Test Lab
Cert 2951.01

TEST REPORT

Applicant	Hangzhou Hikvision Digital Technology Co., Ltd.
Address	No.555 Qianmo Road, Binjiang District, Hangzhou 310052, China

Manufacturer or Supplier	Hangzhou Hikvision Digital Technology Co., Ltd.
Address	No. 700 Dongliu Road, Binjiang District, Hangzhou 310052, Zhejiang, China.
Product	Network Zoom Camera
Brand Name	HIKVISION
Model	DS-2ZCN3007(C)
Additional Model & Model Difference	DS-2ZCN3006(C), See items 2.1
Date of tests	Apr. 12, 2016 ~ Jun. 29, 2016

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

☒ **EN 55032:2012 + AC:2013, Class A**
☒ **EN 61000-3-2:2014**
☒ **EN 61000-3-3:2013**
☒ **EN 50130-4:2011**

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

Tested by Jerry Fu Project Engineer / EMC Department	Approved by Glyn He Supervisor / EMC Department
	Date: Mar. 28, 2017

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
CE160412N096	Original release	Jun. 29, 2016
CE170307N090-26	Based on the original report CE160412N096 renewed address about the applicant and changed the standard EN55022 to EN55032, but it doesn't need to be retested after engineer evaluated.	Mar. 28, 2017

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

EMISSION			
Standard	**Test Type**	**Result**	**Remarks**
EN 55032:2012 +AC:2013, Class A	Conducted Test	PASS	Minimum passing margin is –29.91dB at 0.525 MHz
	Radiated Test (30MHz~1GHz)	PASS	Minimum passing margin is –6.34dB at 199.75MHz
EN 61000-3-2:2014	Harmonic current emissions	PASS	Meets the requirements.
EN 61000-3-3:2013	Voltage fluctuations & flicker	PASS	Meets the requirements.

IMMUNITY (EN 50130-4:2011)			
Standard	**Test Type**	**Result**	**Remarks**
EN 61000-4-2:2009	Electrostatic discharge immunity test	PASS	Electrostatic Discharge – ESD: 2, 4, 8kV Air discharge, 6kV Contact discharge,
EN 61000-4-3:2006 +A1:2008+A2:2010	Radiated, radio-frequency, electromagnetic field immunity test	PASS	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80-2700 MHz, 10V/m, 80% Sinusoidal, 1kHz, Pulse Modulation, 1 Hz (0.5s ON: 0.5s OFF)
EN 61000-4-4:2004 +A1:2010	Electrical fast transient / burst immunity test.	PASS	Electrical Fast Transient/Burst - EFT AC Power lines: 2kV, Other supply/signal lines: 1kV
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, Line-to- Line 0.5kV & 1KvLine-to-ground 0.5kV, 1Kv &2kV, Other supply/signal lines - line-to-ground : 0.5kV& 1Kv
EN 61000-4-6:2009	Immunity to conducted disturbances, induced by radio-frequency fields	PASS	Conducted Radio Frequency Disturbances Test – CS: 0.15-100 MHz, 10Vrms, 80% Sinusoidal, 1kHz, Pulse Modulation 1 Hz (0.5s ON: 0.5s OFF)
EN 61000-4-11:2004	Voltage dips, short interruptions and voltage variations immunity tests	PASS	Voltage Dips: i) 20% reduction 250 period ii) 30% reduction 25period iii) 60% reduction 10 period iv) 100% reduction 250 period
EN 50130-4:2011	Mains supply voltage variations test	PASS	Supply voltage max. (Umax)= Unom + 10% Supply voltage min. (Umin)=Unom – 15%

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 emissions	150kHz ~ 30MHz	+/- 2.70 dB
Radiated emissions	30 MHz ~ 1GHz	+/- 4.06 dB

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Network Zoom Camera
MODEL NO.	DS-2ZCN3007(C)
ADDITIONAL MODEL	DS-2ZCN3006(C)
POWER SUPPLY	DC 12V from adapter
CABLE SUPPLIED	N/A
THE HIGHEST OPERATING FREQUENCY	72MHz

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was showed in test report.
3. Please refer to the EUT photo document (Reference No.: 170307N090-26) for detailed product photo。
4. Additional model DS-2ZCN3006(C) is identical with the test model DS-3ZCN2007(C) except the model name, the color of appearance and silkscreen for trading purpose.

2.2 DESCRIPTION OF TEST MODES

The EUT was tested under the **Monitoring** mode for all tests.

2.3 TEST PROGRAM USED AND OPERATION DESCRIPTIONS

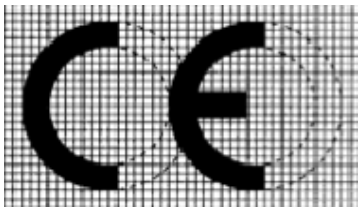
a. Placed the EUT on the test table and it was powered by adapter.

b. Prepared notebooks to act as communication partners.

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

The EUT has been tested and complied with the requirements of the following standards:

EN 55032:2012 + AC:2013 Class A
EN 61000-3-2:2014
EN 61000-3-3:2013
EN 50130-4:2011
EN 61000-4-2:2009
EN 61000-4-3:2006+A1:2008+A2:2010
EN 61000-4-4:2004+A1:2010
EN 61000-4-5:2006
EN 61000-4-6:2009
EN 61000-4-11:2004
EN 50130-4:2011

Note: All Immunity tests to EN 50130-4 were performed in accordance with EN 61000-4-X and not IEC 61000-4-X(X=2, 3, 4, 5, 6, 11).

2.6 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as a 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	DELL	E6420	9H12FS1	N/A

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line: Unshielded, Detachable 1.0m, DC Line: Unshielded, Detachable 2.0m

The supervisory host and EUT power by the adapter follow as below:

ADAPTER	
BRAND:	DVE
MODEL:	ADS-12PFG-12FUS 120100
INPUT:	AC 100-240V, 50/60Hz 0.5A
OUTPUT:	DC 12V, 1A
DC LINE:	Unshielded, Non-detachable, 1.5m

Remarks: 1. Notebook is distal support units with EMI test.
2. Radiated emissions test used 10m RJ45l line, conducted test and immunity test used 0.5m RJ45 line.
3. The RJ 45 cable only for use on support camera.

3 EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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	ESCS30	100340	May 11,16	May 10,17
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 04,16	Mar. 03,17
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Apr. 05,16	Apr. 04,17
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Jan. 08,16	Jan. 07,17
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, GRGT/CHINA and NIM/CHINA.
2. The test was performed in Shielded Room 553

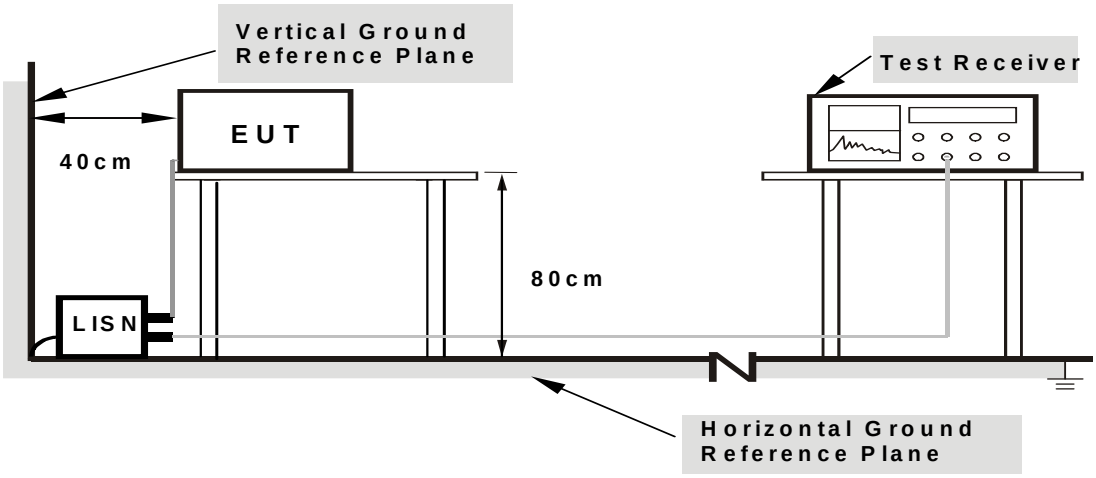
3.1.3 TEST PROCEDURE

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) were not recorded.

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 80cm from EUT and at least 80cm from other units and other metal planes support units.

3.1.6 EUT OPERATING CONDITIONS

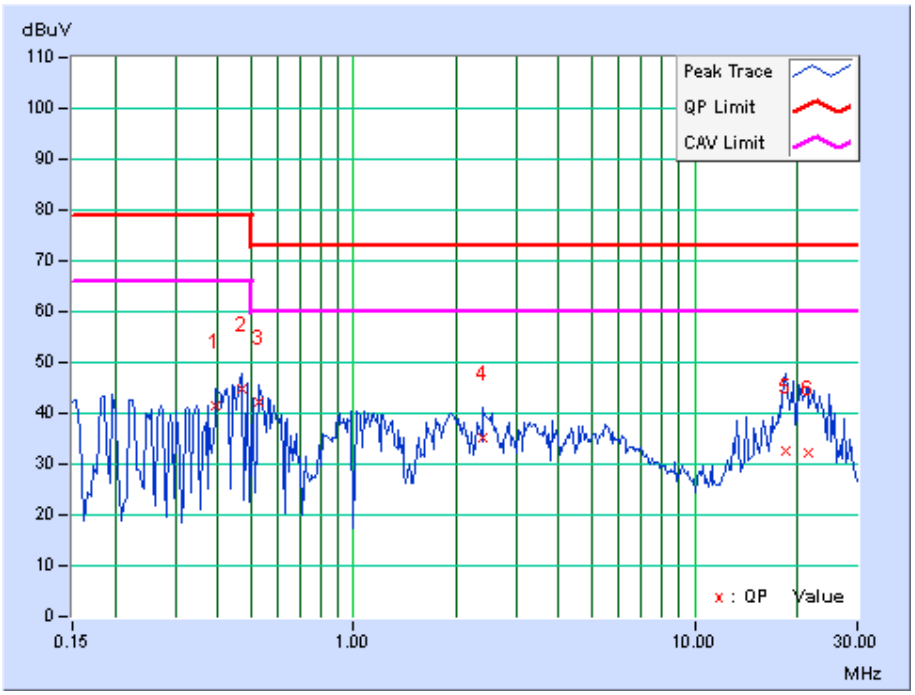
a. Turned on the power of all equipment.
b. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

3.1.7 TEST RESULTS

TEST MODE	Monitoring	PHASE	Line(L)
TEST VOLTAGE	DC 12V From Adapter Input AC 230V 50Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 55% RH	TESTED BY: David Wang	

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	0.39609	9.88	31.44	18.06	41.32	27.94	79.00	66.00	-37.68	-38.06
2	0.47031	9.91	34.93	21.52	44.84	31.43	79.00	66.00	-34.16	-34.57
3	**0.52500**	**9.92**	**32.42**	**20.17**	**42.34**	**30.09**	**73.00**	**60.00**	**-30.66**	**-29.91**
4	2.40625	9.99	25.32	13.64	35.31	23.63	73.00	60.00	-37.69	-36.37
5	18.44531	10.34	22.09	10.55	32.43	20.89	73.00	60.00	-40.57	-39.11
6	21.47656	10.47	21.72	9.29	32.19	19.76	73.00	60.00	-40.81	-40.24

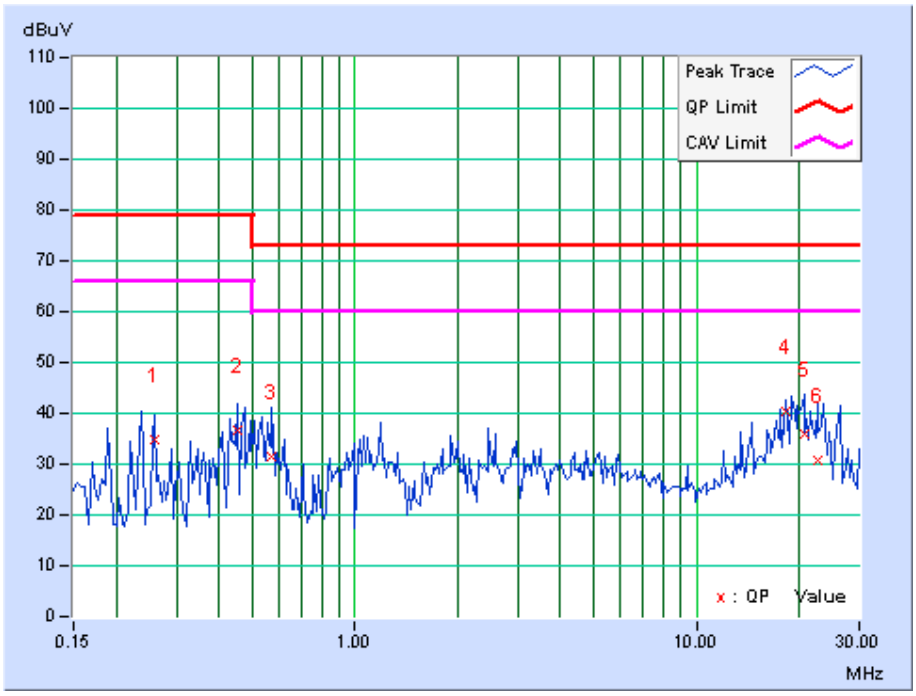
REMARKS: The emission levels of other frequencies were very low against the limit.



TEST MODE	Monitoring	**PHASE**	Neutral (N)
TEST VOLTAGE	DC 12V From Adapter Input AC 230V 50Hz	**6dB BANDWIDTH**	9 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 55% RH	**TESTED BY**: David Wang	

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	0.25938	9.52	25.45	12.73	34.97	22.25	79.00	66.00	-44.03	-43.75
2	0.45469	9.55	26.95	15.69	36.50	25.24	79.00	66.00	-42.50	-40.76
3	0.57188	9.57	22.07	11.46	31.64	21.03	73.00	60.00	-41.36	-38.97
4	18.24219	10.03	30.22	12.54	40.25	22.57	73.00	60.00	-32.75	-37.43
5	20.64063	10.11	25.85	6.18	35.96	16.29	73.00	60.00	-37.04	-43.71
6	22.59375	10.22	20.56	2.65	30.78	12.87	73.00	60.00	-42.22	-47.13

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



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: EN 55032

FOR FREQUENCY BELOW 1000 MHz

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

FREQUENCY (MHz)	Class A (at 3m) Quasi-Peak dBuV/m	Class B (at 3m) 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

TEST STANDARD: EN 55032
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.

3.2.2 TEST INSTRUMENTS

FOR FREQUENCY BELOW 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Apr. 05,16	Apr. 04,17
Bilog Antenna	Teseq	CBL 6111D	30643	Jul. 16, 15	Jul. 15, 16
Amplifier	Burgeon	BPA-530	100220	Apr. 05,16	Apr. 04,17
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Mar. 12,16	Mar. 11,18
Test software	ADT	ADT_Radiated _V7.6.15.9.2	N/A	N/A	N/A

FREQUENCY RANGE ABOVE 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	ETS-Lindgren	3117	00062558	May 30,14	May 29,16
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170242	Mar. 12,16	Mar. 11,17
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Apr. 05,16	Apr. 04,17
Broadband Preamplifier	SCHWARZBECK	BBV9718	305	Mar. 09,16	Mar. 08,17
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 11,15	Nov. 10,16
Test Software	ADT	ADT_Radiated_ V7.6.15.9.2	N/A	N/A	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 or 24 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in 966 Chamber.

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	ETS-Lindgren	3117	00085519	Dec. 30, 15	Dec. 29, 16

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	SCHWARZBECK	BBHA 9170	BBHA9170242	Mar. 12,16	Mar. 11,17

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.

3.2.3 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 3 meters 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:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier)
4. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier)
5. Margin value = Emission level – 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 3 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. The bore sight should be used during the test above 1GHz.

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:

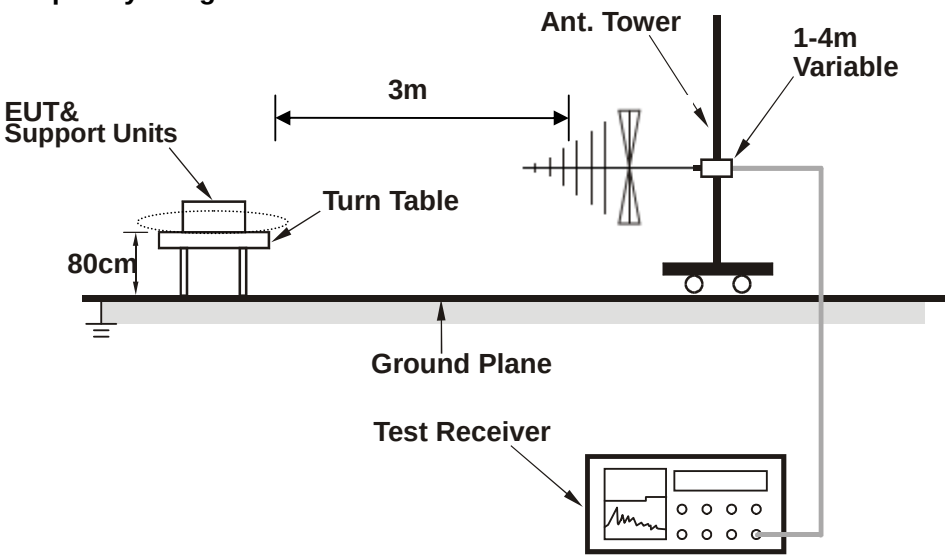
1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
2. For measurement of frequency above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

3.2.4 DEVIATION FROM TEST STANDARD

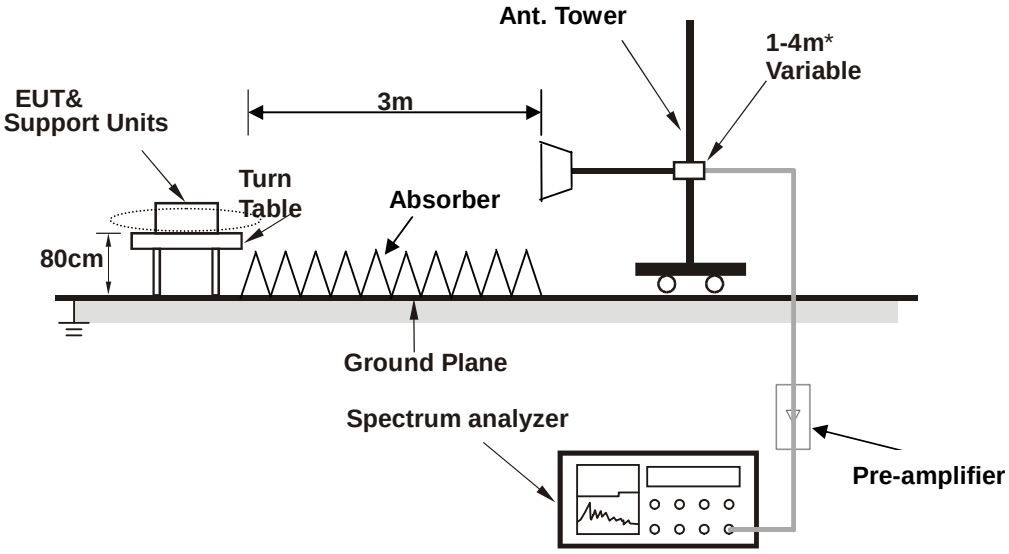
No deviation.

3.2.5 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.

3.2.6 EUT OPERATING CONDITIONS

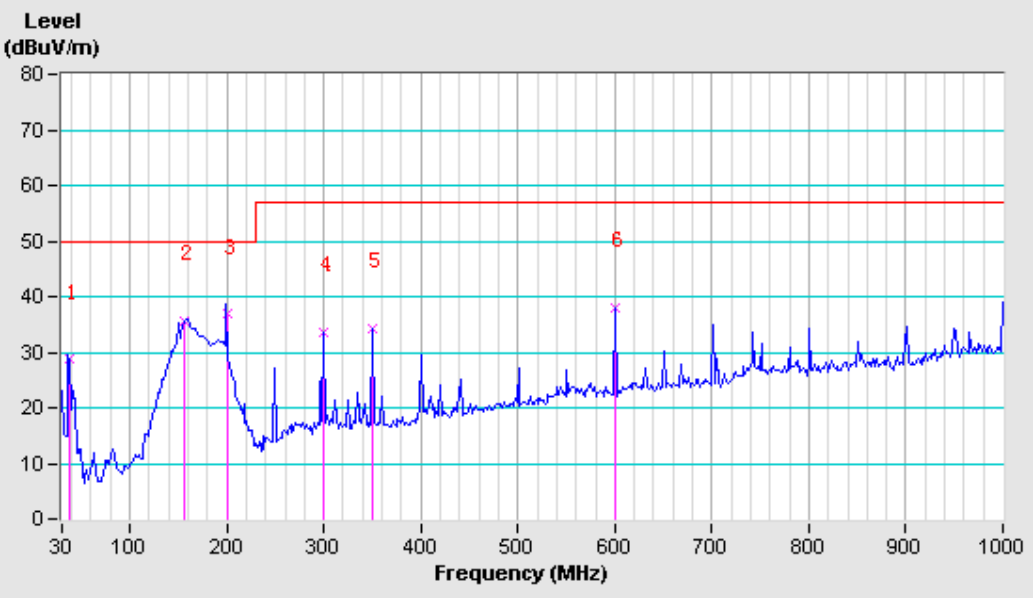
Same as item 3.1.6

3.2.7 TEST RESULTS

TEST MODE	Monitoring	FREQUENCY RANGE	30-1000MHz
TEST VOLTAGE	DC 12V From Adapter Input AC 230V 50Hz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 54% RH,	**TESTED BY:** Sook	

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	38.08	-16.10	44.81	28.71	50.00	-21.29	100	0
2	156.10	-18.29	53.91	35.62	50.00	-14.38	100	0
3	199.75	-20.21	57.02	36.81	50.00	-13.19	100	0
4	299.98	-14.11	47.73	33.62	57.00	-23.38	100	0
5	350.10	-12.81	47.12	34.31	57.00	-22.69	100	0
6	600.68	-5.67	43.73	38.06	57.00	-18.94	100	0

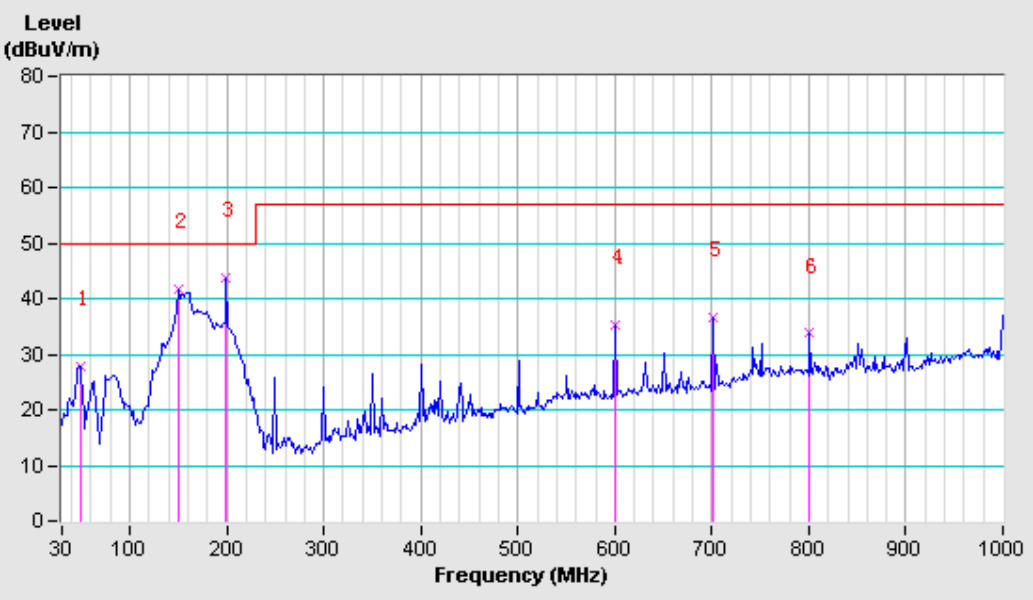
REMARKS: The emission levels of other frequencies were very low against the limit.



TEST MODE	Monitoring	**FREQUENCY RANGE**	30-1000MHz
TEST VOLTAGE	DC 12V From Adapter Input AC 230V 50Hz	**DETECTOR FUNCTION & RESOLUTION BANDWIDTH**	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	20deg. C, 54% RH,	**TESTED BY:** Sook	

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	49.40	-21.97	49.89	27.92	50.00	-22.08	100	0
2	149.63	-17.92	59.70	41.78	50.00	-8.22	100	0
3	**199.75**	**-20.21**	**63.87**	**43.66**	**50.00**	**-6.34**	**100**	**0**
4	600.68	-5.67	40.95	35.28	57.00	-21.72	100	0
5	700.92	-3.57	40.28	36.71	57.00	-20.29	100	0
6	801.15	-1.79	35.57	33.78	57.00	-23.22	100	0

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



3.3 HARMONICS CURRENT MEASUREMENT

3.3.1 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 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 are for all applications having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

3.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
5kVA AC Power Source	California Instruments	5001ix-400	55194	April 09,16	April 08,17
Harmonic/Flicker Test System	California Instruments	PACS-1	72134	April 09,16	April 08,17
Test Software	California Instruments	CTS 3.0 - V3.2.0.35	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, GRGT/CHINA and NIM/CHINA.

3.3.3 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.

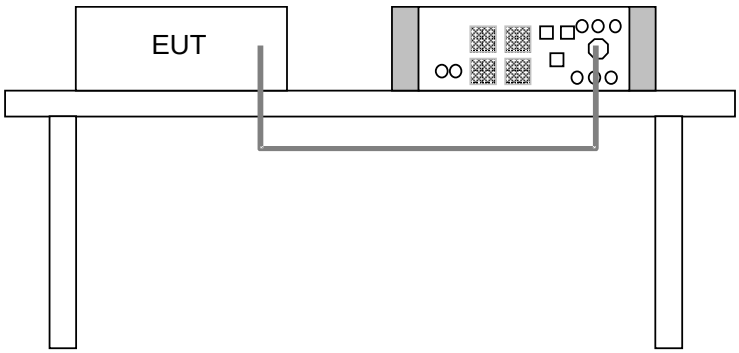
b. The classification of EUT is according to section 5 of EN 61000-3-2
The EUT is classified as follows:
Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified 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 and personal computer monitors and television 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.

3.3.4 DEVIATION FROM TEST STANDARD

No deviation

3.3.5 TEST SETUP



3.3.6 EUT OPERATING CONDITIONS

Same as item 3.1.6

3.3.7 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 61000-3-2:2014.

3.4 VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

3.4.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

TEST STANDARD: EN 61000-3-3

TEST ITEM	LIMIT	NOTE
P_{st}	1.0	P_{st} means short-term flicker indicator.
P_{lt}	0.65	P_{lt} means long-term flicker indicator.
$T_{d(t)}$ (ms)	500	$T_{d(t)}$ means maximum time that d(t) exceeds 3.3%.
d_{max} (%)	4	dmax means maximum relative voltage change.
dc (%)	3.3	dc means relative steady-state voltage change

3.4.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
5kVA AC Power Source	California Instruments	5001ix-400	55194	April 09,16	April 08,17
Harmonic/Flicker Test System	California Instruments	PACS-1	72134	April 09,16	April 08,17
Test Software	California Instruments	CTS 3.0 - V3.2.0.35	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, GRGT/CHINA and NIM/CHINA.

3.4.3 TEST PROCEDURE

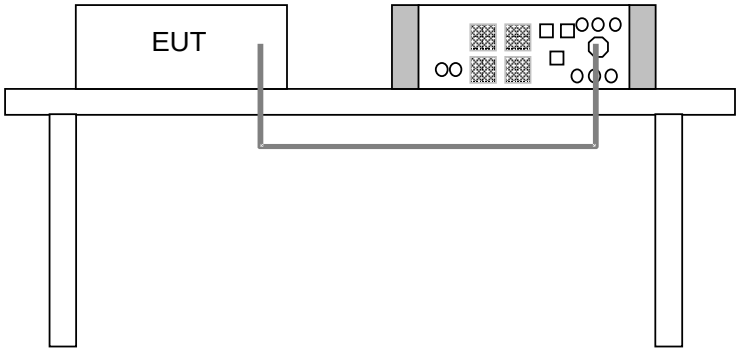
a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.

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.

3.4.4 DEVIATION FROM TEST STANDARD

No deviation

3.4.5 TEST SETUP



3.4.6 EUT OPERATING CONDITIONS

Same as item 3.4.6

3.4.7 TEST RESULTS

TEST MODE	Monitoring		
FUNDAMENTAL VOLTAGE	229.78Vrms	OBSERVATION PERIOD (Tp)	10 minutes
ENVIRONMENTAL CONDITIONS	24deg. C, 53%RH,	TESTED BY	Sook Su

TEST PARAMETER	MEASUREMENT VALUE	LIMIT	REMARKS
P_{st}	0.064	1.0	Pass
P_{lt}	/	0.65	/
$T_{d(t)}$ (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

4.1.1 GENERAL DESCRIPTION

Product Standard:	**EN 50130-4:2011**	
Basic Standard, specification requirement	EN 61000-4-2	Electrostatic Discharge – ESD: 6kV Contact discharge, 2kV, 4kV& 8kV air discharge,
	EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80-2700 MHz, 10V/m, 80% sinusoidal 1kHz, Pulse Modulation 1 Hz (0.5s ON: 0.5s OFF)
	EN 61000-4-4	Electrical Fast Transient/Burst - EFT AC mains supply lines: 2kV, Other supply/ signal lines: 1kV
	EN 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, AC mains supply Lines: line to line 0.5 kV, 1 kV, line to ground 0.5 kV, 1 kV, 2kV Other supply/ signal lines: line to ground0.5 kV, 1kV
	EN 61000-4-6	Conducted Radio Frequency Disturbances Test – CS: 0.15-100 MHz, 10Vrms, 80% sinusoidal, 1kHz, Pulse Modulation 1 Hz (0.5s ON: 0.5s OFF)
	EN 61000-4-11	Voltage Dips: v) 20% reduction 250 period Performance Criterion C vi) 30% reduction 25period Performance Criterion A vii) 60% reduction 10 period Performance Criterion A viii) 100% reduction 250 period
	EN 50130-4	Supply voltage max. (Umax)= Unom + 10% Supply voltage min. (Umin)=Unom – 15%

4.1.2 PERFORMANCE CRITERIA

STANDARD	CRITERIA FOR COMPLIANCE
EN 61000-4-2	There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the discharges is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for functional test, after the conditioning.
EN 61000-4-3	There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissable, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicators occurs at a field strength of 3 V/m. For components of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at 10 V/m, providing: a) there is no permanent damage or change to the EUT (e.g. no corruption of memory or changes to programmable settings etc.); b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used; and c) there is no observable deterioration of the picture at 1 V/m. For components with radio links, it is accepted that communications via the radio link may not be possible during the conditioning within the transmitter and receiver exclusion bands defined in the relevant part of ETSI EN 301 489 for that type of radio link equipment. If the EUT is designed to detect and indicate this loss of communication, then this indication is permitted, providing it is in accordance with the manufacturer's specification. It may be necessary to use appropriate filters to ensure that failures out of the exclusion bands are not due to harmonics generated by the test system. NOTE: If no part of ETSI EN 301 489 is applicable to the type of radio link equipment then the definition of the exclusion bands should be taken from ETSI EN 300 339. The EUT shall meet the acceptance criteria for the functional test , after the conditioning.
EN 61000-4-4	There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the bursts is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for functional test, after the conditioning.

STANDARD	CRITERIA FOR COMPLIANCE
EN 61000-4-5	There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the surges is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for functional test, after the conditioning.
EN 61000-4-6	There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissable, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change, and no such flickering of indicators occurs at U_0 = 130 dBμV. For components of CCTV systems, where the status is monitored by observing the TV picture, then deterioration of the picture is allowed at U_0 = 140 dBμV, providing: a) there is no permanent damage or change to the EUT (e.g. no corruption of memory or changes to programmable settings etc.); b) at U_0 = 130 dBμV, any deterioration of the picture is so minor that the system could still be used; and c) there is no observable deterioration of the picture at U_0 = 120 dBμV. For components with radio links, it is accepted that communications via the radio link may not be possible during the conditioning within the transmitter and receiver exclusion bands defined in the relevant part of ETSI EN 301 489 for that type of radio link equipment. If the EUT is designed to detect and indicate this loss of communication, then this indication is permitted, providing it is in accordance with the manufacturer's specification. It may be necessary to use appropriate filters to ensure that failures out of the exclusion bands are not due to harmonics generated by the test system. NOTE: If no part of ETSI EN 301 489 is applicable to the type of radio link equipment then the definition of the exclusion bands should be taken from ETSI EN 300 339. The EUT shall meet the acceptance criteria for the functional test after the conditioning.
EN 61000-4-11	There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change. The EUT shall meet the acceptance criteria for functional test, after the conditioning.

4.1.3 EUT OPERATING CONDITION

Same as item 3.1.6

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:	Contact Discharge : 6 kV (Direct &Indirect) Air Discharge: 2kV, 4kV & 8kV (Direct)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: 10/20 times at each test point Contact Discharge: 10 times on each test points /200 times in total
Discharge Mode:	Single Discharge
Discharge Period:	1 second

4.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
ESD Generator	TESEQ	NSG 437	279	Mar. 07,16	Mar. 06,17
Test Software	TESEQ	V03.03	N/A	N/A	N/A
ESD Generator	EM TEST	Dito	V1211112265	Mar. 17,16	Mar. 16,17
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.

4.2.3 TEST PROCEDURE

The discharges shall be applied in two ways:

a. 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.

b. Air discharges at slots and apertures and insulating surfaces:
On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

The basic test procedure was in accordance with EN 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 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.

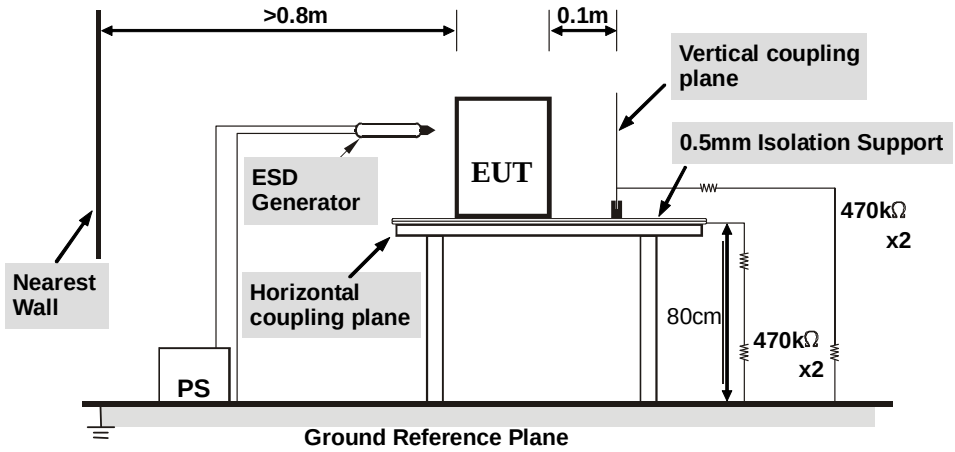
g. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned horizontal at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.

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.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



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 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 EN 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.

4.2.6 TEST RESULTS

TEST MODE	Monitoring	TEST VOLTAGE	DC 12V From Adapter Input AC 230V 50Hz
ENVIRONMENTAL CONDITIONS	23.5deg. C, 44.5% RH 101.5kPa	TESTED BY: Paul Liang	

Direct Discharge Application				
Test Level (kV)	Polarity	Test Point	Test Result of Contact Discharge	Test Result of Air Discharge
6	+/-	All metal part	Pass	N/A
2, 4, 8	+/-	All non-metal part	N/A	Pass

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

Result: Pass

1. The EUT working normal, before the conditioning.
2. Monitor the EUT during the conditioning period to detect no any change in status, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

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

4.3.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-3
Frequency Range:	80-2700MHz
Field Strength:	10 V/m
Modulation:	80%, AM Modulation, 1 Hz Pulse Modulation (0.5s ON: 0.5s OFF)
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Antenna Height:	1.5m
Dwell Time:	at least 3 seconds

4.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal Generator	Agilent	N5181A	MY50142530	Oct. 12,15	Oct. 11,16
Bilog Antenna	Teseq	CBL 6111D	27089	Jun. 25,15	Jun. 24,16
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. 09,15	Nov. 08,16
Power Sensor	ESE	51011EMC	35716	Nov. 09,15	Nov. 08,16
Power Sensor	ESE	51011EMC	35715	Nov. 09,15	Nov. 08,16
E-Field probe	Narda	NBM-520	2403/01B	May 28, 15	May 27, 17
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. 09,15	Nov. 08,16
Dual Directional Coupler	TESEQ	C6187	95175	Nov. 09,15	Nov. 08,16
Dual Directional Coupler	TESEQ	CPH-274F	M251304-01	Nov. 09,15	Nov. 08,16
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.

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 2700 MHz, with the signal 80% amplitude modulated with a 1kHz 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.

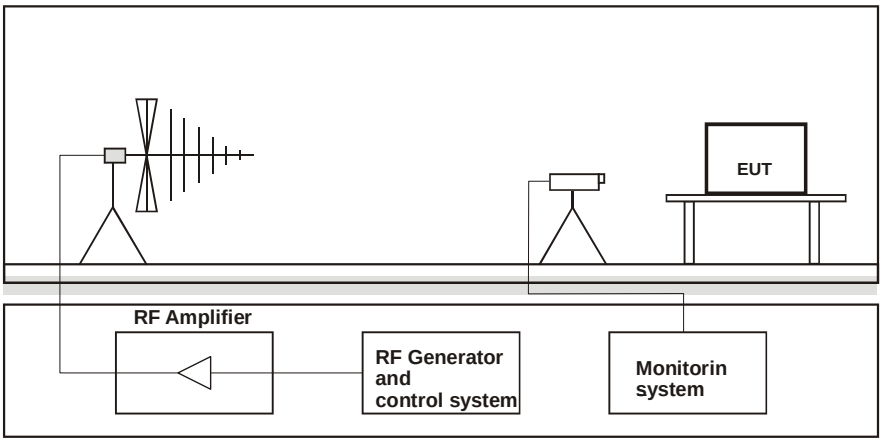
d. The field strength levels were 10V/m.

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



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.

FLOOR STANDING EQUIPMENT
The EUT installed in a representative system as described in section 7 of EN 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.

4.3.6 TEST RESULTS

TEST MODE	Monitoring	**TEST VOLTAGE**	DC 12V From Adapter Input AC 230V 50Hz
ENVIRONMENTAL CONDITIONS	19.2deg. C, 49.7% RH	**TESTED BY:** Kery He	

Field Strength (V/m)	Test Frequency Note#1 (MHz)	Polarization of antenna (Horizontal / Vertical)	Test Distance (m)	Test Result	Remark
10	80 – 2700	H&V	3	Pass	1

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

Result: Pass

Remark:

1. The EUT working normal, before the conditioning.
2. No degradation in the performance of the EUT was observed, after the conditioning.
3. There is no observable deterioration of the picture.

4.4 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST (EFT)

4.4.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-4
Test Voltage:	AC mains supply lines: 2kV Other supply / signal lines: 1kV
Polarity:	Positive & Negative
Impulse Frequency:	100 kHz
Impulse Waveshape :	5/50 ns
Burst Duration:	15 ms/75 ms
Burst Period:	300 ms
Test Duration:	1 min.

4.4.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EFT Tester	HAEFELY	PEFT4010	150546	May 11,15	May 10,17
EFT Coupling Clamp	HAEFELY	IP4A	150407	May 11,15	May 10,17
Test Software	HAEFELY	SWPE4010 1.22	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, GRGT/CHINA and NIM/CHINA.

4.4.3 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.

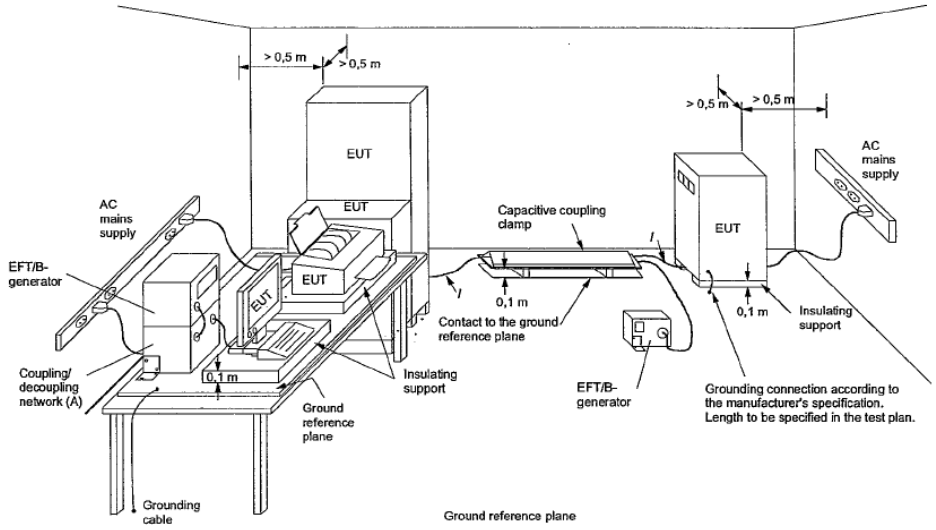
c The duration time of each test sequential was 1 minute.

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

4.4.4 DEVIATION FROM TEST STANDARD

No Deviation.

4.4.5 TEST SETUP



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

NOTE:
F/ length between clamp and the EUT to be tested (should be 0.5 ± 0.05m)
(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.

NOTE:
EUTs, whether stationary floor-mounted or table top, and equipment designed to be mounted in other configurations, shall be placed on a ground reference plane and shall be insulated from it by an insulating support 0.1 m ± 0.01 m thick. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

4.4.6 TEST RESULTS

TEST MODE	Monitoring	**TEST VOLTAGE**	DC 12V From Adapter Input AC 230V 50Hz
ENVIRONMENTAL CONDITIONS	19.4deg. C, 59.7% RH	**TESTED BY:** Sook Su	

Pulse Voltage	2.0 kV		___ kV		___ kV	
Pulse Polarity	+	—	+	—	+	—
L	Pass	Pass	/	/	/	/
N	Pass	Pass	/	/	/	/
L+N	Pass	Pass	/	/		

Result: Pass

1. The EUT working normal, before the conditioning.
2. Monitor the EUT during the conditioning period to detect no any change in status, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

4.5 SURGE IMMUNITY TEST

4.5.1 TEST SPECIFICATION

Basic Standard:	EN 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:	AC mains supply Lines: line to line 1 kV, line to ground 2kV Other supply/ signal lines: line to ground 1kV
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

4.5.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Combination wave Module	TESEQ AG	CDN 3061	1361	Jan. 08,16	Jan. 08,17
Telecom Surge Module	TESEQ AG	NSG 3060 Mainframe	1404	Jan. 08,16	Jan. 08,17
CDN	TESEQ	CDN HSS-2	34275	Nov. 13,15	Nov. 12,16
CDN	TESEQ	CDN 118	30741	Nov. 13,15	Nov. 12,16
Test Software	TESEQ	CDM 3061_0002.30	1361	N/A	N/A
Test Software	TESEQ	HVM 3060_0002.30	293	N/A	N/A
Surge Controller	HAEFELY	PSURGE8000	150366	Sep 11,15	Sep 10,16
Surge Impulse Module	HAEFELY	PIM100	150007	Sep 11,15	Sep 10,16
Surge Coupling Module	HAEFELY	PCD100	149870	Sep 11,15	Sep 10,16
Test Software	HAEFELY	SWPS8000	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, GRGT/CHINA and NIM/CHINA.

4.5.3 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).

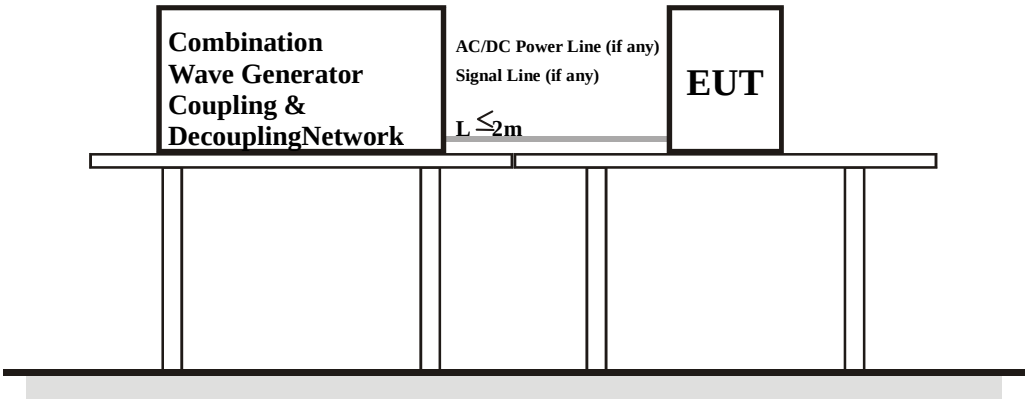
c. For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

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).

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 TEST SETUP



4.5.6 TEST RESULTS

TEST MODE	Monitoring	TEST VOLTAGE	DC 12V From Adapter Input AC 230V 50Hz
ENVIRONMENTAL CONDITIONS	19.4deg. C, 59.7% RH	TESTED BY: Sook Su	

Voltage (kV)	Test Point	Polarity	Test result	Voltage (kV)	Test Point	Polarity	Test result
1.0	L-N	+	Pass	/	/	+	/
		-	Pass			-	/

Signal ports and telecommunication ports:

Voltage (kV)	Test Point	Polarity	Test result	Voltage (kV)	Test Point	Polarity	Test result
/	/	+	/	/	/	+	/
		-	/			-	/

Result: Pass

1. The EUT working normal, before the conditioning.
2. Monitor the EUT during the conditioning period to detect no any change in status, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

4.6 IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS (CS)

4.6.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-6
Frequency Range:	0.15 MHz - 100 MHz
Field Strength:	10 $V_{r.m.s}$
Modulation:	1kHz, 80%, sinusoidal, 1 Hz Pulse Modulation (0.5s ON: 0.5s OFF)
Frequency Step:	1 % of fundamental
Coupled Cable:	Power Mains
Coupling Device:	CDN-M2(2 wires)

4.6.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal Generator	Rohde&Schwarz	SME06	829498/006	Oct. 12,15	Oct. 11,16
CDN	Luthi	L-801M2/M3	2015	Sep.09,15	Sep. 08,16
CDN(AUX)	TESEQ	CDN M016	27452	Nov. 13,15	Nov. 12,16
CDN	TESEQ	T200A	26944	Apr. 05,16	Apr. 04,17
CDN	TESEQ	T400A	26536	Apr. 05,16	Apr. 04,17
CDN	TESEQ	ST08A	32256	Apr. 05,16	Apr. 04,17
6dB 50Watt Attenuator	HUBER+SUHNER	5906.17.0005	303688	Oct. 12,15	Oct. 11,16
Signal Amplifier	HAEFELY	PAMP250	149594	NA	NA
Electromagnetic Injection Clamp	Luthi	EM101	35640	Sep.09,15	Sep. 08,16
C/S Test System	HAEFELY	WinPAMP	NSEMC002	N/A	N/A
Test Software	ADT	BVADT_CS_V7.5.1	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.

4.6.3 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 150 kHz to 100 MHz, 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.

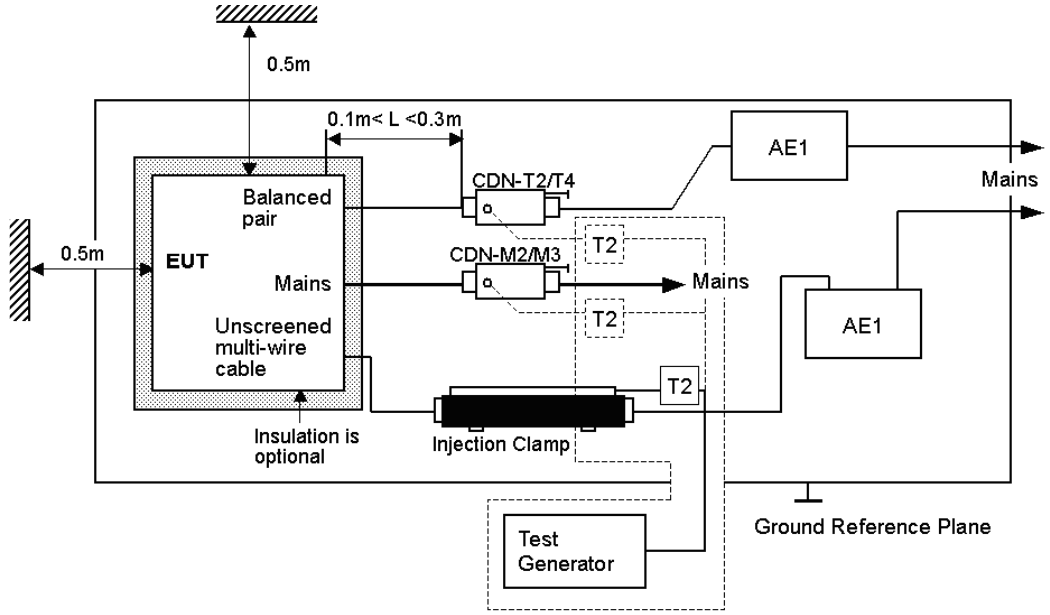
e. The dwell time of the amplitude modulated carrier at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0,5 s. The sensitive frequencies (e.g. clock frequencies) shall be analyzed separately.

f. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

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:

FLOOR-STANDING EQUIPMENT
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	Monitoring	TEST VOLTAGE	DC 12V From Adapter Input AC 230V 50Hz
ENVIRONMENTAL CONDITIONS	23.5deg. C, 44.5% RH	TESTED BY: Pual Liang	

Voltage (V)	Test Frequency Note#1 (MHz)	Tested Line	Injection Method.	Test Result	Remark
10	0.15 –100 MHz	AC Line	CDN-M2	Pass	1

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

Result: Pass

1. The EUT working normal, before the conditioning.
2. Monitor the EUT during the conditioning period to detect no any change in status, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

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

4.7.1 TEST SPECIFICATION

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

4.7.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
DIPS Tester	HAEFELY	PLINE 1610	150370	April 09,16	April 08,17
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, GRGT/CHINA and NIM/CHINA.

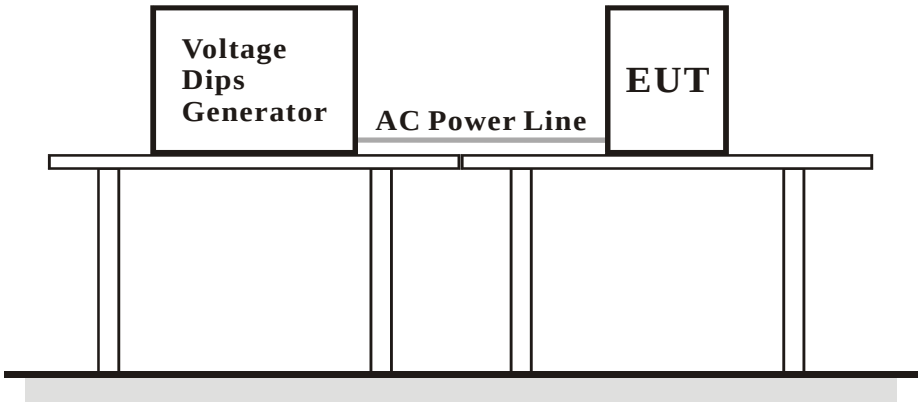
4.7.3 TEST PROCEDURE

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.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation.

4.7.5 TEST SETUP



4.7.6 TEST RESULTS

TEST MODE	Monitoring	TEST VOLTAGE	DC 12V From Adapter
ENVIRONMENTAL CONDITIONS	19.4deg. C, 59.7% RH	TESTED BY: Sook Su	

Ut :100 Vac 50 Hz	Durations		Event interval (sec)	Total events (time)	Test result
Voltage dips (%)	(period)	(ms)			
20	250	5000	10	3	Pass
30	25	500	10	3	Pass
60	10	200	10	3	Pass
100	250	5000	10	3	Pass
Ut : 230 Vac 50 Hz	Durations		Event interval (sec)	Total events (time)	Test result
Voltage dips (%)	(period)	(ms)			
20	250	5000	10	3	Pass
30	25	500	10	3	Pass
60	10	200	10	3	Pass
100	250	5000	10	3	Pass
Ut : 240 Vac 50 Hz	Durations		Event interval (sec)	Total events (time)	Test result
Voltage dips (%)	(period)	(ms)			
20	250	5000	10	3	Pass
30	25	500	10	3	Pass
60	10	200	10	3	Pass
100	250	5000	10	3	Pass

Remark: According to the client's requirement, we used a UPS as ancillary equipment to meet the requirements of this clause during test.
Ut=the nominal supply voltage

Result: Pass

1. The EUT working normal, before the conditioning.
2. Monitor the EUT during the conditioning period to detect no any change in status, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

4.8 VOLTAGE VARIATIONS IMMUNITY TEST

4.8.1 TEST SPECIFICATION

Basic Standard:	EN 50130-4:2011
Test Duration Time:	Minimum 5 minutes

4.8.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
DIPS Tester	HAEFELY	PLINE 1610	150370	April 09,16	April 08,17
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, GRGT/CHINA and NIM/CHINA.

4.8.3 TEST PROCEDURE

Connect the EUT to suitable power supply, monitoring and loading equipment. Subject the specimen to each of the power supply conditions, indicated in the following table until temperature stability is reached:

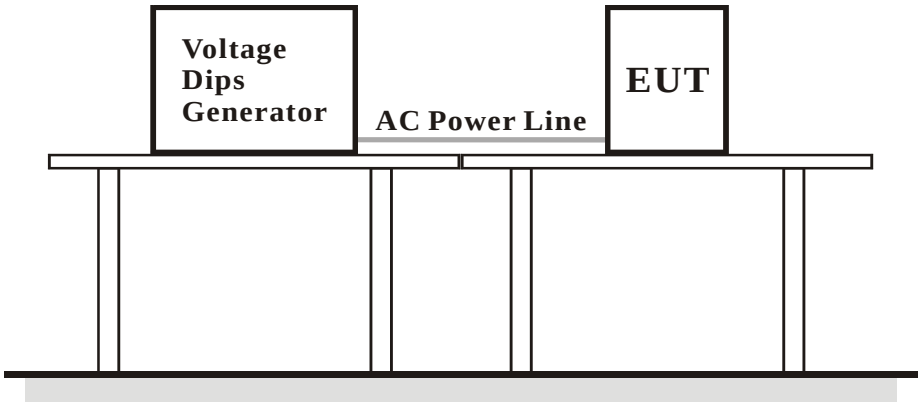
Supply voltage max. (U_{max})	U_{nom} [1)] +10%
Supply voltage min. (U_{min})	U_{nom} [1)] -15%
[1)] U_{nom} = Nominal mains votage. Where provision is made to adapt the equipment to suit a number of nominal supply voltages (e.g. by transformer tap changing), the above conditioning severity shall be applied for each nominal voltage, with the equipment suitably adapted. For equipment which is claimed to be suitable for a range of nominal mains voltages (e.g. 220/240V) without adaptation, U_{max} =(Maximum U_{nom}) + 10% and U_{min}= (Minimum U_{nom}) – 15%. In any case the range of U_{nom} must include the European nominal mains voltage of 230V.	

Monitor the EUT during the conditioning to detect any change in status. When temperature stability has been obtained, at each of the supply conditions, subject the EUT to the functional test.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation.

4.8.5 TEST SETUP



4.8.6 TEST RESULTS

TEST MODE	Monitoring	TEST VOLTAGE	DC 12V From Adapter Input AC 230V 50Hz
ENVIRONMENTAL CONDITIONS	19.4deg. C, 59.7% RH	**TESTED BY:** Sook Su	

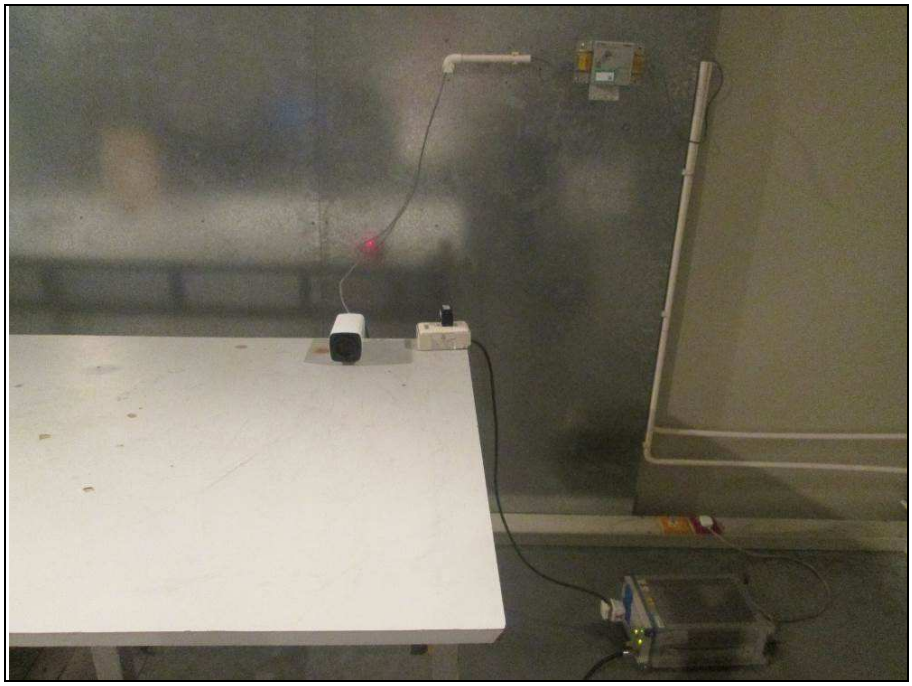
Voltage	Event Interval (sec)	Observation	Remark
264 (240+10%) Vac	60	NOTE	PASS
85 (100-15%) Vac	60	NOTE	PASS

Result: Pass

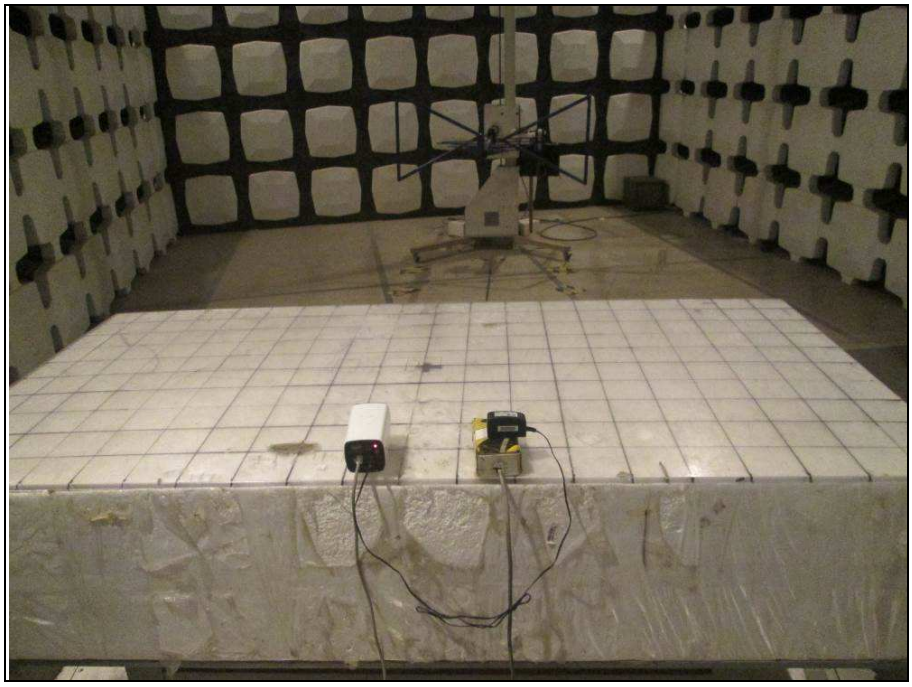
1. The EUT working normal, before the conditioning.
2. Monitor the EUT during the conditioning period to detect no any change in status, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

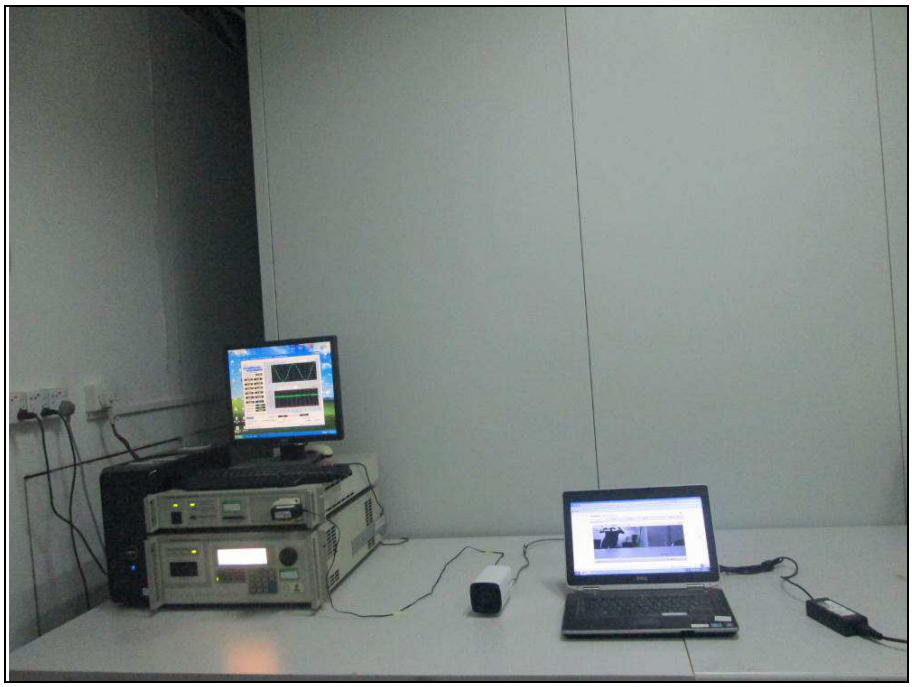
CONDUCTED EMISSION TEST



RADIATED EMISSION TEST (30MHz-1GHz)

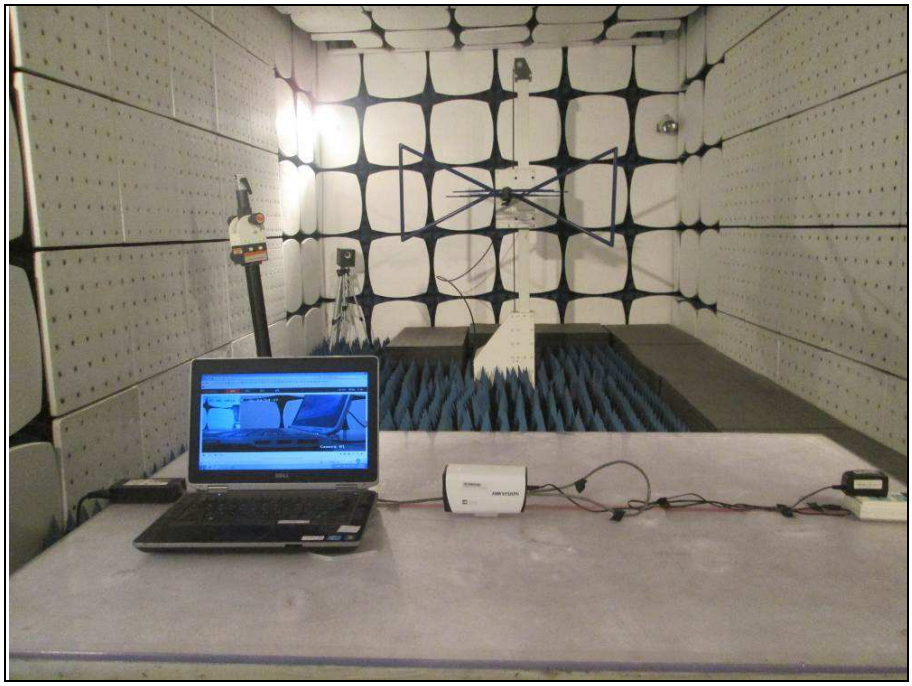


HARMONICS EMISSION TEST &
VOLTAGE FLUCTUATIONS AND FLICKER TEST

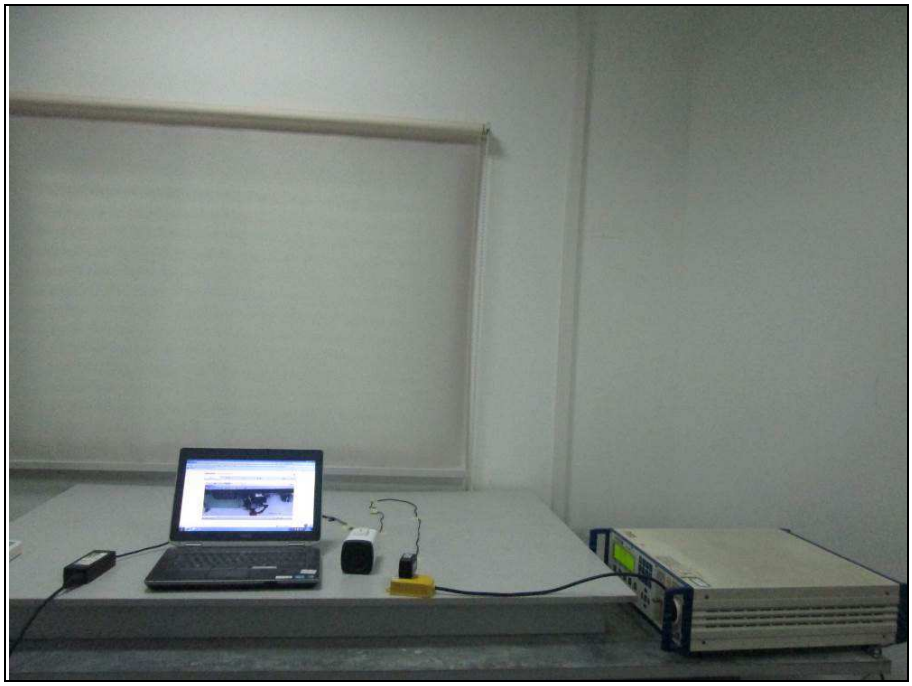


ESD TEST

RS TEST

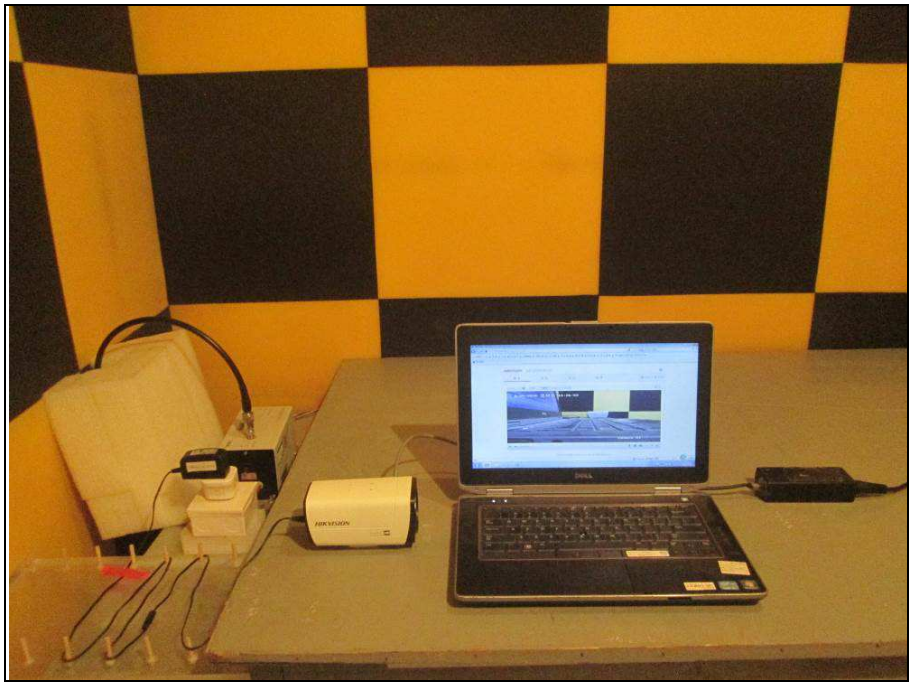


EFT TEST

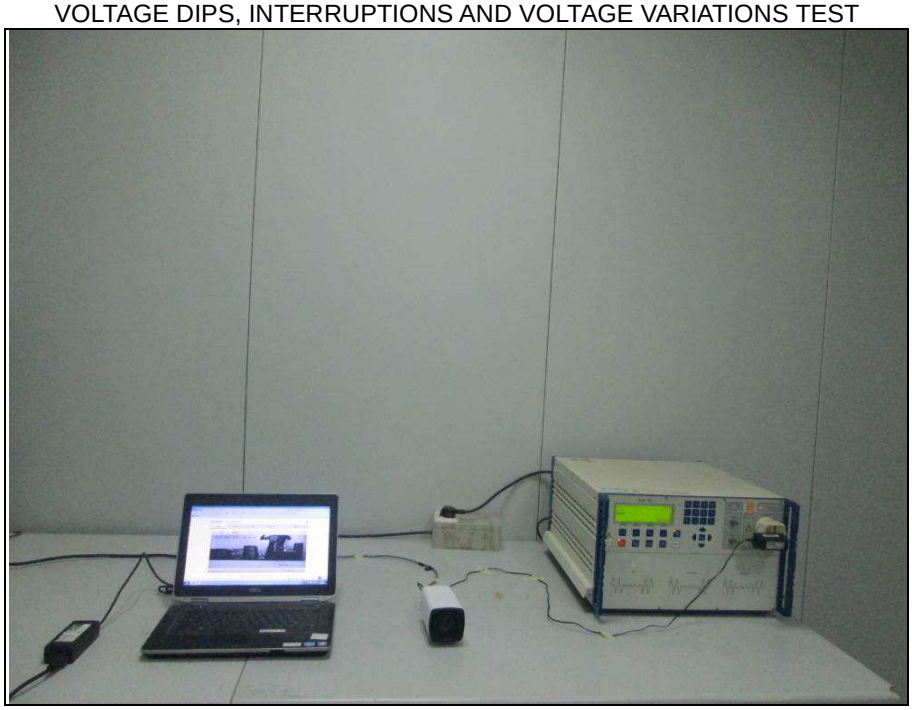


SURGE TEST

CONDUCTED SUSCEPTIBILITY TEST



VOLTAGE DIPS, INTERRUPTIONS AND VOLTAGE VARIATIONS 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---