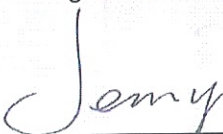


## EMC TEST REPORT

Applicant.....: SHENZHEN FENDA TECHNOLOGY CO., LTD.  
Address.....: Fenda Hi-Tech Park, Zhoushi Road, Shiyao Town, Baoan District, Shenzhen  
City, Guangdong, China  
Manufacturer.....: SHENZHEN FENDA TECHNOLOGY CO., LTD.  
Address.....: Fenda Hi-Tech Park, Zhoushi Road, Shiyao Town, Baoan District, Shenzhen  
City, Guangdong, China  
Factory.....: SHENZHEN FENDA TECHNOLOGY CO., LTD.  
Address.....: Fenda Hi-Tech Park, Zhoushi Road, Shiyao Town, Baoan District, Shenzhen  
City, Guangdong, China  
Product Name.....: 2.1 computer multimedia speaker  
Brand Name.....: F&D  
Model No. ....: HT-350, HT-360, HT-380, HT-390(For model difference refer to section 2)  
Measurement Standard.....: EN 55032: 2015+A11: 2020  
EN IEC 61000-3-2: 2019  
EN 61000-3-3: 2013+A1: 2019  
EN 55035: 2017+A11: 2020  
Receipt Date of Samples....: July 02, 2021  
Date of Tested.....: July 02, 2021 to August 20, 2021  
Date of Report.....: December 28, 2021

This report shows that above equipment is technically compliant with the requirements of the standards above. All test results in this report apply only to the tested sample(s). Without prior written approval of Dongguan Nore Testing Center Co., Ltd, this report shall not be reproduced except in full.

  
Prepared by

Jenny Liu / Project Engineer

  
Approved by

Iori Fan / Authorized Signatory

---

## Table of Contents

1. Summary of Test Result .....	4
2. General Description of EUT.....	5
3. Configuration of EUT .....	7
4. Description of Support Device .....	8
5. Test Facility.....	9
6. Test Conditions.....	10
7. Measurement Uncertainty .....	11
8. Measurement Bandwidths .....	11
9. Deviations and Abnormalities from Standard Conditions.....	11
10. Sample Calculations.....	12
11. Conducted Emission Measurement .....	13
12. Conducted Differential Voltage Emissions Measurement.....	20
13. Radiated Emission Measurement .....	22
14. Harmonic Current Emission Measurement .....	28
15. Voltage Fluctuations & Flicker Measurement.....	30
16. Performance Criteria for Immunity .....	34
17. Electrostatic Discharge Measurement .....	35
18. Continuous RF Electromagnetic Field Disturbances Measurement .....	41
19. Electrical Fast Transient/Burst Measurement .....	46
20. Surge Measurement .....	49
21. Continuous Induced RF Disturbances Measurement .....	53
22. Power Frequency Magnetic Field Measurement .....	58
23. Voltage Dips and Interruptions Measurement.....	60
24. Measuring Devices and Test Equipment .....	63
25. Photographs of Test Configuration.....	67
26. Photographs of the EUT .....	71

**Revision History**

Report Number	Description	Issued Date
NTC2112024EV00	Initial Issue	2021-12-28

## 1. Summary of Test Result

EMISSION			
Standard	Test Item	Result	Remarks
EN 55032: 2015+A11: 2020	Conducted Emission	PASS	---
	Conducted Disturbance at the telecommunication ports	N/A	---
	Radiated Emission	PASS	---
EN IEC 61000-3-2: 2019	Harmonic Current Emission	PASS	---
EN 61000-3-3: 2013+A1: 2019	Voltage Fluctuations & Flicker	PASS	---

IMMUNITY(EN 55035: 2017+A11: 2020)			
Standard	Test Item	Result	Remarks
IEC 61000-4-2: 2008	Electrostatic Discharges (ESD)	PASS	---
IEC 61000-4-3: 2006+A1: 2007+A2: 2010	Continuous RF Electromagnetic Field Disturbances	PASS	---
IEC 61000-4-4: 2012	Electrical Fast Transients/Burst (EFT/B)	PASS	---
IEC 61000-4-5: 2014	Surges	PASS	---
IEC 61000-4-6: 2013	Continuous Induced RF Disturbances	PASS	---
IEC 61000-4-8: 2009	Power Frequency Magnetic Field	N/A	The EUT does not Contain Magnetic Field Sensitive Components.
IEC 61000-4-11: 2004	Voltage Dips and Interruptions	PASS	---

## 2. General Description of EUT

Product Information	
Product name:	2.1 computer multimedia speaker
Main Model Name:	HT-350
Additional Model Name:	HT-360, HT-380, HT-390
Model Difference:	These models have the same circuit schematic, construction, PCB layout and critical components. Their differences are model number and the size of enclosure.
S/N:	2107-3437 for Soundbar; 2107-3437-1 for Subwoofer
Brand Name:	F&D
EUT Type:	Class B
Operation Frequency:	Below 108MHz
Hardware Version:	V1.0
Software Version:	V1.0
Temperature Range:	0 – 40 °C
Rating:	For Soundbar: AC 100-240V 50/60Hz, 0.5A For Subwoofer: AC 100-240V 50/60Hz, 0.5A
I/O Port:	For Soundbar: AC Port*1, USB Port*1, Optical Port*1, AUX Port*1, HDMI ARC*1 For Subwoofer: AC Port*1
Accessories Information	
Adapter:	N/A
Cable:	Power cord 1: 1.63m unshielded; Power cord 2: 1.63m unshielded
Other:	IR Remote * 1

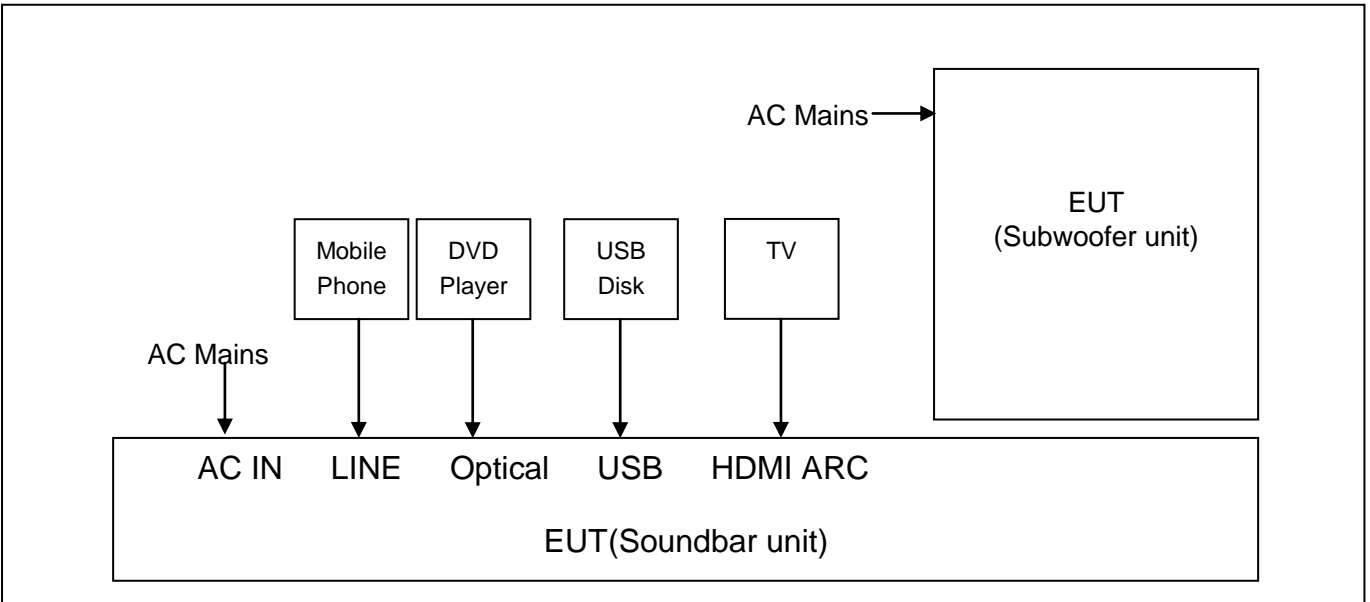
Additional Information	
Note:	<ol style="list-style-type: none"> <li>1. According to the model difference, all tests were performed on model HT-350.</li> <li>2. The EUT consists of Soundbar and Subwoofer two units.</li> <li>3. The manufacturer declared that length of Audio line/ Signal line is less than 3m.</li> </ol>
Remark:	<p>This report was an additional report based on NTC2107049EV00. Comparing with the original report NTC2107049EV00, this report changed the information of the applicant, manufacturer, product name, and model name, brand name. According to the manufacturer, all the original test data continue to be referenced but the changed information.</p>

### 3. Configuration of EUT

#### Description of Test Modes

Test Mode		Description
Normal working: for Soudbar+Subwooferunit		
1	Line IN	Turn on the EUT and set it operating at LINE mode, then connect the EUT to mobile phone through 3.5mm signal wire to play 1KHz signal.
2	USB Playing	Turn on the EUT and set it operating at USB mode, then insert the USB flash disk to the EUT to play 1KHz signal.
3	Optial IN	Turn on the EUT and set it operating at Optical mode, then connect the EUT to DVD player through optical signal wire to play 1KHz signal.
4	HDMI ARC IN	Turn on the EUT and set it operating at ARC mode, then connect the EUT to TV through HDMI signal wire to play audio signal.
5	Stand-by	Turn on the EUT and set it operating at stand-by mode.
For Subwoofer unit		
6	ON	Turn on the EUT and set it operating at normal working mode.

#### Block Diagram of Configuration



**Note:**

- a. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- b. Grounding was established in accordance with the manufacturer’s requirements and conditions for the intended use, if necessary.

#### 4. Description of Support Device

No.	Equipment	Brand	M/N	S/N	Cable Specification	Remarks
2.	iPhone	Apple	MG492CH/A	F1MPLG6NG5 MQ	---	Provided by the laboratory
3.	Mobile Phone	HUAWEI	H60-L01	357143040643 733	---	Provided by the laboratory
4.	USB DISK	Sony	USB 3.0 8GB	---	---	Provided by the laboratory
5.	DVD Player	Pioneer	DV-310NC-K	0JTL030411CN	Power Cord: 1.8m Unshielded, with core	Provided by the laboratory
6.	TV	SONY	KDL-32W600D	---	---	Provided by the laboratory
7.	Adapter for TV	SONY	ACDP-045S03 I/P: AC100V-240V,50 Hz/60Hz,1.1A O/P: DC19.5V2.35A	---	AC Line: 1.09m unshielded DC Line: 1.15m unshielded with a core	Provided by the laboratory



## 5. Test Facility

Test Site	:	Dongguan Nore Testing Center Co., Ltd. (Dongguan NTC Co., Ltd.)
Accreditations and Authorizations	:	<p>The Laboratory has been assessed and proved to be in compliance with CNAS/CL01</p> <p>Listed by CNAS, August 13, 2018</p> <p>The Certificate Registration Number is L5795.</p> <p>The Certificate is valid until August 13, 2024</p> <p>The Laboratory has been assessed and proved to be in compliance with ISO17025</p> <p>Listed by A2LA, November 01, 2017</p> <p>The Certificate Registration Number is 4429.01</p> <p>The Certificate is valid until December 31, 2021</p> <p>Listed by FCC, November 06, 2017</p> <p>Test Firm Registration Number: 907417</p> <p>Listed by Industry Canada, June 08, 2017</p> <p>The Certificate Registration Number. Is 46405-9743A</p>
Test Site Location	:	Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District, Dongguan City, Guangdong Province, China

## 6. Test Conditions

No.	Test Item	Test Mode	Test Voltage	Tested by	Remarks
1.	Conducted Emission	1-6	AC 110V 60Hz AC 230V 50Hz	Alvin	See note 1
2.	Conducted Emission (Asymmetric mode) Wired network Port	---	---	---	---
3.	Conducted Emission (Asymmetric mode) -Antenna Port	---	---	---	---
4.	Conducted Differential Voltage Emissions	---	---	---	---
5.	Radiated Emission	1-6	AC 110V 60Hz AC 230V 50Hz	Loki	See note 1
6.	Harmonic Current Emission	1-6	AC 230V 50Hz	Rick	See note 1
7.	Voltage Fluctuations & Flicker	1-6	AC 230V 50Hz	Rick	See note 1
8.	Electrostatic Discharges (ESD)	1-6	AC 110V 60Hz AC 230V 50Hz	Rick	See note 2
9.	Continuous RF Electromagnetic Field Disturbances	1-6	AC 110V 60Hz AC 230V 50Hz	Alvin	See note 1
10.	Electrical Fast Transients/Burst (EFT/B)	1-6	AC 110V 60Hz AC 230V 50Hz	Rick	See note 2
11.	Surges	1-6	AC 110V 60Hz AC 230V 50Hz	Rick	See note 2
12.	Continuous Induced RF Disturbances	1-6	AC 110V 60Hz AC 230V 50Hz	Alvin	See note 2
13.	Power Frequency Magnetic Field	---	---	---	---
14.	Voltage Dips and Interruptions	1-6	AC 100V 60Hz AC 230V 50Hz	Rick	See note 2

**Note:**

- The testing climatic conditions for temperature, humidity, and atmospheric pressure are within: 15~35°C, 30~70%, 86~106kPa.
- The testing climatic conditions for temperature, humidity, and atmospheric pressure are within: 15~35°C, 30~60%, 86~106kPa.
- Only the worst case was recorded in the report.

## 7. Measurement Uncertainty

No.	Test Item	Frequency	Uncertainty	Remarks
1.	Conducted Emission (AC mains)	9KHz ~ 150KHz	$\pm 3.04$ dB	---
		150KHz ~ 30MHz	$\pm 2.52$ dB	---
2.	Conducted Emission (Asymmetric mode) Wired network Port	150KHz ~ 30MHz	$\pm 2.52$ dB	---
3.	Conducted Emission (Asymmetric mode) Antenna Port	150KHz ~ 30MHz	$\pm 2.52$ dB	---
4.	Conducted Differential Voltage Emissions	30 ~ 2150MHz	$\pm 2.52$ dB	---
5.	Radiated Emission	30MHz ~ 1GHz	$\pm 4.68$ dB	---
		1GHz ~ 6GHz	$\pm 5.14$ dB	---

**Note:**

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .
2. The measurement uncertainty levels above are estimated and calculated according to CISPR 16-4-2.

## 8. Measurement Bandwidths

No.	Frequency Range (MHz)	Peak Level (kHz)	Quasi-Peak Level (kHz)	Average Level (kHz)
1.	0.01 ~ 0.15	0.3	0.2	0.2
2.	0.15 ~ 30.0	10.0	9.0	9.0
3.	30 ~ 1000	100.0	120.0	120.0
4.	Above 1000	1000.0	N/A	1000.0

**Note:** Measurements were made using the bandwidths and detectors specified by the standard. No video filter was used.

## 9. Deviations and Abnormalities from Standard Conditions

No additions, deviations and exclusions from the standard.

### 10. Sample Calculations

Conducted Emission						
Freq. (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Detector
0.1600	40.80	10.60	51.40	65.16	-13.76	QP

Where,

- Freq. = Emission frequency in MHz
- Reading Level = Spectrum Analyzer/Receiver Reading
- Corrector Factor = Insertion loss of LISN + Cable Loss + RF Switching Unit attenuation
- Measurement = Reading + Corrector Factor
- Limit = Limit stated in standard
- Margin = Measurement - Limit
- Detector = Reading for Quasi-Peak / Average / Peak

Radiated Emission						
Freq. (MHz)	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
43.5800	41.36	-7.66	33.70	40.00	-6.30	QP

Where,

- Freq. = Emission frequency in MHz
- Reading Level = Spectrum Analyzer/Receiver Reading
- Corrector Factor = Antenna Factor + Cable Loss - Pre-amplifier
- Measurement = Reading + Corrector Factor
- Limit = Limit stated in standard
- Over = Margin, which calculated by Measurement - Limit
- Detector = Reading for Quasi-Peak / Average / Peak

## 11. Conducted Emission Measurement

### LIMITS

Limits for conducted disturbance for the AC mains power ports:

Frequency (MHz)	<input type="checkbox"/> Class A (dBuV)		<input checked="" type="checkbox"/> Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.5	79	66	66 to 56	56 to 46
0.5 to 5	73	60	56	46
5 to 30	73	60	60	50

- Note:
1. If the limits for the average detector are met when using the quasi-peak detector, then the limits for the measurements with the average detector are considered to be met.
  2. The higher value measured with and without the outer conductor screen of the antenna terminal connected to earth is considered.
  3. Television receivers with teletext facilities should be tested in teletext mode with teletext Picture.
  4. The lower limit shall apply at the transition frequencies.
  5. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.

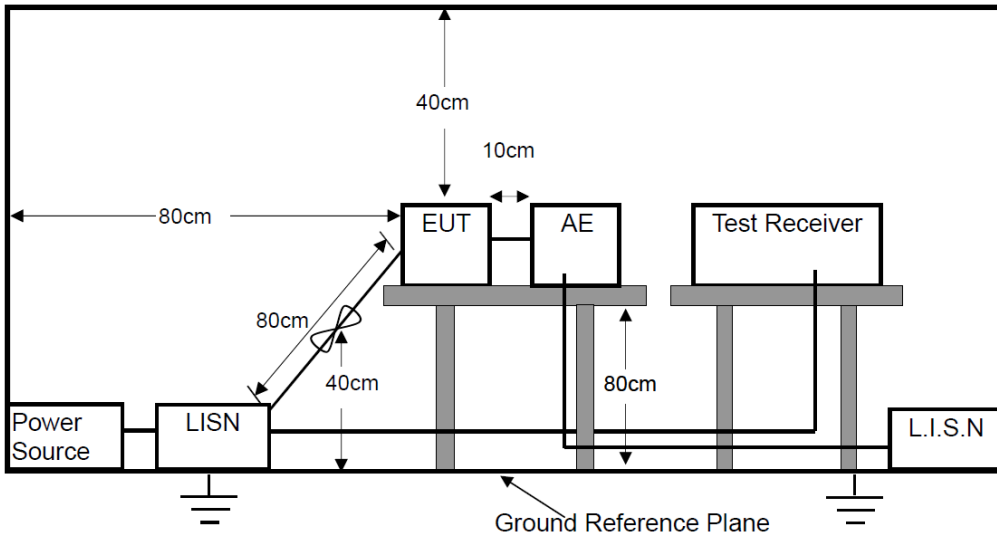
Limits for conducted disturbance for asymmetric mode:

Frequency (MHz)	Voltage limits <input type="checkbox"/> Class A (dB(uV))		Current limits <input type="checkbox"/> Class A (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.5	97 to 87	84 to 74	53 to 43	40 to 30
0.5 to 30	87	74	43	30
Frequency (MHz)	Voltage limits <input type="checkbox"/> Class B (dBuV)		Current limits <input type="checkbox"/> Class B (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 to 0.5	84 to 74	74 to 64	40 to 30	30 to 20
0.5 to 30	74	64	30	20

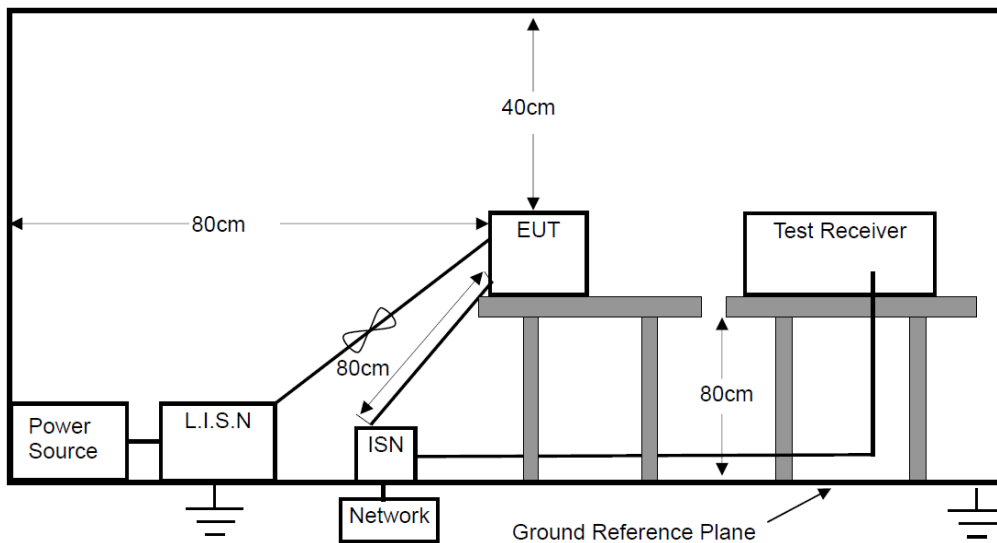
- Note:
1. The lower limit shall apply at the transition frequencies.
  2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5MHz.

### BLOCK DIAGRAM OF TEST SETUP

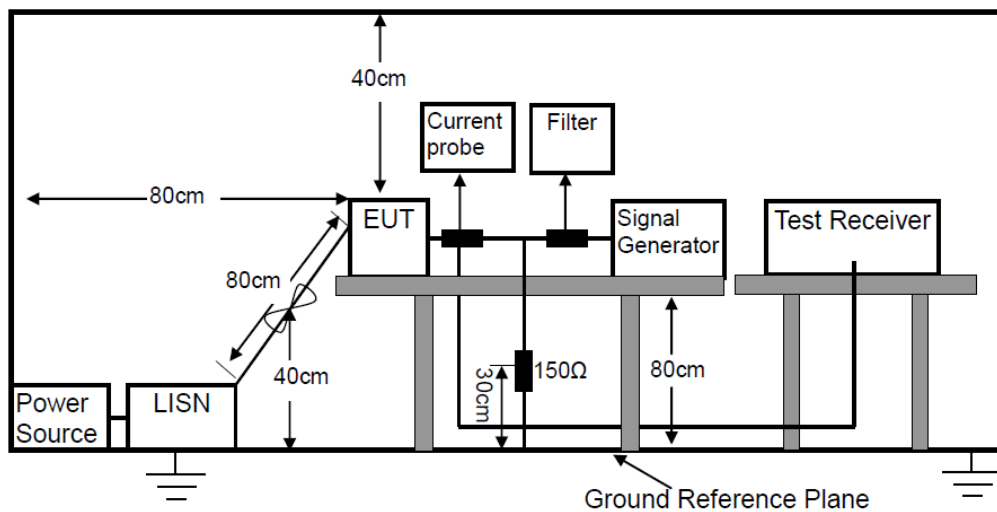
#### Conducted Disturbance at the Mains power Ports



#### Conducted Disturbance for asymmetric mode at the wired network ports



#### Conducted Disturbance for asymmetric mode at the antenna ports



## **TEST PROCEDURES**

- a. The EUT was placed on a wooden table 0.8m height from the metal ground plan and 0.4m from the conducting wall of the shielding room and it was kept at 0.8m from any other grounded conducting surface.
- b. Configure the EUT and support devices as per section 3.
- c. All I/O cables and support devices were positioned as per EN 55032.
- d. Connect mains power port of the EUT to a line impedance stabilization network (LISN) and wired network port to Asymmetric Artificial Network (AAN).
- e. Connect all support devices to the other LISN and AAN, if needed.
- f. Turn on the EUT and all support devices, and make it run stably.
- g. Set the detector and measurement bandwidth of test-receiver system as per EN 55032.
- h. Scan the frequency range from 150KHz to 30MHz at both sides of AC line for conducted interference checking
- i. Repeat the above scans in each mode and record the test data.

## **TEST RESULTS**

PASS

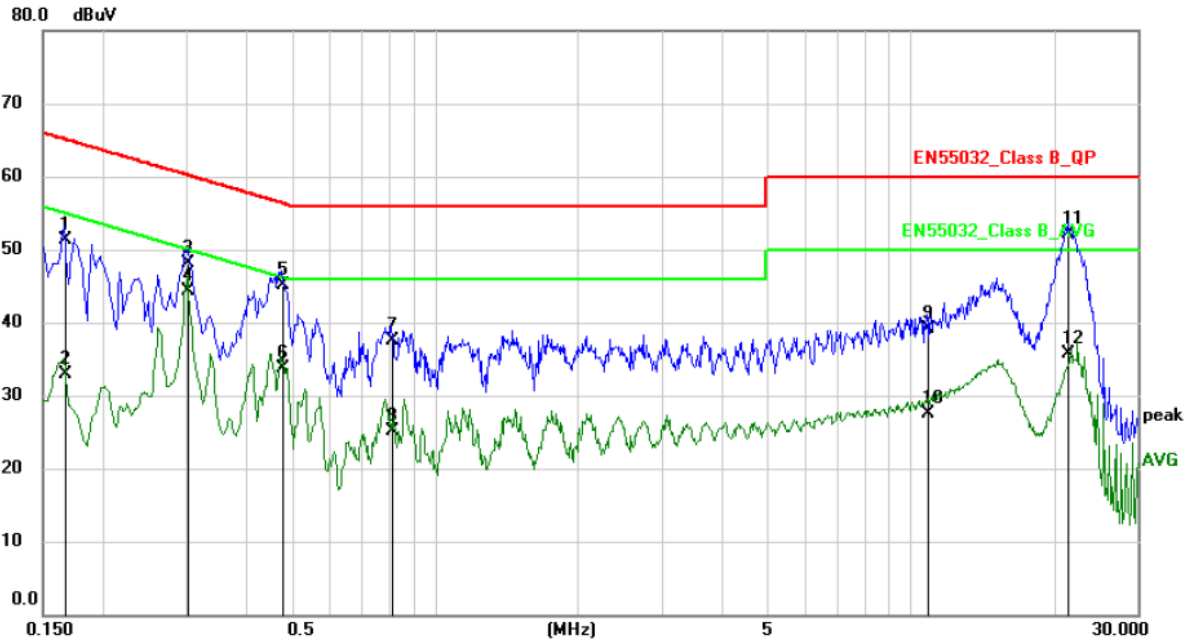
Please refer to the following pages of the worst case.

M/N: HT-350	Testing Voltage: AC 230V 50Hz
Phase: L1	Detector: QP & AVG
Test Mode: 5	

### Conducted Emission Measurement

Date: 2021/8/10

Time: 16:46:28



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1660	40.80	10.60	51.40	65.16	-13.76	QP	
2	0.1660	22.30	10.60	32.90	55.16	-22.26	AVG	
3	0.3019	37.50	10.60	48.10	60.19	-12.09	QP	
4 *	0.3019	33.80	10.60	44.40	50.19	-5.79	AVG	
5	0.4779	34.47	10.63	45.10	56.38	-11.28	QP	
6	0.4779	23.07	10.63	33.70	46.38	-12.68	AVG	
7	0.8100	26.93	10.67	37.60	56.00	-18.40	QP	
8	0.8100	14.43	10.67	25.10	46.00	-20.90	AVG	
9	10.8300	28.37	10.73	39.10	60.00	-20.90	QP	
10	10.8300	16.87	10.73	27.60	50.00	-22.40	AVG	
11	21.4379	41.33	10.77	52.10	60.00	-7.90	QP	
12	21.4379	24.93	10.77	35.70	50.00	-14.30	AVG	

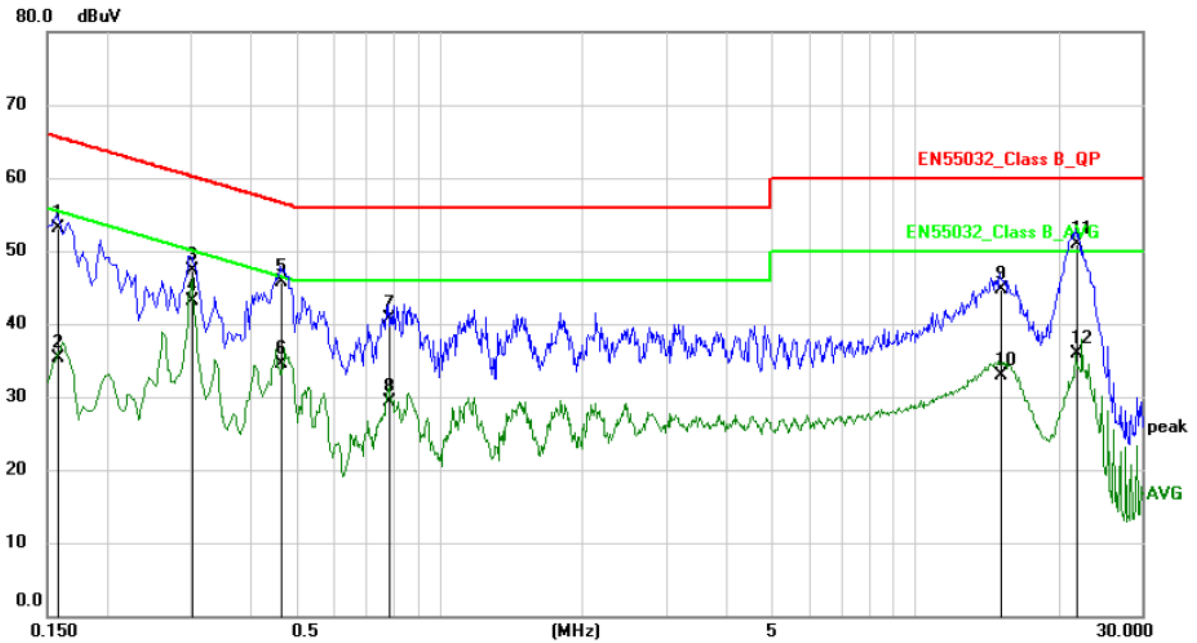


M/N: HT-350	Testing Voltage: AC 230V 50Hz
Phase: N	Detector: QP & AVG
Test Mode: 5	

### Conducted Emission Measurement

Date: 2021/8/10

Time: 16:52:06



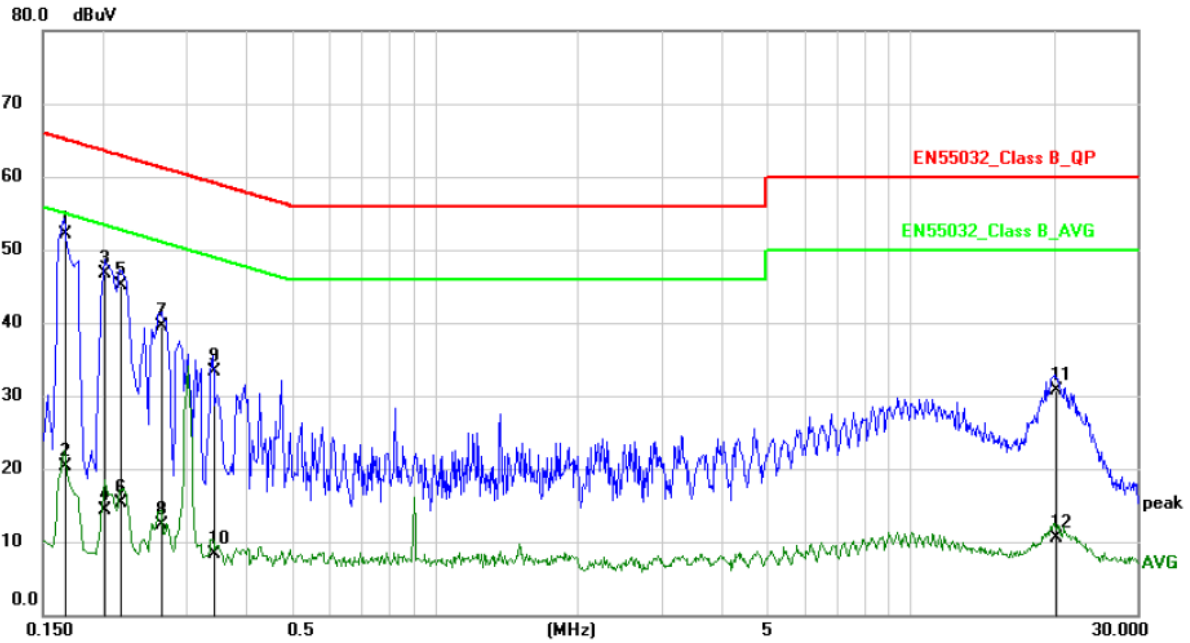
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1580	42.50	10.60	53.10	65.57	-12.47	QP	
2	0.1580	24.80	10.60	35.40	55.57	-20.17	AVG	
3	0.3020	36.70	10.60	47.30	60.19	-12.89	QP	
4 *	0.3020	32.60	10.60	43.20	50.19	-6.99	AVG	
5	0.4660	35.18	10.62	45.80	56.58	-10.78	QP	
6	0.4660	23.98	10.62	34.60	46.58	-11.98	AVG	
7	0.7820	30.03	10.67	40.70	56.00	-15.30	QP	
8	0.7820	18.73	10.67	29.40	46.00	-16.60	AVG	
9	15.1339	34.05	10.75	44.80	60.00	-15.20	QP	
10	15.1339	22.15	10.75	32.90	50.00	-17.10	AVG	
11	21.7540	40.13	10.77	50.90	60.00	-9.10	QP	
12	21.7540	25.13	10.77	35.90	50.00	-14.10	AVG	

M/N: HT-350	Testing Voltage: AC 230V 50Hz
Phase: L1	Detector: QP & AVG
Test Mode: 6	

### Conducted Emission Measurement

Date: 2021/8/10

Time: 18:03:56



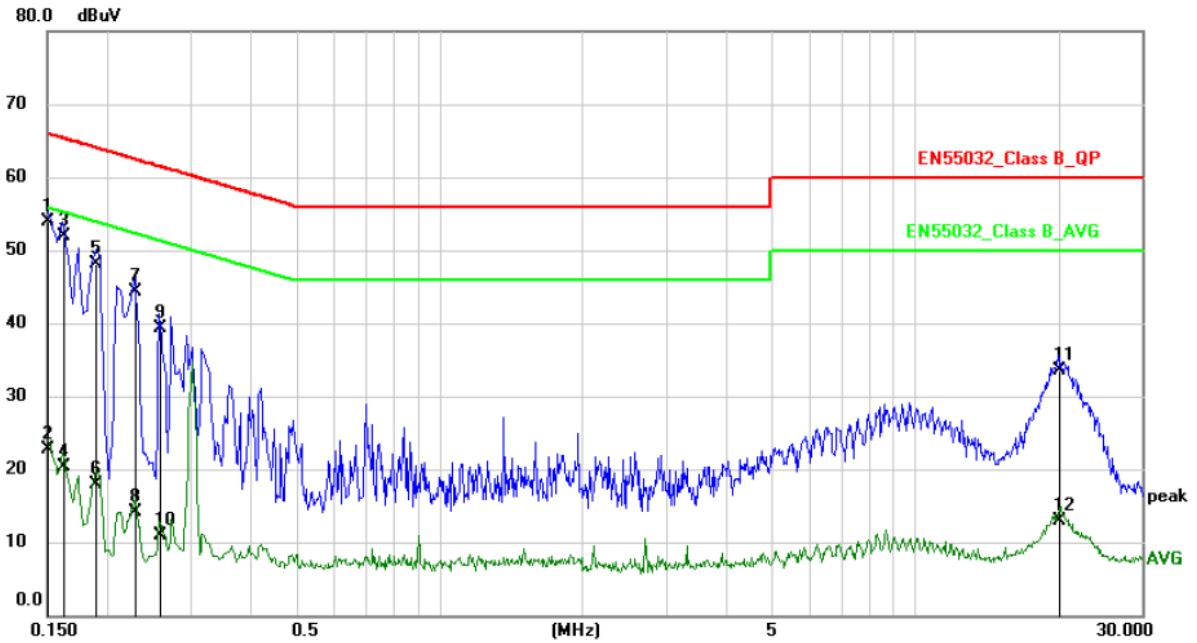
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1 *	0.1660	41.60	10.60	52.20	65.16	-12.96	QP	
2	0.1660	9.80	10.60	20.40	55.16	-34.76	AVG	
3	0.2020	36.10	10.60	46.70	63.53	-16.83	QP	
4	0.2020	3.80	10.60	14.40	53.53	-39.13	AVG	
5	0.2179	34.60	10.60	45.20	62.90	-17.70	QP	
6	0.2179	4.70	10.60	15.30	52.90	-37.60	AVG	
7	0.2660	28.90	10.60	39.50	61.24	-21.74	QP	
8	0.2660	1.70	10.60	12.30	51.24	-38.94	AVG	
9	0.3420	22.79	10.61	33.40	59.15	-25.75	QP	
10	0.3420	-2.21	10.61	8.40	49.15	-40.75	AVG	
11	20.2179	20.03	10.77	30.80	60.00	-29.20	QP	
12	20.2179	-0.17	10.77	10.60	50.00	-39.40	AVG	

M/N: HT-350	Testing Voltage: AC 230V 50Hz
Phase: N	Detector: QP & AVG
Test Mode: 6	

### Conducted Emission Measurement

Date: 2021/8/10

Time: 18:09:29



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1 *	0.1500	43.30	10.60	53.90	66.00	-12.10	QP	
2	0.1500	12.10	10.60	22.70	56.00	-33.30	AVG	
3	0.1620	41.40	10.60	52.00	65.36	-13.36	QP	
4	0.1620	9.70	10.60	20.30	55.36	-35.06	AVG	
5	0.1900	37.60	10.60	48.20	64.04	-15.84	QP	
6	0.1900	7.40	10.60	18.00	54.04	-36.04	AVG	
7	0.2300	33.70	10.60	44.30	62.45	-18.15	QP	
8	0.2300	3.60	10.60	14.20	52.45	-38.25	AVG	
9	0.2580	28.70	10.60	39.30	61.50	-22.20	QP	
10	0.2580	0.40	10.60	11.00	51.50	-40.50	AVG	
11	20.0259	22.83	10.77	33.60	60.00	-26.40	QP	peak
12	20.0259	2.13	10.77	12.90	50.00	-37.10	AVG	AVG

## 12. Conducted Differential Voltage Emissions Measurement

### LIMITS

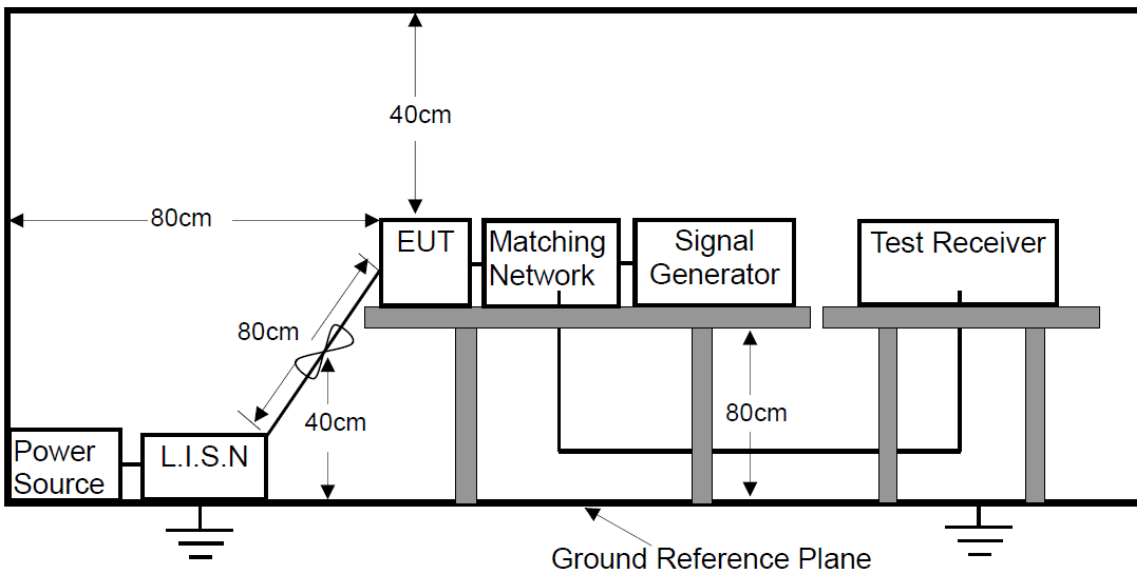
Limits for conducted differential voltage emissions from Class B equipment:

Applicability	Frequency Range (MHz)	Detector Type/ Bandwidth	Class B Limits dB(uV) 75Ω		
			Other*	Local Oscillator Fundamental	Local Oscillator Harmonics
See Note 1	30 to 950	For frequencies ≤1GHz  Quasi Peak/ 120kHz  For frequencies ≥1 GHz  Peak/1 MHz	46	46	46
	950 to 2150		46	54	54
Tuner units (not the LNB) for satellite signal reception.	950 to 2150		46	54	54
Frequency modulation audio receivers and PC tuner cards.	30 to 300		46	54	50
	300 to 1000				52
Frequency modulation car radios.	30 to 300		46	66	59
	300 to 1000	52			
See Note 2	30 to 950	46	76	46	
	950 to 2150			N/A	54

Note

1. Television receivers (analogue or digital), video recorders and PC TV broadcast receiver tuner cards working in channels between 30 MHz and 1 GHz, and digital audio receivers.
2. Applicable to EUTs with RF modulator output ports (for example DVD equipment, video recorders, camcorders and decoders etc.) designed to connect to TV broadcast receiver tuner ports. Limits specified for the LO are for the RF modulator carrier signal and harmonics.
3. The term 'other' refers to all emissions other than the fundamental and the harmonics of the LO.

### BLOCK DIAGRAM OF TEST SETUP



## TEST PROCEDURES

- a. The EUT was placed on a wooden table 0.8m height from the metal ground plan and 0.4m from the conducting wall of the shielding room and it was kept at 0.8m from any other grounded conducting surface.
- b. Configure the EUT and support devices as per section 3.
- c. All I/O cables and support devices were positioned as per EN 55032.
- d. Connect mains power port of the EUT to a line impedance stabilization network (LISN).
- e. Connect wired network port of the EUT and necessary support device to 75~50Ω matching network.
- f. Connect all support devices to the other LISN and AAN, if needed.
- g. Set the output level of the auxiliary signal generator shall be set to give at the antenna input terminal of the receiver the value of 60 dB(μV) for frequency modulation receivers and 70dB(μV) for television receivers, on 75Ω impedance.
- h. Turn on the EUT and all support devices, and make it run stably.
- i. Set the detector and measurement bandwidth of test-receiver system as per EN 55032.
- j. Scan the frequency range from 30MHz to 2150MHz for differential voltage emissions checking.
- k. Repeat the above scans in each specified mode and channel and record the test data.

## TEST RESULTS

Not Applicable

### 13. Radiated Emission Measurement

#### LIMITS

Below 1GHz:

Frequency (MHz)	<input type="checkbox"/> Class A		<input checked="" type="checkbox"/> Class B	
	Quasi-peak dB(uV/m)		Quasi-peak dB(uV/m)	
	At 3m	At 10m	At 3m	At 10m
30 to 230	50	40	40	30
230 to 1000	57	47	47	37

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

Above 1GHz:

Frequency (GHz)	<input type="checkbox"/> Class A at 3m		<input checked="" type="checkbox"/> Class B at 3m	
	Peak dB(uV/m)	Average dB(uV/m)	Peak dB(uV/m)	Average dB(uV/m)
1 ~ 3	76	56	70	50
3 ~ 6	80	60	74	54

For FM Receiver:

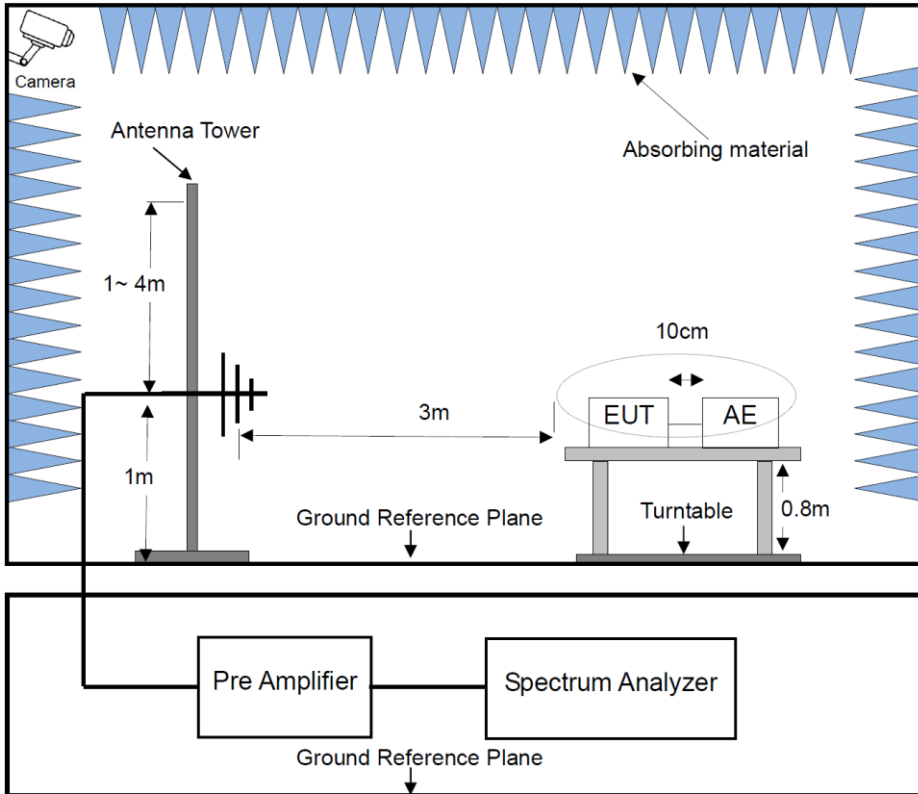
	Quasi-peak dB(uV/m)			
	<input checked="" type="checkbox"/> Class B At 3m		<input type="checkbox"/> Class B At 10m	
	Fundamental	Harmonics	Fundamental	Harmonics
30 to 230	60	52	50	42
230 to 300		52		42
300 to 1000		56		46

Required highest frequency for radiated measurement

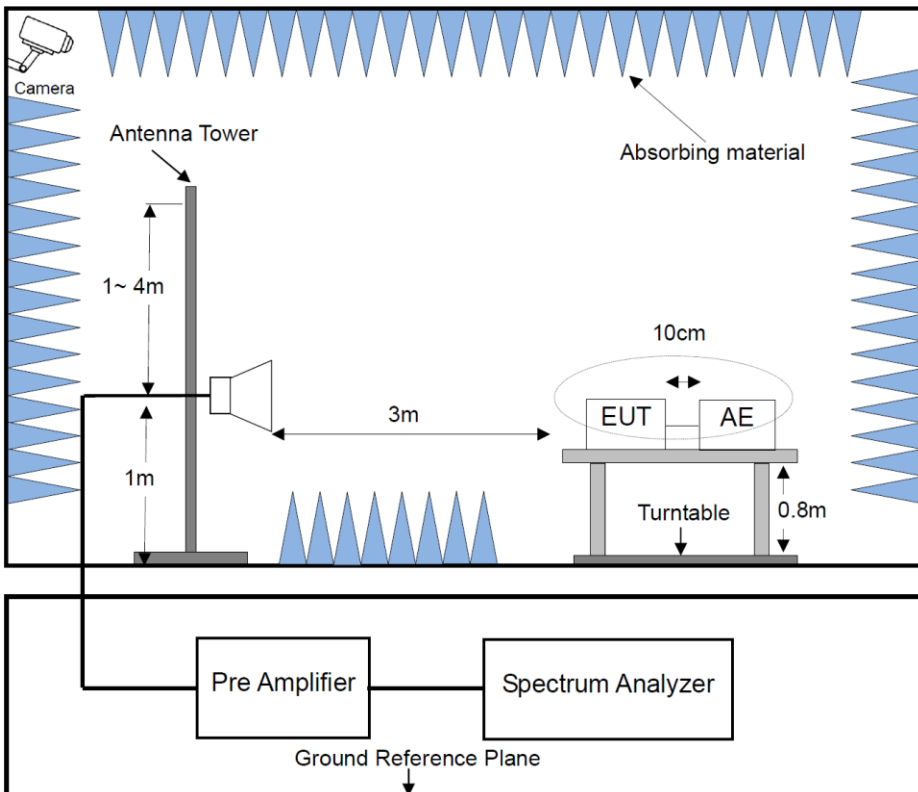
Highest internal frequency* ( $F_x$ )	Highest measured frequency
$F_x \leq 108$ MHz	1 GHz
108 MHz < $F_x \leq 500$ MHz	2 GHz
500 MHz < $F_x \leq 1$ GHz	5 GHz
$F_x > 1$ GHz	5 × $F_x$ up to a maximum of 6 GHz
Note	<ol style="list-style-type: none"> <li>Highest fundamental frequency generated or used within the EUT or highest frequency at which it operates.</li> <li>For FM and TV broadcast receivers, <math>F_x</math> is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.</li> <li>For outdoor units of home satellite receiving systems highest measured frequency shall be 18GHz.</li> <li>Where <math>F_x</math> is unknown, the radiated emission measurements shall be performed up to 6 GHz.</li> </ol>

**BLOCKDIAGRAM OF TEST SETUP**

Below 1GHz:



Above 1GHz





## **TEST PROCEDURES**

- a. The EUT was placed on a rotatable wooden table top 0.8m above ground.
- b. The EUT was set 3m away from the receiving antenna which was mounted on the top of a variable height antenna tower.
- c. Configure the EUT and support devices as per section 3.
- d. All I/O cables and support devices were positioned as per EN 55032.
- e. Connect mains power port of the EUT to the outlet socket under the turntable and connect all other support devices to other outlet socket under the turntable.
- f. Turn on the EUT and all support devices, and make it run stably.
- g. Set the detector and measurement bandwidth of test-receiver system as per EN 55032.
- h. Scan the frequency range from 30MHz to 1000MHz for radiation emissions checking.
- i. Emissions were scanned and measured rotating the EUT from 0 to 360 degrees and positioning the antenna from 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- j. Repeat the above scans in each mode and channel and record the test data.

## **TEST RESULTS**

PASS

Please refer to the following pages of the worst case.

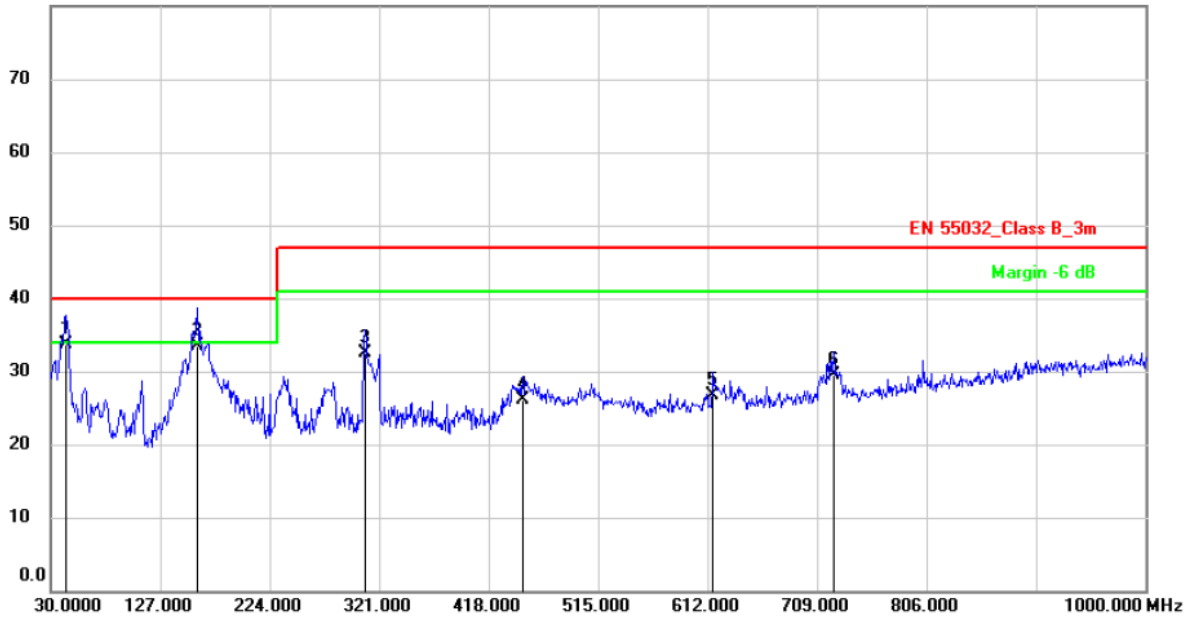
M/N: HT-350	Testing Voltage: AC 230V 50Hz
Polarization: Horizontal	Detector: QP
Test Mode: 4	Distance: 3m

### Radiated Emission Measurement

Date: 2021/8/9

Time: 16:47:52

80.0 dBuV/m



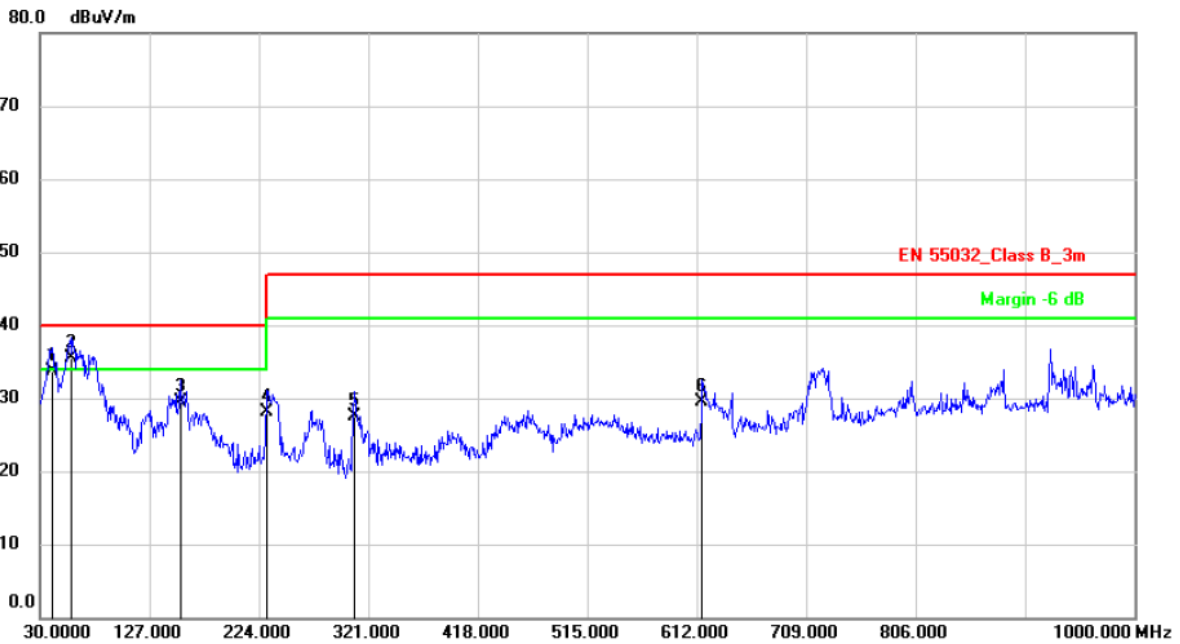
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	*	43.5800	41.36	-7.66	33.70	40.00	-6.30	QP	
2		159.9800	43.94	-10.44	33.50	40.00	-6.50	QP	
3		308.3900	37.79	-5.29	32.50	47.00	-14.50	QP	
4		448.0700	28.77	-2.57	26.20	47.00	-20.80	QP	
5		616.8500	25.81	0.89	26.70	47.00	-20.30	QP	
6		723.5500	26.89	2.61	29.50	47.00	-17.50	QP	

M/N: HT-350	Testing Voltage: AC 230V 50Hz
Polarization: Vertical	Detector: QP
Test Mode: 4	Distance: 3m

### Radiated Emission Measurement

Date: 2021/8/9

Time: 16:40:43



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1		40.6699	41.64	-7.84	33.80	40.00	-6.20	QP	
2	*	57.1600	43.28	-7.68	35.60	40.00	-4.40	QP	
3		154.1600	41.02	-11.52	29.50	40.00	-10.50	QP	
4		230.7900	36.03	-7.93	28.10	47.00	-18.90	QP	
5		308.3900	33.79	-6.29	27.50	47.00	-19.50	QP	
6		616.8500	29.63	-0.03	29.60	47.00	-17.40	QP	

## 14. Harmonic Current Emission Measurement

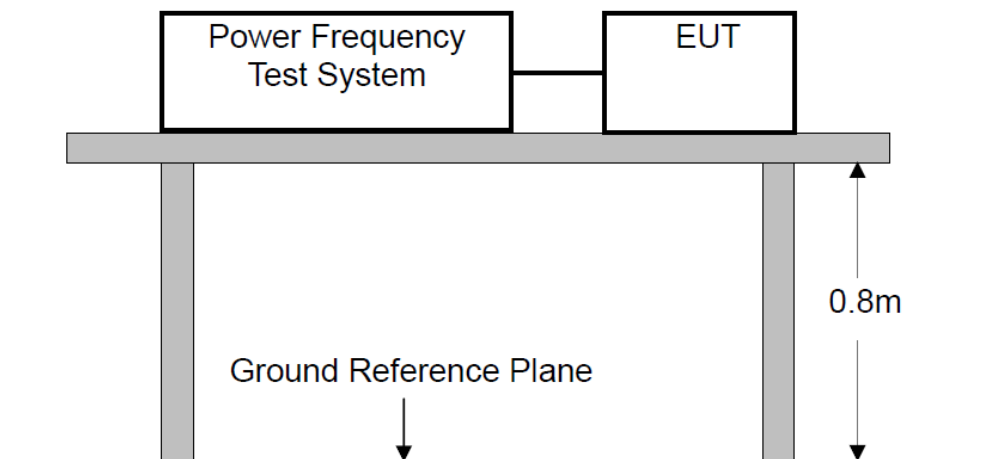
### LIMITS

Limit of Harmonic Current Emission

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

Note: The limits above are not specified for equipment with a rated input power of 75W or less (other than lighting equipment).

### BLOCK DIAGRAM OF TEST SETUP



## TEST PROCEDURES

- a. The EUT was placed on a wooden table 0.8m above ground.
- b. Configure the EUT and support devices as per section 3.
- c. Turn on the EUT and all support devices, and make it run stably.
- d. Set the EUT to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- e. Classify the EUT as follows:
  - Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment ,equipment not specified in one of the three other classes.
  - Class B: Portable tools; Arc welding equipment which is not professional equipment.
  - Class C: Lighting equipment.
  - Class D: Equipment having a specified power less than or equal to 600W of the Personal computers and personal computer monitors and television receivers
- f. Set correspondent test program and measurement time of the test system to measure the current harmonics emanated from EUT, and then record the test data.

## TEST RESULTS

PASS

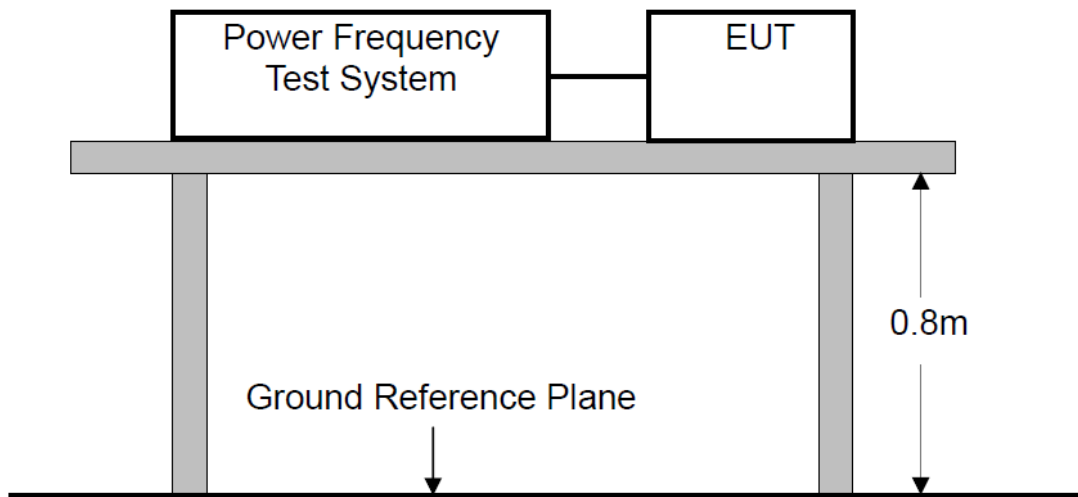
According to clause 7 of EN IEC 61000-3-2, equipment with a rated power of 75W or less, no limits apply. It is considered to meet the requirements of the standard.

## 15. Voltage Fluctuations & Flicker Measurement

### LIMITS

Test Item	Limit	Remarks
$P_{st}$	1.0	$P_{st}$ = Short-term flicker indicator
$P_{lt}$	0.65	$P_{lt}$ = Long-term flicker indicator
$T_{dt}$	500ms	$T_{dt}$ = Maximum accumulated time that dt with a deviation exceeding 3,3 %
$d_{max}(\%)$	4%	$d_{max}$ = Maximum relative voltage change
$d_c(\%)$	3.3%	$d_c$ = Maximum relative steady-state voltage change

### BLOCK DIAGRAM OF TEST SETUP



## **TEST PROCEDURE**

- a. The EUT was placed on a wooden table 0.8m above ground.
- b. Configure the EUT and support devices as per section 3.
- c. Turn on the EUT and all support devices, and make it run stably.
- d. Set the EUT to produce the most unfavorable sequence of voltage changes under normal operating conditions.
- e. Set correspondent test program and measurement time of the test system to measure the most unfavorable sequence of voltage changes from EUT, and then record the test data.

## **TEST RESULTS**

PASS

Please refer to the following page of the worst case.

**Flicker Test Summary per IEC61000-3-3:2013/AMD1:2017 (Run time)**

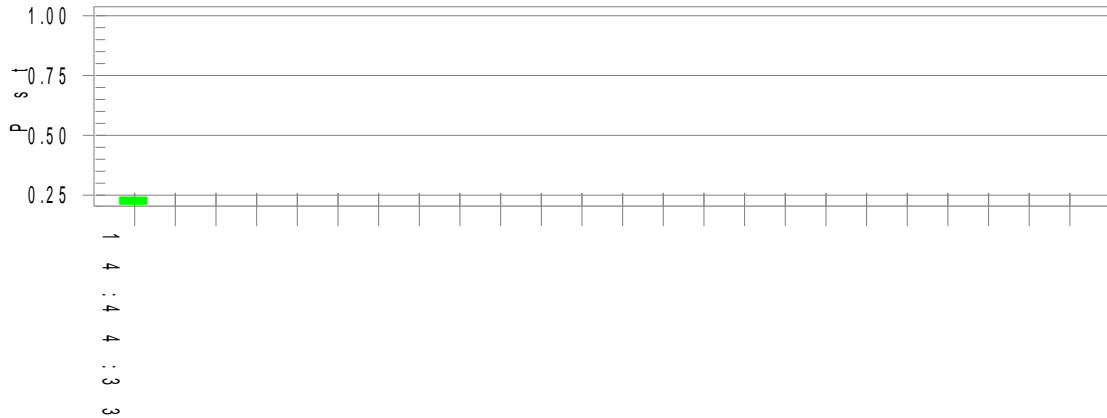
**EUT: TV soundbar**  
**Test category: All parameters (European limits)**  
**Test date: 2021/8/11**  
**Test duration (min): 10**  
**Comment: ON**  
**Customer: HC**  
**M/N: HT-350(Subwoofer unit)**  
**Test Result: Pass**

**Tested by: Loki**  
**Test Margin: 100**  
**Start time: 14:34:12**  
**Data file name: F-000010.cts\_data**  
**End time: 14:44:39**

**Status: Test Completed**

**Pst<sub>i</sub> and limit line**

**European Limits**



**Plt and limit line**



**Parameter values recorded during the test:**

<b>Vrms at the end of test (Volt):</b>	<b>230.54</b>		
<b>Highest dt (%):</b>		<b>Test limit (%):</b>	
<b>T-max (mS):</b>	<b>0</b>	<b>Test limit (mS):</b>	<b>500.0 Pass</b>
<b>Highest dc (%):</b>	<b>0.00</b>	<b>Test limit (%):</b>	<b>3.30 Pass</b>
<b>Highest dmax (%):</b>	<b>0.00</b>	<b>Test limit (%):</b>	<b>4.00 Pass</b>
<b>Highest Pst (10 min. period):</b>	<b>0.242</b>	<b>Test limit:</b>	<b>1.000 Pass</b>
<b>Highest Plt (2 hr. period):</b>	<b>0.106</b>	<b>Test limit:</b>	<b>0.650 Pass</b>



**Flicker Test Summary per IEC61000-3-3:2013/AMD1:2017 (Run time)**

**EUT: TV soundbar**  
**Test category: All parameters (European limits)**  
**Test date: 2021/8/11**  
**Test duration (min): 10**  
**Comment: USB Playing**  
**Customer: HC**  
**M/N: HT-350 (Soundbar unit)**  
**Test Result: Pass**

**Tested by: Loki**  
**Test Margin: 100**  
**Start time: 11:15:21**  
**End time: 11:25:48**  
**Data file name: F-000538.cts\_data**

**Status: Test Completed**

**Pst<sub>i</sub> and limit line**

**European Limits**



**Plt and limit line**



**Parameter values recorded during the test:**

<b>Vrms at the end of test (Volt):</b>	<b>230.57</b>		
<b>Highest dt (%):</b>		<b>Test limit (%):</b>	
<b>T-max (mS):</b>	<b>0</b>	<b>Test limit (mS):</b>	<b>500.0 Pass</b>
<b>Highest dc (%):</b>	<b>0.00</b>	<b>Test limit (%):</b>	<b>3.30 Pass</b>
<b>Highest dmax (%):</b>	<b>0.00</b>	<b>Test limit (%):</b>	<b>4.00 Pass</b>
<b>Highest Pst (10 min. period):</b>	<b>0.263</b>	<b>Test limit:</b>	<b>1.000 Pass</b>
<b>Highest Plt (2 hr. period):</b>	<b>0.115</b>	<b>Test limit:</b>	<b>0.650 Pass</b>

## 16. Performance Criteria for Immunity

The performance criteria are referred to the test standard: **EN 55035**

### Performance Criteria A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

### Performance Criteria B

During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.

After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

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

### Performance Criteria C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.

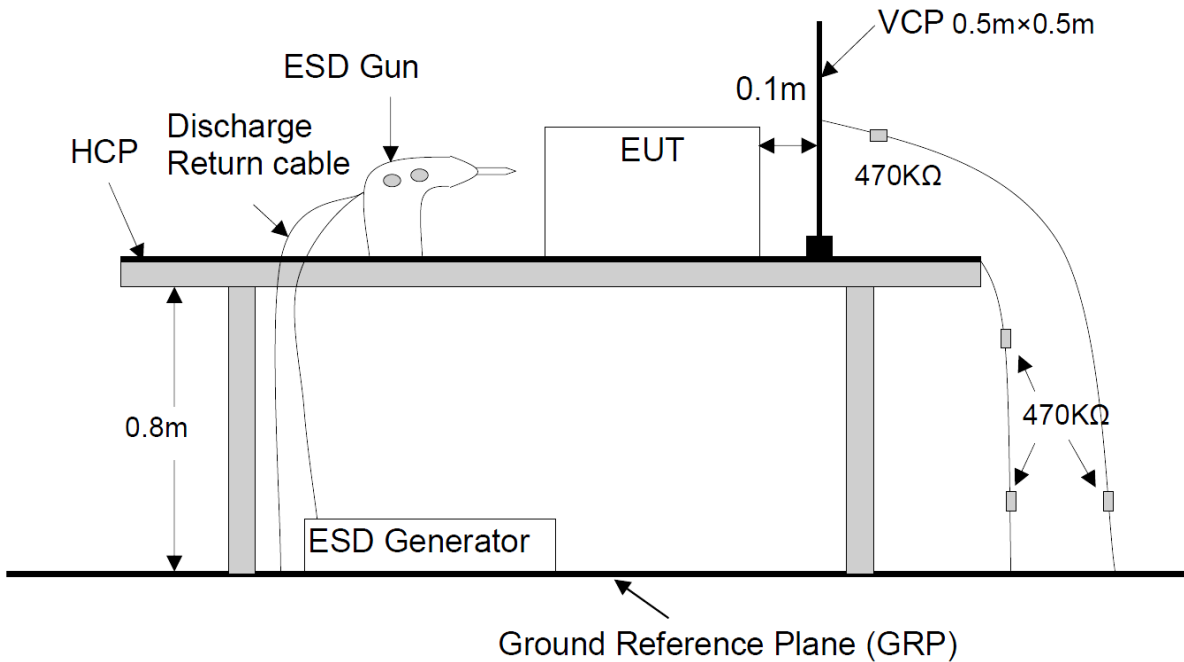
Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

## 17. Electrostatic Discharge Measurement

### TEST LEVEL

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1	±2.0	±2.0
2	±4.0	±4.0
3	±6.0	±8.0
4	±8.0	±15.0
X	Special	Special
Note:	"x" is an open level.	

### BLOCK DIAGRAM OF TEST SETUP



## TEST PROCEDURES

### Air Discharge:

Air discharges at slots and apertures and insulating surfaces. On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

### Contact Discharge:

Contact discharges to the conductive surfaces and coupling planes. The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 20 indirect discharges to the center of the front edge of the Horizontal Coupling Plane (HCP). The remaining three test points shall each receive at least 20 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

- a. The EUT was placed on a wooden table 0.8m height from the ground.
- b. The EUT was located 0.1m minimum from all side of the HCP (dimensions 1.6m x0.8m).
- c. Configure the EUT and support devices as per section 3.
- d. The support units were located 30cm away from the EUT, but direct support unit was/were located at same location as EUT on the HCP and keep at a distance of 10cm with EUT.
- e. Turn on the EUT and all support devices, and make it run stably.
- f. The time interval between two successive single discharges was at least 1 second. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- g. Air discharges were 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 was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.

- h. At least ten single discharges (in the most sensitive polarity) were applied at the front edge of each HCP opposite the center point of each unit of the EUT and 0.1 meters from the front of the EUT. The long axis of the discharge electrode was in the plane of the HCP and perpendicular to its front edge during the discharges.
- i. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane (VCP) in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.
- j. Repeat the above steps in each mode and record the test result.

**MINIMUM REQUIREMENT:**

Description	Level	Performance Criterion
Contact Discharge	±4.0KV	B
Air Discharge	±8.0KV	B

**TEST RESULT**

**PASS**

Please refer to the following pages.

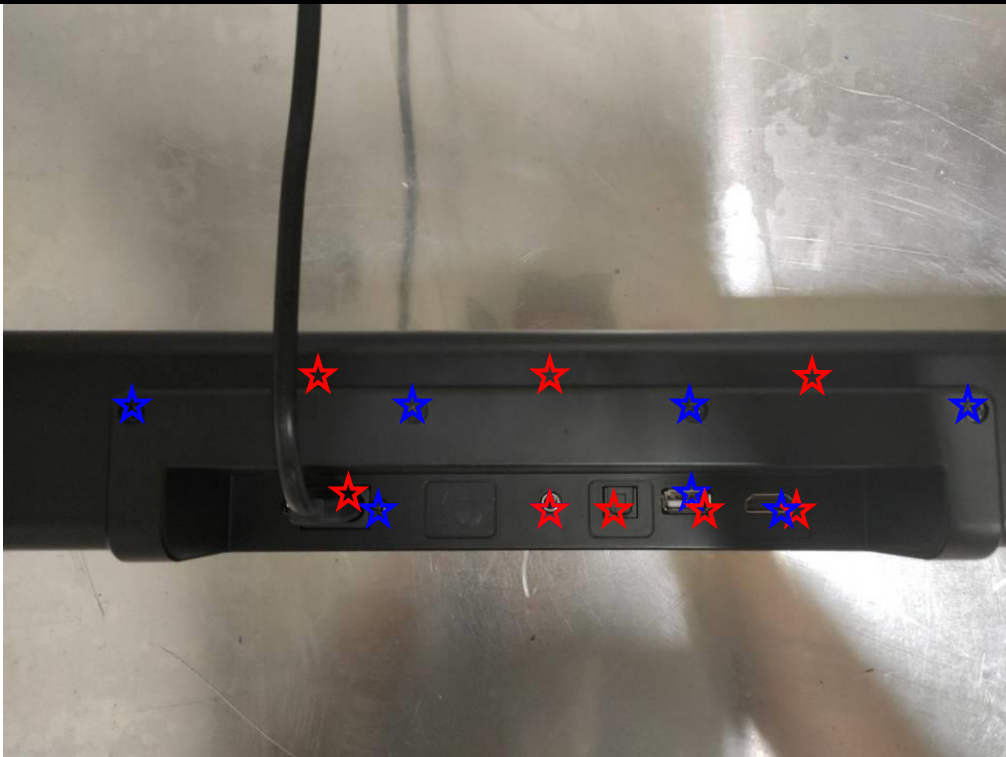
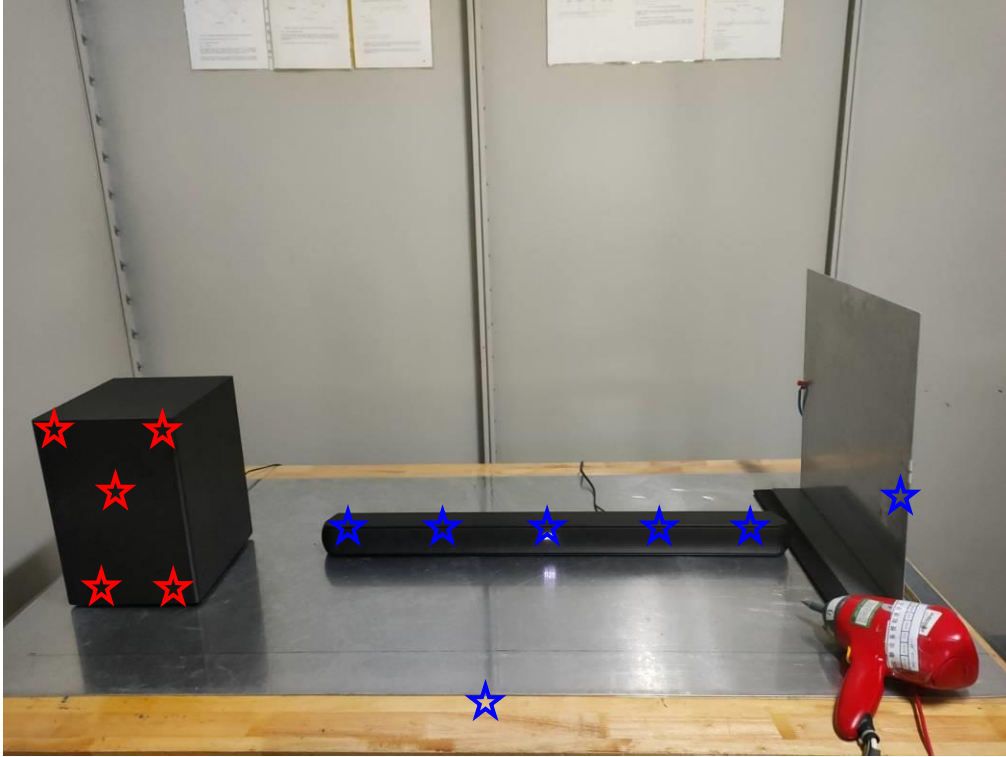
### Electrostatic Discharge Test Results

Ambient Condition:	Temp.: 22°C	R.H.: 52%	Air Pressure : 101 kPa
Test Specifications	Test Level:	±2, 4 KV for Contact Discharge ±2, 4, 8 KV for Air Discharge	
	Discharge Impedance:	330ohm / 150pF	
	NO. Of Discharges:	10 times at each test point for each polarity at least	
	Polarity:	Positive / Negative	
	Discharge Mode:	Single	
	Interval Time Of Discharges:	≥1s	
Required Performance Criterion	B		
Tested Mode	1-6		
	Test Point	Kind A-Air Discharge C-Contact Discharge	Result (Performance Criterion)
	Metal	C	A
	(Line IN, USB, HDMI) Port	C	A
	Optical Port, Button	A	A
	Slot of EUT, AC Port	A	A
	Indirect Discharge (VCP)	C	A
	Indirect Discharge (HCP)	C	A

Note: During the test, the EUT did not show any abnormality.

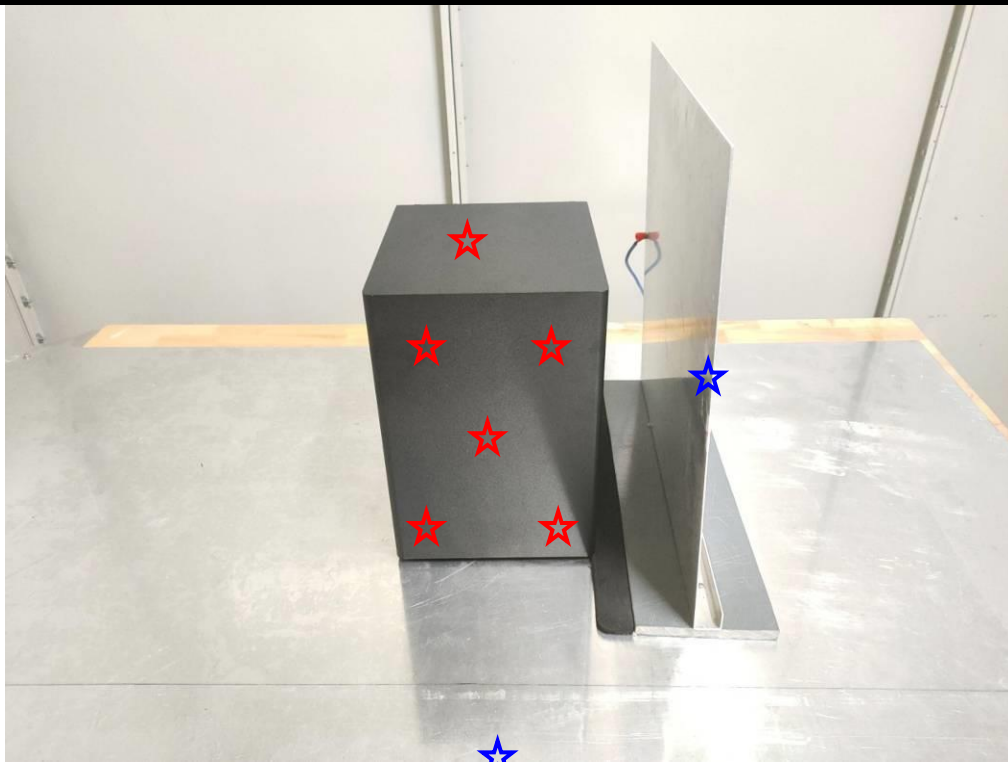
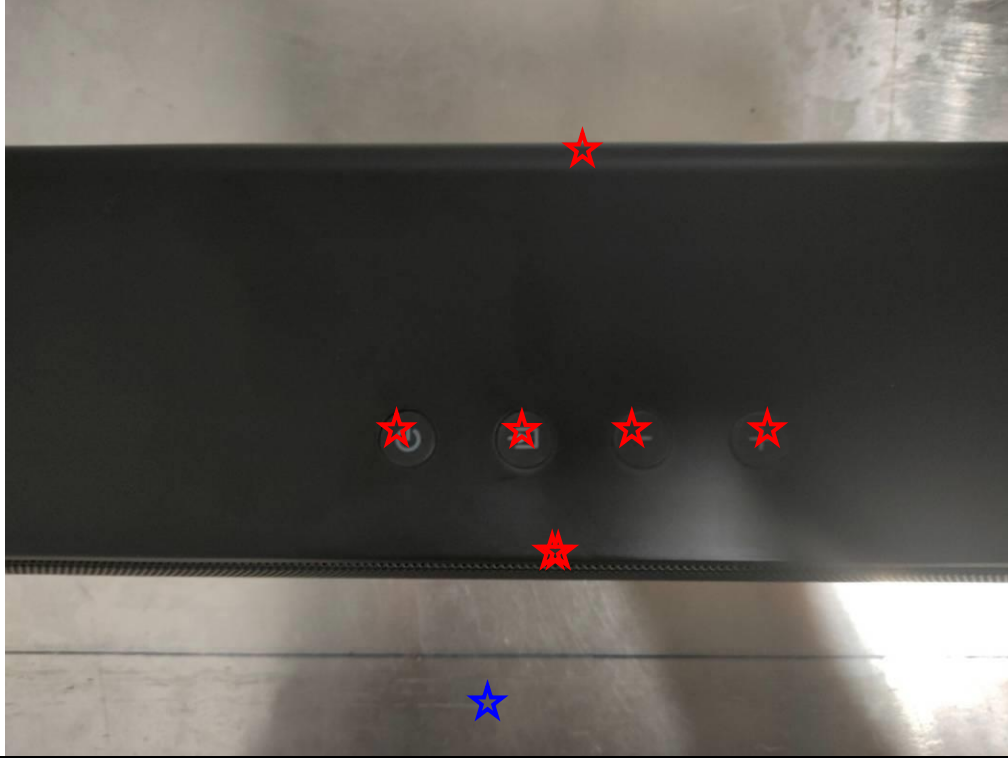
**ESD TEST POINT**

(★ Air Discharge; ☆ Contact Discharge)



**ESD TEST POINT**

(★ Air Discharge; ★ Contact Discharge)





## 18. Continuous RF Electromagnetic Field Disturbances Measurement

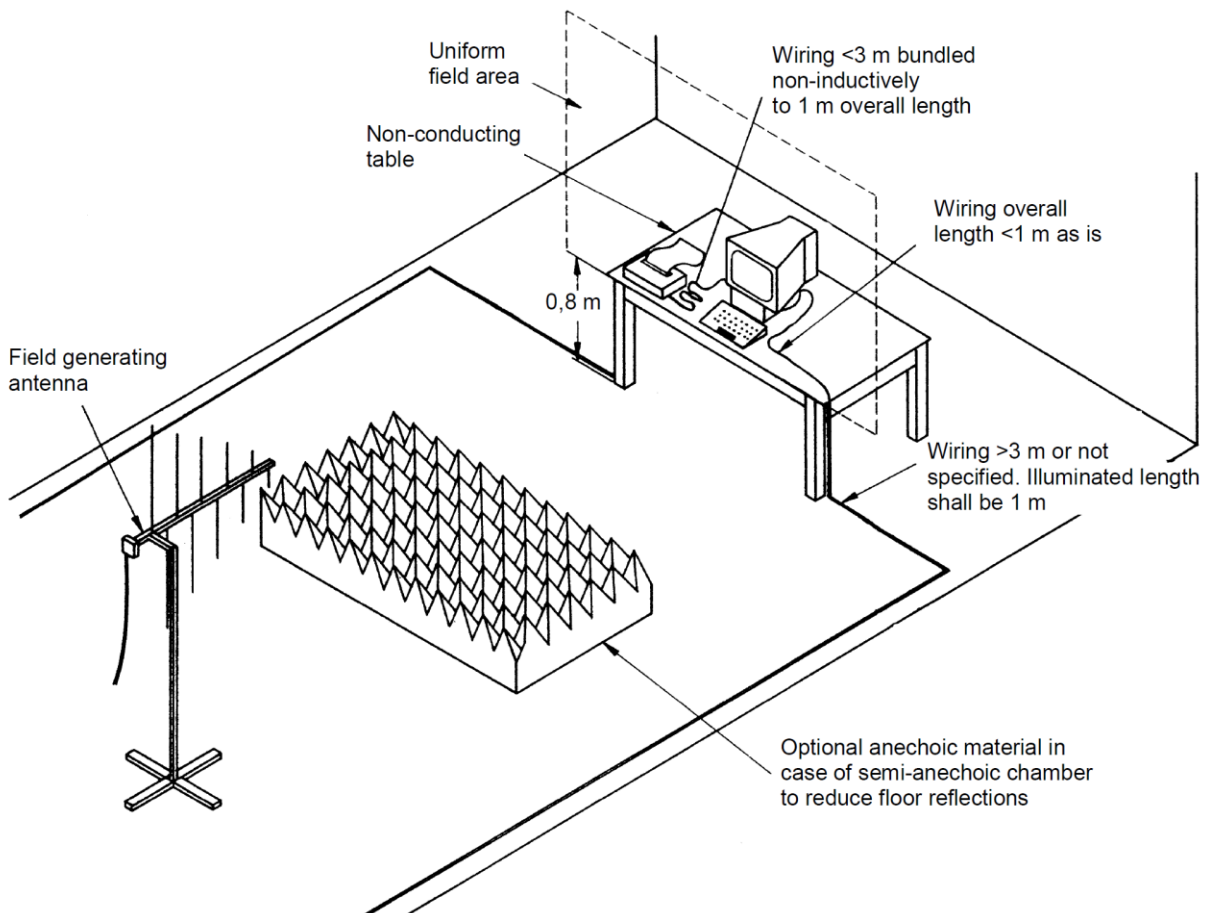
### TEST LEVEL

Level	Field Strength V/m
1	1
2	3
3	10
X*	Special

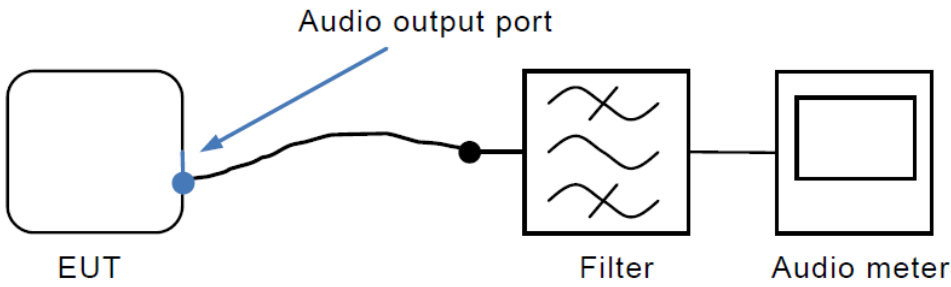
Note: "x" is an open test level and the associated field strength may be any value.

### BLOCK DIAGRAM OF TEST SETUP

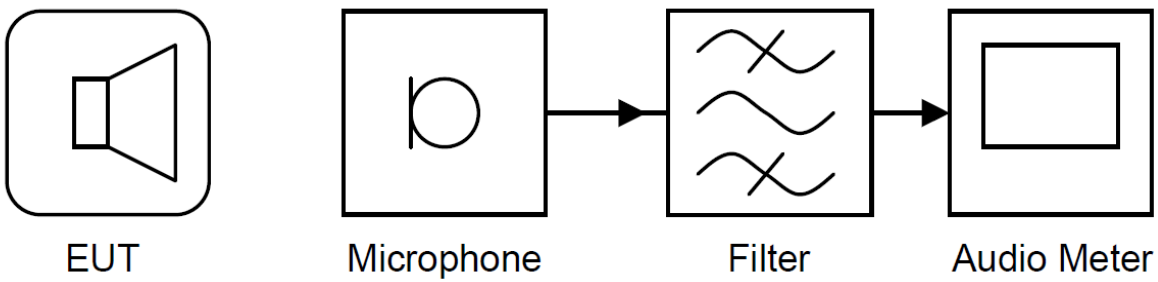
Normal Test:



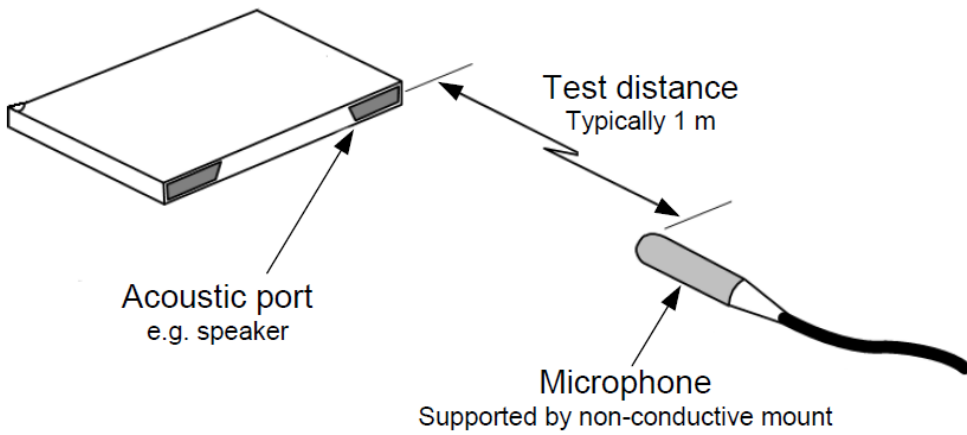
Test setup for electrical measurements (direct connection to EUT):



Test setup for acoustic measurements:



Test setup for acoustic measurements on loudspeakers



## TEST PROCEDURES

- a. The testing was performed in a fully anechoic chamber.
- b. The EUT and necessary support devices were placed on a turn table which is 0.8 meter above ground.
- c. EUT was set 3 meter away from the transmitting antenna which is mounted on an antenna tower.
- d. Configure the EUT and support devices as per section 3.
- e. Turn on the EUT and all support devices, and make it run stably.
- f. Set horizontal and vertical polarization of the antenna to test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually.
- g. All the scanning conditions are as follows:
- h. Repeat the above steps in each mode and record the test result.

## MINIMUM REQUIREMENT

Description	Level	Frequency	Performance Criterion
RF Field Strength Susceptibility	3V/m	80~1000MHz	A
	3V/m	1800MHz	A
	3V/m	2600MHz	A
	3V/m	3500MHz	A
	3V/m	5000MHz	A

## TEST RESULTS

PASS

Please refer to the following pages.

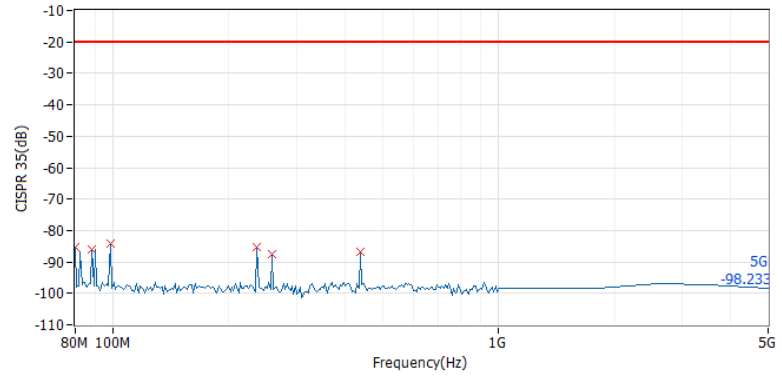
RF Field Strength Susceptibility Test Results				
Ambient Condition	Temp.: 24°C	R.H.: 52%	Air Pressure: 101 kPa	
Test Specifications	Fielded Strength:	3V/m		
	Modulation:	1kHz sine wave, 80%AM		
	Frequency Size:	1% of preceding frequency value		
	Dwell Time:	1s		
	Mode:	Swept test		
Required Performance Criterion	A			
Tested Mode	1-6			
Frequency (MHz)	Level (V/m)	Antenna polarity	Side	Result (Performance Criterion)
80-1000, 1800, 2600, 3500, 5000	3	Horizontal	Front	A
			Left	A
			Right	A
			Back	A
		Vertical	Front	A
			Left	A
			Right	A
			Back	A
Note: During the test, the EUT did not show any abnormality.				

### RF Field Strength Susceptibility Test Results

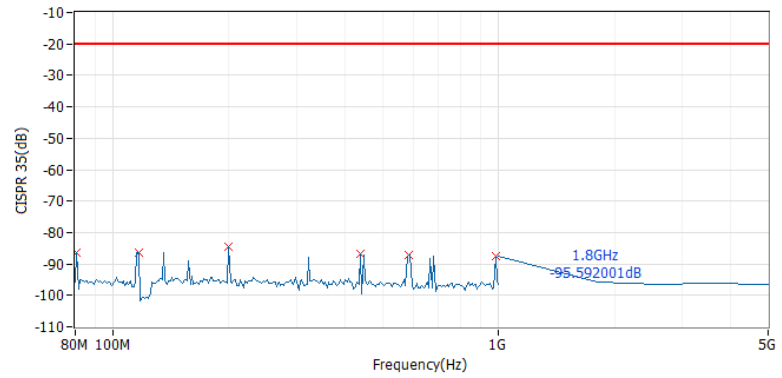
Worst case: USB Playing

Note: The value of the reference level was reduce 20dB as the limit.

Horizontal



Vertical



## 19. Electrical Fast Transient/Burst Measurement

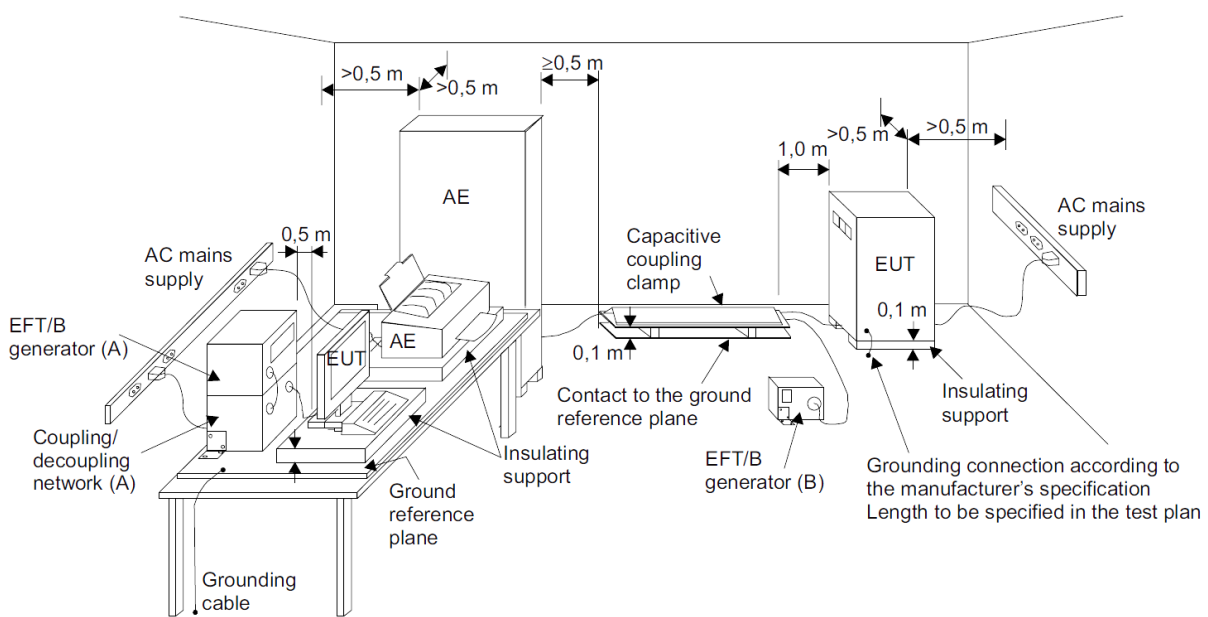
### TEST LEVEL

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, Earth port (PE)		Signal and control ports	
	Voltage peak (KV)	Repetition rate (KHz)	Voltage peak (KV)	Repetition rate (KHz)
1	0.5	5 or 100	0.25	5 or 100
2	1	5 or 100	0.5	5 or 100
3	2	5 or 100	1	5 or 100
4	4	5 or 100	2	5 or 100
X	Special	Special	Special	Special

Note

1. The use of 5 KHz repetition rates is traditional; however, 100 KHz is closer to reality. Product committees should determine which frequencies are relevant for specific products or product types.
2. With some products, there may be no clear distinction, between power ports and I/O ports, in which case it is up to product committees to make this determination for test purposes.
3. "X" is an open level. The level has to be specified in the dedicated equipment specification.

### BLOCK DIAGRAM OF TEST SETUP



**TEST PROCEDURES**

- a. The EUT was placed on the insulating support 0.8m above the reference ground plane.
- b. Configure the EUT and support devices as per section 3.
- c. Turn on the EUT and all support devices, and make it run stably.
- d. For input and output AC power port of the EUT, the EUT was connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. The coaxial output of the EFT generator to the terminals on the EUT should not exceed 0.5 meter. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.
- e. For signal ports of the EUT, the EUT was connected to the power mains, and the signal line through a coupling device which couples the EUT interference signal to signal line. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.
- f. Repeat the above steps in each mode and record the test result.

**MINIMUM REQUIREMENT**

Description	AC Mains power ports	Analogue/digital data ports
Test Level	1.0KV	0.5KV
Repetition frequency	5kHz	5kHz
Impulse Wave-shape	5/50ns (Tr/Th)	5/50ns (Tr/Th)
Performance Criterion	B	B

**TEST RESULTS**

PASS

Please refer to the following page.

Electrical Fast Transient/Burst Test Results			
Ambient Condition	Temp.: 22°C	R.H.: 52%	Air Pressure: 101 kPa
Test Specifications	Test Level:	1.0 kV for power port 0.5 kV for signal port	
	Repetition Frequency:	5kHz;	
	Duration:	15ms	
	Period:	300ms	
	Impulse Wave Shape:	5/50ns (Tr/Th)	
	Test Duration:	≥1min	
Required Performance Criterion	B		
Tested Mode	1-6		
Coupling Mode And Port	<input checked="" type="checkbox"/> AC Mains <input checked="" type="checkbox"/> Direct Coupling <input type="checkbox"/> Signal line <input type="checkbox"/> Capacitive <input type="checkbox"/> DC line		
Test Line	Test Voltage	Result (Performance Criterion)	
L	±1KV	B	
N	±1KV	B	
PE	---	---	
L ∖ N	±1KV	B	
L ∖ PE	---	---	
N ∖ PE	---	---	
L ∖ N ∖ PE	---	---	
Signal port (RJ- 45)	---	---	
Signal port (Tuner)	---	---	
Note : The noise phenomenon occurred during the test, but the EUT can be resumed to normal operation after the test.			



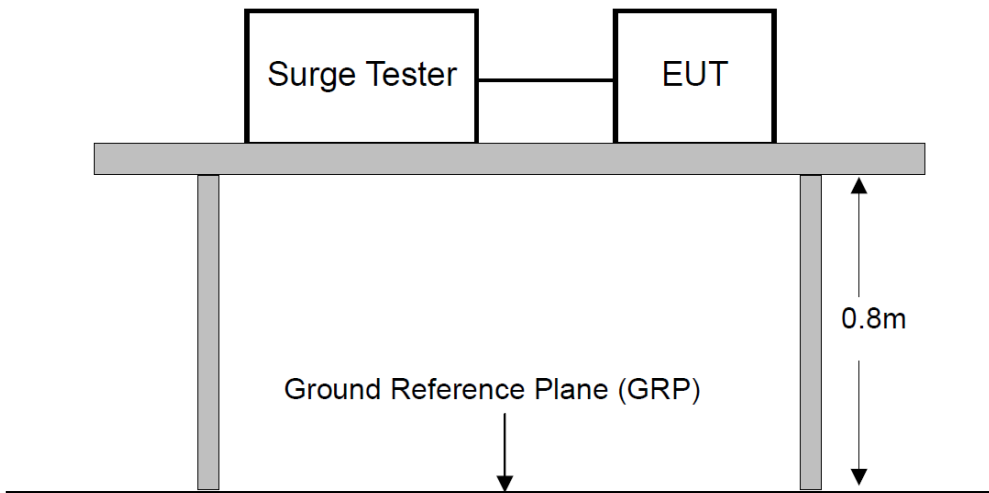
## 20. Surge Measurement

### TEST LEVEL

Level	Open-Circuit Test Voltage (kV)	
	Line to Line	Line to Earth
1	-	0.5
2	0.5	1
3	1	2
4	2	4
X	Special	Special

Note: "X" can be any level, above, below or in between the others. The level shall be specified in the dedicated equipment specification.

### BLOCK DIAGRAM OF TEST SETUP



## TEST PROCEDURES

- a. The EUT was placed on the wooden table 0.8m above the ground.
- b. Configure the EUT and support devices as per section 3.
- c. Turn on the EUT and all support devices, and make it run stably.
- d. The surge is applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.
- e. For test applied to unshielded un-symmetrically operated interconnection lines of EUT, the surge was applied to the lines via the capacitive coupling. The coupling / decoupling networks didn't influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.
- f. For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT, the surge was applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor were not specified. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.
- g. Five positive and five negative (polarity) pulses at specified phase angles with a 1min repetition rate are conducted during test.
- h. Repeat the above steps in each mode and record the test result.

**MINIMUM REQUIREMENT**

Description	AC Mains power ports		Analogue/digital data ports	
	Line to Line	Line to Earth	Unshielded Symmetrical	Coaxial or Shielded
Test Level	1.0kV	2.0kV	1.0 and 4.0Kv*	0.5kV
Wave-Shape	1.2/50(8/20)us	1.2/50(8/20)us	10/700 (5/320)us	1.2/50(8/20)us
Performance Criterion	B	B	C	B

Note: \*: Surges are applied with primary protection fitted. Where possible, use the actual primary protector intended to be used in the installation. Where the surge coupling network for the 10/700 (5/320)µs waveform affects the functioning of high speed data ports, the test shall be carried out using a 1,2/50 (8/20)us waveform and appropriate coupling network.

**TEST RESULTS**

PASS

Please refer to the following page.

### Surge Immunity Test Results

Ambient Condition	Temp.: 22°C	R.H.: 52%	Air Pressure: 101 kPa
Test Specifications	Wave-Shape:	1.2/50 us (Tr/Th) / 8/20 us (Tr/Th) for input power port 10/700 us (Tr/Th) / 5/320 us (Tr/Th) for Signal port	
	Test Level:	±0.5, 1.0kV for Line to Line ±1.0, 2.0kV for Line to Earth	
	Phase Angle:	90° and 270°	
	Polarity	Positive / Negative	
	NO. Of Pulse :	5 positive / 5 negative	
	Pulse Repetition Rate :	1 time per minute / maximum	
	Generator Source Impedance :	2 ohm / power supply network 12 ohm / power supply network to ground 42 ohm / other lines to ground /	
Required Performance Criterion	B		
Tested Mode	1-6		
Test Line	Phase Angle	Test Voltage	Result (Performance Criterion)
L-N	90°	+0.5KV, +1KV	A
	270°	-0.5KV, -1KV	
L-PE	---	---	---
	---	---	
N-PE	---	---	---
	---	---	
Signal port	---	---	---
DC line	---	---	---

Note : During the test, the EUT did not show any abnormality.

## 21. Continuous Induced RF Disturbances Measurement

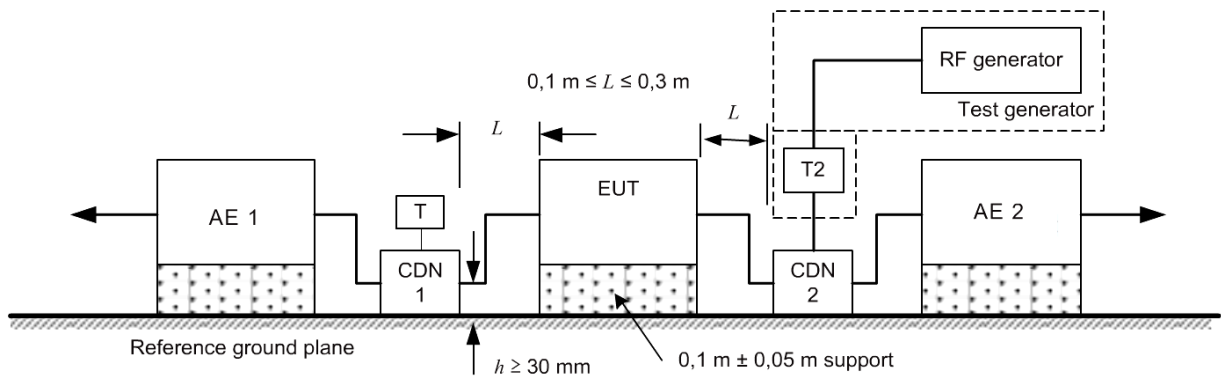
### TEST LEVEL

Level	Field Strength V
1	1
2	3
3	10
X	Special

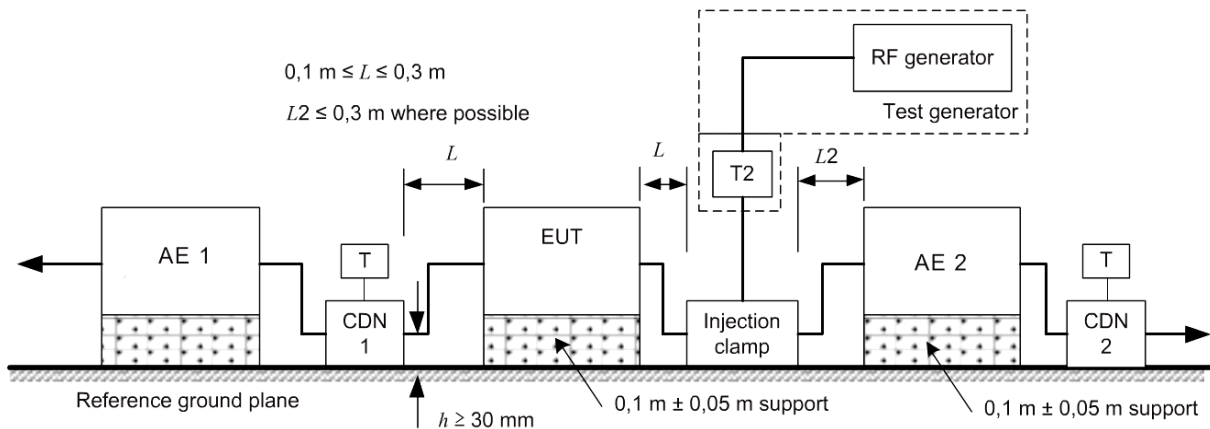
Note\*: Where the amplitude of a test level varies over a given frequency range, it changes linearly with respect to the logarithm of the frequency.

### BLOCK DIAGRAM OF TEST SETUP

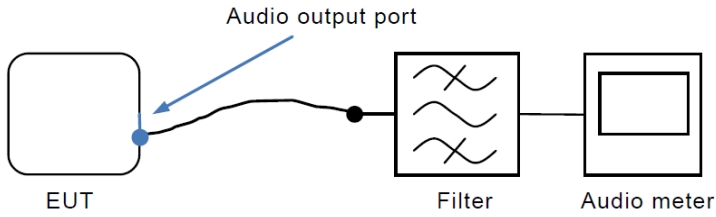
#### CDN Test:



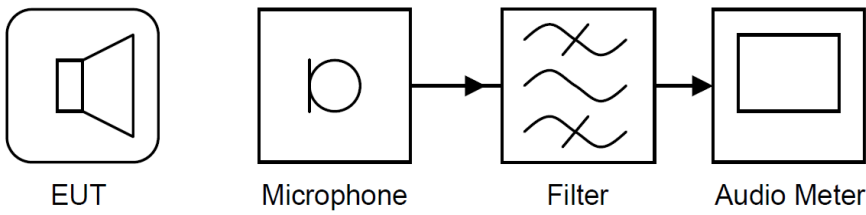
#### Clamp Test:



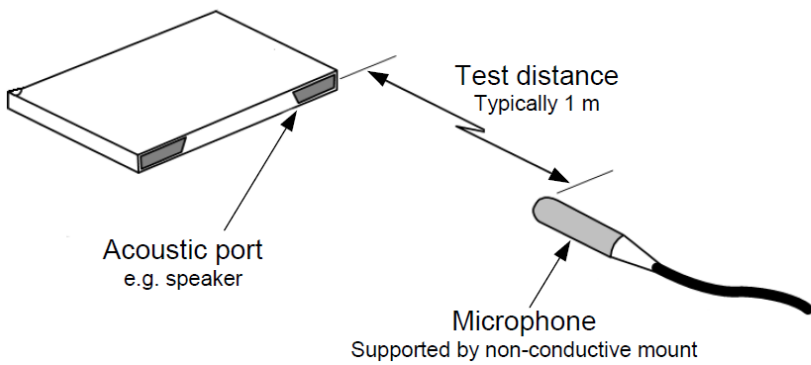
Test setup for electrical measurements (direct connection to EUT):



Test setup for acoustic measurements:



Test setup for acoustic measurements on loudspeakers



**TEST PROCEDURES**

- a. The EUT was placed on the insulating support 0.1m above the ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- b. Configure the EUT and support devices as per section 3.
- c. Turn on the EUT and all support devices, and make it run stably.
- d. The disturbance signal described below is injected to EUT through CDN.
- e. The frequency range is swept from 150 KHz to 80 MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave. The rate of sweep shall not exceed  $1.5 \times 10^{-3}$  decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- f. Repeat the above steps in each mode and record the test result.

**MINIMUM REQUIREMENT**

AC Mains power ports			Analogue/digital data ports		
Frequency ranges (MHz)	Test Level V(r.m.s)	Performance Criterion	Frequency ranges (MHz)	Test Level V(r.m.s)	Performance Criterion
0.15 to10	3	A	0.15 to10	3	A
10 to 30	3 to 1	A	10 to 30	3 to 1	A
30 to 80	1	A	30 to 80	1	A

**TEST RESULTS**

PASS

Please refer to the following pages.

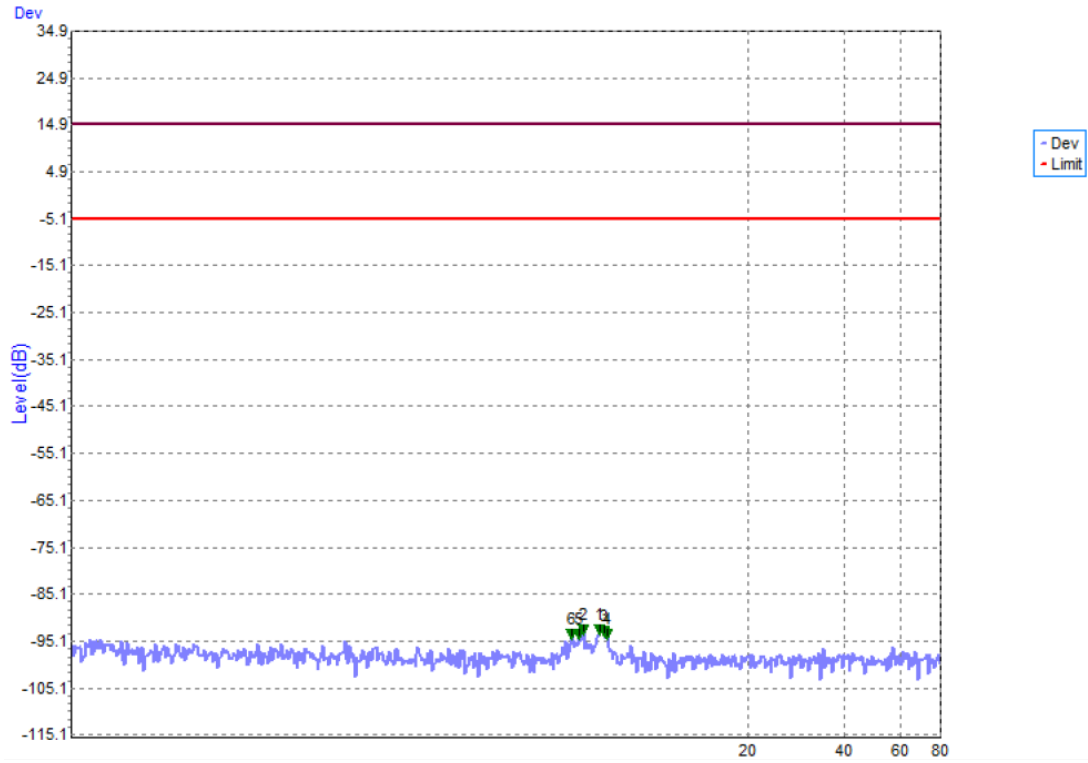
Injected Currents Susceptibility Test Results			
Ambient Condition	Temp.: 24°C	R.H.:52%	Air Pressure:101 kPa
Test Specifications	Test Level:	3V (r.m.s), 3 to 1V (r.m.s), 1V (r.m.s)	
	Modulation:	1kHz sine wave, 80%AM	
	Step Size:	1% of preceding frequency value	
	Dwell Time:	1s	
	Mode:	Swept test	
Required Performance Criterion	A		
Tested Mode	1-6		
Test Port	Frequency (MHz)	Level(V)	Result (Performance Criterion)
AC Mains	0.15~10	3	A
	10~30	3 to 1	A
	30-80	1	A
Signal Port (RJ-45)	---	---	---
	---	---	---
	---	---	---
Note : During the test, the EUT did not show any abnormality.			



### Injected Currents Susceptibility Test Results

Worst case mode: USB Playing

Note: The value of the reference level was reduce 20dB as the limit.



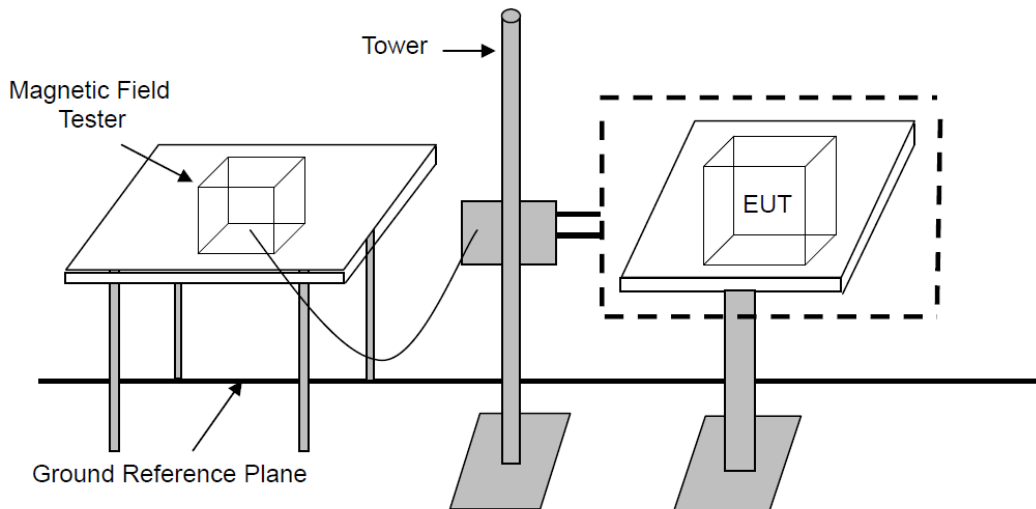
## 22. Power Frequency Magnetic Field Measurement

### TEST LEVEL

Level	Magnetic field strength A/m
1	1
2	3
3	10
4	30
5	100
X*	Special

Note\*: "x" can be any level, above, below or in-between the other levels. This level can be given in the product specification.

### BLOCK DIAGRAM OF TEST SETUP



**TEST PROCEDURES**

- a. The EUT was placed on the middle of an induction coil(1\*1m), under which is a 0.8m-thick insulating support.
- b. Configure the EUT and support devices as per section 3.
- c. All cables of the EUT were exposed to the magnetic field for 1m of their length.
- d. X, Y and Z polarization of the induction coil are set on test, so that each side of the E.U.T. is affected by the magnetic field. If not possible as the EUT size, change the position of the EUT is permitted.
- e. Repeat the above steps in each mode and record the test result.

**MINIMUM REQUIREMENT**

Fielded Strength	1A/m
Frequency	50Hz or 60Hz
Performance Criterion	A

**TEST RESULTS**

Not Applicable.

### 23. Voltage Dips and Interruptions Measurement

#### TEST LEVEL

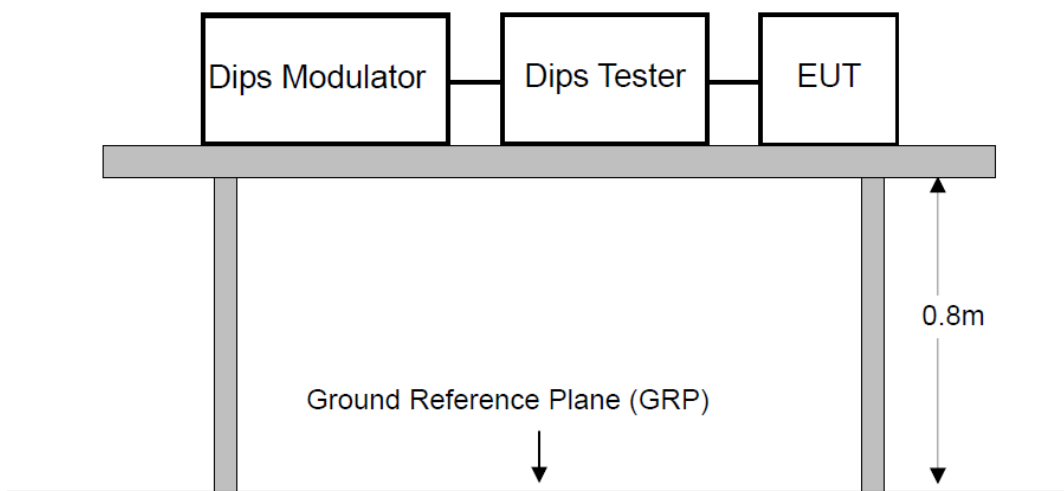
Class	Test level and durations for voltage dips ( $t_s$ )(50Hz/60Hz)				
Class 1	Case-by-case according to the equipment requirements				
Class 2	0 % during ½ cycle	0 % during 1 cycle	70 % during 25/30 <sup>b</sup> cycles		
Class 3	0 % during ½ cycle	0 % during 1 cycle	40 % during 10/12 <sup>b</sup> cycles	70 % during 25/30 <sup>b</sup> cycles	80 % during 250/300 <sup>c</sup> cycles
Class X <sup>a</sup>	X	X	X	X	X

Note: a. To be defined by product committee. For equipment connected directly or indirectly to the public network, the levels must not be less severe than Class 2.  
 b. "25/30 cycles" means "25 cycles for 50 Hz test" and "30 cycles for 60 Hz test".

Class	Test level and durations for short interruptions ( $t_s$ ) (50 Hz/60 Hz)				
Class 1	Case-by-case according to the equipment requirements				
Class 2	0 % during 250/300 <sup>b</sup> cycles				
Class 3	0 % during 250/300 <sup>b</sup> cycles				
Class X <sup>a</sup>	X	X	X	X	X

Note: a. To be defined by product committee. For equipment connected directly or indirectly to the public network, the levels must not be less severe than Class 2.  
 b. "250/300 cycles" means "250 cycles for 50 Hz test" and "300 cycles for 60 Hz test".

#### BLOCK DIAGRAM OF TEST SETUP



## TEST PROCEDURES

- a. The EUT was placed on the wooded table 0.8m above the ground.
- b. Configure the EUT and support devices as per section 3.
- c. Setting the parameter of tests and then perform the test software of test simulator.
- d. Conditions changes to occur at 0 and 180 degree crossover point of the voltage waveform.
- e. Repeat the above steps in each mode and record the test result.

## MINIMUM REQUIREMENT

Description	Level	Cycle	Performance Criterion
Voltage Dips	Residual voltage <5%	0.5	B
Voltage Dips	Residual voltage 70%	25 for 50Hz	B
Voltage Dips	Residual voltage 70%	30 for 60Hz	B
Voltage Interruptions	Residual voltage <5%	250 for 50Hz	C
Voltage Interruptions	Residual voltage <5%	300 for 60Hz	C

## TEST RESULTS

PASS

Please refer to the following page.

### Voltage Dips and Interruptions Test Results

Ambient Condition:	Temp.: 22°C	R.H.: 52%	Air Pressure: 101 kPa
Test Specifications:	Residual Voltage:	0%, 70%	
	Duration (periods):	<input checked="" type="checkbox"/> 0.5	
		<input checked="" type="checkbox"/> 25 for 50Hz	<input checked="" type="checkbox"/> 30 for 60Hz
		<input checked="" type="checkbox"/> 250 for 50Hz	<input checked="" type="checkbox"/> 300 for 60Hz
	Phase Angle:	0°	
	Interval Between Tests:	10s	
NO. Of Tests:	3 times		
Required Performance Criterion	B for voltage dips C for voltage interruptions		
Tested Mode	1-6		
Test Level (Residual voltage) %	Duration (periods)		Result (Performance Criterion)
	50Hz	60Hz	
0	0.5P	0.5P	A
70	25P	30P	A
0	250P	300P	C

Note : Criterion A: During the test, the EUT did not show any abnormality.  
 Criterion C: The EUT powered off during the test, but it can be recovered by user after test.

## 24. Measuring Devices and Test Equipment

For Conducted Emission Measurement (AC Mains)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 13, 2021	1 Year
2.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 13, 2021	1 Year
3.	L.I.S.N	Rohde & Schwarz	ESH2-Z5	893606/014	Mar. 13, 2021	1 Year
4.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar. 13, 2021	1 Year
5.	Test Software	EZ	EZ_EMCC	N/A	N/A	N/A

For Conducted Emission Measurement (Asymmetric Mode, Wired Network Port)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 13, 2021	1 Year
2.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 13, 2021	1 Year
3.	AAN	Schwarzbeck	NTFM 8158	CAT5-8158-0006	Mar. 13, 2021	1 Year
4.	AAN	Schwarzbeck	NTFM 8158	CAT6-8158-0009	Mar. 13, 2021	1 Year
5.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar. 13, 2021	1 Year
6.	Test Software	EZ	EZ_EMCC	N/A	N/A	N/A

For Conducted Emission Measurement (Asymmetric Mode, Antenna Port)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 13, 2021	1 Year
2.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 13, 2021	1 Year
3.	Current probe	Schwarzbeck	SW9605	9605-221	Mar. 13, 2021	1 Year
4.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar. 13, 2021	1 Year
5.	Test Software	EZ	EZ_EMCC	N/A	N/A	N/A

For Conducted Differential Voltage Emissions Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 13, 2021	1 Year
2.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 13, 2021	1 Year
3.	Matching and Combining network	Inrnet	6007	N/A	Mar. 13, 2021	1 Year
4.	Test Software	EZ	EZ_EMCC	N/A	N/A	N/A

 For Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 13, 2021	1 Year
2.	Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Mar. 13, 2021	1 Year
3.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 23, 2021	1 Year
4.	Loop Antenna	Schwarzbeck	FMZB 1513	1513-272	Mar. 23, 2021	1 Year
5.	Horn Antenna	COM-Power	AH-118	071078	Mar. 23, 2021	1 Year
6.	Pre-Amplifier	HP	HP 8447D	1145A00203	Mar. 13, 2021	1 Year
7.	Pre-Amplifier	HP	HP 8449B	3008A00964	Mar. 13, 2021	1 Year
8.	Chamber	SAEMC	9*7*7m	N/A	Apr. 21, 2021	2 Year
9.	Test Software	EZ	EZ_EMCC	N/A	N/A	N/A

 For Harmonic / Flicker Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Frequency Analyzer	California Instruments	PACS-1	72846	Mar. 13, 2021	1 Year
2.	5KVA AC Power Source	California Instruments	5001iX	60137	Mar. 13, 2021	1 Year
3.	Software	California Instruments	CTS 4.2.5	N/A	N/A	N/A



For Electrostatic Discharge Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	TESEQ	NSG 437	432	Mar. 23, 2021	1 Year

For RF Electromagnetic Field Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	Agilent	N5181A	MY4707016 0	Mar. 13, 2021	1 Year
2.	RF Switch	SKET	N/A	N/A	N/A	N/A
3.	Power Amplifier	SKET	HAP801000M _250W	201804008	N/A	N/A
4.	Power Amplifier	SKET	HAP0103G_7 5W	201804009	N/A	N/A
5.	Power Amplifier	SKET	HAP0306G_5 0W	201804010	N/A	N/A
6.	Power Meter	Agilent	E4419B	GB40201469	Mar. 13, 2021	1 Year
7.	Power Sensor	Agilent	E9304A	MY4149891 9	Mar. 13, 2021	1 Year
8.	Power Sensor	Agilent	E9300A	US39211259	Mar. 13, 2021	1 Year
9.	E-Field Probe	Narda	EP-601	N/A	Mar. 23, 2021	1 Year
10.	Antenna	Schwarzbeck	STLP 9129	9129071	N/A	N/A
11.	Audio Analyzer	Rohde & Schwarz	UPV	100894	Mar. 13, 2021	1 Year
12.	Chamber	Chengyu	7*5*3.5m	N/A	Apr. 25, 2021	3 Year
13.	Test Software	SKET	SKET_RS	N/A	N/A	N/A

For Electrical Fast Transient /Burst Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Burst Tester	EM TEST	UCS 500N7	V110410868 3	Mar. 13, 2021	1 Year
2.	Coupling Clamp	EM TEST	HFK	0311-94	Mar. 13, 2021	1 Year
3.	Test Soft	EM TEST	lec. control	N/A	N/A	N/A

For Surge Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Tester	EM TEST	UCS 500N7	V1104108683	Mar. 13, 2021	1 Year
2.	Test Soft	EM TEST	lec. control	N/A	N/A	N/A

 For Injected Currents Immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal generator	IFR	2023A	2023051280	Mar. 13, 2021	1 Year
2.	Power Amplifier	SCHAFFNER	CBA9425	1022	Mar. 13, 2021	1 Year
3.	6dB 50Watt Attenuator	SCHAFFNER	ATN6025	N/A	Mar. 13, 2021	1 Year
4.	CDN	Lioncel	CDN-M3-16	0170703	Mar. 13, 2021	1 Year
5.	CDN	Lioncel	CDN-M2-16	0170708	Mar. 13, 2021	1 Year
6.	CDN	CDSI	ADN-M5/AF5	8105001	Mar. 13, 2021	1 Year
7.	EM Clamp	CDSI	EMCL-22	8192007	Mar. 13, 2021	1 Year
8.	Directional Coupler	SCHAFFNER	255	19184	Mar. 13, 2021	1 Year
9.	Audio Analyzer	Rohde & Schwarz	UPV	100894	Mar. 13, 2021	1 Year
10.	Test Software	EZ	EZ_CS	N/A	N/A	N/A

 For Power Frequency magnetic field immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	EVERFINE	EMS61000-8K_V200	N/A	Mar. 13, 2021	1 Year
2.	Adjustable Magnetic field Coil	EVERFINE	MFC-4	N/A	Mar. 13, 2021	1 Year
3.	Test Software	EVERFINE	MS	N/A	N/A	N/A

 For Voltage Dips and Interruptions Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Dips Tester	EM TEST	UCS500N	V1104108683	Mar. 13, 2021	1 Year
2.	Dips Modulator	EM TEST	V4780S2	0111-11	Mar. 13, 2021	1 Year
3.	Test Soft	EM TEST	lec.control	N/A	N/A	N/A

## 25. Photographs of Test Configuration

Photo of Conducted Emission Measurement



Photo of Radiated Emission Measurement

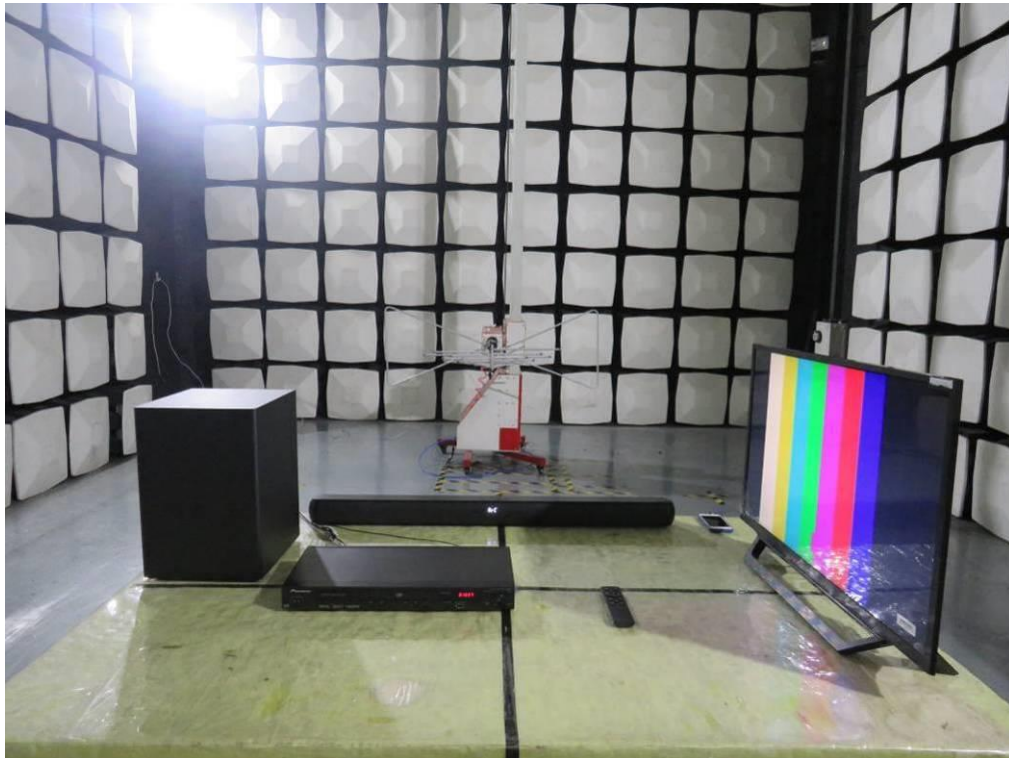


Photo of Harmonic/Flicker Measurement



Photo of Electrostatic Discharge Measurement



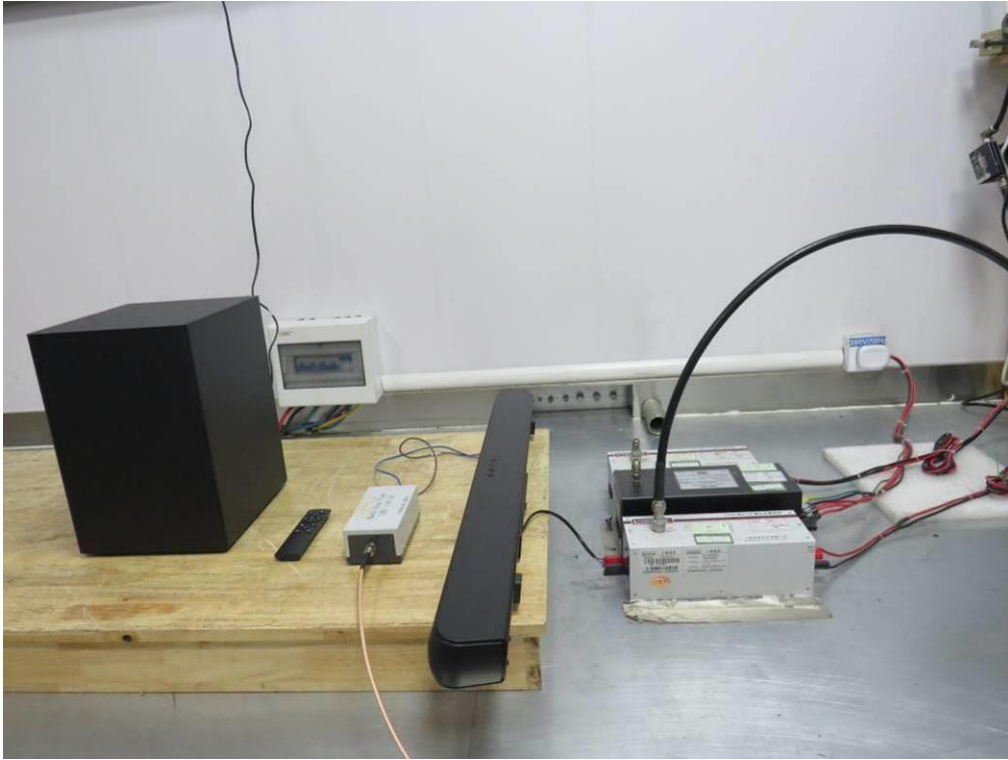
Photo of Continuous RF Electromagnetic Field Disturbances Measurement



Photo of Electrical Fast Transients / Burst / Surge / Voltage Dips and Interruptions Measurement

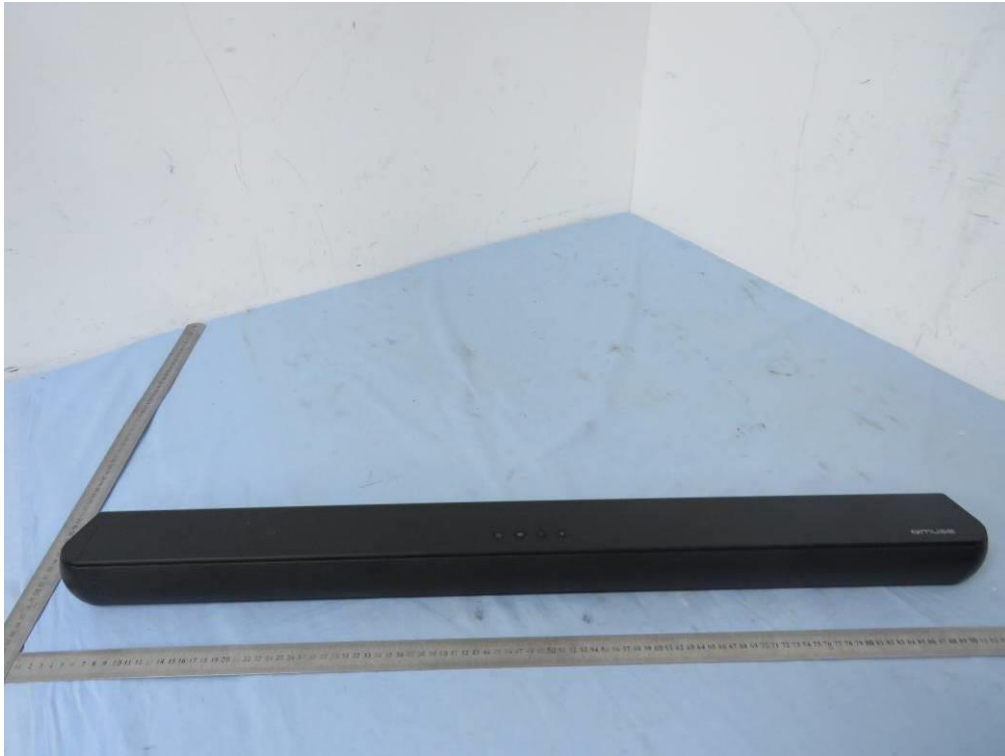


Photo of Continuous Induced RF Disturbances Measurement



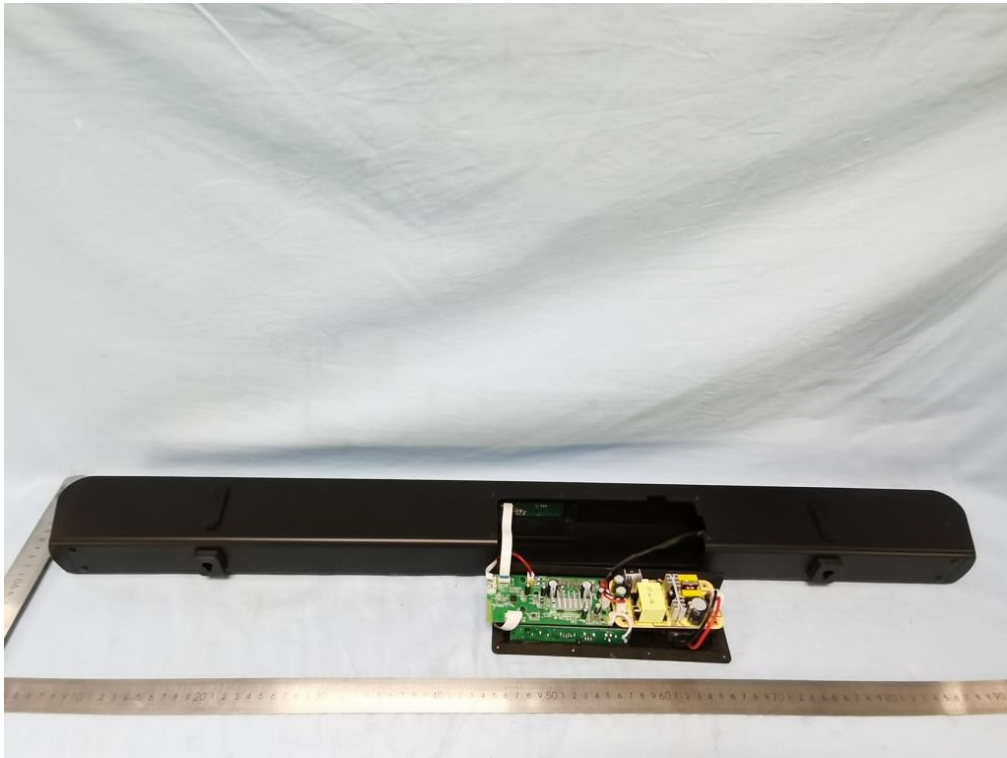
## 26. Photographs of the EUT

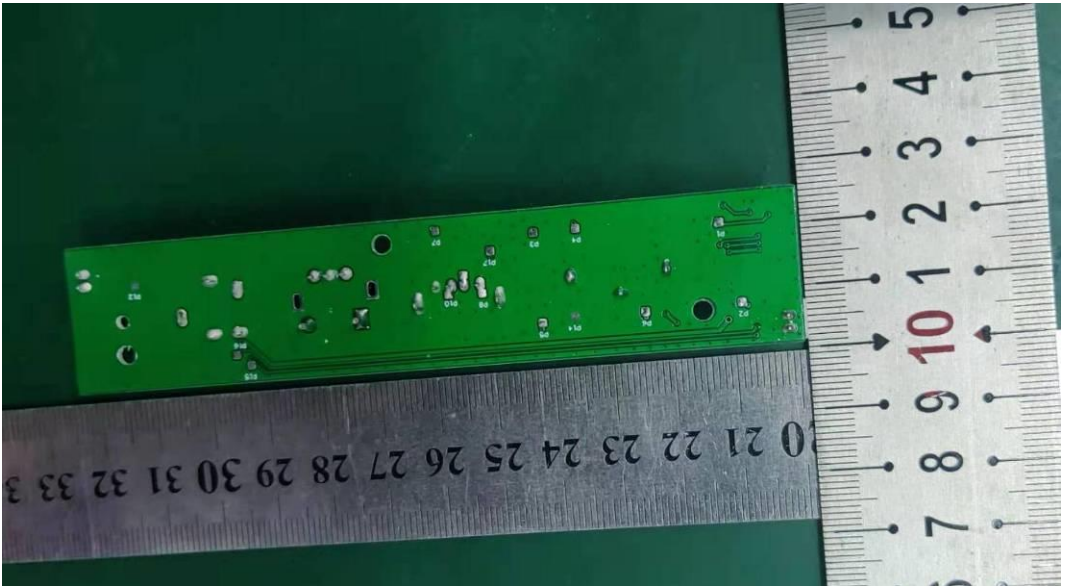
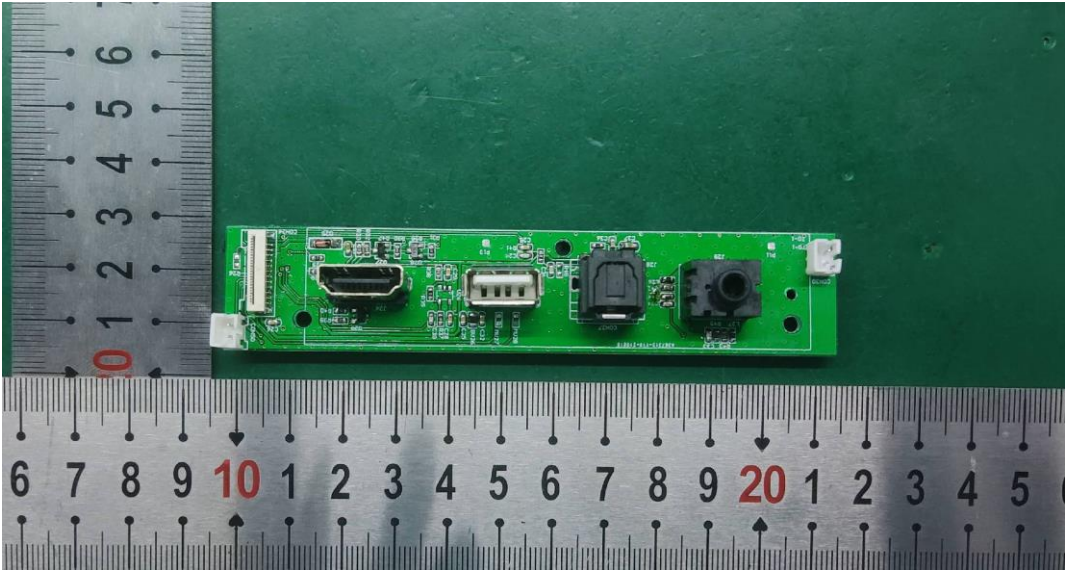


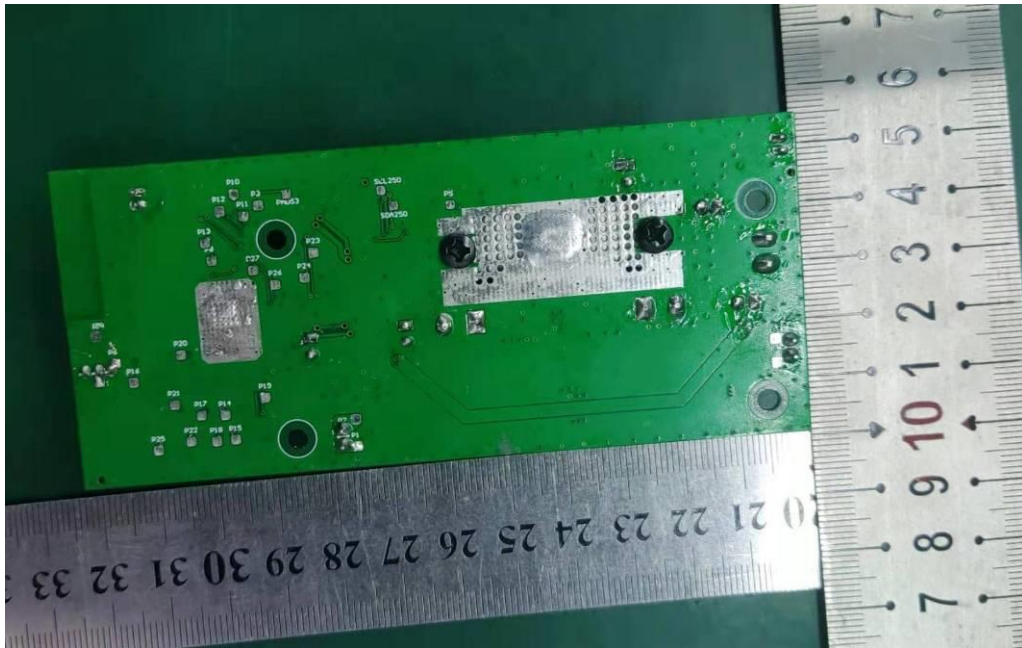
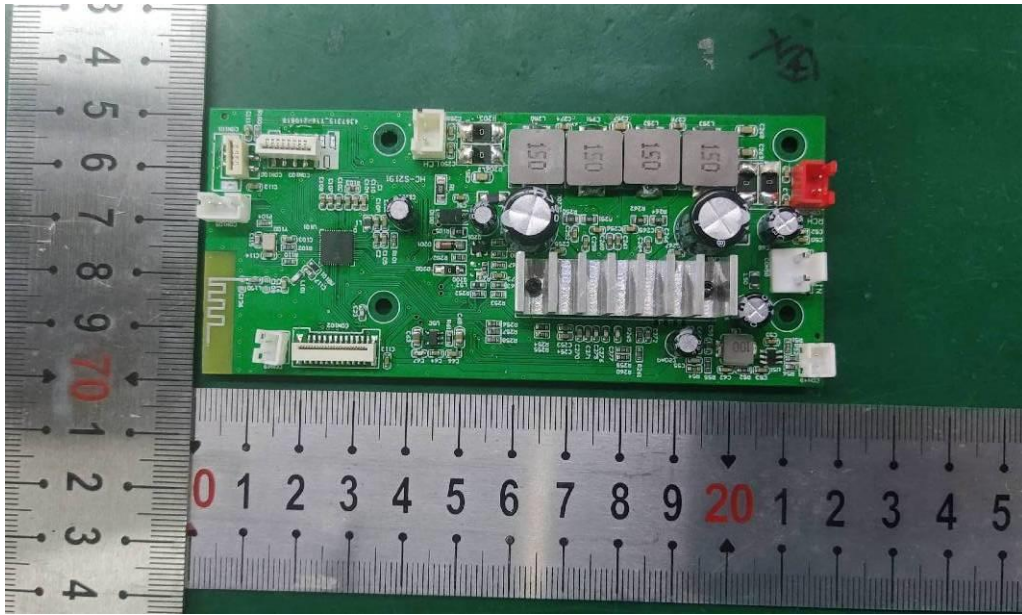


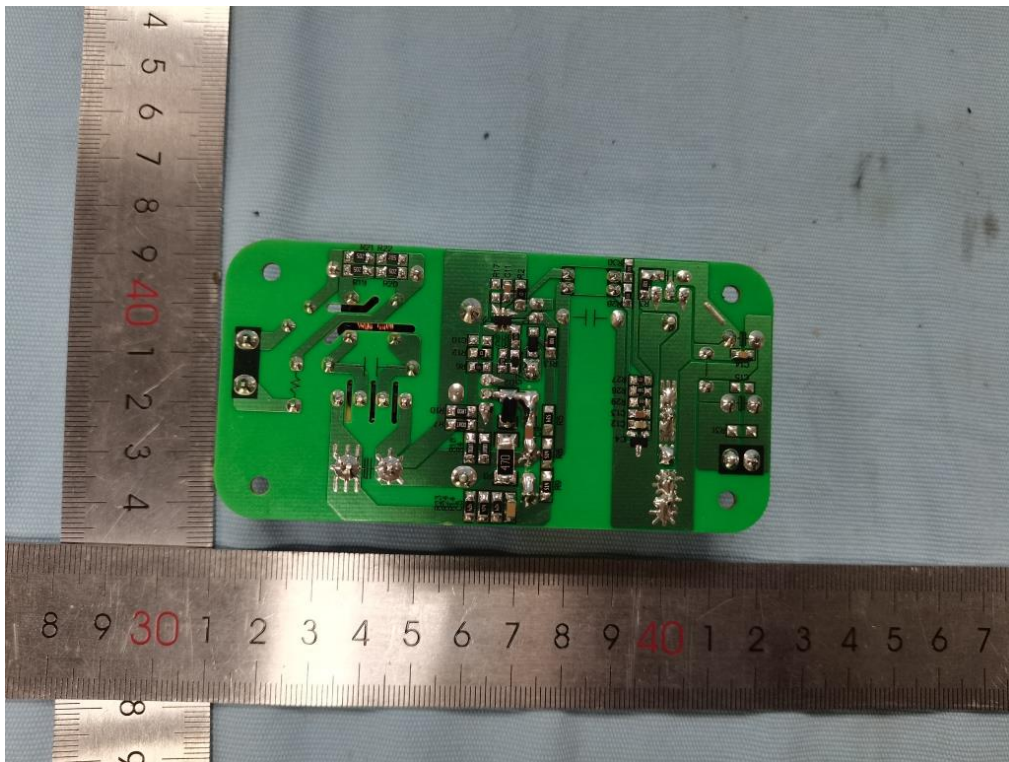
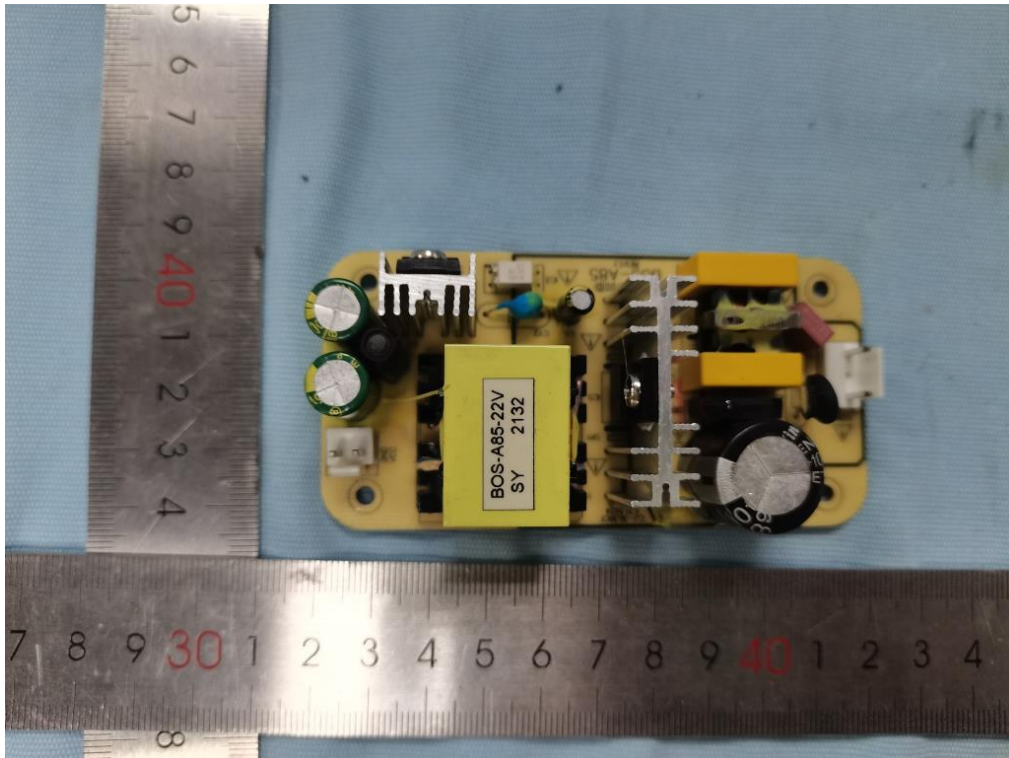


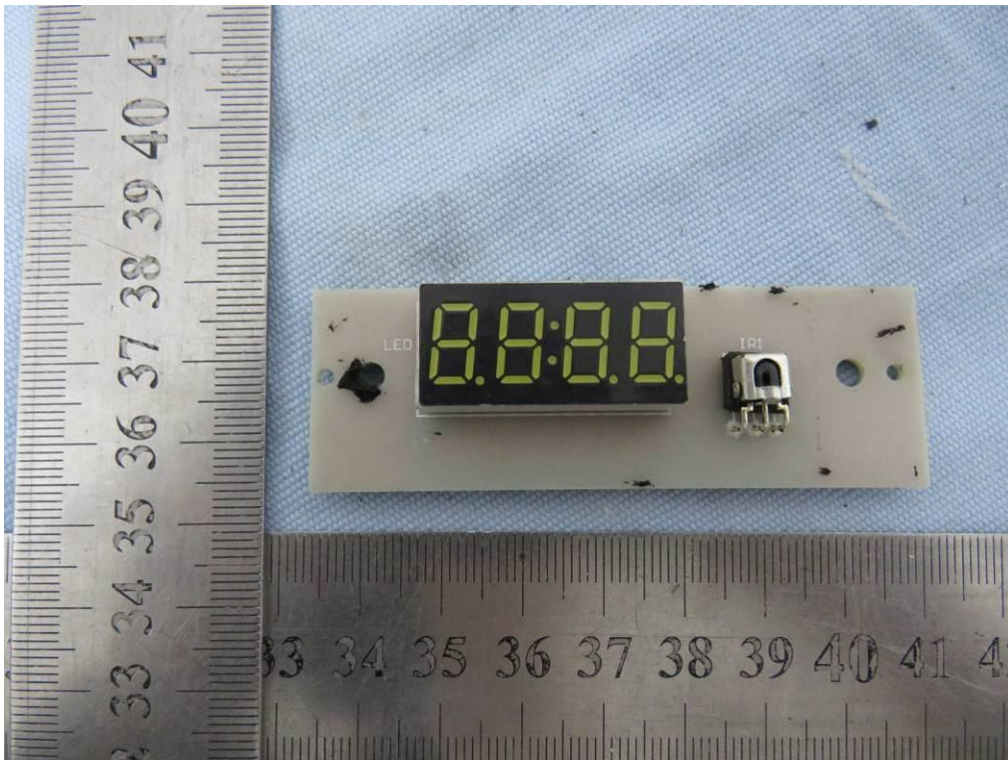


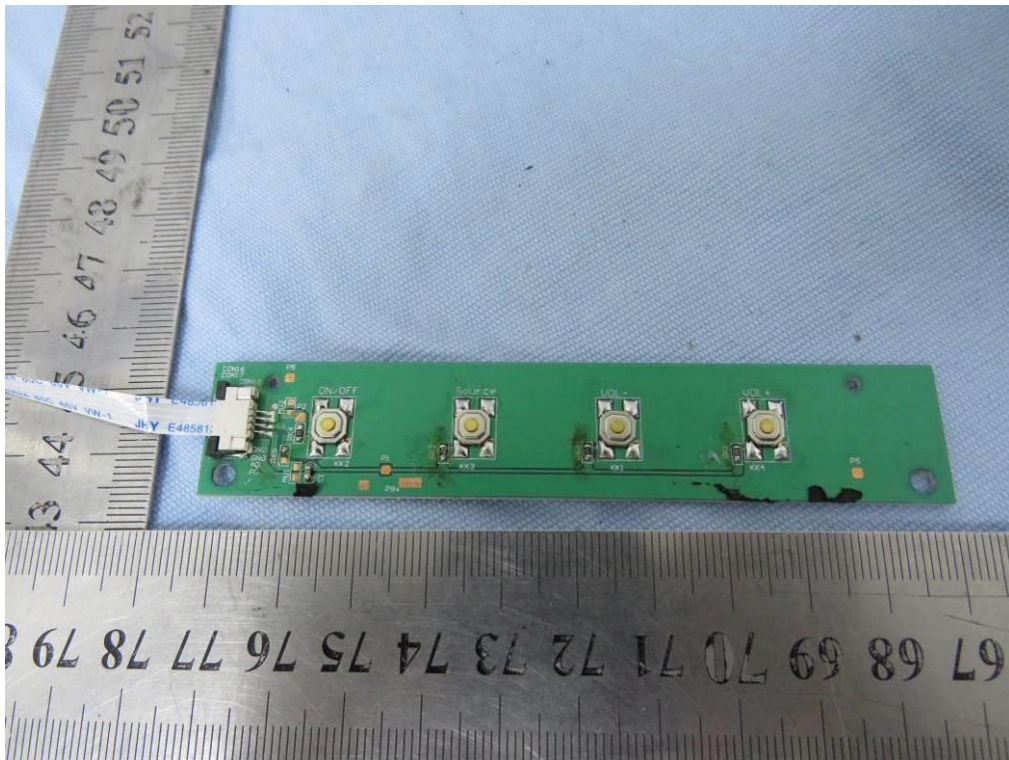
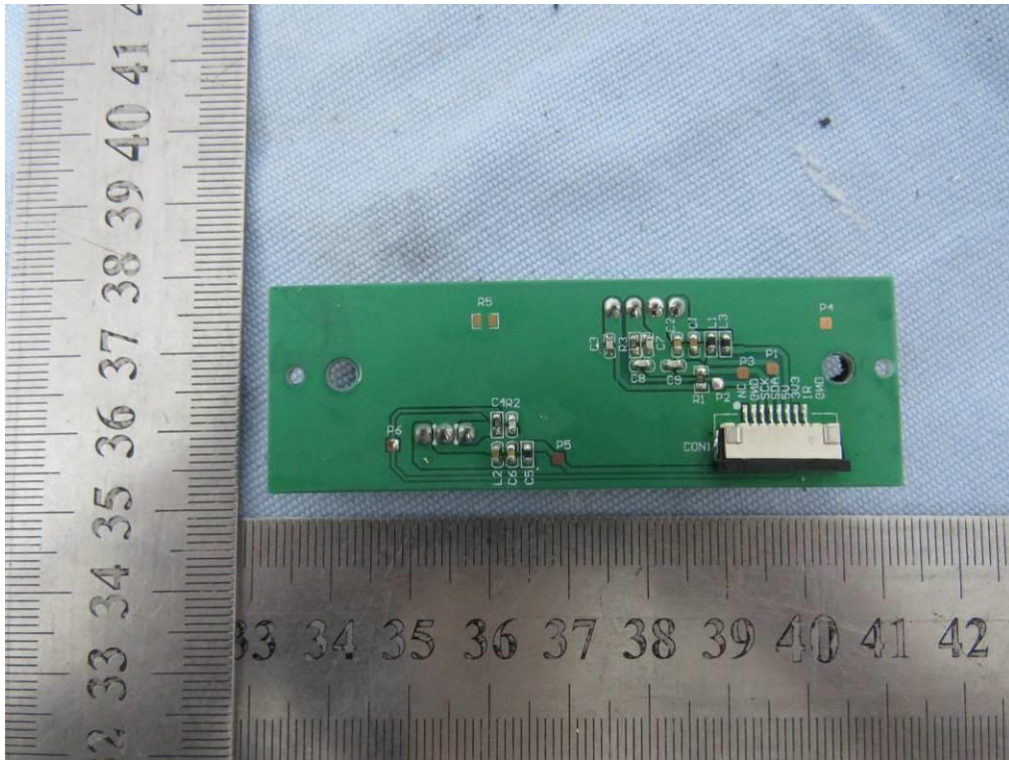


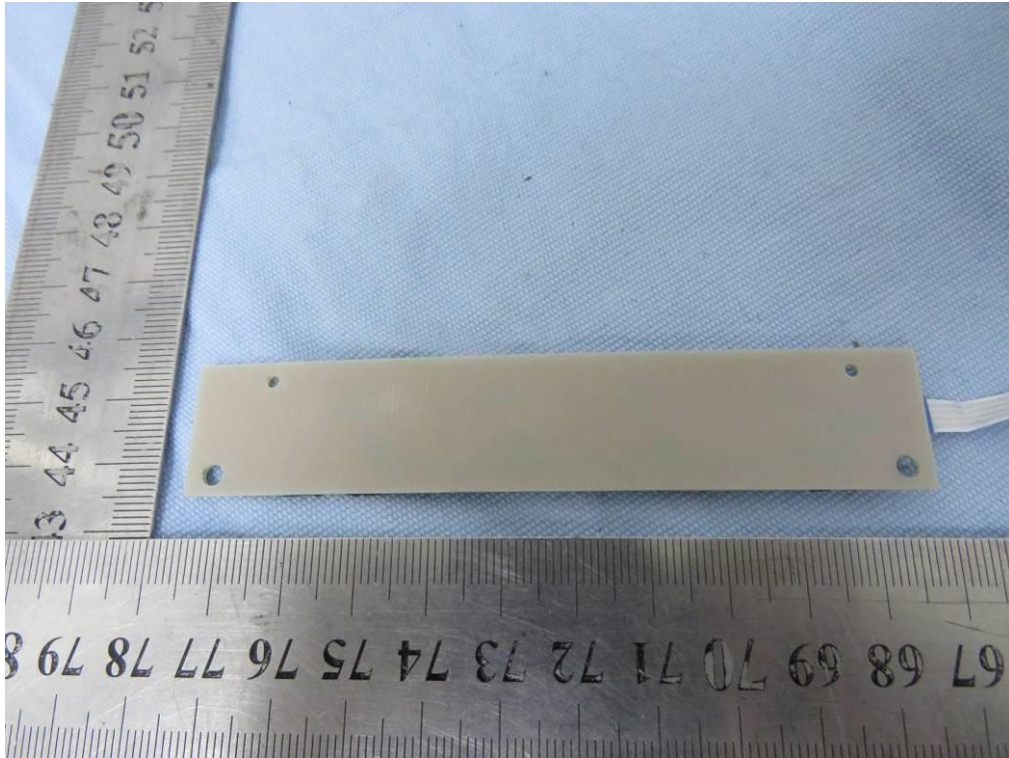




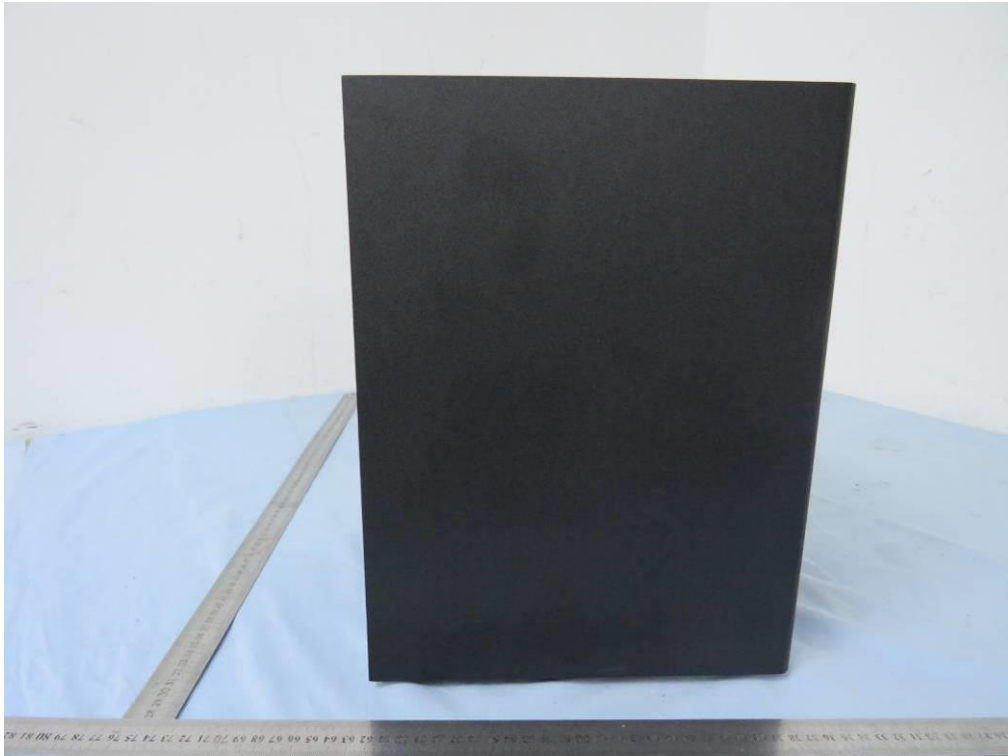


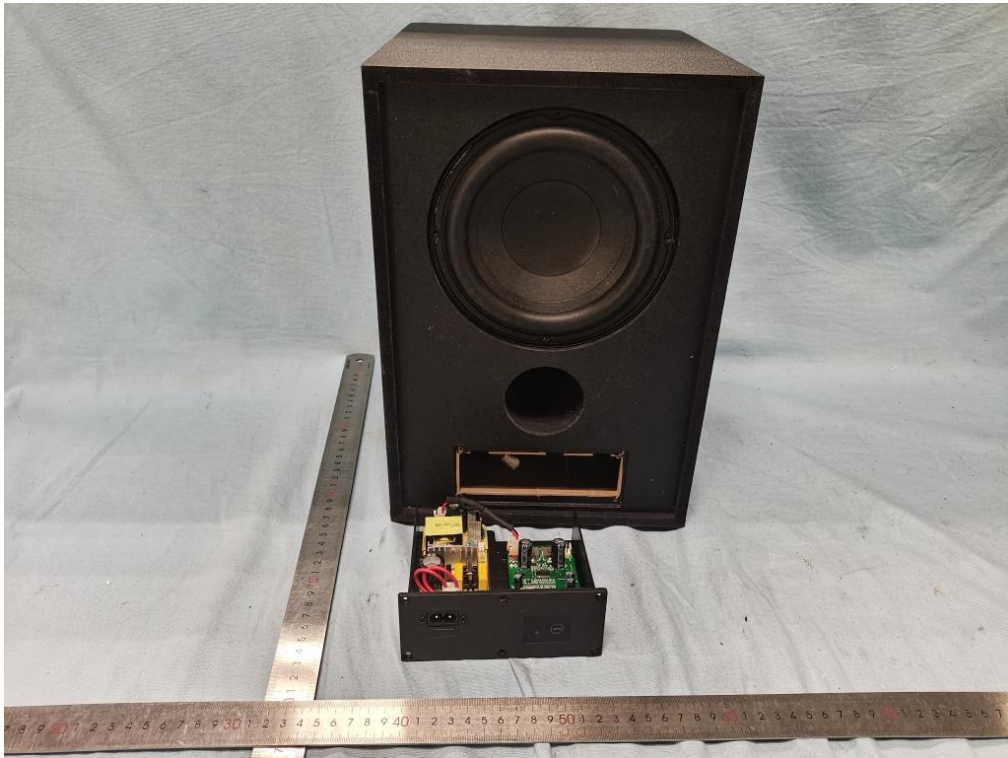


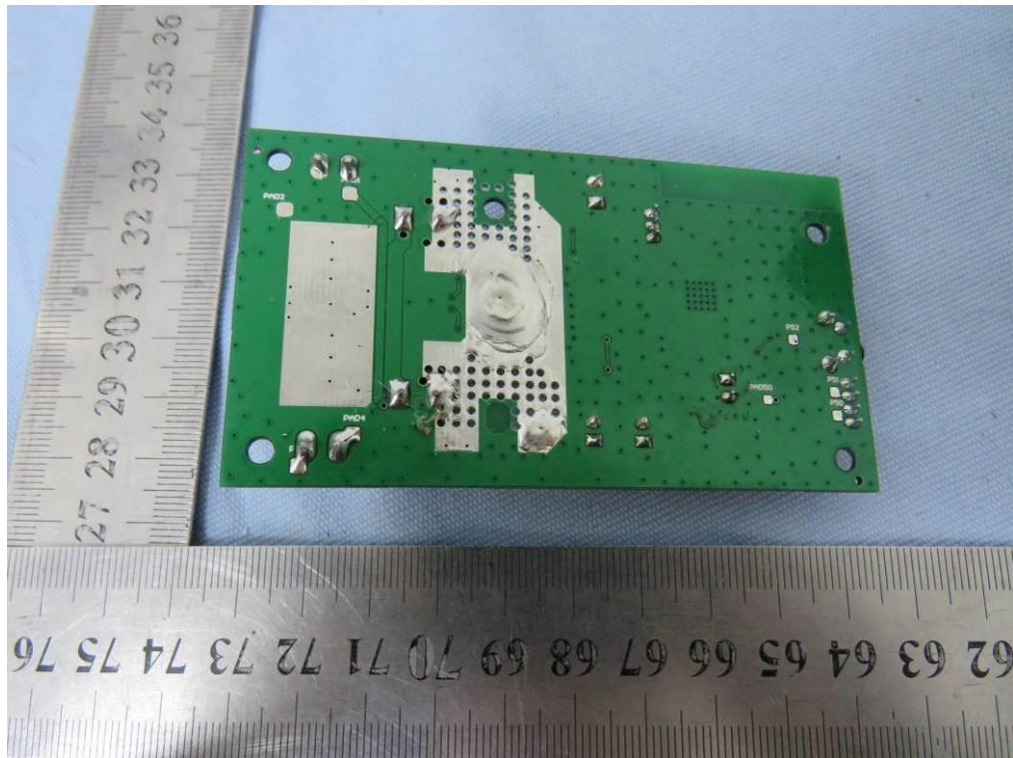
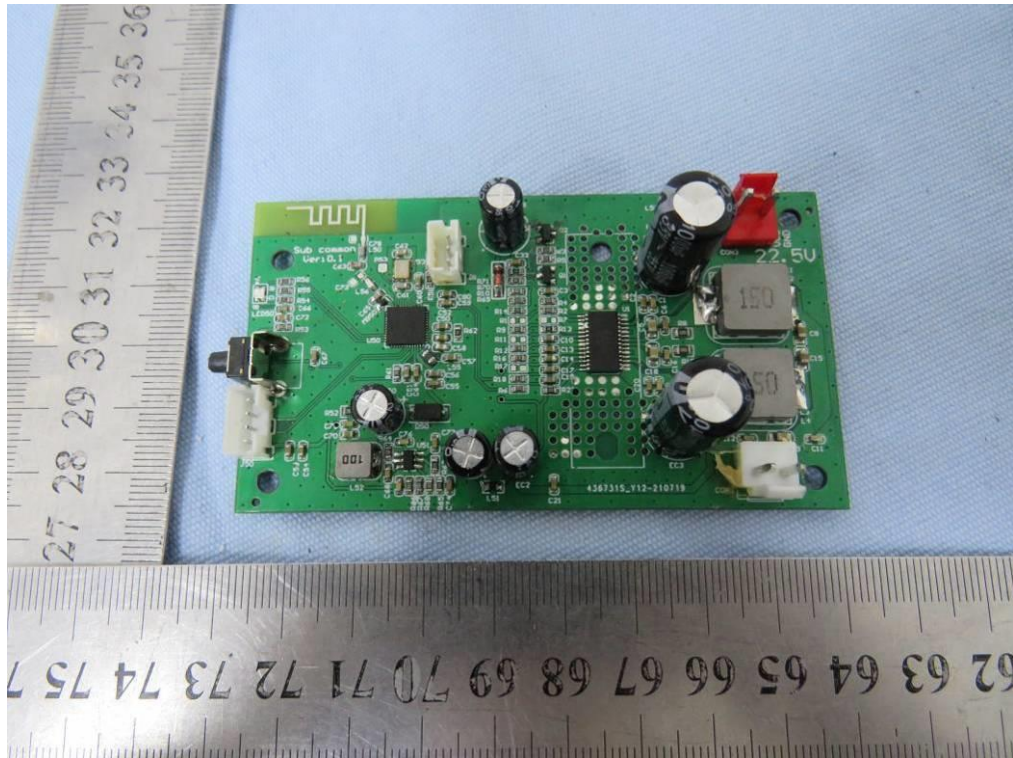


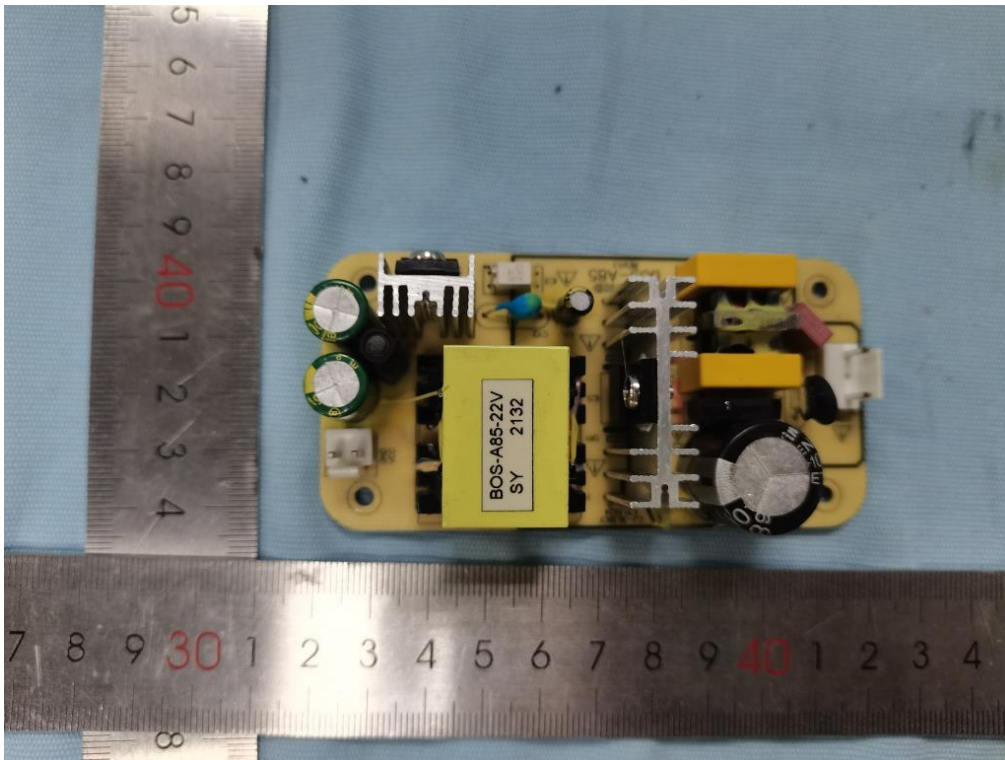


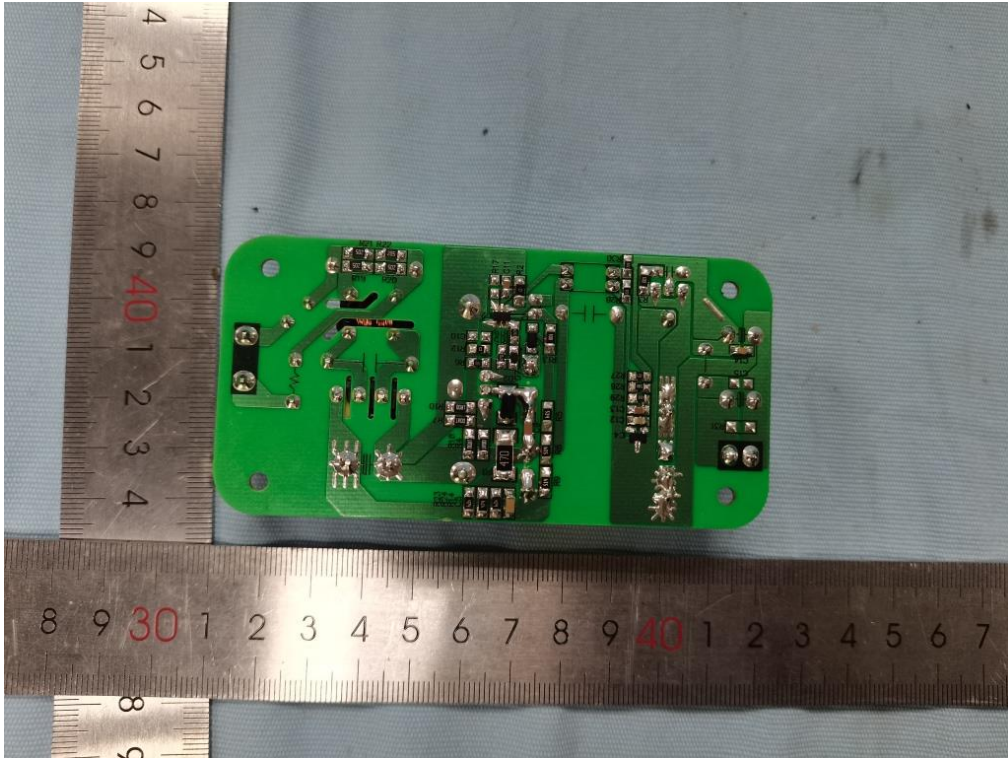












---End---