

FCC REPORT

Applicant: Shenzhen Junlan Electronic Ltd

Address of Applicant: No.277 PingKui Road, Shijing Community, Pingshan Street, Pingshan New District, Shenzhen, China

Equipment Under Test (EUT)

Product Name: WATER DANCING BLUETOOTH MINI TOWER

Model No.: SP118-BLACK-FD-PL, 2101175, TSB-63628, CAB-A6689, SP606-BLACK, TDV-99FC6, SDVD9960-B, TDV-22FC6, SDVD9957-D, TDV-16006, SDVD1030-B, TDV-21FB8, SDVD1010, 2101096

Trade Mark: SYLVANIA

FCC ID: OKUTSB63628

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.249:2014

Date of sample receipt: May 23, 2016

Date of Test: May 24, 2016

Date of report issued: May 25, 2016

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Lo

Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	May 25, 2016	Original

Prepared By:

Kang Liu

Date:

May 25, 2016

Project Engineer

Check By:

Andy Wu

Date:

May 25, 2016

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Field strength of the fundamental signal	15.249 (a)	N/A
Spurious emissions	15.249 (a) (d)/15.209	Pass
Band edge	15.249 (d)/15.205	N/A
20dB Occupied Bandwidth	15.215 (c)	N/A

Pass: The EUT complies with the essential requirements in the standard.

Remark: Test according to ANSI C63.10 2013 and ANSI C63.4: 2014

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 Client Information

Applicant:	Shenzhen Junlan Electronic Ltd
Address of Applicant:	No.277 PingKui Road, Shijing Community, Pingshan Street, Pingshan New District, Shenzhen, China
Manufacturer/ Factory:	SHENZHEN JUNLAN ELECTRONIC LTD
Address of Manufacturer/ Factory:	No.277 PingKui Road, Shijing Community, Pingshan Street, Pingshan New District, Shenzhen, China

5.2 General Description of EUT

Product Name:	WATER DANCING BLUETOOTH MINI TOWER
Model No.:	SP118-BLACK-FD-PL, 2101175,TSB-63628, CAB-A6689, SP606-BLACK, TDV-99FC6, SDVD9960-B, TDV-22FC6, SDVD9957-D, TDV-16006, SDVD1030-B, TDV-21FB8, SDVD1010, 2101096
Operation Frequency:	2402MHz~2480MHz
Channel numbers:	79
Channel separation:	1MHz
Modulation type:	GFSK, Pi/4QPSK, 8DPSK
Antenna Type:	PCB antenna
Antenna gain:	0dBi (declare by Applicant)
Power supply:	Adapter 1: Model: GKYP50150058UL1 Input: 100-240V, 50/60Hz, 0.5A Output: 5.8V, 1.5A Adapter 2: Model: AY10BA-AF0581502-US Input: 100-240V, 50/60Hz, 0.5A Max Output: 5.8V, 1.5A
Remark:	Both adapter 1 and adapter 2 were tested, and the adapter 1 is the worst. So only the data of adapter is reported.

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	21	2422MHz	41	2442MHz	61	2462MHz
2	2403MHz	22	2423MHz	42	2443MHz	62	2463MHz
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
19	2420MHz	39	2440MHz	59	2460MHz	79	2480MHz
20	2421MHz	40	2441MHz	60	2461MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2441MHz
The Highest channel	2480MHz

5.3 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
<i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i>	

Final Test Mode:

The EUT was tested in GFSK, $\pi/4$ QPSK, 8DPSK modulation, and found the GFSK modulation is the worst case.

According to ANSI C63.10 standards, the test results are both the "worst case" and "worst setup":

Y axis (see the test setup photo)

5.4 Description of Support Units

None.

5.5 Test Facility

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

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 600491, June 28, 2013.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

5.6 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5.7 Other Information Requested by the Customer

None.

6 Test Instruments list

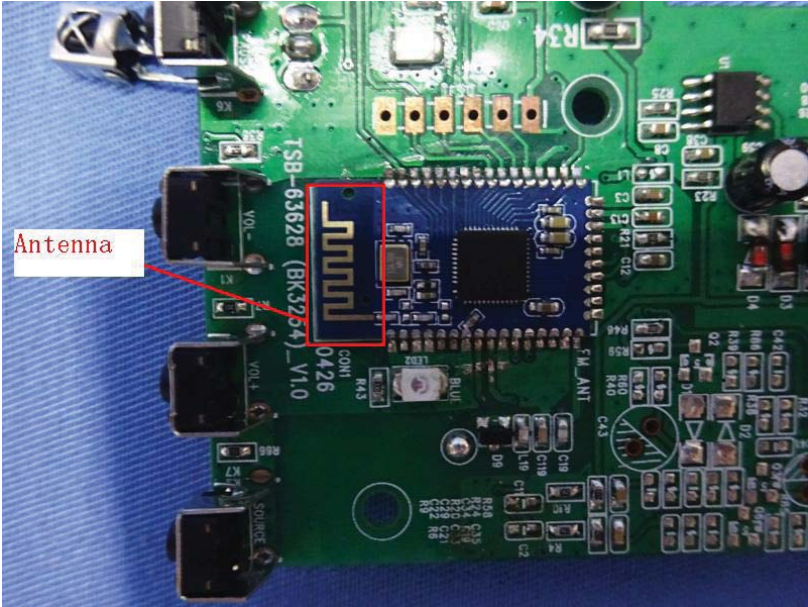
Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS533	Jun. 30 2015	Jun. 29 2016
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jun. 30 2015	Jun. 29 2016
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Jun. 30 2015	Jun. 29 2016
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	Jun. 26 2015	Jun. 25 2016
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 26 2016	Mar. 25 2017
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	Mar. 27 2016	Mar. 26 2017
10	Coaxial Cable	GTS	N/A	GTS211	Mar. 27 2016	Mar. 26 2017
11	Coaxial cable	GTS	N/A	GTS210	Mar. 27 2016	Mar. 26 2017
12	Coaxial Cable	GTS	N/A	GTS212	Mar. 27 2016	Mar. 26 2017
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jun. 30 2015	Jun. 29 2016
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jun. 30 2015	Jun. 29 2016
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	Jun. 26 2015	Jun. 25 2016
16	Band filter	Amindeon	82346	GTS219	Mar. 27 2016	Mar. 26 2017

Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	Jun. 30 2015	Jun. 29 2016
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jun. 30 2015	Jun. 29 2016
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	Jun. 30 2015	Jun. 29 2016
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jun. 30 2015	Jun. 29 2016
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	Jun. 30 2015	Jun. 29 2016
6	Coaxial Cable	GTS	N/A	GTS227	Jun. 30 2015	Jun. 29 2016
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	ChangChun	DYM3	GTS257	July 07 2015	July 06 2016

7 Test results and Measurement Data

7.1 Antenna requirement

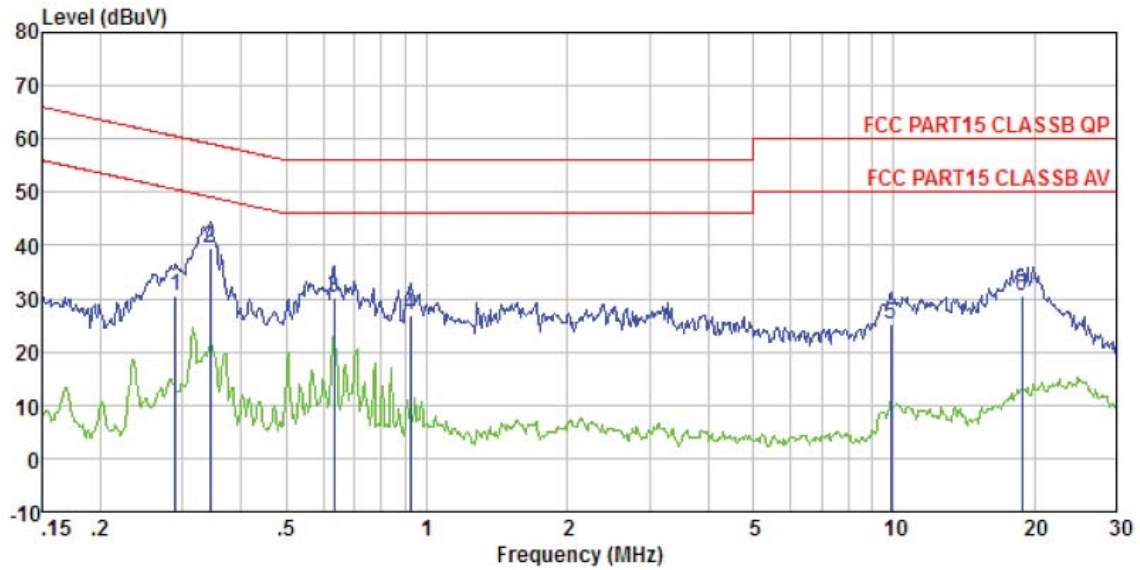
Standard requirement:	FCC Part15 C Section 15.203
<p>15.203 requirement:</p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p>	
<p>EUT Antenna:</p> <p><i>The antenna is PCB antenna, the best case gain of the antenna is 0dBi</i></p> 	

7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207															
Test Method:	ANSI C63.10:2013															
Test Frequency Range:	150KHz to 30MHz															
Class / Severity:	Class B															
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto															
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>		Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
	Frequency range (MHz)	Limit (dBuV)														
		Quasi-peak	Average													
	0.15-0.5	66 to 56*	56 to 46*													
	0.5-5	56	46													
5-30	60	50														
* Decreases with the logarithm of the frequency.																
Test setup:																
	<p><i>Remark:</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>															
Test procedure:	<ol style="list-style-type: none"> 1. The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement. 															
Test Instruments:	Refer to section 6.0 for details															
Test mode:	Refer to section 5.3 for details															
Test results:	Pass															

Measurement data

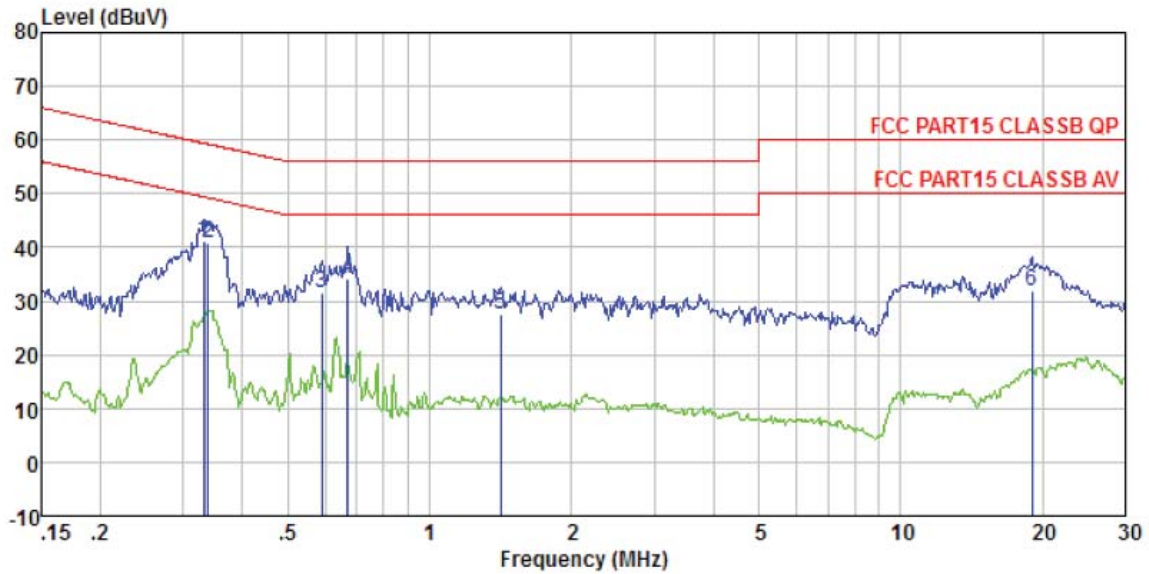
Line:



Site : Shielded room
 Condition : FCC PART15 CLASSB QP LISN-2013 LINE
 Job No. : 0230
 Test Mode : Bluetooth mode
 Test Engineer: Sky

	Read	LISN	Cable	Limit	Over	
Freq	Level	Level	Factor	Line	Limit	Remark
MHz	dBuV	dBuV	dB	dB	dB	
1	0.289	30.16	30.37	0.11	0.10	60.54 -30.17 QP
2	0.343	39.41	39.62	0.11	0.10	59.13 -19.51 QP
3	0.634	30.00	30.26	0.13	0.13	56.00 -25.74 QP
4	0.923	26.59	26.86	0.14	0.13	56.00 -29.14 QP
5	9.861	24.59	25.07	0.29	0.19	60.00 -34.93 QP
6	18.820	29.80	30.57	0.55	0.22	60.00 -29.43 QP

Neutral:



Site : Shielded room
 Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
 Job No. : 0230
 Test Mode : Bluetooth mode
 Test Engineer: Sky

	Read	LISN	Cable	Limit	Over	
Freq	Level	Level	Factor	Loss	Line	Limit Remark
MHz	dBuV	dBuV	dB	dB	dBuV	dB
1	0.332	40.92	41.08	0.06	0.10	59.40 -18.32 QP
2	0.339	40.61	40.77	0.06	0.10	59.22 -18.45 QP
3	0.592	31.43	31.62	0.07	0.12	56.00 -24.38 QP
4	0.672	33.82	34.02	0.07	0.13	56.00 -21.98 QP
5	1.418	27.20	27.42	0.09	0.13	56.00 -28.58 QP
6	19.021	31.31	32.00	0.47	0.22	60.00 -28.00 QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7.3 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	30MHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
Limit: (Field strength of the fundamental signal)	Frequency	Limit (dBuV/m @3m)		Remark	
	2400MHz-2483.5MHz	94.00		Average Value	
		114.00		Peak Value	
Limit: (Spurious Emissions)	Frequency	Limit (dBuV/m @3m)		Remark	
	30MHz-88MHz	40.00		Quasi-peak Value	
	88MHz-216MHz	43.50		Quasi-peak Value	
	216MHz-960MHz	46.00		Quasi-peak Value	
	960MHz-1GHz	54.00		Quasi-peak Value	
	Above 1GHz	54.00		Average Value	
		74.00		Peak Value	
Limit: (band edge)	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.				
Test setup:	<p>Below 1GHz</p> <p>Above 1GHz</p>				

	<p>The diagram illustrates the test setup. An EUT (Electromagnetic Under Test) is placed on a turn table. The turn table is positioned 3 meters away from an antenna tower. The antenna tower has a horn antenna mounted on top. The antenna height is varied from 1 meter to 4 meters above the ground. The turn table is 1.5 meters high for frequencies below 1 GHz and 1 meter high for frequencies above 1 GHz. The antenna is connected to a spectrum analyzer and an amplifier.</p>
<p>Test Procedure:</p>	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
<p>Test Instruments:</p>	<p>Refer to section 6.0 for details</p>
<p>Test mode:</p>	<p>Refer to section 5.3 for details</p>
<p>Test results:</p>	<p>Pass</p>

Measurement data:

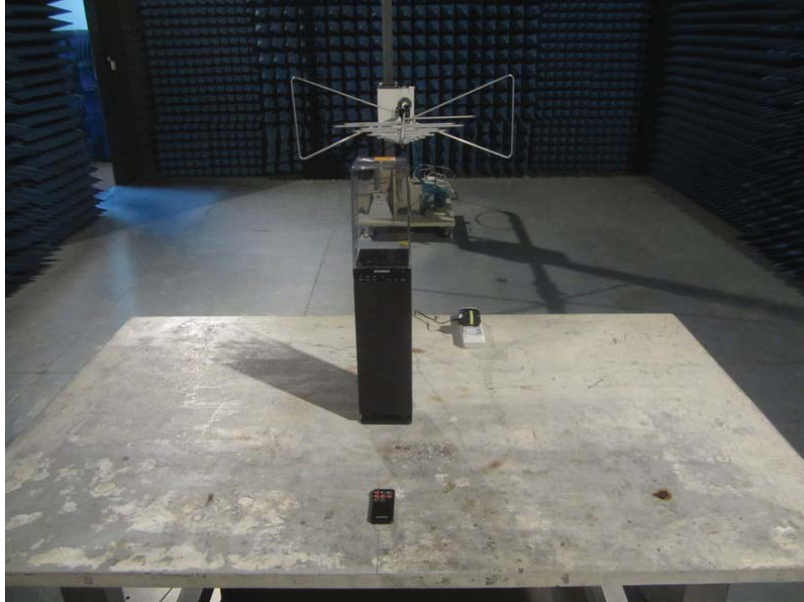
7.3.1 Spurious emissions

■ Below 1GHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
32.634	39.03	14.31	0.58	30.08	23.84	40	-16.16	Vertical
39.715	36.36	15.49	0.66	30.04	22.47	40	-17.53	Vertical
119.018	42.11	12.69	1.35	29.58	26.57	43.5	-16.93	Vertical
201.393	35.23	12.6	1.85	29.21	20.47	43.5	-23.03	Vertical
397.633	30.46	17.01	2.84	29.51	20.8	46	-25.2	Vertical
426.521	32.17	17.5	2.98	29.44	23.21	46	-22.79	Vertical
38.888	27.62	15.3	0.65	30.05	13.52	40	-26.48	Horizontal
120.699	37.99	12.38	1.37	29.56	22.18	43.5	-21.32	Horizontal
229.293	36.31	13.62	2.01	29.47	22.47	46	-23.53	Horizontal
389.355	33.88	16.83	2.8	29.55	23.96	46	-22.04	Horizontal
473.835	34.98	17.95	3.2	29.35	26.78	46	-19.22	Horizontal
968.934	31.51	23.55	5.11	29.1	31.07	54	-22.93	Horizontal

8 Test Setup Photo

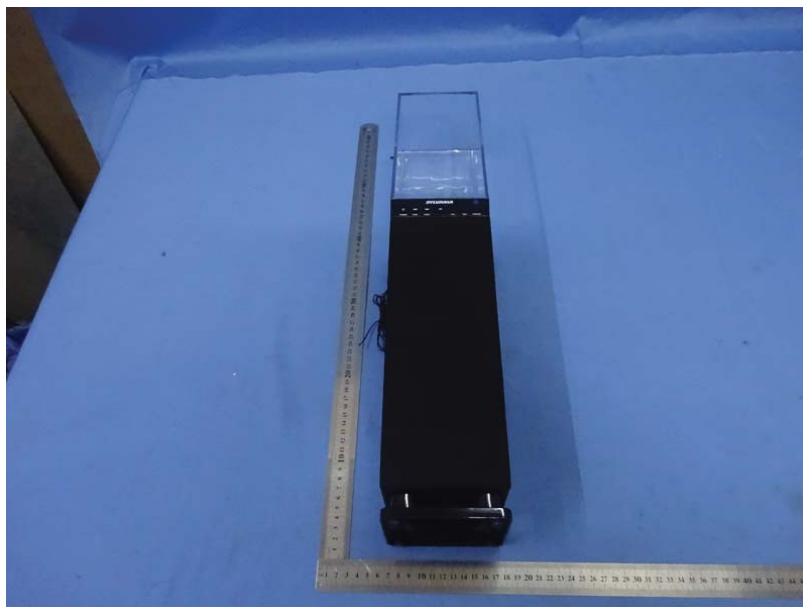
Radiated Emission

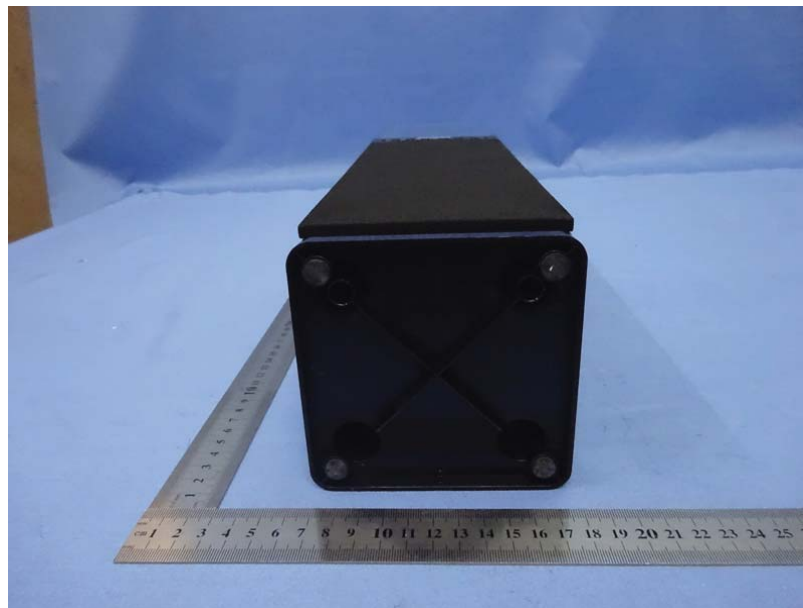


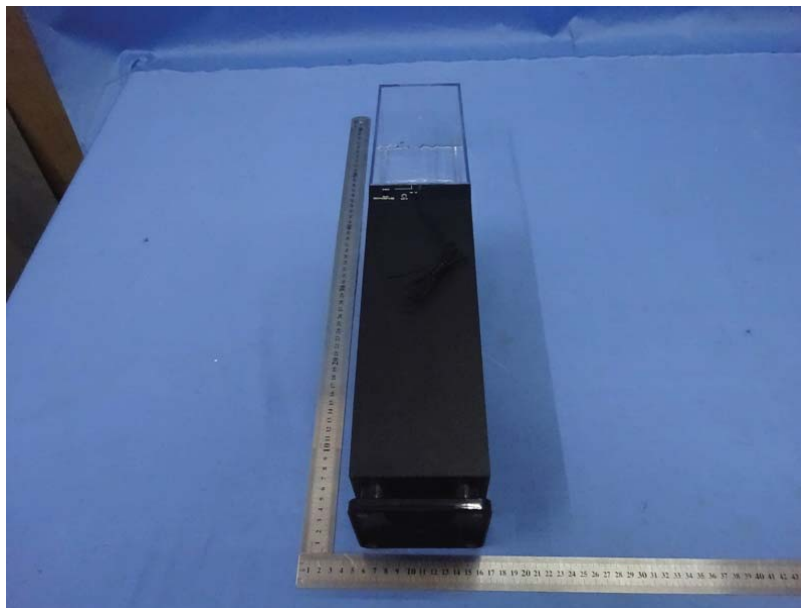
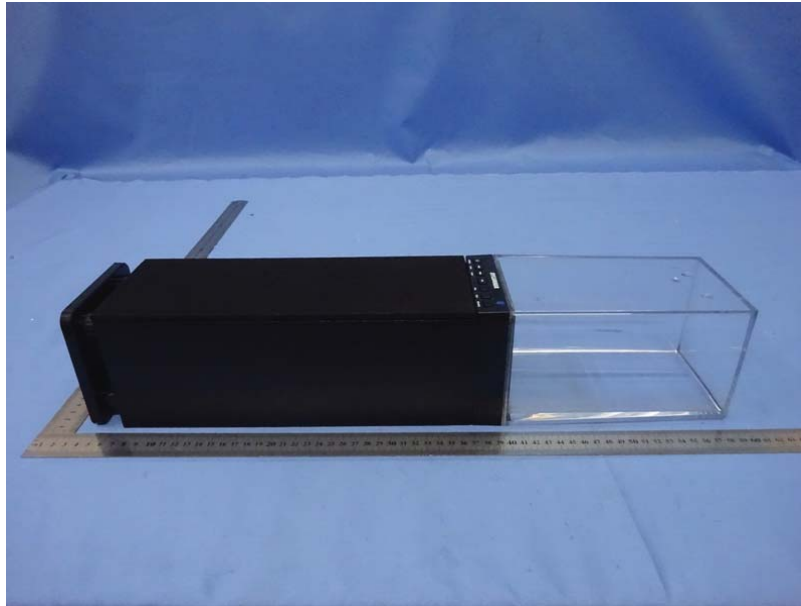
Conducted Emission

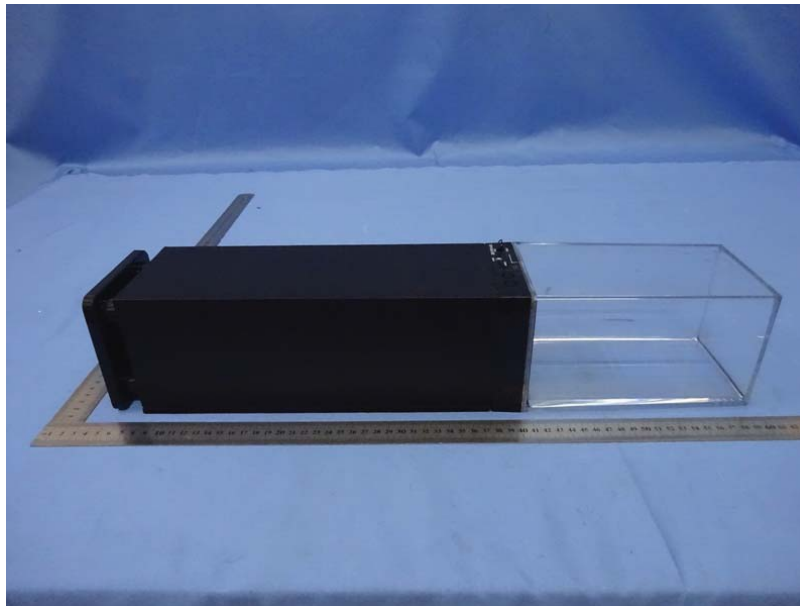


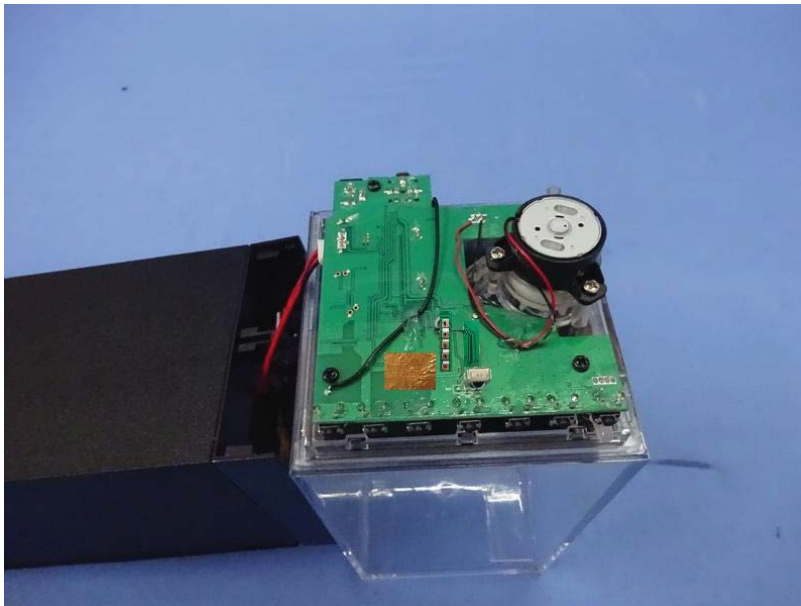
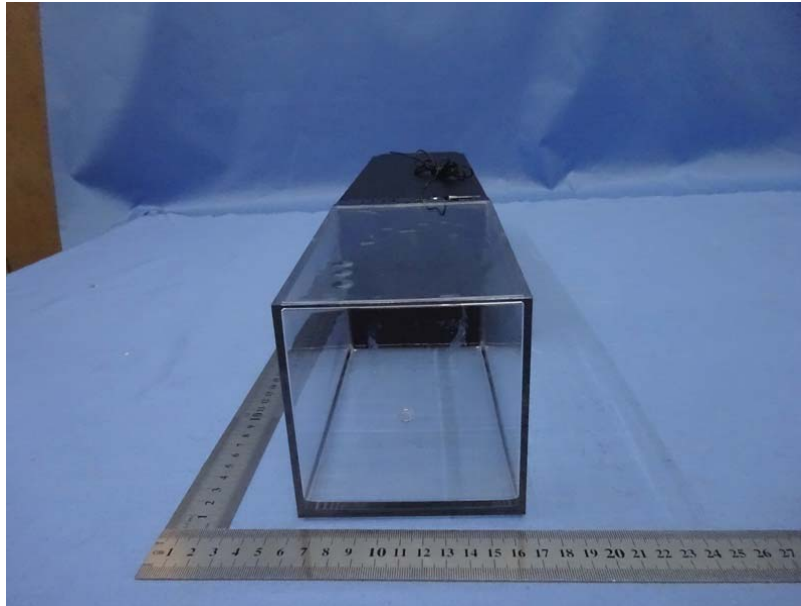
9 EUT Constructional Details

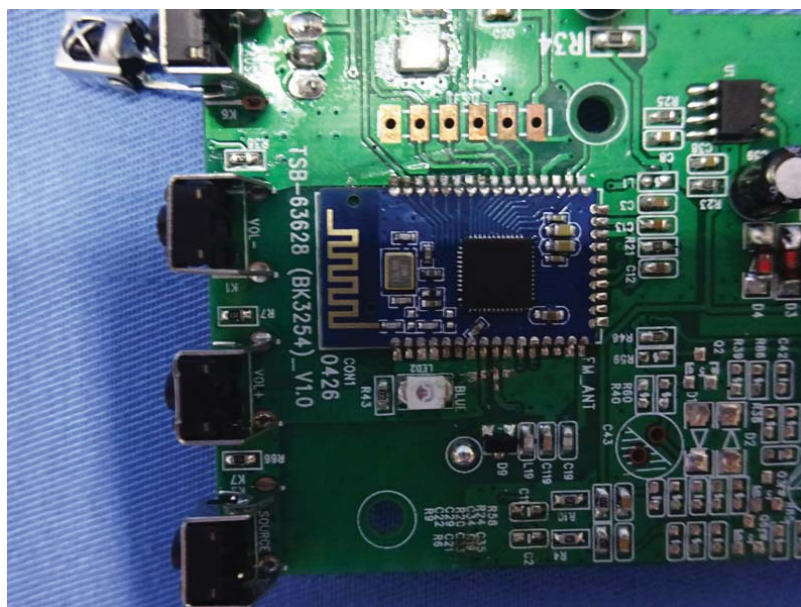
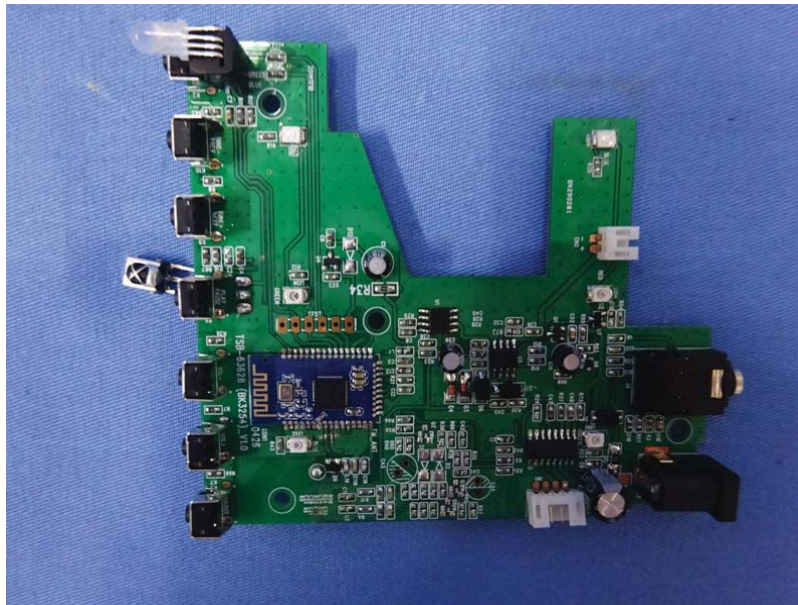


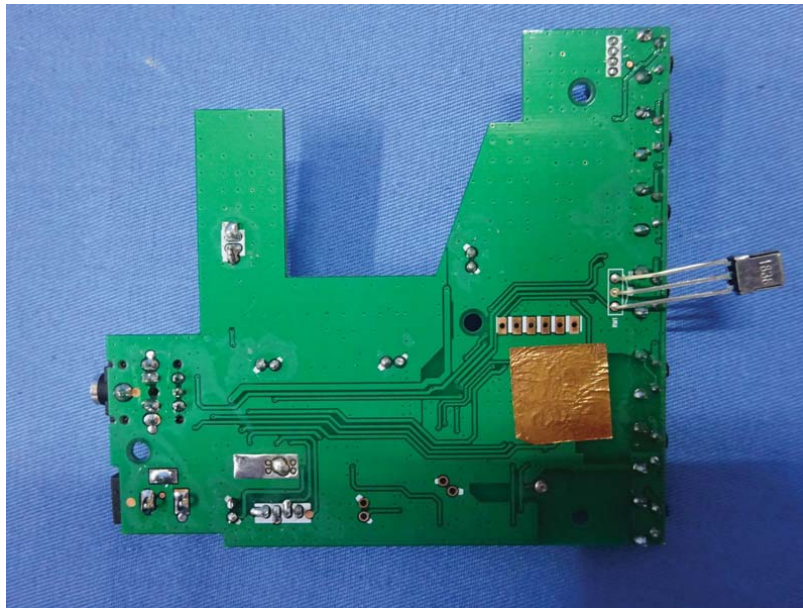














Adapter 1:



Adapter 2:



----- End -----