DAT-PL-162/04-01

TESTING
No. L0570

TEST REPORT

REPORT NUMBER：I13GC9474-EMC

Sort of equipment:	GSM/GPRS(850/900/1800/1900MHz)+BT Wireless Data Module
Type of designation:	SIM800H
Manufacturer:	Shenyang Simcom Technology Ltd.

ACCORDING TO:

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

ETSI EN 301 489-7 V 1.3.1(2005-11)

ETSI EN 301 489-17 V2.1.1(2009-05)

China Telecommunication Technology Labs.

Month, date, year
August 22, 2013

Signature

Ma Xin
Director

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1 General Information

1.1 Notes

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with EN 301 489-7 V 1.3.1(2005-11),EN 301 489-17 V2.1.1(2009-05) .

The test results of this test report relate exclusively to the item(s) tested as specified in section 2.

The following deviation from, additions to, or exclusions from the test specifications have been made. See Annex C.

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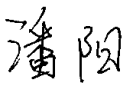
1.2 Testers

Name: Pan Yang

Position: Engineer

Department: Department of EMC test

Signature: 

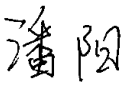
Editor of this test report:

Name: Pan Yang

Position: Engineer

Department: Department of EMC test

Date: 2013-08-22

Signature: 

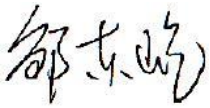
Technical responsibility for area of testing:

Name: Zou Dongyi

Position: Manager

Department: Department of EMC test

Date: 2013-08-22

Signature: 

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1.3 Testing Laboratory

1.3.1 Location

Name:	China Telecommunication Technology Labs.
Address:	11 YUE TAN NAN JIE BEIJING P.R.CHINA 100045
Tel:	+86 10 68094053
Fax:	+86 10 68011404
Email:	emc@chinattl.com

1.3.2 Details of accreditation status

Accredited by:	DATech Deutsche Akkreditierungsstelle Technik in der TGA GmbH（German Accreditation Body for Technology in the TGA）
Lab number:	DA7130
DAR Registration number:	DAT-PL-162/04-01
Accredited by:	CNAS (China National Accreditation Service for Conformity Assessment)
Registration number:	CNAS L0570
Standard:	ISO/IEC 17025:2005

1.3.3 Test location, where different from section 1.3.1

Name:	------
Address:	------

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1.4 Details of applicant or manufacturer

1.4.1 Applicant

Name:	Shanghai SIMCom Wireless Solutions Co.,Ltd.
Address:	Building A,SIM Technology Building,No.633,Jinzhong Road,Changning District,Shanghai R.R.China
Country:	China
Telephone:	+86-021-32523300
Fax:	+86-021-32523020
Contact:	Liweixing
Telephone:	+86-021-32523300

1.4.2 Manufacturer (if different from applicant in section 1.4.1)

Name:	Shenyang Simcom Technology Ltd
Address:	No.37, Shenbei Rd, Shenbei New Aear, Shenyang,P.R.China

1.4.3 Manufactory (if different from applicant in section 1.4.1)

Name:	------
Address:	------

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2 Test Item

2.1 General info.:

Manufacturer:	Shenyang Simcom Technology Ltd
Name:	GSM/GPRS(850/900/1800/1900MHz)+BT Wireless Data Module
Model Number:	SIM800H
Serial Number:	IMEI: 860719020042408
Production Status:	Product
Receipt date of test item:	2013-08-14

2.2 Outline of E.U.T.:

EUT is a GSM/GPRS(850/900/1800/1900MHz)+BT Wireless Data Module

2.3 Modifications Incorporated in E.U.T.:

The E.U.T. has not been modified from what is described by the brand name and unique type identification stated above.

2.4 Equipment Configuration:

Equipment configuration list:

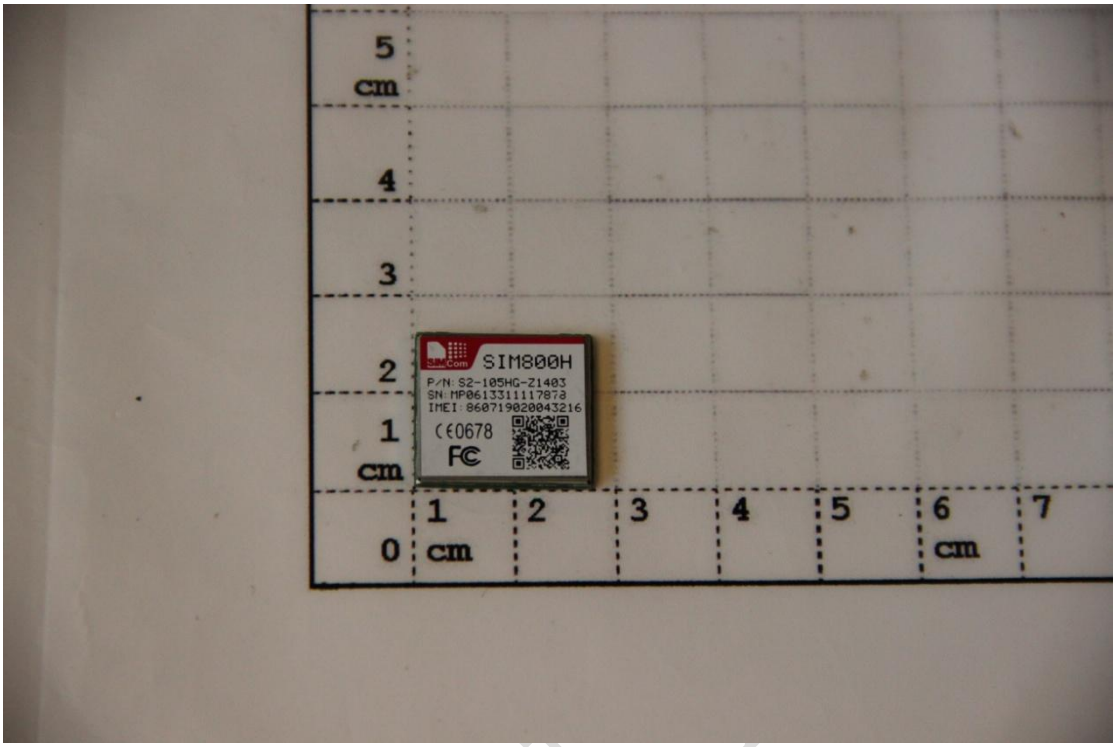
Item	Generic Description	Type	Serial No.	Remarks
A	Module	SIM800H	MP0613311117797	None
B	Main board 1	Sim800L-TE	--	None
C	Main board 2	SIM900-EVB	MP0613192141721	
B	Adapter	DSA-0131F-06 EU 12	--	None
C	Antenna	--	1005 058600	None

2.5 Other Information:

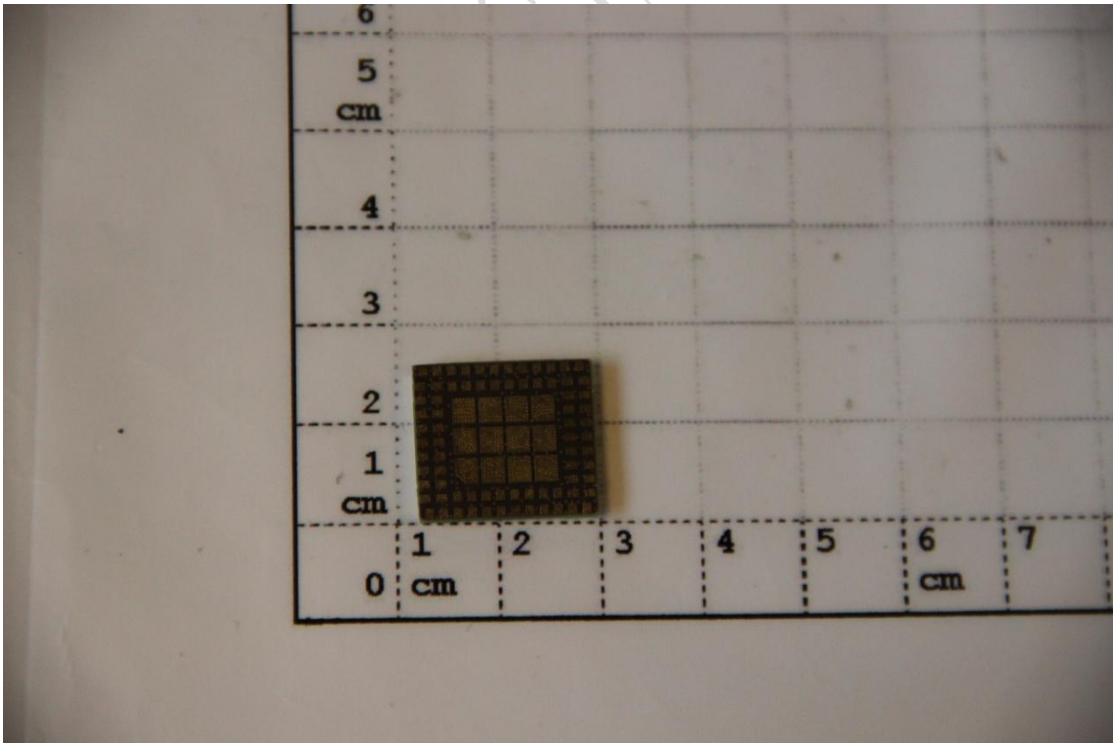
Hardware version: V1.02

Software version: SIM800 R13.08

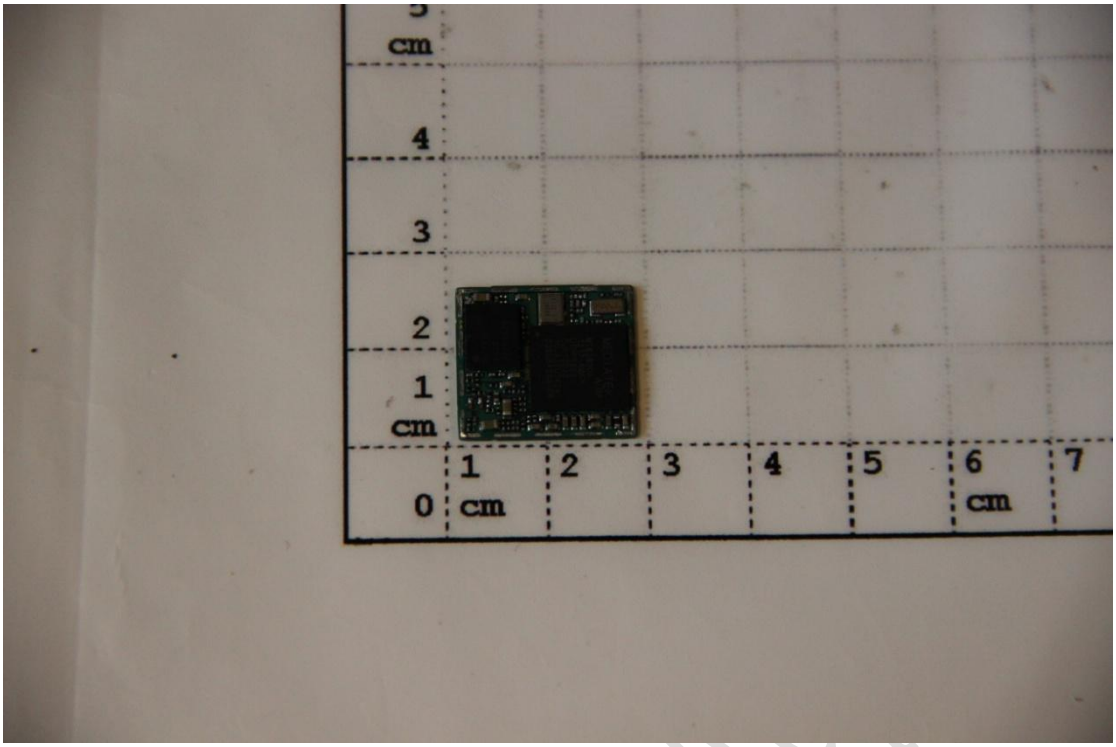
2.6 E.U.T Photographs:



Face



Back



Main board (face)

3 Summary of Test

3.1 Test Results

General: **All measurements are traceable to national standards.**
Standard: **EN 301 489-1 V1.9.2 (2011-09)**
EN 301 489-7 V1.3.1 (2005-11)
EN 301 489-17 V2.1.1(2009-05)
Test Voltage: **230VAC 50Hz**
Abstract: --

Test Item	Basic Standard	Application	Results
Radiated emission	EN 55022 (2006)	Enclosure of ancillary equipment	Complies
Conducted emission	EN 55022 (2006)	AC mains input/output port	Complies
Conducted emission	EN 55022 (2006)	DC power input/output port	NA
Conducted emission	EN 55022 (2006)	Telecommunication port	NA
Harmonic current emissions	EN 61000-3-2 (2006)	AC mains input port	NA
Voltage fluctuations and flicker	EN 61000-3-3 (2005)	AC mains input port	NA
RF electromagnetic field (80MHz to 2700MHz)	EN 61000-4-3 (2006)	Enclosure	Complies

Electrostatic discharge	EN 61000-4-2 (2001)	Enclosure	Complies
Fast transients common mode	EN 61000-4-4 (2004)	AC power ports	Complies
		DC power ports	NA
		Signal, telecommunication and control ports	NA
RF common mode 0.15MHz to 80MHz	EN 61000-4-6 (2005)	AC power ports	Complies
		DC power ports	NA
		Signal, telecommunication and control ports	NA
Transients and surges	ISO 7637-2 (2004)	DC power input ports	NA
Voltage dips and interruptions	EN 61000-4-11 (2004)	AC mains power input ports	Complies
Surges, line to line and line to ground	EN 61000-4-5 (2006)	AC mains power input ports, telecommunication ports	Complies
Note: NA=Not Applicable			

3.2 Test Manner

Test Item	Test setup and operating modes
1) Radiated emission	30MHz-1GHz frequency range: Mode 1: GSM900 + GPRS + idle + Adapter Mode 2: GSM1800 + GPRS + Idle + Adapter Mode 5 : BT + Adapter
	1GHz-6GHz frequency range: Mode 1: GSM900 + GPRS + idle + Adapter Mode 2: GSM1800 + GPRS + Idle + Adapter Mode 5 : BT + Adapter
2) Conducted emission	Mode 3: GSM900 + GPRS + Traffic + Adapter Mode 4: GSM1800 + GPRS + Traffic + Adapter Mode 5 : BT + Adapter
3) RF electromagnetic field (80MHz to 2700MHz)	Mode 3: GSM900 + GPRS + Traffic + Adapter Mode 4: GSM1800 + GPRS + Traffic + Adapter Mode 5 : BT + Adapter
4) Electrostatic discharge	Mode 3: GSM900 + GPRS + Traffic + Adapter Mode 4: GSM1800 + GPRS + Traffic + Adapter Mode 5 : BT + Adapter
5) Fast transients common mode	Mode 3: GSM900 + GPRS + Traffic + Adapter Mode 4: GSM1800 + GPRS + Traffic + Adapter Mode 5 : BT + Adapter
6) RF Common Mode	Mode 3: GSM900 + GPRS + Traffic + Adapter

0.15MHz-80MHz	Mode 4: GSM1800 + GPRS + Traffic + Adapter Mode 5 : BT + Adapter
Remark: 1. The worst case of radiated emission for 30MHz-1GHz is mode 2 and for 1-6GHz is mode 2. 2. The worst case for conducted emission is mode 4.	

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Test Item	Test setup and operating modes
7) Voltage dips and interruptions	Mode 3: GSM900 + GPRS + Traffic + Adapter Mode 4: GSM1800 + GPRS + Traffic + Adapter Mode 5 : BT + Adapter
8) Surges, line to line and line to ground	Mode 3: GSM900 + GPRS + Traffic + Adapter Mode 4: GSM1800 + GPRS + Traffic + Adapter Mode 5 : BT + Adapter
Remark: 1. The worst case of radiated emission for 30MHz-1GHz is mode 2 and for 1-6GHz is mode 2. 2. The worst case for conducted emission is mode 4.	

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3.3 Monitoring EUT in test

3.3.1Monitoring for continuous phenomena applied to MS

3.3.1.1GSM and WCDMA mode

At the start of the test, a communication link shall be established. During the test, the operator shall observe whether the communication link is maintained. The RX Quality for GSM and BER for WCDMA of the communication is measured by SS. There should be not more than 3 and 0.1% respectively. At the conclusion of the test, the operator shall directly check whether the EUT operate as intended with no loss of user control functions or stored data. For GPS mode, the GPS was activated and connected with GPS communication tester.

In addition to confirming the above performance during a communication, the test is also been performed in idle mode, with an interference receiver to monitor whether the transmitter unintentionally operates.

3.3.2Monitoring for transient phenomena applied to MS

3.3.2.1GSM and WCDMA mode

At the start of the test, a communication link shall be established. At the conclusion of each exposure, the operator shall directly observe if the EUT operate with no user noticeable loss of the communication link. At the conclusion of the total test comprising the series of individual exposures, the operator shall directly check whether the EUT operate as intended with no loss of user control functions or stored data, and the communication link has been maintained. For GPS mode, the GPS was activated and connected with GPS communication tester.

In addition to confirming the above performance during a communication, the test is also been performed in idle mode, and monitor if transmitter unintentionally operates with an interference receiver.

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4 Test Results

4.1 Radiated Emissions (Enclosure of ancillary equipment)

Specifications: EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-7 V 1.3.1(2005-11)
EN 301 489-17 V2.1.1(2009-05)

Date of tests: 2013-08-15

Test conditions: Ambient Temperature:15℃-35℃
Relative Humidity:30%-60%

Method of measurement: EN 55022(2006)

Test equipment:

Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
1	EMI Test Receiver	R/S	ESI26	EMI Test Receiver	2014-01-09	Normal
2	Ultra Broadband Antenna	R/S	VULB 9160	Ultra Broadband Antenna	2013-09-05	Normal
3	Double-Ridged Horn Antenna	R/S	HF906	Double-Ridged Horn Antenna	2014-01-23	Normal
4	Fully-Anechoic Chamber	ETS	11.8m×6.5m ×6.3m	Fully-Anechoic Chamber	2013-11-16	Normal
5	Radio Communications Analyzer	Anritsu	MT8820B	Radio Communications Analyzer	2014-01-26	Normal

Remarks: The measurement distance is 3 meters.

Limits for radiated emissions from ancillary equipment at a measuring distance of 3m:

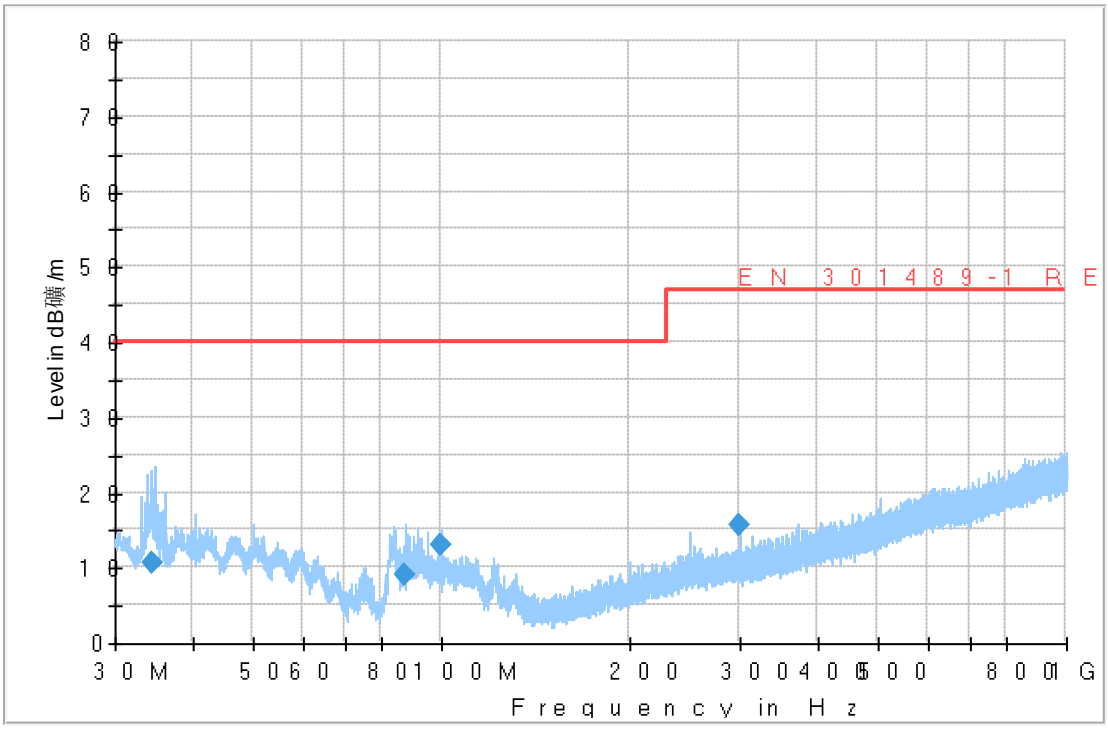
Frequency range	Limits(Quasi-peak)
30 MHz to 230 MHz	40 dBμV/m
230 MHz to 1000 MHz	47 dBμV/m

Frequency range	Average limit	Peak limit
1GHz to 3GHz	50 dBμV/m	70 dBμV/m
3GHz to 6GHz	54 dBμV/m	74 dBμV/m

Test Results:

The E.U.T. complies.

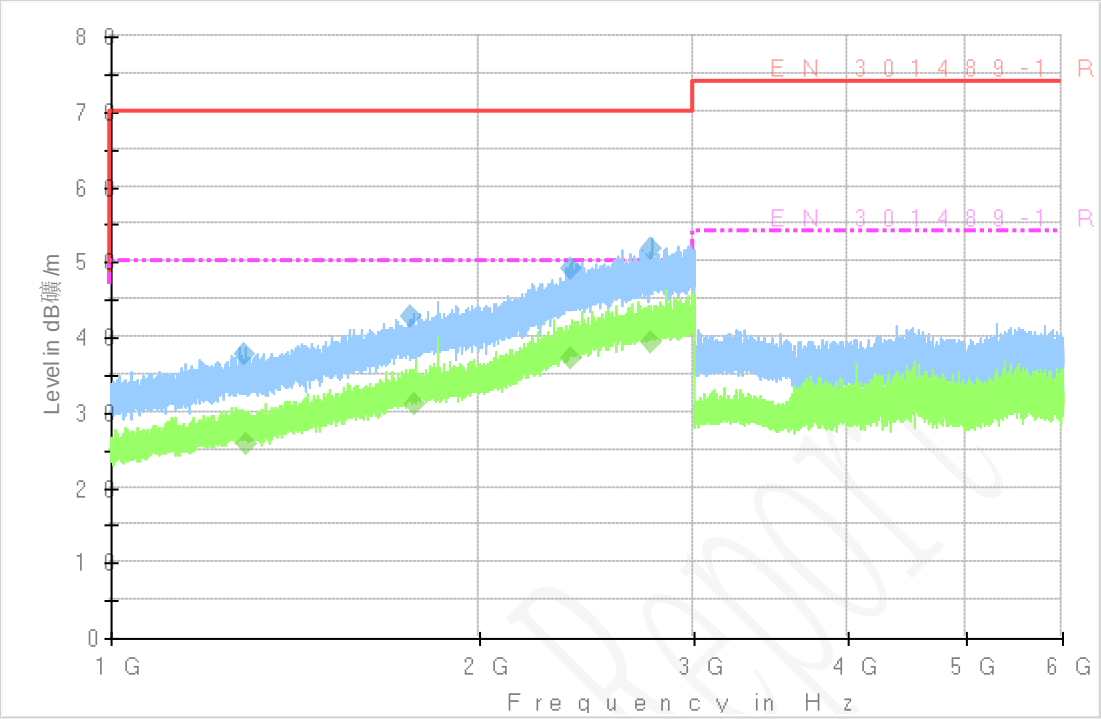
Test data:



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
34.568333	10.7	1000.0	120.000	113.0	V	254.0	-26.7	29.3	40.0
87.439333	9.1	1000.0	120.000	100.0	V	-24.0	-27.2	30.9	40.0
100.001667	13.1	1000.0	120.000	120.0	H	-29.0	-24.9	26.9	40.0
300.015667	15.5	1000.0	120.000	211.0	V	-6.0	-21.5	31.5	47.0

Remarks:
The worst case for radiated emission (30M-1GHz) is mode 2, and only the test data of this mode was reported.
The measurement uncertainty is 4.16 dB (k=2) when antenna is vertical polarization and 4.50 (k=2) when antenna is horizontal polarization.



Final Result 1

Frequency (MHz)	MaxPeak (dBuV/m)	Meas. Time	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBuV/m)
1288.280000	37.5	100.0	1000.000	155.0	H	194.0	-5.1	32.5	70.0
1762.346667	42.7	100.0	1000.000	155.0	V	2.0	0.0	27.3	70.0
2379.640000	49.0	100.0	1000.000	155.0	H	11.0	6.1	21.0	70.0
2768.333333	51.6	100.0	1000.000	155.0	V	-7.0	8.7	18.4	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)
1291.173333	25.6	100.0	1000.000	155.0	V	293.0	-5.1	24.4	50.0
1777.240000	30.9	100.0	1000.000	155.0	H	-11.0	0.2	19.1	50.0
2380.613333	37.0	100.0	1000.000	155.0	H	2.0	6.1	13.0	50.0
2766.480000	39.1	100.0	1000.000	155.0	V	11.0	8.7	10.9	50.0

Remarks:
The worst case for radiated emission（1-6GHz）is mode 2, and only the test data of this mode was reported.
The measurement uncertainty is 4.20 dB (k=2) when antenna is vertical polarization and 4.55 (k=2) when antenna is horizontal polarization.

Test Photos:

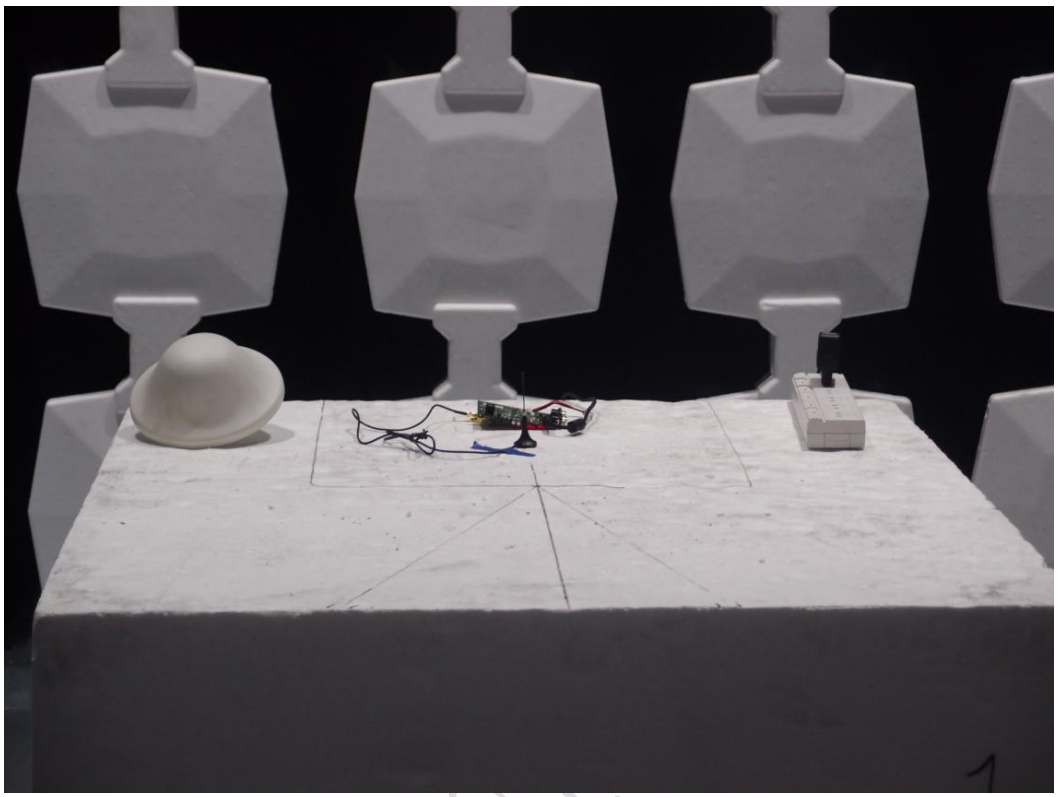


Photo of RE test

CTL Test

4.2 Conducted Emissions (AC Mains Ports)

Specifications: EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-7 V 1.3.1(2005-11)
EN 301 489-17 V2.1.1(2009-05)

Date of tests: 2013-08-17

Test conditions: Ambient Temperature:15℃-35℃
Relative Humidity:30%-60%

Method of measurement: EN 55022(2006)

Test equipment:

Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
1	EMI Test Receiver	R/S	ESCI	101235	2013-11-01	Normal
2	V-LISN	R/S	ENV216	101386	2013-11-05	Normal
3	Universal Radio Communication tester	R/S	CMU200	123125	2013-09-26	Normal

Limits of the conducted disturbance at the AC mains ports:

Frequency range	Limit(Quasi-peak)	Limit(Average)
0.15 MHz to 0.5 MHz	66 dBμV – 56 dBμV	56 dBμV – 46 dBμV
>0.5 MHz to 5MHz	56 dBμV	46 dBμV
>5 MHz to 30 MHz	60 dBμV	50 dBμV
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

Footnotes:(if necessary)

Test Results:

The E.U.T. complies.

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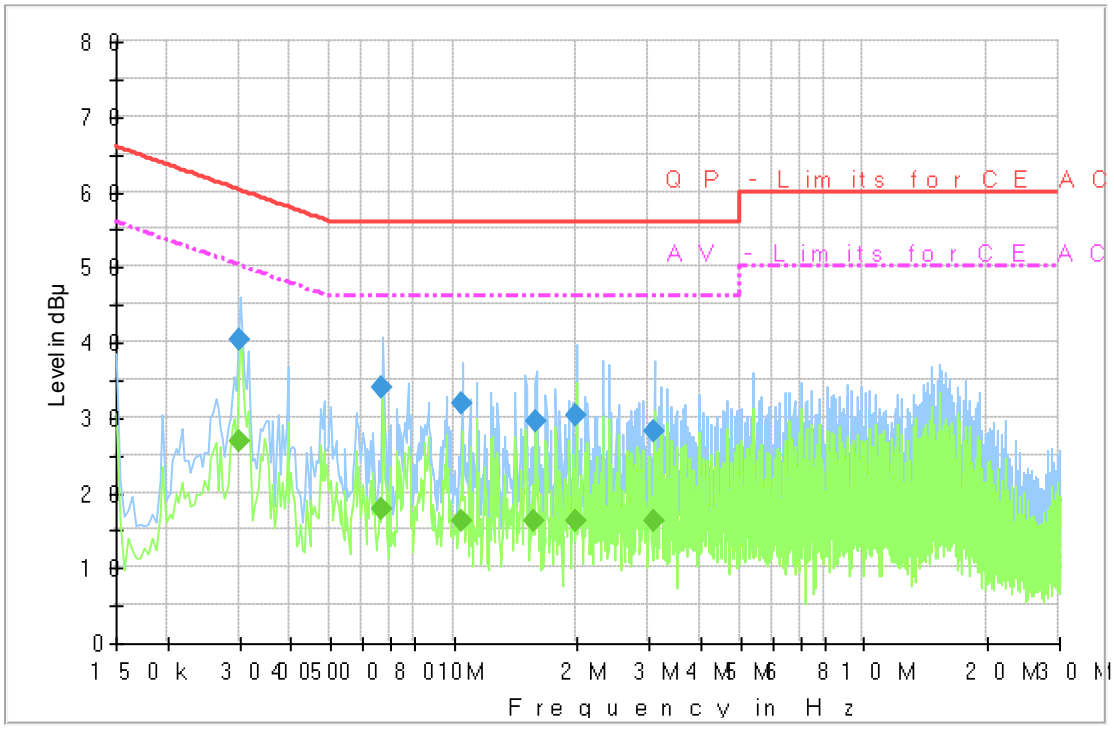
Test data:



Final Result 1

Frequency (MHz)	QuasiPeak (dBµ V)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ	Comment
0.302981	40.2	1000.0	9.000	On	L1	10.0	19.9	60.2	
0.672375	34.0	1000.0	9.000	On	L1	10.1	22.0	56.0	
1.049231	31.7	1000.0	9.000	On	L1	9.9	24.3	56.0	
1.586531	29.4	1000.0	9.000	On	L1	9.9	26.6	56.0	
1.993238	30.1	1000.0	9.000	On	L1	9.9	25.9	56.0	
3.075300	28.1	1000.0	9.000	On	L1	9.8	27.9	56.0	

Final Result 2

Frequency (MHz)	Average (dBµ V)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ	Comment
0.302981	26.8	1000.0	9.000	On	L1	10.0	23.4	50.2	
0.672375	17.8	1000.0	9.000	On	L1	10.1	28.2	46.0	
1.049231	16.2	1000.0	9.000	On	L1	9.9	29.8	46.0	
1.582800	16.3	1000.0	9.000	On	L1	9.9	29.7	46.0	
1.993238	16.1	1000.0	9.000	On	L1	9.9	29.9	46.0	
3.075300	16.1	1000.0	9.000	On	L1	9.8	29.9	46.0	

Remarks:

The worst case for conducted emission is mode 4, and only the test data of this mode was reported.
The measurement uncertainty is 3.74 dB (k=2).

Test Photos:

4.3 Harmonic Current Emissions (AC Mains Input Ports)

Specifications: EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-7 V 1.3.1(2005-11)
EN 301 489-17 V2.1.1(2009-05)

Test conditions: Ambient Temperature:15℃-35℃
Relative Humidity:30%-60%

Method of measurement: EN 61000-3-2 (2005)

Test equipment:

Number	Description	Manufacture	Model Number	Serial Number	Cal Due	State
1	Digital power analyzer	EMTEST	DPA500N	v112610 9988	2014-02-14	Normal
2	Universal Radio Communication tester	R/S	CMU200	123125	2013-09-26	Normal
3	ultra compact simulator	EMTEST	UCS500n7	V112610 9983	2014-01-05	Normal

Remarks: The E.U.T is a Class A equipment. The test observation period is 150s.

Limits for class A equipment:

Harmonic order n	Maximum permissible harmonic current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15≤n≤39	$0.15\frac{15}{n}$
Even harmonics	
2	1.08
4	0.43
6	0.30
8≤n≤40	$0.23\frac{8}{n}$

Test Results:

Since the EUT'S power is less than 75w,so this test is not apply.

4.4 Voltage Fluctuations and Flicker (AC Mains Input Ports)

Specifications: EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-7 V 1.3.1(2005-11)
EN 301 489-17 V2.1.1(2009-05)

Test conditions: Ambient Temperature:15℃-35℃
Relative Humidity:30%-60%

Method of measurement: EN 61000-3-3 (2005)

Test equipment:

Number	Description	Manufacture	Model Number	Serial Number	Cal Due	State
1	Digital power analyzer	EMTEST	DPA500N	v1126109988	2014-02-14	Normal
2	Universal Radio Communication tester	R/S	CMU200	123125	2013-09-26	Normal

Limits:

EN 61000-3-3 (2005) clause 5:

The following limits apply:

— the value of P_{st} shall not be greater than 1,0;

— the value of P_{lt} shall not be greater than 0,65;

— the value of d(t) during a voltage change shall not exceed 3,3 % for more than 500 ms;

— the relative steady-state voltage change, d_c , shall not exceed 3,3 %;

— the maximum relative voltage change, d_{max} , shall not exceed;

a) 4 % without additional conditions;

b) 6 % for equipment which is:

— switched manually, or

— switched automatically more frequently than twice per day, and also has either a delayed restart(the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

NOTE: The cycling frequency will be further limited by the P_{st} and P_{lt} limit. For example: a d max of 6 % producing a rectangular voltage change characteristic twice per hour will give a P_{lt} of about 0,65.

Limits (continued):

c) 7 % for equipment which is:

— attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or

— switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

In the case of equipment having several separately controlled circuits in accordance with 6.6, limits b) and c) shall apply only if there is delayed or manual restart after a power supply interruption; or all equipment with automatic switching which is energized immediately on restoration of supply after a power supply interruption, limits a) shall apply; for all equipment with manual switching, limits b) or c) shall apply depending on the rate of switching.

P_{st} and P_{lt} requirements shall not be applied to voltage changes caused by manual switching.

The limits shall not be applied to voltage changes associated with emergency switching or emergency interruptions.

Test Results:

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

CTTL Test Report

4.5 RF Electromagnetic Field (80MHz to 2700MHz)

Specifications: EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-7 V 1.3.1(2005-11)
EN 301 489-17 V2.1.1(2009-05)

Date of tests: 2013-08-19

Test conditions: Ambient Temperature: 15℃-35℃
Relative Humidity: 30%-60%

Method of measurement: EN 61000-4-3 (2006)

Test levels: 80MHz-1000MHz, 1400MHz-2700MHz,
3V/m(unmodulated,r.m.s), 80%AM(1kHz), Dwell time: 3s

Test equipment:

Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
1	Signal Generator	R/S	SMY02	100024	2013-10-25	Normal
2	Power Meter	R/S	NRVS	100085	2014-01-06	Normal
3	Radio Communications Analyzer	Anritsu	MT8820B	6200772659	2014-01-26	Normal
4	Audio analyzer	R/S	UPL	100061	2014-07-01	Normal

Performance Criteria:

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

Method of Measurement

a. The test procedure was in accordance with IEC 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.

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 Conditions

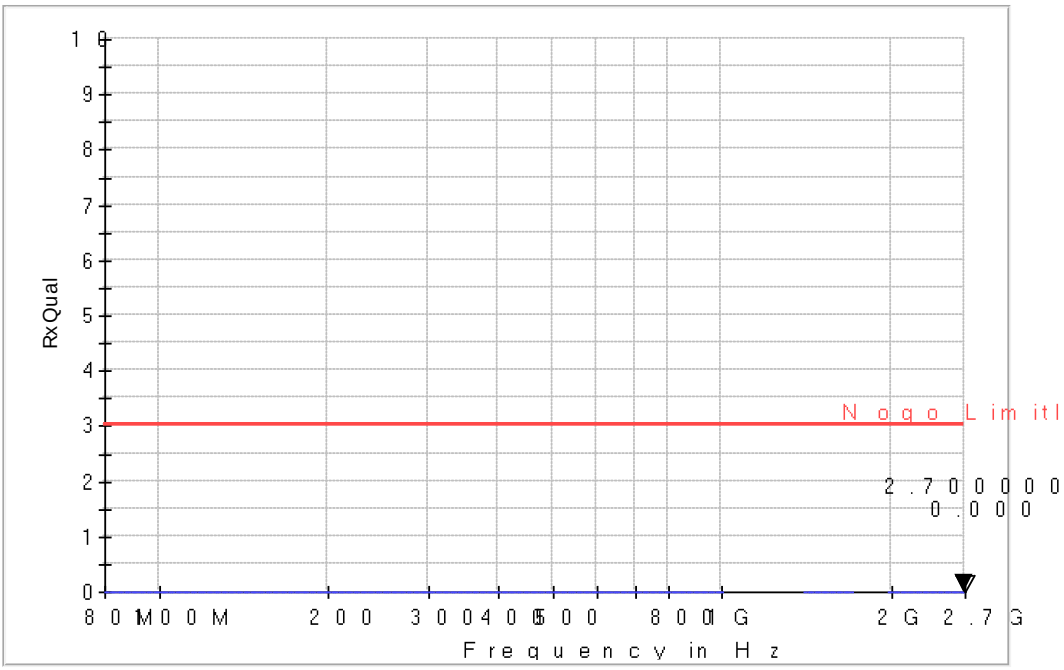
Frequency	EUT state	Polarity	Field	Result	Comments

(MHz)			Strength (V/m)		
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

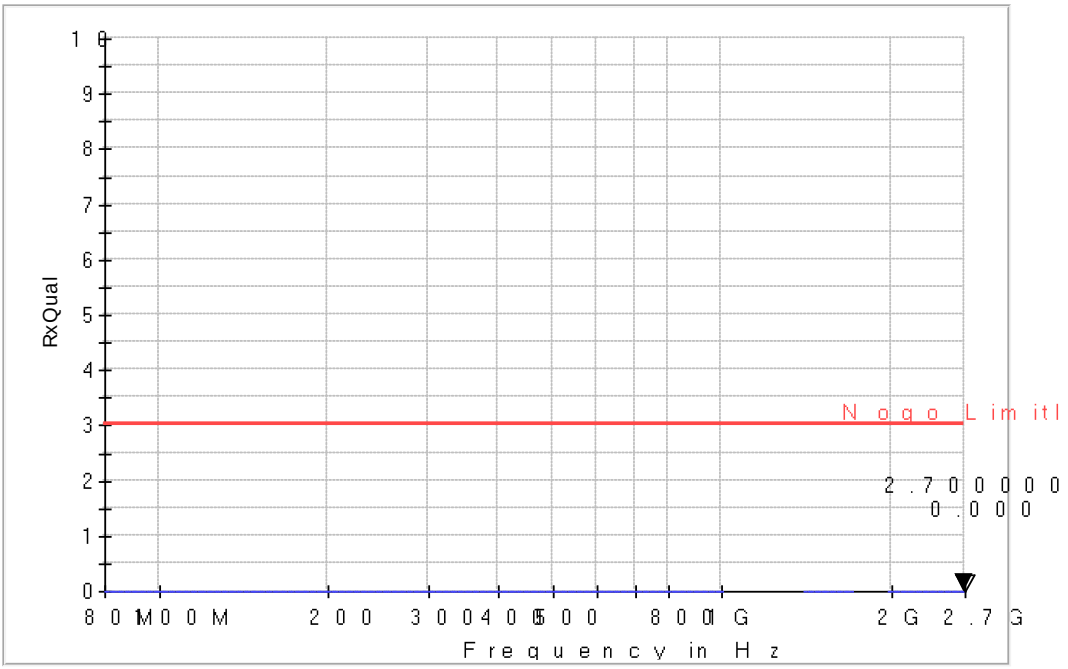
Test Data (only the worst case was reported):

Mode 3

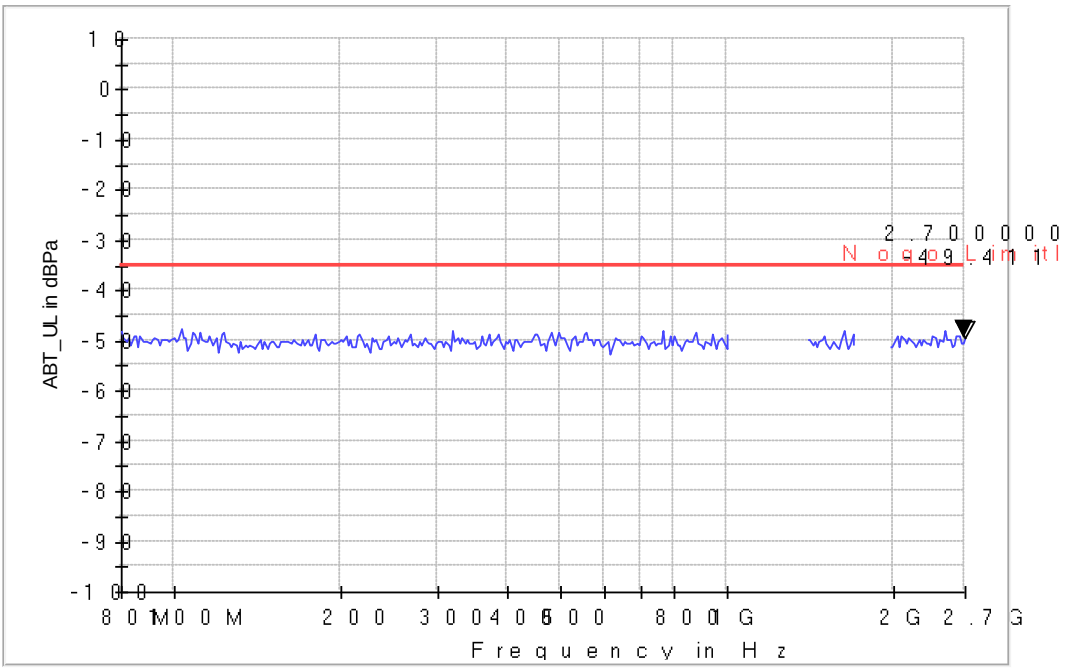
RX quality 80MHz-2.7GHz Horizontal



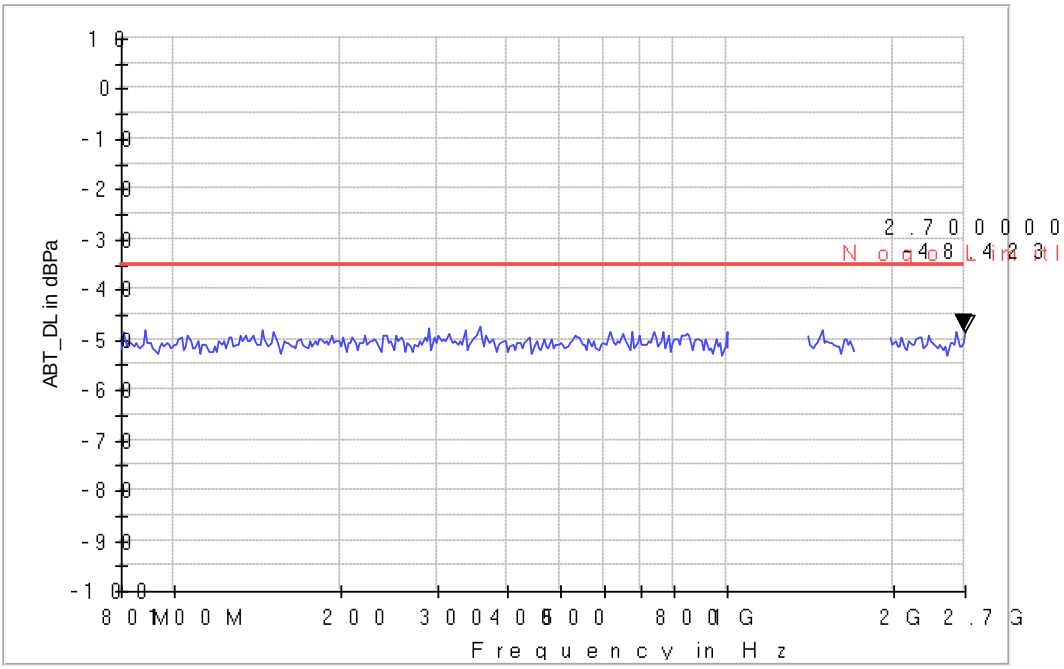
RX quality 80MHz-2.7GHz Vertical



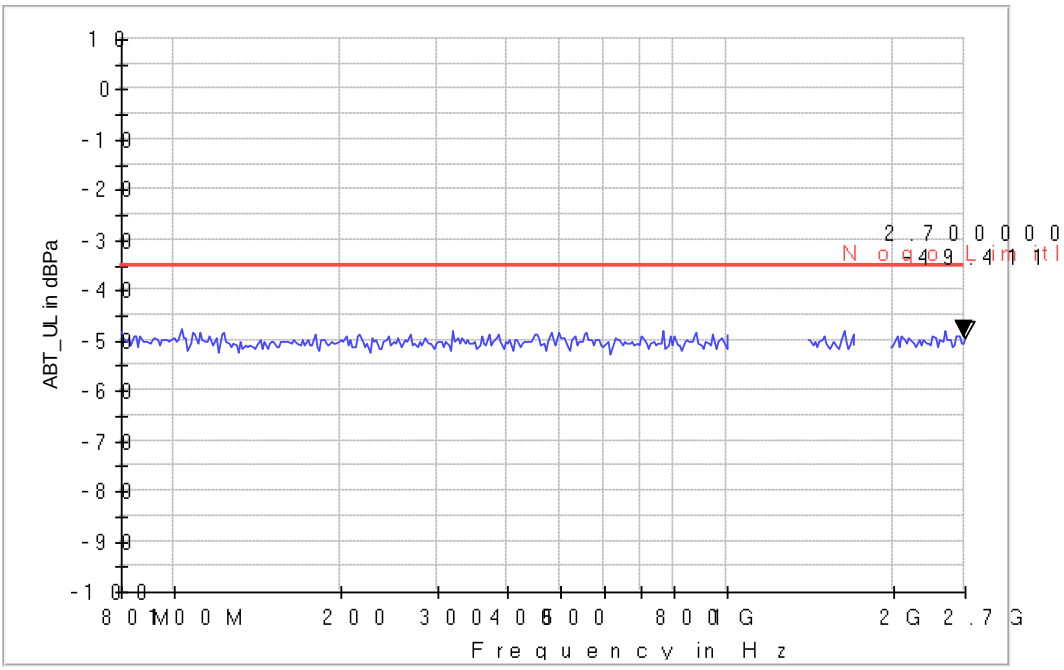
Up Link 80MHz-2.7GHz Horizontal



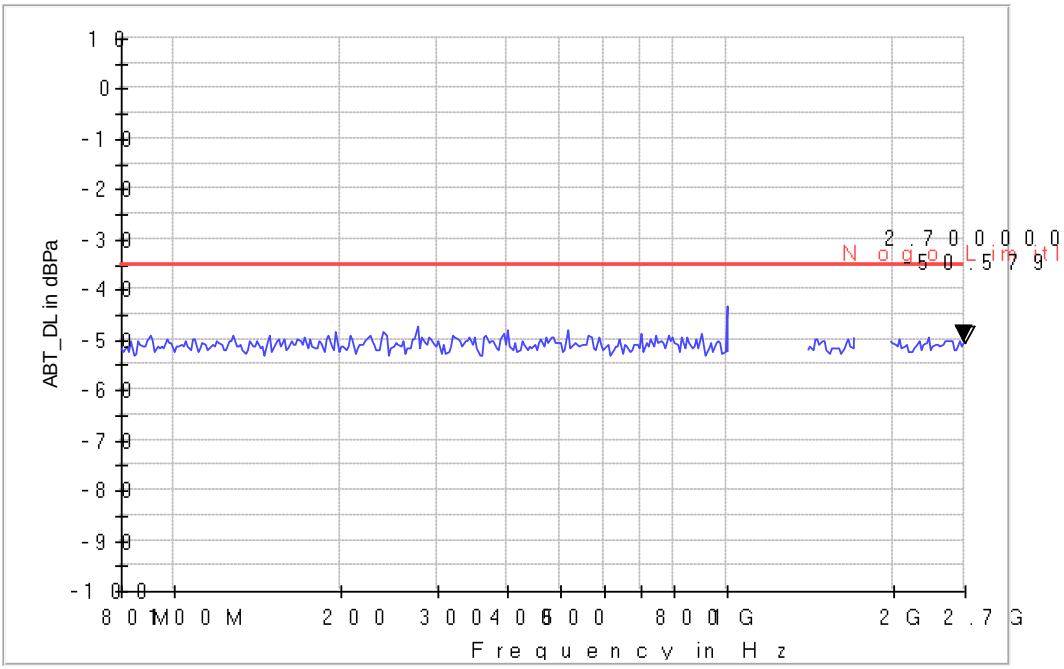
Down Link 80MHz-2.7GHz Horizontal



Up Link 80MHz-2.7GHz Vertical

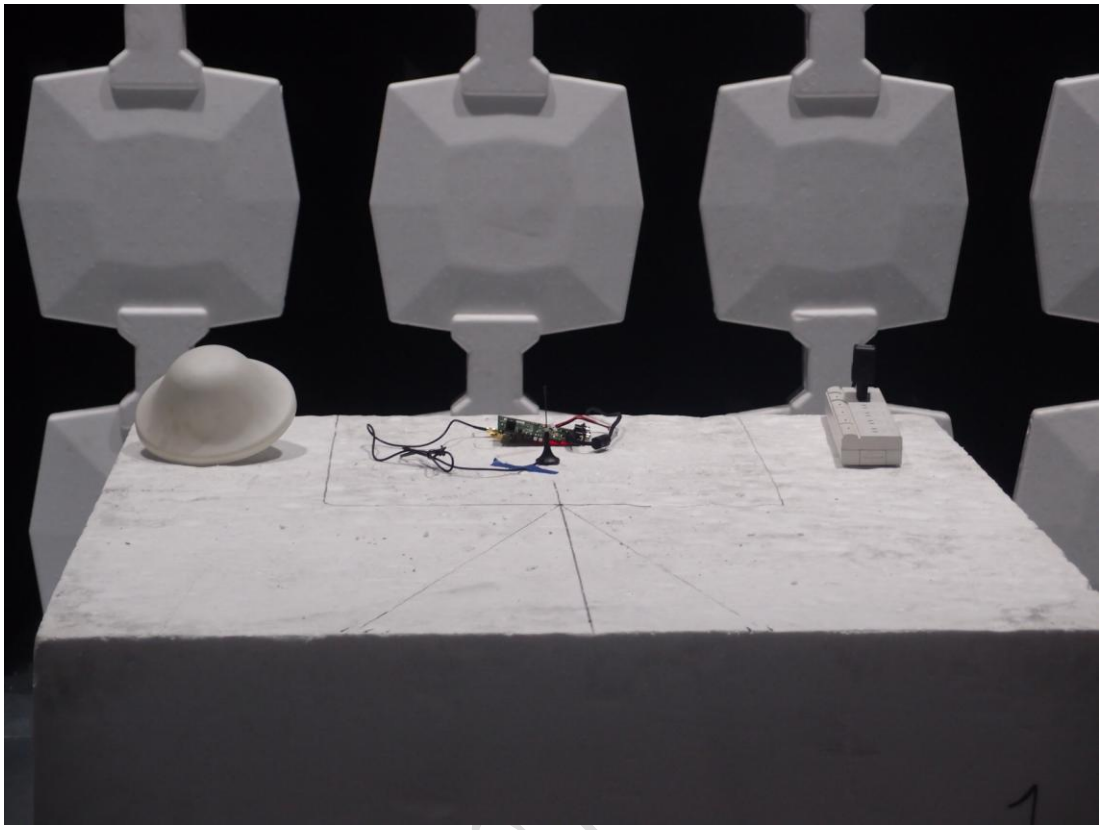


Down Link 80MHz-2.7GHz Vertical



CTTL Test

Test Photos:



4.6 Electrostatic Discharge

Specifications: EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-7 V 1.3.1(2005-11)
EN 301 489-17 V2.1.1(2009-05)

Date of tests: 2013-08-19

Test conditions: Ambient Temperature: 15℃-35℃
Relative Humidity: 30%-60%

Method of measurement: EN 61000-4-2 (2001)

Test levels: 4kV contact discharge, 8kV air discharge

Test equipment:

Number	Description	Manufacture	Model Number	Serial Number	Cal Due	State
1	ESD generator	EMTEST	Dito	V1126109982	2013-11-16	Normal
2	Universal Radio Communication tester	R/S	CMU200	123125	2013-09-26	Normal

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:

The E.U.T. complies.
The E.U.T. meets Performance Criteria.

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Test Point:

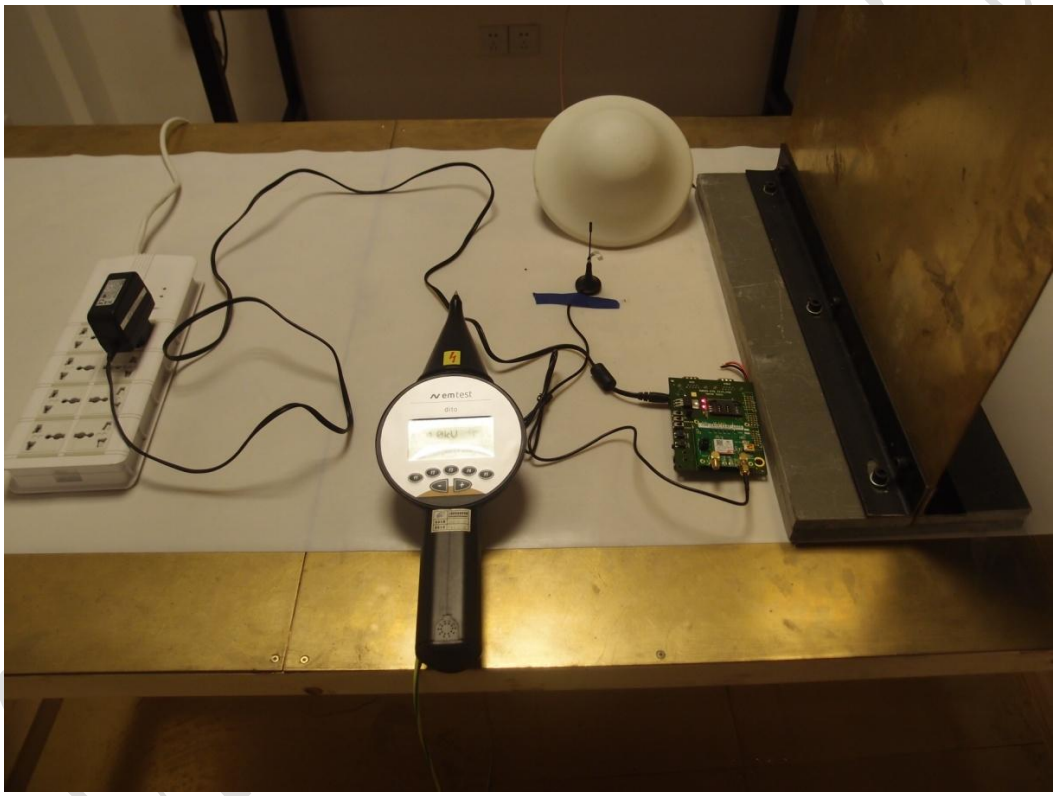
1. HCP & VCP

Note: VCP is Vertical Conducting Plane. HCP is Horizontal Conducting Plane.

Test data:

Mode 1: GSM900 voice traffic mode + Adapter+ Earphone+GPS RX					
Test Point	**ESD Level (kV)**	**Contact or Air**	**Application Quantity**	**Result**	**Comments**
1	+2	Contact	60	Pass	None
1	-2	Contact	60	Pass	None
1	+4	Contact	60	Pass	None
1	-4	Contact	60	Pass	None

Test photos:



4.7 Fast transients common mode

Specifications: EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-7 V 1.3.1(2005-11)
EN 301 489-17 V2.1.1(2009-05)

Date of tests: 2013-08-19

Test conditions: Ambient Temperature: 15℃-35℃
Relative Humidity: 30%-60%

Method of measurement: EN 61000-4-4 (2004)

Test levels: 0.5kV for signal, telecommunication and control ports
0.5kV for DC power input port
1kV for AC mains power input port

Test equipment:

Number	Description	Manufacturer	Model umber	Serial Number	Cal Due	State
1	ultra compact simulator	EMTEST	UCS500 N7	V1126109983	2013-11-29	Normal
2	Universal Radio Communication tester	R/S	CMU200	123125	2013-09-26	Normal

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:

The E.U.T. complies.
The E.U.T. meets Performance Criteria.

Test ports:
1. AC mains power input port

Test Data:

Test Port	Test Level	E.U.T. Operating Mode	Coupling Mode (Direct or Capacitive)	Time Duration	Result	Comments
1	±1kV	Mode 1 Mode 4	Direct	60s	Pass	None

Remarks: The other signal port, telecommunication port, control port, and/or DC power port of E.U.T. do not have cables which may be longer than 3m. So these ports are not applicable for this test.

Test system Verification Requirements:

Verification Waveform Characteristics:

Limts \ Load	50Ω Load（KW50）	1000ΩLoad（KW1000）
Rise Time	t_r=5ns ±30%	t_r=5ns ±30%
Duration time	t_d=50ns ±30%	t_d=50ns (-15,+100)

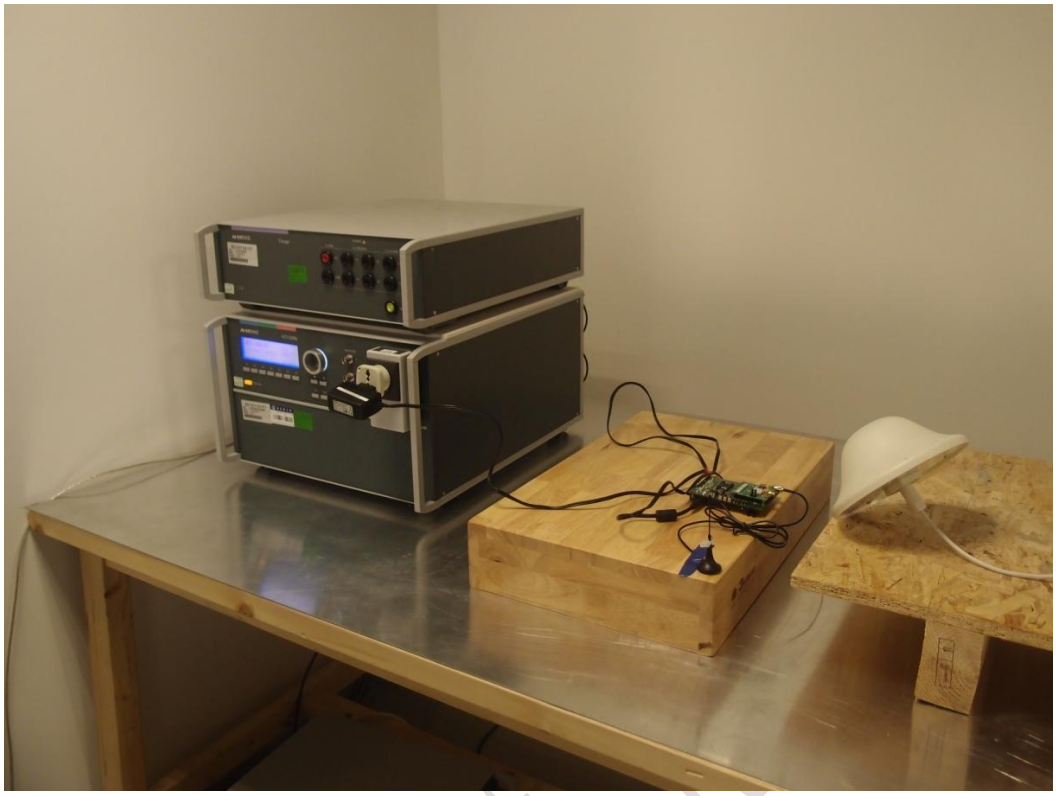
Peak Voltage V_p:

Set voltage kV	V_p (open circuit) kV	V_p (1 000 Ω) kV	V_p (50 Ω) kV	Repetition frequency kHz
0,25	0,25	0,24	0,125	5 or 100
0,5	0,5	0,48	0,25	5 or 100
1	1	0,95	0,5	5 or 100
2	2	1,9	1	5 or 100
4	4	3,8	2	5 or 100

Verification Results Record:

Load	Voltage Level	t_r (ns)	t_d (ns)	V_p (V)	Results
50 Ohm	500 V	--	--	--	--
	1000 V	5.51	54	960	Pass
1000 Ohm	500 V	--	--	--	--
	1000 V	5.62	57	1000	Pass

Test Photos:



CTTL Test

4.8 RF Common Mode 0.15MHz-80MHz

Specifications: EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-7 V 1.3.1(2005-11)
EN 301 489-17 V2.1.1(2009-05)

Date of tests: 2013-08-20

Test conditions: Ambient Temperature: 15℃-35℃
Relative Humidity: 30%-60%

Method of measurement: EN 61000-4-6 (2006)

Test level: 0.15MHz-80MHz, 3V(unmodulated, r.m.s), 80%AM(1kHz), Dwell time: 0.5s

Test equipment:

Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
1	Signal Generator	R/S	SMY02	100024	2013-10-25	Normal
2	Power Meter	R/S	NRVS	100231	2014-01-05	Normal
3	Radio Communications Analyzer	Anritsu	MT8820B	6200772659	2014-01-26	Normal
4	Audio analyzer	R/S	UPL	100061	2014-07-01	Normal

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.

During the test, the RXQUAL of the downlink shall not exceed the value of three, 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.

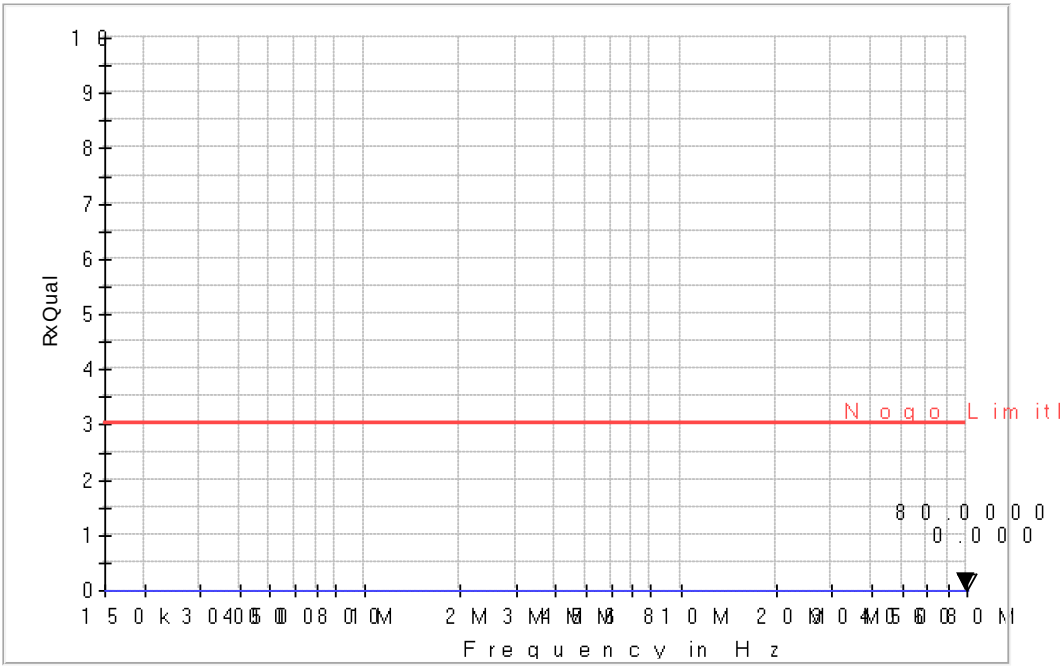
Test Result:

The E.U.T. complies.
The E.U.T. meets Performance Criteria.
Test ports:
1. AC mains power input port

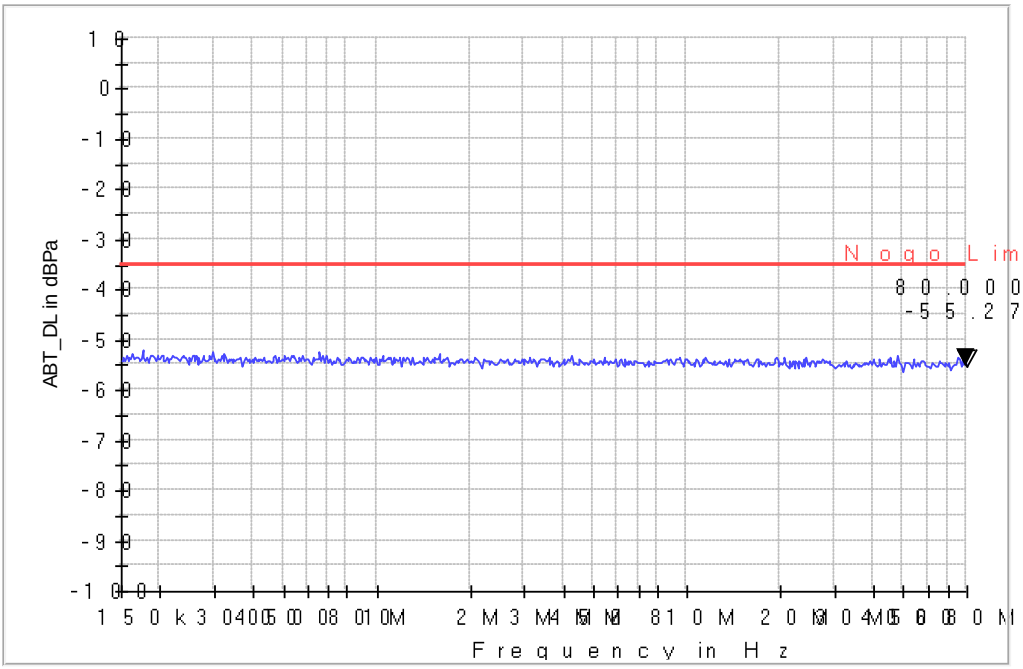
Test Conditions

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

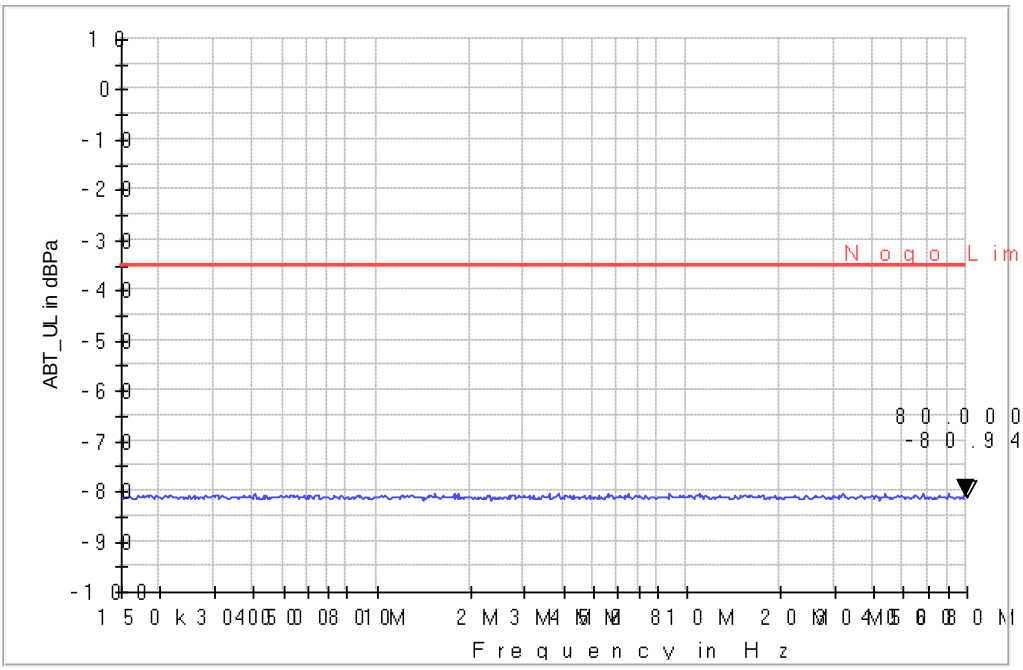
Test data (only the worst case was reported):
Mode 3
RX quality 0.15MHZ-80MHZ



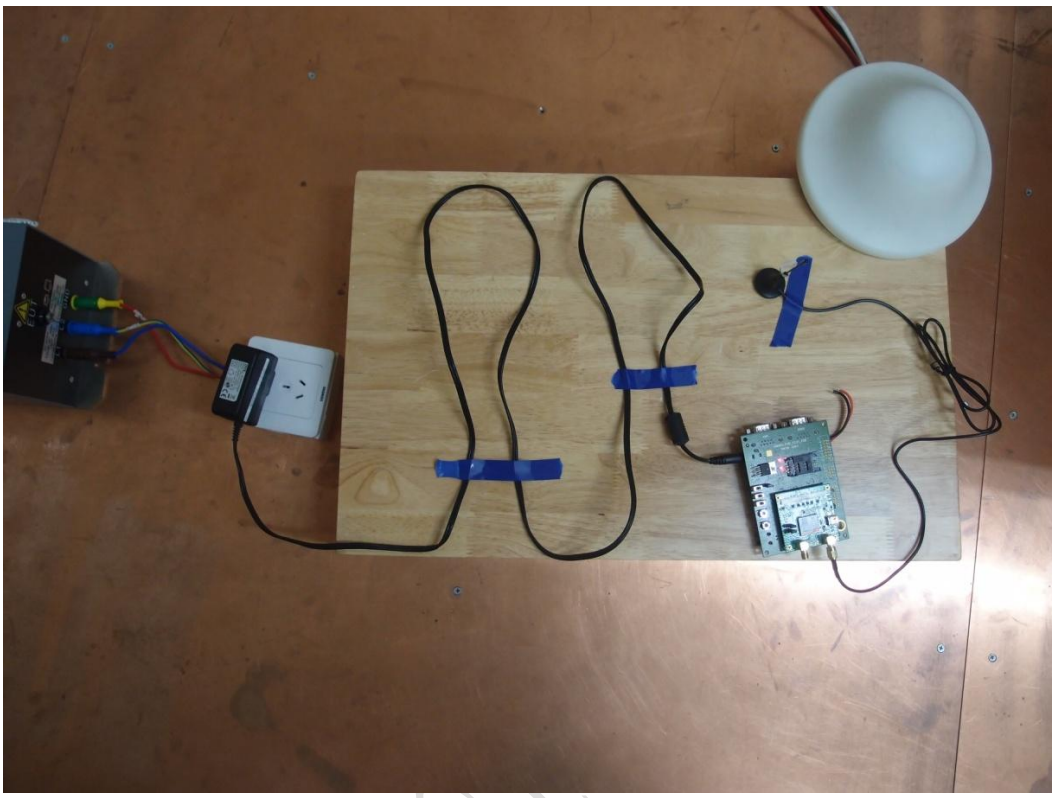
Down Link 0.15MHZ-80MHZ



Up Link 0.15MHZ-80MHZ



Test Photos:



4.9 Voltage Dips and Interruptions

Specifications: EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-7 V 1.3.1(2005-11)
EN 301 489-17 V2.1.1(2009-05)

Date of tests: 2013-08-20

Test conditions: Ambient Temperature: 15℃-35℃
Relative Humidity: 30%-60%

Method of measurement: EN 61000-4-11 (2004)

Test levels: Voltage dips: 0 % residual voltage for 0.5 cycle;
Voltage dips: 0 % residual voltage for 1 cycle;
Voltage dips: 70 % residual voltage for 25 cycles;
Voltage interruptions: 0 % residual voltage for 250 cycles.

Test equipment:

Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
1	ultra compact simulator	EMTEST	UCS500N7	V1126109983	2013-11-29	Normal

2	Universal Radio Communication tester	R/S	CMU200	123125	2013-09-26	Normal

Performance Criteria:

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

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

Test Result:

The E.U.T. complies.

The E.U.T. meets Performance Criteria.

Test ports:

1. AC Mains Port

All Test Modes:

Test Data:

Test Port	% residual voltage	Time Duration	E.U.T. Operating Mode	Result	Comments
1	0	0.5 cycle	Mode 3~ Mode5	Pass	None
1	0	1 cycle	Mode 3~ Mode5	Pass	None
1	70	25 cycle	Mode 3~ Mode5	Pass	None
1	0	250 cycle	Mode 3~ Mode5	Pass	None

4.10 Surge Immunity, line to line and line to ground

Specifications: EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-7 V 1.3.1(2005-11)
EN 301 489-17 V2.1.1(2009-05)

Date of tests: 2013-08-20

Test conditions: Ambient Temperature: 15℃-35℃
Relative Humidity: 30%-60%

Method of measurement: EN 61000-4-5 (2005)

Test levels: 2kV line to ground and 1kV line to line for AC mains power input port, 1.2/50μs pulse;

Test equipment:

Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
1	ultra compact simulator	EMTEST	UCS500N7	V1126109983	2014-01-05	Normal
2	Universal Radio Communication tester	R/S	CMU200	123125	2013-09-26	Normal

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:

The E.U.T. complies.
The E.U.T. meets Performance Criteria.

Test ports:
1. AC mains power input port
Test Mode:
Mode 3~ Mode5
Test Data:

Test Port	Test level	E.U.T. Operating Mode	Result	Comments
1	1kV line to line, 1.2/50μs pulse	Mode 3 Mode 4 Mode 5	Pass	None

Test System Verification Record:

Open Circuit Voltage	Measured Voltage kV	Wave form 1: 1.2/50		Wave form 2: 10/700		Results
		Front Time μs 1,2 ± 30 %	Time to Half Value μs 50 ± 20 %	Front Time μs 10 ±	Time to Half Value μs 700 ±	

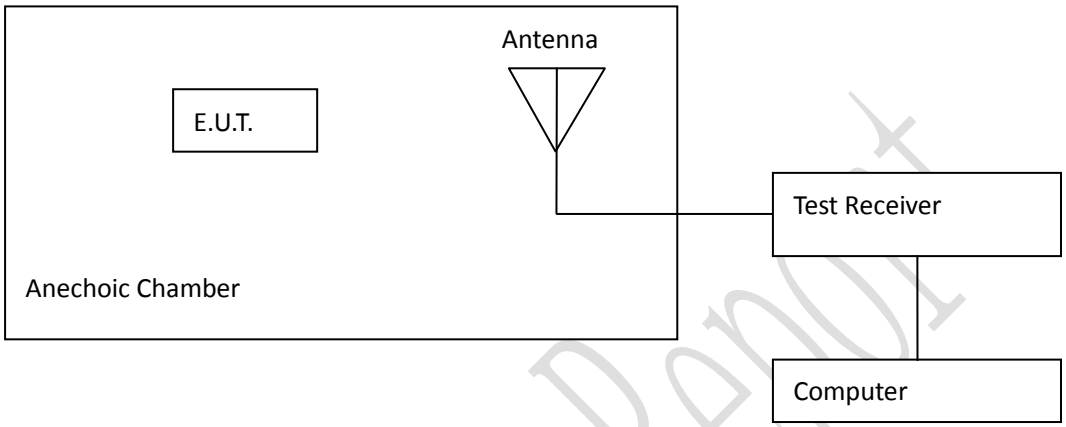
				30 %	20 %	
0.5kV± 10 %	--	--	--	--	--	--
1.0kV± 10 %	1.05	1.41	50.8	--	--	P
2.0 kV± 10 %	--	--	--	--	--	--
4.0 kV± 10 %	--	--	--	--	--	--

CTTL Test Report

ANNEX A Test Setup Diagrams

A.1 Radiated Emissions

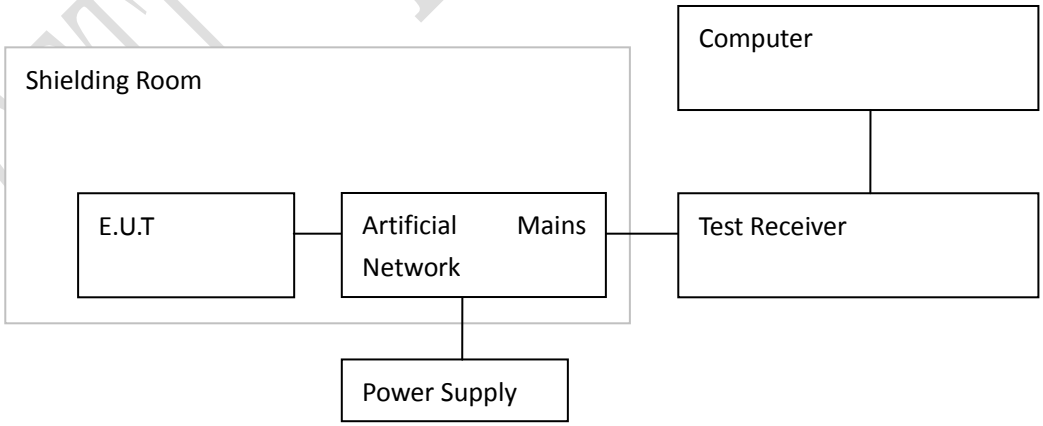
Applicable to standard EN 55022(2006)
Test Configuration - Radiated Emission



The measuring distance between E.U.T and antenna is 3m.

A.2 Conducted Emissions (AC mains port)

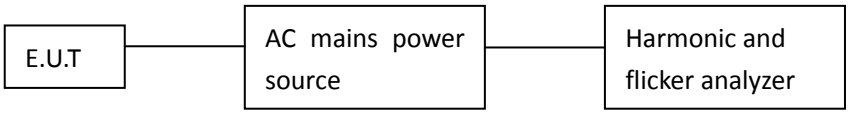
Applicable to standard EN 55022(2006)
Test Configuration - Conducted Emission



A.3 Harmonic current emissions

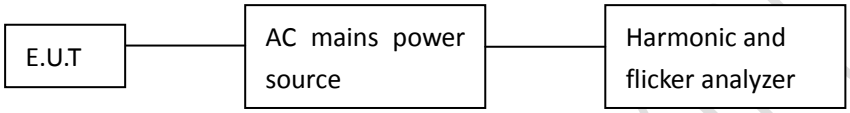
Applicable to standard EN 61000-3-2(2006)

Test configuration – Harmonic emission



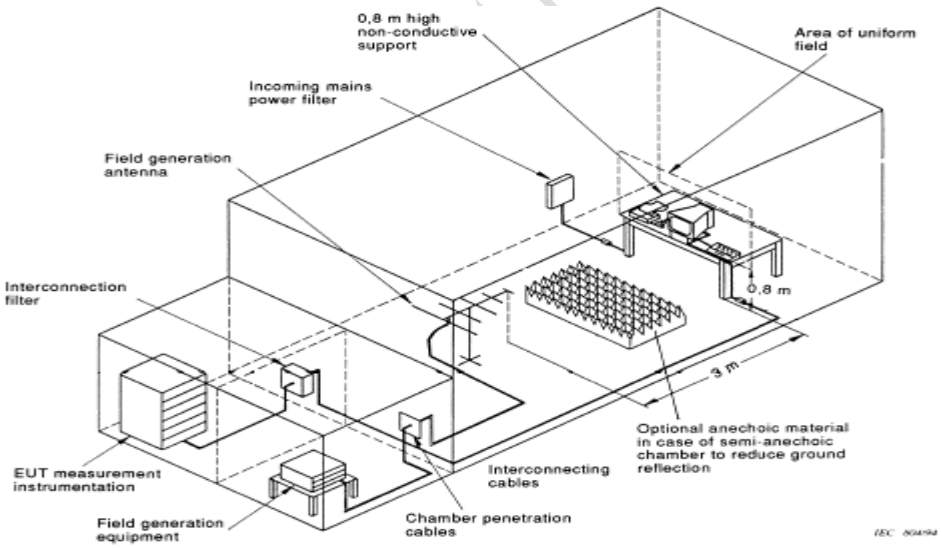
A.4 Voltage fluctuations and filcker

Applicable to standard EN 61000-3-3(2005)
Test configuration – Voltage fluctuations and filcker



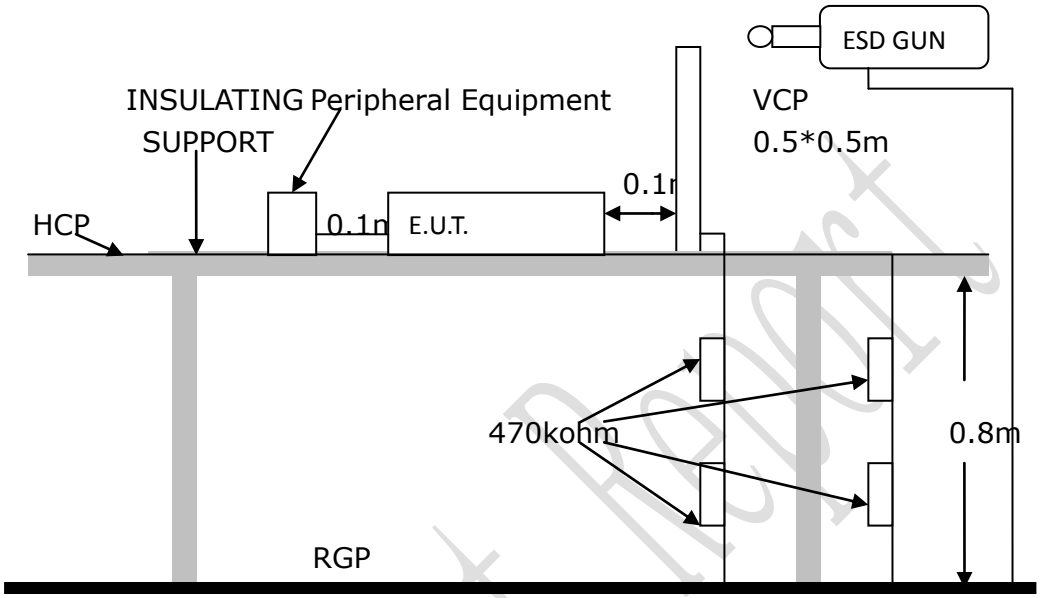
A.5 RF electromagnetic field (80MHz to 2700MHz)

Applicable to standard IEC 61000-4-3:2006
Test Configuration - RF electromagnetic field (80MHz to 2700MHz)



A.6 Electrostatic Discharge

Applicable to standard EN 61000-4-2(2001)
Test Configuration - Electrostatic Discharge

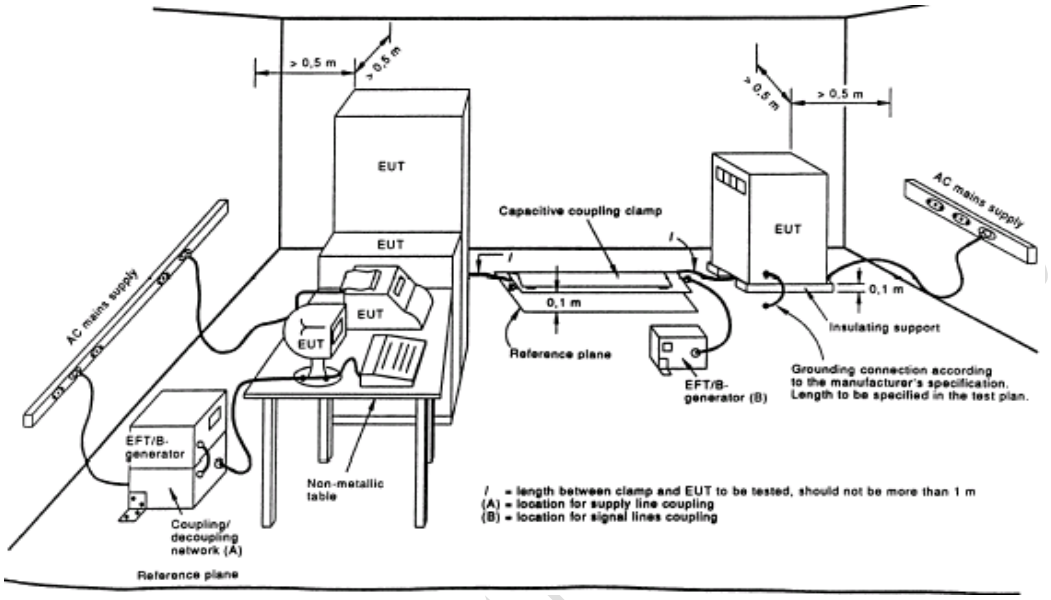


HCP – Horizontal Coupling Plane
VCP – Vertical Coupling Plane
RGP – Reference Ground Plane

CTTL Test Report

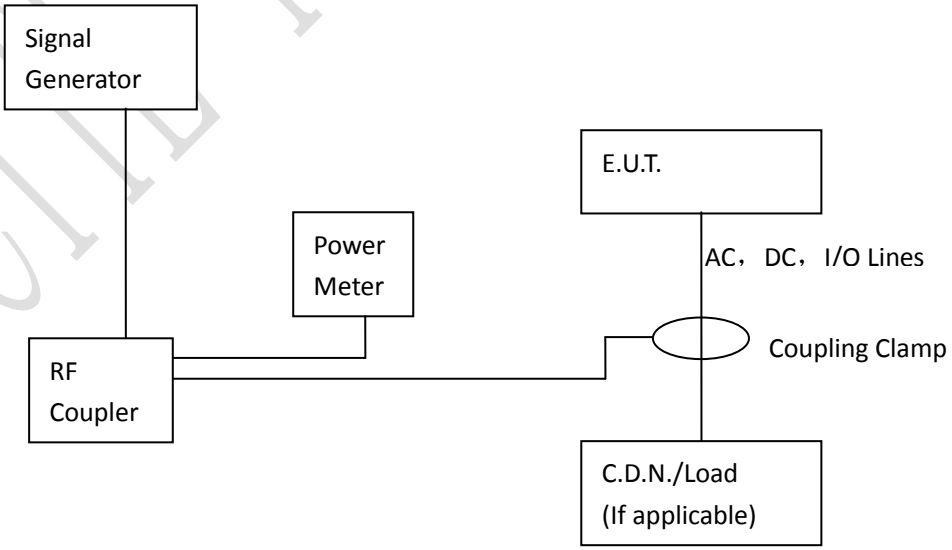
A.7 Fast transients common mode

Applicable to standard EN 61000-4-4(2004)
Test Configuration - Fast transients common mode



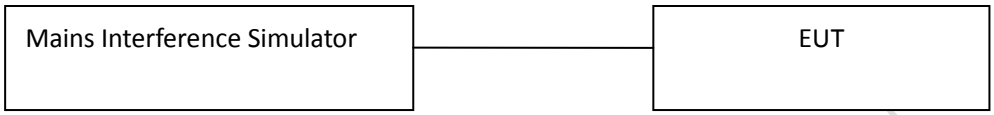
A.8 RF common mode 0.15 MHz to 80 MHz

Applicable to standard EN 61000-4-6(2005)
Test Configuration – RF common mode (0.15 MHz to 80 MHz)



A.9 Voltage dips and interruptions

Applicable to standard EN 61000-4-11(2004)
Test Configuration –Voltage dips and interruptions



A.10 Surges, line to line and line to ground

Applicable to standard EN 61000-4-5(2006)

Test Configuration – Surges, line to line and line to ground

ANNEX B Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

The End of this Report

CTTL Test Report