

EMC TEST REPORT
for
Azlan Logistics Limited

SP-1800P Pair 60w Active Loudspeakers
Model No.: SP-1800P

Prepared for : Azlan Logistics Limited
Address : Redwood 2, Chineham Business Park, Crockford Lane,
Basingstoke, Hampshire, RG248WQ, United Kingdom

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TEST REPORT VERIFICATION

Applicant : Azlan Logistics Limited
Manufacturer : Azlan Logistics Limited
EUT : SP-1800P Pair 60w Active Loudspeakers
Model No. : SP-1800P
Rating : 16V== 5.4A
Trade Mark : VISION

Measurement Procedure Used:

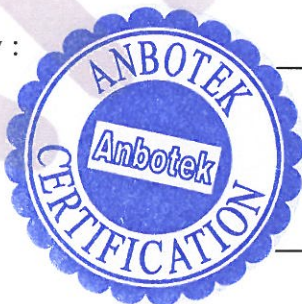
EN 55013: 2013
EN 61000-3-2: 2014;
EN 61000-3-3: 2013;
EN 55020: 2007+A11: 2011
(IEC 61000-4-2; EN 61000-4-4)

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN 55013, EN 55020, EN 61000-3-2 and EN 61000-3-3 requirements. The Project in EN 55020 was tested in Shenzhen EMTEK Co., Ltd.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Test Date: May 01~04, 2016

Prepared by :



Kebo Zhang
(Engineer/ Kebo Zhang)

Reviewer :

Olivia Yang
(Project Manager/Olivia Yang)

Approved & Authorized Signer :

Tom Chen
(Manager/Tom Chen)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : SP-1800P Pair 60w Active Loudspeakers

Model Number : SP-1800P

Test Power Supply : AC 230V, 50Hz

Applicant : Azlan Logistics Limited
Address : Redwood 2, Chineham Business Park, Crockford Lane,
Basingstoke, Hampshire, RG248WQ, United Kingdom

Manufacturer : Azlan Logistics Limited
Address : Redwood 2, Chineham Business Park, Crockford Lane,
Basingstoke, Hampshire, RG248WQ, United Kingdom

Factory : Azlan Logistics Limited
Address : Redwood 2, Chineham Business Park, Crockford Lane,
Basingstoke, Hampshire, RG248WQ, United Kingdom

Date of receipt : May 01, 2016

Date of Test : May 01~04, 2016

Adapter : Model: BX-16005400
Input: AC 100-240V, 50/60Hz, 1.8A Max
Output: DC 16V, 5400mA

DVD : Manufacturer: SONY
M/N: BDP-S380
S/N: 4065848
CE , FCC

1.2. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 752021

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, July 10, 2013.

IC-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A-1, Feb. 22, 2013.

CNAS - LAB Code: L3503

Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing Laboratories.

Test Location

All Emissions tests were performed

Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

1.3 Test Summary

For the EUT described above. The standards used were EN55013 for Emissions & EN55020 for Immunity.

Table 1 : Tests Carried Out Under EN 55013: 2013

Standard	Test Items	Status
EN 55013: 2013	Disturbance Voltage at The Mains Terminals (150KHz To 30MHz)	√
EN 55013: 2013	Disturbance Power (30MHz To300MHz)	√
EN 55013: 2013	Radiated Disturbances (30MHz To 1000MHz)	√
EN 55013: 2013	Disturbance Voltage at The Antenna Terminals(30MHz To 2150MHz)	x
EN 55013: 2013	Wanted signal and disturbance voltage at the RF output of equipment(30MHz To 2150MHz)	x
EN 55013: 2013	Radiated Power(1GHz To 3GHz)	x

- √ Indicates that the test is applicable
X Indicates that the test is not applicable

Table 2 : Tests Carried Out Under EN 61000-3-2: 2014 / EN 61000-3-3: 2013

Standard	Test Items	Status
EN 61000-3-2: 2014	Harmonic Current Test	√
EN 61000-3-3: 2013	Voltage Fluctuations and Flicker Test	√

Table 3 : Tests Carried Out Under EN 55020: 2007+A11: 2011

Standard	Test Items	Status
EN 55020: 2007+A11: 2011 S1	Input immunity at antenna terminal	x
EN 55020: 2007+A11: 2011 S2a	Immunity Conducted Voltages	√
EN 55020: 2007+A11: 2011 S2b	Immunity Conducted Currents	x
EN 55020: 2007+A11: 2011 S3	Immunity Radiated Fields	√
EN 55020: 2007+A11: 2011 S4	Screening effectiveness	x
EN 55020: 2007+A11: 2011 S5	Immunity to radiated fields 900MHz ±5MHz 3V/M	√
IEC 61000-4-4	Immunity to Electrical transients	√
IEC 61000-4-2	Electrostatic discharge Immunity	√

- √ Indicates that the test is applicable
x Indicates that the test is not applicable

1.4. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.1dB (Horizontal) Ur = 4.3dB (Vertical)
Disturbance Uncertainty	:	Ud = 2.6 dB
Conduction Uncertainty	:	Uc = 3.4 dB

1.5. EMS Performance Criteria

- √ A: Normal performance within the specification limits
√ B: Temporary degradation or loss of function or performance which is self-recoverable
√ C: Temporary degradation or loss of function or performance which requires operator intervention or system reset
√ D: Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data

2. MEASURING DEVICE AND TEST EQUIPMENT

2.1. Conducted Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Two-Line V-network	Rohde & Schwarz	ENV216	100055	Apr. 17, 2016	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Apr. 17, 2016	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Apr. 17, 2016	1 Year

2.2. Disturbance Power Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Absorbing Clamp	FCC	F-201-23M M	08166	Apr. 17, 2016	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Apr. 17, 2016	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Apr. 17, 2016	1 Year

2.3. Radiated Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 17, 2016	1 Year
2.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 20, 2016	1 Year
3.	Pre-amplifier	SONOMA	310N	186860	Apr. 17, 2016	1 Year

2.4. Harmonic Current/Flicker Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
4.	Programmable AC Power source	SOPH POWER	PAG-1050	630250	Apr. 17, 2016	1 Year
5.	Harmonic and Flicker Analyzer	LAPLACE	AC2000A	272629	Apr. 20, 2016	1 Year

2.5. Electrostatic Discharge Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Simulators	3ctest	ESD-30T	ES0131505	June. 25, 2015	1 Year

2.6. Electrical Fast Transient /Burst Immunity Measurement

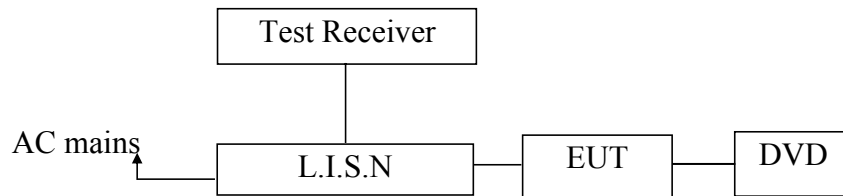
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EFT Burst Simulator	PRIMA	EFT61004B	PR10114282	Apr. 17, 2016	1 Year

2.7. EN 55020 Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	TS9980 Software	R&S	T80-K1V2.21	184	N/A	N/A
2.	Signal Generator	R&S	SMB100A	103041	May 29, 2015	1 Year
3.	Signal Generator	R&S	SMB100A	103042	May 29, 2015	1 Year
4.	Power Meter	R&S	NRVS	101761	May 29, 2015	1 Year
5.	Audio Analyzer	R&S	UPV	101473	May 29, 2015	1 Year
6.	Level Meter	R&S	URV35	100339	May 29, 2015	1 Year
7.	RF&System Control Panel	R&S	TS-RSP	100426	N/A	N/A
8.	Power Amplifier	BONN	TS998AM	97483	May 29, 2015	1 Year
9.	TV Test signal Transmitter	R&S	SFU	101716	May 29, 2015	1 Year
10.	TV Generator PAL	R&S	SGPF	100204	May 29, 2015	1 Year
11.	TV Generator SECAM	Philips	PM5418	LO 604796	May 29, 2015	1 Year
12.	Stripline Test Cell	R&S	TS998JC	N/A	N/A	1 Year
13.	EMI Test Receiver	Rohde & Schwarz	ESCS30	828985/018	May 29, 2015	1 Year
14.	Absorbing Clamp	Rohde & Schwarz	MDS21	833711/025	May 29, 2015	1 Year
15.	Log.-Per. Antenna	SCHWARZBECK	VULP 9118E	N/A	May 29, 2015	1 Year
16.	Power Amplifier	PRANA	AP32MT215	N/A	May 29, 2015	1 Year

3. POWER LINE CONDUCTED EMISSION TEST

3.1. Block Diagram of Test Setup



3.2. Measuring Standard

EN 55013: 2013

3.3. Power Line Conducted Emission Limits

Frequency (MHz)	Limit (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0
NOTE1-The lower limit shall apply at the transition frequencies. NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

3.4. EUT Configuration on Measurement

The following equipments are installed on Conducted Emission Measurement to meet EN 55013 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

3.5. Operating Condition of EUT

3.5.1. Setup the EUT as shown on Section 3.1.

3.5.2. Turn on the power of all equipments.

3.5.3. Let the EUT work in measuring mode (Aux Mode, AV Mode) and measure it.

3.6. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and connected to the AC mains through Line Impedance Stability Network (L.I.S.N). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are investigated to find out the maximum conducted emission according to the EN 55013 regulations during conducted emission measurement.

The bandwidth of the field strength meter (R&S Test Receiver ESCI) is set at 9KHz in 150KHz~30MHz.

The frequency range from 150kHz to 30MHz is investigated for AC mains.

The test results are listed in Section 3.7.

3.7. Measuring Results

PASS.

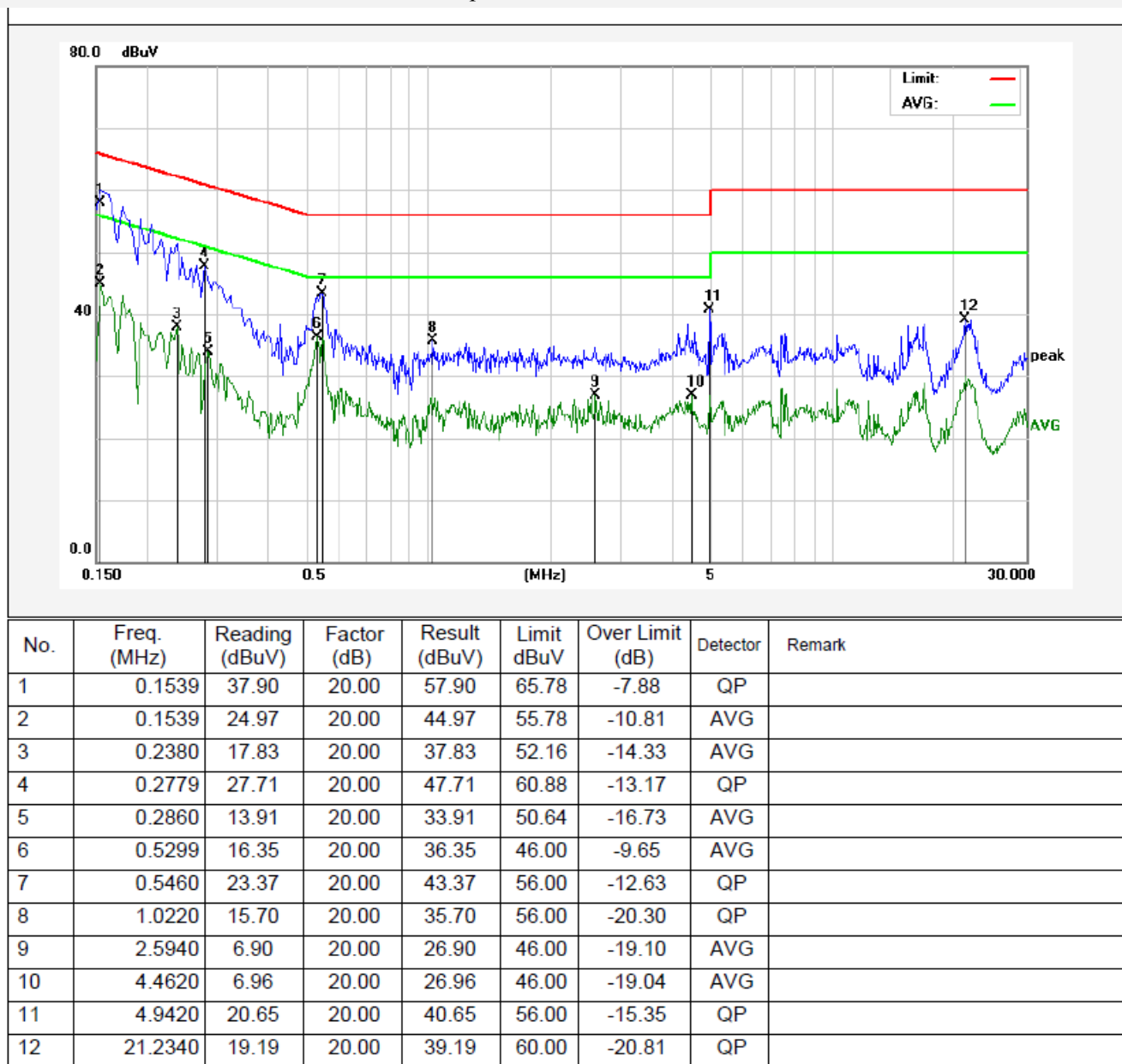
The frequency range 150kHz to 30MHz is investigated

The test curves are shown in the following pages.

The EUT was tested on (Aux Mode, AV Mode) modes, only the worst data of (AV Mode) are attached in the following pages.

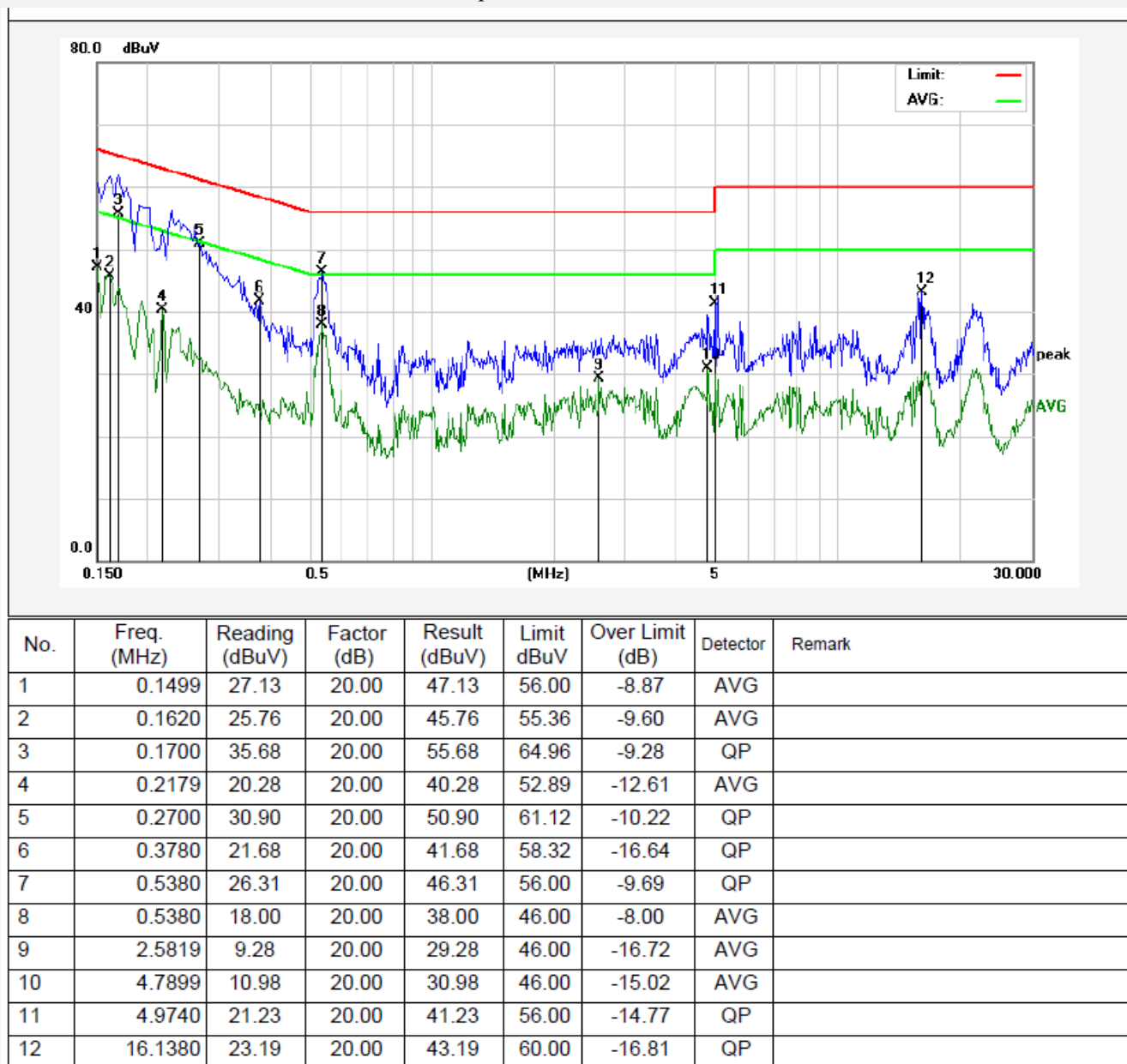
CONDUCTED EMISSION TEST DATA

Test Site: 1# Shielded Room
Operating Condition: AV Mode
Test Specification: AC 230V, 50Hz
Comment: L
Temp.:22.2℃ Hum.:60%



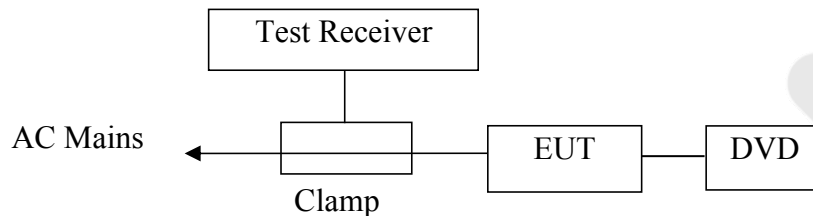
CONDUCTED EMISSION TEST DATA

Test Site: 1# Shielded Room
Operating Condition: AV Mode
Test Specification: AC 230V, 50Hz
Comment: N
Temp.:22.2℃ Hum.:60%



4. DISTURBANCE POWER TEST

4.1. Block Diagram of Test Setup



4.2. Measuring Standard

EN 55013: 2013

4.3. Disturbance Power Limits

All emanations from devices or system including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

Frequency MHz	Limits dB(pW)	
	Quasi-peak Value	Average Value
30 ~ 300	45 Increasing Linearly with Frequency to 55	35 Increasing Linearly with Frequency to 45

4.4. EUT Configuration on Measurement

The EN 55013 Regulations test method must be used to find the maximum emission during radiated emission measurement. The configuration of the EUT is the same as used in conducted emission measurement.

4.5. Operating Condition of EUT

4.5.1. Setup the EUT and simulators as shown in Section 4.1.

4.5.2. Turn on the power of all equipments.

4.5.3. Let the EUT work in measuring mode (AV Mode) and measure it.

4.6. Test Procedure

The EUT is placed on the ground and away from other metallic surface at least 0.8m. It is connected to the power mains through an extension cord of 6m min. The absorber clamp clamps the cord and moves from the far end to the EUT to measure the disturbing energy emitted from the cord.

The bandwidth of the test receiver(R&S ESCI) is set at 120kHz.

All the test results are listed in Section 4.7.

4.7. Disturbance Power Test Results

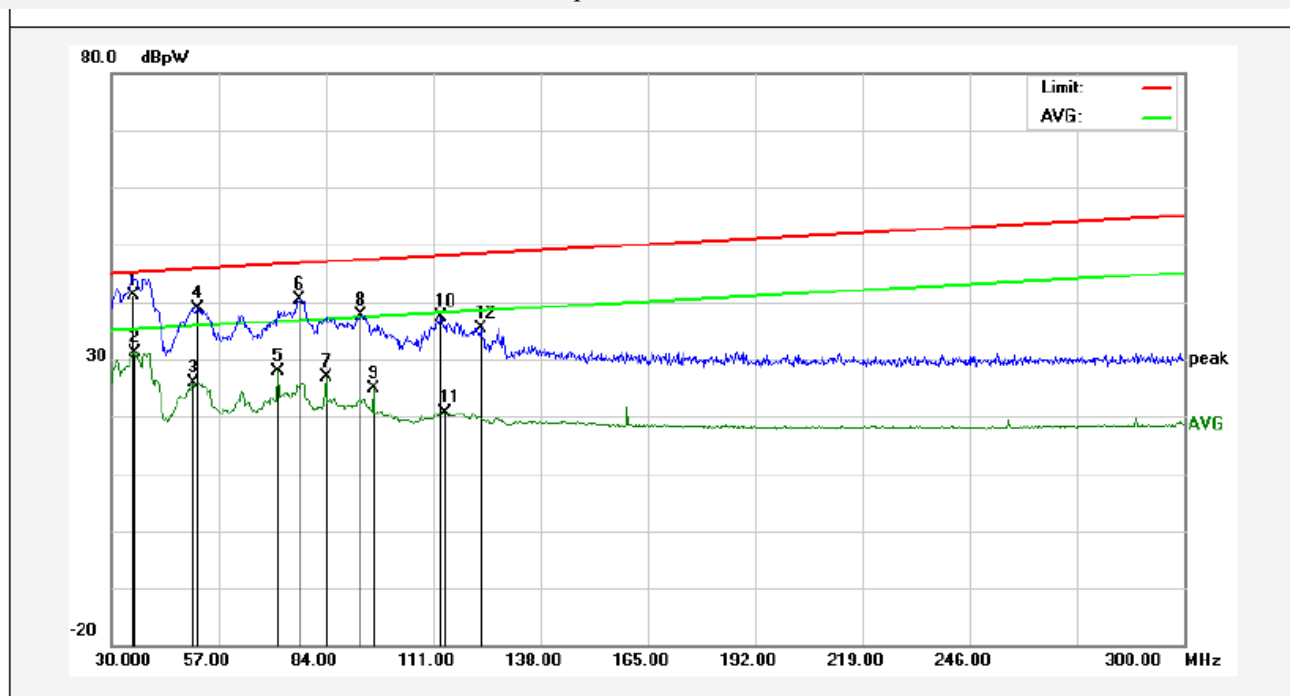
PASS.

The frequency spectrum from 30 MHz to 300 MHz is investigated.

The test curves are shown in the following pages.

Power Clamp Test

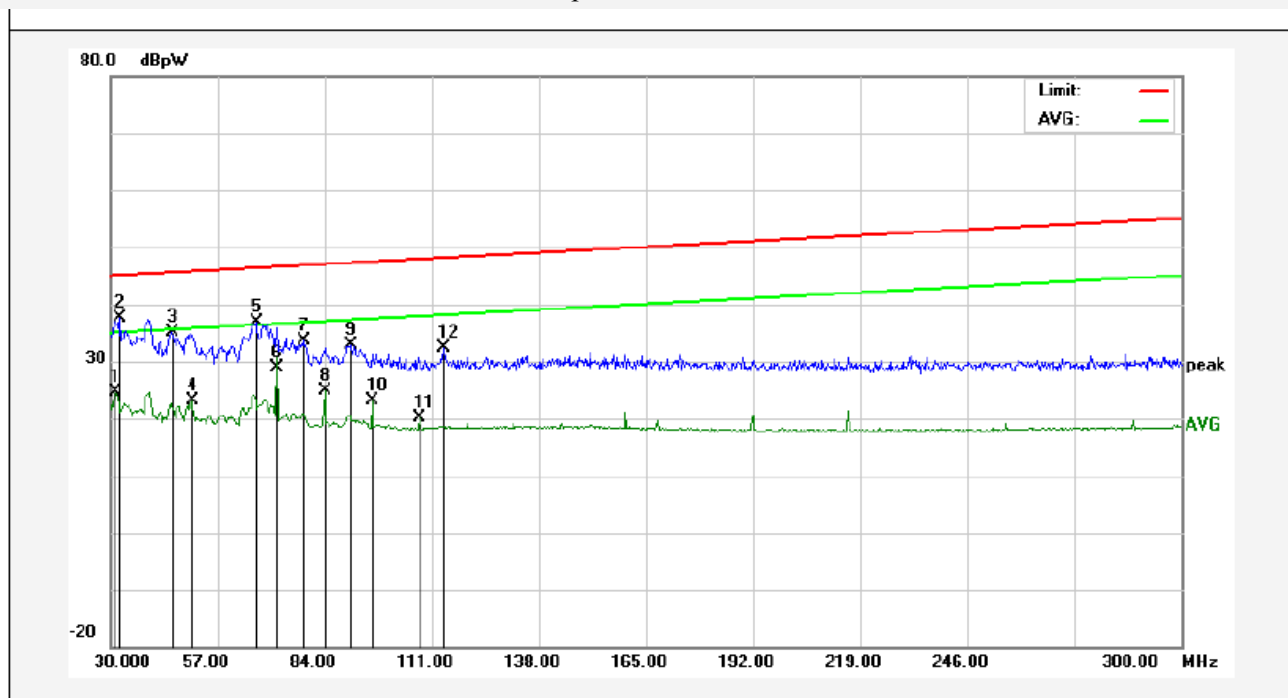
Test Site: 1# Shielded Room
Operating Condition: AV Mode
Test Specification: AC 230V, 50Hz
Comment: AC LINE
Temp.:22.2°C Hum:60%



No.	Freq. (MHz)	Reading (dBpW)	Factor (dB)	Result (dBpW)	Limit (dBpW)	Over Limit (dB)	Detector	Remark
1	35.6400	15.19	26.00	41.19	45.21	-4.02	QP	
2	35.8800	5.14	26.00	31.14	35.22	-4.08	AVG	
3	50.6800	-0.06	26.00	25.94	35.77	-9.83	AVG	
4	51.7599	12.87	26.00	38.87	45.81	-6.94	QP	
5	72.0000	1.84	26.00	27.84	36.56	-8.72	AVG	
6	77.5199	14.48	26.00	40.48	46.76	-6.28	QP	
7	84.0000	0.95	26.00	26.95	37.00	-10.05	AVG	
8	93.0400	11.73	26.00	37.73	47.33	-9.60	QP	
9	96.0000	-1.17	26.00	24.83	37.44	-12.61	AVG	
10	112.9600	11.38	26.00	37.38	48.07	-10.69	QP	
11	114.1600	-5.40	26.00	20.60	38.12	-17.52	AVG	
12	122.9600	9.33	26.00	35.33	48.44	-13.11	QP	

Power Clamp Test

Test Site: 1# Shielded Room
Operating Condition: AV Mode
Test Specification: AC 230V, 50Hz
Comment: DC LINE
Temp.:22.2°C Hum:60%



No.	Freq. (MHz)	Reading (dBpW)	Factor (dB)	Result (dBpW)	Limit (dBpW)	Over Limit (dB)	Detector	Remark
1	31.4799	-1.26	26.00	24.74	35.05	-10.31	AVG	
2	32.4400	11.59	26.00	37.59	45.09	-7.50	QP	
3	45.5200	9.07	26.00	35.07	45.57	-10.50	QP	
4	50.5598	-2.99	26.00	23.01	35.76	-12.75	AVG	
5	66.8399	10.92	26.00	36.92	46.36	-9.44	QP	
6	72.0000	2.77	26.00	28.77	36.56	-7.79	AVG	
7	78.7600	7.66	26.00	33.66	46.81	-13.15	QP	
8	84.0000	-1.02	26.00	24.98	37.00	-12.02	AVG	
9	91.0000	6.92	26.00	32.92	47.26	-14.34	QP	
10	96.0000	-2.85	26.00	23.15	37.44	-14.29	AVG	
11	108.0000	-5.82	26.00	20.18	37.89	-17.71	AVG	
12	114.2000	6.38	26.00	32.38	48.12	-15.74	QP	

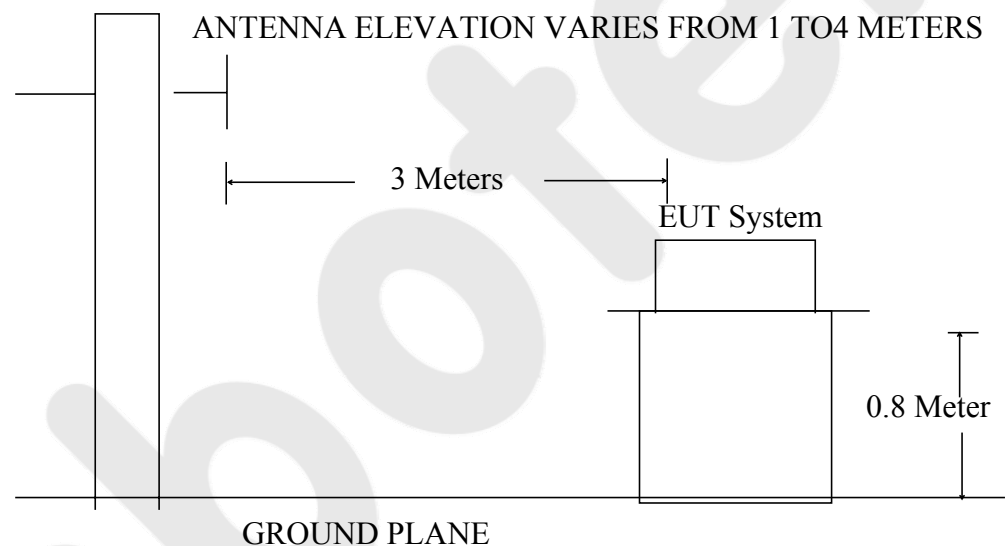
5. RADIATED EMISSION TEST

5.1. Block Diagram of Test

5.1.1. Block diagram of connection between the EUT and simulators



5.1.2. Block diagram of test setup (In chamber)



5.2. Measuring Standard

EN 55013:2013

5.3. Radiated Emission Limits

5.3.1. EN 55013:2013

Radiated Emission Limits

All emanations from an EN 55013 device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

FREQUENCY MHz	DISTANCE Meters	Limit Values	
		dB(μ V)/m	
≤ 1000	3	Fundamental	57
30~300	3	Harmonics	52
300~1000	3	Harmonics	56
30~230	3	Other	40
230~1000	3	Other	47

- Note:
- (1) The smaller limit shall apply at the combination point between two frequency bands.
 - (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

5.4. EUT Configuration on Test

The EN 55013 regulations test method must be used to find the maximum emission during radiated emission measurement.

5.5. Operating Condition of EUT

5.5.1. Turn on the power.

5.5.2. Let the EUT work in measuring mode (Aux Mode, AV Mode) and measure it.

5.6. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Bilog antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the Receiver (ESCI) is set at 120kHz.

The EUT is tested in 9*6*6 Chamber.

The test results are listed in Section 5.7.

5.7. Measuring Results

PASS.

The frequency range from 30MHz to 1000MHz is investigated.

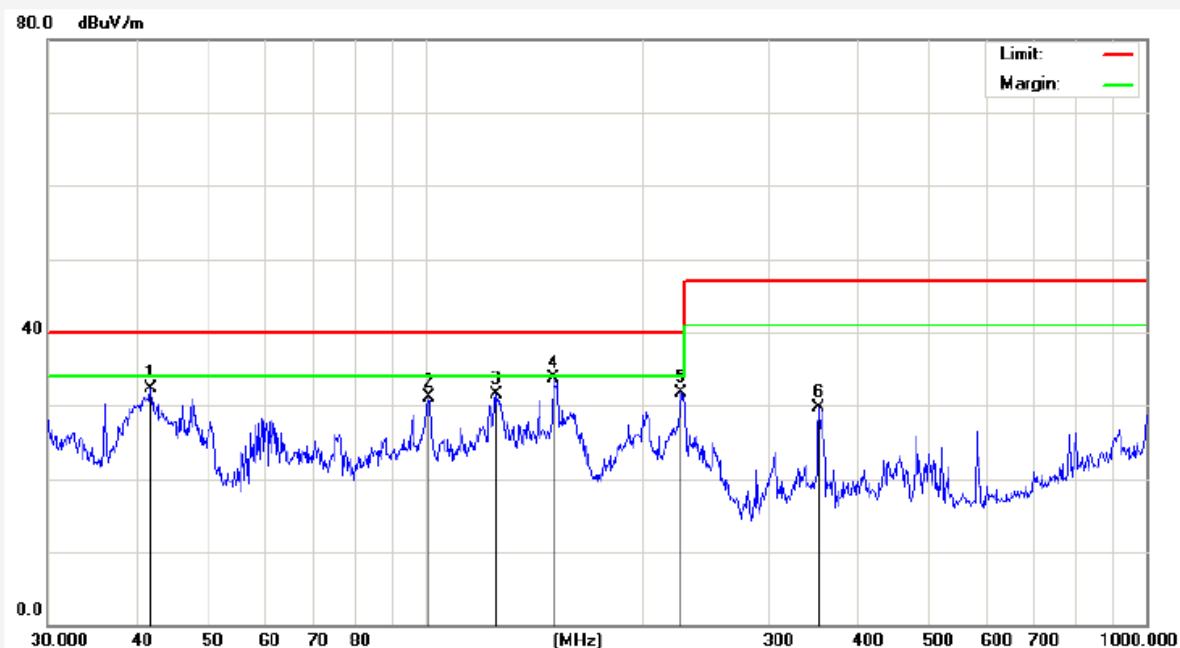
The test curves are shown in the following pages.

The EUT was tested on (Aux Mode, AV Mode) modes, only the worst data of (AV Mode) are attached in the following pages.

Job No.:	AT011605500E	Polarization:	Horizontal
Standard:	(RE)EN 55013_3m	Power Source:	AC 230V, 50Hz
Test item:	Radiation Test	Temp.(°C)/Hum.(%RH):	24.3(°C)/55%RH
Note:	AV Mode	Distance:	3m

No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	61.7781	54.49	-28.74	25.75	40.00	-14.25	peak			
2	96.0986	55.38	-32.04	23.34	40.00	-16.66	peak			
3	143.8295	63.86	-34.10	29.76	40.00	-10.24	peak			
4	191.7450	63.93	-31.33	32.60	40.00	-7.40	peak			
5	239.9874	56.86	-28.25	28.61	47.00	-18.39	peak			
6	362.9844	53.38	-23.70	29.68	47.00	-17.32	peak			

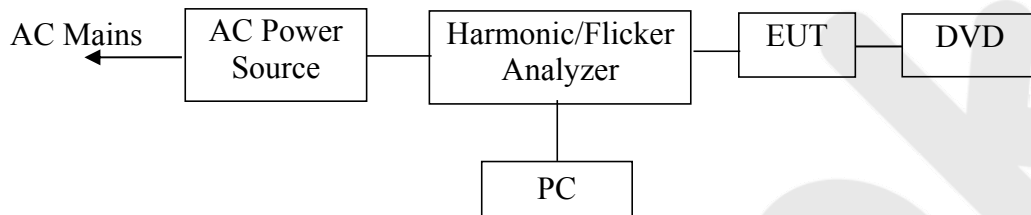
Job No.:	AT011605500E	Polarization:	Vertical
Standard:	(RE)EN 55013_3m	Power Source:	AC 230V, 50Hz
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.3(C)/55%RH
Note:	AV Mode	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	41.7129	54.04	-21.68	32.36	40.00	-7.64	peak			
2	101.2885	57.80	-26.64	31.16	40.00	-8.84	peak			
3	125.4457	59.41	-27.90	31.51	40.00	-8.49	peak			
4	150.5378	62.59	-28.96	33.63	40.00	-6.37	peak			
5	226.0994	56.67	-25.03	31.64	40.00	-8.36	peak			
6	351.7079	52.66	-22.97	29.69	47.00	-17.31	peak			

6. HARMONIC CURRENT EMISSION TEST

6.1. Block Diagram of Test Setup



6.2. Measuring Standard

EN 61000-3-2: 2014

6.3. Operation Condition of EUT

- 6.3.1. Setup the EUT as shown on Section 6.1.
- 6.3.2. Turn on the power of all equipments.
- 6.3.3. After that, let the EUT work and measure it.

6.4. Measuring Results

PASS.

Test data see following pages.

HARMONIC CURRENT TEST RESULT SUMMARY (RUN TIME)

Tested On : May 01, 2016 10:07 for 150 Seconds.

Supply Voltage : 0.0 to 258.6 Vrms 347.1 Vpk Frequency : 47.37 to 70.58 Hz

Supply Pass : Harmonic Requirements Frequency Limits and Crest Limits.

Load Power : 0.90 to 85.41 W 113.7 VA Power Factor 0.583

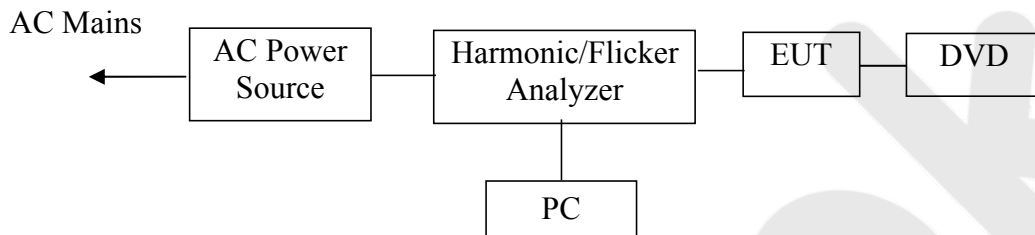
Load Current : 0.0 to 568.7 mArms 0.0 to 1593.0 mApk Crest Factor: 3.031

Limits Applied : EN61000-3-2:2014 Class A Limits Apply.

Harmonic Number	Limit Current mA	Average (filtered) mA	% Limit	max. Value (Filtered) mA	% Limit	Assessment
Fundamental :		278.4				
2 :	1080.0	13.0	1.2	91.8	8.5	Pass
3 :	2300.0	252.3	11.0	258.4	11.2	Pass
4 :	430.0	15.5	3.6	151.4	35.2	Pass
5 :	1140.0	207.4	18.2	213.9	18.8	Pass
6 :	300.0	13.5	4.5	146.4	48.8	Pass
7 :	770.0	155.3	20.2	161.3	20.9	Pass
8 :	230.0	8.5	3.7	84.5	36.7	Pass
9 :	400.0	100.5	25.1	106.1	26.5	Pass
10 :	184.0	4.9	2.7	37.0	20.1	Pass
11 :	330.0	52.1	15.8	57.3	17.4	Pass
12 :	153.3	2.9	1.9	13.2	8.6	Pass
13 :	210.0	17.5	8.3	20.0	9.5	Pass
14 :	131.4	3.0	2.3	19.7	15.0	Pass
15 :	150.0	18.3	12.2	20.6	13.7	Pass
16 :	115.0	2.9	2.5	20.1	17.5	Pass
17 :	132.3	26.8	20.3	28.3	21.4	Pass
18 :	102.2	3.4	3.3	14.3	14.0	Pass
19 :	118.4	25.6	21.6	27.1	22.9	Pass
20 :	92.0	3.7	4.0	8.3	9.0	Pass
21 :	107.1	17.4	16.2	19.6	18.3	Pass
22 :	83.6	4.0	4.8	7.4	8.9	Pass
23 :	97.8	7.6	7.8	9.3	9.5	Pass
24 :	76.7	4.0	5.2	8.7	11.3	Pass
25 :	90.0	5.2	5.8	8.7	9.7	Pass
26 :	70.8	3.4	4.8	8.0	11.3	Pass
27 :	83.3	10.0	12.0	11.4	13.7	Pass
28 :	65.7	2.4	3.7	6.3	9.6	Pass
29 :	77.6	11.3	14.6	12.0	15.5	Pass
30 :	61.3	1.3	2.1	4.9	8.0	Pass
31 :	72.6	9.2	12.7	10.2	14.0	Pass
32 :	57.5	1.0	1.7	3.7	6.4	Pass
33 :	68.2	4.9	7.2	6.2	9.1	Pass
34 :	54.1	1.2	2.2	3.1	5.7	Pass
35 :	64.3	1.2	1.9	2.9	4.5	Pass
36 :	51.1	1.3	2.5	2.8	5.5	Pass
37 :	60.8	2.9	4.8	3.8	6.3	Pass
38 :	48.4	1.1	2.3	2.8	5.8	Pass
39 :	57.7	3.6	6.2	4.0	6.9	Pass
40 :	46.0	0.7	1.5	2.6	5.7	Pass
21 - 39 :	251.4	27.5	10.9	29.3	11.7	-

7. VOLTAGE FLUCTUATION AND FLICKER TEST

7.1. Block Diagram of Test Setup



7.2. Measuring Standard

EN 61000-3-3: 2013

7.3. Operation Condition of EUT

7.3.1. Setup the EUT as shown on Section 7.1.

7.3.2. Turn on the power of all equipments.

7.3.3. After that, let the EUT work and measure it.

7.4. Measuring Results

PASS.

Test data see following pages.

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

Tested On : May 01, 2016 10:27 for 600 Seconds.

Supply Voltage : 228.8 Vrms 319.5 Vpk Frequency : 49.99 to 50.02 Hz
Load Current : 466.5 to 468.6 mArms 1451.7 to 1462.2 mApk Crest Factor: 3.116

Test Method : EN61000-3-3:2013

Voltage Variations :

Highest Level: -0.39%
Lowest Level: -0.69%
d(max): 0.30% PASS

Highest d(t) of 500ms: 0.00% PASS
Present d(t) over 3.33%: 0.00 Seconds
Longest d(t) over 3.33%: 0.00 Seconds
Highest Steady State: -0.55%
Lowest Steady State: -0.55%
Max d(c) Between Adjacent: 0.00% PASS
Max d(c) Between Any: 0.00%

Short Term Flicker Pst: 0.73 PASS

Flicker Results :

Pst Classifier	Plt Calculation
Duration	Flicker Interval Pst
0.1%	7.53
0.7%	5.06
1.0%	4.13
1.5%	2.97
2.2%	1.84
3%	1.09
4%	0.50
6%	0.13
8%	0.03
10%	0.00
13%	0.00
17%	0.00
30%	0.00
50%	0.00
80%	0.00

8. IMMUNITY AGAINST RFI VOLTAGES/CURRENT TEST

8.1. General conditions during testing

For equipment for which the wanted signals are not explicitly described in the EN55020, the nominal signals as specified by the manufacturer shall be applied during the tests, in case a sound signal other than 1 KHz is used as a wanted signal, an appropriate band pass filter shall be used, instead of the filter specified. The input signal applied during the test shall be included in the technical report. The signal level refers in all other cases to the r.m.s. value of the carrier at the peak of the modulation.

8.1.1. Immunity Against RFI Voltage

The immunity against unwanted signal voltages present at the audio and mains input terminals and audio output terminal. Propagation by capacitive coupling (mains, loudspeaker, headphone, audio in/out.).

8.1.2. Immunity Against RFI Current

The immunity from unwanted signal (common mode) currents present in cables connected to the equipment. Propagation by inductive coupling (antenna/tuner input).

8.2. Limits

8.2.1. Limits of immunity of RF voltages of mains, loudspeaker and headphone terminals (S2a)

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

8.2.2. Limits of immunity to RF voltages of audio input and output terminals (except loudspeaker and headphone terminals)(S2a)

Frequency MHz	Level dB(μV)(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	

8.3. Test Result

PASS.

Test data see following pages.

Test: Immunity Conducted Voltages S2a <SP-1800P>

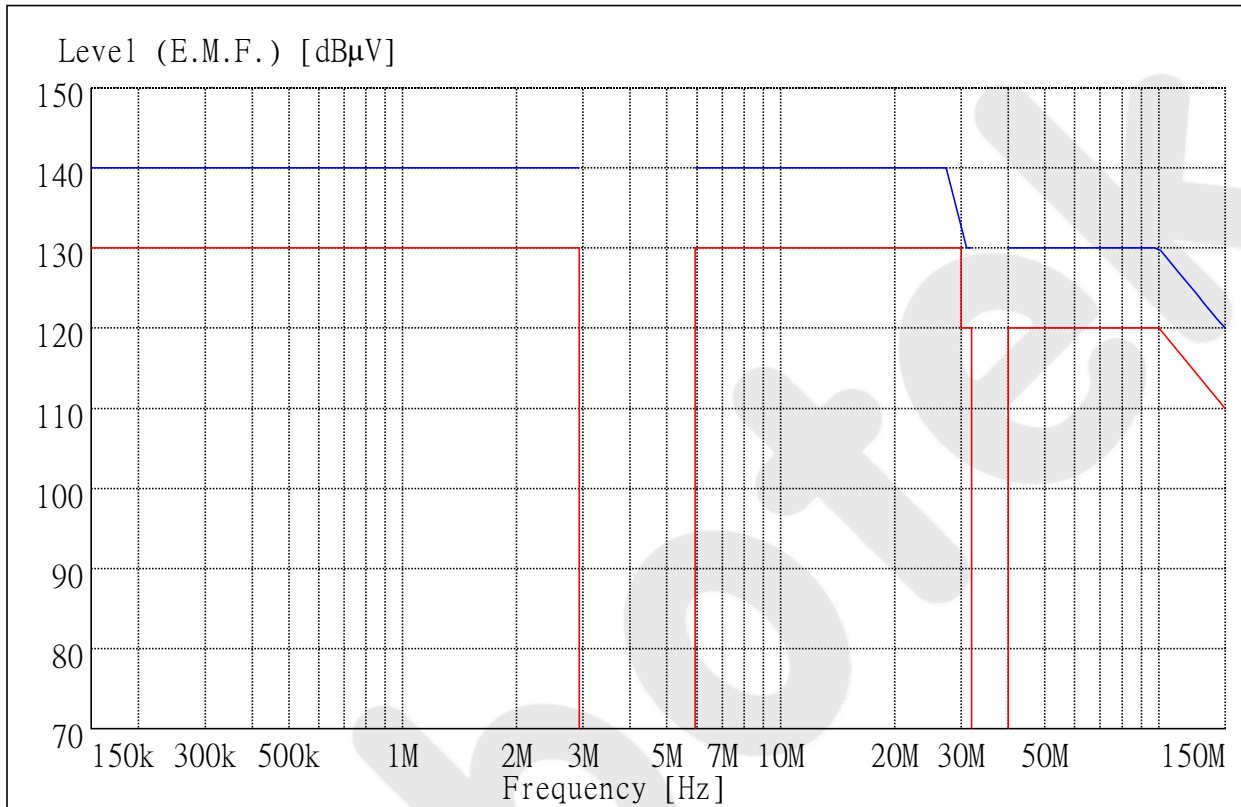
Test Mode: Sound

S/N: 63.8 dB

Country: Germany (IF 36.00 MHz)

AF Level: 376 mV

Interf. Signal: Mains,



Test: Immunity Conducted Voltages S2a <SP-1800P>

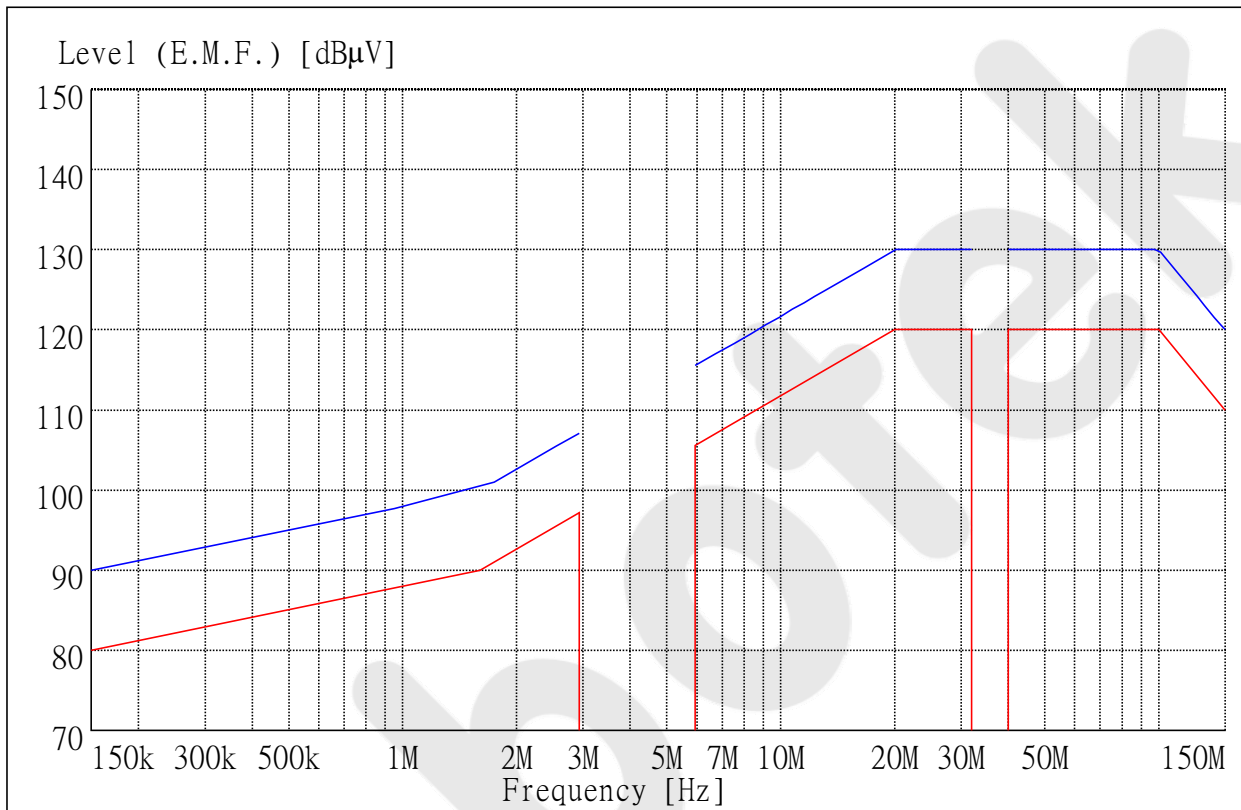
Test Mode: Sound

S/N: 63.9 dB

Country: Germany (IF 36.00 MHz)

AF Level: 376 mV

Interf. Signal: TV SCART Audio Out,



9. AMBIENT ELECTROMAGNETIC FIELDS IMMUNITY TEST

9.1. Test Standard

EN 55020: 2007+A11: 2011

9.2. Limits

Receivers and multifunction equipment operating in the monitor mode shall also meet the requirement of 125dB ($\mu\text{V/m}$) in the frequency range 150 kHz to 150MHz. For the frequency range $f_c \pm 1.5\text{MHz}$ the limit of 101dB($\mu\text{V/m}$) applies.

Frequency MHz	Level dB($\mu\text{V/m}$)
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 87 Except the tuned channel ± 0.5	109d
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 color subcarrier frequency	
a For systems B,D, G, K, I ,L,M. b only for system L. c The frequency 47 MHz cab be varied on a national basis depending on the use of this frequency range. d For television receivers with reception function in frequency range. For television receivers without reception function in this frequency range a level of 125 dB($\mu\text{V/m}$) shall apply.	

For equipment with audio or video functions other than related to broadcast reception, for instance infrared headphones, For infrared headphones the frequency band $f_{\text{mod}} \pm f_{\text{diff}}$ is exempted.

Limits of Immunity to ambient electromagnetic fields of equipment with audio or video functions (S3)

Frequency MHz	Level
0.15 to 150	125

9.3. Test Result

PASS.

Test data see following pages

Test: Immunity Radiated Fields S3 < SP-1800P >

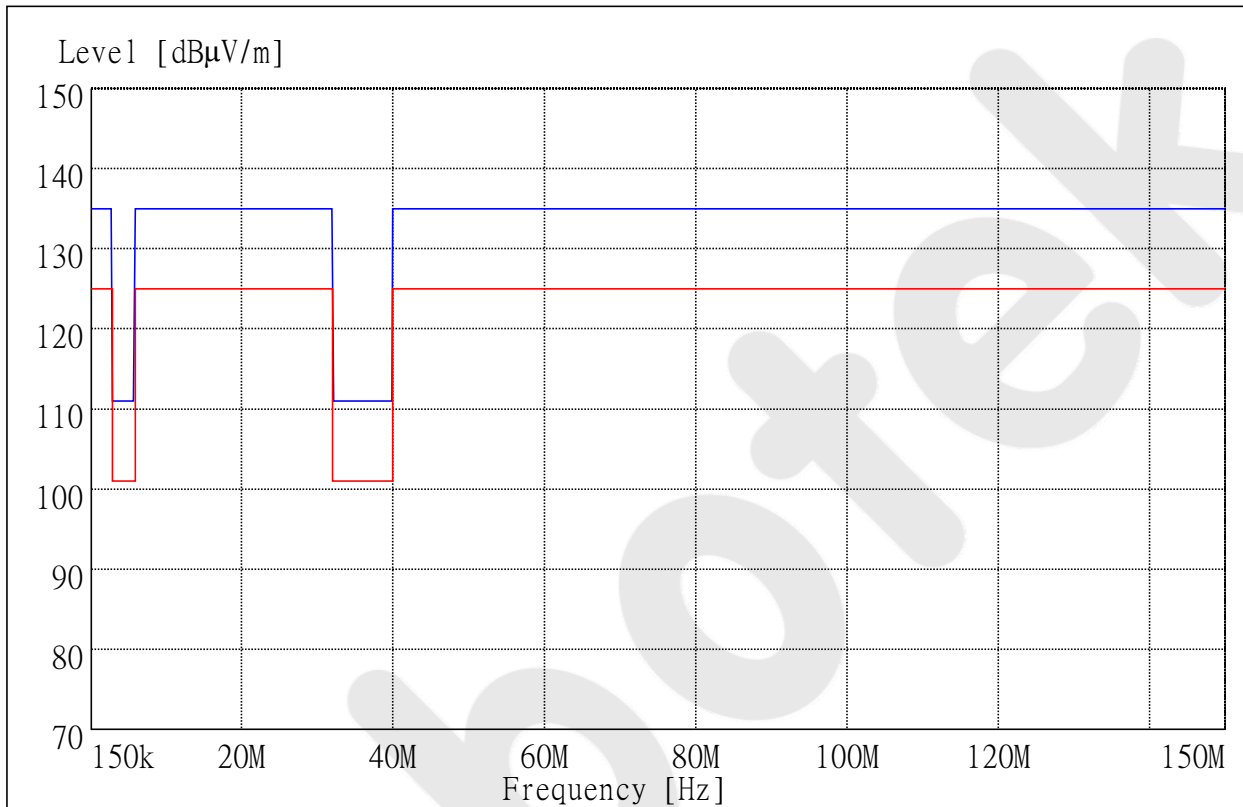
Test Mode: Sound

S/N: 108.8 dB

Country: Germany (IF 36.00 MHz)

AF Level: 382 mV

Interf. Signal:



10. KEYED CARRIER TEST

10.1. Test Standard

EN 55020: 2007+A11: 2011

10.2. Test Procedure

As an alternative method, a non-homogeneous field strength $\cong 3\text{V/m}$ of similar characteristics as the test specification (e.g. Generated by a dummy GSM portable telephone) may be applied in a shielded room.

The dummy shall be placed on non-metallic with a height of 80cm, at a distance of 1m to the EUT. The front side of the EUT shall be placed in parallel to the antenna line of sight, the position shall be described in the measurement report.

10.3. Test Result

PASS.

Test data see following pages

Test: Keyed Carrier S5 < SP-1800P >

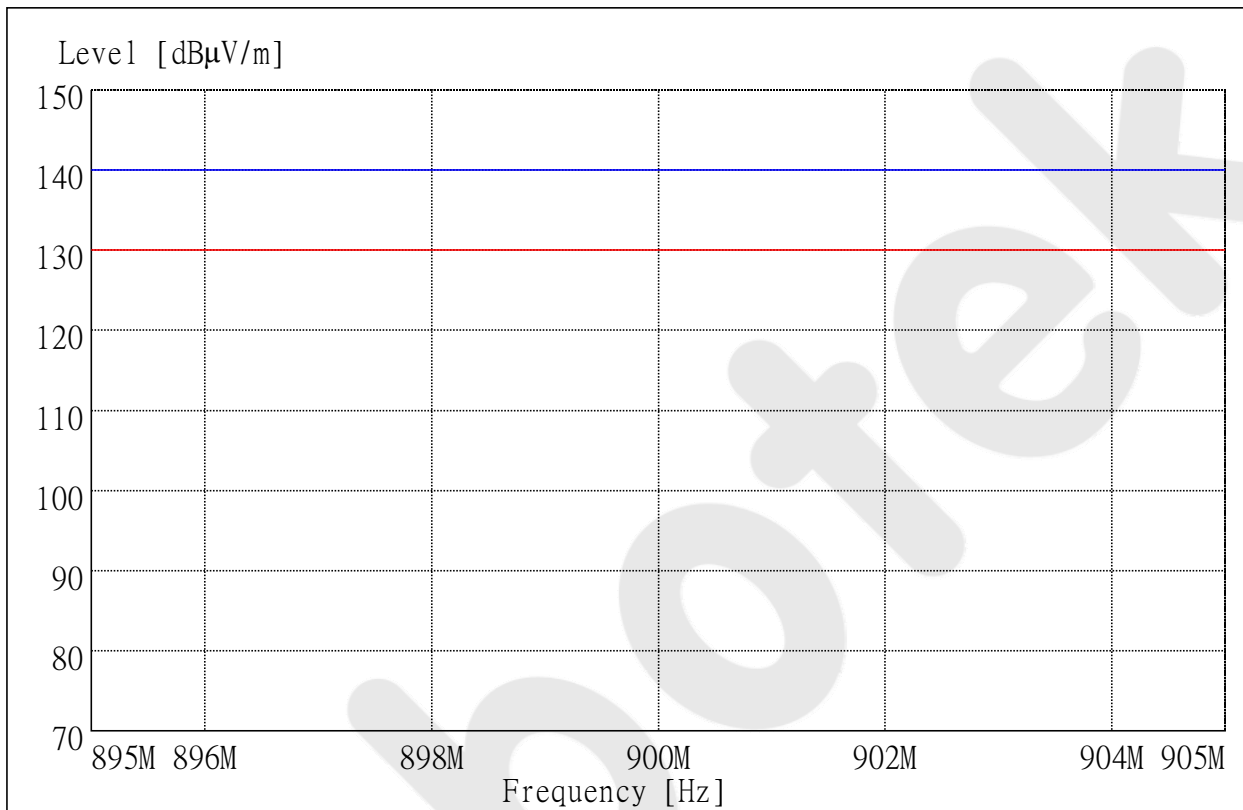
Test Mode: Sound

S/N: 78.6 dB

Country: Germany (IF 36.00 MHz)

AF Level: 385 mV

Interf. Signal:



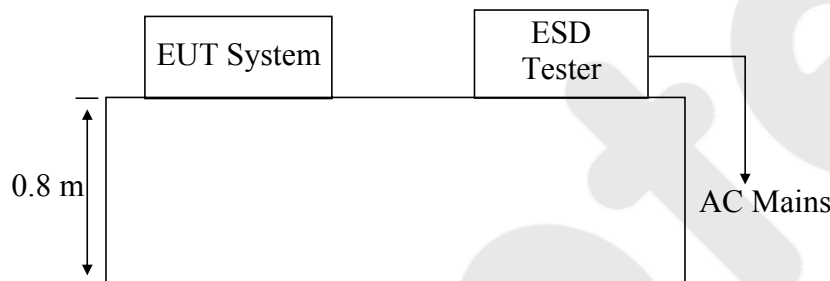
11. ELECTROSTATIC DISCHARGE IMMUNITY TEST

11.1. Block Diagram of Test Setup

11.1.1. Block diagram of connection between the EUT and simulators



11.1.2. For block diagram of test setup



11.2. Measuring Standard

EN 55020: 2007+A11: 2011

IEC 61000-4-2

Severity Level: 3 / Air Discharge: $\pm 8\text{kV}$ Level: 2 / Contact Discharge: $\pm 4\text{kV}$

11.3. Severity Levels and Performance Criterion

11.3.1. Severity level

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

11.3.2. Performance criterion: B

11.4. EUT Configuration

The following equipments are installed on Electrostatic Discharge immunity Measurement to meet EN 55020 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

11.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 3.5 except the test set up replaced by Section 11.1.

11.6. Test Procedure

11.6.1. 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 EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 100 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

11.6.2. Contact Discharge:

All the procedure shall be same as Section 11.6.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

11.6.3. Indirect discharge for horizontal coupling plane

At least 50 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

11.6.4. Indirect discharge for vertical coupling plane

At least 50 single discharge 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 EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

11.7. Measuring Results

PASS.

Test data see following pages

Electrostatic Discharge Test Results

Shenzhen Anbotek Compliance Laboratory Limited

Test Mode :	Aux Mode, AV Mode	Temperature :	25℃
Air discharge :	±8.0kV	Humidity :	54%
Contact discharge:	±4.0kV	Criterion required :	B
Power Supply :	AC 230V, 50Hz	Number of discharge :	10
Test Result: ☒ Pass ☐ Fail			
Location		Kind A-Air Discharge C-Contact Discharge	Result
Slot of the EUT	10 points	A	☒ A ☐ B ☐ C ☐ D
Others	8 points	A	☒ A ☐ B ☐ C ☐ D
Function Keys	8 points	A	☒ A ☐ B ☐ C ☐ D
Metal surface of EUT	8 points	C	☒ A ☐ B ☐ C ☐ D
HCP	8 points	C	☒ A ☐ B ☐ C ☐ D
VCP of front	8 points	C	☒ A ☐ B ☐ C ☐ D
VCP of rear	8 points	C	☒ A ☐ B ☐ C ☐ D
VCP of left	8 points	C	☒ A ☐ B ☐ C ☐ D
VCP of right	8 points	C	☒ A ☐ B ☐ C ☐ D
Note:			

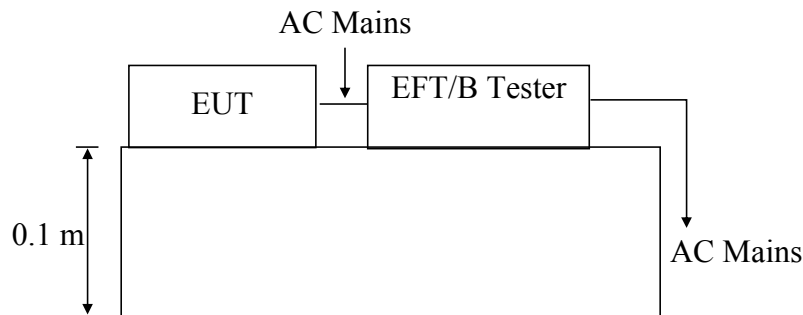
12. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

12.1. Block Diagram of Test Setup

12.1.1. Block Diagram of connection between the EUT and simulators



12.1.2. EFT Test Setup



12.2. Measuring Standard

EN 55020: 2007+A11: 2011
EN 61000-4-4
Severity Level, Level 2: 1kV

12.3. Severity Levels and Performance Criterion

12.3.1. Severity level

Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1.	0.5 kV	0.25 kV
2.	1 kV	0.5 kV
3.	2 kV	1 kV
4.	4 kV	2 kV
X	Special	Special

12.3.2. Performance criterion: **B**

12.4. EUT Configuration

The following equipments are installed on Electrical Fast Transient/Burst Immunity

Measurement to meet EN 55020 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

12.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 3.5, except the test set up replaced by Section 12.1.

12.6. Test Procedure

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

12.6.1. For input and output AC power ports:

The EUT 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 mins.

12.6.2. For signal lines and control lines ports:

No I/O ports. It's unnecessary to test.

12.6.3. For DC output line ports:

It's unnecessary to test.

12.7. Measuring Results

PASS.

Test data see following pages

Electrical Fast Transient/Burst Test Results

Shenzhen Anbotek Compliance Laboratory Limited

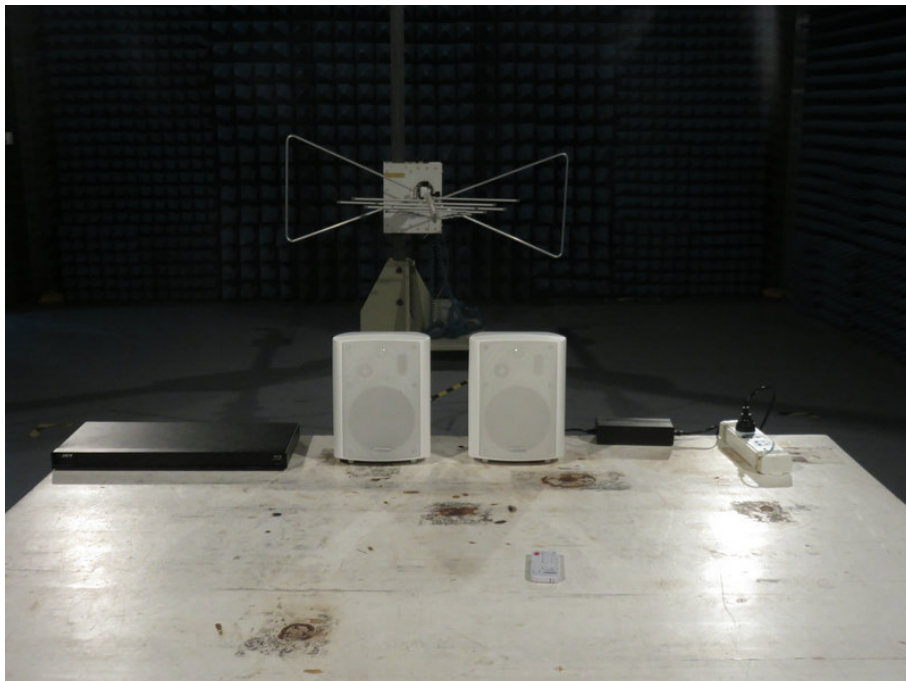
Operation Mode: Aux Mode, AV Mode		Criterion required : B	
Power Supply : AC 230V, 50Hz		Test Result : ☒ Pass ☐ Fail	
Ambient Condition :		24°C	55% RH
Inject Line : AC Mains	Inject Method: Direct		Inject Time(s): 120
Line	Polarity	Test Voltage	Result
L	±	1kV	☒ A ☐ B ☐ C ☐ D
N	±	1kV	☒ A ☐ B ☐ C ☐ D
PE			
L 、 N	±	1kV	☒ A ☐ B ☐ C ☐ D
L 、 PE			
N 、 PE			
L 、 N 、 PE			
Signal Line			
DC Line			
Note :			
Remark:			

13. PHOTOGRAPH

13.1. Photo of Power Line Conducted Emission Test



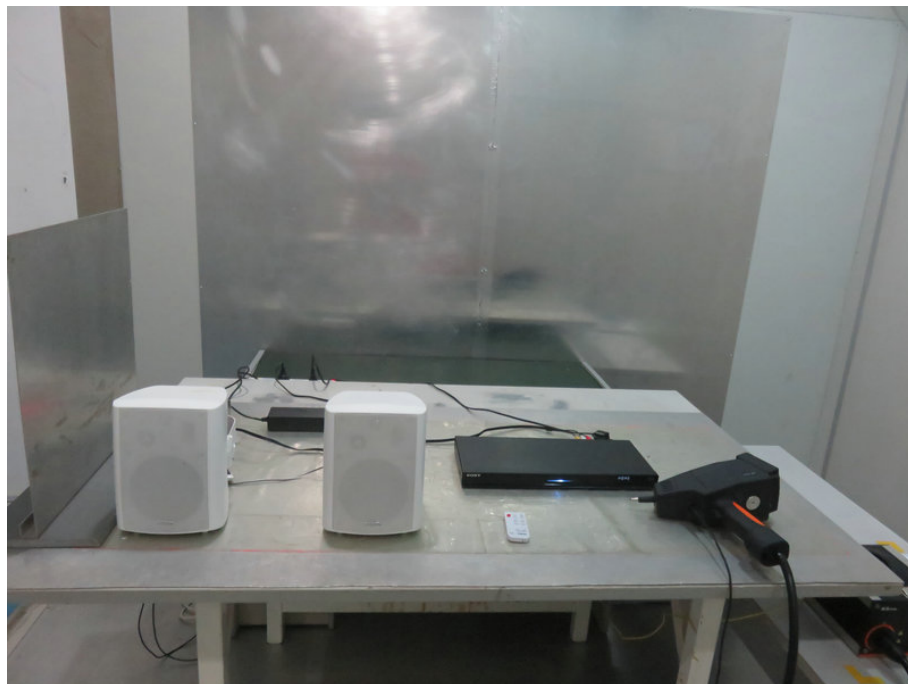
13.2. Photo of Radiated Emission Test



13.3. Photo of Harmonic Current / Flicker Test



13.4. Photo of Electrostatic Discharge Test



13.5. Photo of Electrical Fast Transient/Burst Immunity Test



13.6. Photo of Disturbance Power Test



APPENDIX I (Photos of EUT)

Figure 1
The EUT- Overall View



Figure 2
The EUT- Front View



Figure 3
The EUT- Back View



Figure 4
The EUT- Side View



Figure 5
The EUT- Partial View



Figure 6
The EUT- Partial View



Figure 7
The EUT- Inside View

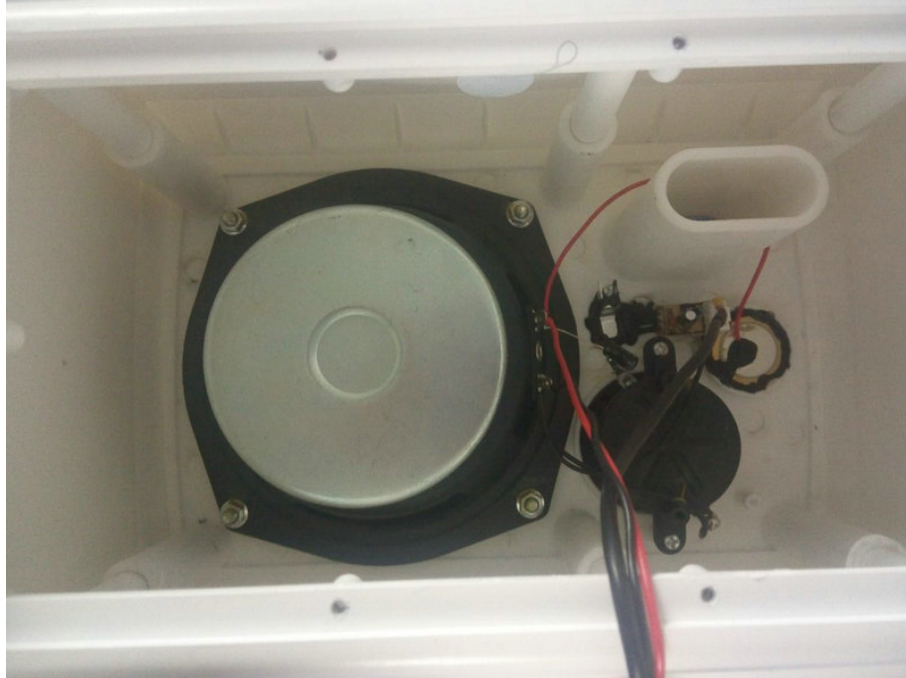


Figure 8
The EUT- Inside View

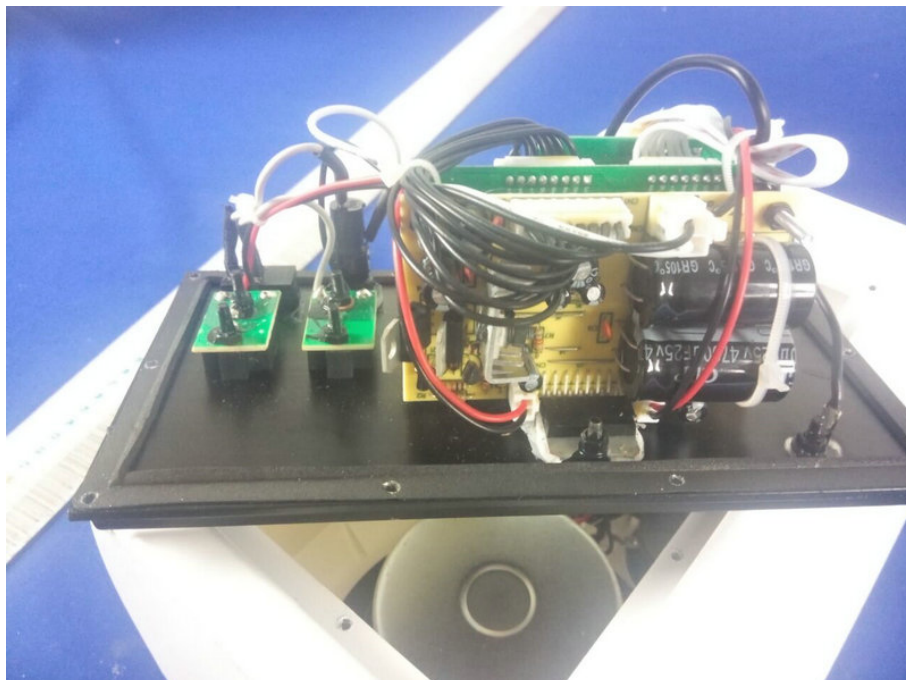


Figure 9
The EUT- Inside View

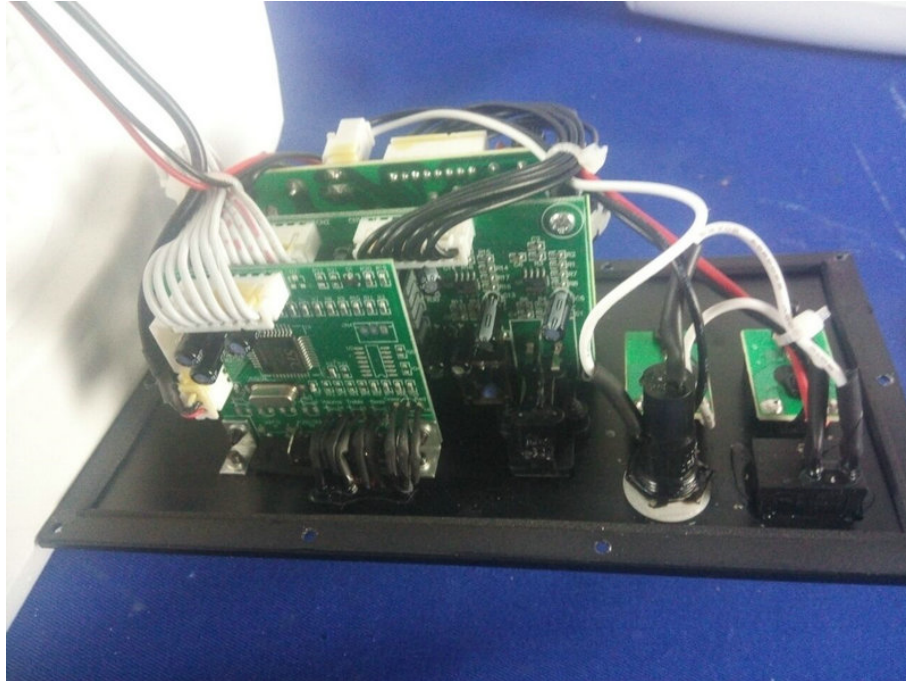


Figure 10
The EUT- Remote Control View



Figure 11
The EUT- Adapter View



CE Label

1. The CE conformity marking must consist of the initials 'CE' taking the following form:
If the CE marking is reduced or enlarged, the proportions given in the above graduated drawing must be respected.
2. The CE marking must have a height of at least 5 mm except where this is not possible on account of the nature of the apparatus.
3. The CE marking must be affixed to the product or to its data plate. Additionally it must be affixed to the packaging, if any, and to the accompanying documents.
4. The CE marking must be affixed visibly, legibly and indelibly.
It must have the same height as the initials 'CE'.