

Radio Equipment Directive-EMC
for
Shandong USR IOT Technology Limited

4G Router

Model No.: USR-G800, USR-G801, USR-G802, USR-G803, USR-G804,
USR-G805, USR-G806, USR-G807, USR-G808, USR-G809

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Report Number : R011608860E-M1
Date of Test : Aug. 24~ Sept. 08, 2016
Date of Report : Sept. 09, 2016

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TEST REPORT

Applicant : Shandong USR IOT Technology Limited
Manufacturer : Shandong USR IOT Technology Limited
EUT : 4G Router
Model No. : USR-G800, USR-G801, USR-G802, USR-G803, USR-G804,
USR-G805, USR-G806, USR-G807, USR-G808, USR-G809
Serial No. : N.A.
Trade Mark : 
Rating : DC 9~16V, 600~800mA

Measurement Procedure Used:

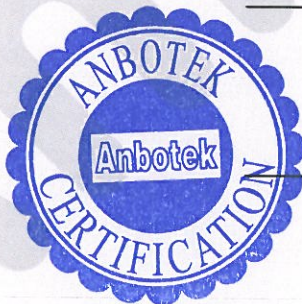
ETSI EN 301 489-1 V1.9.2 (2011-09)
ETSI EN 301 489-7 V1.3.1 (2005-11)
ETSI EN 301 489-17 V2.2.1 (2012-09)
ETSI EN 301 489-24 V1.5.1 (2010-10)

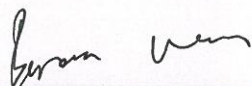
The device described above is tested by Shenzhen Anbotech Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotech Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN 301 489-1, EN 301 489-7, EN 301 489-17 & EN 301 489-24 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotech Compliance Laboratory Limited

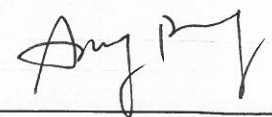
Date of Test : Aug. 24~ Sept. 08, 2016

Prepared by :

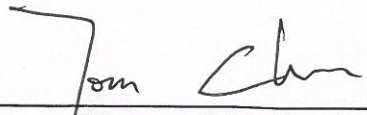



(Engineer / Baron Wen)

Reviewer :


(Project Manager/Amy Ding)

Approved & Authorized Signer :


(Manager/Tom Chen)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	: 4G Router
Model Number	: USR-G800, USR-G801, USR-G802, USR-G803, USR-G804, USR-G805, USR-G806, USR-G807, USR-G808, USR-G809 (Note: All samples are the same except the model number and colour, so we prepare “USR-G800” for test only.)
Test Power Supply	: AC 230V, 50Hz for adapter
Adapter	: Model No.: DQS151-120100-16312C Input: AC 100-240V, 50/60Hz, 0.4A Max Output: DC 12V, 1.0A
Frequency	: WiFi: 2412 ~ 2472MHz (13 channels) GSM: 900/1800 WCDMA: 900/2100 LTE:band 1;3
Antenna Gain	: WiFi: 3 dBi GSM: 5 dBi WCDMA: 5 dBi LTE: 5 dBi
Applicant Address	: Shandong USR IOT Technology Limited Floor 11, Building 1, No. 1166 Xinluo Street, Gaoxin Qu, 250101, Jinan, Shandong, China
Manufacturer Address	: Shandong USR IOT Technology Limited Floor 11, Building 1, No. 1166 Xinluo Street, Gaoxin Qu, 250101, Jinan, Shandong, China
Factory Address	: Shandong USR IOT Technology Limited Floor 11, Building 1, No. 1166 Xinluo Street, Gaoxin Qu, 250101, Jinan, Shandong, China
Date of receipt	: Aug. 24, 2016
Date of Test	: Aug. 24~ Sept. 08, 2016
Remark	: Once the new report takes into force, the original report withdraw. This report is based on original report R011608860E. Both reports are the same except updated the product name.

1.2. Auxiliary Equipment Used during Test

Notebook : Manufacturer: LIFE BOOK
Model: LH531
CE, FCC DOC

Printer : Manufacturer: Brother
M/N: MFC-3360C
S/N: N/A
CE, FCC: DOC

1.3. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 752021

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 06, 2016.

IC-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A, Jun. 13, 2016.

Test Location

All Emissions tests were performed
Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC
Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong,
China

1.4. Measurement Uncertainty

Radiation Uncertainty : Ur = 4.1 dB (Horizontal)
Ur = 4.3 dB (Vertical)

Conduction Uncertainty : Uc = 3.4 dB

1.5. Test Standards

ETSI EN 301 489-1 V1.9.2 (2011-09)

Electromagnetic compatibility and Radio spectrum Matters (ERM);
Electromagnetic Compatibility (EMC) standard for radio equipment and services;
Part 1: Common technical requirements

ETSI EN 301 489-7 V1.3.1 (2005-11)

Electromagnetic compatibility and Radio spectrum Matters (ERM);
ElectroMagnetic Compatibility (EMC)
standard for radio equipment and services;
Part 7: Specific conditions for mobile
and portable radio and ancillary equipment of digital cellular radio
telecommunications systems (GSM and DCS)

ETSI EN 301 489-17 V2.2.1 (2012-09)

Electromagnetic compatibility and Radio spectrum Matters (ERM);
Electromagnetic Compatibility (EMC) standard for radio equipment and services;
Part 17: Specific conditions for 2,4GHz wideband transmission systems and 5GHz
high performance RLAN equipment

ETSI EN 301 489-24 V1.5.1 (2010-10)

Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic
Compatibility (EMC) standard for radio equipment and services;
Part 24: Specific conditions for IMT-2000 CDMA Direct Spread (UTRA and
E-UTRA) for Mobile and portable (UE) radio and ancillary equipment

2. MEASURING DEVICE AND TEST EQUIPMENT

Test equipments list of Shenzhen Anbotek Compliance Laboratory Limited.

2.1. Conducted Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Two-Line V-network	Rohde & Schwarz	ENV216	100055	Apr. 16, 2016	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Apr. 16, 2016	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Apr. 16, 2016	1 Year

2.2. Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 16, 2016	1 Year
2.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 19, 2016	1 Year
3.	Pre-amplifier	SONOMA	310N	186860	Apr. 16, 2016	1 Year

2.3. Harmonic and Flicker Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Programmable AC Power source	SOPH POWER	PAG-1050	630250	Apr. 16, 2016	1 Year
2.	Harmonic and Flicker Analyzer	LAPLACE	AC2000A	272629	Apr. 19, 2016	1 Year

2.4. Electrostatic Discharge Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Simulators	3ctest	ESD-30T	ES0131505	Jun. 20, 2016	1 Year

2.5. R/S Immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	RF Power Meter. Dual Channel	BOONTON	4232A	10539	May 29, 2016	1 year
2.	50ohm Diode Power Sensor	BOONTON	51011EMC	34236/34238	May 29, 2016	1 year
3.	Broad-Band Horn Antenna	SCHWARZBECK	BBHA9120 L3F	332	May 29, 2016	1 year
4.	Power Amplifier	PRANA	AP32MT215	N/A	May 29, 2016	1 year
5.	Power Amplifier	MILMEGA	AS0102-55	N/A	May 29, 2016	1 year
6.	Signal Generator	AEROFLEX	2023B	N/A	May 29, 2016	1 year
7.	Field Strength Meter	HOLADAY	HI-6005	N/A	May 29, 2016	1 year
8.	RS232 Fiber Optic Modem	HOLADAY	HI-4413P	N/A	May 29, 2016	1 year
9.	Log.-Per. Antenna	SCHWARZBECK	VULP 9118E	N/A	May 29, 2016	1 year

2.6. Electrical Fast Transient/Burst Immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EFT Burst Simulator	PRIMA	EFT61004B	PR10114282	Apr. 16, 2016	1 Year
2.	EFT-Clamp	PRIMA	EFT-Clamp	/	Apr. 16, 2016	1 Year

2.7. Surge Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	6kV Surge Generator	TESEQ	NSG 3060	1480	Mar. 30, 2016	1 Year
2.	CDN	TESEQ	CDN 3061	1408	Mar. 30, 2016	1 Year

2.8. Injected Currents Susceptibility Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	C/S Conducted Immunity Test System	FRANKONIA	CIT-10	126A1196/2012	Apr. 16, 2016	1 Year
2.	CDN	FRANKONIA	CDN - M2+ M3	A2210178/2012	Apr. 16, 2016	1 Year
3.	6dB attenuator	FRANKONIA	DAM 26W	1172202	Apr. 16, 2016	1 Year

2.9. Voltage Dips and Interruptions Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	CYCLE SAG Simulator	PRIMA	DRP61011A G	PR12046234	Apr. 16, 2016	1 Year

3. Technical Test

3.1. Summary of Test Results

No Deviations from the technical specification(s) were ascertained in the course of the tests Performed	
Final Verdict: (only "Passed" if all single measurements are "Passed")	Passed

3.2. Test Report

Emission (EMI)

EMI Phenomenon	Port	Requirement		EUT Setup	Result	Applicability
		Standard	Basic Standard			
Conducted Interference Voltage	AC Mains	ETSI EN 301 489-1:2011 Clause 8.4	EN 55022	Refer to Section 5	Complies	Applicable
Conducted Interference Voltage	DC Mains	ETSI EN 301 489-1:2011 Clause 8.3	EN 55022	Refer to Section 4	N/A	Not Applicable
Radiated Interference Field Strength 30~1000MHz	Enclosure	ETSI EN 301 489-1:2011 Clause 8.2	EN 55022	Refer to Section 4	Complies	Applicable
Harmonic Current Emissions	AC Mains Input Port	ETSI EN 301 489-1:2011 Clause 8.5	EN 61000-3-2	Refer to Section 5	N/A	Not Applicable
Flicker & Voltage Fluctuation	AC Mains Input Port	ETSI EN 301 489-1:2011 Clause 8.6	EN 61000-3-3	Refer to Section 5	Complies	Applicable

Immunity (EMS)

EMS Phenomenon	Port	Requirement		EUT Setup	Result	Applicability
		Standard	Basic Standard			
Electronic Discharge (ESD)	Enclosure	ETSI EN 301 489-1:2011 Clause 9.3	IEC 61000-4-2	Refer to Section 5	Complies	Applicable
RF-Electro-Magnetic Field (80-1000MHz and 1400-2000 MHz)	Enclosure	ETSI EN 301 489-1:2011 Clause 9.2	IEC 61000-4-3	Refer to Section 5	Complies	Applicable
Fast Transients, Burst	Power Line	ETSI EN 301 489-1:2011 Clause 9.4	IEC 61000-4-4	Refer to Section 5	Complies	Applicable
Surge	Power Line (1 Phase)	ETSI EN 301 489-1:2011 Clause 9.8	IEC 61000-4-5	Refer to Section 5	Complies	Applicable

Transients & Surges Vehicular Environment	Power Line (Car Charge)	ETSI EN 301 489-1:2011 Clause 9.6	ISO 7367-1 ISO 7367-2	N/A	N/A	Not Applicable
RF Common Mode (0.15-80MHz)	Power Line	ETSI EN 301 489-1:2011 Clause 9.5	IEC 61000-4-6	Refer to Section 5	Complies	Applicable
Vol. Dips, Interruptions & Fluctuations (AC Power)	Power Line	ETSI EN 301 489-1:2011 Clause 9.7	IEC 61000-4-11	Refer to Section 5	Complies	Applicable

N/A=Not Applicable

- Performance criteria A for immunity tests with phenomena of a continuous nature;
Communication between the Tx and Rx in the front of pings should not drop during the test.
- Performance criteria B for immunity tests with phenomena of a transient nature;
N/A
- Performance criteria C for immunity tests with power interruptions exceeding a certain time.
N/A

Note: For details see subclause 6.2 ETSI EN 301 489-1

3.2.1. Emission Test – Radiated Emissions

This test assesses that ability of ancillary equipment to limit their internal noise from being radiated from the enclosure.

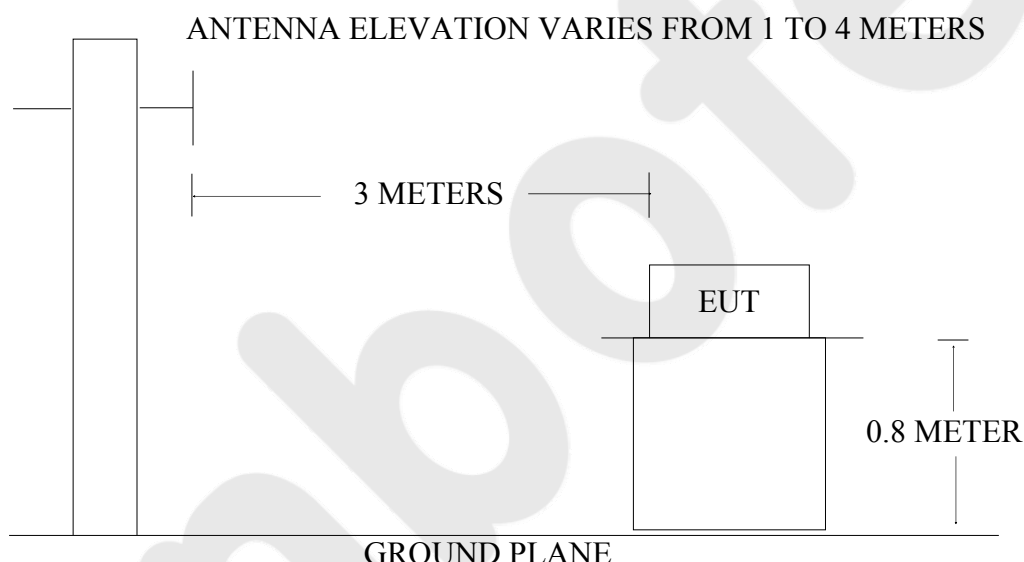
According to EMC basic standard (EN 55022)

Measurement according to EMC basic standard, The test results correspond to the 3m-OATS result. The EUT and its simulators are placed on a turntable which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to EN 55013 and EN 55022 on radiated measurement. Radiated emissions were investigated over the frequency range from 30MHz to 1GHz using a receiver bandwidth of 120kHz. Radiated was performed at an antenna to EUT distance of 3 meters.

Test Setup

EUT was setup on a 3m standard OATS



Limits

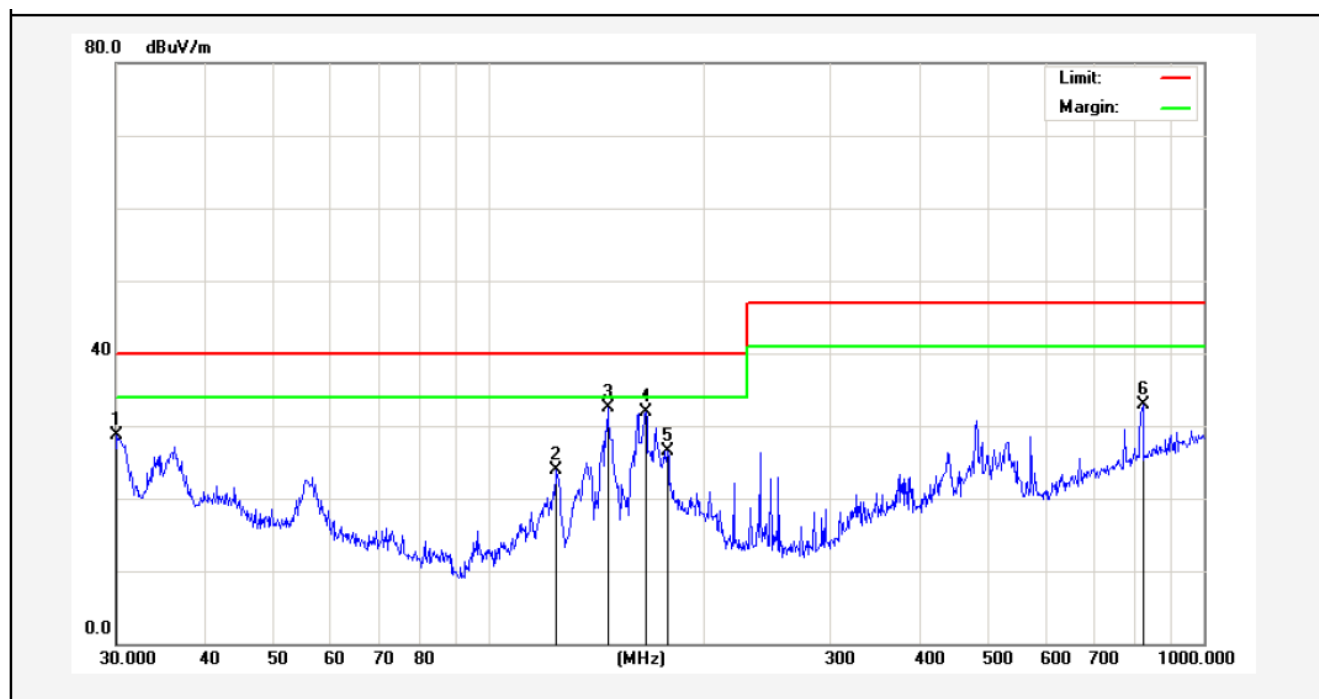
Freq. Range (MHz)	Distance (m)	Field Strength (dBμV/m)
30 – 230	3	40
230 – 1000	3	47

Results

Receiving Antenna Directed to	Angle of Turntable	Hori. / Vert.	Comment	Result (Passed / Failed)
--	0° - 360°	H/V	EUT Operating Normal	Passed

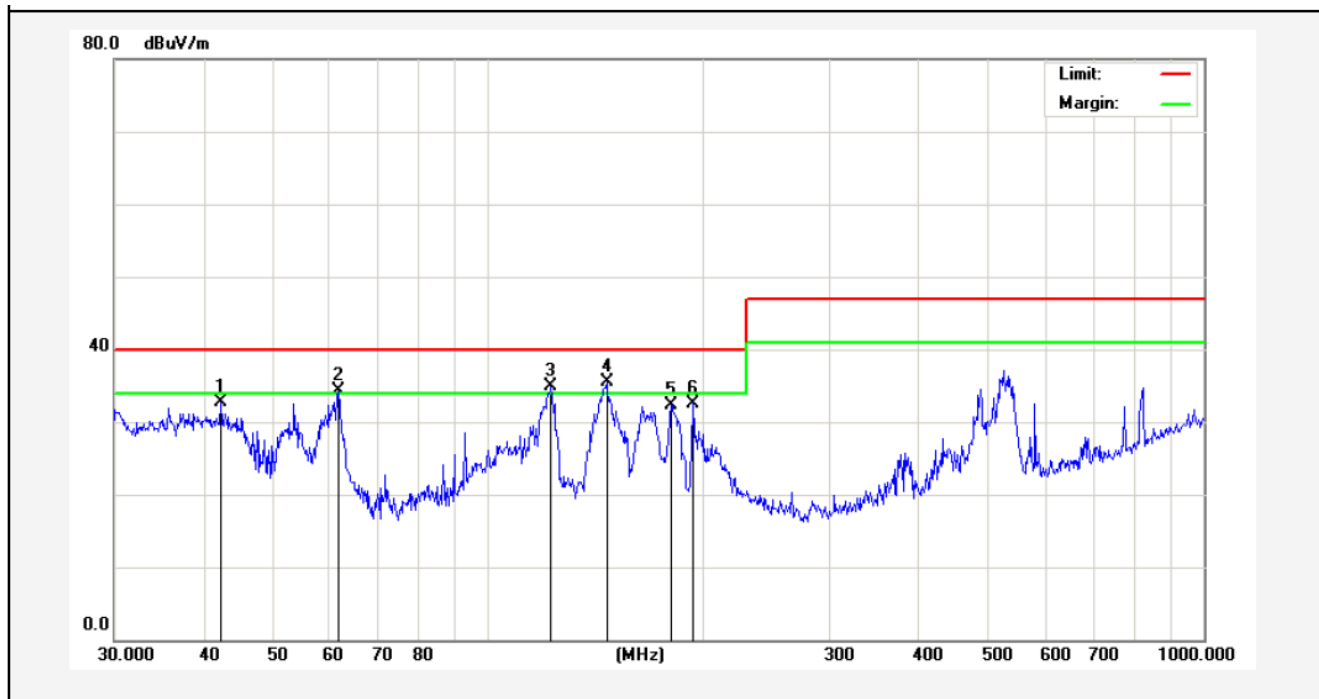
The EUT was tested on (LTE Mode, WiFi Mode) modes, only the worst data of (LTE Mode) is attached in the following pages.

Job No.:	AT011608860S	Plarization:	Horizontal
Standard:	(RE)EN301489_Class B_3m	Power Source:	AC 230V, 50Hz for adapter
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	LTE Mode	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.1053	45.59	-16.90	28.69	40.00	-11.31	peak			
2	124.1329	45.94	-21.95	23.99	40.00	-16.01	peak			
3	146.3735	55.97	-23.40	32.57	40.00	-7.43	peak			
4	165.4866	54.70	-22.70	32.00	40.00	-8.00	peak			
5	177.5091	48.48	-22.03	26.45	40.00	-13.55	peak			
6	821.7103	39.08	-6.16	32.92	47.00	-14.08	peak			

Job No.:	AT011608860S	Plarization:	Vertical
Standard:	(RE)EN301489_Class B_3m	Power Source:	AC 230V, 50Hz for adapter
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Test Mode:	LTE Mode	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	42.3021	43.97	-11.27	32.70	40.00	-7.30	peak			
2	61.7781	50.48	-16.13	34.35	40.00	-5.65	QP	100	0	
3	122.4039	51.68	-16.68	35.00	40.00	-5.00	QP	100	360	
4	146.3735	53.92	-18.40	35.52	40.00	-4.48	QP	100	0	
5	180.0165	49.08	-16.85	32.23	40.00	-7.77	peak			
6	193.0945	48.51	-15.91	32.60	40.00	-7.40	peak			

3.2.2. Emission Test – AC Mains Power Line Conducted Emissions

This test is applicable for radio equipment and ancillary equipment for fixed use that may have DC cables longer than 3 m (see clause 5.1 - manufacturer's declaration) and for vehicular use irrespective of cable length.

According to EMC basic standard (EN 55022)

The test method shall be in accordance with EN 55022 [7] and the Artificial Mains Networks (AMNs) shall be connected to the AC mains power source.

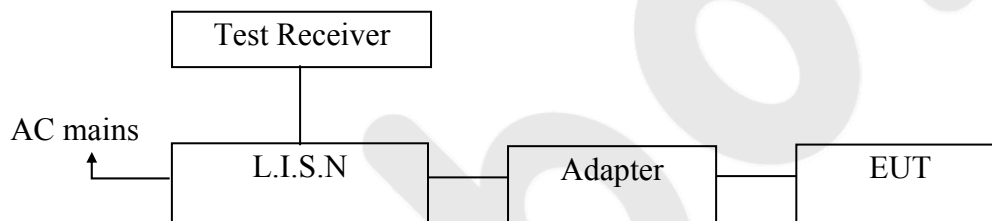
The measurement frequency range extends from 150 kHz to 30 MHz. When the EUT is a transmitter operating at frequencies below 30 MHz, then the exclusion band for transmitters applies (see clause 4.3) for measurements in the transmit mode of operation.

For emission measurements on AC output ports of the EUT the relevant port shall be connected via an AMN to a load drawing the rated current of the source. In case where the AC output port is directly connected (or via a circuit breaker) to the AC power input port of the EUT the AC power output port need not to be tested.

Test Setup

EUT was setup as before.

For Power Line:



Limits

Frequency (MHz)	Limit (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0

NOTE1-The lower limit shall apply at the transition frequencies.

NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

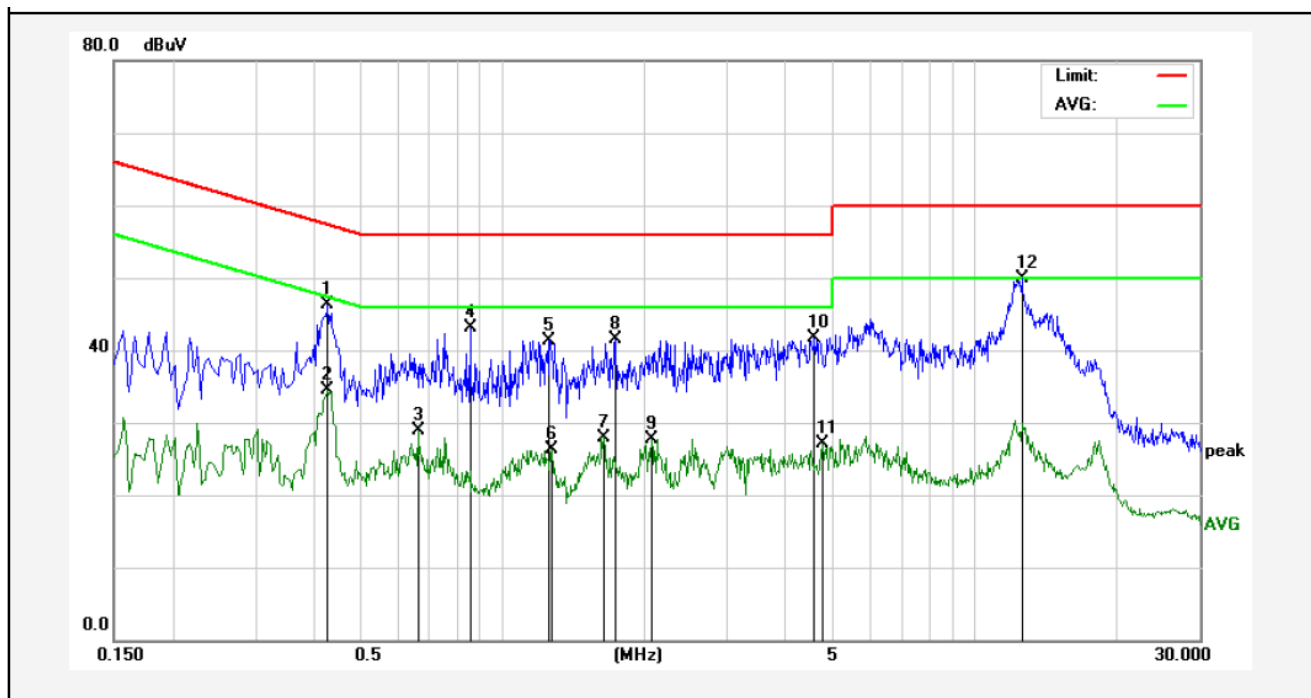
Results

Pass.

Please refer the following pages.

CONDUCTED EMISSION TEST DATA

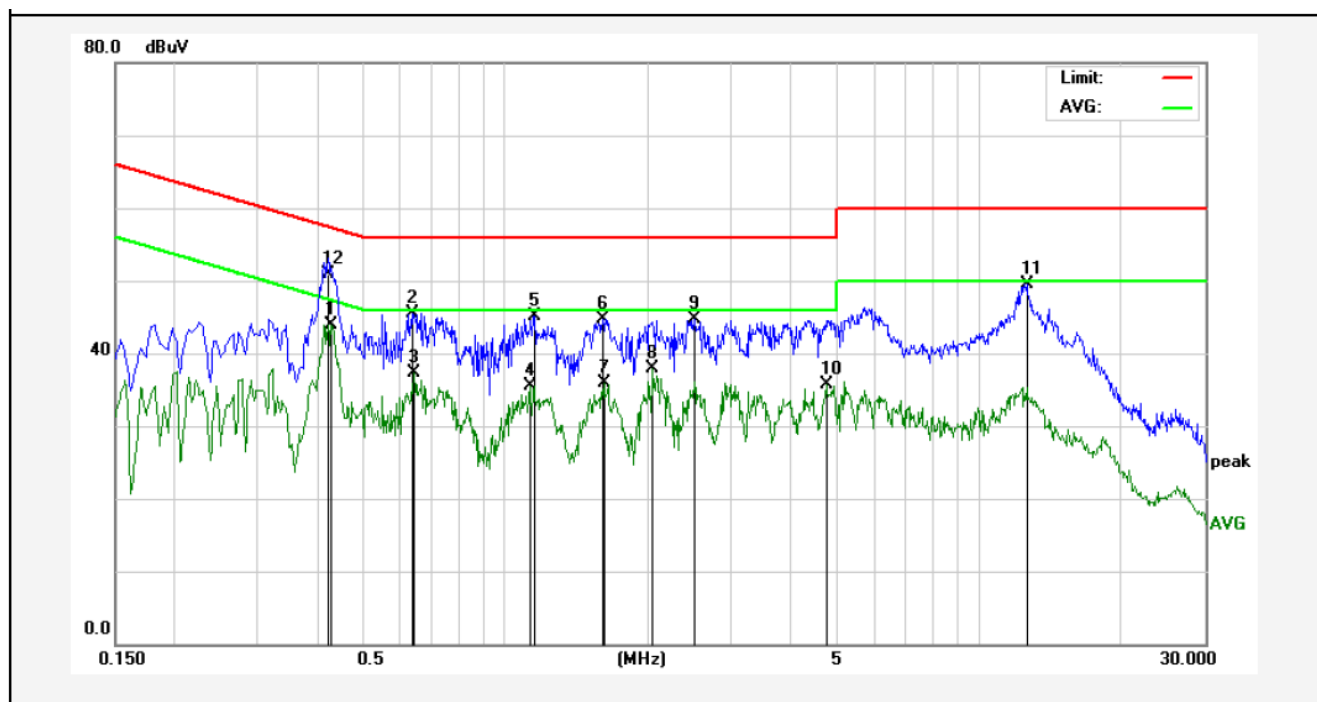
Test Site: 1# Shielded Room
Operating Condition: LTE Mode
Test Specification: AC 230V, 50Hz for adapter
Comment: Live Line
Tem.:24℃ Hum.:49%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.4260	46.32	0.00	46.32	57.33	-11.01	QP	
2	0.4260	34.57	0.00	34.57	47.33	-12.76	AVG	
3	0.6620	28.93	0.00	28.93	46.00	-17.07	AVG	
4	0.8540	43.08	0.00	43.08	56.00	-12.92	QP	
5	1.2579	41.37	0.00	41.37	56.00	-14.63	QP	
6	1.2700	26.39	0.00	26.39	46.00	-19.61	AVG	
7	1.6420	28.00	0.00	28.00	46.00	-18.00	AVG	
8	1.7420	41.46	0.00	41.46	56.00	-14.54	QP	
9	2.0660	27.72	0.00	27.72	46.00	-18.28	AVG	
10	4.5780	41.74	0.00	41.74	56.00	-14.26	QP	
11	4.7819	27.19	0.00	27.19	46.00	-18.81	AVG	
12	12.6220	49.94	0.00	49.94	60.00	-10.06	QP	

CONDUCTED EMISSION TEST DATA

Test Site: 1# Shielded Room
Operating Condition: LTE Mode
Test Specification: AC 230V, 50Hz for adapter
Comment: Neutral Line
Tem.:24℃ Hum.:49%



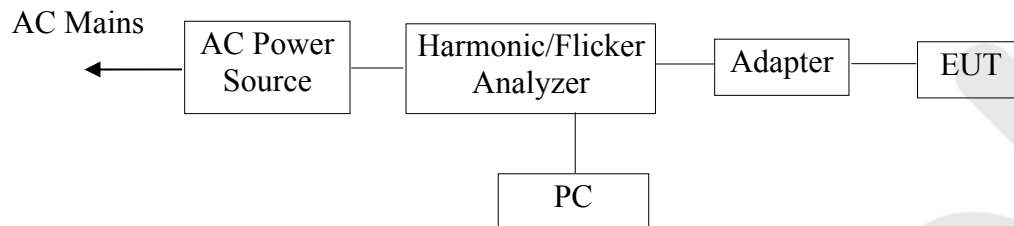
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.4300	43.95	0.00	43.95	47.25	-3.30	AVG	
2	0.6340	45.52	0.00	45.52	56.00	-10.48	QP	
3	0.6419	37.35	0.00	37.35	46.00	-8.65	AVG	
4	1.1260	35.52	0.00	35.52	46.00	-10.48	AVG	
5	1.1539	45.19	0.00	45.19	56.00	-10.81	QP	
6	1.6060	44.65	0.00	44.65	56.00	-11.35	QP	
7	1.6140	35.88	0.00	35.88	46.00	-10.12	AVG	
8	2.0460	37.93	0.00	37.93	46.00	-8.07	AVG	
9	2.5100	44.79	0.00	44.79	56.00	-11.21	QP	
10	4.7660	35.63	0.00	35.63	46.00	-10.37	AVG	
11	12.6180	49.58	0.00	49.58	60.00	-10.42	QP	
12	0.4220	50.91	0.00	50.91	57.41	-6.50	QP	

3.2.3. Emission Test –Harmonic current emissions (AC mains input port)

The appropriate requirements of EN 61000-3-2/A1 [16] for harmonic current emission apply for equipment covered by the scope of the present document with an input current up to and including 16A per phase.

Test Setup

EUT was setup as before.



Results

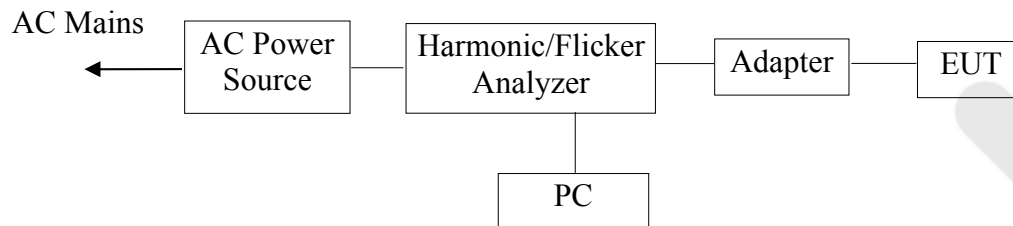
The active input power of the EUT is less than 75W. Therefore, according to EN 61000-3-2, no limits are necessary.

3.2.4. Emission Test – Voltage fluctuations and flicker (AC mains input port)

The appropriate requirements of EN 61000-3-3 [17] for voltage fluctuations and flicker apply for equipment covered by the scope of the present document with an input current up to and including 16A per phase.

Test Setup

EUT was setup as before.



Results

PASS

Please refer the following pages.

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

HA-PC Link Plus. Software v2.02. Firmware v2.81

Test Mode: LTE Mode

Supply Voltage : 228.9 Vrms 324.8 Vpk Frequency : 50.00 Hz

Load Current : 34.6 to 39.8 mArms 201.8 to 248.2 mApk Crest Factor: 6.342

Test Method: EN61000-3-3:2013

Voltage Variations :

Highest Level: -0.12%

Lowest Level: -0.63%

d(max): 0.51%

PASS

Highest d(t) of 500ms: 0.00%

PASS

Present d(t) over 3.33%: 0.00 Seconds

Longest d(t) over 3.33%: 0.00 Seconds

Highest Steady State: -0.46%

Lowest Steady State: -0.48%

Max d(c) Between Adjacent: 0.02%

PASS

Max d(c) Between Any: 0.02%

Short Term Flicker Pst: 0.18

PASS

Flicker Results :

Pst Classifier	Plt Calculation
Duration	Flicker Interval Pst
0.1%	0.93
0.7%	0.09
1.0%	0.04
1.5%	0.01
2.2%	0.00
3%	0.00
4%	0.00
6%	0.00
8%	0.00
10%	0.00
13%	0.00
17%	0.00
30%	0.00
50%	0.00
80%	0.00

3.2.5. Immunity Test - Radiated, RF Electromagnetic Fields

According to EMC basic standard (IEC 61000-4-3)

- Type of Port: Enclosure
- Performance Criterion: CT/CR
- The distance between the turn-table axis and TX&RX antenna is 3m.
- Field strength = 3V/m
- Start Frequency: 80MHz ~ 1000MHz, 1400MHz ~ 2700 MHz
- Frequency Step = lin 1MHz
- Modulation = AM, 400Hz, 1kHz, 80%
- Test Mode: LTE Mode

Results

Frequency (MHz)	Antenna Polarity	Radiation to	Reaction of the EUT During and after test	Result
80-1000, 1400-2700	Horizontal	Front	No reactions recognized	Passed
80-1000, 1400-2700	Vertical	Front	No reactions recognized	Passed
80-1000, 1400-2700	Horizontal	Rear	No reactions recognized	Passed
80-1000, 1400-2700	Vertical	Rear	No reactions recognized	Passed
80-1000, 1400-2700	Horizontal	Left	No reactions recognized	Passed
80-1000, 1400-2700	Vertical	Left	No reactions recognized	Passed
80-1000, 1400-2700	Horizontal	Right	No reactions recognized	Passed
80-1000, 1400-2700	Vertical	Right	No reactions recognized	Passed

Note: Performance criteria A observed.

Test Procedure

The EUT and load, which are placed on a table that is 0.8 meter above ground, are placed with one coincident with the calibration plane such that the distance from antenna to the EUT was 3 meters. Both horizontal and vertical polarization of the antenna and four sides of the EUT are set on measurement.

In order to judge the EUT performance, a CCD camera is used to monitor EUT screen.

Note: The Project in IEC 61000-4-3 was tested in Shenzhen EMTEK Co., Ltd.

3.2.6. Immunity Test – Electrostatic Discharge

According to EMC basic standard (IEC 61000-4-2)

- Type of Port: Enclosure
- Performance Criterion: CT/CR
For the table top EUT the distance to the reference ground plane should be 80cm.
Direct contact discharge on conducting surfaces of EUT
Indirect air discharge on insulating surfaces of EUT
±2kV, ±4kV direct discharge & ±2kV, ±4kV, ±8kV air discharge
- Test Mode: LTE Mode

Test Results

Item	Contact Discharge to conducted surfaces and to coupling planes		Air Discharge at insulating surfaces
	Direct Contact Discharge	Indirect Contact Discharge	
Test Voltage	Reaction of EUT / Result	Reaction of EUT / Result	Reaction of EUT / Result
+2kV	n.r.r. Passed	n.r.r. Passed	n.r.r. Passed
-2kV	n.r.r. Passed	n.r.r. Passed	n.r.r. Passed
+4kV	n.r.r. Passed	n.r.r. Passed	n.r.r. Passed
-4kV	n.r.r. Passed	n.r.r. Passed	n.r.r. Passed
+6kV	-	-	-
-6kV	-	-	-
+8kV	-	-	n.r.r. Passed
-8kV	-	-	n.r.r. Passed

Remarks: n.r.r. = no reaction recognized

Performance Criteria A observed and No any function degraded during the tests.

3.2.7. Immunity Test –Fast transients, common mode

Severity Levels and Performance Criterion (IEC 61000-4-4)

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1.	0.5 kV	0.25 kV
2.	1 kV	0.5 kV
3.	2 kV	1 kV
4.	4 kV	2 kV
X	Special	Special

Severity Level, Level 2: 1kV

Performance criterion: **B**

Test Mode: LTE Mode

Test Procedure

The EUT is put on the table which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

Test Results

Passed

3.2.8. Immunity Test –Radio frequency, common mode

According to EMC basic standard (IEC 61000-4-6)

The test method shall be in accordance with IEC 61000-4-6 [12].

The following requirements and evaluation of test results shall apply:

- the test level shall be severity level 2 as given in IEC 61000-4-6 [12] corresponding to 3 V rms unmodulated. The test signal shall then be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1 000 Hz. If the wanted signal is modulated at 1 000 Hz, then the test signal of 400 Hz shall be used;
- the test shall be performed over the frequency range 150 kHz to 80 MHz with the exception of an exclusion band for transmitters, and for receivers and duplex transceivers, (see clause 4);
- for receivers and transmitters the stepped frequency increments shall be 1 % frequency increment of the momentary frequency in the frequency range 150 kHz to 80 MHz, unless specified otherwise in the part of EN 301 489 series [22] dealing with the particular type of radio equipment;
- the injection method to be used shall be selected according to the basic standard IEC 61000-4-6 [12];
- responses on receivers or receiver parts of transceivers occurring at discrete frequencies which are narrow band responses (spurious responses), are disregarded from the test, (see clause 4);
- the frequencies of the immunity test signal selected and used during the test shall be recorded in the test report.

Severity Levels and Performance Criterion

Level	Field Strength V(rms)
1.	1
2.	3
3.	10
X	Special

Performance criterion: **A**

Test Mode: LTE Mode

Test Procedure

The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).

Test Results

Passed

3.2.9. Immunity Test – Voltage dips and interruptions

According to EMC basic standard (IEC 61000-4-11)

The following requirements and evaluation of test results shall apply.

The test method shall be in accordance with IEC 61000-4-11 [13].

The test levels shall be:

- a voltage dip corresponding to a reduction of the supply voltage of 30 % for 10 ms; and
- a voltage dip corresponding to a reduction of the supply voltage of 60 % for 100 ms; and
- a voltage interruption corresponding to a reduction of the supply voltage of greater than 95 % for 5 000 ms.

Severity Levels and Performance Criterion

Test Level %U _T	Voltage dip and short interruptions %U _T	Duration (in period)
0	100	0.5 1 5 10 25 50 *
40	60	
70	30	

Performance criterion: **B&C**

Test Mode: LTE Mode

Test Results

Passed

3.2.10. Immunity Test – Surges

According to EMC basic standard (IEC 61000-4-5)

The test method shall be in accordance with IEC 61000-4-5 [11].

The requirements and evaluation of test results given in clause 9.8.2.1 (telecommunication ports, outdoor cables),

clause 9.8.2.2 (telecommunication ports, indoor cables) and clause 9.8.2.3 (mains ports) shall apply, but no test shall be required where normal functioning cannot be achieved, because of the impact of the CDN on the EUT.

Severity Levels and Performance Criterion

Severity Level	Open-Circuit Test Voltage kV
1	- 5
2	- 0
3	- 0
4	4.0
*	Special

Performance criterion: **B**

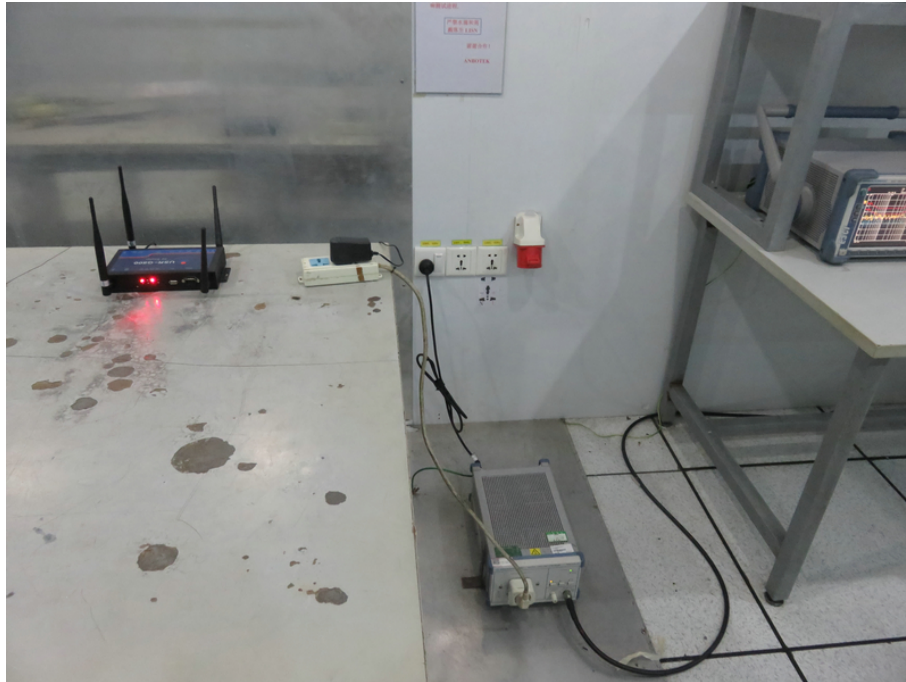
Test Mode: LTE Mode

Test Results

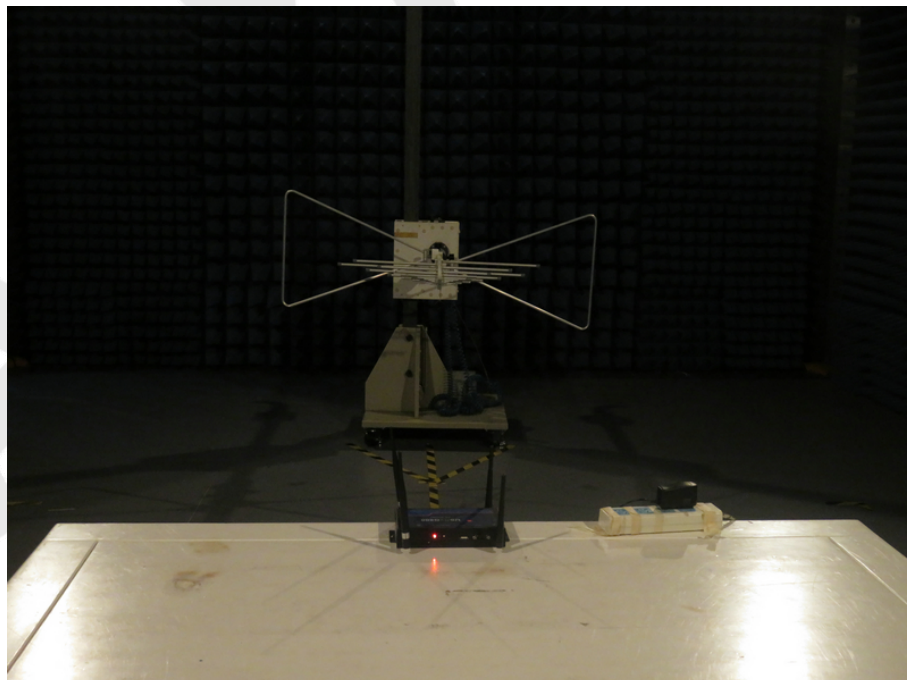
Passed

APPENDIX I (TEST PHOTOGRAPHS)

1. Photo of Power Line Conducted Emission Test



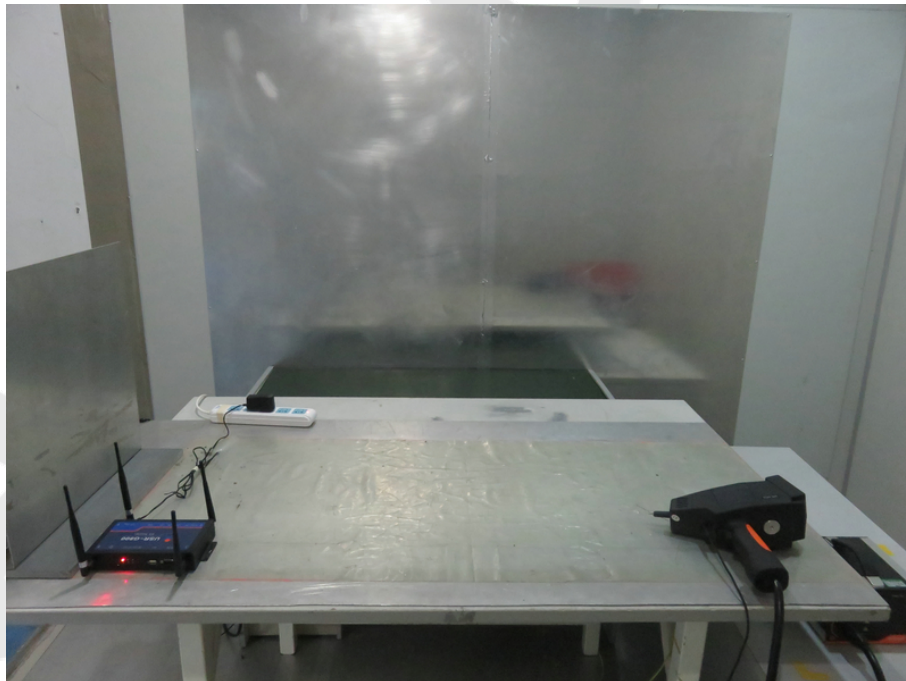
2. Photo of Radiated Emission Test



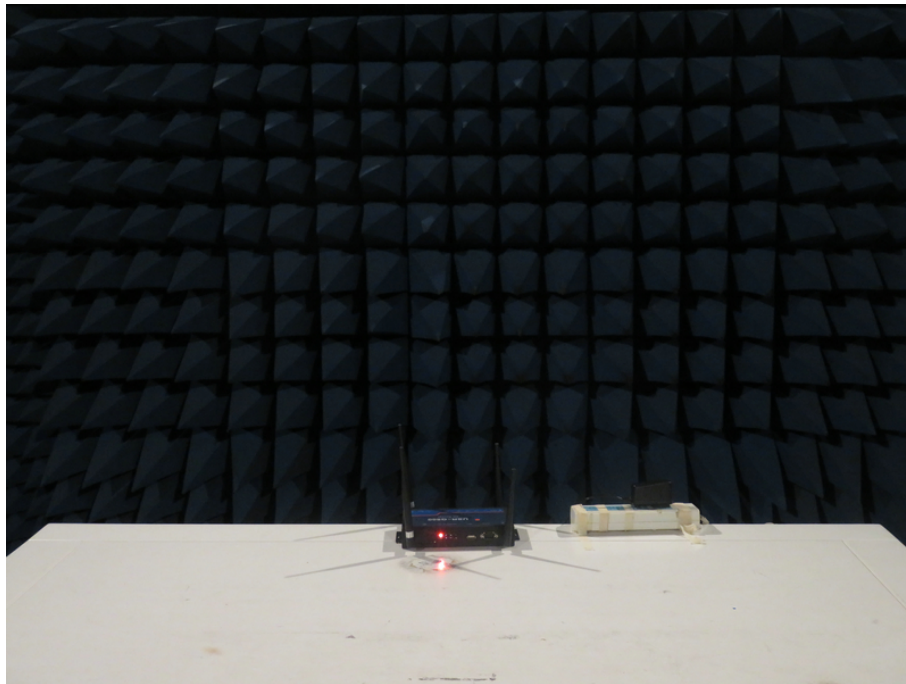
3. Photo of Flicker Test



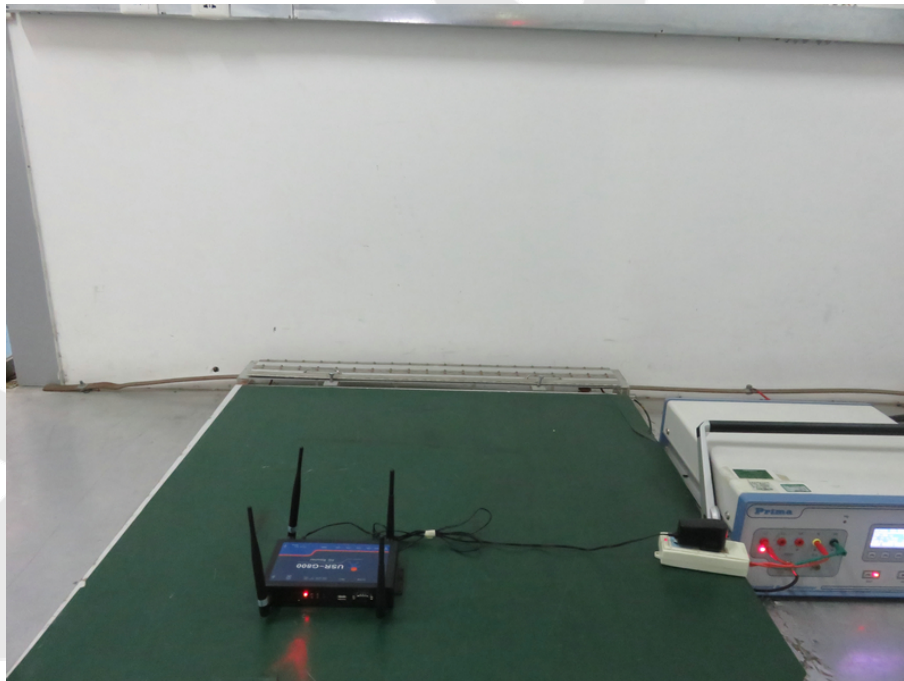
4. Photo of Electrostatic Discharge Test



5. Photo of RF Field Strength Susceptibility Test



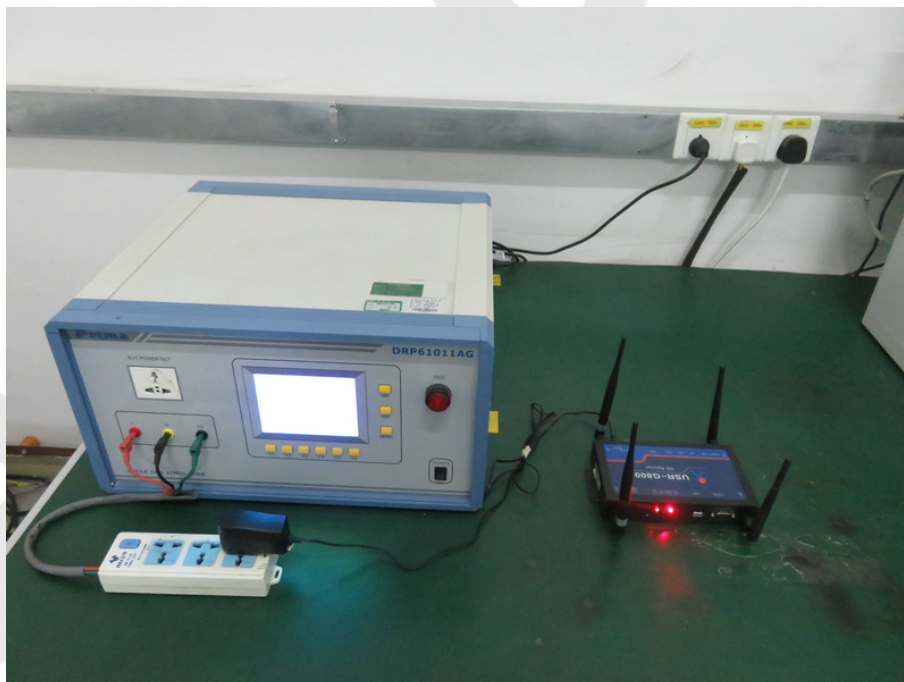
6. Photo of Electrical Fast Transient /Burst Immunity Test



7. Photo of Surge Test



8. Photo of Dips Immunity Test



9. Photo of C/S Test



APPENDIX II (EXTERNAL PHOTOS)

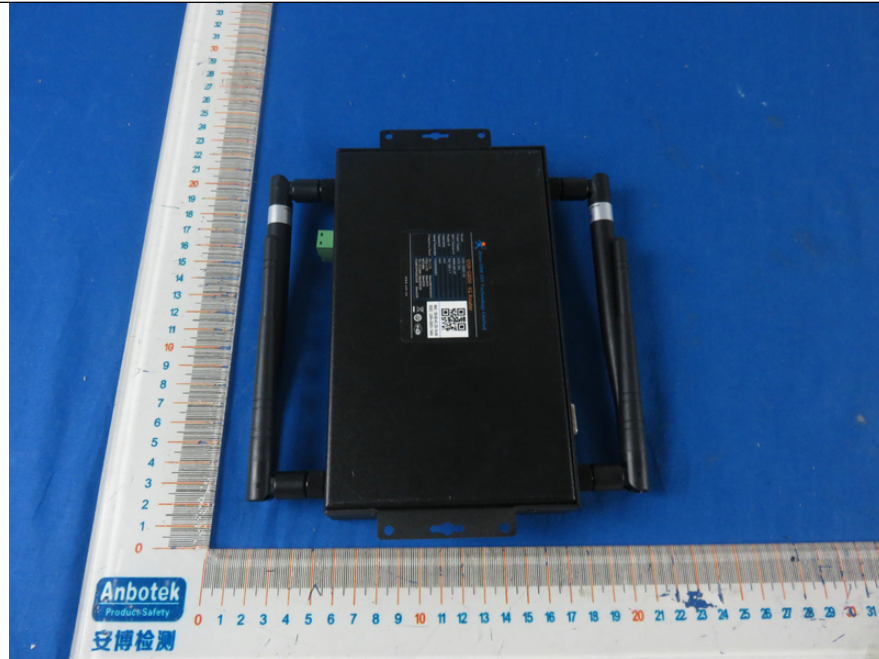
1. Figure
The EUT-Overall View



2. Figure
The EUT-Top View



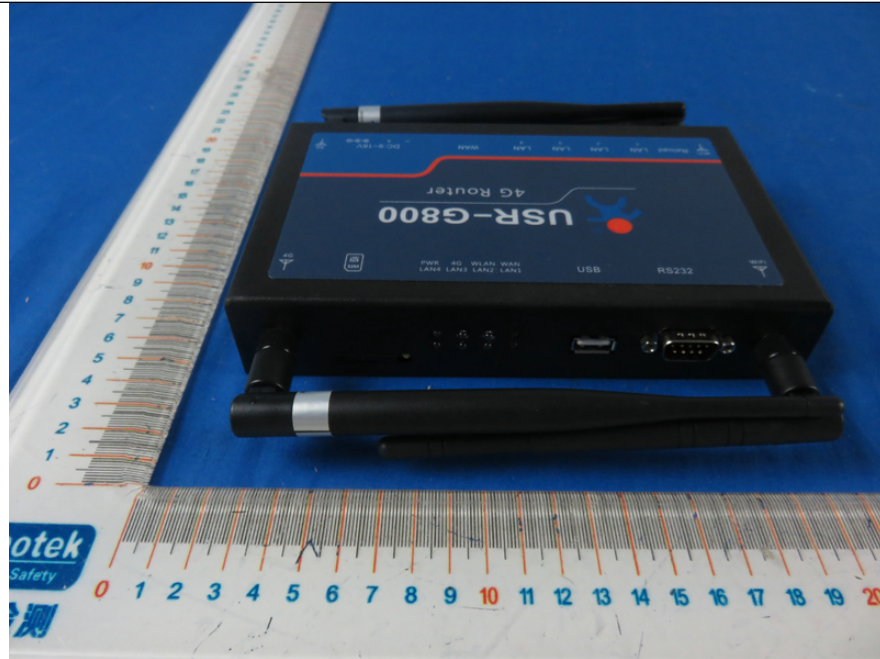
3. Figure
The EUT-Bottom View



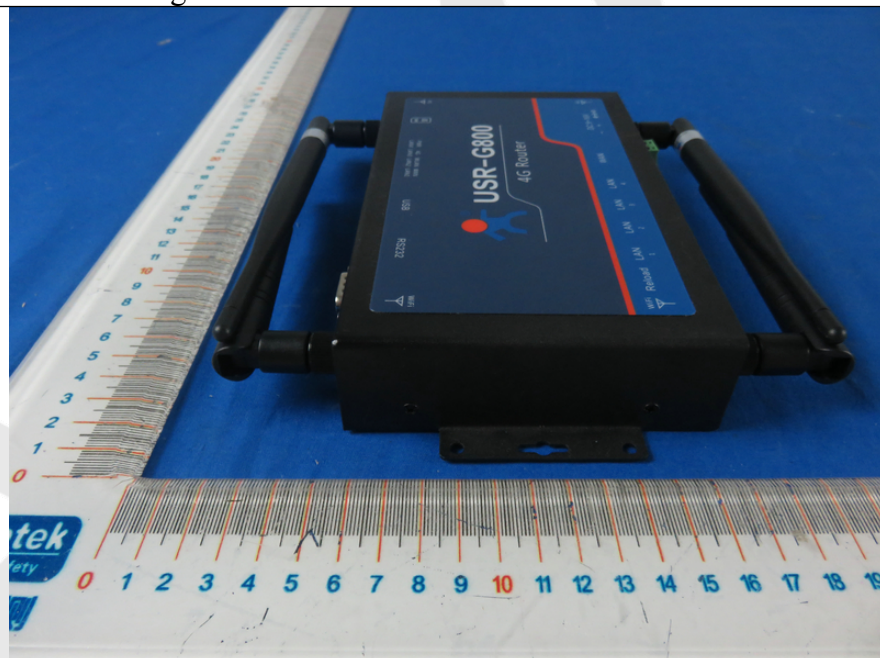
4. Figure
The EUT-Front View



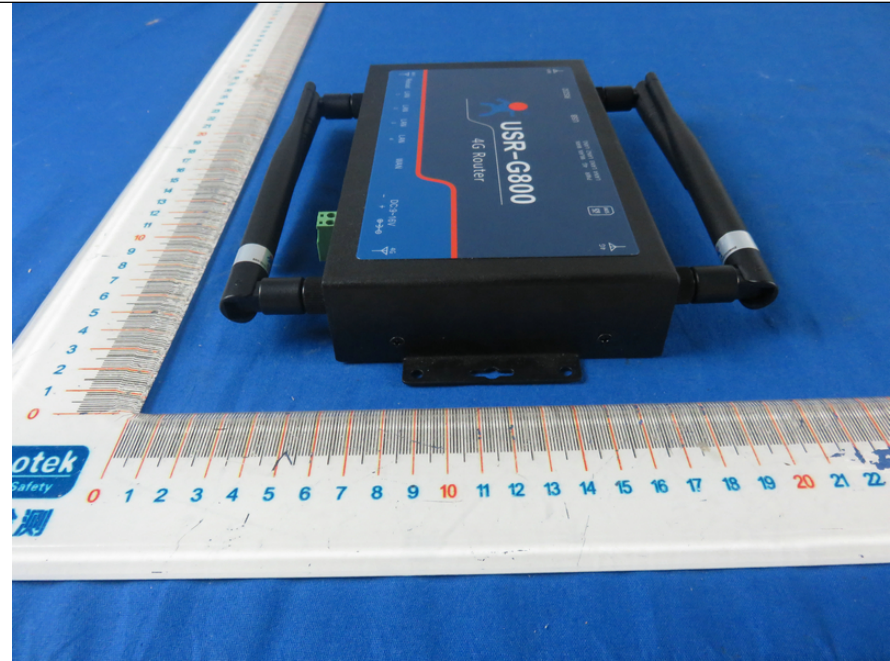
5. Figure
The EUT-Back View



6. Figure
The EUT-Right View



7. Figure
The EUT-Left View

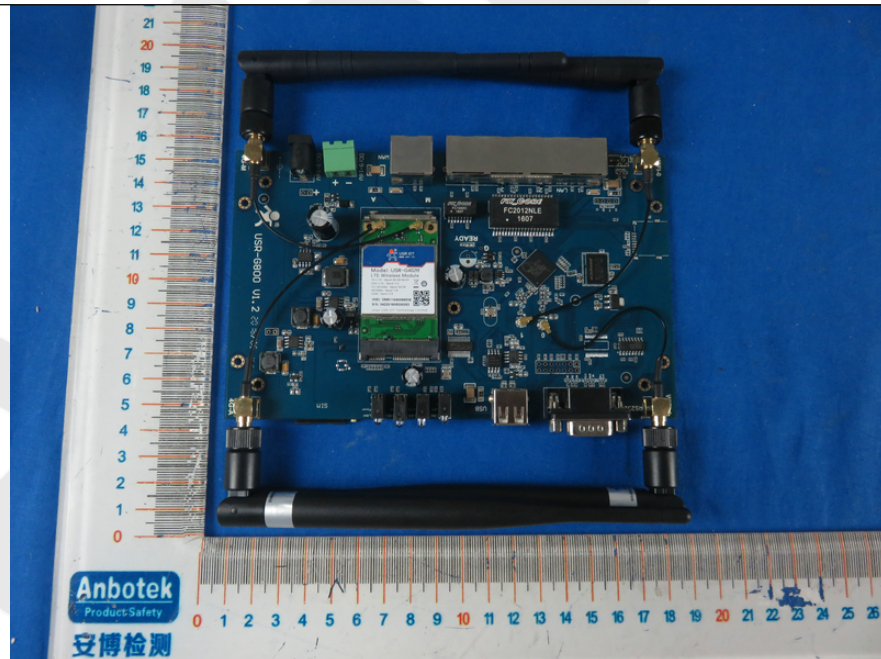


APPENDIX III (INTERNALPHOTOS)

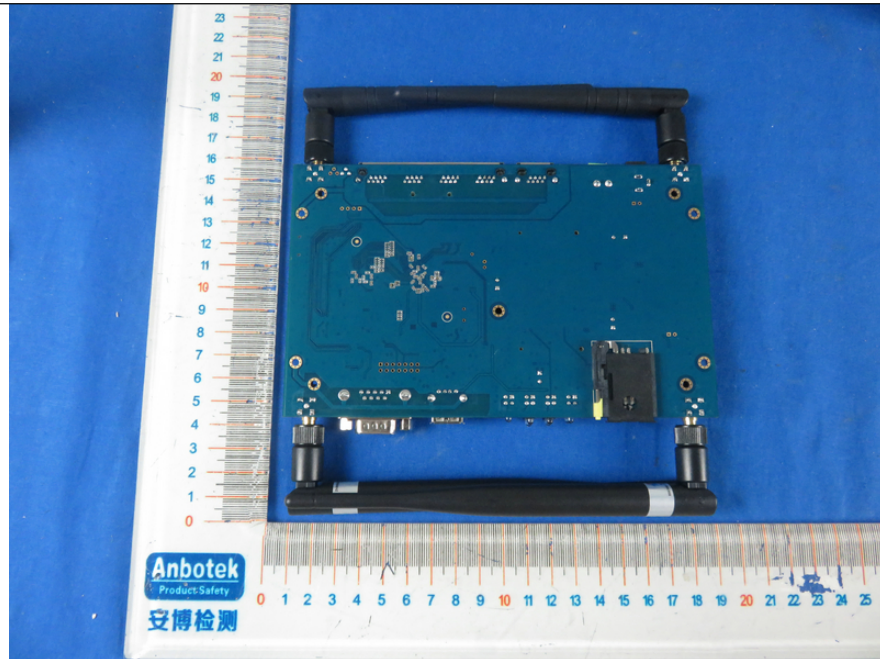
1. Figure
The EUT-Inside View



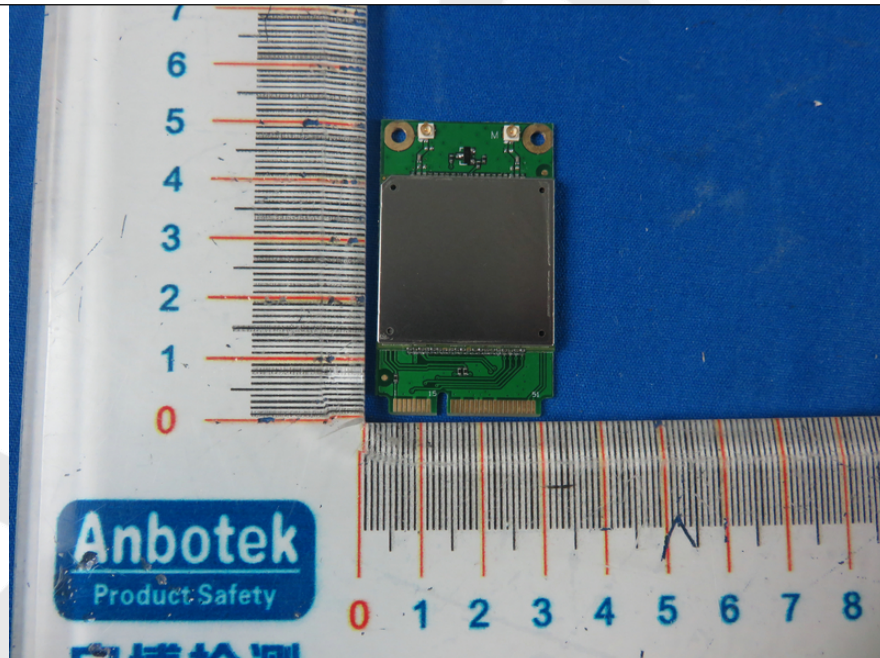
2. Figure
PCB of the EUT-Front View



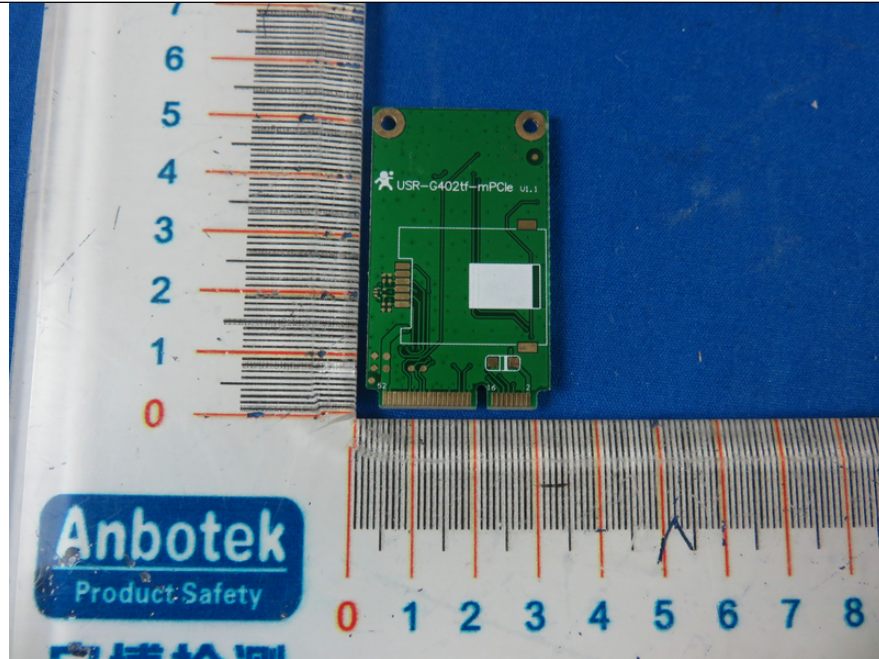
3. Figure
PCB of the EUT-Back View



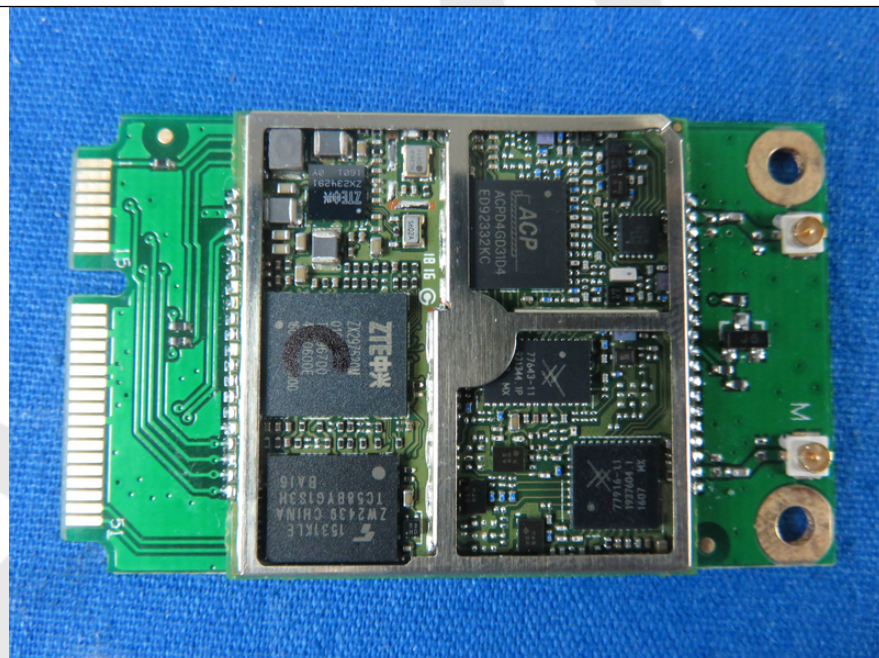
4. Figure
PCB of the EUT-Front View



5. Figure
PCB of the EUT-Back View



6. Figure
PCB of the EUT-Front View



7. Figure
PCB of the EUT-Back View

