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Report On

Application for Grant of Equipment Authorization of the
Novatel Wireless Inc.
T1114 Wireless Router with cellular voice and data capabilities

FCC Part 15 Subpart E §15.407

Report No. SC1307899D August 2013

REPORT ON	Radio Testing of the Novatel Wireless Inc. Wireless Router with cellular voice and data capabilities
TEST REPORT NUMBER	SC1307899D
PREPARED FOR	Novatel Wireless Inc. 9645 Scranton Road, Suite 205 San Diego, CA 92121-3030 USA
CONTACT PERSON	Todd Gallagher RF Engineer (403) 295-4891 tgallagher@nvt.com
PREPARED BY	Juan Manuel Gonzalez **Name** Authorized Signatory Title: EMC/Wireless Test Engineer
APPROVED BY	Chip R. Fleury **Name** Authorized Signatory
DATED	August 22, 2013

Revision History

SC1307899D Novatel Wireless Inc. T1114 Wireless Router with cellular voice and data capabilities					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
08/22/13	Initial Release				Juan Manuel Gonzalez

CONTENTS

SECTION 1

REPORT SUMMARY

Radio Testing of the
Novatel Wireless Inc.
Wireless Router with cellular voice and data capabilities

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Novatel Wireless Inc. Wireless Router with cellular voice and data capabilities to the requirements of FCC Part 15 Subpart E §15.407.

Objective	To perform Radio Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Novatel Wireless Inc.
Model Number(s)	T1114
FCC ID Number	PKRNVWT1114
IC Number	N/A
Serial Number(s)	SEZ100073700125
Number of Samples Tested	1
Test Specification/Issue/Date	• FCC Part 15 Subpart E §15.407 (October 1, 2011).
Start of Test	August 05, 2013
Finish of Test	August 16, 2013
Name of Engineer(s)	Juan Manuel Gonzalez Alez Chang
Related Document(s)	• 789033 D01 General UNII Test Procedures v01r01 (Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E. • Supporting documents for EUT certification are separate exhibits.

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC Part 15 Subpart E §15.407 with cross-reference to the corresponding IC RSS standard is shown below.

Operation in the 5.15 to 5.25GHz band				
Section	**Spec Clause**	**Test Description**	**Result**	**Comments/Base Standard**
2.1	§15.207(a)	Conducted Emissions	Compliant	
2.2	§15.407(e)	Indoor Operation Only	Client Declaration	
2.3	§15.407(a)(1)	26 dB Bandwidth	As Reported	
2.4	§15.407(a)(1)	Output Power	Compliant	
2.5	§15.407(a)(1)	Power Spectral Density	Compliant	
2.6-2.8	§15.407(b)(1) / 15.209	Out-Of-Band Emission Limits	Compliant	
2.9	§15.407(a)(6)	Peak Excursion Ratio	Compliant	

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was a Novatel Wireless Inc. T1114 Wireless Router with cellular voice and data capabilities. The EUT is a wireless device that delivers Internet connectivity and telephone service, it uses LTE Bands 4 and 13 / CDMA BC0 & BC1 .The EUT can make a phone call, connect up to 10 devices via Wi-Fi (b/g/n 2.4GHz and a/n 5 GHz UNII-1 and UNII-3) and connect up to 3 devices via Ethernet, simultaneously.

The EUT poses 2 optional antenna ports accessible to customers to improve the coverage range with Custom design antenna "Sold separately". (See Exhibit PKRNVWT1114_Theory of Operation page 24 - 28)

1.3.2 EUT General Description

EUT Description	Wireless Router with cellular voice and data capabilities
Model Number(s)	T1114
Rated Voltage	Ac DC Converter: 100-240VAC 50/60Hz to 5.0 VDC /3.5A Nominal voltage.
Output Power	16.4 dBm/43.65mW (conducted – Average) 19.42 dBm/87.49mW EIRP
Frequency Range	5180 MHz to 5240 MHz in the 5150 MHz to 5350 MHz Band
Number of Operating Frequencies	4
Channels Verified	Low Channel 5180 MHz Mid Channel (1) 5200 MHz Mid Channel (2) 5220 MHz High Channel 5240MHz
Antenna Type (used during evaluation)	Integral (Complies with Part 15.203 requirements)
Modulation Used	OFDM

1.3.3 Antenna Details

Internal Antennas Details (Client declaration, max. antenna gain covered under this test report)	**WWAN Antenna –CDMA** Manufacturer: Pulse Part Number: DA-01019774 Type: PIFA Antenna Gain: • CDMA BC0 - 850MHz : -0.59 dBi • CDMA BC1 - 1880MHz : -0.82 dBi

WWAN Antenna – LTE Band 13/4
Manufacturer: Pulse
Part Number: DA-01019775
Type: PIFA
Antenna Gain:

- LTE B13 - 700MHz : 1.21 dBi
- LTE Band 4 – 1700MHz: 2.44 dBi

WLAN – Antenna: 802.11 a/b/g/n
Manufacturer: Murata
Part Number: 12023199
Type: CERAMIC CHIP
Antenna Gain:

- 802. 11 b/g/n 2.4MHz : 2.99 dBi
- 802.11 a/n 5GHz: 3.02 dBi

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
A	Conducted antenna port measurement. EUT TX a Max power and connected to supplied AC-DC adapter.
B	Radiated test setup. EUT connected wirelessly with the wideband radio communication tester (CMW500, TX a Max power and connected to supplied AC-DC adapter.
C	RX Mode. EUT in Idle mode connected to supplied AC-DC adapter.

1.4.2 EUT Exercise Software

Before each test, the EUT is configured using Qualcomm Radio Control Toolkit Version 3.0.11.0. The software allows configuration of channels, mode + data rate and power level. Power level is set according to manufacturer specification for each mode (802.11b/g/n).

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
Dell	Support Laptop	Novatel Wireless Test Configuration Support Laptop
LUXSHARE-ICT	USB cable	Shielded Type A to Micro USB (0.912 meter) USB Revision 2.

1.4.4 Worst Case Configuration

Worst-case configuration used in this test report based from Peak Output Power measurements:

Mode	Channel	Data Rate
802.11a	48(High Channel)	18Mbps
802.11n	48 (High Channel)	6.5Mbps

EUt is designed for indoor use an table top operation, for radiated spurious measurements only default configuration was evaluated (See Test Set up pictures Exhibit)

1.5 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.6 MODIFICATION RECORD

Description of Modification	Modification Fitted By	Date Modification Fitted
Serial Number SEZ100073700125		
N/A		

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test (if relevant) are recorded on the appropriate test pages.

1.7 TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz and 789033 D01 General UNII Test Procedures v01r01 (Federal Communications Commission Office of Engineering and Technology Laboratory Division Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E.
For conducted and radiated emissions the equipment under test (EUT) was configured to measure its highest possible emission level. This level was based on the maximized cable configuration from exploratory testing per ANSI C63.4-2009. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

1.8 TEST FACILITY

1.8.1 FCC – Registration No.: US5296

TUV SUD America Inc. (San Diego), a §2.498 listed test firm operates the EMC Laboratory registered under Sony Electronics Inc. Product Quality Division EMC. This laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is US5281.

1.8.2 Industry Canada (IC) Registration No.: 3067A

The 10m Semi-anechoic chamber of TUV SUD America Inc. (San Diego), has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No. 3067A.

SECTION 2

TEST DETAILS

Radio Testing of the
Novatel Wireless Inc.
Wireless Router with cellular voice and data capabilities

TÜV SÜD AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 FAX: 858 546 0364

2.1 CONDUCTED EMISSIONS

2.1.1 Specification Reference

Part 15 Subpart C §15.207(a)

2.1.2 Standard Applicable

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

**Decreases with the logarithm of the frequency.*

2.1.3 Equipment Under Test and Modification State

Serial No: SEZ100073700125 / Test Configuration B and C

2.1.4 Date of Test/Initial of test personnel who performed the test

August 15, 2013/JMG

2.1.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.6 Environmental Conditions

Ambient Temperature	24.1°C
Relative Humidity	44.5%
ATM Pressure	99.1 kPa

2.1.7 Additional Observations

- Measurement was done using EMC32 V8.53 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.1.8 for sample computation.

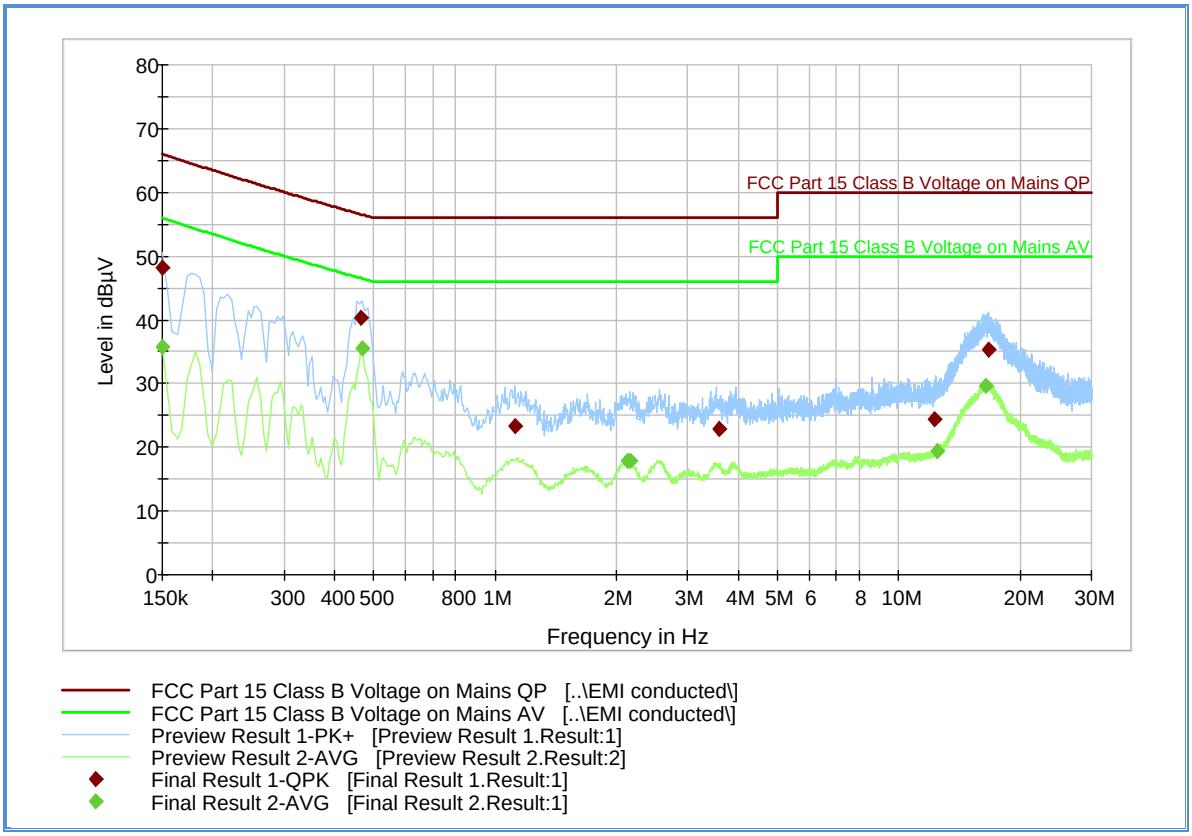
2.1.8 Sample Computation (Conducted Emission – Quasi Peak)

Measuring equipment raw measurement (dbµV) @ 150kHz			5.5
Correction Factor (dB)	Asset# 8607 (20 dB attenuator)	19.9	20.7
	Asset# 1177 (cable)	0.15	
	Asset# 1176 (cable)	0.35	
	Asset# 7568 (LISN)	0.30	
Reported QuasiPeak Final Measurement (dbµV) @ 150kHz			**26.2**

2.1.9 Test Results

Compliant. See attached plots and tables.

2.1.10 Line 1 (RX Mode)



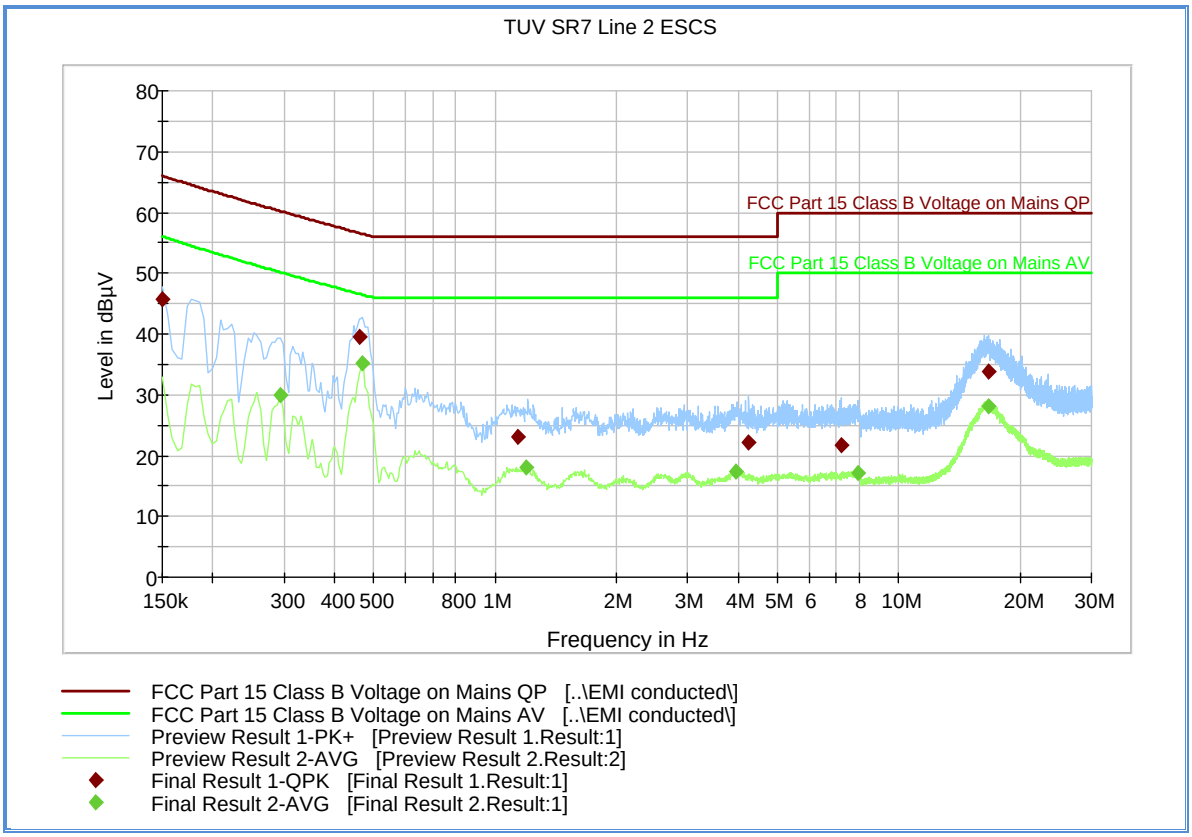
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.150000	48.1	1000.0	9.000	Off	L1	20.4	17.9	66.0
0.465000	40.3	1000.0	9.000	Off	L1	20.2	16.2	56.6
1.117500	23.4	1000.0	9.000	Off	L1	20.3	32.6	56.0
3.588000	22.8	1000.0	9.000	Off	L1	20.3	33.2	56.0
12.277500	24.4	1000.0	9.000	Off	L1	20.5	35.6	60.0
16.710000	35.3	1000.0	9.000	Off	L1	20.8	24.7	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.150000	35.8	1000.0	9.000	Off	L1	20.4	20.2	56.0
0.469500	35.5	1000.0	9.000	Off	L1	20.2	10.9	46.5
2.125500	17.9	1000.0	9.000	Off	L1	20.3	28.1	46.0
2.157000	17.8	1000.0	9.000	Off	L1	20.3	28.2	46.0
12.439500	19.3	1000.0	9.000	Off	L1	20.6	30.7	50.0
16.435500	29.6	1000.0	9.000	Off	L1	20.8	20.4	50.0

2.1.11 Line 2 (RX Mode)



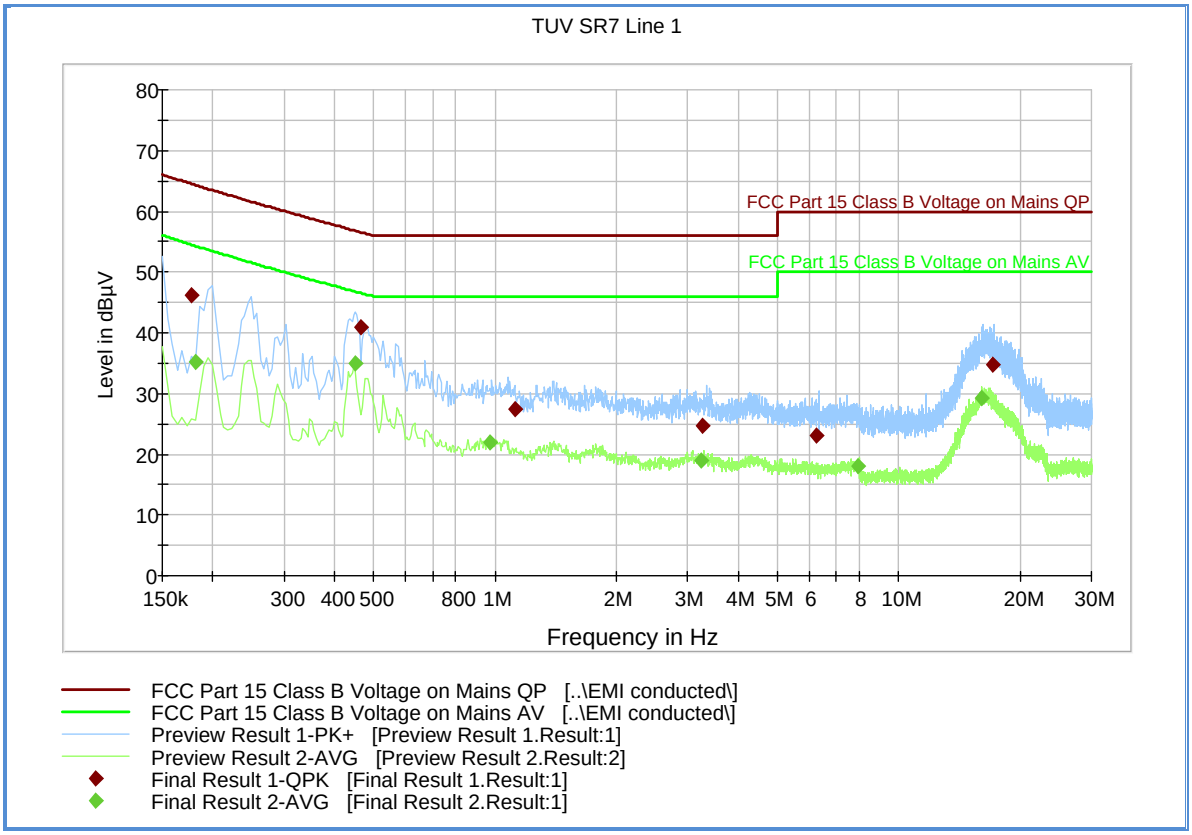
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.150000	45.7	1000.0	9.000	Off	N	21.2	20.3	66.0
0.460500	39.6	1000.0	9.000	Off	N	21.1	17.0	56.6
1.135500	23.1	1000.0	9.000	Off	N	21.1	32.9	56.0
4.254000	22.1	1000.0	9.000	Off	N	21.2	33.9	56.0
7.197000	21.8	1000.0	9.000	Off	N	21.2	38.2	60.0
16.669500	33.9	1000.0	9.000	Off	N	21.6	26.1	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.294000	30.0	1000.0	9.000	Off	N	21.1	20.2	50.2
0.469500	35.2	1000.0	9.000	Off	N	21.1	11.3	46.5
1.198500	18.0	1000.0	9.000	Off	N	21.1	28.0	46.0
3.948000	17.3	1000.0	9.000	Off	N	21.2	28.7	46.0
7.948500	17.0	1000.0	9.000	Off	N	21.2	33.0	50.0
16.669500	28.2	1000.0	9.000	Off	N	21.6	21.8	50.0

2.1.1 Line 1 (Worst Case 802.11 a)



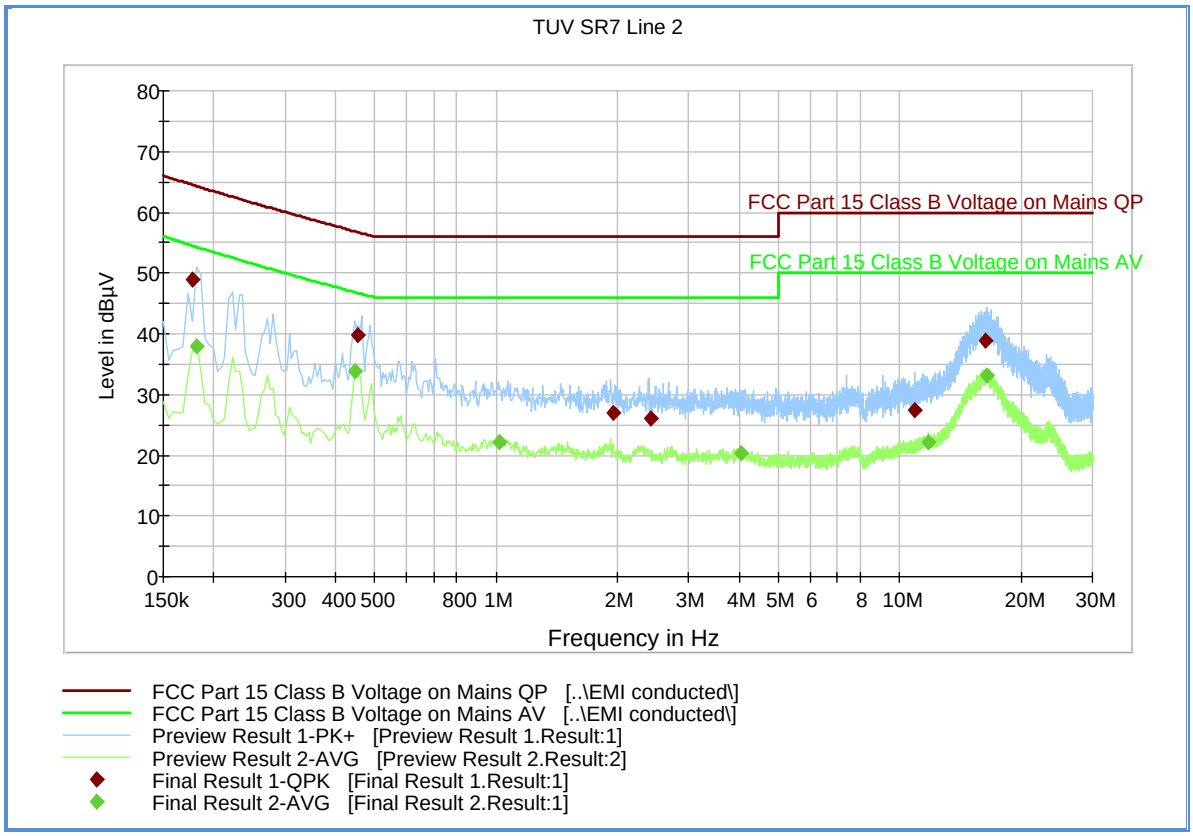
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.177000	46.2	1000.0	9.000	Off	L1	20.4	18.4	64.5
0.465000	41.0	1000.0	9.000	Off	L1	20.2	15.5	56.6
1.117500	27.3	1000.0	9.000	Off	L1	20.3	28.7	56.0
3.259500	24.7	1000.0	9.000	Off	L1	20.3	31.3	56.0
6.265500	23.2	1000.0	9.000	Off	L1	20.4	36.8	60.0
17.151000	34.9	1000.0	9.000	Off	L1	20.8	25.1	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.181500	35.3	1000.0	9.000	Off	L1	20.4	19.0	54.3
0.451500	34.9	1000.0	9.000	Off	L1	20.2	11.9	46.8
0.973500	21.8	1000.0	9.000	Off	L1	20.2	24.2	46.0
3.228000	19.0	1000.0	9.000	Off	L1	20.3	27.0	46.0
7.921500	18.0	1000.0	9.000	Off	L1	20.4	32.0	50.0
16.084500	29.3	1000.0	9.000	Off	L1	20.8	20.7	50.0

2.1.2 Line 2 (Worst Case 802.11 a)



Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.177000	48.8	1000.0	9.000	Off	N	21.2	15.7	64.5
0.456000	39.8	1000.0	9.000	Off	N	21.1	17.0	56.7
1.950000	27.0	1000.0	9.000	Off	N	21.1	29.0	56.0
2.418000	26.0	1000.0	9.000	Off	N	21.1	30.0	56.0
10.873500	27.4	1000.0	9.000	Off	N	21.3	32.6	60.0
16.363500	39.0	1000.0	9.000	Off	N	21.6	21.0	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.181500	37.8	1000.0	9.000	Off	N	21.2	16.4	54.3
0.447000	33.8	1000.0	9.000	Off	N	21.1	13.0	46.8
1.023000	22.2	1000.0	9.000	Off	N	21.1	23.8	46.0
4.060500	20.4	1000.0	9.000	Off	N	21.2	25.6	46.0
11.805000	22.1	1000.0	9.000	Off	N	21.3	27.9	50.0
16.467000	33.0	1000.0	9.000	Off	N	21.6	17.0	50.0

2.2 INDOOR OPERATION ONLY

2.2.1 Specification Reference

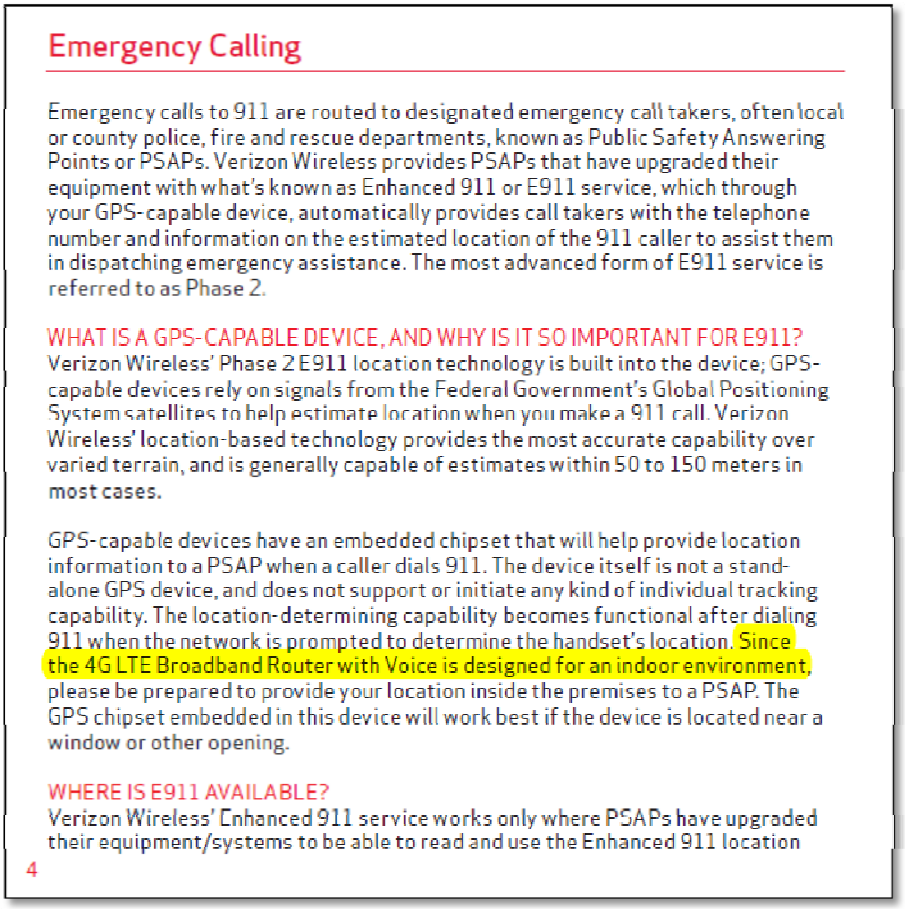
Part 15 Subpart E §15.407(e)

2.2.2 Standard Applicable

(e) Within the 5.15–5.25 GHz band, U-NII devices will be restricted to indoor operations to reduce any potential for harmful interference to co-channel MSS operations.

2.2.3 Manufacturer Declaration

See attached page(4) from the Product Safety & Warranty Information indicating compliance with this requirement.



Emergency Calling

Emergency calls to 911 are routed to designated emergency call takers, often local or county police, fire and rescue departments, known as Public Safety Answering Points or PSAPs. Verizon Wireless provides PSAPs that have upgraded their equipment with what's known as Enhanced 911 or E911 service, which through your GPS-capable device, automatically provides call takers with the telephone number and information on the estimated location of the 911 caller to assist them in dispatching emergency assistance. The most advanced form of E911 service is referred to as Phase 2.

WHAT IS A GPS-CAPABLE DEVICE, AND WHY IS IT SO IMPORTANT FOR E911?

Verizon Wireless' Phase 2 E911 location technology is built into the device; GPS-capable devices rely on signals from the Federal Government's Global Positioning System satellites to help estimate location when you make a 911 call. Verizon Wireless' location-based technology provides the most accurate capability over varied terrain, and is generally capable of estimates within 50 to 150 meters in most cases.

GPS-capable devices have an embedded chipset that will help provide location information to a PSAP when a caller dials 911. The device itself is not a stand-alone GPS device, and does not support or initiate any kind of individual tracking capability. The location-determining capability becomes functional after dialing 911 when the network is prompted to determine the handset's location. Since the 4G LTE Broadband Router with Voice is designed for an indoor environment, please be prepared to provide your location inside the premises to a PSAP. The GPS chipset embedded in this device will work best if the device is located near a window or other opening.

WHERE IS E911 AVAILABLE?

Verizon Wireless' Enhanced 911 service works only where PSAPs have upgraded their equipment/systems to be able to read and use the Enhanced 911 location

4

2.3 26 dB BANDWIDTH

2.3.1 Specification Reference

Part 15 Subpart E §15.407(a)(1)

2.3.2 Standard Applicable

(1) For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2.3.3 Test Methodology

Section D of 789033 D01 General UNII Test Procedures v01r01

2.3.4 Equipment Under Test and Modification State

Serial No: SEZ100073700125 / Default Test Configuration

2.3.5 Date of Test/Initial of test personnel who performed the test

August 8, 2013/JMG and AC

2.3.6 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.7 Environmental Conditions

Ambient Temperature	24.1°C
Relative Humidity	49.2%
ATM Pressure	100.1kPa

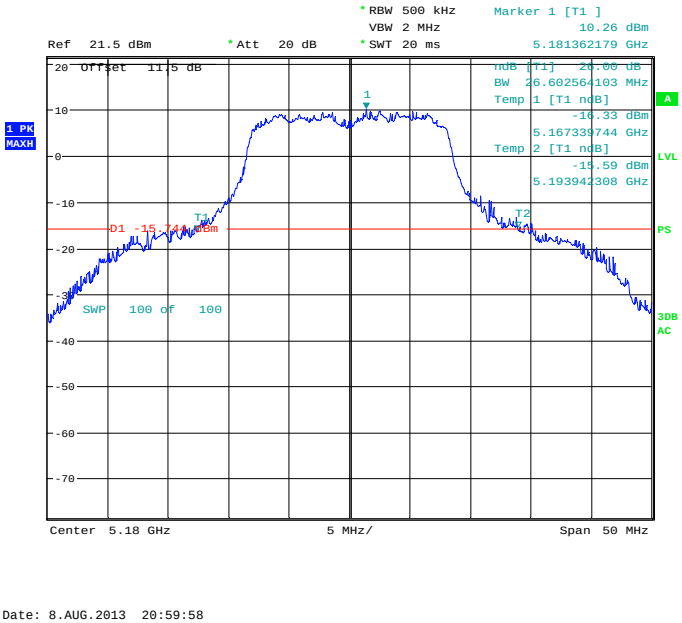
2.3.8 Additional Observations

- This is a radiated test.
- Span is wide enough to capture the channel transmission.
- RBW is 1% of the span.
- VBW > RBW.
- Sweep is auto.
- Detector is peak.

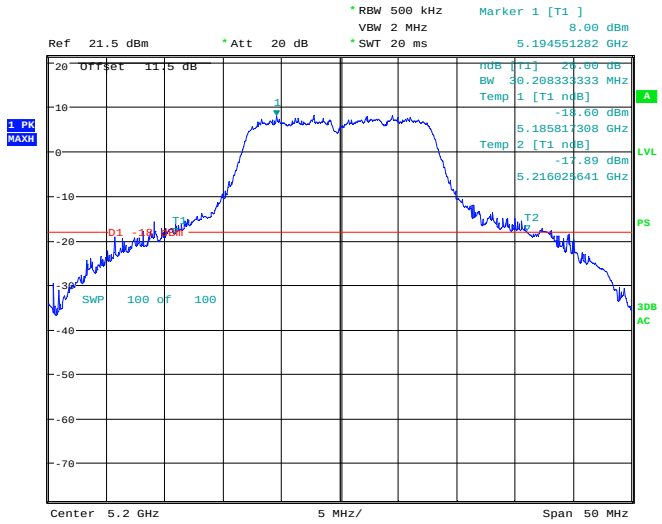
- Trace is max hold.
- “n dB down” (26dB) marker function of the spectrum analyzer was used for this test.
- RBW adjusted until RBW/EBW ratio is approximately 1%.

2.3.9 Test Results (as reported)

a / Mode		
Low Channel (5180 MHz)	**Mid Channel (5200 MHz)**	**High Channel (5240 MHz)**
26.60 MHz	30.20 MHz	25.16 MHz

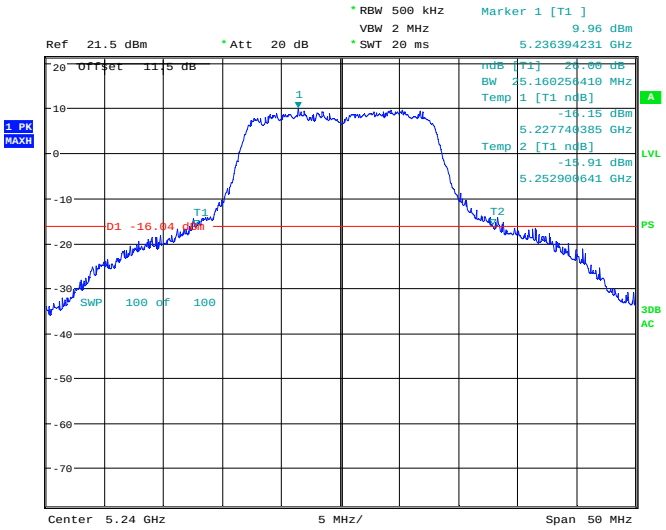


Low Channel (36) a Mode



Date: 8.AUG.2013 21:02:54

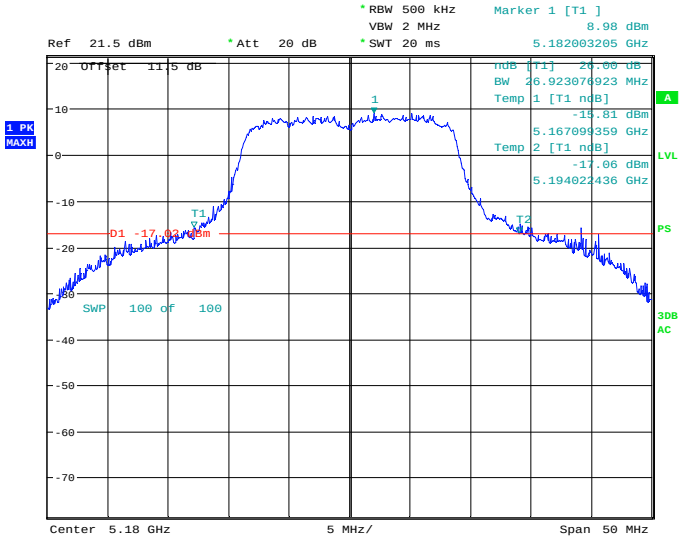
Mid Channel(40) a Mode



Date: 8.AUG.2013 21:10:58

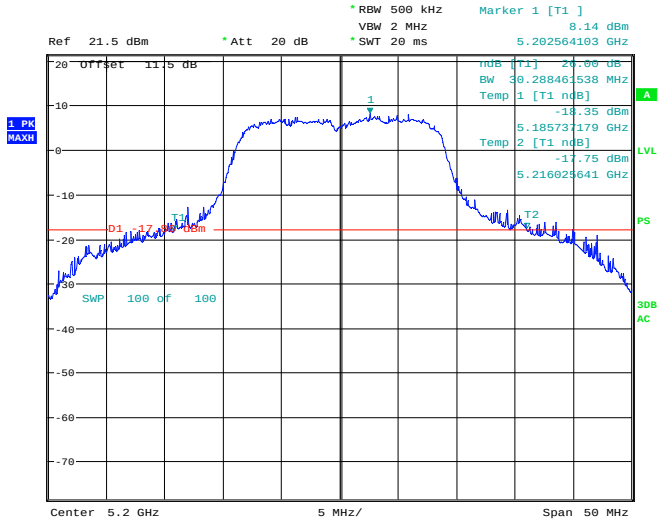
High Channel(48) a Mode

n / Mode		
Low Channel (5180 MHz)	**Mid Channel (5200 MHz)**	**High Channel (5240 MHz)**
26.92 MHz	30.28 MHz	27.24 MHz



Date: 8.AUG.2013 21:13:44

Low Channel (36) n Mode



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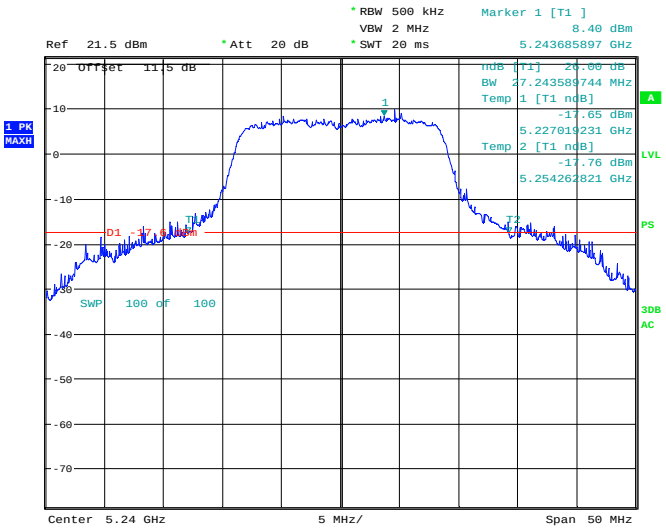
Mid Channel(40) n Mode



Date: 8.AUG.2013 21:20:56

High Channel(48) n Mode

2.4 OUTPUT POWER

2.4.1 Specification Reference

Part 15 Subpart E §15.407(a)(1) and RSS-210 A9.2(1)

2.4.2 Standard Applicable

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2.4.3 Test Methodology

Section A Method PM of 789033 D01 General UNII Test Procedures v01r01

2.4.4 Equipment Under Test and Modification State

Serial No: SEZ100073700125 / Test Configuration A

2.4.5 Date of Test/Initial of test personnel who performed the test

August 8, 2013/JMG and AC.

2.4.6 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.7 Environmental Conditions

Ambient Temperature	24.1°C
Relative Humidity	49.2%
ATM Pressure	100.1kPa

2.4.8 Additional Observations

- This is a conducted test using a wideband RF power meter as an alternative to spectrum analyzer measurements.
- All available data rates were verified. The worst case data rate (marked bold and italic) will be verified for each test throughout this test report.

2.4.9 Limit Consideration for FCC

FCC Limit = 50mW or 4 dBm + 10 log (26dB BW in MHz)
= 50mW or 4 dBm + 10 log (30.28MHz)
= 50mW or 18.81 dBm (76.03mW)
= since 50mW < 76.03 mW
= therefore limit used for this test is 50mW or 17dBm limit

2.4.10 Test Results (Maximum Conducted Power)

802.11 Mode	Channel (#)	Frequency (MHz)	Data (Mbps)	Avg (dBm)	Peak (dBm)
802.11a Mode Test Results	36 (+13.0dBm) **Tx Gain Set**	5180	6	15.94	22.01
			9	15.92	21.91
			12	16.05	22.01
			18	16.03	21.83
			24	16.21	22.05
			36	16.21	22.03
			48	15.81	21.99
			54	15.75	21.99
	40 (+13.0dBm) ***Tx Power Set***	5200	6	16.19	22.17
			9	16.10	22.09
			12	16.04	22.12
			18	16.11	21.96
			24	15.91	22.18
			36	15.86	22.15
			48	15.86	22.14
			54	15.84	22.13
	44 (+13.0dBm) ***Tx Power Set***	5220	6	16.11	22.29
			9	16.09	22.16
			12	16.08	22.27
			18	16.08	22.10
			24	16.11	22.37
			36	15.91	22.32
			48	15.52	22.23
			54	15.48	22.19
	48 (+13.0dBm) ***Tx Power Set***	5240	6	16.34	22.53
			9	16.42	22.49
			12	16.35	22.48
			18	***16.40***	22.33
			24	16.19	22.54

			36	15.89	22.52
			48	15.84	22.43
			54	15.79	22.44
802.11n Mode Test Results	36 (+13.0dBm) **Tx Gain Set**	5180	6.5	15.93	21.97
			13	15.82	21.89
			19.5	15.94	21.97
			26	16.27	22.02
			39	16.30	22.00
			52	16.22	21.99
			58.5	16.21	22.05
			65	16.18	22.03
	40 (+13.0dBm) ***Tx Power Set***	5200	6.5	16.01	22.10
			13	15.86	22.00
			19.5	15.97	22.03
			26	15.97	22.06
			39	15.91	22.06
			52	15.85	22.02
			58.5	15.81	22.18
			65	15.77	22.10
	44 (+13.0dBm) ***Tx Power Set***	5220	6.5	15.98	22.25
			13	15.87	22.20
			19.5	15.96	22.27
			26	15.92	22.15
			39	15.84	22.19
			52	15.75	22.21
			58.5	15.43	22.34
			65	15.41	22.10
	48 (+13.0dBm) ***Tx Power Set***	5240	6.5	***16.32***	22.49
			13	16.17	22.43
			19.5	16.25	22.48
			26	16.22	22.44
			39	16.13	22.42
			52	15.78	22.32
			58.5	16.05	22.58
			65	15.69	22.49

2.5 POWER SPECTRAL DENSITY

2.5.1 Specification Reference

Part 15 Subpart E §15.407(a)(1)

2.5.2 Standard Applicable

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2.5.3 Test Methodology

Section E of 789033 D01 General UNII Test Procedures v01r01

2.5.4 Equipment Under Test and Modification State

Serial No: SEZ100073700125 / Test Configuration A

2.5.5 Date of Test/Initial of test personnel who performed the test

August 14, 2013/JMG

2.5.6 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.7 Environmental Conditions

Ambient Temperature	24.0°C
Relative Humidity	46.8%
ATM Pressure	100.1 kPa

2.5.8 Additional Observations

- This is a conducted test as per Section E (PPSD) of 789033 D01 General UNII Test Procedures v01r01.
- Average power spectrum method used is SA-1 (trace averaging with the EUT transmitting at full power through each sweep)

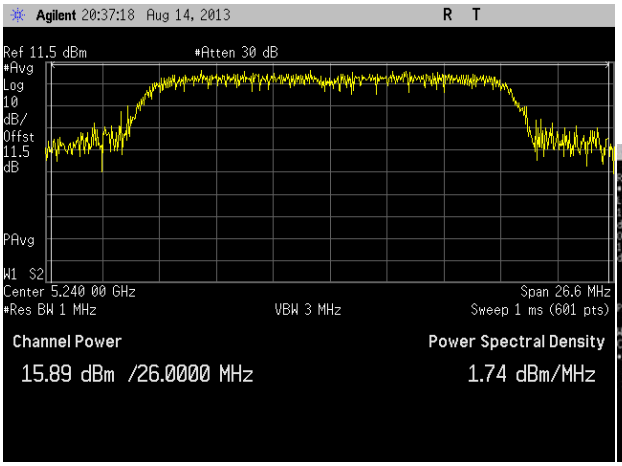
2.5.9 Test Results (PPSD)

See attached plots and table.

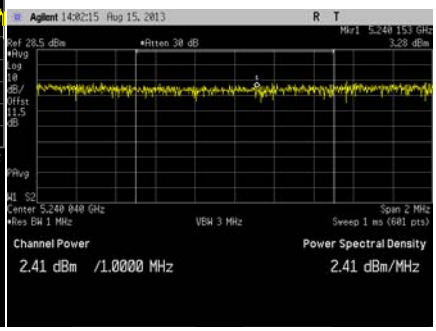
802.11 a				
Channel	**Frequency (MHz)**	**PPSD (dBm)**	**Limit (dBm)**	**Margin (dB)**
36	5180	1.86	4	2.14
40	5200	1.73	4	2.27
48	5240	1.74	4	2.26

Low Channel (802.11 a)

Mid Channel (802.11 a)



High Channel (802.11 a) **/**

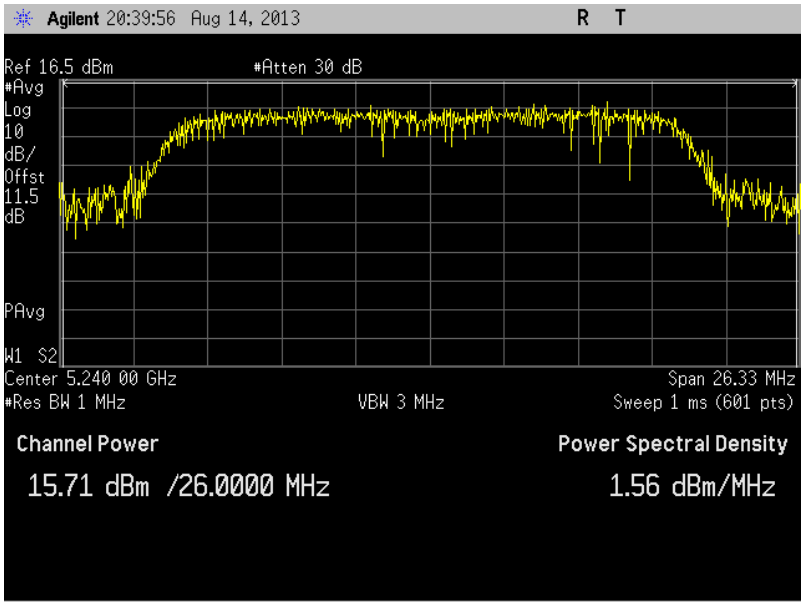


Reducing Span to1MHz

802.11 n				
Channel	**Frequency (MHz)**	**PPSD (dBm)**	**Limit (dBm)**	**Margin (dB)**
36	5180	1.52	4	2.48
40	5200	1.31	4	2.69
48	5240	1.56	4	2.44

Low Channel (802.11 n)

Mid Channel (802.11 n)



High Channel (802.11 n)

2.6 OUT-OF-BAND EMISSION LIMITS

2.6.1 Specification Reference

Part 15 Subpart E §15.407(b)(1)

2.6.2 Standard Applicable

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz.

2.6.3 Test Methodology

Section G of 789033 D01 General UNII Test Procedures v01r01

2.6.4 Equipment Under Test and Modification State

Serial No: SEZ100073700125 / Test Configuration A

2.6.5 Date of Test/Initial of test personnel who performed the test

August 8, 2013/JMG and AC.

2.6.6 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.7 Environmental Conditions

Ambient Temperature	24.1°C
Relative Humidity	49.2%
ATM Pressure	100.1kPa

2.6.8 Additional Observations

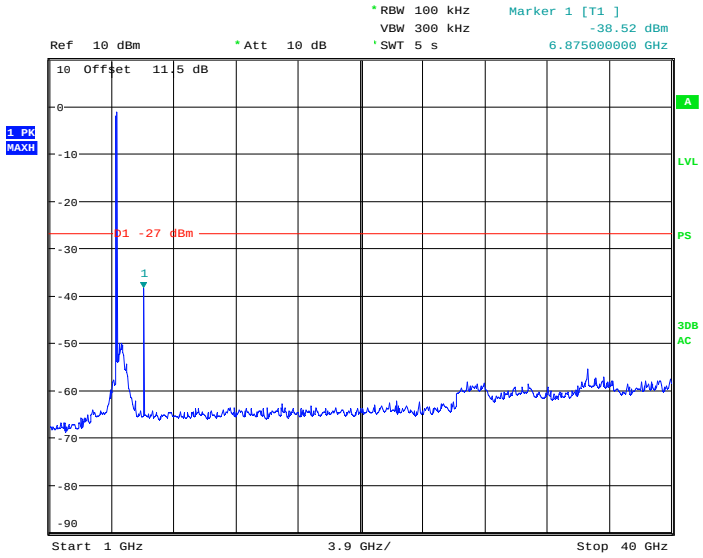
- This is a conducted test as per Section G of 789033 D01 General UNII Test Procedures v01r01 .

2.6.9 Sample Computations

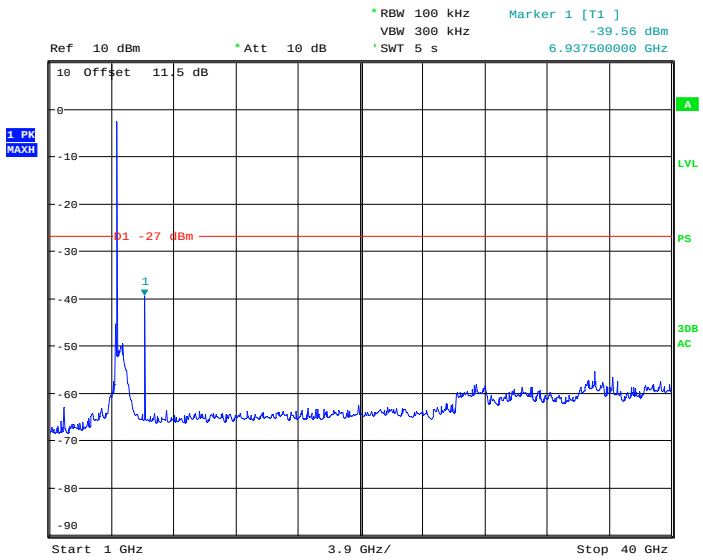
- Highest out-of-band emission observed = -38.52 dBm @ 6.87GHz (802.11 a Low Channel)
- EIRP(dBm) = -38.52 +3.02 dBi (antenna gain)
- EIRP(dBm) = -35.5 dBm (compared to the -27 dBm Limit)

2.6.10 Test Results

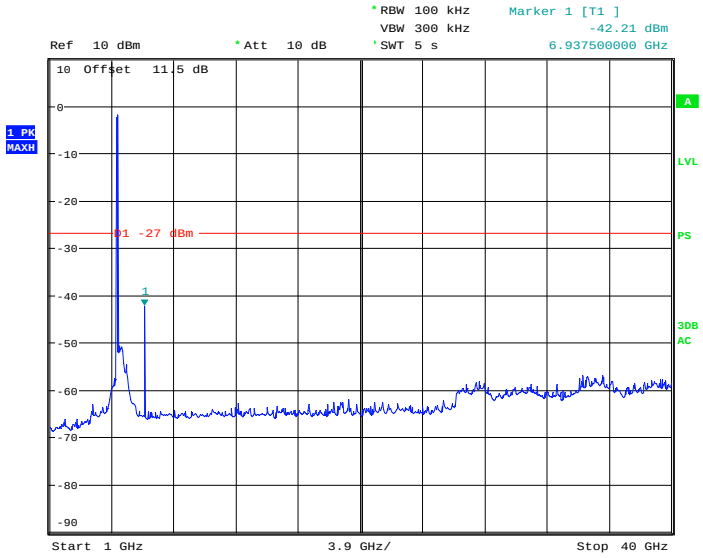
Complies. See attached plots.



Low Channel (5180 MHz) 802.11 a

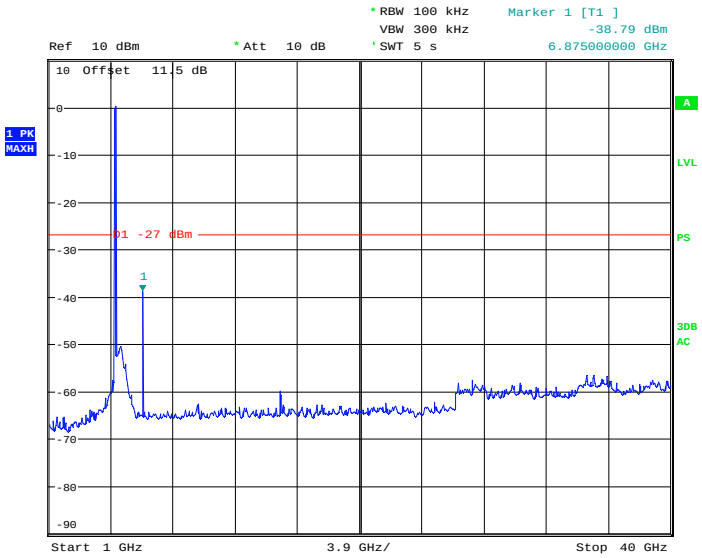


Mid Channel (5200 MHz) 802.11 a



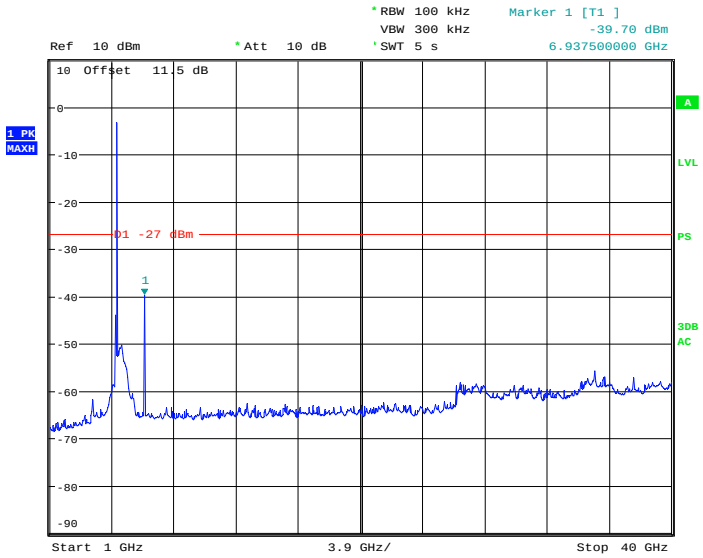
Date: 8.AUG.2013 21:35:55

High Channel (5240 MHz) 802.11 a



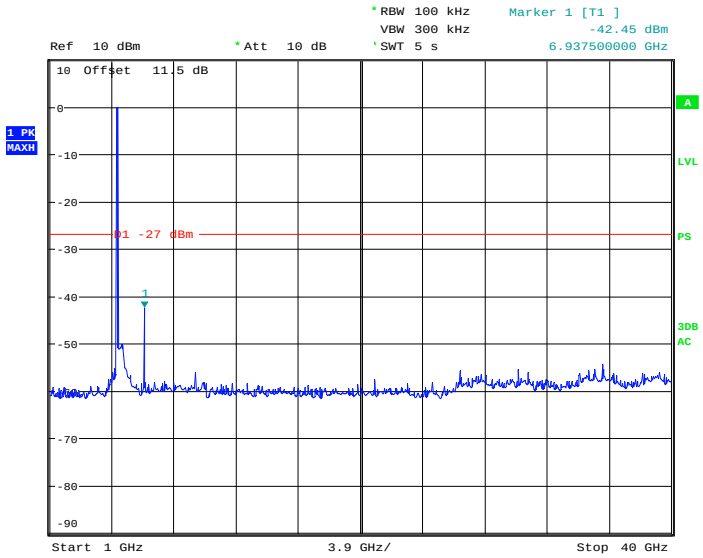
Date: 8.AUG.2013 21:30:36

Low Channel (5180 MHz) 802.11 n



Date: 8.AUG.2013 21:31:40

Mid Channel (5200 MHz) 802.11 n



Date: 8.AUG.2013 21:28:24

High Channel (5240 MHz) 802.11 n

2.7 BAND-EDGE COMPLIANCE OF RF CONDUCTED EMISSIONS

2.7.1 Specification Reference

Part 15 Subpart E §15.407(b)(1)/(7)

2.7.2 Standard Applicable

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz.

The provisions of §15.205 apply to intentional radiators operating under this section.

2.7.3 Test Methodology

Section G of 789033 D01 General UNII Test Procedures v01r01

2.7.4 Equipment Under Test and Modification State

Serial No: SEZ100073700125 / Test Configuration A

2.7.5 Date of Test/Initial of test personnel who performed the test

August 8, 2013/JMG and AC.

2.7.6 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.7 Environmental Conditions

Ambient Temperature	24.1°C
Relative Humidity	49.2%
ATM Pressure	100.1kPa

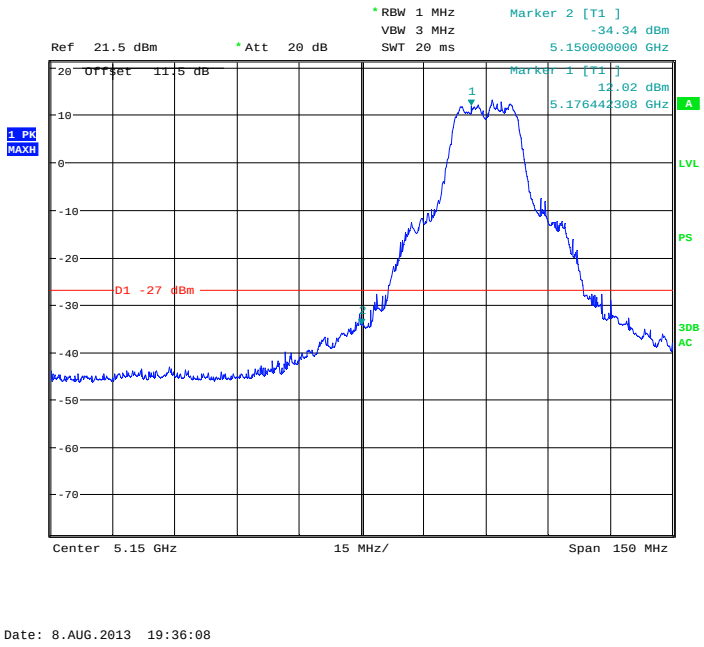
2.7.8 Additional Observations

- This is a conducted test as per Section G of 789033 D01 General UNII Test Procedures v01r01 .
- RBW=1MHz/VBW=3MHz
- Detector = Peak
- Sweep time=Auto
- Trace Mode=max hold
- Sweep allowed to continue until the trace stabilized.

2.7.9 Test Results

Complies. See attached plots and calculations.

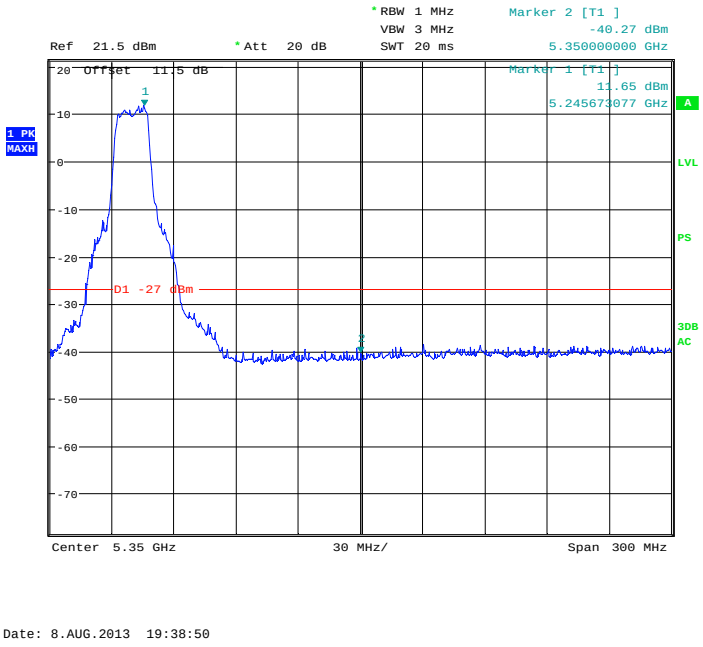
802.11 a



Low Channel (5180 MHz)

Lower band edge calculation:

- 5150 MHz (in the restricted band)
- Use the following formula as per Section G(1)(ii) of 789033 D01 General UNII Test Procedures v01r01:
  E(dBµV/m) = EIRP (dBm) + 95.2
  = (-34.34 dBm + 3.02dBi antenna gain) + 95.2
  = 63.88 dBµV/m @ 3 meters
- 63.88 dBµV/m (Peak) is less than than the 74 dBµV/m peak limit of 15.209.



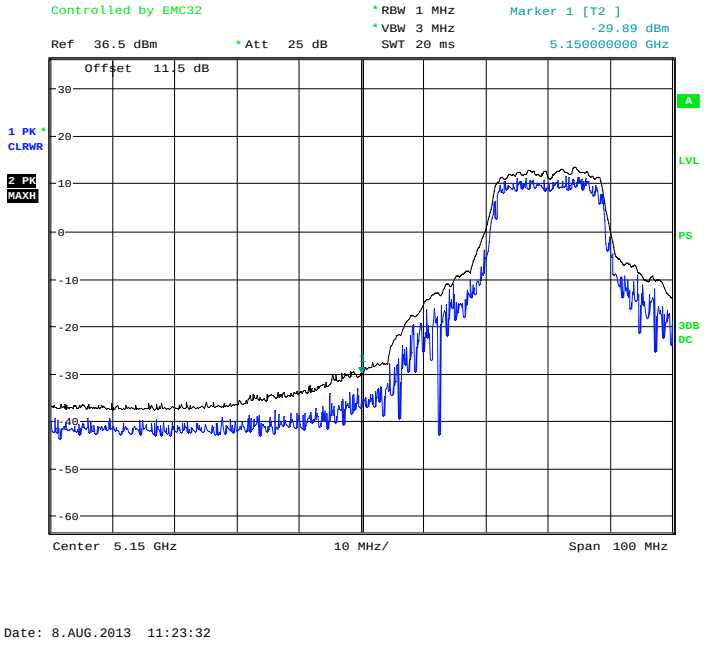
High Channel (5240 MHz)

Upper band edge calculation:

- 5350 MHz (not in the restricted bands)
- Limit is -27dBm EIRP
- Calculation @ 5350 MHz:

Peak measurement @ 5350 MHz	= -40.27 dBm
EIRP @ 5350 MHz	= -40.27 + 3.02 dBi (antenna gain)
	= -37.25 dBm
Margin of compliance	= 10.25 dB

802.11 n



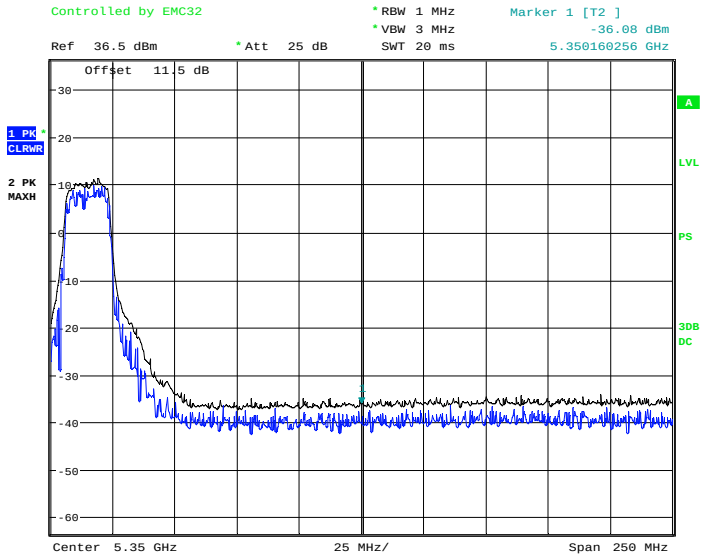
Low Channel (5180 MHz)

Lower band edge calculation:

- 5150 MHz (in the restricted band)
- Use the following formula as per Section G(1)(ii) of 789033 D01 General UNII Test Procedures v01r01:

E(dBµV/m) = EIRP (dBm) + 95.2
= (-29.89 dBm + 3.02dBi antenna gain) + 95.2
= 68.33 dBµV/m @ 3 meters

68.33dBµV/m (Peak) is less than than the 74 dBµV/m peak limit of 15.209.



High Channel (5240 MHz)

Upper band edge calculation:

- 5350 MHz (not in the restricted bands)
- Limit is -27dBm EIRP
- Calculation @ 5350 MHz:

Peak measurement @ 5350 MHz	= -36.08 dBm
EIRP @ 5350 MHz	= -36.08 + 3.02 dBi (antenna gain)
	= -33.06 dBm
Margin of compliance	= 6.06 dB

2.8 SPURIOUS RADIATED EMISSIONS

2.8.1 Specification Reference

Part 15 Subpart E §15.407(b)(1)

2.8.2 Standard Applicable

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz.

The provisions of §15.205 apply to intentional radiators operating under this section.

2.8.3 Test Methodology

Section G of 789033 D01 General UNII Test Procedures v01r01

2.8.4 Equipment Under Test and Modification State

Serial No: SEZ100073700125 / Test Configuration B

2.8.5 Date of Test/Initial of test personnel who performed the test

From August 06 to August 13, 2013/JMG & AC

2.8.6 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.8.7 Environmental Conditions

Ambient Temperature	24.3°C
Relative Humidity	49.5%
ATM Pressure	100.1 kPa

2.8.8 Additional Observations

- These are radiated tests (cabinet emissions measurements) to supplement conducted measurements performed.
- Measurement was done using EMC32 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.7.9 for sample computation.

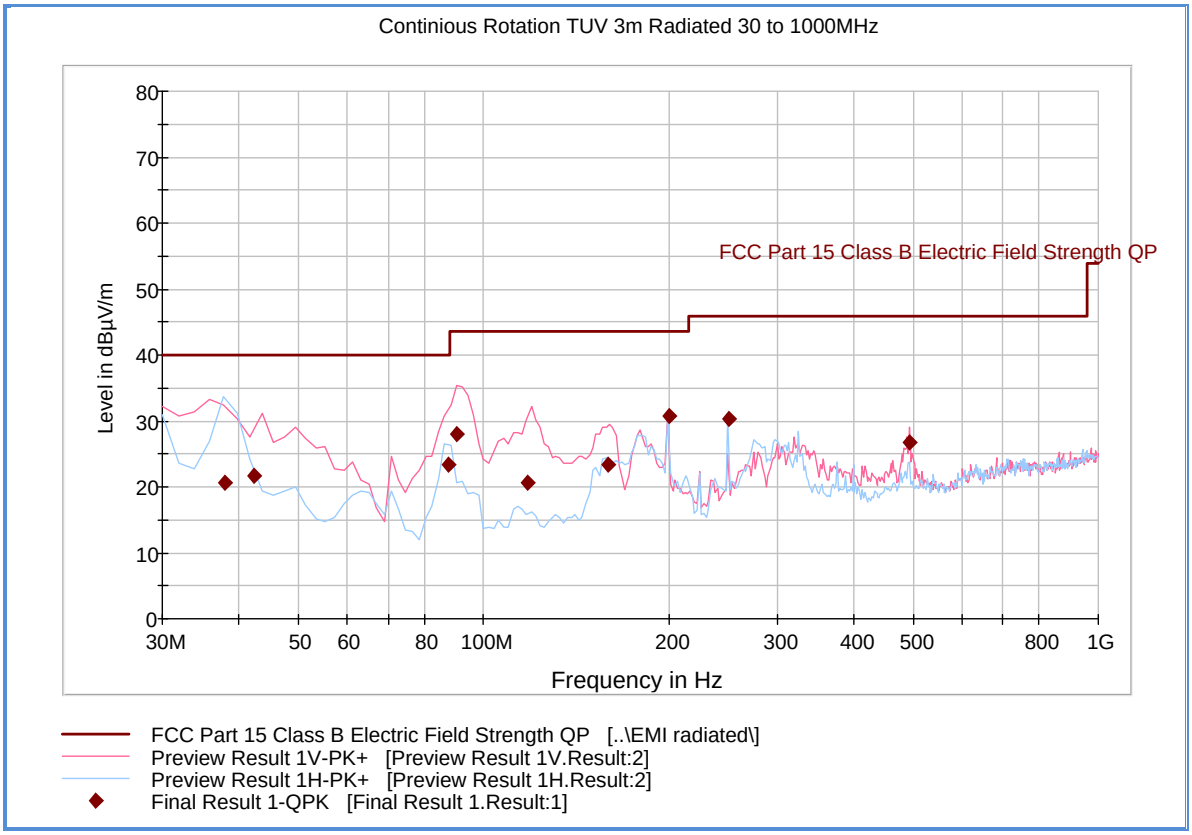
2.8.9 Sample Computation (Radiated Emission)

Measuring equipment raw measurement (dbµV) @ 30 MHz			24.4
Correction Factor (dB)	Asset# 1066 (cable)	0.3	-12.6
	Asset# 1172 (cable)	0.3	
	Asset# 1016 (preamplifier)	-30.7	
	Asset# 1175(cable)	0.3	
	Asset# 1002 (antenna)	17.2	
Reported QuasiPeak Final Measurement (dbµV/m) @ 30MHz			**11.8**

2.8.10 Test Results

See attached plots.

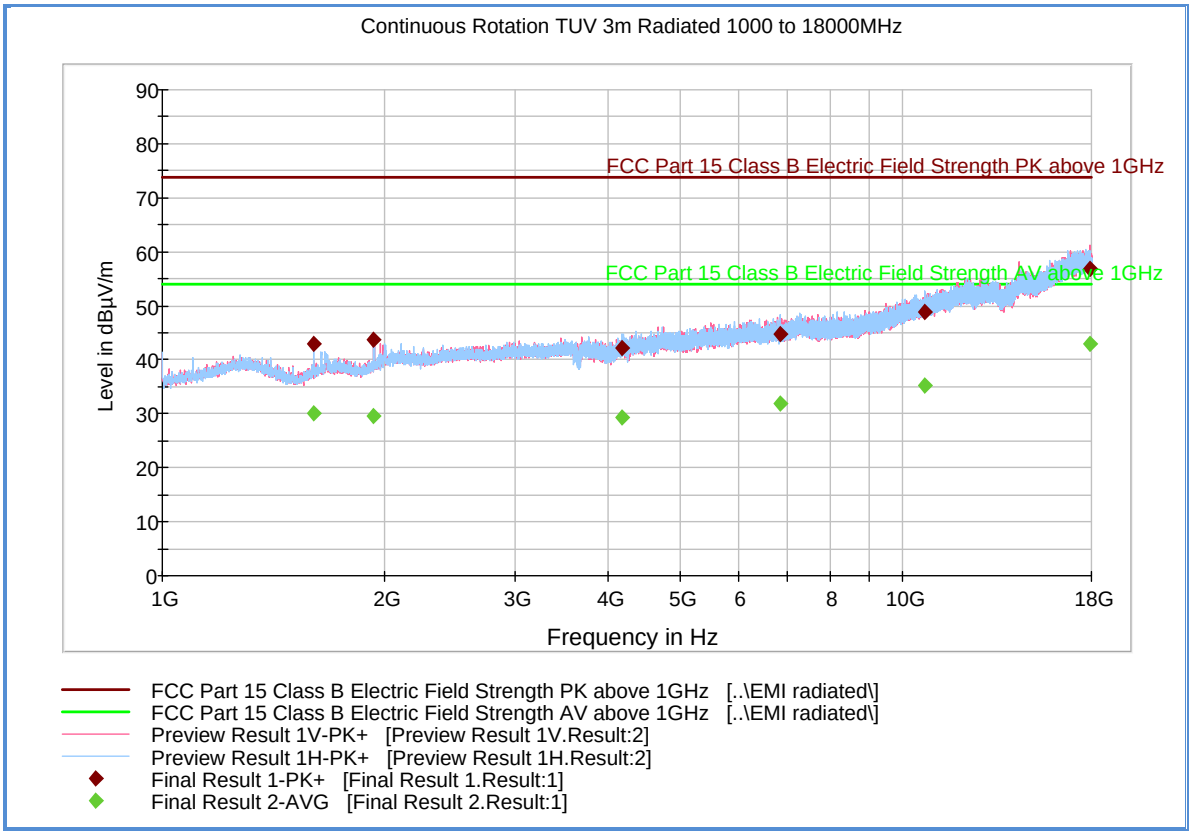
2.8.11 Test Results Below 1GHz (Receive Mode)



Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
37.855551	20.6	1000.0	120.000	356.0	H	15.0	-15.1	19.4	40.0
42.207214	21.6	1000.0	120.000	100.0	V	300.0	-17.1	18.4	40.0
87.508858	23.4	1000.0	120.000	100.0	V	197.0	-20.4	16.6	40.0
90.420521	28.1	1000.0	120.000	106.0	V	237.0	-19.9	15.4	43.5
117.778838	20.6	1000.0	120.000	100.0	V	18.0	-19.6	22.9	43.5
159.680481	23.3	1000.0	120.000	100.0	V	247.0	-17.5	20.2	43.5
199.998236	30.7	1000.0	120.000	100.0	V	22.0	-15.3	12.8	43.5
249.979319	30.3	1000.0	120.000	100.0	H	69.0	-13.1	15.7	46.0
492.805291	26.7	1000.0	120.000	100.0	V	13.0	-6.0	19.3	46.0

2.8.12 Test Results Above 1GHz (Receive Mode)



Peak Data

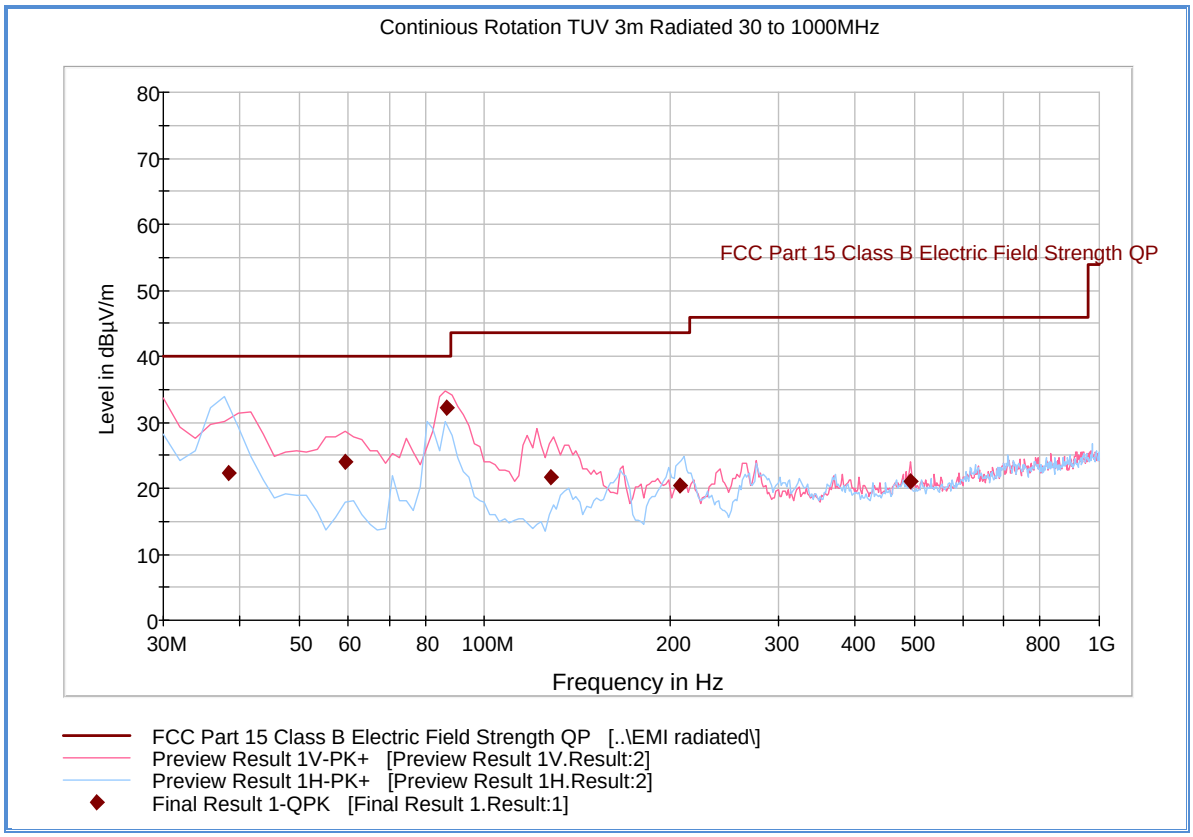
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1599.900000	43.0	1000.0	1000.000	400.5	H	46.0	-4.3	30.9	73.9
1931.966667	43.8	1000.0	1000.000	355.1	V	39.0	-2.0	30.1	73.9
4174.866667	42.1	1000.0	1000.000	131.6	H	270.0	3.7	31.8	73.9
6830.666667	44.6	1000.0	1000.000	158.5	H	283.0	8.8	29.3	73.9
10721.70000	49.0	1000.0	1000.000	300.2	H	194.0	13.8	24.9	73.9
17896.73333	56.8	1000.0	1000.000	203.4	V	278.0	22.4	17.1	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1599.900000	30.1	1000.0	1000.000	400.5	H	46.0	-4.3	23.8	53.9
1931.966667	29.5	1000.0	1000.000	355.1	V	39.0	-2.0	24.4	53.9
4174.866667	29.4	1000.0	1000.000	131.6	H	270.0	3.7	24.5	53.9
6830.666667	31.9	1000.0	1000.000	158.5	H	283.0	8.8	22.0	53.9
10721.70000	35.3	1000.0	1000.000	300.2	H	194.0	13.8	18.6	53.9
17896.73333	42.9	1000.0	1000.000	203.4	V	278.0	22.4	11.0	53.9

Test Notes: No emissions observed above 1GHz. All measurements presented are noise floor figures.

2.8.13 Test Results Below 1GHz (Worst Case 802.11 n)

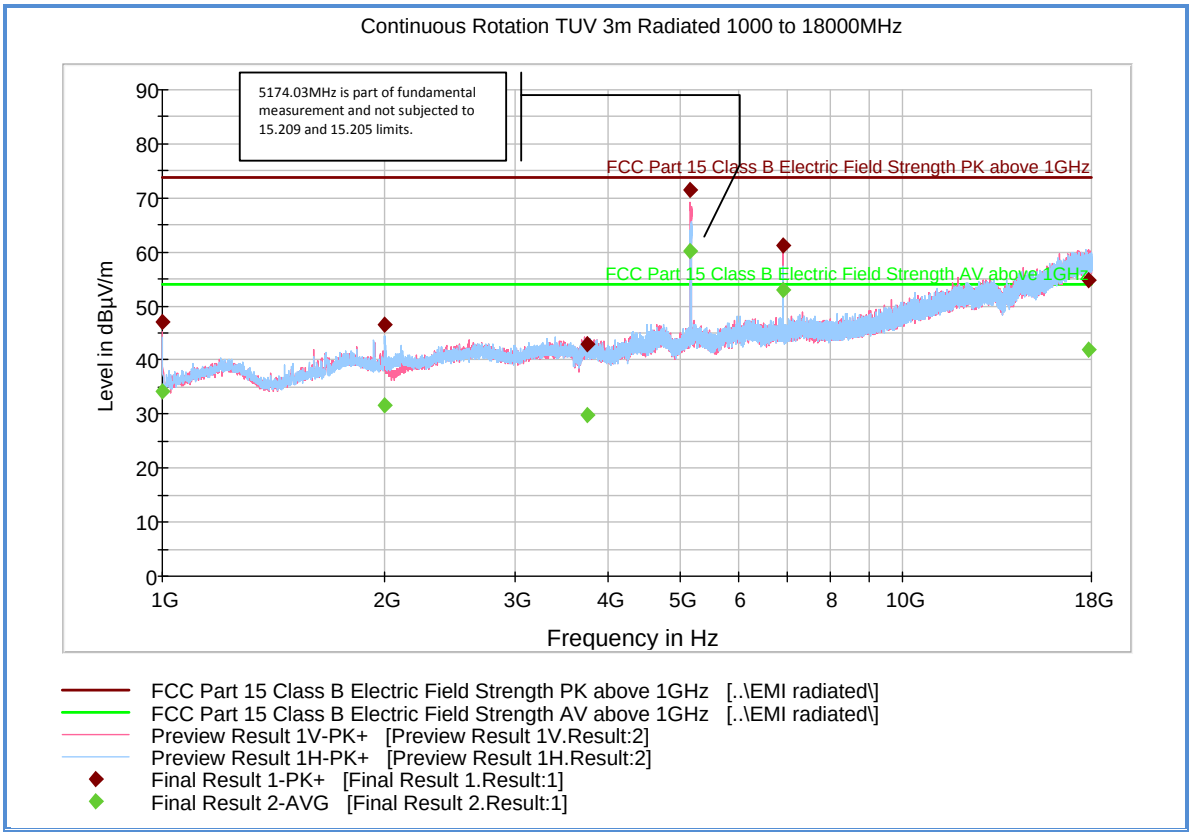


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
38.295551	22.2	1000.0	120.000	400.0	H	263.0	-15.4	17.8	40.0
59.398317	23.9	1000.0	120.000	100.0	V	151.0	-20.9	16.1	40.0
86.852745	32.3	1000.0	120.000	115.0	V	207.0	-20.5	7.7	40.0
128.218277	21.7	1000.0	120.000	100.0	V	81.0	-19.9	21.8	43.5
208.181563	20.4	1000.0	120.000	171.0	H	319.0	-14.8	23.1	43.5
492.765291	21.1	1000.0	120.000	100.0	V	88.0	-6.0	24.9	46.0

Test Notes: Only worst case channel presented for spurious emissions below 1GHz.

2.8.14 Test Results Above 1GHz (802.11 a Low Channel)



Peak Data

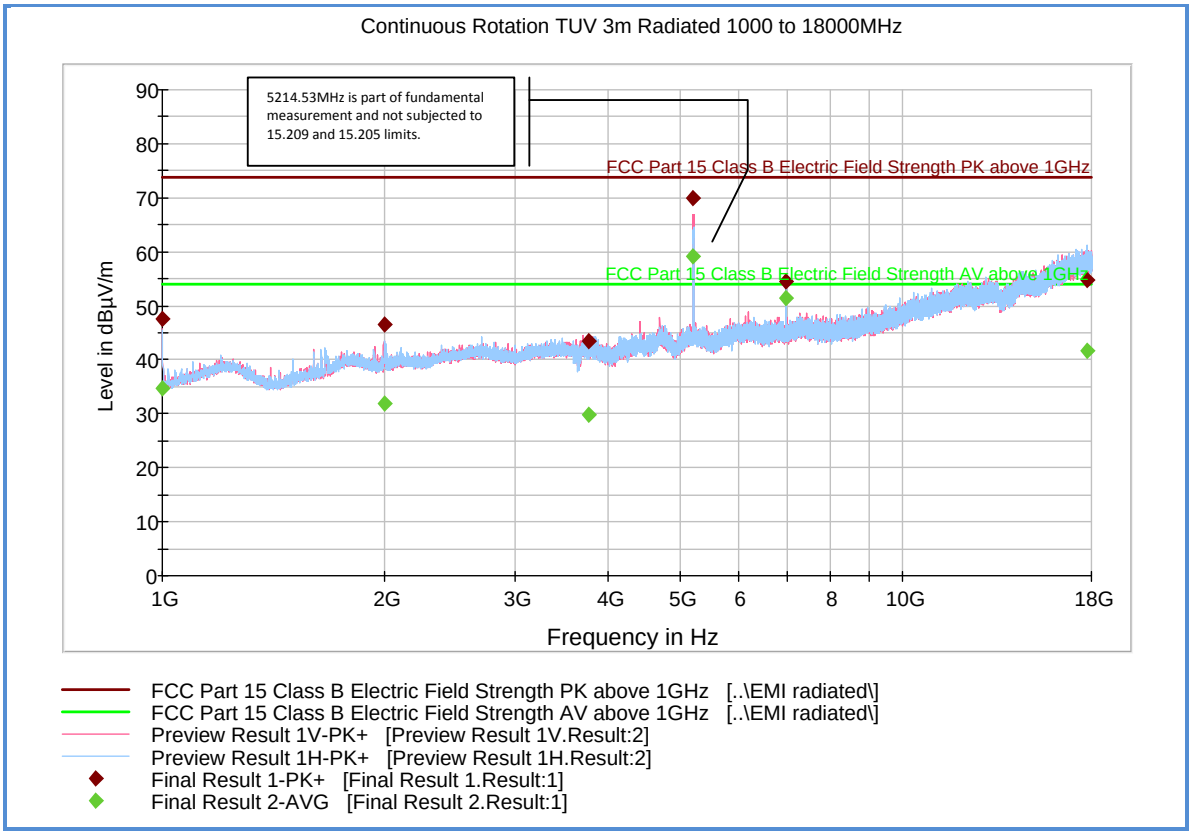
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	47.0	1000.0	1000.000	200.4	V	276.0	-6.3	26.9	73.9
1999.800000	46.5	1000.0	1000.000	252.3	H	191.0	-1.6	27.4	73.9
3744.966667	42.9	1000.0	1000.000	315.1	V	285.0	3.0	31.0	73.9
5174.033333	71.4	1000.0	1000.000	200.4	V	-9.0	6.4	2.5	73.9
6906.566667	61.2	1000.0	1000.000	185.4	V	72.0	8.8	12.7	73.9
17827.133333	54.8	1000.0	1000.000	99.6	V	293.0	22.3	19.1	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	34.1	1000.0	1000.000	200.4	V	276.0	-6.3	19.8	53.9
1999.800000	31.7	1000.0	1000.000	252.3	H	191.0	-1.6	22.2	53.9
3744.966667	30.0	1000.0	1000.000	315.1	V	285.0	3.0	23.9	53.9
5174.033333	60.3	1000.0	1000.000	200.4	V	-9.0	6.4	-6.4	53.9
6906.566667	53.0	1000.0	1000.000	185.4	V	72.0	8.8	0.9	53.9
17827.133333	41.9	1000.0	1000.000	99.6	V	293.0	22.3	12.0	53.9

Test Notes: 5174.03MHz is part of fundamental measurement and not subjected to 15.209 and 15.205 limits. There are no emissions observed above 7GHz (noise floor measurements).

2.8.15 Test Results Above 1GHz (802.11 a Mid Channel)



Peak Data

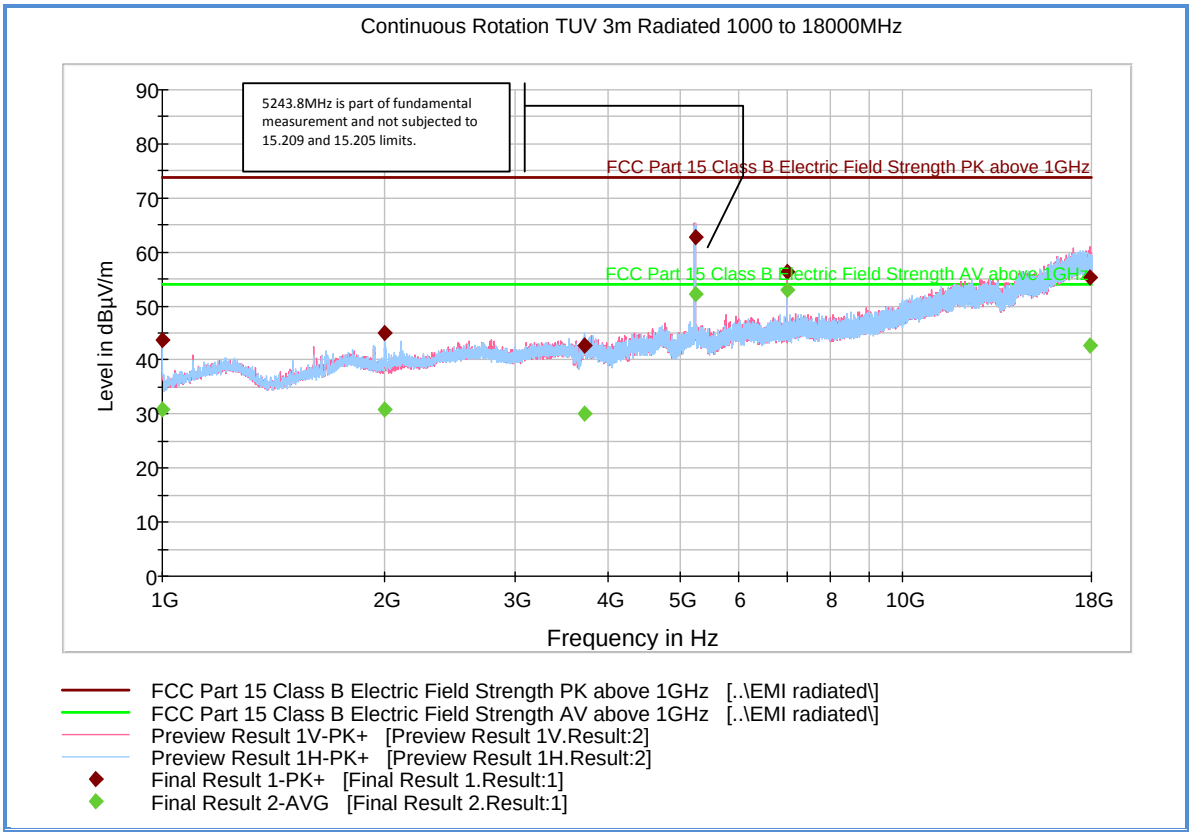
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	47.5	1000.0	1000.000	200.4	V	245.0	-6.3	26.4	73.9
1999.600000	46.6	1000.0	1000.000	252.3	H	3.0	-1.6	27.3	73.9
3775.000000	43.4	1000.0	1000.000	292.2	V	95.0	2.8	30.5	73.9
5214.533333	70.0	1000.0	1000.000	243.3	V	3.0	6.7	3.9	73.9
6959.833333	54.6	1000.0	1000.000	103.6	V	145.0	8.9	19.3	73.9
17757.433333	54.9	1000.0	1000.000	131.6	H	60.0	22.2	19.0	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	34.7	1000.0	1000.000	200.4	V	245.0	-6.3	19.2	53.9
1999.600000	31.8	1000.0	1000.000	252.3	H	3.0	-1.6	22.1	53.9
3775.000000	29.8	1000.0	1000.000	292.2	V	95.0	2.8	24.1	53.9
5214.533333	59.2	1000.0	1000.000	243.3	V	3.0	6.7	-5.3	53.9
6959.833333	51.5	1000.0	1000.000	103.6	V	145.0	8.9	2.4	53.9
17757.433333	41.7	1000.0	1000.000	131.6	H	60.0	22.2	12.2	53.9

Test Notes: 5214.53MHz is part of fundamental measurement and not subjected to 15.209 and 15.205 limits. There are no emissions observed above 7GHz (noise floor measurements).

2.8.16 Test Results Above 1GHz (802.11 a High Channel)



Peak Data

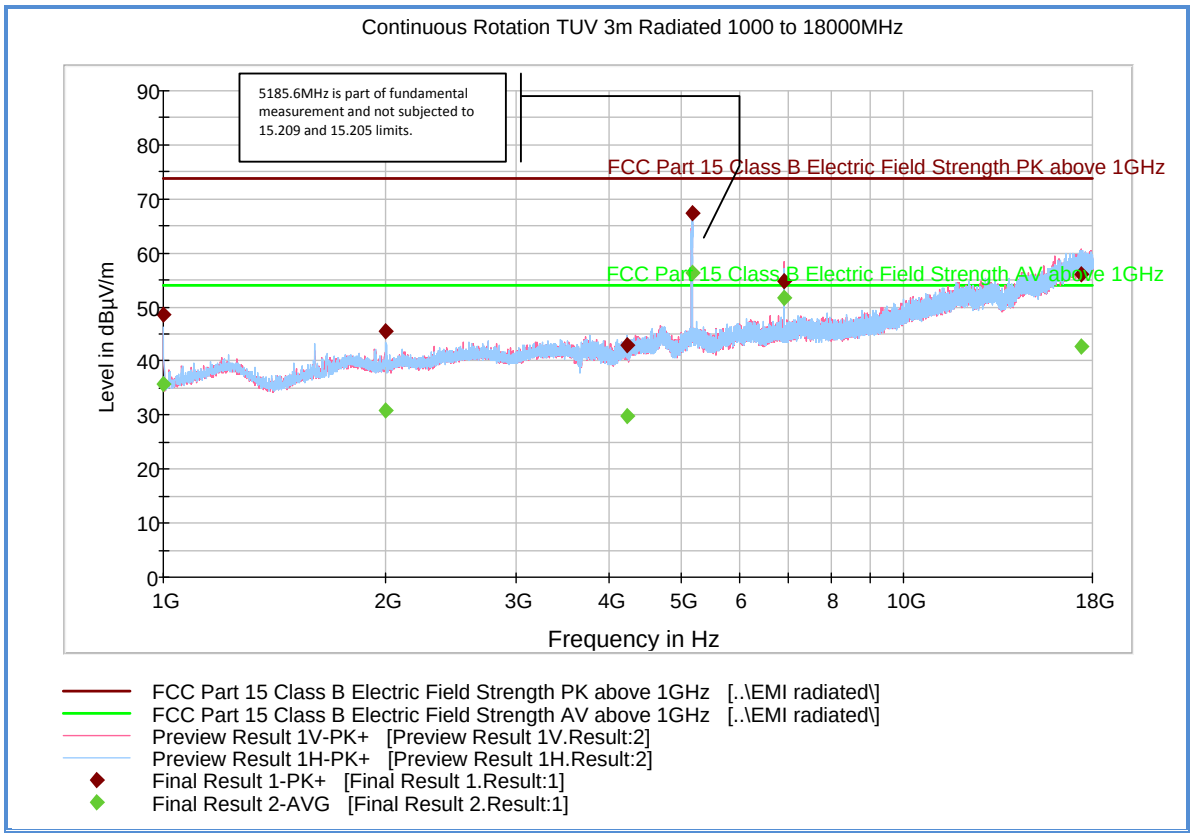
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	43.7	1000.0	1000.000	213.4	V	285.0	-6.3	30.2	73.9
1999.400000	45.0	1000.0	1000.000	271.3	H	9.0	-1.6	28.9	73.9
3714.133333	42.6	1000.0	1000.000	223.4	H	220.0	2.9	31.3	73.9
5243.800000	62.8	1000.0	1000.000	103.6	V	205.0	6.8	11.1	73.9
6986.466667	56.4	1000.0	1000.000	348.1	V	54.0	8.9	17.5	73.9
17942.200000	55.2	1000.0	1000.000	302.2	V	155.0	22.5	18.7	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	31.0	1000.0	1000.000	213.4	V	285.0	-6.3	23.0	53.9
1999.400000	30.8	1000.0	1000.000	271.3	H	9.0	-1.6	23.1	53.9
3714.133333	30.0	1000.0	1000.000	223.4	H	220.0	2.9	23.9	53.9
5243.800000	52.1	1000.0	1000.000	103.6	V	205.0	6.8	1.8	53.9
6986.466667	53.1	1000.0	1000.000	348.1	V	54.0	8.9	0.8	53.9
17942.200000	42.8	1000.0	1000.000	302.2	V	155.0	22.5	11.1	53.9

Test Notes: 5243.8MHz is part of fundamental measurement and not subjected to 15.209 and 15.205 limits. There are no emissions observed above 7GHz (noise floor measurements).

2.8.17 Test Results Above 1GHz (802.11 n Low Channel)



Peak Data

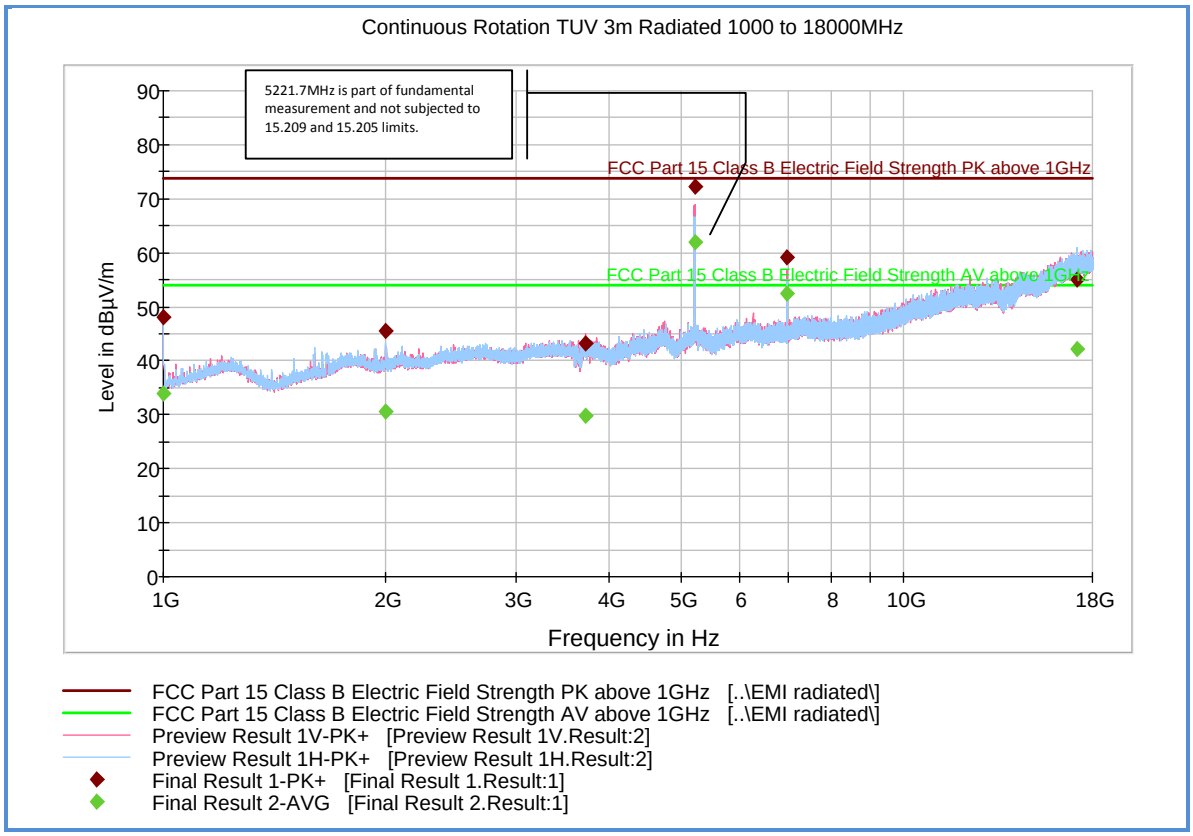
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	48.5	1000.0	1000.000	198.4	H	192.0	-6.3	25.4	73.9
1999.566667	45.5	1000.0	1000.000	260.2	H	295.0	-1.6	28.4	73.9
4225.266667	43.0	1000.0	1000.000	282.2	H	58.0	3.9	30.9	73.9
5185.600000	67.4	1000.0	1000.000	114.6	H	136.0	6.5	6.5	73.9
6906.566667	54.7	1000.0	1000.000	188.4	V	67.0	8.8	19.2	73.9
17357.766667	56.0	1000.0	1000.000	400.3	V	234.0	22.1	17.9	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	35.8	1000.0	1000.000	198.4	H	192.0	-6.3	18.1	53.9
1999.566667	30.8	1000.0	1000.000	260.2	H	295.0	-1.6	23.1	53.9
4225.266667	29.7	1000.0	1000.000	282.2	H	58.0	3.9	24.2	53.9
5185.600000	56.4	1000.0	1000.000	114.6	H	136.0	6.5	-2.5	53.9
6906.566667	51.6	1000.0	1000.000	188.4	V	67.0	8.8	2.3	53.9
17357.766667	42.6	1000.0	1000.000	400.3	V	234.0	22.1	11.3	53.9

Test Notes: 5185.6MHz is part of fundamental measurement and not subjected to 15.209 and 15.205 limits. There are no emissions observed above 7GHz (noise floor measurements).

2.8.18 Test Results Above 1GHz (802.11 n Mid Channel)



Peak Data

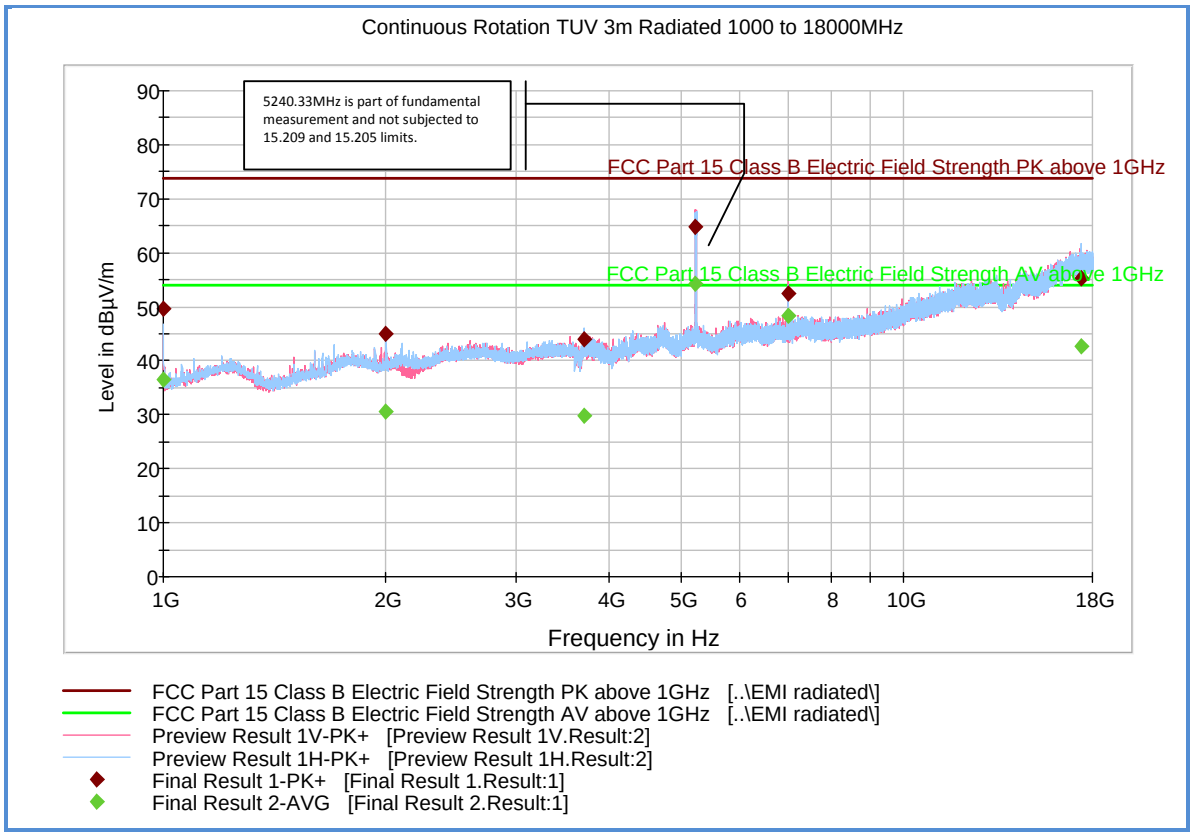
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.400000	48.1	1000.0	1000.000	200.4	H	348.0	-6.3	25.8	73.9
1999.600000	45.6	1000.0	1000.000	270.2	H	1.0	-1.6	28.3	73.9
3717.400000	43.2	1000.0	1000.000	400.3	V	162.0	3.0	30.7	73.9
5221.700000	72.3	1000.0	1000.000	159.5	V	274.0	6.7	1.6	73.9
6959.833333	59.2	1000.0	1000.000	327.1	V	53.0	8.9	14.7	73.9
17139.200000	55.1	1000.0	1000.000	196.4	H	185.0	21.8	18.8	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.400000	33.8	1000.0	1000.000	200.4	H	348.0	-6.3	20.1	53.9
1999.600000	30.6	1000.0	1000.000	270.2	H	1.0	-1.6	23.3	53.9
3717.400000	29.8	1000.0	1000.000	400.3	V	162.0	3.0	24.1	53.9
5221.700000	62.0	1000.0	1000.000	159.5	V	274.0	6.7	-8.1	53.9
6959.833333	52.5	1000.0	1000.000	327.1	V	53.0	8.9	1.4	53.9
17139.200000	42.2	1000.0	1000.000	196.4	H	185.0	21.8	11.7	53.9

Test Notes: 5221.7MHz is part of fundamental measurement and not subjected to 15.209 and 15.205 limits. There are no emissions observed above 7GHz (noise floor measurements).

2.8.19 Test Results Above 1GHz (802.11 n High Channel)



Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	49.6	1000.0	1000.000	187.4	H	16.0	-6.3	24.3	73.9
1999.966667	45.0	1000.0	1000.000	268.2	H	126.0	-1.6	28.9	73.9
3709.200000	43.9	1000.0	1000.000	389.1	H	106.0	2.9	30.0	73.9
5240.333333	64.8	1000.0	1000.000	246.3	V	-10.0	6.8	9.1	73.9
6986.466667	52.5	1000.0	1000.000	315.1	V	53.0	8.9	21.4	73.9
17392.333333	55.3	1000.0	1000.000	301.6	H	314.0	22.2	18.6	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	36.5	1000.0	1000.000	187.4	H	16.0	-6.3	17.4	53.9
1999.966667	30.6	1000.0	1000.000	268.2	H	126.0	-1.6	23.3	53.9
3709.200000	29.9	1000.0	1000.000	389.1	H	106.0	2.9	24.0	53.9
5240.333333	54.4	1000.0	1000.000	246.3	V	-10.0	6.8	-0.5	53.9
6986.466667	48.3	1000.0	1000.000	315.1	V	53.0	8.9	5.6	53.9
17392.333333	42.6	1000.0	1000.000	301.6	H	314.0	22.2	11.3	53.9

Test Notes: 5240.33 MHz is part of fundamental measurement and not subjected to 15.209 and 15.205 limits. There are no emissions observed above 7GHz (noise floor measurements).

2.9 PEAK EXCURSION RATIO

2.9.1 Specification Reference

Part 15 Subpart E §15.407(a)(6)

2.9.2 Standard Applicable

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

2.9.3 Test Methodology

Section F of 789033 D01 General UNII Test Procedures v01r01

2.9.4 Test Methodology

Section E of 789033 D01 General UNII Test Procedures v01r01

2.9.5 Equipment Under Test and Modification State

Serial No: SEZ100073700125 / Test Configuration A

2.9.6 Date of Test/Initial of test personnel who performed the test

August 15, 2013/JMG

2.9.7 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.9.8 Environmental Conditions

Ambient Temperature	24.1°C
Relative Humidity	44.5%
ATM Pressure	99.1 kPa

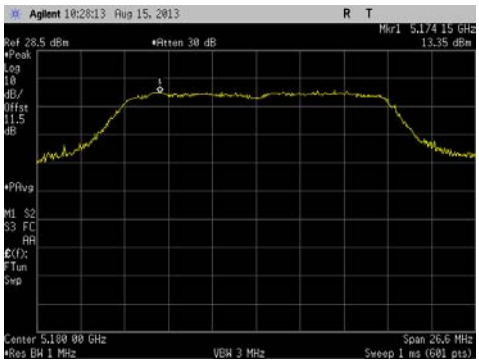
2.9.9 Additional Observations

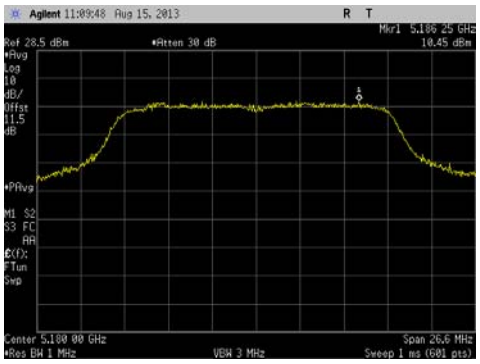
- This is a conducted test as per Section G of 789033 D01 General UNII Test Procedures v01r01.
- The ratio of the peak-max-hold spectrum was verified not to exceed 13 dB.

2.9.10 Test Results

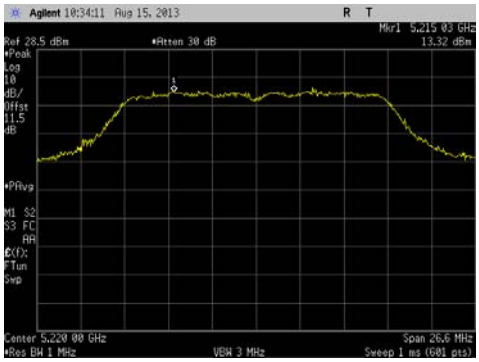
See attached plots and table.

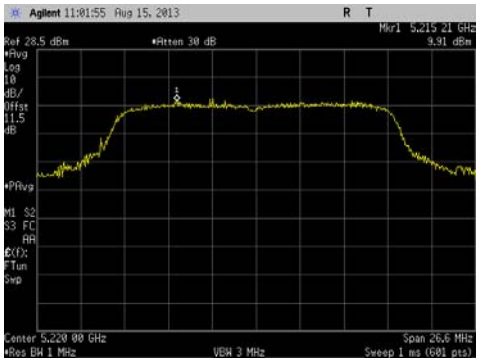
802.11 a						
Channel	**Frequency (MHz)**	**Peak Max Hold (dBm)**	**Peak of average power spectrum (dBm)**	**Ratio (dB)**	**Limit (dB)**	**Margin (dB)**
36	5180	13.35	10.45	2.9	13	10.1
44	5220	13.32	9.91	3.41	13	9.59
48	5240	12.91	9.82	3.09	13	9.91



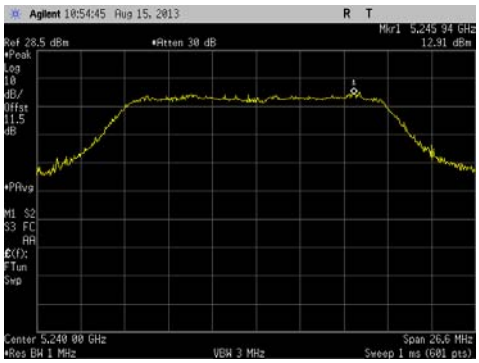


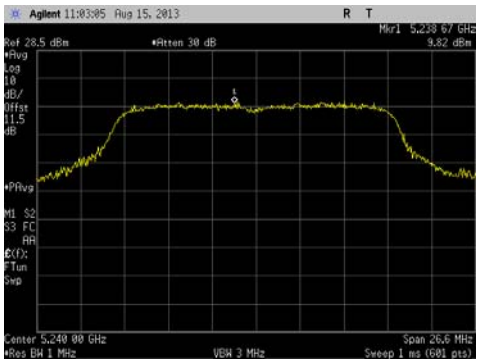
Low Channel (802.11 a)





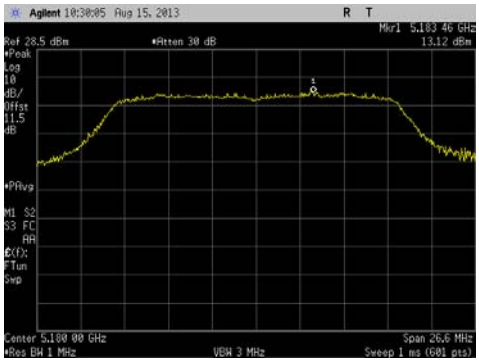
Mid Channel (802.11 a)

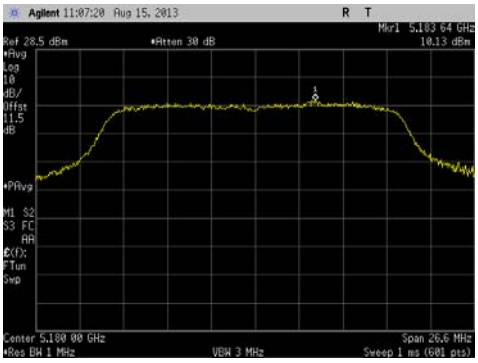




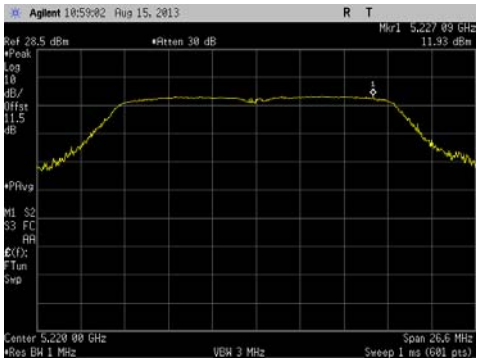
High Channel (802.11 a)

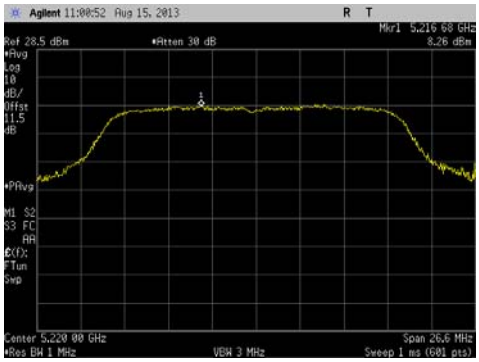
802.11 n						
Channel	Frequency (MHz)	Peak Max Hold (dBm)	Peak of average power spectrum (dBm)	Ratio (dB)	Limit (dB)	Margin (dB)
36	5180	13.12	10.13	2.99	13	10.01
44	5220	11.93	8.26	3.67	13	9.33
48	5240	12.03	9.05	2.98	13	10.02



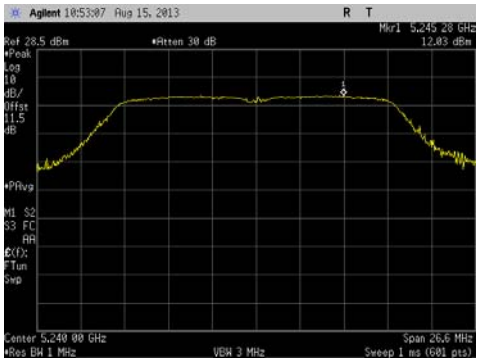


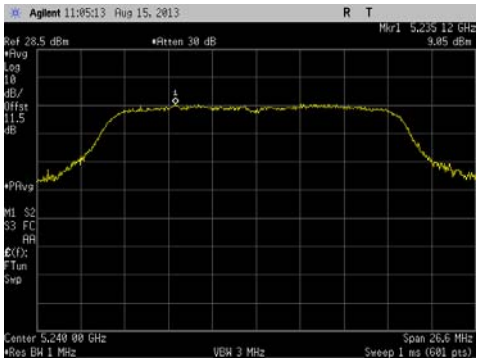
Low Channel (802.11 n)





Mid Channel (802.11 n)





High Channel (802.11 n)

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

ID Number (SDGE/SDRB)	Test Equipment	Type	Serial Number	Manufacturer	Cal Date	Cal Due Date
Conducted Port Setup						
7569	Series Power Meter	N1911A P-	MY45100625	Agilent	04/15/13	04/15/14
7570	50MHz-18GHz Wideband Power Sensor	N1921A	MY45240588	Agilent	05/06/13	05/06/14
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	07/24/13	07/24/14
6814	PSA Series Spectrum Analyzer	E4440A	MY42510441	Agilent	11/07/12	11/07/13
8607	20dB Attenuator	34-20-34	BP4180	MCE/Weinschel	Verified by 6814 and 1003	
8686	20dB Attenuator	0846	BW-N20W5+	MCL	Verified by 6814 and 1003	
Radiated Test Setup						
1033	Bilog Antenna	3142C	00044556	EMCO	06/25/13	06/25/14
7575	Double-ridged waveguide horn antenna	3117	00155511	EMCO	03/25/13	03/25/14
8628	Pre-amplifier	QLJ 01182835-JO	8986002	QuinStar Technologies Inc.	09/21/12	09/21/13
1153	High-frequency cable	SucoFlex 100 SX	N/A	Suhner	09/21/12	09/21/13
8543	High-frequency cable	Micropore 19057793	N/A	United Microwave Products	09/21/12	09/21/13
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	07/31/13	07/31/14
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	07/24/13	07/24/14
1016	Pre-amplifier	PAM-0202	187	PAM	09/24/12	09/24/13
Conducted Emissions						
1024	EMI Test Receiver	ESCS 30	847793/001	Rhode & Schwarz	03/11/13	03/11/14
7567	LISN	FCC-LISN-50-25-2-10	120304	Fischer Custom Comm.	06/11/13	06/11/14
7568	LISN	FCC-LISN-50-25-2-10	120305	Fischer Custom Comm.	07/10/13	07/10/14
8607	20dB Attenuator	CAT-20	N/A	MCL HAT-20	08/21/12	08/21/13
8609	20dB Attenuator	CAT-20	N/A	MCL HAT-20	08/21/12	08/21/13
Miscellaneous						
	Test Software	EMC32	V8.53	Rhode & Schwarz	N/A	
1003	Signal Generator	SMR-40	1104.0002.40	Rhode & Schwarz	11/12/12	11/12/13
6452	Multimeter	3478A	2911A52177	Hewlett Packard	08/02/13	08/02/14
7560	Barometer/Temperature /Humidity Transmitter	iBTHX-W	1240476	Omega	11/19/12	11/19/13

Note.- For ID #8607 and 8609 Conducted Emission Was performed on August 15, 2013. (when the the Equipment was within the calibration range.)

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

3.2.1 Radiated Emission Measurements (Below 1GHz)

	Contribution	Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.45	0.26	0.07
2	Cables	Rectangular	0.50	0.29	0.08
3	Preamp	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.75	0.43	0.19
5	Site	Rectangular	3.89	2.25	5.04
6	EUT Setup	Rectangular	1.00	0.58	0.33
				Combined Uncertainty (u_c):	2.41
				Coverage Factor (k):	2
				Expanded Uncertainty:	4.82

3.2.2 Radiated Emission Measurements (Above 1GHz)

	Contribution	Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.57	0.33	0.11
2	Cables	Rectangular	0.70	0.40	0.16
3	Preamp	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.37	0.21	0.05
5	Site	Rectangular	3.89	2.25	5.04
6	EUT Setup	Rectangular	1.00	0.58	0.33
				Combined Uncertainty (u_c):	2.40
				Coverage Factor (k):	2
				Expanded Uncertainty:	4.81

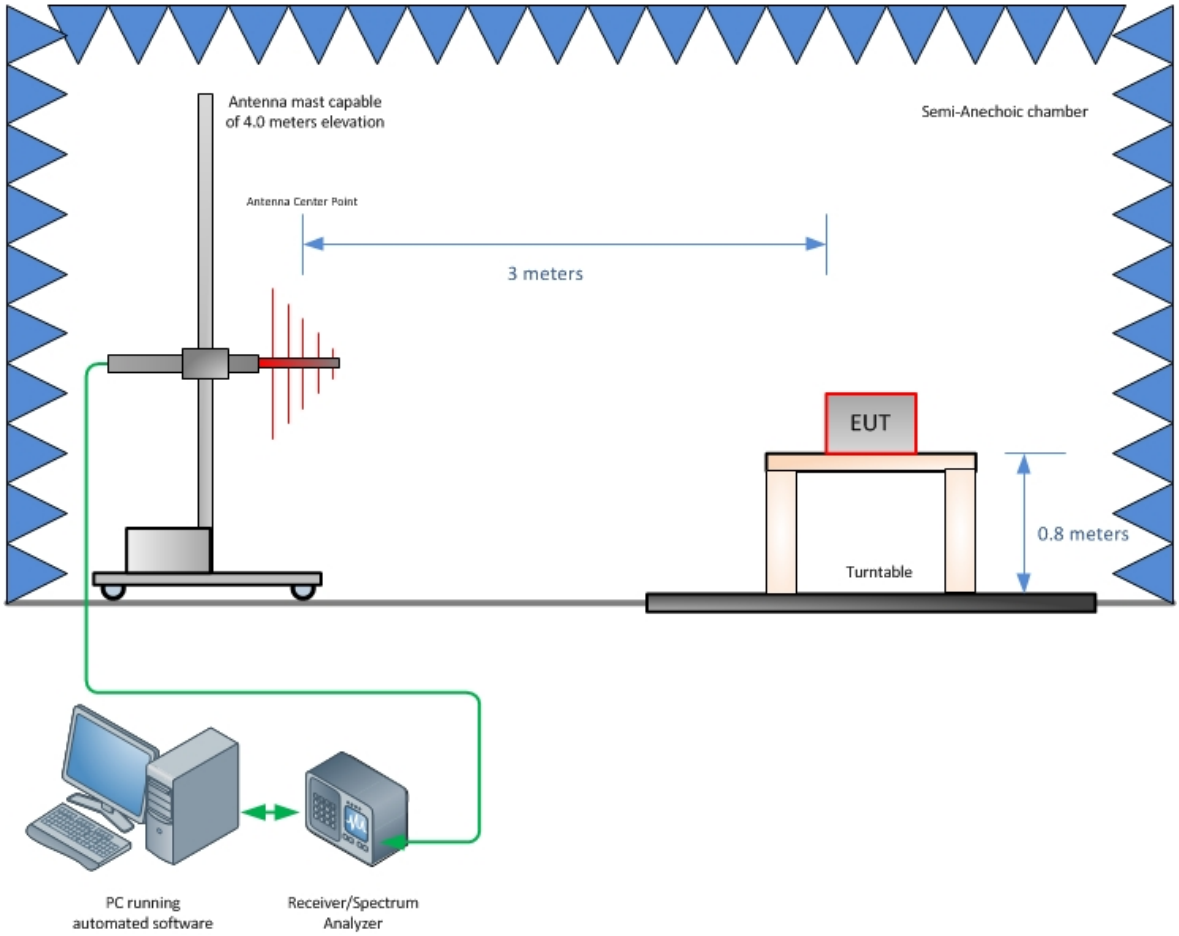
3.2.3 Conducted Antenna Port Measurement

	Contribution	Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.57	0.33	0.11
2	Cables	Rectangular	0.50	0.29	0.08
3	EUT Setup	Rectangular	1.00	0.58	0.33
				Combined Uncertainty (u_c):	0.72
				Coverage Factor (k):	2
				Expanded Uncertainty:	1.45

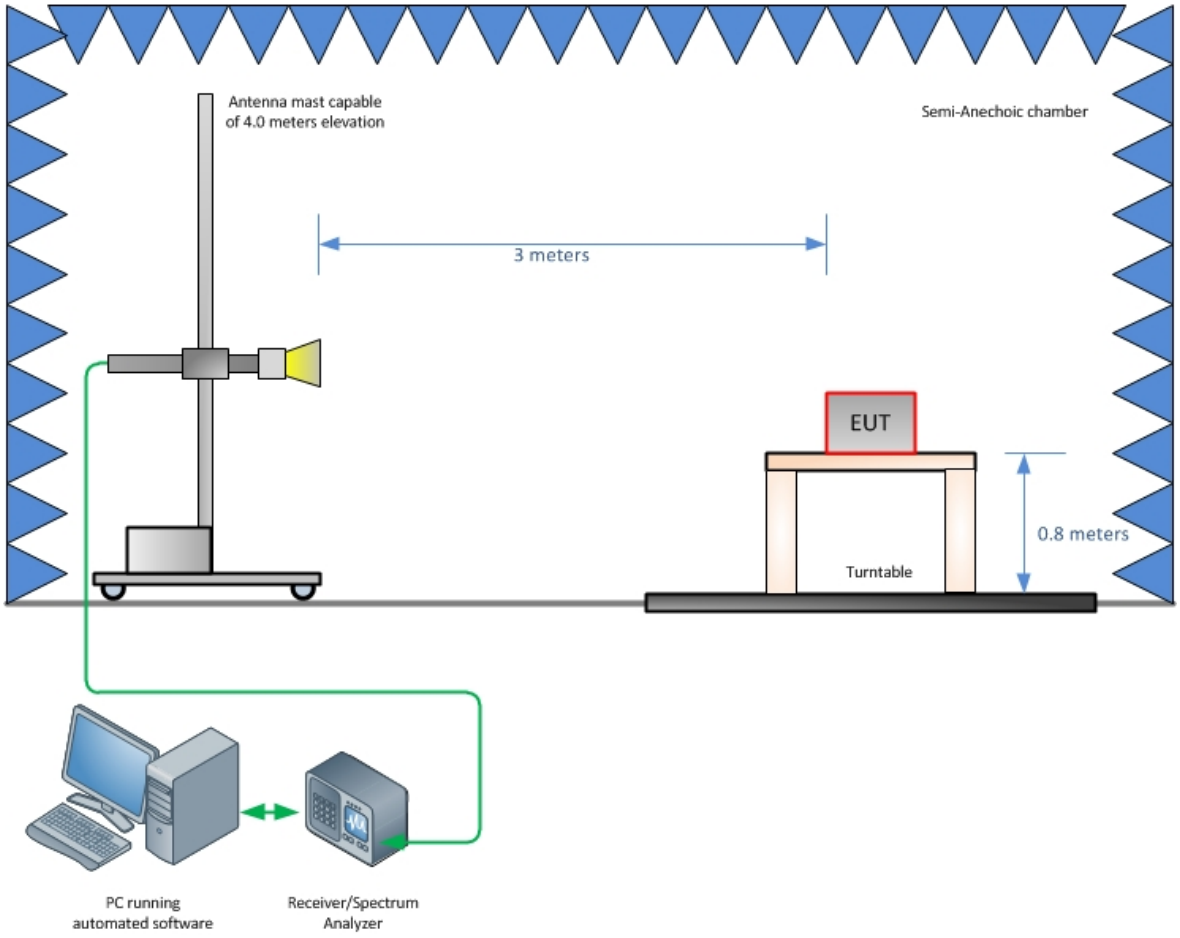
SECTION 4

DIAGRAM OF TEST SETUP

4.1 TEST SETUP DIAGRAM



Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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