STC Test Report

Applicant (LEE001): Leapfrog Enterprises, Inc.
6401 Hollis Street, Suite 150, Emeryville, CA 94608-1070

Manufacturer: Leapfrog Enterprises, Inc.
Units 1601-03, 12-13, 16/F Office Tower Two The Harbourfront, 18-22 Tak Fung Street, Hung Hom, Kowloon, Hong Kong.

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

Product:	LeapPad Ultra (Rio)
Brand Name:	LeapFrog
Model Number:	33200
FCC ID:	QDX33200

Date Sample(s) Received: 2013-03-18

Date Tested: 2013-03-26 to 2013-04-05

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2011 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): For additional model(s) details, see page 4

Dr. LEE Kam Chuen
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
The Hong Kong Standards and Testing Centre Ltd.

CONTENT:

1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate

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

Product:	LeapPad Ultra (Rio)
Manufacturer:	Leapfrog Enterprises, Inc. Units 1601-03, 12-13, 16/F Office Tower Two The Harbourfront, 18-22 Tak Fung Street, Hung Hom, Kowloon, Hong Kong.
Brand Name:	LeapFrog
Model Number:	33200
Additional Model Number(s):	33300, 83333, 83334, 83335, 83336, 83337, 83338, 974-00890, 974-00891, 974-00892, 974-00893
Rating:	117Va.c. / 3.7Vd.c. (rechargeable battery x 1) The AC/DC Adaptor used for the tests was provided by the applicant with the following details: Two pins (Live / Neutral) only adaptor, Model Number: 690-11330, Input: 100V-240Va.c. 50/60Hz 0.2A, Output: 5Vd.c. 1.5A 7.5VA

1.2.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Leapfrog Enterprises, Inc., LeapPad Ultra (Rio). The transmission signal is digital modulated with channel frequency range 2412-2462MHz.

1.3 Date of Order

2013-03-18

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2013-03-26 to 2013-04-05

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: 2011 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	☒	☐	☐
Antenna requirement	FCC 47CFR 15.203	N/A	N/A	☒	☐	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

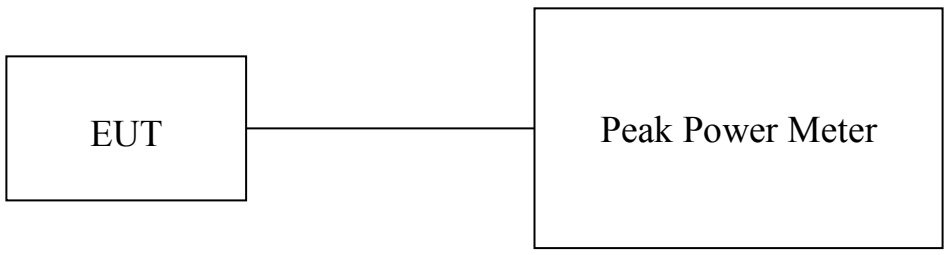
3.1.1 Maximum Peak Output Power

Test Requirement:	FCC 47CFR 15.247(b)(3)
Test Method:	N/A
Test Date:	2013-04-05
Mode of Operation:	WiFi communication mode (Fundamental Frequency – Conducted Power)

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)	Output Power (dBm)
Low	2412	0.0344	15.366
Middle	2437	0.0324	15.105
High	2462	0.0389	15.899

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

Channel	Frequency(MHz)	Output Power(Watt)	Output Power (dBm)
Low	2412	0.0308	14.886
Middle	2437	0.0272	14.346
High	2462	0.0337	15.276

Results of WiFi Tx Mode 802.11 n20, (2412MHz to 2462MHz) : Pass (TX Unit)
Maximum conducted output power

Channel	Frequency(MHz)	Output Power(Watt)	Output Power (dBm)
Low	2412	0.0233	13.674
Middle	2437	0.0174	12.405
High	2462	0.0247	13.927

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

3.1.2 Radiated Emissions

Test Requirement:	FCC 47CFR 15.247
Test Method:	ANSI C63.4:2009
Test Date:	2013-04-05
Mode of Operation:	WiFi communication mode

Test Method:

The sample was placed 0.8m above the ground plane on a standard radiated emission test site. 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. In the frequency range of 9kHz to 30MHz, The center of the loop antenna shall be 1 meter above the ground and rotated loop axis for maximum reading. The emissions worst-case are shown in Test Results of the following pages.

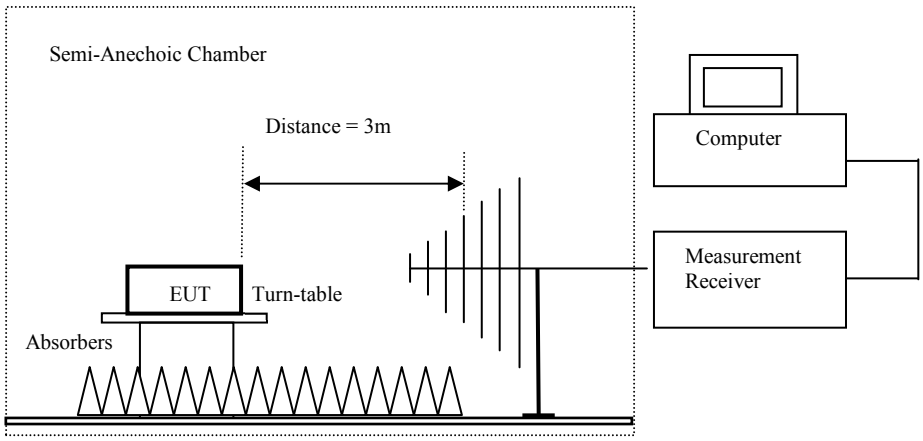
Remark: 3 orthogonal axis apply to hand-held device only.

*: Semi-anechoic chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd. with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

Spectrum Analyzer Setting:

9KHz – 30MHz (Pk & Av)	RBW:	10kHz
	VBW:	30kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
30MHz – 1GHz (QP)	RBW:	120kHz
	VBW:	120kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
Above 1GHz (Pk & Av)	RBW:	3MHz
	VBW:	3MHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold

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 WiFi communication 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 WiFi communication 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 WiFi communication mode (2412.0 MHz) (802.11b) (Above 1GHz): Pass

Field Strength of Fundamental 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	
2412.0	68.4	28	96.4	---	---	Horizontal

Field Strength of Fundamental 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	
2412.0	61.3	28	89.3	---	---	Horizontal

Result of WiFi communication 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	
4824.5	16.5	32.9	49.4	74.0	24.6	Horizontal

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	
4824.5	5.8	32.9	38.7	54.0	15.3	Horizontal

Result of WiFi communication mode (2412.0 MHz) (802.11b) (Band Edge measurement): 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	
2330.7	18.1	28.0	46.1	74.0	27.9	Horizontal
2491.3	16.3	28.0	44.3	74.0	29.7	Horizontal

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	
2330.7	12.3	28.0	40.3	54.0	13.7	Horizontal
2491.3	10.2	28.0	38.2	54.0	15.8	Horizontal

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

Field Strength of Fundamental 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	
2437.0	70.7	28.0	98.7	---	---	Horizontal

Field Strength of Fundamental 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	
2437.0	60.3	28.0	88.3	---	---	Horizontal

Result of WiFi communication 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	
2519.3	18.6	28.1	46.7	78.7	32.0	Horizontal
4874.6	16.3	32.9	49.2	74.0	24.8	Horizontal

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	dBµV/m	dBµV/m	
2519.3	9.0	28.1	37.1	68.3	31.2	Horizontal
4874.6	4.7	32.9	37.6	54.0	16.4	Horizontal

Result of WiFi communication mode (2437.0 MHz) (802.11b) (Band Edge measurement): 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	
2356.1	20.7	28.0	48.7	74.0	25.3	Horizontal
2489.3	14.1	28.0	42.1	74.0	31.9	Horizontal

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	
2356.1	12.3	28.0	40.3	54.0	13.7	Horizontal
2489.3	8.1	28.0	36.1	54.0	17.9	Horizontal

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

Field Strength of Fundamental 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	
2462.0	69.3	28.0	97.3	---	---	Horizontal

Field Strength of Fundamental 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	
2462.0	60.1	28.0	88.1	---	---	Horizontal

Result of WiFi communication mode (2462.0 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	
2541.0	19.9	28.2	48.1	74.0	25.9	Horizontal
4923.9	17.8	32.9	50.7	74.0	23.3	Horizontal

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	
2541.0	11.1	28.2	39.3	54.0	14.7	Horizontal
4923.9	4.8	32.9	37.7	54.0	16.3	Horizontal

Result of WiFi communication mode (2462.0 MHz) (802.11b) (Band Edge measurement): 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	
2391.3	24.1	28.0	52.1	74.0	21.9	Horizontal
2484.1	18.3	28.0	46.3	74.0	27.7	Horizontal

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	
2391.3	14.9	28.0	42.9	54.0	11.1	Horizontal
2484.1	10.9	28.0	38.9	54.0	15.1	Horizontal

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

Field Strength of Fundamental 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	
2412.0	68.8	28.0	96.8	---	---	Horizontal

Field Strength of Fundamental 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	
2412.0	57.1	28.0	85.1	---	---	Horizontal

Result of WiFi communication 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	
4825.0	16.2	32.9	49.1	74.0	24.9	Horizontal

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	
4825.0	4.2	32.9	37.1	54.0	16.9	Horizontal

Result of WiFi communication mode (2412.0 MHz) (802.11g) (Band Edge measurement): 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	
2331.1	20.3	28.0	48.3	74.0	25.7	Horizontal
2491.2	17.1	28.0	45.1	74.0	28.9	Horizontal

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	
2331.1	9.1	28.0	37.1	54.0	16.9	Horizontal
2491.2	8.2	28.0	36.2	54.0	17.8	Horizontal

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

Field Strength of Fundamental 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	
2437.0	66.7	28.0	94.7	---	---	Horizontal

Field Strength of Fundamental 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	
2437.0	55.2	28.0	83.2	---	---	Horizontal

Result of WiFi communication mode (2437.0 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	
2519.3	15.1	28.1	43.2	74.7	31.5	Horizontal
4874.6	12.3	32.9	45.2	74.0	28.8	Horizontal

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	
2519.3	8.7	28.1	36.8	63.2	26.4	Horizontal
4874.6	3.8	32.9	36.7	54.0	17.3	Horizontal

Result of WiFi communication mode (2437.0 MHz) (802.11g) (Band Edge measurement): 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	
2358.1	21.1	28.0	49.1	74.0	24.9	Horizontal
2488.9	14.1	28.0	42.1	74.0	31.9	Horizontal

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	
2358.1	8.8	28.0	36.8	54.0	17.2	Horizontal
2488.9	6.1	28.0	34.1	54.0	19.9	Horizontal

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

Field Strength of Fundamental 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	
2462.0	65.2	28.0	93.2	---	---	Horizontal

Field Strength of Fundamental 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	
2462.0	52.3	28.0	80.3	---	---	Horizontal

Result of WiFi communication 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	
2541.2	18.0	28.1	46.1	73.2	27.1	Horizontal
4928.4	12.0	33.0	45.0	74.0	29.0	Horizontal

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	
2541.2	9.2	28.1	37.3	60.3	23.0	Horizontal
4928.4	4.1	33.0	37.1	54.0	16.9	Horizontal

Result of WiFi communication mode (2462.0 MHz) (802.11g) (Band Edge measurement): 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	
2389.3	18.3	28.0	46.3	74.0	27.7	Horizontal
2485.7	19.8	28.0	47.8	74.0	26.2	Horizontal

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	
2389.3	8.7	28.0	36.7	54.0	17.3	Horizontal
2485.7	9.3	28.0	37.3	54.0	16.7	Horizontal

Result of WiFi communication mode (2412.0 MHz) (802.11 n20) (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 WiFi communication mode (2412.0 MHz) (802.11 n20) (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 WiFi communication mode (2412.0 MHz) (802.11n) (Above 1GHz): Pass

Field Strength of Fundamental 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	
2412.0	66.1	28.0	94.1	---	---	Horizontal

Field Strength of Fundamental 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	
2412.0	54.9	28.0	82.9	---	---	Horizontal

Result of WiFi communication mode (2412.0 MHz) (802.11 n20) (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	
4824.5	10.2	32.9	43.1	74.0	30.9	Horizontal

Result of WiFi communication mode (2412.0 MHz) (802.11 n20) (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	
4824.5	3.4	32.9	36.3	54.0	17.7	Horizontal

Result of WiFi communication mode (2412.0 MHz) (802.11 n20) (Band Edge measurement): 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	
2332.4	17.1	28.0	45.1	74.0	28.9	Horizontal
2490.2	24.2	28.0	52.2	74.0	21.8	Horizontal

Result of WiFi communication mode (2412.0 MHz) (802.11 n20) (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	
2332.4	9.3	28.0	37.3	54.0	16.7	Horizontal
2490.2	11.2	28.0	39.2	54.0	14.8	Horizontal

Result of WiFi communication mode (2437.0 MHz) (802.11 n20) (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 WiFi communication mode (2437.0 MHz) (802.11 n20) (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 WiFi communication mode (2437.0 MHz) (802.11 n20) (Above 1GHz): Pass

Field Strength of Fundamental 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	
2437.0	64.8	28.0	92.8	---	---	Horizontal

Field Strength of Fundamental 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	
2437.0	52.1	28.0	80.1	---	---	Horizontal

Result of WiFi communication mode (2437.0 MHz) (802.11 n20) (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	
2519.3	15.1	28.1	43.2	72.8	29.6	Horizontal
4875.1	12.4	32.9	45.3	74.0	28.7	Horizontal

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	
2519.3	8.8	28.1	36.9	60.1	23.2	Horizontal
4875.1	4.9	32.9	37.8	54.0	16.2	Horizontal

Result of WiFi communication mode (2437.0 MHz) (802.11 n20) (Band Edge Measurement): 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	
2356.1	19.3	28.0	47.3	74.0	26.7	Horizontal
2488.7	15.1	28.0	43.1	74.0	30.9	Horizontal

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	
2356.1	10.1	28.0	38.1	54.0	15.9	Horizontal
2488.7	9.1	28.0	37.1	54.0	16.9	Horizontal

Result of WiFi communication mode (2462.0 MHz) (802.11 n20) (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 WiFi communication mode (2462.0 MHz) (802.11 n20) (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 WiFi communication mode (2462.0 MHz) (802.11 n20) (Above 1GHz): Pass

Field Strength of Fundamental 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	
2462.0	64.3	28.0	92.3	---	---	Horizontal

Field Strength of Fundamental 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	
2462.0	52.7	28.0	80.7	---	---	Horizontal

Result of WiFi communication mode (2462.0 MHz) (802.11 n20) (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	
2541.3	17.6	28.3	45.9	72.3	26.4	Horizontal
4922.8	11.2	32.9	44.1	74.0	29.9	Horizontal

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	
2541.3	9.6	28.3	37.9	60.7	22.8	Horizontal
4922.8	4.4	32.9	37.3	54.0	16.7	Horizontal

Result of WiFi communication mode (2462.0 MHz) (802.11 n20) (Band Edge Measurement): 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	
2385.4	20.1	28.0	48.1	74.0	25.9	Horizontal
2489.1	16.7	28.0	44.7	74.0	29.3	Horizontal

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	
2385.4	10.3	28.0	38.3	54.0	15.7	Horizontal
2489.1	9.1	28.0	37.1	54.0	16.9	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 communication mode (30MHz – 1GHz) – 3.7Vd.c.: 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	
92.30	16.9	10.0	26.9	22.1	150.0	Horizontal
123.60	16.2	9.1	25.3	18.4	150.0	Horizontal
277.50	18.5	14.8	33.3	46.2	200.0	Horizontal
388.50	15.7	18.4	34.1	50.7	200.0	Horizontal
700.00	12.2	24.9	37.1	71.6	200.0	Horizontal
832.40	5.8	25.8	31.6	38.0	200.0	Horizontal

Result of WiFi communication mode (30MHz – 1GHz) – 117Va.c.: 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	
92.30	18.7	10.0	28.7	27.2	150.0	Horizontal
123.60	20.0	9.1	29.1	28.5	150.0	Horizontal
277.50	20.6	14.8	35.4	58.9	200.0	Horizontal
388.50	17.7	18.4	36.1	63.8	200.0	Horizontal
700.00	12.4	24.9	37.3	73.3	200.0	Horizontal
832.40	6.3	25.8	32.1	40.3	200.0	Horizontal

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:	2013-06-04
Mode of Operation:	WiFi communication 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.

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 level / 100kHz band (dBm)	Maximum Power spectral density / 3kHz band limit
2412.0	**3.0**	**8dBm**
2437.0	**3.3**	**8dBm**
2462.0	**3.6**	**8dBm**

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

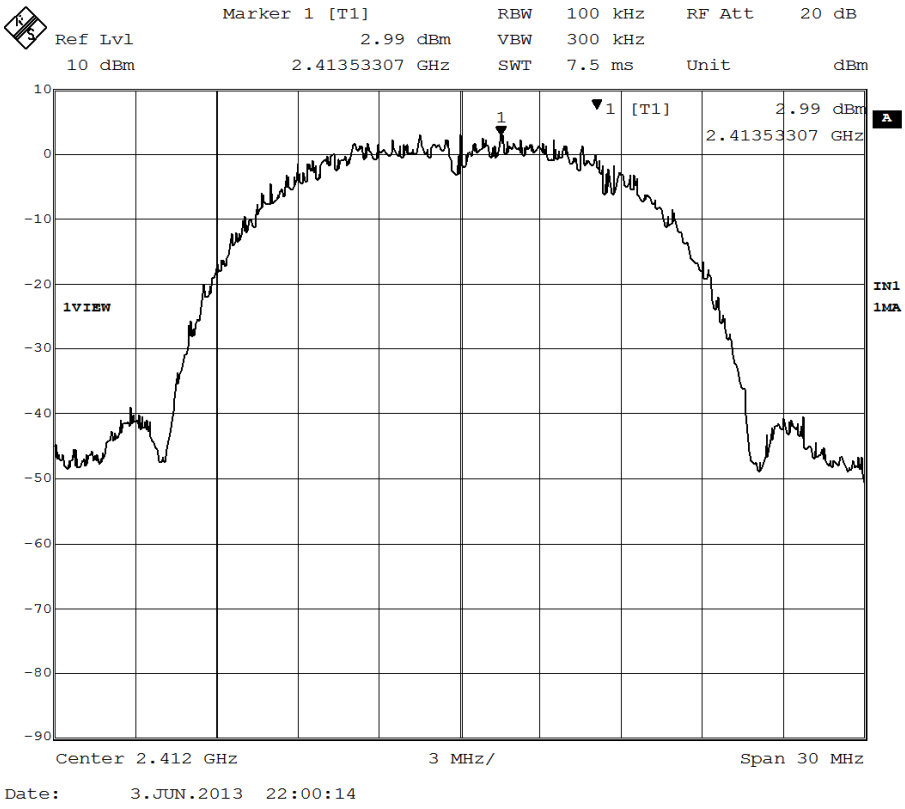
Transmitter Frequency (MHz)	Maximum Power spectral density level / 100kHz band (dBm)	Maximum Power spectral density / 3kHz band limit
2412.0	**0.8**	**8dBm**
2437.0	**0.6**	**8dBm**
2462.0	**1.3**	**8dBm**

Results of WiFi Mode 802.11 n20 (Tx:2412MHz to 2462MHz) : Pass (TX Unit)
Maximum power spectral density

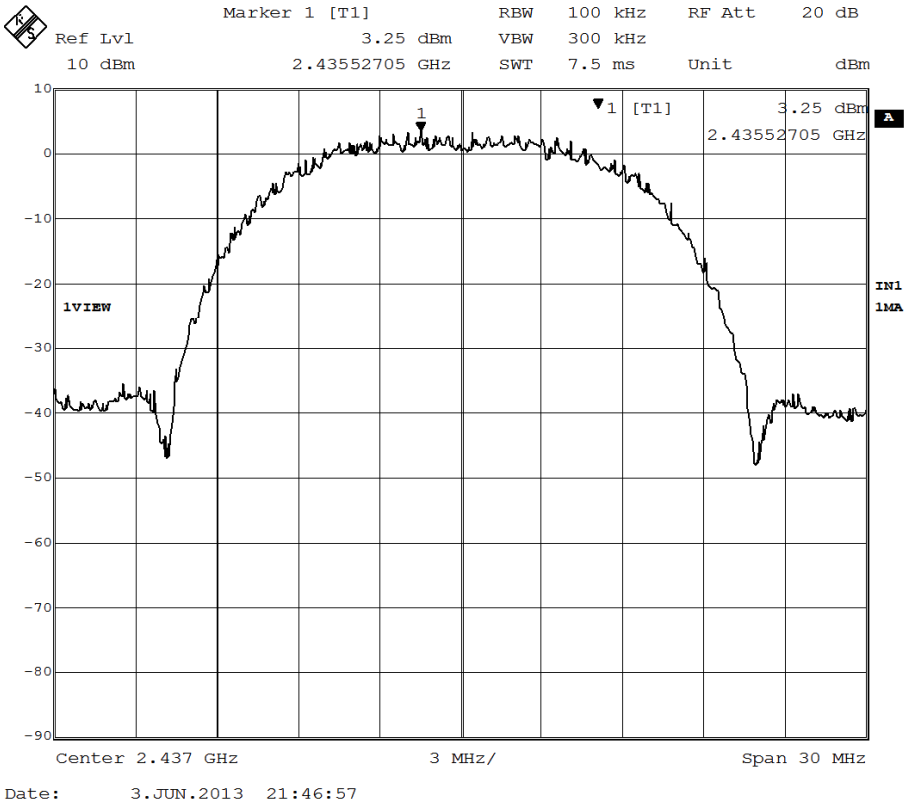
Transmitter Frequency (MHz)	Maximum Power spectral density level / 100kHz band (dBm)	Maximum Power spectral density / 3kHz band limit
2412.0	**-1.2**	**8dBm**
2437.0	**0.0**	**8dBm**
2462.0	**1.5**	**8dBm**

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

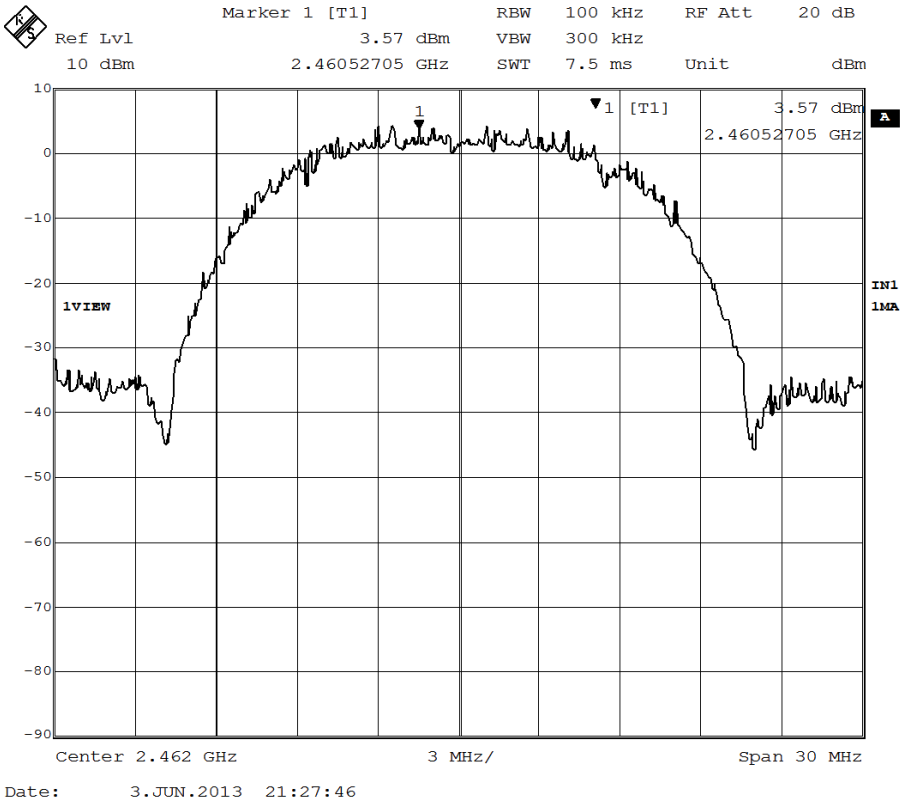
CH 1 (2412.0 MHz)



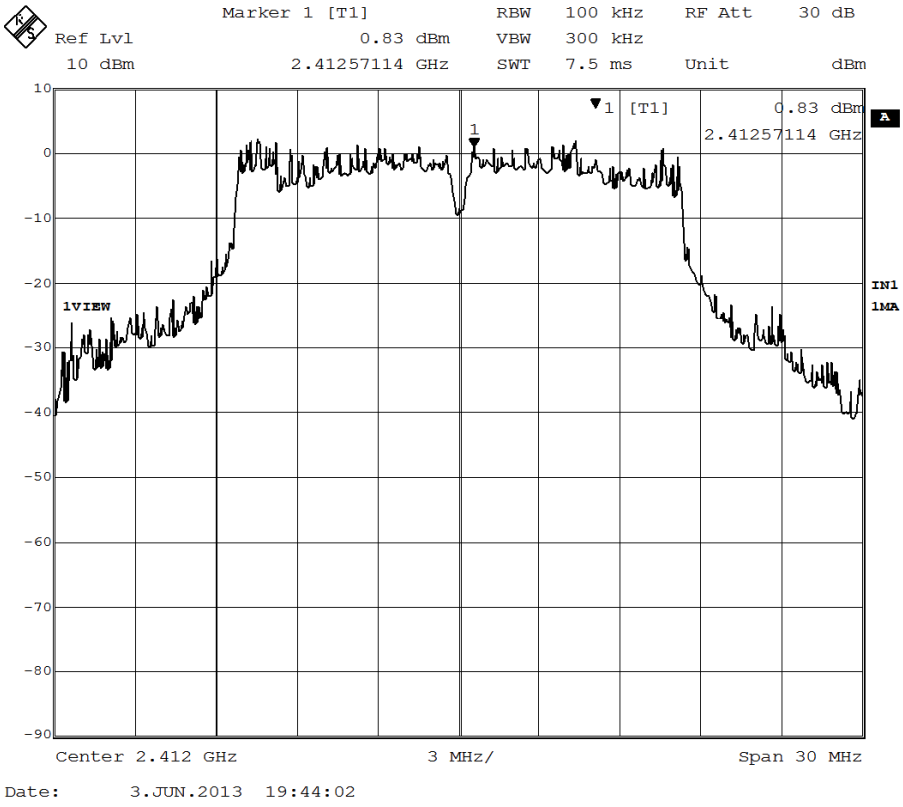
CH 6 (2437.0 MHz)



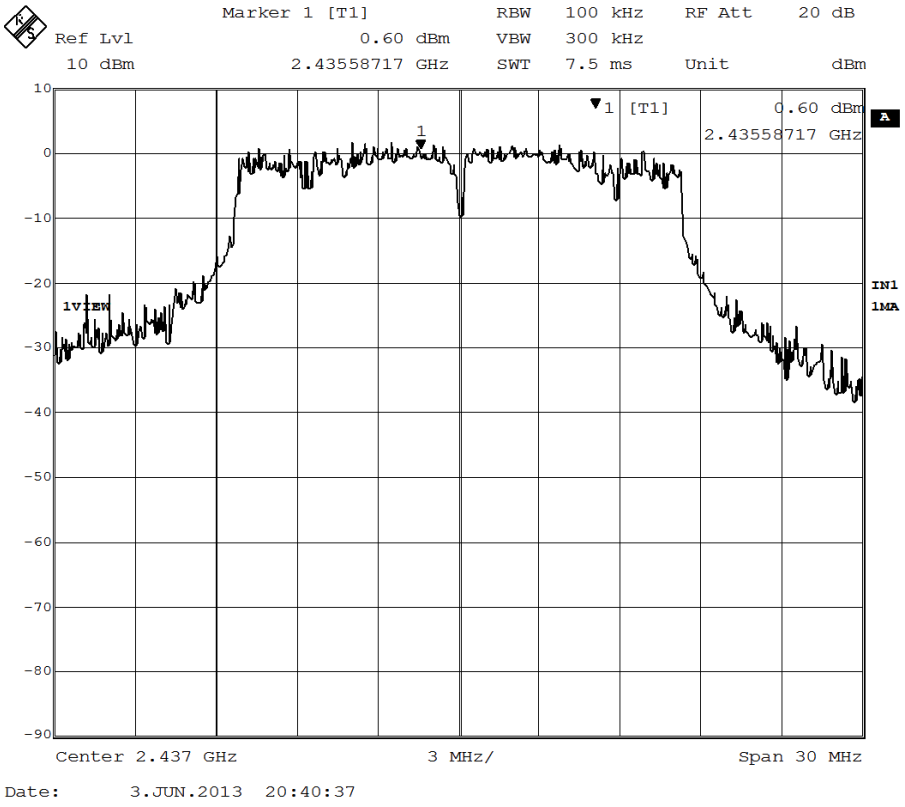
CH 11 (2462.0 MHz)



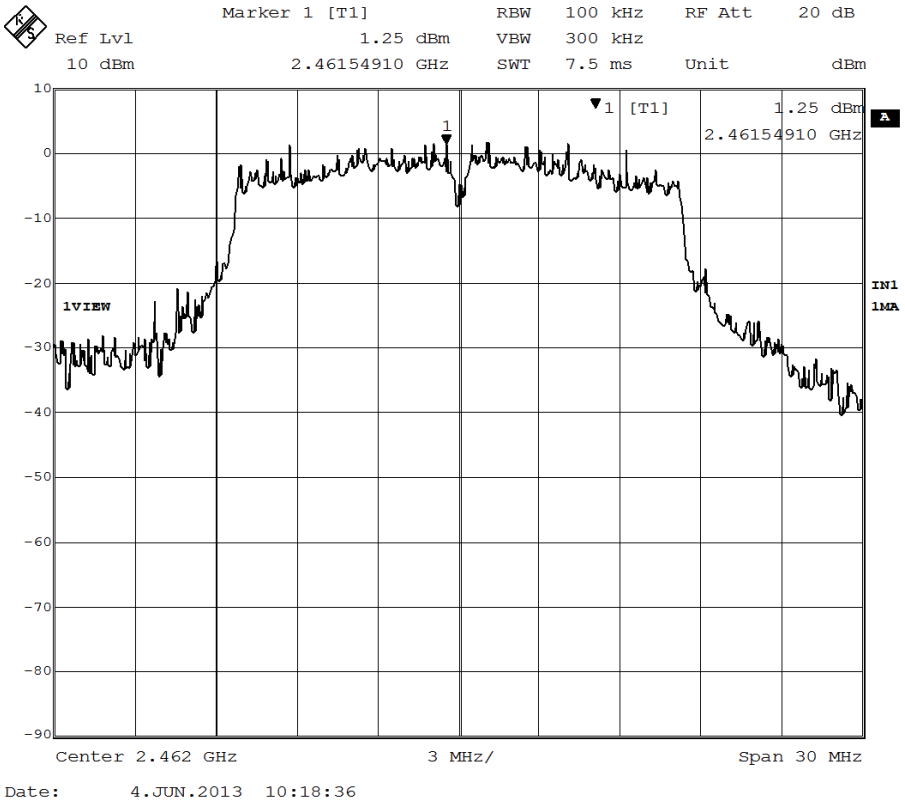
WiFi mode 802.11 g, (Tx:2412MHz to 2462MHz)
Ch 1 (2412.0 MHz)



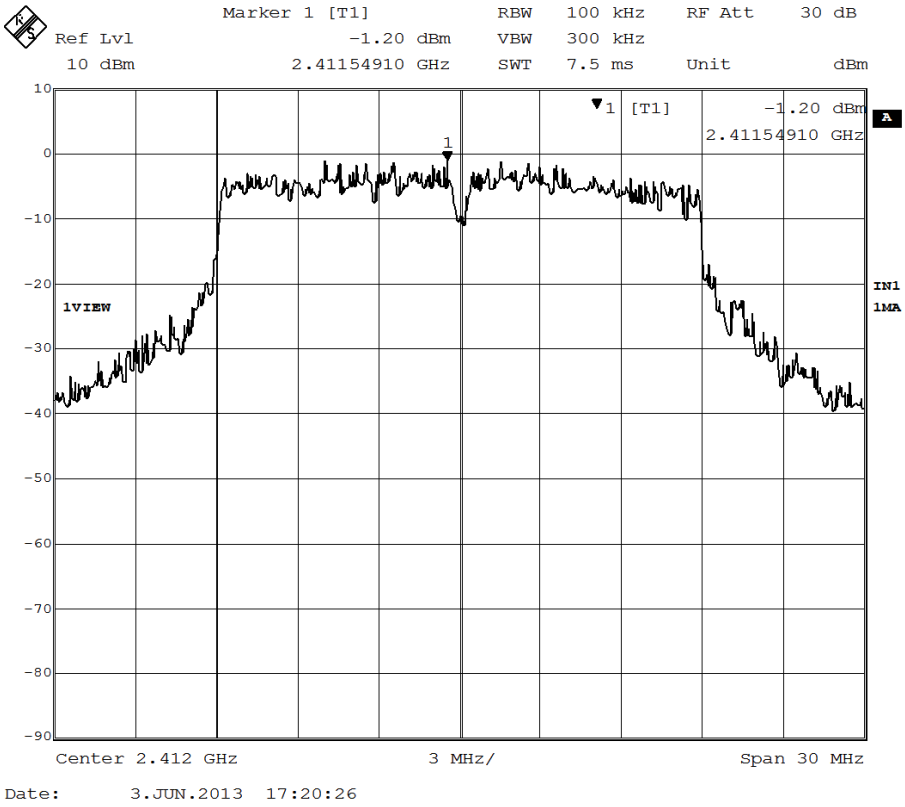
CH 6 (2437.0 MHz)



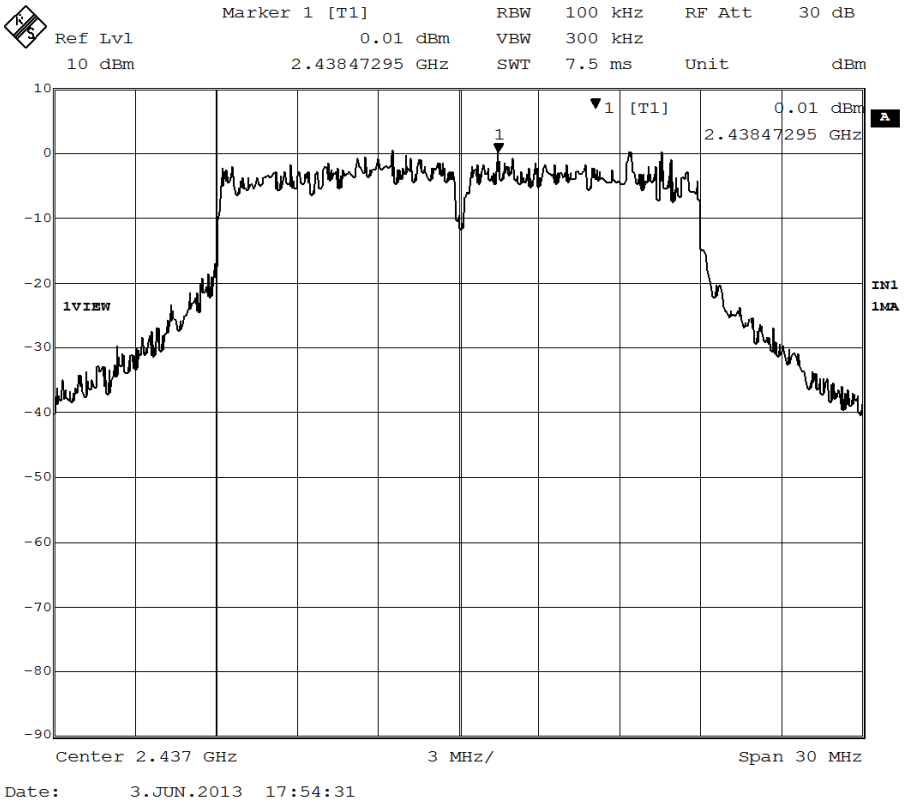
CH 11 (2462.0 MHz)



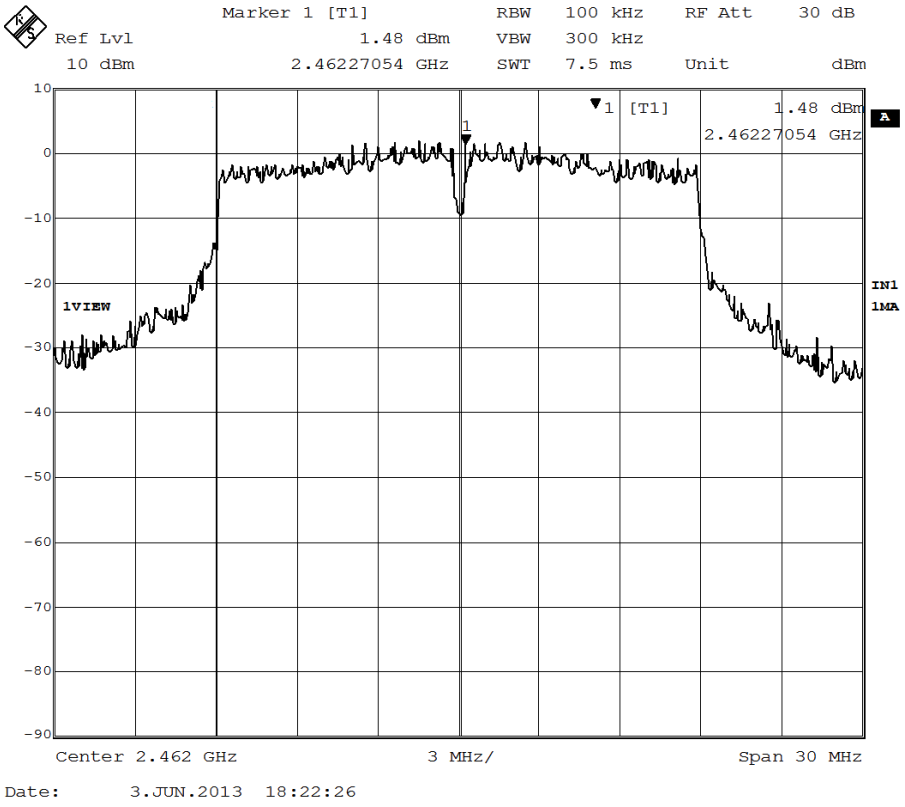
WiFi mode 802.11 n20, (Tx: 2412MHz to 2462MHz)
CH 1 (2412.0 MHz)



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:	2013-06-04
Mode of Operation:	WiFi communication 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.

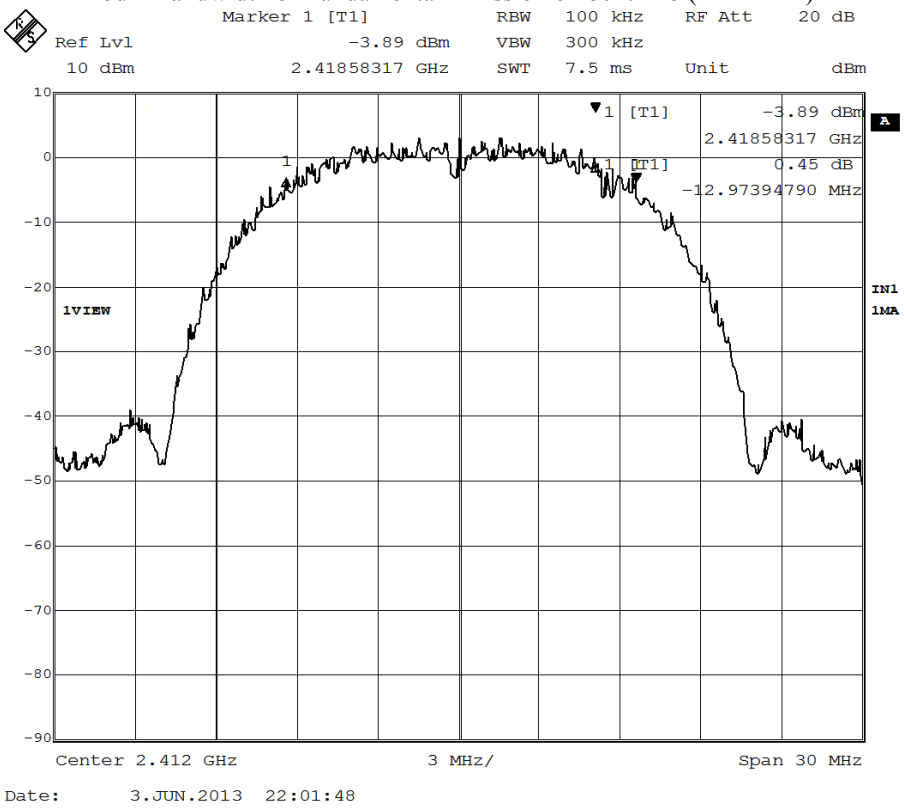
Test Setup:

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	12.97	> 500

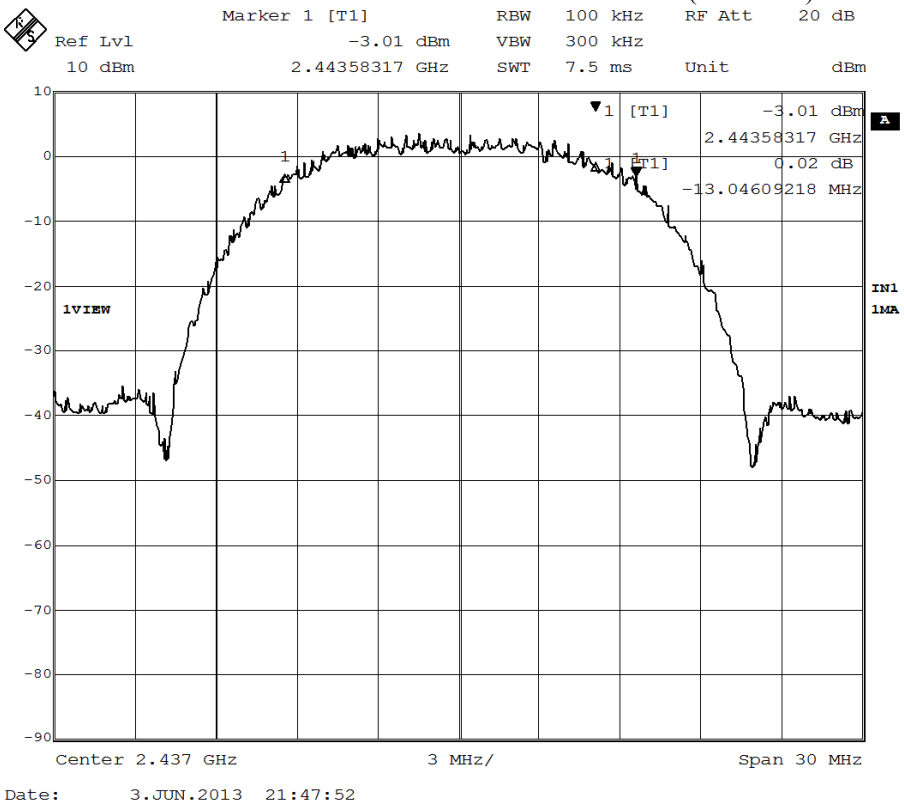
6dB Bandwidth of Fundamental Emission on 802.11 b (2412MHz)



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2437.0	13.05	> 500

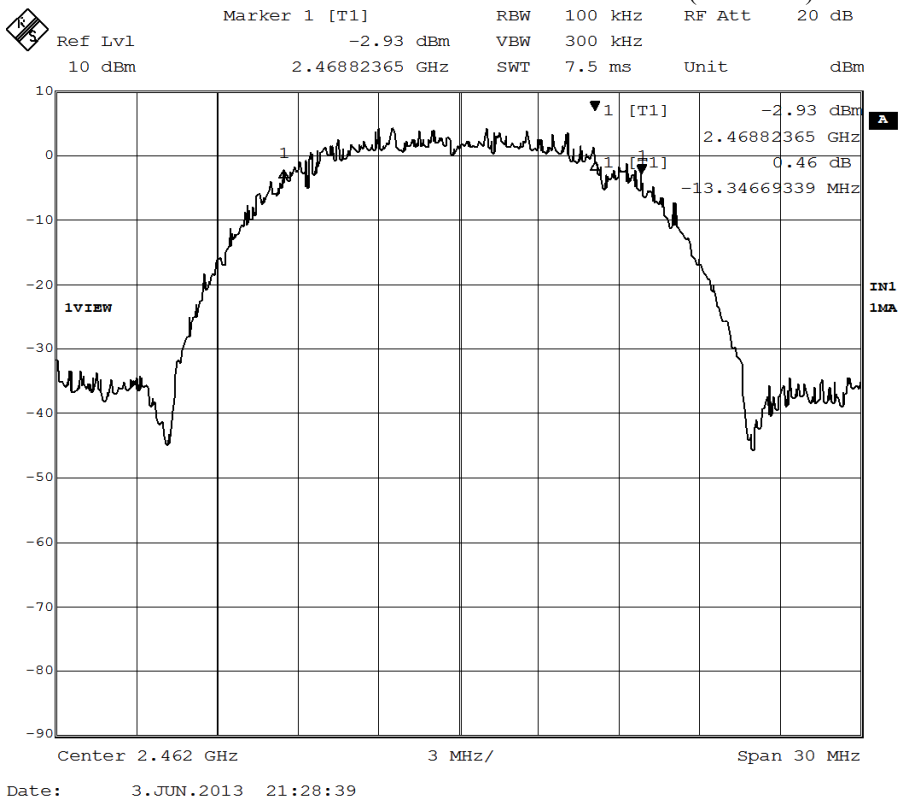
6dB Bandwidth of Fundamental Emission on 802.11 b (2437MHz)



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2467.0	13.35	> 500

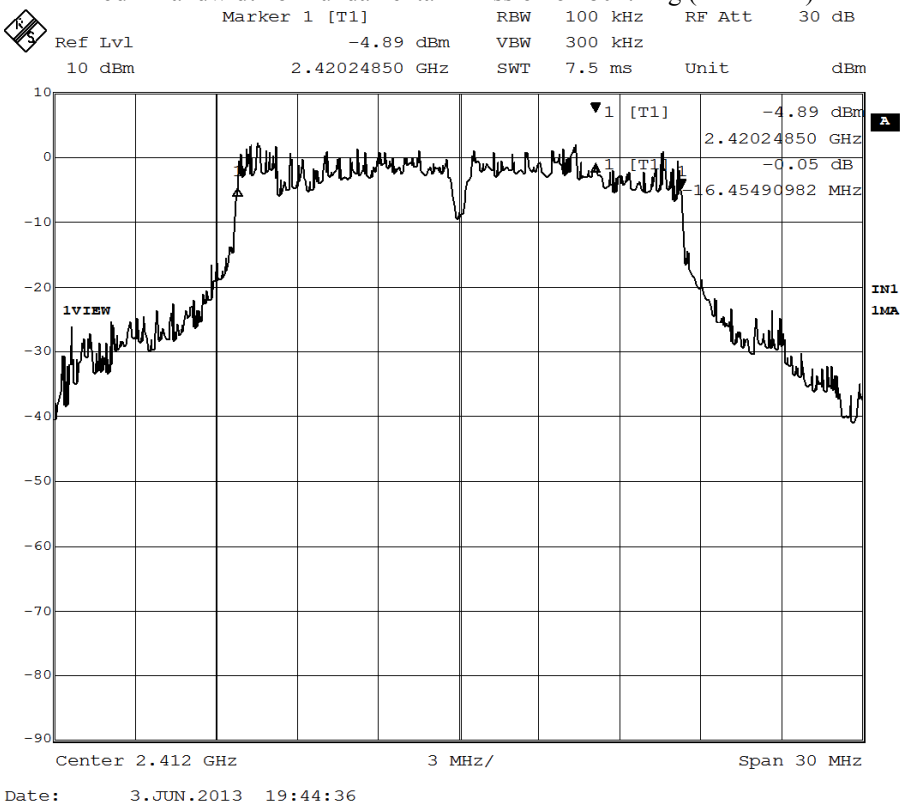
6dB Bandwidth of Fundamental Emission on 802.11 b (2462MHz)



Limits for 6dB Spectrum Bandwidth Measurement:

Center Frequency [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2412.0	16.45	> 500

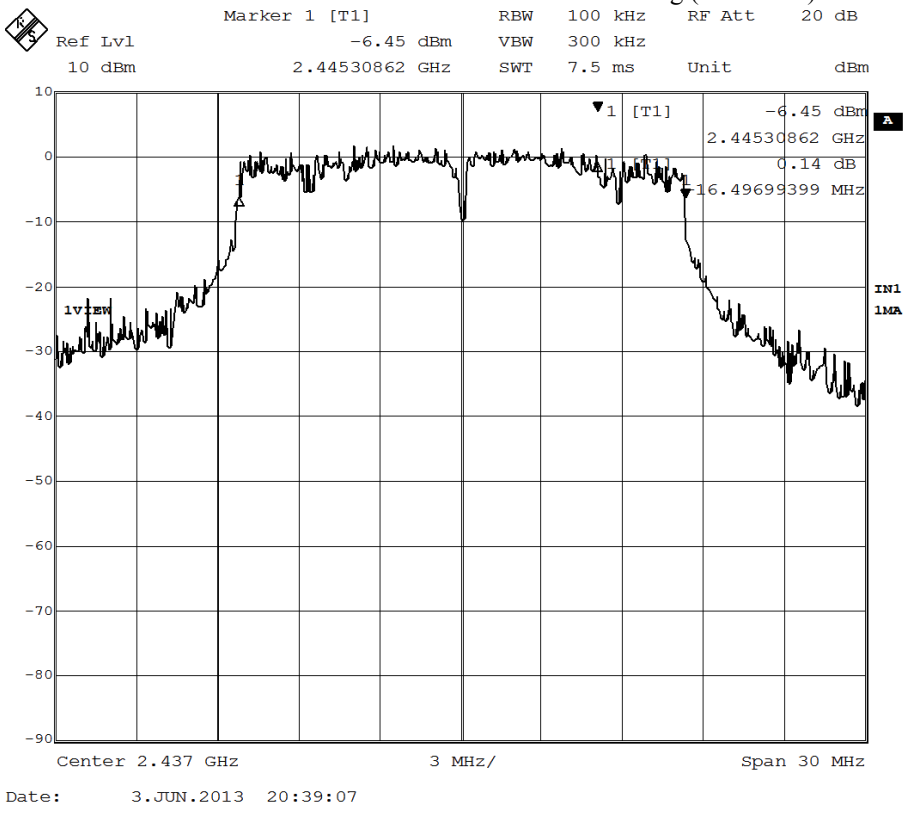
6dB Bandwidth of Fundamental Emission on 802.11 g (2412MHz)



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2437.0	16.50	> 500

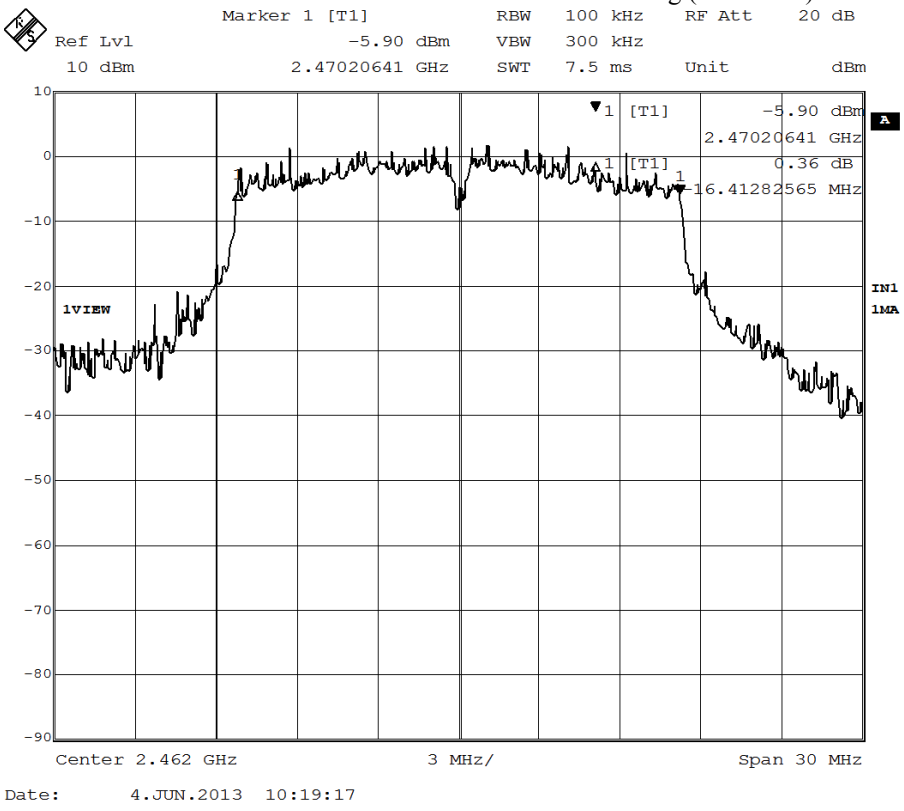
6dB Bandwidth of Fundamental Emission on 802.11 g (2437MHz)



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2462.0	16.41	> 500

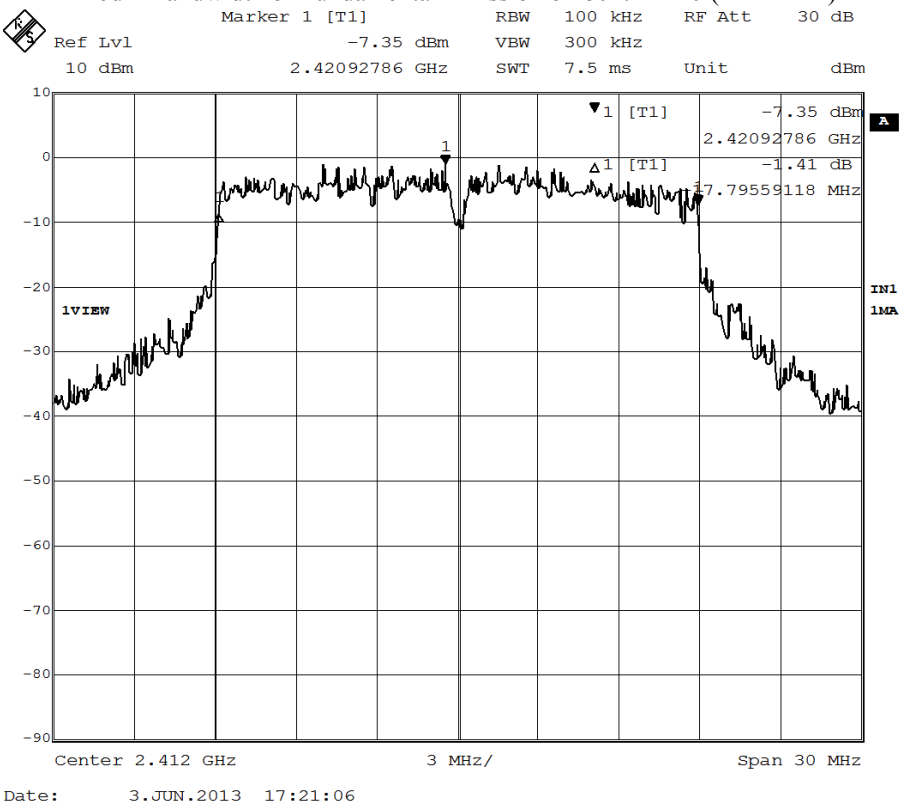
6dB Bandwidth of Fundamental Emission on 802.11 g (2462MHz)



Limits for 6dB Spectrum Bandwidth Measurement:

Center Frequency [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2412.0	17.80	> 500

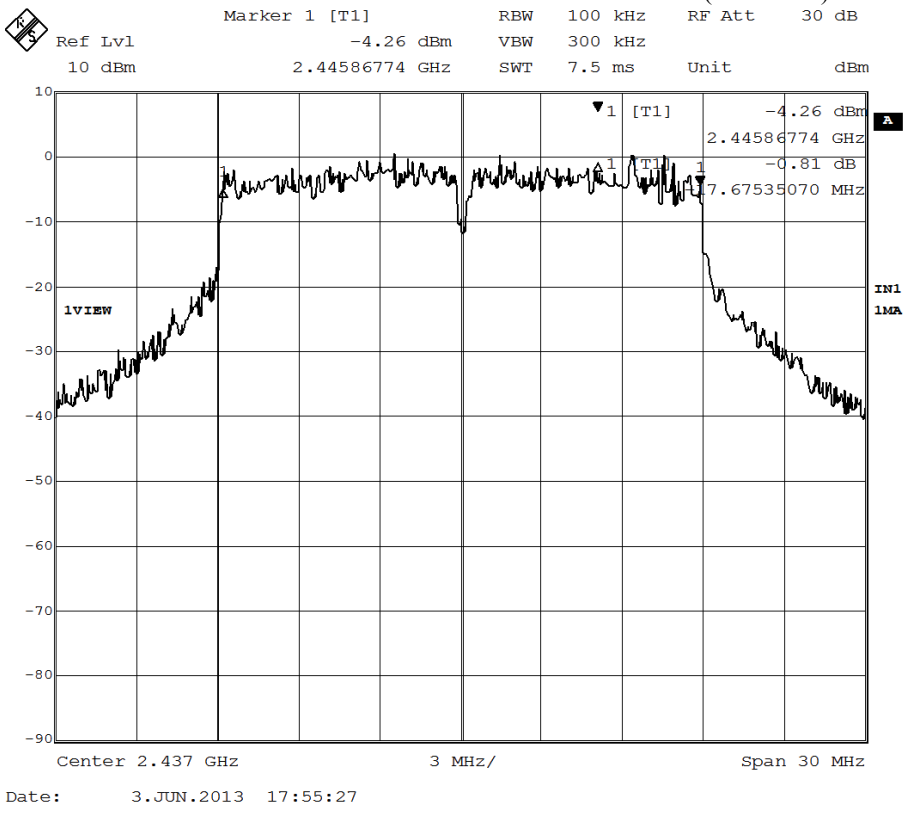
6dB Bandwidth of Fundamental Emission on 802.11 n20 (2412MHz)



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2437.0	17.68	> 500

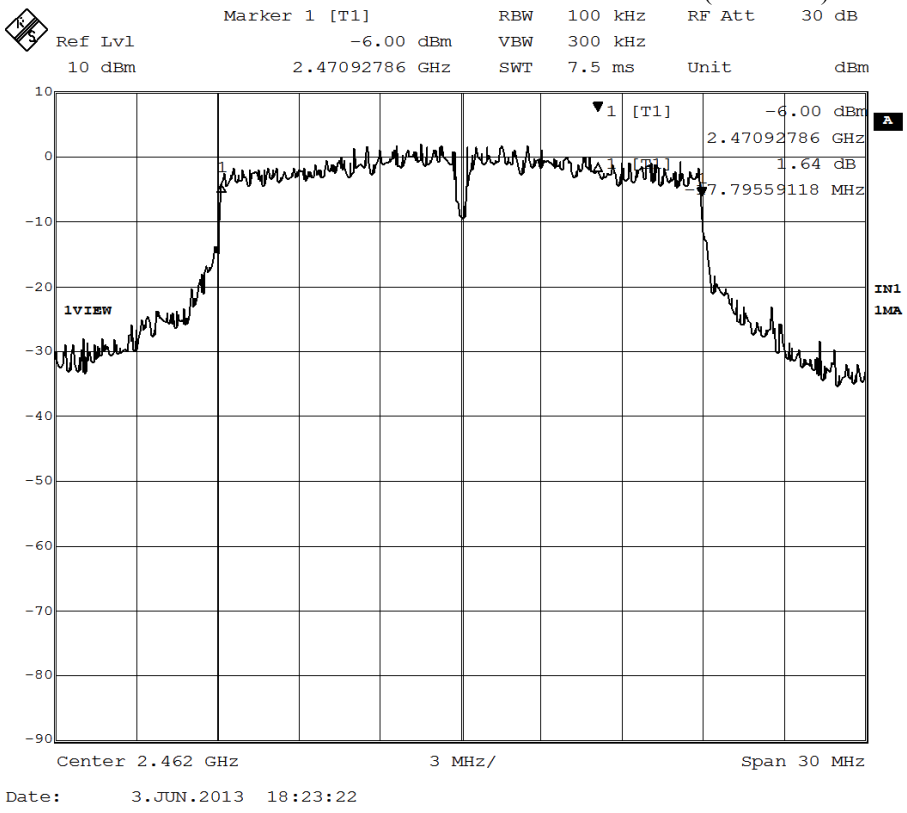
6dB Bandwidth of Fundamental Emission on 802.11 n20 (2437MHz)



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2462.0	17.80	> 500

6dB Bandwidth of Fundamental Emission on 802.11 n20 (2462MHz)



3.1.5 Band Edges Measurement

Test Requirement:	FCC 47CFR 15.247
Test Method:	ANSI C63.4:2009
Test Date:	2012-06-03
Mode of Operation:	WiFi communication mode

Test Method:

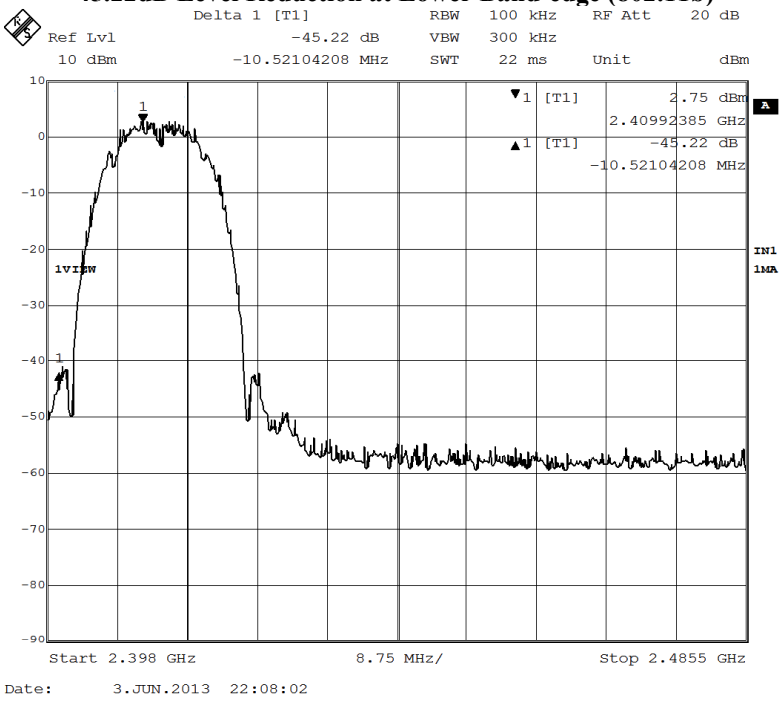
The band edge is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. The RBW and VBW are set to 100kHz for this measurement.

Test Setup:

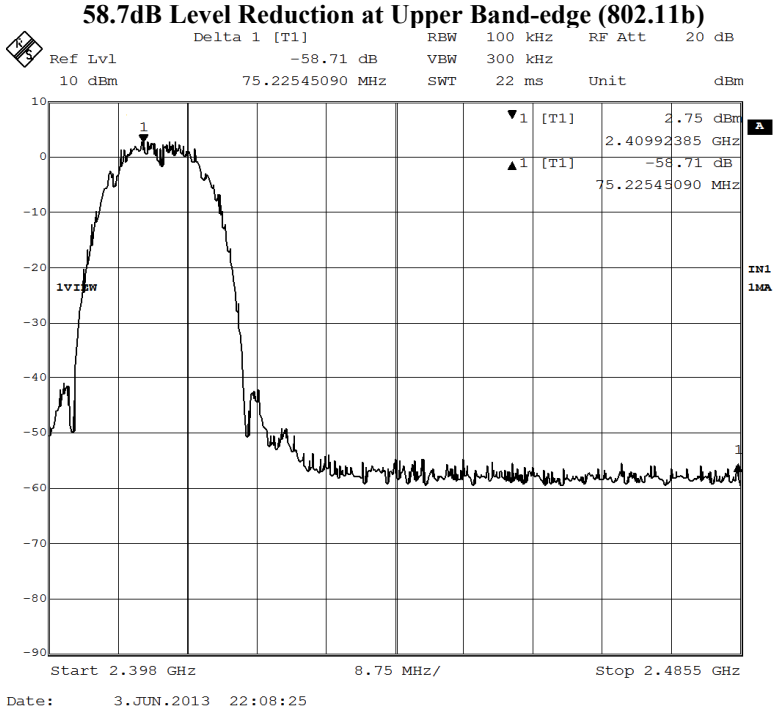
As Test Setup of clause 3.1.2 in this test report.

802.11b Ch. 1

45.22dB Level Reduction at Lower Band-edge (802.11b)

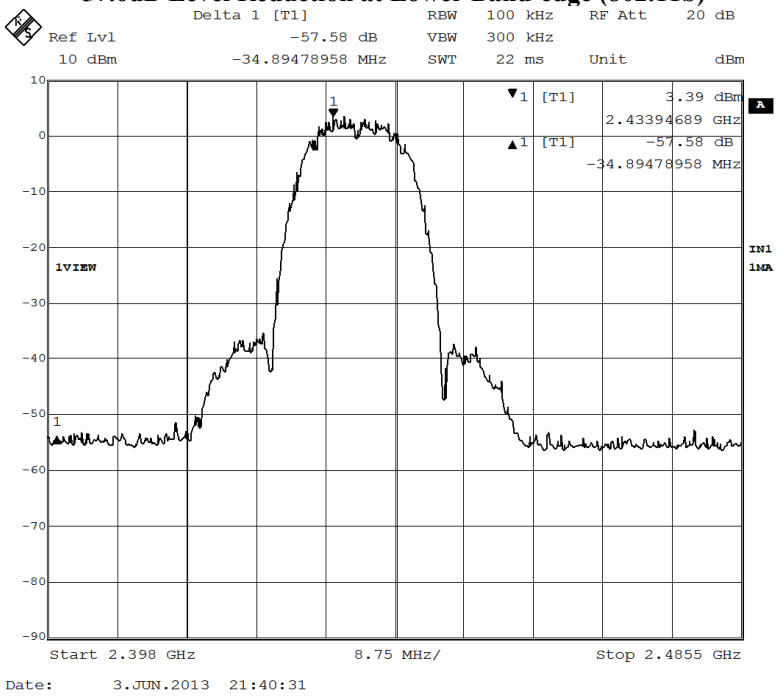


58.7dB Level Reduction at Upper Band-edge (802.11b)

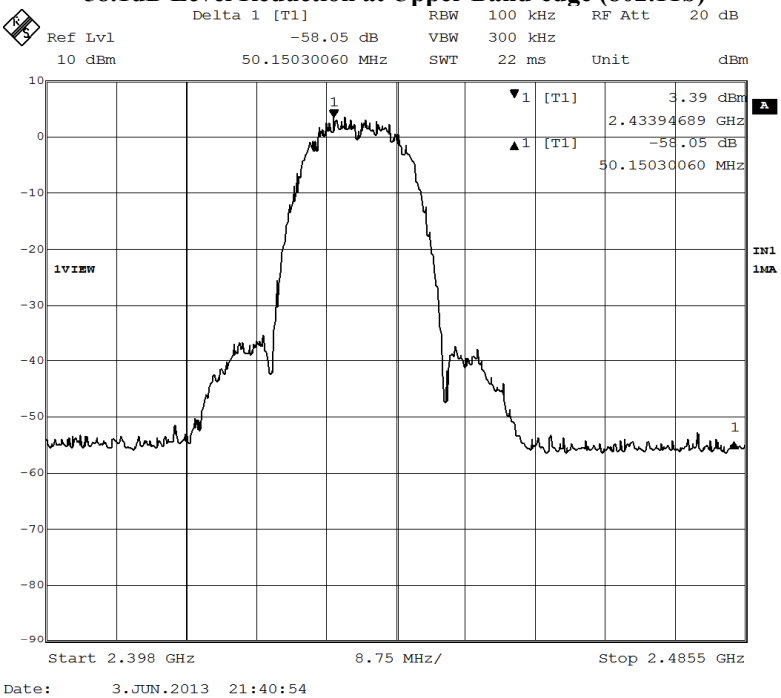


802.11b Ch. 6

57.6dB Level Reduction at Lower Band-edge (802.11b)

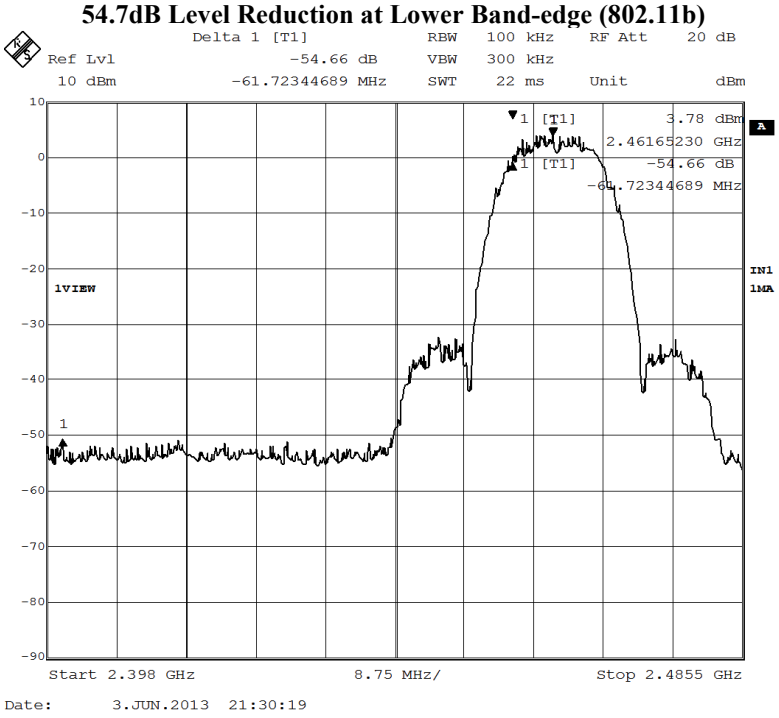


58.1dB Level Reduction at Upper Band-edge (802.11b)

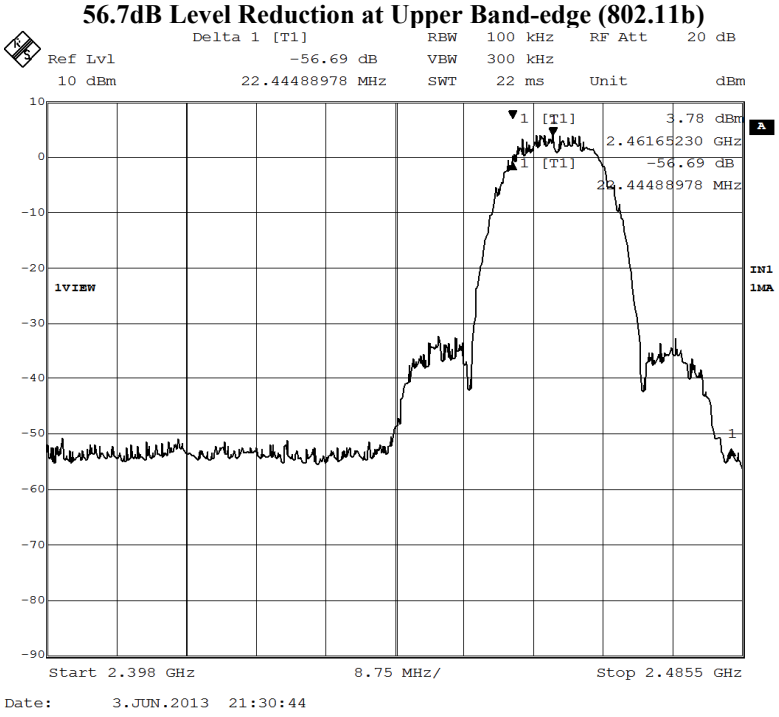


802.11b Ch. 11

54.7dB Level Reduction at Lower Band-edge (802.11b)

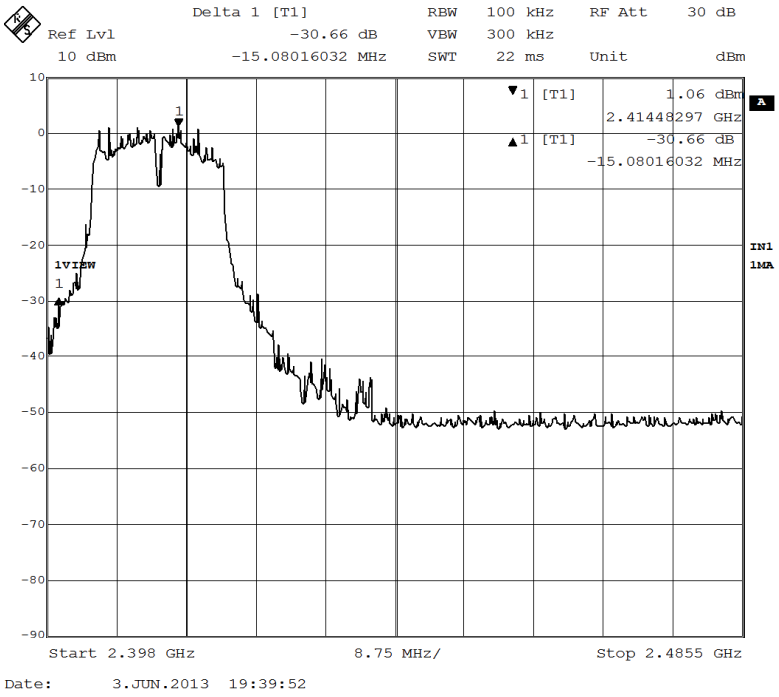


56.7dB Level Reduction at Upper Band-edge (802.11b)

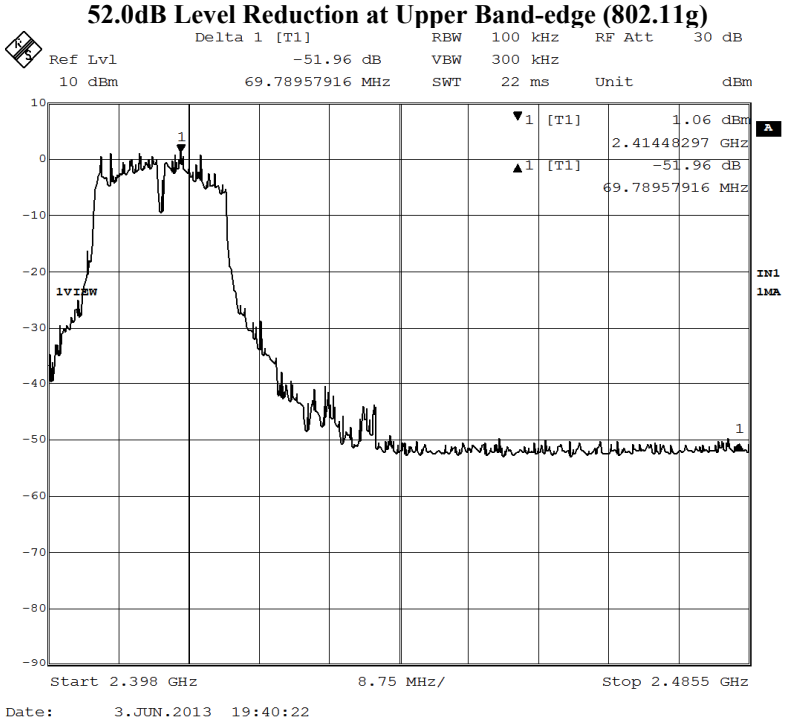


802.11g Ch. 1

30.7dB Level Reduction at Lower Band-edge (802.11g)

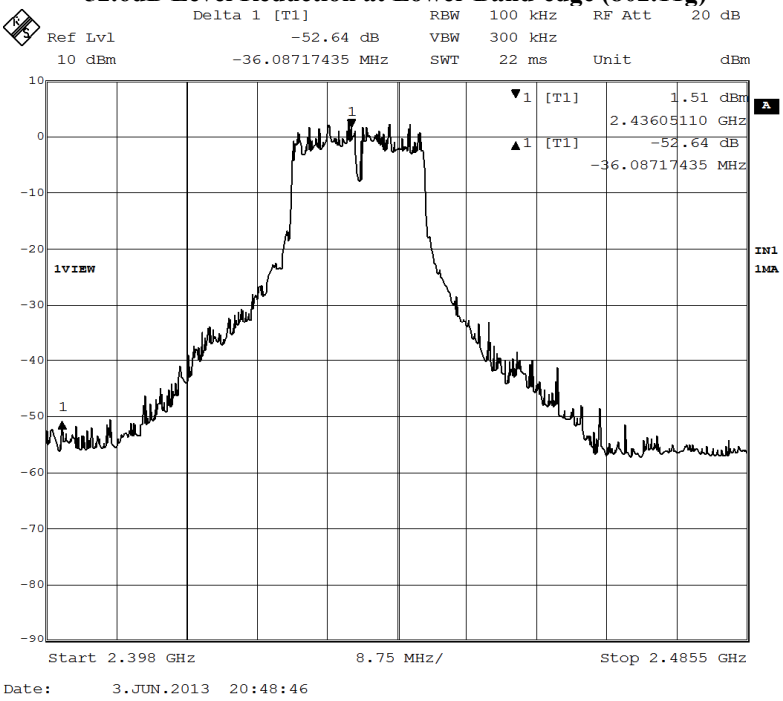


52.0dB Level Reduction at Upper Band-edge (802.11g)

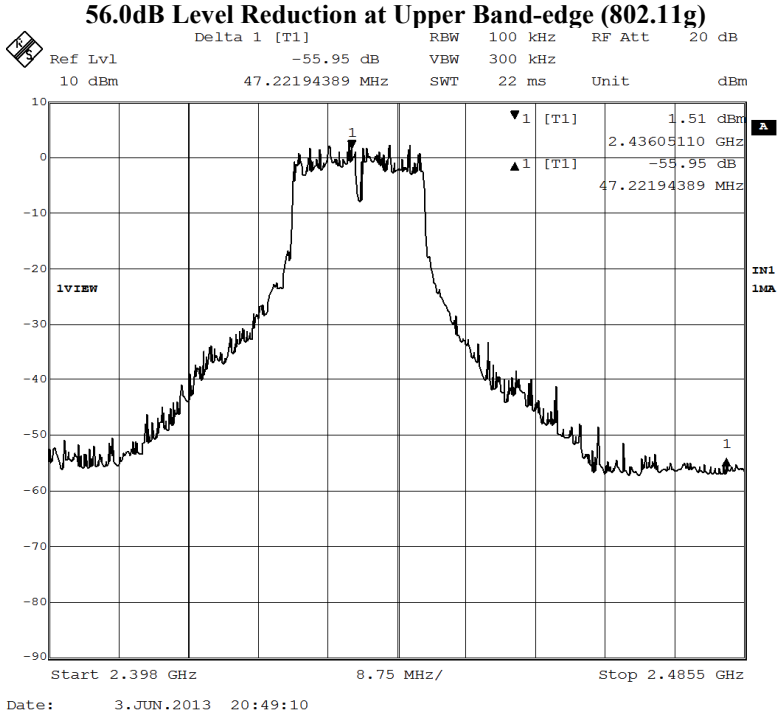


802.11g Ch. 6

52.6dB Level Reduction at Lower Band-edge (802.11g)

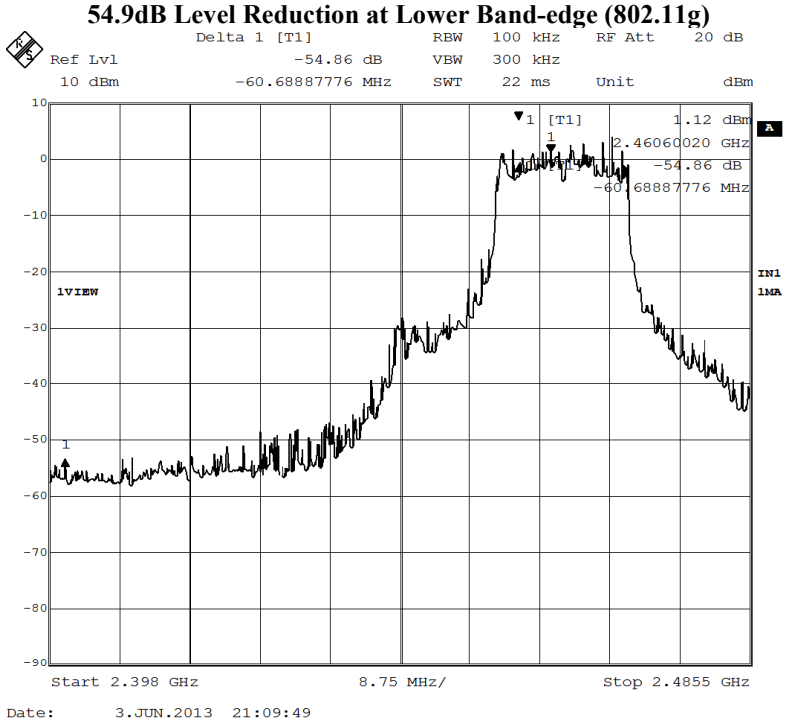


56.0dB Level Reduction at Upper Band-edge (802.11g)

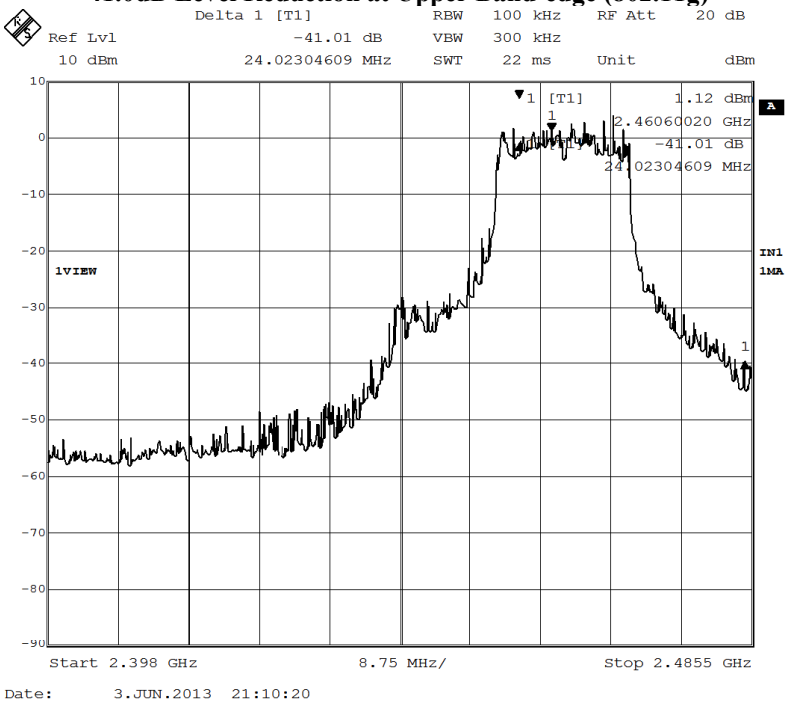


802.11g Ch. 11

54.9dB Level Reduction at Lower Band-edge (802.11g)

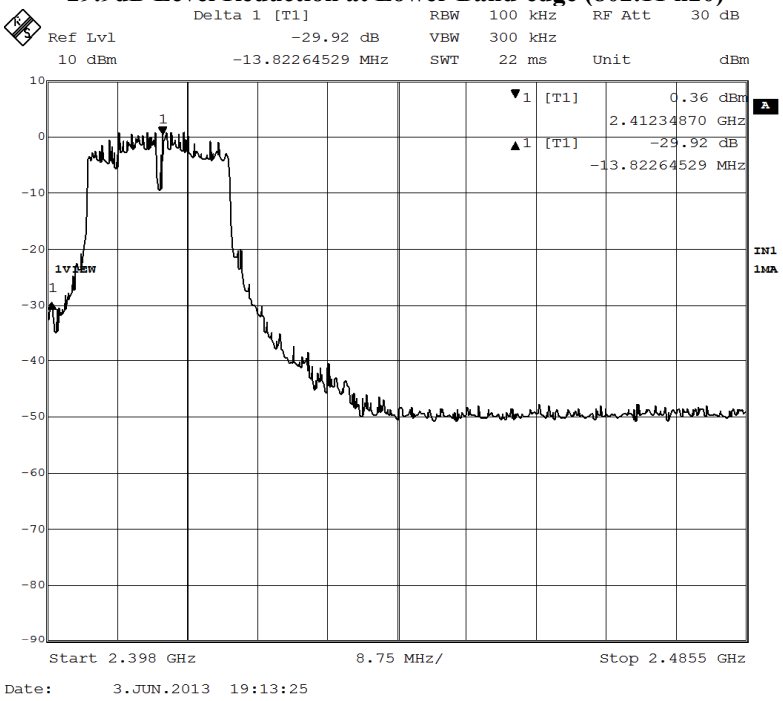


41.0dB Level Reduction at Upper Band-edge (802.11g)

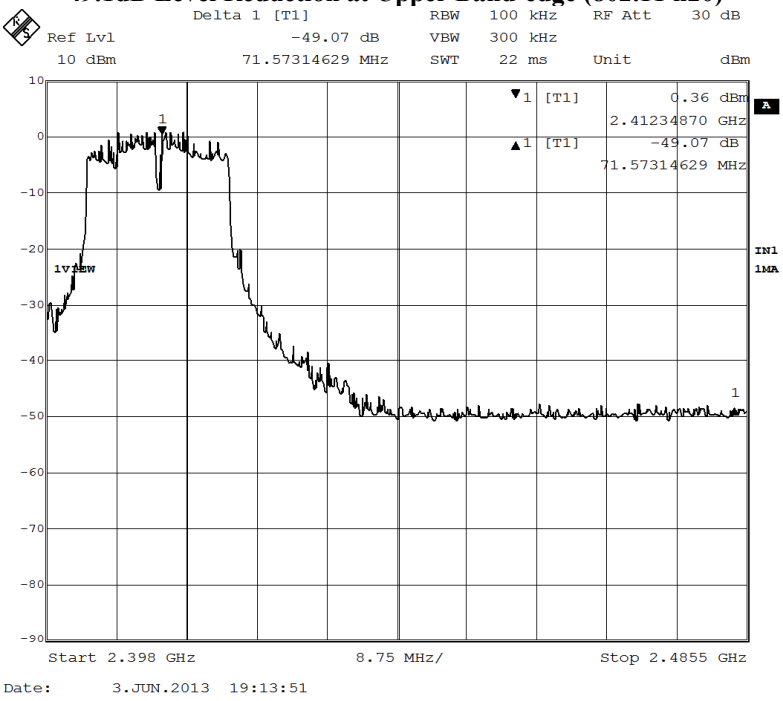


802.11 n20 Ch. 1

29.9dB Level Reduction at Lower Band-edge (802.11 n20)

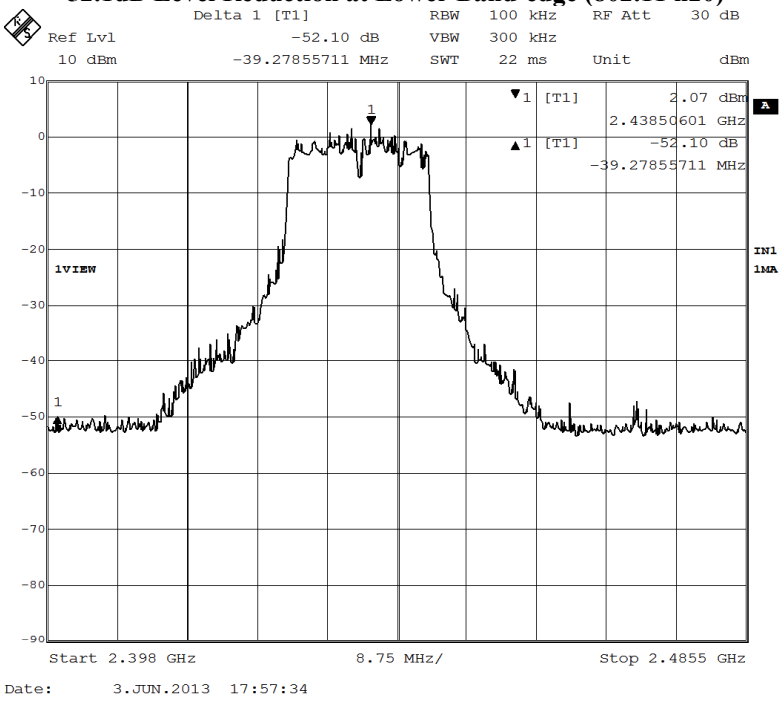


49.1dB Level Reduction at Upper Band-edge (802.11 n20)

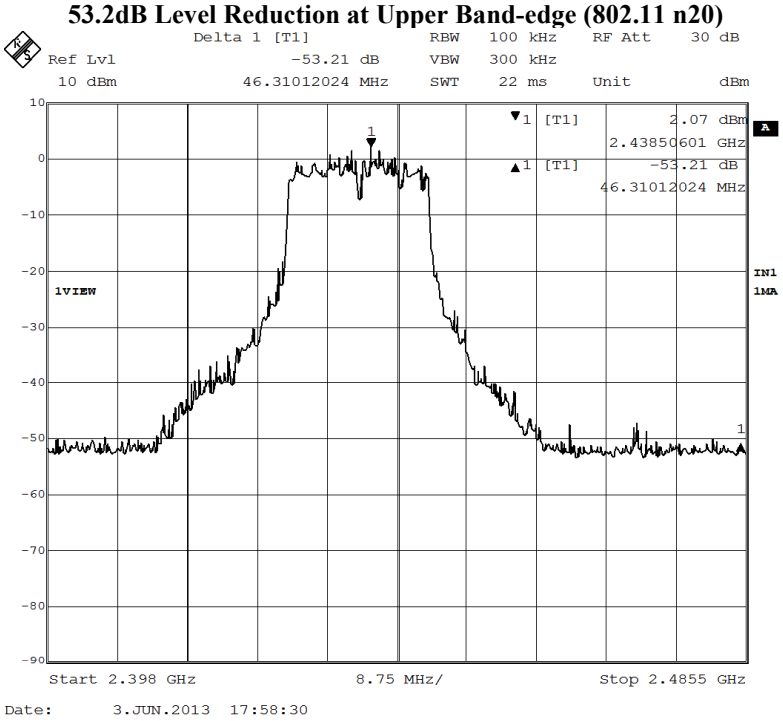


802.11 n20 Ch. 6

52.1dB Level Reduction at Lower Band-edge (802.11 n20)

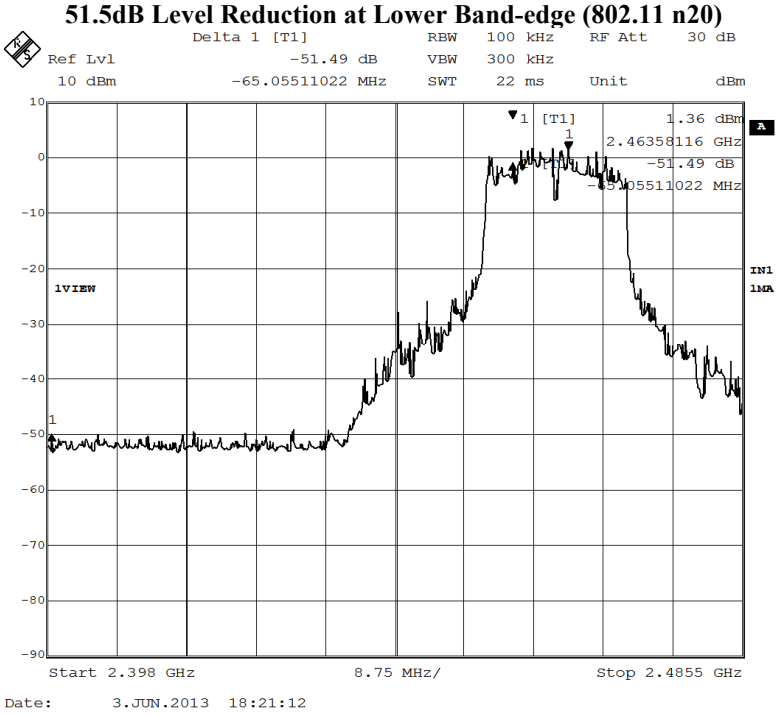


53.2dB Level Reduction at Upper Band-edge (802.11 n20)

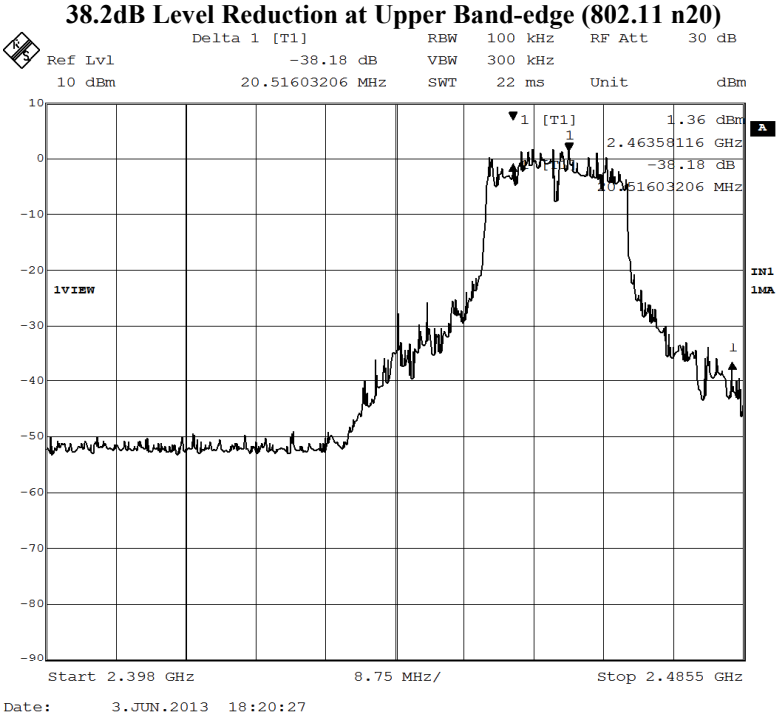


802.11 n20 Ch. 11

51.5dB Level Reduction at Lower Band-edge (802.11 n20)



38.2dB Level Reduction at Upper Band-edge (802.11 n20)



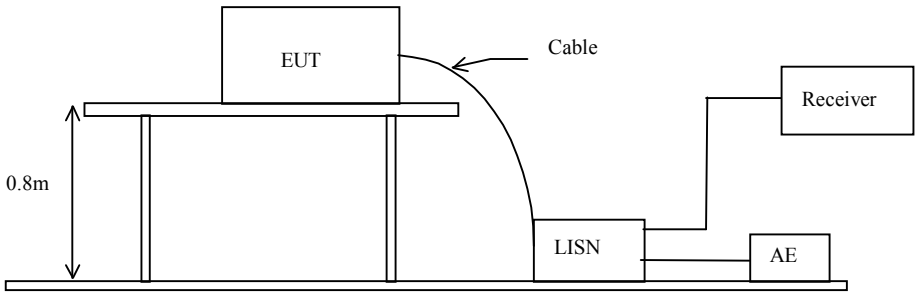
3.1.6 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2009
Test Date:	2013-03-26
Mode of Operation:	WiFi communication mode

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:



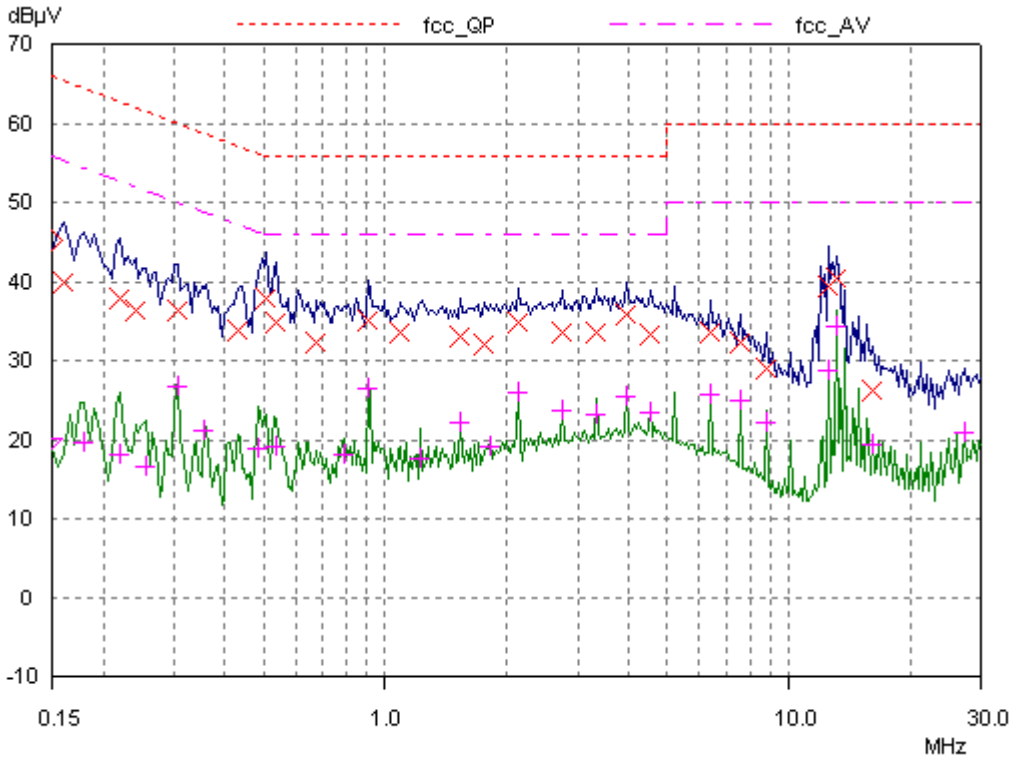
Limit for Conducted Emissions (FCC 47 CFR 15.207):

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.

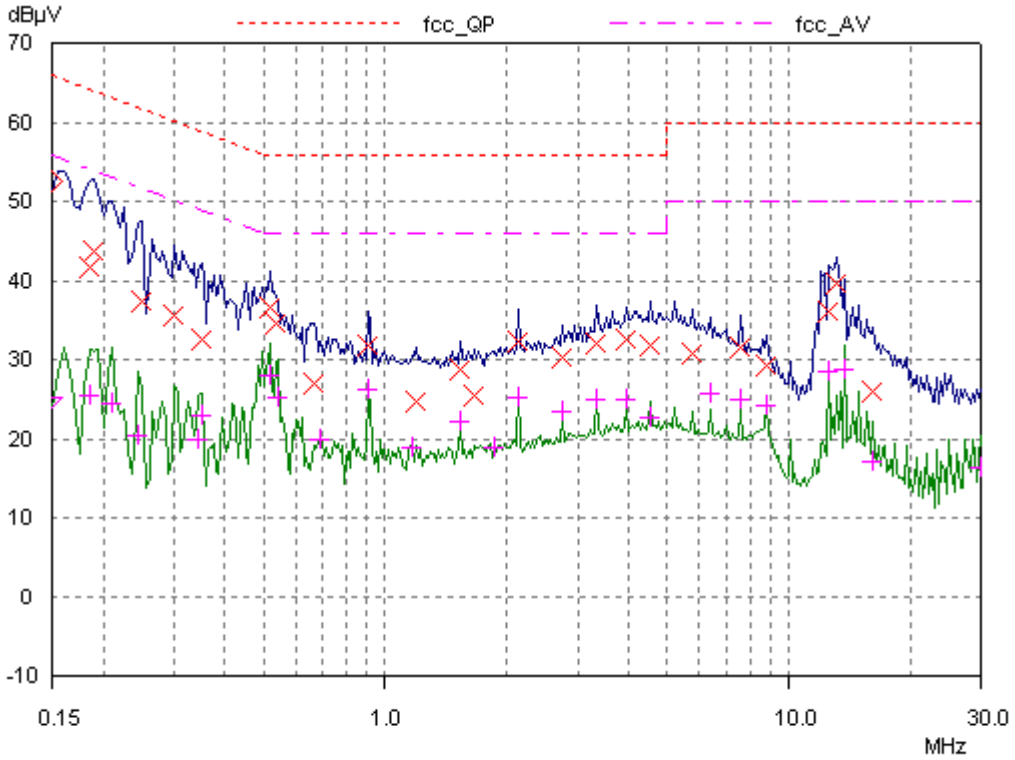
Results of WiFi communication mode - Live: PASS



Results of WiFi communication mode - Live: PASS

Conductor	Frequency	Quasi-peak		Average	
		Level	Limit	Level	Limit
Live or Neutral	MHz	dBµV	dBµV	dBµV	dBµV
Live	0.160	39.9	65.5	-*-	-*-
Live	0.180	-*-	-*-	19.6	54.5
Live	0.220	38.0	62.8	18.2	52.8
Live	0.240	36.4	62.1	-*-	-*-
Live	0.255	-*-	-*-	16.8	51.6
Live	0.305	36.5	60.1	26.7	50.1
Live	0.355	-*-	-*-	21.1	48.8
Live	0.430	34.0	57.3	-*-	-*-
Live	0.485	-*-	-*-	18.9	46.3
Live	0.505	38.0	56.0	-*-	-*-
Live	0.535	35.0	56.0	19.2	46.0
Live	0.675	32.3	56.0	-*-	-*-
Live	0.790	-*-	-*-	18.3	46.0
Live	0.910	35.2	56.0	26.7	46.0
Live	1.090	33.7	56.0	-*-	-*-
Live	1.225	-*-	-*-	17.7	46.0
Live	1.525	33.0	56.0	22.3	46.0
Live	1.765	32.0	56.0	-*-	-*-
Live	1.825	-*-	-*-	19.3	46.0
Live	2.125	34.9	56.0	26.0	46.0
Live	2.740	33.6	56.0	23.6	46.0
Live	3.340	33.7	56.0	23.2	46.0
Live	3.955	35.9	56.0	25.6	46.0
Live	4.555	33.4	56.0	23.5	46.0
Live	6.385	33.7	60.0	25.7	50.0
Live	7.600	32.3	60.0	25.0	50.0
Live	8.815	29.0	60.0	22.2	50.0
Live	12.460	39.4	60.0	28.8	50.0
Live	13.075	40.6	60.0	34.4	50.0
Live	16.105	26.3	60.0	19.4	50.0
Live	27.355	-*-	-*-	20.9	50.0

Results of WiFi communication mode - Neutral: PASS



Results of WiFi communication mode - Neutral: PASS

Conductor	Frequency	Quasi-peak		Average	
		Level	Limit	Level	Limit
Live or Neutral	MHz	dBµV	dBµV	dBµV	dBµV
Neutral	0.185	41.8	64.3	25.6	54.3
Neutral	0.190	43.9	64.0	-*-	-*-
Neutral	0.210	-*-	-*-	24.4	53.2
Neutral	0.245	-*-	-*-	20.4	51.9
Neutral	0.250	37.5	61.8	-*-	-*-
Neutral	0.300	35.8	60.2	-*-	-*-
Neutral	0.345	-*-	-*-	19.9	49.1
Neutral	0.350	32.7	59.0	23.1	49.0
Neutral	0.515	36.7	56.0	28.1	46.0
Neutral	0.535	34.7	56.0	-*-	-*-
Neutral	0.540	-*-	-*-	25.4	46.0
Neutral	0.665	27.0	56.0	-*-	-*-
Neutral	0.690	-*-	-*-	20.1	46.0
Neutral	0.910	32.0	56.0	26.3	46.0
Neutral	1.165	-*-	-*-	19.0	46.0
Neutral	1.195	24.7	56.0	-*-	-*-
Neutral	1.525	28.7	56.0	22.3	46.0
Neutral	1.660	25.6	56.0	-*-	-*-
Neutral	1.870	-*-	-*-	19.0	46.0
Neutral	2.125	32.3	56.0	25.4	46.0
Neutral	2.740	30.4	56.0	23.4	46.0
Neutral	3.340	32.2	56.0	24.9	46.0
Neutral	3.955	32.7	56.0	25.1	46.0
Neutral	4.555	31.9	56.0	22.8	46.0
Neutral	5.770	30.8	60.0	-*-	-*-
Neutral	6.385	-*-	-*-	25.7	50.0
Neutral	7.600	31.6	60.0	24.9	50.0
Neutral	8.815	29.3	60.0	24.3	50.0
Neutral	12.460	-*-	-*-	28.6	50.0
Neutral	12.550	36.2	60.0	-*-	-*-
Neutral	13.075	39.7	60.0	-*-	-*-
Neutral	13.675	-*-	-*-	28.9	50.0
Neutral	16.105	26.1	60.0	17.3	50.0
Neutral	29.785	-*-	-*-	16.3	50.0

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 Fixed internal antenna. There is no external antenna, the antenna gain = -6.5dBi.
All component install on inside of EUT. User unable to remove or changed the Antenna.

Frequency List for 802.11 b/g, 802.11n20
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

Radiated / Conducted Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM299	DOUBLE-RIDGED WAVEGUIDE HORN ANTENNA	ETS-LINDGREN	3115	00114120	2012/01/25	2014/01/25
EM300	PYRAMIDAL STANDARD GAIN HORN ANTENNA	ETS-LINDGREN	3160-09	00130130	2012-01-24	2014-01-24
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-LINDGREN	FACT-3	--	2012/10/25	2013/10/25
EM229	EMI TEST RECEIVER	R&S	ESIB40	100248	2013/05/07	2014/05/07
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2011/09/14	2013/09/14
EM200	DUAL CHANNEL POWER METER	R & S	NRVD	100592	2011-10-10	2013-10-10
EM201	10V INSERTION UNIT	R & S	URV5-Z2	100089	2011-10-10	2013-10-10

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM197	LISN	EMCO	4825/2	1193	2012/05/16	2013/05/16
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2013/05/07	2014/05/07
EM179	IMPULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	357-8810.52/54	2013/01/27	2014/01/27
EM154	SHIELDING ROOM	SIEMENS MATSUSHITA COMPONENTS	N/A	803-740-057-99A	2012/02/03	2017/02/03

Remarks:-

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