TEST REPORT

No. I15D00070-EMC

For

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

Production: **GSM/GPRS+GPS Module**

Model Name: **SIM808**

Hardware Version: **V2.01**

Software Version: **SIM800 R14.18**

Issued date: **2015-06-26**

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

Revision Version

Report Number	Revision	Date	Memo
I15D00070-EMC	00	2015-06-26	Initial creation of test report

CONTENTS

1. Test 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

NormalTemperature:	15-35℃
Relative Humidity:	30-60%

1.3. Project data

Project Leader:	Chen Kan
Testing Start Date:	2015-06-01
Testing End Date:	2015-06-26

1.4. Signature

You Jinjun
(Prepared this test report)

Yu Naiping
(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:	86-021-32523300
Postcode:	200335

2.2. Manufacturer Information

Company Name:	Shenyang Simcom Technology Ltd.
Address:	No.37, Shenbei Rd, Shenbei New Aear, Shenyang,P.R.China
Telephone:	86-024-88922222
Postcode:	N/A

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

3.1. About EUT

ProductName	GSM/GPRS+GPS Module
Model name	SIM808
GSM Frequency Band	GSM900/GSM1800/GSM850/GSM1900
Additional Communication Function	GPS/2G AGPS

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	865067020388784	V2.01	SIM800 R14.18	2015-05-25

*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	GPS Antenna	/	/
AE2	Earphone	/	/
AE3	USB cable	/	/
AE4	Notebook	ThinkPad Edge E430	/

*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 301489-3	Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz	V1.6.1(2013-08)
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)
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

4.2.1GENERAL 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 PowerPort: 1KV DC PowerPort: 0.5KV SignalPorts and TelecommunicationPorts: 0.5KV Performance Criterion B
	EN 61000-4-5	Surge Immunity Test: For Power: 1.2/50 μs Open Circuit Voltage, 8/20 μs 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 SignalPorts and TelecommunicationPorts: 10/700μs 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:	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. 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.
Criteria C:	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. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

5. Test Results

5.1. Summary of Test Results

Note: NA means not applicable.

Items	Test List	Standard	Verdict
1	Radiated Emission	EN55022 (2010)	Pass
2	Conducted Emission	EN55022 (2010)	NA
3	Harmonic Current Emissions	EN61000-3-2 (2006+A1:2009+A2:2009)	NA
4	Voltage Fluctuations and Flicker	EN61000-3-3 (2008)	NA
5	Electrostatic Discharge	EN 61000-4-2(2009)	Pass
6	RF Electromagnetic Field	EN 61000-4-3 (2006+A1:2008+A2:2010)	Pass
7	Fast Transients Common Mode	EN 61000-4-4 (2004+A1:2010)	NA
8	Surge	EN 61000-4-5 (2006)	NA
9	RF Common Mode	EN 61000-4-6 (2009)	NA
10	Voltage Dips and Interruptions	EN 61000-4-11 (2004)	NA

5.2. Statements

The SIM808, supporting GSM 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-6GHz frequency range: Mode 3: GSM900 idle mode + GPRS +GPS Mode 4: GSM1800 idle mode + GPRS +GPS
RF electromagnetic field (80MHz to 2700MHz)	Mode 1: GSM900 traffic mode + GPRS +GPS Mode 2: GSM1800 traffic mode+ GPRS+GPS
Electrostatic discharge	Mode 1: GSM900 traffic mode + GPRS +GPS Mode 2: GSM1800 traffic mode+ GPRS+GPS Mode 3: GSM900 idle mode + GPRS +GPS Mode 4: GSM1800 idle mode + GPRS +GPS
Remark: The worst case of radiated emission for 30MHz-1GHz is mode 4 and for 1-6GHz is mode 3	

6.2. EUT System Operation

1. Connect the EUT with AE4.
2. Setup the EUT according to the standard,connect the EUT with Universal Radio Communication.
3. Start testing and monitoring the function.

7. Test Equipments Utilized

No.	Name	Type	Series Number	Producer	Cal.Date	Cal.interval
1	Universal Radio Communication	CMU200	123102	R&S	2014-07-07	1
2	Test Receiver	ESCI	101235	R&S	2014-07-06	1
3	Test Receiver	ESU40	100307	R&S	2014-07-25	1
4	Trilog Antenna	VULB9163	VULB9163-515	Schwarzbeck	2014-11-05	3
5	Double Ridged Guide	ETS-3117	00135885	ETS	2014-05-06	3
6	2-Line V-Network	ENV216	101380	R&S	2014-07-25	1
7	Single Phase Harmonic	DPA500N	V1126109988	EM Test	2014-07-25	1
8	Multifunction AC/DC Power	Netwave7	V1126109989	EM Test	2014-07-25	1
9	Ultra Compact Simulator	UCS 500N7	V1126109983	EM Test	2014-07-22	1
10	Motorized Variac	MV 2616	V1126109987	EM Test	2014-07-22	1
11	Telecom Surge Module	TSurge7	V0902104582	EM Test	2014-07-22	1
12	Audio Analyzer	UPV	101950	R&S	2014-07-07	1
13	Power Meter	NRP2	101804	R&S	2014-07-07	1
14	Signal Generator	SMB 100A	105563	R&S	2014-07-07	1
15	Power Amplifier	BLWA 0810-160/100D	118564A	R&S	N.C.R	NA
16	Power Amplifier	BLWA 1060-100/50D	118564B	R&S	N.C.R	NA
17	Power Sensor	NRP-Z51	102840	R&S	2014.07.07	1
18	Power Sensor	NRP-Z51	102841	R&S	2014.07.07	1
19	ESD Test Simulator	Dito	V1126109982	EM Test	2014-07-28	1
20	Signal Generator	SMB 100A	105562	R&S	2014-07-07	1

21	Power Meter	NRP2	101805	R&S	2014-07-07	1
22	Power Amplifier	BBA100	100994	R&S	N.C.R	NA
23	Power Sensor	NRP-Z91	101503	R&S	2014.07.07	1
24	Power Sensor	NRP-Z91	101504	R&S	2014.07.07	1
25	CDN	FCC-801-M2/M 3-16A	111779	FCC FISCHER	2014-07-25	1
26	EMI Test Software	EMC32 V9.15	NA	R&S	NA	NA
27	EFT/SURGE/DI P Test Software	iec . control V5.1.7.0	NA	EM TEST	NA	NA
28	Universal Radio Communication	CMW500	144668	R&S	2015-01-21	1

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 andthe 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 (dBμV/m)
30-230	40
230-1000	47

Table 2:

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

Table 3:

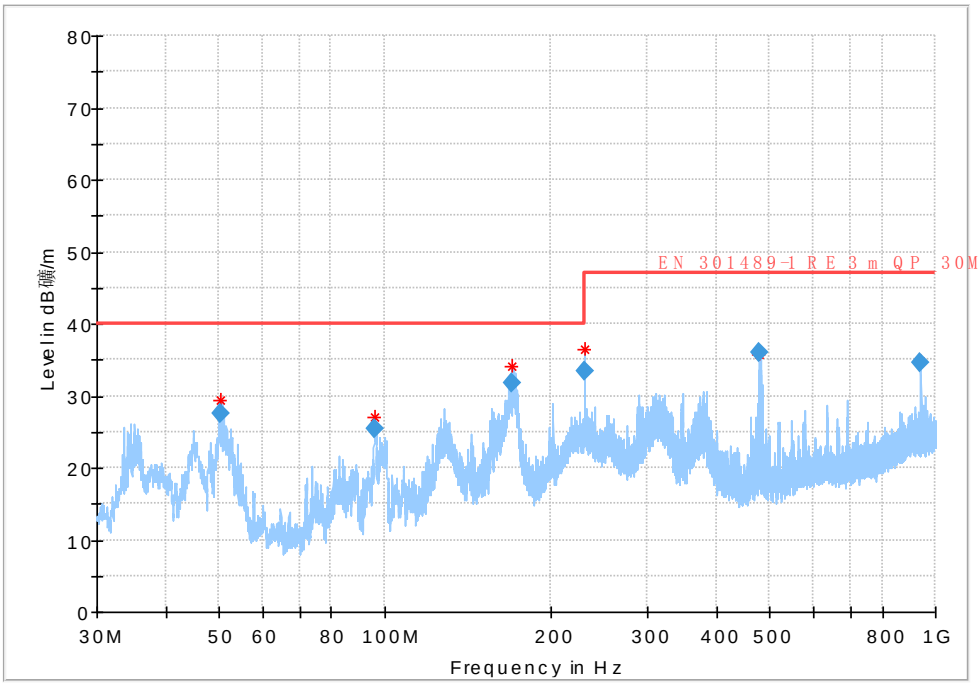
Test conditions

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

Uncertainty Measurement

The measurement uncertainty is 5.59dB (k=2).

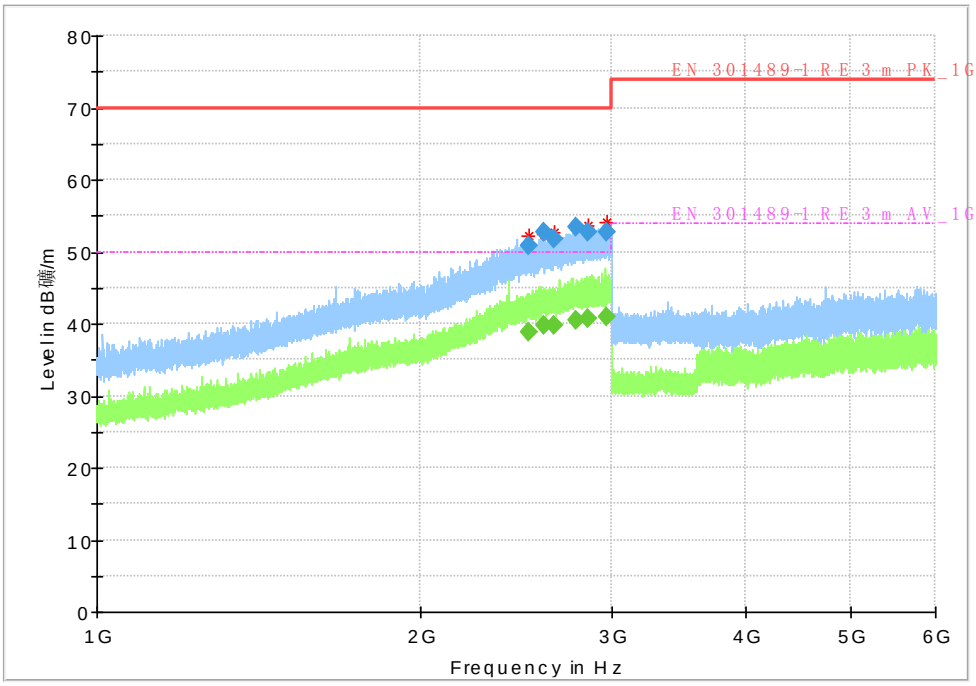
Test Results



Mode 4 (30M-1GHz)

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV /m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
50.491667	27.43	40.00	12.57	1000.0	120.000	100.0	V	106.0	-25.1
96.097000	25.43	40.00	14.57	1000.0	120.000	100.0	V	43.0	-24.7
170.497667	31.69	40.00	8.31	1000.0	120.000	200.0	H	0.0	-26.1
231.299667	33.48	47.00	13.52	1000.0	120.000	200.0	H	203.0	-23.2
480.015333	35.92	47.00	11.08	1000.0	120.000	100.0	V	156.0	-15.5
941.436667	34.51	47.00	12.49	1000.0	120.000	100.0	V	202.0	-7.7



Mode 3 (1GHz-6GHz)

Final Result 1

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2519.133333	50.87	---	70.00	19.13	100.0	1000.000	155.0	H	50.87	---
2519.133333	---	38.87	50.00	11.13	100.0	1000.000	155.0	H	---	38.87
2599.093333	52.61	---	70.00	17.39	100.0	1000.000	155.0	H	52.61	---
2599.093333	---	39.66	50.00	10.34	100.0	1000.000	155.0	H	---	39.66
2654.186667	51.78	---	70.00	18.22	100.0	1000.000	155.0	V	51.78	---
2654.186667	---	39.66	50.00	10.34	100.0	1000.000	155.0	V	---	39.66
2787.026667	---	40.56	50.00	9.44	100.0	1000.000	155.0	H	---	40.56
2787.026667	53.49	---	70.00	16.51	100.0	1000.000	155.0	H	53.49	---
2854.520000	---	40.69	50.00	9.31	100.0	1000.000	155.0	H	---	40.69
2854.520000	52.82	---	70.00	17.18	100.0	1000.000	155.0	H	52.82	---
2975.533333	52.75	---	70.00	17.25	100.0	1000.000	155.0	H	52.75	---
2975.533333	---	40.89	50.00	9.11	100.0	1000.000	155.0	H	---	40.89

8.2. Electrostatic Discharge

Test Specification

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

Reference standard:

EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-3 V1.6.1 (2013-08)
EN 301 489-7 V1.3.1(2005-11)
EN 55024:(2010)

Method of Measurement

The discharges shall be applied in two ways:

a. 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:

Performance criteria for Transient phenomena applied to Transmitters (TT)
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(indirect discharge)	100	Pass
2	±4	Contact(indirect discharge)	100	Pass

8.3. 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：	0.5s

Reference standard:

EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-3 V1.6.1 (2013-08)
EN 301 489-7 V1.3.1(2005-11)
EN 55024:(2010)

Method of Measurement(For Phone function)

a. The test procedure was in accordance with EN 61000-4-3.
b. 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.
c. 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.
d. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
e. The EUT was exposed to both vertically and horizontally polarized fields on each of the four sides.

Performance Criteria:

Performance criteria for Continuous phenomena applied to Transmitters (CT)
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). The RXQUAL of the downlink is not exceeding the value of three, measured during each individual exposure in the test sequence.
NOTE: When there is a high level background noise present the filter bandwidth can be reduced down to a minimum of 40 Hz.
During the test, the maximum Bit Error Ratio was less than 1×10^{-3} measured during each individual exposure in the test sequence.
At the conclusion of the EUT shall operate as intended with no loss of user control functions or stored data, 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 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
2. Radiated Signal	AM80% Modulated with 1kHz
3. Scanning Frequency	80MHz - 1000MHz
4 Dwell Time	3 Seconds
5. Frequency step size △f:	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.

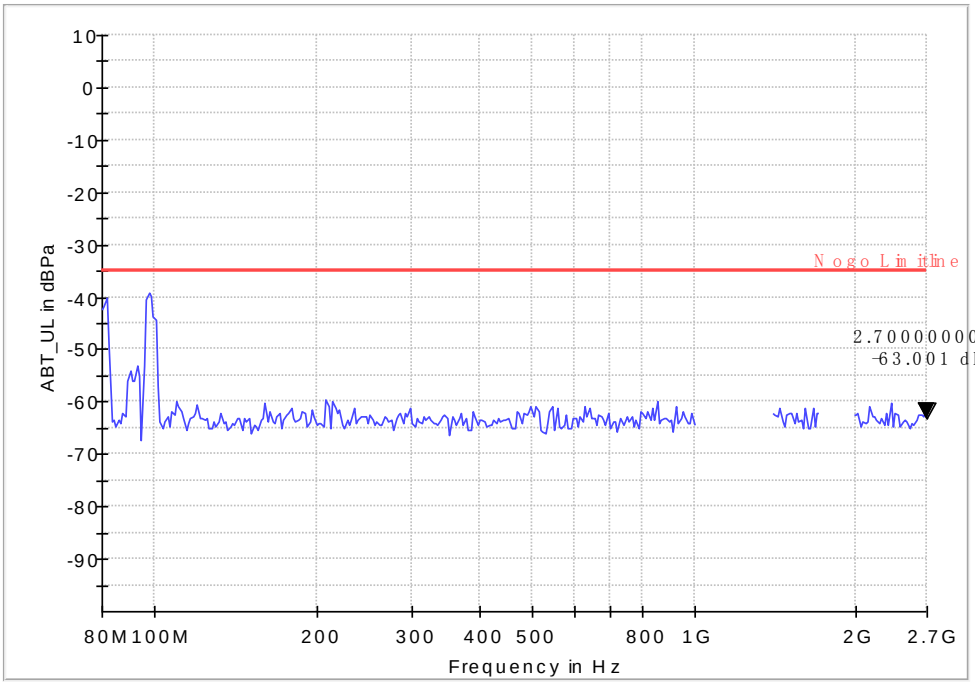
e) In order to judge the EUT performance, a CCD camera is used to monitor EUT screen.

Test Conditions

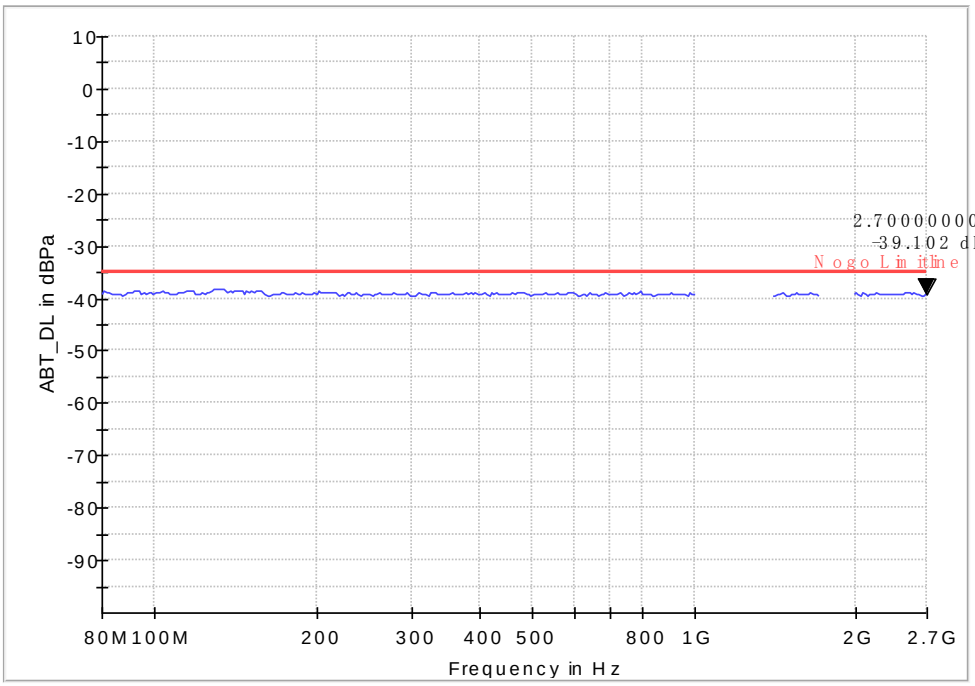
Frequency (MHz)	EUT state	Polarity	Field Strength (V/m)	Result	Comments
80M-1GHz, 1.4-2.7GHz	Front side	H/V	3	Pass	None
80M-1GHz, 1.4-2.7GHz	Back side	H/V	3	Pass	None
80M-1GHz, 1.4-2.7GHz	Left side	H/V	3	Pass	None
80M-1GHz, 1.4-2.7GHz	Right side	H/V	3	Pass	None

Test Results

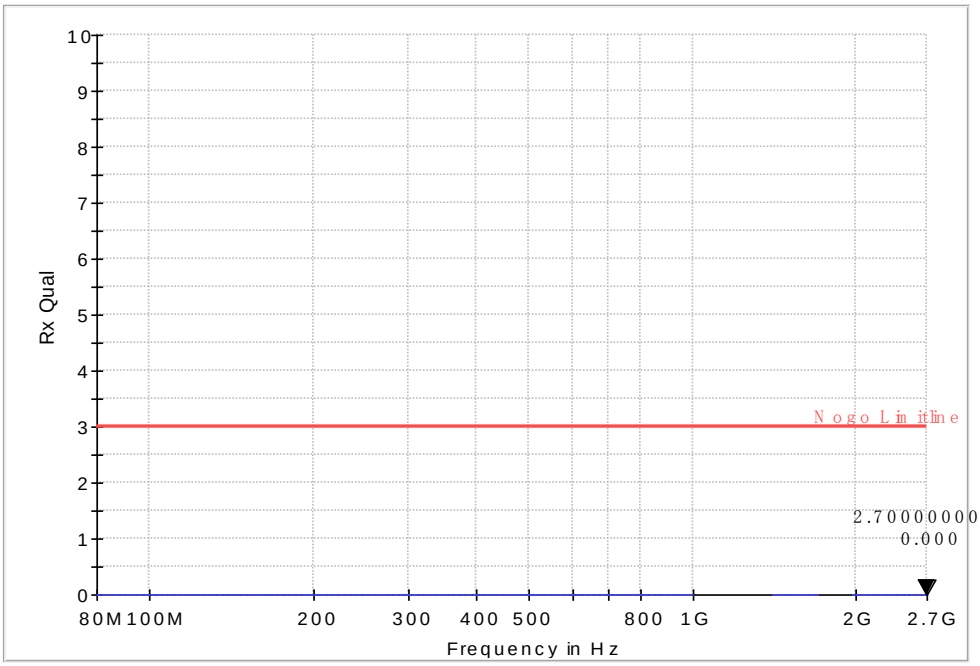
The worst case for RF electromagnetic field (80M-1G, 1.4-2.7G) is mode 2, and only the test data of this mode was reported.



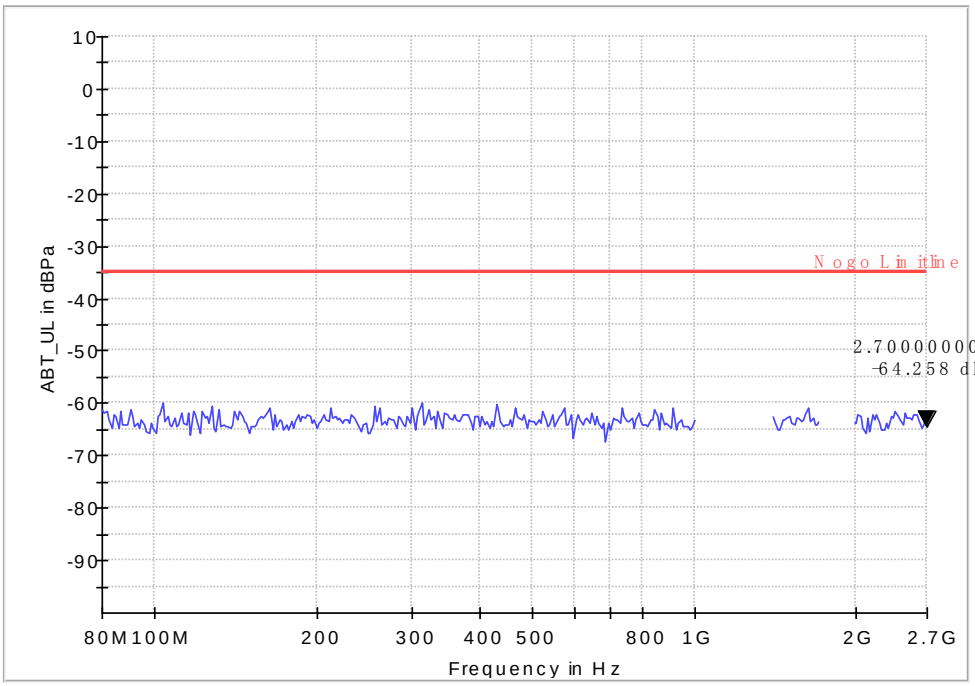
ABT_Uplink in dBPa (80M-1G, 1.4-2.7G, Horizontal)



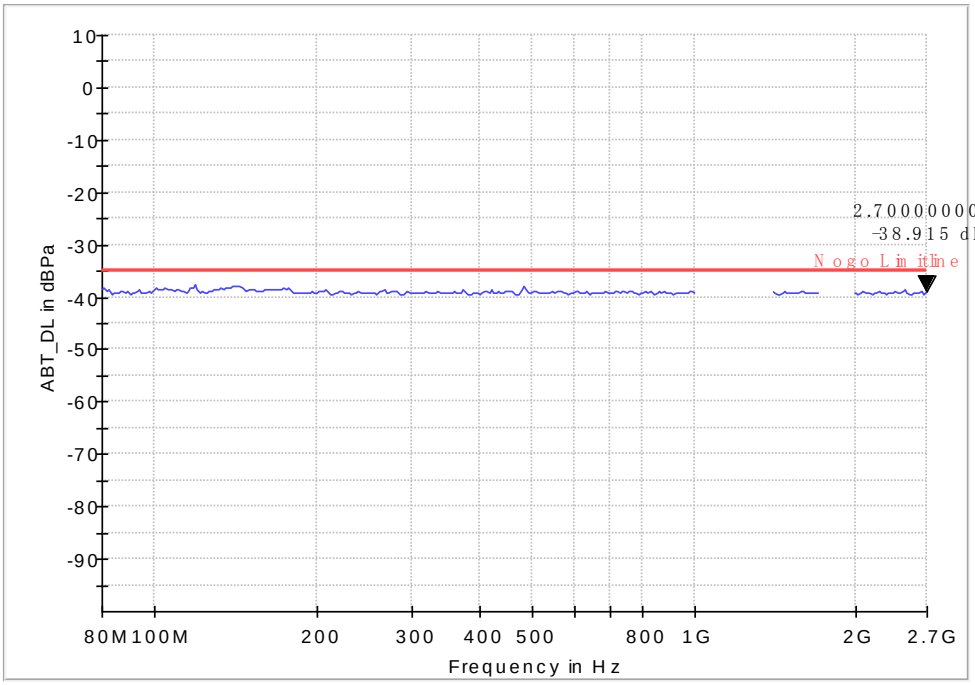
ABT_Downlink in dBPa (80M-1G, 1.4-2.7G, Horizontal)



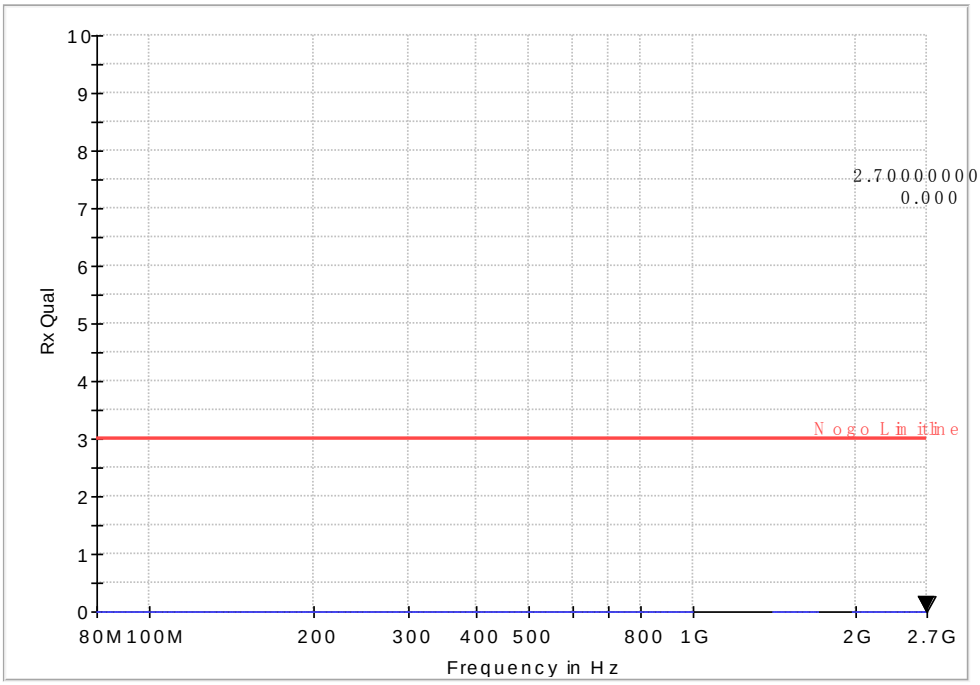
RX Quality (80M-1G, 1.4-2.7G, Horizontal)



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



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

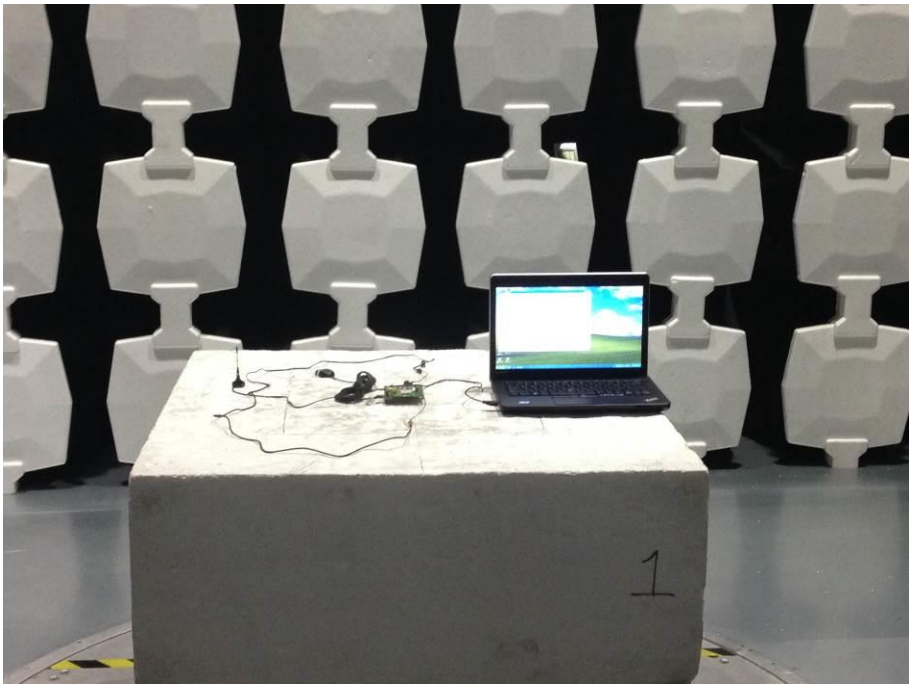


RX Quality (80M-1G, 1.4-2.7G, Vertical)

Annex A Test Configuration Photos

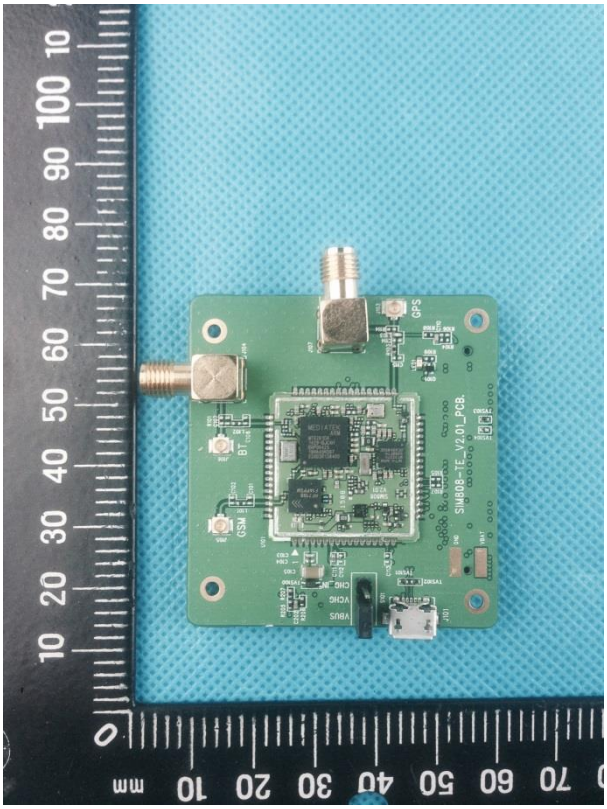
Picture1 : Photo of RE test

Picture2 : Photo of ESD test

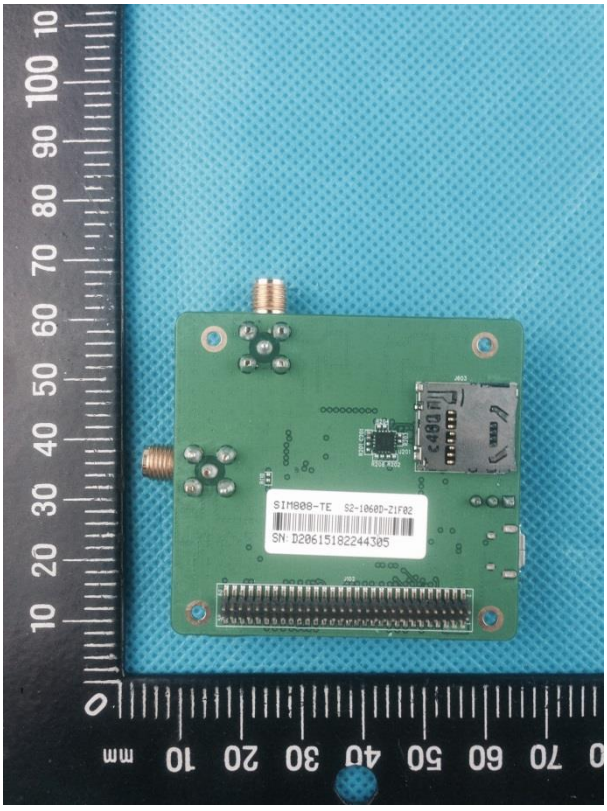


Picture3 : Photo of RS test

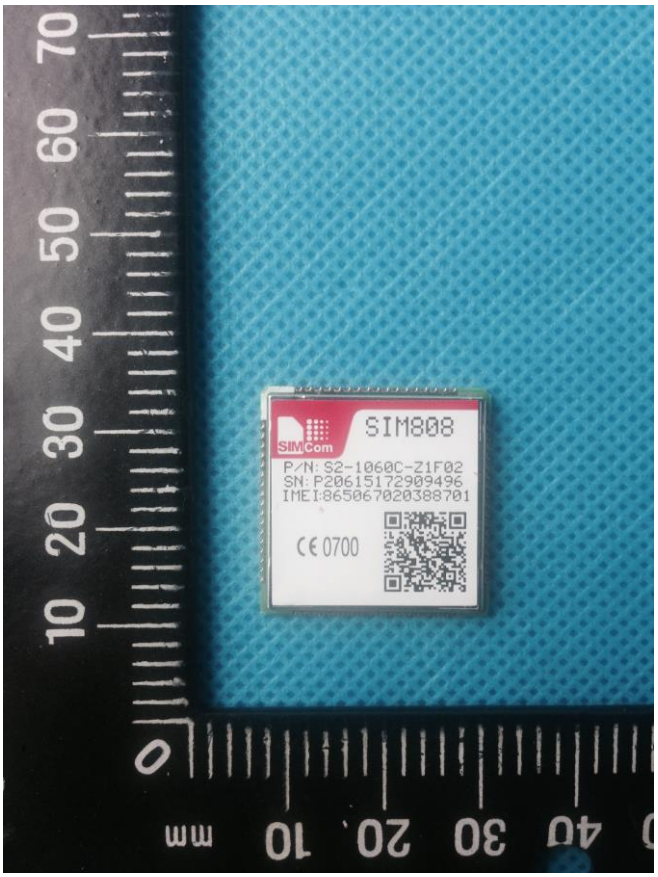
Annex B EUT Photos



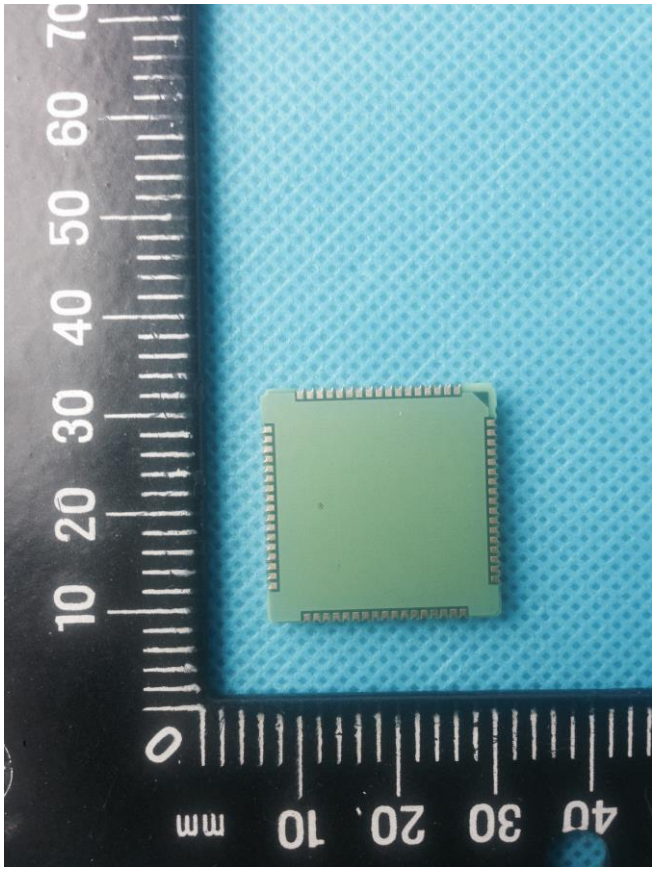
Picture1 : EUT + test AE



Picture2 : EUT + test AE



Picture3: EUT



Picture4 : EUT

Picture5 : Photo of GPS Antenna

Picture6 : Photo of main antenna

Picture7 Photo of Earphone

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