



**SGS-CSTC Standards Technical Services
(Shanghai) Co., Ltd.**

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China
Telephone: +86 (0) 21 6191 5666
Fax: +86 (0) 21 6191 5678
ee.shanghai@sgs.com

Report No.: SHEM170300102101
Page: 1 of 41

1 Cover Page

TEST REPORT

Application No.:	SHEM1703001021CR
Applicant:	Zhejiang Dahua Vision Technology Co., Ltd.
Equipment under Test (EUT) NOTE: The following sample(s) was/were submitted and identified by the client as.	
Product Name:	IP CAMERA
Model No.(EUT):	DH-IPC-HDBW1430EP-AW
Add Model No.:	DH-IPC-HDBW1430EN-AW, IPC-HDBW1430EP-AW, IPC-HDBW1430EN-AW, IPC-HDBW1230EP-AW, IPC-HDBW1230EN-AW, DH-IPC-HDBW1230EP-AW, DH-IPC-HDBW1230EN-AW, IPC-HDBW1435EP-W, IPC-HDBW1435EN-W, DH-IPC-HDBW1435EP-W, DH-IPC-HDBW1435EN-W, IPC-HDBW1235EP-W, IPC-HDBW1235EN-W, DH-IPC-HDBW1235EP-W, DH-IPC-HDBW1235EN-W.
Standards:	EN 55032:2015 (Class B), EN 55024:2010+A1:2015, EN 50130-4:2011+A1:2014, EN 61000-3-2:2014, EN 61000-3-3:2013
Date of Receipt:	2017-03-03
Date of Test:	2017-03-31 to 2017-04-06
Date of Issue:	2017-05-15
Test Result:	Pass*

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EU Directives.




Parlam Zhan
E&E Section Manager
SGS-CSTC (Shanghai) Co., Ltd.

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00	/	2017-05-15	/	Original

Authorized for issue by:				
Engineer		Eddy Zong		
		Print Name		
Clerk		Susie Liu		
		Print Name		
Reviewer		Parlam Zhan		
		Print Name		

3 Test Summary

ELECTROMAGNETIC INTERFERENCE (EMI)			
Test	Test Requirement	Test Method	Result
Conducted Emission (150KHz to 30MHz)	EN 55032:2015	EN 55032:2015	PASS
Conducted Emission on Telecommunication (150KHz to 30MHz)	EN 55032:2015	EN 55032:2015	PASS
Radiated Emission, (30MHz to 1GHz)	EN 55032:2015	EN 55032:2015	PASS
Radiated Emission (above 1 GHz)	EN 55032:2015	EN 55032:2015	PASS*
Harmonic Emission (100 Hz to 2 kHz)	EN 61000-3-2:2014	EN 61000-3-2:2014	PASS
Flicker Emission	EN 61000-3-3:2013	EN 61000-3-3:2013	PASS
Electromagnetic Susceptibility(EMS)			
Test	Test Requirement	Test Method	Result
Electrostatic discharge	EN 50130-4:2011+A1:2014 & EN 55024:2010+A1:2015	EN 61000-4-2:2009	PASS
Radiated electromagnetic fields	EN 50130-4:2011+A1:2014 & EN 55024:2010+A1:2015	EN 61000-4-3:2006 +A1: 2008+A2:2010	PASS
Fast transient bursts	EN 50130-4:2011+A1:2014 & EN 55024:2010+A1:2015	EN 61000-4-4:2012	PASS
Slow high energy voltage surge	EN 50130-4:2011+A1:2014 & EN 55024:2010+A1:2015	EN 61000-4-5:2014	PASS
Conducted disturbances induced by electromagnetic fields	EN 50130-4:2011+A1:2014 & EN 55024:2010+A1:2015	EN 61000-4-6:2014	PASS
Mains supply voltage dips and short interruptions	EN 50130-4:2011+A1:2014 & EN 55024:2010+A1:2015	EN 61000-4-11:2004	PASS
Mains supply voltage variations	EN 50130-4:2011+A1:2014	EN 50130-4:2011+A1:2014	PASS
Remark:			
EUT In this whole report EUT means Equipment Under Test.			
N/A: Not applicable. Please refer to Section 7.5 of this report for details.			
Note1:* The highest frequency of the internal sources of the EUT is above 1GHz, the measurement shall be made up to 5 times the highest frequency of 6GHz, whichever is less.			
Note2: There are series models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model DH-IPC-HDBW1430EP-AW was tested since their differences were the software version, their naming and color silk.			

4 Contents

1	COVER PAGE	1
2	VERSION	2
3	TEST SUMMARY	3
4	CONTENTS	4
5	GENERAL INFORMATION	5
5.1	Client Information.....	5
5.2	Details of E.U.T	5
5.3	E.U.T Operation Mode.....	5
5.4	E.U.T Operation Environment	5
5.5	Description of Support Units	5
5.6	Deviation from Standards	7
5.7	Abnormalities from Standard Conditions	7
5.8	Modification/Retest Record	7
5.9	Monitoring of EUT for All Immunity Test.....	7
5.10	Test Location.....	7
5.11	Test Facility.....	7
5.12	Measurement Uncertainty	8
6	EQUIPMENT LIST	9
7	ELECTROMAGNETIC INTERFERENCE TEST RESULTS.....	11
7.1	Conducted Emissions on Mains Terminals, 150 kHz to 30 MHz	11
7.2	Conducted Emissions at Telecommunication ports, 150 kHz to 30 MHz.....	17
7.3	Radiated Emissions, 30MHz to 1GHz	21
7.4	Radiated Emissions, 1GHz to 6GHz.....	27
7.5	Harmonics Test Result	33
7.6	Flicker Test Result	34
8	IMMUNITY TEST RESULTS	36
8.1	Electrostatic discharge	36
8.2	Radiated electromagnetic fields (80MHz to 2.7GHz).....	38
8.3	Fast transient bursts.....	40
8.4	Slow high energy voltage surge	42
8.5	Conducted disturbances induced by electromagnetic fields	44
8.6	Mains supply voltage dips and short interruptions	46
8.7	Mains supply voltage variations	48
9	EQUIPMENT UNDER TEST PICTURES.....	49

10	EUT CONSTRUCTIONAL DETAILS	49
----	----------------------------------	----

5 General Information

5.1 Client Information

Applicant:	Zhejiang Dahua Vision Technology Co., Ltd.
Address of Applicant:	No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China
Manufacturer:	Zhejiang Dahua Vision Technology Co., Ltd.
Address of Manufacturer:	No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China
Factory:	Zhejiang Dahua Vision Technology Co., Ltd.
Address of Factory:	No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R. China

5.2 Details of E.U.T

Product Description:	Fixed product with Ethernet port		
Power Supply:	DC 12V 1A		
Test Voltage:	AC 230V 50Hz for adapter or POE		
Adapter:	Manufacturer:	SHENZHEN HONOR ELECTRONIC CO.,LTD.	
	Model No.:	ADS-12AM-12 12012EPG	
	Rated Input:	AC 100~240V, 50/60Hz	
	Rated Output:	DC 12V 1.0A	
	Cable length:	AC port:	2 wires
		DC port:	290 cm

5.3 E.U.T Operation Mode

Test Mode	Description of Test Mode
Ethernet monitoring mode	Establish communication between EUT and router via LAN port, and then connect PC to Router. Using PC monitoring images.

5.4 E.U.T Operation Environment

Temperature Range: 20-25°C
Humidity Range: 30-60% RH
Atmospheric Pressure Range: 100-102kPa

5.5 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Supplied by
Laptop	Lenovo	ThinkPad X100e	SGS
Router	CISCO	RV110W	SGS

Software name	Manufacturer	Version	Supplied By
---------------	--------------	---------	-------------



**SGS-CSTC Standards Technical Services
(Shanghai) Co., Ltd.**

Report No.: SHEM170300102101

Page: 6 of 49

IE	Microsoft	V11	SGS
----	-----------	-----	-----

5.6 Deviation from Standards

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).

5.7 Abnormalities from Standard Conditions

None.

5.8 Modification/Retest Record

None.

5.9 Monitoring of EUT for All Immunity Test

Audio: N/A

Visual: Working status of the EUT.

5.10 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China.

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

5.11 Test Facility

• CNAS (No. CNAS L0599)

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

FCC – Registration No.: 402683

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683.

• Industry Canada (IC) – IC Assigned Code: 8617A

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1.

• VCCI (Member No.: 3061)

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3868, C-4336, T-2221, G-830 respectively.

5.12 Measurement Uncertainty

According to CISPR 16-4-2.

Test Item	Frequency Range	Measurement Uncertainty	U_{CISPR}
Conducted Emission at mains port using AMN	9kHz-150kHz	3.2 dB	3.8 dB
Conducted Emission at mains port using AMN	150kHz-30MHz	3.0 dB	3.4 dB
Conducted Emission at mains port using VP	9kHz-30MHz	1.9 dB	3.9 dB
Conducted Emission at telecommunication port using AAN	150kHz-30MHz	2.4 dB	5.0 dB
Radiated Emission	30MHz-1000MHz	4.4 dB	6.3 dB
Radiated Emission	1GHz-18GHz	4.6 dB	5.2 dB (1GHz-6GHz)
			5.5 dB (6GHz-18GHz)
Disturbance Power	30MHz-300MHz	3.5 dB	4.5 dB
Remark: AMN – Artificial Mains Network VP – Voltage Probe AAN – Asymmetric Artificial Network			

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

6 Equipment list

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
Conducted Emission						
1	EMI test receiver	Rohde & Schwarz	ESCS30	TDGC2	2017-01-14	2018-01-13
2	Line impedance stabilization network	SCHWARZBECK	NSLK8127	8127490	2017-01-14	2018-01-13
3	Line impedance stabilization network	EMCO	3816/2	00034161	2017-01-14	2018-01-13
4	8-Wire ISN CAT 5	SCHWARZBECK	CAT5 8158	CAT5-8158-0061	2017-01-14	2018-01-13
Radiated Emission						
1	EMI test receiver	Rohde & Schwarz	ESU40	100109	2017-01-14	2018-01-13
2	Loop Antenna (9KHz – 30MHz)	SCHWARZBECK	FMZB1519	1519-034	2017-02-07	2018-01-15
3	Broadband UHF-VHF ANTENNA (30MHz – 1GHz)	SCHWARZBECK	VULB9168	9168-313	2017-02-07	2018-01-15
4	Horn Antenna (1GHz to 18GHz)	SCHWARZBECK	BBHA9120D	9120D-679	2017-02-07	2018-01-15
5	Low noise Pre-amplifier (9KHz – 1GHz)	LNA6900	TESEQ	71033	2017-01-14	2018-01-13
6	Pre-Amplifier (1GHz -25GHz)	SCHWARZBECK	SCU-F0118-G 40-BZ4-CSS(F)	10001	2017-01-14	2018-01-13
Flicker						
1	Single phase harmonics & flicker analyzer	EM test	DPA500	V0507100125	2017-01-14	2018-01-13
2	AC SOURCE 6KVA	EM test	ACS500	V0507100126	2017-01-14	2018-01-13
Electrostatic discharge						
1	Electrostatic Discharge Simulator	TESEQ	NSG 437	468	2016-08-15	2017-08-14
Radiated electromagnetic fields						
1	Single Generator	Rohde & Schwarz	SMR40	100555	2016-08-12	2017-08-11
2	Calibrated Stacked Lagarithmic-Periodic Test-Antenna	SCHWARIBFCK	STLP9128D	9128D055	/	/
3	Stacked DoubleLog-Per.	SCHWARIBFCK	STLP 9149	9149-187	/	/

	Antenna					
4	Power Amplifiers	MILMEGA	80RF1000-250	1053058	/	/
5	Power Amplifiers	MILMEGA	AS0840-55-55	1053059	/	/
6	Power Meter	Rohde & Schwarz	NRP	101641	2017-01-14	2018-01-13
7	Electromagnetic Field Probe	ETS-Lindgren	HI-6113	00114591	2016-08-12	2017-08-11
8	Power sensor	Rohde & Schwarz	NRP-Z91	100647	2017-01-14	2018-01-13
9	Power sensor	Rohde & Schwarz	NRP-Z22	101096	2016-08-12	2017-08-11
Fast transient bursts						
1	Ultra-compact simulator	EM test	UCS500M4	V0507100122	2017-01-14	2018-01-13
2	Capacitive coupling clamp	EM test	HFK	5040004	2016-08-12	2017-08-11
Slow high energy voltage surge						
1	Ultra-compact simulator	EM test	UCS500M4	V0507100122	2017-01-14	2018-01-13
2	Data coupling network 4 line	EM test	CNV 504	4020002001	2016-08-12	2017-08-11
Mains supply voltage dips and short interruptions						
1	Ultra-compact simulator	EM test	UCS500M4	V0507100122	2017-01-14	2018-01-13
2	Motorised Variac	EM test	MV2616	V0507100123	2017-01-14	2018-01-13
Conducted Immunity Test						
1	AM/FM signal generator	Rohde & Schwarz	SMY01	8256751018	2017-01-14	2018-01-13
2	PAMP Conducted RF test system	HAEFFLY	PAMP250	151708	2017-01-14	2018-01-13
3	CDN impedence and K-factor	LUTHI	L-801 M2/M3	2117	2017-01-14	2018-01-13
4	Coupling Clamp	LUTHI	EM 101	35724	2017-01-14	2018-01-13
General Equipment						
1	Digital pressure meter	YONGZHI	DYM3-01	101012	2017-03-03	2018-03-02
2	Digital Multimeter	FLUKE	17B	10560713	2017-01-14	2018-01-13
3	Temperature& humidity recorder	ShangHai weather meter work	ZJ 1-2B	84320600, 803136, F304020153, 20101201FS 100A6K,201 106117	2017-01-14	2018-01-13

7 Electromagnetic Interference Test Results

7.1 Conducted Emissions on Mains Terminals, 150 kHz to 30 MHz

Detector: Peak for pre-scan (9 kHz Resolution Bandwidth from 150 kHz to 30 MHz)

Limit:

Frequency range MHz	Class B Limits dB (μV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note1: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.
Note2: The lower limit is applicable at the transition frequency.

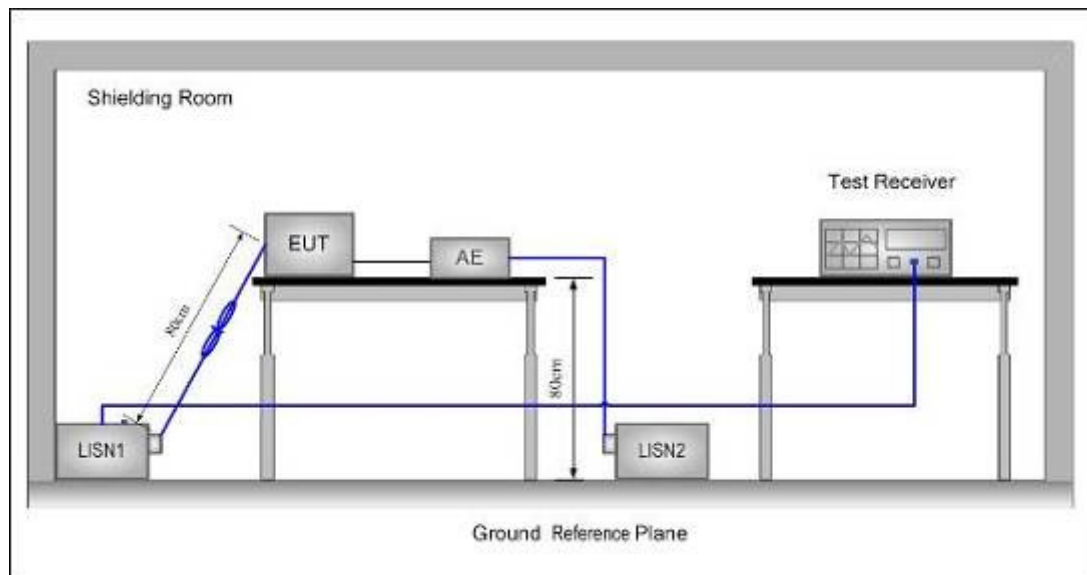
7.1.1 E.U.T. Operation

Test mode: Ethernet monitoring mode

Pre-scan was performed with peak detected on all ports, Quasi-peak & average measurements were performed at the frequencies at which maximum peak emission level were detected.

Please see the attached Quasi-peak and Average test results.

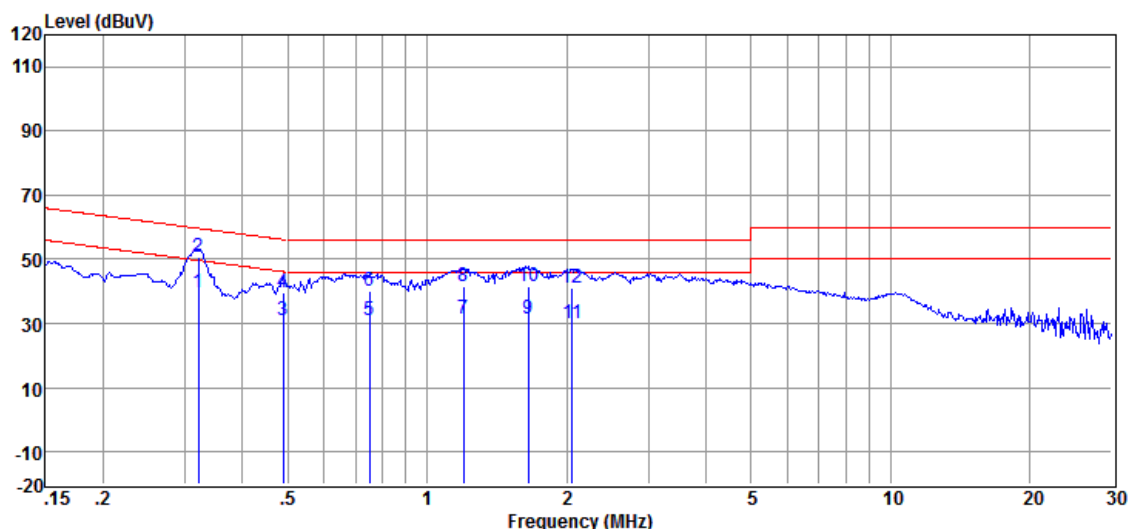
7.1.2 Test Setup and Procedure



1. The mains terminal disturbance voltage was measured with the EUT in a shielded room.
2. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT was connected to a second LISN, which was bonded to the ground reference plane in the same way as the LISN for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance was between the closest points of the LISN and the EUT. The mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m. All other units of the EUT and associated equipment was at least 0.8 m from the LISN.

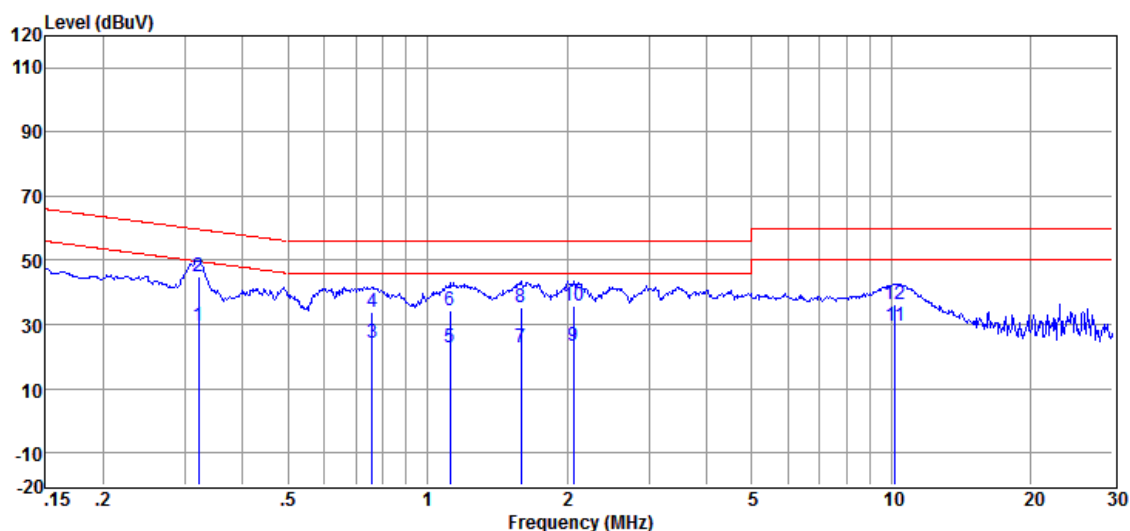
7.1.3 Measurement Data

Live Line:



Item	Freq.	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)	
1	0.322	29.48	0.09	10.16	39.73	49.66	-9.93	Average
2	0.322	40.25	0.09	10.16	50.50	59.66	-9.16	QP
3	0.489	20.81	0.10	10.17	31.08	46.19	-15.11	Average
4	0.489	29.50	0.10	10.17	39.77	56.19	-16.42	QP
5	0.751	20.72	0.10	10.17	30.99	46.00	-15.01	Average
6	0.751	30.08	0.10	10.17	40.35	56.00	-15.65	QP
7	1.197	21.32	0.08	10.18	31.58	46.00	-14.42	Average
8	1.197	31.22	0.08	10.18	41.48	56.00	-14.52	QP
9	1.654	21.32	0.08	10.19	31.59	46.00	-14.41	Average
10	1.654	31.44	0.08	10.19	41.71	56.00	-14.29	QP
11	2.055	19.99	0.08	10.19	30.26	46.00	-15.74	Average
12	2.055	31.04	0.08	10.19	41.31	56.00	-14.69	QP

Neutral Line:

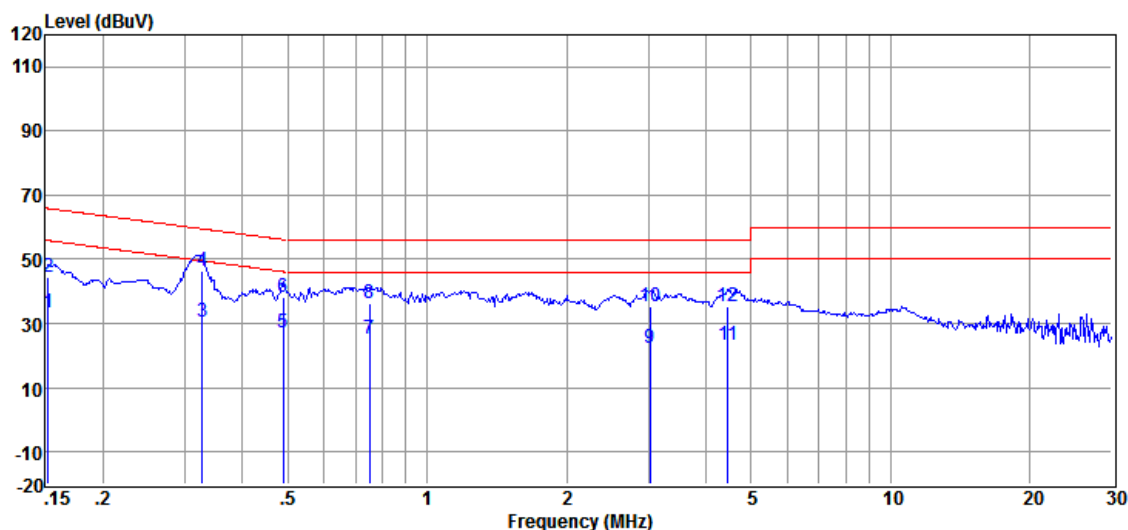


Item	Freq.	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)	
1	0.322	19.55	0.04	10.16	29.75	49.66	-19.91	Average
2	0.322	34.62	0.04	10.16	44.82	59.66	-14.84	QP
3	0.759	14.07	0.05	10.18	24.30	46.00	-21.70	Average
4	0.759	23.75	0.05	10.18	33.98	56.00	-22.02	QP
5	1.117	12.60	0.05	10.18	22.83	46.00	-23.17	Average
6	1.117	23.98	0.05	10.18	34.21	56.00	-21.79	QP
7	1.593	12.34	0.06	10.19	22.59	46.00	-23.41	Average
8	1.593	25.04	0.06	10.19	35.29	56.00	-20.71	QP
9	2.066	12.97	0.06	10.19	23.22	46.00	-22.78	Average
10	2.066	25.39	0.06	10.19	35.64	56.00	-20.36	QP
11	10.179	19.40	0.21	10.12	29.73	50.00	-20.27	Average
12	10.179	25.92	0.21	10.12	36.25	60.00	-23.75	QP

Level = Read Level + LISN/ISN Factor + Cable Loss.

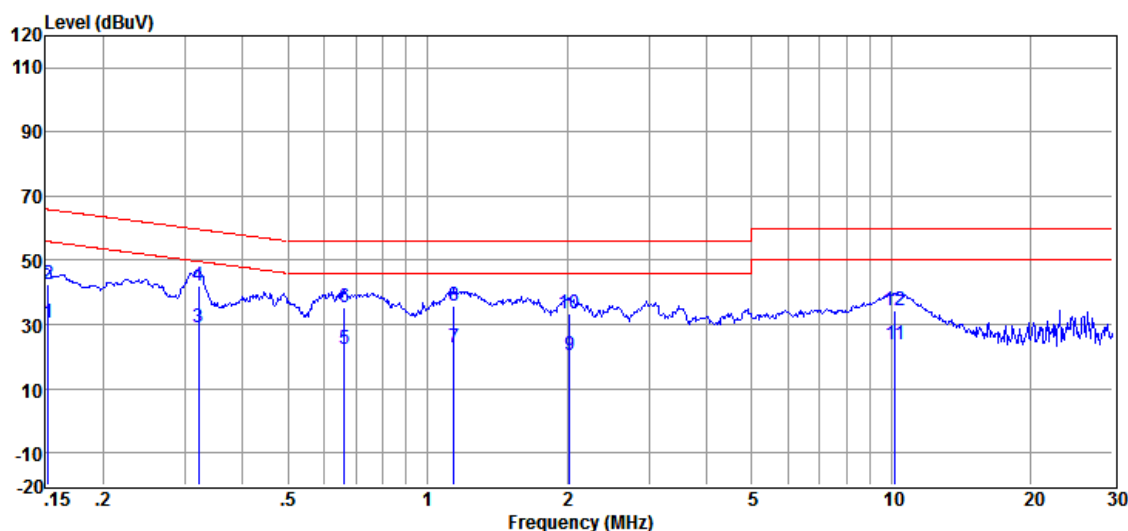
POE:

Live Line:



Item	Freq.	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)	
1	0.152	23.46	0.05	9.81	33.32	55.87	-22.55	Average
2	0.152	34.46	0.05	9.81	44.32	65.87	-21.55	QP
3	0.327	20.44	0.09	9.81	30.34	49.53	-19.19	Average
4	0.327	36.44	0.09	9.81	46.34	59.53	-13.19	QP
5	0.489	17.27	0.10	9.82	27.19	46.19	-19.00	Average
6	0.489	28.27	0.10	9.82	38.19	56.19	-18.00	QP
7	0.751	15.39	0.10	9.83	25.32	46.00	-20.68	Average
8	0.751	26.39	0.10	9.83	36.32	56.00	-19.68	QP
9	3.025	12.36	0.11	9.85	22.32	46.00	-23.68	Average
10	3.025	25.36	0.11	9.85	35.32	56.00	-20.68	QP
11	4.454	13.53	0.14	9.86	23.53	46.00	-22.47	Average
12	4.454	25.53	0.14	9.86	35.53	56.00	-20.47	QP

Neutral Line:



Item	Freq.	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)	
1	0.152	20.45	0.05	9.81	30.31	55.87	-25.56	Average
2	0.152	32.45	0.05	9.81	42.31	65.87	-23.56	QP
3	0.322	18.99	0.04	9.81	28.84	49.66	-20.82	Average
4	0.322	31.99	0.04	9.81	41.84	59.66	-17.82	QP
5	0.661	12.66	0.05	9.82	22.53	46.00	-23.47	Average
6	0.661	25.66	0.05	9.82	35.53	56.00	-20.47	QP
7	1.141	12.98	0.05	9.84	22.87	46.00	-23.13	Average
8	1.141	25.98	0.05	9.84	35.87	56.00	-20.13	QP
9	2.023	10.40	0.06	9.85	20.31	46.00	-25.69	Average
10	2.023	23.40	0.06	9.85	33.31	56.00	-22.69	QP
11	10.179	13.52	0.21	9.87	23.60	50.00	-26.40	Average
12	10.179	24.52	0.21	9.87	34.60	60.00	-25.40	QP

Level = Read Level + LISN/ISN Factor + Cable Loss.

7.2 Conducted Emissions at Telecommunication ports, 150 kHz to 30 MHz

Detector: Peak for pre-scan
Quasi-Peak and Average at frequency with maximum peak
(9 kHz resolution bandwidth)

Class / Limit: Table 4-Class B

Frequency range MHz	Class B Voltage limits dB (μV)	
	Quasi-peak	Average
0.15 to 0.50	84 to 74	74 to 64
0.50 to 30	74	64

NOTE 1: The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.
NOTE 2: The lower limit is applicable at the transition frequency.

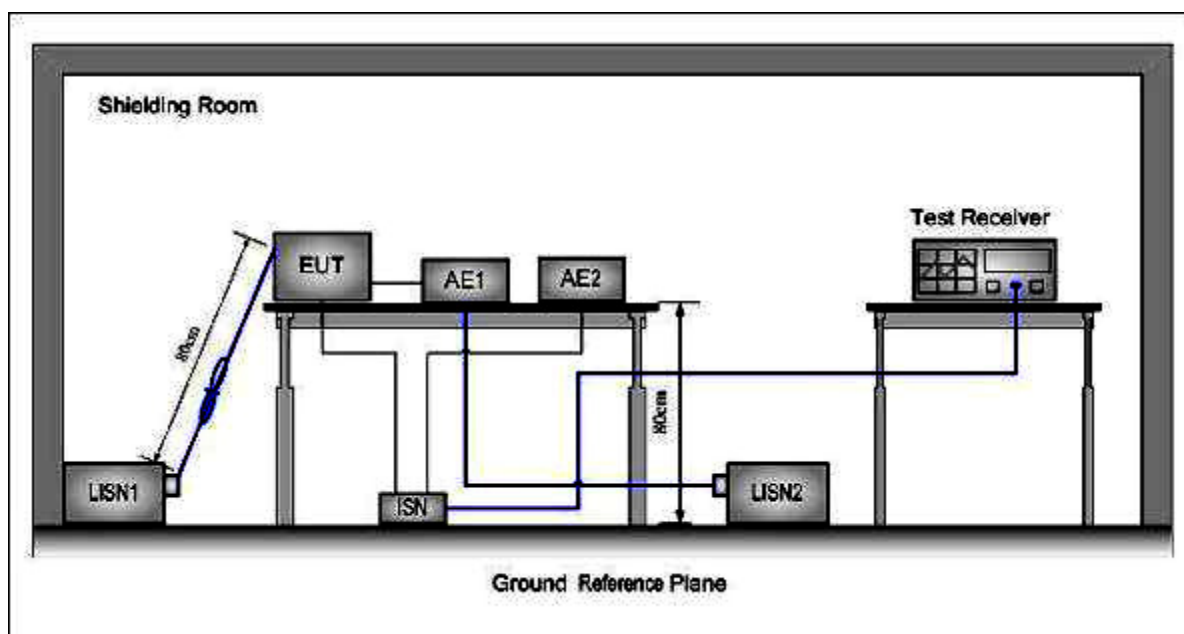
7.2.1 E.U.T. Operation

Test mode: Ethernet monitoring mode

Pre-scan was performed with peak detected on all ports, Quasi-peak & average measurements were performed at the frequencies at which maximum peak emission level were detected.

Please see the attached Quasi-peak and Average test results.

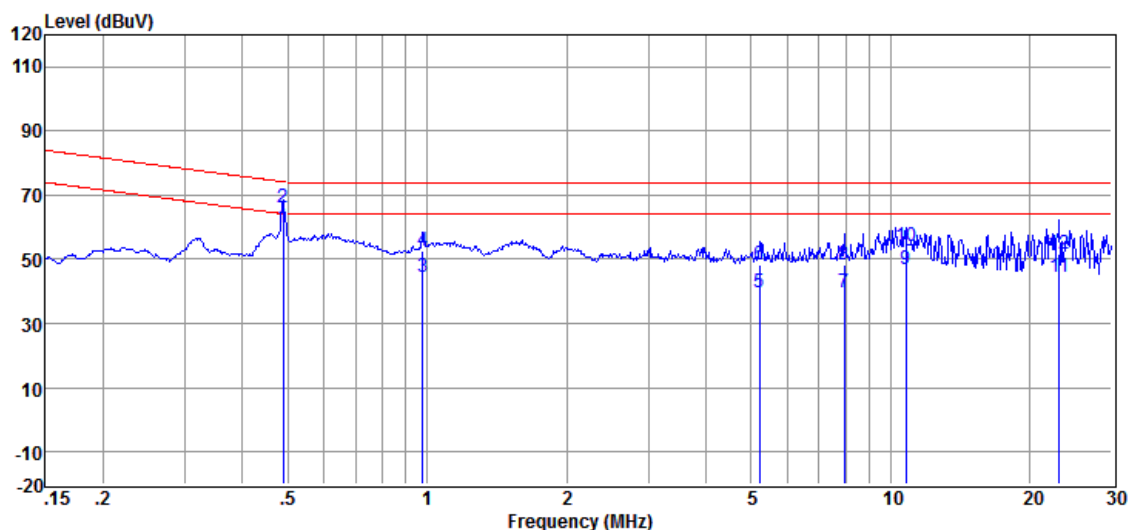
7.2.2 Test Setup and Procedure



1. The mains terminal disturbance voltage test was conducted in a shielded room.
2. The EUT was connected to nominal power supply through an LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The Telecommunication cables of EUT was connected to ISN. The power cables of all other units of the EUT was connected to LISN2, which was bonded to the ground reference plane in the same way as the LISN for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN.
5. The ISNs were used for measurements on telecom ports, they were nominally 0.8 m from the EUT and bonded to a ground reference plane. Other units of the equipment under test shall be at least 0.8 m from the ISN.

7.2.3 Measurement Data

LAN port:

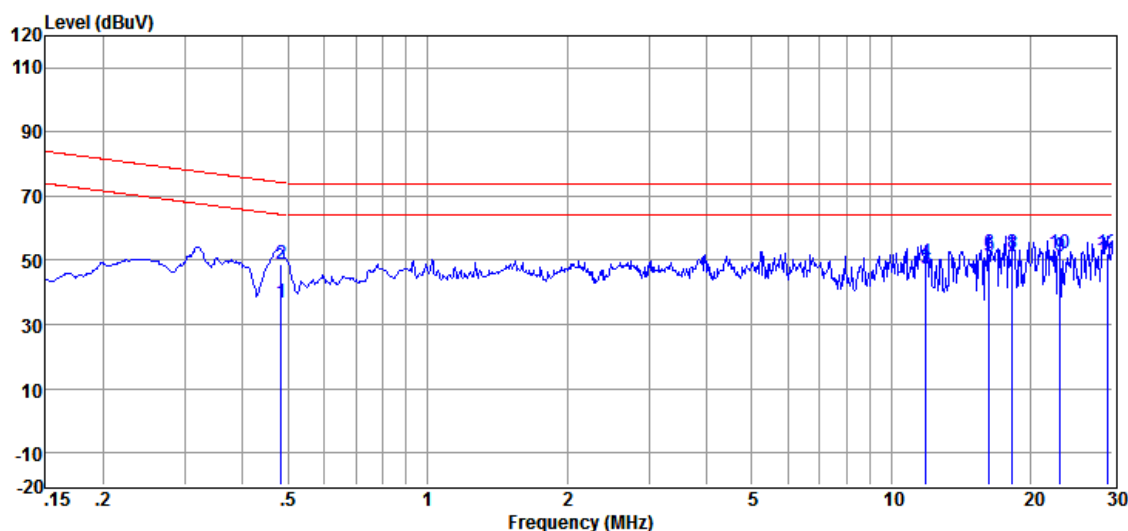


Item	Freq.	Read Level	ISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)	
1	0.489	40.15	9.45	10.17	59.77	64.19	-4.42	Average
2	0.489	46.65	9.45	10.17	66.27	74.19	-7.92	QP
3	0.979	25.15	9.35	10.18	44.68	64.00	-19.32	Average
4	0.979	33.05	9.35	10.18	52.58	74.00	-21.42	QP
5	5.221	20.39	9.20	10.25	39.84	64.00	-24.16	Average
6	5.221	28.85	9.20	10.25	48.30	74.00	-25.70	QP
7	7.935	20.18	9.20	10.29	39.67	64.00	-24.33	Average
8	7.935	29.01	9.20	10.29	48.50	74.00	-25.50	QP
9	10.790	27.49	9.21	10.20	46.90	64.00	-17.10	Average
10	10.790	34.83	9.21	10.20	54.24	74.00	-19.76	QP
11	23.140	24.72	9.35	10.40	44.47	64.00	-19.53	Average
12	23.140	31.74	9.35	10.40	51.49	74.00	-22.51	QP

Level = Read Level + LISN/ISN Factor + Cable Loss.

POE:

LAN port:



Item	Freq.	Read Level	ISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)	
1	0.484	22.20	9.25	10.19	41.64	74.00	-32.36	Average
2	0.484	23.80	9.25	10.19	43.24	87.00	-43.76	QP
3	11.870	17.20	9.23	10.20	36.63	74.00	-37.37	Average
4	11.870	20.83	9.23	10.20	40.26	87.00	-46.74	QP
5	16.226	28.13	9.21	10.24	47.58	74.00	-26.42	Average
6	16.226	34.98	9.21	10.24	54.43	87.00	-32.57	QP
7	18.232	20.96	9.20	10.25	40.41	74.00	-33.59	Average
8	18.232	29.04	9.20	10.25	48.49	87.00	-38.51	QP
9	23.140	16.92	9.20	10.28	36.40	74.00	-37.60	Average
10	23.140	22.25	9.20	10.28	41.73	87.00	-45.27	QP
11	29.216	3.06	9.32	10.37	22.75	74.00	-51.25	Average
12	29.216	10.95	9.32	10.37	30.64	87.00	-56.36	QP

Level = Read Level + LISN/ISN Factor + Cable Loss.

7.3 Radiated Emissions, 30MHz to 1GHz

Detector: Peak for pre-scan (120 kHz resolution bandwidth)

Limit:

For 3m

Frequency range	Quasi-peak limits(Class B)
MHz	dB (μV/m)
30 to 230	40
230 to 1000	47
At transitional frequencies the lower limit applies.	

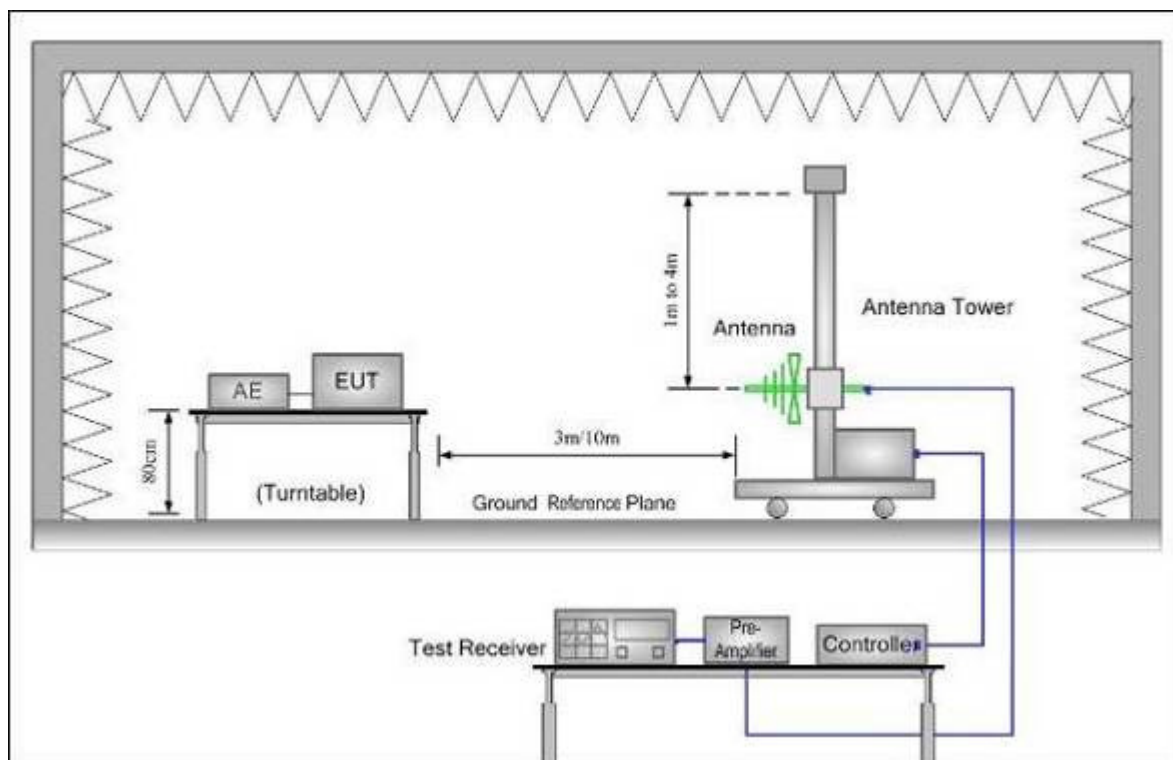
7.3.1 E.U.T. Operation

Test mode: Ethernet monitoring mode

Pre-scan was performed with peak detected on all ports, Quasi-peak measurements were performed at the frequencies at which maximum peak emission level were detected.

Please see the attached Quasi-peak test results.

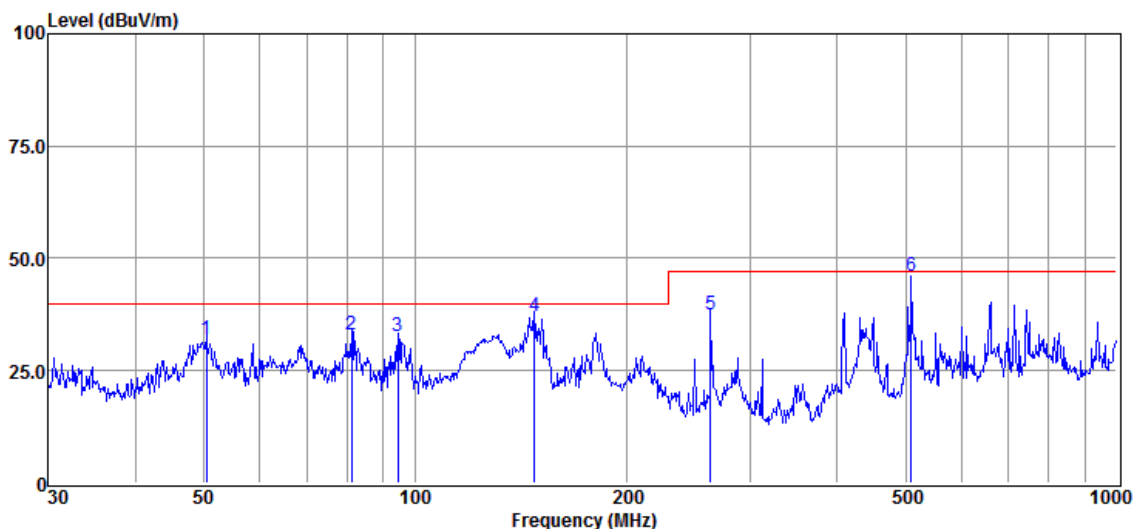
7.3.2 Test Setup and Procedure



1. The radiated emissions test was conducted in a semi-anechoic chamber.
2. The EUT was connected to AC power source through a mains power outlet which was bonded to the ground reference plane; The mains cables shall drape to the ground reference plane.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum signature data plots of the EUT.
5. The frequencies of maximum emission were determined in the final radiated emissions measurement, the physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

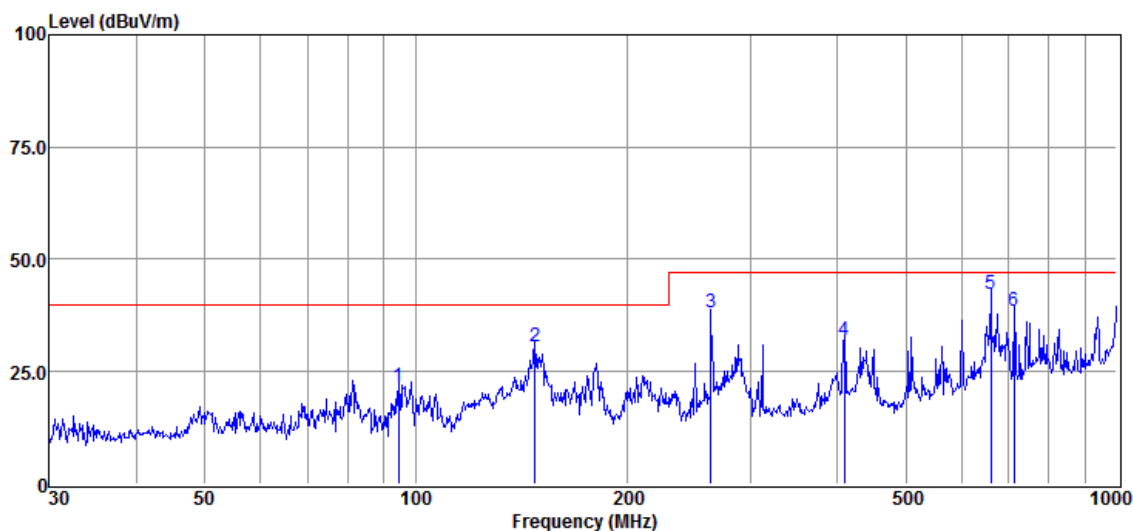
7.3.3 Measurement Data

Vertical:



Item	Freq.	Read Level	Antenna Factor	Preamplifier Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	50.41	46.87	13.76	28.80	0.26	32.09	40.00	-7.91	QP
2	81.21	52.28	8.98	28.70	0.38	32.94	40.00	-7.06	QP
3	94.43	51.67	8.99	28.61	0.43	32.48	40.00	-7.52	QP
4	147.92	52.13	12.70	28.40	0.62	37.05	40.00	-2.95	QP
5	263.82	52.23	12.24	27.90	0.79	37.36	47.00	-9.64	QP
6	510.04	56.51	17.40	29.21	1.20	45.90	47.00	-1.10	QP

Horizontal:

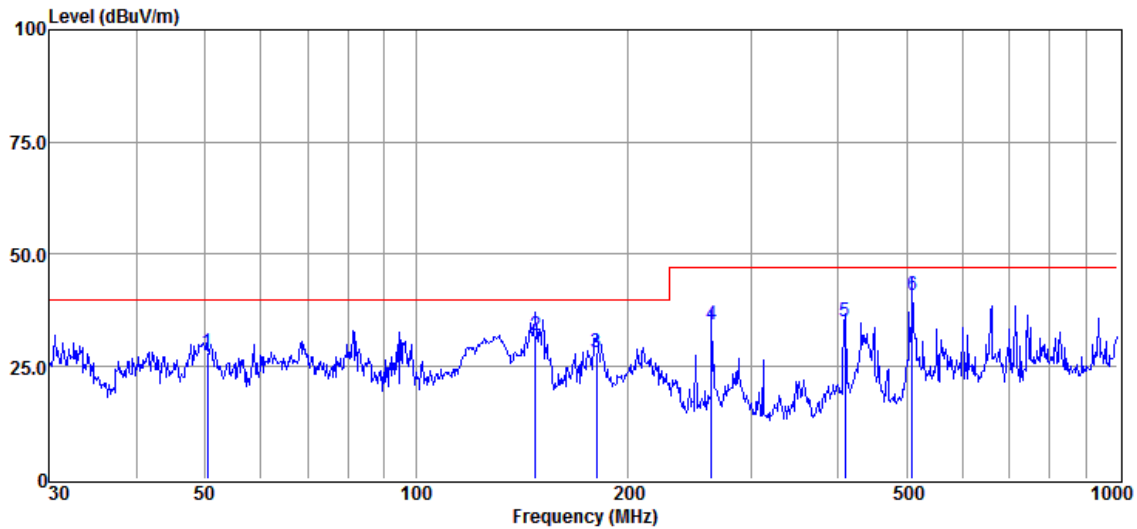


Item	Freq.	Read Level	Antenna Factor	Preamplifier Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	94.43	41.01	8.99	28.61	0.43	21.82	40.00	-18.18	QP
2	147.92	45.83	12.70	28.40	0.62	30.75	40.00	-9.25	QP
3	263.82	52.87	12.24	27.90	0.79	38.00	47.00	-9.00	QP
4	408.95	44.50	15.35	28.74	1.01	32.12	47.00	-14.88	QP
5	661.15	49.83	20.13	29.27	1.55	42.24	47.00	-4.76	QP
6	714.17	44.85	21.10	29.29	1.75	38.41	47.00	-8.59	QP

$$\text{Level} = \text{Read Level} + \text{Antenna Factor} + \text{Cable Loss} - \text{Preamplifier Factor}$$

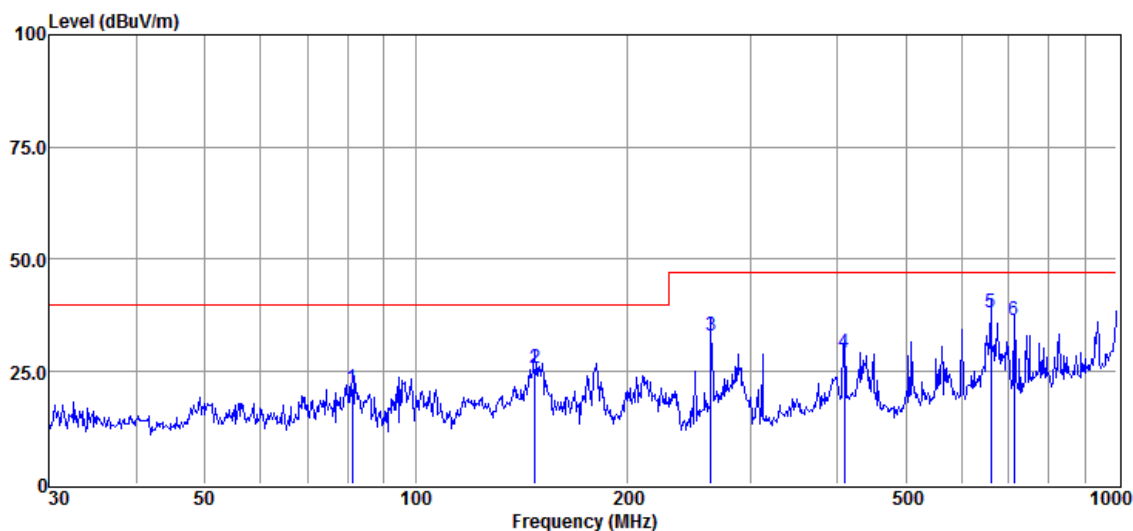
POE:

Vertical:



Item	Freq.	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	50.41	45.45	10.68	28.30	0.26	28.09	40.00	-11.91	QP
2	147.92	48.09	11.78	28.44	0.62	32.05	40.00	-7.95	QP
3	180.65	44.14	11.79	28.36	0.67	28.24	40.00	-11.76	QP
4	263.82	48.81	11.99	27.23	0.79	34.36	47.00	-12.64	QP
5	408.95	46.76	15.30	28.15	1.01	34.92	47.00	-12.08	QP
6	510.04	50.91	17.45	28.66	1.20	40.90	47.00	-6.10	QP

Horizontal:



Item	Freq.	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	81.21	40.92	8.01	28.18	0.38	21.13	40.00	-18.87	QP
2	147.92	41.79	11.78	28.44	0.62	25.75	40.00	-14.25	QP
3	263.82	47.45	11.99	27.23	0.79	33.00	47.00	-14.00	QP
4	408.95	40.96	15.30	28.15	1.01	29.12	47.00	-17.88	QP
5	661.15	45.28	19.91	28.50	1.55	38.24	47.00	-8.76	QP
6	714.17	42.61	20.47	28.42	1.75	36.41	47.00	-10.59	QP

$$\text{Level} = \text{Read Level} + \text{Antenna Factor} + \text{Cable Loss} - \text{Preamp Factor}$$

7.4 Radiated Emissions, 1GHz to 6GHz

Detector: Peak for pre-scan
Peak and Average if maximised peak within 6 dB of limit
(1 MHz resolution bandwidth)

Class / Limit: Table 8-Class B

Frequency range GHz	Class B Limits	
	Average limit dB (μV/m)	Peak limits dB (μV/m)
1 to 3	50	70
3 to 6	54	74

At transitional frequencies the lower limit applies.

Remark:

The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes.

1. If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.
2. If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.
3. If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, measurement shall only be made up to 5 GHz.
4. If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

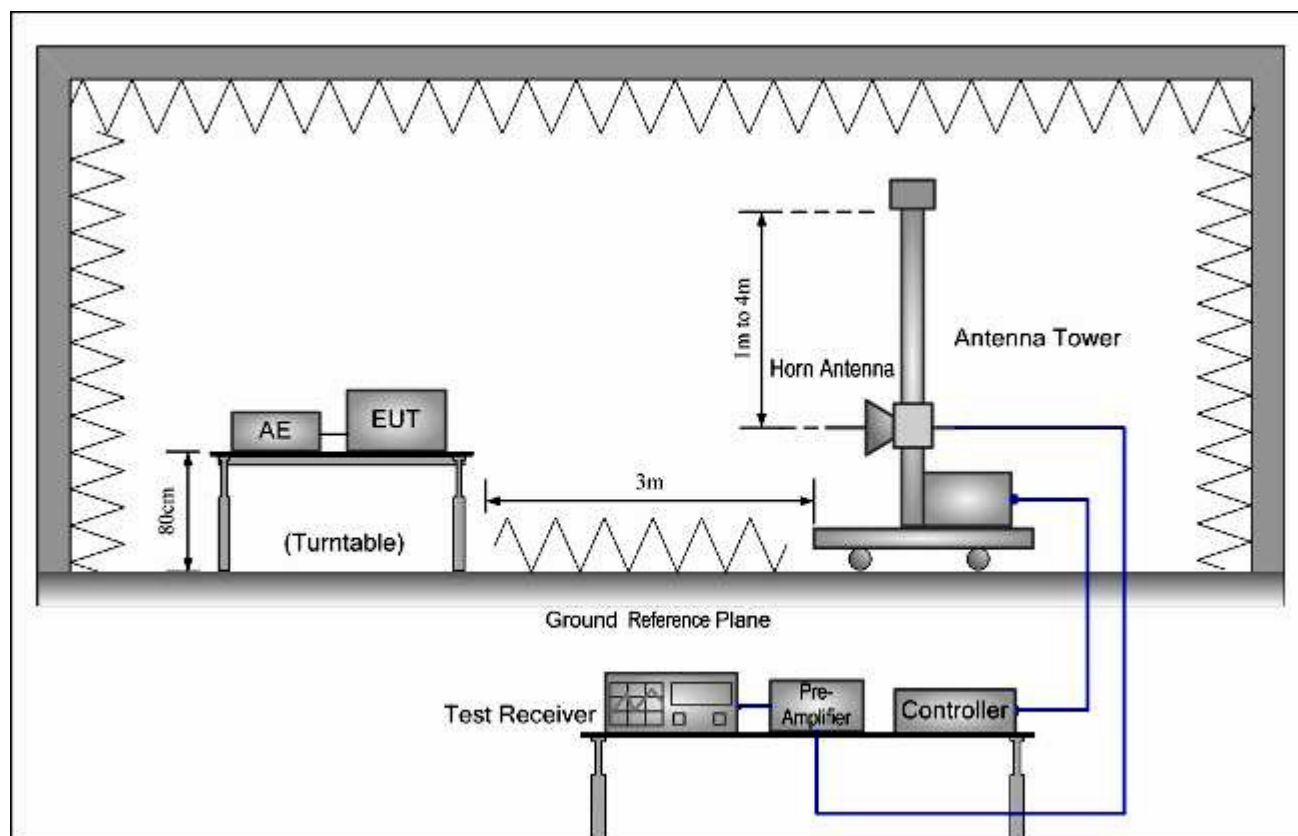
7.4.1 E.U.T. Operation

Test mode: Ethernet monitoring mode

Pre-scan was performed with peak detected on all ports, Peak & average measurements were performed at the frequencies at which maximum peak emission level were detected.

Please see the attached Peak and Average test results.

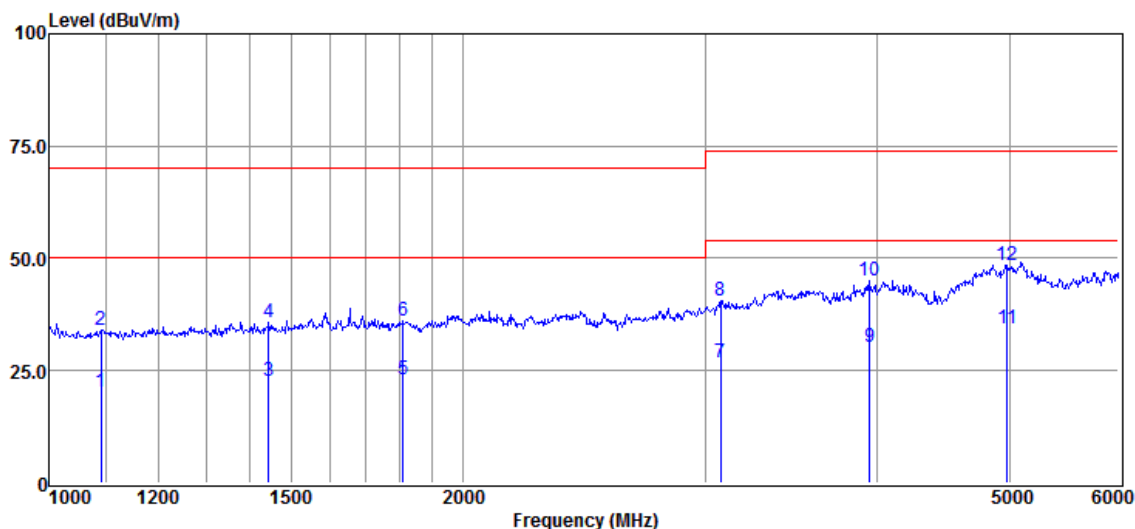
7.4.2 Test Setup and Procedure



1. The radiated emissions test was conducted in a fully-anechoic chamber.
2. Horn antenna was used for the frequency above 1GHz
3. The EUT was connected to nominal power supply through a mains power outlet which was bonded to the ground reference plane; The mains cables were draped to the ground reference plane. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum plots of the EUT.
5. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

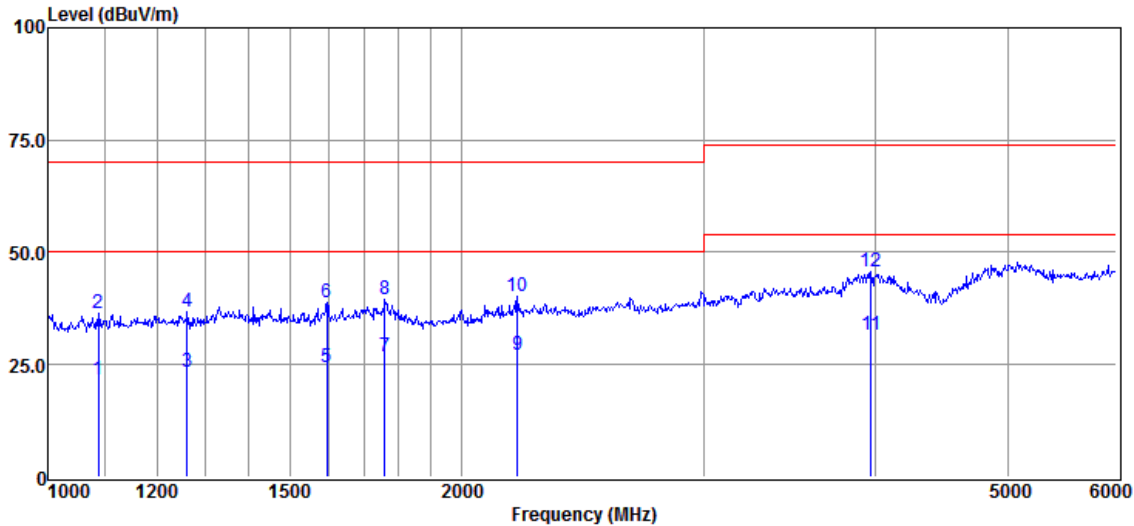
7.4.3 Measurement Data

Vertical:



Item	Freq.	Read Level	Antenna Factor	Preamplifier Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	1089.81	33.17	24.61	40.74	3.11	20.15	50.00	-29.85	Average
2	1089.81	47.21	24.61	40.74	3.11	34.19	70.00	-35.81	Peak
3	1443.85	34.29	24.95	40.55	3.96	22.65	50.00	-27.35	Average
4	1443.85	47.32	24.95	40.55	3.96	35.68	70.00	-34.32	Peak
5	1809.54	33.34	26.36	40.98	4.39	23.11	50.00	-26.89	Average
6	1809.54	46.44	26.36	40.98	4.39	36.21	70.00	-33.79	Peak
7	3080.91	32.39	29.62	40.77	5.71	26.95	54.00	-27.05	Average
8	3080.91	45.83	29.62	40.77	5.71	40.39	74.00	-33.61	Peak
9	3952.23	31.02	32.54	40.10	6.90	30.36	54.00	-23.64	Average
10	3952.23	45.78	32.54	40.10	6.90	45.12	74.00	-28.88	Peak
11	4979.93	31.07	37.86	41.69	7.04	34.28	54.00	-19.72	Average
12	4979.93	45.38	37.86	41.69	7.04	48.59	74.00	-25.41	Peak

Horizontal:

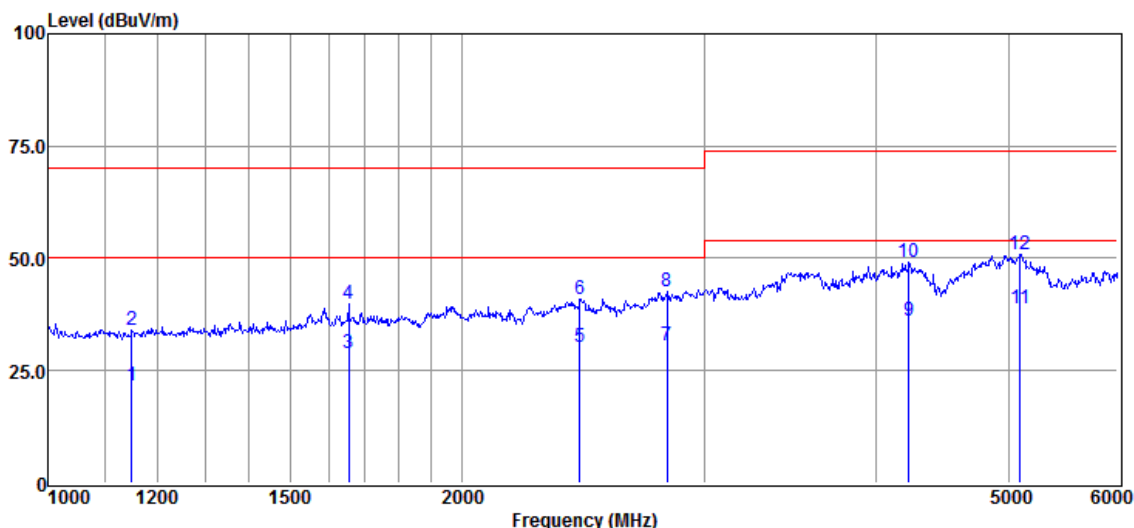


Item	Freq.	Read Level	Antenna Factor	Preamplifier Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	1087.86	34.55	24.60	40.74	3.11	21.52	50.00	-28.48	Average
2	1087.86	49.37	24.60	40.74	3.11	36.34	70.00	-33.66	Peak
3	1262.29	35.62	24.79	40.64	3.57	23.34	50.00	-26.66	Average
4	1262.29	48.90	24.79	40.64	3.57	36.62	70.00	-33.38	Peak
5	1596.24	35.68	25.46	40.68	3.94	24.40	50.00	-25.60	Average
6	1596.24	49.94	25.46	40.68	3.94	38.66	70.00	-31.34	Peak
7	1758.40	37.17	26.16	40.91	4.26	26.68	50.00	-23.32	Average
8	1758.40	50.02	26.16	40.91	4.26	39.53	70.00	-30.47	Peak
9	2195.88	36.22	27.39	41.11	4.49	26.99	50.00	-23.01	Average
10	2195.88	49.37	27.39	41.11	4.49	40.14	70.00	-29.86	Peak
11	3973.53	32.36	32.60	40.08	6.90	31.78	54.00	-22.22	Average
12	3973.53	46.27	32.60	40.08	6.90	45.69	74.00	-28.31	Peak

Level = Read Level + Antenna Factor + Cable Loss – Preamplifier Factor

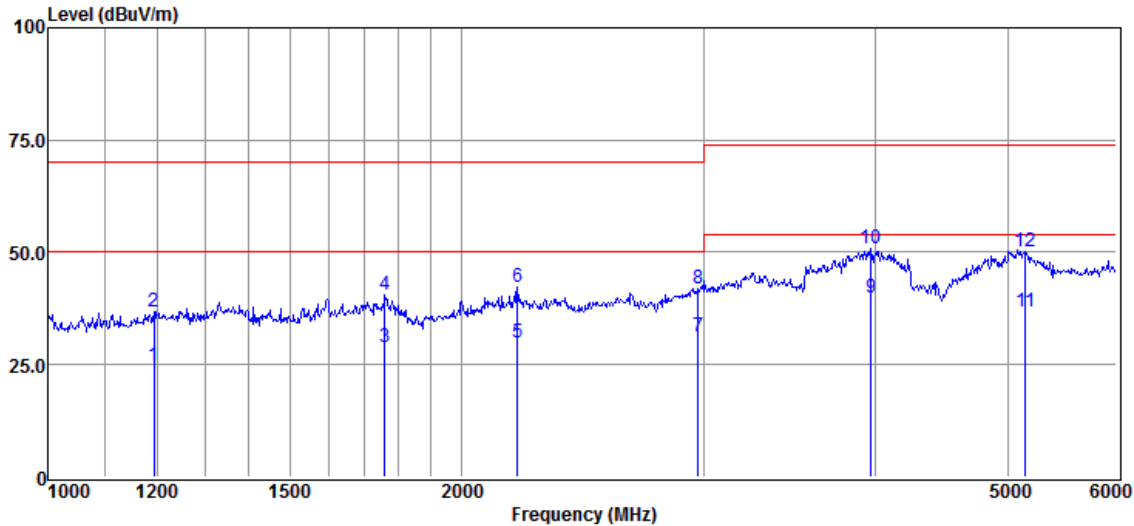
POE:

Vertical:



Item	Freq.	Read Level	Antenna Factor	Preamplifier	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	1150.00	34.51	24.67	40.70	3.25	21.73	50.00	-28.27	Average
2	1150.00	46.87	24.67	40.70	3.25	34.09	70.00	-35.91	Peak
3	1654.48	39.77	25.71	40.76	4.06	28.78	50.00	-21.22	Average
4	1654.48	50.77	25.71	40.76	4.06	39.78	70.00	-30.22	Peak
5	2436.36	38.72	27.72	40.98	4.84	30.30	50.00	-19.70	Average
6	2436.36	49.41	27.72	40.98	4.84	40.99	70.00	-29.01	Peak
7	2821.95	38.06	28.54	40.86	4.98	30.72	50.00	-19.28	Average
8	2821.95	50.01	28.54	40.86	4.98	42.67	70.00	-27.33	Peak
9	4230.70	38.00	31.51	40.62	7.06	35.95	54.00	-18.05	Average
10	4230.70	51.10	31.51	40.62	7.06	49.05	74.00	-24.95	Peak
11	5097.29	35.82	37.55	41.67	7.02	38.72	54.00	-15.28	Average
12	5097.29	48.09	37.55	41.67	7.02	50.99	74.00	-23.01	Peak

Horizontal:



Item	Freq.	Read Level	Antenna Factor	Preamplifier Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	1194.09	37.36	24.72	40.68	3.43	24.83	50.00	-25.17	Average
2	1194.09	49.34	24.72	40.68	3.43	36.81	70.00	-33.19	Peak
3	1758.40	39.41	26.16	40.91	4.26	28.92	50.00	-21.08	Average
4	1758.40	51.02	26.16	40.91	4.26	40.53	70.00	-29.47	Peak
5	2195.88	39.14	27.39	41.11	4.49	29.91	50.00	-20.09	Average
6	2195.88	51.37	27.39	41.11	4.49	42.14	70.00	-27.86	Peak
7	2972.46	37.72	29.19	40.83	5.35	31.43	50.00	-18.57	Average
8	2972.46	48.26	29.19	40.83	5.35	41.97	70.00	-28.03	Peak
9	3973.53	40.28	32.60	40.08	6.90	39.70	54.00	-14.30	Average
10	3973.53	51.27	32.60	40.08	6.90	50.69	74.00	-23.31	Peak
11	5152.39	34.03	37.06	41.64	7.21	36.66	54.00	-17.34	Average
12	5152.39	47.47	37.06	41.64	7.21	50.10	74.00	-23.90	Peak

Level = Read Level + Antenna Factor + Cable Loss – Preamplifier Factor

7.5 Harmonics Test Result

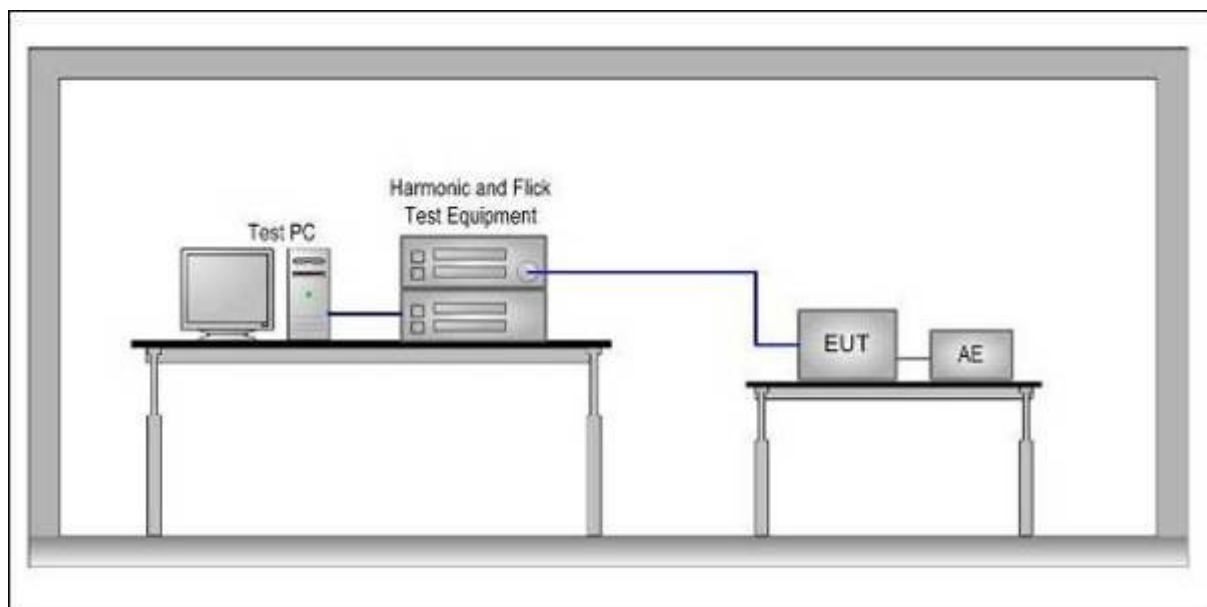
Measurement Time: 2.5mins

Class / Severity: Class A

7.5.1 E.U.T. Operation

Test mode: N/A

7.5.2 Test Setup and Procedure



1. The EUT was tested with the equipment configured to its rated current.
2. The measurements were carried out under steady conditions. When a piece of EUT is brought into operation or is taken out of operation, manually or automatically, harmonic currents and power are not taken into account at first 10s following the switching event. EUT shall not be in standby mode for more than 10% of any observation period.
3. Harmonics of the fundamental current were measured using a digital power meter with an analogue output and frequency analyser which was integrated in the harmonic & flicker test system.
4. For each harmonic order, measure the 1,5 s smoothed r.m.s. harmonic current in each DFT time window and calculate the arithmetic average of the measured values from the DFT time windows, over the entire observation period. Each harmonic order, all 1.5 s smoothed r.m.s. harmonic current values and the average values for the individual harmonic currents, taken over the entire test observation period shall be less than or equal to the applicable limits.

7.5.3 Measurement Data

There is no need for Harmonics test to be performed on this product (rated power is less than 75W) in accordance with EN 61000-3-2.

7.6 Flicker Test Result

Measurement Time: 120 mins
Class / Severity: Clause 5 of EN 61000-3-3

7.6.1 E.U.T. Operation

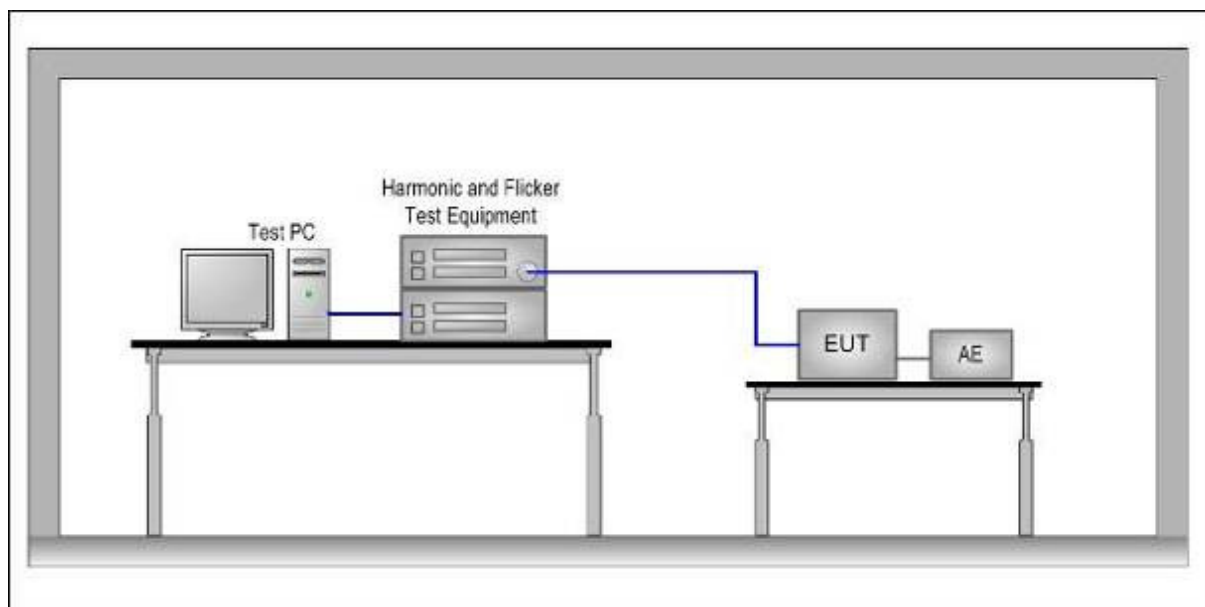
Test mode: Ethernet monitoring mode

Note: "Pst and Plt requirements shall not be applied to voltage changes caused by manual switching.

The limits shall not be applied to voltage changes associated with emergency switching or emergency interruptions."

Please also refer to Annex A (Application of limits and type test conditions) for details in EN 61000-3-3.

7.6.2 Test Setup and Procedure



1. The test supply voltage (open-circuit voltage) was the rated voltage of the EUT. The Test voltage: was maintained within $\pm 2\%$ of the nominal value. The frequency was $50\text{ Hz} \pm 0.5\%$.
2. The voltage fluctuations and flicker were measured at the supply terminals of the EUT.
3. The observation period, T_p , for the assessment of flicker values by flicker measurement, flicker simulation, or analytical method was:
 - for Pst, $T_p = 10\text{ min}$;
 - for Plt, $T_p = 2\text{ h}$.

The observation period included that part of the whole operation cycle in which the EUT produces the most unfavorable sequence of voltage changes.

7.6.3 Measurement Data

Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.90		
T-max (mS):	0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.22	Test limit (%):	3.30 Pass
Highest dmax (%):	0.25	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.229	Test limit:	1.000 Pass
Highest Plt (2 hr. period):	0.100	Test limit:	0.650 Pass

POE:

Parameter values recorded during the test:

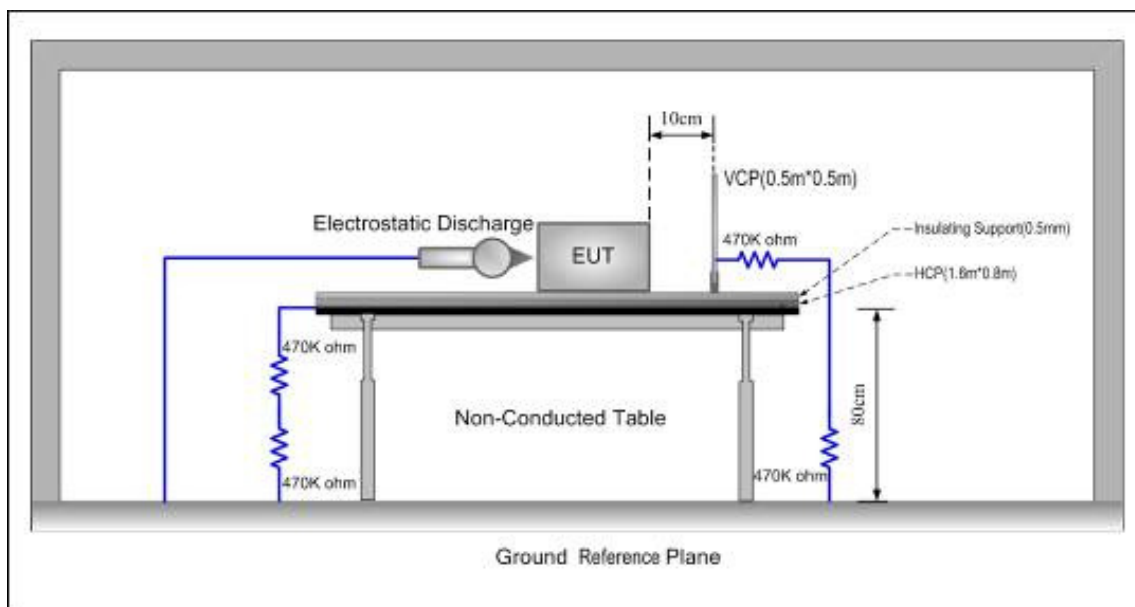
Vrms at the end of test (Volt):	229.90		
T-max (mS):	0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.26	Test limit (%):	3.30 Pass
Highest dmax (%):	0.32	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.236	Test limit:	1.000 Pass
Highest Plt (2 hr. period):	0.100	Test limit:	0.650 Pass

8 Immunity Test Results

8.1 Electrostatic discharge

Discharge Voltage:	Air Discharge:	$\pm 2\text{ kV}$, $\pm 4\text{ kV}$, $\pm 8\text{ kV}$
	Contact Discharge:	$\pm 6\text{ kV}$
	HCP/VCP:	$\pm 6\text{ kV}$
Polarity:	Positive & Negative	
Number of Discharge:	Minimum 10 times at each test point for Contact and VCP&HCP Discharge; Minimum 10 times at each test point for Air Discharge.	
Discharge Mode:	Single Discharge	
Discharge Period:	1 second minimum	
Criteria for compliance:	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.	

8.1.1 Test Setup and Procedure



1. Contact discharge was applied only to conductive surfaces of the EUT. Air discharge was applied only to non-conducted surfaces of the EUT.
2. The EUT was put on a 0.8m high wooden table for table-top equipment or 0.1m high for floor standing equipment standing on the ground reference plane (GRP).
3. A horizontal coupling plane(HCP) 1.6m by 0.8m in size was placed on the table, and the EUT with its cables were isolated from the HCP by an insulating support thick than 0.5mm. The VCP 0.5m by 0.5m in size while HCP were constructed from the same material type and thickness as that of the GRP, and connected to the GRP via a 470kΩ resistor at each end. The distance between EUT and any of the other metallic surface

excepted the GRP, HCP and VCP was greater than 0.8m.

4. During the contact discharges, the tip of the discharge electrode was touch the EUT before the discharge switch is operated. During the air discharges, the round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT.
5. After each discharge, the ESD generator was removed from the EUT, the generator is then retriggered for a new single discharge. For ungrounded product, a discharge cable with two resistances were used after each discharge to remove remnant electrostatic voltage. A minimum 10 times discharges at each point of each polarity single discharge were applied to HCP and VCP.

8.1.2 Test Results

Direct Application Test Results

- Observations: Test Point:
1. All insulated enclosure & seams.
 2. All accessible metal parts of the enclosure.

Direct Application		Test Results			
Discharge Level (kV)	Polarity (+/-)	Test Point	Test Mode	Contact Discharge	Air Discharge
2,4,8	+/-	1	Ethernet monitoring mode	N/A	Pass
6	+/-	2		Pass	N/A

Indirect Application Test Results

- Observations: Test Point:
1. All sides.

Indirect Application		Test Results			
Discharge Level (kV)	Polarity (+/-)	Test Point	Test Mode	Horizontal Coupling	Vertical Coupling
6	+/-	1	Ethernet monitoring mode	Pass	Pass

Results: Pass

Test phenomenon description for the EUT:

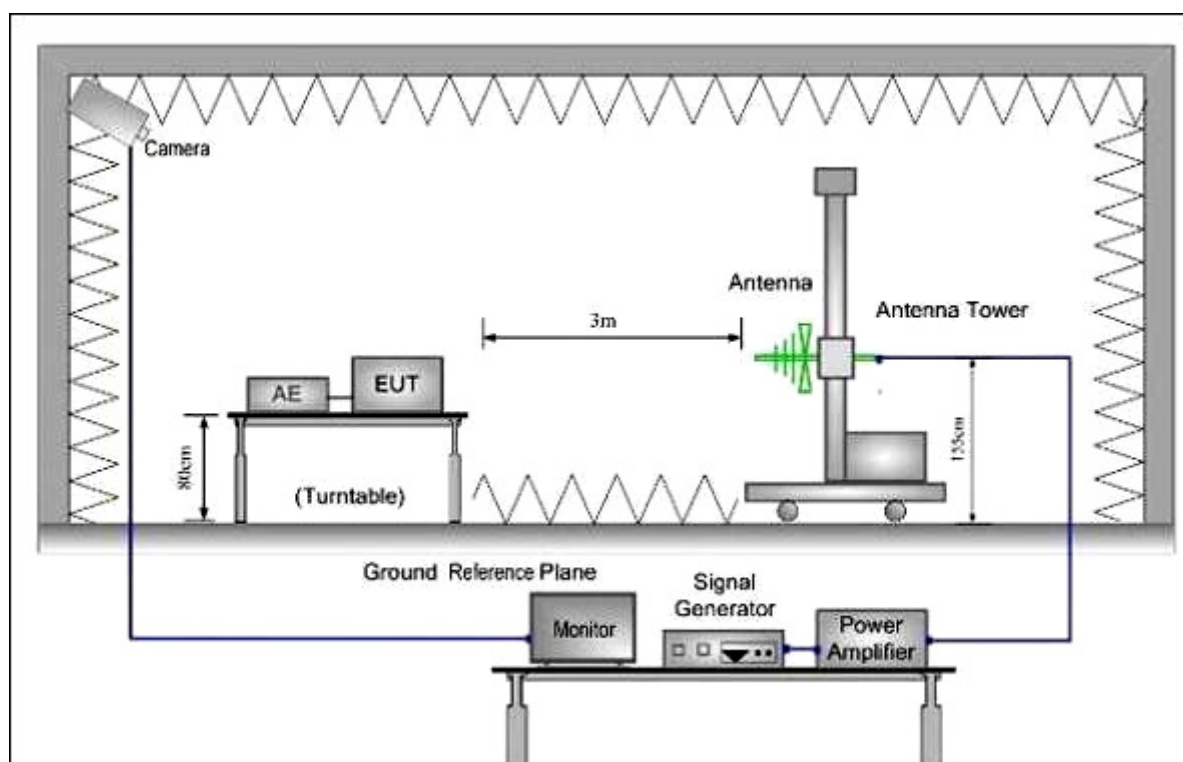
1. The EUT working normal, before the conditioning.
2. Monitor the EUT during the conditioning period to detect no any change in status, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

N/A: Not applicable (not required in the standard or floor mounted the EUT)

8.2 Radiated electromagnetic fields (80MHz to 2.7GHz)

Test level:	10 V/m on enclosure
Modulation:	80%, 1 kHz Amplitude Modulation & 0.5s ON 0.5s OFF Pulse Modulation
Criteria for compliance:	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, and no such flickering of indicators occurs at a field strength of 3 V/m.

8.2.1 Test Setup and Procedure



1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items.
2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length.
3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area).

4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary. Here the frequency range was swept incrementally, the step size was not exceed 1% of the preceding frequency value.
5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0.5 s.
6. The test normally was performed with the generating antenna facing each side of the EUT.
7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.
8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or a audio monitor were used to monitor the performance of the EUT.

8.2.2 Test Results:Pass

Frequency	Level	Modulation	Test Mode	Dwell Time	Antenna Polarization	EUT Face	Result / Observations
80 MHz-2.7 GHz	10 V/m	(80%, 1kHz, A.M.)&(0.5s ON 0.5s OFF P.M.)	Enternet monitoring mode	3s	V	Front	Pass
					H		Pass
					V	Rear	Pass
					H		Pass
					V	Left	Pass
					H		Pass
					V	Right	Pass
					H		Pass
					V	Top	N/A
					H		N/A
					V	Bottom	N/A
					H		N/A

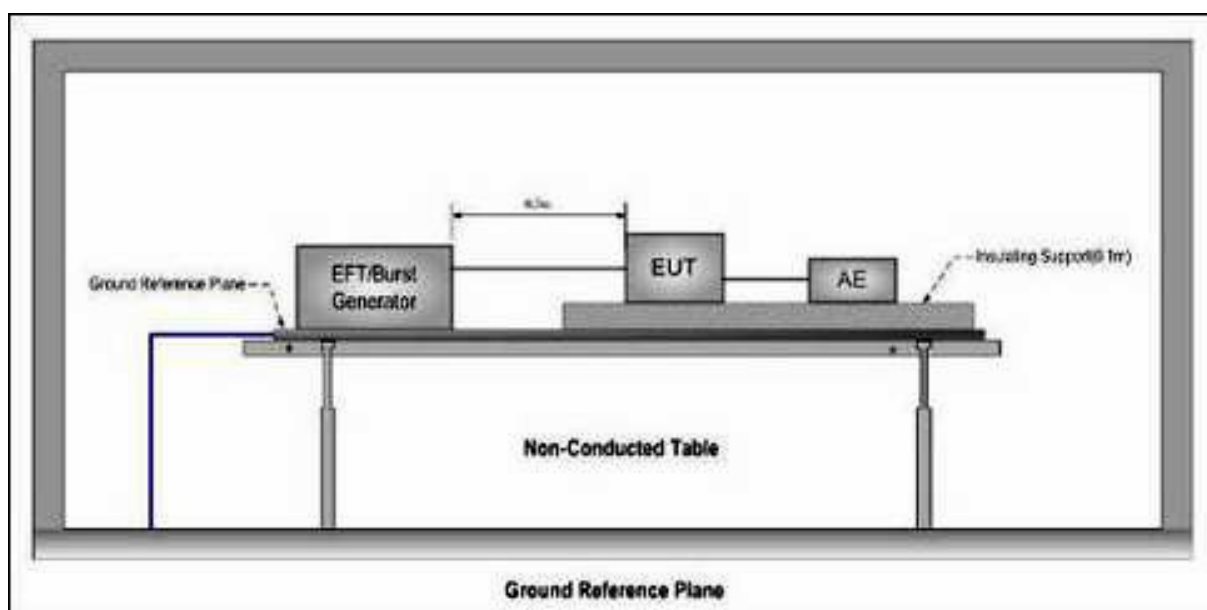
Test phenomenon description for the EUT:

1. The EUT working normal, before the conditioning.
2. Monitor the EUT during the conditioning period and detected no any changes in states, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

8.3 Fast transient bursts

Test Level:	±1.0kV on AC port ±0.5kV on Signal ports
Polarity:	Positive & Negative
Repetition Frequency:	100KHz
Burst Duration:	300ms
Test Duration:	1 minute per level & polarity
Criteria for compliance:	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.

8.3.1 Test Setup and Procedure



1. The EUT was placed on a ground reference plane (GRP) insulated by an insulating support 0.1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
2. The GRP shall project beyond the EUT and the clamp by at least 0.1m on all sides. The distance between the EUT and any other of the metallic surface except the GRP was greater than 0.5m. All cables to the EUT were placed on the insulation support 0.1m above GRP. Cables not subject to EFT were routed as far as possible from cable under test to minimize the coupling between the cables.
3. The length of signal and power cable between the EUT and EFT generator was 0.5m. If the cable is a non-detachable supply cable more than 0.5m, the excess length of this cable shall be folded to avoid a flat coil and situated at a distance of 0.1m above the GRP.
4. The EUT was conducted the below specified level voltage test for line to neutral or line to neutral to earth (for clamp coupling is for the signal line), 120 seconds duration.

5. If the equipment contains identical ports, only one was tested; multiconductor cables, such as a 50-pair telecommunication cable, were tested as a single cable. Cables did not be split or divided into groups of conductors for this test; interface ports, which were intended by the manufacturer to be connected to data cables not longer than 3 m, did not be tested.

8.3.2 Test Results: Pass

AC port:

Lead under Test	Level (±kV)	Coupling Direct/Clamp	Test mode	Observations (Performance Criterion)
Live + Neutral	±1.0	Direct	Enternet monitoring mode	Pass

Signal ports:

Lead under Test	Level (±kV)	Coupling Direct/Clamp	Test mode	Observations (Performance Criterion)
Signal cable	± 0.5	Clamp	Enternet monitoring mode	Pass

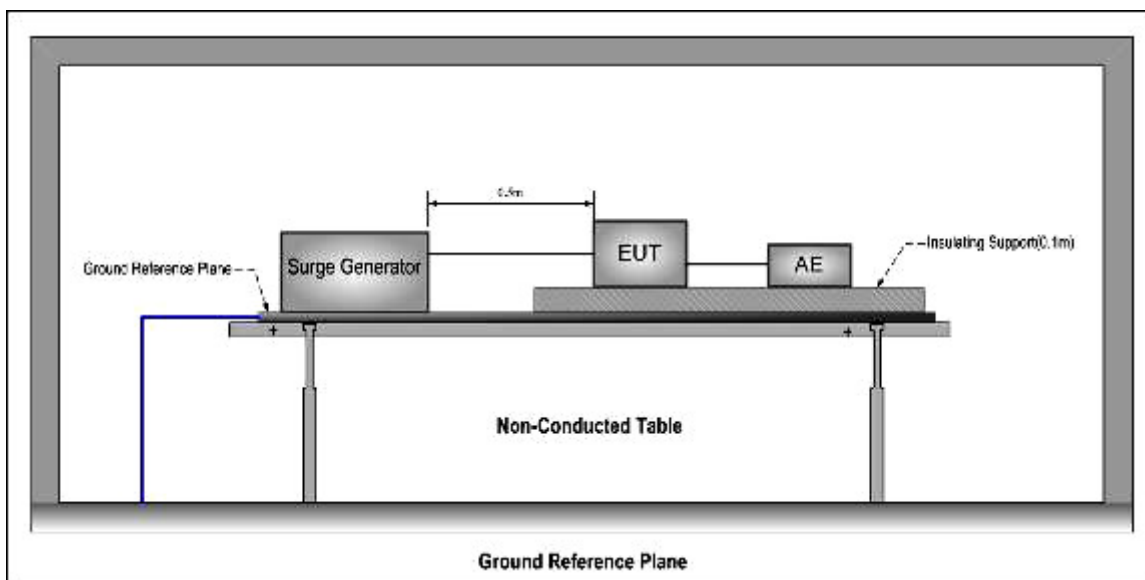
Test phenomenon description for the EUT:

1. The EUT working normal, before the conditioning.
2. Monitor the EUT during the conditioning period and detected no any changes in states, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

8.4 Slow high energy voltage surge

Test Level:	AC Supply: $\pm 1.0\text{kV}$, $\pm 2.0\text{kV}$ Line to Line Signal ports : $\pm 1.0\text{kV}$ Line to Ground
Polarity:	Positive & Negative
Generator source impedance:	$2\ \Omega$ on Line to Line, $42\ \Omega$ on Signal ports
Trigger Mode:	Internal
No. of surges:	5 positive, 5 negative at 0° , 90° , 180° , 270° for AC Mains, 5 positive, 5 negative for Signal ports.
Criteria for compliance:	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.

8.4.1 Test Setup and Procedure



1. The EUT was placed on a ground reference plane (GRP) insulated by an insulating support 0.1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
2. The 1,2/50 μs surge was to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks were 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 so that the specified wave may be applied on the lines under test.

3. The power cord between the EUT and the coupling/decoupling network was not exceeding 2 m in length. The interconnection line between the EUT and the coupling/ decoupling network shall not exceed 2 m in length.
4. The EUT was conducted 0.5kV and 1kV test voltage for live to neutral and line to neutral, five positive pulses and five negative pulses each at 0°, 90°, 180° and 270° for a.c. power ports. The test levels were applied on the EUT with a 2 Ω generator source impedance for power supply terminals and 40 Ω output impedance for interconnection lines. The tests were done at repetition rate one per minute.

8.4.2 Test Results: Pass

AC supply:

Pulse No	Line-Line	Level (kV)	Surge Interval	Phase (deg)	Test Mode	Observation (Performance Criterion)
1–10	L-N	+1.0, 2.0	60 s	0°	Ethernet monitoring mode	Pass
11–20	L-N	-1.0, 2.0	60 s	0°		Pass
21–30	L-N	+1.0, 2.0	60 s	90°		Pass
31–40	L-N	-1.0, 2.0	60 s	90°		Pass
41–50	L-N	+1.0, 2.0	60 s	180°		Pass
51–60	L-N	-1.0, 2.0	60 s	180°		Pass
61–70	L-N	+1.0, 2.0	60 s	270°		Pass
71–80	L-N	-1.0, 2.0	60 s	270°		Pass

A: During test, no degradation in the performance of the EUT was observed; After test, no degradation in the performance of the EUT was observed.

Signal ports:

Pulse No	Line under test	Matching resistor	Level (kV)	Surge Interval	Test Mode	Observation (Performance Criterion)
1–10	Line-Ground	42 ohm	-1.0	60s	Ethernet monitoring mode	Pass
11–20	Line-Ground	42 ohm	+1.0	60s		Pass

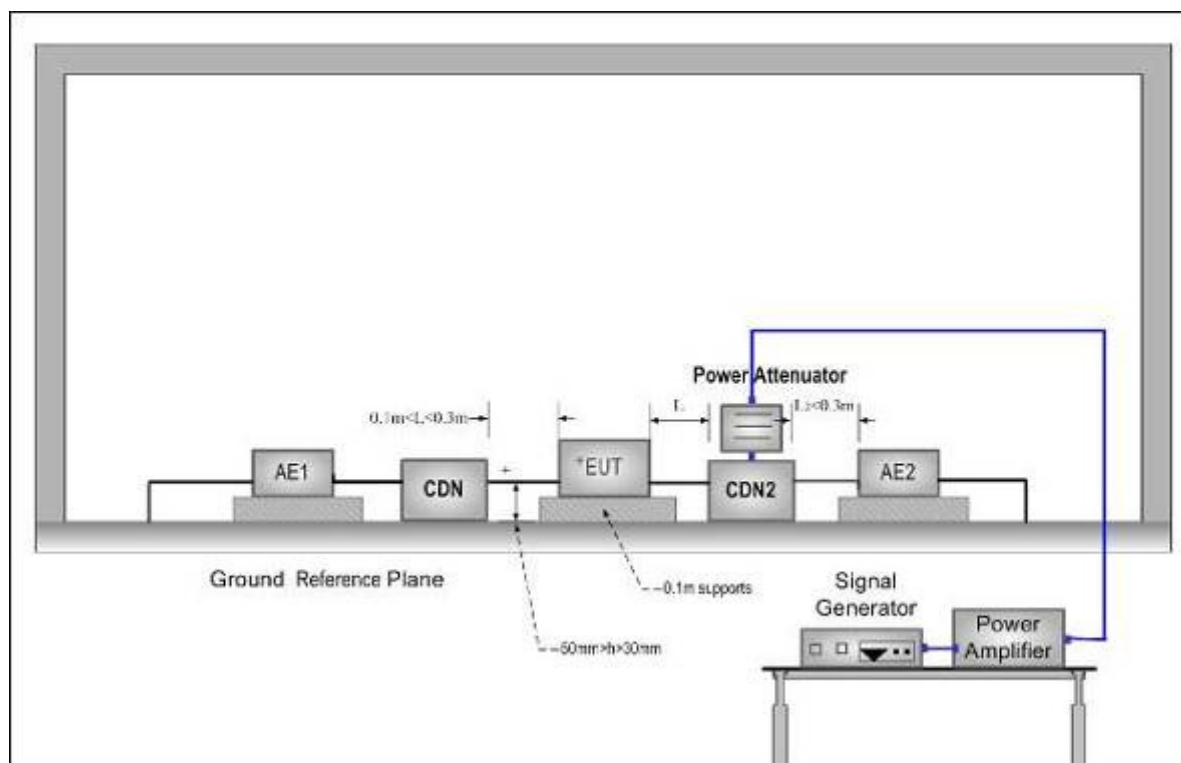
Test phenomenon description for the EUT:

1. The EUT working normal, before the conditioning.
2. Monitor the EUT during the conditioning period and detected no any changes in states, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

8.5 Conducted disturbances induced by electromagnetic fields

Frequency Range:	0.15 MHz to 100 MHz
Test level:	10V r.m.s (unmodulated emf into 150 Ω)
Modulation:	80%, 1kHz Amplitude Modulation & 0.5s ON 0.5s OFF Pulse Modulation
Criteria for compliance:	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, and no such flickering of indicators occurs at $U_0 = 130$ dBuV.

8.5.1 Test Setup and Procedure



1. The EUT was placed on an insulating support of 0.1m height above a ground reference Plane, arranged and connected to satisfy its functional requirement. All cables exiting the EUT was supported at a height of at least 30 mm above the ground reference plane.
2. The coupling and decoupling devices were required, they were located between 0,1 m and 0,3 m from the EUT. This distance was to be measured horizontally from the projection of the EUT on to the ground reference plane to the coupling and decoupling device.
3. Each AE, used with clamp injection, shall be placed on an insulating support 0,1 m above the ground reference plane. A decoupling network shall be installed on each cable between the EUT and AE except the cable under test. All cables connected to each AE, other than those being connected to the EUT, shall be provided with decoupling networks. The decoupling networks connected to each AE (except those on cables between the EUT and AE) shall be applied no further than 0,3 m from the AE. The cable(s) between the AE and the decoupling network (s) or in between the AE and the injection clamp shall not be bundled nor wrapped and shall be kept between 30 mm and 50 mm above the ground reference plane.
4. The frequency range was swept from 150 kHz to 100 MHz, using the signal levels established during the

setting process, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or to change coupling devices as necessary. Where the frequency was swept incrementally, the step size do not exceed 1% of the preceding frequency value. The dwell time of the amplitude modulated carrier at each frequency was not less than the time necessary for the EUT to be exercised and to respond, and was not less than 0.5 s.

5. If the interface ports, which were intended by the manufacturer to be connected to data cables not longer than 3 m, did not be tested.

8.5.2 Test Results:Pass

Frequency	Line	Test Level	Modulation	Step Size	Dwell Time	Test Mode	Test Results
150kHz to 100MHz	AC Mains	1Vr.m.s 3Vr.m.s 10Vr.m.s	80%, 1kHz Amp. Mod.	1%	3s	Enternet monitoring mode	Pass
150kHz to 100MHz	AC Mains		0.5s ON, 0.5s OFF P.M. Mod.	1%	3s		Pass
150kHz to 100MHz	Signal ports		80%, 1kHz Amp. Mod. Clamp	1%	3s		Pass
150kHz to 100MHz	Signal ports		0.5s ON, 0.5s OFF P.M. Mod. Clamp	1%	3s		Pass

Test phenomenon description for the EUT:

1. The EUT working normal, before the conditioning.
2. Monitor the EUT during the conditioning period and detected ripples in states at signal ports testing, during the conditioning, then could be recovered after test.
3. No degradation in the performance of the EUT was observed, after the conditioning.
 - a, At 1Vr.m.s & 3Vr.m.s, during the test and after test no degradation in the performance of the EUT was observed.
 - b, At 10Vr.m.s, the EUT working is normal.

8.6 Mains supply voltage dips and short interruptions

Voltage dips and short interruptions:

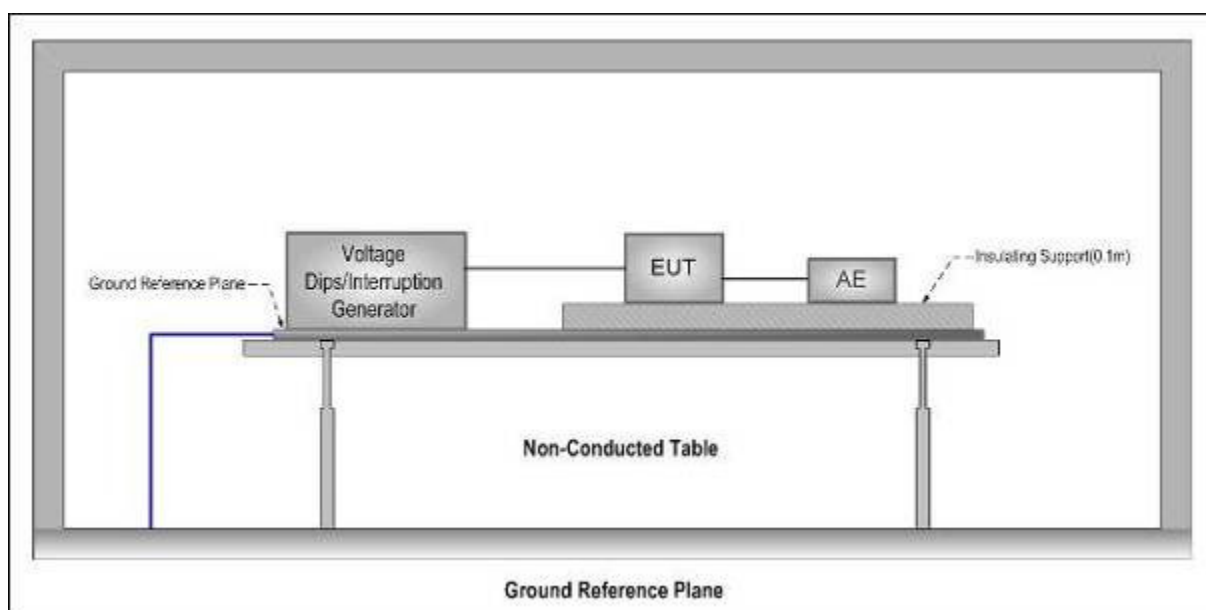
- 0 % UT for 250 period
- 40 % UT for 10 period
- 70 % UT for 25 period
- 80 % UT for 250 period

(U_T is the nominal supply voltage.)

Criteria:

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.

8.6.1 Test Setup and Procedure



1. The EUT was placed on a ground reference plane(GRP) insulated by an insulating support 0,1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
2. The test was performed with the EUT connected to the test generator with the shortest power supply cable as specified by the EUT manufacturer.
3. The EUT was tested for each selected combination of test level and duration with a sequence of three dips /interruptions with intervals of 10 s minimum. Each representative mode of operation was tested.
4. For EUT with more than one power cord, each power cord was tested individually.

8.6.2 Test Results:Pass

U_T = AC 230V 50Hz

Test Level % U_T	Phase	Duration of drop out in Periods	No. of drop out	Time between drop out	Test Mode	Test Results
0	0°,180°	250	3	10s	Ethernet monitoring mode	Pass
40	0°,180°	10	3	10s		Pass
70	0°,180°	25	3	10s		Pass
80	0°,180°	250	3	10s		Pass

Remark:

According to the client's requirement, we used a UPS as ancillary equipment to meet the requirements of this clause during test.

U_T = the nominal supply voltage.

Test phenomenon description for the EUT:

1. The EUT working normal, before the conditioning.
2. Monitor the EUT during the conditioning period and detected no any changes in states, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

8.7 Mains supply voltage variations

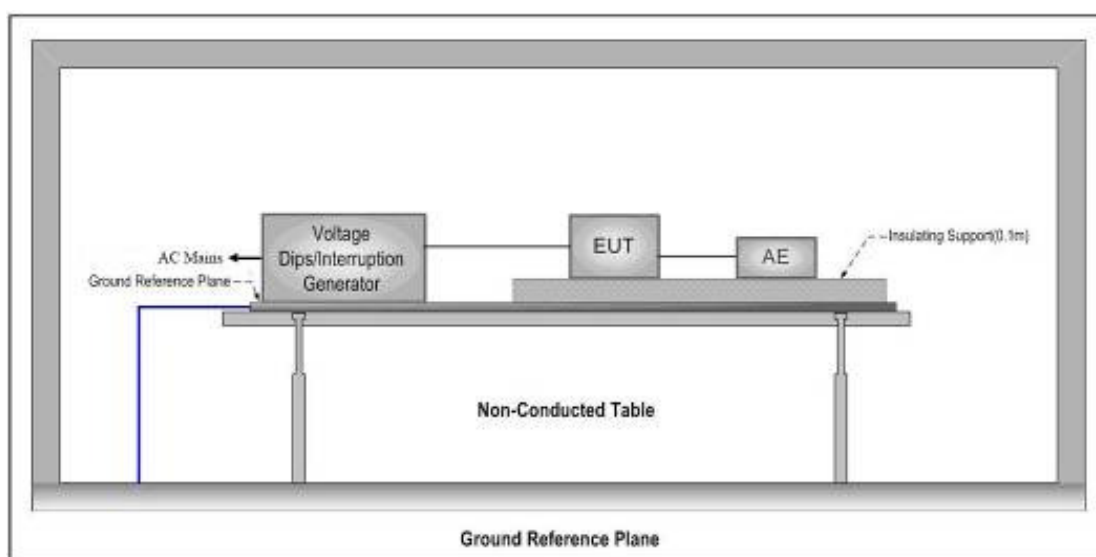
Voltage max.	AC 253V ($U_{max}: U_{nom} + 10\%$)
Voltage min.	AC 195.5V ($U_{min}: U_{nom} - 15\%$)
U_{nom} Voltage:	AC 230V
Criteria:	There shall be no damage, malfunction or change of status due to the different supply voltage conditions. The EUT shall meet the acceptance criteria for the functional test (see Clause 6 of EN 50130-4), during the conditioning.

8.7.1 Test Results:Pass

Test phenomenon description for the EUT:

1. The EUT working normal, before the conditioning.
2. Monitor the EUT during the conditioning period and detected no any changes in states, during the conditioning.
3. No degradation in the performance of the EUT was observed, after the conditioning.

Test Setup:



9 Equipment Under Test Pictures

Refer to the < DH-IPC-HDBW1430EP-AW _Test Setup Photos-EN >

10 EUT Constructional Details

Refer to the < DH-IPC-HDBW1430EP-AW _External Photos > & < DH-IPC-HDBW1430EP-AW _Internal Photos >.

--End of the Report--