

# EMC TEST REPORT

The device described below is tested by Dongguan Nore Testing Center Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results are contained in this test report. Dongguan Nore Testing Center Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

Applicant : SHENZHEN FENDA TECHNOLOGY CO., LTD.  
Address : Fenda Hi-Tech Park, Zhoushi Road, Shiyao Town, Baoan District, Shenzhen City, Guangdong, China  
Manufacturer/Factory : SHENZHEN FENDA TECHNOLOGY CO., LTD.  
Address : Fenda Hi-Tech Park, Zhoushi Road, Shiyao Town, Baoan District, Shenzhen City, Guangdong, China  
E.U.T. : Bluetooth Speaker  
Brand Name : F&D  
Model No. : W20, W22, W40, W47, W45 (For model difference refer to section 2.1)  
Measurement Standard : EN 55032: 2015  
EN 61000-3-2: 2014, EN 61000-3-3: 2013  
EN 55035: 2017  
(IEC 61000-4-2: 2008, IEC 61000-4-3: 2006+A1: 2007+A2: 2010,  
IEC 61000-4-4: 2012, IEC 61000-4-5: 2014,  
IEC 61000-4-6: 2013, IEC 61000-4-8: 2009, IEC 61000-4-11: 2004)  
Date of Receiver : September 13, 2018  
Date of Test : September 13, 2018 to October 16, 2018  
Date of Report : October 16, 2018

This Test Report is Issued Under the Authority of :

Prepared by



Rose Hu / Engineer

Approved & Authorized Signer



Jori Fan / Authorized Signatory

This report shows that the E.U.T. is technically compliant with the EN 55032, EN 61000-3-2, EN 61000-3-3, EN 55035. This report applies to above tested sample only and shall not be reproduced in part without written approval of Dongguan Nore Testing Center Co., Ltd.



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APPENDIX I (Photos of the E.U.T.) (7 pages)



## 1. SUMMARY OF TEST RESULTS

The E.U.T. has been tested according to the following specifications:

<b>EMISSION</b>			
<b>Standard</b>	<b>Test Type</b>	<b>Result</b>	<b>Remarks</b>
EN 55032: 2015	Mains Terminal Disturbance Voltage Test	PASS	Uncertainty: 2.7dB
	Antenna Terminal Disturbance Voltage Test	N/A	Uncertainty: 2.7dB
	Conducted Disturbance at the telecommunication ports	N/A	Not applicable
	Radiated Emission Test	PASS	Uncertainty: 3.4dB
EN 61000-3-2: 2014	Harmonic current emission	PASS	Meets the requirements.
EN 61000-3-3: 2013	Voltage fluctuations & flicker	PASS	Meets the requirements.
<b>IMMUNITY(EN 55035: 2017)</b>			
<b>Standard</b>	<b>Test Type</b>	<b>Result</b>	<b>Remarks</b>
IEC 61000-4-2: 2008	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion B
IEC 61000-4-3: 2006+A1: 2007+A2: 2010	Radio-frequency, electromagnetic field immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-4: 2012	Electrical fast transient/ burst immunity test	PASS	Meets the requirements of Performance Criterion B
IEC 61000-4-5: 2014	Surge immunity test	PASS	Meets the requirements of Performance Criterion B
IEC 61000-4-6: 2013	Injected Currents immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-8: 2009	Magnetic Field immunity test	N/A	The EUT do not contain magnetic field sensitive components.
IEC 61000-4-11: 2004	Voltage Dips and Interruptions	PASS	Meets the requirements of Performance Criterion B&C

## 2. GENERAL INFORMATION

### 2.1 Details of E.U.T.

E.U.T.	: Bluetooth Speaker
Main model number	: W20
Additional Model number	: W22, W40, W47, W45
Brand Name	: F&D
E.U.T. Type	: Class B
Operation Frequency	: Below 108MHz (Except BT function)
Rating	: DC 18V come from adater
Adapter	: Manufacturer: Zhongshan Baolijin Electronic Co., Ltd. M/N: BLJ15W180100P1-V Input: AC100-240V 50/60Hz 0.6A Output: DC 18V 1000mA
Test Voltage	: AC 230V 50Hz
Cable	: DC Line: 1.45m Unshielded
Operating Temperature Range	: 0°C to 35°C (Declaration by manufacturer)
Model Difference Description	: These models have the same circuitry, electrical mechanical, PCB Layout and physical construction. The difference in model number.
HW	: V1.0
SW	: V1.0
Remark	: According to the model difference, all tests were performed on model W20.

## 2.2 Description of Support Device

Mobile Phone	:	Manufacturer: Apple M/N: MKT42LL/A S/N: DNQQC0ZMGRYH
Mobile Phone	:	Manufacturer: Apple M/N: MG492CH/A S/N: F1MPLG6NG5MQ
TF Card	:	Manufacturer: Kingston M/N: 8GB

## 2.3 Block Diagram of Test Setup

Block diagram of connection between the E.U.T. and simulators

### (1) AUX IN



### (2) TF Card Playing



## 2.4 Test Facility

### Site Description

EMC Lab : Listed by CNAS, August 13, 2018  
The certificate is valid until August 13, 2024  
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01  
The Certificate Registration Number is L5795.

Listed by A2LA, November 01, 2017  
The certificate is valid until December 31, 2019  
The Laboratory has been assessed and proved to be in compliance with ISO17025  
The Certificate Registration Number is 4429.01

Listed by FCC, November 06, 2017  
The Designation Number is CN1214  
Test Firm Registration Number: 907417

Listed by Industry Canada, June 08, 2017  
The Certificate Registration Number. Is 46405-9743

Name of Firm : Dongguan Nore Testing Center Co., Ltd.  
(Dongguan NTC Co., Ltd.)

Site Location : Building D, Gaosheng Science & Technology Park,  
Zhouxi Longxi Road, Nancheng District, Dongguan  
City, Guangdong Province, China

## 2.5 Abnormalities from Standard Conditions

None



### 3. MEASURING DEVICES AND TEST EQUIPMENT

#### 3.1 For Mains terminals Disturbance voltage test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 14, 2018	1 Year
2.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 14, 2018	1 Year
3.	L.I.S.N	Rohde & Schwarz	ESH2-Z5	893606/014	Mar. 14, 2018	1 Year
4.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar.14, 2018	1 Year
5.	Test Software	EZ	EZ_EMG	N/A	N/A	N/A

#### 3.2 For Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 14, 2018	1 Year
2.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 23, 2018	1 Year
3.	Positioning Controller	UC	UC 3000	N/A	N/A	N/A
4.	Color Monitor	SUNSP0	SP-140A	N/A	N/A	N/A
5.	Single Phase Power Line Filter	SAEMC	PF201A-32	110210	N/A	N/A
6.	3 Phase Power Line Filter	SAEMC	PF401A-200	110318	N/A	N/A
7.	DC Power Filter	SAEMC	PF301A-200	110245	N/A	N/A
8.	Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Mar. 14, 2018	1 Year
9.	Horn Antenna	COM-Power	AH-118	071078	Mar. 23, 2018	1 Year
10.	Loop Antenna	Schwarzbeck	FMZB 1513	1513-272	Apr. 24, 2018	1 Year
11.	Pre-Amplifier	HP	HP 8449B	3008A00964	Mar. 14, 2018	1 Year
12..	Pre-Amplifier	HP	HP 8447D	1145A00203	Mar. 14, 2018	1 Year
13.	Chamber	SAEMC	9*7*7m	N/A	Aug. 22, 2018	2 Year
14.	Test Software	EZ	EZ_EMG	N/A	N/A	N/A

### 3.3 For Harmonic / Flicker Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Frequency Analyser	California Instruments	PACS-1	72846	Mar. 14, 2018	1 Year
2.	5KVA AC Power Source	California Instruments	500liX	60137	Mar. 14, 2018	1 Year
3.	Software	California Instruments	CTS30	N/A	N/A	N/A

### 3.4 For Electrostatic Discharge Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	TESEQ	NSG 437	432	Mar. 15, 2018	1 Year

### 3.5 For RF Electromagnetic Field Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	Agilent	N5181A	MY47070160	Apr. 24, 2018	1 Year
2.	RF Switch	SKET	N/A	N/A	N/A	N/A
3.	Power Amplifier	SKET	HAP801000 M_250W	201804008	N/A	N/A
4.	Power Amplifier	SKET	HAP0103G_75W	201804009	N/A	N/A
5.	Power Amplifier	SKET	HAP0306G_50W	201804010	N/A	N/A
6.	Power Meter	Agilent	E4419B	GB40201469	Apr.24,2018	1 Year
7.	Power Sensor	Agilent	E9300A	MY41498919	Apr.24,2018	1 Year
8.	Power Sensor	Agilent	E9300A	US39211259	Apr.24,2018	1 Year
9.	E-Field Probe	Narda	EP-601	N/A	Apr.24,2018	1 Year
10.	Antenna	Schwarzbeck	STLP 9129	9129071	Apr.24,2018	2 Year
11.	Audio Analyzer	Rohde & Schwarz	UPV	100894	Mar. 23, 2018	1 Year
12.	Chamber	Chengyu	7*5*3.5m	N/A	Mar.26,2018	2 Year
13.	Test Software	EZ	EZ_RS	N/A	N/A	N/A

### 3.6 For Electrical Fast Transient /Burst Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Burst Tester	EM TEST	UCS 500N	V1104108683	Mar. 14, 2018	1 Year
2.	Coupling Clamp	EM TEST	HFK	0311-94	Mar. 14, 2018	1 Year
3.	Test Soft	EM TEST	lec. control	N/A	N/A	N/A

### 3.7 For Surge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Tester	EM TEST	UCS 500N	V1104108683	Mar. 14, 2018	1 Year
2.	Test Soft	EM TEST	lec. control	N/A	N/A	N/A

### 3.8 For Injected Currents Immunity Measurement

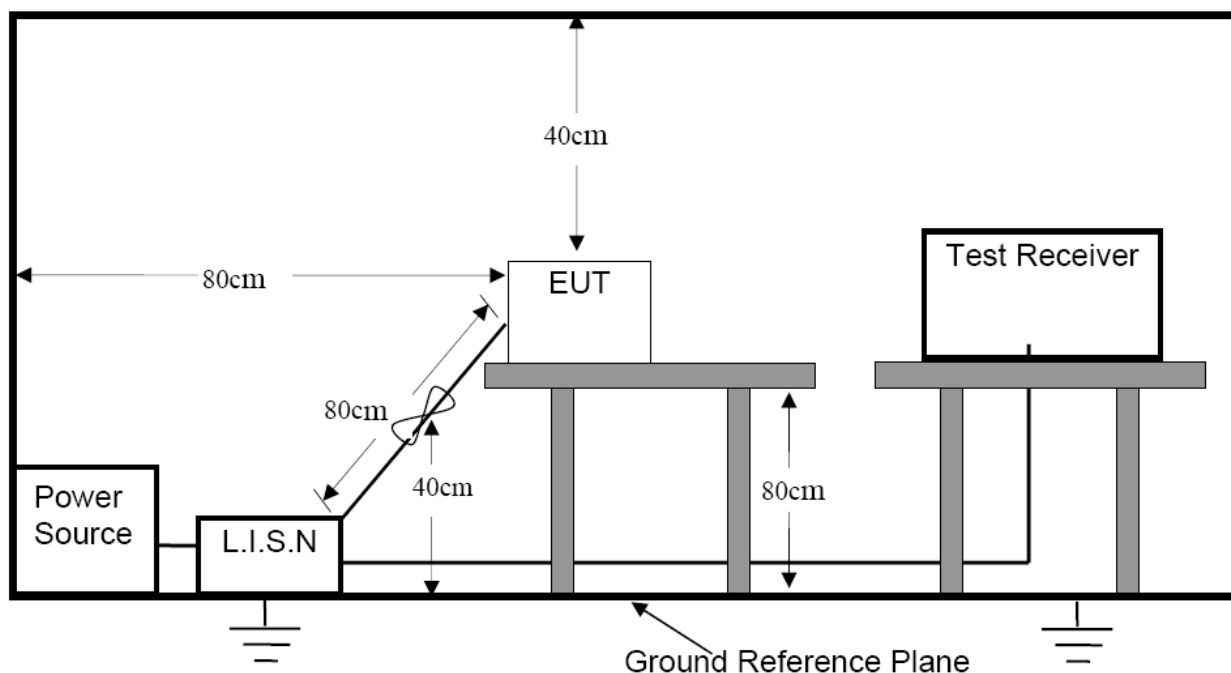
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	IFR	2023A	N/A	Mar. 14, 2018	1 Year
2.	Power Amplifier	SCHAFFNER	CBA9425	1022	Mar. 14, 2018	1 Year
3.	6dB 50Watt Attenuator	SCHAFFNER	ATN6025	N/A	Mar. 14, 2018	1 Year
4.	CDN	Lioncel	CDN-M3-16	0170708	Mar. 14, 2018	1 Year
5.	CDN	Lioncel	CDN-M2-16	0170723	Mar. 14, 2018	1 Year
6.	Directional Coupler	SCHAFFNER	255	19184	Mar. 14, 2018	1 Year
7.	Dips Modulator	EM TEST	V4780S2	0111-11	Mar. 14, 2018	1 Year
8.	Audio Analyzer	Rohde & Schwarz	UPV	100894	Mar. 23, 2018	1 Year
9.	Test Software	EZ	EZ_CS	N/A	N/A	N/A

### 3.9 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. 14, 2018	1 Year
2.	Test Soft	EM TEST	lec.control	N/A	N/A	N/A
3.	Dips Modulator	EM TEST	V4780S2	0111-11	Mar. 14, 2018	1 Year

## 4. MAINS TERMINAL DISTURBANCE VOLTAGE MEASUREMENT

### 4.1 Block Diagram of Test Setup



### 4.2 Limit of Mains Terminal Disturbance voltage measurement

Test Standard: EN 55032

Limits for conducted disturbance at the mains ports.

Frequency range (MHz)	Limits (dB(uV))	
	Quasi-peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

\*Decreasing linearly with the logarithm of the frequency.

- 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 0.5 MHz.

#### 4.3 Test Procedure

The E.U.T. is put on the 0.8 m high table and connected to the AC mains through a Artificial Mains Network (AMN). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission levels according to the EN 55032 regulations during conducted emission test.

The bandwidth of the test receiver (R&S Test Receiver ESCI) is set at 9 KHz.

#### 4.4 Operating Condition of E.U.T.

4.4.1 Setup the E.U.T. and simulators as shown in Section 2.3.

4.4.2 Turn on the power of all equipments.

4.4.3 Let the E.U.T. work in test modes (AUX IN, TF Card Playing) and test it.

#### 4.5 Mains Terminal Disturbance Voltage Test Results

**PASS.**

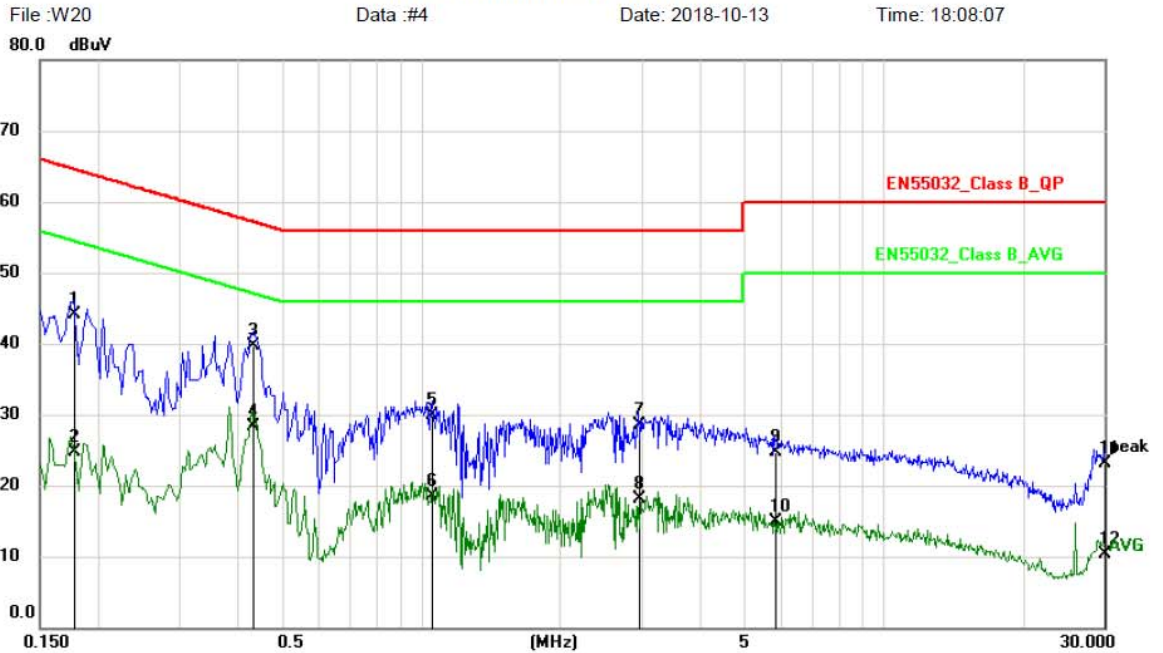
Please refer to the following pages of the worst case: AUX IN





Dongguan NTC Co., Ltd.  
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**Conducted Emission Measurement**



Site: Phase: **L1** Temperature: 26  
 Limit: EN55032\_Class B\_QP Power: AC230V/50Hz Humidity: 50 %  
 EUT: Bluetooth Speaker  
 M/N: W20  
 Mode: AUX IN  
 Note:

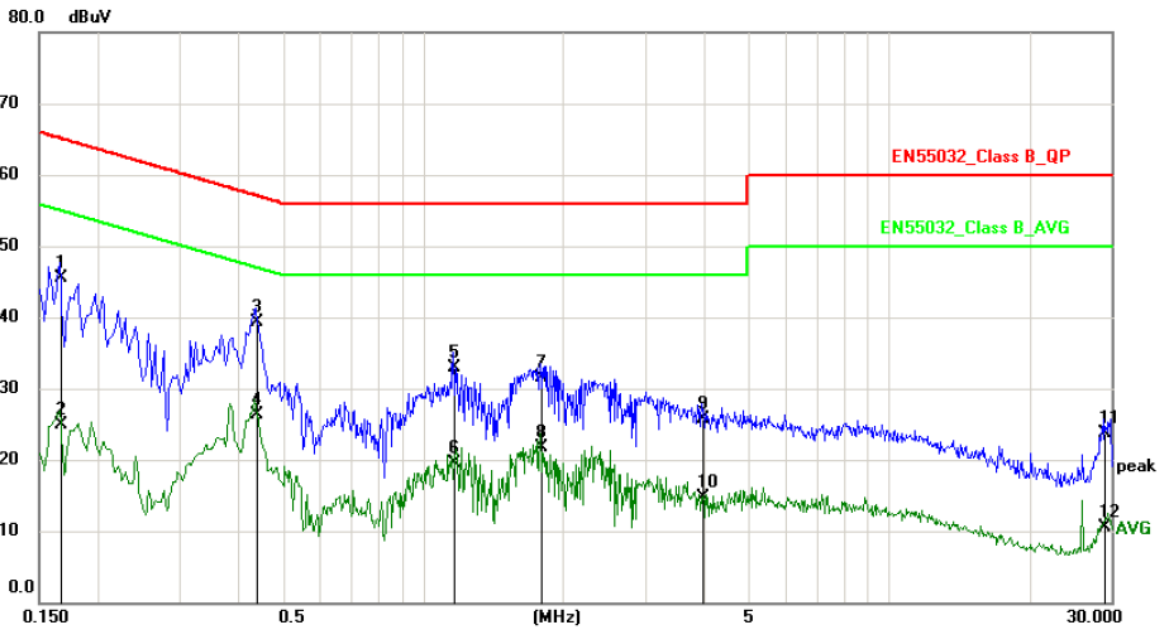
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1779	33.49	10.61	44.10	64.58	-20.48	QP	
2		0.1779	14.19	10.61	24.80	54.58	-29.78	AVG	
3	*	0.4339	29.08	10.62	39.70	57.18	-17.48	QP	
4		0.4339	17.68	10.62	28.30	47.18	-18.88	AVG	
5		1.0580	19.25	10.65	29.90	56.00	-26.10	QP	
6		1.0580	7.85	10.65	18.50	46.00	-27.50	AVG	
7		2.9539	17.85	10.65	28.50	56.00	-27.50	QP	
8		2.9539	7.45	10.65	18.10	46.00	-27.90	AVG	
9		5.8178	14.14	10.66	24.80	60.00	-35.20	QP	
10		5.8178	4.24	10.66	14.90	50.00	-35.10	AVG	
11		30.0000	12.52	10.68	23.20	60.00	-36.80	QP	
12		30.0000	-0.38	10.68	10.30	50.00	-39.70	AVG	



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Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

Conducted Emission Measurement

File :W20 Data :#3 Date: 2018-10-13 Time: 18:01:08

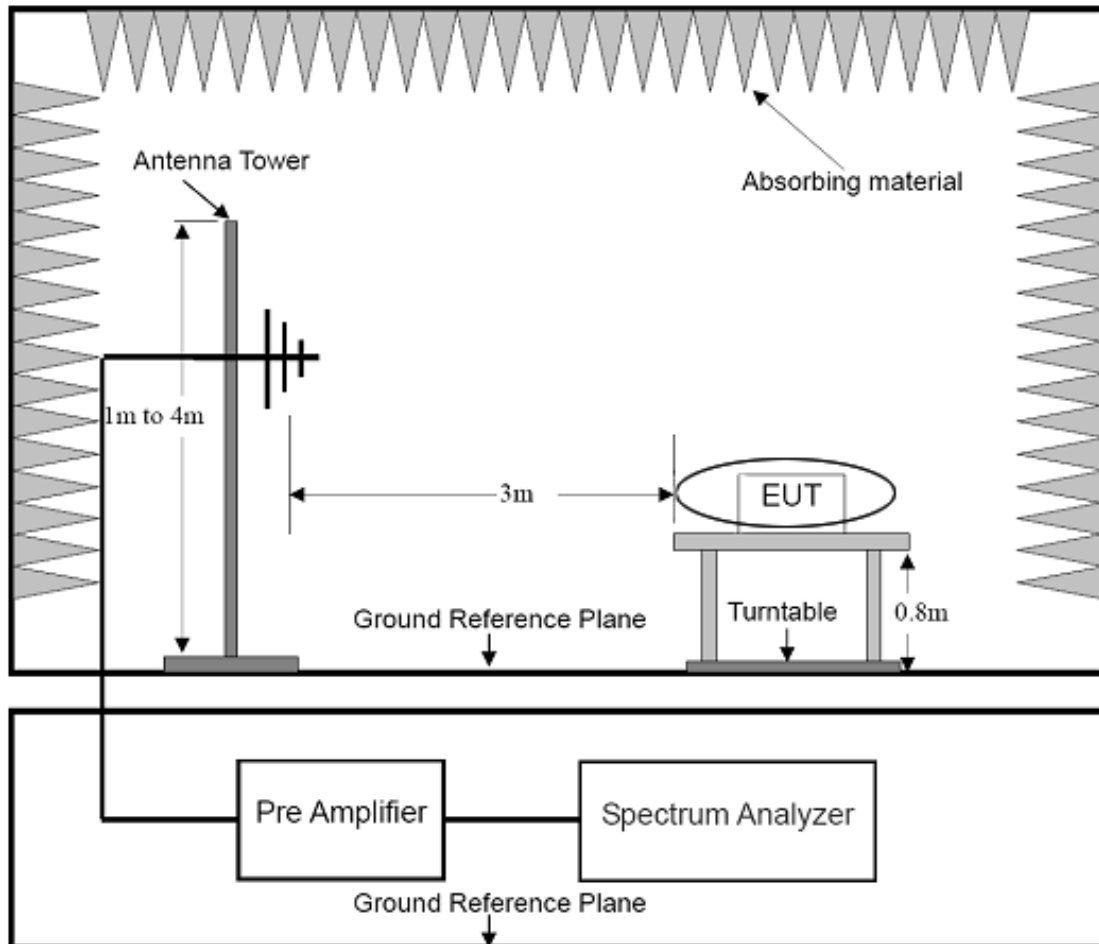


Site Phase: *N* Temperature: 26  
 Limit: EN55032\_Class B\_QP Power: AC230V/50Hz Humidity: 50 %  
 EUT: Bluetooth Speaker  
 M/N: W20  
 Mode: AUX IN  
 Note:

No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.1660	34.99	10.61	45.60	65.16	-19.56	QP	
2	0.1660	14.39	10.61	25.00	55.16	-30.16	AVG	
3 *	0.4380	28.68	10.62	39.30	57.10	-17.80	QP	
4	0.4380	15.78	10.62	26.40	47.10	-20.70	AVG	
5	1.1620	22.35	10.65	33.00	56.00	-23.00	QP	
6	1.1620	8.95	10.65	19.60	46.00	-26.40	AVG	
7	1.7900	20.95	10.65	31.60	56.00	-24.40	QP	
8	1.7900	11.15	10.65	21.80	46.00	-24.20	AVG	
9	3.9700	15.14	10.66	25.80	56.00	-30.20	QP	
10	3.9700	4.14	10.66	14.80	46.00	-31.20	AVG	
11	29.0460	13.02	10.68	23.70	60.00	-36.30	QP	
12	29.0460	-0.18	10.68	10.50	50.00	-39.50	AVG	

## 5. RADIATED EMISSION MEASUREMENT

### 5.1 Block Diagram of Test



### 5.2 Limit of Radiated Emission Measurement

Test Standard: EN 55032

Limits for radiated disturbance of class B at a measuring distance of 3m

Frequency range MHz	Quasi-peak limits dB(uV/m)
30 to 230	40
230 to 1000	47

Note 1 The lower limit shall apply at the transition frequency.

Note 2 Additional provisions may be required for cases where interference occurs.

### 5.3 Test Procedure

E.U.T. and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. E.U.T. is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to EN 55032 on radiated emission measurement.

Below 1GHz, the bandwidth of the EMI test is set at 120 KHz.

The frequency range from 30 MHz to 1 GHz is checked.

### 5.4 Operating Condition of E.U.T.

5.4.1 Setup the E.U.T. and simulators as shown in Section 2.3.

5.4.2 Turn on the power of all equipments.

5.4.3 Let the E.U.T. work in test modes (AUX IN, TF Card Playing) and test it.

### 5.5 Radiated Emission Measurement Result

**PASS.**

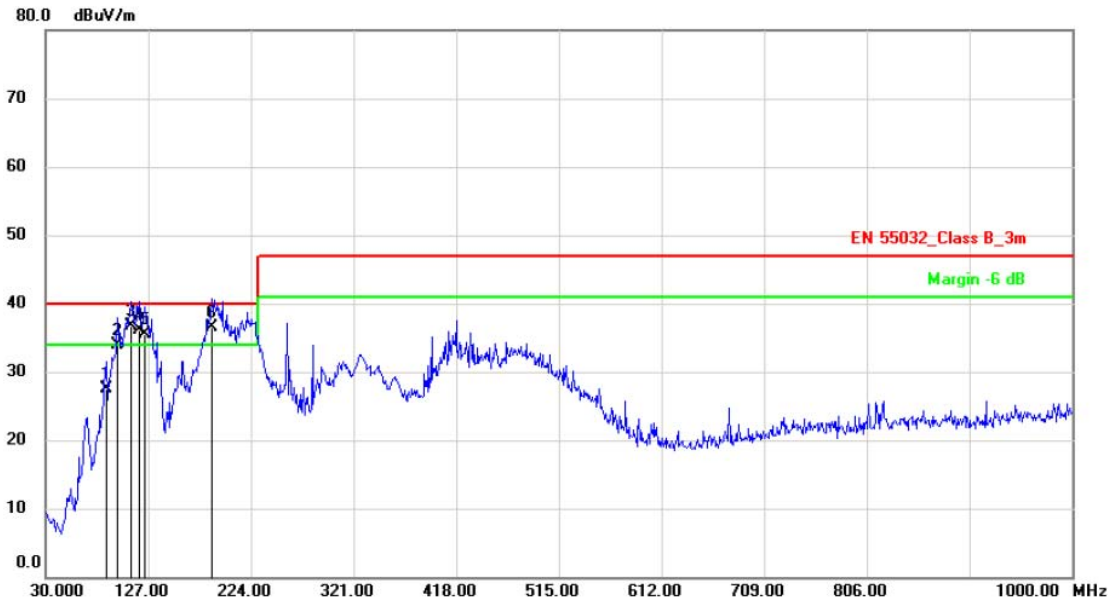
Please refer to the following pages of the worst case: TF Card Playing



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 Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

**Radiated Emission Measurement**

File :W20 副本      Data :#17      Date: 2018-10-19      Time: 11:22:42



Site: 3m Chamber      Polarization: *Horizontal*      Temperature: 26  
 Limit: EN 55032\_Class B\_3m      Power: AC 230V/50Hz      Humidity: 47 %  
 EUT: Bluetooth Speaker      Distance: 3m  
 M/N: W20  
 Mode: TF Card Playing  
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		87.2300	42.11	-14.61	27.50	40.00	-12.50	QP		
2		97.9000	46.30	-12.40	33.90	40.00	-6.10	QP		
3	*	110.5100	49.06	-12.26	36.80	40.00	-3.20	QP		
4	!	118.2700	49.78	-13.68	36.10	40.00	-3.90	QP		
5	!	123.1200	49.90	-14.40	35.50	40.00	-4.50	QP		
6	!	187.1400	50.22	-13.72	36.50	40.00	-3.50	QP		

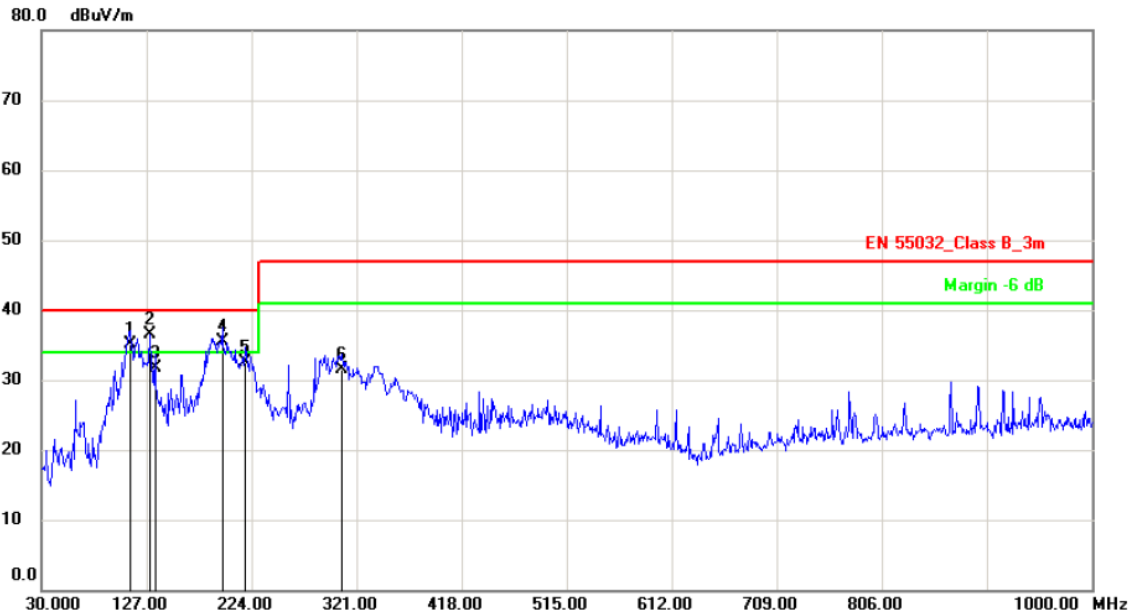




Dongguan NTC Co., Ltd.  
 Tel:+86-769-22022444 Fax:+86-769-22022799  
 Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

**Radiated Emission Measurement**

File :W20 副本      Data :#18      Date: 2018-10-19      Time: 11:26:32

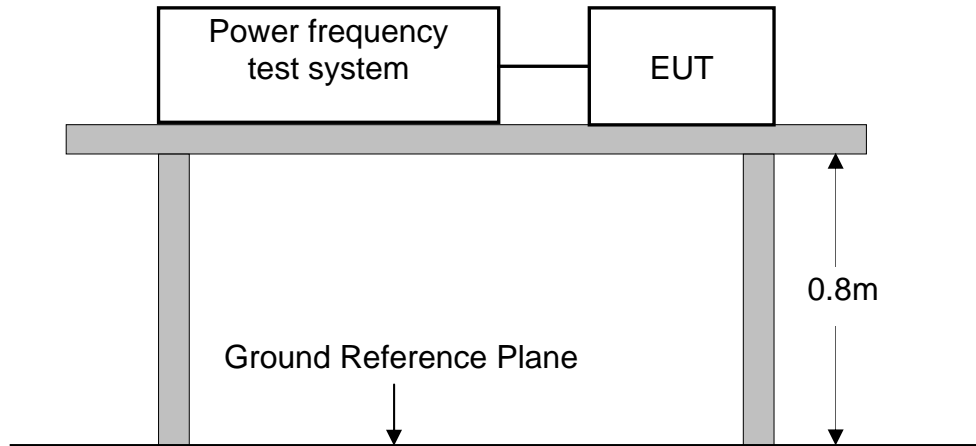


Site: 3m Chamber      Polarization: *Vertical*      Temperature: 26  
 Limit: EN 55032\_Class B\_3m      Power: AC 230V/50Hz      Humidity: 47 %  
 EUT: Bluetooth Speaker      Distance: 3m  
 M/N: W20  
 Mode: TF Card Playing  
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	!	111.4800	51.13	-16.12	35.01	40.00	-4.99	QP		
2	*	129.9100	54.72	-18.15	36.57	40.00	-3.43	QP		
3		134.7600	50.06	-18.36	31.70	40.00	-8.30	QP		
4	!	196.8400	51.84	-16.42	35.42	40.00	-4.58	QP		
5		218.1800	48.62	-16.02	32.60	40.00	-7.40	QP		
6		307.4200	43.86	-12.26	31.60	47.00	-15.40	QP		

## 6. HARMONIC CURRENT EMISSION TEST

### 6.1 Block Diagram of Test Setup



### 6.2 Limits of Harmonics current measurement

Test Standard: EN 61000-3-2

Limits for Class A equipment	
Harmonics Order n	Max. permissible harmonics current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15<=n<=39	0.15x15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
8<=n<=40	0.23x8/n

For the following categories of equipment limits are not specified in this edition of the standard.

Note: Equipment with a rated power of 75W or less, other than lighting equipment.

## 6.3 Test Procedure

The E.U.T. was put on the top of a wooden table 0.8m above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

The E.U.T. is classified 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 following types: Personal computers and personal computer monitors and television receivers.

## 6.4 Operating Condition of E.U.T.

6.4.1 Setup the E.U.T. and simulators as shown in Section 2.3.

6.4.2 Turn on the power of all equipments.

6.4.3 Let the E.U.T. work in test modes (FM Mode, TF Card Playing) and test it.

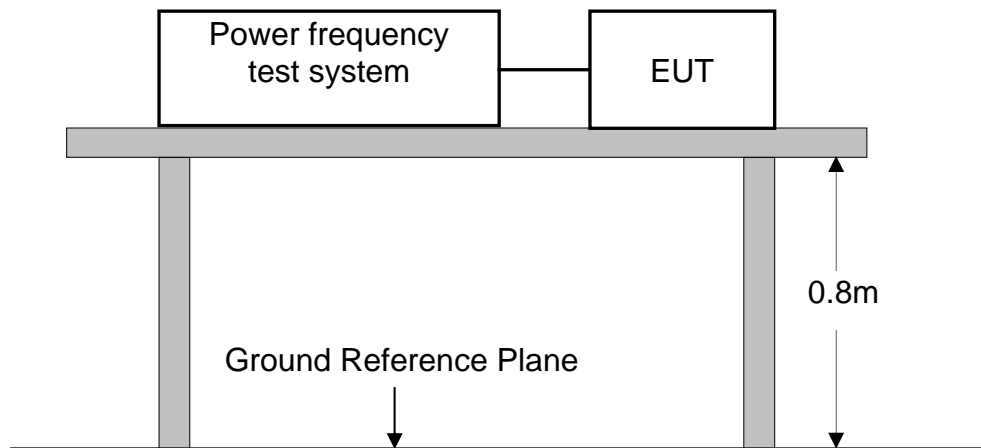
## 6.5 Test Results

**PASS.**

According to clause 7 of EN 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.

## 7. VOLTAGE FLUCTUATIONS & FLICKER TEST

### 7.1 Block Diagram of Test Setup



### 7.2 Limits of Voltage Fluctuations & Flicker Measurement

Test Standard: EN 61000-3-3

Test Item	Limit
$P_{st}$ (Short-term flicker indicator.)	1.0
$P_{lt}$ (Long-term flicker indicator.)	0.65
$T_{d(t)}$ (ms) ( Maximum time that $d(t)$ exceeds 3.3%)	500
$d_{max}$ (%) (Maximum relative voltage change.)	4
$d_c$ (%) (Relative steady-state voltage change)	3.3

### 7.3 Test Procedure

The E.U.T. was put on the top of a wooden table 0.8m above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.

## 7.4 Operating Condition of E.U.T.

7.4.1 Setup the E.U.T. and simulators as shown in Section 2.3.

7.4.2 Turn on the power of all equipments.

7.4.3 Let the E.U.T. work in test modes (FM Mode, TF Card Playing) and test it.

## 7.5 Test Results

**PASS.**

Please refer to the following page of the worst case: AUX IN



**Flicker Test Summary per EN/IEC61000-3-3 Ed. 3.0 (2013) (Run time)**

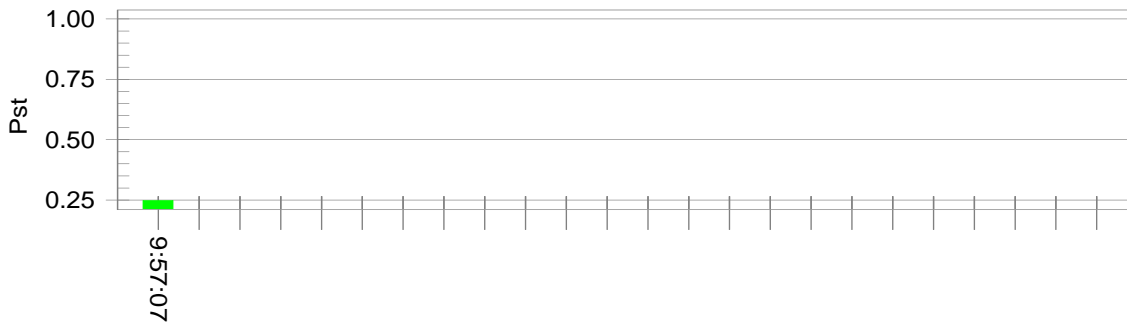
EUT: Bluetooth Speaker  
 Test category: All parameters (European limits)  
 Test date: 2018/10/16  
 Test duration (min): 10  
 Comment: AUX IN  
 Customer: FENDA  
 M/N:W20  
 Test Result: Pass

Tested by: Ivan  
 Test Margin: 100  
 End time: 9:57:08  
 Data file name: F-000208.cts\_data

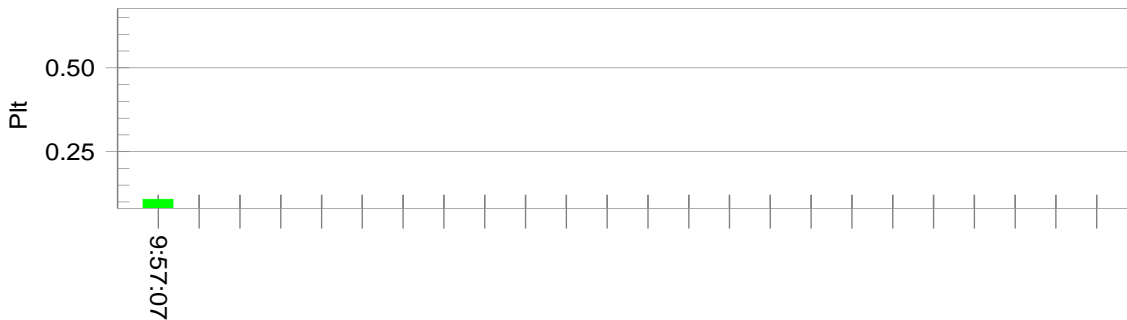
Status: Test Completed

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

**European Limits**



**Plt and limit line**



**Parameter values recorded during the test:**

Vrms at the end of test (Volt):	230.40	Test limit (%):	N/A	N/A
Highest dt (%):	0.00	Test limit (mS):	500.0	Pass
T-max (mS):	0	Test limit (%):	3.30	Pass
Highest dc (%):	0.00	Test limit (%):	4.00	Pass
Highest dmax (%):	-0.05	Test limit:	1.000	Pass
Highest Pst (10 min. period):	0.248	Test limit:	0.650	Pass
Highest Plt (2 hr. period):	0.108			

## 8. 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.

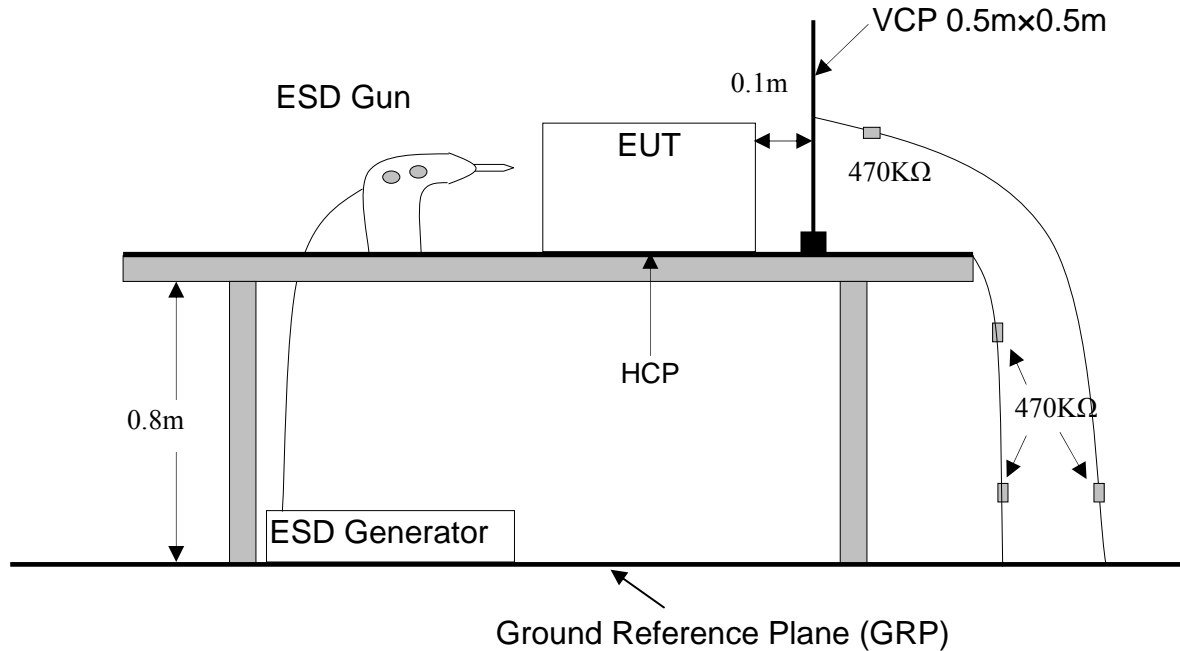
#### Performance Criteria C

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.

## 9. ELECTROSTATIC DISCHARGE IMMUNITY TEST

### 9.1 Block Diagram of Test Setup



### 9.2 Test Standard and Severity Levels

#### 9.2.1 Test Standard:

EN 55035

(IEC 61000-4-2 Air Discharge: Severity Level: 3,  $\pm 2, 4, 8$ KV;

Contact Discharge: Level: 2,  $\pm 2, 4$ KV)

#### 9.2.2 Severity Levels:

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	$\pm 2$	$\pm 2$
2.	$\pm 4$	$\pm 4$
3.	$\pm 6$	$\pm 8$
4.	$\pm 8$	$\pm 15$
X	Special	Special

## 9.3 Test Procedure

### 9.3.1 Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the E.U.T.. After each discharge, the discharge electrode shall be removed from the E.U.T..

The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

### 9.3.2 Contact Discharge:

All the procedure shall be same as Section 9.3.1. except that the tip of the discharge electrode shall touch the E.U.T..

### 9.3.3 Indirect discharge for horizontal coupling plane

At least 10 single discharges(in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit(if applicable) of the E.U.T. and 0.1m from the front of the E.U.T.. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

### 9.3.4 Indirect discharge for vertical coupling plane

At least 10 single discharge (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the E.U.T.. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the E.U.T. are completely illuminated.

## 9.4 Test Results

**PASS.**

Please refer to the following page.

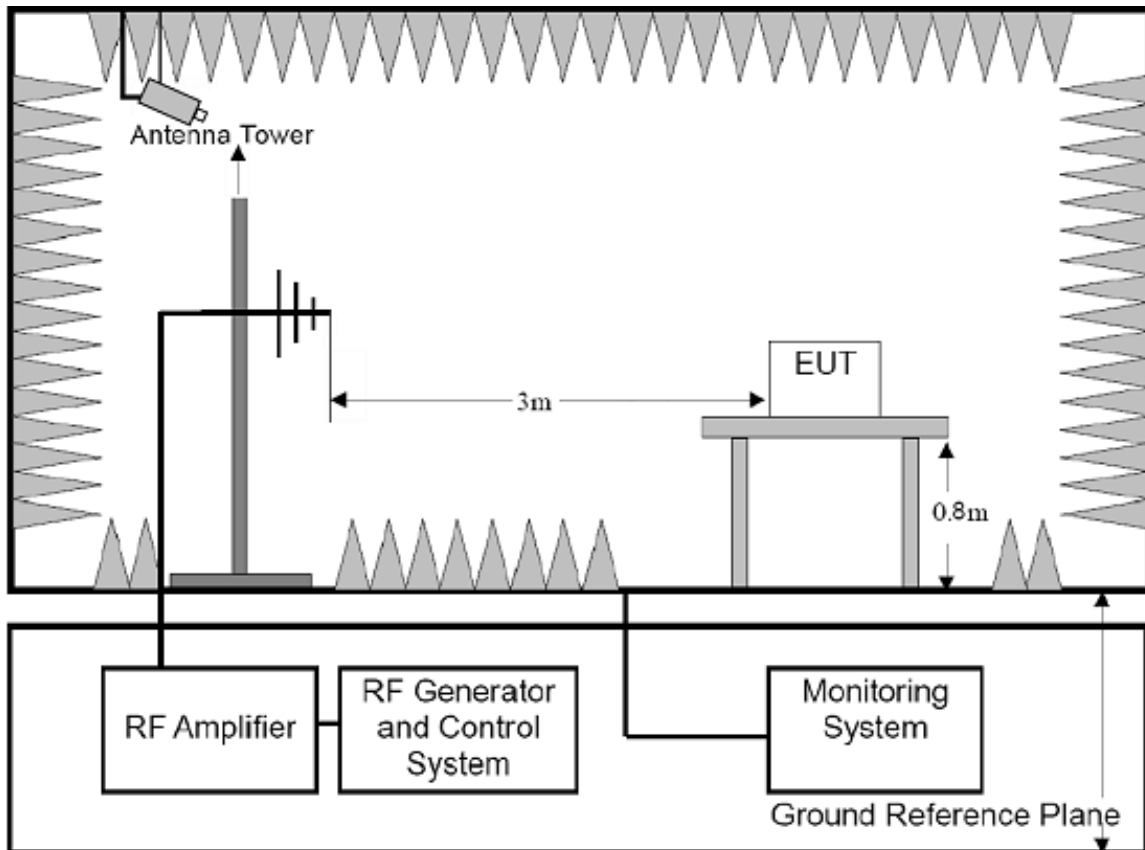
## Electrostatic Discharge Test Results

Ambient Condition:	Temp.: 25°C	R.H.: 50 %	Air Pressure: 101 kPa
Power Supply:	AC 230V 50Hz	Required Performance Criterion: B	
Test Level:	±2, 4 kV Contact Discharge; ±2, 4, 8 kV Air Discharge For each point positive 10 times and negative 10 times		
Tested mode:	AUX IN, TF Card Playing		
Test Point	Kind A-Air Discharge C-Contact Discharge	Result (Performance Criterion)	
Metal	C	A	
Slot of EUT, Button	A	A	
USB Port	C	B	
TF Card Port	A	A	
AUX, DC port	A	A	
Indirect Discharge (HCP)	C	A	
Indirect Discharge (VCP)	C	A	
<p>Note: The sound of EUT muting occurs during the test, but it can be resumed by itself after test.</p>			
Test Equipment : ESD Tester (TESEQ, NSG 437)		Test Engineer : Jimmy	



## 10. RF FIELD STRENGTH SUSCEPTIBILITY TEST

### 10.1 Block Diagram of Test Setup



### 10.2 Test Standard and Severity Levels

#### 10.2.1 Test Standard

EN 55035  
 (IEC 61000-4-3, Severity Level: 2, 3V / m)

#### 10.2.2 Severity Levels

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

### 10.3 Test Procedure

The E.U.T. and its simulators are placed on a turn table which is 0.8 meter above ground. E.U.T. is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of E.U.T. must be faced this transmitting antenna and measured individually.

All the scanning conditions are as follows :

Condition of Test	Remarks
1. Fielded Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80-1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz
4. Dwell time of radiated	0.0015 decade/s
5. Waiting Time	1 Sec.

### 10.4 Test Results

**PASS.**

Please refer to the following page.

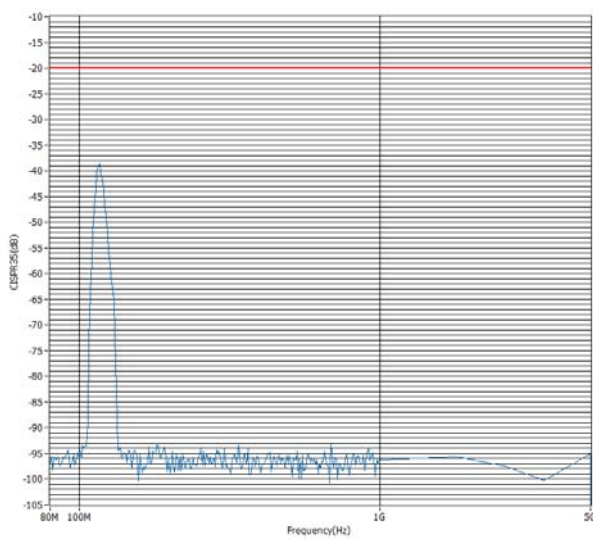
## RF Field Strength Susceptibility Test Results

Ambient Condition:	Temp.: 25°C	R.H.: 52%	Air Pressure: 101 kPa	
Power Supply:	AC 230V 50Hz	Required Performance Criterion: A		
Test Specifications:	Modulation: 1kHz, 80%AM; Step Size: 1%; Dwell Time: 1s			
Tested mode:	AUX IN, TF Card Playing			
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

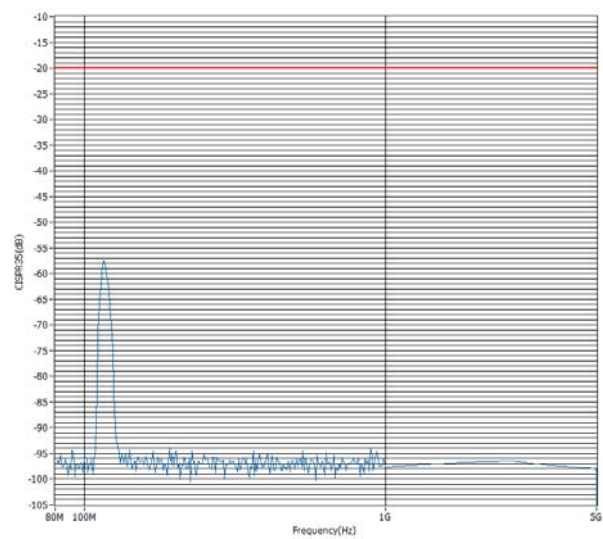
Worst case mode: AUX IN

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

Horizontal



Vertical



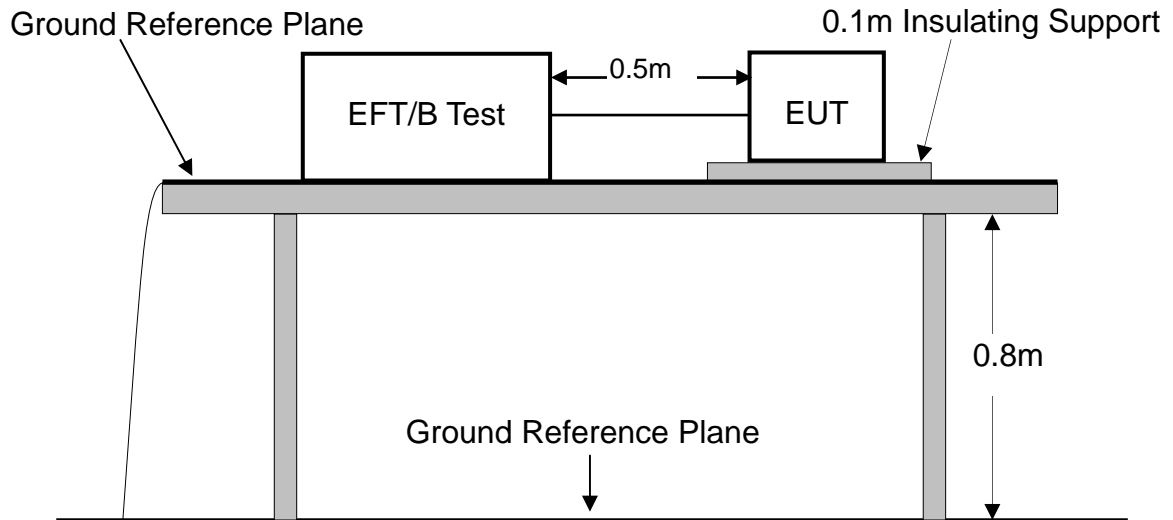
TEST RESULT

PASS

Test Engineer : Ivan

## 11. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

### 11.1 Block Diagram of Test Setup



### 11.2 Test Standard and Severity Levels

#### 11.2.1 Test Standard

EN 55035

(IEC 61000-4-4, Severity Level, Level 2: 1KV)

#### 11.2.2 Severity level

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

Note 1 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.

Note 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.

Note 3 "X" is an open level. The level has to be specified in the dedicated equipment specification.

### 11.3 Test Procedure

The E.U.T. is put on the table which is 0.8 meter high above the ground. This reference ground plane shall project beyond the E.U.T. by at least 0.1m on all sides and the minimum distance between E.U.T. and all other conductive structure, except the ground plane beneath the E.U.T., shall be more than 0.5m.

#### 11.3.1 For input and output AC power ports:

The E.U.T. is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.

#### 11.3.2 For signal lines ports:

It's unnecessary to test.

#### 11.3.3 For DC ports:

It's unnecessary to test.

### 11.4 Test Result

**PASS.**

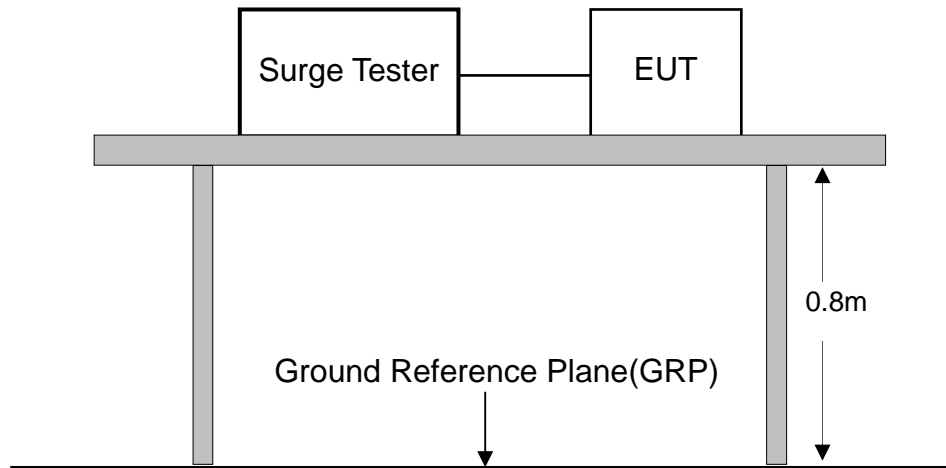
Please refer to the following page.

## Electrical Fast Transient/Burst Test Results

Ambient Condition:	Temp.: 25°C	R.H.: 51 %	Air Pressure: 101 kPa
Power Supply:	AC 230V 50Hz	Required Performance Criterion: B	
Test Level:	Repetition Frequency: 5kHz; Duration: 15ms; Period: 300ms		
Tested mode:	AUX IN, TF Card Playing		
Line :	<input checked="" type="checkbox"/> AC Mains	<input type="checkbox"/> Signal line	<input type="checkbox"/> DC line
Coupling :	<input checked="" type="checkbox"/> Direct	<input type="checkbox"/> Capacitive	
Line	Test Voltage	Result (Performance Criterion)	
L	±1KV	A	
N	±1KV	A	
PE	--	--	
L、N	±1KV	A	
L、PE	--	--	
N、PE	--	--	
L、N、PE	--	--	
Telecommunication Port	--	--	
DC line	--	--	
Note:			
Test Equipment : Burst Tester(EM TEST, UCS500N)		Test Engineer : Jimmy	

## 12. SURGE IMMUNITY TEST

### 12.1 Block Diagram of Test Setup



### 12.2 Test Standard and Severity Levels

#### 12.2.1 Test Standard

EN 55035

(IEC 61000-4-5, Severity Level: Line To Line, Level 2: 1.0KV)

#### 12.2.2 Severity level

Severity Level	Open-Circuit Test Voltage KV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special



### 12.3 Test Procedure

1. Set up the E.U.T. and test generator as shown on Section 12.1.
2. For Mains line to line coupling mode, provide a 1.0KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to E.U.T. selected points.  
For signal line, provide a 1.0KV 10/700us voltage surge.
3. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
4. Different phase angles are done individually.
5. Record the E.U.T. operating situation during compliance test and decide the E.U.T. immunity criterion for above each test.

### 12.4 Test Result

**PASS.**

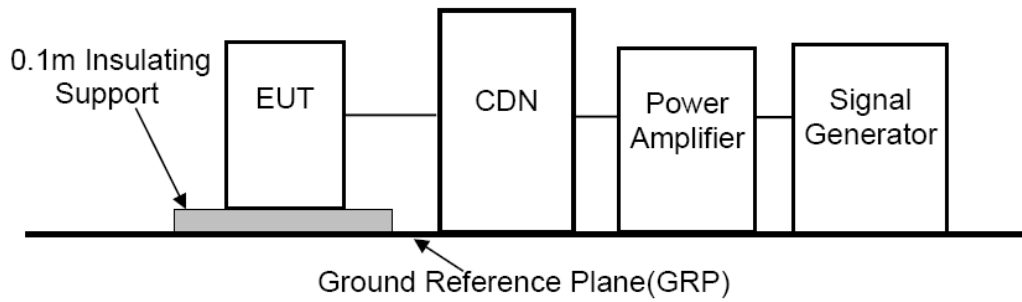
Please refer to the following page.

## Surge Immunity Test Results

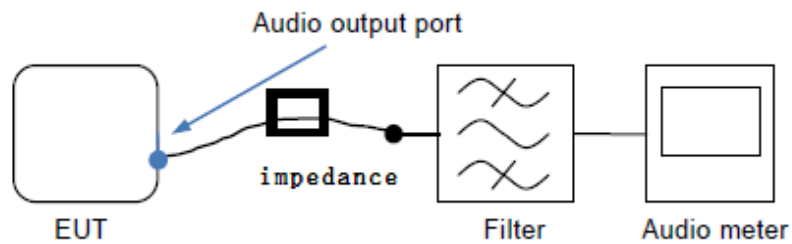
Ambient Condition:	Temp.: 25°C	R.H.: 52 %	Air Pressure: 101 kPa
Power Supply:	AC 230V 50Hz	Required Performance Criterion: B	
Test Specifications:	Voltage surge 1.2/50 us ; Current surge 8/20 us ; Five positive pulses Line-to-neutral at 90°phase, Five negative pulses Line-to-neutral at 270°phase.		
Tested mode:	AUX IN, TF Card Playing		
<b>Line</b>	<b>Phase Angle</b>	<b>Test Voltage</b>	<b>Result (Performance Criterion)</b>
L-N	90°	+1KV	A
	270°	-1KV	A
L-PE	--	--	--
	--	--	--
N-PE	--	--	--
	--	--	--
Telecommunication Port	--	--	--
	--	--	--
DC line	--	--	--
	--	--	--
Note:			
Test Equipment : Surge Tester(EM TEST, UCS500N)		Test Engineer : Jimmy	

## 13. INJECTED CURRENTS SUSCEPTIBILITY TEST

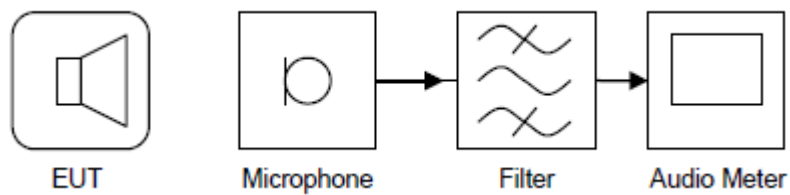
### 13.1 Block Diagram of Test Setup



**For Electrical measurements setup:**



**For Acoustic measurements setup:**



## 13.2 Test Standard and Severity Levels

### 13.2.1 Test Standard

EN 55035  
(IEC 61000-4-6:2014)

### 13.2.2 Severity level

Level	Field Strength V
0.15-10MHz	3
10-30MHz	3 to 1 *
30-80MHz	1

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.

## 13.3 Test Procedure

1. Set up the E.U.T., CDN and test generators as shown on Section 13.1.
2. Let the E.U.T. work in test mode and measure it.
3. The E.U.T. are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from E.U.T.. Cables between CDN and E.U.T. are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
4. The disturbance signal described below is injected to E.U.T. through CDN.
5. The E.U.T. operates within its operational mode(s) under intended climatic conditions after power on.
6. 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.
7. Recording the E.U.T. operating situation during compliance testing and decide the E.U.T. immunity criterion.

## 13.4 Test Result

**PASS.**

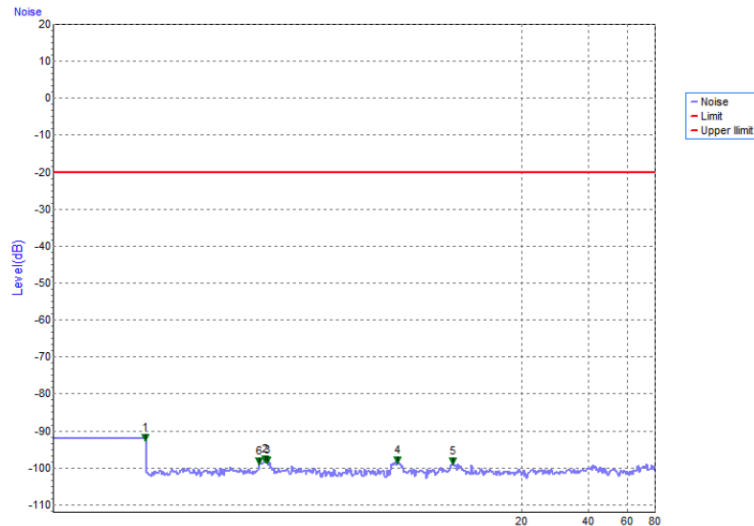
Please refer to the following page.

## Injected Currents Susceptibility Test Results

Ambient Condition:	Temp.: 25 °C	R.H.: 51%	Air Pressure: 101 kPa
Power Supply:	AC 230V 50Hz	Required Performance Criterion: A	
Test Specifications:	Modulation : 1KHz, 80%AM, Step Size : 1%, Dwell Time : 3s		
Tested mode:	AUX IN, TF Card Playing		
Test Port	Frequency (MHz)	Level(V)	Result (Performance Criterion)
AC Mains	0.15~10	3	A
AC Mains	10~30	3 to 1	A
AC Mains	30~80	1	A

Worst case mode: AUX IN,

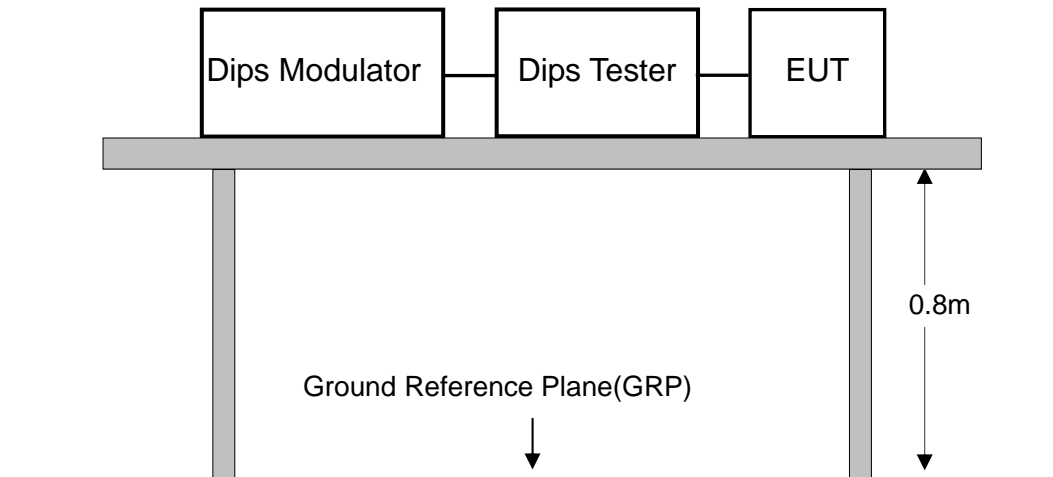
Note: The value of the reference level was reduce 20dB as the limit.



Test Result	Pass
Test Equipment : C/S Test System (HAEFELY, WinPAMP)      Test Engineer : Ivan	

## 14. VOLTAGE DIPS AND INTERRUPTIONS TEST

### 14.1 Block Diagram of Test Setup



### 14.2 Test Standard and Severity Levels

#### 14.2.1 Test Standard

EN 55035  
 (IEC 61000-4-11)

#### 14.2.2 Severity level

Test Level %UT	Voltage dip and short interruptions %UT	Duration (in period)
0	100	0.5 1
40	60	5 10
70	30	25 50 *

### 14.3 Test Procedure

1. Set up the E.U.T. and test generator as shown on Section 14.1.
2. The interruptions are introduced at selected phase angles with specified duration.
3. Record any degradation of performance.

#### 14.4 Test Result

**PASS.**

Please refer to the following page.

## Voltage Dips And Interruptions Test Results

Ambient Condition:	Temp.: 25 °C	R.H.: 51%	Air Pressure: 101 kPa
Power Supply:	AC 230V 50/60Hz	Required Performance Criterion: B & C	
Test Specifications:	0%UT, 0.5Cycle; 30%UT, 25Cycle; 0%UT,250Cycle		
Tested mode:	AUX IN, TF Card Playing		
Test Level % UT	Duration (in period)		Result (Performance Criterion)
	50Hz	60Hz	
0	0.5P	0.5P	A
70	25P	30P	A
0	250P	300P	C
Note : During the test, the EUT power off, but it can be recovered by user after test.			
Test Result		Pass	
Test Equipment : Dips Tester: EM TEST, UCS 500N		Test Engineer : Jimmy	

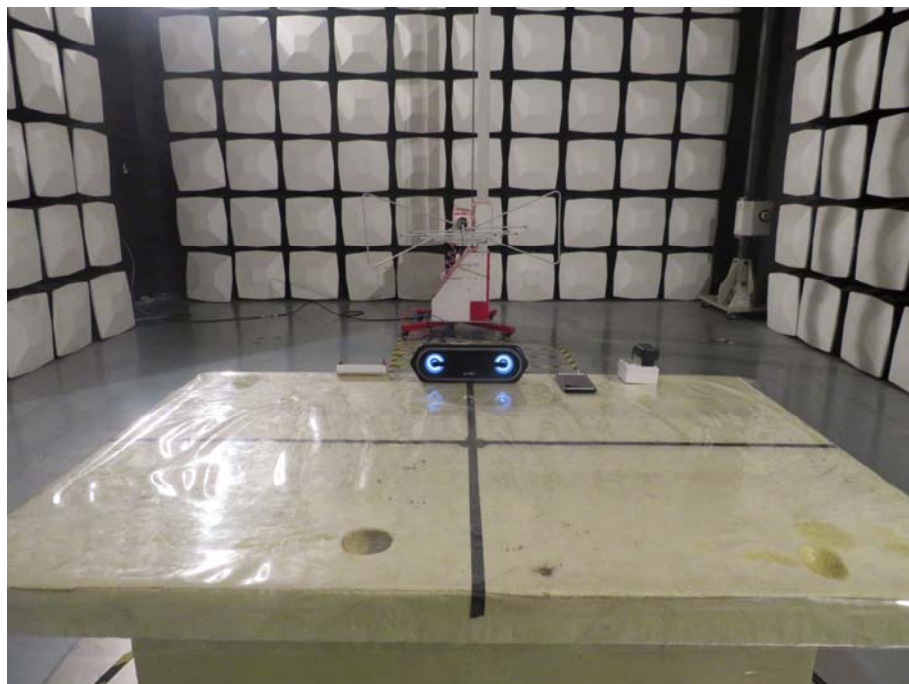


## 15. PHOTOGRAPHS

### 15.1 Photo of Power Line Conducted Emission Measurement



### 15.2 Photo of Radiated Emission Measurement



### 15.3 Photo of Harmonic Current / Flicker Measurement



### 15.4 Photo of Electrostatic Discharge Immunity Measurement



### 15.5 Photo of RF Electromagnetic Field Immunity



### 15.6 Photo of Electrical Fast Transient /Burst /Surge /Voltage Dips



### 15.7 Photo of Injected Currents Immunity



# APPENDIX I (PHOTOS OF E.U.T.)



## General Appearance of the E.U.T.



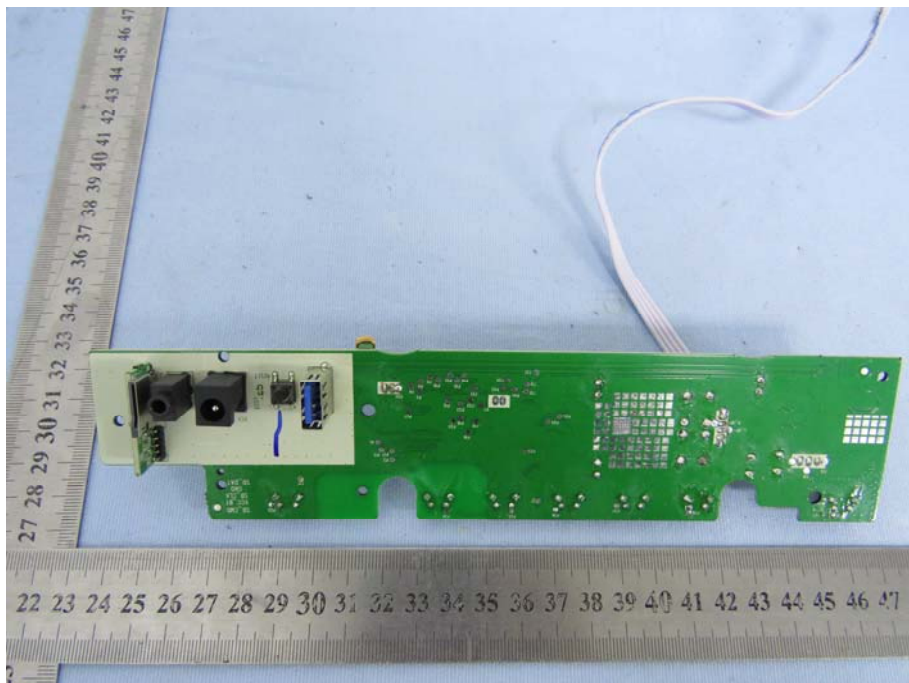




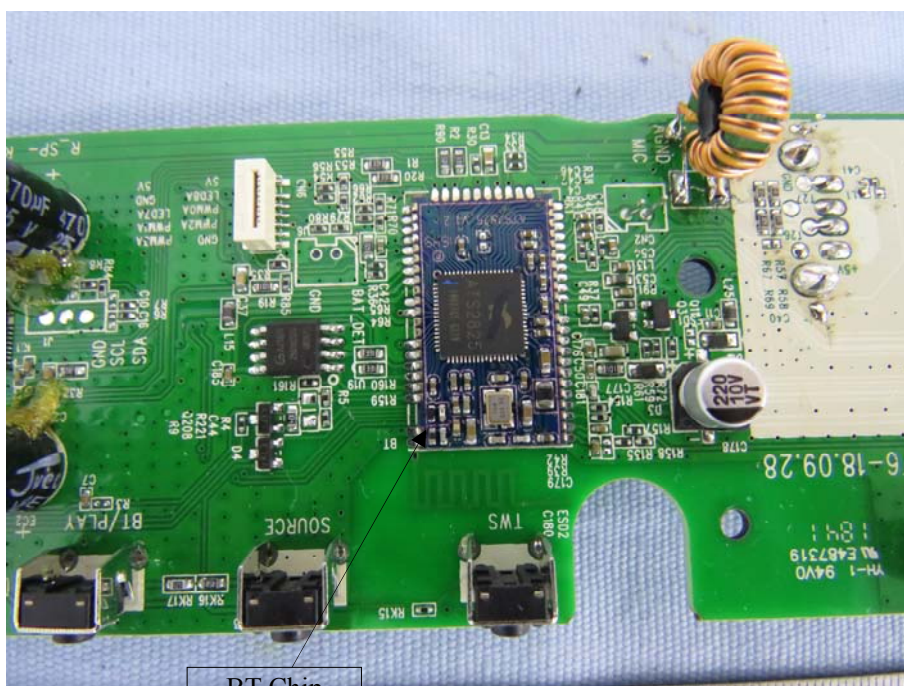
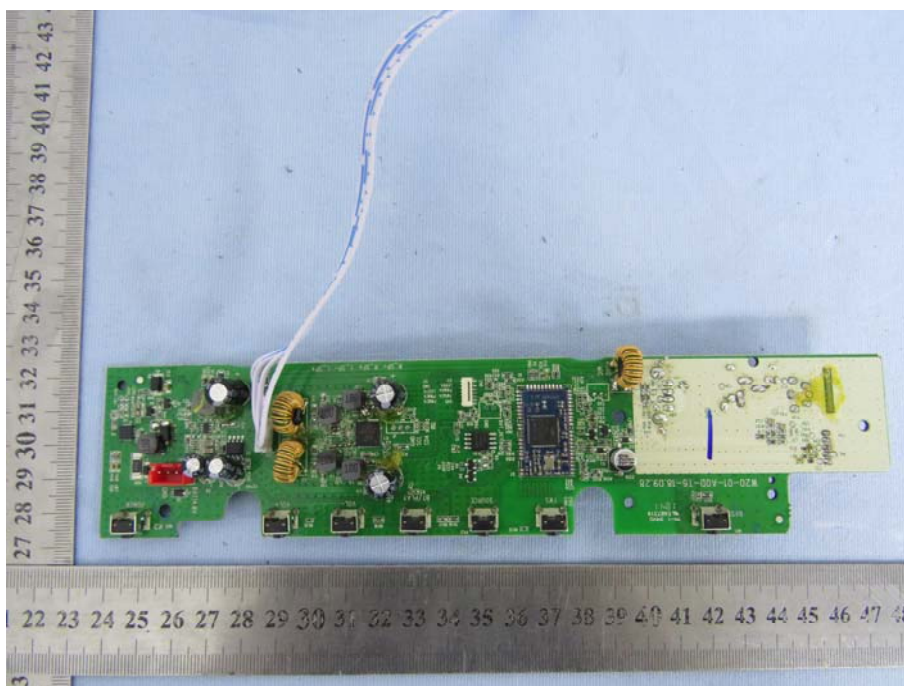












---End---