

EMC TEST REPORT

For

Shenzhen Etross telecom Co., Ltd.

GSM FIXED WIRELESS TERMINAL

Test Model: SA125

Additional Model: 8848

Prepared for : Shenzhen Etross telecom Co., Ltd.  
Address : 301, Block B, Yuetong Comprehensive Bldg, Meilong Road,  
Longhua Town, Bao'an District Shenzhen, Guangdong  
Province, China, 518109

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.  
Address : 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue,  
Bao'an District, Shenzhen, Guangdong, China

Tel : (+86)755-82591330  
Fax : (+86)755-82591332  
Web : www.LCS-cert.com  
Mail : webmaster@LCS-cert.com

Date of receipt of test sample : September 28, 2017  
Number of tested samples : 1  
Serial number : Prototype  
Date of Test : September 28, 2017~October 21, 2017  
Date of Report : October 21, 2017



**EMC TEST REPORT****Draft ETSI EN 301 489-19 V2.1.0 (2017-03) & ETSI EN 301 489-17 V3.1.1(2017-02) & Draft ETSI EN 301 489-52 V1.1.0 (2016-11)**

Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services

**Report Reference No. .... : LCS170928004AE1****Date Of Issue ..... : October 21, 2017****Testing Laboratory Name..... : Shenzhen LCS Compliance Testing Laboratory Ltd.****Address ..... : 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China****Testing Location/ Procedure..... : Full application of Harmonised standards ☒  
Partial application of Harmonised standards ☐  
Other standard testing method ☐****Applicant's Name..... : Shenzhen Etross telecom Co., Ltd.****Address ..... : 301, Block B, Yuetong Comprehensive Bldg, Meilong Road, Longhua Town, Bao'an District Shenzhen, Guangdong Province, China, 518109****Test Specification****Standard..... : ETSI EN 301 489-1 V2.1.1 (2017-02)  
Draft ETSI EN 301 489-52 V1.1.0 (2016-11)****Test Report Form No. .... : LCSEMC-1.0****TRF Originator ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.****Master TRF ..... : Dated 2011-03****Shenzhen LCS Compliance Testing Laboratory Ltd. All rights reserved.**

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**Test Item Description. .... : GSM FIXED WIRELESS TERMINAL****Trade Mark ..... : smartwares /ETROSS****Test Model..... : SA125****Ratings..... : DC 7.4V by Battery(800mAh)****Adapter: Input:100-240VAC, 50/60Hz, 0.2A****Output: 12VDC, 500mA****Result ..... : Positive****Compiled by:***Linda He*

Linda He/ Administrators

**Supervised by:***Dick Su*

Dick Su/ Technique principal

**Approved by:**

Gavin Liang/ Manager

**EMC -- TEST REPORT****Test Report No. : LCS170928004AE1**October 21, 2017

Date of issue

Test Model..... : SA125

EUT..... : GSM FIXED WIRELESS TERMINAL

**Applicant..... : Shenzhen Etross telecom Co., ltd.**Address..... : 301, Block B, Yuetong Comprehensive Bldg, Meilong Road,  
Longhua Town, Bao'an District Shenzhen, Guangdong  
Province, China, 518109

Telephone..... : /

Fax..... : /

**Manufacturer..... : Shenzhen Etross telecom Co., ltd.**Address..... : 301, Block B, Yuetong Comprehensive Bldg, Meilong Road,  
Longhua Town, Bao'an District Shenzhen, Guangdong  
Province, China, 518109

Telephone..... : /

Fax..... : /

**Factory..... : Shenzhen Etross telecom Co., ltd.**Address..... : 301, Block B, Yuetong Comprehensive Bldg, Meilong Road,  
Longhua Town, Bao'an District Shenzhen, Guangdong  
Province, China, 518109

Telephone..... : /

Fax..... : /

**Test Result****Positive**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

## Revision History

Revision	Issue Date	Revisions	Revised By
000	October 21, 2017	Initial Issue	Gavin Liang

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## 1. GENERAL INFORMATION

### 1.1. Product Description for Equipment Under Test (EUT)

EUT	GSM FIXED WIRELESS TERMINAL	
Test Model	SA125	
Additional Model	8848	
Model Declaration	PCB board, structure and internal of these model(s) are the same, So no additional models were tested.	
Power Supply	DC 7.4V by Battery(800mAh) Adapter: Input:100-240VAC, 50/60Hz, 0.2A Output: 12VDC, 500mA	
Hardware Version	R2.0	
Software Version	V3.1	
2G		
Support Band	<input checked="" type="checkbox"/> GSM 900 (EU-Band) <input checked="" type="checkbox"/> DCS 1800 (EU-Band) <input checked="" type="checkbox"/> GSM 850 (U.S.-Band) <input checked="" type="checkbox"/> PCS 1900 (U.S.-Band)	
Release Version	R99	
GPRS Class	Class 12	
EGPRS Class	Class 12	
Uplink	GSM 900: 880MHz ~ 915MHz DCS 1800: 1710MHz ~ 1785MHz	
Downlink	GSM 900: 925MHz ~ 960MHz DCS 1800: 1805MHz ~ 1880MHz	
Type Of Modulation	GMSK for GSM/GPRS, GMSK/8PSK for EGPRS	
Antenna Description	External Antenna, 2.5dBi(Max.)	
Power Class	GSM 900: Class 4, DCS 1800: Class 1	

## 1.2. Objective

ETSI EN 301 489-1	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU
ETSI EN 301 489-52	Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 52: Specific conditions for Cellular Communication Mobile and portable (UE) radio and ancillary equipment

The objective is to determine compliance with ETSI EN 301 489-1 V2.1.1 (2017-02) & Draft ETSI EN 301 489-52 V1.1.0 (2016-11).

## 1.3. Related Submittal(s)/Grant(s)

No Related Submittals.

## 1.4. Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V2.1.1 (2017-02), Draft ETSI EN 301 489-52 V1.1.0 (2016-11).

## 1.5. Description of Test Facility

FCC Registration Number. is 254912.  
 Industry Canada Registration Number. is 9642A-1.  
 ESMD Registration Number. is ARCB0108.  
 UL Registration Number. is 100571-492.  
 TUV SUD Registration Number. is SCN1081.  
 TUV RH Registration Number. is UA 50296516-001.  
 NVLAP Registration Code is 600167-0.

## 1.6. Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate
SHZHEN NALIN ELEC.TECH.CO.,LTD.	Adapter of EUT	NLA050120 W1U1	--	CE

## 1.7. External I/O

I/O Port Description	Quantity	Cable
--	--	--



**1.8. List Of Measuring Equipment**

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	X-series USB Peak and Average Power Sensor Agilent	Agilent	U2021XA	MY54080022	2016-10-27	2017-10-26
2	4 CH. Simultaneous Sampling 14 Bits 2MS/s	Agilent	U2531A	MY54080016	2016-10-27	2017-10-26
3	Test Software	Ascentest	AT890-SW	20160630	N/A	N/A
4	RF Control Unit	Ascentest	AT890-RFB	N/A	2017-06-17	2018-06-16
5	ESA-E SERIES SPECTRUM ANALYZER	Agilent	E4407B	MY41440754	2016-11-18	2017-11-17
6	MXA Signal Analyzer	Agilent	N9020A	MY49100040	2017-06-17	2018-06-16
7	SPECTRUM ANALYZER	R&S	FSP	100503	2017-06-17	2018-06-16
8	MXG Vector Signal Generator	Agilent	N5182A	MY47071151	2016-11-18	2017-11-17
9	ESG VECTOR SIGNAL GENERATOR	Agilent	E4438C	MY42081396	2016-11-18	2017-11-17
10	PSG Analog Signal Generator	Agilent	E8257D	MY4520521	2016-11-18	2017-11-17
11	Universal Radio Communication Tester	R&S	CMU 200	105788	2017-06-17	2018-06-16
12	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2017-06-17	2018-06-16
13	RF Control Unit	Tonscend	JS0806-1	N/A	2017-06-17	2018-06-16
14	DC Power Supply	Agilent	E3642A	N/A	2016-11-18	2017-11-17
15	LTE Test Software	Tonscend	JS1120-1	N/A	N/A	N/A
16	Temperature & Humidity Chamber	GUANGZHOU GOGN WEN	GDS-100	70932	2017-10-11	2018-10-10
17	DC Source	CHROMA	62012P-80-60	34782951	2017-10-11	2018-10-10
18	RF Filter	Micro-Tronics	BRC50718	S/N-017	2017-06-17	2018-06-16
19	RF Filter	Micro-Tronics	BRC50719	S/N-011	2017-06-17	2018-06-16
20	RF Filter	Micro-Tronics	BRC50720	S/N-011	2017-06-17	2018-06-16
21	RF Filter	Micro-Tronics	BRC50721	S/N-013	2017-06-17	2018-06-16
22	RF Filter	Micro-Tronics	BRM50702	S/N-195	2017-06-17	2018-06-16
23	Splitter/Combiner	Micro-Tronics	PS2-15	CB11-20	2017-06-17	2018-06-16
24	Splitter/Combiner	Micro-Tronics	CB11-20	N/A	2017-06-17	2018-06-16
25	Attenuator	Micro-Tronics	PAS-8-10	S/N23466	2017-06-17	2018-06-16
26	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2017-06-17	2018-06-16
27	Positioning Controller	MF	MF-7082	/	2017-06-17	2018-06-16
28	EMI Test Software	AUDIX	E3	N/A	2017-06-17	2018-06-16
29	EMI Test Receiver	R&S	ESR 7	101181	2017-06-17	2018-06-16
30	AMPLIFIER	QuieTek	QTK-A2525G	CHM10809065	2016-11-18	2017-11-17
31	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2017-06-23	2018-06-22
32	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2017-05-02	2018-05-01
33	Horn Antenna	EMCO	3115	6741	2017-06-23	2018-06-22
34	RF Cable-R03m	Jye Bao	RG142	CB021	2017-06-17	2018-06-16
35	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2017-06-17	2018-06-16

36	TEST RECEIVER	R&S	ESCI	101142	2017-06-17	2018-06-16
37	RF Cable-CON	UTIFLEX	3102-26886-4	CB049	2017-06-17	2018-06-16
38	10dB Attenuator	SCHWARZBECK	MTS-IMP136	261115-001-0032	2017-06-17	2018-06-16
39	Artificial Mains	R&S	ENV216	101288	2017-06-17	2018-06-16
40	Power Analyzer Test System	Voltech	PM6000	20000670053	2017-06-17	2018-06-16
41	ESD Simulator	SCHLODER	SESD 230	604035	2017-06-17	2018-06-16
42	RF POWER AMPLIFIER	OPHIR	5225R	1052	2017-03-22	2018-03-21
43	RF POWER AMPLIFIER	OPHIR	5273F	1019	2017-03-24	2018-03-23
44	Stacked Broadband Log Periodic Antenna	SCHWARZBECK	STLP 9128	9128ES-145	2017-04-28	2018-04-27
45	Stacked Mikrowellen Log.-Per Antenna	SCHWARZBECK	STLP 9149	9149-482	2017-04-28	2018-04-27
46	Electric field probe	Narda S.TS./PMM	EP601	611WX70332	2017-02-05	2018-02-05
47	Power Meter	Agilent	E4419B	MY45104493	2017-06-17	2018-06-16
48	Power Sensor	Agilent	E9301H	MY41495234	2017-06-17	2018-06-16
49	Power Sensor	Agilent	E4412A	MY41500229	2017-06-17	2018-06-16
50	Immunity Simulative Generator	EM TEST	UCS500-M4	0101-34	2016-11-18	2017-11-17
51	Simulator	FRANKONIA	CIT-10	A126A1195	2017-06-17	2018-06-16
52	CDN	FRANKONIA	CDN-M2	5100100100	2017-06-17	2018-06-16
53	CDN	FRANKONIA	CDN-M3	0900-11	2017-06-17	2018-06-16
54	Attenuator	FRANKONIA	ATT6	0010222A	2017-06-17	2018-06-16
55	Infuse tongs	EM TEST	EM-Clamp	0513A031201	2017-06-17	2018-06-16
56	Voltage dips and up generator	3CTEST	VDG-1105G	EC0171014	2017-06-17	2018-06-16
Note: All equipment is calibrated through GUANGZHOU LISAI CALIBRATION AND TEST CO.,LTD.						

**1.9. Measurement Uncertainty**

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.42dB	
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.54dB	Polarize: V
	4.1dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	2.08dB	Polarize: H
	2.56dB	Polarize: V
Uncertainty for radio frequency	0.01ppm	
Uncertainty for conducted RF Power	0.65dB	
Uncertainty for temperature	0.2°C	
Uncertainty for humidity	1%	
Uncertainty for DC and low frequency voltages	0.06%	

**1.10. Description Of Test Modes**

There was 7 test Modes. TM1 to TM7 were shown below:

TM1: Operate in traffic mode GSM 900;  
 TM2: Operate in traffic mode GPRS 900;  
 TM3: Operate in traffic mode EGPRS 900;  
 TM4: Operate in traffic mode DCS 1800;  
 TM5: Operate in traffic mode GPRS 1800;  
 TM6: Operate in traffic mode EGPRS 1800;  
 TM7: Idle mode

\*\*\*Note:

1. All test modes were tested, but we only recorded the worst case in this report.

## 2. SUMMARY OF TEST RESULTS

Rule	Description of Test Items	Result
§7.1	Reference to clauses EN 301 489-1 §8.4 AC mains power input/output ports	Compliant
§7.1	Reference to clauses EN 301 489-1 §8.3 DC power input/output ports	N/A*
§7.1	Reference to clauses EN 301 489-1 §8.2 Enclosure of ancillary equipment measured on a stand alone basis	Compliant
§7.1	Reference to clauses EN 301 489-1 §8.5 Harmonic current emissions (AC mains input port)	Compliant
§7.1	Reference to clauses EN 301 489-1 §8.6 Voltage fluctuations and flicker (AC mains input port)	Compliant
§7.1	Reference to clauses EN 301 489-1 §8.7 Telecommunication ports	N/A*
§7.2	Reference to clauses EN 301 489-1 §9.3 Electrostatic discharge (EN 61000-4-2)	Compliant
§7.2	Reference to clauses EN 301 489-1 §9.2 Radio frequency electromagnetic field (80 MHz to 1 000 MHz and 1 400 MHz to 2 700 MHz)(EN 61000-4-3)	Compliant
§7.2	Reference to clauses EN 301 489-1 §9.4 Fast transients, common mode (EN 61000-4-4)	Compliant
§7.2	Reference to clauses EN 301 489-1 §9.8 Surges (EN 61000-4-5)	Compliant
§7.2	Reference to clauses EN 301 489-1 §9.5 Radio frequency, common mode (EN 61000-4-6)	Compliant
§7.2	Reference to clauses EN 301 489-1 §9.6 Transients and surges in the vehicular environment (ISO 7637-2)	N/A*
§7.2	Reference to clauses EN 301 489-1 §9.7 Voltage dips and interruptions (EN 61000-4-11)	Compliant

### 3. LINE CONDUCTED EMISSION

#### 3.1. Conducted Emission Limit

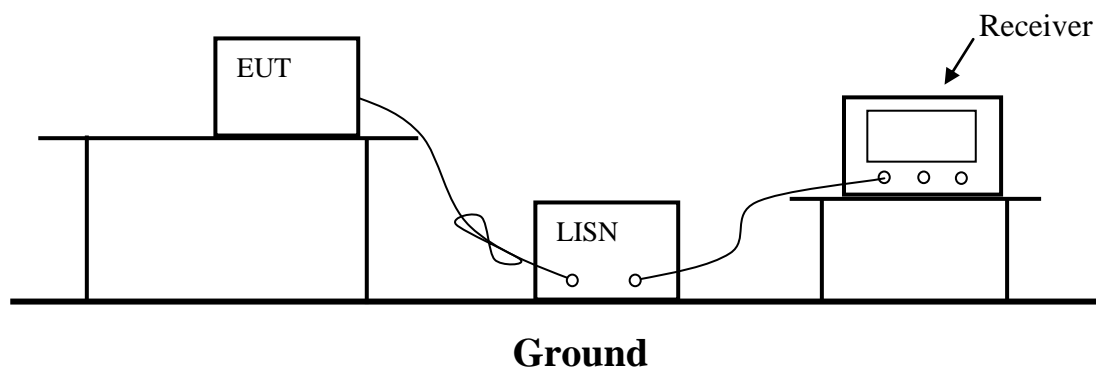
ETSI EN 301 489-1 V2.1.1 (2017-02)/EN 55032 Class B

#### Limits for Line Conducted Emission

Frequency (MHz)	Limit (dB $\mu$ 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.

#### 3.2. Test Configuration



The setup of EUT is according with per ETSI EN 301 489-1 measurement procedure. The specification used was with the ETSI EN 301 489-1 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The EUT received DC 5V charging power from the Adapter which received power through a LISN supplying power of AC 230V/50Hz.

### 3.3. EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range  
150 kHz – 30 MHz

IFBW  
9 kHz

### 3.4. Test Procedure

Power on the EUT, the EUT begins to work. Make sure the EUT operates normally during the test.

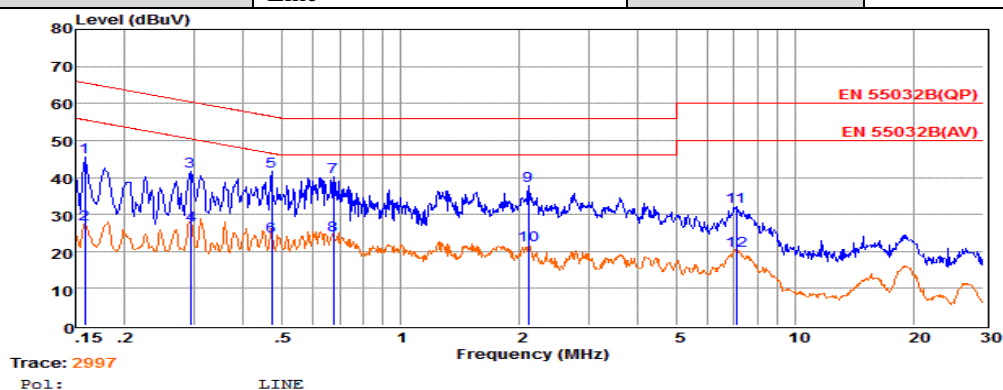
Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

### 3.5. Test Data

For pre-scan, the worst test case is TM1, and the test data was show as follow:

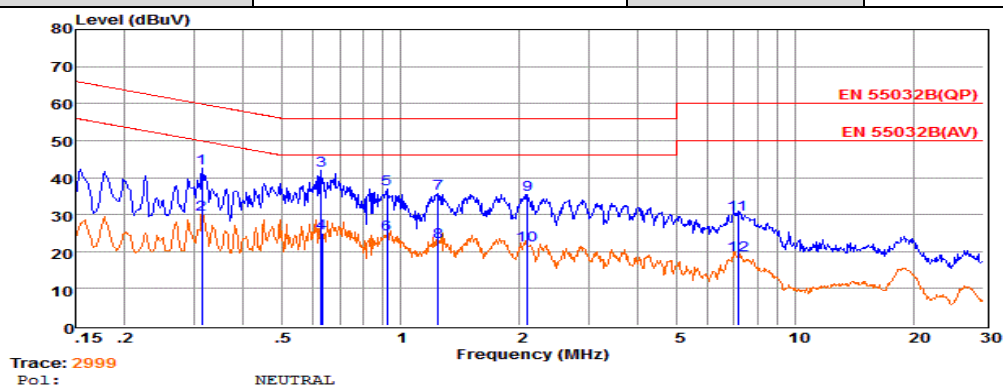
Model No.	SA125	Test Mode	TM1
Environmental Conditions	24℃, 41.5% RH	Test Engineer	Jayden Zhuo
Pol	Line		



	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB
1	0.16	26.01	9.58	0.02	10.00	45.61	65.56	-19.95	QP
2	0.16	7.70	9.58	0.02	10.00	27.30	55.55	-28.25	Average
3	0.29	21.97	9.63	0.03	10.00	41.63	60.41	-18.78	QP
4	0.29	7.30	9.63	0.03	10.00	26.96	50.41	-23.45	Average
5	0.47	22.10	9.62	0.04	10.00	41.76	56.49	-14.73	QP
6	0.47	4.54	9.62	0.04	10.00	24.20	46.49	-22.29	Average
7	0.68	20.47	9.64	0.04	10.00	40.15	56.00	-15.85	QP
8	0.68	4.76	9.64	0.04	10.00	24.44	46.00	-21.56	Average
9	2.11	18.22	9.64	0.05	10.00	37.91	56.00	-18.09	QP
10	2.11	1.88	9.64	0.05	10.00	21.57	46.00	-24.43	Average
11	7.10	12.49	9.68	0.07	10.00	32.24	60.00	-27.76	QP
12	7.10	0.58	9.68	0.07	10.00	20.33	50.00	-29.67	Average

Remarks: 1. Measured = Reading + LISNFac + Cable Loss + Aux2 Fac.  
2. The emission levels that are 20dB below the official limit are not reported.

Model No.	SA125	Test Mode	TM1
Environmental Conditions	24℃, 41.5% RH	Test Engineer	Jayden Zhuo
Pol	Neutral		



	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB
1	0.31	22.97	9.60	0.03	10.00	42.60	59.88	-17.28	QP
2	0.31	10.27	9.60	0.03	10.00	29.90	49.88	-19.98	Average
3	0.63	22.12	9.63	0.04	10.00	41.79	56.00	-14.21	QP
4	0.63	5.37	9.63	0.04	10.00	25.04	46.00	-20.96	Average
5	0.92	17.33	9.63	0.05	10.00	37.01	56.00	-18.99	QP
6	0.92	5.13	9.63	0.05	10.00	24.81	46.00	-21.19	Average
7	1.24	15.88	9.63	0.05	10.00	35.56	56.00	-20.44	QP
8	1.24	2.84	9.63	0.05	10.00	22.52	46.00	-23.48	Average
9	2.10	15.79	9.63	0.05	10.00	35.47	56.00	-20.53	QP
10	2.10	2.13	9.63	0.05	10.00	21.81	46.00	-24.19	Average
11	7.14	10.21	9.69	0.07	10.00	29.97	60.00	-30.03	QP
12	7.14	-0.79	9.69	0.07	10.00	18.97	50.00	-31.03	Average

Remarks: 1. Measured = Reading + LISNFac + Cable Loss + Aux2 Fac.  
2. The emission levels that are 20dB below the official limit are not reported.

Note: For conducted emission and radiated emission test, a power supply of 230VAC and 120VAC was used for testing respectively, and only recorded the worst case of 230VAC.

## 4. RADIATED DISTURBANCE

### 4.1. Radiated Emission Limit

ETSI EN 301 489-1 V2.1.1 (2017-02)/EN 55032 Class B

#### Limits for radiated disturbance Below 1GHz

Frequency (MHz)	Distance (Meters)	Field Strengths Limit (dB $\mu$ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47

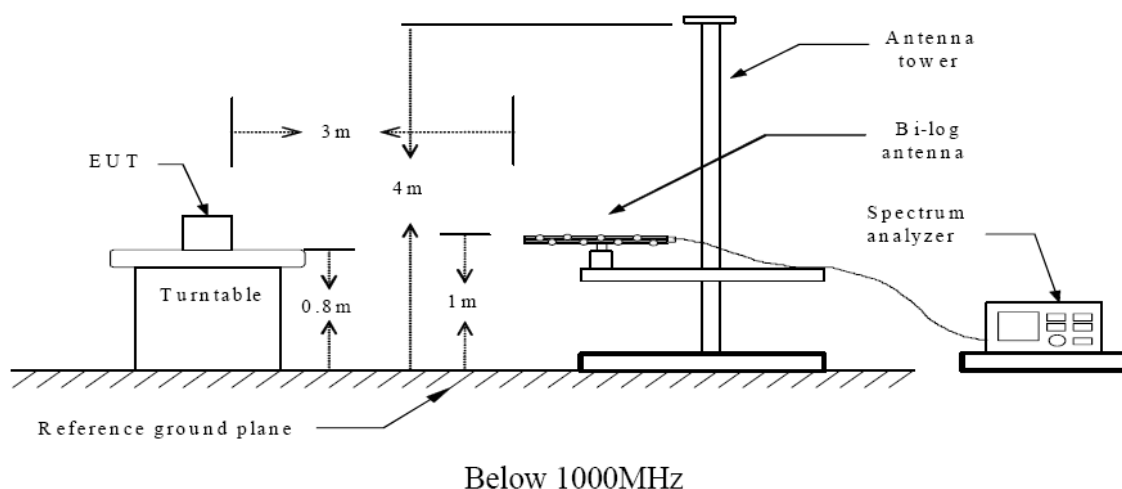
Note: (1) The smaller limit shall apply at the combination point between two frequency bands. (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

#### Limits for radiated disturbance Above 1GHz

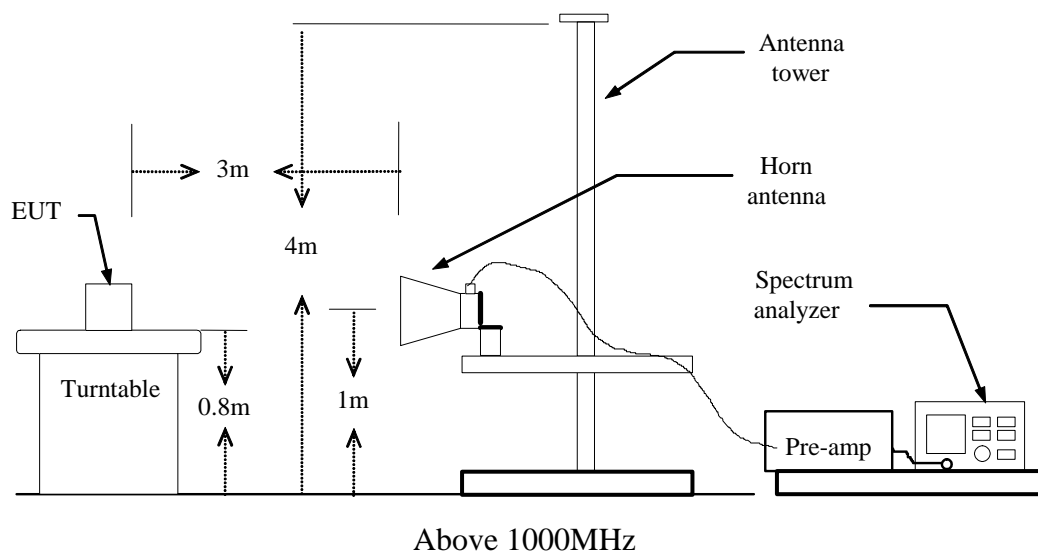
Frequency (MHz)	Distance (Meters)	Average Limit (dB $\mu$ V/m)	Peak Limit (dB $\mu$ V/m)
1000-3000	3	50	70
3000-6000	3	54	74

Note: The lower limit applies at the transition frequency.

### 4.2. Test Configuration







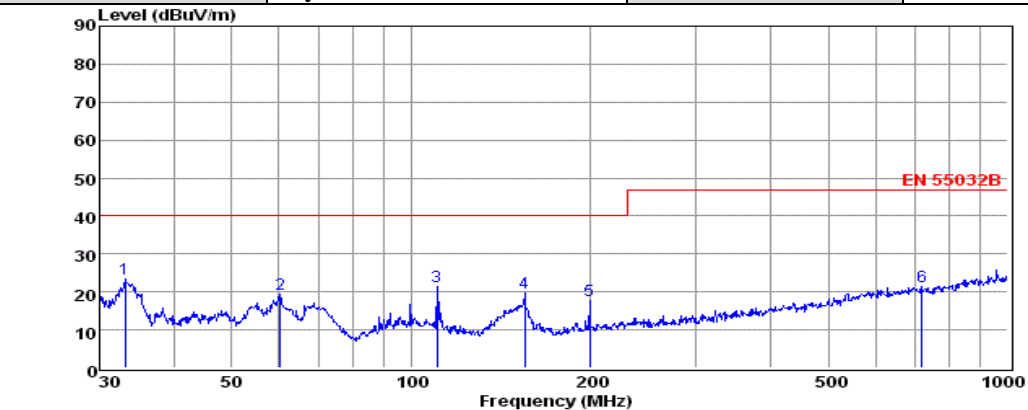
### 4.3. Test Procedure

Please refer to ETSI EN 301 489-1 Clause 8.2.3 and EN 55032 Clause 6 for the measurement methods.

### 4.4. Test Data

The worst test mode of the EUT was TM1, and its test data was showed as the follow:

<b>Model No.</b>	SA125	<b>Test Mode</b>	TM1
<b>Environmental Conditions</b>	24.5°C, 41% RH	<b>Detector Function</b>	Quasi-peak
<b>Pol</b>	Vertical	<b>Distance</b>	3m
<b>Test Engineer</b>	Jayden Zhuo		



pol:

VERTICAL

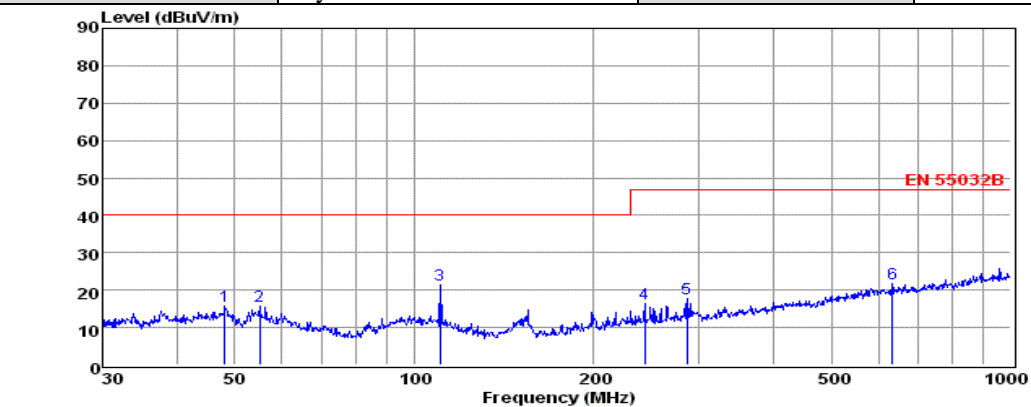
	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	33.09	10.83	0.37	12.31	23.51	40.00	-16.49	QP
2	60.28	6.17	0.49	12.58	19.24	40.00	-20.76	QP
3	110.57	8.59	0.61	12.15	21.35	40.00	-18.65	QP
4	154.82	10.62	0.76	8.46	19.84	40.00	-20.16	QP
5	199.29	6.44	0.84	10.57	17.85	40.00	-22.15	QP
6	719.20	0.52	1.75	19.05	21.32	47.00	-25.68	QP

Note: 1. All readings are Quasi-peak values.

2. Measured= Reading + Antenna Factor + Cable Loss

3. The emission that at 20db blow the official limit are not reported

<b>Model No.</b>	SA125	<b>Test Mode</b>	TM1
<b>Environmental Conditions</b>	24.5°C, 41% RH	<b>Detector Function</b>	Quasi-peak
<b>Pol</b>	Horizontal	<b>Distance</b>	3m
<b>Test Engineer</b>	Jayden Zhuo		



pol:

HORIZONTAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	48.16	1.91	0.35	13.36	15.62	40.00	-24.38	QP
2	55.03	2.11	0.46	13.02	15.59	40.00	-24.41	QP
3	110.57	8.66	0.61	12.15	21.42	40.00	-18.58	QP
4	243.38	3.28	0.90	12.08	16.26	47.00	-30.74	QP
5	286.98	3.82	1.05	12.81	17.68	47.00	-29.32	QP
6	633.91	1.60	1.50	18.57	21.67	47.00	-25.33	QP

Note: 1. All readings are Quasi-peak values.

2. Measured= Reading + Antenna Factor + Cable Loss

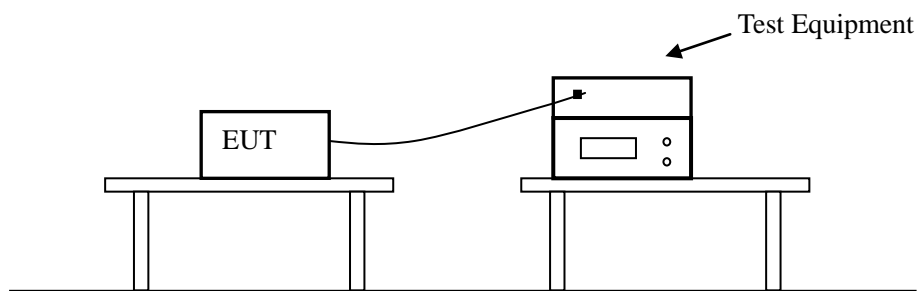
3. The emission that at 20db blow the official limit are not reported

<b>Test Mode:</b> TM1(above 1GHz)	<b>Tested by:</b> Jayden Zhuo
<b>Test voltage:</b> AC 230V/50Hz	<b>Test Distance:</b> 3m
<b>Detector Function:</b> Peak+AV	<b>Test Results:</b> Passed

Polarization	Frequency MHz	Emission Level dB $\mu$ V/m		Limits dB $\mu$ V/m		Margin dB $\mu$ V/m	
Horizontal	1402.72	55.23	37.38	70	50	-14.77	-12.62
	1852.12	54.91	34.61	70	50	-15.09	-15.39
	3217.41	56.72	32.45	74	54	-17.28	-21.55
	3961.19	61.25	37.43	74	54	-12.75	-16.57
	4449.12	62.47	39.77	74	54	-11.53	-14.23
	4867.86	63.41	37.90	74	54	-10.59	-16.10
Vertical	1380.81	53.65	34.66	70	50	-16.35	-15.34
	1882.02	57.88	34.29	70	50	-12.12	-15.71
	3233.57	43.04	38.25	74	54	-30.96	-15.75
	3733.54	46.20	36.14	74	54	-27.80	-17.86
	4451.44	42.28	38.03	74	54	-31.72	-15.97
	4854.44	46.07	36.50	74	54	-27.93	-17.50
<p>1. Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.</p> <p>2. Measurements above show only up to 6 maximum emissions noted.</p> <p>3. Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.</p>							

## 5. HARMONIC CURRENT EMISSIONS

### 5.1. Test Configuration



### 5.2. Test Standard

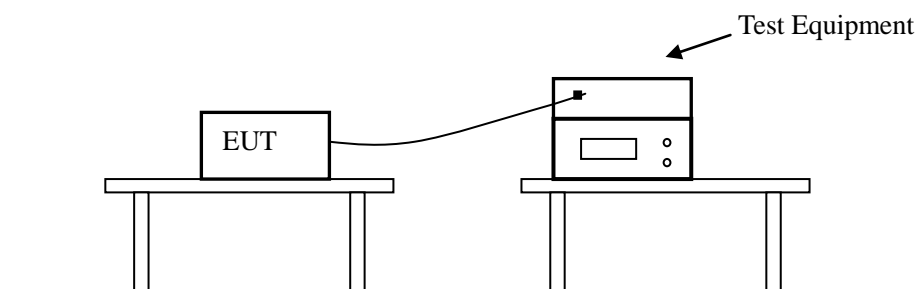
According to ETSI EN 301 489-1 V2.1.1 (2017-02) & EN 61000-3-2: 2014

### 5.3. Test Data

Because power of EUT less than 75W, According standard EN 61000-3-2, Harmonic current unnecessary to test.

## 6. VOLTAGE FLUCTUATION AND FLICKER

### 6.1. Test Configuration



### 6.2. Test Standard

According to ETSI EN 301 489-1 V2.1.1 (2017-02) & EN 61000-3-3: 2013

### 6.3. Test Data

Voltech IEC61000-3 Windows Software 1.14.06RC1				
Type of Test:	Flickermeter Test - Table			
Power Analyzer:	Voltech PM6000 SN: 200006700523 Firmware Version: v1.21.07RC2			
Channel(s):	1. SN: 090015502053, 28 Adjusted Date: 22 JUN 2011. 2. SN:None Adjusted Date:None 3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None 5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None			
Shunt(s):	1. SN: 091024301916, 4 Adjusted Date: 23 JUN 2011. 2. SN:None Adjusted Date:None 3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None 5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None			
AC Source:	Mains / Manual Source			
Overall Result:	Notes:			
<b>PASS</b>	Measurement method - Voltage			

	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.102	0.097	0.100	0

## **7. GENERAL PERFORMANCE CRITERIA FOR IMMUNITY TEST**

### **7.1. Performance criteria for Continuous phenomena applied to Transmitter (CT)**

For equipment of type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.

Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

### **7.2. Performance criteria for Transient phenomena applied to Transmitter (TT)**

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

### **7.3. Performance criteria for Continuous phenomena applied to Receiver (CR)**

For equipment of type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

### **7.4. Performance criteria for Transient phenomena applied to Receiver (TR)**

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

**Performance criteria for ETSI EN 301 489-17 V3.1.1(2017-02)**

Criteria	During test	After test
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).

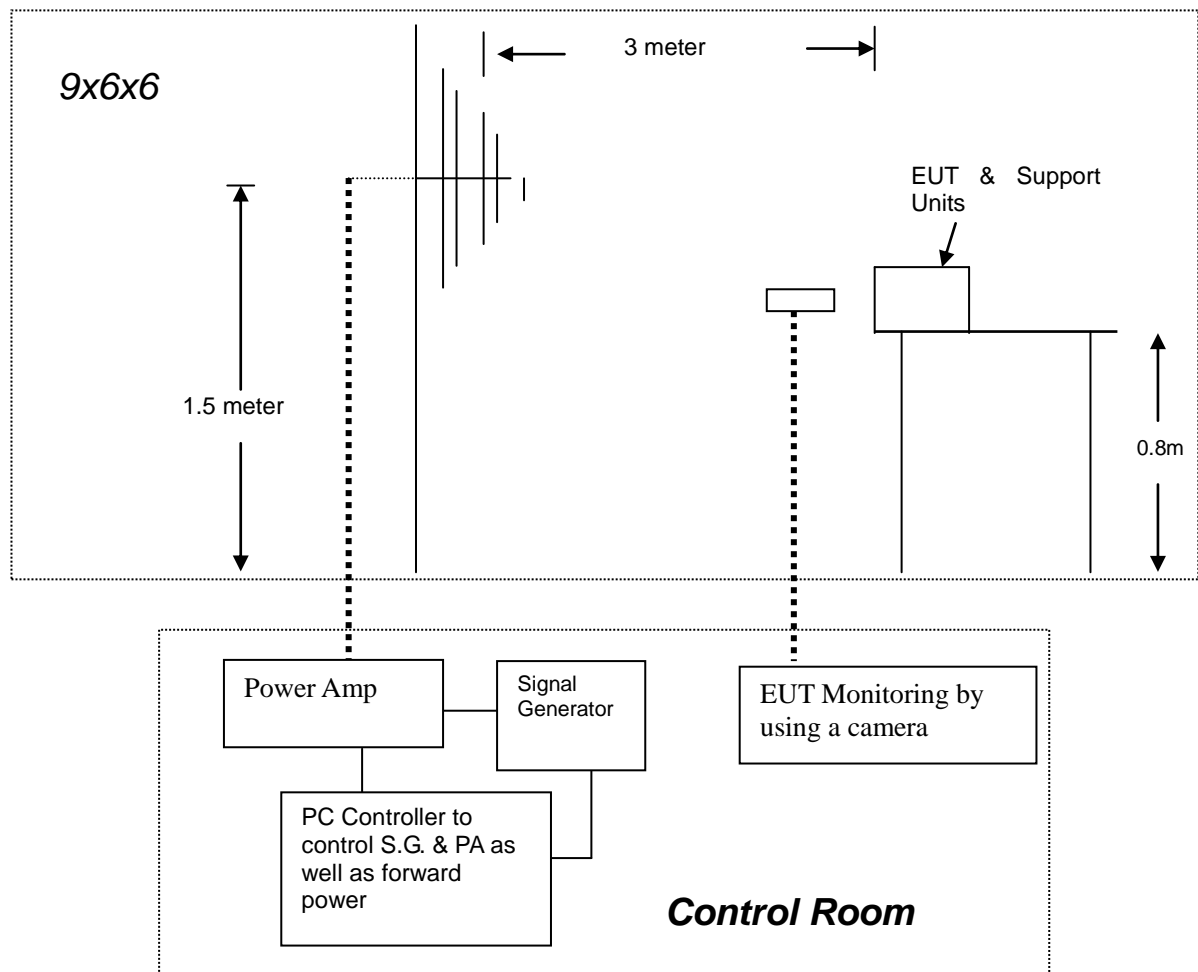
NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

## 8. RF ELECTROMAGNETIC FIELD ((80 MHZ -6000 MHZ))

### 8.1. Test Configuration





## 8.2. Test Standard

ETSI 301 489-1, EN 301 489-17  
(EN 61000-4-3: 2006+A2: 2010)

Test level 2 at 3V / m.

## 8.3. Severity Level

Level	Field Strength V/m
1.	1
2.	3
3.	10
X	Special

Performance criterion: A

## 8.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen. All the scanning conditions are as follows:

Condition of Test	Remarks
1. Fielded Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Unmodulated
3. Scanning Frequency	80 - 6000 MHz
4. Dwell time of radiated	0.0015 decade/s
5. Waiting Time	3 Sec.

**8.5. Test Result****MS Test Result:**

EUT Working Mode	Antenna Polarity	Frequency (MHz)	Field Strength (V/m)	Observation	Position	Conclusion
GPRS/EGPRS 900 MHz, Traffic	Vertical	80-6000	3	CT,CR	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	CT,CR	Front, Right, Left, Back	Pass
GPRS/EGPRS 900 MHz, Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back	Pass
GPRS/EGPRS 1800 MHz, Traffic	Vertical	80-6000	3	CT,CR	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	CT,CR	Front, Right, Left, Back	Pass
GPRS/EGPRS 1800 MHz, Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back	Pass

**TM7 Test Result:**

EUT Working Mode	Antenna Polarity	Frequency (MHz)	Field Strength (V/m)	Observation	Position	Conclusion
Operating Mode	Vertical	80-6000	3	See Note	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back	Pass
Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back	Pass

\*\*\*Note: Unintentional transmission is not founded from the EUT.

## Special conditions for EMC immunity tests

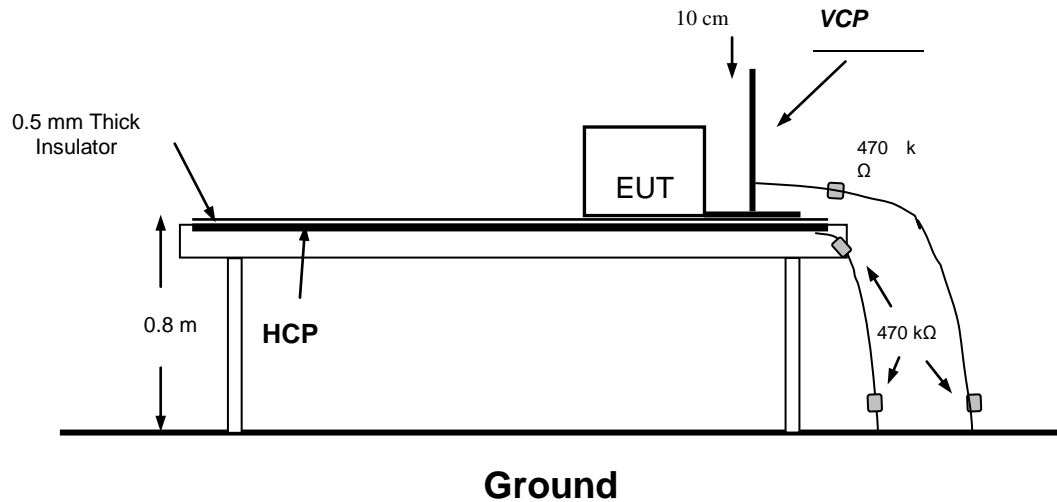
EUT operating Mode		Polarity	Conclusion
GSM900	bit error ratio	H	Pass
		V	Pass
	block error ratio	H	Pass
		V	Pass
DCS1800	bit error ratio	H	Pass
		V	Pass
	block error ratio	H	Pass
		V	Pass

Note: 1. During the test, the maximum bit error ratio is less than  $1 \times 10^{-3}$ ;  
During the test, the maximum block error ratio is less than  $1 \times 10^{-2}$ .

## 9. ELECTROSTATIC DISCHARGE

Please refer to ETSI EN 301 489-1 and EN 61000-4-2.

### 9.1. Test Configuration



EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.5 by 1.0-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

## 9.2. Test Procedure

ETSI EN 301 489-1 V2.1.1 (2017-02)/ EN 61000-4-2: 2009

Test level 3 for Air Discharge at  $\pm 8$  kV

Test level 2 for Contact Discharge at  $\pm 4$  kV

### 9.2.1. Air Discharge

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

### 9.2.2. Contact Discharge

All the procedure shall be same as Section 6.2.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

### 9.2.3. Indirect Discharge For Horizontal Coupling Plane

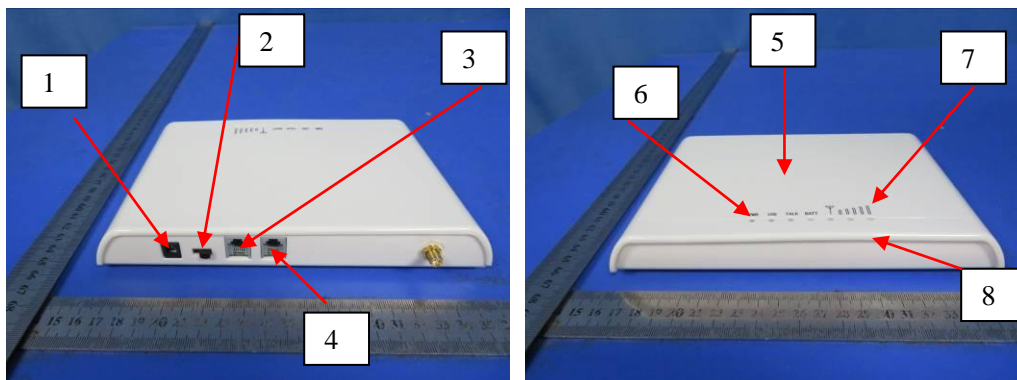
At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

### 9.2.4. Indirect Discharge For Vertical Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

## 9.3. Test Data

**PASS.**



\*\*\*Note: The air discharge points are 5, 6, 7 and 8.  
The contact discharge points are 1, 2, 3 and 4.

# Electrostatic Discharge Test Results

<b>Standard</b>	<input type="checkbox"/> IEC 61000-4-2 <input checked="" type="checkbox"/> EN 61000-4-2		
<b>Applicant</b>	Shenzhen Etross telecom Co., ltd.		
<b>EUT</b>	GSM FIXED WIRELESS TERMINAL	<b>Temperature</b>	22.6℃
<b>M/N</b>	SA125	<b>Humidity</b>	41.5%
<b>Criterion</b>	B	<b>Pressure</b>	1021mbar
<b>Test Mode</b>	TM1-TM7	<b>Test Engineer</b>	Jayden Zhuo

## TEST RESULT OF MS

Test Voltage	Coupling	Observation	Result (Pass/Fail)
±2KV, ±4kV	Contact Discharge	TT, TR	Pass
±2KV, ±4kV, ±8kV	Air Discharge	TT, TR	Pass
±2KV, ±4kV	Indirect Discharge HCP	TT, TR	Pass
±2KV, ±4kV	Indirect Discharge VCP	TT, TR	Pass

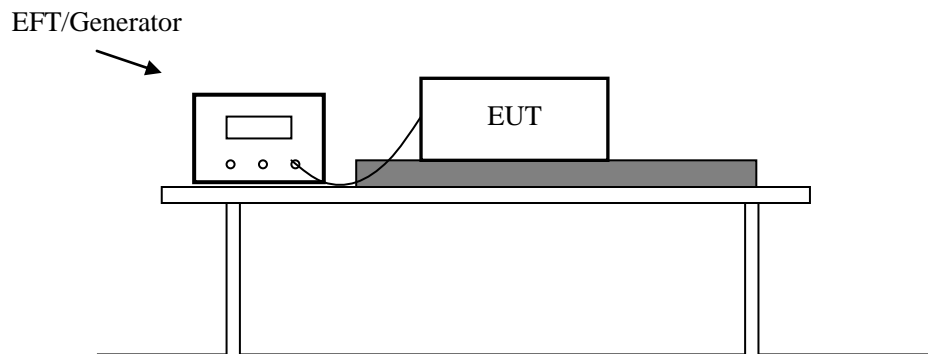
## TEST RESULT OF TM7

Test Voltage	Coupling	Result (Pass/Fail)
±2KV, ±4kV	Contact Discharge	Pass
±2KV, ±4kV, ±8kV	Air Discharge	Pass
±2KV, ±4kV	Indirect Discharge HCP	Pass
±2KV, ±4kV	Indirect Discharge VCP	Pass

Note: The EUT performance complied with performance criteria for CT&CR to MS Function and there is no any degradation of performance and function.

## 10. ELECTRICAL FAST TRANSIENT IMMUNITY

### 10.1. Test Configuration



### 10.2. Test Standard

ETSI EN 301 489-1 V2.1.1 (2017-02)/ EN61000-4-4: 2012

Test level 2 at 1 kV

#### Test level

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

Performance criterion: B

### 10.3. 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.

10.4.1. For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device, which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.

10.4.2. For signal lines and control lines ports: No I/O ports. It's unnecessary to test.

10.4.3. For DC output line ports: It's unnecessary to test.

### 10.4. Test Data

**PASS.**

Please refer to the following page.



## Electrical Fast Transient/Burst Test Results

<b>Standard</b>	<input type="checkbox"/> IEC 61000-4-4 <input checked="" type="checkbox"/> EN 61000-4-4		
<b>Applicant</b>	Shenzhen Etross telecom Co., ltd.		
<b>EUT</b>	GSM      FIXED      WIRELESS TERMINAL	<b>Temperature</b>	24.6℃
<b>M/N</b>	SA125	<b>Humidity</b>	42.5%
<b>Test Mode</b>	TM1-TM7	<b>Criterion</b>	B
<b>Test Engineer</b>	Jayden Zhuo		

### TEST RESULT OF MS

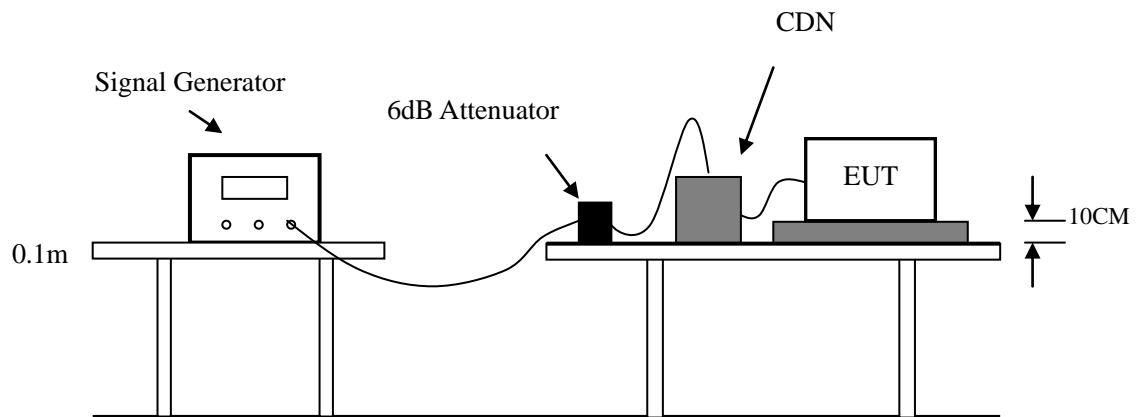
Line	Test Voltage	Polarity	Observation	Result (Pass/Fail)
L	1KV	+/-	TT, TR	Pass
N	1KV	+/-	TT, TR	Pass
L-N	1KV	+/-	TT, TR	Pass

### TEST RESULT OF TM7

Line	Test Voltage	Polarity	Result (Pass/Fail)
L	1KV	+/-	Pass
N	1KV	+/-	Pass
L-N	1KV	+/-	Pass

## 11. RF COMMON MODE

### 11.1. Test Configuration



### 11.2. Test Standard

ETSI EN 301 489-1 V2.1.1 (2017-02)/ EN 61000-4-6: 2014

Test level 2 at 3 V (r.m.s.), 0.15 MHz ~ 80 MHz,

Modulation type: AM

Modulation depth: 80%

Modulation signal: 1 kHz

#### Test level

Level	Voltage Level (r.m.s.) (V)
1	1
2	3
3	10
X	Special

Performance criterion: A

### 11.3. Test Procedure

11.3.1. Let the EUT work in test mode and test it.

11.3.2. The EUT are placed on an insulating support 0.1 m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3 m 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).

11.3.3. The disturbance signal described below is injected to EUT through CDN.

11.3.4. The EUT operates within its operational mode(s) under intended climatic conditions after power on.

11.3.5. The frequency range is swept from 150 kHz to 80 MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

11.3.6. The rate of sweep shall not exceed  $1.5 \times 10^{-3}$  decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

11.3.7. Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

### 11.4. Test Data

**PASS.**

Please refer to the following page.

## Injected Currents Susceptibility Test Results

<b>Standard</b>	<input type="checkbox"/> IEC 61000-4-6 <input checked="" type="checkbox"/> EN 61000-4-6		
<b>Applicant</b>	Shenzhen Etross telecom Co., ltd.		
<b>EUT</b>	GSM      FIXED      WIRELESS TERMINAL	<b>Temperature</b>	24℃
<b>M/N</b>	SA125	<b>Humidity</b>	41.5%
<b>Test Mode</b>	TM1-TM7	<b>Criterion</b>	A
<b>Test Engineer</b>	Jayden Zhuo		

### TEST RESULT OF MS

Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Observation	Result (Pass/Fail)
0.15 ~ 80	AC Mains	3V	CT, CR	Pass

### TEST RESULT OF TM7

Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Result (Pass/Fail)
0.15 ~ 80	AC Mains	3V	Pass

**Remark:**

1. Modulation Signal: 1kHz 80% AM

2. Measurement Equipment :

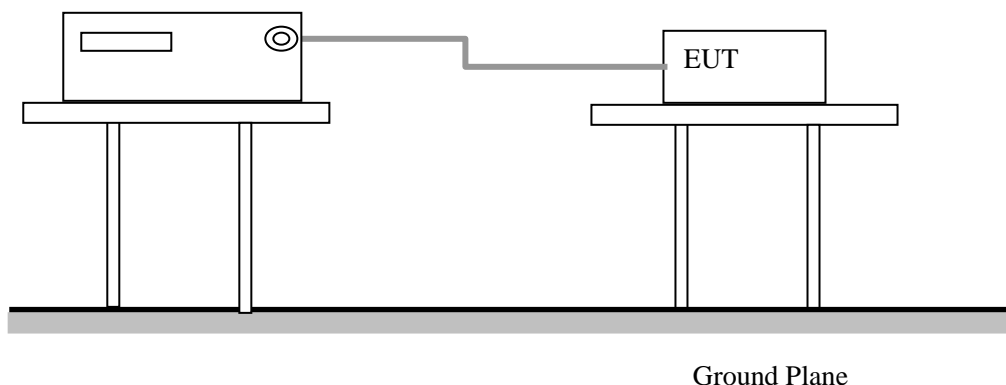
Simulator: CIT-10 (FRANKONIA)

CDN : ☒ CDN-M2 (FRANKONIA)

☐ CDN-M3 (FRANKONIA)

## 12. SURGES, LINE TO LINE AND LINE TO GROUND

### 12.1. Test Configuration



### 12.2. Test Standard

ETSI EN 301 489-1 V2.1.1 (2017-02) / EN 61000-4-5: 2014

L-N: Test level 2 at 1 kV

L-PE, N-PE Test Level 3 at 2kV

#### Test Level

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

Performance criterion: B

### 12.3. Test Procedure

- 12.3.1. For line to line coupling mode, provide a 0.5 kV 1.2/50us voltage surge (at open-circuit condition).
- 12.3.2. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 12.3.3. Different phase angles are done individually.
- 12.3.4. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

## 12.4. Test Data

Surge Immunity Test Result			
Standard	<input type="checkbox"/> IEC 61000-4-5 <input checked="" type="checkbox"/> EN 61000-4-5		
Applicant	Shenzhen Etross telecom Co., Ltd.		
EUT	GSM    FIXED    WIRELESS TERMINAL	Temperature	24.6℃
M/N	SA125	Humidity	42.5%
Test Mode	TM1-TM7	Criterion	A
Test Engineer	Jayden Zhuo		

## TEST RESULT OF MS

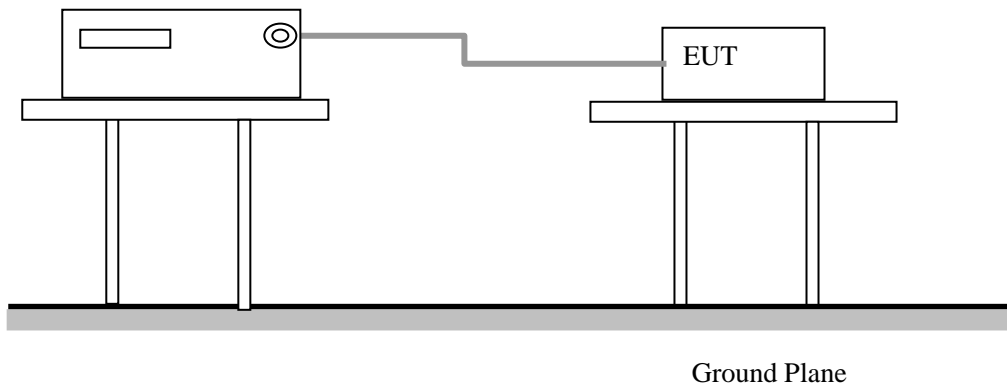
Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (KV)	Observation	Result (Pass/Fail)
L-N	+	0°, 90°, 180°, 270°	5	1.0	TT, TR	Pass
	-	0°, 90°, 180°, 270°	5	1.0	TT, TR	Pass

## TEST RESULT OF TM7

Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (KV)	Result (Pass/Fail)
L-N	+	0°, 90°, 180°, 270°	5	1.0	Pass
	-	0°, 90°, 180°, 270°	5	1.0	Pass

## 13. VOLTAGE DIPS/INTERRUPTIONS IMMUNITY TEST

### 13.1. Test Configuration



### 13.2. Test Standard

ETSI EN 301 489-1 V2.1.1 (2017-02)/ EN 61000-4-11: 2004  
Test levels and Performance Criterion

#### Test Level

Voltage Reduction %UT	Voltage dips %UT	Duration (in period)
100	0	0.5
100	0	1
30	70	5
Voltage Reduction %UT	Voltage Interruptions %UT	Duration (in period)
100	0	250

Performance criterion: B&C

### 13.3. Test Procedure

13.3.1. The interruption is introduced at selected phase angles with specified duration.

13.3.2. Record any degradation of performance.

## 13.4. Test Data

Voltage Dips And Interruptions Test Results			
<b>Standard</b>	<input type="checkbox"/> IEC 61000-4-11 <input checked="" type="checkbox"/> EN 61000-4-11		
<b>Applicant</b>	Shenzhen Etross telecom Co., ltd.		
<b>EUT</b>	GSM FIXED WIRELESS TERMINAL	<b>Temperature</b>	24.6°C
<b>M/N</b>	SA125	<b>Humidity</b>	42.5 %
<b>Test Mode</b>	TM1-TM7	<b>Criterion</b>	A
<b>Test Engineer</b>	Jayden Zhuo		

## TEST RESULT OF MS

Test Level % U <sub>T</sub>	Voltage Dips & Short Interruptions % U <sub>T</sub>	Duration (in periods)	Observation	Result (Pass/Fail)
0	100	0.5P	TT, TR	Pass
0	100	1P	TT, TR	Pass
70	30	25P	TT, TR	Pass
0	100	250P	TT, TR	Pass

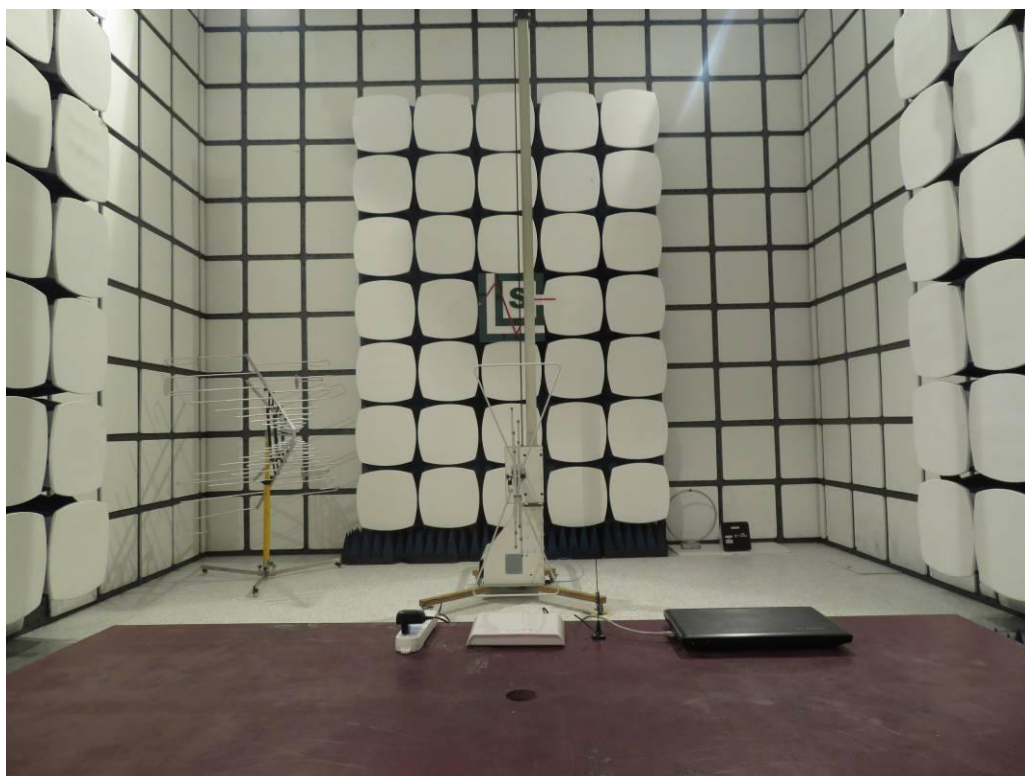
## TEST RESULT OF TM7

Test Level % U <sub>T</sub>	Voltage Dips & Short Interruptions % U <sub>T</sub>	Duration (in periods)	Result (Pass/Fail)
0	100	0.5P	Pass
0	100	1P	Pass
70	30	25P	Pass
0	100	250P	Pass

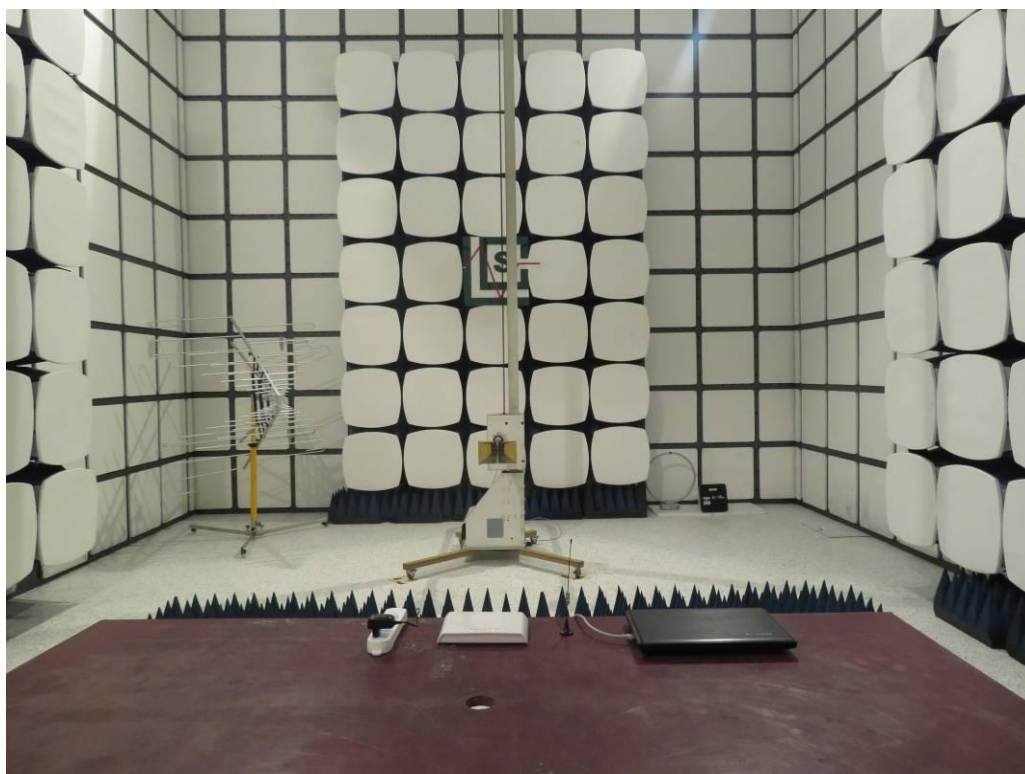


## 14. TEST SETUP PHOTOGRAPHS

### 9.1. Photo of Radiated Emissions Measurement



Below 1GHz



Above 1GHz

## 9.2. Photo of Power Line Conducted Measurement



## 9.3. Photo of Harmonic & Flicker Measurement



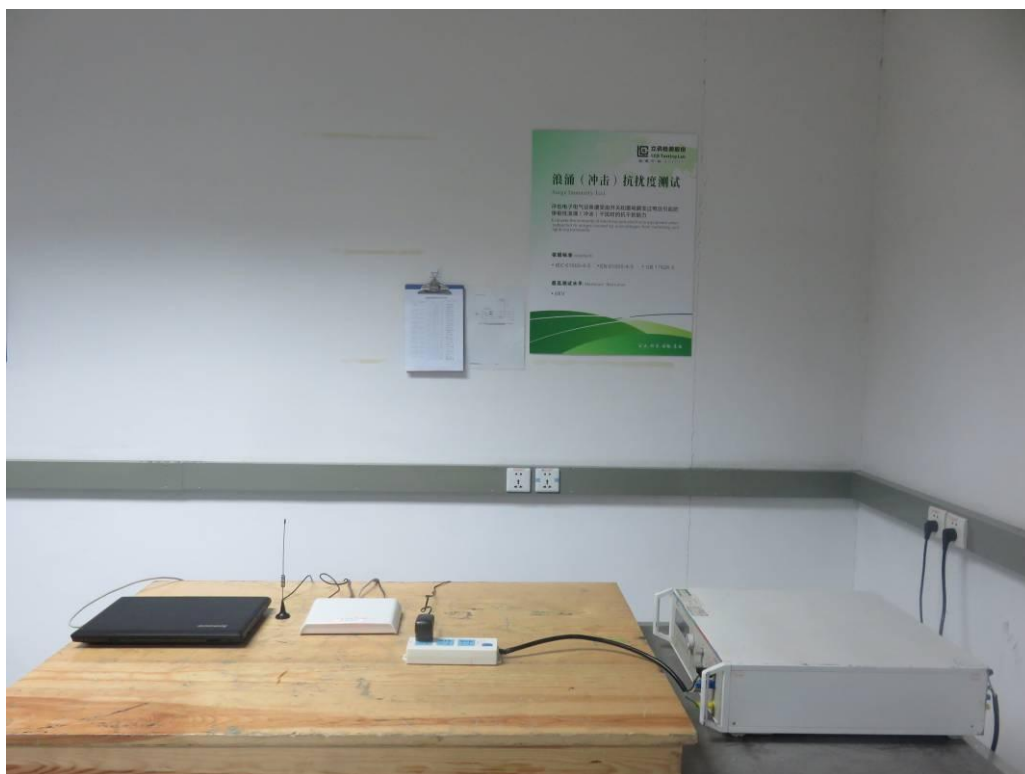




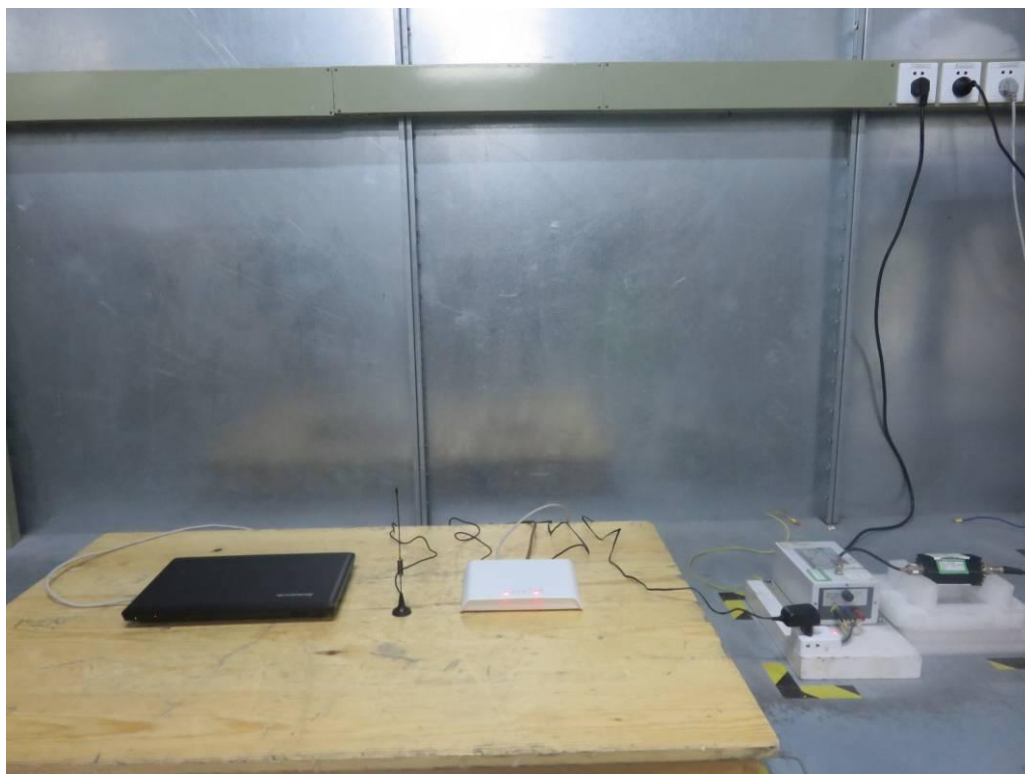
## 9.6. Photo of Electrical Fast Transient/Burst Test



## 9.7. Photo of Surge Immunity Test



### 9.8. Photo of Injected Currents Susceptibility Test



### 9.9. Photo of Voltage Dips and Short Interruptions Immunity Test



## 15. PHOTOS OF EUT



Fig. 1



Fig. 2



Fig. 3

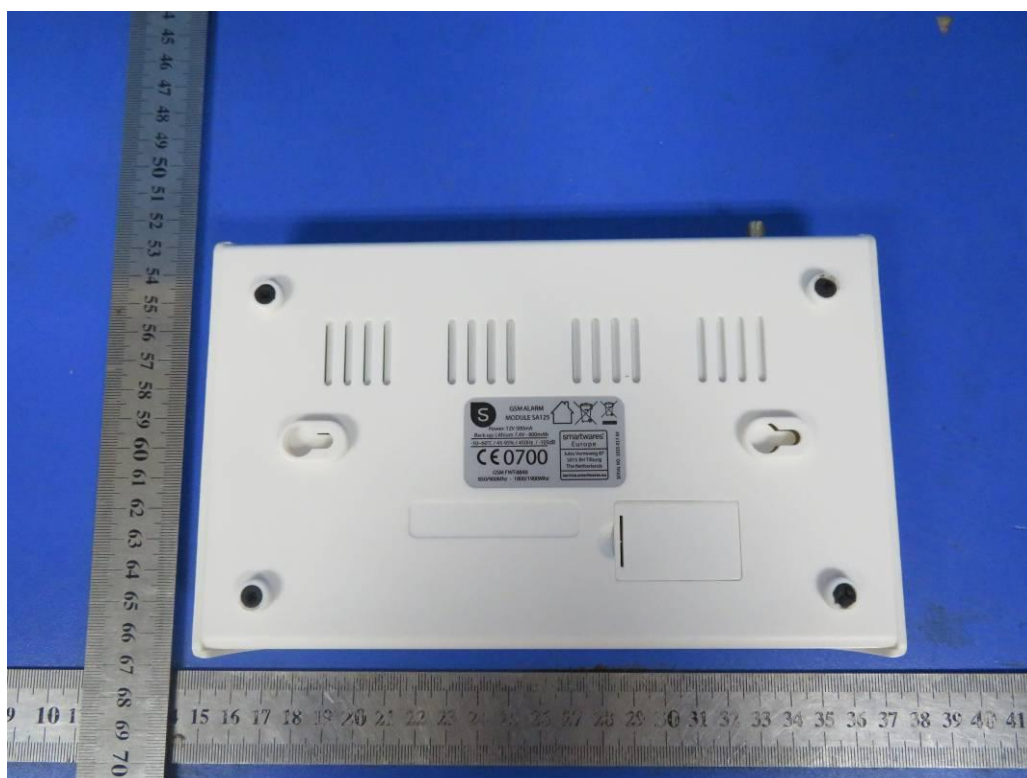


Fig. 4



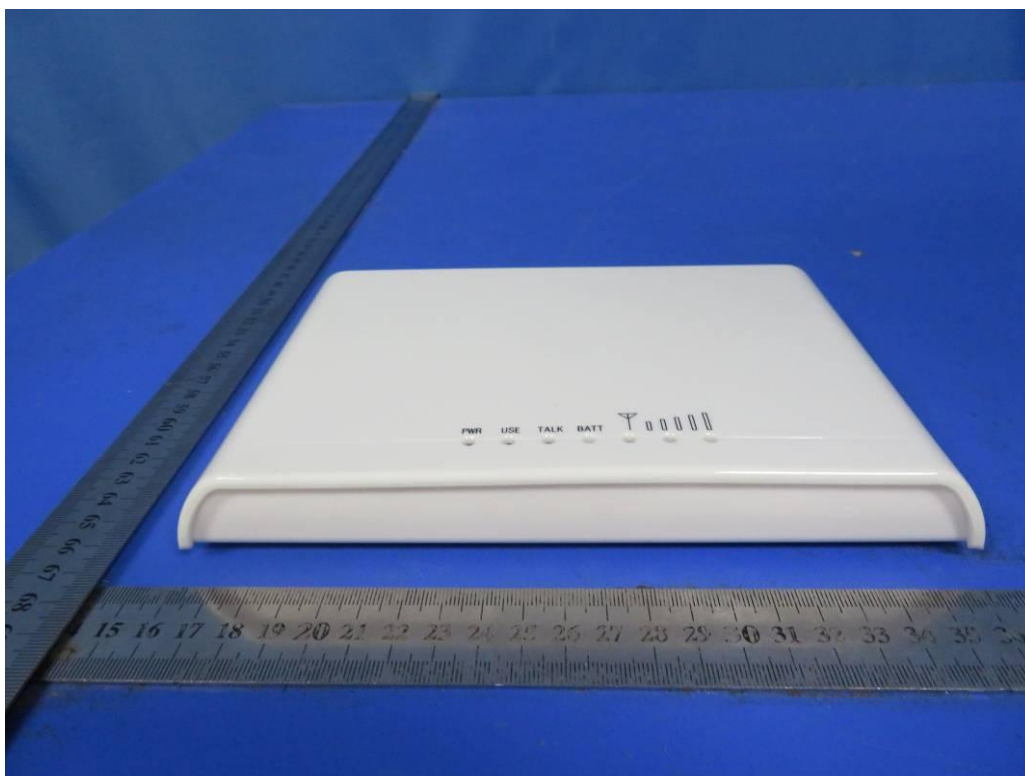


Fig. 5

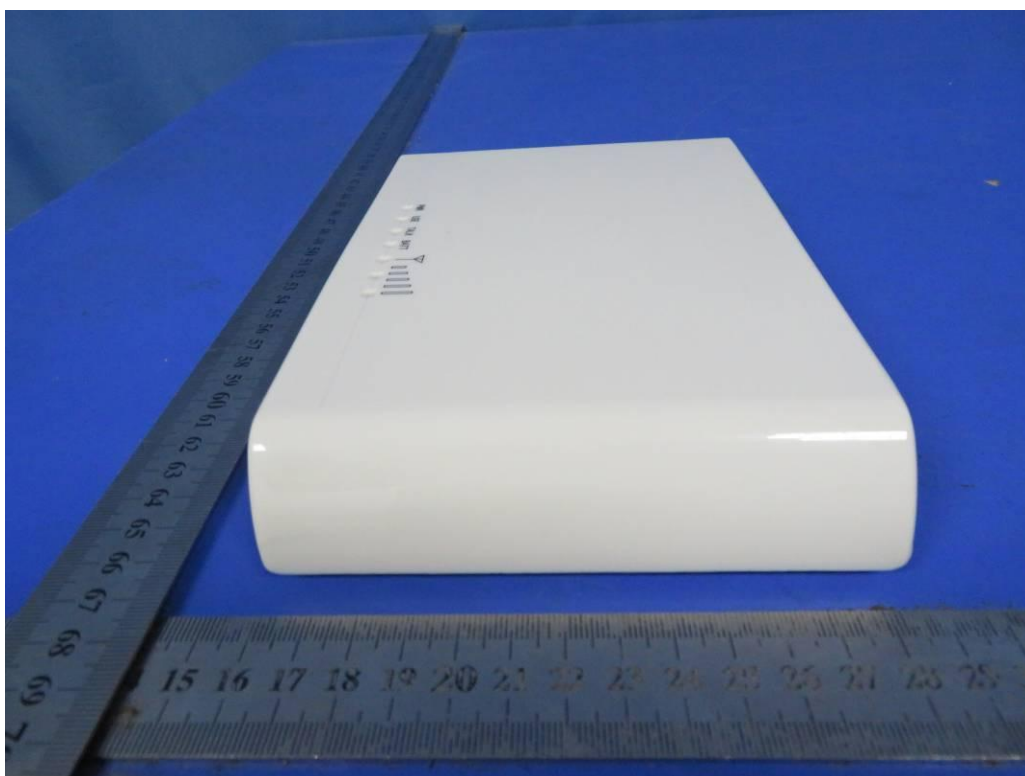


Fig. 6





Fig. 7

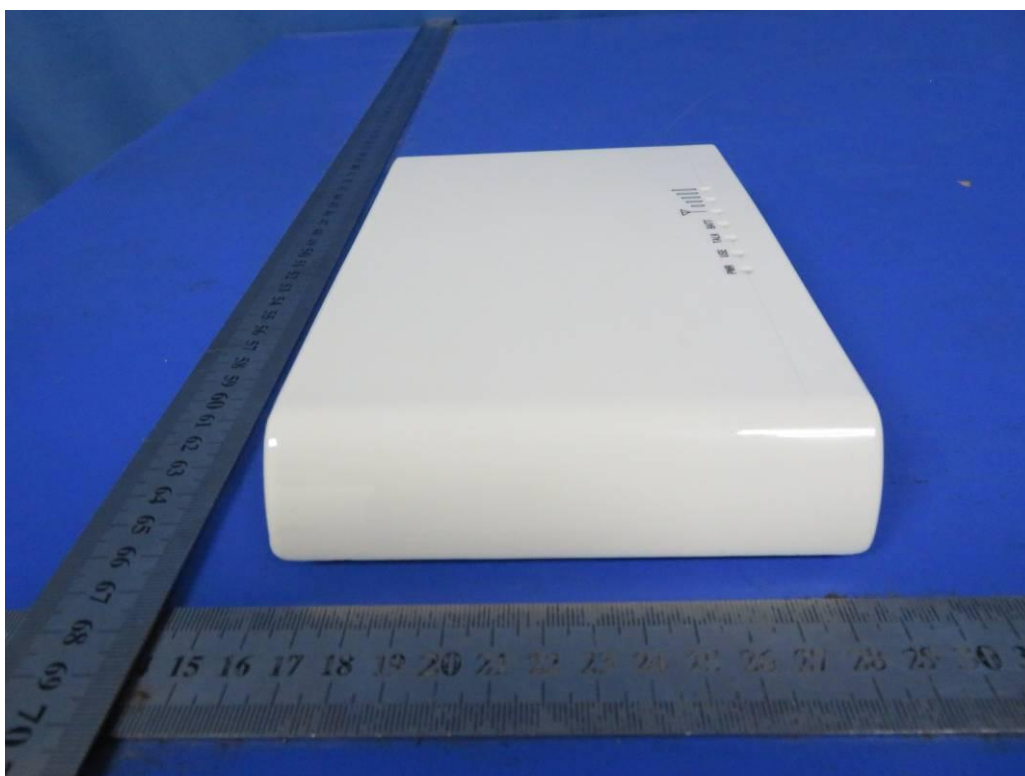


Fig. 8



Fig. 9

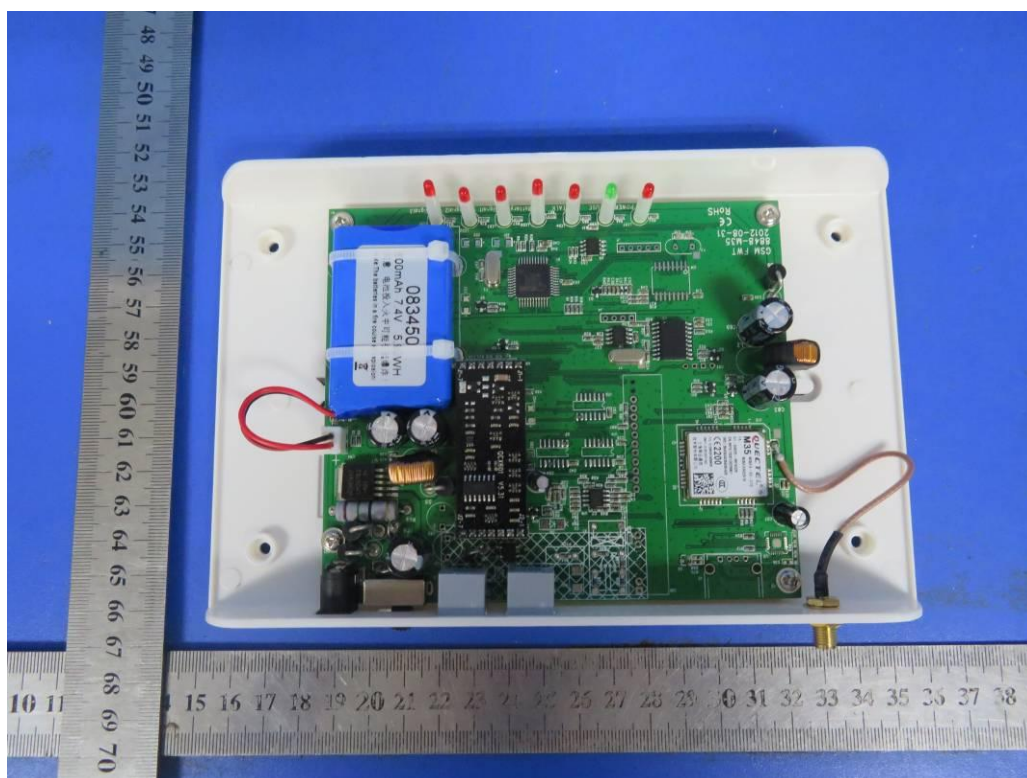


Fig. 10

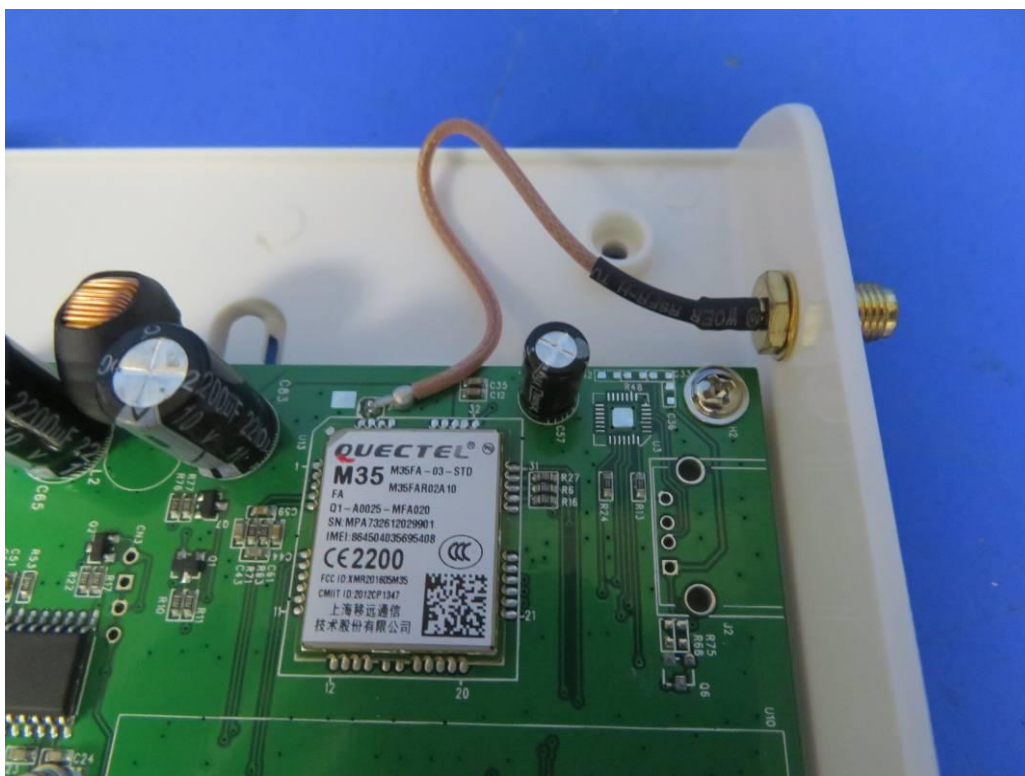


Fig. 11



Fig. 12





Fig. 13

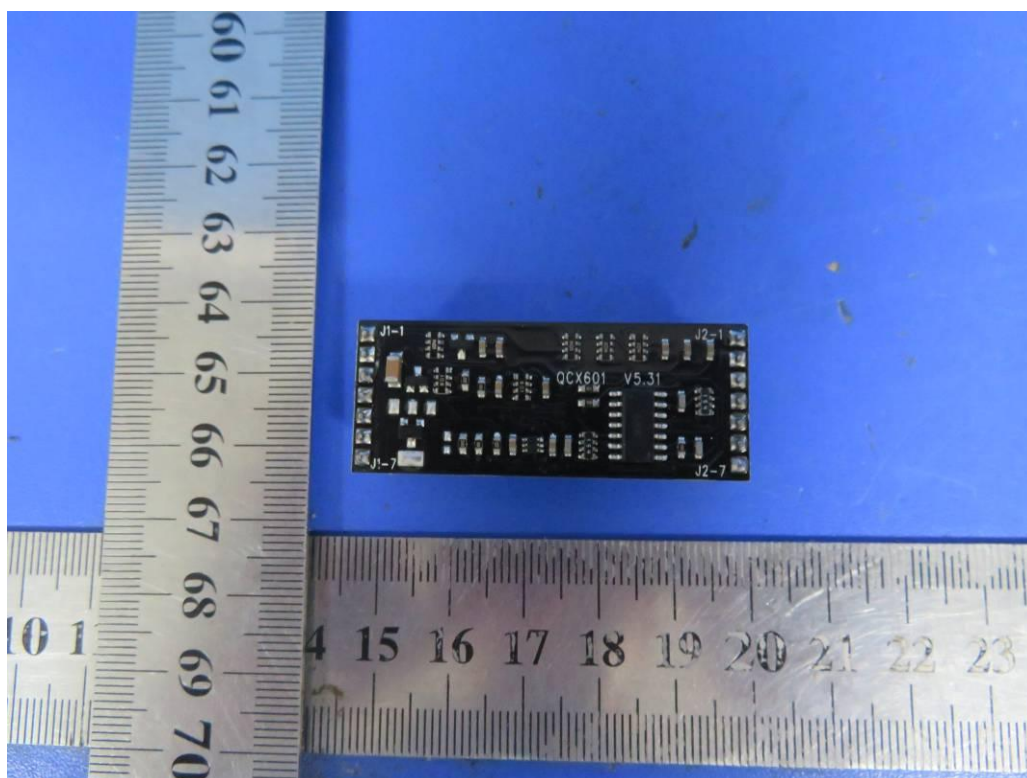


Fig. 14

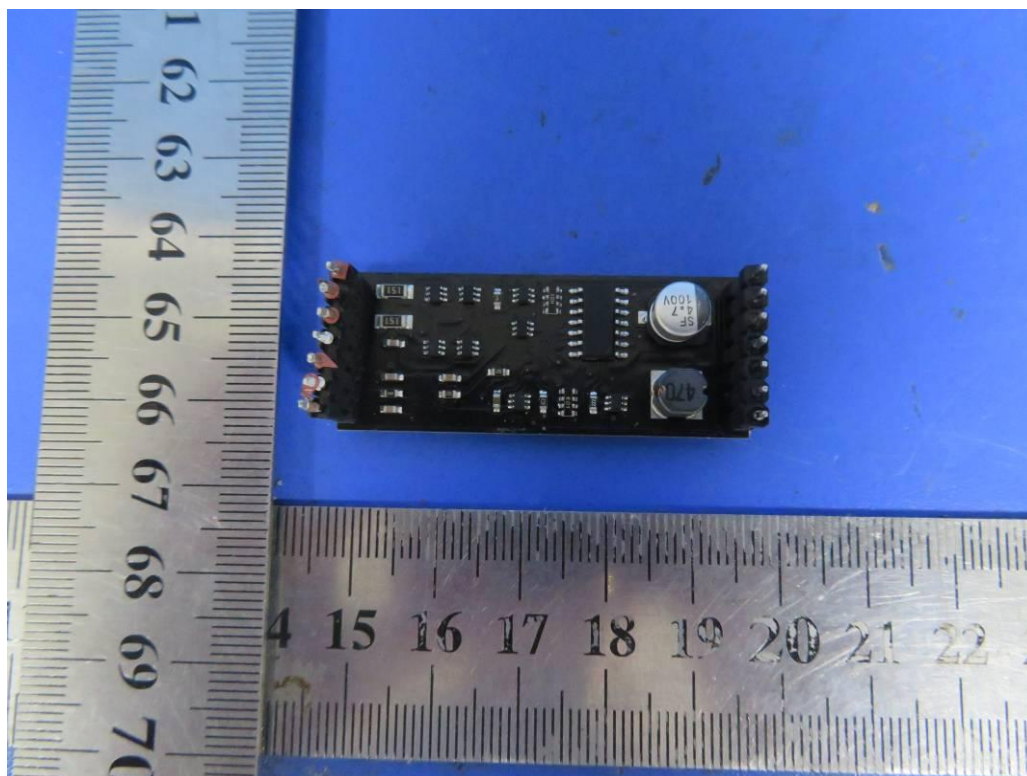


Fig. 15

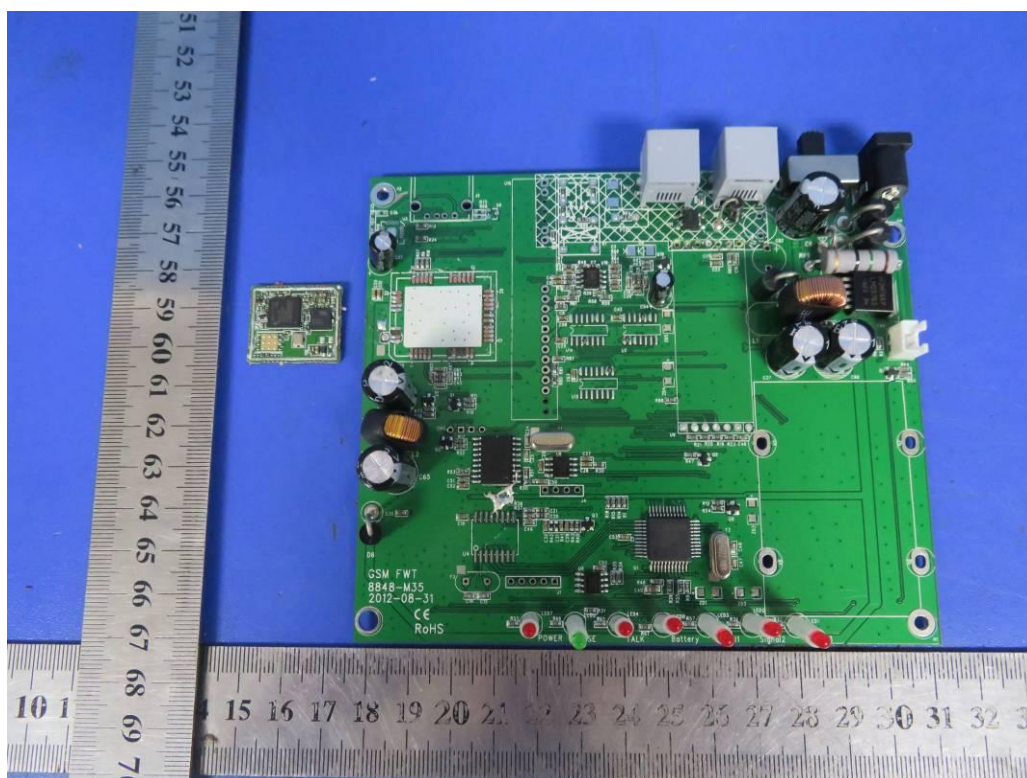


Fig. 16





Fig. 17

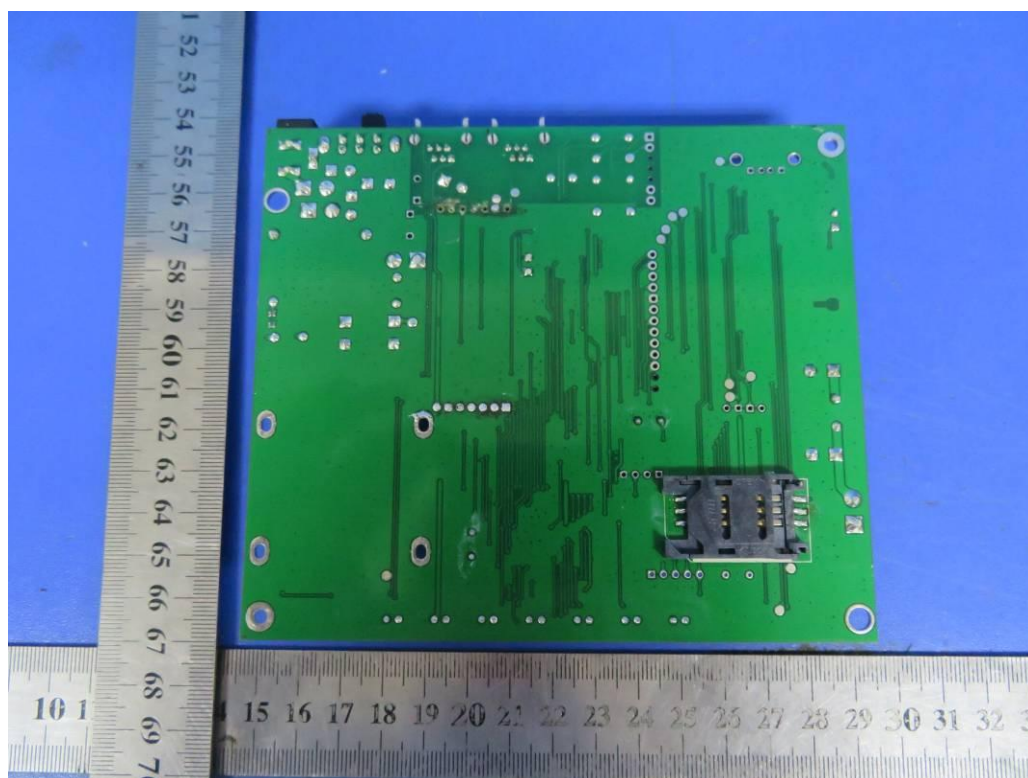


Fig. 18



Fig. 19

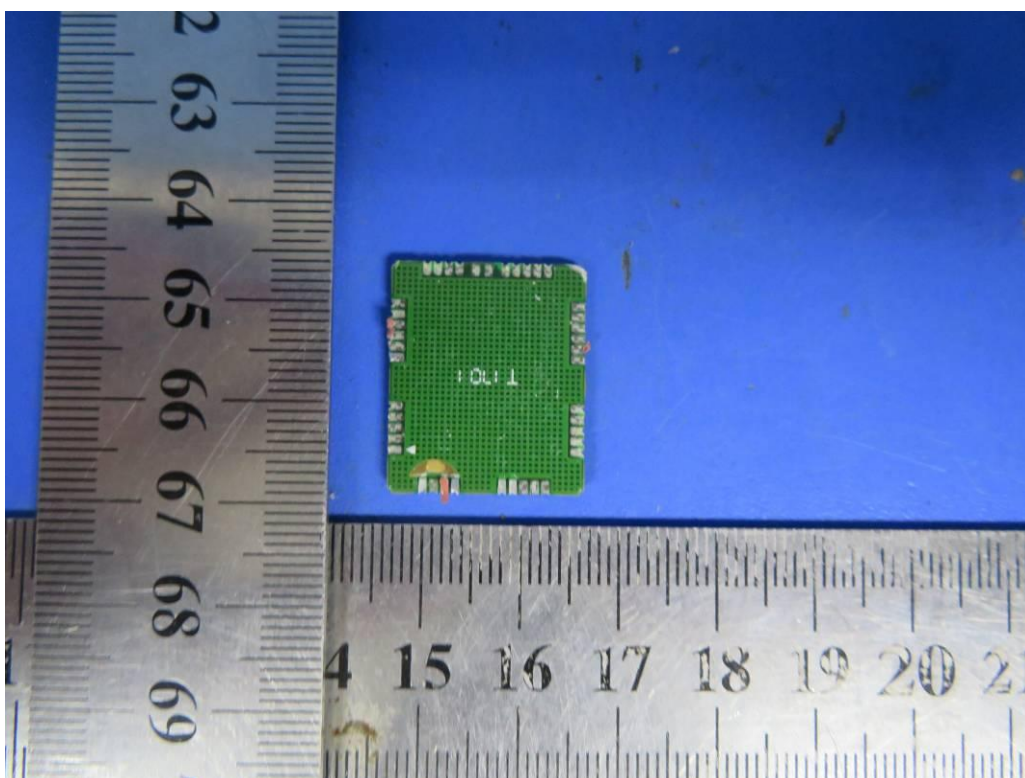


Fig. 20

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