



TEST REPORT

ETSI EN 301 489-1 V1.9.2: 2011-09/ETSI EN 301 489-24 V1.5.1: 2010-10

Report Reference No......: **TRE1303013505 R/C: 59940**

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Date of issue.....: May 22, 2013

Testing Laboratory Name: **Shenzhen Huatongwei International Inspection Co., Ltd**

Address.....: Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China

Applicant's name: **RICON TECHNOLOGIES FZE**

Address.....: Ras Al Khaimah, UAE P.O. Box 16111

Test specification:

Standard: **ETSI EN 301 489-1 V1.9.2: 2011-09**

ETSI EN 301 489-24 V1.5.1: 2010-10

TRF Originator.....: Shenzhen Huatongwei International Inspection CO., Ltd

Master TRF.....: Dated 2006-06

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Test item description : Cellular Router

Trade Mark: **RICON**

Manufacturer: **RICON TECHNOLOGIES FZE**

Model/Type reference.....: S9922

List Model: /

Modulation: GMSK

Operation Frequency Band: FDD Band I & FDD Band VIII

Power Class: Power Class 3

Ratings.....: DC12.0V adapter from AC 230V/50Hz

Result.....: **Positive**

TEST REPORT

Test Report No. :	TRE1303013505	May 22, 2013
		Date of issue

Equipment under Test : Cellular Router

Model /Type : S9922

Listed Models : /

Applicant : **RICON TECHNOLOGIES FZE**

Address : Ras Al Khaimah,UAE P.O. Box 16111

Manufacturer : **RICON TECHNOLOGIES FZE**

Address : Ras Al Khaimah,UAE P.O. Box 16111

Test Result according to the standards on page 4:	Positive
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The test report merely corresponds to the test sample.

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

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1. TEST STANDARDS

The tests were performed according to following standards:

[ETSI EN 301 489-1 V1.9.2 \(2011-09\)](#)—Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements

[ETSI EN 301 489-24 V1.5.1 \(2010-10\)](#)—Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment; Part 17: Specific conditions for wideband transmission systems

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Mar 26, 2013
Testing commenced on	:	Mar 26, 2013
Testing concluded on	:	May 22, 2013

2.2. Equipment Under Test

The **RICON TECHNOLOGIES FZE.**'s Model: S9922 or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	Cellular Router
Model Number	S9922
Power Class	Power Class 3
Rated Output Power	24dBm
Modulation Type	GMSK
Antenna Type	External
Operation Frequency Band	FDD Band I & FDD Band VIII
HSDPA Release Version	Release 5 & Release 6
HSUPA Release Version	Release 6
WCDMA Release Version	R99

Power supply system utilised

Power supply voltage	:	<input type="radio"/> 230V / 50 Hz	<input type="radio"/> 115V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input checked="" type="radio"/> Other (specified in blank below)	

DC 12.0 V Adapter from AC 230V/50Hz

2.3. Short description of the Equipment under Test (EUT)

2.4GHz (Cellular Router (M/N:S9922))

For more details, refer to the user's manual of

the EUT. Serial number: Prototype

2.4. EUT operation mode

The EUT has been tested under typical operating condition. No software used to control the EUT for staying in transmitting and receiving mode for testing.

2.5. Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test relative to a performance criteria defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product. Examples of functions defined by the manufacturer to be evaluated during testing include, but are not limited to, the following:

- essential operational modes and states;
- tests of all peripheral access(hard disks, floppy disks, printers, keyboard, mouse, etc.);
- quality of software execution

- quality of data display and transmission
- quality of speech transmission

Definition related to the performance level:

- based on the used product standard
- based on the declaration of the manufacturer, requestor or purchaser

Performance criteria

The equipment shall meet the performance criteria specified in this clause and clauses 6.1 to 6.4, as appropriate.

Portable equipment intended for use whilst powered by the main battery of a vehicle shall additionally fulfil the applicable requirements set out in EN 301 489-1 [1], clauses 7.1 and 7.2 for mobile equipment.

Portable or mobile equipment powered by the AC mains shall additionally fulfil the applicable requirements of EN 301 489-1 [1], clauses 7.1 and 7.2 for radio and ancillary equipment for fixed use.

The establishment and maintenance of a communications link, the assessment of RXQUAL, and the assessment of the audio breakthrough by monitoring the speech output signal level, are used as performance criteria to ensure that all primary functions of the transmitter and receiver are evaluated during the immunity tests. In addition, the test shall also be performed in idle mode to ensure the transmitter does not unintentionally operate.

The maintenance of a communications link shall be assessed using an indicator which may be part of the test system or the EUT.

If an equipment is of a specialized nature, such that the performance criteria described in the following clauses are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in the following clauses.

Performance criteria for Continuous phenomena applied to Transmitters (CT)

A communication link shall be established at the start of the test, and maintained during the test, see clauses 4.2.2 to 4.2.5.

During the test, the uplink 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, 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.

At the conclusion of the test, 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.

Performance criteria for Transient phenomena applied to Transmitters (TT)

A communications link shall be established at the start of the test, see clauses 4.2.2 to 4.2.5.

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.

Performance criteria for Continuous phenomena applied to Receivers (CR)

A communications link shall be established at the start of the test, clauses 4.2.1 to 4.2.4.

During the test, the RXQUAL of the downlink shall not exceed the value of three, measured during each individual exposure in the test sequence.

During the test, the 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, 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.

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained.

Performance criteria for Transient phenomena applied to Receivers (TR)

A communications link shall be established at the start of the test, clauses 4.2.1 to 4.2.4.

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.

Special conditions

Emission

No special conditions shall apply to UE in the scope of the present document.

Immunity

The following special conditions set out in table 1, relate to the immunity test methods used in the EN 301 489-1 [1], clause 9.

Table 1: Special conditions for EMC immunity measurements

Reference to clauses in EN 301 489-1 [1]	Special product-related conditions, additional to or modifying the test conditions in EN 301 489-1 [1], clause 9
9.2 Radio frequency electromagnetic field 9.2.2 Test method	When using the max hold detector method (see annex B) at each test frequency step initially an unmodulated test signal shall be applied. Then the test modulation shall be applied.
9.5 Radio frequency, common mode 9.5.2 Test method	There is no exclusion band for the equipment in the scope of the present document. when using the max hold detector method (see annex B) at each test frequency step initially an unmodulated test signal shall be applied. Then the test modulation shall be applied. The procedure used for identifying narrowband responses does not apply to conducted immunity tests in the frequency range 150 kHz to 80 MHz (see clause 4.4).
9.6.3 Performance criteria	During tests with pulses 3a and 3b, the performance criteria TT shall apply, see clause 6.2.

Performance criteria for continuous phenomena

A communication link shall be established at the start of the test, and maintained during the test, clauses 4.1 and 4.2.

In the speech mode, the performance criteria shall be that the Up Link and Down Link speech output levels shall be at least 35 dB less than the recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (annex B).

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

At the conclusion of the test, 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 in traffic mode, the test shall be performed in idle mode, and the transmitter shall not unintentionally operate.

UTRA

In the data transfer mode, the performance criteria can be one of the following:

- if the BER (as referred in TS 134 109 [8]) is used, it shall not exceed 0,001 during the test sequence;
- if the BLER (as referred in TS 134 109 [8]) is used, it shall not exceed 0,01 during the test sequence.

The BLER calculation shall be based on evaluating the CRC on each transport block.

E-UTRA

In the data transfer mode, the performance criteria shall be that the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channel as specified in annex C in TS 136 101 [13] with parameters specified in tables 7.3.1-1 and 7.3.1-2 in TS 136 101 [13] during the test sequence.

A communication link shall be established at the start of the test, and maintained during the test, clauses 4.1 and 4.2.

In the speech mode, the performance criteria shall be that the Up Link and Down Link speech output levels shall be at least 35 dB less than the recorded reference levels, when measured through an audio band pass

filter of width 200 Hz, centred on 1 kHz (annex B).

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

At the conclusion of the test, 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 in traffic mode, the test shall be performed in idle mode, and the transmitter shall not unintentionally operate.

UTRA

In the data transfer mode, the performance criteria can be one of the following:

- if the BER (as referred in TS 134 109 [8]) is used, it shall not exceed 0,001 during the test sequence;
- if the BLER (as referred in TS 134 109 [8]) is used, it shall not exceed 0,01 during the test sequence.

The BLER calculation shall be based on evaluating the CRC on each transport block.

E-UTRA

In the data transfer mode, the performance criteria shall be that the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channel as specified in annex C in TS 136 101 [13] with parameters specified in tables 7.3.1-1 and 7.3.1-2 in TS 136 101 [13] during the test sequence.

Performance criteria for Transient phenomena

A communications link shall be established at the start of the test, clauses 4.1 and 4.2.

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 in traffic mode, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

2.6. Modifications

No modifications were implemented to meet testing criteria.

2.7. NOTE

The EUT including GPRS,EGPRS, WCDMA and WLAN function,The functions of the EUT listed as below:

	Test Standards	Reference Report
Radio-WCDMA	ETSI EN 301 908-1 V5.2.1: 2011-05 ETSI EN 301 908-2 V4.2.1: 2010-03	TRE1303013501
Radio-GSM	ETSI EN 301 511 V9.0.2: 2003-03	TRE1303013502
Radio-WLAN	ETSI EN 300 328 V1.7.1: 2006-10	TRE1303013503
EMC-GSM	ETSI EN 301 489-1 V1.9.2: 2011-09 ETSI EN 301 489-7 V1.3.1: 2005-11	TRE1303013504
EMC-WCDMA	ETSI EN 301 489-1 V1.9.2: 2011-09 ETSI EN 301 489-24 V1.5.1: 2010-10	TRE1303013505
EMC-WLAN	ETSI EN 301 489-1 V1.9.2: 2011-09 ETSI EN 301 489-17 V2.2.1: 2012-09	TRE1303013506
EMC	EN 55022:2010 EN 55024:2010	TRE1303013507
EMF	EN62311:2008	TRE1303013508

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Huatongwei International Inspection Co., Ltd
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Phone: 86-755-26715686 Fax: 86-755-26748089

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2009) and CISPR Publication 22.

3.2. Test Facility

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

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: Mar. 01, 2012. Valid time is until Feb 28, 2015.

A2LA-Lab Cert. No. 2243.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until Sept. 30, 2013.

FCC-Registration No.: 662850

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 662850, Renewal date Jun. 01, 2012, valid time is until Jun. 01, 2015.

IC-Registration No.: 5377A

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Jan. 25, 2011, valid time is until Jan. 24, 2014.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

NEMKO-Aut. No.: ELA125

Shenzhen Huatongwei International Inspection Co., Ltd has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10, the authorization is valid through July 07, 2013

VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) and Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2010. Valid time is until Dec. 23, 2013.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 19, 2015.

Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

DNV

Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2013.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

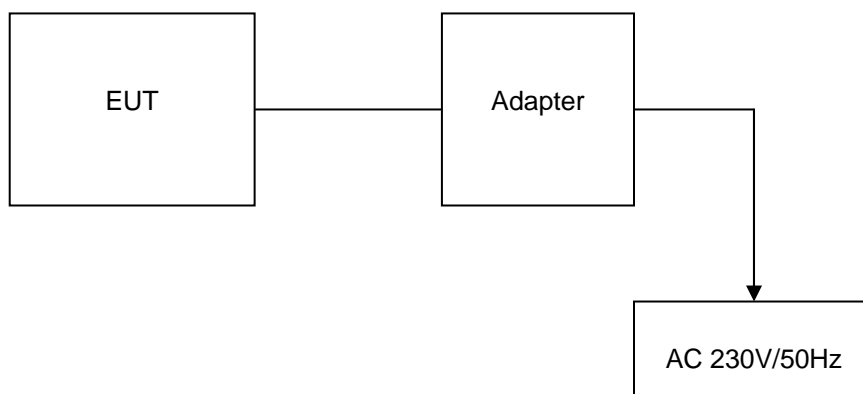


Table 2-1 Equipment Used in Tested System

Adapter:

Model: KW300-120E20
 Input:100-240V~50/60Hz 0.8A
 Output: +12V DC 2.0A
 Power Cable: 120cm
 ◇ Shielded ◆ Unshielded

3.5. Test Description

ETSI EN 301 489-1/-24 requirements		
Radiated emission	ETSI EN301 489-1 V1.9.2 Clause 7.1	PASS
Conducted emission(AC Mains)	ETSI EN301 489-1 V1.9.2 Clause 7.1	PASS
Conducted emission(Communication Ports)	ETSI EN301 489-1 V1.9.2 Clause 7.1	PASS
Harmonic current emissions	ETSI EN301 489-1 V1.9.2 Clause 7.1	PASS
Voltage fluctuations and flicker	ETSI EN301 489-1 V1.9.2 Clause 7.1	PASS
Electrostatic discharge	ETSI EN301 489-1 V1.9.2 Clause 7.2	PASS
RF electromagnetic field	ETSI EN301 489-1 V1.9.2 Clause 7.2	PASS
Fast transients common mode	ETSI EN301 489-1 V1.9.2 Clause 7.2	PASS
RF common mode 0,15 MHz to 80 MHz	ETSI EN301 489-1 V1.9.2 Clause 7.2	PASS
Transients and surges	ETSI EN301 489-1 V1.9.2 Clause 7.2	N/A
Voltage dips and interruptions	ETSI EN301 489-1 V1.9.2 Clause 7.2	PASS
Surges, line to line and line to ground	ETSI EN301 489-1 V1.9.2 Clause 7.2	PASS

Remark: The measurement uncertainty is not included in the test result.

3.6. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.22dB	(1)
Radiated Emission	1~12.75GHz	4.35dB	(1)
Conducted Disturbance	0.15~30MHz	3.29dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.7. Equipments Used during the Test

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Ultrar-Broadband Antenna	Rohde&Schwarz	HL562	100015	2012/10/27
2	EMI Test Receiver	Rohde&Schwarz	ESI 26	100009	2012/10/27
3	RF Test Panel	Rohde&Schwarz	TS / RSP	335015/ 0017	2012/10/27
4	Turetable	ETS	2088	2149	2012/10/27
5	Antenna Mast	ETS	2075	2346	2012/10/27
6	EMI Test Software	Rohde&Schwarz	ESK1	N/A	2012/10/27
7	Horn Antenna	Rohde&Schwarz	HF906	100039	2012/10/27
8	Universal Radio Communication Tester	Rohde&Schwarz	CMU200	112012	2012/10/27
9	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	2012/10/27
10	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	539	2012/10/27
11	HORN ANTENNA	ShwarzBeck	9120D	1011	2012/10/27
12	TURNTABLE	MATURO	TT2.0	----	2012/10/27
13	ANTENNA MAST	MATURO	TAM-4.0-P	----	2012/10/27

Electrostatic Discharge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ESD Simulator	EM TEST	DITOC0103Z	0301-04	2012/10/27
2	Universal Radio Communication Tester	Rohde&Schwarz	CMU200	112012	2012/10/27

Conducted Susceptibility Test					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal Generator	IFR	2023A	202304/060	2012/10/27
2	Amplifier	AR	75A250	302205	2012/10/27
3	Dual Directional Coupler	AR	DC2600	302389	2012/10/27
4	6db Attenuator	EMTEST	ATT6/75	0010230A	2012/10/27
5	EM Clamp	LÜTHI	EM101	335625	2012/10/27
6	CDN	EMTEST	CDN M3	0802-03	2012/10/27
7	Audio Analyzer	Rohde&Schwarz	UPL	112356	2012/10/27
8	Universal Radio Communication Tester	Rohde&Schwarz	CMU200	112012	2012/10/27

RF Electromagnetic Field					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal Generator	IFR	2032	203002/100	2012/10/27
2	AMPLIFIER	AR	150W1000	301584	2012/10/27
3	DUAL DIRECTIONAL COUPLER	AR	DC6080	301508	2012/10/27
4	POWER HEAD	AR	PH2000	301193	2012/10/27
5	POWER METER	AR	PM2002	302799	2012/10/27
6	TRANSMITTING AERIAL	AR	AT1080	28570	2012/10/27
7	POWER AMPLIFIER	AR	25S1G4A	0325511	2012/10/27
8	DUAL DIRECTIONAL COUPLER	AR	DC7144A	0325100	2012/10/27
9	TRANSMITTING AERIAL	AR	AT4002A	0324848	2012/10/27
10	Audio Analyzer	Rohde&Schwarz	UPL	112356	2012/10/27
11	Universal Radio Communication Tester	Rohde&Schwarz	CMU200	112012	2012/10/27

Voltage Fluctuation and Flicker & Harmonic Current					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Purified Power Source	CALIFORNIA INSTRUMENTS	HFS500	54513	2012/10/27
2	Harmonic And Flicker Analyzer	EM TEST	DPA503S1	0500-10	2012/10/27
3	Universal Radio Communication Tester	Rohde&Schwarz	CMU200	112012	2012/10/27

Conducted Disturbance					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	Rohde&Schwarz	ESCI	100106	2012/10/27
2	Artificial Mains	Rohde&Schwarz	ESH2-Z5	100028	2012/10/27
3	Pulse Limiter	Rohde&Schwarz	ESHSZ2	100044	2012/10/27
4	EMI Test Software	Rohde&Schwarz	ESK1	N/A	2012/10/27
5	Single Balanced Telecom Pair ISN	FCC	FCC-TLISN-T2-02	20371	2012/10/27
6	Two Balanced Telecom Pairs ISN	FCC	FCC-TLISN-T4-02	20373	2012/10/27
7	Universal Radio Communication Tester	Rohde&Schwarz	CMU200	112012	2012/10/27

Electrical Fast Transient/Burst Test					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Ultra Compact Simulator	EM TEST	UCS500M6	0500-19	2012/10/27
2	Coupling Clamp	EM TEST	HFK	1501-14	2012/10/27
3	Universal Radio Communication Tester	ROHDE & SCHWARZ	CMU200	112012	2012/10/27

Voltage Dips and Interruptions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Ultra Compact Simulator	EM TEST	UCS500M6	0500-19	2012/10/27
2	Motor Driven Voltage Transformer	EM TEST	MV2616	0301-11	2012/10/27
3	Universal Radio Communication Tester	Rohde&Schwarz	CMU200	112012	2012/10/27

The Calibration Interval was one year.

4. TEST CONDITIONS AND RESULTS

4.1. ETSI EN 301 489-1/-24 REQUIREMENTS

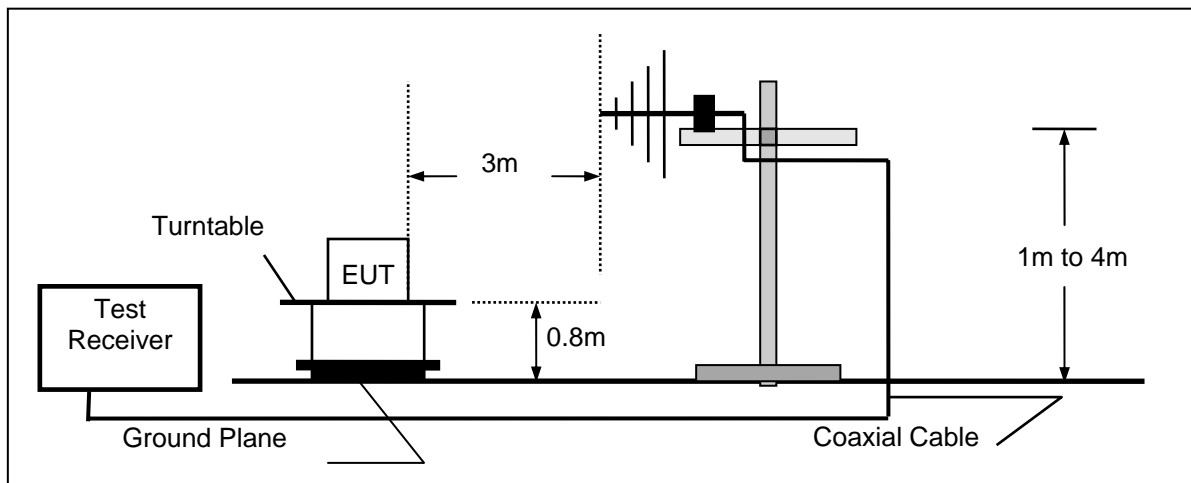
4.1.1. Radiated Emission

LIMIT

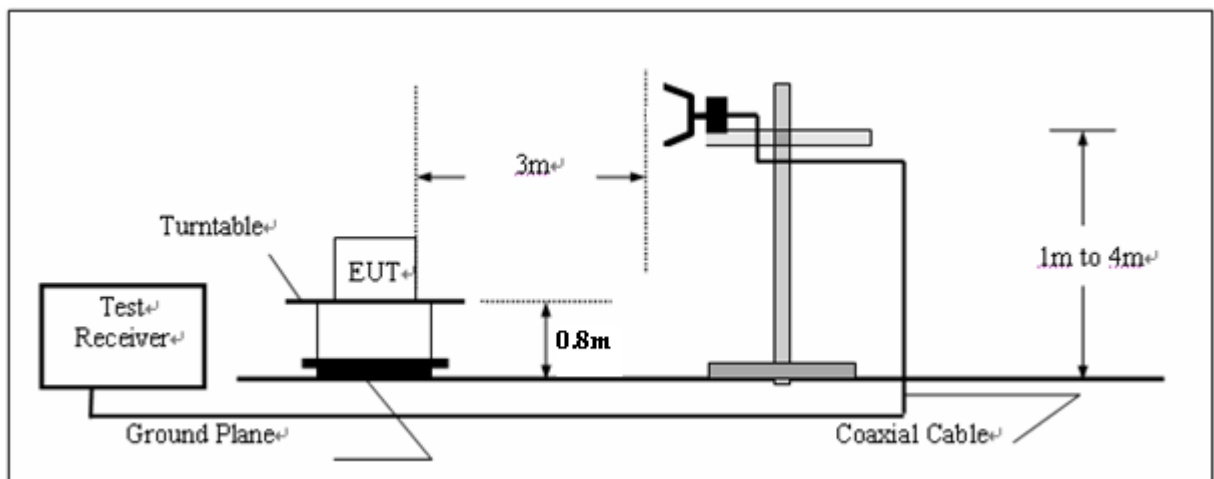
Please refer to ETSI EN 301 489-1 Clause 8.2.3, Table 4 and EN 55022 Clause 6, Table 6, and Class B

TEST CONFIGURATION

(b) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 8.2.3 and EN 55022 Clause 6 for the measurement methods.

TEST RESULTS

Remark:

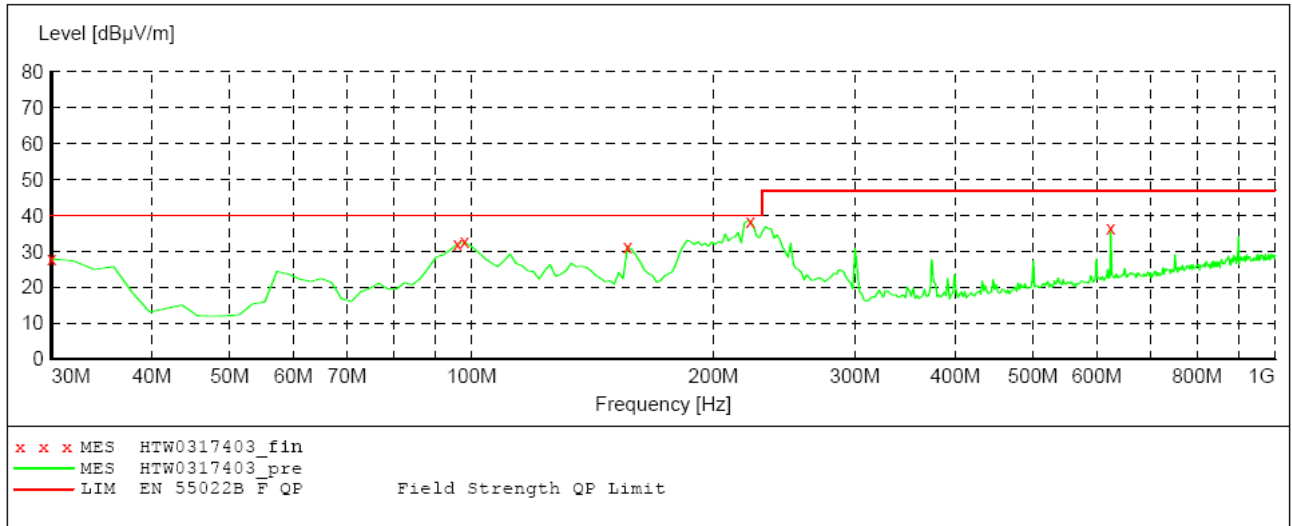
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) + Pre-amplifier (dB)
3. Margin value = Emission level – Limit value.
4. “---” means the margin at least 10dB, so not record the test values.
5. The IF bandwidth of EMI Test Receiver was 120 KHz for measuring from 30 MHz to 1 GHz and 1MHz for measuring above 1GHz.

6. We tested all idle mode, recorded worst case at WCDMA900 idle test mode.

Below 1000MHz

SCAN TABLE: "test Field (30M-1G) QP"

Short Description:			Field Strength (30M-1G)			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	1.0 s	120 kHz	HL562



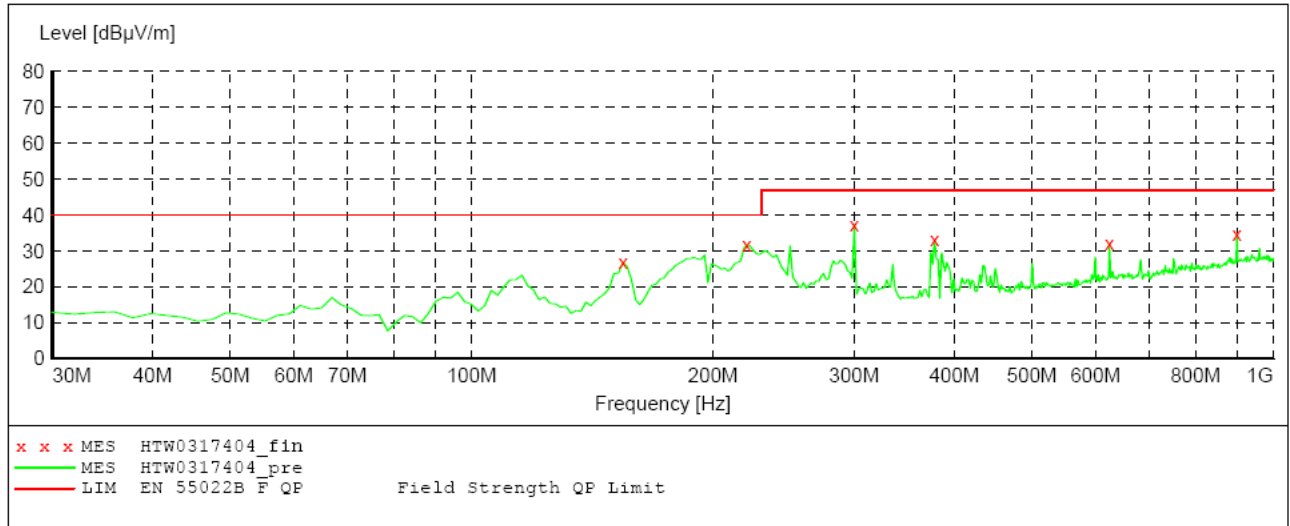
MEASUREMENT RESULT: "HTW0317403_fin"

5/17/2013 6:08PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	27.90	-16.7	40.0	12.1	QP	100.0	219.00	HORIZONTAL
96.092184	32.10	-15.9	40.0	7.9	QP	100.0	122.00	HORIZONTAL
98.036072	32.60	-15.8	40.0	7.4	QP	100.0	101.00	HORIZONTAL
156.352705	31.40	-19.3	40.0	8.6	QP	100.0	93.00	HORIZONTAL
222.444890	38.50	-15.4	40.0	1.5	QP	100.0	328.00	HORIZONTAL
624.829659	36.40	-5.7	47.0	10.6	QP	100.0	93.00	HORIZONTAL

SCAN TABLE: "test Field (30M-1G) QP"

Short Description:			Field Strength (30M-1G)			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
30.0 MHz	1.0 GHz	60.0 kHz	QuasiPeak	1.0 s	120 kHz	HL562



MEASUREMENT RESULT: "HTW0317404_fin"

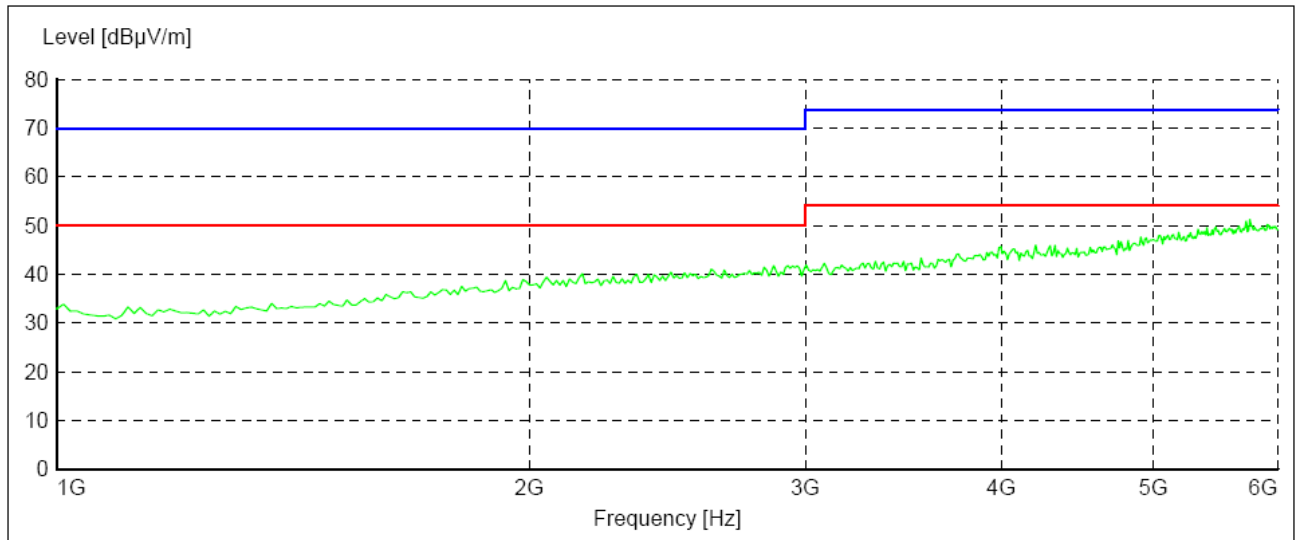
5/17/2013 6:10PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
154.408818	26.90	-19.4	40.0	13.1	QP	100.0	146.00	VERTICAL
220.501002	31.70	-15.5	40.0	8.3	QP	100.0	0.00	VERTICAL
300.200401	37.30	-13.1	47.0	9.7	QP	100.0	29.00	VERTICAL
377.955912	33.00	-11.4	47.0	14.0	QP	100.0	166.00	VERTICAL
624.829659	31.90	-5.7	47.0	15.1	QP	100.0	0.00	VERTICAL
900.861723	34.70	-2.1	47.0	12.3	QP	100.0	93.00	VERTICAL

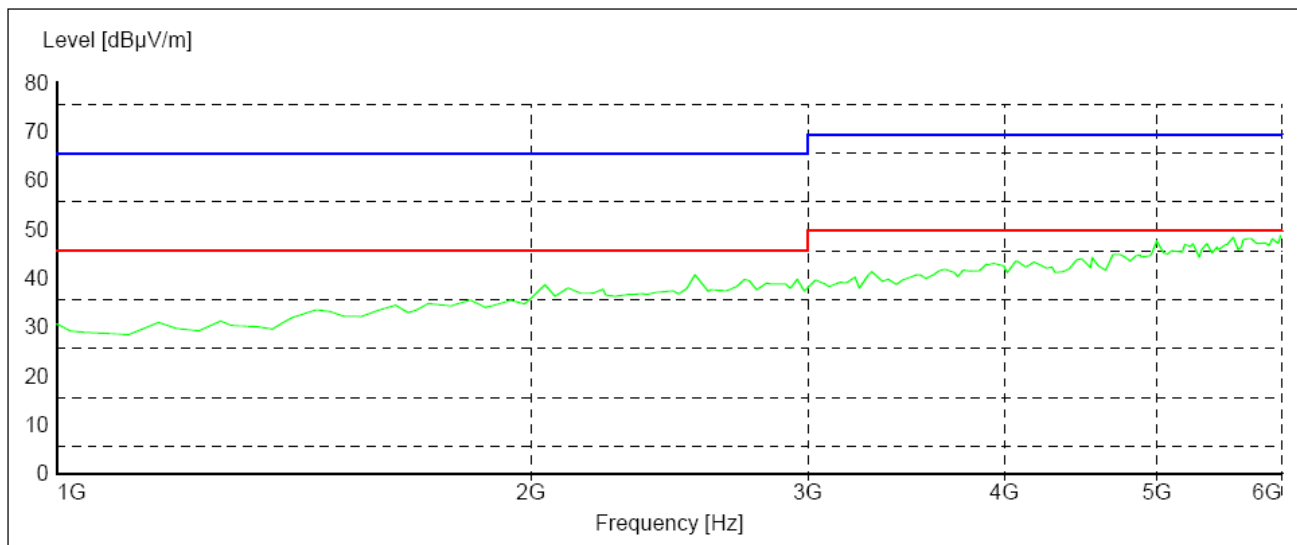
REMARKS:

1. * Undetectable
2. The IF bandwidth of EMI Test Receiver was 120 KHz for measuring from 30 MHz to 1 GHz and 1 MHz for measuring above 1 GHz

Above 1GHz



Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Detector	Correction Factor (dB/m)	Polari zation
---	---	---	---	---	Peak	---	V
---	---	---	---	---	AV	---	V



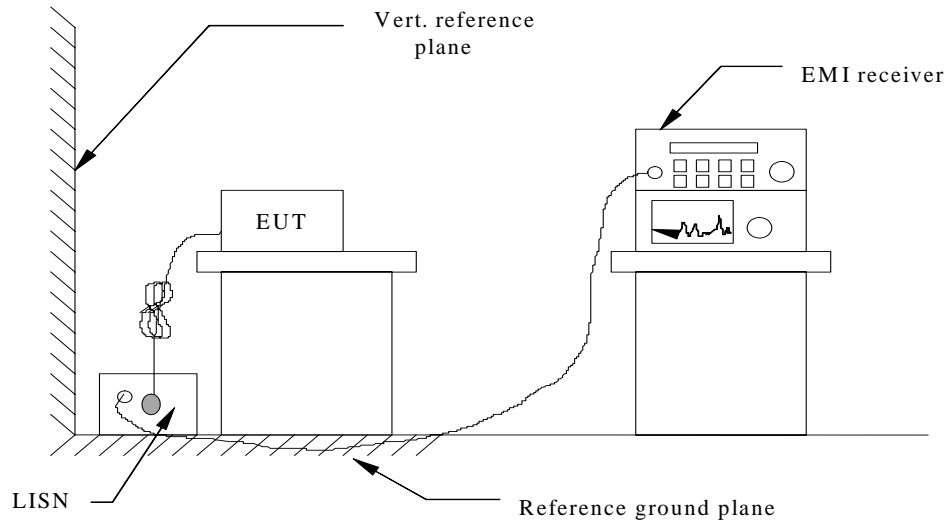
Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Detector	Correction Factor (dB/m)	Polari zation
---	---	---	---	---	Peak	---	H
---	---	---	---	---	AV	---	H

4.1.2. Conducted Emission (AC Mains)

LIMIT

Please refer to ETSI EN 301 489-1 Clause 8.4.3, Table 8 and EN 55022 Clause 5, Table 2, and Class B

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 8.4.3 and EN 55022 Clause 5 for the measurement methods.

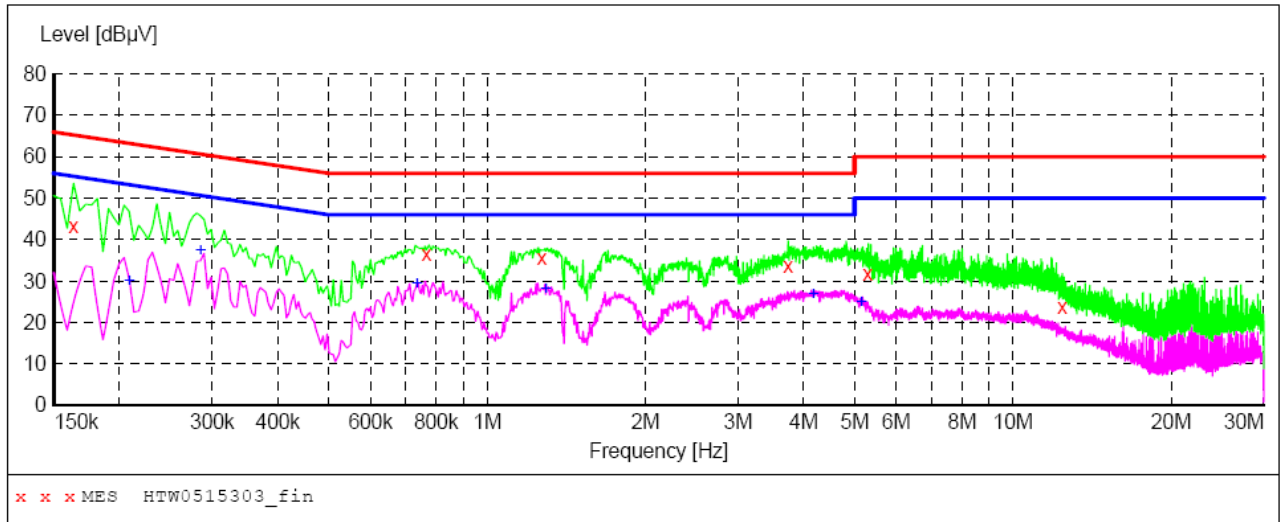
TEST RESULTS

Remark:

1. We tested all test conditions, recorded worst case at WCDMA900 traffic mode.

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "HTW0515303_fin"

5/15/2013 9:25AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.163500	43.10	10.2	65	22.2	QP	L1	GND
0.766500	36.50	10.1	56	19.5	QP	L1	GND
1.270500	35.50	10.2	56	20.5	QP	L1	GND
3.736500	33.50	10.2	56	22.5	QP	L1	GND
5.293500	31.60	10.2	60	28.4	QP	L1	GND
12.412500	23.70	10.3	60	36.3	QP	L1	GND

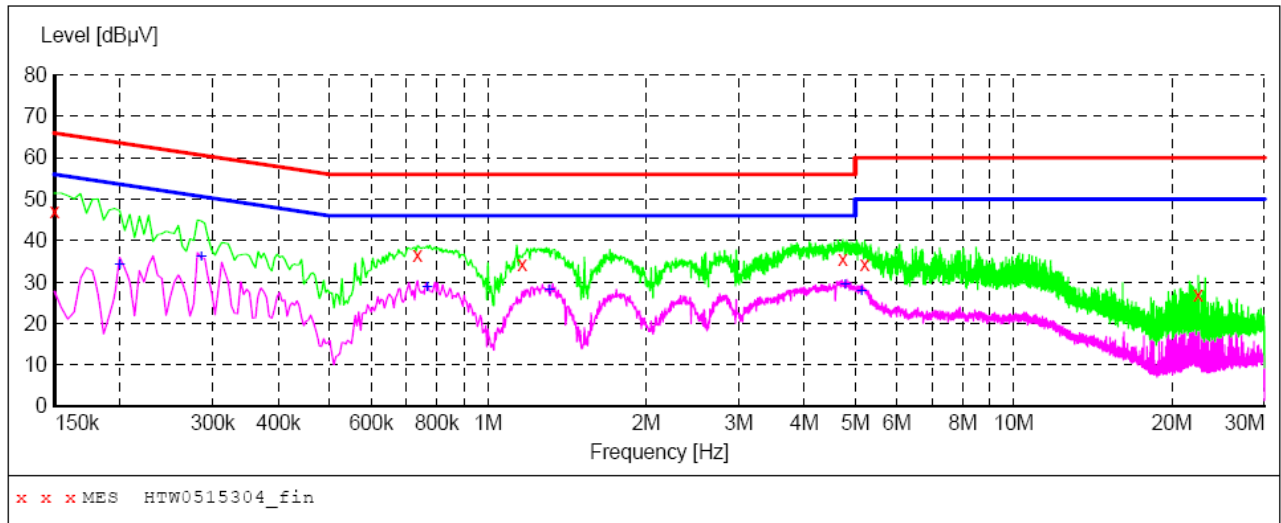
MEASUREMENT RESULT: "HTW0515303_fin2"

5/15/2013 9:25AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.208500	30.30	10.2	53	23.0	AV	L1	GND
0.285000	37.40	10.3	51	13.3	AV	L1	GND
0.735000	29.60	10.1	46	16.4	AV	L1	GND
1.293000	28.10	10.2	46	17.9	AV	L1	GND
4.177500	27.00	10.2	46	19.0	AV	L1	GND
5.149500	25.10	10.2	50	24.9	AV	L1	GND

SCAN TABLE: "Voltage (9K-30M) FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "HTW0515304_fin"

5/15/2013 9:27AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	47.00	10.2	66	19.0	QP	N	GND
0.735000	36.70	10.1	56	19.3	QP	N	GND
1.162500	34.20	10.2	56	21.8	QP	N	GND
4.731000	35.60	10.2	56	20.4	QP	N	GND
5.212500	34.20	10.2	60	25.8	QP	N	GND
22.456500	26.90	10.5	60	33.1	QP	N	GND

MEASUREMENT RESULT: "HTW0515304_fin2"

5/15/2013 9:27AM

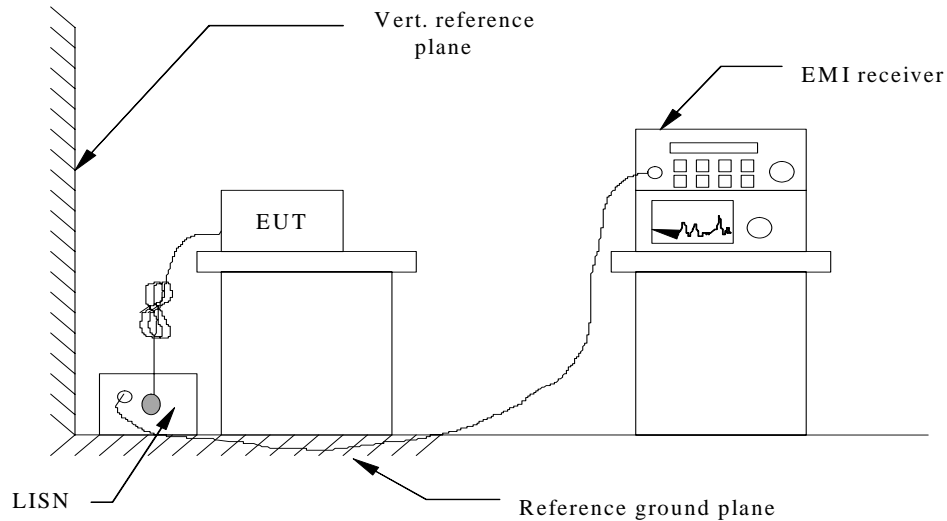
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.199500	34.40	10.2	54	19.2	AV	N	GND
0.285000	36.30	10.3	51	14.4	AV	N	GND
0.766500	28.90	10.1	46	17.1	AV	N	GND
1.311000	28.20	10.2	46	17.8	AV	N	GND
4.785000	29.60	10.2	46	16.4	AV	N	GND
5.136000	28.00	10.2	50	22.0	AV	N	GND

4.1.3. Conducted Emission (Communication Ports)

LIMIT

Please refer to ETSI EN 301 489-1 Clause 8.3.3, Table 6 and EN 55022 Clause 5, Table 4, and Class B

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 8.3.2 and EN 55022 Clause 5 for the measurement methods.

TEST RESULTS

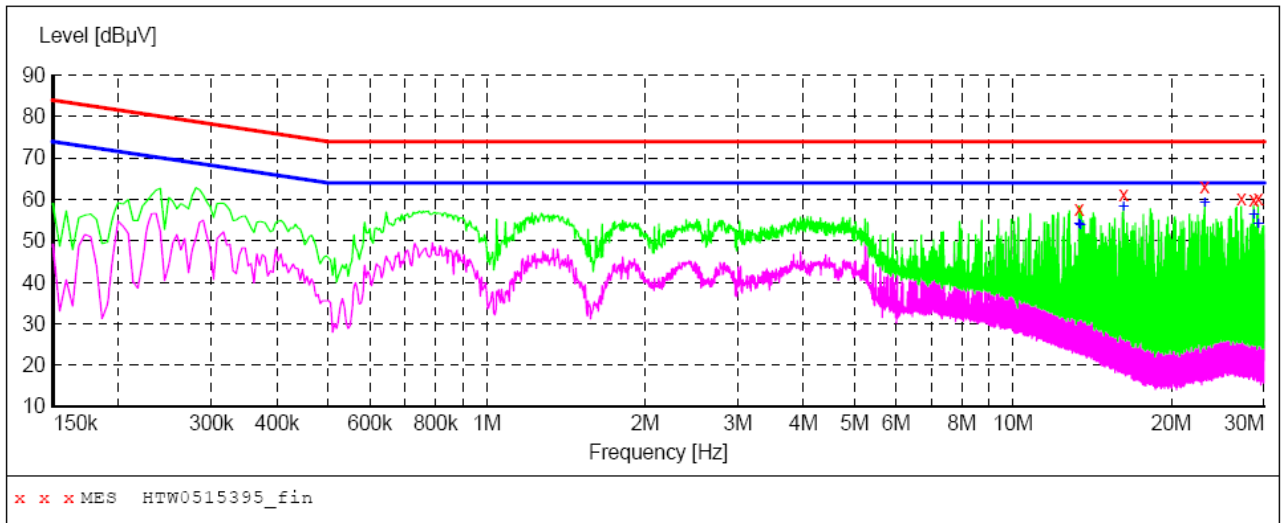
Remark:

1. We tested all test conditions, recorded worst case at WCDMA900 traffic mode.

LAN port

SCAN TABLE: "EN 22 T Voltage FIN"

Short Description: 150K-30MHz Voltage



MEASUREMENT RESULT: "HTW0515395_fin"

5/15/2013 9:58AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
13.357500	57.60	19.9	74	16.4	QP	LAN	GND
16.228500	61.20	19.9	74	12.8	QP	LAN	GND
23.127000	63.20	20.0	74	10.8	QP	LAN	GND
27.159000	60.20	20.0	74	13.8	QP	LAN	GND
28.684500	60.00	20.0	74	14.0	QP	LAN	GND
29.233500	60.10	20.0	74	13.9	QP	LAN	GND

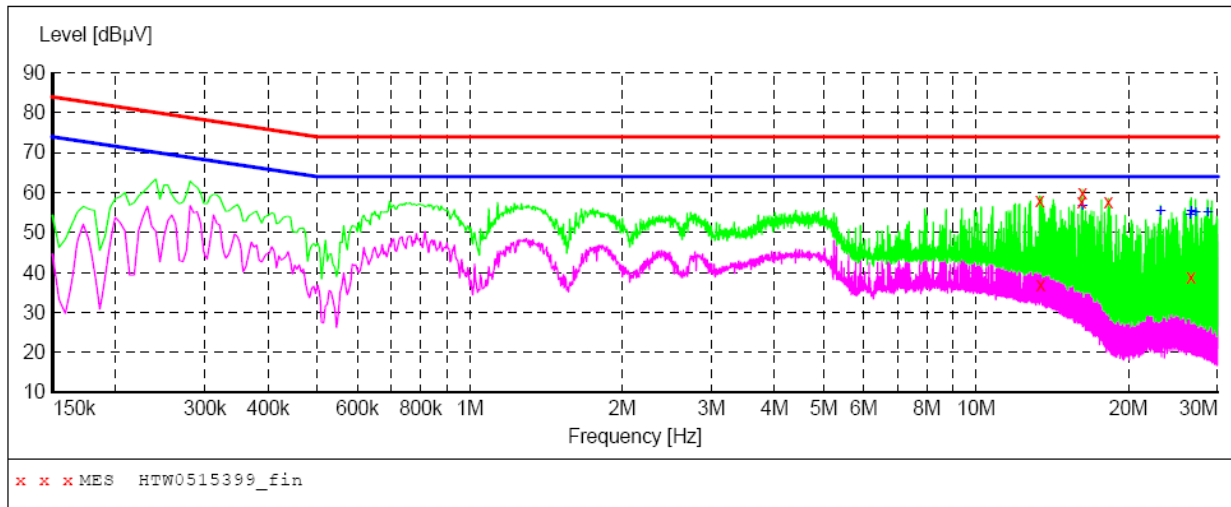
MEASUREMENT RESULT: "HTW0515395_fin2"

5/15/2013 9:58AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
13.357500	54.30	19.9	64	9.7	AV	LAN	GND
13.420500	53.90	19.9	64	10.1	AV	LAN	GND
16.228500	58.30	19.9	64	5.7	AV	LAN	GND
23.127000	59.30	20.0	64	4.7	AV	LAN	GND
28.684500	56.30	20.0	64	7.7	AV	LAN	GND
29.238000	54.10	20.0	64	9.9	AV	LAN	GND

WAN port

SCAN TABLE: "EN 22 T Voltage FIN"
 Short Description: 150K-30MHz Voltage



MEASUREMENT RESULT: "HTW0515399_fin"

5/15/2013 10:17AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
13.357500	57.90	19.9	74	16.1	QP	WAN	GND
13.420500	37.10	19.9	74	36.9	QP	WAN	GND
16.165500	57.60	19.9	74	16.4	QP	WAN	GND
16.228500	59.80	19.9	74	14.2	QP	WAN	GND
18.244500	57.60	19.9	74	16.4	QP	WAN	GND
26.610000	38.70	20.0	74	35.3	QP	WAN	GND

MEASUREMENT RESULT: "HTW0515399_fin2"

5/15/2013 10:17AM

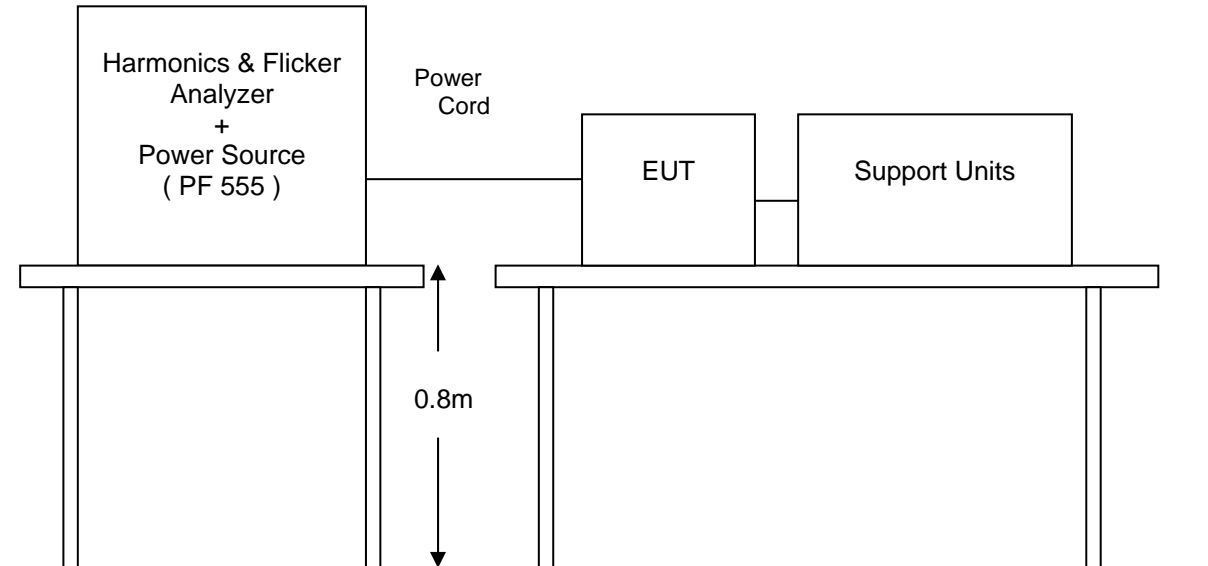
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
16.228500	56.70	19.9	64	7.3	AV	WAN	GND
23.127000	55.60	20.0	64	8.4	AV	WAN	GND
26.488500	54.50	20.0	64	9.5	AV	WAN	GND
26.610000	55.40	20.0	64	8.6	AV	WAN	GND
27.159000	55.10	20.0	64	8.9	AV	WAN	GND
28.684500	55.20	20.0	64	8.8	AV	WAN	GND

4.1.4. AC Mains Harmonic Current Emission

LIMIT

Please refer to EN 61000-3-2

TEST CONFIGURATION



TEST PROCEDURE

Please refer to EN 61000-3-2 for the measurement methods.

TEST RESULTS

Remark:

1. We tested all test conditions, recorded worst case at WCDMA900 traffic mode.

Report title:	HTW0425203
Company Name:	HTW
Date of test:	13:10 25.Apr 2013
Measurement file name:	Harmonics_3_2_Ed3.rsd
Tester:	Eric
Standard used:	EN/IEC 61000-3-2 Ed.3 Quasi-stationary Equipment class A <= 150% of the limit
Observation time:	150s
Windows width:	10 periods - (EN/IEC 61000-4-7 Edition 2002 + A1:2008)
Customer:	RICON TECHNOLOGIES FZE
E. U. T.:	S9922 AC 230V/50Hz

Test Result	
E. U. T.:	PASS
Power Source:	PASS

Check harmonics 2..40 [exception odd 21..39]:**Harmonic(s) > 150%:**

Order (n): None

Harmonic(s) with average > 100%:

Order (n): None

Check odd harmonics 21..39:**All Partial Odd Harmonics below partial limits.****Harmonic(s) > 150%:**

Order (n): None

Harmonic(s) with average > 150%:

Order (n): None

Power Source Result**First dataset out of limit:**

DS (time): None

Harmonic(s) out of limit:

Order (n): None

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	45.874E-3			
2	522.272E-6	0.048	1.08	PASS
3	39.745E-3	1.728	2.30	PASS
4	491.419E-6	0.114	430.00E-3	PASS
5	38.382E-3	3.367	1.14	PASS
6	520.622E-6	0.174	300.00E-3	PASS
7	36.208E-3	4.702	770.00E-3	PASS
8	605.088E-6	0.263	230.00E-3	PASS
9	33.807E-3	8.452	400.00E-3	PASS
10	617.124E-6	0.335	184.00E-3	PASS
11	30.680E-3	9.297	330.00E-3	PASS
12	587.486E-6	0.383	153.33E-3	PASS
13	27.097E-3	12.903	210.00E-3	PASS
14	599.555E-6	0.456	131.43E-3	PASS
15	23.887E-3	15.925	150.00E-3	PASS
16	559.380E-6	0.486	115.00E-3	PASS
17	19.822E-3	14.977	132.35E-3	PASS
18	400.081E-6	0.391	102.22E-3	PASS
19	16.029E-3	13.536	118.42E-3	PASS
20	435.436E-6	0.473	92.00E-3	PASS
21	13.008E-3	8.094	160.71E-3	PASS
22	469.612E-6	0.561	83.64E-3	PASS
23	10.025E-3	6.832	146.74E-3	PASS
24	407.739E-6	0.532	76.66E-3	PASS
25	7.359E-3	5.451	135.00E-3	PASS
26	329.510E-6	0.466	70.77E-3	PASS
27	5.350E-3	4.280	124.99E-3	PASS
28	294.241E-6	0.448	65.71E-3	PASS
29	4.297E-3	3.692	116.39E-3	PASS
30	286.863E-6	0.468	61.33E-3	PASS
31	3.818E-3	3.507	108.87E-3	PASS
32	263.235E-6	0.458	57.50E-3	PASS
33	3.770E-3	3.686	102.27E-3	PASS
34	269.103E-6	0.497	54.12E-3	PASS
35	3.774E-3	3.914	96.44E-3	PASS
36	266.625E-6	0.522	51.11E-3	PASS
37	3.673E-3	4.026	91.21E-3	PASS
38	270.711E-6	0.559	48.42E-3	PASS
39	3.518E-3	4.066	86.53E-3	PASS
40	270.531E-6	0.588	46.00E-3	PASS

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	47.012E-3			
2	1.201E-3	0.074	1.62	PASS
3	40.841E-3	1.184	3.45	PASS
4	1.093E-3	0.170	645.00E-3	PASS
5	39.467E-3	2.308	1.71	PASS
6	1.094E-3	0.243	450.00E-3	PASS
7	37.178E-3	3.219	1.15	PASS
8	1.216E-3	0.353	345.00E-3	PASS
9	34.650E-3	5.775	600.00E-3	PASS
10	1.160E-3	0.420	276.00E-3	PASS
11	31.444E-3	6.352	495.00E-3	PASS
12	1.110E-3	0.483	229.99E-3	PASS
13	27.656E-3	8.780	315.00E-3	PASS
14	1.101E-3	0.559	197.15E-3	PASS
15	24.341E-3	10.818	225.00E-3	PASS
16	1.123E-3	0.651	172.50E-3	PASS
17	20.143E-3	10.146	198.52E-3	PASS
18	724.669E-6	0.473	153.33E-3	PASS
19	16.230E-3	9.137	177.63E-3	PASS
20	823.716E-6	0.597	138.00E-3	PASS
21	13.074E-3	8.135	160.71E-3	PASS
22	917.162E-6	0.731	125.46E-3	PASS
23	10.148E-3	6.916	146.74E-3	PASS
24	801.375E-6	0.697	114.99E-3	PASS
25	7.496E-3	5.553	135.00E-3	PASS
26	630.889E-6	0.594	106.16E-3	PASS
27	5.410E-3	4.328	124.99E-3	PASS
28	547.717E-6	0.556	98.57E-3	PASS
29	4.421E-3	3.799	116.39E-3	PASS
30	531.579E-6	0.578	92.00E-3	PASS
31	3.995E-3	3.669	108.87E-3	PASS
32	469.519E-6	0.544	86.25E-3	PASS
33	3.958E-3	3.870	102.27E-3	PASS
34	473.763E-6	0.584	81.18E-3	PASS
35	3.955E-3	4.101	96.44E-3	PASS
36	448.108E-6	0.585	76.66E-3	PASS
37	3.806E-3	4.173	91.21E-3	PASS
38	470.750E-6	0.648	72.63E-3	PASS
39	3.622E-3	4.186	86.53E-3	PASS
40	446.358E-6	0.647	69.00E-3	PASS

Maximum harmonic voltage results

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	230.21	100.089		
2	132.89E-3	0.058	0.2	PASS
3	427.48E-3	0.186	0.9	PASS
4	47.47E-3	0.021	0.2	PASS
5	19.29E-3	0.008	0.4	PASS
6	45.31E-3	0.020	0.2	PASS
7	33.60E-3	0.015	0.3	PASS
8	25.92E-3	0.011	0.2	PASS
9	12.22E-3	0.005	0.2	PASS
10	19.99E-3	0.009	0.2	PASS
11	29.79E-3	0.013	0.1	PASS
12	15.04E-3	0.007	0.1	PASS
13	15.96E-3	0.007	0.1	PASS
14	14.54E-3	0.006	0.1	PASS
15	27.39E-3	0.012	0.1	PASS
16	16.71E-3	0.007	0.1	PASS
17	12.76E-3	0.006	0.1	PASS
18	16.67E-3	0.007	0.1	PASS
19	31.17E-3	0.014	0.1	PASS
20	17.89E-3	0.008	0.1	PASS
21	11.87E-3	0.005	0.1	PASS
22	15.24E-3	0.007	0.1	PASS
23	16.54E-3	0.007	0.1	PASS
24	10.68E-3	0.005	0.1	PASS
25	11.32E-3	0.005	0.1	PASS
26	13.20E-3	0.006	0.1	PASS
27	14.63E-3	0.006	0.1	PASS
28	14.05E-3	0.006	0.1	PASS
29	14.15E-3	0.006	0.1	PASS
30	12.92E-3	0.006	0.1	PASS
31	9.78E-3	0.004	0.1	PASS
32	11.37E-3	0.005	0.1	PASS
33	15.61E-3	0.007	0.1	PASS
34	6.59E-3	0.003	0.1	PASS
35	7.49E-3	0.003	0.1	PASS
36	8.87E-3	0.004	0.1	PASS
37	16.01E-3	0.007	0.1	PASS
38	8.39E-3	0.004	0.1	PASS
39	11.90E-3	0.005	0.1	PASS
40	12.47E-3	0.005	0.1	PASS

4.1.5. AC Mains Voltage Fluctuation and Flicker

LIMIT

Please refer to EN 61000-3-3

TEST CONFIGURATION

Same as the configuration of the AC MAINS HARMONIC CURRENT EMISSIONS TEST

TEST PROCEDURE

Please refer to EN 61000-3-3 for the measurement methods.

TEST RESULTS

Remark:

1. We tested all test conditions, recorded worst case at WCDMA900 traffic mode.

Report title:	HTW0425204
Company Name:	HTW
Date of test:	14:22 25.Apr 2013
Tester:	Eric
Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	120 min (12 Flicker measurements)
Flickermeter:	230V / 50Hz
Flicker Impedance:	Zref (IEC 60725)
Customer:	RICON TECHNOLOGIES FZE
E. U. T.:	S9922
	AC 230V/50Hz

Test Result	PASS
-------------	------

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.074	4.00	PASS
dt [s]	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.073	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 2	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.068	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 3	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.074	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 4	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.071	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 5	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.072	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 6	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.074	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 7	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.074	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 8	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.074	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 9	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.072	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 10	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.071	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 11	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.070	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 12	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.072	4.00	PASS
dt [s]	0.000	0.50	PASS

4.1.6. Electrostatic Discharge

LIMIT

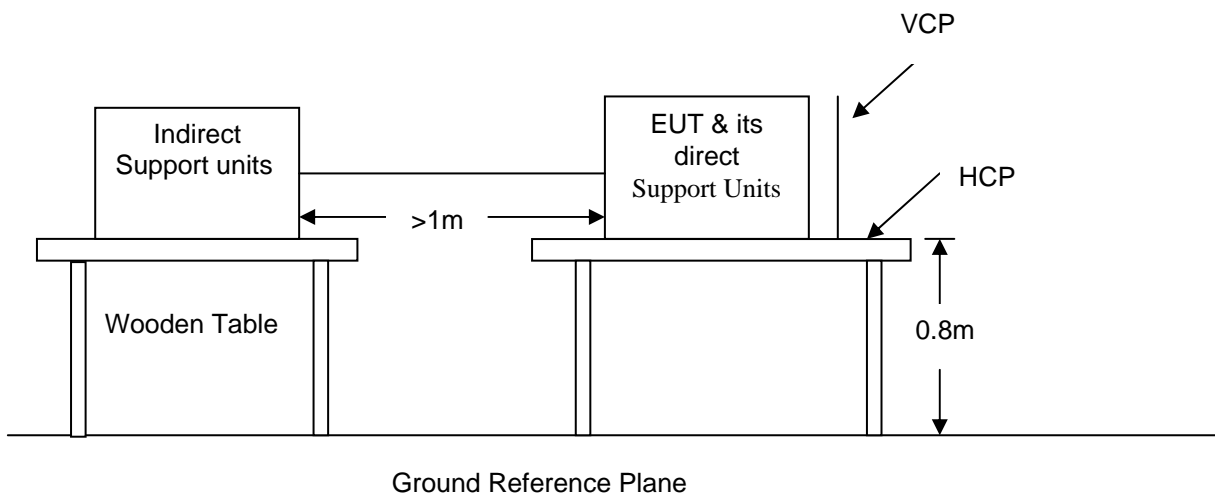
Please refer to EN 61000-4-2

SEVERITY LEVELS OF ELECTROSTATIC DISCHARGE

Severity level: Contact Discharge at $\pm 4\text{KV}$ Air Discharge at $\pm 8\text{KV}$

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.3.2 and EN 61000-4-2 for the measurement methods.

TEST RESULTS

Contact Discharge:

The ESD generator is held perpendicular to the surface to which the discharge is applied and the tip of the discharge electrode touch the surface of EUT. Then turn the discharge switch. The generator is then re-triggered for a new single discharge and repeated at least 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Air Discharge:

Air discharge is used where contact discharge can't be applied. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated at least 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Indirect discharge for horizontal coupling plane:

At least 10 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT.

Indirect discharge for vertical coupling plane:

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

Climatic conditions

- ambient temperature : 25 °C
- relative humidity: 55%
- atmospheric pressure: 960 mbar

Result of Final Tests (Operating Mode & Standby (Receiving) Mode)

Point of Discharge	Applied Voltage (KV)	Total No. of Discharge (Each Point)	Criterion	Results	Remark
Air Test Point	±2	50	TT/TR	PASS	Note 1,2,3
	±4	50	TT/TR	PASS	Note 1,2,3
	±8	50	TT/TR	PASS	Note 1,2,3
Contact Discharge Test Points	±2	50	TT/TR	PASS	Note 1,2,3
	±4	50	TT/TR	PASS	Note 1,2,3
VCP (4 sides)	±2	50	TT/TR	PASS	Note 1,2,3
	±4	50	TT/TR	PASS	Note 1,2,3
HCP (4 sides)	±2	50	TT/TR	PASS	Note 1,2,3
	±4	50	TT/TR	PASS	Note 1,2,3

Reamrk:

1. The EUT operate with no user noticeable loss of the communication link during and after test at traffic mode;
2. The EUT can maintain communication link and operate as intended with no loss of user control functions or stored data during and after test at traffic mode;
3. The transmitter can not unintentionally operate during performed in idle mode;

Description of Discharge Point

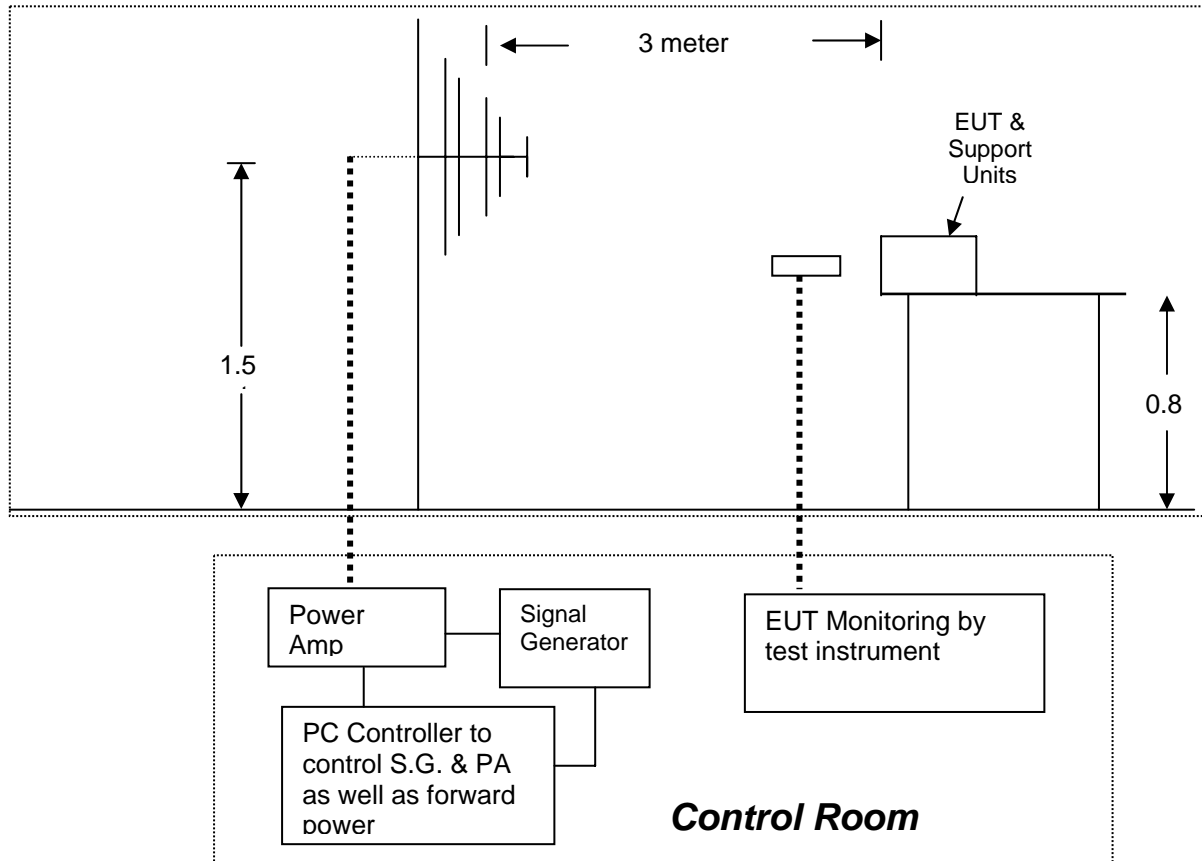
Contact Discharge 5 Test point		Air Discharge	
●	Metallic Screws	○	Plastic Screws
●	Metallic Case	○	Plastic Case(gap)
●	Metallic Connect ports	○	Plastic Connect Ports
●	Metallic Junctions	○	Plastic Junctions
●	Others (Antenna Port)	○	Others

4.1.7. RF Electromagnetic Field

LIMIT

Please refer to EN 61000-4-3

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.2.2, ETSI EN 301 489-24 Clause 7.2.2 and EN 61000-4-3 for the measurement methods.

TEST RESULTS

80% A.M, 1000 Hz Sine wave (Field Strength: 3 V/m)

	Freq. Range (MHz)	Field	Modulation	Polarity	Position	Criterion	Selection for the final test	Remark
1	80-1000	3V/m	Yes	H / V	Front	CT/CR	<input checked="" type="checkbox"/>	Note 1,2,3
	1400-2700	3V/m	Yes	H / V	Front	CT/CR	<input checked="" type="checkbox"/>	Note 1,2,3
2	80-1000	3V/m	Yes	H / V	Right	CT/CR	<input checked="" type="checkbox"/>	Note 1,2,3
	1400-2700	3V/m	Yes	H / V	Right	CT/CR	<input checked="" type="checkbox"/>	Note 1,2,3
3	80-1000	3V/m	Yes	H / V	Back	CT/CR	<input checked="" type="checkbox"/>	Note 1,2,3
	1400-2700	3V/m	Yes	H / V	Back	CT/CR	<input checked="" type="checkbox"/>	Note 1,2,3
4	80-1000	3V/m	Yes	H / V	Left	CT/CR	<input checked="" type="checkbox"/>	Note 1,2,3
	1400-2700	3V/m	Yes	H / V	Left	CT/CR	<input checked="" type="checkbox"/>	Note 1,2,3

Result of Final Tests (Operating Mode & Standby (Receiving) Mode)

Freq. Range (MHz)	Field	Modulation Depth	Polarity	BER	BER Limit	Mode	Remark	Result
80-1000	3V/m	80%	H	0.000	0.001	CT Traffic	Note 1,2,3	PASS
1400-2700	3V/m	80%	H	0.000	0.001		Note 1,2,3	PASS
80-1000	3V/m	80%	V	0.000	0.001		Note 1,2,3	PASS
1400-2700	3V/m	80%	V	0.000	0.001		Note 1,2,3	PASS
80-1000	3V/m	80%	H	0.000	0.001	CR Receiving (Idle)	Note 1,2,3	PASS
1400-2700	3V/m	80%	H	0.000	0.001		Note 1,2,3	PASS
80-1000	3V/m	80%	V	0.000	0.001		Note 1,2,3	PASS
1400-2700	3V/m	80%	V	0.000	0.001		Note 1,2,3	PASS

Remark:

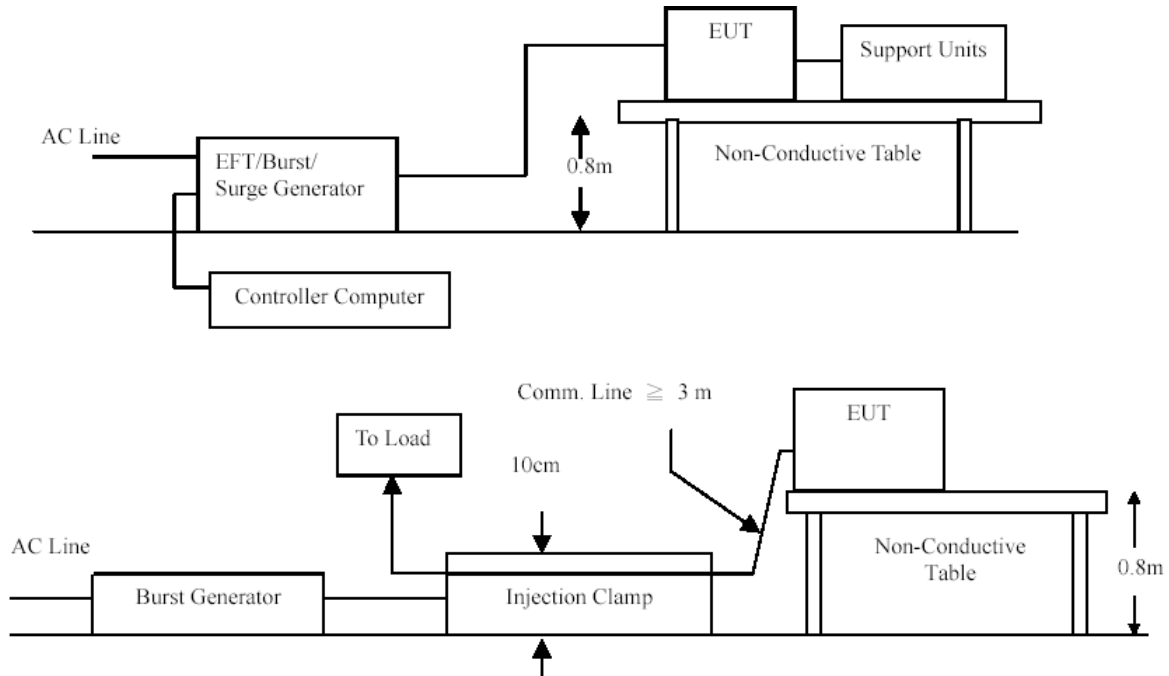
1. The EUT can operate as intended with no loss of user control functions or stored data, and maintain the communication link during and after test at traffic mode;
2. The transmitter shall not unintentionally operate during and after test at idle mode;
3. Exclusion band: WCDMA 900: Transmit Band: 885.1MHz-910.1MHz Receive Band: 840MHz-1045MHz; WCDMA2100: Transmit Band: 1937.5MHz~1962.5MHz Receive Band: 2025MHz~2195MHz

4.1.8. Fast Transients- Common Mode

LIMIT

Please refer to EN 61000-4-4

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.4.2 and EN 61000-4-4 for the measurement methods.

TEST RESULTS

Impulse Frequency: 5 kHz
 Tr/Th: 5/50ns
 Burst Duration: 15ms
 Burst Period: 300ms
 Test duration: 120s

Injection Line	Voltage (kV)	Injected Method	Criterion	Result	Remark
<input checked="" type="checkbox"/> Line	±1	Direct	TT/TR	PASS	Note 1,2,3
<input checked="" type="checkbox"/> Neutral	±1	Direct	TT/TR	PASS	Note 1,2,3
<input type="checkbox"/> PE	± 1	Direct	TT/TR	PASS	Note 1,2,3
<input checked="" type="checkbox"/> Line + Neutral	±1	Direct	TT/TR	PASS	Note 1,2,3
<input type="checkbox"/> L + PE	± 1	Direct	TT/TR	PASS	Note 1,2,3
<input type="checkbox"/> N + PE	± 1	Direct	TT/TR	PASS	Note 1,2,3
<input type="checkbox"/> L + N + PE	± 1	Direct	TT/TR	PASS	Note 1,2,3
<input checked="" type="checkbox"/> RJ45 port (LAN cable)	±0.5	Clamp	TT/TR	PASS	Note 1,2,3
<input type="checkbox"/> RJ11 port (Line cable)	±0.5	Clamp	TT/TR	PASS	Note 1,2,3

Reamrk:

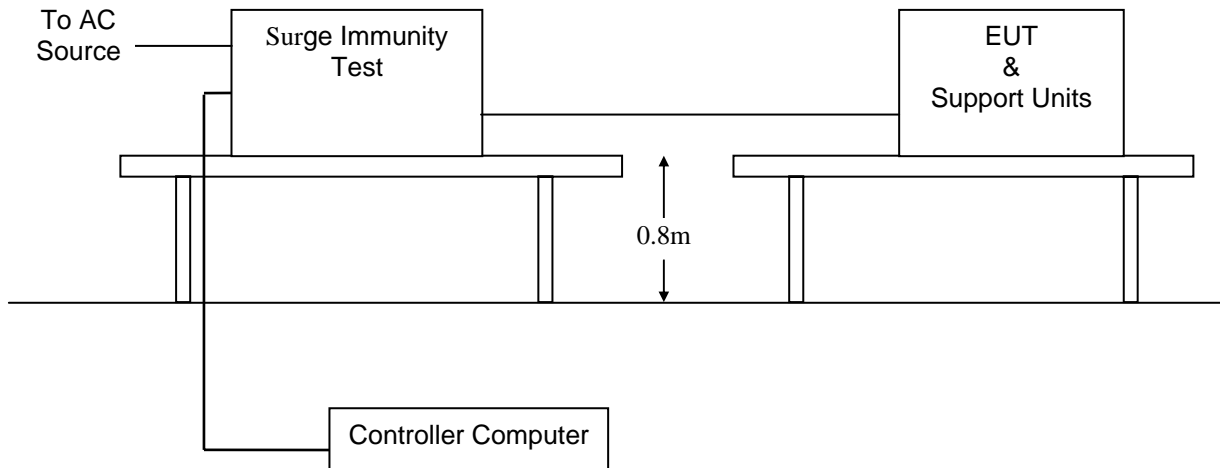
1. The EUT operate with no user noticeable loss of the communication link during and after test at traffic mode;
2. The EUT can maintain communication link and operate as intended with no loss of user control functions or stored data during and after test at traffic mode;
3. The transmitter can not unintentionally operate during performed in idle mode;

4.1.9. Surge

LIMIT

Please refer to EN 61000-4-5

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.4.2 and EN 61000-4-5 for the measurement methods.

TEST RESULTS

Results of Final Tests

Voltage Waveform: 1.2/50 us
 Current Waveform: 8/20 us
 Polarity: Positive/Negative
 Phase angle: 0°, 90°, 180°, 270°

Coupling Line	Voltage (kV)	Polarity	Coupling Method	Criterion	Result	Remark
<input checked="" type="checkbox"/> Line + Neutral	1	Pos./ Neg.	Capacitive	TT/TR	PASS	Note 1,2,3
<input type="checkbox"/> L + PE	2	Pos./ Neg.	Capacitive	TT/TR	PASS	Note 1,2,3
<input type="checkbox"/> N + PE	2	Pos./ Neg.	Capacitive	TT/TR	PASS	Note 1,2,3
<input type="checkbox"/> T, R-Ground	0.5	Pos./ Neg.	Capacitive	TT/TR	PASS	Note 1,2,3
<input checked="" type="checkbox"/> RJ45 port (LAN)	1	Pos./ Neg.	Capacitive	TT/TR	PASS	Note 1,2,3
<input type="checkbox"/> RJ11 port (Line cable)	1	Pos./ Neg.	Capacitive	TT/TR	PASS	Note 1,2,3

Reamrk:

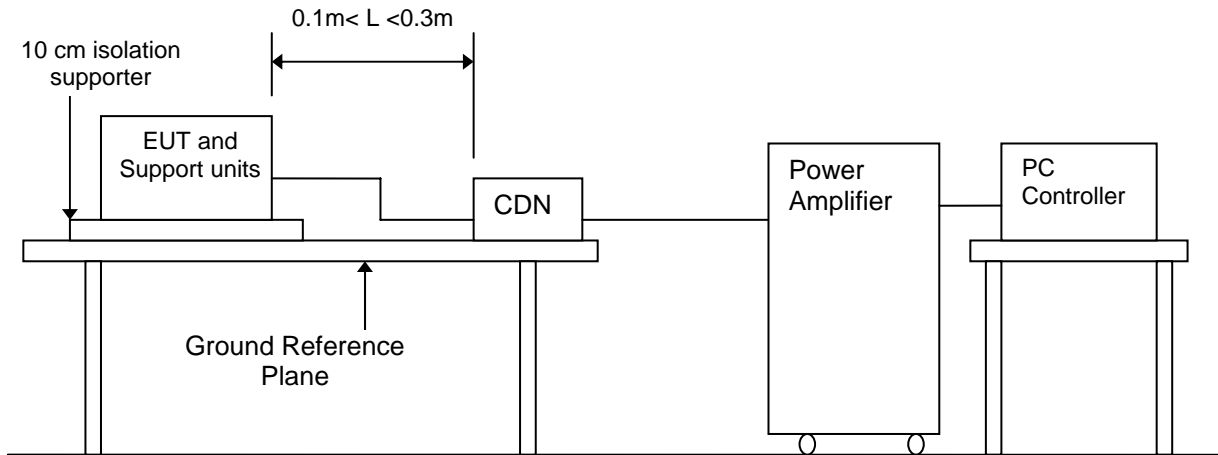
1. The EUT operate with no user noticeable loss of the communication link during and after test at traffic mode;
2. The EUT can maintain communication link and operate as intended with no loss of user control functions or stored data during and after test at traffic mode;
3. The transmitter can not unintentionally operate during performed in idle mode;

4.1.10. RF- Common Mode

LIMIT

Please refer to EN 61000-4-6

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.5.2, ETSI EN 301 489-24 Clause 7.2.2 and EN 61000-4-6 for the measurement methods.

TEST RESULTS

Results of Final Tests

Frequency Range: 0.15MHz~80MHz
 Frequency Step: 1% of fundamental
 Dwell time: 1 Sec.

80% A.M., 1 kHz Sine wave (Field Strength: 3 V/m)

Coupling type: **CDN** / **RF Current Probe** / **EM CLAMP (LÜTHI)**

Freq. Range (MHz)	Test Point	Field	Modulation Depth	Coupling type	BER	BER Limit	Mode	Remark	Result
0.15-80	DC IN	3V/m	80%	CDN	0.00	0.001	CT Traffic	Note 1,2	PASS
0.15-80	RJ45	3V/m	80%	Clamp	0.00	0.001		Note 1,2	PASS
0.15-80	DC IN	3V/m	80%	CDN	0.00	0.001	CR Receiving (Idle)	Note 1,2	PASS
0.15-80	RJ45	3V/m	80%	Clamp	0.00	0.001		Note 1,2	PASS

Remark:

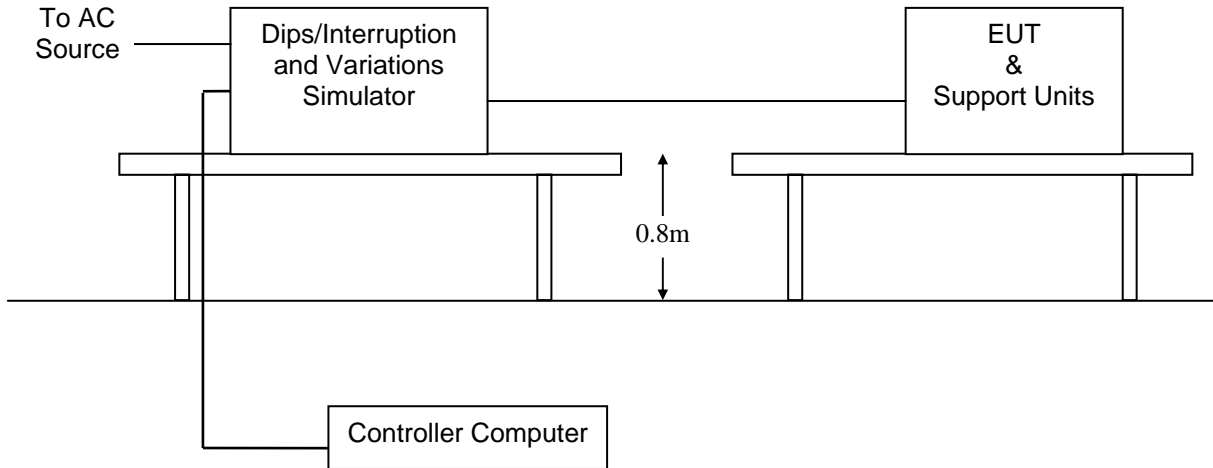
1. The EUT can operate as intended with no loss of user control functions or stored data, and maintain the communication link during and after test at traffic mode;
2. The transmitter shall not unintentionally operate during and after test at idle mode;

4.1.11. Voltage Dips and Interruptions

LIMIT

Please refer to EN 61000-4-11

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.7.2 and EN 61000-4-11 for the measurement methods

TEST RESULTS

Test conditions

Interruption at phase angles of 0, 45, 90, 135, 180, 225, 270 and 315 degree in a 10 sec-interval.

	Test Level (% UT)	Reduction (%)	Duration	
			Peiod	ms
Voltage Dips	0	100%	0.5	10
	0	100%	1	20
	70	30%	25	500
Voltage Interruption	0	100%	250	5000

Note: The duration with a sequence of three dips/interruptions with a minimum interval of 10 s between each test event. The test level is U=100V and 240V.

Results of Final Tests

Voltage Dips

Test Level (% UT)	Reduction (%)	Duration		Criterion	Results	Remark
		Peiod	ms			
0	100%	0.5	10	TT/TR	PASS	Note 1,2,3
0	100%	1	20	TT/TR	PASS	Note 1,2,3
70	30%	25	500	TT/TR	PASS	Note 1,2,3

Interruptions

Test Level (% UT)	Reduction (%)	Duration		Criterion	Results	Remark
		Peiod	ms			
0	100%	250	5000	TT/TR	PASS	Note 1,2,3

Reamrk:

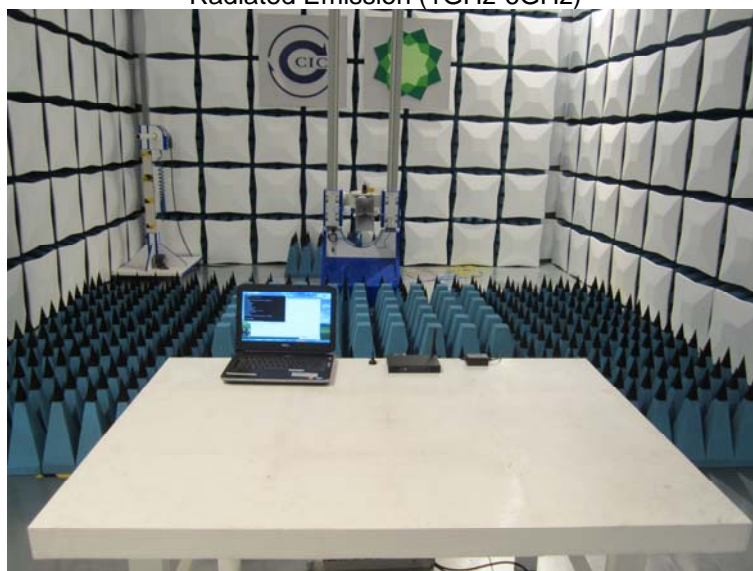
1. The EUT operate with no user noticeable loss of the communication link during and after test at traffic mode;
2. The EUT can maintain communication link and operate as intended with no loss of user control functions or stored data during and after test at traffic mode;
3. The transmitter can not unintentionally operate during performed in idle mode;

5. Test Set-up Photos of the EUT

Radiated Emission (30MHz-1GHz)



Radiated Emission (1GHz-6GHz)



Conducted Emission (AC Mains)



Conducted Emission (RJ45)



AC Mains Voltage Fluctuation and Flicker/ Voltage Dips and Interruptions



Electrostatic Discharge



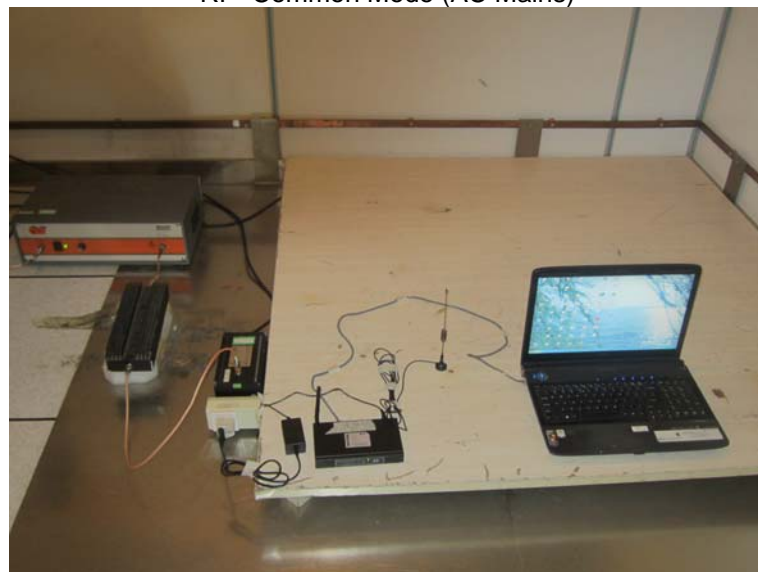
Surge /Fast Transients- Common Mode (AC Mains)



Surge (RJ45)



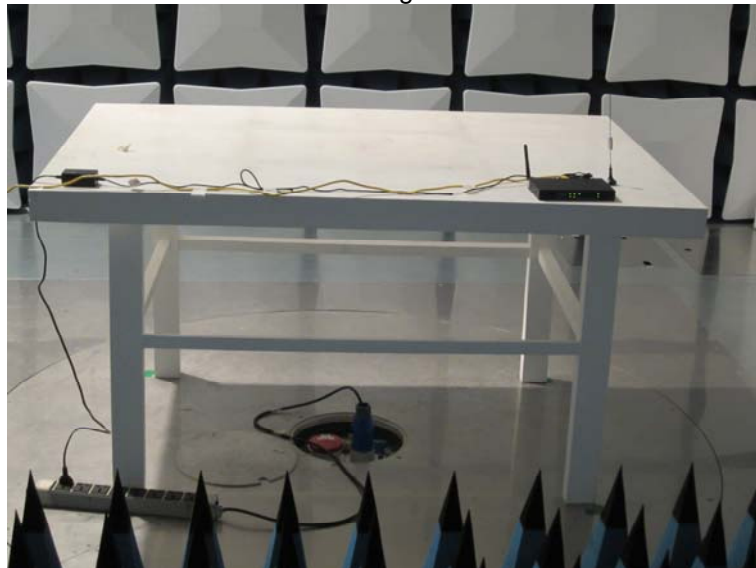
RF- Common Mode (AC Mains)



RF- Common Mode (RJ45)



RF Electromagnetic Field



.....End of Report.....