

FCC PART 15 CLASS B
EMI MEASUREMENT AND TEST REPORT
For

SHENZHEN CJC-HYUNDAI ELECTRICAL CO., LTD

3rd Floor, No. 11 Building, Software Park, Nanshan District, Shenzhen, China

FCC ID: 2AAAU-I300

May 02, 2013

This Report Concerns: Original Report	Equipment Type: Bluetooth Portable Speakers
Test Engineer:	Anna Lv <i>Anna Lv</i>
Report No.:	BST11041095ER-4
Receive EUT	April 19, 2013 / April 19, 2013 -
Date/Test Date:	May 02, 2013
Reviewed By:	Mike Moo <i>Mike Moo</i>
Prepared By:	Shenzhen BST Technology Co.,Ltd. 3F,Weames Technology Building, No. 10 Kefa Road, Science Park, Nanshan District,Shenzhen,Guangdong,China Tel: 0755-26747751-3 Fax: 0755-26747751-3 ext.826

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3 Test Summary

Test Item	Section in CFR 47	Result
Conducted Emission	Part15.107	PASS
Radiated Emissions	Part15.109	PASS

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

4 General Information

4.1 Client Information

Applicant:	SHENZHEN CJC-HYUNDAI ELECTRICAL CO., LTD
Address of Applicant:	3rd Floor, No. 11 Building, Software Park, Nanshan District, Shenzhen, China
Manufacturer:	Huizhou CJC-Hyundai Electronic Co., Ltd
Address of Manufacturer:	CJC Industrial Park, Pingtan Town, Huiyang District, Huizhou China

4.2 General Description of EUT

Product Name:	Bluetooth Portable Speakers
Model No.:	i300, i80, i70, i200
Trade name:	HYUNDAI
Test Model No.:	i300
Remark:	<i>i300, i80, i70 and i200 are identical in the same PCB layout, interior structure and electrical circuits. The only differences are the appearance color and model name for commercial purpose.</i>
Power supply:	DC 3.7V Li-ion Battery

4.3 Test mode

Test mode:	
PC mode	Keep the EUT in data exchange with PC mode.

4.4 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 fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, July 20, 2010.

• **Industry Canada (IC)**

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-1.

4.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

Tel: 0755-27798480

Fax: 0755-27798960

4.6 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
HP	Printer	CB495A	05257893	DoC
DELL	PC	OPTIPLEX745	GTS312	DoC
DELL	MONITOR	E178FPC	N/A	DoC
DELL	KEYBOARD	SK-8115	N/A	DoC
DELL	MOUSE	MOC5UO	N/A	DoC

4.7 Abnormalities from Standard Conditions

None.

4.8 Other Information Requested by the Customer

None.

5 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	Mar. 29 2013	Mar. 28 2015
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	ESU EMI Test Receiver	R&S	ESU26	GTS203	Jul. 07 2012	Jul. 06 2013
4	BiConiLog Antenna	SCHWARZBECK	VULB9163	GTS214	Mar. 09 2013	Mar. 08 2014
5	Double -ridged waveguide horn	SCHWARZBECK	9120D	GTS208	Mar. 09 2013	Mar. 08 2014
6	RF Amplifier	HP	8347A	GTS204	Jul. 07 2012	Jul. 06 2013
7	Preamplifier	HP	8349B	GTS206	Jul. 07 2012	Jul. 06 2013
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial cable	GTS	N/A	GTS210	Jul. 07 2012	Jul. 06 2013
10	Coaxial Cable	GTS	N/A	GTS211	Jul. 07 2012	Jul. 06 2013
11	Thermo meter	N/A	N/A	GTS256	Jul. 07 2012	Jul. 06 2013

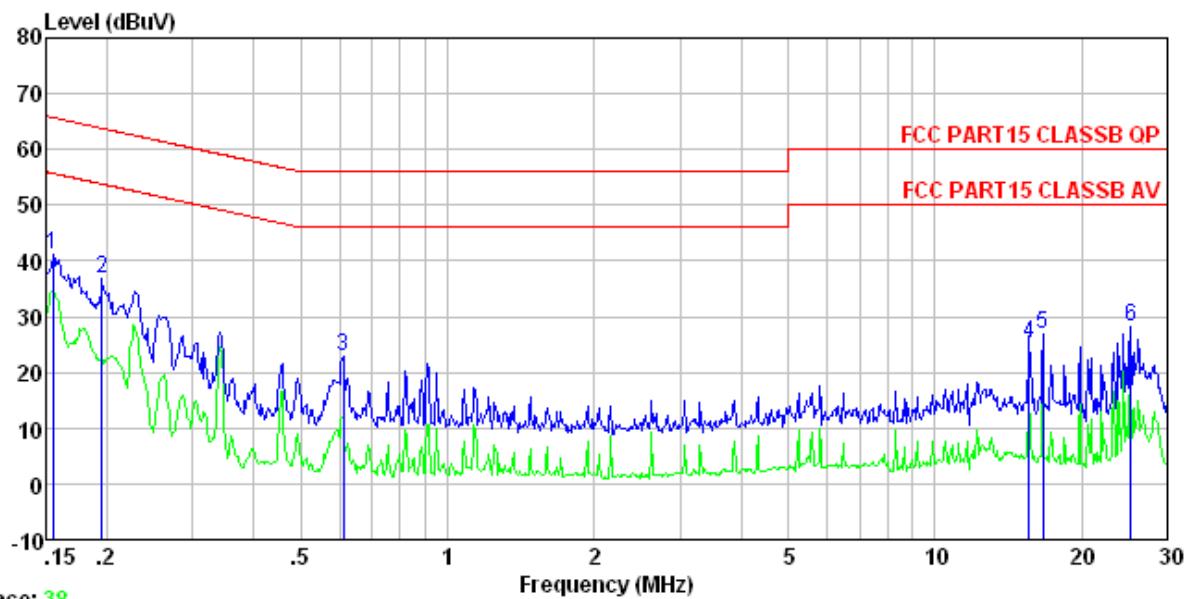
Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	Sep. 08 2011	Sep. 07 2013
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	Jul. 03 2012	Jul. 02 2013
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	Jul. 03 2012	Jul. 02 2013
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jul. 03 2012	Jul. 02 2013
5	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS226	Jul. 03 2012	Jul. 02 2013
6	Coaxial Cable	GTS	N/A	GTS227	Jul. 03 2012	Jul. 02 2013
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 (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	Barometer	ChangChun	DYM3	GTS257	July 10 2012	July 09 2013

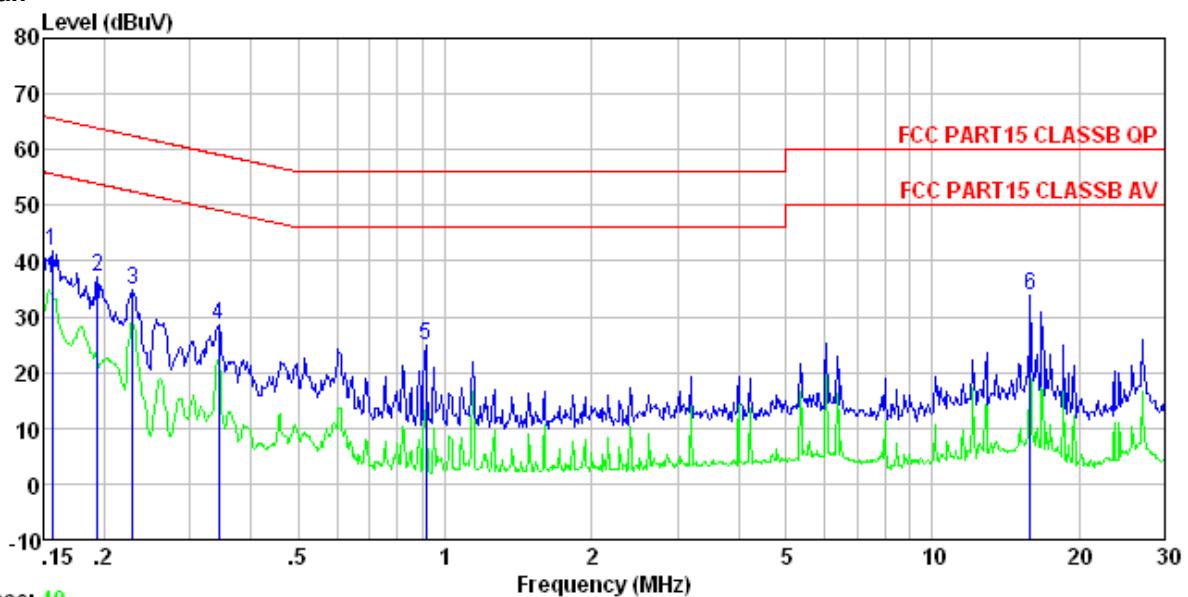
6 Test Results and Measurement Data

6.1 Conducted Emissions

Test Requirement:	FCC Part15 B Section 15.107																
Test Method:	ANSI C63.4:2003																
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>Remark 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 E.U.T 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 C63.4: 2003 on conducted measurement. 																
Test Instruments:	Refer to section 6 for details																
Test mode:	Refer to section 5.3 for details																
Test results:	Pass																

Measurement Data**Line:**

Freq	Read	LISN	Cable	Limit	Over	Remark	
	MHz	dBuV	Factor	Loss	Level	Line	Limit
1	0.155	41.33	-0.26	0.10	41.17	65.74	-24.57 QP
2	0.195	36.80	-0.23	0.10	36.67	63.80	-27.13 QP
3	0.611	22.84	-0.20	0.10	22.74	56.00	-33.26 QP
4	15.635	25.70	-0.53	0.20	25.37	60.00	-34.63 QP
5	16.661	27.25	-0.54	0.20	26.91	60.00	-33.09 QP
6	25.188	28.97	-0.84	0.21	28.34	60.00	-31.66 QP

Neutral:

Trace: 40

Condition : FCC PART15 CLASSB QP LISN-2012 NEUTRAL

Job No. : 487RF

Test mode : PC mode

Test Engineer: Jim

	Read Freq	LISN Level	Cable Loss	Limit Level	Line Level	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB
1	0.156	41.82	-0.13	0.10	41.79	65.65	-23.86 QP
2	0.193	37.20	-0.09	0.10	37.21	63.89	-26.68 QP
3	0.229	34.68	-0.09	0.10	34.69	62.48	-27.79 QP
4	0.343	28.58	-0.09	0.10	28.59	59.13	-30.54 QP
5	0.914	24.93	-0.09	0.10	24.94	56.00	-31.06 QP
6	15.885	34.18	-0.42	0.20	33.96	60.00	-26.04 QP

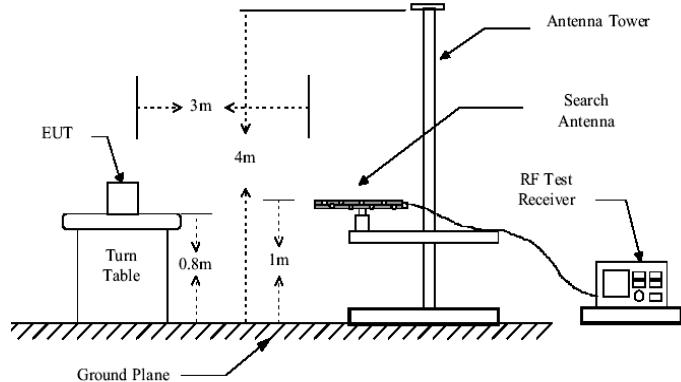
Remark: If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

Notes:

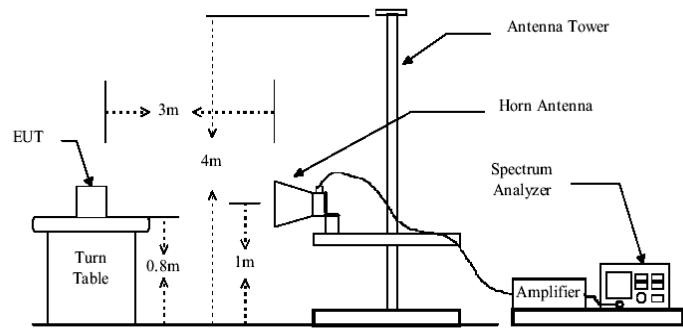
1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss

6.2 Radiated Emission

Test Requirement:	FCC Part15 B Section 15.109																								
Test Method:	ANSI C63.4:2003																								
Test Frequency Range:	30MHz to 6GHz																								
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																								
Receiver setup:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Detector</th> <th>RBW</th> <th>VBW</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>30MHz-1GHz</td> <td>Quasi-peak</td> <td>120kHz</td> <td>300kHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td>Above 1GHz</td> <td>Peak</td> <td>1MHz</td> <td>3MHz</td> <td>Peak</td> </tr> <tr> <td></td> <td>Peak</td> <td>1MHz</td> <td>10Hz</td> <td>Average</td> </tr> </tbody> </table>					Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak		Peak	1MHz	10Hz	Average
Frequency	Detector	RBW	VBW	Remark																					
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value																					
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Limit:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Limit (dBuV/m @3m)</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>30MHz-88MHz</td> <td>40.00</td> <td>Quasi-peak Value</td> </tr> <tr> <td>88MHz-216MHz</td> <td>43.50</td> <td>Quasi-peak Value</td> </tr> <tr> <td>216MHz-960MHz</td> <td>46.00</td> <td>Quasi-peak Value</td> </tr> <tr> <td>960MHz-1GHz</td> <td>54.00</td> <td>Quasi-peak Value</td> </tr> <tr> <td rowspan="2">Above 1GHz</td><td>500</td> <td>Average</td> </tr> <tr> <td>5000</td> <td>Peak</td> </tr> </tbody> </table>					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	500	Average	5000	Peak
Frequency	Limit (dBuV/m @3m)	Remark																							
30MHz-88MHz	40.00	Quasi-peak Value																							
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216MHz-960MHz	46.00	Quasi-peak Value																							
960MHz-1GHz	54.00	Quasi-peak Value																							
Above 1GHz	500	Average																							
	5000	Peak																							
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table 0.8 meters 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 setup:	Below 1GHz																								



Above 1GHz



Test environment:	Temp.: 25 5°C	Humid.: 55%	Press.: 1 012mbar
Measurement Record:	Uncertainty: $\pm 4.5\text{dB}$		
Test Instruments:	Refer to section 6 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

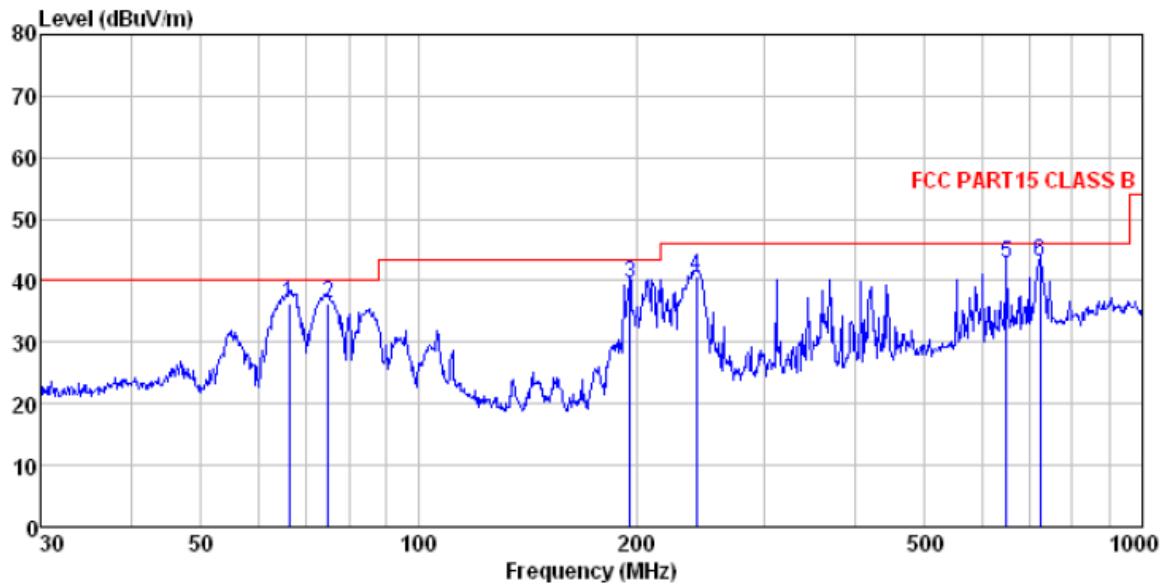
Note:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

Measurement Data**Below 1GHz**

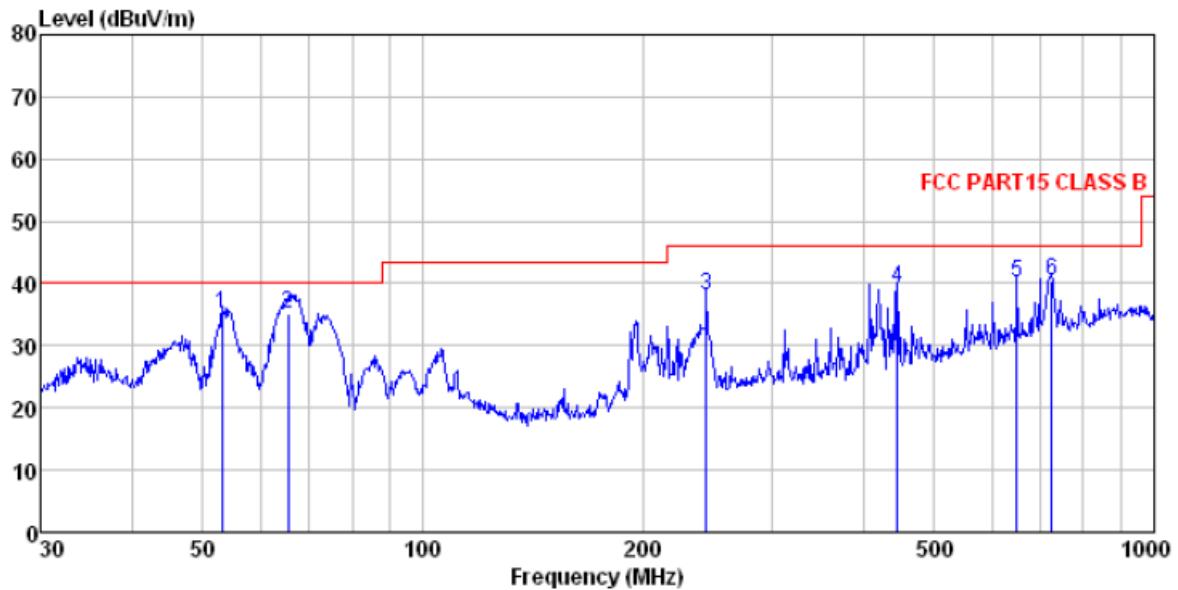
Horizontal:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163 -2012-05 HORIZONTAL
 Job No. : 487RF
 Test Mode : PC mode
 Test Engineer: Edward

	Read	Antenna	Cable	Preamp	Limit	Over		
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	66.266	53.44	13.92	0.91	31.90	36.37	40.00	-3.63 QP
2	74.919	54.88	12.13	0.98	31.82	36.17	40.00	-3.83 QP
3	195.822	56.36	13.57	1.82	32.13	39.62	43.50	-3.88 QP
4	241.676	55.86	15.09	2.08	32.16	40.87	46.00	-5.13 QP
5	649.660	48.81	21.15	3.91	31.12	42.75	46.00	-3.25 QP
6	721.726	47.95	22.10	4.17	31.22	43.00	46.00	-3.00 QP

Vertical:

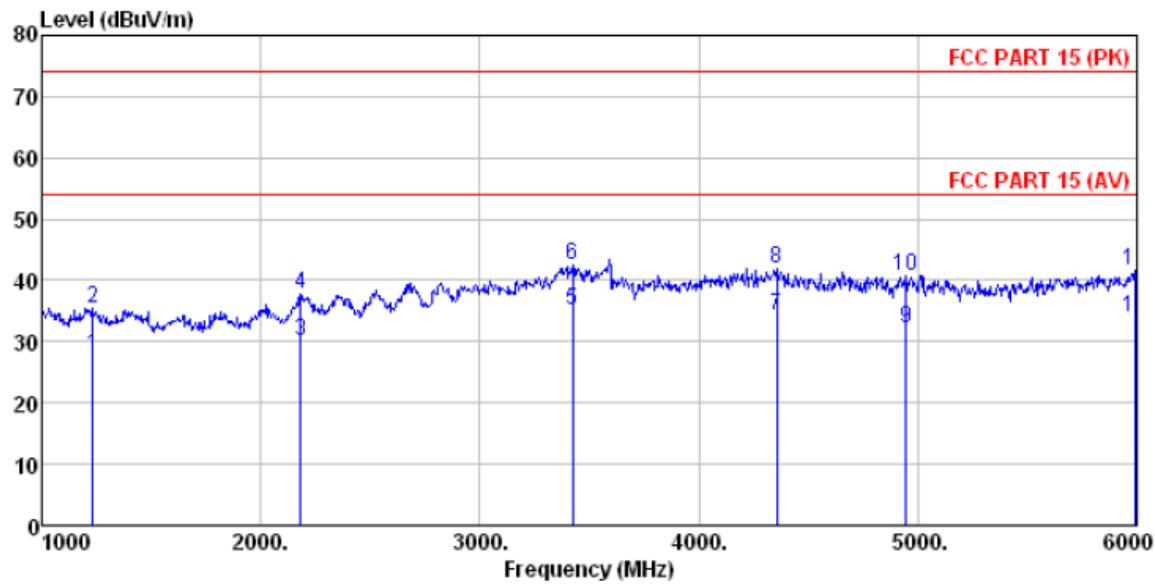


Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163 -2012-05 VERTICAL
 Job No. : 487RF
 Test Mode : PC mode
 Test Engineer: Edward

	Read	Antenna	Cable	Preamp	Limit	Over		
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	53.131	50.13	16.19	0.80	31.95	35.17	40.00	-4.83 QP
2	65.343	51.89	14.33	0.90	31.91	35.21	40.00	-4.79 QP
3	244.232	53.16	15.08	2.09	32.16	38.17	46.00	-7.83 QP
4	444.851	50.32	17.57	3.07	31.74	39.22	46.00	-6.78 QP
5	649.660	46.08	21.15	3.91	31.12	40.02	46.00	-5.98 QP
6	724.261	45.52	22.10	4.18	31.22	40.58	46.00	-5.42 QP

Above 1GHz

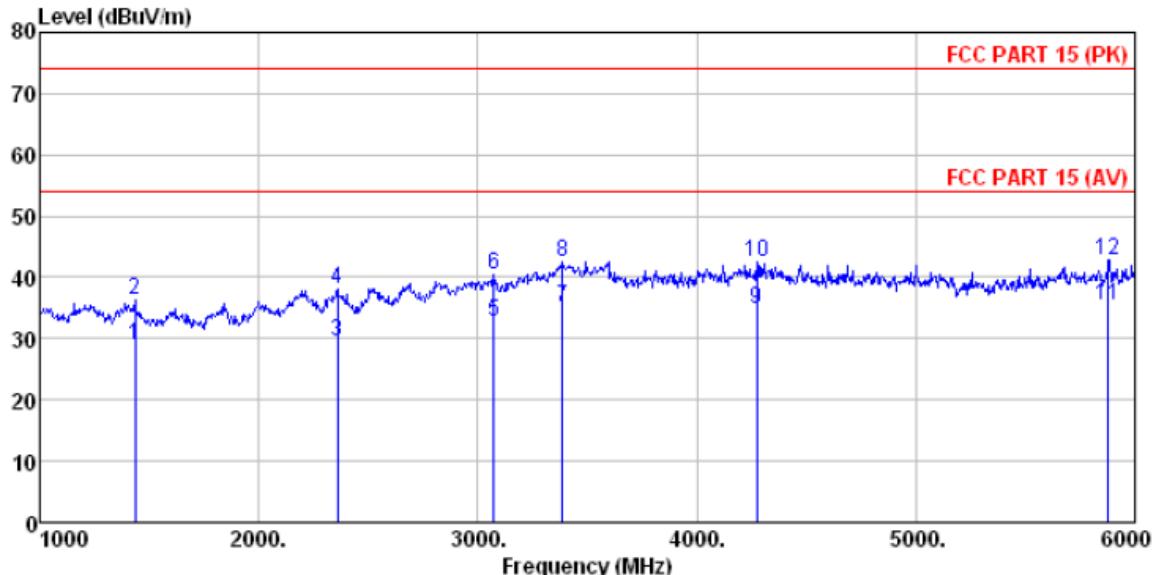
Horizontal:



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT (>1GHZ) HORIZONTAL
 Job No. : 487RF
 Test Mode : PC mode
 Test Engineer: Edward

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Remark
	Level	Factor	Loss	Factor	Level	Line	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1 1235.000	30.80	25.48	4.49	33.16	27.61	54.00	-26.39 Average
2 1235.000	38.54	25.48	4.49	33.16	35.35	74.00	-38.65 Peak
3 2180.000	31.43	27.80	5.17	34.27	30.13	54.00	-23.87 Average
4 2180.000	39.14	27.80	5.17	34.27	37.84	74.00	-36.16 Peak
5 3425.000	32.35	28.72	6.82	32.83	35.06	54.00	-18.94 Average
6 3425.000	39.93	28.72	6.82	32.83	42.64	74.00	-31.36 Peak
7 4355.000	26.87	30.93	8.21	31.86	34.15	54.00	-19.85 Average
8 4355.000	34.55	30.93	8.21	31.86	41.83	74.00	-32.17 Peak
9 4945.000	23.67	31.91	8.71	32.16	32.13	54.00	-21.87 Average
10 4945.000	32.40	31.91	8.71	32.16	40.86	74.00	-33.14 Peak
11 5995.000	22.94	32.88	10.20	32.13	33.89	54.00	-20.11 Average
12 5995.000	30.80	32.88	10.20	32.13	41.75	74.00	-32.25 Peak

Vertical:



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120D ANT(>1GHZ) VERTICAL
 Job No. : 487RF
 Test Mode : PC mode
 Test Engineer: Edward

Freq	Read	Antenna	Cable	Preamp	Limit		Over	Remark
	Level	Factor	Loss	Factor	Level	Line	Limit	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1 1435.000	32.40	25.40	4.64	33.50	28.94	54.00	-25.06	Average
2 1435.000	39.75	25.40	4.64	33.50	36.29	74.00	-37.71	Peak
3 2360.000	30.50	27.69	5.35	34.05	29.49	54.00	-24.51	Average
4 2360.000	38.95	27.69	5.35	34.05	37.94	74.00	-36.06	Peak
5 3075.000	31.20	28.67	6.10	33.24	32.73	54.00	-21.27	Average
6 3075.000	38.77	28.67	6.10	33.24	40.30	74.00	-33.70	Peak
7 3385.000	32.60	28.57	6.74	32.89	35.02	54.00	-18.98	Average
8 3385.000	40.22	28.57	6.74	32.89	42.64	74.00	-31.36	Peak
9 4275.000	27.92	30.58	8.14	31.86	34.78	54.00	-19.22	Average
10 4275.000	35.79	30.58	8.14	31.86	42.65	74.00	-31.35	Peak
11 5880.000	24.87	32.74	10.04	32.20	35.45	54.00	-18.55	Average
12 5880.000	32.26	32.74	10.04	32.20	42.84	74.00	-31.16	Peak

Due to the highest frequency in the EUT is 72MHz, the highest measurement frequency is 1GHz.

7 Test Setup Photo

Radiated Emission



Conducted Emission



8 EUT Constructional Details

Reference to the test report No. BST11041095ER-3

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