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Report On

Application for Grant of Equipment Authorization of the
Novatel Wireless Inc.
MiFi5580 Personal Wireless Router

FCC Part 15 Subpart C §15.247
IC RSS-Gen and RSS-210 Issue 8 December 2010

* This Report only covers the Radiated portion of the above requirements and the conducted port measurements were performed by Novatel Wireless Inc. and can be found attached to this report in Novatel Report No.: NVTLTR0047-02.

Report No. SC1303824B MAY 2013

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Report No. SC1303824B MAY 2013

REPORT ON	Radio Testing of the Novatel Wireless Inc. Personal Wireless Router
TEST REPORT NUMBER	SC1303824B
PREPARED FOR	Novatel Wireless Inc. 9645 Scranton Road, Suite 205 San Diego, CA 92121-3030 USA
CONTACT PERSON	Todd Gallagher Regulatory Engineering Manager (403) 295-4891 tgallagher@nvt.com
PREPARED BY	Juan Manuel Gonzalez **Name** Authorized Signatory Title: EMC Engineer
APPROVED BY	Chip R. Fleury **Name** Authorized Signatory
DATED	May 28, 2013

Revision History

SC1303824B Novatel Wireless Inc. MiFi5580 Personal Wireless Router					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
05/28/13	Initial Release				Juan M Glez.

CONTENTS

SECTION 1

REPORT SUMMARY

Radio Testing of the
Novatel Wireless Inc.
Personal Wireless Router

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Novatel Wireless Inc. MiFi5580 Personal Wireless Router to the requirements of the following:

- FCC Part 15 Subpart C §15.247
- IC RSS-Gen and RSS-210 Issue 8 December 2010.

Note .- This Report only covers the Radiated portion of the above requirements and the conducted port measurements were performed by Novatel Wireless Inc. and will be presented in a different exhibit.

Objective	To perform Radio Testing (Only Radiated) 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)	MiFi5580
FCC ID Number	PKRNVWMIFI5580
IC Number	N/A
Serial Number(s)	Engineering Sample
Number of Samples Tested	1
Test Specification/Issue/Date	• FCC Part 15 Subpart C §15.247 (October 1, 2011). • RSS-210 - Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment (Issue 8, December 2010). • RSS-Gen - General Requirements and Information for the Certification of Radio Apparatus (Issue 3, December 2010).
Start of Test	May 06, 2013
Finish of Test	May 22, 2013
Name of Engineer(s)	Juan M. Gonzalez
Related Document(s)	• RF Exposure Lab Certificate Of Compliance SAR Evaluation Test Report Number: SAR.20130402 • Supporting documents for EUT certification are separate exhibits. • Conducted port Measurements will be presented in a different report/ exhibit by Novatel Wireless Inc.

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC Part 15 Subpart C §15.247 with cross-reference to the corresponding IC RSS standard is shown below.

Section	§15.247 Spec Clause	RSS	Test Description	Result	Comments/ Base Standard
2.1	§15.207(a)	RSS-Gen 7.2.4	Conducted Emissions	Compliant	
2.2	§15.247(d)	RSS-210 A8.5	Spurious Radiated Emissions	Compliant	
2.2		RSS-Gen 4.10	Receiver Spurious Emissions	Compliant	
2.3	§15.247(d)	RSS-210 A8.5	Radiated Restricted Band Edge Measurements	Compliant	

1.3 PRODUCT INFORMATION

1.3.1 EUT General Description

The Equipment Under Test (EUT) was a Novatel Wireless Inc. MiFi5580 Personal Wireless Router. The EUT creates a personal Wi-Fi cloud, capable of sharing high-speed 4G LTE and 3G Mobile Broadband Internet connectivity with up to 10 Wi-Fi-enabled devices simultaneously. The EUT comes with an AC adapter Novatel Wireless model: SSW-2423.

1.3.2 EUT General Description

EUT Description	MiFi5580 Personal Wireless Router
Rated Voltage	3.7 VDC Nominal voltage.
Mode Verified	802.11 b/g/n WLAN
Capability	800/1900 CDMA2000 1xRTT and 1xEV-DO Release 0 Revision A, Band 25, 26 and 41 LTE, 802.11 b/g/n WLAN
Primary Unit (EUT)	☐ Production ☒ Pre-Production ☐ Engineering
Antenna Details	WLAN – Antenna 5: 802.11 b/g/n Manufacturer: NVTL Part Number: N/A Type: Monopole (Etched onto PCB) Antenna Gain: • 802. 11 b/g/n 2450MHz : 1.03 dBi WWAN –EVDO/ LTE Band 25, 26, Manufacturer: Ethertronics Part Number: NVTL Part #: 01019835 Type: Monopole Antenna Gain: • CDMA BC0 - 850MHz : -0.21 dBi • CDMA BC1 - 1880MHz : 2.45 dBi • CDMA BC10 – 850MHz : -0.21 dBi • LTE B25 - 1880MHz : 2.45 dBi • LTE B26 - 850MHz : -0.21 dBi WWAN – LTE Band 41 Manufacturer: NVTL Part Number: N/A Type: Monopole (Etched onto PCB) Antenna Gain: • LTE B41 - 2600MHz : 0.81 dBi

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
A	EUT transmitting max power through integral antenna. 802.11b 1Mbps data rate.
B	EUT transmitting max power through integral antenna. 802.11g 6Mbps data rate.
C	EUT transmitting max power through integral antenna. 802.11n 6.5Mbps data rate.
D	EUT in receive mode. (TX=off)

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

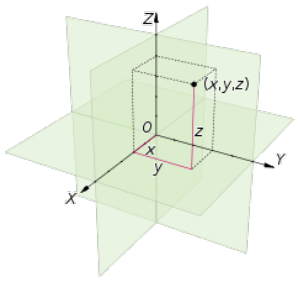
Manufacturer	Equipment/Cable	Description
Dell	Support Laptop	Novatel Wireless Test Configuration Support Laptop
LUXSHARE-ICT	USB cable	Shielded Type A to Micro USB (0.912 meter) USB Revision 2.

1.4.4 Worst Case Configuration

Worst-case configuration used in this test report verified from conducted power measurements from Novatel Wireless Inc.)

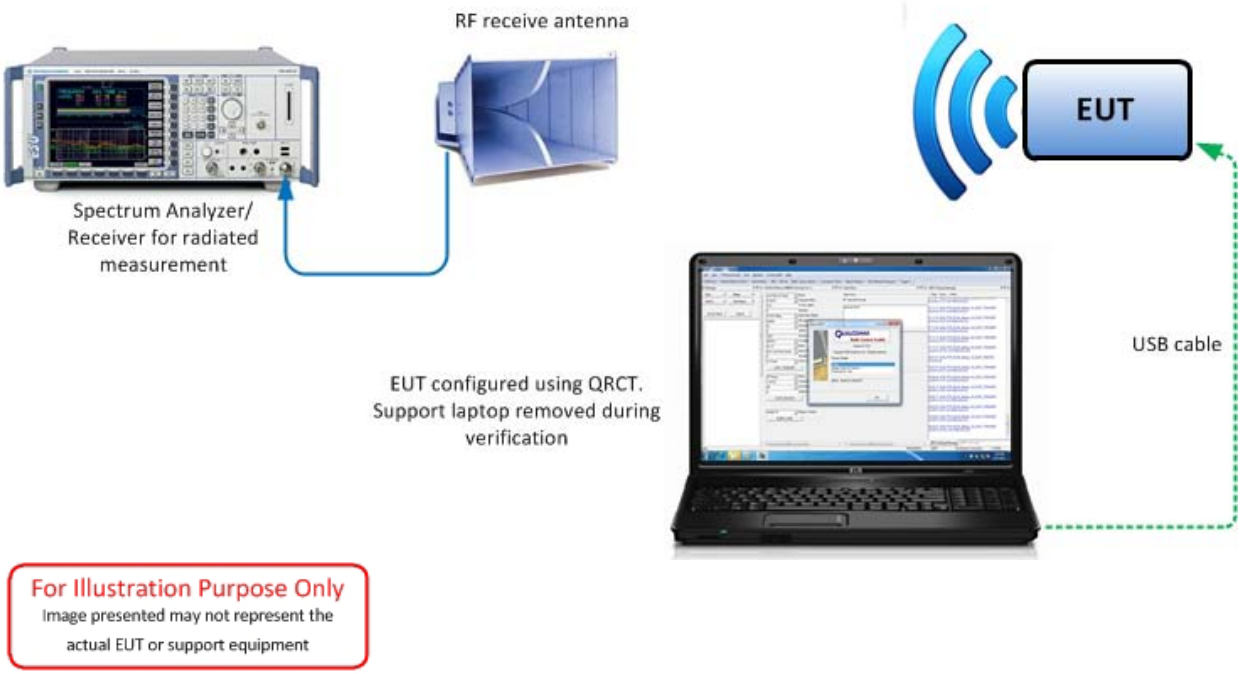
Mode	Channel	Data Rate
802.11b	6 (Mid Channel)	1Mbps
802.11g	10 (High Channel)	6Mbps
802.11n	6 (Mid Channel)	6.5Mbps

EUT is a portable device. For radiated measurements X, Y and Z orientations were verified. Worst case position is “X”.



1.4.5 Simplified Test Configuration Diagram

Radiated Test Configuration



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 Engineering Sample		
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.
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), is an accredited test facility with the site description report on file and has met all the requirements specified in §2.498 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Registration is US5296.

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.
Personal Wireless Router

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

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).

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: Engineering Sample / Test Configuration A,B and C

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

May 14 & 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	22.4°C
Relative Humidity	55.0%
ATM Pressure	99.6 kPa

2.1.7 Additional Observations

- The EUT is a battery powered device however with provision to connect to public AC mains via supplied AC adapter/charger.
- The EUT was verified using worst case configuration (worst case channel/mode). The EUT was set to transmit max. power while plugged into the AC adapter and RX mode.
- EUT verified using input voltage of 120VAC 60Hz.

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

- 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 2.2.8 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# 7567 (LISN)	0.30	
Reported QuasiPeak Final Measurement (dbµV) @ 150kHz			**26.2**

2.1.9 Test Results

Compliant. See attached plots and tables.

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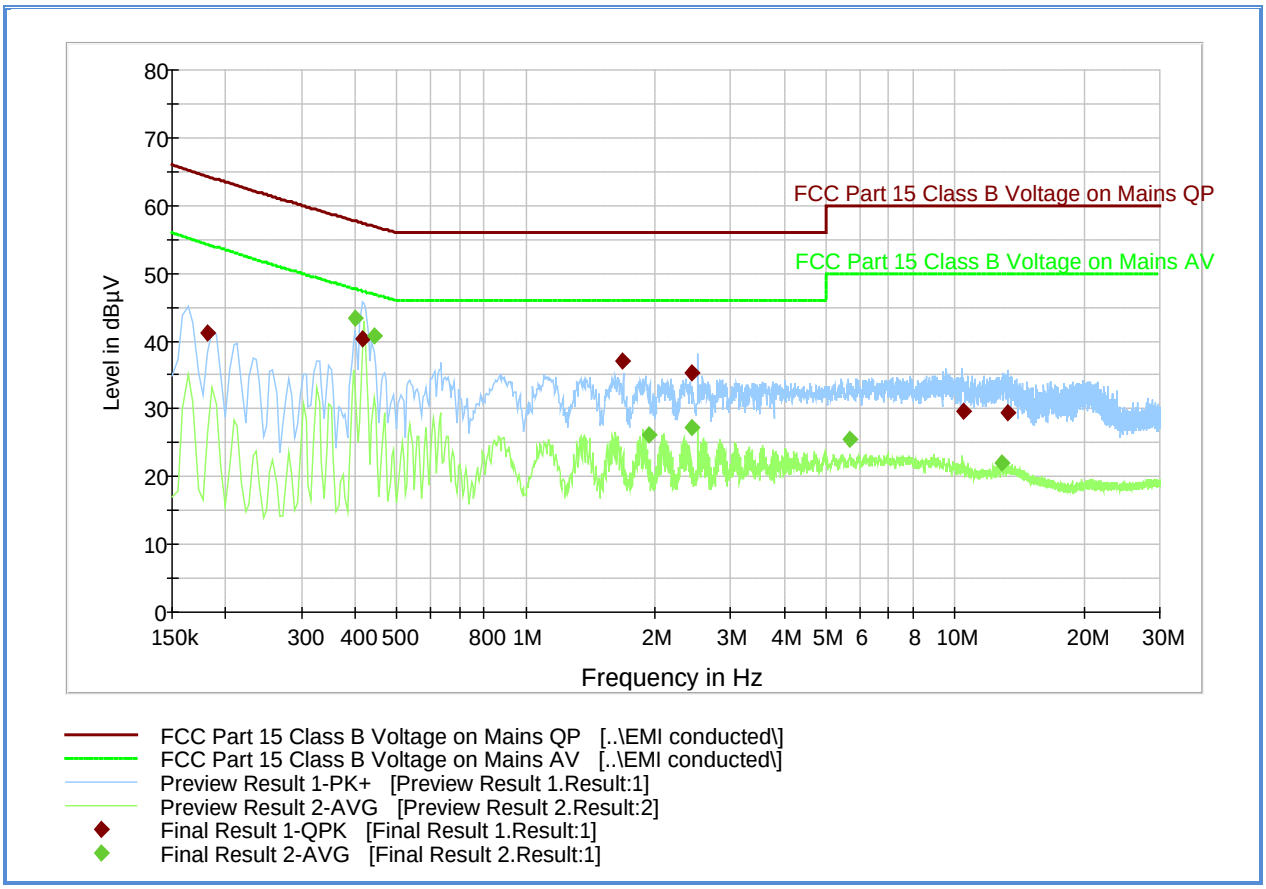
2.1.10 **Line 1 (Hot) 802.11b**



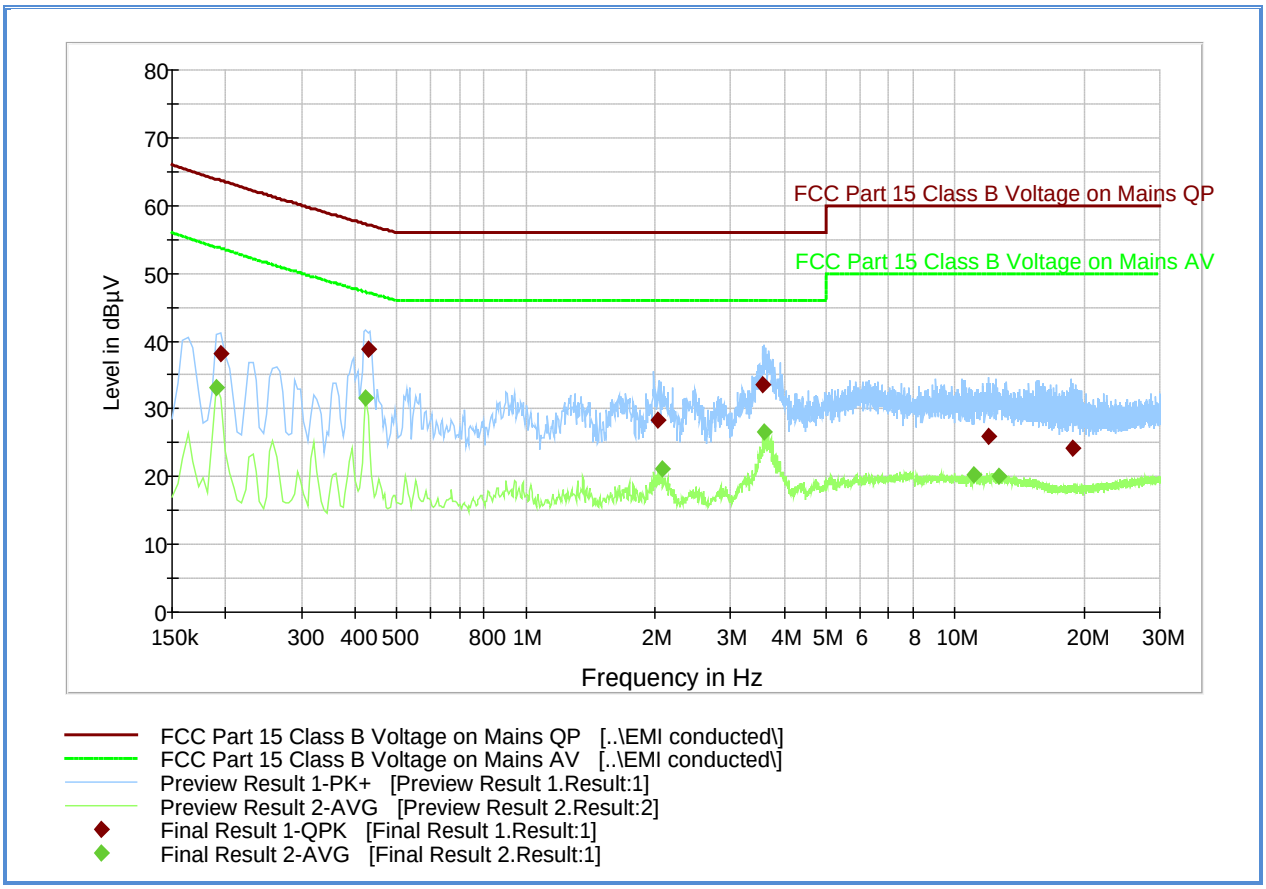
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.181500	41.2	1000.0	9.000	Off	L1	20.4	23.1	64.3
0.415500	40.3	1000.0	9.000	Off	L1	20.2	17.2	57.4
1.684500	37.1	1000.0	9.000	Off	L1	20.3	18.9	56.0
2.445000	35.3	1000.0	9.000	Off	L1	20.3	20.7	56.0
10.423500	29.8	1000.0	9.000	Off	L1	20.4	30.2	60.0
13.240500	29.4	1000.0	9.000	Off	L1	20.6	30.6	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit – Ave (dBµV)
0.402000	43.4	1000.0	9.000	Off	L1	20.2	4.3	47.7
0.442500	40.8	1000.0	9.000	Off	L1	20.2	6.1	46.9
1.936500	26.2	1000.0	9.000	Off	L1	20.3	19.8	46.0
2.440500	27.2	1000.0	9.000	Off	L1	20.3	18.8	46.0
5.676000	25.4	1000.0	9.000	Off	L1	20.4	24.6	50.0
12.894000	22.0	1000.0	9.000	Off	L1	20.6	28.0	50.0

2.1.11 **Line 2 (Neutral) 802.11b**



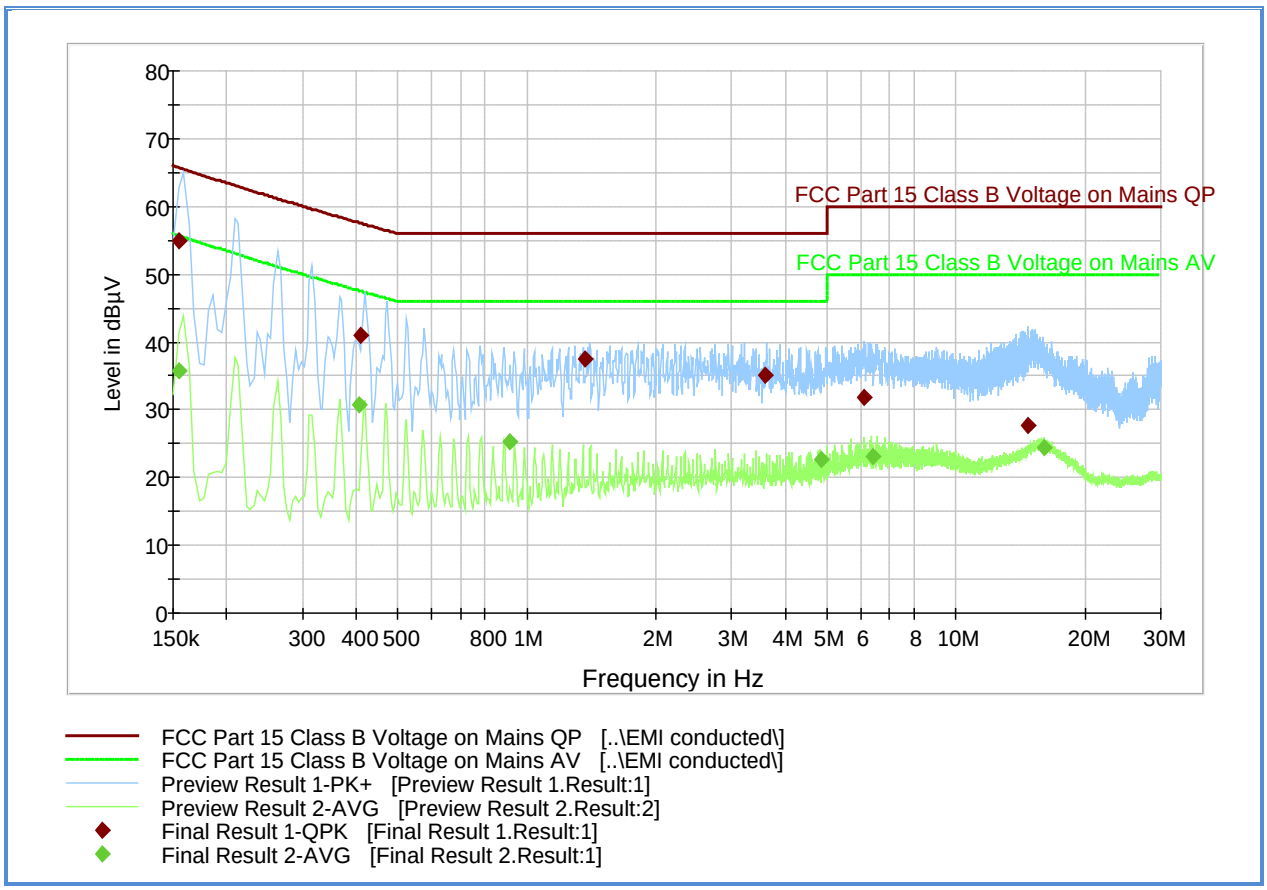
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.195000	38.1	1000.0	9.000	Off	N	21.2	25.5	63.7
0.429000	38.8	1000.0	9.000	Off	N	21.1	18.4	57.2
2.031000	28.4	1000.0	9.000	Off	N	21.1	27.6	56.0
3.565500	33.6	1000.0	9.000	Off	N	21.2	22.4	56.0
12.003000	25.9	1000.0	9.000	Off	N	21.3	34.1	60.0
18.748500	24.3	1000.0	9.000	Off	N	21.7	35.7	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit – Ave (dBµV)
0.190500	33.1	1000.0	9.000	Off	N	21.2	20.7	53.9
0.424500	31.7	1000.0	9.000	Off	N	21.1	15.6	47.2
2.076000	21.2	1000.0	9.000	Off	N	21.1	24.8	46.0
3.579000	26.6	1000.0	9.000	Off	N	21.2	19.4	46.0
11.017500	20.2	1000.0	9.000	Off	N	21.3	29.8	50.0
12.637500	20.0	1000.0	9.000	Off	N	21.3	30.0	50.0

2.1.12 **Line 1 (Hot) 802.11g**



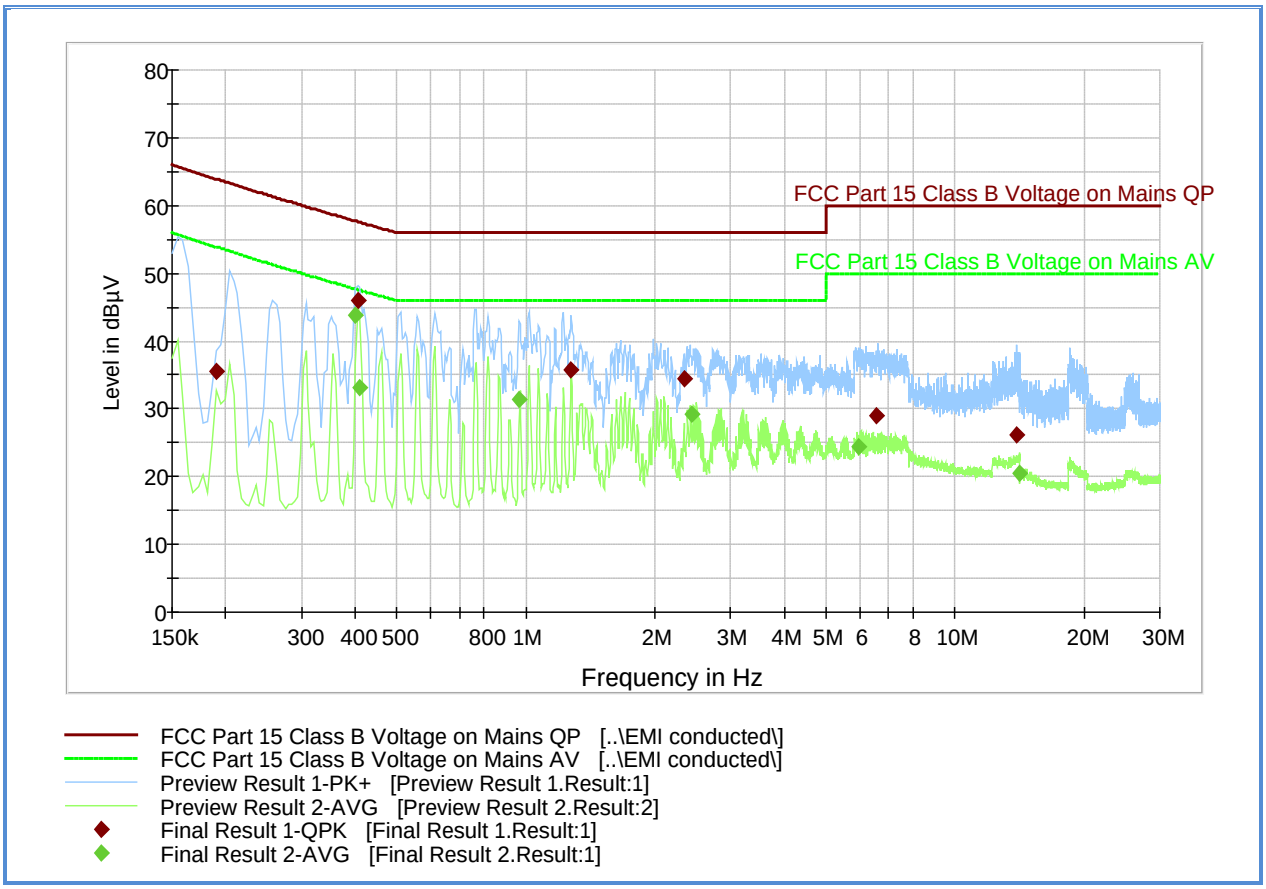
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.154500	55.0	1000.0	9.000	Off	L1	20.4	10.8	65.7
0.411000	41.0	1000.0	9.000	Off	L1	20.2	16.5	57.5
1.369500	37.5	1000.0	9.000	Off	L1	20.3	18.5	56.0
3.601500	35.1	1000.0	9.000	Off	L1	20.3	20.9	56.0
6.094500	31.9	1000.0	9.000	Off	L1	20.4	28.1	60.0
14.721000	27.7	1000.0	9.000	Off	L1	20.7	32.3	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit – Ave (dBµV)
0.154500	35.7	1000.0	9.000	Off	L1	20.4	20.0	55.7
0.406500	30.7	1000.0	9.000	Off	L1	20.2	16.9	47.6
0.915000	25.4	1000.0	9.000	Off	L1	20.2	20.6	46.0
4.870500	22.8	1000.0	9.000	Off	L1	20.4	23.2	46.0
6.396000	23.2	1000.0	9.000	Off	L1	20.4	26.8	50.0
16.026000	24.4	1000.0	9.000	Off	L1	20.8	25.6	50.0

2.1.13 **Line 2 (Neutral) 802.11g**



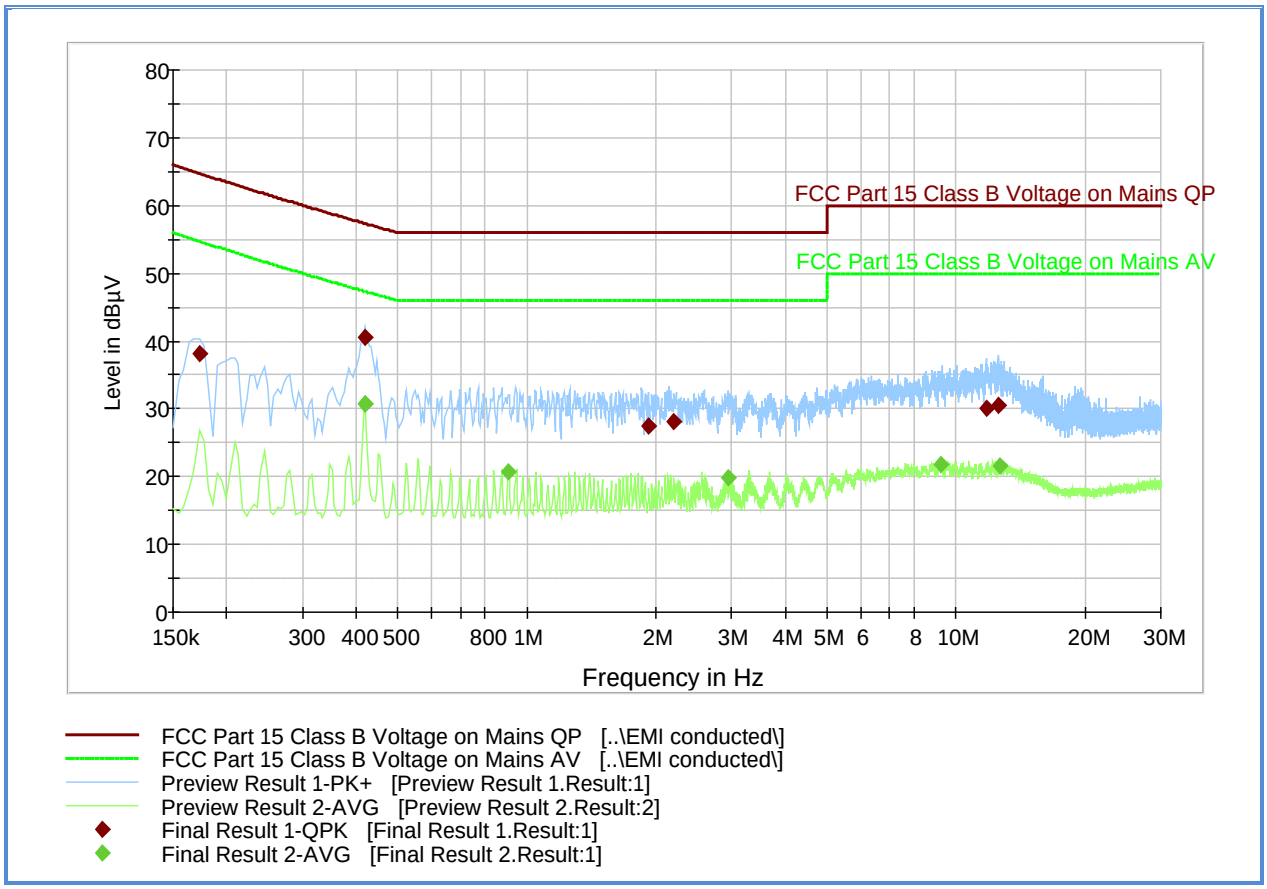
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.190500	35.5	1000.0	9.000	Off	N	21.2	28.3	63.9
0.406500	45.9	1000.0	9.000	Off	N	21.1	11.7	57.6
1.275000	35.8	1000.0	9.000	Off	N	21.1	20.2	56.0
2.346000	34.4	1000.0	9.000	Off	N	21.1	21.6	56.0
6.549000	29.0	1000.0	9.000	Off	N	21.2	31.0	60.0
13.915500	26.1	1000.0	9.000	Off	N	21.4	33.9	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit – Ave (dBµV)
0.402000	43.9	1000.0	9.000	Off	N	21.1	3.8	47.7
0.411000	33.1	1000.0	9.000	Off	N	21.1	14.4	47.5
0.964500	31.4	1000.0	9.000	Off	N	21.1	14.6	46.0
2.431500	29.2	1000.0	9.000	Off	N	21.1	16.8	46.0
5.955000	24.3	1000.0	9.000	Off	N	21.2	25.7	50.0
14.154000	20.6	1000.0	9.000	Off	N	21.4	29.4	50.0

2.1.14 **Line 1 (Hot) 802.11n**



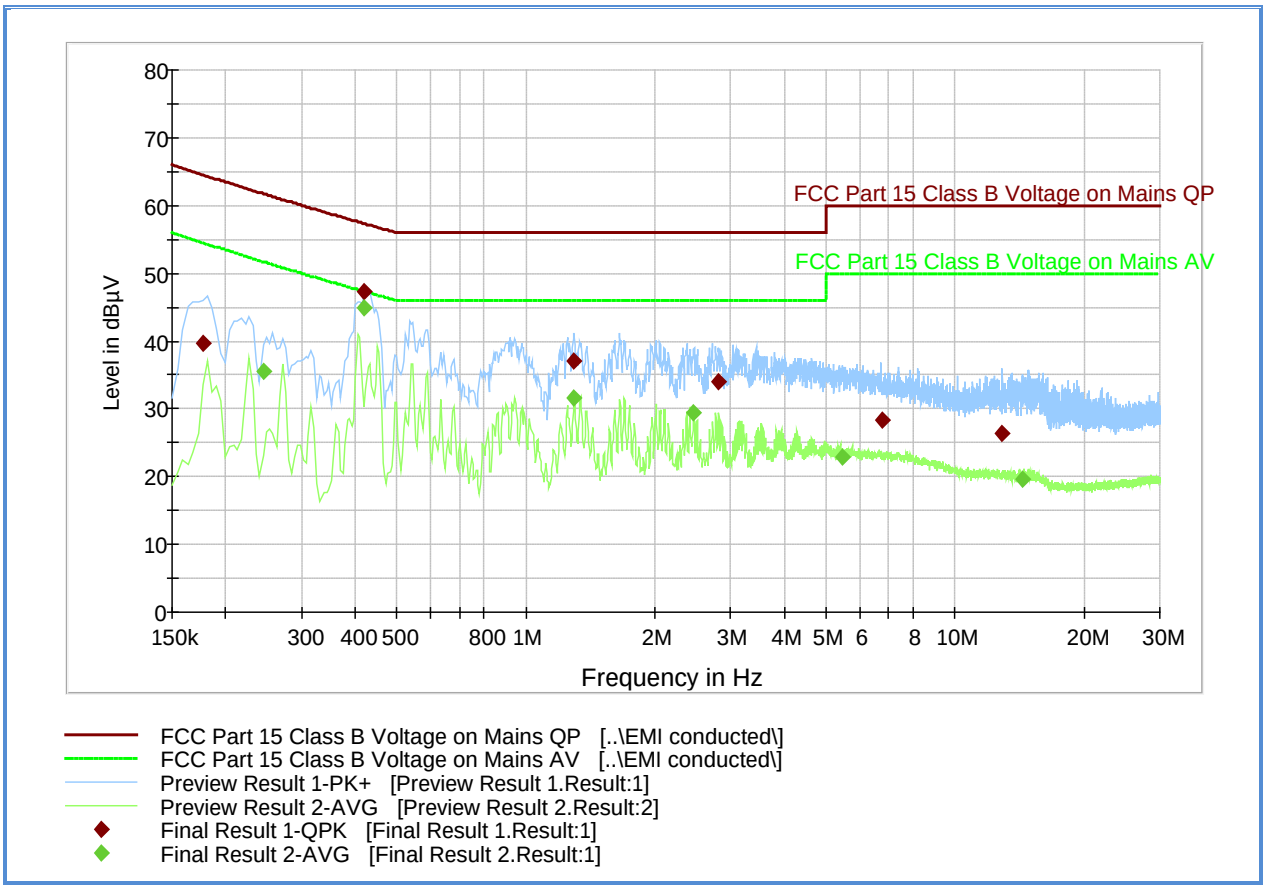
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.172500	38.1	1000.0	9.000	Off	L1	20.4	26.7	64.8
0.420000	40.6	1000.0	9.000	Off	L1	20.2	16.8	57.3
1.918500	27.6	1000.0	9.000	Off	L1	20.3	28.4	56.0
2.197500	28.0	1000.0	9.000	Off	L1	20.3	28.0	56.0
11.773500	30.2	1000.0	9.000	Off	L1	20.5	29.8	60.0
12.565500	30.6	1000.0	9.000	Off	L1	20.6	29.4	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit – Ave (dBµV)
0.420000	30.7	1000.0	9.000	Off	L1	20.2	16.6	47.3
0.420000	30.7	1000.0	9.000	Off	L1	20.2	16.6	47.3
0.906000	20.7	1000.0	9.000	Off	L1	20.2	25.3	46.0
2.935500	19.8	1000.0	9.000	Off	L1	20.3	26.2	46.0
9.235500	21.8	1000.0	9.000	Off	L1	20.4	28.2	50.0
12.696000	21.6	1000.0	9.000	Off	L1	20.6	28.4	50.0

2.1.15 **Line 2 (Neutral) 802.11n**



Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.177000	39.7	1000.0	9.000	Off	N	21.2	24.8	64.5
0.420000	47.3	1000.0	9.000	Off	N	21.1	10.0	57.3
1.297500	37.2	1000.0	9.000	Off	N	21.1	18.8	56.0
2.800500	34.0	1000.0	9.000	Off	N	21.1	22.0	56.0
6.742500	28.3	1000.0	9.000	Off	N	21.2	31.7	60.0
12.813000	26.4	1000.0	9.000	Off	N	21.4	33.6	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit – Ave (dBµV)
0.244500	35.6	1000.0	9.000	Off	N	21.1	16.1	51.7
0.420000	44.8	1000.0	9.000	Off	N	21.1	2.5	47.3
1.297500	31.7	1000.0	9.000	Off	N	21.1	14.4	46.0
2.454000	29.4	1000.0	9.000	Off	N	21.1	16.6	46.0
5.469000	23.0	1000.0	9.000	Off	N	21.2	27.0	50.0
14.356500	19.5	1000.0	9.000	Off	N	21.4	30.5	50.0

2.2 SPURIOUS RADIATED EMISSIONS

2.2.1 Specification Reference

Part 15 Subpart C §15.247(d)

2.2.2 Standard Applicable

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

2.2.3 Equipment Under Test and Modification State

Serial No: Engineering Sample / Test Configuration A,B,C and D

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

May 07 to May 21, 2013/JMG

2.2.5 Test Equipment Used

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

2.2.6 Environmental Conditions

Ambient Temperature	23.2°C
Relative Humidity	49.8%
ATM Pressure	99.9 kPa

2.2.7 Additional Observations

- This is a radiated test. The spectrum was searched from 30MHz to the 10th harmonic (25GHz).
- There are no emissions found that do not comply to the restricted bands defined in FCC Part 15 Subpart C, 15.205 or Part 15.247(d).
- Only the worst case configuration (802.11g, High Channel, 6Mbps) presented for radiated emissions below 1GHz.

- Before each test, a new set of battery (freshly charged) is installed.
- 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 2.7.8 for sample computation.

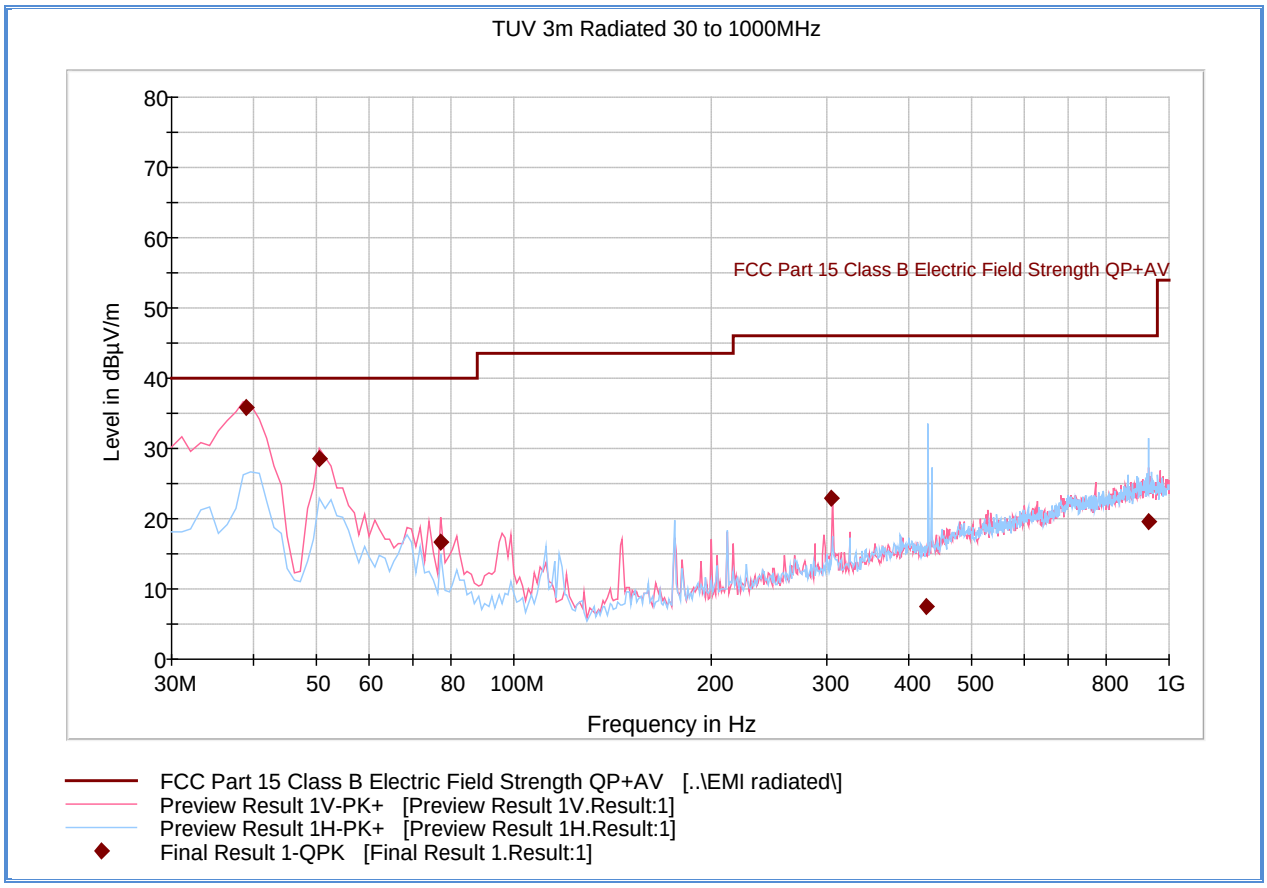
2.2.8 Sample Computation (Radiated Emission)

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**

2.2.9 Test Results

See attached plots.

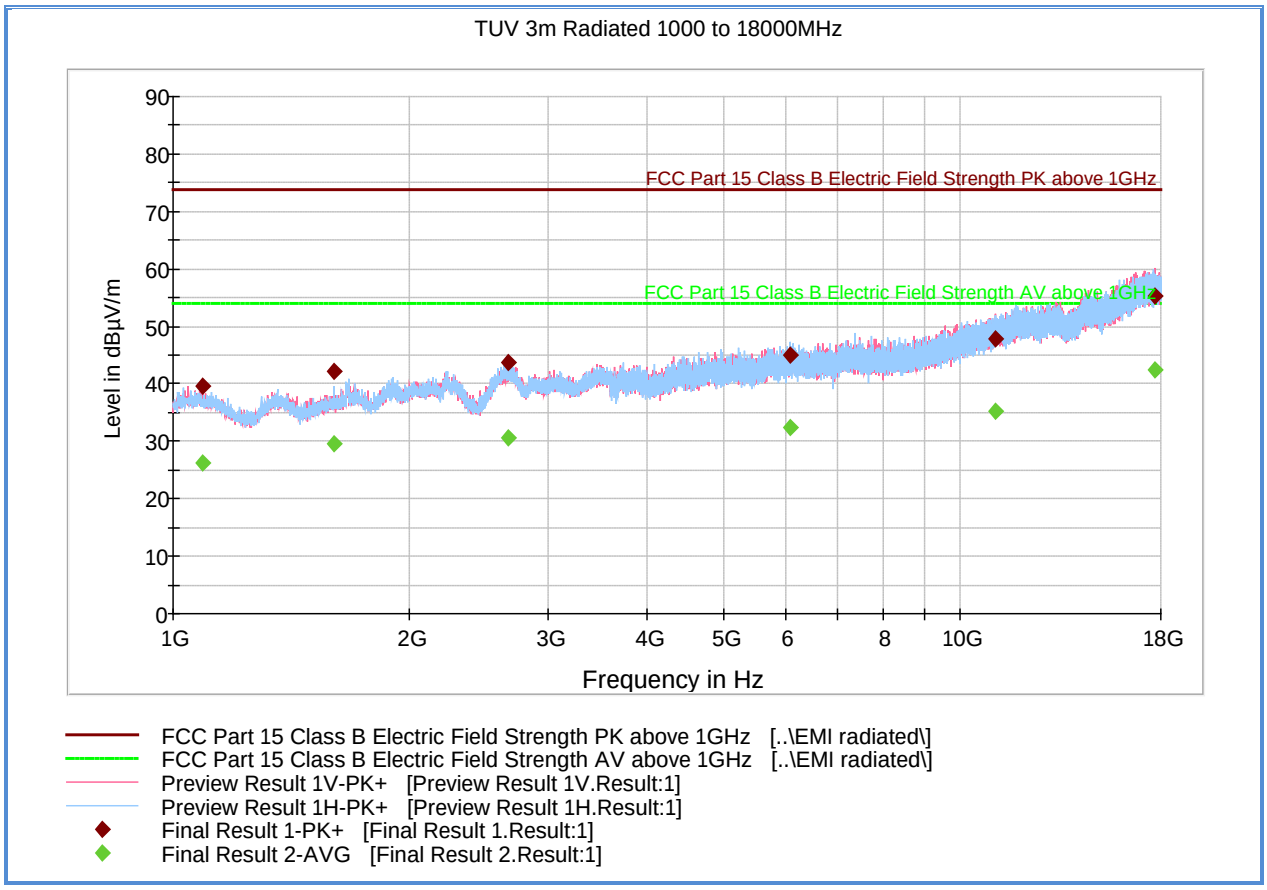
2.2.10 **Test Results Below 1GHz (Receive Mode)**



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)
38.942222	35.8	1000.0	120.000	103.0	V	37.0	-17.7	4.2	40.0
50.437778	28.4	1000.0	120.000	103.0	V	258.0	-21.6	11.6	40.0
77.222222	16.7	1000.0	120.000	103.0	V	37.0	-24.2	23.3	40.0
305.431111	22.9	1000.0	120.000	103.0	V	1.0	-16.1	23.1	46.0
426.217778	7.4	1000.0	120.000	106.0	H	248.0	-13.9	38.6	46.0
929.662222	19.6	1000.0	120.000	106.0	H	37.0	-5.2	26.4	46.0

2.2.11 **Test Results Above 1GHz (Receive Mode)**



Peak Data

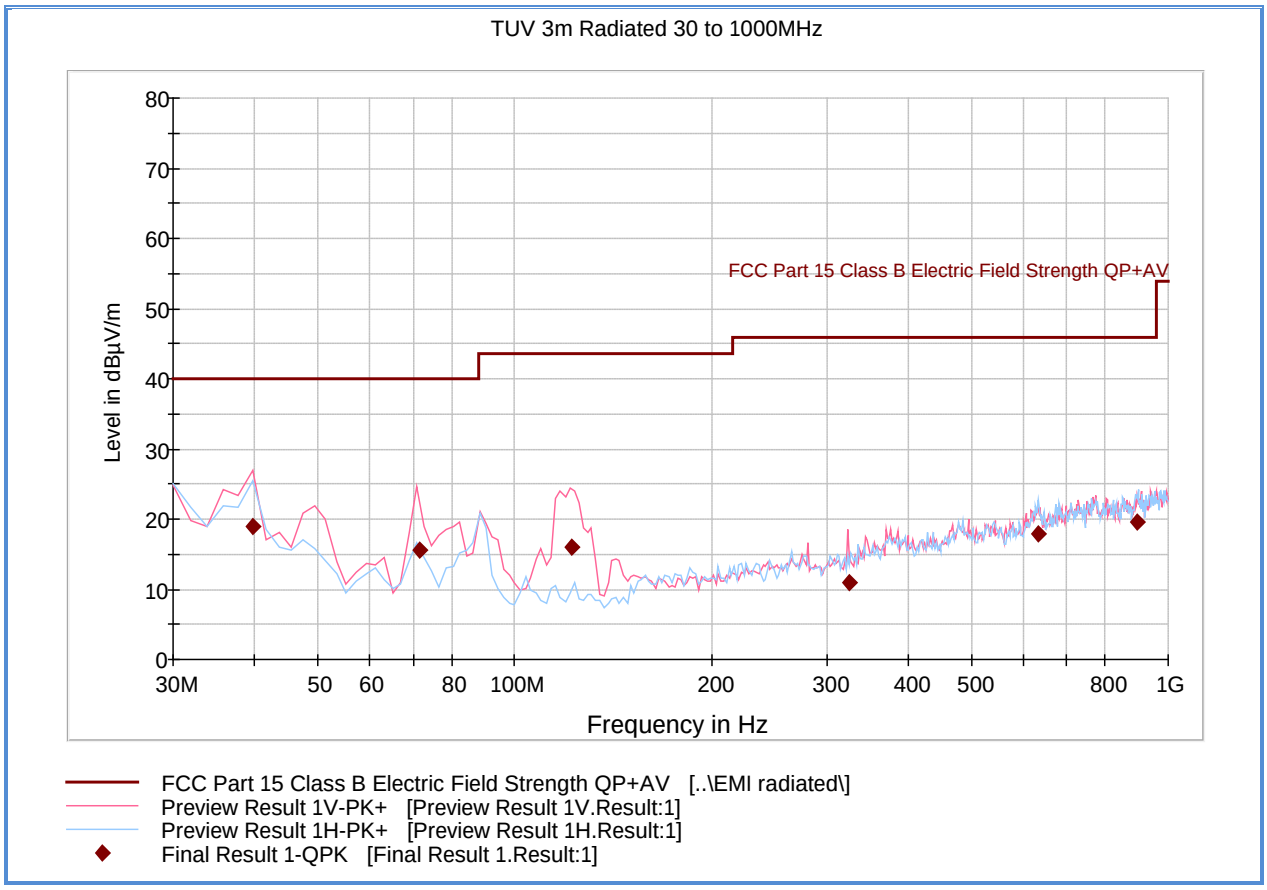
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1087.926667	39.7	1000.0	1000.000	174.7	V	133.0	-5.8	34.2	73.9
1600.000000	42.1	1000.0	1000.000	220.5	H	302.0	-4.3	31.8	73.9
2667.073333	43.6	1000.0	1000.000	361.2	V	265.0	0.6	30.3	73.9
6083.993333	44.9	1000.0	1000.000	354.2	H	45.0	8.0	29.0	73.9
11098.87333	47.9	1000.0	1000.000	398.1	V	155.0	14.6	26.0	73.9
17681.66666	55.3	1000.0	1000.000	133.8	V	309.0	22.1	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)
1087.926667	26.3	1000.0	1000.000	174.7	V	133.0	-5.8	27.6	53.9
1600.000000	29.6	1000.0	1000.000	220.5	H	302.0	-4.3	24.3	53.9
2667.073333	30.7	1000.0	1000.000	361.2	V	265.0	0.6	23.2	53.9
6083.993333	32.4	1000.0	1000.000	354.2	H	45.0	8.0	21.5	53.9
11098.87333	35.1	1000.0	1000.000	398.1	V	155.0	14.6	18.8	53.9
17681.66666	42.3	1000.0	1000.000	133.8	V	309.0	22.1	11.6	53.9

Test Notes: No significant emissions observed. All emissions presented are noise-floor measurements.

2.2.12 Test Results Below 1GHz (Worst Case Configuration)

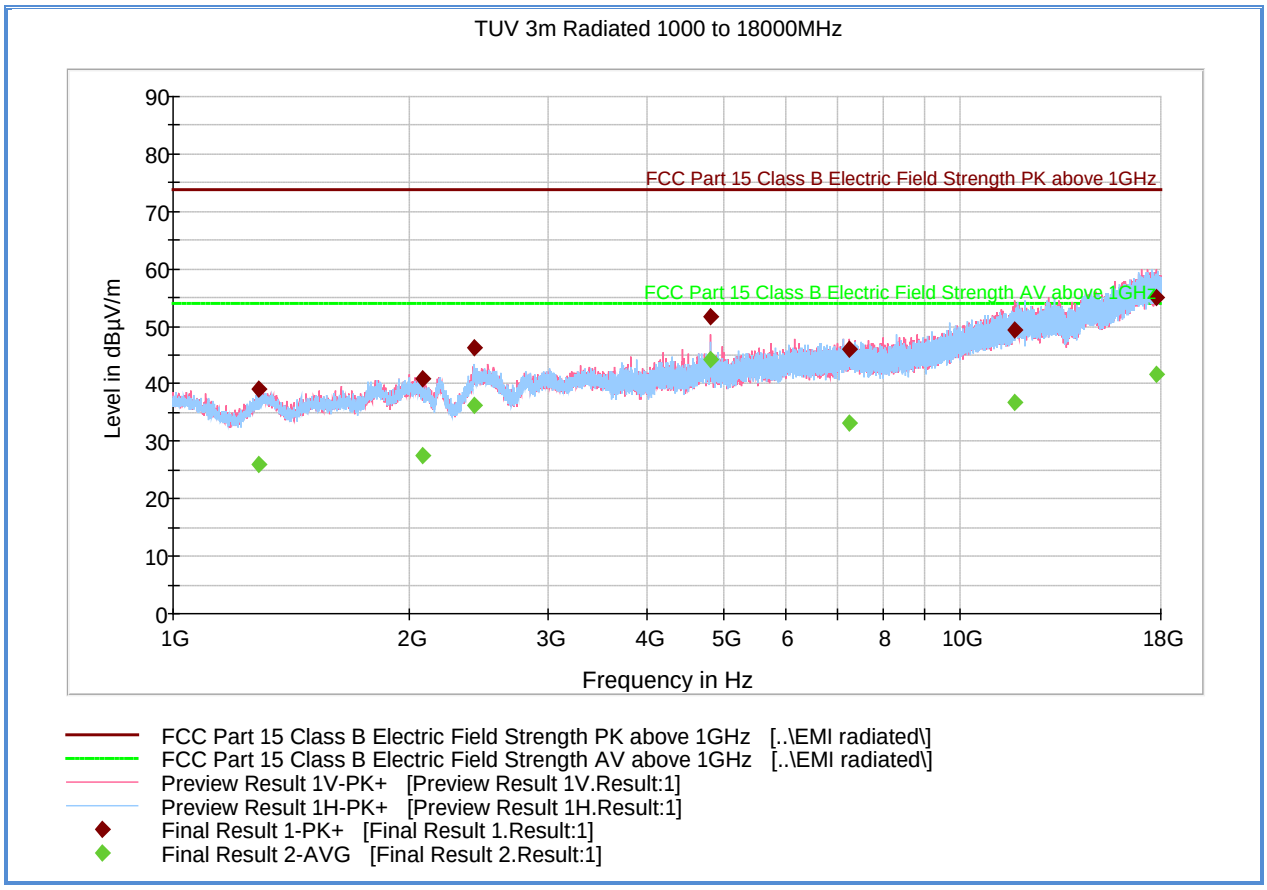


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
39.679439	18.9	1000.0	120.000	100.0	V	352.0	-16.6	21.1	40.0
71.581643	15.6	1000.0	120.000	100.0	V	269.0	-21.7	24.4	40.0
122.106613	15.9	1000.0	120.000	100.0	V	2.0	-20.3	27.6	43.5
325.847054	11.0	1000.0	120.000	126.0	V	135.0	-11.6	35.0	46.0
633.125210	17.8	1000.0	120.000	126.0	H	176.0	-2.9	28.2	46.0
898.517836	19.5	1000.0	120.000	132.0	H	334.0	0.6	26.5	46.0

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

2.2.13 **Test Results Above 1GHz (802.11b Low Channel)**



Peak Data

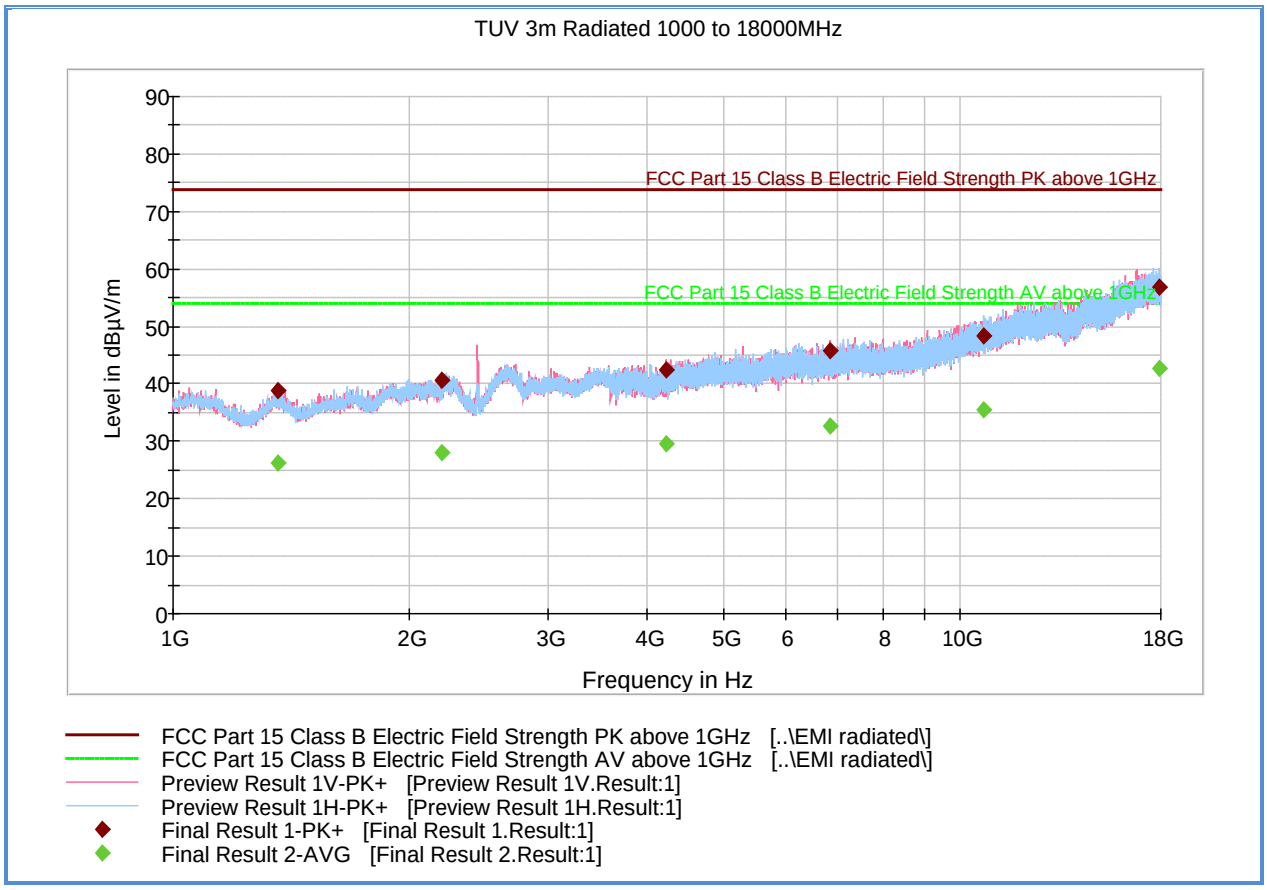
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1284.566667	39.0	1000.0	1000.000	100.6	V	125.0	-4.8	34.9	73.9
2071.500000	40.8	1000.0	1000.000	100.6	H	66.0	-1.5	33.1	73.9
2409.160000	46.2	1000.0	1000.000	100.6	H	319.0	-0.4	27.7	73.9
4823.920000	51.8	1000.0	1000.000	100.6	V	308.0	5.3	22.1	73.9
7242.860000	46.0	1000.0	1000.000	100.6	V	330.0	9.6	27.9	73.9
11731.713333	49.5	1000.0	1000.000	100.6	V	198.0	15.6	24.4	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)
1284.566667	26.1	1000.0	1000.000	100.6	V	125.0	-4.8	27.8	53.9
2071.500000	27.5	1000.0	1000.000	100.6	H	66.0	-1.5	26.4	53.9
2409.160000	36.1	1000.0	1000.000	100.6	H	319.0	-0.4	17.8	53.9
4823.920000	44.2	1000.0	1000.000	100.6	V	308.0	5.3	9.7	53.9
7242.860000	33.1	1000.0	1000.000	100.6	V	330.0	9.6	20.8	53.9
11731.713333	36.8	1000.0	1000.000	100.6	V	198.0	15.6	17.1	53.9

Test Notes: Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 5GHz. Measurements above 5GHz are noise floor figures.

2.2.14 **Test Results Above 1GHz (802.11b Mid Channel)**



Peak Data

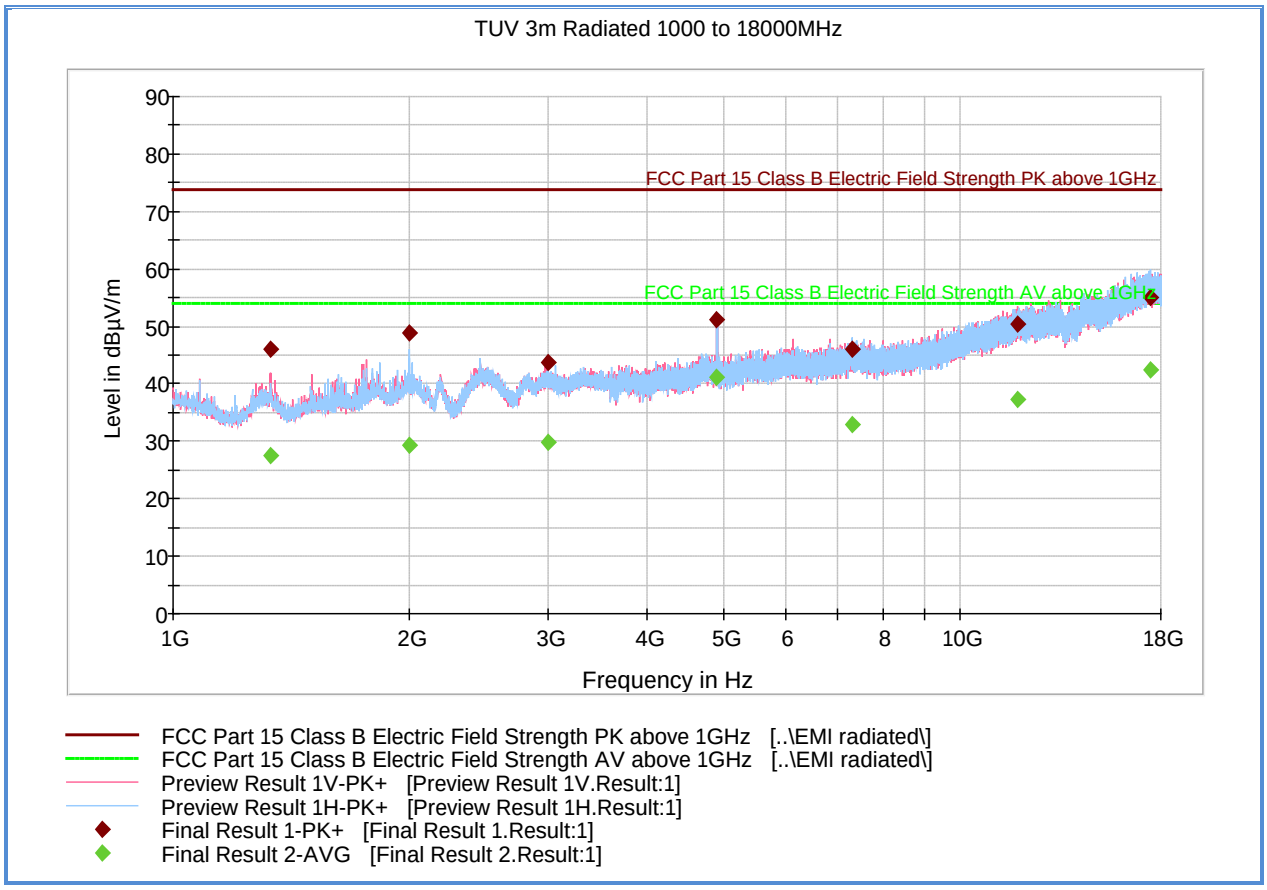
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1356.940000	38.8	1000.0	1000.000	198.6	H	0.0	-4.9	35.1	73.9
2199.940000	40.6	1000.0	1000.000	191.6	V	44.0	-1.2	33.3	73.9
4231.673333	42.5	1000.0	1000.000	229.5	V	178.0	4.0	31.4	73.9
6825.886667	45.7	1000.0	1000.000	250.4	V	242.0	8.8	28.2	73.9
10715.000000	48.4	1000.0	1000.000	250.4	H	0.0	13.8	25.5	73.9
17929.340000	56.8	1000.0	1000.000	238.4	H	242.0	22.5	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)
1356.940000	26.3	1000.0	1000.000	198.6	H	0.0	-4.9	27.6	53.9
2199.940000	28.1	1000.0	1000.000	191.6	V	44.0	-1.2	25.8	53.9
4231.673333	29.5	1000.0	1000.000	229.5	V	178.0	4.0	24.4	53.9
6825.886667	32.6	1000.0	1000.000	250.4	V	242.0	8.8	21.3	53.9
10715.000000	35.6	1000.0	1000.000	250.4	H	0.0	13.8	18.3	53.9
17929.340000	42.8	1000.0	1000.000	238.4	H	242.0	22.5	11.1	53.9

Test Notes: Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 1GHz. Measurements above 3GHz are noise floor figures.

2.2.15 **Test Results Above 1GHz (802.11b High Channel)**



Peak Data

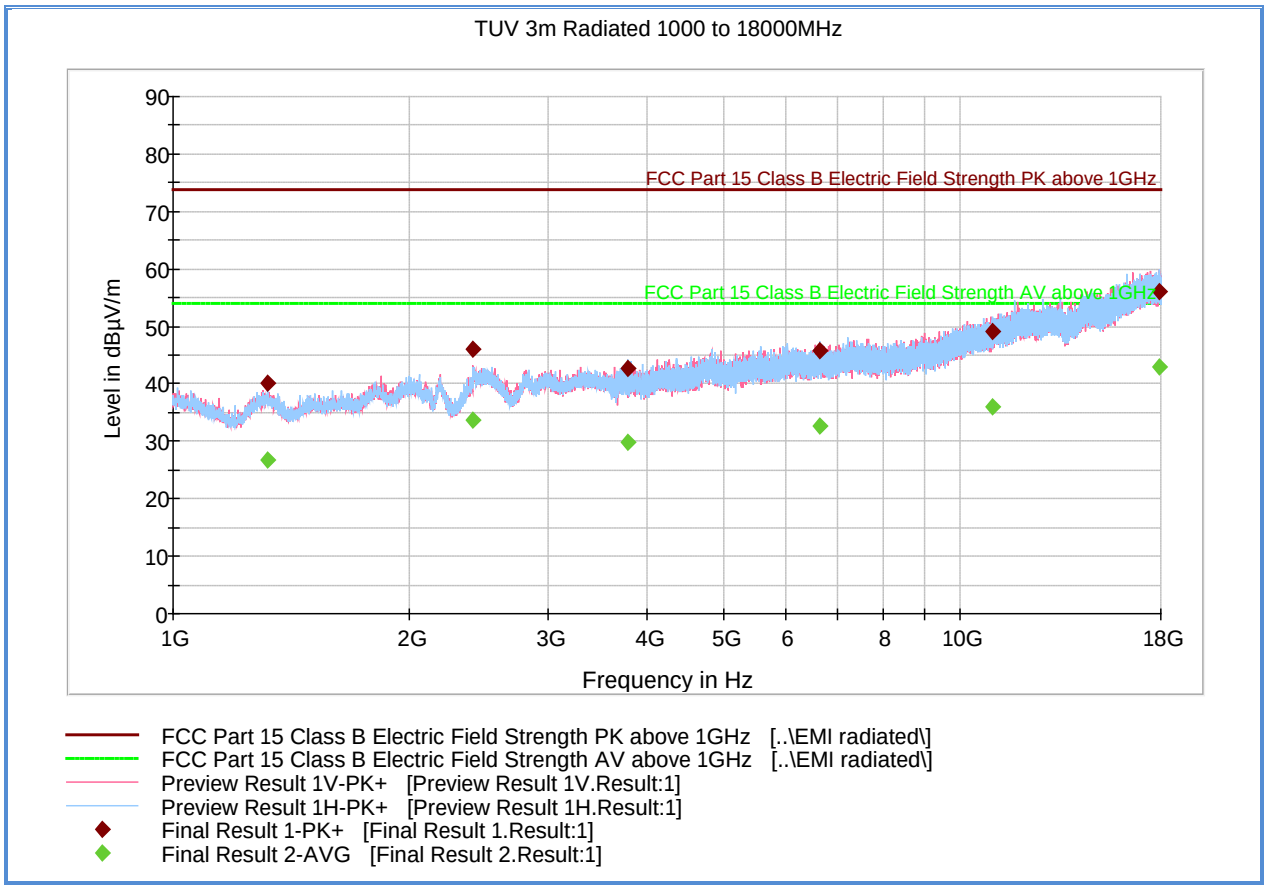
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1329.213333	46.0	1000.0	1000.000	100.6	V	148.0	-4.9	27.9	73.9
1994.233333	48.8	1000.0	1000.000	100.6	H	88.0	-1.6	25.1	73.9
3000.026667	43.8	1000.0	1000.000	100.6	V	252.0	1.5	30.1	73.9
4913.906667	51.2	1000.0	1000.000	100.6	V	323.0	5.2	22.7	73.9
7303.453333	46.0	1000.0	1000.000	100.6	H	120.0	9.7	27.9	73.9
11846.020000	50.3	1000.0	1000.000	100.6	V	198.0	15.9	23.6	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)
1329.213333	27.6	1000.0	1000.000	100.6	V	148.0	-4.9	26.3	53.9
1994.233333	29.3	1000.0	1000.000	100.6	H	88.0	-1.6	24.6	53.9
3000.026667	29.8	1000.0	1000.000	100.6	V	252.0	1.5	24.1	53.9
4913.906667	41.1	1000.0	1000.000	100.6	V	323.0	5.2	12.8	53.9
7303.453333	32.9	1000.0	1000.000	100.6	H	120.0	9.7	21.0	53.9
11846.020000	37.2	1000.0	1000.000	100.6	V	198.0	15.9	16.7	53.9

Test Notes: Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 5GHz. Measurements above 5GHz are noise floor figures.

2.2.16 **Test Results Above 1GHz (802.11g Low Channel)**



Peak Data

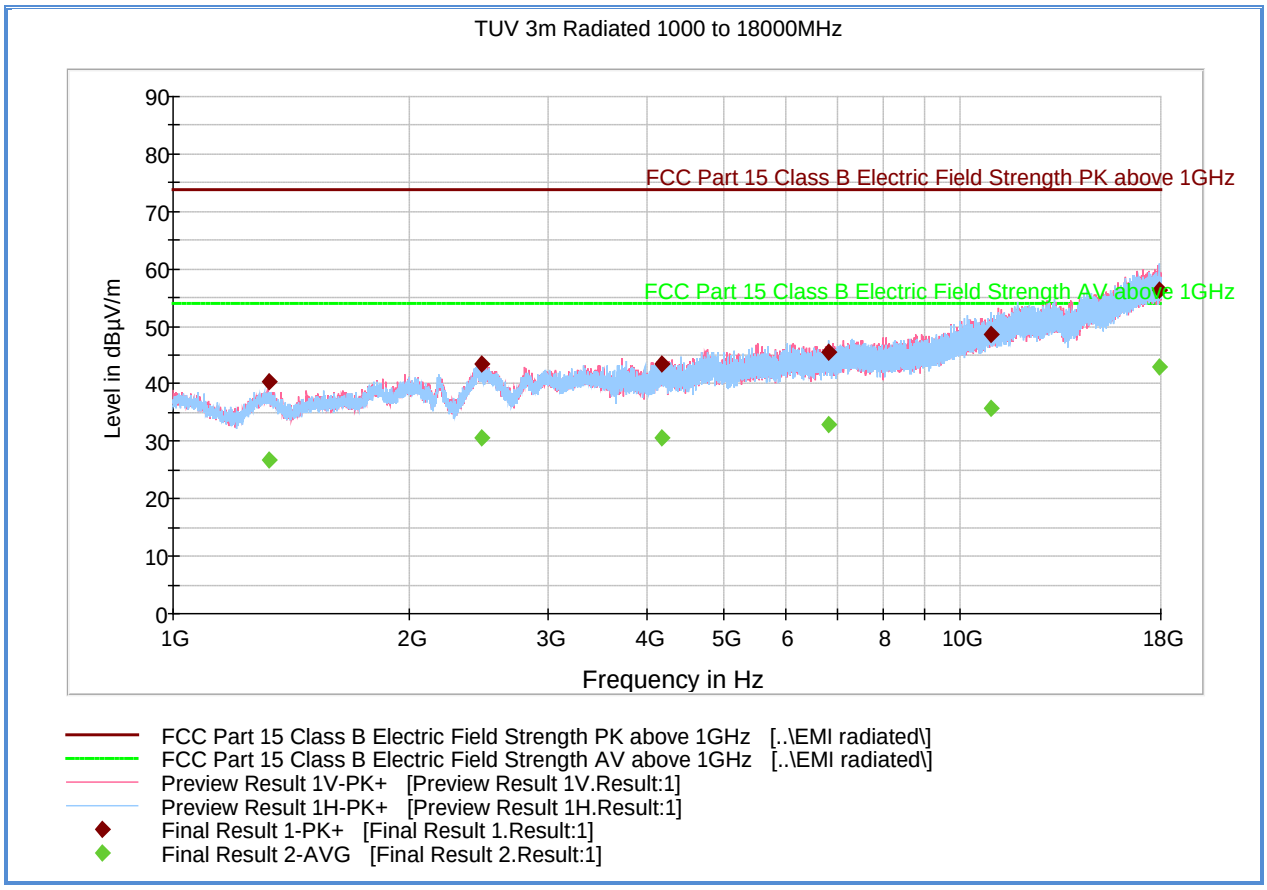
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1320.393333	40.1	1000.0	1000.000	100.6	H	353.0	-4.9	33.8	73.9
2405.720000	46.0	1000.0	1000.000	100.6	V	315.0	-0.4	27.9	73.9
3776.006667	42.8	1000.0	1000.000	100.6	H	220.0	2.8	31.1	73.9
6639.153333	45.7	1000.0	1000.000	100.6	H	311.0	8.2	28.2	73.9
11016.993333	49.2	1000.0	1000.000	100.6	H	308.0	14.5	24.7	73.9
17957.400000	56.0	1000.0	1000.000	100.6	H	151.0	22.6	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)
1320.393333	26.6	1000.0	1000.000	100.6	H	353.0	-4.9	27.3	53.9
2405.720000	33.7	1000.0	1000.000	100.6	V	315.0	-0.4	20.2	53.9
3776.006667	29.9	1000.0	1000.000	100.6	H	220.0	2.8	24.0	53.9
6639.153333	32.6	1000.0	1000.000	100.6	H	311.0	8.2	21.3	53.9
11016.993333	36.1	1000.0	1000.000	100.6	H	308.0	14.5	17.8	53.9
17957.400000	42.9	1000.0	1000.000	100.6	H	151.0	22.6	11.0	53.9

Test Notes: Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 1GHz. Measurements above 1GHz are noise floor figures.

2.2.17 **Test Results Above 1GHz (802.11g Mid Channel)**



Peak Data

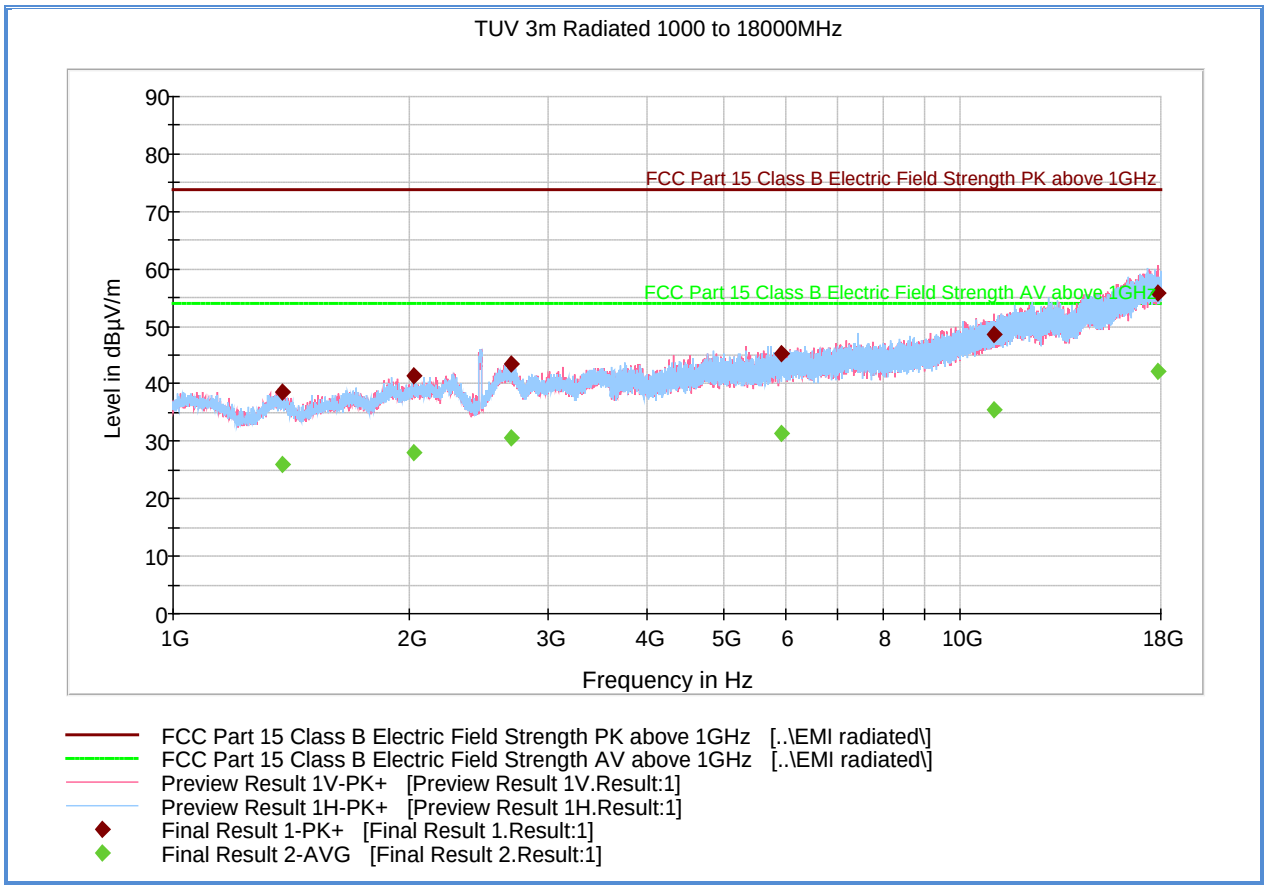
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1321.960000	40.4	1000.0	1000.000	100.6	V	176.0	-4.9	33.5	73.9
2470.886667	43.4	1000.0	1000.000	100.6	H	14.0	-0.2	30.5	73.9
4179.140000	43.5	1000.0	1000.000	100.6	V	191.0	3.7	30.4	73.9
6798.233333	45.6	1000.0	1000.000	100.6	H	282.0	8.8	28.3	73.9
10929.193333	48.7	1000.0	1000.000	100.6	H	25.0	14.4	25.2	73.9
17916.600000	56.2	1000.0	1000.000	100.6	H	154.0	22.4	17.7	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)
1321.960000	26.6	1000.0	1000.000	100.6	V	176.0	-4.9	27.3	53.9
2470.886667	30.5	1000.0	1000.000	100.6	H	14.0	-0.2	23.4	53.9
4179.140000	30.5	1000.0	1000.000	100.6	V	191.0	3.7	23.4	53.9
6798.233333	32.8	1000.0	1000.000	100.6	H	282.0	8.8	21.1	53.9
10929.193333	35.9	1000.0	1000.000	100.6	H	25.0	14.4	18.0	53.9
17916.600000	43.0	1000.0	1000.000	100.6	H	154.0	22.4	10.9	53.9

Test Notes: Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 1GHz. Measurements above 1GHz are noise floor figures.

2.2.18 **Test Results Above 1GHz (802.11g High Channel)**



Peak Data

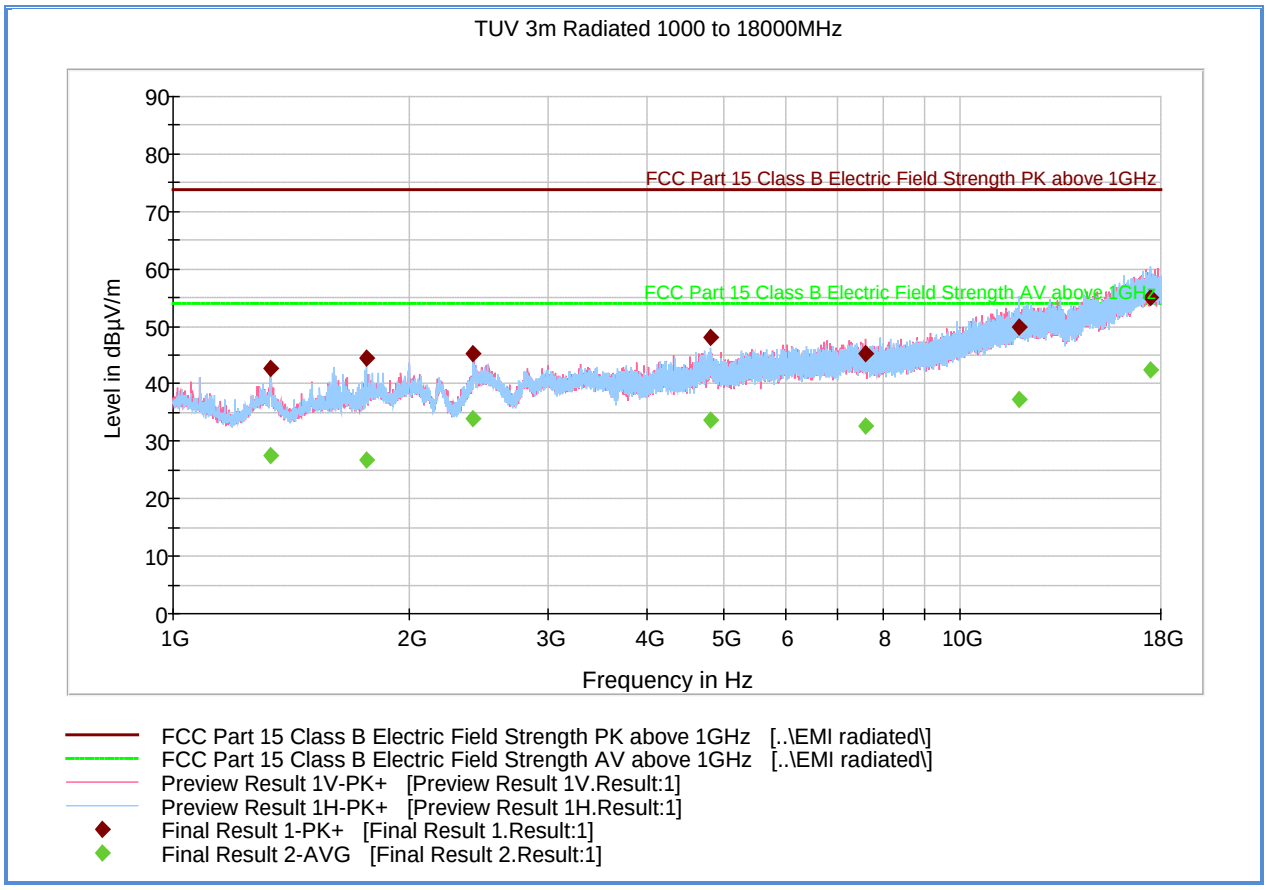
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1377.260000	38.5	1000.0	1000.000	181.6	V	110.0	-4.9	35.4	73.9
2026.253333	41.3	1000.0	1000.000	150.7	V	264.0	-1.6	32.6	73.9
2689.580000	43.5	1000.0	1000.000	201.6	H	176.0	0.6	30.4	73.9
5920.586667	45.2	1000.0	1000.000	99.8	V	7.0	7.7	28.7	73.9
11036.500000	48.7	1000.0	1000.000	251.4	V	20.0	14.6	25.2	73.9
17848.833333	55.8	1000.0	1000.000	227.5	V	358.0	22.3	18.1	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)
1377.260000	26.0	1000.0	1000.000	181.6	V	110.0	-4.9	27.9	53.9
2026.253333	28.1	1000.0	1000.000	150.7	V	264.0	-1.6	25.8	53.9
2689.580000	30.5	1000.0	1000.000	201.6	H	176.0	0.6	23.4	53.9
5920.586667	31.4	1000.0	1000.000	99.8	V	7.0	7.7	22.5	53.9
11036.500000	35.6	1000.0	1000.000	251.4	V	20.0	14.6	18.3	53.9
17848.833333	42.1	1000.0	1000.000	227.5	V	358.0	22.3	11.8	53.9

Test Notes: Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 1GHz. Measurements above 1GHz are noise floor figures.

2.2.19 **Test Results Above 1GHz (802.11n Low Channel)**



Peak Data

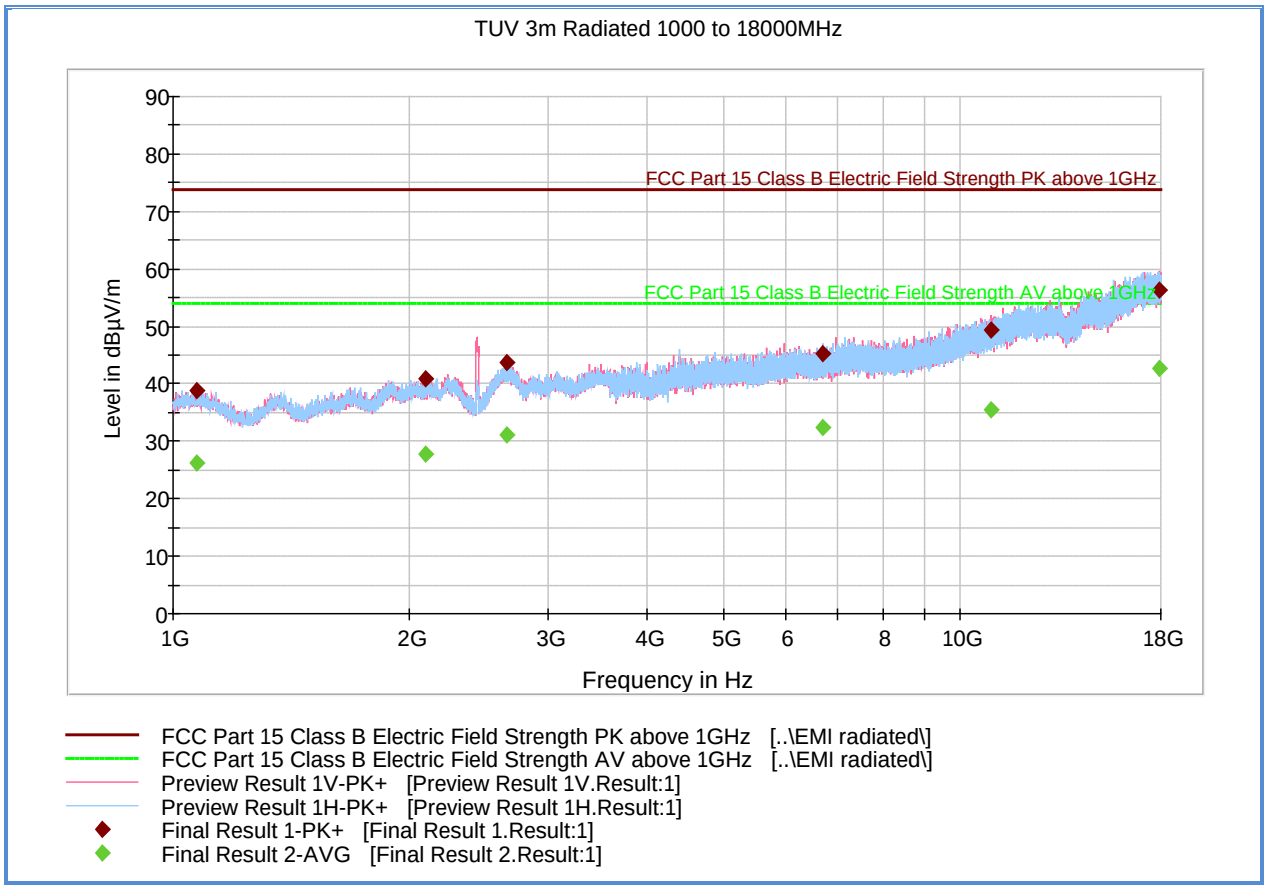
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1329.420000	42.7	1000.0	1000.000	100.6	H	110.0	-4.9	31.2	73.9
1761.300000	44.5	1000.0	1000.000	100.6	H	11.0	-2.9	29.4	73.9
2405.720000	45.3	1000.0	1000.000	100.6	H	99.0	-0.4	28.6	73.9
4812.680000	48.0	1000.0	1000.000	100.6	H	322.0	5.3	25.9	73.9
7596.633333	45.2	1000.0	1000.000	100.6	V	308.0	9.5	28.7	73.9
11908.833333	49.8	1000.0	1000.000	100.6	H	302.0	15.9	24.1	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)
1329.420000	27.5	1000.0	1000.000	100.6	H	110.0	-4.9	26.4	53.9
1761.300000	26.7	1000.0	1000.000	100.6	H	11.0	-2.9	27.2	53.9
2405.720000	33.9	1000.0	1000.000	100.6	H	99.0	-0.4	20.0	53.9
4812.680000	33.8	1000.0	1000.000	100.6	H	322.0	5.3	20.1	53.9
7596.633333	32.6	1000.0	1000.000	100.6	V	308.0	9.5	21.3	53.9
11908.833333	37.2	1000.0	1000.000	100.6	H	302.0	15.9	16.7	53.9

Test Notes: Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 1GHz. Measurements above 1GHz are noise floor figures.

2.2.20 **Test Results Above 1GHz (802.11n Mid Channel)**



Peak Data

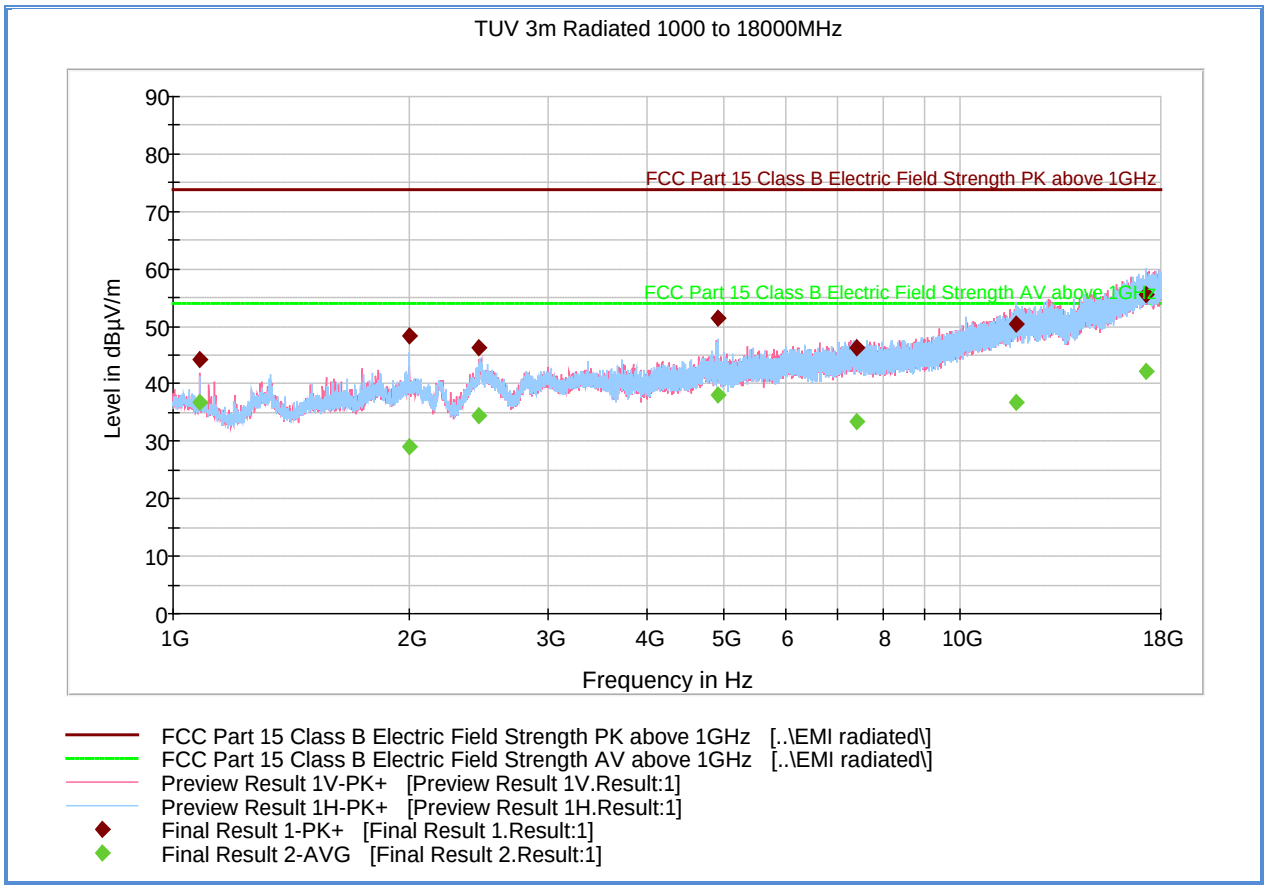
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1069.886667	38.8	1000.0	1000.000	101.8	H	154.0	-5.9	35.1	73.9
2094.940000	40.8	1000.0	1000.000	184.6	V	212.0	-1.5	33.1	73.9
2657.960000	43.8	1000.0	1000.000	150.7	H	143.0	0.6	30.1	73.9
6691.213333	45.2	1000.0	1000.000	215.5	H	14.0	8.4	28.7	73.9
10934.533333	49.4	1000.0	1000.000	166.7	V	198.0	14.4	24.5	73.9
17926.760000	56.3	1000.0	1000.000	219.5	V	132.0	22.5	17.6	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)
1069.886667	26.3	1000.0	1000.000	101.8	H	154.0	-5.9	27.6	53.9
2094.940000	27.9	1000.0	1000.000	184.6	V	212.0	-1.5	26.0	53.9
2657.960000	31.0	1000.0	1000.000	150.7	H	143.0	0.6	22.9	53.9
6691.213333	32.4	1000.0	1000.000	215.5	H	14.0	8.4	21.5	53.9
10934.533333	35.5	1000.0	1000.000	166.7	V	198.0	14.4	18.4	53.9
17926.760000	42.8	1000.0	1000.000	219.5	V	132.0	22.5	11.1	53.9

Test Notes: Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 1GHz. Measurements above 1GHz are noise floor figures.

2.2.21 Test Results Above 1GHz (802.11n 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)
1079.960000	44.1	1000.0	1000.000	100.6	V	44.0	-5.8	29.8	73.9
1992.620000	48.4	1000.0	1000.000	100.6	H	242.0	-1.7	25.5	73.9
2450.693333	46.2	1000.0	1000.000	100.6	H	110.0	-0.3	27.7	73.9
4915.193333	51.5	1000.0	1000.000	100.6	H	308.0	5.2	22.4	73.9
7394.413333	46.3	1000.0	1000.000	100.6	H	55.0	9.7	27.6	73.9
11762.033333	50.4	1000.0	1000.000	100.6	H	236.0	15.7	23.5	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)
1079.960000	36.7	1000.0	1000.000	100.6	V	44.0	-5.8	17.2	53.9
1992.620000	28.9	1000.0	1000.000	100.6	H	242.0	-1.7	25.0	53.9
2450.693333	34.3	1000.0	1000.000	100.6	H	110.0	-0.3	19.6	53.9
4915.193333	38.1	1000.0	1000.000	100.6	H	308.0	5.2	15.8	53.9
7394.413333	33.3	1000.0	1000.000	100.6	H	55.0	9.7	20.6	53.9
11762.033333	36.7	1000.0	1000.000	100.6	H	236.0	15.7	17.2	53.9

Test Notes: Measurement was performed with a 2.4GHz notch filter. No significant emissions observed above 5GHz. Measurements above 5GHz are noise floor figures.

2.3 RADIATED RESTRICTED BAND EDGE MEASUREMENTS

2.3.1 Specification Reference

Part 15 Subpart C §15.247(d)

2.3.2 Standard Applicable

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

2.3.3 Equipment Under Test and Modification State

Serial No: Engineering Sample / Test Configuration A,B and C

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

May 08/09 and May 22, 2013/JMG

2.3.5 Test Equipment Used

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

2.3.6 Environmental Conditions

Ambient Temperature	22.9°C
Relative Humidity	50.6%
ATM Pressure	99.6 kPa

2.3.7 Additional Observations

- This is a radiated test. The spectrum was searched from 2310MHz to 2390MHz for lower band edge and 2483.5MHz to 2500MHz for the upper band edge.
- There are no emissions found that do not comply with the restricted bands defined in FCC Part 15 Subpart C, 15.205.
- Before each test, a new set of battery (freshly charged) is installed.

- 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 2.8.8 for sample computation.

2.3.8 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**

2.3.9 Test Results

See attached plots.

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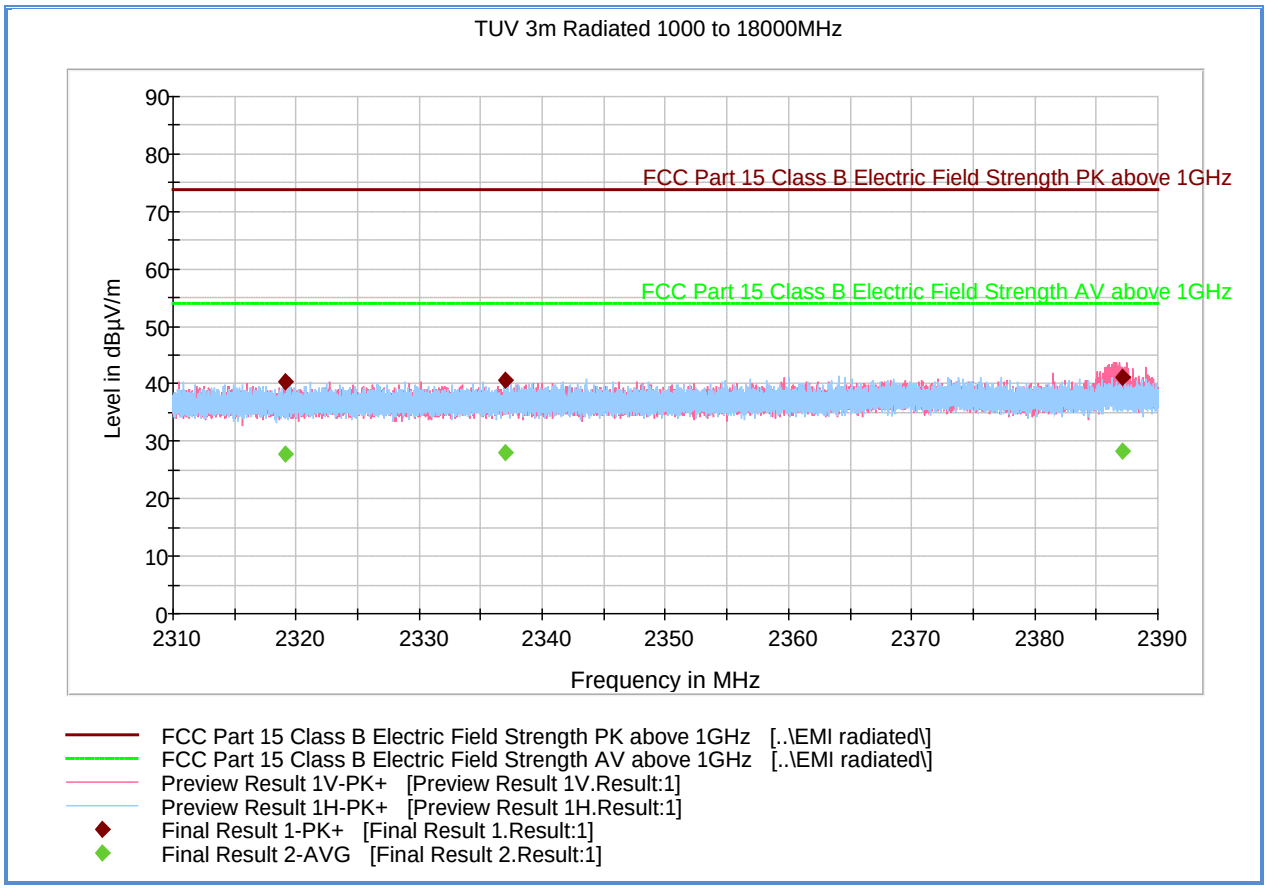
2.3.10 **Test Results Above 802.11b Low Channel**



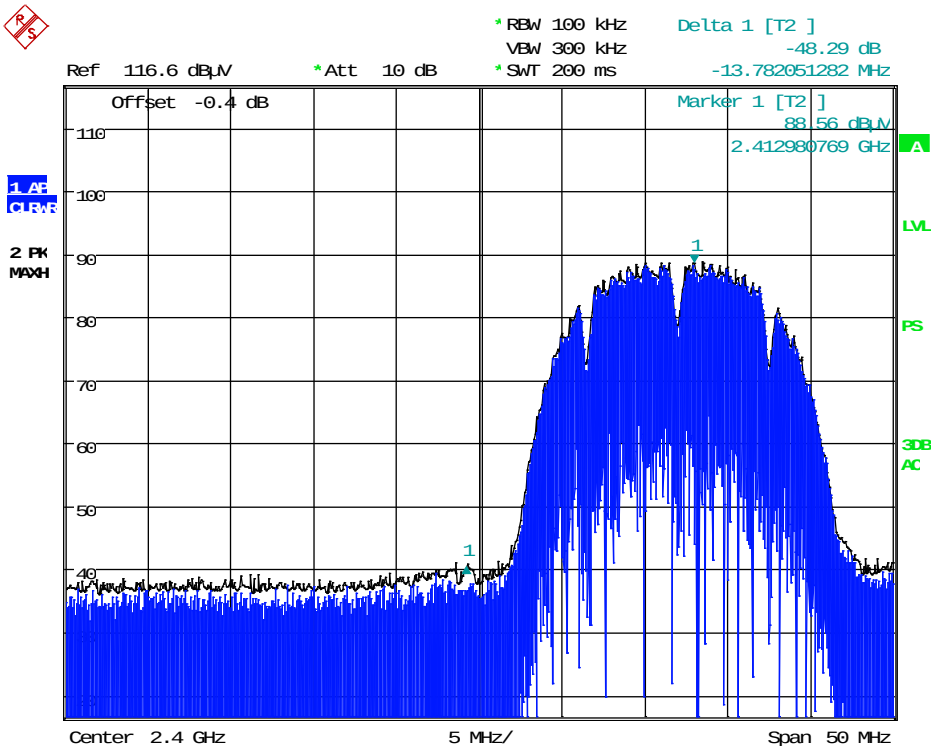
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2319.153333	40.4	1000.0	1000.000	399.3	H	59.0	-0.8	33.5	73.9
2337.014667	40.6	1000.0	1000.000	399.3	V	159.0	-0.7	33.3	73.9
2387.134667	41.0	1000.0	1000.000	329.2	V	331.0	-0.5	32.9	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)
2319.153333	27.9	1000.0	1000.000	399.3	H	59.0	-0.8	26.0	53.9
2337.014667	28.0	1000.0	1000.000	399.3	V	159.0	-0.7	25.9	53.9
2387.134667	28.2	1000.0	1000.000	329.2	V	331.0	-0.5	25.7	53.9

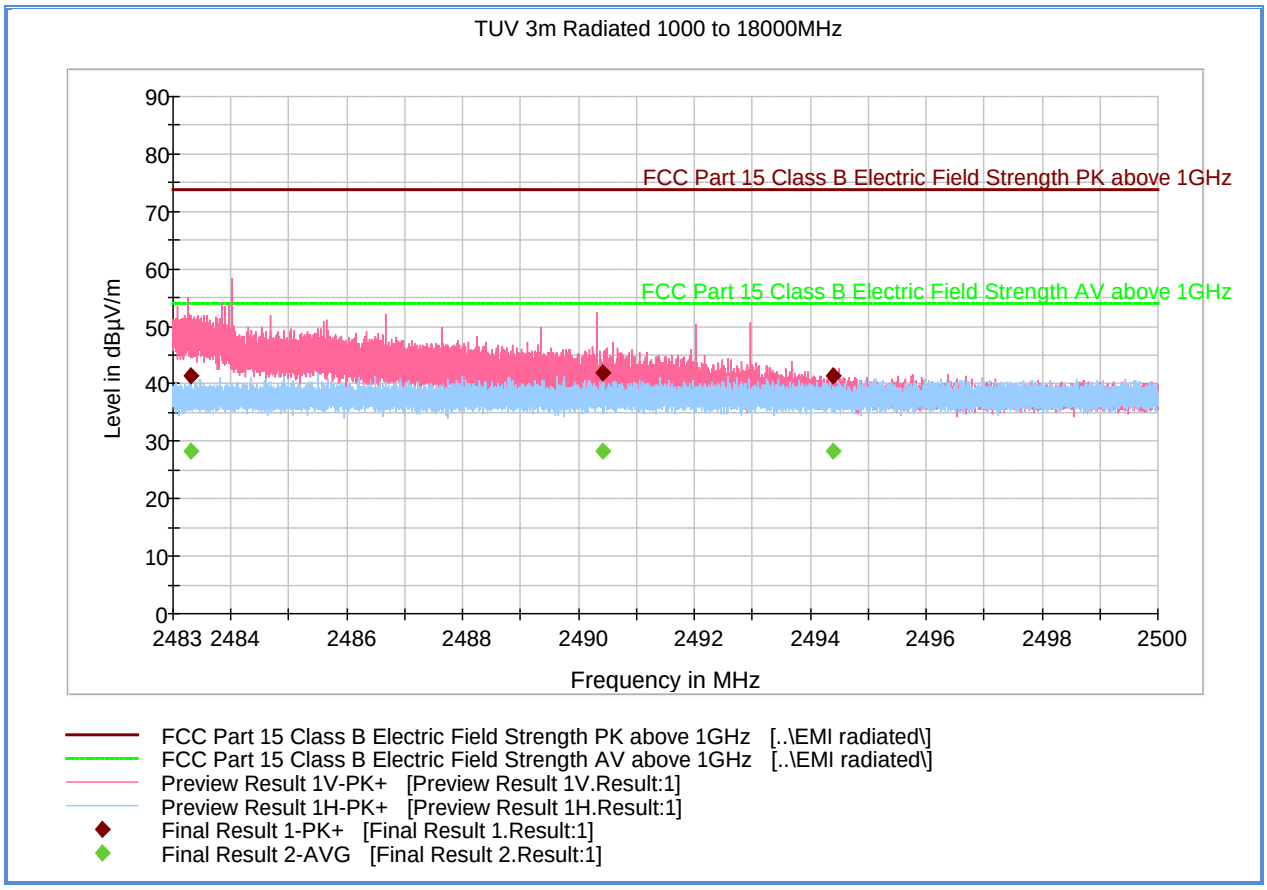
2.3.11 **Test Results Lower Band Edge 802.11 b**



Date: 22.MAY.2013 09:48:45

Test Notes: Carrier frequency (Low Channel) was maximized for this test. Correction factor of -0.4dB is from the cable, antenna and preamp used. Limit for this test is 20dBc.

2.3.12 **Test Results Above 802.11b 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)
2483.317733	41.5	1000.0	1000.000	244.4	V	51.0	-0.2	32.4	73.9
2490.411133	41.9	1000.0	1000.000	370.1	V	94.0	-0.2	32.0	73.9
2494.396633	41.3	1000.0	1000.000	399.3	V	95.0	-0.1	32.6	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)
2483.317733	28.4	1000.0	1000.000	244.4	V	51.0	-0.2	25.5	53.9
2490.411133	28.4	1000.0	1000.000	370.1	V	94.0	-0.2	25.5	53.9
2494.396633	28.4	1000.0	1000.000	399.3	V	95.0	-0.1	25.5	53.9

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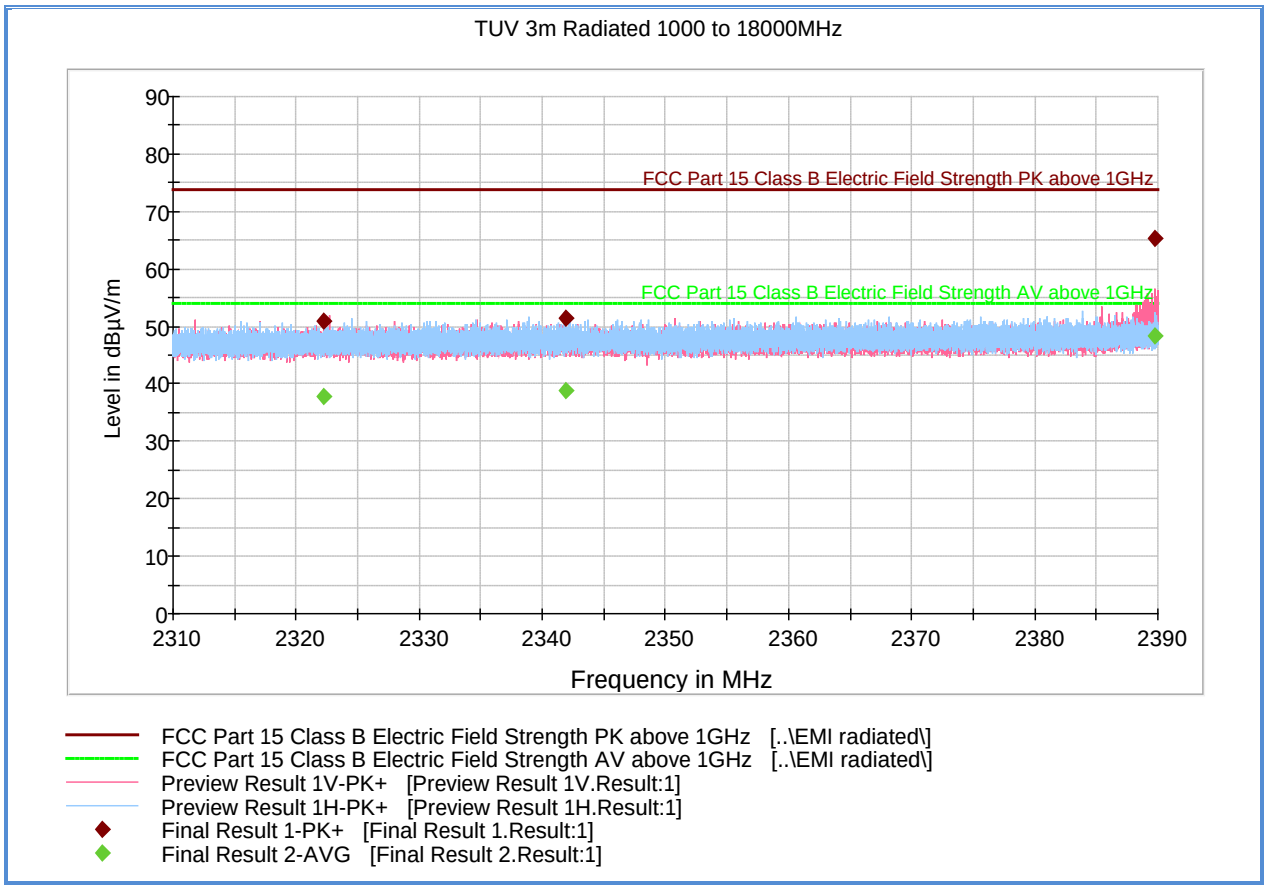
2.3.13 **Test Results Above 802.11g Low Channel**



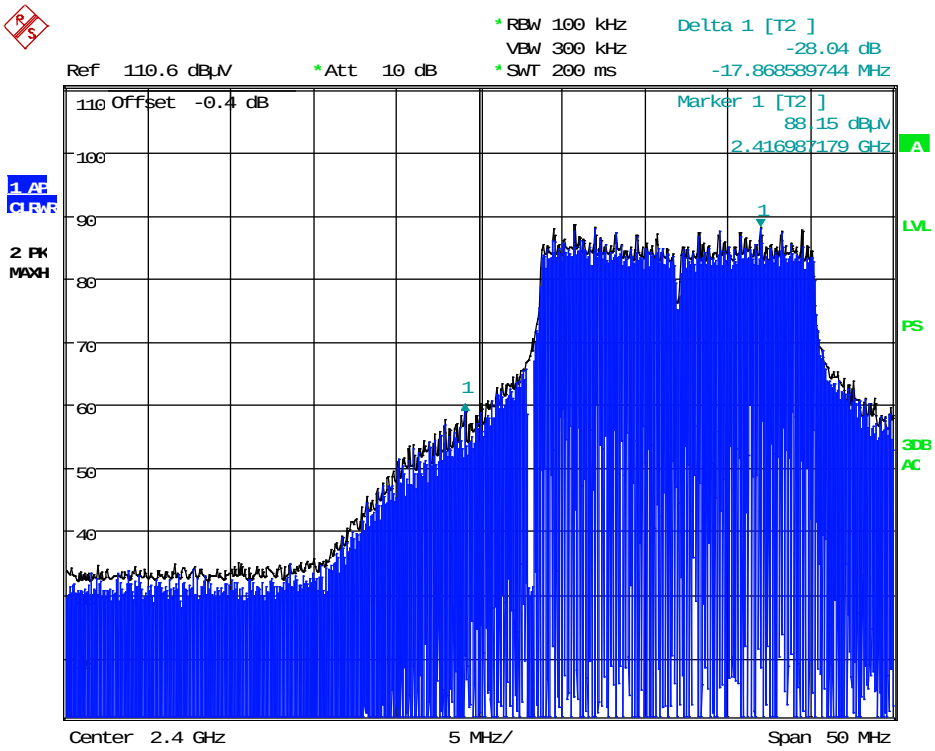
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2322.206667	50.9	1000.0	1000.000	392.5	V	67.0	9.2	23.0	73.9
2341.921333	51.4	1000.0	1000.000	118.8	H	15.0	9.3	22.5	73.9
2389.809333	65.4	1000.0	1000.000	104.9	V	110.0	9.5	8.5	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)
2322.206667	37.7	1000.0	1000.000	392.5	V	67.0	9.2	16.2	53.9
2341.921333	38.9	1000.0	1000.000	118.8	H	15.0	9.3	15.0	53.9
2389.809333	48.4	1000.0	1000.000	104.9	V	110.0	9.5	5.5	53.9

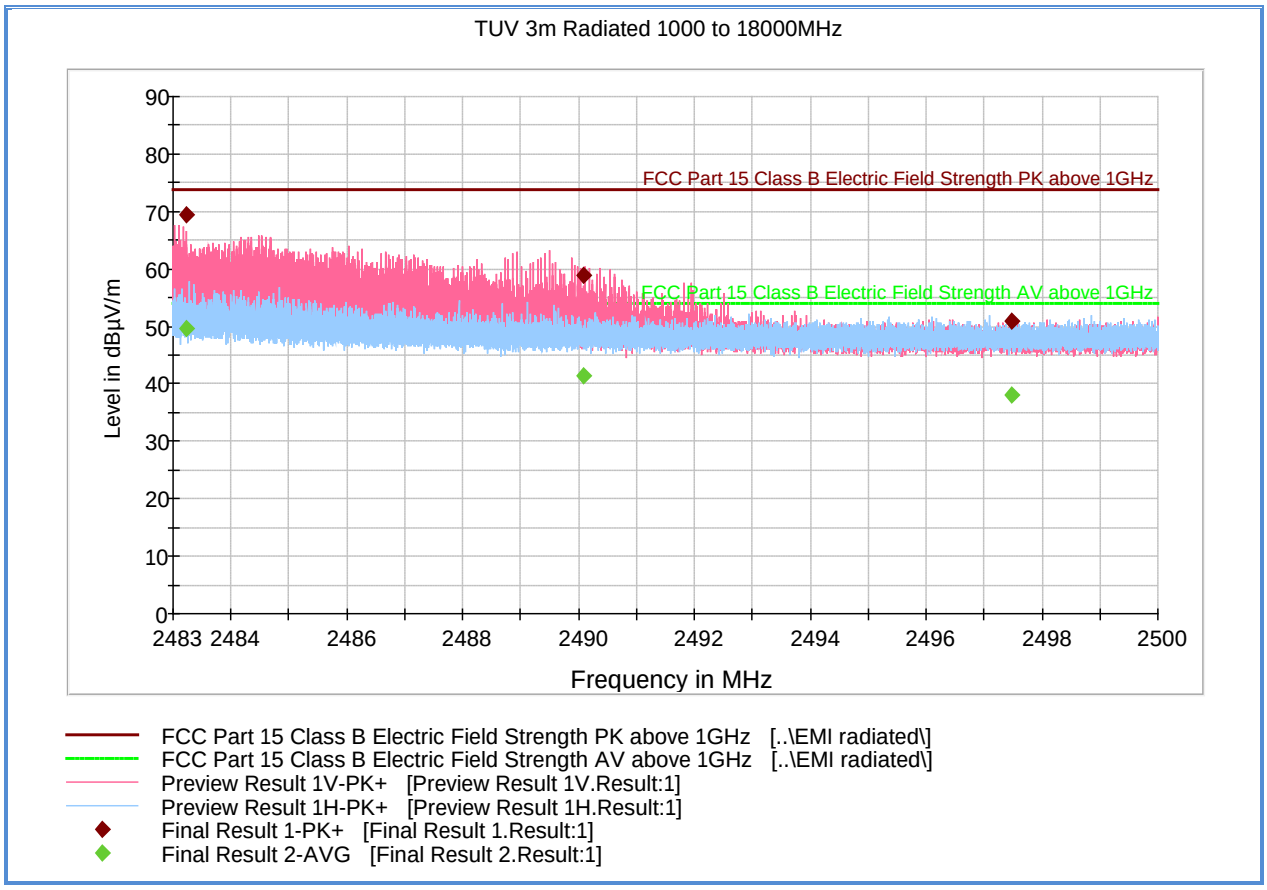
2.3.14 **Test Results Lower Band Edge 802.11 g**



Date: 22.MAY.2013 10:05:01

Test Notes: Carrier frequency (Low Channel) was maximized for this test. Correction factor of -0.4dB is from the cable, antenna and preamp used. Limit for this test is 20dBc.

2.3.15 **Test Results Above 802.11g High Channel**



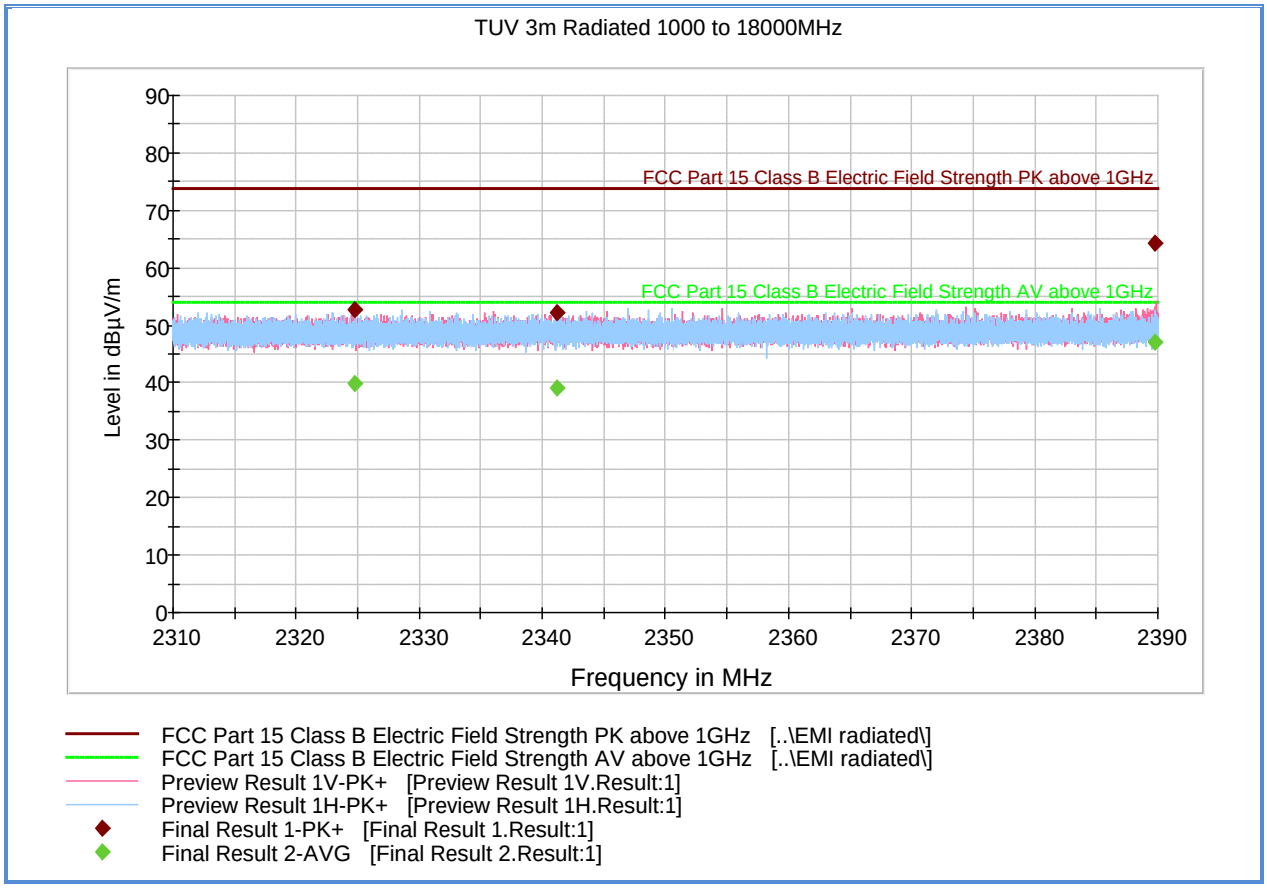
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2483.240000	69.4	1000.0	1000.000	99.8	V	110.0	9.8	4.5	73.9
2490.076267	58.9	1000.0	1000.000	100.9	V	118.0	9.8	15.0	73.9
2497.475267	50.8	1000.0	1000.000	242.4	H	67.0	9.9	23.1	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)
2483.240000	49.6	1000.0	1000.000	99.8	V	110.0	9.8	4.3	53.9
2490.076267	41.5	1000.0	1000.000	100.9	V	118.0	9.8	12.4	53.9
2497.475267	38.2	1000.0	1000.000	242.4	H	67.0	9.9	15.7	53.9

2.3.16 **Test Results Above 802.11n Low Channel**



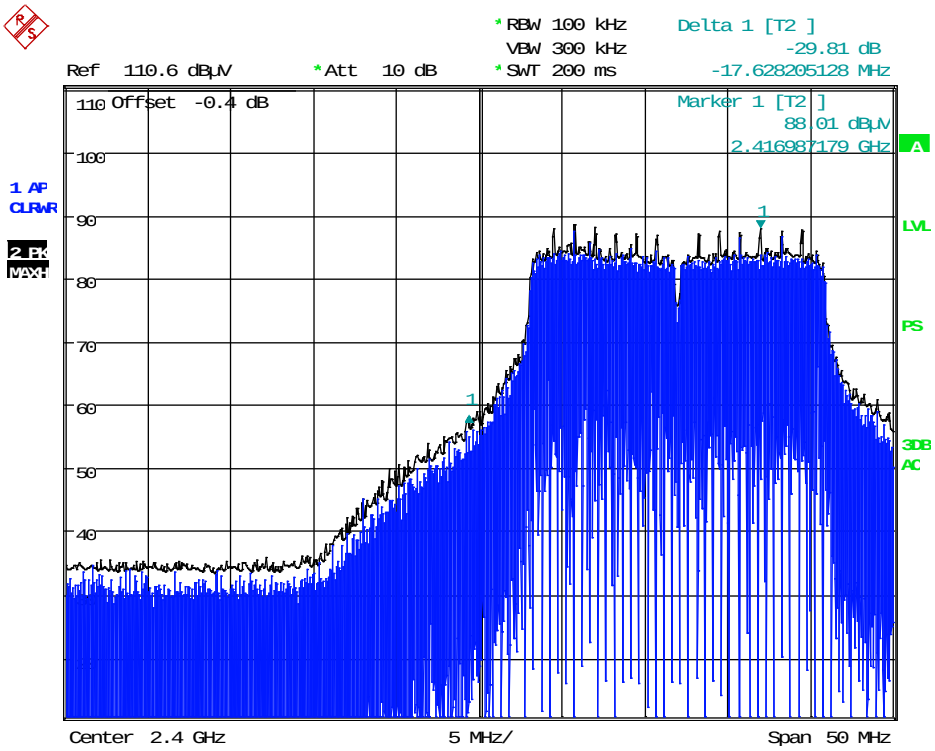
Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2324.737333	52.7	1000.0	1000.000	101.9	H	214.0	9.2	21.2	73.9
2341.174667	52.2	1000.0	1000.000	162.7	H	221.0	9.3	21.7	73.9
2389.820000	64.2	1000.0	1000.000	99.8	V	115.0	9.5	9.7	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)
2324.737333	39.9	1000.0	1000.000	101.9	H	214.0	9.2	14.0	53.9
2341.174667	39.2	1000.0	1000.000	162.7	H	221.0	9.3	14.7	53.9
2389.820000	47.0	1000.0	1000.000	99.8	V	115.0	9.5	6.9	53.9

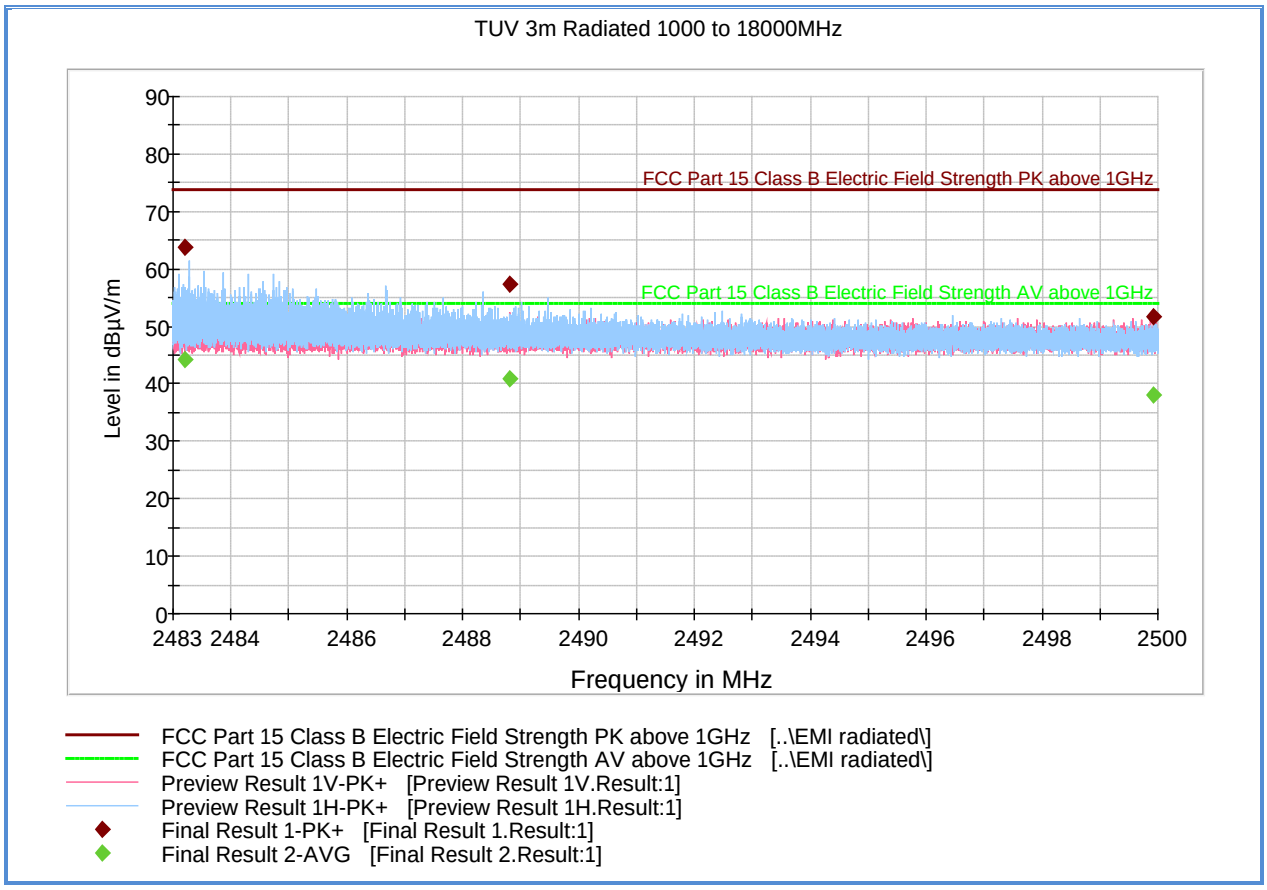
2.3.17 **Test Results Lower Band Edge 802.11 n**



Date: 22.MAY.2013 10:16:34

Test Notes: Carrier frequency (Low Channel) was maximized for this test. Correction factor of -0.4dB is from the cable, antenna and preamp used. Limit for this test is 20dBc.

2.3.18 **Test Results Above 802.11n 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)
2483.200000	63.8	1000.0	1000.000	108.8	H	142.0	9.8	10.1	73.9
2488.801133	57.4	1000.0	1000.000	99.8	H	132.0	9.8	16.5	73.9
2499.923900	51.6	1000.0	1000.000	263.4	H	70.0	9.9	22.3	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)
2483.200000	44.1	1000.0	1000.000	108.8	H	142.0	9.8	9.8	53.9
2488.801133	40.8	1000.0	1000.000	99.8	H	132.0	9.8	13.1	53.9
2499.923900	38.1	1000.0	1000.000	263.4	H	70.0	9.9	15.8	53.9

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 Emissions Test Setup						
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	06/13/12	06/13/13
7567	LISN	FCC-LISN-50-25-2-10	120304	Fischer Custom Comm.	05/24/12	05/24/13
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
Radiated Test Setup						
1033	Bilog Antenna	3142C	00044556	EMCO	05/23/12	05/23/13
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
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	08/10/12	08/10/13
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	06/13/12	06/13/13
1016	Pre-amplifier	PAM-0202	187	PAM	09/24/12	09/24/13
6815	2.4GHz Band Notch Filter	BRM50702	008	Micro-Tronics	Verified by 1040	
Miscellaneous						
7560	Barometer/Temperature /Humidity Transmitter	iBTHX-W	1240476	Omega	08/12/12	08/12/13
6452	Multimeter	3478A	2911A52177	Hewlett Packard	07/16/12	07/16/13
	Test Software	EMC32	V8.52	Rhode & Schwarz	N/A	

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

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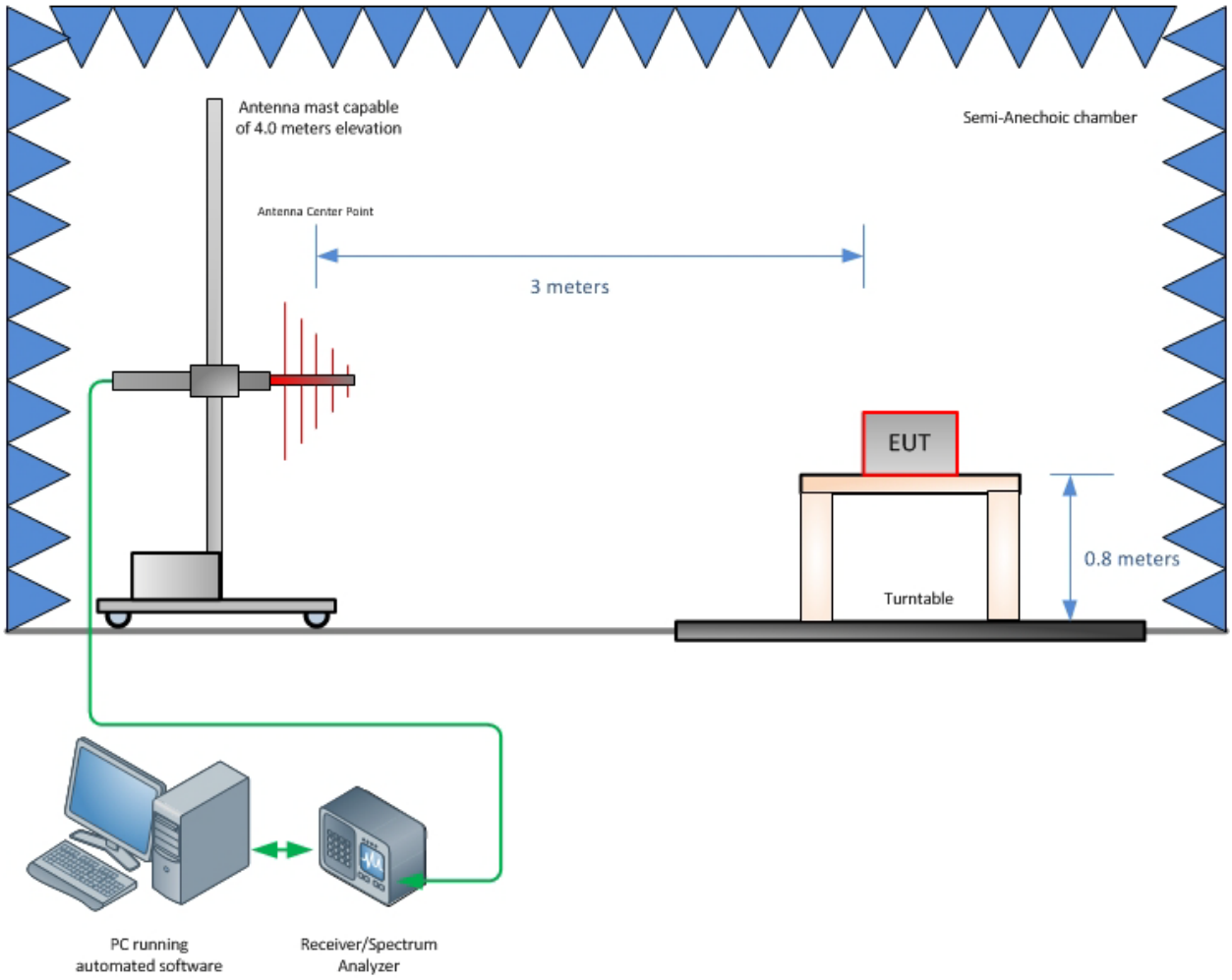
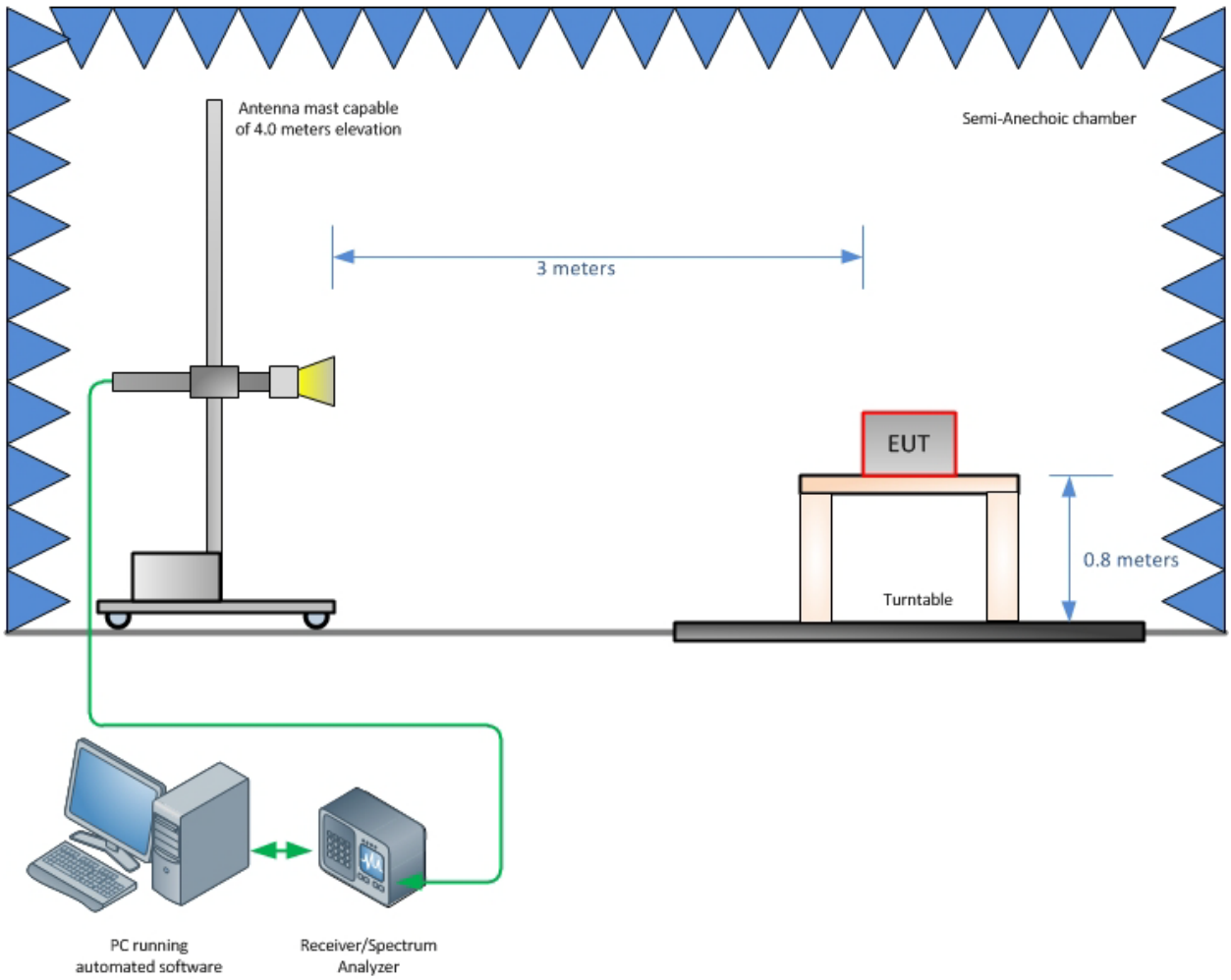
SECTION 4

DIAGRAM OF TEST SETUP

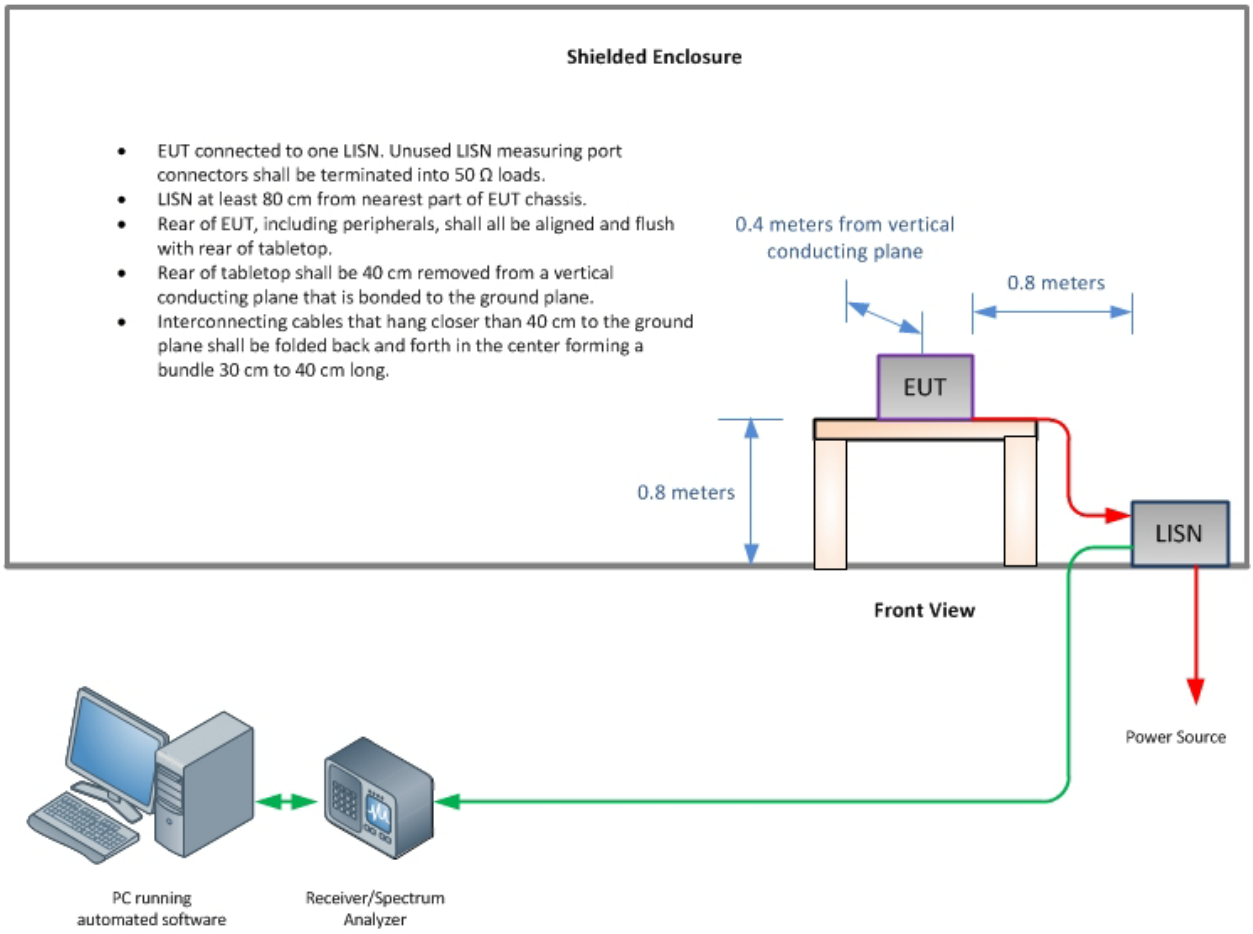
4.1 TEST SETUP DIAGRAM



Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)



Conducted Emissions Test Setup

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SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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Certificate Number: 3228.01

Novatel Wireless, Inc.

Test Report
EMC Conducted Certification

FCC CFR47 Part 15.247 SUBPART C

Model Number: MiFi5580
FCC ID: PKRNVWMIFI5580

Report No.: NVTLTR0047-02
Date: 06/17/2013

Test Report
EMC Conducted Certification

Prepared For:

Novatel Wireless Inc.
9645 Scranton Road
San Diego CA 92121
Device Type: Mobile Hotspot
Model: MiFi5580
FID: SY16413700015

Performed By:
Novatel Wireless RPT Lab
Novatel Wireless Inc.
9645 Scranton Road
San Diego, CA 92121

	Name	Date
Prepared by: **Signature:**	**Roman Olmos** **Hardware Engineer II**	**06/16/2013**
Approved by: **Signature:**	**William Stewart** **Staff Regulatory Engineer**	**06/17/2013**
Revised by: **Signature:**	**N/A**	

Distribution
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1 Introduction

1.1 Purpose

To determine Equipment-Under-Test (EUT) is compliant with the Test Specification set forth in the Section 1.2 Test Methodology. Complaint/Non-Complaint indications in this report are opinions expressed by Novatel Wireless, Inc based on interpretations and/or observations of test results.

1.2 Test Methodology and Standards

All measurements documented in this report were performed in accordance 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.
- The equipment under test (EUT) was configured to measure its highest possible conducted emissions level. This level was based on the maximized cable configuration from exploratory testing per ANSI C63.4-2009.
- FCC CFR47 Part 15.247 Subpart C

1.3 Results Summary of Standards

Section	FCC Part	Conducted Test Description	Result	Comments
4.1	§15.247(b)(3)	Peak Output Power	Compliant	N/A
4.2	§15.247(a)(2)	Minimum 6 dB RF Bandwidth	Compliant	N/A
4.3	§15.247(d)	Out-of-Band Emissions - Conducted	Compliant	N/A
4.4	§15.247(d)	Band-edge Compliance of RF Conducted Emissions	Compliant	N/A
4.5	§15.247(e)	Power Spectral Density for Digitally Modulated Device	Compliant	N/A

1.4 Deviation from Standards

Line Item	FCC Part	Test Description	Comments
1	§15.207(a)	AC Line Conducted Emissions	Not Performed
2	§15.247(d)	Spurious Radiated Emissions	Not Performed
3	§15.247(d)	Radiated Restricted Band Edge Measurements	Not Performed

2 Equipment Under Test (EUT)

2.1 EUT Information and General Description

Date of Measurements:	06/13-14/2013		
Date of Device Receipt:	5/20/2013		
Device Manufacturer:	Novatel Wireless		
Device Model:	MiFi5580		
Device Description/Type:	Mobile Hot Spot		
Device S/N:	FID: SY16413700015		
Device Modes:	3G-CDMA/4G-LTE/802.11bgn		
Device Band Capability:	800MHz/1900MHz/2.4GHz/2.6GHz		
Device HW Revision:	1.5		
Device SW Revision:	4.26		
FCC ID:	PKRNVWMIFI5580		
Rated Voltage:	+3.7Vdc Nominal Voltage		
Modes Verified:	802.11 b/g/n		
EUT Functional Condition:	☐ Production	☒ Pre-Production	☐ Engineering
Comments:	Novatel Wireless Inc. Equipment Under Test (EUT) MiFi5580 is a Personal Wireless Router. The EUT creates a personal Wi-Fi cloud capable of sharing high-speed 3G and 4G Mobile Broadband Internet Connectivity with up to 10 Wi-Fi enabled devices simultaneously. The EUT comes with an AC Adapter Novatel Wireless Model: SSW-2423.		
Results of tests relate only to item tested.			

Antenna Manufacturer:	Novatel Wireless, Inc.	
Antenna Part#:	N/A	
Antenna Type:	Monopole (Etched on PCB)	
Frequency Band	**Frequency Range (MHz)**	**Antenna Peak Gain (dBi)**
WLAN	2400MHz	1.03 dBi

2.2 EUT Test Configuration

Note: EUT Test Configuration and Supported Modes	
Item#	**Description**
A	EUT Transmitting Max Power via integral antenna port 802.11b/1Mbps data rate
B	EUT Transmitting Max Power via integral antenna port 802.11g/6Mbps data rate
C	EUT Transmitting Max Power via integral antenna port 802.11n/6.5Mbps data rate

2.3 EUT Worse-Case Mode Configuration

Mode	Channel	Frequency	Data
(Type)	(#)	(MHz)	(Mbps)
802.11b	1	2412	1
802.11g	6	2437	6
802.11n	6	2437	6.5

2.4 EUT Worse-Case Mode Results

Mode	Channel	Frequency	Data	Avg Power	Peak Power
	(#)	(MHz)	(Mbps)	(dBm)	(dBm)
802.11b	1	2412	2	16.93	19.36
	6	2437	1	16.98	19.26
	10	2457	1	16.85	19.19
802.11g	1	2412	24	15.99	22.88
	6	2437	24	16.94	23.76
	10	2457	6	16.97	23.51
802.11n	1	2412	6.5	15.97	22.54
	6	2437	6.5	16.99	23.68
	10	2457	6.5	16.97	23.59

2.5 EUT Support Equipment

Note: Customer provided hardware and/or software to support EUT testing.	
Item#	**Description**
1	EUT Software: EUT was configured using Qualcomm Radio Control Toolkit Version 3.0.11.0. Diagnostic Software allows configuration of channels, mode + data rate and power level. Power level is set according to the manufacturer's specification for each mode.
2	Dell Configuration Support Laptop (Qty.1)
3	USB Cable : • Manufacturer: LUXSHARE-ICT • Shielded Type A to Micro USB (0.912 Meter) USB Revision 2

2.6 EUT Maximum Conducted Peak Output Power

Mode	Frequency Range	Maximum Output Power	
(Type)	(MHz)	(dBm)	(mW)
802.11b	2412-2462	16.98	49.89
802.11g	2412-2462	16.97	49.77
802.11n	2412-2462	16.99	50.00

3 Measurement System Information

3.1 Test Equipment & Calibration

The test equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturer's specification and ISO-17025 accredited calibration. Calibration data is traceable to the recognized national standards.

3.2 Test Equipment List

Equipment	Manufacturer	Model	S/N	Current Calibration Date	Next Calibration Date
Wireless Communication Test Set	Agilent	E5515C/8960	MY47511006	02/28/2013	02/28/2015
PSA Series Spectrum Analyzer 3Hz-44GHz	Agilent	E4446A	MY46180178	02/28/2012	02/28/2014
Power Meter	Anritsu	ML2495A	1212001	04/13/2012	04/13/2014
Power Sensor	Anritsu	MA2411B	1126216	03/20/2012	03/20/2014
20dB Attenuator	N/A	N/A	20-1	Verified 06/21/2012	Next Verification 06/21/2013
20dB Attenuator	N/A	N/A	20-2	Verified 06/21/2012	Next Verification 06/21/2013
RF Shield Box Assembly	N/A	N/A	RF-C01	Verified 05/09/2013	Next Verification 08/09/2013

3.3 Conducted Test Setup

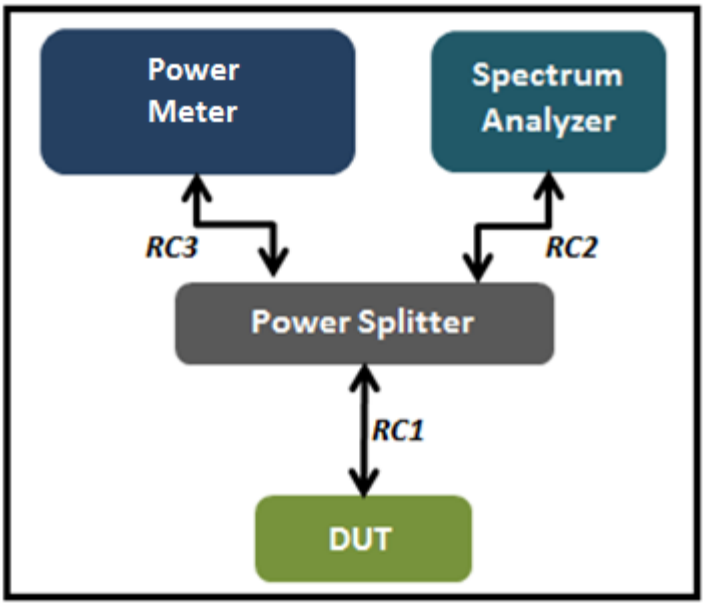


Figure 1: Conducted Transmitter Power & Emissions Test Setup

3.4 Conducted Measurement Uncertainty

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

Test Discipline	MU
Peak Output Power:	**±1.57dB**
Conducted Spurious Emissions:	**±4.14dB**
Band Edge:	**±2.51dB**
Power Spectral Density:	**±2.51dB**

4 Conducted Test Results

4.1 Peak Output Power – RF Power Verification

4.1.1 Standard Reference

FCC Part §15.247(b)(3)

4.1.2 Environmental Conditions

Environmental Conditions				
Initials	**Date**	**Description**	**Start**	**Stop**
RO	6/13/2013	Humidity	36.9%	36.4 %
		Temperature	23.6 °C	23.8 °C
		Barometer	1004 mbar	1003 mbar

4.1.3 Test Conditions

- Measurement is made using a broadband power meter while EUT is operating in transmission mode at the appropriate frequencies.
- An offset of 24.9dB used to compensate for external setup losses
- Both Peak and Average results recorded

4.1.4 802.11b Mode Test Results

Channel	Frequency	Data	Avg Power	Peak Power
(#)	(MHz)	(Mbps)	(dBm)	(dBm)
1	2412	1	16.89	19.42
		2	16.93	19.36
		5.5	16.91	19.30
		11	16.84	19.36
6	2437	1	16.98	19.26
		2	16.90	19.29
		5.5	16.91	19.25
		11	16.90	19.34
10	2457	1	16.85	19.19
		2	16.84	19.20
		5.5	16.82	19.15
		11	16.77	19.27

4.1.5 802.11g Mode Test Results

Channel	Frequency	Data	Avg Power	Peak Power
(#)	(MHz)	(Mbps)	(dBm)	(dBm)
1	2412	6	15.96	22.67
		9	15.95	22.55
		12	15.90	22.77
		18	15.86	22.56
		24	15.99	22.88
		36	15.78	22.64
		48	15.70	22.67
		54	15.71	22.65
6	2437	6	16.75	23.56
		9	16.60	23.58
		12	16.55	23.48
		18	16.59	23.24

		24	16.94	23.76
		36	16.95	23.67
		48	16.92	23.58
		54	16.96	23.75
10	2457	6	16.97	23.51
		9	16.58	23.39
		12	16.53	23.47
		18	16.56	23.24
		24	16.36	23.64
		36	16.49	23.53
		48	16.40	23.40
		54	16.85	23.74

4.1.6 802.11n Mode Test Results

Channel	Frequency	Data	Avg Power	Peak Power
(#)	(MHz)	(Mbps)	(dBm)	(dBm)
1	2412	6.5/7.2	15.97	22.54
		13/14.4	15.78	22.75
		19.5/21.7	15.85	22.72
		26/28.9	15.78	22.77
		39/43.3	15.81	22.78
		52/57.8	16.17	22.96
		58.5/65	16.08	23.08
		65/72.2	15.94	22.81
6	2437	6.5/7.2	16.99	23.68
		13/14.4	16.97	23.61
		19.5/21.7	16.96	23.54
		26/28.9	16.96	23.57
		39/43.3	16.96	23.51
		52/57.8	16.81	23.53
		58.5/65	16.76	23.76
		65/72.2	16.71	23.63

10	2457	6.5/7.2	16.97	23.59
		13/14.4	16.96	23.53
		19.5/21.7	16.97	23.62
		26/28.9	16.78	23.49
		39/43.3	16.70	23.81
		52/57.8	16.78	23.58
		58.5/65	16.84	23.85
		65/72.2	16.79	23.57

4.2 Minimum 6dB RF Bandwidth

4.2.1 Standard Reference

FCC Part §15.247(a)(2)

4.2.2 Environmental Conditions

Environmental Conditions				
Initials	**Date**	**Description**	**Start**	**Stop**
RO	6/14/2013	Humidity	36.9 %	35.9 %
		Temperature	23.8 °C	23.9 °C
		Barometer	1003 mbar	1002 mbar

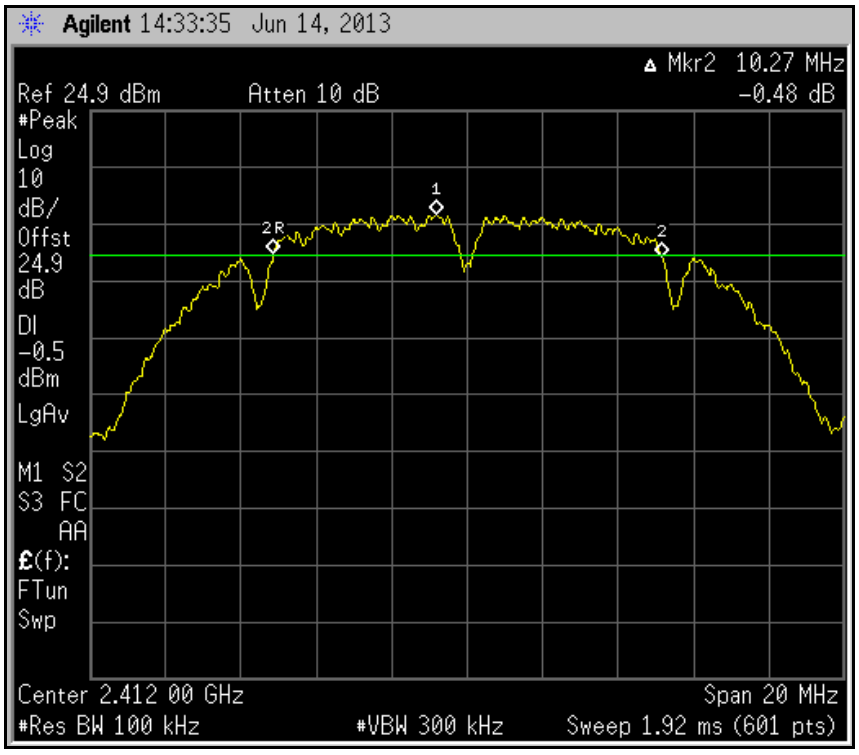
4.2.3 Test Conditions

- Spectrum Analyzer used to collect test results.
- An offset of 24.9dB used to compensate for external setup losses
- 20dB Attenuator used
- Display Line was enabled 6dB below the peak level
- 6dB Bandwidth verified using delta-marker measurement
- Detector set to Peak
- Span is wide enough to capture the channel transmission
- RBW is 100KHz
- VBW is 3x RBW
- Sweep set to Auto Couple
- Trace is Max Hold

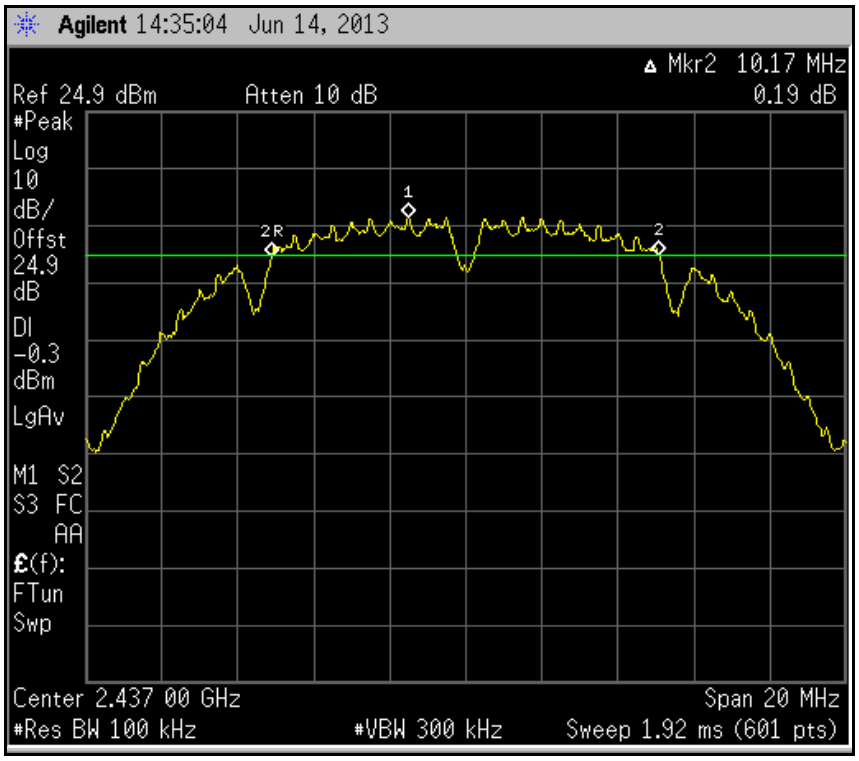
4.2.4 Results

Mode	Channel	Frequency	Data	Measured Bandwidth	Minimum Bandwidth
	(#)	(MHz)	(Mbps)	(MHz)	(MHz)
802.11b	1	2412	2	10.27	0.500
	6	2437	1	10.17	0.500
	10	2457	1	10.10	0.500
802.11g	1	2412	24	16.13	0.500
	6	2437	24	16.37	0.500
	10	2457	6	15.93	0.500
802.11n	1	2412	6.5	16.23	0.500
	6	2437	6.5	16.90	0.500
	10	2457	6.5	17.10	0.500

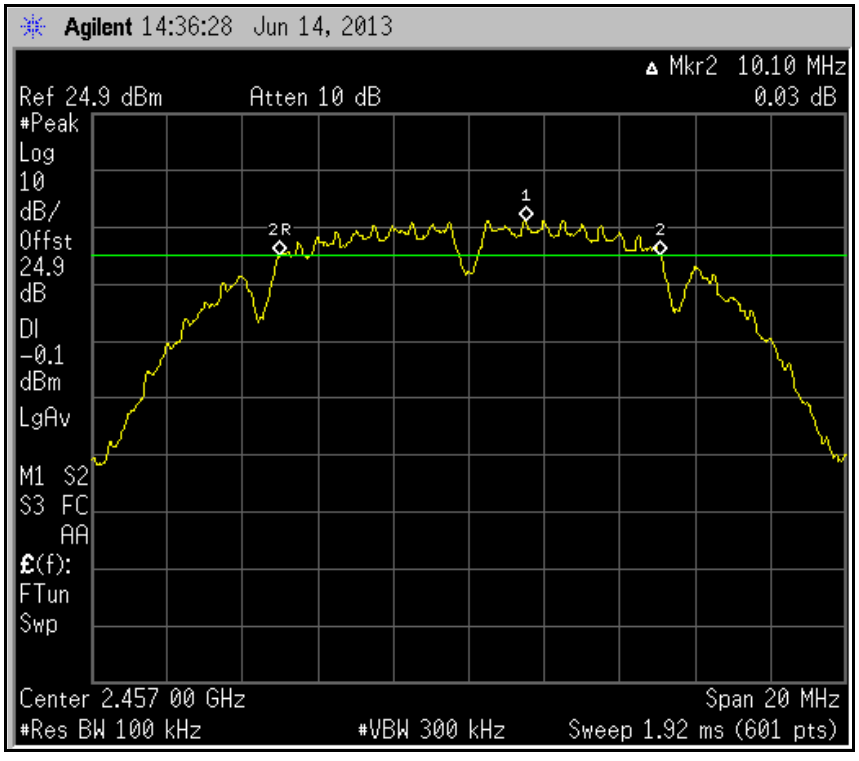
4.2.5 Test Result Plots



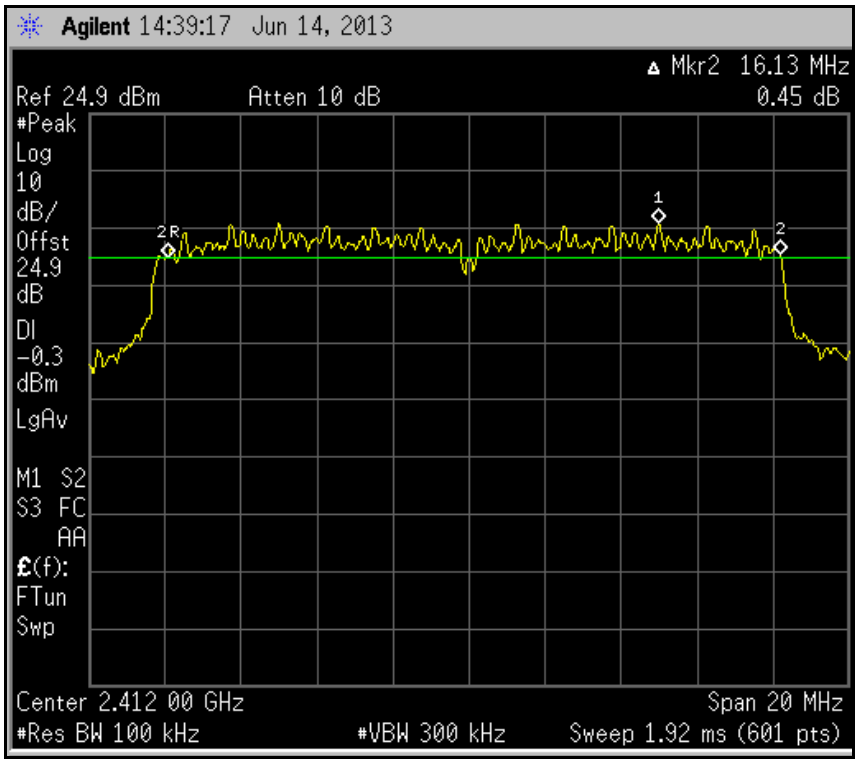
802.11b Channel 1



802.11b Channel 6



802.11b Channel 10



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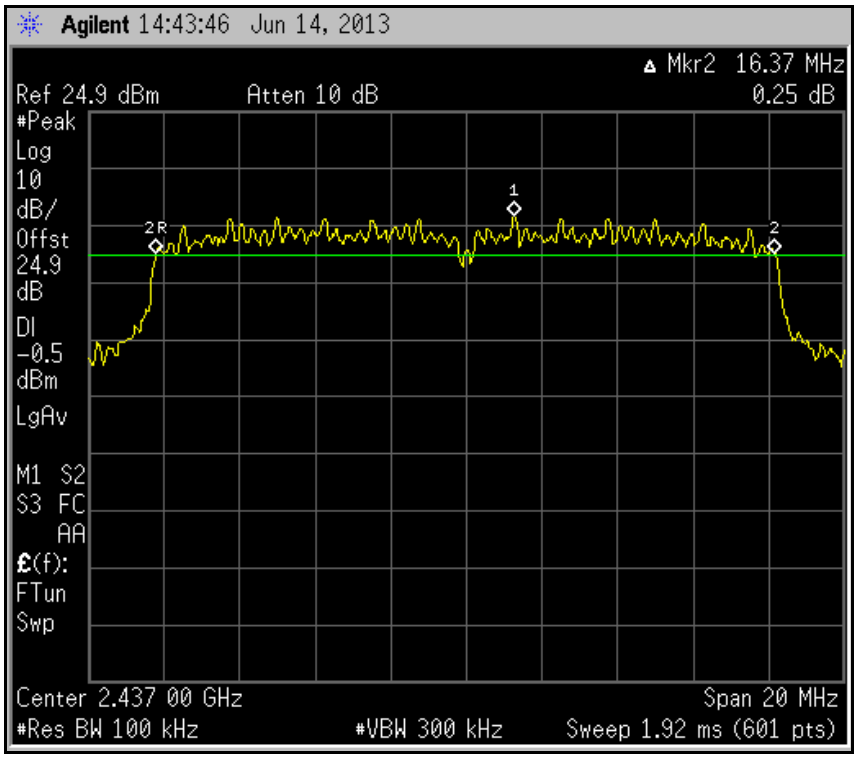

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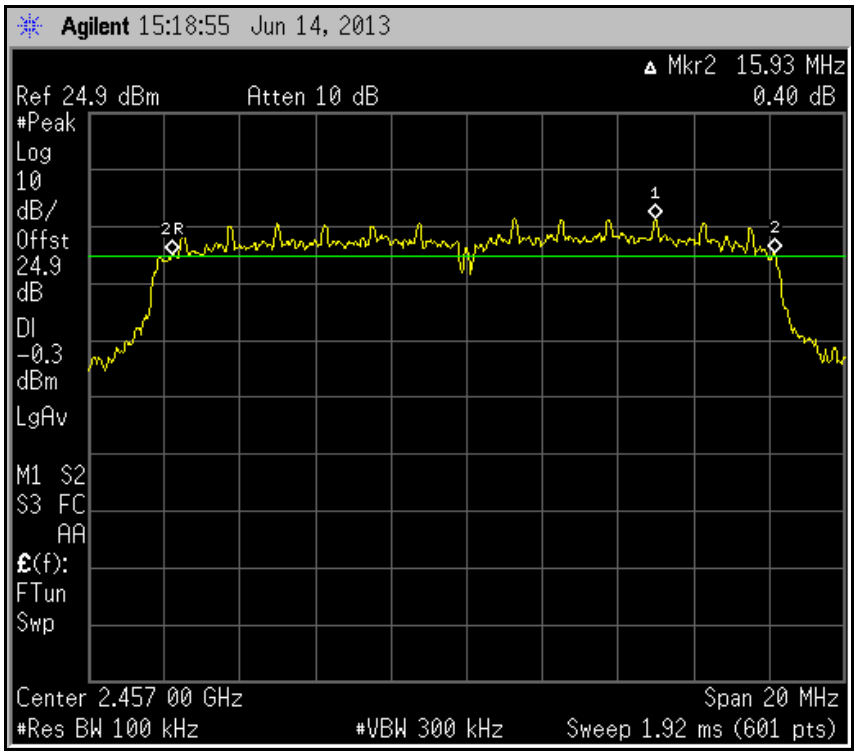

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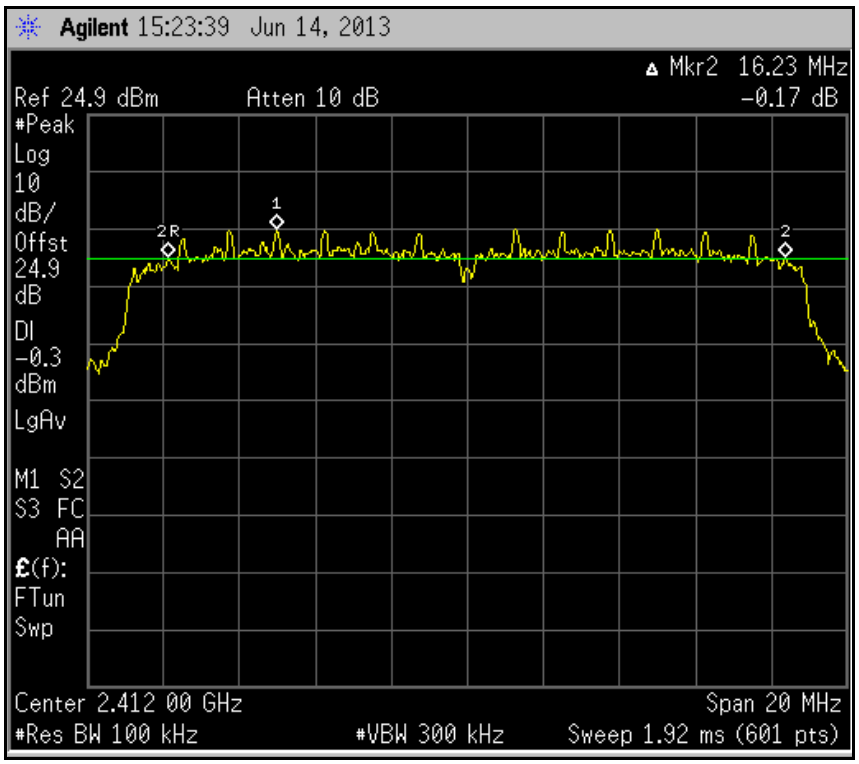
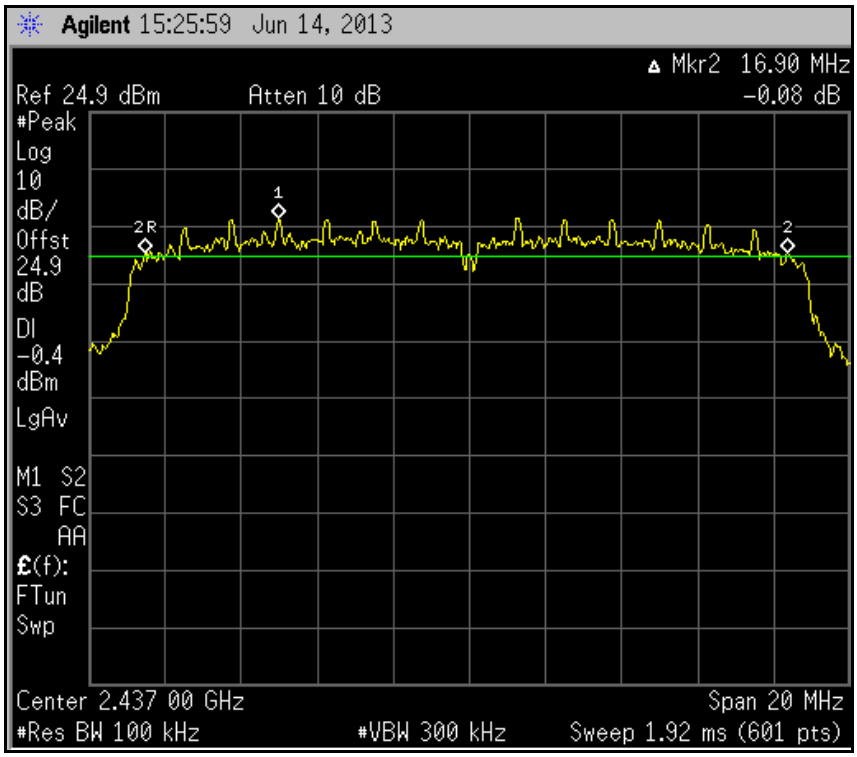


802.11n Channel 1



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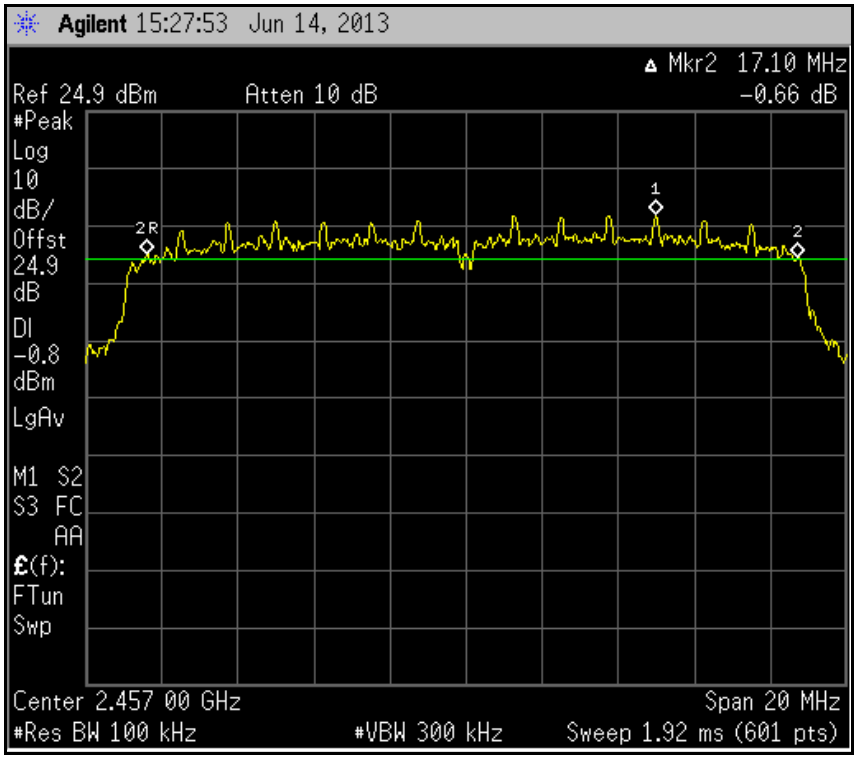


802.11n Channel 10

4.3 Out-Of-Band Emissions

4.3.1 Standard Reference

FCC Part §15.247(d)

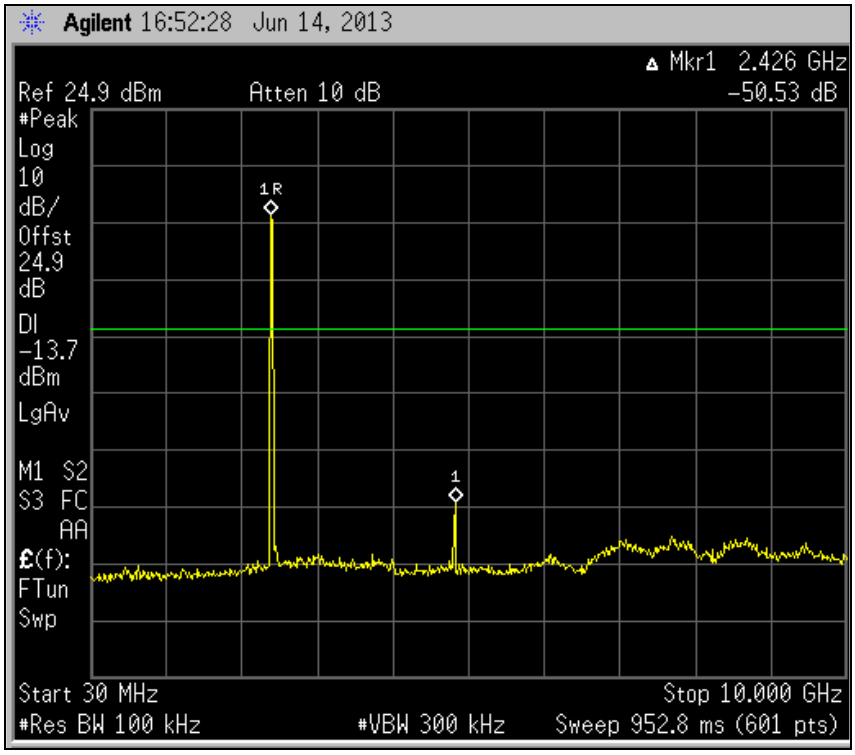
4.3.2 Environmental Conditions

Environmental Conditions				
Initials	**Date**	**Description**	**Start**	**Stop**
RO	6/14/2013	Humidity	35.9 %	35.9 %
		Temperature	23.9 °C	23.9 °C
		Barometer	1002 mbar	1002 mbar

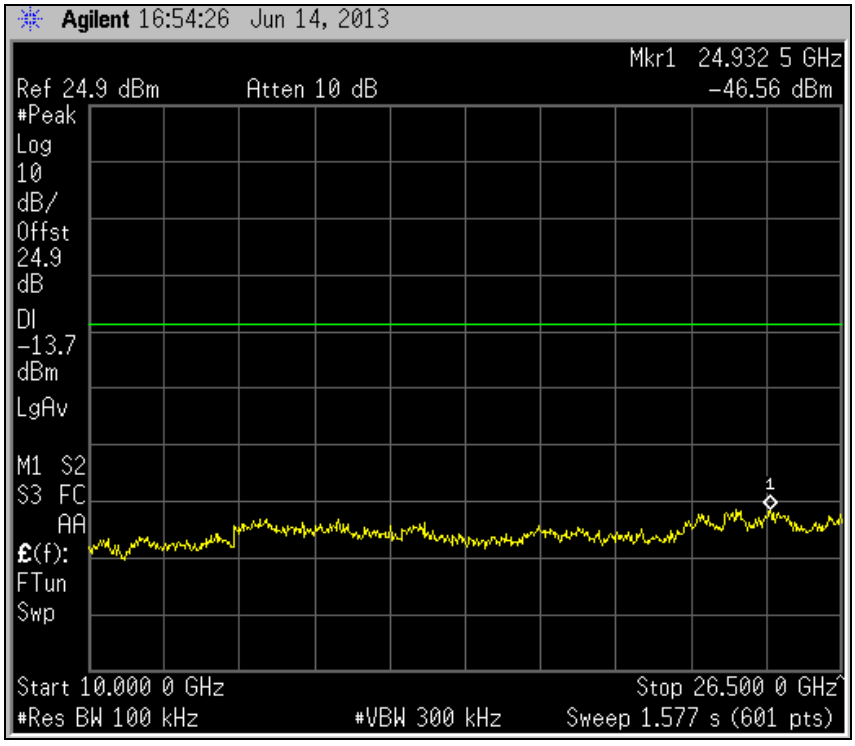
4.3.3 Test Conditions

- Spectrum Analyzer used to collect test results.
- An offset of 24.9dB used to compensate for external setup losses.
- 20dB Attenuator used
- Display Line was enabled 20dB below the highest level of the desired power within the band
- Detector set to Peak
- RBW is 100KHz
- VBW is 3x RBW
- Sweep set to Auto Couple
- Trace is Max Hold
- Spectrum search from 30MHz up to 26.5Ghz

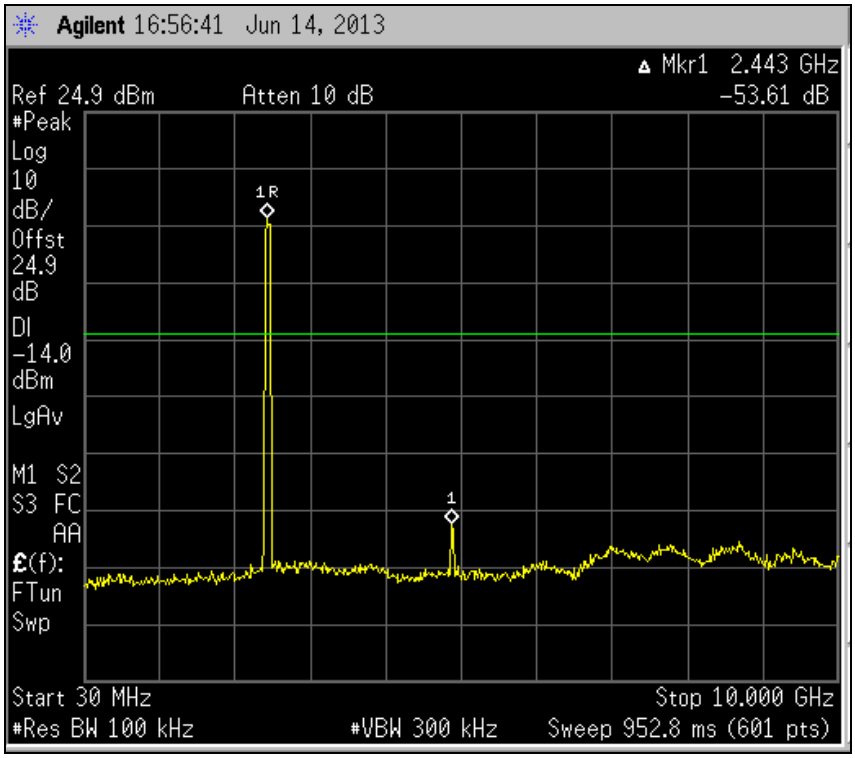
4.3.4 Test Result Plots



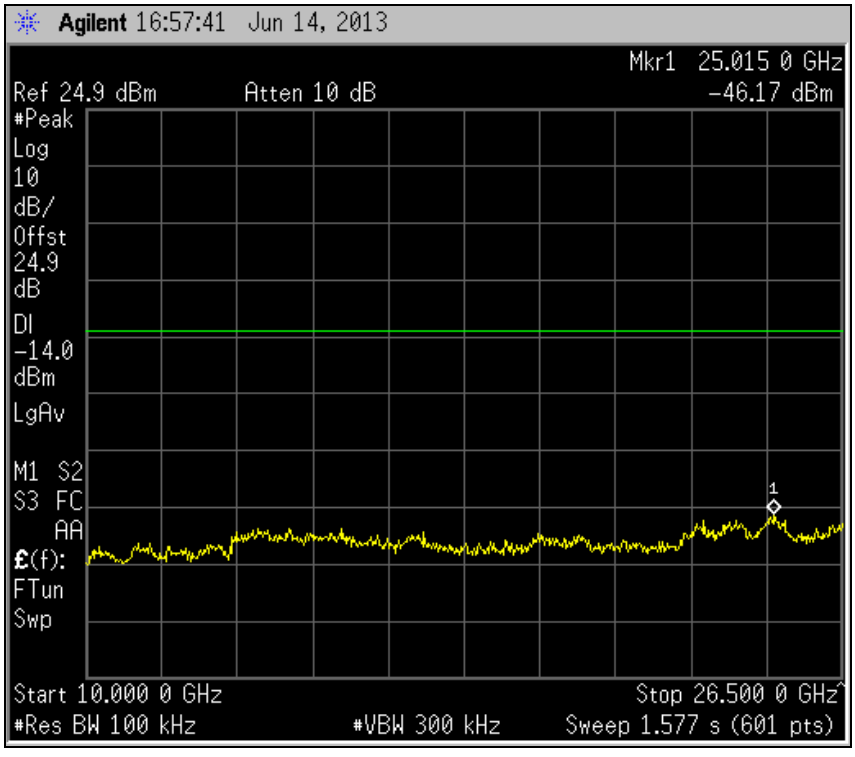
802.11b Channel 1 (30MHz to 10GHz)



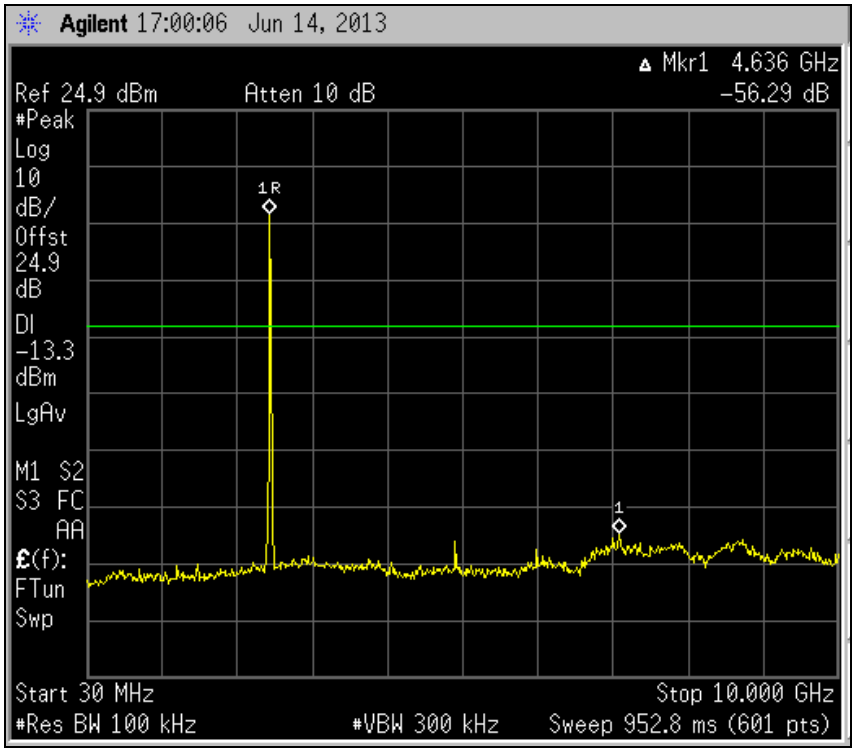
802.11b Channel 1 (10GHz to 25GHz)



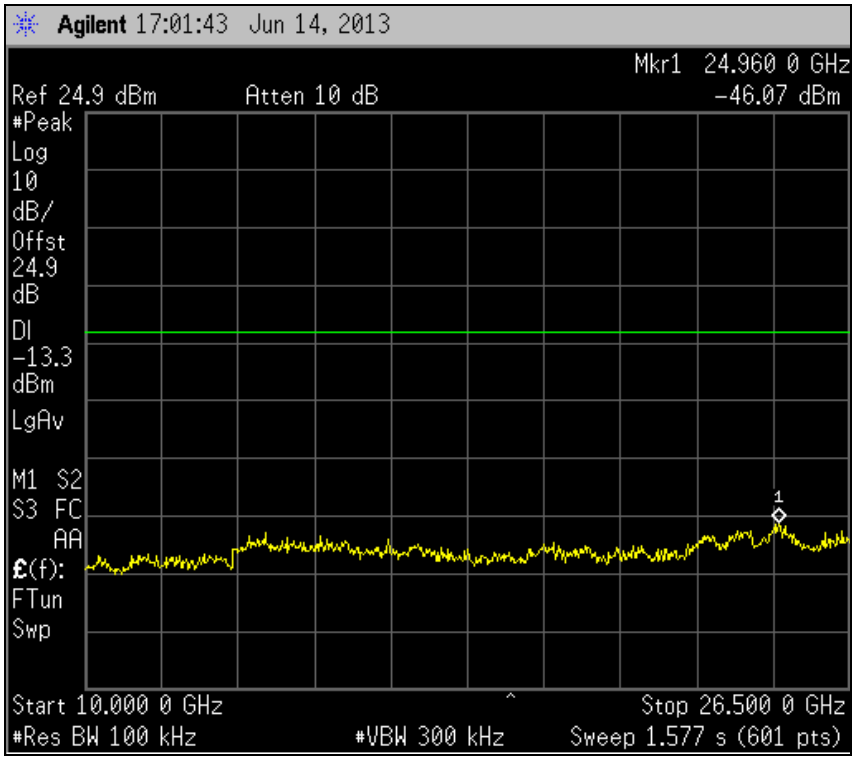
802.11b Channel 6 (30MHz to 10GHz)



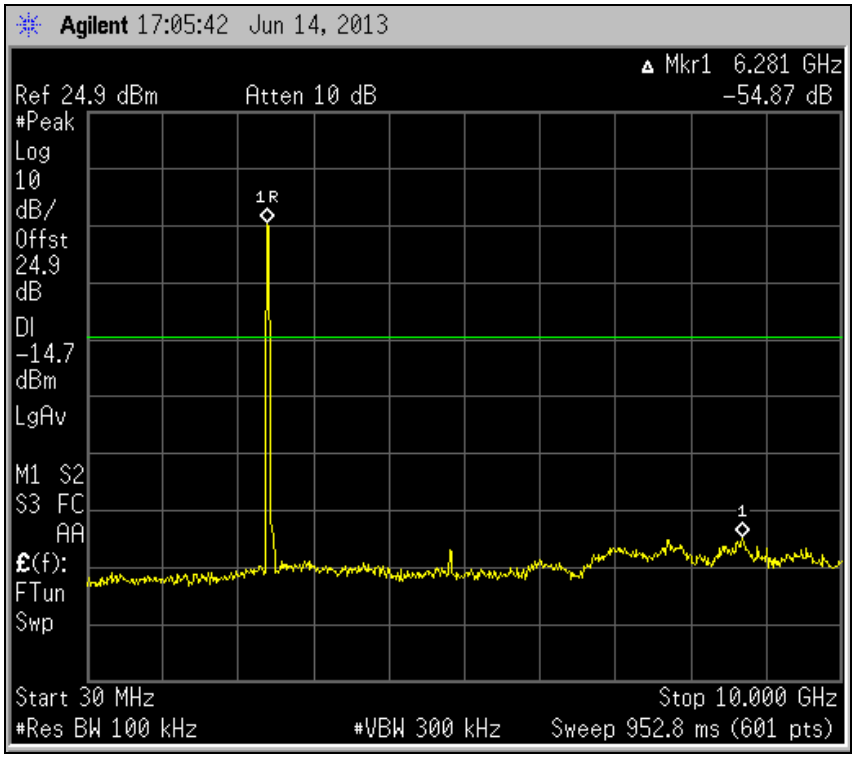
802.11b Channel 6 (10GHz to 25GHz)



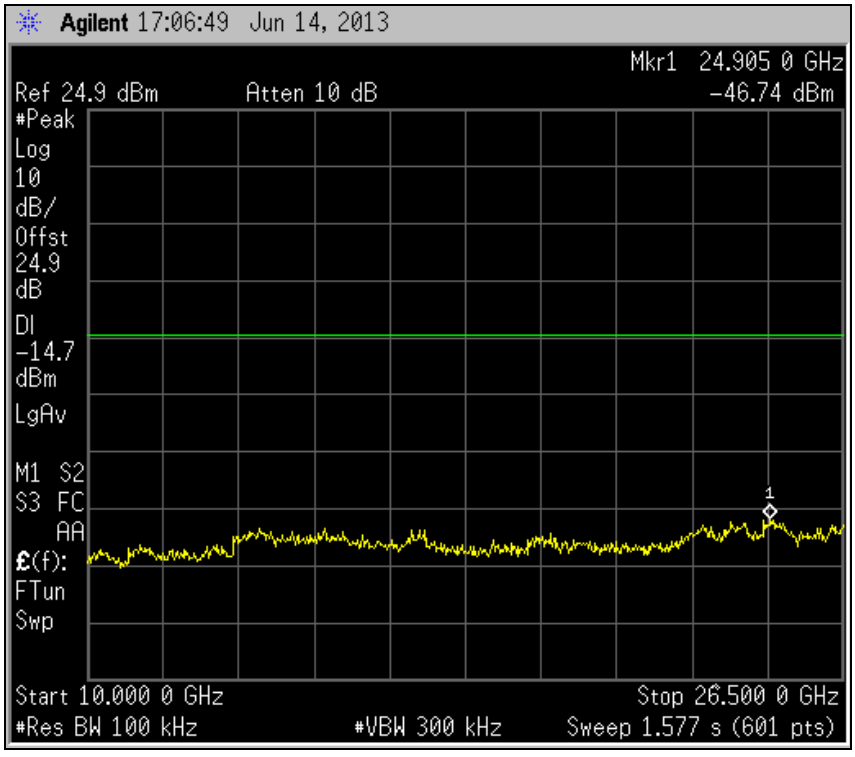
802.11b Channel 10 (30MHz to 10GHz)



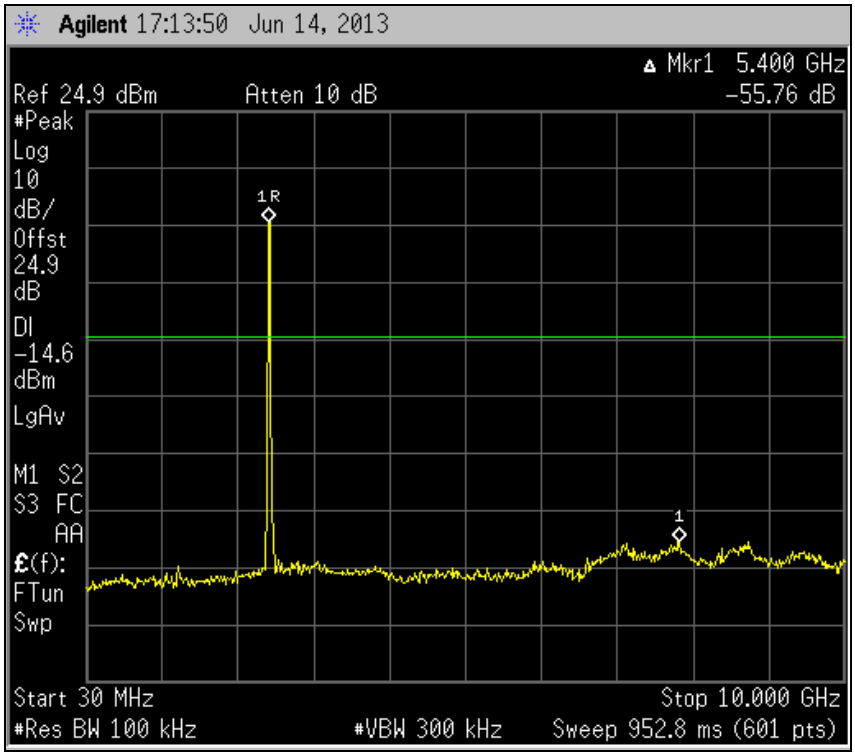
802.11b Channel 10 (10GHz to 25GHz)



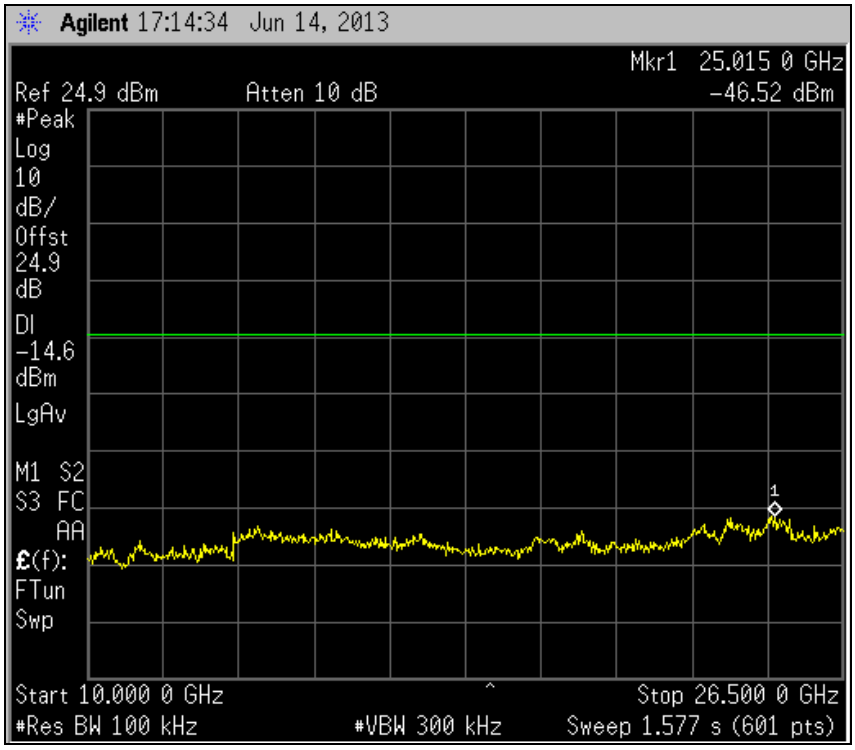
802.11g Channel 1 (30MHz to 10GHz)



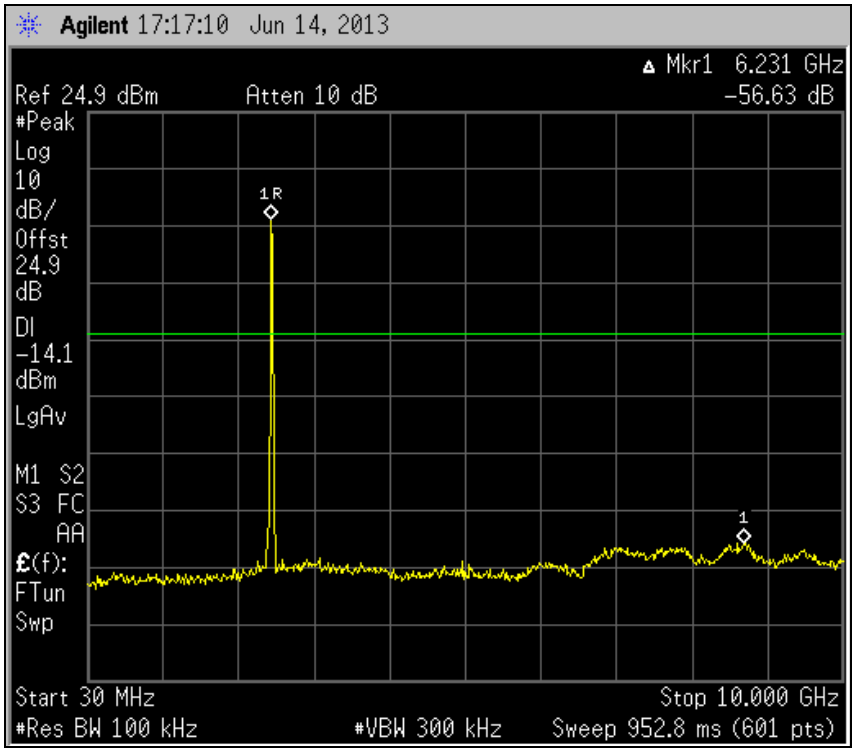
802.11g Channel 1 (10GHz to 25GHz)



802.11g Channel 6 (30MHz to 10GHz)



802.11g Channel 6 (10GHz to 25GHz)



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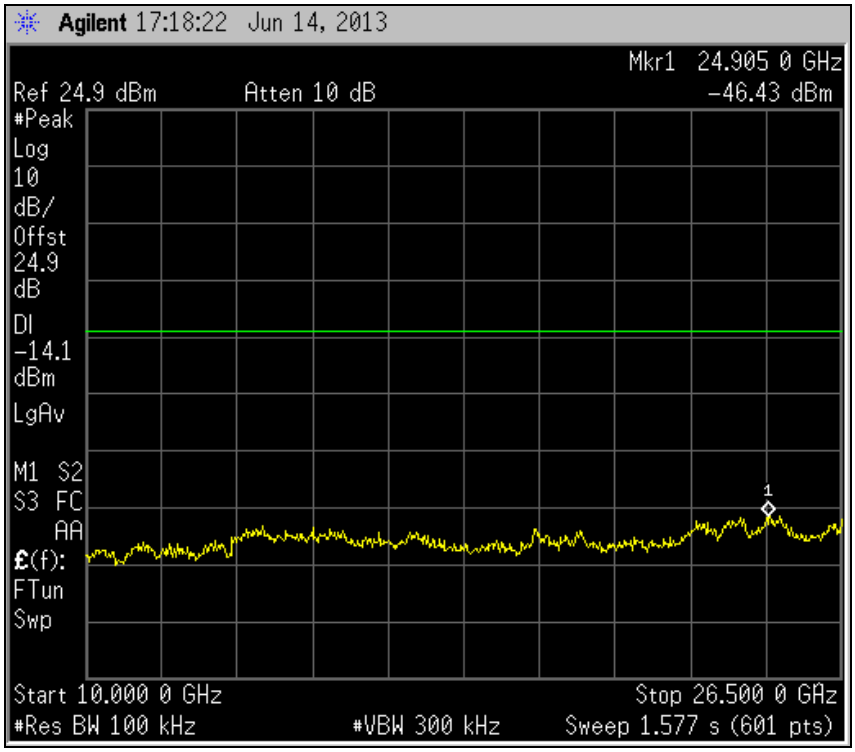
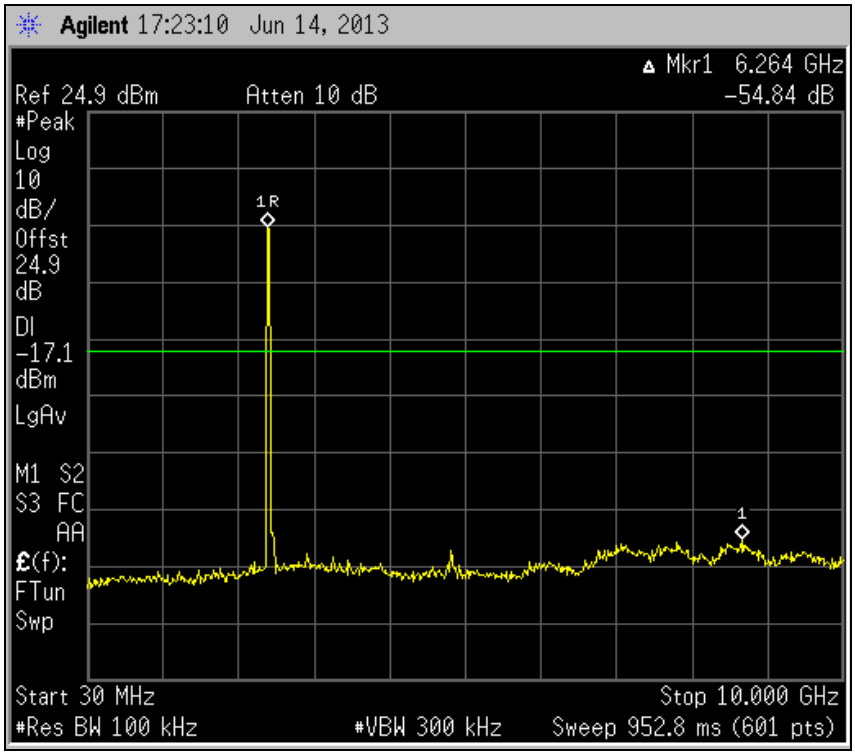
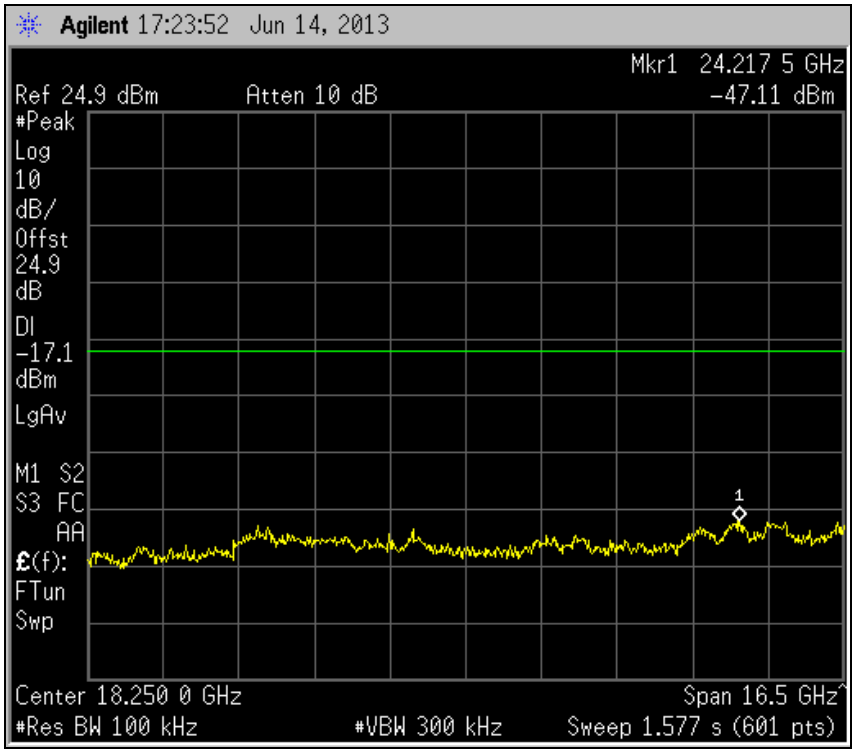


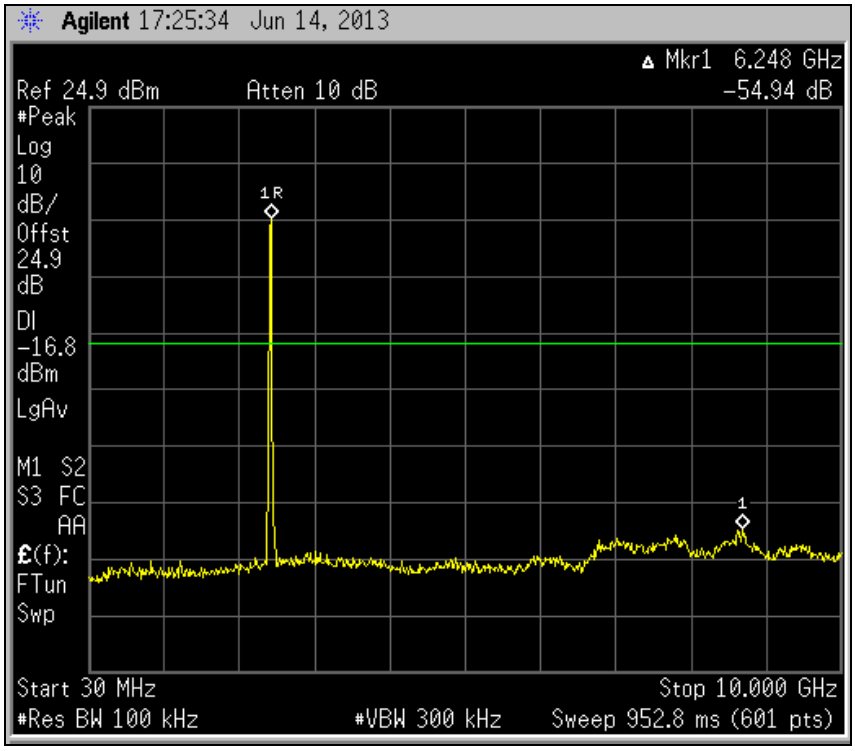
802.11g Channel 10 (10GHz to 25GHz)



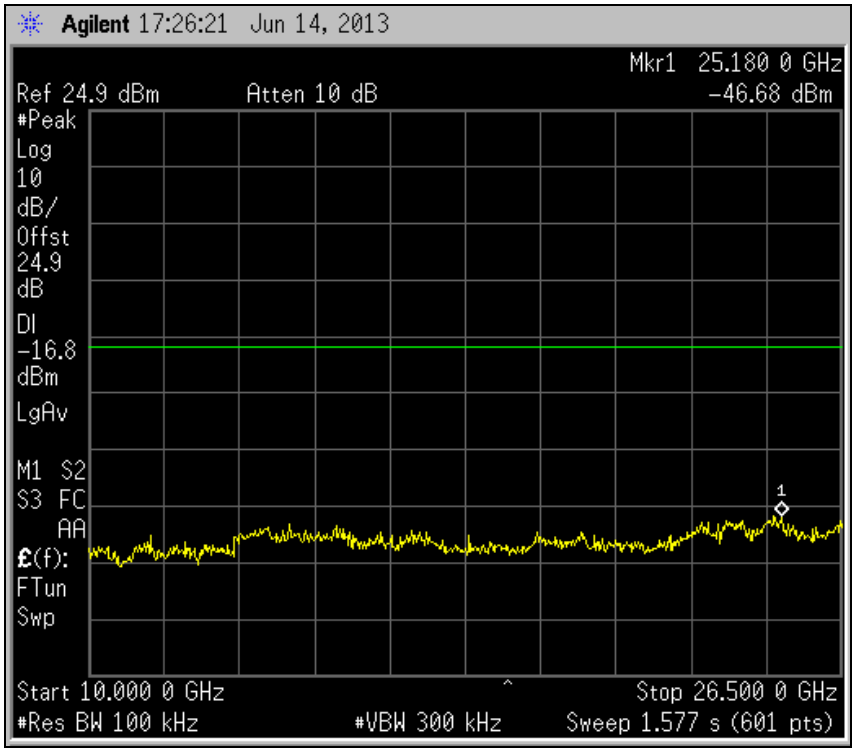
802.11n Channel 1 (30MHz to 10GHz)



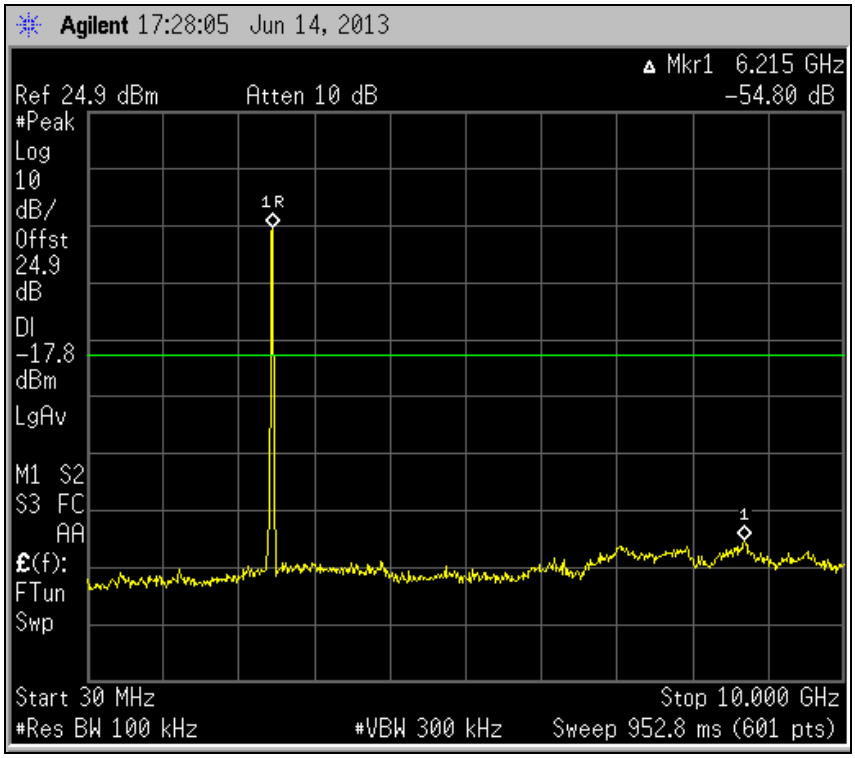
802.11n Channel 1 (10GHz to 25GHz)



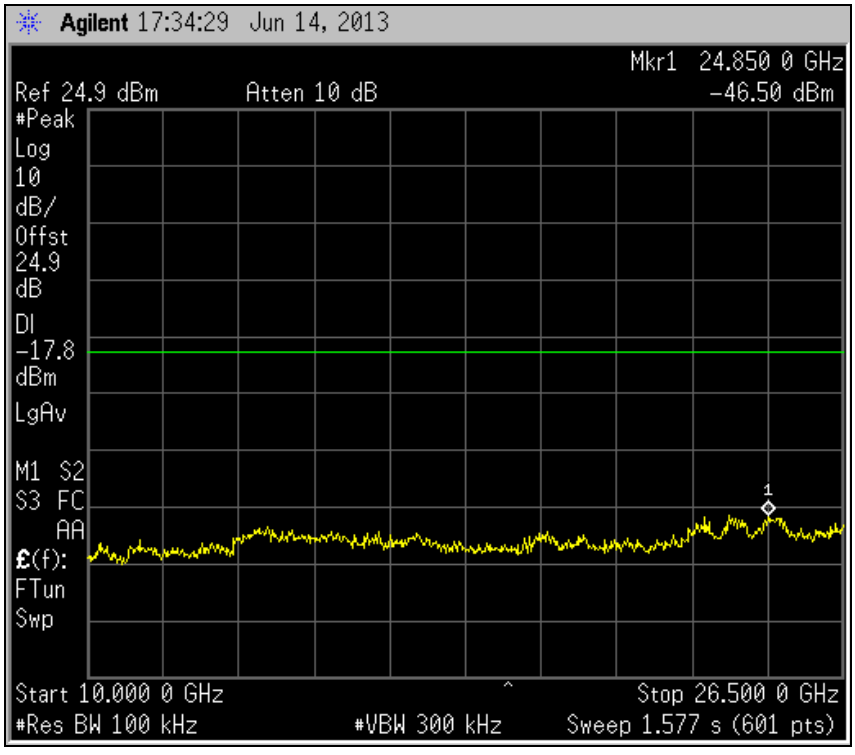
802.11n Channel 6 (30MHz to 10GHz)



802.11n Channel 6 (10GHz to 25GHz)



802.11n Channel 10 (30MHz to 10GHz)



802.11n Channel 10 (10GHz to 25GHz)

4.4 Band-Edge

4.4.1 Standard Reference

FCC Part §15.247(d)

4.4.2 Environmental Conditions

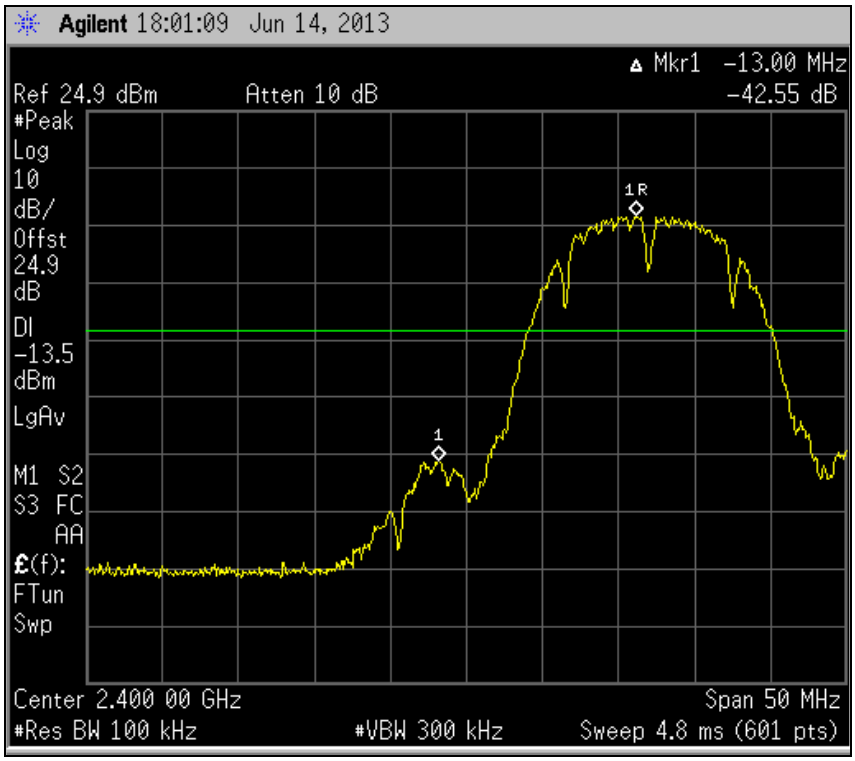
Environmental Conditions				
Initials	**Date**	**Description**	**Start**	**Stop**
RO	6/14/2013	Humidity	35.9 %	36.9 %
		Temperature	23.9 °C	23.8 °C
		Barometer	1002 mbar	1002 mbar

4.4.3 Test Conditions

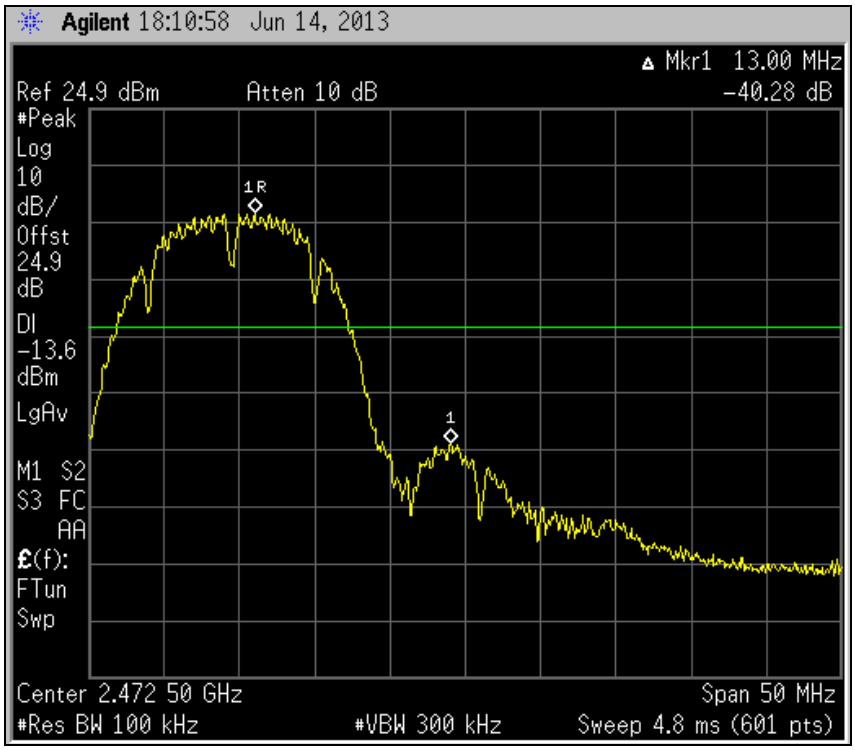
- Band-edge (2400MHz and 2472.5MHz) emissions was verified
- The Spectrum Analyzer was centered on the band-edge frequency while setting the EUT to the corresponding transmit channel

  (i.e. Low Channel for lower band-edge)
- Spectrum Analyzer used to collect test results
- An offset of 24.9dB used to compensate for external setup losses
- 20dB Attenuator used
- Display Line was enabled 20dB below the highest level of the desired power within the band
- Detector set to Peak
- RBW is 100KHz
- VBW is 3x RBW
- Sweep set to Auto Couple
- Trace is Max Hold

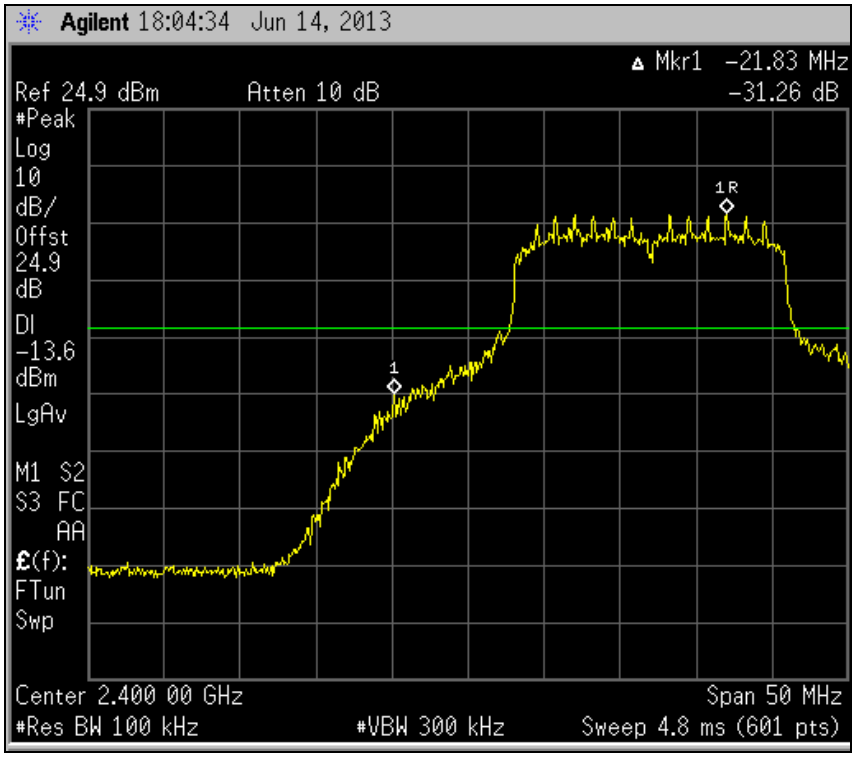
4.4.4 Test Result Plots



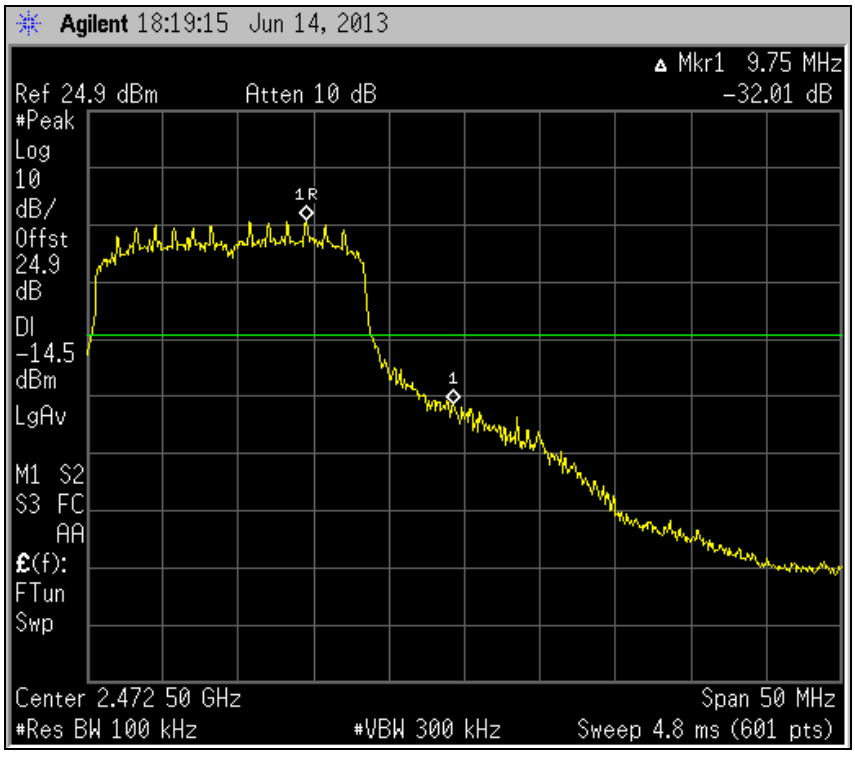
802.11b Low Channel (2412 MHz)



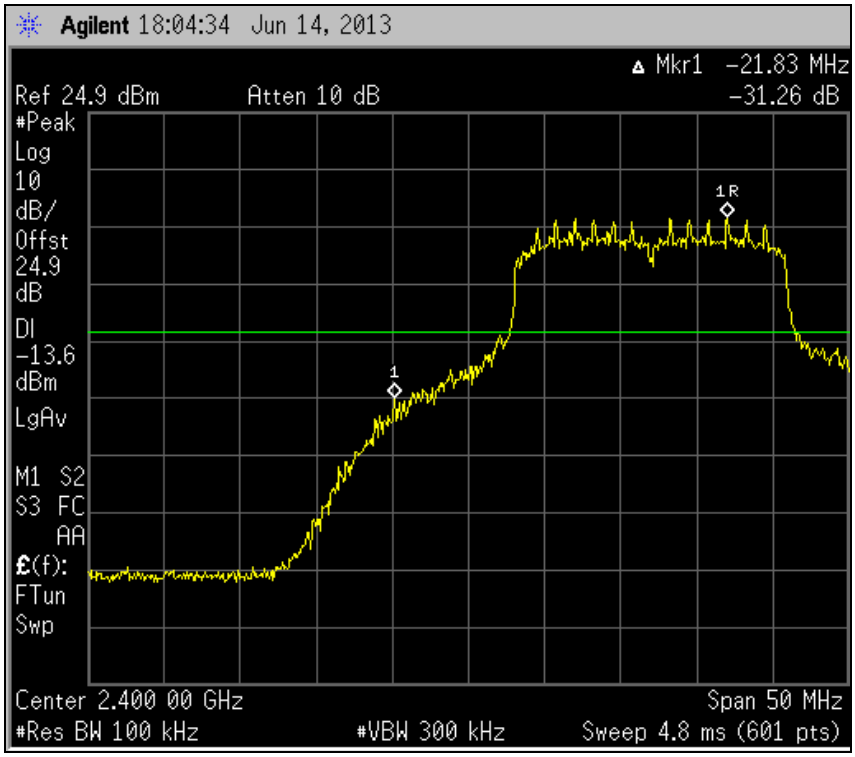
802.11b High Channel (2457 MHz)



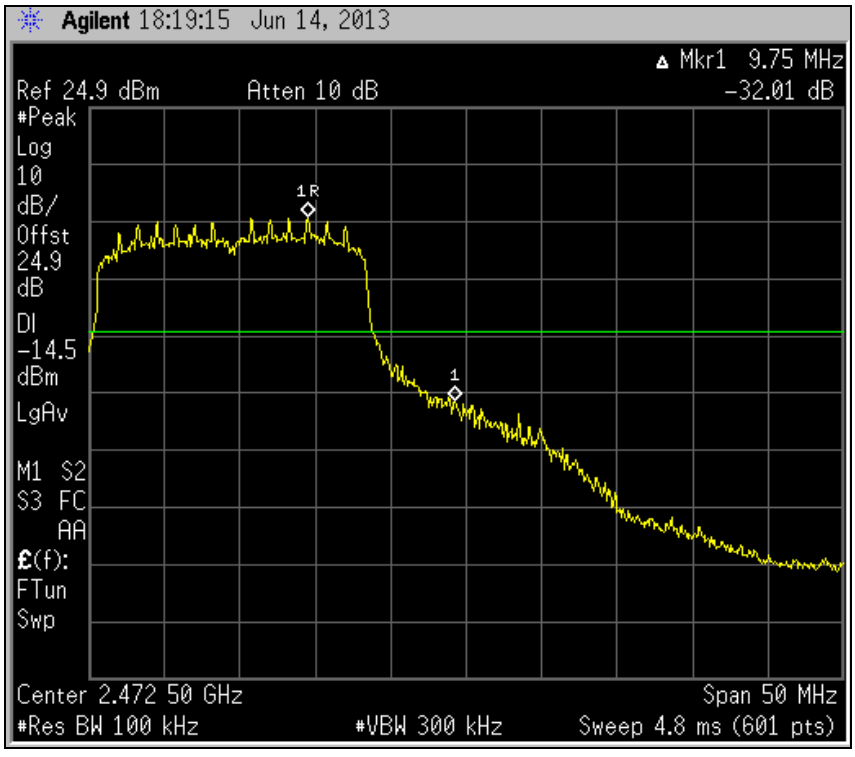
802.11g Low Channel (2412 MHz)



802.11g High Channel (2457 MHz)



802.11n Low Channel (2412 MHz)



802.11n High Channel (2457 MHz)

4.5 Power Spectral Density

4.5.1 Standard Reference

FCC Part §15.247(e)

4.5.2 Environmental Conditions

Environmental Conditions				
Initials	**Date**	**Description**	**Start**	**Stop**
RO	6/14/2013	Humidity	36.9 %	35.9 %
		Temperature	23.8 °C	24.0 °C
		Barometer	1002 mbar	1002 mbar

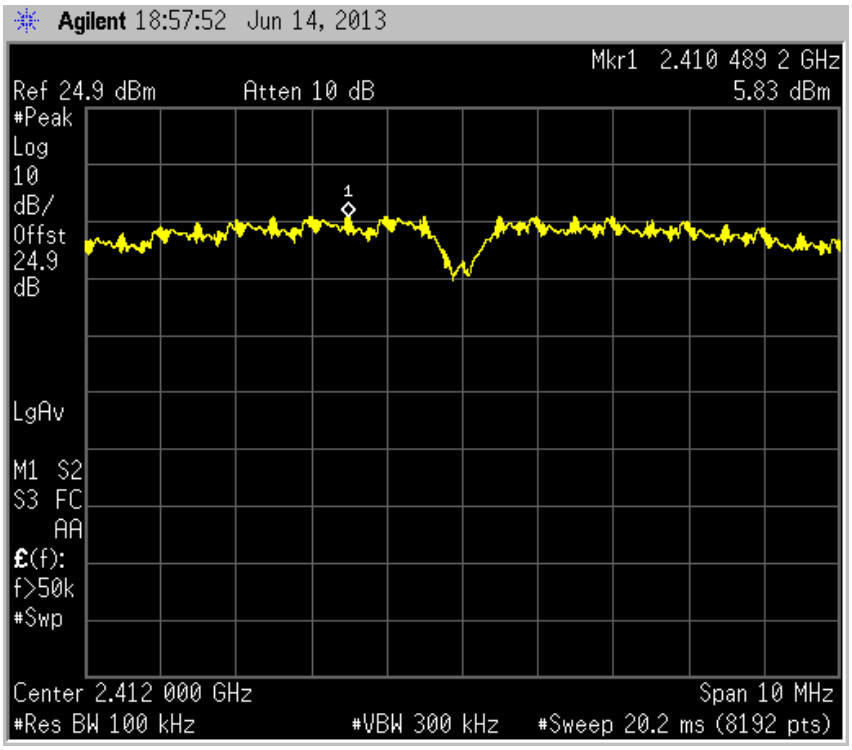
4.5.3 Test Conditions

- Test procedure is per Section 5.3.1 of KDB 558074 (January 18, 2012)
- Bandwidth Correction Factor BWCF is from 10log(3kHz/100kHz)
- Spectrum Analyzer used to collect test results.
- An offset of 24.9dB used to compensate for external setup losses
- 20dB Attenuator used
- RBW is 100KHz
- VBW is 3x RBW
- Sweep set to Auto Couple
- Trace is Max Hold

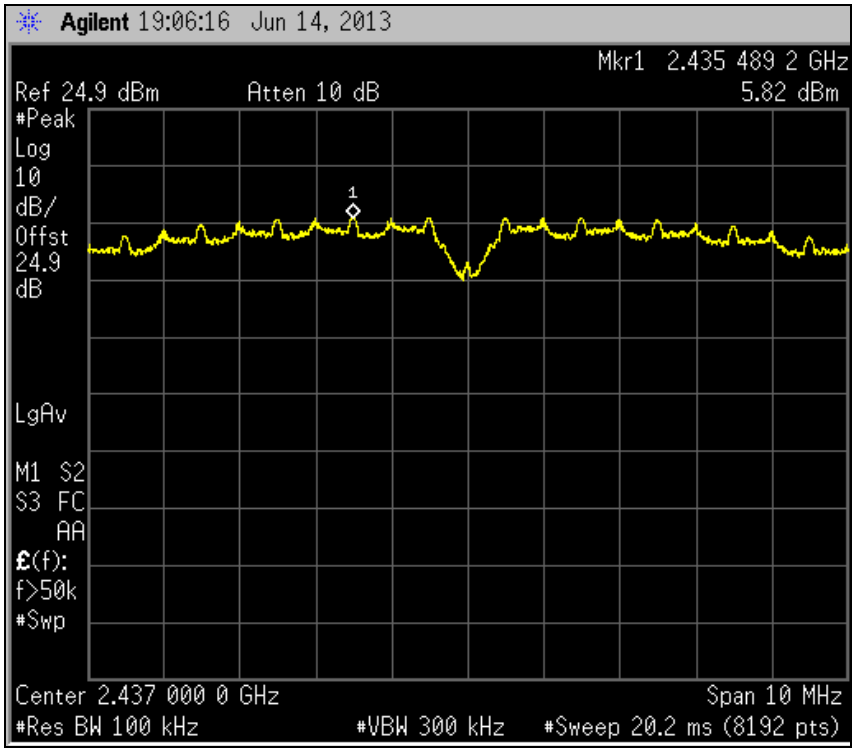
4.5.4 Test Result

Mode	Channel	Frequency	Marker Reading	Bandwidth Correction Factor (BWCF)	PSD Level	Limit
	(#)	(MHz)	(dBm)	(dB)	(dBm)	(dBm)
802.11b	1	2412	5.83	-15.228	-9.398	≤8
	6	2437	5.82	-15.228	-9.408	≤8
	10	2457	6.09	-15.228	-9.138	≤8
802.11g	1	2412	5.53	-15.228	-10.698	≤8
	6	2437	6.06	-15.228	-9.168	≤8
	10	2457	6.12	-15.228	-9.108	≤8
802.11n	1	2412	5.48	-15.228	-9.748	≤8
	6	2437	7.20	-15.228	-8.028	≤8
	10	2457	6.12	-15.228	-9.108	≤8

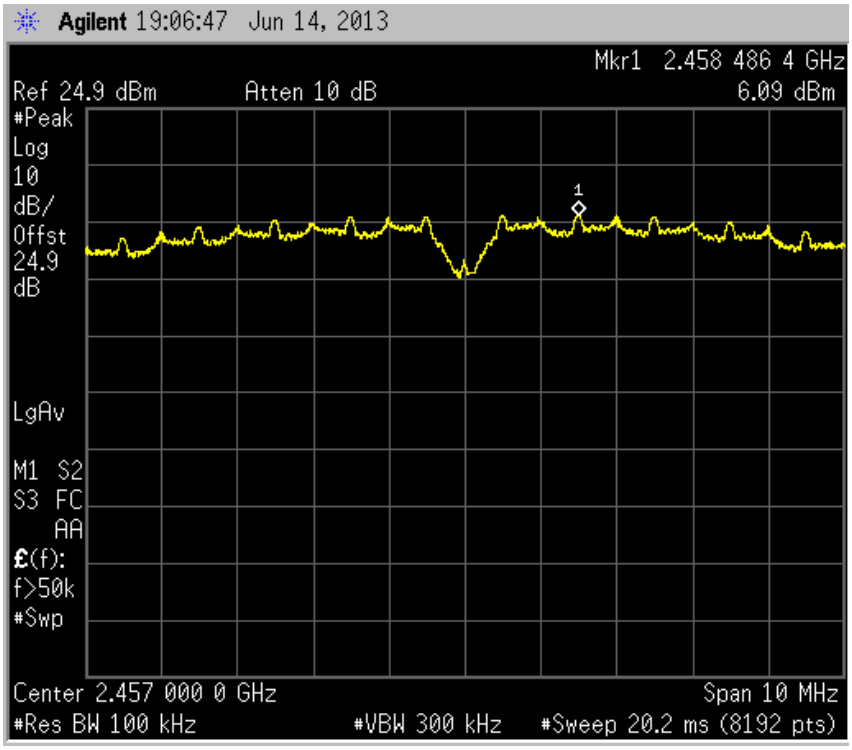
4.5.5 Test Result Plots



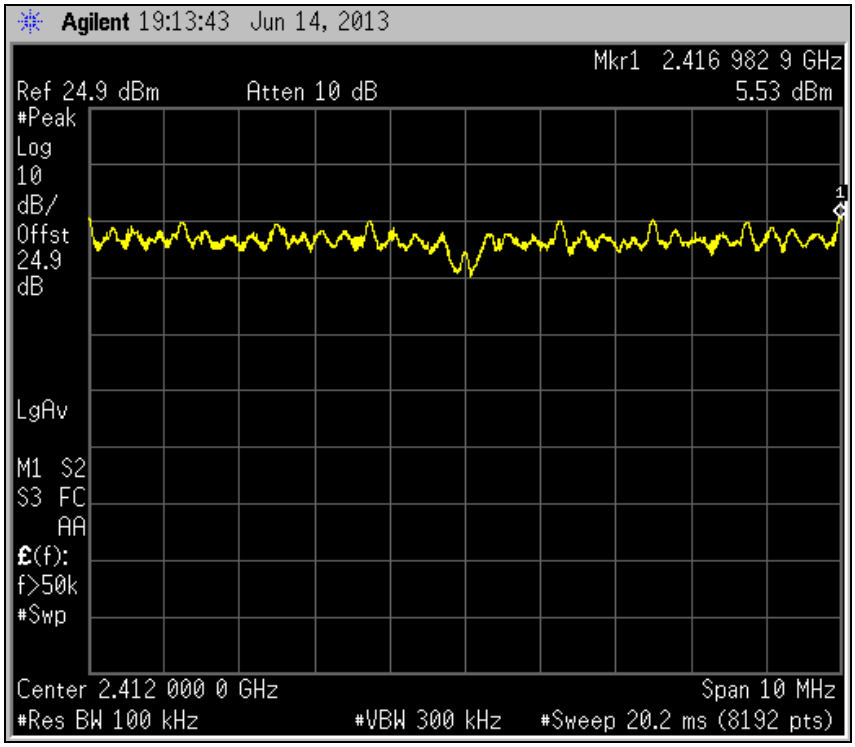
802.11b_Low Channel 1



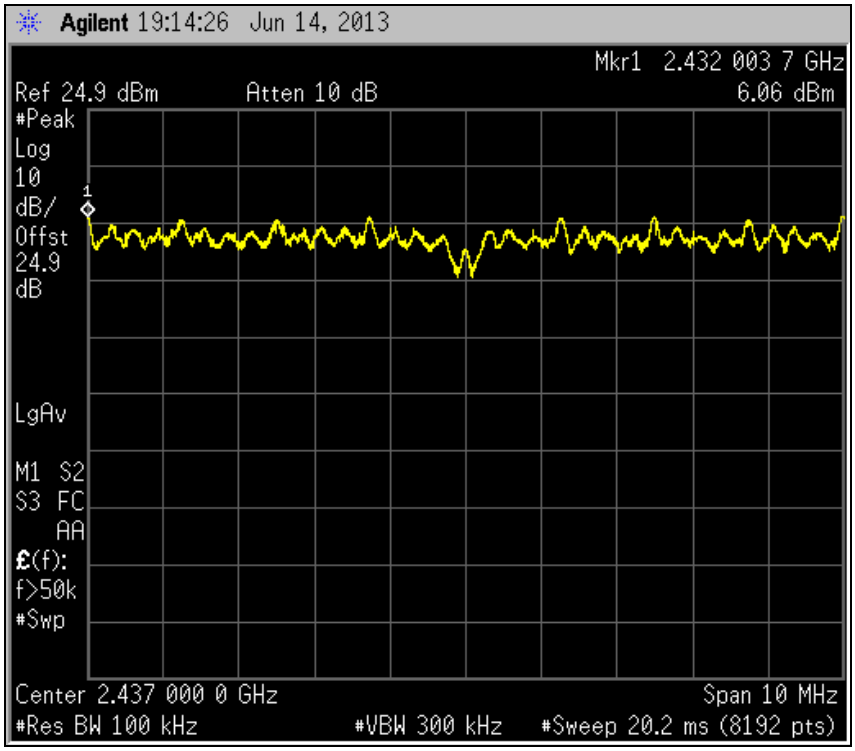
802.11b_Middle Channel 6



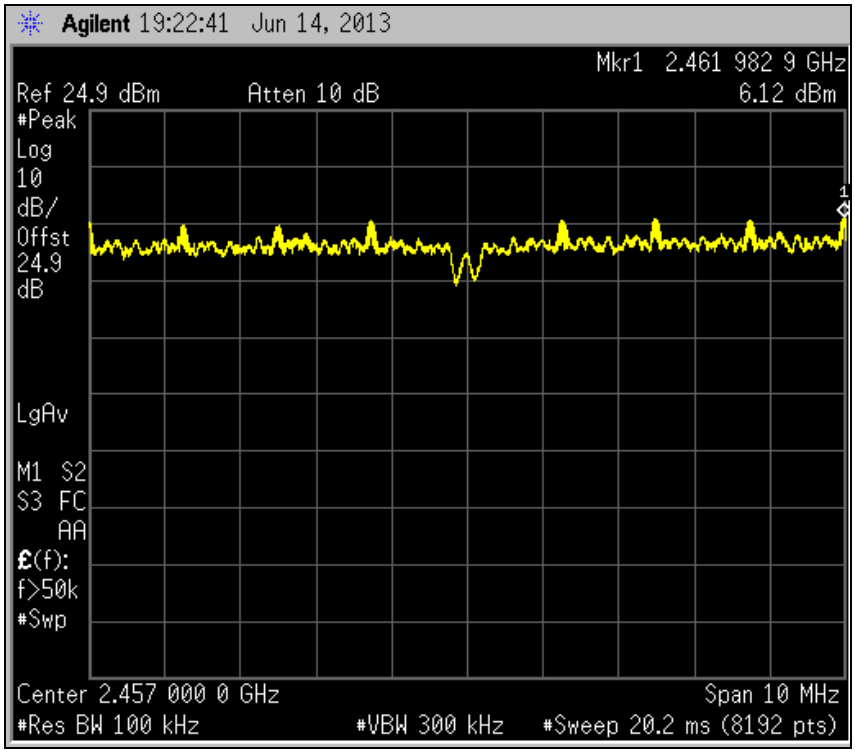
802.11b_High Channel 10



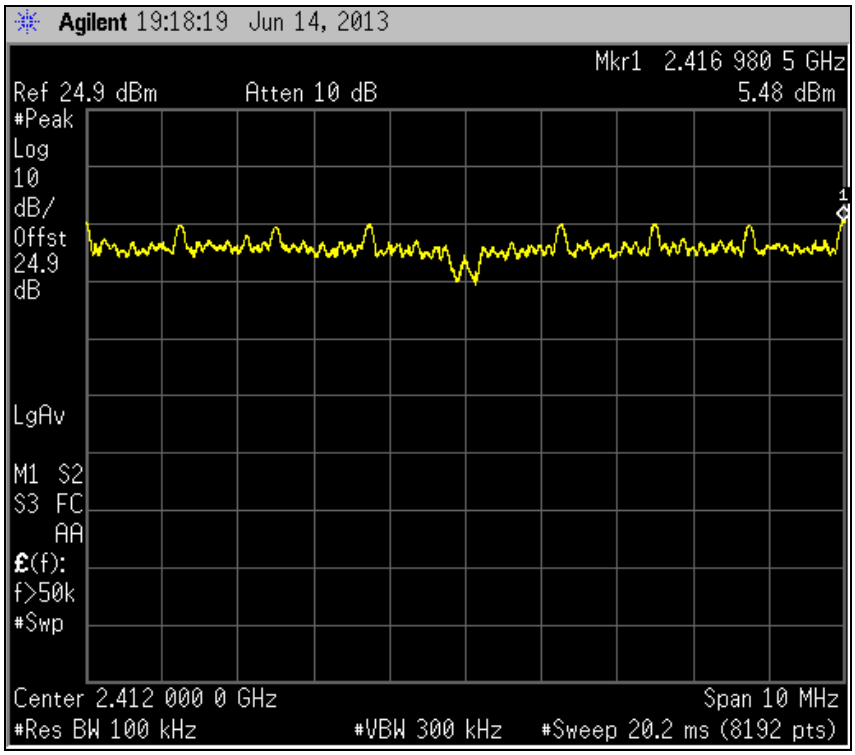
802.11g_Low Channel 1



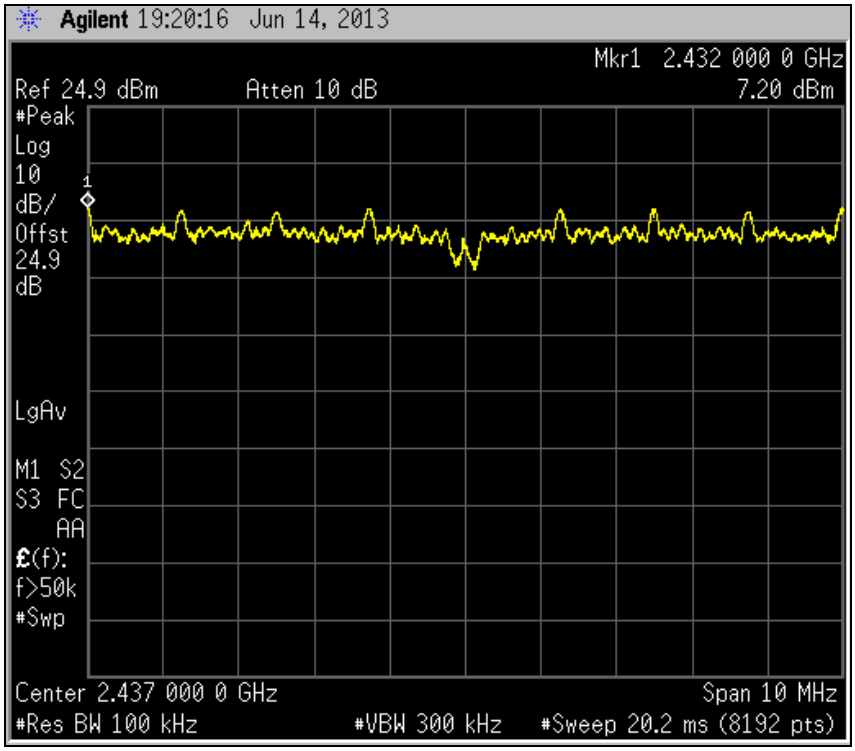
802.11g_Middle Channel 6



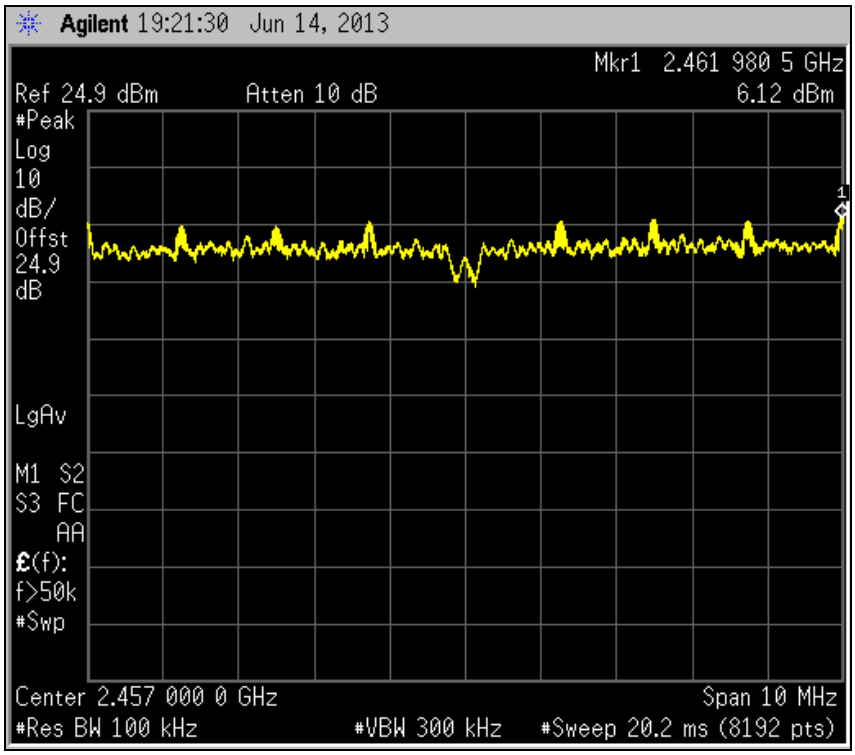
802.11g_High Channel 10



802.11n_Low Channel 1



802.11n_Middle Channel 6



802.11n_High Channel 10

5 Conclusion

The data and/or results collected are in reference to only the test sample(s) listed in this test report under the conditions and modes of operation described. This Test Report shows MiFi5580 PKRNVWMIFI5580 is in compliance with:

- Federal Communications Commission CRF47 Part 15.247 SUBPART C Rules

6 Test Facility and Accreditations

- The test site and/or measurement facility used to collect the data results in this test report is located at 9645 Scranton Road, San Diego CA, USA.
- Novatel Wireless RPT Lab is accredited by A2LA ISO-17025, Laboratory ID #3228.01.
- The Full Scope of Accreditation for this lab can be viewed at http://www.a2la.org/scopepdf

7 Disclaimers and Copyright

- It is the manufacturer's responsibility to assure the continued compliance of production units of this model.
- Novatel Wireless RPT Lab shall have no liability for any alteration of this document not carried out by Novatel Wireless RPT Lab. Such actions will constitute fraud nullify the document.
- This test report must not be used by the client to claim product certification, approval, or endorsement by A2LA ISO17025 and/or any federal government agency.

8 Report Modifications

Record of Modification		
Issue	Date	Modifications/Pages changed
NVTLTR0047-02	06/17/2013	Released Version

End of Report