Global United Technology Services Co., Ltd.

Report No.: GTSE15040054701

FCC REPORT

Applicant: ZAGG Inc.

Address of Applicant: 3855 South 500 West, Salt Lake City, UT 84115 USA

Equipment Under Test (EUT)

Product Name: ZAGG Speaker Case

Model No.: IP6ZSC-BK0, IP6ZSC-BL0

FCC ID: QTG-ZAGGSPKRCS

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

Date of sample receipt: April 22, 2015

Date of Test: April 23-27, 2015

Date of report issued: April 28, 2015

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	*April 28, 2015*	*Original*

Prepared By:	Edward.Pan	***Date:***	*April 28, 2015*
	Project Engineer		
Check By:	Hank. yan	***Date:***	*April 28, 2015*
	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)	Pass
Spurious emissions	15.249 (a) (d)/15.209	Pass
Band edge	15.249 (d)/15.205	Pass
20dB Occupied Bandwidth	15.215 (c)	Pass

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

Remark: "N/A " is not applicable

5 General Information

5.1 Client Information

Applicant:	ZAGG Inc.
Address of Applicant:	3855 South 500 West, Salt Lake City, UT 84115 USA
Manufacturer/Factory:	Interface Tech Co.,Ltd
Address of Manufacturer/ Factory:	Room 3008, Zian Business Building, Xin'an 2nd Road, Baoan District, Shenzhen City, China

5.2 General Description of EUT

Product Name:	ZAGG Speaker Case
Model No.:	IP6ZSC-BK0, IP6ZSC-BL0
Test Model No.:	IP6ZSC-BK0
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The only difference is the model name for commercial purpose.	
Operation Frequency:	2402MHz~2480MHz
Channel numbers:	79
Channel separation:	1MHz
Modulation type:	GFSK, Pi/4QPSK, 8DPSK
Antenna Type:	Integral Antenna
Antenna gain:	1.6dBi(declare by Applicant)
Power supply:	DC 5.0V 1A DC 3.7V 1800mAh Li-ion battery

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
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.	

Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

Axis	X	Y	Z
Field Strength(dBuV/m)	93.14	95.43	94.14

Final Test Mode:

The EUT was tested in GFSK, Pi/4QPSK, 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

Manufacturer	Description	Model	Serial Number
Emerson Network Power	USB Charger	A1299	N/A

5.5 Test Facility

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

● **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. To ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

● **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly 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: Room 301-309, 3th Floor, Block A, Huafeng Jinyuan Business Building, No. 300 Laodong Industrial Zone,Xixiang Road, Baoan District, Shenzhen 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	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 28 2015	Mar. 27 2016
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	Jul. 01 2014	Jun 30 2015
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 01 2014	Jun 30 2015
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Jul. 01 2014	Jun 30 2015
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 27 2014	June 26 2015
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 27 2015	Mar. 26 2016
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	Mar. 28 2015	Mar. 27 2016
10	Coaxial Cable	GTS	N/A	GTS211	Mar. 28 2015	Mar. 27 2016
11	Coaxial cable	GTS	N/A	GTS210	Mar. 28 2015	Mar. 27 2016
12	Coaxial Cable	GTS	N/A	GTS212	Mar. 28 2015	Mar. 27 2016
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jul. 01 2014	Jun. 30, 2015
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 01 2014	Jun. 30, 2015
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 27 2014	June 26 2015
16	Band filter	Amindeon	82346	GTS219	Mar. 28 2015	Mar. 27 2016

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	July 01 2014	June 30 2015
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	July 01 2014	June 30 2015
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	July 01 2014	June 30 2015
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	July 01 2014	June 30 2015
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	July 01 2014	June 30 2015
6	Coaxial Cable	GTS	N/A	GTS227	July 01 2014	June 30 2015
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

7 Test results and Measurement Data

7.1 Antenna requirement

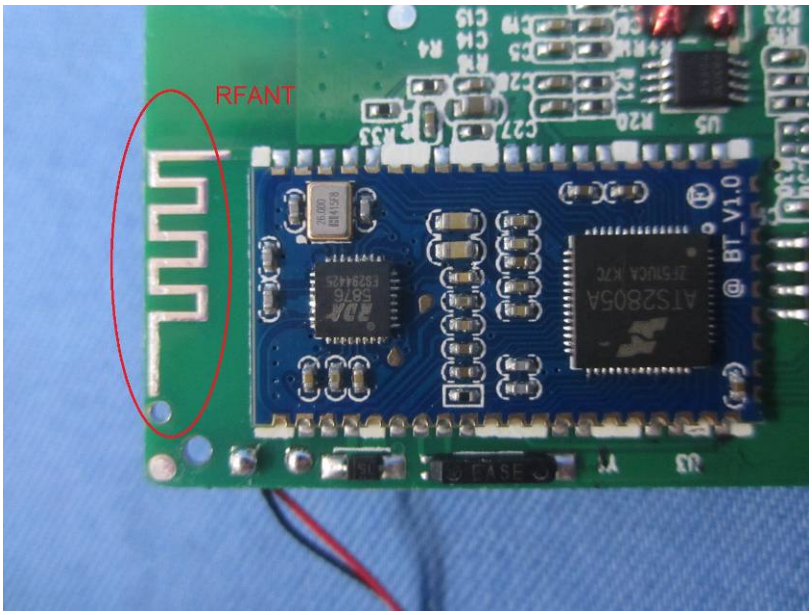
Standard requirement:	FCC Part15 C Section 15.203

15.203 requirement:

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.

E.U.T Antenna:

The antenna is integral Antenna, the best case gain of the antenna is 1.6dBi



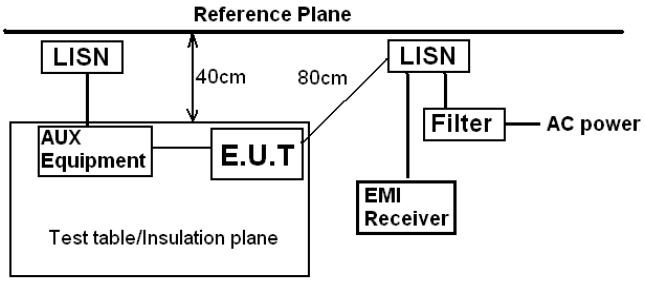
7.2 Conducted Emissions

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:	

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:



Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

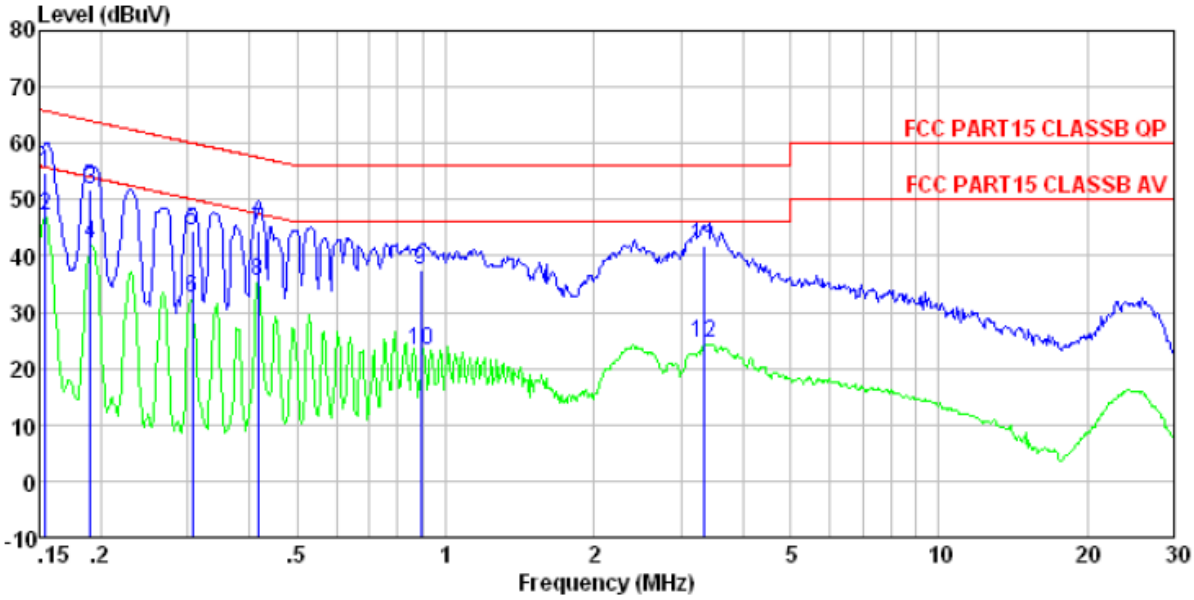
Test procedure:

1. The E.U.T is 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

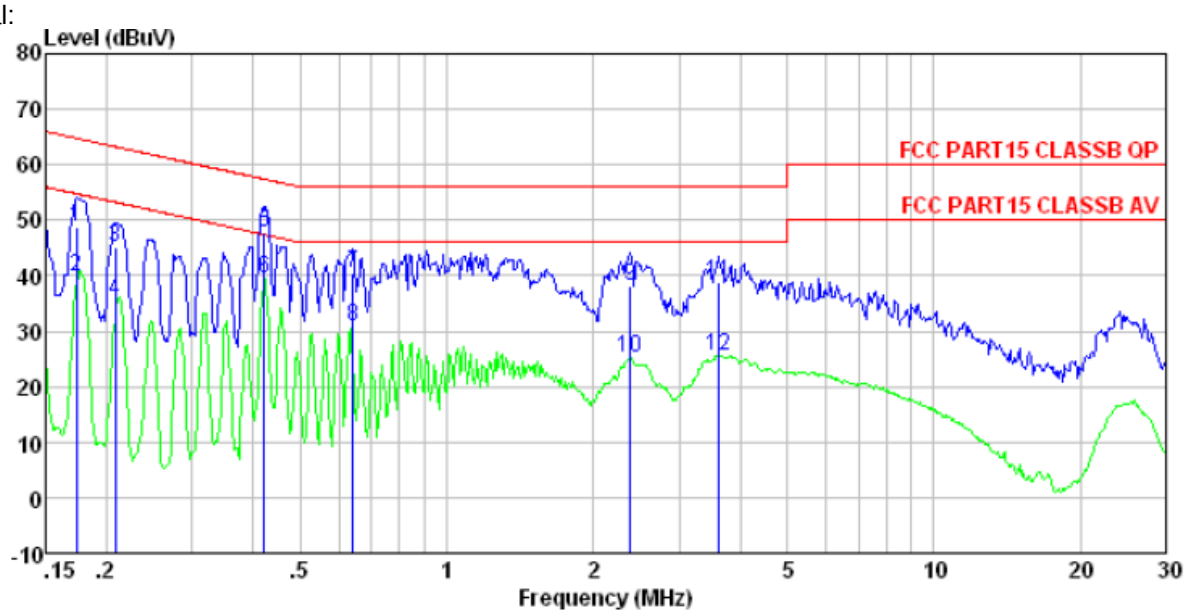
Line:



Condition : FCC PART15 CLASSB QP LISN-2013 LINE
Job No. : 0547RF
Test mode : Bluetooth mode
Test Engineer: Qing

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.154	54.56	0.15	0.12	54.83	65.78	-10.95	QP
2	0.154	46.86	0.15	0.12	47.13	55.78	-8.65	Average
3	0.190	51.46	0.14	0.13	51.73	64.02	-12.29	QP
4	0.190	41.92	0.14	0.13	42.19	54.02	-11.83	Average
5	0.307	44.13	0.11	0.10	44.34	60.06	-15.72	QP
6	0.307	32.40	0.11	0.10	32.61	50.06	-17.45	Average
7	0.417	44.36	0.12	0.11	44.59	57.51	-12.92	QP
8	0.417	35.43	0.12	0.11	35.66	47.51	-11.85	Average
9	0.890	37.19	0.14	0.13	37.46	56.00	-18.54	QP
10	0.890	22.94	0.14	0.13	23.21	46.00	-22.79	Average
11	3.328	41.57	0.18	0.15	41.90	56.00	-14.10	QP
12	3.328	24.18	0.18	0.15	24.51	46.00	-21.49	Average

Neutral:



Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
Job No. : 0547RF
Test mode : Bluetooth mode
Test Engineer: Qing

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.174	48.58	0.07	0.13	48.78	64.77	-15.99	QP
2	0.174	39.74	0.07	0.13	39.94	54.77	-14.83	Average
3	0.208	45.01	0.07	0.13	45.21	63.27	-18.06	QP
4	0.208	35.33	0.07	0.13	35.53	53.27	-17.74	Average
5	0.421	47.49	0.06	0.11	47.66	57.42	-9.76	QP
6	0.421	39.23	0.06	0.11	39.40	47.42	-8.02	Average
7	0.641	40.15	0.07	0.13	40.35	56.00	-15.65	QP
8	0.641	30.65	0.07	0.13	30.85	46.00	-15.15	Average
9	2.384	37.99	0.10	0.15	38.24	56.00	-17.76	QP
10	2.384	24.92	0.10	0.15	25.17	46.00	-20.83	Average
11	3.603	38.49	0.14	0.15	38.78	56.00	-17.22	QP
12	3.603	25.11	0.14	0.15	25.40	46.00	-20.60	Average

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)

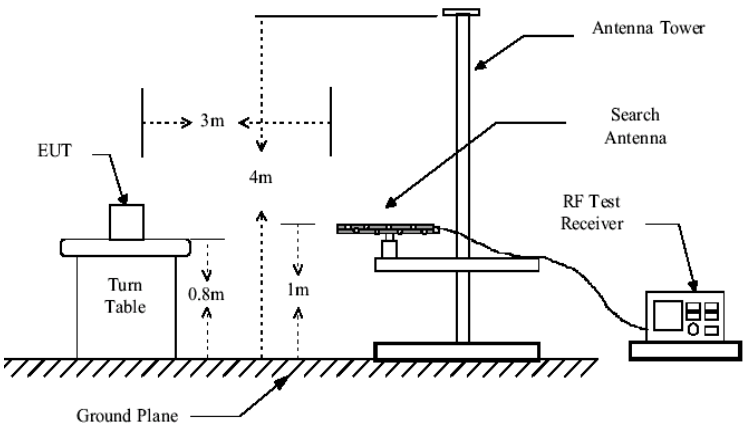
Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.00	Quasi-peak Value
88MHz-216MHz	43.50	Quasi-peak Value
216MHz-960MHz	46.00	Quasi-peak Value
960MHz-1GHz	54.00	Quasi-peak Value
Above 1GHz	54.00	Average Value
	74.00	Peak Value

Limit:
(band edge)

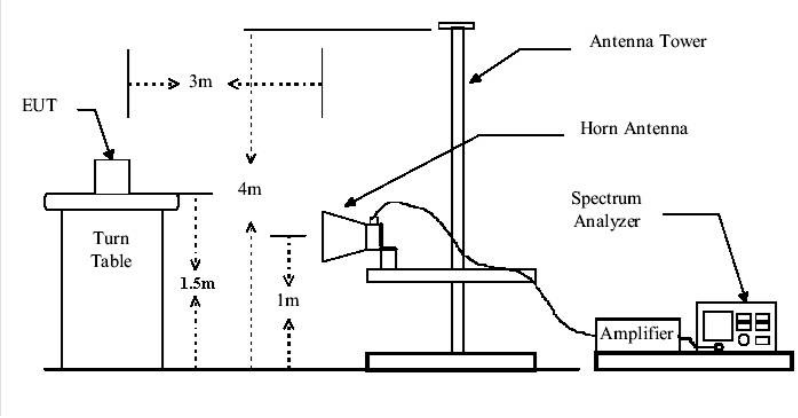
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Test setup:

Below 1GHz



Above 1GHz

	
Test Procedure:	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.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement data:

7.3.1 Field Strength of The Fundamental Signal

Peak value:

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
2402.00	96.15	27.58	5.39	34.01	95.11	114.00	-18.89	Vertical
2402.00	91.53	27.58	5.39	34.01	90.49	114.00	-23.51	Horizontal
2441.00	96.48	27.48	5.43	33.96	95.43	114.00	-18.57	Vertical
2441.00	94.63	27.48	5.43	33.96	93.58	114.00	-20.42	Horizontal
2480.00	95.22	27.52	5.47	33.92	94.29	114.00	-19.71	Vertical
2480.00	90.16	27.52	5.47	33.92	89.23	114.00	-24.77	Horizontal

Average value:

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
2402.00	86.02	27.58	5.39	34.01	84.98	94.00	-9.02	Vertical
2402.00	81.77	27.58	5.39	34.01	80.73	94.00	-13.27	Horizontal
2441.00	86.45	27.48	5.43	33.96	85.40	94.00	-8.60	Vertical
2441.00	84.34	27.48	5.43	33.96	83.29	94.00	-10.71	Horizontal
2480.00	85.28	27.52	5.47	33.92	84.35	94.00	-9.65	Vertical
2480.00	80.82	27.52	5.47	33.92	79.89	94.00	-14.11	Horizontal

Remark: RBW 3MHz, VBW 10MHz , peak detector for PK value, RBW 3MHz, VBW 10MHz AV detector for AV value

7.3.2 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
31.29	47.14	14.32	0.57	30.09	31.94	40.00	-8.06	Vertical
64.21	49.00	12.97	0.90	29.89	32.98	40.00	-7.02	Vertical
158.11	55.26	10.58	1.62	29.37	38.09	43.50	-5.41	Vertical
173.81	51.35	11.23	1.71	29.30	34.99	43.50	-8.51	Vertical
451.14	36.97	17.58	3.09	29.39	28.25	46.00	-17.75	Vertical
668.14	34.01	20.69	3.97	29.23	29.44	46.00	-16.56	Vertical
63.31	47.15	13.37	0.89	29.90	31.51	40.00	-8.49	Horizontal
78.97	45.91	10.43	1.02	29.80	27.56	40.00	-12.44	Horizontal
158.11	53.39	10.58	1.62	29.37	36.22	43.50	-7.28	Horizontal
302.48	41.03	15.08	2.37	29.98	28.50	46.00	-17.50	Horizontal
451.14	38.55	17.58	3.09	29.39	29.83	46.00	-16.17	Horizontal
750.11	35.81	21.43	4.28	29.20	32.32	46.00	-13.68	Horizontal

■ Above 1GHz

Test channel:	Lowest channel

Peak value:

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
4804.00	39.22	31.78	8.60	32.09	47.51	74.00	-26.49	Vertical
7206.00	33.10	36.15	11.65	32.00	48.90	74.00	-25.10	Vertical
9608.00	32.60	37.95	14.14	31.62	53.07	74.00	-20.93	Vertical
12010.00	*					74.00		Vertical
14412.00	*					74.00		Vertical
4804.00	43.90	31.78	8.60	32.09	52.19	74.00	-21.81	Horizontal
7206.00	35.02	36.15	11.65	32.00	50.82	74.00	-23.18	Horizontal
9608.00	32.20	37.95	14.14	31.62	52.67	74.00	-21.33	Horizontal
12010.00	*					74.00		Horizontal
14412.00	*					74.00		Horizontal

Average value:

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
4804.00	27.67	31.78	8.60	32.09	35.96	54.00	-18.04	Vertical
7206.00	21.57	36.15	11.65	32.00	37.37	54.00	-16.63	Vertical
9608.00	20.53	37.95	14.14	31.62	41.00	54.00	-13.00	Vertical
12010.00	*					54.00		Vertical
14412.00	*					54.00		Vertical
4804.00	32.11	31.78	8.60	32.09	40.40	54.00	-13.60	Horizontal
7206.00	23.87	36.15	11.65	32.00	39.67	54.00	-14.33	Horizontal
9608.00	20.42	37.95	14.14	31.62	40.89	54.00	-13.11	Horizontal
12010.00	*					54.00		Horizontal
14412.00	*					54.00		Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *"*", means this data is the too weak instrument of signal is unable to test.*

Test channel:	Middle channel

Peak value:

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
4882.00	37.76	31.85	8.67	32.12	46.16	74.00	-27.84	Vertical
7323.00	32.13	36.37	11.72	31.89	48.33	74.00	-25.67	Vertical
9764.00	31.74	38.35	14.25	31.62	52.72	74.00	-21.28	Vertical
12205.00	*					74.00		Vertical
14646.00	*					74.00		Vertical
4882.00	42.14	31.85	8.67	32.12	50.54	74.00	-23.46	Horizontal
7323.00	33.93	36.37	11.72	31.89	50.13	74.00	-23.87	Horizontal
9764.00	31.20	38.35	14.25	31.62	52.18	74.00	-21.82	Horizontal
12205.00	*					74.00		Horizontal
14646.00	*					74.00		Horizontal

Average value:

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
4882.00	26.50	31.85	8.67	32.12	34.90	54.00	-19.10	Vertical
7323.00	20.78	36.37	11.72	31.89	36.98	54.00	-17.02	Vertical
9764.00	19.82	38.35	14.25	31.62	40.80	54.00	-13.20	Vertical
12205.00	*					54.00		Vertical
14646.00	*					54.00		Vertical
4882.00	30.78	31.85	8.67	32.12	39.18	54.00	-14.82	Horizontal
7323.00	22.98	36.37	11.72	31.89	39.18	54.00	-14.82	Horizontal
9764.00	19.59	38.35	14.25	31.62	40.57	54.00	-13.43	Horizontal
12205.00	*					54.00		Horizontal
14646.00	*					54.00		Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *"*", means this data is the too weak instrument of signal is unable to test.*

Test channel:	Highest channel

Peak value:

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
4960.00	36.55	31.93	8.73	32.16	45.05	74.00	-28.95	Vertical
7440.00	31.33	36.59	11.79	31.78	47.93	74.00	-26.07	Vertical
9920.00	31.02	38.81	14.38	31.88	52.33	74.00	-21.67	Vertical
12400.00	*					74.00		Vertical
14880.00	*					74.00		Vertical
4960.00	40.68	31.93	8.73	32.16	49.18	74.00	-24.82	Horizontal
7440.00	33.02	36.59	11.79	31.78	49.62	74.00	-24.38	Horizontal
9920.00	30.37	38.81	14.38	31.88	51.68	74.00	-22.32	Horizontal
12400.00	*					74.00		Horizontal
14880.00	*					74.00		Horizontal

Average value:

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
4960.00	25.57	31.93	8.73	32.16	34.07	54.00	-19.93	Vertical
7440.00	20.15	36.59	11.79	31.78	36.75	54.00	-17.25	Vertical
9920.00	19.26	38.81	14.38	31.88	40.57	54.00	-13.43	Vertical
12400.00	*					54.00		Vertical
14880.00	*					54.00		Vertical
4960.00	29.72	31.93	8.73	32.16	38.22	54.00	-15.78	Horizontal
7440.00	22.27	36.59	11.79	31.78	38.87	54.00	-15.13	Horizontal
9920.00	18.94	38.81	14.38	31.88	40.25	54.00	-13.75	Horizontal
12400.00	*					54.00		Horizontal
14880.00	*					54.00		Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *"*", means this data is the too weak instrument of signal is unable to test.*

7.3.3 Bandedge emissions

All of the restriction bands were tested, and only the data of worst case was exhibited.

Test channel:	Lowest channel

Peak value:

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
2390.00	43.81	27.59	5.38	30.18	46.60	74.00	-27.40	Horizontal
2400.00	60.73	27.58	5.39	30.18	63.52	74.00	-10.48	Horizontal
2390.00	44.44	27.59	5.38	30.18	47.23	74.00	-26.77	Vertical
2400.00	62.86	27.58	5.39	30.18	65.65	74.00	-8.35	Vertical

Average value:

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
2390.00	34.15	27.59	5.38	30.18	36.94	54.00	-17.06	Horizontal
2400.00	45.44	27.58	5.39	30.18	48.23	54.00	-5.77	Horizontal
2390.00	34.16	27.59	5.38	30.18	36.95	54.00	-17.05	Vertical
2400.00	47.18	27.58	5.39	30.18	49.97	54.00	-4.03	Vertical

Test channel:	Highest channel

Peak value:

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
2483.50	46.02	27.53	5.47	29.93	49.09	74.00	-24.91	Horizontal
2500.00	45.02	27.55	5.49	29.93	48.13	74.00	-25.87	Horizontal
2483.50	47.02	27.53	5.47	29.93	50.09	74.00	-23.91	Vertical
2500.00	46.10	27.55	5.49	29.93	49.21	74.00	-24.79	Vertical

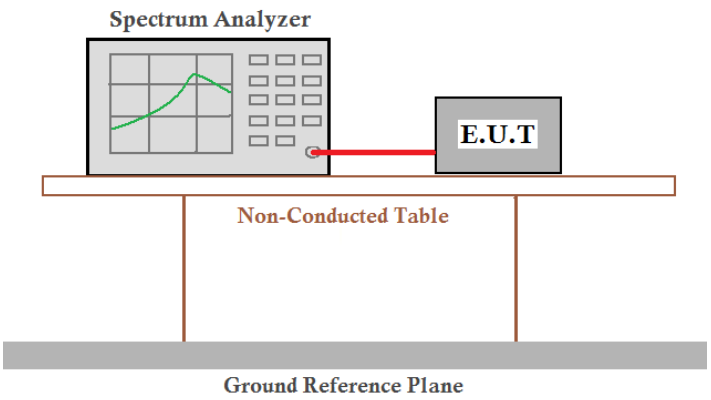
Average value:

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
2483.50	36.98	27.53	5.47	29.93	40.05	54.00	-13.95	Horizontal
2500.00	34.85	27.55	5.49	29.93	37.96	54.00	-16.04	Horizontal
2483.50	38.27	27.53	5.47	29.93	41.34	54.00	-12.66	Vertical
2500.00	34.85	27.55	5.49	29.93	37.96	54.00	-16.04	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*

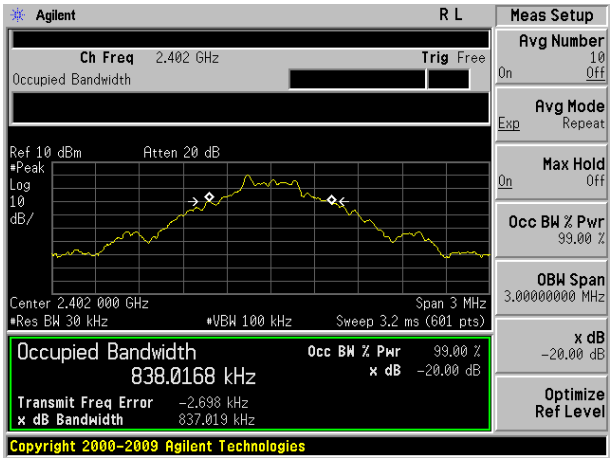
7.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.10:2013
Limit:	Operation Frequency range 2400MHz~2483.5MHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

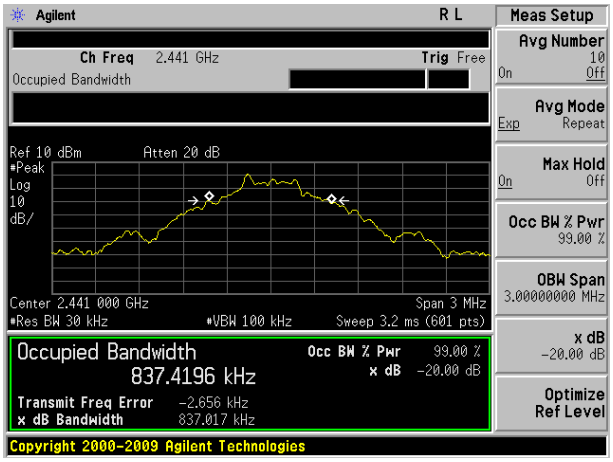
Measurement Data

Test channel	20dB bandwidth(MHz)	Result
Lowest	0.837	Pass
Middle	0.837	Pass
Highest	0.835	Pass

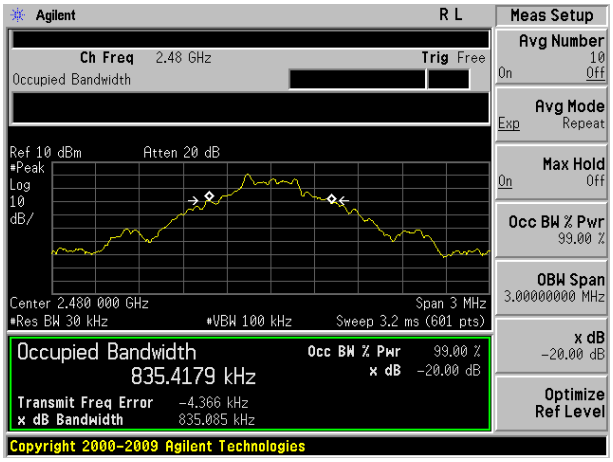
Test plot as follows:



Lowest channel



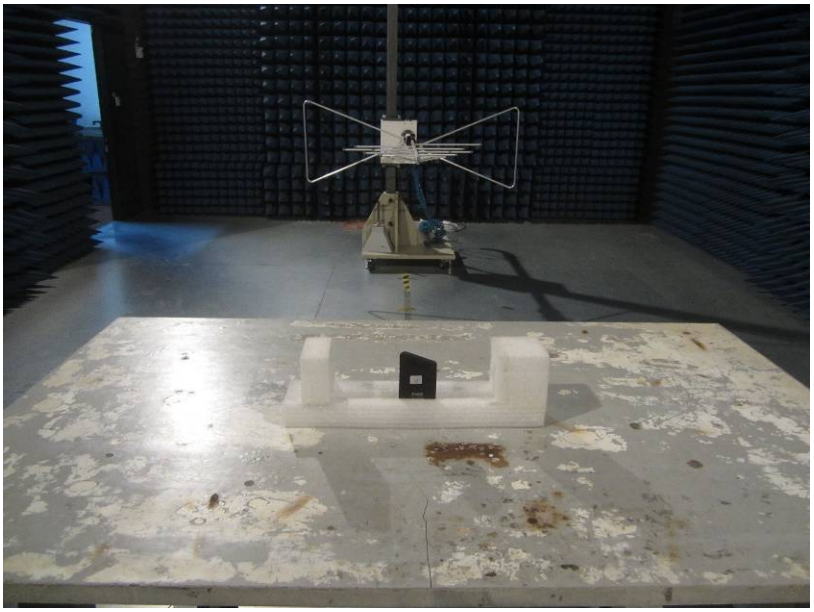
Middle channel

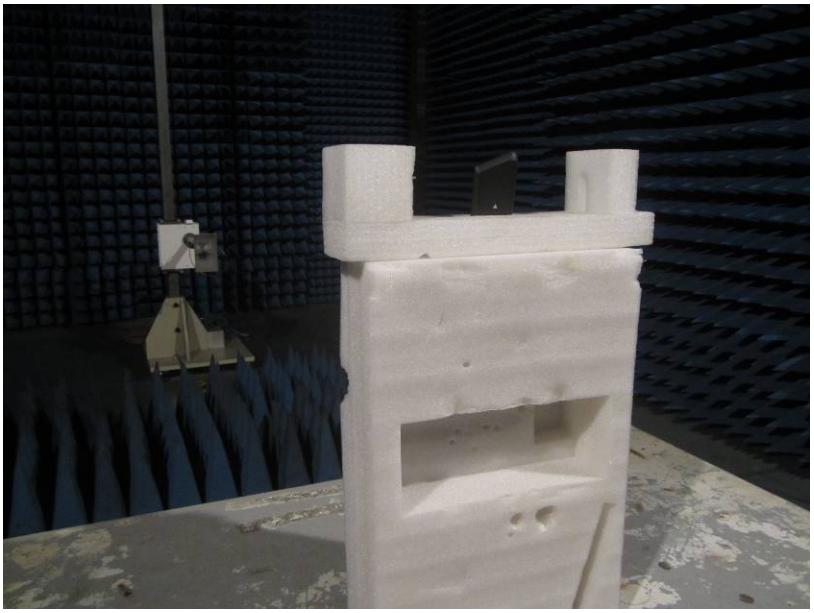


Highest channel

8 Test Setup Photo

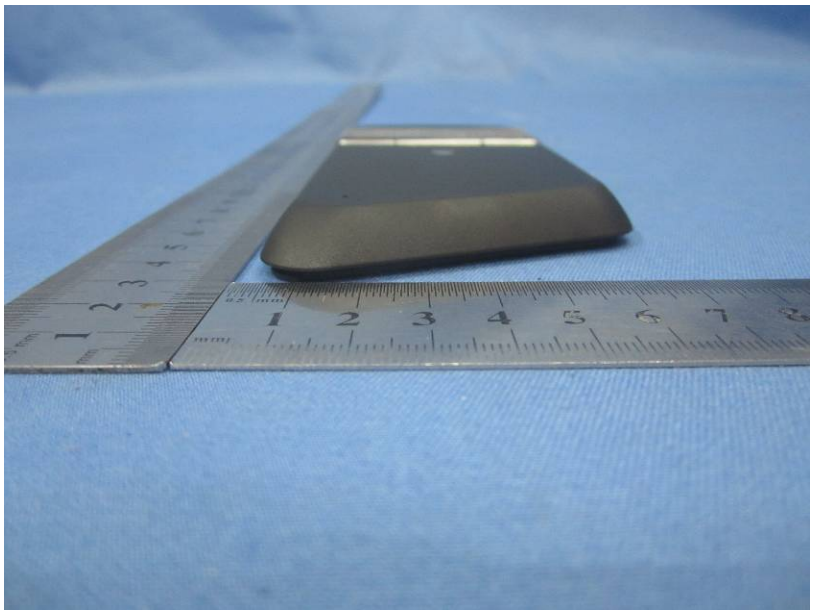
Radiated Emission

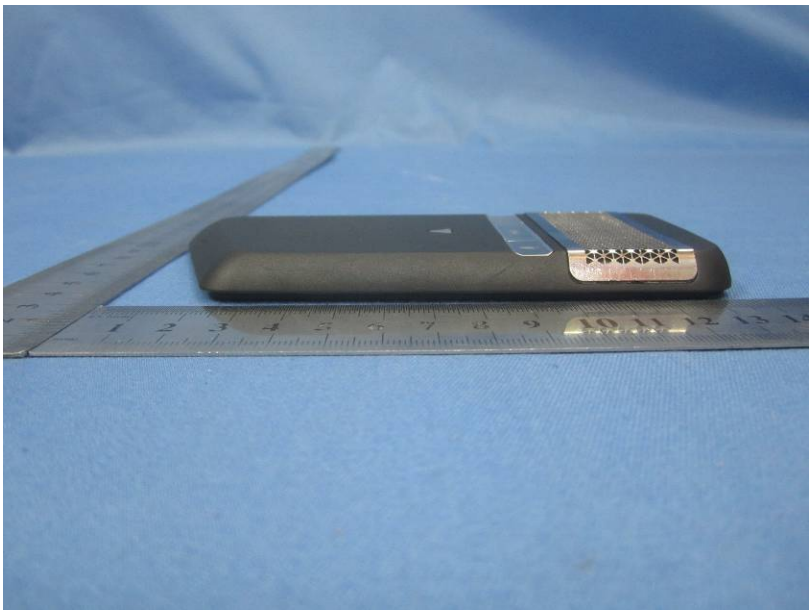


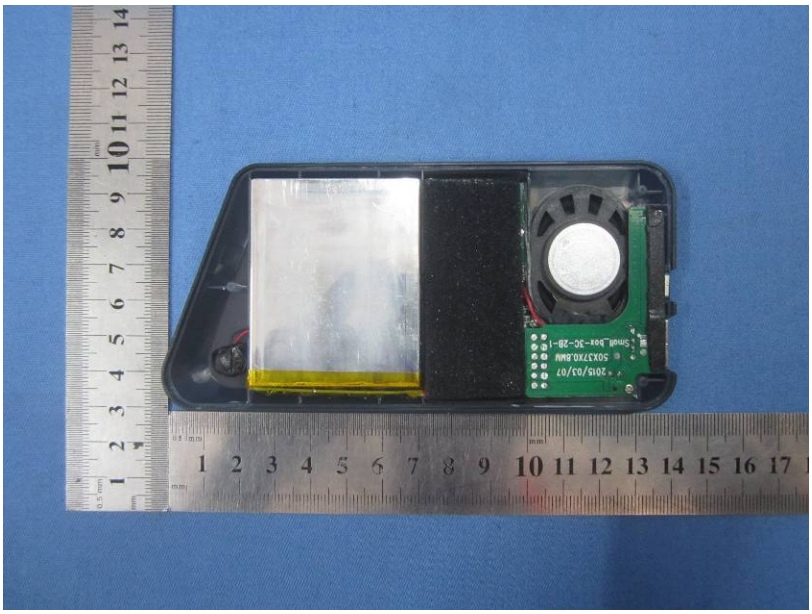


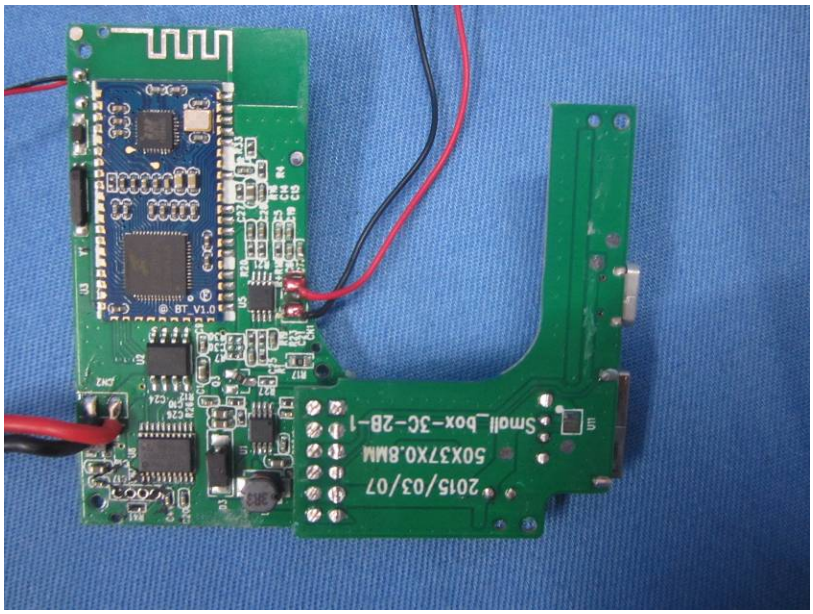
Conducted Emission

9 EUT Constructional Details





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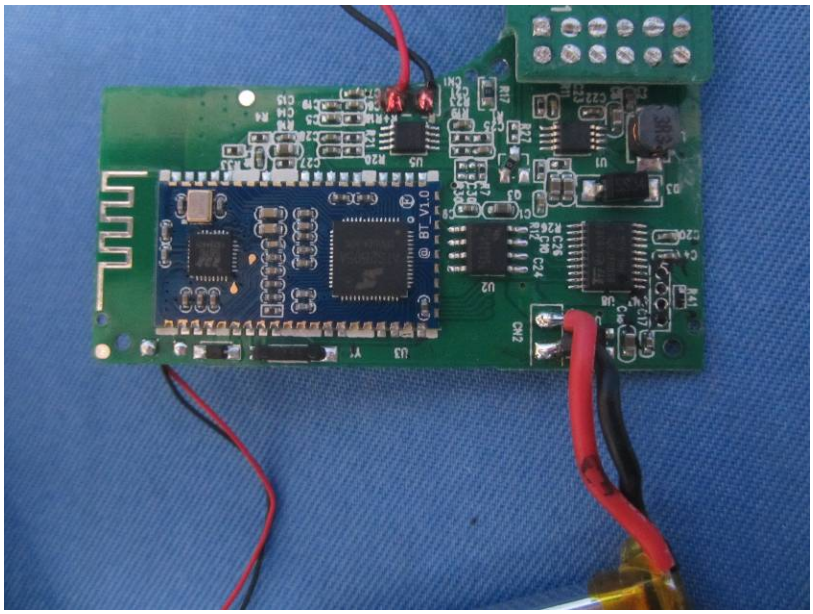

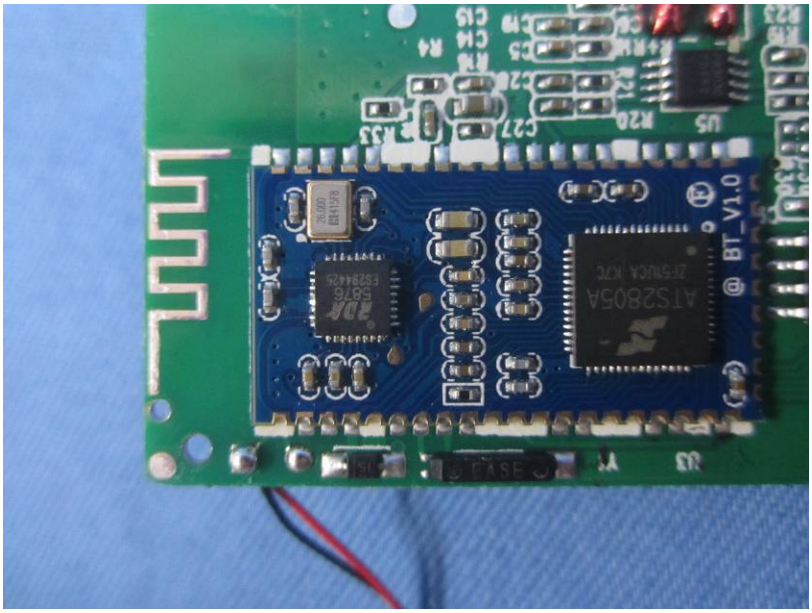
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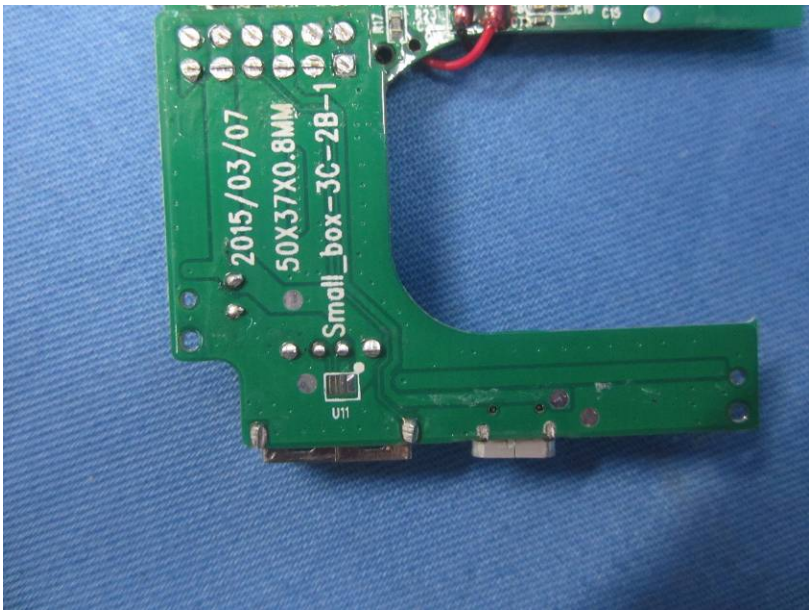
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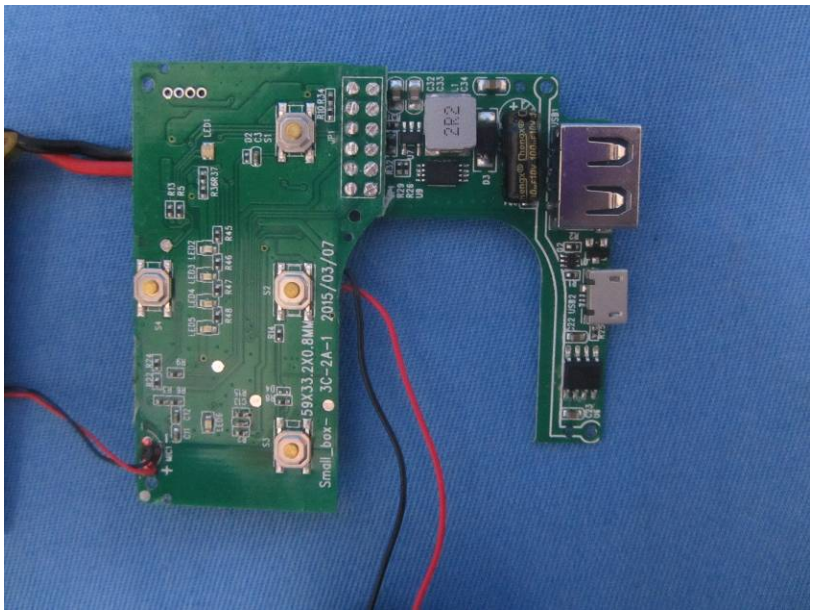
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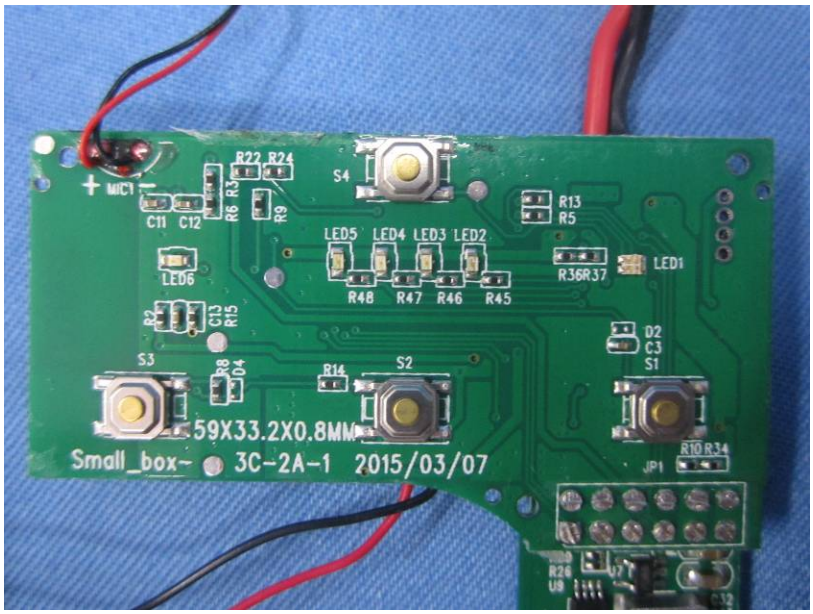
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C11 C12
R22 R24
R6 R3
R9
S4
R13
R5
LED5 LED4 LED3 LED2
R48 R47 R46 R45
R36R37
LED1
LED6
R2
C13
R15
D2
C3
S1
S3
R8
D4
R14
S2
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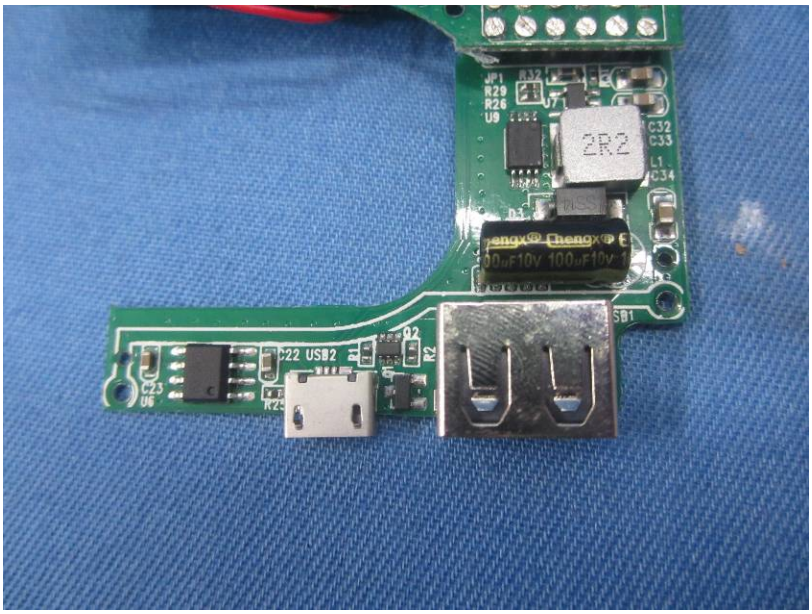
R10 R34
JP1



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