Test Lab
Cert 2951.01

TEST REPORT

Applicant	Shenzhen Gembird Electronics Ltd.
Address	5F, Building B, Shi-Feng Industrial Zone, Hua-Ning Rd., Xin-Wei Village, Da-Lang Street, Long-Hua, Bao-An Area, Shenzhen 518109, Guangdong Province, P.R.C.

Manufacturer or Supplier	Shenzhen Gembird Electronics Ltd.
Address	5F, Building B, Shi-Feng Industrial Zone, Hua-Ning Rd., Xin-Wei Village, Da-Lang Street, Long-Hua, Bao-An Area, Shenzhen 518109, Guangdong Province, P.R.C.
Product	Wireless broadband router, 300 Mbps
Brand Name	N/A
Model	WNP-RT-001
Additional Model & Model Difference	N/A
Date of tests	Dec. 07, 2012 ~ Jan. 17, 2013

The submitted sample of the above equipment has been tested according to the following European Directive **-** Radio Equipment and Telecommunications Terminal Equipment directive 1999/5/EC article 3.1(b) and the requirements of the following standards:

☒ **EN 301 489-1 V1.9.2 (2011-09)**
☒ **EN 301 489-17 V2.2.1 (2012-09)**

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

Tested by Breeze Jiang Project Engineer / EMC Department	Approved by Sam Tung Manager / EMC Department
Glyn	Date: Jan. 17, 2013

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RM121207N012-1	Original release	Jan. 17, 2013

1 SUMMARY OF TEST RESULTS

After estimating all the combination of every test mode, the result shown as below is the worst case.

The EUT has been tested according to the following specifications.

EMISSION			
Standard	**Test Type**	**Result**	**Remarks**
EN 55022:2010	Conducted Test	PASS	Minimum passing margin is - 8.47dB at 1.59000MHz
	Conducted Test (Telecom Port)	PASS	Minimum passing margin is - 4.93dB at 23.12832MHz
	Radiated Test (30MHz~1GHz)	PASS	Meets Limits Minimum passing margin is -1.25dB at 312.48MHz
	Radiated Test (1GHz~6GHz)	PASS	Meets Limits Minimum passing margin is - 6.1dB at 3892.33MHz
EN 61000-3-2:2006 +A1:2009+A2:2009	Harmonic current emissions	PASS	Meets the requirements
EN 61000-3-3:2008	Voltage fluctuations & flicker	PASS	Meets the requirements

IMMUNITY			
Standard	**Test Type**	**Result**	**Remarks**
EN 61000-4-2:2009	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-3:2006 + A1 + A2:2010	Radiated, radio-frequency, electromagnetic field immunity test	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-4:2004 + A1:2010	Electrical fast transient / burst immunity test.	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-5:2006	Surge immunity test	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-6:2009	Immunity to conducted disturbances, induced by radio-frequency fields	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-11:2004	Voltage dips, short interruptions and voltage variations immunity tests	PASS	Meets the requirements of Voltage Dips: 1. 0% residual – Performance Criterion A 2. 0% residual – Performance Criterion A 3. 70% residual – Performance Criterion A Voltage Interruptions: 1. 0% residual – 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:

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

Measurement	Frequency	Uncertainty
Conducted emission	150kHz ~ 30MHz	+/- 2.94 dB
Conducted emission(Telecom Port)	150kHz ~ 30MHz	+/- 2.66 dB
Radiated emissions	30MHz~1GHz	+/- 3.40 dB
Radiated emissions	1GHz ~ 6GHz	+/- 2.20 dB

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless broadband router
MODEL NO.	WNP-RT-001
NOMINAL VOLTAGE:	DC 5V From Adapter Input AC 230V/50Hz
MODULATION TECHNOLOGY	DSSS, OFDM
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
OPERATING FREQUENCY:	2412-2472MHz for 11b/g/n(HT20) 2422-2462MHz for 11n(HT40)
ANTENNA TYPE:	Integral External Antenna; 5dBi gain
I/O PORTS:	Refer to user's manual
CABLE SUPPLIED:	RJ45 cable

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual

2. The EUT was powered by the following adapter:

ADAPTER	
BRAND:	N/A
MODEL:	SCF0500100E1BA
INPUT:	100~240VAC 50/60HZ 0.15A
OUTPUT:	5VDC,1A
DC LINE:	1m

3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

2.2 DESCRIPTION OF TEST MODE

◆ **FOR CONDUCTED EMISSION TEST AT MAINS TERMINAL**

Test Mode	Test Voltage
RJ45 Port Data Transmitting (10Mbps More than 10%)	**DC5V From Adapter Input AC230V/50Hz**
RJ45 Port Data Transmitting (100Mbps More than 10%)	

◆ **FOR CONDUCTED EMISSION TEST AT TELECOMMUNICATION PORT**

Test Mode	Test Voltage
RJ45 Port Data Transmitting (10Mbps More than 10%)	**DC5V From Adapter Input AC230V/50Hz**
RJ45 Port Data Transmitting (100Mbps More than 10%)	

◆ **FOR HARMONIC, FLICKER AND IMMUNITY TEST**

Test Mode	Test Voltage
RJ45 Port Data Transmitting (100Mbps)	**DC5V From Adapter Input AC230V/50Hz**

2.3 GENERAL DESCRIPTION OF APPLIED STANDARD

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-17 V2.2.1 (2012-09)
EN 55022:2010, Class B
EN 61000-3-2:2006+A1:2009+A2:2009
EN 61000-3-3:2008
EN 61000-4-2:2009
EN 61000-4-3:2006 + A1:2007 + A2:2010
EN 61000-4-4:2004 + A1:2010
EN 61000-4-5:2006
EN 61000-4-6:2009
EN 61000-4-11:2004

According to clause 7.1 (Table 1) and 7.2 (Table 2) of **EN 301 489-1**, all test items have been performed and recorded as per the above standards.
Note: The above EN basic standards are applied with latest version if customer has no special requirement.

2.4 DESCRIPTION OF SUPPORT UNIT

The EUT has been tested as an independent 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

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line: Unshielded, Detachable 0.8m, DC Line: Unshielded, Undetachable 1.8m.

2.5 CONFIGURATION OF SYSTEM UNDER TEST

Please Refer to section 5 Photographs of the test configuration for reference.

3 EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: EN 55022

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15-0.5	79	66	66-56	56-46
0.5-5	73	60	56	46
5-30	73	60	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
3. All emanations 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.

3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU 26	100005	May 15,12	May 14,13
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	May 15,12	May 14,13
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	May 15,12	May 14,13
RF Cable	FUJIKURA	3D-2W	553 Cable	May 2,12	May 2,13
Impedance Stabilization Network	TESEQ	ISN T800	27957	Oct.10,12	Oct. 09,13
Test Software	ADT	ADT_Cond _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 and NIM/CHINA.
2. The test was performed in shielding room 553.

3.1.3 TEST PROCEDURE

a. 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.

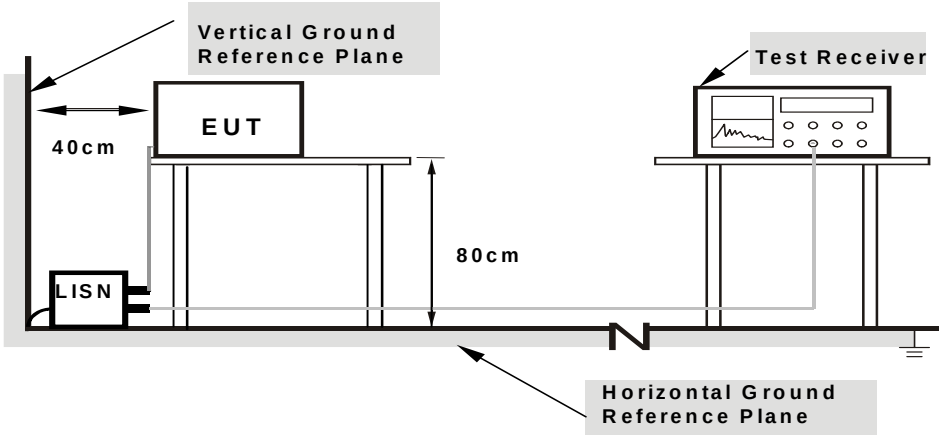
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit - 20dB) was not reported.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.

3.1.5 TEST SETUP



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

3.1.6 EUT OPERATING CONDITIONS

a. Turned on the power of all equipment.

b. EUT in the transfer rate more than 10% of the state test

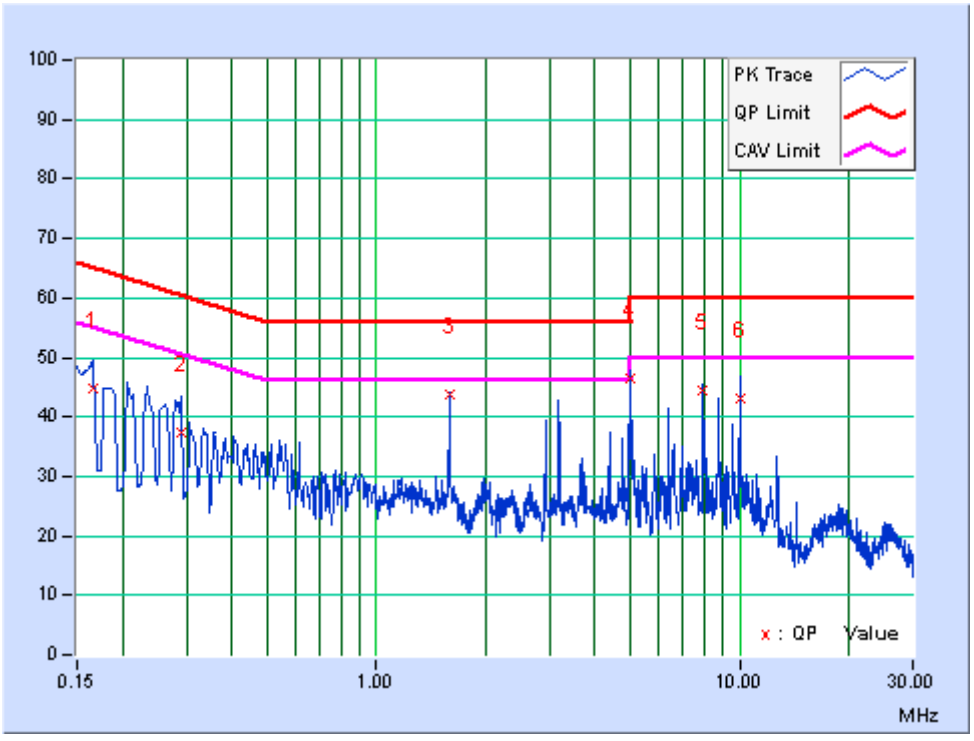
c. EUT was operated according to the type used was description in manufacturer's specifications or the user's manual.

3.1.7 TEST RESULTS

TEST MODE	RJ45 Port Data Transmitting (100Mbps More than 10%)	**6DB BANDWIDTH**	9 kHz
TEST VOLTAGE	DC 5V From Adapter Input AC230V/50Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	17deg. C, 50% RH	**TESTED BY**	Bin

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16579	9.81	35	18.91	44.81	28.72	65.17	55.17	-20.36	-26.45
2	0.28982	9.77	27.56	14.36	37.33	24.13	60.53	50.53	-23.20	-26.40
3	**1.59000**	**9.85**	**34.05**	**27.68**	**43.90**	**37.53**	**56.00**	**46.00**	**-12.10**	**-8.47**
4	5.00000	9.99	36.49	18.74	46.48	28.73	56.00	46.00	-9.52	-17.27
5	7.95173	10.05	34.26	27.72	44.31	37.77	60.00	50.00	-15.69	-12.23
6	10.00016	10.06	32.9	19.71	42.96	29.77	60.00	50.00	-17.04	-20.23

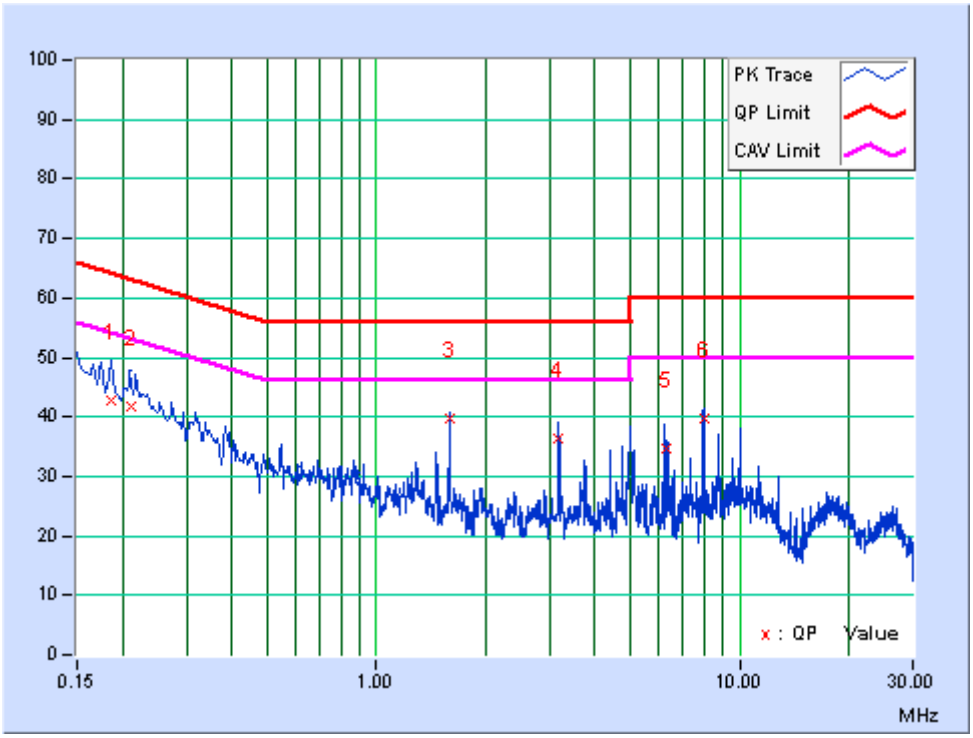
REMARKS: The emission levels of other frequencies were very low against the limit.



TEST MODE	RJ45 Port Data Transmitting (100Mbps More than 10%)	**6DB BANDWIDTH**	9 kHz
TEST VOLTAGE	DC 5V From Adapter Input AC230V/50Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	17deg. C, 50% RH	**TESTED BY**	Bin

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18600	9.82	33.1	17.24	42.92	27.06	64.21	54.21	-21.29	-27.15
2	0.21015	9.78	31.82	16.06	41.60	25.84	63.20	53.20	-21.60	-27.36
3	1.59008	9.83	29.82	19.49	39.65	29.32	56.00	46.00	-16.35	-16.68
4	3.17826	9.90	26.55	15.59	36.45	25.49	56.00	46.00	-19.55	-20.51
5	6.25017	9.99	24.55	10.13	34.54	20.12	60.00	50.00	-25.46	-29.88
6	7.95400	10.03	29.66	21.55	39.69	31.58	60.00	50.00	-20.31	-18.42

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



3.2 CONDUCTED EMISSION MEASUREMENT AT TELECOMMUNICATION PORTS

3.2.1 LIMIT OF CONDUCTED COMMON MODE DISTURBANCE AT TELECOMMUNICATION PORTS

TEST STANDARD: EN 55022

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.

3.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU 26	100005	May 15,12	May 14,13
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	May 15,12	May 14,13
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	May 15,12	May 14,13
RF Cable	FUJIKURA	3D-2W	553 Cable	May 2,12	May 2,13
Impedance Stabilization Network	TESEQ	ISN T800	27957	Oct. 10,12	Oct. 09,13
Test Software	ADT	ADT_Cond _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 and NIM/CHINA.

2. The test was performed in Shielded Room 553.

3.2.3 TEST PROCEDURE

For ISN:

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room and connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN.

b. Voltage at the measurement port of the ISN was detected, the reading was corrected by adding the voltage division factor of the ISN, and was compared to the voltage limits.

c. The disturbance levels and the frequencies of at least six highest disturbances were recorded from each telecommunication port, which comprises the EUT.

For Current Probe:

a. Current probe shall be placed at 0.1m from the ISN.

b. Current at the measurement port of the ISN was detected, the reading was corrected by adding the current division factor of the current probe, and was compared to the current limits.

c. The disturbance levels and the frequencies of at least six highest disturbances were recorded from each telecommunication port, which comprises the EUT

d. Break the insulation and connect a 150Ω resistor from the outside surface of the shield to ground and apply a clamp between 150Ω connection and associated equipment (For STP LAN only).

For Voltage Probe:

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room and connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN.

b. Voltage at the measurement port of the voltage probe was detected, the reading was corrected by adding the voltage division factor of the voltage probe, and was compared to the voltage limits.

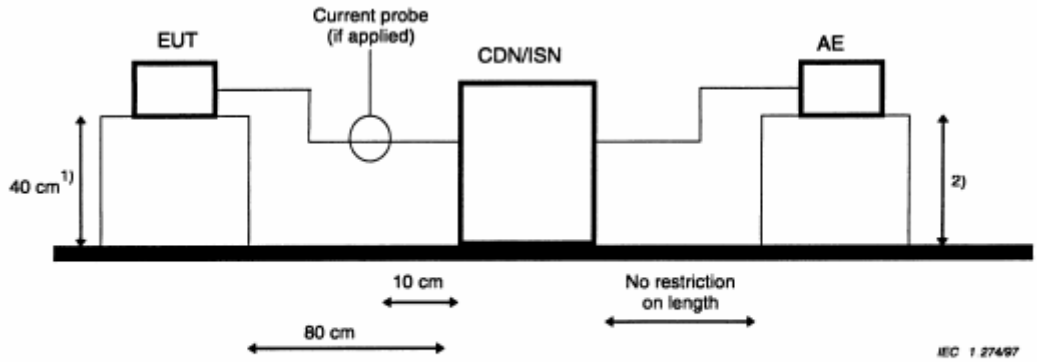
c. The disturbance levels and the frequencies of at least six highest disturbances were recorded from each telecommunication port, which comprises the EUT.

3.2.4 DEVIATION FROM TEST STANDARD

No deviation

3.2.5 TEST SETUP

For ISN & Current Probe (UTP LAN cable):

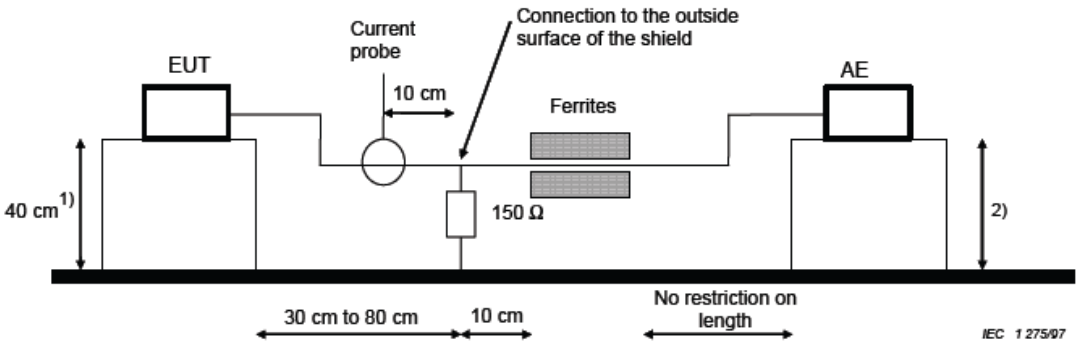


AE = Associated equipment
EUT = Equipment under test

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

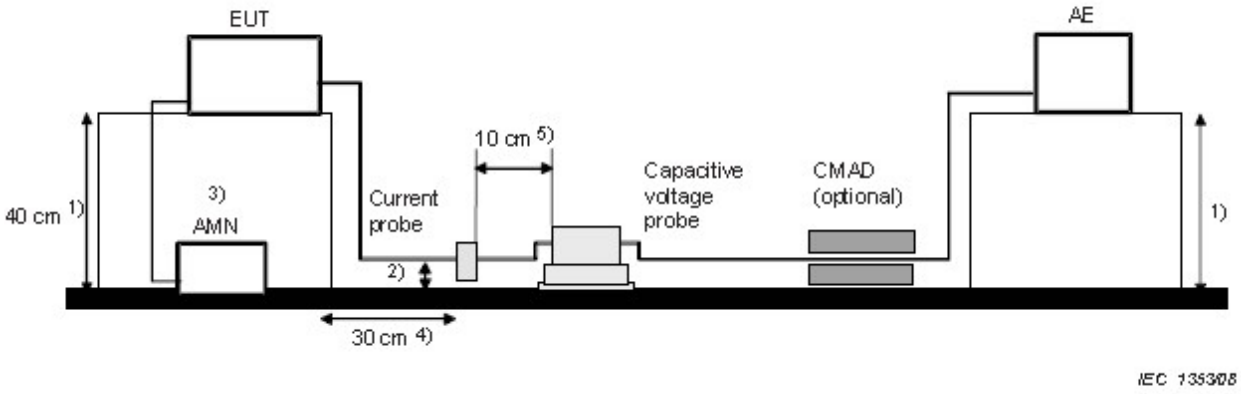
2) Distance to the reference groundplane is not critical.

For Current Probe (STP LAN cable):



AE = Associated equipment
EUT = Equipment under test

For Voltage & Current Probe:



AE = Associated equipment
EUT = Equipment under test
CMAD = Common mode Absorbing Device

It is not required to place both the current probe and the capacitive voltage probe in the measurement set up at the same time unless simultaneous current and voltage measurements are to be made.

NOTE:

1. The methods of conformance testing were selected according to EN55022: 2010, section: 9.6.1 of measurement method using an ISN with a longitudinal conversion loss (LCL) as defined in section: 9.6.2.
2. When measurements were performed on a single unscreened balanced pair, an adequate ISN for two wires were used; when performed on unscreened cables containing two balanced pairs, an adequate ISN for four wires were used.
3. The communication function of EUT was executed and ISN was connected between EUT and associated equipment and the ISN was connected directly to reference ground plane.

3.2.6 EUT OPERATING CONDITIONS

a Turn on the power of the EUT.

b EUT in the transfer rate more than 10% of the state test.

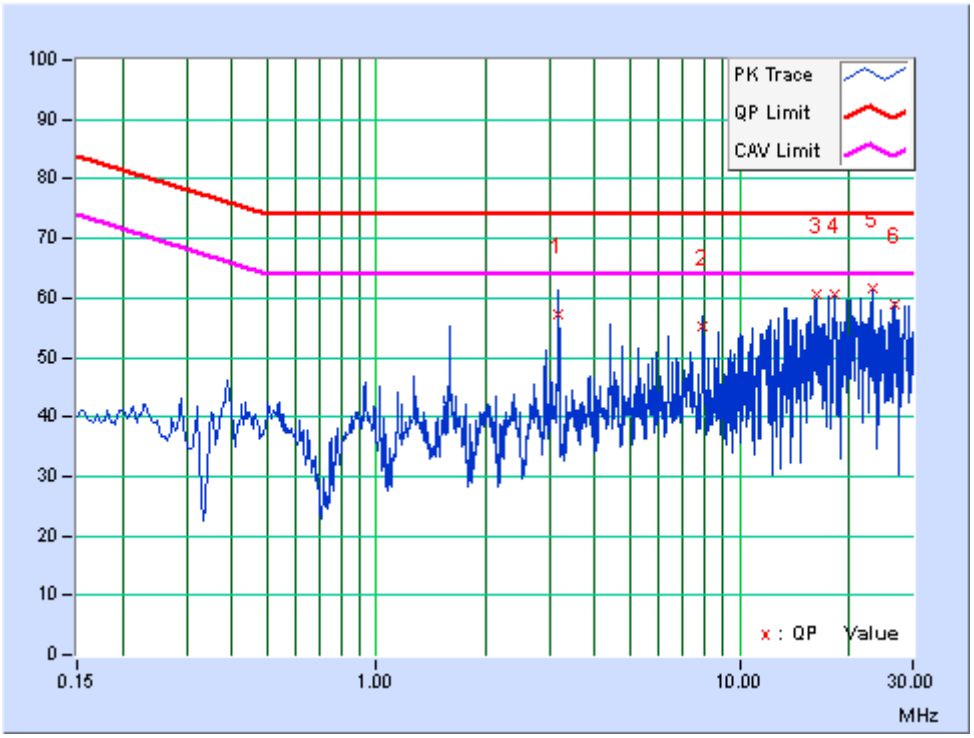
c EUT was operated according to the type used was description in manufacturer’s specifications or the user's manual.

3.2.7 TEST RESULTS

TEST MODE	RJ45 Port Data Transmitting (100Mbps more than 10%)	**6dB BANDWIDTH**	9kHz
TEST VOLTAGE	DC 5V From Adapter Input AC230V/50Hz	**PHASE**	RJ45 TELECOM PORT (100Mbps)
ENVIRONMENTAL CONDITIONS	17deg. C, 50% RH	**TEST BY**	Bin

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	3.17905	9.52	47.81	42.15	57.33	51.67	74	64	-16.67	-12.33
2	7.92318	9.52	45.69	41.98	55.21	51.5	74	64	-18.79	-12.5
3	16.22800	9.58	50.93	48.25	60.51	57.83	74	64	-13.49	-6.17
4	18.24312	9.62	50.95	48.23	60.57	57.85	74	64	-13.43	-6.15
5	**23.12832**	**9.74**	**51.99**	**49.33**	**61.73**	**59.07**	**74**	**64**	**-12.27**	**-4.93**
6	26.60896	9.81	49.19	46.43	59.00	56.24	74	64	-15.00	-7.76

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



3.3 RADIATED EMISSION MEASUREMENT

3.3.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: EN 55022
FOR FREQUENCY BELOW 1000 MHz

FREQUENCY (MHz)	Class B (at 3m) dBuV/m	Class B (at 10m) dBuV/m
30 – 230	40	30
230 – 1000	47	37

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.

3.3.2 TEST INSTRUMENTS

FOR FREQUENCY BELOW 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESVS10	841431/004	May 23,12	May 22,13
Bilog Antenna	Teseq	CBL 6111D	30643	July 14,12	July 13,13
EMI Test Receiver	Rohde&Schwarz	ESPI	100302	May 23,12	May 22,13
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Mar. 24,12	Mar. 23,13
Signal Amplifier	Agilent	8447D	2944A10488	May 2,12	May 2,13
RF Cable	IMRO	IMRO-400	966 Cable 1#	May 2,12	May 2,13
Test software	ADT	ADT_Radiated_V7.5.4	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 and NIM/CHINA.
2. The test was performed in Chamber 966.

FOR FREQUENCY ABOVE 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	EMCO	3117	00062558	Oct.18,12	Oct.17,13
Horn Antenna	EMCO	3117	00085519	Feb. 11,12	Feb. 10,13
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170147	Feb. 18,11	Feb. 17,13
Spectrum Analyzer	Agilent	E4446A	MY46180622	May 02,12	May 01,13
Pre-Amplifier (100MHz-26.5GHz)	Agilent	8449B	3008A00409	May 31,12	May 30,13
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 04,12	Nov. 03,13
Test Software	ADT	ADT_Radiated_V7.6.15	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 and NIM/CHINA.

2. The test was performed in 10m Chamber.

3. The horn antenna are used only for the measurement of emission frequency above 1GHz if tested.

3.3.3 TEST PROCEDURE

<Frequency Range below 1GHz>

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground In a 3 meter Semi-anechoic 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 is varied from one meter to four 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 turn 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 1 GHz.

NOTE: The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.

<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 Semi-anechoic 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 system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

NOTE:

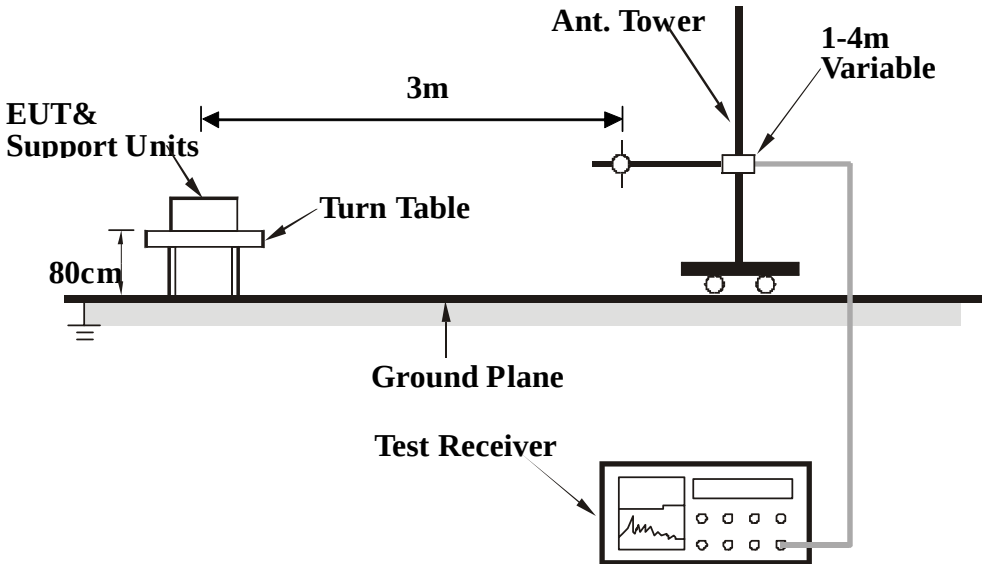
1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
2. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.

3.3.4 DEVIATION FROM TEST STANDARD

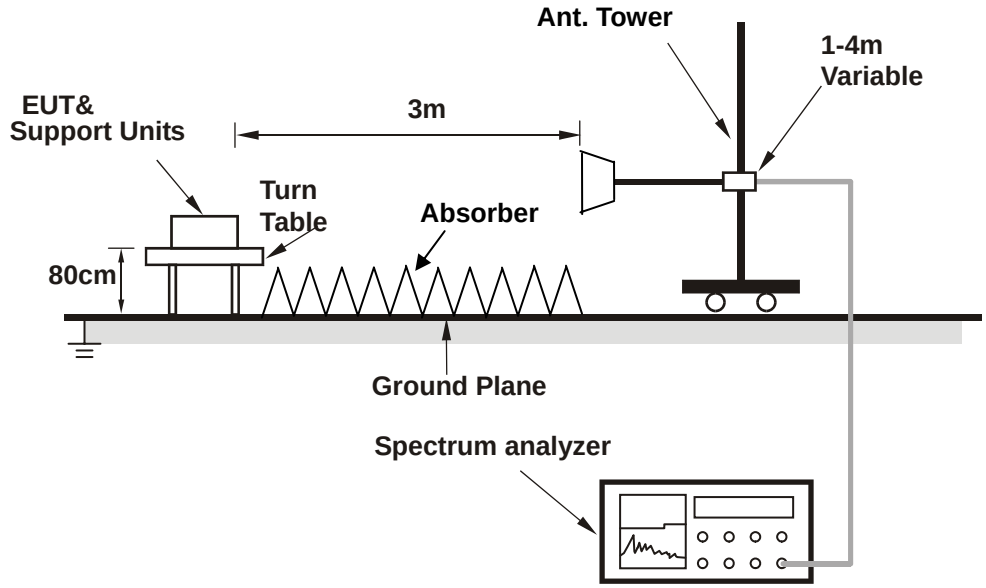
No deviation

3.3.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>

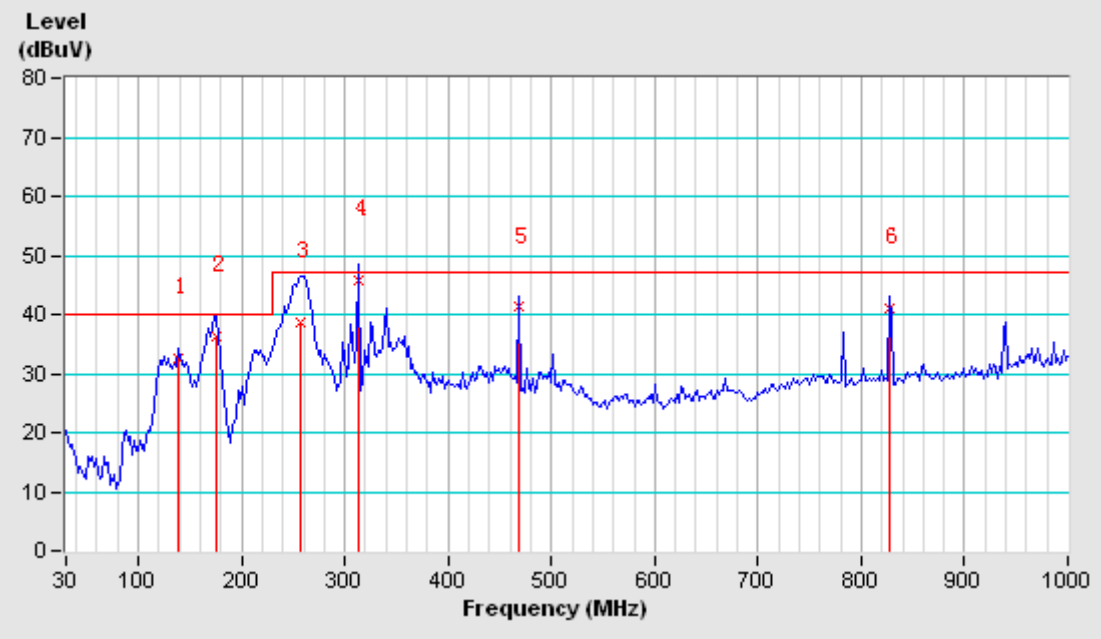


3.3.6 TEST RESULTS (BELOW 1GHz)

TEST MODE	RJ45 Port Data Transmitting (100Mbps More than 10%)	**FREQUENCY RANGE**	30-1000MHz
TEST VOLTAGE	DC 5V From Adapter Input AC230V/50Hz	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	21deg. C, 52% RH	**TESTED BY**: Robert	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M								
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	138.64	12.98	19.50	32.48	40	-7.52	196	36
2	174.64	11.22	25.20	36.42	40	-3.58	268	236
3	257.46	14.71	24.00	38.71	47	-8.29	100	360
4	**312.48**	**15.75**	**30.00**	**45.75**	**47**	**-1.25**	**100**	**161**
5	468.44	20.86	20.34	41.20	47	-5.80	145	114
6	827.34	27.40	13.75	41.15	47	-5.85	245	0

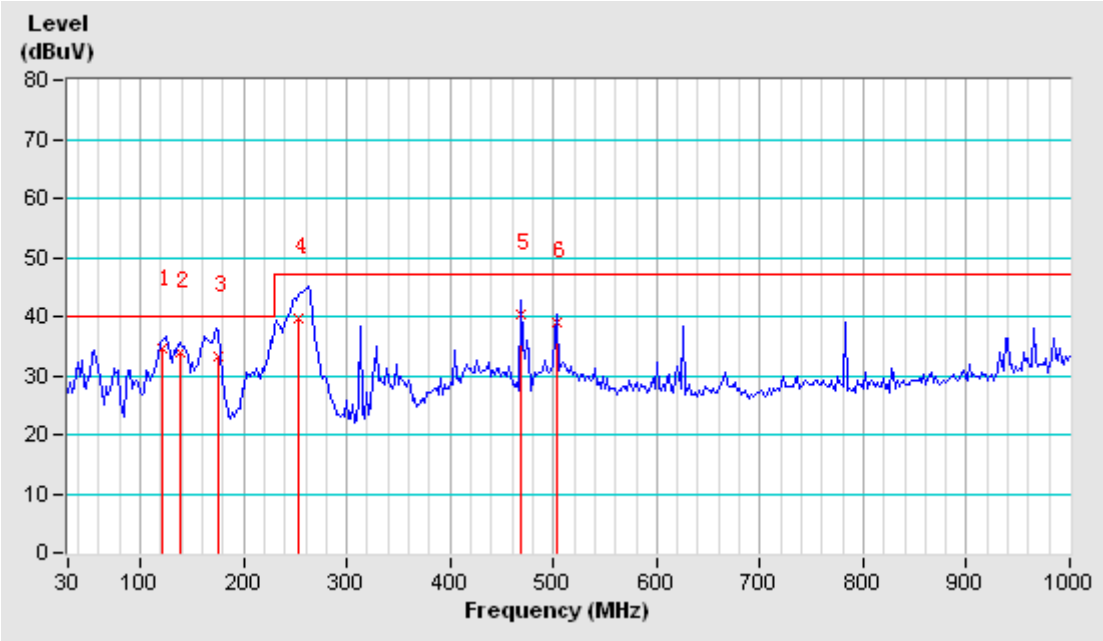
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. All the readings were Quasi-Peak values.



TEST MODE	RJ45 Port Data Transmitting (100Mbps More than 10%)	**FREQUENCY RANGE**	30-1000MHz
TEST VOLTAGE	DC 5V From Adapter Input AC230V/50Hz	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	21deg. C, 52% RH	**TESTED BY**: Robert	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M								
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	121.18	12.93	21.54	34.47	40	-5.53	100	118
2	138.64	12.98	20.95	33.93	40	-6.07	100	152
3	174.68	11.22	22.10	33.32	40	-6.68	100	360
4	252.68	14.44	25.30	39.74	47	-7.26	100	226
5	468.44	20.86	19.54	40.40	47	-6.60	100	83
6	503.36	21.41	17.68	39.09	47	-7.91	100	211

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. All the readings were Quasi-Peak values.



3.3.7 TEST RESULTS (ABOVE 1GHz)

TEST MODE	RJ45 Port Data Transmitting (100Mbps More than 10%)	**FREQUENCY RANGE**	1-2 GHz
TEST VOLTAGE	DC 5V From Adapter Input AC230V/50Hz	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Peak/Average, 1 MHz
ENVIRONMENTAL CONDITIONS	21deg. C, 52% RH	**TESTED BY**: Yuqiang Yin	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2642.67	47.5 PK	70.0	-22.5	1.00 H	157	10.32	37.18
2	2642.67	39.6 AV	50.0	-10.4	1.00 H	157	2.46	37.18
3	3692.33	53.7 PK	74.0	-20.3	1.00 H	204	9.72	43.94
4	3692.33	45.2 AV	54.0	-8.8	1.00 H	204	1.25	43.94
5	3892.33	55.7 PK	74.0	-18.3	1.00 H	279	10.44	45.27
6	**3892.33**	**48.0 AV**	**54.0**	**-6.1**	**1.00 H**	**279**	**2.68**	**45.27**
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2658.00	46.6 PK	70.0	-23.5	1.10 V	320	9.34	37.21
2	2658.00	38.3 AV	50.0	-11.7	1.10 V	320	1.13	37.21
3	3425.00	52.4 PK	74.0	-21.6	1.00 V	148	10.44	41.96
4	3425.00	44.1 AV	54.0	-9.9	1.00 V	148	2.17	41.96
5	3975.33	55.3 PK	74.0	-18.7	1.02 V	213	9.52	45.82
6	3975.33	46.7 AV	54.0	-7.3	1.02 V	213	0.91	45.82

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

3.4 HARMONICS CURRENT MEASUREMENT

3.4.1 LIMITS OF HARMONICS CURRENT MEASUREMENT

TEST STANDARD: EN 61000-3-2

Limits for Class A equipment	
Harmonics Order n	Max. permissible harmonics current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15<=n<=39	0.15x15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
8<=n<=40	0.23x8/n

Limits for Class D equipment		
Harmonics Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd Harmonics only		
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
13	0.30	0.21
15<=n<=39	3.85/n	0.15x15/n

NOTE: 1. Class A and Class D are classified according to item 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.

3.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
5kVA AC Power Source	California Instruments	5001ix-400	55194	May 23,12	May 22,13
Harmonic/Flicker Test System	California Instruments	PACS-1	72134	May 24,12	May 23,13
Test Software	California Instruments	CTS 3.0 - V3.2.0.16	N/A	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 and NIM/CHINA

3.4.3 TEST PROCEDURE

a. 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.

b. The classification of EUT is according to section 5 of EN 61000-3-2.

The EUT is classified as follows:

Class A: 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.

Class B: Portable tools. Arc welding equipment which is not professional equipment.

Class C: Lighting equipment.

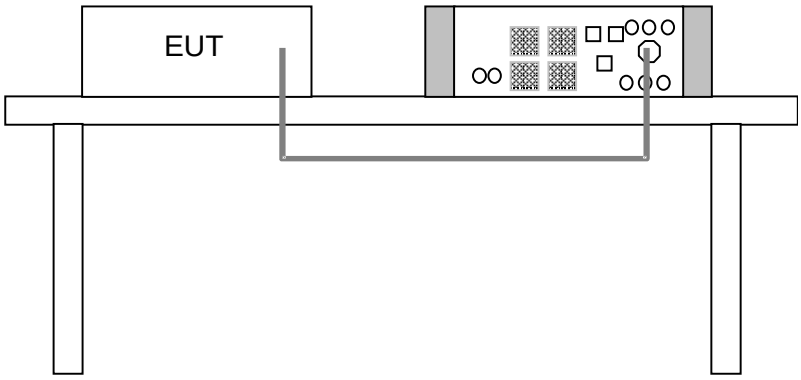
Class D: Equipment having a specified power less than or equal to 600 W of the following types: Personal computers, personal computer monitors and TV receivers.

c. 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.

3.4.4 DEVIATION FROM TEST STANDARD

No deviation.

3.4.5 TEST SETUP



3.4.6 EUT OPERATING CONDITIONS

Same as item 3.1.6

3.4.7 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 61000-3-2:2006 + A1:2009 + A2:2009.

3.5 VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

3.5.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

TEST STANDARD: EN 61000-3-3

Test Item	Limit	Note
Pst	1.0	Pst means short-term flicker indicator.
Plt	0.65	Plt means long-term flicker indicator.
Tdt (ms)	500	Tdt means maximum time that dt exceeds 3.3 %.
dmax (%)	4%	dmax means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change

3.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
5kVA AC Power Source	California Instruments	5001ix-400	55194	May 23,12	May 22,13
Harmonic/Flicker Test System	California Instruments	PACS-1	72134	May 24,12	May 23,13
Test Software	California Instruments	CTS 3.0 - V3.2.0.16	N/A	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 and NIM/CHINA

3.5.3 TEST PROCEDURE

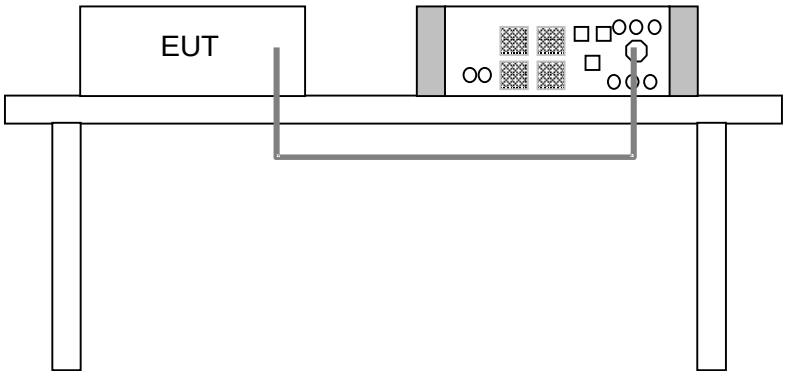
a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.

b. 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.

3.5.4 DEVIATION FROM TEST STANDARD

No deviation.

3.5.5 TEST SETUP



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

3.5.6 EUT OPERATING CONDITIONS

Same as item 3.1.6.

3.5.7 TEST RESULTS

TEST MODE	RJ45 Port Data Transmitting (100Mbps More than 10%)		
FUNDAMENTAL VOLTAGE	229.68Vrms	OBSERVATION PERIOD (Tp)	10 minutes
ENVIRONMENTAL CONDITIONS	21.5deg. C, 51.8% RH	TESTED BY	Xuehui

TEST PARAMETER	MEASUREMENT VALUE	LIMIT	REMARKS
P_{st}	0.064	1.0	Pass
P_{lt}	/	0.65	Pass
$T_{d(t)}$ (ms)	0	500	Pass
d_{max} (%)	0	4	Pass
dc (%)	0	3.3	Pass

NOTE: (1) P_{st} means short-term flicker indicator.
(2) $T_{d(t)}$ means maximum time that d(t) exceeds 3.3%
(3) d_{max} means maximum relative voltage change.
(4) dc means relative steady-state voltage change.

4 IMMUNITY TEST

4.1 GENERAL DESCRIPTION

Product Standard	**EN 301 489-1 V1.9.2 (2011-09)** **EN 301 489-17 V2.2.1 (2012-09)**	
Basic Standard, Specification, and Performance Criterion required	EN 61000-4-2	Electrostatic Discharge – ESD: 8 kV air discharge, 4 kV contact discharge, Performance Criterion B
	EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80 ~ 1000 MHz, 1400 ~ 2700 MHz, 3 V/m, 80% AM (1 kHz), Performance Criterion A
	EN 61000-4-4	Electrical Fast Transient/Burst - EFT AC Power line: 1kV, DC Power line: 0.5kV Signal line: 0.5kV Performance Criterion B
	EN 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, 10/700 us Open Circuit Voltage, 5 /320 us Short Circuit Current, AC Power Line: line to line 1 kV, line to earth 2kV DC Power Line: line to earth 0.5kV Signal line: 1kV 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: i) 0% residual for 250 cycle, Performance Criterion C

4.1.1 GENERAL PERFORMANCE CRITERIA DESCRIPTION

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

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. May show degradation of performance (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 2). 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 1). No unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2). 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 2).

NOTE 1: 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.

NOTE 2: 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 form the apparatus if used as intended.

NOTE 3: During the test,used the software to monitor the EUT’s output data.

4.2 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

4.2.1 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: 2, 4 kV (Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Contact Discharge :200 times in total Air Discharge:20 times on each test points
Discharge Mode:	Single Discharge
Discharge Period:	1 second

4.2.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
ESD Generator	TESEQ	NSG 437	279	Oct.15,12	Oct.14,13
Test Software	TESEQ	V03.03	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 and NIM/CHINA

4.2.3 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 ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.

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.

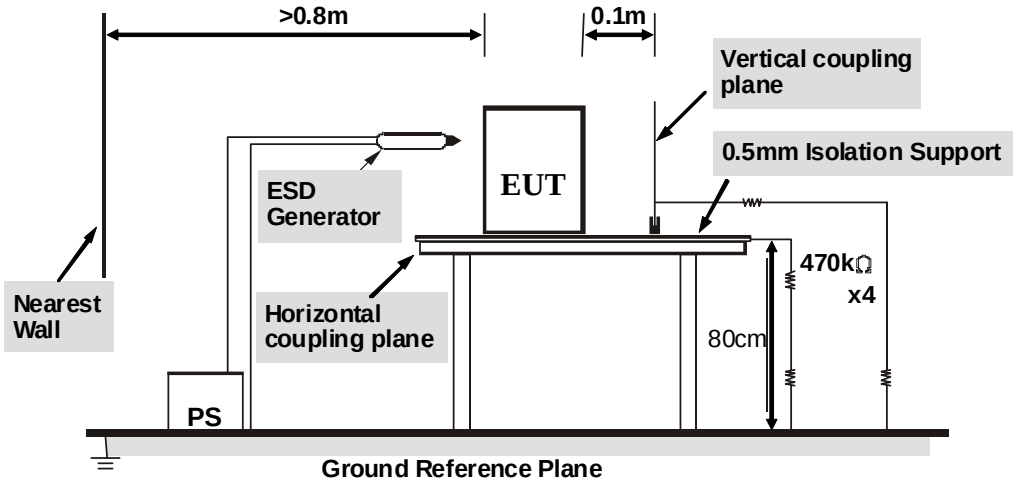
g. At least ten single discharges (in the most sensitive polarity) were applied to the **H**orizontal **C**oupling **P**lane at points on each side of the EUT. The ESD generator was positioned horizontally at a distance of 0.1 meters from the EUT with the discharge electrode touching the **HCP.**

h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **V**ertical **C**oupling **P**lane 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.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 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 **G**round **R**eference **P**lane. 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 **H**orizontal **C**oupling **P**lane (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940kΩ 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 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

4.2.6 TEST RESULTS

TEST MODE	RJ45 Port Data Transmitting (100Mbps More than 10%)	TEST VOLTAGE	DC 5V From Adapter Input AC230V/50Hz
ENVIRONMENTAL CONDITIONS	23.2deg. C, 42.2% RH, 100.2Kpa	TESTED BY: Eric	

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

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

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

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

4.3.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-3
Frequency Range:	80 MHz ~ 1000 MHz
	1400 MHz ~ 2700 MHz
Field Strength:	3 V/m
Modulation:	1 kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Antenna Height:	1.5 m
Dwell Time:	3 seconds

4.3.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal Generator	Agilent	N5181A	MY50142530	Nov. 02,12	Nov. 01,13
Antenna Log-Periodic	CORAD	ATR80M6G	0337307	Dec. 28,12	Dec. 27,13
Antenna Log-Periodic	CORAD	ATS700M11G	0336821	Dec. 28,12	Dec. 27,13
Switch Controller	CORAD	SC1000	0337343	Dec. 28,12	Dec. 27,13
RF Power Meter	ESE	4242	13984	Nov. 02,12	Nov. 01,13
Power Sensor	ESE	51011EMC	35716	Nov. 02,12	Nov. 01,13
Power Sensor	ESE	51011EMC	35715	Nov. 02,12	Nov. 01,13
E-Field probe	Narda	NBM-520	2403/01B	Nov. 07,12	Nov. 06,13
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	Dec. 28,12	Dec. 27,13
Dual Directional Coupler	TESEQ	C6187	95175	Dec. 28,12	Dec. 27,13
Dual Directional Coupler	TESEQ	CPH-274F	M251304-01	Dec. 28,12	Dec. 27,13
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 and NIM/CHINA.

4.3.3 TEST PROCEDURE

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

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

b. The frequency range is swept from 80 MHz to 1000 MHz & 1400 MHz to 2700 MHz with the signal 80% amplitude modulated with a 1 kHz sine wave.

c. 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.

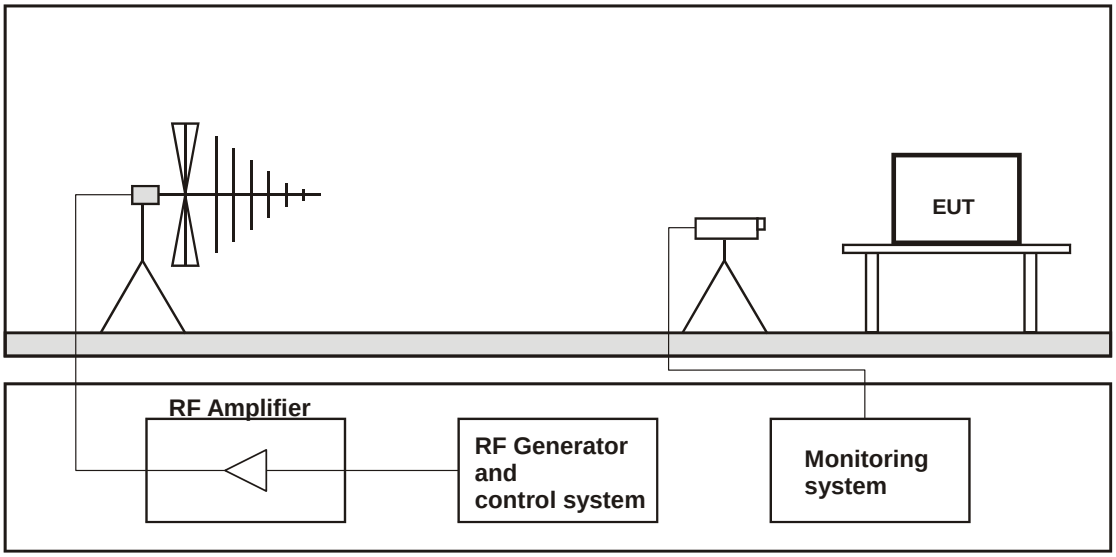
d. The field strength level was 3 V/m.

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 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.

4.3.6 TEST RESULTS

TEST MODE	RJ45 Port Data Transmitting (100Mbps More than 10%)	TEST VOLTAGE	DC5V From Adapter Input AC230V/50Hz
ENVIRONMENTAL CONDITIONS	23.2deg. C, 42.5% RH	TESTED BY: Harry	

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
3	1400-2700	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.

4.4 ELECTRICAL FAST TRANSIENT (EFT)

4.4.1 TEST SPECIFICATION

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

4.4.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EFT Tester	HAEFELY	PEFT4010	150546	May 15,12	May 14,13
EFT Coupling Clamp	HAEFELY	IP4A	150407	May 15,12	May 14,13
Test Software	HAEFELY	SWPE4010 1.22	N/A	N/A	N/A

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

4.4.3 TEST PROCEDURE

a. Both positive and negative polarity discharges were applied.

b. The length of the “hot wire” from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 0.5 meter ± 0.05 meter.

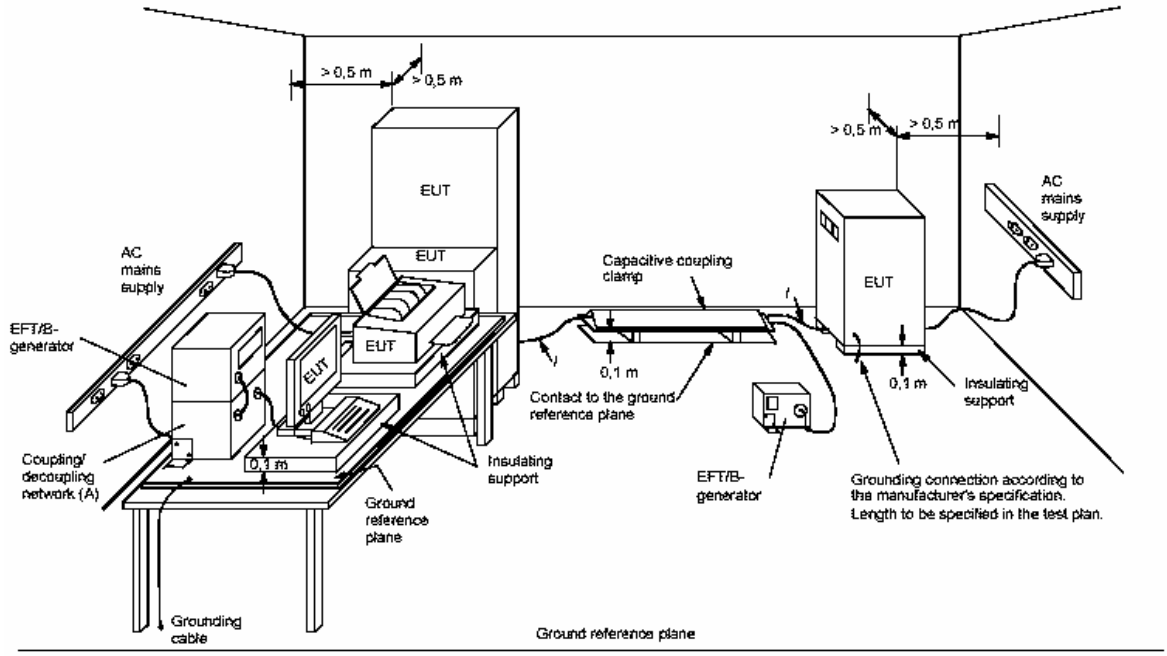
c. The duration time of each test sequential was 1 minute.

d. The transient/burst waveform was in accordance with EN 61000-4-4, 5/50ns.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



NOTE:
TABLETOP EQUIPMENT
The configuration consisted of a wooden table standing on the Ground Reference Plane and should be located 0.1m + /- 0.01m above the Ground Reference Plane.
The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR STANDING EQUIPMENT
The EUT installed in a representative system as described in section 7 of IEC 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.

4.4.6 TEST RESULTS

TEST MODE	RJ45 Port Data Transmitting (100Mbps More than 10%)	Test Voltage	DC5V From Adapter Input AC230V/50Hz
ENVIRONMENTAL CONDITIONS	22.1deg. C, 54.7% RH	TESTED BY: xuehui	

Pulse Voltage	1 kV		0.5 kV		___ kV		___ 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.

4.5 SURGE IMMUNITY

4.5.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-5
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8/20 us Short Circuit Current
Test Voltage:	Power port: 0.5, 1 kV
Surge Input/Output:	L-N
Generator Source Impedance:	2 ohm between networks
Polarity:	Positive/Negative
Phase Angle:	0°/90°/180°/270°
Pulse Repetition Rate:	1 time / min.
Number of Tests:	5 positive and 5 negative at selected points

4.5.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Surge Controller	HAEFELY	PSURGE8000	150366	May 23,12	May 22,13
Surge Impulse Module	HAEFELY	PIM100	150007	May 23,12	May 22,13
Surge Coupling Module	HAEFELY	PCD100	149870	May 23,12	May 22,13
Combination wave Module	TESEQ AG	CDN 3061	1361	Feb. 14,12	Feb. 13,13
Telecom Surge Module	TESEQ AG	NSG 3060 Mainframe	1404	Feb. 15,12	Feb. 14,13
Test Software	HAEFELY	SWPS8000	N/A	N/A	N/A

NOTE: 1. The test was performed in EMS Room 2.

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

4.5.3 TEST PROCEDURE

a. For EUT power supply:

The surge is 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 was shorter than 2 meters in length.

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

The surge was applied to the lines via the capacitive coupling. The coupling / decoupling networks didn't influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

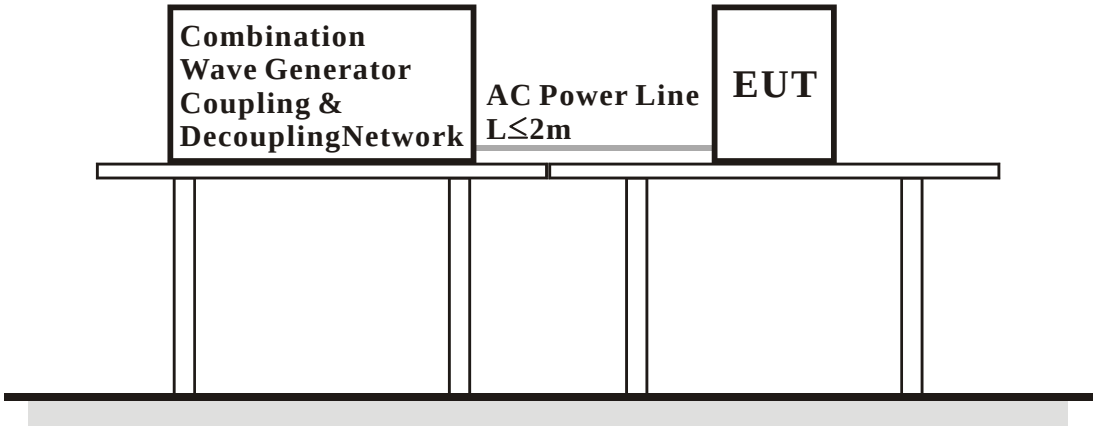
c. For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

The surge was applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor was not specified. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 TEST SETUP



4.5.6 TEST RESULTS

TEST MODE	RJ45 Port Data Transmitting (100Mbps More than 10%)	TEST VOLTAGE	DC 5V From Adapter Input AC230V/50Hz
ENVIRONMENTAL CONDITIONS	22.1deg. C, 54.7% RH	**TESTED BY:** Xuehui	

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	A		N/A
		−	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
0.5, 1	RJ45 Port	+	A	/	/	+	/
		−	A			−	/

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

4.6 CONDUCTED RADIO FREQUENCY DISTURBANCES (CS)

4.6.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-6
Frequency Range:	0.15 MHz ~ 80 MHz
Field Strength:	3 Vrms
Modulation:	1 kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Coupled cable:	Power Mains, Unshielded
Coupling device:	CDN-M2 (2 wires)

4.6.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal Generator	Rohde&Schwarz	SME06	829498/006	Oct.15,12	Oct.14,13
CDN	Luthi	L-801M2/M3	2015	Oct.10,12	Oct. 09,13
CDN(AUX)	TESEQ	CDN M016	27452	Nov. 20,12	Nov. 19,13
CDN	TESEQ	T200A	26944	Apr. 28,12	Apr. 27,13
CDN	TESEQ	T400A	26536	Apr. 28,12	Apr. 27,13
CDN	TESEQ	ST08A	32256	Apr. 28,12	Apr. 27,13
6dB 50Watt Attenuator	HUBER+SUHNER	5906.17.0005	303688	Oct.15,12	Oct.14,13
Signal Amplifier	HAEFELY	PAMP250	149594	NA	NA
Electromagnetic Injection Clamp	Luthi	EM101	35640	Oct.15,12	Oct.14,13
C/S Test System	HAEFELY	WinPAMP	NSEMC002	May 15,12	May 14,13
Test Software	ADT	BVADT_CS_V7 .5.1	N/A	N/A	N/A

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

4.6.3 TEST PROCEDURE

a. The test was 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.

b. The frequency range was swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal was modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate was 1.5 x 10^{-3} decades/s. Where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value from 150 kHz to 80 MHz.

c. One of the CDNS not used for injection was terminated with 50 Ω ,providing only one return path. All other CDNs were coupled as doupled networks.

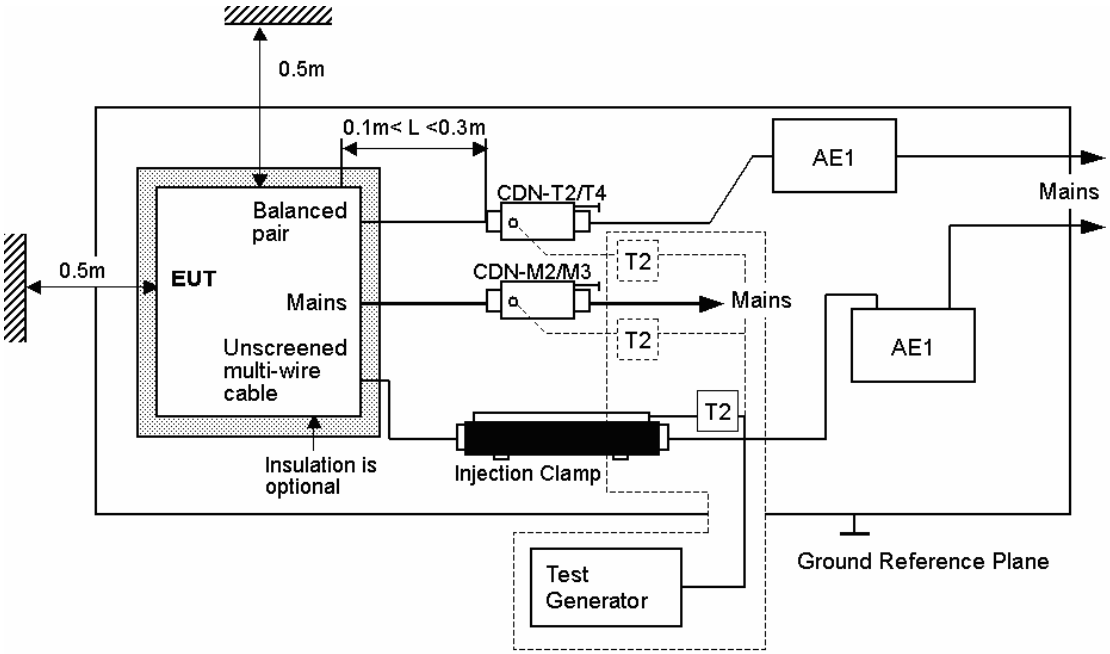
d. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequency(ies) and harmonics or frequencies of dominant interest, was analyzed separately.

e. Attempts was made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation.

4.6.5 TEST SETUP



NOTE: The EUT clearance from any metallic obstacles shall be at least 0.5m.
All non-excited input ports of the CDNs shall be terminated by 50Ω loads.

Note: 1. The EUT is setup 0.1m above Ground Reference Plane.
2. The CDNs and / or EM clamp used for real test depends on ports and cables configuration of EUT.

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

NOTE:

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.

4.6.6 TEST RESULTS

TEST MODE	RJ45 Port Data Transmitting (100Mbps More than 10%)	TEST VOLTAGE	DC 5V From Adapter Input AC230V/50Hz
ENVIRONMENTAL CONDITIONS	24.2deg. C, 56.2% RH	TESTED BY: Harry	

Voltage (V)	Test Frequency Note#1 (MHz)	Tested Line	Injection Method.	Test Result	Remark
3	0.15 –80 MHz	AC Line	CDN-M2	A	Pass
3	0.15 –80 MHz	RJ45 Port (network line)	Clamp	A	Pass

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.

4.7 VOLTAGE DIP/SHORT INTERRUPTIONS/VOLTAGE VARIATIONS (DIP) IMMUNITY TEST

4.7.1 TEST SPECIFICATION

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

4.7.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
DIPS Tester	HAEFELY	PLINE 1610	150370	May 23,12	May 22,13
Test Software	HAEFELY	SWPL1610 1.43	N/A	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 and NIM/CHINA

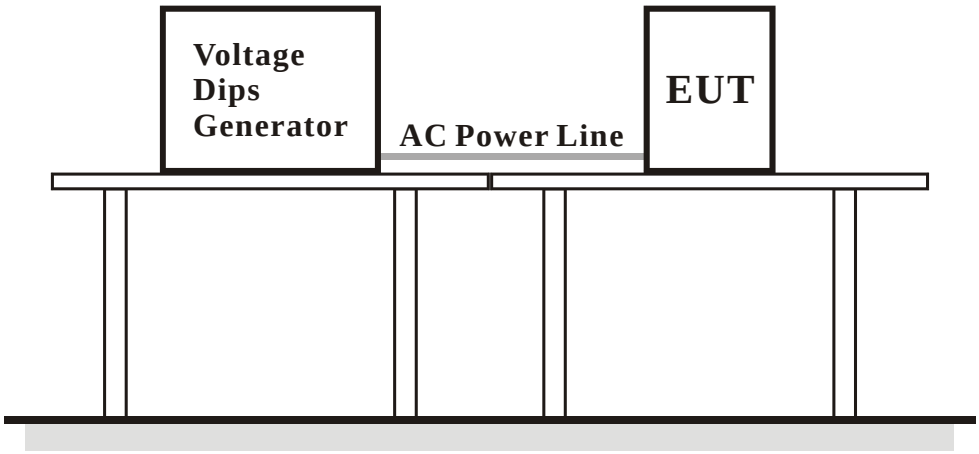
4.7.3 TEST PROCEDURE

The EUT was tested for each selected combination of test levels and duration with a sequence of 3 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.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation.

4.7.5 TEST SETUP



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

4.7.6 TEST RESULTS

TEST MODE	RJ45 Port Data Transmitting (100Mbps More than 10%)	TEST VOLTAGE	DC 5V From Adapter In AC230V/50Hz
ENVIRONMENTAL CONDITIONS	23.1deg. C, 54.6% RH	TESTED BY: Xuehui Wen	

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

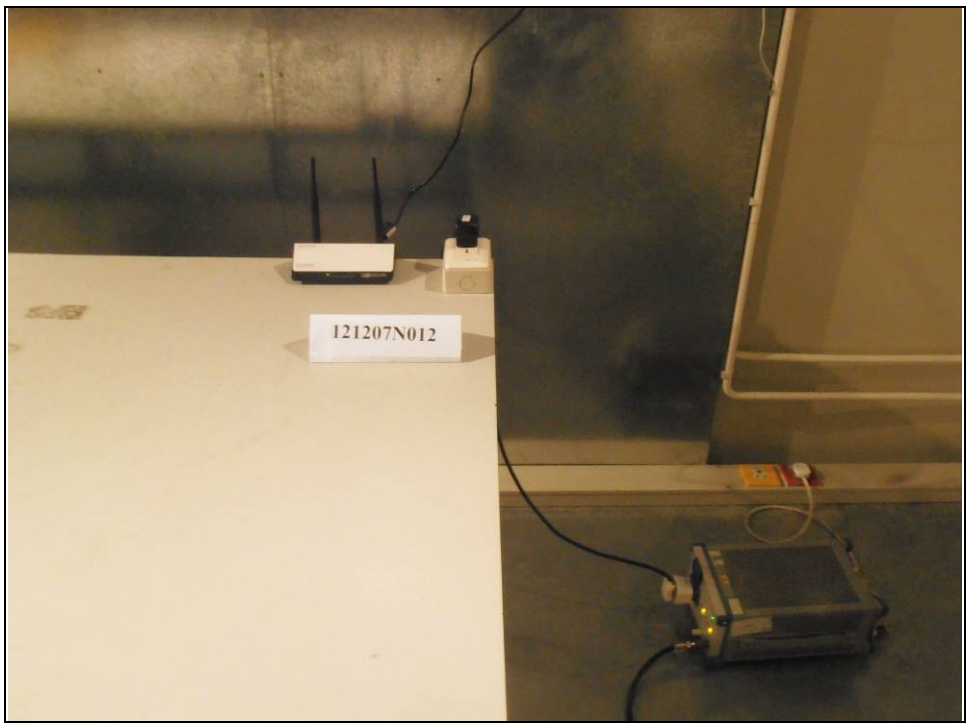
Ut : 230 Vac 50 Hz	Durations		Event interval (sec)	Total events (time)	Test result
Voltage dips (%)	(period)	(ms)			
100	0.5	10	10	3	A
100	1	20	10	3	A
70	25	500	10	3	A
100	250	5000	20	3	B

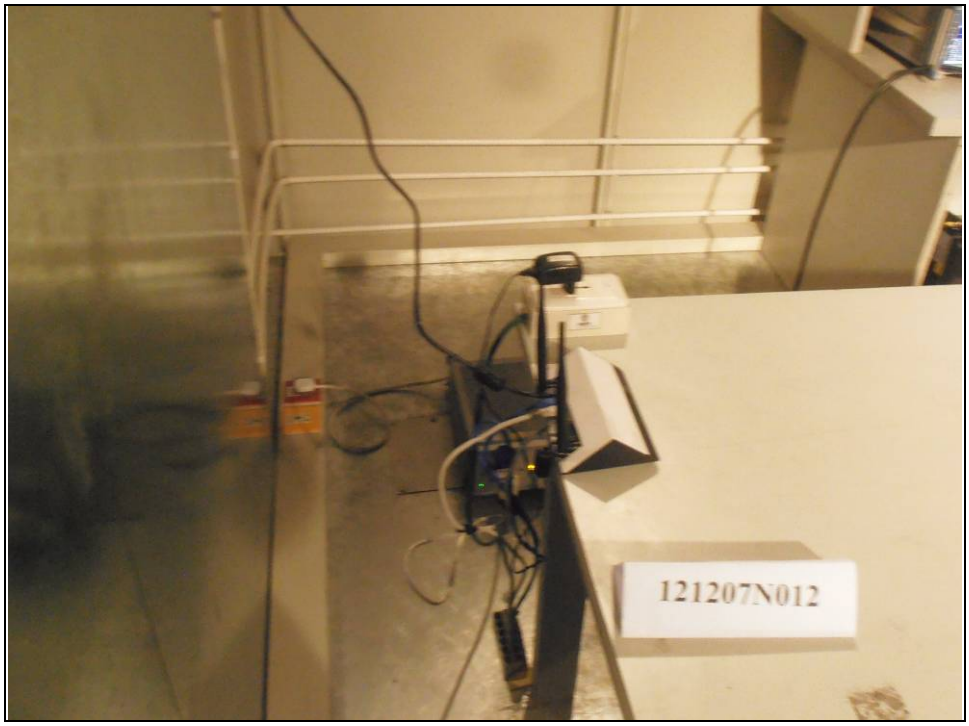
NOTE: A: There was no change compared with initial operation during the test.

B: Data transmitting paused for a little while, but could self-recover after the test.

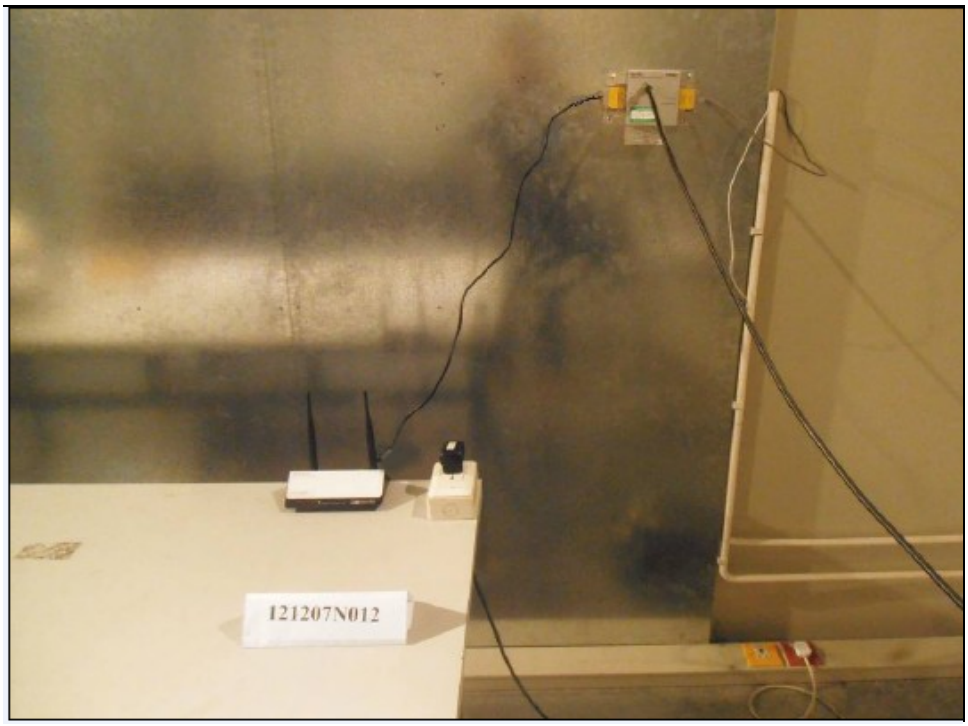
5 PHOTOGRAPHS OF THE TEST CONFIGURATION

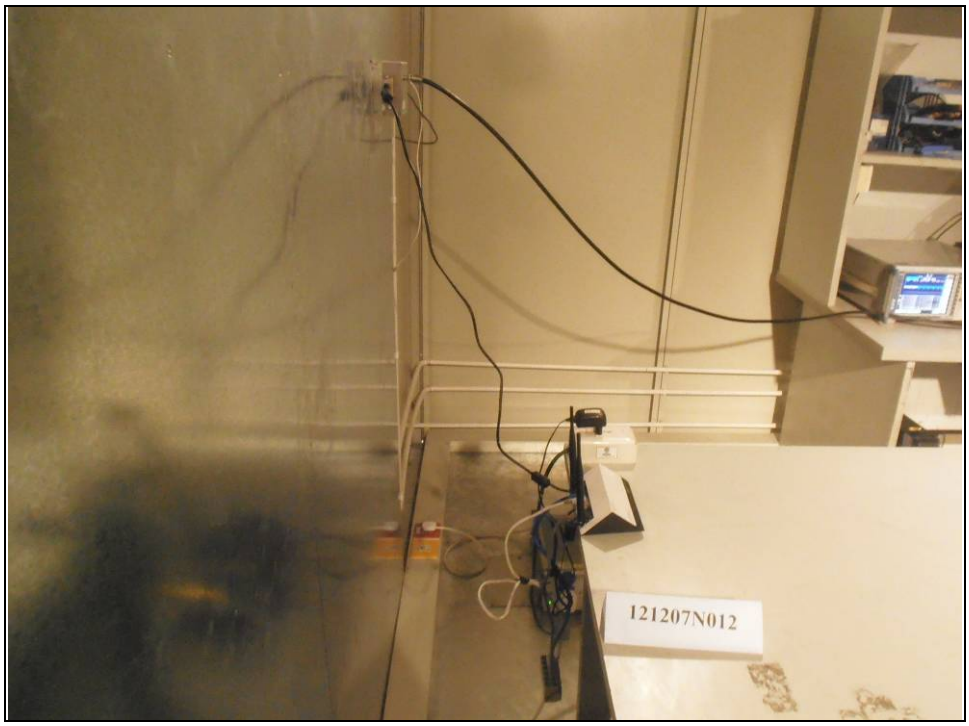
CONDUCTED EMISSION TEST(MAINS TERMINAL)



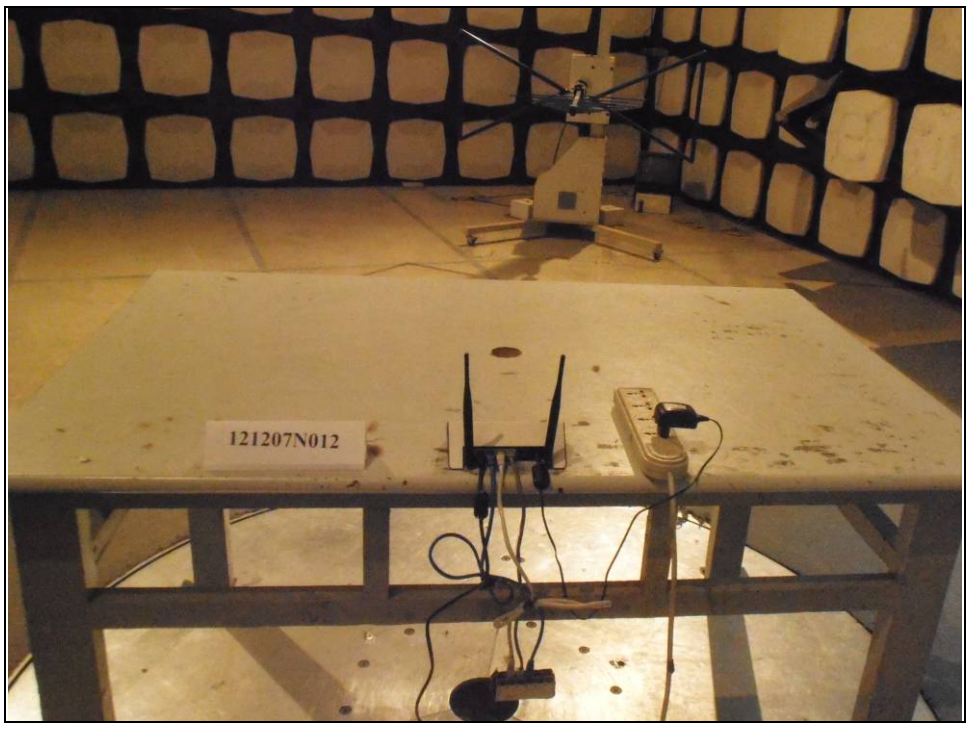


CONDUCTED EMISSION TEST(TELECOMMUNICATION PORT)

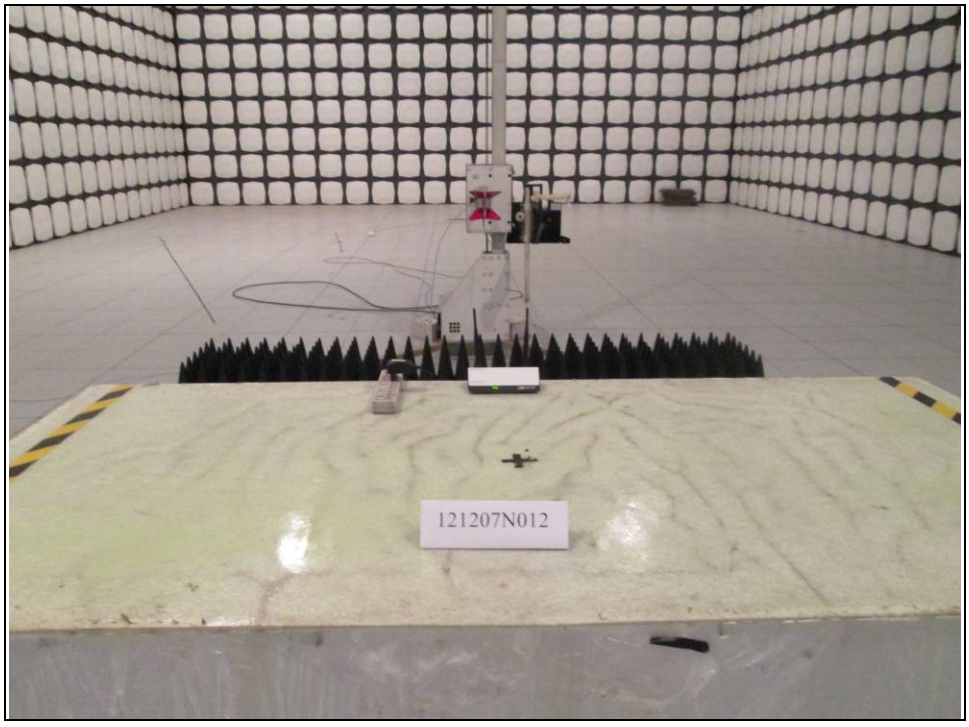


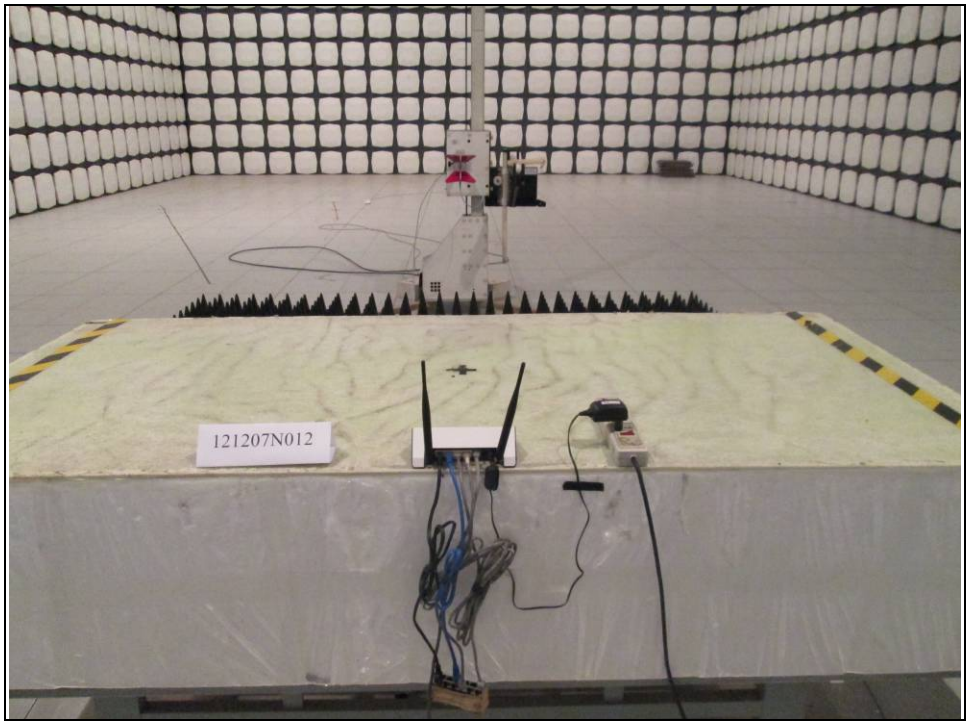


RADIATED EMISSION TEST
<30MHz~1GHz>



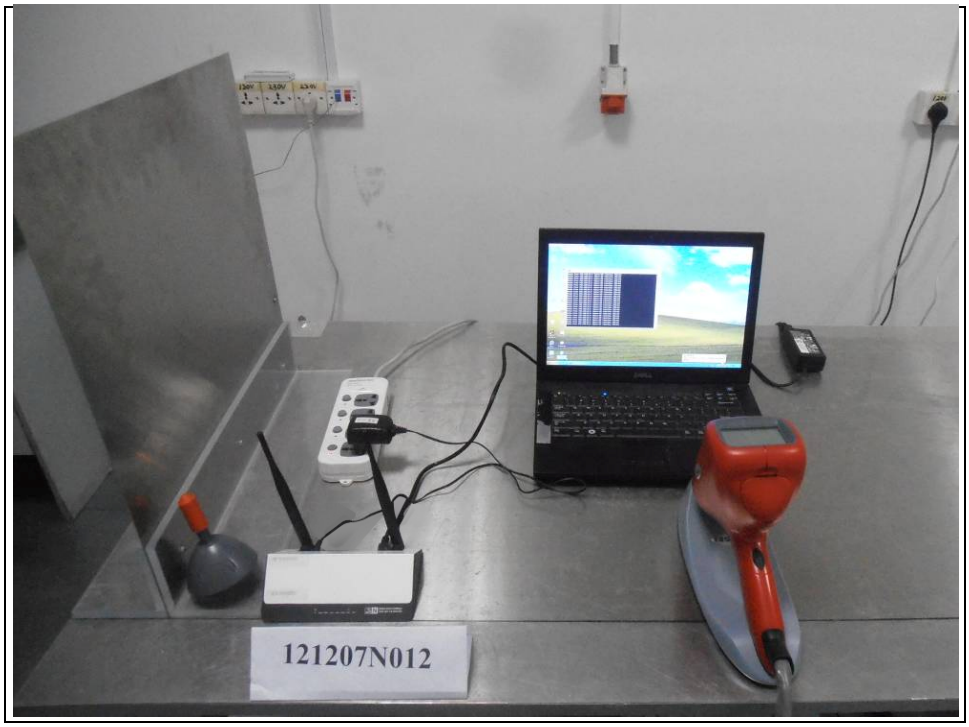
RADIATED EMISSION TEST
<Above 1GHz>



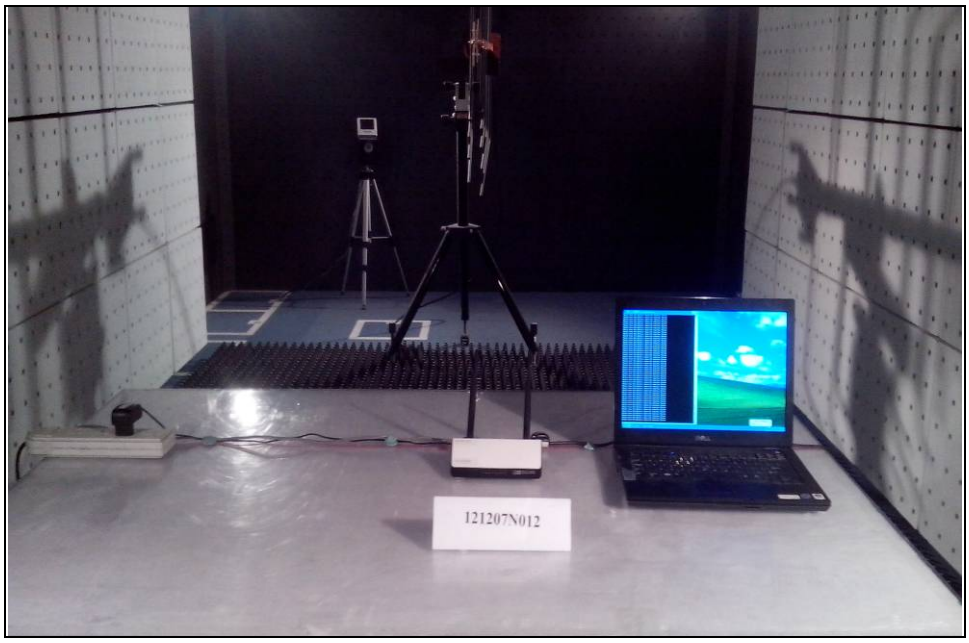


HARMONICS EMISSION TEST &
VOLTAGE FLUCTUATIONS AND FLICKER TEST

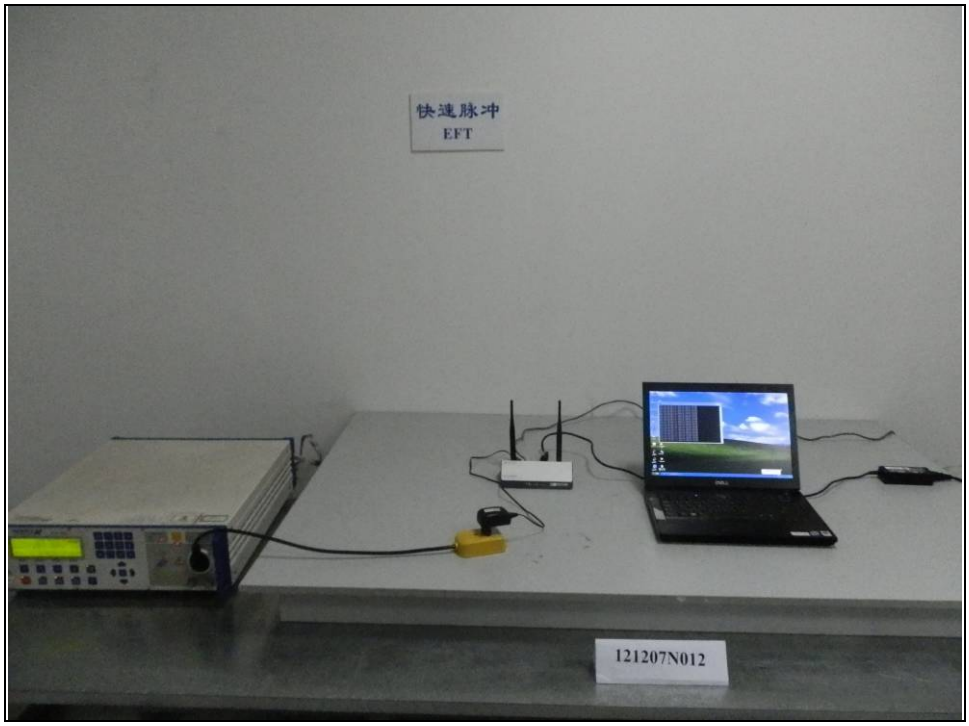
ESD TEST



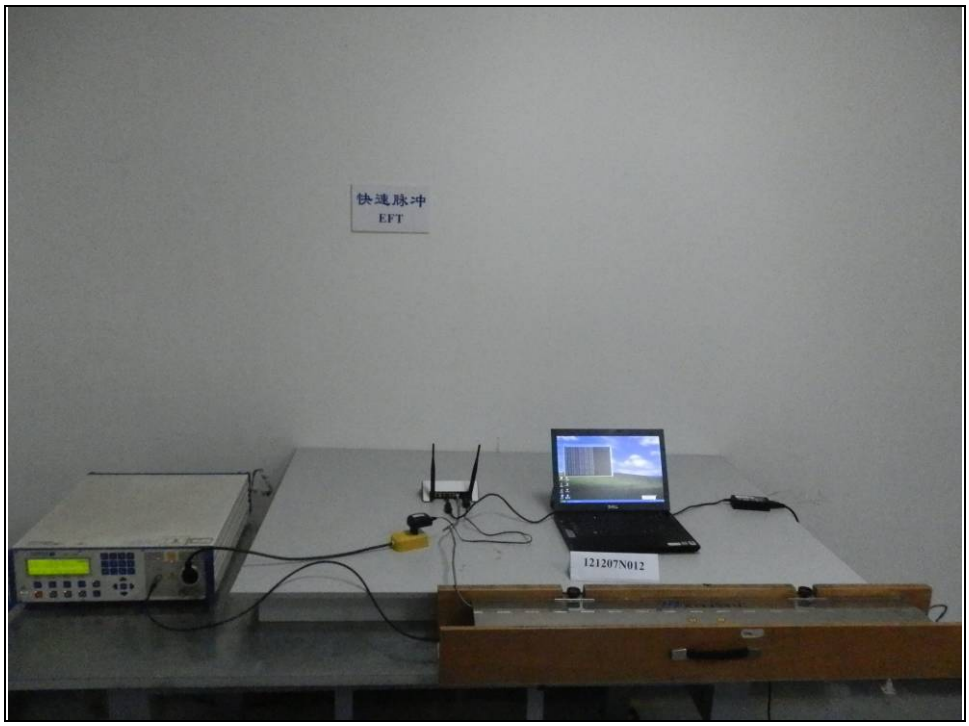
R/S TEST



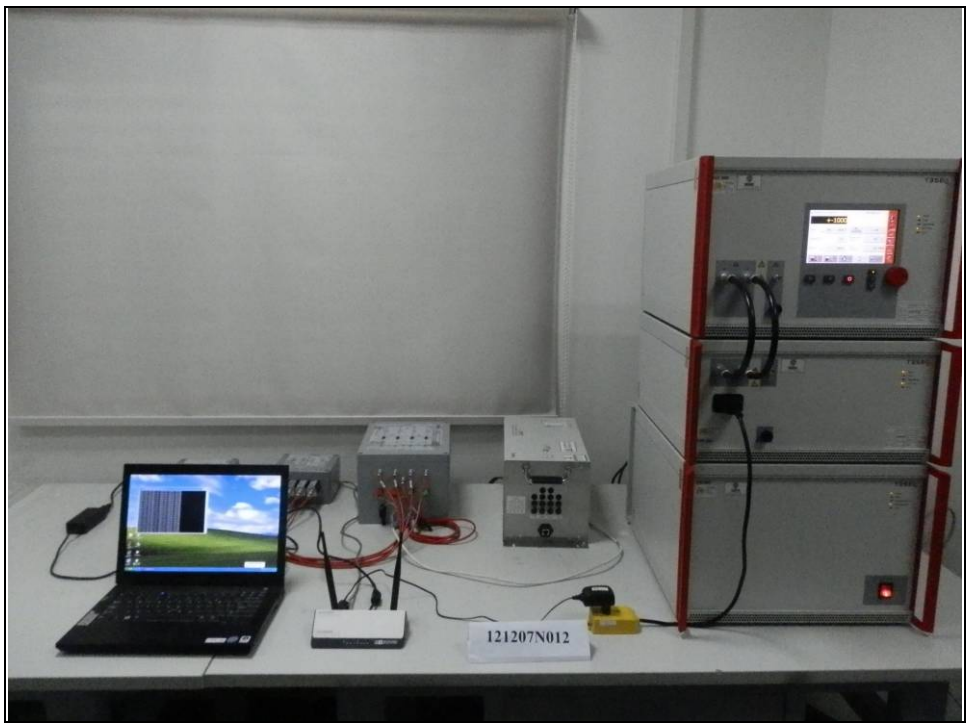
EFT TEST (MAINS TERMINAL)



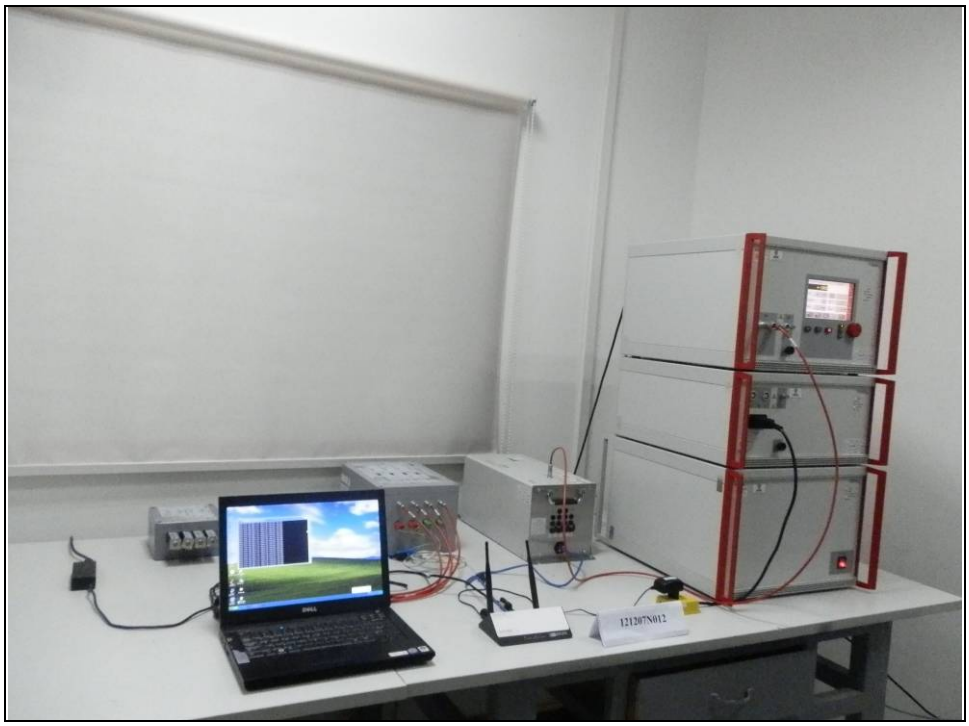
EFT TEST (TELECOMMUNICATION PORT)



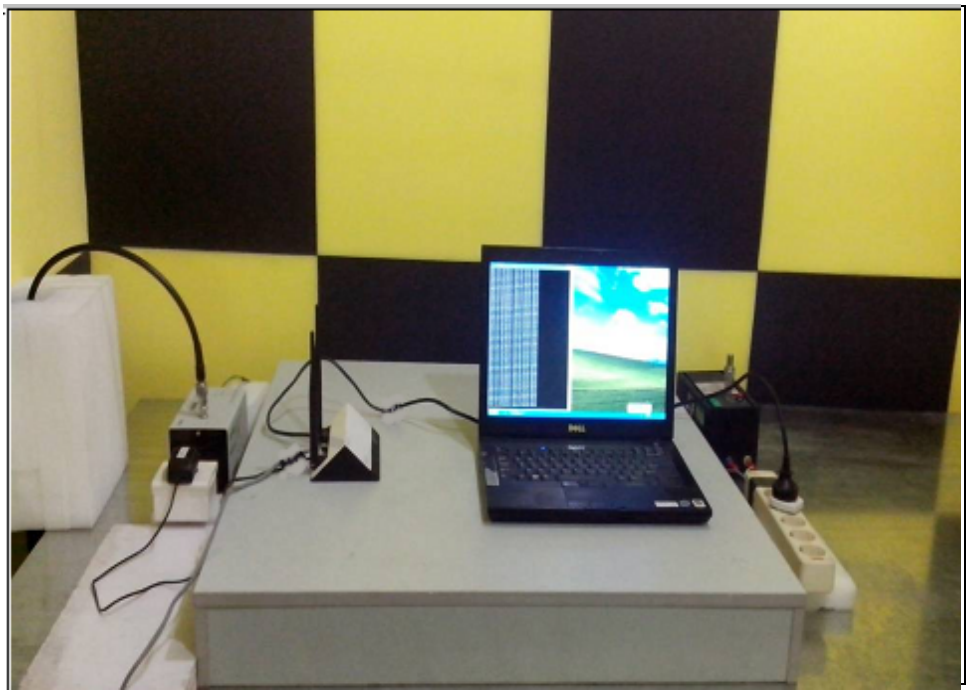
SURGE TEST (MAINS TERMINAL)



SURGE TEST (TELECOMMUNICATION PORT)



CONDUCTED SUSCEPTIBILITY TEST (MAINS TERMINAL)



CONDUCTED SUSCEPTIBILITY TEST (TELECOMMUNICATION PORT)

VOLTAGE DIPS AND INTERRUPTIONS TEST

6 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---