TEST REPORT

Product Name : EnerLog
Model Number : EnerLog

Prepared for	:	Shenzhen Atess Power Technology Co.,Ltd
Address	:	1st Floor of Building 3 at Sector B and 3rd Floor of Building 9,Henglong Industrial Park, No.4 Industrial Zone,Shuitian Community, Shiyan Street, Baoan District, Shenzhen
Prepared by	:	EMTEK (SHENZHEN) CO., LTD.
Address	:	Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China Tel: (0755) 26954280 Fax: (0755) 26954282
Report Number	:	ENS2203230140E00201R
Date(s) of Tests	:	October 24, 2019 to December 17, 2019
Date of issue	:	March 26, 2022

TABLE OF CONTENT

TEST REPORT DESCRIPTION

Applicant	:	Shenzhen Atess Power Technology Co.,Ltd
Manufacturer	:	Shenzhen Atess Power Technology Co.,Ltd
Trade Mark	:	ATESS
EUT	:	EnerLog
Model Number	:	EnerLog
Power supply	:	Adapter: Model: KA1201A-0502000DE Input: 100-240V~50/60Hz, 0.4A Max Output: 12V/1000mA
Test Voltage	:	AC 230V/50Hz and AC 120V/60Hz

Measurement Procedure Used:

EN 55032:2015
EN 61000-3-2:2014
EN 61000-3-3:2013
EN 55035:2017
(IEC 61000-4-2:2008, IEC 61000-4-3:2006+A1:2007+A2:2010, IEC 61000-4-4:2012,
IEC 61000-4-5:2005, IEC 61000-4-6:2008, IEC 61000-4-8:2009, IEC 61000-4-11:2004)

The device described above is tested by EMTEK (SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and EMTEK (SHENZHEN) CO., LTD. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN 55032, EN 61000-3-2, EN 61000-3-3, EN 55035 requirements.
This report applies to above tested sample only and shall not be reproduced in part without written approval of EMTEK (SHENZHEN) CO., LTD.

Date of Test	:	October 24, 2019 to December 17, 2019
Prepared by	:	Junqin Cai Junqin Cai/Editor
Reviewer	:	Kaimin Guo Kaimin Guo/Supervisor
Approved & Authorized Signer	:	Lisa Wang/Manager

EMTEK (SHENZHEN) CO., LTD. TESTING

Modified History

Version	Report No.	Revision Date	Summary
Ver.1.0	ES191024006E	/	Original Report
Ver.1.0	ES191024006E-1	May 8, 2020	Change Applicant and Trademark
Ver.1.0	ENS2203230140E002	March 26, 2022	Changes the manufacturer, factory, address and model

1. DESCRIPTION OF STANDARDS AND RESULTS (EUT)

EMISSION				
Description of Test Item		Standard	Limits	Results
Conducted Emissions From the AC Mains Power Ports		EN 55032:2015	Class B	Pass
Asymmetric mode conducted emissions	Wired network ports	EN 55032:2015	Class B	Pass
	Optical fibre ports	EN 55032:2015	Class B	N/A
	Broadcast receiver tuner ports	EN 55032:2015	Class B	N/A
	Antenna ports	EN 55032:2015	Class B	N/A
Conducted differential voltage emissions	TV broadcast receiver tuner ports	EN 55032:2015	Class B	N/A
	RF modulator output ports	EN 55032:2015	Class B	N/A
	FM broadcast receiver tuner ports	EN 55032:2015	Class B	N/A
Radiated emissions at frequencies up to 1 GHz		EN 55032:2015	Class B	Pass
Radiated emissions at frequencies above 1 GHz		EN 55032:2015	Class B	Pass
Radiated emissions from FM receivers		EN 55032:2015	Table A.6	N/A
Outdoor units of home satellite receiving systems		EN 55032:2015	Table A.7	N/A
Harmonic Current Emissions		EN 61000-3-2:2014	Class A	N/A
Voltage Fluctuation and Flicker		EN 61000-3-3:2013	Section 5	Pass

IMMUNITY				
Description of Test Item		Basic Standard	Performance Criteria	Results
Electrostatic Discharge	Enclosure ports	IEC 61000-4-2:2008	B	Pass
Continuous RF electromagnetic field disturbances	Enclosure ports	IEC 61000-4-3:2006+ A1:2007+A2:2010	A	Pass
Electrical fast transients/burst	AC mains power ports	IEC61000-4-4:2012	B	Pass
	Analogue/digital data ports (Network port)		B	Pass
	DC network power ports		B	N/A
Surges	AC mains power ports	IEC 61000-4-5:2005	B	Pass
	Analogue/digital data ports (Network port)		B	Pass
	DC network power ports		B	N/A
Continuous induced RF disturbances	AC mains power ports	IEC 61000-4-6:2008	A	Pass
	Analogue/digital data ports (Network port)		A	Pass
	DC network power ports		B	N/A
Power frequency magnetic field	Enclosure ports	IEC 61000-4-8:2009	A	N/A
Voltage dips and interruptions	AC mains power ports	IEC 61000-4-11:2004	B,C	Pass
Broadband impulsive conducted disturbances	Analogue/digital data ports	\	N/A	N/A
Note: N/A is an abbreviation for Not Applicable.				

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT	:	EnerLog
Model Number	:	EnerLog
Test Voltage	:	AC 230V/50Hz and AC 120V/60Hz
Applicant	:	Shenzhen Atess Power Technology Co.,Ltd
Address	:	1st Floor of Building 3 at Sector B and 3rd Floor of Building 9, Henglong Industrial Park, No.4 Industrial Zone, Shuitian Community, Shiyan Street, Baoan District, Shenzhen
Manufacturer	:	Shenzhen Atess Power Technology Co.,Ltd
Address	:	1st Floor of Building 3 at Sector B and 3rd Floor of Building 9, Henglong Industrial Park, No.4 Industrial Zone, Shuitian Community, Shiyan Street, Baoan District, Shenzhen
Manufacturer	:	Shenzhen Atess Power Technology Co.,Ltd
Address	:	1st Floor of Building 3 at Sector B and 3rd Floor of Building 9, Henglong Industrial Park, No.4 Industrial Zone, Shuitian Community, Shiyan Street, Baoan District, Shenzhen
Date of Received	:	October 24, 2019
Date of Test	:	October 24, 2019 to December 17, 2019

Note: This report changes the manufacturer, factory, address and model based on ES191024006E-1. This change or addition does not affect the test results. Original data and records refer to ES191024006E-1.

2.2. Independent Operation Modes

A. Ping mode
B. Standby mode
C. Off

2.3. Test Manner

Test Items	Test Voltage	Operation Modes	Worst case
Conducted disturbance at mains Terminals	AC 230V/50Hz, AC 120V/60Hz	Mode A	Mode A
Radiated emissions at frequencies up to 1 GHz	AC 230V/50Hz	Mode A	Mode A
Radiated emissions at frequencies above 1 GHz	AC 230V/50Hz	Mode A	Mode A
Voltage Fluctuation and Flicker	AC 230V/50Hz	Mode A	Mode A
EMS	AC 230V/50Hz	Mode A, Mode B	\

2.4. Description of Support Device

Auxiliary Cable List and Details					
Cable Description	Length (m)	Shielded /Unshielded	With / Without Ferrite	Supplied by	Certification
/	/	/	/	/	/

Auxiliary Equipment List and Details					
Description	Manufacturer	Model	Serial Number	Supplied by	Certification
PC	LENOVO	M713A	/	EMTEK	CE

2.5. Description of Test Facility

Site Description

EMC Lab. : Accredited by CNAS, 2018.11.30
The certificate is valid until 2022.10.28
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2017)
The Certificate Registration Number is L2291

Accredited by TUV Rheinland Shenzhen 2018.3.30
The Laboratory has been assessed according to the requirements ISO/IEC 17025

Accredited by FCC, August 09, 2018
Designation Number: CN1204
Test Firm Registration Number: 882943
Accredited by A2LA, August 08, 2018
The Certificate Registration Number is 4321.01

Accredited by Industry Canada, November 09, 2018
The Certificate Registration Number is CN0008

Name of Firm : EMTEK (SHENZHEN) CO., LTD.

Site Location : Bldg 69, Majialong, Industry Zone, Nanshan District, Shenzhen, Guangdong, China 516025

2.6. Measurement Uncertainty

Test Item		Uncertainty
Conducted Emission Uncertainty	:	3.16dB(9k~150kHz Conduction 2#) 2.90dB(150k-30MHz Conduction 2#)
Radiated Emission Uncertainty (3m 3# Chamber)	:	4.40dB (30M~1GHz Polarize: H) 5.04dB (30M~1GHz Polarize: V) 4.94dB (1~6GHz)
Uncertainty for Flicker test	:	0.07%
Uncertainty for Harmonic test	:	1.8%
Uncertainty for C/S Test	:	1.45(Using CDN Test)
Uncertainty for R/S Test	:	2.10dB(80MHz-200MHz) 1.76dB(200MHz-1000MHz)
Uncertainty for test site temperature and humidity	:	0.6℃ 4%

3. MEASURING DEVICE AND TEST EQUIPMENT

3.1. For Conducted Emissions At the AC Mains Power Ports

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	Rohde & Schwarz	ESCI	101384	May 19, 2019	1 Year
2	AMN	Rohde & Schwarz	ENV216	101161	May 18, 2019	1 Year
3	AMN	Kyoritsu	KNW-407	8-1492-9	May 18, 2019	1 Year
4	Current probe	Rohde & Schwarz	EZ-17	100213	May 18, 2019	1 Year
5	Capacitive Voltage Probe	TESEQ	CVP 2200 A	47173	May 18, 2019	1 Year

3.2. For TELECOM terminals Disturbance Voltage Test(site 1)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	Rohde & Schwarz	ESCI	101384	May 19, 2019	1 Year
2	AAN	TESEQ	ISN T800	30327	March 14, 2019	1 Year
3	AAN	TESEQ	ISN T8-CAT6	32186	March 14, 2019	1 Year
4	Impedance Matching Pads	Weinschel	9070-50/75	N/A	May 18, 2019	1 Year

5	Impedance Matching Pads	Weinschel	9070-50/75	N/A	May 18, 2019	1 Year

3.3. For Radiated Emission Measurement (3m)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	Rohde & Schwarz	ESU 26	100154	May 19, 2019	1Year
2	Pre-Amplifie	Lunar EM	LNA30M3G-25	J10100000070	June 6, 2019	1Year
3	Bilog Antenna	Schwarzbeck	VULB9163	659	September 22, 2019	2 Year
4	Horn antenna	Schwarzbeck	BBHA9120D	9120D-1177	June 12, 2019	2 Year
5	Pre-Amplifie	SKET	LNPA_0118G-45	SK2019051801	May 19, 2019	1Year
6	Loop Antenna	Schwarzbeck	FMZB1519	1519-012	July 14, 2019	2 Year
7	Spectrum Analyzer	Rohde & Schwarz	FSV40	100967	May 19, 2019	1Year
8	Horn antenna	Schwarzbeck	BBHA9170	9170-399	June 16, 2019	2 Year

3.4. For Harmonic Current / Flicker Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Power Source	CI	5001IX-CTS-400-413	N/A	May 19, 2019	1 Year
2	Harmoniv Flicker test system	CI	PACS-1	1413A02055	May 19, 2019	1 Year
3	45KVA AC Power source	Teseq	NSG 1007-45/45KVA	1305A02873	May 19, 2019	1 Year
4	Signal conditioning Unit	Teseq	CCN 1000-3	1305A02873	May 19, 2019	1 Year
5	Impedance network	Teseq	INA2197/37A	1305A02873	May 19, 2019	1 Year
6	Impedance network	Teseq	INA 2196/75A	1305A02874	May 19, 2019	1 Year

3.5. For Electrostatic Discharge Immunity

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	ESD Tester	TESEQ	NSG 438A	130	July 28, 2019	1 Year

3.6. For Continuous RF Electromagnetic Field Disturbances Immunity

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Power Amplifier	MILMEGA	AS0102-55	1018770	May 19, 2019	1 Year
2	50ohm Diode Power Sensor	BOONTON	51011EMC	34236	May 19, 2019	1 Year
3	RF Power Meter. Dual Channel	BOONTON	4232A	10539	May 19, 2019	1 Year

4	Log.-Per. Antenna	SCHWARZBECK	VULP 9118E	811	N/A	N/A
5	Signal Generator	Agilent	N5181A	MY50145187	May 19, 2019	1 Year
6	50ohm Diode Power Sensor	BOONTON	51011EMC	36164	May 19, 2019	1 Year
7	Broad-Band Horn Antenna	SCHWARZBECK	STLP 9149	9149-227	N/A	N/A
8	Field Strength Meter	DARE	RSS1006A	10I00037SNO22	May 19, 2019	1 Year
9	Multi-function interface system	DARE	CTR1009B	12I00250SNO72	N/A	N/A
10	Automatic switch group	DARE	RSW1004A	N/A	N/A	N/A
11	Power Amplifier	MILMEGA	AS1860-50	1059346	May 19, 2019	1 Year
12	Power Amplifier	MILMEGA	80RF1000-175	1059345	May 19, 2019	1 Year
13	Directional Coupler	MILMEGA	DC6180AM1	0340463	May 19, 2019	1 Year
14	Audio Analyzer	R&S	UPV	101473	May 19, 2019	1 Year
15	Audio Test System	AUDIO PRECISION	ATS-1	41100	August 31, 2019	1 Year

3.7. For Electrical Fast Transient / Burst Immunity

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Burst Tester	HAEFELY	PEFT4010	080981-16	May 18, 2019	1Year
2	Coupling Clamp	HAEFELY	IP-4A	147147	May 18, 2019	1Year
3	Three phase CDN	Teseq	CDN 163	202	May 18, 2019	1 Year

3.8. For Surges Immunity

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Controller	HAEFELY	Psurge 8000	174031	May 18, 2019	1Year
2	Impulse Module	HAEFELY	PIM 100	174124	May 18, 2019	1Year
3	Coupling Decoupling	HAEFELY	PCD 130	172181	May 18, 2019	1Year
4	Coupling Module	HAEFELY	PCD122	174354	May 18, 2019	1Year
5	Impulse Module	HAEFELY	PIM 120	174435	May 18, 2019	1Year
6	Coupling Module	HAEFELY	PCD 126A	174387	May 18, 2019	1Year
7	Impulse Module	HAEFELY	PIM 110	174391	May 18, 2019	1Year
8	Impulse Module	HAEFELY	PIM 150	178707	May 18, 2019	1Year
9	Impulse Module	PMI	PCDN8	190422	May 18, 2019	1Year

3.9. For Continuous Induced RF Disturbances Immunity

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Continuous Wave Simulator	EMTEST	CWS500C	0900-12	May 19, 2019	1Year
2	CDN	EMTEST	CDN-M2	510010010010	May 18, 2019	1Year
3	CDN	EMTEST	CDN-M3	0900-11	May 18, 2019	1Year
4	EM Injection Clamp	EMTEST	F-2031-23MM	368	May 18, 2019	1Year
5	Attenuator	EMTEST	100W 6dB DC-3G	/	May 18, 2019	1Year

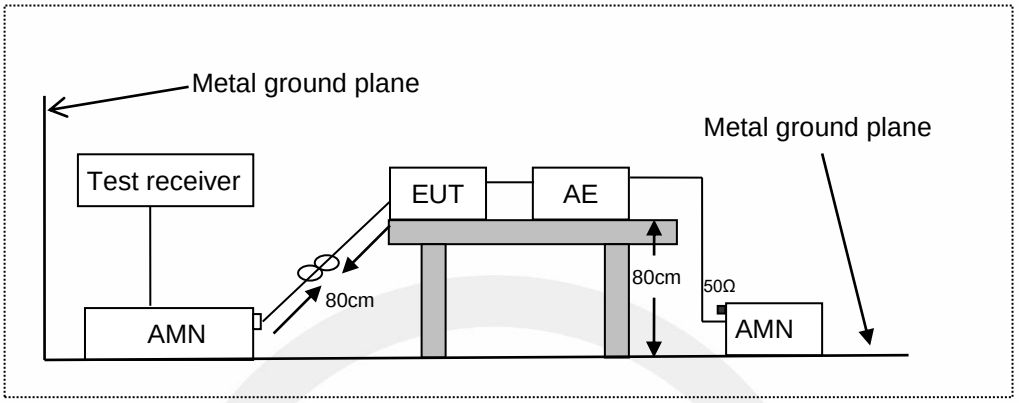
6	Signal Generator	R&S	SMB100A	103041	May 18, 2019	1Year
7	CDN	LUTHI	CDN L-801 M2/M3	2606	May 18, 2019	1Year
8	Three phase CDN	TESEQ	CDN M332S	32655	May 18, 2019	1 Year
9	Three phase CDN	TESEQ	CDN M432S	33670	May 18, 2019	1 Year
10	Three phase CDN	TESEQ	CDN M432-3LNS	34048	May 18, 2019	1 Year
11	Three phase CDN	TESEQ	CDN M532S	33799	May 18, 2019	1 Year
12	Current Injection Clamp	FCC	F-120-9	140302	May 18, 2019	1 Year
13	Power meter	AGILENT	E4418B	MY45102886	May 19, 2019	1 Year
14	Directional coupler	SKET	DC_0110000M-100W	SK2018080301	May 19, 2019	1 Year

3.10.For Voltage Dips And Interruptions Immunity

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	45KVA AC Power source	Teseq	NSG 1007-45/45KVA	1305A02873	May 19, 2019	1 Year
2	Profline 2100 AC Switching Unit	Teseq	NSG 2200-3	A22714	May 19, 2019	1 Year

4. CONDUCTED EMISSIONS FROM THE AC MAINS POWER PORTS

4.1. Block Diagram of Test Setup



AMN: Artificial Mains Network
AE: Associated equipment
EUT: Equipment under test

4.2. Limits

EN 55032, Class B, Table A.10

Frequency range MHz	Coupling device (see Table A.8)	Detector type / bandwidth	Class B limits dB(μV)
0.15 to 0.5	AMN	Quasi Peak / 9 kHz	66 to 56
0.5 to 5			56
5 to 30			60
0.15 to 0.5	AMN	Average / 9 kHz	56 to 46
0.5 to 5			46
5 to 30			50

4.3. Test Procedure

The EUT was placed on a desk 0.8 m height from the metal ground plane and 0.4 m from the conducting wall of the shielding room and it was kept at least 0.8 m from any other grounded conducting surface. The size of the table will nominally be 1.5 m x1.0 m.

The rear of the arrangement shall be flush with the back of the supporting tabletop unless that would not be possible or typical of normal use.

All units of equipment forming the system under test (includes the EUT as well as connected peripherals and associated equipment or devices) shall be arranged such that a nominal 0.1 m separation is achieved between the neighboring units.

Connect EUT to the power mains through a artificial mains network (AMN). Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the centre into a bundle no longer than 0.4 m, so that its length is shortened to 1 m.

All the support units are connecting to the other AMN.

The AMN provides 50 ohm coupling impedance for the measuring instrument.

The CISPR states that the AMN with 50 ohm and 50 microhenry should be used.

Both sides of AC line were checked for maximum conducted interference.

The frequency range from 150 kHz to 30 MHz was sweep.

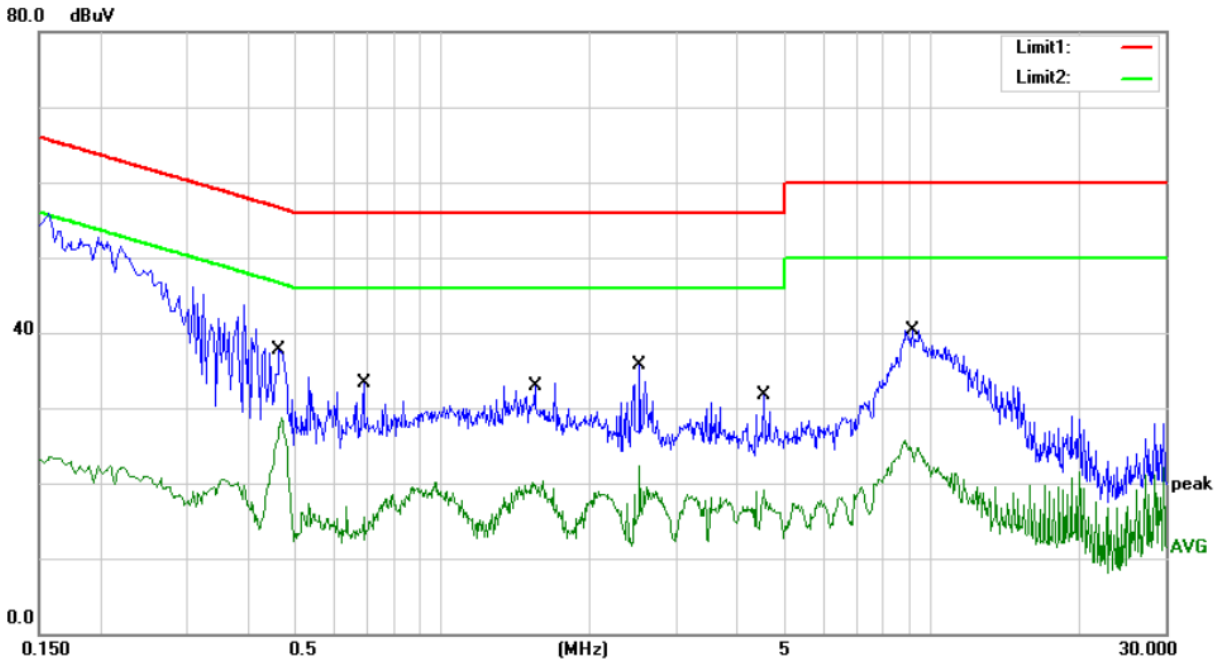
Set the test-receiver system to quasi peak detect function and average detect function, and to measure the conducted emissions values.

Test results were obtained from the following equation:
Emission Level (dBμV) = AMN Factor (dB) + Cable Loss (dB) + Reading (dBμV)
Margin (dB) = Emission Level (dBμV) - Limit (dBμV)

4.4. Measuring Results

PASS.

All the modes were tested and the data of the worst modes are attached the following pages.

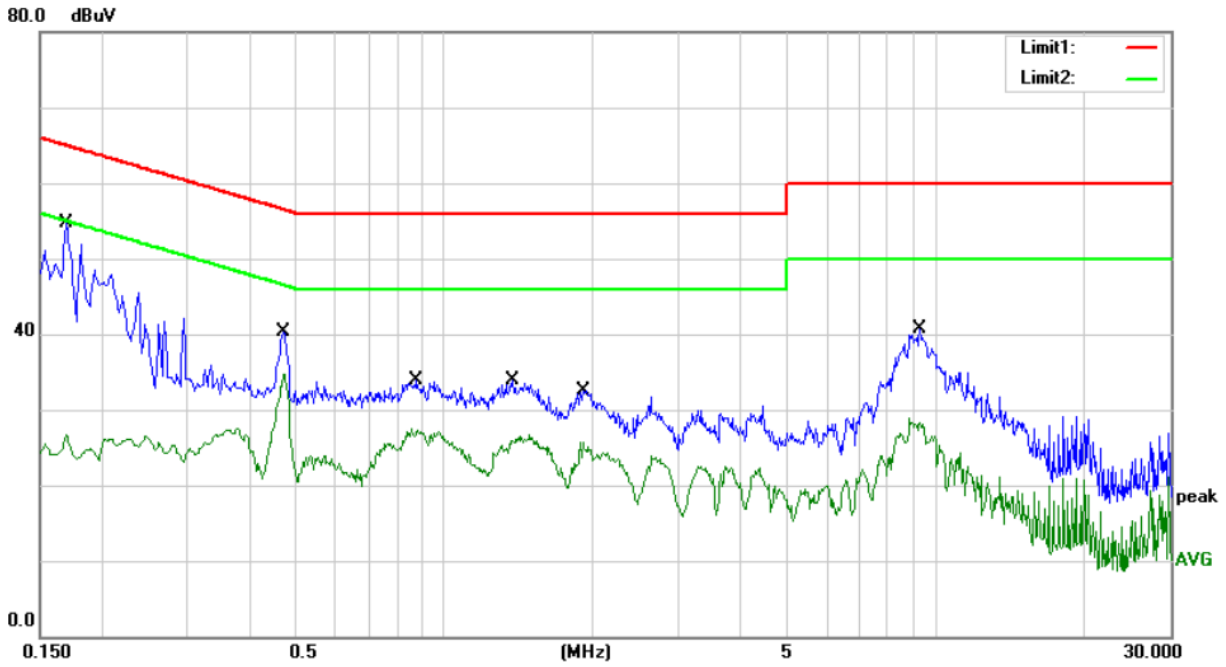


Site Conduction #1
Limit: EN55032
Mode: Ping Mode
Note:

Phase: *N*
Power: AC 230V/50Hz

Temperature: 24.9
Humidity: 54 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4660	28.05	9.56	37.61	56.58	-18.97	QP	
2	*	0.4660	19.19	9.56	28.75	46.58	-17.83	AVG	
3		0.6900	23.70	9.57	33.27	56.00	-22.73	QP	
4		0.6900	8.88	9.57	18.45	46.00	-27.55	AVG	
5		1.5500	23.36	9.59	32.95	56.00	-23.05	QP	
6		1.5500	10.73	9.59	20.32	46.00	-25.68	AVG	
7		2.5380	26.16	9.61	35.77	56.00	-20.23	QP	
8		2.5380	12.62	9.61	22.23	46.00	-23.77	AVG	
9		4.5380	21.99	9.65	31.64	56.00	-24.36	QP	
10		4.5380	9.54	9.65	19.19	46.00	-26.81	AVG	
11		9.1140	30.61	9.77	40.38	60.00	-19.62	QP	
12		9.1140	15.86	9.77	25.63	50.00	-24.37	AVG	



Site Conduction #1
Limit: EN55032
Mode: Ping Mode
Note:

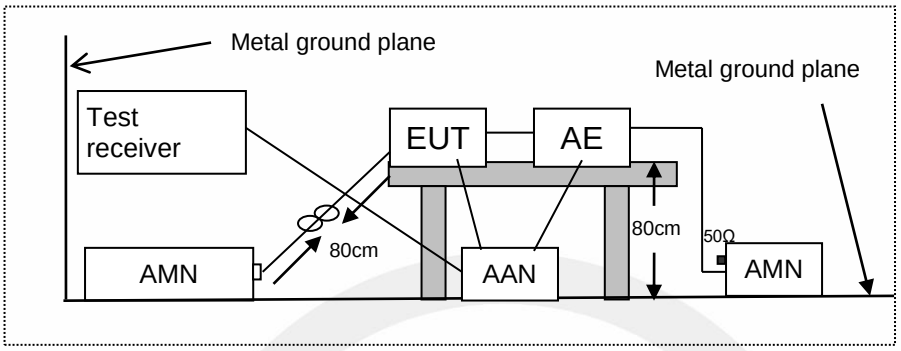
Phase: *L1*
Power: AC 230V/50Hz

Temperature: 24.9
Humidity: 54 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1700	45.10	9.55	54.65	64.96	-10.31	QP	
2		0.1700	17.07	9.55	26.62	54.96	-28.34	AVG	
3		0.4700	30.71	9.56	40.27	56.51	-16.24	QP	
4		0.4700	25.19	9.56	34.75	46.51	-11.76	AVG	
5		0.8780	24.30	9.58	33.88	56.00	-22.12	QP	
6		0.8780	17.86	9.58	27.44	46.00	-18.56	AVG	
7		1.3740	24.25	9.59	33.84	56.00	-22.16	QP	
8		1.3740	16.86	9.59	26.45	46.00	-19.55	AVG	
9		1.9180	22.99	9.59	32.58	56.00	-23.42	QP	
10		1.9180	16.21	9.59	25.80	46.00	-20.20	AVG	
11		9.2860	30.86	9.78	40.64	60.00	-19.36	QP	
12		9.2860	19.05	9.78	28.83	50.00	-21.17	AVG	

5. ASYMMETRIC MODE CONDUCTED EMISSIONS AT WIRED NETWORK PORTS

5.1. Block Diagram of Test Setup



AMN: Artificial mains network
AE: Associated equipment
EUT: Equipment under test
AAN: Asymmetric artificial network

5.2. Limits

EN 55032, Class B, Table A.12

Frequency range (MHz)	Coupling device (see Table A.8)	Detector type / bandwidth	Class B voltage limits dB(μV)	Class B current limits dB(μA)
0.15 to 0.5	AAN	Quasi Peak / 9 kHz	84 to 74	N/A
0.5 to 30			74	
0.15 to 0.5	AAN	Average / 9 kHz	74 to 64	
0.5 to 30			64	
0.15 to 0.5	CVP and current probe	Quasi Peak / 9 kHz	84 to 74	40 to 30
0.5 to 30			74	30
0.15 to 0.5	CVP and current probe	Average / 9 kHz	74 to 64	30 to 20
0.5 to 30			64	20
0.15 to 0.5	Current Probe	Quasi Peak / 9 kHz	N/A	40 to 30
0.5 to 30				30
0.15 to 0.5	Current Probe	Average / 9 kHz		30 to 20
0.5 to 30				20

5.3. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and connected to the AC mains through artificial mains network(AMN) or connected to the wired network port through an asymmetric artificial network(ANN). AMN provided a 50ohm coupling impedance for the tested

equipment AC mains port, ANN provided a common mode (asymmetric mode) impedance of 150 Ω to the wired network port under test. Both sides of AC line and the wired network line are investigated to find out the maximum conducted emission according to the EN 55032 regulations during conducted emission measurement.

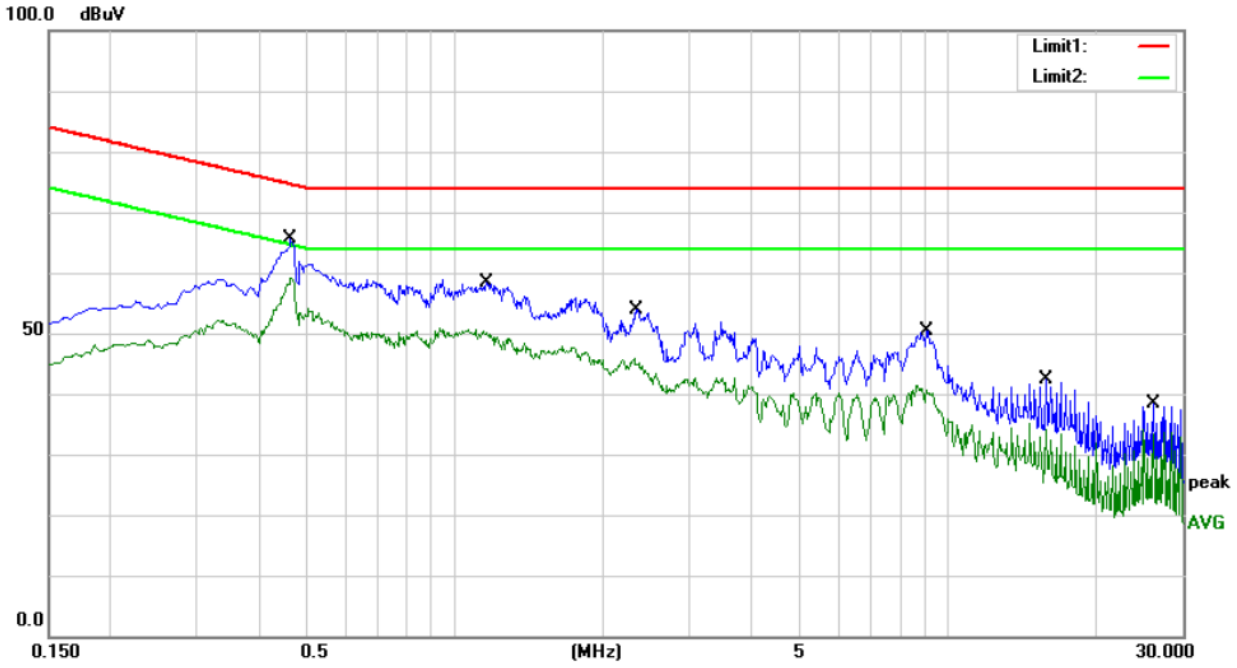
The bandwidth of the receiver is set at 9kHz in 150kHz~30MHz. The frequency range from 150kHz to 30MHz is investigated.

Test results were obtained from the following equation:
Emission Level (dBμV) = ANN Factor (dB) + Cable Loss (dB) + Reading (dBμV)
Margin (dB) = Emission Level (dBμV) - Limit (dBμV)

5.4. Measuring Results

PASS.

The test was passed at the minimum margin that marked by the frame in the following test record. Please see the attached pages.



Site Conduction #1
Limit: EN55032
Mode: Ping Mode
Note:

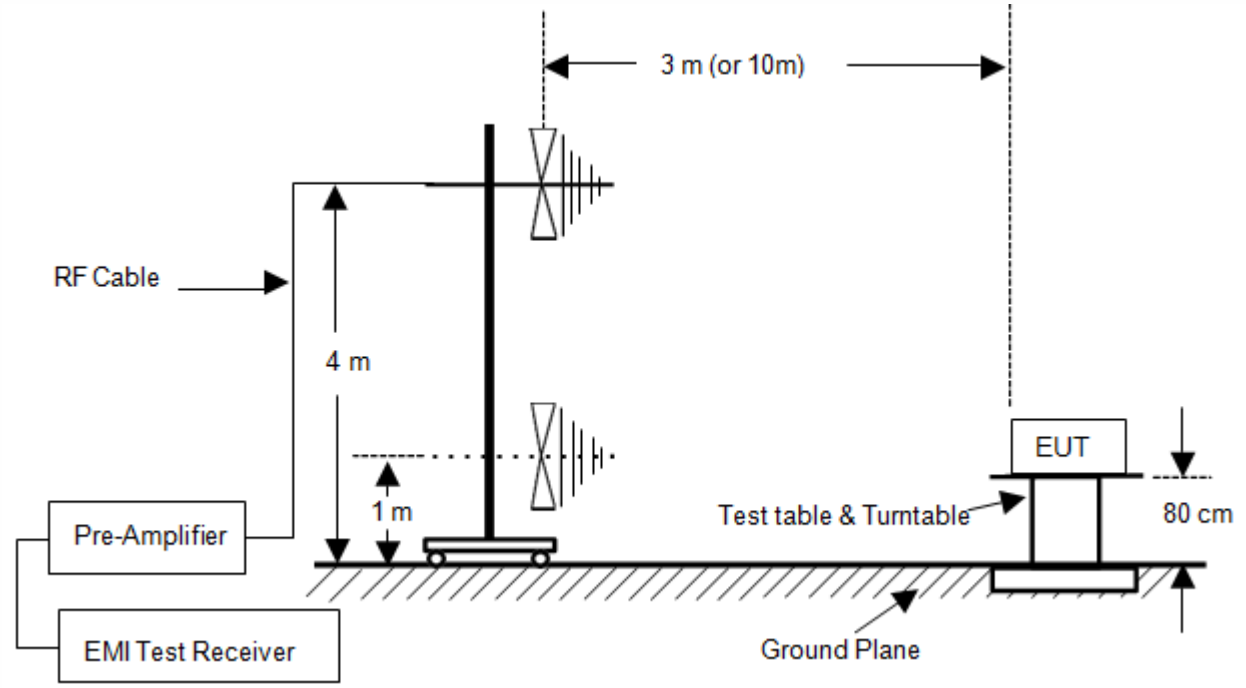
Phase:
Power: AC 230V/50Hz

Temperature: 25.4
Humidity: 54 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4660	55.95	9.57	65.52	74.58	-9.06	QP	
2	*	0.4660	49.51	9.57	59.08	64.58	-5.50	AVG	
3		1.1620	48.68	9.59	58.27	74.00	-15.73	QP	
4		1.1620	41.06	9.59	50.65	64.00	-13.35	AVG	
5		2.3380	44.22	9.62	53.84	74.00	-20.16	QP	
6		2.3380	36.19	9.62	45.81	64.00	-18.19	AVG	
7		9.0900	40.66	9.76	50.42	74.00	-23.58	QP	
8		9.0900	31.14	9.76	40.90	64.00	-23.10	AVG	
9		15.8340	32.38	9.94	42.32	74.00	-31.68	QP	
10		15.8340	24.09	9.94	34.03	64.00	-29.97	AVG	
11		26.2580	28.31	10.15	38.46	74.00	-35.54	QP	
12		26.2580	24.02	10.15	34.17	64.00	-29.83	AVG	

6. RADIATED EMISSION MEASUREMENT (UP TO 1GHz)

6.1. Block Diagram of Test Setup



6.2. Radiated Limit

EN 55032, Class B, Table A.4

Frequency range MHz	Measurement			Class B limits dB(μV/m)
	Facility	Distance (m)	Detector type / bandwidth	
30 to 230	OATS/SAC	10	Quasi Peak / 120 kHz	30
230 to 1 000				37
30 to 230	OATS/SAC	3		40
230 to 1 000				47

6.3. Test Procedure

The EUT was placed on a non-conductive table whose total height equaled 80cm. All units of equipment forming the system under test (includes the EUT as well as connected peripherals and associated equipment or devices) shall be arranged such that a nominal 0.1 m separation is achieved between the neighboring units. Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the centre into a bundle no longer than 0.4 m, so that its length is shortened to 1 m.

The EUT was set 3 meters (or 10 meters) away from the receiving antenna that was mounted on a

non-conductive mast. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level.

The turntable can rotate 360 degree to determine the position of the maximum emission level.

The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

The bandwidth of the Receiver is set at 120 kHz.

Test results were obtained from the following equation:
Emission level (dBμV/m) = Antenna Factor -Amp Factor +Cable Loss + Reading
Margin (dB) = Emission Level (dBμV/m) - Limit (dBμV/m)

6.4. Measuring Results

PASS.

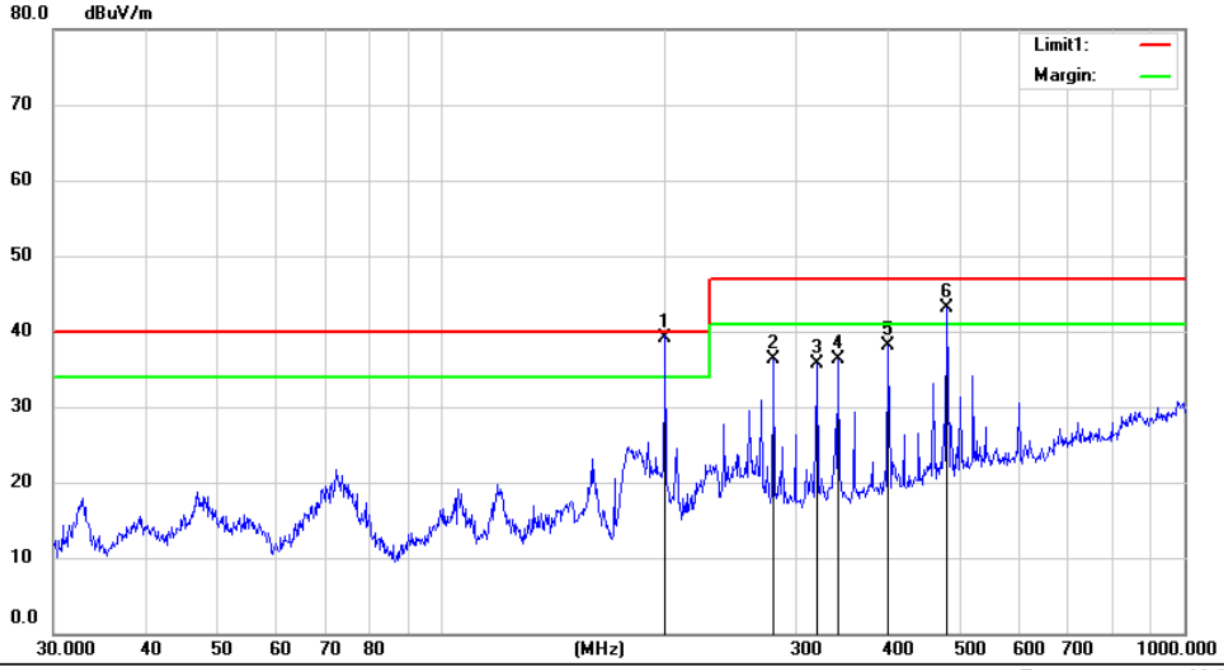
All the modes were tested and the data of the worst modes are attached the following pages.

Site 3m Chamber #3
Limit: EN55032
Mode:Ping mode
Note:

Polarization: *Vertical*
Power: AC 230V/50Hz

Temperature: 29.5 C
Humidity: 48 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	44.3335	43.03	-11.38	31.67	40.00	-8.33	QP			
2		46.6458	42.90	-11.26	31.64	40.00	-8.36	QP			
3		59.8588	39.11	-12.78	26.31	40.00	-13.69	QP			
4		148.5712	44.26	-15.40	28.82	40.00	-11.18	QP			
5		172.4476	43.54	-14.15	29.37	40.00	-10.63	QP			
6		243.0574	42.43	-10.08	32.33	47.00	-14.67	QP			



Site 3m Chamber #3
Limit: EN55032
Mode:Ping Mode
Note:

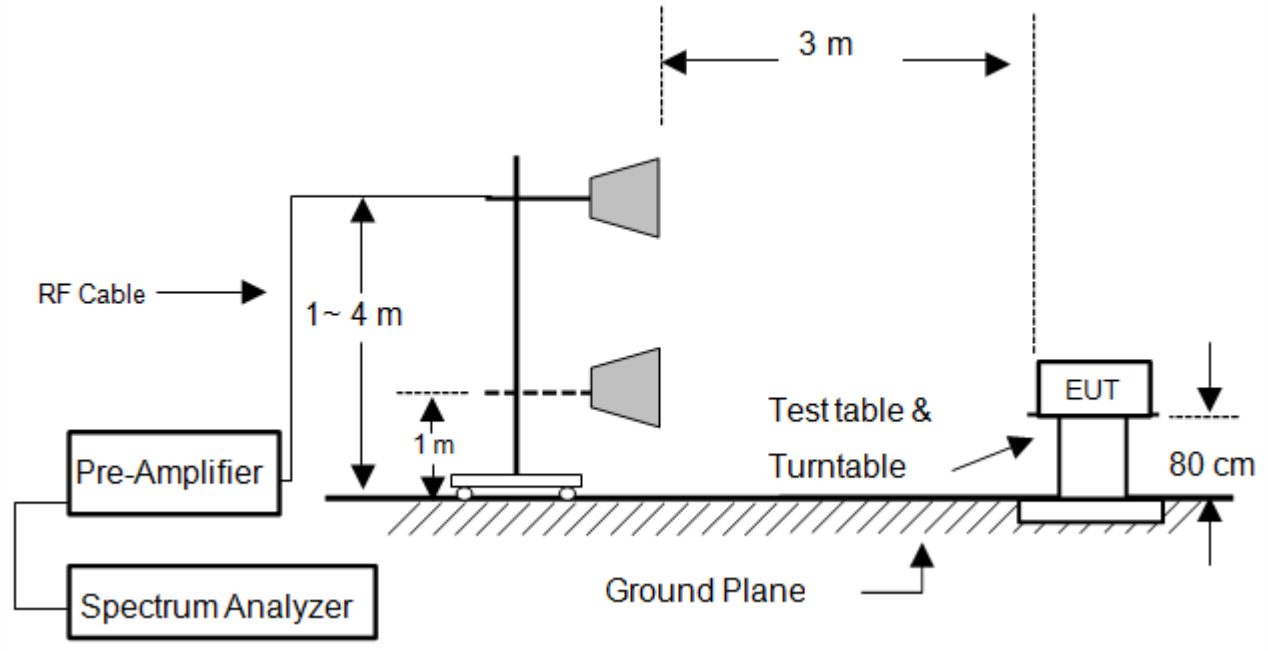
Polarization: *Horizontal*
Power: AC 230V/50Hz

Temperature: 22.5 C
Humidity: 40 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	199.9856	52.10	-13.00	39.10	40.00	-0.90	QP			
2		280.0237	47.54	-11.21	36.33	47.00	-10.67	QP			
3		320.0491	46.22	-10.58	35.64	47.00	-11.36	QP			
4		342.0986	46.84	-10.52	36.32	47.00	-10.68	QP			
5		400.0108	46.61	-8.44	38.17	47.00	-8.83	QP			
6	!	480.0224	50.04	-6.94	43.10	47.00	-3.90	QP			

7. RADIATED EMISSION MEASUREMENT (ABOVE 1GHz)

7.1. Block Diagram of Test Setup



7.2. Radiated Limit

EN 55032, Class B, Table A.5

Frequency range (MHz)	Measurement			Class B limits dB(μV/m)
	Facility	Distance (m)	Detector type/ bandwidth	
1000 to 3000	FSOATS	3	Average / 1 MHz	50
3000 to 6000				54
1000 to 3000			Peak /1 MHz	70
3000 to 6000				74
Note: 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. 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. 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. If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. 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.				

7.3. Test Procedure

The EUT was placed on a non-conductive table whose total height equaled 80cm. All units of equipment forming the system under test (includes the EUT as well as connected peripherals and associated equipment or devices) shall be arranged such that a nominal 0.1 m separation is achieved between the neighboring units. Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the centre into a bundle no longer than 0.4 m, so that its length is shortened to 1 m.

The EUT was set 3 meters away from the receiving antenna that was mounted on a non-conductive mast. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level.

The turntable can rotate 360 degree to determine the position of the maximum emission level.

The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

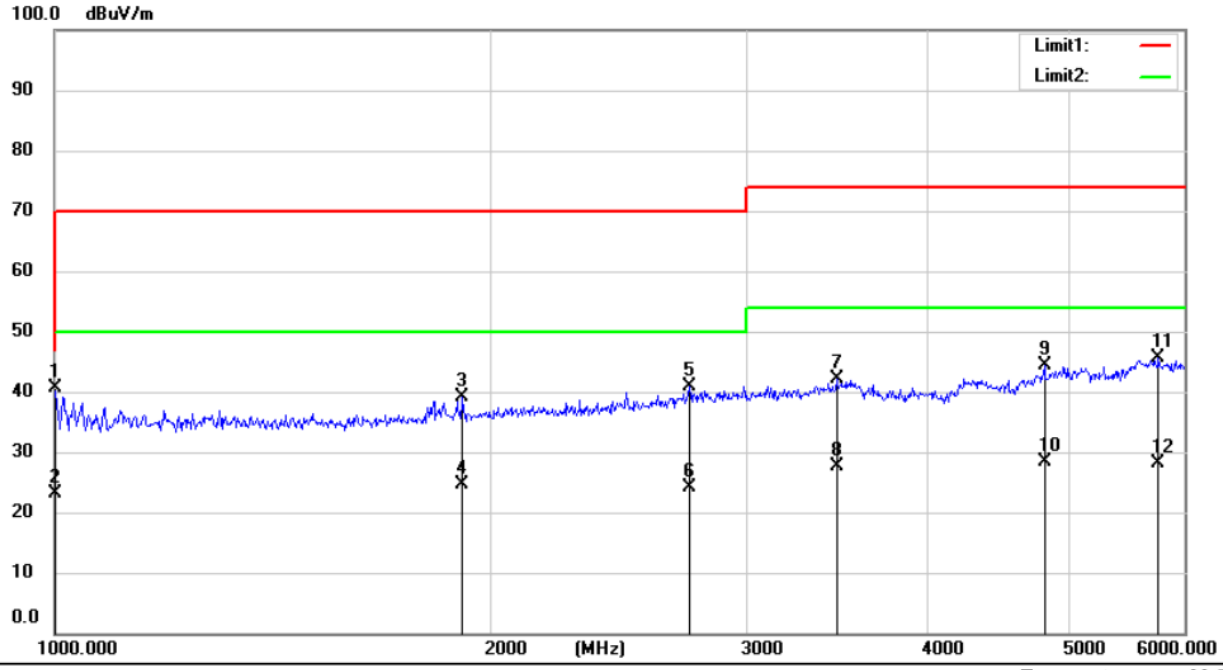
The frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz.

Test results were obtained from the following equation:
Emission level (dBμV/m) = Antenna Factor -Amp Factor +Cable Loss + Reading
Margin (dB) = Emission Level (dBμV/m) - Limit (dBμV/m)

7.4. Measuring Results

PASS

All the modes were tested and the data of the worst modes are attached the following pages.

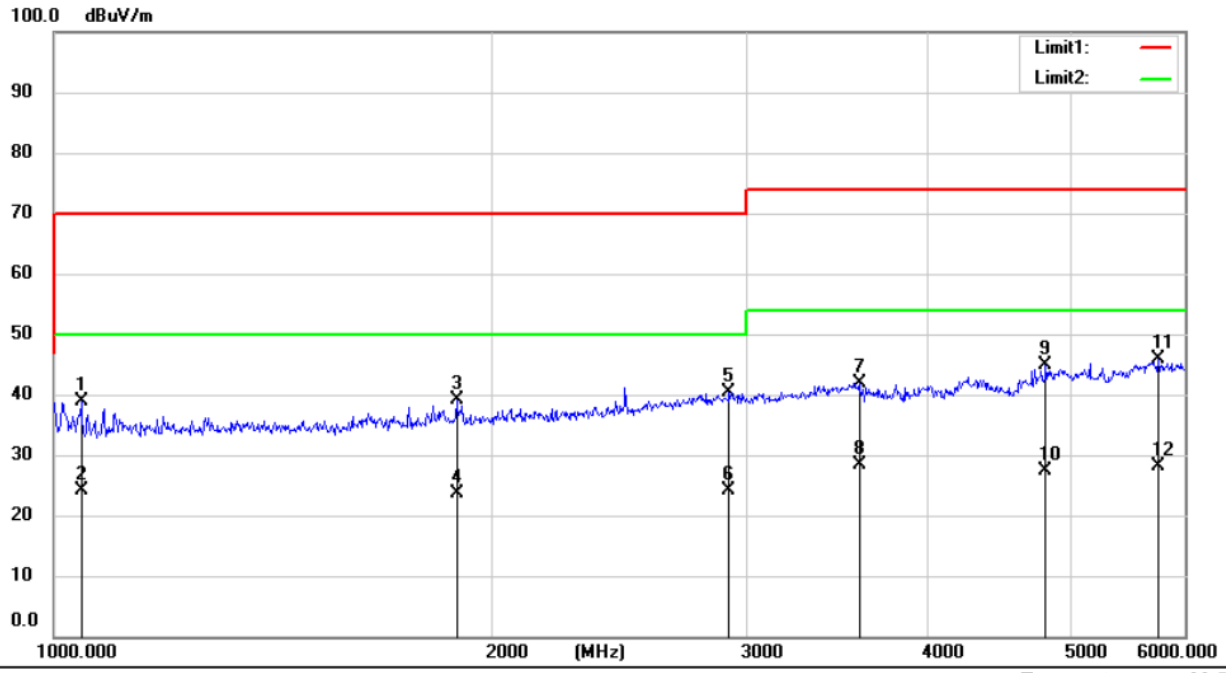


Site 3m Chamber #3
Limit: EN55032
Mode:Ping Mode
Note:

Polarization: *Vertical*
Power: AC 230V/50Hz

Temperature: 22.5 C
Humidity: 61 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1001.255	58.61	-18.07	40.54	70.00	-29.46	peak			
2		1001.255	41.22	-18.07	23.15	50.00	-26.85	AVG			
3		1911.180	54.87	-15.82	39.05	70.00	-30.95	peak			
4	*	1911.180	40.46	-15.82	24.64	50.00	-25.36	AVG			
5		2739.744	53.69	-12.83	40.86	70.00	-29.14	peak			
6		2739.744	36.92	-12.83	24.09	50.00	-25.91	AVG			
7		3455.879	53.41	-11.32	42.09	74.00	-31.91	peak			
8		3455.879	39.00	-11.32	27.68	54.00	-26.32	AVG			
9		4804.636	52.20	-7.82	44.38	74.00	-29.62	peak			
10		4804.636	36.31	-7.82	28.49	54.00	-25.51	AVG			
11		5761.891	51.21	-5.53	45.68	74.00	-28.32	peak			
12		5761.891	33.70	-5.53	28.17	54.00	-25.83	AVG			



Site 3m Chamber #3 Polarization: *Horizontal* Temperature: 22.5 C

Limit: EN55032 Power: AC 230V/50Hz Humidity: 61 %

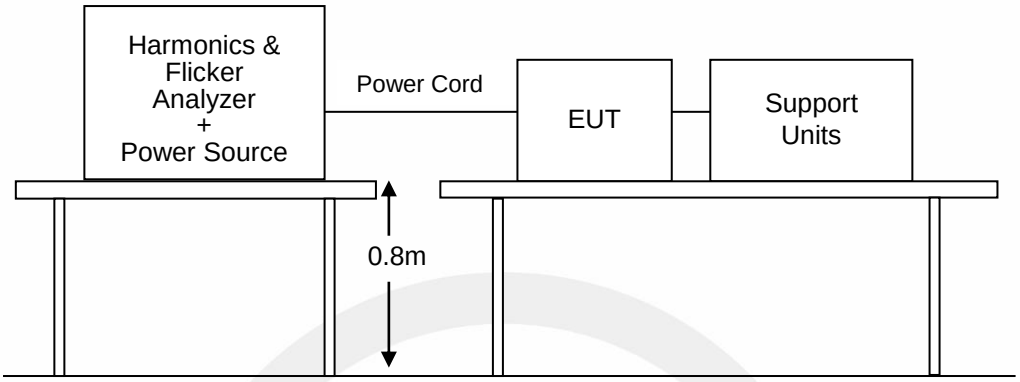
Mode:Ping Mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1045.438	56.79	-17.96	38.83	70.00	-31.17	peak			
2		1045.438	42.09	-17.96	24.13	50.00	-25.87	AVG			
3		1895.153	54.98	-15.85	39.13	70.00	-30.87	peak			
4		1895.153	39.53	-15.85	23.68	50.00	-26.32	AVG			
5		2914.448	52.61	-12.15	40.46	70.00	-29.54	peak			
6		2914.448	36.24	-12.15	24.09	50.00	-25.91	AVG			
7		3582.608	52.90	-10.99	41.91	74.00	-32.09	peak			
8	*	3582.608	39.33	-10.99	28.34	54.00	-25.66	AVG			
9		4816.703	52.59	-7.79	44.80	74.00	-29.20	peak			
10		4816.703	35.28	-7.79	27.49	54.00	-26.51	AVG			
11		5757.763	51.45	-5.54	45.91	74.00	-28.09	peak			
12		5757.763	33.55	-5.54	28.01	54.00	-25.99	AVG			

8. HARMONIC CURRENT EMISSION MEASUREMENT

8.1. Block Diagram of Test Setup



8.2. Standard Limits

EN 61000-3-2, CLASS A
Harmonic current emissions evaluate the potential for the EUT to cause distortion on the AC power lines. It is applicable to electrical and electronic equipment having an input current≤16 A per phase, and intended to be connected to public low-voltage distribution systems

Table 1 - Limits for Class A equipment

Harmonic order n	Maximum permissible harmonic current (A)
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \le n \le 39$	$0.15 \frac{0.15}{n}$
Even harmonics	
2	1.08
4	0.43
6	0.30
$8 \le n \le 40$	$0.23 \frac{8}{n}$

8.3. Test Procedure

The measurement of harmonic currents shall be performed as follows: i. For each harmonic order, measure the 1.5 s smoothed r.m.s. harmonic current in each DFT time window as defined in EN / IEC 61000-4-7:2009. ii. Calculate the arithmetic average of the measured values from the DFT time windows, over the entire observation period Short cyclic (T cycle≤2.5 min). Because of synchronisation to meet the requirements for repeatability in 5%.

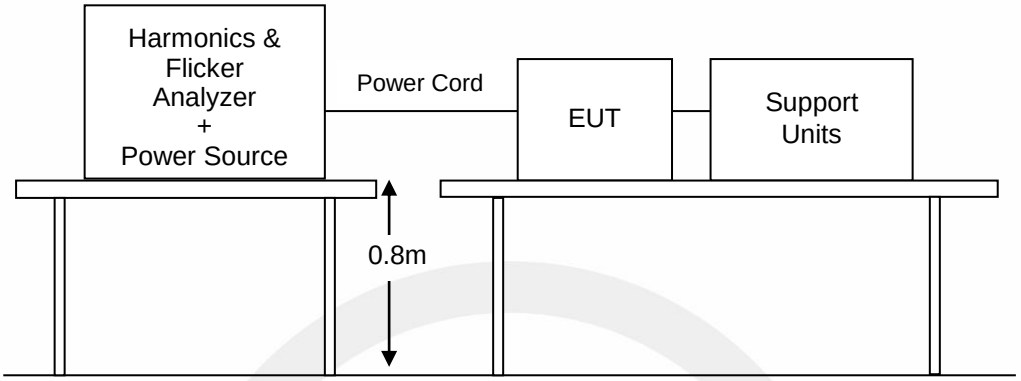
8.4. Test Results

Not Applicable.

Because the power of EUT is less than 75W, according standard EN 61000-3-2, Harmonic current isn't required.

9. VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

9.1. Block Diagram of Test Setup



9.2. Standard Limits

EN 61000-3-3 Limits
The objective of voltage changes, voltage fluctuations and flicker in public low voltage supply systems during equipment with rated current≤16 A per phase, ensures that home appliances and certain other electrical equipment do not adversely affect lighting equipment when connected to the same power system.
Voltage Fluctuation and Flicker Limits:
— the value of Pst shall not be greater than 1.0;
— the value of Plt shall not be greater than 0.65;
— the value of d(t) during a voltage change shall not exceed 3.3 % for more than 500 ms;
— the relative steady-state voltage change, dc, shall not exceed 3.3 %;
— the maximum relative voltage change, dmax, shall not exceed 4.0 %;

9.3. Test Procedure

The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance. The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of 8% is achieved during the whole assessment procedure.

9.4. Test Results

PASS.

Please see the attached page.

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

EUT: SHINEMASTER **Tested by: PJ**
Test category: All parameters (European limits) **Test Margin: 100**
Test date: 2019/10/26 **Start time: 1:41:25** **End time: 1:51:57**
Test duration (min): 10 **Data file name: WIN2105_F-000341.cts_data**
Comment: Ping Mode
Customer:

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

Pst_i and limit line **European Limits**

Parameter values recorded during the test:

Vrms at the end of test (Volt):	**230.68**			
Highest dt (%):	**0.00**	**Test limit (%):**	**N/A**	**N/A**
T-max (mS):	**0.0**	**Test limit (mS):**	**500.0**	**Pass**
Highest dc (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Highest dmax (%):	**-0.07**	**Test limit (%):**	**4.00**	**Pass**
Highest Pst (10 min. period):	**0.064**	**Test limit:**	**1.000**	**Pass**

10. IMMUNITY GENERAL PERFORMANCE CRITERIA DESCRIPTION

General performance criteria are defined in EN 55035 clause 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.

EN 55035:
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.

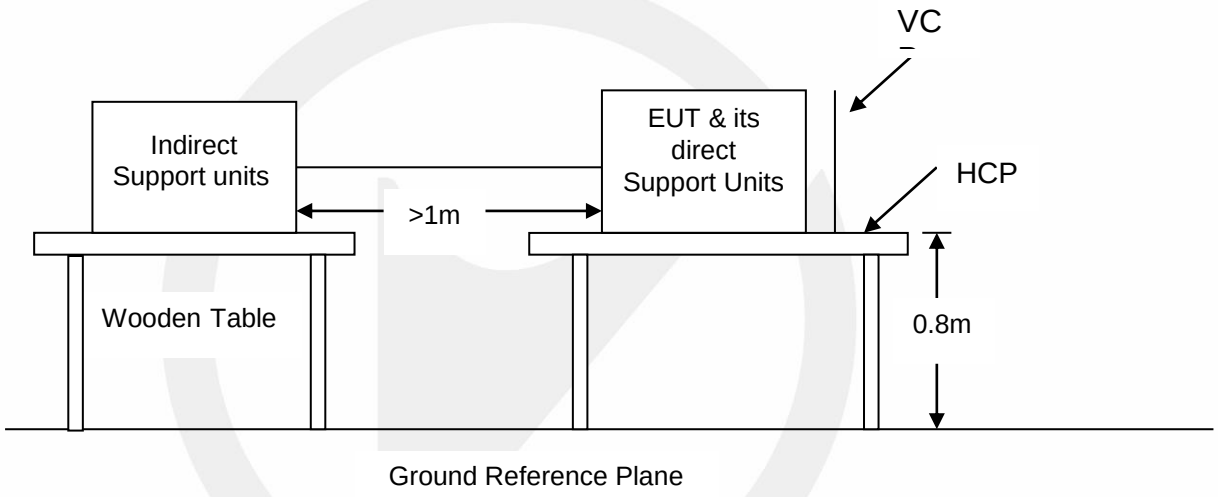
Performance criterion C
Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

11. ELECTROSTATIC DISCHARGE

11.1. Test Specification

Test standard	:	EN 55035
Basic standard	:	IEC 61000-4-2
Performance criterion	:	B
Test level	:	±8.0kV (Air discharge) ±4.0kV (Contact discharge)

11.2. Block Diagram of Test Setup



11.3. Test Procedure

a. In the case of air discharge testing, the climatic conditions shall be within the following ranges:
- ambient temperature: 15°C to 35°C;
- relative humidity : 30% to 60%;
- atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar)

b. Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.

c. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

d. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted : - If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate. - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge. - The contact discharge test shall not be applied to such surfaces.

e. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

f. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final test level should not exceed the product specification value in order to avoid damage to the equipment.
g. The test shall be performed with both air discharge and contact discharge. The test shall be performed with single discharges. On each pre-selected point at least 10 single discharges (in the most sensitive polarity) shall be applied. For the time interval between successive single discharges an initial value of 1 s is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
h. Ensure that the applied charge on the EUT has been dis-charged before next ESD pulse.

11.4.Test Results

PASS

Temperature	:	23 °C
Humidity	:	49%
Atmospheric Pressure	:	101kpa
Test Engineer	:	PJ
Test Date	:	2019-10-26

Air Discharge:

Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
±8 kV	enclosure and seams	A	B	Pass

Contact Discharge

Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
±4kV	metal parts of the enclosure	A	B	Pass

Indirect Discharge

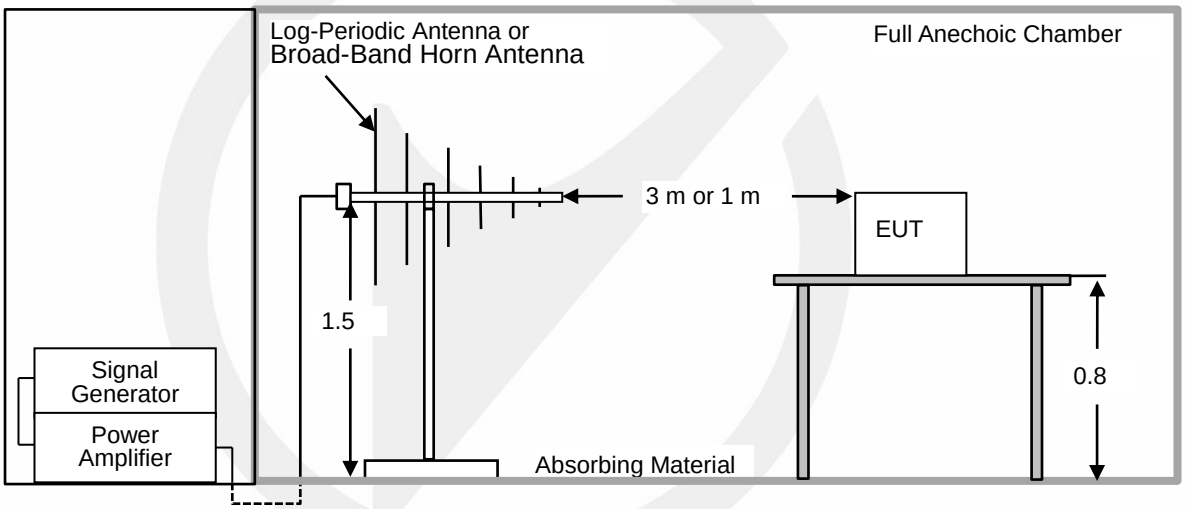
Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
±4 kV	HCP	A	B	Pass
±4kV	VCP	A	B	Pass

12. CONTINUOUS RF ELECTROMAGNETIC FIELD DISTURBANCES

12.1. Test Specification

Test standard	:	EN 55035	
Basic standard	:	IEC 61000-4-3	
Performance criterion	:	A	
Frequency range & Test level	:	☒80M-1000MHz	3V/m
		☒Spot frequency	3V/m
		☐Additional spot frequency	3V/m
Modulation	:	AM, 80%, 1kHz sine-wave	

12.2. Block Diagram of Test Setup



12.3. Test procedure

The procedure defined in this part requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels. To comply with local regulations and to prevent biological hazards to the testing personnel, it is recommended that these tests be carried out in a shielded enclosure or semi-anechoic chamber.

a. The antenna which is enabling the complete frequency range of 80-1000 MHz is placed 3m (or 1m) away from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the antenna.
b. The test is performed with the antenna facing the front and back sides of the EUT with. Both vertical and horizontal polarizations from antenna are tested.

12.4.Test results

PASS

Temperature	:	24.5°C
Humidity	:	49%
Atmospheric Pressure	:	101kpa
Test Engineer	:	PJ
Test Date	:	2019-10-26

☒ 80M-1000MHz:

Freq. Range (MHz)	Field	Modulation	Polarity	Position (°)	Actual criterion	Required performance criterion	Result
80-1000	3V/m	AM, 80%	H / V	/	A	A	Pass

☒ Spot frequency:

Freq (MHz)	Field	Modulation	Polarity	Position (°)	Actual criterion	Required performance criterion	Result
1800, 2600, 3500, 5000	3V/m	AM, 80%	H / V	/	A	A	Pass

☐ Additional spot frequency:

Freq (MHz)	Field	Modulation	Polarity	Position (°)	Actual criterion	Required performance criterion	Result
80, 120, 160, 230, 434, 460, 600, 863, 900	3V/m	AM, 80%	H / V	0, 90,180, 270	N/A	A	N/A

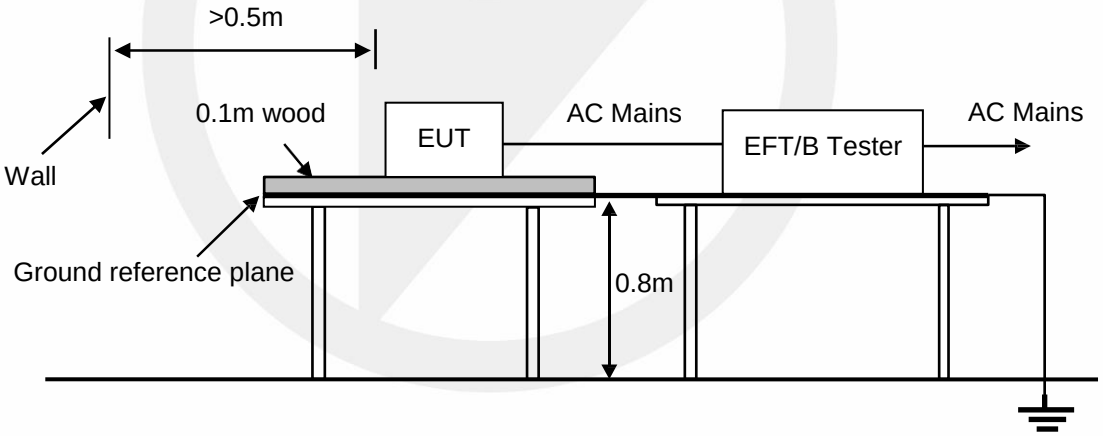
13. ELECTRICAL FAST TRANSIENTS/BURST

13.1. Test Specification

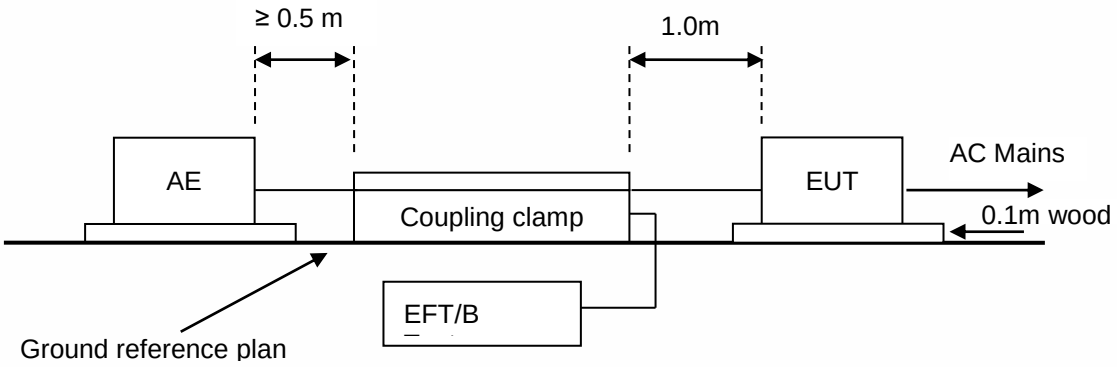
Test standard	:	EN 55035
Basic standard	:	IEC 61000-4-4
Performance criterion	:	B
Test level	:	☒1kV, AC mains power ports
		☐0.5kV, DC network power ports
		☐0.5kV, Analogue/digital data ports
Repetition frequency	:	☒5kHz, ☐100kHz(Only xDSL ports)
Tr/Th:	:	5/50ns
Burst period	:	300ms
Test time :	:	120s

13.2. Block Diagram of Test Setup

AC Lines:



Signal lines:



13.3. Test Procedure

The EUT is put on the table that is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

13.4. Test Results

PASS

Temperature	:	23°C
Humidity	:	49%
Atmospheric Pressure	:	101kpa
Test Engineer	:	PJ
Test Date	:	2019-10-26

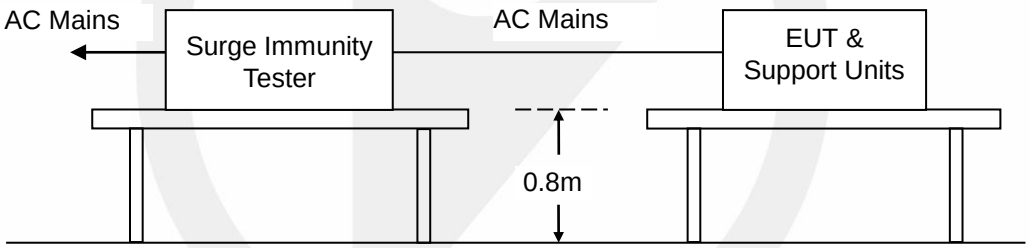
Injection Line	Voltage (kV)	Injected Method	Actual criterion	Required performance criterion	Result (Pass/Fail)
☒ AC mains power ports	± 1	☒ CDN ☐ Direct injection ☐ Capacitive coupling clamp	A	B	Pass
☐ DC network power ports	± 0.5	☐ CDN ☐ Direct injection ☐ Capacitive coupling clamp	N/A	N/A	N/A
☒ Analogue/digital data ports (Wired network port)	± 0.5	☐ CDN ☐ Direct injection ☒ Capacitive coupling clamp	A	B	Pass
☐ Analogue/digital data ports (Broadcast receiver tuner port)	± 0.5	☐ CDN ☐ Direct injection ☐ Capacitive coupling clamp	N/A	N/A	N/A
☐ Analogue/digital data ports (.....)	± 0.5	☐ CDN ☐ Direct injection ☐ Capacitive coupling clamp	N/A	N/A	N/A

14. SURGES

14.1. Test Specification

Test standard	:	EN 55035
Basic standard	:	IEC 61000-4-5
Test level	:	☒1kV, Line to Line, AC mains power ports, Criterion B
		☐2kV, Line to Earth, AC mains power ports, Criterion B
		☐0.5kV, Line to Reference ground, DC network power ports, Criterion B
		☐1.0kV, Lines to Ground, Unshielded symmetrical, Criterion C
		☐4.0kV, Lines to Ground, Unshielded symmetrical, Criterion C
		☐0.5kV, Shield to ground, Coaxial or shielded port, Criterion B
Number of surges	:	5 (for each combination of parameters)
Repetition rate	:	1 minute / time
Polarity:	:	Positive / Negative
Phase angle:	:	90°, 270° (Only AC mains power ports)

14.2. Block Diagram of Test Setup



14.3. Test Procedure

This test simulates a lightning event by inducing transients onto the AC/DC power supply lines in common mode (Line to Ground) and differential mode (Line to Line). Each device was tested in a total of two surge configurations: Line to Ground (L-G): Combination Wave, Line to Protective Earth with 9uF and 10Ohm and Neutral to Protective Earth with 9uF and 10Ohm, common mode, generator earthed.
Line to Line (L-L): Combination Wave,
Line to Neutral with 18uF, differential mode, generator floated.
2 ohm : the source impedance of the low-voltage power supply network.
12 ohm : the source impedance of the low-voltage power supply network and ground.

a. If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the a.c. voltage wave (positive and negative).
b. The surges have to be applied line to line and line to earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no other specification.
c. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan. All lower levels including the selected test level shall be satisfied.
d. For testing the secondary protection, the output voltage of the generator shall be increased up to the

worst-case voltage breakdown level (let-through level) of the primary protection.
e. Testing shall be performed according to a Test Plan, which shall be included in the test report.
f. To find all critical points of the duty cycle of the equipment, a sufficient number of positive and negative test pulses shall be applied.

14.4. Test results

PASS

Temperature	:	23°C
Humidity	:	49%
Atmospheric Pressure	:	101kpa
Test Engineer	:	PJ
Test Date	:	2019-10-26

☒ AC mains power ports:

Coupling Line	Voltage (kV)	Waveform (μs)	Polarity	Actual criterion	Required performance criterion	Result (Pass/Fail)
☒ Line to line	0.5, 1	1.2/50 (8/20)	Pos./ Neg.	A	B	Pass
☐ Line to earth	0.5, 1, 2	1.2/50 (8/20)	Pos./ Neg.	A	B	N/A

☐ DC network power ports:

Coupling Line	Voltage (kV)	Waveform (μs)	Polarity	Actual criterion	Required performance criterion	Result (Pass/Fail)
Line to Reference ground	0.5	1.2/50 (8/20)	Pos./ Neg.	A	B	N/A

☒ Analogue/digital data ports:

Port type	Coupling Line	Voltage (kV)	Waveform (μs)	Polarity	Actual criterion	Required performance criterion	Result (Pass/Fail)
☒ Unshielded symmetrical (Wired network port)	Lines to ground	0.5, 1	10/700 (5/320)	Pos./ Neg.	A	C	Pass
☐ Unshielded symmetrical (.....)	Lines to ground	0.5, 1	10/700 (5/320)	Pos./ Neg.	N/A	C	N/A
☐ Unshielded symmetrical	Lines to ground	0.5, 1, 2, 4	10/700 (5/320)	Pos./ Neg.	N/A	C	N/A
☐ Coaxial or shielded (Broadcast receiver tuner port)	Shield to ground	0.5	1.2/50 (8/20)	Pos./ Neg.	N/A	C	N/A

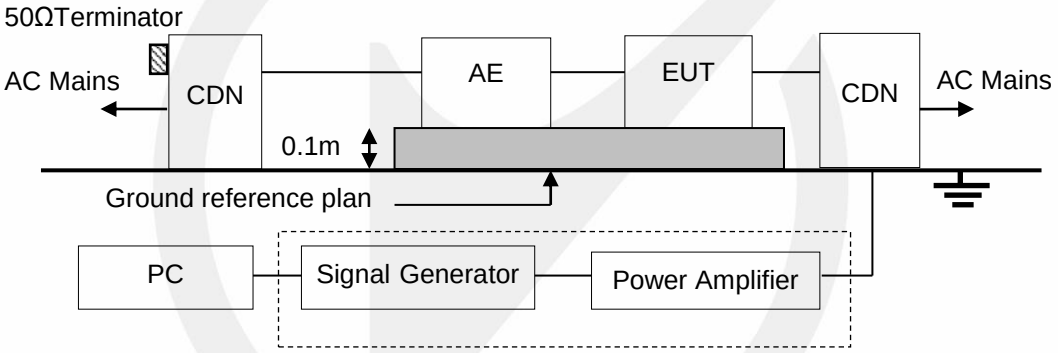
☐ Coaxial or shielded (.....)	Shield to ground	0.5	1.2/50 (8/20)	Pos./ Neg.	N/A	C	N/A

15. CONTINUOUS INDUCED RF DISTURBANCES

15.1. Test Specification

Test standard	:	EN 55035
Basic standard	:	IEC 61000-4-6
Performance criterion	:	A
Frequency range & Test level	:	0.15M to 10MHz, 3V 10M to 30MHz, 3V to 1V 30M to 80MHz, 1V
Modulation	:	AM 80%, 1kHz sine-wave
Frequency Step	:	1% of fundamental

15.2. Block Diagram of Test Setup



15.3. Test Procedure

a. The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.
b. The EUT is placed on a 0.1m high test table, and a well grounded cable is connected to metallic plane above the test table.
c. All cables/wires must be laid out on test plate (3cm in thickness),and the EUT is set up on test plate (10 cm in thickness) as shown in test setup photo, and the cables/wires must not be in mid-air, they should be touching the surface of test plate. Ensure that the EUT is properly connected to the accessory equipment.
d. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50 ohm load resistor.
e. The frequency range is swept from 150 kHz to 80 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 switch coupling devices as necessary. The rate of sweep shall no exceed 1.5 x 10-3 decades/s. Where the frequency is swept incrementally, the step size shall no exceed 1% of the start and thereafter 1% of the preceding frequency value.
f. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency (ies) and harmonics or frequencies of dominant interest shall be analyzed separately.
g. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise

modes selected for susceptibility
h. Testing shall be performed according to a Test Plan, which shall be included in the test report.

15.4. Test results

PASS

Temperature	:	23°C
Humidity	:	49%
Atmospheric Pressure	:	101kpa
Test Engineer	:	PJ
Test Date	:	2019-10-26

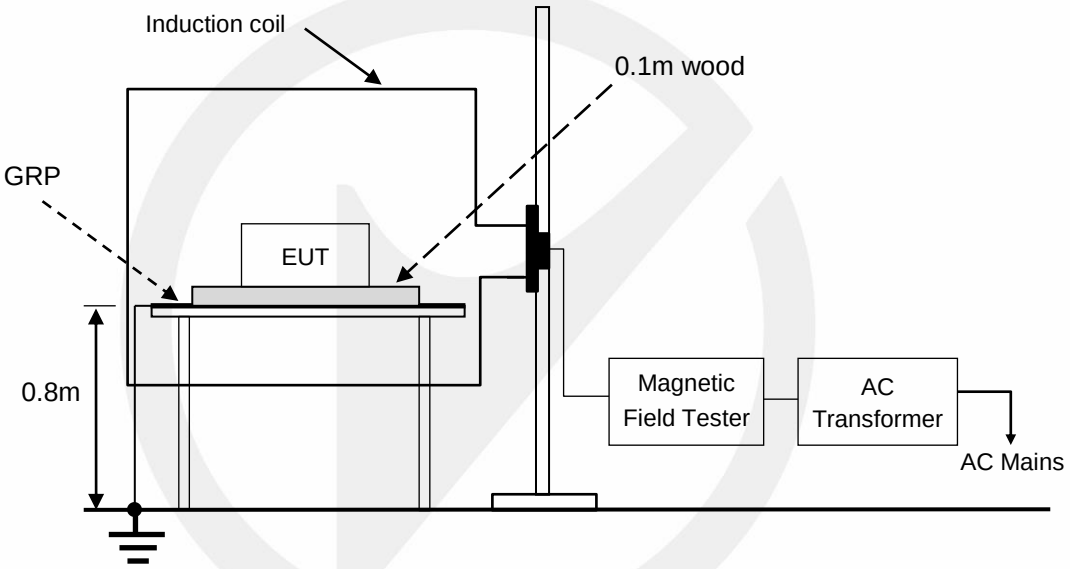
Range (MHz)	Levers (V)	Injection port	Coupling type	Actual criterion	Required performance criterion	Result (Pass/Fail)
0.15-10	3	☒AC mains power ports	☒CDN ☐EM Clamp ☐Current Clamp ☐Direct injection	A	A	Pass
10-30	3-1					
30-80	1					
0.15-10	3	☐DC network power ports	☐CDN ☒EM Clamp ☐Current Clamp ☐Direct injection	N/A	N/A	N/A
10-30	3-1					
30-80	1					
0.15-10	3	☒Analogue/digital data ports (Wired network port)	☐CDN ☒EM Clamp ☐Current Clamp ☐Direct injection	A	A	Pass
10-30	3-1					
30-80	1					
0.15-10	3	☐Analogue/digital data ports (Broadcast receiver tuner port)	☐CDN ☐EM Clamp ☒Current Clamp ☐Direct injection	N/A	N/A	N/A
10-30	3-1					
30-80	1					
0.15-10	3	☐Analogue/digital data ports (.....)	☐CDN ☐EM Clamp ☒Current Clamp ☐Direct injection	N/A	N/A	N/A
10-30	3-1					
30-80	1					

16. POWER FREQUENCY MAGNETIC FIELD

16.1. Test Specification

Test Standard	:	EN 55035
Basic Standard	:	IEC 61000-4-8
Performance criterion	:	A
Test level	:	1A/m

16.2. Block Diagram of Test Setup



GRP: Ground reference plane
EUT: Equipment under test

16.3. Test Procedure

The EUT is placed in the middle of a induction coil (1*1m), under which is a 1*1*0.1m (high) table, this small table is also placed on a larger table, 0.8 m above the ground. Both horizontal and vertical polarization of the induction coil is set on test, so that each side of the EUT is affected by the magnetic field. Also can reach the same aim by change the position of the EUT.

16.4. Test Results

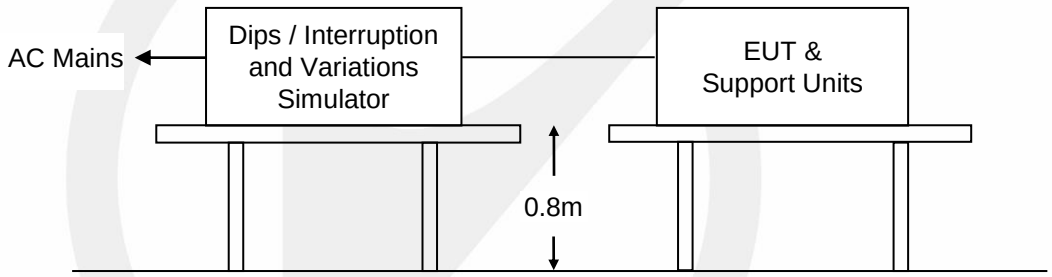
Not Applicable.

17. VOLTAGE DIPS AND INTERRUPTIONS

17.1. Test Specification

Test standard	:	EN 55035
Basic standard	:	IEC 61000-4-11
Test level	:	☒0%, 0.5 period, Criterion B
		☒70%, 25 periods for 50Hz, Criterion C
		☐70%, 30 periods for 60Hz, Criterion C
		☒0%, 250 periods for 50Hz, Criterion C
		☐0%, 300 periods for 60Hz, Criterion C

17.2. Block Diagram of Test Setup



17.3. Test Procedure

a. Where the equipment has a rated voltage the following shall apply - If the voltage range does not exceed 20% of the lower voltage specified for the rated voltage range, a single voltage within that range may be specified as a basis for test level specification.
- In all other cases, the test procedure shall be applied for both the lowest and highest voltages declared in the voltage range.
b. Test Conditions
- Select operated voltage and frequency of EUT - Test of interval : 10 sec.
- Level and duration : Sequence of 3 dips/interrupts.
- Voltage rise (and fall) time : 1.5 μs.

17.4.Test results

PASS

Temperature	:	23°C
Humidity	:	49%
Atmospheric Pressure	:	101kpa
Test Engineer	:	PJ
Test Date	:	2019-10-26

	Test Level (% UT)	Phase angle (°)	Input Voltage (V)	Freq (Hz)	Duration (periods)	Actual criterion	Required performance criterion	Result (Pass /Fail)
☒Voltage dips	0%	0º, 180º	AC 230V	50	0.5	A	B	Pass
☒Voltage dips	70%	0º, 180º	AC 230V	50	25	A	C	Pass
☒Voltage interruptions	0%	0º, 180º	AC 230V	50	250	C	C	Pass

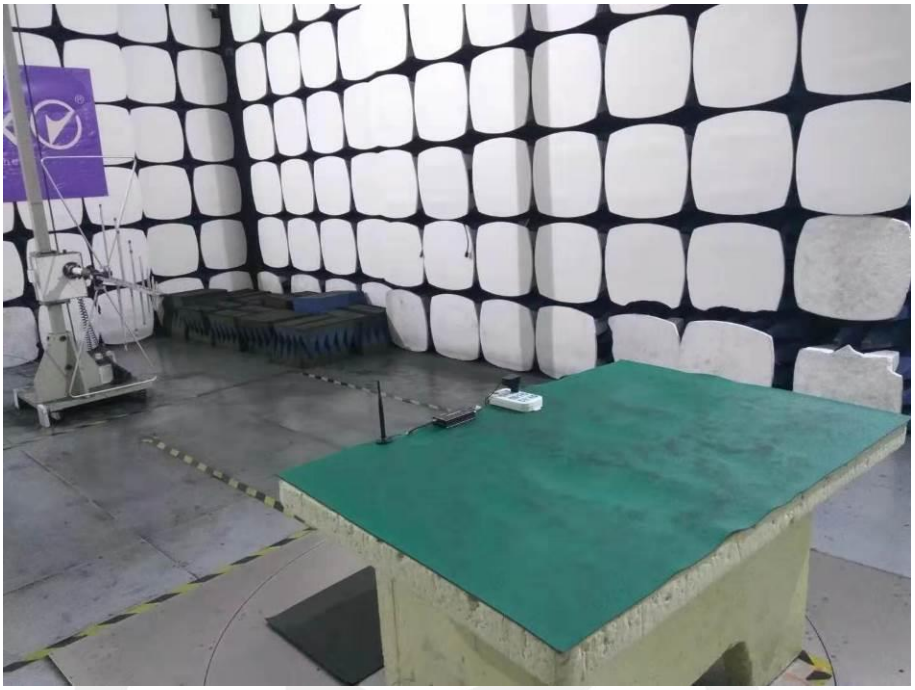
Note：C: During the test, the EUT shut down, after the test, it can reset by user.

18. PHOTOGRAPHS

18.1. Photos of Conducted Emissions from the AC Mains Power Ports

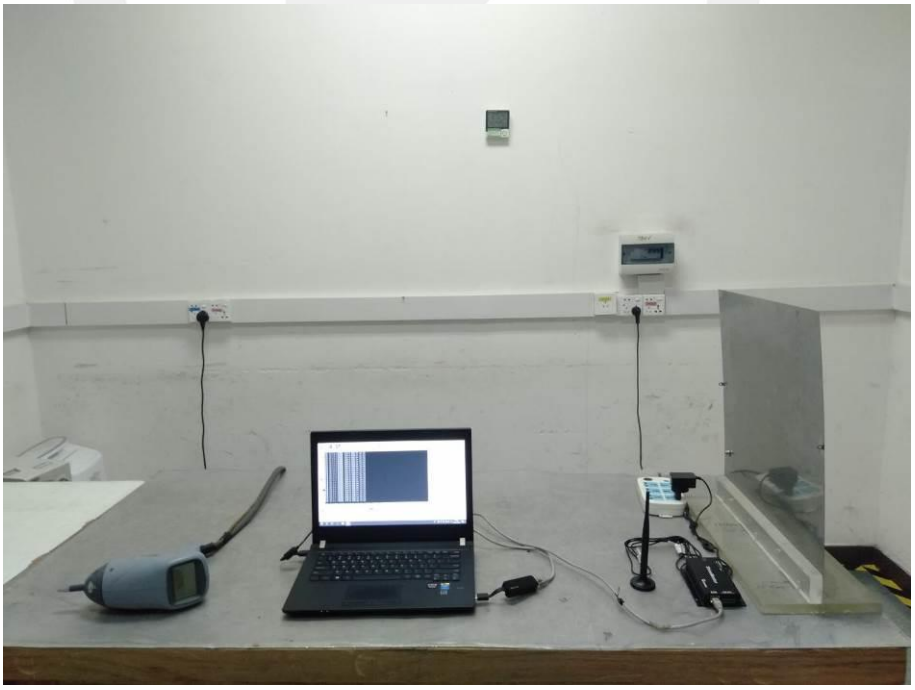
18.2. Photo for Asymmetric Mode Conducted Emissions

18.3.Photos of Radiation Emission Measurement



18.4.Photo of Harmonic / Flicker Measurement

18.5.Photo of Electrostatic Discharges



18.6.Photo of Continuous RF Electromagnetic Field Disturbances

18.7.Photos of Electrical Fast Transients/Burst

AC Mains:

Signal Line:

17.7.Photos of Surges

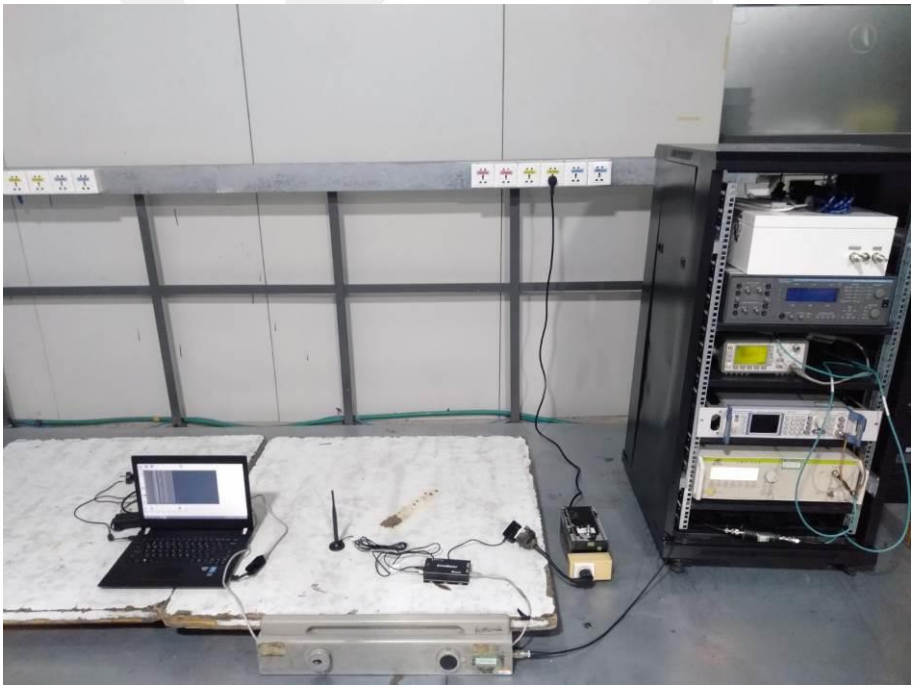
AC Mains:

Signal Line:

17.8.Photos of Continuous Induced RF Disturbances

AC Mains:

Signal Line:



17.9.Photo of Voltage Dips And Interruptions

APPENDIX
(PHOTOS OF EUT)

------ End of Report ------