

# TEST REPORT

**Application No.:** SHCR2311002373EV  
**Applicant:** CSE Energy&Technology Co.,Ltd  
**Address of Applicant:** Building S4, No.777, Sizhuan Road, Shanghai, China  
**Manufacturer:** CSE Energy&Technology Co.,Ltd  
**Address of Manufacturer:** Building S4, No.777, Sizhuan Road, Shanghai, China  
**Equipment Under Test (EUT):**  
**EUT Name:** AC charging pile of electric vehicle  
**Model No.:** CSE-BCG-AS32-K01-3-CE, CSE-BCG-AS32-K01-1-CE  
**Remark:** Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.  
**Trade Mark:** CSE  
**Standard(s) :** EN IEC 61851-21-2:2021  
**Date of Receipt:** 2023-10-10  
**Date of Test:** 2023-10-23 to 2023-10-24  
**Date of Issue:** 2023-11-21

<b>Test Result:</b>	<b>Pass*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.



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

SHEM-TRF-001 Rev. 02 Sep01, 2023

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Revision Record			
Version	Description	Date	Remark
00	Co-license	2023-11-21	Base on SHCR231000208701

Authorized for issue by:			
Tested By	<i>Bill Wu</i>		
	Bill Wu/Project Engineer		
Approved By	<i>Parlam Zhan</i>		
	Parlam Zhan / Reviewer		

## 2 Test Summary

<b>Emission Part</b>				
<b>Item</b>	<b>Standard</b>	<b>Method</b>	<b>Requirement</b>	<b>Result</b>
Conducted Emissions at Mains Terminals (150kHz-30MHz)	EN IEC 61851-21-2:2021	EN IEC 61851-21-2:2021	Table 8	Pass
Conducted Emissions at AC CPT Port (150kHz-30MHz)	EN IEC 61851-21-2:2021	EN IEC 61851-21-2:2021	Table 11	Pass
Radiated disturbances (2kHz-185kHz)	EN IEC 61851-21-2:2021 Annex B	EN IEC 61851-21-2:2021 Annex B	Table B.1	Pass
Radiated Emissions (30MHz-1GHz)	EN IEC 61851-21-2:2021	EN IEC 61851-21-2:2021	Table 18	Pass
Radiated Emissions (above 1GHz)	EN IEC 61851-21-2:2021	EN IEC 61851-21-2:2021	Table 19	Pass
Harmonic Current Emission	EN IEC 61851-21-2:2021	EN 61000-3-12:2011	Table 2	Pass
Voltage Fluctuations and Flicker	EN IEC 61851-21-2:2021	EN IEC 61000-3-11:2019	Clause 5	Pass

N/A: Not applicable

<b>Immunity Part</b>				
<b>Item</b>	<b>Standard</b>	<b>Method</b>	<b>Requirement</b>	<b>Result</b>
Electrostatic Discharge	EN IEC 61851-21-2:2021	IEC 61000-4-2:2008	4kV Contact Discharge 8kV Air Discharge	Pass
Radiated Immunity(80MHz-2.7GHz)	EN IEC 61851-21-2:2021	IEC 61000-4-3:2006+AMD1:2007+AMD2:2010	80MHz-1GHz: 3V/m, 1.4GHz-2GHz: 3V/m, 2.0GHz-2.7GHz: 3V/m, 80%, 1kHz Amp. Mod.	Pass
Electrical Fast Transients/Burst at Power Port	EN IEC 61851-21-2:2021	IEC 61000-4-4:2012	2kV 5/50ns Tr/Td 5kHz Repetition Frequency	Pass
Electrical Fast Transients/Burst at CPT Port	EN IEC 61851-21-2:2021	IEC 61000-4-4:2012	2kV 5/50ns Tr/Td 5kHz Repetition Frequency	Pass
Surge at Power Port	EN IEC 61851-21-2:2021	IEC 61000-4-5:2014	1.2/50µs Tr/Td 1kV Line to Line 2kV Line to Ground	Pass

<b>Emission Part</b>				
<b>Item</b>	<b>Standard</b>	<b>Method</b>	<b>Requirement</b>	<b>Result</b>
Surge at CPT Port	EN IEC 61851-21-2:2021	IEC 61000-4-5:2014	1.2/50 $\mu$ s Tr/Td 1kV Line to Line 2kV Line to Ground	Pass
Conducted Immunity at Power Port (150kHz-80MHz)	EN IEC 61851-21-2:2021	IEC 61000-4-6:2013	3Vrms (emf),80%,1kHz Amp. Mod.	Pass
Conducted Immunity at CPT Port (150kHz-80MHz)	EN IEC 61851-21-2:2021	IEC 61000-4-6:2013	10Vrms (emf),80%,1kHz Amp. Mod.	Pass
Power Frequency Magnetic Field	EN IEC 61851-21-2:2021	IEC 61000-4-8:2009	50Hz, 60Hz (for systems $\leq$ 32A) 30A/m, (for systems >32A) 100A/m	Pass
Voltage Dips and Interruptions	EN IEC 61851-21-2:2021	IEC 61000-4-11:2004 ( $\leq$ 16A) IEC 61000-4-34:2005+A1:2009 (>16A)	For 50Hz: 40 % UT for 10per 70 % UT for 25per 0 % UT for 1per 0 % UT for 250per For 60Hz: 40 % UT for 12per 70 % UT for 30per 0 % UT for 1per 0 % UT for 300per	Pass

Note1: There are series models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model CSE-BCG-AS32-K01-3-CE was tested since their difference was the number of wireless modules varies.

Note2: This report was an additional report copied from the report SHCR231000208701, just changing the model name, company information and trade mark. Since the electrical circuit design, layout, components used and internal wiring for the model CSE-BCG-AS32-K01-3-CE in this report was exactly the same as the model CSG-BCG-AS32-K01-3-CE in the report SHCR231000208701.

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## 4 General Information

### 4.1 Details of E.U.T.

Power supply: AC 230V 50 32A

Test voltage: AC 230V 50Hz

### 4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Load resistance	By SGS	N/A	N/A

### 4.3 Measurement Uncertainty & Decision Rule

#### Measurement Uncertainty

No.	Item	Measurement Uncertainty ( $U_{Lab}$ )	$U_{CISPR}$
1	Conducted Emission at mains port using AMN	3.4dB (9kHz to 150kHz)	3.8dB (9kHz to 150kHz)
		2.9dB (150kHz to 30MHz)	3.4dB (150kHz to 30MHz)
2	Conducted Emission at mains port using VP	2.2dB (9kHz to 30MHz)	2.9dB (9kHz to 30MHz)
3	Conducted Emission at telecommunication port using AAN	4.6dB (150kHz to 30MHz)	5.0dB (150kHz to 30MHz)
4	Radiated Power	3.4dB (30MHz to 300MHz)	4.5dB (30MHz to 300MHz)
5	Radiated emission	5.7dB (30MHz-1GHz)	6.3dB (30MHz-1GHz)
		4.8dB (1GHz-6GHz)	5.2dB (1GHz-6GHz)
		5.0dB (6GHz-18GHz)	5.5dB (6GHz-18GHz)
6	Radiated disturbance (disturbance current in a LLAS)	2.6dB (9kHz to 30MHz)	3.3dB (9kHz to 30MHz)

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

#### Decision Rule:

- CISPR 16-4-2 for emission measurements is as below described.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

$U_{LAB}$  less than  $U_{CISPR}$ , therefore:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

#### 4.4 Test Location

All tests were performed at:

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

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

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g. max. clock frequency, highest internal frequency, antenna gain, cable loss, etc ) is provided by the applicant. (if applicable).

2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (if applicable).

3. Sample source: sent by customer.

#### 4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **A2LA (Certificate No. 6332.01)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

• **FCC (Designation Number: CN1301)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

• **ISED (CAB Identifier: CN0020)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 8617A

• **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

#### 4.6 Deviation from Standards

None

#### 4.7 Abnormalities from Standard Conditions

None

#### 4.8 Monitoring of EUT for All Immunity Test

Visual: Working status of EUT.

## 5 Equipment List

<b>Conducted Emissions at AC Mains Power Port (150kHz-30MHz)</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Inventory No.</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
EMI test receiver	Rohde & Schwarz	ESR7	SHEM162-1	2022/12/20	2023/12/19
Line impedance stabilization network	SCHWARZBECK	NSLK8127	SHEM061-1	2022/12/20	2023/12/19
Line impedance stabilization network	EMCO	3816_2	SHEM019-1	2022/12/20	2023/12/19
Pulse limiter	Rohde & Schwarz	ESH3-Z2	SHEM029-1	2022/12/20	2023/12/19
Shielding Room	ZHONGYU	8*4*3M	SHEM079-2	2020/12/20	2023/12/19
CE test Cable	/	/	SHEM172-1	2022/12/20	2023/12/19
Test Software	ESE	e3	Version: 6.111221a	N/A	N/A

<b>Radiated Emissions (2kHz-185kHz)</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Inventory No.</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
loop antenna	SCHWARZBECK	FESP-5133-F	SHEM284-1	2023/06/27	2024/06/26

<b>Radiated Emissions (30MHz-1GHz)</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Inventory No.</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
EMI test receiver	Rohde & Schwarz	ESU40	SHEM051-1	2022/12/20	2023/12/19
EMI test receiver	Rohde & Schwarz	ESR7	SHEM201-1	2023/8/01	2024/7/31
CONTROLLER	INNCO	CO2000	SHEM047-1	N/A	N/A
ANTENNA MAST	INNCO	MA400-EP	SHEM047-2	N/A	N/A
TURN DEVICE	INNCO	DE 3600-RH	SHEM047-3	N/A	N/A
Broadband UHF-VHF ANTENNA	SCHWARZBECK	VULB9168	SHEM048-1	2023/9/3	2025/9/2
Broadband UHF-VHF ANTENNA	SCHWARZBECK	VULB9168	SHEM202-1	2023/4/17	2025/4/16
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2023/5/6	2026/5/5
Pre-amplifier	HP	8447D	SHEM236-1	2022/12/22	2023/12/21
Pre-amplifier	HP	8447D	SHEM143-1	2022/12/20	2023/12/19
RE test Cable	/	/	SHEM217-2	2023/5/9	2024/5/8
Test Software	ESE	e3	Version: 6.191211	N/A	N/A
Semi/Fully Anechoic	TIANDE	9*6*6M	SHEM198-1	2021/05/27	2024/05/26

<b>Radiated Emissions (Above 1GHz)</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Inventory No.</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
EMI test receiver	Rohde & Schwarz	ESU40	SHEM051-1	2022/12/20	2023/12/19
CONTROLLER	INNCO	CO2000	SHEM047-1	N/A	N/A
ANTENNA MAST	INNCO	MA400-EP	SHEM047-2	N/A	N/A
TURN DEVICE	INNCO	DE 3600-RH	SHEM047-3	N/A	N/A
Horn Antenna (1-	Schwarzbeck	BBHA9120D	SHEM050-1	2023/9/3	2025/9/2



18GHz)					
Pre-amplifier (1-18GHz)	Schwarzbeck	SCU-F0118-G40-BZ4-CSS(F)	SHEM050-2	2022/12/20	2023/12/19
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2023/5/6	2026/5/5
Test Software	ESE	e3	Version: 6.191211	N/A	N/A
Semi/Fully Anechoic	TIANDE	9*6*6M	SHEM198-1	2021/05/27	2024/05/26

<b>Voltage Fluctuations and Flicker</b>					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Harmonic&Flicker analyzer	AMETEK	PACS-1	SHEM024-2	2023/8/01	2024/7/31
AC Power Source 5KVA	AMETEK	5001iX	SHEM025-2	2023/8/01	2024/7/31
Test Software	AMETEK	CTS4	Version: 4.24.0	N/A	N/A
Harmonic&Flicker analyzer	EM TEST	DPA500	SHEM024-1	2023/8/01	2024/7/31
AC Power Source 6KVA	EM TEST	ACS500	SHEM025-1	2023/8/01	2024/7/31
Test Software	EM TEST	DPA	Version: 5.4.8.0	N/A	N/A

<b>Harmonic Current Emission</b>					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Harmonic&Flicker analyzer	AMETEK	PACS-1	SHEM024-2	2023/8/01	2024/7/31
AC Power Source 5KVA	AMETEK	5001iX	SHEM025-2	2023/8/01	2024/7/31
Test Software	AMETEK	CTS4	Version: 4.24.0	N/A	N/A
Harmonic&Flicker analyzer	EM TEST	DPA500	SHEM024-1	2023/8/01	2024/7/31
AC Power Source 6KVA	EM TEST	ACS500	SHEM025-1	2023/8/01	2024/7/31
Test Software	EM TEST	DPA	Version: 5.4.8.0	N/A	N/A

<b>Radiated Immunity (80MHz-6GHz)</b>					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Signal generator	Rohde & Schwarz	SMB100A	SHEM194-1	2022/12/20	2023/12/19
Power Meter	Rohde & Schwarz	NRP	SHEM057-1	2023/8/01	2024/7/31
Power meter sensor	Rohde & Schwarz	NRP-Z91	SHEM057-3	2023/8/01	2024/7/31
Antenna	SCHWARZBECK	STLP9128D	SHEM130-1	N/A	N/A
Antenna	SCHWARZBECK	STLP9149	SHEM131-1	N/A	N/A
Amplifier	MILMEGA	AS0840-55-55	SHEM133-1	2022/12/20	2023/12/19
Amplifier	MILMEGA	80RF1000-250	SHEM132-1	2022/12/20	2023/12/19
Amplifier	Rohde & Schwarz	BBA150-E60	SHEM171-1	2022/12/20	2023/12/19
Power meter sensor	Rohde & Schwarz	NRP-Z22	SHEM136-1	2023/8/01	2024/7/31
ElectroMagnetic Field Probe	ETS-Lindgren	HI-6105	SHEM134-1	2023/8/24	2024/8/23



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Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2023/5/6	2026/5/5
Test Software	Rohde & Schwarz	EMC32	Version: 10.20.01	N/A	N/A

### Surge at AC Mains Power Port

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2022/12/20	2023/12/19
Test Software	EMC-PARTNER	GENECS	Version: 3.29	N/A	N/A
Immunity Test System	TESEQ	NSG 3060	SHEM224-1	2023/8/01	2024/7/31
Coupling / Decoupling Network (CDN)	TESEQ	CDN 3061	SHEM224-3	2023/8/01	2024/7/31

### Conducted Immunity at AC Mains Power Port (150kHz-80MHz)

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Signal generator	Rohde & Schwarz	SMB100A	SHEM194-1	2022/12/20	2023/12/19
Power Amplifier	HAEFFLY	PAMP250	SHEM023-1	2022/12/20	2023/12/19
6dB Attenuator	HUAXIANG	DTS50-6dB-1G-A	SHEM123-2	2022/12/20	2023/12/19
Coupling clamp	LUTHI	EM 101	SHEM027-1	2023/06/05	2024/06/04
Coupling and Decoupling Network (CDN)	LUTHI	L-801 M1	SHEM023-5	2022/12/20	2023/12/19
Coupling and Decoupling Network (CDN)	LUTHI	L-801 M2/M3	SHEM023-6	2022/12/20	2023/12/19
Shielding Room	ZHONGYU	5*3*3M	SHEM079-6	2022/12/20	2025/12/19
RF Generator	SCHAFFNER	NSG 2070	SHEM221-1	2022/8/02	2024/8/01
Test Software	Rohde & Schwarz	EMC32	Version: 10.20.01	N/A	N/A

### Conducted Immunity at Signal Port (150kHz-80MHz)

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Signal generator	Rohde & Schwarz	SMB100A	SHEM194-1	2022/12/20	2023/12/19
Power Amplifier	HAEFFLY	PAMP250	SHEM023-1	2022/12/20	2023/12/19
6dB Attenuator	HUAXIANG	DTS50-6dB-1G-A	SHEM123-2	2022/12/20	2023/12/19
Coupling clamp	LUTHI	EM 101	SHEM027-1	2023/06/05	2024/06/04
Coupling and Decoupling Network (CDN)	LUTHI	L-801 M1	SHEM023-5	2022/12/20	2023/12/19
Coupling and Decoupling Network (CDN)	LUTHI	L-801 M2/M3	SHEM023-6	2022/12/20	2023/12/19
Shielding Room	ZHONGYU	5*3*3M	SHEM079-6	2022/12/20	2025/12/19
Coupling and Decoupling Network	Teseq	CDN M016	SHEM168-1	2023/8/01	2024/7/31



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RF Generator	SCHAFFNER	NSG 2070	SHEM221-1	2022/8/02	2024/8/01
Test Software	Rohde & Schwarz	EMC32	Version: 10.20.01	N/A	N/A

### Voltage Dips and Interruptions

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2022/12/20	2023/12/19
Test Software	EMC-PARTNER	GENECS	Version: 3.29	N/A	N/A
Immunity Test System	TESEQ	NSG 3060	SHEM224-1	2023/8/01	2024/7/31
Coupling / Decoupling Network (CDN)	TESEQ	CDN 3061	SHEM224-3	2023/8/01	2024/7/31
Manual step transformer	TESEQ	INA 6501	SHEM224-4	2023/8/01	2024/7/31

### Electrostatic Discharge

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Electrostatic Discharge Simulator	TESEQ	NSG 437	SHEM041-2	2023/8/01	2024/7/31

### Electrical Fast Transients Burst at AC Mains Power Port

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2022/12/20	2023/12/19
Test Software	EMC-PARTNER	GENECS	Version: 3.29	N/A	N/A
Immunity Test System	TESEQ	NSG 3060	SHEM224-1	2023/8/01	2024/7/31
Coupling / Decoupling Network (CDN)	TESEQ	CDN 3061	SHEM224-3	2023/8/01	2024/7/31

### Electrical Fast Transients Burst at Signal Port

Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Immunity Test System	EMC PARTNER	TRA3000 F-S-D-V	SHEM163-1	2022/12/20	2023/12/19
Test Software	EMC-PARTNER	GENECS	Version: 3.29	N/A	N/A
Immunity Test System	TESEQ	NSG 3060	SHEM224-1	2023/8/01	2024/7/31
Coupling / Decoupling Network (CDN)	TESEQ	CDN 3061	SHEM224-3	2023/8/01	2024/7/31
Capacitive Coupling Clamp	EM TEST	HFK	SHEM026-2	2022/12/20	2023/12/19



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

SHEM-TRF-001 Rev. 02 Sep01, 2023

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General used equipment					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Digital pressure meter	YONGZHI	DYM3-01	SHEM082-1	2021-01-22	2024-01-21
Temperature&humidity recorder	ShangHai weather meter work	ZJ 1-2B	SHEM042-9~10	2022-12-31	2023-12-30
Temperature&humidity recorder	ShangHai weather meter work	ZJ 1-2B	SHEM042-5	2023-07-23	2024-07-22
Digital Temperature& humidity recorder	Jianda Renke	RS-WS-N01-6J	SHEM247-1~8	2023-01-13	2024-01-12
Digital Multimeter	FLUKE	17B+	SHEM271-1	2023-07-19	2024-07-18
Autoformer regulator	Guangzhou bao de	TDGC2-5KVA	SHEM150-1	N/A	N/A
Multi-purpose tong tester	FLUKE	317	SHEM001-2	2022-11-14	2023-11-13

## 6 Emission Test Results

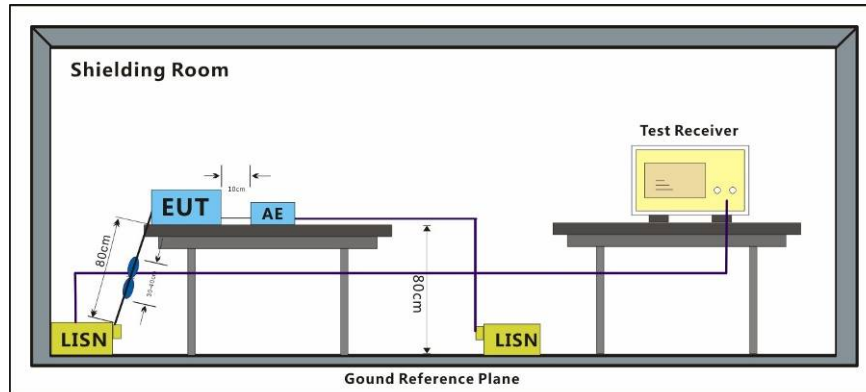
### 6.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

Test Requirement:	EN IEC 61851-21-2:2021
Test Method:	EN IEC 61851-21-2:2021
Frequency Range:	150kHz to 30MHz
Limit:	
0.15M-0.5MHz	66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average
0.5M-5MHz	56dB(μV) quasi-peak, 46dB(μV) average
5M-30MHz	60dB(μV) quasi-peak, 50dB(μV) average
Detector:	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

#### 6.1.1 E.U.T. Operation

Operating Environment:			
Temperature:	22 °C	Humidity:	50 % RH Atmospheric Pressure: 1020 mbar
Test mode:	a: Charging mode: Keep EUT charging continuously with 20% rated power.		
	b: Charging mode: Keep EUT charging continuously with 80% rated power.		

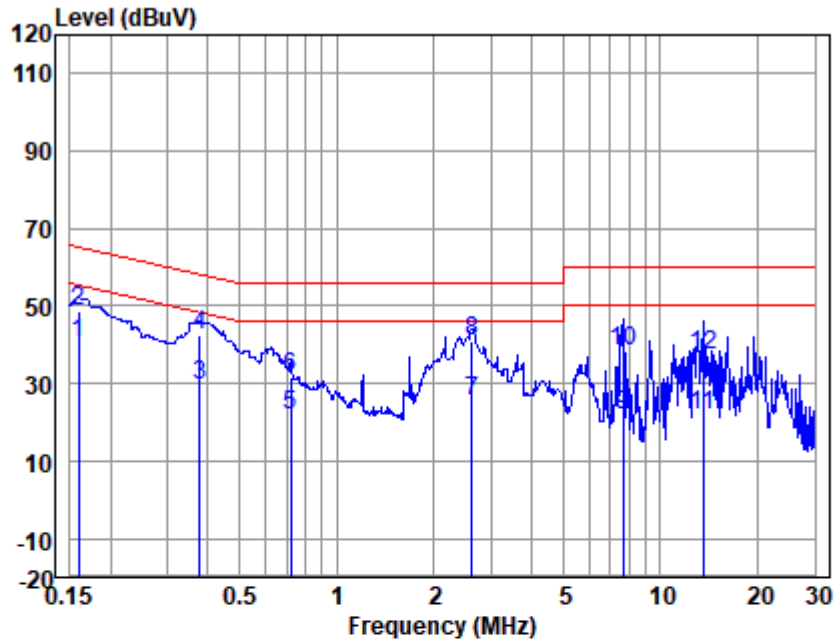
#### 6.1.2 Test Setup Diagram



#### 6.1.3 Measurement Data

An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

Mode:a; Line:Live Line

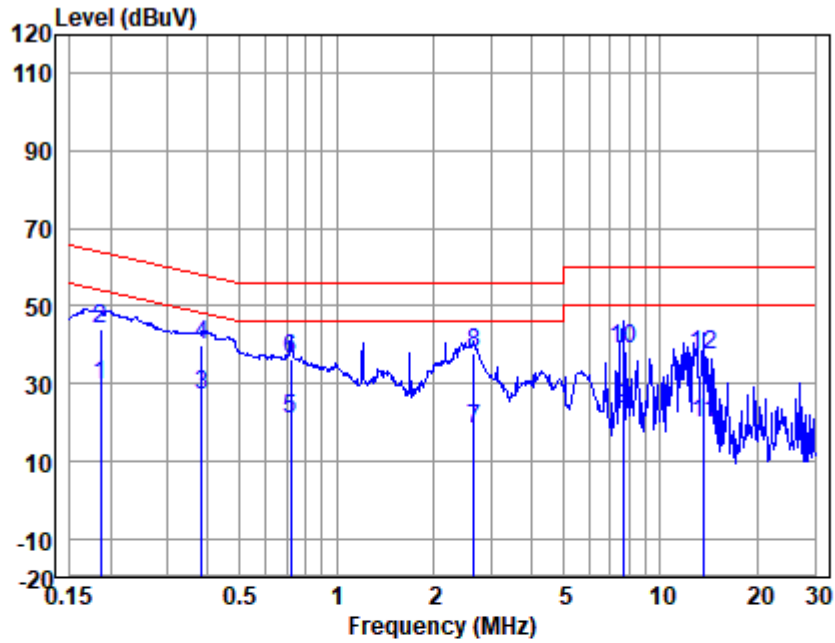


LISN : LINE  
 EUT/Project No : 02087EV  
 Test Mode : 00

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.16	29.94	0.40	9.87	40.21	55.52	-15.31	Average
2	0.16	38.33	0.40	9.87	48.60	65.52	-16.92	QP
3	0.38	19.40	0.26	9.87	29.53	48.34	-18.81	Average
4	0.38	32.29	0.26	9.87	42.42	58.34	-15.92	QP
5	0.72	11.55	0.20	9.86	21.61	46.00	-24.39	Average
6	0.72	21.47	0.20	9.86	31.53	56.00	-24.47	QP
7	2.62	15.33	0.23	9.87	25.43	46.00	-20.57	Average
8	2.62	30.84	0.23	9.87	40.94	56.00	-15.06	QP
9	7.65	11.38	0.40	9.98	21.76	50.00	-28.24	Average
10	7.65	28.07	0.40	9.98	38.45	60.00	-21.55	QP
11	13.55	11.52	0.47	10.02	22.01	50.00	-27.99	Average
12	13.55	26.93	0.47	10.02	37.42	60.00	-22.58	QP

Notes: Emission Level = Read Level + LISN Factor + Cable loss

Mode:a; Line:Neutral Line

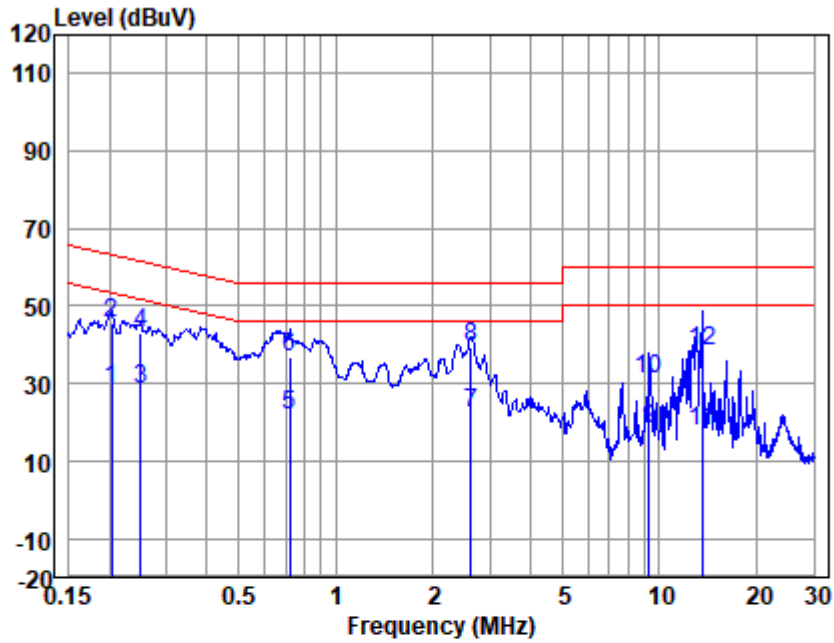


LISN : NEUTRAL  
 EUT/Project No : 02087EV  
 Test Mode : 00

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.19	19.23	0.31	9.87	29.41	54.20	-24.79	Average
2	0.19	34.03	0.31	9.87	44.21	64.20	-19.99	QP
3	0.38	16.76	0.30	9.87	26.93	48.21	-21.28	Average
4	0.38	29.85	0.30	9.87	40.02	58.21	-18.19	QP
5	0.72	10.74	0.30	9.86	20.90	46.00	-25.10	Average
6	0.72	26.23	0.30	9.86	36.39	56.00	-19.61	QP
7	2.65	8.20	0.36	9.87	18.43	46.00	-27.57	Average
8	2.65	27.60	0.36	9.87	37.83	56.00	-18.17	QP
9	7.65	13.13	0.37	9.98	23.48	50.00	-26.52	Average
10	7.65	28.77	0.37	9.98	39.12	60.00	-20.88	QP
11	13.62	9.10	0.45	10.02	19.57	50.00	-30.43	Average
12	13.62	27.04	0.45	10.02	37.51	60.00	-22.49	QP

Notes: Emission Level = Read Level + LISN Factor + Cable loss

Mode:b Line:Live Line



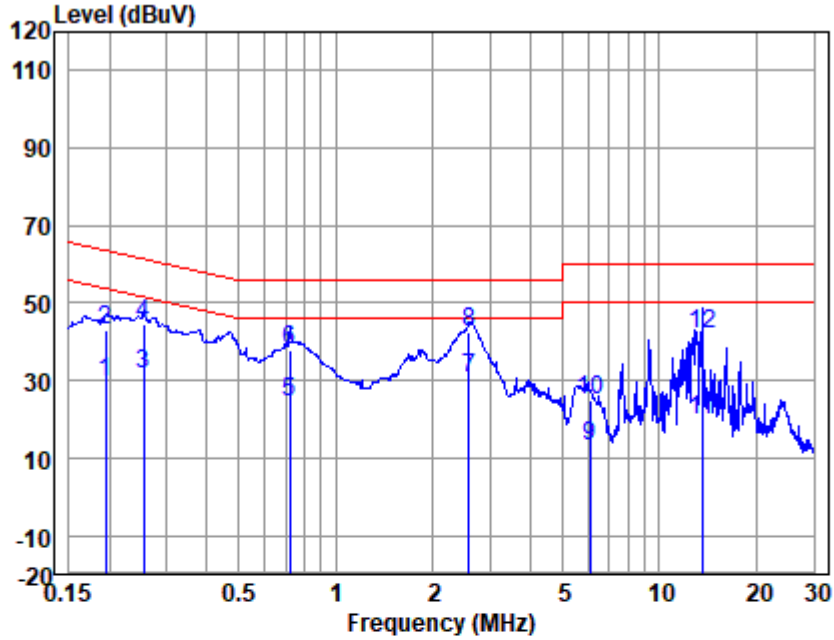
LISN : LINE  
 EUT/Project No : 02087EV  
 Test Mode : 01

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.20	18.17	0.40	9.87	28.44	53.49	-25.05	Average
2	0.20	35.17	0.40	9.87	45.44	63.49	-18.05	QP
3	0.25	18.21	0.35	9.87	28.43	51.78	-23.35	Average
4	0.25	32.55	0.35	9.87	42.77	61.78	-19.01	QP
5	0.72	11.67	0.20	9.86	21.73	46.00	-24.27	Average
6	0.72	26.56	0.20	9.86	36.62	56.00	-19.38	QP
7	2.61	12.03	0.23	9.87	22.13	46.00	-23.87	Average
8	2.61	29.43	0.23	9.87	39.53	56.00	-16.47	QP
9	9.30	7.73	0.40	9.98	18.11	50.00	-31.89	Average
10	9.30	21.00	0.40	9.98	31.38	60.00	-28.62	QP
11	13.55	7.32	0.47	10.02	17.81	50.00	-32.19	Average
12	13.55	27.63	0.47	10.02	38.12	60.00	-21.88	QP

Notes: Emission Level = Read Level + LISN Factor + Cable loss



Mode:b; Line:Neutral Line



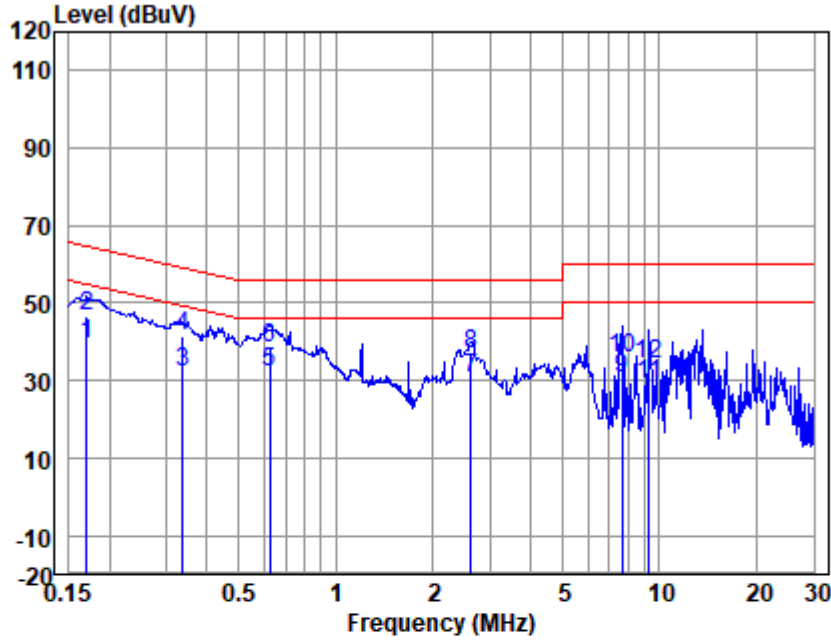
LISN : NEUTRAL  
 EUT/Project No : 02087EV  
 Test Mode : 01

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.19	19.55	0.30	9.87	29.72	53.84	-24.12	Average
2	0.19	32.77	0.30	9.87	42.94	63.84	-20.90	QP
3	0.25	21.40	0.30	9.87	31.57	51.60	-20.03	Average
4	0.25	34.20	0.30	9.87	44.37	61.60	-17.23	QP
5	0.72	14.02	0.30	9.86	24.18	46.00	-21.82	Average
6	0.72	27.66	0.30	9.86	37.82	56.00	-18.18	QP
7	2.58	20.47	0.36	9.87	30.70	46.00	-15.30	Average
8	2.58	32.14	0.36	9.87	42.37	56.00	-13.63	QP
9	6.11	2.50	0.38	9.97	12.85	50.00	-37.15	Average
10	6.11	14.34	0.38	9.97	24.69	60.00	-35.31	QP
11	13.55	9.11	0.45	10.02	19.58	50.00	-30.42	Average
12	13.55	31.50	0.45	10.02	41.97	60.00	-18.03	QP

Notes: Emission Level = Read Level + LISN Factor + Cable loss



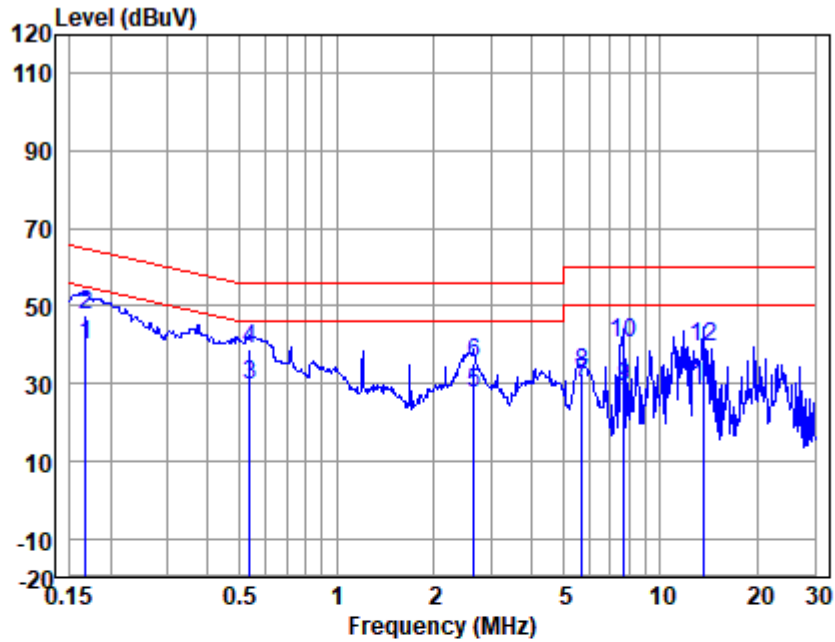
Mode:a;



LISN : LINE  
 EUT/Project No : 2087EV  
 Test Mode : 02

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.17	29.34	0.40	9.87	39.61	54.94	-15.33	Average
2	0.17	36.50	0.40	9.87	46.77	64.94	-18.17	QP
3	0.34	21.79	0.29	9.87	31.95	49.31	-17.36	Average
4	0.34	31.40	0.29	9.87	41.56	59.31	-17.75	QP
5	0.63	22.27	0.20	9.86	32.33	46.00	-13.67	Average
6	0.63	28.38	0.20	9.86	38.44	56.00	-17.56	QP
7	2.62	20.54	0.23	9.87	30.64	46.00	-15.36	Average
8	2.62	26.55	0.23	9.87	36.65	56.00	-19.35	QP
9	7.65	20.36	0.40	9.98	30.74	50.00	-19.26	Average
10	7.65	25.51	0.40	9.98	35.89	60.00	-24.11	QP
11	9.30	18.85	0.40	9.98	29.23	50.00	-20.77	Average
12	9.30	24.01	0.40	9.98	34.39	60.00	-25.61	QP

Notes: Emission Level = Read Level + LISN Factor + Cable loss



LISN : NEUTRAL  
 EUT/Project No : 2087EV  
 Test Mode : 02

	Freq (MHz)	Read level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Emission Level (dBuV)	Limit (dBuV)	Over Limit (dB)	Remark
1	0.17	29.54	0.32	9.87	39.73	55.08	-15.35	Average
2	0.17	37.62	0.32	9.87	47.81	65.08	-17.27	QP
3	0.54	19.46	0.30	9.86	29.62	46.00	-16.38	Average
4	0.54	28.53	0.30	9.86	38.69	56.00	-17.31	QP
5	2.65	17.48	0.36	9.87	27.71	46.00	-18.29	Average
6	2.65	24.82	0.36	9.87	35.05	56.00	-20.95	QP
7	5.71	19.74	0.42	9.97	30.13	50.00	-19.87	Average
8	5.71	22.31	0.42	9.97	32.70	60.00	-27.30	QP
9	7.73	18.97	0.38	9.98	29.33	50.00	-20.67	Average
10	7.73	29.99	0.38	9.98	40.35	60.00	-19.65	QP
11	13.62	18.79	0.45	10.02	29.26	50.00	-20.74	Average
12	13.62	29.03	0.45	10.02	39.50	60.00	-20.50	QP

Notes: Emission Level = Read Level + LISN Factor + Cable loss

**6.3 Radiated Emissions (2kHz-185kHz)**

Frequency range: 2kHz-185kHz

Limit:

频率范围 kHz	峰值限值 dB(μA/m)
2 ~ 10	62~60 <sup>a</sup>
10~30	60
30~75	60~95 <sup>b</sup>
75~120	95~55 <sup>a</sup>
120~140	55
140~185	55~95 <sup>b</sup>

<sup>a</sup> 限值随着频率线性递减。  
<sup>b</sup> 限值随着频率线性增加。

2kHz-185kHz

70 dB(μV/m) quasi-peak, 50 dB(μV/m) Average-peak

Detector:

Peak for pre-scan (200Hz resolution bandwidth) 2K-185KHz

**6.3.1 E.U.T. Operation**

Operating Environment:

Temperature: 24 °C Humidity: 48 % RH Atmospheric Pressure: 1010 mbar

**6.3.2 E.U.T. Operation**

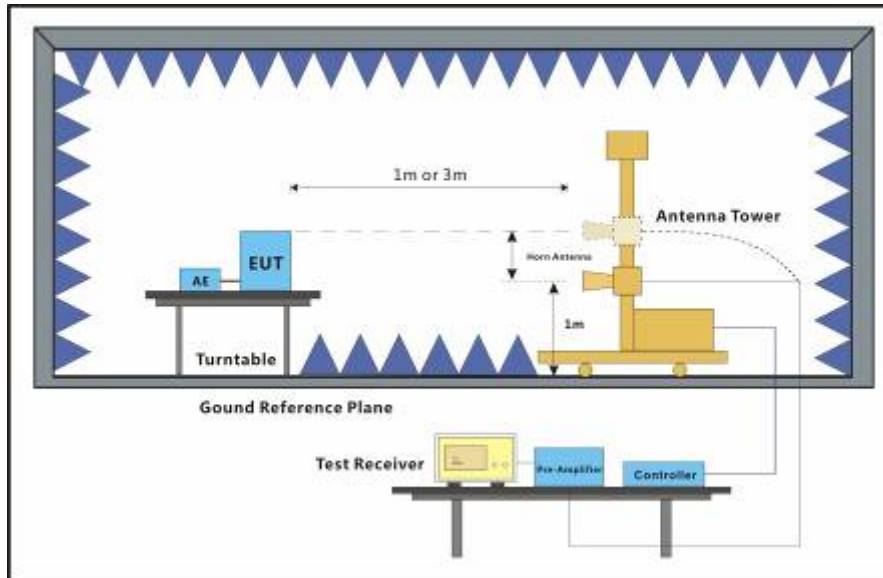
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Pretest these mode to find the worst case:  
a: Charging mode: Keep EUT charging continuously with 20% rated power.  
b: Charging mode: Keep EUT charging continuously with 80% rated power.

The worst case for final test:  
a: Charging mode: Keep EUT charging continuously with 20% rated power.

### 6.3.3 Test Setup Diagram



### 6.3.4 Measurement Procedure and Data

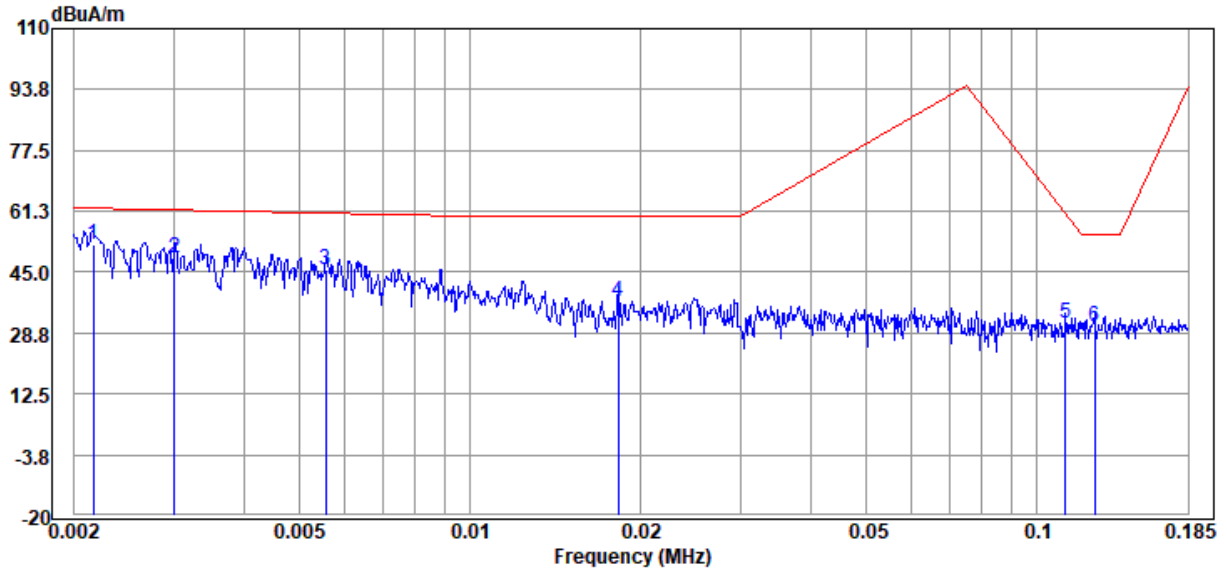
An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

Notes: 1. Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)

2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier (dB)

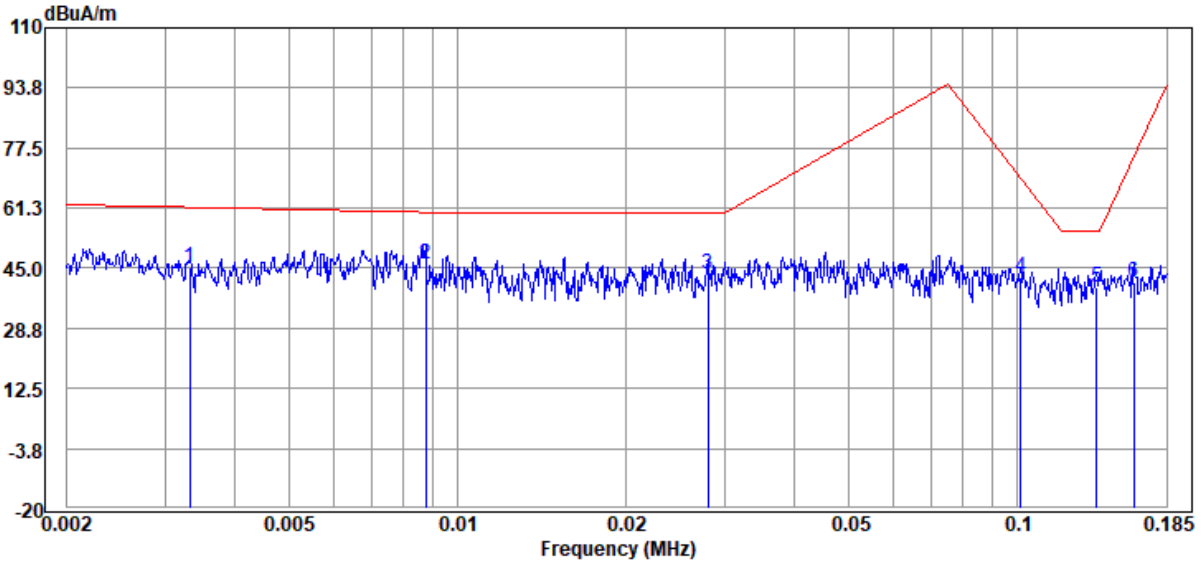
3. pre-scan was at 0°, 90°, 180°, 270°, the worst data were recored in this report: 0°

Mode:a; X



Item	Freq.	Read Level	AUX Factor	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	0.002	7.03	45.24	52.27	61.90	-9.63	QP
2	0.003	6.70	42.31	49.01	61.49	-12.48	QP
3	0.006	8.35	37.28	45.63	60.73	-15.10	QP
4	0.018	8.39	28.81	37.20	60.00	-22.80	QP
5	0.112	7.35	23.88	31.23	60.54	-29.31	QP
6	0.126	6.70	23.59	30.29	55.00	-24.71	QP

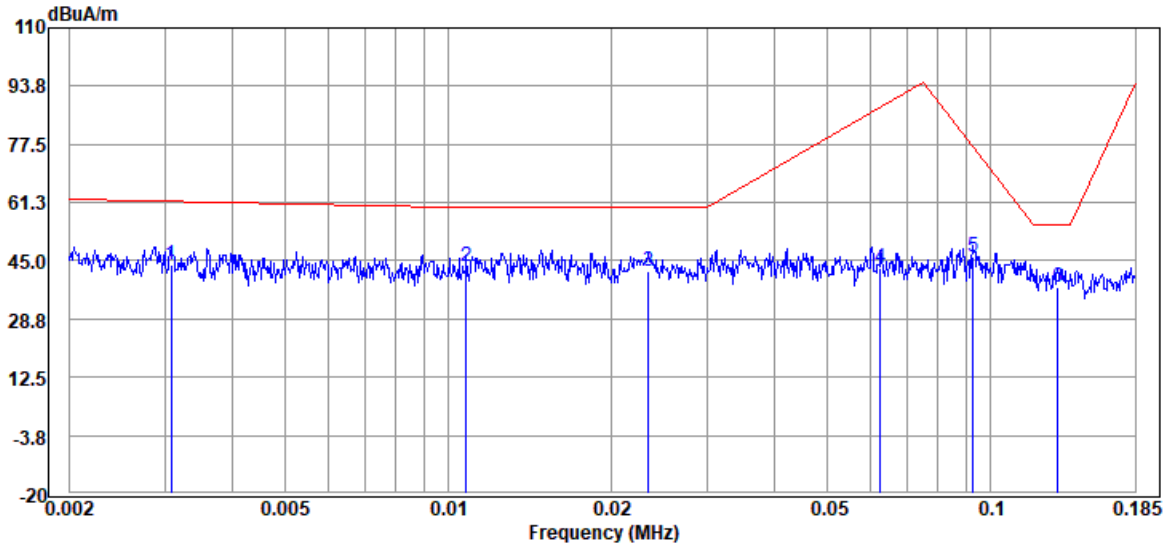
Mode:a; Y



Item	Freq.	Read Level	AUX Factor	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	0.003	3.37	41.71	45.08	61.37	-16.29	QP
2	0.009	12.38	33.79	46.17	60.17	-14.00	QP
3	0.028	16.38	26.95	43.33	60.00	-16.67	QP
4	0.101	18.44	23.99	42.43	69.40	-26.97	QP
5	0.138	16.49	23.44	39.93	55.00	-15.07	QP
6	0.162	18.09	23.21	41.30	75.51	-34.21	QP



Mode:a; Z



Item	Freq.	Read Level	AUX Factor	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	0.003	1.70	42.21	43.91	61.47	-17.56	QP
2	0.011	10.85	32.63	43.48	60.00	-16.52	QP
3	0.023	13.93	28.02	41.95	60.00	-18.05	QP
4	0.063	17.92	25.12	43.04	88.16	-45.12	QP
5	0.093	22.02	24.16	46.18	76.73	-30.55	QP
6	0.133	14.10	23.49	37.59	55.00	-17.41	QP

### 6.4 Radiated Emissions (30MHz-1GHz)

Test Requirement:	EN IEC 61851-21-2:2021
Test Method:	EN IEC 61851-21-2:2021
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m
Limit:	
30MHz-230MHz	40 dB( $\mu$ V/m) quasi-peak
230MHz-1GHz	47 dB( $\mu$ V/m) quasi-peak
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30M to 1000MHz

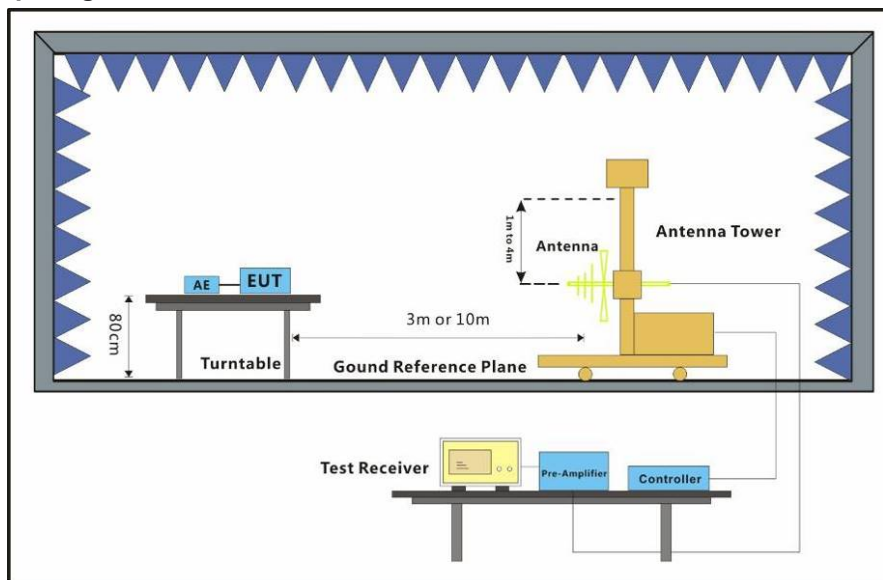
#### 6.4.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C      Humidity: 50 % RH      Atmospheric Pressure: 1020 mbar

Test mode:      a: Charging mode: Keep EUT charging continuously with 20% rated power.  
                      b: Charging mode: Keep EUT charging continuously with 80% rated power.

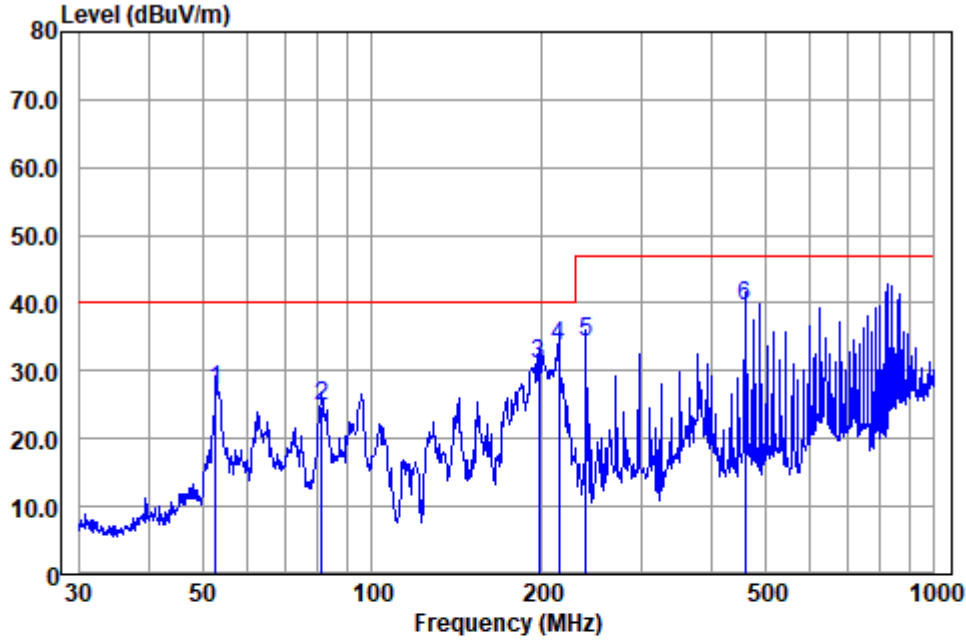
#### 6.4.2 Test Setup Diagram



#### 6.4.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

Mode:a; Polarization:Horizontal

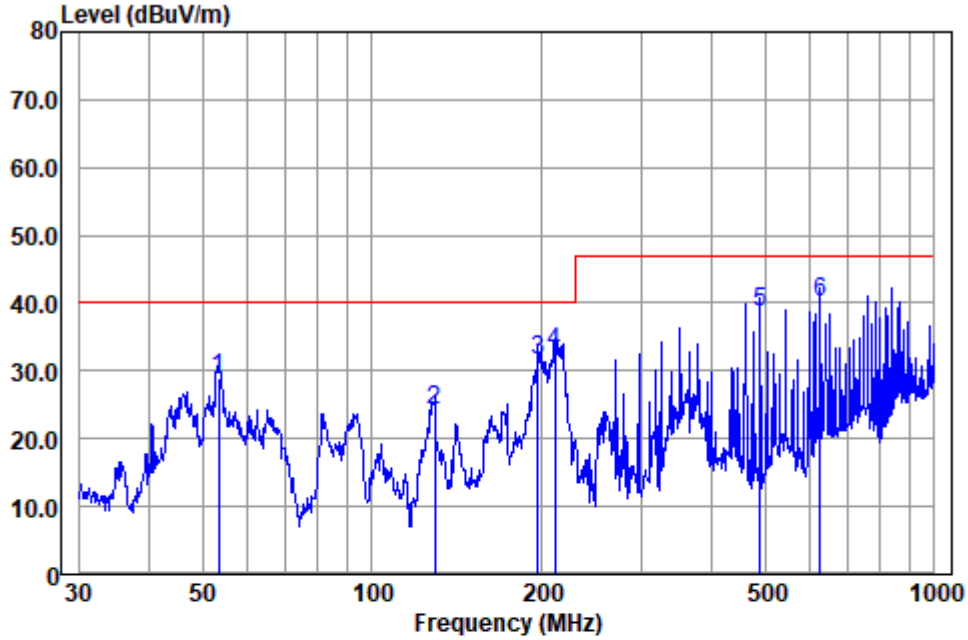


Antenna Polarity :HORIZONTAL  
 EUT/Project :2087EV  
 Test mode :00

	Read Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	52.760	45.82	13.90	1.08	33.67	27.13	40.00	-12.87	QP
2	81.212	47.90	8.75	1.78	33.51	24.92	40.00	-15.08	QP
3	197.893	51.38	10.12	2.93	33.31	31.12	40.00	-8.88	QP
4	214.514	53.95	9.85	3.22	33.23	33.79	40.00	-6.21	QP
5	239.987	53.12	11.00	3.15	33.13	34.14	47.00	-12.86	QP
6	460.727	50.95	17.40	4.22	33.00	39.57	47.00	-7.43	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:a; Polarization:Vertical

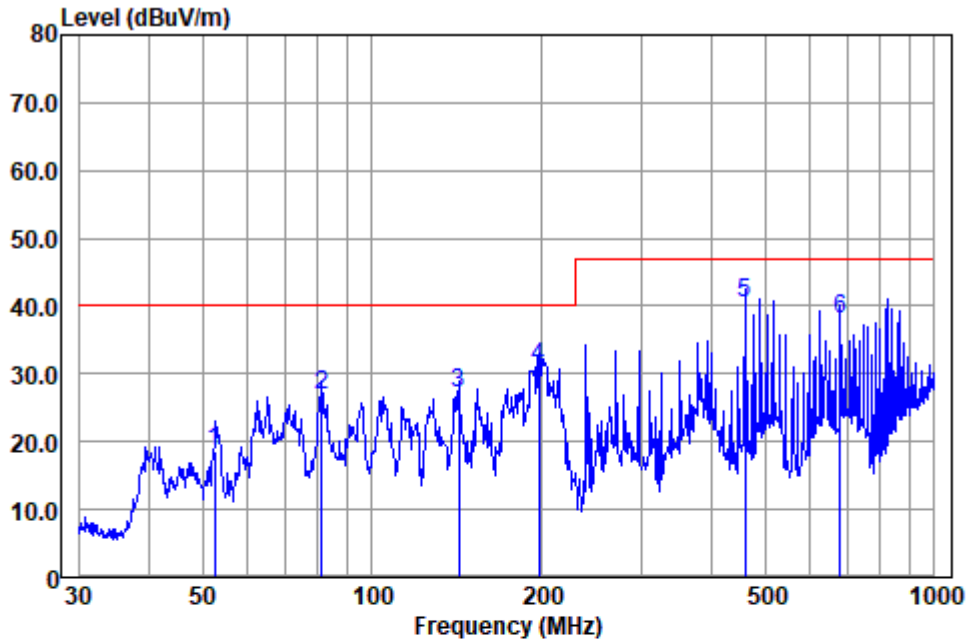


Antenna Polarity :VERTICAL  
 EUT/Project :2087EV  
 Test mode :00

	Read	Antenna	Cable	Preamp	Emission	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	53.318	47.54	13.90	1.08	33.66	28.86	40.00	-11.14 QP
2	129.468	43.55	12.00	2.23	33.54	24.24	40.00	-15.76 QP
3	197.200	51.76	10.16	2.90	33.31	31.51	40.00	-8.49 QP
4	211.527	53.11	9.82	3.21	33.25	32.89	40.00	-7.11 QP
5	489.027	49.65	17.75	4.37	33.00	38.77	47.00	-8.23 QP
6	625.078	46.95	20.40	5.74	32.94	40.15	47.00	-6.85 QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:b; Polarization:Horizontal

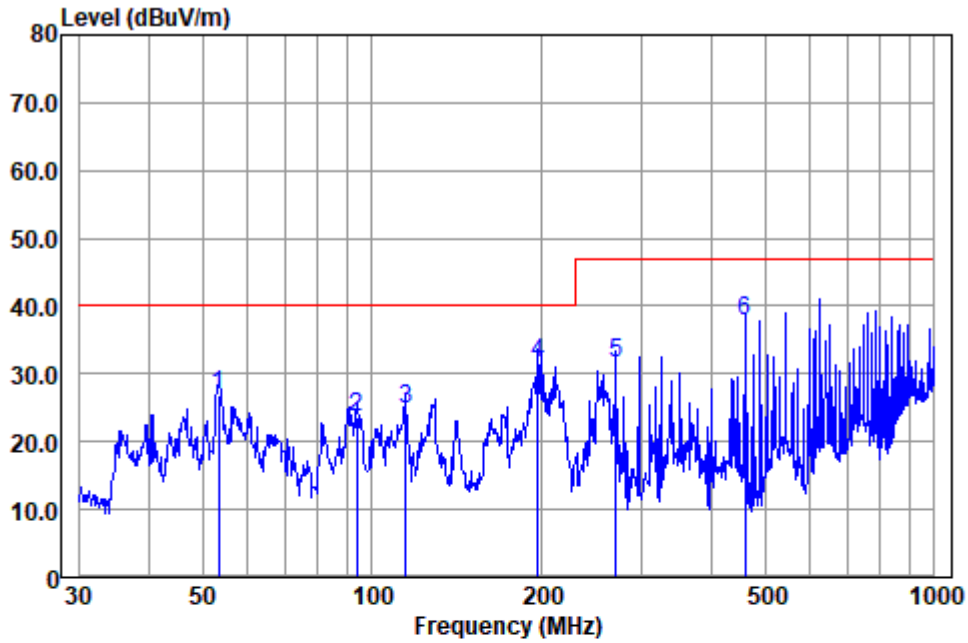


Antenna Polarity :HORIZONTAL  
 EUT/Project :2087EV  
 Test mode :01

	Read Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	52.391	37.31	13.90	1.07	33.67	18.61	40.00	-21.39	QP
2	81.212	49.90	8.75	1.78	33.51	26.92	40.00	-13.08	QP
3	142.324	44.84	13.25	2.47	33.51	27.05	40.00	-12.95	QP
4	197.893	51.38	10.12	2.93	33.31	31.12	40.00	-8.88	QP
5	460.727	51.95	17.40	4.22	33.00	40.57	47.00	-6.43	QP
6	679.960	43.94	20.70	6.36	32.84	38.16	47.00	-8.84	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:b; Polarization:Vertical



Antenna Polarity :VERTICAL  
 EUT/Project :2087EV  
 Test mode :01

	Read Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Emission Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	53.318	45.54	13.90	1.08	33.66	26.86	40.00	-13.14	QP
2	93.768	47.23	8.10	1.85	33.60	23.58	40.00	-16.42	QP
3	114.515	45.76	10.70	2.03	33.57	24.92	40.00	-15.08	QP
4	197.200	51.76	10.16	2.90	33.31	31.51	40.00	-8.49	QP
5	271.325	48.72	12.35	3.45	33.05	31.47	47.00	-15.53	QP
6	460.727	49.18	17.40	4.22	33.00	37.80	47.00	-9.20	QP

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

### 6.5 Radiated Emissions (above 1GHz)

Test Requirement:	EN IEC 61851-21-2:2021
Test Method:	EN IEC 61851-21-2:2021
Frequency Range:	Above 1GHz
Measurement Distance:	3m
Limit:	
1GHz-3GHz	70 dB( $\mu$ V/m) peak, 50 dB( $\mu$ V/m) average
3GHz-6GHz	74 dB( $\mu$ V/m) peak, 54 dB( $\mu$ V/m) average
Detector:	Peak for pre-scan (1000kHz resolution bandwidth) 1000M to 6000MHz

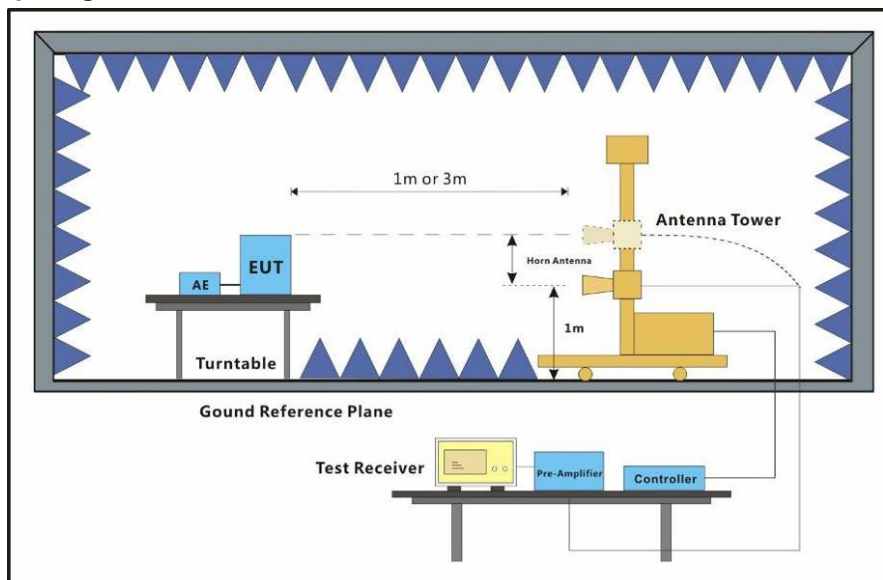
#### 6.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C      Humidity: 50 % RH      Atmospheric Pressure: 1020 mbar

Test mode:      a: Charging mode: Keep EUT charging continuously with 20% rated power.  
                      b: Charging mode: Keep EUT charging continuously with 80% rated power.

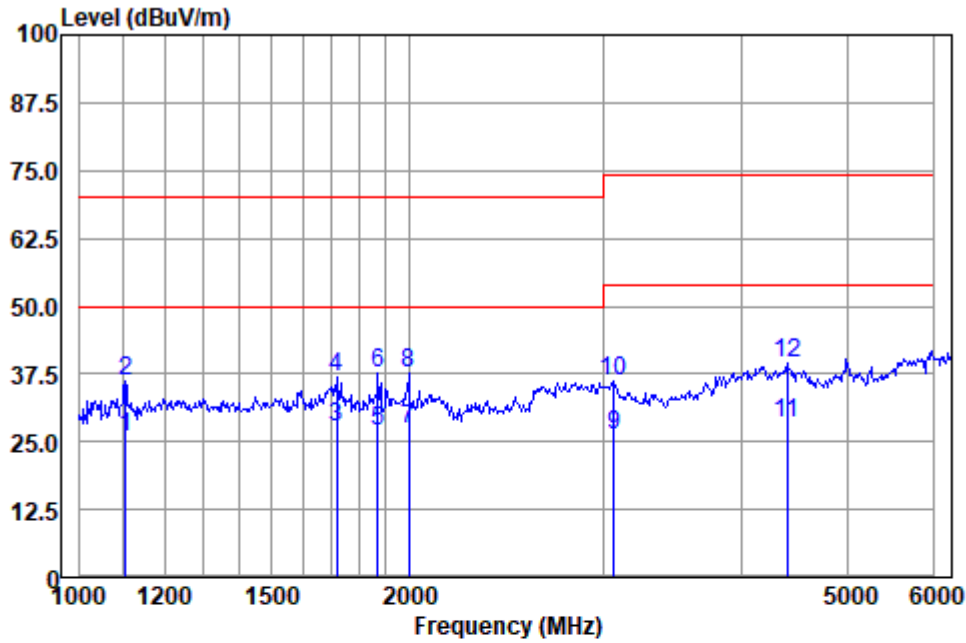
#### 6.5.2 Test Setup Diagram



#### 6.5.3 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

Mode:a; Polarization:Horizontal



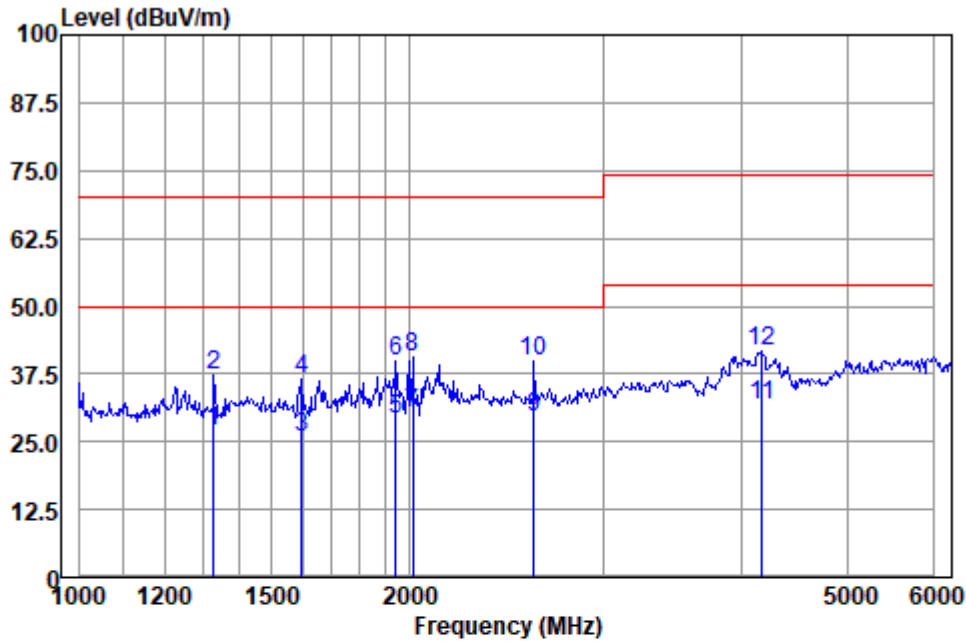
Antenna Polarity :HORIZONTAL  
 EUT/Project :02087EV  
 Test mode :00

	Read	Antenna	Cable	Preamp	Emission	Limit	Over	
-----	-----	-----	-----	-----	-----	-----	-----	-----
1	2	3	4	5	6	7	8	9
-----	-----	-----	-----	-----	-----	-----	-----	-----
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	Remark
1103.264	40.22	23.00	3.64	41.20	25.66	50.00	-24.34	Average
1103.264	50.76	23.00	3.64	41.20	36.20	70.00	-33.80	Peak
1716.864	40.65	23.40	4.68	41.20	27.53	50.00	-22.47	Average
1716.864	50.03	23.40	4.68	41.20	36.91	70.00	-33.09	Peak
1872.381	39.11	23.97	4.92	41.17	26.83	50.00	-23.17	Average
1872.381	49.96	23.97	4.92	41.17	37.68	70.00	-32.32	Peak
1995.309	38.58	24.90	5.02	41.10	27.40	50.00	-22.60	Average
1995.309	48.87	24.90	5.02	41.10	37.69	70.00	-32.31	Peak
3069.345	34.67	27.53	6.24	42.30	26.14	54.00	-27.86	Average
3069.345	44.57	27.53	6.24	42.30	36.04	74.00	-37.96	Peak
4405.090	33.11	30.10	7.61	42.31	28.51	54.00	-25.49	Average
4405.090	43.93	30.10	7.61	42.31	39.33	74.00	-34.67	Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor



Mode:a; Polarization:Vertical

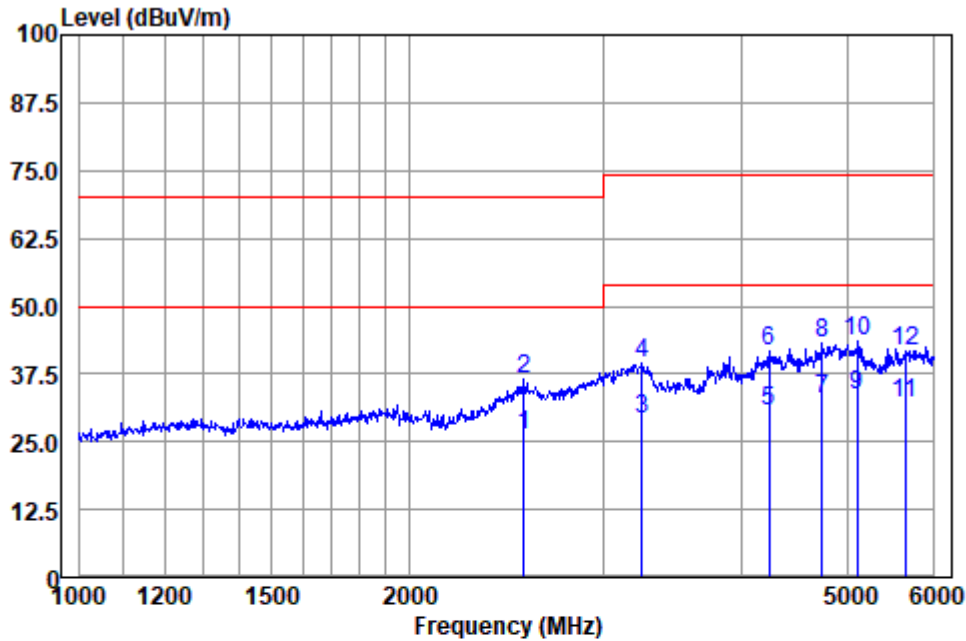


Antenna Polarity :VERTICAL  
 EUT/Project :02087EV  
 Test mode :00

	Read	Antenna	Cable	Preamp	Emission	Limit	Over	
-----	-----	-----	-----	-----	-----	-----	-----	-----
1	2	3	4	5	6	7	8	9
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	Remark
1	1327.446	40.34	23.60	4.02	41.20	26.76	50.00	-23.24 Average
2	1327.446	50.92	23.60	4.02	41.20	37.34	70.00	-32.66 Peak
3	1597.181	39.13	23.60	4.46	41.20	25.99	50.00	-24.01 Average
4	1597.181	49.64	23.60	4.46	41.20	36.50	70.00	-33.50 Peak
5	1944.073	41.22	24.10	4.98	41.12	29.18	50.00	-20.82 Average
6	1944.073	51.71	24.10	4.98	41.12	39.67	70.00	-30.33 Peak
7	2012.686	41.36	24.90	5.03	41.12	30.17	50.00	-19.83 Average
8	2012.686	51.95	24.90	5.03	41.12	40.76	70.00	-29.24 Peak
9	2595.613	39.28	26.70	5.73	42.30	29.41	50.00	-20.59 Average
10	2595.613	49.80	26.70	5.73	42.30	39.93	70.00	-30.07 Peak
11	4181.768	37.15	29.60	7.30	42.37	31.68	54.00	-22.32 Average
12	4181.768	47.15	29.60	7.30	42.37	41.68	74.00	-32.32 Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:b; Polarization:Horizontal

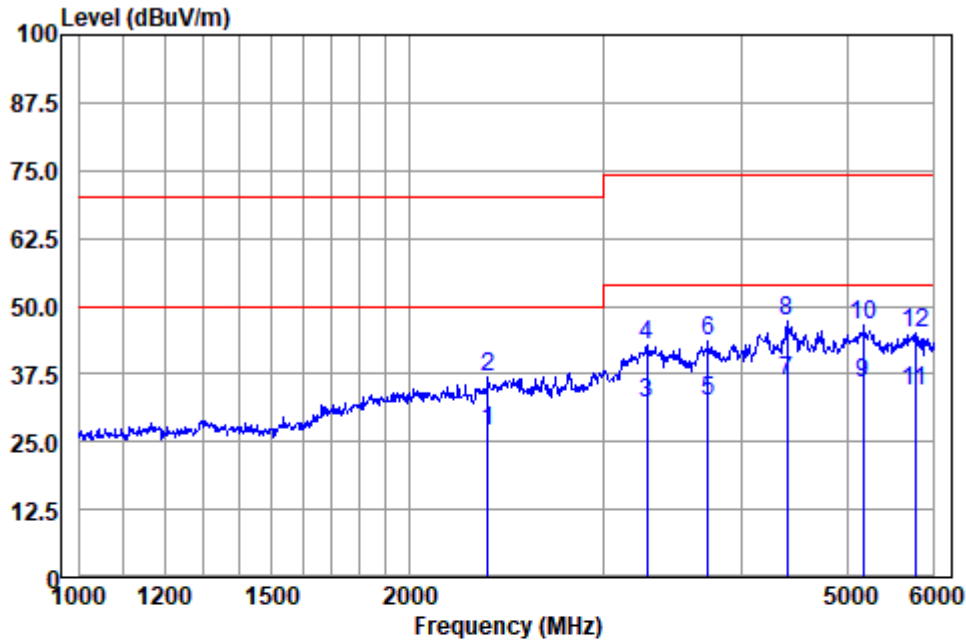


Antenna Polarity :HORIZONTAL  
 EUT/Project :02087EV  
 Test mode :01

	Read	Antenna	Cable	Preamp	Emission	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2538.859	36.52	26.40	5.67	42.30	26.29	50.00	-23.71 Average
2	2538.859	46.83	26.40	5.67	42.30	36.60	70.00	-33.40 Peak
3	3251.049	37.23	27.70	6.53	42.30	29.16	54.00	-24.84 Average
4	3251.049	47.42	27.70	6.53	42.30	39.35	74.00	-34.65 Peak
5	4245.883	35.93	29.80	7.38	42.35	30.76	54.00	-23.24 Average
6	4245.883	46.69	29.80	7.38	42.35	41.52	74.00	-32.48 Peak
7	4744.751	36.47	30.80	7.97	42.30	32.94	54.00	-21.06 Average
8	4744.751	46.52	30.80	7.97	42.30	42.99	74.00	-31.01 Peak
9	5106.433	36.28	31.43	8.22	42.28	33.65	54.00	-20.35 Average
10	5106.433	46.12	31.43	8.22	42.28	43.49	74.00	-30.51 Peak
11	5645.392	33.58	32.07	8.57	42.25	31.97	54.00	-22.03 Average
12	5645.392	43.47	32.07	8.57	42.25	41.86	74.00	-32.14 Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

Mode:b; Polarization:Vertical



Antenna Polarity :VERTICAL  
 EUT/Project :02087EV  
 Test mode :01

	Read	Antenna	Cable	Preamp	Emission	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2354.812	37.23	26.43	5.46	42.22	26.90	50.00	-23.10 Average
2	2354.812	47.20	26.43	5.46	42.22	36.87	70.00	-33.13 Peak
3	3286.188	40.22	27.70	6.56	42.30	32.18	54.00	-21.82 Average
4	3286.188	50.98	27.70	6.56	42.30	42.94	74.00	-31.06 Peak
5	3738.689	39.34	28.63	6.97	42.35	32.59	54.00	-21.41 Average
6	3738.689	50.20	28.63	6.97	42.35	43.45	74.00	-30.55 Peak
7	4408.687	40.90	30.03	7.61	42.31	36.23	54.00	-17.77 Average
8	4408.687	51.96	30.03	7.61	42.31	47.29	74.00	-26.71 Peak
9	5170.883	38.24	31.50	8.24	42.27	35.71	54.00	-18.29 Average
10	5170.883	49.13	31.50	8.24	42.27	46.60	74.00	-27.40 Peak
11	5757.763	35.76	32.27	8.61	42.31	34.33	54.00	-19.67 Average
12	5757.763	46.32	32.27	8.61	42.31	44.89	74.00	-29.11 Peak

Note:Emission Level=Read Level+Antenna Factor+Cable loss-Preamp Factor

### 6.6 Harmonic Current Emission

Test Requirement: EN IEC 61851-21-2:2021

Test Method: EN 61000-3-12:2011

Frequency Range: 100Hz to 2kHz

#### 6.6.1 E.U.T. Operation

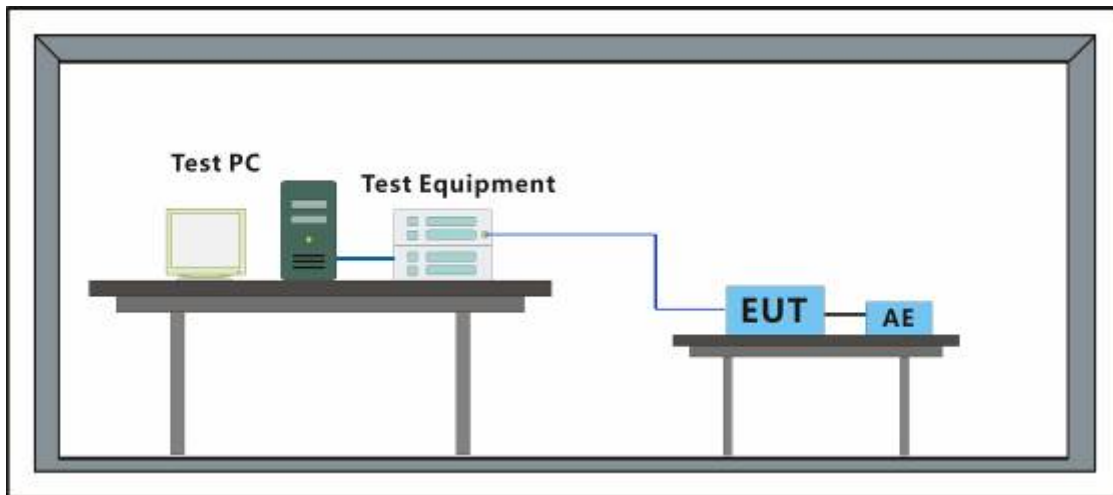
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

Pretest these mode to find the worst case:  
a: Charging mode: Keep EUT charging continuously with 20% rated power.  
b: Charging mode: Keep EUT charging continuously with 80% rated power.

The worst case for final test:  
a: Charging mode: Keep EUT charging continuously with 20% rated power.

#### 6.6.2 Test Setup



#### 6.6.3 Measurement Data

Mode:a

**Average harmonic current results**

Hn	I <sub>eff</sub> [A]	% of Limit	Limit [A]	Result
1	9.314			
2	1.656E-3			PASS
3	10.315E-3			PASS
4	2.464E-3			PASS
5	5.653E-3			PASS
6	1.210E-3			PASS
7	3.831E-3			PASS
8	1.119E-3			PASS
9	2.195E-3			PASS
10	1.065E-3			PASS
11	3.456E-3			PASS
12	1.140E-3			PASS
13	5.197E-3			PASS
14	1.137E-3			PASS
15	3.885E-3			PASS
16	1.260E-3			PASS
17	3.901E-3			PASS
18	1.303E-3			PASS
19	1.631E-3			PASS
20	1.251E-3			PASS
21	4.981E-3			PASS
22	1.547E-3			PASS
23	5.733E-3			PASS
24	1.228E-3			PASS
25	4.760E-3			PASS
26	1.517E-3			PASS
27	3.264E-3			PASS
28	1.202E-3			PASS
29	1.624E-3			PASS
30	1.414E-3			PASS
31	3.251E-3			PASS
32	1.238E-3			PASS
33	3.591E-3			PASS
34	1.341E-3			PASS
35	2.619E-3			PASS
36	1.333E-3			PASS
37	1.715E-3			PASS
38	1.386E-3			PASS
39	2.417E-3			PASS
40	1.394E-3			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

**Maximum harmonic current results**

Hn	I <sub>eff</sub> [A]	% of Limit	Limit [A]	Result
1	9.321			
2	2.113E-3			PASS
3	10.938E-3			PASS
4	2.726E-3			PASS
5	6.084E-3			PASS
6	1.432E-3			PASS
7	4.161E-3			PASS
8	1.355E-3			PASS
9	2.520E-3			PASS
10	1.222E-3			PASS
11	3.706E-3			PASS
12	1.348E-3			PASS
13	5.569E-3			PASS
14	1.320E-3			PASS
15	4.140E-3			PASS
16	1.486E-3			PASS
17	4.264E-3			PASS
18	1.488E-3			PASS
19	2.052E-3			PASS
20	1.645E-3			PASS
21	5.375E-3			PASS
22	1.779E-3			PASS
23	6.238E-3			PASS
24	1.488E-3			PASS
25	5.140E-3			PASS
26	1.744E-3			PASS
27	3.912E-3			PASS
28	1.362E-3			PASS
29	2.455E-3			PASS
30	1.722E-3			PASS
31	3.728E-3			PASS
32	1.418E-3			PASS
33	4.221E-3			PASS
34	1.643E-3			PASS
35	3.166E-3			PASS
36	1.506E-3			PASS
37	2.011E-3			PASS
38	1.593E-3			PASS
39	3.067E-3			PASS
40	1.693E-3			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

**Maximum harmonic voltage results**

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	230.92	100.400		
2	85.86E-3	0.037	0.2	PASS
3	89.48E-3	0.039	0.9	PASS
4	15.71E-3	0.007	0.2	PASS
5	32.99E-3	0.014	0.4	PASS
6	12.67E-3	0.006	0.2	PASS
7	30.89E-3	0.013	0.3	PASS
8	14.66E-3	0.006	0.2	PASS
9	68.36E-3	0.030	0.2	PASS
10	15.75E-3	0.007	0.2	PASS
11	89.44E-3	0.039	0.1	PASS
12	17.20E-3	0.007	0.1	PASS
13	94.48E-3	0.041	0.1	PASS
14	13.88E-3	0.006	0.1	PASS
15	69.20E-3	0.030	0.1	PASS
16	16.19E-3	0.007	0.1	PASS
17	32.22E-3	0.014	0.1	PASS
18	16.04E-3	0.007	0.1	PASS
19	43.39E-3	0.019	0.1	PASS
20	22.42E-3	0.010	0.1	PASS
21	79.49E-3	0.035	0.1	PASS
22	17.60E-3	0.008	0.1	PASS
23	96.12E-3	0.042	0.1	PASS
24	16.14E-3	0.007	0.1	PASS
25	88.79E-3	0.039	0.1	PASS
26	16.84E-3	0.007	0.1	PASS
27	71.96E-3	0.031	0.1	PASS
28	14.44E-3	0.006	0.1	PASS
29	30.38E-3	0.013	0.1	PASS
30	14.45E-3	0.006	0.1	PASS
31	45.05E-3	0.020	0.1	PASS
32	12.32E-3	0.005	0.1	PASS
33	67.15E-3	0.029	0.1	PASS
34	14.86E-3	0.006	0.1	PASS
35	79.44E-3	0.035	0.1	PASS
36	14.38E-3	0.006	0.1	PASS
37	73.06E-3	0.032	0.1	PASS
38	17.90E-3	0.008	0.1	PASS
39	67.27E-3	0.029	0.1	PASS
40	14.76E-3	0.006	0.1	PASS



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### **Power and THD results - DS: 419**

True power P:	2.152kW	Apparent power S:	2.152kVA
Reactiv power Q:	51.27var	Power factor:	1.000
THD (U):	0.001	THD (I):	0.002
Crest Factor (U):	1.414	Crest Factor (I):	1.415



### 6.7 Voltage Fluctuations and Flicker

Test Requirement: EN IEC 61851-21-2:2021

Test Method: EN IEC 61000-3-11:2019

#### 6.7.1 E.U.T. Operation

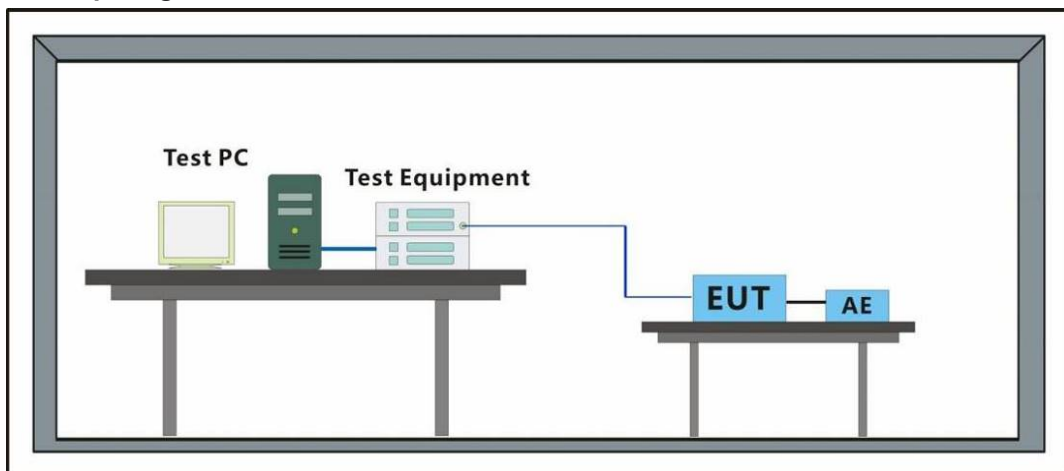
Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Pretest these mode to find the worst case:  
 a: Charging mode: Keep EUT charging continuously with 20% rated power.  
 b: Charging mode: Keep EUT charging continuously with 80% rated power.

The worst case for final test:  
 a: Charging mode: Keep EUT charging continuously with 20% rated power.

#### 6.7.2 Test Setup Diagram



#### 6.7.3 Measurement Data

##### Maximum Flicker results

	EUT values	Limit
dc [%]	1.510	3.30
dmax [%]	1.653	6.00
dt [s]	0.000	0.50
Pst	0.447	1.00
Plt	0.419	0.65

Maximum permissible system impedance

(According to EN IEC 61000-3-11:2019 clause 6.3.2)

	<b>Impedance [Ohm]</b>
Zsys1 (dmax)	1.713
Zsys2 (dc)	1.032
Zsys3 (Pst)	1.579
Zsys4 (Plt)	0.912
<b>Zmax (smallest value Zsys1~4)</b>	0.912

Determine the maximum permissible sys impedance Zmax (0.912Ω) at the interface point of user's supply, if necessary that the equipment is connected only to a supply of that impedance or less.

## **7 Immunity Test Results**

### **7.1 Performance Criteria Description in EN IEC 61851-21-2:2021**

**Criterion A**

The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus 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, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

**Criterion B**

The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

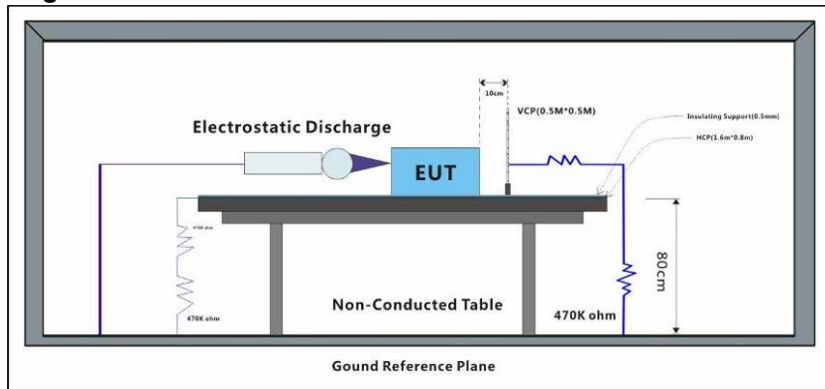
**Criterion C**

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

### 7.2 Electrostatic Discharge

Test Requirement: EN IEC 61851-21-2:2021  
 Test Method: IEC 61000-4-2:2008  
 Performance Criterion: B  
 Discharge Impedance: 330Ω/150pF  
 Number of Discharge: Minimum 10 times at each test point  
 Discharge Mode: Single Discharge  
 Discharge Period: 1 second minimum

#### 7.2.1 Test Setup Diagram



#### 7.2.2 E.U.T. Operation

Operating Environment:  
 Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar  
 Test mode:  
 a: Charging mode: Keep EUT charging continuously with 20% rated power.  
 b: Charging mode: Keep EUT charging continuously with 80% rated power.

#### 7.2.3 Test Results:

Observations: Test Point:  
 1. All insulated enclosure and seams.  
 2. All accessible metal parts of the enclosure.  
 3. All side

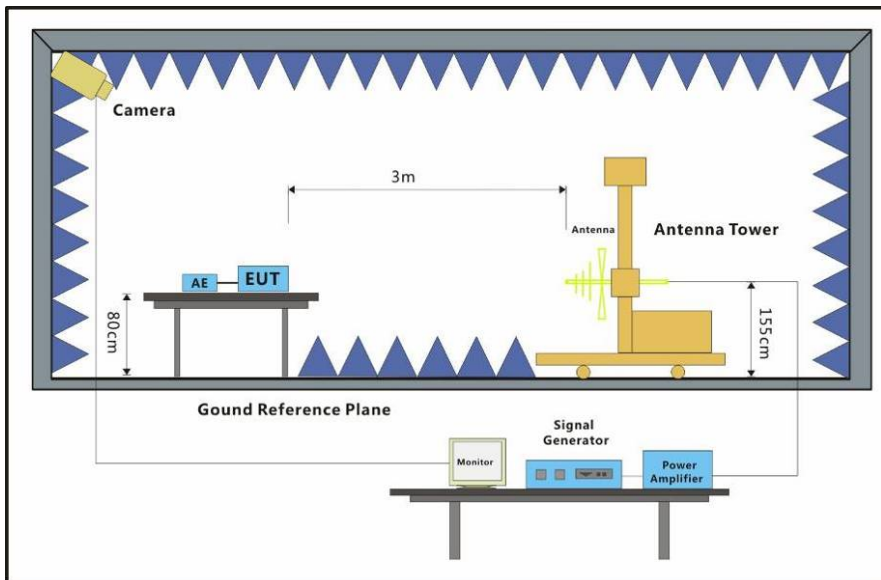
Discharge type	Level (kV)	Polarity	Test Point	Result / Observations
Air Discharge	8	+	1	A
Air Discharge	8	-	1	A
Contact Discharge	4	+	2	A
Contact Discharge	4	-	2	A
Horizontal Coupling	4	+	3	A
Horizontal Coupling	4	-	3	A
Vertical Coupling	4	+	3	A
Vertical Coupling	4	-	3	A

**Results:** A: No degradation in the performance of the EUT was observed.

### 7.3 Radiated Immunity(80MHz-2.7GHz)

Test Requirement: EN IEC 61851-21-2:2021  
 Test Method: IEC 61000-4-3:2006+ AMD1:2007+AMD2:2010  
 Performance Criterion: A  
 Frequency Range: 80MHz to 1GHz, 1.4GHz to 2GHz, 2GHz to 2.7GHz  
 Antenna Polarisation: Vertical and Horizontal  
 Modulation: 1kHz,80% Amp. Mod,1% increment

#### 7.3.1 Test Setup Diagram



#### 7.3.2 E.U.T. Operation

Operating Environment:  
 Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar  
 Test mode: a: Charging mode: Keep EUT charging continuously with 20% rated power.  
 c: Waiting mode: Keep EUT standby and waiting.

#### 7.3.3 Test Results:

Frequency	Level (V/m)	EUT Face	Dwell time	Result / Observations
80MHz-1GHz	3	Front	3s	A
80MHz-1GHz	3	Back	3s	A
80MHz-1GHz	3	Left	3s	A
80MHz-1GHz	3	Right	3s	A
80MHz-1GHz	3	Top	3s	A
80MHz-1GHz	3	Underside	3s	A
1.4GHz-2GHz	3	Front	3s	A
1.4GHz-2GHz	3	Back	3s	A
1.4GHz-2GHz	3	Left	3s	A
1.4GHz-2GHz	3	Right	3s	A
1.4GHz-2GHz	3	Top	3s	A
1.4GHz-2GHz	3	Underside	3s	A
2GHz-2.7GHz	3	Front	3s	A
2GHz-2.7GHz	3	Back	3s	A



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2GHz-2.7GHz	3	Left	3s	A
2GHz-2.7GHz	3	Right	3s	A
2GHz-2.7GHz	3	Top	3s	A
2GHz-2.7GHz	3	Underside	3s	A

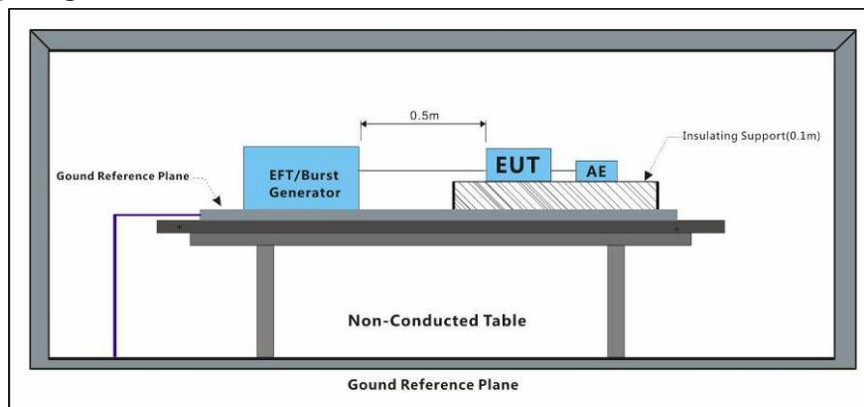
### Results:

A: No degradation in the performance of the EUT was observed.

### 7.4 Electrical Fast Transients/Burst at Power Port

Test Requirement: EN IEC 61851-21-2:2021  
 Test Method: IEC 61000-4-4:2012  
 Performance Criterion: B  
 Repetition Frequency: 5kHz  
 Burst Period: 300ms  
 Test Duration: 2 minute per level & polarity

#### 7.4.1 Test Setup Diagram



#### 7.4.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Test mode: a: Charging mode: Keep EUT charging continuously with 20% rated power.

c: Waiting mode: Keep EUT standby and waiting.

#### 7.4.3 Test Results:

Test Line	Level (kV)	Polarity	CDN/Clamp	Result / Observations
AC power port	2	+	CDN	A
AC power port	2	-	CDN	A

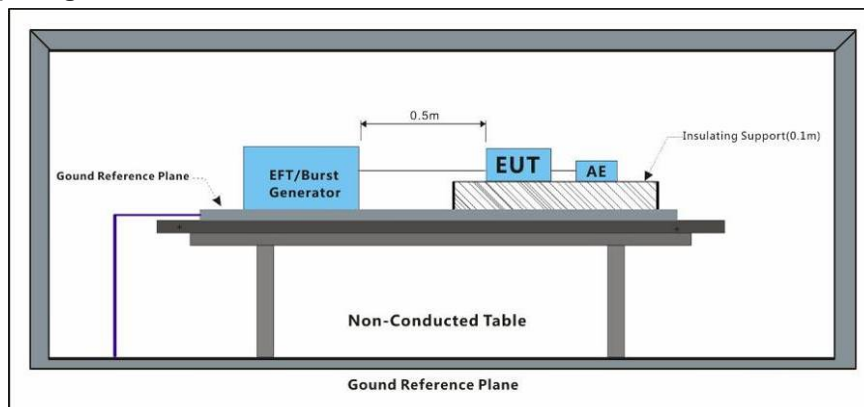
#### Results:

A: No degradation in the performance of the EUT was observed.

### 7.5 Electrical Fast Transients/Burst at CPT Port

Test Requirement:	EN IEC 61851-21-2:2021
Test Method:	IEC 61000-4-4:2012
Performance Criterion:	B
Repetition Frequency:	5kHz
Burst Period:	300ms
Test Duration:	2 minute per level & polarity

#### 7.5.1 Test Setup Diagram



#### 7.5.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Test mode: a: Charging mode: Keep EUT charging continuously with 20% rated power.

c: Waiting mode: Keep EUT standby and waiting.

#### 7.5.3 Test Results:

Test Line	Level (kV)	Polarity	CDN/Clamp	Result / Observations
CPT port	2	+	CDN	A
CPT port	2	-	CDN	A

#### Results:

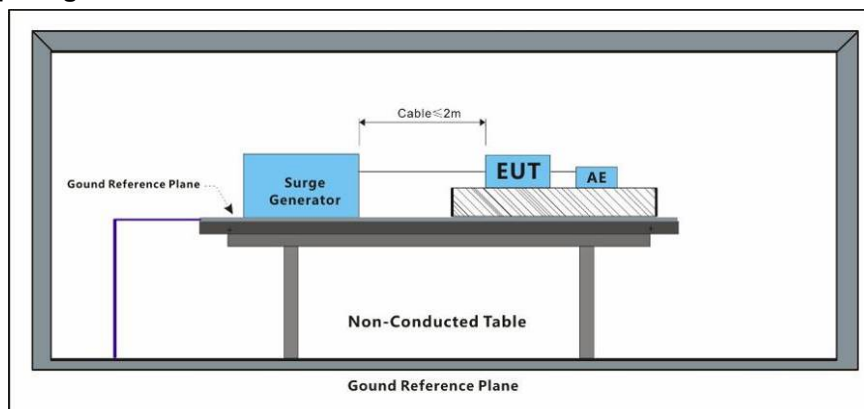
A: No degradation in the performance of the EUT was observed.



### 7.6 Surge at Power Port

Test Requirement: EN IEC 61851-21-2:2021  
 Test Method: IEC 61000-4-5:2014  
 Performance Criterion: B  
 Interval: 60s between each surge  
 No. of surges: 5 positive, 5 negative at 0°, 90°, 180°, 270°.

#### 7.6.1 Test Setup Diagram



#### 7.6.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C      Humidity: 50 % RH      Atmospheric Pressure: 1020 mbar

Test mode: a: Charging mode: Keep EUT charging continuously with 20% rated power.

c: Waiting mode: Keep EUT standby and waiting.

#### 7.6.3 Test Results:

Test Line	Level (kV)	Polarity	Phase (deg)	Result / Observations
L-N	1	+	0°	A
L-N	1	-	0°	A
L-N	1	+	90°	A
L-N	1	-	90°	A
L-N	1	+	180°	A
L-N	1	-	180°	A
L-N	1	+	270°	A
L-N	1	-	270°	A
L-PE	2	+	0°	A
L-PE	2	-	0°	A
L-PE	2	+	90°	A
L-PE	2	-	90°	A
L-PE	2	+	180°	A
L-PE	2	-	180°	A
L-PE	2	+	270°	A
L-PE	2	-	270°	A
N-PE	2	+	0°	A
N-PE	2	-	0°	A
N-PE	2	+	90°	A



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N-PE	2	-	90°	A
N-PE	2	+	180°	A
N-PE	2	-	180°	A
N-PE	2	+	270°	A
N-PE	2	-	270°	A

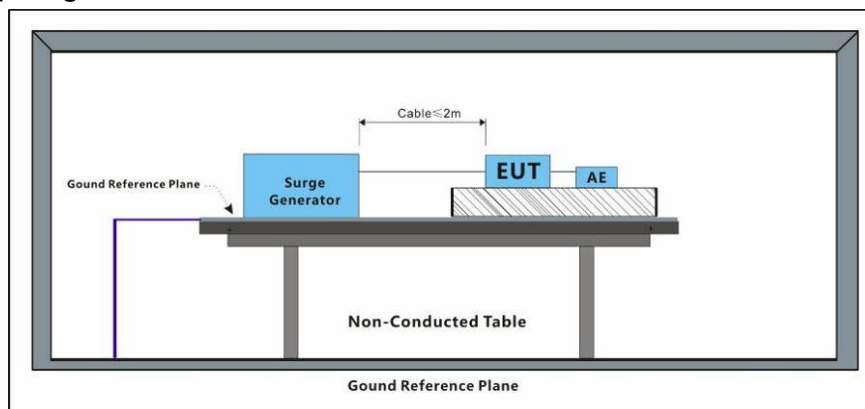
### Results:

A: No degradation in the performance of the EUT was observed.

### 7.7 Surge at CPT Port

Test Requirement: EN IEC 61851-21-2:2021  
 Test Method: IEC 61000-4-5:2014  
 Performance Criterion: B  
 Interval: 60s between each surge  
 No. of surges: 5 positive, 5 negative at 0°, 90°, 180°, 270°.

#### 7.7.1 Test Setup Diagram



#### 7.7.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Test mode: a: Charging mode: Keep EUT charging continuously with 20% rated power.

c: Waiting mode: Keep EUT standby and waiting.

#### 7.7.3 Test Results:

Test Line	Level (kV)	Polarity	Phase (deg)	Result / Observations
L-N	1	+	0°	A
L-N	1	-	0°	A
L-N	1	+	90°	A
L-N	1	-	90°	A
L-N	1	+	180°	A
L-N	1	-	180°	A
L-N	1	+	270°	A
L-N	1	-	270°	A
L-PE	2	+	0°	A
L-PE	2	-	0°	A
L-PE	2	+	90°	A
L-PE	2	-	90°	A
L-PE	2	+	180°	A
L-PE	2	-	180°	A
L-PE	2	+	270°	A
L-PE	2	-	270°	A
N-PE	2	+	0°	A
N-PE	2	-	0°	A
N-PE	2	+	90°	A



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N-PE	2	-	90°	A
N-PE	2	+	180°	A
N-PE	2	-	180°	A
N-PE	2	+	270°	A
N-PE	2	-	270°	A

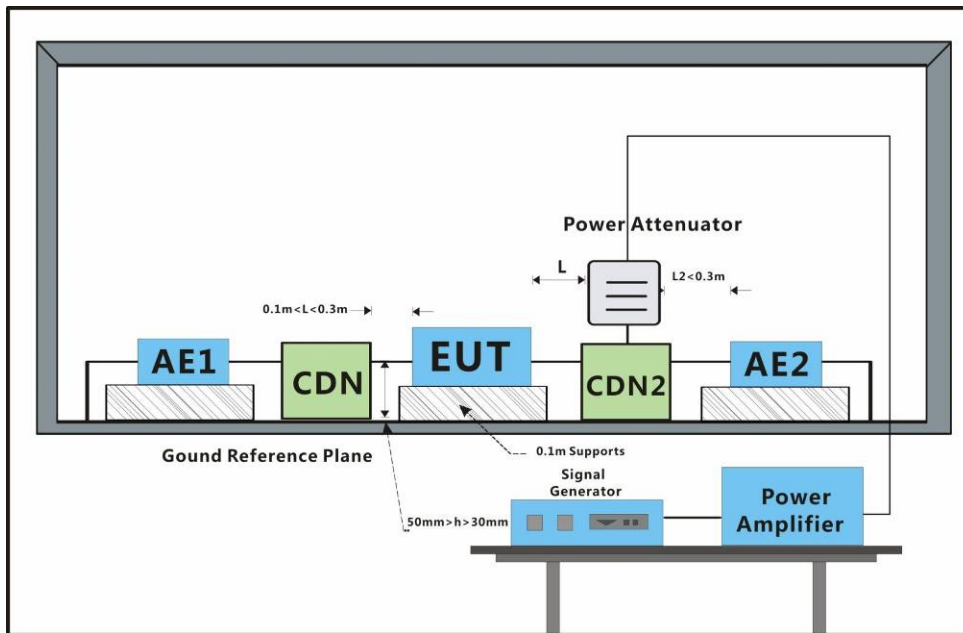
### Results:

A: No degradation in the performance of the EUT was observed.

### 7.8 Conducted Immunity at Power Port (150kHz-80MHz)

Test Requirement: EN IEC 61851-21-2:2021  
 Test Method: IEC 61000-4-6:2013  
 Performance Criterion: A  
 Frequency Range: 0.15MHz to 80MHz  
 Modulation: 80%, 1kHz Amplitude Modulation  
 Step Size: 1%

#### 7.8.1 Test Setup Diagram



#### 7.8.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C      Humidity: 50 % RH      Atmospheric Pressure: 1020 mbar

Test mode: a: Charging mode: Keep EUT charging continuously with 20% rated power.

c: Waiting mode: Keep EUT standby and waiting.

#### 7.8.3 Test Results:

Cable port	Level (Vrms)	CDN/Clamp	Dwell time	Result / Observations
AC power port	3	CDN	2s	A

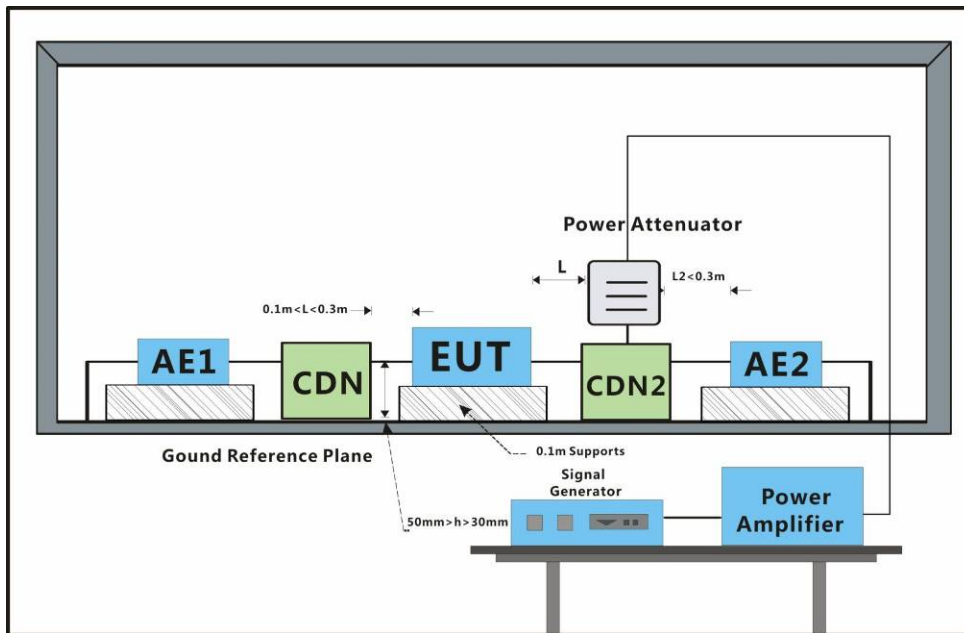
#### Results:

A: No degradation in the performance of the EUT was observed.

### 7.9 Conducted Immunity at CPT Port (150kHz-80MHz)

Test Requirement: EN IEC 61851-21-2:2021  
 Test Method: IEC 61000-4-6:2013  
 Performance Criterion: A  
 Frequency Range: 0.15MHz to 80MHz  
 Modulation: 80%, 1kHz Amplitude Modulation  
 Step Size: 1%

#### 7.9.1 Test Setup Diagram



#### 7.9.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1020 mbar

Test mode: a: Charging mode: Keep EUT charging continuously with 20% rated power.

c: Waiting mode: Keep EUT standby and waiting.

#### 7.9.3 Test Results:

Cable port	Level (Vrms)	CDN/Clamp	Dwell time	Result / Observations
CPT port	10	CDN	2s	A

#### Results:

A: No degradation in the performance of the EUT was observed.

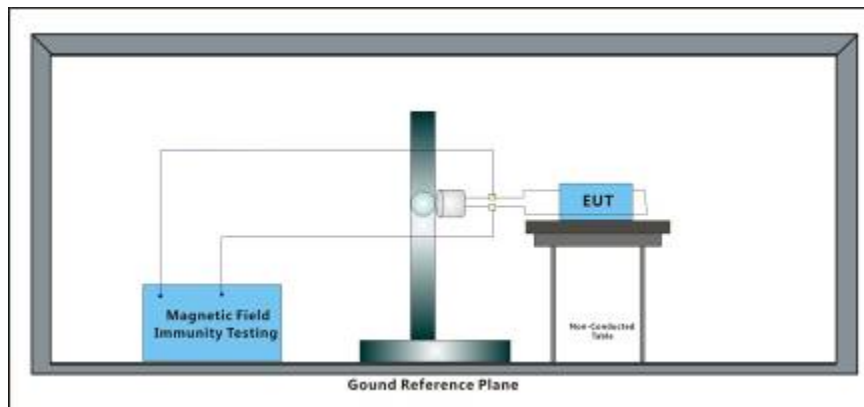
### 7.10 Power Frequency Magnetic Field

Test Requirement: EN IEC 61851-21-2:2021

Test Method: IEC 61000-4-8:2009

Performance Criterion: A

#### 7.10.1 Test Setup Diagram



#### 7.10.2 E.U.T. Operation

Operating Environment:

Temperature: 22 °C      Humidity: 50 % RH      Atmospheric Pressure: 1001 mbar

Test mode: a: Charging mode: Keep EUT charging continuously with 20% rated power.

c: Waiting mode: Keep EUT standby and waiting.

#### 7.10.3 Test Results:

Frequency	Systems	Level (A/m)	Axial	Magnetic Field Type	Result / Observations
50Hz	≤32A	30	X	Continuous filed	A
50Hz	≤32A	30	Y	Continuous filed	A
50Hz	≤32A	30	Z	Continuous filed	A

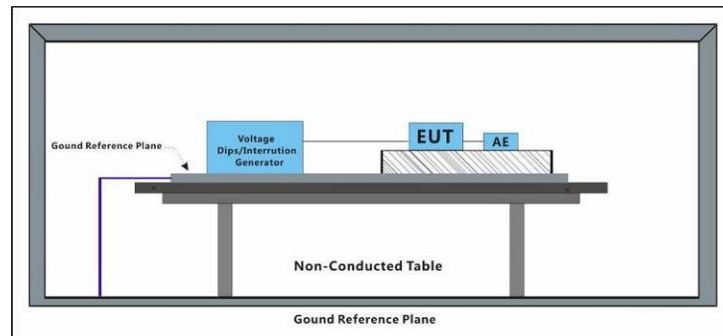
#### Results:

A: No degradation in the performance of the EUT was observed.

### 7.11 Voltage Dips and Interruptions

Test Requirement:	EN IEC 61851-21-2:2021
Test Method:	IEC 61000-4-11:2004 ( $\leq 16A$ ), IEC 61000-4-34:2005+A1:2009 ( $>16A$ )
Performance Criterion:	For 50Hz: 40 % UT for 10per 70 % UT for 25per 0 % UT for 1per 0 % UT for 250per For 60Hz: 40 % UT for 12per 70 % UT for 30per 0 % UT for 1per 0 % UT for 300per
No. of Dips / Interruptions:	3 per Level
Time between dropout	10s

#### 7.11.1 Test Setup Diagram



#### 7.11.2 E.U.T. Operation

Operating Environment:	
Temperature:	22 °C      Humidity: 50 % RH      Atmospheric Pressure: 1020 mbar
Test mode:	a: Charging mode: Keep EUT charging continuously with 20% rated power. c: Waiting mode: Keep EUT standby and waiting.

#### 7.11.3 Test Results:

Level % UT	Phase (deg)	Duration	No. of Dips / Interruptions	Result / Observations
40	0°	10 Cycles	3	A
40	180°	10 Cycles	3	A
70	0°	25 Cycles	3	A
70	180°	25 Cycles	3	A
0	0°	1 Cycles	3	A
0	180°	1 Cycles	3	A
0	0°	250 Cycles	3	C
0	180°	250 Cycles	3	C

#### Results:

- A: No degradation in the performance of the EUT was observed.
- C: During the test, the EUT stop working. After testing, the EUT restarted by operator.



## 8 Photographs

### Conducted Emissions at Mains Terminals (150kHz-30MHz) Test Setup



### Radiated Emissions (30MHz - 1GHz) Test Setup



### Radiated Emissions (above 1GHz) Test Setup



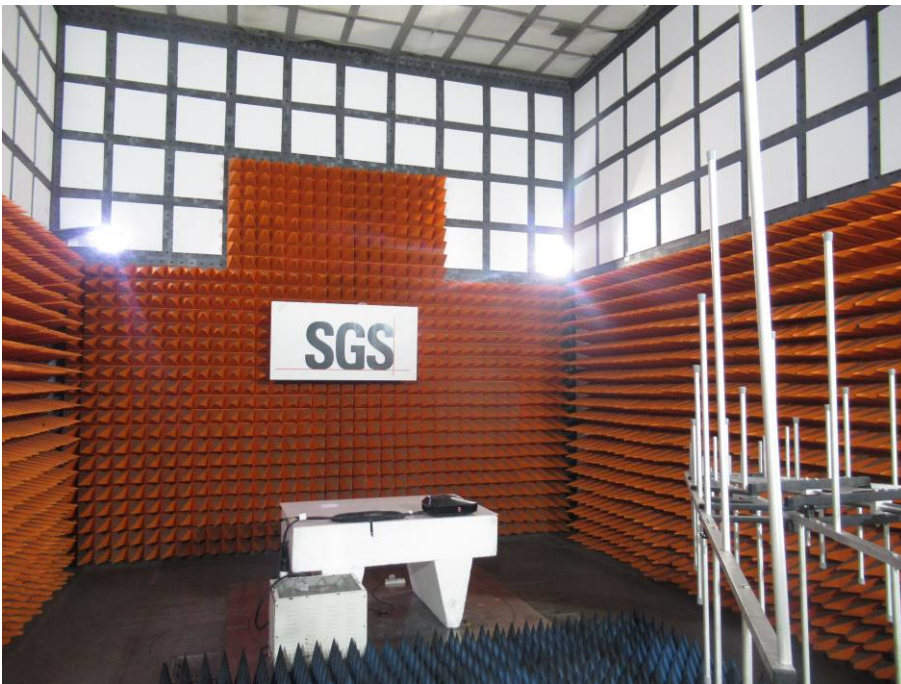
### Harmonic & Voltage Fluctuations and Flicker Test Setup



### Electrostatic Discharge Test Setup



### Radiated Immunity(80MHz-2.7GHz) Test Setup





Electrical Fast Transients/Burst at Power Port Test Setup



### Surge at Power Port Test Setup



### Conducted Immunity at Power Port (150kHz-80MHz) Test Setup



### Voltage Dips and Interruptions Test Setup

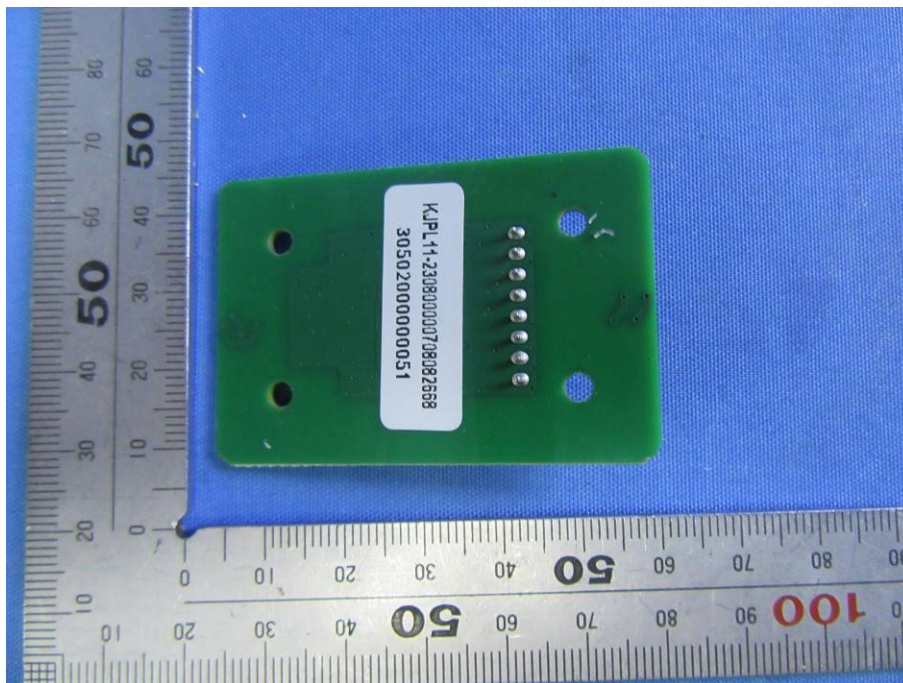
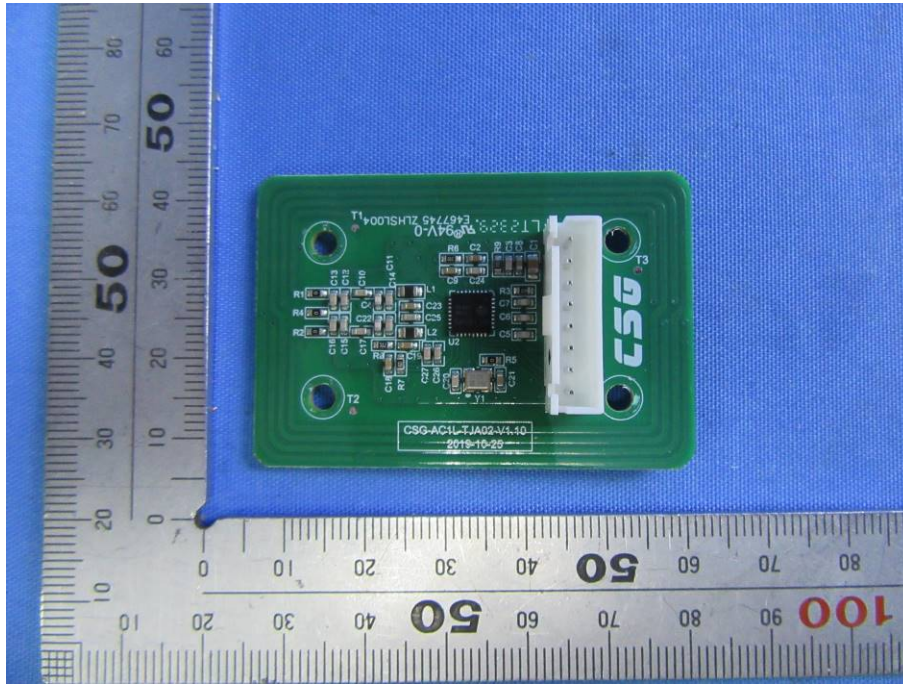


### Power Frequency Magnetic Field

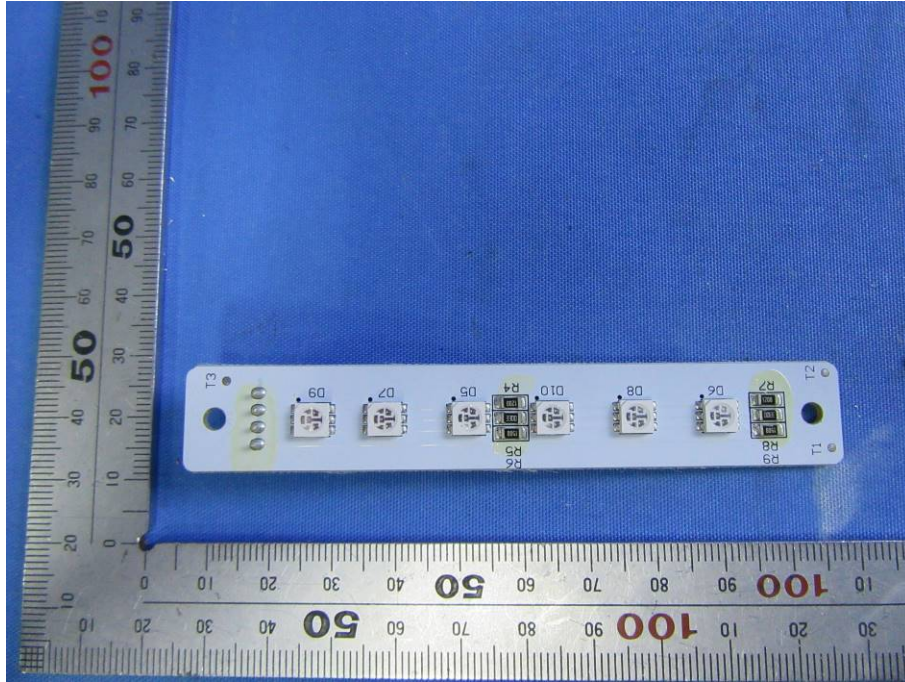


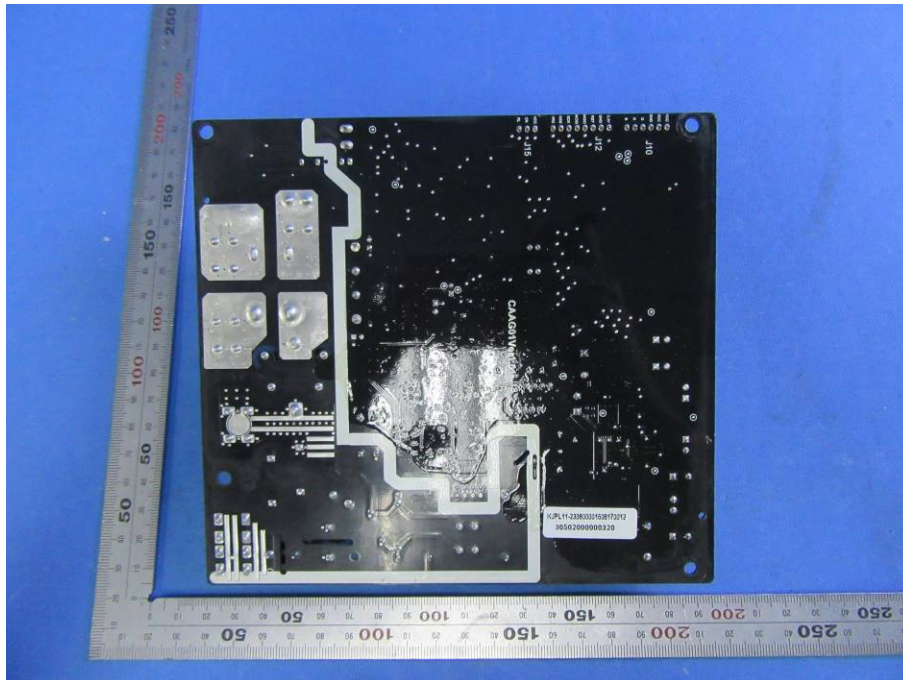
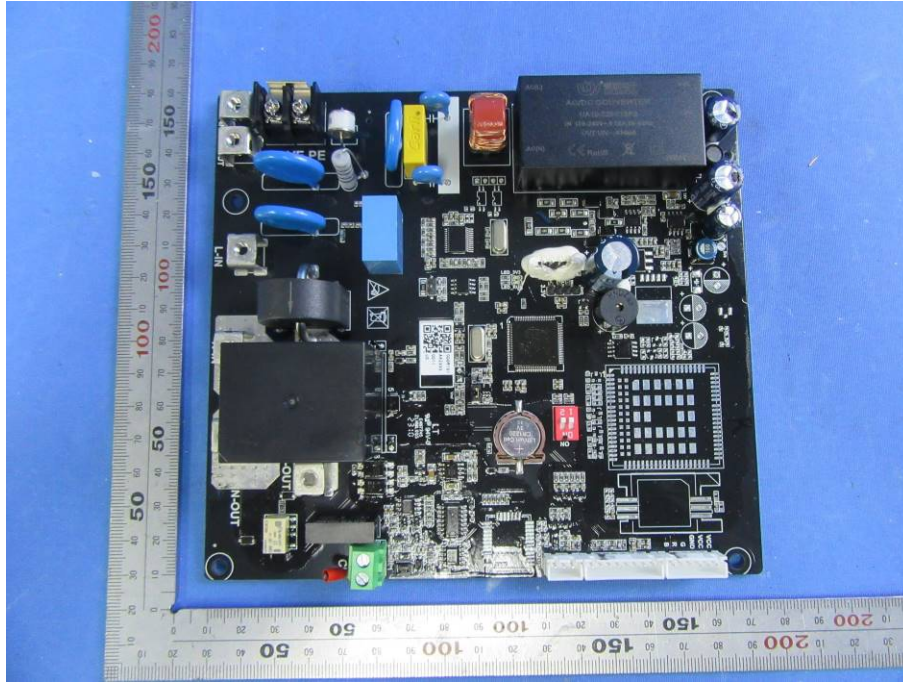
## 9 EUT Constructional Details (EUT Photos)











- End of the Report -