



TEST REPORT

No. 2013EM02091

For

**Client: Shanghai SIMCom Wireless Solutions
Co., Ltd.**

**Production: GSM/GPRS(850/900/1800/1900MHz)+
BT Wireless Data Module**

Model Name: SIM800

Hardware Version: V2.01

Software Version: SIM800 R13.08

Issued date: 2014-01-16



Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of ECIT Shanghai.

Test Laboratory:

ECIT Shanghai, East China Institute of Telecommunications

Add: 7-8F, G Area, No.668, Beijing East Road, Huangpu District, Shanghai, P. R. China

Tel: (+86)-021-63843300, E-Mail: welcome@ecit.org.cn

CONTENTS

1. TESTING LABORATORY	3
1.1. TESTING LOCATION	3
1.2. TESTING ENVIRONMENT	3
1.3. PROJECT DATA	3
1.4. SIGNATURE	3
2. CLIENT INFORMATION	4
2.1. APPLICANT INFORMATION	4
2.2. MANUFACTURER INFORMATION	4
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	5
3.1. ABOUT EUT	5
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	5
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST	5
4. REFERENCE DOCUMENTS	6
4.1. REFERENCE DOCUMENTS FOR TESTING	6
4.2. GENERAL PERFORMANCE DESCRIPTION FOR EN 55024	7
4.2.1 GENERAL DESCRIPTION	7
4.2.2. GENERAL PERFORMANCE CRITERIA DESCRIPTION	8
5. TEST RESULTS	9
5.1. SUMMARY OF TEST RESULTS	9
5.2. STATEMENTS	9
6. TEST METHODOLOGY	10
6.1. DECISION OF FINAL TEST MODE	10
7. TEST EQUIPMENTS UTILIZED	11
8. MEASUREMENT RESULTS	12
8.1. RADIATED EMISSION	12
8.2. CONDUCTED EMISSION	15
8.3. HARMONIC CURRENT EMISSIONS	16
8.4. VOLTAGE FLUCTUATIONS AND FLICKER	16
8.5. ELECTROSTATIC DISCHARGE	16
8.6. RF ELECTROMAGNETIC FIELD	18
8.7. FAST TRANSIENTS COMMON MODE	23
8.8. SURGE	24
8.9. RF COMMON MODE	25
8.10. VOLTAGE DIPS AND INTERRUPTIONS	28
ANNEX A TEST CONFIGURATION PHOTOS	29
ANNEX B EUT PHOTOS	32

1. Testing Laboratory

1.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7-8F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	(+86)-021-63843300
Fax:	(+86)-021-63843301

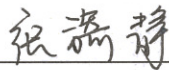
1.2. Testing Environment

Normal Temperature:	15-35°C
Relative Humidity:	30-60%

1.3. Project data

Project Leader:	Gong Yujuan
Testing Start Date:	2013-12-23
Testing End Date:	2014-01-13

1.4. Signature



Zhang Yijing

(Prepared this test report)



You Jinjun

(Reviewed this test report)



Zheng Zhongbin

Director of the laboratory

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: Shanghai SIMCom Wireless Solutions Co., Ltd.
Address: Building A, SIM Technology Building, No. 633, Jinzhong Road, Changning District, Shanghai R.R. China
Telephone: 86-021-32523020
Postcode: 200335
Fax: 86-021-32523020

2.2. Manufacturer Information

Company Name: Shenyang Simcom Technology Ltd.
Address: No. 37, Shenbei Rd, Shenbei New Area, Shenyang, P.R. China
Telephone: 86-024-88922222
Fax: 86-024-88922225

3. Equipment under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Product Name	GSM/GPRS(850/900/1800/1900MHz)+BT Wireless Data Module
Model name	SIM800
GSM Frequency Band	GSM850/GSM900/GSM1800 /GSM1900

Note: Photographs of EUT are shown in ANNEX B of this test report.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N01	D10613481833729	V2.01	SIM800 R13.08	2013-12-23

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	SN
AE1	Adapter	DSA-15P-05	--
AE2	Main Board	SIM5310-EVB S2-3035X	D20613221669855
AE3	Antenna	--	--
AE4	Earphone	--	--

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
ETSI EN 301489-1	Part 1: Common technical requirements	V1.9.2 (2011-09)
ETSI EN 301489-7	Part 7: Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio telecommunications systems (GSM and DCS)	V1.3.1 (2005-11)
ETSI EN 301489-17	Part17: Specific conditions for Broadband Data Transmission Systems	V2.2.1 (2012-09)
EN 55022:(2010)	Information technology equipment --- Radio disturbance characteristics---- Limits and methods of measurement	2010-12
EN 55024:(2010)	Information technology equipment --- Immunity characteristics---- Limits and methods of measurement	2010-11

4.2. GENERAL PERFORMANCE DESCRIPTION for EN 55024

4.2.1 GENERAL DESCRIPTION

Product Standard	EN 55024: 2010	
	Test Type	Minimum Requirements
Basic Standard, Specification, and Performance Criterion required	EN 61000-4-2	Electrostatic Discharge – ESD: 8KV air discharge, 4KV Contact discharge, Performance Criterion B
	EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80 ~1000 MHz, 3V/m, 80% AM(1KHz), Performance Criterion A
	EN 61000-4-4	Electrical Fast Transient/Burst - EFT, AC Power Port: 1KV DC Power Port: 0.5KV Signal Ports and Telecommunication Ports: 0.5KV Performance Criterion B
	EN 61000-4-5	Surge Immunity Test: For Power: 1.2/50 μ s Open Circuit Voltage, 8/20 μ s Short Circuit Current, AC Power Port ~ line to line: 1KV, line to earth (ground): 2KV DC Power Port ~ line to earth: 0.5KV Performance Criterion B For Signal Ports and Telecommunication Ports: 10/700 μ s generator: With primary protectors fitted:4KV Without primary protectors:1KV Performance Criterion C
	EN 61000-4-6	Conducted Radio Frequency Disturbances Test –CS: 0.15 ~ 80 MHz, 3Vrms, 80% AM, 1KHz, Performance Criterion A
	EN 61000-4-11	Voltage Dips: AC 50Hz i) >95% reduction for 0.5 period, Performance Criterion B ii) 30% reduction for 25 period, Performance Criterion C Voltage Interruptions: >95% reduction for 250 period Performance Criterion C

4.2.2. GENERAL PERFORMANCE CRITERIA DESCRIPTION

Criteria A:	The apparatus shell continues to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the manufacturer does not specify the minimum performance level or the permissible performance loss, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criteria B:	<p>After test, the apparatus shell continues to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomenon below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance.</p> <p>During the test, degradation of performance is however allowed. However, no change of operating state if stored data is allowed to persist after the test. If the manufacturer does not specify the minimum performance level or the permissible performance loss, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
Criteria C:	<p>Temporary loss of function is allowed, provided the functions is self-recoverable or can be restored by the operation of controls by the user in accordance with the manufacturer instructions.</p> <p>Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>

5. Test Results

5.1. Summary of Test Results

Items	Test List	Standard	Verdict
1	Radiated Emission	EN 55022 (2010)	Pass
2	Conducted Emission	EN 55022 (2010)	Pass
3	Harmonic Current Emissions	EN 61000-3-2 (2006)	NA
4	Voltage Fluctuations and Flicker	EN 61000-3-3 (2008)	NA
5	Electrostatic Discharge	EN 61000-4-2 (2001)	Pass
6	RF Electromagnetic Field	EN 61000-4-3 (2006)	Pass
7	Fast Transients Common Mode	EN 61000-4-4 (2004)	Pass
8	Surge	EN 61000-4-5 (2006)	Pass
9	RF Common Mode	EN 61000-4-6 (2005)	Pass
10	Voltage Dips and Interruptions	EN 61000-4-11 (2004)	Pass

Note: NA means not applicable.

5.2. Statements

The SIM800, supporting GSM850/900/1800/1900 and BT, manufactured by Shenyang Simcom Technology Ltd. is a new product for testing. ECIT only performed test cases which identified with Pass/Fail/Inc result in section 5.1.

ECIT has verified that the compliance of the tested device specified in section 3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.

6. TEST METHODOLOGY

6.1. DECISION OF FINAL TEST MODE

The EUT was tested together with the above additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

The test configuration modes are as the following:

Test Item	Test setup and operating modes
Radiated emission	30MHz-1GHz frequency range: Mode 4 : GSM 900 idle mode + Adapter+ Earphone +antenna Mode 5 :GSM 1800 idle mode +Adapter+ Earphone + antenna Mode 6: idle mode + BT+ Adapter+ Earphone + antenna
	1GHz-6GHz frequency range: Mode 4 : GSM 900 idle mode + Adapter+ Earphone +antenna Mode 5 :GSM 1800 idle mode +Adapter+ Earphone + antenna Mode 6: idle mode + BT+ Adapter+ Earphone + antenna
Conducted emission	Mode 1 : GSM 900 traffic mode + Adapter+ Earphone +antenna Mode 2 :GSM 1800 traffic mode +Adapter+ Earphone + antenna Mode 3: idle mode + BT+ Adapter+ Earphone + antenna
RF electromagnetic field (80MHz to 2700MHz)	Mode 1 : GSM 900 traffic mode + Adapter+ Earphone +antenna Mode 2 :GSM 1800 traffic mode +Adapter+ Earphone + antenna Mode 3: idle mode + BT+ Adapter+ Earphone + antenna
Electrostatic discharge	Mode 1 : GSM 900 traffic mode + Adapter+ Earphone +antenna Mode 2 :GSM 1800 traffic mode +Adapter+ Earphone + antenna Mode 3: idle mode + BT+ Adapter+ Earphone + antenna
Fast transients common mode	Mode 1 : GSM 900 traffic mode + Adapter+ Earphone +antenna Mode 2 :GSM 1800 traffic mode +Adapter+ Earphone + antenna Mode 3: idle mode + BT+ Adapter+ Earphone + antenna
RF Common Mode 0.15MHz-80MHz	Mode 1 : GSM 900 traffic mode + Adapter+ Earphone +antenna Mode 2 :GSM 1800 traffic mode +Adapter+ Earphone + antenna Mode 3: idle mode + BT+ Adapter+ Earphone + antenna
Surges, line to line and line to ground	Mode 1 : GSM 900 traffic mode + Adapter+ Earphone +antenna Mode 2 :GSM 1800 traffic mode +Adapter+ Earphone + antenna Mode 3: idle mode + BT+ Adapter+ Earphone + antenna
Voltage dips and interruptions	Mode 1 : GSM 900 traffic mode + Adapter+ Earphone +antenna Mode 2 :GSM 1800 traffic mode +Adapter+ Earphone + antenna Mode 3: idle mode + BT+ Adapter+ Earphone + antenna
Remark: The 1. The worst case of radiated emission for 30MHz-1GHz is mode 4 and for 1-6GHz is mode 4. 2. The worst case for conducted emission is mode 1.	

7. Test Equipments Utilized

No.	Name	Type	Series Number	Producer	Cal. Due Date
1	Universal Radio Communication Tester	CMU200	123102	R&S	2014-08-30
2	Test Receiver	ESCI	101235	R&S	2014-08-30
3	Test Receiver	ESU40	100307	R&S	2014-10-29
4	Trilog Antenna	VULB9163	19-162515	Schwarzbeck	2014-11-11
5	Double Ridged Guide Antenna	ETS-3117	135885	ETS	2014-04-28
6	2-Line V-Network	ENV216	101380	R&S	2014-10-30
7	Single Phase Harmonic & Flicker	DPA500N	V1126109988	EM Test	2014-10-28
8	Multifunction AC/DC Power Source	Netwave7	V1126109989	EM Test	2014-10-28
9	Ultra Compact Simulator	UCS 500N7	V1126109983	EM Test	2014-07-22
10	Motorized Variac	MV 2616	V1126109987	EM Test	2014-07-22
11	Telecom Surge Module	TSurge7	V0902104582	EM Test	2014-07-22
12	Audio Analyzer	UPV	101950	R&S	2014-08-30
13	Power Meter	NRP2	101804	R&S	2014-08-30
14	Signal Generator	SMB 100A	105563	R&S	2014-08-30
15	ESD Test Simulator	Dito	V1126109982	EM Test	2014-10-31

8. Measurement Results

8.1. Radiated Emission

Method of Measurement

- a. For 30-1000MHz, the EUT was placed on the top of a rotating 0.8-m table above the ground at a semi-anechoic chamber. The distance between the EUT and the received antenna was 3 meters. The table was rotated 360 degree and the received antenna mounted on a variable-height antenna tower was varied from 1m to 4m to find the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the measurement.
- b. For 1000-6000MHz, the EUT was placed on the top of a 1.50m table above the ground at a 3m fully anechoic chamber. The Received antenna was also fixed on the 1.50m height of the tower, 3m away from the EUT. The table was rotated 360 degree to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the measurement.

Limits for Radiated Emission at a measuring distance of 3m

Table 1:

Frequency Range (MHz)	Quasi-Peak (dBuV/m)
30-230	40
230-1000	47

Table 2:

Frequency Range (MHz)	Peak (dBuV/m)	Average (dBuV/m)
1000-3000	70	50
3000-6000	74	54

Table 3:

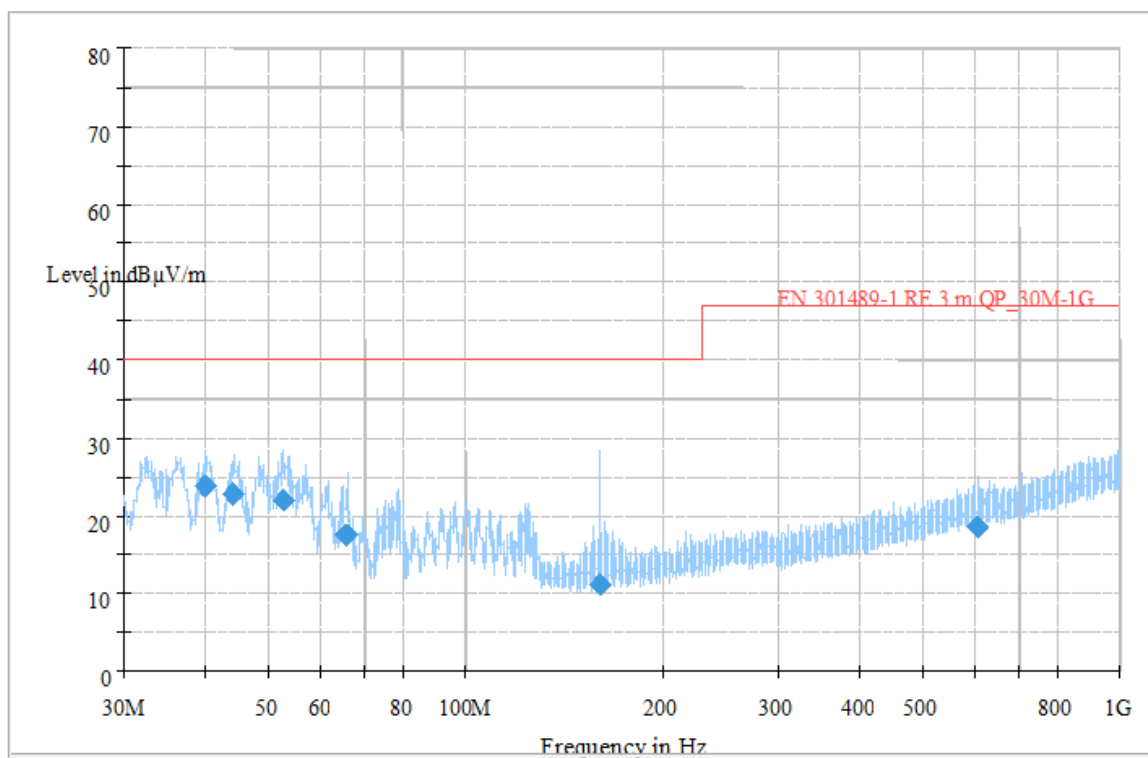
Test conditions

Frequency Range (MHz)	RBW/VBW	Sweep Time (s)
30-1000	120KHz/300KHz	AUTO
1000-6000	1MHz/1MHz	AUTO

Uncertainty Measurement

The measurement uncertainty is 3.92dB (k=1.96).

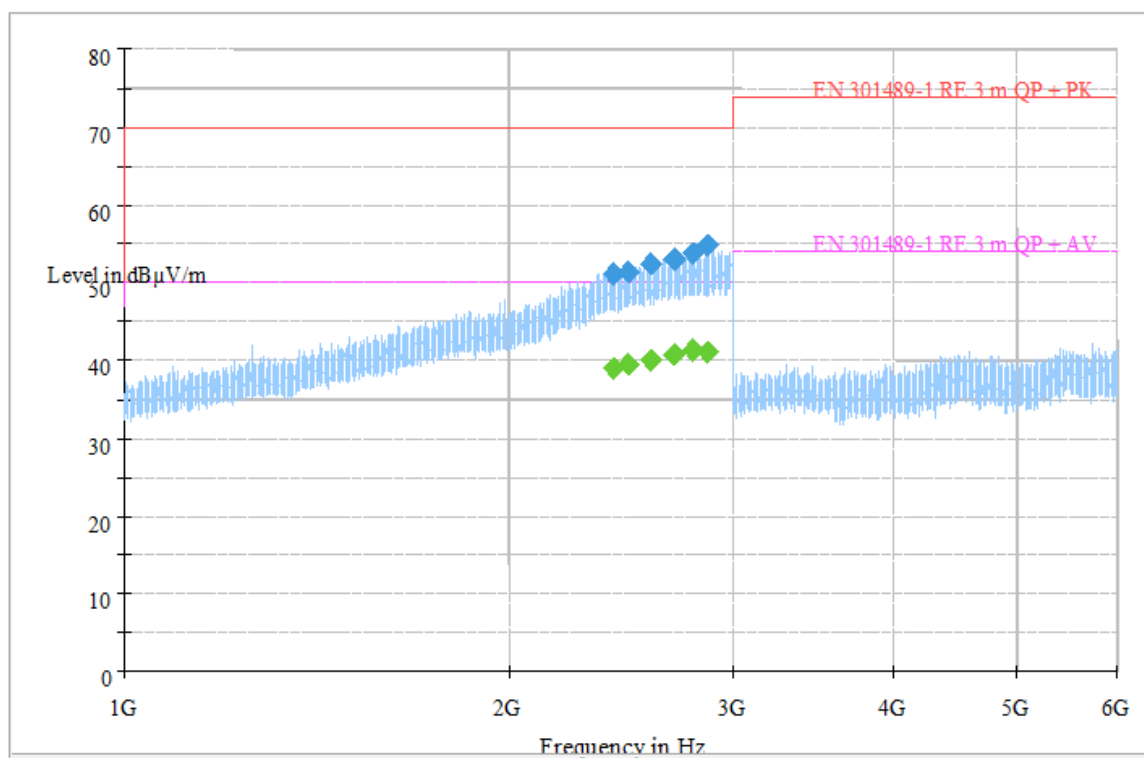
Test Results



Mode 4 (30M-1GHz)

Data Reduction Result 1

Frequency MHz	QP dBuV/m	Mea.Time ms	RBW kHz	Height cm	Polarity	Azimuth deg	Corr. dB	Margin dB	Limit dBuV/m
40.048000	23.7	1000.0	120.000	100.0	V	-9.0	-24.0	16.3	40.0
44.186667	22.9	1000.0	120.000	100.0	V	76.0	-24.0	17.1	40.0
52.656333	22.1	1000.0	120.000	200.0	V	310.0	-24.1	17.9	40.0
65.777667	17.6	1000.0	120.000	100.0	V	237.0	-26.9	22.4	40.0
160.094000	11.0	1000.0	120.000	100.0	V	192.0	-26.6	29.0	40.0
604.879000	18.7	1000.0	120.000	200.0	V	218.0	-12.2	28.3	47.0



Mode 4 (1GHz-6GHz)

Final Result 1

Frequency (MHz)	Pk (dBuV/m)	Meas. Time	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
2419.133333	51.2	100.0	1000.000	155.0	V	-21.0	7.8	18.8	70.0
2479.080000	51.4	100.0	1000.000	155.0	V	-9.0	8.2	18.6	70.0
2583.733333	52.4	100.0	1000.000	155.0	H	266.0	8.9	17.6	70.0
2691.946667	52.9	100.0	1000.000	155.0	V	45.0	9.6	17.1	70.0
2789.693333	53.8	100.0	1000.000	155.0	V	163.0	10.1	16.2	70.0
2868.826667	54.9	100.0	1000.000	155.0	V	225.0	10.4	15.1	70.0

Final Result 2

Frequency (MHz)	Average (dBuV/m)	Meas. Time	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
2419.173333	39.1	100.0	1000.000	155.0	V	14.0	7.8	10.9	50.0
2480.760000	39.3	100.0	1000.000	155.0	V	16.0	8.2	10.7	50.0
2585.453333	40.1	100.0	1000.000	155.0	H	253.0	8.9	9.9	50.0
2691.866667	40.8	100.0	1000.000	155.0	V	45.0	9.6	9.2	50.0
2790.293333	41.2	100.0	1000.000	155.0	V	140.0	10.1	8.8	50.0
2868.506667	41.1	100.0	1000.000	155.0	V	297.0	10.4	8.9	50.0

8.2. Conducted Emission

Method of Measurement

The EUT was placed on a 0.8m height table with EUT being connected to the power mains through a line impedance stabilization network (LISN). Both lines of the power mains connected to the EUT were checked for maximum conducted interference. The frequency range from 150 KHz to 30 MHz was searched.

Limit of Conducted Emission

Frequency Range (MHz)	Conducted Limit (dBuV)	
	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

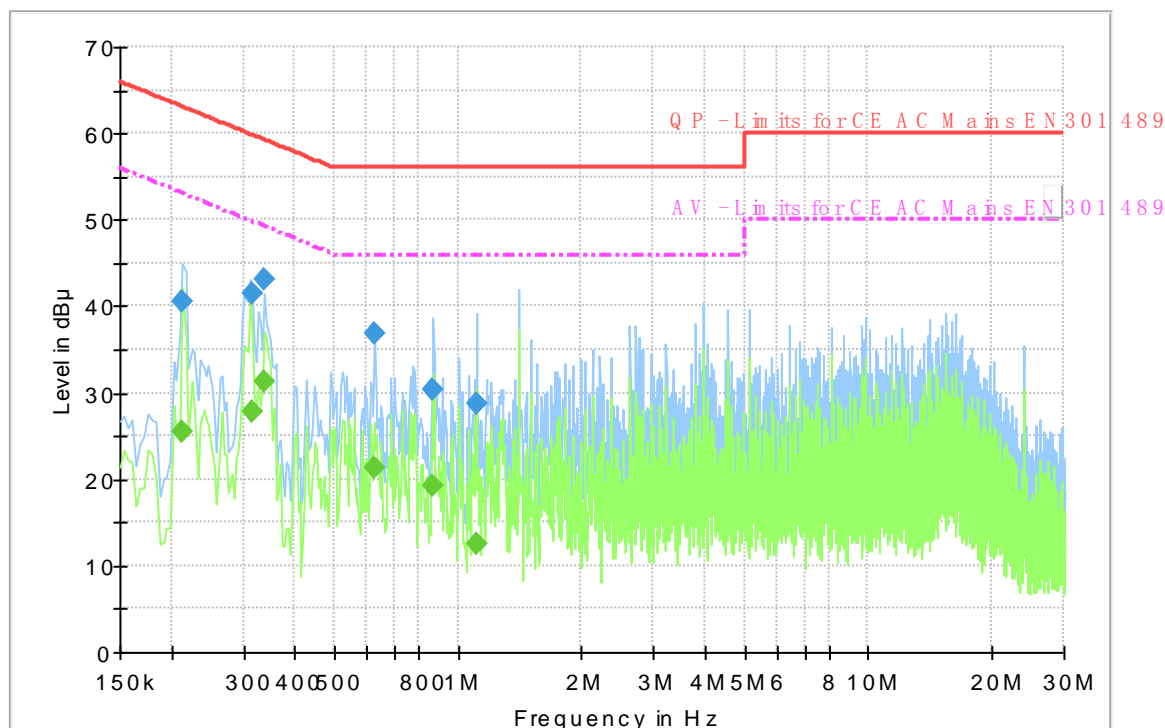
Test Condition in Charging Mode

Voltage (V)	Frequency (Hz)	RBW	Sweep Time (s)
230	50	9 KHz	AUTO

Uncertainty Measurement

The measurement uncertainty is 2.69dB (k=1.96).

Test Results



Mode 1 (150K-30M)

Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.213431	40.5	1000.0	9.000	On	L1	10.0	22.6	63.1
0.314175	41.5	1000.0	9.000	On	L1	10.1	18.3	59.9
0.336562	43.2	1000.0	9.000	On	L1	10.1	16.1	59.3
0.627600	36.8	1000.0	9.000	On	L1	10.1	19.2	56.0
0.870131	30.3	1000.0	9.000	On	L1	10.0	25.7	56.0
1.112662	28.8	1000.0	9.000	On	N	9.9	27.2	56.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.213431	25.6	1000.0	9.000	On	L1	10.0	27.5	53.1
0.314175	27.8	1000.0	9.000	On	L1	10.1	22.1	49.9
0.336562	31.4	1000.0	9.000	On	L1	10.1	17.9	49.3
0.627600	21.3	1000.0	9.000	On	L1	10.1	24.7	46.0
0.870131	19.4	1000.0	9.000	On	L1	10.0	26.6	46.0
1.112662	12.5	1000.0	9.000	On	N	9.9	33.5	46.0

Note: L1 and N line is all have been tested ,the result of them is synthesized in the above data diagram.

8.3. Harmonic Current Emissions

Since the EUT's power supply is less than 75W, the test item is not applicable.

8.4. Voltage Fluctuations and Flicker

Since the EUT is unlikely to produce significant voltage fluctuations or flicker, the test item is not applicable.

8.5. Electrostatic Discharge
Test Specification

Discharge Impedance:	330 ohm / 150pF
Discharge Voltage:	Air discharge (± 8 KV) Contact discharge (± 4 KV)
Polarity:	Positive & Negative
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

Method of Measurement

The discharges shall be applied in two ways:

- Contact discharges to the conductive surfaces and coupling planes

A method of testing, in which the electrode of the test generator is held in contact with the EUT, and

the discharge actuated by the discharge switch within the generator. Test shall be performed at a maximum repetition rate of one discharge per second.

b. Air discharges at slots and apertures and insulating surfaces

On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

Performance Criteria:

EN 301 489-7 v1.3.1 (2005-11)

Clause 6.2 Performance criteria for Transient phenomena applied to Transmitters (TT)

Clause 6.4 Performance criteria for Transient phenomena applied to Receivers (TR)

A communications link shall be established at the start of the test.

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.

In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

Test Points

1. HCP	2. VCP
--------	--------

Test Results

Test Points	Test Level (KV)	Contact or Air	Application Quantity	Result
1	+/-4	Contact	30	Pass
2	+/-4	Contact	30	Pass

8.6. RF Electromagnetic Field

Test Specification

Frequency Range:	80MHz-1GHz ,1.4GHz-2.7GHz
Field Strength:	3V/m
Modulation:	1KHz Sine Wave, 80%, AM Modulation
Frequency Step:	1% of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3m
Antenna Height:	1.50m
Dwell Time:	At least 0.5s

Method of Measurement(For Phone function)

- The test procedure was in accordance with EN 61000-4-3.
- A communication link should be established and the testing was performed in a full-anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- The frequency range is swept from 80MHz to 1000MHz, 1400MHz to 2700MHz, with the signal 80% amplitude modulated with a 1 KHz sine wave. The frequency range is swept incrementally, and the step size was 1% of fundamental. The field strength level was 3V/m.
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- The EUT was exposed to both vertically and horizontally polarized fields on each of the four sides.

Performance Criteria:

EN 301 489-7 v1.3.1(2005-11)

Clause 6.1 Performance criteria for Continuous phenomena applied to Transmitters (CT)

Clause 6.3 Performance criteria for Continuous phenomena applied to Receivers (CR)

A communication link shall be established at the start of the test, and maintained during the test.

During the test, the uplink and downlink speech output level and downlink speech out put level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

NOTE: When there is a high level background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz.

Test Specification(For ITE function)

The test procedure was in accordance with EN 61000-4-3

a) The testing was performed in a fully anechoic chamber. 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.

b) All the scanning conditions are as follows:

Condition of Test	Remarks
1. Field Strength	3 V/m Level 2
2. Radiated Signal	AM80% Modulated with 1kHz
3. Scanning Frequency	80MHz - 1000MHz
4 Dwell Time	3 Seconds
5. Frequency step size Δf :	1%

c) The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

d) The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

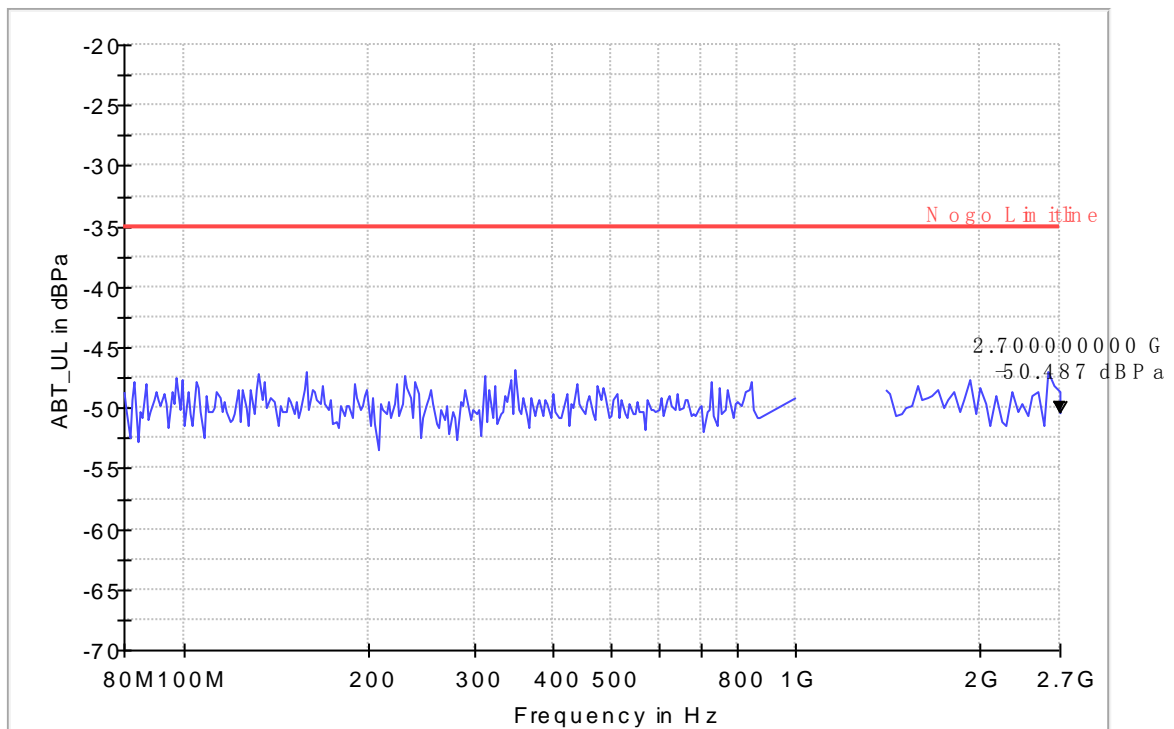
e) In order to judge the EUT performance, a CCD camera is used to monitor EUT screen.

Test Conditions

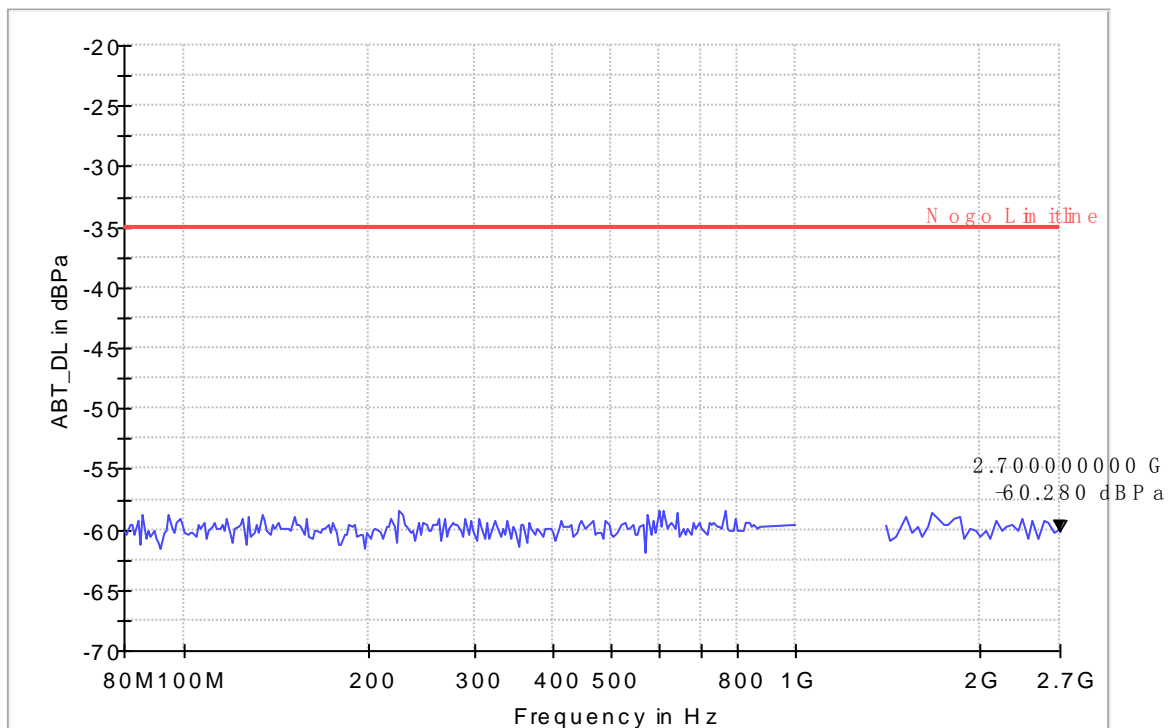
Frequency (MHz)	EUT state	Polarity	Field Strength (V/m)	Result	Comments
80M-1GHz, 1.4-2.7GHz	Front side	H/V	3	Pass	None
80M-1GHz, 1.4-2.7GHz	Back side	H/V	3	Pass	None
80M-1GHz, 1.4-2.7GHz	Left side	H/V	3	Pass	None
80M-1GHz, 1.4-2.7GHz	Right side	H/V	3	Pass	None

Test Results

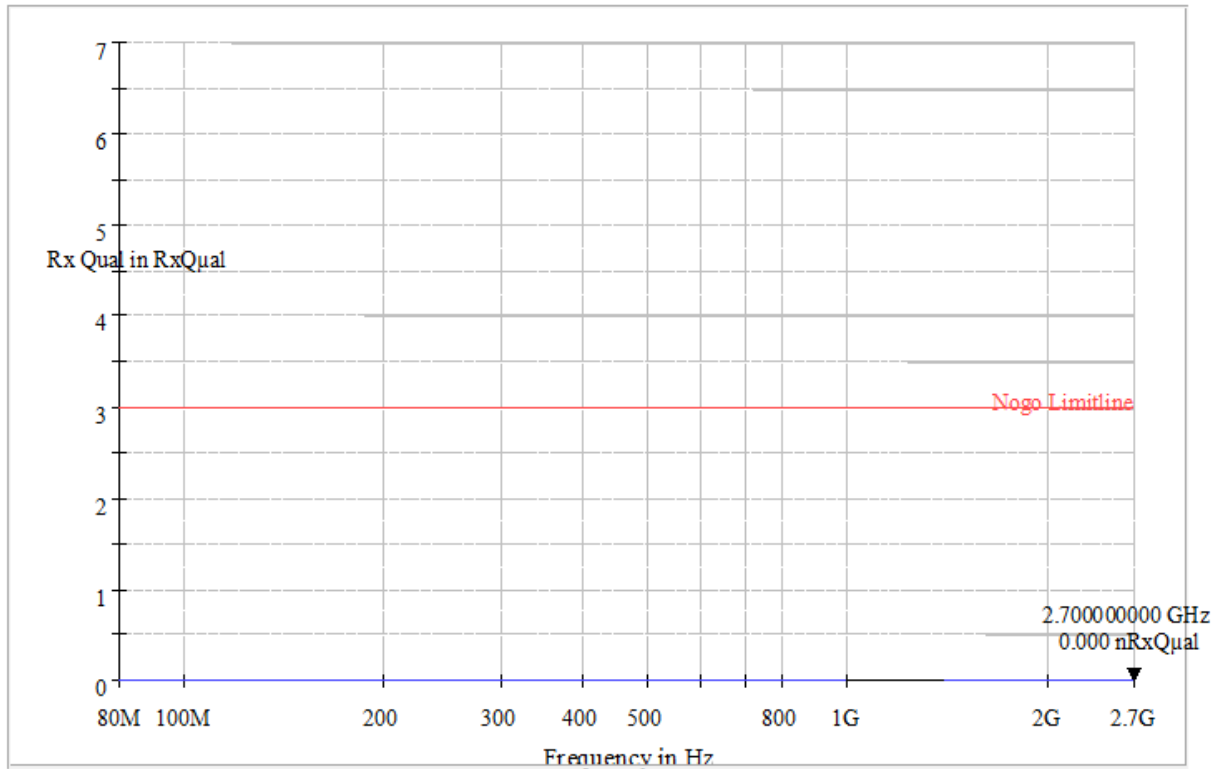
The worst case for RF electromagnetic field (80M-1G, 1.4-2.7G) is mode 1 , and only the test data of this mode was reported.



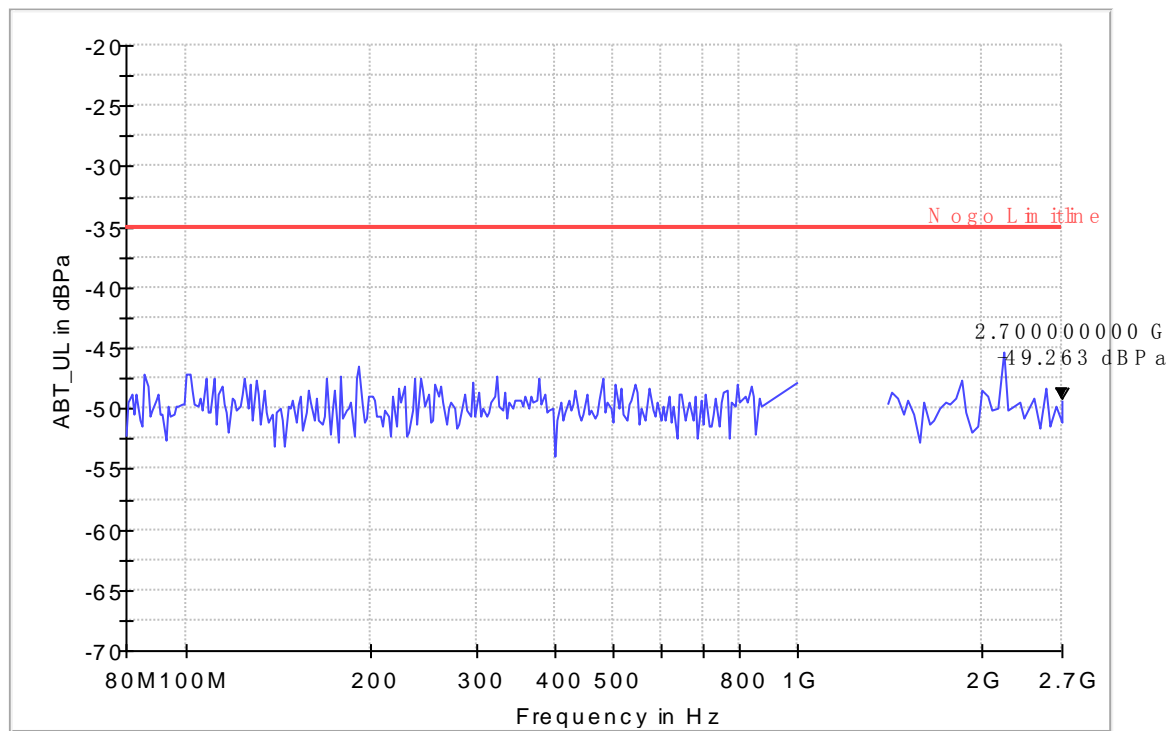
ABT_Uplink in dBPa (80M-1G, 1.4-2.7G, Horizontal)



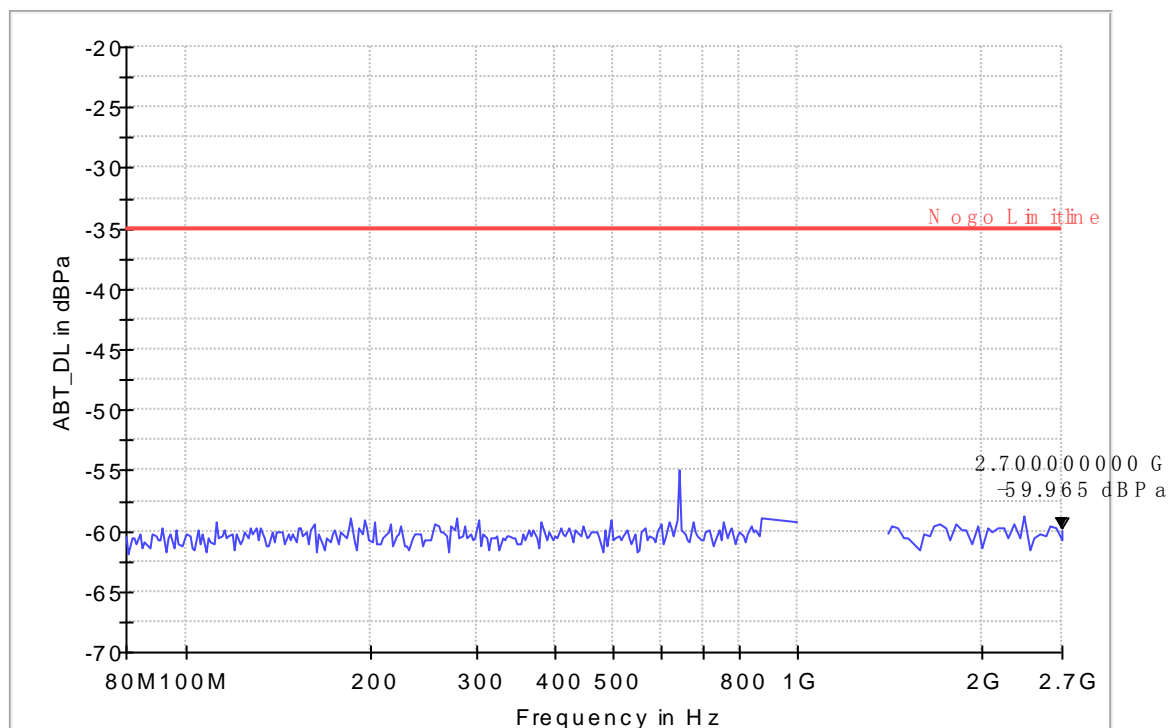
ABT_Downlink in dBPa (80M-1G, 1.4-2.7G, Horizontal)



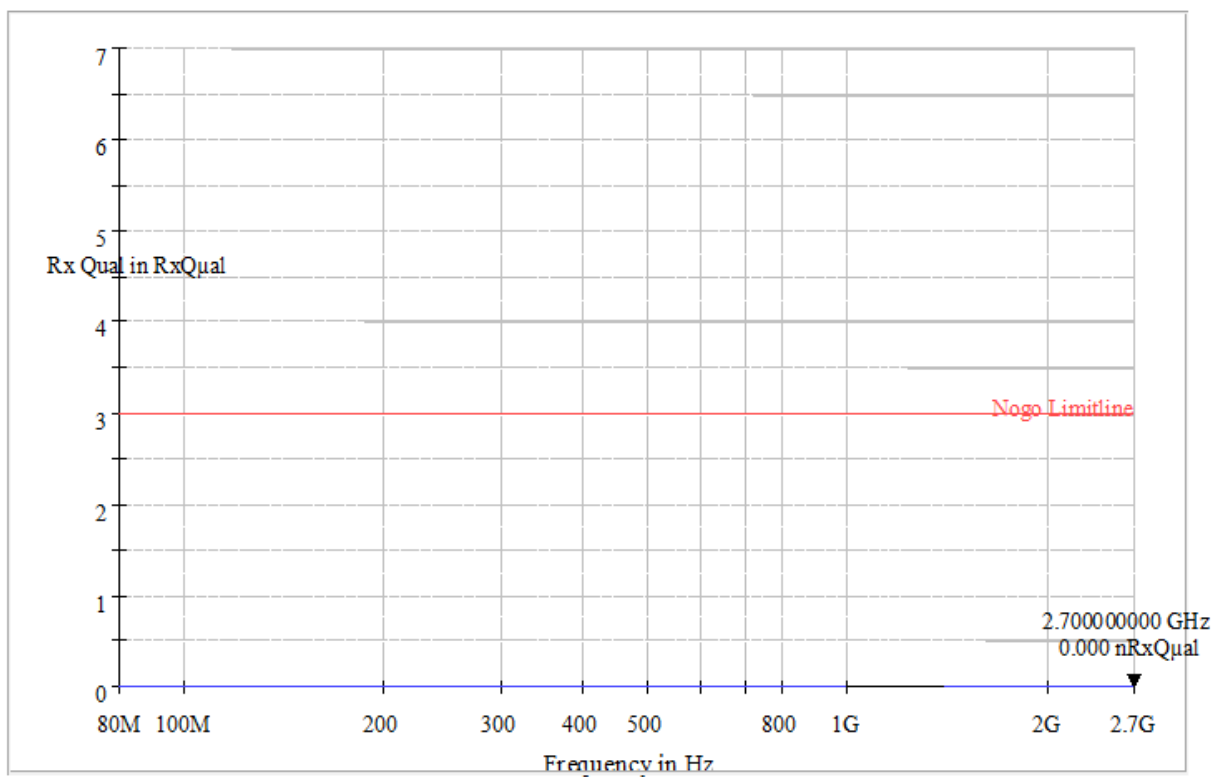
RX Quality (80M-1G, 1.4-2.7G, Horizontal)



ABT_Uplink in dBPa (80M-1G, 1.4-2.7G, Vertical)



ABT_Downlink in dBPa (80M-1G, 1.4-2.7G, Vertical)



RX Quality (80M-1G, 1.4-2.7G, Vertical)

8.7. Fast Transients Common Mode**Test Specification**

Test Voltage:	±1 KV
Polarity:	Positive& Negative
Impulse Frequency:	5 KHz
Impulse Wave shape:	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	Not less than 1 min

Method of Measurement

The EUT was tested with 1 KV discharges to the power input ports.

- The EUT was 0.1 meters from the ground plane.
- Both positive and negative polarity discharges were applied.
- The length of the power cable from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1 meter.
- The duration time of each test sequential was 1 minute.

Performance Criteria:

EN 301 489-7 v1.3.1 (2005-11)

Clause 6.2 Performance criteria for Transient phenomena applied to Transmitters (TT)

Clause 6.4 Performance criteria for Transient phenomena applied to Receivers (TR)

A communications link shall be established at the start of the test.

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.

In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

Test Results

Test Point	Polarity	Test level (KV)	Result
L1	+/-	1	Pass
L2	+/-	1	Pass
L1-L2	+/-	1	Pass

8.8. Surge

Test Specification

Wave-Shape	Combination Wave 1.2/50 us Open Circuit Voltage 8/20us Short Circuit Current
Test Voltage:	Power Line: L1-L2 1KV
Surge Input/Output:	L1-L2
Generator Source Impedance	2 ohm between networks
Polarity:	Positive/Negative
Phase Angle:	0°/90°/180°/270
Pulse Repetition Rate:	1 time/min(maximum)
Number of Tests:	5 positive and 5 negative at selected points

Method of Measurement

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter)

Performance Criteria:

EN 301 489-7 v1.3.1 (2005-11)

Clause 6.2 Performance criteria for Transient phenomena applied to Transmitters (TT)

Clause 6.4 Performance criteria for Transient phenomena applied to Receivers (TR)

A communications link shall be established at the start of the test.

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.

At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.

In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

Test Results

Voltage (KV)	Test Points	Result	Comments
+/- 1 KV	L1 – L2	Pass	None

8.9. RF Common Mode**Test Specification**

Frequency Range:	150 KHz-80 MHz
Field Strength:	3 V
Modulation:	1 KHz Sine Wave, 80%, AM Modulation
Frequency Step:	1% of fundamental
Coupled Cable:	Power mains and unshielded
Coupling Device:	CDN

Method of Measurement

- The EUT was 10cm above the ground plane. The coupling and the de-coupling devices should be placed on the ground plane and 30cm from the power and signal mains. All excess of the EUT cables were folded into the non-inductive form and placed above the ground plane for 30cm.
- The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50 ohm load resistor.
- The frequency range is swept from 0.15 MHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80% amplitude. The signal is modulated with a 1 KHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value where the frequency is swept incrementally.
- The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequency and harmonics or frequencies of dominant interest, shall be analyzed separately.
- Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

Performance Criteria:

EN 301 489-7 v1.3.1(2005-11)

Clause 6.1 Performance criteria for Continuous phenomena applied to Transmitters (CT)

Clause 6.3 Performance criteria for Continuous phenomena applied to Receivers (CR)

A communication link shall be established at the start of the test, and maintained during the test.

During the test, the uplink and downlink speech output level and downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centered on 1 kHz (audio breakthrough check).

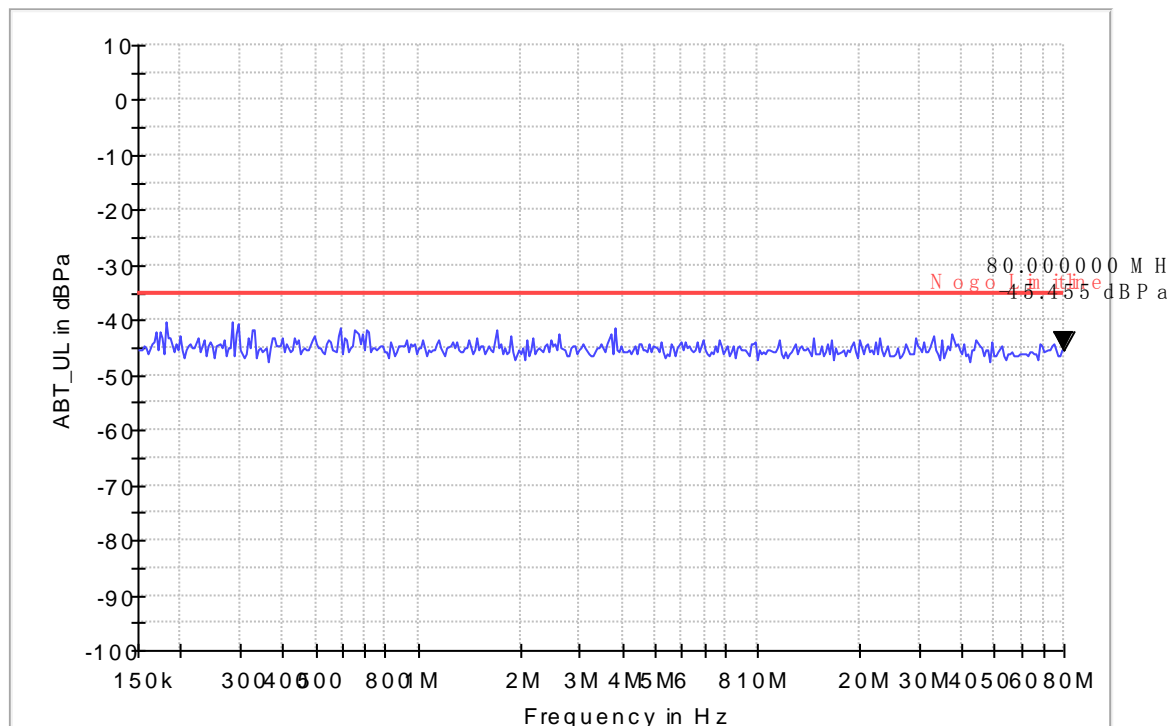
NOTE: When there is a high level background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz.

Test Conditions

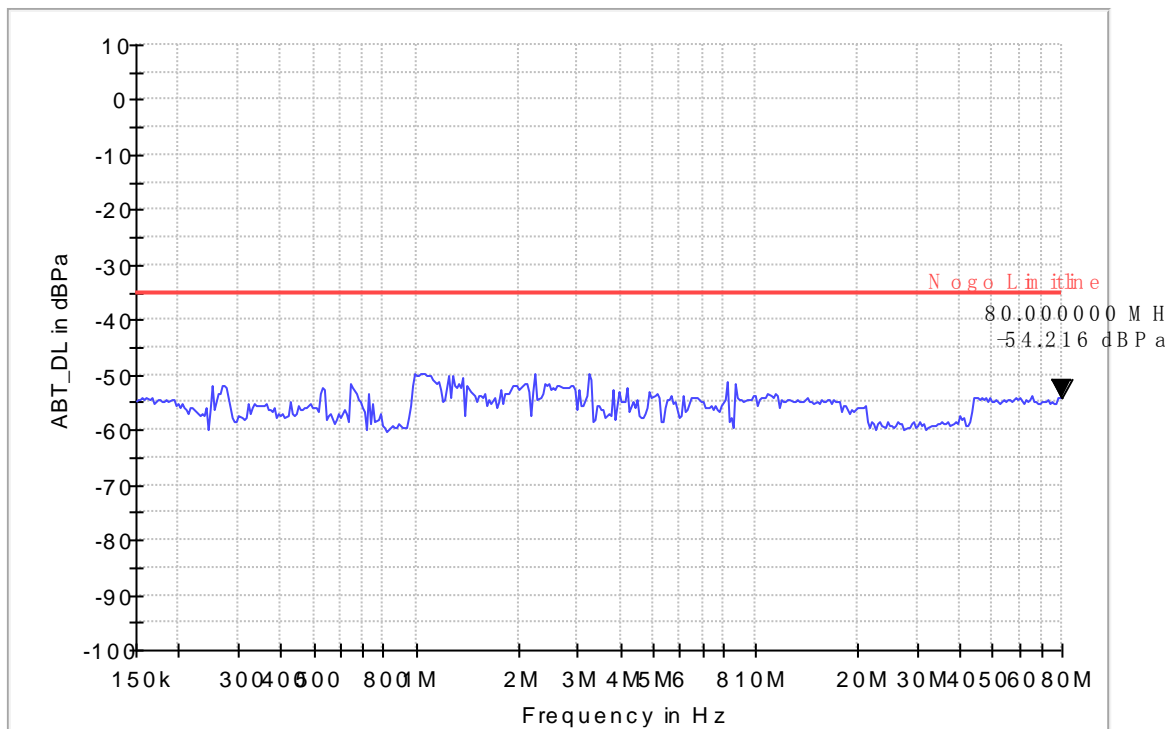
Frequency (MHz)	Field Strength (V/m)	Result
0.15-80	3	Pass

Test Results

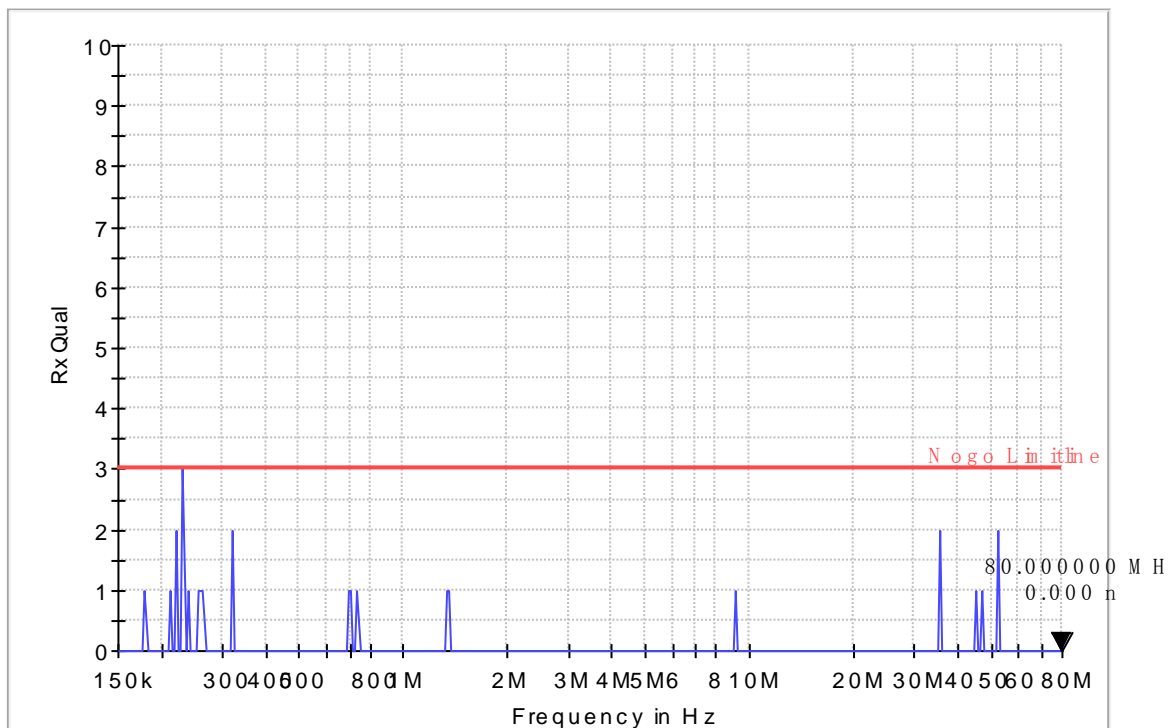
The worst case for RF common mode (150K-80M) is mode 1 , and only the test data of this mode was reported.



ABT_Uplink in dBPa



ABT_Downlink in dBPa



RX Quality

8.10. Voltage Dips and Interruptions

Test Specification

Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum 10 seconds
Phase Angle:	0°/45°/90°/135°/180°/225°/270°/315°

Method of Measurement

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

Performance Criteria:

For voltage dips, TT and CR performance criteria are used.

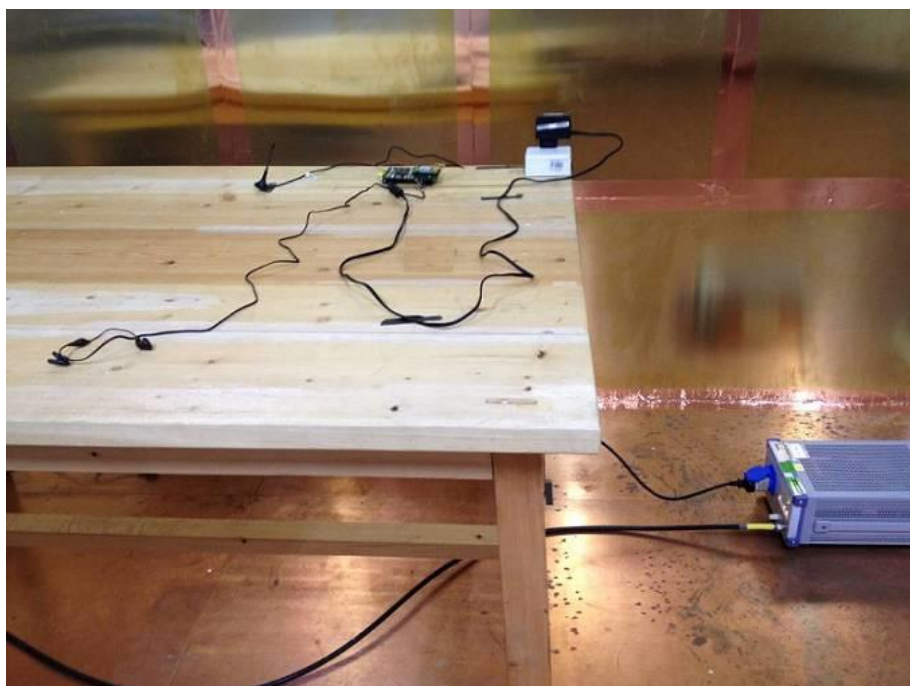
For voltage interruption, TT and TR performance criteria are used.

Test Results

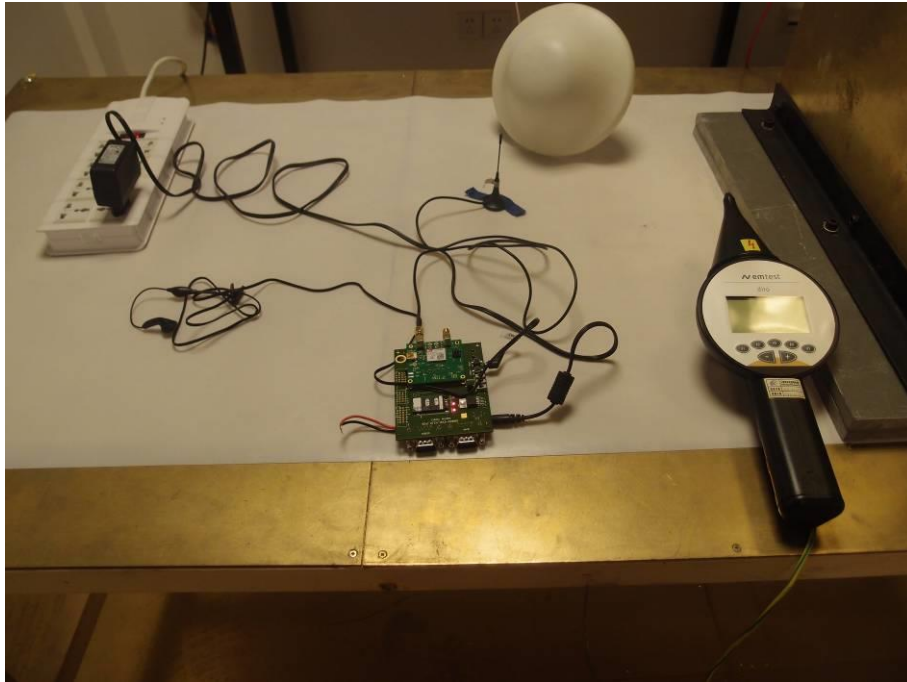
Voltage % Reduction	Periods (Cycle)	Result	Comments
0	0.5	Pass	None
0	1	Pass	None
70	25	Pass	None
0	250	Pass	None

Annex A Test Configuration Photos

Picture 1: Photo of RE test



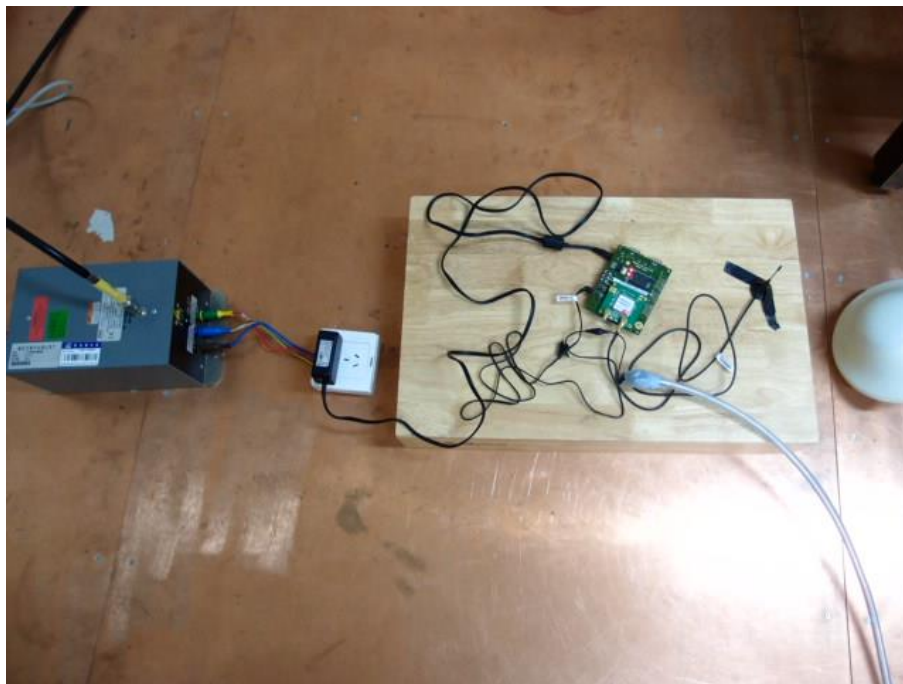
Picture 2: Photo of CE test



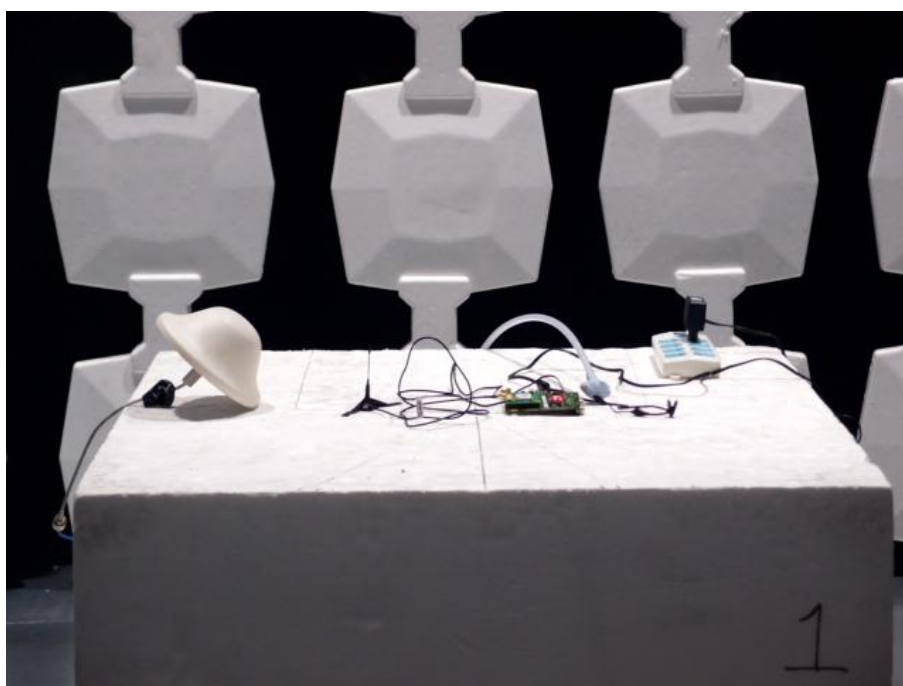
Picture 3: Photo of ESD test



Picture 4: Photo of EFT, Surge and AC-dip test

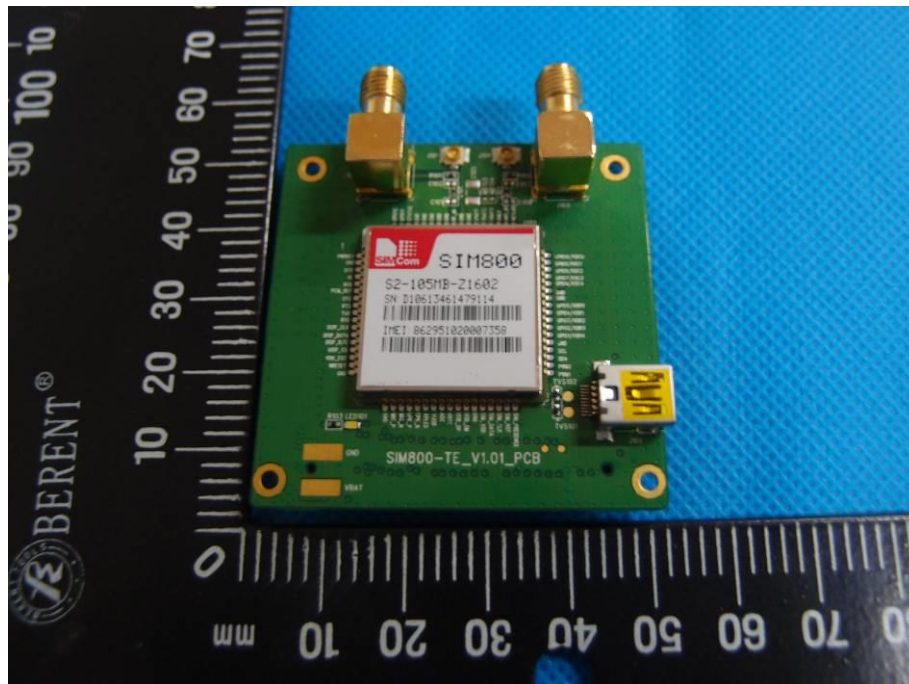


Picture 5: Photo of CS test

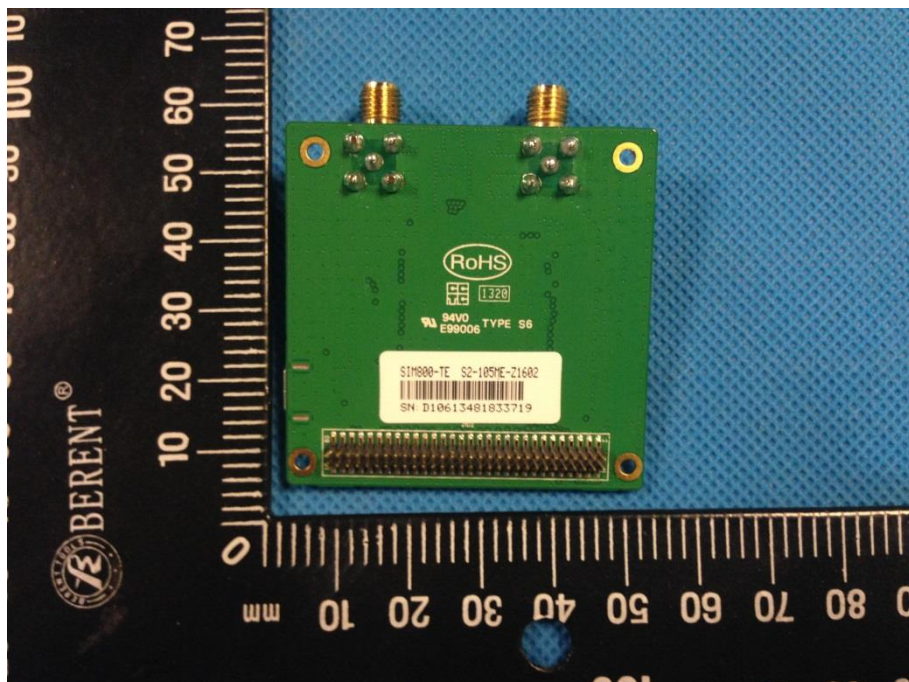


Picture 6: Photo of RS test

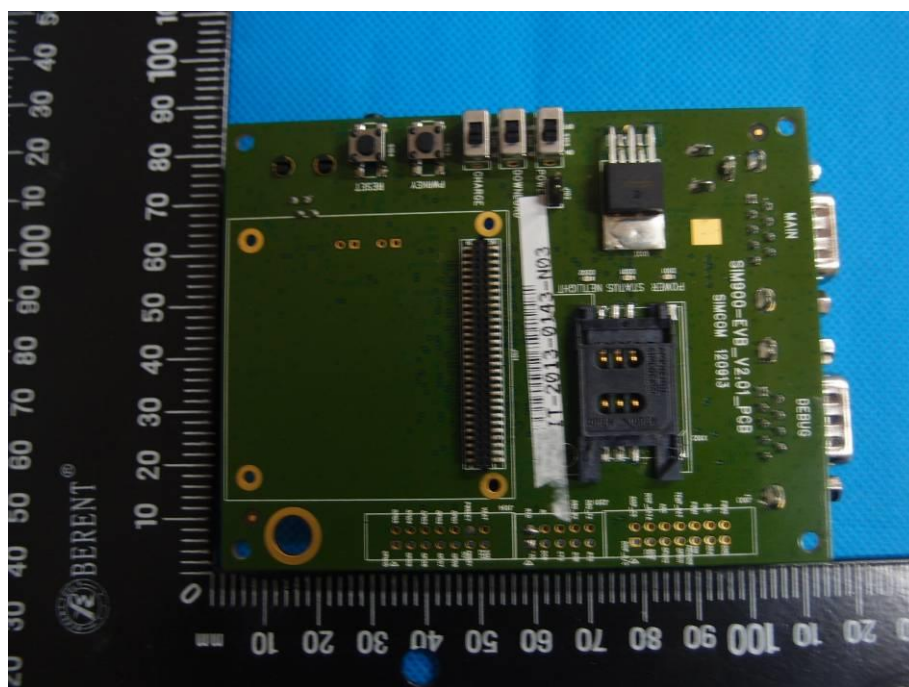
Annex B EUT Photos



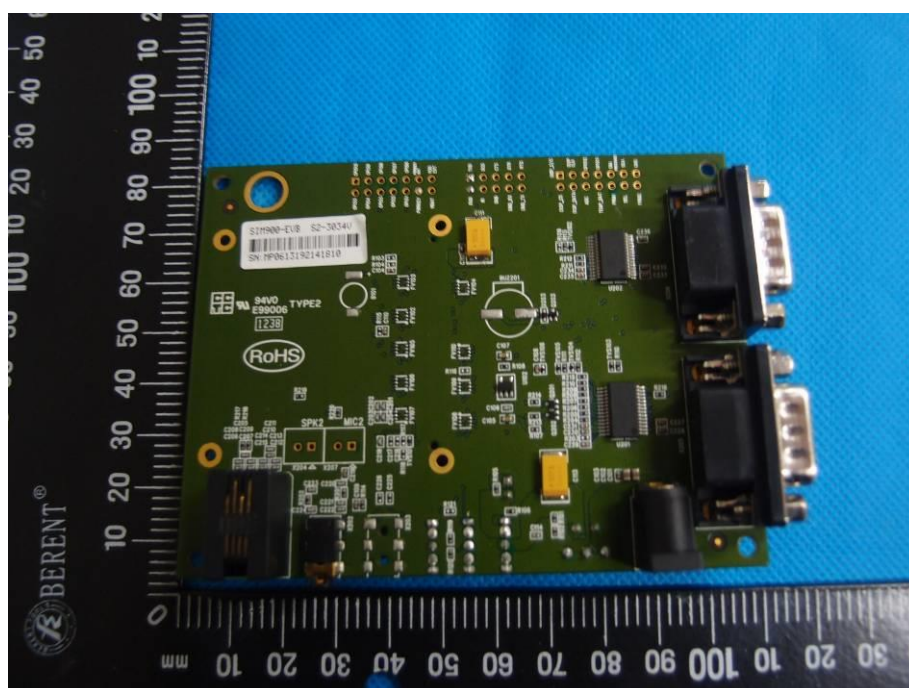
Picture 7: Front of the EUT



Picture 8: Back of the EUT



Picture 9: Front of the AE main board



Picture 10: Back of the AE main board



Picture 11: Photo of the adapter



Picture 12: Photo of the nameplate



Picture 13:Photo of earphone



Picture 14:Photo of antenna

*****End the Report*****