

EMC

TEST REPORT

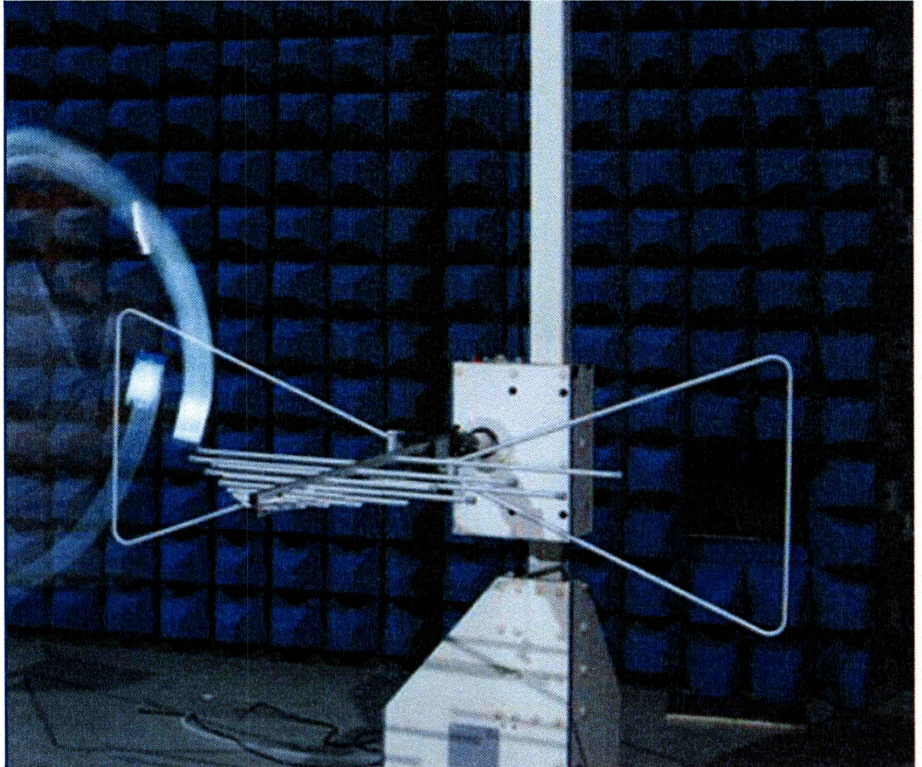
ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
Computer Multimedia Speaker

ISSUED TO
SHENZHEN FENDA TECHNOLOGY CO., LTD.

Fenda Hi-Tech Park, Zhoushi Road, Shiyan, Baoan, Shenzhen, China
518108



Tested by: Zhang Guoxi
Zhang Guoxi
Date Sep. 28, 2021

Approved by: Liao Jianming
Liao Jianming
(Technical Director)

Date Sep. 28, 2021

Report No.: BL-SZ2170989-402

EUT Name: Computer Multimedia Speaker

Model Name: V720 (refer section 2.4)

Brand Name: N/A

Test Standard: EN 55032: 2015+A1:2020

EN 55035: 2017+A11:2020

EN IEC 61000-3-2: 2019

EN 61000-3-3: 2013+A1:2019

Test Conclusion: Pass

Test Date: Sep. 10, 2021 ~ Sep. 24, 2021

Date of Issue: Sep. 28, 2021

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Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
<u>Rev. 01</u>	<u>Sep. 28, 2021</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
Fax Number	+86 755 6182 4271

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
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 to 25°C
Ambient Relative Humidity	30% to 60%
Ambient Pressure	100 kPa to 102 kPa

1.4 Announce

- (1) The test report reference to the report template version v3.6
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing 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	SHENZHEN FENDA TECHNOLOGY CO., LTD.
Address	Fenda Hi-Tech Park, Zhoushi Road, Shiyan, Baoan, Shenzhen, China 518108

2.2 Manufacturer Information

Manufacturer	SHENZHEN FENDA TECHNOLOGY CO., LTD.
Address	Fenda Hi-Tech Park, Zhoushi Road, Shiyan, Baoan, Shenzhen, China 518108

2.3 Factory Information

Factory	SHENZHEN FENDA TECHNOLOGY CO., LTD.
Address	Fenda Hi-Tech Park, Zhoushi Road, Shiyan, Baoan, Shenzhen, China 518108

2.4 General Description for Equipment under Test (EUT)

EUT Name	Computer Multimedia Speaker
Model Name Under Test	V720
Series Model Name	V620 Plus, V620 Pro, V720 Pro, V720 Plus, V720X, V780, V780 Plus, V780 Pro, V780X
Description of Model name differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in market and customer.
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Note: Not applicable.

2.6 Technical Information

Network and Wireless connectivity		Bluetooth
Interfaces present on the EUT	AC Ports	From mains to AC power adapter.
	DC Ports	From power supply to EUT, the DC port cable length is less than 3m.
	I/O Ports	USB, which cable length is less than 3m.
	Telecom Ports	No Tel ports.

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	EN 55032: 2015+A1:2020	Electromagnetic compatibility of multimedia equipment — Emission requirements
2	EN 55035: 2017+A11:2020	Electromagnetic compatibility of multimedia equipment - Immunity requirements
3	EN IEC 61000-3-2: 2019	Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).
4	EN 61000-3-3: 2013+A1:2019	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 Referenced Standards

The following referenced standards are necessary for the report. For undated references in this report, the cited version applies.

No.	Identity	Document Title
1	IEC 61000-4-2 (2008)	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test.
2	IEC 61000-4-3 (2006),+A1 (2007)+A2 (2010)	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test.
3	IEC 61000-4-4 (2012)	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test.
4	IEC 61000-4-5 (2005)	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test.
5	IEC 61000-4-6 (2008)	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields.
6	IEC 61000-4-8 (2009)	Electromagnetic compatibility (EMC) - Part 4- 8: Testing and measurement techniques - Power frequency magnetic field immunity test
7	IEC 61000-4-11 (2004)	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests.
8	IEC 61000-4-20 (2010)	Electromagnetic compatibility (EMC)- Part 4- 20: Testing and measurement techniques- Emission and immunity testing in transverse electromagnetic (TEM) waveguides
9	IEC 61000-4-21 (2011)	Electromagnetic compatibility (EMC)- Part 4- 21: Testing and measurement techniques- Reverberation chamber test methods

3.3 Verdict

No.	Base Standard	Description	Test Verdict	Result	Remark
Emission					
1	EN 55032	Radiated Emission	Below 1 GHz	Pass	ANNEX A.1 -- Note 1
			Above 1 GHz	Pass	
2	EN 55032	Conducted Emission	Mains terminals	Pass	ANNEX A.2 --
			Asymmetric mode	N/A	ANNEX A.3 Note 2
			Differential voltage	N/A	ANNEX A.4 Note 3
3	EN 61000-3-2	Harmonic Current Emissions	N/A	ANNEX A.5	Note 4
4	EN 61000-3-3	Voltage Fluctuations & Flicker	Pass	ANNEX A.6	--
Immunity					
5	IEC 61000-4-2	Electrostatic Discharge Immunity	Pass	ANNEX A.7	--
6	IEC 61000-4-3 IEC 61000-4-20 IEC 61000-4-21	Radiated RF Electromagnetic Field Immunity	Pass	ANNEX A.8	--
7	IEC 61000-4-4	Electrical Fast Transient/Burst Immunity	AC Ports	Pass	ANNEX A.9 -- -- Note 5
			DC Ports	N/A	
			Analogue/ Digital data Ports	N/A	
8	IEC 61000-4-5	Surge Immunity	AC Ports	Pass	ANNEX A.10 Note 6 Note 7 Note 8
			DC Ports	N/A	
			Analogue/ Digital data Ports	N/A	
9	IEC 61000-4-6	Immunity to Conducted Disturbances Induced by RF Fields	AC Ports	Pass	ANNEX A.11 Note 9
			DC Ports	N/A	
			Analogue/ Digital data Ports	N/A	
10	IEC 61000-4-8	Power-frequency magnetic field	N/A	ANNEX A.12	Note 10
11	IEC 61000-4-11	Voltage Dips and Short Interruptions Immunity	Pass	ANNEX A.13	Note 11
12	EN 55035 (4.2.7)	Broadband impulsive conducted disturbances	N/A	ANNEX A.14	Note 12

Note 1: The highest frequency of the internal sources of the EUT is above 108 MHz, the measurement shall be made above 1 GHz.

Note 2: For cables longer than 3 m only.

Note 3: For Class B broadcasting receiver only.

Note 4: There is no need for Harmonics test to be performed on this product (rated power is less than 75 W) in accordance with EN IEC 61000-3-2: 2019.

For further details, please refer to Clause 7 of EN 61000-3-2: 2014 which states:

“For the following categories of equipment, limits are not specified in this edition of the standard:
- equipment with a rated power of 75 W or less, other than lighting equipment.”

For DC Ports and Analogue/ Digital data Ports, applicable only to ports which according to the manufacturer’s specification support cable lengths greater than 3 m.

Note 5: The repetition frequency is 100 kHz for CPE, xDSL ports.

Note 6: The number of pulses applied shall be as follows:

- Five positive pulses line-to-neutral at 90o phase
- Five negative pulses line-to-neutral at 270o phase

The following additional pulses are required only if the EUT has an earth connection or if the EUT is earthed via any AE.

- Five positive pulses line-to-earth at 90o phase
- Five negative pulses line-to-earth at 270o phase
- Five negative pulses neutral-to-earth at 90o phase
- Five positive pulses neutral-to-earth at 270o phase

For multiple-phase systems where a neutral conductor is present, the test is applied (as defined above) to a single phase unless the other phases are connected to significantly different circuit arrangements.

For multiple-phase systems where a neutral conductor is not present, the test is applied as defined in the basic standard.

Note 7: Applicable only to ports which, according to the manufacturer's specification, may connect directly to outdoor cables.

Note 8: Surges are applicable to ports which satisfy all the following conditions:

- may connect directly to cables that leave the building structure.
- defined as an antenna port a wired network port or a broadcast receiver tuner port. Typical ports covered include xDSL, PSTN, CATV, antenna and similar. Excluded ports are LAN and similar.

Note 9: The level is 3V from 0.15 MHz to 10MHz, from 3V decrease to 1V when 10 MHz to 30 MHz with Logarithmic, and 1V from 30MHz to 80 MHz.

Note 10: Applicable only to equipment containing devices intrinsically susceptible to magnetic fields, such as CRT monitors, Hall effect elements electro-dynamic microphones magnetic field sensors or audio frequency transformers.

Note 11: Changes to occur at 0 degree crossover point of the voltage waveform. If the EUT does not demonstrate compliance when tested with 0 degree switching. The test shall be repeated with the switching occurring at both 90 degrees and 270 degrees. If EUT satisfies these alternative requirements, then it fulfils the requirements. This condition shall be recorded in the test report.

Note 12: Applicable only to CPE xDSL ports.

3.4 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)	2.96 dB
Radiated emissions (30 MHz-1 GHz)	3.67 dB
Radiated emissions (1 GHz-18 GHz)	3.57 dB
Radiated emissions (18 GHz-40 GHz)	5.16 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)	20°C to 25°C	USB 5V	30% to 60%	100 kPa to 102 kPa

4.2 Test Equipment

Radiated Emission Test For Frequency Below 1 GHz (10 m)						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWA RZ	ESRP	101036	2021.06.01	2022.05.31	<input type="checkbox"/>
Test Antenna- Bi-Log	SCHWARZBECK	VULB 9168	9168-0883	2020.05.11	2022.05.10	<input type="checkbox"/>
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60 *7.35m	N/A	2021.08.15	2024.08.14	<input type="checkbox"/>

Radiated Emission Test For Frequency Below 1 GHz (3 m)						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2021.09.13	2022.09.12	<input checked="" type="checkbox"/>
Test Antenna- Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2021.08.20	2024.08.19	<input checked="" type="checkbox"/>
Anechoic Chamber	CHANGNING	9m*6m*6m	N/A	2020.03.16	2023.03.15	<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	2021.09.13	2022.09.12	<input checked="" type="checkbox"/>
Test Antenna- Horn	SCHWARZBECK	BBHA 9120D	1917	2019.07.02	2022.07.01	<input checked="" type="checkbox"/>
Anechoic Chamber	CHANGNING	9m*6m*6m	N/A	2020.03.16	2023.03.15	<input checked="" type="checkbox"/>

Conducted disturbance Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	KEYSIGHT	N9010B	MY57110309	2021.06.01	2022.05.31	<input checked="" type="checkbox"/>
LISN	SCHWARZBECK	NSLK 8127	8127-940	2020.11.10	2021.11.09	<input checked="" type="checkbox"/>
ISN	TESEQ	ISN T800	34449	2020.12.08	2021.12.07	<input type="checkbox"/>
ISN	TESEQ	ISN T8- CAT6	53561	2021.06.01	2022.05.31	<input type="checkbox"/>
Shielded Enclosure	YiHeng Electronic Co., Ltd	3.4m*3.1m* 2.8m	N/A	2018.08.16	2022.08.15	<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	2020.10.16	2021.10.15	<input checked="" type="checkbox"/>
AC TESTING POWER SOURCE	EVERFINE	DPS1030	Y120984CJ7 331115	2021.01.14	2022.01.13	<input checked="" type="checkbox"/>

Electrostatic Discharge Immunity Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
ESD Test System	AMETEK CTS	DITO	P18332 22423	2021.06.04	2022.06.03	<input checked="" type="checkbox"/>

Radiated RF Electromagnetic Field Immunity Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
Anechoic Chamber	RAINFORD	7m*4m*3m	N/A	2019.11.24	2022.11.23	<input checked="" type="checkbox"/>
Signal Generator	Agilent	N5181A	MY50141919	2021.06.01	2022.05.31	<input checked="" type="checkbox"/>
Power Amplifier	OPHIR RF	5225F	1037	2021.02.18	2022.02.17	<input checked="" type="checkbox"/>
Power Amplifier	OPHIR RF	5273F	1016	2021.02.18	2022.02.17	<input checked="" type="checkbox"/>
Power Amplifier	RFLIGHT	NTWPAS	2560025	2021.02.18	2022.02.17	<input checked="" type="checkbox"/>
Power Meter	R&S	NRVD-B2	7250BJ- 0112/2011	2020.09.25	2021.09.24	<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	EP602	511WX51129	2020.09.22	2021.09.21	<input checked="" type="checkbox"/>
Feld Strength Meter	Narda	EP602	511WX51129	2021.09.21	2022.09.20	<input checked="" type="checkbox"/>
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2021.08.20	2024.08.19	<input checked="" type="checkbox"/>
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	1917	2019.07.02	2022.07.01	<input checked="" type="checkbox"/>
Mouth Simulator	B&K	4227	2423931	2020.10.23	2021.10.22	<input checked="" type="checkbox"/>
Sound Calibrator	B&K	4231	2430337	2020.10.23	2021.10.22	<input checked="" type="checkbox"/>
Sound Level Meter	B&K	NL-20	00844023	2020.10.23	2021.10.22	<input checked="" type="checkbox"/>
Ear Simulator	B&K	4192 -L-001	3038758	2021.01.15	2022.01.14	<input checked="" type="checkbox"/>
Audio analyzer	R&S	UPL 16	100129	2021.02.26	2022.02.25	<input checked="" type="checkbox"/>

Electrical Fast Transient/Burst Immunity & Transients and Surges & Voltage Dips and Short Interruptions Immunity Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
(EFT/ SURGE/ DIPS)Three-in-one Test System	HTEC	HCOMPACT 7	190801	2021.06.01	2022.05.31	<input checked="" type="checkbox"/>
DIPS coupling	HTEC	HV1P16T	190303	2021.06.01	2022.05.31	<input checked="" type="checkbox"/>
EFT Clamp (Telecom Ports)	HTEC	H3C	N/A	2021.06.01	2022.05.31	<input type="checkbox"/>
SURGE coupling (Telecom Ports)	HTEC	TCOMB-4	143807	2021.06.01	2022.05.31	<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	CDG 6000-75	126B1286	2021.06.01	2022.05.31	<input checked="" type="checkbox"/>
CDN-M2+3	SCHLODER	CDN M2+M3-16	A2210276	2021.06.01	2022.05.31	<input checked="" type="checkbox"/>
Injection Probe	FCC	F-120-8M	190119	2021.01.14	2022.01.13	<input type="checkbox"/>

Power Frequency Magnetic Fields Immunity						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
Magnetic Field Tester	HEAFELY	HMFG 100	191001	2021.06.01	2022.05.31	<input type="checkbox"/>

Broadband impulsive conducted disturban						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
Wave Signal generato	KEYSIGHT	33500B	MY57301229	2020.10.19	2021.10.18	<input type="checkbox"/>
Amplifier	SCHLODER	CDG 6000-75	126B1286	2021.06.01	2022.05.31	<input type="checkbox"/>
CDN(ISN)	TESEQ	ISN T800	34449	2020.12.08	2021.12.07	<input type="checkbox"/>
CDN-M2+3	SCHLODER	CDN M2+M3-16	A2210276	2021.06.01	2022.05.31	<input type="checkbox"/>
DSLAM	ZTE	ZXDSL9806	00D0D097B1D4	N/A	N/A	<input type="checkbox"/>
Line Simulator	SPIRENT	DSL-6626	E0097100283	N/A	N/A	<input type="checkbox"/>

4.3 Test Enclosure list

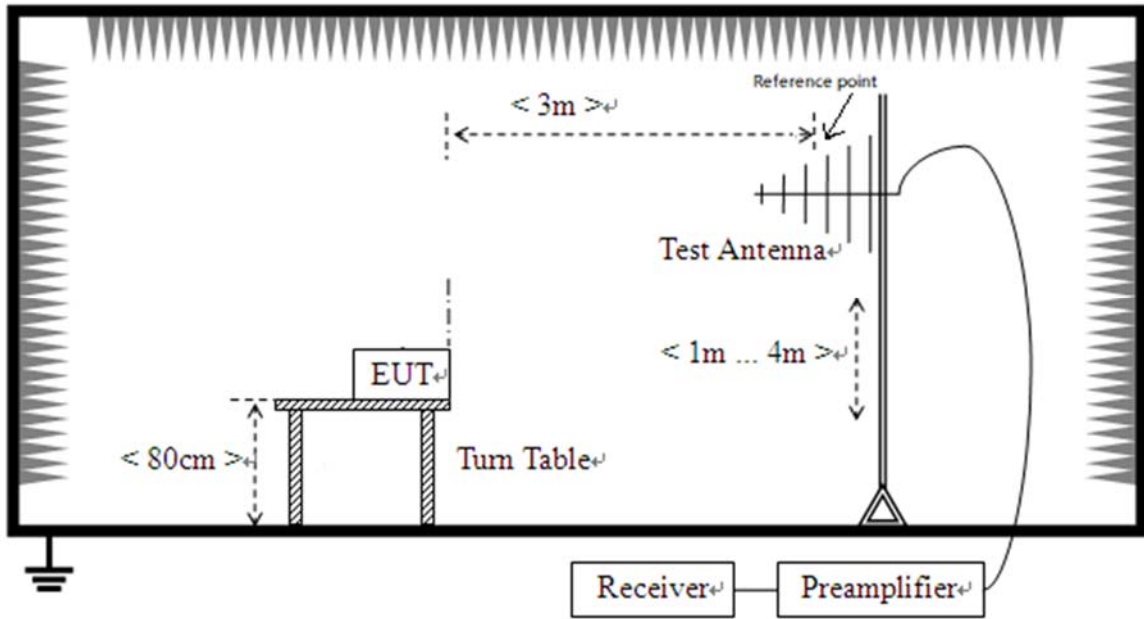
Description	Manufacturer	Model	Serial No.	Length	Description	Use
Adapter	OPPO	AK779GB	N/A	N/A	N/A	<input checked="" type="checkbox"/>
AUX Cable	N/A	N/A	N/A	N/A	N/A	<input checked="" type="checkbox"/>
Laptop	Apple	A1465	N/A	N/A	N/A	<input checked="" type="checkbox"/>
Phone	OPPO	CPH0701	N/A	N/A	N/A	<input checked="" type="checkbox"/>
Earphone	N/A	N/A	N/A	N/A	N/A	<input checked="" type="checkbox"/>

4.4 Test Configurations

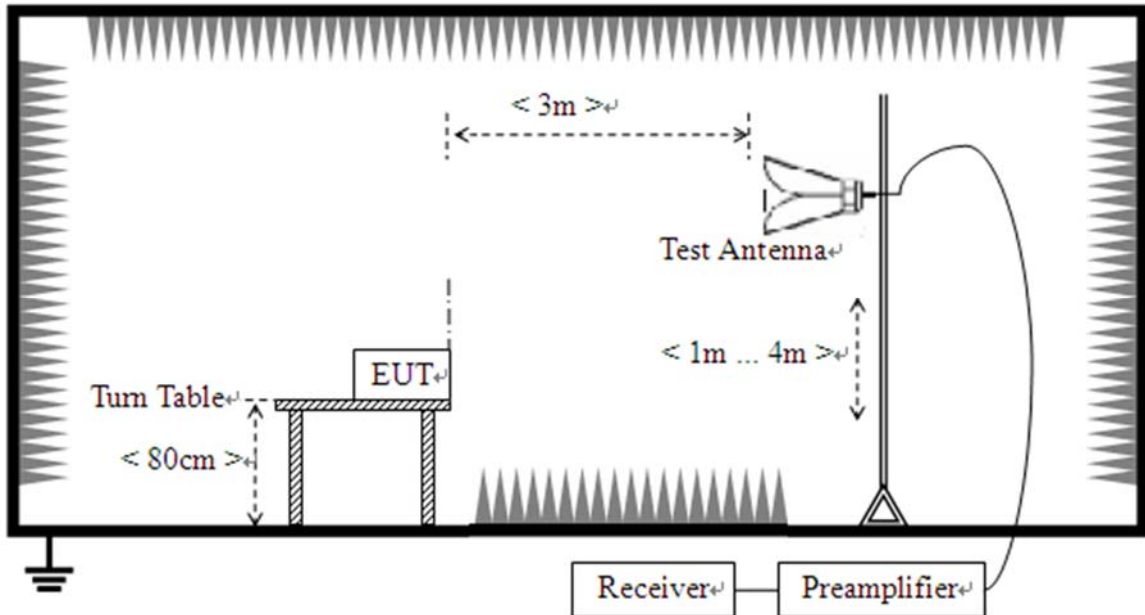
Test Configurations (TC) No.	Description
TC01	<u>The AUX Play Test Mode (Loudspeaker Output)</u> EUT + Adapter + AUX Cable + Phone
TC02	<u>The AUX Play Test Mode (Earphone Output)</u> EUT + Adapter + AUX Cable + Phone + Earphone
TC03	<u>The USB Play Test Mode (Loudspeaker Output)</u> EUT + Laptop + AUX Cable + Phone
TC04	<u>The USB Play Test Mode (Earphone Output)</u> EUT + Laptop + AUX Cable + Phone + Earphone

4.5 Test Setups

Test Setup 1

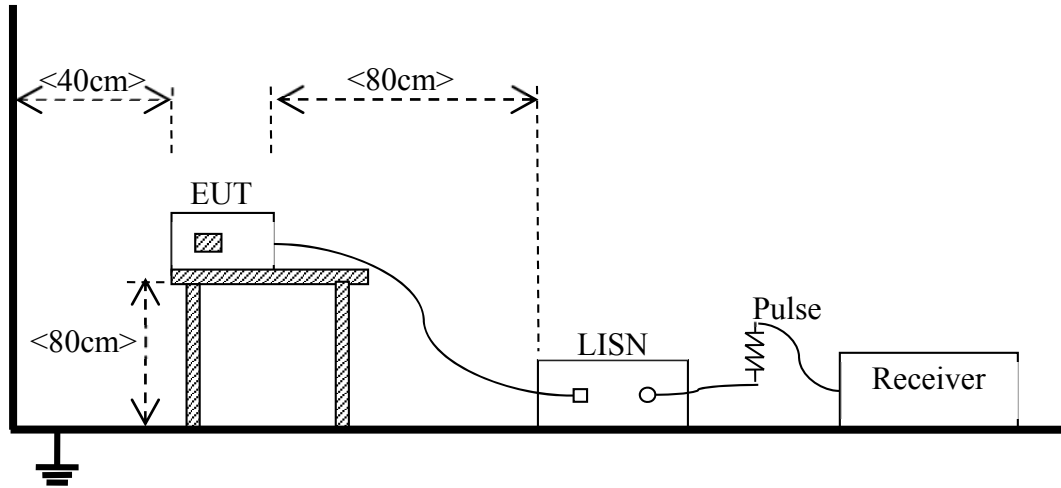


(For Radiated Emission Test (30 MHz-1 GHz))



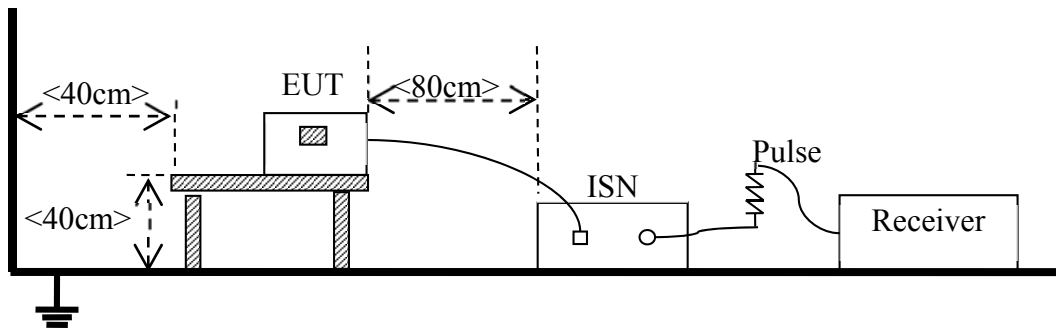
(For Radiated Emission Test (above 1 GHz))

Test Setup 2



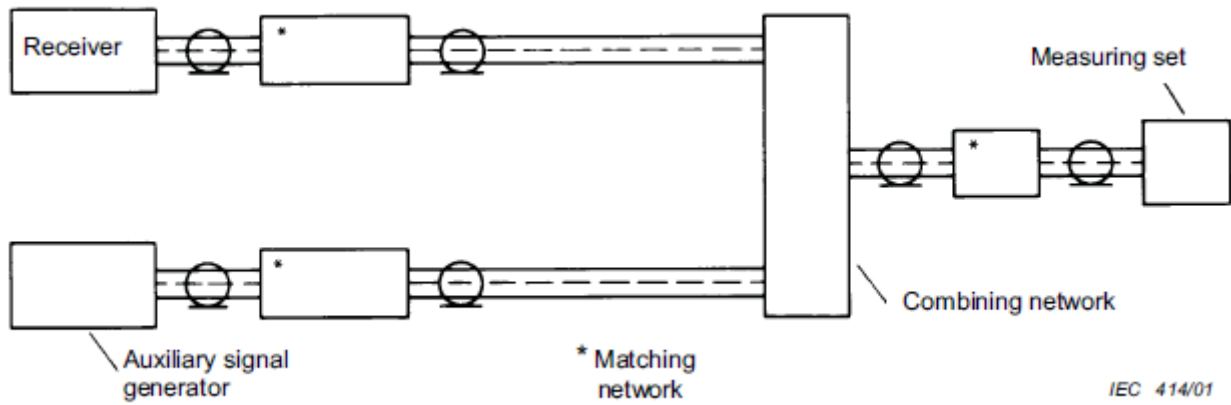
(For Conducted disturbance voltage at mains terminals Test)

Test Setup 3



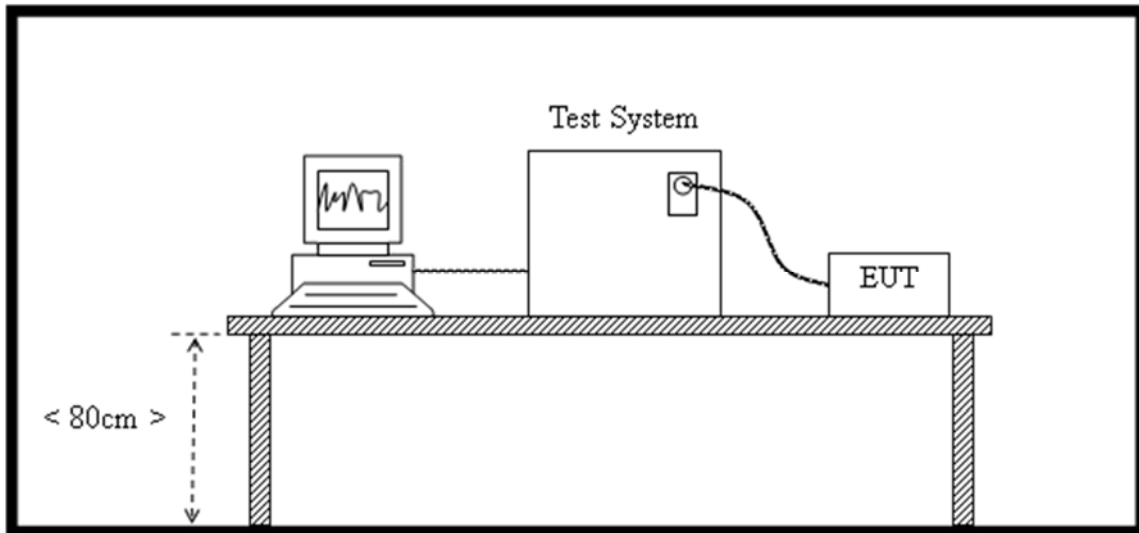
(For Conducted disturbance for asymmetric mode Test)

Test Setup 4



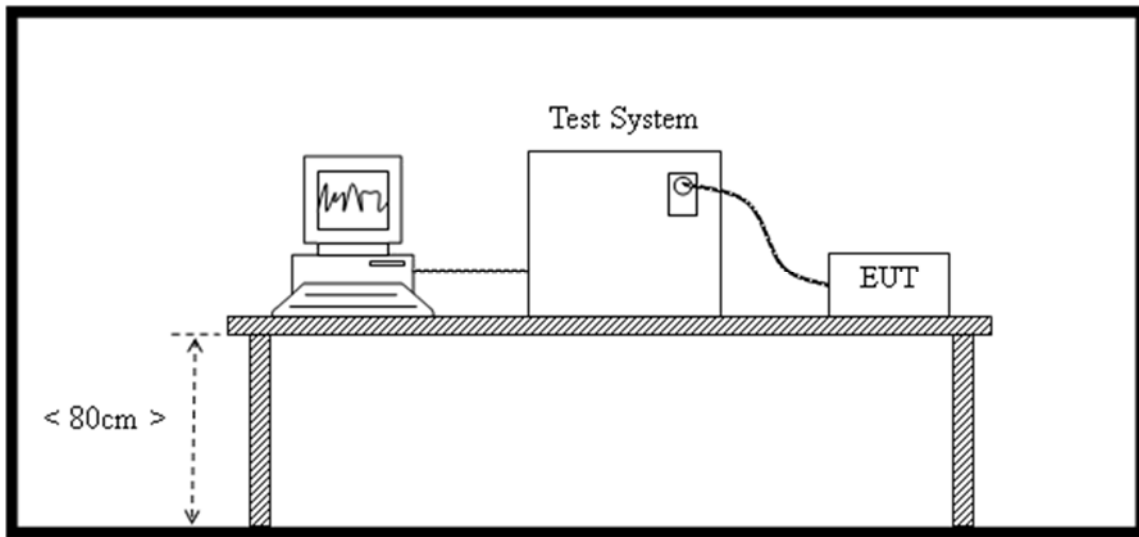
(For Conducted differential voltage emission (TV/FM broadcast receiver tuner ports))

Test Setup 5



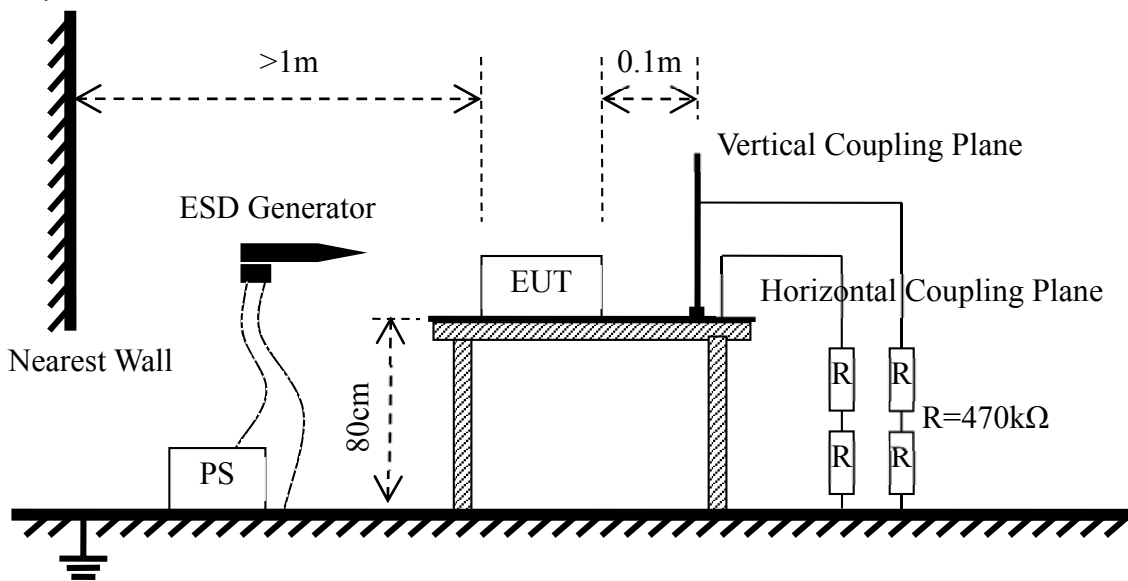
(For Harmonic Current Emissions Measurement Test)

Test Setup 6



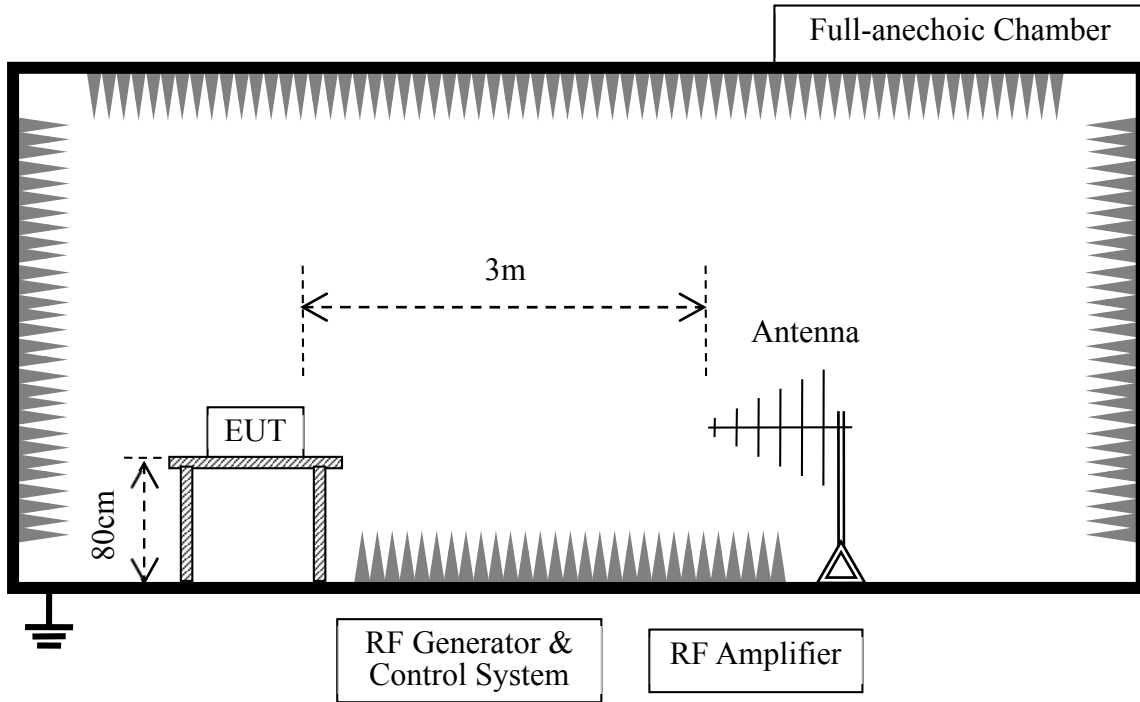
(For Voltage Fluctuations and Flicker Measurement Test)

Test Setup 7



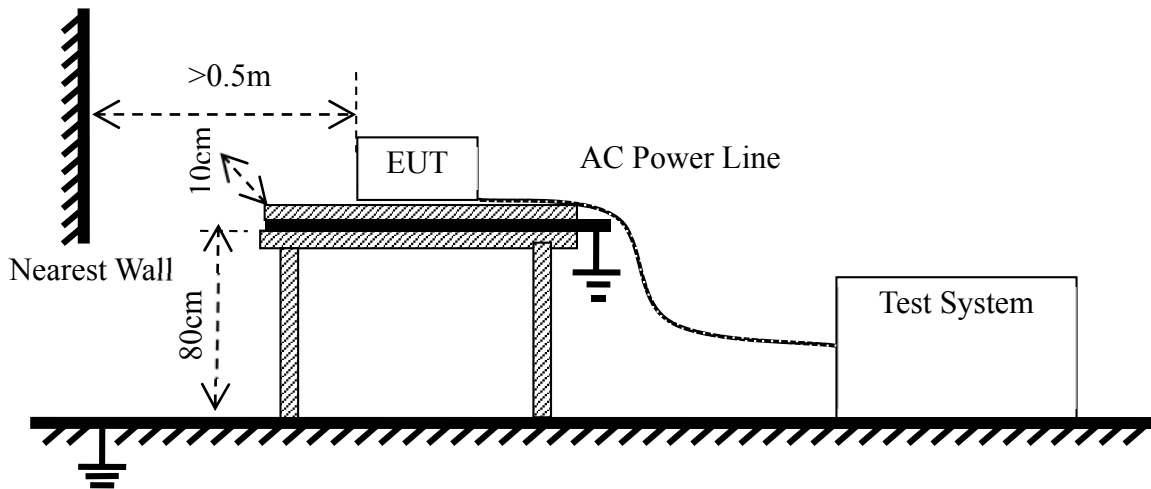
(For Electrostatic Discharge Immunity Test)

Test Setup 8

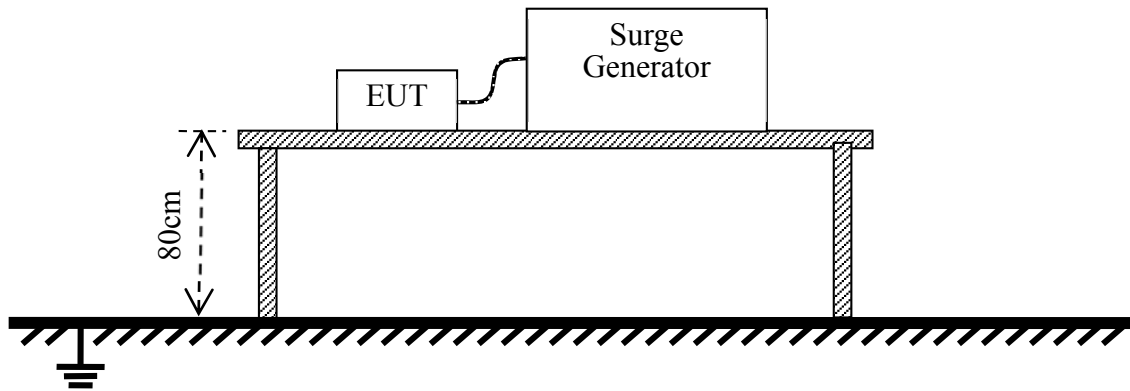


(For Radiated Immunity Test)

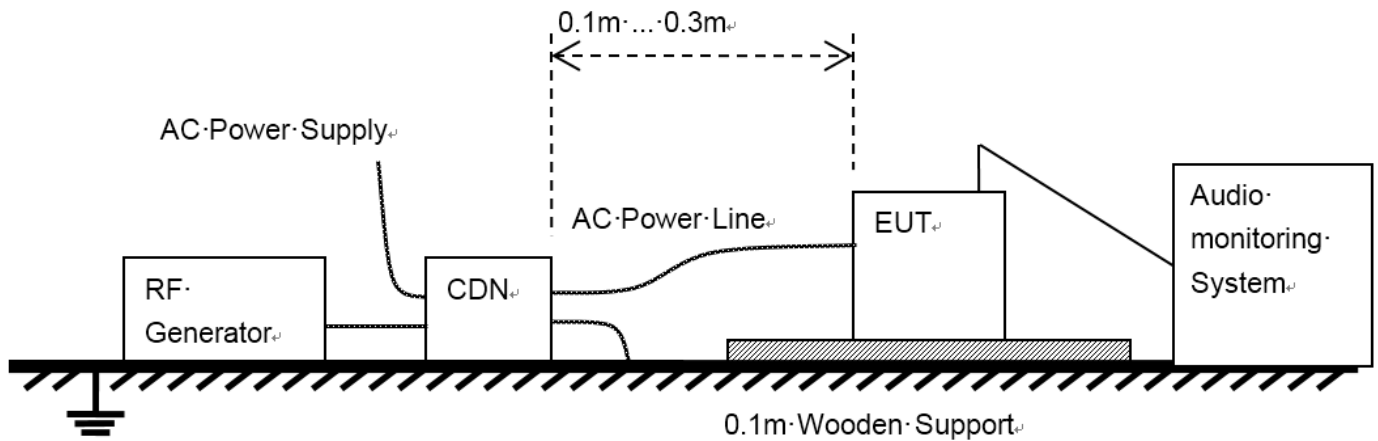
Test Setup 9



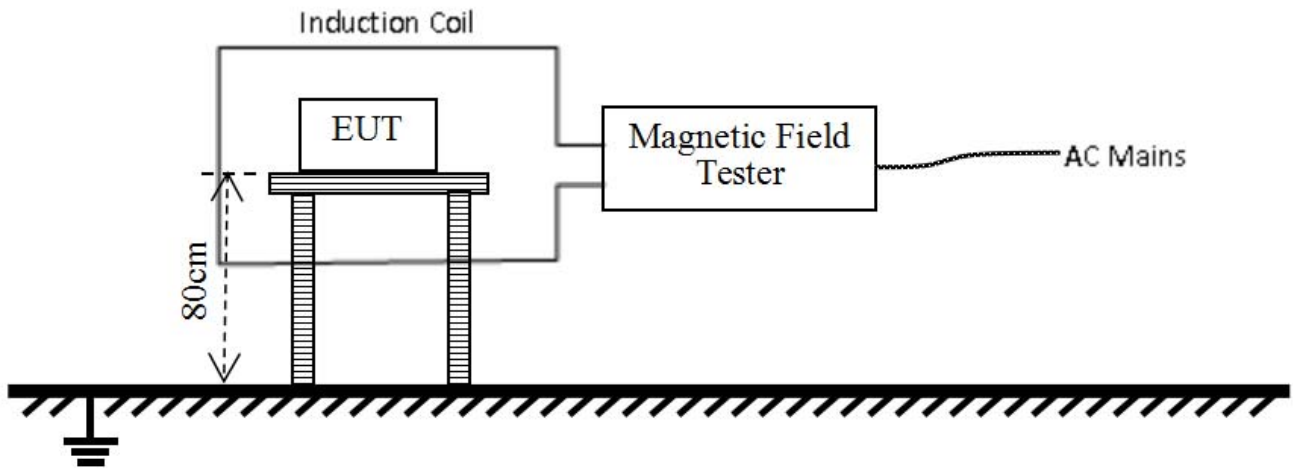
(For Electrical Fast Transient / Burst Immunity Test)

Test Setup 10

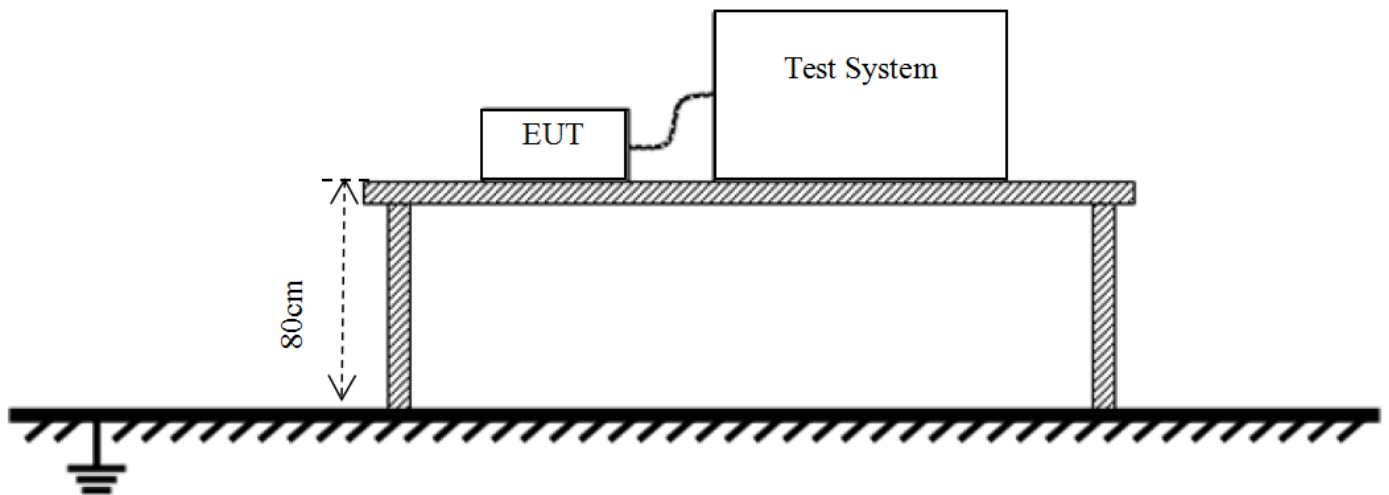
(For Surge Immunity Test)

Test Setup 11

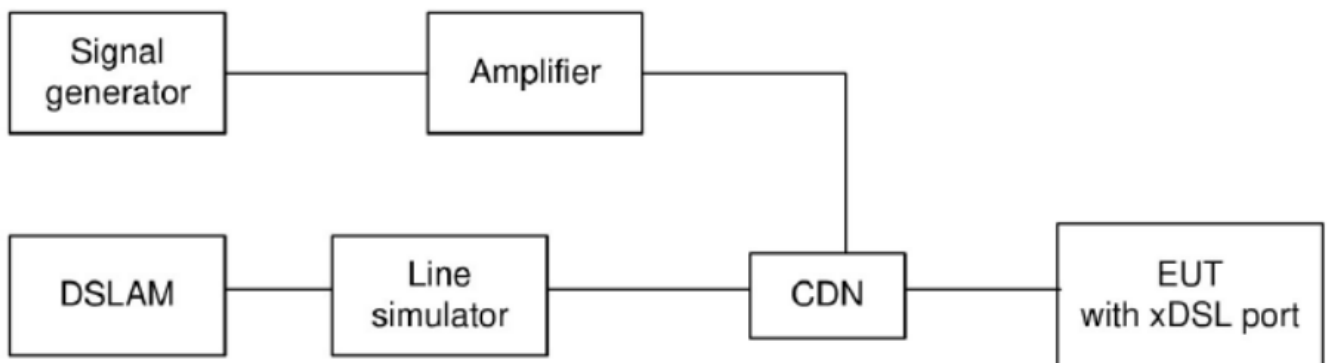
(For Immunity to Conducted Disturbances Induced By RF Fields Test)

Test Setup 12

(Power Frequency Magnetic Fields)

Test Setup 13

(For Voltage Dips and Short Interruptions Immunity Test)

Test Setup 14

(For Broadband Impulse Noise Disturbances Repetitive Immunity Test)

4.6 Test Conditions

Test Case	Test Conditions	
Radiated Emission	Test Env.	NTNV
	Test Setup	Test Setup 1
	Test Configuration	TC01~TC04 ^{Note}
Conducted disturbance voltage at mains terminals	Test Env.	NTNV
	Test Setup	Test Setup 2
	Test Configuration	TC01~TC02 ^{Note}
Voltage Fluctuations & Flicker	Test Env.	NTNV
	Test Setup	Test Setup 6
	Test Configuration	TC01~TC02 ^{Note}
Electrostatic Discharge Immunity	Test Env.	NTNV
	Test Setup	Test Setup 7
	Test Configuration	TC01~TC04 ^{Note}
Radiated RF Electromagnetic Field Immunity	Test Env.	NTNV
	Test Setup	Test Setup 8
	Test Configuration	TC01~TC04 ^{Note}
Electrical Fast Transient/Burst Immunity	Test Env.	NTNV
	Test Setup	Test Setup 9
	Test Configuration	TC01~TC02 ^{Note}
Surge Immunity	Test Env.	NTNV
	Test Setup	Test Setup 10
	Test Configuration	TC01~TC02 ^{Note}
Immunity to Conducted Disturbances Induced by RF Fields	Test Env.	NTNV
	Test Setup	Test Setup 11
	Test Configuration	TC01~TC02 ^{Note}
Voltage Dips and Short Interruptions Immunity	Test Env.	NTNV
	Test Setup	Test Setup 13
	Test Configuration	TC01~TC02 ^{Note}
Note: Based on client request, all normal using modes of the normal function were tested, but only the worst test data of test mode is reported in this report. The AUX Play Test Mode (Loudspeaker Output) is the worst mode in this report.		

5 TEST ITEMS

5.1 Emission Tests

5.1.1 Radiated Emission

5.1.1.1 Limit

Frequency range (MHz)	Class A (at 3 m)		Class B (at 3 m)	
	Quasi-Peak Limit (dB μ V/m)		Quasi-Peak Limit (dB μ V/m)	
30 - 230	50		40	
230 - 1000	57		47	

Frequency range (MHz)	Class A (at 3 m)		Class B (at 3 m)	
	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)
1000-6000	80	60	74	54

Requirements for radiated emissions from FM receivers

Frequency range (MHz)	Measurement		Quasi-Peak Limit (dB μ V/m) Fundamental	Quasi-Peak Limit (dB μ V/m) Harmonics	Quasi-Peak Limit (dB μ V/m) Other
	Facility	Distance (m)			
30-230	OATS/SAC	10	50	42	30
230-300				42	37
300-1000				46	37
30-230	OATS/SAC	3	60	52	40
230-300				52	47
300-1000				56	47

NOTE:

- 1) The lower limit shall apply at the transition frequency.
- 2) Additional provisions may be required for cases where interference occurs.

5.1.1.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 1. The photo of test setup please refer to ANNEX B.

5.1.1.3 Test Procedure

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.

5.1.1.4 Test Result

Please refer to ANNEX A.1.

5.1.2 Conducted disturbance voltage at mains terminals

5.1.2.1 Test Limit

Frequency range (MHz)	Class A		Class B	
	Quasi-peak (dB μ V)	Average (dB μ V)	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 - 0.50	79	66	66-56	56-46
0.50 - 5	73	60	56	46
5 - 30	73	60	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.

5.1.2.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 2. The photo of test setup please refer to ANNEX B.

5.1.2.3 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.

5.1.2.4 Test Result

Please refer to ANNEX A.2.

5.1.3 Conducted disturbance for asymmetric mode

5.1.3.1 Test Limit

Frequency range (MHz)	Class A		Class B	
	Quasi-peak (dB μ V)	Average (dB μ V)	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 - 0.50	97-87	84-74	84-74	74-64
0.50 - 30	87	74	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.

5.1.3.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 3. The photo of test setup please refer to ANNEX B.

5.1.3.3 Test Procedure

Measurement of common mode (asymmetric mode) current or voltage emissions at wired network ports for attachment of unshielded balanced pairs shall be performed with the wired network port connected by a cable to an AAN. The AAN shall define the common mode termination impedance seen by the wired network port during the emission measurements.

The voltage division factor shall be added to the measured voltage measured by the receiver directly at the voltage measurement port of the AAN and the result compared with the voltage limits as applicable.

5.1.3.4 Test Result

Please refer to ANNEX A.3.

5.1.4 Conducted differential voltage emission

5.1.4.1 Test Limit

Applicability	Frequency range (MHz)	Differential voltage limit @75Ω(dBuV)		
		Local Oscillator Fundamental	Local Oscillator Harmonics	Other
Television receivers; video recorders; PC TV broadcast receiver tuner cards; Digital audio receivers	30 to 950	46	46	46
	950 to 2150	54	54	46
Tuner units (not the LNB) for satellite signal reception	950 to 2150	54	54	46
FM audio receivers and PC tuner cards	30 to 300	54	50	46
	300 to 1000	54	52	46
FM car radios	30 to 300	66	59	46
	300 to 1000	66	52	46
RF modulator output ports connect to TV broadcast receiver tuner ports	30 to 950	76	46	46
	950 to 2150	N/A	54	46

5.1.4.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 4. The photo of test setup please refer to ANNEX B.

5.1.4.3 Test Procedure

1. The impedance as seen from the TV/FM broadcast receiver tuner port of the EUT shall be equal to the nominal antenna input impedance for which the port has been designed. The EUT shall be tuned to the wanted signal from the AE (signal generator). The emission level shall be measured across the relevant frequency range taking into account the attenuation between the EUT TV/FM broadcast receiver tuner port and the measurement device.
2. The RF modulator output port of the EUT is connected to the input of the measuring device by means of a coaxial cable and a matching network (if necessary). The characteristic impedance of the cable shall be equal to the nominal output impedance of the EUT. The EUT shall produce an RF carrier modulated by a video signal defined. The RF output level shall be obtained by adding the insertion loss of the matching network to the indication of the measuring device (tuned to the video carrier frequency and its harmonics).

5.1.4.4 Test Result

Please refer to ANNEX A.4.

5.1.5 Harmonic Current Emissions

5.1.5.1 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.

5.1.5.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 5. The photo of test setup please refer to ANNEX B.

5.1.5.3 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.

5.1.5.4 Test Result

Please refer to ANNEX A.5.

5.1.6 Voltage Fluctuations and Flicker Measurement

5.1.6.1 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

5.1.6.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 6. The photo of test setup please refer to ANNEX B.

5.1.6.3 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

5.1.6.4 Test Result

Please refer to ANNEX A.6.

5.2 Immunity Tests

5.2.1 Test Performance Criteria for Immunity Test

5.2.1.1 General Performance Criteria

Type	Description
Criterion A	<p>The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended.</p> <p>The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
Criterion B	<p>During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.</p> <p>After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.</p> <p>If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
Criterion C	<p>Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed</p>

5.2.1.2 Performance Criteria for CPE containing xDSL ports

Type	Description
Criterion A	<p>In the absence of impulsive noise:</p> <p>The modem shall operate without retraining at its target noise margin with a bit rate value depending on the line attenuation and the stationary noise being present on the line. (The actual value will be between the minimum and maximum bit rate values programmed in the port).</p> <p>With the impulsive noise applied:</p> <p>The modem shall operate without retraining and without SES at the bit rate established prior to the application of the impulsive noise. No extra CRC errors shall occur due to the impulsive noise.</p>
Criterion B	<p>Modems shall withstand the application of the isolated impulsive noise events. The performance criteria defined in Table F.3 shall be applied.</p>

Table F.3 – Performance criteria against impulse duration

Impulse duration ms	Performance criteria
0,24	The application of the impulse shall not cause the xDSL link to lose synchronisation. No CRC errors are permitted.
10	The application of the 5 impulses shall result in less than 75 CRC errors and shall not cause the link to lose synchronisation.
300	The application of the impulse shall not cause the xDSL link to lose synchronisation.

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: 8 kV Contact Discharge: 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 Setup

Please refer to 4.5 section description of test setup of test setup 7. The photo of test setup please refer to ANNEX B.

5.2.2.3 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 0.5m*0.5m) is placed vertically to and 0.1 meters from the EUT.

5.2.2.4 Test Result

Please refer to ANNEX A.7.

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, 1800/2600/3500/5000 ($\pm 1\%$) MHz
Field Strength	1 V/m, 3 V/m (unmodulated, r.m.s)
Modulation	1 kHz sine wave, 80%, AM modulation
Frequency Step	1% of fundamental
Polarity of Antenna	Horizontal and Vertical
Test Distance	3 m
Antenna Height	1.5 m
Dwell Time	≤ 5 seconds

5.2.3.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 8. The photo of test setup please refer to ANNEX B.

5.2.3.3 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 1800/2600/3500/5000 ($\pm 1\%$) 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.
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.

5.2.3.4 Test Result

Please refer to ANNEX A.8.

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: 1 kV.
	DC Power Ports, Analogue/ Digital data Ports: 0.5 kV.
Polarity	Positive / Negative
Impulse Frequency	5 kHz, 100 kHz for CPE xDSL ports
Impulse Wave Shape	5/50 ns
Burst Duration	15 ms
Burst Period	300 ms
Test Duration	> 1 min

5.2.4.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 9. The photo of test setup please refer to ANNEX B.

5.2.4.3 Test Procedure

1. The EUT is tested with 1000 V discharges to the AC power input leads, and 500 V for DC Power Ports and Analogue/ Digital data Ports.
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.

5.2.4.4 Test Result

Please refer to ANNEX A.9.

5.2.5 Surge Immunity

5.2.5.1 Test Specification

Specification	Value		
	AC Power Port	DC Power Port	Analogue/ Digital data 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	Voltage: 10/700 μ s
Test Voltage	line to ground 2 kV, line to line 1 kV	line to reference ground 0.5 kV	0.5KV, 1 kV or 4KV See note 1,2,3
Polarity	Positive / Negative		
Phase Angle	90°, 270°	N/A	N/A
Repetition Rate	60 seconds		
Times	5 times per condition		

Note1: Port type: unshielded symmetrical Apply: lines to ground; Port type: coaxial or shielded Apply: shield to ground.

Note2: The test level 1kV and 4kV should apply where primary protection is intended; The test level 1kV should apply where primary protection is not intended.

Note3: The test level 0.5kV apply to coaxial or shielded.

5.2.5.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 10. The photo of test setup please refer to ANNEX B.

5.2.5.3 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 1m*1m 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.

5.2.5.4 Test Result

Please refer to ANNEX A.10.

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	1 V rms, 3 V rms (unmodulated, r.m.s)
Modulation	1 kHz sine wave, 80% AM
Frequency Step	1% of fundamental
Coupled Cable	AC Power Line; DC Power Line; Analogue/ Digital data Line

5.2.6.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 11. The photo of test setup please refer to ANNEX B.

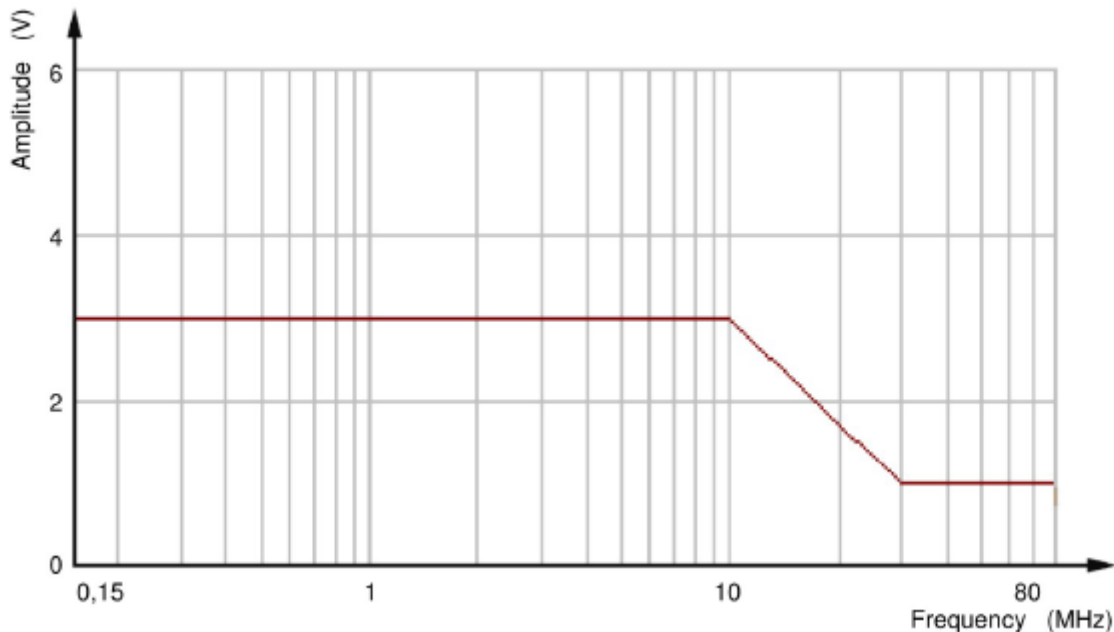
5.2.6.3 Test Procedure

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 50 Ohm load resistor.

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

The field strength level refer follow figure.



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.

5.2.6.4 Test Result

Please refer to ANNEX A.11.

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	1 A/m
Test Duration	5 min

5.2.7.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 12. The photo of test setup please refer to ANNEX B.

5.2.7.3 Test Procedure

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m) 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.

5.2.7.4 Test Result

Please refer to ANNEX A.12.

5.2.8 Voltage Dips and Short Interruptions Immunity

5.2.8.1 Test Specification

Specification	Value
Basic Standard	IEC 61000-4-11
Voltage Dips	100% reduction: 10 ms; 30% reduction: 500 ms
Voltage Interruptions	100% reduction: 5000 ms
Voltage Phase Angle	0°, 90°, 270°

5.2.8.2 Test Setup

Please refer to 4.5 section description of test setup of test setup 13. The photo of test setup please refer to ANNEX B.

5.2.8.3 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; c) 30% voltage dip of supplied voltage and duration 500 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 ms is followed, which is a sequence of three voltage interruptions with intervals of 10 seconds.

Changes to occur at 0 degree crossover point of the voltage waveform. If the EUT does not demonstrate compliance when tested with 0 degree switching. the test shall be repeated with the switching occurring at both 90 degrees and 270 degrees. If EUT satisfies these alternative requirements, then it fulfils the requirements. This condition shall be recorded in the test report.

5.2.8.4 Test Result

Please refer to ANNEX A.13.

ANNEX A TEST RESULTS

A.1 Radiated Emission

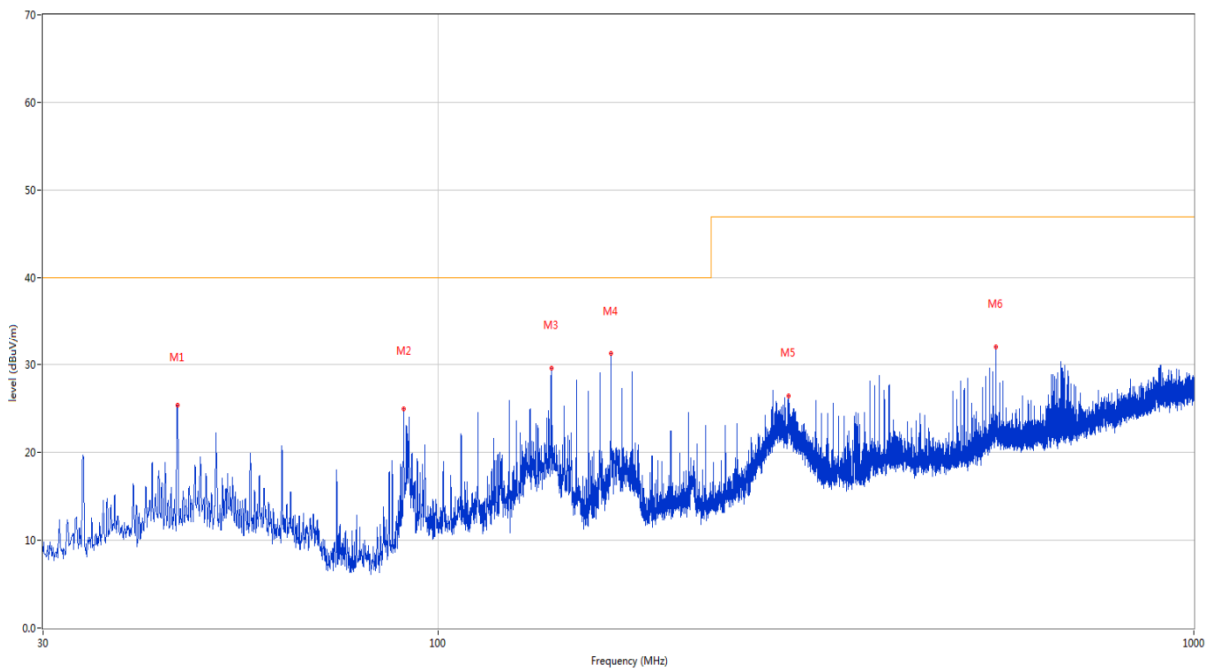
Note 1: The symbol of "--" in the table which means not application.

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 (Below 1 GHz)

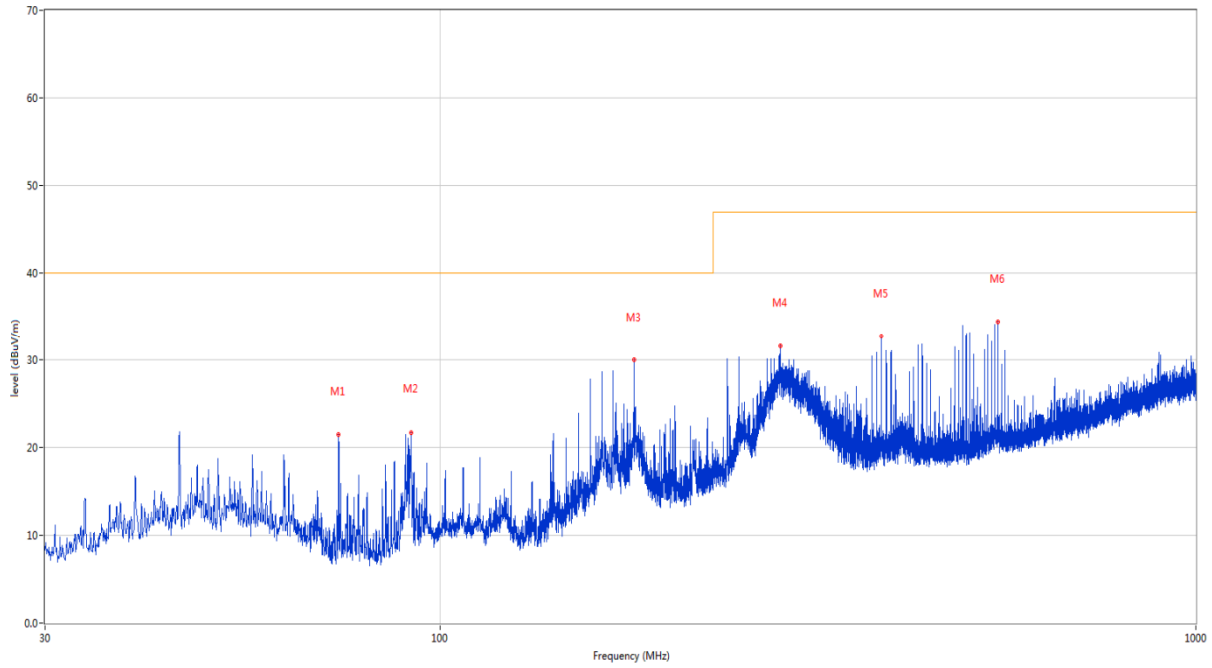
The AUX Play Test Mode (Loudspeaker Output)

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 (Degree)	Height (cm)	Antenna	Verdict
1	45.181	25.38	-23.20	40.0	-14.62	Peak	227.50	100	Vertical	Pass
2	90.043	25.00	-26.11	40.0	-15.00	Peak	128.60	100	Vertical	Pass
3	141.113	29.61	-27.64	40.0	-10.39	Peak	25.70	100	Vertical	Pass
4	169.340	31.26	-26.92	40.0	-8.74	Peak	349.90	100	Vertical	Pass
5	277.544	27.01	-21.92	47.0	-19.99	Peak	224.40	200	Vertical	Pass
6	547.543	32.02	-15.28	47.0	-14.98	Peak	17.60	100	Vertical	Pass

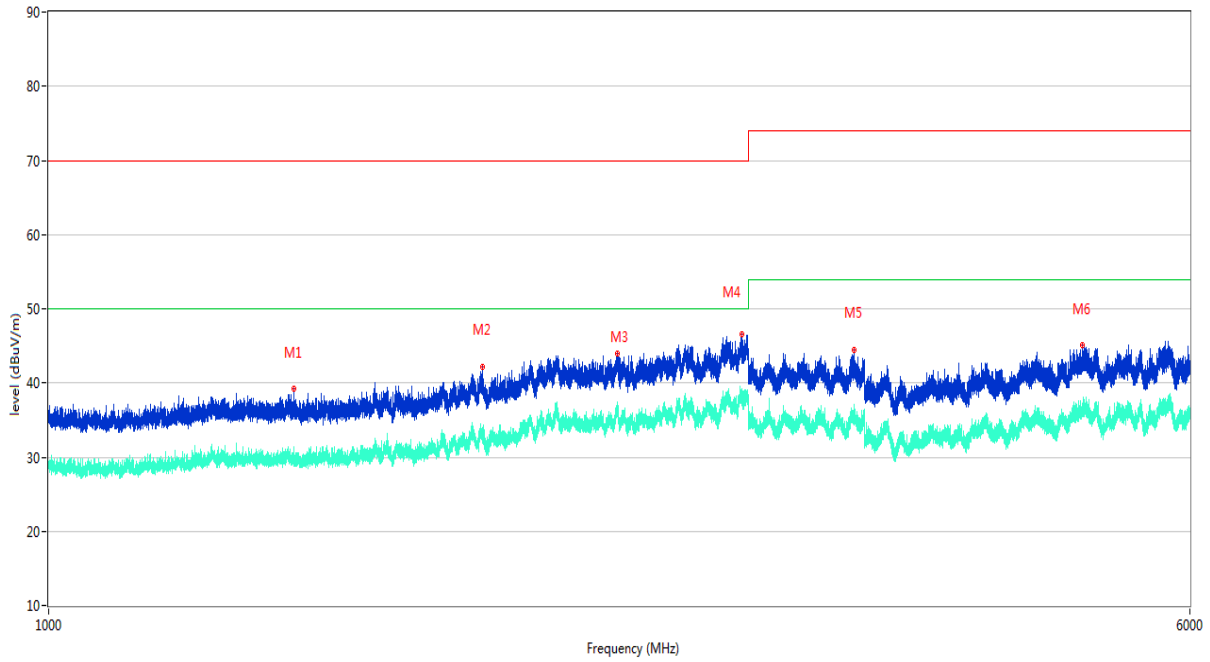
A.1.2 Test Antenna Horizontal, 30 MHz – 1 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	73.408	19.63	-28.48	40.0	-20.37	Peak	179.30	100	Horizontal	Pass
2	91.547	21.71	-25.73	40.0	-18.29	Peak	214.80	200	Horizontal	Pass
3	180.641	29.98	-25.97	40.0	-10.02	Peak	307.70	200	Horizontal	Pass
4	282.249	31.63	-21.79	47.0	-15.37	Peak	289.10	100	Horizontal	Pass
5	383.856	32.71	-19.27	47.0	-14.29	Peak	21.50	100	Horizontal	Pass
6	547.543	34.40	-15.28	47.0	-12.60	Peak	234.20	100	Horizontal	Pass

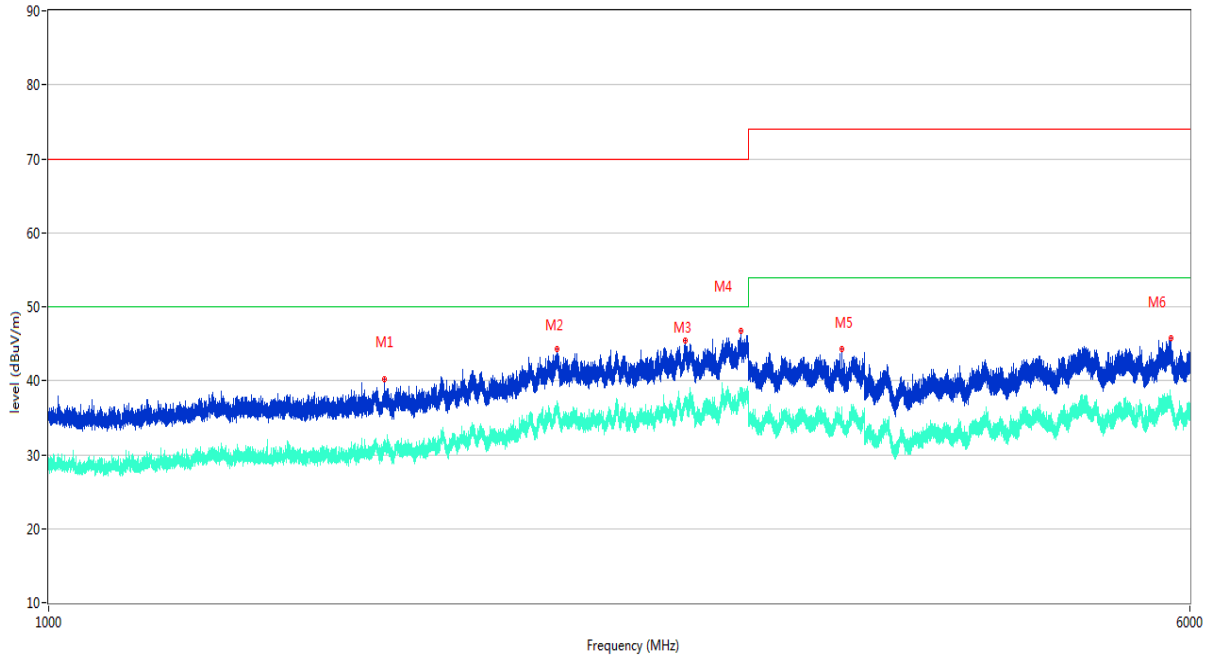
Test Data and Plots (Above 1 GHz)

A.1.3 Test Antenna Vertical, 1 GHz – 6 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1469.300	39.16	-15.56	70.0	-30.84	Peak	39.00	100	Vertical	Pass
1**	1469.300	30.21	-15.56	50.0	-19.79	AV	39.00	100	Vertical	Pass
2	1975.700	42.24	-12.35	70.0	-27.76	Peak	1.50	100	Vertical	Pass
2**	1975.700	32.54	-12.35	50.0	-17.46	AV	1.50	100	Vertical	Pass
3	2441.400	43.97	-8.51	70.0	-26.03	Peak	1.50	100	Vertical	Pass
3**	2441.400	35.40	-8.51	50.0	-14.60	AV	1.50	100	Vertical	Pass
4	2969.000	46.64	-5.57	70.0	-23.36	Peak	145.40	100	Vertical	Pass
4**	2969.000	38.91	-5.57	50.0	-11.09	AV	145.40	100	Vertical	Pass
5	3540.900	44.52	-6.56	74.0	-29.48	Peak	280.00	100	Vertical	Pass
5**	3540.900	35.97	-6.56	54.0	-18.03	AV	280.00	100	Vertical	Pass
6	5070.000	45.11	-3.08	74.0	-28.89	Peak	167.10	100	Vertical	Pass
6**	5070.000	36.01	-3.08	54.0	-17.99	AV	167.10	100	Vertical	Pass

A.1.4 Test Antenna Horizontal, 1 GHz – 6 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1693.500	40.23	-13.99	70.0	-29.77	Peak	116.50	100	Horizontal	Pass
1**	1693.500	30.62	-13.99	50.0	-19.38	AV	116.50	100	Horizontal	Pass
2	2222.600	44.32	-8.42	70.0	-25.68	Peak	237.50	100	Horizontal	Pass
2**	2222.600	37.27	-8.42	50.0	-12.73	AV	237.50	100	Horizontal	Pass
3	2718.700	45.40	-7.06	70.0	-24.60	Peak	70.00	100	Horizontal	Pass
3**	2718.700	37.10	-7.06	50.0	-12.90	AV	70.00	100	Horizontal	Pass
4	2966.000	46.78	-5.43	70.0	-23.22	Peak	60.80	100	Horizontal	Pass
4**	2966.000	38.47	-5.43	50.0	-11.53	AV	60.80	100	Horizontal	Pass
5	3473.400	44.27	-7.25	74.0	-29.73	Peak	6.50	100	Horizontal	Pass
5**	3473.400	33.86	-7.25	54.0	-20.14	AV	6.50	100	Horizontal	Pass
6	5828.550	45.68	-2.80	74.0	-28.32	Peak	77.10	100	Horizontal	Pass
6**	5828.550	36.20	-2.80	54.0	-17.80	AV	77.10	100	Horizontal	Pass

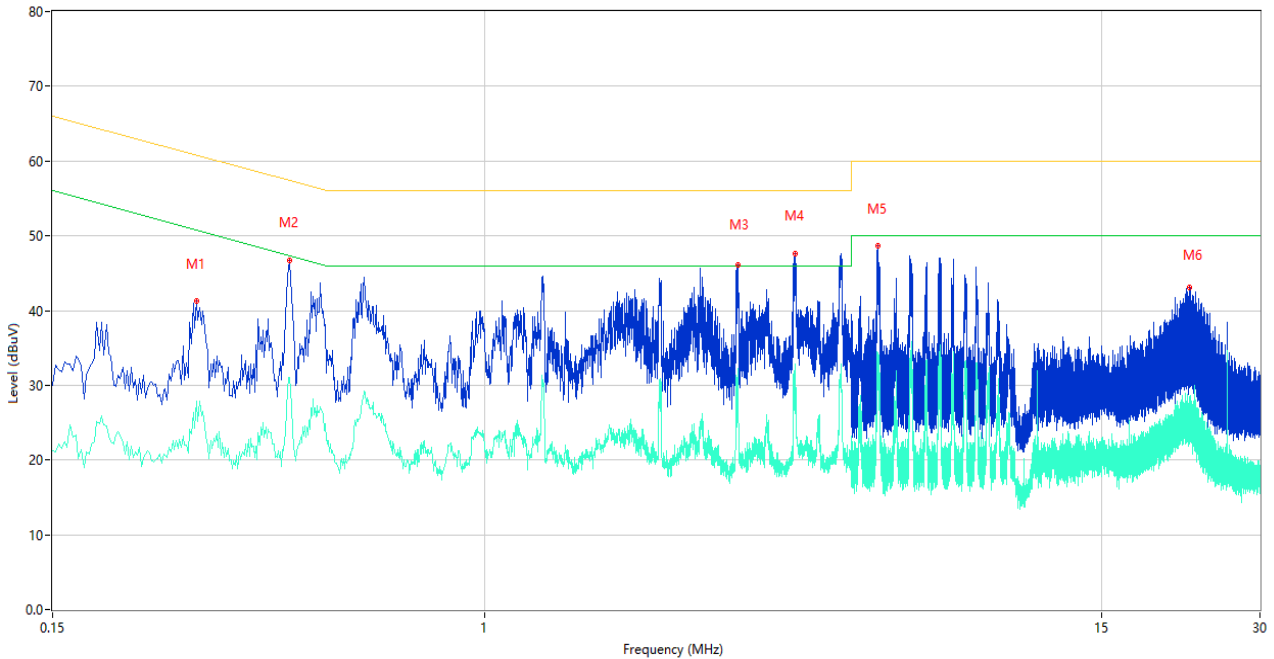
A.2 Conducted disturbance voltage at mains terminals Test

Note: Two nominal voltages of 230 V (± 10 V) and 110 V (± 10 V), using a frequency of 50 Hz or 60 Hz, is normally sufficient for an EUT intended for worldwide use. Voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 230 VAC, 50/60 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 230 VAC, 50 Hz were tested respectively, but only the worst configuration (230 VAC, 50 Hz) shown here.

Test Data and Plots

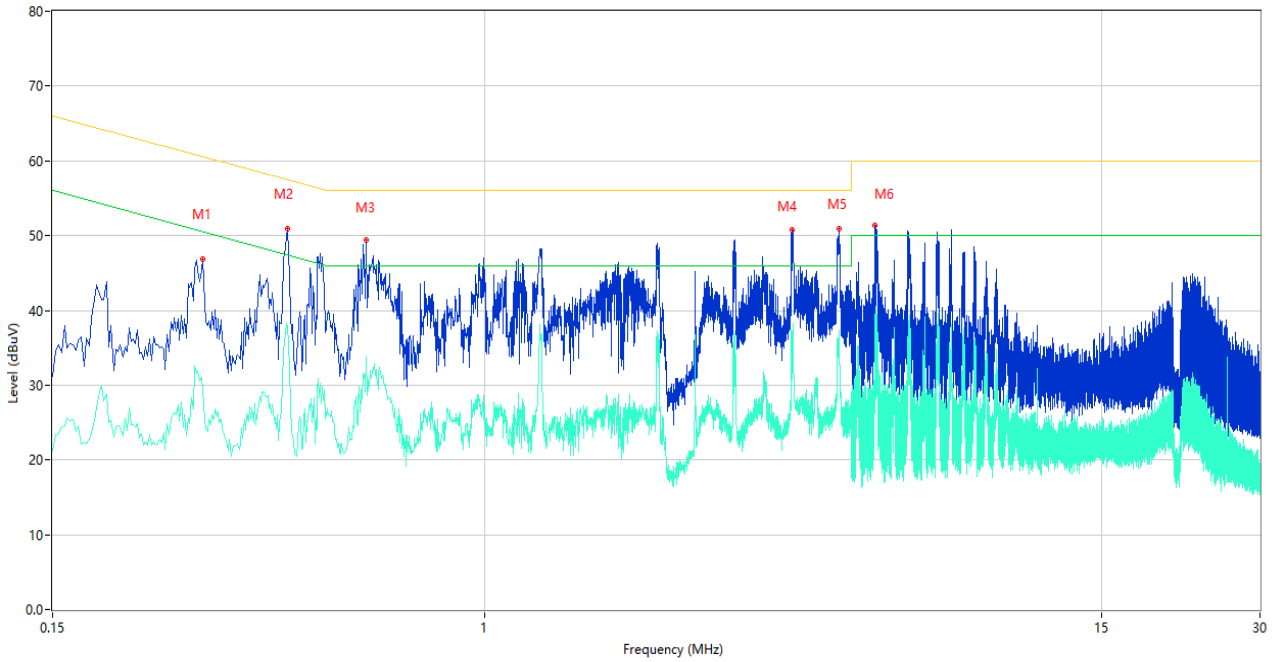
The AUX Play Test Mode (Loudspeaker Output)

A.2.1 L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.282	41.32	10.34	60.76	-19.44	Peak	L	Pass
1**	0.282	27.82	10.34	50.76	-22.94	AV	L	Pass
2	0.424	46.75	10.31	57.37	-10.62	Peak	L	Pass
2**	0.424	31.06	10.31	47.37	-16.31	AV	L	Pass
3	3.038	46.16	10.28	56.00	-9.84	Peak	L	Pass
3**	3.038	31.08	10.28	46.00	-14.92	AV	L	Pass
4	3.900	47.66	10.30	56.00	-8.34	Peak	L	Pass
4**	3.900	31.59	10.30	46.00	-14.41	AV	L	Pass
5	5.602	48.66	10.31	60.00	-11.34	Peak	L	Pass
5**	5.602	34.41	10.31	50.00	-15.59	AV	L	Pass
6	22.066	43.03	10.59	60.00	-16.97	Peak	L	Pass
6**	22.066	27.72	10.59	50.00	-22.28	AV	L	Pass

A.2.2 N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.290	46.83	10.34	60.52	-13.69	Peak	N	Pass
1**	0.290	29.41	10.34	50.52	-21.11	AV	N	Pass
2	0.420	50.98	10.31	57.45	-6.47	Peak	N	Pass
2**	0.420	37.87	10.31	47.45	-9.58	AV	N	Pass
3	0.594	49.37	10.28	56.00	-6.63	Peak	N	Pass
3**	0.594	33.85	10.28	46.00	-12.15	AV	N	Pass
4	3.842	50.70	10.29	56.00	-5.30	Peak	N	Pass
4**	3.842	37.17	10.29	46.00	-8.83	AV	N	Pass
5	4.738	50.87	10.30	56.00	-5.13	Peak	N	Pass
5**	4.738	36.71	10.30	46.00	-9.29	AV	N	Pass
6	5.548	51.41	10.31	60.00	-8.59	Peak	N	Pass
6**	5.548	39.48	10.31	50.00	-10.52	AV	N	Pass

A.3 Conducted disturbance for asymmetric mode

Note: Not applicable.

A.4 Conducted differential voltage emission

Note: Not applicable.

A.5 Harmonic Current Emissions

Note: Not applicable.

A.6 Voltage Fluctuations & Flicker

Test Parameter	Limit	Measurement Value	Verdict
Pst	1.0	0.00	Pass
Plt	0.65	0.00	Pass
Tdt	0.5	0.00	Pass
dmax (%)	4%	0.19%	Pass
dc (%)	3.3%	0.02%	Pass

A.7 Electrostatic Discharge Immunity

Test Points	Discharge Level (kV)	Discharge Mode	Number of Discharge	Verdict
HCP	±2, ±4	Contact	100	Pass
VCP	±2, ±4	Contact	100	Pass
USB Port	±2, ±4, ±8	Air	20	Pass
AUX Port	±2, ±4, ±8	Air	20	Pass
Earphone Port	±2, ±4, ±8	Air	20	Pass
Keys	±2, ±4, ±8	Air	40	Pass
Shell and Crack	±2, ±4, ±8	Air	20	Pass

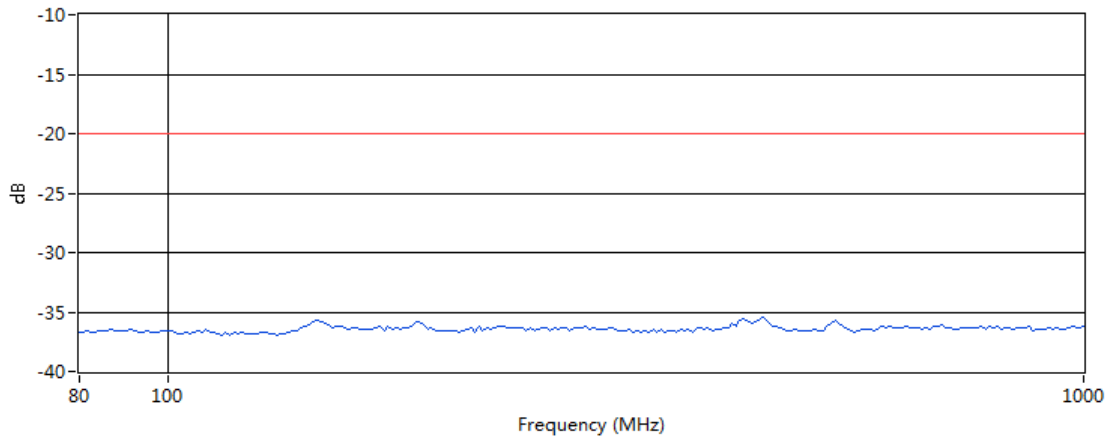
Note: Performance of the all modes comply with the performance criteria in Criterion B.

A.8 Radio Frequency Electromagnetic Field Immunity

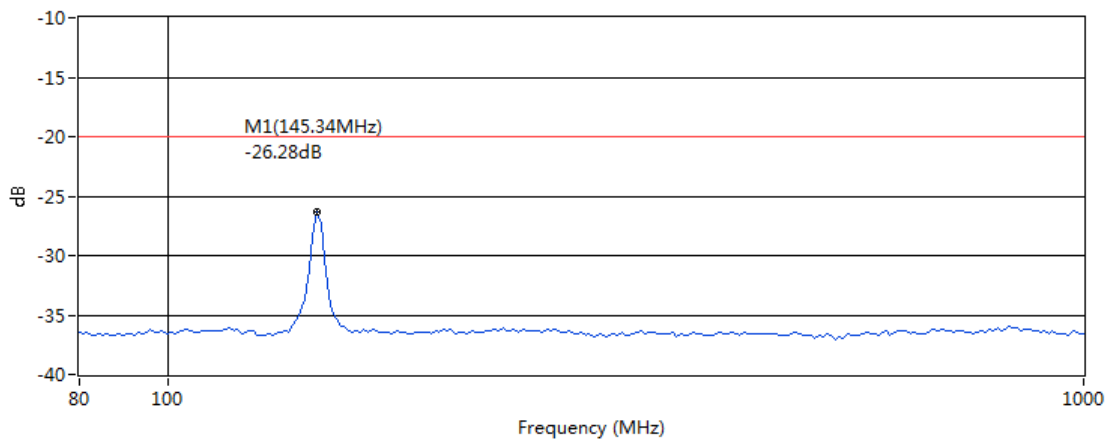
Antenna Polarity	Frequency (MHz)	Side	Field Strength (V/m)	Verdict
Vertical	80 – 1000, 1800, 2600, 3500, 5000	Front	3	Pass
		Back	3	Pass
		Left	3	Pass
		Right	3	Pass
Horizontal	80 – 1000, 1800, 2600, 3500, 5000	Front	3	Pass
		Back	3	Pass
		Left	3	Pass
		Right	3	Pass

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

Vertical



Horizontal



A.9 Electrical Fast Transient/Burst Immunity

Test Data (AC Power Port)

Test Point	Polarity	Test Level (kV)	Verdict
L - GND	+ / -	1	Pass
N - GND	+ / -	1	Pass
L+N - GND	+ / -	1	Pass

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

A.10 Surge Immunity

Test Data (AC Power Port)

Coupling Line	phase	Polarity	Times	Voltage (kV)	Verdict
L-N	90°	+	5	1	Pass
L-N	270°	-	5	1	Pass

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

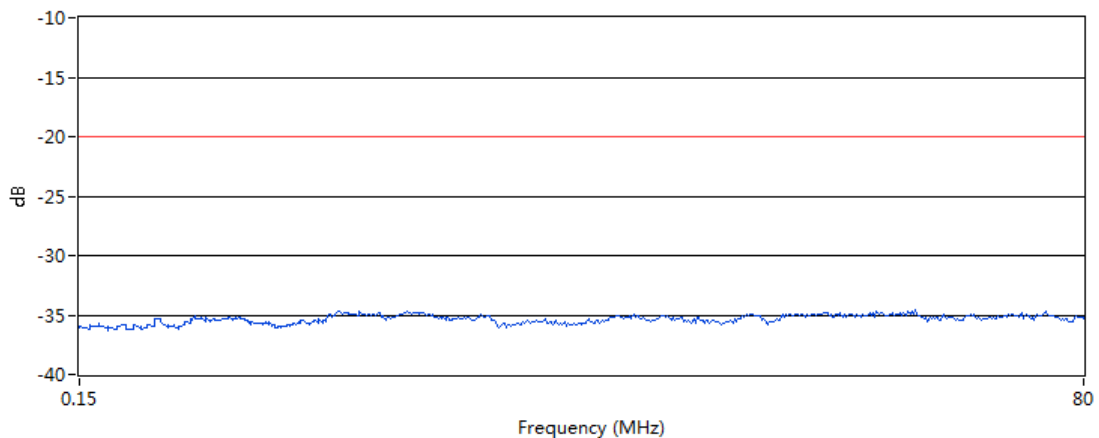
A.11 Immunity to Conducted Disturbances Induced by RF Fields

Test Data (AC Power Port)

Test Point	Frequency (MHz)	Field Strength (V rms)	Verdict
AC Port	0.15 - 10	3	Pass
AC Port	10 - 30	3 - 1 ^{Note1}	Pass
AC Port	30 - 80	1	Pass

Note 1: The detailed description of level refer to the figure on 5.1.6.

Note 2: Performance of the all modes comply with the performance criteria in Criterion A.



A.12 Power Frequency Magnetic Fields Immunity

Note: Not applicable.

A.13 Voltage Dips and Short Interruptions Immunity

Test Mode	Voltage Reduction	Duration (ms)	Times	Interval (sec)	Verdict
Voltage Dips	100%	10	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.

A.14 Broadband impulsive conducted disturbances

Note: Not applicable.

ANNEX B TEST SETUP PHOTOS

Please refer the document "BL-SZ2170989-AE-2.PDF".

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document "BL-SZ2170989-AW.PDF".

ANNEX D EUT INTERNAL PHOTOS

Please refer the document "BL-SZ2170989-AI.PDF".

--END OF REPORT--