TEST REPORT

Product Name	:	**Uninterruptible Power Systems(UPS)**
Model Number	:	**V101SPR-RTY, V101SPR-36RTY, V101HPR-RTY, V101HPR-36RTY**

Prepared for	:	Voltan Technology Limited
Address	:	48 Ravenor Park Road, Greenford, UB6 9QY, London, United Kingdom
Prepared by	:	EMTEK (SHENZHEN) CO., LTD.
Address	:	Building 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China Tel: (0755) 26954280 Fax: (0755) 26954282

Report Number	:	ENS2503200223E00501R
Date(s) of Tests	:	August 17, 2022 to November 25, 2022
Date of issue	:	March 25, 2025

TABLE OF CONTENT

TEST REPORT DESCRIPTION

Applicant	:	Voltan Technology Limited
Manufacturer	:	Voltan Technology Limited
Trademark	:	VOLTAN
EUT	:	Uninterruptible Power Systems(UPS)
Model Number	:	V101SPR-RTY, V101SPR-36RTY, V101HPR-RTY, V101HPR-36RTY
Battery Bank	:	VBR4024C, VBR6036C
Rating	:	Input: 220-240VAC, 50/60Hz Output: 220-240VAC Buttery: DC 24V

Measurement Procedure Used:

EN IEC 62040-2:2018, IEC 62040-2:2016
EN IEC 61000-3-2:2019+A1:2021
EN 61000-3-3:2013+A2:2021
(IEC 61000-4-2:2008, IEC 61000-4-3:2006+A1:2007+A2:2010, IEC61000-4-4:2012, IEC 61000-4-5:2014, IEC 61000-4-6:2013, IEC 61000-4-8:2009, IEC 61000-4-11:2004, IEC 61000-2-2:2002)

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 IEC 62040-2, IEC 62040-2 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	:	August 17, 2022 to November 25, 2022
Prepared by	:	Jessie Hu/Editor
Reviewer	:	Kaimin Guo/Supervisor
Approved & Authorized Signer	:	Lisa Wang/Manager

Modified Information

Version	Report No.	Revision Date	Summary
Ver.1.0	ENS2503200223E00501R	/	Original Report

1. DESCRIPTION OF STANDARDS AND RESULTS (EUT)

EMISSION				
Description of Test Item		Standard	Limits	Results
conducted emissions	at the AC input port (mains)	EN IEC 62040-2: 2018	C2	Pass
	at the AC output port	EN IEC 62040-2: 2018	C2	N/A
	at the network ports	EN IEC 62040-2: 2018	C2	N/A
Radiated emissions at frequencies up to 1 GHz		EN IEC 62040-2: 2018	C2	Pass
Harmonic Current Emissions		EN IEC 61000-3-2:2019+A1:2021	Class A	Pass
Voltage Fluctuation and Flicker		EN 61000-3-3:2013+A2:2021	Section 5	Pass
IMMUNITY				
Description of Test Item		Basic Standard	Performance Criteria	Results
Electrostatic Discharge (ESD)		IEC 61000-4-2:2008	B	Pass
RF Field Strength Susceptibility (R/S)		IEC 61000-4-3: 2006+A1:2007+A2:2010	A	Pass
Electro Fast Transient (EFT)		IEC 61000-4-4:2012	B	Pass
Surge (Input AC Power Port)		IEC 61000-4-5:2014	B	Pass
Radio-Frequency, Continuous Conducted Disturbance		IEC 61000-4-6:2013	A	Pass
Power Frequency Magnetic Field		IEC 61000-4-8:2009	A	Pass
Low Frequency signals		IEC 61000-2-2:2002	A	Pass
Voltage Dips and Interruptions		IEC 61000-4-11:2004	-	Pass
Note: N/A is an abbreviation for Not Applicable.				

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT	:	Uninterruptible Power Systems(UPS)
Model Number	:	V101SPR-RTY, V101SPR-36RTY, V101HPR-RTY, V101HPR-36RTY (Note: These models are identical in circuitry and electrical, mechanical and physical construction; the only differences are the trade name and model number. for trading purpose. We prepare V101SPR-RTY for test.)
Battery Bank	:	VBR4024C, VBR6036C
Sample number	:	1#
Test Voltage	:	AC 230V/50Hz, DC 24V
Applicant	:	Voltan Technology Limited
Address	:	48 Ravenor Park Road, Greenford, UB6 9QY, London, United Kingdom
Manufacturer	:	Voltan Technology Limited
Address	:	48 Ravenor Park Road, Greenford, UB6 9QY, London, United Kingdom
Date of Received	:	August 17, 2022
Date of Test	:	August 17, 2022 to November 25, 2022

Note: This report change applicant, Manufacturer, trademark, Battery Bank and model number is based on ENS2411110239E00101R, this change does not affect the test results, and its original data and records refer to ENS2411110239E00101R.

2.2. Independent Operation Modes

A. On
1. Line mode
2. Battery mode

2.3. Test Manner

Test Items	Test Voltage	Operation Modes	Worst case
Conducted disturbance at mains Terminals	AC 230V/50Hz DC 24V	Mode A	Mode A.2
Radiated emissions at frequencies up to 1 GHz	AC 230V/50Hz DC 24V	Mode A	Mode A.2
Harmonic Current Emissions	AC 230V/50Hz	Mode A.1	Mode A.1
Voltage Fluctuation and Flicker	AC 230V/50Hz	Mode A.1	Mode A.1
EMS	AC 230V/50Hz DC 24V	Mode A	Mode A

2.4. Description of Support Device

N/A

2.5. Description of Test Facility

Site Description
EMC Lab. : **Accredited by CNAS**
The Certificate Registration Number is L2291.
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01 (identical to ISO/IEC 17025:2017)

Accredited by FCC
Designation Number: CN1204
Test Firm Registration Number: 882943

Accredited by A2LA
The Certificate Number is 4321.01.

Accredited by Industry Canada
The Conformity Assessment Body Identifier is CN0008

Name of Firm : EMTEK (SHENZHEN) CO., LTD.
Site Location : Building 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

2.6. Measurement Uncertainty

Test Item		Uncertainty
Conducted Emission Uncertainty	:	2.08dB (9k~150kHz Conduction 1#) 2.40dB (150k-30MHz Conduction 1#)
Radiated Emission Uncertainty (3m 1# Chamber)	:	4.46dB (30M~1GHz Polarize: H) 5.04dB (30M~1GHz Polarize: V)
Uncertainty for Flicker test	:	0.07%
Uncertainty for Harmonic test	:	1.8%
Uncertainty for C/S Test	:	1.45(Using CDN Test) 2.37(Using EM Clamp 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 Mains Power Ports

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	EMI Test Receiver	Rohde & Schwarz	ESCI	101384	May 14, 2022	1 Year
☑	AMN	Rohde & Schwarz	ENV216	101161	May 14, 2022	1 Year
☑	AMN	Kyoritsu	KNW-407	8-1492-9	May 14, 2022	1 Year

3.2. For Radiated Emission Measurement (3M)

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	Pre-Amplifier	HP	8447F	2944A07999	May 14, 2022	1 Year
☑	EMI Test Receiver	Rohde & Schwarz	ESCI	101414	May 14, 2022	1 Year
☑	Bilog Antenna	Schwarzbeck	VULB9163	712	July 05, 2021	2 Year

3.3. For Harmonics and Flick

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	45KVA AC Power source	Teseq	NSG 1007-45/45KVA	1305A02873	May 15, 2022	1 Year
☑	Signal conditioning Unit	Teseq	CCN 1000-3	1305A02873	May 15, 2022	1 Year
☑	Impedance network	Teseq	INA2197/37A	1305A02873	May 15, 2022	1 Year
☑	Impedance network	Teseq	INA 2196/75A	1305A02874	May 15, 2022	1 Year
☐	Profline 2100 AC Switching Unit	Teseq	NSG 2200-3	A22714	May 15, 2022	1 Year

3.4. Electrostatic Discharge Immunity Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	ESD Tester	TESEQ AG	NSG 438A	130	June 23, 2022	1 Year

3.5. For RF Strength Susceptibility Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	Power Amplifier	MILMEGA	AS0102-55	1018770	May 14, 2022	1 Year
☑	RF Power Meter. Dual Channel	BOONTON	4232A	10539	May 14, 2022	1 Year
☑	Log.-Per. Antenna	SCHWARZBECK	VULP 9118E	811	N/A	N/A
☑	Signal Generator	Agilent	N5181A	MY50145187	May 14, 2022	1 Year
☑	50ohm Diode Power Sensor	BOONTON	51011EMC	36164	May 14, 2022	1 Year
☑	Broad-Band Horn Antenna	SCHWARZBECK	STLP 9149	9149-227	N/A	N/A
☑	Field Strength Meter	DARE	RSS1006A	10I00037SNO 22	May 23, 2022	1 Year
☑	Multi-function interface system	DARE	CTR1009B	12I00250SNO 72	N/A	N/A
☑	Automatic switch group	DARE	RSW1004A	N/A	N/A	N/A
☑	Power Amplifier	MILMEGA	AS1860-50	1059346	May 14, 2022	1 Year
☑	Power Amplifier	MILMEGA	80RF1000-17 5	1059345	May 14, 2022	1 Year
☑	Directional Coupler	MILMEGA	DC6180AM1	0340463	May 14, 2022	1 Year
☑	Audio Analyzer	R&S	UPV	101473	May 14, 2022	1 Year
☑	Audio Test System	AUDIO PRECISION	ATS-1	41100	May 14, 2022	1 Year

3.6. For Electrical Fast Transient / Burst Immunity Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	Burst Tester	HAEFELY	PEFT4010	080981-16	May 15, 2022	1 Year
☑	Coupling Clamp	HAEFELY	IP-4A	147147	May 15, 2022	1 Year

3.7. For Surge Immunity Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	Controller	HAEFELY	Psurge 8000	174031	May 15, 2022	1 Year
☑	Impulse Module	HAEFELY	PIM 100	174124	May 15, 2022	1 Year
☑	Coupling Decoupling	HAEFELY	PCD 130	172181	May 15, 2022	1 Year
☑	Coupling Module	HAEFELY	PCD122	174354	May 15, 2022	1 Year
☑	Impulse Module	HAEFELY	PIM 120	174435	May 15, 2022	1 Year
☑	Coupling Module	HAEFELY	PCD 126A	174387	May 15, 2022	1 Year
☑	Impulse Module	HAEFELY	PIM 110	174391	May 15, 2022	1 Year
☑	Impulse Module	HAEFELY	PIM 150	178707	May 15, 2022	1 Year
☑	Impulse Module	PMI	PCDN8	190422	May 15, 2022	1 Year

3.8. For Injected Current Susceptibility Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	Continuous Wave Simulator	EMTEST	CWS500C	0900-12	May 15, 2022	1 Year
☑	CDN	EMTEST	CDN-M2	510010010010	May 15, 2022	1 Year
☑	CDN	EMTEST	CDN-M3	0900-11	May 14, 2022	1 Year
☑	EM Injection Clamp	EMTEST	F-2031-23MM	368	May 15, 2022	1 Year
☑	Attenuator	EMTEST	100W 6dB DC-3G	/	May 14, 2022	1 Year
☑	Signal Generator	R&S	SMB100A	103041	May 14, 2022	1 Year
☑	CDN	LUTHI	CDN L-801 M2/M3	2606	May 14, 2022	1 Year

3.9. For Magnetic Field Immunity Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	Magnetic Field Tester	HAEFELY	MAG100	250040.1	May 15, 2022	1 Year

3.10. For Voltage Dips Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	45KVA AC Power source	Teseq	NSG 1007-45/45KVA	1305A02873	May 15, 2022	1 Year
☐	Signal conditioning Unit	Teseq	CCN 1000-3	1305A02873	May 15, 2022	1 Year
☐	Impedance network	Teseq	INA2197/37A	1305A02873	May 15, 2022	1 Year
☐	Impedance network	Teseq	INA 2196/75A	1305A02874	May 15, 2022	1 Year
☑	Profline 2100 AC Switching Unit	Teseq	NSG 2200-3	A22714	May 15, 2022	1 Year

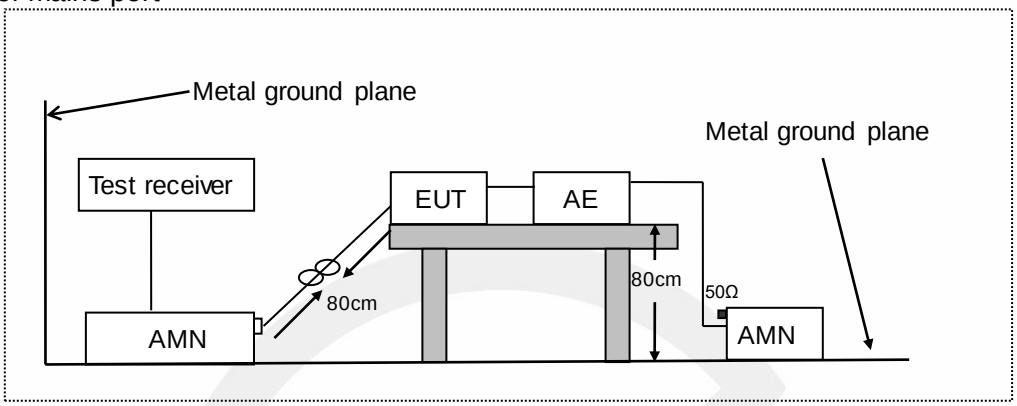
3.11. Low Frequency Signals Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	Programmable AC Source	CHROMA	6530	5341	May 15, 2022	1 Year

4. CONDUCTED EMISSIONS FROM THE AC MAINS POWER PORTS

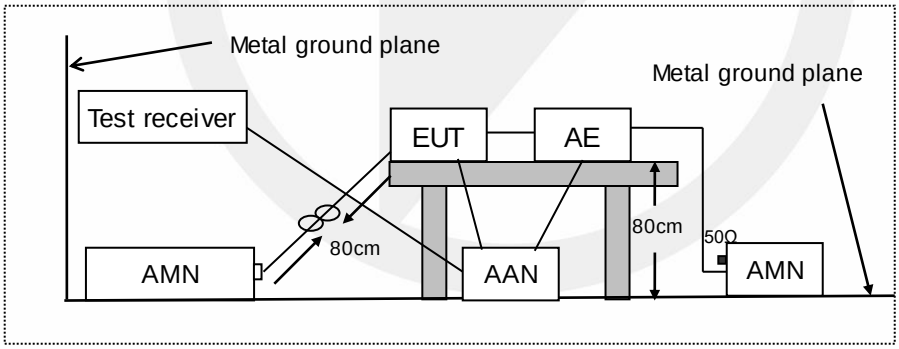
4.1. Block Diagram of Test Setup

For mains port



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

For network port:



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

4.2. Limits

Table 1 – Limits of mains terminal and network port disturbance voltage for category C1 and category C2 UPS in the frequency range 0,15 MHz to 30 MHz

Frequency range MHz	Limits dB (μV)							
	Category C1 UPS				Category C2 UPS			
	Mains terminal		Network port		Mains terminal		Network port	
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0,15 to 0,50[b]	66 to 56[a]	56 to 46[a]	84 to 74[a]	74 to 64[a]	79	66	97 to 87[a]	84 to 74[a]
0,50 to 5[b]	56	46	74	64	73	60	87	74
5 to 30	60	50			73	60		

[a] The limit decreases linearly with the logarithm of the frequency.

[b] The lower limit shall apply at the transition frequency.

Table 2 – Limits of mains terminal and network port disturbance voltage for category C3 UPS in the frequency range 0,15 MHz to 30 MHz

UPS rated output current A	Frequency range MHz	Limits dB (μV)			
		Mains terminal		Network port	
		Quasi-peak	Average	Quasi-peak	Average
> 16 to 100	0,15 to 0,50[b]	100	90	110 to 100[a]	94 to 84[a]
	0,50 to 5,0[b]	86	76	100	84
	5,0 to 30,0	90 to 73[a]	80 to 60[a]		
> 100	0,15 to 0,50[b]	130	120	110 to 100[a]	94 to 84[a]
	0,50 to 5,0[b]	125	115	100	84
	5,0 to 30,0	115	105		

[a] The limits decrease linearly with the logarithm of the frequency.

[b] The lower limit shall apply at the transition frequency.

4.3. Test Procedure

For mains port:

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.

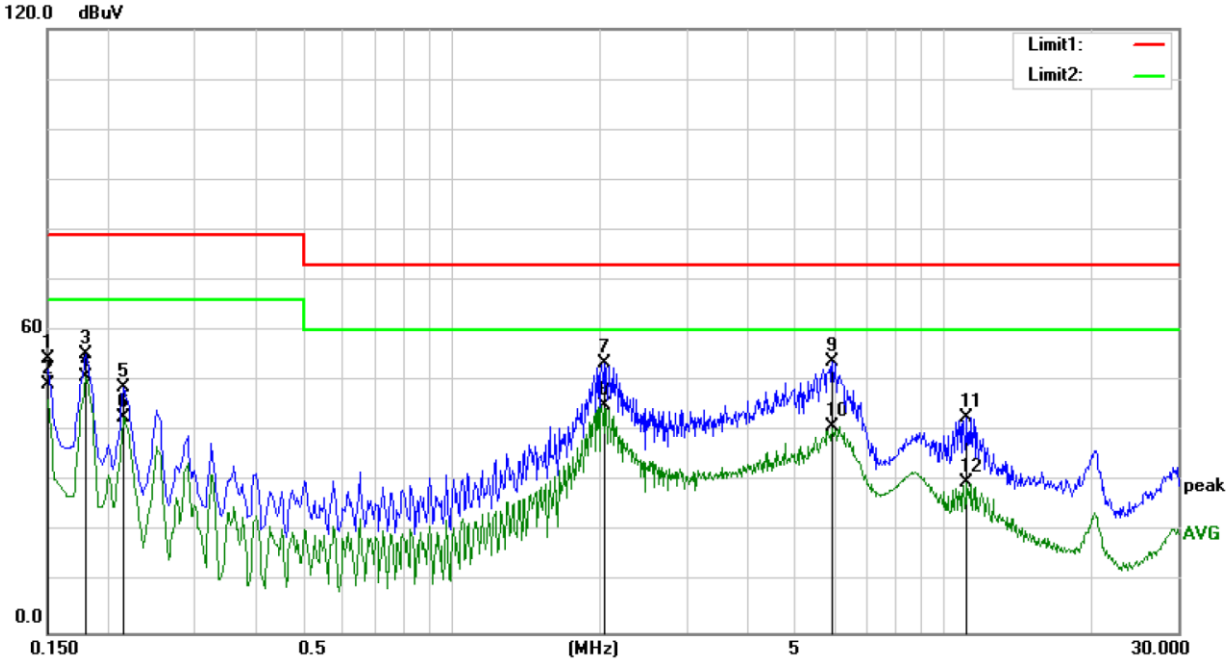
Both sides of AC line were checked for maximum conducted interference.

4.4. Measuring Results

PASS.

Please see the attached pages.

Temperature	:	21.9°C
Humidity	:	58%
Atmospheric Pressure	:	101kpa
Test Engineer	:	HL
Test Date	:	2022-11-11



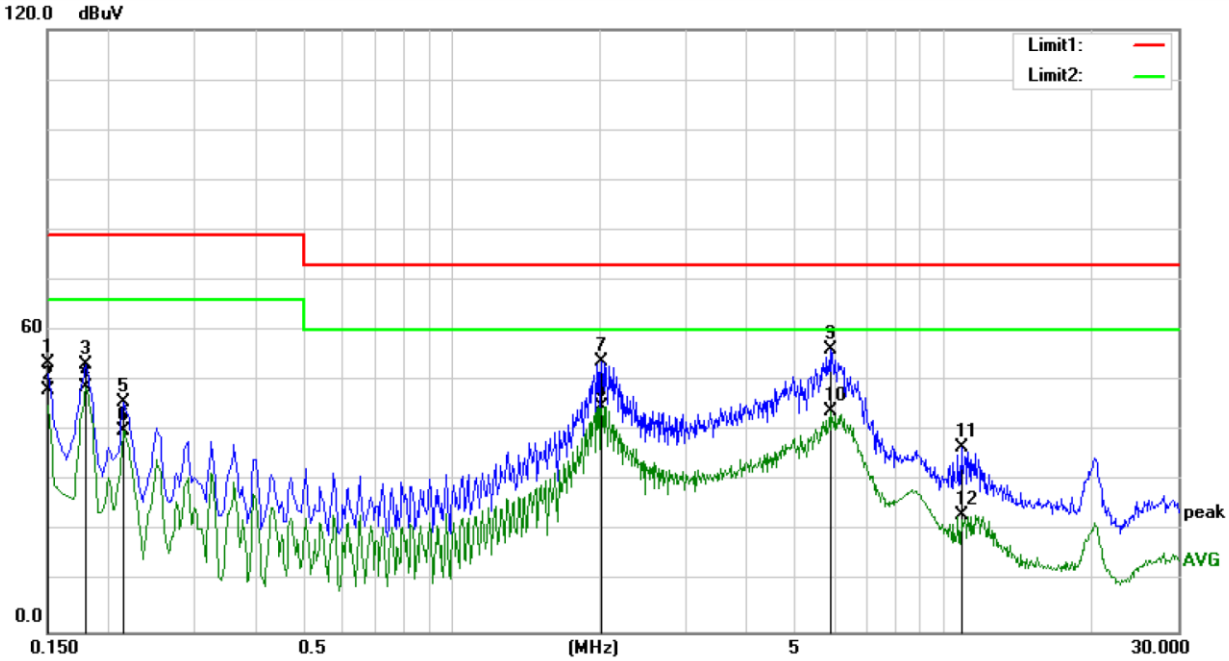
Site Conduction #1
Phase: *L1*
Temperature: 21.9

Limit: (CE)EN62040-2 C2_QP
Power: AC 230V/50Hz
Humidity: 58 %

Mode: Line mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	44.76	9.81	54.57	79.00	-24.43	QP	
2		0.1500	39.59	9.81	49.40	66.00	-16.60	AVG	
3		0.1800	45.68	9.74	55.42	79.00	-23.58	QP	
4		0.1800	41.11	9.74	50.85	66.00	-15.15	AVG	
5		0.2150	38.98	9.72	48.70	79.00	-30.30	QP	
6		0.2150	33.10	9.72	42.82	66.00	-23.18	AVG	
7		2.0500	43.97	9.59	53.56	73.00	-19.44	QP	
8	*	2.0500	35.43	9.59	45.02	60.00	-14.98	AVG	
9		5.9550	44.16	9.68	53.84	73.00	-19.16	QP	
10		5.9550	31.30	9.68	40.98	60.00	-19.02	AVG	
11		11.1550	33.02	9.75	42.77	73.00	-30.23	QP	
12		11.1550	20.11	9.75	29.86	60.00	-30.14	AVG	

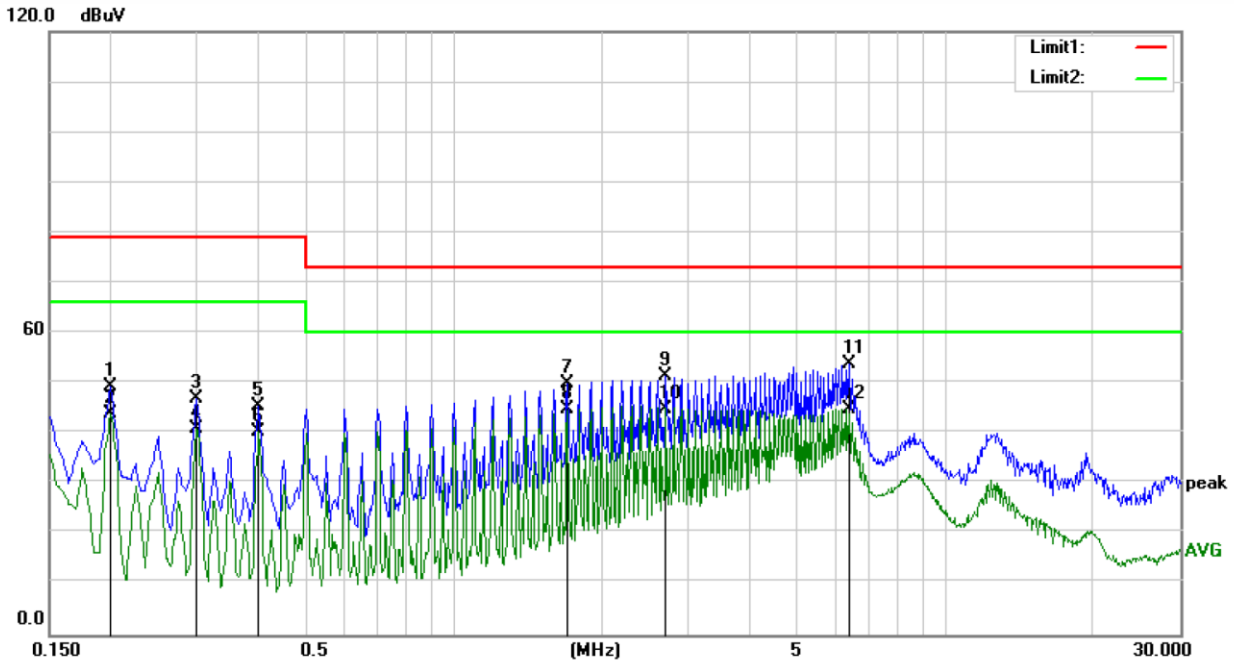


Site Conduction #1
Limit: (CE)EN62040-2 C2_QP
Mode: Line mode
Note:

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

Temperature: 21.9
Humidity: 58 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	43.79	9.81	53.60	79.00	-25.40	QP	
2		0.1500	38.38	9.81	48.19	66.00	-17.81	AVG	
3		0.1800	43.60	9.74	53.34	79.00	-25.66	QP	
4		0.1800	39.12	9.74	48.86	66.00	-17.14	AVG	
5		0.2150	36.04	9.72	45.76	79.00	-33.24	QP	
6		0.2150	30.37	9.72	40.09	66.00	-25.91	AVG	
7		2.0200	44.24	9.58	53.82	73.00	-19.18	QP	
8	*	2.0200	35.37	9.58	44.95	60.00	-15.05	AVG	
9		5.8800	46.45	9.68	56.13	73.00	-16.87	QP	
10		5.8800	34.15	9.68	43.83	60.00	-16.17	AVG	
11		10.8550	26.98	9.75	36.73	73.00	-36.27	QP	
12		10.8550	13.58	9.75	23.33	60.00	-36.67	AVG	



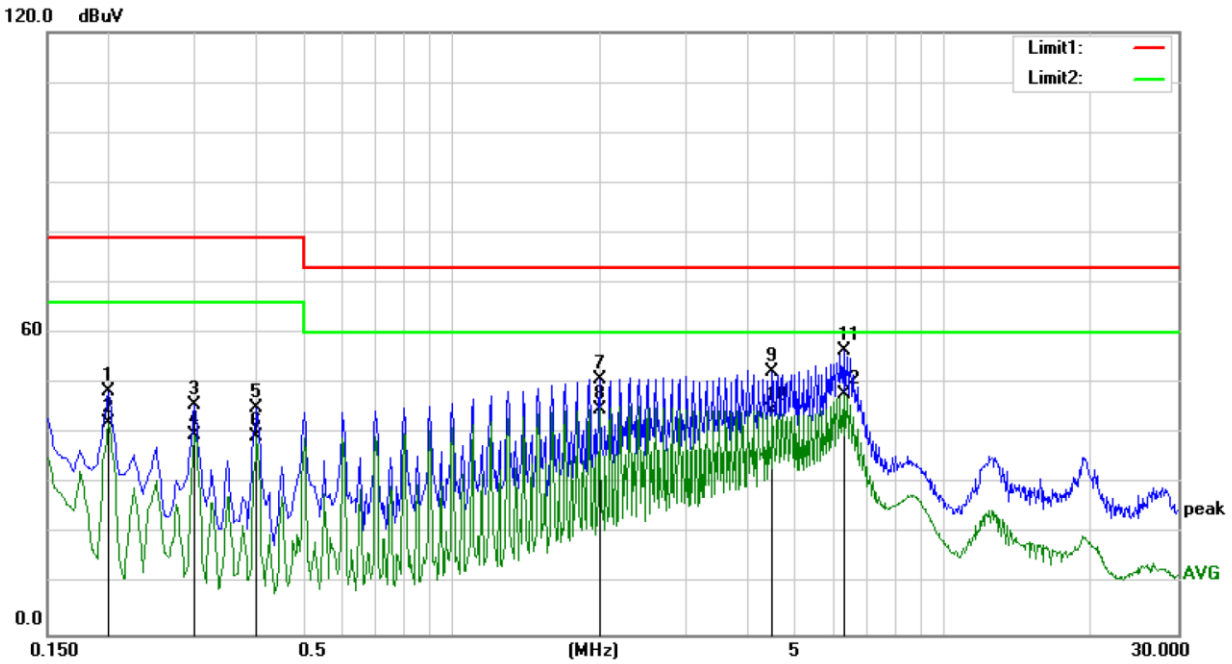
Site Conduction #1 Phase: *L1* Temperature: 21.9

Limit: (CE)EN62040-2 C2_QP Power: DC 24V Humidity: 58 %

Mode: Battery mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2000	39.72	9.70	49.42	79.00	-29.58	QP	
2		0.2000	34.38	9.70	44.08	66.00	-21.92	AVG	
3		0.3000	37.08	9.80	46.88	79.00	-32.12	QP	
4		0.3000	31.25	9.80	41.05	66.00	-24.95	AVG	
5		0.4000	35.93	9.66	45.59	79.00	-33.41	QP	
6		0.4000	30.82	9.66	40.48	66.00	-25.52	AVG	
7		1.7000	40.32	9.58	49.90	73.00	-23.10	QP	
8		1.7000	35.14	9.58	44.72	60.00	-15.28	AVG	
9		2.7000	41.67	9.67	51.34	73.00	-21.66	QP	
10	*	2.7000	35.13	9.67	44.80	60.00	-15.20	AVG	
11		6.3800	44.11	9.67	53.78	73.00	-19.22	QP	
12		6.3800	35.11	9.67	44.78	60.00	-15.22	AVG	



Site Conduction #1 Phase: N Temperature: 21.9

Limit: (CE)EN62040-2 C2_QP Power: DC 24V Humidity: 58 %

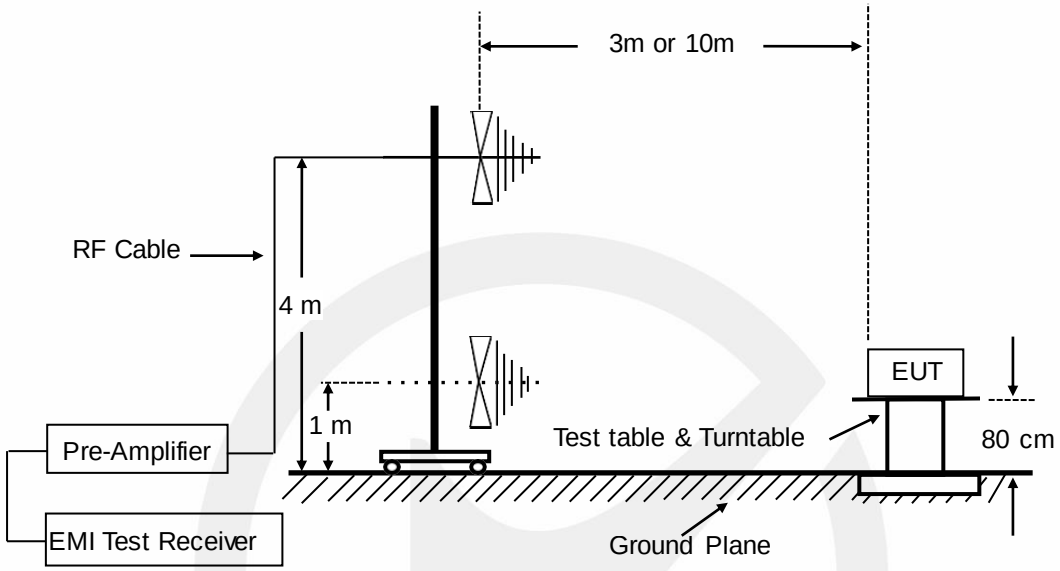
Mode: Battery mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2000	38.61	9.70	48.31	79.00	-30.69	QP	
2		0.2000	32.35	9.70	42.05	66.00	-23.95	AVG	
3		0.3000	35.98	9.80	45.78	79.00	-33.22	QP	
4		0.3000	30.00	9.80	39.80	66.00	-26.20	AVG	
5		0.4000	35.49	9.66	45.15	79.00	-33.85	QP	
6		0.4000	29.71	9.66	39.37	66.00	-26.63	AVG	
7		2.0000	41.39	9.58	50.97	73.00	-22.03	QP	
8		2.0000	35.42	9.58	45.00	60.00	-15.00	AVG	
9		4.5000	42.72	9.69	52.41	73.00	-20.59	QP	
10		4.5000	34.95	9.69	44.64	60.00	-15.36	AVG	
11		6.2800	46.83	9.67	56.50	73.00	-16.50	QP	
12	*	6.2800	38.09	9.67	47.76	60.00	-12.24	AVG	

5. RADIATED EMISSION MEASUREMENT (UP TO 1GHZ)

5.1. Block Diagram of Test Setup



5.2. Radiated Limit

Table 3 – Limits of radiated emission in the frequency range 30 MHz to 1 000 MHz

Frequency range MHz	Quasi-peak limits dB (μV/m)		
	Category C1 UPS	Category C2 UPS	Category C3 UPS
30 to 230[a]	30	40	50
230 to 1 000	37	47	60
[a] The lower limit shall apply at the transition frequency.			

NOTE 1 The test distance is 10 m. If the emission measurement at 10 m cannot be made because of high ambient noise levels or for other reasons, measurements are made at a closer distance, for example 3 m. An inverse proportionality factor of 20 dB per decade is used to normalize the measured data to the specified distance for determining compliance.

NOTE 2 Where interference occurs additional provisions can be necessary.

5.3. 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.

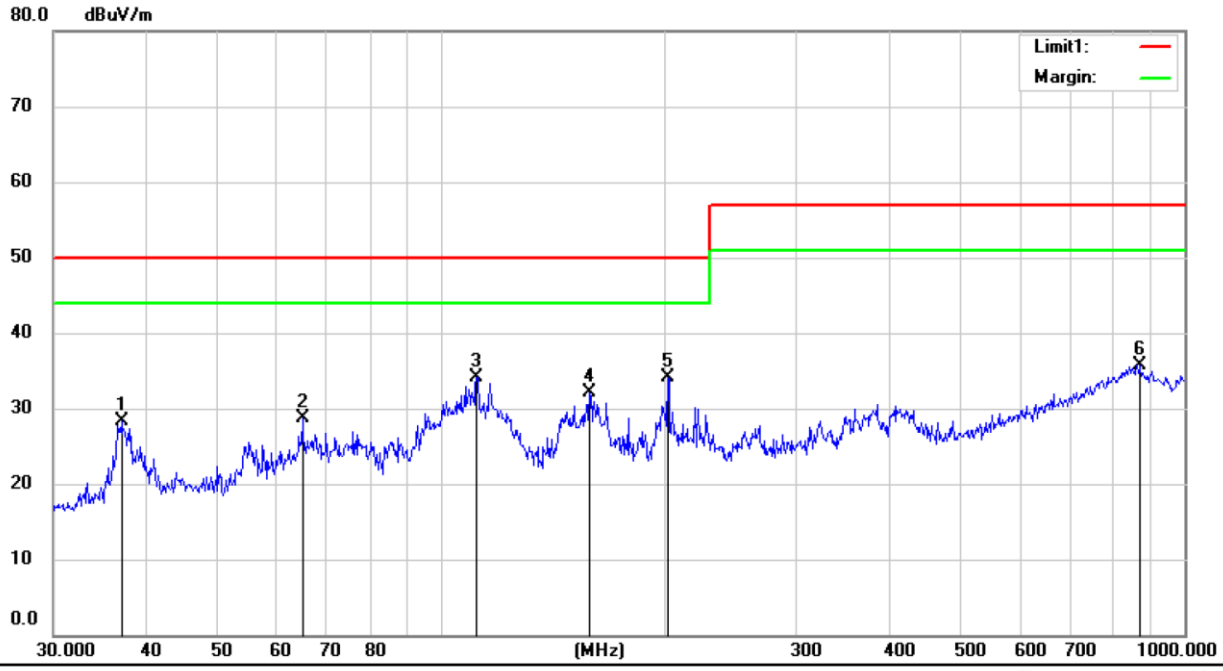
Test results were obtained from the following equation:
Emission level (dBμV/m) = Antenna Factor -Amp Factor +Cable Loss + Reading
Margin (dB) = Emission Level (dBμV/m) - Limit (dBμV/m)

5.4. Measuring Results

PASS.

Please see the attached pages.

Temperature	:	28.1°C
Humidity	:	43%
Atmospheric Pressure	:	101kpa
Test Engineer	:	HL
Test Date	:	2022-11-25



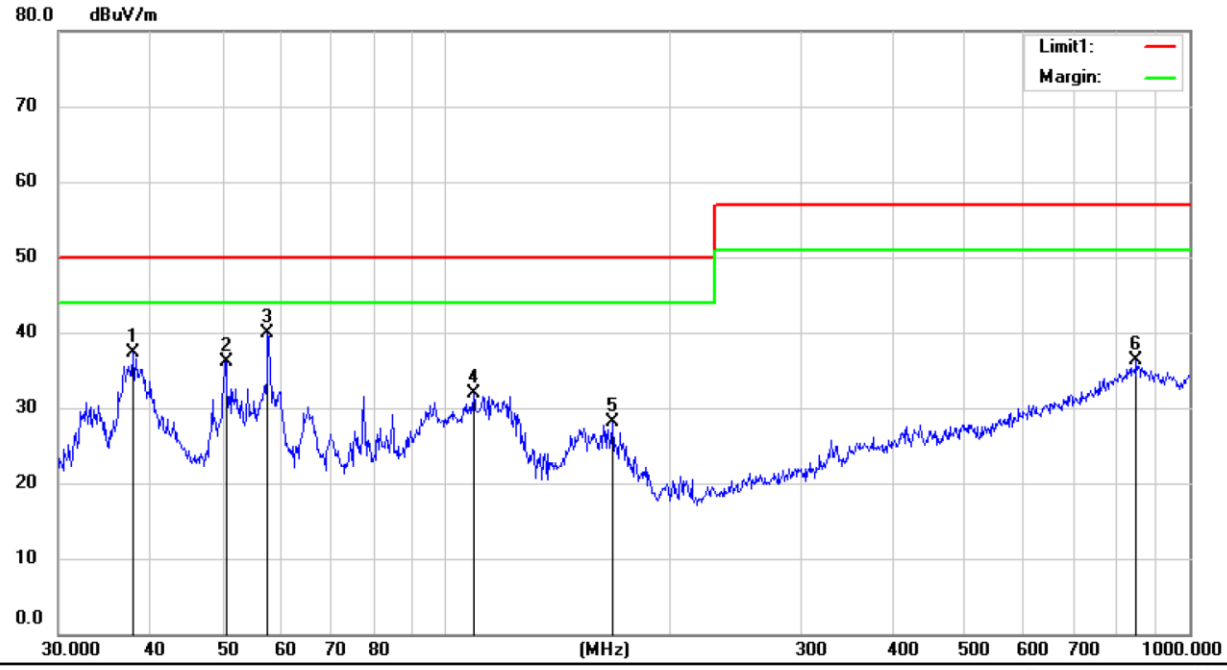
Site 3m Chamber #1 Polarization: *Horizontal* Temperature: 28.1 C

Limit: (RE)EN62040-2_C2 Power: AC 230V/50Hz Humidity: 43 %

Mode:Line mode

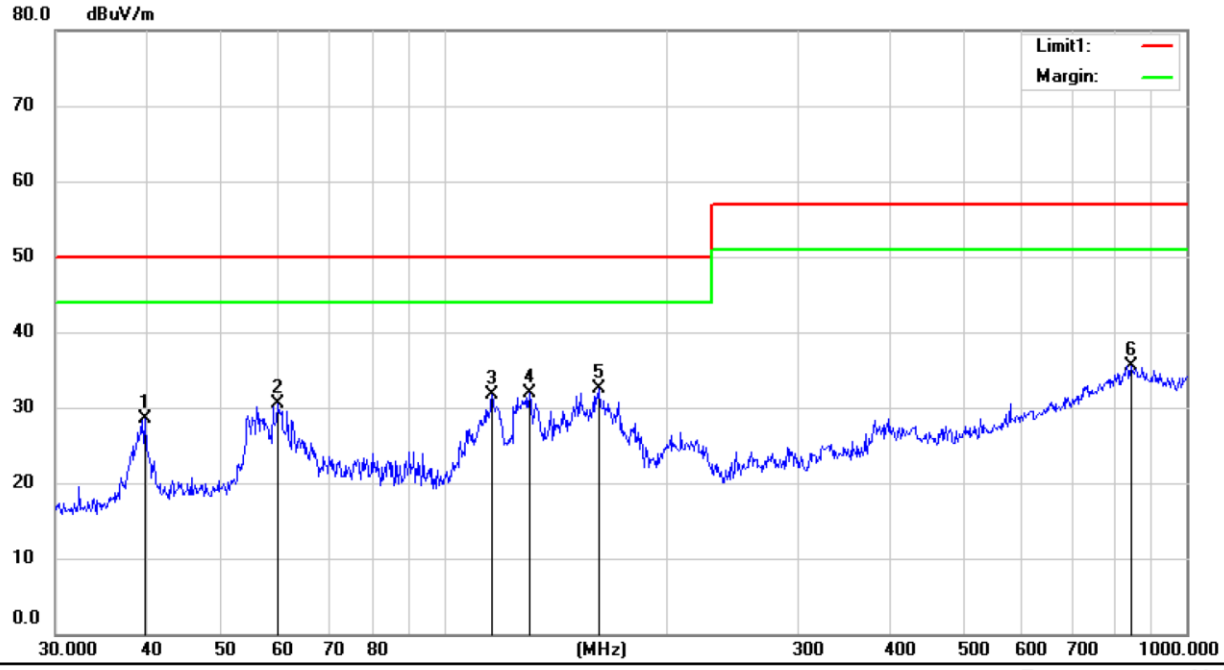
Note:

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		37.1061	37.05	-8.84	28.21	50.00	-21.79	QP			
2		64.9720	36.32	-7.57	28.75	50.00	-21.25	QP			
3	*	111.5422	44.30	-10.19	34.11	50.00	-15.89	QP			
4		158.1123	41.75	-9.65	32.10	50.00	-17.90	QP			
5		202.0118	43.52	-9.41	34.11	50.00	-15.89	QP			
6		871.0371	29.52	6.26	35.78	57.00	-21.22	QP			



Site 3m Chamber #1
Polarization: *Vertical*
Temperature: 28.1 C
Limit: (RE)EN62040-2_C2
Power: AC 230V/50Hz
Humidity: 43 %
Mode:Line 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		37.8453	46.17	-8.81	37.36	50.00	-12.64	QP			
2		50.4531	43.63	-7.49	36.14	50.00	-13.86	QP			
3	*	57.5686	47.56	-7.58	39.98	50.00	-10.02	QP			
4		108.9331	42.26	-10.32	31.94	50.00	-18.06	QP			
5		167.3834	38.04	-9.96	28.08	50.00	-21.92	QP			
6		850.6623	29.66	6.68	36.34	57.00	-20.66	QP			



Site 3m Chamber #1
Polarization: *Horizontal*
Temperature: 28.1 C

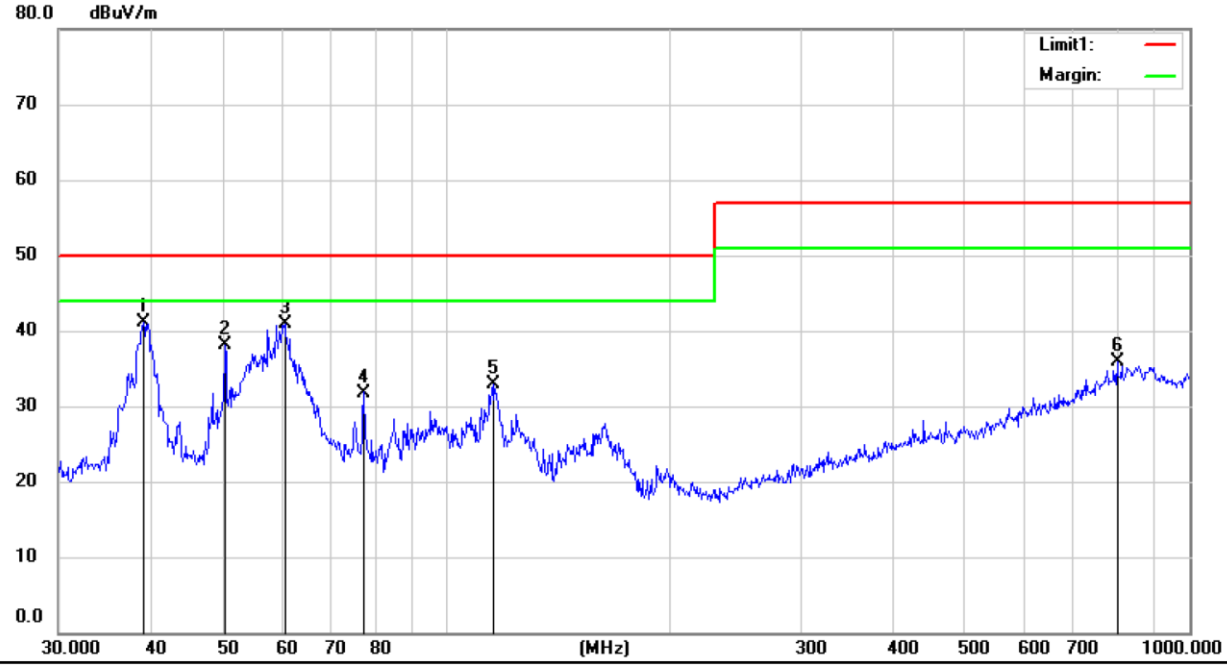
Limit: (RE)EN62040-2_C2
Power: DC 24V
Humidity: 43 %

Mode: Battery 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		39.6800	36.85	-8.31	28.54	50.00	-21.46	QP			
2		59.7802	37.89	-7.44	30.45	50.00	-19.55	QP			
3		116.4890	41.60	-9.90	31.70	50.00	-18.30	QP			
4		130.7223	42.19	-10.19	32.00	50.00	-18.00	QP			
5	*	162.0414	42.32	-9.77	32.55	50.00	-17.45	QP			
6		843.6074	28.84	6.61	35.45	57.00	-21.55	QP			

Power: DC 240V



Site 3m Chamber #1
Limit: (RE)EN62040-2_C2
Mode: Battery mode
Note:

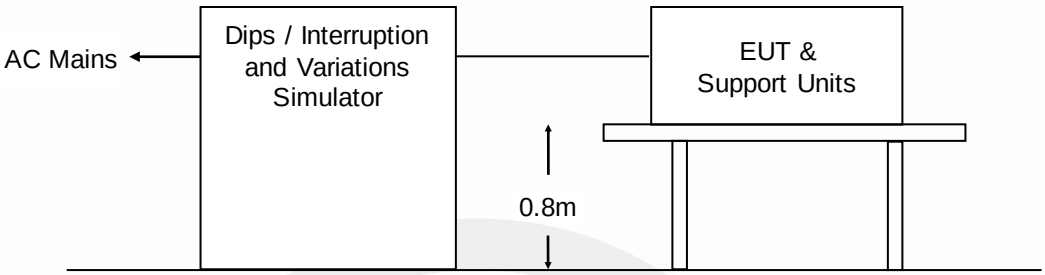
Polarization: *Vertical*
Power: DC 24V

Temperature: 28.1 C
Humidity: 43 %

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	*	39.0930	49.53	-8.48	41.05	50.00	-8.95	QP			
2		50.3868	45.58	-7.49	38.09	50.00	-11.91	QP			
3		60.5715	48.35	-7.43	40.92	50.00	-9.08	QP			
4		77.4230	41.85	-10.05	31.80	50.00	-18.20	QP			
5		115.5736	42.72	-9.84	32.88	50.00	-17.12	QP			
6		801.0837	30.34	5.62	35.96	57.00	-21.04	QP			

6. HARMONIC CURRENT EMISSION MEASUREMENT

6.1. Block Diagram of Test Setup



6.2. Measuring Standard

EN IEC 61000-3-2:2019+A1:2021

6.3. Operation Condition of EUT

Same as Section 6.4, except the test setup replaced as Section 6.1.

6.4. Measuring Results

PASS.

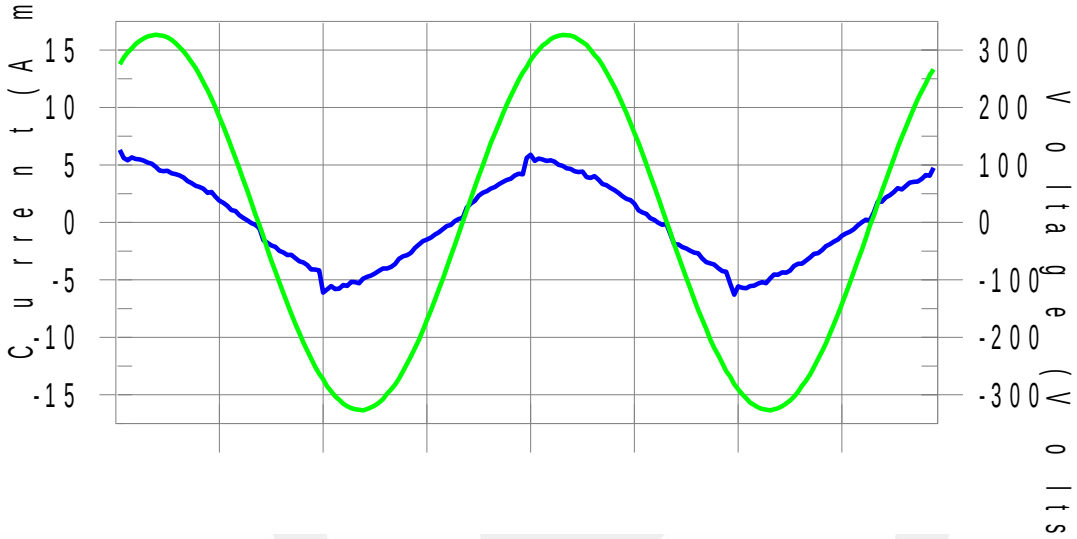
Please see the attached pages.

Harmonics – Class-A per IEC 61000-3-2 (Run time)

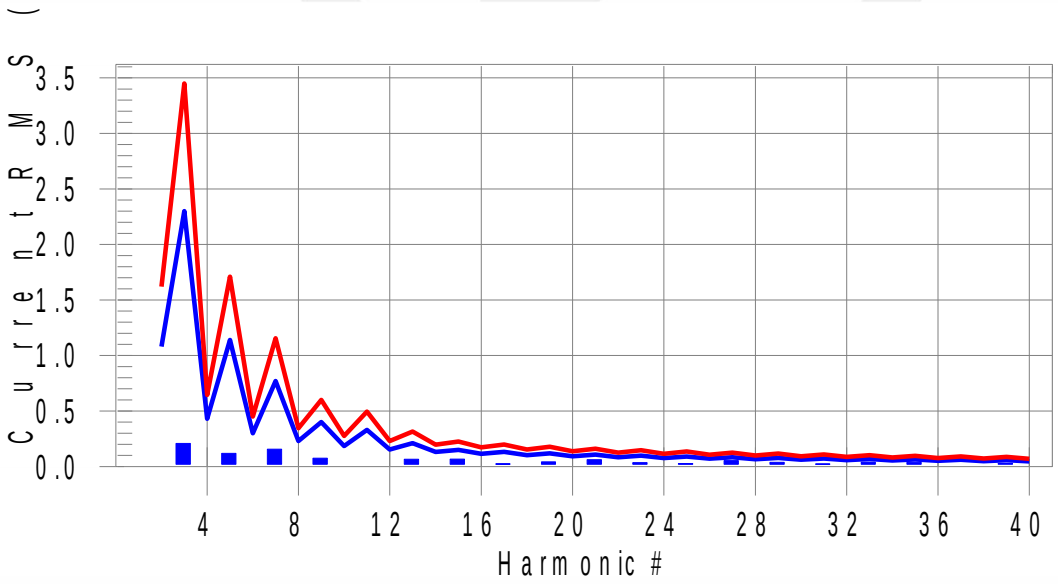
EUT: Uninterruptible Power Systems **Tested by: YJ**
Test category: Class-A (European limits) **Test Margin: 100**
Test date: 2022/8/19 **Start time: 0:31:44** **End time: 0:34:26**
Test duration (min): 2.5 **Data file name: CTSMXL_H-000833.cts_data**
Comment: Line mode
Customer: Voltan Technology Limited

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

Current & voltage waveforms



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



Test result: Pass **Worst harmonics H33-46.2% of 150% limit, H27-64.4% of 100% limit.**

Current Test Result Summary (Run time)

EUT: Uninterruptible Power Systems **Tested by: YJ**
Test category: Class-A (European limits) **Test Margin: 100**
Test date: 2022/8/19 **Start time: 0:31:44** **End time: 0:34:26**
Test duration (min): 2.5 **Data file name: CTSMXL_H-000833.cts_data**
Comment: Line mode
Customer: Voltan Technology Limited

Test Result: Pass **Source qualification: Normal**
THC(A): 0.337 **I-THD(%): 9.4** **POHC(A): 0.121** **POHC Limit(A): 0.251**

Highest parameter values during test:

V_RMS (Volts):	230.851	Frequency(Hz):	50.00
I_Peak (Amps):	6.658	I_RMS (Amps):	3.618
I_Fund (Amps):	3.592	Crest Factor:	1.847
Power (Watts):	814.0	Power Factor:	0.978

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.006	1.080	N/A	0.007	1.620	N/A	Pass
3	0.208	2.300	9.0	0.211	3.450	6.1	Pass
4	0.002	0.430	N/A	0.003	0.645	N/A	Pass
5	0.119	1.140	10.5	0.120	1.710	7.0	Pass
6	0.002	0.300	N/A	0.003	0.450	N/A	Pass
7	0.156	0.770	20.3	0.157	1.155	13.6	Pass
8	0.001	0.230	N/A	0.004	0.345	N/A	Pass
9	0.076	0.400	18.9	0.077	0.600	12.8	Pass
10	0.001	0.184	N/A	0.003	0.276	N/A	Pass
11	0.013	0.330	N/A	0.015	0.495	N/A	Pass
12	0.001	0.153	N/A	0.004	0.230	N/A	Pass
13	0.065	0.210	31.1	0.067	0.315	21.1	Pass
14	0.002	0.131	N/A	0.004	0.197	N/A	Pass
15	0.067	0.150	44.8	0.070	0.225	31.1	Pass
16	0.001	0.115	N/A	0.003	0.173	N/A	Pass
17	0.024	0.132	18.2	0.025	0.198	12.7	Pass
18	0.001	0.102	N/A	0.003	0.153	N/A	Pass
19	0.042	0.118	35.3	0.043	0.178	24.1	Pass
20	0.001	0.092	N/A	0.003	0.138	N/A	Pass
21	0.062	0.107	57.6	0.063	0.161	39.3	Pass
22	0.002	0.084	N/A	0.003	0.125	N/A	Pass
23	0.034	0.098	35.1	0.036	0.147	24.3	Pass
24	0.001	0.077	N/A	0.003	0.115	N/A	Pass
25	0.026	0.090	29.2	0.028	0.135	20.5	Pass
26	0.002	0.071	N/A	0.004	0.107	N/A	Pass
27	0.054	0.083	64.4	0.055	0.125	44.0	Pass
28	0.001	0.066	N/A	0.003	0.099	N/A	Pass
29	0.038	0.078	48.4	0.039	0.116	33.6	Pass
30	0.002	0.061	N/A	0.020	0.092	N/A	Pass
31	0.022	0.073	30.3	0.031	0.109	28.2	Pass
32	0.002	0.058	N/A	0.015	0.086	N/A	Pass
33	0.040	0.068	59.0	0.047	0.102	46.2	Pass
34	0.002	0.054	N/A	0.014	0.081	N/A	Pass
35	0.038	0.064	59.0	0.041	0.096	42.4	Pass
36	0.002	0.051	N/A	0.015	0.077	N/A	Pass
37	0.016	0.061	N/A	0.024	0.091	N/A	Pass
38	0.003	0.048	N/A	0.021	0.073	N/A	Pass
39	0.030	0.058	51.2	0.033	0.087	38.0	Pass
40	0.003	0.046	N/A	0.009	0.069	N/A	Pass

Voltage Source Verification Data (Run time)

EUT: Uninterruptible Power Systems **Tested by: YJ**
Test category: Class-A (European limits) **Test Margin: 100**
Test date: 2022/8/19 **Start time: 0:31:44** **End time: 0:34:26**
Test duration (min): 2.5 **Data file name: CTSMXL_H-000833.cts_data**
Comment: Line mode
Customer: Voltan Technology Limited

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

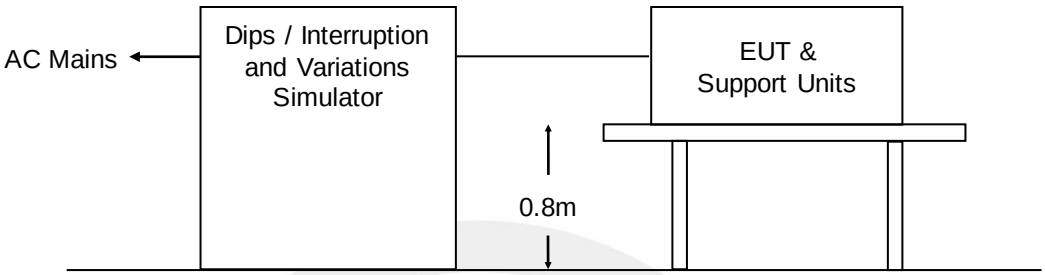
Highest parameter values during test:

Voltage (Vrms):	230.851	Frequency(Hz):	50.00
I_Peak (Amps):	6.658	I_RMS (Amps):	3.618
I_Fund (Amps):	3.592	Crest Factor:	1.847
Power (Watts):	814.0	Power Factor:	0.978

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.085	0.462	18.47	OK
3	0.135	2.077	6.51	OK
4	0.028	0.462	6.14	OK
5	0.089	0.923	9.69	OK
6	0.019	0.462	4.19	OK
7	0.112	0.692	16.12	OK
8	0.020	0.462	4.40	OK
9	0.052	0.462	11.24	OK
10	0.018	0.462	4.00	OK
11	0.065	0.231	28.02	OK
12	0.008	0.231	3.68	OK
13	0.070	0.231	30.24	OK
14	0.011	0.231	4.90	OK
15	0.037	0.231	16.02	OK
16	0.009	0.231	3.81	OK
17	0.024	0.231	10.25	OK
18	0.007	0.231	3.15	OK
19	0.044	0.231	18.93	OK
20	0.012	0.231	5.01	OK
21	0.069	0.231	29.80	OK
22	0.008	0.231	3.50	OK
23	0.048	0.231	20.99	OK
24	0.008	0.231	3.47	OK
25	0.030	0.231	12.90	OK
26	0.010	0.231	4.37	OK
27	0.081	0.231	34.90	OK
28	0.008	0.231	3.48	OK
29	0.058	0.231	25.35	OK
30	0.037	0.231	15.82	OK
31	0.036	0.231	15.42	OK
32	0.027	0.231	11.53	OK
33	0.080	0.231	34.47	OK
34	0.029	0.231	12.73	OK
35	0.075	0.231	32.37	OK
36	0.030	0.231	12.81	OK
37	0.036	0.231	15.43	OK
38	0.045	0.231	19.30	OK
39	0.064	0.231	27.74	OK
40	0.049	0.231	21.08	OK

7. VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

7.1. Block Diagram of Test Setup



7.2. Standard Limits

EN 61000-3-3:2013+A2:2021 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 %;

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.

7.3. Test Results

PASS.

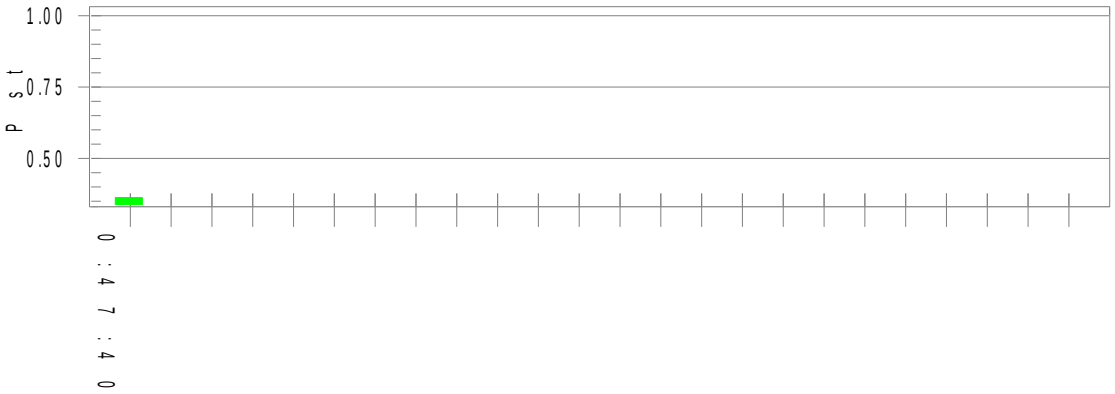
Please see the attached page.

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

EUT: Uninterruptible Power Systems **Tested by: YJ**
Test category: All parameters (European limits) **Test Margin: 100**
Test date: 2022/8/19 **Start time: 0:37:19** **End time: 0:47:46**
Test duration (min): 10 **Data file name: CTSMXL_F-000834.cts_data**
Comment: Line mode
Customer: Voltan Technology Limited

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):	**230.69**			
T-max (mS):	**0.0**	**Test limit (mS):**	**500.0**	**Pass**
Highest dc (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Highest dmax (%):	**-0.03**	**Test limit (%):**	**4.00**	**Pass**
Highest Pst (10 min. period):	**0.362**	**Test limit:**	**1.000**	**Pass**
Highest Plt (2 hr. period):	**0.158**	**Test limit:**	**0.650**	**Pass**

8. IMMUNITY PERFORMANCE CRITERIA DESCRIPTION

Performance Level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level by its manufacturer or the requestor of the test, or the agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:
1. Based on the used product standard
2. Based on the declaration of the manufacturer, requestor or purchaser

EN IEC 62040-2:

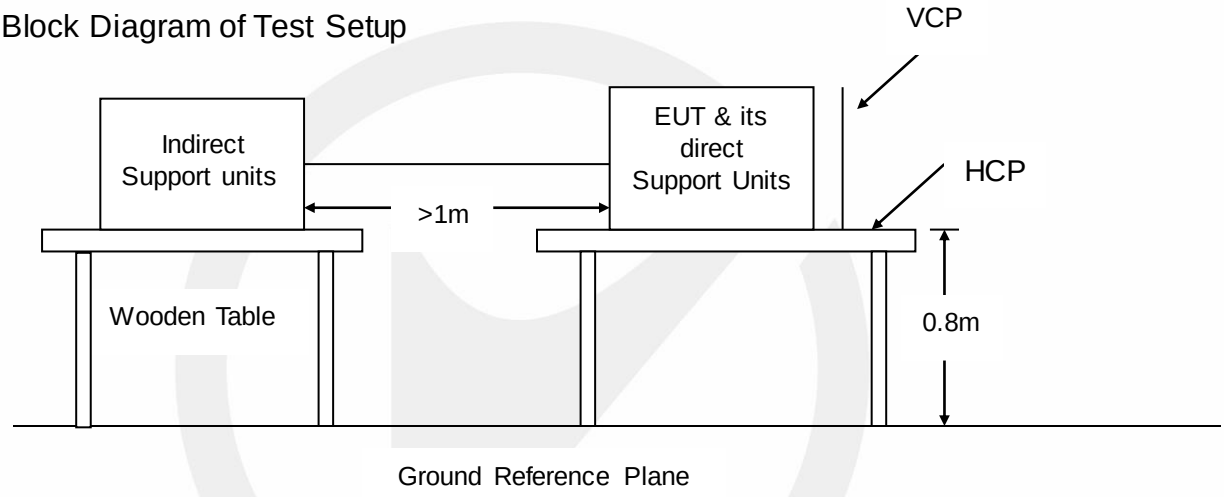
	Criterion A	**Criterion B**
Output characteristics	Voltage permitted to vary only within the steady-state characteristics applicable (≥100ms limits in Figures 1, 2 or 3 of EN62040-3)	Voltage permitted to vary within the inverse time characteristics applicable (<100 m sec limits in Figures 1, 2 or 3 of EN 62040-3)
External and internal indications and metering	Change only during test	Change only during test
Control signals to external devices	No change	Change only temporarily in consistency with the actual UPS mode of operation
Mode of operation	No change	Change only temporarily

9. ELECTROSTATIC DISCHARGE

9.1. Test Specification

Test Standard	:	EN IEC 62040-2
Basic Standard	:	IEC 61000-4-2
Performance criterion	:	B
Test level	:	±8.0kV (Air discharge) ±4.0kV (Contact discharge)

9.2. Block Diagram of Test Setup



9.3. 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. According to the CE severity level on pre-selected points, at least 10 single discharges (in the most sensitive polarity) shall be applied on air discharge and at least 25 single discharges (in the most sensitive polarity) shall be applied on contact discharge. For the time interval between successive single discharges, an initial value of one second 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.

9.4. Test Results

PASS

Temperature	:	21.7°C
Humidity	:	51%
Atmospheric Pressure	:	101kpa
Test Engineer	:	YJ
Test Date	:	2022-08-18

Air Discharge:

Amount of discharge	Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
Mini 10 /Point	±2, 4, 8 kV	Slot/ LED/Button/ Screen	A	B	Pass

Contact Discharge

Amount of discharge	Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
Mini 25 /Point	±2; 4kV	Metal/Screw	A	B	Pass

Indirect Discharge

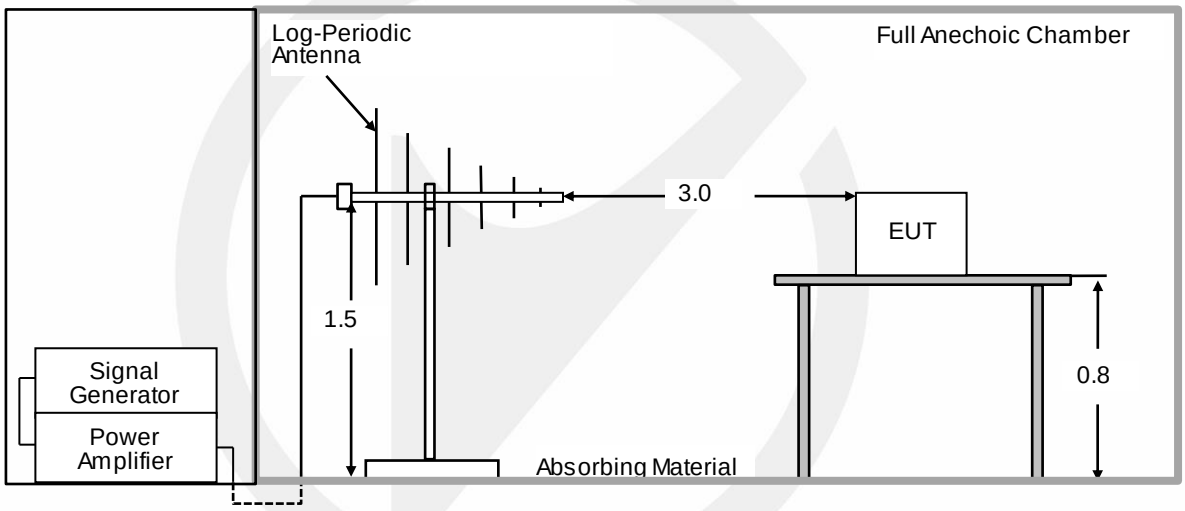
Amount of discharge	Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
Mini 10 /Point	±2; 4kV	HCP	A	B	Pass
Mini 10 /Point	±2; 4kV	VCP	A	B	Pass

10.RF FIELD STRENGTH SUSCEPTIBILITY TEST

10.1.Test Specification

Test Standard	:	EN IEC 62040-2
Basic Standard	:	IEC 61000-4-3
Performance criterion	:	A
Test level	:	10V/m
Frequency Range		80M-1000MHz
Modulation		AM 80%, 1kHz sine-wave

10.2.Block Diagram of Test Setup



10.3.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 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.

10.4. Test results

PASS

Temperature	:	24.5°C
Humidity	:	46%
Atmospheric Pressure	:	101kpa
Test Engineer	:	YJ
Test Date	:	2022-08-18

Freq. Range (MHz)	Field	Modulation	Polarity	Position (°)	Actual criterion	Required performance criterion	Result
80-1000	10V/m	AM	H / V	Front	A	A	Pass
80-1000	10V/m	AM	H / V	Right	A	A	Pass
80-1000	10V/m	AM	H / V	Back	A	A	Pass
80-1000	10V/m	AM	H / V	Left	A	A	Pass

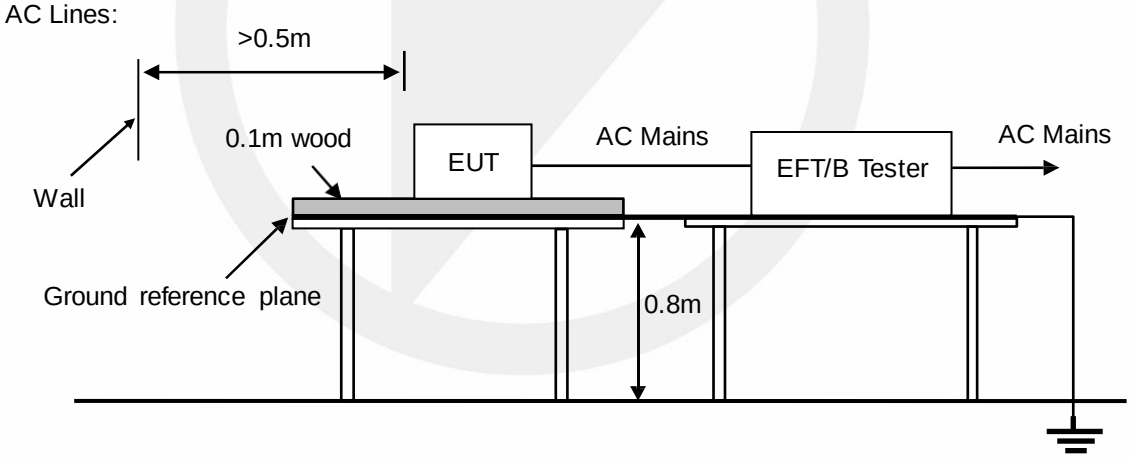
11. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

11.1. Test Specification

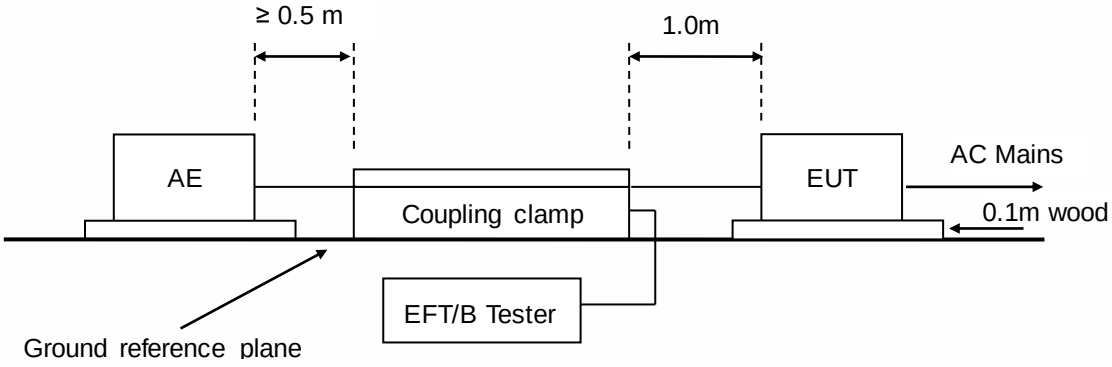
Test Standard	:	EN IEC 62040-2
Basic Standard	:	IEC 61000-4-4
Performance criterion	:	B
Test level	:	☒2kV, AC input power ports ☒2kV, AC output power ports ☐2kV, DC port ☐2KV, DC interface ☐2kV, Network port
Repetition frequency	:	☒ 5kHz, ☐100kHz
Tr/Th:	:	5/50ns
Burst Period	:	300ms
Test Time :	:	120s

11.2. Block Diagram of Test Setup

AC Lines:



Signal lines:



11.3. 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.

11.4. Test Results

PASS

Temperature	:	24.7°C
Humidity	:	52%
Atmospheric Pressure	:	101kpa
Test Engineer	:	YJ
Test Date	:	2022-08-18

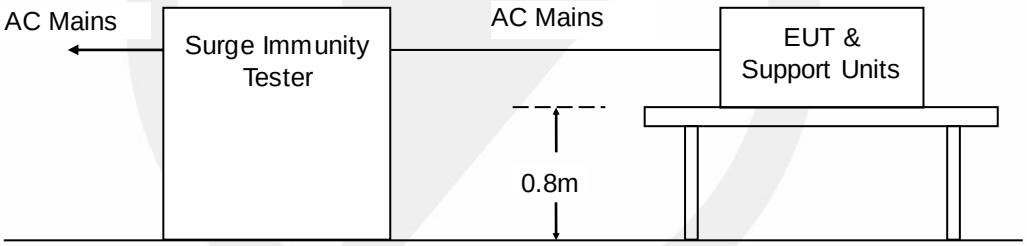
Injection Line	Voltage (kV)	Injected Method	Actual criterion	Required performance criterion	Result (Pass/Fail)
☒ AC input power ports	± 2	☒ CDN ☐ Direct injection ☐ Capacitive coupling clamp	A	B	Pass
☒ AC output power ports	± 2	☒ CDN ☐ Direct injection ☐ Capacitive coupling clamp	A	B	Pass
☐ DC port	± 2	☐ CDN ☐ Direct injection ☐ Capacitive coupling clamp	N/A	N/A	N/A
☐ DC interface	± 2	☐ CDN ☐ Direct injection ☐ Capacitive coupling clamp	N/A	N/A	N/A
☐ Network port	± 2	☐ CDN ☐ Direct injection ☒ Capacitive coupling clamp	N/A	N/A	N/A

12.SURGE IMMUNITY TEST

12.1.Test Specification

Test Standard	:	EN IEC 62040-2
Basic Standard	:	IEC 61000-4-5
Test level	:	☒1.0kV, Line - Line, AC input power ports, Criterion B
		☒2.0kV, Line - Earth, AC input power ports, Criterion B
		☐1.0kV, Line - Line, AC output power ports, Criterion B
		☐2.0kV, Line - Earth, AC output power ports, Criterion B
		☐1.0kV, Line - Line, DC port, Criterion B
		☐2.0kV, Line - Earth, DC port, Criterion B
		☐1.0kV, Network ports, Criterion B
Number of surges	:	5 (for each combination of parameters)
Repetition rate	:	1 minute / time
Polarity:	:	Positive / Negative
Phase angle:	:	0º, 90º, 180º, 270º

12.2.Block Diagram of Test Setup



12.3.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.

12.4. Test results

PASS

Temperature	:	24.7°C
Humidity	:	52%
Atmospheric Pressure	:	101kpa
Test Engineer	:	YJ
Test Date	:	2022-08-18

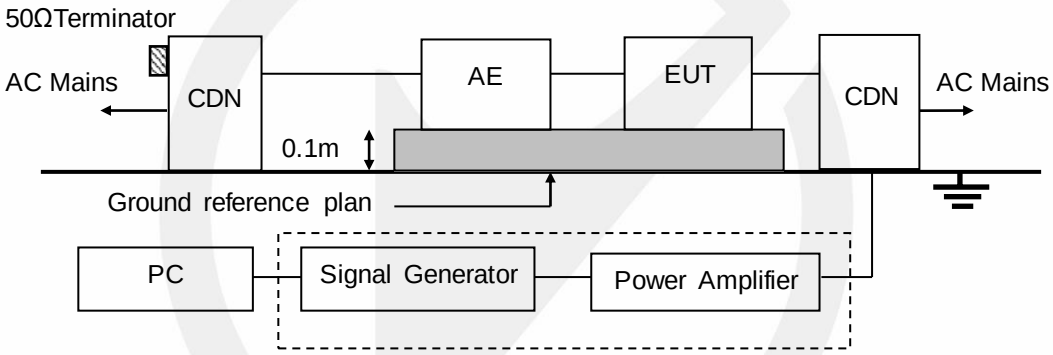
Coupling Line	Voltage (kV)	Waveform (μs)	Polarity	Actual criterion	Required performance criterion	Result (Pass/Fail)
☒ AC input power ports (Line to line)	1	1.2/50 (8/20)	Pos./ Neg.	A	B	Pass
☒ AC input power ports (Line to earth)	2	1.2/50 (8/20)	Pos./ Neg.	A	B	Pass
☐ AC output power ports (Line to line)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

13.INJECTED CURRENTS SUSCEPTIBILITY TEST

13.1.Test Specification

Test Standard	:	EN IEC 62040-2
Basic Standard	:	IEC 61000-4-6
Performance criterion	:	A
Test level	:	10V
Frequency Range	:	0.15M-80MHz
Modulation	:	AM 80%, 1kHz sine-wave
Frequency Step	:	1% of fundamental

13.2.Block Diagram of Test Setup



13.3.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.

13.4. Test results

PASS

Temperature	:	24.7°C
Humidity	:	52%
Atmospheric Pressure	:	101kpa
Test Engineer	:	YJ
Test Date	:	2022-08-18

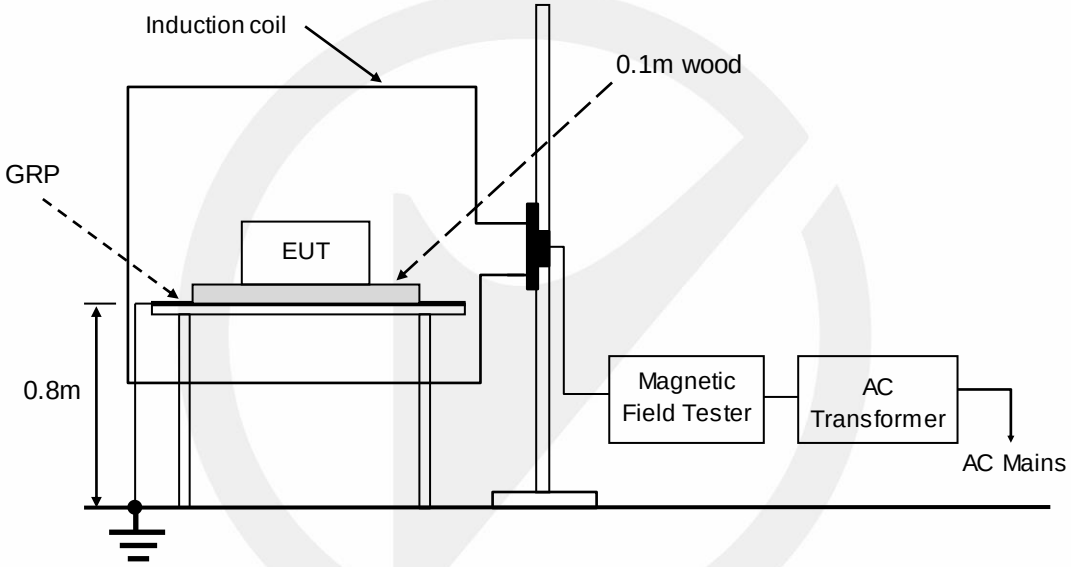
Range (MHz)	Levers	Injection port	Coupling type	Actual criterion	Required performance criterion	Result (Pass/Fail)
0.15-80	10V	☒ AC input power ports ☒ AC output power ports ☐ DC port ☐ Network port	☒ CDN ☐ EM Clamp ☐ Current Clamp ☐ Direct injection	A	A	Pass
0.15-80	3V	☐ AC input power ports ☐ AC output power ports ☐ DC port ☐ Network port	☐ CDN ☐ EM Clamp ☐ Current Clamp ☐ Direct injection	N/A	A	N/A

14.MAGNETIC FIELD SUSCEPTIBILITY TEST

14.1.Test Specification

Test Standard	:	EN IEC 62040-2
Basic Standard	:	IEC 61000-4-8
Performance criterion	:	A
Test level	:	30A/m

14.2.Block Diagram of Test Setup



GRP: Ground reference plane
EUT: Equipment under test

14.3.Test Procedure

The EUT is placed in the middle of a induction coil (1*1m), under which is a 1*1*0.1m (high) wood, 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.

14.4. Test Results

PASS

Temperature	:	24.7°C
Humidity	:	52%
Atmospheric Pressure	:	101kpa
Test Engineer	:	YJ
Test Date	:	2022-08-18

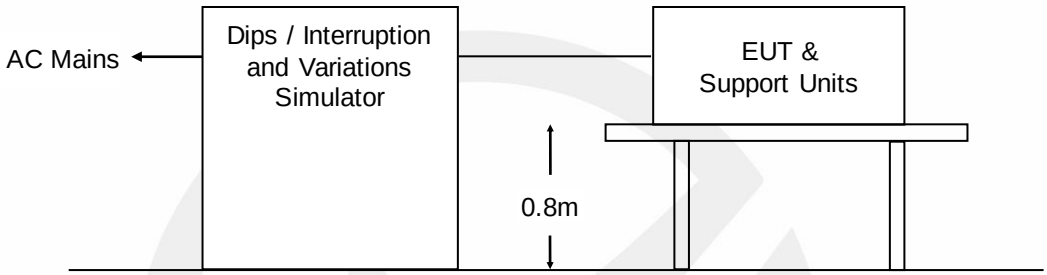
Test Level (A/m)	Frequency	Testing Duration	Coil Orientation	Actual criterion	Required performance criterion	Result (Pass/Fail)
30	☒ 50Hz	5 mins	☒ x-axis ☒ y-axis ☒ z-axis	A	A	Pass

15. VOLTAGE DIPS AND INTERRUPTIONS TEST

15.1. Test Specification

Test Standard	:	EN IEC 62040-2
Basic Standard	:	IEC 61000-4-11

15.2. Block Diagram of Test Setup



15.3. 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.

15.4. Test results

PASS

Temperature	:	24.7°C
Humidity	:	52%
Atmospheric Pressure	:	101kpa
Test Engineer	:	YJ
Test Date	:	2022-08-18

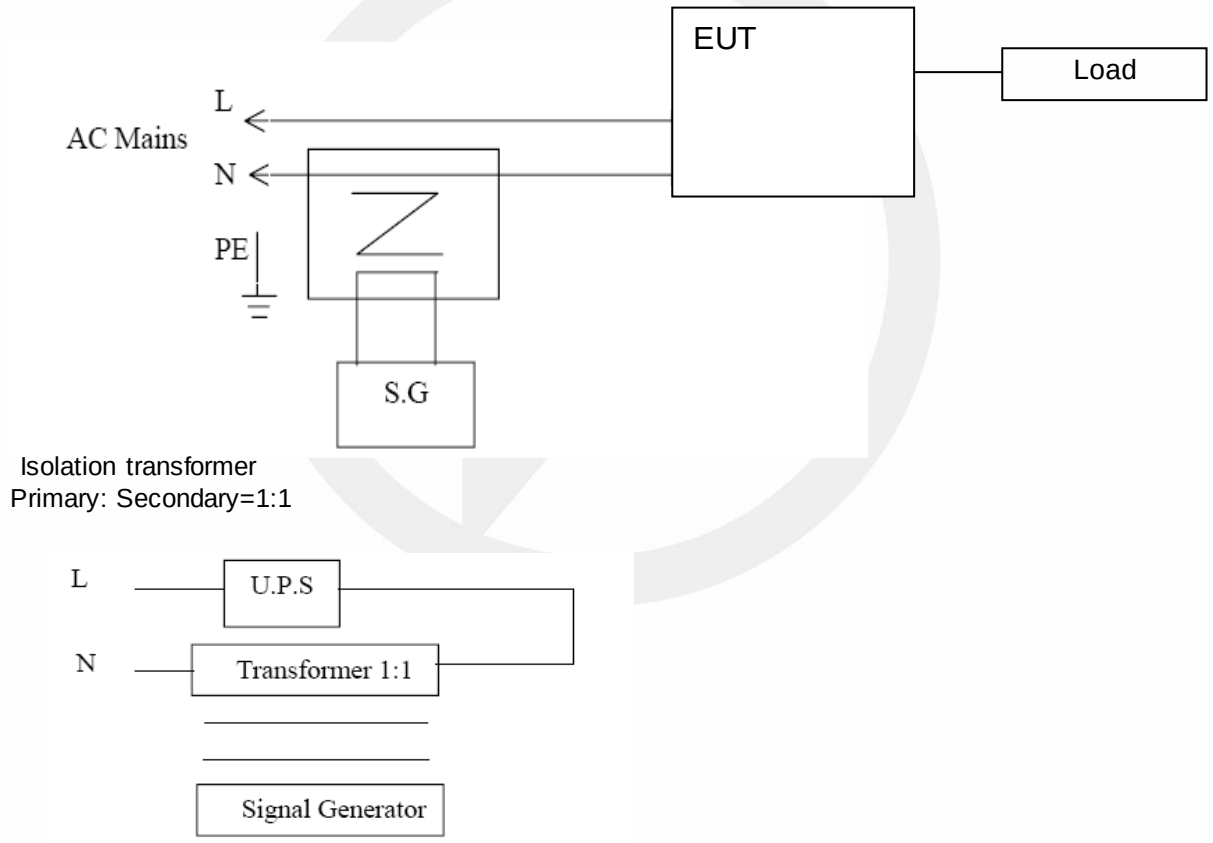
	Test Level (% UT)	Phase angle (°)	Reduction (%)	Duration (periods)	Actual criterion	Required performance criterion	Result (Pass/Fail)
Voltage Dips	0%	0º, 180º	100%	0.5	A	B	Pass
	70%	0º, 180º	30%	25	A	C	Pass
Voltage Interruption	0%	0º, 180º	100%	250	B	C	Pass
Note: When the sample drops to 0% and 250P, the working mode of the sample changes and the test ends, It can automatically recover to normal.							

16.LOW FREQUENCY SIGNALS TEST

16.1.Test Specification

Test Standard	:	EN IEC 62040-2
Basic Standard	:	IEC 61000-2-2
Performance criterion	:	A
Test frequency	:	140-360Hz
Test level	:	10V(rms)Sinusoidal

16.2.Block Diagram of Test Setup



16.3.Test Procedure

1) Set up the EUT and test generator as shown on Block diagram.
2) Add the 10V (rms) Sinusoidal interference signal and the interference signal frequency from 140Hz ~ 360Hz to L terminal.
3) Repeat the second step at the N-terminus.

16.4. Test Results

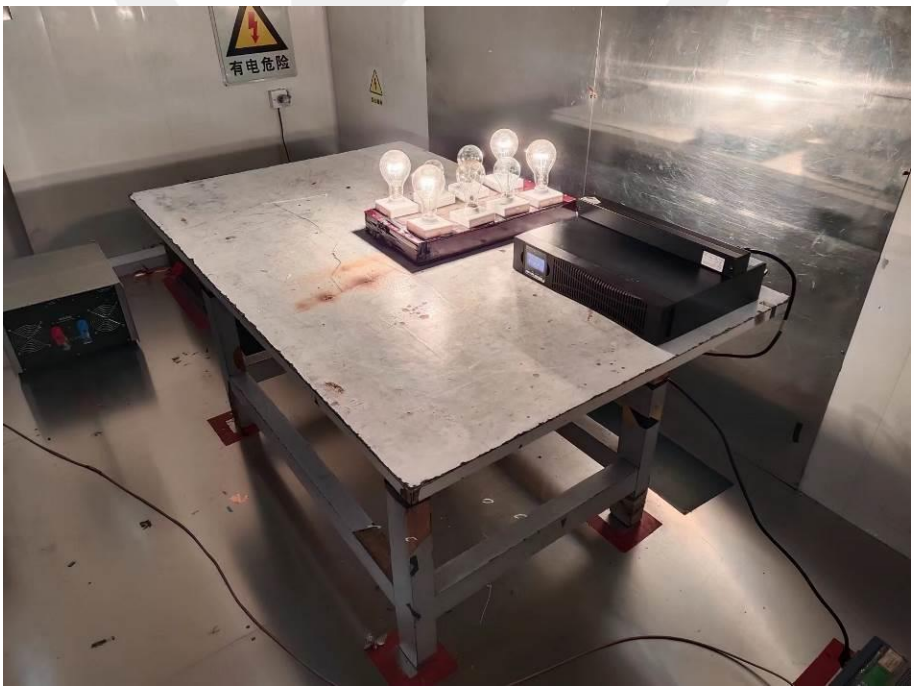
PASS.

Temperature	:	24.7°C
Humidity	:	52%
Atmospheric Pressure	:	101kpa
Test Engineer	:	YJ
Test Date	:	2022-08-18

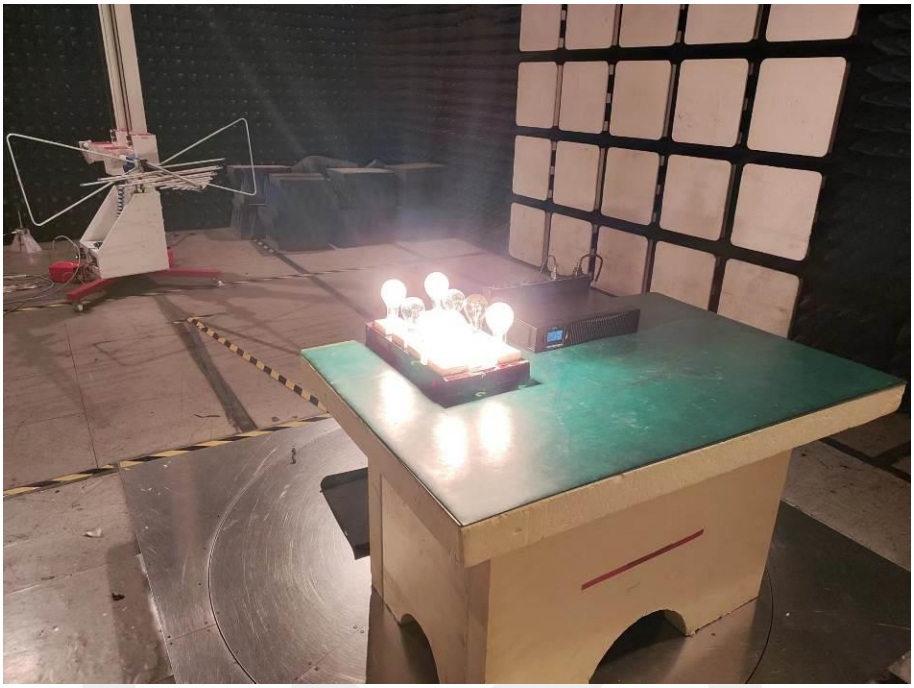
Frequency Range (Hz)	Step (Hz)	Position	Strength	Result	Note
140	10	L,N	10V(rms) Sinusoidal	Pass	A
160				Pass	A
200				Pass	A
240				Pass	A
280				Pass	A
320				Pass	A
360				Pass	A

17.PHOTOGRAPHS

17.1.Photo of Conducted Emissions



17.2.Photo of Radiation Emission Measurement

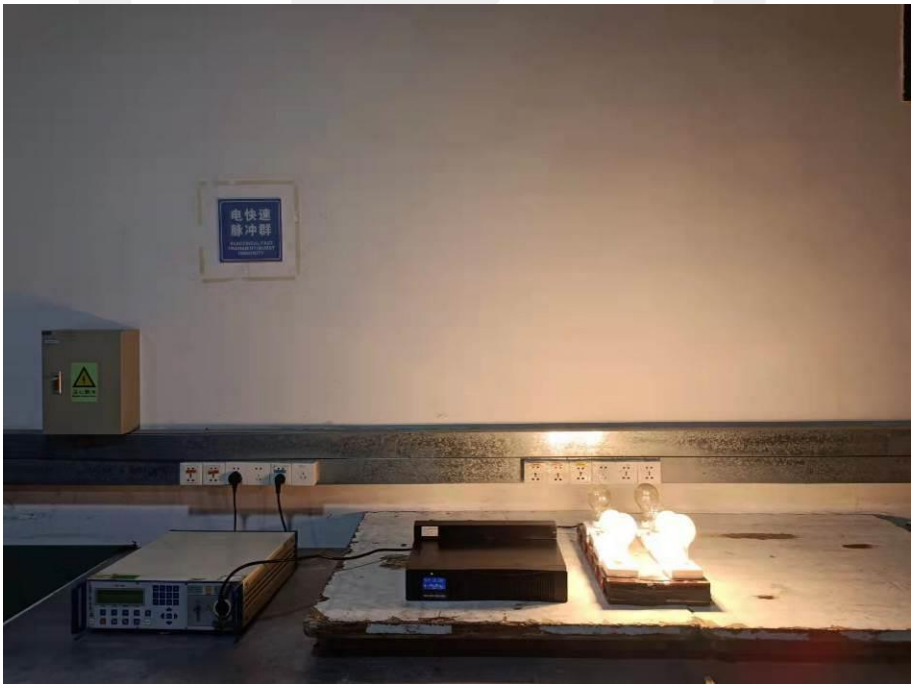


17.3.Photo of Harmonic / Flick Measurement

17.4.Photo of Electrostatic Discharge Test

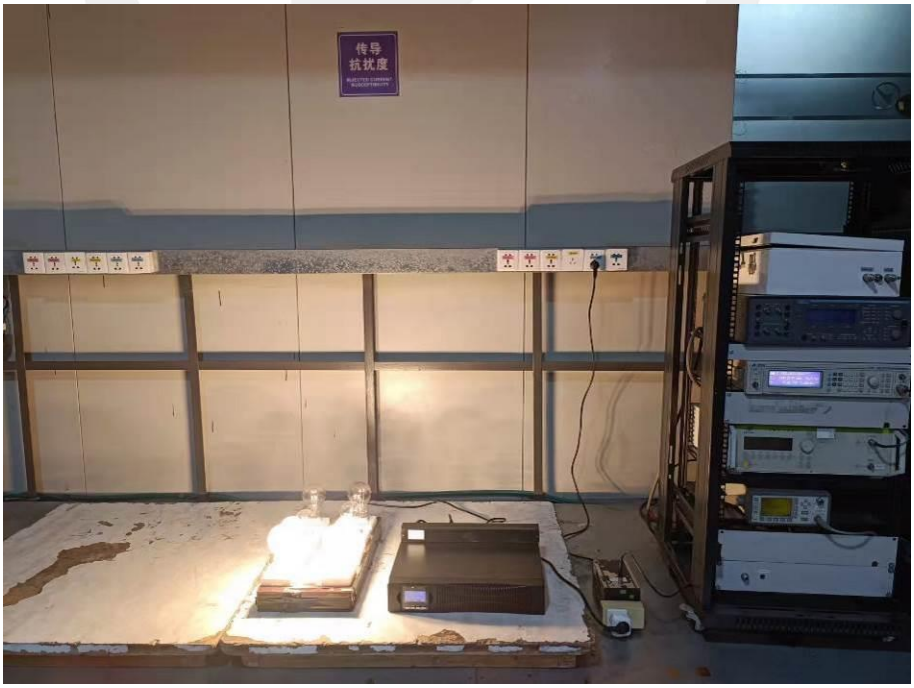
17.5.Photo of RF Field Strength Susceptibility Test

17.6.Photo of Electrical Fast Transient / Burst Test



17.7.Photo of Surge Test

17.8.Photo of Injected Currents Susceptibility Test

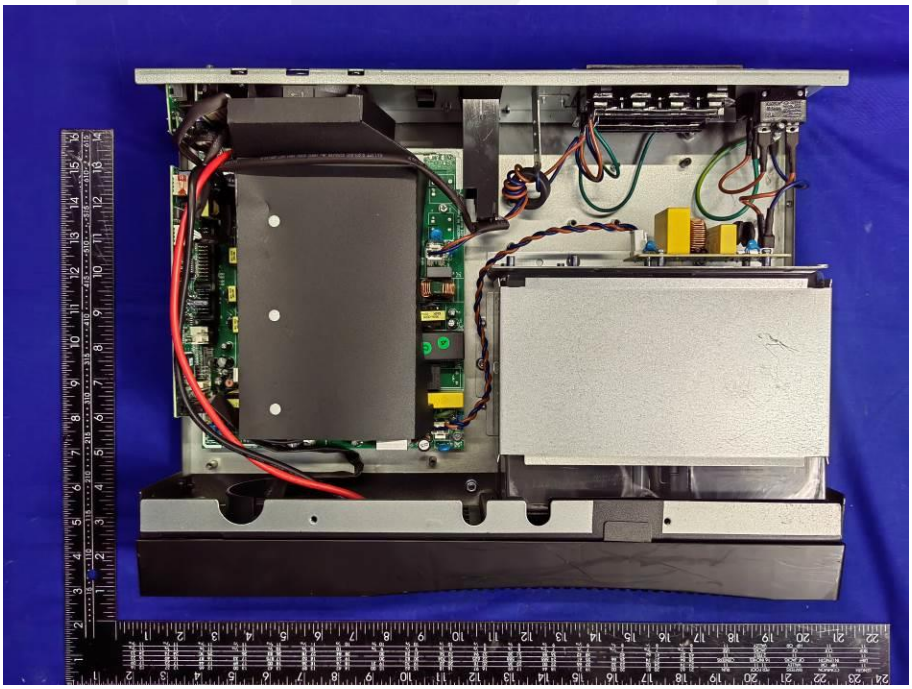


17.9.Photo of Magnetic Field Susceptibility Test

17.10.Photo of Voltage Dips and Interruption Immunity Test

17.11. Photo of Low Frequency Signals Test

APPENDIX A (Photos of EUT)



End of Report

Statement

1 . This report is invalid without the signature of the authorized approver and "special seal for testing".

2 . This report shall not be copied partly without authorization.

3 . The test results or observations are applicable only to tested sample. Client shall be responsible for representativeness of the sample and authenticity of the material.

4 . The observations or tests with special mark fall outside the scope of accreditation, and are only used for purpose of commission, research, training, internal quality control etc.

5 . The test results or observations are provided in accordance with measured value, without taking risks caused by uncertainty into account. Without explicit stipulation in special agreements, standards or regulations, EMTEK shall not assume any responsibility.

6 . Objections shall be raised within 20 days from the date receiving the report.