

EMC TEST REPORT

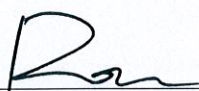
The device described below is tested by Dongguan Nore Testing Center Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results are contained in this test report. Dongguan Nore Testing 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. : 2.1 Multimedia Speaker
Brand Name : F&D
Model No. : F210X, AL2109 Plus, F210U, F210BT, F210F, F210
(For model difference refer to section 2.1.)
Measurement Standard : EN 55032: 2012+AC: 2013
EN 61000-3-2: 2014, EN 61000-3-3: 2013
EN 55020: 2007+A11: 2011
(EN 61000-4-2: 2009, EN 61000-4-3: 2006+A2: 2010,
EN 61000-4-4: 2012)
Date of Receiver : April 28, 2016
Date of Test : April 28, 2016 to May 17, 2016
Date of Report : May 17, 2016

This Test Report is Issued Under the Authority of :

Prepared by

Approved & Authorized Signer


Rose Hu / Engineer


Lori 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.

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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:

| EMISSION | | | |
|-------------------------|--|--------|-------------------------|
| Standard | Test Type | Result | Remarks |
| EN 55032: 2012+AC: 2013 | Mains Terminal Disturbance Voltage Test | PASS | Uncertainty: 2.7dB |
| | Antenna Terminal Disturbance Voltage Test | N/A | Not applicable |
| | 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. |

| IMMUNITY(EN 55020: 2007+A11: 2011) | | | |
|------------------------------------|--|--------|---|
| Standard | Test Type | Result | Remarks |
| EN 55020: 2007+A11: 2011 | Input immunity (S1) | N/A | Not applicable |
| | Immunity from conducted voltages (S2a) | PASS | Meets the requirements. |
| | Immunity from conducted currents (S2b) | N/A | Not applicable |
| | Immunity from radiated fields (S3) | PASS | Meets the requirements. |
| | Screening effectiveness (S4) | N/A | Not applicable |
| 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. | : 2.1 Multimedia Speaker |
| Model No. | : F210X, AL2109 Plus, F210U, F210BT, F210F, F210 (All tests were carried on model F210X.) |
| Brand Name | : F&D |
| E.U.T. Type | : Class B |
| Operation Frequency | : Below 108MHz (Except BT function) |
| Rating | : AC 220-240V 50/60Hz |
| Adapter | : None |
| Test Voltage | : AC 230V 50Hz |
| Cable | : None |
| Description of model difference | : These models have the same circuitry, electrical mechanical, PCB layout and physical construction. Their differences in model name for trading purpose. |
| Remark | : None |

2.2 Description of Support Device

| | | |
|---------------------------|---|--|
| Audio Signal Generator | : | Manufacturer: LONGWEIINSTRUMENTS (H.K) CO., LTD. M/N: TAG-101 S/N: N/A CE |
| FM Signal Generator | : | Manufacturer: LEADER M/N: 3214 S/N: 1100164 |
| USB Flash Disk | : | Manufacturer: Kingston M/N: 4GB |

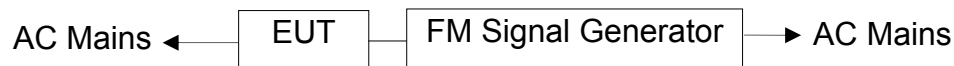
2.3 Block Diagram of Test Setup

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

(1) Test mode: AUX IN



(2) Test mode: FM Mode



(3) Test mode: USB Playing



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 FCC, July 03, 2014
The Certificate Number is 665078.

Listed by Industry Canada, June 18, 2014
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. 07, 2016 | 1 Year |
| 2. | L.I.S.N | Rohde & Schwarz | ENV 216 | 101317 | Mar. 07, 2016 | 1 Year |
| 3. | L.I.S.N | Schwarzbeck | NNLK8129 | 8129-212 | Mar. 07, 2016 | 1 Year |
| 4. | RF Switching Unit | Compliance Direction Systems Inc. | RSU-M2 | 38311 | Mar. 07, 2016 | 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. 07, 2016 | 1 Year |
| 2. | Antenna | Schwarzbeck | VULB9162 | 9162-010 | Mar. 14, 2016 | 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. 07, 2016 | 1 Year |
| 9. | Cable | Huber+Suhner | RG223U | N/A | Mar. 07, 2016 | 1 Year |
| 10. | Power Amplifier | HP | HP 8447D | 1145A00203 | Mar. 07, 2016 | 1 Year |

3.3 For Harmonic / Flicker Measurement

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|-----------------------------|------------------------|-----------|------------|---------------|---------------|
| 1. | Power Frequency Test System | California Instruments | CTS | 72846 | May. 08, 2016 | 1 Year |
| 2. | 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. 14, 2016 | 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 | MY50142530 | Aug. 31, 2015 | 1 Year |
| 2. | Antenna Log-Periodic | CORAD | ATR80M6G | 0337307 | Aug. 31, 2015 | 1 Year |
| 3. | RF Power Meter | ESE | 4242 | 13984 | Aug. 31, 2015 | 1 Year |
| 4. | Power Amplifier | TESEQ | CBA 1G-150 | T44029 | N/A | N/A |
| 5. | Power Sensor | ESE | 51011EMC | 35716 | Aug. 31, 2015 | 1 Year |

3.6 For Electrical Fast Transient /Burst Immunity Test

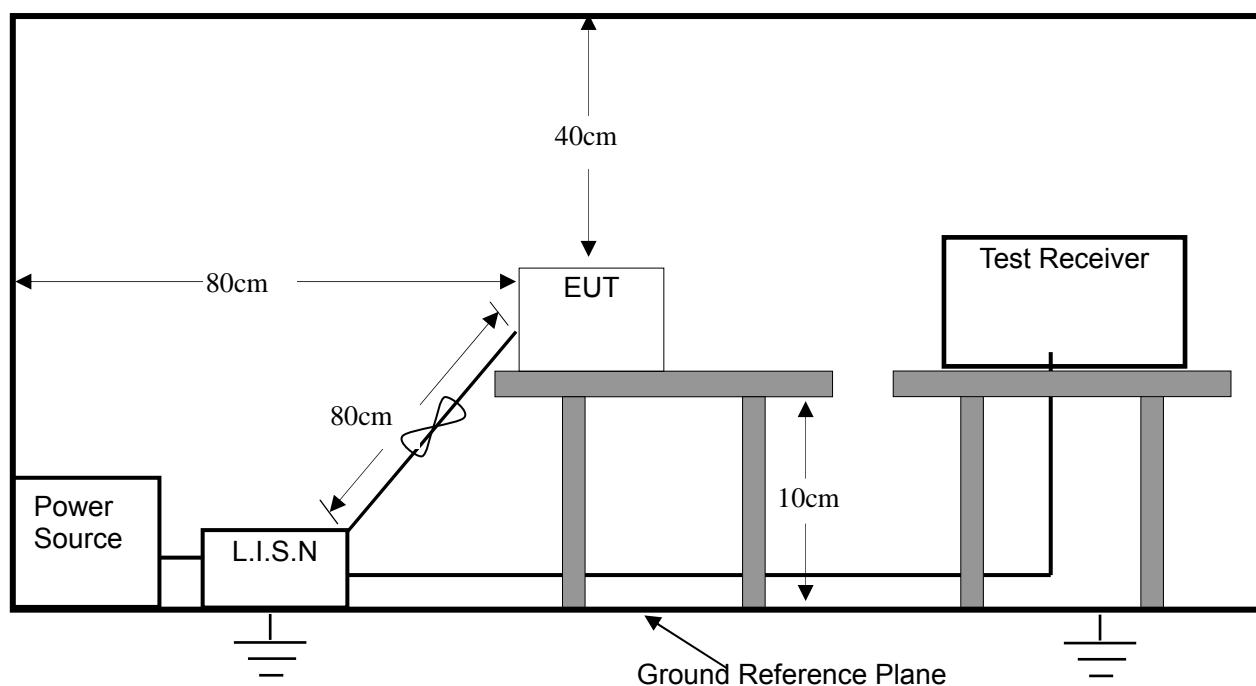
| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|----------------|--------------|--------------|-------------|---------------|---------------|
| 1. | Burst Tester | EM TEST | UCS 500N | V1104108683 | Mar. 07, 2016 | 1 Year |
| 2. | Coupling Clamp | EM TEST | HFK | 0311-94 | Mar. 07, 2016 | 1 Year |
| 3. | Test Soft | EM TEST | lec. control | N/A | N/A | N/A |

3.7 For EN55020 Immunity Test

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|-------------------------|---------------|-----------|------------|--------------|---------------|
| 1. | Broadcast System Test | Rohde&Schwarz | SFU | 101543 | May 14, 2016 | 1 Year |
| 2. | TV Generator PAL | Rohde&Schwarz | SGPF | 100200 | May 14, 2016 | 1 Year |
| 3. | Spectrum Analyzer | Rohde&Schwarz | FSL3 | 101507 | May 14, 2016 | 1 Year |
| 4. | Signal Generator | Rohde&Schwarz | SMB100A | 102382 | May 14, 2016 | 1 Year |
| 5. | Signal Generator | Rohde&Schwarz | SMB100A | 102383 | May 14, 2016 | 1 Year |
| 6. | Power Meter | Rohde&Schwarz | NRVS | 101732 | May 14, 2016 | 1 Year |
| 7. | Audio Analyzer | Rohde&Schwarz | UPV | 101346 | May 14, 2016 | 1 Year |
| 8. | Level Meter | Rohde&Schwarz | URV35 | 100335 | May 14, 2016 | 1 Year |
| 9. | 100V Insertion Unit 50Ω | Rohde&Schwarz | URV5-Z4 | 100207 | May 14, 2016 | 1 Year |
| 10. | RF Probe | Rohde&Schwarz | URV5-Z7 | 100657 | May 14, 2016 | 1 Year |
| 11. | Absorbing Clamp | Rohde&Schwarz | MDS-21 | 100352 | May 14, 2016 | 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. | | |

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 (FM Mode, USB Playing, AUX IN) and test it.

4.5 Mains Terminal Disturbance Voltage Test Results

PASS.

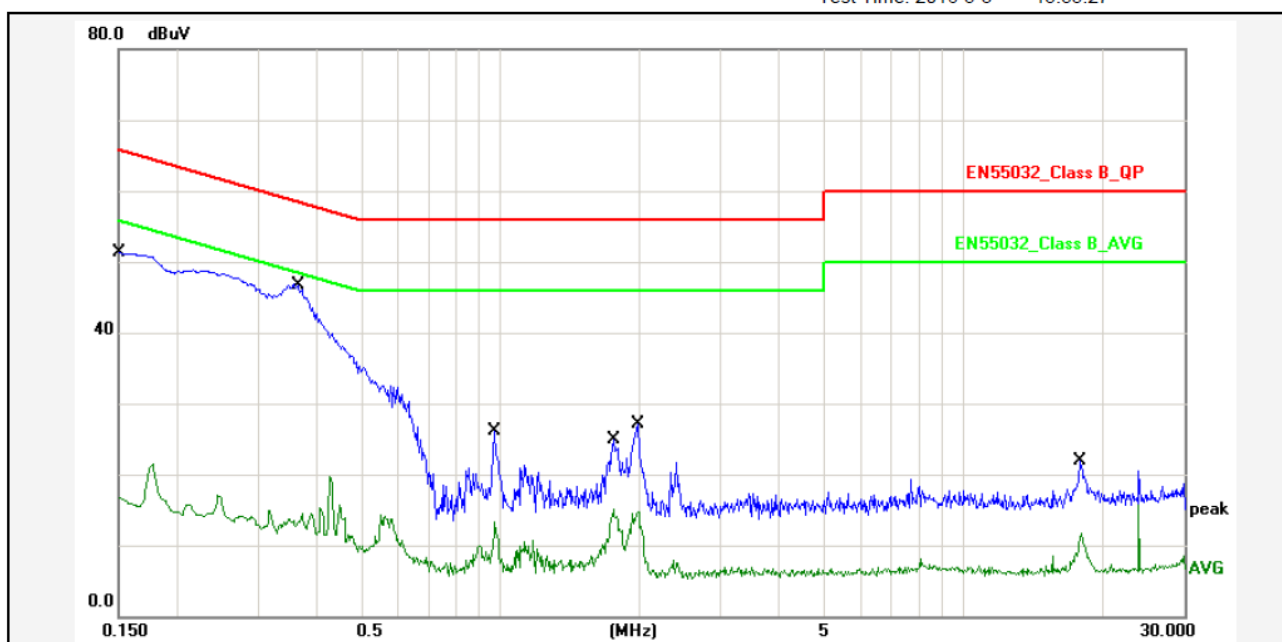
Please refer to the following pages of the worst case: USB Playing.



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

Site: Conduction

Test Time: 2016-5-3 15:55:27



Report No.: F210X

Test Standard: EN55032_Class B_QP

Test item: Conducted Emission

Phase: L1

Applicant: FENDA

Temp.()/Hum.(%): 22(C) / 50 %

Product: 2.1 Multimedia Speaker

Power Rating: AC 230V/50Hz

Model No.: F210X

Test Engineer: chilaw

Test Mode: USB Playing

Remark:

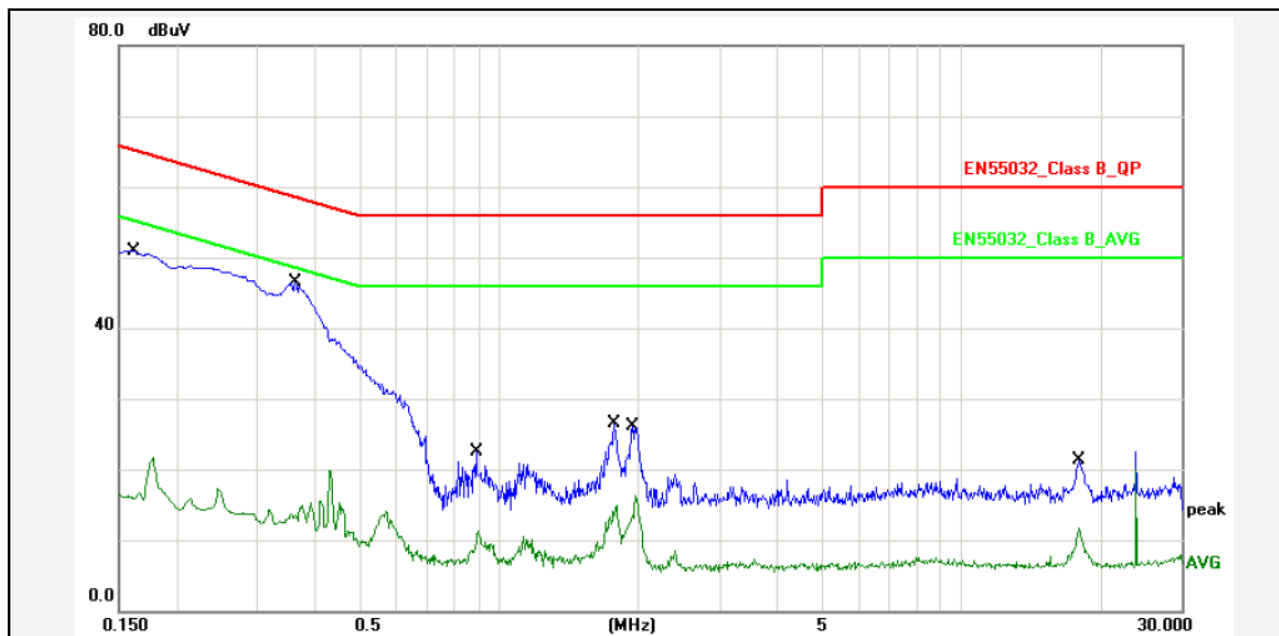
| No. | Frequency (MHz) | Factor (dBuV) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|---------------|----------------|--------------|--------------|-------------|----------|-----|--------|
| 1 | 0.1500 | 10.80 | 35.40 | 46.20 | 65.99 | -19.79 | QP | P | |
| 2 | 0.1500 | 10.80 | 8.80 | 19.60 | 55.99 | -36.39 | AVG | P | |
| 3 | 0.3660 | 10.80 | 33.80 | 44.60 | 58.59 | -13.99 | QP | P | |
| 4 | 0.3660 | 10.80 | 0.80 | 11.60 | 48.59 | -36.99 | AVG | P | |
| 5 | 0.9740 | 10.80 | 13.30 | 24.10 | 56.00 | -31.90 | QP | P | |
| 6 | 0.9740 | 10.80 | 0.50 | 11.30 | 46.00 | -34.70 | AVG | P | |
| 7 | 1.7700 | 10.80 | 12.00 | 22.80 | 56.00 | -33.20 | QP | P | |
| 8 | 1.7700 | 10.80 | 1.20 | 12.00 | 46.00 | -34.00 | AVG | P | |
| 9 | 1.9900 | 10.80 | 14.20 | 25.00 | 56.00 | -31.00 | QP | P | |
| 10 | 1.9900 | 10.80 | 1.90 | 12.70 | 46.00 | -33.30 | AVG | P | |
| 11 | 17.9298 | 10.80 | 9.00 | 19.80 | 60.00 | -40.20 | QP | P | |
| 12 | 17.9298 | 10.80 | -1.20 | 9.60 | 50.00 | -40.40 | AVG | P | |



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

Site: Conduction

Test Time: 2016-5-3 15:47:01



Report No.: F210X

Test Standard: EN55032_Class B_QP

Test item: Conducted Emission

Applicant: FENDA

Product: 2.1 Multimedia Speaker

Model No.: F210X

Phase: N

Temp.()/Hum.(%): 22(C) / 50 %

Power Rating: AC 230V/50Hz

Test Engineer: chilaw

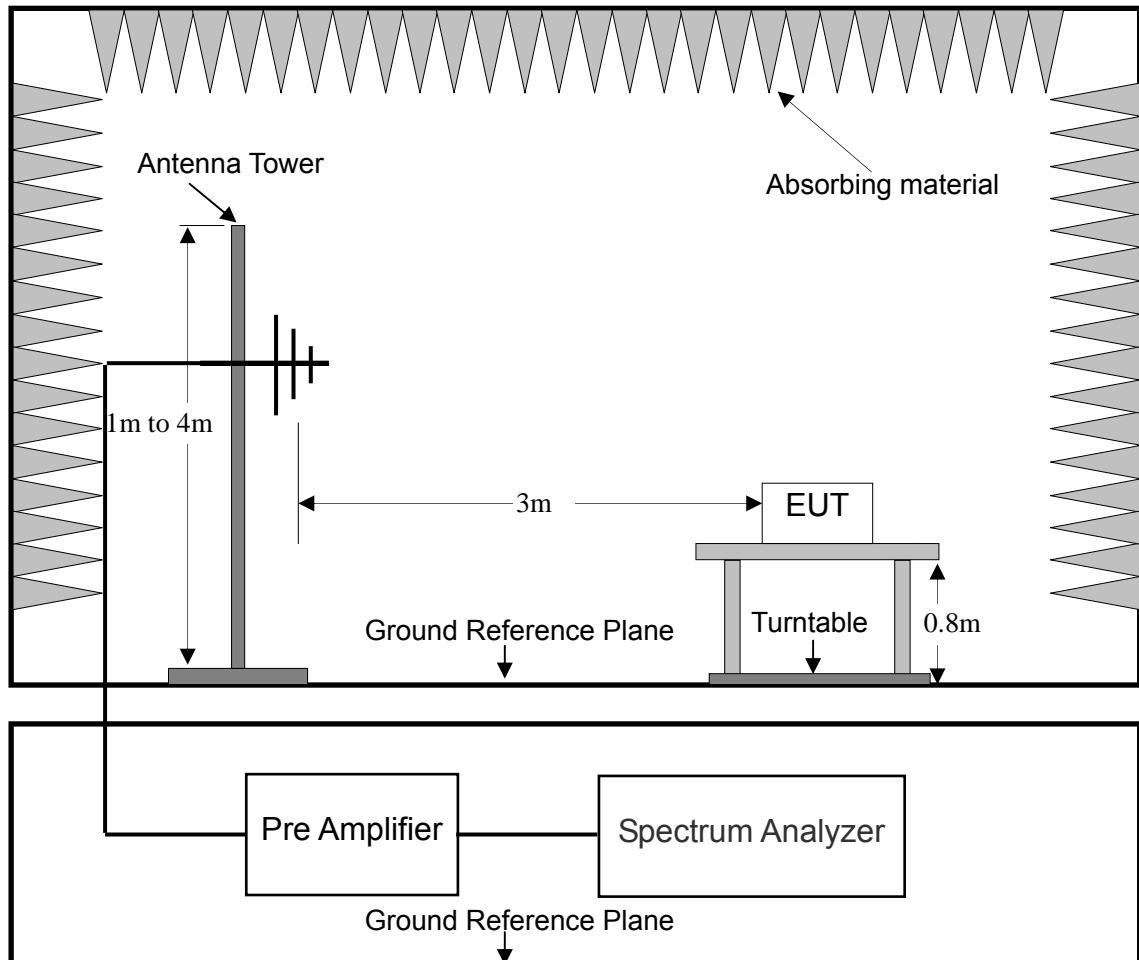
Test Mode: USB Playing

Remark:

| No. | Frequency (MHz) | Factor (dBuV) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|---------------|----------------|--------------|--------------|-------------|----------|-----|--------|
| 1 | 0.1620 | 10.80 | 35.10 | 45.90 | 65.36 | -19.46 | QP | P | |
| 2 | 0.1620 | 10.80 | 8.80 | 19.60 | 55.36 | -35.76 | AVG | P | |
| 3 | 0.3620 | 10.80 | 33.70 | 44.50 | 58.68 | -14.18 | QP | P | |
| 4 | 0.3620 | 10.80 | 1.60 | 12.40 | 48.68 | -36.28 | AVG | P | |
| 5 | 0.8900 | 10.80 | 9.60 | 20.40 | 56.00 | -35.60 | QP | P | |
| 6 | 0.8900 | 10.80 | -1.60 | 9.20 | 46.00 | -36.80 | AVG | P | |
| 7 | 1.7780 | 10.80 | 13.60 | 24.40 | 56.00 | -31.60 | QP | P | |
| 8 | 1.7780 | 10.80 | 2.00 | 12.80 | 46.00 | -33.20 | AVG | P | |
| 9 | 1.9420 | 10.80 | 13.20 | 24.00 | 56.00 | -32.00 | QP | P | |
| 10 | 1.9420 | 10.80 | 3.50 | 14.30 | 46.00 | -31.70 | AVG | P | |
| 11 | 17.9899 | 10.80 | 8.40 | 19.20 | 60.00 | -40.80 | QP | P | |
| 12 | 17.9899 | 10.80 | -1.20 | 9.60 | 50.00 | -40.40 | AVG | P | |

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 (FM Mode, USB Playing, AUX IN) and test it.

5.5 Radiated Emission Measurement Result

PASS.

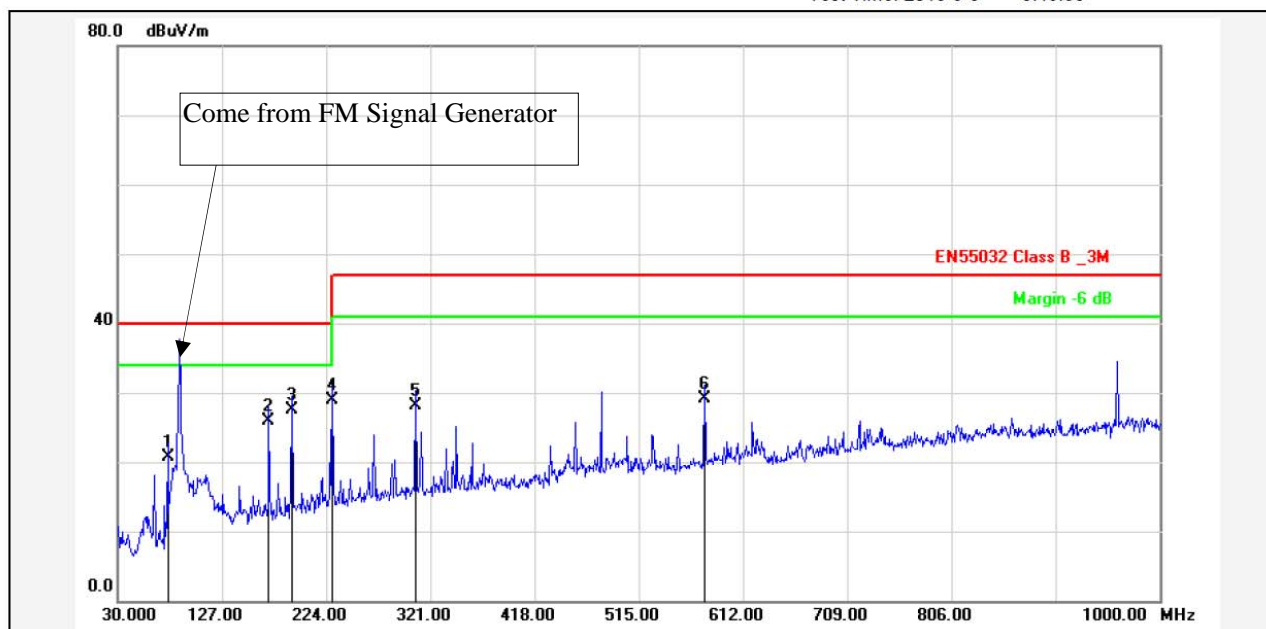
Please refer to the following pages of the worst case: FM 88MHz.



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

Site: Radiation

Test Time: 2016-5-3 8:45:58



Report No.: F210X

Test Standard: EN55032 Class B_3M

Test Distance: 3m

Test item: Radiation Emission

Ant. Polarization: Horizontal

Applicant: FENDA

Temp.(C)/Hum.(%): 22(C) / 54 %

Product: 2.1 Multimedia Speaker

Power Rating: AC 230V/50Hz

Model No.: F210X

Test Engineer: Anson

Test Mode: FM Mode

Remark: 88MHz

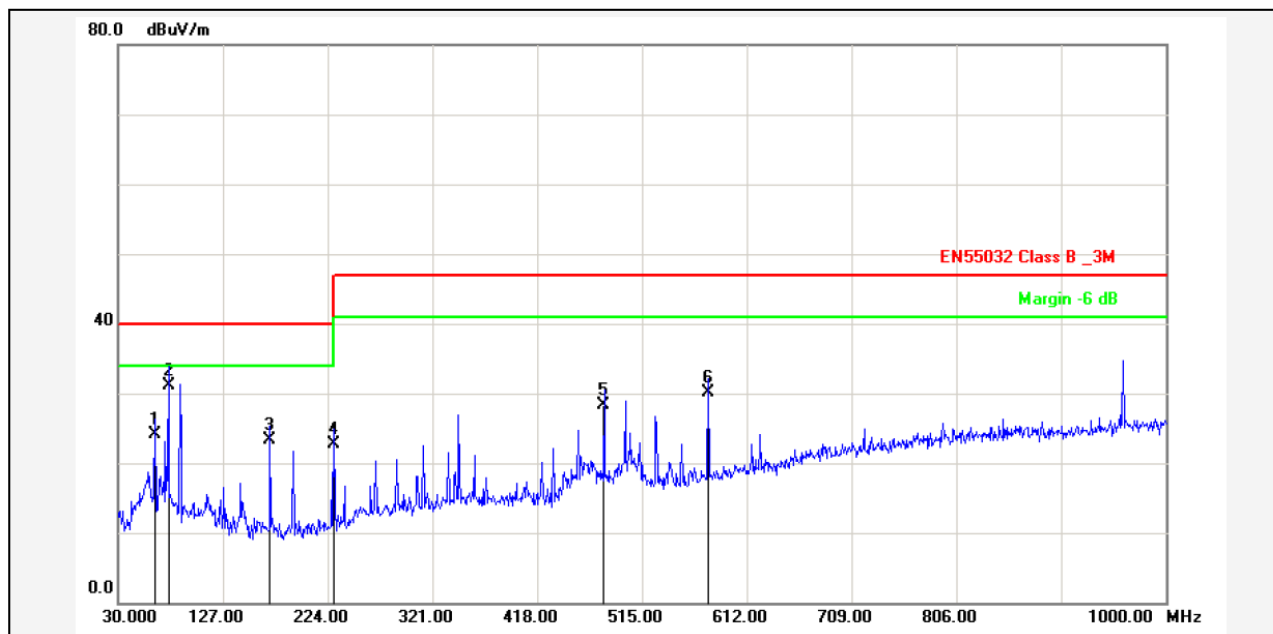
| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1 | 76.5600 | -19.49 | 40.19 | 20.70 | 40.00 | -19.30 | QP | | | P | |
| 2 | 170.6500 | -14.76 | 40.76 | 26.00 | 40.00 | -14.00 | QP | | | P | |
| 3 | 191.9900 | -13.51 | 41.01 | 27.50 | 40.00 | -12.50 | QP | | | P | |
| 4 | 229.8198 | -12.46 | 41.36 | 28.90 | 40.00 | -11.10 | QP | | | P | |
| 5 | 307.4200 | -10.26 | 38.46 | 28.20 | 47.00 | -18.80 | QP | | | P | |
| 6 | 576.1100 | -5.70 | 34.80 | 29.10 | 47.00 | -17.90 | QP | | | P | |



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

Site: Radiation

Test Time: 2016-5-3 8:38:58



Report No.: F210X

Test Standard: EN55032 Class B_3M

Test Distance: 3m

Test item: Radiation Emission

Ant. Polarization: Vertical

Applicant: FENDA

Temp.(C)/Hum.(%): 22(C) / 54 %

Product: 2.1 Multimedia Speaker

Power Rating: AC 230V/50Hz

Model No.: F210X

Test Engineer: Anson

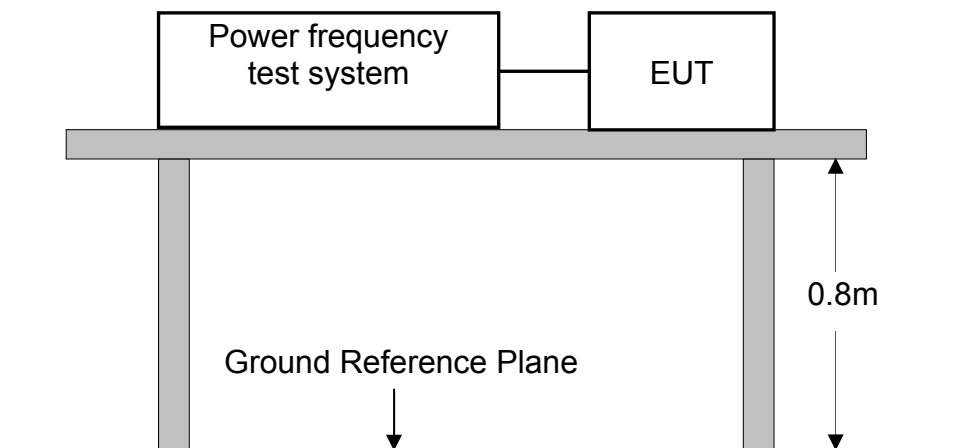
Test Mode: FM Mode

Remark: 88MHz

| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1 | 63.9500 | -15.30 | 39.50 | 24.20 | 40.00 | -15.80 | QP | | | P | |
| 2 | 76.5600 | -19.05 | 50.25 | 31.20 | 40.00 | -8.80 | QP | | | P | |
| 3 | 170.6500 | -17.76 | 41.16 | 23.40 | 40.00 | -16.60 | QP | | | P | |
| 4 | 229.8198 | -15.46 | 38.26 | 22.80 | 40.00 | -17.20 | QP | | | P | |
| 5 | 480.0799 | -9.21 | 37.61 | 28.40 | 47.00 | -18.60 | QP | | | P | |
| 6 | 576.1100 | -7.70 | 37.90 | 30.20 | 47.00 | -16.80 | QP | | | P | |

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 |
| $15 \leq n \leq 39$ | $0.15 \times 15/n$ |
| Even harmonics | |
| 2 | 1.08 |
| 4 | 0.43 |
| 6 | 0.30 |
| $8 \leq n \leq 40$ | $0.23 \times 8/n$ |

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 (FM Mode, USB Playing, AUX IN) and test it.

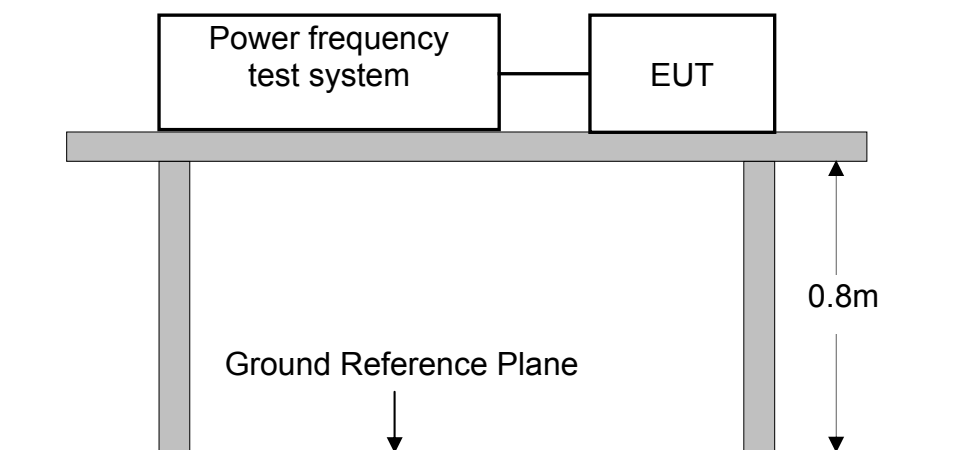
6.5 Test Results

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 (FM Mode, USB Playing, AUX IN) and test it.

7.5 Test Results

PASS.

Please refer to the following page of the worst case: USB Playing.

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

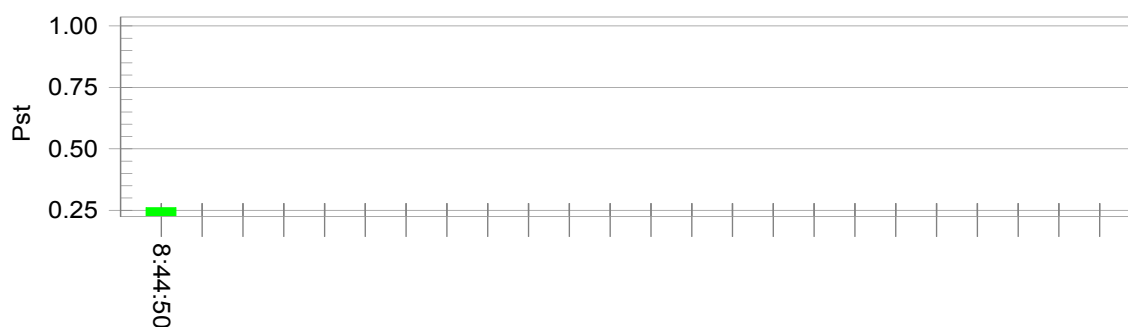
EUT: 2.1 Multimedia Speaker
Test category: All parameters (European limits)
Test date: 2016-5-4
Test duration (min): 10
Comment: USB Playing
Customer: FENDA
Model: F210X
Test Result: Pass

Tested by: Steven
Test Margin: 100
End time: 8:44:51
Data file name: F-010058.cts_data

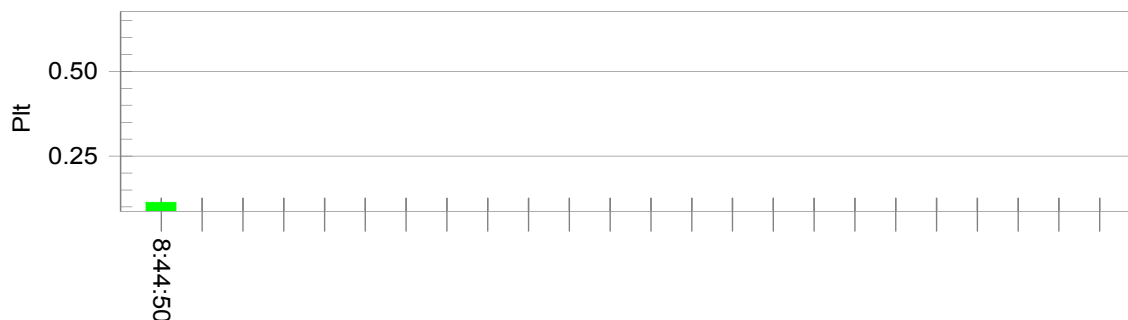
Status: Test Completed

Pst_i and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

| | | | |
|---------------------------------|--------|------------------|-------|
| Vrms at the end of test (Volt): | 230.29 | | |
| Highest dt (%): | 0.22 | Test limit (%): | N/A |
| T-max (mS): | 0 | Test limit (mS): | 500.0 |
| Highest dc (%): | 0.00 | Test limit (%): | 3.30 |
| Highest dmax (%): | 0.05 | Test limit (%): | 4.00 |
| Highest Pst (10 min. period): | 0.261 | Test limit: | 1.000 |
| Highest Plt (2 hr. period): | 0.114 | Test limit: | 0.650 |

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 ≥ 40 dB at a wanted audio signal level of 50 mW, or at another audio signal level specified by the manufacturer. If the S/N ratio is less than 43 dB, the performance criterion for audio assessment is the actual S/N ratio minus 3 dB. For AM sound receivers the criterion is ≥ 26 dB at 50 mW; and is ≥ 26 dB at 500 mW 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.

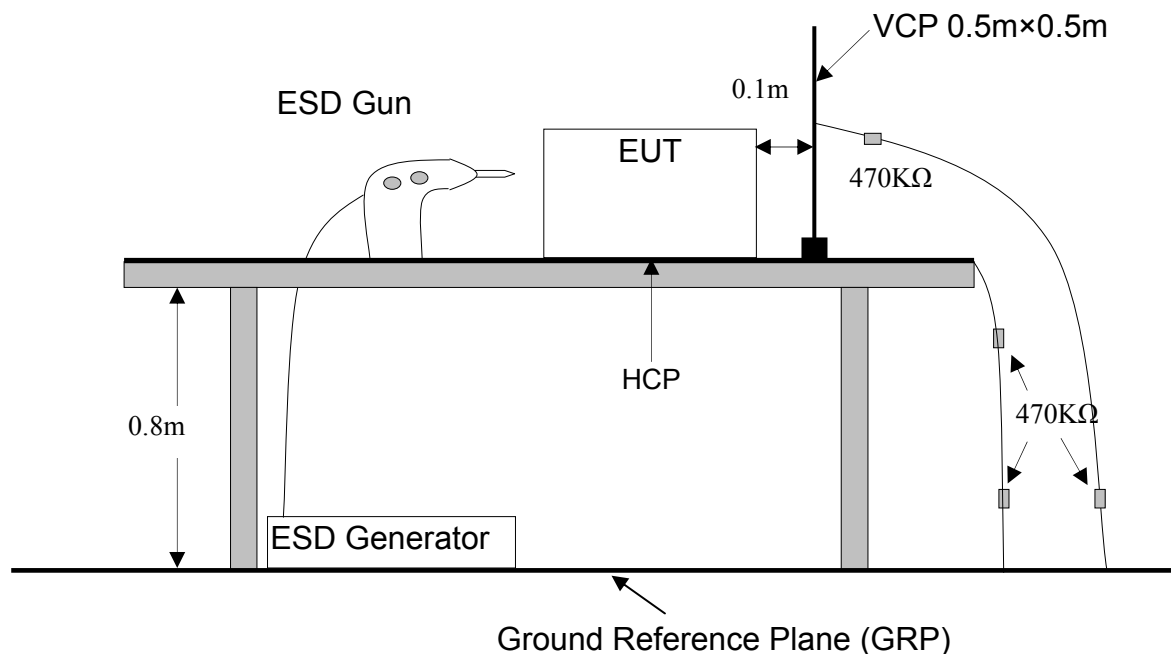
The criterion of compliance with the requirement is just perceptible degradation by observation of the picture. The screen shall be observed under normal viewing conditions (brightness 15 lx to 20 lx), at a viewing distance of six times the height of the screen.

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, ± 8 KV;
Contact Discharge: Level: 2, ± 4 KV)

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.

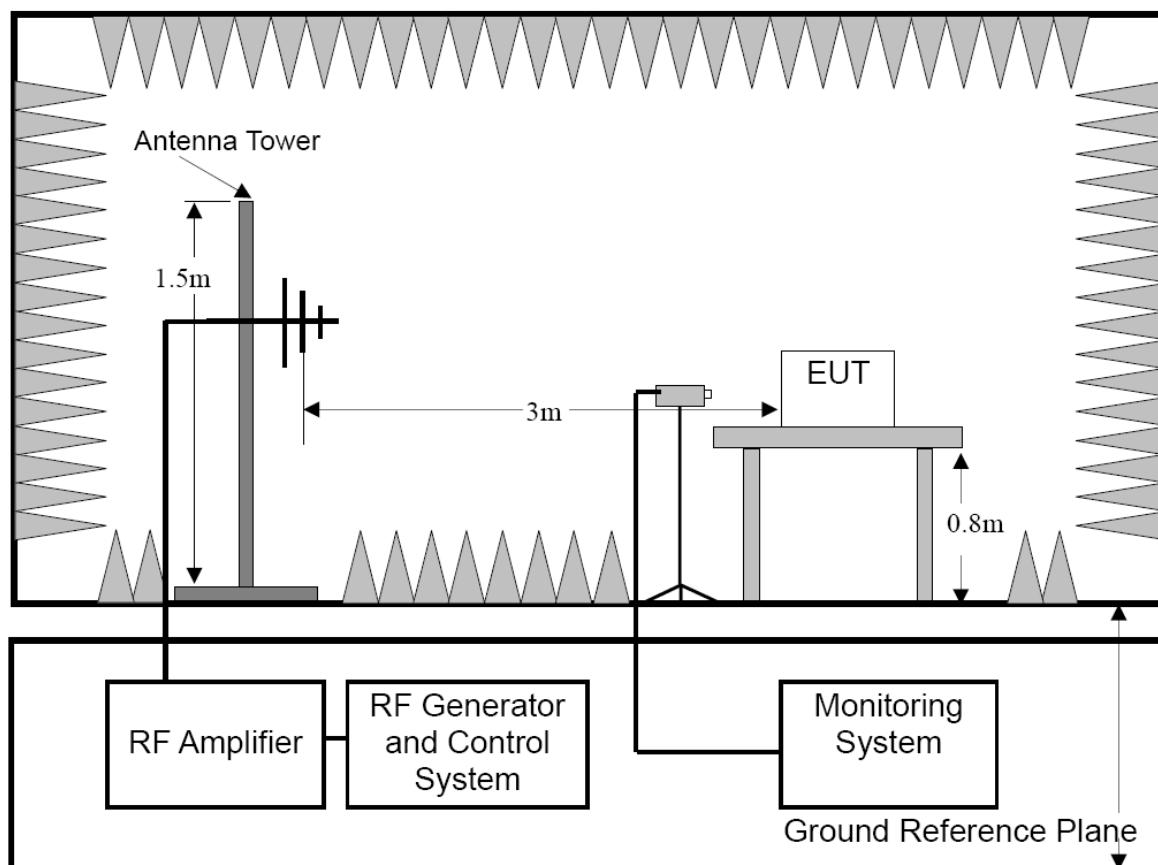
Please refer to the following page.

Electrostatic Discharge Test Results

| | | | |
|---|---|--|-----------------------------------|
| Ambient Condition: | Temp.: 24 °C | R.H.: 55 % | 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: | FM Mode, USB Playing, AUX IN | | |
| Test Point | | Kind A-Air Discharge C-Contact Discharge | Result (Performance Criterion) |
| AUX IN | | A,C | B |
| Slot of EUT | | A | A |
| Speaker port | | A,C | B |
| USB Port | | C | B |
| Screw | | C | A |
| Indirect Discharge (HCP) | | C | A |
| Indirect Discharge (VCP) | | C | A |
| Note: During the test, the EUT changes to stand-by mode, but it can be recovered by users after test. This test results was performed based on the client's product specifications and user's manual | | | |
| Test Equipment : ESD Tester (TESEQ, NSG 437) | | Test Engineer : Steven | |

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.

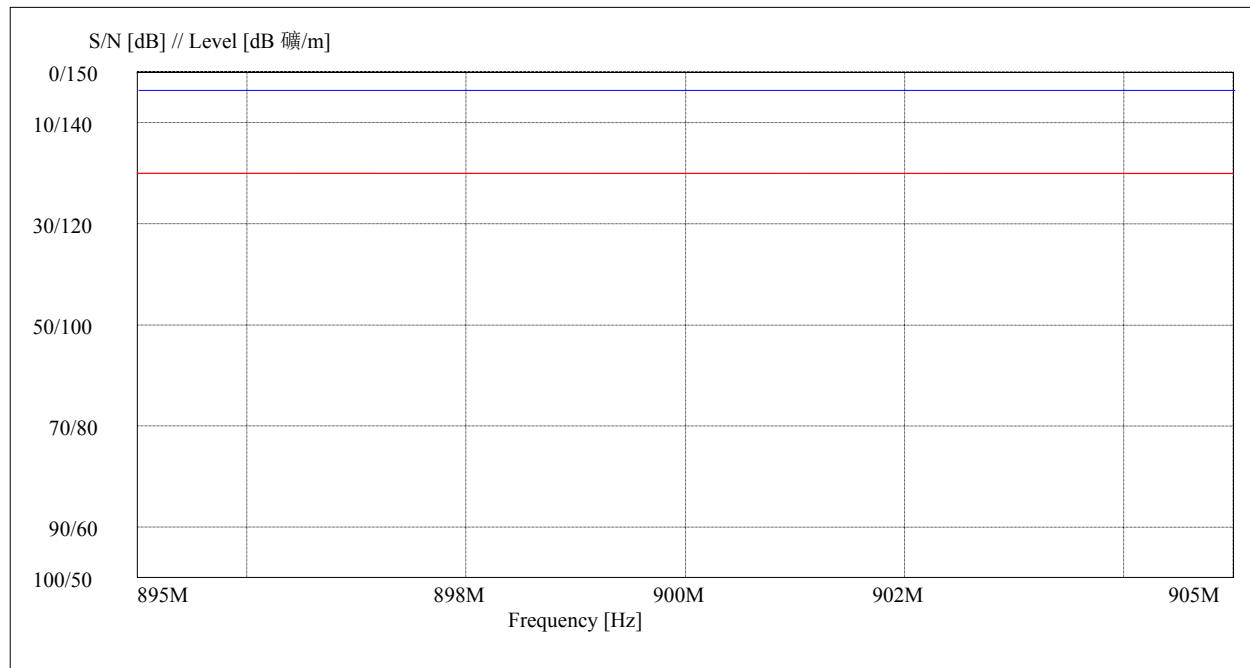
Please refer to the following pages of the worst case.

Test: Keyed Carrier S5 <F210X>

Test Mode: Amplifier -
Operating Mode: AUX IN
Frequency: -

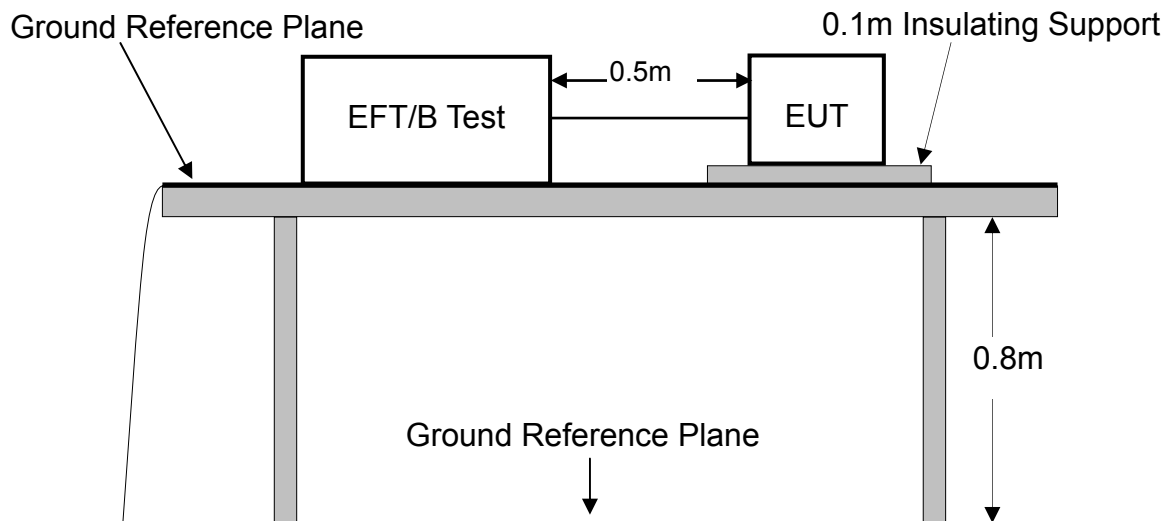
Monitor: Speaker
S/N: 75.1 dB
AF Level: 54.1 mW

Interf. Signal: Scan, 040516-00012-001, 5/4/2016, 11:45:27AM



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

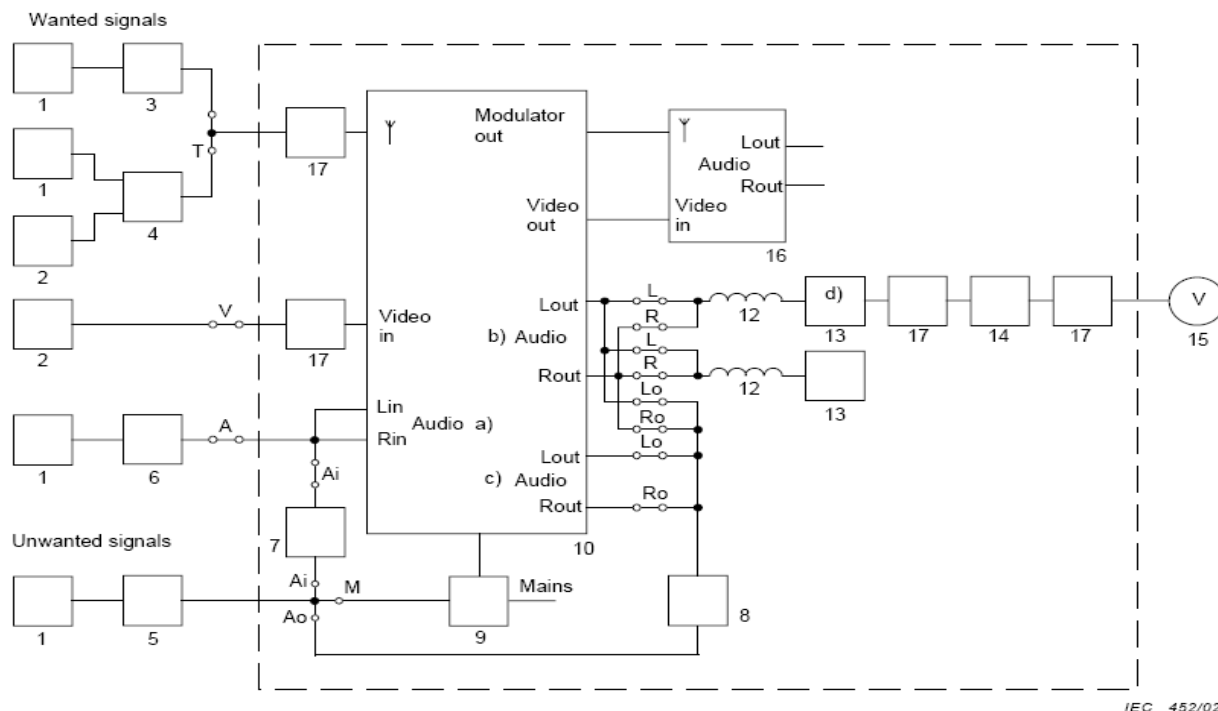
PASS.

Please refer to the following pages.

Electrical Fast Transient/Burst Test Results

| | | | |
|---|---|--|-----------------------|
| Ambient Condition: | Temp.: 24 °C | R.H.: 55 % | Air Pressure: 101 kPa |
| Power Supply: | AC 230V 50Hz | Required Performance Criterion: B | |
| Test Level: | Repetition Frequency: 5kHz; Duration: 15ms; Period: 300ms | | |
| Tested mode: | FM Mode, USB Playing, AUX IN | | |
| 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 | B | |
| N | ±1KV | B | |
| PE | | | |
| L、N | ±1KV | B | |
| L、PE | | | |
| N、PE | | | |
| L、N、PE | | | |
| Signal line | | | |
| DC line | | | |
| Note: In test mode, 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 : Steven | |

Other terminals:



IEC 452/02

- 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 ($>10 \text{ k}\Omega$) audio output impedance.

Key

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

(12, 13, 14 and 15 may be replaced by figure 2b or 2c if appropriate.)

R_s rated source impedance of the audio input ($1 \text{ k}\Omega$ 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 to RF voltages(common mode) of antenna terminals

| Frequency MHz | Level dB(μ V)(e.m.f.) |
|--|-------------------------------|
| 26 to 30 | 126 |
| ^a Decreasing linearly with the logarithm of frequency | |

Table 2 Limits of immunity of RF voltages of mains, loudspeaker and headphone terminals

| Frequency MHz | Level dB(μ V)(e.m.f.) |
|--|-------------------------------|
| 0.15 to 30 | 130 |
| 30 to 100 | 120 |
| 100 to 150 | 120-110 ^a |
| ^a Decreasing linearly with the logarithm of frequency | |

Table 3 Limits of immunity to RF voltages of audio input and output terminals (except loudspeaker and headphone terminals)(S2)

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

Table 4 Additional unwanted signal frequencies to be excluded in tests on sound and television reception functions.

| Function | Frequency range | |
|--|--|--------------------------|
| | The tuned channel in all cases, plus | |
| | the IF channel MHz | other frequencies MHz |
| FM sound receivers | $f_i \pm 0,5$ | None |
| Television receivers | $f_i - 2$ to $f_v + 2$ (for systems B, G, I, L, D, K, M) $f_v - 2$ to $f_i + 2$ (for system L') | $f_s \pm 0,5$ |
| NOTE f_i is the sound intermediate frequency; f_v is the vision intermediate frequency; f_s is the intercarrier sound frequency. | | |

12.3 Test Result

PASS.

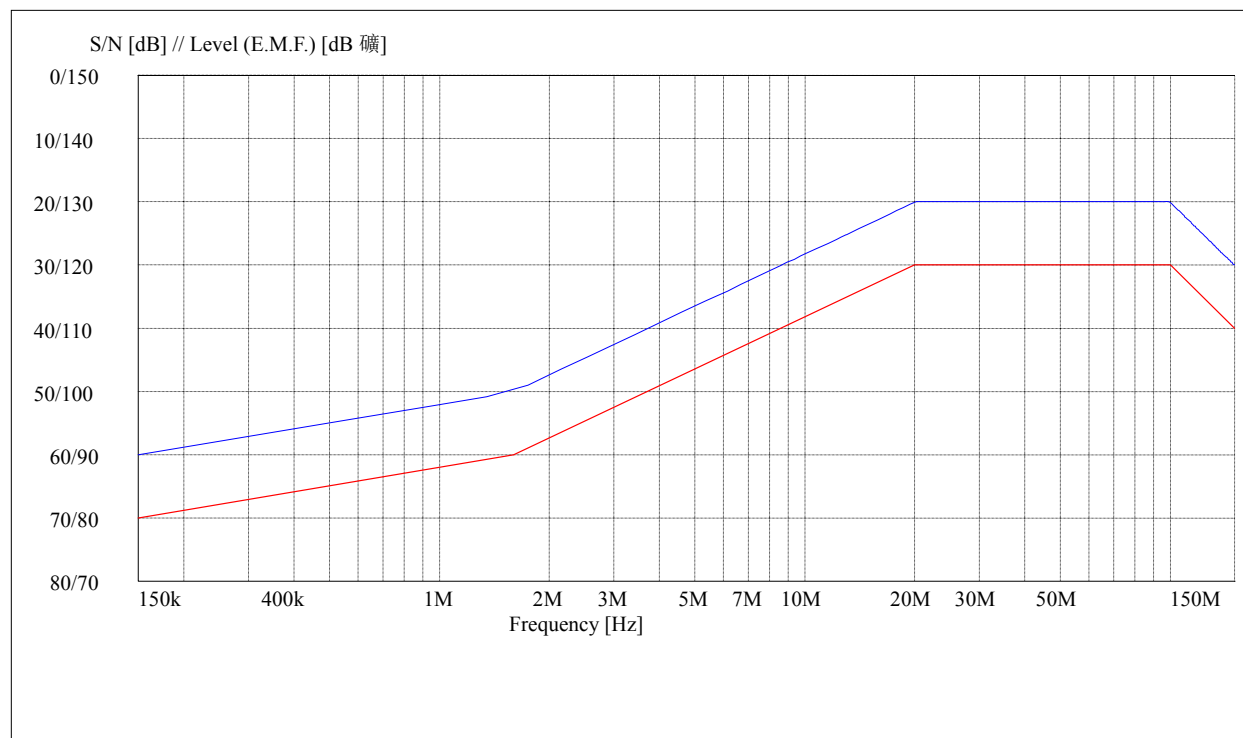
Please refer to the following pages of the worst case.

Test: Immunity Conducted Voltages S2a <F210X>

Test Mode: Amplifier -
Operating Mode: AUX IN
Frequency: -

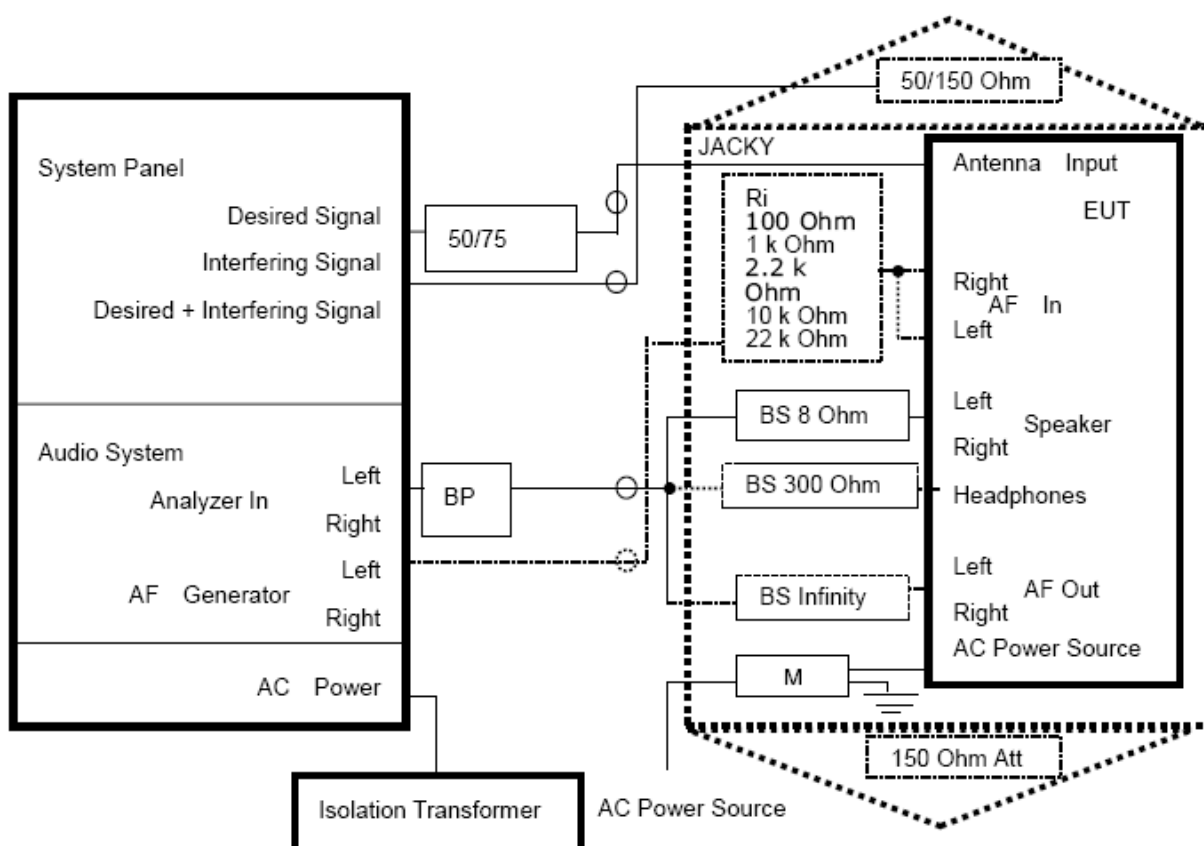
Monitor: Spekaer
S/N: 75.3 dB
AF Level: 50.5 mW

Interf. Signal: AUX IN, 040516-00012-001, 5/4/2016, 2:35:22PM



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 Except frequency bands: $(f_c - 1,5)$ to $(f_c + 1,5)$ $(f_s - 0,5)$ to $(f_s + 0,5)$ $(f_i - 2)$ to $(f_v + 2)$ ^a $(f_v - 2)$ to $(f_i + 2)$ ^b | 125 101 101 101 101 |
| For non-European countries and Russia 47 to 150 ^c Except the tuned channel ± 0,5 | 109 ^d |
| For European countries 47 to 87 87 to 108 108 to 144 144 to 150 Except the tuned channel ± 0,5 | 109 125 109 125 |
| 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.

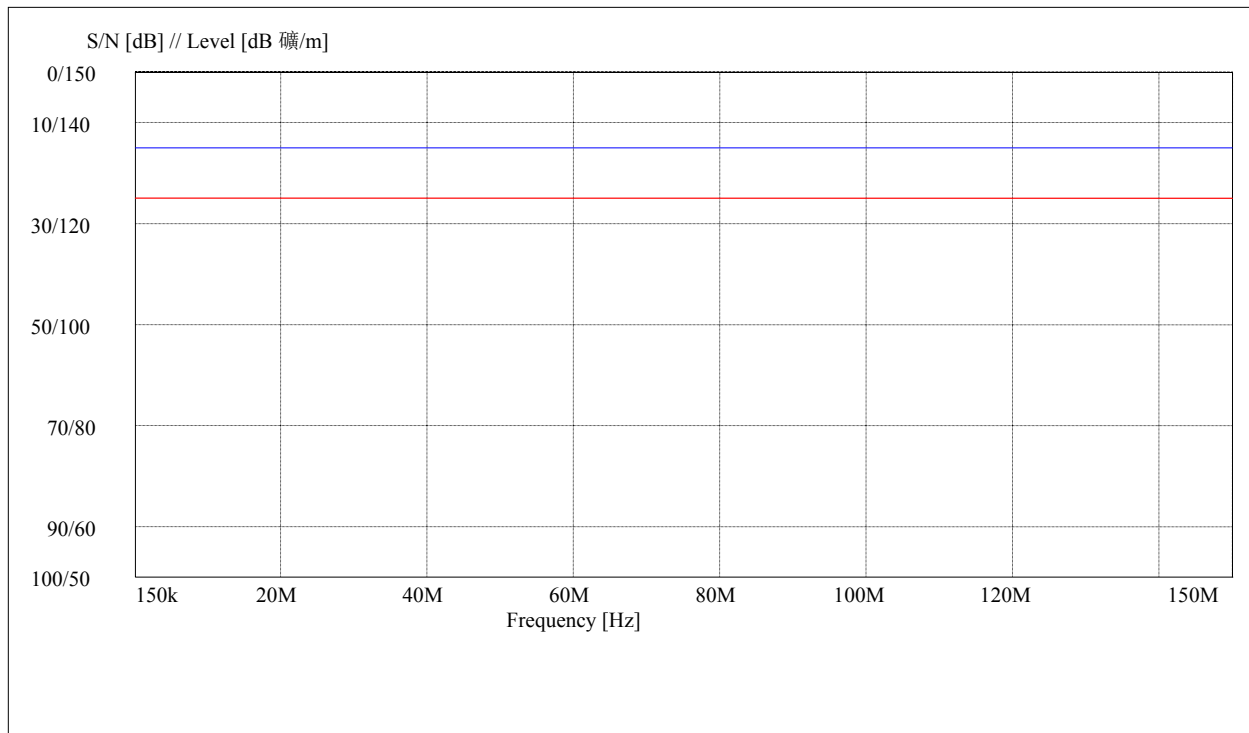
Please refer to the following pages of the worst case.

Test: Immunity Radiated Fields S3 <F210X>

Test Mode: Amplifier -
Operating Mode: AUX IN
Frequency: -

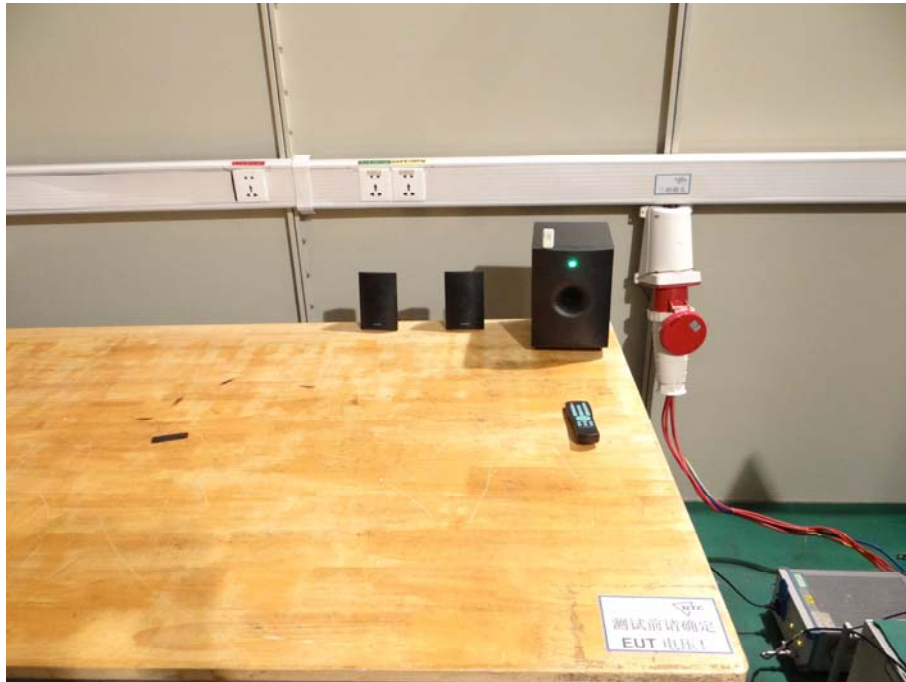
Monitor: Speaker
S/N: 75.3 dB
AF Level: 52.8 mW

Interf. Signal: Scan, 040516-00018-001, 5/4/2016, 2:39:40AM K2 = 1.6 dB

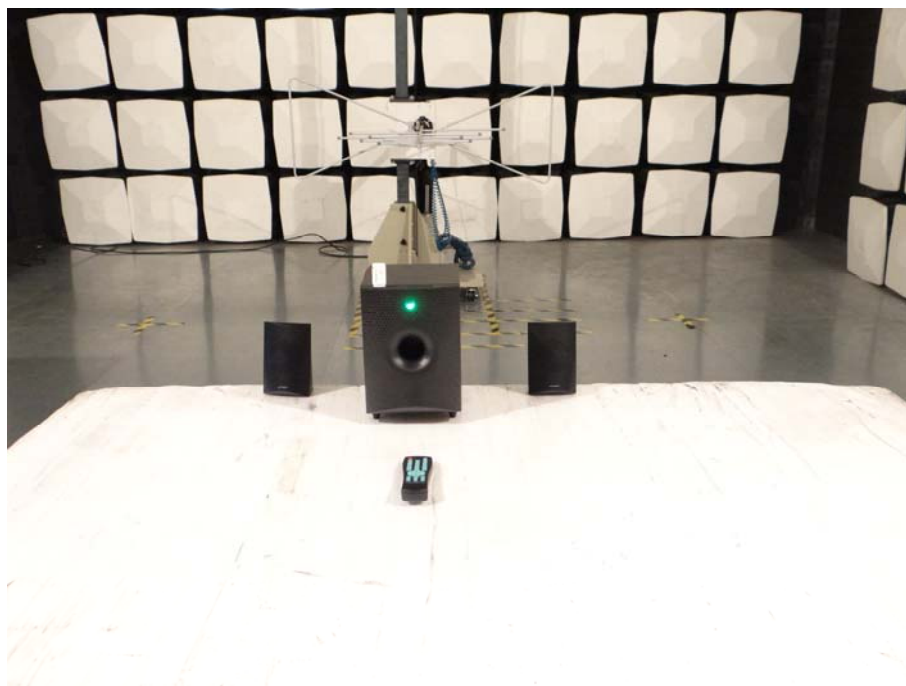


14. PHOTOGRAPHS

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.)

Figure 1
General Appearance of the E.U.T.



Figure 2
General Appearance of the E.U.T.



Figure 3
General Appearance of the E.U.T.



Figure 4
General Appearance of the E.U.T.



Figure 5
General Appearance of the E.U.T.



Figure 6
General Appearance of the E.U.T. (Remote)



Figure 7
General Internal of the E.U.T.



Figure 8
General Appearance of the PCB.

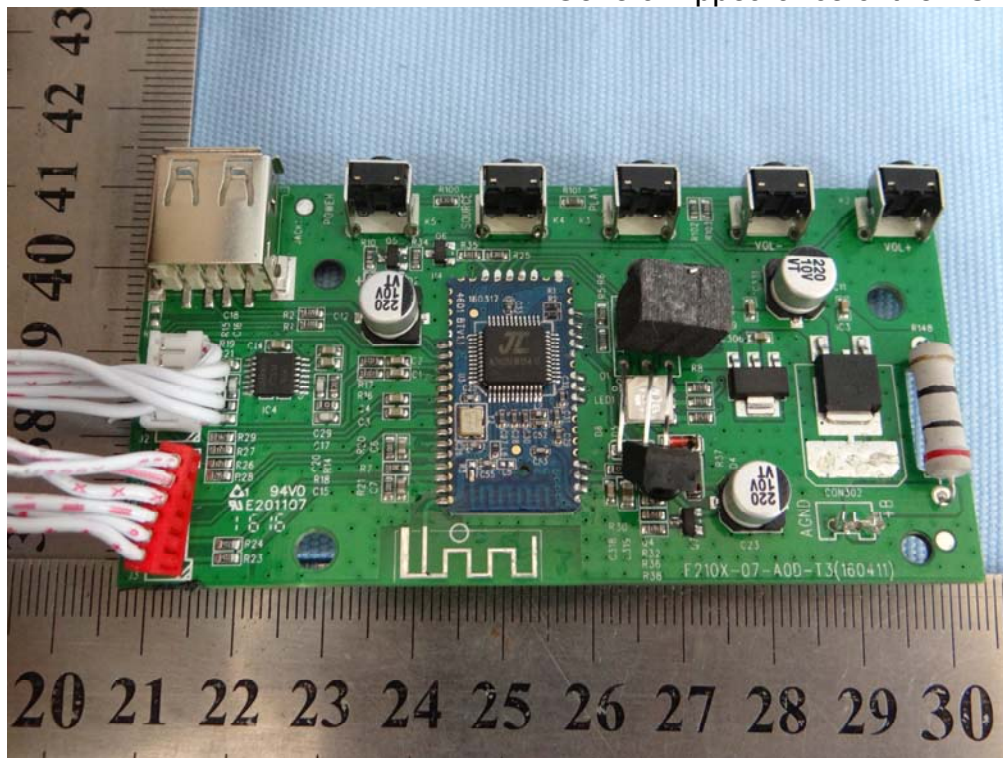


Figure 9
General Appearance of the PCB

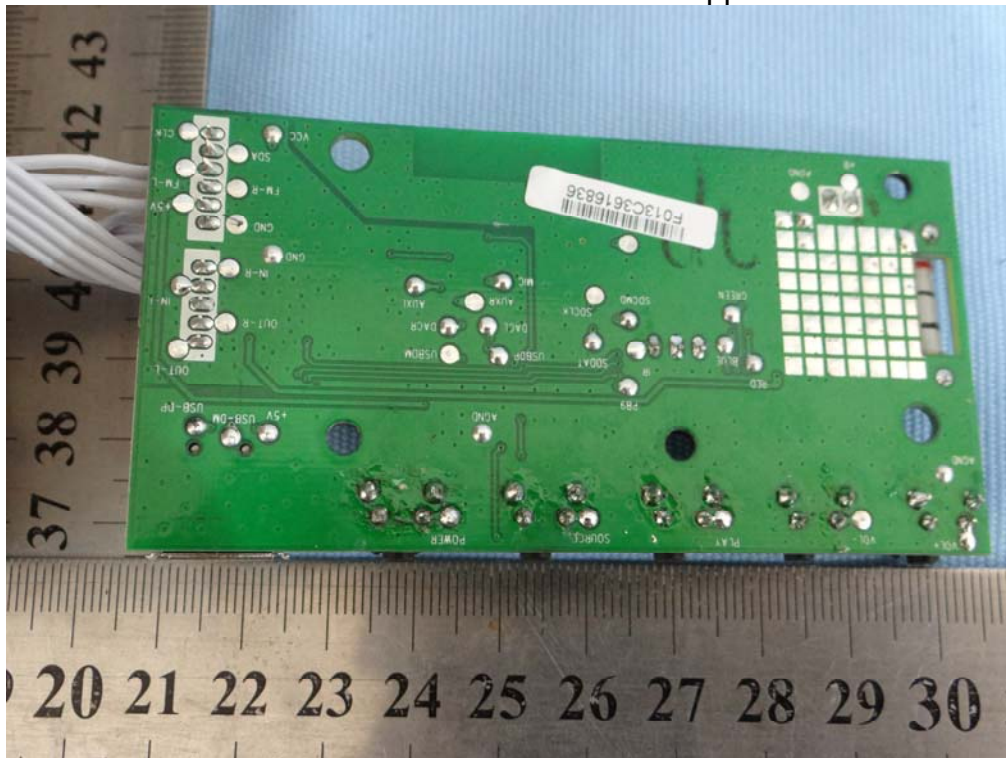


Figure 10
General Appearance of the PCB

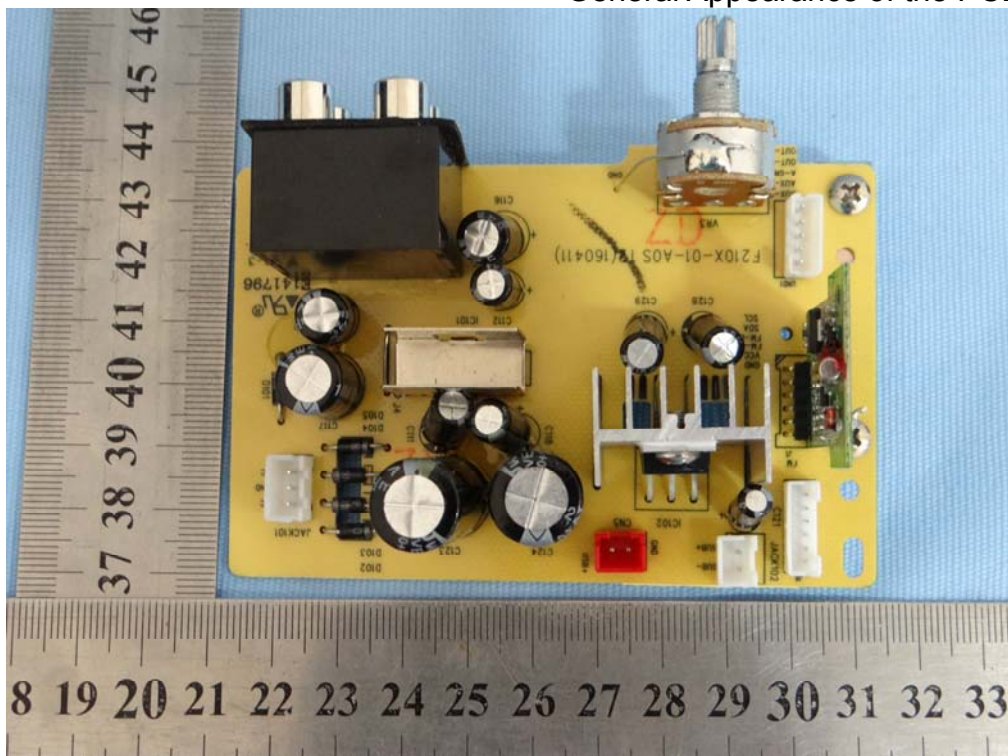


Figure 11
General Appearance of the PCB

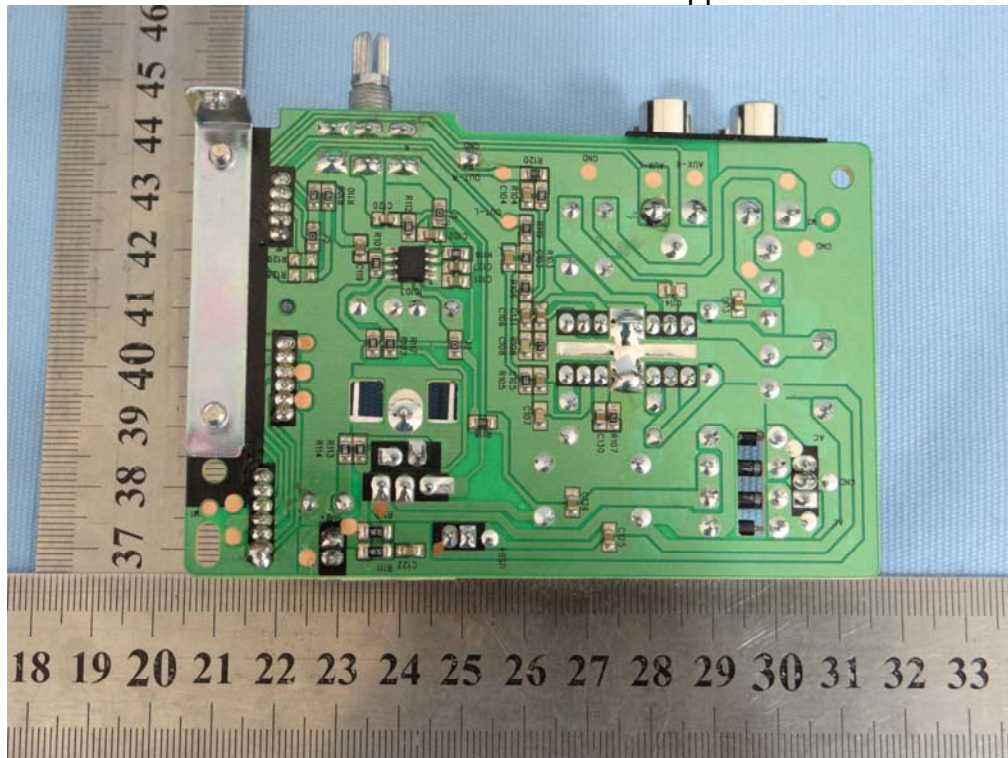


Figure 12
General Appearance of the PCB

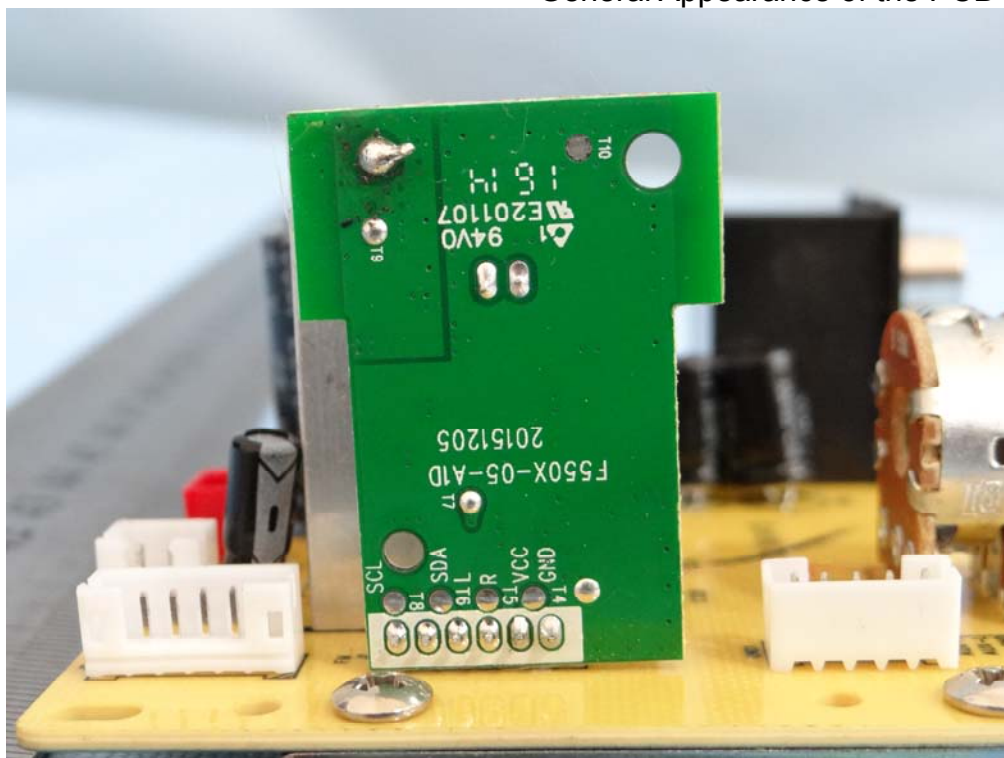
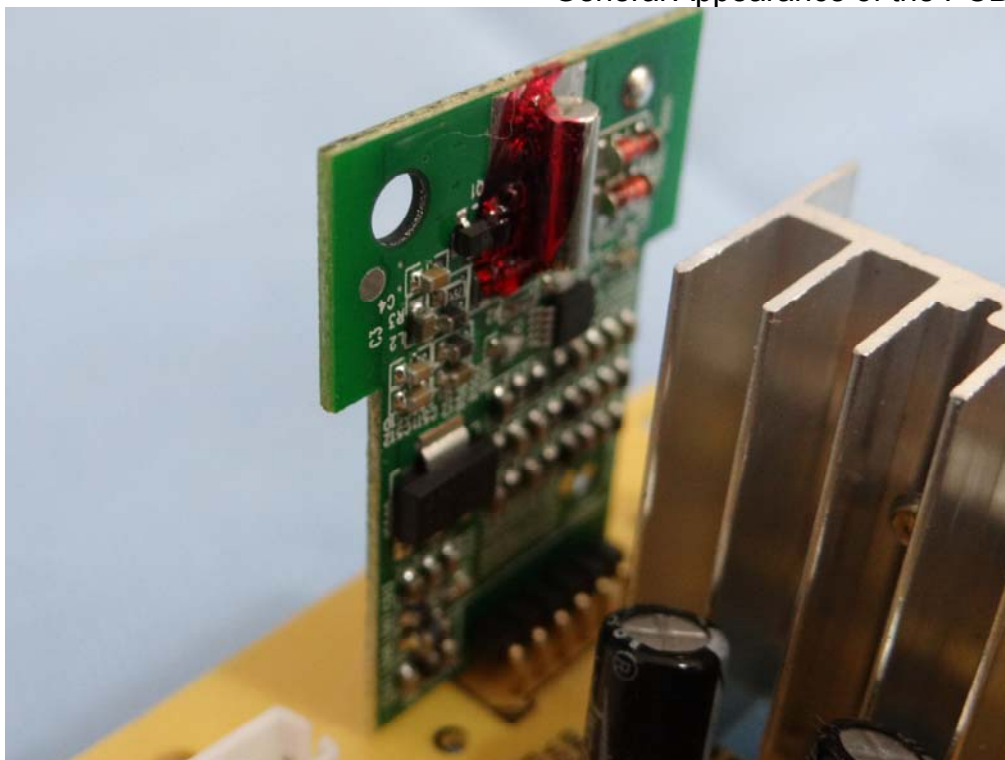


Figure 13
General Appearance of the PCB



---End---