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, Shiyan Town, Baoan District, Shenzhen City, Guangdong, China
Manufacturer/Factory	:	SHENZHEN FENDA TECHNOLOGY CO., LTD.
Address	:	Fenda Hi-Tech Park, Zhoushi Road, Shiyan Town, Baoan District, Shenzhen City, Guangdong, China
E.U.T.	:	Computer multimedia speaker
Brand Name	:	F&D
Model No.	:	T5, T5-10, T6, T7, T8, T1, T3 (For model difference refer to section 2.1)
Measurement Standard	:	EN 55032: 2015 EN 61000-3-2: 2014, EN 61000-3-3: 2013 EN 55020: 2007+A12: 2016 (EN 61000-4-2: 2009, EN 61000-4-3: 2006+A2: 2010, EN 61000-4-4: 2012)
Date of Receiver	:	November 24, 2017
Date of Test	:	November 24, 2017 to December 09, 2017
Date of Report	:	December 09, 2017

This Test Report is Issued Under the Authority of :

Prepared by	Approved & Authorized Signer
Knight Wen / Engineer	Iori 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 and EN 55020. 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.

TEL: +86-769-22022444 FAX: +86-769-22022799 Web: www.ntc-c.com
Address: Building D, Gaosheng Science & Technology Park, Zhouxi Longxi Road, Nancheng District, Dongguan City, Guangdong, China

TABLE OF CONTENT

APPENDIX I (Photos of the E.U.T.) (10 pages)

Revision History of This Test Report

Report Number	Description	Issued Date
NTC1711192EV00	Initial Issue	2017-12-09

1. SUMMARY OF TEST RESULTS

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

EMISSION			
Standard	**Test Type**	**Result**	**Remarks**
EN 55032: 2015	Mains Terminal Disturbance Voltage Test	PASS	Uncertainty: 2.7dB
	Antenna Terminal Disturbance Voltage Test	N/A	Meets the requirements.
	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.

IMMUNITY(EN 55020: 2007+A12: 2016)			
Standard	**Test Type**	**Result**	**Remarks**
EN 55020: 2007+A12: 2016	Input immunity (S1)	N/A	Meets the requirements.
	Immunity from conducted voltages (S2a)	PASS	Meets the requirements.
	Immunity from conducted currents (S2b)	N/A	Meets the requirements.
	Immunity from radiated fields (S3)	PASS	Meets the requirements.
	Screening effectiveness (S4)	N/A	Meets the requirements.
EN61000-4-2: 2009	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion B
EN 61000-4-3: 2006+A2: 2010	Radiated, radio-frequency, electromagnetic field immunity test(S5)	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-4: 2012	Electrical fast transient/ burst immunity test	PASS	Meets the requirements of Performance Criterion B

2. GENERAL INFORMATION

2.1 Details of E.U.T.

E.U.T.	:	Computer multimedia speaker
Main model number	:	T5
Additional Model number	:	T5-10, T6, T7, T8, T1, T3
Brand Name	:	F&D
E.U.T. Type	:	Class B
Operation Frequency	:	Below 108MHz (Except for BT function).
Operating Temperature Range	:	5°C to 45°C (Declaration by manufacturer)
Rating	:	AC 100V-240V, 50/60Hz DC 12V From internal sealed rechargeable battery
Test Voltage	:	AC 230V 50Hz, AC 110V 60Hz DC 12V From Internal sealed rechargeable battery (Only the worst case was recorded in this report.)
Cable	:	N/A
Description of model difference	:	Both of models have the same circuit schematic, construction, PCB Layout and critical components. Their difference in model number due to trading purpose.
HW	:	V1.0
SW	:	V1.0
Remark	:	According to the model difference, all tests were carried on model T5.

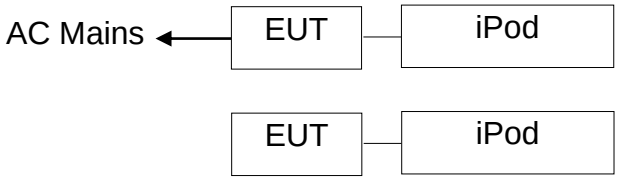
2.2 Description of Support Device

iPod	:	Manufacturer: Apple M/N: A1446 S/N: DCYNV5EMFOGQ
USB Flash Disk	:	Manufacturer: Sony M/N: USB 3.0 8GB
FM signal Generator	:	Manufacturer: LEADER M/N: 3214 S/N: 110064

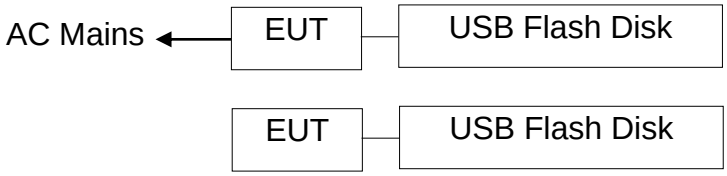
2.3 Block Diagram of Test Setup

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

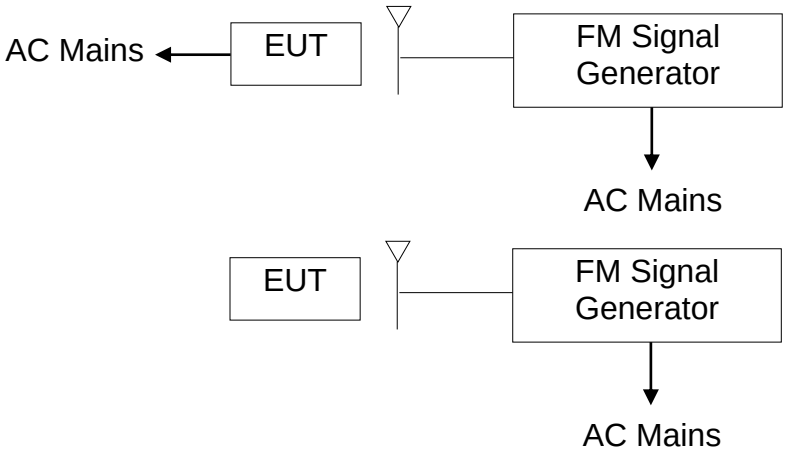
(1) AUX IN, Charging+ AUX IN,



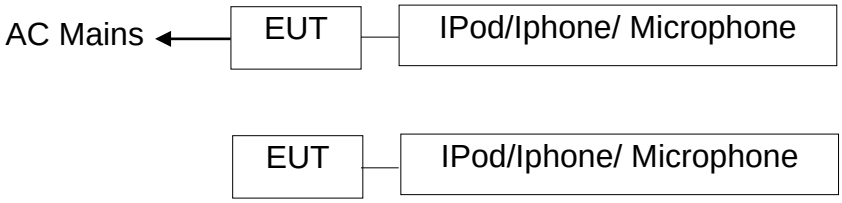
(2) USB Playing, Charging+ USB Playing



(3) FM Mode, Charging+ FM Mode



(4)MIC IN,Guilta IN, Charging+ MIC IN, Charging+ Guilta IN



2.4 Test Facility

Site Description

EMC Lab : Listed by CNAS, August 14, 2015
The certificate is valid until August 13, 2018
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 1 : Dongguan Nore Testing Center Co., Ltd. (Dongguan NTC Co., Ltd.)

Site Location 1 : Building D, Gaosheng Science & Technology Park, Zhouxi Longxi Road, Nancheng District, Dongguan City, Guangdong Province, China

Name of Firm 2 : Bureau Veritas Shenzhen Co., Ltd., Dongguan Branch

Site Location 2 : No. 34, Chenwulu Section, Guantai Rd., Houjie Town, Dongguan City, Guangdong 523942, 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, 2017	1 Year
2.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 14, 2017	1 Year
3.	L.I.S.N	Schwarzbeck	NNLK8129	8129212	Mar. 07, 2017	1 Year
4.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar. 14, 2017	1 Year

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, 2017	1 Year
2.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 15, 2017	1 Year
3.	Positioning Controller	UC	UC 3000	N/A	N/A	N/A
4.	Color Monitor	SUNSPO	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.	Cable	Huber+Suhner	CBL3-NN-9M	21490001	Mar. 14, 2017	1 Year
9.	Cable	Huber+Suhner	RG223U	N/A	Mar. 14, 2017	1 Year
10.	Power Amplifier	HP	HP 8447D	1145A00203	Mar. 14, 2017	1 Year

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, 2017	1 Year
2.	5KVA AC Power Source	California Instruments	500liX	60137	Mar. 14, 2017	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, 2017	1 Year

3.5 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, 2017	1 Year
2.	Coupling Clamp	EM TEST	HFK	0311-94	Mar. 14, 2017	1 Year
3.	Test Soft	EM TEST	lec. control	N/A	N/A	N/A

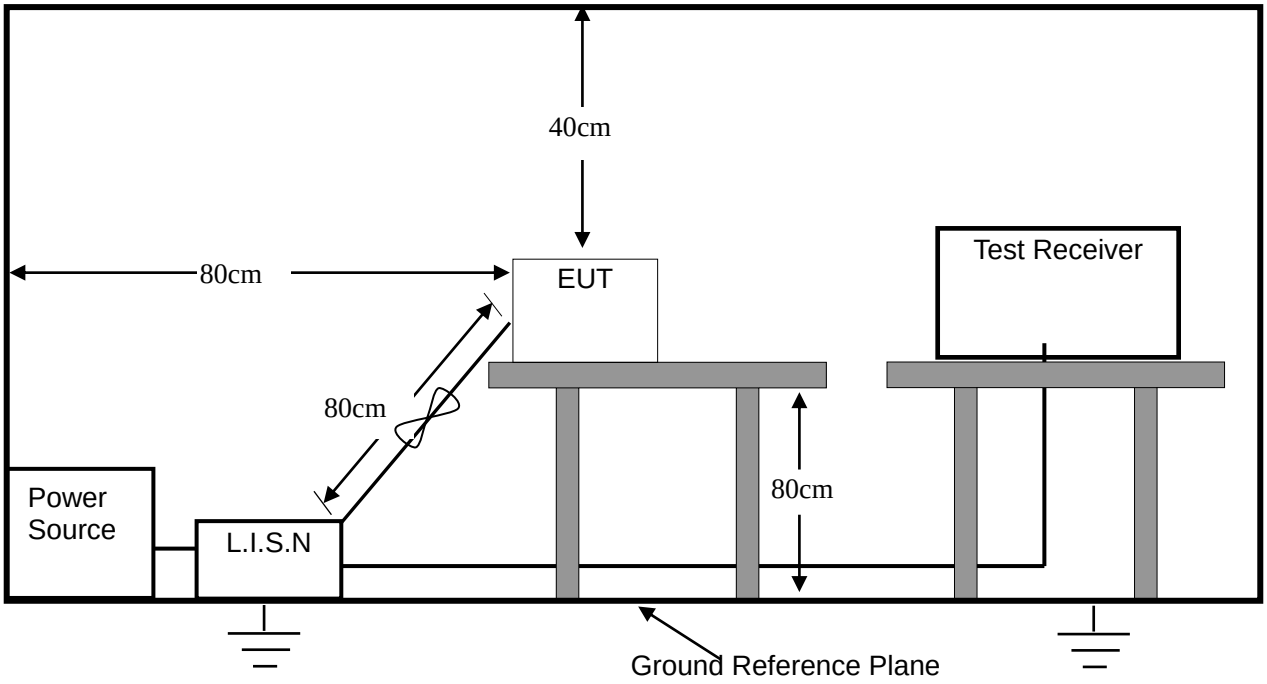
3.6 For EN55020 Immunity Test

(Bureau Veritas Shenzhen Co., Ltd., Dongguan Branch)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Broadcast Test System	Rohde&Schwarz	SFU	101543	May 14, 2017	1 Year
2.	TV Generator PAL	Rohde&Schwarz	SGPF	100200	May 14, 2017	1 Year
3.	Spectrum Analyzer	Rohde&Schwarz	FSL3	101507	May 14, 2017	1 Year
4.	Signal Generator	Rohde&Schwarz	SMB100A	102382	May 14, 2017	1 Year
5.	Signal Generator	Rohde&Schwarz	SMB100A	102383	May 14, 2017	1 Year
6.	Power Meter	Rohde&Schwarz	NRVS	101732	May 14, 2017	1 Year
7.	Audio Analyzer	Rohde&Schwarz	UPV	101346	May 14, 2017	1 Year
8.	Level Meter	Rohde&Schwarz	URV35	100335	May 14, 2017	1 Year
9.	100V Insertion Unit 50Ω	Rohde&Schwarz	URV5-Z4	100207	May 14, 2017	1 Year
10.	RF Probe	Rohde&Schwarz	URV5-Z7	100657	May 14, 2017	1 Year
11.	Absorbing Clamp	Rohde&Schwarz	MDS-21	100352	May 14, 2017	1 Year
12.	Test Software	Rohde&Schwarz	T80-K1	N/A	N/A	N/A

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	Limits (dB(uV))	
(MHz)	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. 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.

4.3 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 EN55032 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 (Charging+AUX IN, Charging+USB Playing, Charging+FM Mode, Charging+Guilta IN, Charging+MIC IN) and test it.

4.5 Mains Terminal Disturbance Voltage Test Results

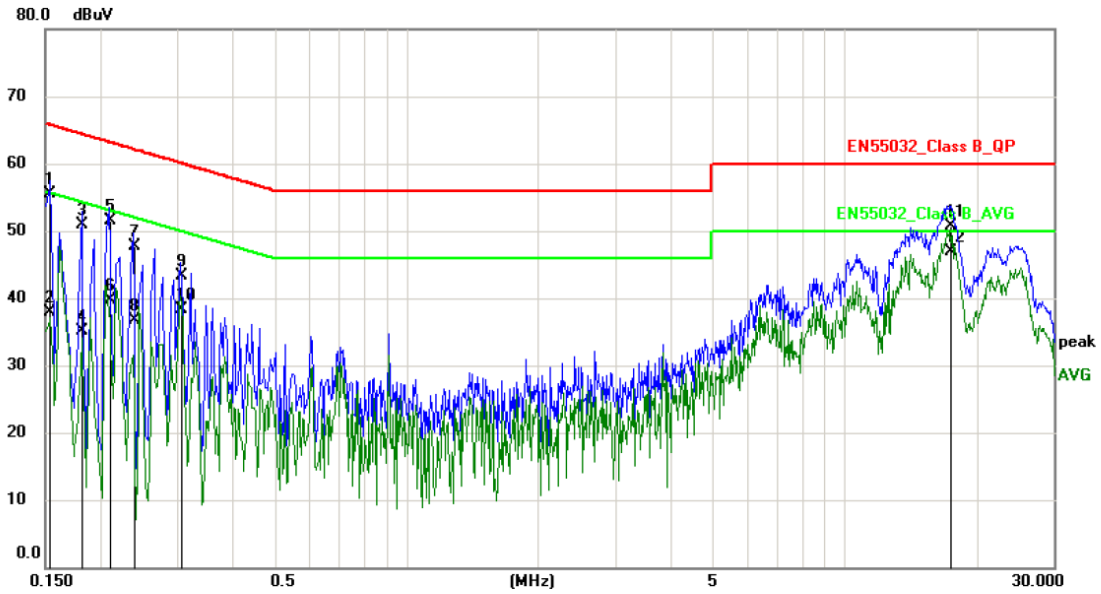
PASS.

Please refer to the following pages of the worst case

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

Conducted Emission Measurement

File :T5 Data :#6 Date: 2017-11-27 Time: 10:37:20



Site
Limit: EN55032_Class B_QP
EUT: Computer multimedia speaker
M/N: T5
Mode: Charging+FM Mode
Note:

Phase: *L1*
Power: AC230V/50Hz

Temperature: 26
Humidity: 53 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1539	44.70	10.80	55.50	65.79	-10.29	QP	
2		0.1539	27.20	10.80	38.00	55.79	-17.79	AVG	
3		0.1819	40.10	10.80	50.90	64.40	-13.50	QP	
4		0.1819	24.30	10.80	35.10	54.40	-19.30	AVG	
5		0.2100	40.80	10.80	51.60	63.21	-11.61	QP	
6		0.2100	29.00	10.80	39.80	53.21	-13.41	AVG	
7		0.2380	37.00	10.80	47.80	62.17	-14.37	QP	
8		0.2380	26.00	10.80	36.80	52.17	-15.37	AVG	
9		0.3060	32.50	10.80	43.30	60.08	-16.78	QP	
10		0.3060	27.50	10.80	38.30	50.08	-11.78	AVG	
11		17.4460	40.00	10.80	50.80	60.00	-9.20	QP	
12	*	17.4460	36.10	10.80	46.90	50.00	-3.10	AVG	

*:Maximum data x:Over limit !:over margin 〈Reference Only

File :T5\Data :#6 *Page: 1* Engineer Signature: Lee

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

Conducted Emission Measurement

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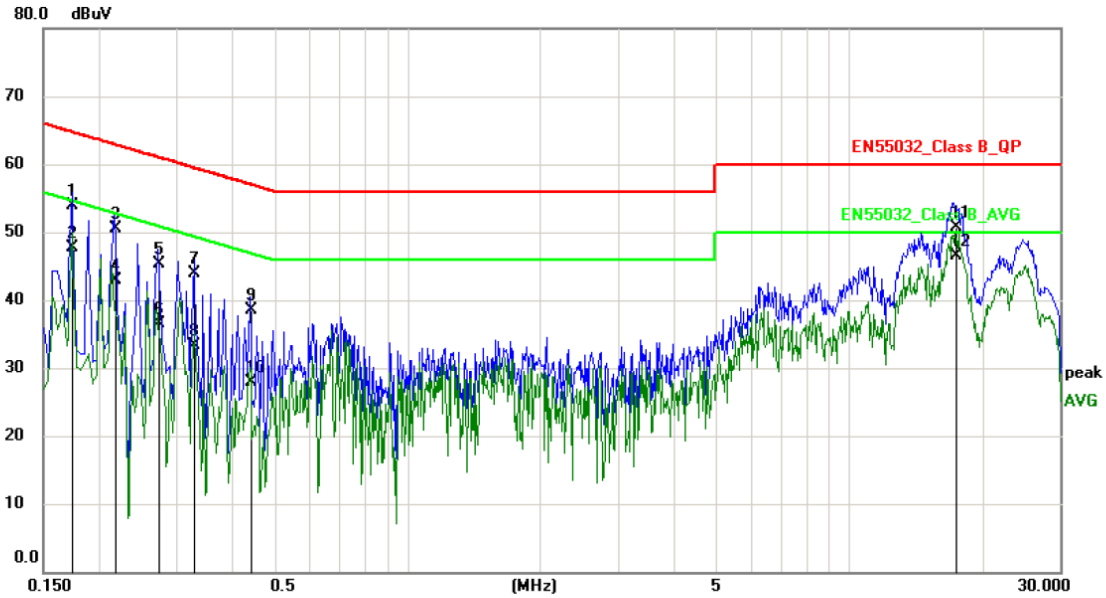


Site
Limit: EN55032_Class B_QP
EUT: Computer multimedia speaker
M/N: T5
Mode: Charging+FM Mode
Note:

Phase: *N*
Power: AC230V/50Hz

Temperature: 26
Humidity: 53 %

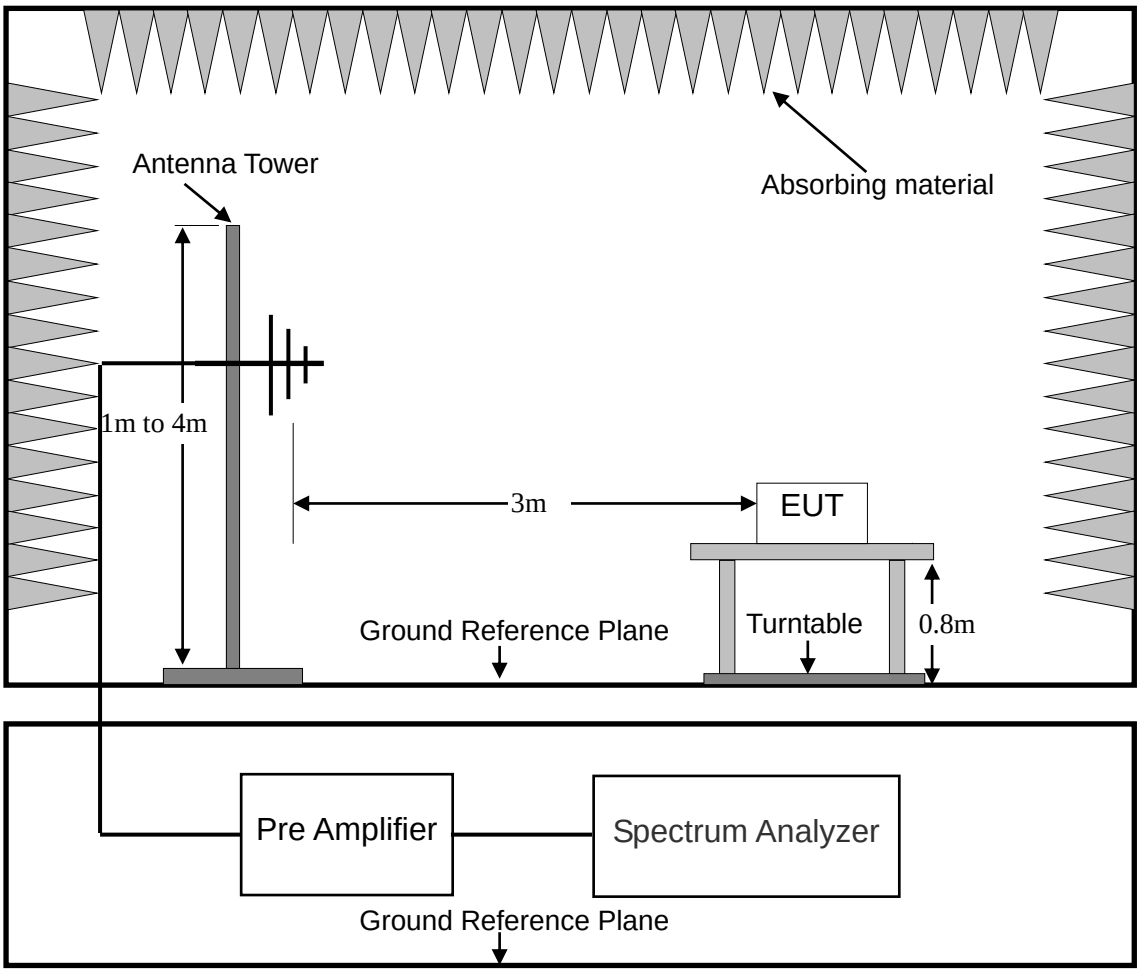
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1740	43.10	10.80	53.90	64.77	-10.87	QP	
2		0.1740	37.00	10.80	47.80	54.77	-6.97	AVG	
3		0.2180	39.70	10.80	50.50	62.89	-12.39	QP	
4		0.2180	32.10	10.80	42.90	52.89	-9.99	AVG	
5		0.2740	34.60	10.80	45.40	61.00	-15.60	QP	
6		0.2740	25.70	10.80	36.50	51.00	-14.50	AVG	
7		0.3300	33.20	10.80	44.00	59.45	-15.45	QP	
8		0.3300	22.50	10.80	33.30	49.45	-16.15	AVG	
9		0.4420	27.70	10.80	38.50	57.02	-18.52	QP	
10		0.4420	17.20	10.80	28.00	47.02	-19.02	AVG	
11		17.4060	39.90	10.80	50.70	60.00	-9.30	QP	
12	*	17.4060	35.80	10.80	46.60	50.00	-3.40	AVG	

*:Maximum data x:Over limit !:over margin 〈Reference Only

File :T5\Data :#7 *Page: 1* Engineer Signature: Lee

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 at a measuring distance of 3m
Limits below 1GHz

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.

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, USB Playing, FM Mode, Guilta IN, MIC IN, Charging+AUX IN, Charging+USB Playing, Charging+FM Mode, Charging+Guilta IN, Charging+MIC IN) and test it.

5.5 Radiated Emission Measurement Result

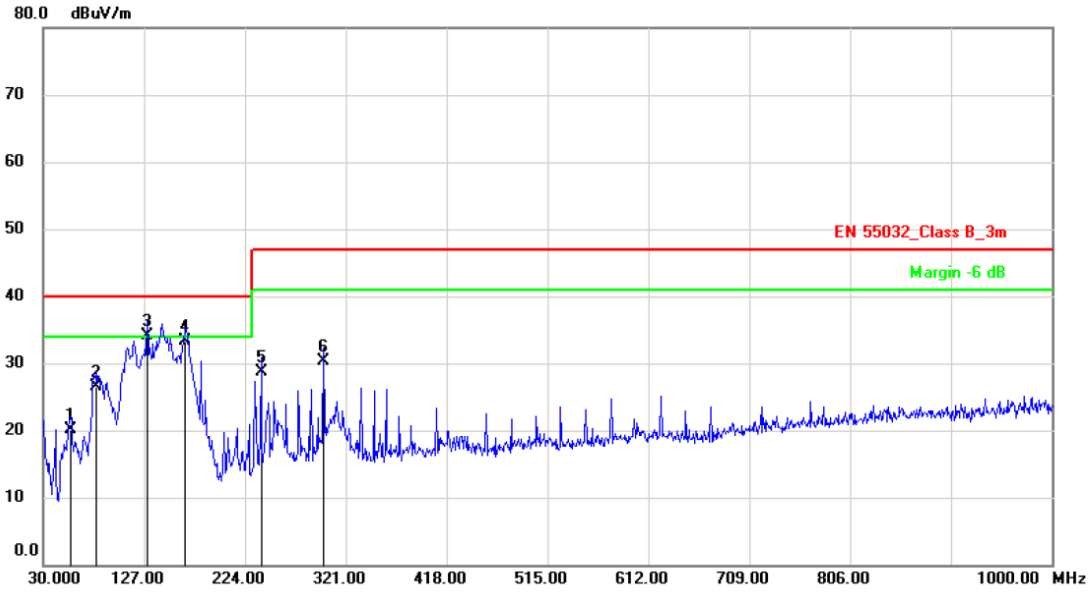
PASS.

Please refer to the following pages of the worst case

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

Radiated Emission Measurement

File :T5 Data :#3 Date: 2017-11-27 Time: 15:17:22



Site
Limit: EN 55032_Class B_3m
EUT: Computer multimedia speaker
M/N: T5
Mode: Charging+USB Playing
Note:

Polarization: *Horizontal*
Power: AC230V/50Hz
Distance: 3m

Temperature: 26
Humidity: 60 %

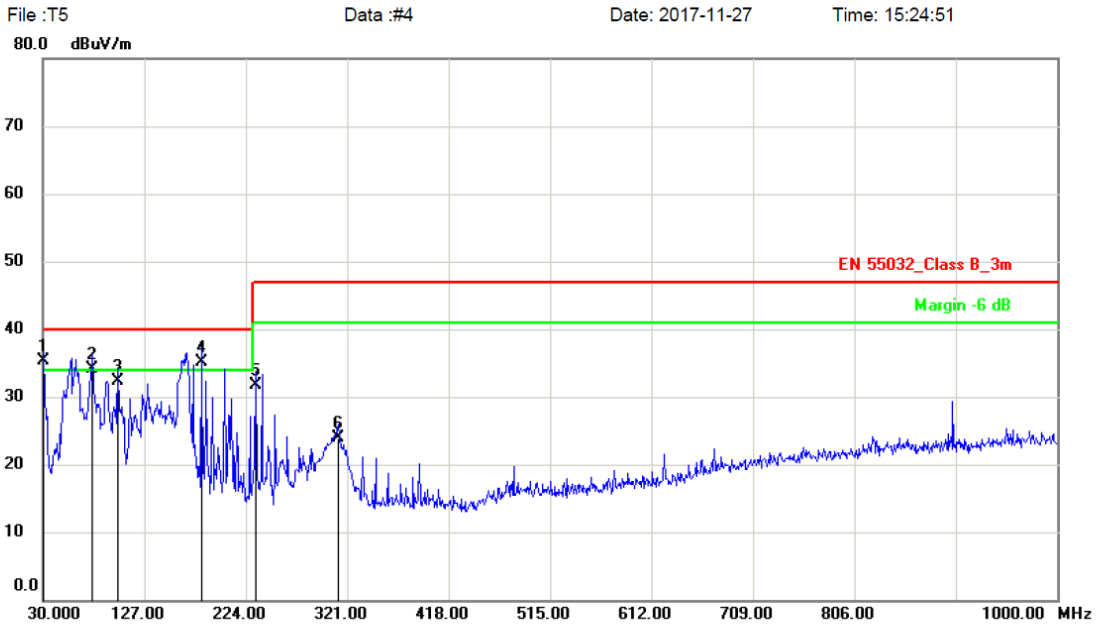
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		56.1900	37.95	-17.85	20.10	40.00	-19.90	QP			
2		80.4400	42.64	-16.04	26.60	40.00	-13.40	QP			
3	*	129.9100	49.35	-15.15	34.20	40.00	-5.80	QP			
4		166.7700	48.22	-14.92	33.30	40.00	-6.70	QP			
5		239.5200	40.86	-12.06	28.80	47.00	-18.20	QP			
6		299.6600	40.77	-10.47	30.30	47.00	-16.70	QP			

*:Maximum data x:Over limit !:over margin 〈Reference Only

File :T5\Data :#3 *Page: 1* Engineer Signature: Lay

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

Radiated Emission Measurement



Site
Limit: EN 55032_Class B_3m
EUT: Computer multimedia speaker
M/N: T5
Mode: Charging+USB Playing
Note:

Polarization: *Vertical*
Power: AC230V/50Hz
Distance: 3m

Temperature: 26
Humidity: 60 %

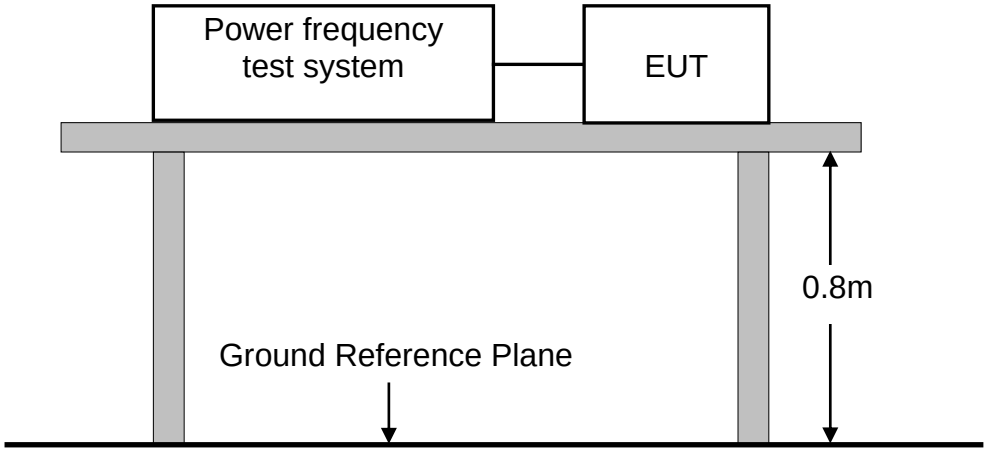
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	30.0000	51.20	-15.90	35.30	40.00	-4.70	QP			
2	!	77.5300	53.28	-19.08	34.20	40.00	-5.80	QP			
3		101.7800	48.36	-16.06	32.30	40.00	-7.70	QP			
4	!	181.3200	52.26	-17.06	35.20	40.00	-4.80	QP			
5		233.7000	47.00	-15.30	31.70	47.00	-15.30	QP			
6		312.2700	36.03	-12.13	23.90	47.00	-23.10	QP			

*:Maximum data x:Over limit !:over margin 〈Reference Only

File :T5\Data :#4 *Page: 1* Engineer Signature: Lay

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	0.15×15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
8<=n<=40	0.23×8/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 (Charging+AUX IN, Charging+USB Playing, Charging+FM Mode, Charging+Guilta IN, Charging+MIC IN) and test it.

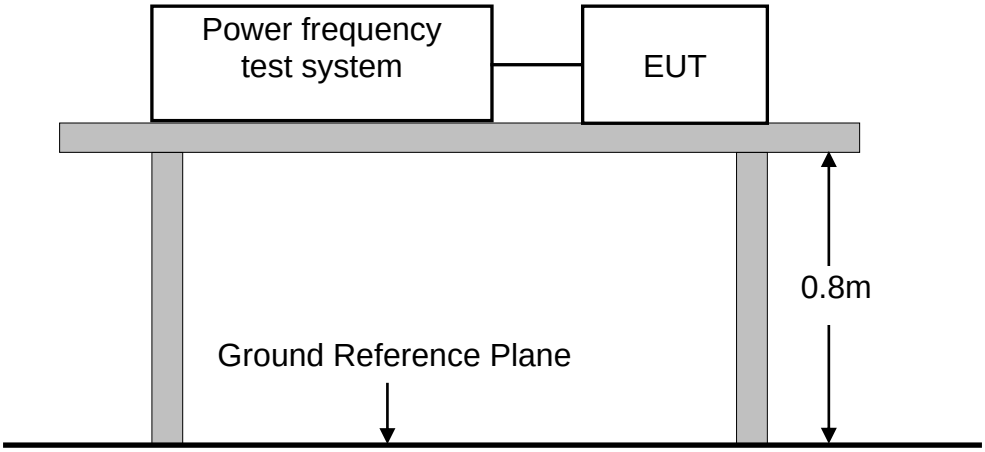
6.5 Test Results

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 (Charging+AUX IN, Charging+USB Playing, Charging+FM Mode, Charging+Guilta IN, Charging+MIC IN) and test it.

7.5 Test Results

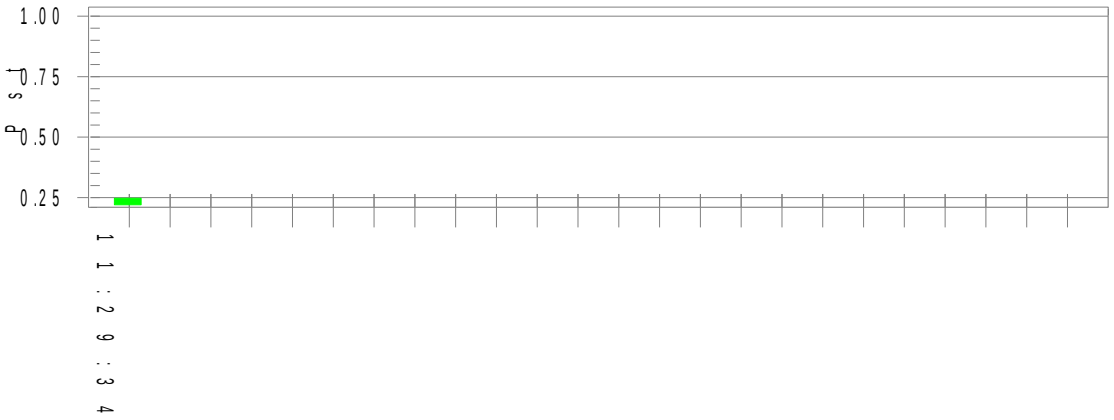
PASS.

Please refer to the following pages of the worst case

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

EUT: Computer multimedia speaker **Tested by: Ivan**
Test category: All parameters (European limits) **Test Margin: 100**
Test date: 2017-11-28 **Start time: 11:19:04** **End time: 11:29:35**
Test duration (min): 10 **Data file name: F-001014.cts_data**
Comment: Charging+USB Playing
Customer: FENDA
M/N: T5
Test Result: Pass **Status: Test Completed**

Pst_i and limit line **European Limits**



Plt and limit line

Parameter values recorded during the test:

Vrms at the end of test (Volt):	**230.33**			
Highest dt (%):	**0.00**	**Test limit (%):**	**N/A**	**N/A**
T-max (mS):	**0**	**Test limit (mS):**	**500.0**	**Pass**
Highest dc (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Highest dmax (%):	**0.05**	**Test limit (%):**	**4.00**	**Pass**
Highest Pst (10 min. period):	**0.248**	**Test limit:**	**1.000**	**Pass**
Highest Plt (2 hr. period):	**0.108**	**Test limit:**	**0.650**	**Pass**

8. PERFORMANCE CRITERIA FOR IMMUNITY

The performance criteria are referred to the test standard:

EN 55020

Performance Criteria A
The equipment shall continue to operate as intended during the test. No change of actual operating state (for example change of channel) is allowed as a result of the application of the test. Multifunction equipment shall for each function meet the relevant requirements. Evaluation is carried out for audio and video functions.

Evaluation of Audio Quality
The criterion of compliance with the requirement is a wanted to unwanted audio signal ratio of≥40dB at a wanted audio signal level of 50mW, or at another audio signal level specified by the manufacturer. If the S/N ratio is less than 43dB, the performance criterion for audio assessment is the actual S/N ratio minus 3dB. For AM sound receivers the criterion is≥26dB at 50mW; and is≥26dB at 500mW for the AM/FM car radios or broadcast receiver cards for computers.

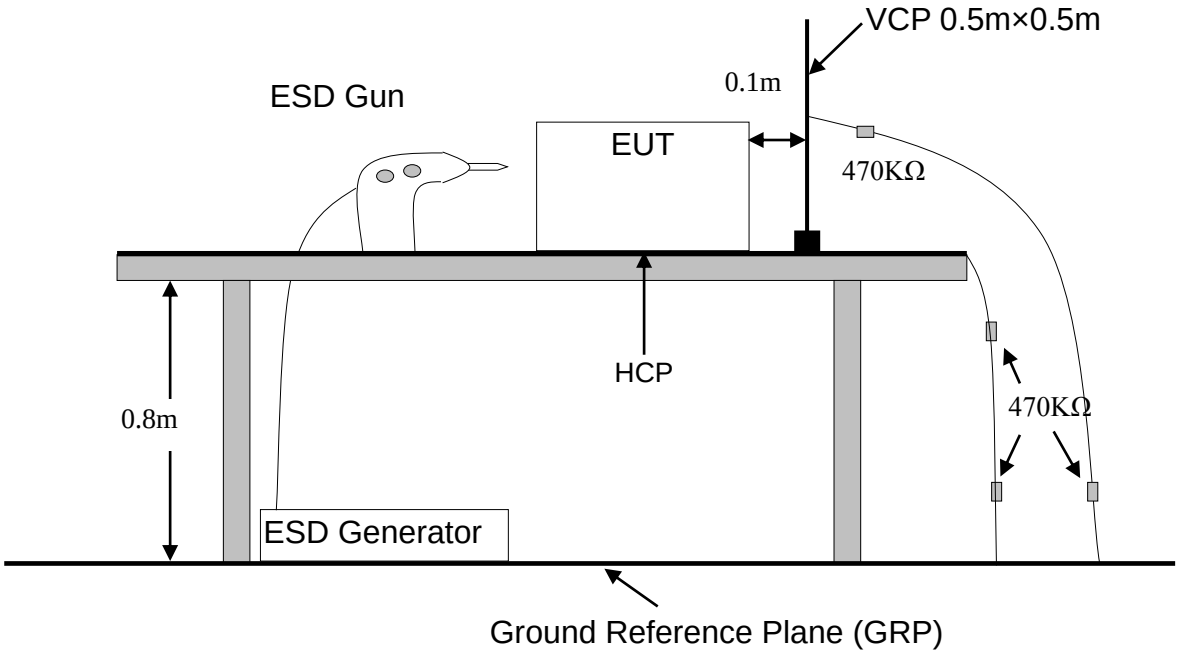
Evaluation of Video Quality
In the evaluation of picture interference the wanted test signal produces a standard picture (in the case of video tape equipment on the screen of the test-tv-set) and the unwanted signal produces a degradation of the picture. The degradation may be in a number of forms, such as a superposed pattern, disturbance of synchronization, geometrical distortion, loss of picture contrast, of colour, etc.

The criterion of compliance with the requirement is just perceptible degradation by observation of the picture. The screen shall be observed under normal viewing conditions (brightness 15 lx to 20 lx), at a viewing distance of six times the height of the screen.

Performance criterion B
The equipment shall continue to operate as intended after the test. No loss of function is allowed after the test when the apparatus is used as intended, but failures which are recovered automatically but which cause temporary delay in processing, are permissible. No change of actual operating state for example change of channel or stored data and settings is allowed as a result of the application of the test. During the test, degradation of performance is allowed.

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 55020
(EN 61000-4-2 Air Discharge: Severity Level: 3, ± 8KV;
Contact Discharge: Level: 2, ± 4KV)

9.2.2 Severity Levels:

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	±2	±2
2.	±4	±4
3.	±6	±8
4.	±8	±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 discharges (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.: 23 ℃	R.H.: 50 %	Air Pressure : 101 kPa
Power Supply:	AC 230V 50Hz DC 12V	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, USB Playing, FM Mode, Guilta IN, MIC IN, Charging+AUX IN, Charging+USB Playing, Charging+FM Mode, Charging+Guilta IN, Charging+MIC IN		

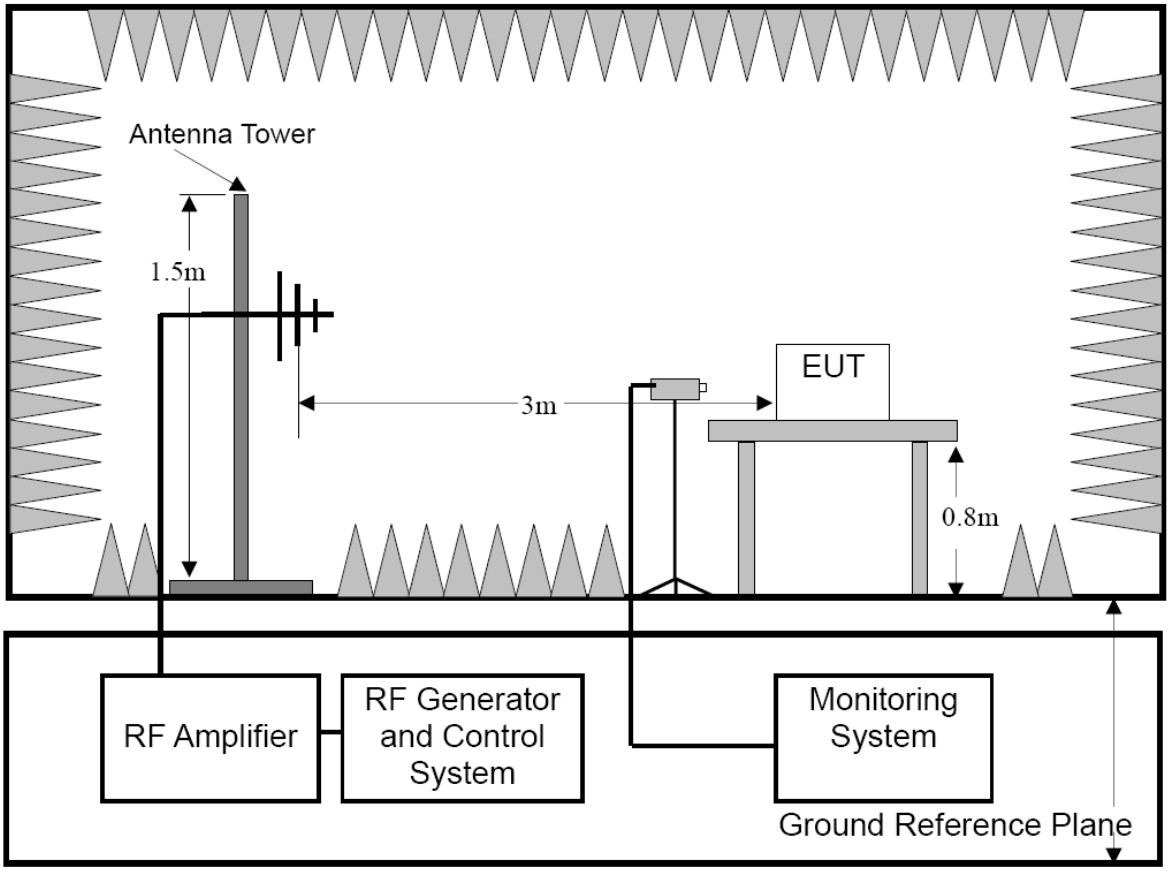
Test Point	**Kind** A-Air Discharge C-Contact Discharge	**Result** (Performance Criterion)
Metal Antenna	C	A
USB,MIC,Guilta Port	C	B
AUX Port	A	A
LED	A	A
Button	A	A
Surface of EUT	A	A
Indirect Discharge (HCP)	C	A
Indirect Discharge (VCP)	C	A

Note:
In test modes, the sound of EUT muting occurs during test, but it can be resumed by itself after test.

Test Equipment : ESD Tester (TESEQ, NSG 437) Test Engineer : Ivan

10. RF FIELD (KEYED CARRIER) STRENGTH SUSCEPTIBILITY TEST (S5)

10.1 Block Diagram of Test Setup



10.2 Test Standard and Severity Levels

10.2.1 Test Standard

EN 55020
(EN 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	895 - 905 MHz
4. Dwell time of radiated	0.0015 decade/s
5. Waiting Time	1 Sec.

10.4 Test Results

PASS.

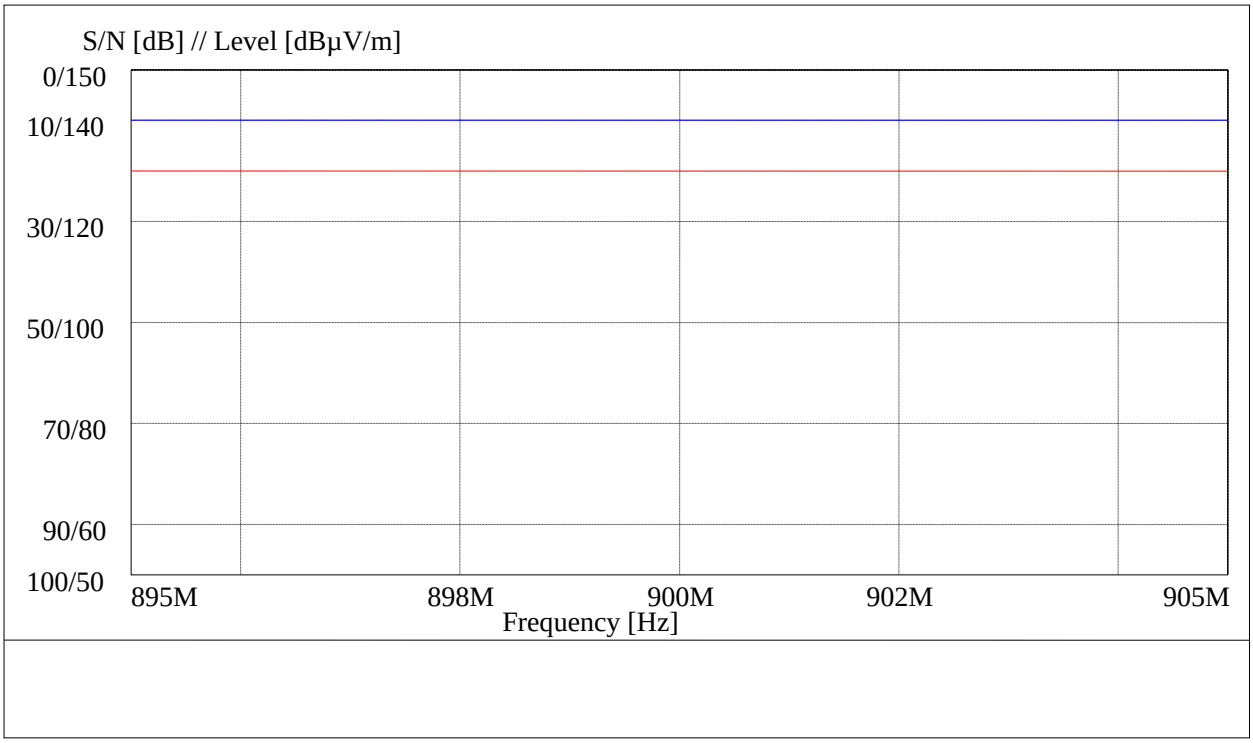
Please refer to the following pages of the worst case.

Note: This test was carry out on Bureau Veritas Shenzhen Co., Ltd., Dongguan Branch.

Test: Keyed Carrier S5 <T5>

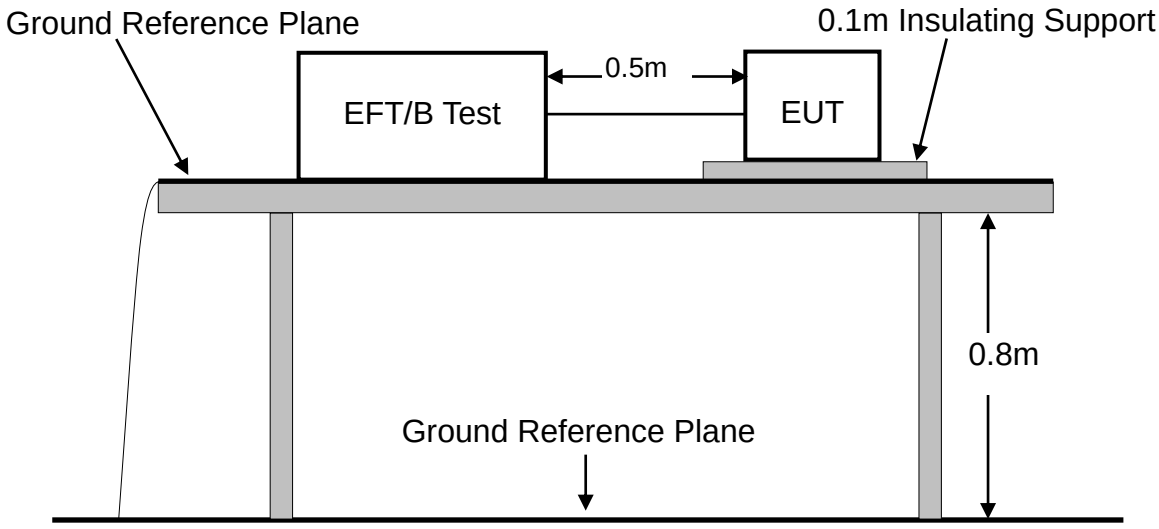
Test Mode:	Combi Device -	Monitor:	Speaker
Operating Mode:	AUX	S/N:	63.6 dB
Frequency:	-	AF Level:	54.7 mW

Interf. Signal: Scan, 281117-00502-001, 11/28/2017, 2:38:42PM



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 55020
(EN 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 pages.

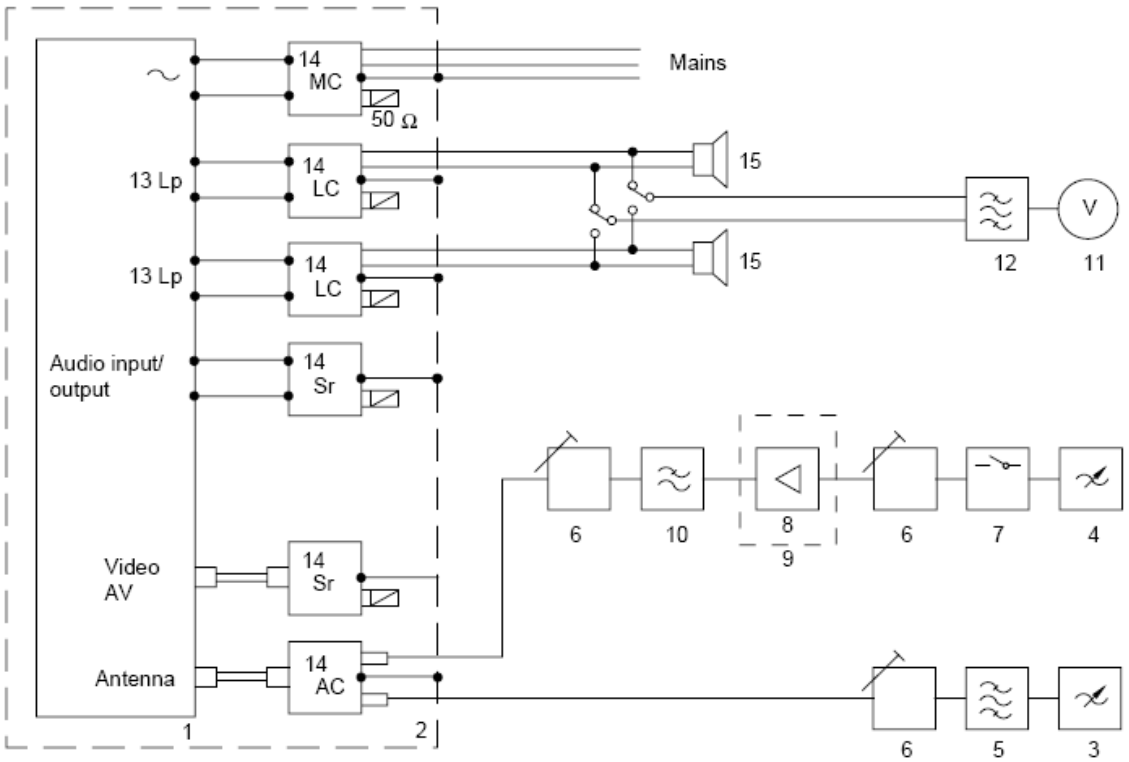
Electrical Fast Transient/Burst Test Results

Ambient Condition:	Temp.: 23 ℃	R.H.: 50%	Air Pressure: 101 kPa
Power Supply:	AC 230V 50Hz	Required Performance Criterion: B	
Test Level:	Repetition Frequency: 5kHz; Duration: 15ms; Period: 300ms		
Test mode:	Charging+AUX IN, Charging+USB Playing, Charging+FM Mode, Charging+Guilta IN, Charging+MIC IN		
Line : ☒ AC Mains ☐ Signal line ☐ DC line Coupling : ☒ Direct ☐ Capacitive			
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 line			
DC line			
Note: In test modes, the sound of EUT muting occurs during test, but it can be resumed by itself after test.			
Test Equipment : Burst Tester(EM TEST, UCS500N)		Test Engineer : Ivan	

12. RF VOLTAGES IMMUNITY TEST(S2)

12.1 Test setup

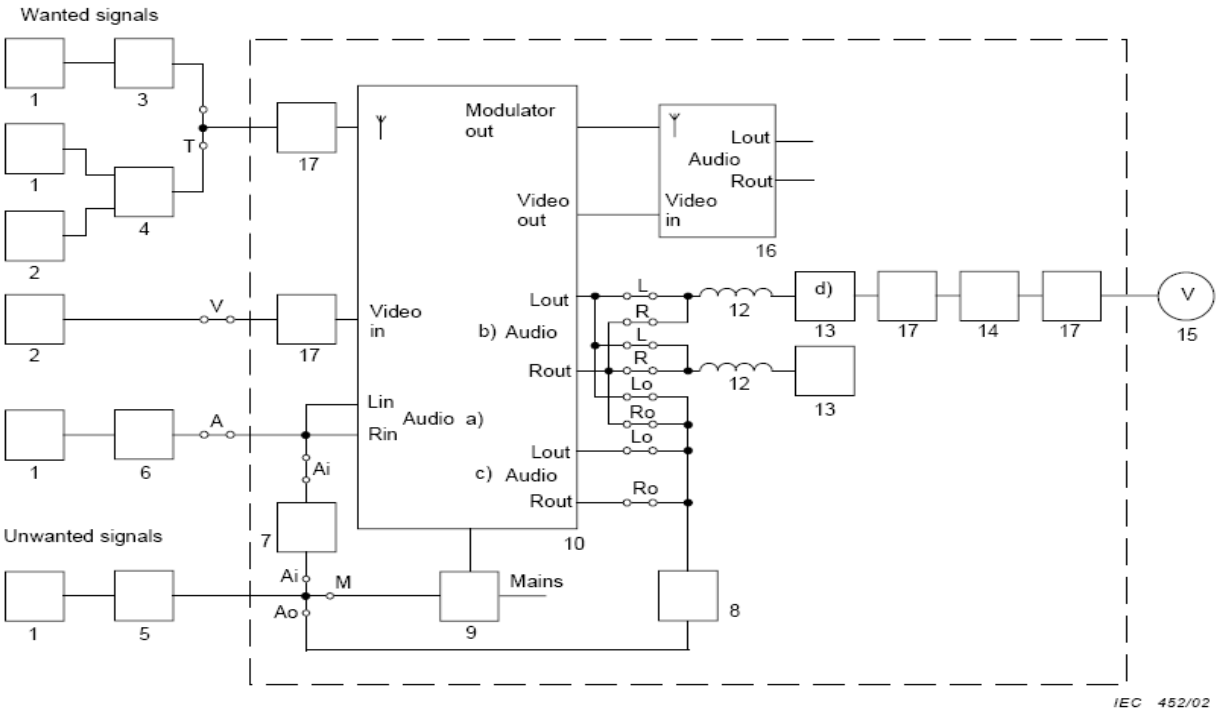
Antenna terminals:



Key

1 Equipment under test
2 Metal plate P = 2 m × 1 m
3 Generator of wanted signal G1
4 Generator of unwanted signal G2
5 Channel filter Fc
6 Attenuators T1, T2, T3
7 Switch S1
8 Amplifier Am
9 Shielded box Sh
10 Low-pass filter F
11 Audio frequency voltmeter V
12 Band-pass filter 0,5 kHz to 3 kHz (see annex B)
13 Loudspeaker connectors Lp
14 Coupling units MC, LC, Sr, AC (see annex C) of the loudspeaker
15 Dummy load simulating the nominal impedance of the loudspeaker

Other terminals:



a) Channels 1 and 2 in the case of two channel sound television equipment.
b) Audio power output provided for adjusting and measurement.
c) Other audio outputs.
d) To be left out in case of high-resistance (>10 kΩ) audio output impedance.

Key

1 AF generator 1 kHz G1
2 Video generator G2
3 RF generator G3 for FM
4 RF generator G4 for TV
5 RF generator G5 for unwanted signal
6 Impedance (Rs to RG1)
7 RC network for audio inputs RC_i
8 RC network for audio outputs RC_o
9 Mains stop filter MSF
10 Equipment under test
11 Metal plate P = 2 m × 1 m
12 RF choke L = 100 µH
13 Rated load impedance of the audio output RL
14 Band-pass filter BP (input impedance 10 kΩ)
15 Audio frequency voltmeter V
16 Test-TV-set TTS
17 Sheath current choke Sh (ferrite cores)

(12, 13, 14 and 15 may be replaced by figure 2b or 2c if appropriate.)
Rs rated source impedance of the audio input (1 kΩ in the case of video tape equipment).

12.2 Test Standard and Limits

12.2.1 Test Standard

EN 55020

12.2.2 Limits

Table 1 Limits of immunity of RF voltages of mains, loudspeaker and headphone terminals

Frequency MHz	Level dB(μV)(e.m.f.)
0.15 to 30 30 to 100 100 to 150	130 120 120-110 [a]
[a] Decreasing linearly with the logarithm of frequency	

Table 2 Limits of immunity to RF voltages of audio input and output terminals (except loudspeaker and headphone terminals)(S2)

Frequency MHz	Level dB(μV)(e.m.f.)
0.15 to 1.6 1.6 to 20 20 to 100 100 to 150	80-90 [a] 90-120 [a] 120 120-110 [b]
[a] Increasing linearly with the logarithm of frequency [b] Decreasing linearly with the logarithm of frequency	

12.3 Test Result

PASS.

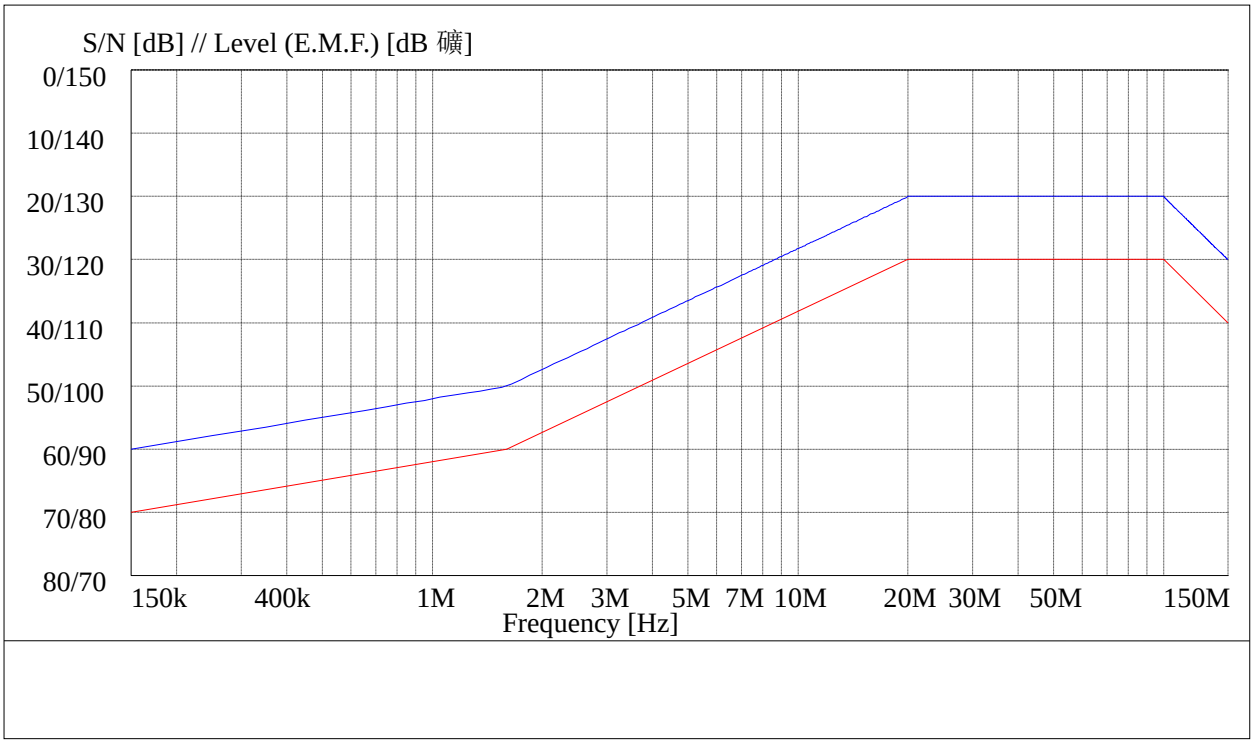
Please refer to the following page of the worst case.

Note: This test was carry out on Bureau Veritas Shenzhen Co., Ltd., Dongguan Branch.

Test: Immunity Conducted Voltages S2a <T5 >

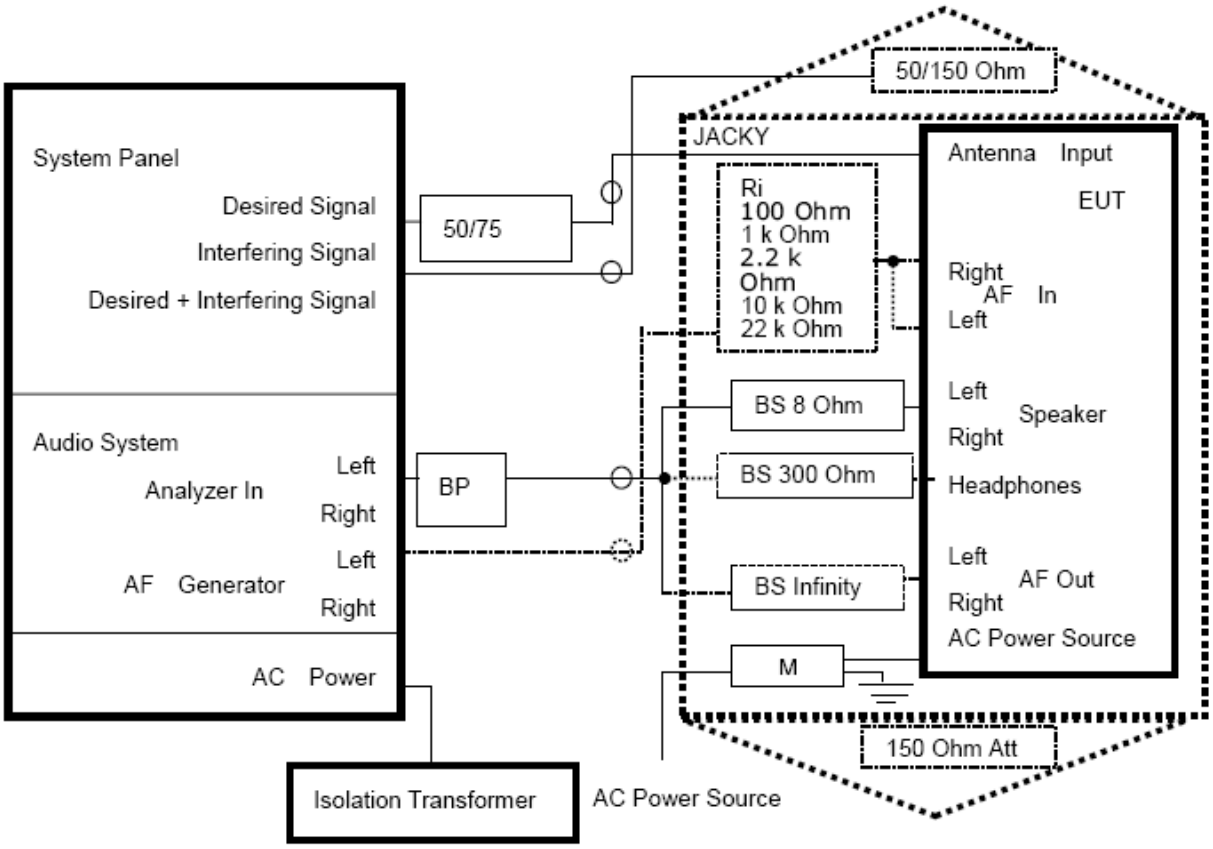
Test Mode:	**Combi Device -**	**Monitor:**	**Speaker**
Operating Mode:	**AUX**	**S/N:**	**65.7 dB**
Frequency:	**-**	**AF Level:**	**54.6 mW**

Interf. Signal: AUX, 281117-00503-001, 11/28/2017, 3:12:24PM



13. AMBIENT ELECTROMAGNETIC FIELDS IMMUNITY TEST(S3)

13.1 Block Diagram of Test Setup



13.2 Test Standard and Limits

13.2.1 Test Standard

EN 55020

13.2.2 Limits

Limits of immunity to ambient electromagnetic fields of Television reception functions of sound receivers

Frequency MHz	**Level** dB(μV/m)
0,15 to 47	125
Except frequency bands:	
(f_c – 1,5) to (f_c + 1,5)	101
(f_s – 0,5) to (f_s + 0,5)	101
(f_i – 2) to (f_v + 2) [a]	101
(f_v – 2) to (f_i + 2) [b]	101
For non-European countries and Russia	
47 to 150 [c]	109 [d]
Except the tuned channel ± 0,5	
For European countries	
47 to 87	109
87 to 108	125
108 to 144	109
144 to 150	125
Except the tuned channel ± 0,5	
NOTE f_i is the sound intermediate frequency f_v is the vision intermediate frequency f_s is the intercarrier sound frequency f_c is the colour subcarrier frequency	

[a] For systems B, D, G, K, I, L, M.

[b] Only for system L'.

[c] The frequency 47 MHz can be varied on a national basis depending on the use of this frequency range.

[d] For television receivers with reception function in this frequency range. For television receivers without reception function in this frequency range a level of 125 dB(μV/m) shall apply.

13.3 Test Result

PASS.

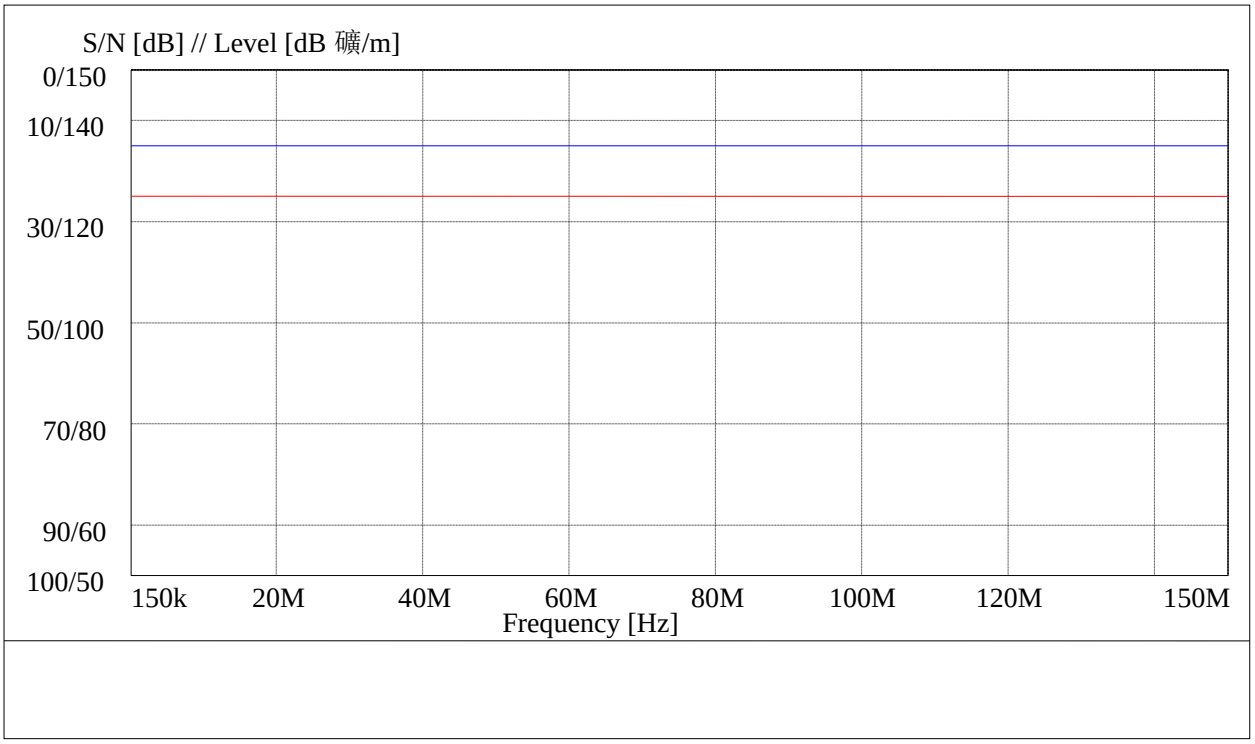
Please refer to the following pages of the worst case.

Note: This test was carry out on Bureau Veritas Shenzhen Co., Ltd., Dongguan Branch.

Test: Immunity Radiated Fields S3 <T5>

Test Mode:	**Combi Device -**	**Monitor:**	Speaker
Operating Mode:	**AUX**	**S/N:**	**69.7 dB**
Frequency:	**-**	**AF Level:**	**47.3 mW**

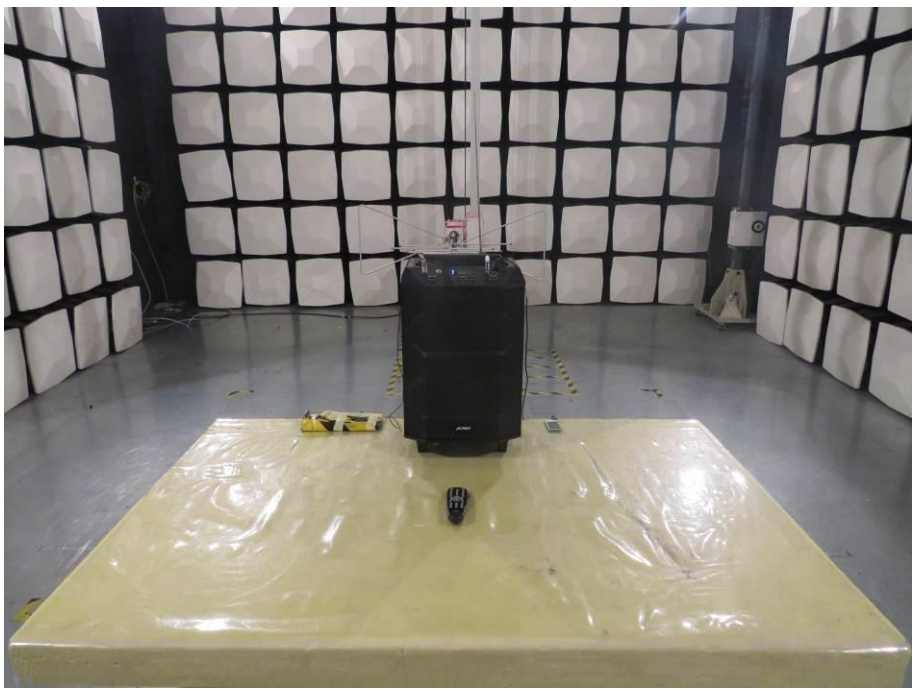
Interf. Signal: Scan, 281117-00504-001, 11/28/2017, 3:51:27PM **K2 = 1.6 dB**



14. PHOTOGRAPHS

14.1 Photo of Power Line Conducted Emission Measurement

14.2 Photo of Radiated Emission Measurement



14.3 Photo of Harmonic Current / Flicker Measurement

14.4 Photo of Electrostatic Discharge Immunity Measurement

14.5 Photo of Electrical Fast Transient /Burst Immunity Measurement

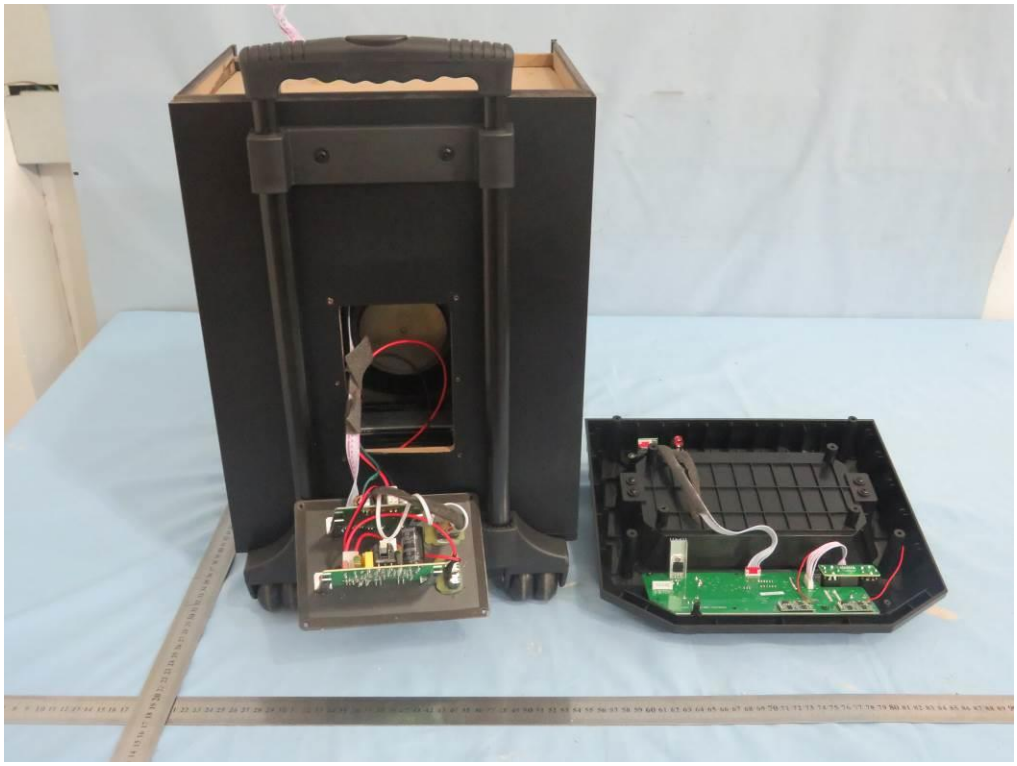
14.6 Photo of S2 Measurement

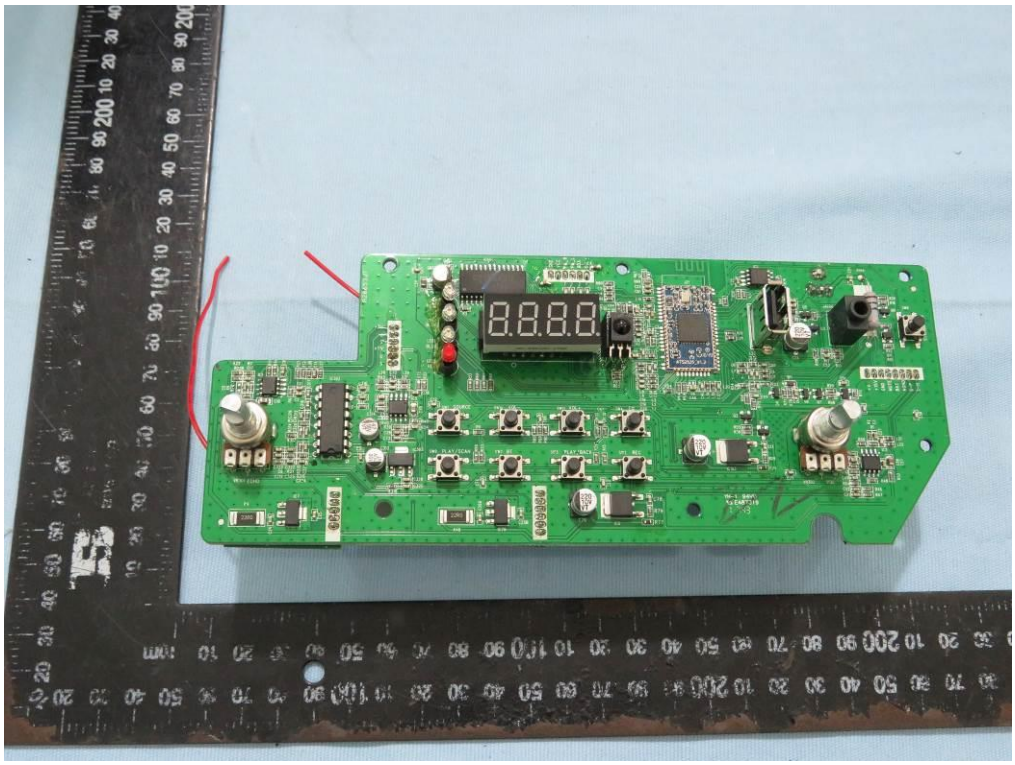
14.7 Photo of S3 Measurement

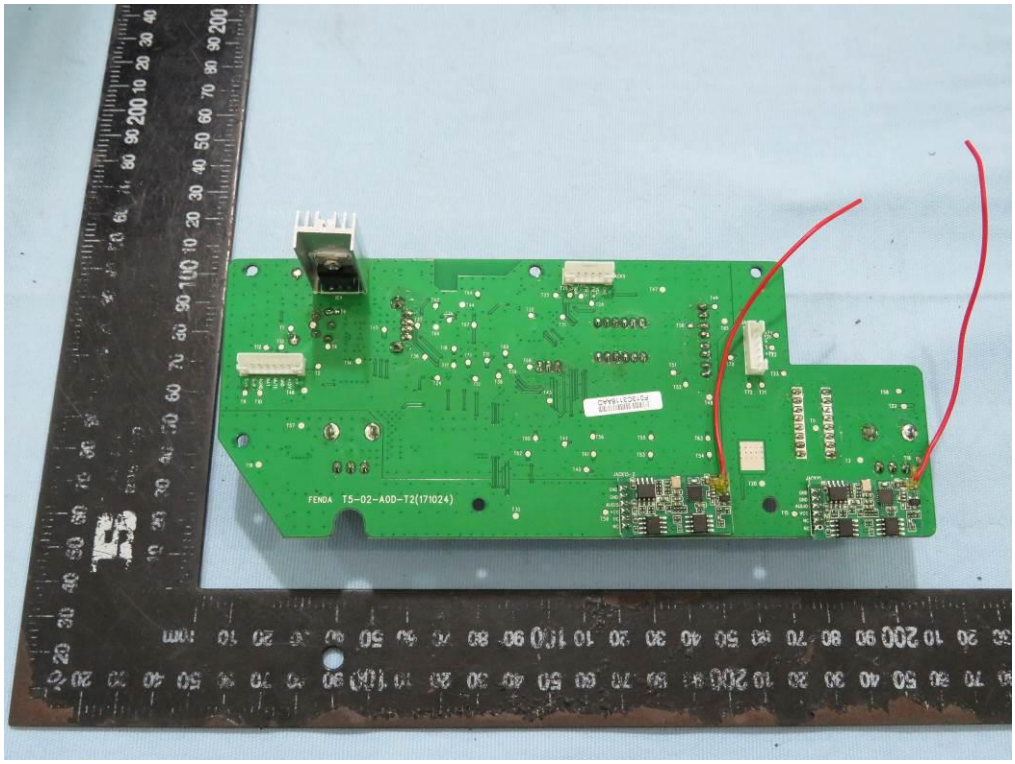
APPENDIX I
(PHOTOS OF E.U.T.)

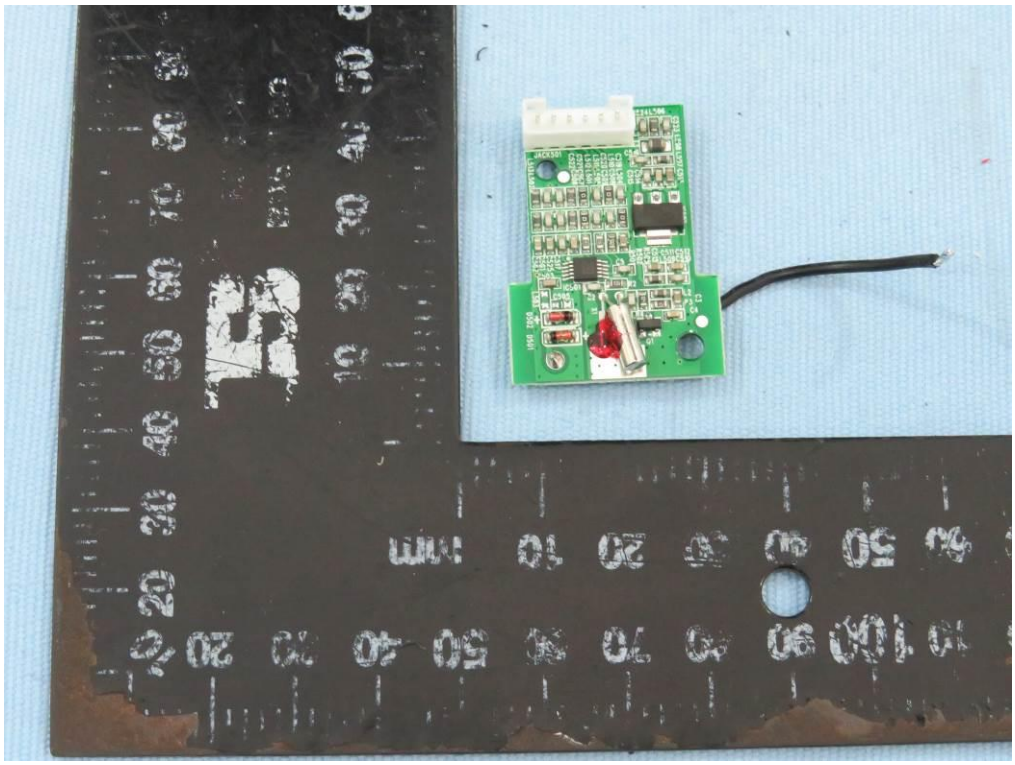
General Appearance of the E.U.T.

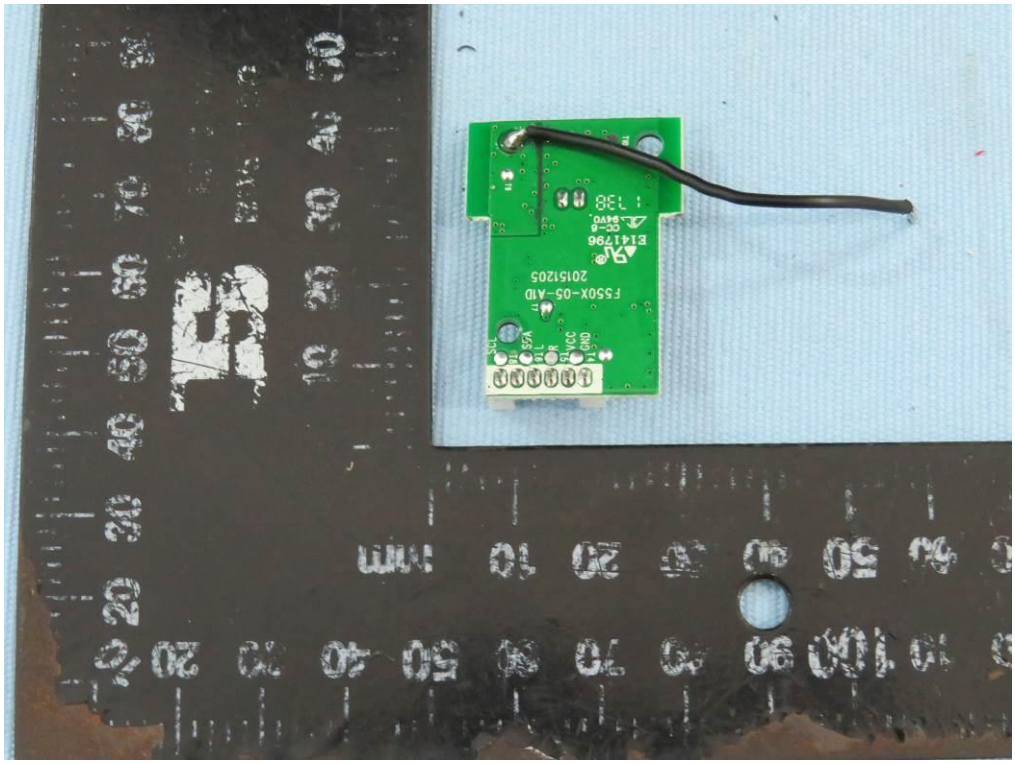

Guitar
MIC
USB
AUX
Source
MASTER VOLUME
EQ
Scan
Rec.play
Record
ECHO

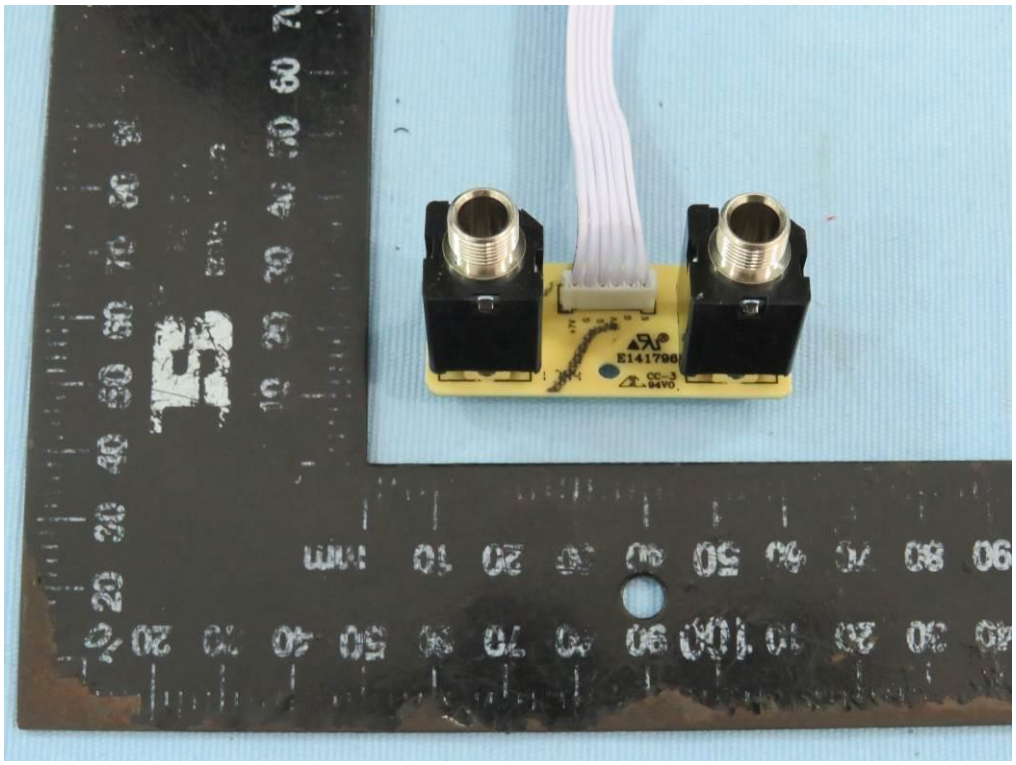


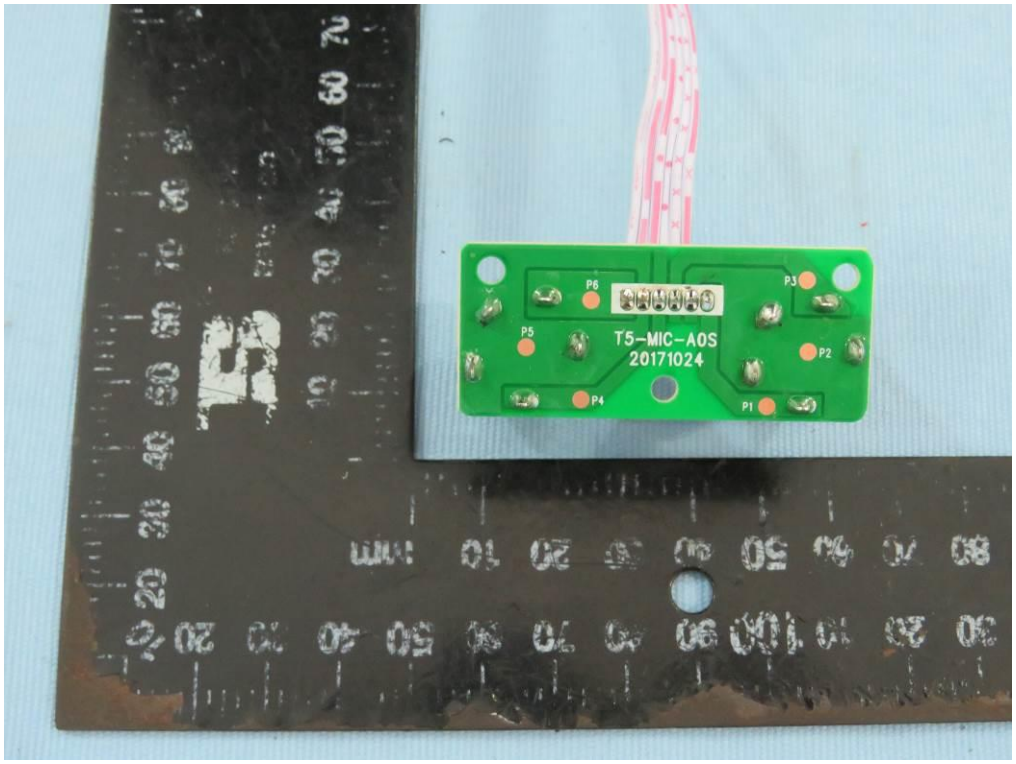


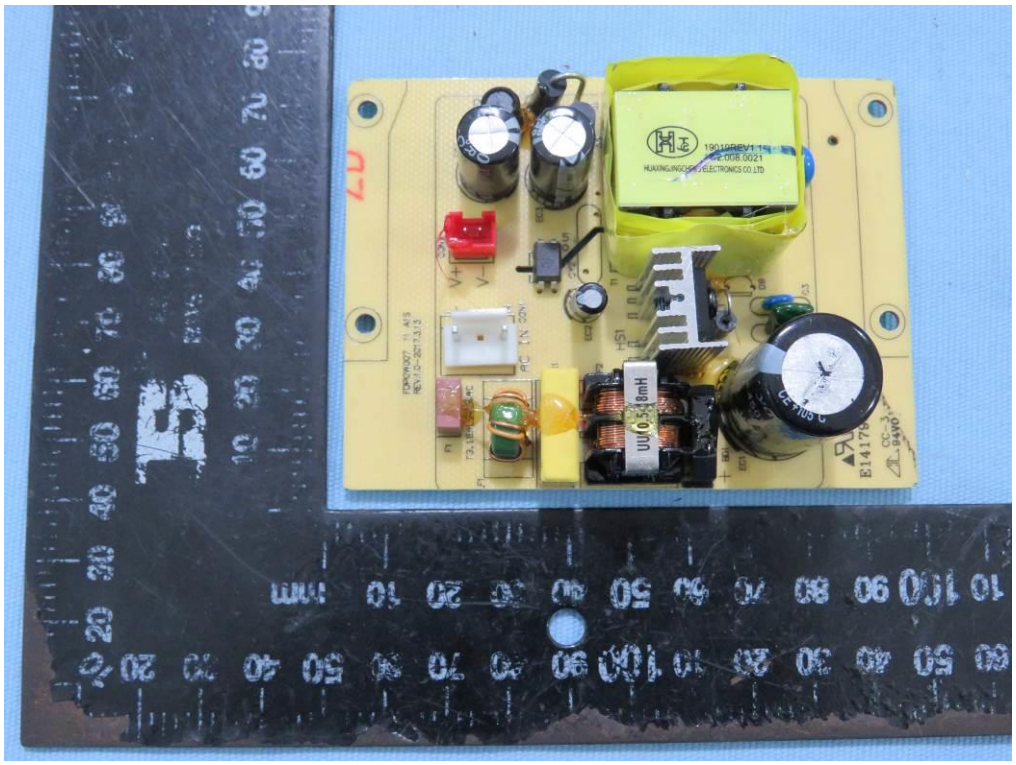

FENDA T5-02-A0D-T2(171024)

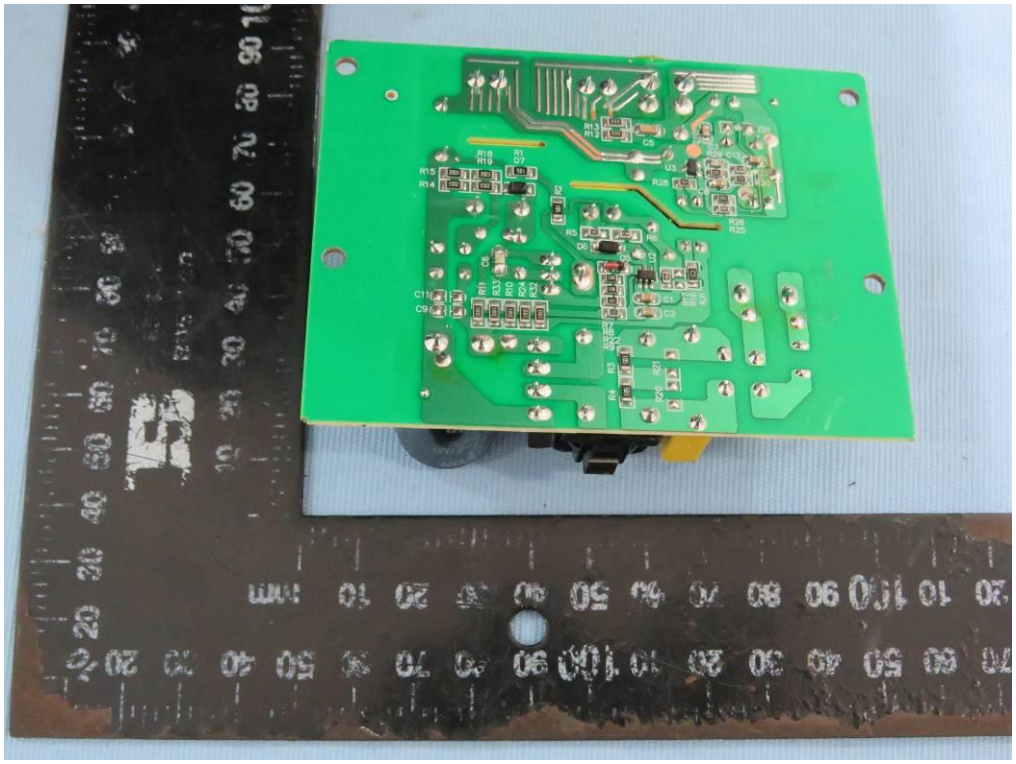


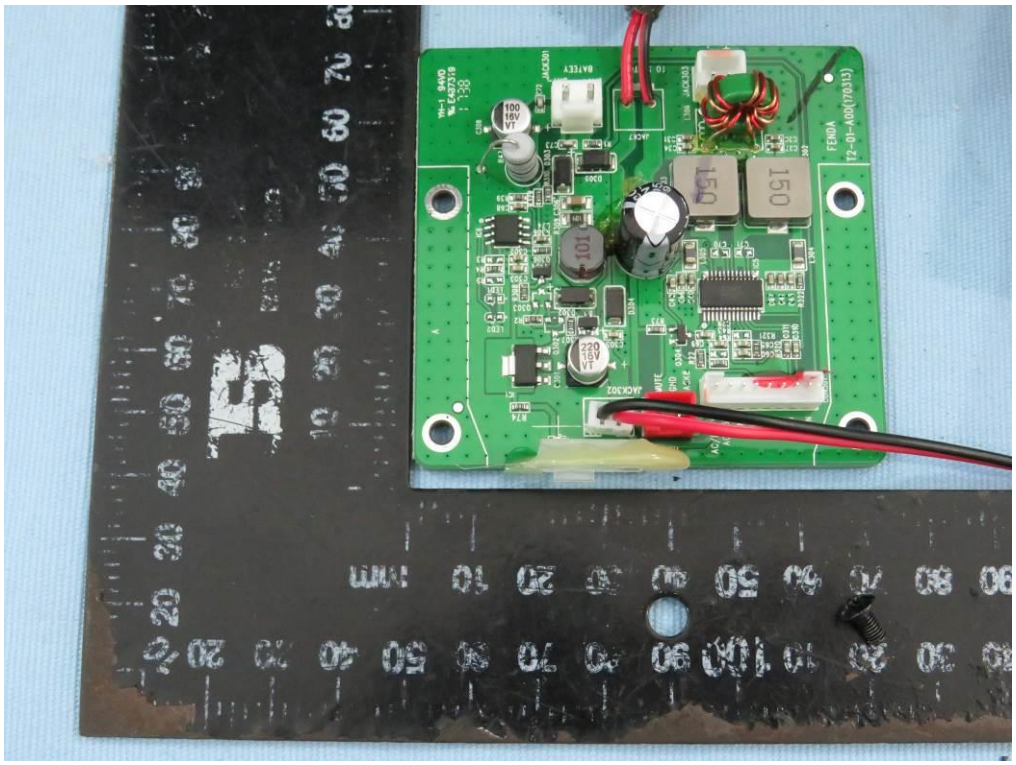

E141796
20151205
F550X-05-A1D

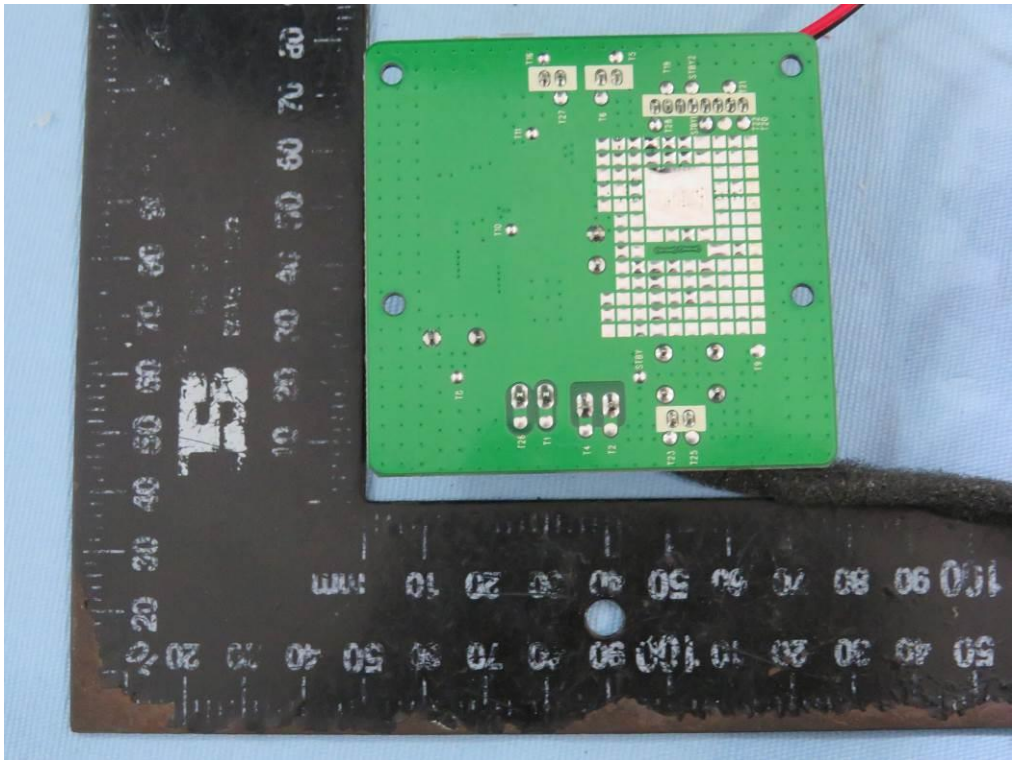



P6
P3
P5
T5-MIC-AOS
20171024
P2
P4
P1









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