

EMC TEST REPORT

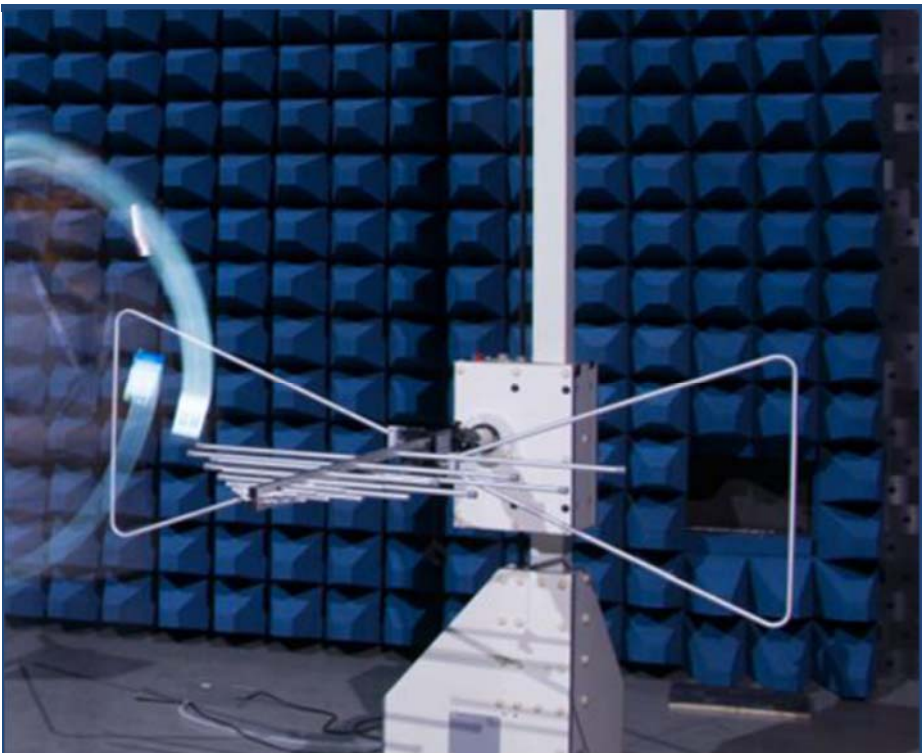
ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
Computer Multimedia Speaker

ISSUED TO
SHENZHEN FENDA TECHNOLOGY CO., LTD.

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



Tested by:		Report No.:	BL-SZ2170989-401
	Zhang Guoxi	EUT Name:	Computer Multimedia Speaker
Date		Model Name:	V720 (refer section 2.4)
		Brand Name:	N/A
Approved by:		Test Standard:	ETSI EN 301 489-1 V2.2.3(2019-11) ETSI EN 301 489-17 V3.2.4 (2020-09)
		Test Conclusion:	Pass
Date		Test Date:	Aug. 17, 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°C 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 V3.8.
- (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.
	Wired Network Ports	No Wired Network ports.

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

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

No.	Identity	Document Title
1	ETSI EN 301 489-1 V2.2.3 (2019-11)	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
2	ETSI EN 301 489-17 V3.2.4 (2020-09)	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility

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	CENELEC EN 55032 (2015)	Electromagnetic compatibility of multimedia equipment - Emission Requirements.
2	CENELEC EN 61000-3-2 (2014)	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
3	CENELEC 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.
4	CENELEC EN 61000-4-2 (2009)	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test.
5	CENELEC EN 61000-4-3 (2006), A1 (2008) and A2 (2010)	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test.
6	CENELEC EN 61000-4-4 (2012)	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test.
7	CENELEC EN 61000-4-5 (2014): + A1 (2017)	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test.
8	CENELEC EN 61000-4-6 (2014)	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields.
9	CENELEC EN 61000-4-11 (2004)	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests.
10	ISO 7637-2 (2004)	Road vehicles - Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only.

3.3 Verdict

No.	Base Standard	Description	Verdict	Test Result	Remark	
Emission						
1	EN 55032	Radiated Emission	Below 1 GHz	Pass	ANNEX A.1	--
			Above 1 GHz	Pass		--
2	EN 55032	Conducted Emission	AC Mains Port	Pass	ANNEX A.2	--
			DC Power Port	N/A		--
			Wired Network Port	N/A		--
3	EN 61000-3-2	Harmonic Current Emissions	N/A	ANNEX A.3	Note 1	
4	EN 61000-3-3	Voltage Fluctuations & Flicker	Pass	ANNEX A.4	--	
Immunity						
5	EN 61000-4-2	Electrostatic Discharge Immunity	Pass	ANNEX A.5	--	
6	EN 61000-4-3	Radiated RF Electromagnetic Field Immunity	Pass	ANNEX A.6	--	
7	EN 61000-4-4	Electrical Fast Transient/Burst Immunity	AC Ports	Pass	ANNEX A.7	--
			DC Ports	N/A		--
			Wired Network Port	N/A		--
8	ISO 7637-2	Transients and Surges	N/A	ANNEX A.8	--	
9	EN 61000-4-5	Surge Immunity	AC Ports	Pass	ANNEX A.9	--
			Wired Network Port	N/A		--
10	EN 61000-4-6	Immunity to Conducted Disturbances Induced by RF Fields	AC Ports	Pass	ANNEX A.10	--
			DC Ports	N/A		--
			Wired Network Port	N/A		--
11	EN 61000-4-11	Voltage Dips and Short Interruptions Immunity	Pass	ANNEX A.11	--	
<p>Note 1: There is no need for Harmonics test to be performed on this product (rated power is less than 75 W) in accordance with EN 61000-3-2: 2014.</p> <p>For further details, please refer to Clause 7 of EN 61000-3-2: 2014 which states:</p> <p>“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.”</p>						

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 (9 kHz-30 MHz)	3.76 dB
Radiated emissions (30 MHz-1 GHz)	3.67 dB
Radiated emissions (1 GHz-18 GHz)	3.57 dB
Radiated emissions (18 GHz-26.5 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 List

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	2019.07.02	2022.07.01	<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	Y120984CJ7331115	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	P1833222423	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	2019.07.02	2022.07.01	<input checked="" type="checkbox"/>
Test Antenna-	SCHWARZBECK	VULB 9163	9163-624	2021.08.20	2024.08.19	<input checked="" type="checkbox"/>

Radiated RF Electromagnetic Field Immunity Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
Bi-Log						
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 type="checkbox"/>
Sound Calibrator	B&K	4231	2430337	2020.10.23	2021.10.22	<input type="checkbox"/>
Sound Level Meter	B&K	NL-20	00844023	2020.10.23	2021.10.22	<input type="checkbox"/>
Ear Simulator	B&K	4192 -L-001	3038758	2021.01.15	2022.01.14	<input type="checkbox"/>
Audio analyzer	R&S	UPL 16	100129	2021.02.26	2022.02.25	<input 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"/>

4.3 Test Enclosure list

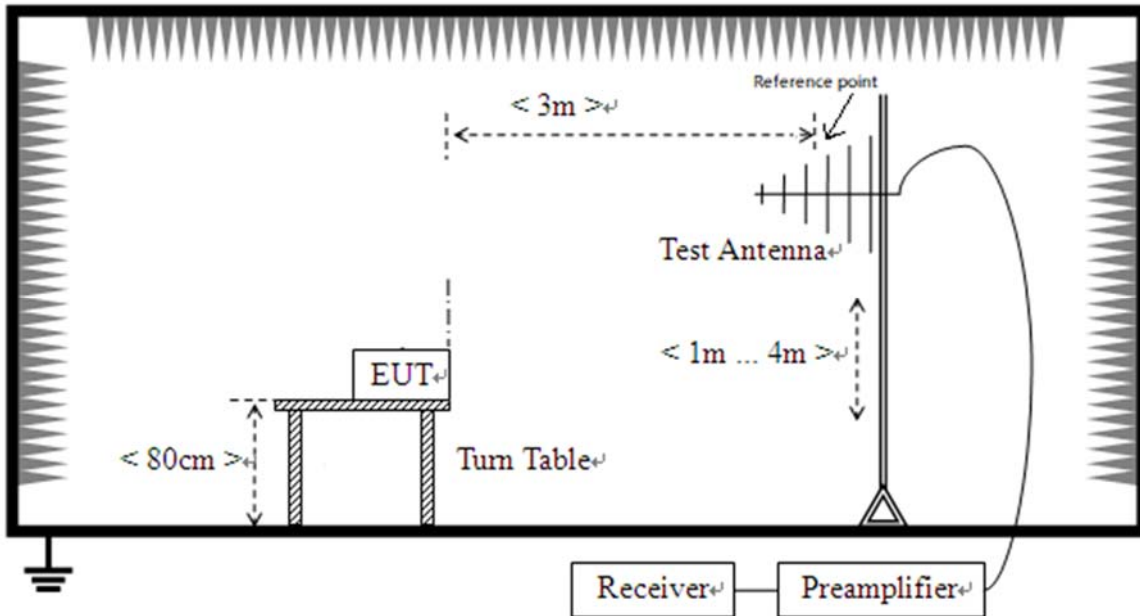
Description	Manufacturer	Model	Serial No.	Length	Description	Use
Adapter	OPPO	AK779GB	N/A	N/A	N/A	<input checked="" type="checkbox"/>
AUX Cable	N/A	N/A	N/A	N/A	N/A	<input checked="" type="checkbox"/>
Laptop	Apple	A1465	N/A	N/A	N/A	<input checked="" type="checkbox"/>
Phone	OPPO	CPH0701	N/A	N/A	N/A	<input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

4.4 Test Configurations

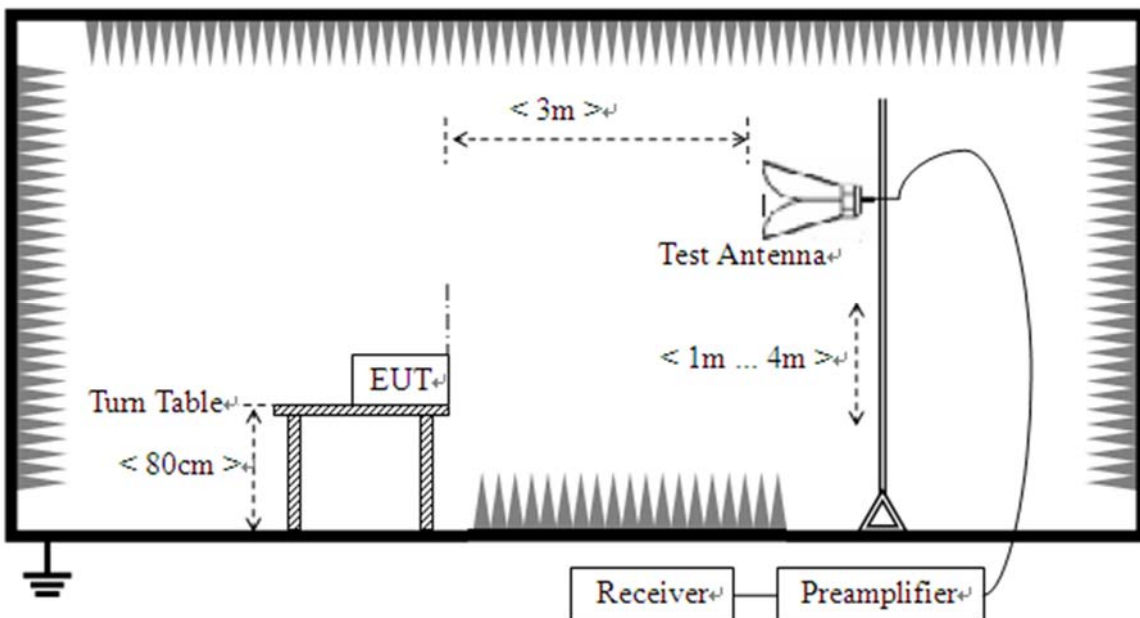
Test Configurations (TC) No.	Description
TC01	<u>The Bluetooth Play Test Mode (Loudspeaker Output)</u> EUT + Adapter + AUX Cable + Phone + BT Link
TC02	<u>The Bluetooth Play Test Mode (Earphone Output)</u> EUT + Adapter + AUX Cable + Phone + BT Link + Earphone
TC03	<u>The AUX Play Test Mode (Loudspeaker Output)</u> EUT + Adapter + AUX Cable + Phone
TC04	<u>The AUX Play Test Mode (Earphone Output)</u> EUT + Adapter + AUX Cable + Phone + Earphone
TC05	<u>The USB Play Test Mode (Loudspeaker Output)</u> EUT + Laptop + AUX Cable + Phone
TC06	<u>The USB Play Test Mode (Earphone Output)</u> EUT + Laptop + AUX Cable + Phone + Earphone

4.5 Test Setups

Test Setup 1

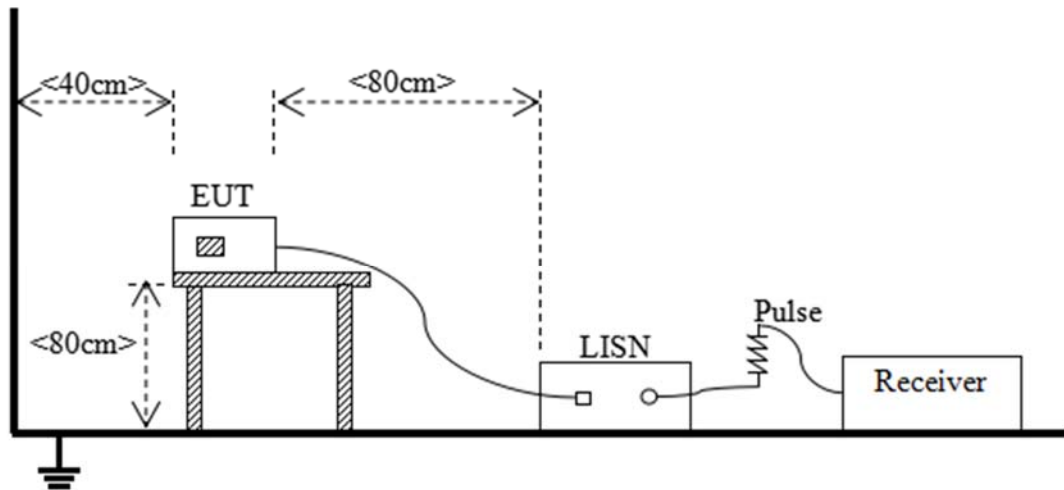


(For Radiated Emission Test (30 MHz-1 GHz))



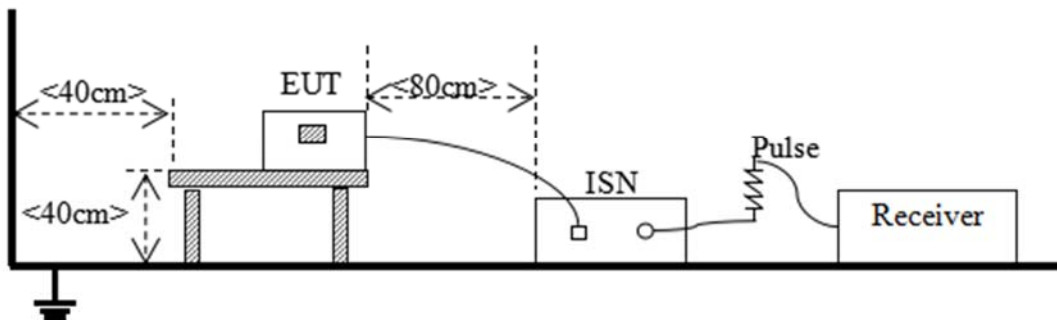
(For Radiated Emission Test (above 1 GHz))

Test Setup 2



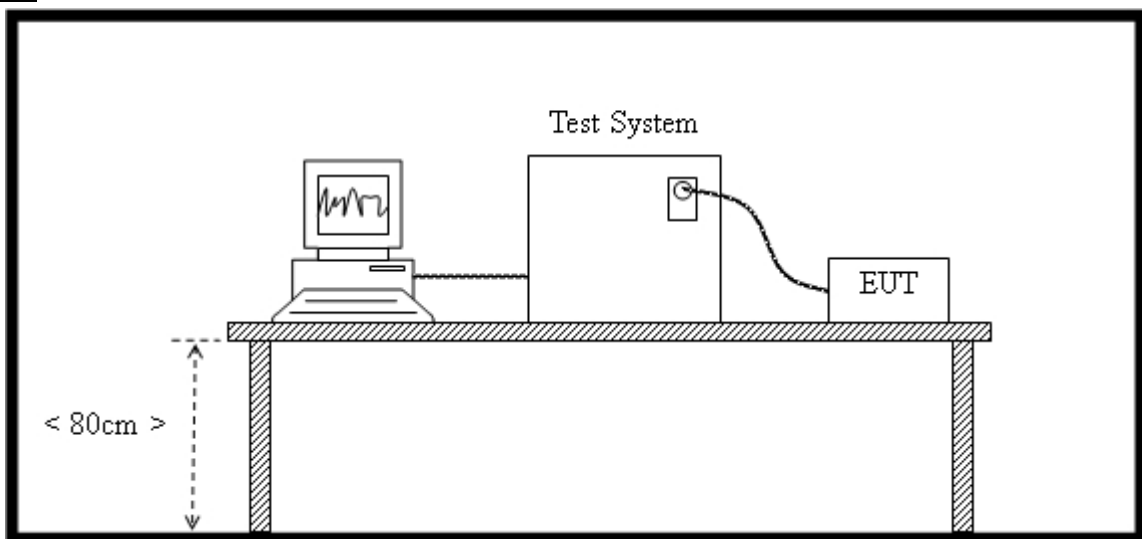
(For Conducted Emission at AC/DC Ports Test)

Test Setup 3

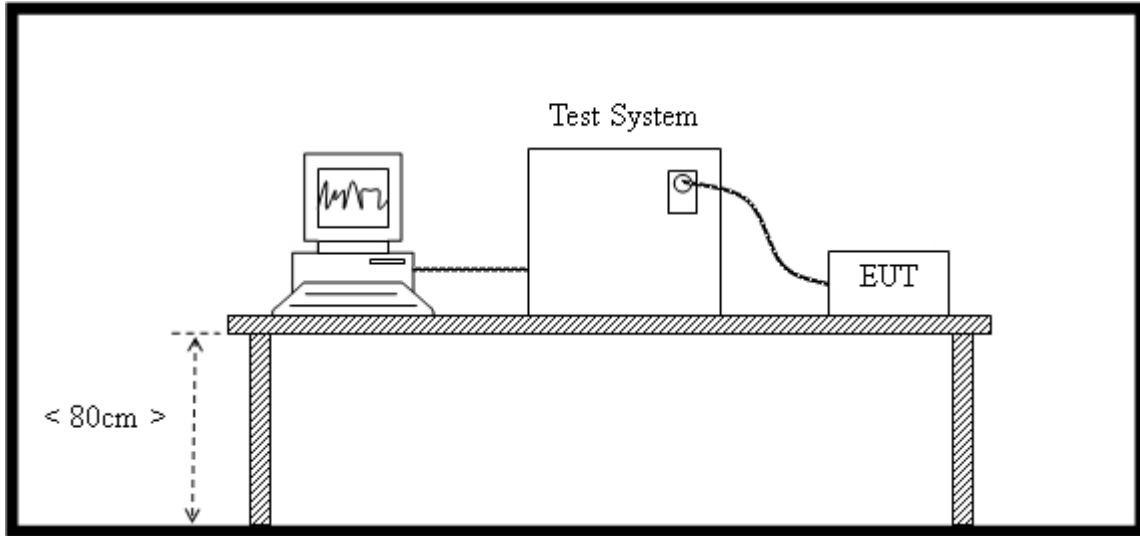


(For Conducted Emission for Wired Network Ports Test)

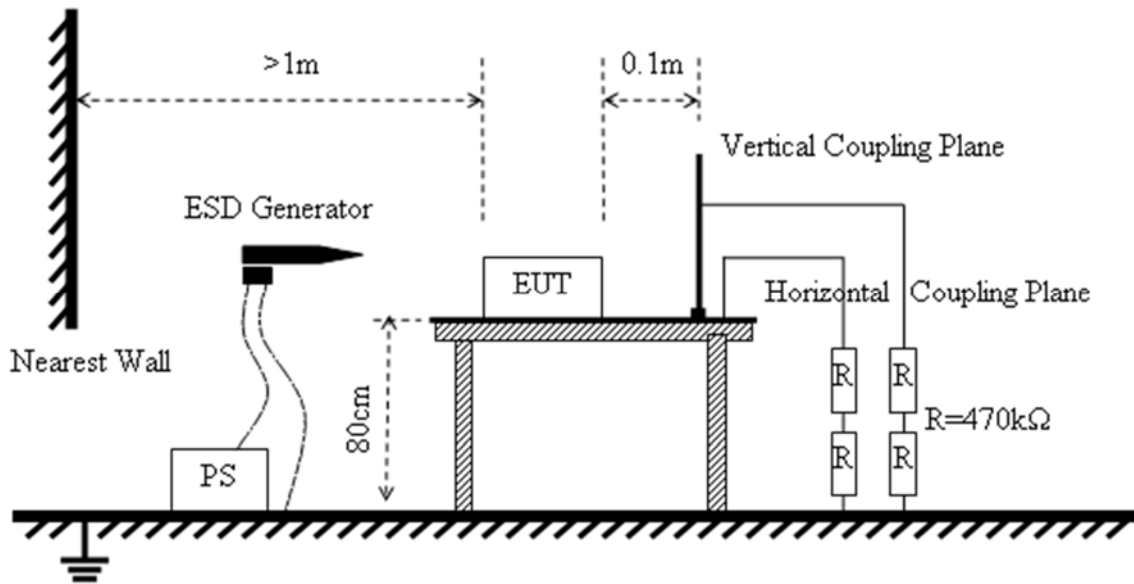
Test Setup 4



(For Harmonic Current Emissions Measurement Test)

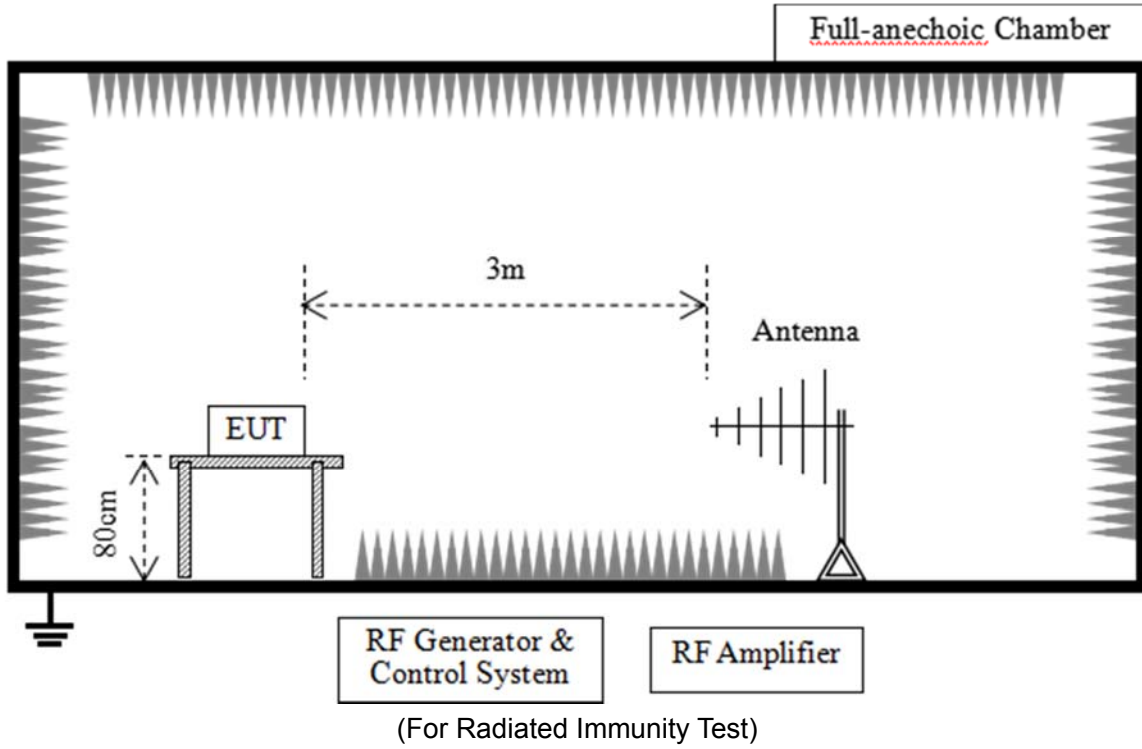
Test Setup 5

(For Voltage Fluctuations and Flicker Measurement Test)

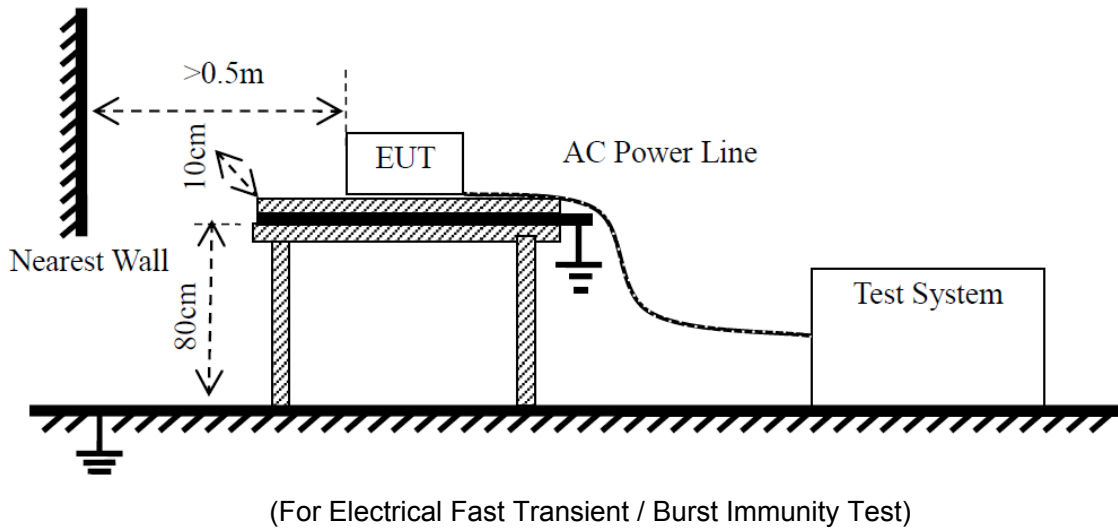
Test Setup 6

(For Electrostatic Discharge Immunity Test)

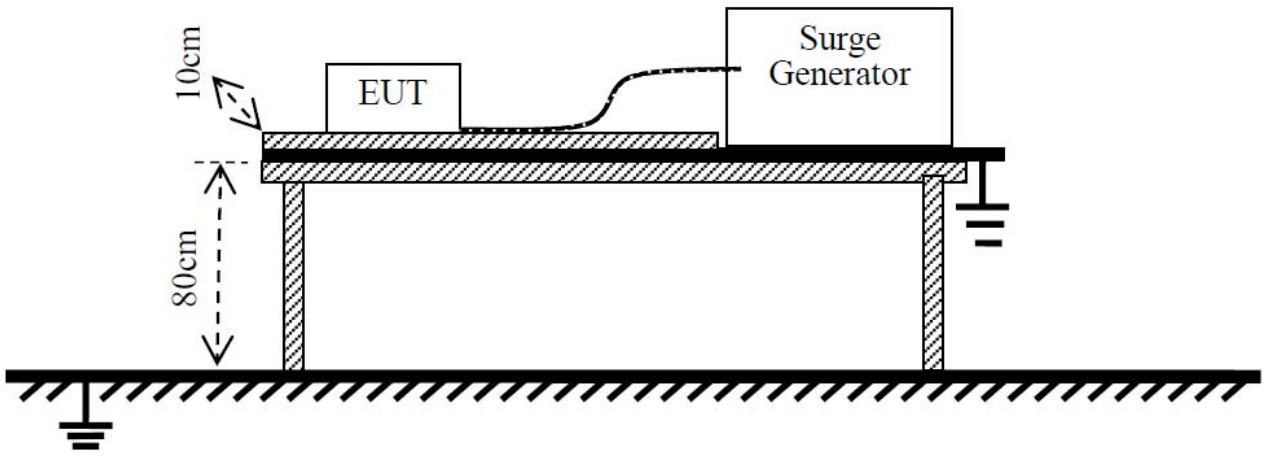
Test Setup 7



Test Setup 8

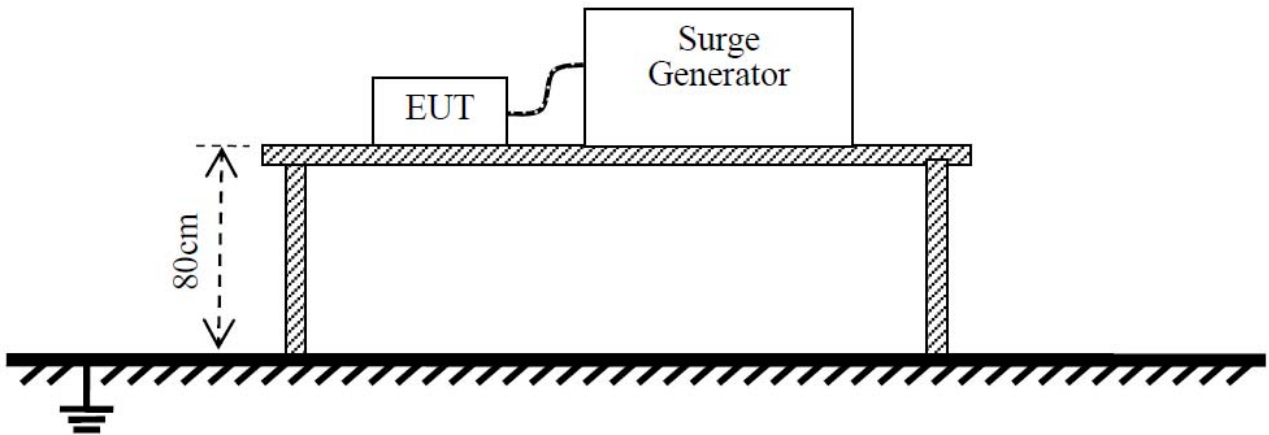


Test Setup 9



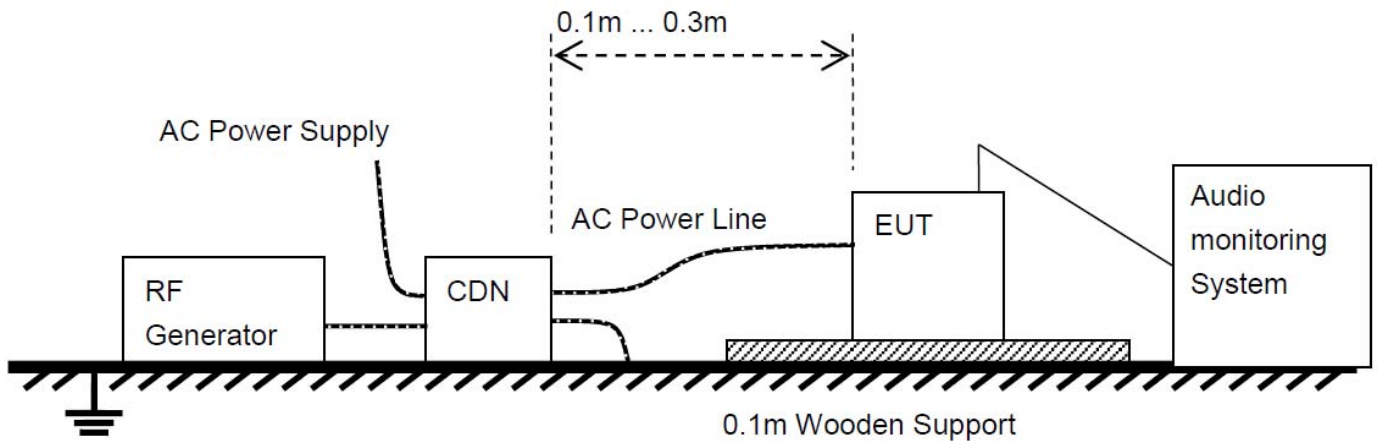
(Transients and Surges)

Test Setup 10



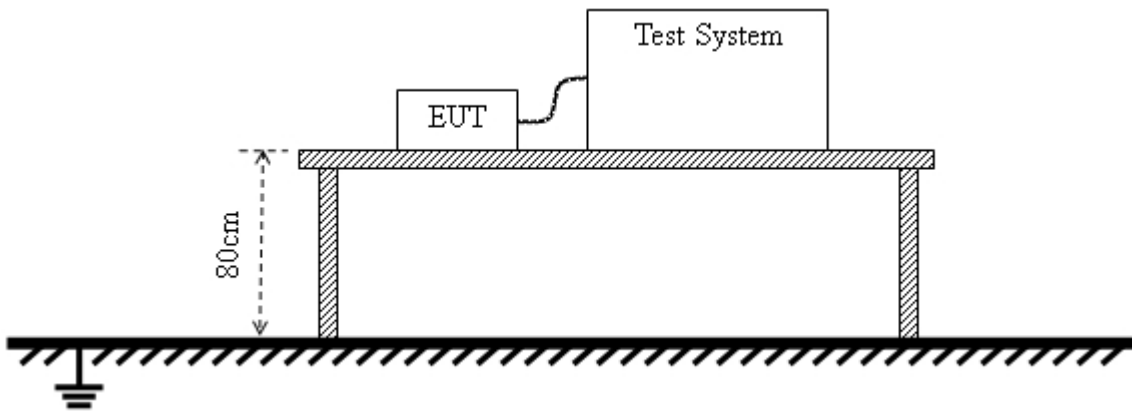
(For Surge Immunity Test)

Test Setup 11



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

Test Setup 12



(For Voltage Dips and Short Interruptions Immunity Test)

4.6 Test Conditions

Test Case	Test Conditions	
Radiated Emission	Test Env.	NTNV
	Test Setup	Test Setup 1
	Test Configuration	TC01~TC06 ^{Note}
Conducted Emission	Test Env.	NTNV
	Test Setup	Test Setup 2
	Test Configuration	TC01~TC04 ^{Note}
Voltage Fluctuations & Flicker	Test Env.	NTNV
	Test Setup	Test Setup 5
	Test Configuration	TC01~TC04 ^{Note}
Electrostatic Discharge Immunity	Test Env.	NTNV
	Test Setup	Test Setup 6
	Test Configuration	TC01~TC06 ^{Note}
Radiated RF Electromagnetic Field Immunity	Test Env.	NTNV
	Test Setup	Test Setup 7
	Test Configuration	TC01~TC06 ^{Note}
Electrical Fast Transient/Burst Immunity, AC Port	Test Env.	NTNV
	Test Setup	Test Setup 8
	Test Configuration	TC01~TC04 ^{Note}
Surge Immunity, AC Ports	Test Env.	NTNV
	Test Setup	Test Setup 10
	Test Configuration	TC01~TC04 ^{Note}
Immunity to Conducted Disturbances Induced by RF Fields, AC Ports	Test Env.	NTNV
	Test Setup	Test Setup 11
	Test Configuration	TC01~TC04 ^{Note}
Voltage Dips and Short Interruptions Immunity	Test Env.	NTNV
	Test Setup	Test Setup 12
	Test Configuration	TC01~TC04 ^{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 Bluetooth 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)
1000-3000	76	56	70	50
3000-6000	80	60	74	54

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

All Radiated Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was 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.

5.1.1.4 Test Result

Please refer to ANNEX A.1.

5.1.2 Multi-Radio Co-location Radiated Emission(实验室有提供多发数据则保留本章节，没有则删)

Per ETSI EG 203 367 Section 6.2 Multi-radio equipment

If the manufacturer of the multi-radio equipment installs the radio products in equivalent assessment conditions (i.e. host equivalent to the one used for the assessment of the radio products) and according to the installation instructions for the radio products, then no additional assessment of the multi-radio equipment against article 3.2 of the RED is required. In cases of more than one transmitter operating at the same time then a re-assessment of the spurious emissions and consideration of potential effects of intermodulation should be performed.

The manufacturer of the multi-radio equipment should define the typical operation conditions of the equipment (e.g. number of transmitters operational at the same time). The assessment of the spurious emissions of the multi-radio equipment should be carried out as set out in the relevant radio harmonized standards applicable to each radio product and according to these typical operation conditions.

The applicable spurious emissions requirements and limits for multi-radio equipment are those specified in the relevant radio harmonized standards applicable to each radio product.

If the applicable harmonised radio standards contain different limits and measuring conditions, then the multi-radio equipment should be assessed to the harmonised radio standard that specifies the least stringent limits for the common part of the frequency measurement ranges, in those cases where more than one transmitter operates at the same time. To assess the remaining parts of the frequency measurement ranges, the limits from the relevant harmonised radio standard should be used.

5.1.2.1 Test Limit

the multi-radio equipment should be assessed to the harmonised radio standard that specifies the least stringent limits for the common part of the frequency measurement ranges.

5.1.2.2 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.

5.1.2.3 Test Procedure

All Radiated Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was 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.

5.1.2.4 Test Result

Please refer to ANNEX A.1.9 to A.1.20 (Worst case mode for GSM, WCDMA and LTE Band)

5.1.3 Conducted Emission

5.1.3.1 Test Limit

AC Port

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

DC Port

Frequency range (MHz)	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 - 0.50	79	66
0.50 - 30	73	60

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.

Wired Network Port

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 2 or setup 3. The photo of test setup please refer to ANNEX B.

5.1.3.3 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.

5.1.3.4 Test Result

Please refer to ANNEX A.2.

5.1.4 Harmonic Current Emissions

5.1.4.1 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	0.15X15/n	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.

5.1.4.2 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

The EUT is placed on the top of a wooden table 0.8 m 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.

5.1.4.4 Test Result

Please refer to ANNEX A.3.

5.1.5 Voltage Fluctuations and Flicker Measurement

5.1.5.1 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

5.1.5.2 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

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

5.1.5.4 Test Result

Please refer to ANNEX A.4.

5.2 Immunity Tests

5.2.1 Test Performance Criteria for Immunity Test

5.2.1.1 Performance Criteria (EN 301489-1)

5.2.1.1.1 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.

5.2.1.1.2 Performance Criteria for CT and CR

During and after the test, the equipment shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the equipment is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

5.2.1.1.3 Performance Criteria for TT and TR

For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies:

- For products with only one symmetrical port intended for connection to outdoor lines, 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 SW reboot is not allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.
- For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. A SW reboot is not allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

For all other ports the following applies:

- After the test, the equipment shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the equipment is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of

performance.

- During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed.
- If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

5.2.1.3 Performance criteria (EN 301489-17)

5.2.1.3.1 General Performance Criteria

Type	During test	After test
Criterion A	<p>Shall operate as intended. (see note). Shall be no loss of function. Shall be no unintentional transmissions</p>	<p>Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.</p>
Criterion B	<p>May be loss of function.</p>	<p>Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.</p>
Criterion C	<p>May be loss of function.</p>	<p>Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data</p>
<p>NOTE: For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %.</p> <p>For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.</p>		

About Bluetooth function Performance Criteria

Type	During test	After test
Criterion A	<p>Shall operate as intended.</p> <p>May show degradation of performance (For example have noise or transmission short time interruption).</p> <p>Shall be no loss of Bluetooth function.</p> <p>Shall be no unintentional transmissions.</p>	<p>Shall operate as intended.</p> <p>Shall be no degradation of performance (For example have noise or transmission short time interruption)</p> <p>Shall be no loss of Bluetooth function.</p> <p>Shall be no loss of stored data or user programmable functions.</p>
Criterion B	<p>May show loss of function (For example Bluetooth transmission interruption).</p> <p>May show degradation of performance (For example have noise or transmission short time interruption).</p> <p>No unintentional transmissions.</p>	<p>Bluetooth Functions shall be self-recoverable.</p> <p>Shall operate as intended after recovering.</p> <p>Shall be no degradation of performance (For example have noise or transmission short time interruption).</p> <p>Shall be no loss of stored data or user programmable functions.</p>
Criterion C	<p>May be loss of function (For example Bluetooth transmission interruption).</p>	<p>Functions shall be recoverable by the operator.</p> <p>Shall operate as intended after recovering.</p> <p>Shall be no degradation of performance (For example have noise or transmission short time interruption).</p>

5.2.1.3.2 Performance criteria for Continuous phenomena

The performance criteria A shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur during the test.

Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur during the test.

5.2.1.3.3 Performance criteria for Transient phenomena

The performance criteria B shall apply, except for voltage dips greater than or equal to 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.

Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur as a result of the application of the test.

Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur as a result of the application of the test.

5.2.2 Electrostatic Discharge Immunity

5.2.2.1 Test Specification

Specification	Value
Basic Standard	EN 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 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.

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

5.2.2.4 Test Result

Please refer to ANNEX A.5.

5.2.3 Radio Frequency Electromagnetic Field Immunity

5.2.3.1 Test Specification

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

5.2.3.2 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.

5.2.3.3 Test Procedure

PER Test:

Before testing, we should set the base station(CMW500) to the mode that needs to be tested, such as Bluetooth or WIFI, then set EUT to the corresponding mode and connect to Base station. Adjust the base station interface to the PER interface, and observe the PER value on the base station interface by adding interference signal during the test.

The test procedure was in accordance with EN 61000-4-3.

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 6000 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.6.

5.2.4 Electrical Fast Transient / Burst Immunity

5.2.4.1 Test Specification

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

5.2.4.2 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.

5.2.4.3 Test Procedure

1. The EUT is tested with 1000 V discharges to the AC power input leads, and 500 V for wired network 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 1m.
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.7.

5.2.5 Transients and Surges

Specification	Value
Basic Standard	ISO 7637-2
Immunity test level	III
Voltage	12 V
Test pulse number	1, 2a, 2b, 3a / 3b,4
Repetition Rate	For the purpose of EMC testing it is sufficient to apply pulses 1, 2a, 2b and 4, 10 times each, and apply the test pulses 3a and 3b for 20 minutes each.

5.2.5.1 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.

5.2.5.2 Test Procedure

1. The immunity of ESA representative of its type shall be tested by the method(s) according to ISO 7637-2: 2011.
2. For test pulses 3a and 3b, the leads between the terminals of the test pulse generator and the DUT shall be laid out in a straight parallel line at a height of (500+10 mm) above the ground plane and shall have a length of (0,5 ± 0,1) m.
3. Please refer to Annex B for the photographs of the Test Configuration.

5.2.5.3 Test Result

Please refer to ANNEX A.8.

5.2.6 Surge Immunity

5.2.6.1 Test Specification

AC Power Port and Wired Network Port

Specification	Value	
	AC Power Port	Wired Network Port
Ports class	AC Power Port	Wired Network Port
Basic Standard	EN 61000-4-5	
Waveform	Voltage: 1.2/50 μ s	Voltage: 10/700 μ s
Test Voltage	line to ground 2 kV, line to line 1 kV; line to ground 1 kV, line to line 0.5 kV(Note 1)	0.5 kV, or 1 kV See Note 2,3,4
Polarity	Positive / Negative	
Phase Angle	0°, 90°, 180°, 270°	N/A
Repetition Rate	60 seconds	
Times	5 times per condition	

Note 1: The test level for AC mains ports, in telecommunications centres.

Note 2: The test level for wired network ports, intended to be connected to indoor cables (longer than 30 m) shall be 0,5 kV (applied line to ground, or shield to ground).The test generator shall provide the 1,2/50 μ s pulse.

Note 3: The test level for symmetrically operated, wired network ports, intended to be directly connected to wired network ports via outdoor cables, shall be 1 kV (applied lines to ground).The test generator shall provide the 10/700 μ s pulse.

Note 4: The test level for non-symmetrically operated wired network ports, intended to be directly connected to wired network ports via outdoor cables, shall be 1 kV (applied line to ground, or shield to ground) and 0,5 kV (applied line to line).The test generator shall provide the 1,2/50 μ s pulse.

5.2.6.2 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.

5.2.6.3 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 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.

5.2.6.4 Test Result

Please refer to ANNEX A.9.

5.2.7 Immunity to Conducted Disturbances Induced by RF Fields

5.2.7.1 Test Specification

Specification	Value
Basic Standard	EN 61000-4-6
Frequency Range	0.15 MHz – 80 MHz
Field Strength	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; Wired Network Line
Coupling Device	CDN-M2+3

5.2.7.2 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.

5.2.7.3 Test Procedure

PER Test:

Before testing, we should set the base station(CMW500) to the mode that needs to be tested, such as Bluetooth or WIFI, then set EUT to the corresponding mode and connect to Base station. Adjust the base station interface to the PER interface, and observe the PER value on the base station interface by adding interference signal during the test.

The test procedure was in accordance with EN 61000-4-6.

1. The EUT shall be tested within its intended operating and climatic conditions.
2. 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.
3. The test signal is 80% amplitude modulated with a 1 kHz sine wave.
4. 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 1.5×10^{-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.
5. 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.
6. Attempts should be made to fully exercise the EUT during test, and to fully interrogate all exercise modes selected for susceptibility.

5.2.7.4 Test Result

Please refer to ANNEX A.10.

5.2.8 Voltage Dips and Short Interruptions Immunity

5.2.8.1 Test Specification

Specification	Value
Basic Standard	EN 61000-4-11
Voltage Dips	100% reduction: 10 ms; 100% reduction: 20 ms; 30% reduction: 500 ms
Voltage Interruptions	100% reduction: 5000 ms
Voltage Phase Angle	0°

5.2.8.2 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.

5.2.8.3 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; b) 100% voltage dip of supplied voltage with duration of 20 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.

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.

5.2.8.4 Test Result

Please refer to ANNEX A.11.

ANNEX A TEST RESULTS

A.1 Radiated Emission

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

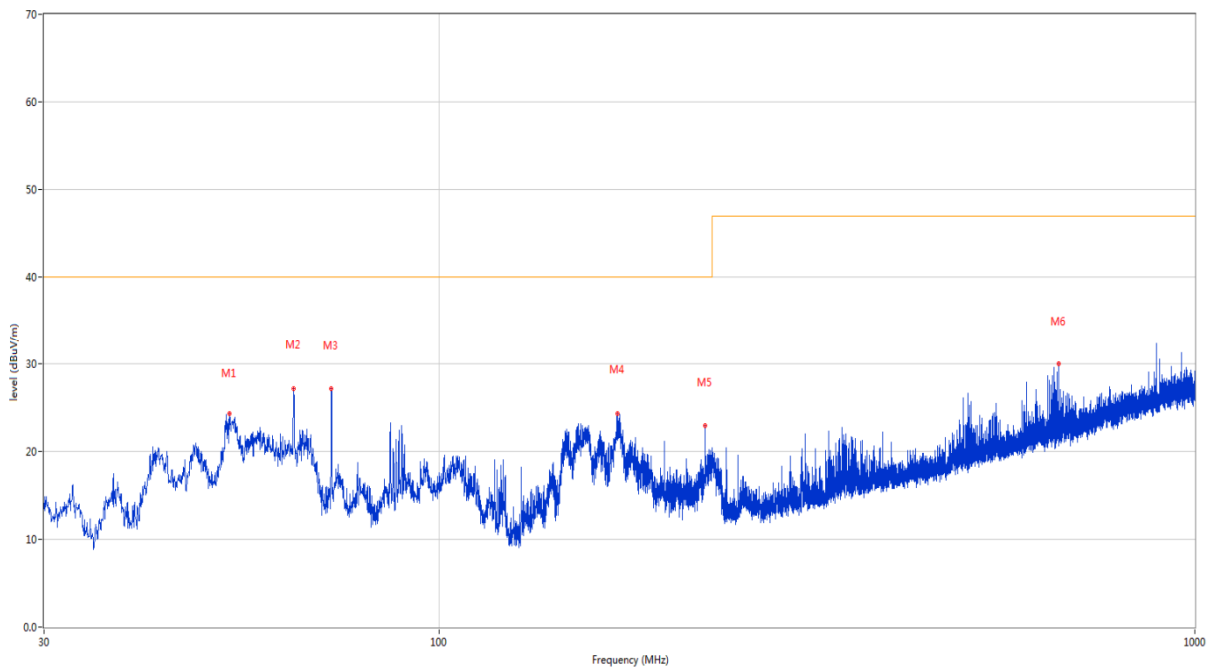
Note 2: Measurements shall be made with a quasi-peak measuring receiver in the frequency range 30 MHz to 1000 MHz. To reduce the testing time, a peak measuring receiver may be used instead of a quasi-peak measuring receiver. In case of dispute, measurement with a quasi-peak measuring receiver will take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

Note 3: This marked spikes near 2400 MHz with circle should be ignored because they are Bluetooth carrier frequency.

Test Data and Plots (Below 1 GHz)

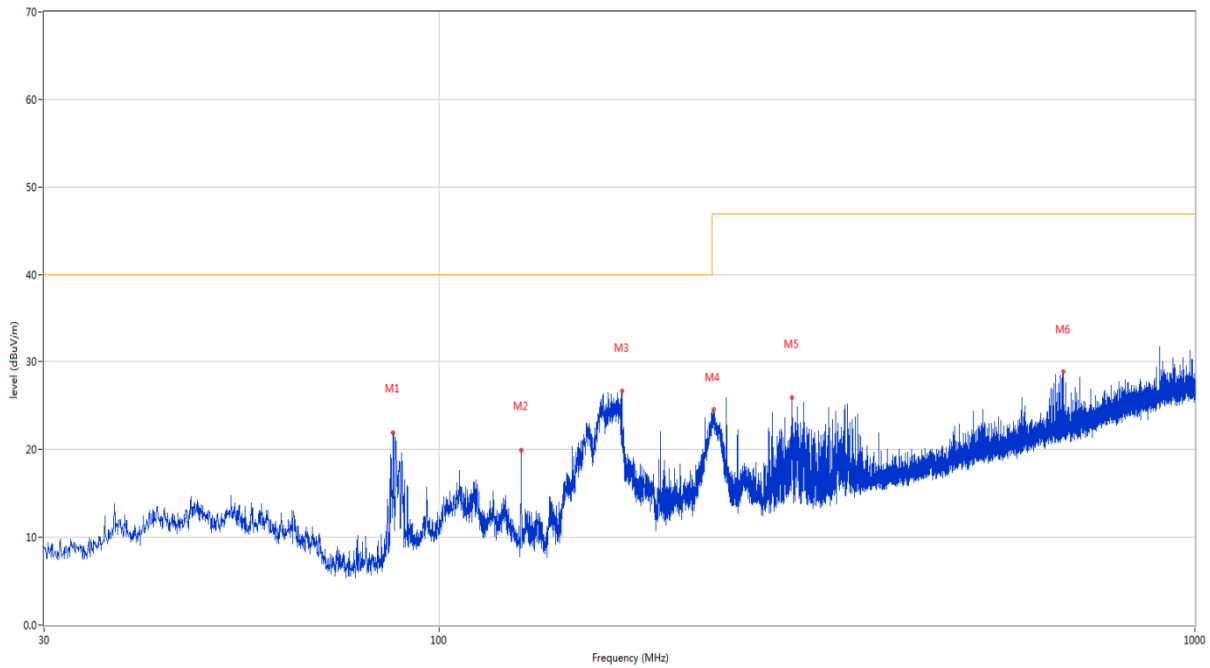
The Bluetooth Play Test Mode (Loudspeaker Output)

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	52.795	24.29	-23.04	40.0	-15.71	Peak	73.70	100	Vertical	Pass
2	64.192	27.17	-24.96	40.0	-12.83	Peak	210.60	100	Vertical	Pass
3	72.001	27.14	-28.26	40.0	-12.86	Peak	265.10	200	Vertical	Pass
4	172.008	24.33	-26.42	40.0	-15.67	Peak	125.20	100	Vertical	Pass
5	224.727	22.90	-23.82	40.0	-17.10	Peak	107.90	100	Vertical	Pass
6	660.742	29.95	-13.93	47.0	-17.05	Peak	1.60	100	Vertical	Pass
7	889.566	45.35	-10.44	47.0	-1.65	Peak	234.80	200	Vertical	Pass

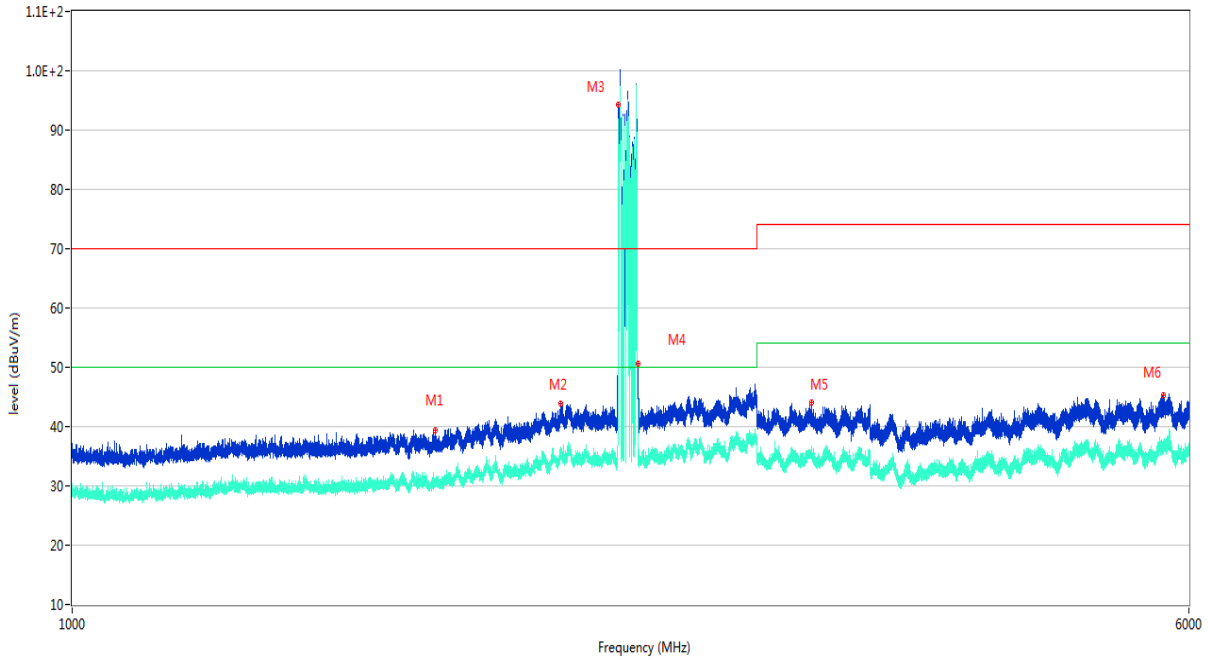
A.1.2 Test Antenna Horizontal, 30 MHz – 1 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	86.939	21.94	-26.78	40.0	-18.06	Peak	0.40	200	Horizontal	Pass
2	128.455	19.93	-27.17	40.0	-20.07	Peak	3.50	200	Horizontal	Pass
3	174.482	26.59	-26.58	40.0	-13.41	Peak	61.10	200	Horizontal	Pass
4	230.693	24.48	-23.37	47.0	-22.52	Peak	0.00	200	Horizontal	Pass
5	293.258	25.92	-21.76	47.0	-21.08	Peak	17.40	100	Horizontal	Pass
6	669.230	28.81	-13.27	47.0	-18.19	Peak	0.00	200	Horizontal	Pass
7	889.614	39.42	-10.42	47.0	-7.58	Peak	242.90	100	Horizontal	Pass

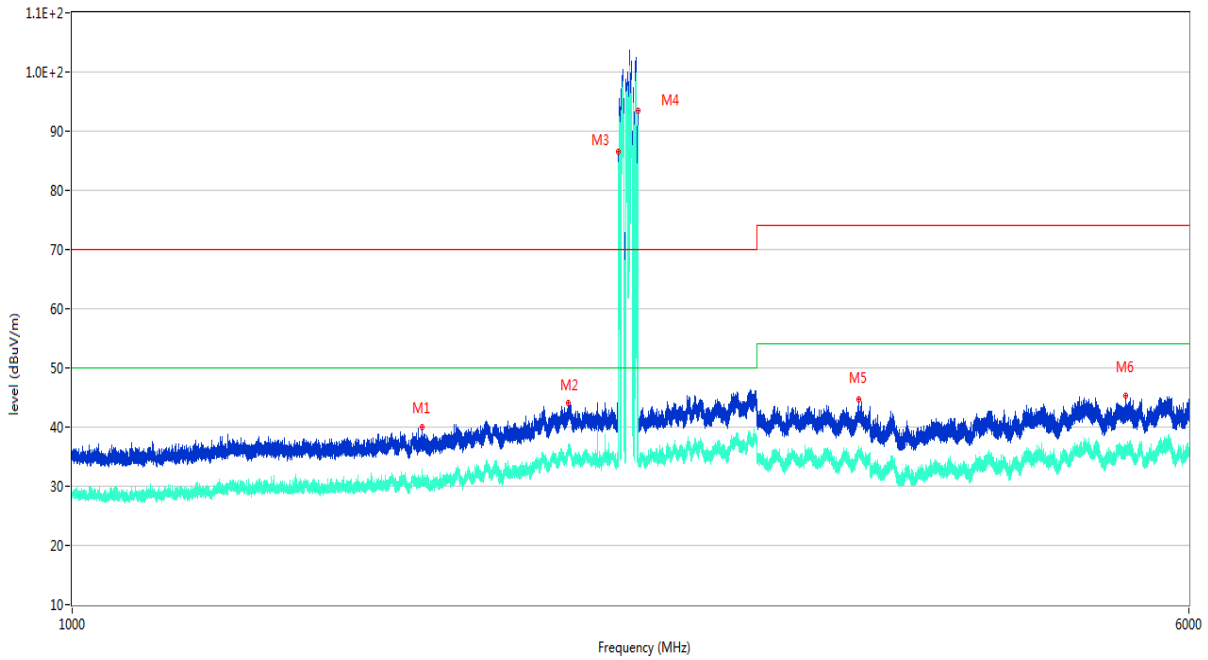
Test Data and Plots (Above 1 GHz)

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	1789.800	39.44	-14.59	70.0	-30.56	Peak	139.80	100	Vertical	Pass
1**	1789.800	31.30	-14.59	50.0	-18.70	AV	139.80	100	Vertical	Pass
2	2188.800	43.94	-10.24	70.0	-26.06	Peak	82.70	100	Vertical	Pass
2**	2188.800	36.60	-10.24	50.0	-13.40	AV	82.70	100	Vertical	Pass
3	2402.200	94.21	-9.24	70.0	24.21	Peak	354.70	100	Vertical	N/A
3**	2402.200	90.86	-9.24	50.0	40.86	AV	354.70	100	Vertical	N/A
4	2477.500	50.66	-9.91	70.0	-19.34	Peak	106.30	100	Vertical	N/A
4**	2477.500	42.31	-9.91	50.0	-7.69	AV	106.30	100	Vertical	N/A
5	3276.600	44.08	-7.50	74.0	-29.92	Peak	177.70	100	Vertical	Pass
5**	3276.600	35.47	-7.50	54.0	-18.53	AV	177.70	100	Vertical	Pass
6	5757.300	45.22	-2.82	74.0	-28.78	Peak	225.90	100	Vertical	Pass
6**	5757.300	36.41	-2.82	54.0	-17.59	AV	225.90	100	Vertical	Pass

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



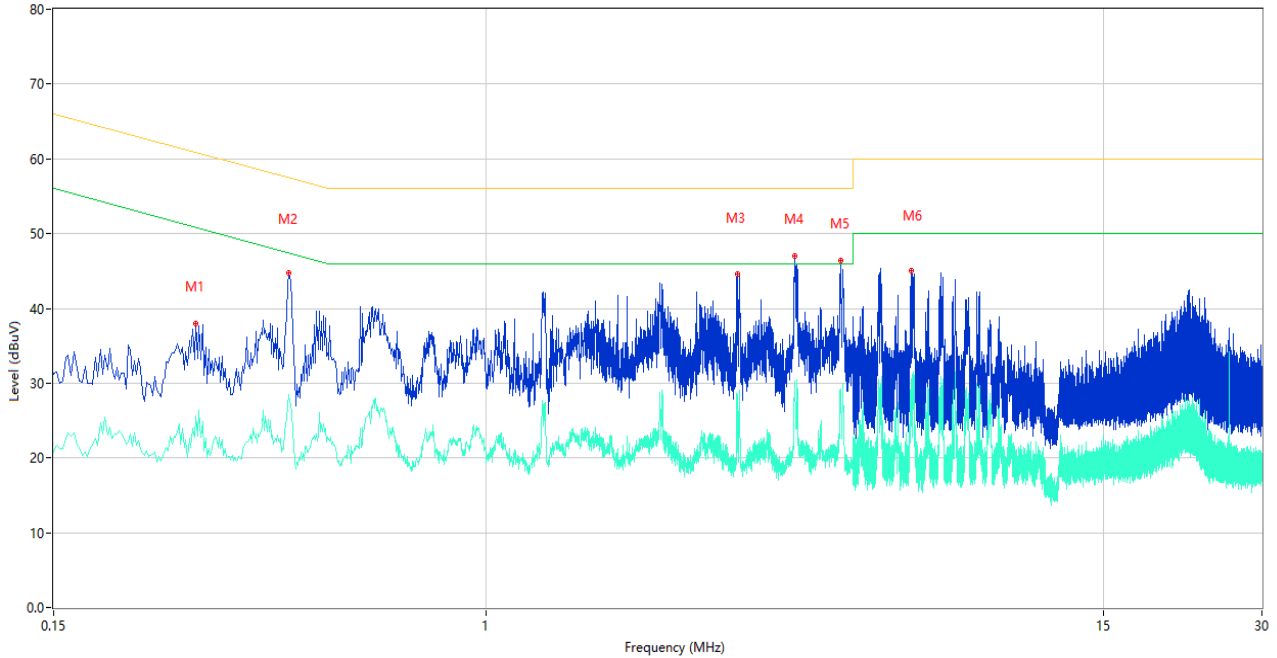
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1752.200	39.92	-14.65	70.0	-30.08	Peak	101.20	100	Horizontal	Pass
1**	1752.200	31.03	-14.65	50.0	-18.97	AV	101.20	100	Horizontal	Pass
2	2216.100	44.05	-8.62	70.0	-25.95	Peak	5.20	100	Horizontal	Pass
2**	2216.100	36.45	-8.62	50.0	-13.55	AV	5.20	100	Horizontal	Pass
3	2403.200	86.58	-9.08	70.0	16.58	Peak	300.30	100	Horizontal	N/A
3**	2403.200	76.74	-9.08	50.0	26.74	AV	300.30	100	Horizontal	N/A
4	2477.800	93.39	-9.90	70.0	23.39	Peak	332.80	100	Horizontal	N/A
4**	2477.800	90.02	-9.90	50.0	40.02	AV	332.80	100	Horizontal	N/A
5	3530.700	44.62	-6.73	74.0	-29.38	Peak	234.00	100	Horizontal	Pass
5**	3530.700	35.33	-6.73	54.0	-18.67	AV	234.00	100	Horizontal	Pass
6	5418.150	45.24	-3.61	74.0	-28.76	Peak	50.30	100	Horizontal	Pass
6**	5418.150	34.61	-3.61	54.0	-19.39	AV	50.30	100	Horizontal	Pass

A.2 Conducted Emissions

Test Data and Plots

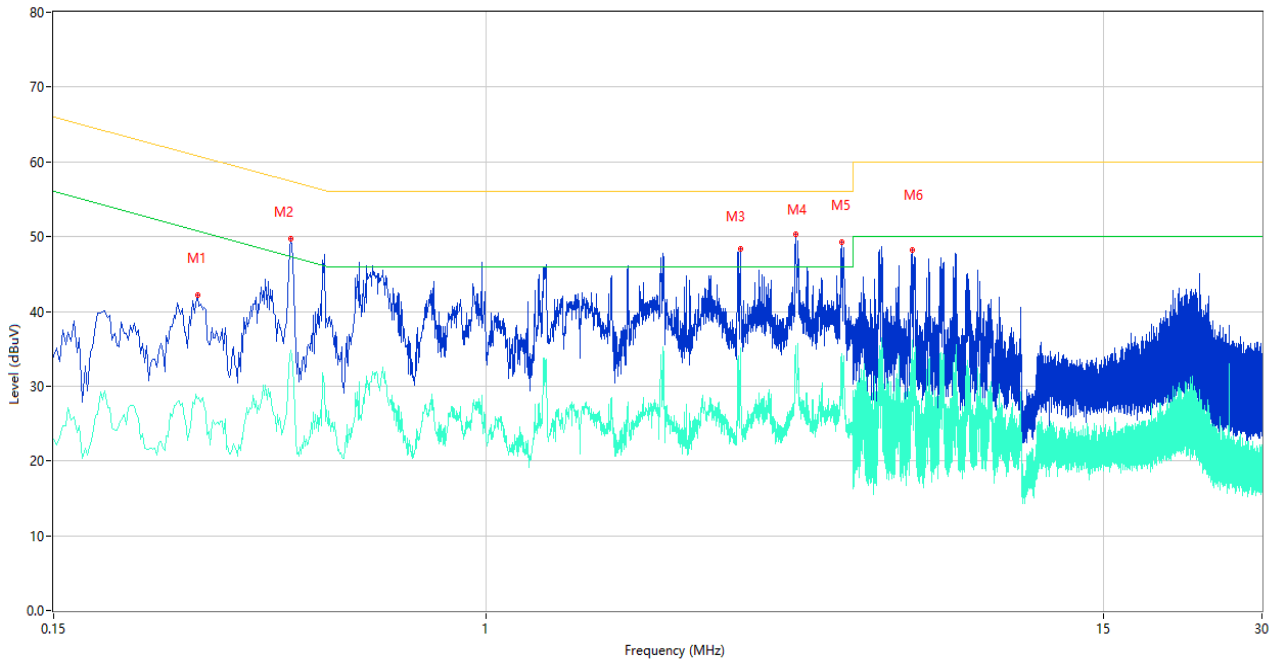
The Bluetooth Play Test Mode (Loudspeaker Output)

A.2.1 L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.280	37.94	10.34	60.82	-22.88	Peak	L	Pass
1**	0.280	25.55	10.34	50.82	-25.27	AV	L	Pass
2	0.420	44.80	10.31	57.45	-12.65	Peak	L	Pass
2**	0.420	28.44	10.31	47.45	-19.01	AV	L	Pass
3	3.004	44.67	10.28	56.00	-11.33	Peak	L	Pass
3**	3.004	28.48	10.28	46.00	-17.52	AV	L	Pass
4	3.872	46.94	10.31	56.00	-9.06	Peak	L	Pass
4**	3.872	29.28	10.31	46.00	-16.72	AV	L	Pass
5	4.734	46.39	10.30	56.00	-9.61	Peak	L	Pass
5**	4.734	29.20	10.30	46.00	-16.80	AV	L	Pass
6	6.462	45.00	10.33	60.00	-15.00	Peak	L	Pass
6**	6.462	30.62	10.33	50.00	-19.38	AV	L	Pass

A.2.2 N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.282	42.12	10.34	60.76	-18.64	Peak	N	Pass
1**	0.282	28.36	10.34	50.76	-22.40	AV	N	Pass
2	0.424	49.75	10.31	57.37	-7.62	Peak	N	Pass
2**	0.424	34.80	10.31	47.37	-12.57	AV	N	Pass
3	3.048	48.29	10.28	56.00	-7.71	Peak	N	Pass
3**	3.048	34.73	10.28	46.00	-11.27	AV	N	Pass
4	3.884	50.31	10.31	56.00	-5.69	Peak	N	Pass
4**	3.884	35.32	10.31	46.00	-10.68	AV	N	Pass
5	4.754	49.31	10.30	56.00	-6.69	Peak	N	Pass
5**	4.754	34.04	10.30	46.00	-11.96	AV	N	Pass
6	6.482	48.16	10.34	60.00	-11.84	Peak	N	Pass
6**	6.482	36.16	10.34	50.00	-13.84	AV	N	Pass

A.3 Harmonic Current Emissions

Note: Not applicable.

A.4 Voltage Fluctuations and Flicker Measurement

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%	0.18%	Pass
dc (%)	3.3%	0.03%	Pass

A.5 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: The performance criteria in TT and TR is only applicable to the TC01 to TC06 Test Modes of the EUT, performance of the other 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, 1000 – 3000, 3000 – 6000	Front	3	Pass
		Back	3	Pass
		Left	3	Pass
		Right	3	Pass
Horizontal	80 – 1000, 1000 – 3000, 3000 – 6000	Front	3	Pass
		Back	3	Pass
		Left	3	Pass
		Right	3	Pass

Note 1: The performance criteria in CT and CR is only applicable to the TC01 to TC06 Test Modes of the EUT, performance of the other modes comply with the performance criteria in Criterion A.

Note 2: During the test, the PER of Bluetooth is less than 10%.

A.7 Electrical Fast Transient / Burst Immunity

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

Note: The performance criteria in TT and TR is only applicable to the TC01 to TC04 Test Modes of the EUT, performance of the other modes comply with the performance criteria in Criterion B.

A.8 Transients and Surges

Note: Not applicable.

A.9 Surge Immunity

Coupling Line	Polarity	Voltage (kV)	Verdict
L-N	+ / -	1	Pass

Note: The performance criteria in TT and TR is only applicable to the TC01 to TC04 Test Modes of the EUT, performance of the other modes comply with the performance criteria in Criterion B.

A.10 Immunity to Conducted Disturbances Induced by RF Fields

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

Note 1: The performance criteria in CT and CR is only applicable to the TC01 to TC04 Test Modes of the EUT, performance of the other modes comply with the performance criteria in Criterion A.

Note 2: During the test, the PER of Bluetooth is less than 10%.

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: The performance criteria in TT and TR is only applicable to the TC01 to TC04 Test Modes of the EUT, performance of the other modes comply with the performance criteria in Voltage Dips 100% Voltage Reduction in Criterion B. Voltage Dips 30% Voltage Reduction and Voltage Interruptions performance in Criterion C.

ANNEX B TEST SETUP PHOTOS

Please refer the document "BL-SZ2170989-AE-1.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--