



STC Test Report



Date: 2014-08-07

Page 1 of 46

No.: DM116204

Applicant (DGZ025): WOOX Innovations Ltd.
5/F., Philips Electronics Building, 5 Science Park East
Avenue, Hong Kong Science Park, New Territories, Hong
Kong

Manufacturer: WOOX Innovations Ltd.
5/F., Philips Electronics Building, 5 Science Park East
Avenue, Hong Kong Science Park, New Territories, Hong
Kong

Description of Sample(s): Submitted sample(s) said to be
Product: Waterproof Wireless Portable Speaker
Brand Name: PHILIPS
Model Number: BT2200B/37
FCC ID: 2AANUBT2200

Date Sample(s) Received: 2014-07-15

Date Tested: 2014-07-16 to 2014-07-21

Investigation Requested: Perform ElectroMagnetic Interference measurement in
accordance with FCC 47CFR [Codes of Federal Regulations]
Part 15: 2012. FCC KDB Publication 558074 D01 DTS
Meas Guidance v02 and ANSI C63.4:2009 for FCC
Certification.

Conclusion(s): The submitted product COMPLIED with the requirements of
Federal Communications Commission [FCC] Rules and
Regulations Part 15. The tests were performed in accordance
with the standards described above and on Section 2.2 in this
Test Report.

Remark(s): Bluetooth 4.0 (GFSK)


LONG Yun Jian, Along
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
STC (Dongguan) Company Limited



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STC Test Report

Date: 2014-08-07

Page 2 of 46

No.: DM116204

CONTENT:

Cover	Page 1 of 45	
Content	Page 2 of 45	
<u>1.0</u>	<u>General Details</u>	
1.1	Test Laboratory	Page 3 of 45
1.2	Equipment Under Test [EUT] Description of EUT operation	Page 3 of 45
1.3	Date of Order	Page 3 of 45
1.4	Submitted Sample(s)	Page 3 of 45
1.5	Test Duration	Page 3 of 45
1.6	Country of Origin	Page 3 of 45
1.7	RF Module Details	Page 4 of 45
1.8	Antenna Details	Page 4 of 45
1.9	Channel List	Page 4 of 45
<u>2.0</u>	<u>Technical Details</u>	
2.1	Investigations Requested	Page 5 of 45
2.2	Test Standards and Results Summary	Page 5 of 45
<u>3.0</u>	<u>Test Results</u>	
3.1	Emission	Page 6-36 of 45
<u>Appendix A</u>		
	List of Measurement Equipment	Page 37 of 45
<u>Appendix B</u>		
	Ancillary Equipment	Page 38 of 45
Appendix C		
	Photographs of EUT	Page 39 - 45 of 45

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STC Test Report

Date: 2014-08-07

Page 3 of 46

No.: DM116204

1.0 General Details

1.1 Test Laboratory

STC (Dongguan) Company Limited
EMC Laboratory
68 Fumin Nan Road, Dalang, Dongguan, Guangdong, China

Telephone: (86 769) 81119888
Fax: (86 769) 81116222

1.2 Equipment Under Test [EUT] Description of Sample(s)

Product: Waterproof Wireless Portable Speaker
Manufacturer: WOOX Innovations Ltd.
Factory: 1) TCL Technoly Electronics (Huizhou) Co., Ltd.
Section 19, Zhongkai High-tech Development Zone, Huizhou
City, Guang Dong Province, China
2) TCL Technoly Electronics (Huizhou) Co., Ltd.
Section 37, Zhongkai High-tech Development Zone, Huizhou
City, Guang Dong Province, China
Brand Name: PHILIPS
Model Number: BT2200B/37
Additional Model Number: BT2200#/XX(The character “#” denoting can be A-Z consist,
denoting the cabinet colour only. “XX”=17, 37)
Rating: 5.0Vd.c. (Powered by PC USB port) / Li-ion rechargeable battery
x1 = 3.7Vd.c-

1.2.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Waterproof Wireless Portable Speaker of WOOX Innovations Ltd., it is Audio System, modulation by IC; and type is frequency hopping speed spectrum Modulation.

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STC Test Report

Date: 2014-08-07

Page 4 of 46

No.: DM116204

1.3 Date of Order

2014-07-15

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2014-07-16 to 2014-07-21

1.6 Country of Origin

China

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STC Test Report

Date: 2014-08-07

Page 5 of 46

No.: DM116204

1.7 RF Module Details

Module Model Number: JS-BTM8615
Module FCC ID:
Module Transmission Type: Bluetooth 4.0
Modulation: GFSK
Data Rates: 1Mbps
Frequency Range: 2400-2483.5MHz
Carrier Frequencies: 2402MHz – 2480MHz

Module Specification (specification provided by manufacturer)

1.8 Antenna Details

Antenna Type: Meander line antenna
Antenna Gain: 0dBi

1.9 Channel List

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

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STC Test Report

Date: 2014-08-07

Page 6 of 46

No.: DM116204

2.0 **Technical Details**

2.1 **Investigations Requested**

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2012 Regulations. FCC KDB Publication 558074 D01 DTS Meas Guidance v02 and ANSI C63.4:2009 for FCC Certification.

2.2 **Test Standards and Results Summary Tables**

EMISSION Results Summary						
Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Fail	N/A
Maximum Peak Output Power	FCC 47CFR 15.247(b)(3)	FCC KDB Publication 558074 D01 DTS Meas Guidance v02	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiated Spurious Emissions	FCC 47CFR 15.209	ANSI C63.4:2009	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AC Mains Conducted Emissions	FCC 47CFR 15.207	ANSI C63.4:2009	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Power Spectral Density	FCC 47CFR 15.247(e)	FCC KDB Publication 558074 D01 DTS Meas Guidance v02	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6dB Bandwidth	FCC 47CFR 15.247(a)(2)	FCC KDB Publication 558074 D01 DTS Meas Guidance v02	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Band Edge Emissions (Radiated)	FCC 47CFR 15.247(d)	FCC KDB Publication 558074 D01 DTS Meas Guidance v02	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Antenna requirement	FCC 47CFR 15.203	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RF Exposure	FCC 47CFR 15.247(i)	N/A	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: N/A - Not Applicable

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STC Test Report

Date: 2014-08-07

Page 7 of 46

No.: DM116204

3.0 Test Results

3.1 Emission

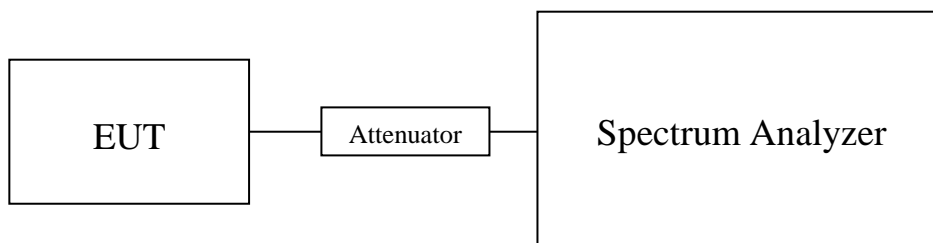
3.1.1 Maximum Peak Output Power

Test Requirement:	FCC 47CFR 15.247(b)(3)
Test Method:	FCC KDB Publication 558074 D01 DTS Meas Guidance v02
Test Date:	2014-07-21
Mode of Operation:	Bluetooth 4.0 Tx mode

Test Method:

The RF output of the EUT was connected to the spectrum analyzer. All the attenuation or cable loss will be added to the measured maximum output power. The results are recorded in mW.

Test Setup:



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STC Test Report

Date: 2014-08-07

Page 8 of 46

No.: DM116204

Limits for Peak Output Power of Fundamental & Harmonics Emissions [FCC 47CFR 15.247]:

For Digital Transmission systems in 2400-2483.5 MHz Band: 1 Watt (30dBm)

Results of BT4.0 Tx Mode, (2402MHz to 2480MHz) : Pass (TX Unit) (GFSK)		
Maximum conducted output power		
Channel	Frequency(MHz)	Output Power(Watt)
0	2402	0.00229
19	2442	0.00230
39	2480	0.00223

Calculated measurement uncertainty : 30MHz to 1GHz 1.7dB
1GHz to 26GHz 1.7dB

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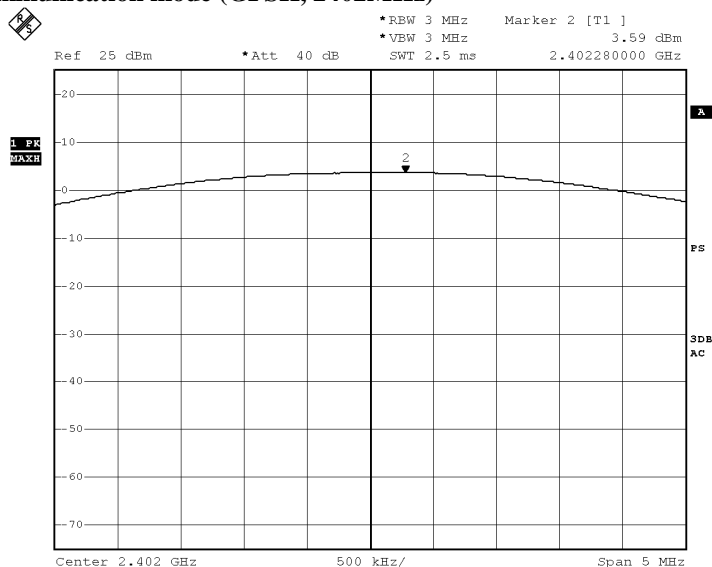
STC Test Report

Date: 2014-08-07

Page 9 of 46

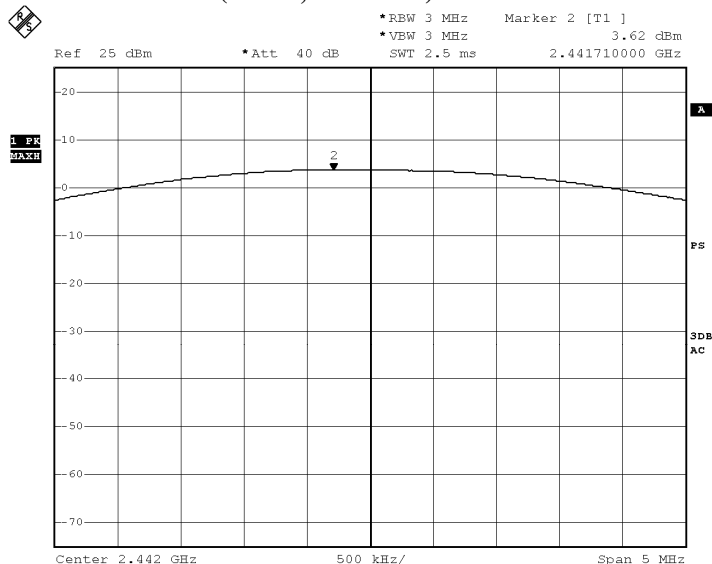
No.: DM116204

Test plot of Maximum Peak Conducted Output Power : Bluetooth Communication mode (GFSK, 2402MHz)



Date: 16.JUL.2014 19:34:15

Bluetooth Communication mode (GFSK, 2442MHz)



Date: 16.JUL.2014 19:31:41

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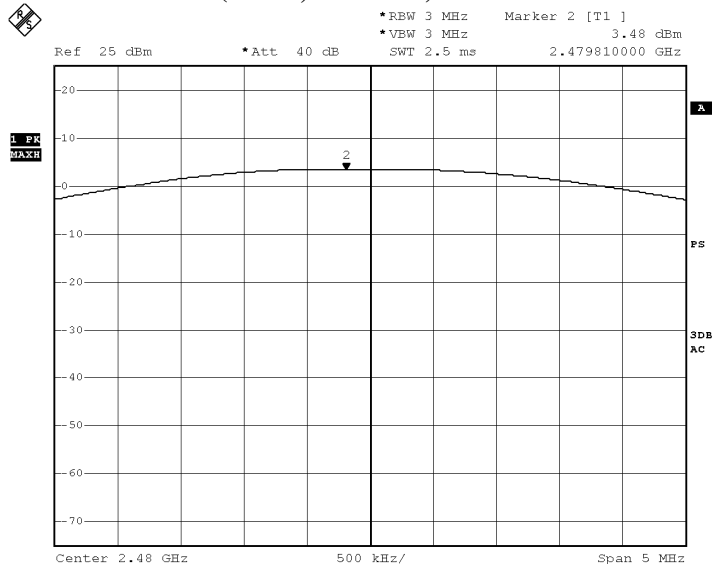
STC Test Report

Date: 2014-08-07

Page 10 of 46

No.: DM116204

Bluetooth Communication mode (GFSK, 2480MHz)



Date: 16.JUL.2014 19:32:48

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STC Test Report

Date: 2014-08-07

Page 11 of 46

No.: DM116204

3.1.2 Radiated Emissions

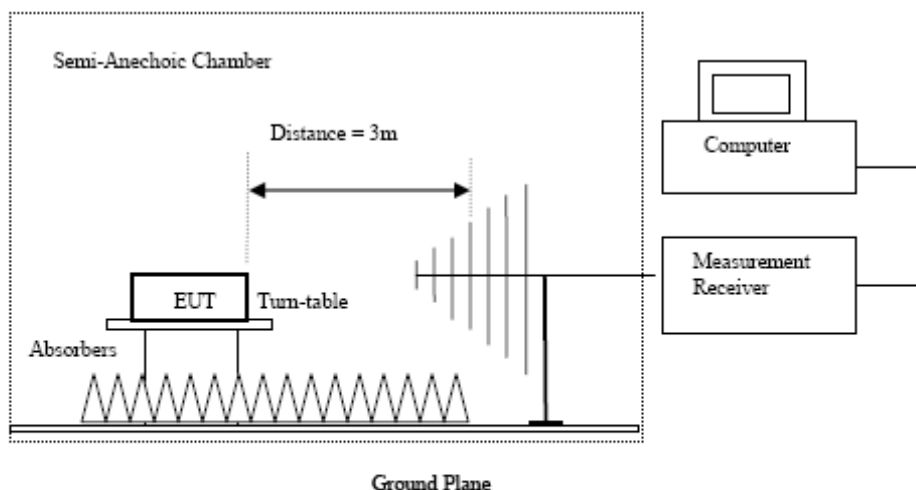
Test Requirement: FCC 47CFR 15.209
Test Method: ANSI C63.4:2009
Test Date: 2014-07-17
Mode of Operation: Bluetooth 4.0 Tx mode / Bluetooth +Charging mode

Test Method:

The sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

* Semi-anechoic chamber located on the G/F of "STC (Dongguan) Company Limited" with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 629686.

Test Setup:



- Absorbers placed on top of the ground plane are for measurements above 1000MHz only.
- Measurements between 30MHz to 1000MHz made with Bi-log antennas, above 1000MHz horn antennas are used, 9kHz to 30MHz loop antennas are used.

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STC Test Report

Date: 2014-08-07

Page 12 of 46

No.: DM116204

Limits for Radiated Emissions [FCC 47 CFR 15.247 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μ V/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Bluetooth Communication mode (GFSK) (9kHz – 30MHz): Pass

The Low Frequency, which started from 9KHz to 30MHz, was Pre-scan and the result which was more than 20dB lower than the Limit line.

Result of Tx mode (2402.0 MHz) (GFSK) (Above 1GHz): Pass

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	Margin dB μ V/m	E-Field Polarity
4804.0	15.8	41.5	57.3	74.0	16.7	Vertical
4804.0	9.1	42.4	51.5	74.0	22.5	Horizontal
7206.0	5.0	45.1	50.1	74.0	23.9	Vertical
7206.0	11.6	46.2	57.8	74.0	16.2	Horizontal
9608.0	9.2	48.0	57.2	74.0	16.8	Vertical
9608.0	7.1	48.8	55.9	74.0	18.1	Horizontal
12010.0	3.5	51.5	55.0	74.0	19.0	Vertical
12010.0	4.7	52.4	57.1	74.0	16.9	Horizontal

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STC Test Report

Date: 2014-08-07

Page 13 of 46

No.: DM116204

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	Margin dB μ V/m	E-Field Polarity
4804.0	1.0	41.5	42.5	54.0	11.5	Vertical
4804.0	-3.8	42.4	38.6	54.0	15.4	Horizontal
7206.0	-2.0	45.1	43.1	54.0	10.9	Vertical
7206.0	-5.5	46.2	40.7	54.0	13.3	Horizontal
9608.0	-8.8	48.0	39.2	54.0	14.8	Vertical
9608.0	-8.0	48.8	40.8	54.0	13.2	Horizontal
12010.0	-11.4	51.5	40.1	54.0	13.9	Vertical
12010.0	-10.5	52.4	41.9	54.0	12.1	Horizontal

Result of Tx mode (2442.0 MHz) (GFSK) (Above 1GHz): Pass

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	Margin dB μ V/m	E-Field Polarity
4884.0	13.6	41.6	55.2	74.0	18.8	Vertical
4884.0	11.6	42.5	54.1	74.0	19.9	Horizontal
7326.0	9.0	45.2	54.2	74.0	19.8	Vertical
7326.0	9.3	46.3	55.6	74.0	18.4	Horizontal
9768.0	7.4	48.1	55.5	74.0	18.5	Vertical
9768.0	6.1	48.9	55.0	74.0	19.0	Horizontal
12210.0	2.7	51.6	54.3	74.0	19.7	Vertical
12210.0	4.6	52.5	57.1	74.0	16.9	Horizontal

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	Margin dB μ V/m	E-Field Polarity
4884.0	-0.9	41.6	40.7	54.0	13.3	Vertical
4884.0	-3.3	42.5	39.2	54.0	14.8	Horizontal
7326.0	-6.1	45.2	39.1	54.0	14.9	Vertical
7326.0	-6.0	46.3	40.3	54.0	13.7	Horizontal
9768.0	-6.5	48.1	41.6	54.0	12.4	Vertical
9768.0	-5.9	48.9	43.0	54.0	11.0	Horizontal
12210.0	-10.4	51.6	41.2	54.0	12.8	Vertical
12210.0	-11.9	52.5	40.6	54.0	13.4	Horizontal

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STC Test Report

Date: 2014-08-07

Page 14 of 46

No.: DM116204

Result of Tx mode (2480.0 MHz) (GFSK) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Peak Value						
Frequency MHz	Measured Level @3m dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	Margin dB μ V/m	E-Field Polarity
4960.0	14.4	41.4	55.8	74.0	18.2	Vertical
4960.0	11.6	42.7	54.3	74.0	19.7	Horizontal
7440.0	9.6	45.6	55.2	74.0	18.8	Vertical
7440.0	9.3	46.5	55.8	74.0	18.2	Horizontal
9920.0	6.6	48.6	55.2	74.0	18.8	Vertical
9920.0	5.7	49.7	55.4	74.0	18.6	Horizontal
12400.0	3.6	51.7	55.3	74.0	18.7	Vertical
12400.0	2.7	52.7	55.4	74.0	18.6	Horizontal

Field Strength of Spurious Emissions						
Average Value						
Frequency MHz	Measured Level @3m dB μ V	Correction Factor dB/m	Field Strength dB μ V/m	Limit @3m dB μ V/m	Margin dB μ V/m	E-Field Polarity
4960.0	-1.8	41.4	39.6	54.0	14.4	Vertical
4960.0	-2.3	42.7	40.4	54.0	13.6	Horizontal
7440.0	-5.6	45.6	40.0	54.0	14.0	Vertical
7440.0	-5.0	46.5	41.5	54.0	12.5	Horizontal
9920.0	-10.0	48.6	38.6	54.0	15.4	Vertical
9920.0	-2.7	49.7	47.0	54.0	7.0	Horizontal
12400.0	-11.4	51.7	40.3	54.0	13.7	Vertical
12400.0	-12.2	52.7	40.5	54.0	13.5	Horizontal

Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz

* Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty (9kHz-30MHz): 3.3dB

(30MHz -1GHz): 4.6dB

(1GHz -26GHz): 4.4dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

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STC Test Report

Date: 2014-08-07

Page 15 of 46

No.: DM116204

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

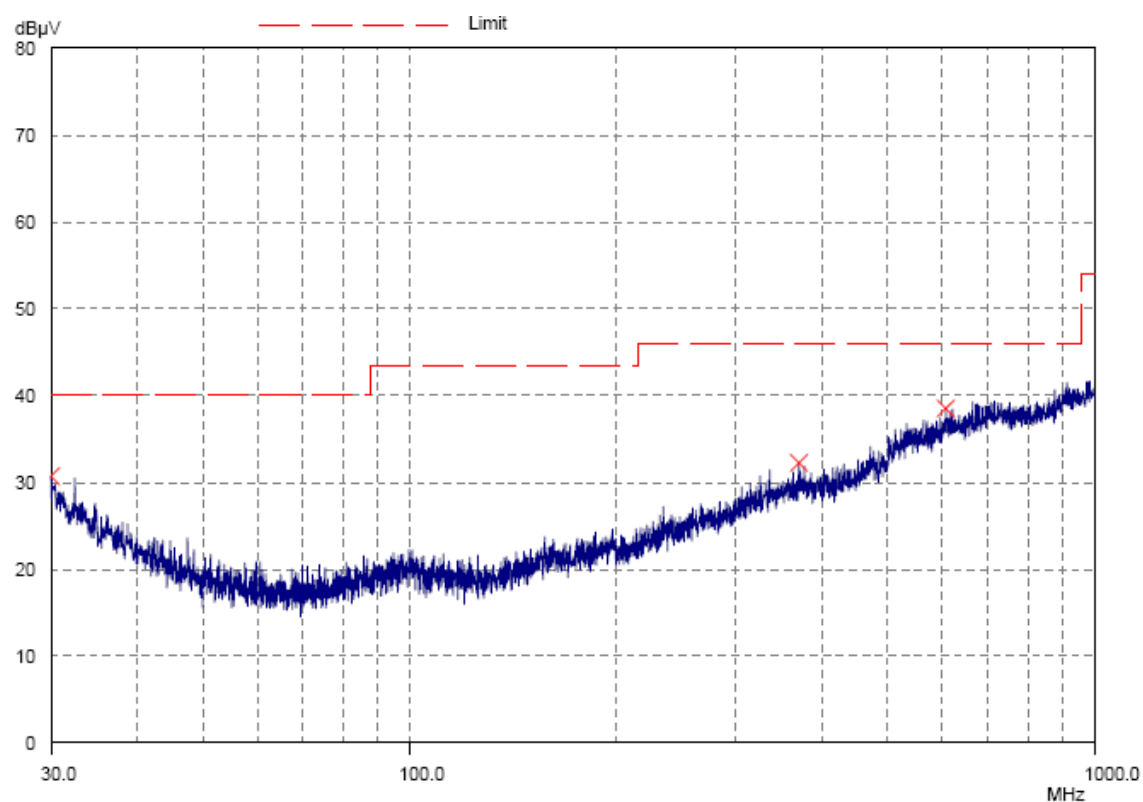
Frequency Range [MHz]	Quasi-Peak Limits [$\mu\text{V/m}$]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Bluetooth Communication mode (EUT paired with iPod) (30MHz – 1GHz): Pass

Please refer to the following table for result details

Horizontal



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STC Test Report

Date: 2014-08-07

Page 16 of 46

No.: DM116204

Result of Bluetooth Communication mode (EUT paired with iPod) (30MHz – 1GHz): Pass

Radiated Emissions					
Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
30.0	Horizontal	30.7	40.0	34.3	100
370.8	Horizontal	32.3	46.0	41.2	150
606.9	Horizontal	38.5	46.0	84.1	150

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STC Test Report

Date: 2014-08-07

Page 17 of 46

No.: DM116204

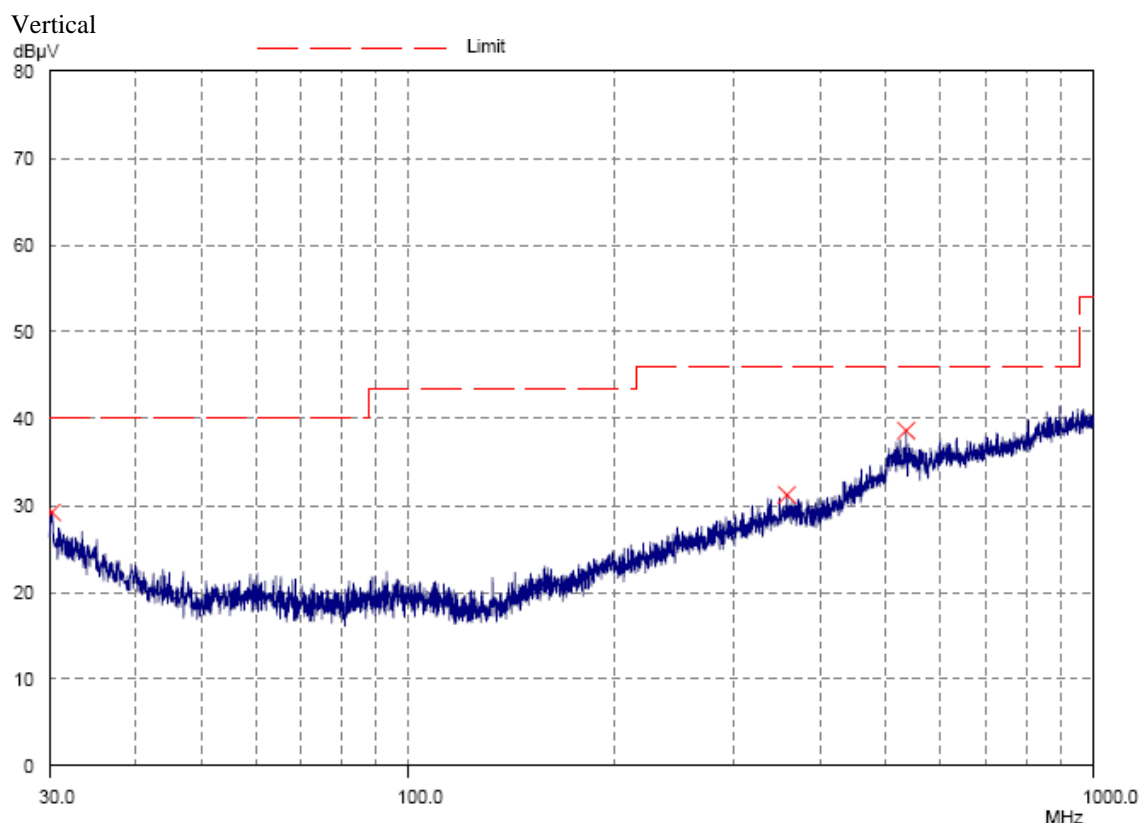
Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [$\mu\text{V}/\text{m}$]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Bluetooth Communication mode (EUT paired with iPod) (30MHz – 1GHz): Pass

Please refer to the following table for result details



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STC Test Report

Date: 2014-08-07

Page 18 of 46

No.: DM116204

Result of Bluetooth Communication mode (EUT paired with iPod) (30MHz – 1GHz): Pass

Radiated Emissions					
Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
30.3	Vertical	29.2	40.0	28.8	100
357.9	Vertical	31.2	46.0	36.3	100
534.4	Vertical	38.6	46.0	85.1	150

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STC Test Report

Date: 2014-08-07

Page 19 of 46

No.: DM116204

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

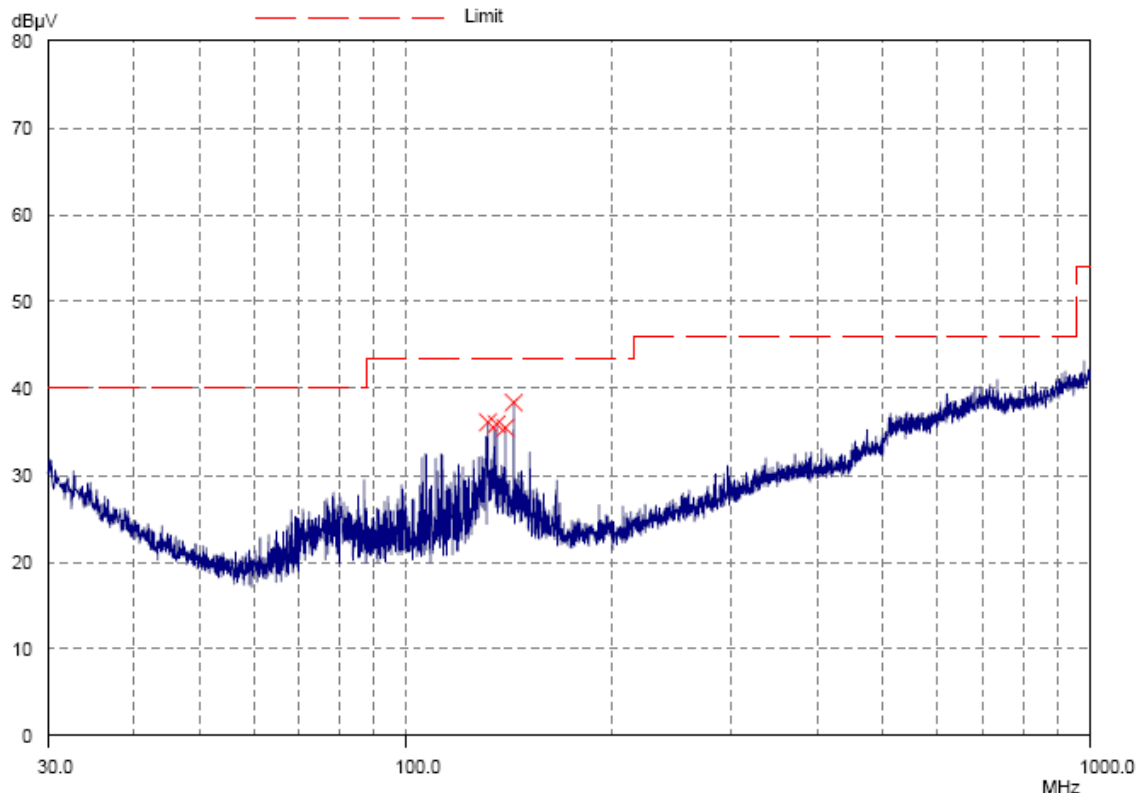
Frequency Range [MHz]	Quasi-Peak Limits [$\mu\text{V/m}$]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Bluetooth Communication + Charging mode (EUT paired with iPod, USB port connected to PC) (30MHz – 1GHz): Pass

Please refer to the following table for result details

Horizontal



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STC Test Report

Date: 2014-08-07

Page 20 of 46

No.: DM116204

Result of Bluetooth Communication + Charging mode (EUT paired with iPod, USB port connected to PC) (30MHz – 1GHz): Pass

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
132.0	Horizontal	36.1	43.5	63.8	150
136.0	Horizontal	35.9	43.5	62.4	150
140.0	Horizontal	35.5	43.5	59.6	200
144.0	Horizontal	39.0	43.5	89.1	150

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STC Test Report

Date: 2014-08-07

Page 21 of 46

No.: DM116204

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

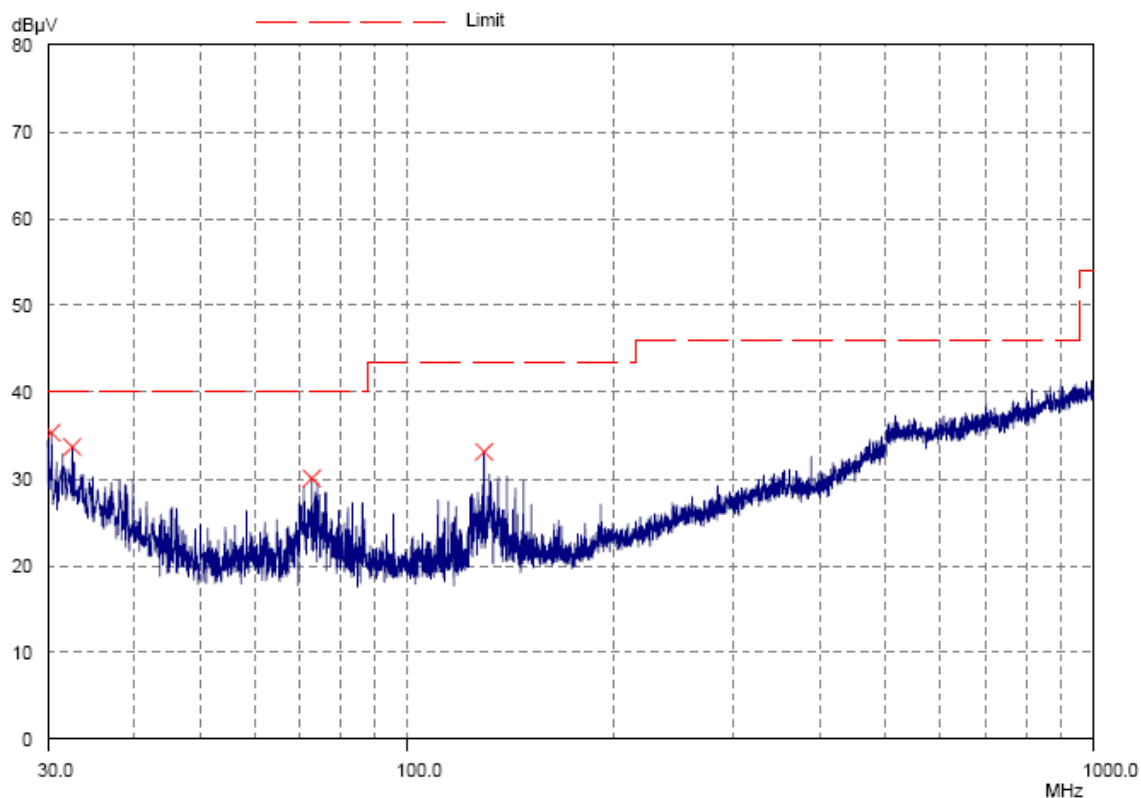
Frequency Range [MHz]	Quasi-Peak Limits [$\mu\text{V/m}$]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Bluetooth Communication + Charging mode (EUT paired with iPod, USB port connected to PC) (30MHz – 1GHz): Pass

Please refer to the following table for result details

Vertical



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STC Test Report

Date: 2014-08-07

Page 22 of 46

No.: DM116204

Result of Bluetooth Communication + Charging mode (EUT paired with iPod, USB port connected to PC) (30MHz – 1GHz): Pass

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dB μ V/m	Limit @3m dB μ V/m	Level @3m μ V/m	Limit @3m μ V/m
30.4	Vertical	35.3	40.0	58.2	100
32.6	Vertical	33.7	43.4	48.4	150
72.8	Vertical	30.1	43.5	32.0	150
129.8	Vertical	33.1	46.0	45.2	200

Remarks:

Calculated measurement uncertainty (30MHz – 1GHz): 4.6dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

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STC Test Report

Date: 2014-08-07

Page 23 of 46

No.: DM116204

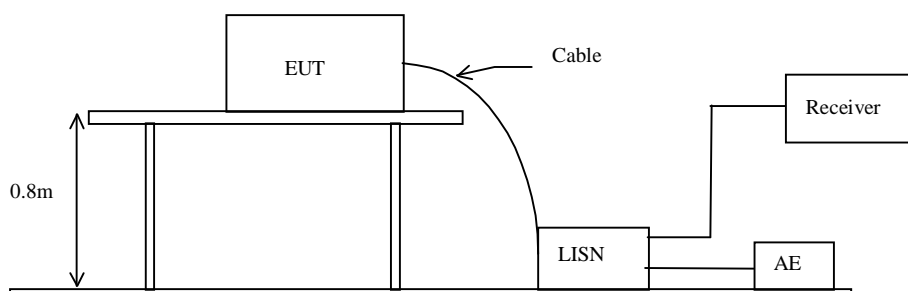
3.1.3 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2009
Test Date:	2014-07-17
Mode of Operation:	Bluetooth Communication + Charging mode (GFSK)
Test Voltage:	120V a.c. 60Hz

Test Method:

The test was performed in accordance with ANSI C63.4: 2009, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:



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Date: 2014-08-07

Page 24 of 46

No.: DM116204

Limit for Conducted Emissions (FCC 47 CFR 15.207):

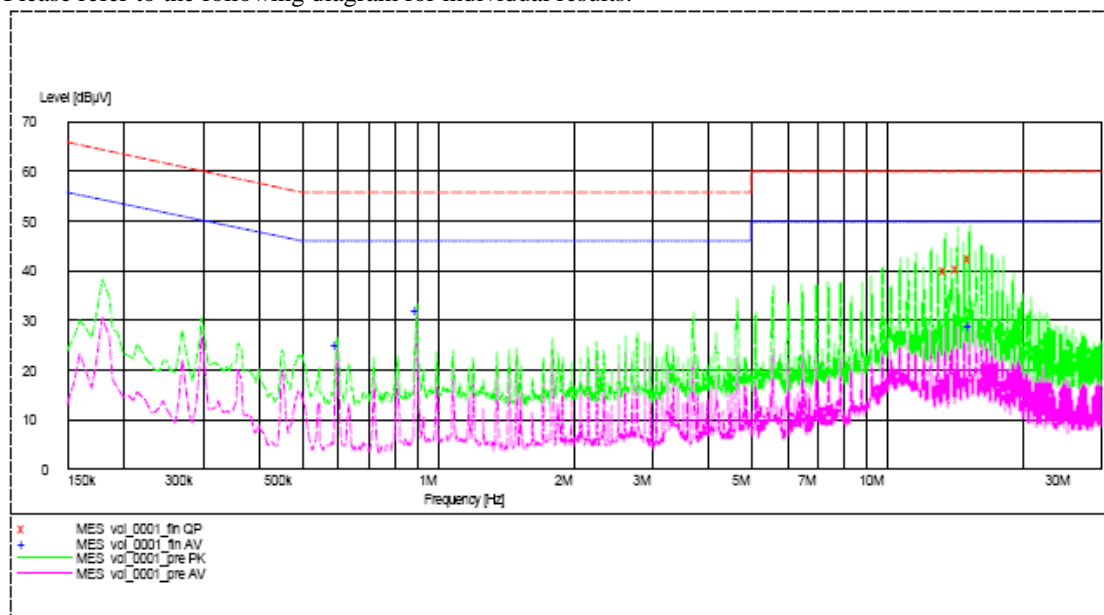
Frequency Range [MHz]	Quasi-Peak Limits [dB μ V]	Average [dB μ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Result of Bluetooth Communication + Charging mode (EUT paired with iPod, USB port connected to PC) (L): PASS

Please refer to the following diagram for individual results.



Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dB μ V	Limit dB μ V	Level dB μ V	Limit dB μ V
Live	0.600	-*-	-*-	25.2	46.0
Live	0.900	-*-	-*-	32.0	46.0
Live	15.390	-*-	-*-	28.8	50.0
Live	13.505	40.0	60.0	-*-	-*-
Live	14.435	40.6	60.0	-*-	-*-
Live	15.390	42.4	60.0	-*-	-*-

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Date: 2014-08-07

Page 25 of 46

No.: DM116204

Limit for Conducted Emissions (FCC 47 CFR 15.207):

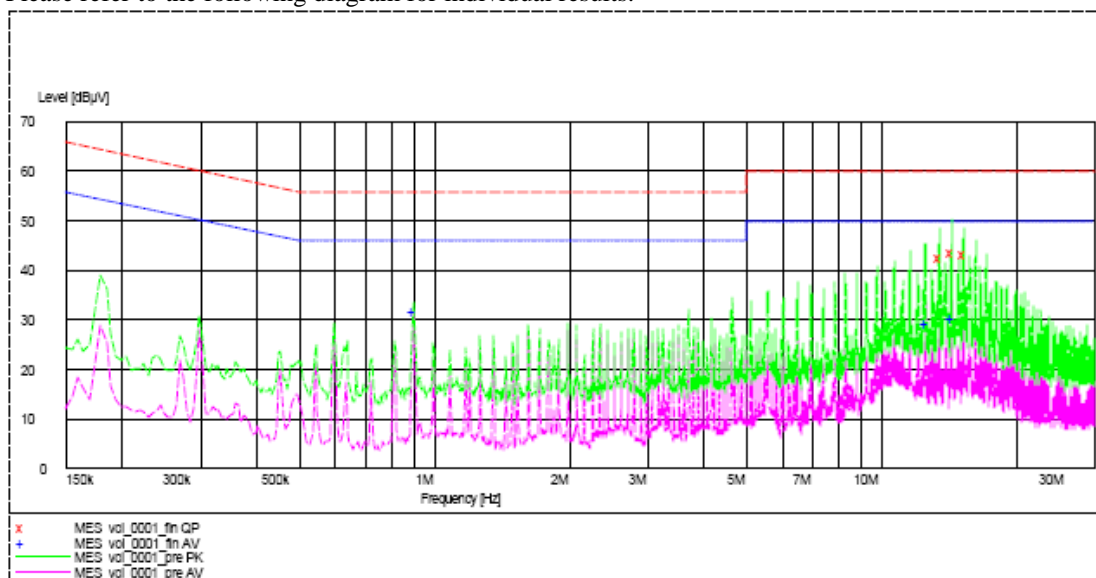
Frequency Range [MHz]	Quasi-Peak Limits [dBμV]	Average [dBμV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Result of Bluetooth Communication + Charging mode (EUT paired with iPod, USB port connected to PC) (N): PASS

Please refer to the following diagram for individual results.



Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dBμV	Limit dBμV	Level dBμV	Limit dBμV
Neutral	0.900	-*-	-*-	31.7	46.0
Neutral	12.590	-*-	-*-	29.2	50.0
Neutral	14.460	-*-	-*-	30.2	50.0
Neutral	13.505	42.5	60.0	-*-	-*-
Neutral	14.440	43.7	60.0	-*-	-*-
Neutral	15.360	43.3	60.0	-*-	-*-

Remarks:

Calculated measurement uncertainty (0.15MHz – 30MHz): 3.2dB

-*- Emission(s) that is far below the corresponding limit line.

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STC Test Report

Date: 2014-08-07

Page 26 of 46

No.: DM116204

3.1.3 Power Spectral Density

Test Requirement: FCC 47CFR 15.247(e)
Test Method: FCC KDB Publication 558074 D01 DTS Meas Guidance v02
Test Date: 2014-07-16
Mode of Operation: Bluetooth 4.0 Tx mode

Test Method:

The RF output of the EUT was connected to the spectrum analyzer. Set the fundamental frequency as the center frequency of the spectral analyzer. Use RBW=3kHz , VBW= 10KHz , Set the span to 1.5 times the DTS channel bandwidth. Detector = peak, Sweep time = auto couple , Trace mode = max hold. Measure the Power Spectral Density (PSD) and record the results in dBm.

Test Setup:

As Test Setup of clause 3.1.1 in this test report.

Test Limit:

The maximum power spectral density (PSD) shall not exceeded 8dBm in any 3kHz band.

Results of BT 4.0 Mode (Tx:2402MHz to 2480MHz) : Pass (TX Unit)

Maximum power spectral density

Transmitter Frequency (MHz)	Maximum Power spectral density level / 3kHz band (dBm)	Maximum Power spectral density / 3kHz band limit
2402.0	-12.00	8dBm
2442.0	-11.02	8dBm
2480.0	-12.59	8dBm

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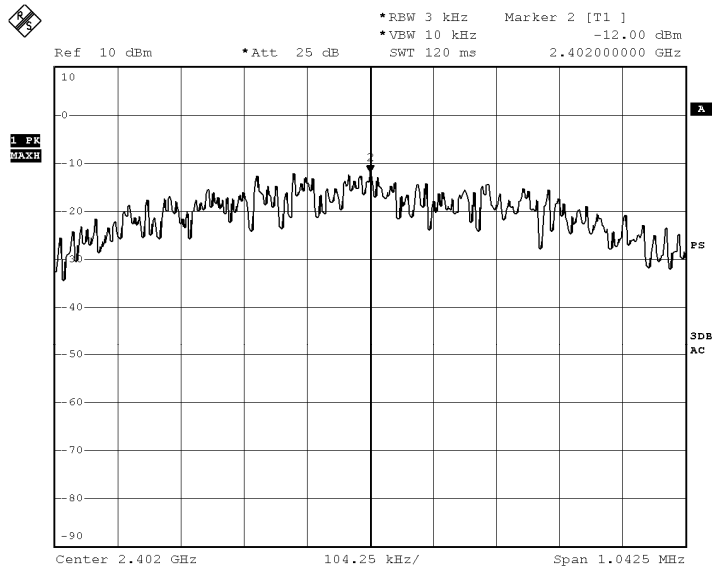
Date: 2014-08-07

Page 27 of 46

No.: DM116204

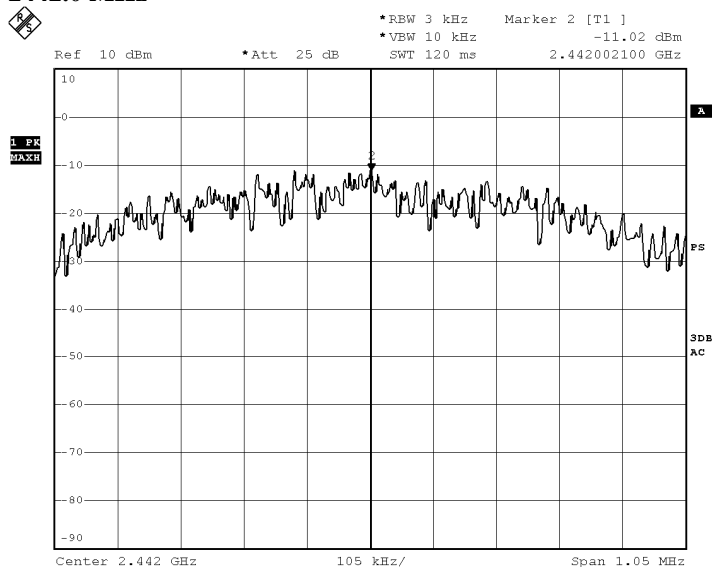
Bluetooth 4.0 mode (Tx: 2402MHz to 2480MHz)

2402.0 MHz



Date: 16.JUL.2014 19:36:17

2442.0 MHz



Date: 16.JUL.2014 19:37:52

2480.0 MHz

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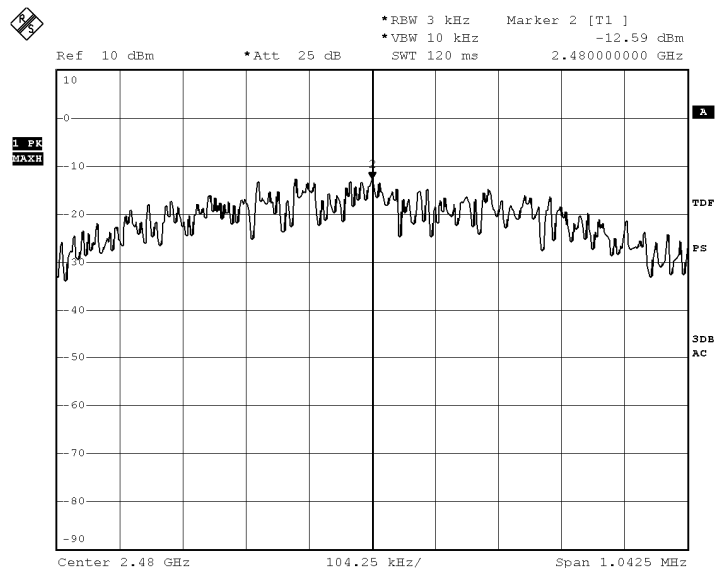


STC Test Report

Date: 2014-08-07

Page 28 of 46

No.: DM116204



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STC Test Report

Date: 2014-08-07

Page 29 of 46

No.: DM116204

3.1.4 6dB Bandwidth Measurement

Test Requirement:	FCC 47CFR 15.247(a)(2)
Test Method:	FCC KDB Publication 558074 D01 DTS Meas Guidance v02
Test Date:	2014-07-16
Mode of Operation:	Bluetooth 4.0 Tx mode

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Test Setup:

As Test Setup of clause 3.1.1 in this test report.

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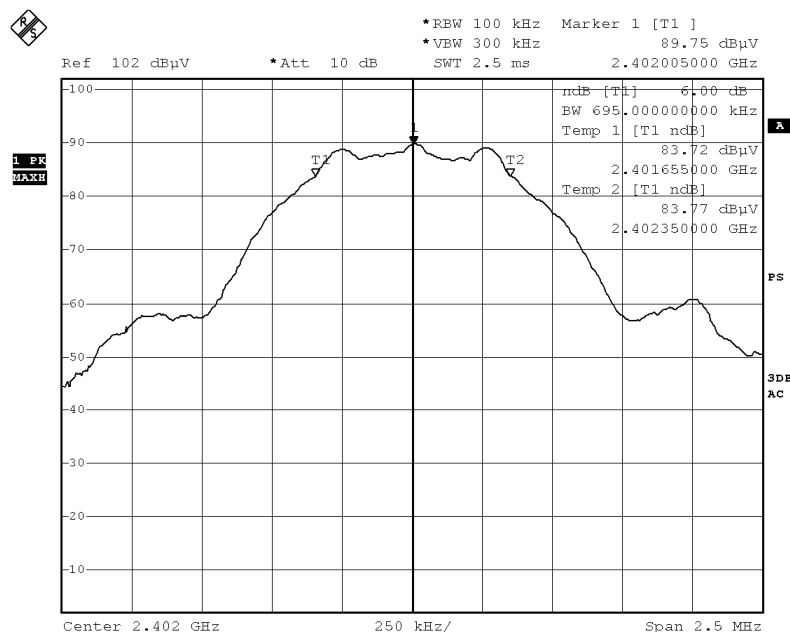
Page 30 of 46

No.: DM116204

Limits for 6dB Bandwidth Measurement:

Center Frequency [MHz]	6dB Bandwidth [kHz]	FCC Limits [kHz]
2402.0	695.0	> 500

6 dB Bandwidth Plot on Configuration BT 4.0 (GFSK: 2402MHz)



Date: 16.JUL.2014 18:04:17

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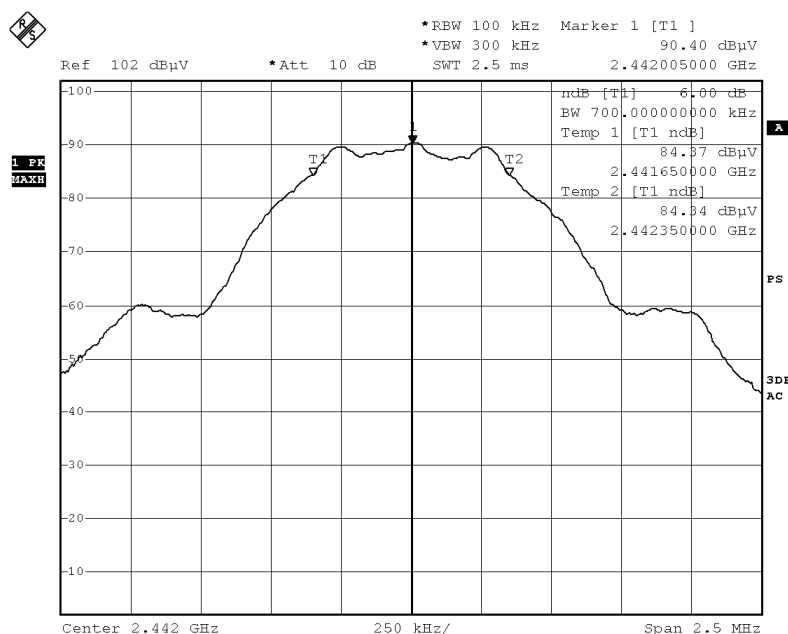
Page 31 of 46

No.: DM116204

Limits for 6dB Bandwidth Measurement:

Center Frequency [MHz]	6dB Bandwidth [kHz]	FCC Limits [kHz]
2442.0	700.0	> 500

6 dB Bandwidth Plot on Configuration BT 4.0 (GFSK: 2442MHz)



Date: 16.JUL.2014 18:06:10

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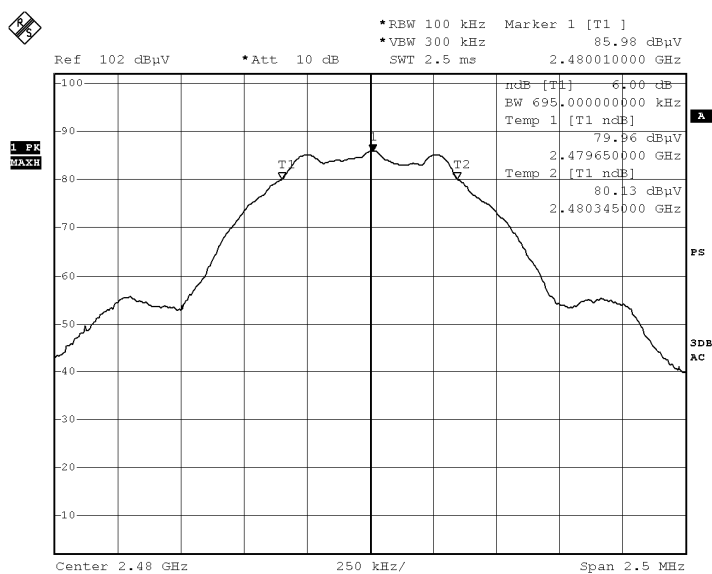
Page 32 of 46

No.: DM116204

Limits for 6dB Bandwidth Measurement:

Center Frequency [MHz]	6dB Bandwidth [kHz]	FCC Limits [kHz]
2480.0	695.0	> 500

6 dB Bandwidth Plot on Configuration BT 4.0 (GFSK: 2480MHz)



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STC Test Report

Date: 2014-08-07

Page 33 of 46

No.: DM116204

3.1.5 Band Edges Measurement (Radiated)

Test Requirement:	FCC 47CFR 15.247
Test Method:	FCC KDB Publication 558074 D01 DTS Meas Guidance v02
Test Date:	2014-07-16
Mode of Operation:	Bluetooth 4.0 Tx mode

Test Method:

The band edge is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. The RBW and VBW are set to 100kHz for this measurement.

Test Setup:

As Test Setup of clause 3.1.2 in this test report.

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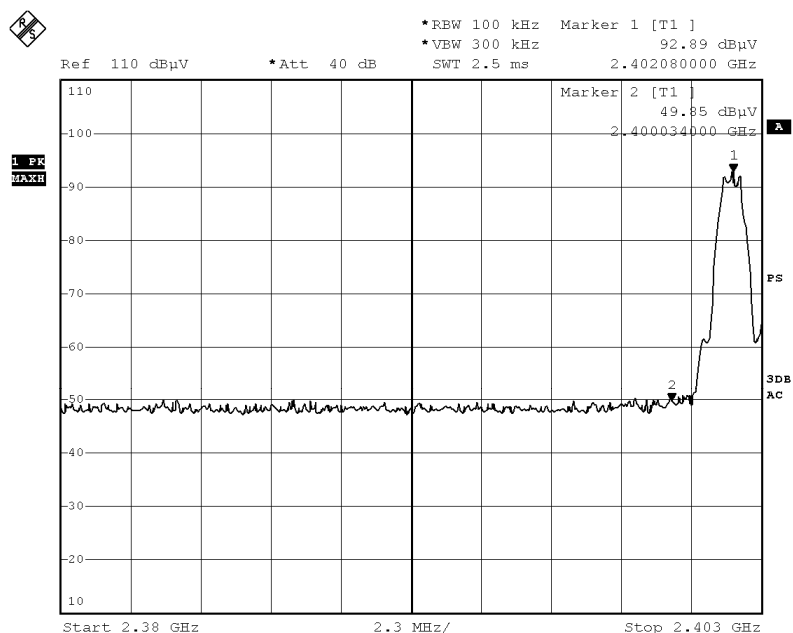
STC Test Report

Date: 2014-08-07

Page 34 of 46

No.: DM116204

Band-edge Compliance of RF Emissions – Lowest (GFSK: BT4.0 mode 2402MHz)



Date: 16.JUL.2014 18:14:49

Field Strength of Band-edge Compliance						
Peak Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dBμV	dB/m	dBμV/m	dBμV/m	dBμV/m	
2400.0	20.8	35.4	56.2	74.0	17.8	Vertical
Field Strength of Band-edge Compliance						
Average Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dBμV	dB/m	dBμV/m	dBμV/m	dBμV/m	
2400.0	3.7	35.4	39.1	54.0	14.9	Vertical

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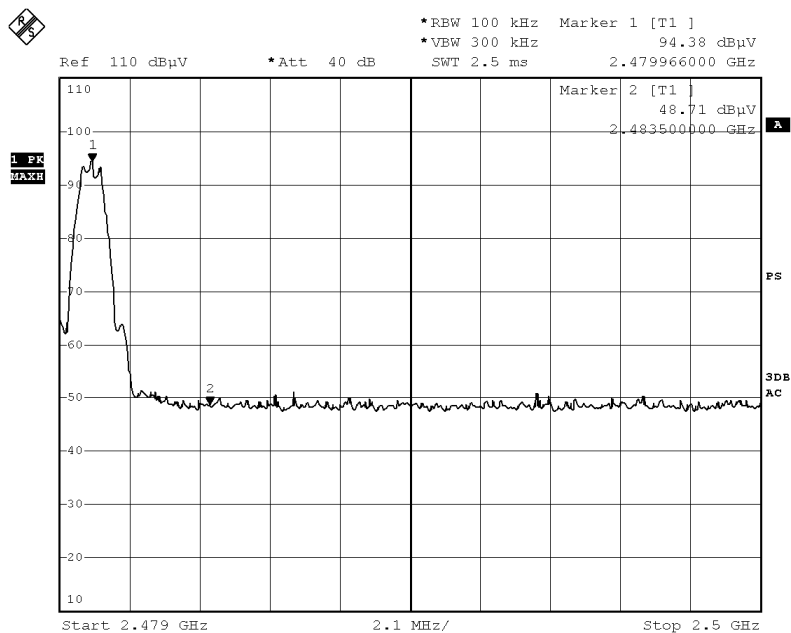
STC Test Report

Date: 2014-08-07

Page 35 of 46

No.: DM116204

Band-edge Compliance of RF Emissions – Highest (GFSK: BT4.0 mode 2480MHz)



Date: 16.JUL.2014 18:17:17

Field Strength of Band-edge Compliance						
Peak Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dBμV	dB/m	dBμV/m	dBμV/m	dBμV/m	
2483.5	18.8	35.4	54.2	74.0	19.8	Horizontal
Field Strength of Band-edge Compliance						
Average Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dBμV	dB/m	dBμV/m	dBμV/m	dBμV/m	
2483.5	4.2	35.4	39.6	54.0	14.4	Horizontal

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Date: 2014-08-07

Page 36 of 46

No.: DM116204

3.1.6 Antenna Requirement

Test Requirements: § 15.203

Test Specification:

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 shall be considered sufficient to comply with the provisions of this section. 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.

Test Results:

This is Meander line antenna. There is no external antenna, the antenna gain = 0dBi.
All component install on inside of EUT. User unable to remove or changed the Antenna.

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Date: 2014-08-07

Page 37 of 46

No.: DM116204

3.1.7 RF Exposure

Test Requirement:	FCC 47CFR 15.247(i)
Test Date:	2014-07-21
Mode of Operation:	BT mode
Dimension of EUT:	107.5mm x 58.7mm x 68.5mm

Requirements:

In 15.247(i), an equipment shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the limits in §§ 1.1310 and 2.1093 of this chapter. Applications to the Commission for construction permits, licenses to transmit or renewals thereof, equipment authorizations or modifications in existing facilities must contain a statement confirming compliance with the limits unless the facility, operation, or transmitter is categorically excluded, as discussed below. Technical information showing the basis for this statement must be submitted to the Commission upon request.

According to KDB447498 D01 General RF Exposure Guidance v05, unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition.

Test Results:

RF Exposure Evaluation

The Maximum conducted output power = 2.30 mW (at frequency = 2.442 GHz)

It's Conducted source-based time-averaging output power = 2.29mW (at frequency = 2.442GHz)

Since the SAR test exclusion thresholds for 2450MHz at test separation distances ≤ 10 mm = 19mW and the Conducted source-based time-averaging output power is less than 10mW.

Therefore. the SAR evaluation can be exempted.

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STC Test Report

Date: 2014-08-07

Page 38 of 46

No.: DM116204

Appendix A

List of Measurement Equipment

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EMD004	LISN	ROHDE & SCHWARZ	ESH3-Z5	100102	2014.03.21	2015.03.21
EMD022	EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100314	2014.03.21	2015.03.21
EMD035	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100441	2014.06.10	2015.06.10
EMD036	EMI Test Receiver	ROHDE & SCHWARZ	ESIB 26	100388	2014.06.10	2015.06.10
EMD041	TWO-LINE V-NETWORK	ROHDE & SCHWARZ	ENV216	100261	2014.03.21	2015.03.21
EMD061	Biconilog Antenna	ETS.LINDGREN	3142C	00060439	2012.11.28	2014.11.28
EMD062	Double-Ridged Waveguide (1GHz – 18GHz)	ETS.LINDGREN	3117	00075933	2013.01.19	2015.01.19
EMD084	MULTI-DVICE CONTROLLER	ETS.LINDGREN	2090	00060107	N/A	N/A
EMD088	Video Contol Unit	ETS.LINDGREN	Y21953A	2601073	N/A	N/A
EMD093	Monitor	ViewSonic	VA9036	Q8X064201876	N/A	N/A
EMD102	Intelligent Frequency	Ainuo Instrument Co., Ltd	AN97005SS	79707454	N/A	N/A
EMD103	Intelligent Frequency	Ainuo Instrument Co., Ltd	AN97005SS	79707455	N/A	N/A
EMD105	FACT-3 EMC Chamber	ETS.LINDGREN	FACT-3	3803	N/A	N/A
EMD106	Shielding Room #1	ETS.LINDGREN	RFD-100	3802	N/A	N/A
EMD111	Power meter	ROHDE & SCHWARZ	NRVD	102051	2014.03.21	2015.03.21
	100V Insertion Unit	ROHDE & SCHWARZ	URV5-Z4	100464	2014.03.21	2015.03.21
EMD113	Pre-Amplifier	ROHDE & SCHWARZ	N/A	1129588	2014.03.21	2015.03.21
EMD124	Loop Antenna	ETS-Lindgren	6502	00104905	2014.04.28	2016.04.28
EMD131	Standard Gain Horn Antenna (18GHz – 26.5GHz)	Chengdu AINFO Inc.	JTXLB-42-15-C-KF	J2021100721001	2013.04.09	2015.04.09

Remarks:-

N/A Not Applicable or Not Available

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STC Test Report

Date: 2014-08-07

Page 39 of 46

No.: DM116204

Appendix B

Ancillary Equipment

ITEM NO.	DESCRIPTION	MODEL NO.	FCC ID	REMARK
1	DELL COMPUTER	DMC	N/A	N/A
2	DELL MONITOR	E177FPB	ARSCM356N	RESOLUTION 1024*768 (DURING TESTING) 1.0M UNSHIEDED POWER VORD CONNECTED TO THE COMPUTER 1.5M SHIELDED CABLE CONNECTED TO THE COMPUTER
3	DELL KEYBOARD	SK-8110	N/A	1.8M SHIELDED COILED CABLE CONNECTED TO THE COMPUTER
4	DELL MOUSE	N/A	N/A	2.4M UNSHIELDED CABLE CONNECTED TO THE COMPUTER
5	LASER PRINTER	HP LASERJET 1020 PLUS	N/A	1.8M UNSHIELDED POWER CORD 2.8M SHIELDED CABLE (BUNDLED TO 1M) CONNECTED TO THE COMPUTER
6	iPod Touch	A1367	BCG-E2407	N/A

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STC Test Report

Date: 2014-08-07

Page 40 of 46

No.: DM116204

Appendix C

Photographs of EUT

Front View of the product



Rear View of the product



Top View of the product



Bottom View of the product



Right View of the product



Left View of the product



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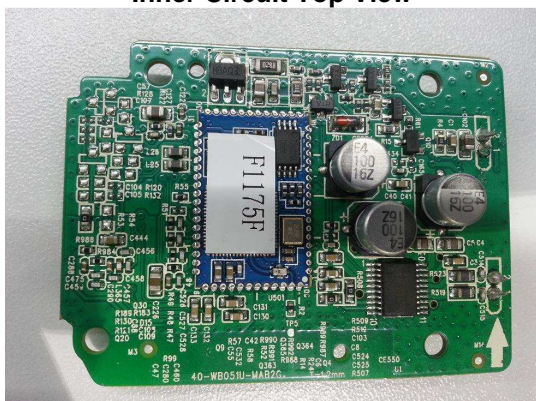
Date: 2014-08-07

Page 41 of 46

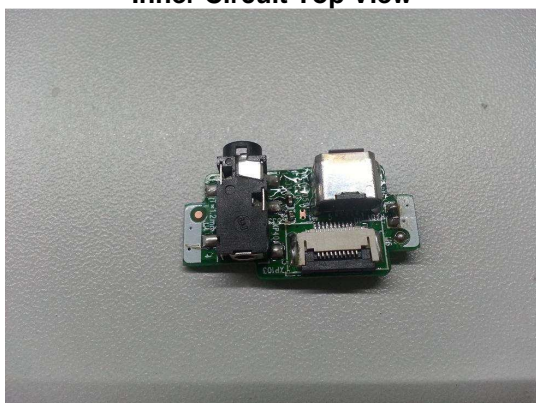
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Photographs of EUT

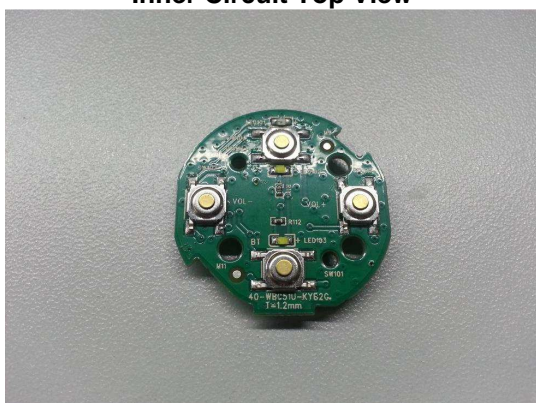
Inner Circuit Top View



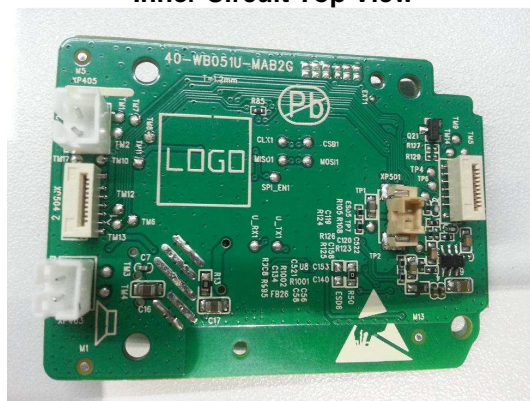
Inner Circuit Top View



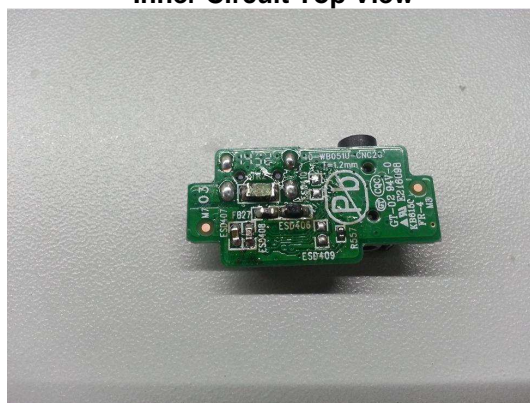
Inner Circuit Top View



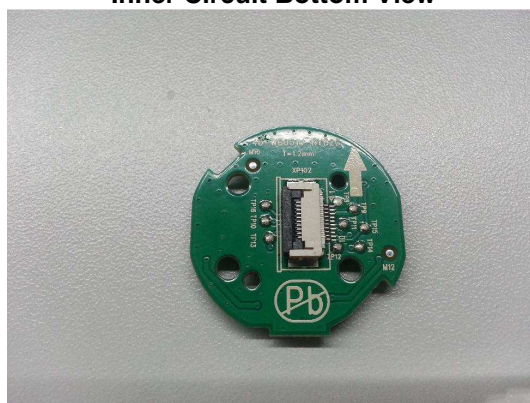
Inner Circuit Top View



Inner Circuit Top View



Inner Circuit Bottom View



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STC Test Report

Date: 2014-08-07

Page 42 of 46

No.: DM116204

Photographs of EUT

Inner Circuit Top View



Inner Circuit Top View



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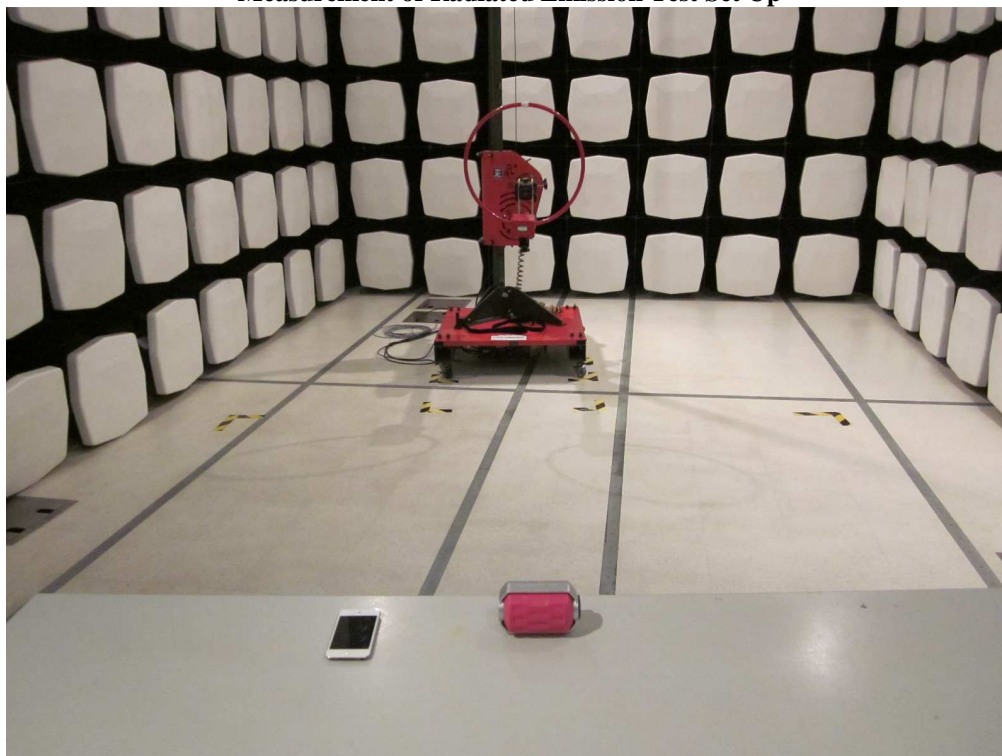
Date: 2014-08-07

Page 43 of 46

No.: DM116204

Photographs of EUT

Measurement of Radiated Emission Test Set Up



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STC Test Report

Date: 2014-08-07

Page 44 of 46

No.: DM116204

Photographs of EUT

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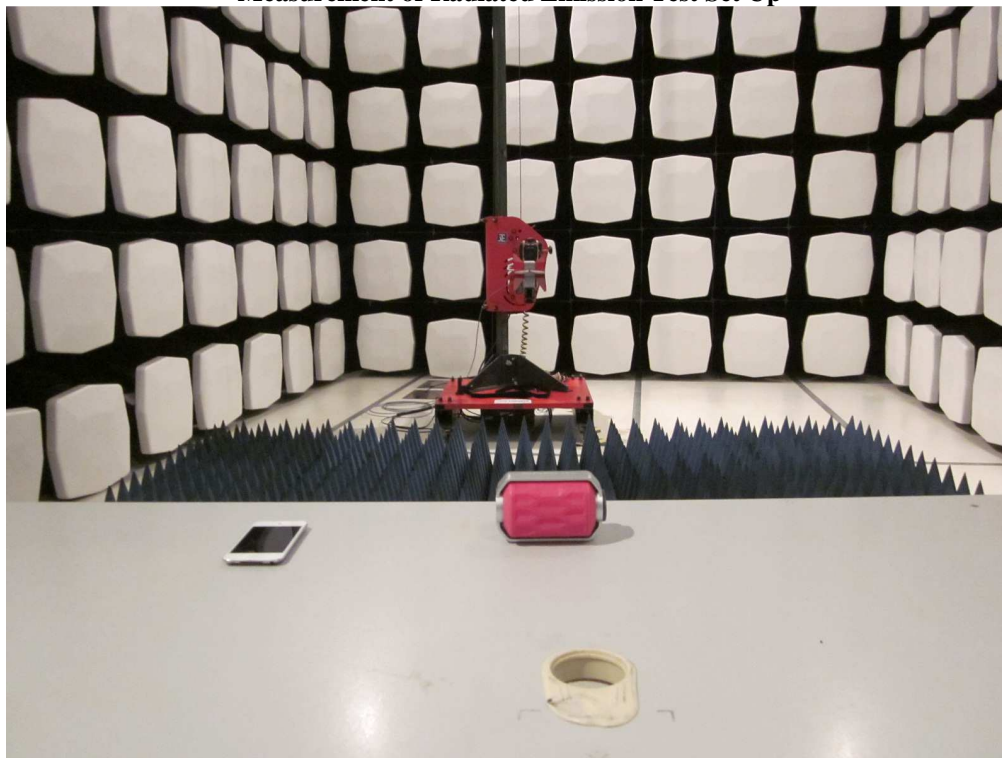
Date: 2014-08-07

Page 45 of 46

No.: DM116204

Photographs of EUT

Measurement of Radiated Emission Test Set Up



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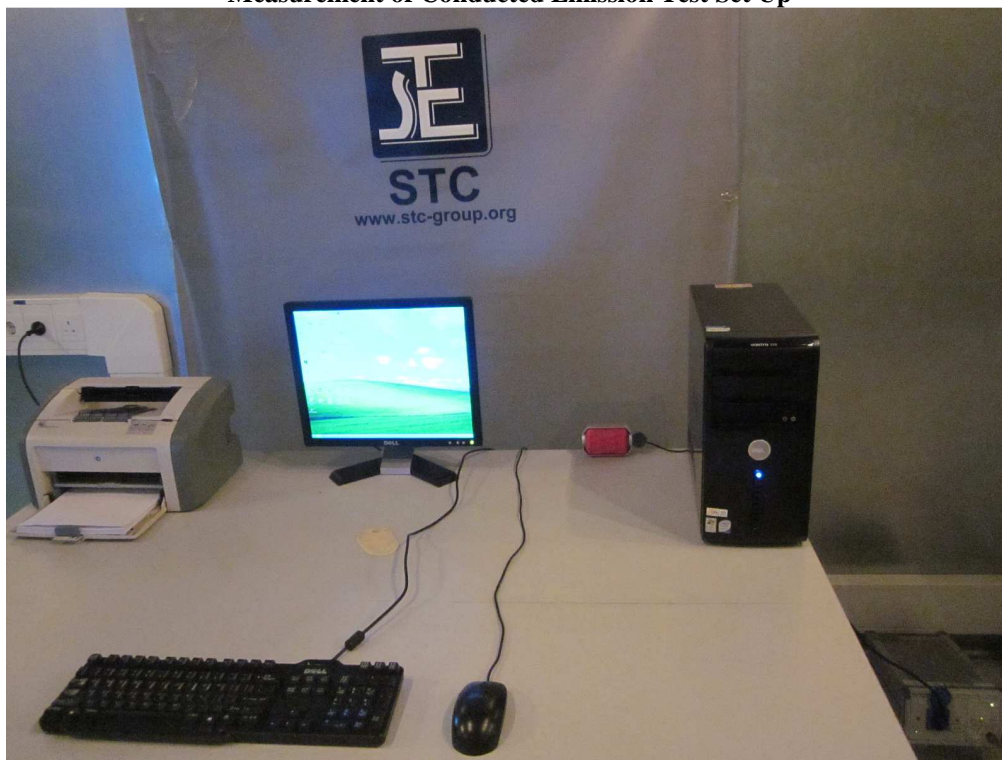
Date: 2014-08-07

Page 46 of 46

No.: DM116204

Photographs of EUT

Measurement of Conducted Emission Test Set Up



******* End of Test Report *******

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