&S	ESCI7	100938-003	11-22-2017	11-23-2018
Receiver	R&S	ESCI7	100938-003	11-23-2018	11-22-2019
Multi device Controller	maturo	NCD/070/10711112	---	01-10-2018	01-09-2019
LISN	schwarzbeck	NNBM8125	81251547	05-11-2018	05-10-2019
LISN	schwarzbeck	NNBM8125	81251548	05-11-2018	05-10-2019
Signal Generator	Agilent	E4438C	MY45095744	03-13-2018	03-12-2019
Signal Generator	Keysight	E8257D	MY53401106	03-13-2018	03-12-2019
Temperature/ Humidity Indicator	Shanghai qixiang	HM10	1804298	10-11-2017	10-12-2018
Temperature/ Humidity Indicator	Shanghai qixiang	HM10	1804298	10-12-2018	10-11-2019
Communication test set	Agilent	E5515C	GB47050534	03-16-2018	03-15-2019
Cable line	Fulai(7M)	SF106	5219/6A	01-10-2018	01-09-2019
Cable line	Fulai(6M)	SF106	5220/6A	01-10-2018	01-09-2019
Cable line	Fulai(3M)	SF106	5216/6A	01-10-2018	01-09-2019
Cable line	Fulai(3M)	SF106	5217/6A	01-10-2018	01-09-2019
Communication test set	R&S	CMW500	104466	02-05-2018	02-04-2019
High-pass filter	Sinoscite	FL3CX03WG18NM12-0398-002	---	01-10-2018	01-09-2019
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	01-10-2018	01-09-2019
band rejection filter	Sinoscite	FL5CX01CA09CL12-0395-001	---	01-10-2018	01-09-2019
band rejection filter	Sinoscite	FL5CX01CA08CL12-0393-001	---	01-10-2018	01-09-2019
band rejection filter	Sinoscite	FL5CX02CA04CL12-0396-002	---	01-10-2018	01-09-2019
band rejection filter	Sinoscite	FL5CX02CA03CL12-0394-001	---	01-10-2018	01-09-2019

7 Test results and Measurement Data

7.1 Conducted Emissions

Test Requirement: 47 CFR Part 15B

Test Method: ANSI C63.4

Test frequency range: 150kHz to 30MHz

Limit:

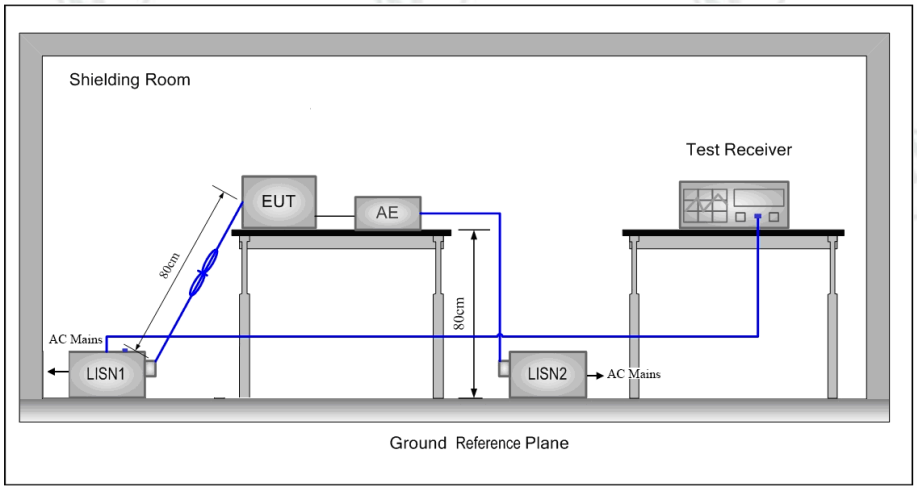
Frequency range (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test Procedure:

1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 on conducted measurement.

Test Setup:



Instruments Used: Refer to section 6 for details

Test Mode: GPS mode and Wi-Fi mode, Bluetooth mode, GSM mode, WCDMA mode, LTE mode

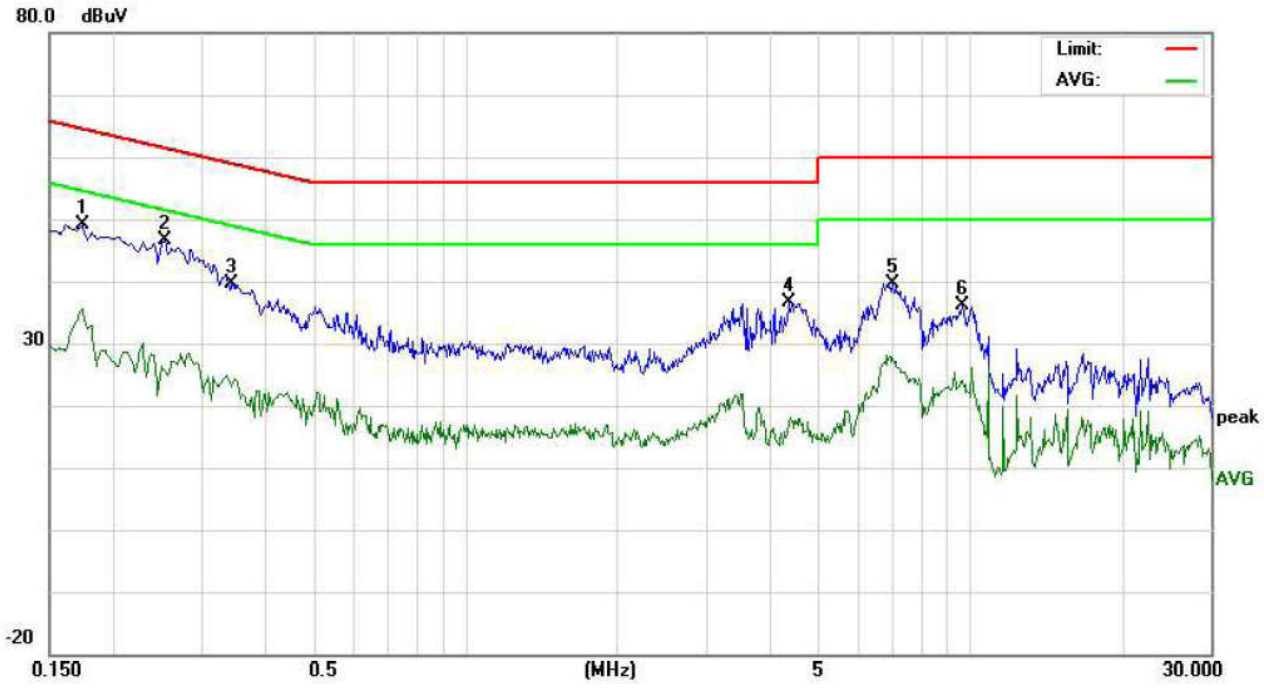
Test Status: Pretest the EUT at different test mode and found the GPS mode which is worst case, the test worst case mode is recorded in the report.

Test Results: Pass

Measurement Data

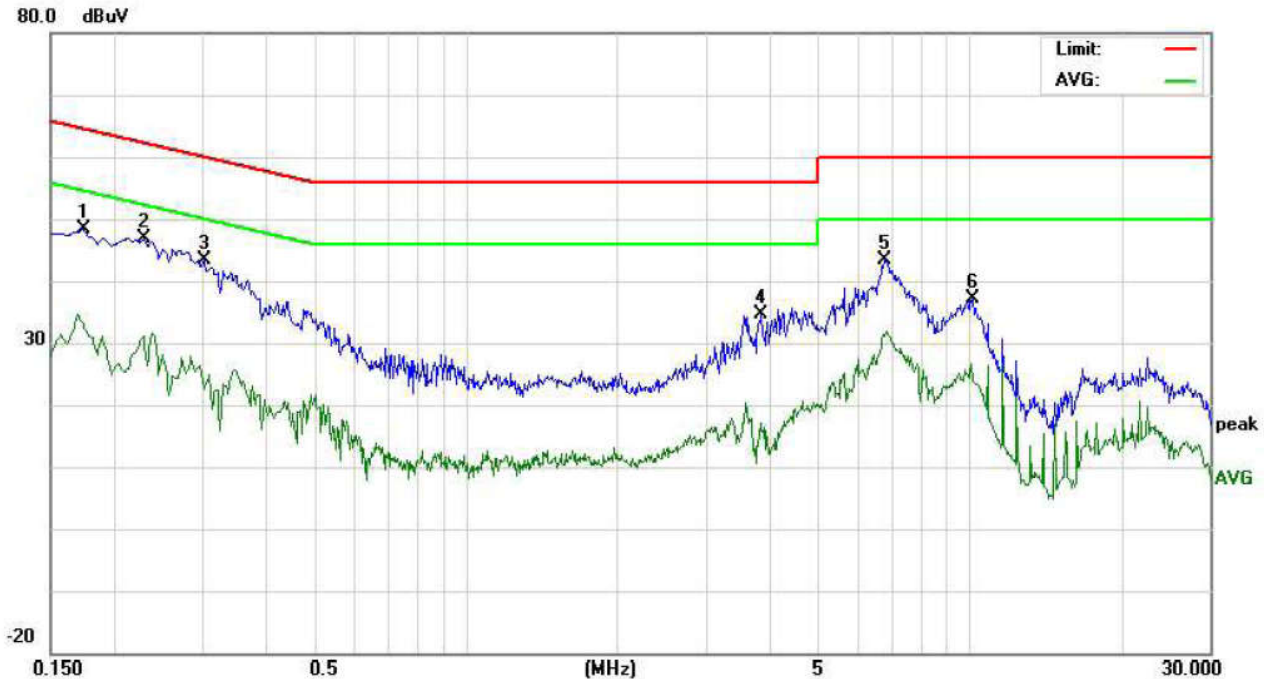
An initial pre-scan was performed on the live and neutral lines with peak detector.
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Product	:	LTE MODULE	**Model/Type reference**	:	GLMM18A02
Temperature	:	21℃	**Humidity**	:	53%
Phase	:	L			



No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1740	39.32	36.54	25.95	9.74	49.06	46.28	35.69	64.76	54.76	-18.48	-19.07	P	
2	0.2540	36.84	33.69	15.80	9.75	46.59	43.44	25.55	61.62	51.62	-18.18	-26.07	P	
3	0.3460	29.95	26.54	13.24	9.77	39.72	36.31	23.01	59.06	49.06	-22.75	-26.05	P	
4	4.3980	26.95	23.87	7.75	9.64	36.59	33.51	17.39	56.00	46.00	-22.49	-28.61	P	
5	7.0620	30.10	27.96	18.10	9.62	39.72	37.58	27.72	60.00	50.00	-22.42	-22.28	P	
6	9.6820	26.42	23.45	14.25	9.77	36.19	33.22	24.02	60.00	50.00	-26.78	-25.98	P	

Product	:	LTE MODULE	**Model/Type reference**	:	GLMM18A02
Temperature	:	21℃	**Humidity**	:	53%
Phase	:	N			



No.	Freq.	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)			
	MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	P/F	Comment
1	0.1740	38.63	35.62	23.33	9.74	48.37	45.36	33.07	64.76	54.76	-19.40	-21.69	P	
2	0.2300	37.27	34.74	21.45	9.73	47.00	44.47	31.18	62.45	52.45	-17.98	-21.27	P	
3	0.3020	33.66	30.21	12.91	9.78	43.44	39.99	22.69	60.19	50.19	-20.20	-27.50	P	
4	3.8700	25.03	22.64	6.45	9.66	34.69	32.30	16.11	56.00	46.00	-23.70	-29.89	P	
5	6.7700	33.64	30.69	21.53	9.62	43.26	40.31	31.15	60.00	50.00	-19.69	-18.85	P	
6	10.1260	27.23	24.58	14.22	9.80	37.03	34.38	24.02	60.00	50.00	-25.62	-25.98	P	

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

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7.2 Radiated Emission

Test Requirement: 47 CFR Part 15B

Test Method: ANSI C63.4

Test site: Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver setup:

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value

Limit:

Frequency	Limit (dBμV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

Test Procedure:

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber (Above 18GHz the distance is 1 meter).

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.

i. Repeat above procedures until all frequencies measured was complete.

Test Setup:

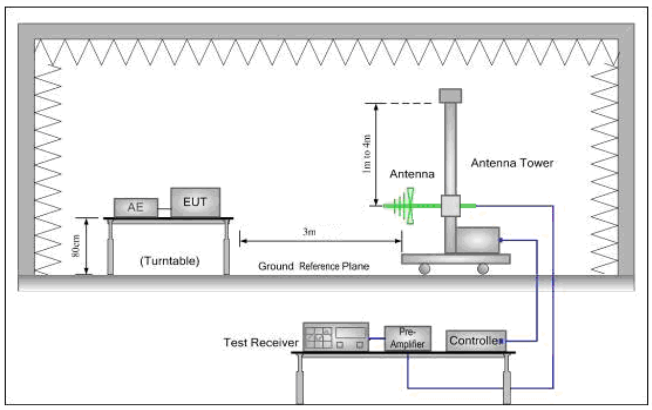


Figure 1. 30MHz to 1GHz

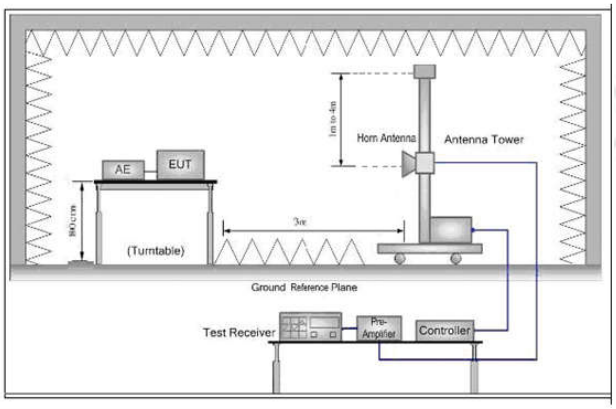


Figure 2. Above 1 GHz

Instruments Used: Refer to section 6 for details

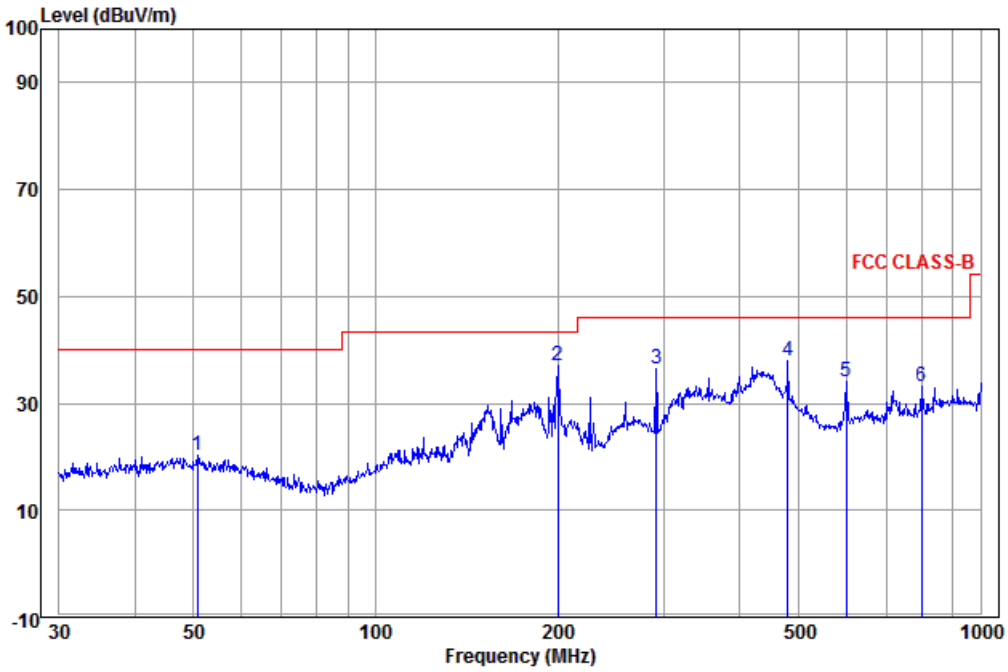
Test Mode: GPS mode and Wi-Fi mode, Bluetooth mode, GSM mode, WCDMA mode, LTE mode

Test Status: Pretest the EUT at different test mode and found the GPS mode which is worst case, the test worst case mode is recorded in the report.

Test Results: Pass

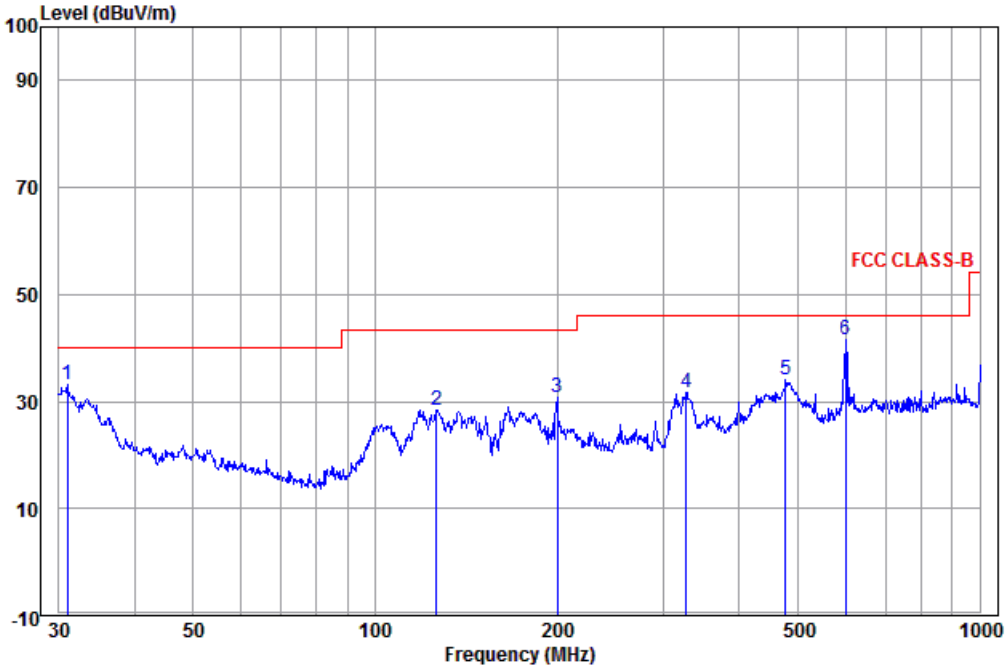
QP value:
Below 1GHz

Product	:	LTE MODULE	**Model/Type reference**	:	GLMM18A02
Temperature	:	23℃	**Humidity**	:	54%
Phase	:	H			



	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	50.764	14.48	0.12	5.63	20.23	40.00	-19.77	Horizontal	QP
2 pp	199.986	11.50	1.10	24.46	37.06	43.50	-6.44	Horizontal	QP
3	291.036	13.27	1.11	22.04	36.42	46.00	-9.58	Horizontal	QP
4	480.528	16.64	1.50	19.89	38.03	46.00	-7.97	Horizontal	QP
5	599.321	18.69	1.83	13.47	33.99	46.00	-12.01	Horizontal	QP
6	798.980	19.79	2.46	10.96	33.21	46.00	-12.79	Horizontal	QP

Product	:	LTE MODULE	**Model/Type reference**	:	GLMM18A02
Temperature	:	23℃	**Humidity**	:	54%
Phase	:	V			

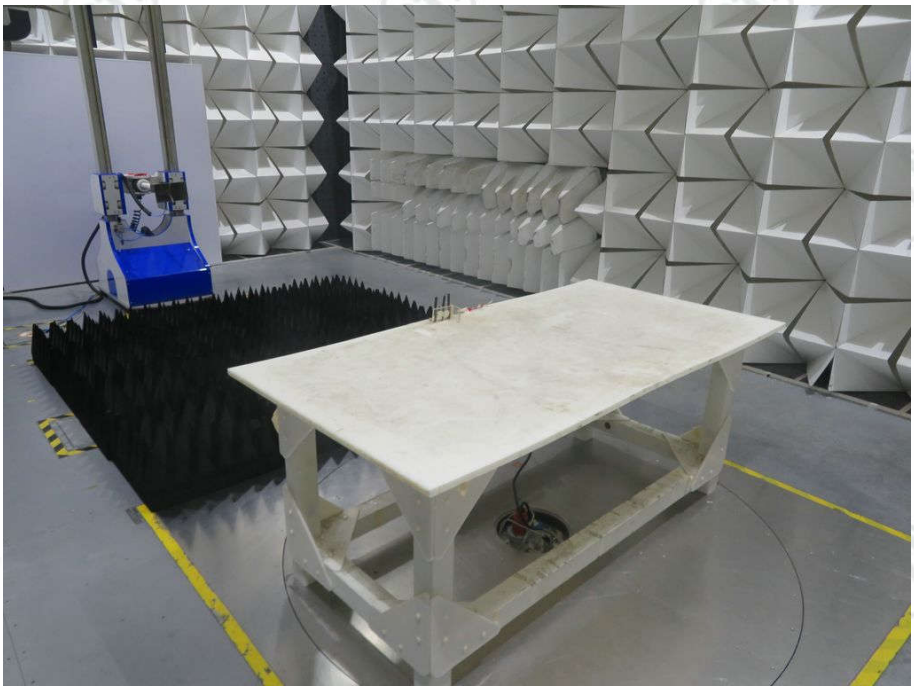


	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	30.962	12.11	0.09	20.81	33.01	40.00	-6.99	Vertical	QP
2	126.329	10.37	0.60	17.51	28.48	43.50	-15.02	Vertical	QP
3	199.986	11.50	1.10	18.03	30.63	43.50	-12.87	Vertical	QP
4	326.740	13.95	1.21	16.59	31.75	46.00	-14.25	Vertical	QP
5	477.169	16.59	1.50	15.94	34.03	46.00	-11.97	Vertical	QP
6 pp	599.321	18.69	1.83	20.96	41.48	46.00	-4.52	Vertical	QP

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Test model No.: GLMM18A02

Radiated emission Test Setup-1(Below 1GHz)

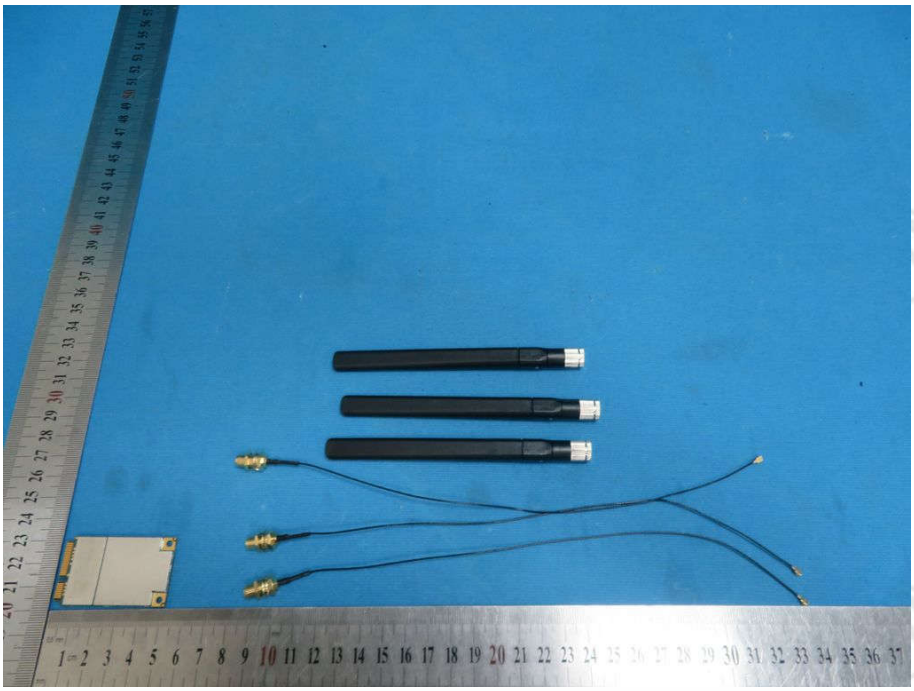


Radiated emission Test Setup-2(Above 1GHz)

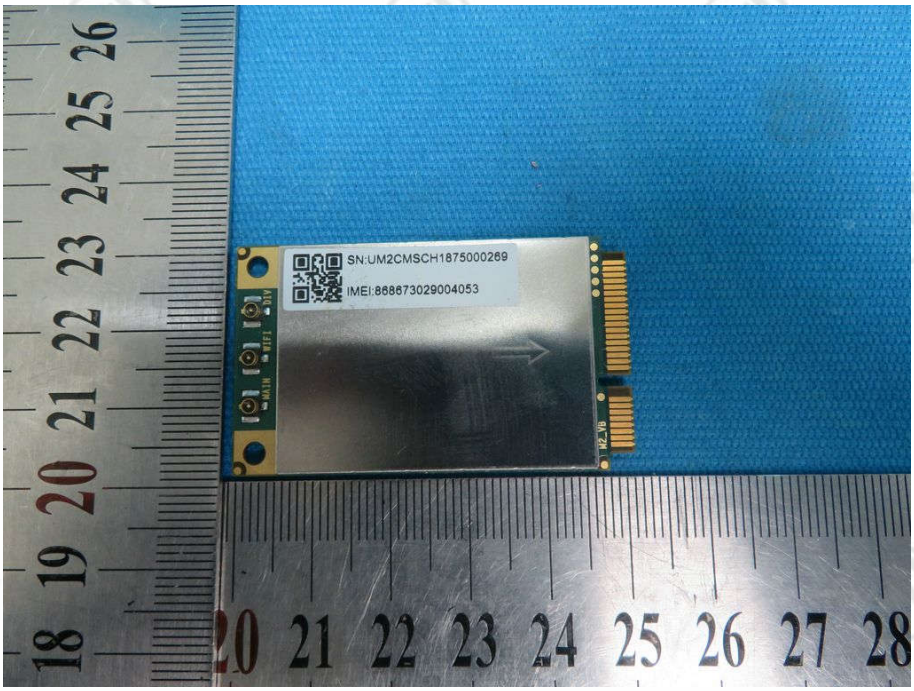
Conducted Emissions Test Setup

APPENDIX 2 PHOTOGRAPHS OF EUT

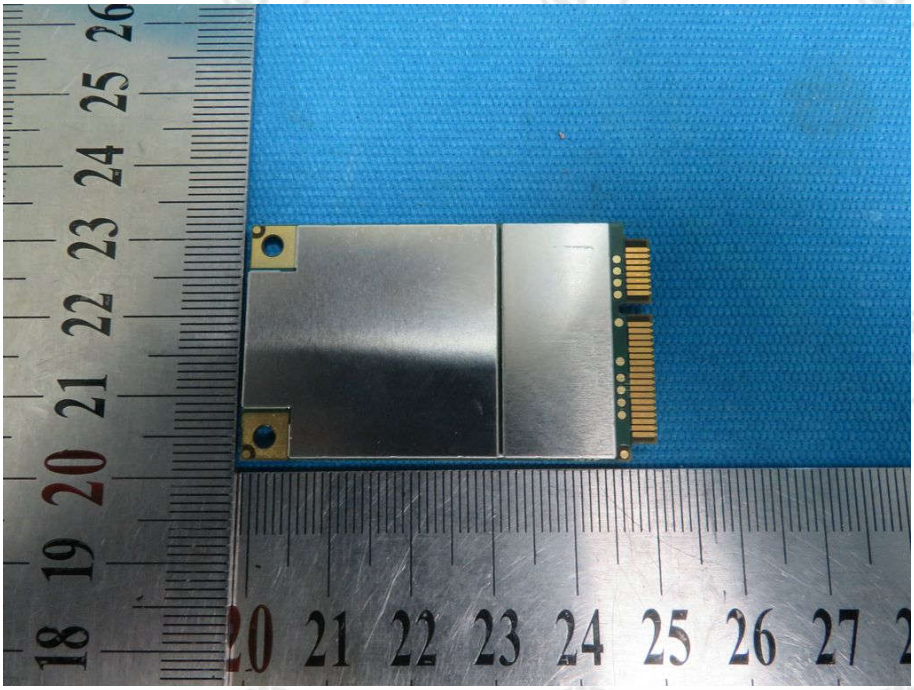
Test model No.: GLMM18A02



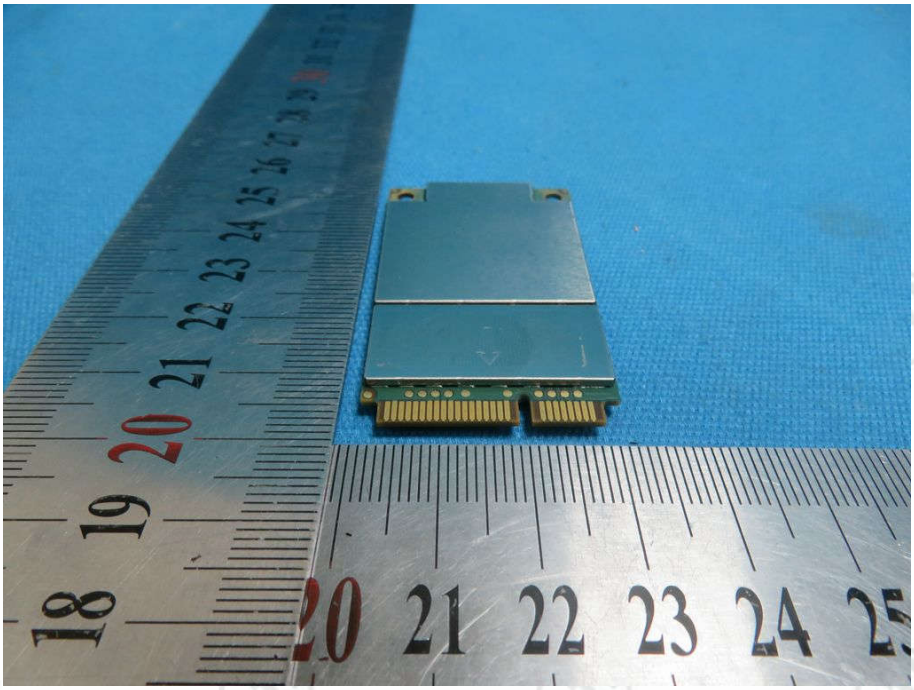
View of Product-1



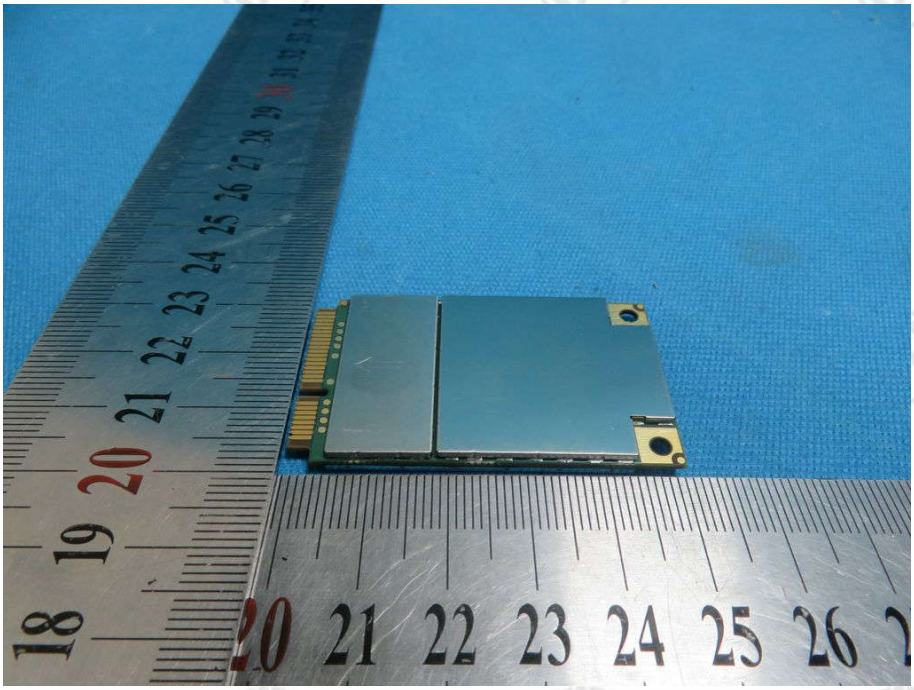
View of Product-2



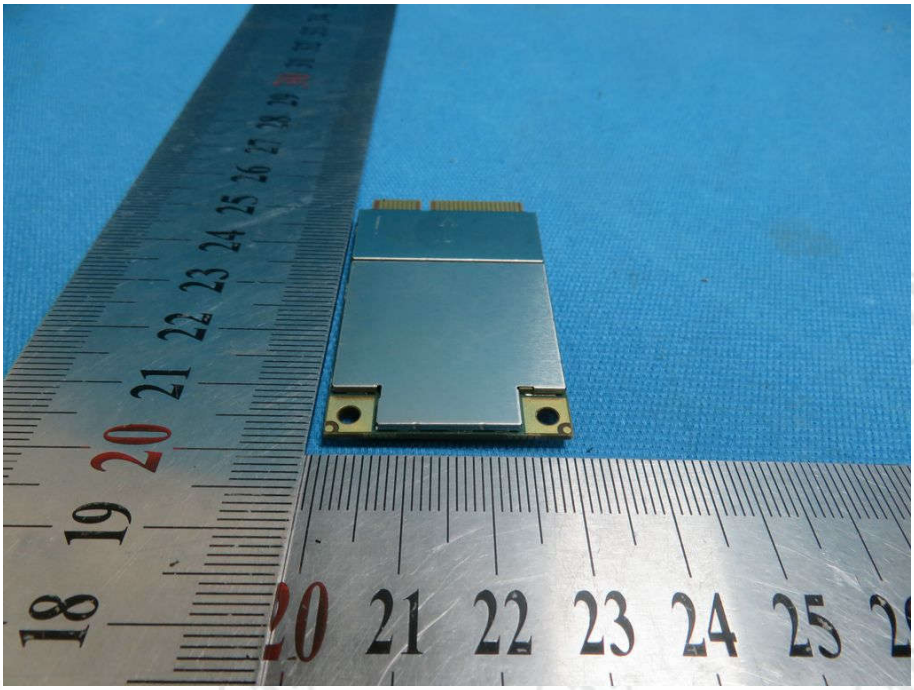
View of Product-3



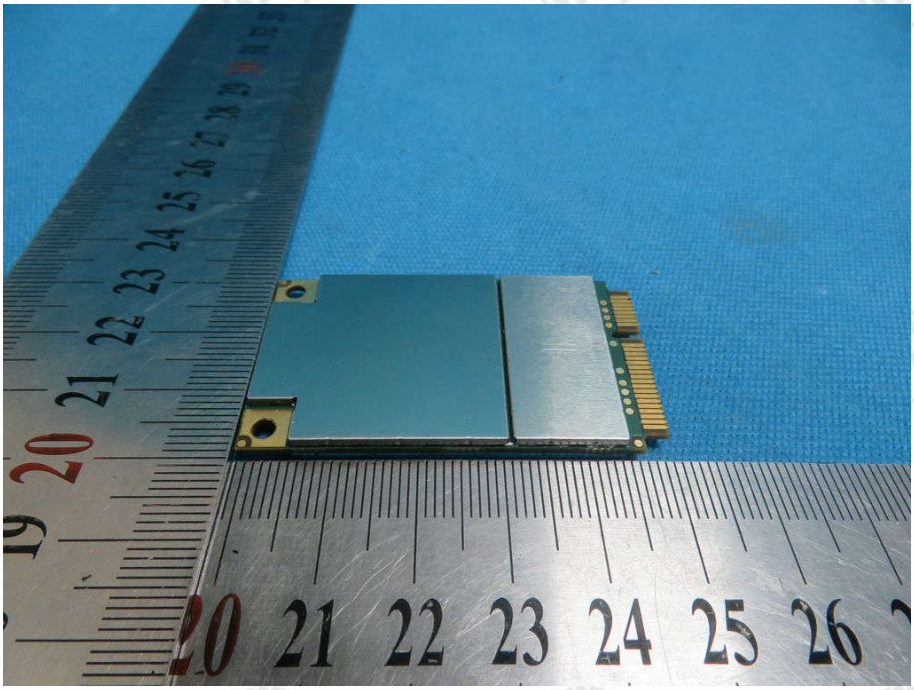
View of Product-4



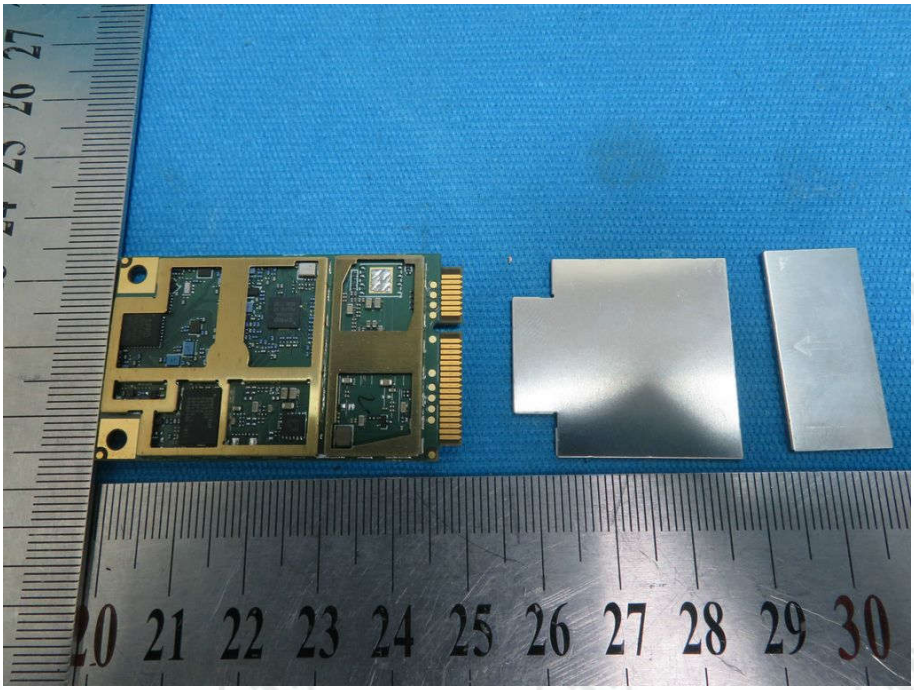
View of Product-5



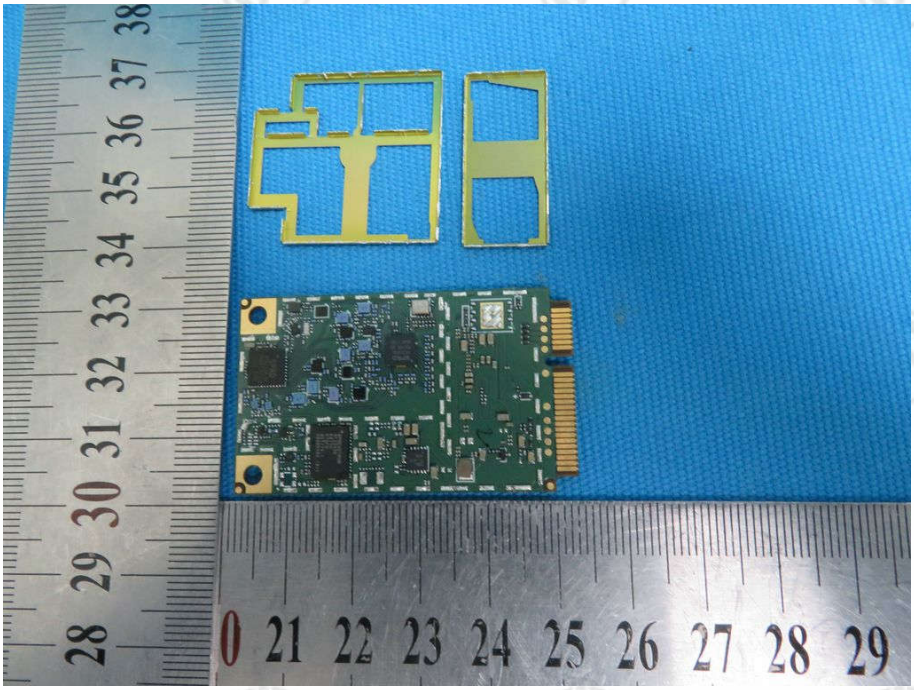
View of Product-6



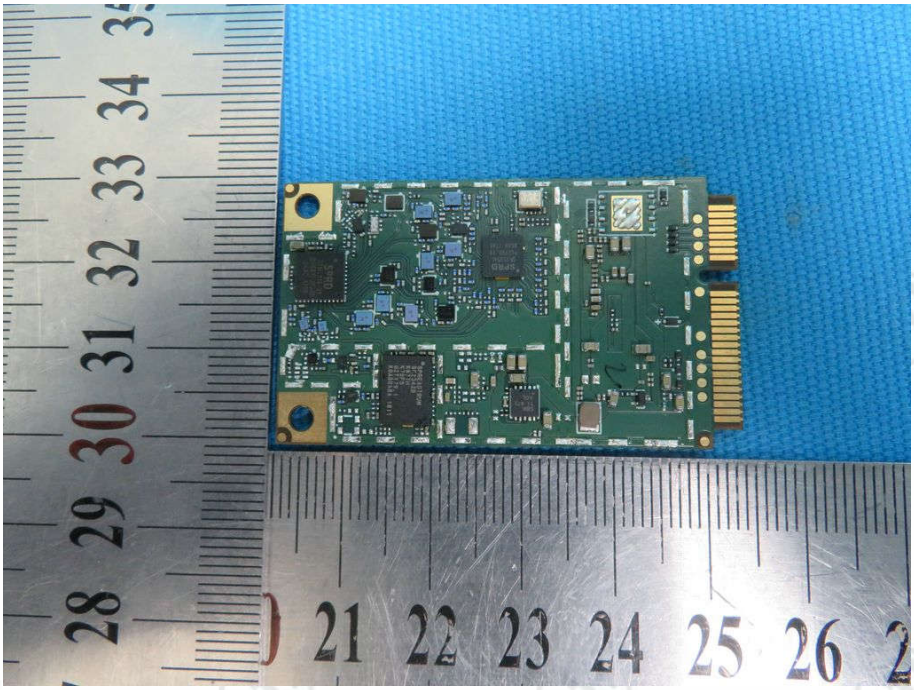
View of Product-7



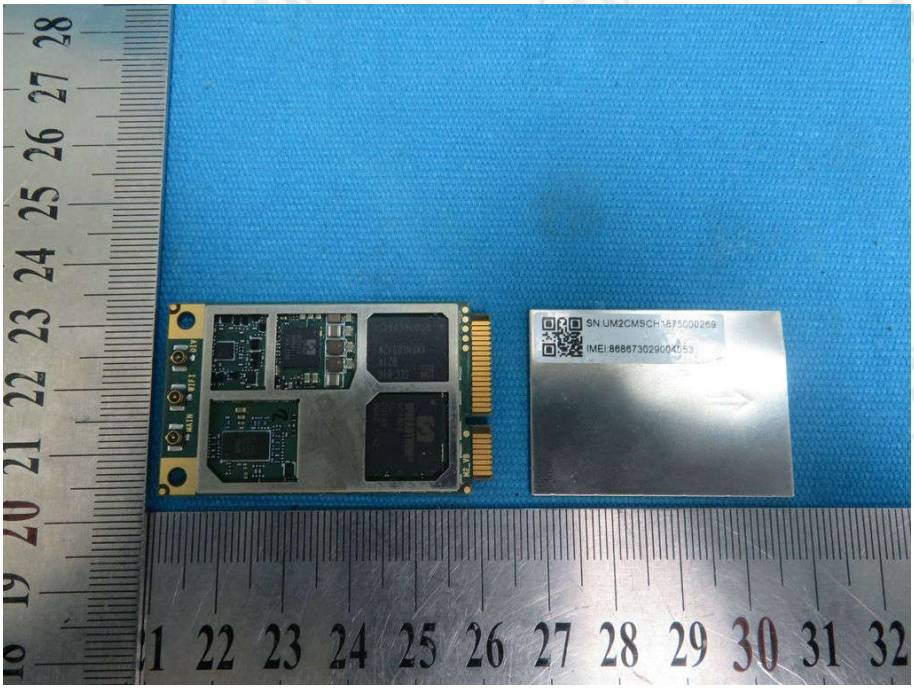
View of Product-8



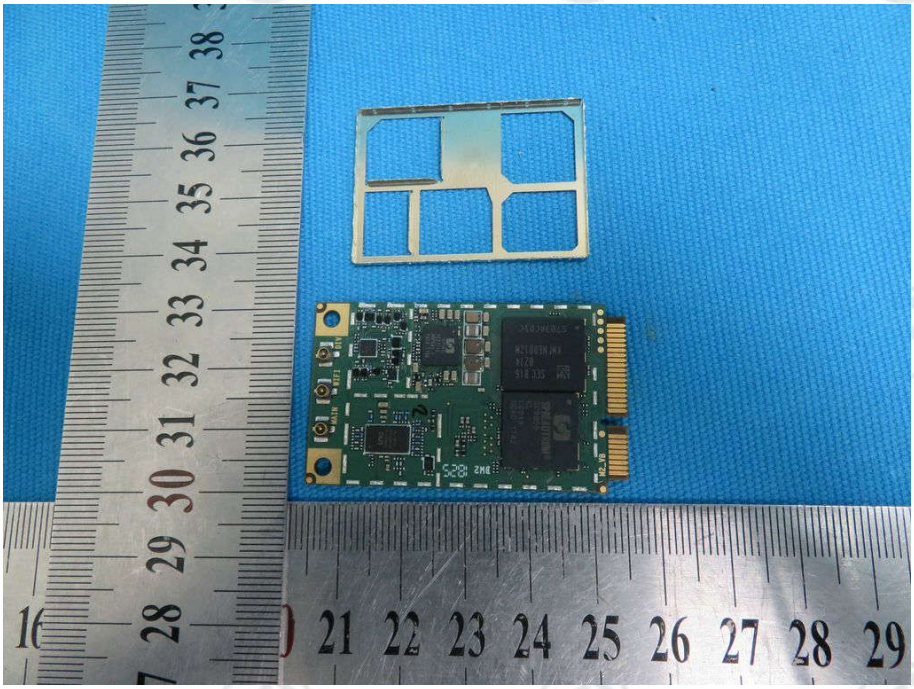
View of Product-9



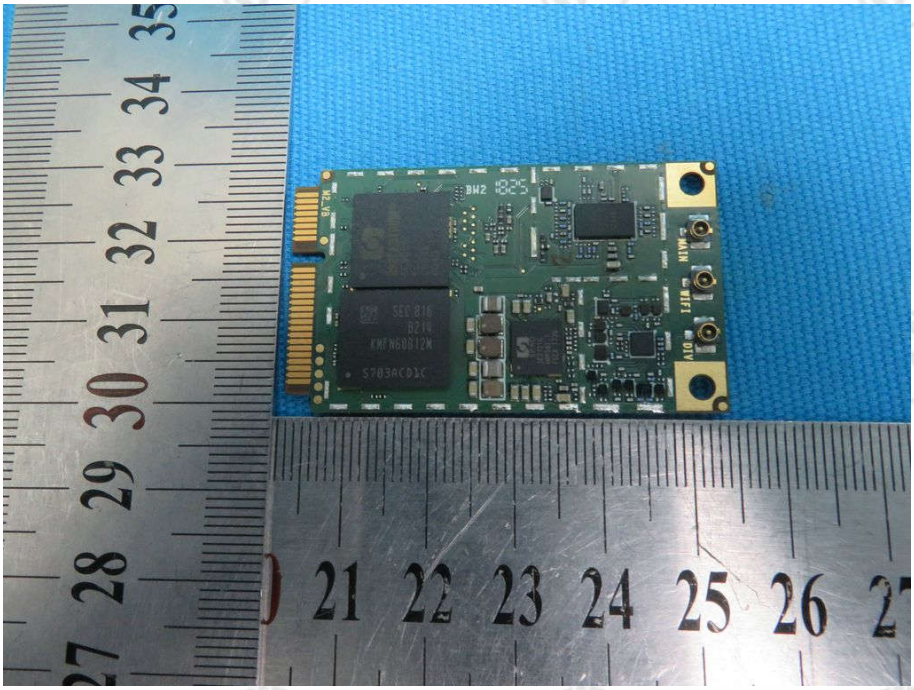
View of Product-10



View of Product-11



View of Product-12



View of Product-13

*** End of Report ***