

CE&UKCA EMC Test Report

Project No. : 1409C052E
Equipment : 8-Port Gigabit Ethernet Switch
Brand Name : Tenda
Test Model : TEG1008D
Series Model : N/A
Applicant : SHENZHEN TENDA TECHNOLOGY CO.,LTD
Address : 6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052
Manufacturer : SHENZHEN TENDA TECHNOLOGY CO.,LTD
Address : 6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052
Date of Receipt : Jun. 29, 2021
Date of Test : Jul. 01, 2021 ~ Jul. 09, 2021
Issued Date : Jul. 23, 2021
Report Version : R00
Test Sample : Engineering Sample No.: DG20210629130
Standard(s) : EN 55032:2015+A11:2020
 EN IEC 61000-3-2:2019
 EN 61000-3-3:2013+A1:2019
 EN 55035:2017+A11:2020
 BS EN 55032:2015+A11:2020
 BS EN IEC 61000-3-2:2019
 BS EN 61000-3-3:2013+A1:2019
 BS EN 55035:2017+A11:2020

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

Sam. Wang

Prepared by : Sam Wang

Kevin Li

Approved by : Kevin Li



TESTING CERT #5123.02

Add: No. 3 Jinshagang 1st Rd. Shixia, Dalang Town, Dongguan City, Guangdong, People's Republic of China.

Tel: +86-769-8318-3000

Web: www.newbtl.com

Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

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BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	<p>Compared with original report(BTL-EMC-1-1409C052C),</p> <ol style="list-style-type: none"> 1. Added the standard of UKCA. 2. Updated the standard to the latest. 3. Added the adapter(Model: BN073-A09009E). <p>So test items of new adapter have have been re-evaluated and recorded in this report. Original adapter' data please refer to original report.</p>	Jul. 23, 2021

Remark: For the original report (BTL-EMC-1-1409C052C), the test data, data evaluation, and equipment configuration contained was accredited by the Authority of TAF according to the ISO/IEC 17025 quality assessment standard and technical standard(s).

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

Emission		
Standard(s)	Test Item	Result
EN 55032:2015+A11:2020 / BS EN 55032:2015+A11:2020	Radiated emissions up to 1 GHz	PASS
	Radiated emissions above 1 GHz	PASS
	Radiated emissions from FM receivers	N/A
	Conducted emissions AC mains power port	PASS
	Asymmetric mode conducted emissions	AAN
		Current Probe
		CP+CVP
	Conducted differential voltage emissions	N/A

Standard(s)	Test Item	Result
EN IEC 61000-3-2:2014 / BS EN IEC 61000-3-2:2014	Harmonic current	PASS
EN 61000-3-3: 2013+A1:2019 / BS EN 61000-3-3: 2013+A1:2019	Voltage fluctuations (Flicker)	PASS

Immunity			
Standard(s)	Ref Standard(s)	Test Item	Result
EN 55035:2017+A11:2020 / BS EN 55035:2017+A11:2020	IEC 61000-4-2:2008	ESD	PASS
	IEC 61000-4-3:2020	RS	PASS
	IEC 61000-4-4:2012	EFT	PASS
	IEC 61000-4-5:2014+AMD1:2017	Surge	PASS
	IEC 61000-4-6:2013	CS	PASS
	IEC 61000-4-8:2009	PFMF	PASS
	IEC 61000-4-11:2020	Dips	PASS

Standard(s)	Section	Test Item	Result
EN 55035:2017+A11:2020 / BS EN 55035:2017+A11:2020	4.2.7	BIN-R	N/A
	4.2.7	BIN-I	N/A

NOTE:

(1) "N/A" denotes test is not applicable to this device.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No. 3 Jinshagang 1st Rd. Shixia, Dalang Town, Dongguan City, Guangdong, People's Republic of China.

1.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2, The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{CISPR} requirement.

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

A. Radiated emissions up to 1 GHz measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB08 (10m)	CISPR	30MHz ~ 200MHz	V	4.44
		30MHz ~ 200MHz	H	3.44
		200MHz ~ 1,000MHz	V	4.28
		200MHz ~ 1,000MHz	H	3.52

B. Radiated emissions above 1 GHz measurement:

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-CB08 (3m)	CISPR	1GHz ~ 6GHz	4.42

C. Conducted emissions AC mains power port measurement:

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-C01	CISPR	150kHz ~ 30MHz	3.18

D. Asymmetric mode conducted emissions port measurement:

Test Site	Method	Test Item	U,(dB)
DG-C01	CISPR	AAN Cat.5 LCL = 65 ... 50 dB	4.26

E. Harmonic current / Voltage fluctuations (Flicker) measurement:

Test Site	Method	Item	U (%)
DG-C01	EN IEC 61000-3-2 / BS EN IEC 61000-3-2	Current	0.593
	EN 61000-3-3 / BS EN 61000-3-3	Voltage	0.595

F. Immunity Measurement:

Test Site	Method	Item	U
DG-SR02	IEC 61000-4-2	Rise time tr	6.80%
		Peak current Ip	6.30%
		Current at 30 ns	6.50%
		Current at 60 ns	6.90%
DG-CB05	IEC 61000-4-3 (80MHz~6GHz)	Electromagnetic field immunity test	2.38dB
DG-SR05	IEC 61000-4-4	Peak voltage (V _P)	3.7%
		Rise time (tr)	4.4%
		Pulse width(tw)	4.1%
		Pulse Freq.(kHz)	0.8%
		Burst Duration(ms)	1.4%
		Burst Period(ms)	1.4%
		Peak voltage (V _P)-with clamp	3.7%
		Rise time (tr) -with clamp	5.0%
		Pulse width(tw) -with clamp	4.8%
DG-SR05/ DG-SR01	IEC 61000-4-5	Open-Circuit Output Voltage (1.2/50us)	3.8%
		Open circuit front time (1.2/50us)	6.3%
		Open circuit time of half value (1.2/50us)	4.6%
		Open-Circuit Output Voltage (10/700us)	3.8%
		Open circuit front time (10/700us)	5.9%
		Open circuit time of half value (10/700us)	4.7%
DG-CB06	IEC 61000-4-6 (150kHz-80MHz)	CDN	1.32dB
		EM clamp	3.16dB
DG-SR05	IEC 61000-4-8	Magnetic Field Strength	2.38%
DG-SR05	IEC 61000-4-11	DIP Amplitude	0.5%
		DIP Time Event	3%

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.


1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Tested By
Radiated emissions up to 1 GHz	25°C	60%	Better Yan
Radiated emissions above 1 GHz	25°C	60%	Kay Zhu
Conducted emissions AC mains power port	25°C	53%	Gerry Zhao
Asymmetric mode conducted emissions	25°C	53%	Gerry Zhao
Harmonic current	25°C	55%	Gerry Zhao
Voltage fluctuations (Flicker)	25°C	55%	Gerry Zhao

Test Item	Temperature	Humidity	Pressure	Tested By
ESD	24°C	46%	1012hPa	Albe Zhou
RS	25°C	49%	/	Peppa Zhang
EFT	24°C	47%	/	Richard Zhang
Surge	24°C	47%	/	Richard Zhang
CS	25°C	49%	/	Promise Yin
PFMF	24°C	47%	/	Richard Zhang
Dips	24°C	47%	/	Richard Zhang

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	8-Port Gigabit Ethernet Switch
Brand Name	Tenda
Test Model	TEG1008D
Series Model	N/A
Model Difference(s)	N/A
Power Source	DC Voltage supplied from AC adapter. Model: BN073-A09009E
Power Rating	I/P: 100-240V ~ 50/60Hz, 0.4A O/P: 9.0V  1.0A 9.0W
Connecting I/O Port	8* LAN port 1* DC port
Classification of EUT	Class B
Highest Internal Frequency(Fx)	Exceed 108MHz

Note:

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

2.2 DESCRIPTION OF TEST MODES

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

Pretest Mode	Description
Mode 1	FULL SYSTEM
Mode 2	LAN1 1Gbps
Mode 3	LAN1 10Mbps

Radiated emissions up to 1 GHz test	
Final Test Mode	Description
Mode 1	FULL SYSTEM

Radiated emissions Above 1 GHz test	
Final Test Mode	Description
Mode 1	FULL SYSTEM

Conducted emissions AC mains power port test	
Final Test Mode	Description
Mode 1	FULL SYSTEM

Asymmetric mode conducted emissions test	
Final Test Mode	Description
Mode 2	LAN1 1Gbps
Mode 3	LAN1 10Mbps

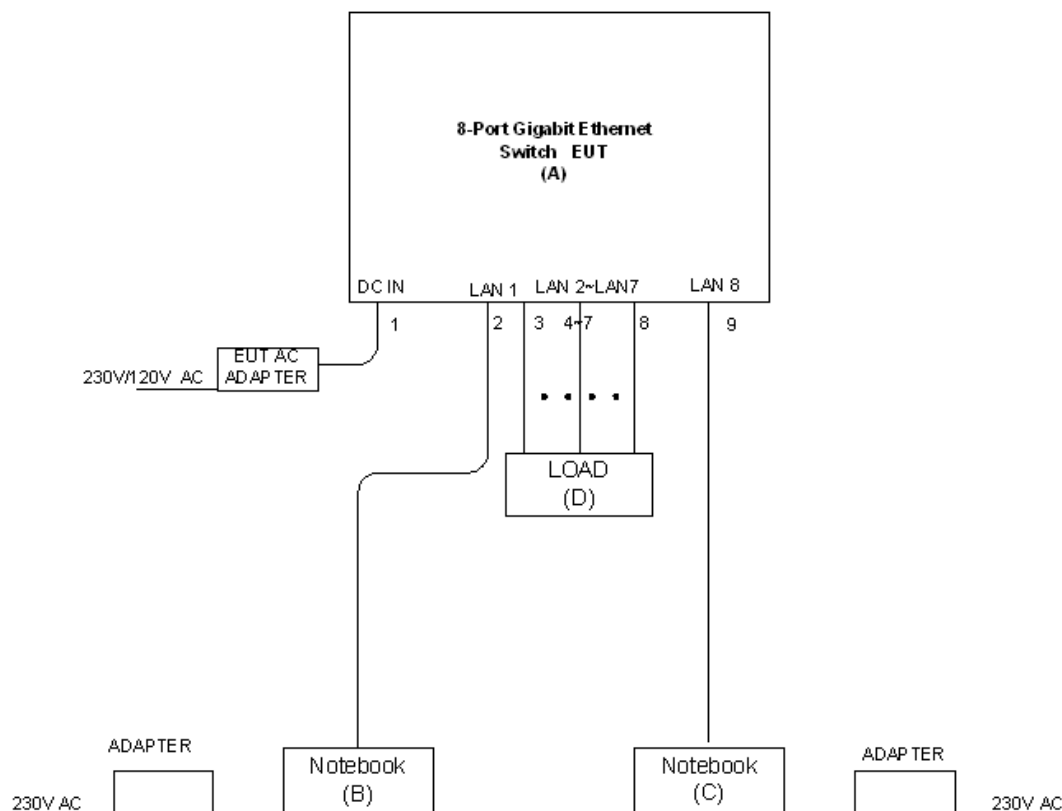
Harmonic current & Voltage fluctuations (Flicker) Test	
Final Test Mode	Description
Mode 1	FULL SYSTEM

For Immunity Test	
Final Test Mode	Description
Mode 1	FULL SYSTEM

2.3 EUT OPERATING CONDITIONS

The EUT exercise program used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use.

2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
A	8-Port Gigabit Ethernet Switch	Tenda	TEG1008D	N/A
B	Notebook	DELL	latitude E5510	N/A
C	Notebook	HP	hstnn-169c-3	CNU02203XG
D	Load	N/A	N/A	N/A

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	AC Main Cable	NO	NO	1.8m
2	RJ45 Cable	NO	NO	10m
3	RJ45 Cable	NO	NO	1.0m
4-7	RJ45 Cable	NO	NO	1.0m
8	RJ45 Cable	NO	NO	1.0m
9	RJ45 Cable	NO	NO	10m

3. EMC EMISSION TEST

3.1 RADIATED EMISSIONS UP TO 1 GHz

3.1.1 LIMITS

Class B equipment up to 1 GHz

Frequency Range MHz	Measurement			Class B limits dB(μV/m)
	Facility	Distance m	Detector type/ bandwidth	
30 - 230	SAC	10	Quasi peak / 120 kHz	30
230 - 1000				37

Notes:

- (1) The limit for radiated test was performed according to as following: EN 55032
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
 Margin Level = Measurement Value - Limit Value

3.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Receiver	Keysight	N9038A	MY54450004	Jul. 25, 2021
2	MXE EMI Receiver	Agilent	N9038A	MY53220133	Feb. 28, 2022
3	Pre-Amplifier	EMC INSTRUMENT	EMC 9135	980284	Dec. 13, 2021
4	Pre-Amplifier	EMC INSTRUMENT	EMC 9135	980283	Dec. 13, 2021
5	Trilog-Broadband Antenna	Schwarzbeck	VULB9168	946	Oct. 16, 2021
6	Trilog-Broadband Antenna	Schwarzbeck	VULB9168	947	Nov. 09, 2021
7	Cable	emci	LMR-400(5m+8m+8m)	N/A	Jan. 06, 2022
8	Cable	emci	LMR-400(5m+8m+8m)	N/A	Jan. 06, 2022
9	Measurement Software	Farad	EZ-EMC Ver.BTL-2ANT-1	N/A	N/A
10	Multi-Device Controller	ETS-Lindgren	2090	N/A	N/A
11	Controller	MF	MF-7802	MF780208159	N/A
12	Attenuator	EMCI	EMCI-N-6-06	N0670	Nov. 09, 2021
13	Attenuator	EMCI	EMCI-N-6-06	N0671	Oct. 16, 2021

Remark: "N/A" denotes no model name, no serial no. or no calibration specified.

All calibration period of equipment list is one year.

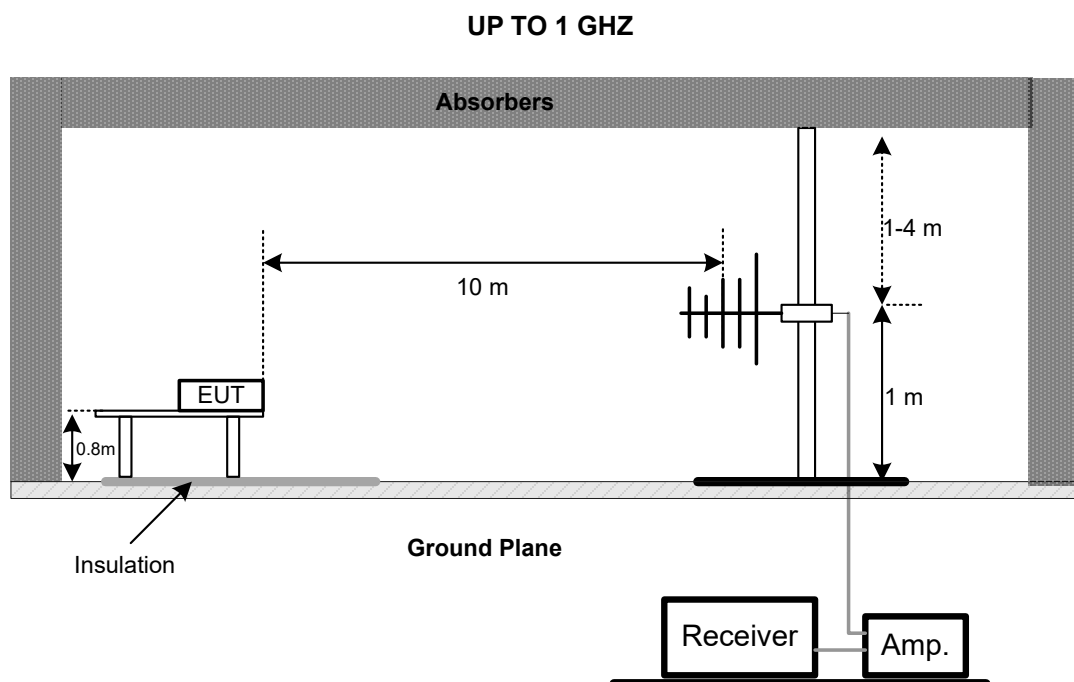
3.1.3 TEST PROCEDURE

- The measuring distance of 10 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- For the actual test configuration, please refer to the related Item - EUT Test Photos.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation

3.1.5 TEST SETUP



3.1.6 MEASUREMENT DISTANCE

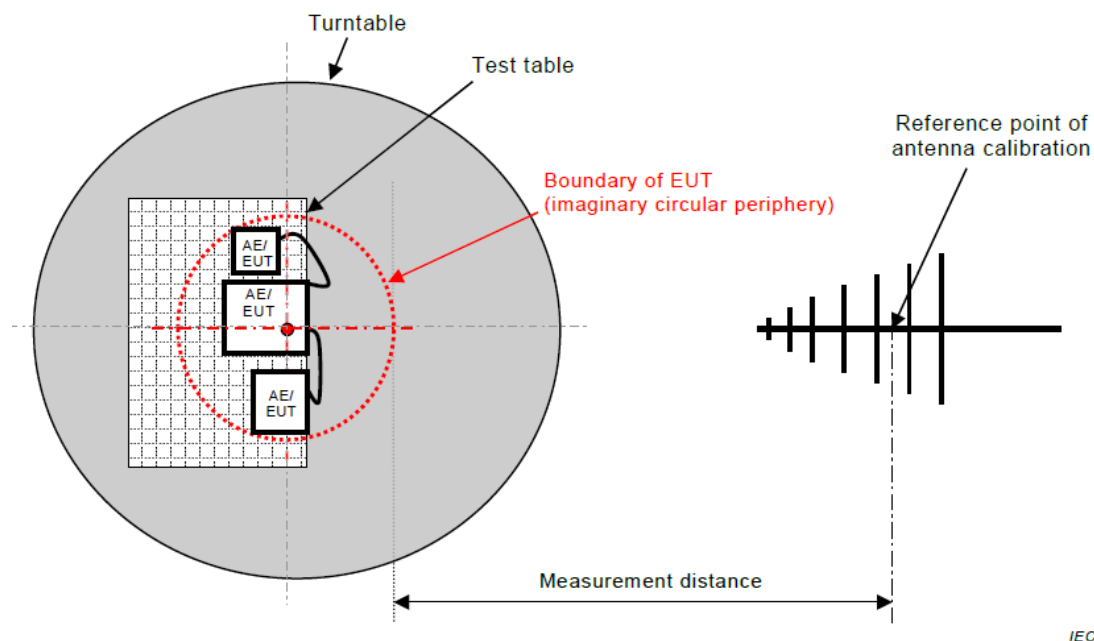


Figure C.1 – Measurement distance

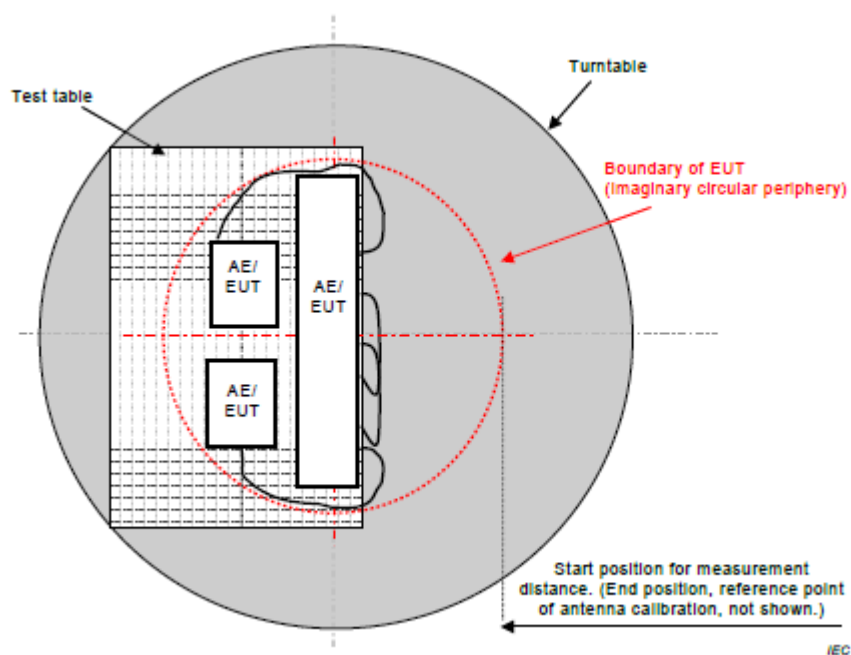
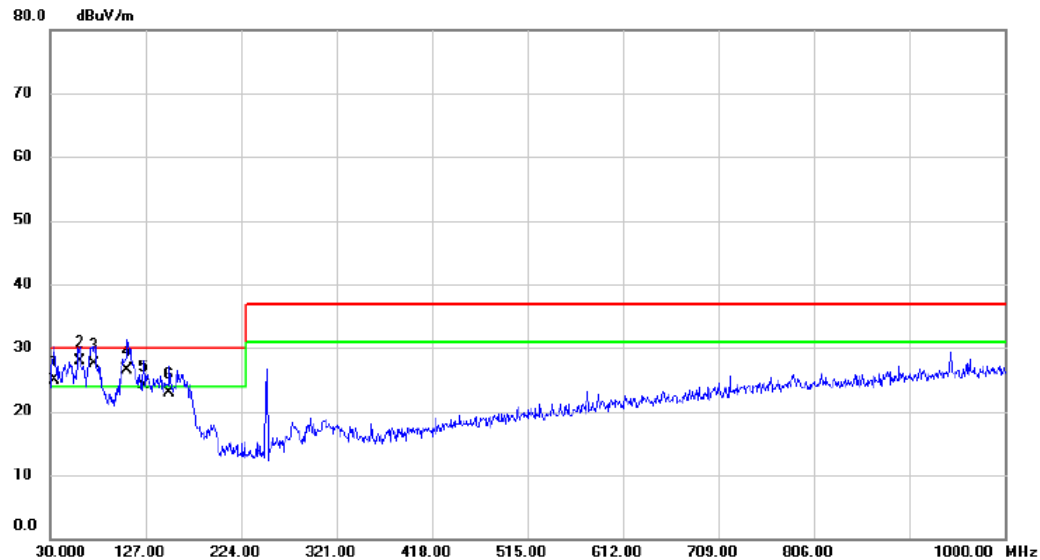


Figure C.2 – Boundary of EUT, Local AE and associated cabling

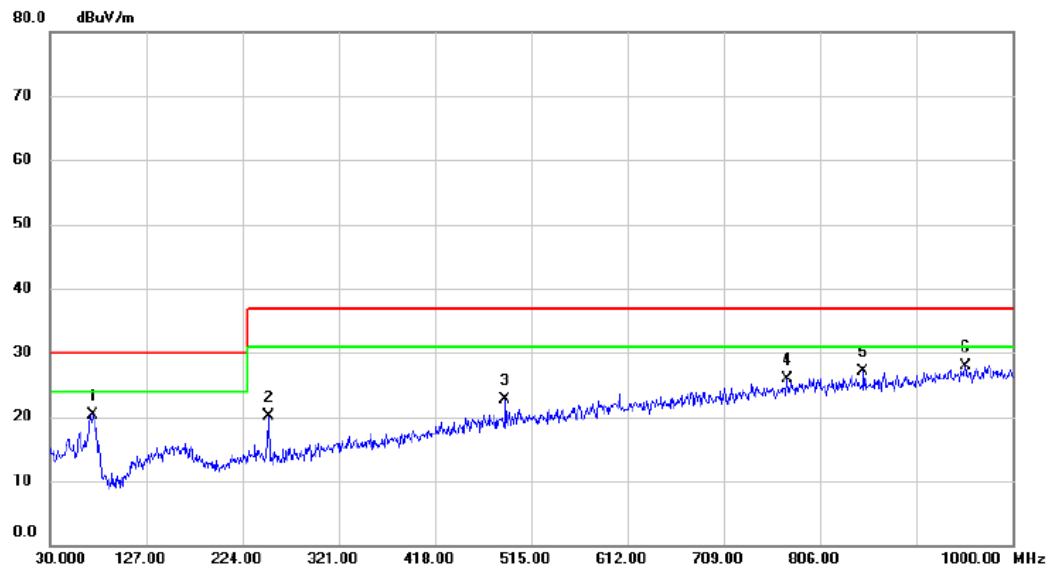
3.1.7 TEST RESULTS

Test Voltage	AC 230V/50Hz	Polarization	Vertical
Test Mode	Mode 1		



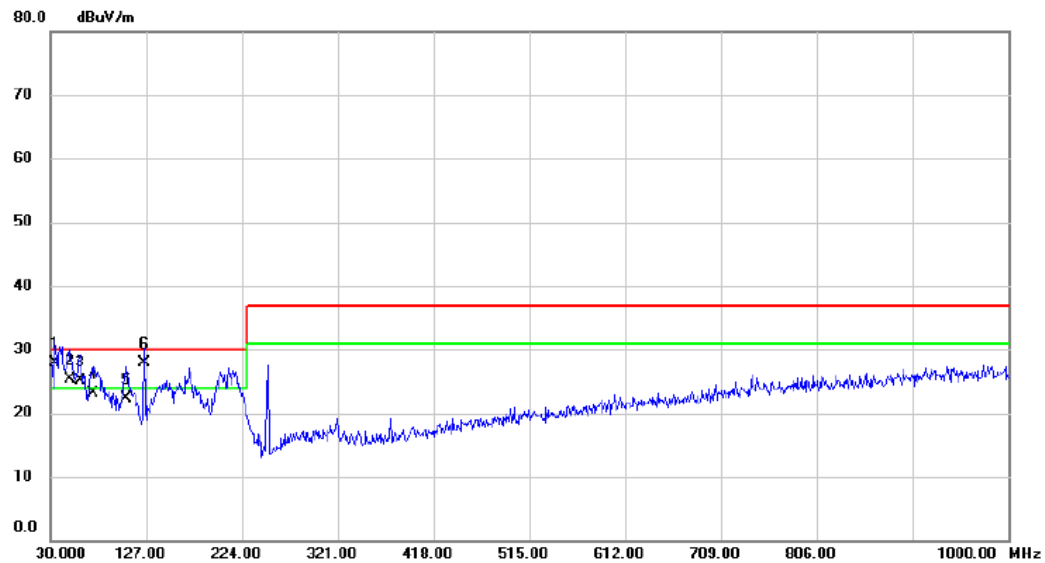
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	!	33.8800	43.76	-18.93	24.83	30.00	-5.17	QP	
2	*	60.0700	45.89	-17.91	27.98	30.00	-2.02	QP	
3	!	74.6200	47.51	-20.07	27.44	30.00	-2.56	QP	
4	!	108.5700	47.23	-20.69	26.54	30.00	-3.46	QP	
5	!	125.0600	43.39	-19.29	24.10	30.00	-5.90	QP	
6		151.2500	39.94	-16.94	23.00	30.00	-7.00	QP	

Test Voltage	AC 230V/50Hz	Polarization	Horizontal
Test Mode	Mode 1		



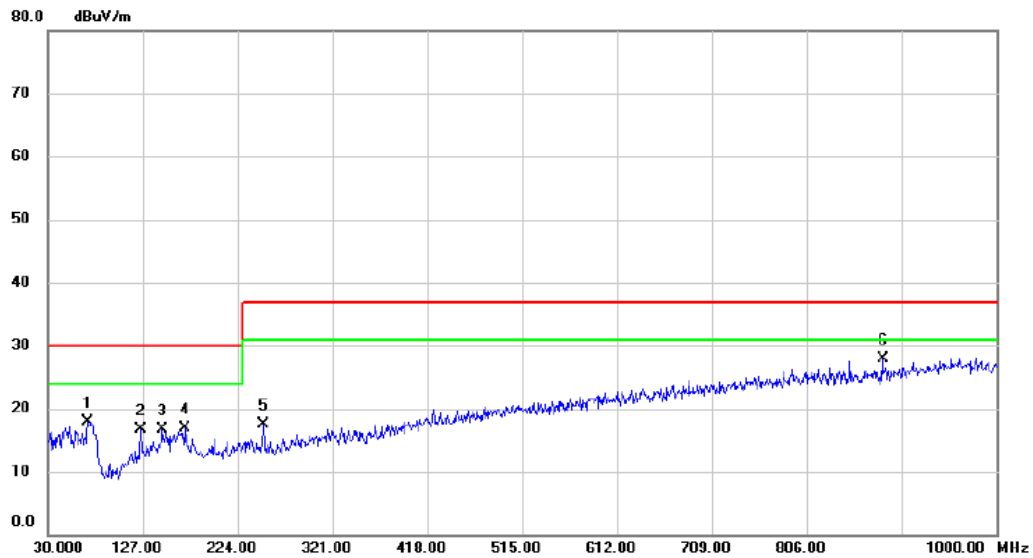
No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	72.6800	40.57	-20.18	20.39	30.00	-9.61	QP	
2	250.1900	36.71	-16.56	20.15	37.00	-16.85	QP	
3	488.8100	33.32	-10.59	22.73	37.00	-14.27	QP	
4	773.0200	32.62	-6.76	25.86	37.00	-11.14	QP	
5	849.6500	33.66	-6.58	27.08	37.00	-9.92	QP	
6 *	952.9550	32.59	-4.72	27.87	37.00	-9.13	QP	

Test Voltage	AC 110V/60Hz	Polarization	Vertical
Test Mode	Mode 1		



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	Level	Factor	ment				
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	!	34.8500	46.77	-18.87	27.90	30.00	-2.10	QP	
2	!	49.4000	43.04	-17.74	25.30	30.00	-4.70	QP	
3	!	60.0700	42.92	-17.91	25.01	30.00	-4.99	QP	
4		73.6500	43.06	-19.95	23.11	30.00	-6.89	QP	
5		106.6300	43.22	-20.91	22.31	30.00	-7.69	QP	
6	*	125.0600	47.24	-19.29	27.95	30.00	-2.05	QP	

Test Voltage	AC 110V/60Hz	Polarization	Horizontal
Test Mode	Mode 1		



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	70.7400	37.80	-19.83	17.97	30.00	-12.03	QP	
2	125.0600	35.23	-18.62	16.61	30.00	-13.39	QP	
3	147.3700	33.29	-16.66	16.63	30.00	-13.37	QP	
4	169.6800	33.40	-16.49	16.91	30.00	-13.09	QP	
5	250.1900	34.14	-16.56	17.58	37.00	-19.42	QP	
6 *	883.6000	34.03	-6.18	27.85	37.00	-9.15	QP	

3.2 RADIATED EMISSIONS ABOVE 1 GHZ

3.2.1 LIMITS

Class B equipment above 1 GHz

Frequency Range MHz	Measurement			Class B limits dB(μV/m)
	Facility	Distance m	Detector type/bandwidth	
1000 - 3000	FSOATS	3	Average / 1 MHz	50
3000 - 6000				54
1000 - 3000			Peak / 1 MHz	70
3000 - 6000				74

Notes:

- (1) The limit for radiated test was performed according to as following: EN 55032
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
 Margin Level = Measurement Value - Limit Value

3.2.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Horn Antenna	EMCO	3115	9605-4803	May 26, 2022
2	Amplifier	Agilent	8449B	3008A02333	Feb. 28, 2022
3	MXE EMI Receiver	Agilent	N9038A	MY53220133	Feb. 28, 2022
4	Measurement Software	Farad	EZ-EMC Ver.BTL-2ANT-1	N/A	N/A
5	Multi-Device Controller	ETS-Lindgren	2090	N/A	N/A
6	Controller	MF	MF-7802	MF780208159	N/A
7	Cable	Micable	RWLP50-4.0A-SMSM-12 M-KJ	20191107 002	Mar. 31, 2022

Remark: "N/A" denotes no model name, no serial no. or no calibration specified.

All calibration period of equipment list is one year.

3.2.3 TEST PROCEDURE

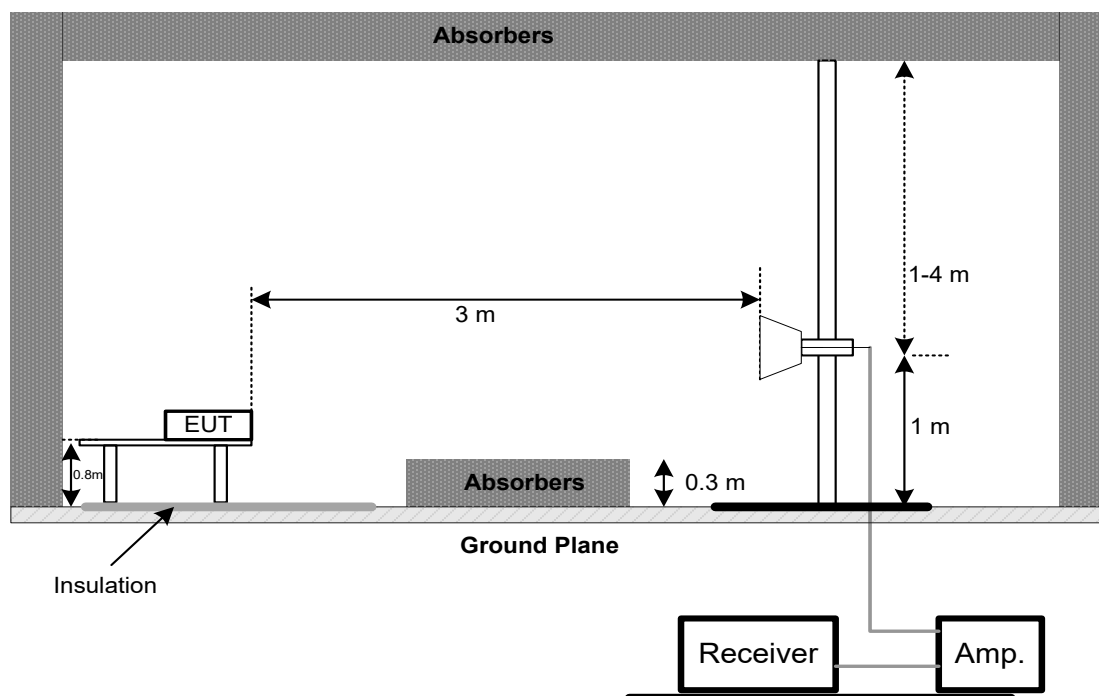
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then AVG detector mode re-measured.
- All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform.
- For the actual test configuration, please refer to the related Item - EUT Test Photos.

3.2.4 DEVIATION FROM TEST STANDARD

No deviation

3.2.5 TEST SETUP

ABOVE 1 GHZ



3.2.6 MEASUREMENT DISTANCE

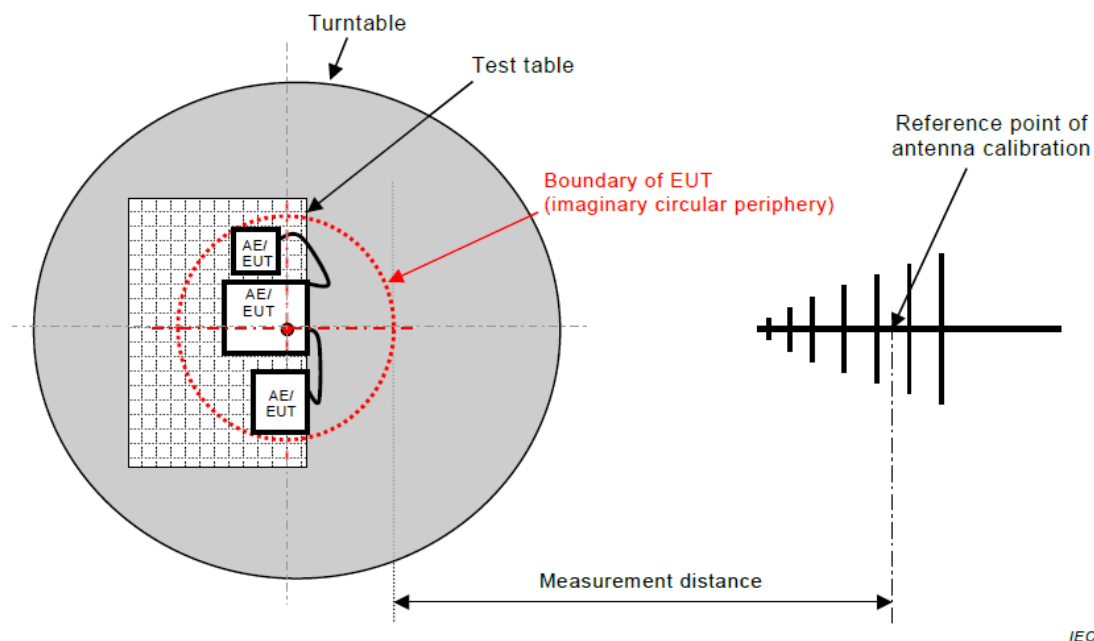


Figure C.1 – Measurement distance

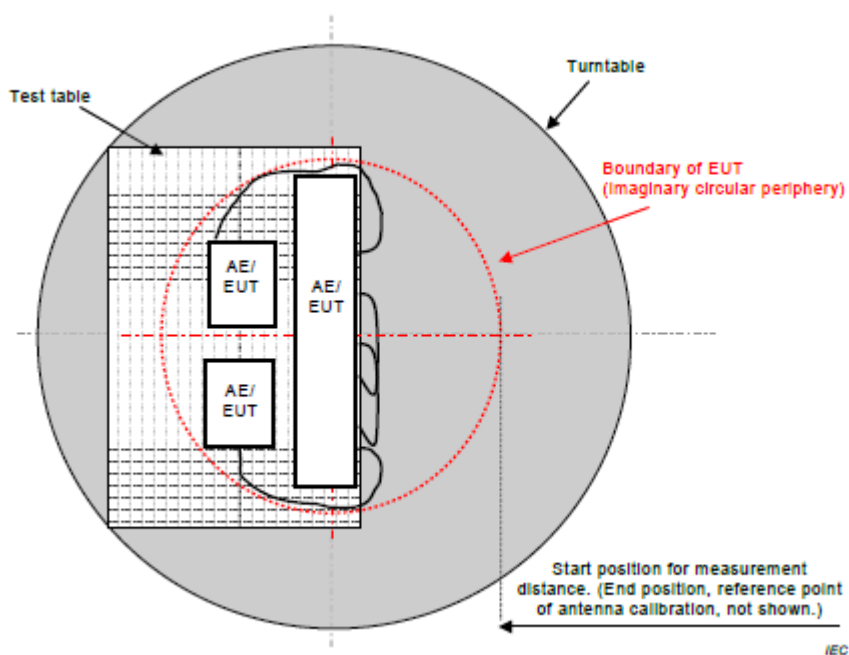
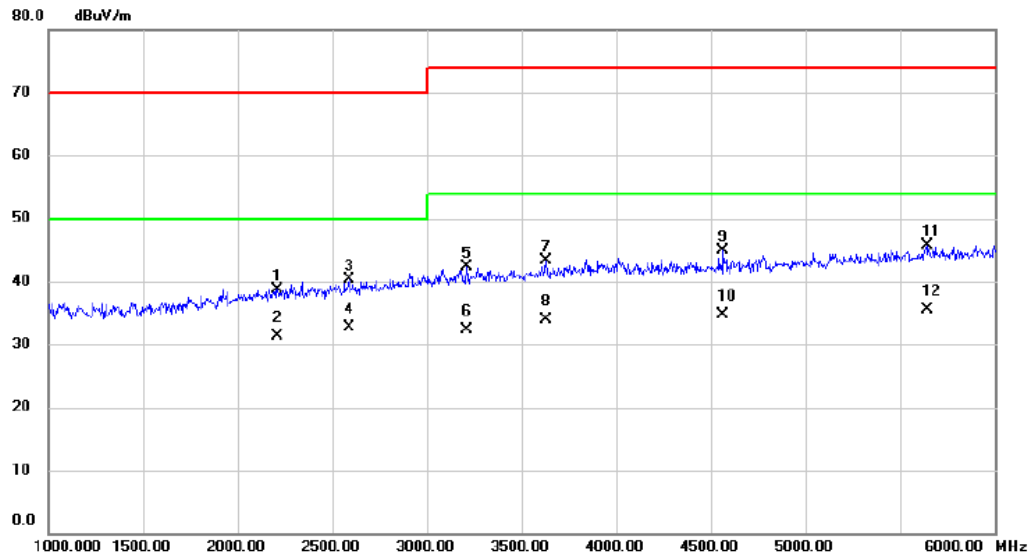


Figure C.2 – Boundary of EUT, Local AE and associated cabling

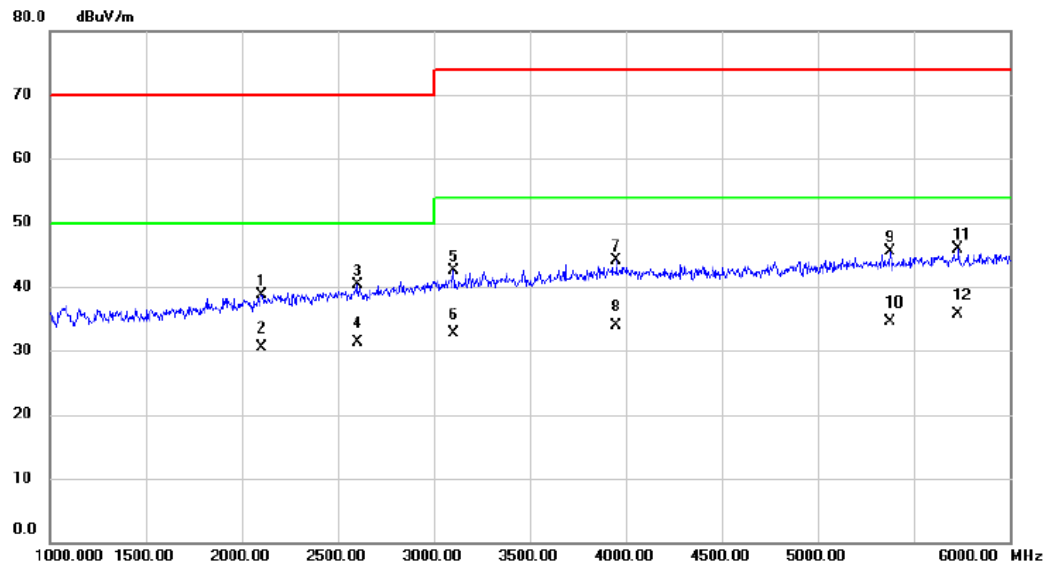
3.2.7 TEST RESULTS

Test Voltage	AC 230V/50Hz	Polarization	Vertical
Test Mode	Mode 1		



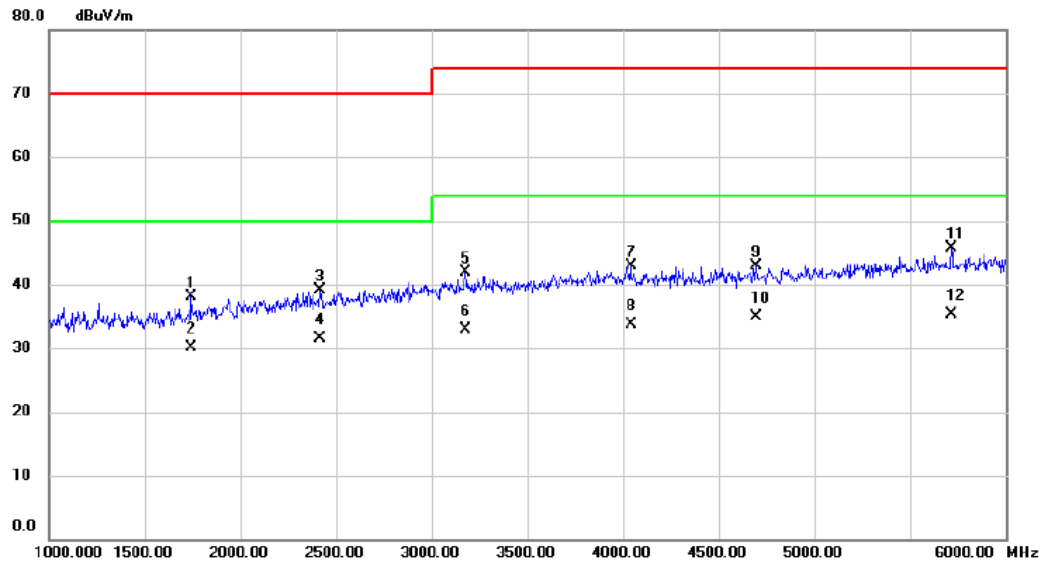
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2212.500	37.92	0.86	38.78	70.00	-31.22	peak	
2		2212.500	30.39	0.86	31.25	50.00	-18.75	AVG	
3		2587.500	37.98	2.31	40.29	70.00	-29.71	peak	
4	*	2587.500	30.36	2.31	32.67	50.00	-17.33	AVG	
5		3212.500	37.43	4.84	42.27	74.00	-31.73	peak	
6		3212.500	27.56	4.84	32.40	54.00	-21.60	AVG	
7		3632.500	36.94	6.34	43.28	74.00	-30.72	peak	
8		3632.500	27.60	6.34	33.94	54.00	-20.06	AVG	
9		4565.000	36.29	8.55	44.84	74.00	-29.16	peak	
10		4565.000	26.06	8.55	34.61	54.00	-19.39	AVG	
11		5642.500	34.09	11.60	45.69	74.00	-28.31	peak	
12		5642.500	23.95	11.60	35.55	54.00	-18.45	AVG	

Test Voltage	AC 230V/50Hz	Polarization	Horizontal
Test Mode	Mode 1		



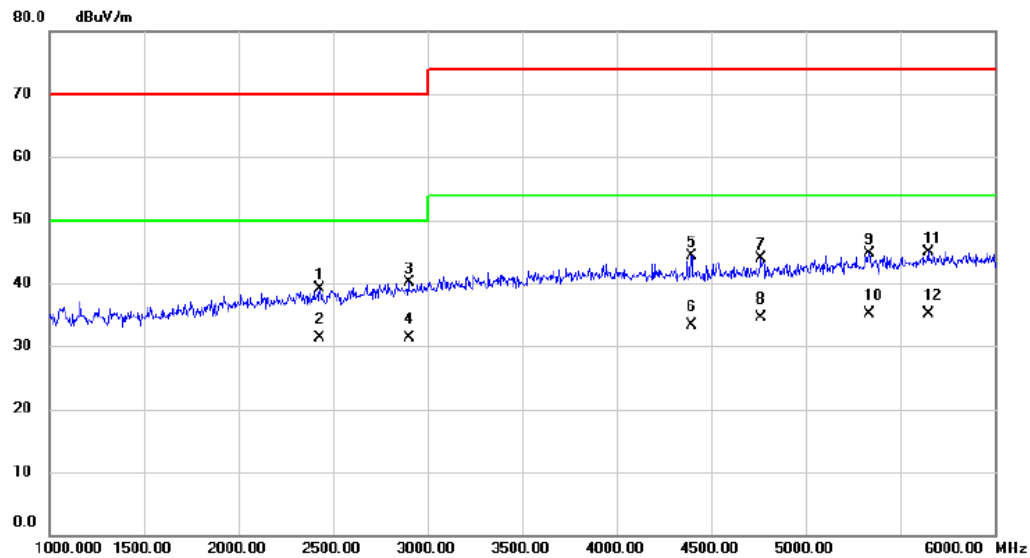
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2100.000	38.36	0.44	38.80	70.00	-31.20	peak	
2		2100.000	29.97	0.44	30.41	50.00	-19.59	AVG	
3		2605.000	37.93	2.39	40.32	70.00	-29.68	peak	
4		2605.000	28.86	2.39	31.25	50.00	-18.75	AVG	
5		3100.000	37.94	4.47	42.41	74.00	-31.59	peak	
6		3100.000	28.30	4.47	32.77	54.00	-21.23	AVG	
7		3950.000	36.45	7.73	44.18	74.00	-29.82	peak	
8		3950.000	26.21	7.73	33.94	54.00	-20.06	AVG	
9		5377.500	34.66	10.92	45.58	74.00	-28.42	peak	
10		5377.500	23.64	10.92	34.56	54.00	-19.44	AVG	
11		5730.000	34.10	11.77	45.87	74.00	-28.13	peak	
12	*	5730.000	23.90	11.77	35.67	54.00	-18.33	AVG	

Test Voltage	AC 110V/60Hz	Polarization	Vertical
Test Mode	Mode 1		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		1745.000	39.65	-1.55	38.10	70.00	-31.90	peak	
2		1745.000	31.69	-1.55	30.14	50.00	-19.86	AVG	
3		2417.500	37.51	1.62	39.13	70.00	-30.87	peak	
4	*	2417.500	29.90	1.62	31.52	50.00	-18.48	AVG	
5		3177.500	37.13	4.73	41.86	74.00	-32.14	peak	
6		3177.500	28.21	4.73	32.94	54.00	-21.06	AVG	
7		4042.500	34.90	7.98	42.88	74.00	-31.12	peak	
8		4042.500	25.80	7.98	33.78	54.00	-20.22	AVG	
9		4695.000	34.04	8.86	42.90	74.00	-31.10	peak	
10		4695.000	26.08	8.86	34.94	54.00	-19.06	AVG	
11		5715.000	33.87	11.74	45.61	74.00	-28.39	peak	
12		5715.000	23.54	11.74	35.28	54.00	-18.72	AVG	

Test Voltage	AC 110V/60Hz	Polarization	Horizontal
Test Mode	Mode 1		



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	2430.000	37.36	1.66	39.02	70.00	-30.98	peak	
2	2430.000	29.56	1.66	31.22	50.00	-18.78	AVG	
3	2900.000	36.46	3.70	40.16	70.00	-29.84	peak	
4 *	2900.000	27.68	3.70	31.38	50.00	-18.62	AVG	
5	4397.500	36.01	8.31	44.32	74.00	-29.68	peak	
6	4397.500	25.09	8.31	33.40	54.00	-20.60	AVG	
7	4765.000	34.92	9.03	43.95	74.00	-30.05	peak	
8	4765.000	25.55	9.03	34.58	54.00	-19.42	AVG	
9	5335.000	34.03	10.76	44.79	74.00	-29.21	peak	
10	5335.000	24.44	10.76	35.20	54.00	-18.80	AVG	
11	5647.500	33.22	11.62	44.84	74.00	-29.16	peak	
12	5647.500	23.46	11.62	35.08	54.00	-18.92	AVG	

3.3 CONDUCTED EMISSION MEASUREMENT AT AC MAINS POWER PORTS

3.3.1 LIMITS

Requirements for conducted emissions from AC mains power ports of Class B equipment

Frequency Range MHz	Coupling Device	Detector Type / bandwidth	Class B Limits (dB(μV))
0.15 - 0.5	AMN	Quasi Peak / 9 kHz	66-56
0.5 - 5			56
5 - 30			60
0.15 - 0.5	AMN	Average / 9 kHz	56-46
0.5 - 5			46
5 - 30			50

NOTE:

(1) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor

Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)

Margin Level = Measurement Value – Limit Value

3.3.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	50Ω Terminator	SHX	TF2-3G-A	8122901	Feb. 27, 2022
2	TWO-LINE V-NETWORK	R&S	ENV216	100526	Nov. 04, 2021
3	EMI Test Receiver	R&S	ESR3	101862	Jul. 25, 2021
4	Artificial-Mains Network	SCHWARZBECK	NSLK 8127	8127685	Feb. 28, 2022
5	Cable	N/A	RG400	N/A(12m)	Mar. 09, 2022
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Remark: "N/A" denotes no model name, no serial no. or no calibration specified.

All calibration period of equipment list is one year.

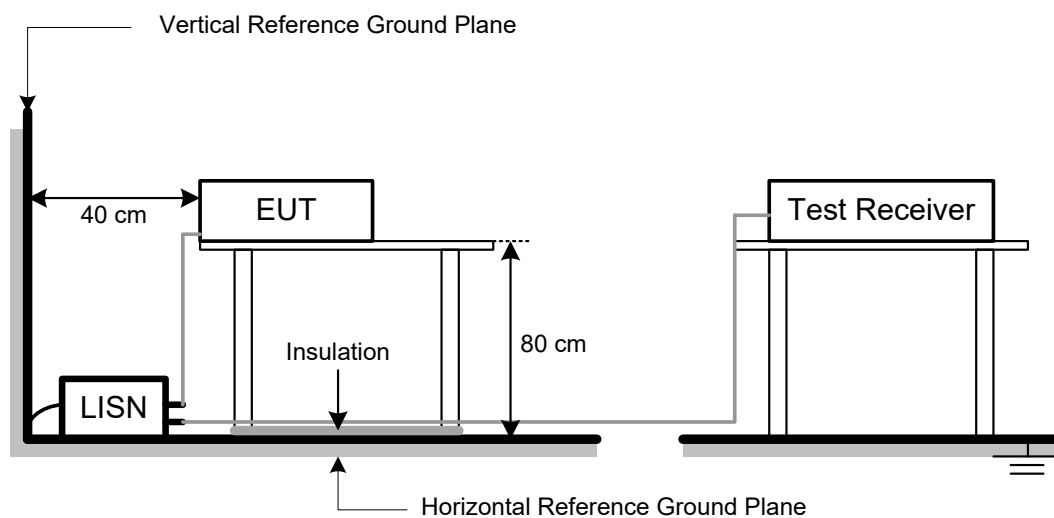
3.3.3 TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3.4 DEVIATION FROM TEST STANDARD

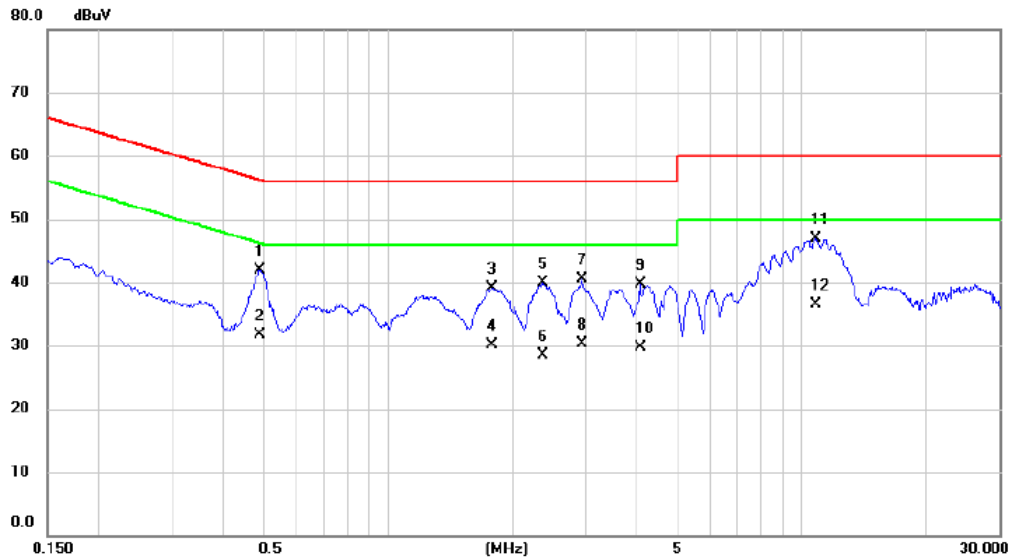
No deviation

3.3.5 TEST SETUP



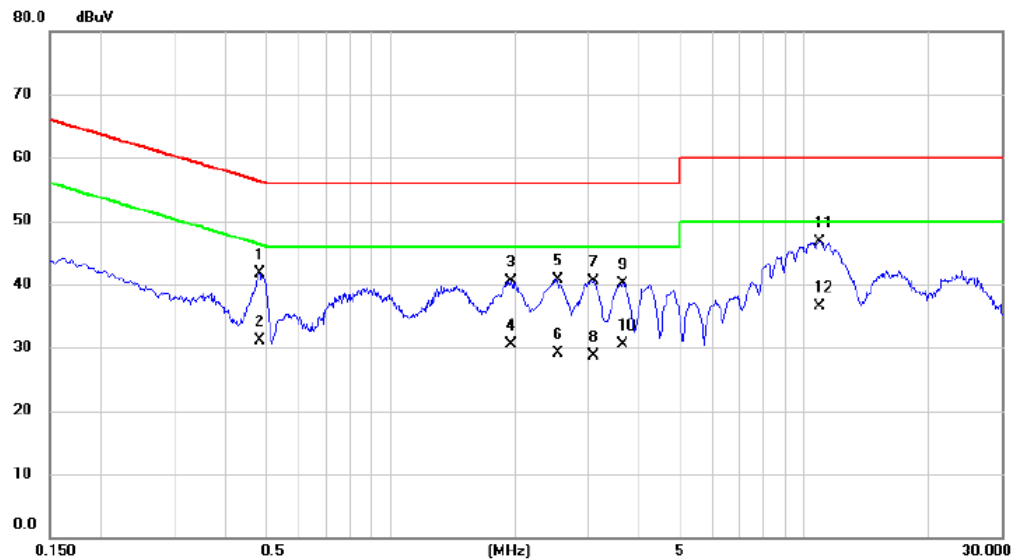
3.3.6 TEST RESULTS

Test Voltage	AC 230V/50Hz	Phase	Line
Test Mode	Mode 1		



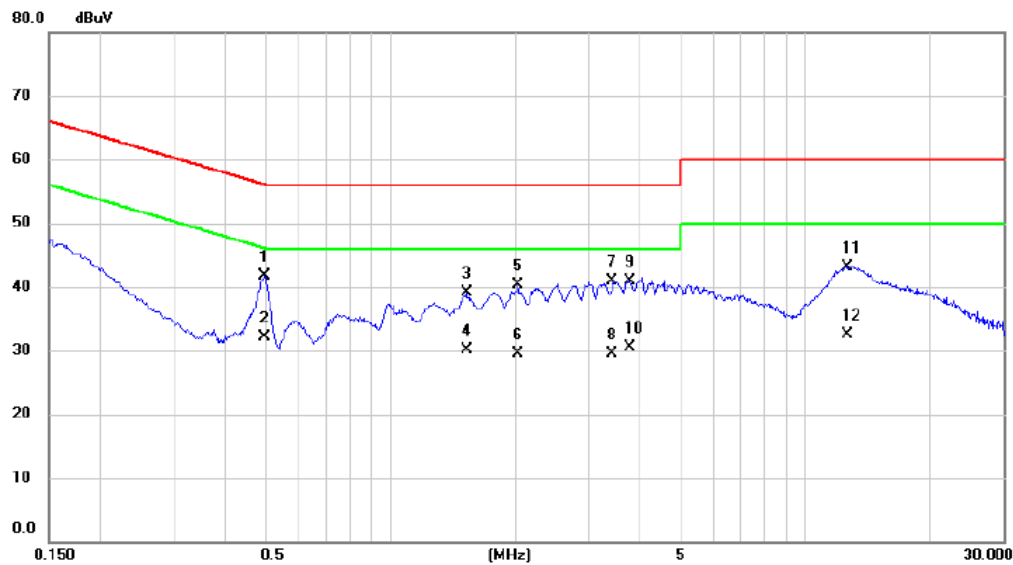
No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.4897	32.29	9.68	41.97	56.17	-14.20	QP	
2	0.4897	22.10	9.68	31.78	46.17	-14.39	AVG	
3	1.7903	29.32	9.79	39.11	56.00	-16.89	QP	
4	1.7903	20.30	9.79	30.09	46.00	-15.91	AVG	
5	2.3640	30.06	9.82	39.88	56.00	-16.12	QP	
6	2.3640	18.60	9.82	28.42	46.00	-17.58	AVG	
7	2.9445	30.55	9.87	40.42	56.00	-15.58	QP	
8	2.9445	20.50	9.87	30.37	46.00	-15.63	AVG	
9	4.0650	29.83	9.93	39.76	56.00	-16.24	QP	
10	4.0650	19.80	9.93	29.73	46.00	-16.27	AVG	
11 *	10.7880	36.61	10.25	46.86	60.00	-13.14	QP	
12	10.7880	26.30	10.25	36.55	50.00	-13.45	AVG	

Test Voltage	AC 230V/50Hz	Phase	Neutral
Test Mode	Mode 1		



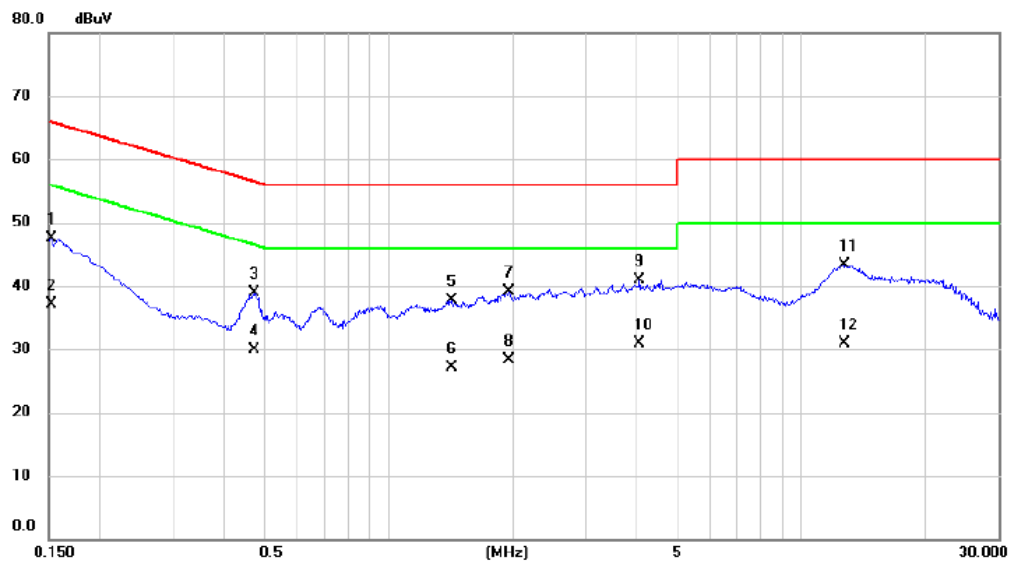
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.4830	31.94	9.68	41.62	56.29	-14.67	QP	
2		0.4830	21.40	9.68	31.08	46.29	-15.21	AVG	
3		1.9545	30.77	9.80	40.57	56.00	-15.43	QP	
4		1.9545	20.70	9.80	30.50	46.00	-15.50	AVG	
5		2.5418	30.96	9.83	40.79	56.00	-15.21	QP	
6		2.5418	19.30	9.83	29.13	46.00	-16.87	AVG	
7		3.1043	30.60	9.88	40.48	56.00	-15.52	QP	
8		3.1043	18.90	9.88	28.78	46.00	-17.22	AVG	
9		3.6398	30.28	9.91	40.19	56.00	-15.81	QP	
10		3.6398	20.50	9.91	30.41	46.00	-15.59	AVG	
11	*	10.8938	36.44	10.29	46.73	60.00	-13.27	QP	
12		10.8938	26.20	10.29	36.49	50.00	-13.51	AVG	

Test Voltage	AC 110V/60Hz	Phase	Line
Test Mode	Mode 1		



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.4965	32.01	9.68	41.69	56.06	-14.37	QP	
2 *	0.4965	22.50	9.68	32.18	46.06	-13.88	AVG	
3	1.5225	29.36	9.77	39.13	56.00	-16.87	QP	
4	1.5225	20.40	9.77	30.17	46.00	-15.83	AVG	
5	2.0288	30.58	9.80	40.38	56.00	-15.62	QP	
6	2.0288	19.80	9.80	29.60	46.00	-16.40	AVG	
7	3.4283	30.99	9.89	40.88	56.00	-15.12	QP	
8	3.4283	19.60	9.89	29.49	46.00	-16.51	AVG	
9	3.7680	31.01	9.92	40.93	56.00	-15.07	QP	
10	3.7680	20.50	9.92	30.42	46.00	-15.58	AVG	
11	12.6443	32.87	10.33	43.20	60.00	-16.80	QP	
12	12.6443	22.10	10.33	32.43	50.00	-17.57	AVG	

Test Voltage	AC 110V/60Hz	Phase	Neutral
Test Mode	Mode 1		



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.1522	37.88	9.66	47.54	65.88	-18.34	QP	
2	0.1522	27.50	9.66	37.16	55.88	-18.72	AVG	
3	0.4717	29.26	9.68	38.94	56.48	-17.54	QP	
4	0.4717	20.30	9.68	29.98	46.48	-16.50	AVG	
5	1.4258	27.97	9.76	37.73	56.00	-18.27	QP	
6	1.4258	17.40	9.76	27.16	46.00	-18.84	AVG	
7	1.9613	29.32	9.80	39.12	56.00	-16.88	QP	
8	1.9613	18.60	9.80	28.40	46.00	-17.60	AVG	
9 *	4.0583	30.99	9.93	40.92	56.00	-15.08	QP	
10	4.0583	20.90	9.93	30.83	46.00	-15.17	AVG	
11	12.7208	32.88	10.38	43.26	60.00	-16.74	QP	
12	12.7208	20.50	10.38	30.88	50.00	-19.12	AVG	

3.4 ASYMMETRIC MODE CONDUCTED EMISSIONS TEST

3.4.1 LIMITS

Requirements for asymmetric mode conducted emissions from Class B equipment

Frequency Range MHz	Coupling device	Detector type / Bandwidth	Class B voltage limits dB(μ V)	Class B current limits dB(μ A)
0.15 - 0.5	AAN	Quasi Peak / 9 kHz	84 - 74	n/a
0.5 - 30			74	
0.15 - 0.5	AAN	Average / 9 kHz	74 - 64	
0.5 - 30			64	

NOTE:

(1) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor

Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)

Margin Level = Measurement Value – Limit Value

3.4.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	50 Ω Terminator	SHX	TF2-3G-A	8122901	Feb. 27, 2022
2	TWO-LINE V-NETWORK	R&S	ENV216	100526	Nov. 04, 2021
3	EMI Test Receiver	R&S	ESR3	101862	Jul. 25, 2021
4	Artificial-Mains Network	SCHWARZBECK	NSLK 8127	8127685	Feb. 28, 2022
5	Cable	N/A	RG400	N/A(12m)	Mar. 09, 2022
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
7	ISN	TESEQ	ISN T800	42838	Jul. 25, 2021

Remark: "N/A" denotes no model name, no serial No. or no calibration specified.

All calibration period of equipment list is one year.

3.4.3 TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.
- AAN** at least 80 cm from nearest part of EUT chassis.

NOTE:

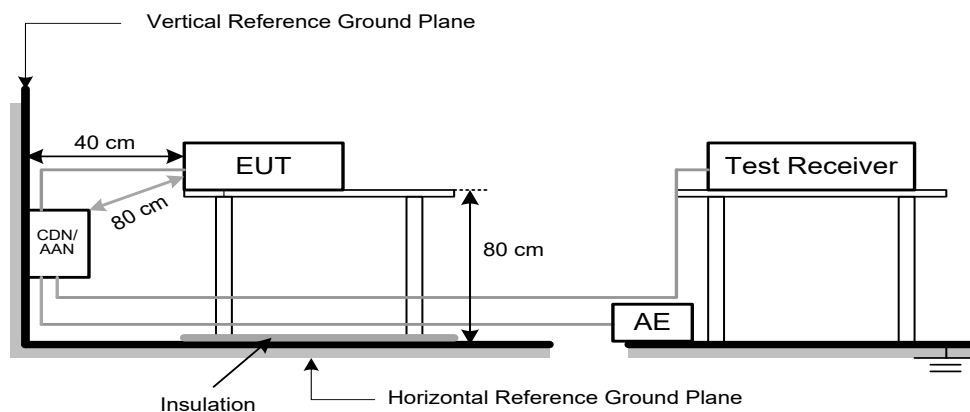
- The communication function of EUT was executed and AAN was connected between EUT and associated equipment and the AAN was connected directly to reference ground plane.
Measure the voltage at the measurement port of the AAN
Correct the measured voltage by adding the AAN voltage division factor
Compare the corrected voltage with the limit.

3.4.4 DEVIATION FROM TEST STANDARD

No deviation

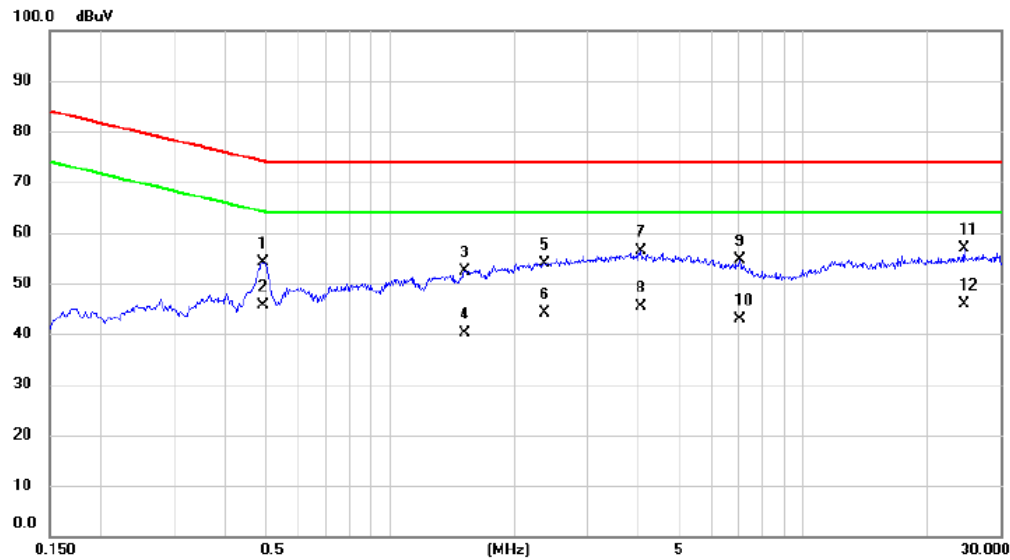
3.4.5 TEST SETUP

- Cable Type: Balanced Unscreened, Screened or Coaxial



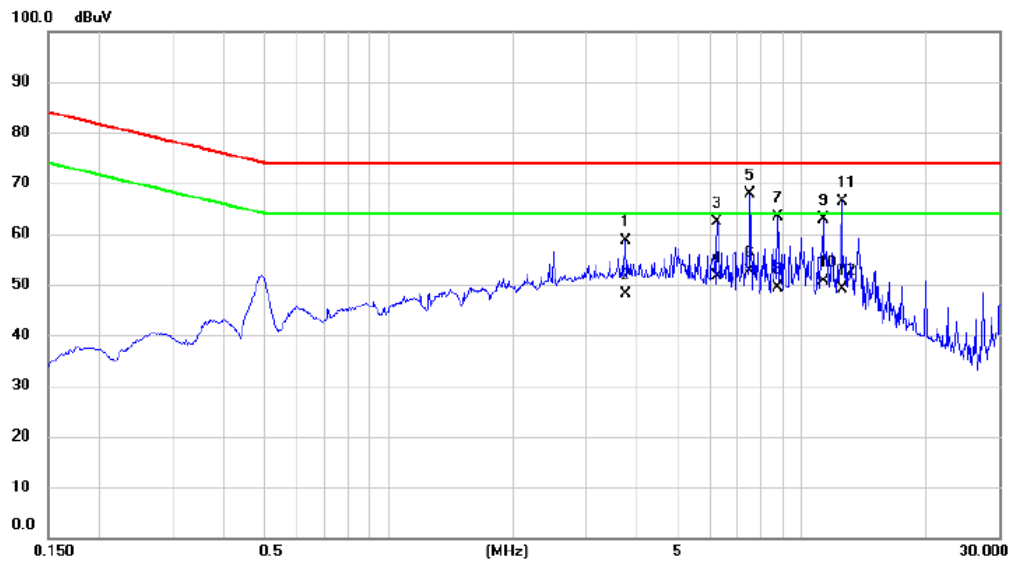
3.4.6 TEST RESULTS

Test Voltage	AC 230V/50Hz
Test Mode	Mode 2



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.4920	44.36	9.83	54.19	74.13	-19.94	QP	
2	0.4920	35.90	9.83	45.73	64.13	-18.40	AVG	
3	1.5180	42.49	9.79	52.28	74.00	-21.72	QP	
4	1.5180	30.30	9.79	40.09	64.00	-23.91	AVG	
5	2.3640	44.19	9.81	54.00	74.00	-20.00	QP	
6	2.3640	34.20	9.81	44.01	64.00	-19.99	AVG	
7	4.0515	46.51	9.87	56.38	74.00	-17.62	QP	
8	4.0515	35.60	9.87	45.47	64.00	-18.53	AVG	
9	7.0148	44.67	9.96	54.63	74.00	-19.37	QP	
10	7.0148	32.90	9.96	42.86	64.00	-21.14	AVG	
11 *	24.4680	46.10	10.67	56.77	74.00	-17.23	QP	
12	24.4680	35.10	10.67	45.77	64.00	-18.23	AVG	

Test Voltage	AC 230V/50Hz
Test Mode	Mode 3



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	3.7500	48.65	9.87	58.52	74.00	-15.48	QP	
2	3.7500	38.20	9.87	48.07	64.00	-15.93	AVG	
3	6.2498	52.51	9.94	62.45	74.00	-11.55	QP	
4	6.2498	41.60	9.94	51.54	64.00	-12.46	AVG	
5 *	7.5008	57.77	9.99	67.76	74.00	-6.24	QP	
6	7.5008	42.70	9.99	52.69	64.00	-11.31	AVG	
7	8.7495	53.40	10.01	63.41	74.00	-10.59	QP	
8	8.7495	39.30	10.01	49.31	64.00	-14.69	AVG	
9	11.2493	52.88	10.08	62.96	74.00	-11.04	QP	
10	11.2493	40.50	10.08	50.58	64.00	-13.42	AVG	
11	12.5003	56.15	10.12	66.27	74.00	-7.73	QP	
12	12.5003	39.10	10.12	49.22	64.00	-14.78	AVG	

3.5 HARMONIC CURRENT EMISSIONS TEST

3.5.1 LIMITS

The power consumption is less than 75W, there is no limit applied.

3.5.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Harmonics and Flicker Analyzer	California Instruments	PACS-1	72344	Jul. 25, 2021
2	3KVA AC Power source	California Instruments	3001ix	56309	Jul. 25, 2021
3	Measurement Software	California	CTS4.0 Version 4.23	N/A	N/A

Remark: "N/A" denotes no model name, no serial No. or no calibration specified.

All calibration period of equipment list is one year.

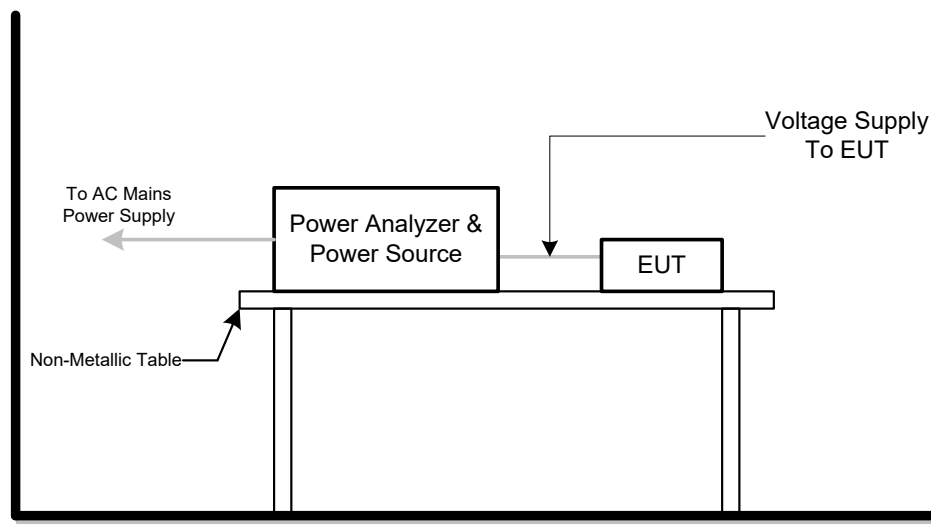
3.5.3 TEST PROCEDURE

- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions.
- The classification of EUT is according to of EN 61000-3-2. The EUT is classified as Class A.
- The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

3.5.4 DEVIATION FROM TEST STANDARD

No deviation

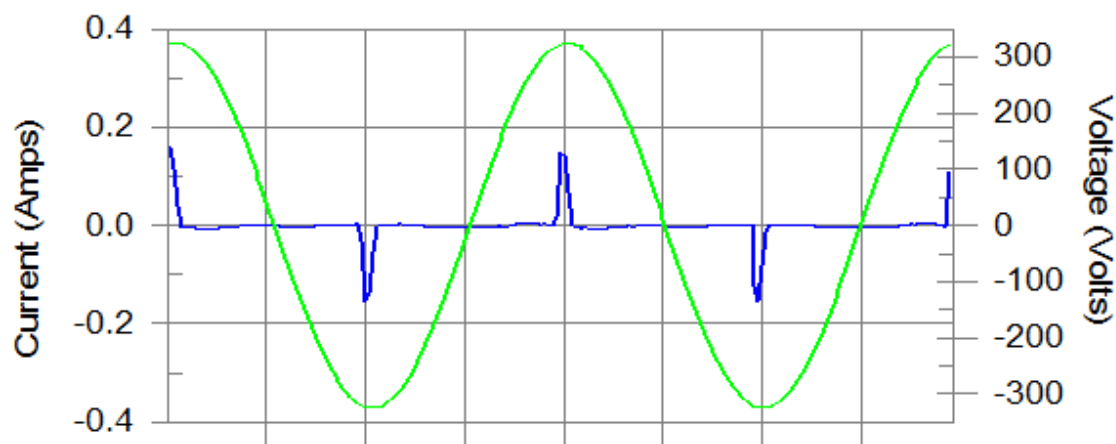
3.5.5 TEST SETUP



3.5.6 TEST RESULTS

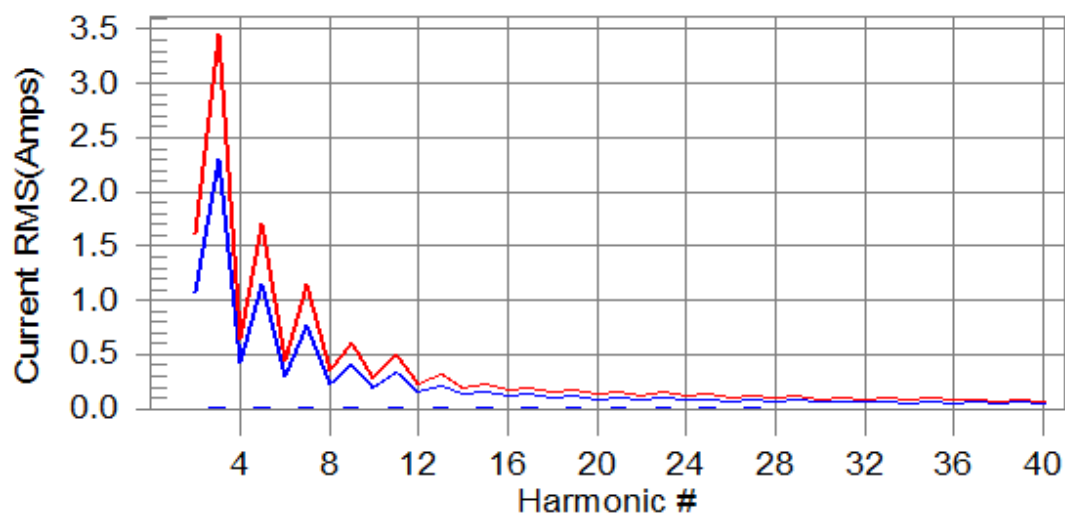
Harmonics – Class-A	
Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Pass Worst harmonics H17-3.7% of 150% limit, H17-5.5% of 100% limit

Current Test Result Summary (Run time)	
Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Highest parameter values during test:

V_RMS (Volts): 229.98
I_Peak (Amps): 0.181
I_Fund (Amps): 0.012
Power (Watts): 2.6

Frequency(Hz): 50.00
I_RMS (Amps): 0.032
Crest Factor: 5.915
Power Factor: 0.375

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	N/A	0.002	1.620	N/A	Pass
3	0.011	2.300	0.5	0.012	3.450	0.4	Pass
4	0.001	0.430	N/A	0.001	0.645	N/A	Pass
5	0.011	1.140	0.9	0.011	1.710	0.6	Pass
6	0.001	0.300	N/A	0.001	0.450	N/A	Pass
7	0.010	0.770	1.3	0.011	1.155	0.9	Pass
8	0.000	0.230	N/A	0.000	0.345	N/A	Pass
9	0.010	0.400	2.4	0.010	0.600	1.7	Pass
10	0.000	0.184	N/A	0.000	0.276	N/A	Pass
11	0.009	0.330	2.8	0.009	0.495	1.9	Pass
12	0.000	0.153	N/A	0.000	0.230	N/A	Pass
13	0.009	0.210	4.1	0.009	0.315	2.8	Pass
14	0.000	0.131	N/A	0.000	0.197	N/A	Pass
15	0.008	0.150	5.3	0.008	0.225	3.6	Pass
16	0.000	0.115	N/A	0.000	0.173	N/A	Pass
17	0.007	0.132	5.5	0.007	0.198	3.7	Pass
18	0.000	0.102	N/A	0.000	0.153	N/A	Pass
19	0.006	0.118	5.5	0.007	0.178	3.7	Pass
20	0.000	0.092	N/A	0.000	0.138	N/A	Pass
21	0.006	0.107	5.3	0.006	0.161	3.6	Pass
22	0.000	0.084	N/A	0.000	0.125	N/A	Pass
23	0.005	0.098	N/A	0.005	0.147	N/A	Pass
24	0.000	0.077	N/A	0.000	0.115	N/A	Pass
25	0.004	0.090	N/A	0.004	0.135	N/A	Pass
26	0.000	0.071	N/A	0.000	0.107	N/A	Pass
27	0.004	0.083	N/A	0.004	0.125	N/A	Pass
28	0.000	0.066	N/A	0.000	0.099	N/A	Pass
29	0.003	0.078	N/A	0.003	0.116	N/A	Pass
30	0.000	0.061	N/A	0.000	0.092	N/A	Pass
31	0.002	0.073	N/A	0.002	0.109	N/A	Pass
32	0.000	0.058	N/A	0.000	0.086	N/A	Pass
33	0.002	0.068	N/A	0.002	0.102	N/A	Pass
34	0.000	0.054	N/A	0.000	0.081	N/A	Pass
35	0.002	0.064	N/A	0.002	0.096	N/A	Pass
36	0.000	0.051	N/A	0.000	0.077	N/A	Pass
37	0.001	0.061	N/A	0.001	0.091	N/A	Pass
38	0.000	0.048	N/A	0.000	0.073	N/A	Pass
39	0.001	0.058	N/A	0.001	0.087	N/A	Pass
40	0.000	0.046	N/A	0.000	0.069	N/A	Pass

Voltage Source Verification Data (Run time)	
Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Highest parameter values during test:

Voltage (Vrms):	229.98	Frequency(Hz):	50.00
I Peak (Amps):	0.181	I RMS (Amps):	0.032
I Fund (Amps):	0.012	Crest Factor:	5.915
Power (Watts):	2.6	Power Factor:	0.375

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.121	0.460	26.41	OK
3	0.524	2.069	25.31	OK
4	0.067	0.460	14.46	OK
5	0.054	0.920	5.86	OK
6	0.037	0.460	8.03	OK
7	0.039	0.690	5.69	OK
8	0.019	0.460	4.23	OK
9	0.040	0.460	8.80	OK
10	0.022	0.460	4.88	OK
11	0.020	0.230	8.69	OK
12	0.018	0.230	7.78	OK
13	0.017	0.230	7.25	OK
14	0.016	0.230	6.93	OK
15	0.016	0.230	7.09	OK
16	0.016	0.230	7.00	OK
17	0.007	0.230	3.01	OK
18	0.015	0.230	6.46	OK
19	0.013	0.230	5.61	OK
20	0.017	0.230	7.32	OK
21	0.007	0.230	2.95	OK
22	0.012	0.230	5.37	OK
23	0.013	0.230	5.44	OK
24	0.006	0.230	2.42	OK
25	0.003	0.230	1.43	OK
26	0.008	0.230	3.48	OK
27	0.010	0.230	4.52	OK
28	0.007	0.230	3.09	OK
29	0.006	0.230	2.58	OK
30	0.005	0.230	2.38	OK
31	0.006	0.230	2.63	OK
32	0.005	0.230	2.32	OK
33	0.005	0.230	1.98	OK
34	0.003	0.230	1.18	OK
35	0.004	0.230	1.62	OK
36	0.004	0.230	1.53	OK
37	0.006	0.230	2.47	OK
38	0.003	0.230	1.20	OK
39	0.004	0.230	1.83	OK
40	0.007	0.230	2.88	OK

3.6 VOLTAGE FLUCTUATIONS (FLICKER) TEST

3.6.1 LIMITS

Tests	Limits	Descriptions
	EN 61000-3-3	
Pst	≤ 1.0 , Tp= 10 min.	Short Term Flicker Indicator
Plt	≤ 0.65 , Tp=2 hr.	Long Term Flicker Indicator
dc	$\leq 3.3\%$	Relative Steady-State V-Chang
dmax	$\leq 4\%$	Maximum Relative V-change
d (t)	≤ 500 ms	Relative V-change characteristic

3.6.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Harmonics and Flicker Analyzer	California Instruments	PACS-1	72344	Jul. 25, 2021
2	3KVA AC Power source	California Instruments	3001ix	56309	Jul. 25, 2021
3	Measurement Software	California	CTS4.0 Version 4.23	N/A	N/A

Remark: "N/A" denotes no model name, no serial No. or no calibration specified.

All calibration period of equipment list is one year.

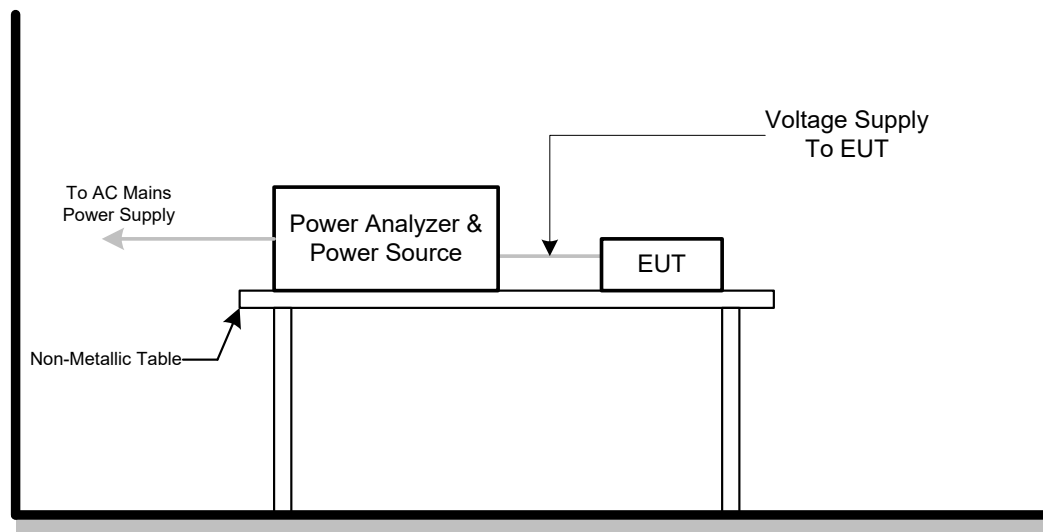
3.6.3 TEST PROCEDURE

- Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in EN 61000-3-3 depend on which standard adopted for compliance measurement.
- All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

3.6.4 DEVIATION FROM TEST STANDARD

No deviation

3.6.5 TEST SETUP

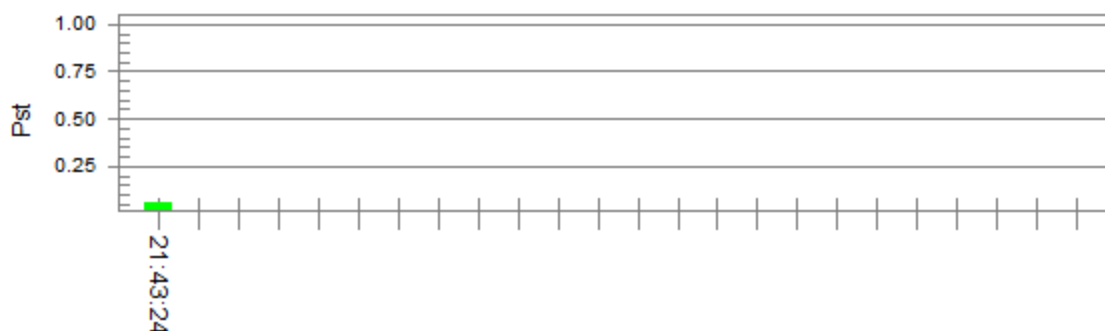


3.6.6 TEST RESULTS

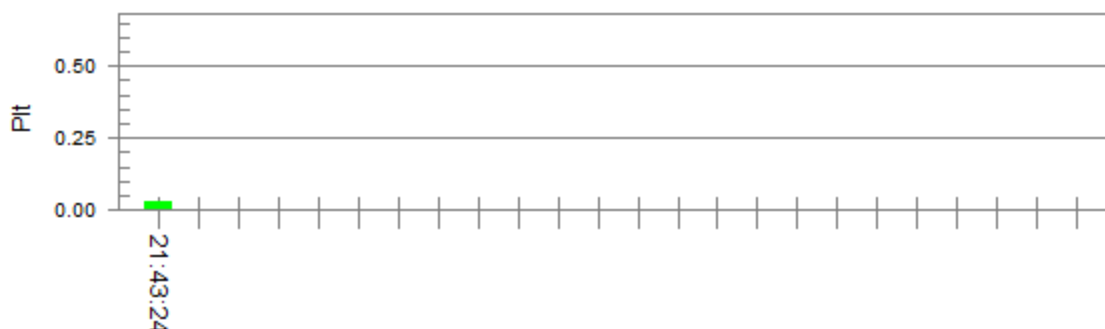
Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Pst and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt): 229.92

T-max (mS): 0

Highest dc (%): 0.00

Highest dmax (%): 0.00

Highest Pst (10 min. period): 0.064

Highest Plt (2 hr. period): 0.028

Test limit (mS): 500.0 Pass

Test limit (%): 3.30 Pass

Test limit (%): 4.00 Pass

Test limit: 1.000 Pass

Test limit: 0.650 Pass

4. EMC IMMUNITY TEST

4.1 STANDARD COMPLIANCE/SEVERITY LEVEL/CRITERIA

Tests Standard No.	Test Specification Level / Test Mode	Test Ports	Criteria
Electrostatic discharge IEC 61000-4-2 (ESD)	±8kV air discharge ±4kV contact discharge (Direct Mode)	Enclosure	B
	±4kV HCP discharge ±4kV VCP discharge (Indirect Mode)	Enclosure	B
Continuous RF electromagnetic field disturbances,swept test IEC 61000-4-3 (RS)	80 MHz to 1000 MHz 3V/m(unmodulated, r.m.s), 1 kHz, 80%, AM modulated	Enclosure	A
Continuous RF electromagnetic field disturbances,spot test IEC 61000-4-3 (RS)	1800 MHz, 2600MHz, 3500 MHz, 5000MHz(±1 %) 3V/m(unmodulated, r.m.s), 1 kHz, 80%, AM modulated	Enclosure	A
Electrical fast transient/burst immunity IEC 61000-4-4 (EFT)	±0.5kV(peak) 5/50ns Tr/Th 5kHz Repetition Frequency (100kHz Repetition Frequency for xDSL port)	Analogue/digital data ports (NOTE 2)	B
	±0.5kV(peak) 5/50ns Tr/Th 5kHz Repetition Frequency	DC network power ports (NOTE 2)	B
	±1 kV(peak) 5/50ns Tr/Th 5kHz Repetition Frequency	AC mains power ports	B

Surge immunity IEC 61000-4-5 (Surge)	Port Type: unshielded symmetrical		
	Apply: lines to ground		
	Primary protection is Intended ±1 kV and ±4 kV 10/700(5/320)Tr/Th μs	Analogue/digital data ports (NOTE 1) & (NOTE 2)	C
	Primary protection is not Intended ±1 kV 10/700(5/320) Tr/Th μs		C
	Port type: coaxial or shielded		
	Apply: shield to ground		
±0.5 kV 1.2/50(8/20) Tr/Th μs	Analogue/digital data ports (NOTE 1) & (NOTE 2)	B	
	line to reference ground for each individual line: ±0.5 kV(peak) 1.2/50(8/20) Tr/Th μs	DC network power ports (NOTE 2)	B
	±1 kV(peak) 1.2/50(8/20) Tr/Th μs (line to line) ±2 kV(peak) 1.2/50(8/20) Tr/Th μs (line to earth or ground)	AC mains power ports	B
Continuous induced RF disturbances IEC 61000-4-6 (CS)	0.15 MHz to 10 MHz 3V(unmodulated, r.m.s), 10 MHz to 30 MHz 3V to 1V(unmodulated, r.m.s), 30 MHz to 80 MHz 1V(unmodulated, r.m.s), 1kHz 80%, AM 150Ω source impedance	Analogue/digital data ports (NOTE 2)	A
	0.15 MHz to 10 MHz 3V(unmodulated, r.m.s), 10 MHz to 30 MHz 3V to 1V(unmodulated, r.m.s), 30 MHz to 80 MHz 1V(unmodulated, r.m.s), 1kHz 80%, AM 150Ω source impedance	DC network power ports (NOTE 2)	A
	0.15 MHz to 10 MHz 3V(unmodulated, r.m.s), 10 MHz to 30 MHz 3V to 1V(unmodulated, r.m.s), 30 MHz to 80 MHz 1V(unmodulated, r.m.s), 1kHz 80%, AM 150Ω source impedance	AC mains power ports	A

Power frequency magnetic field immunity IEC 61000-4-8 (PFMF)	50 Hz or 60Hz, 1A/m(r.m.s)	Enclosure	A
Voltage dips, short interruptions and voltage variations immunity IEC 61000-4-11 (Dips)	Voltage dips: Residual voltage < 5% 0.5 cycle Residual voltage < 70% 25 cycle(50Hz), 30 cycle (60Hz) Voltage interruptions: Residual voltage < 5% 250 cycle (50Hz), 300 cycle (60Hz)	AC Power Ports	B C C

Note.

- 1) Applicable only to ports which, according to the manufacturer's specification, may connect directly to outdoor cables.
- 2) Applicable only to ports which, according to the manufacturer's specification, support cable lengths greater than 3 m.

4.2 GENERAL PERFORMANCE CRITERIA

According to **EN 55035** standards, the general performance criteria as following:

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.
Criterion B	During the application of the disturbance, degradation of performance is allowed. However, nonintended 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.
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. Areboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

4.3 ANNEX F (NORMATIVE) - NETWORKING FUNCTION

4.3.1 GENERAL PERFORMANCE CRITERIA FOR NETWORK FUNCTIONS

Performance criterion A:

Where relevant, during the application of the test the network function shall, as a minimum, operate ensuring that:

- established connections shall be maintained throughout the application of the test;
- no change of operational state or corruption of stored data occurs;
- no increase in error rate above the figure defined by the manufacturer occurs. The manufacturer should select the most appropriate performance measurement criteria for the product or system, for example bit error rate, block error rate;
- no request for retry above the figure defined by the manufacturer;
- the data transmission rate does not reduce below the figure defined by the manufacturer;
- no protocol failure occurs;
- the audio noise level at a two-wire analogue interface (supporting telephony) shall satisfy the requirements of Table G.3. The audio level measurements shall be performed at the demodulated frequency of the disturbance using a narrowband filter with a 3 dB bandwidth of 100 Hz using the method defined in table clause G.1.4. See G.6.1.

As described in the example given in J.3.5 the networking function is monitored during testing using direct functions specified elsewhere in this document.

If needed to verify the operation of the protocol, the following functions shall be verified as described in Table H.1 when performing the additional spot frequency tests:

- ability to establish a connection,
- ability to clear a connection.

Where an EUT has supervisory functions they shall not be affected. Elements that should be monitored include, but are not limited to:

- alarms,
- signalling lamps,
- printer output errors,
- network traffic rates,
- network monitor errors,
- measured network parameters.

Performance criterion B:

Established connections shall be maintained throughout the test, or shall self-recover in a way and timescale that is imperceptible to the user.

The error rate, request for retry and data transmission rates may be degraded during the application of the test. Degradation of the performance as described in criterion A is permitted, provided that the normal operation of the EUT is self-recoverable to the condition established prior to the application of the test.

Where required, the acceptable operation of the function shall be verified at the completion of the test as described in Table H.1, by confirming the following:

- the EUT's ability to establish a connection,
- the EUT's ability to clear a connection.

During surge testing disconnection is allowed on the analogue/digital data port being tested.

If the EUT is a supervisory equipment, it shall not impact the normal operation of the network being monitored. In addition, any supervisory functions impacted during the period of the test shall return to the state prior to the test. Elements to consider include:

- alarms,
- signalling lamps,
- printer output,
- network traffic rates,
- network monitoring.

Performance criterion C:

Degradation of performance as described in criteria A and B is permitted provided that the normal operation of the EUT is self-recoverable to the condition immediately before the application of the test, or can be restored after the test by the operator.

4.4 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

4.4.1 TEST SPECIFICATION

Basic Standard	IEC 61000-4-2
Discharge Impedance	330 ohm / 150 pF
Required Performance	B
Discharge Voltage	Air Discharge: $\pm 2\text{kV}$, $\pm 4\text{kV}$, $\pm 8\text{kV}$ Contact Discharge: $\pm 4\text{kV}$
Polarity	Positive & Negative
Number of Discharge	20 times at each test point
Discharge Mode	Single Discharge
Discharge Period	1 second

4.4.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	ESD Generator	TESEQ AG	NSG 437	450	Dec. 03, 2021

Remark: "N/A" denotes no model name, no serial No. or no calibration specified.

All calibration period of equipment list is one year.

4.4.3 TEST PROCEDURE

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

- a. 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.

NOTE 1 The minimum number of discharges applied is depending on the EUT; for products with synchronized circuits the number of discharges should be larger.

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.

NOTE 2 The points to which the discharges should be applied may be selected by means of an exploration carried out at a repetition rate of 20 discharges per second, or more.

Vertical Coupling Plane (VCP):

The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge.

Horizontal Coupling Plane (HCP):

The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge.

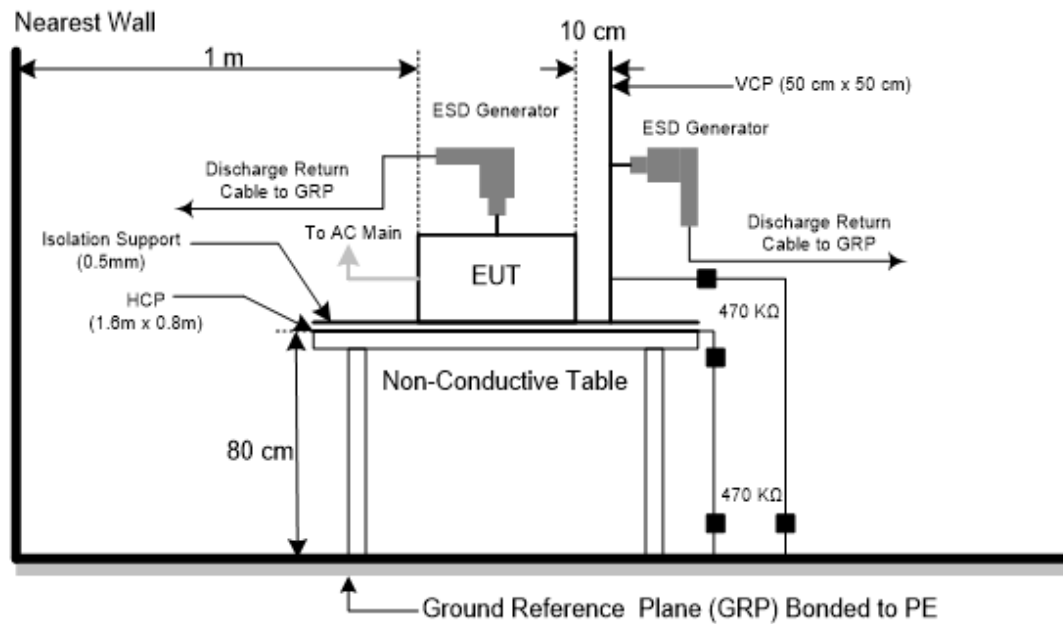
- b. For TABLE-TOP equipment:

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test was installed in a representative system as described in IEC 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 TEST RESULTS

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

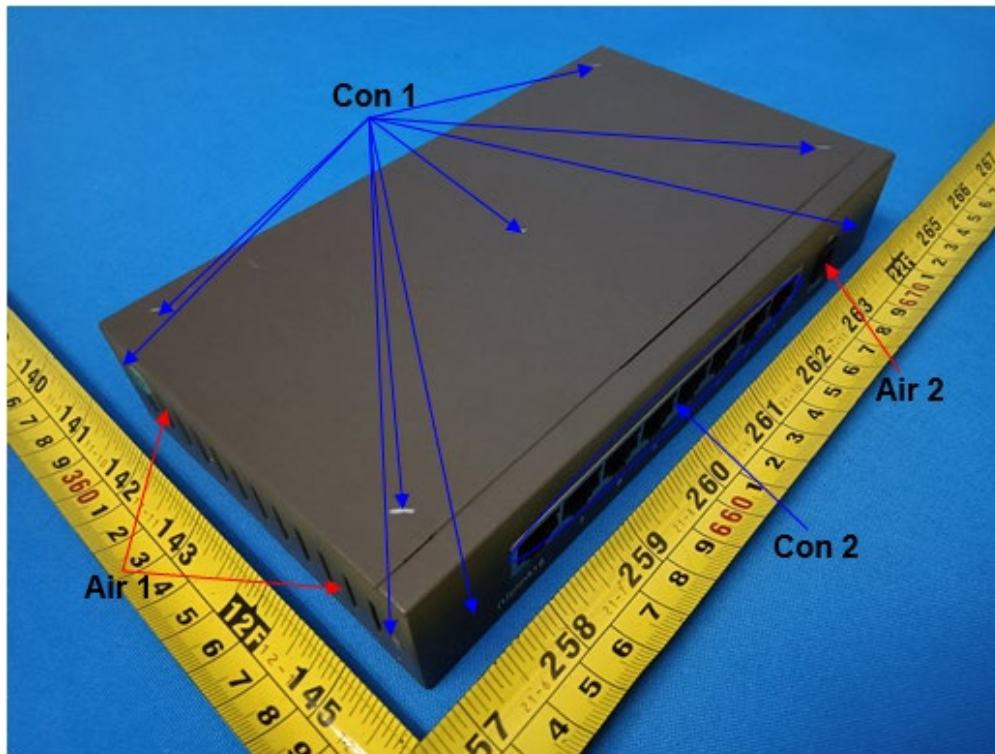
Mode	Air Discharge								Contact Discharge					
	2kV		4kV		8kV		- kV		4kV		4kV		- kV	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1	A	A	A	A	A	A	-	-	A	A	-	-	-	-
2	A	A	A	A	B	B	-	-	B	B	-	-	-	-
3	A	A	A	A	A	A	-	-	A	A	-	-	-	-
4	A	A	A	A	A	A	-	-	-	-	-	-	-	-
5	A	A	A	A	A	A	-	-	-	-	-	-	-	-
6	A	A	A	A	A	A	-	-	-	-	-	-	-	-
Criteria	B								B					
Result	B								B					

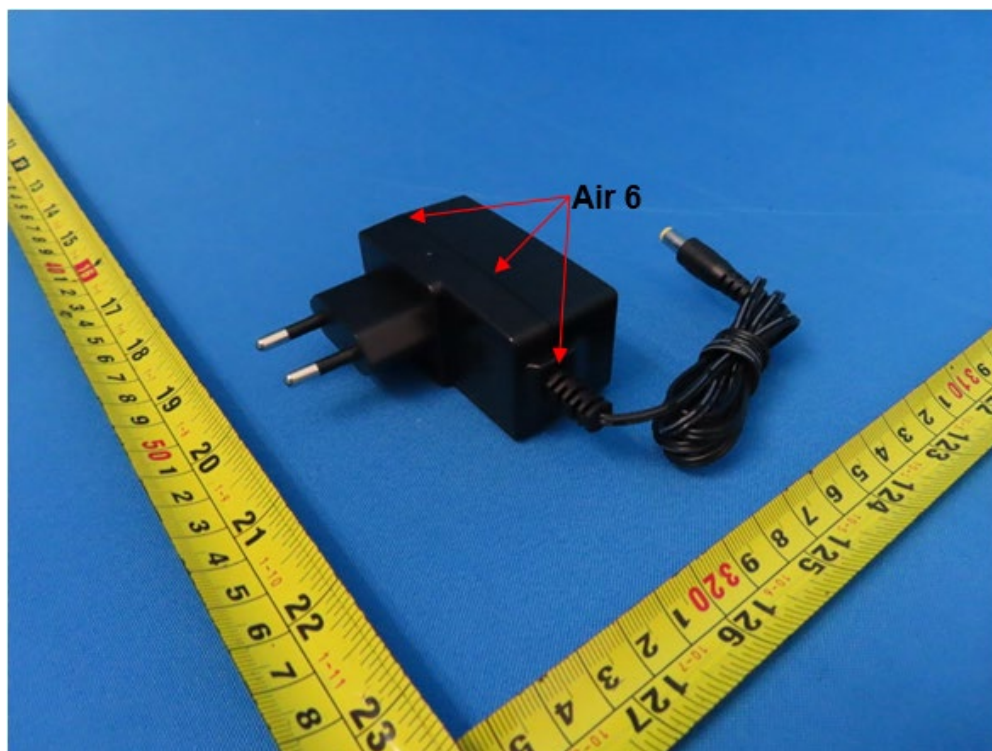
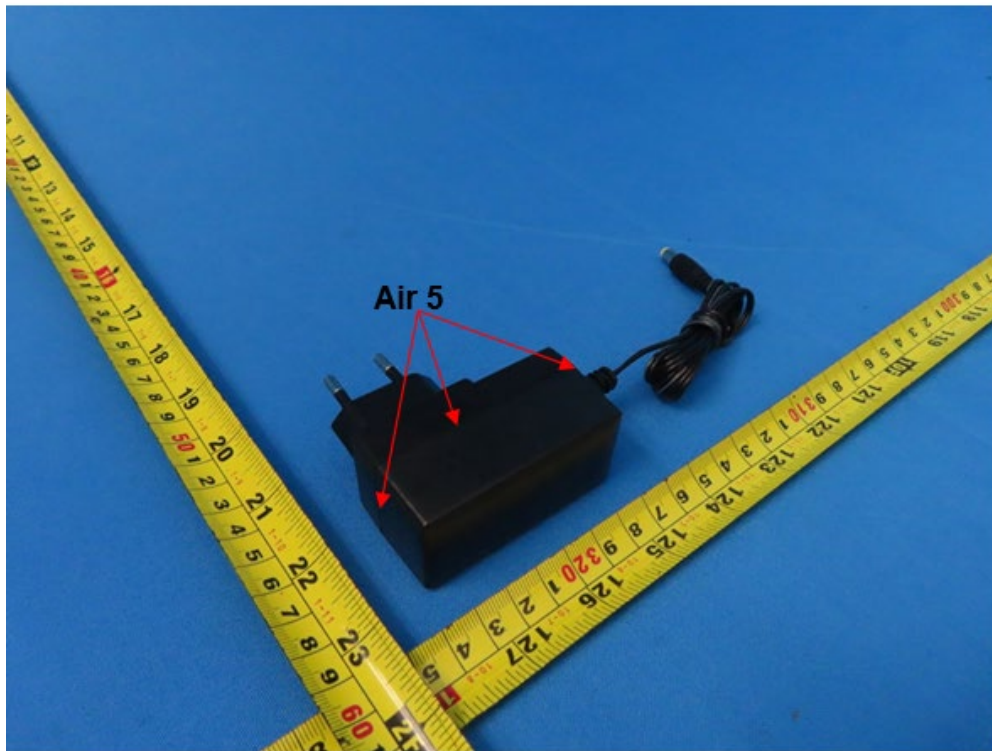
Mode	HCP Contact Discharge						VCP Contact Discharge					
	4kV		- kV		- kV		4kV		- kV		- kV	
Location	P	N	P	N	P	N	P	N	P	N	P	N
Left side	A	A	-	-	-	-	A	A	-	-	-	-
Right side	A	A	-	-	-	-	A	A	-	-	-	-
Front side	A	A	-	-	-	-	A	A	-	-	-	-
Rear side	A	A	-	-	-	-	A	A	-	-	-	-
Criteria	B						B					
Result	A						A					

Note:

- 1) P/N denotes the Positive/Negative polarity of the output voltage.
- 2) N/A - denotes test is not applicable in this test report

PHOTO(S) SHOWN THE LOCATION(S) OF ESD EVALUATED





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

4.5.1 TEST SPECIFICATION

Basic Standard	IEC 61000-4-3
Required Performance	A
Frequency Range	80 MHz - 1000 MHz, 1800 MHz, 2600 MHz, 3500 MHz, 5000MHz($\pm 1\%$)
Field Strength	3 V/m(unmodulated, r.m.s)
Modulation	1 kHz Sine Wave, 80%, AM Modulation
Frequency Step	1% of fundamental
Polarity of Antenna	Horizontal and Vertical
Test Distance	3 m
Antenna Height	1.55 m
Dwell Time	3 seconds

4.5.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	EMCO	3142C	66462	Mar. 26, 2022
2	Microwave Log.-Per. Antenna	Schwarzbeck	STLP 9149	9149-277	Apr. 14, 2022
3	Power amplifier	MILMEGA	80RF1000-250	1064833	Feb. 28, 2022
4	Amplifier	AR	50S1G4A	326720	Feb. 28, 2022
5	Power amplifier	MILMEGA	AS1860-50	1064834	Feb. 28, 2022
6	MXG Analog Signal Generator	Agilent	N5181A	MY49060710	Jul. 25, 2021
7	Measurement Software	Farad	EZ-RS (V2.0.1.3)	N/A	N/A

Remark: "N/A" denotes no model name, no serial No. or no calibration specified.

All calibration period of equipment list is one year.

4.5.3 TEST PROCEDURE

The EUT and support equipment are in a fully-anechoic chamber.

The testing distance from antenna to the EUT was 3 meters.

For TABLE-TOP equipment:

The EUT installed in a representative system as described in IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

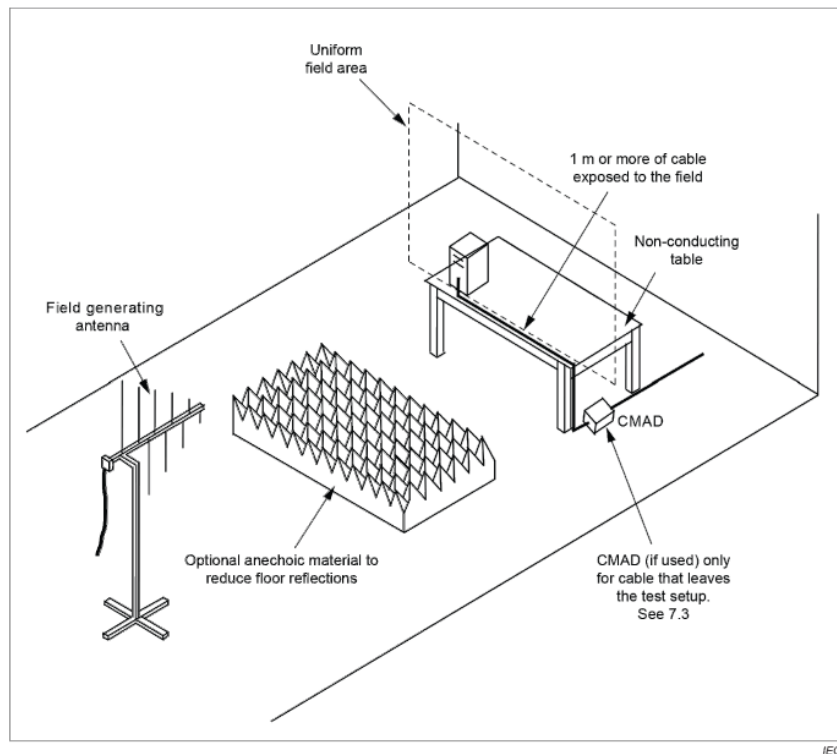
- The field strength level was 3 V/m(unmodulated, r.m.s).
- The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80%amplitude modulated with a 1 kHz sine wave. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP

a) For Continuous induced RF disturbances



4.5.6 TEST RESULTS

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Modulation	Azimuth	Criterion	Result
80 - 1000	H / V	3V/m	AM Modulated 1000Hz, 80%	0	A	A
				90		
				180		
				270		
1800, 2600, 3500, 5000 (±1%)	H / V	3V/m	AM Modulated 1000Hz, 80%	0	A	A
				90		
				180		
				270		

4.6 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST (EFT)

4.6.1 TEST SPECIFICATION

Basic Standard	IEC 61000-4-4
Required Performance	B
Test Voltage	AC mains power ports: ± 1 kV Analogue/digital data ports: ± 0.5 kV
Polarity	Positive & Negative
Impulse Frequency	5 kHz
Impulse Wave shape	5/50 ns
Burst Duration	15 ms
Burst Period	300 ms
Test Duration	1 min.

4.6.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Fast Transient Burst Simulator	Prima	EFT61004TA	PR190741004	Jul. 25, 2021

Remark: "N/A" denotes no model name, no serial No. or no calibration specified.

All calibration period of equipment list is one year.

4.6.3 TEST PROCEDURE

For TABLE-TOP equipment:

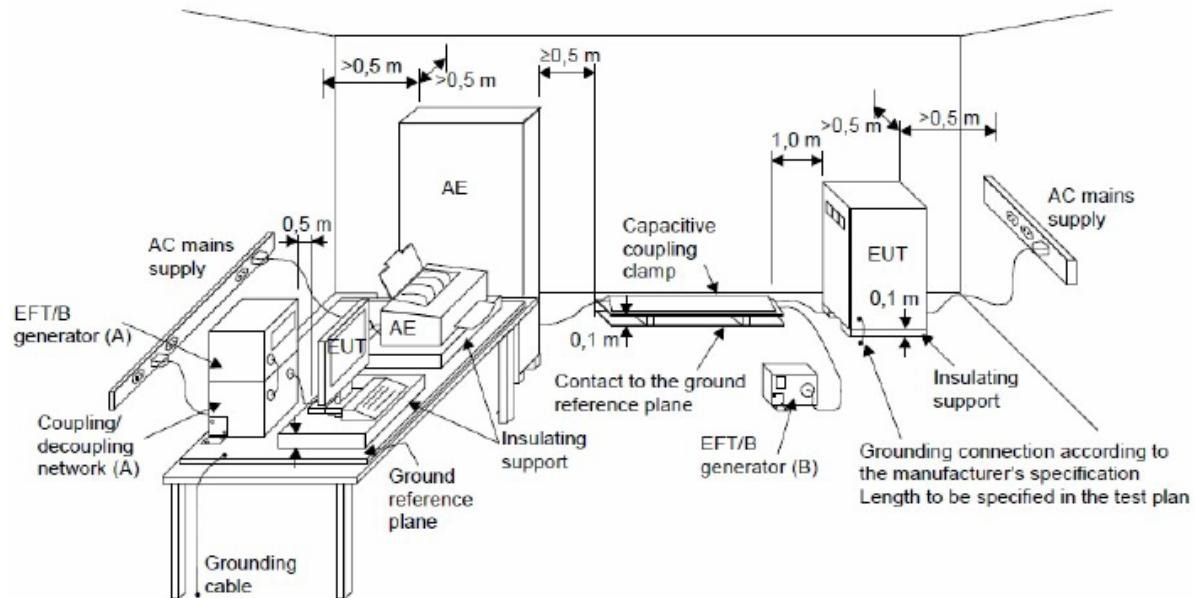
The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane and should be located 0.1 m \pm 0.01m above the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

- Both positive and negative polarity discharges were applied.
- The duration time of each test sequential was 1 minute

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 TEST RESULTS

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

EUT Ports Tested		Polarity	Repetition Frequency	Test Level 1kV	Criterion	Result
AC Power Port	Line (L)	+	5 kHz	B	B	B
		-	5 kHz	B		
	Neutral (N)	+	5 kHz	B	B	B
		-	5 kHz	B		
	L+N	+	5 kHz	B	B	B
		-	5 kHz	B		

EUT Ports Tested		Polarity	Repetition Frequency	Test Level 0.5 kV	Criterion	Result
Analogue/digital data ports	LAN1	+	5 kHz	B	B	B
		-	5 kHz	B		

4.7 SURGE IMMUNITY TEST (SURGE)

4.7.1 TEST SPECIFICATION

Basic Standard	IEC 61000-4-5
Required Performance	B(AC mains power ports) C(Analogue/digital data ports)
Wave-Shape	1.2/50(8/20) Tr/Th μ s combination wave 10/700(5/320) Tr/Th μ s combination wave
Test Voltage	AC mains power ports: ± 0.5 kV, ± 1 kV Analogue/digital data ports: ± 0.5 kV, ± 1 kV
Generator Source Impedance	2 Ω of the low-voltage power supply network. 40 Ω (15 Ω +25 Ω) between outdoor unshielded symmetrical interconnection line and ground when use 10/700(5/320) waveform
Phase Angle, Polarity and Number of Tests	Five positive pulses line-to-neutral at 90° phase Five negative pulses line-to-neutral at 270° phase
Pulse Repetition Rate	1 time / min

4.7.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	System mainframe	Schaffner	NSG 2050	200729-619LU	Aug. 14, 2021
2	CDN	EMC PARTNER	CDN-UTP8	40	Feb. 27, 2022
3	Measurement Software	Schaffner	Win 2000 Version V7.10	N/A	N/A
4	Lightning Surge Generator	Prima	SUG61005TB	PR190854067	Jul. 25, 2021

Remark: "N/A" denotes no model name, no serial No. or no calibration specified.

All calibration period of equipment list is one year.

4.7.3 TEST PROCEDURE

a. For EUT power supply:

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2meters in length (or shorter).

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

The surge is applied to the lines via the capacitive coupling. The coupling /decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

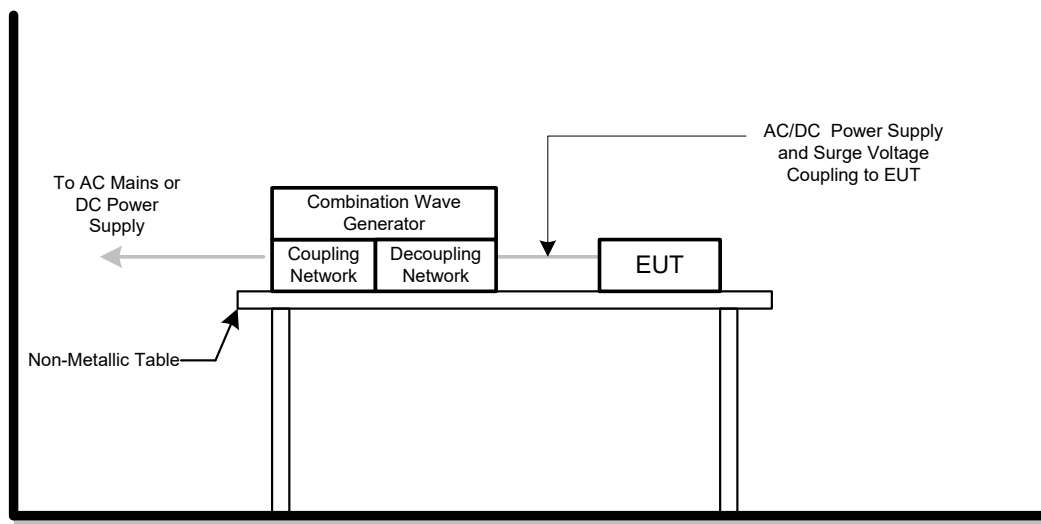
c. For test applied to unshielded symmetrically operated interconnection /telecommunication lines of EUT :

The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



4.7.6 TEST RESULTS

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Wave Form EUT Ports Tested		1.2/50(8/20)Tr/Thµs						Criterion	Result
		Polarity	Phase	Voltage					
				0.5kV	1kV	-- kV	-- kV		
AC	L – N	+	90°	A	B	-	-	B	B
		-	270°	A	B	-	-		

Wave Form EUT Ports Tested	10/700(5/320)Tr/Thµs						Criterion	Result
	Polarity	Phase	Voltage					
			0.5kV	1kV	-- kV	-- kV		
Analogue/digital data ports(LAN1)	+/-	N/A	A	B	-	-	C	B

4.8 IMMUNITY TO CONDUCTED DISTURBANCES, INDUCED BY RADIO-FREQUENCY FIELDS TEST (CS)

4.8.1 TEST SPECIFICATION

Basic Standard	IEC 61000-4-6
Required Performance	A
Frequency Range&Field Strength	0.15 MHz - 10 MHz: 3V (unmodulated, r.m.s.) 10 MHz - 30 MHz: 3V to 1V (unmodulated, r.m.s.) 30 MHz - 80 MHz: 1V (unmodulated, r.m.s.)
Modulation	1 kHz Sine Wave, 80%, AM Modulation
Frequency Step	1% of fundamental
Dwell Time	3 seconds

4.8.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	TEST SYSTEM FOR CONDUCTED AND RADIATED IMMUNITY	TESEQ	NSG 4070B	37513	Jul. 25, 2021
2	Power CDN	FCC	FCC-801-M2 /M3-16A	100270	Feb. 27, 2022
3	Coupling Decoupling Network	Teseq GmbH	CDN T8-10	40373	Jul. 25, 2021
4	Measurement Software	Farad	EZ-CS (V2.0.1.4)	N/A	N/A

Remark: "N/A" denotes no model name, no serial No. or no calibration specified.

All calibration period of equipment list is one year.

4.8.3 TEST PROCEDURE

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.

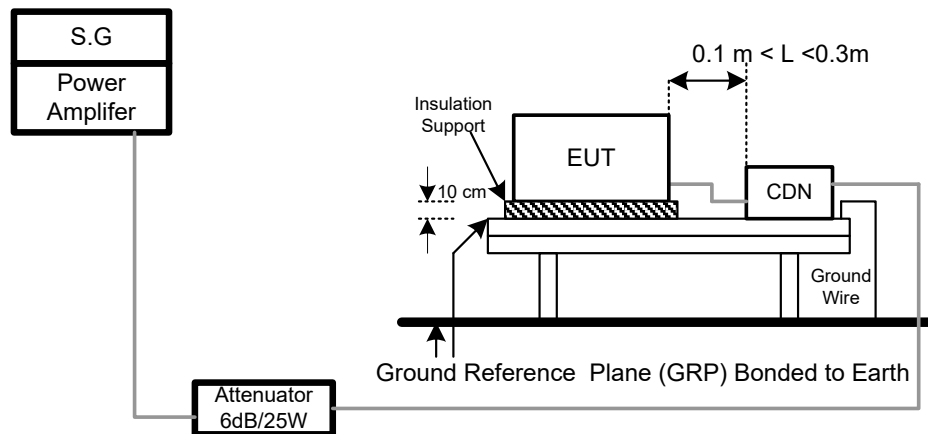
The other condition as following manner:

- The field strength level was 3 V (unmodulated, r.m.s.)
- The frequency range is swept from 150 kHz to 80 MHz, with the signal 80%amplitude modulated with a 1 kHz sinewave. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

4.8.5 TEST SETUP



4.8.6 TEST RESULTS

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Test Ports (Mode)	Freq.Range (MHz)	Field Strength	Modulation	Criteria	Results
AC mains power ports	0.15 - 10	3V	AM Modulated 1000Hz, 80%	A	A
	10 - 30	3V to 1V			
	30 - 80	1V			
Analogue/digital data ports (LAN1)	0.15 - 10	3V	AM Modulated 1000Hz, 80%	A	A
	10 - 30	3V to 1V			
	30 - 80	1V			

4.9 POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST (PFMF)

4.9.1 TEST SPECIFICATION

Basic Standard	IEC 61000-4-8
Required Performance	A
Frequency Range	50/60Hz
Field Strength	1 A/m
Observation Time	1 minute
Inductance Coil	Rectangular type, 1mx1m

4.9.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Magnetic Field test Generator	FCC	F-1000-4-8-G-125A	4032	Feb. 28, 2022
2	Magnetic Field immunity loop	Thermo KeyTek	F-1000-4-8/9/10-L-1M	4024	Feb. 28, 2022

Remark: "N/A" denotes no model name, no serial No. or no calibration specified.

All calibration period of equipment list is one year.

4.9.3 TEST PROCEDURE

For TABLE-TOP equipment:

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

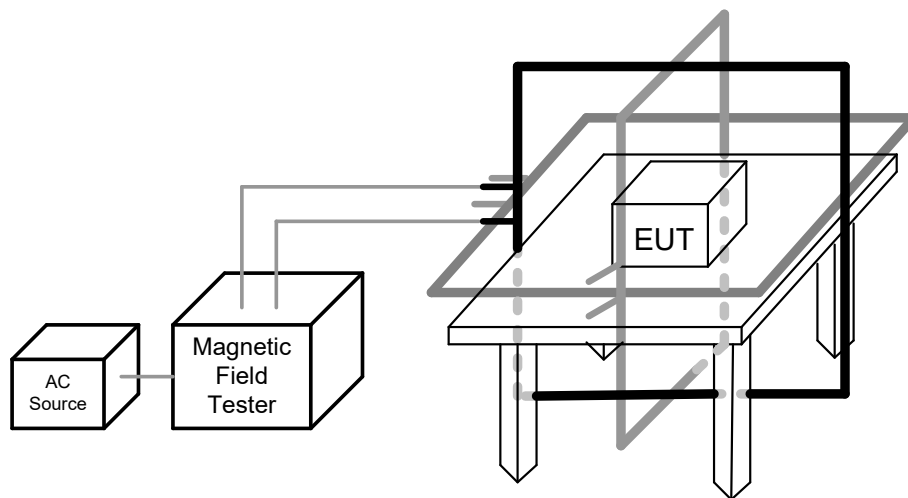
The other condition as following manner:

- The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.
- The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

4.9.4 DEVIATION FROM TEST STANDARD

No deviation

4.9.5 TEST SETUP



4.9.6 TEST RESULTS

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

50Hz

Test Mode	Test Level	Antenna aspect	Duration	Criteria	Results
Enclosure	1 A/m	X	60s	A	A
Enclosure	1 A/m	Y	60s	A	A
Enclosure	1 A/m	Z	60s	A	A

60Hz

Test Mode	Test Level	Antenna aspect	Duration	Criteria	Results
Enclosure	1 A/m	X	60s	A	A
Enclosure	1 A/m	Y	60s	A	A
Enclosure	1 A/m	Z	60s	A	A

4.10 VOLTAGE DIPS, SHORT INTERRUPTIONS AND VOLTAGE VARIATIONS IMMUNITY TEST (DIPS)

4.10.1 TEST SPECIFICATION

Basic Standard	IEC 61000-4-11
Required Performance	Voltage dips: B (For <5% residual voltage, dips) C (For 70% residual voltage, dips) C (For <5% residual voltage, Interruptions)
Interval between Event	Ten seconds
Phase Angle	0°/180°
Test Cycle	3 times

4.10.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Cycle Sag Simulator	Prima	DRP61011TA	PR19076452	Dec. 03, 2021

Remark: "N/A" denotes no model name, no serial No. or no calibration specified.

All calibration period of equipment list is one year.

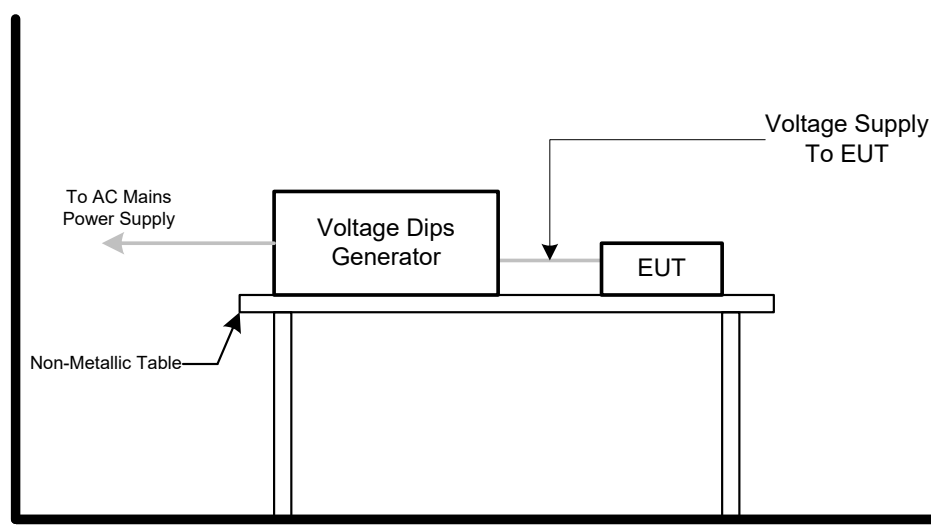
4.10.3 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

4.10.4 DEVIATION FROM TEST STANDARD

No deviation

4.10.5 TEST SETUP



4.10.6 TEST RESULTS

Test Voltage	AC 100V/50Hz, AC 230V/50Hz, AC 240V/50Hz
Test Mode	Mode 1

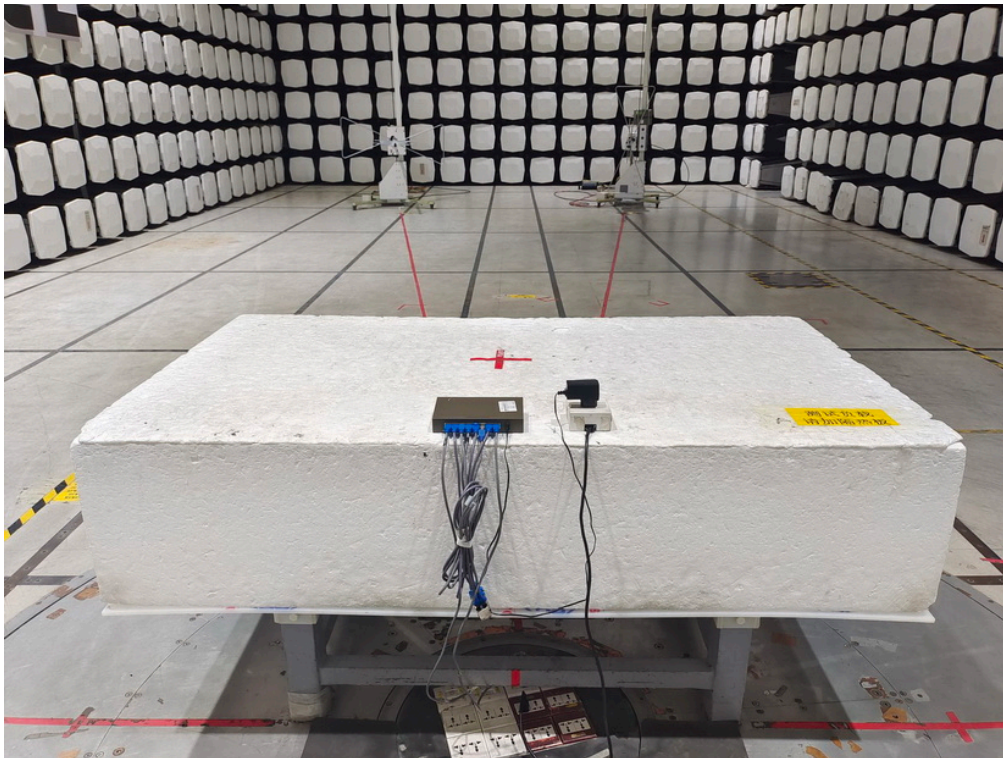
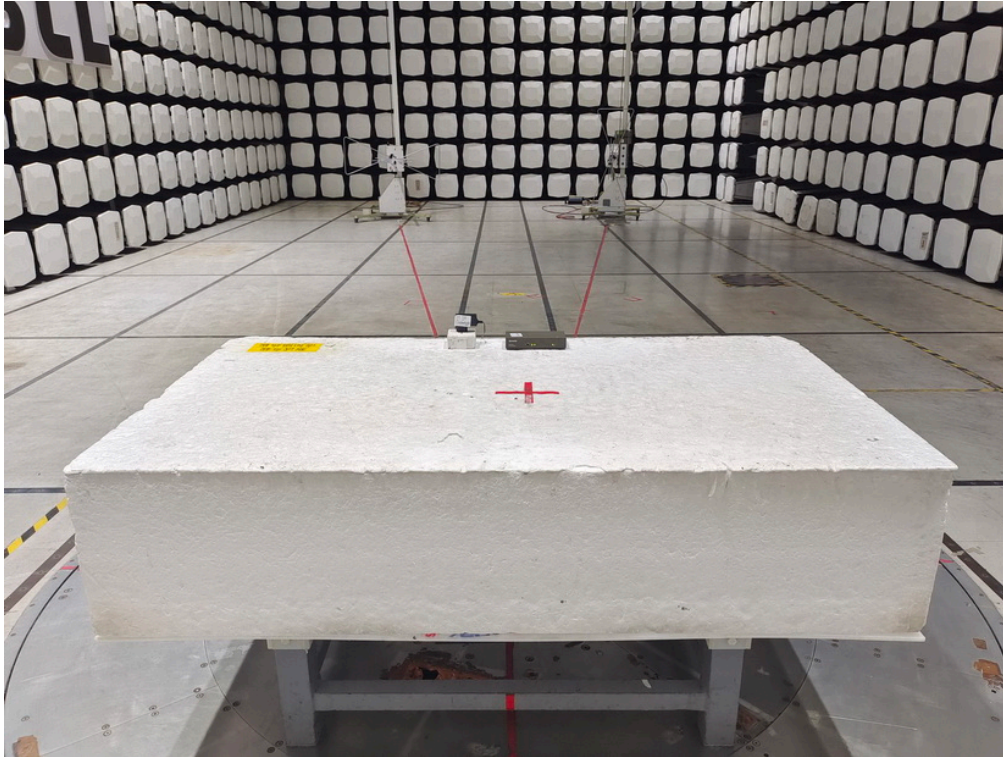
AC 100V/50Hz				
Item	Residual Voltage	Cycle	Criteria	Results
Voltage dips	<5%	0.5	B	A
Voltage dips	70%	25	C	A
Voltage Interruption	<5%	250	C	C

AC 230V/50Hz				
Item	Residual Voltage	Cycle	Criteria	Results
Voltage dips	<5%	0.5	B	A
Voltage dips	70%	25	C	A
Voltage Interruption	<5%	250	C	C

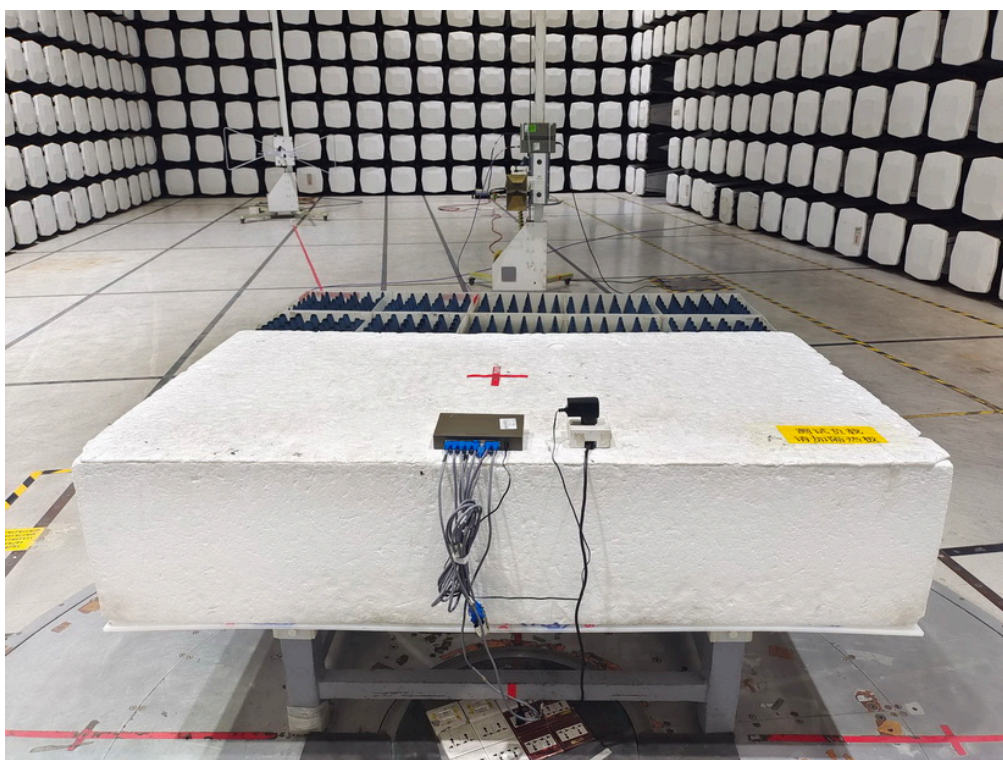
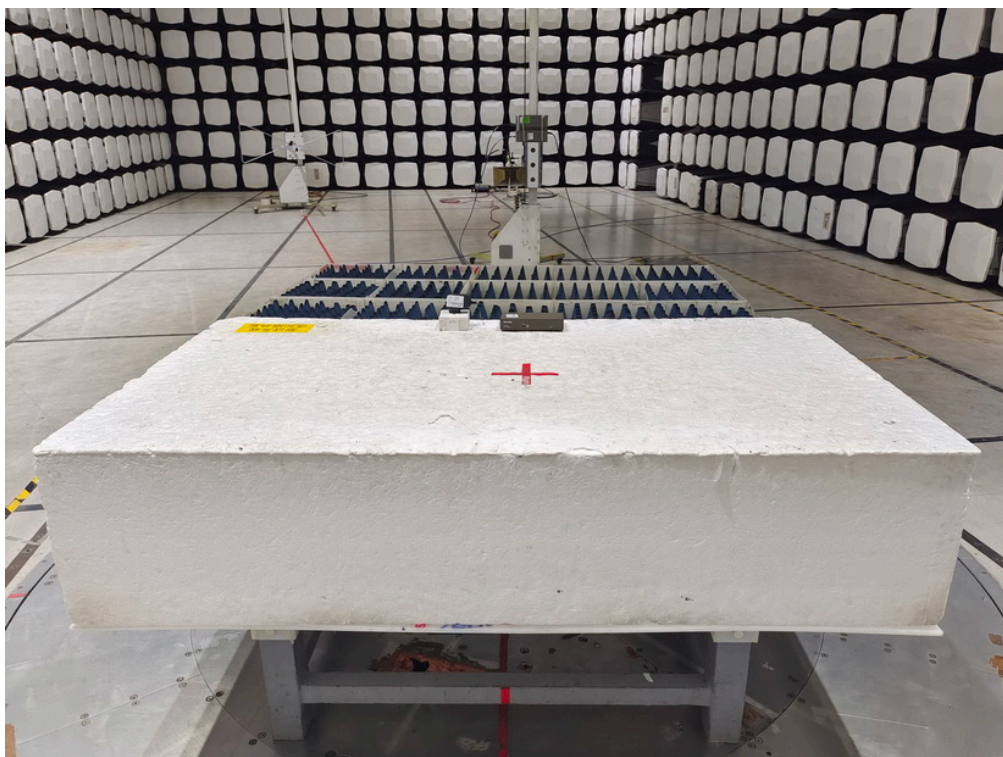
AC 240V/50Hz				
Item	Residual Voltage	Cycle	Criteria	Results
Voltage dips	<5%	0.5	B	A
Voltage dips	70%	25	C	A
Voltage Interruption	<5%	250	C	C

5. EUT TEST PHOTO

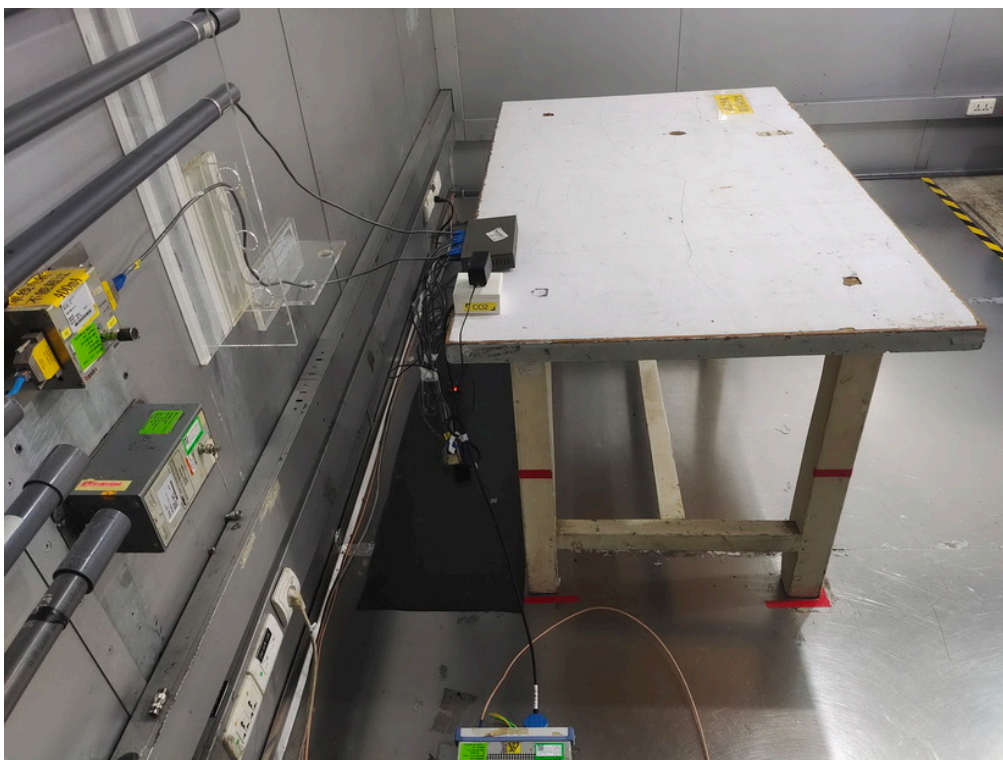
Radiated emissions up to 1 GHz



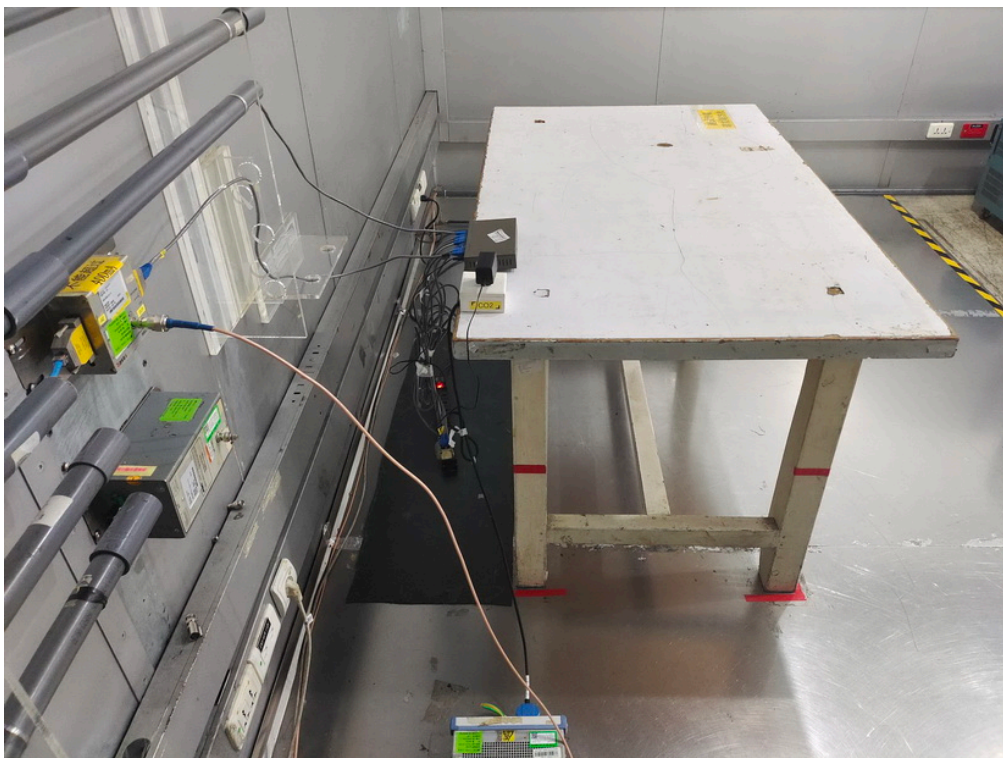
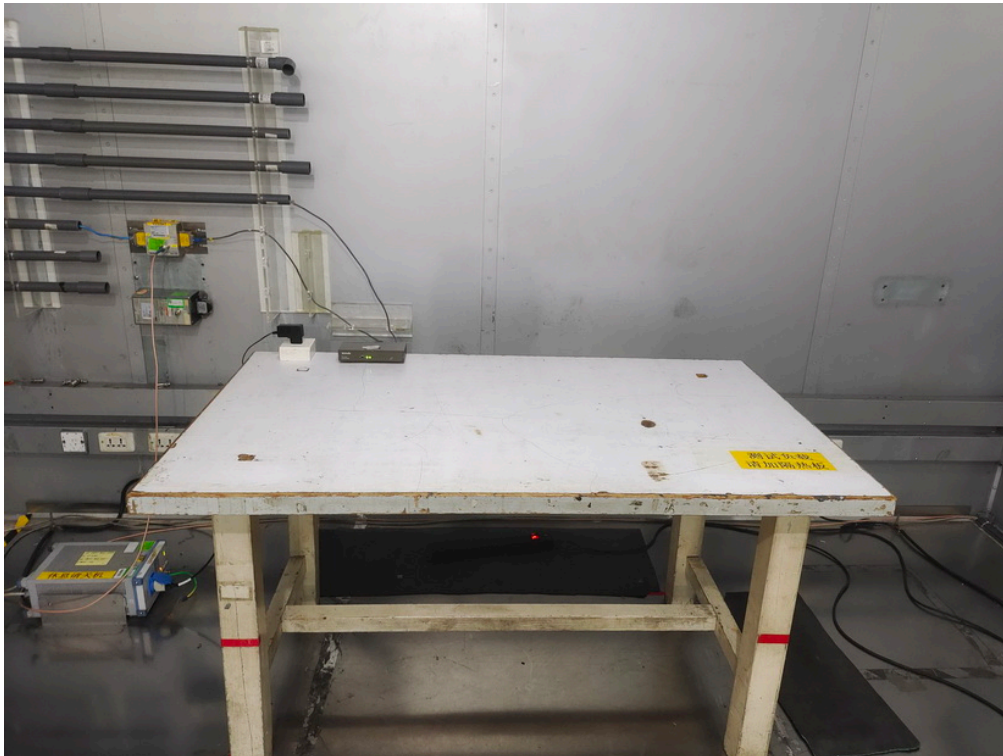
Radiated emissions above 1 GHz



Conducted emissions AC mains power port



Asymmetric mode conducted emissions



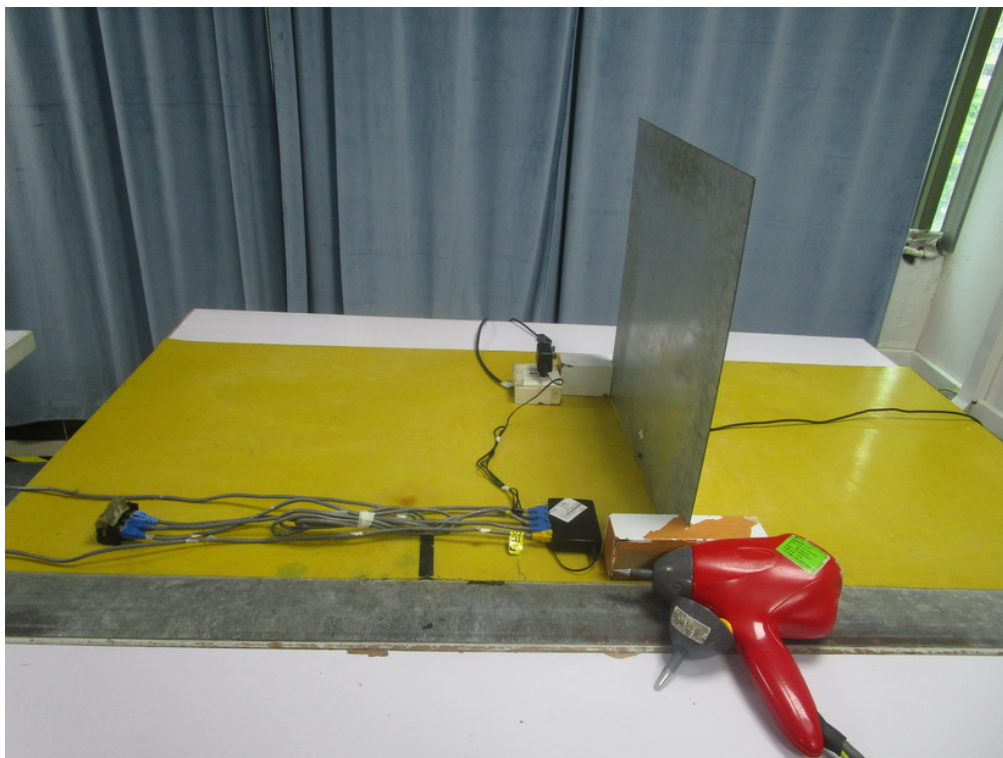
Harmonic current



Voltage fluctuations (Flicker)



Electrostatic discharge immunity



Radiated, radio-frequency, electromagnetic field immunity – Up to 1GHz



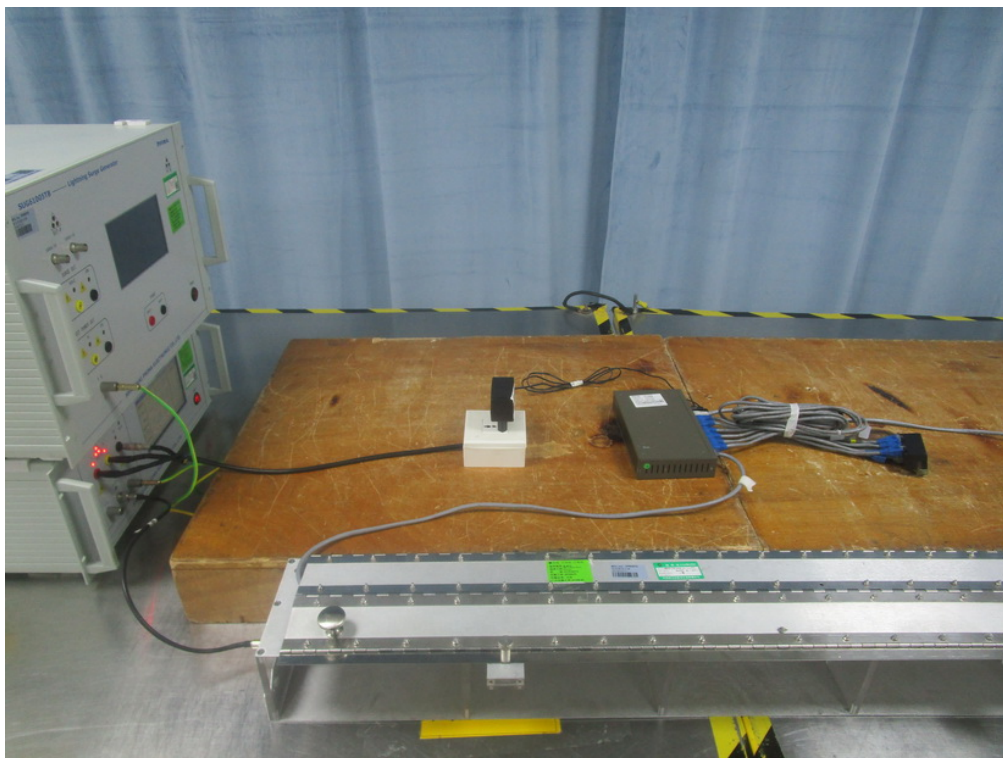
Radiated, radio-frequency, electromagnetic field immunity – Above 1GHz



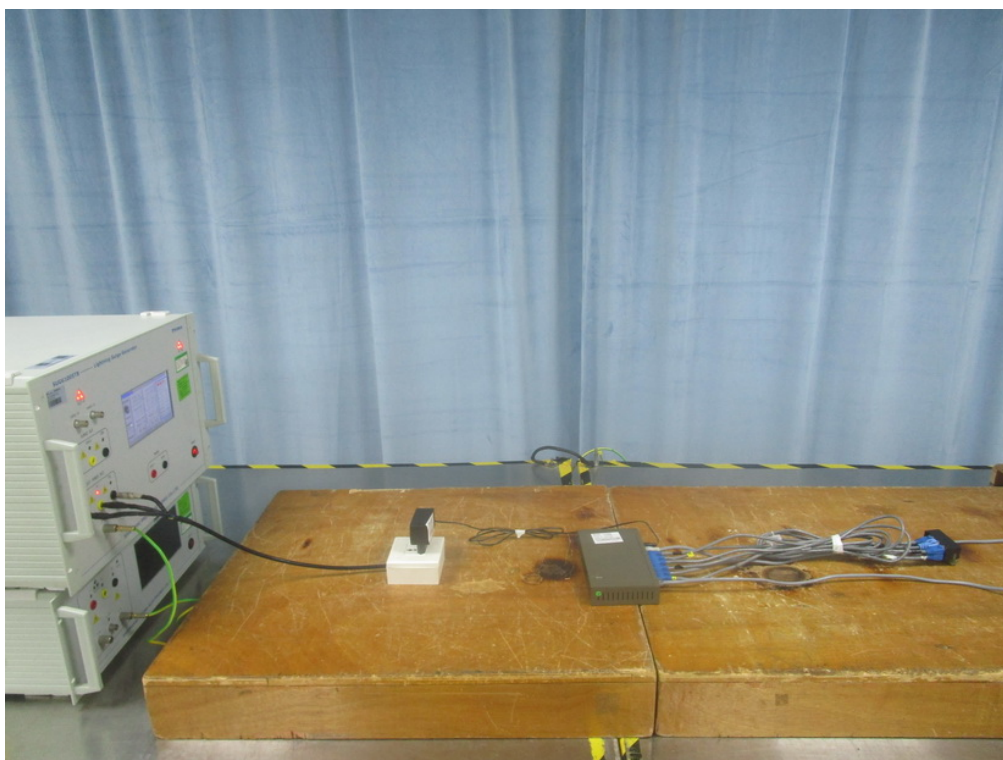
Electrical fast transient/burst immunity - AC



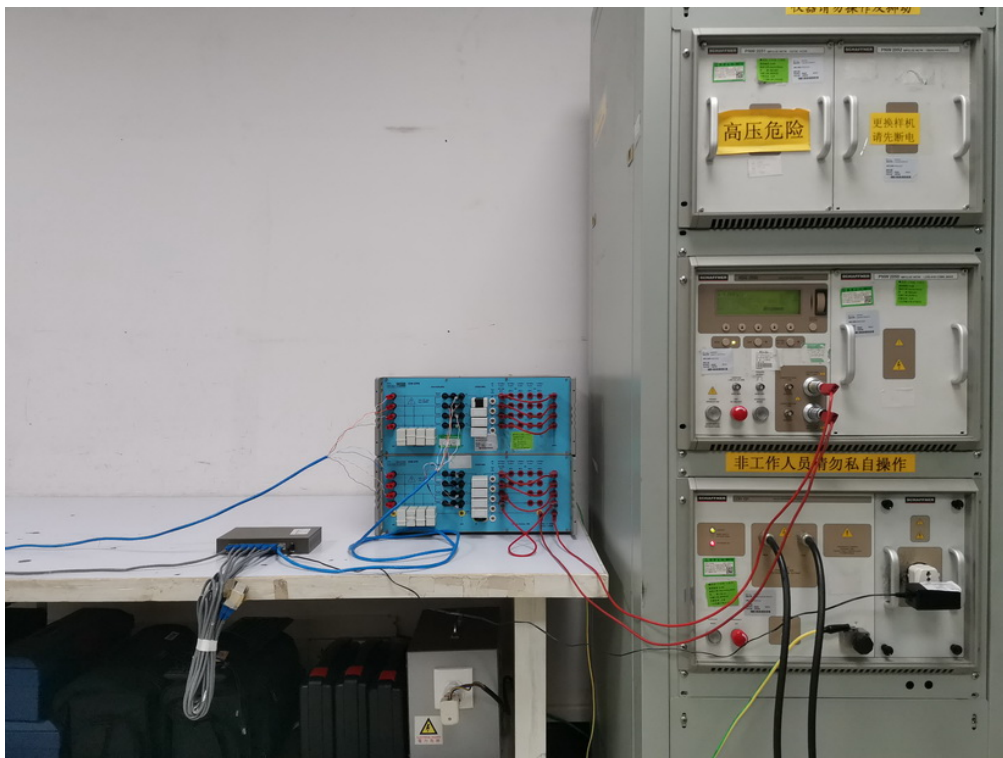
Electrical fast transient/burst immunity(RJ45)



Surge immunity - AC



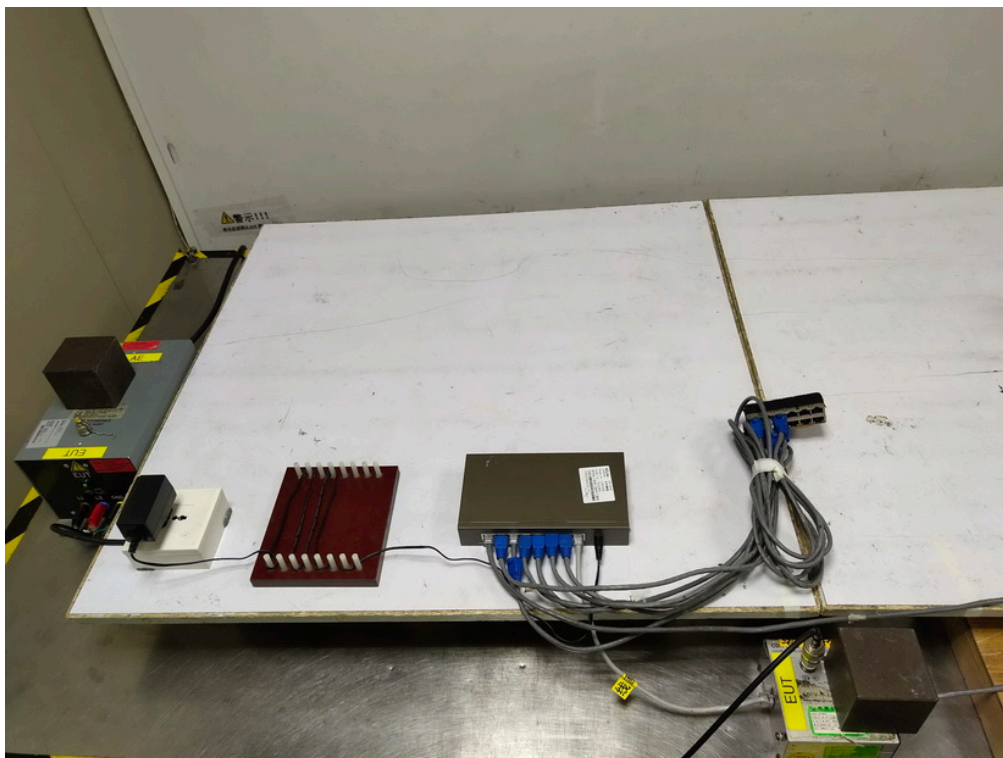
Surge immunity (RJ45)



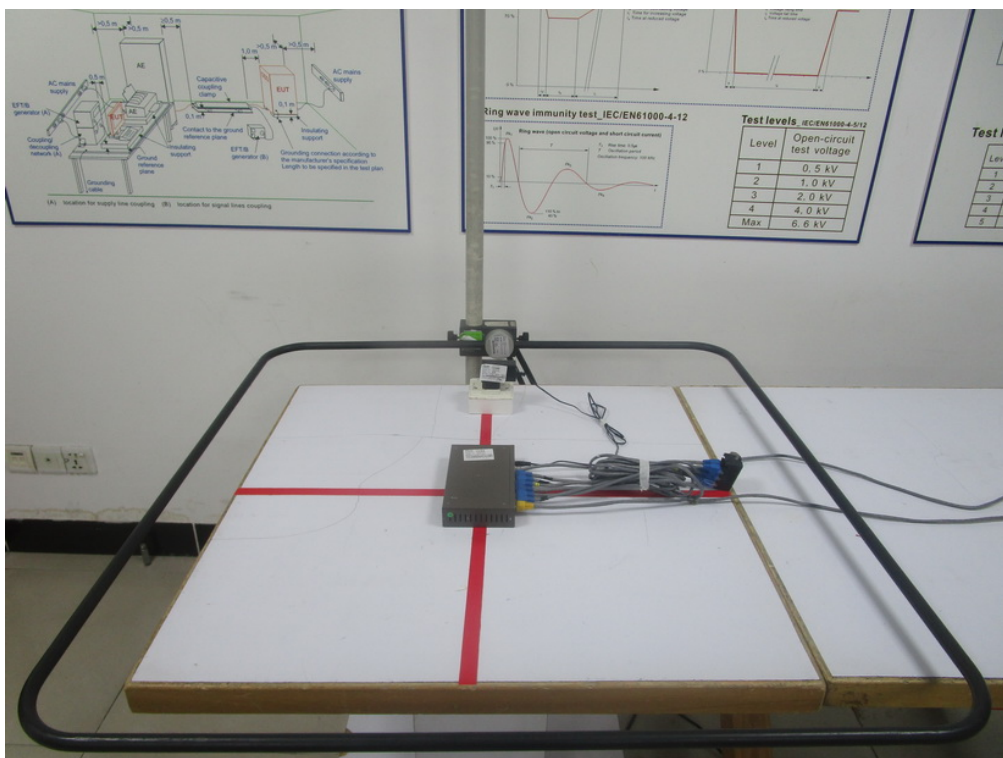
Immunity to conducted disturbances, induced by radio-frequency fields - AC



Immunity to conducted disturbances, induced by radio-frequency fields(RJ45)



Power frequency magnetic field immunity



Voltage dips, short interruptions and voltage variations immunity

