

EMC TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR



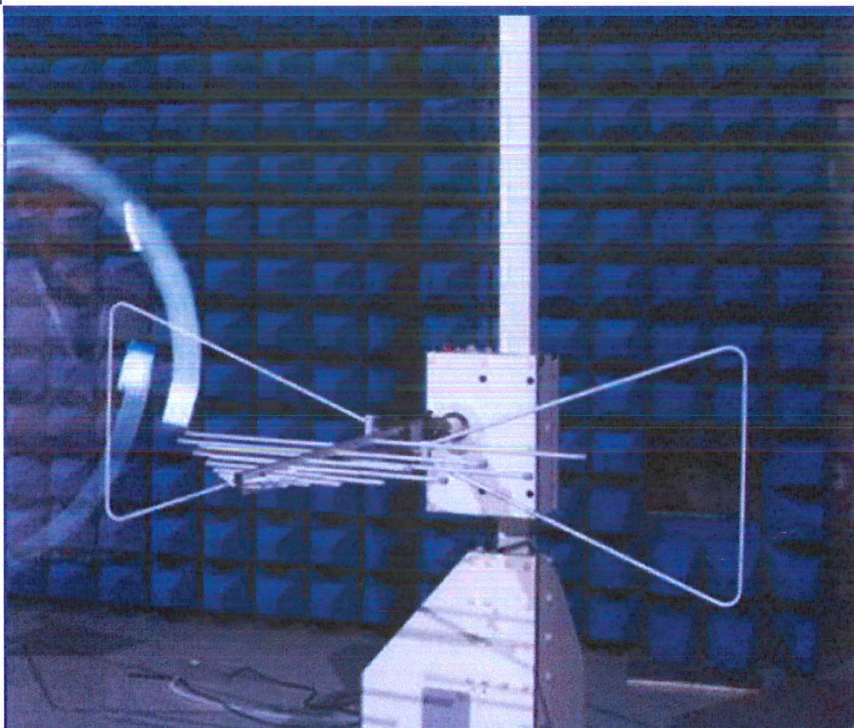
PV Grid inverter



ISSUED TO
EVOLVE ENERGY GROUP CO., LIMITED.

中国认可
国际互认
检测
TESTING
CNAS L6791

RM 702, 7/F FU FAI COMM CTR 27 HILLIER ST SHEUNG WAN, HK



Tested by: Xiong Chong
Xiong Chong

Date: Jun. 23, 2020

Reviewed by: Xia Long
Xia Long

Date: Jun. 23, 2020

Approved by: Liao Jianming
Liao Jianming
(Technical Director)

Date: Jun. 23, 2020

Report No.: BL-DG2060297-401

EUT Name: PV Grid inverter

Model Name: EVVO 3200TL-AV (refer section 2.4)

Brand Name: **EVVO**

Test Standard: Refer Section 3.1

Test conclusion: Pass

Test Date: Jul. 02, 2019 ~ Jul. 22, 2019

Date of Issue: Jun. 23, 2020

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Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
<u>Rev. 01</u>	<u>Jun. 23, 2020</u>	<u>Initial Issue</u>

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1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	<p>The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1.</p> <p>The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.</p> <p>The laboratory is a testing organization accredited by American Association for Laboratory Accreditation(A2LA) according to ISO/IEC 17025.The accreditation certificate is 4344.01.</p> <p>The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.</p>
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20°C~25°C
Ambient Relative Humidity	45% - 55%
Ambient Pressure	100 kPa - 102 kPa

1.4 Announce

- (1) The test report reference to the report template version v4.5.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for testing, reviewing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (7) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	EVOLVE ENERGY GROUP CO., LIMITED
Address	RM 702, 7/F FU FAI COMM CTR 27 HILLIER ST SHEUNG WAN, HK

2.2 Manufacturer Information

Manufacturer	EVOLVE ENERGY GROUP CO., LIMITED
Address	RM 702, 7/F FU FAI COMM CTR 27 HILLIER ST SHEUNG WAN, HK

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	PV Grid inverter
Model Name Under Test	EVVO 3200TL-AV
Series Model Name	EVVO 1100TL-AV, EVVO 1600TL-AV, EVVO 2200TL-AV, EVVO 2700TL-AV, EVVO 3000TL-AV
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A
Remark	Model No.: EVVO 1100TL-AV, EVVO 1600TL-AV, EVVO 2200TL-AV, EVVO 2700TL-AV, EVVO 3000TL-AV. The model EVVO 1600TL-AV and EVVO 3200TL-AV were tested and the worst data are recorded in this report, since the electrical circuit design, layout, components used, internal wiring And function were identical for the above models, please find more specification from below table.

Model Item	EVVO 1100TL-AV	EVVO 1600TL-AV	EVVO 2200TL-AV	EVVO 2700TL-AV	EVVO 3000TL-AV	EVVO 3200TL-AV
Heat sink size	253*253.3*26.5mm			271*253.3*40mm		
Inverter inductance	0.99mH * 2pcs			0.676mH * 2 pcs		
Bus capacitance	470uF /500V* 2 pcs			470uF/550V * 3 pcs		
size	303X260.5X118			321X260.5X131.5		
weight	5.5kg			6.3kg		
Operating voltage range	50-500V			50-550V		
Grid-connected starting voltage	70V			70V		
Full load MPPT range	110-450V	150-450V	200-450V	250-500V	275-500V	300-500V
Max. Input power	1500W	2200W	3000W	3700W	4100W	4500W
Max. Output current	5.3A	7.7A	10.6A	13A	14.5A	16A
Max. Output power	1100VA	1600VA	2200VA	2700VA	3000VA	3300VA









2.5 Ancillary Equipment

Note: not application.

2.6 Technical Information

Interfaces present on the EUT	AC Ports	From mains to AC power adapter.
	DC Ports	From power supply to EUT.
	Telecom Port	No Telecom Ports.
	Signal Ports	No Signal ports.
About the Product		The equipment is Solar Grid-tied Inverter, the above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

TABLE:

EVVO		Solar Grid-tied Inverter
Model No:	EVVO 3200TL - AV	
Max.DC Input Voltage	550V	
Operating MPPT Voltage Range	50~550V	
Max. Input Current	12A	
Max. PV Isc	15A	
Nominal Grid Voltage	L/N/PE, 230Vac	
Max.Output Current	16A	
Nominal Grid Frequency	50/60Hz	
Max.Output Power	3300VA	
Power Factor	1 (adjustable +/-0.8)	
Ingress Protection	IP65	
Operating Temperature Range	-30°C~ +60°C	
Protective Class	Class I	
Inverter Topology	Non-Isolated	
Factory - Shenzhen China		
Manufacturer : EVOLVE ENERGY GROUP CO., LIMITED		
Address :RM 702, 7/F FU FAI COMM CTR 27 HILLIER ST SHEUNG WAN, HK		
Global Head Quarters		
371 Sidco Industrial Estate		
Chennai 600098 India		
VDE0126-1-1,VDE-AR-N4105, IEC61727, IEC62116, UTE C15-712-1, AS4777		
       		

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

The objective of the report is to perform testing according to following standards for CE marking:

No.	Identity	Document Title
1	EN IEC 61000-6-1:2019	Electromagnetic compatibility (EMC) -- Part 6-1: Generic standards —Immunity for residential, commercial and light-industrial environments.
2	IEC 61000-6-1: 2019	Electromagnetic compatibility (EMC) -- Part 6-1: Generic standards —Immunity for residential, commercial and light-industrial environments.
3	EN 61000-6-3: 2007/A1:2011/AC: 2012	Electromagnetic compatibility (EMC) -- Part 6-3: Generic standards — Emission standard for residential, commercial and light-industrial environments.
4	IEC 61000-6-3: 2006+AMD1: 2010	Electromagnetic compatibility (EMC) -- Part 6-3: Generic standards — Emission standard for residential, commercial and light-industrial environments.
5	EN 61000-3-2: 2014	Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).
6	IEC 61000-3-2: 2018	Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).
7	EN 61000-3-3: 2013	Electromagnetic Compatibility (EMC)-- Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low – voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.
8	IEC 61000-3-3:2013+AMD1:2017	Electromagnetic Compatibility (EMC)-- Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low – voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.

3.2 Verdict

No	Base Standard	Description	Test Verdict	Result	Remark
Emission					
1	EN 61000-6-3 IEC 61000-6-3	Radiated Emission	Below 1 GHz	Pass	Annex A.1 -- Note 1
			Above 1 GHz	N/A	
2	EN 61000-6-3 IEC 61000-6-3	Conducted Emission	AC Ports	Pass	Annex A.2 -- Note 2 --
			DC Ports	N/A	
			Telecom Ports	N/A	
3	EN 61000-3-2 IEC 61000-3-2	Harmonic Current Emissions	Pass	Annex A.3	--
4	EN 61000-3-3 IEC 61000-3-3	Voltage Fluctuations & Flicker	Pass	Annex A.4	--
Immunity					
5	IEC 61000-4-2	Electrostatic Discharge Immunity	Pass	Annex A.5	--
6	IEC 61000-4-3	Radiated RF Electromagnetic Field Immunity	Pass	Annex A.6	--
7	IEC 61000-4-4	Electrical Fast Transient/Burst Immunity	AC Ports	Pass	Annex A.7 -- -- --
			DC Ports	Pass	
			Signal Ports	N/A	
8	IEC 61000-4-5	Surge Immunity	AC Ports	Pass	Annex A.8 -- --
			DC Ports	Pass	
9	IEC 61000-4-6	Immunity to Conducted Disturbances Induced by RF Fields	AC Ports	Pass	Annex A.9 -- -- --
			DC Ports	Pass	
			Signal Ports	N/A	
10	IEC 61000-4-8	Power-frequency magnetic field	Pass	Annex A.10	--
11	IEC 61000-4-11	Voltage Dips and Short Interruptions Immunity	AC Ports	Pass	Annex A.11 --
<p>Note 1: The highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall be made up to 1 GHz.</p> <p>Note 2: The EUT not containing devices susceptible to magnetic fields, so this test item is not applicable.</p> <p>Note 3: The only difference between the EUT (test samples in this report) and testing sample of report No. BL-SZ19B0347-401, which was issued by Shenzhen BALUN Technology Co., Ltd. on Aug. 23, 2019 is that add IEC standards, and EUT is the same. All the test result data please refer to report No. BL-SZ19B0347-401, which was issued by Shenzhen BALUN Technology Co., Ltd. on Aug. 23, 2019.</p>					

3.3 Test Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Measurement	Value
Conducted emissions (9 kHz-30 MHz)	3.23 dB
Radiated emissions (30 MHz-1 GHz)	4.30 dB
Radiated emissions (1 GHz-18 GHz)	4.81 dB
Radiated emissions (18 GHz-40 GHz)	5.71 dB

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

Environment Parameter	Selected Values During Tests			
	Temperature	Voltage	Relative Humidity	Ambient Pressure
Normal Temperature, Normal Voltage (NTNV)	23°C~25°C	AC 230V/ 50 Hz DC 360V	50%-55%	100 to 102 kPa

4.2 Test Equipment List

Radiated Emission Test For Frequency Below 1 GHz						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWA RZ	ESRP	101036	2019.06.12	2020.06.11	<input checked="" type="checkbox"/>
Test Antenna- Bi-Log	SCHWARZBECK	VULB 9163	9163-977	2019.07.21	2020.07.20	<input checked="" type="checkbox"/>
Test Antenna- Horn	SCHWARZBECK	BBHA 9120D	9120D-1600	2018.07.11	2020.07.10	<input type="checkbox"/>
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60 *7.35m	N/A	2018.08.08	2020.08.07	<input checked="" type="checkbox"/>

Radiated Emission Test For Frequency Above 1 GHz						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2018.11.07	2019.11.06	<input type="checkbox"/>
Test Antenna- Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2019.07.21	2020.07.20	<input type="checkbox"/>
Test Antenna- Horn	SCHWARZBECK	BBHA 9120D	9120D-1148	2018.07.11	2020.07.10	<input type="checkbox"/>
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2019.02.20	2021.02.18	<input type="checkbox"/>

Conducted disturbance Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWA RZ	ESRP	101036	2019.06.12	2020.06.11	<input checked="" type="checkbox"/>
LISN	SCHWARZBECK	NSLK 8127	8127-687	2019.06.12	2020.06.11	<input type="checkbox"/>
LISN	SCHWARZBECK	NNLK 8129	8129-462	2018.11.07	2019.11.06	<input checked="" type="checkbox"/>
AMN	SCHWARZBECK	NNBM8124	8124-509	2019.06.12	2020.06.11	<input type="checkbox"/>
AMN	SCHWARZBECK	NNBM8124	8124-510	2019.06.12	2020.06.11	<input type="checkbox"/>
ISN	TESEQ	ISN T800	34449	2017.12.05	2019.12.04	<input type="checkbox"/>
Shielded Enclosure	RAINFORD	9m*6m*6m	N/A	2019.02.20	2021.02.18	<input checked="" type="checkbox"/>

Voltage Fluctuations & Flicker and Harmonic Current Emissions Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
HARMONICS,FLICKER&POWER ANALYSER	LAPLACE INSTRUMENTS	AC2000A	377954	2018.11.07	2019.11.06	<input checked="" type="checkbox"/>
AC TESTING POWER SOURCE	EVERFINE	DPS1030	Y120984CJ7 331115	2018.11.07	2019.11.06	<input checked="" type="checkbox"/>

Electrostatic Discharge Immunity Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
ESD Test System	SCHLODER	SESD 30000	206253	2019.06.20	2020.06.19	<input checked="" type="checkbox"/>

Radiated RF Electromagnetic Field Immunity Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2019.02.20	2021.02.18	<input checked="" type="checkbox"/>
Signal Generator	ROHDE&SCHWARZ	SMB100A	177746	2019.06.10	2020.06.09	<input checked="" type="checkbox"/>
Power Amplifier	OPHIR RF	5225F	1037	N/A	N/A	<input checked="" type="checkbox"/>
Power Amplifier	OPHIR RF	5273F	1016	N/A	N/A	<input checked="" type="checkbox"/>
Power Meter	Agilent	E4419B	GB40201833	2018.11.15	2019.11.14	<input checked="" type="checkbox"/>
Directional Coupler	Werlantone	C5982-10	109275	N/A	N/A	<input checked="" type="checkbox"/>
Directional Coupler	Werlantone	CHP-273E	S00801z-01	N/A	N/A	<input checked="" type="checkbox"/>
Feld Strength Meter	Narda	EP601	511WX51129	2019.06.18	2020.06.17	<input checked="" type="checkbox"/>
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2019.07.21	2020.07.20	<input checked="" type="checkbox"/>
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	9120D-1148	2018.07.11	2020.07.10	<input checked="" type="checkbox"/>
Mouth Simulator	B&K	4227	2423931	2018.11.15	2019.11.14	<input type="checkbox"/>
Sound Calibrator	B&K	4231	2430337	2018.11.15	2019.11.14	<input type="checkbox"/>
Sound Level Meter	B&K	NL-20	00844023	2018.11.15	2019.11.14	<input type="checkbox"/>
Ear Simulator	B&K	4185	2409449	2018.11.15	2019.11.14	<input type="checkbox"/>
Ear Simulator	B&K	4195	2418189	2018.11.15	2019.11.14	<input type="checkbox"/>
Audio analyzer	B&K	UPL 16	100129	2018.11.15	2019.11.14	<input type="checkbox"/>

Electrical Fast Transient/Burst Immunity Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EFT Test System	HTEC	HEFT 51	1331011	2019.05.07	2020.05.06	<input checked="" type="checkbox"/>
EFT coupling network	HTEC	ECDN 51	150601	2019.05.07	2020.05.06	<input checked="" type="checkbox"/>
EFT clamp	TESEQ	CDN 3425	25164	2019.05.07	2020.05.06	<input type="checkbox"/>

Transients and Surges Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
SURGE Generator (AC/DC Ports)	HTEC	HCWG 70	151601	2019.05.07	2020.05.06	<input checked="" type="checkbox"/>
SURGE coupling network (AC/DC Ports)	HTEC	SCDN303P7	151602	2019.05.07	2020.05.06	<input checked="" type="checkbox"/>
SURGE Generator (Telecom Ports)	HTEC	HCOMB 70	143806	2019.05.07	2020.05.06	<input type="checkbox"/>
SURGE coupling network (Telecom Ports)	HTEC	TCOMB-4	143807	2019.05.07	2020.05.06	<input type="checkbox"/>

Immunity to Conducted Disturbances Induced by RF Fields						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
CONDUCTED DISTURBANCES TEST SYSTEM	Schloder GmbH	CDG 6000	126B1286	2018.06.13	2019.06.12	<input type="checkbox"/>
CDN-M2+3	Schloder GmbH	CDN M2+M3-16	A2210276	2018.06.13	2019.06.12	<input checked="" type="checkbox"/>
CDN-M1	Schloder GmbH	CDN-M1	A2010063	2018.11.07	2019.11.06	<input type="checkbox"/>
CDN-M4	Schloder GmbH	CDN-M4	A2610002	2018.11.07	2019.11.06	<input type="checkbox"/>
CDN-M5	Schloder GmbH	CDN-M5	A2560005	2018.11.07	2019.11.06	<input type="checkbox"/>
Injection Probe	FCC	F-120-8M	190119	2018.04.19	2019.04.18	<input type="checkbox"/>

Voltage Dips and Short Interruptions Immunity Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
Voltage Fault Simulating Generator	HTEC	HPFS303P	152301	2019.05.07	2020.05.06	<input checked="" type="checkbox"/>
Voltage Fault Coupling Network	HTEC	HV3P30	152302	2019.05.07	2020.05.06	<input checked="" type="checkbox"/>

4.3 Test Enclosure list

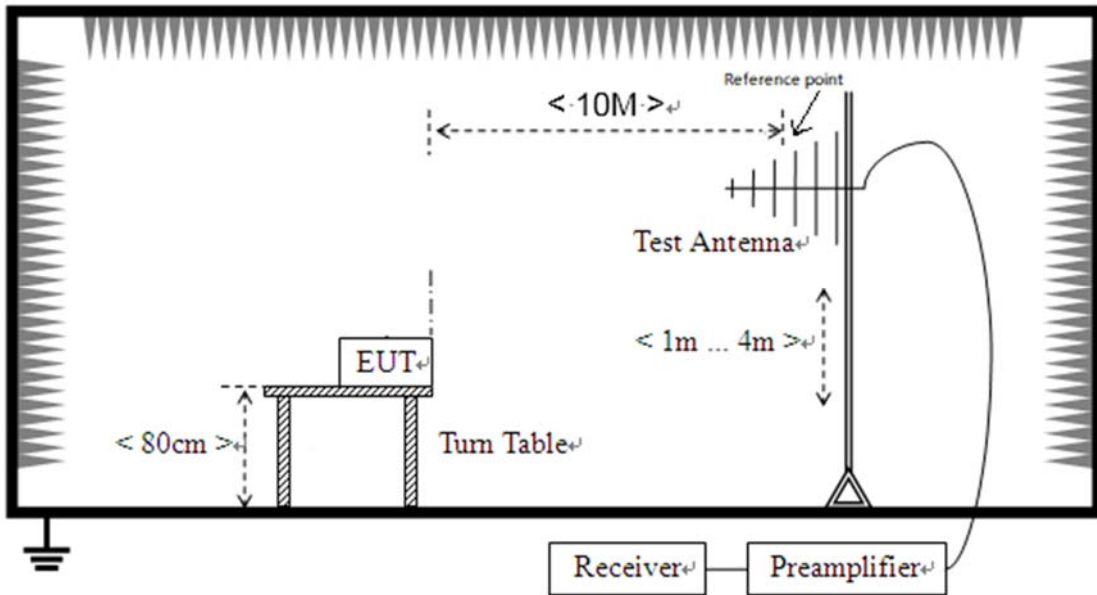
Description	Manufacturer	Model	Serial No.	Length	Description	Use
PC	Dell	015K3N	N/A	N/A	Special Handled	<input type="checkbox"/>
Laptop	Apple	A1465	N/A	N/A	N/A	<input type="checkbox"/>
Printer	HP	DESKJET 1000	N/A	N/A	N/A	<input type="checkbox"/>
Keyboard	Logitech	Y-BP62a	N/A	N/A	N/A	<input type="checkbox"/>
Mouse	Logitech	M100	N/A	N/A	N/A	<input type="checkbox"/>
USB disk	Kingston	N/A	N/A	N/A	N/A	<input type="checkbox"/>
TF Card	Kingston	N/A	N/A	N/A	N/A	<input type="checkbox"/>
VGA Cable	N/A	N/A	N/A	1.5 m	Shielded with core	<input type="checkbox"/>
HDMI Cable	N/A	N/A	N/A	1.5 m	Shielded with core	<input type="checkbox"/>
DVI Cable	N/A	N/A	N/A	1.5 m	Shielded with core	<input type="checkbox"/>
Coaxial video cable	N/A	N/A	N/A	2.0 m	Shielded with core	<input type="checkbox"/>
iPhone	Apple	A1586	N/A	N/A	N/A	<input type="checkbox"/>
Phone	MI	M4	N/A	N/A	N/A	<input type="checkbox"/>
Bluetooth Earphone	SAMSUNG	Gear Circle	N/A	N/A	N/A	<input type="checkbox"/>
Wireless Communications Test Set	R&S	CMW500	142028	N/A	Cal. Due 2019.06.14	<input type="checkbox"/>
WIFI Router	TP-LINK	TL-WDR7500	N/A	N/A	N/A	<input type="checkbox"/>
Earphone	N/A	OPPO	N/A	1.1 m	N/A	<input type="checkbox"/>
Car Battery	Camel	55530	N/A	N/A	12 V/55 Ah	<input type="checkbox"/>
Artificial load	N/A	N/A	N/A	N/A	2.5 Ω/100 W	<input type="checkbox"/>
Artificial load	N/A	N/A	N/A	N/A	5 Ω/100 W	<input type="checkbox"/>
Electronic Load	ITECH	IT8511	N/A	N/A	N/A	<input type="checkbox"/>
USB Cable	N/A	N/A	N/A	1.5 m	Shielded with core	<input type="checkbox"/>
DC Power Supply	ITECH	IT6863A	60001401068 7210006	N/A	N/A	<input type="checkbox"/>
LCD Monitor	SAMSUNG	UA32C4000P	N/A	N/A	N/A	<input type="checkbox"/>
LCD Monitor	Dell	U241HB	N/A	N/A	N/A	<input type="checkbox"/>
RJ45 Cable	N/A	N/A	N/A	1.5 m	Shielded with core	<input type="checkbox"/>
Chorma 62150H-1000S	Chorma	N/A	6215EF01558	N/A	IN 380/400V-- 3~50A--17.2Kw OUT 1000V-- 15A--15kW	<input checked="" type="checkbox"/>

4.4 Test Configurations

Test Configurations (TC) No.	Description
TC01	<u>The Full load Test mode</u> EUT + Chorma 62150H-1000S
TC02	<u>The Half load Test mode</u> EUT + Chorma 62150H-1000S
TC03	<u>The 10% load Test mode</u> EUT + Chorma 62150H-1000S

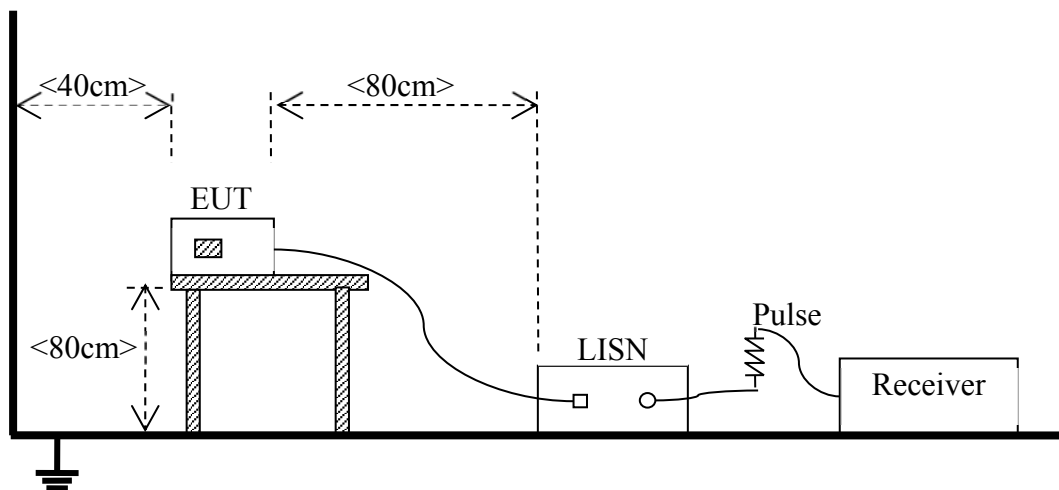
4.5 Description of Test Setup

Test Setup 1

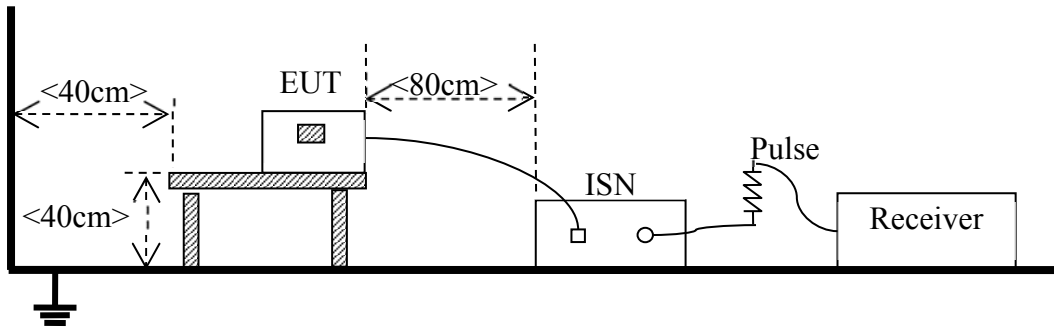


(For Radiated Emission Test (30 MHz-1 GHz))

Test Setup 2

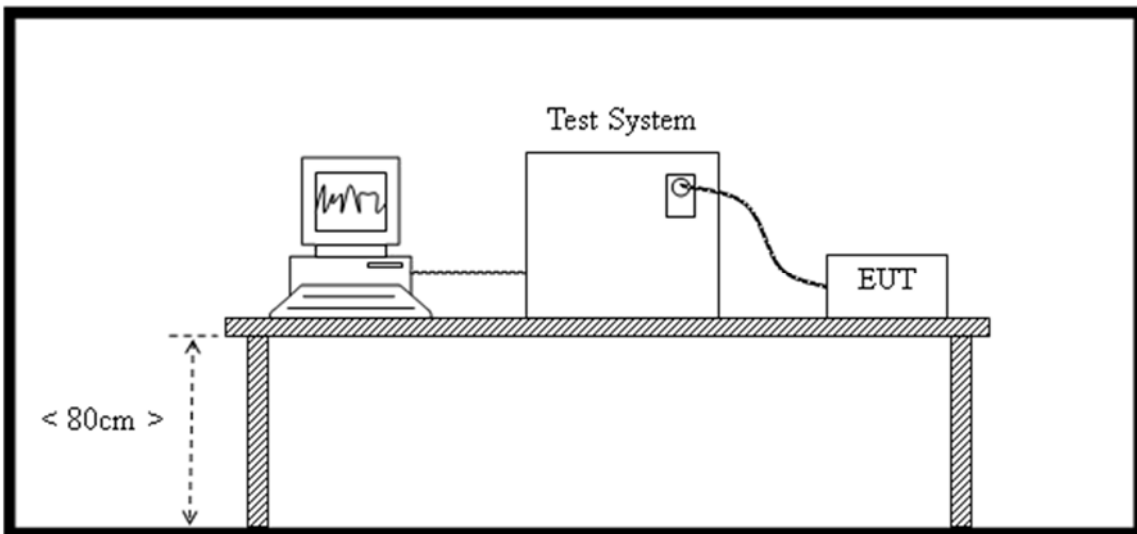


(For Conducted disturbance voltage at mains terminals Test)



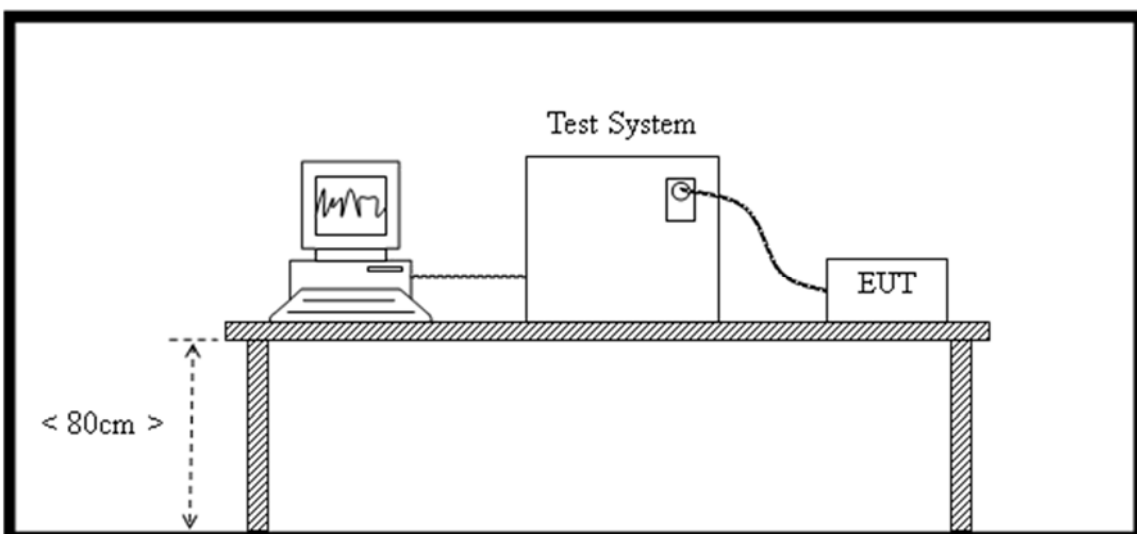
(For Conducted disturbance for asymmetric mode Test)

Test Setup 3



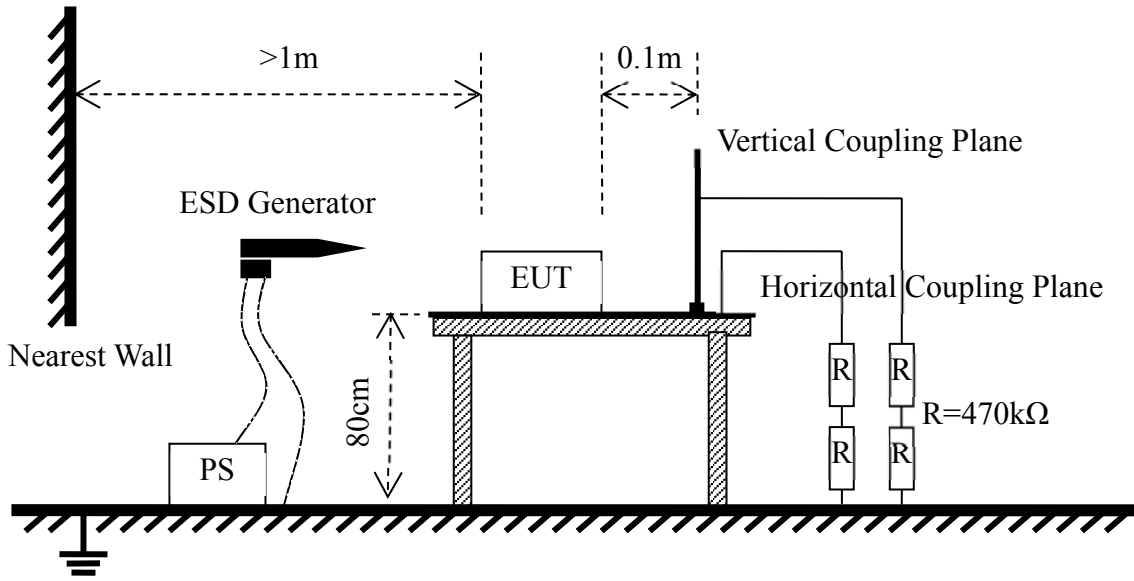
(For Harmonic Current Emissions Measurement Test)

Test Setup 4



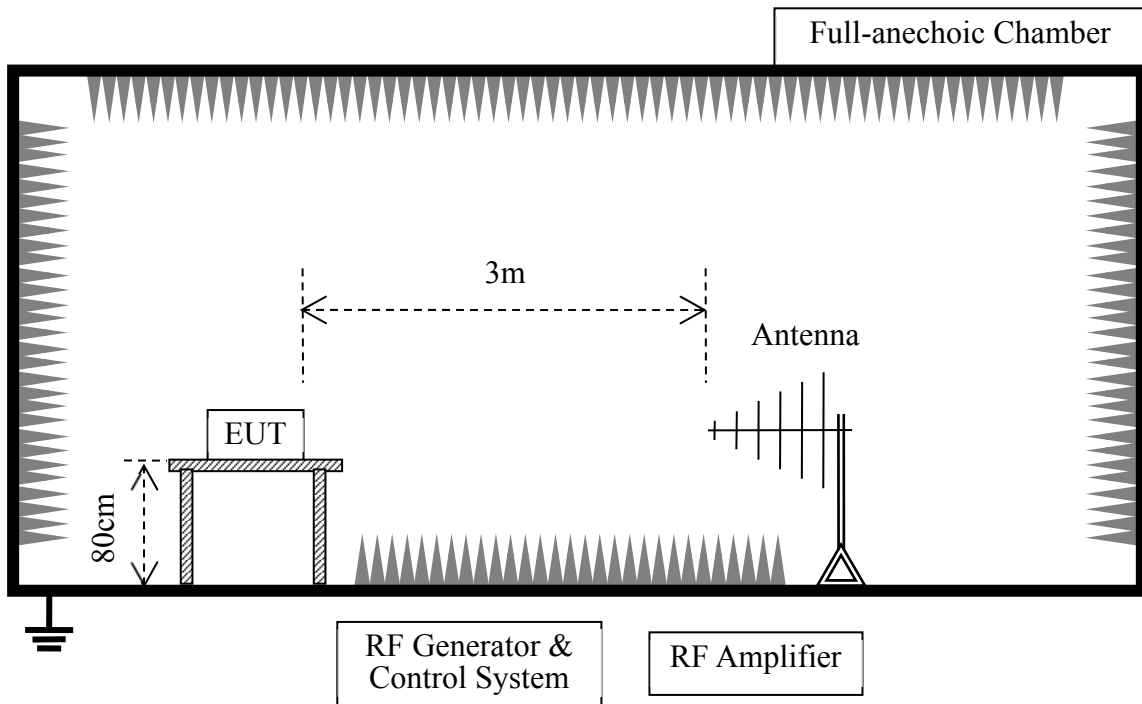
(For Voltage Fluctuations and Flicker Measurement Test)

Test Setup 5



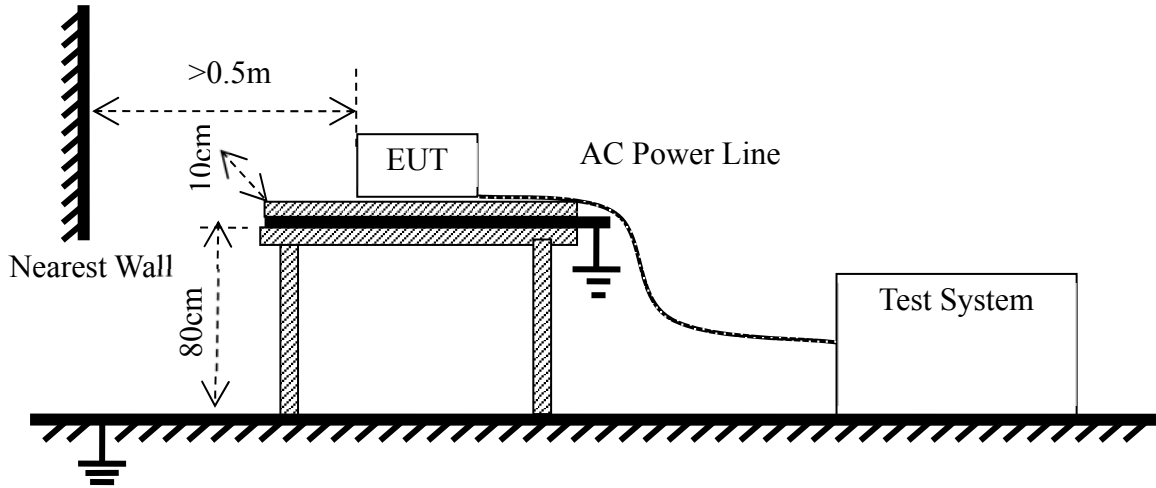
(For Electrostatic Discharge Immunity Test)

Test Setup 6



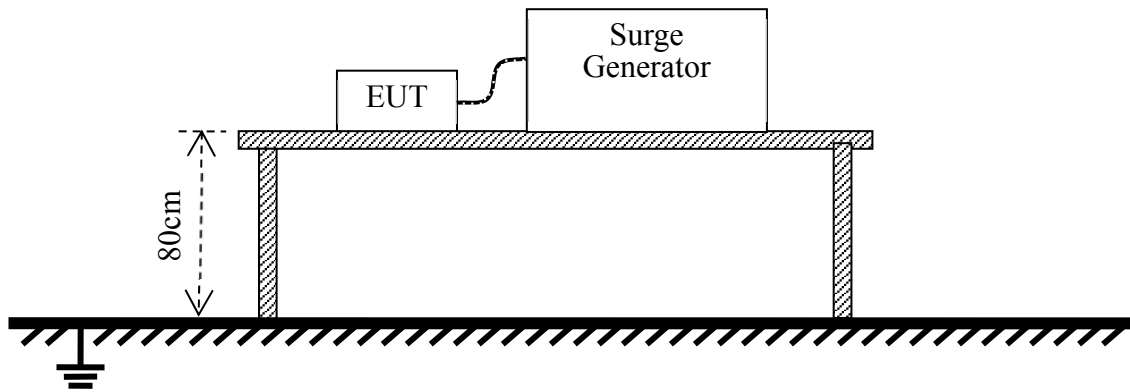
(For Radiated Immunity Test)

Test Setup 7



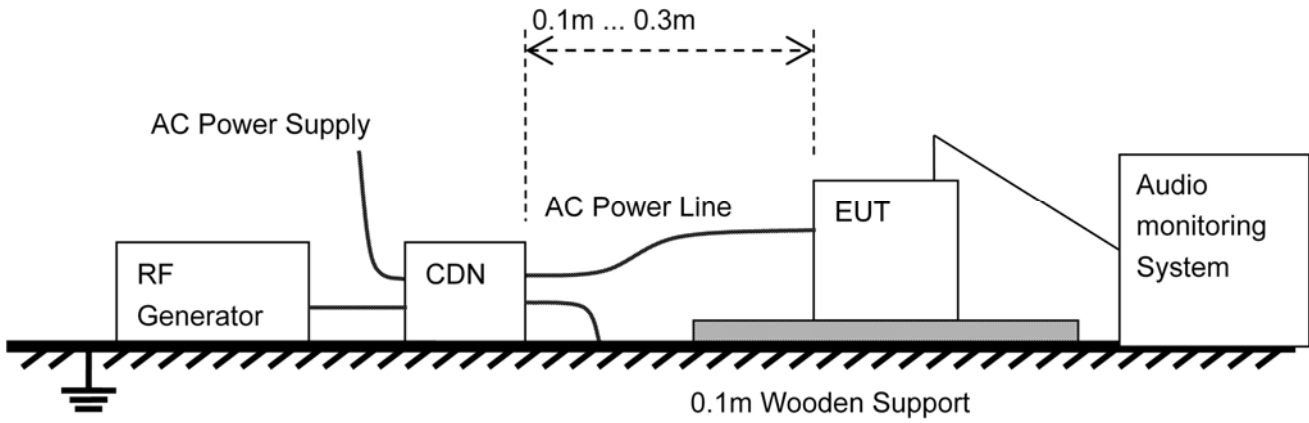
(For Electrical Fast Transient / Burst Immunity Test)

Test Setup 8



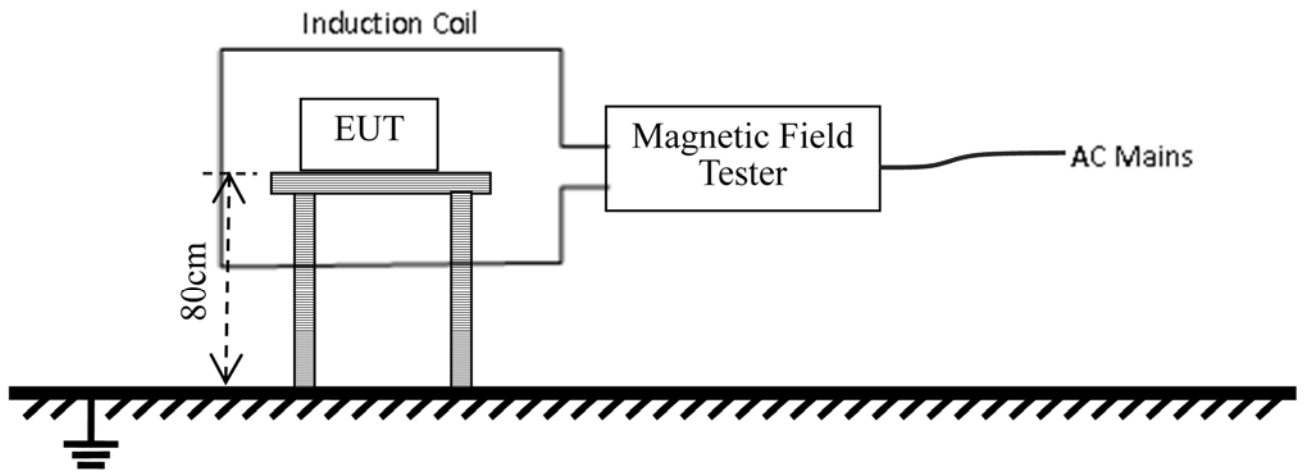
(For Surge Immunity Test)

Test Setup 9



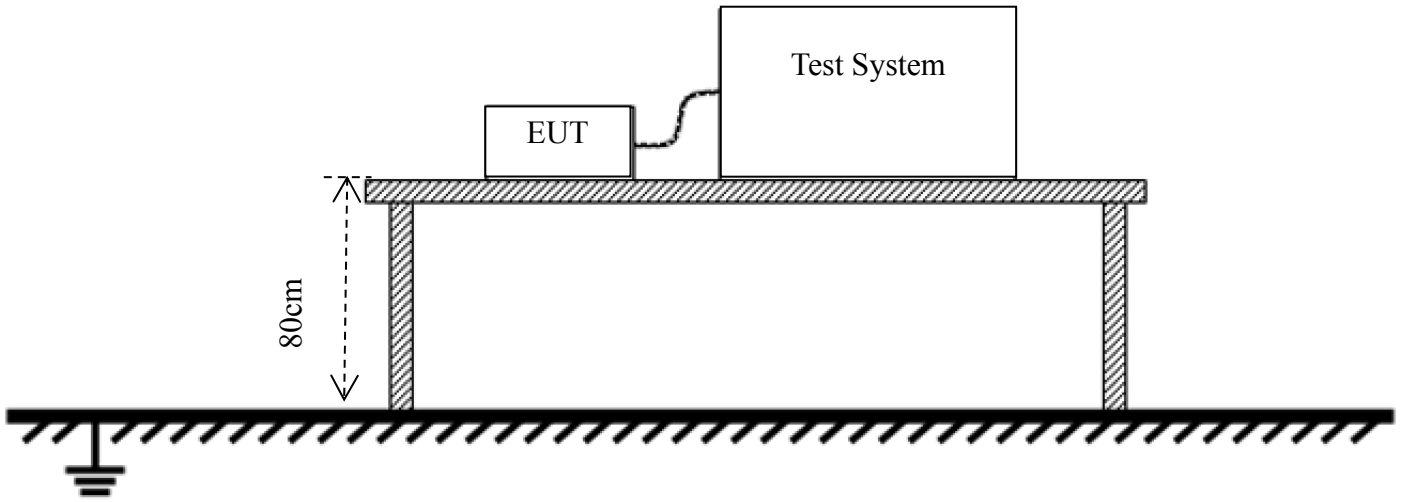
(For Immunity to Conducted Disturbances Induced By RF Fields Test)

Test Setup 10



(Power Frequency Magnetic Fields)

Test Setup 11



(For Voltage Dips and Short Interruptions Immunity Test)

4.6 Test Conditions

Test Case	Test Conditions	
Radiated Emission, Below 1GHz	Test Env.	NTNV
	Test Setup	Test Setup 1
	Test Configuration	TC01-TC03 ^{Note}
Conducted Emission, AC Ports	Test Env.	NTNV
	Test Setup	Test Setup 2
	Test Configuration	TC01-TC03 ^{Note}
Harmonic Current Emissions	Test Env.	NTNV
	Test Setup	Test Setup 4
	Test Configuration	TC01-TC03 ^{Note}
Voltage Fluctuations & Flicker	Test Env.	NTNV
	Test Setup	Test Setup 4
	Test Configuration	TC01-TC03 ^{Note}
Electrostatic Discharge Immunity	Test Env.	NTNV
	Test Setup	Test Setup 5
	Test Configuration	TC01-TC03 ^{Note}
Radiated RF Electromagnetic Field Immunity	Test Env.	NTNV
	Test Setup	Test Setup 6
	Test Configuration	TC01-TC03 ^{Note}
Electrical Fast Transient/Burst Immunity, AC Port	Test Env.	NTNV
	Test Setup	Test Setup 7
	Test Configuration	TC01-TC03 ^{Note}
Surge Immunity, AC Ports	Test Env.	NTNV
	Test Setup	Test Setup 8
	Test Configuration	TC01-TC03 ^{Note}
Immunity to Conducted Disturbances Induced by RF Fields, AC Ports	Test Env.	NTNV
	Test Setup	Test Setup 9
	Test Configuration	TC01-TC03 ^{Note}
Power-frequency magnetic field	Test Env.	NTNV
	Test Setup	Test Setup 10
	Test Configuration	TC01-TC03 ^{Note}
Voltage Dips and Short Interruptions Immunity	Test Env.	NTNV
	Test Setup	Test Setup 11
	Test Configuration	TC01-TC03 ^{Note}
Note: Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report. The Full load test mode is the worst test mode in this report.		

5 TEST ITEMS

5.1 Emission Tests

5.1.1 Radiated Emission

5.1.1.1 Limit

Frequency range (MHz)	Distance (at 3 m)	Distance (at 10 m)	Distance (at 30 m)
	Quasi-Peak Limit (dB μ V/m)	Quasi-Peak Limit (dB μ V/m)	Quasi-Peak Limit (dB μ V/m)
30 - 230	50	40	30
230 - 1000	57	47	37

NOTE:

- 1) The lower limit shall apply at the transition frequency.
- 2) Additional provisions may be required for cases where interference occurs.
- 3) Only apply to apparatus containing devices operating at frequencies more than 9 kHz.

5.1.1.2 Test Procedure

All Radiated Emission tests were performed in the azimuth plane. And test data and plots are recorded in this test report.

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

5.1.2 Conducted Emission

5.1.2.1 Test Limit

AC Port

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

NOTE:

- 1) The lower limit shall apply at the band edges.
- 2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50 MHz.
- 3) It is tested under the low voltage which is for the distribution of AC electric power, the upper limit is generally accepted to be 1000 V.

DC Port

Frequency range (MHz)	Class B	
	Quasi-peak (dBuV)	Average (dBuV)
0.15 - 0.50	79	66
0.50 - 30	73	60

NOTE:

- 1) The lower limit shall apply at the band edges.
- 2) Applicable only to ports intended for connection to a local DC power network or a local battery by a connecting cable exceeding a length of 30 m.

Telecom Port

Frequency (MHz)	Class B	
	Quasi-peak (dBuV)	Average (dBuV)
0.15 - 0.50	84-74	74-64
0.50 - 30	74	64

NOTE:

- 1) The lower limit shall apply at the band edges.
- 2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50 MHz.
- 3) The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to telecommunication port under test.

5.1.2.2 Test Procedure

The EUT is connected to the power mains through a LISN which provides 50 Ω /50 μ H of coupling impedance for the measuring instrument. The test frequency range is from 150 kHz to 30 MHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels that are more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Telecommunication port was checked to find out the maximum conducted emission

5.1.3 Harmonic Current Emissions

5.1.3.1 Limit

Limits for Class A equipment				Limits for Class D equipment		
odd harmonic		Even harmonics		Harmonic order (n)	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
Harmonic order (n)	Maximum permissible harmonic current A	Harmonic order (n)	Maximum permissible harmonic current A			
3	2.30	2	1.08	3	3.4	2.30
5	1.14	4	0.43	5	1.9	1.14
7	0.77	6	0.30	7	1.0	0.77
9	0.40	8 ≤ n ≤ 40	0.23X8/n	9	0.5	0.40
11	0.33			11	0.35	0.33
13	0.21			15 ≤ n ≤ 39	3.85/n	0.15X15/n
15 ≤ n ≤ 39	0.15X15/n					

Note: For Class B equipment, the harmonics of the input current shall not exceed the values given in Table "limits for Class A equipment" multiplied by a factor of 1,5.

For the purpose of harmonic current limitation, equipment is classified as follows:(Note :Class C equipment requirement not include in this standard.)

Class A:

- balanced three-phase equipment;
- household appliances, excluding equipment identified as class D;
- tools, excluding portable tools;
- dimmers for incandescent lamps;
- audio equipment.

Equipment not specified in one of the three other classes shall be considered as class A equipment.

Class B:

- portable tools;
- arc welding equipment which is not professional equipment.

Class C:

- lighting equipment.

Class D:

Equipment having a specified power according to 6.2.2 less than or equal to 600 W, of the following types:

- personal computers and personal computer monitors;
- television receivers.

5.1.3.2 Test Procedure

The EUT is placed on the top of a wooden table 0.8m above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the necessary for the EUT to be exercised.

5.1.4 Voltage Fluctuations and Flicker Measurement

5.1.4.1 Limit

Test Item	Limit	Note
Pst	1.0	Short-term flicker indicator
Plt	0.65	Long-term flicker indicator
Tdt	0.5	Maximum time that dt exceeds 3%
dmax (%)	4%	Maximum relative voltage change
dc (%)	3.3%	Relative steady-state voltage change

5.1.4.2 Test Procedure

During the Flicker measurement, the measure time shall include that part of whole operation changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours. The test specifications refer the next table.

No.	Specification	Value
1	Test Frequency	50 Hz
2	Test Voltage	230 VAC
3	Waveform	Sine
4	Test Time	10 minutes for Pst; 2 hours for Plt

5.2 Immunity Tests

5.2.1 Test Performance Criteria for Immunity Test

5.2.1.1 General Performance Criteria

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

5.2.2 Electrostatic Discharge Immunity

5.2.2.1 Test Specification

Specification	Value
Basic Standard	IEC 61000-4-2
Discharge Impedance	330 Ohm / 150 pF
Discharge Voltage	Air Discharge: 2 kV; 4 kV; 8 kV; Contact Discharge: 2 kV; 4 kV
Polarity	Positive / Negative
Number of Discharge	Minimum 20 times at each test point
Discharge Mode	Single discharge
Discharge Period	1 second minimum

5.2.2.2 Test Procedure

1. Electrostatic discharges are applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
2. The test is performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
3. The time interval between two successive single discharges is at least 1 second.
4. The ESD generator is held perpendicularly to the surface to which the discharge is applied and the return cable is at least 0.2 meters from the EUT.
5. Contact discharges are applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
6. Air discharges are applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator is removed from the EUT and re-triggered for a new single discharge. The test is repeated until all discharges were completed.
7. At least ten single discharges (in the most sensitive polarity) are applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator is positioned vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.
8. At least ten single discharges (in the most sensitive polarity) are applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5 m*0.5 m) is placed vertically to and 0.1 meters from the EUT.

5.2.3 Radio Frequency Electromagnetic Field Immunity

5.2.3.1 Test Specification

Specification	Value
Basic Standard	IEC 61000-4-3
Frequency Range	80 MHz to 1000 MHz, 1400 MHz to 6000 MHz
Field Strength	3 V/m or 1 V/m (unmodulated, r.m.s)
Modulation	1 kHz sine wave, 80%, AM modulation
Frequency Step	1% of fundamental
Polarity of Antenna	Horizontal and Vertical
Test Distance	3 m
Antenna Height	1.5 m
Dwell Time	3 seconds

5.2.3.2 Test Procedure

1. The testing is performed in a fully anechoic chamber. The transmit antenna is located at a distance of 3 meters from the EUT.
2. The test signal is 80% amplitude modulated with a 1 kHz sine wave.
3. The frequency range is swept from 80 MHz to 1000 MHz and 1400 MHz to 2700 MHz with the exception of the exclusion band for transmitters, receivers and duplex transceivers. The rate of sweep does not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size is 1% of fundamental.
4. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
5. The field strength level is 3 V/m for 80 MHz to 1000MHz, 1400 MHz to 2000 MHz and 1 V/m for 2000 MHz to 2700 MHz
6. The test is performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides, but only the worst side data is reported in this report.

5.2.4 Electrical Fast Transient / Burst Immunity

5.2.4.1 Test Specification

Specification	Value
Basic Standard	IEC 61000-4-4
Test Voltage	AC Power Port: 0.5 kV, 1 kV.
	DC Power Ports, Telecom Ports: 0.25 kV, 0.5 kV.
Polarity	Positive / Negative
Impulse Frequency	5 kHz
Impulse Wave Shape	5/50 ns
Burst Duration	15 ms
Burst Period	300 ms
Test Duration	> 1 min

NOTE:

1. The signal ports tests apply only to ports interfacing with cables whose total length according to the manufacturer's functional specification may exceed 3 m.
2. The DC ports test not applicable to input ports intended for connection to a battery or a rechargeable battery which must be removed or disconnected from the apparatus for recharging.
3. The EUT with a DC power input port intended for use with an AC-DC power adaptor shall be tested on the AC power input of the AC-DC power adaptor specified by the manufacturer or where none is so specified, using a typical AC-DC power adaptor.
4. The test applicable to DC power input ports and signal ports intended to be connected permanently to cables longer than 3 m.

5.2.4.2 Test Procedure

1. The EUT is tested with 1000 V discharges to the AC power input leads, 500 V for signal port and DC port.
2. Both positive and negative polarity discharges are applied.
3. The length of the "hot wire" from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1 m.
4. The duration time of each test sequential is 1min.
5. The transient / burst waveform is in accordance with IEC 61000-4-4, 5/50 ns.

5.2.5 Surge Immunity

5.2.5.1 Test Specification

Specification	Value	
	AC Power Port	DC Power Port
Basic Standard	IEC 61000-4-5	
Waveform	Voltage: 1.2/50 μ s; Current: 8/20 μ s	Voltage: 1.2/50 μ s; Current: 8/20 μ s
Test Voltage	line to ground 0.5 kV, 1 kV, 2 kV; line to line 0.5 kV, 1 kV	0.5k V
Polarity	Positive / Negative	
Phase Angle	0°, 90°, 180°, 270°	N/A
Repetition Rate	60 seconds	
Times	5 times per condition	

NOTE:

1. For ports where primary protection is intended, surges are applied at voltages up to 4 kV with the primary protectors fitted. Otherwise the 1 kV test level is applied without primary protection in place.
2. The DC ports test not applicable to input ports intended for connection to a battery or a rechargeable battery which must be removed or disconnected from the apparatus for recharging.
3. The EUT with a DC power input port intended for use with an AC-DC power adaptor shall be tested on the AC power input of the AC-DC power adaptor specified by the manufacturer or where none is so specified, using a typical AC-DC power adaptor.
4. DC ports which are not intended to be connected to a DC distribution network are treated as signal ports.

5.2.5.2 Test Procedure

The EUT and the auxiliary equipment are placed on a table of 0.8 m heights above a metal ground reference plane. The size of ground plane is greater than 1 m*1 m and project beyond the EUT by at least 0.1 m on all sides. The ground plane is connected to the protective earth. The length of power cord between the coupling device and the EUT is less than 2 meters (provided by the manufacturer).

The EUT is connected to the power mains through a coupling device that directly couples the surge interference signal. The surge noise is applied synchronized to the voltage phase at the zero crossing and the peak value of the AC voltage wave (positive and negative).

The surges are applied line to line and line(s) to earth. When testing line to earth the test voltage is applied successively between each of the lines and earth. Set up to the test level specified increased the test voltage. All lower levels including the selected test level are tested. The polarity of each surge level included positive and negative test pulses.

5.2.6 Immunity to Conducted Disturbances Induced by RF Fields

5.2.6.1 Test Specification

Specification	Value
Basic Standard	IEC 61000-4-6
Frequency Range	0.15 MHz – 80 MHz
Field Strength	3 Vrms (unmodulated, r.m.s)
Modulation	1 kHz sine wave, 80% AM
Frequency Step	1% of fundamental
Coupled Cable	AC Power Line; DC Power Line; Telecom Line
Coupling Device	CDN-M2+3

Note:

- 1) The DC port and signal port only apply to ports interfacing with cables whose total length according to the manufacturers functional specification may exceed 3 m.
- 2) The AC port only apply to input ports.
- 3) The test level can also be defined as the equivalent current into a 150 Ω load at signal ports.

5.2.6.2 Test Procedure

The EUT shall be tested within its intended operating and climatic conditions.

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 150 Ohm load resistor.

The test signal is 80% amplitude modulated with a 1 kHz sine wave.

The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80% amplitude. The sweep rate shall not exceed $1.5 \cdot 10^{-3}$ decades/s. The step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value where the frequency is swept incrementally.

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 such as clock frequencies and harmonics or frequencies of dominant interest, shall be analyzed separately.

Attempts should be made to fully exercise the EUT during test, and to fully interrogate all exercise modes selected for susceptibility.

5.2.7 Power Frequency Magnetic Fields Immunity

5.2.7.1 Test Specification

Specification	Value
Basic Standard	IEC 61000-4-8
Field Frequency	50/60 Hz
Test Level	3 A/m
Polarity	Horizontal and Vertical
Test Duration	5 min

NOTE:

1. The test shall be carried out at the frequencies appropriate to the power supply frequency. Equipment intended for use in areas supplied only at one of these frequencies need only be tested at that frequency.
2. Applicable only to apparatus containing devices susceptible to magnetic fields.

5.2.7.2 Test Procedure

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1 m*1 m) and shown in Section 15.1. The induction coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

5.2.8 Voltage Dips and Short Interruptions Immunity

5.2.8.1 Test Specification

AC Ports

Specification	Value
Basic Standard	IEC 61000-4-11
Frequency	50/60Hz
Voltage Dips	100% reduction: 10 ms; 100% reduction: 20 ms; 30% reduction: 500/600 ms
Voltage Interruptions	100% reduction: 5000/6000 ms
Voltage Phase Angle	0°

NOTE: Applicable only to AC input ports.

5.2.8.2 Test Procedure

The power cord is used as supplied by the manufacturer. The EUT was connected to the line output of the Voltage Dips and Interruption Generator.

The EUT is tested for a) 100% voltage dip of supplied voltage with duration of 10 ms; b) 100% voltage dip of supplied voltage with duration of 20 ms; c) 30% voltage dip of supplied voltage and duration 500 or 600 ms. Both of the dip tests are carried out for a sequence of three voltage dips with intervals of 10 seconds.

100% voltage interruption of supplied voltage with duration of 5000 or 6000 ms is followed, which is a sequence of three voltage interruptions with intervals of 10 seconds.

Voltage reductions occur at 0 degrees crossover point of the voltage waveform. The performance of the EUT is checked after the voltage dip or interruption.

ANNEX A TEST RESULTS

A.1 Radiated Emission

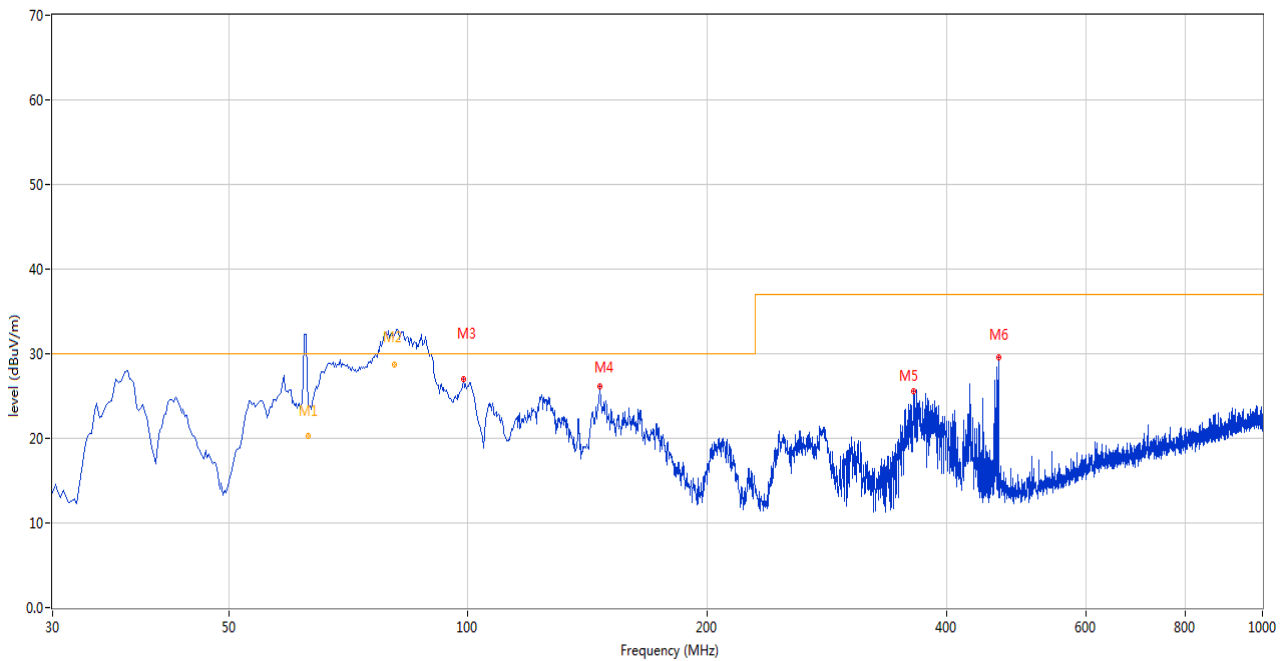
Note 1: The symbol of "--" in the table which means not application.

Note 2: Measurements shall be made with a quasi-peak measuring receiver in the frequency range 30 MHz to 1000 MHz. To reduce the testing time, a peak measuring receiver may be used instead of a quasi-peak measuring receiver. In case of dispute, measurement with a quasi-peak measuring receiver will take precedence.

Test Data and Plots

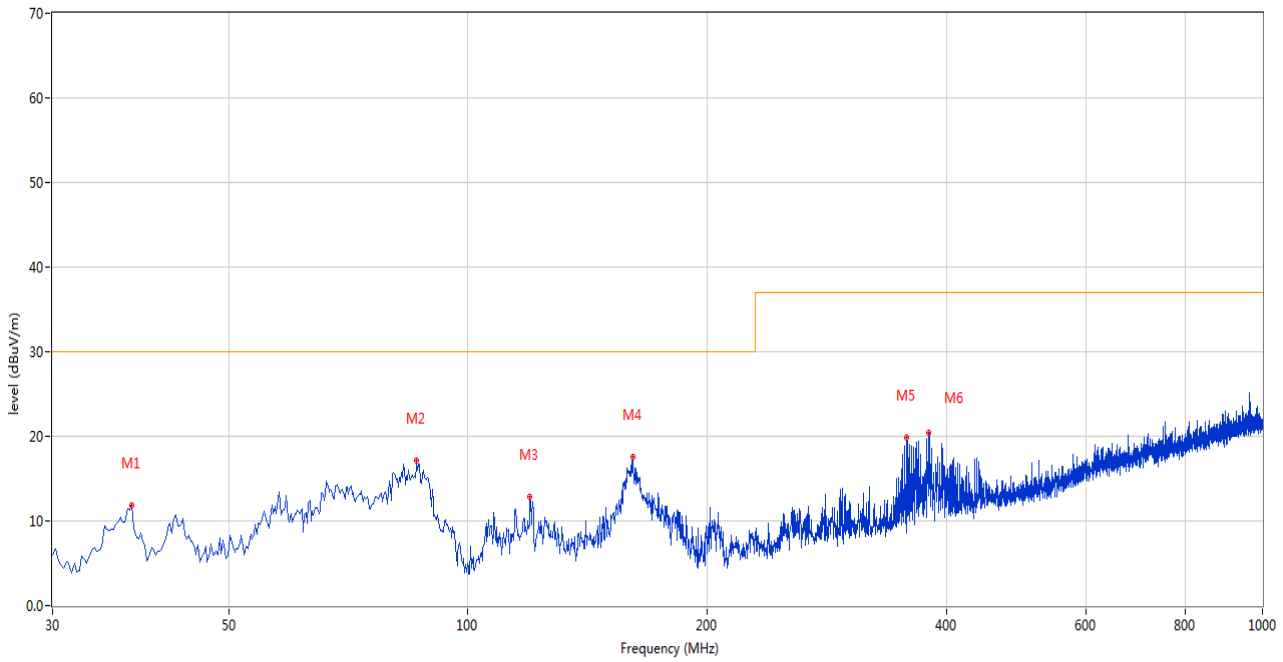
The Full load test mode

A.1.1 Test Antenna Vertical, 30 MHz – 1 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	62.921	23.37	-28.36	30.0	-6.63	Peak	70.00	352	Vertical	N/A
1*	62.921	20.31	-28.36	30.0	-9.69	QP	70.00	352	Vertical	Pass
2	80.682	31.48	-31.23	30.0	1.48	Peak	138.00	243	Vertical	N/A
2*	80.682	28.72	-31.23	30.0	-1.28	QP	138.00	243	Vertical	Pass
3	98.853	27.00	-30.29	30.0	-3.00	Peak	283.00	100	Vertical	Pass
4	146.371	26.17	-25.95	30.0	-3.83	Peak	132.00	100	Vertical	Pass
5	364.324	25.58	-24.05	37.0	-11.42	Peak	310.00	100	Vertical	Pass
6	465.906	29.52	-21.27	37.0	-7.48	Peak	35.00	100	Vertical	Pass

A.1.2 Test Antenna Horizontal, 30 MHz – 1 GHz



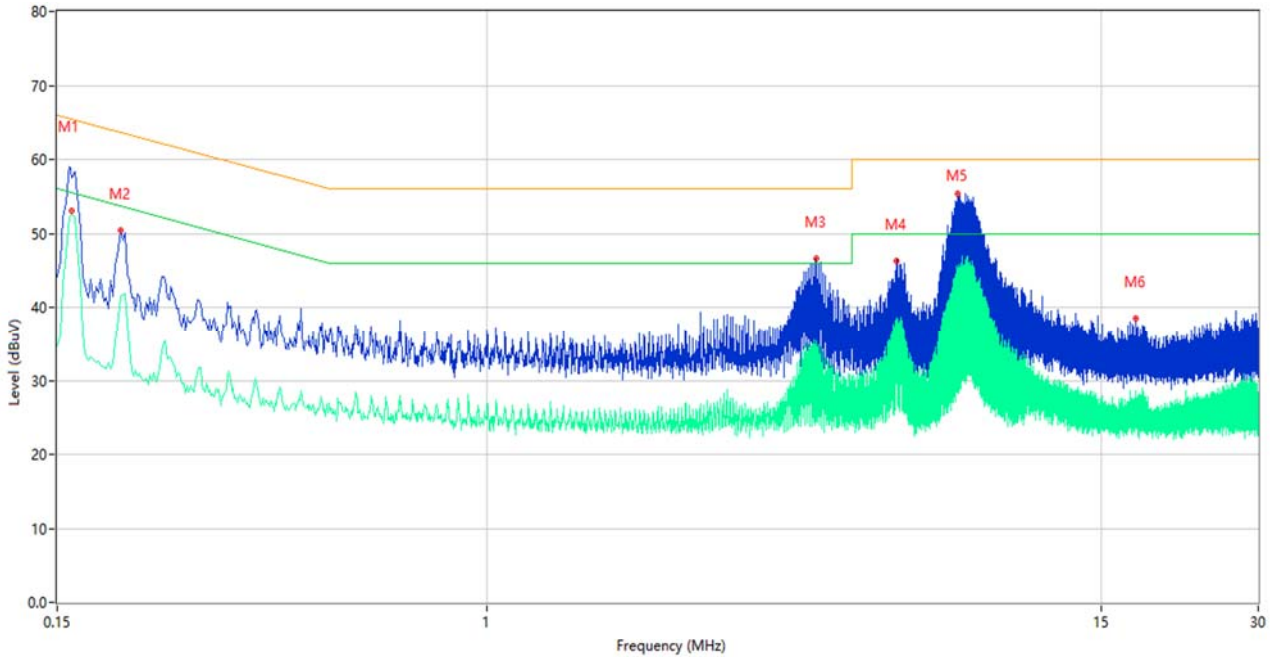
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	37.758	11.88	-27.03	30.0	-18.12	Peak	273.00	100	Horizontal	Pass
2	86.246	17.14	-31.10	30.0	-12.86	Peak	70.00	100	Horizontal	Pass
3	119.703	12.79	-28.08	30.0	-17.21	Peak	141.00	100	Horizontal	Pass
4	161.160	17.54	-25.87	30.0	-12.46	Peak	114.00	100	Horizontal	Pass
5	356.808	19.91	-24.24	37.0	-17.09	Peak	282.00	100	Horizontal	Pass
6	380.567	20.47	-23.50	37.0	-16.53	Peak	70.00	100	Horizontal	Pass

A.2 Conducted Emission

The Full load test mode

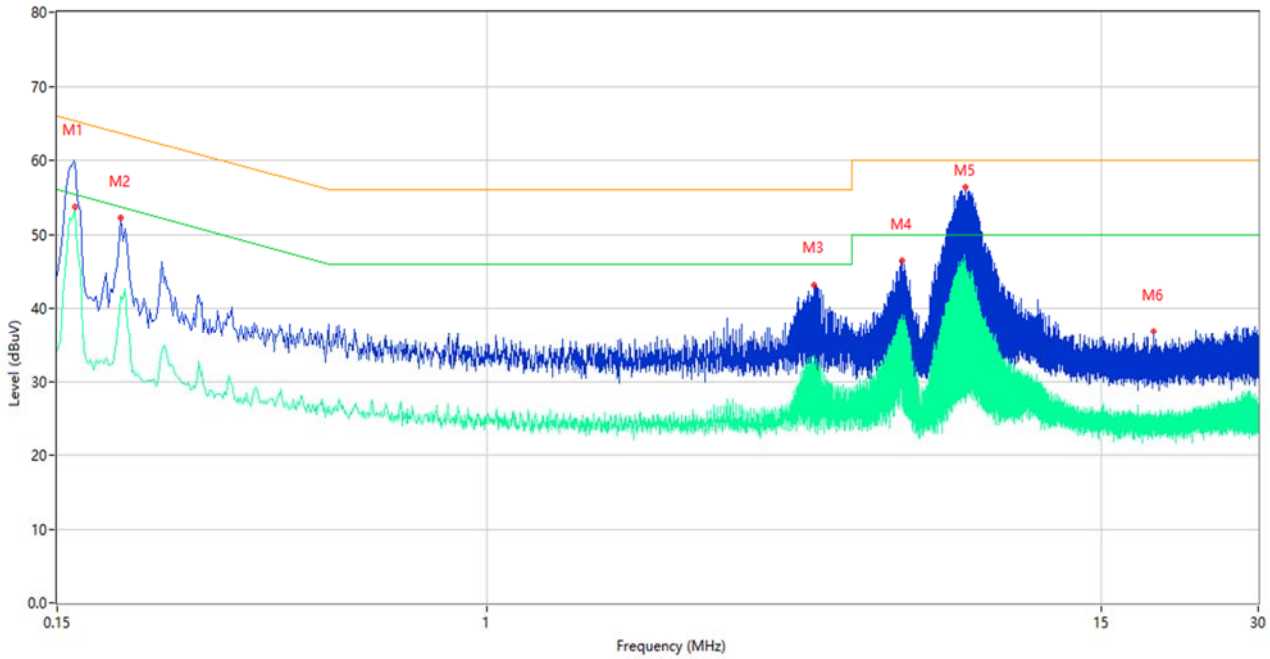
The worst test mode: The Working test mode

A.2.1 L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.150	58.20	10.41	65.50	-7.30	Peak	L	Pass
1**	0.150	53.12	10.41	55.50	-2.38	AV	L	Pass
2	0.198	50.41	10.38	63.69	-13.28	Peak	L	Pass
2**	0.198	41.55	10.38	53.69	-12.14	AV	L	Pass
3	4.280	46.60	10.30	56.00	-9.40	Peak	L	Pass
3**	4.280	34.39	10.30	46.00	-11.61	AV	L	Pass
4	6.080	46.26	10.32	60.00	-13.74	Peak	L	Pass
4**	6.080	38.54	10.32	50.00	-11.46	AV	L	Pass
5	7.960	55.30	10.35	60.00	-4.70	Peak	L	Pass
5**	7.960	45.37	10.35	50.00	-4.63	AV	L	Pass
6	17.520	38.53	10.47	60.00	-21.47	Peak	L	Pass
6**	17.520	25.24	10.47	50.00	-24.76	AV	L	Pass

A.2.3 N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.162	60.21	10.40	65.36	-5.15	Peak	N	Pass
1**	0.162	53.43	10.40	55.36	-1.93	AV	N	Pass
2	0.198	52.22	10.38	63.69	-11.47	Peak	N	Pass
2**	0.198	41.60	10.38	53.69	-12.09	AV	N	Pass
3	4.238	43.21	10.31	56.00	-12.79	Peak	N	Pass
3**	4.238	32.11	10.31	46.00	-13.89	AV	N	Pass
4	6.242	46.38	10.33	60.00	-13.62	Peak	N	Pass
4**	6.242	39.25	10.33	50.00	-10.75	AV	N	Pass
5	8.240	56.36	10.35	60.00	-3.64	Peak	N	Pass
5**	8.240	45.09	10.35	50.00	-4.91	AV	N	Pass
6	18.892	36.85	10.52	60.00	-23.15	Peak	N	Pass
6**	18.892	24.98	10.52	50.00	-25.02	AV	N	Pass

A.3 Harmonic Current Emissions

E. U. T. Rated Power(W):	3300	Active Power(W):	3280
Observation Period(s):	150	The Rate Of Total Harmonic Distortion:	0.35
Voltage(V):	230	System Power Supply:	Normal
Frequency(Hz):	50.01	E. U. T.Category:	A
Power Factor:	0.82	E. U. T.Results:	Pass

Harmonic Number	Average (filtered) (mA)	Limit Current (mA)	% of Limit	max. Value (Filtered) (mA)	Limit Current (mA)	% of Limit	Assessment
2	166	1080	15.4	173	1080	16.0	Pass
3	290	2300	12.6	296	2300	12.9	Pass
4	35	430	8.1	42	430	9.8	Pass
5	197	1140	17.3	203	1140	17.8	Pass
6	89	300	29.7	93	300	31.0	Pass
7	184	770	23.9	196	770	25.5	Pass
8	5	230	2.2	6	230	2.6	Pass
9	152	400	38.0	163	400	40.8	Pass
10	65	184	35.3	82	184	44.6	Pass
11	81	330	24.5	96	330	29.1	Pass
12	56	153.3	36.5	88	153.3	57.4	Pass
13	69	210	32.9	72	210	34.3	Pass
14	7	131.4	5.3	9	131.4	6.8	Pass
15	55	150	36.7	62	150	41.3	Pass
16	41	115	35.7	63	115	54.8	Pass
17	67	132.3	50.6	102	132.3	77.1	Pass
18	36	102.2	35.2	55	102.2	53.8	Pass
19	22	118.4	18.6	25	118.4	21.1	Pass
20	16	92	17.4	45	92	48.9	Pass
21	21	107.1	19.6	26	107.1	24.3	Pass
22	38	83.6	45.5	65	83.6	77.8	Pass
23	40	97.8	40.9	76	97.8	77.7	Pass
24	32	76.7	41.7	35	76.7	45.6	Pass
25	36	90	40.0	67	90	74.4	Pass
26	26	70.8	36.7	46	70.8	65.0	Pass
27	16	83.3	19.2	18	83.3	21.6	Pass
28	22	65.7	33.5	35	65.7	53.3	Pass
29	39	77.6	50.3	52	77.6	67.0	Pass
30	28	61.3	45.7	35	61.3	57.1	Pass
31	26	72.6	35.8	56	72.6	77.1	Pass

32	18	57.5	31.3	37	57.5	64.3	Pass
33	42	68.2	61.6	46	68.2	67.4	Pass
34	33	54.1	61.0	36	54.1	66.5	Pass
35	51	64.3	79.3	57	64.3	88.6	Pass
36	22	51.1	43.1	36	51.1	70.5	Pass
37	39	60.8	64.1	42	60.8	69.1	Pass
38	15	48.4	31.0	18	48.4	37.2	Pass
39	22	57.7	38.1	49	57.7	84.9	Pass
40	18	46	39.1	23	46	50.0	Pass

A.4 Voltage Fluctuations & Flicker

Test Parameter	Limit	Measurement Value	Verdict
Pst	1.0	0.1539	Pass
Plt	0.65	0.56	Pass
Tdt	0.5	0.00	Pass
dmax (%)	4%	0.311%	Pass
dc (%)	3.3%	0.371%	Pass

A.5 Electrostatic Discharge Immunity

Test Points	Discharge Level (kV)	Discharge Mode	Number of Discharge	Verdict
HCP	±2, ±4	Contact	20	Pass
VCP	±2, ±4	Contact	20	Pass
Faceplate	±2, ±4	Contact	240	Pass
Screw (four)	±2, ±4	Contact	80	Pass
Key	±2, ±4, ±8	Air	20	Pass
Screen	±2, ±4, ±8	Air	20	Pass
Shell	±2, ±4	Contact	240	Pass
Crack	±2, ±4, ±8	Air	40	Pass

Note: Performance of the all modes comply with the performance criteria in Criterion B.

A.6 Radio Frequency Electromagnetic Field Immunity

Antenna Polarity	Frequency (MHz)	Side	Field Strength (V/m)	Verdict
Vertical	80 – 1000 1400 – 6000	Front	3	Pass
		Back	3	Pass
		Left	3	Pass
		Right	3	Pass
Horizontal	80 – 1000 1400 – 6000	Front	3	Pass
		Back	3	Pass
		Left	3	Pass
		Right	3	Pass

Note: Performance of the all modes comply with the performance criteria in Criterion A.

A.7 Electrical Fast Transient/Burst Immunity

Test Data (AC Power Port)

Test Point	Polarity	Test Level (kV)	Verdict
AC Port	+ / -	0.5, 1	Pass

Test Data (DC Power Port)

Test Point	Polarity	Test Level (kV)	Verdict
DC Port	+ / -	0.5	Pass

Note: Performance of the all modes comply with the performance criteria in Criterion B.

A.8 Surge Immunity

Test Data (AC Power Port)

Coupling Line	Polarity	Voltage (kV)	Verdict
L-N	+ / -	0.5, 1	Pass
L-PE	+ / -	0.5, 1, 2	Pass
N-PE	+ / -	0.5, 1, 2	Pass

Test Data (DC Power Port)

Coupling Line	Polarity	Voltage (kV)	Verdict
DC Port	+ / -	0.5	Pass

Note: Performance of the all modes comply with the performance criteria in Criterion B.

A.9 Immunity to Conducted Disturbances Induced by RF Fields

Test Data (AC Power Port)

Test Point	Frequency (MHz)	Field Strength (V/m)	Verdict
AC Port	0.15 - 80	3	Pass

Test Data (DC Power Port)

Test Point	Frequency (MHz)	Field Strength (V/m)	Verdict
DC Port	0.15 - 80	3	Pass

Note: Performance of the all modes comply with the performance criteria in Criterion A.

A.10 Power Frequency Magnetic Fields Immunity

Test Point	Test Level (A/m)	Verdict
X	30	Pass
Y	30	Pass
Z	30	Pass

Note: Performance of the all modes comply with the performance criteria in Criterion A.

A.11 Voltage Dips and Short Interruptions Immunity

Test Mode	Voltage Reduction	Duration (ms)	Times	Interval (sec)	Verdict
Voltage Dips	100%	10	3	10	Pass
	100%	20	3	10	Pass
	30%	500	3	10	Pass
Voltage Interruptions	100%	5000	3	10	Pass

Note: Voltage Dips 100% Voltage Reduction performance of the all modes comply with the performance criteria in Criterion B. Voltage Dips 30% Voltage Reduction and Voltage Interruptions performance of the all modes comply with the performance criteria in Criterion C.

ANNEX B TEST SETUP PHOTOS

Note: TEST SETUP PHOTOS reference from original test report: BL-SZ19B0347-401 (issued by Shenzhen BALUN Technology Co., Ltd. On Nov. 28, 2019) ANNEX B TEST SETUP PHOTOS.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document "Annex No.: BL-SZ19B0347-AW.PDF".

ANNEX D EUT INTERNAL PHOTOS

Please refer the document "Annex No.: BL-SZ19B0347-AI.PDF".

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