



TEST REPORT

FCC ID: 2AB3E-ISP56 IC: 10541A-ISP56

Applicant : ION AUDIO,LLC
Address : 200 Scenic View Drive, Cumberland, RI 02864, U.S.A

Equipment Under Test (EUT):

Name : Plunge
Model : iSP56
Trademark : N/A

Standards : FCC PART 15, SUBPART C : 2015 (Section 15.247)
RSS-247 ISSUE 1 MAY 2015; RSS-GEN ISSUE 4 NOV 2014
ANSI C63.4:2014 ; ANSI C63.10:2013

Report No : T1862263 08
Date of Test : November 10- November 15, 2016
Date of Issue : November 18, 2016

Test Result : PASS

In the configuration tested, the EUT complied with the standards specified above
Authorized Signature

(Mark Zhu)
Manager

The manufacture should ensure that all the products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of Shenzhen Alpha Product Testing Co., Ltd. Or test done by Shenzhen Alpha Product Testing Co., Ltd. Approvals in connection with, distribution or use of the product described in this report must be approved by Shenzhen Alpha Product Testing Co., Ltd. Approvals in writing.

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TEST REPORT VERIFICATION

Applicant : ION AUDIO,LLC
 Manufacturer : ION AUDIO,LLC
 EUT Description : Plunge

(A) Model No. : iSP56
 (B) Trademark : N/A
 (C) Ratings Supply : DC 3.7V from Battery or DC 5V from USB port
 (D)Test Voltage : DC 3.7V from Battery or DC 5V from USB port

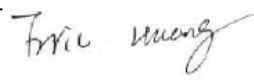
Measurement Standard Used:

FCC Rules and Regulations RSS-247 ISSUE 1, ANSI C63.4-2014, ANSI C63.10-2013

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the RSS-247 limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....: Eric Huang
 Test Engineer 

Approved by (name + signature).....: Simple Guan
 Project Manager 

Date of issue.....: November 18, 2016

1. General Information

1.1. Description of Device (EUT)

EUT	:	Plunge
Model No.	:	iSP56
Trade mark	:	N/A
Power supply	:	DC 3.7V from battery or DC 5V from USB for charging
Radio Technology	:	BT 3.0+EDR
Operation frequency	:	2402-2480MHz
Modulation	:	GFSK, $\pi/4$ DQPSK,8-DPSK
Antenna Type	:	Integrated Antenna, max gain 0dBi.
Adapter	:	N/A
Applicant	:	ION AUDIO,LLC
Address	:	200 Scenic View Drive, Cumberland, RI 02864, U.S.A
manufacture	:	ION AUDIO,LLC
Address	:	200 Scenic View Drive, Cumberland, RI 02864, U.S.A.

1.2. Accessories of device (EUT)

Description	:	N/A
Manufacturer	:	N/A
Model No.	:	N/A

1.3. Test Lab information

Shenzhen Alpha Product Testing Co., Ltd
Building B, East Area of Nanchang Second, Industrial Zone, Gushu 2nd Road,
Bao'an, Shenzhen, China

August 11, 2014 File on Federal Communication Commission
Registration Number: 203110

July 18, 2014 Certificated by IC
Registration Number: 12135A

2. Summary of test

2.1. Summary of test result

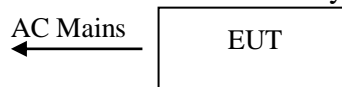
Description of Test Item	Standard	Results
Radiated Emission	FCC Part 15: 15.209 RSS Gen Section 8.9 ANSI C63.4:2014 ANSI C63.10:2013	PASS
Power Line Conducted Emissions	FCC Part 15: 15.207 RSS Gen Section 8.8 ANSI C63.4 :2014 ANSI C63.10 :2013	PASS
Remark: this report is based on FCC ID: 10541A-ISP56 IC: 10541A-ISP56 for class II permission change, therefore, only Power Line Conducted Emissions and Radiated Emission below 1GHz were tested. Please refer to change information letter for change details.		

2.2. Assistant equipment used for test

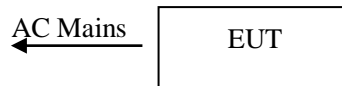
Description	:	Notebook
Manufacturer	:	ACER
Model No.	:	ZQT
Remark: FCC DOC approved		

2.3. Block Diagram

1, For radiated emissions test: EUT was placed on a turn table, which is 0.8 meter high above ground. EUT was be set into BT test mode by software before test.



2, For Power Line Conducted Emissions Test: EUT was connected to notebook by 1.5m USB line



2.4. Test mode

The test software was used to control EUT work in Continuous TX mode, and select test channel, wireless mode.

Charging +Keeping TX mode

2.5. Test Conditions

Temperature range	21-25°C
Humidity range	40-75%
Pressure range	86-106kPa

2.6. Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.42dB	
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB	Polarize: V
	2.57dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.54dB	Polarize: V
	4.1dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	2.08dB	Polarize: H
	2.56dB	Polarize: V
Uncertainty for radio frequency	1×10^{-9}	
Uncertainty for conducted RF Power	0.65dB	
Uncertainty for temperature	0.2°C	
Uncertainty for humidity	1%	
Uncertainty for DC and low frequency voltages	0.06%	

2.7. Test Equipment

Equipment	Manufacture	Model No.	Serial No.	Cal. Due day	Cal Interval
3m Semi-Anechoic	ETS-LINDGREN	N/A	SEL0017	2017.01.19	1 Year
Spectrum analyzer	Agilent	E4407B	MY49510055	2017.01.19	1 Year
Receiver	R&S	ESCI	101165	2017.01.19	1 Year
Bilog Antenna	SCHWARZBECK	VULB 9168	9168-438	2018.01.21	2 Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2018.01.21	2 Year
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170 D(1432)	2018.01.21	2 Year
Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	2017.01.19	1 Year
Cable	Resenberger	SUCOFLEX 104	MY6562/4	2017.01.19	1 Year
Cable	Resenberger	SUCOFLEX 104	309972/4	2017.01.19	1 Year
Cable	Resenberger	SUCOFLEX 104	329112/4	2017.01.19	1 Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2017.01.19	1 Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2017.01.19	1 Year
Power Meter	Anritsu	ML2487A	6K00001491	2017.01.19	1 Year
Power sensor	Anritsu	ML2491A	32516	2017.01.19	1 Year
Pre-amplifier	SCHWARZBECK	BBV9743	9743-019	2017.01.19	1 Year
Pre-amplifier	Quietek	AP-180C	CHM-0602012	2017.01.19	1 Year

3. Radiated emissions

3.1. Limit

All the emissions appearing within RSS-GEN restricted frequency bands shall not exceed the limits shown in RSS-GEN, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with RSS-GEN limits.

RSS-GEN Restricted frequency band

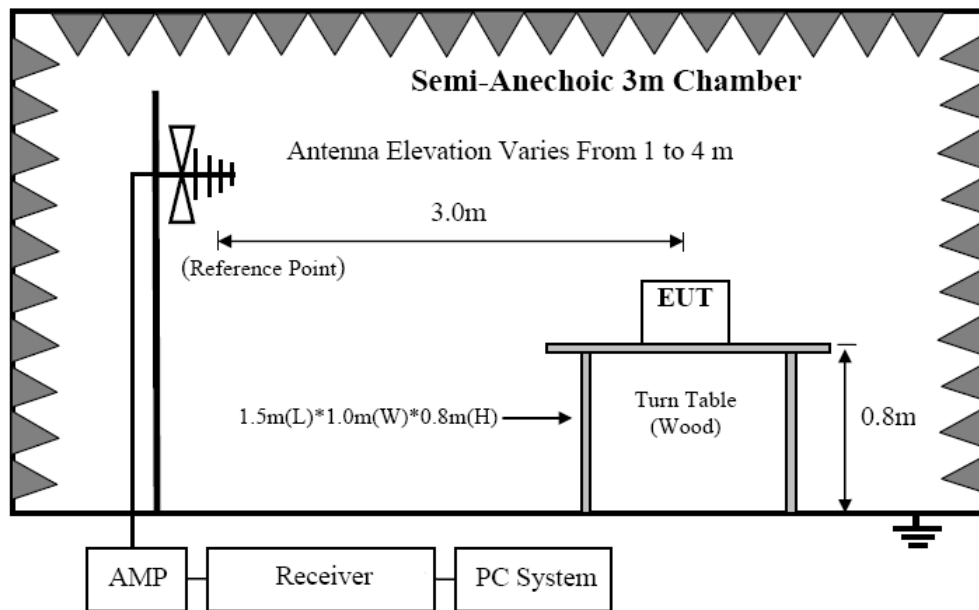
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

RSS-GEN Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

3.2. Block Diagram of Test setup

8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

3.3. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1GHz testing, and 150cm for above 1GHz testing.
- (2) Setup EUT and simulator as shown in section 1.4 and 6.1
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
 - (a) Change work frequency or channel of device if practicable.
 - (b) Change modulation type of device if practicable.
 - (c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9KHz to 1GHz (tenth harmonic of fundamental frequency) was investigated
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4 :2014 on Radiated Emission test.

3.4. Test Result

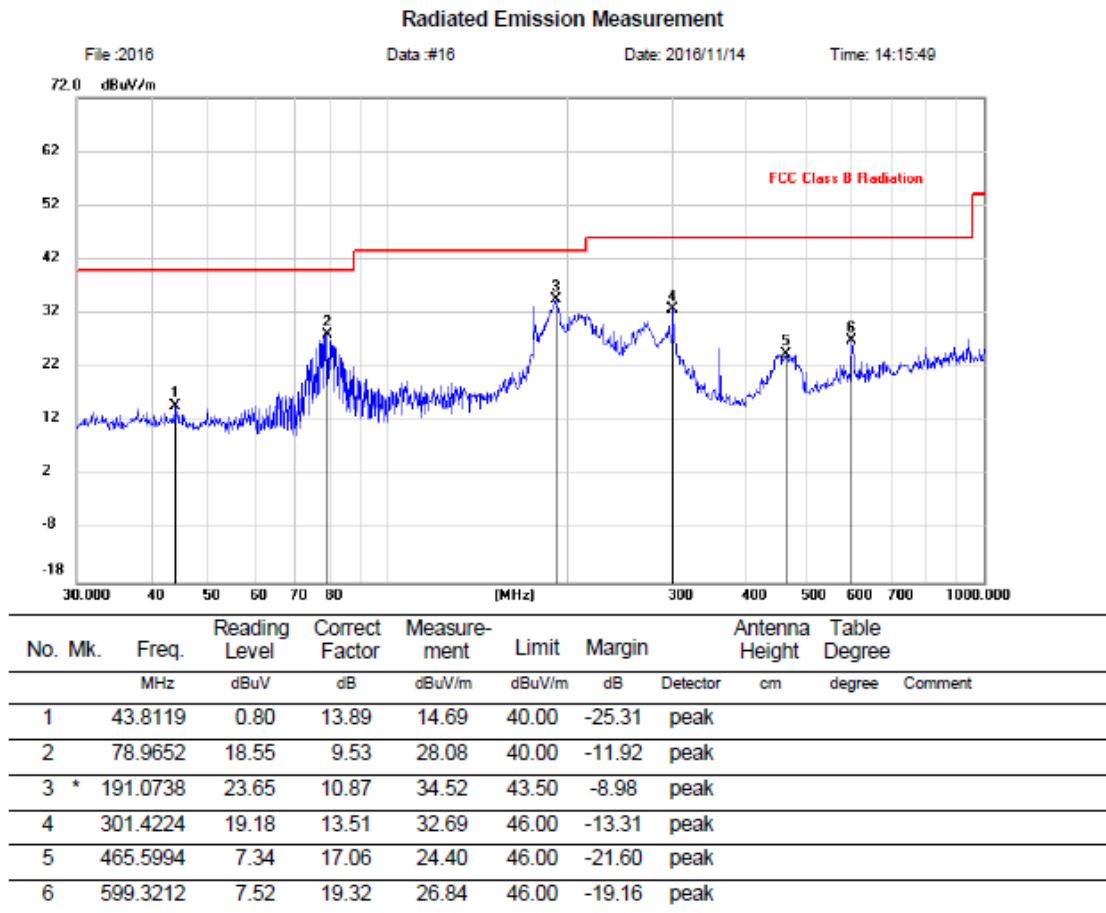
We have scanned the 10th harmonic from 9KHz to the EUT.
Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

From 30MHz to 1000MHz: Conclusion: PASS

H:



V:

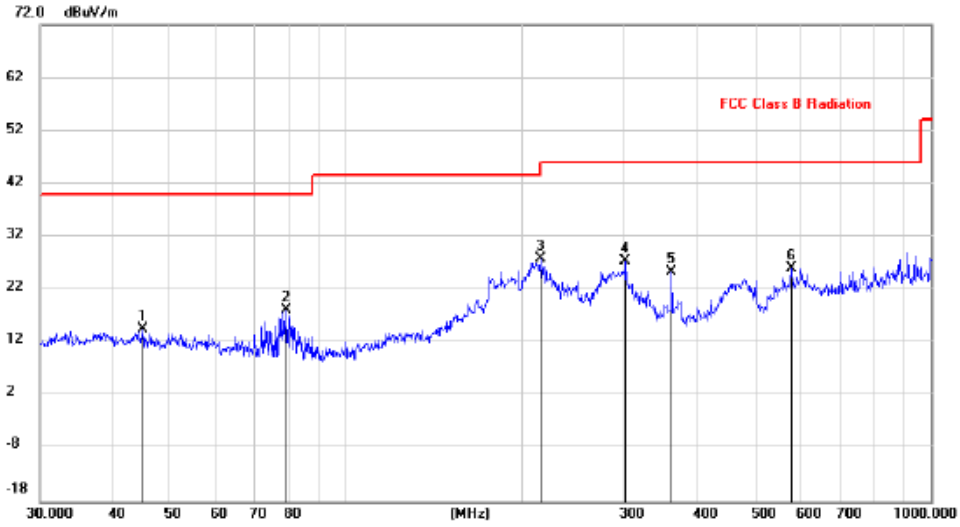
Radiated Emission Measurement

File :2016

Data #15

Date: 2016/11/14

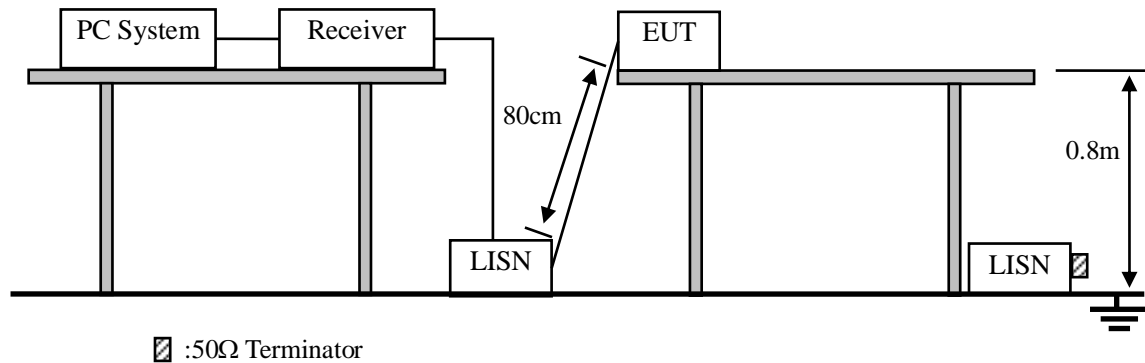
Time: 14:17:58



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Antenna Height cm	Table Degree degree	Comment
1	44.9006	0.78	13.70	14.48	40.00	-25.52	peak			
2	78.9652	8.66	9.53	18.19	40.00	-21.81	peak			
3 *	215.2678	16.72	11.02	27.74	43.50	-15.76	peak			
4	301.4224	13.84	13.51	27.35	46.00	-18.65	peak			
5	360.4476	10.76	14.53	25.29	46.00	-20.71	peak			
6	576.6443	7.05	18.99	26.04	46.00	-19.96	peak			

4. Power Line Conducted Emissions

4.1. Block Diagram of Test Setup



4.2. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

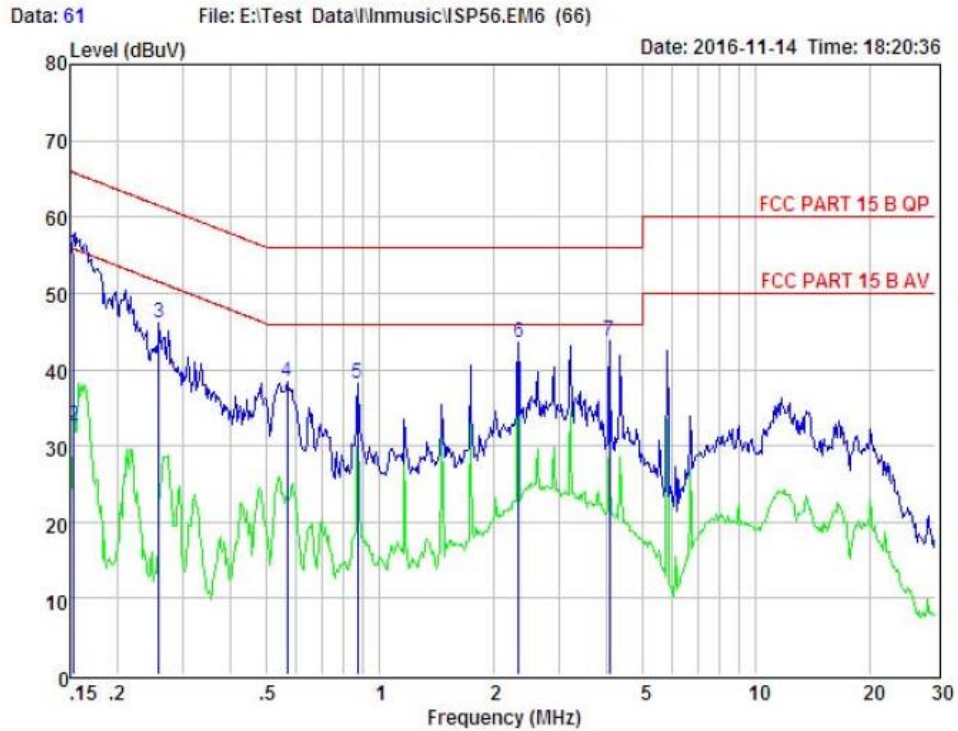
2. The lower limit shall apply at the transition frequencies.

4.3. Test Procedure

- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
- (2) Setup the EUT and simulator as shown in 10.1
- (3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4 2014 on conducted Emission test.
- (4) The bandwidth of test receiver is set at 10KHz.
- (5) The frequency range from 150 KHz to 30MHz is checked.

4.4. Test Result

PASS. (See below detailed test data)

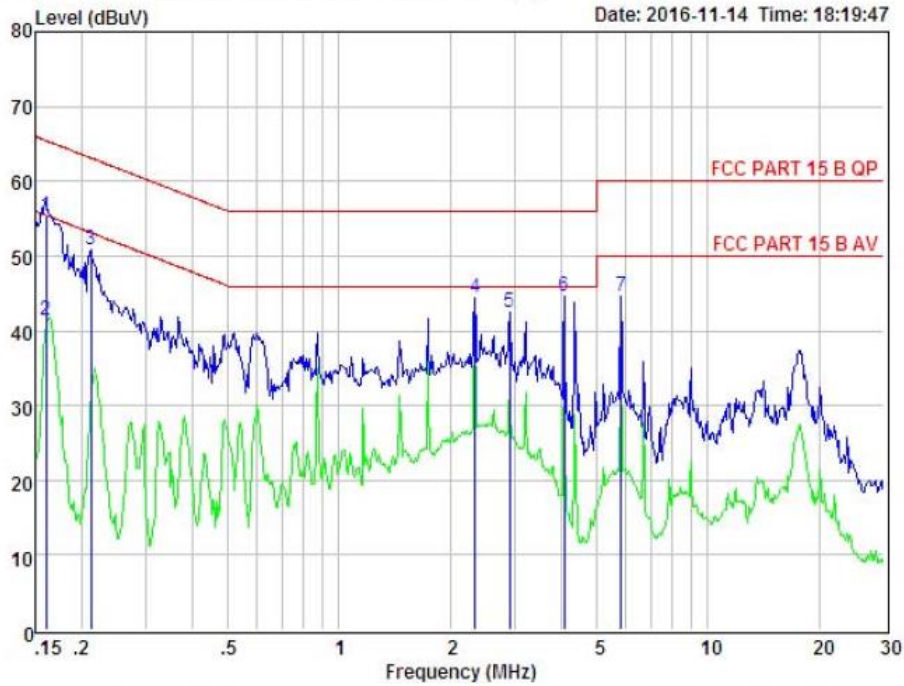


Condition : FCC PART 15 B QP POL: LINE Temp: 25°C Hum: 51 %
 EUT :
 Model No : ISP56
 Test Mode : Charging + Bluetooth
 Power : DC 5V from PC with AC 120V/60Hz
 Test Engineer :
 Remark :

Item	Freq MHz	Read Level dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.153	45.74	0.03	-9.52	0.10	55.39	65.82	-10.43	QP
2	0.153	23.02	0.03	-9.52	0.10	32.67	55.82	-23.15	Average
3	0.259	36.45	0.03	-9.56	0.10	46.14	61.47	-15.33	Peak
4	0.567	28.75	0.03	-9.59	0.10	38.47	56.00	-17.53	Peak
5	0.871	28.40	0.04	-9.62	0.10	38.16	56.00	-17.84	Peak
6	2.334	33.64	0.06	-9.74	0.11	43.55	56.00	-12.45	Peak
7	4.070	33.72	0.08	-9.88	0.12	43.80	56.00	-12.20	Peak

Remark: Level = Read Level + LISN Factor - Preamp Factor + Cable Loss

Data: 59 File: E:\Test Data\Inmusic\ISP56.EM6 (66)



Condition : FCC PART 15 B QP FOL: NEUTRAL Temp: 25°C Hum: 51 %
 EUT :
 Model No : ISP56
 Test Mode : Charging + Bluetooth
 Power : DC 5V from PC with AC 120V/60Hz
 Test Engineer :
 Remark :

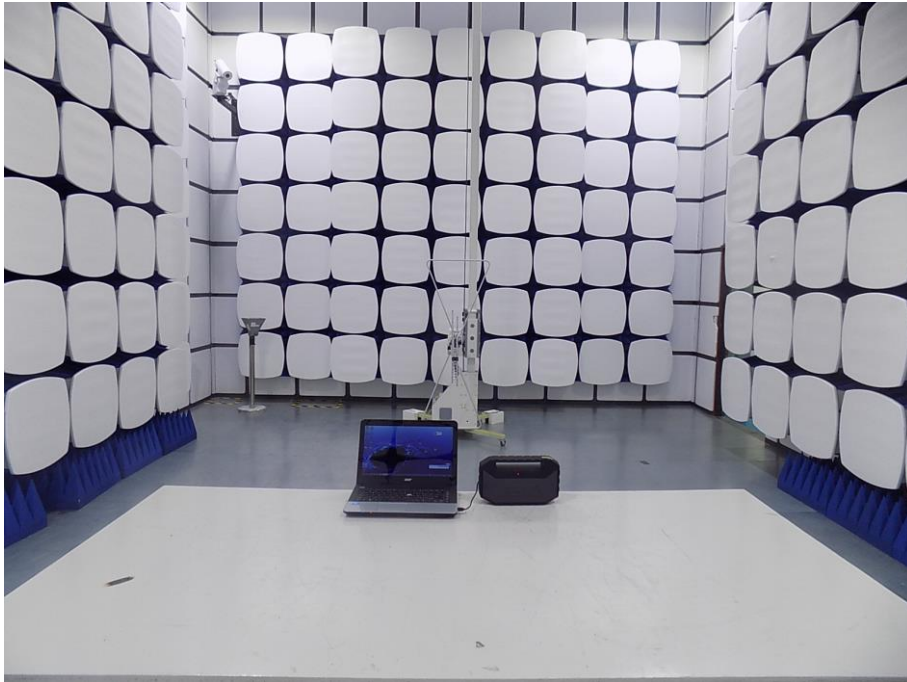
Item	Freq MHz	Read Level dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.161	45.72	0.03	-9.52	0.10	55.37	65.43	-10.06	QP
2	0.161	31.70	0.03	-9.52	0.10	41.35	55.43	-14.08	Average
3	0.213	41.16	0.03	-9.52	0.10	50.81	63.10	-12.29	Peak
4	2.334	34.45	0.06	-9.74	0.11	44.36	56.00	-11.64	Peak
5	2.900	32.59	0.07	-9.79	0.12	42.57	56.00	-13.43	Peak
6	4.070	34.43	0.08	-9.88	0.12	44.51	56.00	-11.49	Peak
7	5.805	34.31	0.11	-9.96	0.14	44.52	60.00	-15.48	Peak

Remark: Level = Read Level + LISN Factor - Preamp Factor + Cable Loss

Note1: If QP Result comply with AV limit, AV Result is deemed to comply with AV limit

5. Test setup photo

5.1. Photos of Radiated emission

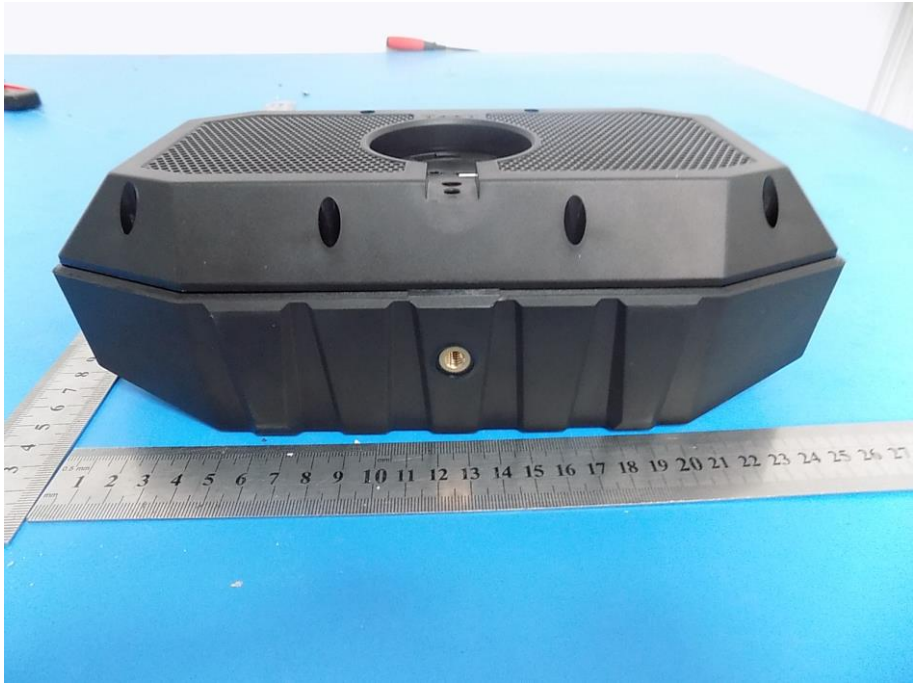


5.2. Photos of Conducted Emission test

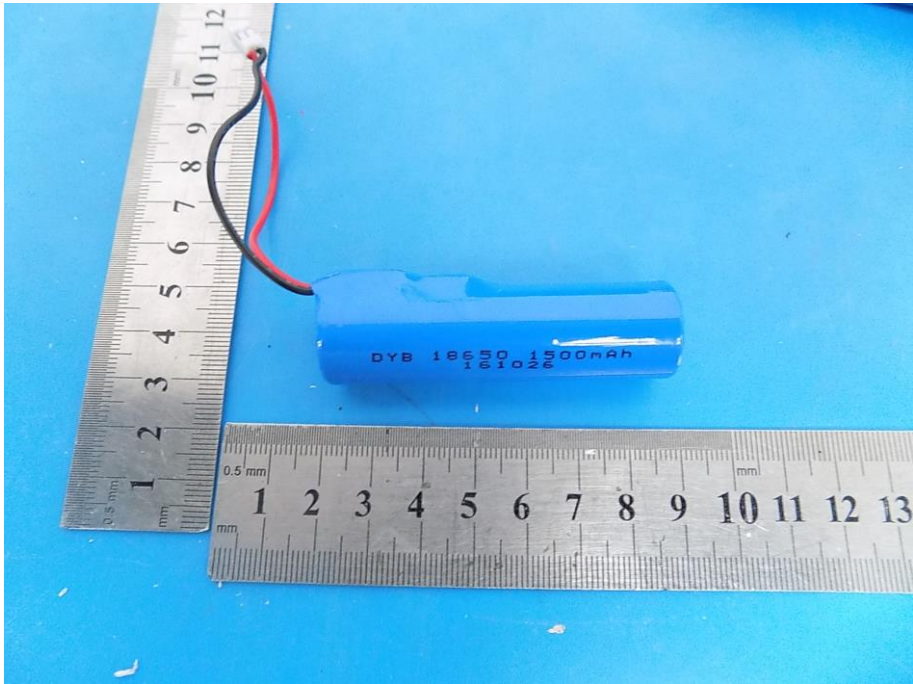
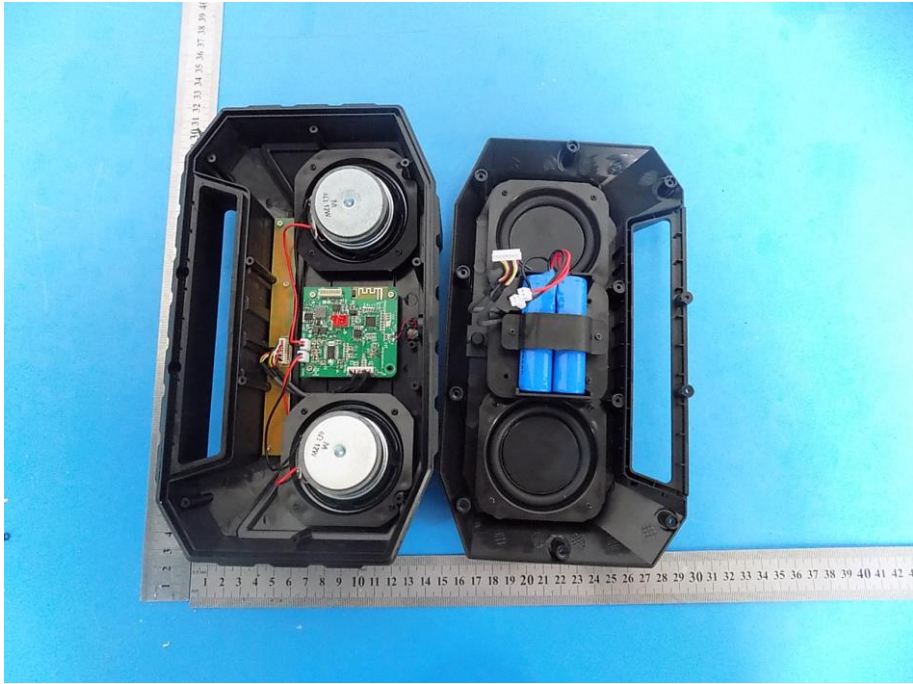


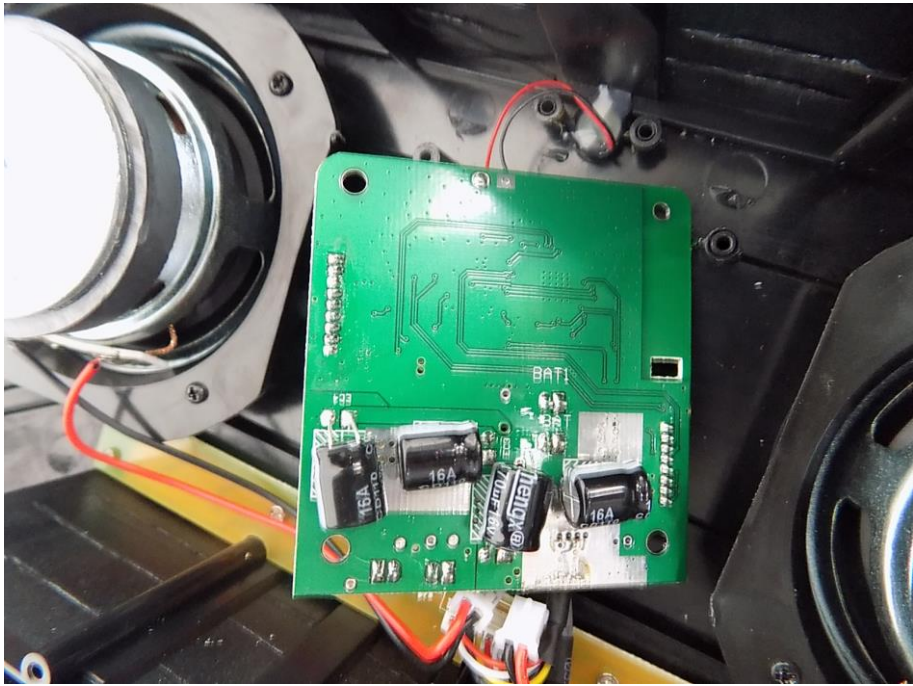
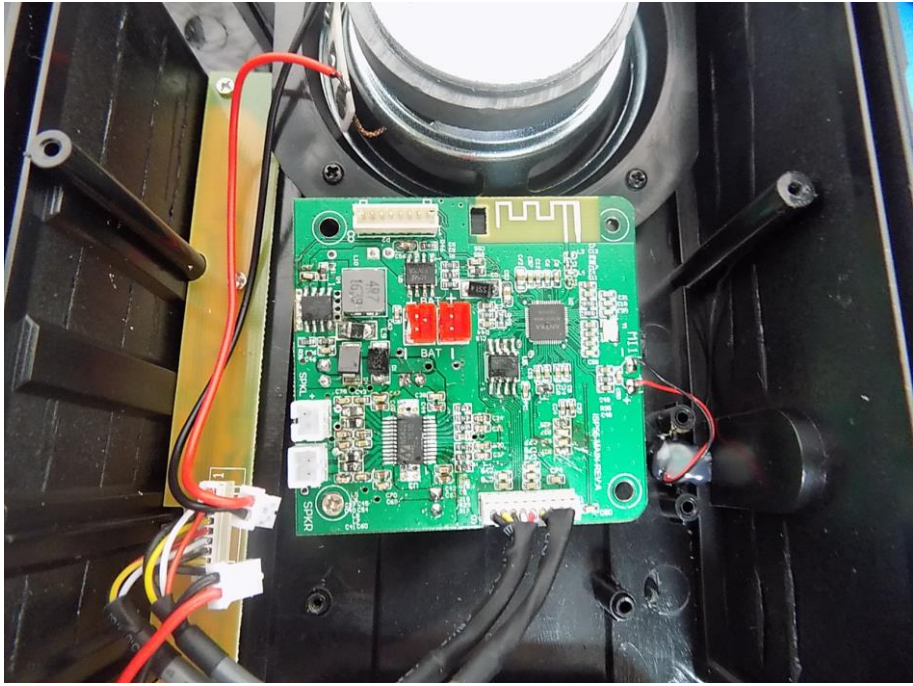
6. Photos of EUT

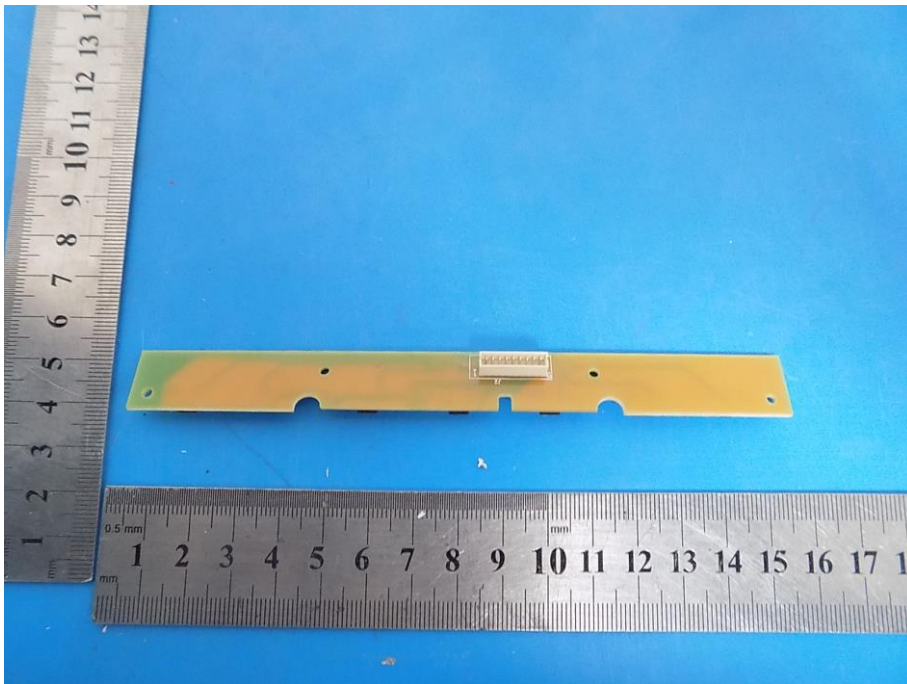
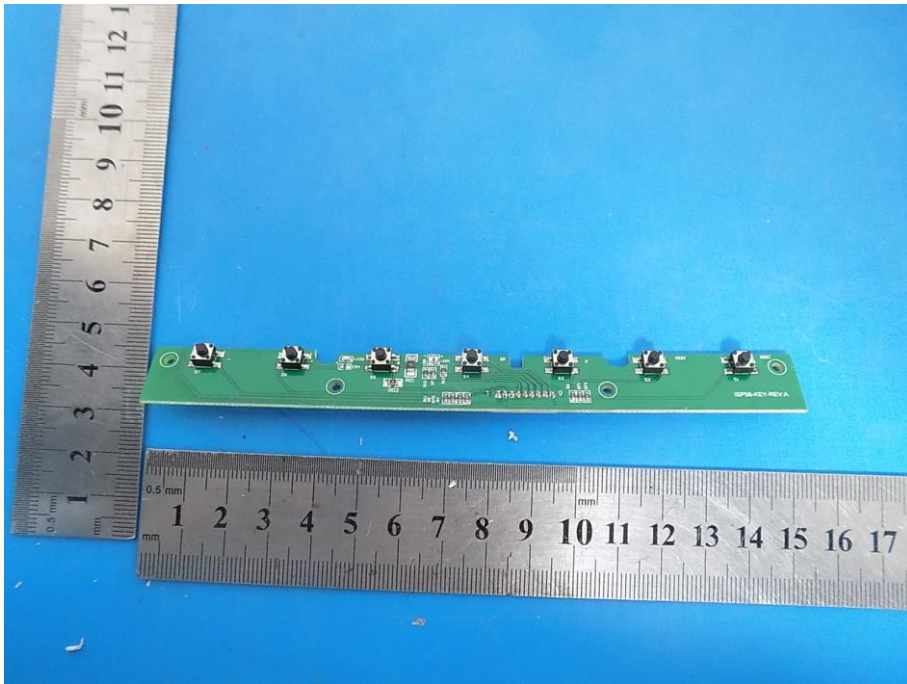












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