


BUREAU
VERITAS

Test Report No.: CE170623N070



TEST REPORT

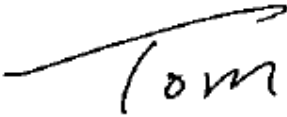

Applicant	SHENZHEN TENDA TECHNOLOGY CO., LTD.
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Manufacturer or Supplier	SHENZHEN TENDA TECHNOLOGY CO., LTD, Dongguan Branch	
Address	No. 79 Yuanyi street, Dalang Town, Dongguan City, Guangdong Province, China	
Product	300Mbps Wireless N Access Point	
Brand Name	Tenda	
Model	AP4	
Additional Model & Model Difference	N/A	
Date of tests	May 14, 2015 ~ Jun. 09, 2015 Jun. 23, 2017 ~ Jul. 08, 2017	

The submitted sample of the above equipment has been tested according to the requirements of the following standards:

- ☒ EN 55032:2015, Class B
- ☒ EN 61000-3-2:2014
- ☒ EN 61000-3-3:2013
- ☒ EN 55024:2010 + A1:2015
- ☒ Draft EN 301 489-1 V2.2.0 (2017-03)
- ☒ Draft EN 301489-17 V3.2.0 (2017-03)

CONCLUSION: The submitted sample was found to **COMPLY** with the test requirement

Tested by Tom Chen Supervisor / EMC Department	Approved by Madison Luo Supervisor / EMC Department
	
	Date: Aug. 02, 2017

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification



Table of Contents

RELEASE CONTROL RECORD	5
1 SUMMARY OF TEST RESULTS	6
1.1 MEASUREMENT UNCERTAINTY	9
2 GENERAL INFORMATION	10
2.1 GENERAL DESCRIPTION OF EUT	10
2.2 DESCRIPTION OF TEST MODES	11
2.3 TEST PROGRAM USED AND OPERATION DESCRIPTIONS	12
2.4 MISCELLANEOUS	12
2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS	13
2.6 DESCRIPTION OF SUPPORT UNITS	13
3 CONDUCTED EMISSION FROM THE AC MAINS POWER PORT	14
3.1 LIMITS	14
3.2 TEST INSTRUMENT	14
3.3 TEST ARRANGEMENT	14
3.4 TEST SETUP	15
3.5 SUPPLEMENTARY INFORMATION	15
3.6 TEST RESULTS	16
4 CONDUCTED EMISSION MEASUREMENT AT TELECOMMUNICATION PORTS	18
4.1 LIMIT OF CONDUCTED COMMON MODE DISTURBANCE AT TELECOMMUNICATION PORTS	18
4.2 TEST INSTRUMENTS	18
4.3 TEST PROCEDURE	19
4.4 DEVIATION FROM TEST STANDARD	21
4.5 TEST SETUP	21
4.6 EUT OPERATING CONDITIONS	22
4.7 TEST RESULTS	23
5 RADIATED EMISSION MEASUREMENT	24
5.1 LIMITS OF RADIATED EMISSION MEASUREMENT	24
5.2 TEST INSTRUMENTS	26
5.3 TEST PROCEDURE	27
5.4 TEST SETUP	29
5.5 SUPPLEMENTARY INFORMATION	29
5.6 TEST RESULTS	30
6 HARMONICS CURRENT MEASUREMENT	33
6.1 LIMITS	33
CLASSIFICATION OF EQUIPMENT	33
6.2 TEST INSTRUMENTS	34
6.3 TEST ARRANGEMENT	34
6.4 TEST SETUP	34
6.5 TEST RESULTS	35
7 VOLTAGE FLUCTUATIONS AND FLICKER MEASUREMENT	36
7.2 TEST INSTRUMENTS	36
7.3 TEST ARRANGEMENT	36
7.4 TEST SETUP	36
7.5 TEST RESULTS	37
8 IMMUNITY TEST	38
8.1 GENERAL DESCRIPTION	38
8.1.1 PERFORMANCE CRITERIA	40
8.1.2 EUT OPERATING CONDITION	43
8.2 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD) (EN55024)	43
8.2.1 TEST SPECIFICATION	43
8.2.2 TEST INSTRUMENTS	43
8.2.3 TEST PROCEDURE	43
8.2.4 DEVIATION FROM TEST STANDARD	44
8.2.5 TEST SETUP	45
8.2.6 TEST RESULTS	46
8.3 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD) (EN301489)	47
8.3.1 TEST SPECIFICATION	47
8.3.2 TEST INSTRUMENT	47



8.3.3	TEST PROCEDURE	48
8.3.4	DEVIATION FROM TEST STANDARD	48
8.3.5	TEST SETUP	49
8.3.6	TEST RESULTS	50
8.4	RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS) (EN55024)	51
8.4.1	TEST SPECIFICATION	51
8.4.2	TEST INSTRUMENTS	51
8.4.3	TEST PROCEDURE	52
8.4.4	DEVIATION FROM TEST STANDARD	52
8.4.5	TEST SETUP	52
8.4.6	TEST RESULTS	53
8.5	RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS) (EN301489)	54
8.5.1	TEST SPECIFICATION	54
8.5.2	TEST INSTRUMENT	54
8.5.3	TEST PROCEDURE	55
8.5.4	DEVIATION FROM TEST STANDARD	55
8.5.5	TEST SETUP	55
8.5.6	TEST RESULTS	56
8.6	ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST (EFT)	57
8.6.1	TEST SPECIFICATION	57
8.6.2	TEST INSTRUMENTS	57
8.6.3	TEST PROCEDURE	57
8.6.4	DEVIATION FROM TEST STANDARD	57
8.6.5	TEST SETUP	58
8.6.6	TEST RESULTS	59
8.7	SURGE IMMUNITY TEST (EN55024, EN301489)	60
8.7.1	TEST SPECIFICATION	60
8.7.2	TEST INSTRUMENTS	60
8.7.3	TEST PROCEDURE	61
8.7.4	DEVIATION FROM TEST STANDARD	61
8.7.5	TEST SETUP	61
8.7.6	TEST RESULTS	62
8.8	IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS (CS) (EN55024, EN301489)	63
8.8.1	TEST SPECIFICATION	63
8.8.2	TEST INSTRUMENTS	63
8.8.3	TEST PROCEDURE	64
8.8.4	DEVIATION FROM TEST STANDARD	64
8.8.5	TEST SETUP	65
8.8.6	TEST RESULTS	66
8.9	VOLTAGE DIP/SHORT INTERRUPTIONS/VOLTAGE VARIATIONS (DIP) IMMUNITY TEST (EN55024).	67
8.9.1	TEST SPECIFICATION	67
8.9.2	TEST INSTRUMENTS	67
8.9.3	TEST PROCEDURE	67
8.9.4	DEVIATION FROM TEST STANDARD	67
8.9.5	TEST SETUP	67
8.9.6	TEST RESULTS	68
8.10	VOLTAGE DIP/SHORT INTERRUPTIONS/VOLTAGE VARIATIONS (DIP) IMMUNITY TEST (EN301 489)	69
8.10.1	TEST SPECIFICATION	69
8.10.2	TEST INSTRUMENT	69
8.10.3	TEST PROCEDURE	69
8.10.4	DEVIATION FROM TEST STANDARD	69
8.10.5	TEST SETUP	70
8.10.6	TEST RESULTS	71
9	PHOTOGRAPHS OF THE TEST CONFIGURATION	72



Test Report No.: CE170623N070

10	APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	81
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BUREAU
VERITAS

Test Report No.: CE170623N070

RELEASE CONTROL RECORD

Issue No.	Description	Date Issued
CE150514N006/ RM150514N006	Original release	Jun. 10, 2015
CE161128N061/ RM161128N061	Based on the original reports CE150514N006/RM150514N006, update standard and directive. Don't retest after engineer evaluated.	Dec. 05, 2016
CE170623N070	Based on reports CE161128N061/RM161128N061, update standard and directive. It needs to retest RS test item after engineer evaluated.	Aug. 02, 2017



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

EMISSION			
Standard	Test Item	Result	Remarks
EN 55032:2015, Class B	Conducted emission from the AC mains power port	PASS	Minimum passing margin is -11.18dB at 0.55625MHz
	Conducted Test (Telecom port)	PASS	Minimum passing margin is -2.86dB at 20.25781MHz
	Radiated emission 30MHz-1GHz	PASS	Minimum passing Class B margin is -1.80dB at 59.100MHz
	Radiated emission 1GHz-6GHz	PASS	Minimum passing margin is -11.10dB at 5387.452MHz
EN 61000-3-2:2014	Harmonic current emissions	PASS	Meets the requirements.
EN 61000-3-3:2013	Voltage fluctuations & flicker	PASS	Meets the requirements.

Remarks: EN55032:2015 versions is required by client and it will also remark in report that it comply with previous standard EN 55032:2012 + AC:2013.



IMMUNITY (EN 55024:2010 + A1:2015)			
Standard	Test Type	Result	Remarks
IEC 61000-4-2:2008 ED. 2.0	Electrostatic discharge immunity test	PASS	Electrostatic Discharge – ESD: 8kV Air discharge, 4kV Contact discharge, Performance Criterion A
IEC 61000-4-3:2010 ED. 3.2	Radiated, radio-frequency, electromagnetic field immunity test	PASS	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80-1000 MHz, 3V/m, 80% AM (1kHz), Performance Criterion A
IEC 61000-4-4:2012 ED. 3.0	Electrical fast transient / burst immunity test.	PASS	Electrical Fast Transient/Burst - EFT AC Power line: 1kV, Performance Criterion A
IEC 61000-4-5:2014 ED. 3.0	Surge immunity test	PASS	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, AC Power Line: line to line 1 kV, Performance Criterion A
IEC 61000-4-6:2013 ED. 4.0	Immunity to conducted disturbances, induced by radio-frequency fields	PASS	Conducted Radio Frequency Disturbances Test – CS: 0.15-80 MHz, 3Vrms, 80% AM, 1kHz, Performance Criterion A
IEC 61000-4-8:2009 ED. 2.0	Power frequency magnetic field immunity test.	PASS	Power Frequency Magnetic Field Test, 50 Hz, 1A/m, Performance Criterion A
IEC61000-4-11:2004 ED. 2.0	Voltage dips, short interruptions and voltage variations immunity tests	PASS	Meets the requirements of Voltage Dips: i) >95% residual - Performance Criterion A ii) 30% residual – Performance Criterion A iii) >95% residual – Performance Criterion B

Remarks: EN 55024:2010 + A1:2015 version is required by client and it will also remark in report that it comply with previous standard EN 55024:2010.



IMMUNITY (Draft EN 301 489-1 V2.2.0, Draft EN 301489-17 V3.2.0(2017-03))			
Standard	Test Type	Result	Remarks
EN 61000-4-2:2009	Electrostatic discharge immunity test	PASS	Electrostatic Discharge – ESD: 2, 4, 8kV Air discharge, 4kV Contact discharge, Performance Criterion B
EN 61000-4-3:2006 + A1 + A2:2010	Radiated, radio-frequency, electromagnetic field immunity test	PASS	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80-6000 MHz, 3V/m, 80% AM (1kHz), Performance Criterion A
EN 61000-4-4:2012	Electrical fast transient / burst immunity test.	PASS	Electrical Fast Transient/Burst - EFT, AC power line: 1 kV Performance Criterion A
EN 61000-4-5:2006	Surge immunity test	PASS	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, Power line: line to line 1 kV, Performance Criterion A
EN 61000-4-6:2009	Immunity to conducted disturbances, induced by radio-frequency fields	PASS	Conducted Radio Frequency Disturbances Test – CS: 0.15 ~ 80 MHz, 3 Vrms, 80% AM, 1 kHz, Performance Criterion A
EN 61000-4-11:2004	Voltage dips, short interruptions and voltage variations immunity tests	PASS	Voltage Dips: i) 0% residual for 0.5 cycle, Performance Criterion A ii) 0% residual for 1 cycle, Performance Criterion A iii) 70% residual for 25 cycle, Performance Criterion A Voltage Interruptions: iv) 0% residual for 250 cycle, Performance Criterion B



1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	FREQUENCY	UNCERTAINTY
Conducted emission from the AC mains power port using AMN	0.15MHz ~ 30MHz	+/-2.66 dB
Conducted emissions at telecom port	0.15MHz ~ 30MHz	+/-4.68 dB
Radiated emission	30MHz ~ 1GHz	+ /-4.10 dB
	Above 1GHz	+/- 4.58 dB



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT OF EUT	300Mbps Wireless N Access Point
MODEL NO.	AP4
POWER SUPPLY	DC 9V from Adapter
CABLE SUPPLIED	RJ45 Line: Unshielded, detachable 1.0m
THE HIGHEST OPERATING FREQUENCY	2472MHz

Note:

1. For the test results, the EUT had been tested with all conditions. But only the worst case was showed in test report.
2. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
3. Please refer to the EUT photo document (Reference No.: 170623N070) for detailed product photo.
4. The EUT was powered by the following adapter:

ADAPTER	
BRAND:	N/A
MODEL:	TEA09E-09060
INPUT:	AC 100-240V, 50/60MHz, 0.3A
OUTPUT:	DC 9V, 0.6A
DC LINE:	Unshielded, Non-detachable 1.50m



2.2 DESCRIPTION OF TEST MODES

The EUT was pre-tested all audio and video input sources as table below, the final worst mode were marked in boldface and recorded in this report.

◆ FOR MAINS TERMINAL DISTURBANCE VOLTAGE AND RADIATED EMISSIONS TESTS:

Test Mode	Test Voltage
RJ45 Data Transmitting 100MHz(More than 10% rate)+poE	DC 9V from adapter Input AC 230V 50Hz DC 9V from adapter Input AC 110V 60Hz
RJ45 Data Transmitting 10MHz(More than 10% rate)+poE	
RJ45 Data Transmitting 100MHz(More than 10% rate)	
RJ45 Data Transmitting 10MHz(More than 10% rate)	
WIFI Link Data Transmitting (More than 10% rate)	
Standby	

◆ FOR FLICKER AND IMMUNITY TESTS:

Test Mode	Test Voltage
RJ45 Data Transmitting 100MHz(More than 10% rate)+poE	DC 9V from adapter Input AC 230V 50Hz
RJ45 Data Transmitting 100MHz(More than 10% rate)	
WIFI Link Data Transmitting (More than 10% rate)	



2.3 TEST PROGRAM USED AND OPERATION DESCRIPTIONS

- a. Turned on the power of all equipment.
- b. EUT was operated according to the type description in manufacturer's specifications or the User's Manual.

2.4 MISCELLANEOUS

➤ Affix CE marking

The marking must be placed visibly and legibly on the product or, if not possible due to the nature of the product, be affixed to the packaging and the accompanying document. The CE marking shall consist of the initials 'CE' taking the following form:



The various components of the CE marking must have the same vertical dimension, and may not be smaller than 5 mm. If the CE marking is reduced or enlarged, the proportions given in the graduated drawing above must be respected.

When the product is subject to other Directives covering other aspects and which also provide for the 'CE' marking, the accompanying documents must indicate that the product also conforms to those other Directives.

However, when one or more of those Directives allow the manufacturer, during a transitional period, to choose which arrangements to apply, the 'CE' marking has to indicate conformity only with the Directives applied by the manufacturer. In this case, the particularities of the Directives applied, as published in the Official Journal of the European Union, must be given in the documents, notices or instructions required by the Directives and accompanying such products.



2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to the specifications of the manufacturers, the EUT must comply with the requirements of the following standards:

EN 55032:2015, CLASS B

EN 61000-3-2:2014

EN 61000-3-3:2013

EN 55024:2010 + A1:2015

IEC 61000-4-2:2008 ED. 2.0

IEC 61000-4-3:2010 ED. 3.2

IEC 61000-4-4:2012 ED. 3.0

IEC 61000-4-5:2014 ED. 3.0

IEC 61000-4-6:2013 ED. 4.0

IEC 61000-4-11:2004 ED. 2.0

DRAFT EN 301 489-1 V2.2.0 (2017-03)

DRAFT EN 301489-17 V3.2.0(2017-03)

EN 61000-4-2:2009

EN 61000-4-3:2006 + A1 + A2:2010

EN 61000-4-4:2012

EN 61000-4-5:2006

EN 61000-4-6:2009

EN 61000-4-11:2004

All applicable tests have been performed and recorded as per the above standards.

2.6 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an dependent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook PC	DELL	5P2PM2X	12400120329	N/A
2	Notebook PC	Lenovo	E430	MP-ODN27	N/A

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line :Unshielded, Detachable 1.0m; DC Line: Unshielded, Undetachable ,1.8m
2	AC Line :Unshielded, Detachable 1.5m; DC Line: Unshielded, Undetachable ,1.5m

Remarks: 1. Notebook PC is distal support units with CE, RE test.

2. CE test used 0.5m and 6.0m RJ45 line, RE test used 0.3m and 6.0m RJ45 line, CS test used 0.3m and 2.0m RJ45 line, EFT test used 0.5m and 3.0m RJ45 line, other immunity test used 0.5m RJ45 line.

3 CONDUCTED EMISSION FROM THE AC MAINS POWER PORT

3.1 LIMITS

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Notes: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

3.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCS30	100340	May 11,15	May 10,16
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	April 25,15	April 24,16
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	April 25,15	April 24,16
Test software	ADT	ADT_Conc _V7.3.7	N/A	N/A	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed at Shielded Room 553.

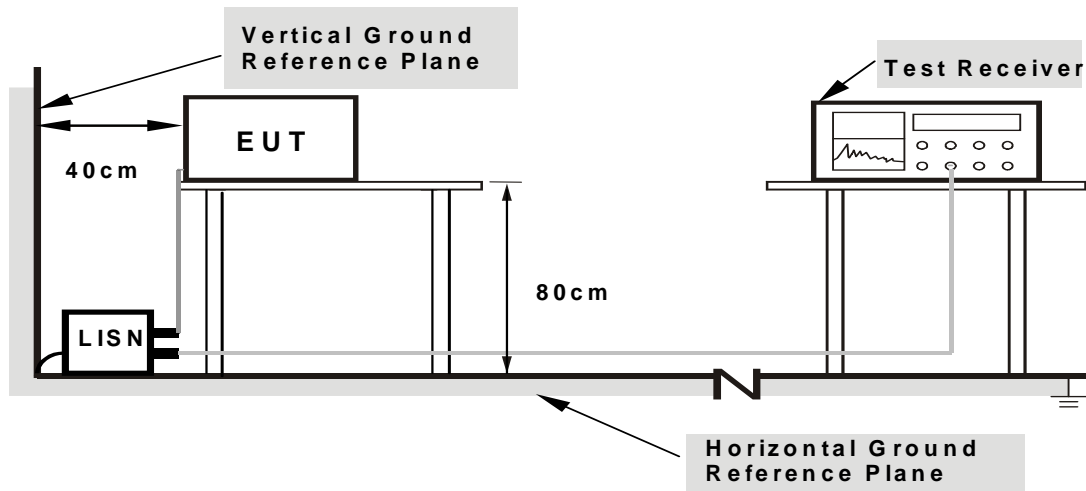
3.3 TEST ARRANGEMENT

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The test results of conducted emissions at mains ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.



3.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.

3.5 SUPPLEMENTARY INFORMATION

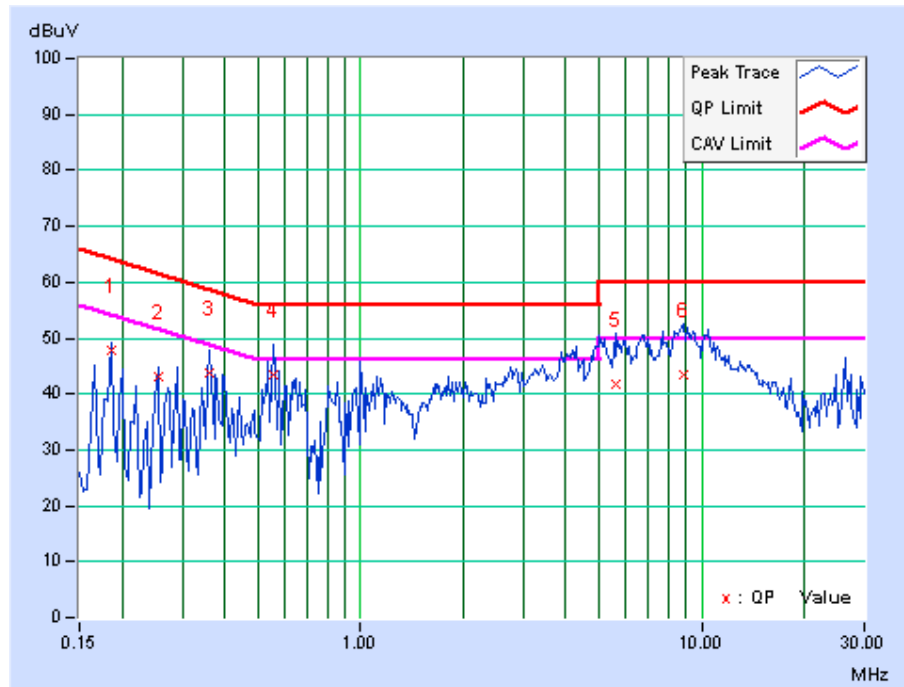
N/A



3.6 TEST RESULTS

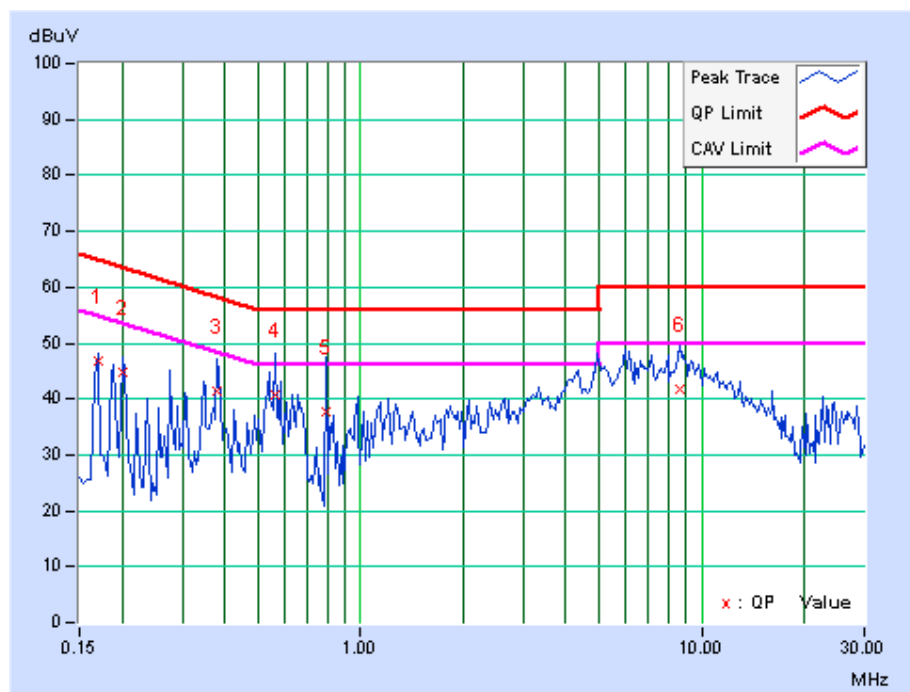
TEST MODE		See section 2.2								
TEST VOLTAGE		DC 9V from adapter Input AC 230V 50Hz			6dB BANDWIDTH		9 kHz			
ENVIRONMENTAL CONDITIONS		25deg. C, 62% RH			TESTED BY: Cheng Zhong					
PHASE OF POWER: LINE (L)										
No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]	[dB (uV)]		(dB)		
		[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.
1	0.18516	9.76	38.16	24.05	47.92	33.81	64.25	54.25	-16.33	-20.44
2	0.25547	9.76	33.43	18.95	43.19	28.71	61.58	51.58	-18.39	-22.87
3	0.36094	9.83	34.09	22.89	43.92	32.72	58.71	48.71	-14.79	-15.99
4	0.55625	9.78	33.61	25.04	43.39	34.82	56.00	46.00	-12.61	-11.18
5	5.57422	9.92	31.72	21.51	41.64	31.43	60.00	50.00	-18.36	-18.57
6	8.86328	10.02	33.51	24.25	43.53	34.27	60.00	50.00	-16.47	-15.73

REMARKS: The emission levels of other frequencies were very low against the limit.



TEST MODE			See section 2.2							
TEST VOLTAGE			DC 9V from adapter Input AC 230V 50Hz			6dB BANDWIDTH		9 kHz		
ENVIRONMENTAL CONDITIONS			25deg. C, 62% RH			TESTED BY: Cheng Zhong				
PHASE OF POWER: NEUTRAL (N)										
No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	9.50	37.44	20.05	46.94	29.55	64.98	54.98	-18.04	-25.43
2	0.20078	9.51	35.42	24.38	44.93	33.89	63.58	53.58	-18.65	-19.69
3	0.38047	9.56	31.97	20.86	41.53	30.42	58.27	48.27	-16.74	-17.85
4	0.56406	9.50	31.18	22.92	40.68	32.42	56.00	46.00	-15.32	-13.58
5	0.79063	9.51	28.13	16.27	37.64	25.78	56.00	46.00	-18.36	-20.22
6	8.61719	9.73	31.91	21.98	41.64	31.71	60.00	50.00	-18.36	-18.29

REMARKS: The emission levels of other frequencies were very low against the limit.



4 CONDUCTED EMISSION MEASUREMENT AT TELECOMMUNICATION PORTS

4.1 LIMIT OF CONDUCTED COMMON MODE DISTURBANCE AT TELECOMMUNICATION PORTS

TEST STANDARD: EN 55032 FOR CLASS A EQUIPMENT

FREQUENCY (MHz)	Voltage Limit (dBuV)		Current Limit (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	97 – 87	84 - 74	53 – 43	40 – 30
0.5 - 30.0	87	74	43	30

FOR CLASS B EQUIPMENT

FREQUENCY (MHz)	Voltage Limit (dBuV)		Current Limit (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	84 - 74	74 - 64	40 – 30	30 – 20
0.5 - 30.0	74	64	30	20

NOTE: (1) The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

4.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Impedance Stabilization Network	TESEQ	ISN T800	27957	Nov.04,14	Nov.03,15
EMI Test Receiver	Rohde&Schwarz	ESCS30	100199	May 11,15	May 10,16
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	May 11,15	May 10,16
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	May 11,15	May 10,16
Test software	ADT	ADT_Conc_V7.3.7	N/A	N/A	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in Shielded Room 553.



4.3 TEST PROCEDURE

For using ISN:

- a. The EUT is placed 0.4 meters from the conducting wall of the shielded room and connected to ISN directly to reference ground plane.
- b. If voltage measurement is used, measure voltage at the measurement port of the ISN, correct the reading by adding the ISN voltage division factor, and compare to the voltage limit.
- c. If current measurement is used, measure current with the current probe and compare to the current limit.
- d. It is not necessary to apply the voltage and the current limit if the ISN is used. A 50 Ω load has to be connected to the measurement port of the ISN during the current measurement.
- e. The disturbance levels and the frequencies of at least six highest disturbances are recorded from be measured each telecommunication port, which comprises the EUT.

For using a 150 Ω load to the outside surface of the shield cable:

- a. Break the insulation and connect a 150 Ω resistor from the outside surface of the shield cable to ground, and apply a ferrite tube or clamp between 150 Ω connection and AE.
- b. The EUT is placed 0.4 meters from the conducting wall of the shielded room and connected to AE with the shield cable.
- c. Measure current with a current probe and compare to the current limit. The common mode impedance towards the right of the 150 Ω resistor.
- d. The disturbance levels and the frequencies of at least six highest disturbances are recorded from be measured each telecommunication port, which comprises the EUT.

For using a combination of current probe and capacitive voltage probe:

- a. The EUT is placed 0.4 meters from the conducting wall of the shielded room and connected to AE with a cable. The cable contains more than four balanced pairs or to unbalanced cable.
- b. Measure current with a current probe and compare to the current limit.
- c. Measure voltage with a capacitive probe and adjust the measured voltage as follows:
 - d. – current margin \leq 6 dB – subtract the actual current margin from measured voltage;
 - e. – current margin $>$ 6 dB – subtract 6 dB from measured voltage.
- f. Compare adjusted voltage with the applicable voltage limit.
- g. Both the measured current and the adjusted voltage shall be below the applicable current and voltage limits.
- h. The disturbance levels and the frequencies of at least six highest disturbances are recorded from be measured each telecommunication port, which comprises the EUT.



BUREAU
VERITAS

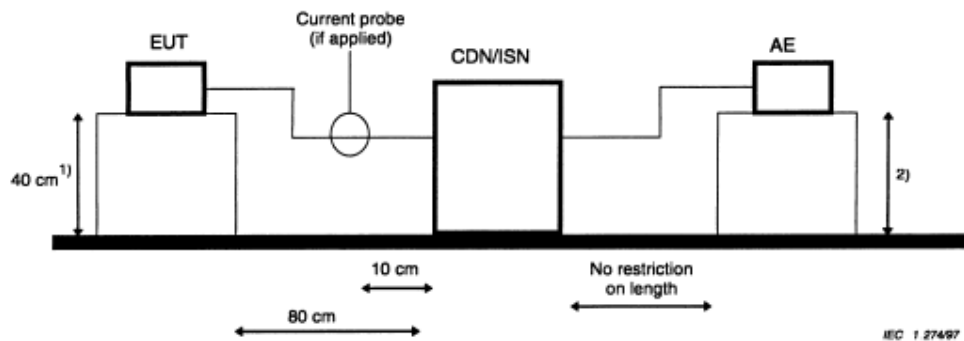
Test Report No.: CE170623N070

4.4 DEVIATION FROM TEST STANDARD

No deviation

4.5 TEST SETUP

For using ISN:



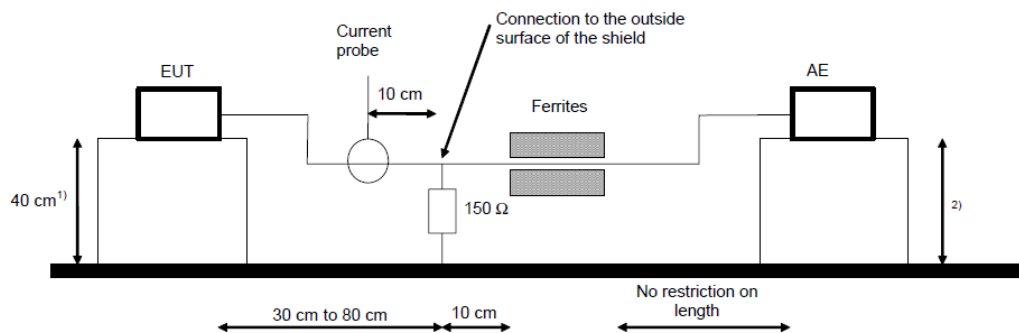
AE = Associated equipment

EUT = Equipment under test

1) Distance to the reference groundplane (vertical or horizontal).

2) Distance to the reference groundplane is not critical.

For using a 150 Ω load to the outside surface of the shield cable:



AE = Associated equipment

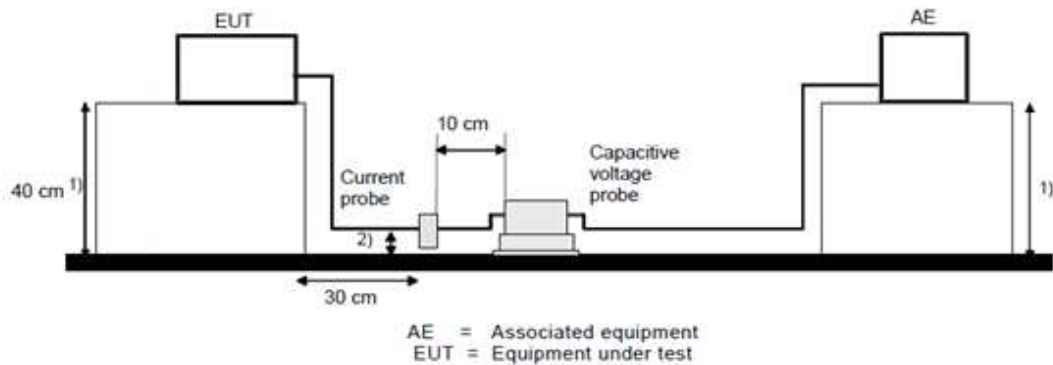
EUT = Equipment under test

1) Distance to the reference groundplane (vertical or horizontal).

2) Distance to the reference groundplane is not critical.



For using a combination of current probe and capacitive voltage probe:



1) Distance to the reference groundplane (vertical or horizontal)

2) Distance 4 ± 1 cm from the reference groundplane

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration

4.6 EUT OPERATING CONDITIONS

The condition of LAN utilization in excess of 10% and sustaining that level for a minimum of 250 ms is created by command TFGEN.



**BUREAU
VERITAS**

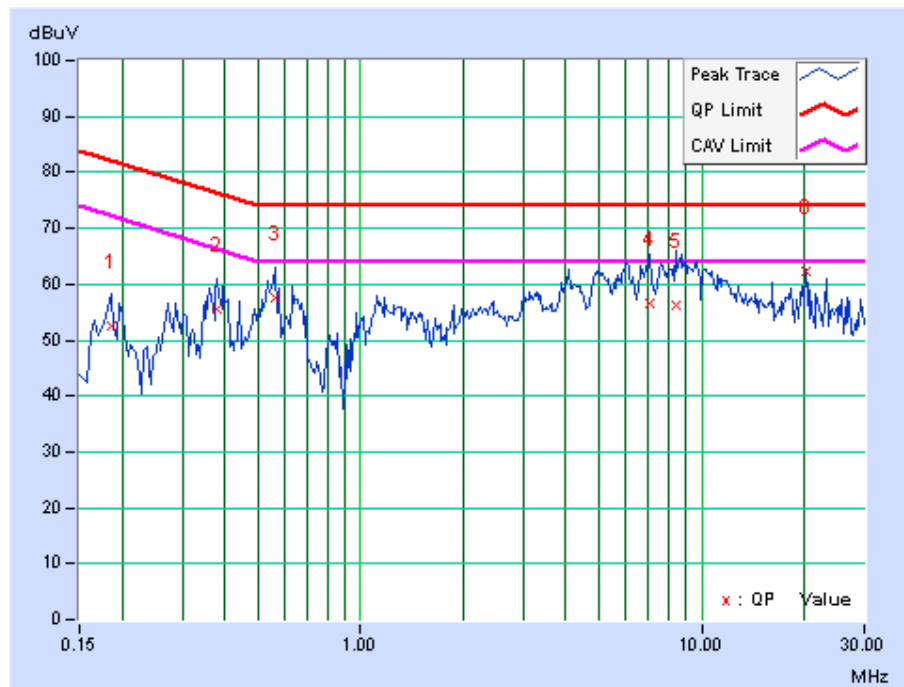
Test Report No.: CE170623N070

4.7 TEST RESULTS

TEST MODE	See section 2.2	6dB BANDWIDTH	9kHz
TEST VOLTAGE	DC 9V from adapter Input AC 230V 50Hz	PHASE	T8
ENVIRONMENTAL CONDITIONS	23 deg. C, 55% RH,	TEST BY	Cheng Zhong

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18516	9.76	42.83	38.29	52.59	48.05	82.25	72.25	-29.66	-24.20
2	0.38047	9.83	45.58	40.45	55.41	50.28	76.27	66.27	-20.85	-15.98
3	0.56016	9.78	47.67	42.44	57.45	52.22	74.00	64.00	-16.55	-11.78
4	7.01172	9.98	46.55	39.53	56.53	49.51	74.00	64.00	-17.47	-14.49
5	8.39063	10.01	46.27	38.64	56.28	48.65	74.00	64.00	-17.72	-15.35
6	20.25781	10.47	51.87	50.67	62.34	61.14	74.00	64.00	-11.66	-2.86

REMARKS: The emission levels of other frequencies were very low against the limit.



**5 RADIATED EMISSION MEASUREMENT****5.1 LIMITS OF RADIATED EMISSION MEASUREMENT****FOR FREQUENCY BELOW 1000 MHz**

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	Quasi-Peak dBuV/m	Quasi-Peak dBuV/m
30 – 230	40	30
230 – 1000	47	37

FREQUENCY (MHz)	Class A (at 3m)	Class B (at 3m)
	Quasi-Peak dBuV/m	Quasi-Peak dBuV/m
30 – 230	50	40
230 – 1000	57	47

For FM receivers

Distance (m)	Source	Frequency Range (MHz)	Limits dB (uV/m)	
			Quasi-peak	
10	Local oscillator	≤1000	Fundamental	50
		30 to 300	Harmonics	42
		300 to 1000	Harmonics	46
	Other	30 to 230		30
		230 to 1000		37
3	Local oscillator	≤1000	Fundamental	60
		30 to 300	Harmonics	52
		300 to 1000	Harmonics	56
	Other	30 to 230		40
		230 to 1000		47

**FREQUENCY RANGE OF RADIATED MEASUREMENT
(For unintentional radiators)**

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	Up to 5 times of the highest frequency or 6 GHz, whichever is less

FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (GHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
1 to 3	76	56	70	50
3 to 6	80	60	74	54

- NOTE:** 1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
 3. All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

**5.2 TEST INSTRUMENTS****FOR FREQUENCY BELOW 1GHz**

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	100962	Mar. 05,15	Mar. 04,16
EMI Test Receiver	Rohde&Schwarz	ESCI	101418	Mar. 05,15	Mar. 04,16
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-554	Dec. 08, 14	Dec. 07, 15
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-555	Nov. 24, 14	Nov. 23, 15
Signal Amplifier	Agilent	8447D	2944A10488	Jun. 25,14	Jun. 24,15
Signal Amplifier	Agilent	8447D	2944A11174	Jun. 25,14	Jun. 24,15
10m Semi-anechoic Chamber	CHANGLING	21.4m*12.1m*8.8m	NSEMC006	May 15, 14	May 14, 16
Test Software	ADT	ADT_Radiated_V 8.7.x	N/A	N/A	N/A

FOR FREQUENCY ABOVE 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum Analyzer (9KHz-25GHz)	Agilent	E7405A	MY45118807	May 12,15	May 11,16
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101003	Apr. 07, 15	Apr. 06, 16
Pre-Amplifier (100MHz-26.5GHz)	EMCI	EMC 012645	980077	Jun. 16,14	Jun. 15,15
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 20,14	Nov. 19,15
Test Software	ADT	ADT_Radiated_V 8.7.x	N/A	N/A	N/A

- NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in 10m Chamber.

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	ETS-Lindgren	3117	00085519	Feb. 03,15	Feb. 02,17

- NOTE:** 1. The test was performed in 10m Chamber.
2. The calibration interval of the above test instruments is 24 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170242	Feb. 13,14	Feb. 12,17

- NOTE:** 1. The test was performed in 10m Chamber.
2. The calibration interval of the above test instruments is 36 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



5.3 TEST PROCEDURE

<Frequency Range below 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
3. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$ (if the raw value not contains the amplifier);
4. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$ (if the raw value contains the amplifier).
5. $\text{Margin value} = \text{Emission level} - \text{Limit value}$.



<Frequency Range above 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna can be varied from one meter-to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test receiver/spectrum was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

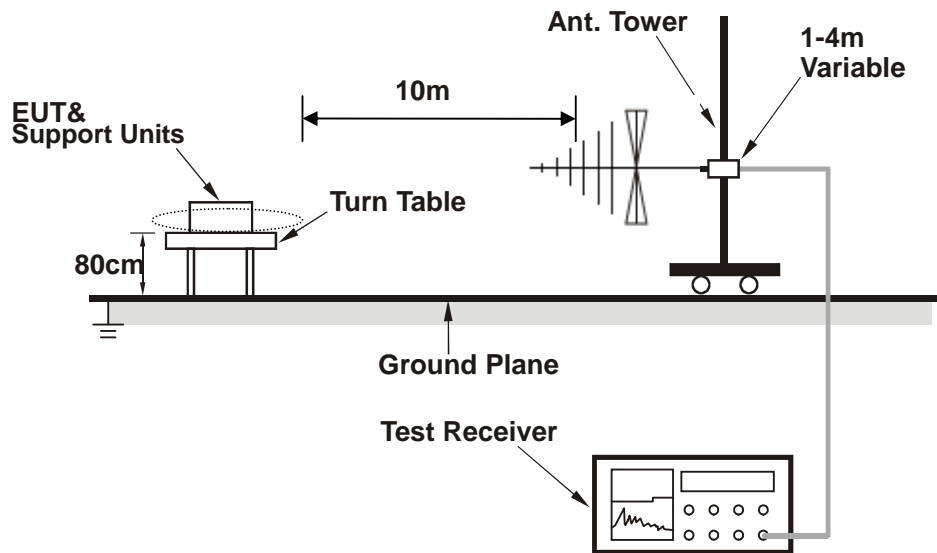
NOTE:

1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
2. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
3. $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
4. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$ (if the raw value not contains the amplifier);
5. $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$ (if the raw value contains the amplifier).
6. $\text{Margin value} = \text{Emission level} - \text{Limit value}$.

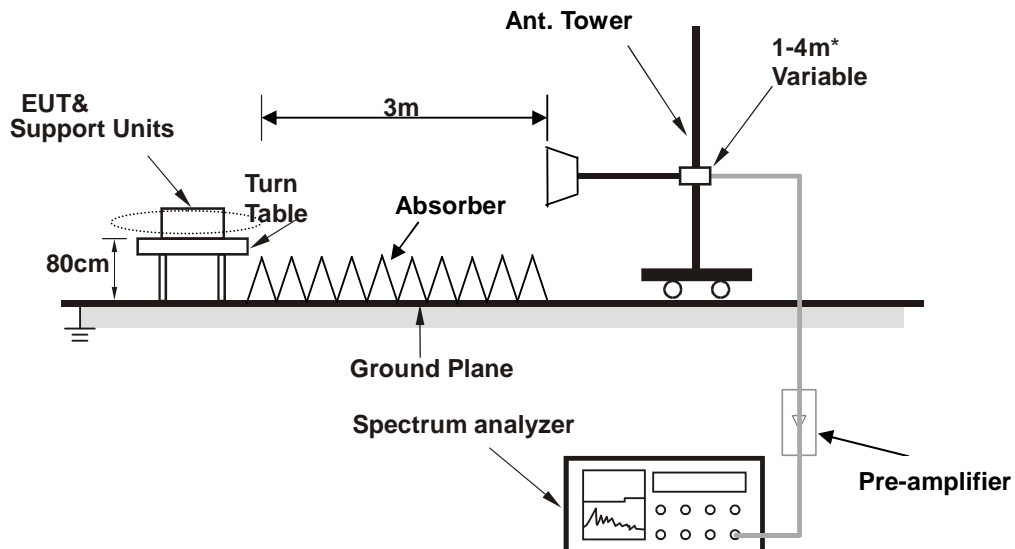


5.4 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



* : depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3

5.5 SUPPLEMENTARY INFORMATION

The more stringent measurement method of paragraph 8.3.2 in ANSI C63.4:2014 was applied for the test.

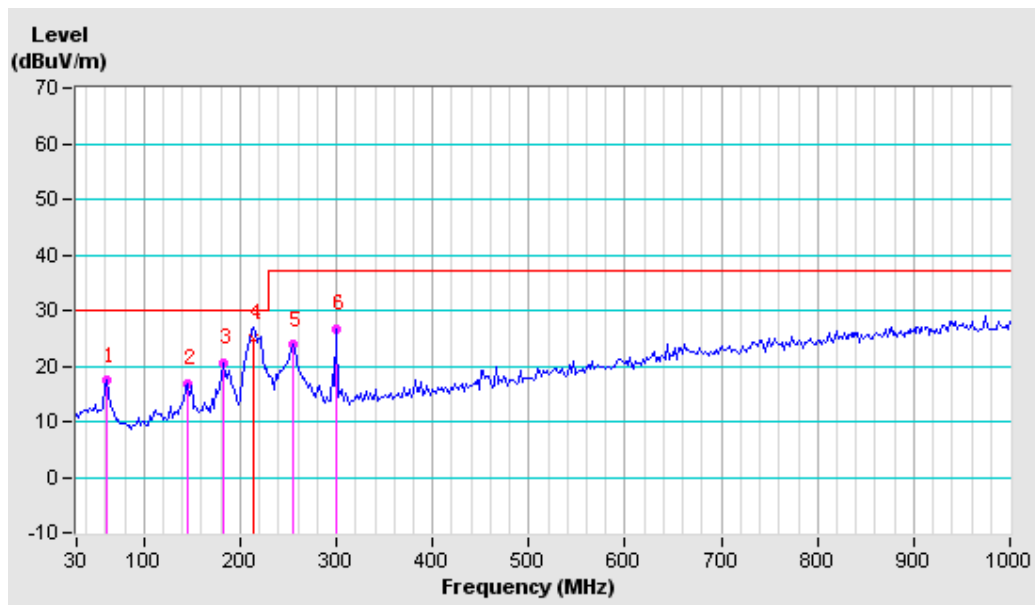


5.6 TEST RESULTS

Below 1GHz

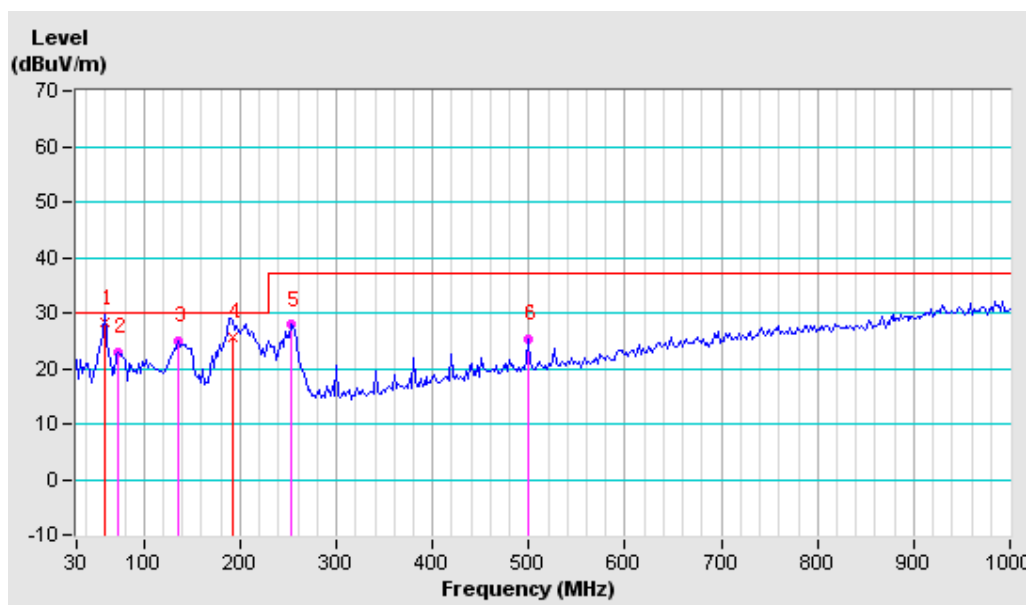
TEST MODE		See section 2.2						
FREQUENCY RANGE		DC 9V from adapter Input AC 230V 50Hz			DETECTOR FUNCTION & BANDWIDTH		Quasi-Peak, 120kHz	
ENVIRONMENTAL CONDITIONS		21 deg. C, 52% RH			TESTED BY: William Wang			
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	61.04	-14.89	32.25	17.36	30.00	-12.64	400	18
2	144.46	-14.40	31.23	16.83	30.00	-13.17	400	22
3	183.26	-15.03	35.60	20.57	30.00	-9.43	400	136
4	214.03	-16.21	41.11	24.90	30.00	-5.10	400	200
5	255.04	-13.99	37.76	23.77	37.00	-13.23	400	108
6	299.66	-12.27	38.81	26.54	37.00	-10.46	400	108

- REMARKS:** 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 30MHz to 1000MHz.
4. Only emissions significantly above equipment noise floor are reported.



TEST MODE		See section 2.2						
FREQUENCY RANGE		DC 9V from adapter Input AC 230V 50Hz			DETECTOR FUNCTION & BANDWIDTH		Quasi-Peak, 120kHz	
ENVIRONMENTAL CONDITIONS		21 deg. C, 52% RH			TESTED BY: William Wang			
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	59.10	-14.23	42.43	28.20	30.00	-1.80	100	99
2	72.68	-15.96	38.82	22.86	30.00	-7.14	100	138
3	134.76	-13.40	38.32	24.92	30.00	-5.08	100	43
4	192.14	-14.66	40.26	25.60	30.00	-4.40	100	216
5	253.10	-11.97	39.82	27.85	37.00	-9.15	100	122
6	499.48	-5.67	30.99	25.32	37.00	-11.68	100	222

- REMARKS:** 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 30MHz to 1000MHz.
4. Only emissions significantly above equipment noise floor are reported.





Above 1GHz

TEST MODE	See section 2.2		
TEST VOLTAGE	DC 9V from adapter Input AC 230V 50Hz	FREQUENCY RANGE	1-6 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 52% RH	TESTED BY: William Wang	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	CORRECTION FACTOR (dB/m)	RAW VALUE (dBuV)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)A	MARGIN (dB)	NTENNA HEIGHT (cm)	TABLE ANGLE (Degree)
1	1515.000 PK	-12.03	60.26	48.23	70.00	-21.77	100	75
2	1515.000 AV	-12.03	44.43	32.40	50.00	-17.60	100	75
3	2275.824 PK	-6.98	57.33	50.35	70.00	-19.65	100	38
4	2275.824 AV	-6.98	43.68	36.70	50.00	-13.30	100	38
5	3359.325 PK	-4.54	60.97	56.43	74.00	-17.57	100	125
6	3359.325 AV	-4.54	47.34	42.80	54.00	-11.20	100	125
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	CORRECTION FACTOR (dB/m)	RAW VALUE (dBuV)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)A	MARGIN (dB)	NTENNA HEIGHT (cm)	TABLE ANGLE (Degree)
1	1674.158 PK	-10.71	59.21	48.50	70.00	-21.50	100	45
2	1674.158 AV	-10.71	45.31	34.60	50.00	-15.40	100	45
3	4215.128 PK	-2.89	56.69	53.80	74.00	-20.20	100	88
4	4215.128 AV	-2.89	44.09	41.20	54.00	-12.80	100	88
5	5387.452 PK	-1.05	53.55	52.50	74.00	-21.50	100	41
6	5387.452 AV	-1.05	43.95	42.90	54.00	-11.10	100	41

REMARKS: 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 1GHz to 6GMHz.
4. Only emissions significantly above equipment noise floor are reported.



6 HARMONICS CURRENT MEASUREMENT

6.1 LIMITS

Limits for Class A equipment		Limits for Class D equipment		
Harmonic Order n	Max. permissible harmonics current A	Harmonic Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd harmonics		Odd Harmonics only		
3	2.30	3	3.4	2.30
5	1.14	5	1.9	1.14
7	0.77	7	1.0	0.77
9	0.40	9	0.5	0.40
11	0.33	11	0.35	0.33
13	0.21	13	0.30	0.21
$15 \leq n \leq 39$	$0.15 \times 15/n$	$15 \leq n \leq 39$	$3.85/n$	$0.15 \times 15/n$
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
$8 \leq n \leq 40$	$0.23 \times 8/n$			

Notes: 1. Class A and Class D are classified according to section 5 of EN 61000-3-2.

2. According to section 7 of EN 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

Classification of Equipment

The EUT is Class A in accordance with EN 61000-3-2 as follows:

Class A	Class B	Class C	Class D
Balanced three-phase equipment; Household appliances excluding equipment as Class D; Tools excluding portable tools; Dimmers for incandescent lamps; Audio equipment; Equipment not specified in one of the three other classes.	Portable tools; Arc welding equipment which is not professional equipment.	Lighting equipment.	Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors; Television receivers; Refrigerators and freezers having one or more variable-speed drives to control compressor motor(s).



6.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
5kVA AC Power Source	California Instruments	5001ix-400	55194	April 8, 15	April 7, 16
Harmonic/Flicker Test System	California Instruments	PACS-1	72134	April 8, 15	April 7, 16
Test Software	California Instruments	CTS 3.0-V3.2.0. 35	N/A	N/A	N/A

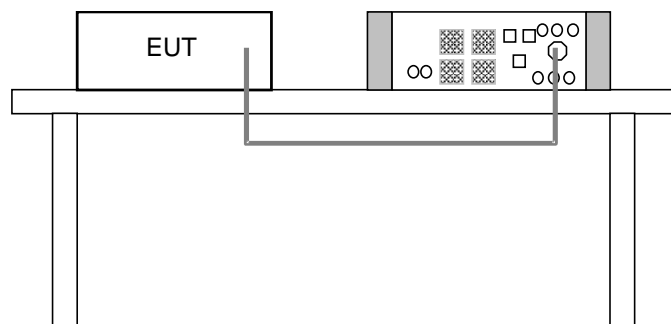
Notes: 1. The test was performed in EMS Room.

2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

6.3 TEST ARRANGEMENT

- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

6.4 TEST SETUP





Test Report No.: CE170623N070

6.5 TEST RESULTS

The limits are not specified for equipment with a rated power of 75W or less (other than lighting equipment). The EUT is not required to meet this test item as its power consumption is lower than 75W.

For further details, please refer to Clause 7 of EN 61000-3-2:2014.



7 VOLTAGE FLUCTUATIONS AND FLICKER MEASUREMENT

7.1 LIMITS

Test item	Limit	Note
P_{st}	1.0	P_{st} : short-term flicker severity.
P_{lt}	0.65	P_{lt} : long-term flicker severity.
T_{max} (ms)	500	T_{max} : maximum time duration during the observation period that the voltage deviation $d(t)$ exceeds the limit for d_c .
d_{max} (%)	4	d_{max} : maximum absolute voltage change during an observation period.
d_c (%)	3.3	d_c : maximum steady state voltage change during an observation period.

7.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
5kVA AC Power Source	California Instruments	5001ix-400	55194	April 8, 15	April 7, 16
Harmonic/Flicker Test System	California Instruments	PACS-1	72134	April 8, 15	April 7, 16
Test Software	California Instruments	CTS 3.0-V3.2.0. 35	N/A	N/A	N/A

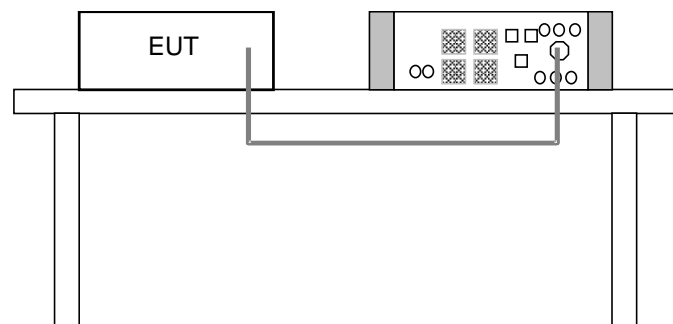
Notes: 1. The test was performed in EMS Room.

2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

7.3 TEST ARRANGEMENT

- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.
- During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

7.4 TEST SETUP





7.5 TEST RESULTS

Observation (T_p)	10 min.	Test Date	2015/05/30
Fundamental Voltage/Ampere	229.81Vrms	Power Frequency	50.00Hz
Environmental Conditions	23 deg. C, 55% RH	Tested by	Harry Li
Test Mode	See Section 2.2		

Test Parameter	Measurement Value	Limit	Remarks
P_{st}	0.064	1.00	Pass
P_{lt}	0.028	0.65	Pass
T_{max} (ms)	0.0	500	Pass
d_{max} (%)	0.00	4	Pass
dc (%)	0.00	3.3	Pass

- Note: (1) P_{st} means short-term flicker indicator.
(2) P_{lt} means long-term flicker indicator.
(3) T_{max} means accumulated time value of $d(t)$ with a deviation exceeding 3.3 %.
(4) d_{max} means maximum relative voltage change.
(5) d_c means maximum relative steady-state voltage change.



8 IMMUNITY TEST

8.1 GENERAL DESCRIPTION

Product Standard:	EN 55024:2010 + A1:2015	
Basic Standard, specification requirement, and Performance Criteria:	IEC 61000-4-2	Electrostatic Discharge – ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B
	IEC 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80-1000 MHz, 3V/m, 80% AM (1kHz), Performance Criterion A
	IEC 61000-4-4	Electrical Fast Transient/Burst - EFT AC Power line: 1kV, DC Power line: 0.5kV Signal line: 0.5kV Performance Criterion B
	IEC 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8/20 us Short Circuit Current, AC Power Line : line to line : 1 kV, line to earth : 2kV;DC Power Line : line to line : 0.5kV, line to earth : 0.5kV Signal line: 1kV Performance Criterion B
	IEC 61000-4-6	Conducted Radio Frequency Disturbances Test – CS: 0.15-80 MHz, 3Vrms, 80% AM, 1kHz, Performance Criterion A
	IEC 61000-4-8	Power Frequency Magnetic Field Test, 50 Hz, 1A/m, Performance Criterion A
	IEC 61000-4-11	Meets the requirements of Voltage Dips: i) reduction for >95% Performance Criterion B ii) reduction for 30% Performance Criterion C iii) reduction for >95% Performance Criterion C



Product Standard	Draft EN 301 489-1 V2.2.0 (2017-03) Draft EN 301489-17 V3.2.0(2017-03)	
Basic Standard, Specification, and Performance Criterion required	EN 61000-4-2	Electrostatic Discharge – ESD: 2, 4, 8 kV air discharge, 4 kV contact discharge, Performance Criterion B
	EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80 ~ 6000 MHz, 3 V/m, 80% AM (1 kHz), Performance Criterion A
	EN 61000-4-4	Electrical Fast Transient/Burst - EFT, AC power line: 1 kV Performance Criterion B
	EN 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, Power line: line to line 1 kV, line to ground 2 kV Performance Criterion B
	EN 61000-4-6	Conducted Radio Frequency Disturbances Test – CS: 0.15 ~ 80 MHz, 3 Vrms, 80% AM, 1 kHz, Performance Criterion A
	EN 61000-4-11	Voltage Dips: i) 0% residual for 0.5 cycle, Performance Criterion B ii) 0% residual for 1 cycle, Performance Criterion B iii) 70% residual for 25 cycle, Performance Criterion C Voltage Interruptions: iv) 0% residual for 250 cycle, Performance Criterion C

**8.1.1 PERFORMANCE CRITERIA****FOR EN55024**

CRITERION A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
CRITERION B	<p>During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.</p> <p>After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.</p> <p>If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
CRITERION C	<p>Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.</p> <p>Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>



For EN 301 489-17

The Requirement of Performance Criteria		
1	Performance criteria for continuous phenomena applied to transmitters (CT)	Criterion A of the applicable class shall apply
2	Performance criteria for transient phenomena applied to transmitters (TT)	Criterion B of the applicable class shall apply
3	Performance criteria for continuous phenomena applied to receivers (CR)	Criterion A of the applicable class shall apply
4	Performance criteria for transient phenomena applied to receivers (TR)	Criterion B of the applicable class shall apply

For EN 301489-17

The phenomena allowed during and after test in each criterion are clearly stated in the following table.

Performance criteria		
Criteria	During test	After test
A	Shall operate as intended. (see note1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).
<p>NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended..</p> <p>NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p> <p>NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p>		



Test Report No.: CE170623N070

8.1.2 EUT OPERATING CONDITION

Same as item 2.3

8.2 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD) (EN55024)

8.2.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge: 8kV (Direct) Contact Discharge: 4kV (Indirect & Direct)
Polarity:	Positive & Negative
Number of Discharge:	50 times at each test point for Contact Discharge, 20 times at each test point for Air Discharge
Discharge Mode:	Single Discharge
Discharge Period:	1 second

8.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
ESD Generator	TESEQ	NSG 437	279	Feb. 03, 15	Feb. 02, 16
Test Software	TESEQ	V03.03	N/A	N/A	N/A
ESD Generator	EM TEST	Dito	V1211112265	Aug. 18, 14	Aug. 17, 15
Test Software	EM TEST	V 2.31	N/A	N/A	N/A

NOTE: 1. The test was performed in ESD Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

8.2.3 TEST PROCEDURE

The discharges shall be applied in two ways:

- Contact discharges to the conductive surfaces and coupling planes:**
The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.
- Air discharges at slots and apertures and insulating surfaces:**
On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

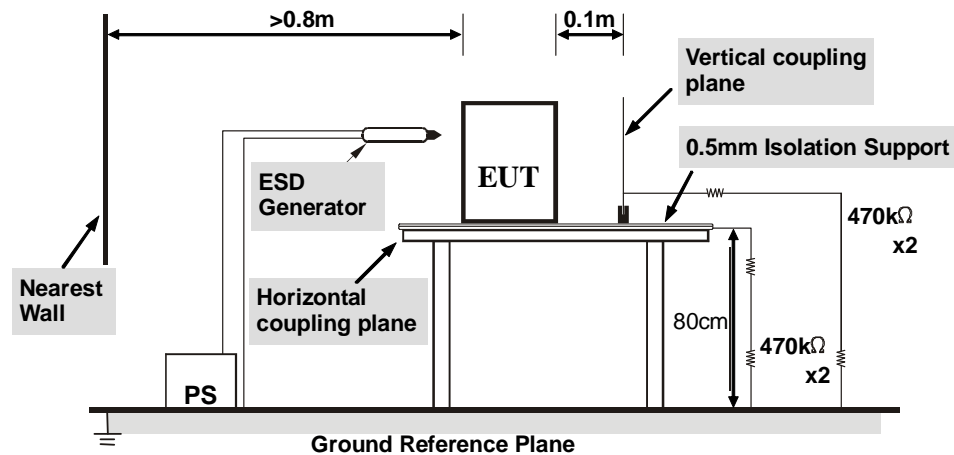
The basic test procedure was in accordance with IEC 61000-4-2:

- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- c. The time interval between two successive single discharges was at least 1 second.
- d. The discharge return cable of the generator shall be kept at a distance of at least 0.2 m from the EUT whilst the discharge is being applied and should not be held by the operator.
- e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- g. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned horizontal at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.
- h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

8.2.4 DEVIATION FROM TEST STANDARD

No deviation.

8.2.5 TEST SETUP



NOTE:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the **Ground Reference Plane**. The **GRP** consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A **Horizontal Coupling Plane** (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940k Ω total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 0.8-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

**8.2.6 TEST RESULTS**

TEST MODE	See section 2.2	TEST VOLTAGE	DC 9V from adapter Input AC 230V 50Hz
ENVIRONMENTAL CONDITIONS	23.1deg. C, 45.2% RH, 101.5Kpa	TESTED BY: Sen He	

Direct Discharge Application				
Test Level (kV)	Polarity	Test Point	Test Result of Contact Discharge	Test Result of Air Discharge
4	+/-	All metal parts	A	N/A
8	+/-	All non-metal parts	N/A	A

Indirect Discharge Application				
Discharge Level (kV)	Polarity	Test Point	Test Result of HCP	Test Result of VCP
4	+/-	HCP	A	N/A
4	+/-	VCP	N/A	A

NOTE: A: There was no change compared with initial operation during the test.



8.3 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD) (EN301489)

8.3.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge: 2, 4, 8 kV (Direct) Contact Discharge: 4 kV (Direct and Indirect)
Polarity:	Positive & Negative
Number of Discharge:	20 times on each test points
Discharge Mode:	Single Discharge
Discharge Period:	1 second

8.3.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
ESD Generator	TESEQ	NSG 437	279	Feb. 03, 15	Feb. 02, 16
Test Software	TESEQ	V03.03	N/A	N/A	N/A
ESD Generator	EM TEST	Dito	V1211112265	Aug. 18, 14	Aug. 17, 15
Test Software	EM TEST	V 2.31	N/A	N/A	N/A

- NOTE:** 1. The test was performed in ESD Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



8.3.3 TEST PROCEDURE

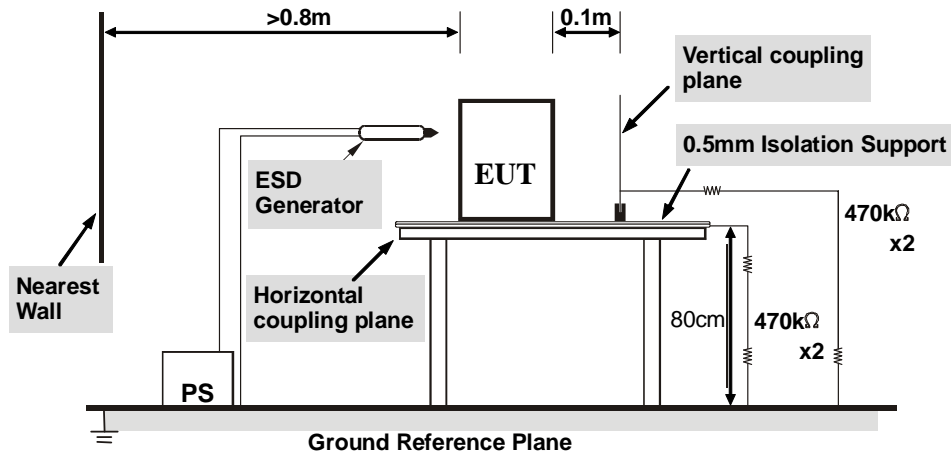
- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- c. The time interval between two successive single discharges was at least 1 second.
- d. The discharge return cable of the generator shall be kept at a distance of at least 0.2 m from the EUT whilst the discharge is being applied and should not be held by the operator.
- e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- g. At least ten single discharges (in the most sensitive polarity) were applied to the **Horizontal Coupling Plane** at points on each side of the EUT. The ESD generator was positioned horizontally at a distance of 0.1 meters from the EUT with the discharge electrode touching the **HCP**.
- h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **Vertical Coupling Plane** in sufficiently different positions that the four faces of the EUT were completely illuminated. The **VCP** (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

8.3.4 DEVIATION FROM TEST STANDARD

No deviation.



8.3.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the **Ground Reference Plane**. The **GRP** consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A **Horizontal Coupling Plane** (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940k Ω total impedance. The equipment under test, was installed in a representative system as described in section 7 of EN 61000-4-2 and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 0.8 minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

**8.3.6 TEST RESULTS**

TEST VOLTAGE	DC 9V from adapter Input AC 230V 50Hz	ENVIRONMENTAL CONDITIONS	23.1deg. C, 45.2% RH, 101.5Kpa
TESTED BY	Sen He		

Direct Discharge Application				
Test Level (kV)	Polarity	Test Point	Test Result of Contact Discharge	Test Result of Air Discharge
4	+ /-	All metal parts	A	N/A
2, 4, 8	+ /-	All Non-metal Parts	N/A	A

Indirect Discharge Application				
Discharge Level (kV)	Polarity	Test Point	Test Result of HCP	Test Result of VCP
4	+ /-	HCP	A	N/A
4	+ /-	VCP	N/A	A

NOTE: A: There was no change compared with initial operation during the test.



8.4 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS) (EN55024)

8.4.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-3
Frequency Range:	80-1000MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Antenna Height:	1.5m
Dwell Time:	at least 3 seconds

8.4.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal Generator	Agilent	N5181A	MY50142530	Oct.16, 14	Oct.15, 15
Bilog Antenna	Teseq	CBL 6111D	27089	Jun. 27, 14	Jun. 26, 15
Antenna Log-Periodic	CORAD	ATS700M11G	0336821	N/A	N/A
Switch Controller	CORAD	SC1000	0337343	N/A	N/A
RF Power Meter	ESE	4242	13984	Nov. 05, 14	Nov. 04, 15
Power Sensor	ESE	51011EMC	35716	Nov. 05, 14	Nov. 04, 15
Power Sensor	ESE	51011EMC	35715	Nov. 05, 14	Nov. 04, 15
E-Field probe	Narda	NBM-520	2403/01B	May 07, 14	May 06, 16
Power Amplifier	TESEQ	CBA 1G-150	T44029	N/A	N/A
Power Amplifier	TESEQ	CBA 3G-100	T44030	N/A	N/A
Power Amplifier	TESEQ	CBA 6G-050	1041204	N/A	N/A
Dual Directional Coupler	TESEQ	C5982	95208	Nov. 20, 14	Nov. 19, 15
Dual Directional Coupler	TESEQ	C6187	95175	Nov. 20, 14	Nov. 19, 15
Dual Directional Coupler	TESEQ	CPH-274F	M251304-01	Nov. 20, 14	Nov. 19, 15
Test Software	ADT	BVADT_RS_V7.6.4-DG	N/A	N/A	N/A

- NOTE:** 1. The test was performed in RS chamber.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

8.4.3 TEST PROCEDURE

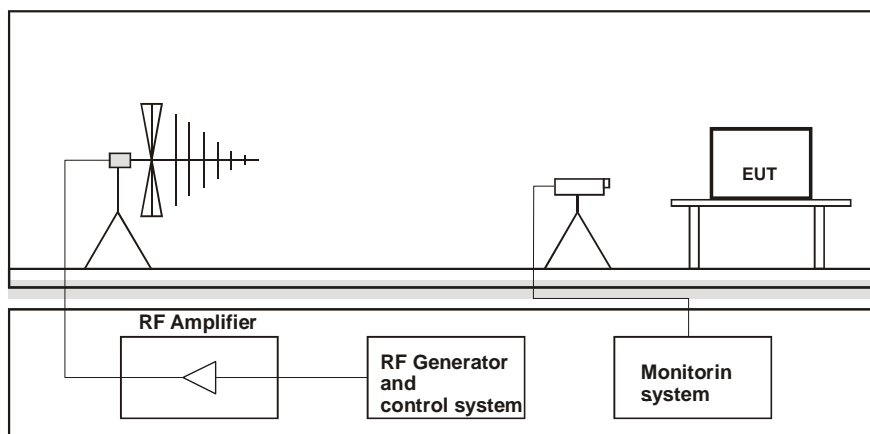
The test procedure was in accordance with IEC 61000-4-3

- The testing was performed in a fully-anechoic chamber.
- The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80% amplitude modulated with a 1kHz sine wave.
- The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0,5s.
- The field strength levels were 3V/m.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

8.4.4 DEVIATION FROM TEST STANDARD

No deviation.

8.4.5 TEST SETUP



NOTE:

TABLETOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

**8.4.6 TEST RESULTS**

TEST MODE	See section 2.2	TEST VOLTAGE	DC 9V from adapter Input AC 230V 50Hz
ENVIRONMENTAL CONDITIONS	24.2 deg. C, 47.2% RH	TESTED BY: Sen He	

Field Strength (V/m)	Test Frequency Note ^{#1} (MHz)	Polarization of antenna (Horizontal / Vertical)	Test Distance (m)	Test Result	Remark
3	80 - 1000	H&V	3	A	N/A

Note^{#1}:

Tested Israel SII Frequencies 89,100,107,144,163,196,244,315,434,460,600,825,845,880 MHz

NOTE: A: There was no change compared with initial operation during the test.



8.5 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS) (EN301489)

8.5.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-3
Frequency Range:	80 MHz ~ 6000 MHz
Field Strength:	3 V/m
Modulation:	1 kHz Sine Wave, 80%, AM Modulation
Frequency Step:	10% of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Antenna Height:	1.5 m
Dwell Time:	3 seconds

8.5.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal Generator	Agilent	N5181A	MY50142530	Oct. 13,16	Oct. 12,17
Bilog Antenna	Teseq	CBL 6111D	27089	July 19,16	July 18,17
Antenna Log-Periodic	AR	ATR80M6G	0337307	N/A	N/A
Antenna Log-Periodic	AR	ATS700M11G	0336821	N/A	N/A
Switch Controller	AR	SC1000	0337343	N/A	N/A
RF Power Meter	ESE	4242	13984	Nov. 04,16	Nov. 03,17
Power Sensor	ESE	51011EMC	35716	Nov. 04,16	Nov. 03,17
Power Sensor	ESE	51011EMC	35715	Nov. 04,16	Nov. 03,17
E-Field probe	Narda	NBM-520	2403/01B	Mar. 08,17	Mar. 07,18
Power Amplifier	TESEQ	CBA 1G-150	T44029	N/A	N/A
Power Amplifier	TESEQ	CBA 3G-100	T44030	N/A	N/A
Power Amplifier	TESEQ	CBA 6G-050	1041204	N/A	N/A
Dual Directional Coupler	TESEQ	C5982	95208	Nov. 04,16	Nov. 03,17
Dual Directional Coupler	TESEQ	C6187	95175	Nov. 04,16	Nov. 03,17
Dual Directional Coupler	TESEQ	CPH-274F	M251304-01	Nov. 04,16	Nov. 03,17
Test Software	ADT	BVADT_RS_V7.6 .4-DG	N/A	N/A	N/A

NOTE: 1. The test was performed in RS chamber.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



8.5.3 TEST PROCEDURE

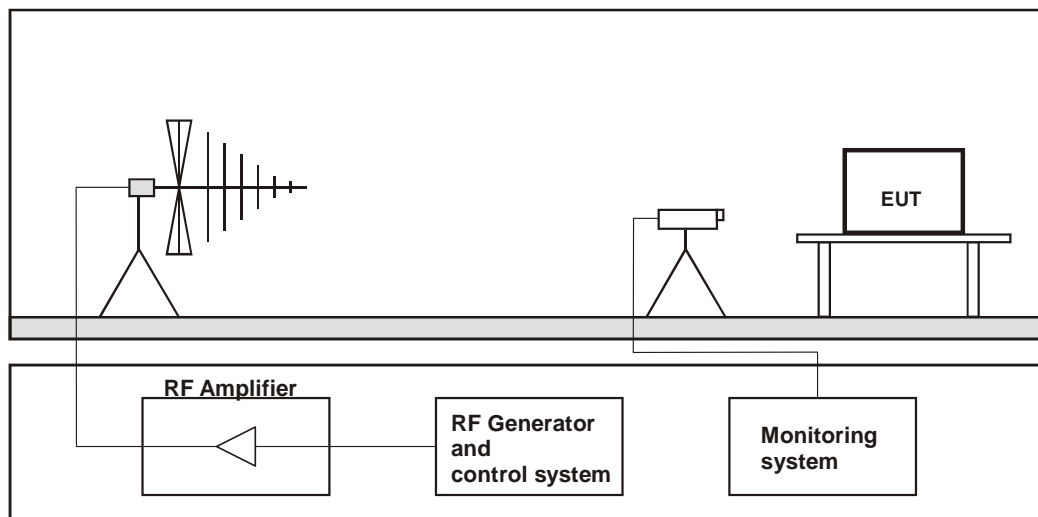
The test procedure was in accordance with EN 61000-4-3.

- The testing was performed in a fully-anechoic chamber.
- The frequency range is swept from 80 MHz to 6000 MHz with the signal 80% amplitude modulated with a 1 kHz sine wave.
- The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0.5s.
- The field strength level was 3 V/m.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

8.5.4 DEVIATION FROM TEST STANDARD

No deviation.

8.5.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

**8.5.6 TEST RESULTS**

TEST MODE	See section 2.2	TEST VOLTAGE	DC 9V from adapter Input AC 230V 50Hz
ENVIRONMENTAL CONDITIONS	23deg.C, 57% RH	TESTED BY: Star	

Field Strength (V/m)	Test Frequency Note ^{#1} (MHz)	Polarization of antenna (Horizontal / Vertical)	Test Distance (m)	Test Result	Remark
3	80-6000	H / V	3	A	N/A

Note^{#1}: Tested Israel SII Frequencies 89,100,107,144,163,196,244,315,434,460,600,825,845,880 MHz

NOTE: A: There was no change compared with initial operation during the test.

**8.6 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST (EFT)
(EN55024, EN301489)****8.6.1 TEST SPECIFICATION**

Basic Standard:	IEC 61000-4-4
Test Voltage:	Power Line: 1kV Signal/Control Line: 0.5kV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Waveshape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	1 min.

8.6.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EFT Tester	HAEFELY	PEFT4010	150546	May 11,15	May 10,16
EFT Coupling Clamp	HAEFELY	IP4A	150407	May 11,15	May 10,16
Test Software	HAEFELY	SWPE4010 1.22	N/A	N/A	N/A

NOTE: 1. The test was performed in EMS Room.

2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

8.6.3 TEST PROCEDURE

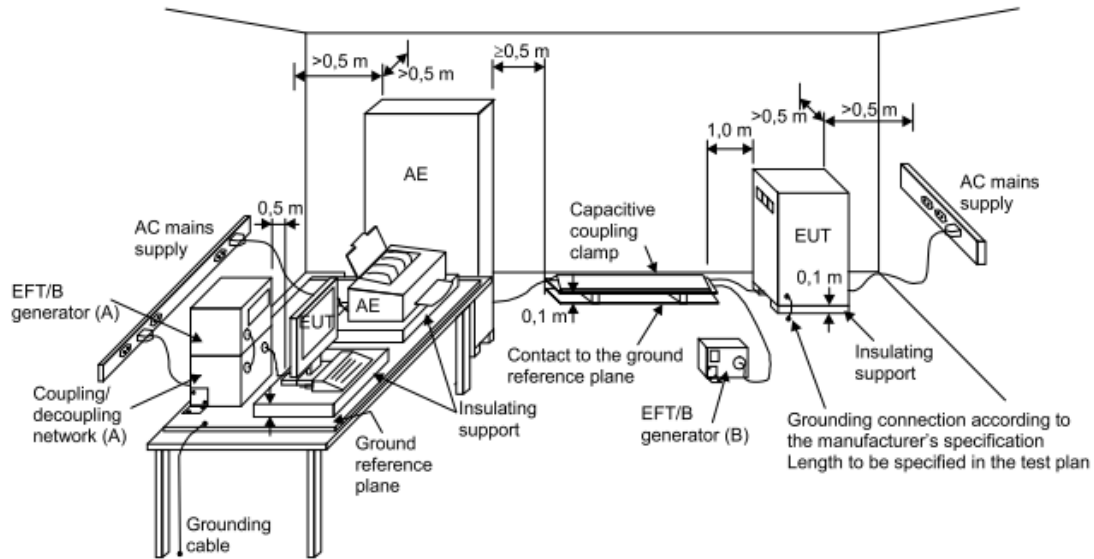
- a Both positive and negative polarity discharges were applied.
- b The distance between any coupling devices and the EUT should be (0.5 – 0/+0.1) m for table-top equipment testing, and (1.0 ± 0.1) m for floor standing equipment.
- c The duration time of each test sequential was 1 minute.
- d The transient/burst waveform was in accordance with IEC 61000-4-4, 5/50ns.

8.6.4 DEVIATION FROM TEST STANDARD

No Deviation.



8.6.5 TEST SETUP



IEC 645/12

- (A) location for supply line coupling
- (B) location for signal lines coupling

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

**8.6.6 TEST RESULTS**

TEST MODE	See section 2.2	TEST VOLTAGE	DC 9V from adapter Input AC 230V 50Hz
ENVIRONMENTAL CONDITIONS	23.4 deg. C, 55% RH	TESTED BY: Xue Wang	

Pulse Voltage	<u>1</u> kV		<u>0.5</u> kV		<u> </u> kV		<u> </u> kV	
Pulse Polarity	+	—	+	—	+	—	+	—
L	A	A	/	/	/	/	/	/
N	A	A	/	/	/	/	/	/
L+N	A	A	/	/	/	/	/	/
RJ45 port	/	/	A	A	/	/	/	/

NOTE: A: There was no change compared with initial operation during the test.



Test Report No.: CE170623N070

8.7 SURGE IMMUNITY TEST (EN55024, EN301489)

8.7.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-5
Wave-Shape:	Signal/telecommunication port(direct to outdoor cables*) 10/700 us Open Circuit Voltage, 5/320 us Short Circuit Current. Input AC power port: 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
Test Voltage:	Line to Line: 1kV Signal and telecommunication ports**
Surge Input/Output:	L-N, RJ45 Port,
Polarity:	Positive/Negative
Phase Angle:	0° /90°/180°/270°
Pulse Repetition Rate:	1 time / 60 sec.
Number of Tests:	5 positive and 5 negative at selected points

* This test is only applicable only to ports, which according to the manufacturer's specification, may connect directly to outdoor cables.

** For ports where primary protection is intended, surges are applied at voltages up to 4kV with the primary protectors fitted. Otherwise the 1kV test level is applied without primary protection in place.

8.7.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Combination wave Module	TESEQ AG	CDN 3061	1361	Feb. 11,15	Feb. 10,16
Telecom Surge Module	TESEQ AG	NSG 3060 Mainframe	1404	Feb. 11,15	Feb. 10,16
CDN	TESEQ	CDN HSS-2	34275	Nov.20, 14	Nov.19, 15
CDN	TESEQ	CDN 118	30741	Nov.20, 14	Nov.19, 15
Test Software	TESEQ	CDM 3061_0002.30	1361	N/A	N/A
Test Software	TESEQ	HVM 3060_0002.30	293	N/A	N/A

- NOTE:** 1. The test was performed in EMS Room 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

8.7.3 TEST PROCEDURE

a. For EUT power supply:

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

b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:

The surge is applied to the lines via the capacitive coupling. The coupling / decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

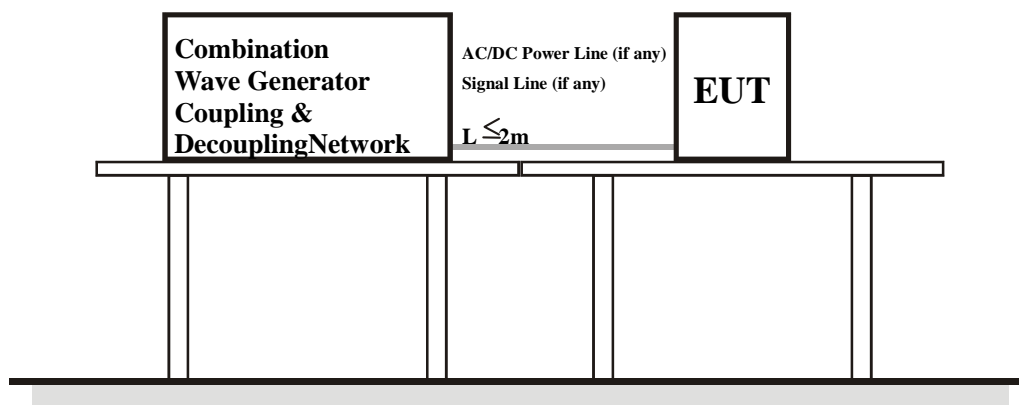
c. For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

8.7.4 DEVIATION FROM TEST STANDARD

No deviation.

8.7.5 TEST SETUP



**8.7.6 TEST RESULTS**

TEST MODE	See section 2.2	TEST VOLTAGE	DC 9V from adapter Input AC 230V 50Hz
ENVIRONMENTAL CONDITIONS	25.3deg. C, 57.7% RH	TESTED BY:	Xue wang

AC/DC Power port:

\Phase angle \ Test result \Voltage (kV) \ Test point\ Polarity		0°	90°	180°	270°		DC Power Port
1	L-N	+	A	A	A	/	N/A
		—	A	A	A	/	N/A

Signal ports and telecommunication ports:

Voltage (kV)	Test Point	Polarity	Test result	Voltage (kV)	Test Point	Polarity	Test result
1.0	RJ45 Port	+	A	/	/	+	/
		—	A			—	/

NOTE: A: There was no change compared with initial operation during the test.

**8.8 IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS (CS)
(EN55024, EN301489)****8.8.1 TEST SPECIFICATION**

Basic Standard:	IEC 61000-4-6
Frequency Range:	0.15 MHz – 80MHz
Field Strength:	3 V _{r.m.s}
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Coupled Cable:	Power Mains
Coupling Device:	CDN-M2(2 wires), CDN(Signal Port)

8.8.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal Generator	Rohde&Schwarz	SME06	829498/006	Oct. 16,14	Oct.15,15
CDN	Luthi	L-801M2/M3	2015	Sep.26,14	Sep. 25,15
CDN(AUX)	TESEQ	CDN M016	27452	Nov. 15,14	Nov. 14,15
CDN	TESEQ	T200A	26944	Apr. 07,15	Apr. 06,16
CDN	TESEQ	T400A	26536	Apr. 07,15	Apr. 06,16
CDN	TESEQ	ST08A	32256	Apr. 07,15	Apr. 06,16
6dB 50Watt Attenuator	HUBER+SUHNER	5906.17.0005	303688	Oct. 16,14	Oct.15,15
Signal Amplifier	HAEFELY	PAMP250	149594	NA	NA
Electromagnetic Injection Clamp	Luthi	EM101	35640	Sep.26,14	Sep. 25,15
C/S Test System	HAEFELY	WinPAMP	NSEMC002	N/A	N/A
Test Software	ADT	BVADT_CS_V 7.5.1	N/A	N/A	N/A

- NOTE:** 1. The test was performed in CS test room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



8.8.3 TEST PROCEDURE

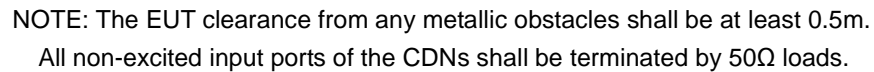
- a. The EUT shall be tested within its intended operating and climatic conditions.
- b. An artificial hand was placed on the hand-held accessory and connected to the ground reference plane.
- c. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.
- d. The frequency range is swept from 0.15 MHz – 80MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. Where the frequency is swept incrementally, the step size shall not exceed 1 % of the preceding frequency value.
- e. The dwell time of the amplitude modulated carrier at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0,5 s. The sensitive frequencies (e.g. clock frequencies) shall be analyzed separately.
- f. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

8.8.4 DEVIATION FROM TEST STANDARD

No deviation.



8.8.5 TEST SETUP



The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

**8.8.6 TEST RESULTS**

TEST MODE	See section 2.2	TEST VOLTAGE	DC 9V from adapter Input AC 230V 50Hz
ENVIRONMENTAL CONDITIONS	25.1 deg. C, 51.2% RH	TESTED BY: Sen He	

Voltage (V)	Test Frequency Note ^{#1} (MHz)	Tested Line	Injection Method.	Test Result	Remark
3	0.15–80 MHz	AC Line	CDN-M2	A	N/A
3	0.15–80 MHz	RJ45	CDN	A	N/A

Note^{#1}: Tested Israel SII Frequencies 0.2,0.53,1,1.5,7.1,13.56,21,27.12,40.68,65,68 MHz

NOTE: A: There was no change compared with initial operation during the test.



8.9 VOLTAGE DIP/SHORT INTERRUPTIONS/VOLTAGE VARIATIONS (DIP) IMMUNITY TEST (EN55024)

8.9.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-11
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0° & 180°
Test Cycle:	3 times

8.9.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
DIPS Tester	HAEFELY	PLINE 1610	150370	April 8, 15	April 7, 16
Test Software	HAEFELY	SWPL1610 1.43	N/A	N/A	N/A

NOTE: 1. The test was performed in EMS Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

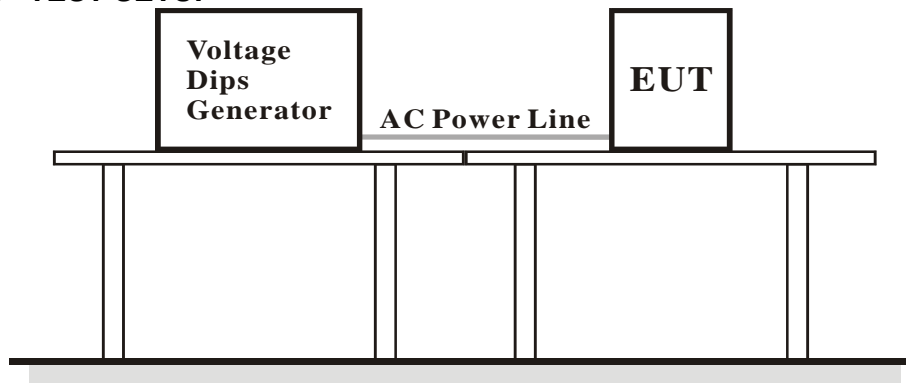
8.9.3 TEST PROCEDURE

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

8.9.4 DEVIATION FROM TEST STANDARD

No deviation.

8.9.5 TEST SETUP



8.9.6 TEST RESULTS

TEST MODE	See section 2.2	TEST VOLTAGE	DC 9V from adapter Input AC 100-240V 50Hz
ENVIRONMENTAL CONDITIONS	23.4deg. C, 55% RH	TESTED BY: Xue Wang	

Ut : <u>100</u> Vac 50 Hz	Durations		Event interval (sec)	Total events (time)	Test result
Voltage dips (%)	(period)	(ms)			
0	0.5	10	10	3	A
70	25	500	10	3	A
0	250	5000	10	3	B

Ut : <u>230</u> Vac 50 Hz	Durations		Event interval (sec)	Total events (time)	Test result
Voltage dips (%)	(period)	(ms)			
0	0.5	10	10	3	A
70	25	500	10	3	A
0	250	5000	10	3	B

Ut : <u>240</u> Vac 50 Hz	Durations		Event interval (sec)	Total events (time)	Test result
Voltage dips (%)	(period)	(ms)			
0	0.5	10	10	3	A
70	25	500	10	3	A
0	250	5000	10	3	B

NOTE: A: There was no change compared with initial operation during the test.
 B: During the test, the EUT stopped operation at the 100% interruption, but it could automatically restore.



8.10 VOLTAGE DIP/SHORT INTERRUPTIONS/VOLTAGE VARIATIONS (DIP) IMMUNITY TEST (EN301 489)

8.10.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-11
	Voltage Dips:
	i) 0% residual for 0.5 cycle
	ii) 0% residual for 1 cycle
Test Levels:	iii) 70% residual for 25 cycle
	Voltage Interruptions:
	iv) 0% residual for 250 cycle
Interval between Event:	10 seconds
Phase Angle:	0°/180°
Test cycle:	3 times

8.10.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
DIPS Tester	HAEFELY	PLINE 1610	150370	April 8, 15	April 7, 16
Test Software	HAEFELY	SWPL1610 1.43	N/A	N/A	N/A

- NOTE:** 1. The test was performed in EMS Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

8.10.3 TEST PROCEDURE

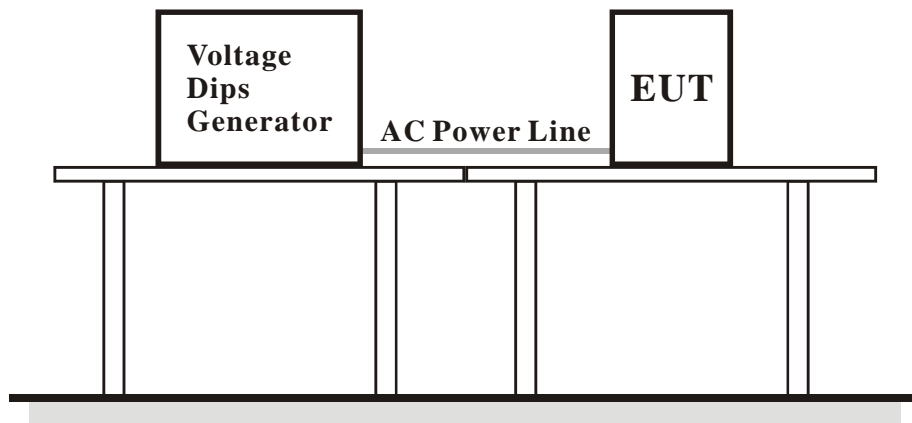
The EUT was tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the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

8.10.4 DEVIATION FROM TEST STANDARD

No deviation.



8.10.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

**8.10.6 TEST RESULTS**

TEST VOLTAGE	DC 9V from adapter Input AC 100-240V 50Hz	ENVIRONMENTAL CONDITIONS	23.4 deg. C, 55% RH
TESTED BY	Xue Wang		

Ut : <u>230</u> Vac <u>50</u> Hz	Durations		Event interval (sec)	Total events (time)	Test result
Voltage dips (%)	(period)	(ms)			
0	0.5	10	10	3	A
0	1	20	10	3	A
70	25	500	10	3	A
0	250	5000	20	3	B

Ut : <u>240</u> Vac <u>50</u> Hz	Durations		Event interval (sec)	Total events (time)	Test result
Voltage dips (%)	(period)	(ms)			
0	0.5	10	10	3	A
0	1	20	10	3	A
70	25	500	10	3	A
0	250	5000	20	3	B

Ut : <u>100</u> Vac <u>50</u> Hz	Durations		Event interval (sec)	Total events (time)	Test result
Voltage dips (%)	(period)	(ms)			
0	0.5	10	10	3	A
0	1	20	10	3	A
70	25	500	10	3	A
0	250	5000	20	3	B

NOTE: A: There was no change compared with initial operation during the test.

B: The EUT stopped operation when at the 100% voltage interruption, and need to Manual recovery.

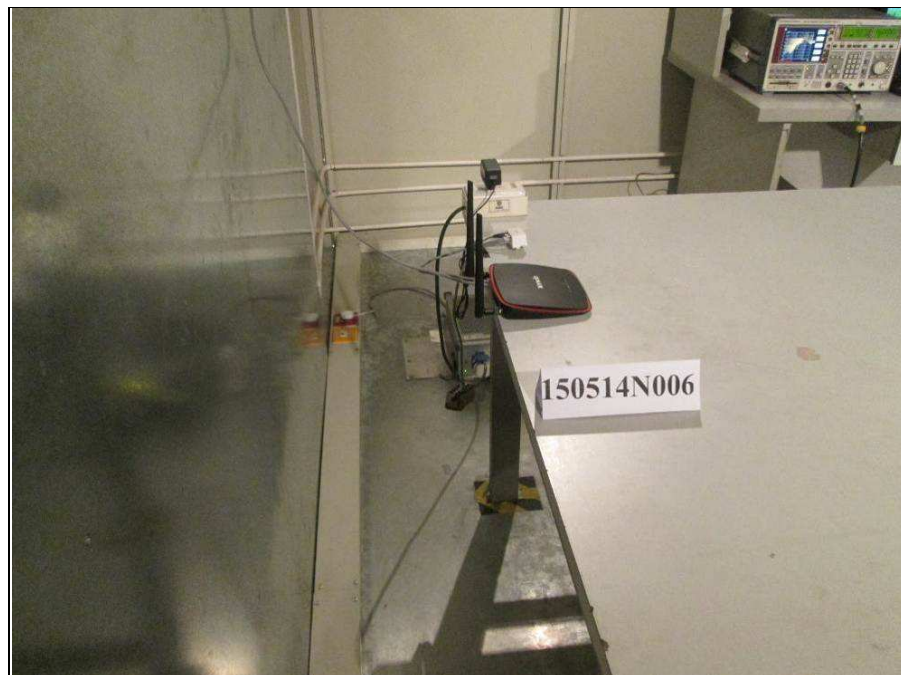
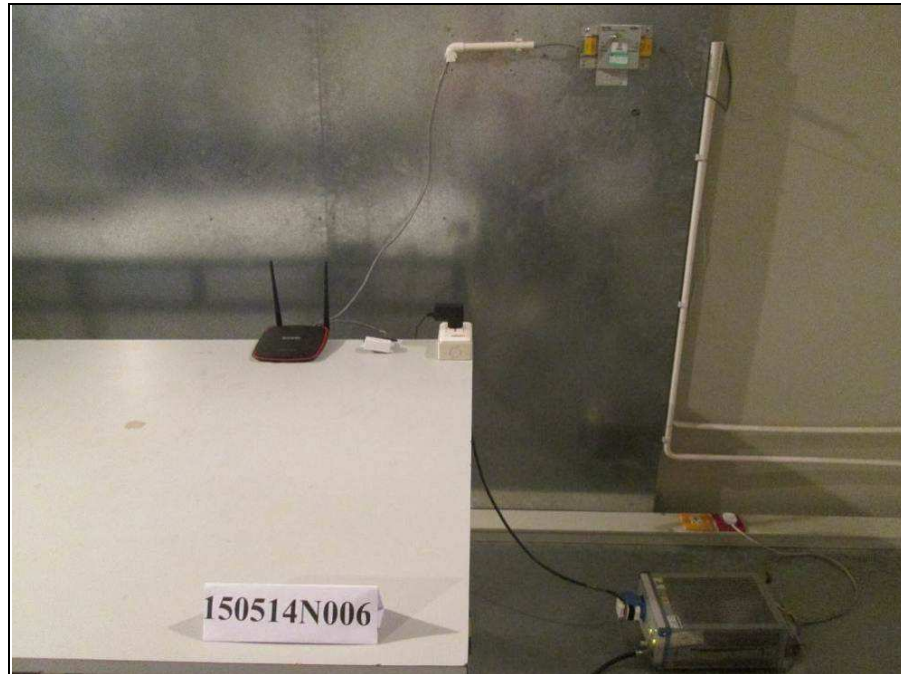


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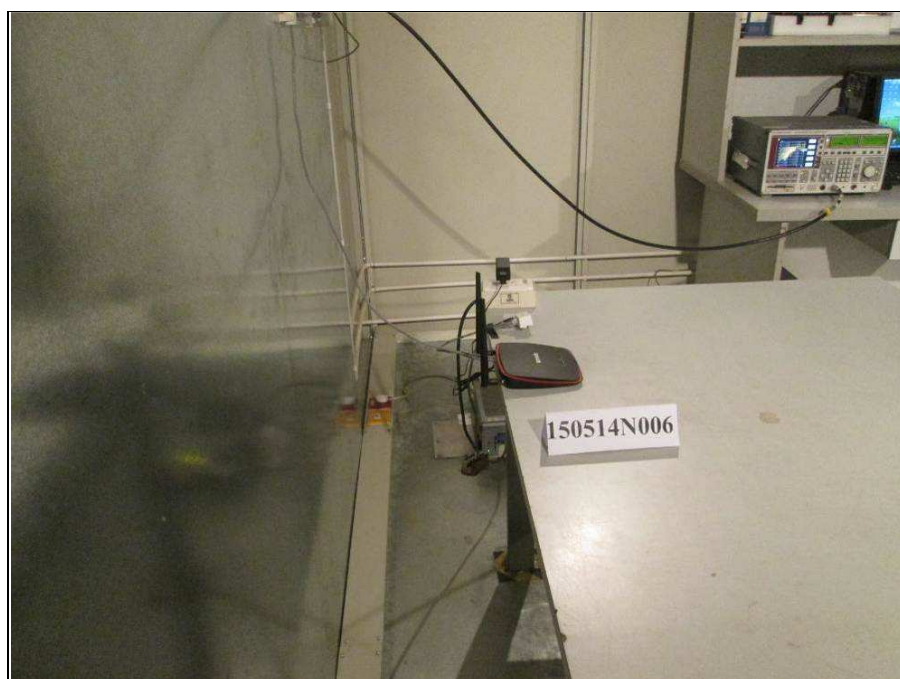
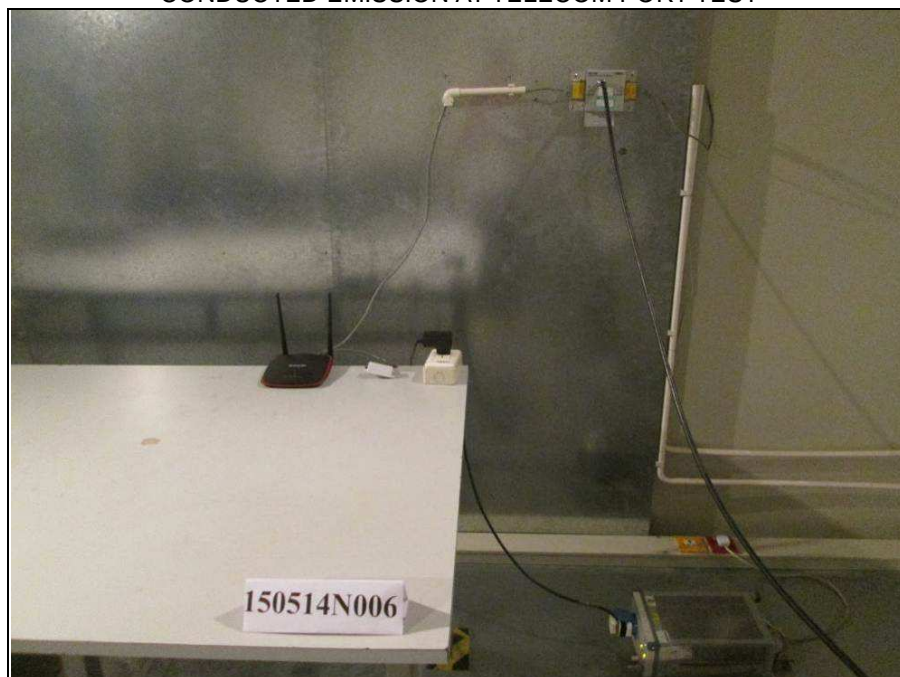
Test Report No.: CE170623N070

9 PHOTOGRAPHS OF THE TEST CONFIGURATION

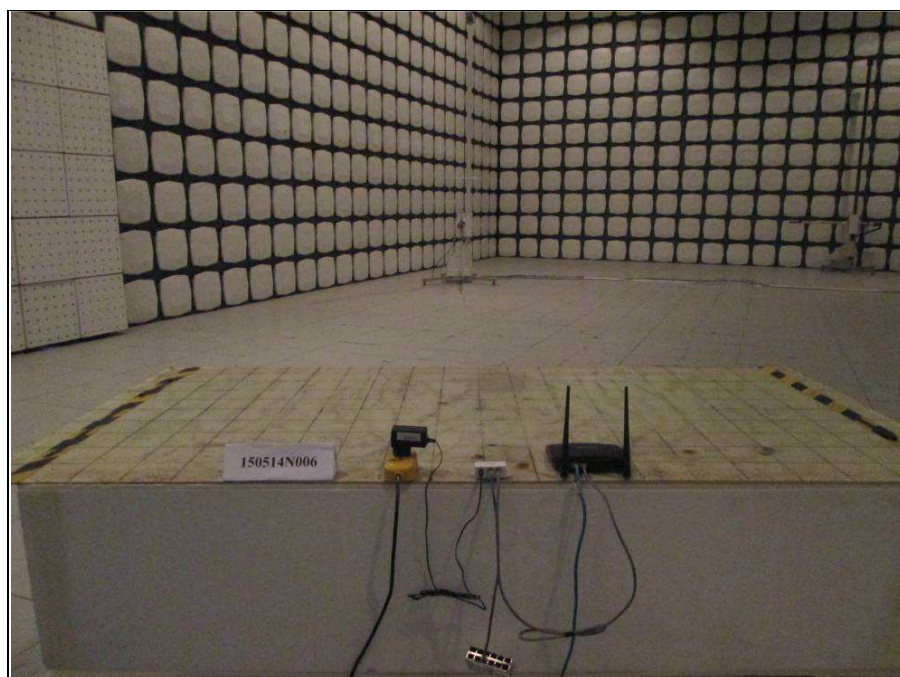
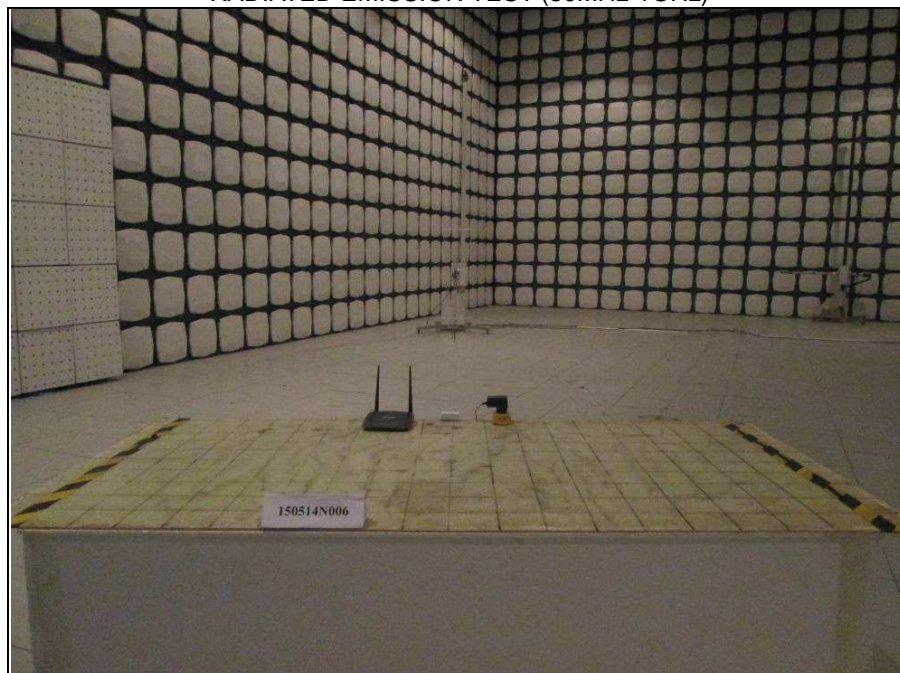
CONDUCTED EMISSION TEST



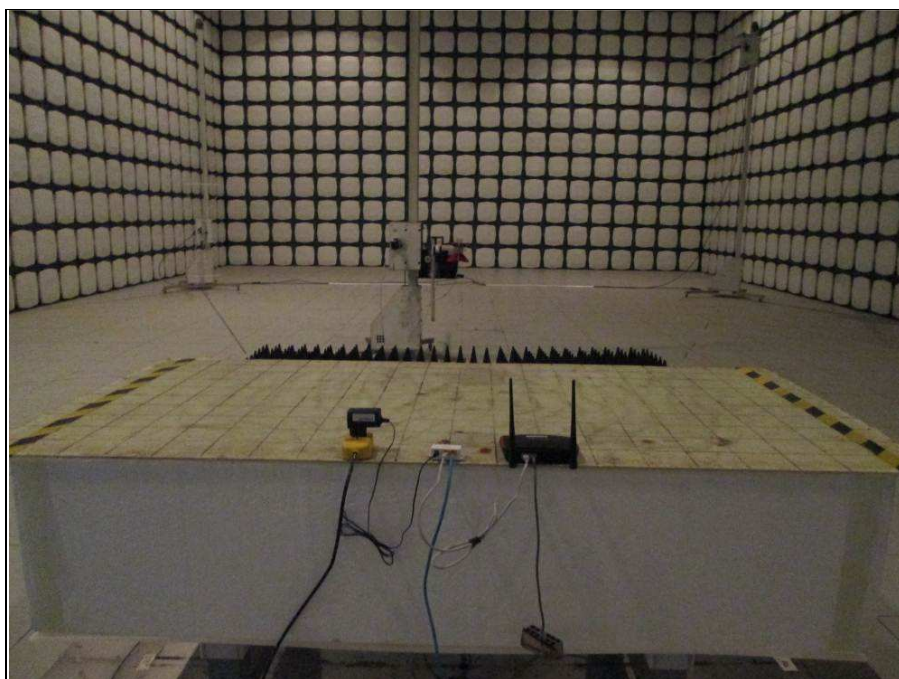
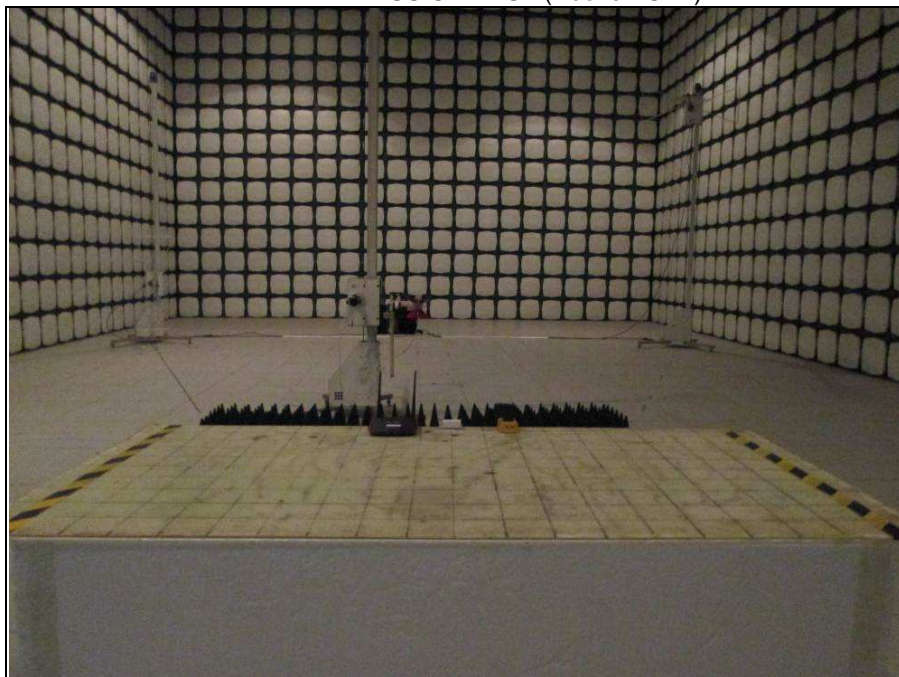
CONDUCTED EMISSION AT TELECOM PORT TEST



RADIATED EMISSION TEST (30MHz-1GHz)



RADIATED EMISSION TEST (Above 1GHz)



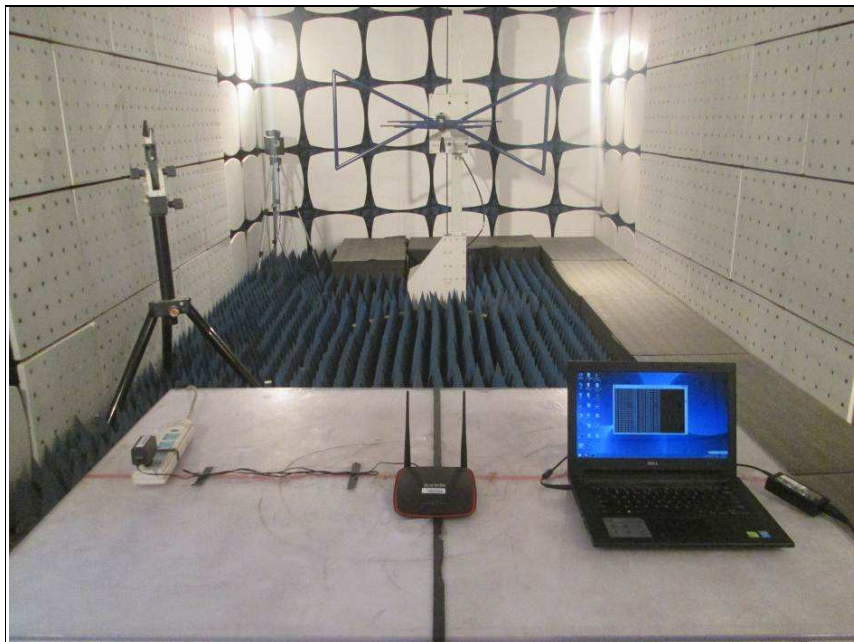
HARMONICS EMISSION TEST &
VOLTAGE FLUCTUATIONS AND FLICKER TEST



ESD TEST



RS TEST



EFT TEST



EFT AT TELECOM PORT TEST



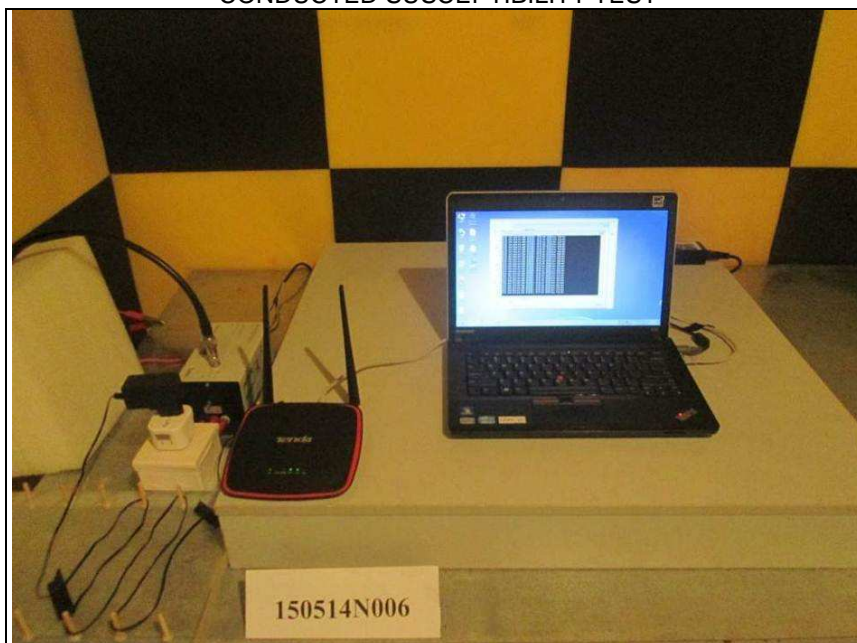
SURGE TEST



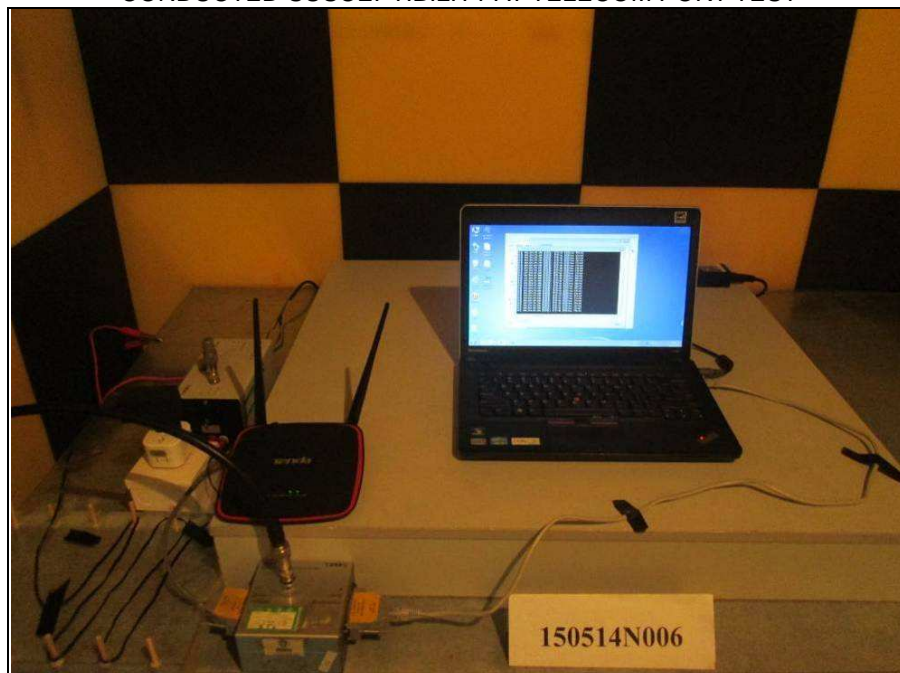
SURGE TEST AT TELECOM PORT TEST



CONDUCTED SUSCEPTIBILITY TEST



CONDUCTED SUSCEPTIBILITY AT TELECOM PORT TEST



VOLTAGE DIPS AND INTERRUPTIONS TEST





Test Report No.: CE170401N021

10 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

---END---