EMC Test Report

Certificate No.	:	TB200425403
Applicant	:	XonTel Technology Trd. Co. W.L.L
Equipment Under Test (EUT)		
EUT Name	:	POE Switch
Model No.	:	XT-2400G
Series Model No.	:	XT-8000P
Brand Name	:	XonTel
Receipt Date	:	2020-04-17
Test Date	:	2020-04-18 to 2020-05-07
Issue Date	:	2020-05-08
Standards	:	EN 55032:2015 EN 61000-3-2:2014 EN 61000-3-3:2013 EN 55035:2017
Conclusions	:	**PASS** In the configuration tested, the EUT complied with the standards specified above. The EUT technically complies with the 2014/30/EU directive requirements.
Test/Witness Engineer	:	Rebeca
Engineer Supervisor		Ivan Su
Engineer Manager	:	Kay Lai

Rebeca

Ivan Su

Kay Lai

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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Revision History

Report No.	Version	Description	Issued Date
TB-EMC172573	Rev.01	Initial issue of report	2020-05-08

1. General Information

1.1. Client Information

Applicant	:	XonTel Technology Trd. Co. W.L.L
Address	:	Aladel Tower, F21, Fahad Al Salem St., State of KUWAIT
Manufacturer	:	XonTel Technology Trd. Co. W.L.L
Address	:	Aladel Tower, F21, Fahad Al Salem St., State of KUWAIT

1.2. General Description of EUT (Equipment Under Test)

EUT Name	:	POE Switch
Model(s)	:	XT-2400G, XT-8000P
Model Difference	:	All above models are identical in schematic, structure and critical components except for different model number.
Brand Name	:	XonTel
Class of EUT	:	☒ Class A ☐ Class B
EUT Type	:	☒ Table top ☐ Floor standing ☐ combination
F_X	:	500MHz-1000MHz
Power Supply	:	Input: 100-240Vac, 50/60Hz
F_X: Highest internal frequency.		

1.3. Description of Operating Mode

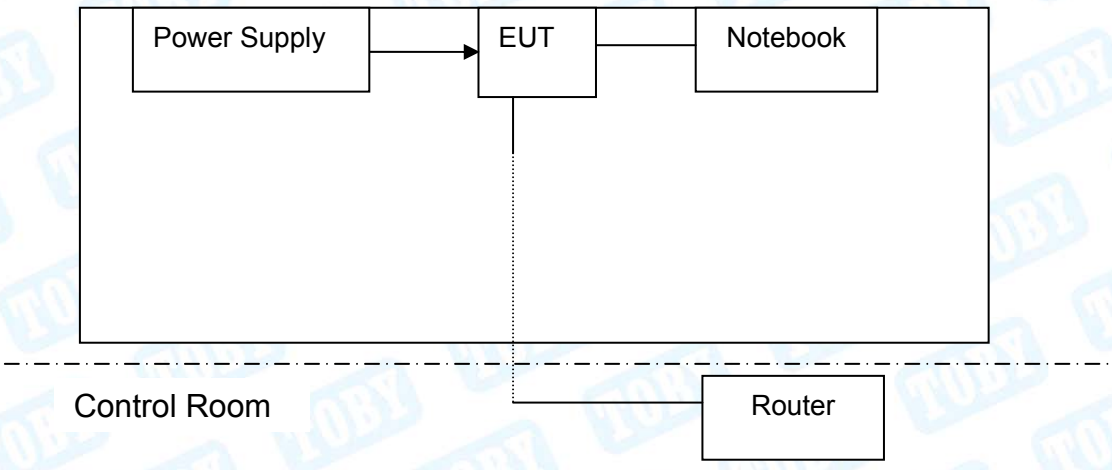
To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Full system Working Mode

The EUT system operated these modes were found to be the worst case during the pre-scanning test as Following:

For EMI Test	
Final Test Mode	**Description**
Mode 1	Full system Working Mode
For EMS Test	
Final Test Mode	**Description**
Mode 1	Full system Working Mode
For ISN Test	
Final Test Mode	**Description**
Mode 2	LAN Port 10Mbps
Mode 3	LAN Port 100Mbps
Mode 4	LAN Port 1000Mbps

1.4. Block Diagram Showing The Configuration of System Tested



1.5. Description of Support Units

Equipment Information				
Name	Model	S/N	Manufacturer	Used "√"
Notebook	T430	-----	Thinkpad	√
Notebook	T450s	-----	Thinkpad	√
Router	TL-WR886N	1183653048162	TP-LINK	√
Note: The notebook and Router provided by the laboratory				

1.6. General Performance Criterion

General

General performance criteria are defined in 8.2, 8.3 and 8.4. These criteria shall be used during the testing of primary functions where no relevant annex is applicable.

When assessing the impact of a disturbance on a function, the assessment should take into consideration the function's performance prior to the application of the disturbance and only identify as failures those changes in performance that are a result of the disturbance.

Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion B

During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.

After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.

Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

1.7. Measurement Uncertainty

The reported uncertainty of measurement y ± U，where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2，providing a level of confidence of approximately 95 %.

Test	Parameters	Expanded Uncertainty (U_{Lab})	Expanded Uncertainty (U_{Cispr})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	±3.50 dB ±3.10 dB	±4.0 dB ±3.6 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	±4.60 dB	N/A
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	±4.50 dB	±5.2 dB
Radiated Emission	Level Accuracy: Above 1000MHz	±4.20 dB	N/A
Mains Harmonic	Voltage	±3.11%	N/A
Voltage Fluctuations & Flicker	Voltage	±3.25%	N/A

1.8. Test Facility

The testing was performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at:1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China.
At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)
The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01
The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025：2005 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01.FCC Accredited Test Site Number: 854351.

IC Registration No.: (11950A)
The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A.

2. TEST Results Summary

EMISSION (☒EN 55032:2015)			
Description of test items	**Standards**	**Class**	**Results**
Conducted disturbance at mains terminals	EN 55032: 2015	☒ Class A ☐ Class B	Pass(1)
Conducted disturbance for asymmetric mode	EN 55032: 2015	☒ Class A ☐ Class B	Pass(2)
Conducted differential voltage emission	EN 55032: 2015	Class B	N/A(2)
Radiated Disturbance	EN 55032: 2015	☒ Class A ☐ Class B	Pass
Harmonic current emissions	EN 61000-3-2: 2014	☒ Class A ☐ Class D	Pass(4)
Voltage fluctuation and flicker	EN 61000-3-3: 2013		Pass

Note:
(1) Class A/Class B: Applicable to AC mains power ports
(2) Class A: Applicable to wired network ports, optical fibre ports with metallic shield or tension members and antenna ports.
Class B: Applicable to wired network ports, optical fibre ports with metallic shield or tension members, broadcast receiver tuner ports and antenna ports.
Applicable to ports listed above and intended to connect to cables longer than 3 m.
(3) Class B: Applicable to TV broadcast receiver tuner ports with an accessible connector, RF modulator output ports and FM broadcast receiver tuner ports with an accessible connector.
(4) 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 D: Equipment having a specified power less than or equal to 600W of the following types: Personal computers and personal computer monitors and television receivers.

IMMUNITY (☒EN 55035:2017)		
Description of test items	**Standards**	**Results**
Electrostatic Discharge (ESD)	EN 61000-4-2: 2009	Pass
Continuous RF Electromagnetic Field Disturbances	EN 61000-4-3: 2006+A2:2008+ A2: 2010	Pass
EFT/B Immunity	EN 61000-4-4: 2012	Pass
Surge Immunity	EN 61000-4-5: 2014	Pass
Continuous RF Disturbances	EN 61000-4-6: 2014	Pass
Power frequency magnetic field	EN 61000-4-8: 2010	N/A(1)
Voltage dips, >95% reduction	EN 61000-4-11: 2004	Pass
Voltage dips, 30% reduction		
Voltage interruptions		
Broadband impulse noise disturbances, repetitive	EN 61000-4-6: 2014	N/A(2)
Broadband impulse noise disturbances, isolated		

Note: N/A is an abbreviation for Not Applicable.

(1) Not applicable, Applicable only to equipment containing devices intrinsically susceptible to magnetic fields, the EUT is not containing devices susceptible to magnetic fields.

(2) Not applicable, Applicable only to CPE xDSL ports.

3. Test Equipment Used

Conducted Emission Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 13, 2019	Jul. 12, 2020
RF Switching Unit	Compliance Direction Systems Inc.	RSU-A4	34403	Jul. 13, 2019	Jul. 12, 2020
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 13, 2019	Jul. 12, 2020
LISN	Rohde & Schwarz	ENV216	101131	Jul. 13, 2019	Jul. 12, 2020
ISN	SCHWARZBECK	NTFM 8131	8131-193	Jul. 13, 2019	Jul. 12, 2020
ISN	SCHWARZBECK	CAT3 8158	cat3 5158-0094	Jul. 13, 2019	Jul. 12, 2020
ISN	SCHWARZBECK	NTFM5158	NTFM5158 0145	Jul. 13, 2019	Jul. 12, 2020
ISN	SCHWARZBECK	CAT 8158	cat5 8158-179	Jul. 13, 2019	Jul. 12, 2020
Radiation Emission Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 13, 2019	Jul. 12, 2020
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Jul. 13, 2019	Jul. 12, 2020
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 01, 2020	Feb.28, 2021
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 01, 2020	Feb.28, 2021
Pre-amplifier	HP	11909A	185903	Mar. 01, 2020	Feb.28, 2021
Pre-amplifier	HP	8449B	3008A00849	Mar. 01, 2020	Feb.28, 2021
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 01, 2020	Feb.28, 2021
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Mar. 01, 2020	Feb.28, 2021
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Harmonic Current and Voltage Fluctuation and Flicker Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
Harmonic Flicker Test System	CI	5001ix-CTS-400	100321	Jul. 12, 2019	Jul. 11, 2020
5K VA	CI	500liX	59468	Jul. 12, 2019	Jul. 11, 2020
Discharge Immunity Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
ESD Tester	TESEQ	NSG437	304	Jul. 13, 2019	Jul. 12, 2020

Radiated Immunity Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
Signal Generator	Rohde & Schwarz	SMT03	200754	Mar. 01, 2020	Feb.28, 2021
Power Meter	Rohde & Schwarz	NRVD	110562	Jan. 10, 2020	Jan. 09, 2021
Voltage Probe	Rohde & Schwarz	URV5-Z2	12056	Jan. 10, 2020	Jan. 09, 2021
Voltage Probe	Rohde & Schwarz	URV5-Z2	12074	Jan. 10, 2020	Jan. 09, 2021
RF Amplifier	AR	50S1G4A	326720	Jan. 10, 2020	Jan. 09, 2021
Bilog Antenna	ETS	3142C	00047662	Jan. 10, 2020	Jan. 09, 2021
Horn Antenna	ARA	DRG-118A	16554	Jan. 10, 2020	Jan. 09, 2021
Electrical Fast Transient/ Surge/ Voltage Dip and Interruption Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
Simulator	EMTEST	UCS500N5	V0948105575	Jul. 13, 2019	Jul. 12, 2020
Auto-transformer	EMTEST	V4780S2	0109-41	Jul. 13, 2019	Jul. 12, 2020
Coupling Clamp	EMTEST	HFK	1109-04	Jul. 13, 2019	Jul. 12, 2020
Conducted Immunity Test					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Cal. Due Date**
RF Generator	FRANKONIA	CIT-10/75	126B1126	Jul. 13, 2019	Jul. 12, 2020
Attenuator	FRANKONIA	59-6-33	A413	Jul. 13, 2019	Jul. 12, 2020
M-CDN	LUTHI	L-801 M2/M3	2599	Jul. 13, 2019	Jul. 12, 2020
AF2-CDN	LUTHI	L-801:AF2	2538	Mar. 01, 2020	Feb.28, 2021
EM Injection Clamp	LUTHI	EM101	35958	Jul. 13, 2019	Jul. 12, 2020

4. Conducted Emission Test

4.1. Test Standard and Limit

4.1.1. Test Standard

EN 55032: 2015

4.1.2. Test Limit

Conducted Disturbance Test Limit (Class A)

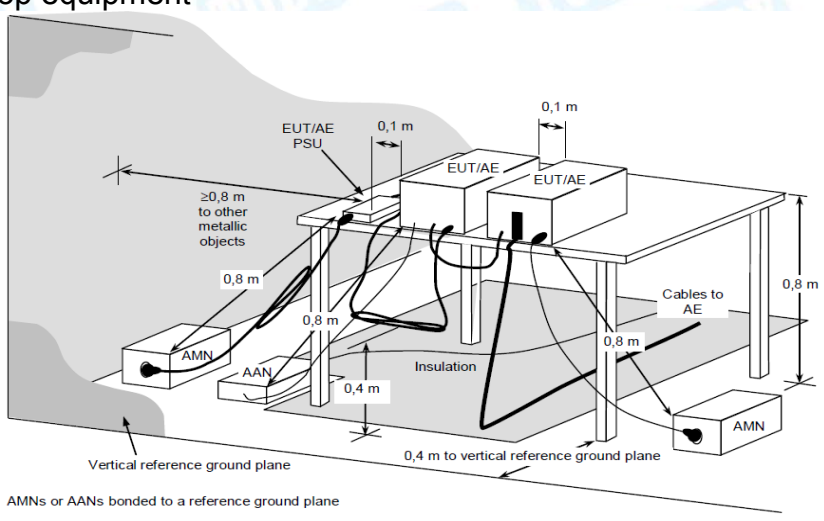
Frequency (MHz)	Maximum RF Line Voltage (dBμV)	
	Quasi-peak Level	Average Level
0.15~0.50	79	66
0.50~30	73	60
NOTE The lower limit shall apply at the transition frequency.		

Conducted Disturbance Test Limit (Class B)

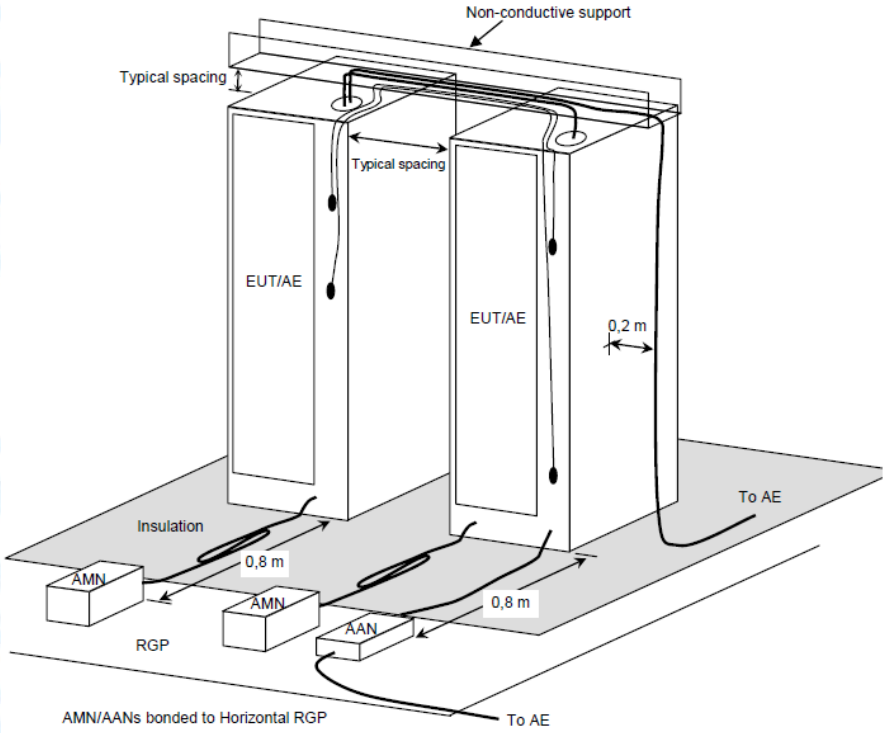
Frequency (MHz)	Maximum RF Line Voltage (dBμV)	
	Quasi-peak Level	Average Level
0.15~0.5	66 ~ 56 *	56 ~ 46 *
0.50~5	56	46
5~30	60	50
NOTE 1 The lower limit shall apply at the transition frequencies. NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

4.2. Test Setup

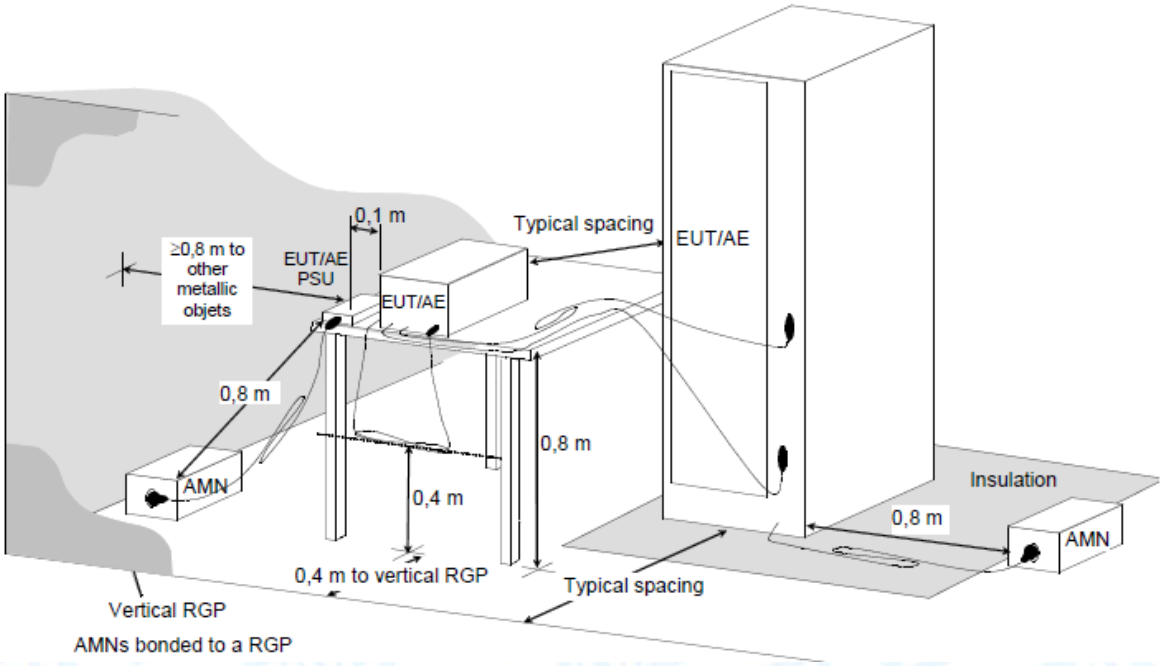
☒ For table top equipment



☐ For floor standing equipment



☐ For combination equipment



4.3. Test Procedure

Detailed test procedure was following clause 7 of CISPR 16-2-1.

All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis.
The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

4.4. Deviation From Test Standard

No deviation

4.5. Test Data

Please refer to the Attachment A.

5 Conducted Emissions for Asymmetric Mode

5.1 Test Standard and Limit

5.1.1. Test Standard

EN 55032: 2015

5.1.2. Limits

Limits for class A equipment

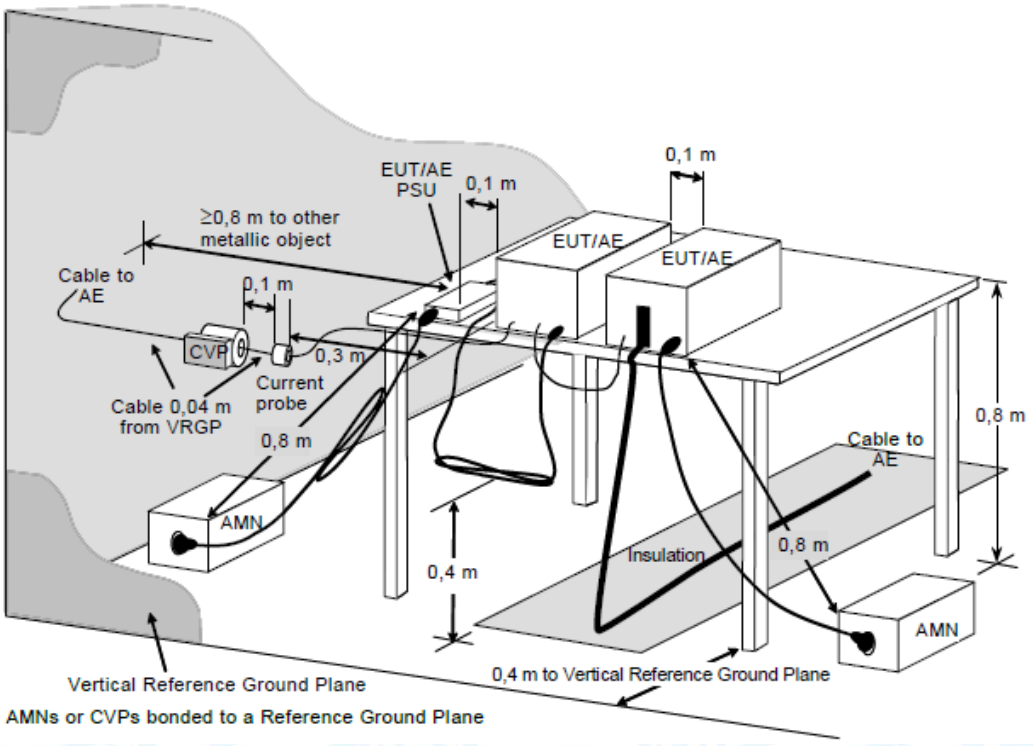
Frequency range (MHz)	Voltage Limits dB(μV)		Current limits dB(μA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	97 ~ 87	84 ~ 74	53 ~ 43	40 ~ 30
0.5 ~ 30	87	74	43	30
Note: if "150Ω to 50Ω adaptor" applied, correction factor of 9.5dB should be added to the test data.				

Limits for class B equipment

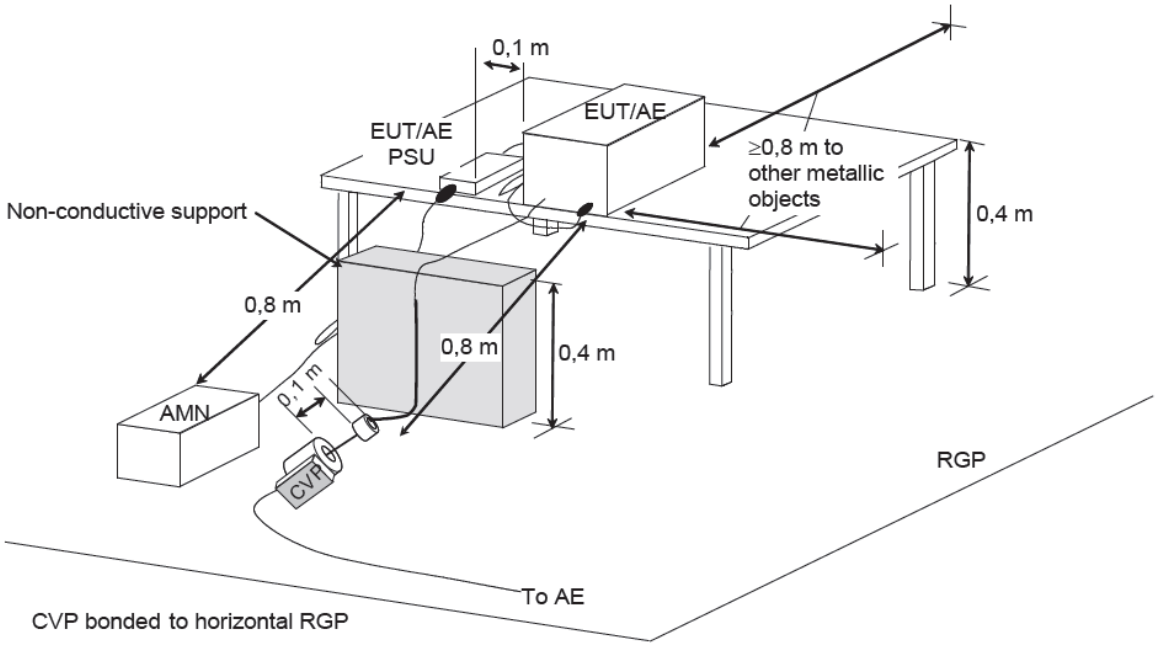
Frequency range (MHz)	Voltage Limits dB(μV)		Current limits dB(μA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	84 ~ 74	74 ~ 64	40 ~ 30	30 ~ 20
0.5 ~ 30	74	64	30	20
Note: if "150Ω to 50Ω adaptor" applied, correction factor of 9.5dB should be added to the test data.				

5.2 Test setup

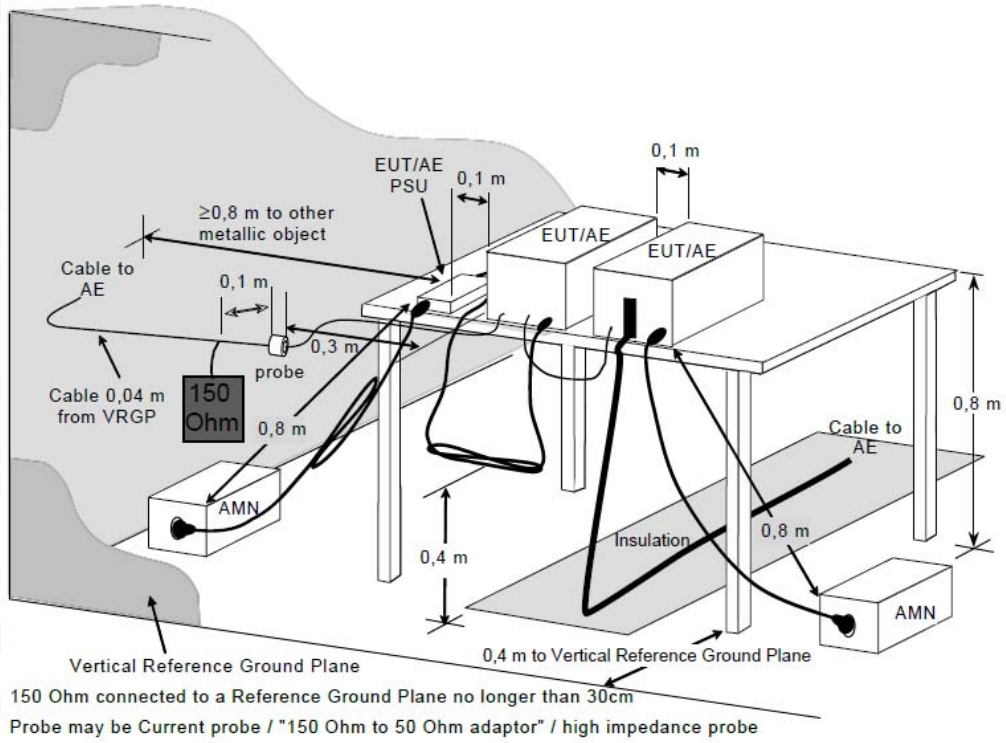
☒ Coupling device: CVP and Current probe (alternative method 1)



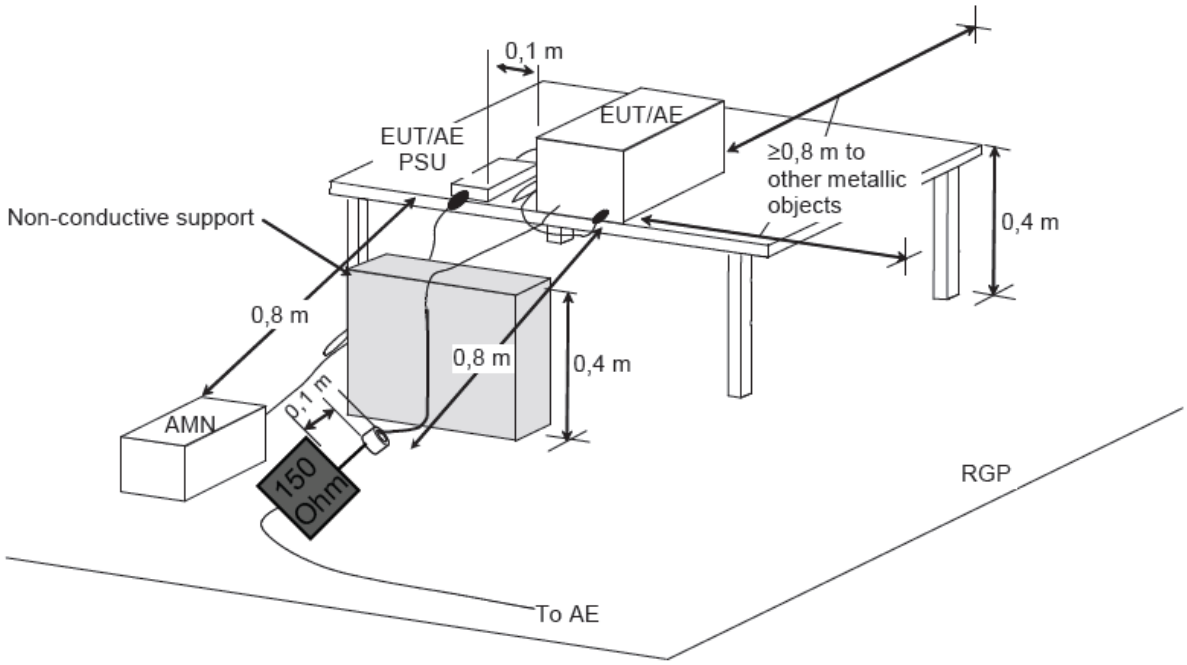
☐ Coupling device: CVP and Current probe (alternative method 2)



☐ Coupling device: Current probe / "150Ω to 50Ω adaptor" / high impedance probe (alternative method 1)



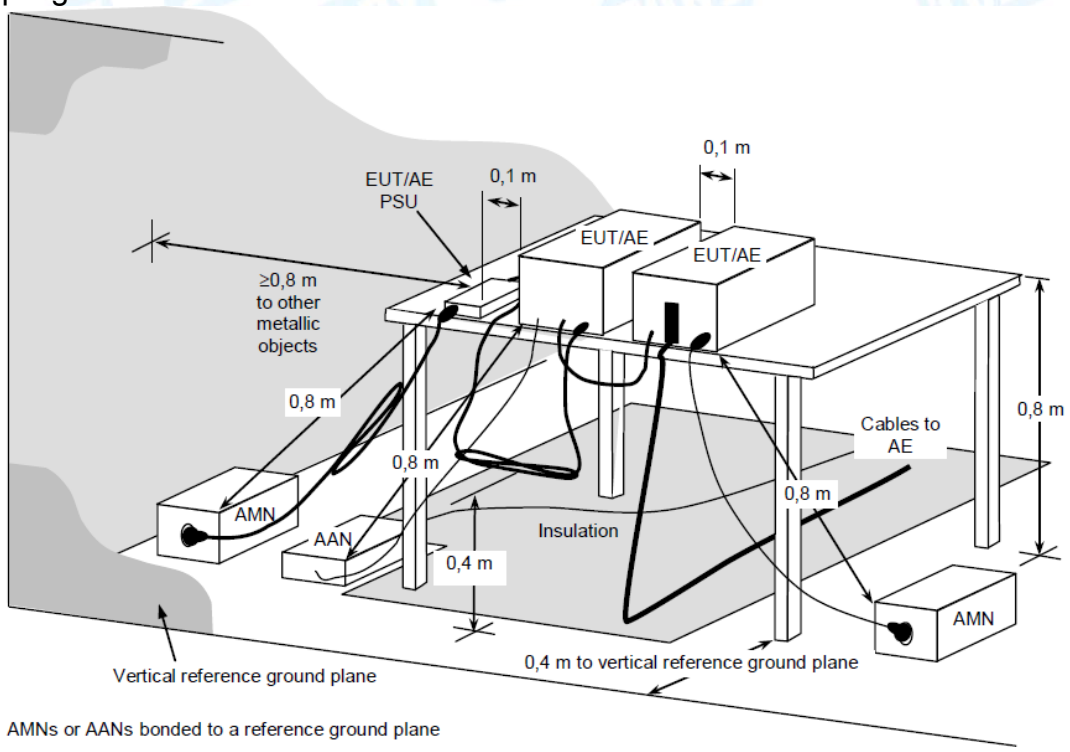
☐ Coupling device: Current probe / “150Ω to 50Ω adaptor” / high impedance probe (alternative method 2)



150 Ohm connected to a Reference Ground Plane no longer than 30cm

Probe may be Current probe / "150 Ohm to 50 Ohm adaptor" / high impedance probe

☐ Coupling device: AAN



AMNs or AANs bonded to a reference ground plane

5.3 Test Setup and Test Procedure

Detailed test procedure was following clause C.4.1 of EN 55032.
Frequency range 150kHz – 30MHz was checked and EMI receiver measurement bandwidth was set to 9 kHz.

Data Port	Measurement type	Coupling device	No. of Pairs
Balanced Unscreened	Voltage	AAN	≤ 4
Balanced Unscreened	Voltage and Current	CVP & Current probe	>4 or unable to AAN
Screened or Coaxial	Voltage	AAN	N/A
Screened or Coaxial	Voltage or Current	Current probe / "150Ω to 50Ω adaptor" / high impedance probe	N/A
Unbalanced cables	Voltage and Current	CVP & Current probe	N/A

5.4 Deviation From Test Standard

No deviation

5.5 Test Data

Please refer to the Attachment B.

6 Conducted Differential Voltage Emissions

6.1 Test Standard and Limit

6.1.1. Test Standard

EN 55032: 2015

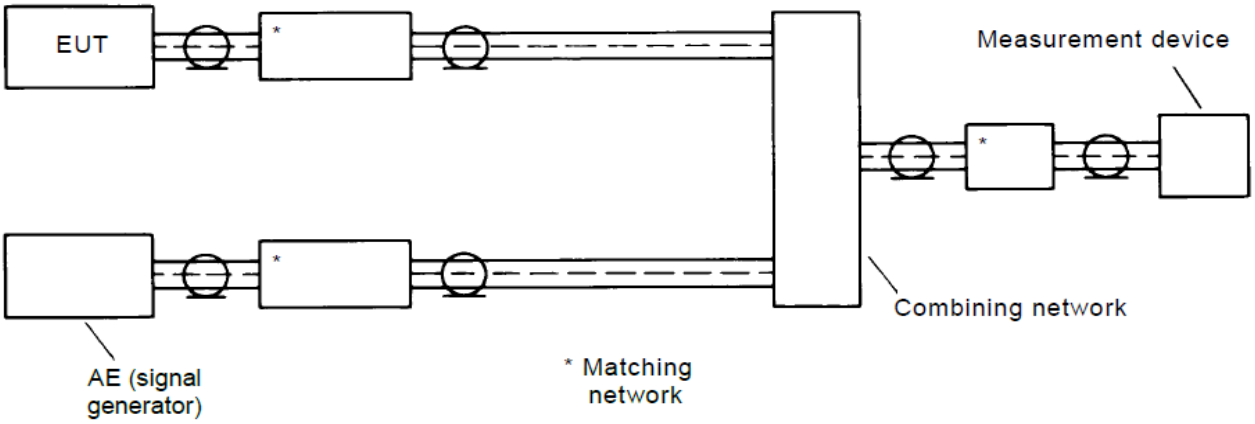
6.1.2. Limits

Requirements for Conducted differential voltage emissions from Class B equipment

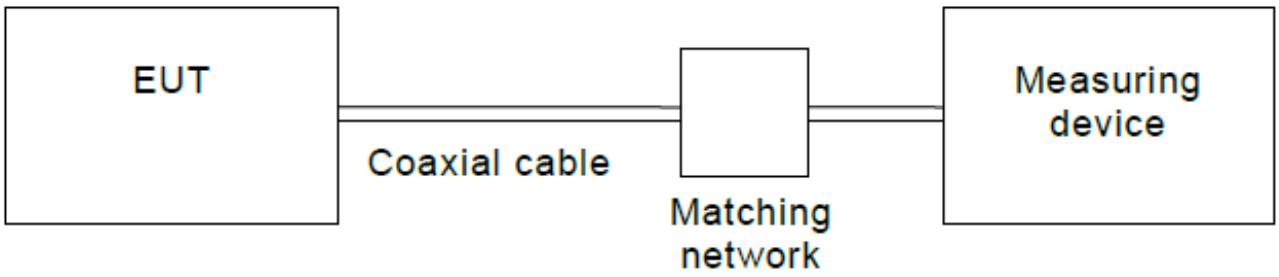
Applicability	Frequency range (MHz)	Differential voltage limit @ 75Ω (dBuV)		
		Other	Local Oscillator Fundamental	Local Oscillator Harmonics
Television receivers; Digital Video Recorders; PC TV broadcast receiver tuner cards; Digital audio receivers;	30 ~ 950	46	46	46
	950 ~ 2 150	46	54	54
Tuner units (not the LNB) for satellite signal reception	950 ~ 2 150	46	54	54
FM audio receivers and PC tuner cards	30 ~ 300	46	54	50
	300 ~ 1 000	46	54	52
FM car radios	30 ~ 300	46	66	59
	300 ~ 1 000	46	66	52
RF modulator output ports connect to TV broadcast receiver tuner ports	30 ~ 950	46	76	46
	950 ~ 2150	46	/	54

6.2 Test setup

☐TV/FM broadcast receiver tuner ports



☐RF modulator output port



6.3 Test Setup and Test Procedure

Detailed test procedure was following clause C4.2 and C4.3 of EN55032. Frequency range 30MHz – 2150MHz was checked and EMI receiver measurement bandwidth was set to 120kHz /1MHz.

6.4 Test Data

This test is not applicable.

☐ TV tuner ports

After the preliminary scan, we found the following test mode (ATV 55.25MHz) producing the highest emission level.

Frequency MHz	Emission Level dBμV	Limits dBμV/75Ω	Margin dB	Remark
Remark: All readings are Quasi-Peak values.				

7 Radiated Emission Test

7.1 Test Standard and Limit

7.1.1 Test Standard

EN 55032: 2015

7.1.2 Test Limit

Bellow 1GHz

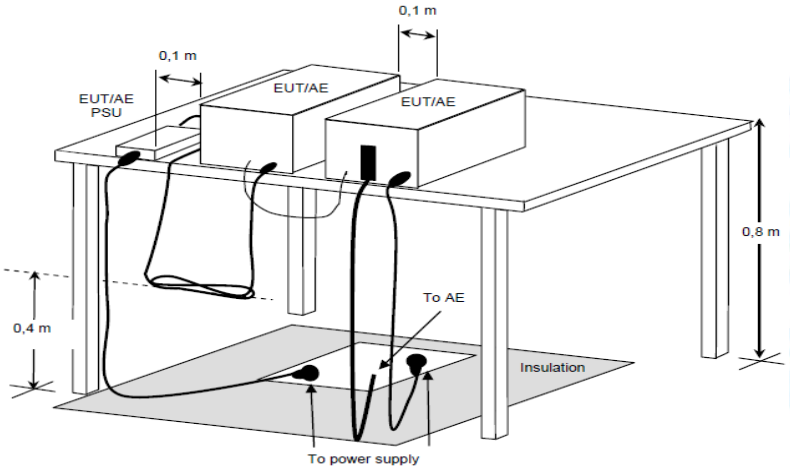
Frequency	Limit (dBμV/m) (3m)	
	Quasi-peak Level	
	Class A	Class B
30MHz~230MHz	50	40
230MHz~1000MHz	57	47
Remark: 1. The lower limit shall apply at the transition frequency. 2. The test distance is 3m.		

Above 1GHz

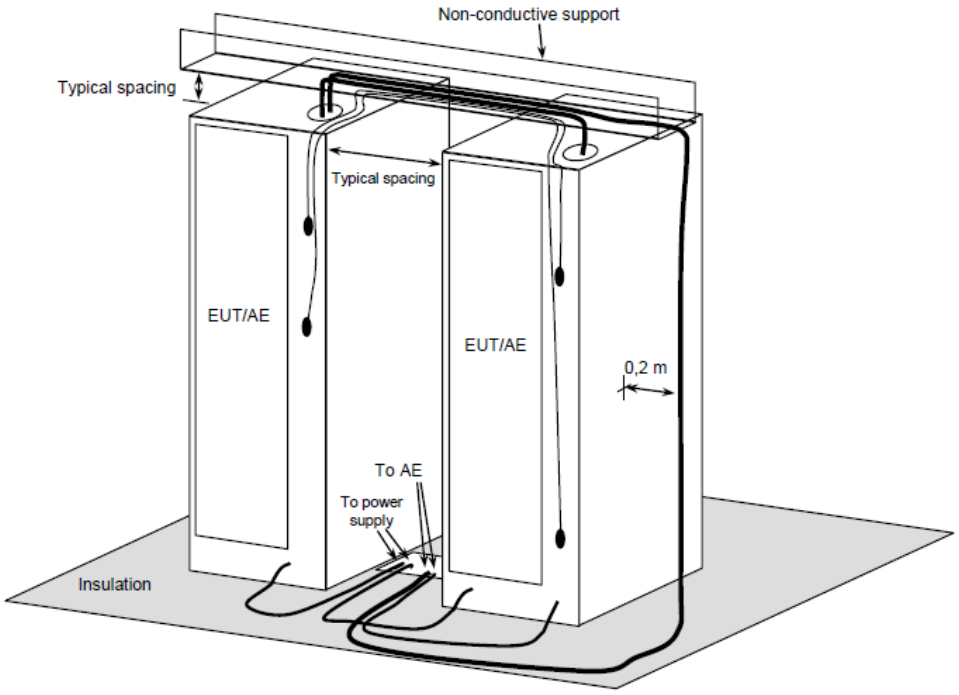
Frequency (GHz)	Limit (dBμV/m) (3m)			
	Class A		Class B	
	Peak	Average	Peak	Average
1~3	76	56	70	50
3~6	80	60	74	54
Remark: 1. The lower limit shall apply at the transition frequency. 2. The test distance is 3m.				

7.2 Test Setup

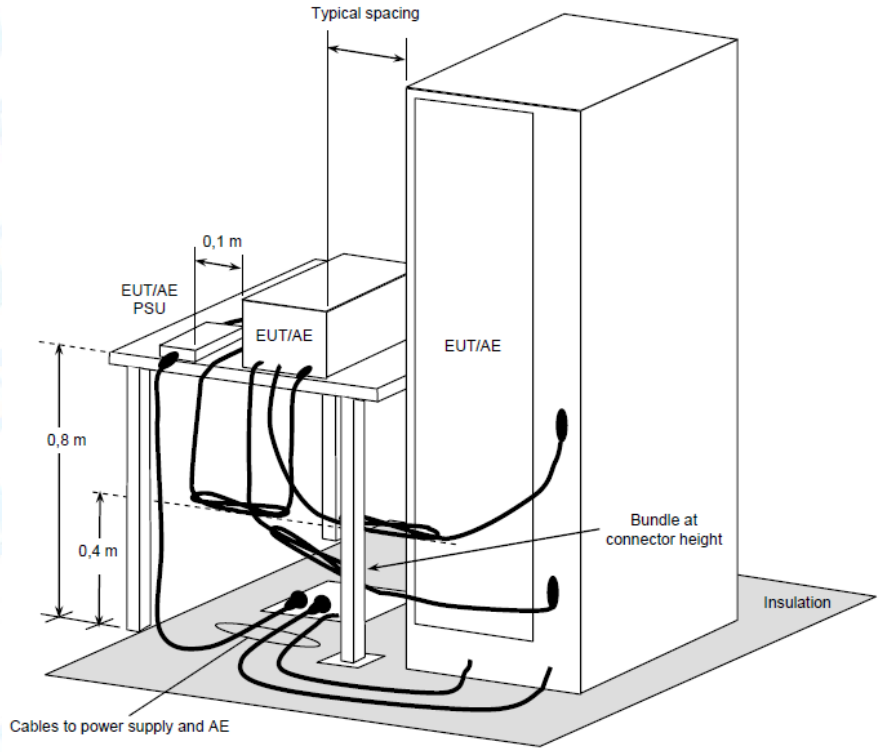
☒ For table top equipment



☐ For floor standing equipment



☐ For combination equipment



7.3 Test Procedure

Measurement was performed according to clause 7.3 of CISPR 16-2-3.

The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m. The table was rotated 360 degrees to determine the position of the highest radiation. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

The initial step in collecting radiated emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range.

If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.

Highest internal frequency (Fx)	Highest measured frequency for radiated measurement	Measured Bandwidth
Fx ≤ 108 MHz	1 GHz	120kHz
108 MHz < Fx ≤ 500 MHz	2 GHz	1MHz
500 MHz < Fx ≤ 1 GHz	5 GHz	1MHz
Fx > 1 GHz	5*Fx up to a maximum of 6 GHz	1MHz
NOTE 1: For FM and TV broadcast receivers, Fx is determined from the highest frequency generated orused excluding the local oscillator and tuned frequencies. **NOTE 2:** For outdoor units of home satell Equipment receiving systems highest measured frequency shall be 18GHz.		

7.4 Deviation From Test Standard

No deviation

7.5 Test Data

Please refer to the Attachment C.

8 Harmonic Current Emission Test

8.1 Test Standard and Limit

8.1.1. Test Standard

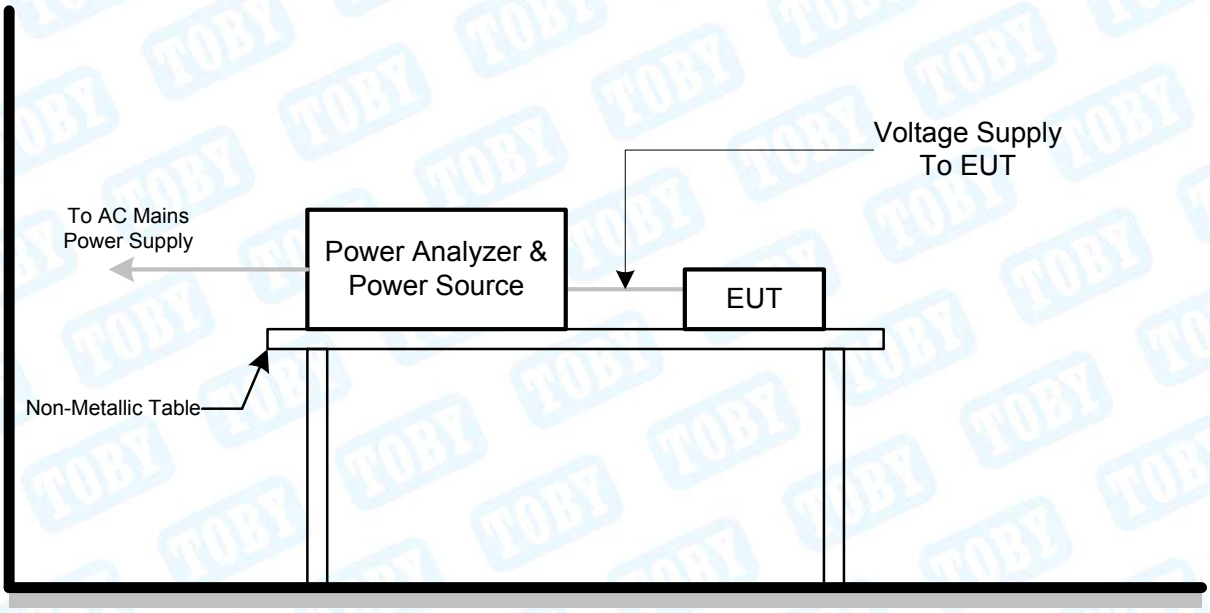
EN 61000-3-2:2014

8.1.2 Limits

Harmonic Current Test Limit

Limits for Class A equipment				Limits for Class D equipment		
Odd Harmonics		Even Harmonics				
Harmonic Order (n)	Maximum permissible harmonic Current (A)	Harmonic Order (n)	Maximum permissible harmonic Current (A)	Harmonic Order (n)	Maximum Permissible Harmonic Current per watt (mA/W)	Maximum Permissible Harmonic Current (A)
3	2.30	2	1.08	3	3.4	2.30
5	1.14	4	0.43	5	1.9	1.14
7	0.77	6	0.30	7	1.0	0.77
9	0.40	8≤n≤40	0.23X8/n	9	0.5	0.40
11	0.33			11	0.35	0.33
13	0.21			15≤n≤39 (odd harmonics only)	3.85/n	0.15X15/n
15≤n≤39	0.15X15/n					

8.2 Test Setup



8.3 Test Procedure

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.

The classification of EUT is according to section 5 of EN 61000-3-2: 2006.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 to600 W of the following types: Personal computers and personal computer monitors and television receivers.

8.4 Deviation From Test Standard

No deviation

8.5 Test Data

Please refer to the Attachment D.

9 Voltage Fluctuation and Flicker Test

9.1 Test Standard and Limit

9.1.1. Test Standard

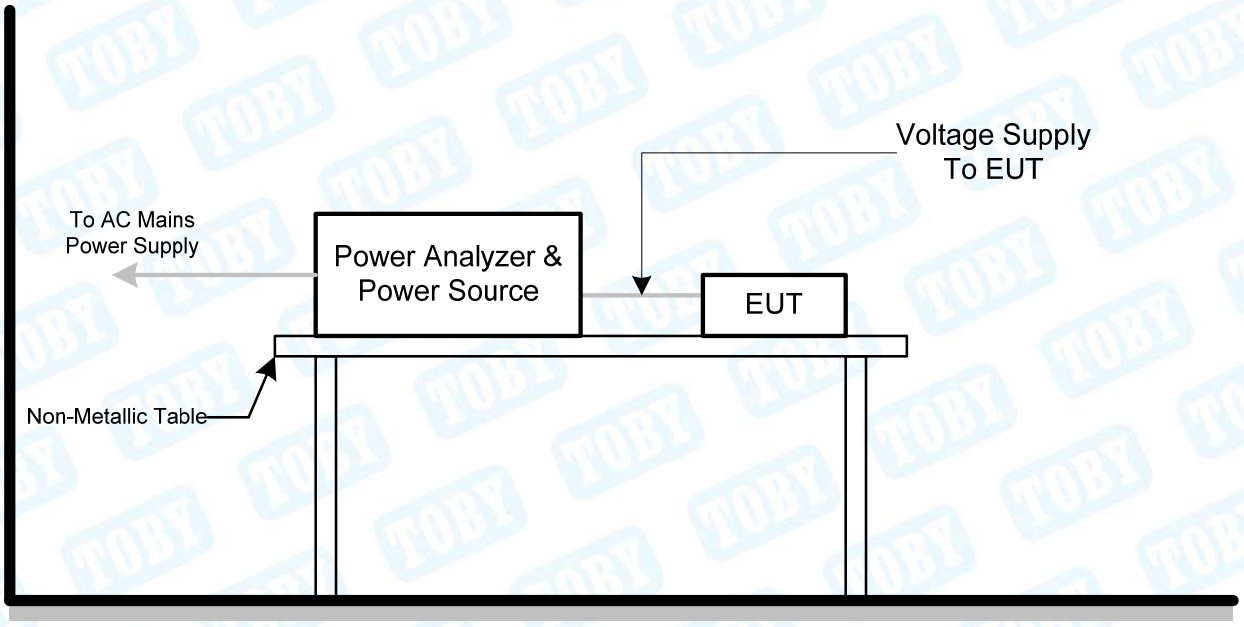
EN 61000-3-3:2013

9.1.2. Limit

Voltage Fluctuation and Flicker Test Limit

Test Items	Limits
Pst	1.0
dc	3.3%
dmax	4.0%
dt	Not exceed 3.3% for 500ms

9.2 Test Setup



9.3 Test Procedure

9.3.1 Harmonic Current Test

Test was performed according to the procedures specified in Clause 5.0 of IEC555-2 and/or Sub-clause 6.2 of IEC/EN 61000-3-2 depend on which standard adopted for compliance measurement.

9.3.2 Fluctuation and Flickers Test:

Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in Clause 5.0/6.0 of IEC555-3 and/or Clause 6.0/4.0 of IEC/EN 61000-3-3 depend on which standard adopted for compliance measurement.

All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

For the actual test configuration, please refer to the related Item –Block Diagram of system tested (please refer to 1.3).

9.4 Deviation From Test Standard

No deviation

9.5 Test Data

Please refer to the Attachment E.

10 Electrostatic Discharge Immunity Test

10.1 Test Requirements

10.1.1. Test Standard

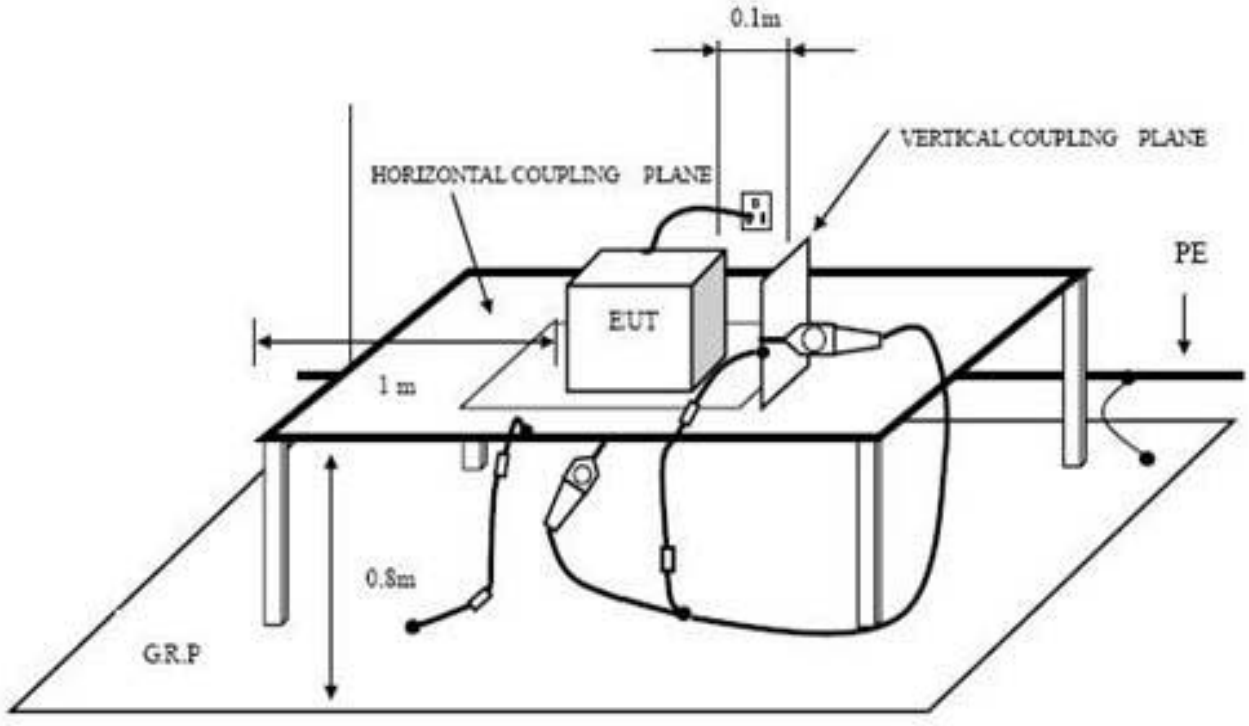
EN 55035:2017 (EN 61000-4-2)

10.1.2. Test Level

Discharge Impedance:	330 ohm/ 150pF
Discharge Voltage:	Air Discharge：2kV/4kV/8kV(Direct) Contact Discharge: 2kV/4kV (Direct /Indirect)
Polarity:	Positive& Negative
Number of Discharge:	Air Discharge: min.20 times at each test point Contact Discharge: min.200 times in total
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

10.1.2 Performance criterion: **B**

10.2 Test Setup



INDIRECT DISCHARGE SETUP

10.3 Test Procedure

10.3.1 Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

10.3.2 Contact Discharge:

All the procedure shall be same as air discharge. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

10.3.3 Indirect discharge for horizontal coupling plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

10.3.4 Indirect discharge for vertical coupling plane

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

10.4 Deviation From Test Standard

No deviation

10.5 Test Data

Please refer to the Attachment F.

11 Radiated Electromagnetic Field Immunity Test

11.1 Test Requirements

11.1.1. Test Standard

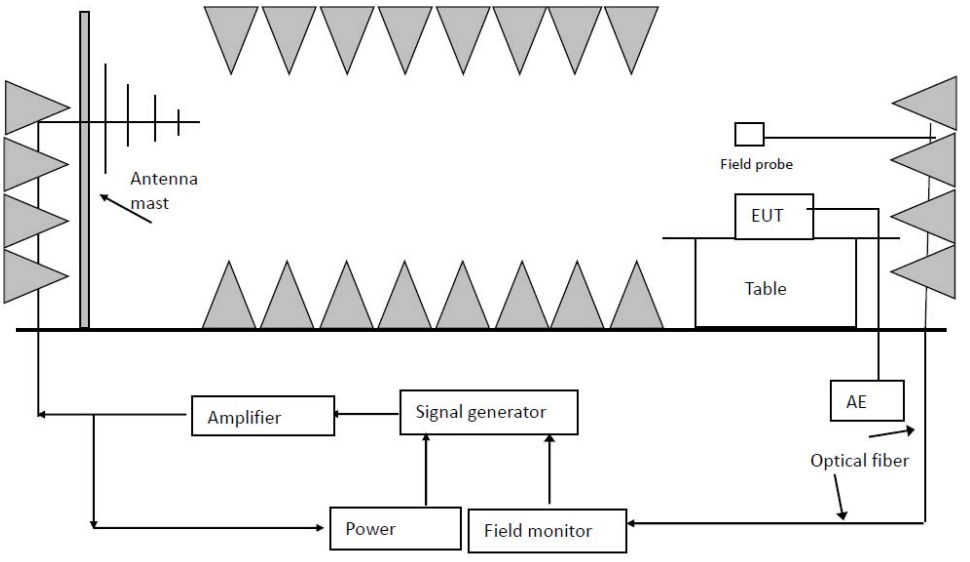
EN 55035:2017 (EN 61000-4-3)

11.1.2. Test Level

Level	Field Strength V/m
1	1
2	3
3	10
X	Special

Performance criterion: **A**

11.2 Test Setup



11.3 Test Procedure

The EUT are placed on a table, which is 0.8 meter high above the ground. The EUT is set 3 meters away from the transmitting antenna, which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna is set on test. Each of the four sides of the EUT must be faced this transmitting antenna and measured individually.

In order to judge the EUT performance, a camera is used to monitor its screen.

All the scanning conditions are as following:

Condition of Test	**Remark**
Fielded strength	3V/m (Severity Level 2)
Radiated signal	Modulated
Scanning frequency	80-1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz
Sweep time of radiated	0.0015 Decade/s
Dwell time	1 Sec.

11.4 Deviation From Test Standard

No deviation

11.5 Test Data

Please refer to the Attachment G.

12 Electrical Fast Transient/Burst Test

12.1 Test Requirements

12.1.1.Test Standard

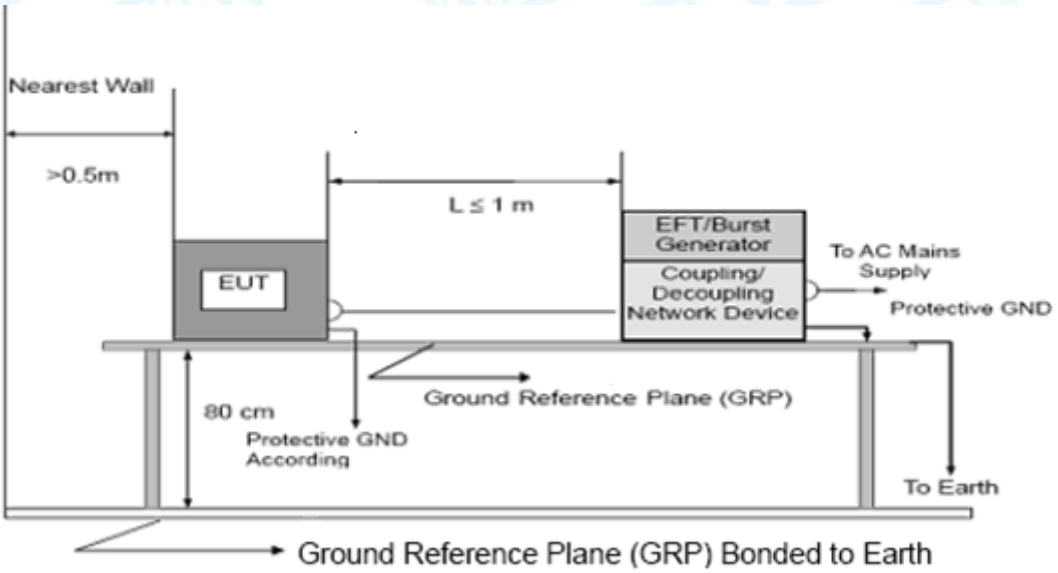
EN 55035:2017 (EN 61000-4-4)

12.1.2.Level

	AC mains power ports	Analogue/Digital Data Ports	DC Network Power Ports
Test Voltage:	1 KV	0.5 KV	0.5KV
Polarity:	Positive&Negative		
Impulse Wave Shape:	5/50ns		
Repetition Frequency:	5KHz		
Burst Duration:	15ms		
Burst Period:	300ms		
Test Duration:	Not less than 1 min		
Note: For CPE xDSL ports repetition frequency is 100 kHz.			

12.1.3.Performance criterion: B

12.2 Test Setup



12.3 Test Procedure

12.3.1 For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 1minute.

12.3.2 For signal lines and control lines ports:

A coupling clamp is use to couple the EFT interference signal to the signal and control lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 1 minute.

12.3.3 For DC input and DC output power ports:

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 1 minute.

12.4 Deviation From Test Standard

No deviation

12.5 Test Data

Please refer to the Attachment H.

13 Surge Immunity Test

13.1 Test Requirements

13.1.1.Test Standard

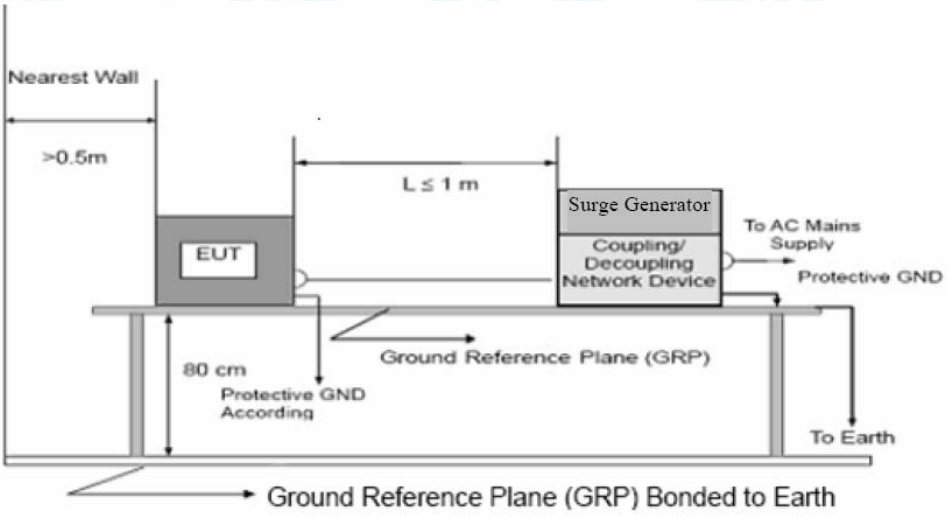
EN 55035:2017 (EN 61000-4-5)

13.1.2.Level

Basic Standard:	**EN 61000-4-5**
Test Requirement:	Analogue/digital data ports: 0.5KV **(see a)**
	DC network power ports: 0.5KV
	AC mains power ports: 1KV(Line-Line), 2KV(Line-earth)
Tr/Th	1.2/50us, 10/700us
Generator Source:	2 ohm between networks
Impedance:	12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	0/90/180/270
Pulse Repetition Rate:	1 time/min.(maximum)
Number of Tests:	5 positive and 5 negative at selected points
a: Port type: coaxial or shielded. Apply: shield to ground.	

13.1.3.Performance criterion: **B**

13.2 Test Setup



13.3 Test Procedure

Set up the EUT and test generator as shown on Section 11.1.2.

At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.

Different phase angles are done individually.

Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

13.4 Deviation From Test Standard

No deviation

13.5 Test Data

Please refer to the Attachment I.

14 Conducted Immunity Test

14.1 Test Requirements

14.1.1.Test Standard

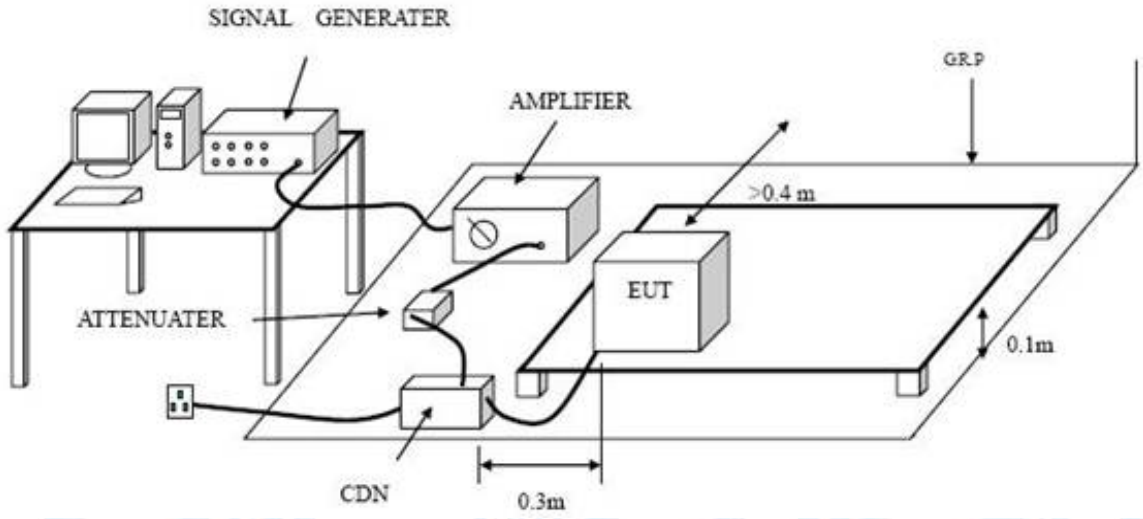
EN 55035:2017 (EN 61000-4-6)

14.1.2.Level

Port	Test Specification
Input AC power port/ Signal Port/ Input DC Port	0.**15MHz~10MHz** **3V(r.m.s.) (unmodul**ated)
	10**MHz~30MHz** **3V to 1V(r.m.s.) (unmodul**ated)
	30**MHz~80MHz** **1V(r.m.s.) (unmodul**ated)
Test Signal	80% AM modulated sine wave, 1KHz

14.1.3.Performance criterion: **A**

14.2 Test Setup



14.3 Test Procedure

Set up the EUT, CDN and test generators.

Let the EUT work in test mode and test it.

The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).

The disturbance signal description below is injected to EUT through CDN.

The EUT operates within its operational mode(s) under intended climatic conditions after power on.

The frequency range is swept from 0.150MHz to 10MHz using 3V signal level; 10MHz to 30MHz using 3V to 1V signal level; 30MHz to 80MHz using 1V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.

The rate of sweep shall not exceed 1.5*10-3decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

14.4 Deviation From Test Standard

No deviation

14.5 Test Data

Please refer to the Attachment J.

15 Voltage Dips and Interruptions Immunity Test

15.1 Test Requirements

15.1.1.Test Standard

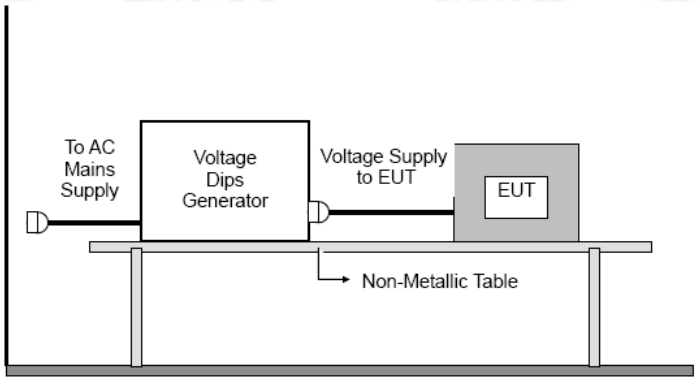
EN 55035:2017 (EN 61000-4-11)

15.1.2.Level

Basic Standard:	**EN 61000-4-11**
Required Performance:	B(For 100%, 0.5 cycle Voltage Dips) C(For 70%, 25 cycle Voltage Dips) C(For 100%, 250 cycle Voltage Interruptions)
Test Duration Time:	Minimum three test events in sequence
Interval Between Event:	Minimum ten seconds
Phase Angle:	0°/45°/90°/135°/180°/225°/270°/315°/360°
Test Cycle:	3 times

15.1.3.Performance criterion: **B&C**

15.2 Test Setup



15.3 Test Procedure

Set up the EUT and test generator as shown above. The EUT is tested for each selected combination of test level and duration with a sequence of three dips/interruptions with intervals of 10s minimum.

15.4 Deviation From Test Standard

No deviation

15.5 Test Data

Please refer to the Attachment K.

16 Photographs - Constructional Details

Photo 1 Appearance of EUT

Photo 2 Appearance of EUT

Photo 3 Appearance of EUT

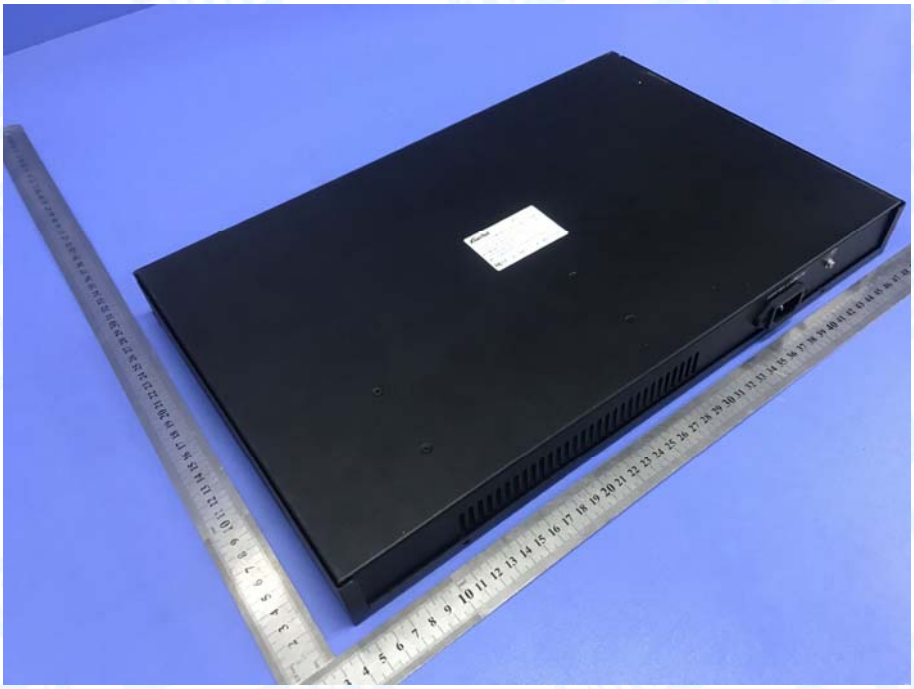


Photo 4 Internal of EUT

Photo 5 Appearance of PCB

Photo 6 Appearance of PCB

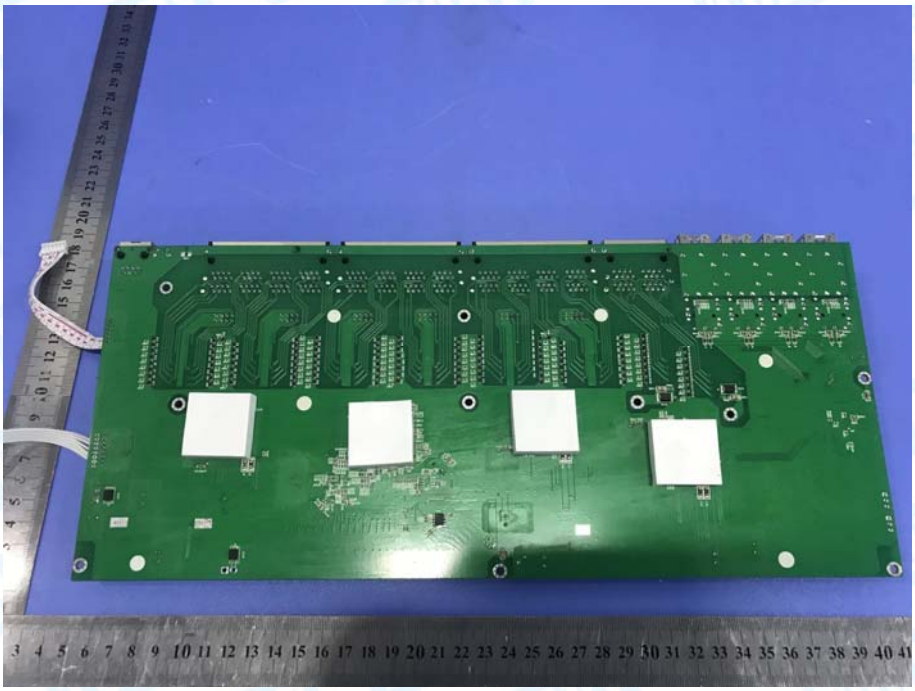


Photo 7 Appearance of PCB

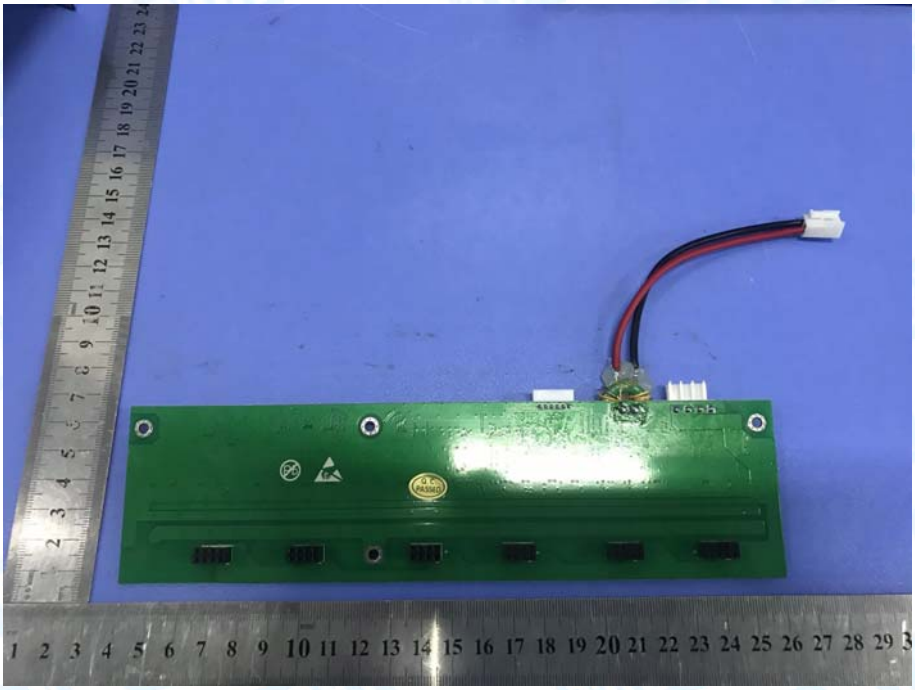


Photo 8 Appearance of PCB

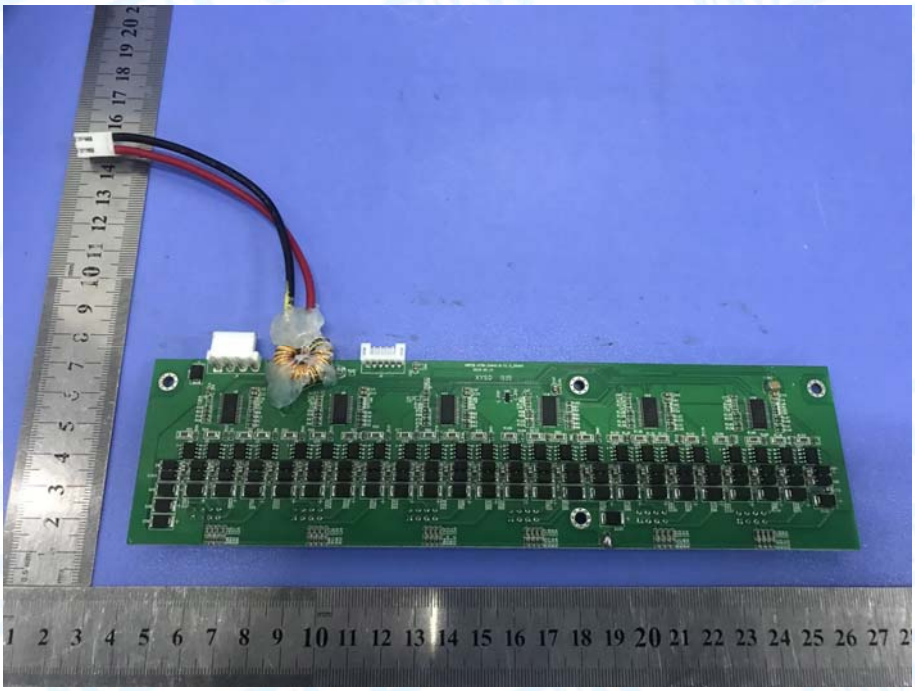
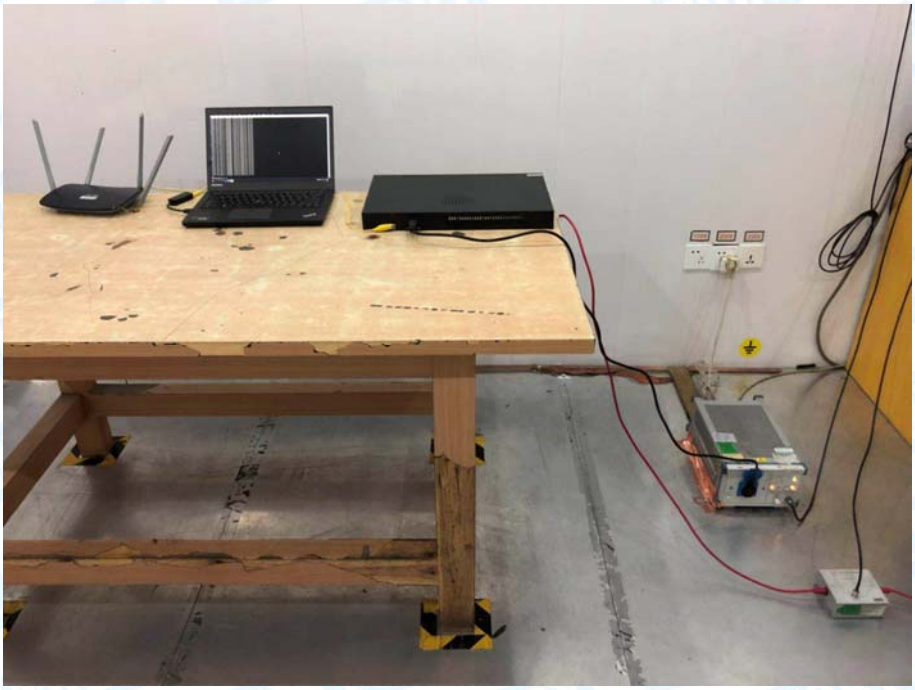


Photo 9 Appearance of PCB

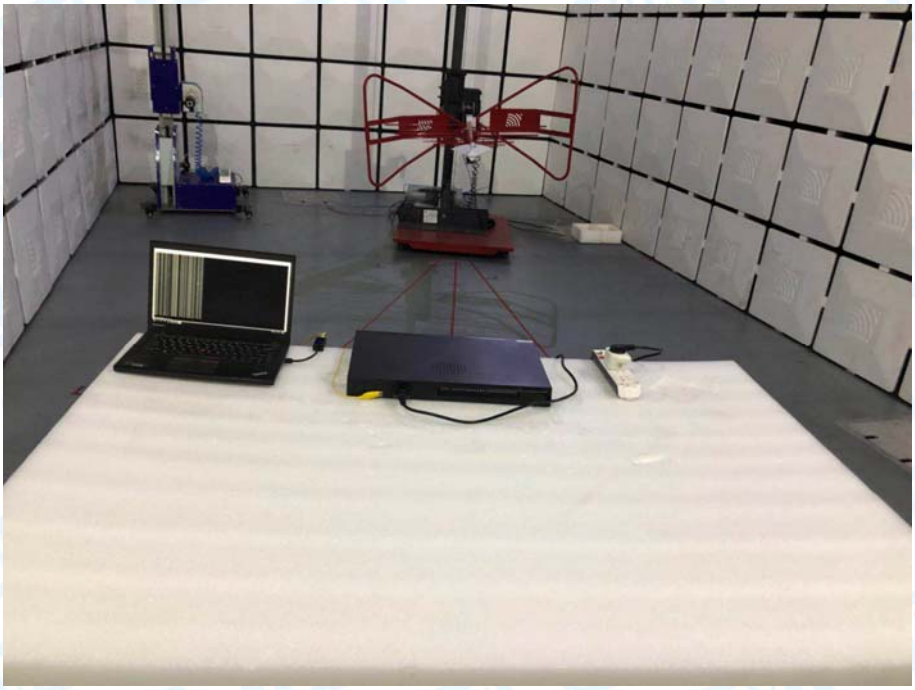
17 Photographs - Test Setup

Conducted Emission Test Setup

Conducted Emission (Asymmetric Mode) Test Setup



Radiated Emission Test Setup

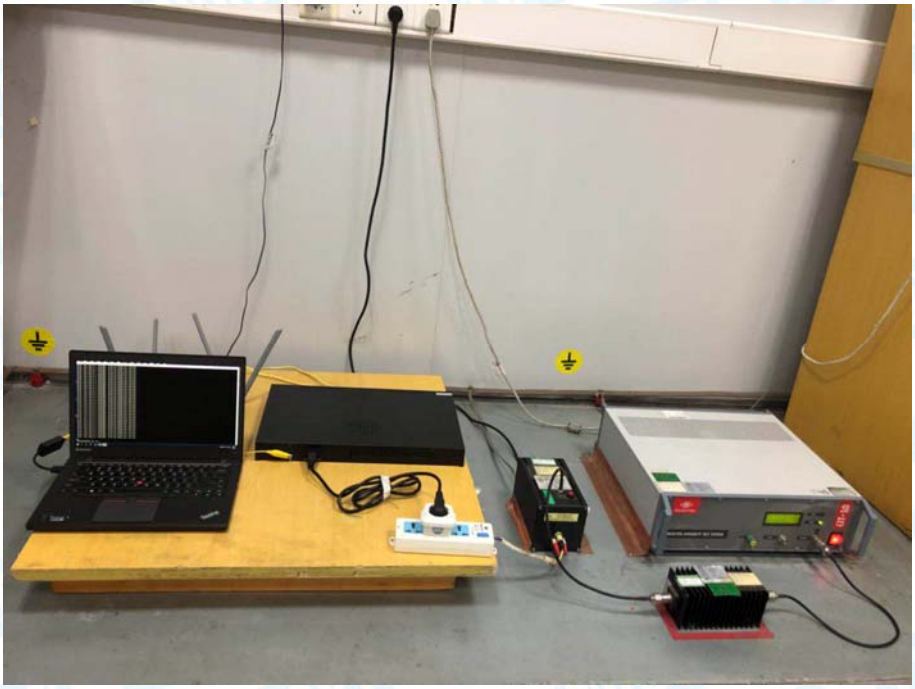


Harmonic current emissions and Voltage fluctuations & flicker Test Setup

Electrostatic Discharge Test Setup

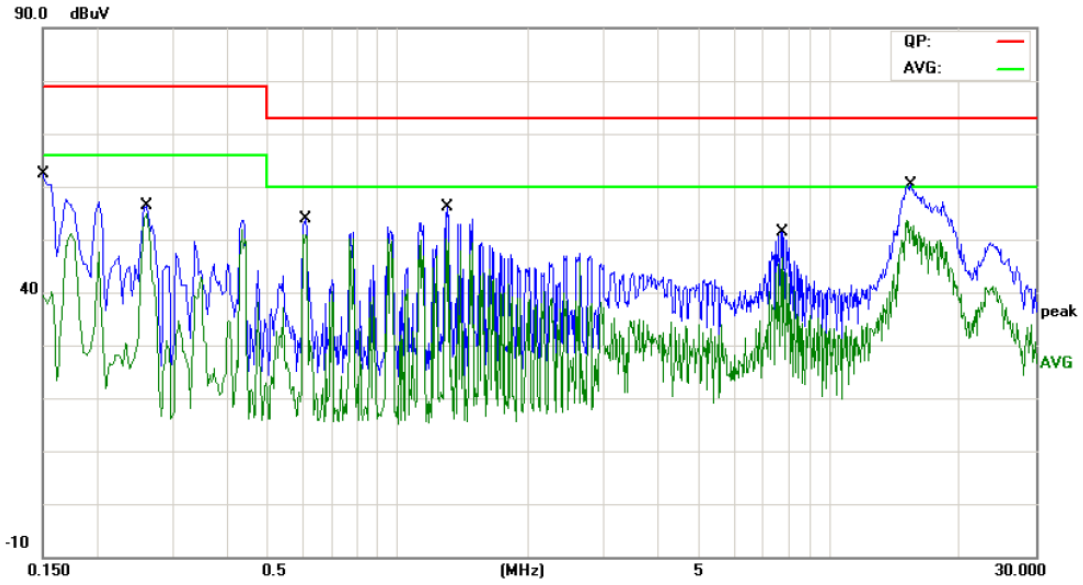
EFT, Surge, Voltage Dips Test Setup

Radio-frequency, Continuous Conducted Disturbance Test Setup



Attachment A--Conducted Emission Data (AC Mains)

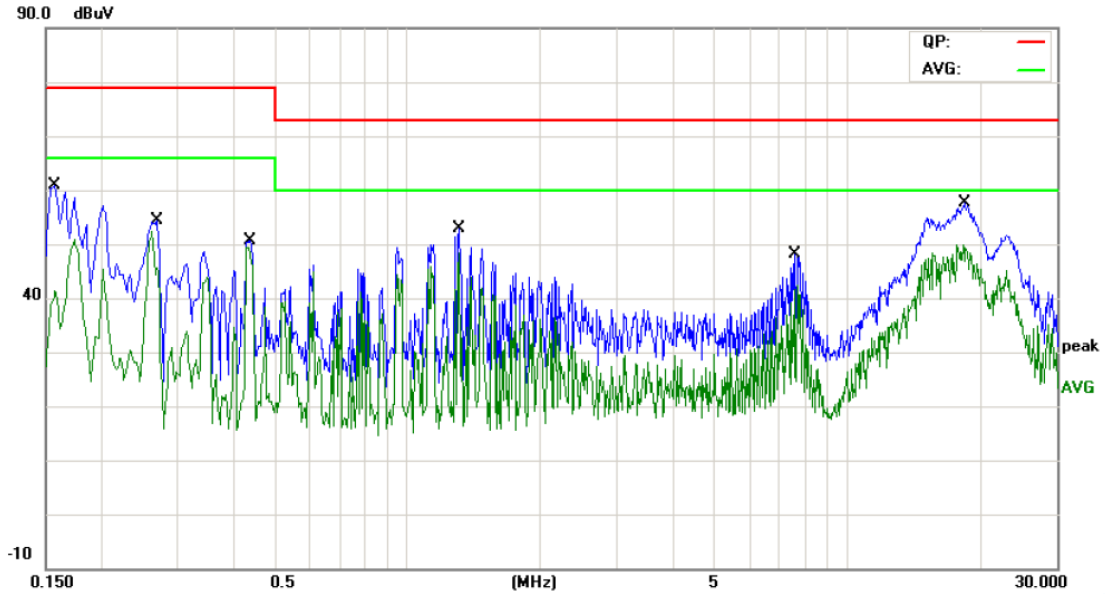
Temperature:	23.5 ℃	**Relative Humidity:**	45%
Pressure:	1010 hPa		
Test Voltage:	AC 230V/50 Hz		
Terminal:	Line		
Test Mode:	Mode 1		
Remark:	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1500	40.50	9.75	50.25	79.00	-28.75	QP
2		0.1500	23.94	9.75	33.69	66.00	-32.31	AVG
3		0.2620	44.60	9.81	54.41	79.00	-24.59	QP
4	*	0.2620	43.77	9.81	53.58	66.00	-12.42	AVG
5		0.6100	41.27	9.94	51.21	73.00	-21.79	QP
6		0.6100	37.05	9.94	46.99	60.00	-13.01	AVG
7		1.2980	43.89	9.72	53.61	73.00	-19.39	QP
8		1.2980	33.56	9.72	43.28	60.00	-16.72	AVG
9		7.7700	38.75	9.82	48.57	73.00	-24.43	QP
10		7.7700	27.81	9.82	37.63	60.00	-22.37	AVG
11		15.4100	46.39	9.82	56.21	73.00	-16.79	QP
12		15.4100	32.91	9.82	42.73	60.00	-17.27	AVG

Emission Level= Read Level+ Correct Factor

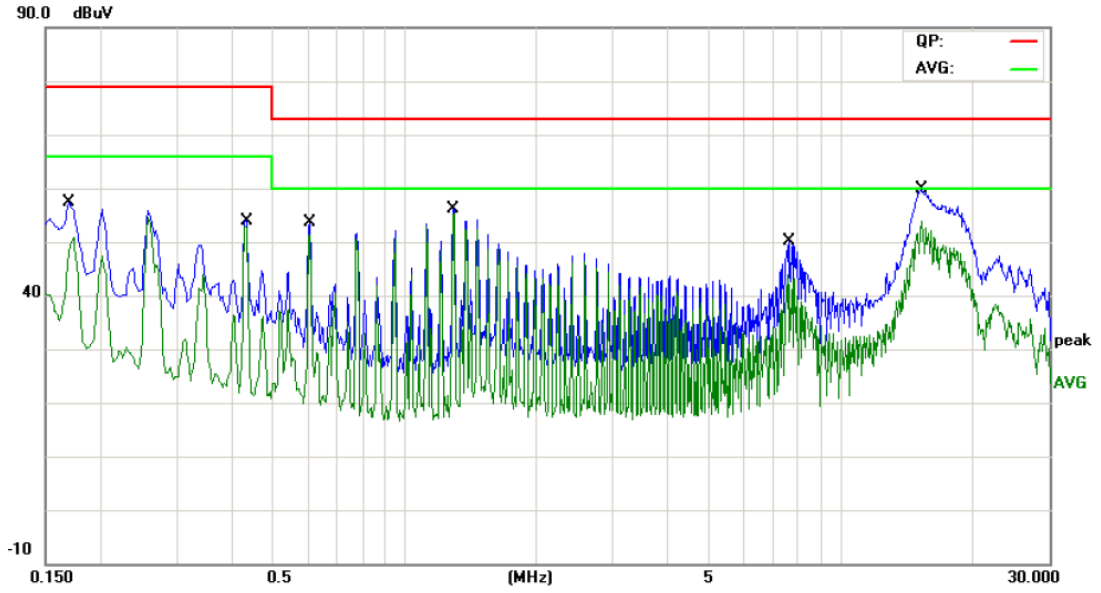
Temperature:	23.5 ℃	**Relative Humidity:**	45%
Pressure:	1010 hPa		
Test Voltage:	AC 230V/50 Hz		
Terminal:	Neutral		
Test Mode:	Mode 1		
Remark:	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1580	40.93	9.61	50.54	79.00	-28.46	QP
2		0.1580	23.76	9.61	33.37	66.00	-32.63	AVG
3		0.2700	38.93	9.69	48.62	79.00	-30.38	QP
4		0.2700	29.34	9.69	39.03	66.00	-26.97	AVG
5		0.4380	38.96	9.77	48.73	79.00	-30.27	QP
6		0.4380	35.86	9.77	45.63	66.00	-20.37	AVG
7		1.3060	40.67	9.69	50.36	73.00	-22.64	QP
8	*	1.3060	30.60	9.69	40.29	60.00	-19.71	AVG
9		7.6340	35.05	9.86	44.91	73.00	-28.09	QP
10		7.6340	24.01	9.86	33.87	60.00	-26.13	AVG
11		18.4500	39.20	9.69	48.89	73.00	-24.11	QP
12		18.4500	26.42	9.69	36.11	60.00	-23.89	AVG

Emission Level= Read Level+ Correct Factor

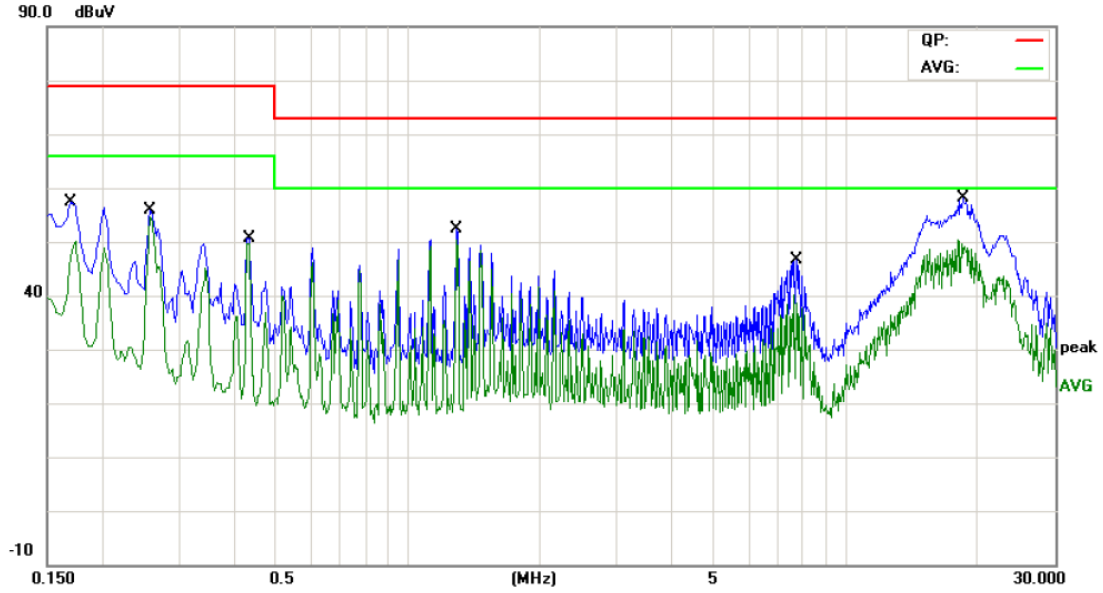
Temperature:	23.5 ℃	**Relative Humidity:**	45%
Pressure:	1010 hPa		
Test Voltage:	AC 110V/60 Hz		
Terminal:	Line		
Test Mode:	Mode 1		
Remark:	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1700	43.58	9.79	53.37	79.00	-25.63	QP
2		0.1700	39.79	9.79	49.58	66.00	-16.42	AVG
3		0.4340	41.78	9.88	51.66	79.00	-27.34	QP
4		0.4340	41.59	9.88	51.47	66.00	-14.53	AVG
5		0.6060	42.05	9.95	52.00	73.00	-21.00	QP
6		0.6060	41.15	9.95	51.10	60.00	-8.90	AVG
7		1.2940	45.58	9.72	55.30	73.00	-17.70	QP
8	*	1.2940	45.42	9.72	55.14	60.00	-4.86	AVG
9		7.6260	35.54	9.82	45.36	73.00	-27.64	QP
10		7.6260	28.71	9.82	38.53	60.00	-21.47	AVG
11		15.2500	46.11	9.82	55.93	73.00	-17.07	QP
12		15.2500	37.96	9.82	47.78	60.00	-12.22	AVG

Emission Level= Read Level+ Correct Factor

Temperature:	23.5 ℃	**Relative Humidity:**	45%
Pressure:	1010 hPa		
Test Voltage:	AC 110V/60 Hz		
Terminal:	Neutral		
Test Mode:	Mode 1		
Remark:	N/A		

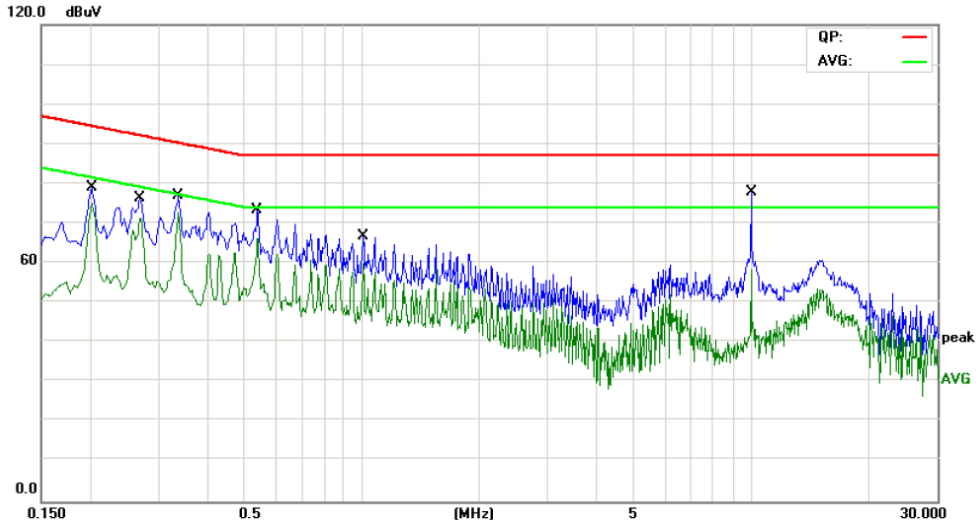


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1700	43.45	9.62	53.07	79.00	-25.93	QP
2		0.1700	39.18	9.62	48.80	66.00	-17.20	AVG
3		0.2580	45.19	9.69	54.88	79.00	-24.12	QP
4		0.2580	45.13	9.69	54.82	66.00	-11.18	AVG
5		0.4340	38.70	9.77	48.47	79.00	-30.53	QP
6		0.4340	38.50	9.77	48.27	66.00	-17.73	AVG
7		1.2940	42.15	9.68	51.83	73.00	-21.17	QP
8	*	1.2940	41.83	9.68	51.51	60.00	-8.49	AVG
9		7.6980	30.19	9.86	40.05	73.00	-32.95	QP
10		7.6980	23.20	9.86	33.06	60.00	-26.94	AVG
11		18.4300	42.13	9.70	51.83	73.00	-21.17	QP
12		18.4300	32.76	9.70	42.46	60.00	-17.54	AVG

Emission Level= Read Level+ Correct Factor

Attachment B--Conducted Emission Data (Asymmetric Mode)

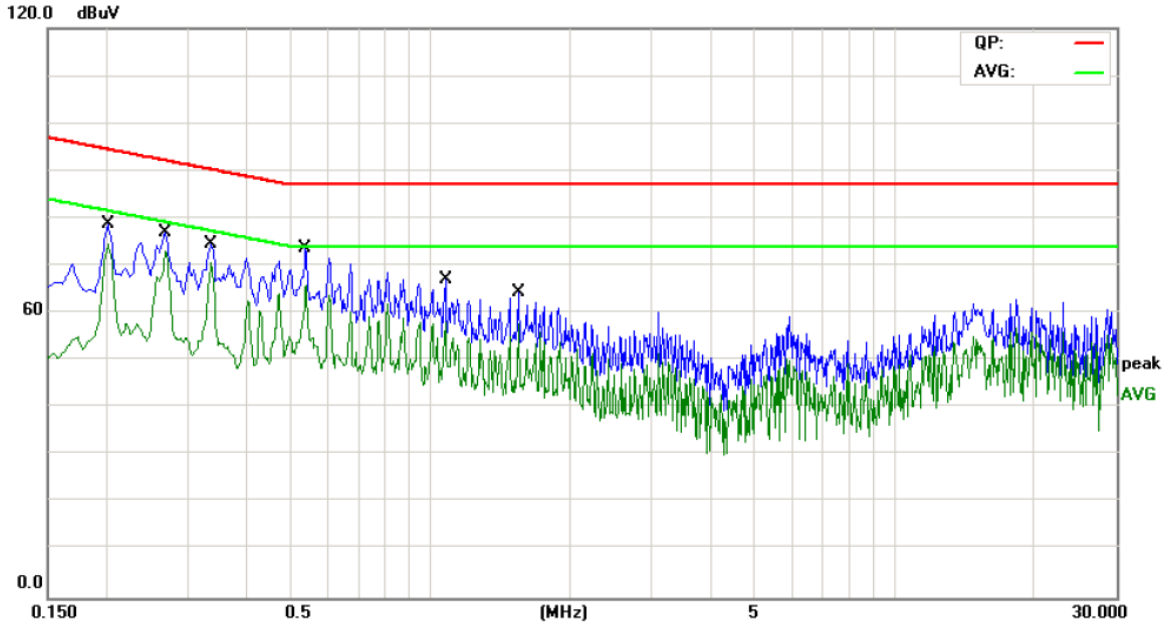
Temperature:	23.2 ℃	**Relative Humidity:**	38%
Pressure:	1010 hPa		
Test Voltage:	AC 230V/50 Hz		
Terminal:	LAN		
Test Mode:	10Mbps		
Remark:	Only showed test data of the worst mode		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.2020	67.99	9.80	77.79	94.52	-16.73	QP
2		0.2020	64.88	9.80	74.68	81.52	-6.84	AVG
3		0.2700	65.42	9.77	75.19	92.12	-16.93	QP
4		0.2700	61.75	9.77	71.52	79.12	-7.60	AVG
5		0.3379	64.64	9.76	74.40	90.25	-15.85	QP
6	*	0.3379	61.39	9.76	71.15	77.25	-6.10	AVG
7		0.5380	62.43	9.65	72.08	87.00	-14.92	QP
8		0.5380	56.61	9.65	66.26	74.00	-7.74	AVG
9		1.0100	54.30	9.51	63.81	87.00	-23.19	QP
10		1.0100	48.27	9.51	57.78	74.00	-16.22	AVG
11		10.0020	65.90	9.55	75.45	87.00	-11.55	QP
12		10.0020	46.41	9.55	55.96	74.00	-18.04	AVG

Emission Level= Read Level+ Correct Factor

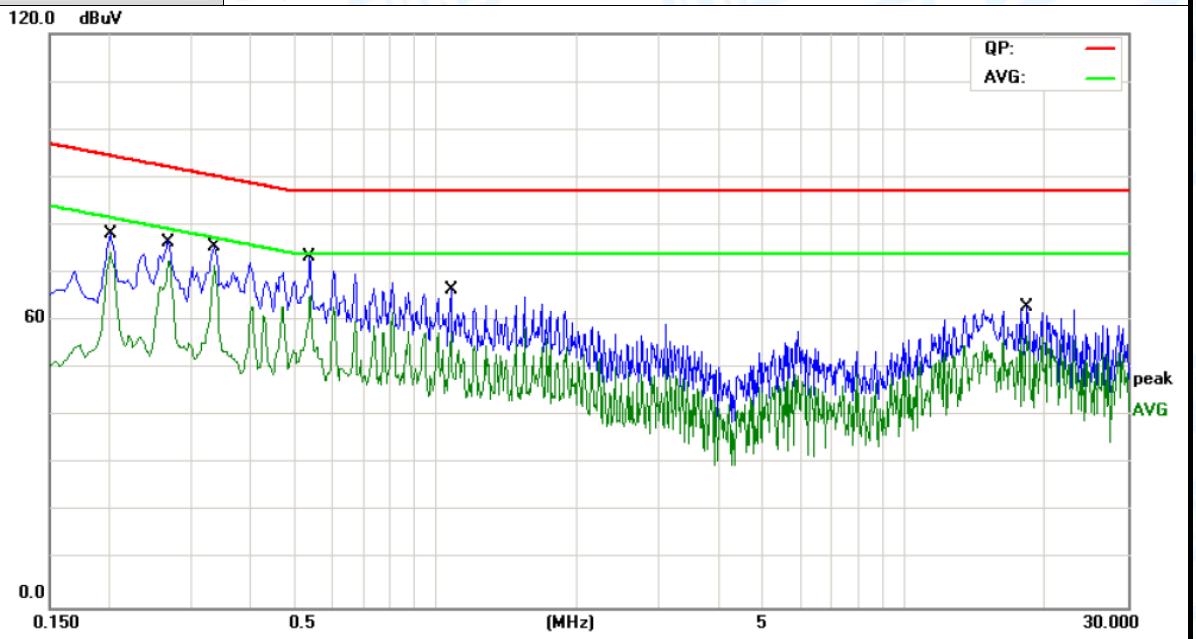
Temperature:	23.2 ℃	**Relative Humidity:**	38%
Pressure:	1010 hPa		
Test Voltage:	AC 230V/50 Hz		
Terminal:	LAN		
Test Mode:	100Mbps		
Remark:	Only showed test data of the worst mode		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.2020	66.98	9.80	76.78	94.52	-17.74	QP
2		0.2020	61.40	9.80	71.20	81.52	-10.32	AVG
3		0.2700	64.91	9.77	74.68	92.12	-17.44	QP
4		0.2700	61.38	9.77	71.15	79.12	-7.97	AVG
5		0.3379	64.49	9.76	74.25	90.25	-16.00	QP
6	*	0.3379	61.33	9.76	71.09	77.25	-6.16	AVG
7		0.5380	62.18	9.65	71.83	87.00	-15.17	QP
8		0.5380	56.40	9.65	66.05	74.00	-7.95	AVG
9		1.0780	53.93	9.51	63.44	87.00	-23.56	QP
10		1.0780	48.56	9.51	58.07	74.00	-15.93	AVG
11		1.5500	53.30	9.52	62.82	87.00	-24.18	QP
12		1.5500	47.70	9.52	57.22	74.00	-16.78	AVG

Emission Level= Read Level+ Correct Factor

Temperature:	23.2 ℃	**Relative Humidity:**	38%
Pressure:	1010 hPa		
Test Voltage:	AC 230V/50 Hz		
Terminal:	LAN		
Test Mode:	1000Mbps		
Remark:	Only showed test data of the worst mode		



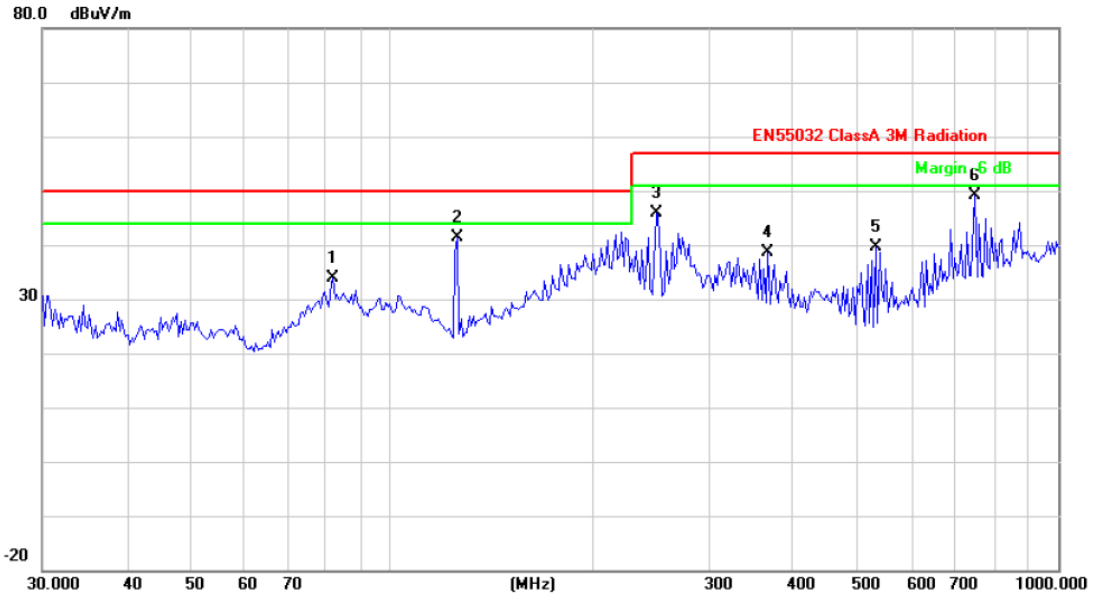
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.2020	68.01	9.78	77.79	94.52	-16.73	QP
2		0.2020	64.91	9.78	74.69	81.52	-6.83	AVG
3		0.2700	65.42	9.82	75.24	92.12	-16.88	QP
4		0.2700	61.75	9.82	71.57	79.12	-7.55	AVG
5		0.3379	64.72	9.83	74.55	90.25	-15.70	QP
6	*	0.3379	61.43	9.83	71.26	77.25	-5.99	AVG
7		0.5380	62.06	9.95	72.01	87.00	-14.99	QP
8		0.5380	56.25	9.95	66.20	74.00	-7.80	AVG
9		1.0780	53.63	9.66	63.29	87.00	-23.71	QP
10		1.0780	48.29	9.66	57.95	74.00	-16.05	AVG
11		18.2420	51.26	9.85	61.11	87.00	-25.89	QP
12		18.2420	47.05	9.85	56.90	74.00	-17.10	AVG

Emission Level= Read Level+ Correct Factor

Attachment C--Radiated Emission Test Data

-----Below 1G

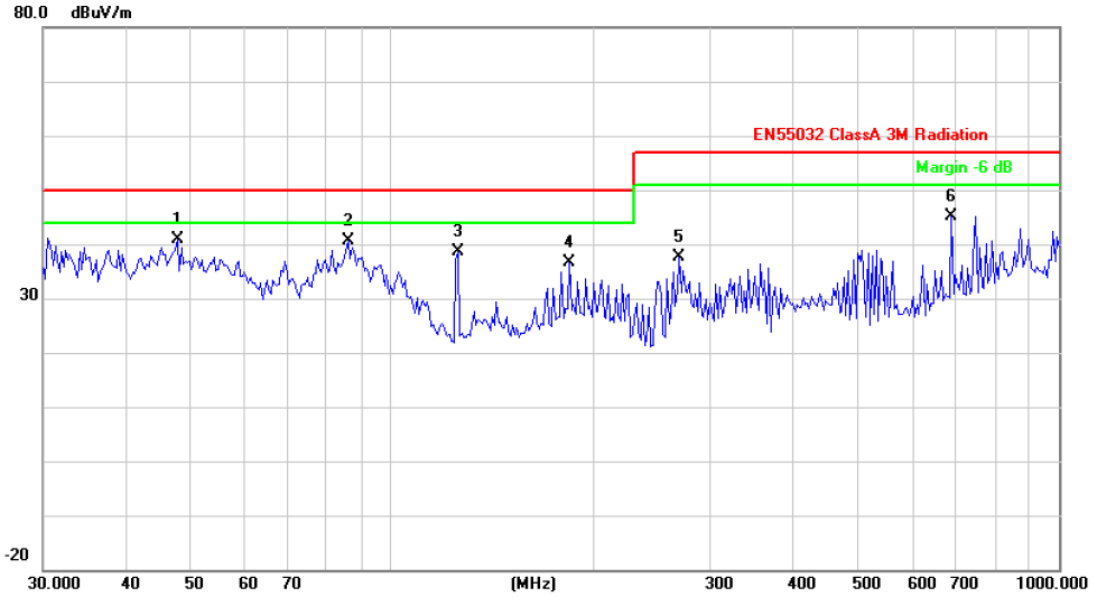
Temperature:	23.5 ℃	**Relative Humidity:**	43%
Pressure:	1010 hPa		
Test Voltage:	AC 230V/50 Hz		
Ant. Pol.	Horizontal		
Test Mode:	Mode 1		
Remark:			



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		81.7833	56.29	-22.46	33.83	50.00	-16.17	peak
2		125.4457	63.72	-22.39	41.33	50.00	-8.67	peak
3		249.4250	62.89	-17.08	45.81	57.00	-11.19	peak
4		366.8231	52.36	-13.62	38.74	57.00	-18.26	peak
5		531.9635	48.91	-9.39	39.52	57.00	-17.48	peak
6	*	750.1083	55.51	-6.42	49.09	57.00	-7.91	peak

Emission Level= Read Level+ Correct Factor

Temperature:	23.5 ℃	**Relative Humidity:**	43%
Pressure:	1010 hPa		
Test Voltage:	AC 230V/50 Hz		
Ant. Pol.	Vertical		
Test Mode:	Mode 1		
Remark:			

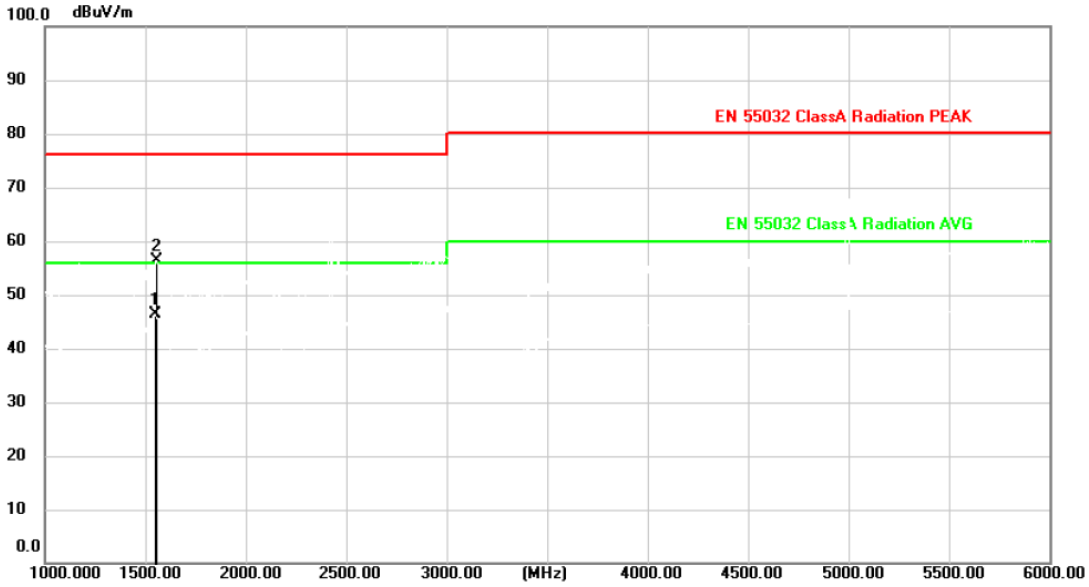


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	47.6586	63.50	-22.56	40.94	50.00	-9.06	peak
2		85.8984	62.76	-22.24	40.52	50.00	-9.48	peak
3		125.4457	60.98	-22.39	38.59	50.00	-11.41	peak
4		184.4898	56.66	-19.97	36.69	50.00	-13.31	peak
5		269.4284	54.26	-16.64	37.62	57.00	-19.38	peak
6		689.5644	52.02	-6.85	45.17	57.00	-11.83	peak

Emission Level= Read Level+ Correct Factor

-----Above 1G

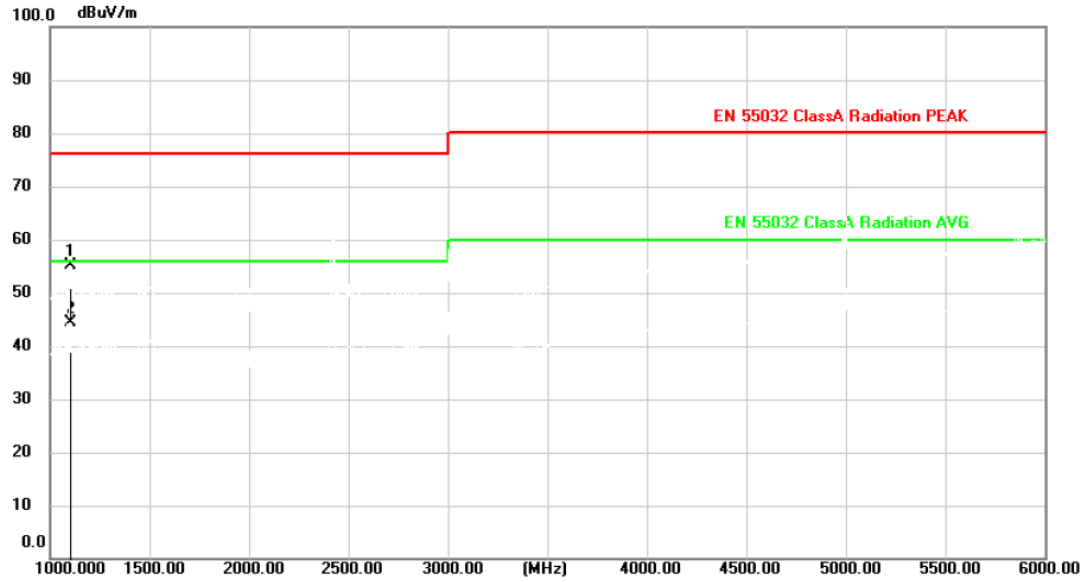
Temperature:	23.5 ℃	**Relative Humidity:**	43%
Pressure:	1010 hPa		
Test Voltage:	AC 230V/50 Hz		
Ant. Pol.	Horizontal		
Test Mode:	Mode 1		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	1550.000	47.98	-1.68	46.30	56.00	-9.70	AVG
2		1555.000	58.07	-1.66	56.41	76.00	-19.59	peak

Emission Level= Read Level+ Correct Factor

Temperature:	23.5 ℃	**Relative Humidity:**	43%
Pressure:	1010 hPa		
Test Voltage:	AC 230V/50 Hz		
Ant. Pol.	Vertical		
Test Mode:	Mode 1		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		1100.000	60.50	-5.39	55.11	76.00	-20.89	peak
2	*	1100.000	49.72	-5.39	44.33	56.00	-11.67	AVG

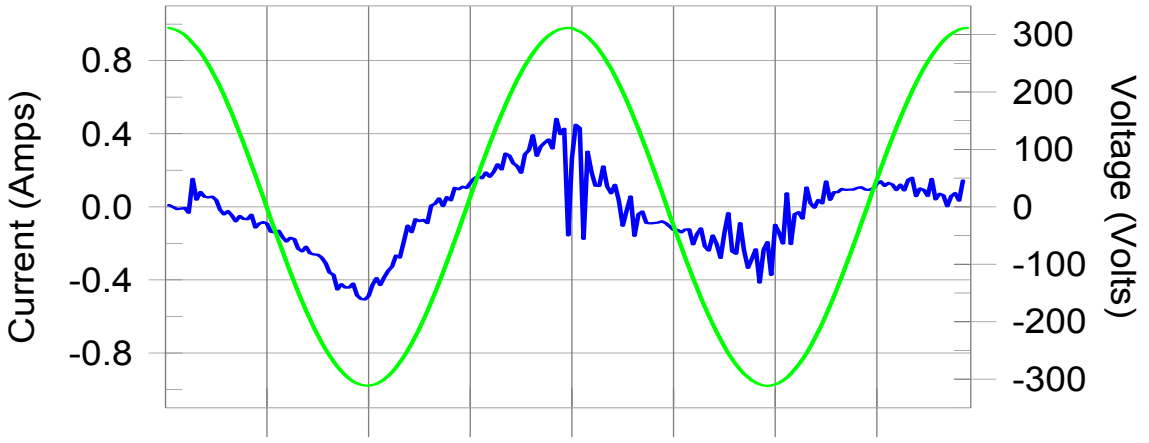
Emission Level= Read Level+ Correct Factor

Attachment D--Harmonic Current Emission Test Data

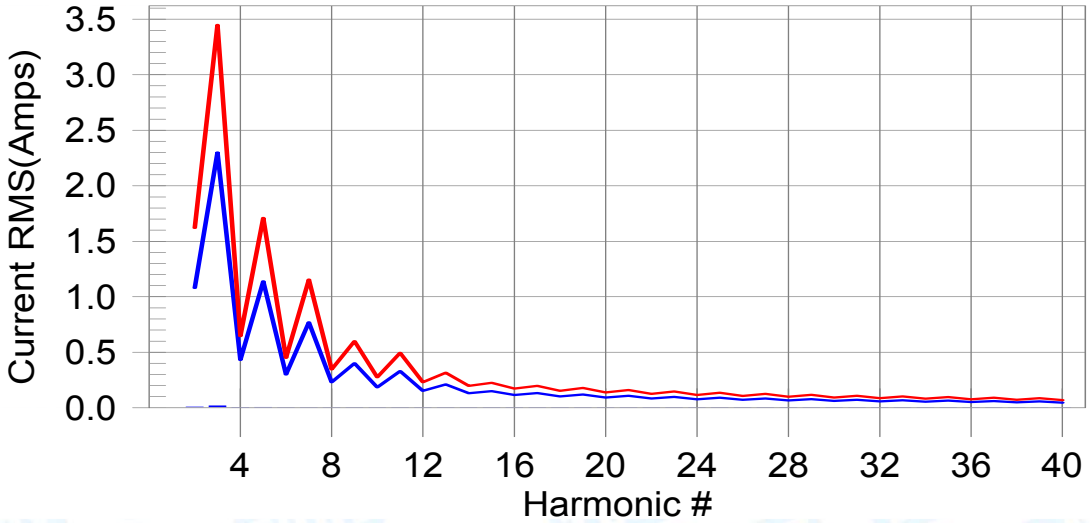
Harmonics – Class-A per Ed. Ed. 5.0 (2018)(Run time)

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class A limit line **European Limits**



Test result: Pass **Worst harmonics H2-0.8% of 150% limit, H3-.7% of 100% limit**

Current Test Result Summary (Run time)

Test Result: Pass Source qualification: Normal
THC(A): 0.020 I-THD(%): 18.4 POHC(A): 0.002 POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts):	220.33	Frequency(Hz):	50.00
I_Peak (Amps):	0.690	I_RMS (Amps):	0.163
I_Fund (Amps):	0.107	Crest Factor:	5.043
Power (Watts):	16.1	Power Factor:	0.552

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.007	1.080	0.6	0.013	1.620	0.8	Pass
3	0.017	2.300	0.7	0.019	3.450	0.6	Pass
4	0.003	0.430	N/A	0.004	0.645	N/A	Pass
5	0.005	1.140	N/A	0.005	1.710	N/A	Pass
6	0.001	0.300	N/A	0.002	0.450	N/A	Pass
7	0.002	0.770	N/A	0.002	1.155	N/A	Pass
8	0.001	0.230	N/A	0.001	0.345	N/A	Pass
9	0.001	0.400	N/A	0.001	0.600	N/A	Pass
10	0.001	0.184	N/A	0.001	0.276	N/A	Pass
11	0.001	0.330	N/A	0.001	0.495	N/A	Pass
12	0.001	0.153	N/A	0.001	0.230	N/A	Pass
13	0.001	0.210	N/A	0.001	0.315	N/A	Pass
14	0.001	0.131	N/A	0.001	0.197	N/A	Pass
15	0.001	0.150	N/A	0.001	0.225	N/A	Pass
16	0.001	0.115	N/A	0.001	0.173	N/A	Pass
17	0.001	0.132	N/A	0.001	0.198	N/A	Pass
18	0.001	0.102	N/A	0.001	0.153	N/A	Pass
19	0.001	0.118	N/A	0.001	0.178	N/A	Pass
20	0.001	0.092	N/A	0.001	0.138	N/A	Pass
21	0.001	0.107	N/A	0.001	0.161	N/A	Pass
22	0.001	0.084	N/A	0.001	0.125	N/A	Pass
23	0.001	0.098	N/A	0.001	0.147	N/A	Pass
24	0.001	0.077	N/A	0.001	0.115	N/A	Pass
25	0.001	0.090	N/A	0.001	0.135	N/A	Pass
26	0.001	0.071	N/A	0.002	0.107	N/A	Pass
27	0.001	0.083	N/A	0.001	0.125	N/A	Pass
28	0.001	0.066	N/A	0.002	0.099	N/A	Pass
29	0.001	0.078	N/A	0.001	0.116	N/A	Pass
30	0.001	0.061	N/A	0.001	0.092	N/A	Pass
31	0.001	0.073	N/A	0.001	0.109	N/A	Pass
32	0.001	0.058	N/A	0.001	0.086	N/A	Pass
33	0.001	0.068	N/A	0.001	0.102	N/A	Pass
34	0.001	0.054	N/A	0.001	0.081	N/A	Pass
35	0.001	0.064	N/A	0.001	0.096	N/A	Pass
36	0.001	0.051	N/A	0.001	0.077	N/A	Pass
37	0.001	0.061	N/A	0.001	0.091	N/A	Pass
38	0.001	0.048	N/A	0.001	0.073	N/A	Pass
39	0.001	0.058	N/A	0.001	0.087	N/A	Pass
40	0.001	0.046	N/A	0.001	0.069	N/A	Pass

Voltage Source Verification Data (Run time)

Test Result: Pass **Source qualification: Normal**

Highest parameter values during test:

Voltage (Vrms):	220.33	Frequency(Hz):	50.00
I_Peak (Amps):	0.690	I_RMS (Amps):	0.163
I_Fund (Amps):	0.107	Crest Factor:	5.043
Power (Watts):	16.1	Power Factor:	0.552

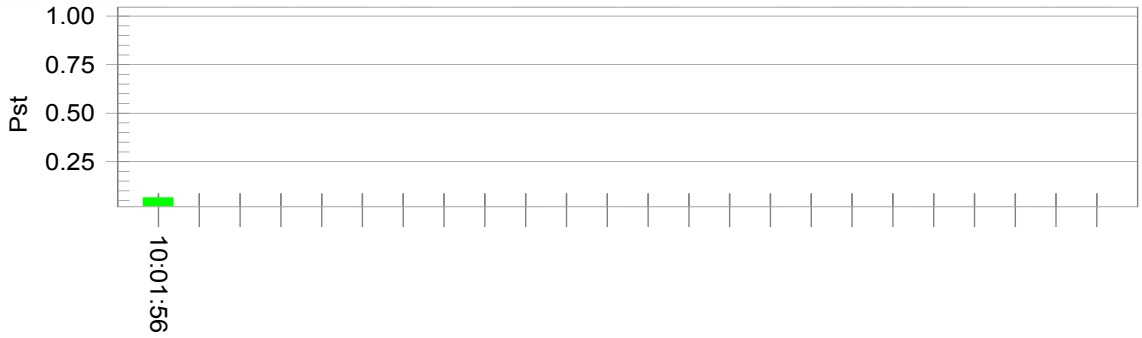
Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.063	0.440	14.24	OK
3	0.465	1.982	23.48	OK
4	0.051	0.441	11.56	OK
5	0.047	0.881	5.29	OK
6	0.027	0.441	6.14	OK
7	0.036	0.661	5.43	OK
8	0.007	0.441	1.50	OK
9	0.016	0.441	3.65	OK
10	0.011	0.441	2.43	OK
11	0.012	0.220	5.51	OK
12	0.012	0.220	5.48	OK
13	0.009	0.220	3.95	OK
14	0.006	0.220	2.94	OK
15	0.011	0.220	5.12	OK
16	0.008	0.220	3.82	OK
17	0.007	0.220	3.23	OK
18	0.010	0.220	4.35	OK
19	0.009	0.220	3.91	OK
20	0.007	0.220	3.39	OK
21	0.005	0.220	2.47	OK
22	0.005	0.220	2.33	OK
23	0.005	0.220	2.36	OK
24	0.003	0.220	1.51	OK
25	0.004	0.220	1.67	OK
26	0.004	0.220	1.99	OK
27	0.006	0.220	2.84	OK
28	0.004	0.220	1.78	OK
29	0.005	0.220	2.20	OK
30	0.004	0.220	1.74	OK
31	0.004	0.220	1.90	OK
32	0.004	0.220	1.63	OK
33	0.004	0.220	1.99	OK
34	0.003	0.220	1.51	OK
35	0.004	0.220	1.81	OK
36	0.003	0.220	1.55	OK
37	0.005	0.220	2.11	OK
38	0.003	0.220	1.52	OK
39	0.004	0.220	2.00	OK
40	0.005	0.220	2.47	OK

Attachment E--Voltage Fluctuation and Flicker Test Data

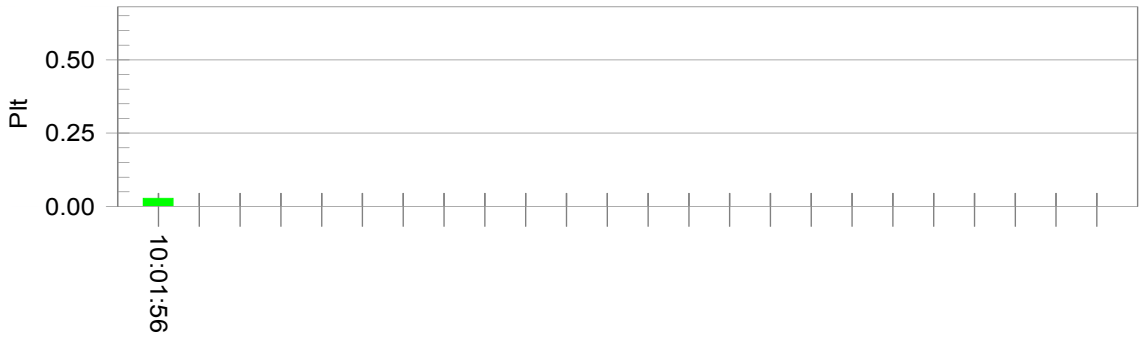
Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)

Test Result: Pass **Status: Test Completed**

Pst_i and limit line **European Limits**



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	220.22			
T-max (mS):	0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.00	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.028	Test limit:	0.650	Pass

Attachment F--Electrostatic Discharge Test Data

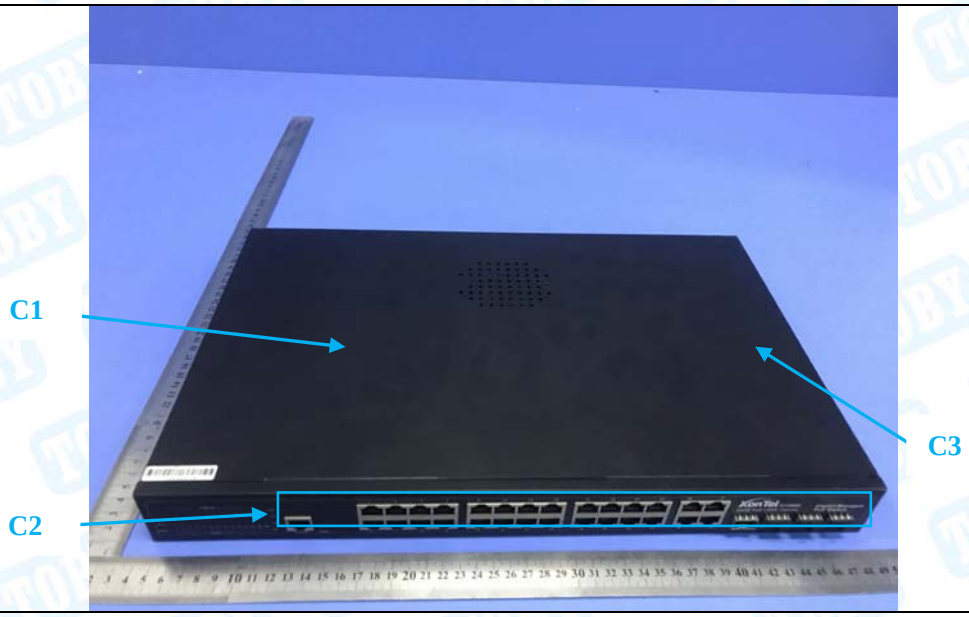
Temperature :	24.4℃	Humidity :	54%
Power supply :	AC 230V/50Hz	Test Mode :	Mode 1

Required Performance Criteria: B

Air Discharge: ±2/±4/±8kV Contact Discharge: ±2/±4kV

Location	Test Level (kV)	Judgment	Result
C1	±2kV±4kV	A	PASS
C2		B	
C3		A	
HCP	±4kV	A	
VCP	±4kV	A	

Test Location Photos



Note:

1) Criteria A: There was no change operated with initial operating during the test.
2) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
3) Criteria C: The system shut down during the test.

Attachment G--RF Field Strength Susceptibility Test Data

Temperature : 24.0℃		Humidity : 40%	
Power supply : AC 230V/50Hz		Test Mode : Mode 1	
Required Performance Criteria: A			
Modulation: AM 80%, Field strength: 3V/m, Pulse: 1 kHz.			

Antenna Polarity	**Actual Performance Criteria**				**Result**
	Frequency Range: 80~1000MHz				
	EUT Position				
	Front	Right	Rear	Left	
H	**A**	**A**	**A**	**A**	**PASS**
V	**A**	**A**	**A**	**A**	**PASS**

EUT Position	Frequency								**Result**
	1800MHz		2600MHz		3500MHz		5000MHz		
	Antenna Polarity								
	H	**V**	**H**	**V**	**H**	**V**	**H**	**V**	
Front	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**PASS**
Right	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**PASS**
Rear	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**PASS**
Left	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**PASS**

Remark:

1) Criteria A: There was no change operated with initial operating during the test.
2) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
3) Criteria C: The system shut down during the test.

Attachment H--Electrical Fast Transient/Burst Test Data

Temperature :	24.4℃	Humidity :	54%
Power supply :	AC 230V/50Hz	Test Mode :	Mode 1

Required Performance Criteria: B

T_r/T_h: 5/50ns, Repetition Frequency: 5KHz

Line	Voltage (kV)	Required Performance Criteria		Actual Performance Criteria		Result
		(+)	(-)	(+)	(-)	
L	1.0	B	B	A	A	PASS
N	1.0	B	B	A	A	PASS
L-N	1.0	B	B	A	A	PASS
L-PE	1.0	B	B	A	A	PASS
N-PE	1.0	B	B	A	A	PASS
L-N-PE	1.0	B	B	A	A	PASS
Analogue/digital data ports	0.5	B	B	A	A	PASS
DC network power ports	0.5	B	B	/	/	/

Remark:

1) Criteria A: There was no change operated with initial operating during the test.
2) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
3) Criteria C: The system shut down during the test.

Attachment I--Surge Immunity Test Data

Temperature	: 24.4℃	Humidity	: 54%
Power supply	: AC 230V/50Hz	Test Mode	: Mode 1

Required Performance Criteria: B

Injected Line	Voltage (kV)	Phase	Actual Performance Criteria		Result	
			(+)	(-)	(+)	(-)
L, N, L-N	1.0	0°	A	A	PASS	PASS
		90°	A	A	PASS	PASS
		180°	A	A	PASS	PASS
		270°	A	A	PASS	PASS
L-PE, N-PE	2.0	0°	A	A	PASS	PASS
		90°	A	A	PASS	PASS
		180°	A	A	PASS	PASS
		270°	A	A	PASS	PASS
L-N-PE	2.0	0°	A	A	PASS	PASS
		90°	A	A	PASS	PASS
		180°	A	A	PASS	PASS
		270°	A	A	PASS	PASS
Analogue/digital data ports	0.5	+/-	A	A	PASS	PASS
DC network power ports	0.5	+/-	/	/	/	/

Remark:

1) Criteria A: There was no change operated with initial operating during the test.
2) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
3) Criteria C: The system shut down during the test.

Attachment J--Conducted Immunity Test Data

Temperature	: 24.4℃	Humidity	: 54%
Power supply	: AC 230V/50Hz	Test Mode	: Mode 1

Required Performance Criteria: A

Frequency Range (MHz)	Injected Position	Voltage Level (e.m.f.)	Required Performance Criteria	Actual Performance Criteria	Result
0.15 ~ 10	AC Mains	3V(rms), AM 80% Modulated with 1 kHz	**A**	A	**PASS**
10 ~ 30		3V to 1V(rms), AM 80% Modulated with 1 kHz	**A**	A	**PASS**
30 ~ 80		1V(rms), AM 80% Modulated with 1 kHz	**A**	A	**PASS**
0.15 ~ 10	DC Mains	3V(rms), AM 80% Modulated with 1 kHz	**A**	/	**/**
10 ~ 30		3V to 1V(rms), AM 80% Modulated with 1 kHz	**A**	/	**/**
30 ~ 80		1V(rms), AM 80% Modulated with 1 kHz	**A**	/	**/**
0.15 ~ 10	Signal Line	3V(rms), AM 80% Modulated with 1 kHz	**A**	A	**PASS**
10 ~ 30		3V to 1V(rms), AM 80% Modulated with 1 kHz	**A**	A	**PASS**
30 ~ 80		1V(rms), AM 80% Modulated with 1 kHz	**A**	A	**PASS**

Remark:

1) Criteria A: There was no change operated with initial operating during the test.
2) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
3) Criteria C: The system shut down during the test.

Attachment K--Voltage Dips and Interruptions Test Data

Temperature :	24.4℃	Humidity :	54%
Power supply :	AC 230V/50Hz	Test Mode :	Mode 1

Criterion: B&C

Test Level % UT	Voltage Dips & Short Interruptions % UT	Duration (in period)	Phase Angle	Required Performance Criteria	Actual Performance Criteria	Result
0	100	250P	0°	**C**	C	**Pass**
70	30	25P	0°	**C**	C	**Pass**
0	100	0.5P	0°	**B**	B	**Pass**

Remark: U_T is the rated voltage for the equipment.

1) Criteria A: There was no change operated with initial operating during the test.
2) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
3) Criteria C: The system shut down during the test.

-----END OF REPORT-----