

EMC Test Report

Report No.: AGC01881181102EE02

PRODUCT DESIGNATION : Bamboo X speaker large

BRAND NAME : N/A

MODEL NAME : P328.11X, M10

CLIENT : Xindao B.V.

DATE OF ISSUE : Nov. 15, 2018

STANDARD(S) : EN 55032:2015/AC:2016-07
EN 61000-3-2:2014
EN 61000-3-3:2013
EN 55035:2017

REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Nov. 15, 2018	Valid	Initial release

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1. VERIFICATION OF CONFORMITY

Applicant	Xindao B.V.
Address	P.O. Box 3082, 2280 GB, Rijswijk, The Netherlands
manufacturer	Xindao B.V.
Address	P.O. Box 3082, 2280 GB, Rijswijk, The Netherlands
Factory	Xindao B.V.
Address	P.O. Box 3082, 2280 GB, Rijswijk, The Netherlands
Product Designation	Bamboo X speaker large
Brand Name	N/A
Test Model	P328.11X
Series Model	M10
Difference Description	All the same except for the model name
Date of test	Nov. 08.2018 to Nov. 14.2018
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-EC-IT/AC(2013-03-01)

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements of Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment.

The test results of this report relate only to the tested sample identified in this report.

Tested By

Jonhen Wang(Wang Yonghuan)) Nov. 14, 2018

Reviewed By

Cool Cheng(Cheng Mengguo) Nov. 15, 2018

Approved By

Forrest Lei(Lei Yonggang)
 Authorized Officer Nov. 15, 2018

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2. SYSTEM DESCRIPTION

TEST MODE DESCRIPTION		
NO.	EMI TEST MODE DESCRIPTION	WORST
1	AUX in with charging	V
NO.	EMS TEST MODE DESCRIPTION	
1	AUX in with charging	
Note: V means EMI worst mode		

3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in measurement" (GUM) published by ISO.

- Uncertainty of Conducted Emission, $U_c = \pm 3.2 \text{ dB}$
- Uncertainty of Radiated Emission below 1GHz, $U_c = \pm 3.9 \text{ dB}$
- Uncertainty of Radiated Emission above 1GHz, $U_c = \pm 4.8 \text{ dB}$

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4. PRODUCT INFORMATION

Housing Type	Plastic and Metal
Power Supply	DC 3.7V by battery

I/O Port Information (☒ Applicable ☐ Not Applicable)

I/O Port of EUT			
I/O Port Type	Number	Cable Description	Tested With
USB port	1	0	1
AUX in port	1	0	1

5. SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Power Cable
PC	APPLE	A1465	N/A	0
Mobile phone	Huawei	V9	N/A	0
Adapter	KUANTEN	KT05W050100USU	N/A	0
AUX in Cable	N/A	N/A	N/A	1m unshielded

Note: The PC and adapter were the charging device for EUT.

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6. IDENTIFICATION OF THE RESPONSIBLE TESTING LOCATION

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1F, B5 Building, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, China

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Description	Manufacturer	Model	S/N	Calibration Date	Calibration Due.
TEST RECEIVER	R&S	ESPI	101206	Jun.12, 2018	Jun.11, 2019
LISN	R&S	ESH2-Z5	100086	Aug.21, 2018	Aug.20, 2019

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Test Receiver	R&S	ESCI	10096	Jun.20, 2018	Jun.19, 2019
Antenna	SCHWARZBECK	VULB9168	D69250	Sep.28, 2018	Sep.27,2019
HORN ANTENNA	ETS LINDGREN	3117	00034609	May 26, 2018	May 25,2019
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 08, 2017	Dec.07,2018

TEST EQUIPMENT OF POWER HARMONICS / VOLTAGE FLUCTUATION / FLICKER TEST

Description	Manufacturer	Model	S/N	Calibration Date	Calibration Due.
Signal Conditioning Unit	Schaffner	CCN1000-1	72431	Aug.21, 2018	Aug.20, 2019
AC Source	Schaffner	NSG1007	56825	Aug.21, 2018	Aug.20, 2019

TEST EQUIPMENT OF ESD TEST

Equipment	Manufacturer	Model	S/N	Calibration Date	Calibration Due.
ESD Simulator	Schaffner	NSG 438	782	Sep. 20, 2018	Sep. 19, 2019

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TEST EQUIPMENT OF SURGE/EFT/DIPSTEST

Description	Manufacturer	Model	S/N	Calibration Date	Calibration Due.
EFT, Surge, Dips Generator	Schaffner	Modula 6150	34437	Aug.21, 2018	Aug.20, 2019

TEST EQUIPMENT OF RS IMMUNITY TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Signal Generator	R&S	E4421B	MY43351603	May 31, 2018	May 30, 2019
Biconilog Antenna	ETS	3142C	00060447	Mar.01, 2018	Feb.28, 2019
Power Sensor	R&S	URV5-Z4	100124	May 31, 2018	May 30, 2019
Power Meter	R&S	NRVD	832378/027	Jun.20, 2018	Jun.19, 2019
Power Amplifier	KALMUS	7100LC	04-02/17-06-001	Jun.20, 2018	Jun.19, 2019
RF Amplifier	Milmega	AS01004-5 5_55	1004793	Jun.20, 2018	Jun.19, 2019
Horn Antenna	ETS LINDGREN	3117	00034609	May 26, 2018	May 25, 2019

TEST EQUIPMENT OF CS IMMUNITY TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Power Amplifier	AR	75A250	18464	Jun.12, 2018	Jun.11, 2019
CDN	Schaffner	M016	21614	Aug.21, 2018	Aug.20, 2019
6dB attenuator	JWF	50FHC-00 6-50	N/A	Jun.12, 2018	Jun.11, 2019
Electromagnetic Injection Clamp	Luthi	EM101	35773	Aug.21, 2018	Aug.20, 2019
Power Sensor	R&S	URV5-Z4	100124	May.15, 2018	May.14, 2019
Power Meter	R&S	NRVD	8323781027	May.15, 2018	May.14, 2019
SIGNAL GENERATOR	R&S	E4421B	MY43351603	May.15, 2018	May.14, 2019

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7. EN 55032 LINE CONDUCTED EMISSION TEST

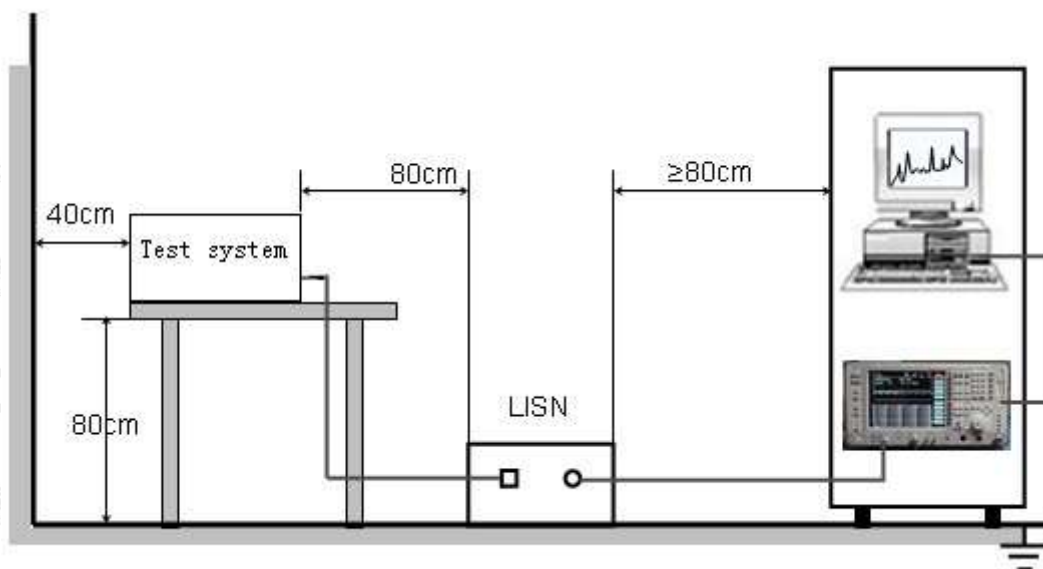
7.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

7.2. BLOCK DIAGRAM OF TEST SETUP



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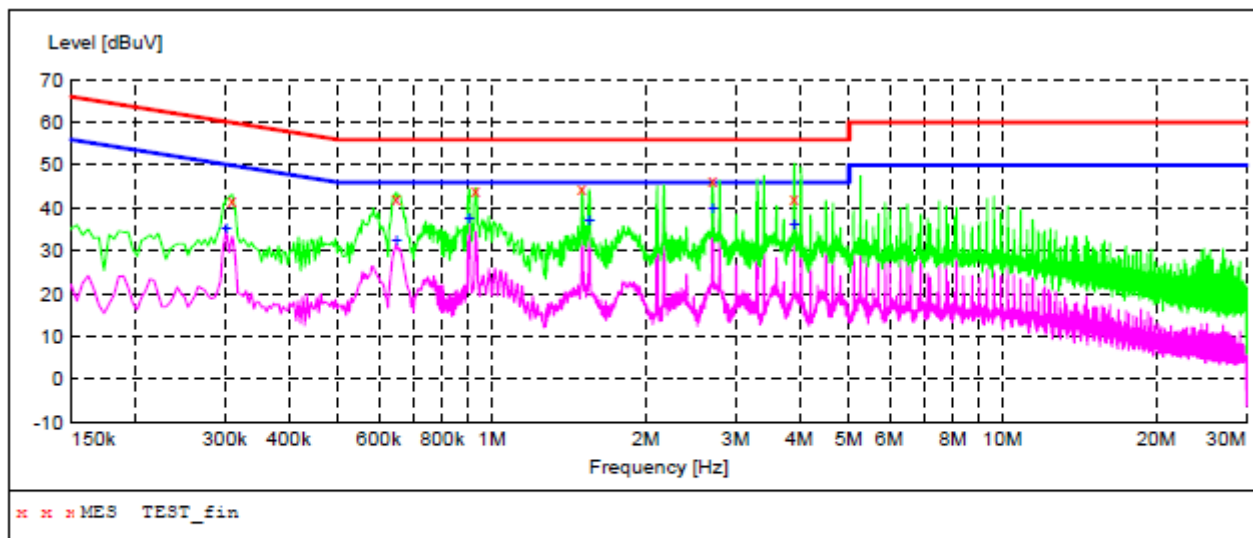
7.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST

- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per EN55032 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per EN55032.
- (3) All I/O cables were positioned to simulate typical actual usage as per EN55032.
- (4) The EUT received charging voltage by adapter through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- (5) All support equipments received power from a second LISN supplying power of AC 230V/50Hz, if any.
- (6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- (7) Analyzer / Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.
- (8) During the above scans, the emissions were maximized by cable manipulation.
- (9) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions.
- (10) Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

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7.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L1



MEASUREMENT RESULT: "TEST_fin"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.310000	42.00	11.3	60	18.0	QP	L1	FLO
0.650000	42.30	11.4	56	13.7	QP	L1	FLO
0.930000	44.10	11.3	56	11.9	QP	L1	FLO
1.502000	44.70	11.3	56	11.3	QP	L1	FLO
2.706000	46.30	11.4	56	9.7	QP	L1	FLO
3.906000	42.20	11.4	56	13.8	QP	L1	FLO

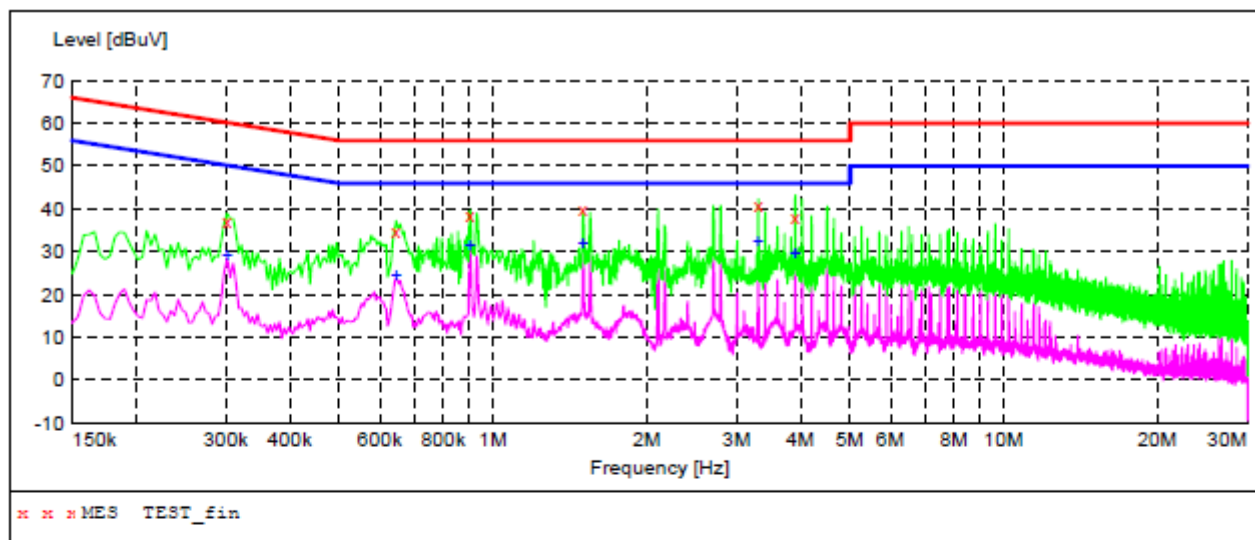
MEASUREMENT RESULT: "TEST_fin2"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.302000	35.20	11.3	50	15.0	AV	L1	FLO
0.650000	32.30	11.4	46	13.7	AV	L1	FLO
0.902000	37.40	11.3	46	8.6	AV	L1	FLO
1.550000	36.90	11.3	46	9.1	AV	L1	FLO
2.706000	39.80	11.4	46	6.2	AV	L1	FLO
3.906000	36.10	11.4	46	9.9	AV	L1	FLO

RESULT: PASS

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LINE CONDUCTED EMISSION TEST-N



MEASUREMENT RESULT: "TEST_fin"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.302000	37.10	11.3	60	23.1	QP	N	FLO
0.646000	35.00	11.4	56	21.0	QP	N	FLO
0.902000	38.60	11.3	56	17.4	QP	N	FLO
1.502000	39.70	11.3	56	16.3	QP	N	FLO
3.306000	41.00	11.4	56	15.0	QP	N	FLO
3.906000	38.10	11.4	56	17.9	QP	N	FLO

MEASUREMENT RESULT: "TEST_fin2"

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.302000	29.10	11.3	50	21.1	AV	N	FLO
0.646000	24.70	11.4	46	21.3	AV	N	FLO
0.902000	31.30	11.3	46	14.7	AV	N	FLO
1.502000	32.00	11.3	46	14.0	AV	N	FLO
3.306000	32.60	11.4	46	13.4	AV	N	FLO
3.906000	29.70	11.4	46	16.3	AV	N	FLO

RESULT: PASS

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8. EN 55032 RADIATED EMISSION TEST

8.1. LIMITS OF RADIATED DISTURBANCES

AT 3M DISTANCES

For class B equipment

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m Q.P.)
30-230	3	40
230-1000	3	47

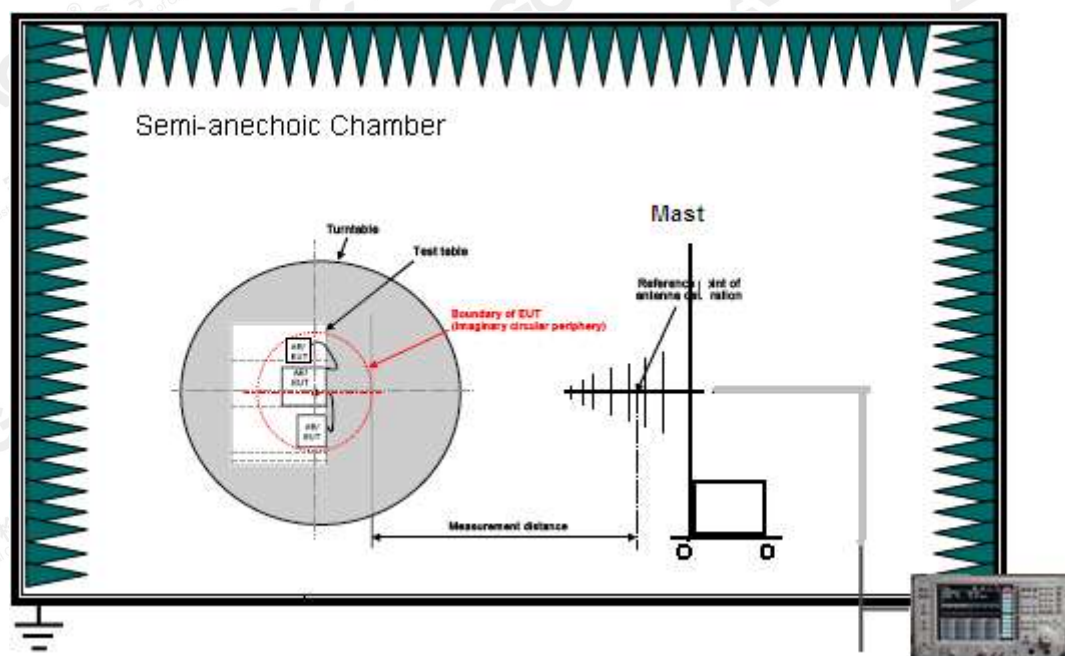
For FM receivers

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m Q.P.)	
		Fundamental	Harmonics
30-230	3	60	52
230-300	3		52
300-1000	3		56

Note: The lower limit shall apply at the transition frequency.

8.2. BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators



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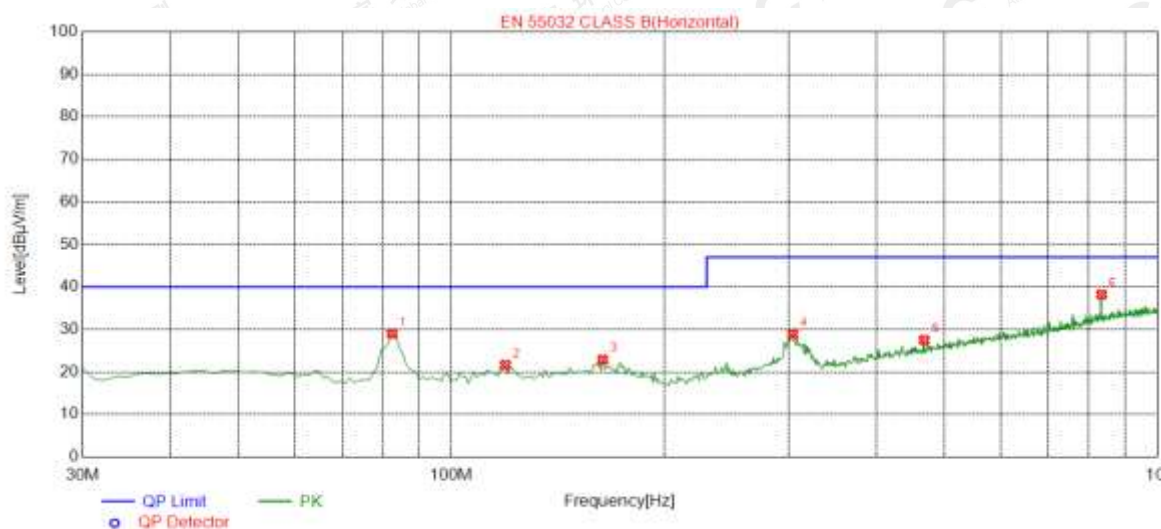
8.3. PROCEDURE OF RADIATED EMISSION TEST

- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per EN 55032 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per EN 55032.
- (3) All I/O cables were positioned to simulate typical actual usage as per EN 55032.
- (4) The EUT received charging voltage by PC which got power through the outlet socket under the turntable. All support equipments received AC230V/50Hz power from socket under the turntable, if any.
- (5) The antenna was placed at 3 meter away from the EUT as stated in EN 55032. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- (6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- (7) The test mode(s) were scanned during the test:
- (8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

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8.4. TEST RESULT OF RADIATED EMISSION TEST

Radiated Emission Test at 3m Distance-Horizontal



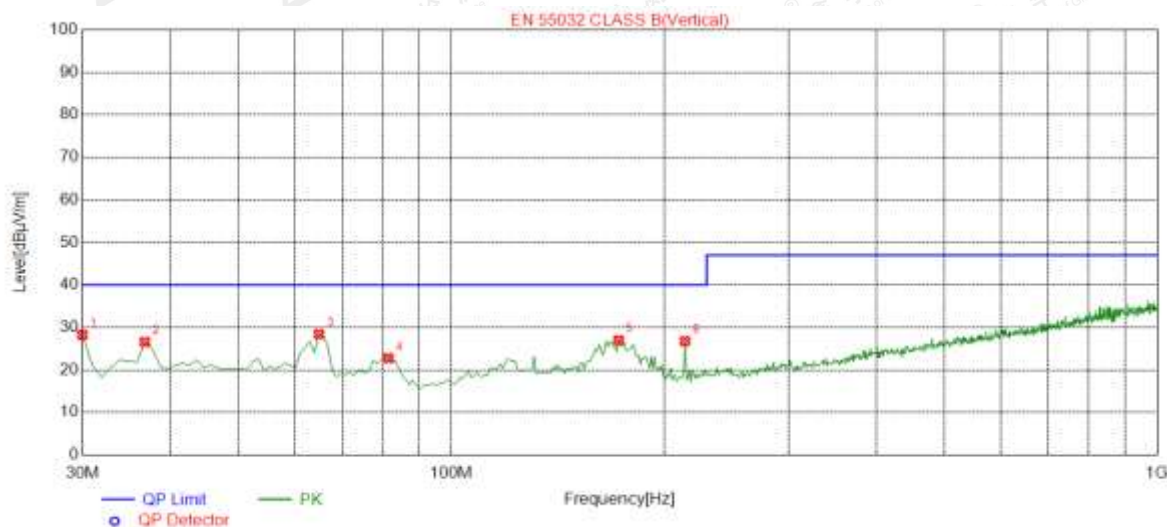
Suspected Data List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	82.3800	29.02	9.73	40.00	10.98	200	1	Horizontal
2	119.240	21.67	12.82	40.00	18.33	150	359	Horizontal
3	163.860	22.88	13.88	40.00	17.12	100	304	Horizontal
4	304.510	28.90	15.11	47.00	18.10	100	0	Horizontal
5	467.470	27.50	20.18	47.00	19.50	100	94	Horizontal
6	834.130	38.22	27.30	47.00	8.78	150	7	Horizontal

RESULT: PASS

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Radiated Emission Test at 3m Distance-Vertical



Suspected Data List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.0000	28.27	12.59	40.00	11.73	100	41	Vertical
2	36.7900	26.59	13.89	40.00	13.41	100	231	Vertical
3	64.9200	28.41	12.70	40.00	11.59	100	139	Vertical
4	81.4100	22.78	9.73	40.00	17.22	150	94	Vertical
5	172.590	26.98	13.01	40.00	13.02	100	5	Vertical
6	214.300	26.79	12.15	40.00	13.21	150	64	Vertical

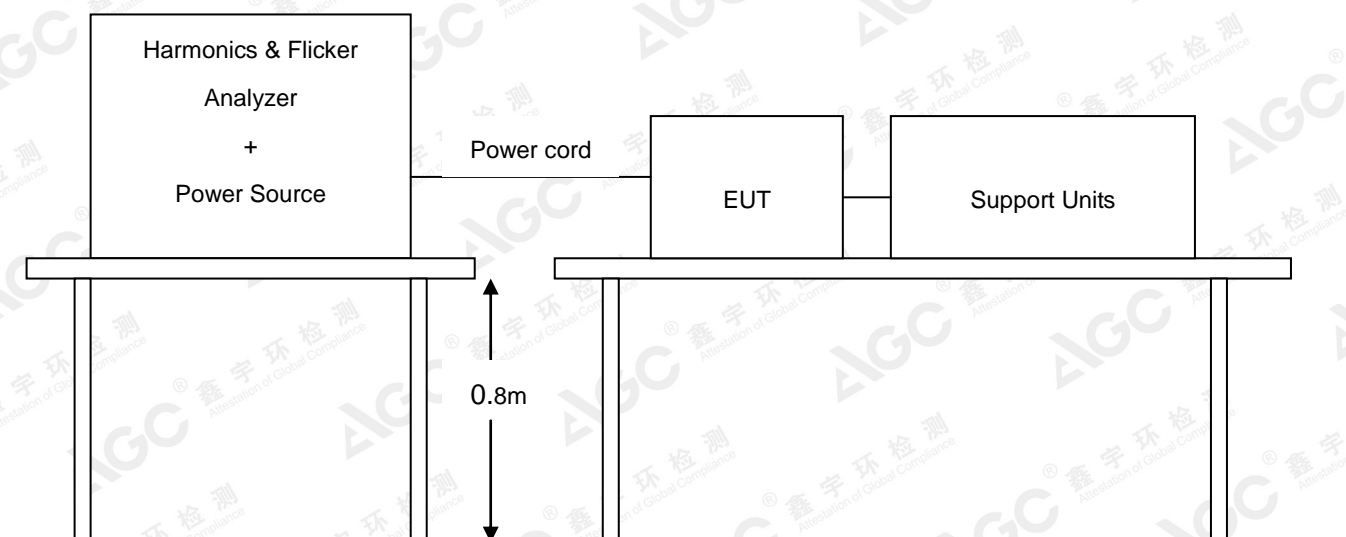
RESULT: PASS

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9. POWER HARMONICS TEST

Port	AC mains
Basic Standard	EN 61000-3-2
Limits	<input checked="" type="checkbox"/> CLASS A ; <input type="checkbox"/> CLASS B ; <input type="checkbox"/> CLASS C ; <input type="checkbox"/> CLASS D
Tester	Jonhen
Temperature	25°C
Humidity	55%

9.1. BLOCK DIAGRAM OF TEST SETUP



9.2. RESULT

Test Specification

Test Frequency:	50Hz	Test Voltage:	230V AC
Waveform:	Sine	Test Time:	2.5min
Classification:	Class A		

Note:

1. The active input power of the EUT is less than 75W.
2. No limits apply for equipment with an active input power up to and including 75W.

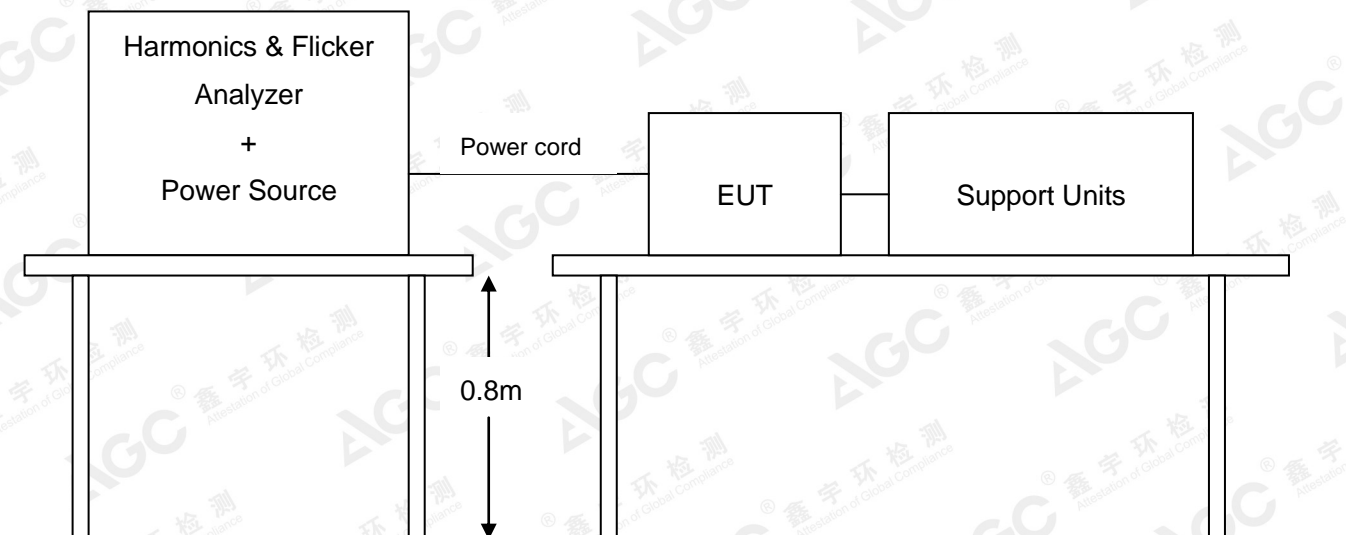
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10. VOLTAGE FLUCTUATION / FLICKER TEST

VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

Port	AC mains
Basic Standard	EN 61000-3-3
Limits	§5 of EN 61000-3-3
Tester	Jonhen
Temperature	25°C
Humidity	55%

10.1. BLOCK DIAGRAM OF TEST SETUP



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10.2. RESULT

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

EUT: P328.11X

Tested by: Jonhen

Test category: All parameters (European limits)

Test Margin: 100

Test date: Nov. 13, 2018

Start time: 09:55:14

End time: 10:03:37

Test duration (min): 10

Data file name: F-000289.cts_data

Comment: AUX in with charging

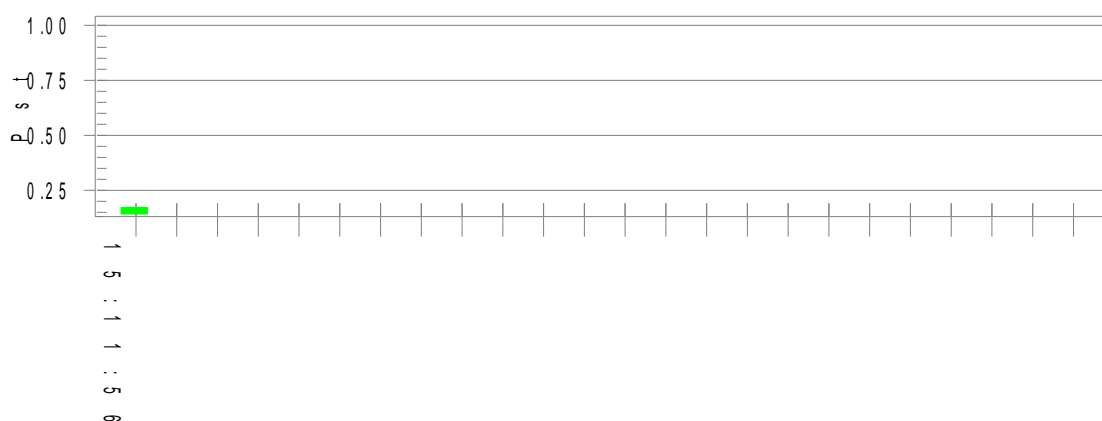
Customer: Xindao B.V.

Test Result: Pass

Status: Test Completed

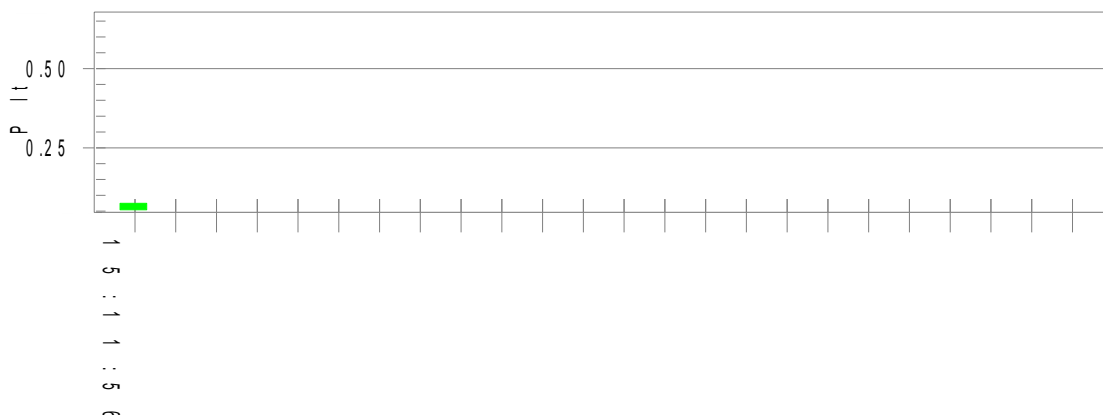
Pst_i and limit line

European Limits



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Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt): 230.83

Highest dt (%): 0.21

Time(mS) > dt: 0.1

Highest dc (%): 0.27

Highest dmax (%): 0.26

Highest Pst (10 min. period): 0.181

Highest Plt (2 hr. period): 0.084

Test limit (%): 3.30 Pass

Test limit (mS): 500.0 Pass

Test limit (%): 3.30 Pass

Test limit (%): 4.00 Pass

Test limit: 1.000 Pass

Test limit: 0.650 Pass

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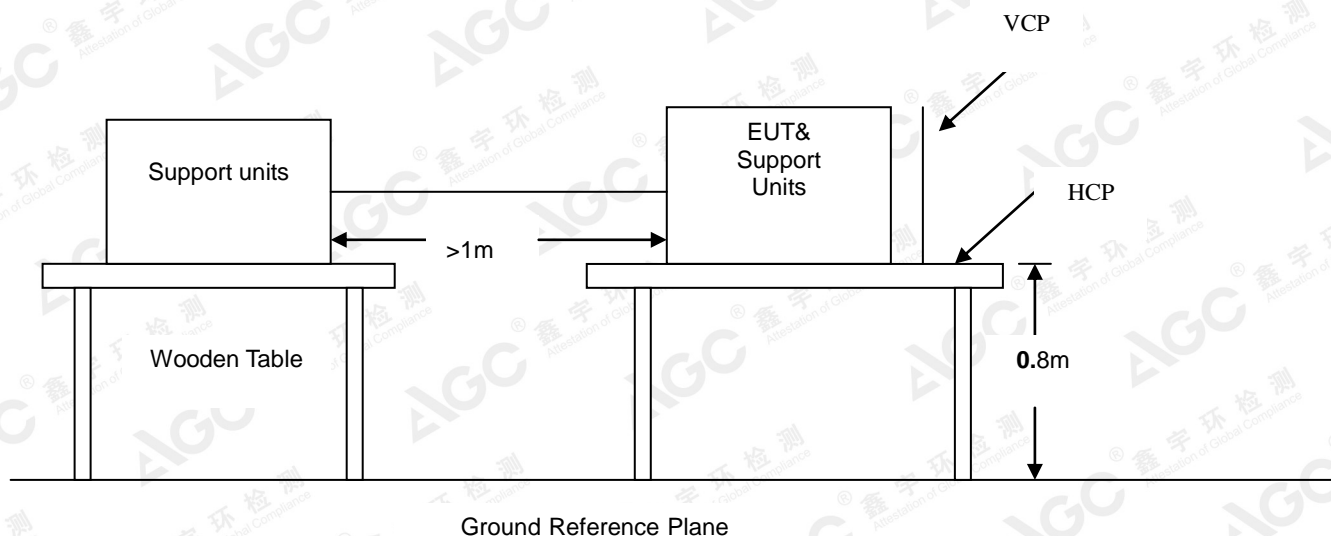
11. ESD IMMUNITY TEST

ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port	Enclosure
Basic Standard	EN 61000-4-2
Test Level	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)
Standard require	B
Tester	Jonhen
Temperature	20°C
Humidity	50%

11.1. BLOCK DIAGRAM OF TEST SETUP

(The 470 k ohm resistors are installed per standard requirement)



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

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11.2. TEST PROCEDURE

The EUT was located 0.1 m minimum from all side of the HCP.

The support units were located 1 m minimum away from the EUT.

EUT worked with resistance load, and make sure EUT worked normally.

Activates the communication function if the EUT with such port(s).

As per the requirement of EN 55035: Contact discharge is the preferred test method. 20 discharges (10 with positive and 10 negative polarity) shall be applied on each accessible metal part of the enclosure. In case of a non-conductive enclosure, discharges shall be applied on the horizontal or vertical coupling planes as specified in EN 61000-4-2.

Air discharges shall be used where contact discharges cannot be applied.

The following test condition was followed during the tests.

Note:

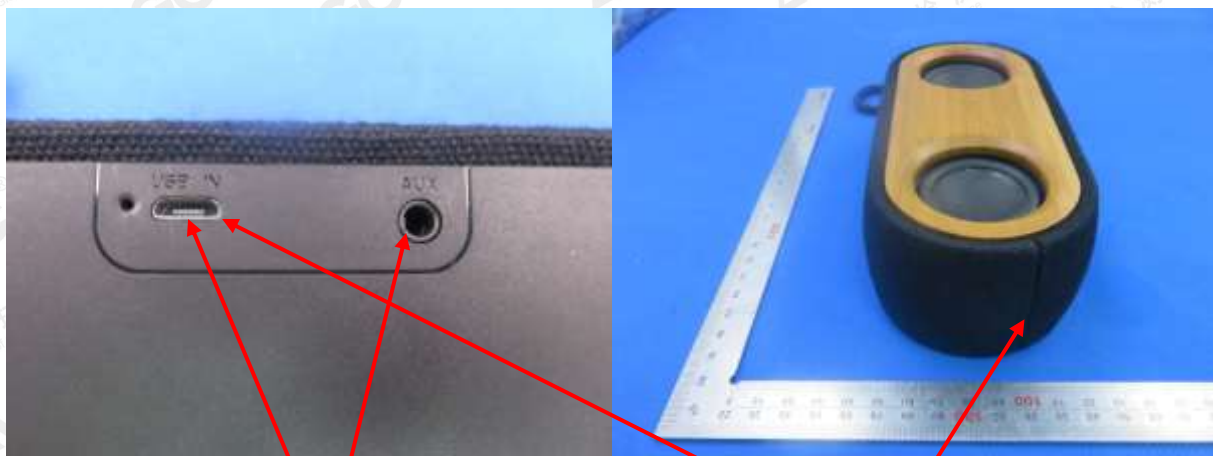
As per the A2 to EN 61000-4-2, a bleed resistor cable is connected between the EUT and HCP during the test.

The electrostatic discharges were applied as follows:

11.3. PERFORMANCE & RESULT

Amount of Discharges	Voltage	Coupling	Performance	Result (Pass/Fail)
Mini 20 /Point	±4kV	Contact Discharge	No Function Loss	Pass
Mini 20 /Point	±4kV	Indirect Discharge HCP (Front)	No Function Loss	Pass
Mini 20 /Point	±4kV	Indirect Discharge HCP (Left)	No Function Loss	Pass
Mini 20 /Point	±4kV	Indirect Discharge HCP (Back)	No Function Loss	Pass
Mini 20 /Point	±4kV	Indirect Discharge HCP (Right)	No Function Loss	Pass
Mini 20 /Point	±4kV	Indirect Discharge VCP (Front)	No Function Loss	Pass
Mini 20 /Point	±4kV	Indirect Discharge VCP (Left)	No Function Loss	Pass
Mini 20 /Point	±4kV	Indirect Discharge VCP (Back)	No Function Loss	Pass
Mini 20 /Point	±4kV	Indirect Discharge VCP (Right)	No Function Loss	Pass
Mini 20 /Point	±8kV	Air Discharge	No Function Loss	Pass

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Contact Discharge

Air Discharge

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11.4. PERFORMANCE & RESULT PERFORMANCE

<input checked="" type="checkbox"/> Criteria A:	The apparatus continues to operate as intended. 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. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> Criteria B:	The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL
--

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12. RADIATED, RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY TEST

12.1. TEST SPECIFICATION

Basic Standard	EN 61000-4-3
Frequency Range	80-1000, 1800, 2600, 3500, 5000(MHz)
Field Strength	3V/m
Modulation	1 kHz sine wave, 80%, AM modulation
Frequency Step	1% of fundamental
Polarity of Antenna	Horizontal and Vertical
Test Distance	3m
Antenna Height	1.5m
Dwell Time	3 seconds

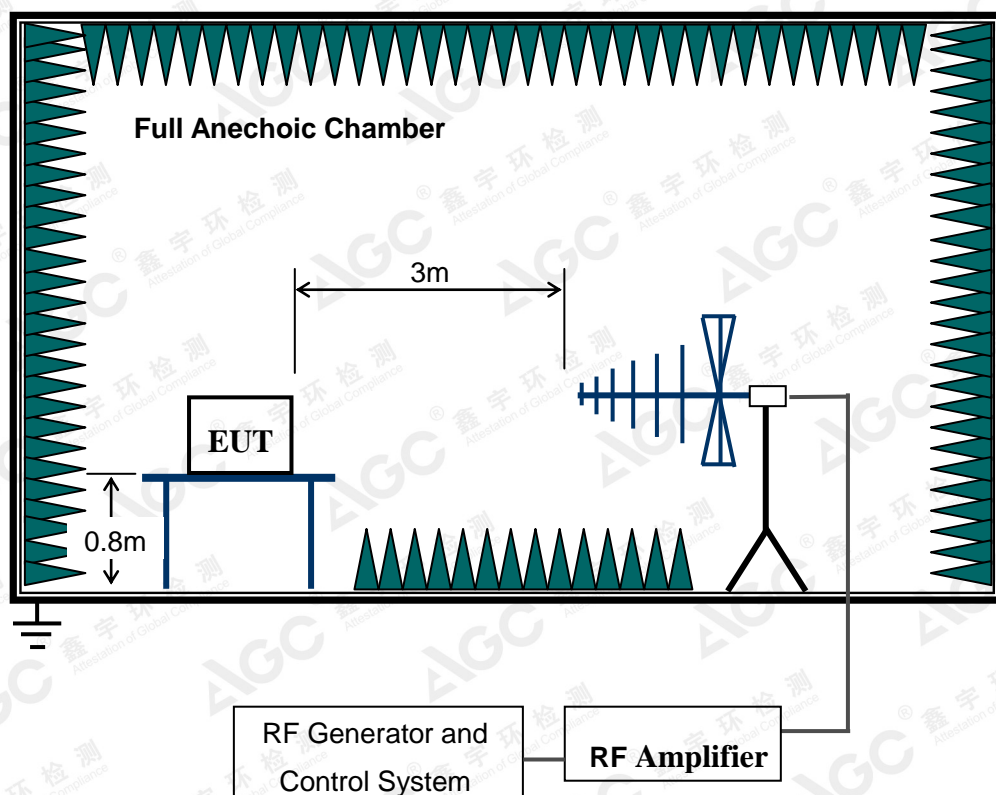
12.2. TEST PROCEDURE

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

- The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- The test signal was 80% amplitude modulated with a 1 kHz sine wave.
- The frequency range was swept at 80-1000, 1800, 2600, 3500, 5000(MHz) with the exception of the exclusion band for transmitters, receivers and duplex transceivers. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- The field strength level was 3V/m.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

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12.3. TEST SETUP



For the actual test configuration, please refer to Appendix A : Photographs of the Test Configuration.

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12.4. TEST RESULT

Freq. Range (MHz)	Field	Modulation	Polarity	Position	Observation	performance	Result (Pass/Fail)
80-1000,1800,2600,3500,5000	3V/m	Yes	H / V	Front	No Function Loss	A	PASS
80-1000,1800,2600,3500,5000	3V/m	Yes	H / V	Back	No Function Loss	A	PASS
80-1000,1800,2600,3500,5000	3V/m	Yes	H / V	Left	No Function Loss	A	PASS
80-1000,1800,2600,3500,5000	3V/m	Yes	H / V	Right	No Function Loss	A	PASS
80-1000,1800,2600,3500,5000	3V/m	Yes	H / V	Top	No Function Loss	A	PASS
80-1000,1800,2600,3500,5000	3V/m	Yes	H / V	Bottom	No Function Loss	A	PASS

Note: 1. operating mode include all modes of EMS in page 6

2. The measured acoustic interference ratio and/or the measured electrical interference ratio during the test is -20 dB.

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12.5. PERFORMANCE

<input checked="" type="checkbox"/> Criteria A:	The apparatus continues to operate as intended. 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. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> Criteria B:	The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**
☐ **FAIL**

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13. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

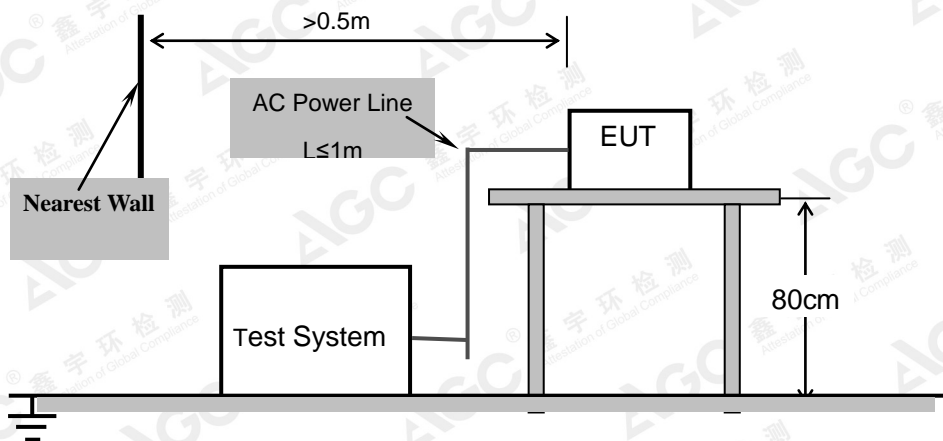
13.1. TEST SPECIFICATION

Basic Standard:	EN 61000-4-4
Test Voltage:	a.c. power port – 1 kV
Polarity:	Positive/Negative
Impulse Frequency:	5kHz
Impulse wave shape:	5/50ns
Burst Duration:	15ms
Burst Period:	300ms
Test Duration:	Not less than 1 min.

13.2. TEST PROCEDURE

1. The EUT was tested with 1000 volt discharges to the AC power input leads.
2. Both positive and negative polarity discharges were 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 meter.
4. The duration time of each test sequential was 1 minute.
5. The transient/burst waveform was in accordance with EN 61000-4-4, 5/50ns.

13.3. TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

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13.4. TEST RESULT

Test Point	Polarity	Test Level (kV)	Observation	performance	Conclusion
a.c. port, L	+/-	1	No function loss	A	Pass
a.c. port, N	+/-	1	No function loss	A	Pass
a.c. port, L-N	+/-	1	No function loss	A	Pass

Note: operating mode include all modes of EMS in page 6

13.5. PERFORMANCE

<input checked="" type="checkbox"/> Criteria A:	The apparatus continues to operate as intended. 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. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> Criteria B:	The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**
☐ **FAIL**

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14. SURGE IMMUNITY TEST

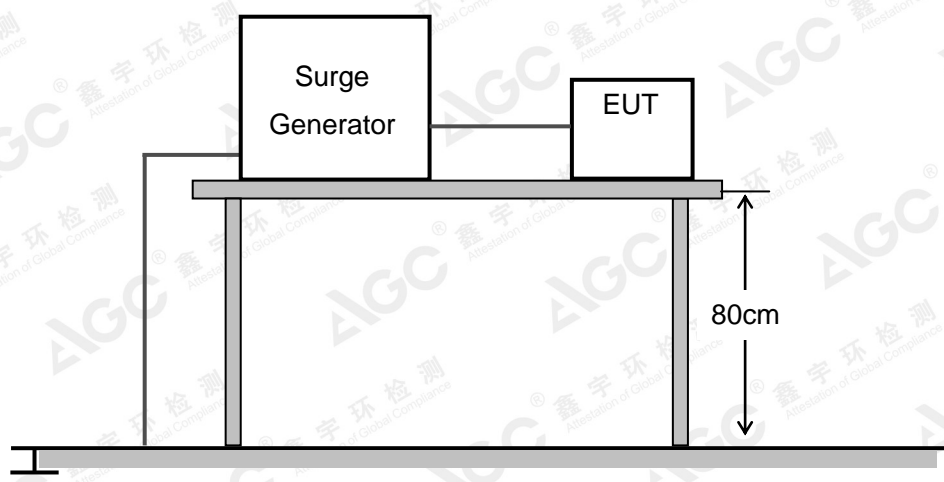
14.1. TEST SPECIFICATION

Basic Standard:	IEC 61000-4-5
Waveform:	Voltage 1.2/50 μ s; Current 8/20 μ s
Test Voltage:	a.c. power port, line to line 1.0 kV,
Polarity:	Positive/Negative
Phase Angle:	90°, 270°
Repetition Rate:	60sec
Times:	5 time/each condition.

14.2. TEST PROCEDURE

- The EUT and the auxiliary equipment were placed on a table of 0.8m heights above a metal ground reference plane. The size of ground plane is greater than 1m \times 1m and project beyond the EUT by at least 0.1m on all sides. The ground plane is connected to the protective earth. The length of power cord between the coupling device and the EUT was less than 2 meters (provided by the manufacturer).
- The EUT was connected to the power mains through a coupling device that directly couples the surge interference signal. The surge noise was applied synchronized to the voltage phase at the zero crossing and the peak value of the AC voltage wave (positive and negative).
- The surges were applied line to line and line(s) to earth. When testing line to earth the test voltage was applied successively between each of the lines and earth. Steps up to the test level specified increased the test voltage. All lower levels including the selected test level were tested. The polarity of each surge level included positive and negative test pulses.

14.3. TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

14.4. TEST RESULT

Coupling Line	Polarity	Voltage (kV)	Observation	performance	Conclusion
a.c. power, L-N	+/-	1.0	No function loss	A	Pass

Note: operating mode include all modes of EMS in page 6

14.5. PERFORMANCE

<input checked="" type="checkbox"/> Criteria A:	The apparatus continues to operate as intended. 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. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> Criteria B:	The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL
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15. IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS

15.1. TEST SPECIFICATION

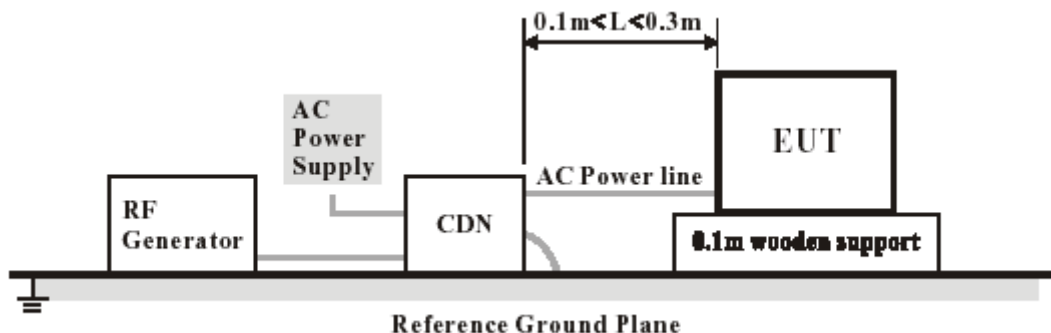
Basic Standard:	IEC 61000-4-6
Frequency Range:	0.15 MHz – 80 MHz
Field Strength:	0.15~10MHz 3Vrms, 10~30MHz 3 to 1Vrms, 30~80MHz 1Vrms
Modulation:	1 kHz Sine Wave, 80% AM
Frequency Step:	1% of fundamental
Coupled Cable:	a.c. power line
Coupling Device:	CDN-M2

15.2. TEST PROCEDURE

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 was 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.

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15.3. TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

15.4. TEST RESULT

EUT Working Mode	Test Point	Frequency (MHz)	Field Strength (Vrms)	Observation	performance	Conclusion
Normal	a.c. port	0.15 – 10	3	No function loss	A	Pass
Normal	a.c. port	10 – 30	3 to1	No function loss	A	Pass
Normal	a.c. port	30 – 80	1	No function loss	A	Pass

Note:

- operating mode include all modes of EMS in page 6
- The measured acoustic interference ratio and/or the measured electrical interference ratio during the test is -20 dB.

15.5. PERFORMANCE

<input checked="" type="checkbox"/> Criteria A:	The apparatus continues to operate as intended. 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. In some cases the performance level may be replaced by a permissible loss of performance.
<input type="checkbox"/> Criteria B:	The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input type="checkbox"/> Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**

☐ **FAIL**

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16. VOLTAGE DIPS AND SHORT INTERRUPTIONS IMMUNITY TEST

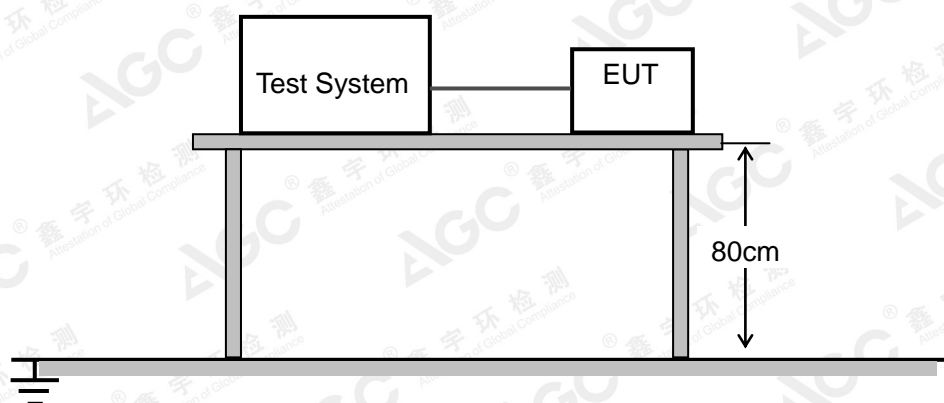
16.1. TEST SPECIFICATION

Basic Standard:	IEC 61000-4-11
Voltage Dips:	100% reduction, 0.5 Cycle 30% reduction, 25 Cycles
Voltage Interruptions:	100% reduction, 250 Cycles
Voltage Phase Angle:	0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°

16.2. TEST PROCEDURE

- The power cord was used as supplied by the manufacturer. The EUT was connected to the line output of the Voltage Dips and Interruption Generator.
- The EUT was tested for (1) 100% voltage dip of supplied voltage with duration of 0.5 cycles, (2) 30% voltage dip of supplied voltage and duration 25 cycles. (3) 100% voltage interruption of supplied voltage with duration of 250 Cycles was followed.
- Voltage reductions occur at 0 degree crossover point of the voltage waveform. The performance of the EUT was checked after the voltage dip or interruption.

16.3. TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

16.4. TEST RESULT

Test Mode	Voltage Reduction	Duration (cycle)	Times	Interval (ms)	Observation	performance	Conclusion
Voltage dips	100%	0.5	3	10	No function loss	B	Pass
	30%	25	3	500	No function loss	C	Pass
Voltage interruptions	100%	250	3	5000	No function loss	C	Pass

Note: operating mode include all modes of EMS in page 6

16.5. PERFORMANCE

<input type="checkbox"/> Criteria A:	The apparatus continues to operate as intended. 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. In some cases the performance level may be replaced by a permissible loss of performance.
<input checked="" type="checkbox"/> Criteria B:	The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
<input checked="" type="checkbox"/> Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**
☐ **FAIL**

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APPENDIX A: PHOTOGRAPHS OF TEST SETUP
CONDUCTED EMISSION TEST SETUP



RADIATED EMISSION TEST SETUP



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POWER HARMONICS AND VOLTAGE FLICKER/FLUCTUATION TEST

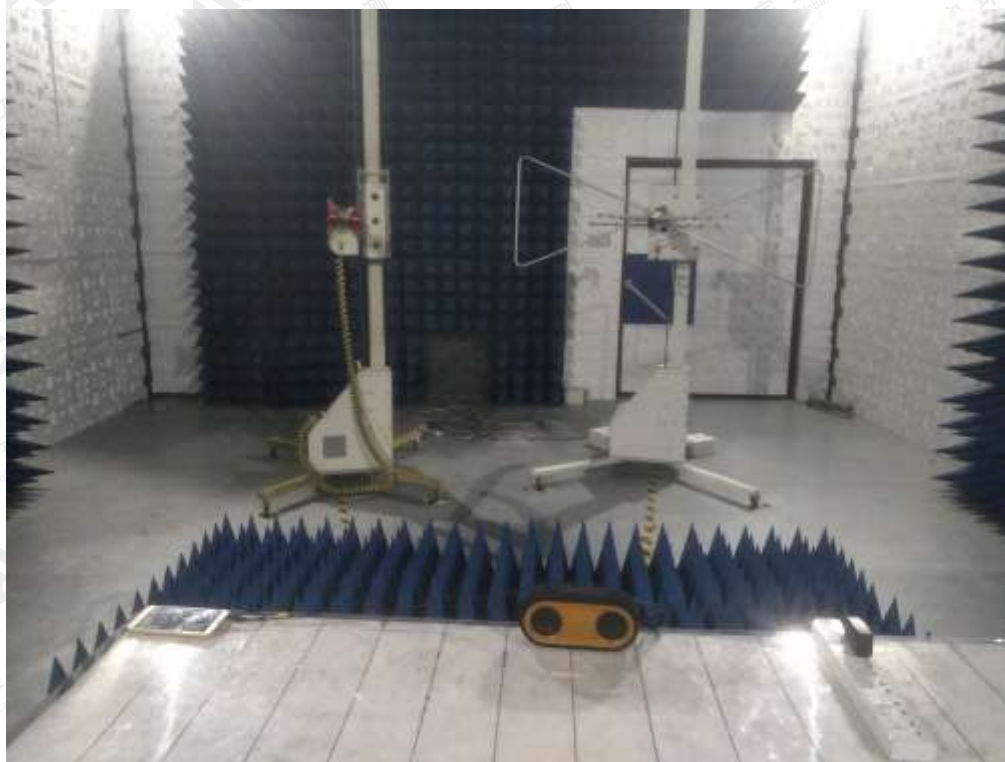


ESD TEST SETUP



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RS TEST SETUP



EFT / SURGE / DIPS IMMUNITY TEST



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CS IMMUNITY TEST



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APPENDIX B: PHOTOGRAPHS OF EUT

Refer to Attached file(appendix I)

-----END OF REPORT-----

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