STC Test Report

Deutsche Akkreditierungsstelle D-PL-12121-01-01

Date: 2013-10-30

No.: DM113039

Applicant (KIC002): Ocean Digital Technology Ltd.
Flat B., 12/F., Yeung Yiu Chung (No.8) Ind. Bldg., 20 Wang Hoi Road, Kowloon Bay, HongKong

Manufacturer: Ocean Digital Technology Ltd.
Flat B., 12/F., Yeung Yiu Chung (No.8) Ind. Bldg., 20 Wang Hoi Road, Kowloon Bay, HongKong

Description of Sample(s): Submitted sample(s) said to be

Product:	Internet Radio
Brand Name:	N/A
Model Number:	MS-280i
FCC ID:	2ABD3-MS280I0000

Date Sample(s) Received: 2013-10-16

Date Tested: 2013-10-18 to 2013-10-22

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2012 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): ---

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

CONTENT:

	Cover	Page 1 of 56
	Content	Page 2-3 of 56
1.0	**General Details**	
1.1	Test Laboratory	Page 4 of 56
1.2	Equipment Under Test [EUT] Description of EUT operation	Page 4 of 56
1.3	Date of Order	Page 4 of 56
1.4	Submitted Sample(s)	Page 4 of 56
1.5	Test Duration	Page 4 of 56
1.6	Country of Origin	Page 4 of 56
2.0	**Technical Details**	
2.1	Investigations Requested	Page 5 of 56
2.2	Test Standards and Results Summary	Page 5 of 56
3.0	**Test Results**	
3.1	Emission	Page 6-47 of 56

Appendix A

List of Measurement Equipment Page 48 of 56

Appendix B

Ancillary Equipment Page 48 of 56

Appendix C

Photographs of EUT Page 49-56 of 56

1.0 General Details

1.1 Test Laboratory

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

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

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

Product:	Internet Radio
Manufacturer:	Ocean Digital Technology Ltd.
Brand Name:	N/A
Model Number:	MS-280i
Rating:	12.0Vd.c. with Jack

The AC/DC adaptor was provided by the applicant with following details:
Brand name: N/A; Model no.: DYS182-120150W-2; Input: 100-240Va.c. 50/60Hz 0.45A MAX; Output: 12Vd.c. 1.5A.

1.2.1 Description of EUT Operation

The Equipment Under Test (EUT) is an Internet Radio. the transmission signal is digital modulated with channel frequency range 2412-2462MHz..

1.3 Date of Order

2013-10-16

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2013-10-18 to 2013-10-22

1.6 Country of Origin

China

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 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
Output Power of Fundamental Emissions	FCC 47CFR 15.247(b)(3)	ANSI C63.4:2009	N/A	☒	☐	☐
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2009	N/A	☒	☐	☐
Conducted Emissions	FCC 47CFR 15.207	ANSI C63.4:2009	N/A	☒	☐	☐
Power Spectral Density	FCC 47CFR 15.247(e)	N/A	N/A	☒	☐	☐
6dB Bandwidth	FCC 47CFR 15.247(a)(2)	N/A	N/A	☒	☐	☐
Band Edge Emissions	FCC 47CFR 15.247(d)	N/A	N/A	☒	☐	☐
RF Exposure	FCC 47CFR 15.247(i)	N/A	N/A	☒	☐	☐
Antenna requirement	FCC 47CFR 15.203	N/A	N/A	☒	☐	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

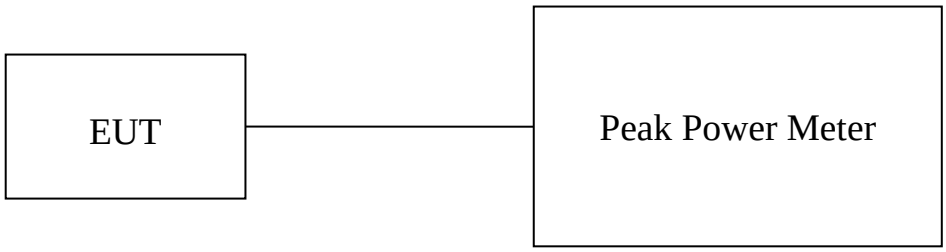
3.1.1 Maximum Peak Output Power

Test Requirement:	FCC 47CFR 15.247(b)(3)
Test Method:	N/A
Test Date:	2013-10-22
Mode of Operation:	WiFi mode

Test Method:

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

Test Setup:



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 WiFi Tx Mode 802.11 b, (2412MHz to 2462MHz) : Pass (TX Unit)
Maximum conducted output power

Channel	Frequency(MHz)	Output Power(Watt)
Low	2412	0.02089
Middle	2437	0.02076
High	2462	0.02083

Results of WiFi Tx Mode 802.11 g, (2412MHz to 2462MHz) : Pass (TX Unit)
Maximum conducted output power

Channel	Frequency(MHz)	Output Power(Watt)
Low	2412	0.02054
Middle	2437	0.02043
High	2462	0.02048

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

3.1.2 Radiated Emissions

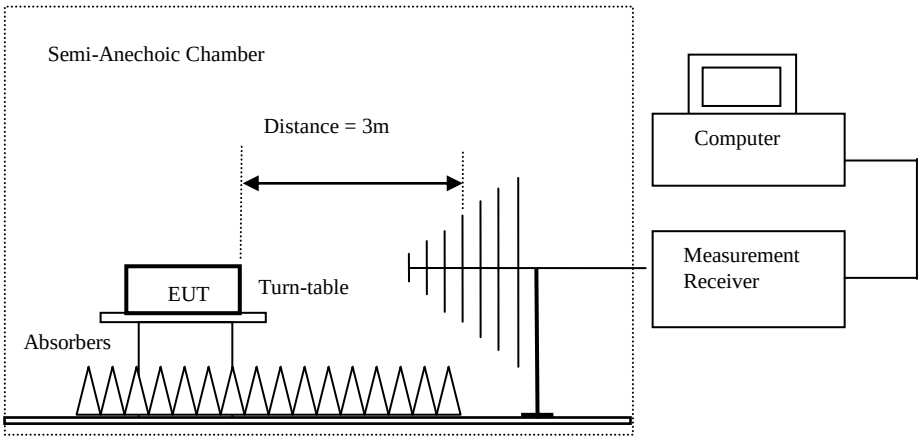
Test Requirement:	FCC 47CFR 15.209
Test Method:	ANSI C63.4:2009
Test Date:	2013-10-21
Mode of Operation:	Tx mode / WiFi mode / Infrared remote control on mode

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:



Ground Plane

Absorbers placed on top of the ground plane are for measurements above 1000MHz only.

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

Frequency Range [MHz]	Quasi-Peak Limits [μV/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 Tx mode (2412.0 MHz) (802.11b) (9kHz – 30MHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency	Measured Level	Correction Factor	Field Strength	Field Strength	Limit	E-Field Polarity
MHz	dBμV	dB/m	dBμV/m	μV/m	μV/m	
Emissions detected are more than 20 dB below the FCC Limits						

Results of Tx mode (2412.0 MHz) (802.11b) (30MHz – 1000MHz): PASS

Field Strength of Spurious Emissions						
Quasi-Peak Value						
Frequency	Measured Level	Correction Factor	Field Strength	Field Strength	Limit	E-Field Polarity
MHz	dBμV	dB/m	dBμV/m	μV/m	μV/m	
Emissions detected are more than 20 dB below the FCC Limits						

Result of Tx mode (2412.0 MHz) (802.11b) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Peak Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
4824.0	15.0	41.5	56.5	74.0	17.5	Vertical
4824.0	13.5	42.4	55.9	74.0	18.1	Horizontal
7236.0	10.8	45.1	55.9	74.0	18.1	Vertical
7236.0	8.7	46.2	54.9	74.0	19.1	Horizontal
9648.0	8.3	48.0	56.3	74.0	17.7	Vertical
9648.0	7.0	48.8	55.8	74.0	18.2	Horizontal
12060.0	4.1	51.5	55.6	74.0	18.4	Vertical
12060.0	3.8	52.4	56.2	74.0	17.8	Horizontal

Result of Tx mode (2412.0 MHz) (802.11b) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
4824.0	1.6	41.5	43.1	54.0	10.9	Vertical
4824.0	-0.6	42.4	41.8	54.0	12.2	Horizontal
7236.0	-2.8	45.1	42.3	54.0	11.7	Vertical
7236.0	-4.7	46.2	41.5	54.0	12.5	Horizontal
9648.0	-8.1	48.0	39.9	54.0	14.1	Vertical
9648.0	-8.6	48.8	40.2	54.0	13.8	Horizontal
12060.0	-10.8	51.5	40.7	54.0	13.3	Vertical
12060.0	-11.3	52.4	41.1	54.0	12.9	Horizontal

Result of Tx mode (2437.0 MHz) (802.11b) (9kHz – 30MHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency	Measured Level	Correction Factor	Field Strength	Field Strength	Limit	E-Field Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
Emissions detected are more than 20 dB below the FCC Limits						

Results of Tx mode (2437.0 MHz) (802.11b) (30MHz – 1000MHz): PASS

Field Strength of Spurious Emissions						
Quasi-Peak Value						
Frequency	Measured Level	Correction Factor	Field Strength	Field Strength	Limit	E-Field Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
Emissions detected are more than 20 dB below the FCC Limits						

Result of Tx mode (2437.0 MHz) (802.11b) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
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	
4874.0	14.6	41.6	56.2	74.0	17.8	Vertical
4874.0	12.9	42.5	55.4	74.0	18.6	Horizontal
7311.0	10.5	45.2	55.7	74.0	18.3	Vertical
7311.0	8.5	46.3	54.8	74.0	19.2	Horizontal
9748.0	7.1	48.1	55.2	74.0	18.8	Vertical
9748.0	6.5	48.9	55.4	74.0	18.6	Horizontal
12185.0	4.3	51.6	55.9	74.0	18.1	Vertical
12185.0	3.6	52.5	56.1	74.0	17.9	Horizontal

Result of Tx mode (2437.0 MHz) (802.11b) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency	Measured	Correction	Field	Limit	Margin	E-Field
	Level @3m	Factor	Strength	@3m		Polarity
MHz	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	
4874.0	-0.8	41.6	40.8	54.0	13.2	Vertical
4874.0	-2.3	42.5	40.2	54.0	13.8	Horizontal
7311.0	-4.1	45.2	41.1	54.0	12.9	Vertical
7311.0	-5.7	46.3	40.6	54.0	13.4	Horizontal
9748.0	-7.8	48.1	40.3	54.0	13.7	Vertical
9748.0	-8.4	48.9	40.5	54.0	13.5	Horizontal
12185.0	-12.1	51.6	39.5	54.0	14.5	Vertical
12185.0	-11.2	52.5	41.3	54.0	12.7	Horizontal

Result of Tx mode (2462.0 MHz) (802.11b) (9kHz – 30MHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency	Measured	Correction	Field	Field	Limit	E-Field
	Level	Factor	Strength	Strength		Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
Emissions detected are more than 20 dB below the FCC Limits						

Results of Tx mode (2462.0 MHz) (802.11b) (30MHz – 1000MHz): PASS

Field Strength of Spurious Emissions						
Quasi-Peak Value						
Frequency	Measured	Correction	Field	Field	Limit	E-Field
	Level	Factor	Strength	Strength		Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
Emissions detected are more than 20 dB below the FCC Limits						

Result of Tx mode (2462.0 MHz) (802.11b) (Above 1GHz): Pass

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dBµV	Correction Factor dB/m	Field Strength dBµV/m	Limit @3m µV/m	Margin µV/m	E-Field Polarity
4924.0	14.5	41.4	55.9	74.0	18.1	Vertical
4924.0	13.4	42.7	56.1	74.0	17.9	Horizontal
7386.0	9.4	45.6	55.0	74.0	19.0	Vertical
7386.0	8.7	46.5	55.2	74.0	18.8	Horizontal
9848.0	7.2	48.6	55.8	74.0	18.2	Vertical
9848.0	5.1	49.7	54.8	74.0	19.2	Horizontal
12310.0	4.3	51.7	56.0	74.0	18.0	Vertical
12310.0	2.9	52.7	55.6	74.0	18.4	Horizontal

Result of Tx mode (2462.0 MHz) (802.11b) (Above 1GHz): Pass

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dBµV	Correction Factor dB/m	Field Strength dBµV/m	Limit @3m µV/m	Margin µV/m	E-Field Polarity
4924.0	-0.5	41.4	40.9	54.0	13.1	Vertical
4924.0	-0.7	42.7	42.0	54.0	12.0	Horizontal
7386.0	-5.4	45.6	40.2	54.0	13.8	Vertical
7386.0	-5.4	46.5	41.1	54.0	12.9	Horizontal
9848.0	-6.9	48.6	41.7	54.0	12.3	Vertical
9848.0	-10	49.7	39.7	54.0	14.3	Horizontal
12310.0	-10.1	51.7	41.6	54.0	12.4	Vertical
12310.0	-12.5	52.7	40.2	54.0	13.8	Horizontal

Result of Tx mode (2412.0 MHz) (802.11g) (9kHz – 30MHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency	Measured Level	Correction Factor	Field Strength	Field Strength	Limit	E-Field Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
Emissions detected are more than 20 dB below the FCC Limits						

Results of Tx mode (2412.0 MHz) (802.11g) (30MHz – 1000MHz): PASS

Field Strength of Spurious Emissions						
Quasi-Peak Value						
Frequency	Measured Level	Correction Factor	Field Strength	Field Strength	Limit	E-Field Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
Emissions detected are more than 20 dB below the FCC Limits						

Result of Tx mode (2412.0 MHz) (802.11g) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Peak Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
4824.0	14.7	41.5	56.2	74.0	17.8	Vertical
4824.0	12.7	42.4	55.1	74.0	18.9	Horizontal
7236.0	10.1	45.1	55.2	74.0	18.8	Vertical
7236.0	9.2	46.2	55.4	74.0	18.6	Horizontal
9648.0	7.5	48.0	55.5	74.0	18.5	Vertical
9648.0	6.9	48.8	55.7	74.0	18.3	Horizontal
12060.0	3.7	51.5	55.2	74.0	18.8	Vertical
12060.0	2.5	52.4	54.9	74.0	19.1	Horizontal

Result of Tx mode (2412.0 MHz) (802.11g) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency	Measured	Correction	Field	Limit	Margin	E-Field
	Level @3m	Factor	Strength	@3m		Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
4824.0	0.0	41.5	41.5	54.0	12.5	Vertical
4824.0	-1.1	42.4	41.3	54.0	12.7	Horizontal
7236.0	-4.3	45.1	40.8	54.0	13.2	Vertical
7236.0	-5.8	46.2	40.4	54.0	13.6	Horizontal
9648.0	-7.3	48.0	40.7	54.0	13.3	Vertical
9648.0	-7.6	48.8	41.2	54.0	12.8	Horizontal
12060.0	-10.4	51.5	41.1	54.0	12.9	Vertical
12060.0	-12.4	52.4	40.0	54.0	14.0	Horizontal

Result of Tx mode (2437.0 MHz) (802.11g) (9kHz – 30MHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency	Measured	Correction	Field	Field	Limit	E-Field
	Level	Factor	Strength	Strength		Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
Emissions detected are more than 20 dB below the FCC Limits						

Results of Tx mode (2437.0 MHz) (802.11g) (30MHz – 1000MHz): PASS

Field Strength of Spurious Emissions						
Quasi-Peak Value						
Frequency	Measured	Correction	Field	Field	Limit	E-Field
	Level	Factor	Strength	Strength		Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
Emissions detected are more than 20 dB below the FCC Limits						

Result of Tx mode (2437.0 MHz) (802.11g) (Above 1GHz): Pass

Field Strength of Spurious Emissions Peak Value						
Frequency MHz	Measured Level @3m dBµV	Correction Factor dB/m	Field Strength dBµV/m	Limit @3m dBµV/m	Margin dBµV/m	E-Field Polarity
4874.0	14.3	41.6	55.9	74.0	18.1	Vertical
4874.0	12.3	42.5	54.8	74.0	19.2	Horizontal
7311.0	10.0	45.2	55.2	74.0	18.8	Vertical
7311.0	8.8	46.3	55.1	74.0	18.9	Horizontal
9748.0	7.0	48.1	55.1	74.0	18.9	Vertical
9748.0	6.1	48.9	55.0	74.0	19.0	Horizontal
12185.0	3.9	51.6	55.5	74.0	18.5	Vertical
12185.0	3.1	52.5	55.6	74.0	18.4	Horizontal

Result of Tx mode (2437.0 MHz) (802.11g) (Above 1GHz): Pass

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dBµV	Correction Factor dB/m	Field Strength dBµV/m	Limit @3m dBµV/m	Margin dBµV/m	E-Field Polarity
4874.0	-0.6	41.6	41.0	54.0	13.0	Vertical
4874.0	-2.9	42.5	39.6	54.0	14.4	Horizontal
7311.0	-4.7	45.2	40.5	54.0	13.5	Vertical
7311.0	-5.6	46.3	40.7	54.0	13.3	Horizontal
9748.0	-8.2	48.1	39.9	54.0	14.1	Vertical
9748.0	-8.8	48.9	40.1	54.0	13.9	Horizontal
12185.0	-10.6	51.6	41.0	54.0	13.0	Vertical
12185.0	-11.3	52.5	41.2	54.0	12.8	Horizontal

Result of Tx mode (2462.0 MHz) (802.11g) (9kHz – 30MHz): Pass

Field Strength of Spurious Emissions						
Average Value						
Frequency	Measured Level	Correction Factor	Field Strength	Field Strength	Limit	E-Field Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
Emissions detected are more than 20 dB below the FCC Limits						

Results of Tx mode (2462.0 MHz) (802.11g) (30MHz – 1000MHz): PASS

Field Strength of Spurious Emissions						
Quasi-Peak Value						
Frequency	Measured Level	Correction Factor	Field Strength	Field Strength	Limit	E-Field Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
Emissions detected are more than 20 dB below the FCC Limits						

Result of Tx mode (2462.0 MHz) (802.11g) (Above 1GHz): Pass

Field Strength of Spurious Emissions						
Peak Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dBµV	dB/m	dBµV/m	µV/m	µV/m	
4924.0	14.9	41.4	56.3	74.0	17.7	Vertical
4924.0	12.9	42.7	55.6	74.0	18.4	Horizontal
7386.0	9.4	45.6	55.0	74.0	19.0	Vertical
7386.0	8.2	46.5	54.7	74.0	19.3	Horizontal
9848.0	6.6	48.6	55.2	74.0	18.8	Vertical
9848.0	5.8	49.7	55.5	74.0	18.5	Horizontal
12310.0	4.1	51.7	55.8	74.0	18.2	Vertical
12310.0	2.7	52.7	55.4	74.0	18.6	Horizontal

Result of Tx mode (2462.0 MHz) (802.11g) (Above 1GHz): Pass

Field Strength of Spurious Emissions Average Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m μV/m	Margin μV/m	E-Field Polarity
4924.0	0.5	41.4	41.9	54.0	12.1	Vertical
4924.0	-1.2	42.7	41.5	54.0	12.5	Horizontal
7386.0	-4.3	45.6	41.3	54.0	12.7	Vertical
7386.0	-5.7	46.5	40.8	54.0	13.2	Horizontal
9848.0	-7.1	48.6	41.5	54.0	12.5	Vertical
9848.0	-8.9	49.7	40.8	54.0	13.2	Horizontal
12310.0	-10.2	51.7	41.5	54.0	12.5	Vertical
12310.0	-11.7	52.7	41.0	54.0	13.0	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.

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

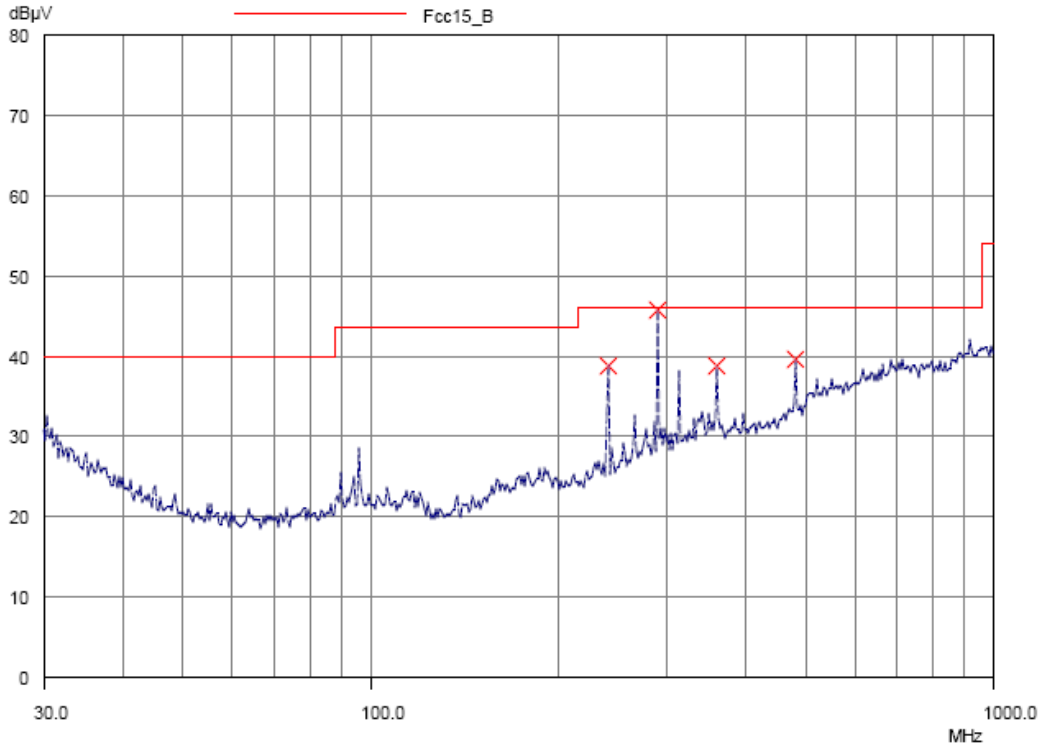
Frequency Range	Quasi-Peak Limits
[MHz]	[μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

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 WiFi mode (EUT Paired with iPod, USB out port connected to Resistive load) (30MHz – 1GHz): Pass

Please refer to the following table for result details

Horizontal



Result of WiFi mode (EUT Paired with iPod, USB out port connected to Resistive load) (30MHz – 1GHz): Pass

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dBµV/m	Limit @3m dBµV/m	Level @3m µV/m	Limit @3m µV/m
240.2	Horizontal	38.9	46.0	88.1	200
287.9	Horizontal	43.5	46.0	149.6	200
359.6	Horizontal	39.0	46.0	89.1	200
480.1	Horizontal	39.7	46.0	96.6	200

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

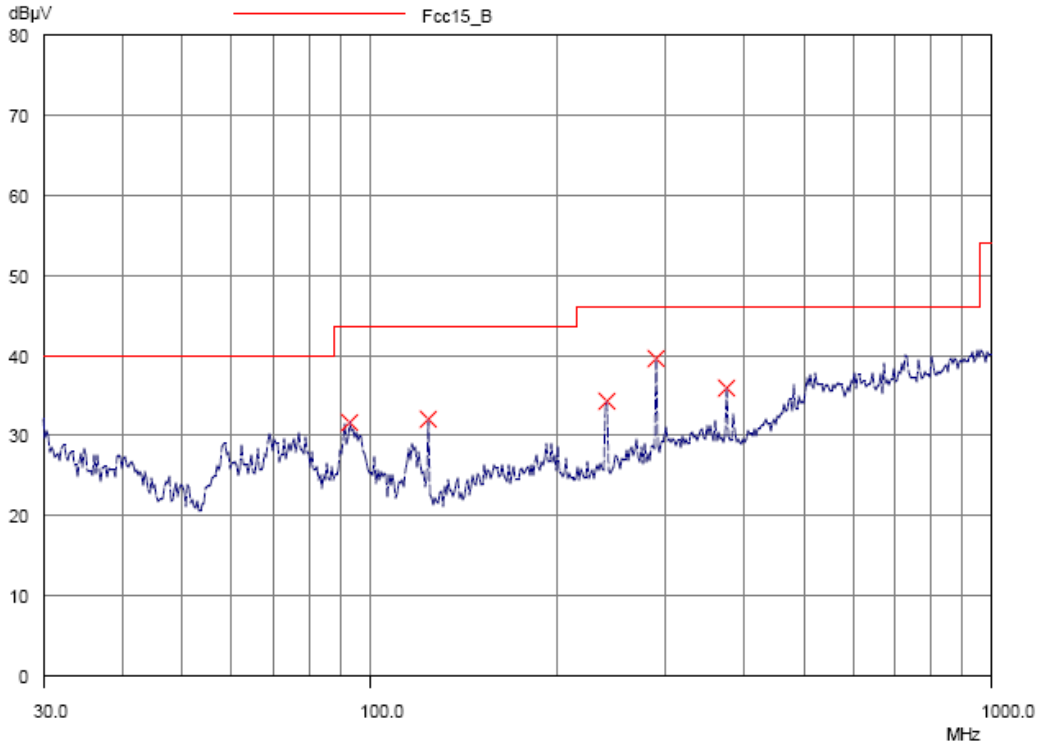
Frequency Range	Quasi-Peak Limits
[MHz]	[μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

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 WiFi mode (EUT Paired with iPod, USB out port connected to Resistive load) (30MHz – 1GHz): Pass

Please refer to the following table for result details

Vertical



Result of WiFi mode (EUT Paired with iPod, USB out port connected to Resistive load) (30MHz – 1GHz): Pass

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dBµV/m	Limit @3m dBµV/m	Level @3m µV/m	Limit @3m µV/m
93.3	Vertical	31.7	43.5	38.5	150
125.0	Vertical	32.1	43.5	40.3	150
240.3	Vertical	34.5	46.0	53.1	200
288.4	Vertical	39.6	46.0	95.5	200
375.0	Vertical	36.1	46.0	63.8	200

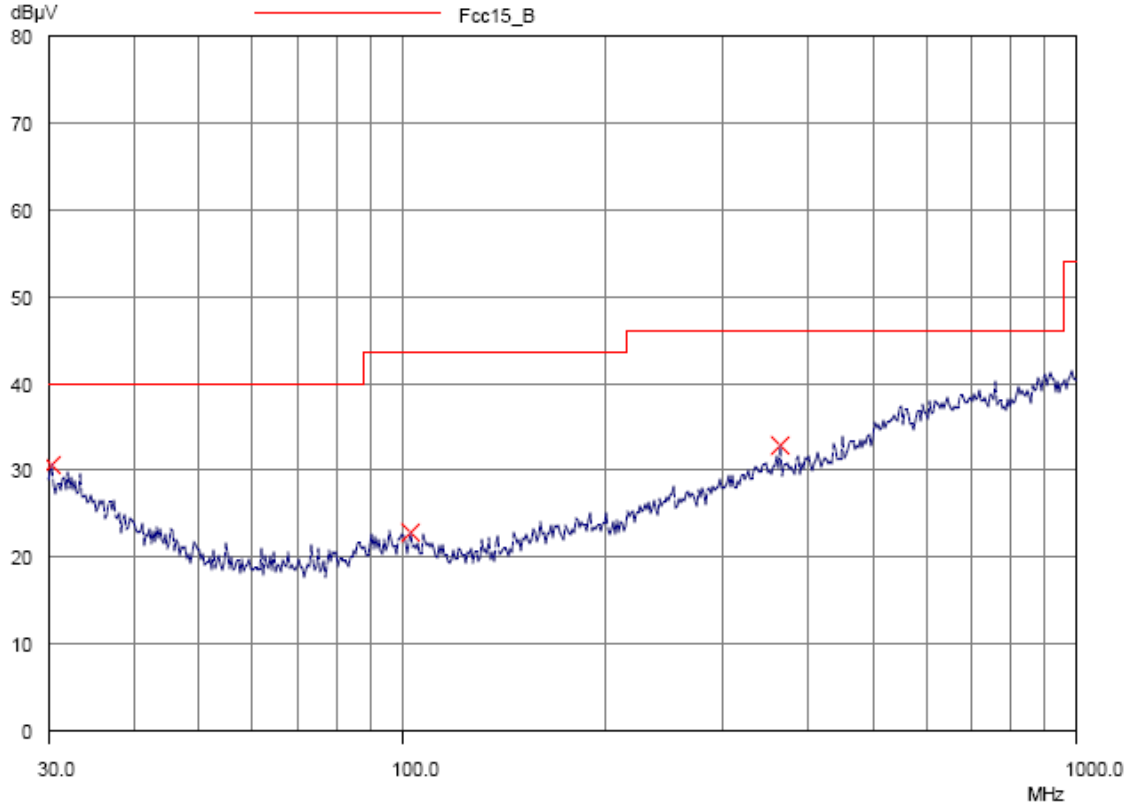
Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range	Quasi-Peak Limits
[MHz]	[μV/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 Infrared remote control on mode(30MHz – 1GHz): Pass
Please refer to the following table for result details

Horizontal



Result of Infrared remote control on mode(30MHz – 1GHz): Pass

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dBµV/m	Limit @3m dBµV/m	Level @3m µV/m	Limit @3m µV/m
30.2	Horizontal	30.7	40.0	34.3	100
103.5	Horizontal	22.9	43.5	14.0	150
363.4	Horizontal	32.9	46.0	44.2	200

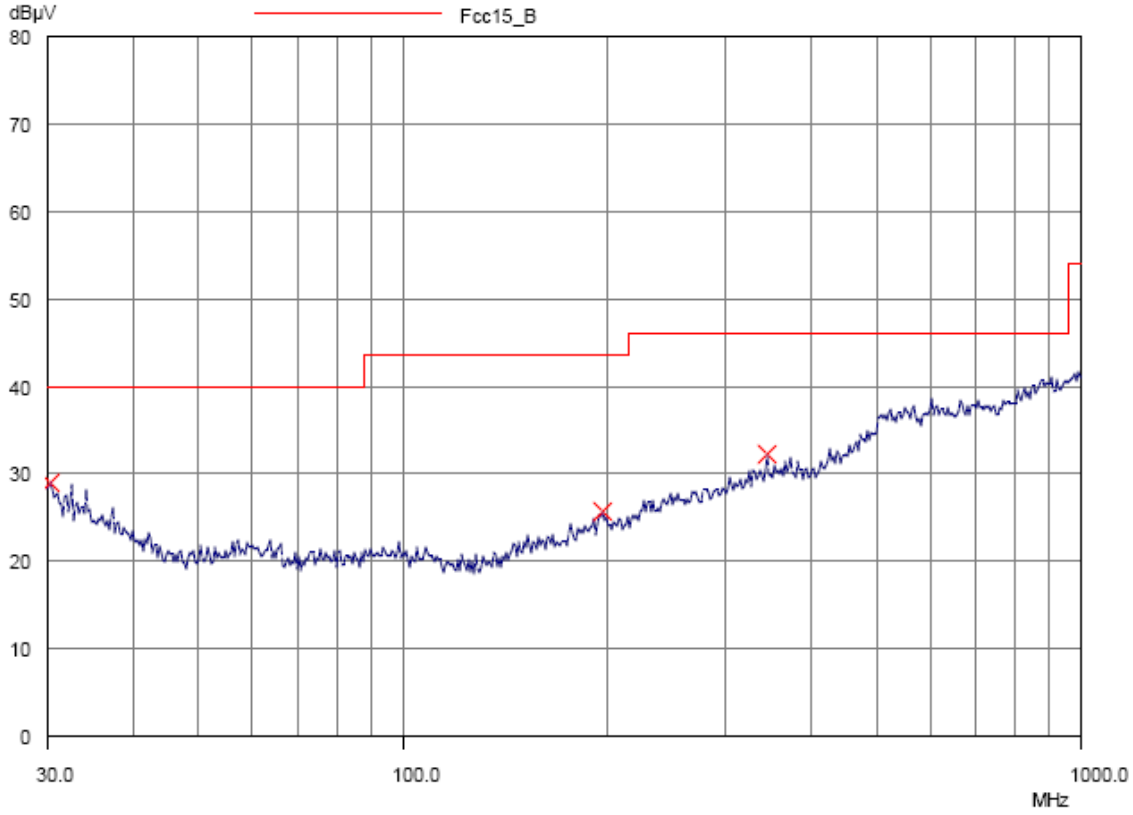
Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range	Quasi-Peak Limits
[MHz]	[μV/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 Infrared remote control on mode(30MHz – 1GHz): Pass
Please refer to the following table for result details

Vertical



Result of Infrared remote control on mode(30MHz – 1GHz): Pass

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dBµV/m	Limit @3m dBµV/m	Level @3m µV/m	Limit @3m µV/m
30.3	Vertical	29.1	40.0	28.5	100
197.3	Vertical	25.7	43.5	19.3	150
344.4	Vertical	32.2	46.0	40.7	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.

3.1.3 Power Spectral Density

Test Requirement:	FCC 47CFR 15.247(e)
Test Method:	ANSI C63.4:2009
Test Date:	2013-10-21
Mode of Operation:	WiFi 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=100kHz and sweep time = span/100kHz. 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.

Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF=10log (3 kHz/100 kHz=-15.2dB)

Results of WiFi Mode 802.11 b (Tx:2412MHz to 2462MHz) : Pass (TX Unit)
Maximum power spectral density

Transmitter Frequency (MHz)	Maximum power spectral density (dBm)
2412.0	-17.91

Transmitter Frequency (MHz)	Maximum power spectral density (dBm)
2437.0	-17.73

Transmitter Frequency (MHz)	Maximum power spectral density (dBm)
2462.0	-17.40

Results of WiFi Mode 802.11 g (Tx:2412MHz to 2462MHz) : Pass (TX Unit)
Maximum power spectral density

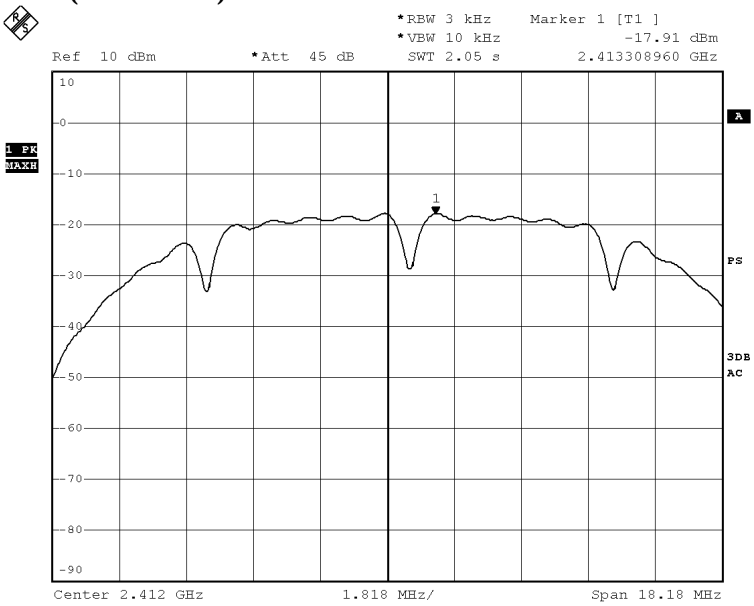
Transmitter Frequency (MHz)	Maximum power spectral density (dBm)
2412.0	-17.17

Transmitter Frequency (MHz)	Maximum power spectral density (dBm)
2437.0	-17.30

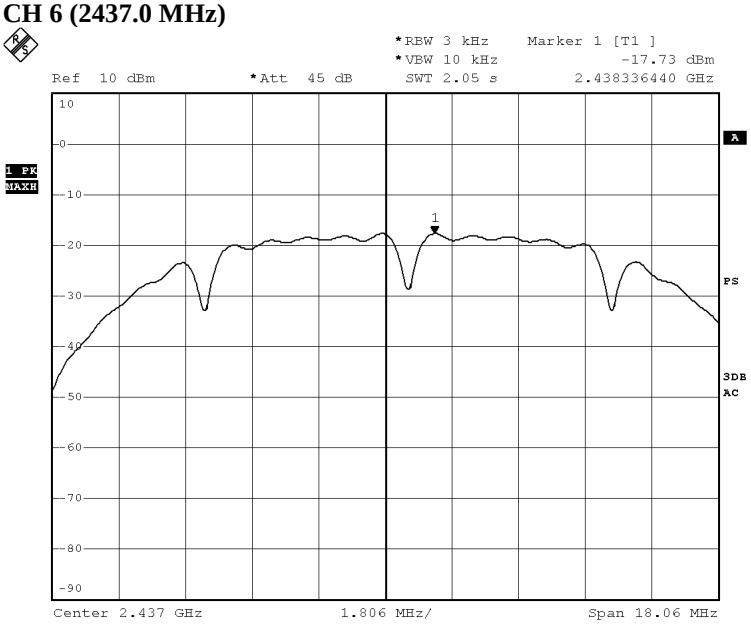
Transmitter Frequency (MHz)	Maximum power spectral density (dBm)
2462.0	-16.54

WiFi mode 802.11 b 1Mbit, (Tx: 2412MHz to 2462MHz)

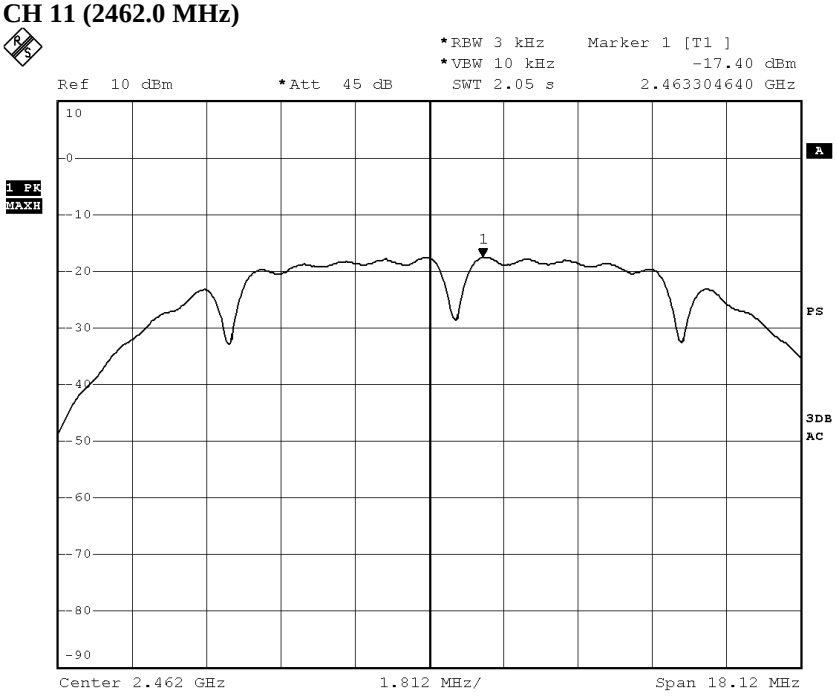
CH 1 (2412.0 MHz)



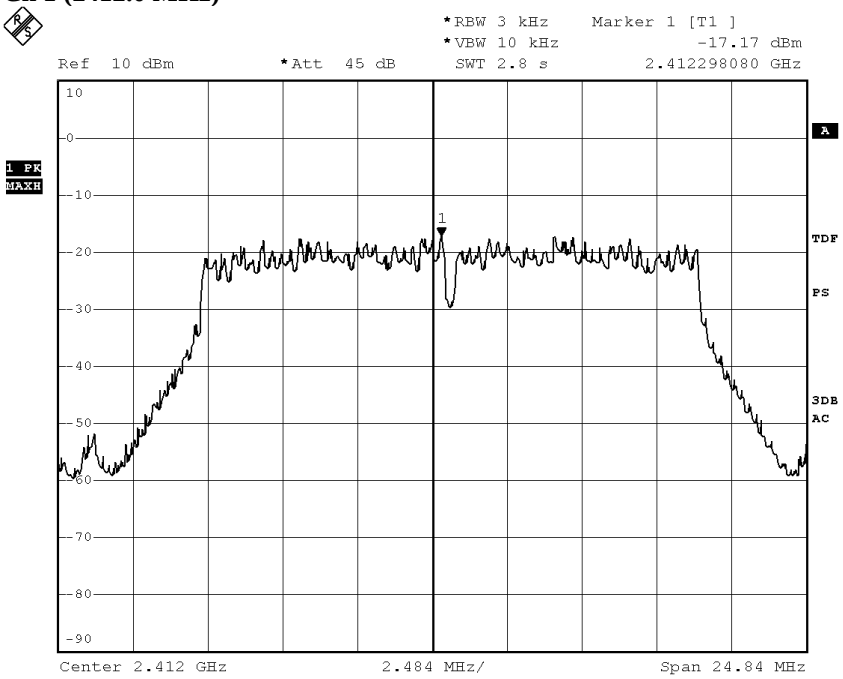
CH 6 (2437.0 MHz)



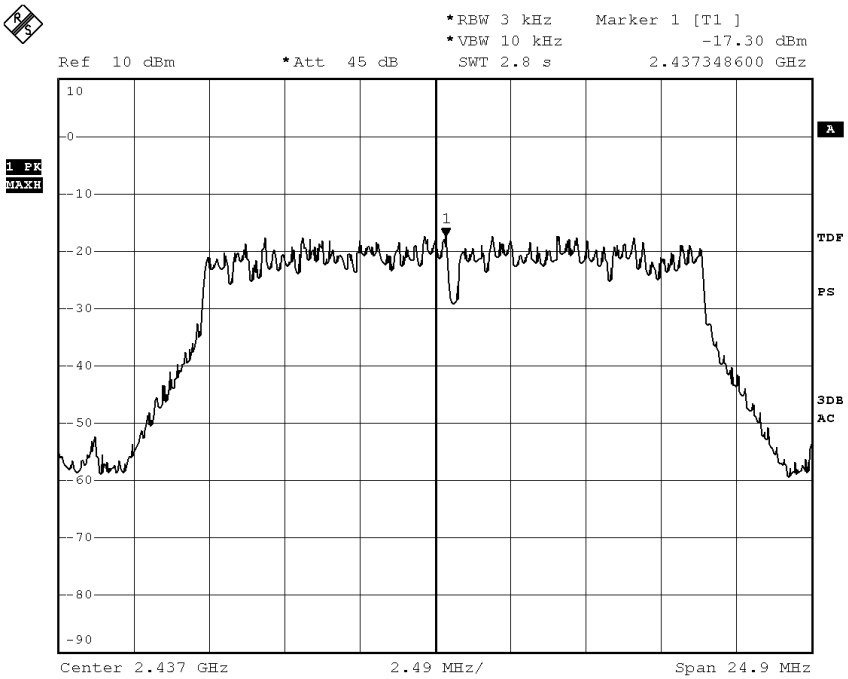
CH 11 (2462.0 MHz)



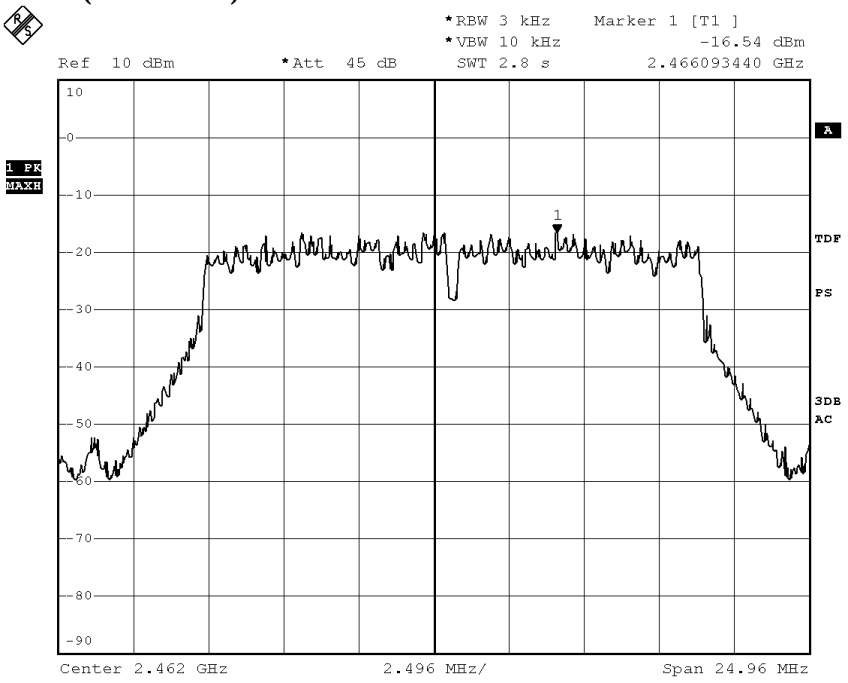
WiFi mode 802.11 g 6Mbit, (Tx: 2412MHz to 2462MHz)
Ch 1 (2412.0 MHz)



CH 6 (2437.0 MHz)



CH 11 (2462.0 MHz)



3.1.4 6dB Spectrum Bandwidth Measurement

Test Requirement:	FCC 47CFR 15.247(a)(2)
Test Method:	ANSI C63.4:2009
Test Date:	2013-10-21
Mode of Operation:	WiFi 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.

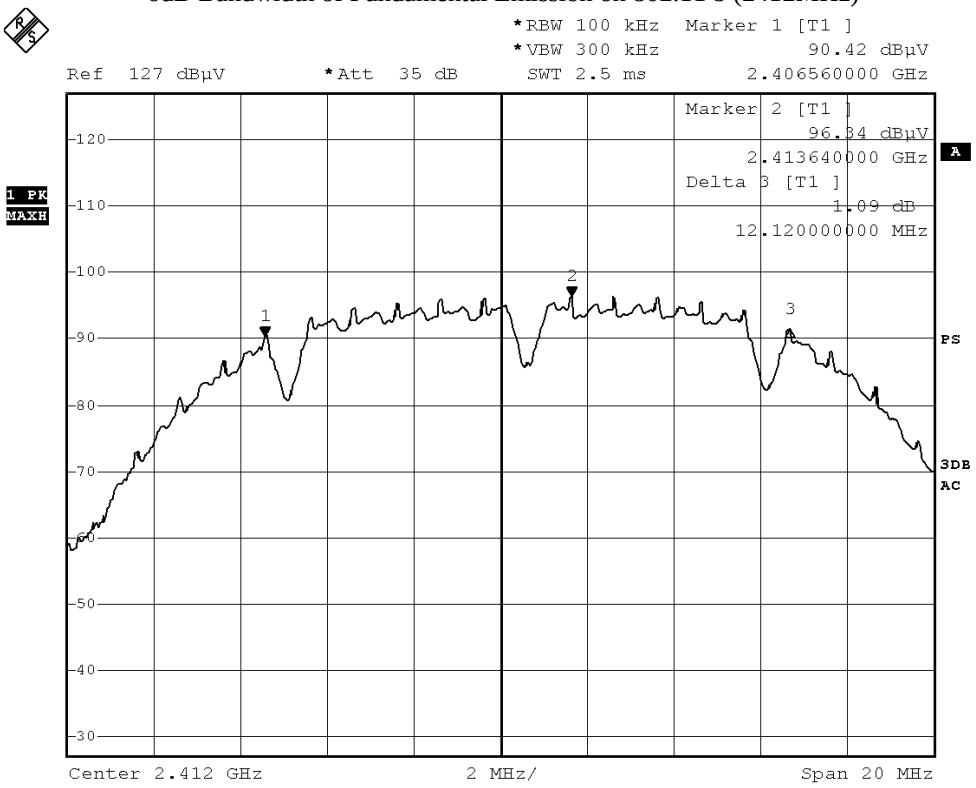
Test Setup:

As Test Setup of clause 3.1.1 in this test report.

Limits for 6dB Spectrum Bandwidth Measurement:

Center Frequency [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2412.0	12.12	> 500

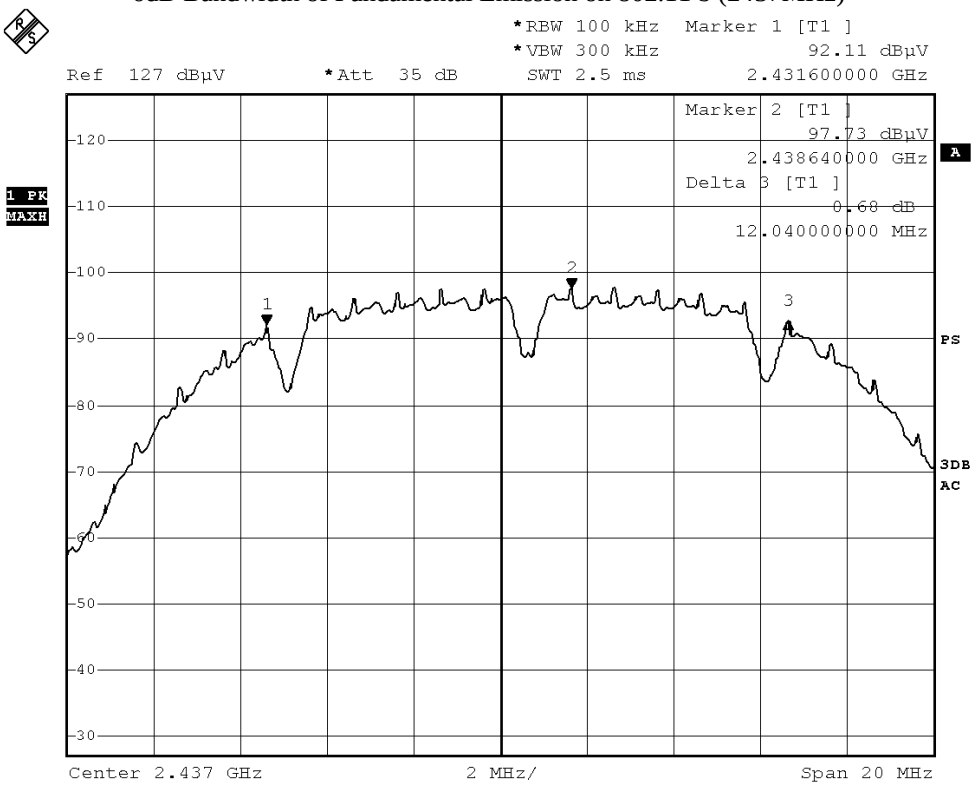
6dB Bandwidth of Fundamental Emission on 802.11 b (2412MHz)



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2437.0	12.04	> 500

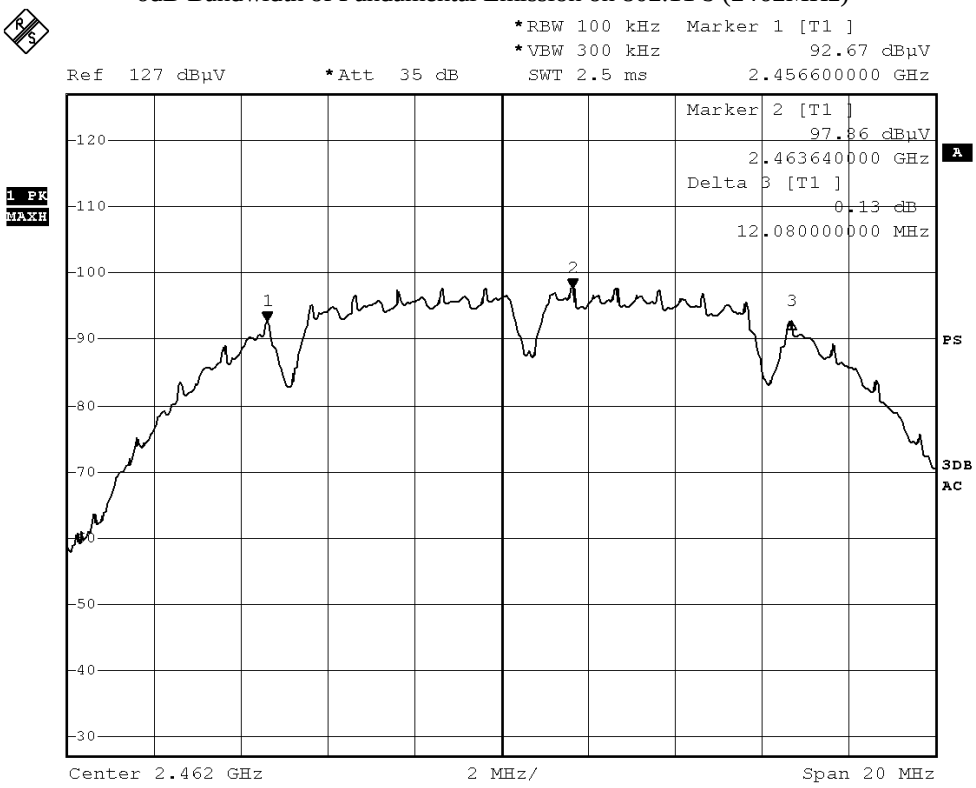
6dB Bandwidth of Fundamental Emission on 802.11 b (2437MHz)



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2462.0	12.08	> 500

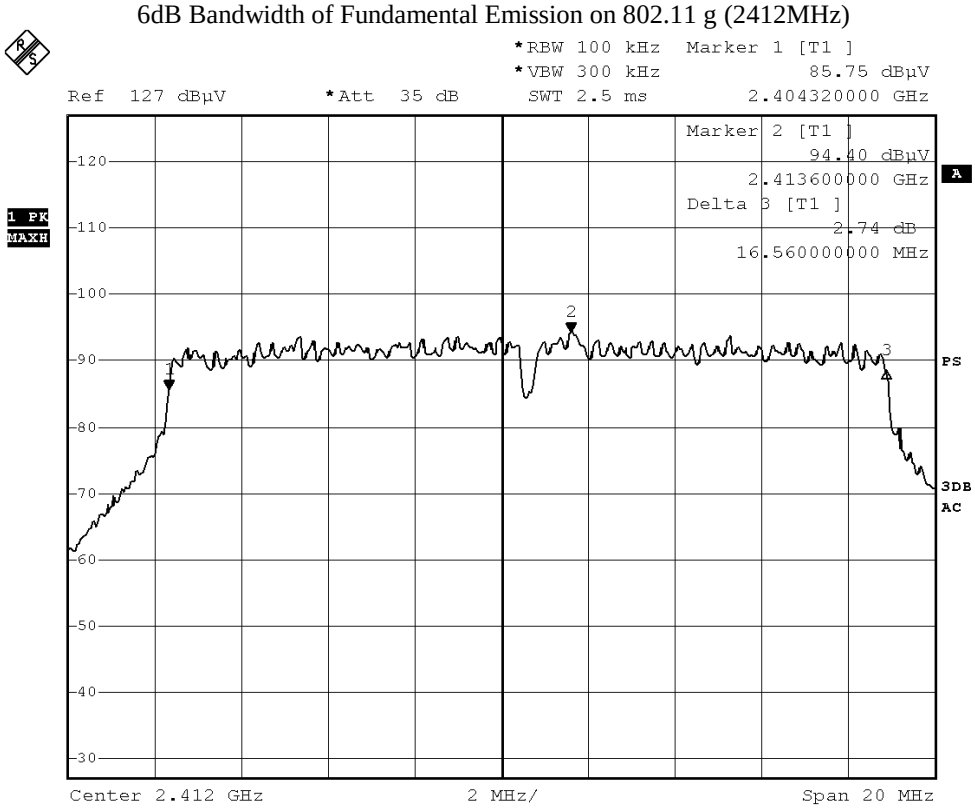
6dB Bandwidth of Fundamental Emission on 802.11 b (2462MHz)



Limits for 6dB Spectrum Bandwidth Measurement:

Center Frequency [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2412.0	16.56	> 500

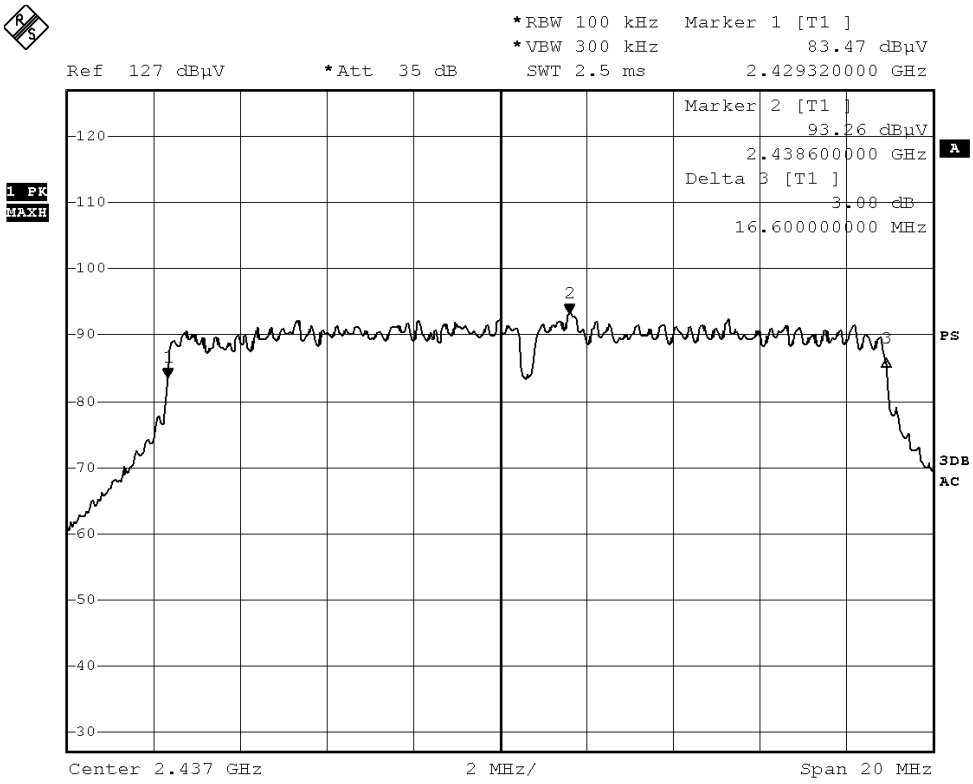
6dB Bandwidth of Fundamental Emission on 802.11 g (2412MHz)



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2437.0	16.60	> 500

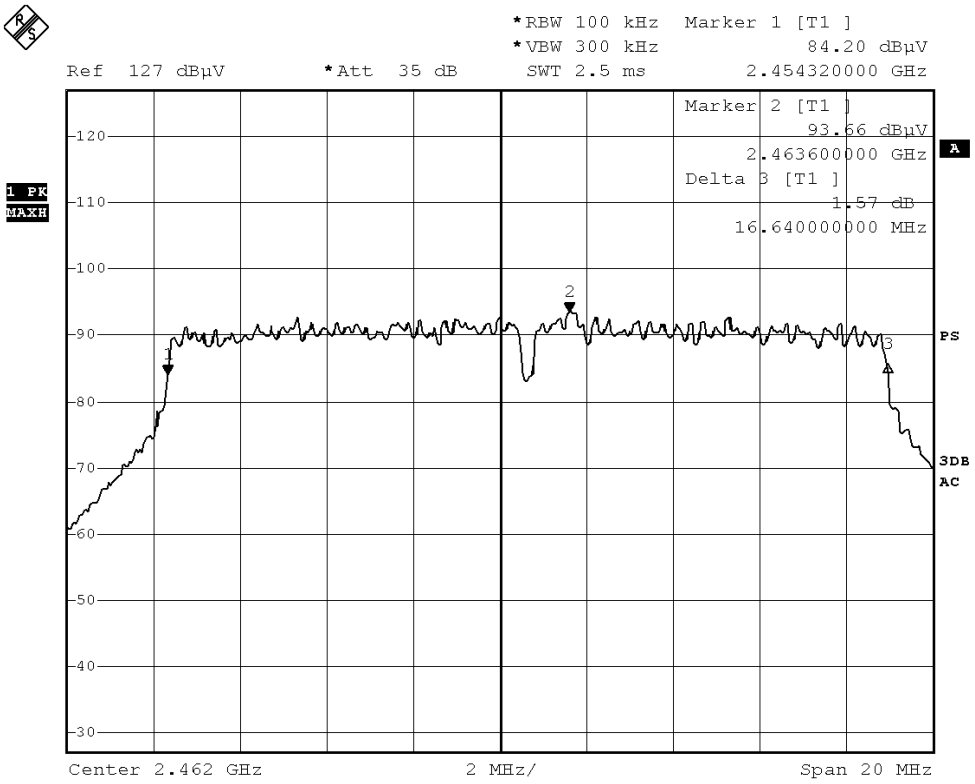
6dB Bandwidth of Fundamental Emission on 802.11 g (2437MHz)



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2462.0	16.64	> 500

6dB Bandwidth of Fundamental Emission on 802.11 g (2462MHz)



3.1.5 Band Edges Measurement

Test Requirement:	FCC 47CFR 15.247
Test Method:	ANSI C63.4:2009
Test Date:	2013-10-21
Mode of Operation:	WiFi mode

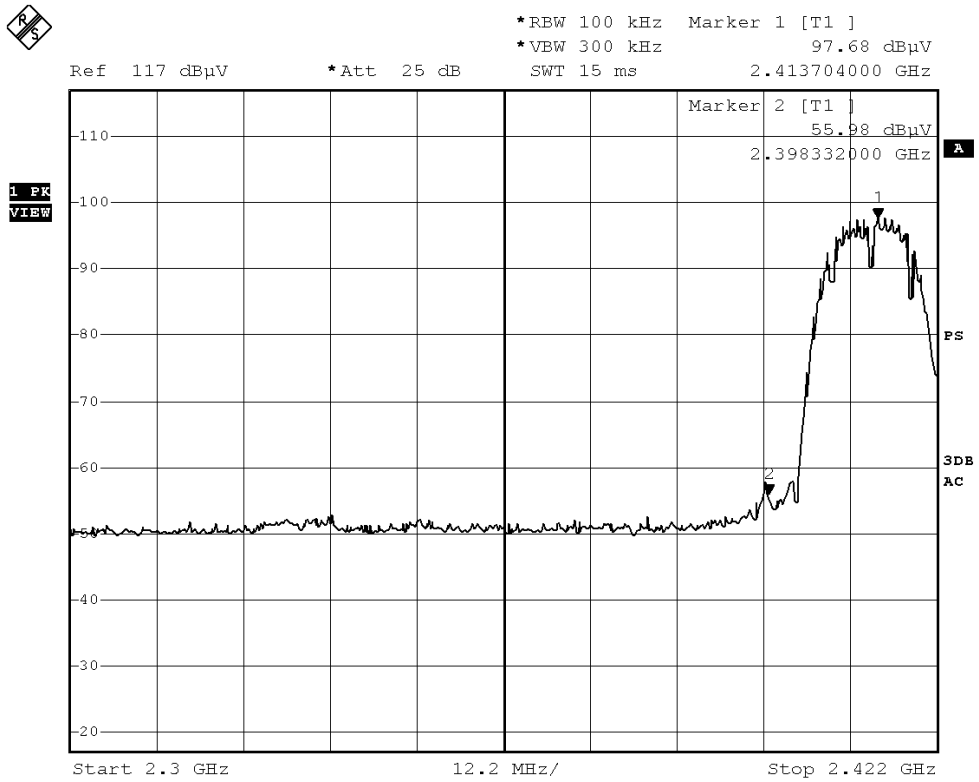
Test Method:

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.

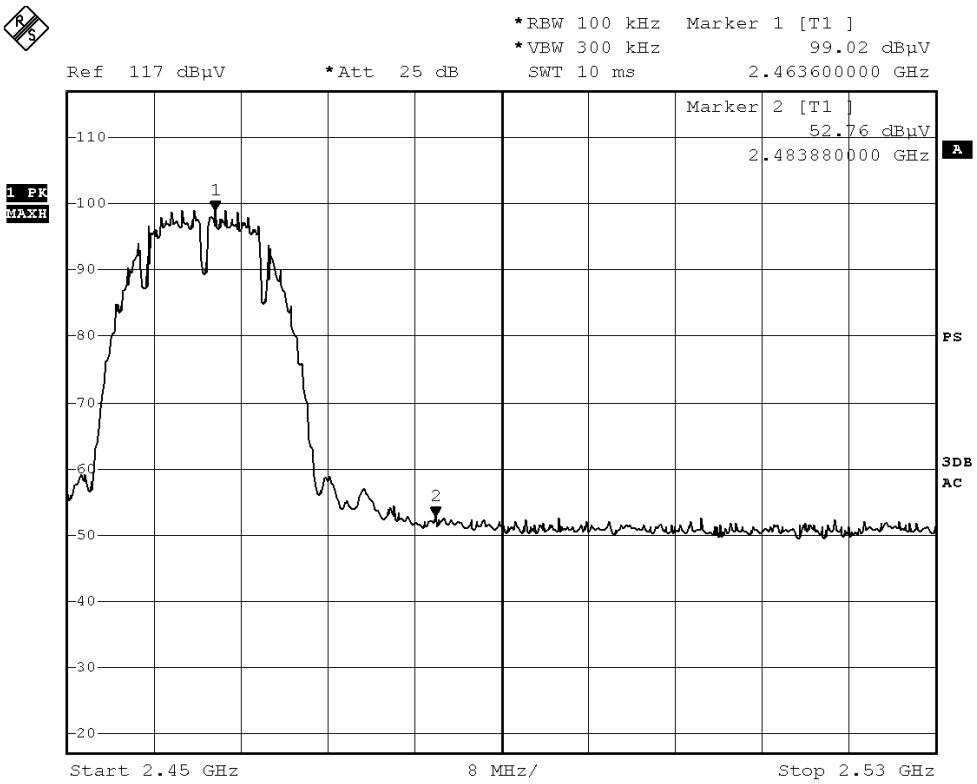
Band-edge Compliance of RF Emissions – Lowest (802.11b)



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	18.5	35.4	53.9	74.0	20.1	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	3.2	35.4	38.6	54.0	15.4	Vertical

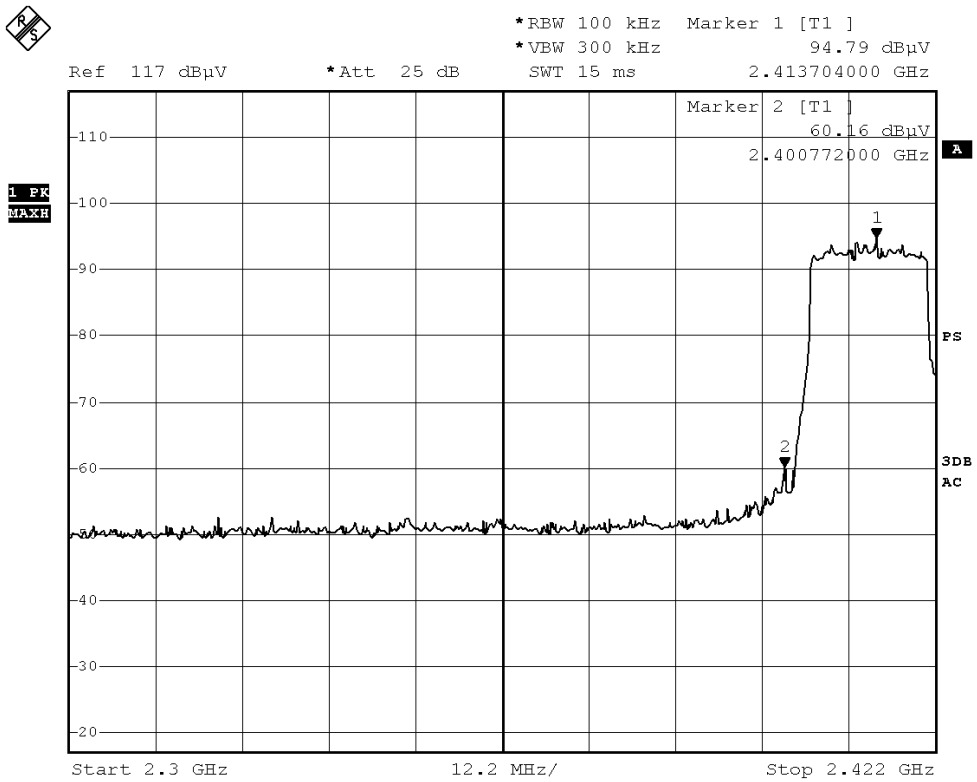
Band-edge Compliance of RF Emissions – Highest (802.11b)



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	20.0	35.4	55.4	74.0	18.6	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	6.3	35.4	41.7	54.0	12.3	Horizontal

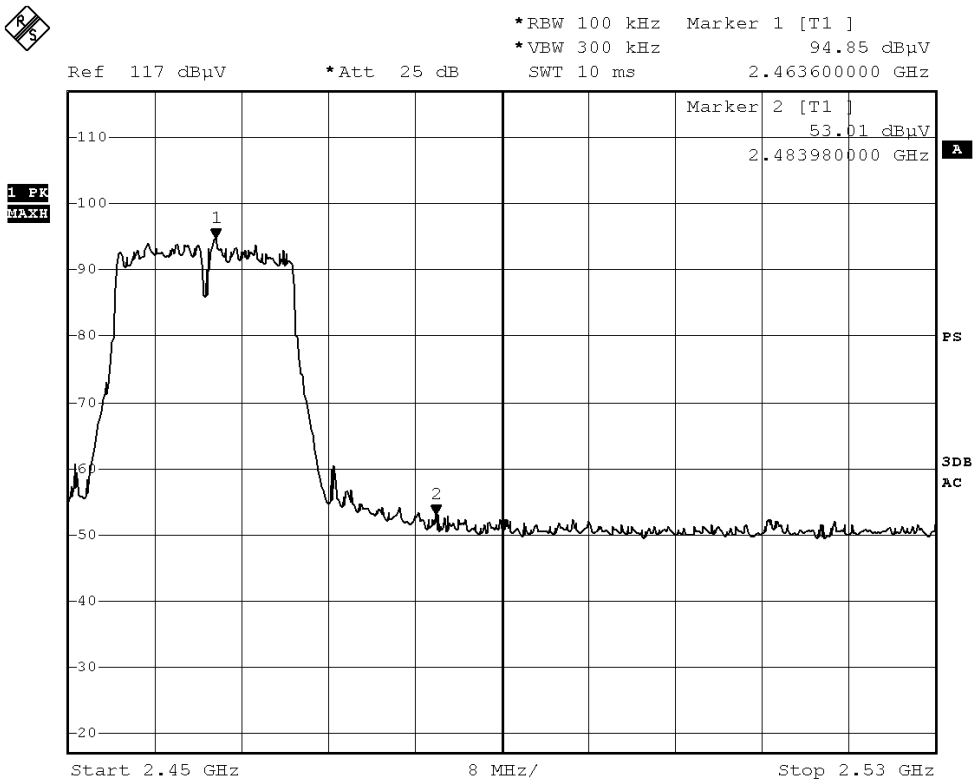
Band-edge Compliance of RF Emissions – Lowest (802.11g)



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	18.3	35.4	53.7	74.0	20.3	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	3.6	35.4	39.0	54.0	15.0	Vertical

Band-edge Compliance of RF Emissions – Highest (802.11g)



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	20.5	35.4	55.9	74.0	18.1	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	6.0	35.4	41.4	54.0	12.6	Horizontal

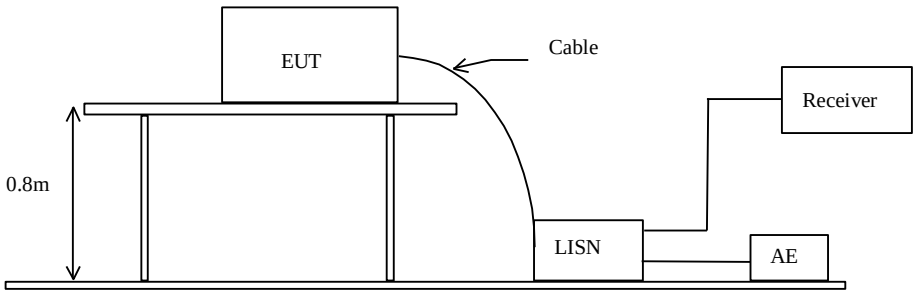
3.1.6 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2009
Test Date:	2013-10-18
Mode of Operation:	WiFi and charge mode (EUT Paired with iPod, USB port connected to Resistive load)

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:



Limit for Conducted Emissions (FCC 47 CFR 15.207):

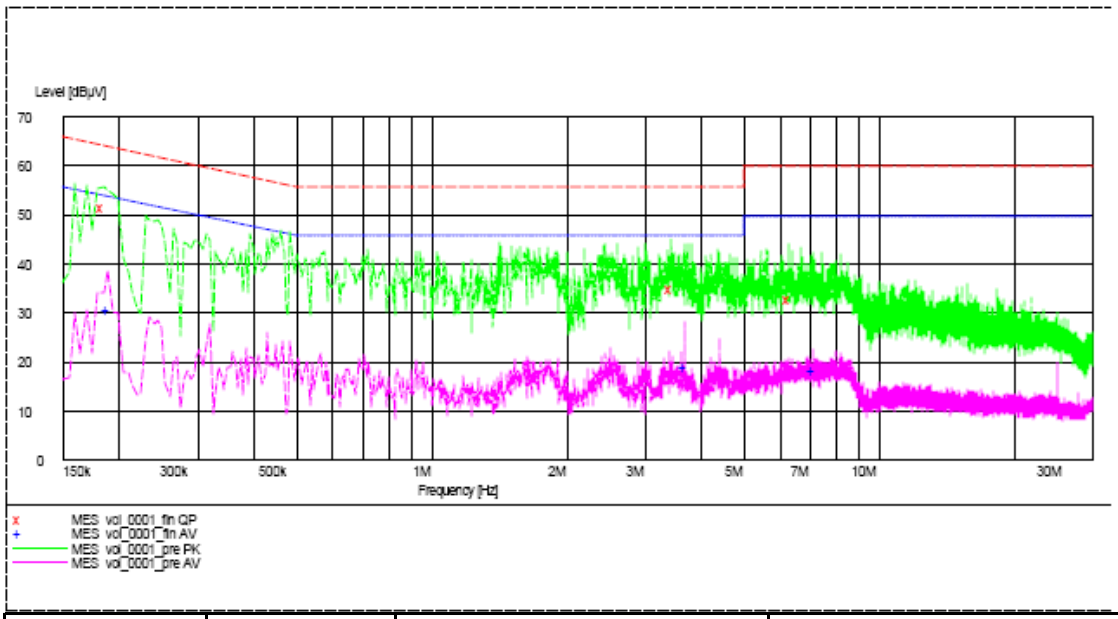
Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* 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.

Results of WiFi and charge mode (EUT Paired with iPod, USB port connected to Resistive load) (L): PASS

Please refer to the following diagram for individual results.



Conductor	Frequency	Quasi-peak		Average	
		Level	Limit	Level	Limit
Live or Neutral	MHz	dBµV	dBµV	dBµV	dBµV
Live	0.190	-*-	-*-	30.7	54.0
Live	3.680	-*-	-*-	19.0	46.0
Live	7.120	-*-	-*-	18.3	50.0
Live	0.185	51.6	64.0	-*-	-*-
Live	3.445	34.8	56.0	-*-	-*-
Live	6.300	32.8	60.0	-*-	-*-

Limit for Conducted Emissions (FCC 47 CFR 15.207):

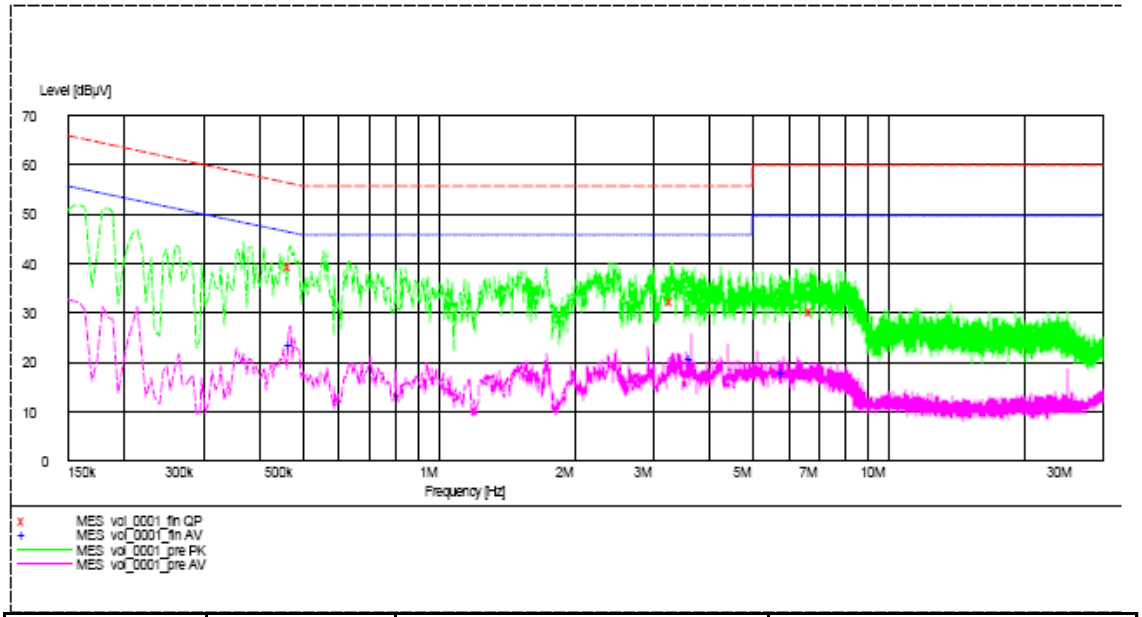
Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* 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.

Results of WiFi and charge mode (EUT Paired with iPod, USB port connected to Resistive load) (N): PASS

Please refer to the following diagram for individual results.



Conductor	Frequency	Quasi-peak		Average	
		Level	Limit	Level	Limit
Live or Neutral	MHz	dBµV	dBµV	dBµV	dBµV
Neutral	0.470	39.7	57.0	23.5	47.0
Neutral	3.665	-*-	-*-	20.7	46.0
Neutral	5.875	-*-	-*-	17.9	50.0
Neutral	3.315	32.5	56.0	-*-	-*-
Neutral	6.785	30.5	60.0	-*-	-*-

Remarks:
Calculated measurement uncertainty (0.15MHz - 30MHz): 3.2dB
-*- Emission(s) that is far below the corresponding limit line.

3.1.7 RF Exposure

Test Requirement:	FCC 47CFR 15.247(i)
Test Date:	2013-10-22
Mode of Operation:	Tx mode

Test Method:

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

Test Results:

The EUT complied with the requirement(s) of this section.
EUT meets the requirements of these sections as proven through MPE calculation
The MPE calculation for EUT @ 20cm
Based on the highest P =20.89 mW

Pd = PG/ 4pi*R^2 = (20.89 x 1.585)/12.566* $(20)^2$
= (33.11)/12.566x 400= 33.11 /5026.4
= 0.0066mW/cm^2

where:
*Pd = power density in mW/cm2
* G = Antenna numeric gain (1.585); Log G = g/10 (g = 2.0dBi).
* P = Conducted RF power to antenna (20.89 mW).
* R = Minimum allowable distance.(20 cm)

*The power density Pd = 0.0066 mW/cm^2 is less than 1 mW/cm^2 (listed MPE limit)
*The SAR evaluation is not needed (this is a desk top device, R> 20 cm)
* The EUT(antenna) must be 0.2 meters away from the General Population.

3.1.8 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 PCB antenna. There is no external antenna, the antenna gain = 2.0dBi. All component install on inside of EUT. User unable to remove or changed the Antenna.

Frequency List for 802.11 b/g
For both 20MHz bandwidth systems, use Channel 1-Channel 11.

Item	Frequency（MHz）	Item	Frequency（MHz）
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	—	—

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	2013.03.15	2014.03.14
EMD022	EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100314	2013.03.15	2014.03.14
EMD035	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100441	2013.05.28	2014.05.27
EMD036	EMI Test Receiver	ROHDE & SCHWARZ	ESIB 26	100388	2013.05.28	2014.05.27
EMD041	TWO-LINE V-NETWORK	ROHDE & SCHWARZ	ENV216	100261	2013.05.28	2014.05.27
EMD061	Biconilog Antenna	ETS.LINDGREN	3142C	00060439	2012.11.03	2014.11.02
EMD062	Double-Ridged Waveguide (1GHz – 18GHz)	ETS.LINDGREN	3117	00075933	2012.11.28	2014.11.27
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 lnstrument Co., Ltd	AN97005SS	79707454	N/A	N/A
EMD103	Intelligent Frequency	Ainuo lnstrument 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	2013.03.15	2014.03.14
	100V Insertion Unit	ROHDE & SCHWARZ	URV5-Z4	100464	2013.03.15	2014.03.14
EMD113	Pre-Amplifier	ROHDE & SCHWARZ	N/A	1129588	2013.03.15	2014.03.14
EMD124	Loop Antenna	ETS-Lindgren	6502	00104905	2012.03.26	2014.03.25
EMD131	Standard Gain Horn Antenna (18GHz – 26.5GHz)	Chengdu AINFO lnc.	JXTXLB-42-15-C-KF	J2021100721001	2013.01.25	2015.01.24

Remarks:-

CM Corrective Maintenance
N/A Not Applicable
TBD To Be Determined

Appendix B

Ancillary Equipment

ITEM NO.	DESCRIPTION	MODEL NO.	FCC ID	REMARK
1	iPod Touch	A1367	BCG-E2407	N/A
2	Resistive	N/A	N/A	N/A

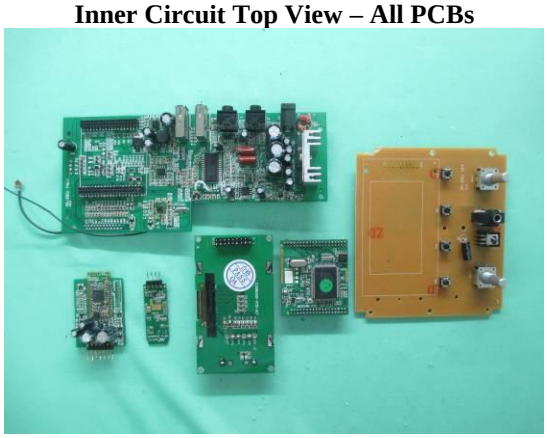
Appendix C

Photographs of EUT

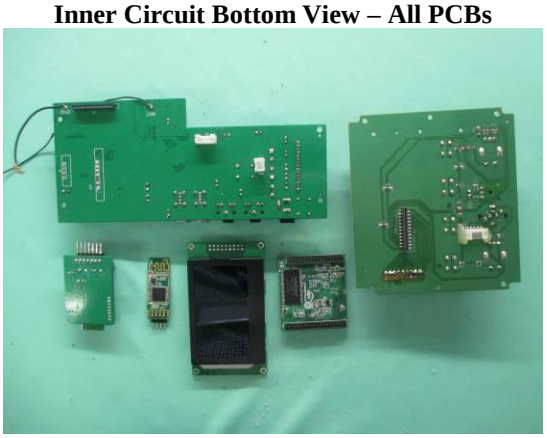
Front View of the product

Rear View of the product

Inner Circuit Top View – All PCBs

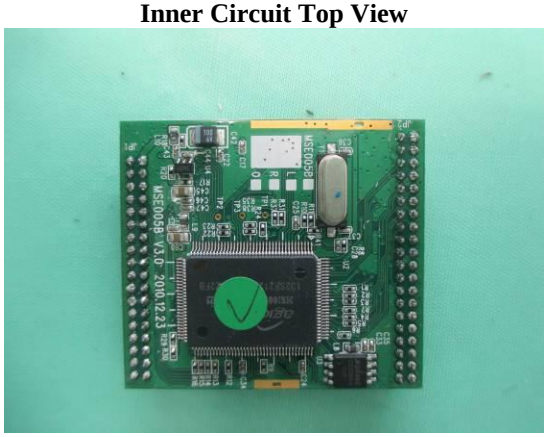


Inner Circuit Bottom View – All PCBs



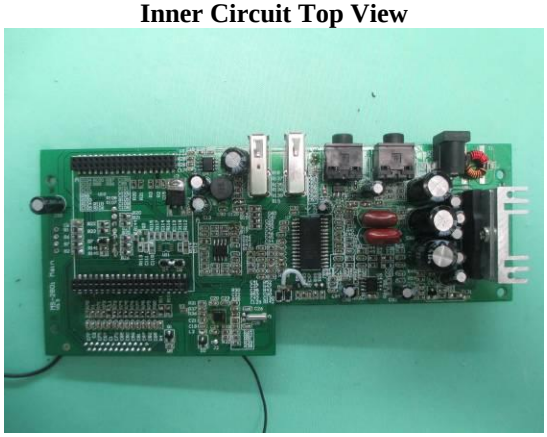
Photographs of EUT

Inner Circuit Top View

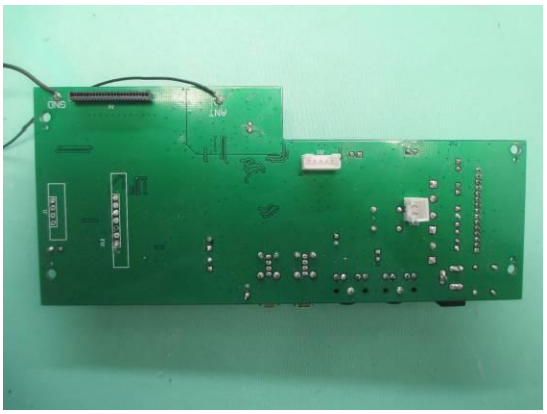


Inner Circuit Bottom View

Inner Circuit Top View

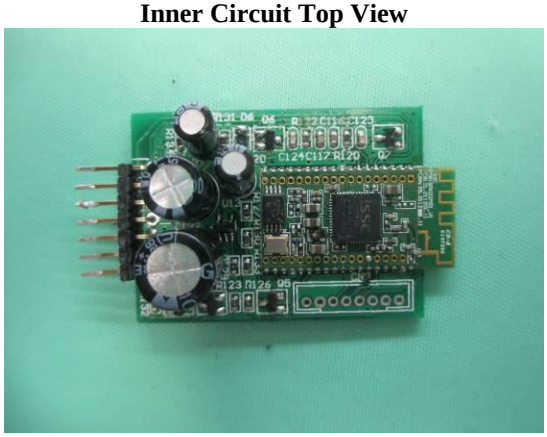


Inner Circuit Bottom View

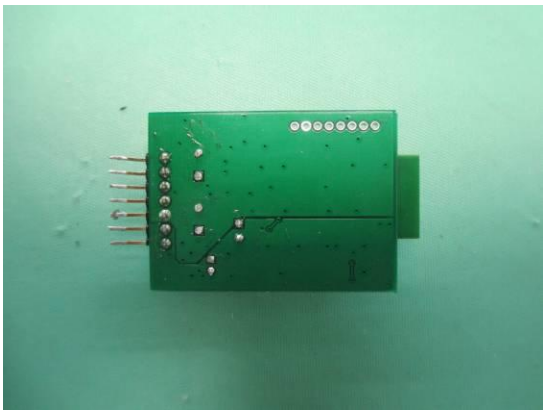


Photographs of EUT

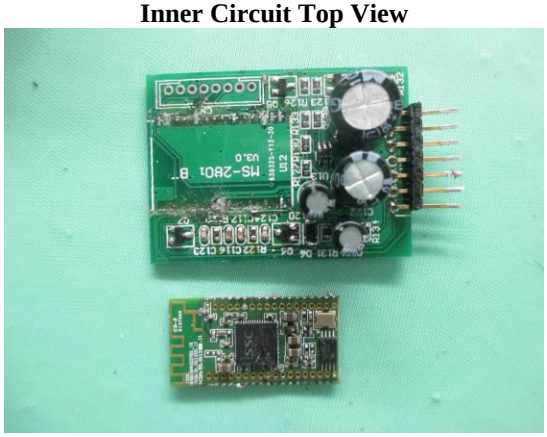
Inner Circuit Top View



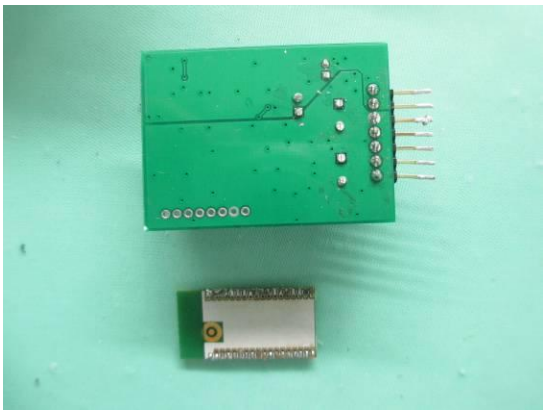
Inner Circuit Bottom View



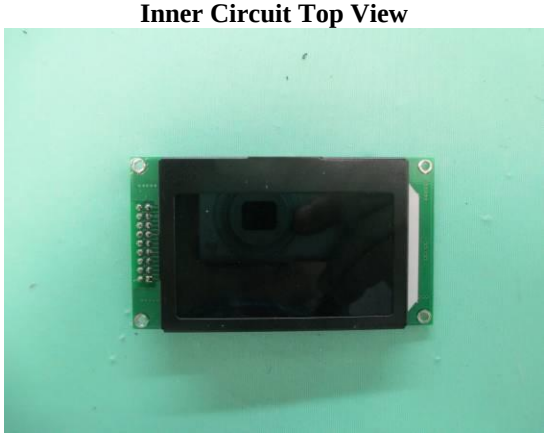
Inner Circuit Top View



Inner Circuit Bottom View



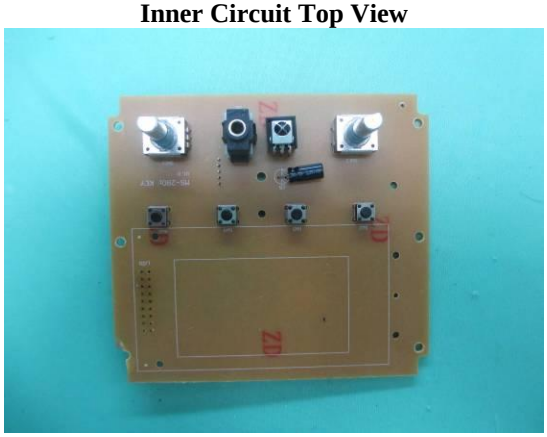
Inner Circuit Top View



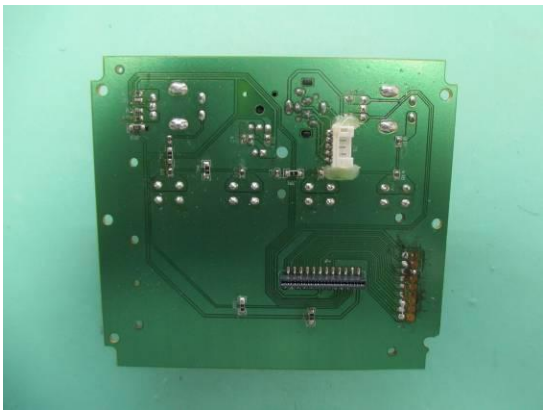
Inner Circuit Bottom View

Photographs of EUT

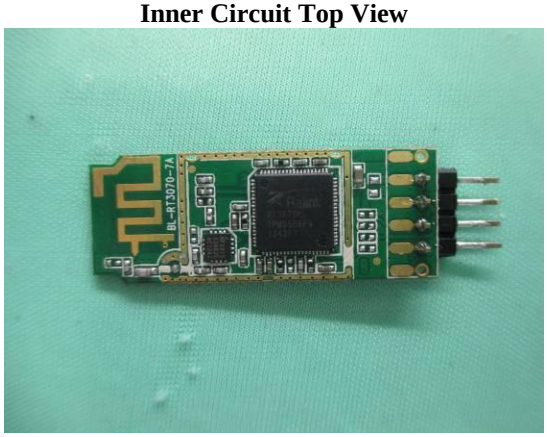
Inner Circuit Top View



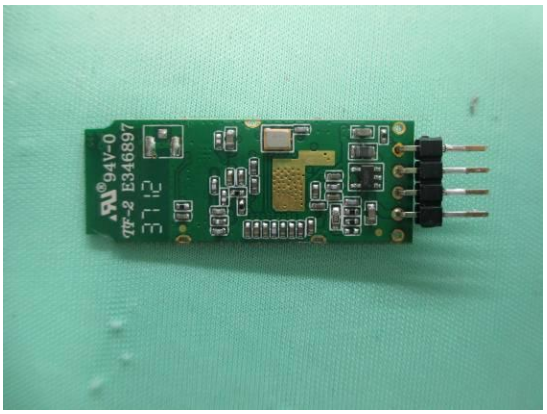
Inner Circuit Bottom View



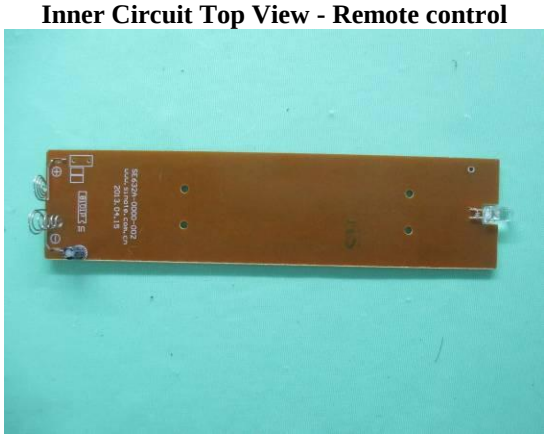
Inner Circuit Top View



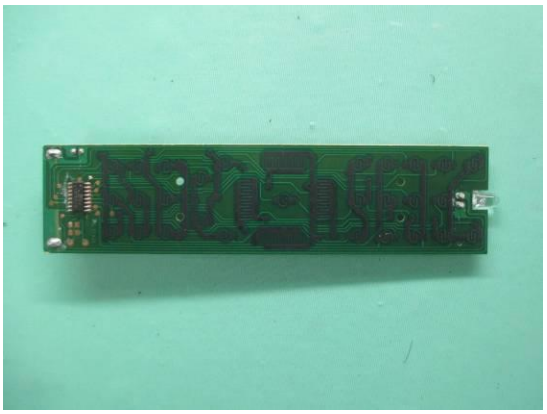
Inner Circuit Bottom View



Inner Circuit Top View - Remote control

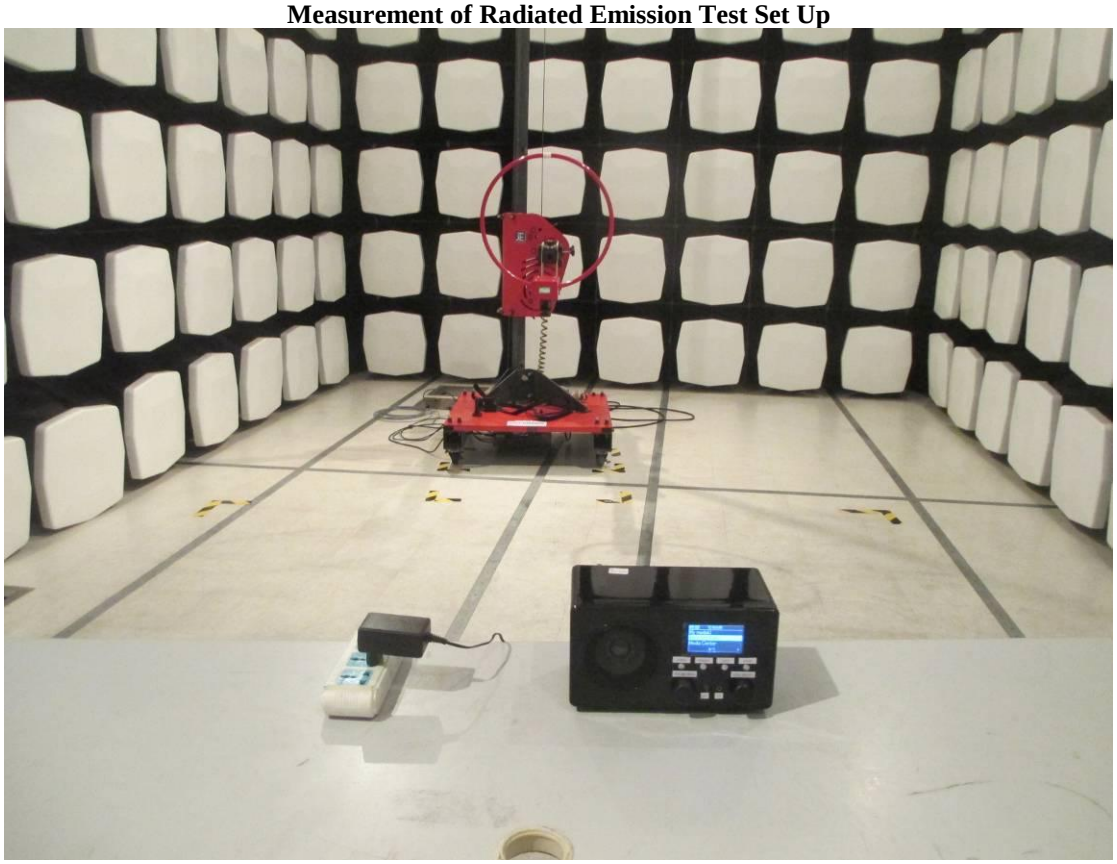


Inner Circuit Bottom View - Remote control



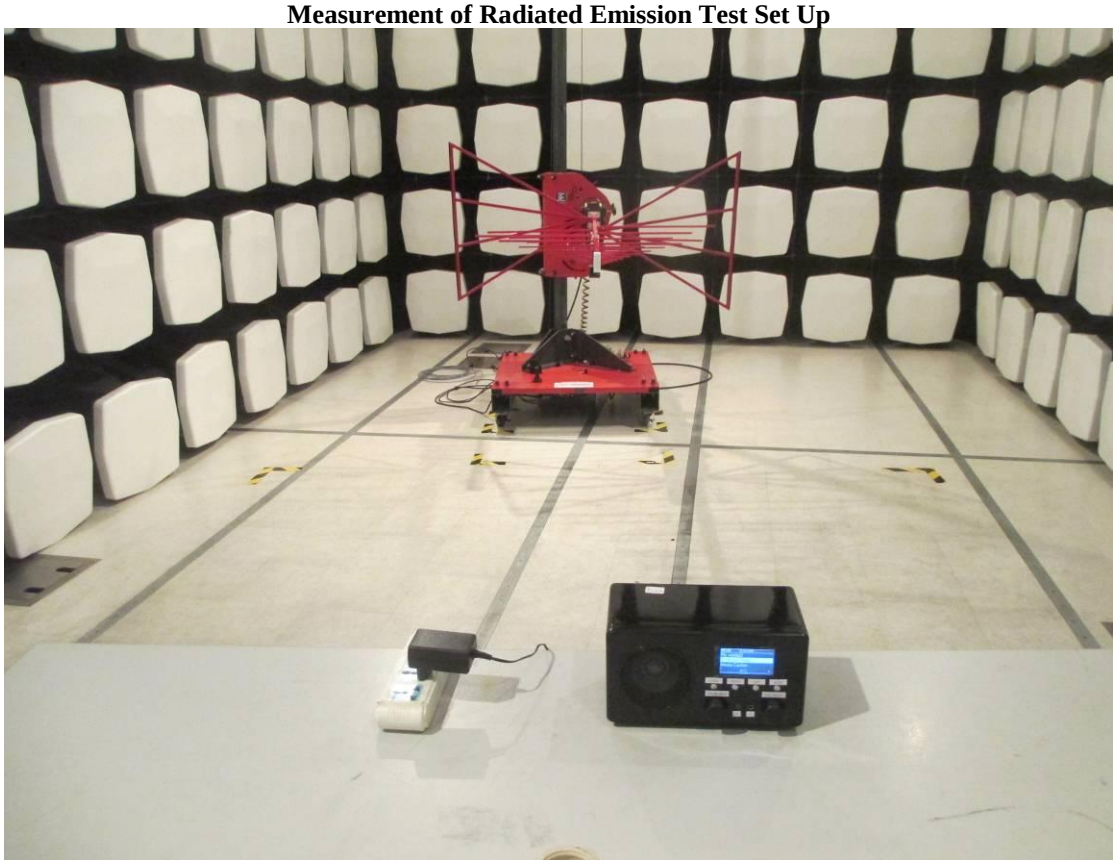
Photographs of EUT

Measurement of Radiated Emission Test Set Up



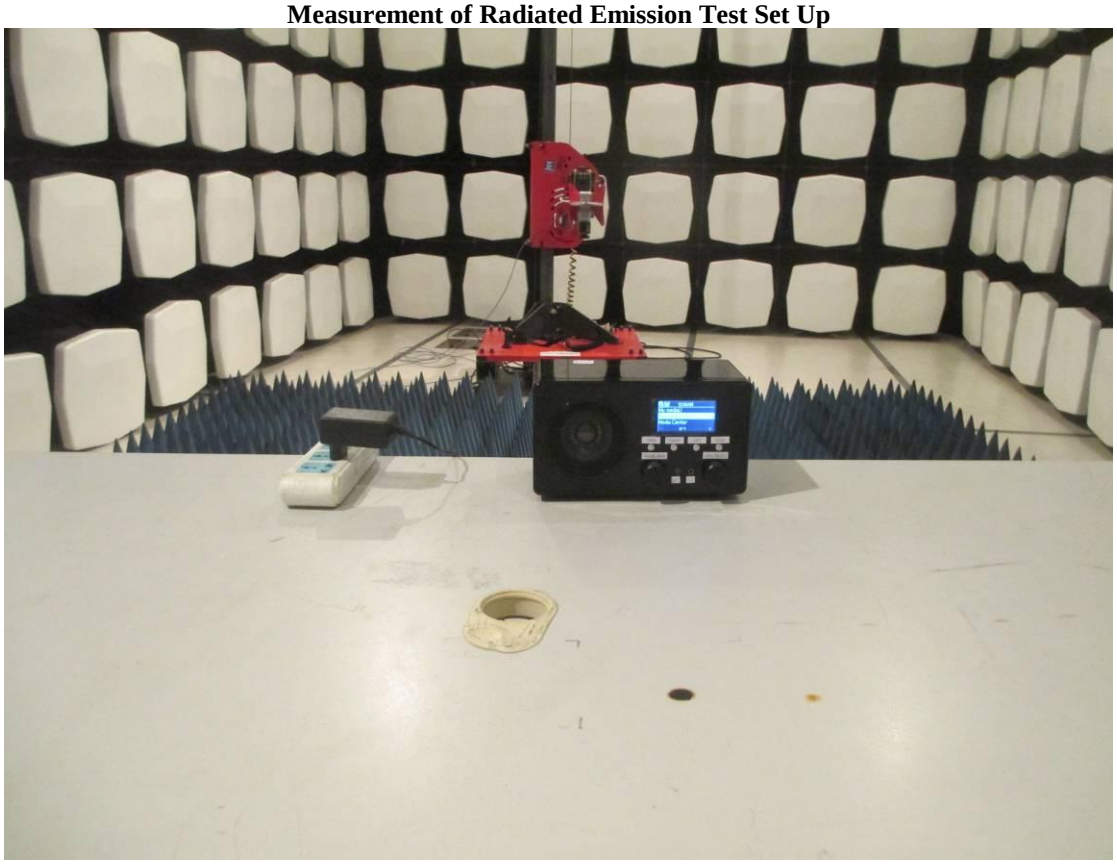
Photographs of EUT

Measurement of Radiated Emission Test Set Up



Photographs of EUT

Measurement of Radiated Emission Test Set Up



Photographs of EUT

Measurement of Conducted Emission Test Set Up

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