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Report On

Application for Grant of Equipment Authorization of the
Novatel Wireless Inc.
MIFI7730L Wireless Hotspot Modem

FCC Part 15 Subpart E §15.407

Report No. SD72118338-0716H (Part 1 of 2) **September 2016**

REPORT ON	Radio Testing of the Novatel Wireless Inc. MIFI7730L Wireless Hotspot Modem
TEST REPORT NUMBER	SD72118338-0716H
PREPARED FOR	Novatel Wireless Inc. 9645 Scranton Road, Suite 205 San Diego, CA 92121 USA
CONTACT PERSON	Roman Olmos Senior Regulatory Engineer (858) 812-3400 rolmos@nvtl.com
PREPARED BY	Ferdinand S. Custodio **Name** Authorized Signatory Title: EMC/Senior Wireless Test Engineer
APPROVED BY	Juan Manuel Gonzalez Name Authorized Signatory Title: EMC SL Manager West Region
DATED	September 15, 2016

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

Revision History

SD72118338-0716H Novatel Wireless Inc. MiFi 7730L Wireless Hotspot Modem					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
09/16/2016	Initial Release				Juan Manuel Gonzalez

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

SECTION 1

REPORT SUMMARY

Radio Testing of the
Novatel Wireless Inc.
MIFI7730L Wireless Hotspot Modem

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

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Novatel Wireless Inc. Wireless Hotspot Modem 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.
Product Marketing Name	MiFi 7730L
Model Number(s)	MIFI7730L
FCC ID Number	PKRNVWMIFI7730
IC Number	3229A-MIFI7730
Serial Number(s)	SZ170616900012 and SZ160616900005
Number of Samples Tested	2
Test Specification/Issue/Date	• FCC Part 15 Subpart E §15.407 (October 1, 2015). • 789033 D02 General UNII Test Procedures New Rules v01r02r02 (Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E) April 08, 2016.
Start of Test	August 03, 2016
Finish of Test	September 15, 2016
Name of Engineer(s)	Ferdinand Custodio
Related Document(s)	None. 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 is shown below.

Operation in the U-NII 1 and U-NII 3 Bands (New Rules)				
Section	**Spec Clause**	**Test Description**	**Result**	**Comments/ Base Standard**
2.1	§15.407(b)(6)	Conducted Emissions	Compliant	
2.2	§15.403(i)	26 dB Bandwidth	As Reported	
2.3	§15.407(e)	Minimum 6dB Bandwidth	Compliant	
2.4	§15.407(a)(1)(ii) and §15.407(a)(3)	Maximum Conducted Output Power	Compliant	
2.5	§15.407(a)(1)(ii) and §15.407(a)(3)	Maximum Power Spectral Density (PSD)	Compliant	
2.6	§15.407(b)(1),(4) (i) and (7) / 15.209	Unwanted Emissions Measurement	Compliant	
2.7	§15.407(b)(1),(4) (i) and (7) / 15.209	Band-Edge Measurements	Compliant	
2.8	§15.407(g)	Frequency Stability	Compliant	

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1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was a Novatel Wireless Inc. MIFI7730L Wireless Hotspot Modem. The EUT supports LTE, WCDMA/HSPA, GPRS, EDGE, 802.11a, 802.11b, 802.11g, 802.11n and 802.11ac. WLAN supports both SISO and MIMO mode. Bands supported for WIFI are 2.4GHz, U-NII 1 and U-NII 3.

1.3.2 EUT General Description

EUT Description	Wireless Hotspot Modem
Product Marketing Name	MiFi 7730L
Model Number(s)	MIFI7730L
Rated Voltage	5VDC via USB or internal rechargeable Li-Ion Battery 3.8V 4500mAh 17.1Wh (PN 40123117.01)
Mode Verified	802.11a, 802.11n and 802.11ac in U-NII 1 and U-NII 3 bands
Capability	LTE, WCDMA/HSPA, GPRS, EDGE, 802.11a, 802.11b, 802.11g, 802.11n and 802.11ac
Primary Unit (EUT)	☐ Production ☒ Pre-Production ☐ Engineering
Antenna Type	RF Ceramic Chip antenna
Antenna Manufacturer	Novatel Wireless Inc.
Antenna Model Number	12023210.01

Antenna Gain

2412 MHz to 2462 MHz	0.8 dBi
5170 MHz to 5250 MHz	3.6 dBi
5735 MHz to 5835 MHz	2.1 dBi

1.3.3 Maximum Conducted Output Power

Mode	Frequency Range (MHz)	MIMO Mode		
		Output Power (dBm)	Output Power (mW)	EIRP Output Power (mW)
802.11a (U-NII 1)	5180-5240	14.66	29.24	66.990
802.11a (U-NII 3)	5745-5825	22.82	191.4	310.46
802.11n (U-NII 1)	5180-5240	15.53	35.73	81.846

802.11n (U-NII 3)	5745-5825	22.78	189.7	307.61
802.11ac (U-NII 1)	5180-5240	15.47	35.24	80.724
802.11ac (U-NII 3)	5745-5825	22.85	192.8	312.61

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1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
A	Power measurements using antenna conducted port test setup. Two power meters were used simultaneously to measure power from both WLAN antenna (RF0 and RF1). SISO mode and MIMO mode verified.
B	Antenna Conducted Port Test Setup. Antenna port (RF0 or RF1) connected directly to the Spectrum Analyser with 20dB external attenuator.
C	AC Conducted Emissions Test Setup. The EUT was programmed initially to transmit worst case configuration, the USB then was replaced with the provided AC Adapter during tests.
D	Radiated Test Setup (Cabinet Spurious Emissions). Antenna port terminated with 50Ω load.

1.4.1 EUT Exercise Software

The EUT is connected to the support laptop via USB. Tera Term was used to communicate with the EUT. The manufacturer provided different macros to load that configures the RF settings of the EUT. Parameters that could be updated using the macros are 802.11 mode, channel, modulation, bandwidth, TX port and TX power.

1.4.2 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
Lenovo	Support Laptop (T410S)	P/N 0A31972 S/N R9-92MH0 10/11
Salom	USB (EUT to Support Laptop)	Type A to Type C USB Cable. Sample DCP-1P4P

1.4.3 Worst Case Configuration

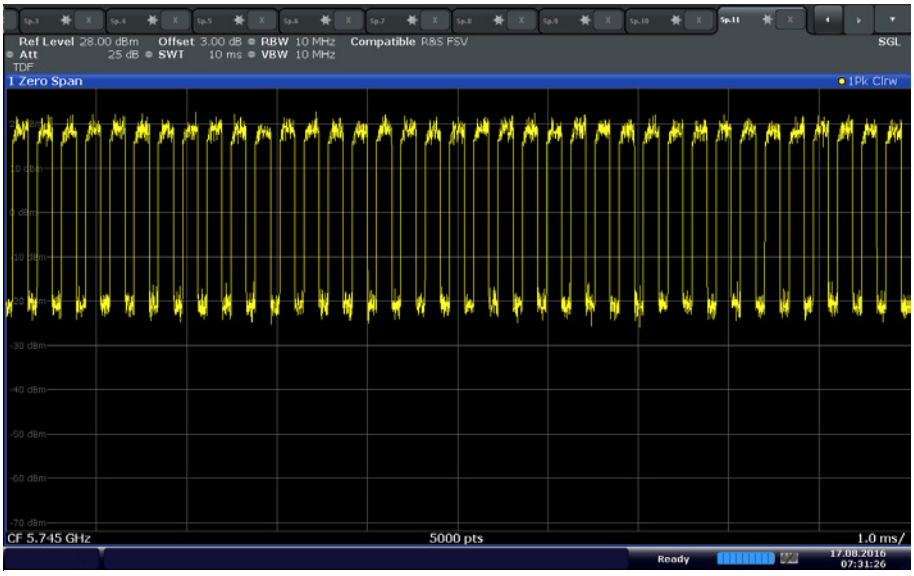
Worst-case configuration used in this test report as per maximum conducted output power measurements (averaged across all three channels and data rate available):

Mode	Channel	Data Rate/MCS
802.11a (U-NII 1)	48 (High Channel)	6 Mbps
802.11n (U-NII 1)	48 (High Channel)	MCS 2
802.11ac (U-NII 1)	40 (Mid Channel)	MCS 8
802.11a (U-NII 3)	157 (Mid Channel)	6 Mbps
802.11n (U-NII 3)	149 (Low Channel)	MCS 7
802.11ac (U-NII 3)	149 (Low Channel)	MCS 8

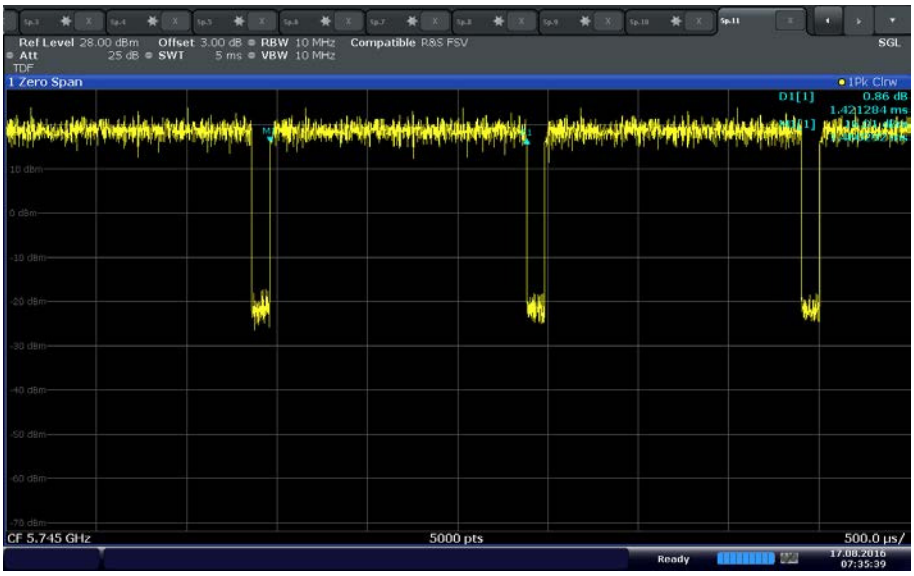
The EUT is a portable device. For radiated measurements, X, Y and Z orientations were verified during initial prescan to verify the worst axis. No major variation in emissions observed between the three (3) orientations for cabinet spurious emissions. Verifications performed using “X” configuration. The photos presented here is for reference only and not the actual EUT.

1.4.4 Duty Cycle and Transmission Duration Used (Worst Case Configuration)

Mode	*T (µs)*	Duty Cycle (x)	*50/T*
802.11a	1421.0	0.9237	35.2 kHz
802.11n	166.00	0.6142	301 kHz
802.11ac	148.23	0.5930	337 kHz



Sample Duty Cycle Calculation (802.11n) 37 Tx /10 ms



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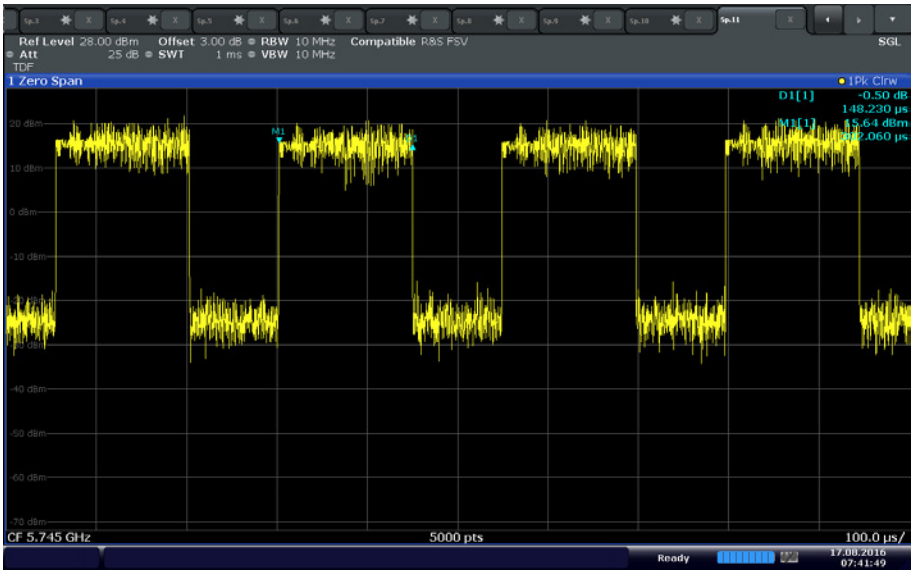
Sample *T* Verification (802.11a)



Date: 17.AUG.2016 07:41:49

Sample *T* Verification (802.11ac)

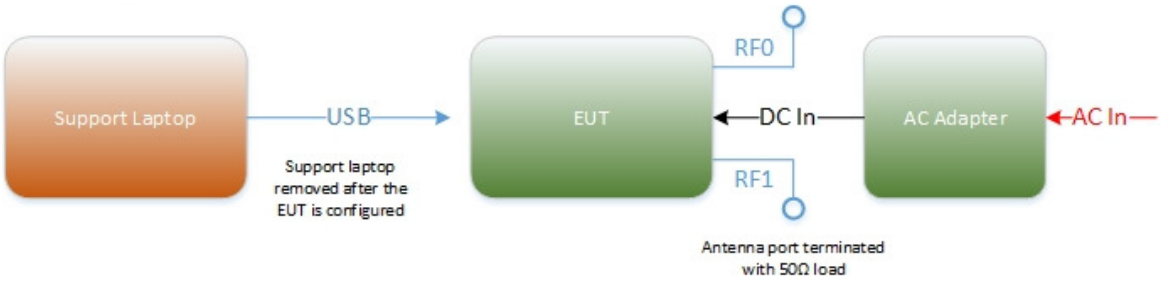
1.4.5 Simplified Test Configuration Diagram

Test Configuration A

Test Configuration B

Test Configuration C

Test Configuration D



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 SZ170616900012 and SZ160616900005		
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 C63.10-2013. American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

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 C63.4-2014. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

1.8 TEST FACILITY LOCATION

1.8.1 TÜV SÜD America Inc. (Mira Mesa)

10040 Mesa Rim Road, San Diego, CA 92121-2912 (32.901268,-117.177681). Phone: 858 678 1400 FAX: 858-546 0364

1.8.2 TÜV SÜD America Inc. (Rancho Bernardo)

16936 Via Del Campo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: 858 942 5542 Fax: 858 546 0364.

1.9 TEST FACILITY REGISTRATION

1.9.1 FCC – Registration No.: US1146

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 §2.948 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Registration is US1146.

1.9.2 Innovation, Science and Economic Development Canada Registration No.: 3067A

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

SECTION 2

TEST DETAILS

Radio Testing of the
Novatel Wireless Inc.
MIFI7730L Wireless Hotspot Modem

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: SZ170616900012/Test Configuration C

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

August 08, 2016/FSC

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/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	28.3 °C
Relative Humidity	48.8 %
ATM Pressure	98.5 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.

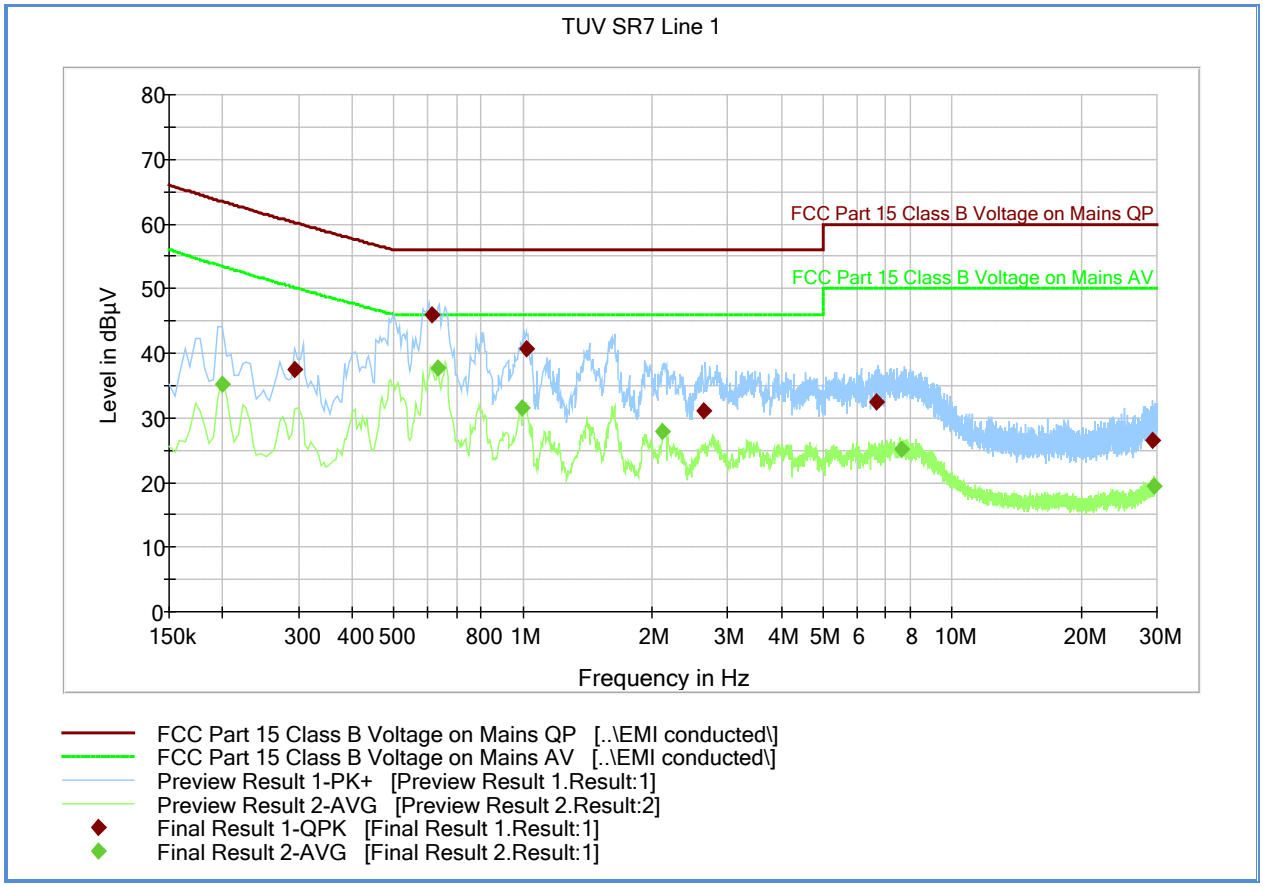
2.1.8 Sample Computation (Conducted Emission – Quasi Peak)

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 MIFI7000 120VAC 60Hz (Line 1)



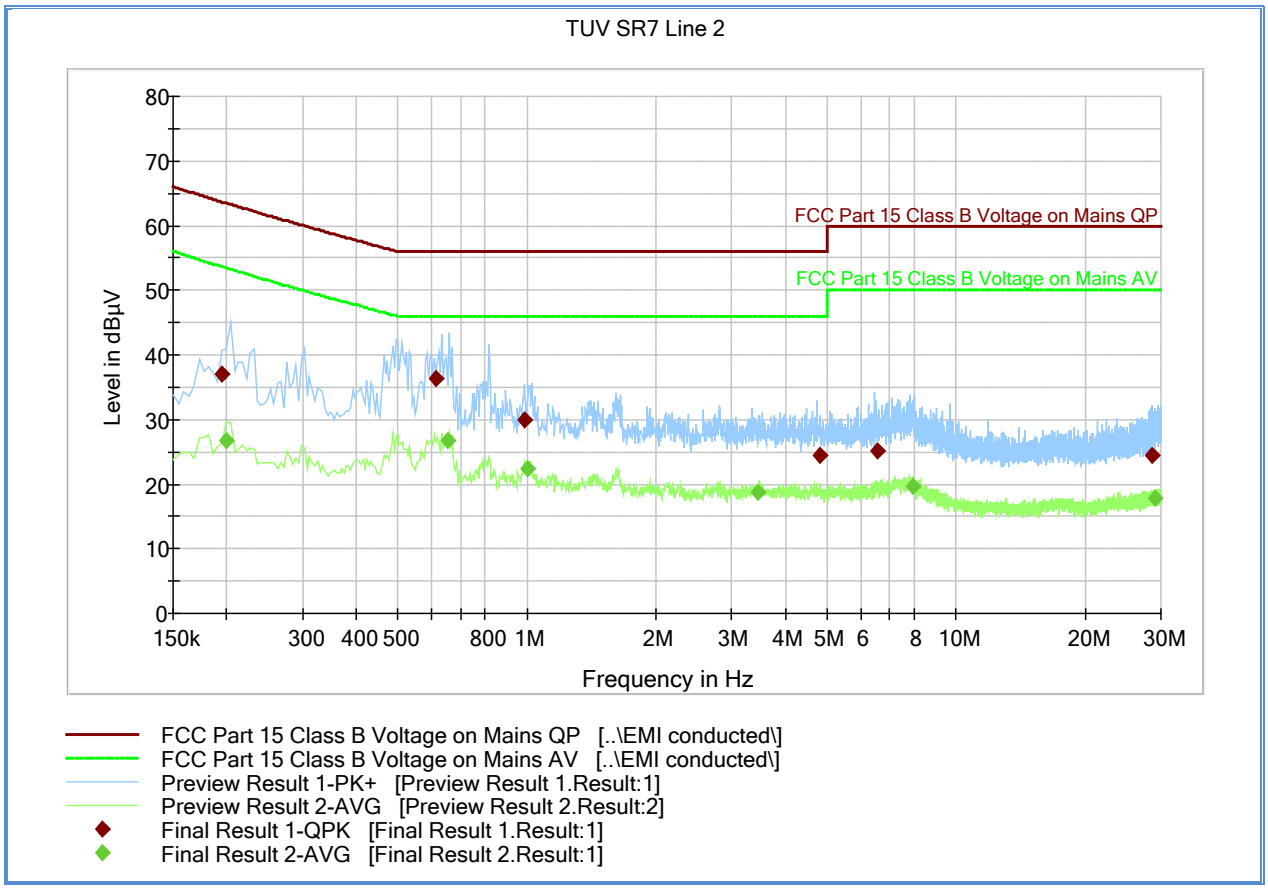
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.294000	37.5	1000.0	9.000	Off	L1	20.0	22.7	60.2
0.613500	46.0	1000.0	9.000	Off	L1	20.0	10.0	56.0
1.023000	40.8	1000.0	9.000	Off	L1	20.0	15.2	56.0
2.638500	31.0	1000.0	9.000	Off	L1	20.1	25.0	56.0
6.679500	32.4	1000.0	9.000	Off	L1	20.1	27.6	60.0
29.355000	26.5	1000.0	9.000	Off	L1	20.5	33.5	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.199500	35.1	1000.0	9.000	Off	L1	20.1	18.4	53.5
0.636000	37.6	1000.0	9.000	Off	L1	20.0	8.4	46.0
0.996000	31.5	1000.0	9.000	Off	L1	20.0	14.5	46.0
2.121000	27.9	1000.0	9.000	Off	L1	20.0	18.1	46.0
7.597500	25.1	1000.0	9.000	Off	L1	20.1	24.9	50.0
29.521500	19.3	1000.0	9.000	Off	L1	20.5	30.7	50.0

2.1.11 MIFI7000 120VAC 60Hz (Line 2)



Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.172500	48.7	1000.0	9.000	Off	N	20.1	16.1	64.8
0.469500	47.0	1000.0	9.000	Off	N	20.0	9.5	56.5
0.978000	35.6	1000.0	9.000	Off	N	20.0	20.4	56.0
4.677000	35.7	1000.0	9.000	Off	N	20.1	20.3	56.0
12.340500	37.7	1000.0	9.000	Off	N	20.2	22.3	60.0
14.833500	43.4	1000.0	9.000	Off	N	20.3	16.6	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.172500	38.5	1000.0	9.000	Off	N	20.1	16.3	54.7
0.469500	42.5	1000.0	9.000	Off	N	20.0	4.0	46.5
0.942000	29.6	1000.0	9.000	Off	N	20.0	16.4	46.0
3.565500	29.6	1000.0	9.000	Off	N	20.1	16.4	46.0
12.453000	31.7	1000.0	9.000	Off	N	20.2	18.3	50.0
14.752500	37.2	1000.0	9.000	Off	N	20.3	12.8	50.0

2.2 26 DB BANDWIDTH

2.2.1 Specification Reference

Part 15 Subpart E §15.403(i)

2.2.2 Standard Applicable

(i) Emission bandwidth. For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement..

2.2.3 Test Methodology

Section II (C) (1) of 789033 D02 General UNII Test Procedures v01r02

2.2.4 Equipment Under Test and Modification State

Serial No: SZ170616900012 / Test Configuration B

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

August 10, 11, and 16, 2016/FSC

2.2.6 Test Equipment Used

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

2.2.7 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	25.7 – 26.2 °C
Relative Humidity	43.9 -45.1 %
ATM Pressure	98.8 - 98.9 kPa

2.2.8 Additional Observations

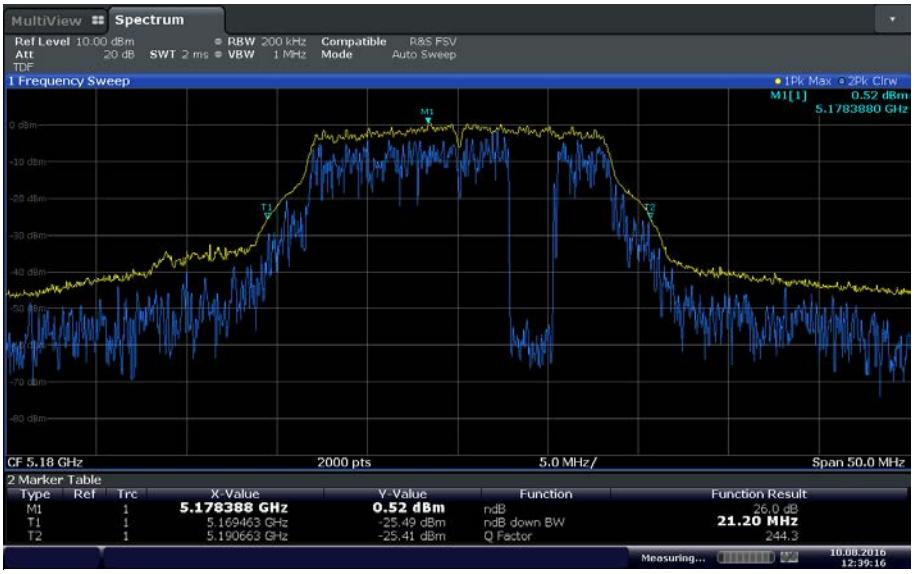
- This is a conducted test.
- Test methodology is per Section II (C) (1) of 789033 D02 General UNII Test Procedures v01r02 (April 08, 2016). All conditions under this Section were satisfied.
- Span is wide enough to capture the channel transmission.
- RBW is 1% initially set approx. to 1% of anticipated EBW.
- VBW > RBW.
- Trace is max hold.
- Detector is peak.

- Sweep time is set to Auto.
- "n dB down" (26dB) marker function of the spectrum analyzer was used for this test.
- RBW adjusted until RBW/EBW ratio is approximately 1% or as the SA setting permits (i.e next setting after 300kHz RBW is limited to 500kHz).

2.2.9 Summary Test Results (as reported)

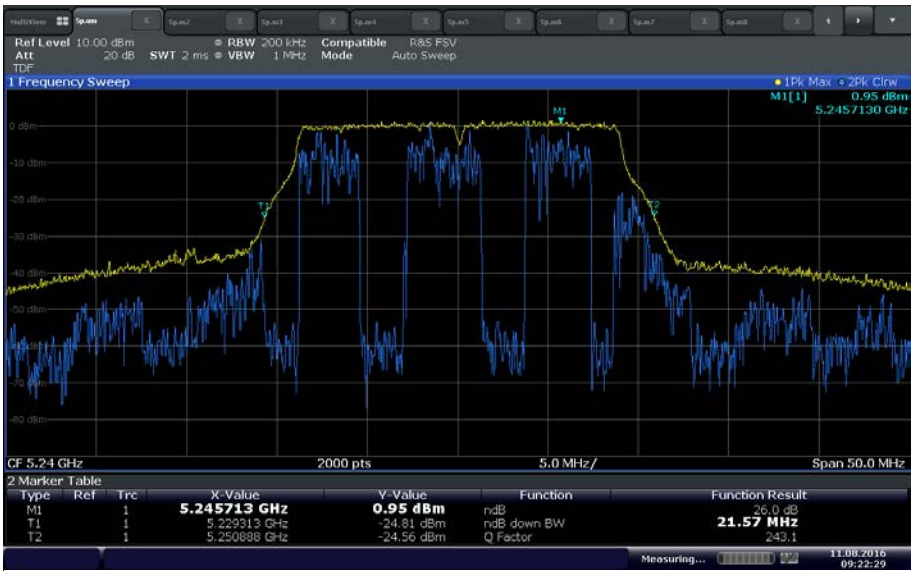
26 dB Bandwidth			
WiFi Mode	**Low Channel**	**Mid Channel**	**High Channel**
802.11a U-NII 1	21.20 MHz	21.10 MHz	21.20 MHz
802.11a U-NII 3	21.25 MHz	21.20 MHz	21.05 MHz
802.11n U-NII 1 (20 MHz)	21.40 MHz	21.50 MHz	21.57 MHz
802.11n U-NII 3 (20 MHz)	21.65 MHz	21.40 MHz	21.30 MHz
802.11n U-NII 1 (40 MHz)	39.58 MHz		39.98 MHz
802.11n U-NII 3 (40 MHz)	39.45 MHz		39.70 MHz
802.11ac U-NII 1 (20 MHz)	21.40 MHz	21.28 MHz	21.23 MHz
802.11ac U-NII 3 (20 MHz)	21.50 MHz	21.50 MHz	21.40 MHz
802.11ac U-NII 1 (40 MHz)	39.52 MHz		39.83 MHz
802.11ac U-NII 3 (40 MHz)	39.95 MHz		39.90 MHz
802.11ac U-NII 1 (80 MHz)		82.05 MHz	
802.11ac U-NII 3 (80 MHz)		81.65 MHz	

2.2.10 Sample Test Plots



Date: 10.AUG.2016 12:39:16

802.11a U-NII 1 Low Channel



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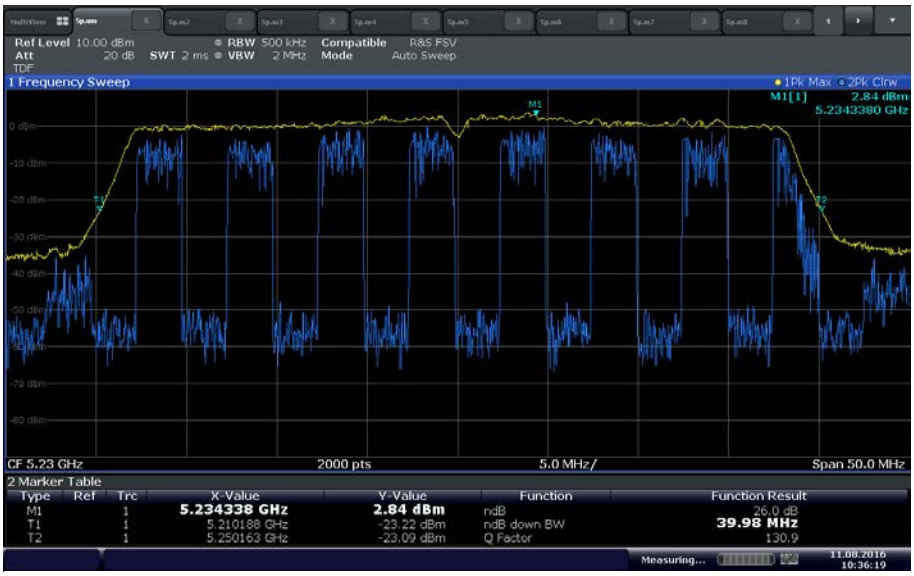
802.11n (20 MHz BW) U-NII 1 High Channel



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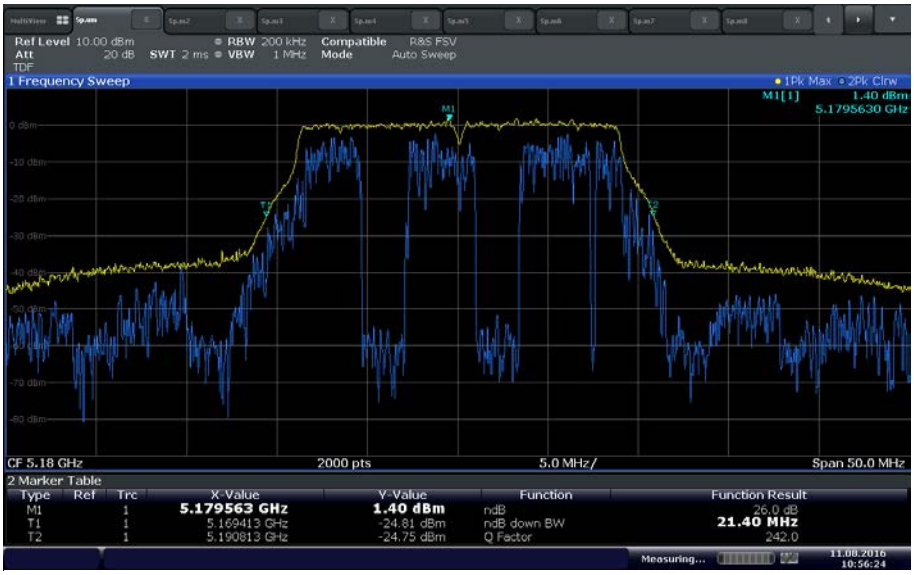
802.11n (40 MHz BW) U-NII 1 High Channel

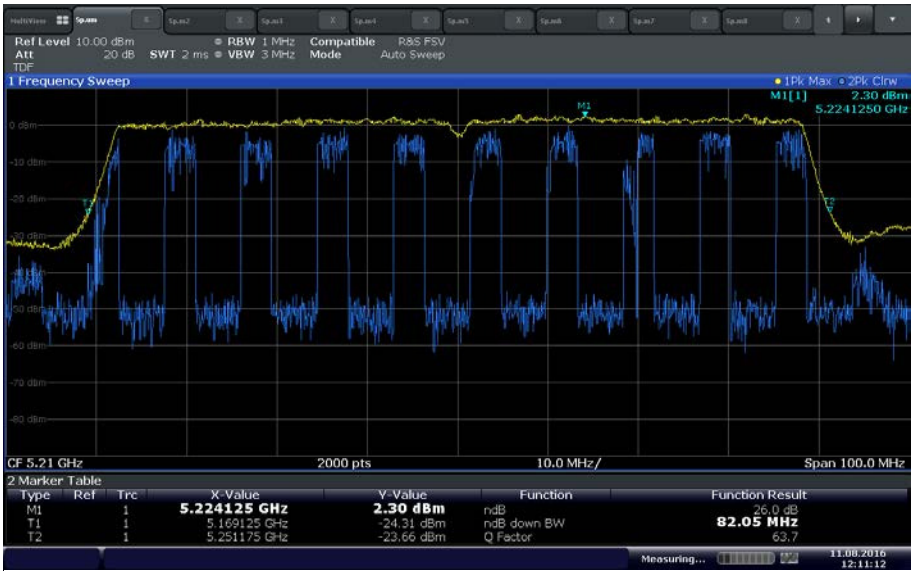


Date: 11.AUG.2016 10:56:24

802.11ac (20 MHz BW) U-NII 1 Low Channel

Date: 11.AUG.2016 11:56:51

802.11ac (40 MHz BW) U-NII 1 High Channel



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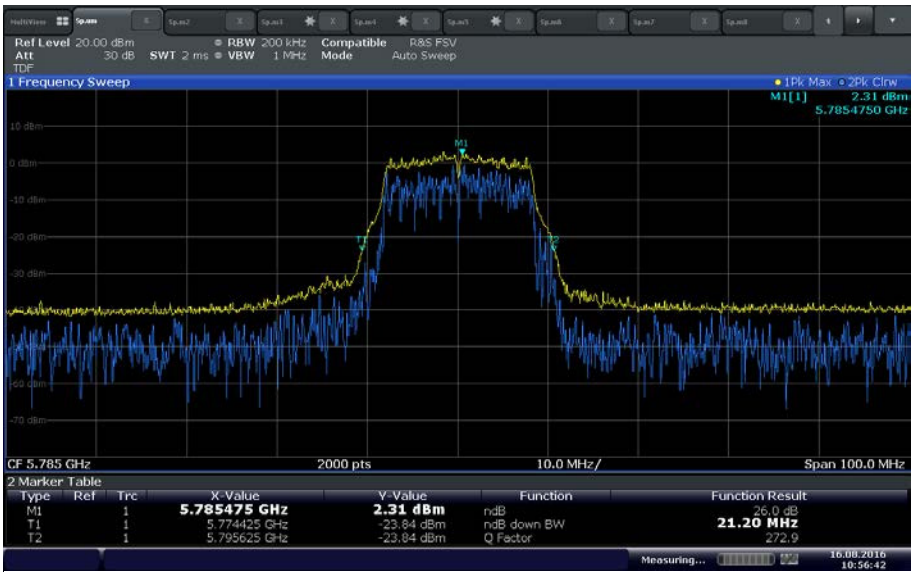
802.11ac (80 MHz BW) U-NII 1 Mid Channel



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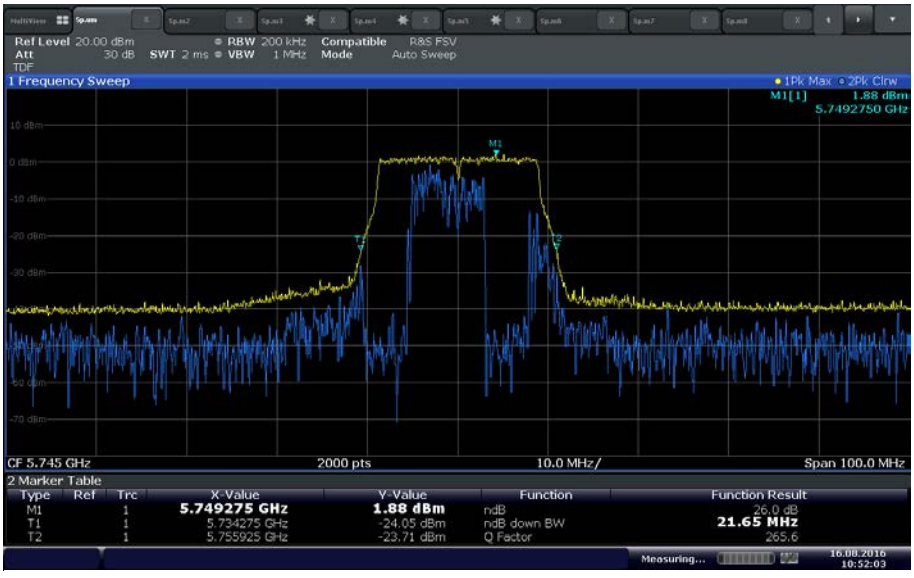
802.11a U-NII 3 Mid Channel



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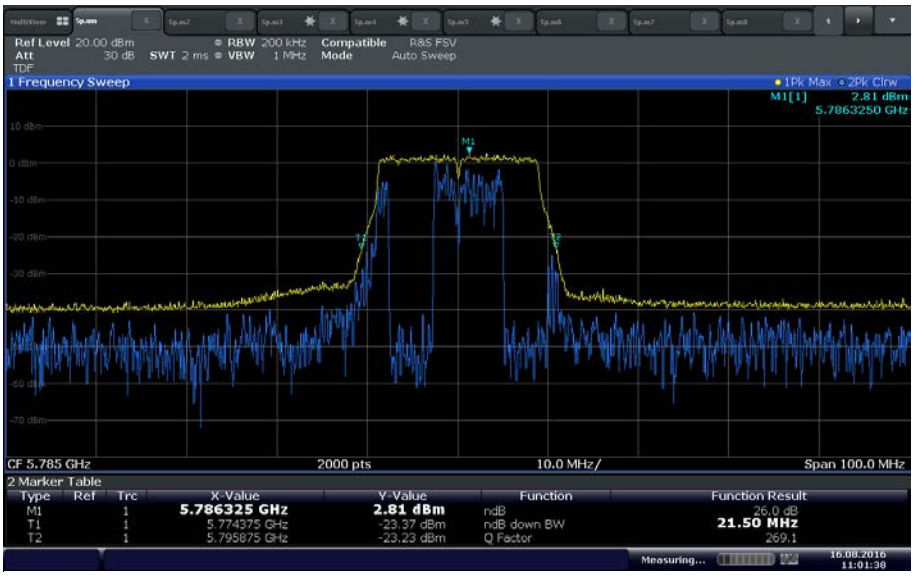
802.11n U-NII 3 Low Channel



Date: 16.AUG.2016 11:01:38

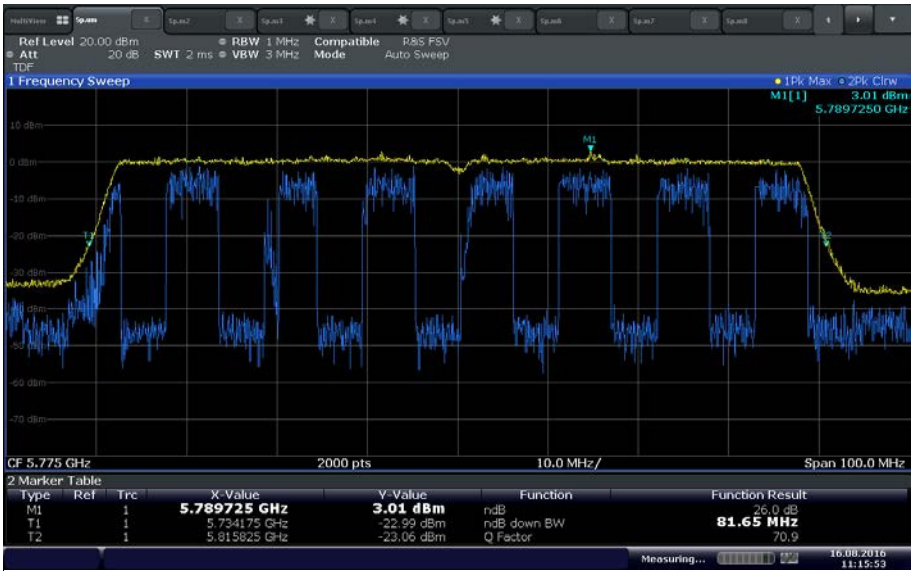
802.11ac U-NII 3 Mid Channel

Date: 16.AUG.2016 11:06:40

802.11n 40 MHz BW U-NII 3 High Channel

Date: 16.AUG.2016 11:09:53

802.11ac 40 MHz BW U-NII 3 Low Channel



Date: 16.AUG.2016 11:15:53

802.11n 80 MHz BW U-NII 3 High Channel

2.3 MINIMUM 6DB BANDWIDTH

2.3.1 Specification Reference

Part 15 Subpart E §15.407(e)

2.3.2 Standard Applicable

(e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

2.3.3 Test Methodology

Section II (C) (2) of 789033 D02 General UNII Test Procedures v01r02

2.3.4 Equipment Under Test and Modification State

Serial No: SZ170616900012 / Test Configuration B

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

August 16, 2016 /FSC

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

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	26.3 °C
Relative Humidity	46.3 %
ATM Pressure	98.7 kPa

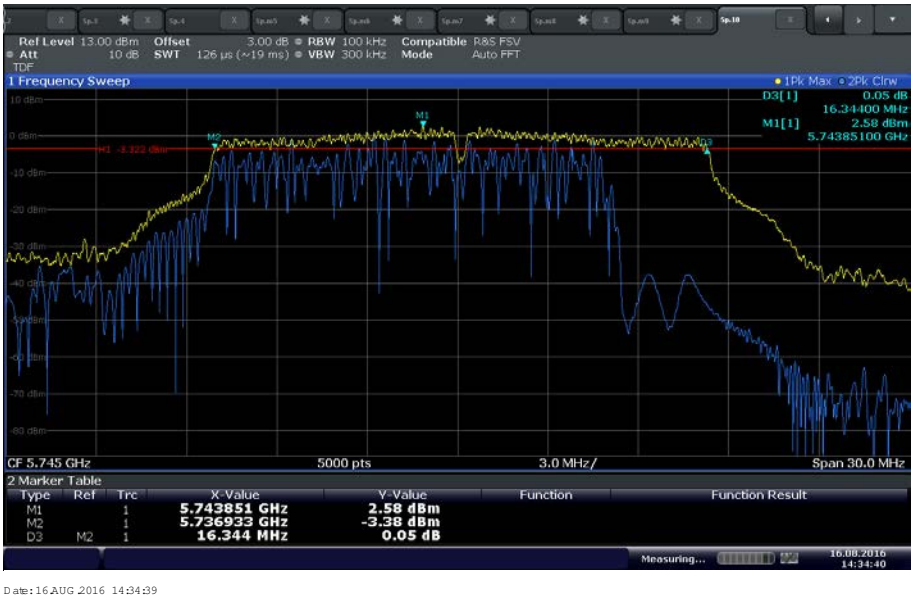
2.3.8 Additional Observations

- This is a conducted test.
- Span is wide enough to capture the channel transmission.
- RBW is 100kHz.
- VBW is 3X RBW.
- Sweep is auto.
- Detector is Peak.
- Trace mode is Max Hold
- A horizontal line will be drawn where the signal is 6 dB down from the peak measurement. The BW will be measured using the outermost points where the signal intersects the line.

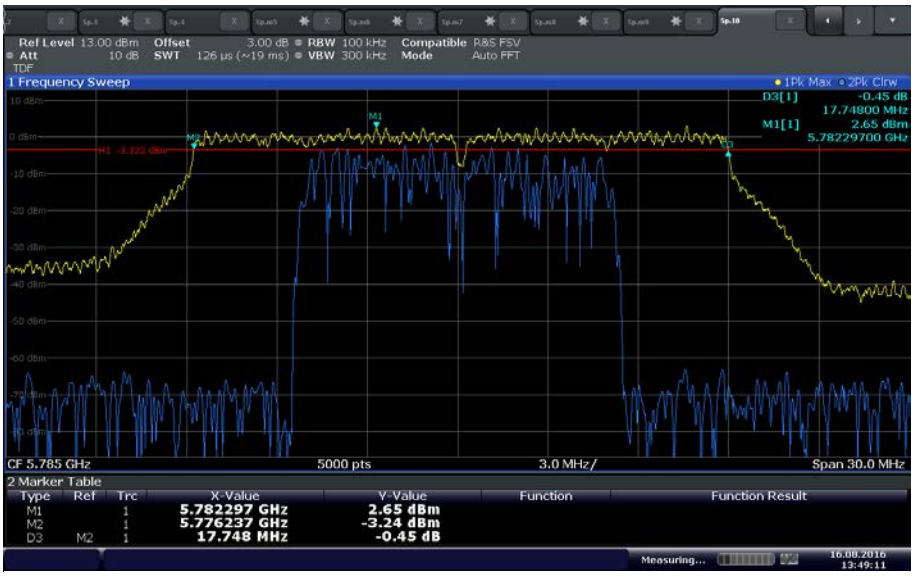
2.3.9 Summary Test Results

Minimum 6 dB Bandwidth (>500kHz)			
WiFi Mode	**Low Channel**	**Mid Channel**	**High Channel**
802.11a U-NII 3	16.344 MHz	16.380 MHz	16.386 MHz
802.11n U-NII 3 (20 MHz)	17.171 MHz	17.748 MHz	17.778 MHz
802.11n U-NII 3 (40 MHz)	36.380 MHz		36.420 MHz
802.11ac U-NII 3 (20 MHz)	17.754 MHz	17.796 MHz	17.766 MHz
802.11ac U-NII 3 (40 MHz)	36.410 MHz		36.385 MHz
802.11ac U-NII 3 (80 MHz)		76.434 MHz	

2.3.10 Sample Test Plots

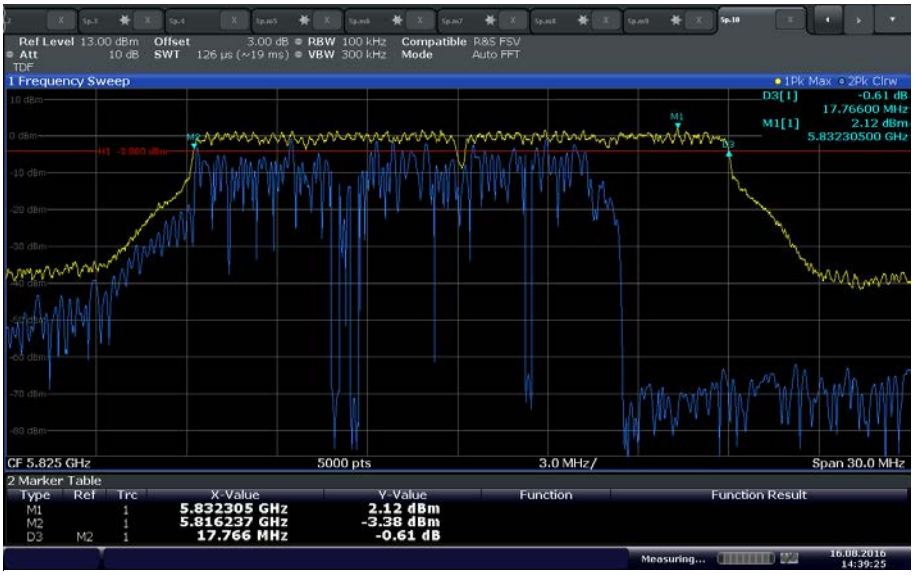


802.11a U-NII 3 Low Channel



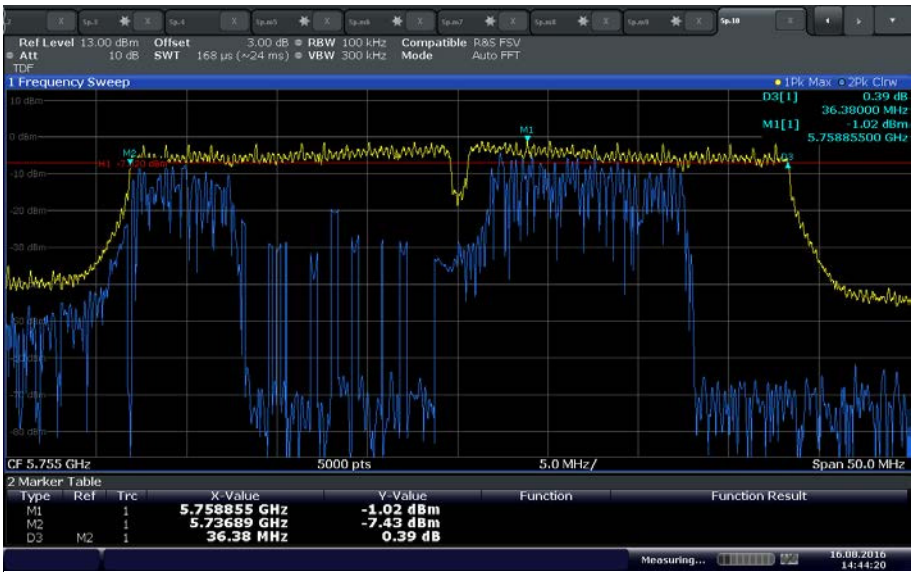
Date: 16.AUG.2016 13:49:11

802.11n U-NII 3 Mid Channel



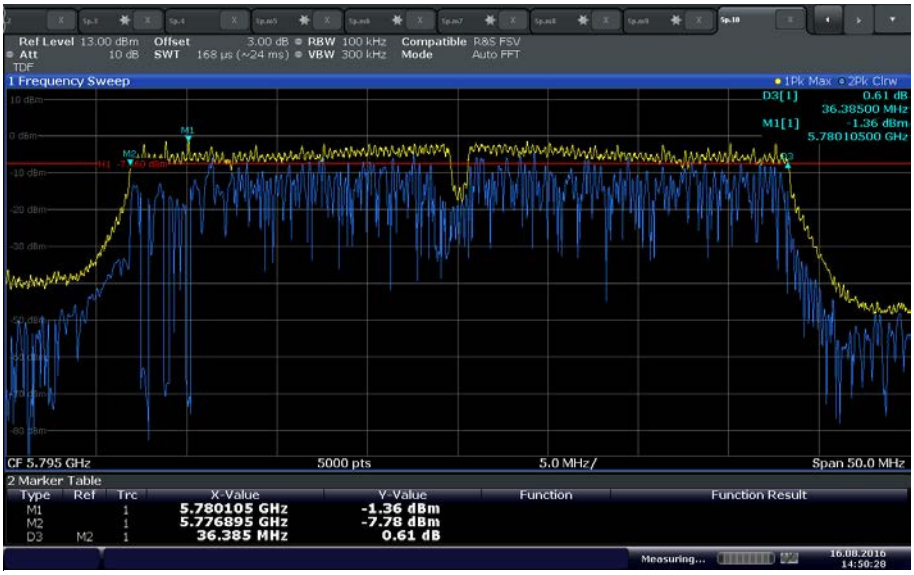
Date: 16.AUG.2016 14:39:25

802.11a U-NII 3 High Channel



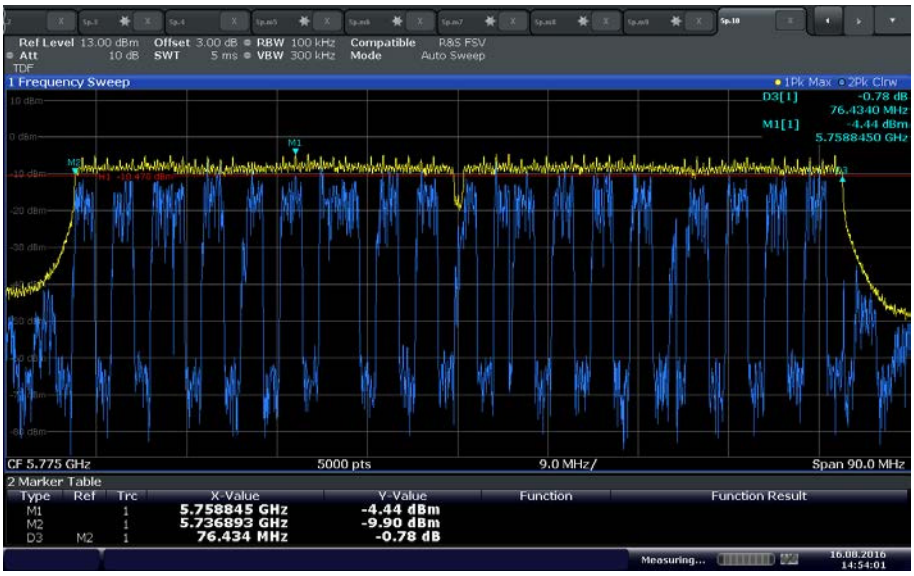
Date: 16.AUG.2016 14:44:20

802.11n 40 MHz BW U-NII 3 Low Channel



Date: 16.AUG.2016 14:50:28

802.11ac 40 MHz BW U-NII 3 High Channel



Date: 16.AUG.2016 14:54:01

802.11ac 80 MHz BW U-NII 3 Mid Channel

2.4 MAXIMUM CONDUCTED OUTPUT POWER

2.4.1 Specification Reference

Part 15 Subpart E §15.407(a)(1)(ii) and §15.407(a)(3)

2.4.2 Standard Applicable

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

2.4.3 Test Methodology

Section II (E)(3)(b) of 789033 D02 General UNII Test Procedures v01r02r02

2.4.4 Equipment Under Test and Modification State

Serial No: SZ160616900005 / Test Configuration A

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

August 03 and 16, 2016 / FSC

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

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	24.8 – 26.4 °C
Relative Humidity	44.5 - 48.6%
ATM Pressure	98.6 - 99.2 kPa

2.4.8 Additional Observations

- This is a conducted test (Maximum conducted [average] output power) using direct connection to power meters. Both antenna ports were monitored even in SISO mode.
- An offset of 21.2dB was added to compensate for the external attenuator and cable used.
- Test methodology is per Section II E (3)(b) Method PM-G of 789033 D02 General UNII Test Procedures v01r02 (April 08, 2016). A gated RF average power meter was used for this test.
- The EUT transmits continuously. Burst Mode of the power meter was used wherein the captured burst were analysed and presented. Captured bursts includes the average power and timing data.

2.4.9 Test Results

WLAN Mode	Channel	Data Rates (Mbps)	Maximum Conducted Output Power (dBm)	
			Worst Case TX Chain	MIMO
802.11a U-NII 1 (5150 MHz to 5250 MHz)	36 (5180 MHz)	6	11.54	14.55
		9	11.28	14.29
		12	11.28	14.29
		18	11.12	14.13
		24	11.02	14.03
	40 (5200 MHz)	6	11.40	14.41
		9	11.32	14.33
		12	11.43	14.44
		18	11.27	14.28
		24	11.28	14.29
	48 (5240 MHz)	6	11.65	14.66
		9	11.54	14.55
		12	11.54	14.55
		18	11.44	14.45
		24	11.35	14.36

WLAN Mode	Channel	Data Rates (Mbps)	Maximum Conducted Output Power (dBm)	
			Worst Case TX Chain	MIMO
802.11a U-NII 3 (5725 MHz to 5850 MHz)	149 (5745 MHz)	6	19.34	22.35
		9	19.36	22.37
		12	19.23	22.24
		18	19.12	22.13
		24	19.09	22.10
	157 (5785 MHz)	6	19.81	22.82
		9	19.78	22.79
		12	19.43	22.44
		18	19.24	22.25
		24	18.89	21.90
	165 (5825 MHz)	6	19.17	22.18
		9	19.11	22.12
		12	19.11	22.12
		18	19.03	22.04
		24	19.02	22.03

WLAN Mode	Channel	Modulation and Coding Scheme	Maximum Conducted Output Power (dBm)	
			Worst Case TX Chain	MIMO
802.11n 20MHz BW U-NII 1 (5150 MHz to 5250 MHz)	36 (5180 MHz)	mcs 0	12.40	15.41
		mcs 1	12.19	15.20
		mcs 2	12.33	15.34
		mcs 3	12.07	15.08
		mcs 4	11.92	14.93
		mcs 5	12.01	15.02
		mcs 6	12.01	15.02
		mcs 7	12.12	15.13
	40 (5200 MHz)	mcs 0	12.26	15.27
		mcs 1	12.12	15.13
		mcs 2	12.10	15.11
		mcs 3	12.11	15.12

802.11n 20MHz BW U-NII 1 (5150 MHz to 5250 MHz)	40 (5200 MHz)	mcs 4	12.24	15.25
		mcs 5	12.30	15.31
		mcs 6	12.29	15.30
		mcs 7	12.31	15.32
	48 (5240 MHz)	mcs 0	12.49	15.50
		mcs 1	12.33	15.34
		mcs 2	12.52	15.53
		mcs 3	12.11	15.12
		mcs 4	11.99	15.00
		mcs 5	12.20	15.21
		mcs 6	12.00	15.01
		mcs 7	12.38	15.39

WLAN Mode	Channel	Modulation and Coding Scheme	Maximum Conducted Output Power (dBm)	
			Worst Case TX Chain	MIMO
802.11n 20MHz BW U-NII 3 (5725 MHz to 5850 MHz)	149 (5745 MHz)	mcs 0	19.67	22.68
		mcs 1	19.67	22.68
		mcs 2	19.54	22.55
		mcs 3	19.64	22.65
		mcs 4	19.66	22.67
		mcs 5	19.72	22.73
		mcs 6	19.65	22.66
		mcs 7	19.77	22.78
	157 (5785 MHz)	mcs 0	19.61	22.62
		mcs 1	19.43	22.44
		mcs 2	19.45	22.46
		mcs 3	19.60	22.61
		mcs 4	19.25	22.26
		mcs 5	19.35	22.36
		mcs 6	19.46	22.47
		mcs 7	19.26	22.27
	165 (5825 MHz)	mcs 0	19.20	22.21
		mcs 1	19.33	22.34
		mcs 2	19.24	22.25

802.11n 20MHz BW U-NII 3 (5725 MHz to 5850 MHz)	165 (5825 MHz)	mcs 3	19.19	22.20
		mcs 4	19.38	22.39
		mcs 5	19.38	22.39
		mcs 6	19.32	22.33
		mcs 7	19.42	22.43

WLAN Mode	Channel	Modulation and Coding Scheme	Maximum Conducted Output Power (dBm)	
			Worst Case TX Chain	MIMO
802.11n 40MHz BW U-NII 1 (5150 MHz to 5250 MHz)	38 (5190 MHz) Program channel is 36	mcs 0	11.04	14.05
		mcs 1	11.14	14.15
		mcs 2	11.31	14.32
		mcs 3	11.24	14.25
		mcs 4	11.32	14.33
		mcs 5	11.47	14.48
		mcs 6	11.35	14.36
		mcs 7	11.48	14.49
	46 (5230 MHz) Program channel is 44	mcs 0	11.51	14.52
		mcs 1	11.43	14.44
		mcs 2	11.54	14.55
		mcs 3	11.33	14.34
		mcs 4	11.50	14.51
		mcs 5	11.53	14.54
		mcs 6	11.51	14.52
		mcs 7	11.43	14.44

WLAN Mode	Channel	Modulation and Coding Scheme	Maximum Conducted Output Power (dBm)	
			Worst Case TX Chain	MIMO
802.11n 40MHz BW U-NII 3 (5725 MHz to 5850 MHz)	151 (5755 MHz) Program channel is 149	mcs 0	17.68	20.69
		mcs 1	17.63	20.64
		mcs 2	17.66	20.67
		mcs 3	17.60	20.61
		mcs 4	17.63	20.64
		mcs 5	17.68	20.69

802.11n 40MHz BW U-NII 3 (5725 MHz to 5850 MHz)	151 (5755 MHz) Program channel is 149	mcs 6	17.62	20.63
		mcs 7	17.63	20.64
	159 (5795 MHz) Program channel is 157	mcs 0	19.41	22.42
		mcs 1	19.33	22.34
		mcs 2	19.40	22.41
		mcs 3	19.33	22.34
		mcs 4	19.30	22.31
		mcs 5	19.22	22.23
		mcs 6	19.38	22.39
		mcs 7	19.24	22.25

WLAN Mode	Channel	Modulation and Coding Scheme	Maximum Conducted Output Power (dBm)	
			Worst Case TX Chain	MIMO
802.11ac 20MHz BW U-NII 1 (5150 MHz to 5250 MHz)	36 (5180 MHz)	mcs 0	12.04	15.05
		mcs 1	12.10	15.11
		mcs 2	11.99	15.00
		mcs 3	12.05	15.06
		mcs 4	12.01	15.02
		mcs 5	12.11	15.12
		mcs 6	12.07	15.08
		mcs 7	12.13	15.14
		mcs 8	12.10	15.11
	40 (5200 MHz)	mcs 0	12.37	15.38
		mcs 1	12.22	15.23
		mcs 2	12.45	15.46
		mcs 3	12.22	15.23
		mcs 4	12.21	15.22
		mcs 5	12.33	15.34
		mcs 6	12.36	15.37
		mcs 7	12.38	15.39
		mcs 8	12.46	15.47
	48 (5240 MHz)	mcs 0	12.31	15.32
		mcs 1	12.27	15.28
		mcs 2	12.31	15.32

802.11ac 20MHz BW U-NII 1 (5150 MHz to 5250 MHz)	48 (5240 MHz)	mcs 3	12.19	15.20
		mcs 4	12.06	15.07
		mcs 5	12.30	15.31
		mcs 6	12.33	15.34
		mcs 7	12.25	15.26
		mcs 8	12.39	15.40

WLAN Mode	Channel	Modulation and Coding Scheme	Maximum Conducted Output Power (dBm)	
			Worst Case TX Chain	MIMO
802.11ac 20MHz BW U-NII 3 (5725 MHz to 5850 MHz)	149 (5745 MHz)	mcs 0	19.77	22.78
		mcs 1	19.67	22.68
		mcs 2	19.74	22.75
		mcs 3	19.57	22.58
		mcs 4	19.72	22.73
		mcs 5	19.77	22.78
		mcs 6	19.69	22.70
		mcs 7	19.55	22.56
		mcs 8	19.84	22.85
	157 (5785 MHz)	mcs 0	19.25	22.26
		mcs 1	19.32	22.33
		mcs 2	19.53	22.54
		mcs 3	19.71	22.72
		mcs 4	19.72	22.73
		mcs 5	19.63	22.64
		mcs 6	19.32	22.33
		mcs 7	19.43	22.44
		mcs 8	19.36	22.37
	165 (5825 MHz)	mcs 0	19.31	22.32
		mcs 1	19.21	22.22
		mcs 2	19.31	22.32
		mcs 3	19.32	22.33
		mcs 4	19.30	22.31
		mcs 5	19.49	22.50
		mcs 6	19.33	22.34
		mcs 7	19.49	22.50
		mcs 8	19.51	22.52

WLAN Mode	Channel	Modulation and Coding Scheme	Maximum Conducted Output Power (dBm)	
			Worst Case TX Chain	MIMO
802.11ac 40MHz BW U-NII 1 (5150 MHz to 5250 MHz)	38 (5190 MHz) Program channel is 36	mcs 0	12.03	15.04
		mcs 1	12.21	15.22
		mcs 2	12.10	15.11
		mcs 3	12.13	15.14
		mcs 4	12.18	15.19
		mcs 5	12.38	15.39
		mcs 6	12.02	15.03
		mcs 7	12.18	15.19
		mcs 8	12.32	15.33
		mcs 9	11.98	14.99
	46 (5230 MHz) Program channel is 44	mcs 0	12.02	15.03
		mcs 1	12.14	15.15
		mcs 2	12.22	15.23
		mcs 3	12.18	15.19
		mcs 4	12.20	15.21
		mcs 5	12.18	15.19
		mcs 6	12.05	15.06
		mcs 7	12.05	15.06
		mcs 8	12.18	15.19
		mcs 9	12.17	15.18

WLAN Mode	Channel	Modulation and Coding Scheme	Maximum Conducted Output Power (dBm)	
			Worst Case TX Chain	MIMO
802.11ac 40MHz BW U-NII 3 (5725 MHz to 5850 MHz)	151 (5755 MHz) Program channel is 149	mcs 0	19.74	22.75
		mcs 1	19.77	22.78
		mcs 2	19.76	22.77
		mcs 3	19.72	22.73
		mcs 4	19.77	22.78
		mcs 5	19.77	22.78
		mcs 6	19.78	22.79
		mcs 7	19.78	22.79

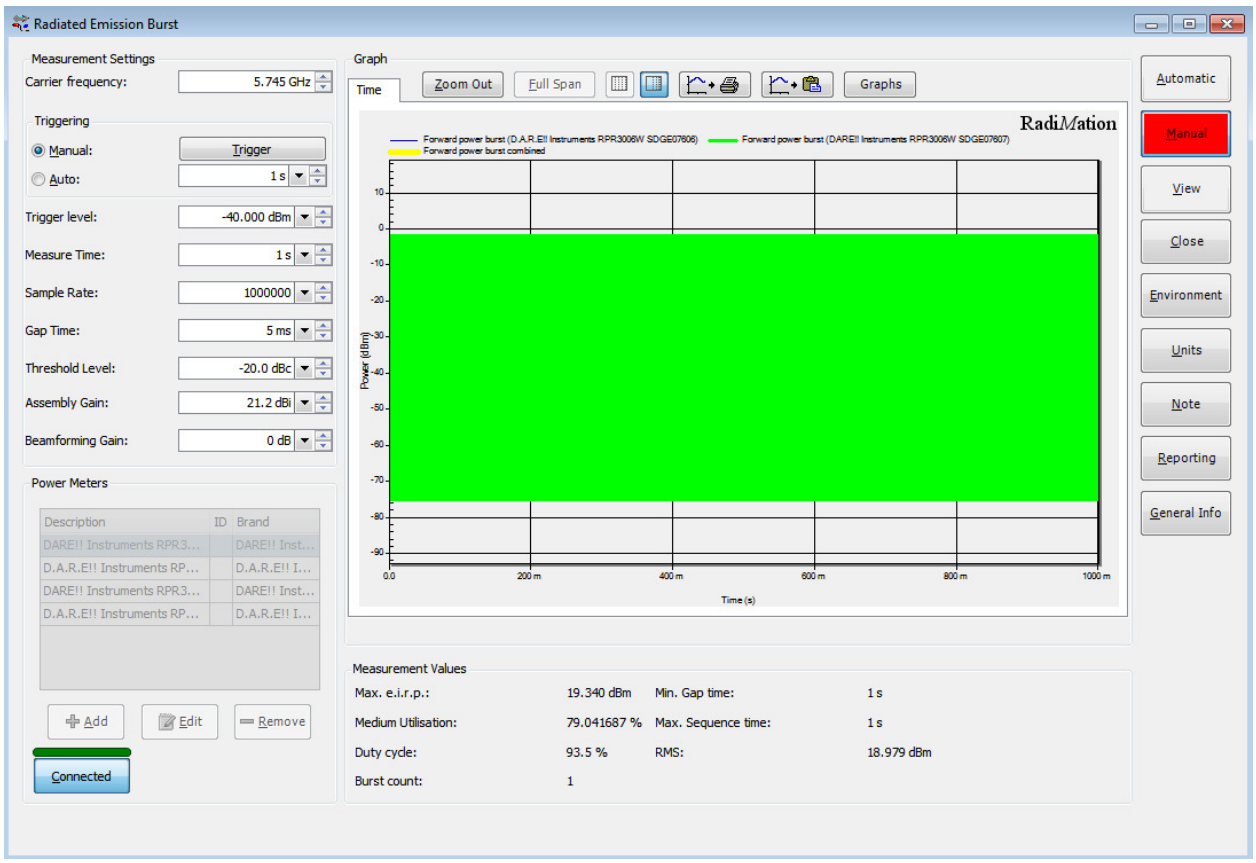
802.11ac 40MHz BW U-NII 3 (5725 MHz to 5850 MHz)	151 (5755 MHz) Program channel is 149	mcs 8	19.75	22.76
		mcs 9	19.79	22.80
	159 (5795 MHz) Program channel is 157	mcs 0	19.34	22.35
		mcs 1	19.33	22.34
		mcs 2	19.47	22.48
		mcs 3	19.42	22.43
		mcs 4	19.50	22.51
		mcs 5	19.33	22.34
		mcs 6	19.43	22.44
		mcs 7	19.44	22.45
		mcs 8	19.38	22.39
		mcs 9	19.45	22.46

WLAN Mode	Channel	Modulation and Coding Scheme	Maximum Conducted Output Power (dBm)	
			Worst Case TX Chain	MIMO
802.11ac 80MHz BW U-NII 1 (5150 MHz to 5250 MHz)	42 (5210 MHz) Program channel is 36	mcs 0	11.52	14.53
		mcs 1	11.42	14.43
		mcs 2	11.51	14.52
		mcs 3	11.63	14.64
		mcs 4	11.70	14.71
		mcs 5	11.67	14.68
		mcs 6	11.53	14.54
		mcs 7	11.67	14.68
		mcs 0	11.52	14.53
		mcs 1	11.42	14.43

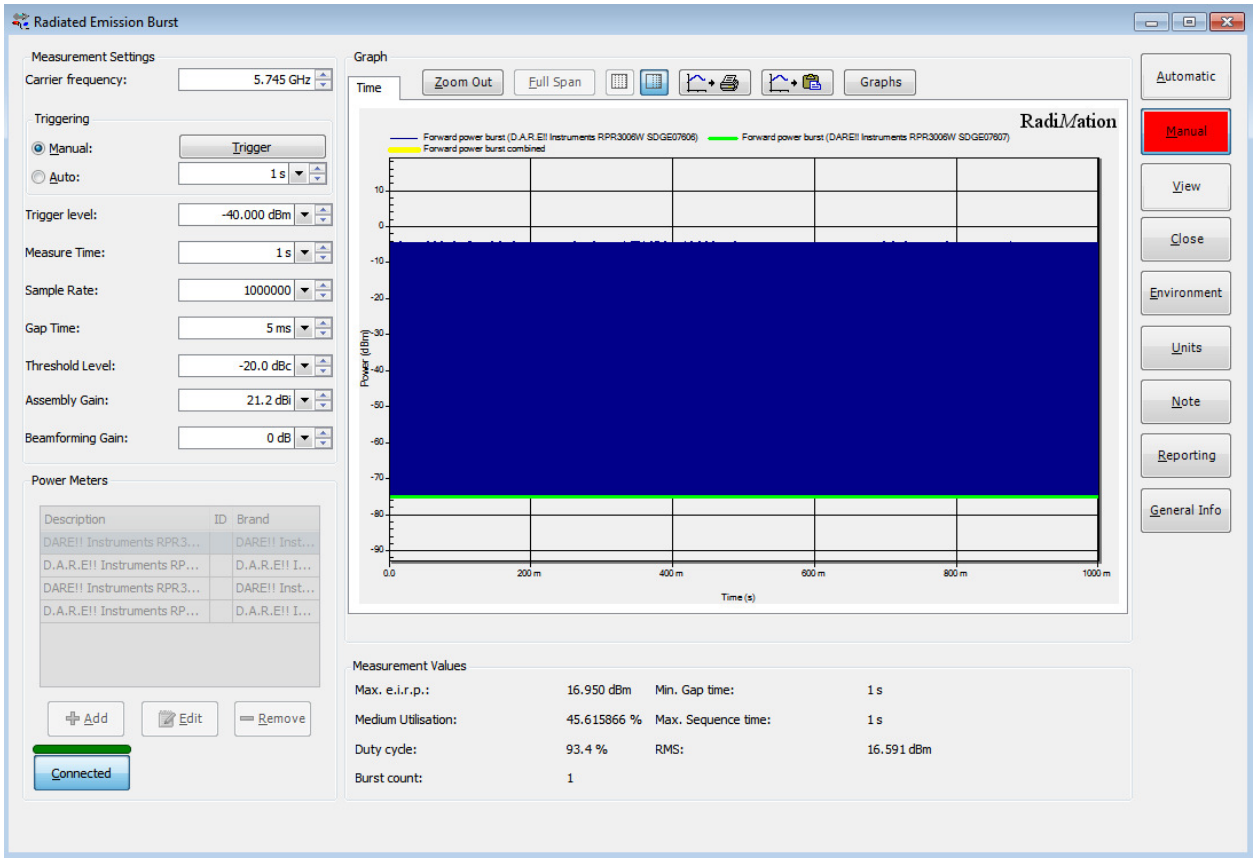
WLAN Mode	Channel	Modulation and Coding Scheme	Maximum Conducted Output Power (dBm)	
			Worst Case TX Chain	MIMO
802.11ac 80MHz BW U-NII 3 (5725 MHz to 5850 MHz)	155 (5775 MHz) Program channel is 157	mcs 0	16.79	19.80
		mcs 1	16.80	19.81
		mcs 2	16.78	19.79
		mcs 3	16.86	19.87
		mcs 4	16.87	19.88

802.11ac 80MHz BW U-NII 3 (5725 MHz to 5850 MHz)	155 (5775 MHz) Program channel is 157	mcs 5	16.93	19.94
		mcs 6	16.83	19.84
		mcs 7	16.88	19.89
		mcs 8	16.80	19.81
		mcs 9	17.04	20.05

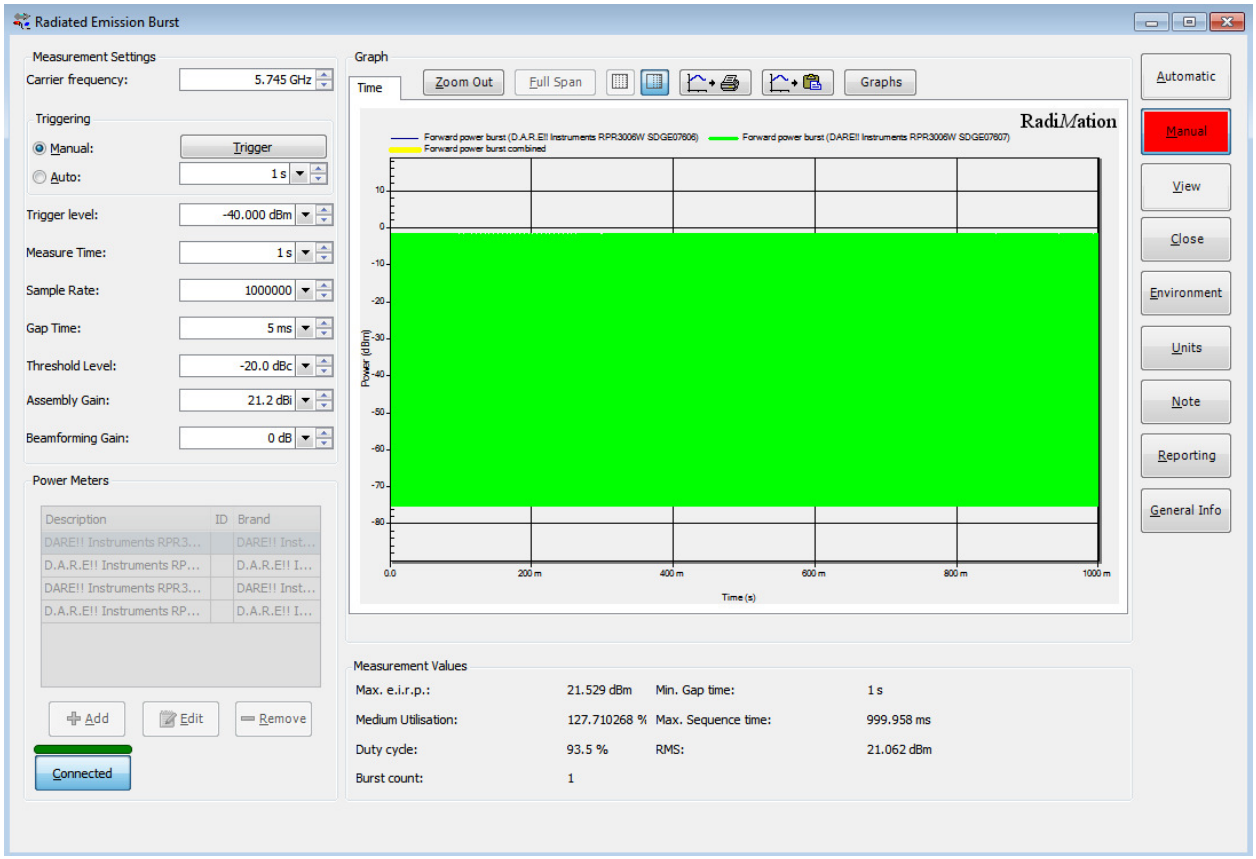
2.4.10 Sample Test Plots



802.11a Low Channel U-NII 3 6 Mbps RF0



802.11a Low Channel U-NII 3 6 Mbps RF1



802.11a Low Channel U-NII 3 6 Mbps MIMO

2.5 MAXIMUM POWER SPECTRAL DENSITY (PSD)

2.5.1 Specification Reference

Part 15 Subpart E §15.407(a)(1)(ii) and §15.407(a)(3) and RSS-247 6.2.1 (1) and 6.2.4 (1)

2.5.2 Standard Applicable

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

6.2.1 (1) The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

6.2.4 (1) The maximum conducted output power shall not exceed 1 W. The power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint3 systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

2.5.3 Test Methodology

Section II (F) PSD of 789033 D02 General UNII Test Procedures v01r02

2.5.4 Equipment Under Test and Modification State

Serial No: SZ170616900012 / Test Configuration B

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

August 10 and 17, 2016; September 15, 2016/FSC

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

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	22.9 - 25.7 °C
Relative Humidity	43.9 – 56.0 %
ATM Pressure	98.7 - 98.9 kPa

2.5.8 Additional Observations

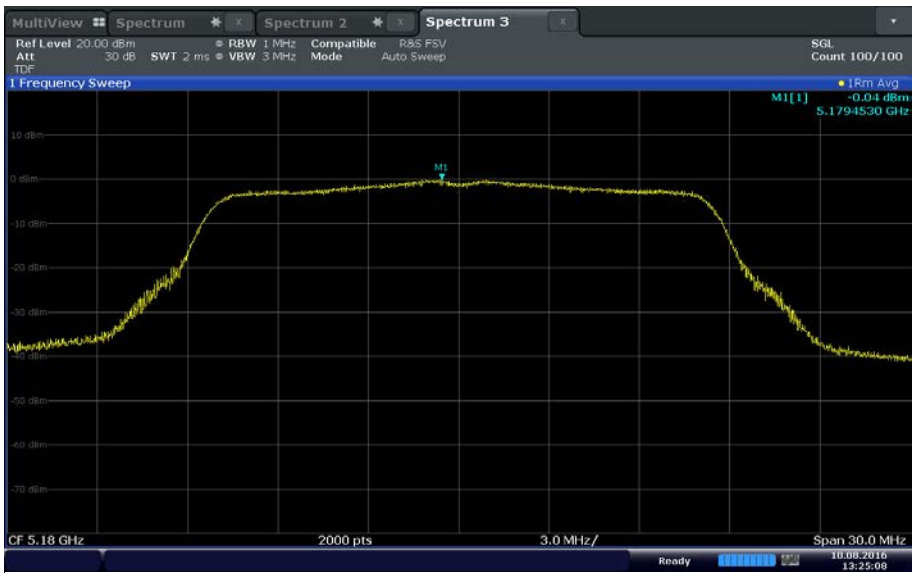
- This is a conducted test as per Section II (F) PSD of 789033 D02 General UNII Test Procedures v01r02 (April 08, 2016). All conditions under this Section were satisfied.
- A Transducer Factor (TDF) was added to compensate for the external attenuator and cable used.
- Only the worst case data rate/modulation for each mode presented.
- RBW for U-NII 1 is 1MHz while 500 kHz for U-NII 3.

2.5.9 Test Results

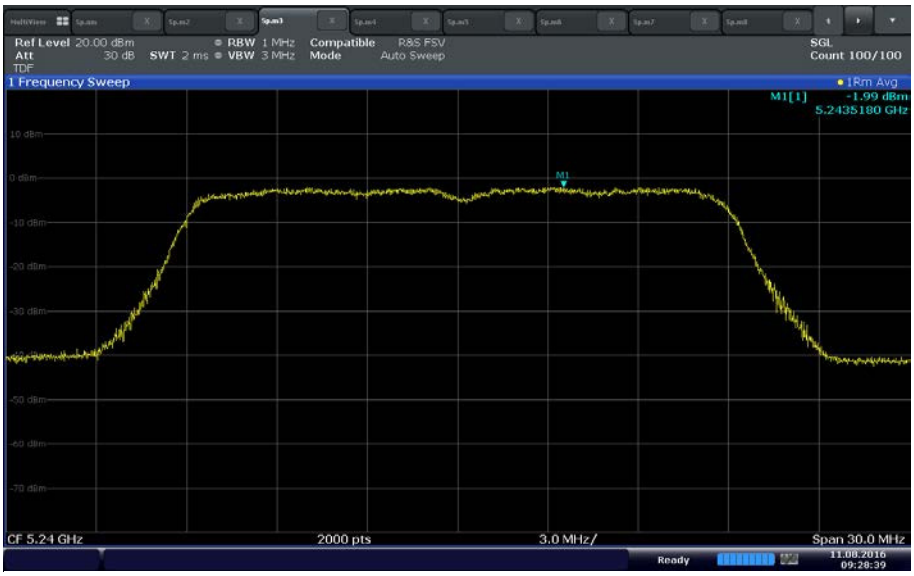
WLAN Mode	Channel	Peak of the Spectrum (dBm)	Duty Cycle Correction Factor (10log(1/x))	Calculated Maximum PSD (dBm)	Limit (dBm)
802.11a U-NII 1	36 (5180 MHz)	-0.04	0.345 dB	0.31/3.91 EIRP	17 dBm/1 Mhz and 10 dBm/1 MHz EIRP
	40 (5200 MHz)	-0.14		0.21/3.81 EIRP	
	48 (5240 MHz)	0.03		0.38/3.98 EIRP	
802.11a U-NII 3	149 (5745 MHz)	4.63		4.975	30 dBm/500 kHz
	157 (5785 MHz)	4.43		4.775	
	165 (5825 MHz)	4.39		4.735	
802.11n U-NII 1 20 MHz BW	36 (5180 MHz)	-1.45	2.12 dB	0.67/4.27 EIRP	17 dBm/1 Mhz and 10 dBm/1 MHz EIRP
	40 (5200 MHz)	-1.96		0.16/3.76 EIRP	
	48 (5240 MHz)	-1.99		0.13/3.73 EIRP	
802.11n U-NII 3 20 MHz BW	149 (5745 MHz)	1.66		3.78	30 dBm/500 kHz
	157 (5785 MHz)	2.00		4.12	
	165 (5825 MHz)	1.77		3.89	

802.11n U-NII 1 40 MHz BW	38 (5190 MHz)	-5.44	2.12 dB	-3.32/0.28 EIRP	17 dBm/1 Mhz and 10 dBm/1 MHz EIRP
	46 (5230 MHz)	-5.14		-3.02/0.58 EIRP	
802.11n U-NII 3 40 MHz BW	151 (5755 MHz)	0.08		2.2	30 dBm/500 kHz
	159 (5795 MHz)	-0.12		2.0	
802.11ac U-NII 1 20 MHz BW	36 (5180 MHz)	-2.17	2.27 dB	0.10/3.70 EIRP	17 dBm/1 Mhz and 10 dBm/1 MHz EIRP
	40 (5200 MHz)	-2.18		0.09/3.69 EIRP	
	48 (5240 MHz)	-2.01		0.26/3.86 EIRP	
802.11ac U-NII 3 20 MHz BW	149 (5745 MHz)	1.61		3.88	30 dBm/500 kHz
	157 (5785 MHz)	1.46		3.73	
	165 (5825 MHz)	1.59		3.86	
802.11ac U-NII 1 40 MHz BW	38 (5190 MHz)	-5.53	2.27 dB	-3.26/0.34 EIRP	17 dBm/1 Mhz and 10 dBm/1 MHz EIRP
	46 (5230 MHz)	-5.50		-3.23/0.37 EIRP	
802.11ac U-NII 3 40 MHz BW	151 (5755 MHz)	0.11		-5.16	30 dBm/500 kHz
	159 (5795 MHz)	-0.18		-5.03	
802.11ac U-NII 1 80 MHz BW	42 (5210 MHz)	-9.41	2.27 dB	-7.14/-3.54 EIRP	17 dBm/1 Mhz and 10 dBm/1 MHz EIRP
802.11ac U-NII 3 80 MHz BW	155 (5775 MHz)	-4.14		-1.87	30 dBm/500 kHz

2.5.10 Sample Test Plots

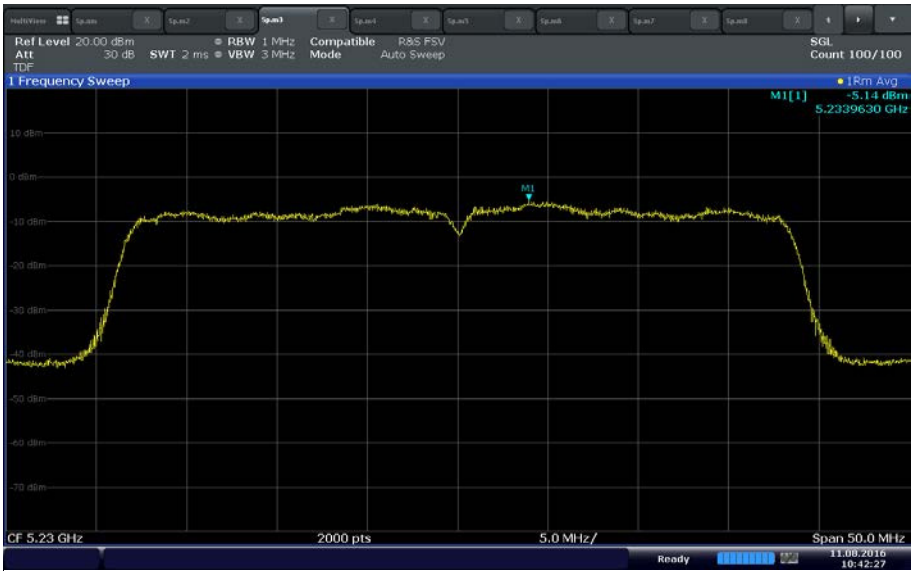


802.11a U-NII 1 Low Channel



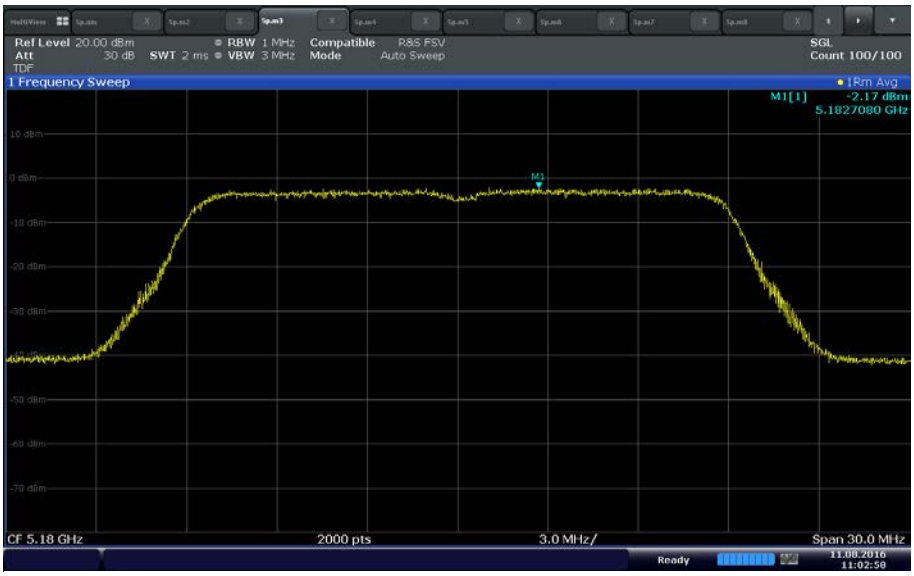
Date: 11.AUG.2016 09:28:39

802.11n (20MHz BW) U-NII 1 High Channel



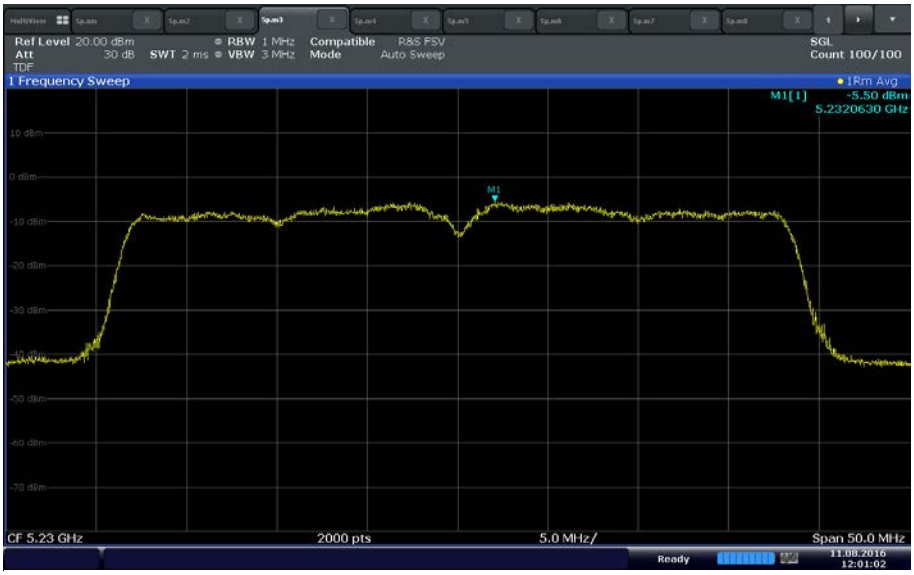
Date: 11.AUG.2016 10:42:27

802.11n (40MHz BW) U-NII 1 High Channel



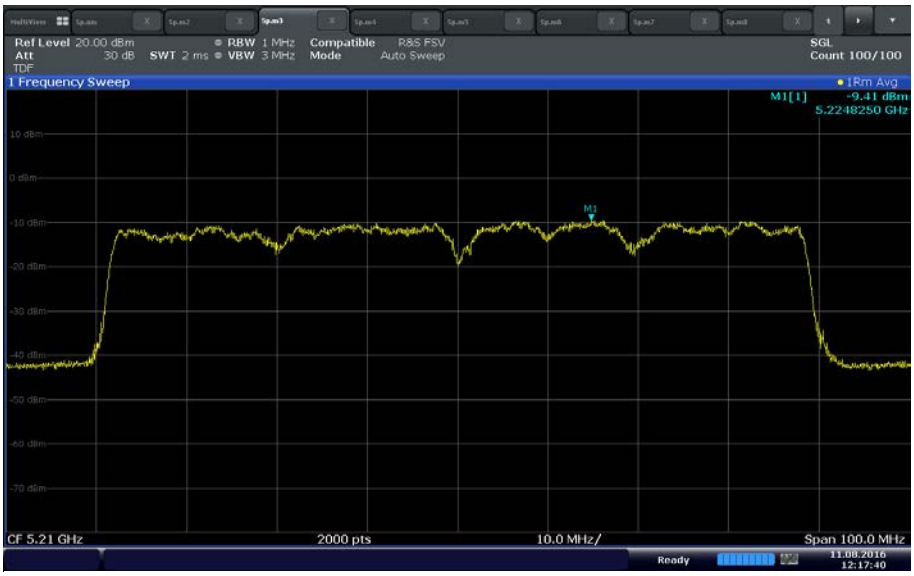
Date: 11.AUG.2016 11:02:58

802.11ac (20MHz BW) U-NII 1 Low Channel



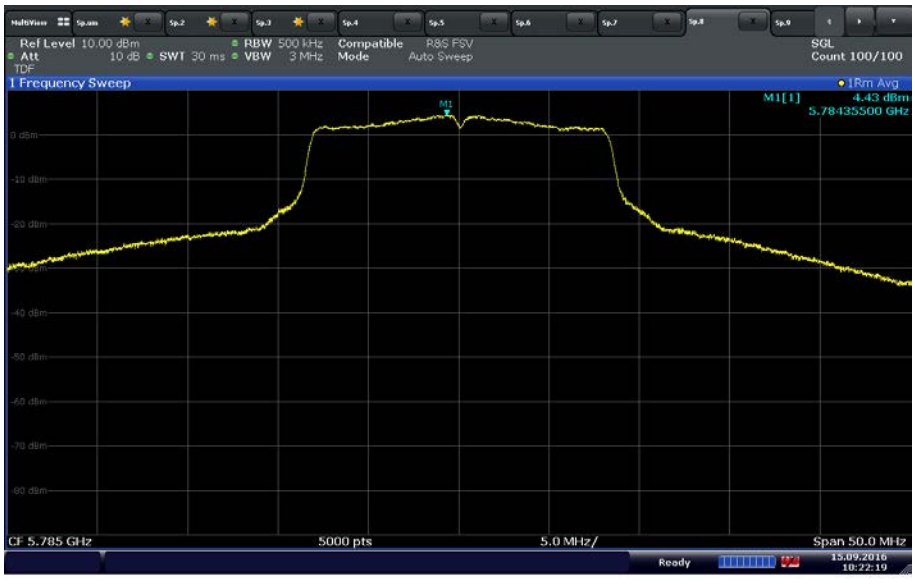
Date: 11.AUG.2016 12:01:02

802.11ac (40MHz BW) U-NII 1 High Channel



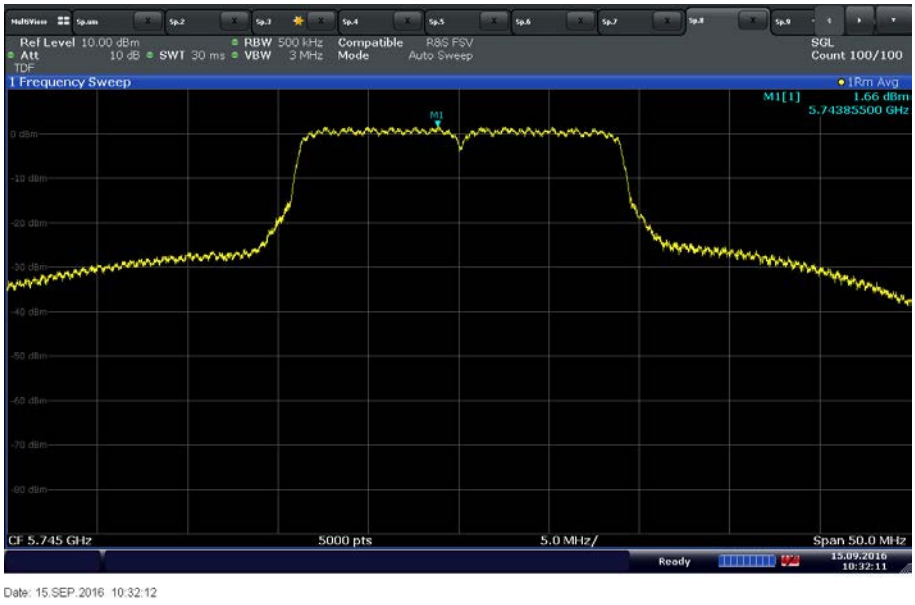
Date: 11.AUG.2016 12:17:40

802.11ac (80MHz BW) U-NII 1 Mid Channel



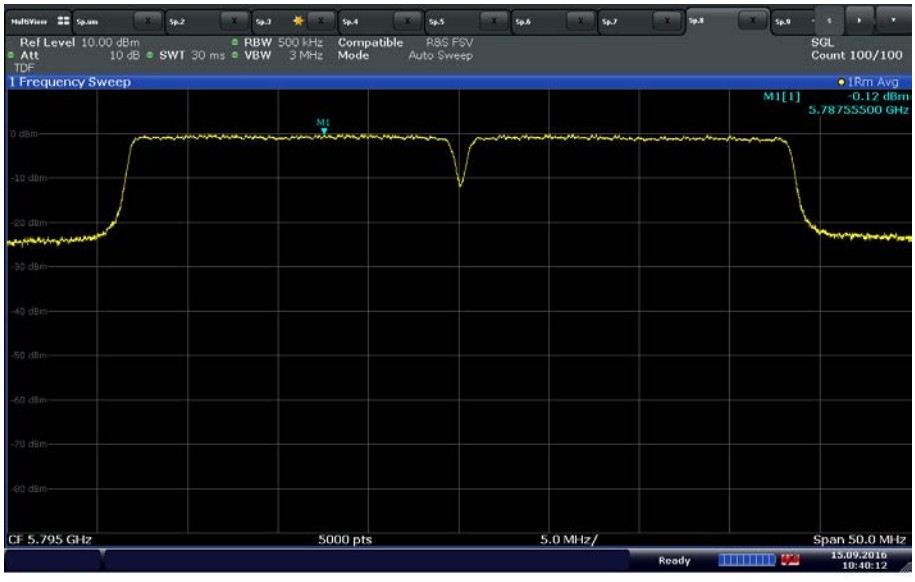
Date: 15.SEP.2016 10:22:19

802.11a U-NII 3 Mid Channel



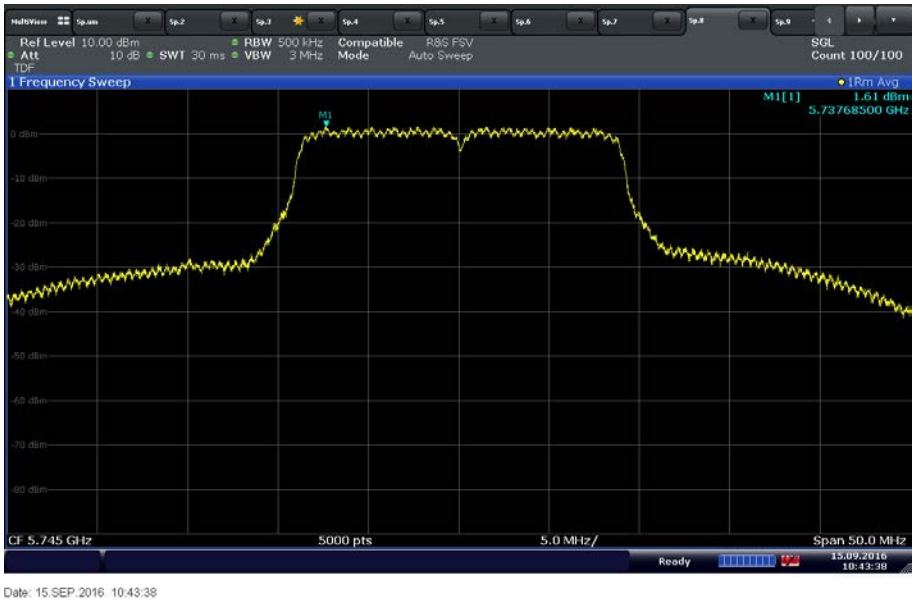
Date: 15.SEP.2016 10:32:12

802.11n (20 MHz BW) U-NII 3 Low Channel



Date: 15.SEP.2016 10:40:13

802.11n (40 MHz BW) U-NII 3 High Channel



802.11ac (20 MHz BW) U-NII 3 Low Channel

802.11ac (40 MHz BW) U-NII 3 High Channel

802.11n (80 MHz BW) U-NII 3 Mid Channel

2.6 UNWANTED EMISSIONS MEASUREMENT

2.6.1 Specification Reference

Part 15 Subpart E §15.407(b)(1),(4)(i) and (7) / 15.209 and RSS-247 6.2.1 (2) and 6.2.4 (2)

2.6.2 Standard Applicable

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) 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 e.i.r.p. of −27 dBm/MHz.

(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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

6.2.4 (2)For the band 5725-5850 MHz, emissions at frequencies from the band edges to 10 MHz above or below the band edges shall not exceed -17 dBm/MHz e.i.r.p.

For emissions at frequencies more than 10 MHz above or below the band edges, the emissions power shall not exceed -27 dBm/MHz.

2.6.3 Test Methodology

Section II (G) Unwanted Emission Measurement of 789033 D02 General UNII Test Procedures v01r02

2.6.4 Equipment Under Test and Modification State

Serial No: SZ170616900012 / Test Configuration B

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

August 10, 12, 13, and 17, 2016/FSC and XYZ

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

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	22-9 - 25.7 °C
Relative Humidity	43.9 – 56.0 %
ATM Pressure	98.7 - 98.9 kPa

2.6.8 Additional Observations

- This is an antenna-port conducted measurement test plus radiated cabinet spurious emissions measurements.
- Only the worst case data rate/modulation presented.
- Sweep time is set to auto.
- Transducer Factor (TDF) was added to compensate for the antenna gain, external attenuator and cable used.
- Additional 3dB offset was added for MIMO mode (verification performed on worst case antenna port).
- When measuring radiated cabinet spurious emissions, the field strength limit of 15.209 is first converted to dBm (EIRP) using the formula under Section G(2)(III) of 789033 D02 General UNII Test Procedures v01r02 for below 1GHz measurements, otherwise §15.407 limits applies. If Peak complies with the limit, no Average evaluation will be performed (above 1GHz measurements).
- Only worst case configuration (channel, data rate or MCS and BW) used for radiated cabinet spurious emissions test.
- Radiated 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.

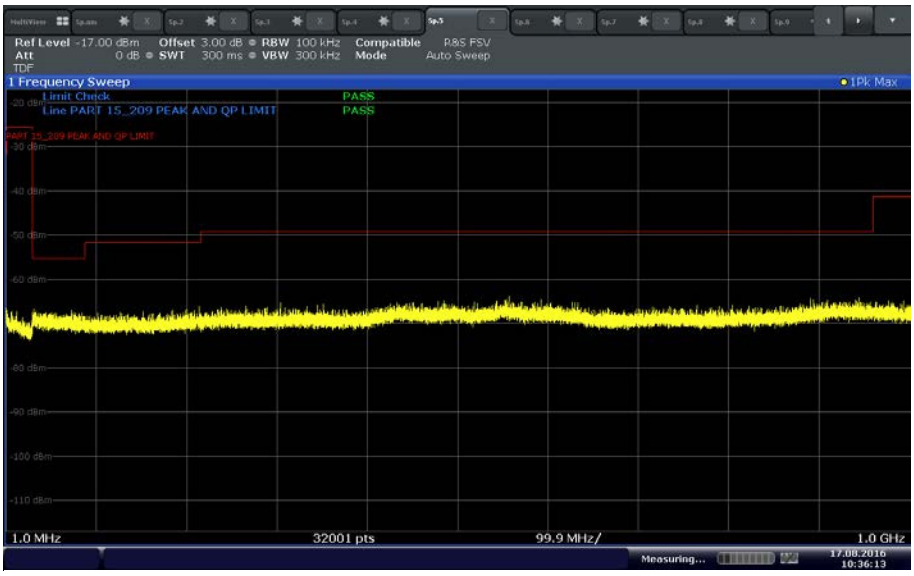
2.6.9 Sample Computation (Radiated Emission)

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**

2.6.10 Test Results

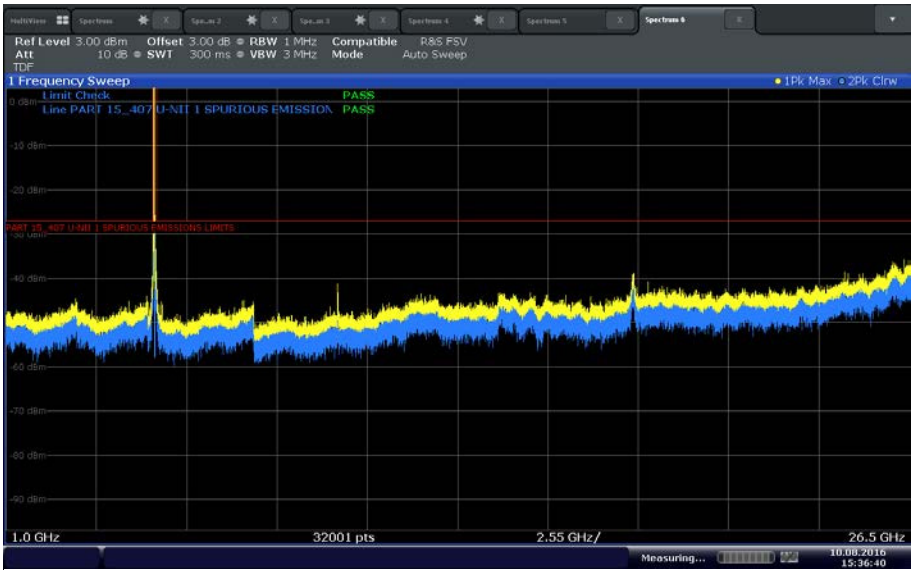
See attached plots.

2.6.11 Test Plots



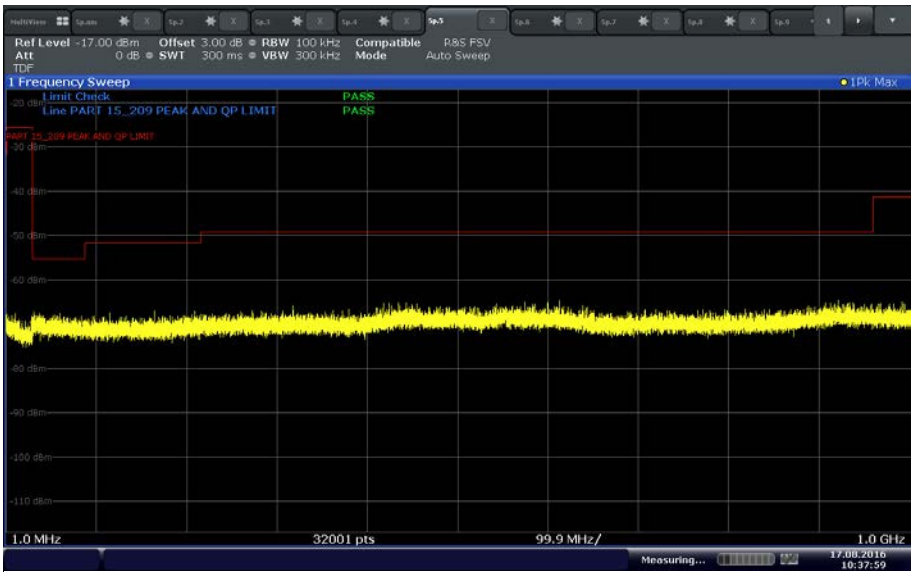
Date: 17.AUG.2016 10:36:14

802.11 a U-NII 1 Low Channel below 1GHz



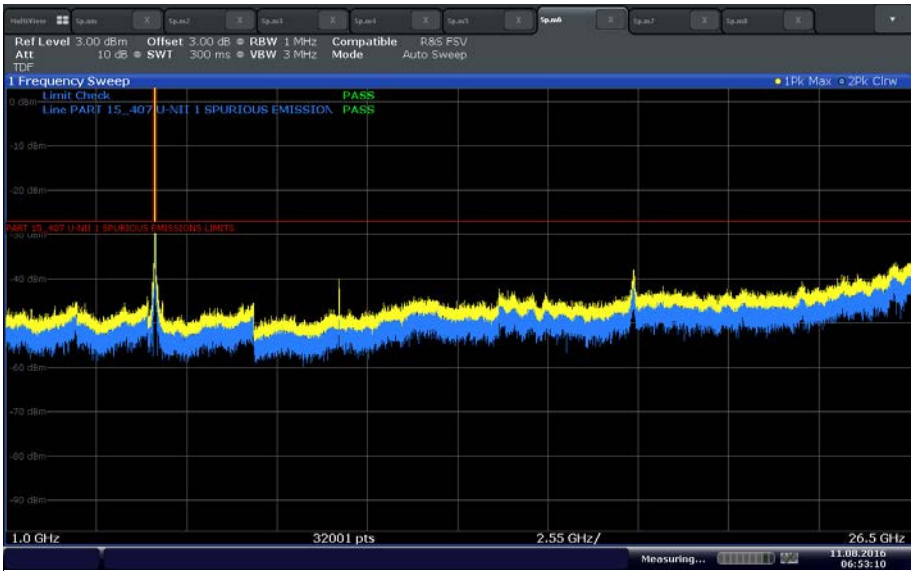
Date: 10.AUG.2016 15:36:40

802.11a U-NII 1 Low Channel above 1GHz



Date: 17.AUG.2016 10:37:59

802.11 a U-NII 1 Mid Channel below 1GHz



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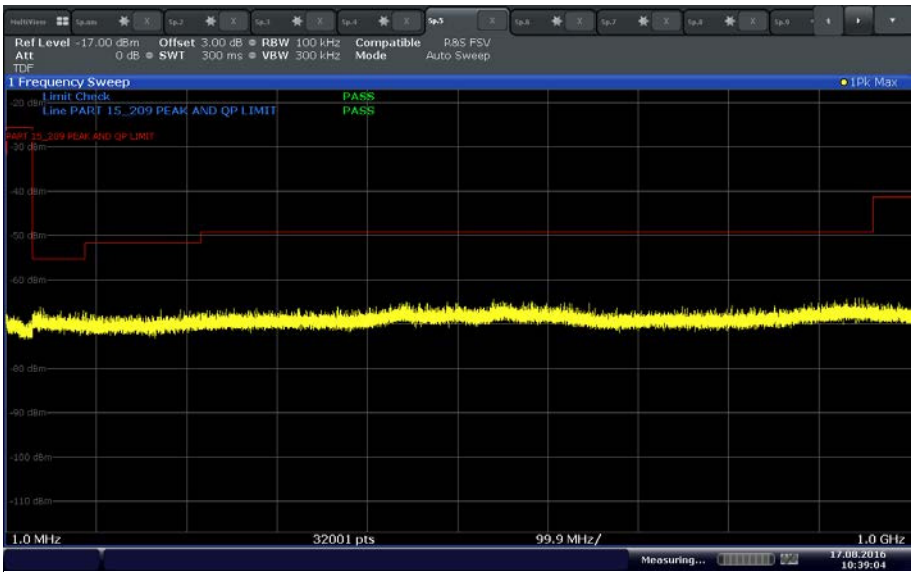
802.11a U-NII 1 Mid Channel above 1GHz



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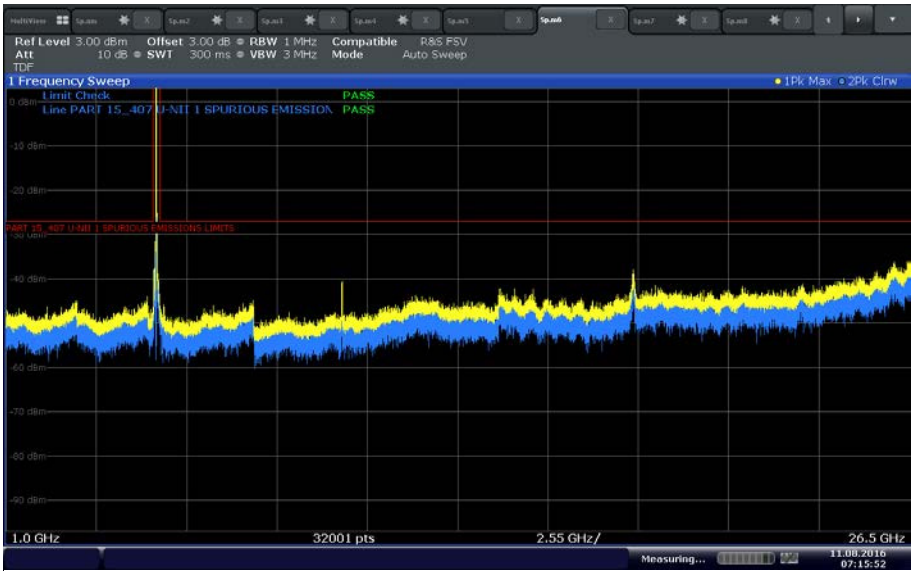
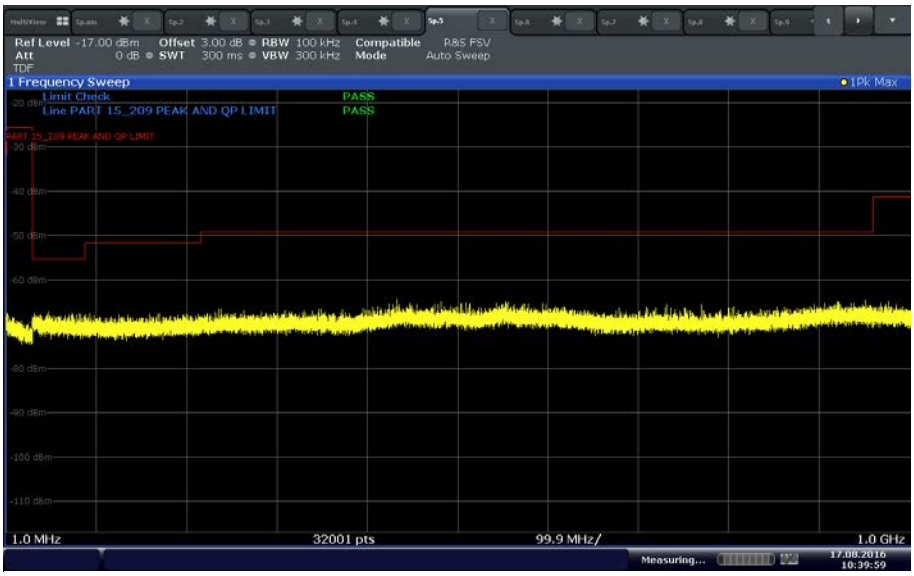
802.11 a U-NII 1 High Channel below 1GHz



Date: 11.AUG.2016 07:15:52

802.11a U-NII 1 High Channel above 1GHz



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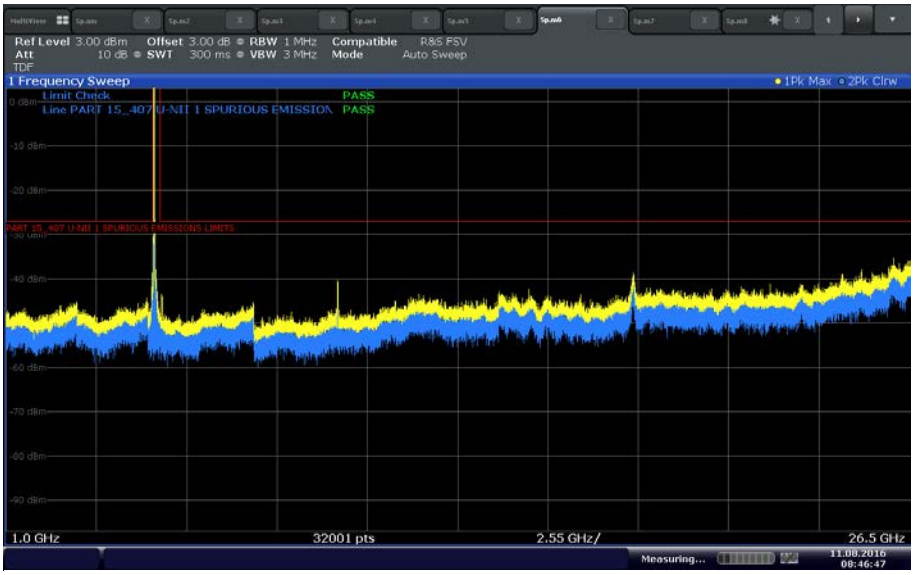
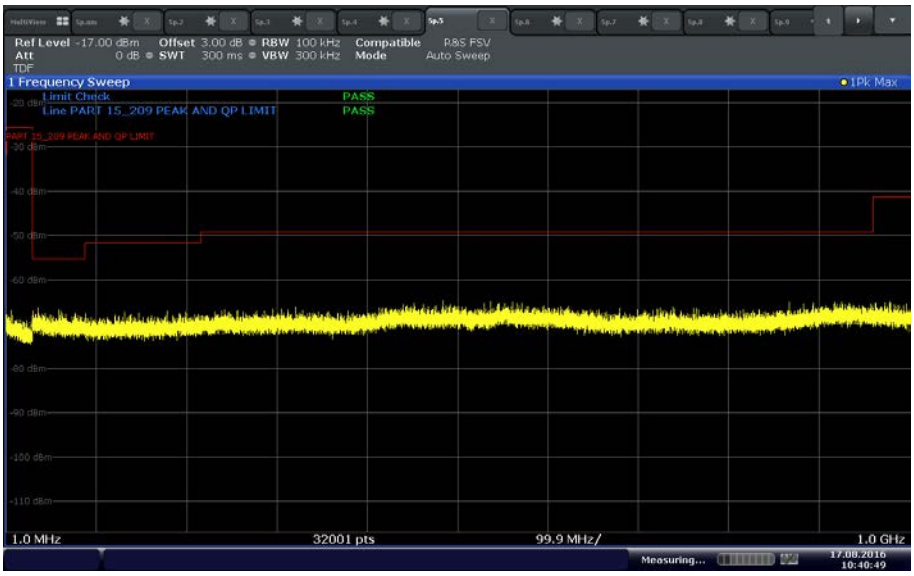
802.11 n (20 MHz) U-NII 1 Low Channel below 1GHz



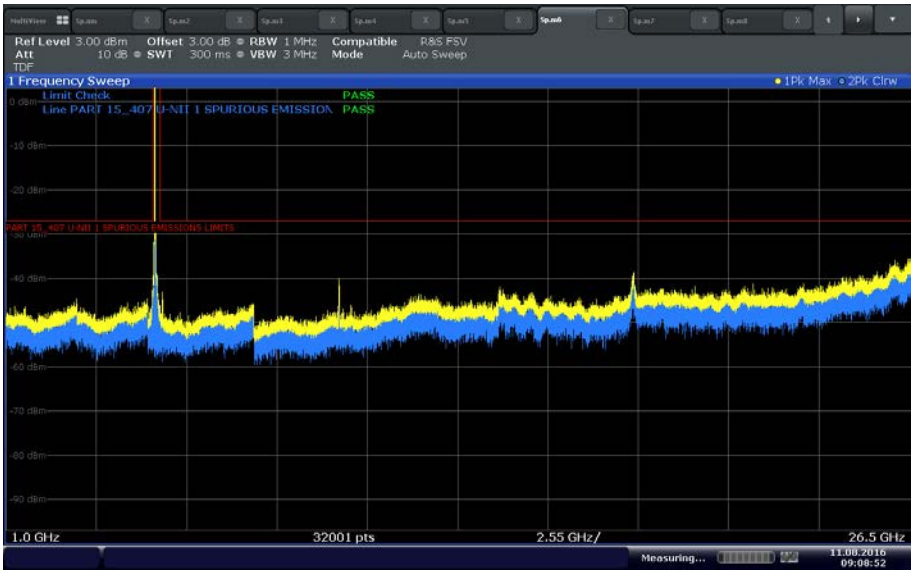
Date: 11.AUG.2016 08:46:46

802.11 n (20 MHz) U-NII 1 Low Channel above 1GHz



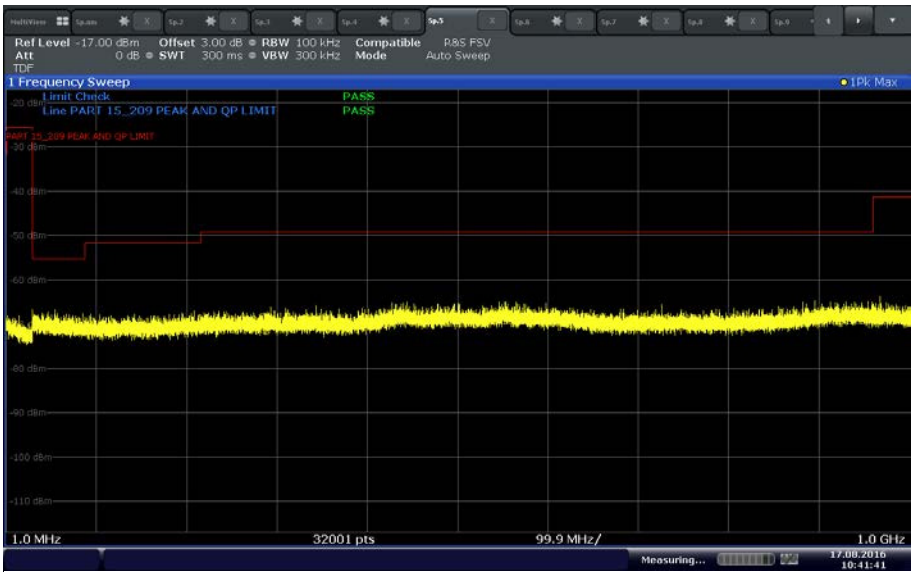
Date: 17.AUG.2016 10:40:49

802.11 n (20 MHz) U-NII 1 Mid Channel below 1GHz



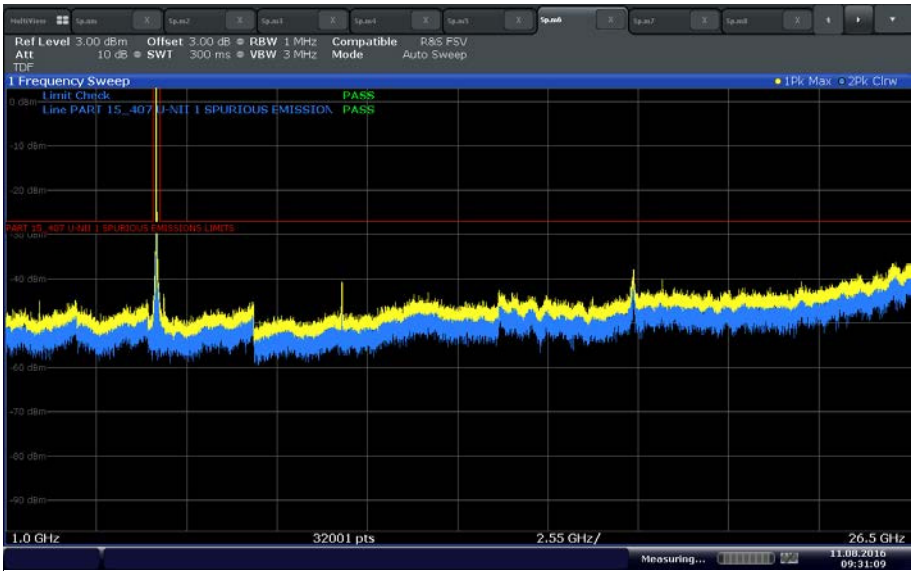
Date: 11.AUG.2016 09:08:52

802.11 n (20 MHz) U-NII 1 Mid Channel above 1GHz



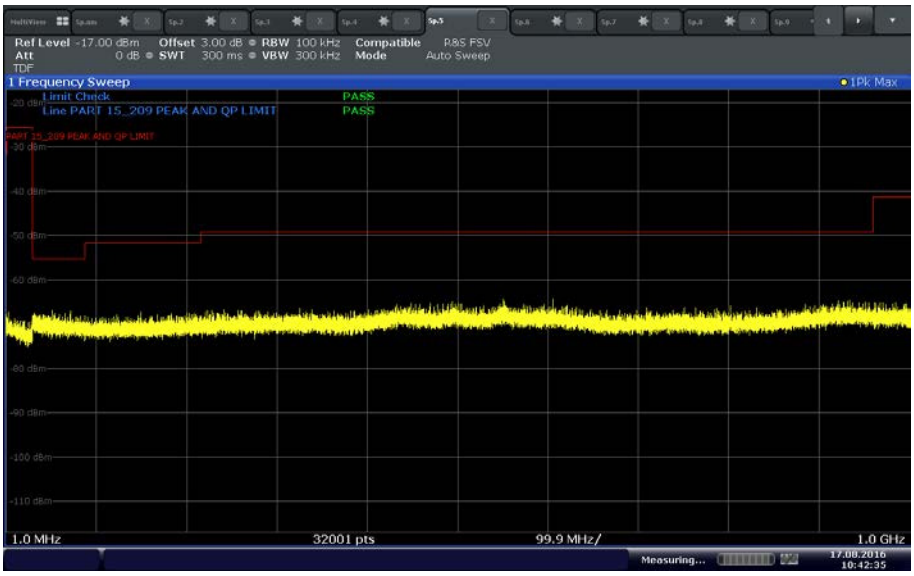
Date: 17.AUG.2016 10:41:41

802.11 n (20 MHz) U-NII 1 High Channel below 1GHz



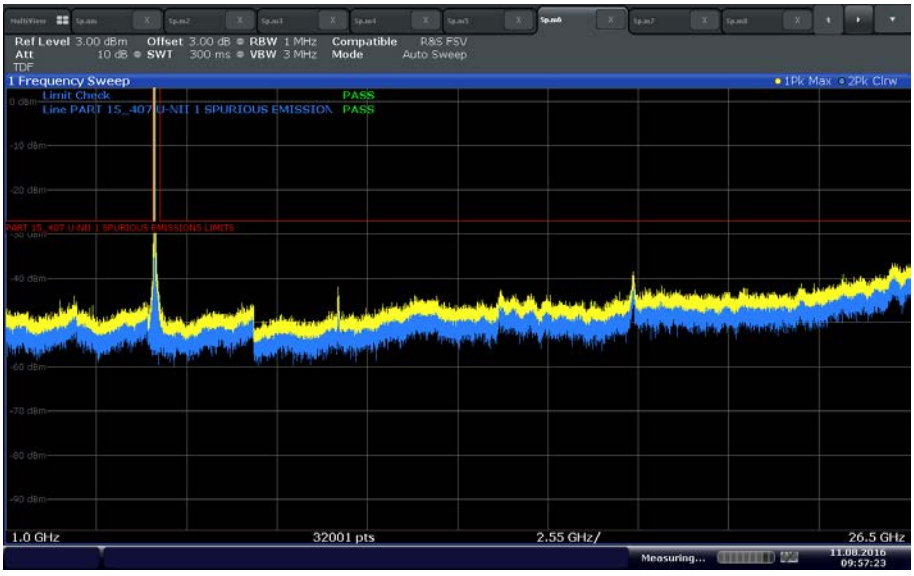
Date: 11.AUG.2016 09:31:09

802.11 n (20 MHz) U-NII 1 High Channel above 1GHz



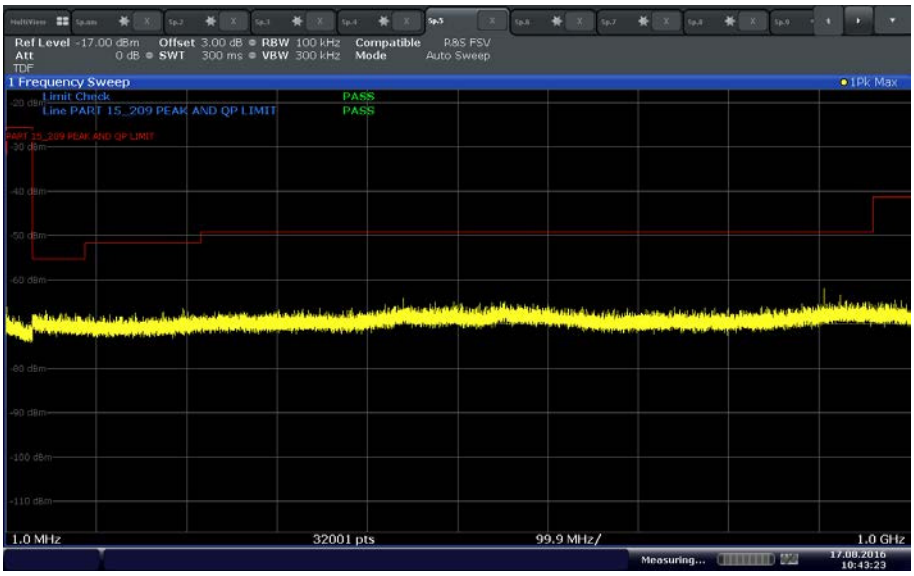
Date: 17.AUG.2016 10:42:35

802.11 n (40 MHz) U-NII 1 Low Channel below 1GHz



Date: 11.AUG.2016 09:57:23

802.11 n (40 MHz) U-NII 1 Low Channel above 1GHz



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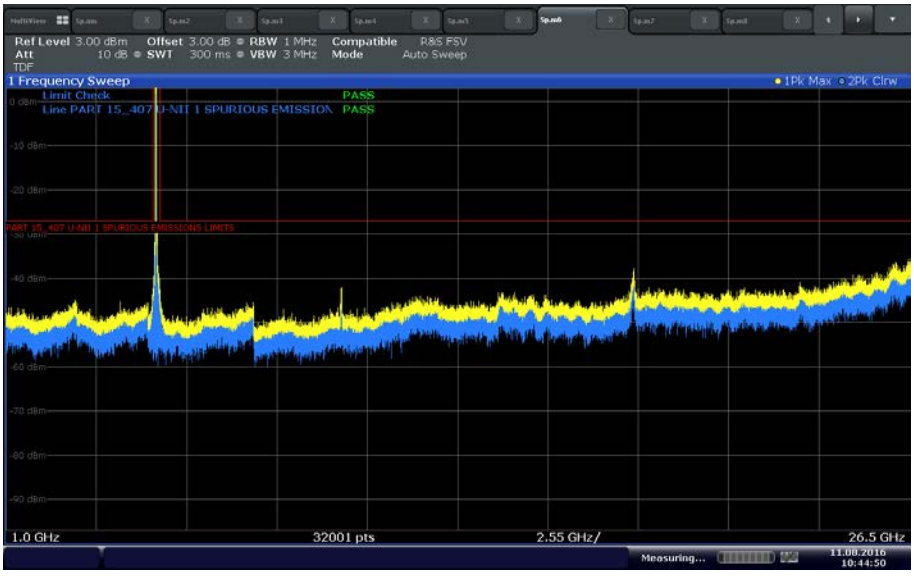
802.11 n (40 MHz) U-NII 1 High Channel below 1GHz



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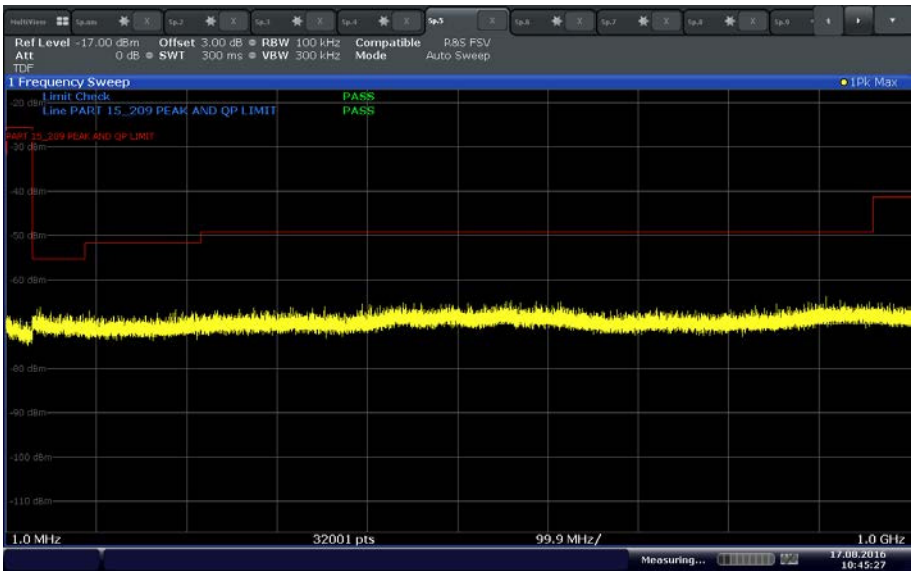
802.11 n (40 MHz) U-NII 1 High Channel above 1GHz



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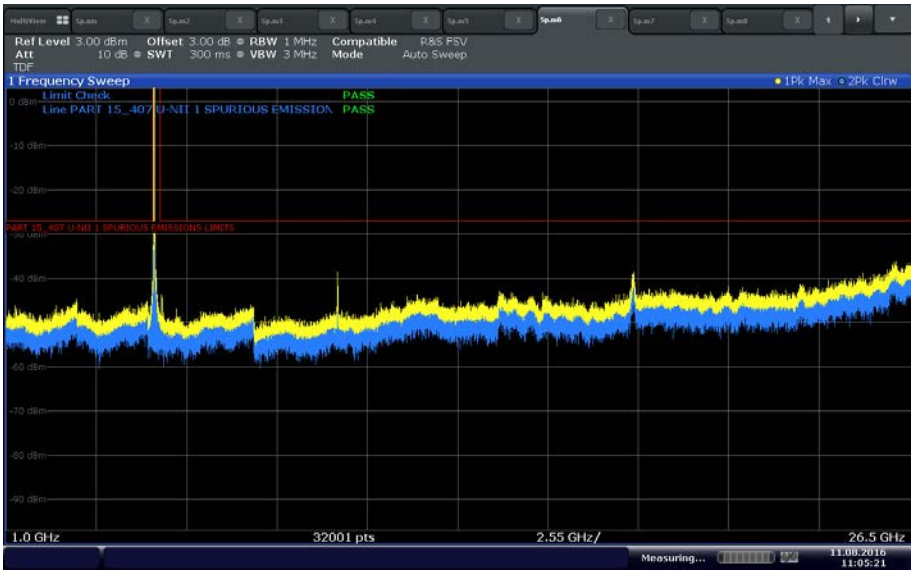
802.11 ac (20 MHz) U-NII 1 Low Channel below 1GHz



Date: 11.AUG.2016 11:05:21

802.11 ac (20 MHz) U-NII 1 Low Channel above 1GHz