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Emissions
Test Report

EUT Name: Norton Core Secure WiFi Router

Model No.: 518

CFR 47 Part 15.407 2018 and RSS 247: 2017

Prepared for:

Symantec Corporation
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Mountain View, CA 94043

Prepared by:

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Revisions

Revision No.	Date MM/DD/YYYY	Reason for Change	Author
0	7/19/2018	Original Document	DA

Note: Latest revision report will replace all previous reports.

Statement of Compliance

Manufacturer:	Symantec Corporation 350 Ellis Street Mountain View, CA 94043
Requester / Applicant:	Symantec Corporation
Name of Equipment:	Norton Core Secure WiFi Router
Model No.	518
Type of Equipment:	Intentional Radiator
Application of Regulations:	CFR 47 Part 15.407 2018 and RSS 247: 2017
Test Dates:	January 12, 2018 to June 15, 2018

Guidance Documents:

Emissions: ANSI C63.10-2013, KDB 789033 D02 General UNII Test Procedures New Rules v01, KDB 662911 D01 Multiple Transmitter Output v02r01

Test Methods:

Emissions: ANSI C63.10-2013, KDB 789033 D02 General UNII Test Procedures New Rules v01, KDB 662911 D01 Multiple Transmitter Output v02r01

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by TUV Rheinland, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that the equipment described above has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the Executive Summary of this report.

This report must not be used to claim product endorsement by A2LA or any agency of the U.S. Government. This report shall not be reproduced except in full, without the written authorization of TUV Rheinland of North America.

Douglas Antioco		Josie Sabado	
Test Engineer	Date July 19, 2018	A2LA Signatory	Date July 19, 2018

Testing Cert #3331.02 **US1131** **2932M**

1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of the CFR 47 Part 15.407 2018 and RSS 247: 2017 based on the results of testing performed on January 12, 2018 to June 15, 2018 on the Norton Core Secure WiFi Router Model 518 manufactured by Symantec Corporation. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report. The 5150-5250 MHz and 5725-5850 MHz frequency bands are covered in this document.

1.3 Summary of Test Results

Table 1: Summary of Test Results

Test	Test Method ANSI C63.4	Worse Case (Measured)	Result
Maximum Output Power	CFR47 15.407 (a)	28.2 dBm (802.11a NoHT 6 Mbps)	**Complied**
Maximum Output Power	RSS 247 Sect.6.2.1.1	28.1 dBm (802.11a NoHT 6 Mbps)	**Complied**
DTS Bandwidth (6dB)	CFR47 15.407 (a) RSS-247 5.2(a)	16.4 MHz (802.11a NoHT 6 Mbps)	**Complied**
Peak Power Spectral Density	CFR47 15.407 (a)	16.7 dBm (802.11a NoHT 6 Mbps)	**Complied**
Peak Power Spectral Density	RSS 247 Sect.6.2	9.5 dBm EIRP (802.11ac VHT20 MCS0, Beamforming mode)	**Complied**
Out of Band Emissions: U-NII-1 Restricted Band Edge	CFR47 15.407 (a)	2.5 dB Margin @ 5146.1 MHz, Average (802.11ac VHT80+80 MCS0)	**Complied**
Out of Band Emissions: U-NII-3 Unrestricted Band Edge	*CFR47 15.407 (b)(4)(i)* *RSS 247 Sect.6.2.1.2*	See Plots	**Complied**
Transmitter Spurious Emissions	CFR47 15.209, CFR47 15.407 (b) RSS-GEN Sect.8.9, RSS-247 Sect. 6.2.1.2	2.2 dB Margin @ 3850.0 MHz, Average (802.11ac VHT80+80 Mode MCS0 Channel 42 & 155)	**Complied**
AC Power Conducted Emission	CFR47 15.207 RSS-GEN Sect.8.8	Class B	**Complied**
Frequency Stability	CFR47 15.407 (g) RSS-GEN Sect. 6.11	N/A (Manufacturer Declaration)	**Complied**

Note: 1. This test report covers 5150-5250MHz and 5725-5850 MHz bands.
2. Measurements are conducted for 4x4 MIMO total power non-beamforming.

1.4 Special Accessories

No special accessories were necessary in order to achieve compliance.

1.5 Equipment Modifications

None

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission

TUV Rheinland of North America at 1279 Quarry Ln, Pleasanton, CA 94566 is recognized by the commission for performing testing services for the general public on a fee basis. These laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (US1131). The laboratory scope of accreditation includes: Title 47 CFR Parts 15, 18, and 90. The accreditation is updated every 3 years.

2.1.2 NIST / A2LA

TUV Rheinland of North America is accredited by the National Voluntary Laboratory Accreditation Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Guide 17025:1999 and ISO 9002 (Lab Code Testing Cert #3331.02). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 Canada – Industry Canada

TUV Rheinland of North America at the 1279 Quarry Ln, Pleasanton, CA 94566 address is accredited by Industry Canada for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by Industry Canada (File Number 2932M). This reference number is the indication to the Industry Canada Certification Officers that the site meets the requirements of RSS 212, Issue 1 (Provisional). The accreditation is updated every 3 years.

2.1.4 Japan – VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America at 1279 Quarry Ln, Pleasanton, CA 94566 has been assessed and approved in accordance with the Regulations for Voluntary Control Measures.

VCCI Registration No. for Pleasanton: A-0261

2.1.5 Acceptance by Mutual Recognition Arrangement

The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TUV Rheinland at 1279 Quarry Ln, Pleasanton, CA 94566 test results and test reports within the scope of the laboratory NIST / A2LA accreditation will be accepted by each member country.

2.2 Test Facilities

All of the test facilities are located at 1279 Quarry Lane, Pleasanton, California 94566, USA.

2.2.1 Emission Test Facility

The Semi-Anechoic chamber and AC Line Conducted measurement facility used to collect the radiated and conducted data has been constructed in accordance with ANSI C63.7:1992. The site has been measured in accordance with and verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4-2014, at a test distance of 3 and 5 meters. The site is listed with the FCC and accredited by A2LA (Lab Code Testing Cert #3331.02). The 3/5-meter semi-anechoic chamber used to collect the radiated data has been verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4-2014, at a test distance of 3 meter and 5 meters. A report detailing this site can be obtained from TUV Rheinland of North America.

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st Edition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities; it is equal to the positive square root of the sum of the variances or co-variances of these other quantities, weighted according to how the measurement result varies with changes in these quantities. The term *standard uncertainty* is the result of a measurement expressed as a standard deviation.

2.3.1 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

Field Strength (dBµV/m) = RAW - AMP + CBL + ACF

Where: RAW = Measured level before correction (dBµV)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu V/m = 10^{\frac{dB\mu V/m}{20}}$$

Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dBuV/m)

25 dBuV/m + 17.5 dB – 20 dB + 1.0 dB = 23.5 dBuV/m

2.3.2 Measurement Uncertainty

Per CISPR 16-4-2	U_{lab}	U_{cispr}
Radiated Disturbance @ 10 meters		
30 – 1,000 MHz	2.25 dB	4.51 dB
Radiated Disturbance @ 3 meters		
30 – 1,000 MHz	2.26 dB	4.52 dB
1 – 6 GHz	2.12 dB	4.25 dB
6 – 18 GHz	2.47 dB	4.93 dB
Conducted Disturbance @ Mains Terminals		
150 kHz – 30 MHz	1.09 dB	2.18 dB
Disturbance Power		
30 MHz– 300 MHz	3.92 dB	4.3 dB

Voltech PM6000A

The estimated combined standard uncertainty for harmonic current and flicker measurements is ± 5.0%.	Per CISPR 16-4-2 Methods

2.3.3 Measurement Uncertainty Immunity

The estimated combined standard uncertainty for ESD immunity measurements is ± 8.2%.	Per IEC 61000-4-2
The estimated combined standard uncertainty for radiated immunity measurements is ± 4.10 dB.	Per IEC 61000-4-3
The estimated combined standard uncertainty for conducted immunity measurements with CDN is ± 3.66 dB	Per IEC 61000-4-6
The estimated combined standard uncertainty for power frequency magnetic field immunity is ± 2.9%.	Per IEC 61000-4-8

Thermo KeyTek EMC Pro

The estimated combined standard uncertainty for EFT fast transient immunity measurements is ± 2.6%.

The estimated combined standard uncertainty for surge immunity measurements is ± 2.6%.
The estimated combined standard uncertainty for voltage variation and interruption measurements is ± 1.74%.

The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2005. Equipment calibration records are kept on file at the test facility.

3 Product Information

3.1 Product Description

The Model 518, Norton Core Secure WiFi Router, is a 4x4 secure wireless router that protects your connected home network, while delivering the highest level of security and performance. It is intended to work as a dual band (2.4GHz and 5GHz) wireless router. The router will be in compliance with regulatory standards of regions it will be operating in.

3.2 Equipment Configuration

A description of the equipment configuration is given in the Test Plan Section. The EUT was tested as called for in the test standard and was configured and operated in a manner consistent with its intended use. The EUT was connected to rated power and allowed to reach intended operating conditions. The placement of the EUT system components was guided by the test standard and selected to represent typical installation conditions.

In the case of an EUT that can operate in more than one configuration, preliminary testing was performed to determine the configuration that produced maximum radiation.

The final configuration was selected to produce the worst case radiation for emissions testing and to place the EUT in the most susceptible state for immunity testing.

3.3 Operating Mode

A description of the operation mode is given in the Test Plan Section. In the case of an EUT that can operate in more than one state, preliminary testing was performed to determine the operating mode that produced maximum radiation.

The final operating mode was selected to produce the worst case radiation for emissions testing and to place the EUT in the most susceptible state for immunity testing.

3.4 Unique Antenna Connector

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of CFR47 Parts 15.211, 15.213, 15.217, 15.219, or 15.221.

3.4.1 Results

The Norton Core Secure WiFi Router has four stamped metal antennas that has maximum gain of 2.5 dBi for 5150-5250MHz and 2.6 dBi for 5725-5850MHz. They are connected via RF connectors that are not easily accessible to the end user.

Refer to Table 30 for additional antenna information.

3.5 Worst Case Test Modes

The worst case chain was determined by using a gated RMS power meter as described by ANSI C63.10-2013 Section 12.3.3.2.

3.5.1 Worse Case Chain

Each chain was measured with the power meter while the remaining chains were terminated with 50 ohms.

Power setting=20.5, HT20 mode, Channel 44 (5220 MHz)

Chain 0	Chain 1	Chain 2	**Chain 3**
19.0	19.4	20.4	**20.9**

Chain 3 is found worse case with respect to output power.

3.5.2 Worse Case Modulation

All 4 chains were measured using a gated RMS power meter per 12.3.3.2 Method PM-Gand then summed per ANSI 63.10 section 14.3.1.

Mode	Modulation	Data Rate	Power Setting	Power Measured (dBm)
802.11a NoHT	BPSK	6	20.5	**26.4**
	BPSK	9	20.5	26.4
	QPSK	12	20.5	25.9
	QPSK	18	20.5	25.8
	16-QAM	24	20.5	26.2
	16-QAM	36	19.5	25.4
	64-QAM	48	17	21.9
	64-QAM	54	15.5	20.6
802.11n HT20	BPSK (MCS0)	6.5	20.5	26.0
	QPSK (MCS1)	13	20.5	26.0
	QPSK (MCS2)	19.5	20.5	26.0
	16-QAM (MCS3)	26	20	25.8
	16-QAM (MCS4)	39	19.5	25.3
	64-QAM (MCS5)	54	18.5	24.4
	64-QAM (MCS6)	58.5	17	21.9
	64-QAM (MCS7)	65	15.5	20.5
802.11ac VHT20	BPSK (MCS0)	6.5	20.5	**26.0**
	QPSK (MCS1)	13	20.5	26.0
	QPSK (MCS2)	19.5	20	25.6
	16-QAM (MCS3)	26	20	25.8
	16-QAM (MCS4)	39	19.5	25.3
	64-QAM (MCS5)	54	18.5	24.5
	64-QAM (MCS6)	58.5	17	22.0
	64-QAM (MCS7)	65	15.5	20.6
	256-QAM (MCS8)	78	14	18.5
802.11n HT40+	BPSK (MCS0)	13.5	17	**22.1**
	QPSK (MCS1)	27	17	22.1
	QPSK (MCS2)	40.5	17	21.9
	16-QAM (MCS3)	54	17	21.9
	16-QAM (MCS4)	81	16	21.0
	64-QAM (MCS5)	108	16	21.0

	64-QAM (MCS6)	121.5	14.5	18.8
	64-QAM (MCS7)	135	13	17.3
802.11ac VHT40	BPSK (MCS0)	13.5	17	**22.1**
	QPSK (MCS1)	27	17	22.1
	QPSK (MCS2)	40.5	17	21.9
	16-QAM (MCS3)	54	17	21.9
	16-QAM (MCS4)	81	16	21.0
	64-QAM (MCS5)	108	16	21.0
	64-QAM (MCS6)	121.5	14.5	18.8
	64-QAM (MCS7)	135	13	17.4
	256-QAM (MCS8)	162	11.5	16.0
	256-QAM (MCS9)	180	11.5	16.0
802.11ac VHT80	BPSK (MCS0)	29.3	14.5	**19.9**
	QPSK (MCS1)	58.5	14.5	19.9
	QPSK (MCS2)	87.8	14.5	19.4
	16-QAM (MCS3)	117	14.5	18.9
	16-QAM (MCS4)	175.5	13.5	17.8
	64-QAM (MCS5)	234	13.5	17.8
	64-QAM (MCS6)	263.3	12	16.3
	64-QAM (MCS7)	292.5	10.5	16.3
	256-QAM (MCS8)	351	9	14.7
	256-QAM (MCS9)	390	9	14.7

For CDD Mode; 802.11a NoHT 1Mbps (BPSK), 802.11n HT40+ MCS0, 802.11ac VHT80 MCS0 modes were used for further measurements.

For Beamforming Mode; 802.11ac VHT20 MCS0, 802.11ac, VHT40 MCS0, 802.11ac VHT80 MCS0 modes were used for further measurements.

Spot-checks were performed on 802.11ac VHT80+80 mode modulations/data rates and MCS0 was determined to be the worst case with respect to output power.

4 Emissions

Testing was performed in accordance with CFR 47 Part 15.407: 2016 and RSS 247: 2017. These test methods are listed under the laboratory's A2LA Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices. Procedures described in section 8 of the standard were used.

4.1 Output Power

The maximum output power requirement is the maximum equivalent isotropic radiated power delivering at the transmitting antenna under specified conditions of measurements in the presence of modulation.

4.1.1 Limit(s)

The maximum output power and harmonics shall not exceed CFR47 Part 15.407 (a):2016 and RSS 247 Sect. 6.2.1 and 5.4.

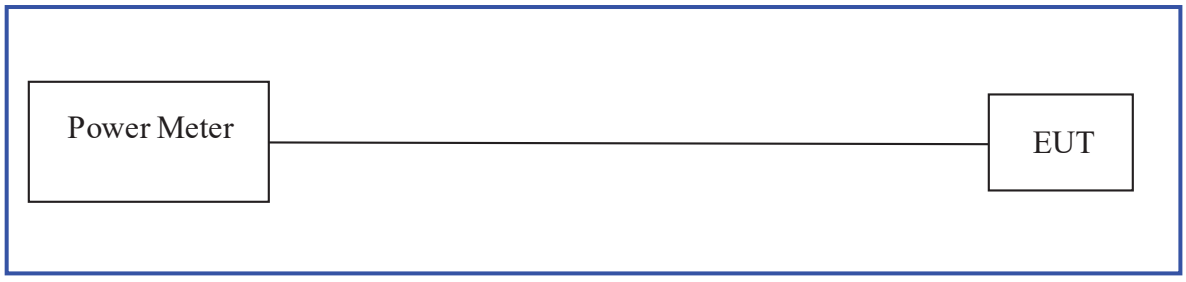
The maximum allowed transmit powers are

Frequency (MHz)	*§15.407*	*RSS-247*
5150-5250	*30 dBm (Conducted)*	*24 dBm (EIRP)*
5725-5850	*30 dBm (Conducted)*	*30 dBm (Conducted)*

4.1.2 Test Method

The ANSI C63.10-2013 Section 12.3.3.2 conducted method was used to measure the channel power output. The preliminary investigation was performed at different data rate/ chain to determine the highest power output for each mode (Section 3.5 of this report). The worst findings were conducted on the low, middle and high channels, where applicable, in each operating range per CFR47 Part 15.407(a) and RSS 247 Sect. 6.2.1.1; 5150 MHz to 5250 MHz. The worst mode results indicated below.

4.1.3 Test Setup:



Each chain was measured individually using a gated RMS power meter per 12.3.3.2 Method PM-Gand then summed per ANSI 63.10 section 14.3.1.

4.1.4 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

4.1.4.1 FCC Power Measurements

Table 2: FCC RF Output Powers CDD mode (Non-Beamforming)

U-NII-1 (5150-5250MHz) CDD Mode								
Mode	Channel	(MHz)	(MHz)	Setting	Power (dBm)	Limit (dBm)	Margin (dB)	Result
802.11a NoHT 6Mbps	36	20	5180	20.5	27.1	30	2.9	Pass
	44	20	5220	20.5	26.9	30	3.1	Pass
	48	20	5240	20.5	26.7	30	3.3	Pass
802.11n HT40+ MCS0	38	40	5190	17	23.7	30	6.3	Pass
	46	40	5230	17	23.5	30	6.5	Pass
802.11ac VHT80 MCS0	42	80	5210	14.5	21.5	30	8.5	Pass
802.11ac VHT80+80 MCS0	42	80	5210	16.5	20.1	30	9.9	Pass
U-NII-3 (5725-5850MHz) CDD Mode								
Mode	Channel	(MHz)	(MHz)	Setting	Power (dBm)	Limit (dBm)	Margin (dB)	Result
802.11a NoHT 6Mbps	149	20	5745	22	28.2	30	1.8	Pass
	157	20	5785	22	27.9	30	2.1	Pass
	165	20	5825	22	27.3	30	2.7	Pass
802.11n HT40+ MCS0	151	40	5755	22	27.9	30	2.1	Pass
	159	40	5795	22	27.3	30	2.7	Pass
802.11ac VHT80 MCS0	155	80	5775	15	21.8	30	8.2	Pass
802.11ac VHT80+80 MCS0	155	80	5775	16.5	18.9	30	11.1	Pass
Note: Chains 1,2 were measured for 802.11ac VHT80+80 MCS0 Mode for UNII-1. Chains 2,3 were measured for 802.11ac VHT80+80 MCS0 Mode for UNII-3.								

Table 3: FCC RF Output Powers Beamforming mode

U-NII-1 (5150-5250MHz) Beamforming Mode								
Mode	Channel	Bandwidth (MHz)	Frequency (MHz)	Power Setting	Total RMS Power (dBm)	Limit (dBm)	Margin (dB)	Result
802.11a NoHT 6Mbps	36	20	5180	18	24.2	28	3.8	Pass
	44	20	5220	18	24.1	28	3.9	Pass
	48	20	5240	18	23.7	28	4.3	Pass
802.11n HT40+ MCS0	38	40	5190	14	20.7	28	7.3	Pass
	46	40	5230	14	20.3	28	7.7	Pass
802.11ac VHT80 MCS0	42	80	5210	13	19.8	28	8.2	Pass
802.11ac VHT80+80 MCS0	42	80	5210	14	17.1	28	10.9	Pass
U-NII-3 (5725-5850MHz) Beamforming Mode								
Mode	Channel	(MHz)	(MHz)	Setting	Power (dBm)	Limit (dBm)	Margin (dB)	Result
802.11a NoHT 6Mbps	149	20	5745	19.5	25.3	28	2.7	Pass
	157	20	5785	19.5	25.2	28	2.8	Pass
	165	20	5825	19.5	24.6	28	3.4	Pass
802.11n HT40+ MCS0	151	40	5755	19.5	25.4	28	2.6	Pass
	159	40	5795	19.5	25.2	28	2.8	Pass
802.11ac VHT80 MCS0	155	80	5775	15	21.9	28	6.1	Pass
802.11ac VHT80+80 MCS0	155	80	5775	14	17.5	28	10.5	Pass
Note: Chains 1,2 were measured for 802.11ac VHT80+80 MCS0 Mode for UNII-1. Chains 2,3 were measured for 802.11ac VHT80+80 MCS0 Mode for UNII-3.								

4.1.4.2 ISED Power Measurements

Table 4: ISED RF Output Powers CDD mode (Non-Beamforming)

U-NII-1 (5150-5250MHz) CDD Mode										
Mode	Channel	Bandwidth (MHz)	Frequency (MHz)	Power Setting	Total RMS Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
802.11a NoHT 6Mbps	36	20	5180	10	16.7	2.5	19.2	22.1	2.9	Pass
	44	20	5220	10	16.6	2.5	19.1	22.1	3	Pass
	48	20	5240	10	16.3	2.5	18.8	22.1	3.3	Pass
802.11n HT40+ MCS0	38	40	5190	12	18.4	2.5	20.9	23.0	2.1	Pass
	46	40	5230	12	18.1	2.5	20.6	23.0	2.4	Pass
802.11ac VHT80 MCS0	42	80	5210	12	18.7	2.5	21.2	23.0	1.8	Pass
802.11ac VHT80+80 MCS0	42	80	5210	15.5	18.9	2.5	21.4	23.0	1.6	Pass
U-NII-3 (5725-5850MHz) CDD Mode										
Mode	Channel	Bandwidth (MHz)	Frequency (MHz)	Power Setting	Total RMS Power (dBm)		Limit (dBm)		Margin (dB)	Result
802.11a NoHT 6Mbps	149	20	5745	22	28.1		30		1.9	Pass
	157	20	5785	22	28		30		2	Pass
	165	20	5825	22	27.4		30		2.6	Pass
802.11n HT40+ MCS0	151	40	5755	22	27.8		30		2.2	Pass
	159	40	5795	22	27.6		30		2.4	Pass
802.11ac VHT80 MCS0	155	80	5775	15	21.8		30		8.2	Pass
802.11ac VHT80+80 MCS0	155	80	5775	15.5	19.3		30		10.7	Pass
Note: Chains 1,2 were measured for 802.11ac VHT80+80 MCS0 Mode for UNII-1. Chains 2,3 were measured for 802.11ac VHT80+80 MCS0 Mode for UNII-3.										

Table 5: ISED RF Output Powers Beamforming mode

U-NII-1 (5150-5250MHz) Beamforming Mode										
Mode	Channel	Bandwidth (MHz)	Frequency (MHz)	Power Setting	Total RMS Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
802.11a NoHT 6Mbps	36	20	5180	5.5	11.5	2.5	20	22.1	2.1	Pass
	44	20	5220	5.5	11.4	2.5	19.9	22.1	2.2	Pass
	48	20	5240	5.5	11.3	2.5	19.8	22.1	2.3	Pass
802.11n HT40+ MCS0	38	40	5190	6.5	12.8	2.5	21.3	23.0	1.7	Pass
	46	40	5230	6.5	12.5	2.5	21	23.0	2	Pass
802.11ac VHT80 MCS0	42	80	5210	6	12.5	2.5	21	23.0	2	Pass
802.11ac VHT80+80 MCS0	42	80	5210	9.5	12.4	2.5	20.9	23.0	2.1	Pass
U-NII-3 (5725-5850MHz) Beamforming Mode										
Mode	Channel	Bandwidth (MHz)	Frequency (MHz)	Power Setting	Total RMS Power (dBm)		Limit (dBm)		Margin (dB)	Result
802.11a NoHT 6Mbps	149	20	5745	19.5	25.1		28		2.9	Pass
	157	20	5785	19.5	25		28		3	Pass
	165	20	5825	19.5	24.4		28		3.6	Pass
802.11n HT40+ MCS0	151	40	5755	19.5	25.2		28		2.8	Pass
	159	40	5795	19.5	25.1		28		2.9	Pass
802.11ac VHT80 MCS0	155	80	5775	15	22		28		6	Pass
802.11ac VHT80+80 MCS0	155	80	5775	9.5	12.8		28		15.2	Pass
Note: Chains 1,2 were measured for 802.11ac VHT80+80 MCS0 Mode for UNII-1. Chains 2,3 were measured for 802.11ac VHT80+80 MCS0 Mode for UNII-3.										

4.2 Occupied Bandwidth and DTS Bandwidth (6dB)

The occupied bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency.

The 99% bandwidth is the bandwidth in which 99% of the transmitted power occupied.

The 6 dB bandwidth is defined the bandwidth of 6 dBr from highest transmitted level of the fundamental frequency.

4.2.1 Limit(s)

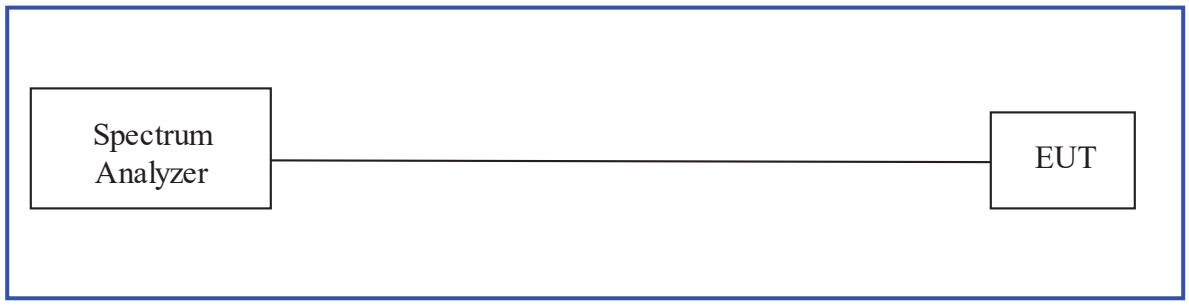
There is no restriction limits for the bandwidths in the U-NII-1 Band. The 99% bandwidth was used to determine the limit for maximum conducted output power per RSS-247 section 6.2.1.1 and to verify transmission in the U-NII-1 Band (5150-5250MHz).

For the U-NII-3 Band (5725-5850MHz) the minimum 6 dB bandwidth shall be at least 500 KHz per §15.407(e).

4.2.2 Test Method

The conducted method was used to measure the occupied bandwidth. The measurement was performed with modulation per CFR47 15.407(a) and RSS Gen Sect.6.6. For U-NII-1, the measurements were performed on 3 channels, where applicable, for the operating frequency range; 5150-5250 MHz to verify that the occupied bandwidth does not impede into the U-NII-2A band (5250-5350MHz) to verify that DFS is not required. For occupied bandwidth measurements, procedures given by ANSI 63.10-2013 section 6.9.3 were used. For DTS Bandwidth (6dB), procedures given by ANSI 63.10-2013 section 11.8.1 were used. The test plan for these measurements were based on guidance from ANSI 63.10-2013 sections 5.6.2.1 and 5.6.2.2.

4.2.3 Test Setup:



Only CDD modes were measured as the beamforming modes share the same modulation families. See section 4.1.2.1 table 2 for power settings.

4.2.4 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 6: Occupied Bandwidth – U-NII-1 Test Results

Mode	Channel	99% Bandwidth (MHz)		
		OBW	FL	FH
802.11a NoHT 6Mbps	36	16.5	5171.7	5188.2
	44	16.5	5211.7	5228.2
	48	16.5	5231.7	5248.2
802.11n HT40+ MCS0	38	36.2	5171.8	5208.0
	46	36.2	5211.8	5248.0
802.11ac VHT80 MCS0	42	77.0	5171.7	5248.6
802.11ac VHT80+80 MCS0	42	76.5	5171.7	5248.3

Note: 802.11ac VHT80+80 MCS0 measured on Chain 0, all other measurements were performed on Chain 3.

Table 7: Occupied and DTS Bandwidth– U-NII-3 Test Results

Mode	Channel	99% Bandwidth (MHz)	DTS Bandwidth (MHz)
802.11a NoHT 6Mbps	157	16.4	16.4
802.11n HT40+ MCS0	159	36.1	35.2
802.11ac VHT80 MCS0	155	75.8	76.4
802.11ac VHT80+80 MCS0	155	75.8	75.7

Note: All measurements were performed on Chain 3.

4.2.4.1 Measurement Plots

4.2.4.1.1 UNII-1

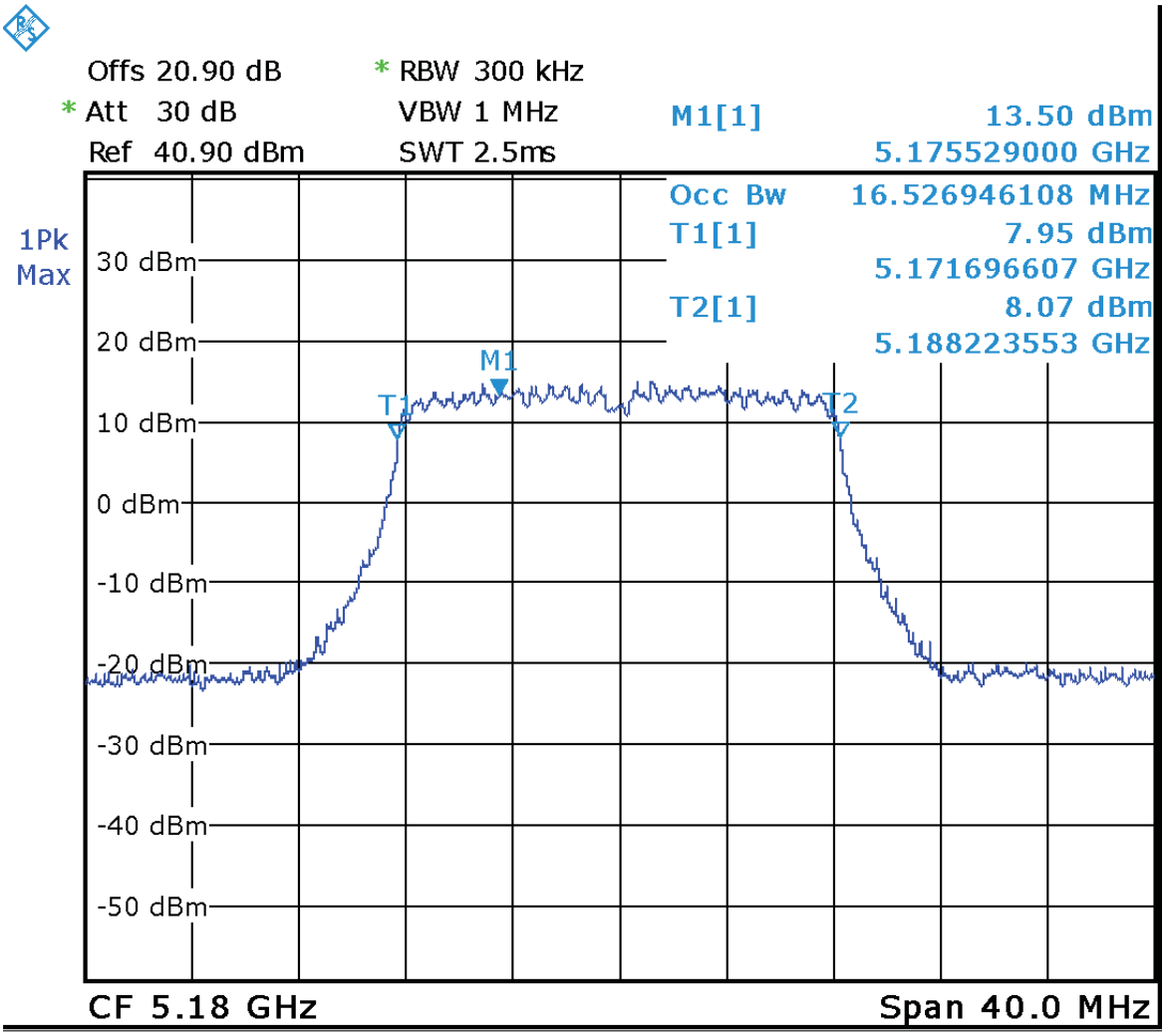


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Figure 1: 99% Occupied Bandwidth, Channel 36 at 802.11a 6Mbps, Chain 3

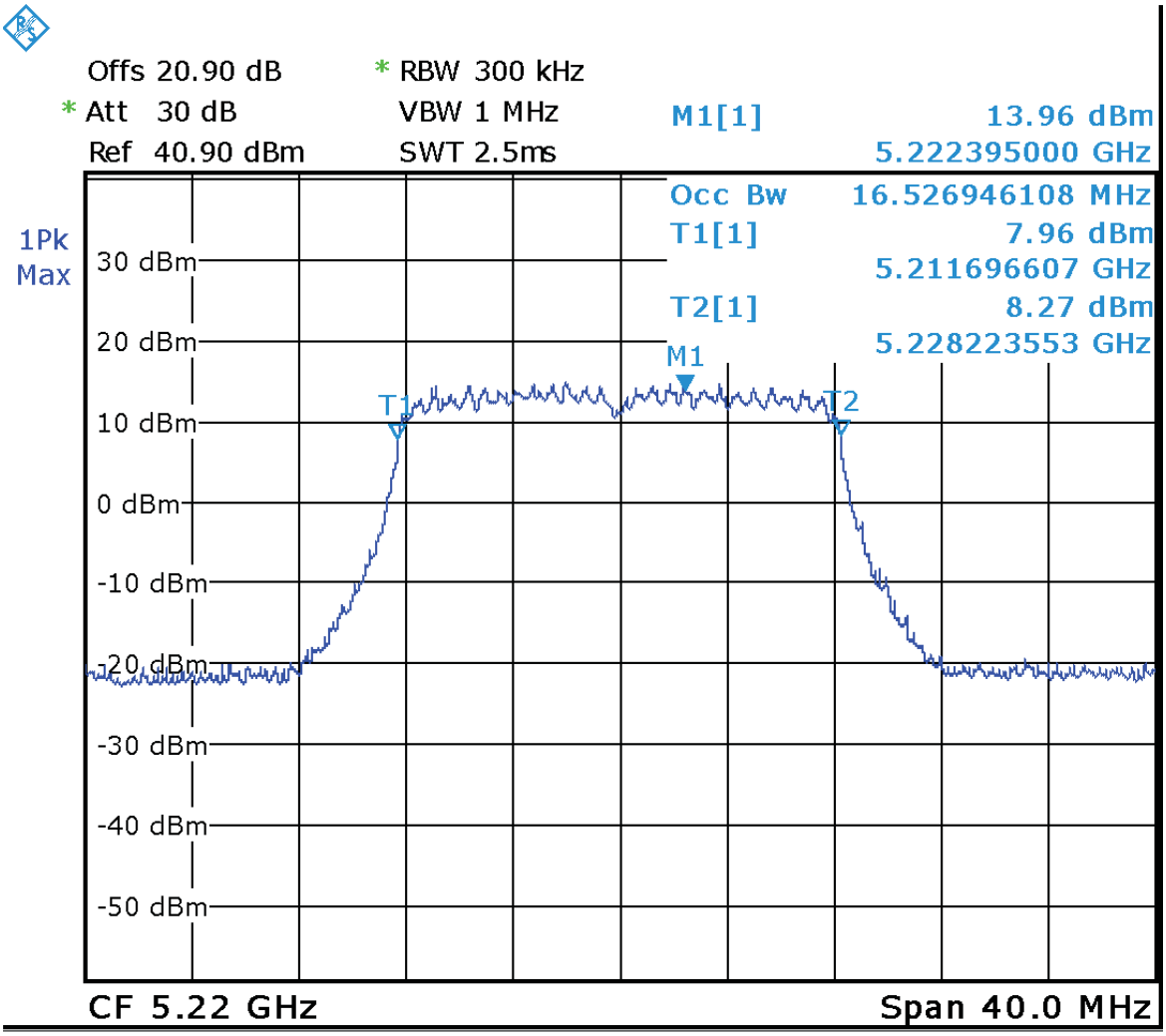

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Figure 2: 99% Occupied Bandwidth, Channel 44 at 802.11a 6Mbps, Chain 3

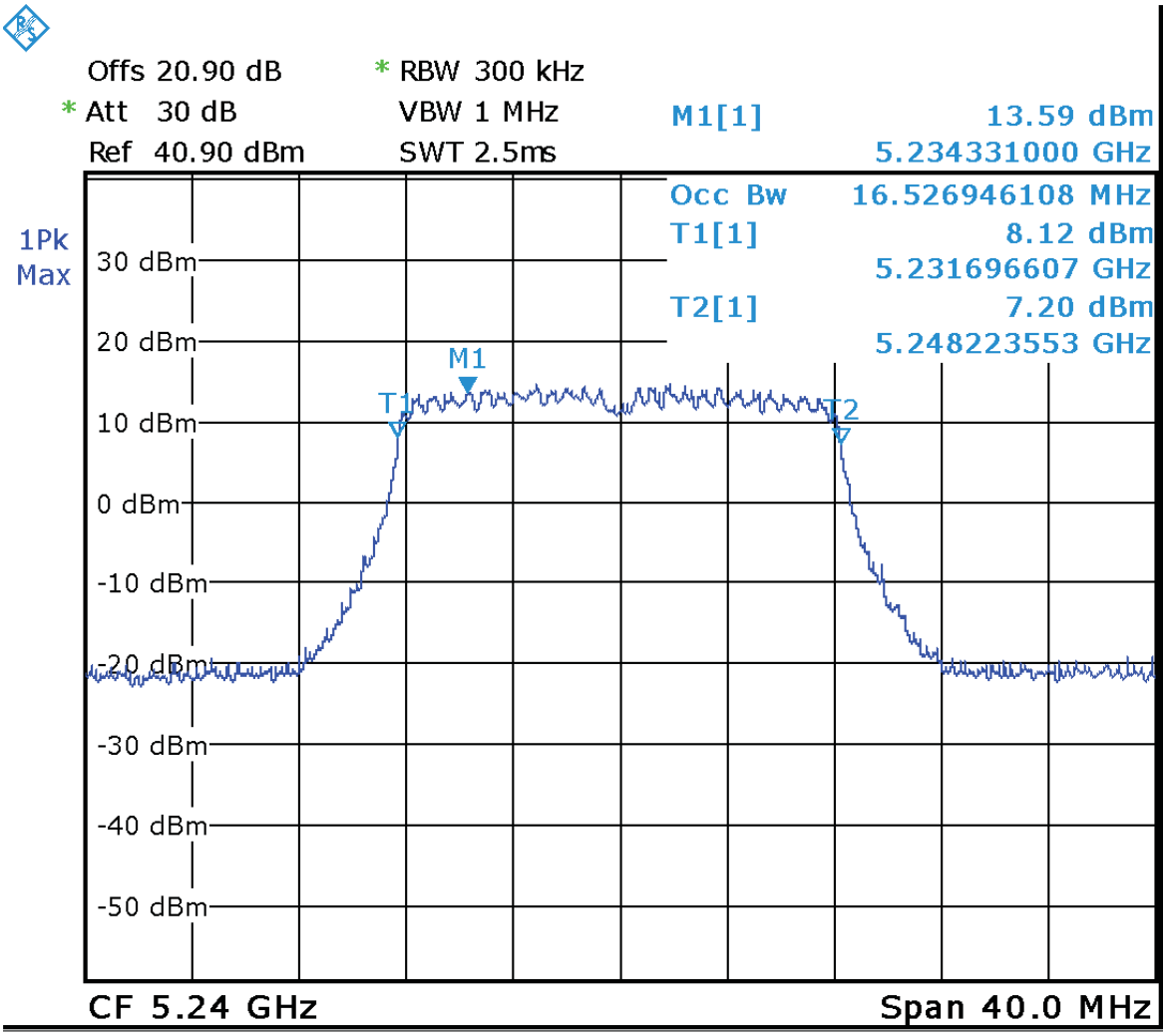

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Figure 3: 99% Occupied Bandwidth, Channel 48 at 802.11a 6Mbps, Chain 3

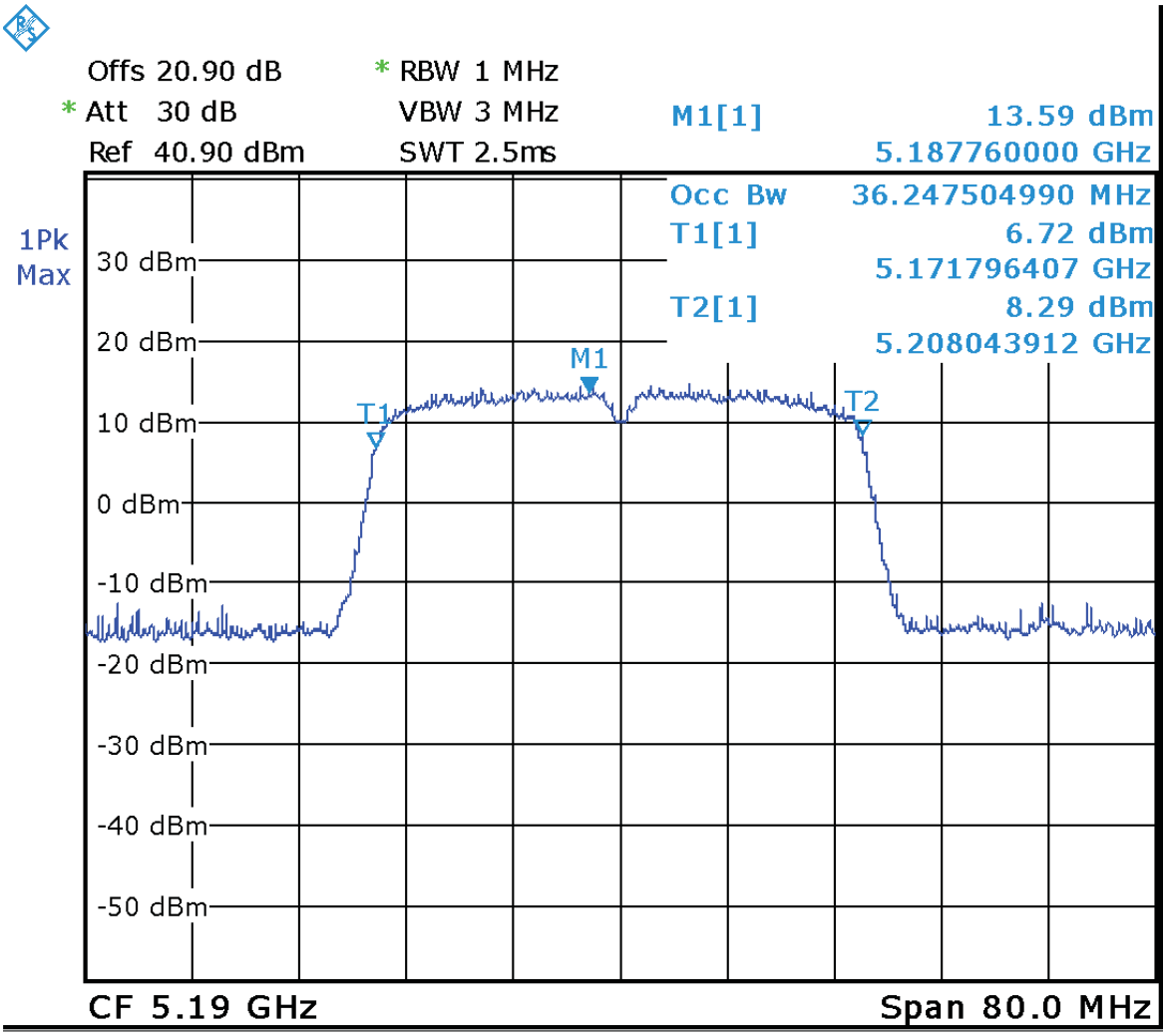

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Figure 4: 99% Occupied Bandwidth, Channel 38 at 802.11n HT40+ MCS0, Chain 3

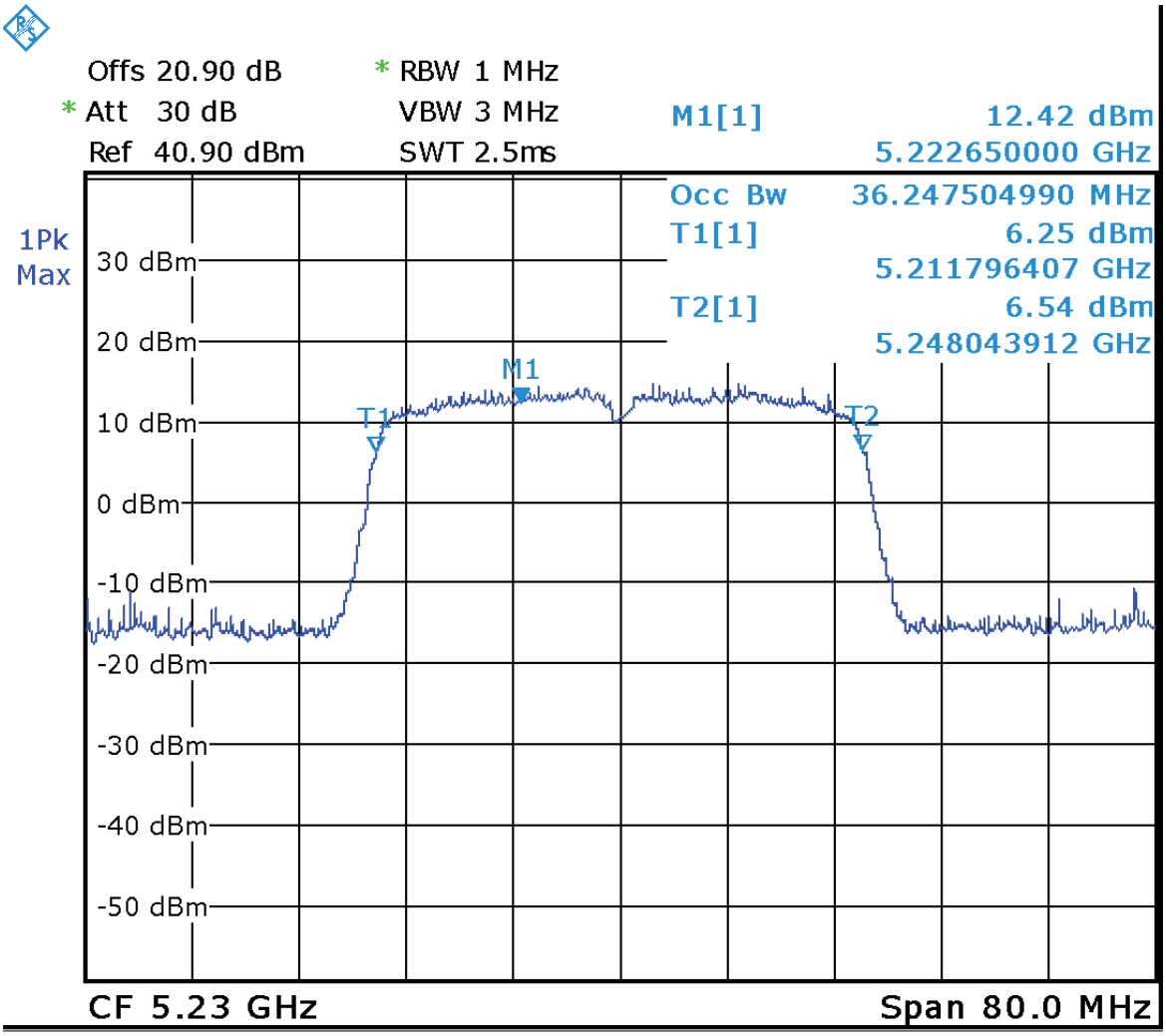

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Figure 5: 99% Occupied Bandwidth, Channel 46 at 802.11n HT40+ MCS0, Chain 3

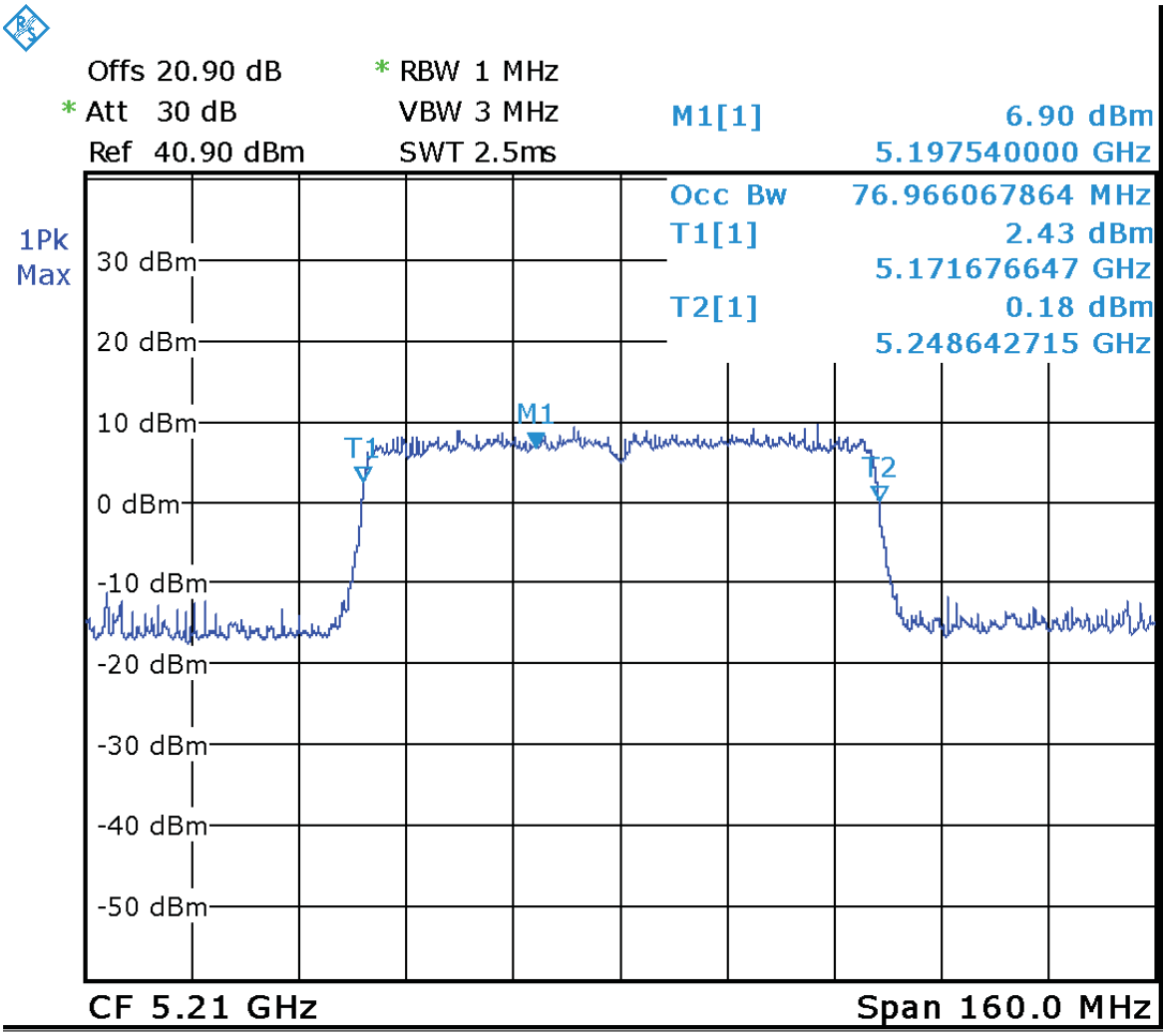

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Figure 6: 99% Occupied Bandwidth, Channel 42 at 802.11ac VHT80 MCS0, Chain 3

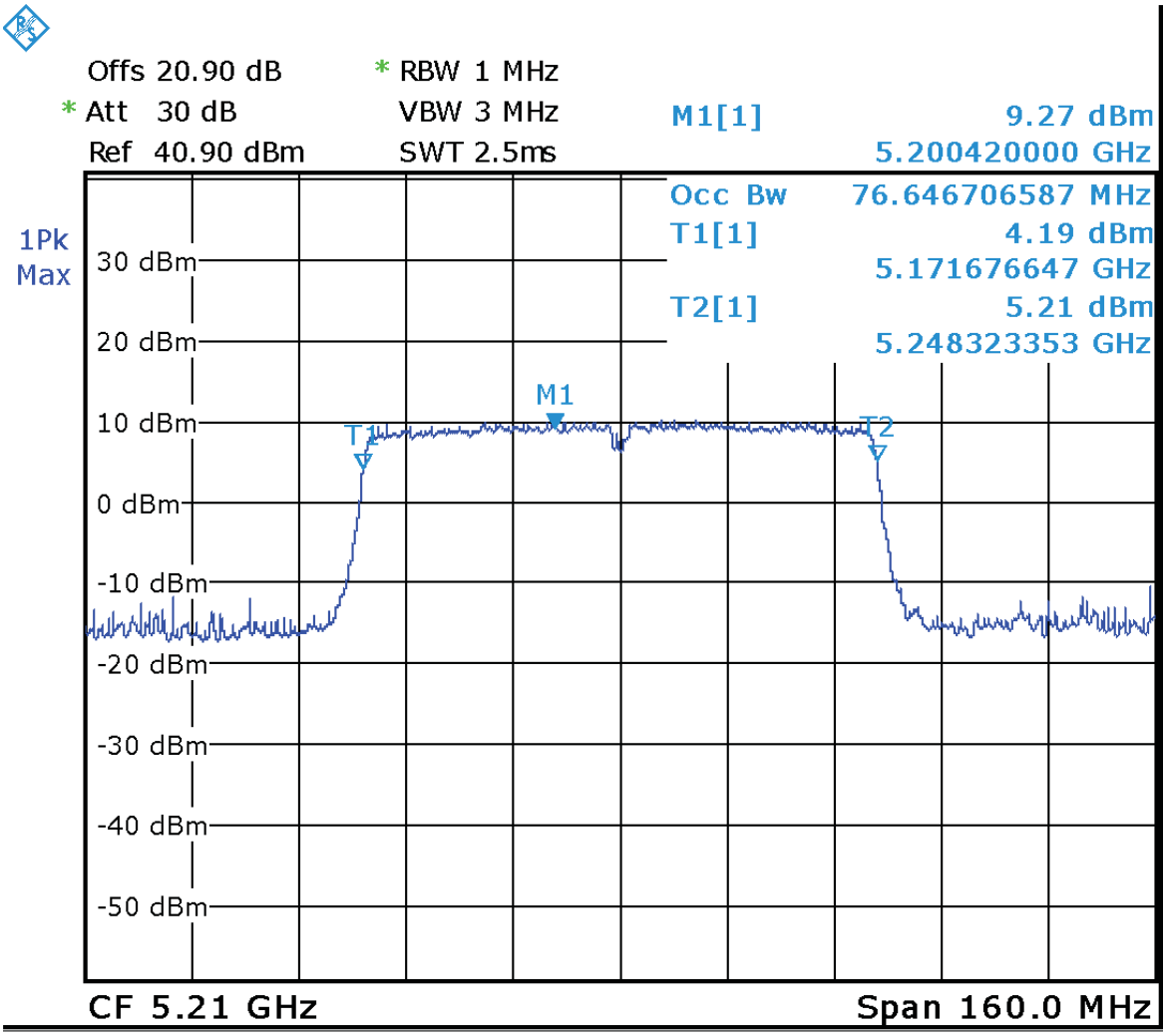

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Figure 7: 99% Occupied Bandwidth, Channel 42 at 802.11ac VHT80+80 MCS0, Chain 0

4.2.4.1.2 UNII-3

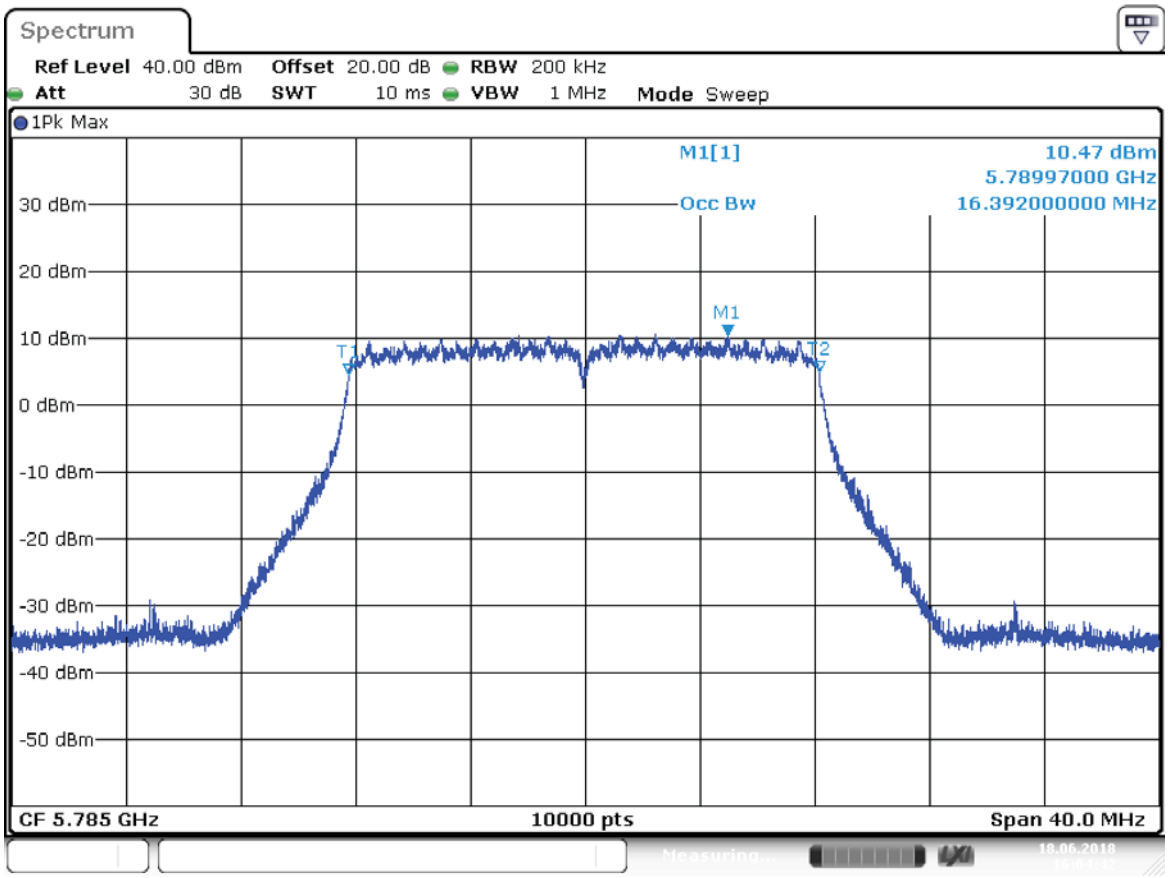

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Figure 8: 99% Occupied Bandwidth, Channel 157 at 802.11a 6Mbps, Chain 3

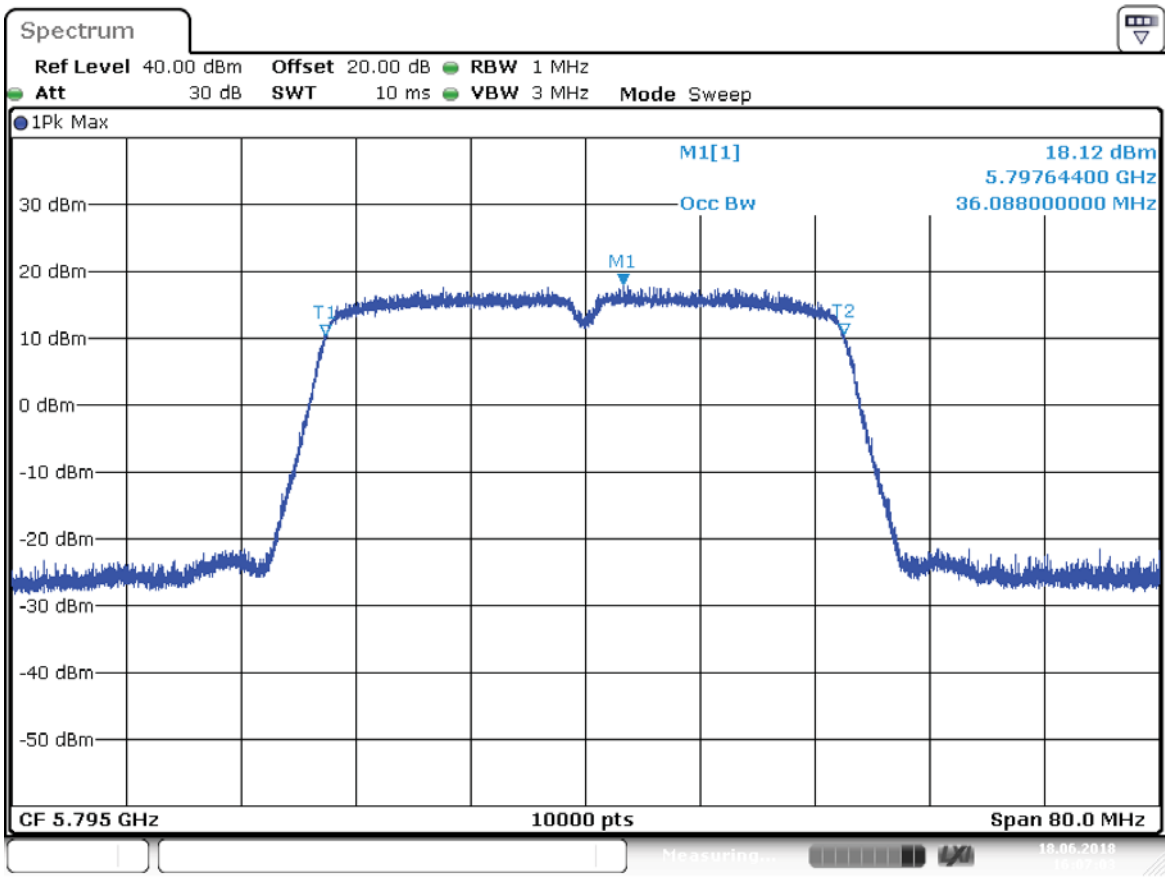

Figure 9: 99% Occupied Bandwidth, Channel 159 at 802.11n HT40+ MCS0, Chain 3

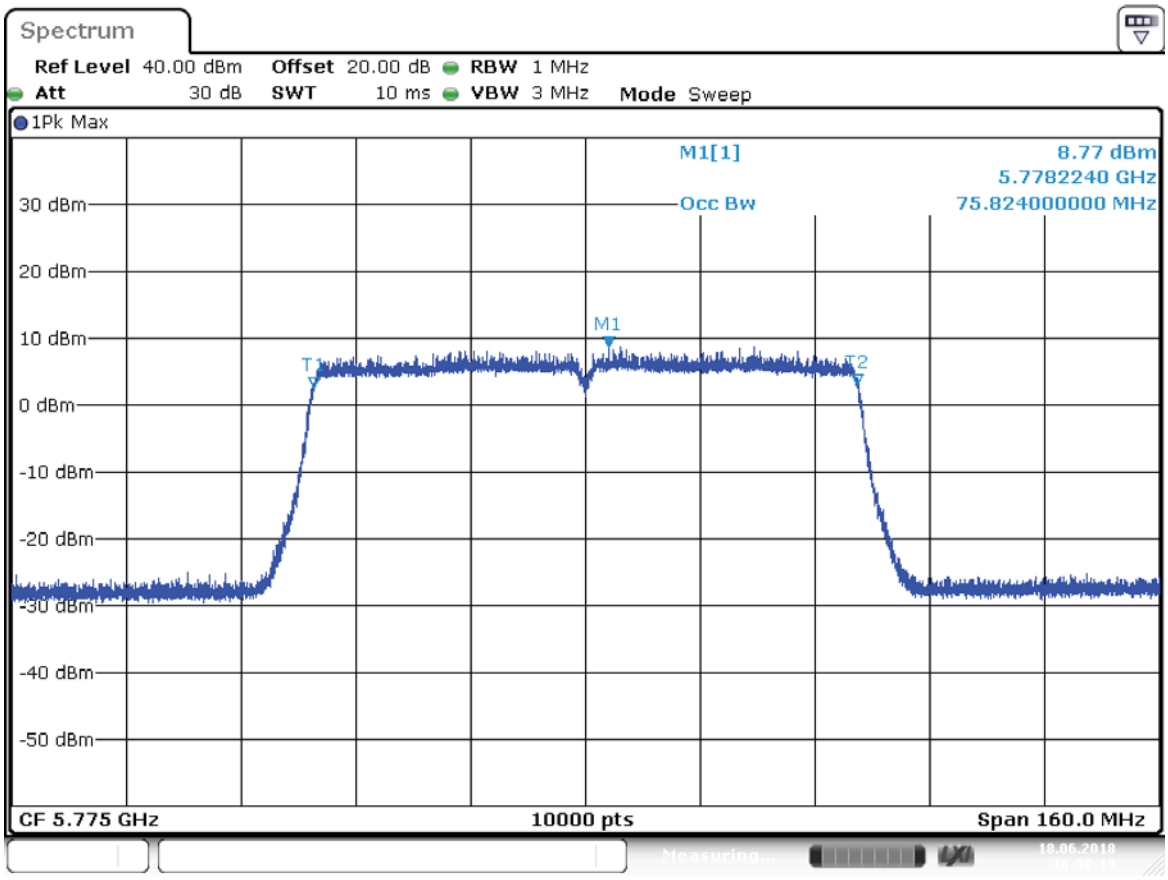

Figure 10: 99% Occupied Bandwidth, Channel 155 at 802.11ac VHT80 MCS0, Chain 3

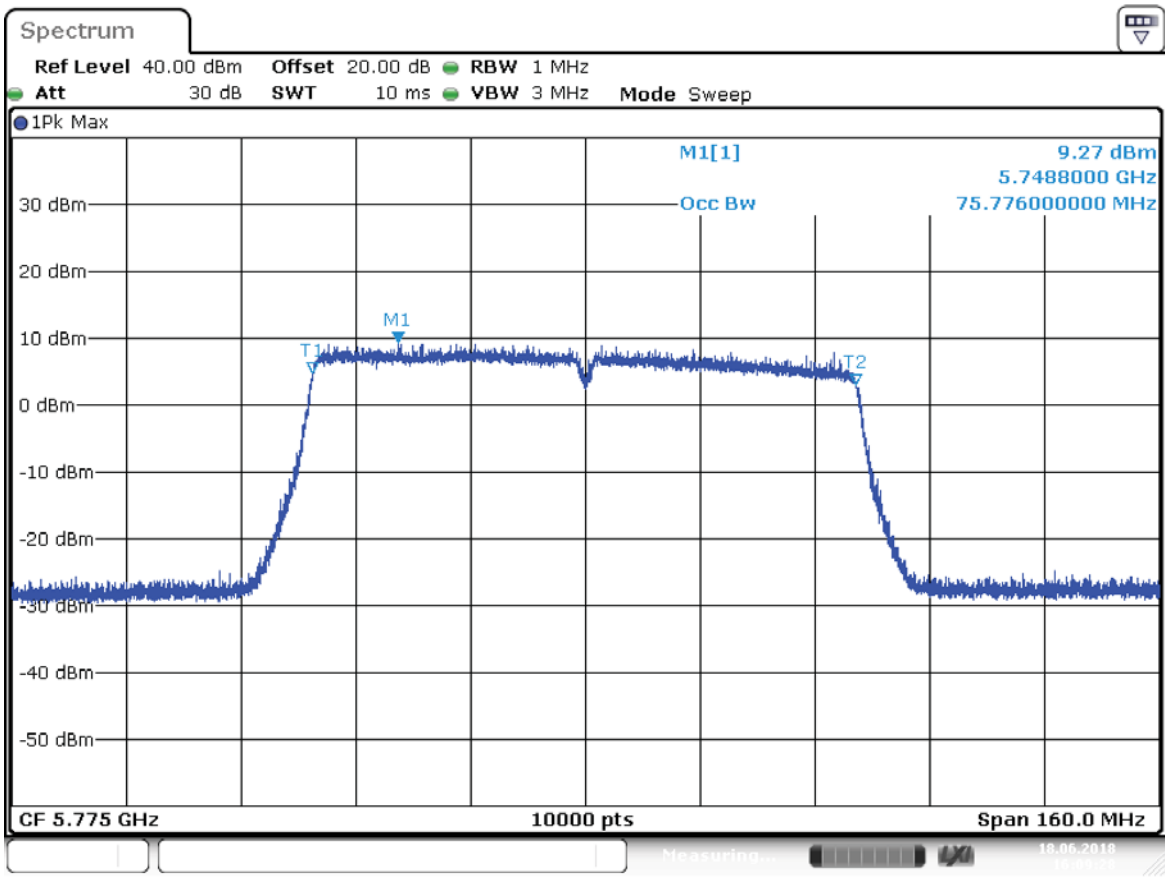

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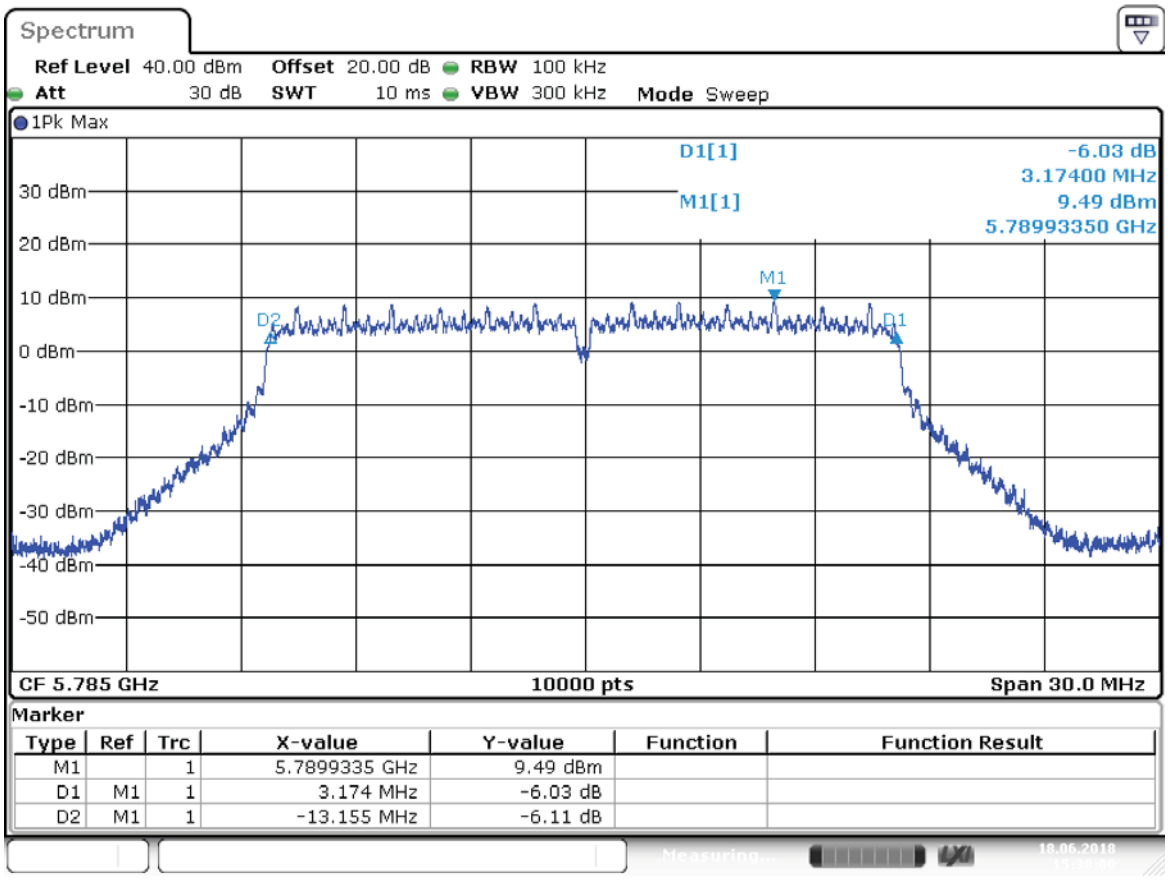
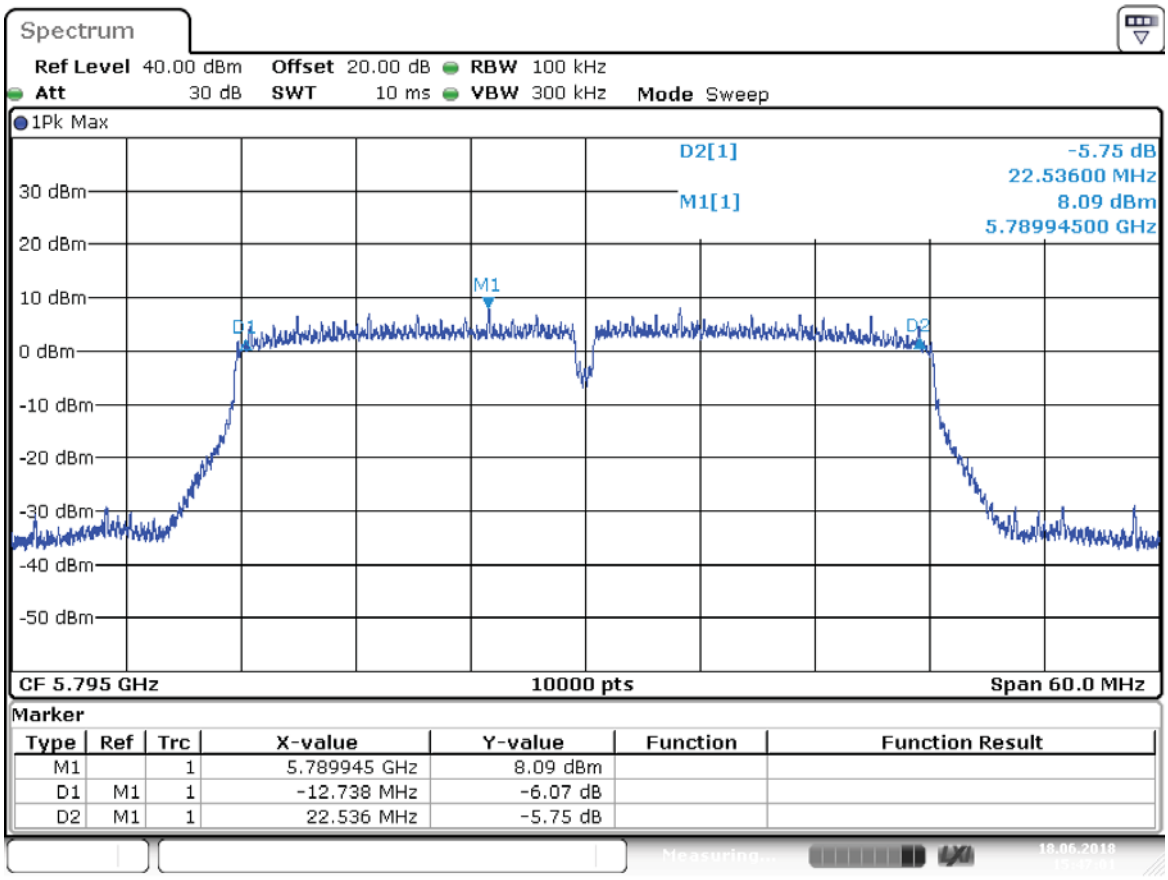
Figure 11: 99% Occupied Bandwidth, Channel 155 at 802.11ac VHT80+80 MCS0, Chain 3



Date: 18.JUN.2018 15:38:01

Figure 12: DTS Bandwidth, Channel 157 at 802.11a 6Mbps, Chain 3



Date: 18.JUN.2018 15:47:01

Figure 13: DTS Bandwidth, Channel 159 at 802.11n HT40+ MCS0, Chain 3

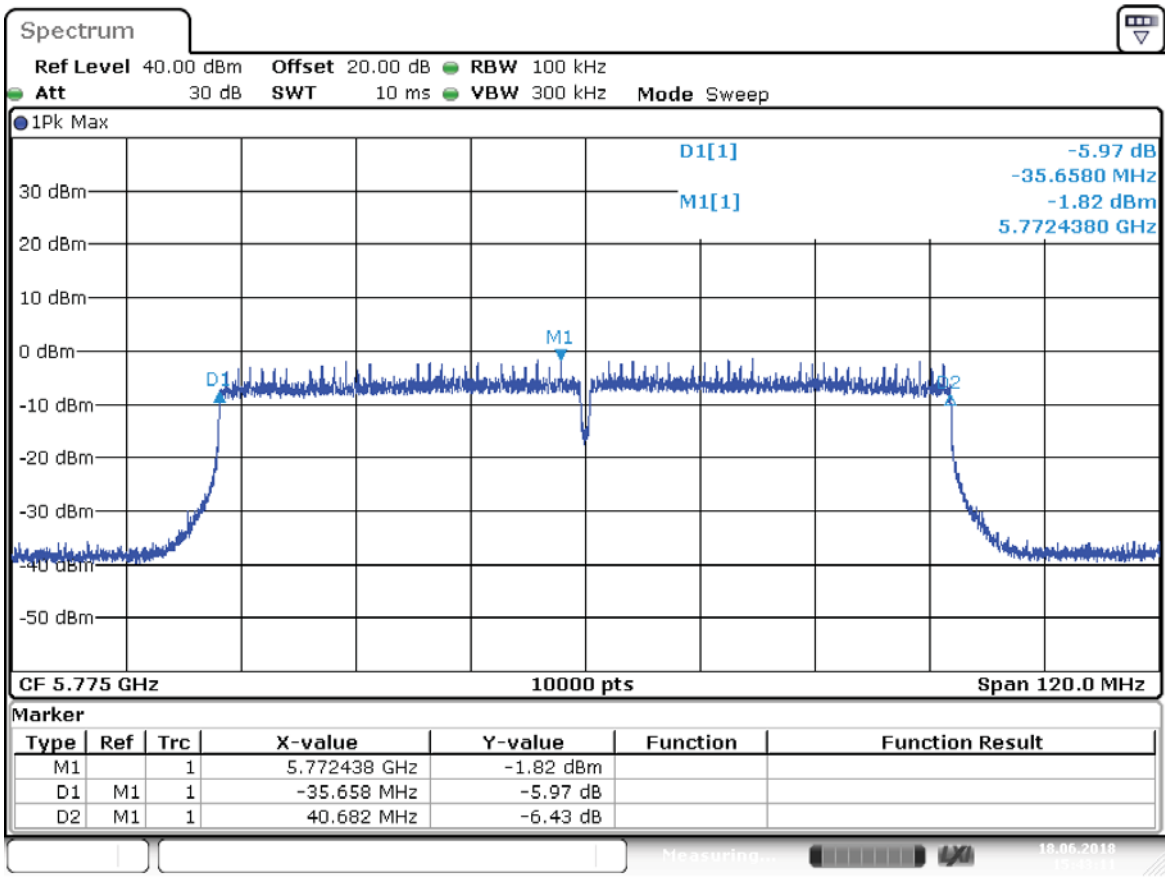


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Figure 14: DTS Bandwidth, Channel 155 at 802.11ac VHT80 MCS0, Chain 3

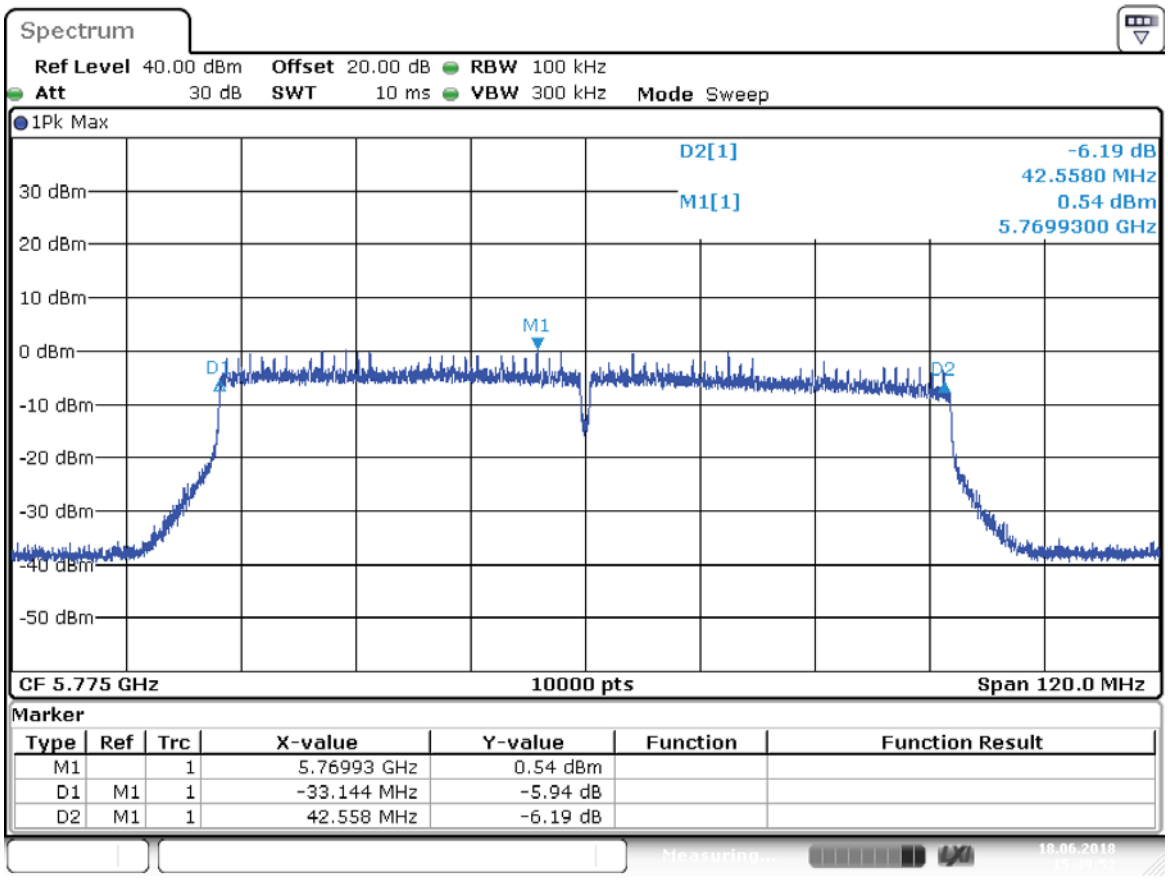

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Figure 15: DTS Bandwidth, Channel 155 at 802.11ac VHT80+80 MCS0, Chain 3

4.3 Peak Power Spectral Density (PPSD)

4.3.1 Limit(s)

U-NII-1 Band (5150-5250MHz):

FCC Part 15.407 (a):

17 dBm in any 1 MHz band

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RSS 247 Section 6.2.1.1:

10 dBm in any 1 MHz band, E.I.R.P.

U-NII-3 Band (5725-5850MHz):

FCC Part 15.407(a):

30 dBm in any 500KHz band

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RSS 247 Section 6.2.4.1:

30 dBm in any 500KHz band

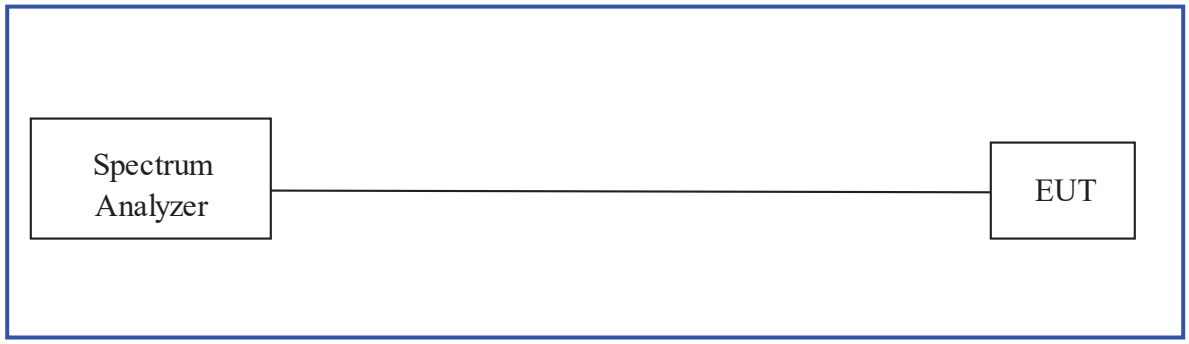
If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.3.2 Test Method

The conducted method was used to measure the power spectral density per ANSI C63.10-2013 section 12.5 and 14.3.2.3. A pre-evaluation was performed to find the worst case modes (Section 3.5 of this report). The worst findings were conducted on the low, middle and high channels, where applicable, in the operating frequency ranges of 5150-5250MHz and 5725-5850MHz.

U-NII-3 (5725-5850MHz) Peak power spectral density not measured as the RF output power is lower than the PPSD limit (30 dBm/500KHz) with a worse case occupied bandwidth of 16.4MHz.

4.3.3 Test Setup:



4.3.4 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

U-NII-3 (5725-5850MHz) Peak power spectral density implies compliance as the RF output power is lower than the PPSD limit (30 dBm/500KHz) with a worse case occupied bandwidth of 16.4MHz.

Table 8: Peak Power Spectral Density – Test Results – FCC

U-NII-1 (5150-5250MHz) CDD Mode										
Mode	Channel	Bandwidth (MHz)	Frequency (MHz)	Power Setting	Worse Chain Measured PPSD (dBm)	Duty Cycle(%)	Total PPSD (dBm)	Limit (dBm/MHz)	Margin (dB)	Result
802.11a NoHT 6Mbps	36	20	5180	20.5	10.5	95.6%	16.7	17	0.3	Pass
	44	20	5220	20.5	10.2	95.6%	16.4	17	0.6	Pass
	48	20	5240	20.5	10.1	95.6%	16.3	17	0.7	Pass
802.11n HT40+ MCS0	38	40	5190	17	4	90.9%	10.4	17	6.6	Pass
	46	40	5230	17	3.8	90.9%	10.2	17	6.8	Pass
802.11ac VHT80 MCS0	42	80	5210	14.5	-2.4	83.9%	4.4	17	12.6	Pass
802.11ac VHT80+80 MCS0	42	80	5210	16.5	-0.3	97.1%	2.8	17	14.2	Pass
U-NII-1 (5150-5250MHz) Beamforming Mode										
Mode	Channel	Bandwidth (MHz)	Frequency (MHz)	Power Setting	Worse Chain Measured PPSD (dBm)	Duty Cycle(%)	Total PPSD (dBm)	Limit (dBm/MHz)	Margin (dB)	Result
802.11ac VHT20 MCS0	36	20	5180	18	7.3	95.6%	13.5	15	1.5	Pass
	44	20	5220	18	7.2	95.6%	13.4	15	1.6	Pass
	48	20	5240	18	6.9	95.6%	13.1	15	1.9	Pass
802.11ac VHT40 MCS0	38	40	5190	14	0.8	90.9%	7.2	15	7.8	Pass
	46	40	5230	14	0.6	90.9%	7.0	15	8.0	Pass
802.11ac VHT80 MCS0	42	80	5210	13	-3.6	83.9%	3.2	15	11.8	Pass
802.11ac VHT80+80 MCS0	42	80	5210	14	-2.8	97.1%	0.3	15	14.7	Pass
Note: Chain 1 was measured for 802.11ac VHT80+80 MCS0 mode, all other measurements were performed on Chain 3.										

Table 9: Peak Power Spectral Density – Test Results – ISED

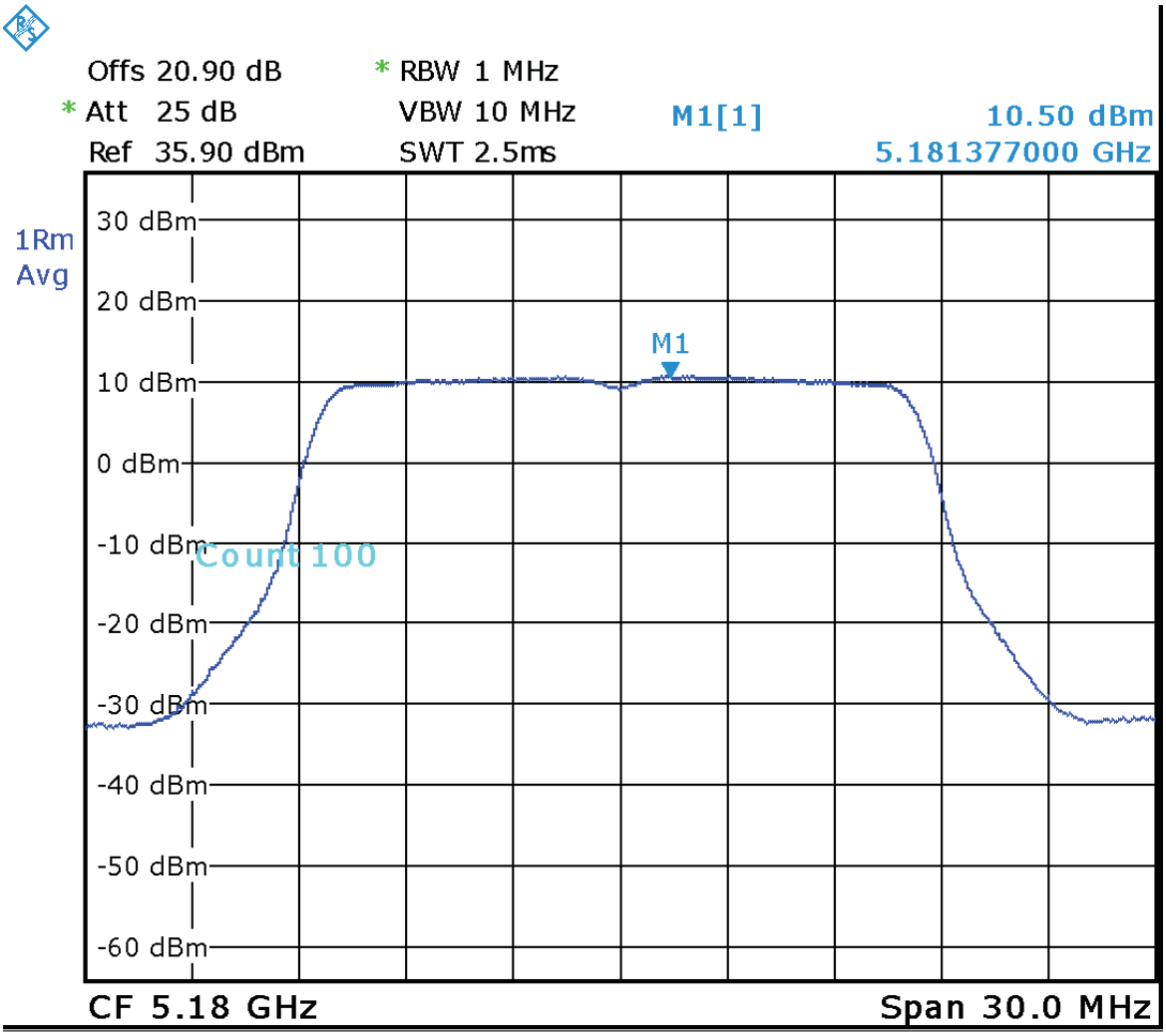
U-NII-1 (5150-5250MHz) CDD Mode												
Mode	Channel	Bandwidth (MHz)	Frequency (MHz)	Power Setting	Worse Chain Measured PPSD (dBm)	Duty Cycle(%)	Total PPSD (dBm)	Max Antenna Gain (dBi)	Total EIRP PPSD (dBm)	EIRP PPSD Limit (dBm/MHz)	Margin (dB)	Result
802.11a NoHT 6Mbps	36	20	5180	10	0.6	95.6%	6.8	2.5	9.3	10	0.7	Pass
	44	20	5220	10	0.1	95.6%	6.3	2.5	8.8	10	1.2	Pass
	48	20	5240	10	-0.1	95.6%	6.1	2.5	8.6	10	1.4	Pass
802.11n HT40+ MCS0	38	40	5190	12	-1.0	90.9%	5.4	2.5	7.9	10	2.1	Pass
	46	40	5230	12	-1.5	90.9%	4.9	2.5	7.4	10	2.6	Pass
802.11ac VHT80 MCS0	42	80	5210	12	-4.5	83.9%	2.3	2.5	4.8	10	5.2	Pass
802.11ac VHT80+80 MCS0	42	80	5210	15.5	-1.4	97.1%	1.7	2.5	4.2	10	5.8	Pass
U-NII-1 (5150-5250MHz) Beamforming Mode												
Mode	Channel	Bandwidth (MHz)	Frequency (MHz)	Power Setting	Worse Chain Measured PPSD (dBm)	Duty Cycle(%)	Total PPSD (dBm)	Max Antenna Gain (dBi)	Total EIRP PPSD (dBm)	EIRP PPSD Limit (dBm/MHz)	Margin (dB)	Result
802.11ac VHT20 MCS0	36	20	5180	5.5	-5.2	95.6%	1.0	2.5	9.5	10	0.5	Pass
	44	20	5220	5.5	-5.5	95.6%	0.7	2.5	9.2	10	0.8	Pass
	48	20	5240	5.5	-5.6	95.6%	0.6	2.5	9.1	10	0.9	Pass
802.11ac VHT40 MCS0	38	40	5190	6.5	-6.8	90.9%	-0.4	2.5	8.1	10	1.9	Pass
	46	40	5230	6.5	-7.2	90.9%	-0.8	2.5	7.7	10	2.3	Pass
802.11ac VHT80 MCS0	42	80	5210	6	-10.9	83.9%	-4.1	2.5	4.4	10	5.6	Pass
802.11ac VHT80+80 MCS0	42	80	5210	9.5	-7.3	97.1%	-4.2	2.5	1.3	10	8.7	Pass

Note: Chain 1 was measured for 802.11ac VHT80+80 MCS0 mode, all other measurements were performed on Chain 3.

4.3.4.1 Measurement Plots

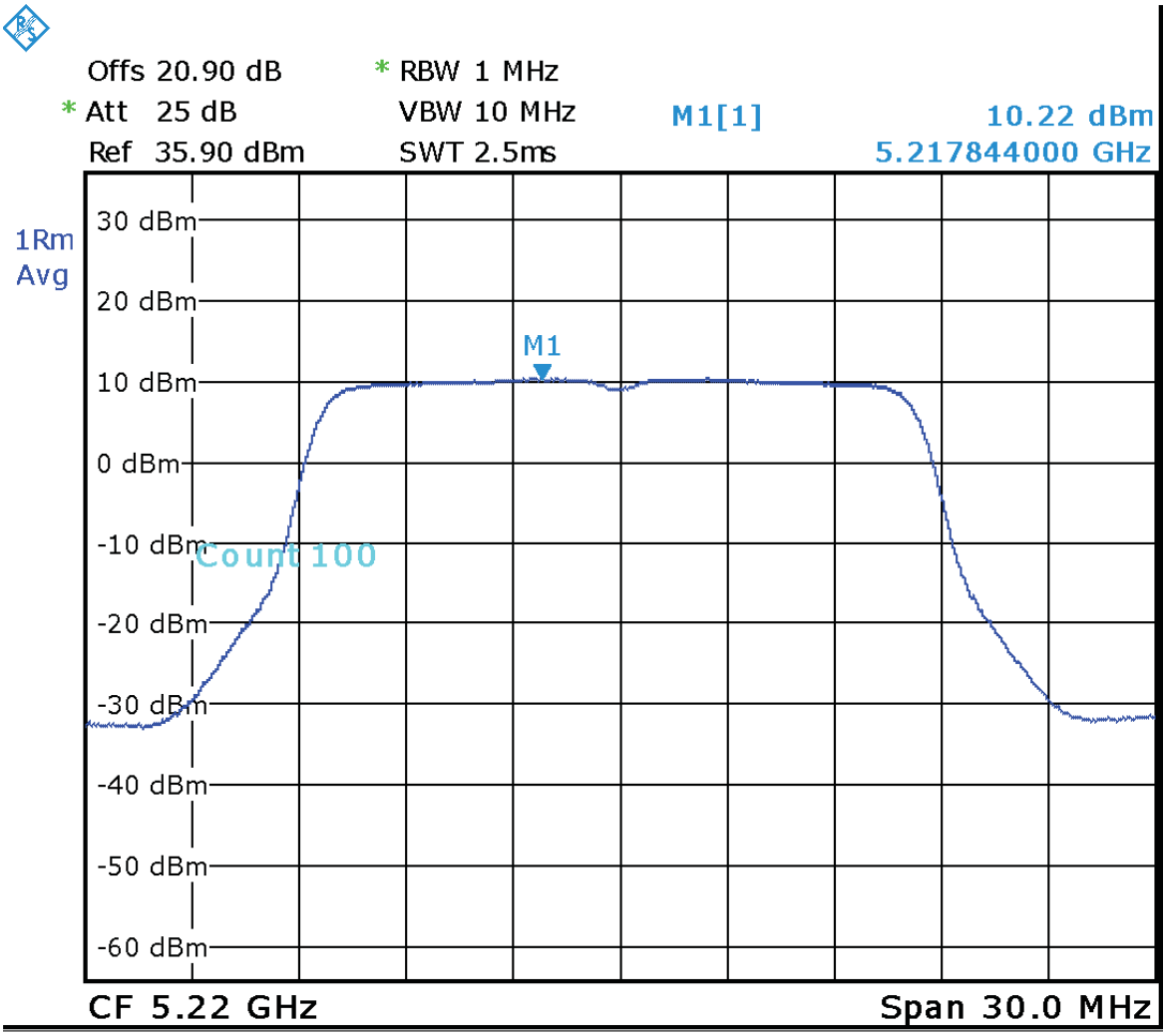
4.3.4.1.1 FCC

4.3.4.1.1.1 CDD Mode



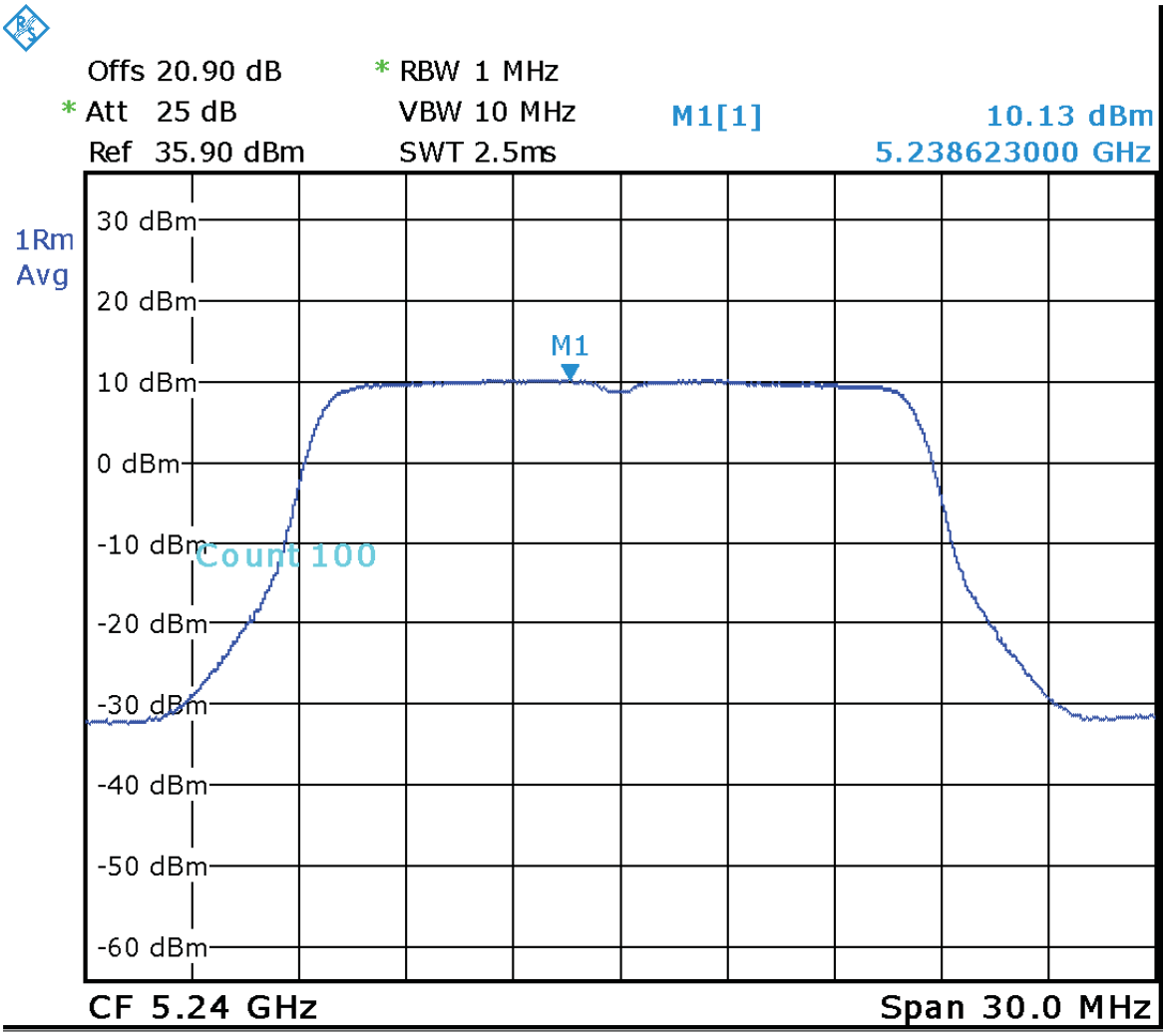
Date: 14.JUN.2018 19:40:42

Figure 16: Power Spectral Density, Channel 36 802.11a NoHT 6 Mbps, Chain 3



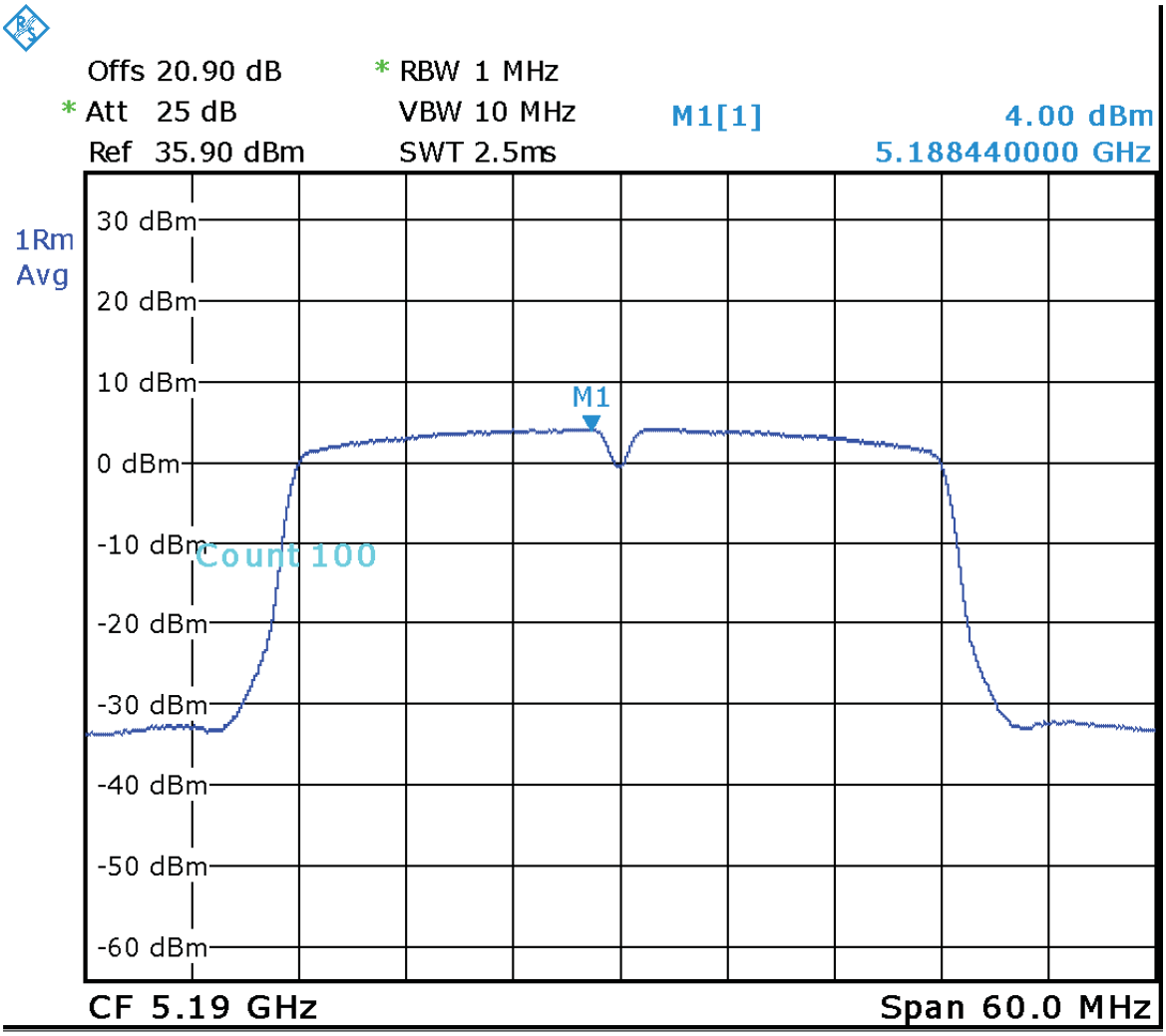
Date: 14.JUN.2018 19:42:52

Figure 17: Power Spectral Density, Channel 44 802.11a NoHT 6 Mbps, Chain 3



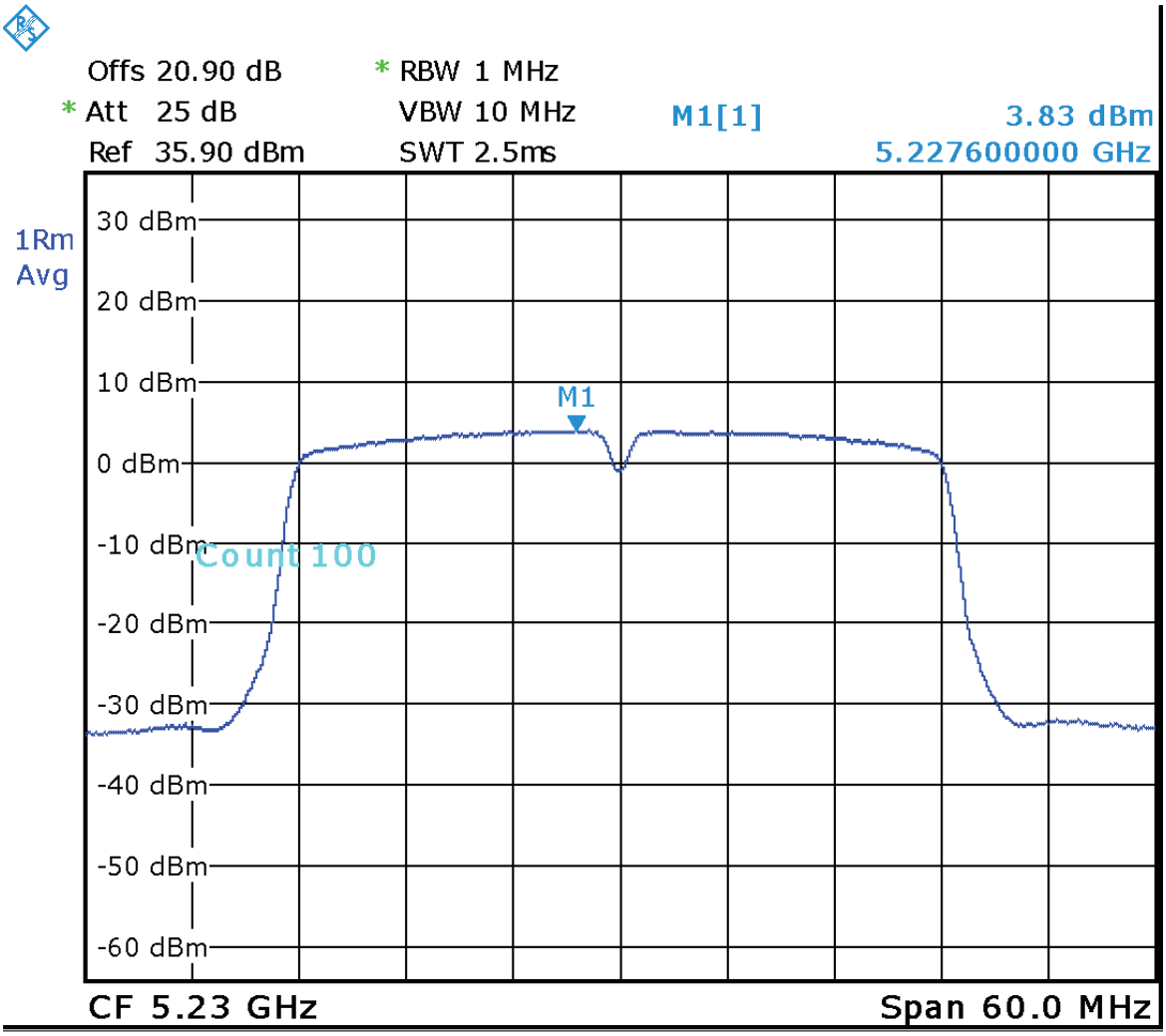
Date: 14.JUN.2018 19:43:47

Figure 18: Power Spectral Density, Channel 48 802.11a NoHT 6 Mbps, Chain 3



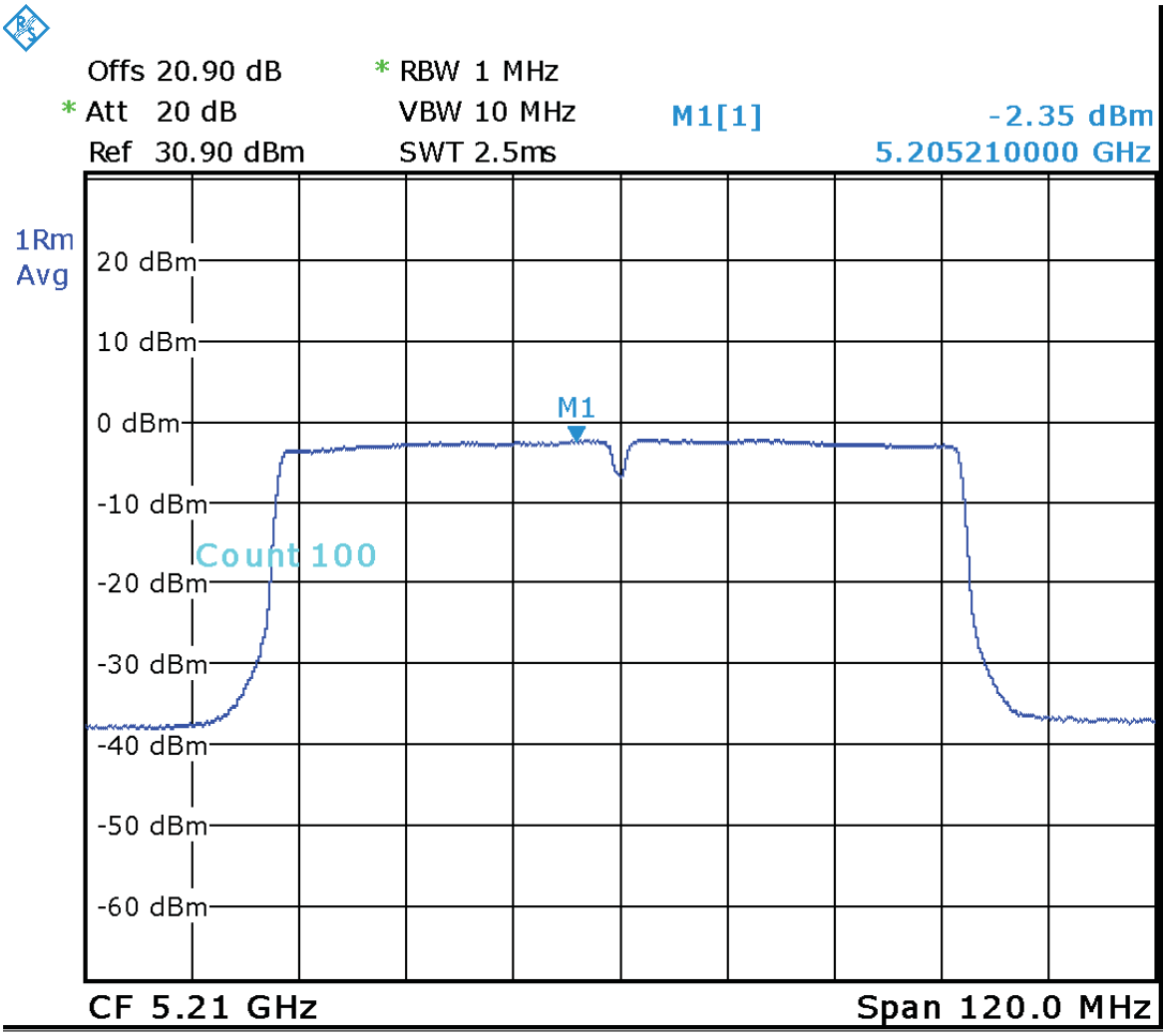
Date: 14.JUN.2018 19:50:14

Figure 19: Power Spectral Density, Channel 38 802.11n HT40+ MCS0, Chain 3



Date: 14.JUN.2018 19:51:17

Figure 20: Power Spectral Density, Channel 46 802.11n HT40+ MCS0, Chain 3



Date: 14.JUN.2018 19:05:20

Figure 21: Power Spectral Density, Channel 42 802.11ac VHT80 MCS0, Chain 3

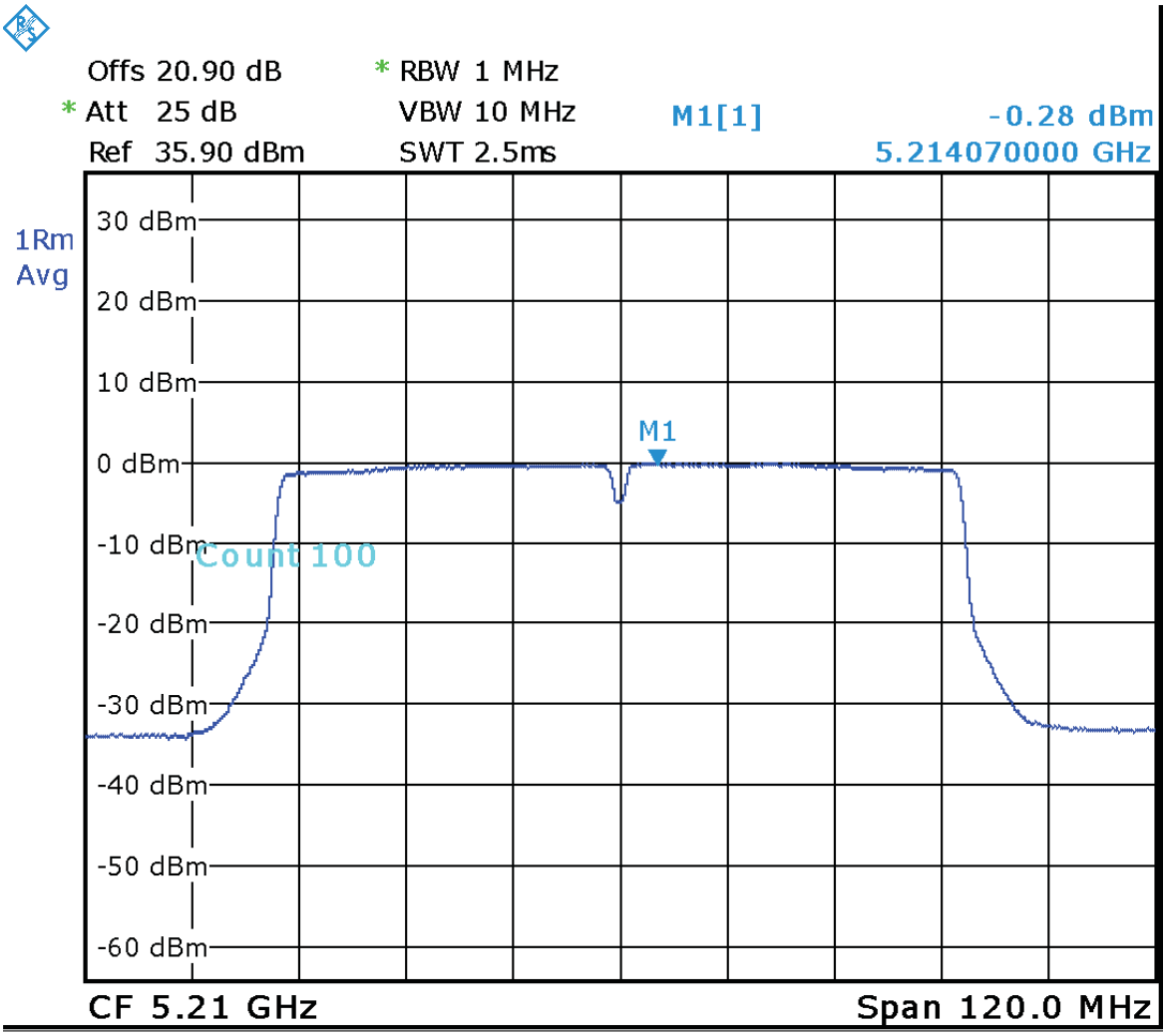
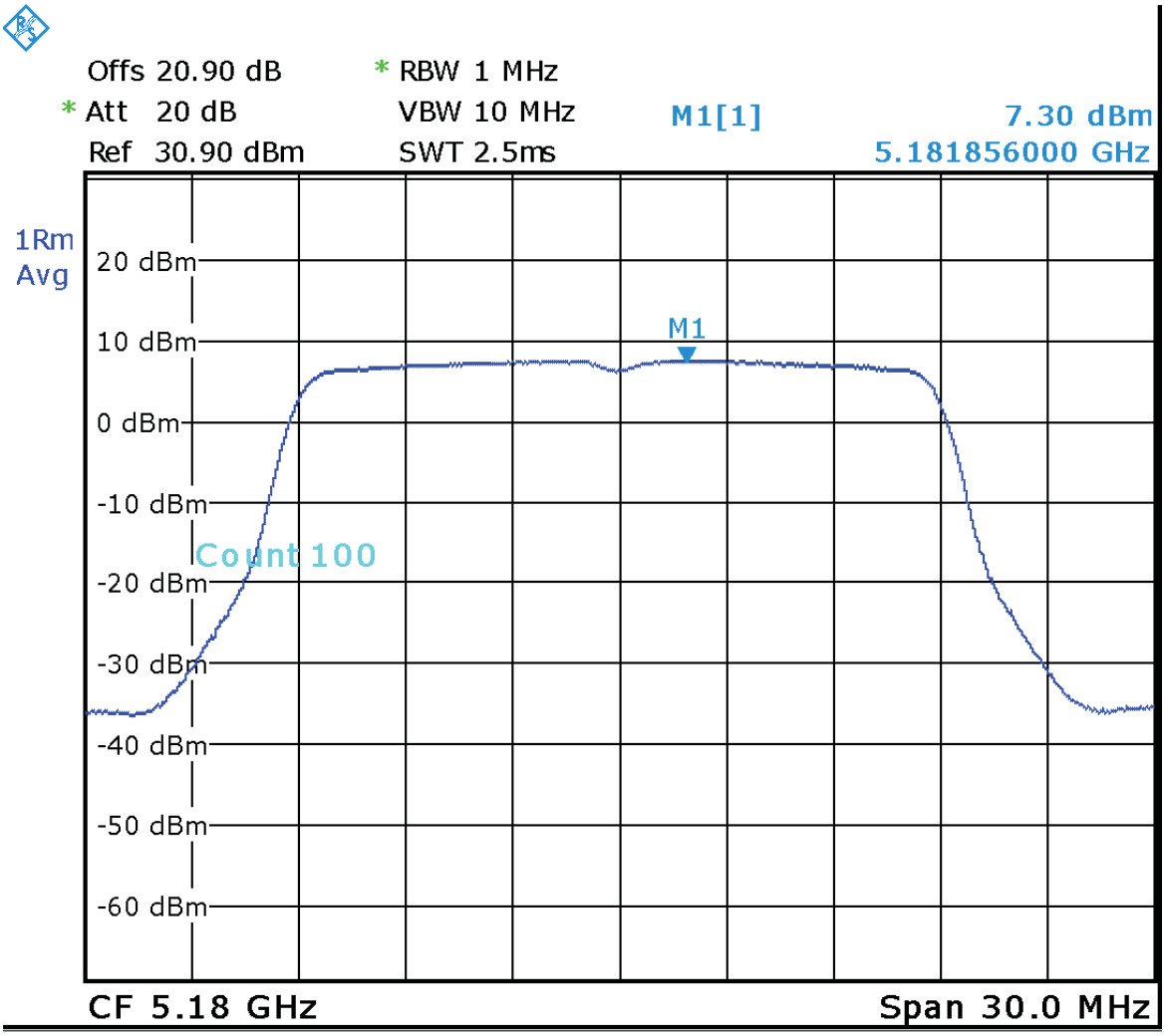


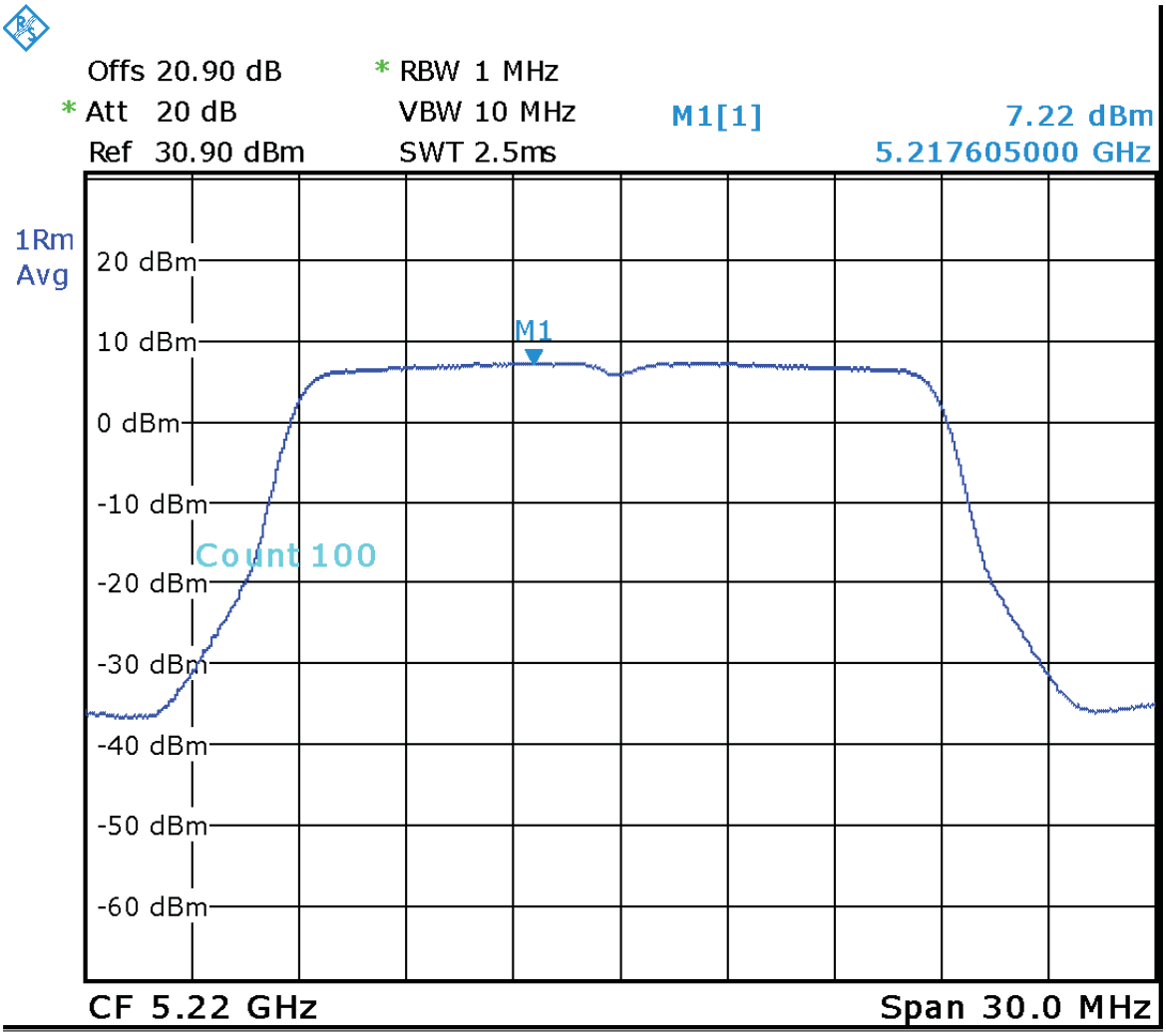
Figure 22: Power Spectral Density, Channel 42 802.11ac VHT80+80 MCS0, Chain 1

4.3.4.1.1.2 Beamforming Mode



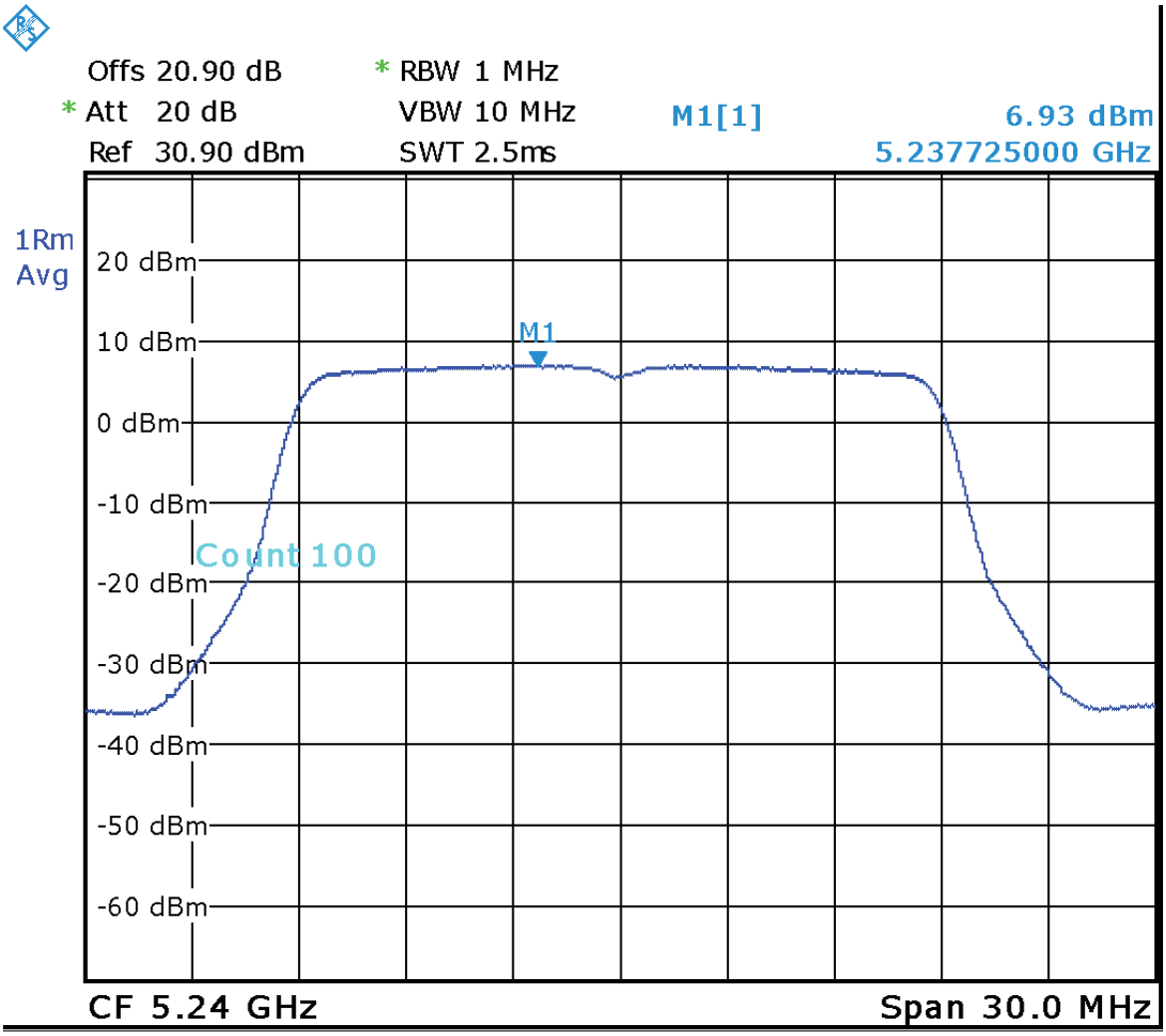
Date: 14.JUN.2018 19:34:04

Figure 23: Power Spectral Density, Channel 36 802.11ac VHT20 MCS0, Chain 3



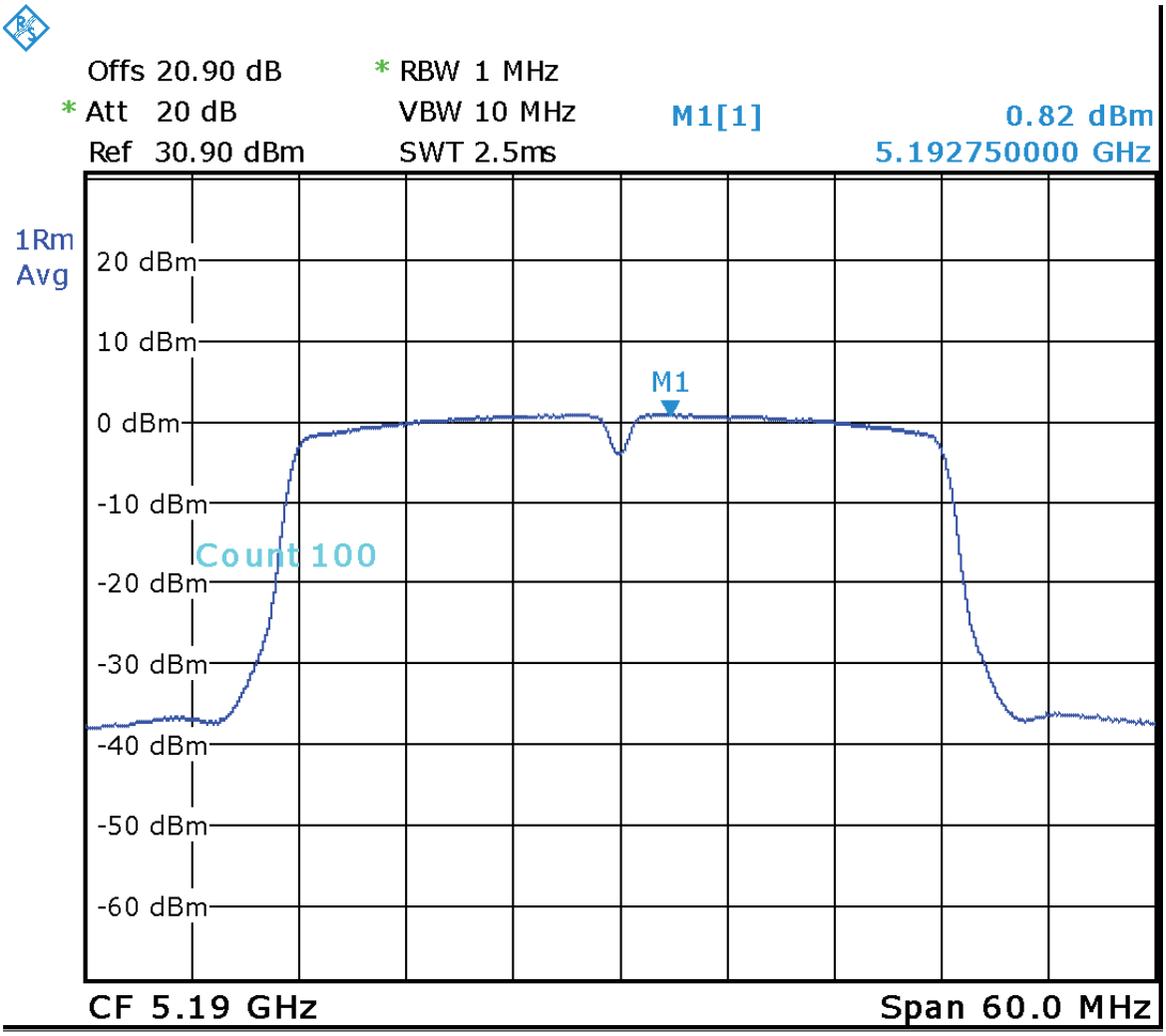
Date: 14.JUN.2018 19:36:52

Figure 24: Power Spectral Density, Channel 44 802.11ac VHT20 MCS0, Chain 3



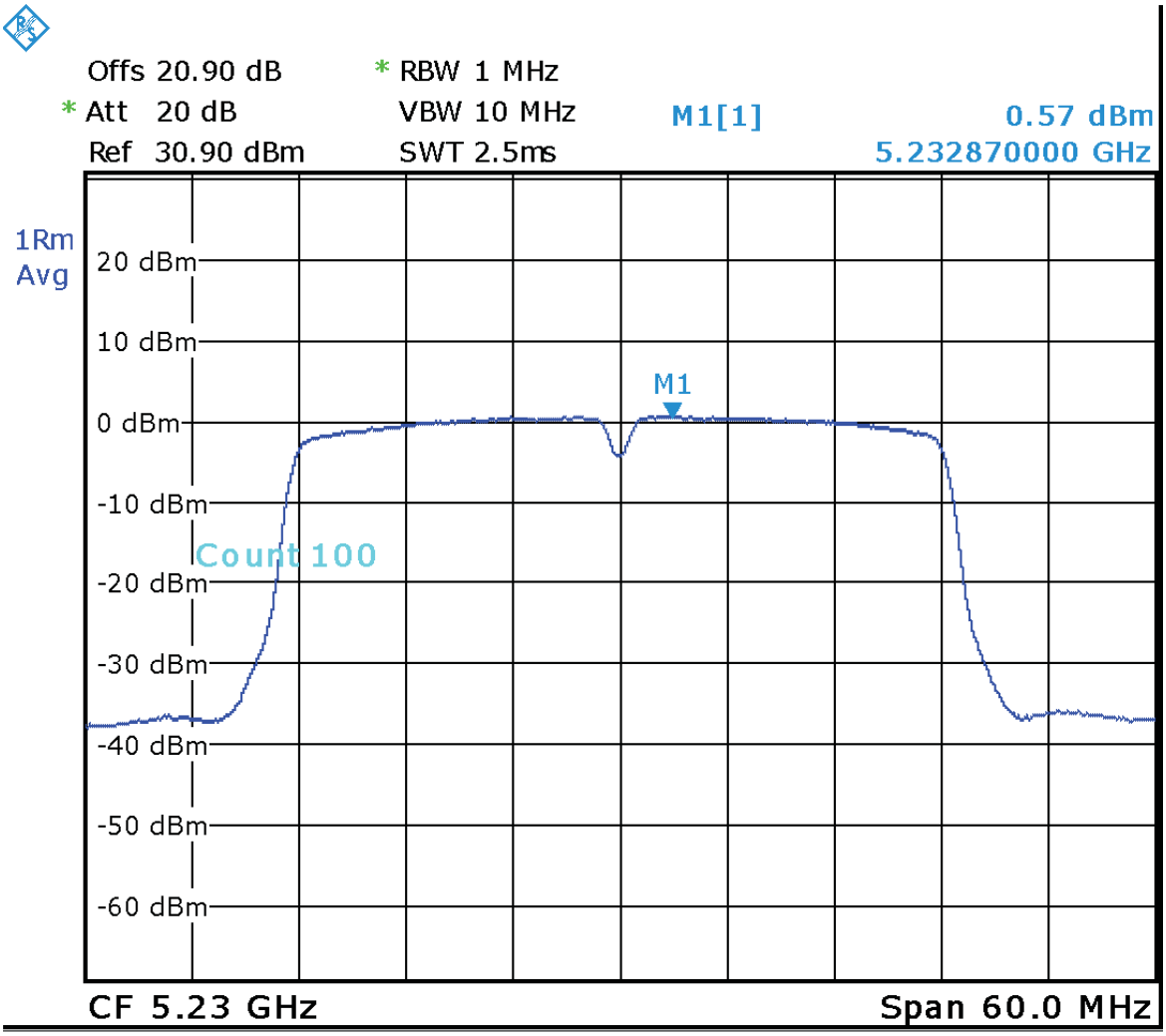
Date: 14.JUN.2018 19:38:20

Figure 25: Power Spectral Density, Channel 48 802.11ac VHT20 MCS0, Chain 3



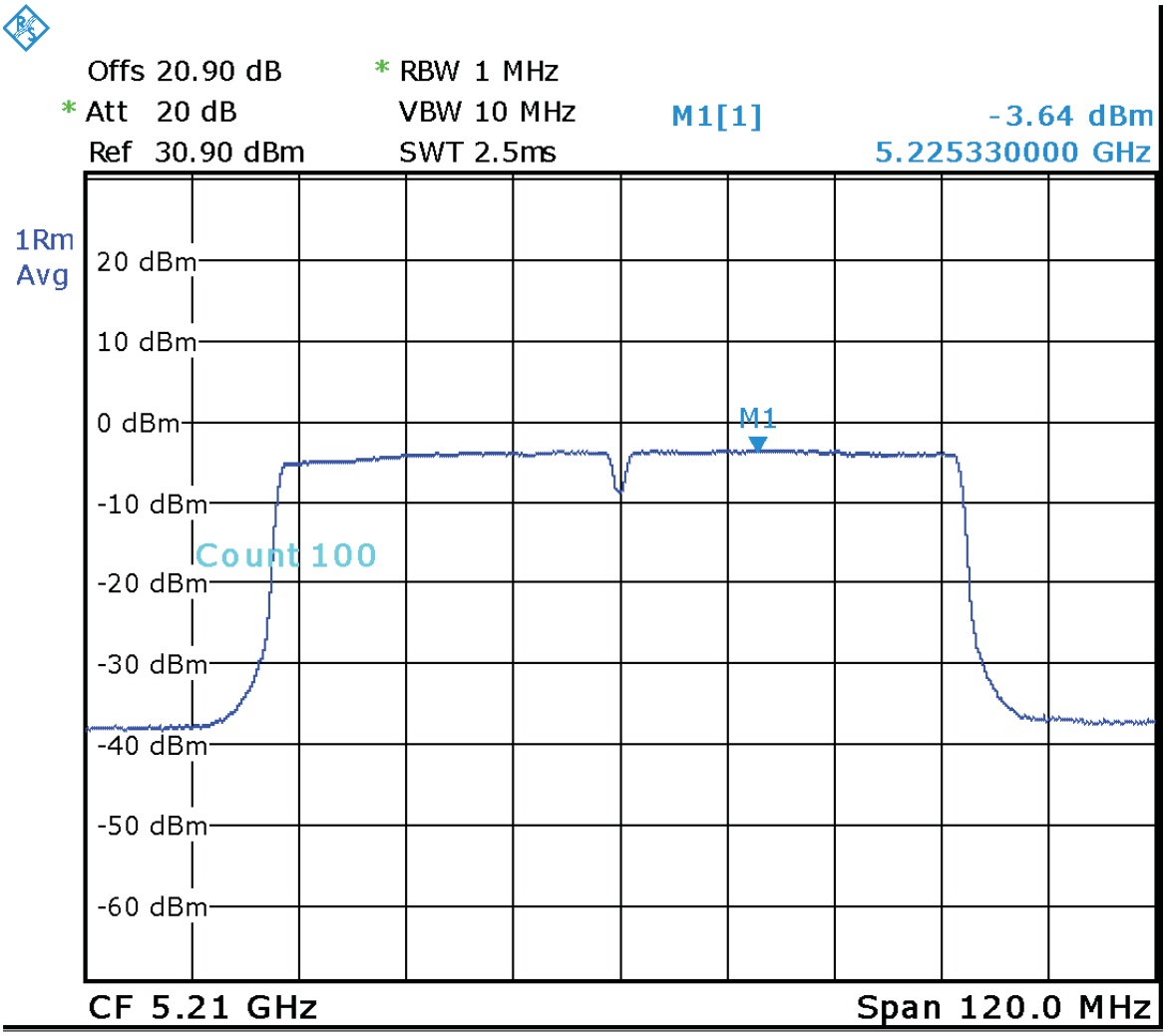
Date: 14.JUN.2018 19:11:26

Figure 26: Power Spectral Density, Channel 38 802.11ac VHT40 MCS0, Chain 3



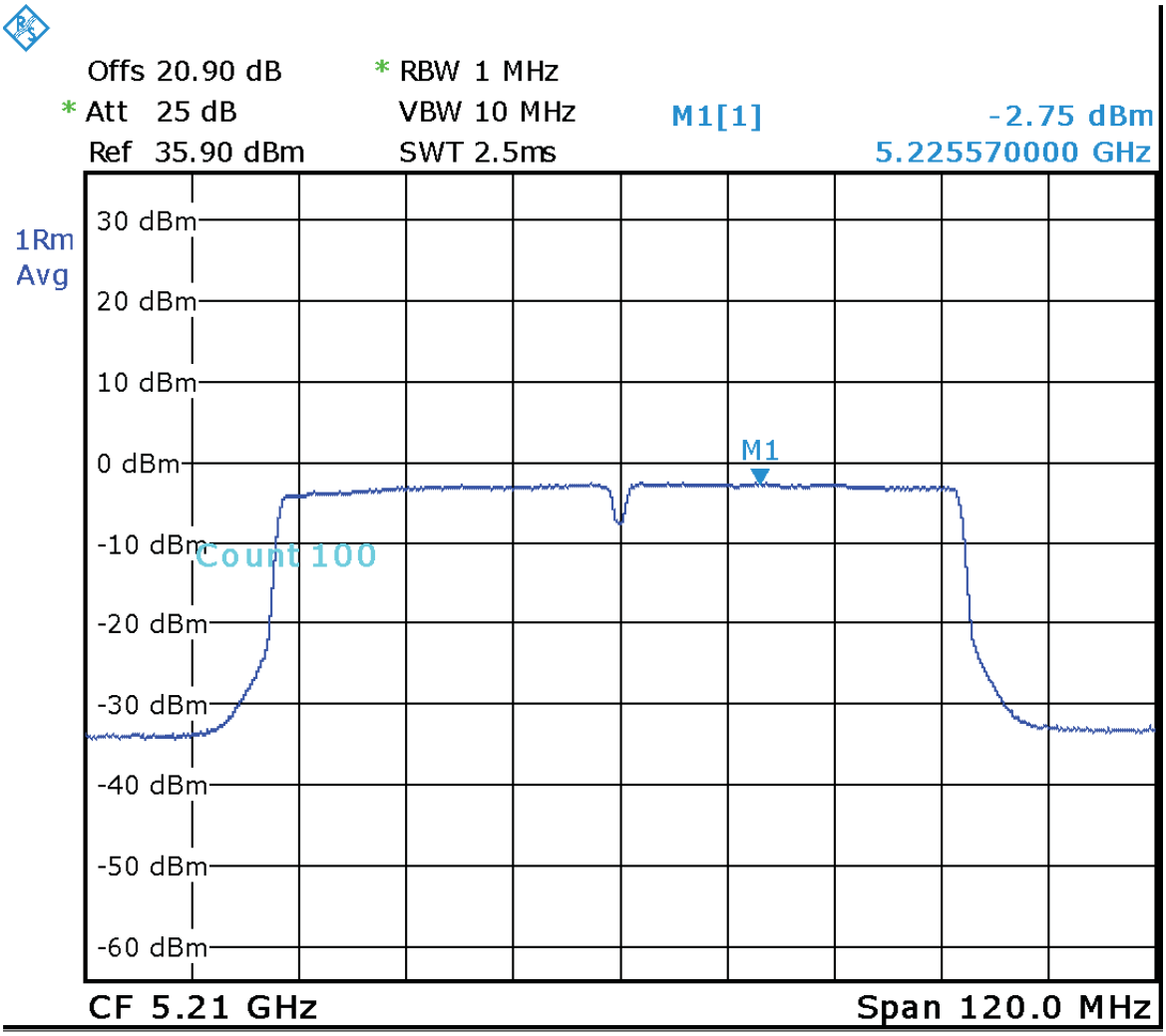
Date: 14.JUN.2018 19:13:33

Figure 27: Power Spectral Density, Channel 46 802.11ac VHT40 MCS0, Chain 3



Date: 14.JUN.2018 19:07:06

Figure 28: Power Spectral Density, Channel 42 802.11ac VHT80 MCS0, Chain 3



Date: 14.JUN.2018 19:56:20

Figure 29: Power Spectral Density, Channel 42 802.11ac VHT80+80 MCS0, Chain 1

4.3.4.1.2 ISED

4.3.4.1.2.1 CDD Mode

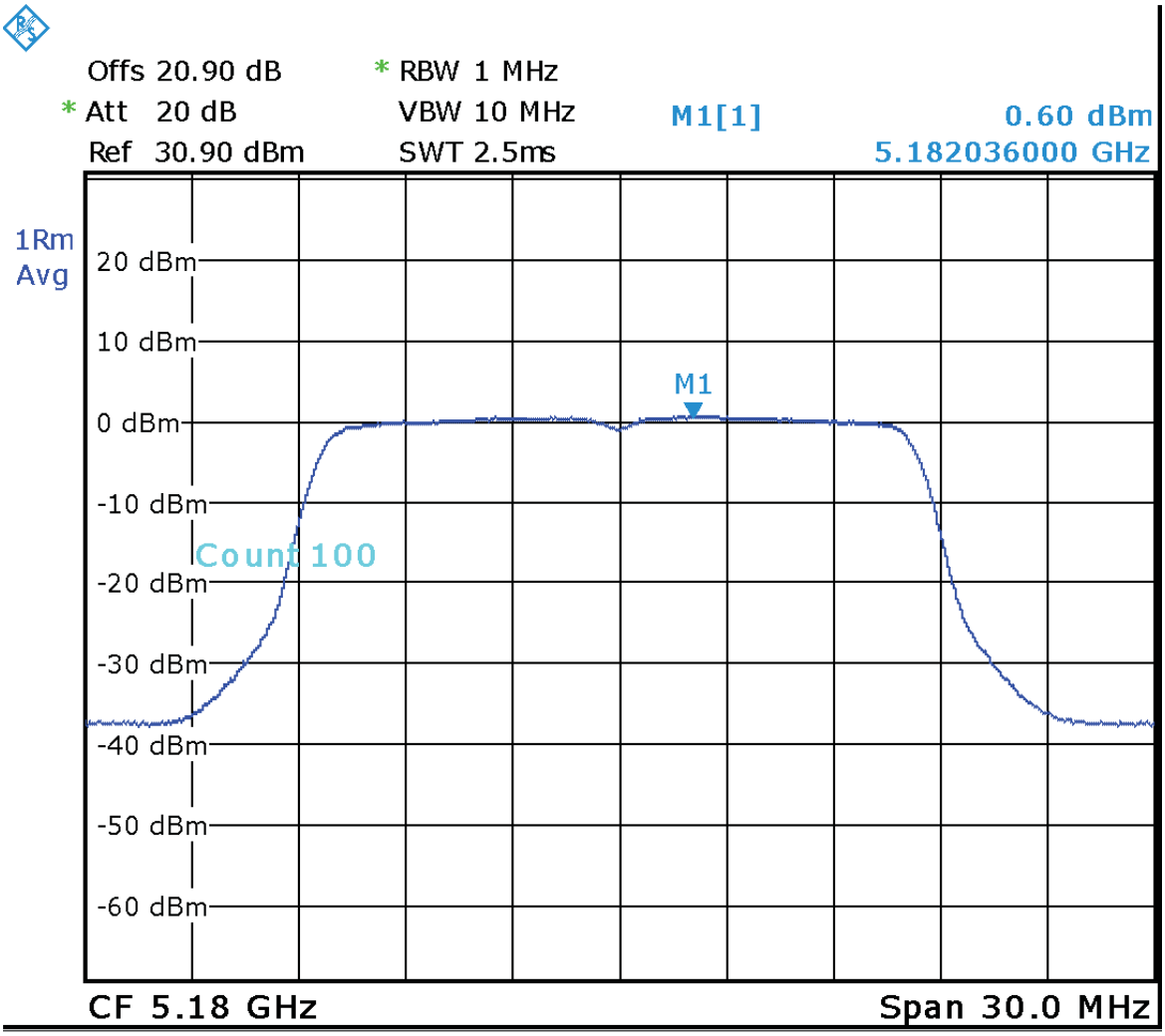
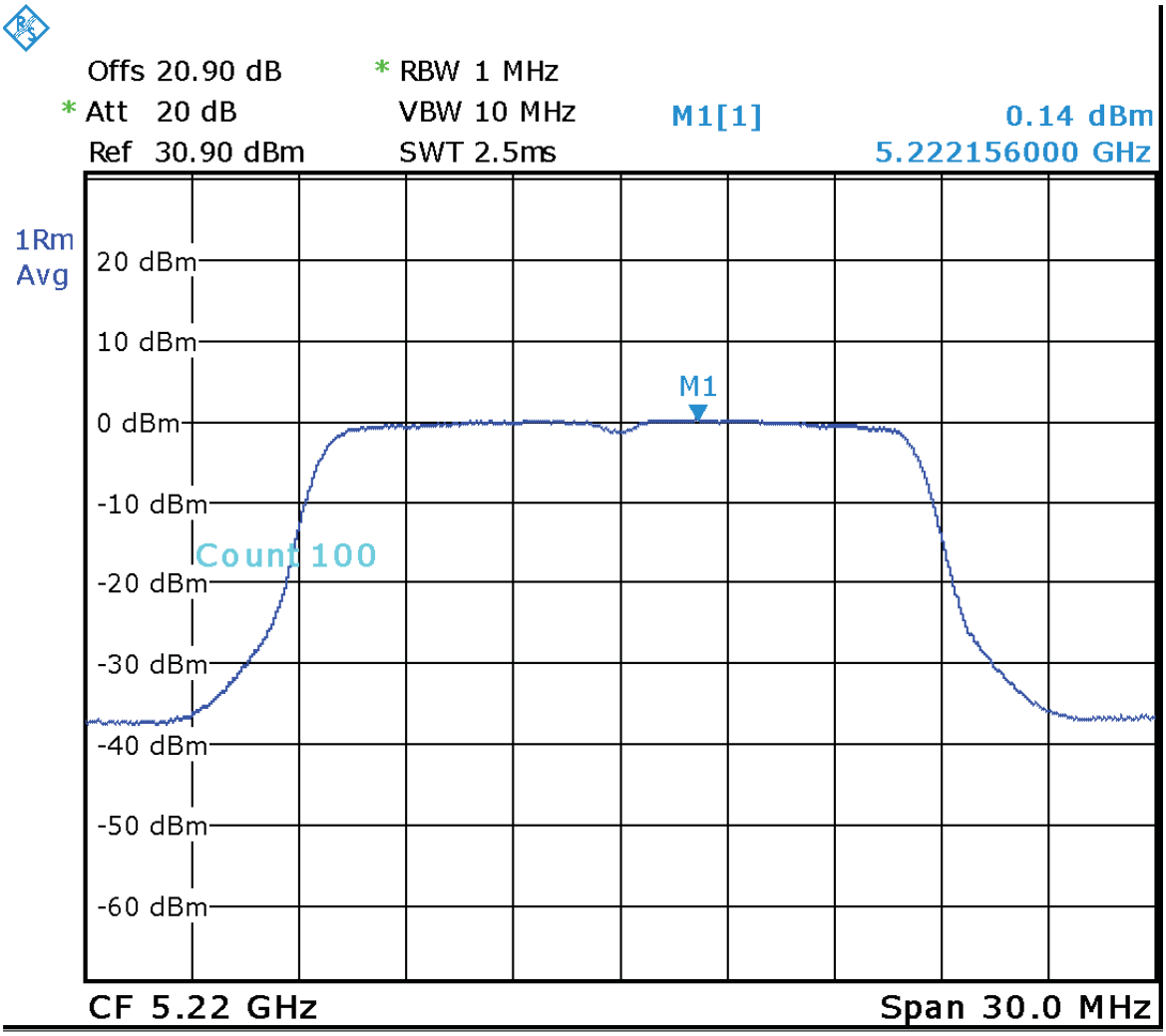
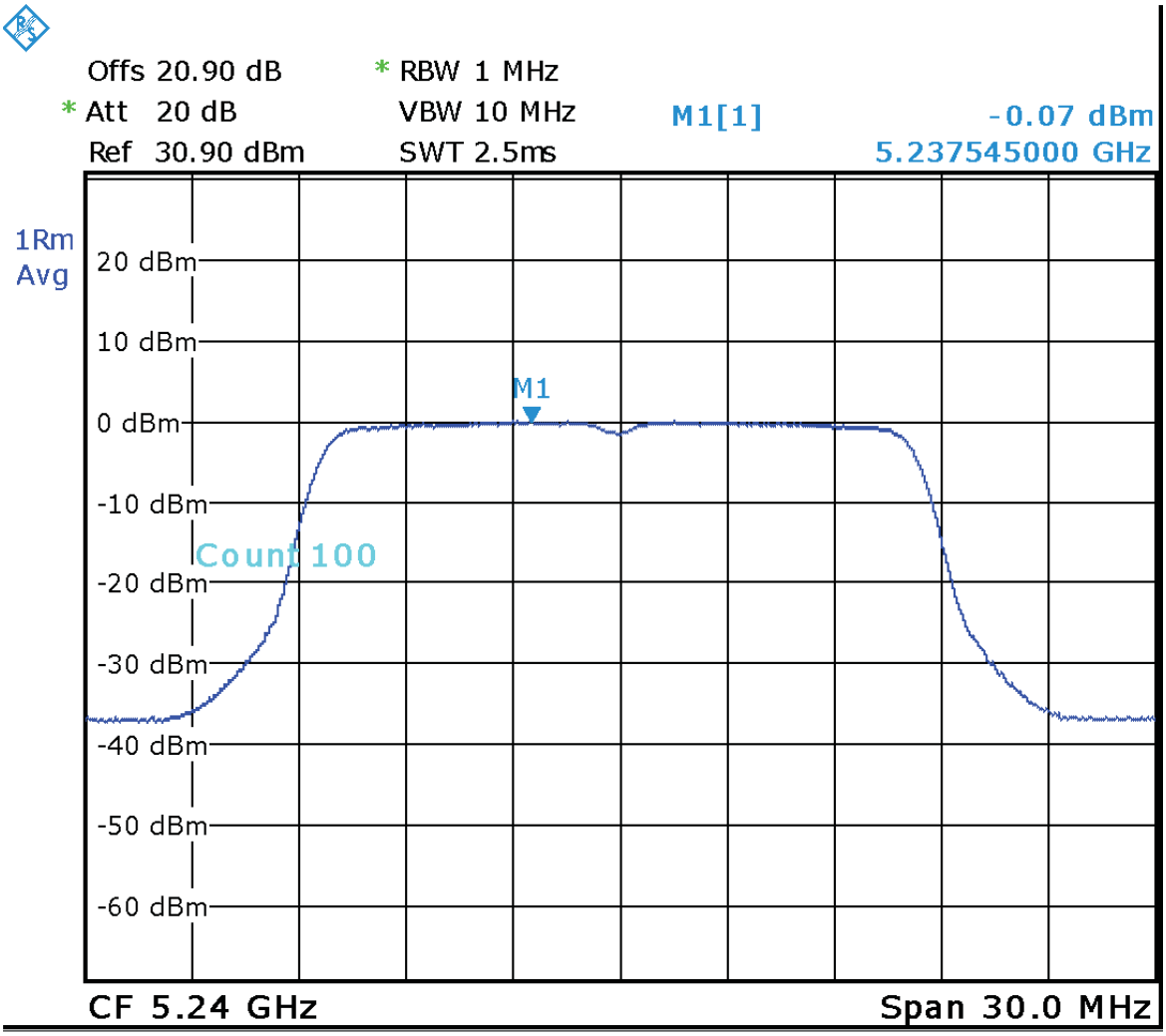


Figure 30: Power Spectral Density, Channel 36 802.11a NoHT 6 Mbps, Chain 3



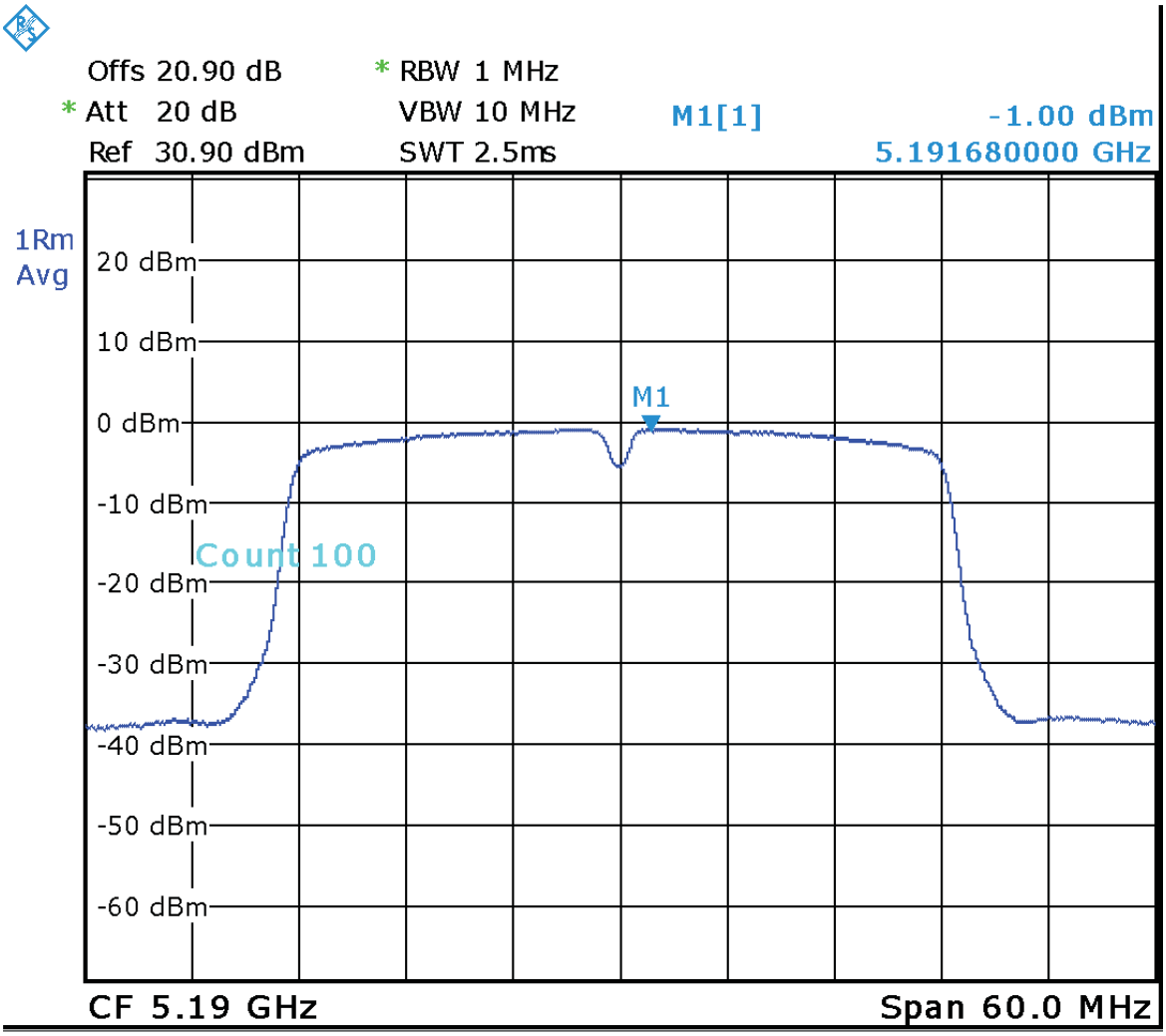
Date: 14.JUN.2018 18:29:53

Figure 31: Power Spectral Density, Channel 44 802.11a NoHT 6 Mbps, Chain 3



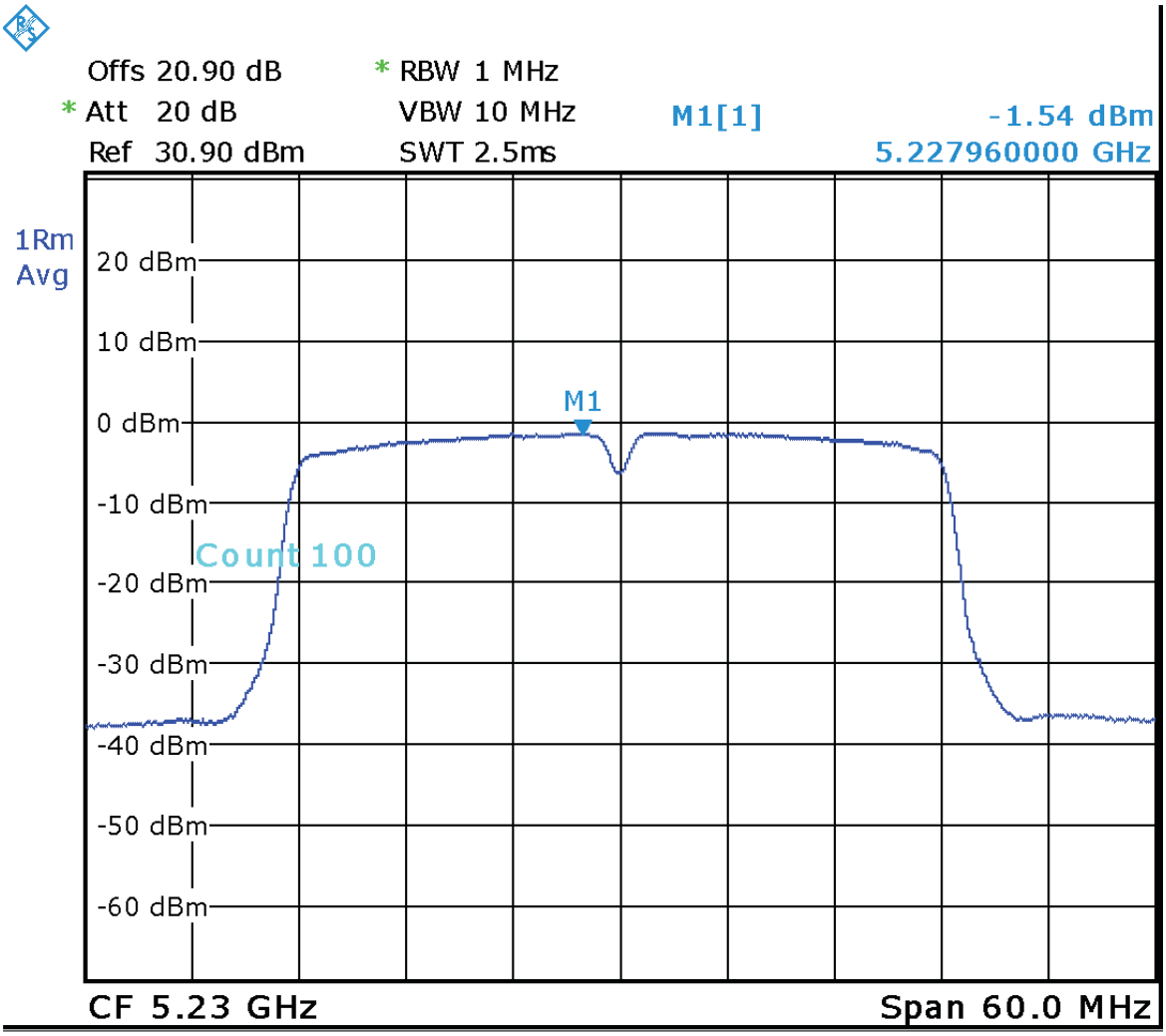
Date: 14.JUN.2018 18:31:09

Figure 32: Power Spectral Density, Channel 48 802.11a NoHT 6 Mbps, Chain 3



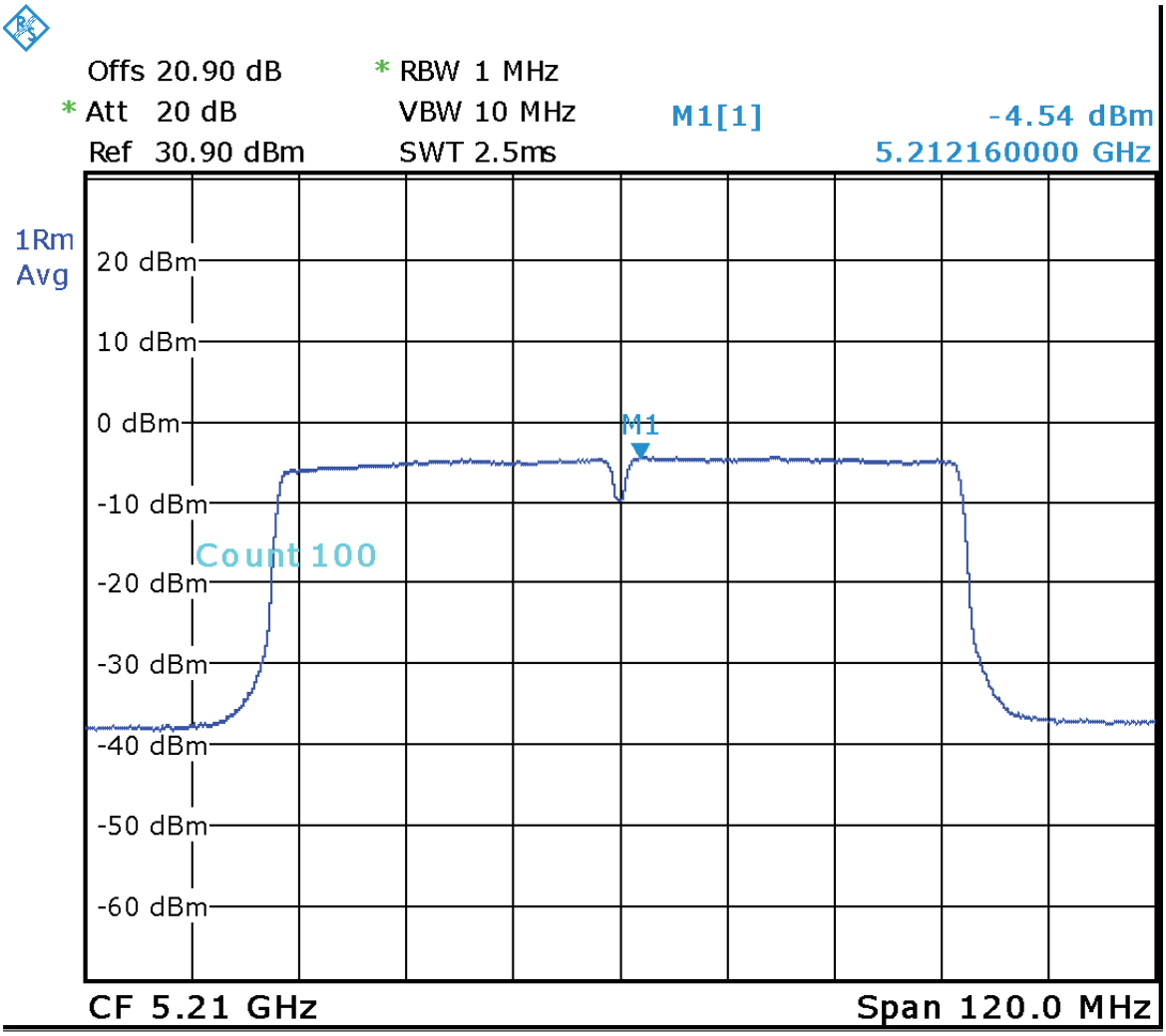
Date: 14.JUN.2018 18:41:35

Figure 33: Power Spectral Density, Channel 38 802.11n HT40+ MCS0, Chain 3



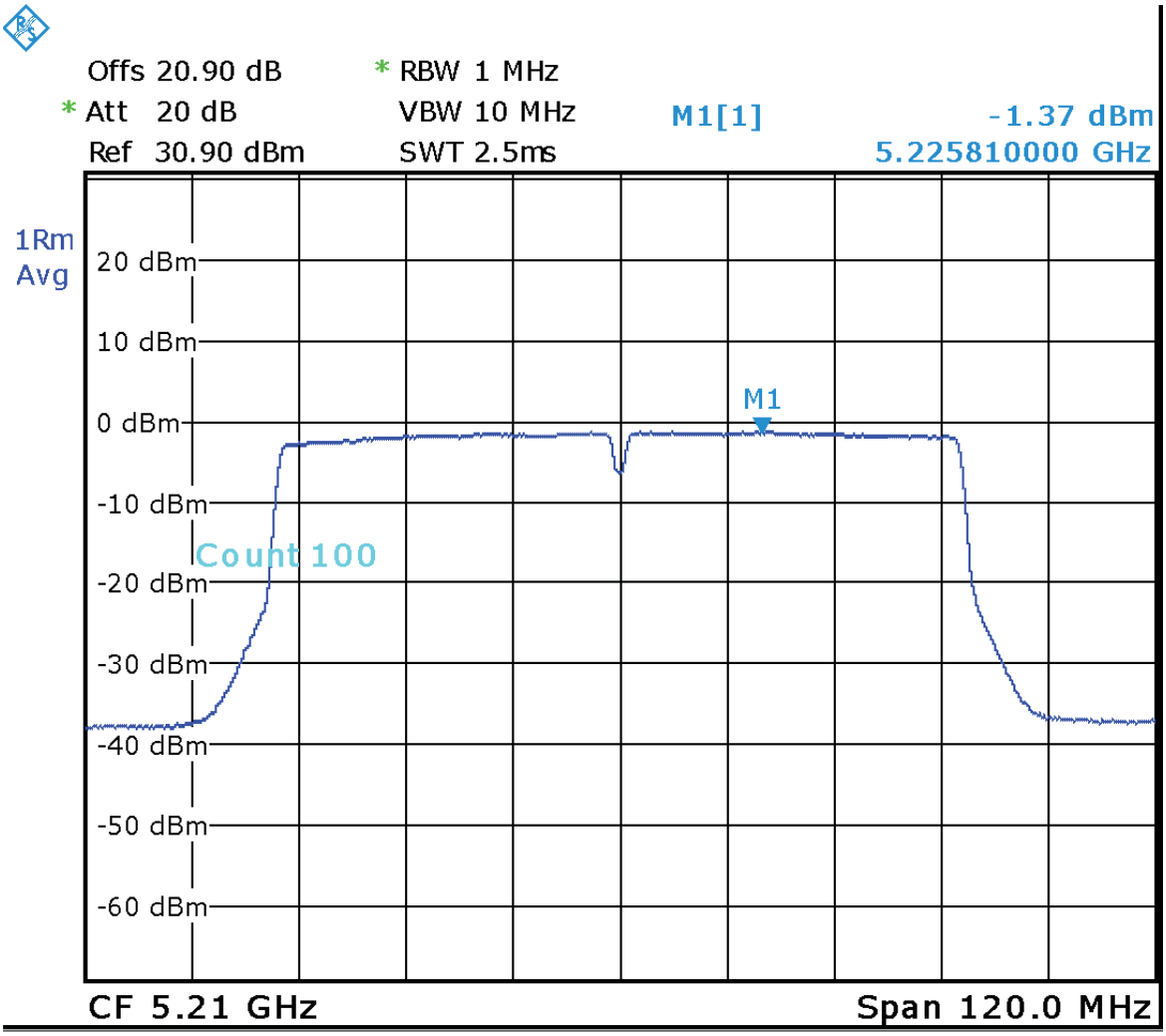
Date: 14.JUN.2018 18:39:56

Figure 34: Power Spectral Density, Channel 46 802.11n HT40+ MCS0, Chain 3



Date: 14.JUN.2018 18:42:44

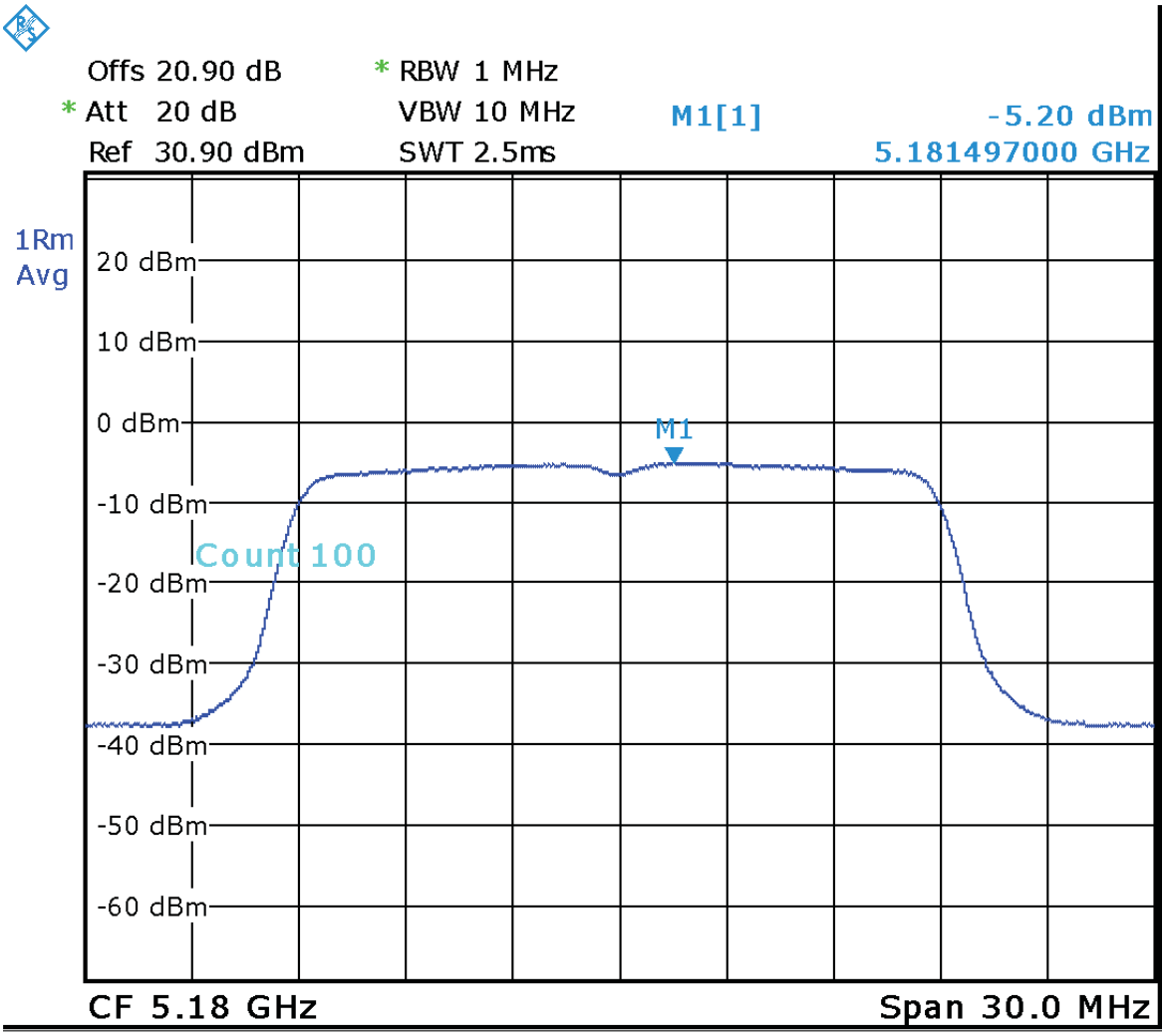
Figure 35: Power Spectral Density, Channel 42 802.11ac VHT80 MCS0, Chain 3



Date: 14.JUN.2018 18:51:29

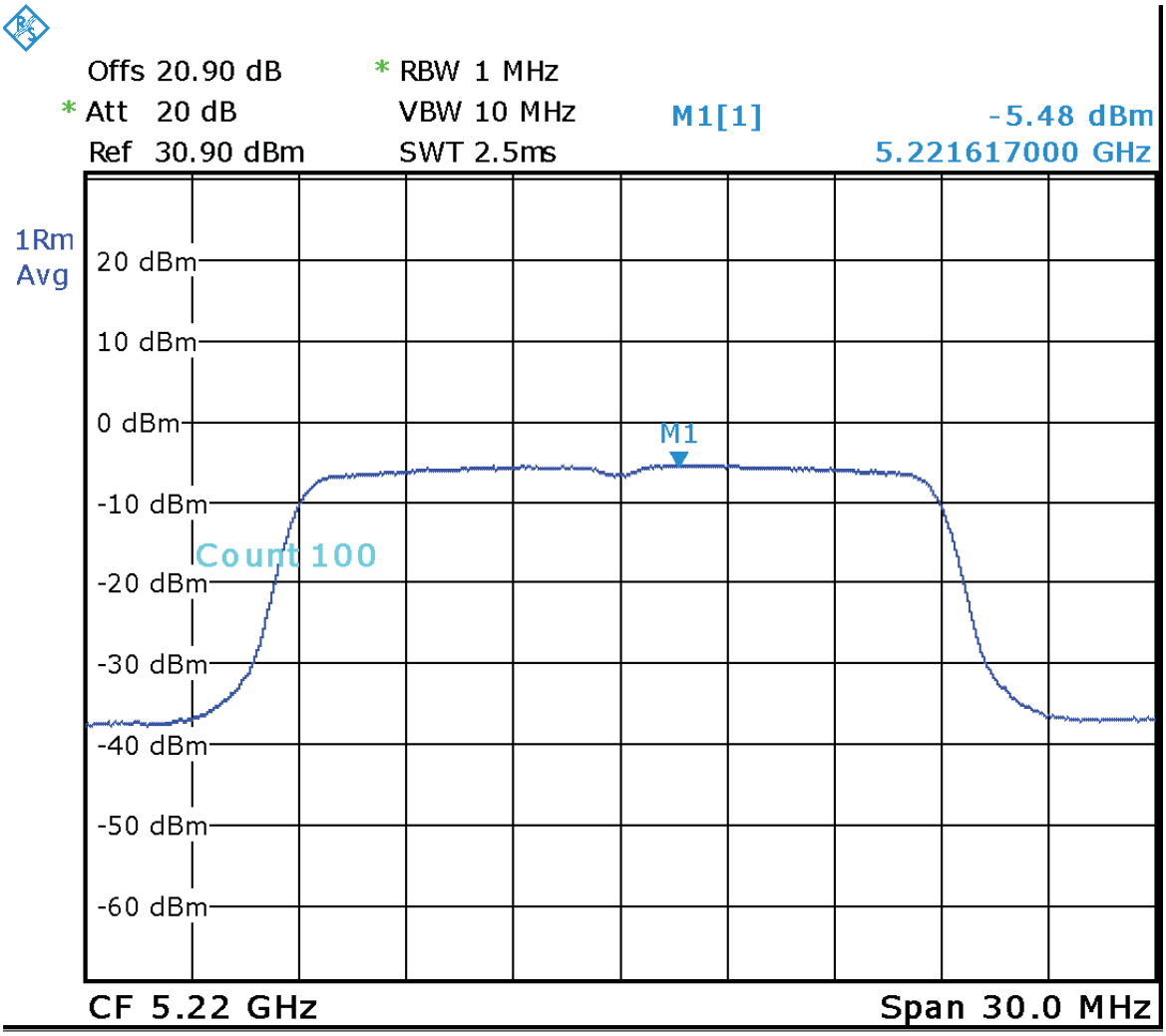
Figure 36: Power Spectral Density, Channel 42 802.11ac VHT80+80 MCS0, Chain 1

4.3.4.1.2.2 Beamforming Mode



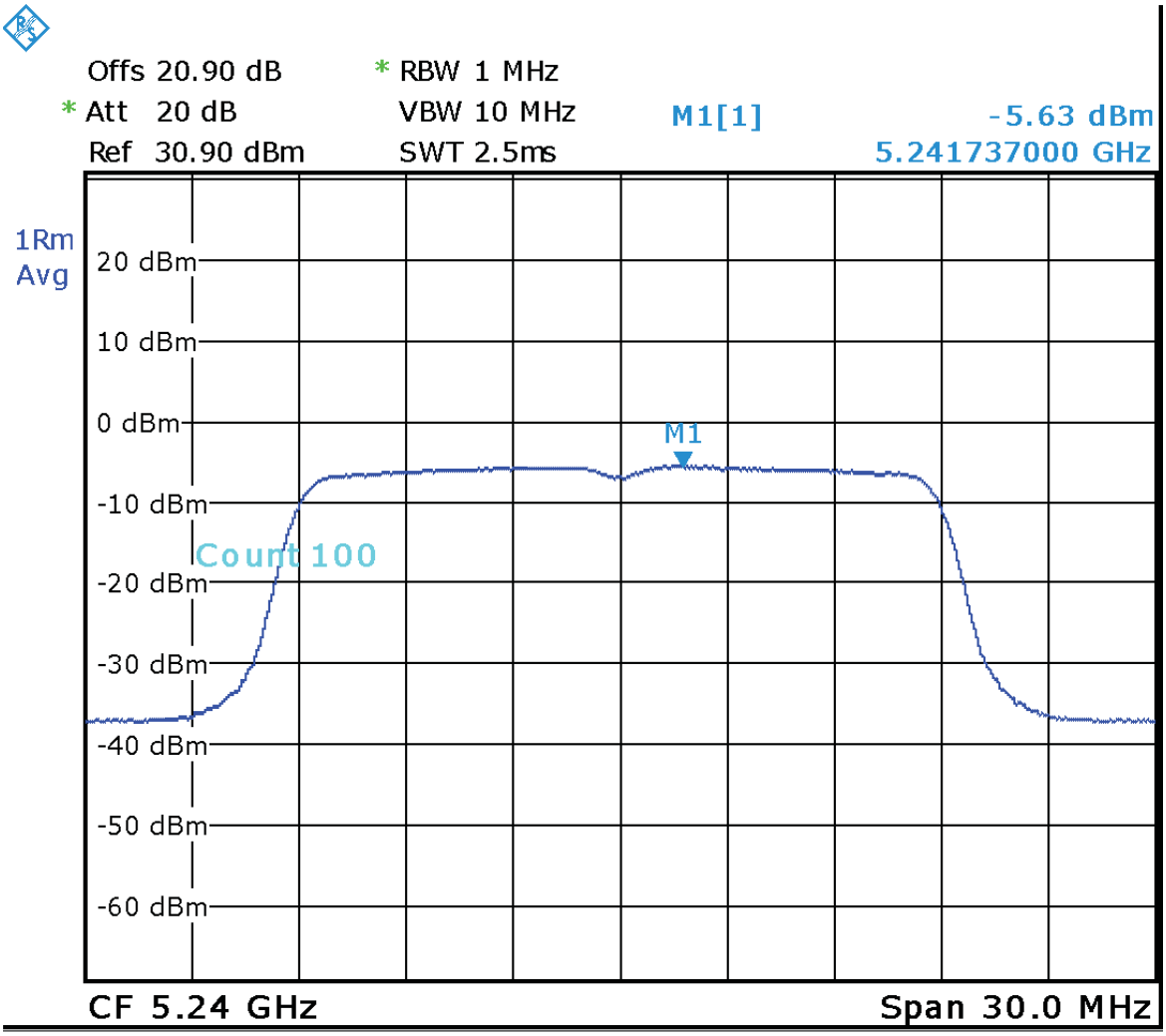
Date: 14.JUN.2018 19:20:28

Figure 37: Power Spectral Density, Channel 36 802.11ac VHT20 MCS0, Chain 3



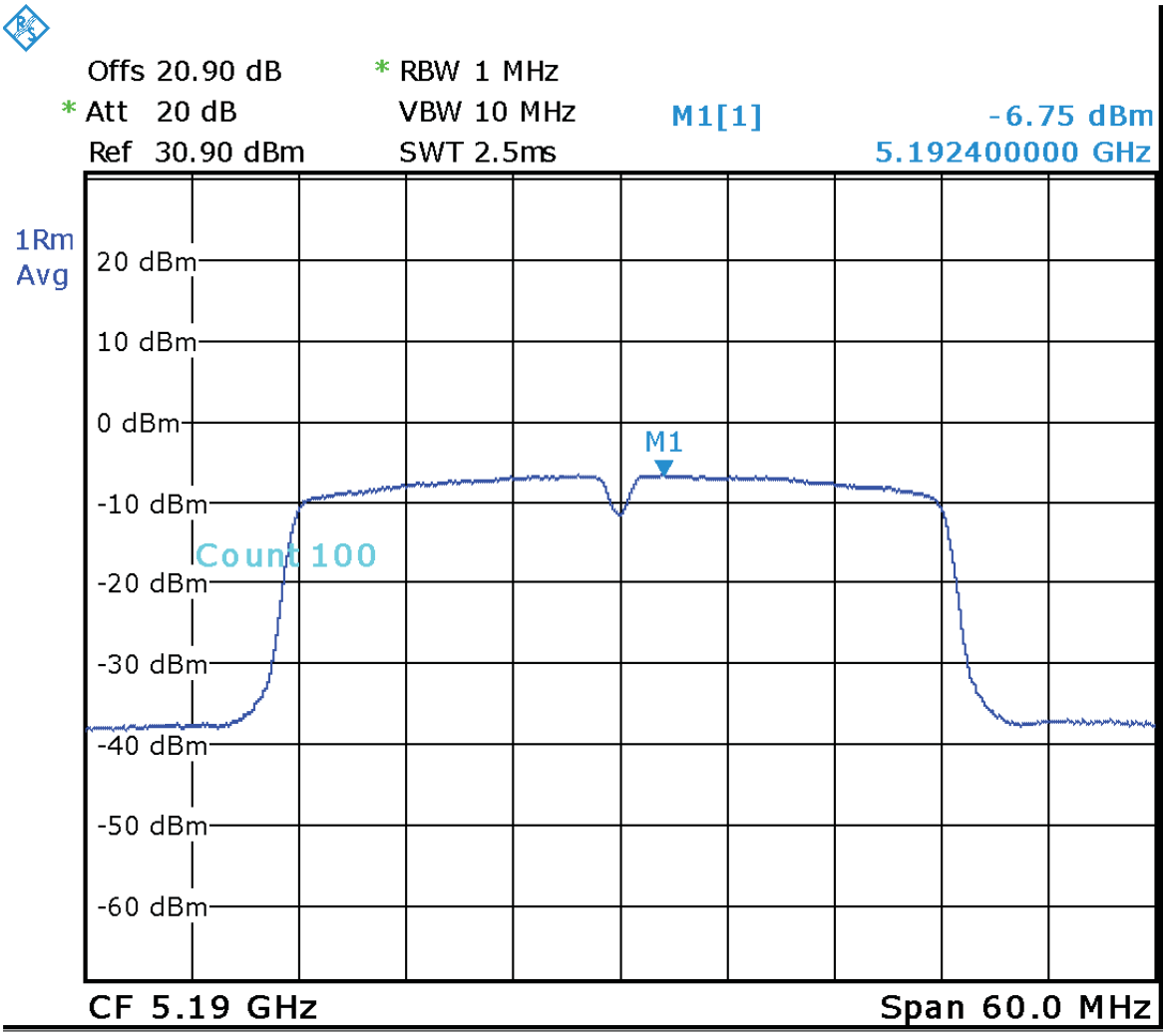
Date: 14.JUN.2018 19:24:53

Figure 38: Power Spectral Density, Channel 44 802.11ac VHT20 MCS0, Chain 3



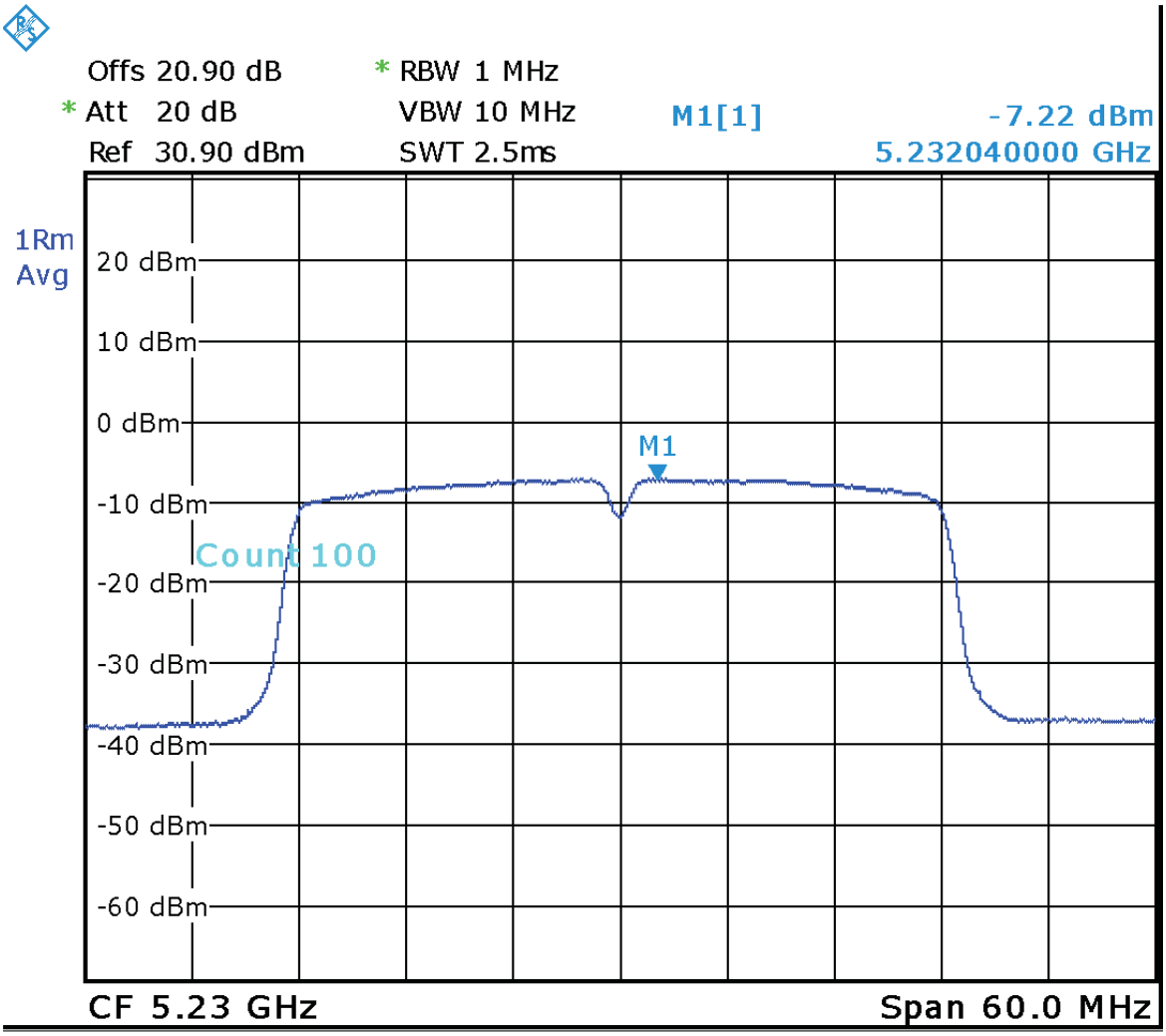
Date: 14.JUN.2018 19:26:04

Figure 39: Power Spectral Density, Channel 48 802.11ac VHT20 MCS0, Chain 3



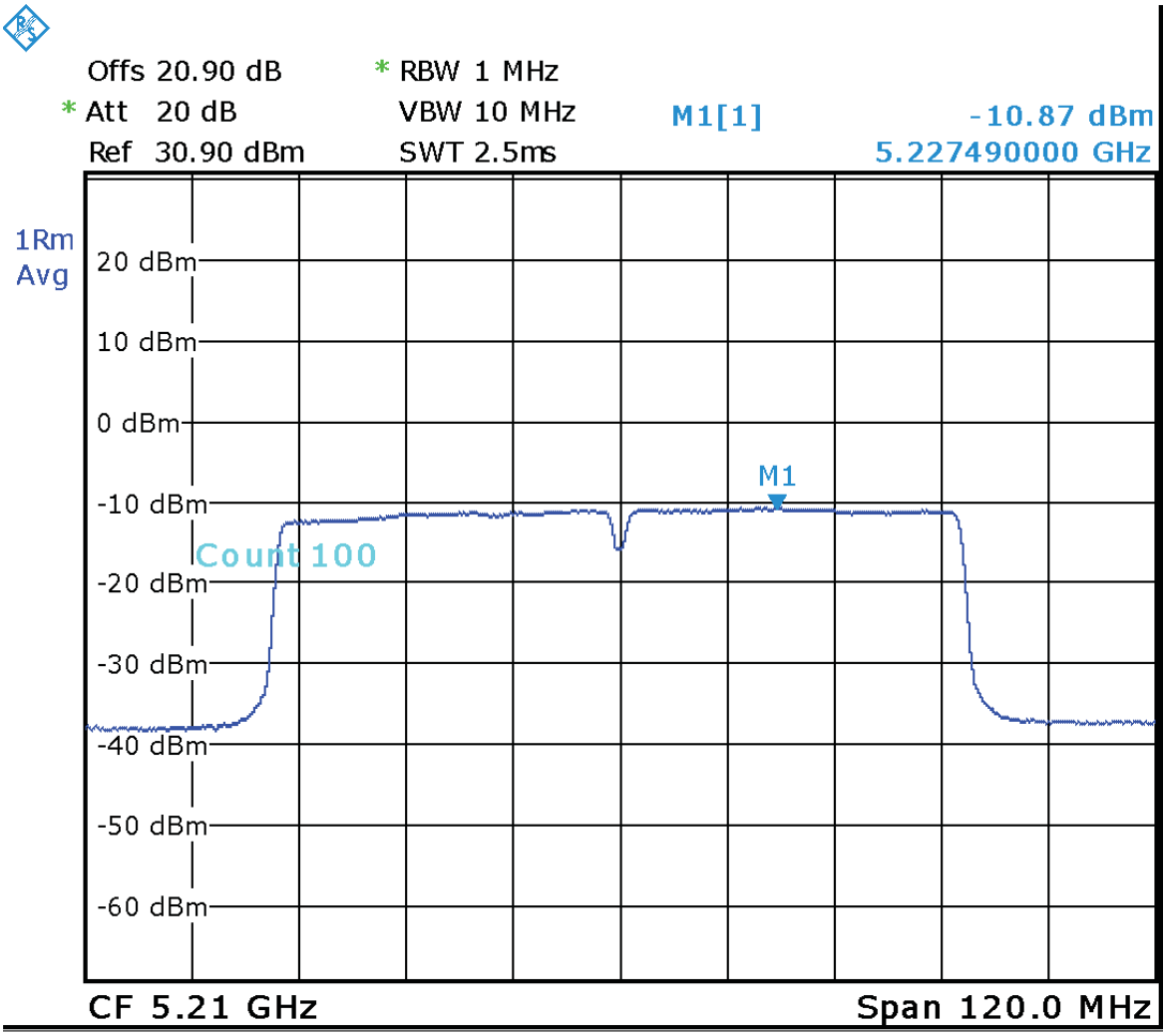
Date: 14.JUN.2018 19:09:58

Figure 40: Power Spectral Density, Channel 38 802.11ac VHT40 MCS0, Chain 3



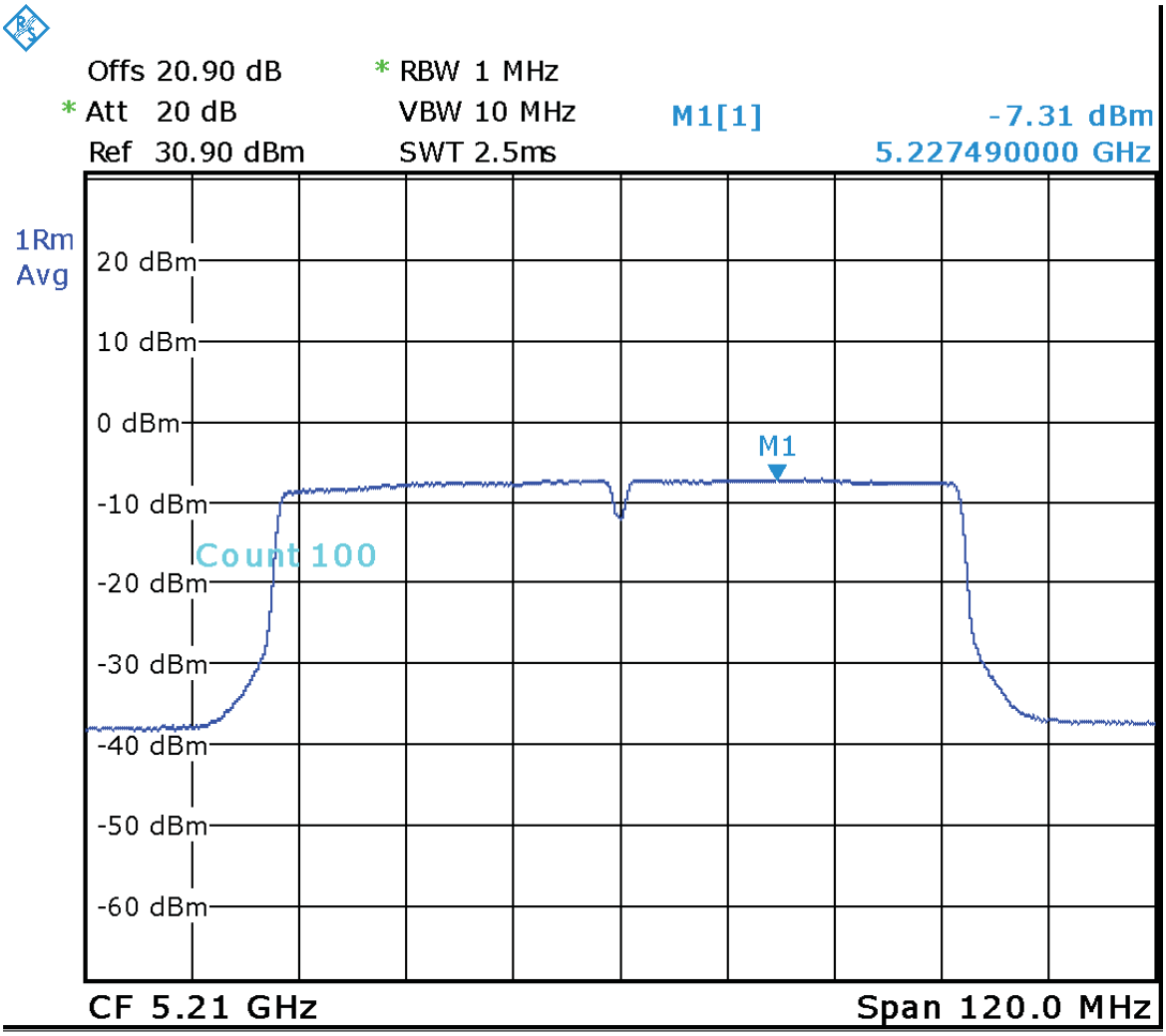
Date: 14.JUN.2018 19:23:25

Figure 41: Power Spectral Density, Channel 46 802.11ac VHT40 MCS0, Chain 3



Date: 14.JUN.2018 19:00:50

Figure 42: Power Spectral Density, Channel 42 802.11ac VHT80 MCS0, Chain 3



Date: 14.JUN.2018 18:57:27

Figure 43: Power Spectral Density, Channel 42 802.11ac VHT80+80 MCS0, Chain 1

4.4 Out of Band Emissions: UNII-1 Restricted Band Edge

Transmitter spurious emissions are emissions outside the frequency range of the equipment when the equipment is in transmitting mode; per requirement of CFR47 15.205, 15.209, 15.407, RSS-247 Sect. 6.2, RSS-GEN Sect. 8.9 and 8.10.

4.4.1 Limit(s)

§15.205(a) Restricted Bandedge at 4.5-5.15GHz:

Peak Detector Limit: 74 dBuV/m
Average Detector Limit: 54 dBuV/m

4.4.2 Test Method

Radiated measurements per ANSI C63.10-2013 Section 6.10.5 were used to measure the undesirable emission requirement in restricted bands. The measurement was performed with modulation. This test was conducted on 3 channels, where applicable, in each mode on the EUT. The power settings used are in section 4.1.4.1 of this report.

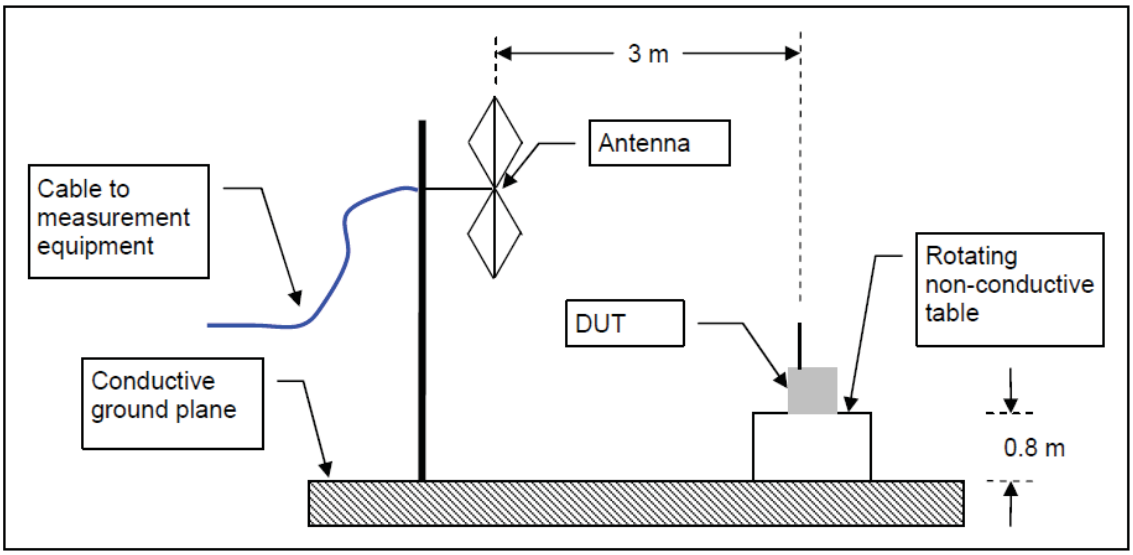
4.4.3 Test Setup

Spectrum Analyzer Settings:

	Peak Measurement	Average Measurement
Detector	Peak	Peak
Trace	Max Hold	Max Hold
RBW	1 MHz	1 MHz
VBW	3 MHz	10 Hz
Sweep Points	501	501
Sweep Time	Coupled	Coupled
Span	See Plots	See Plots, (Maximum of RBW/2 per sweep point)

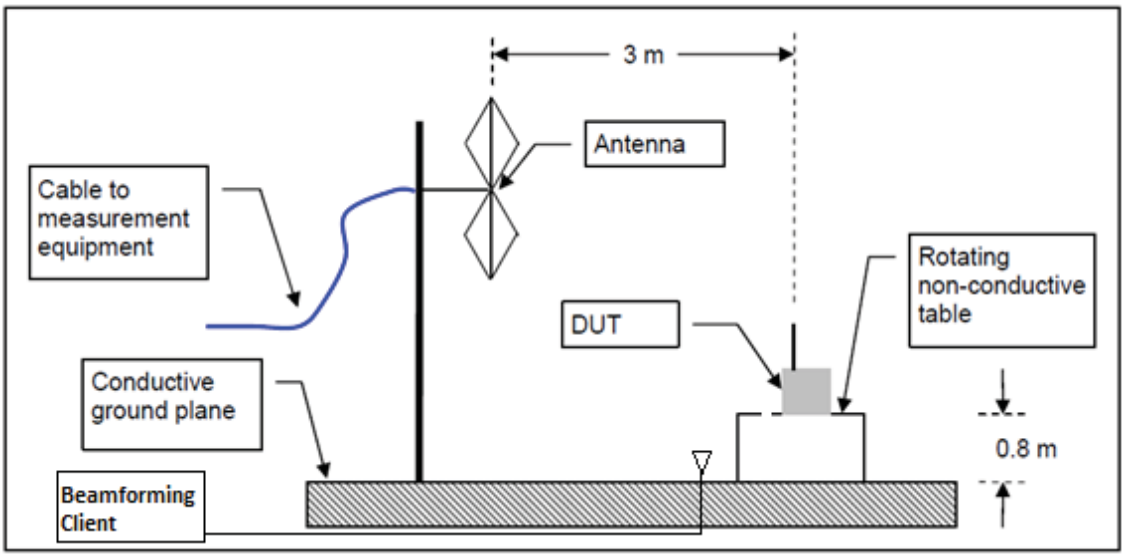
The Average Measurement is corrected with a Duty Cycle Correction Factor as determined in Section 4.4.2 of this report.

CDD Mode



The DUT was stimulated by manufacturer provided test software that is not available to the end user.

Beamforming (BF) Mode



A conducted 4x4 MIMO client that supports beamforming was used to lock the beam. The clients antenna was routed in the chamber and put on the turntable outside the measuring antenna's beamwidth for the fundamental frequency. The EUT uses circular beamforming with a lockable beam as defined in ANSI C63.10-2013 Section 13. Network throughput software tool, iperf3, was used to stimulate the DUT's transmissions with a high duty cycle.
A customized software tool developed by the manufacturer was used to associate the DUT and the Client to any required data rates, channels and power settings before transmissions were initiated.

It was verified that there were no off times longer than 50% of the time spent on each sweep point during the pre-scans.

Iperf3 Command Line for DUT:
iperf -c 192.168.16.1 -p 5021 -i 10 -t 4200 -w 320k -u -b 300M -P 4 -l24000

Iperf3 Command Line for Client (Support Equipment):
iperf3 -s

4.4.4 Duty Cycle

CDD mode duty cycles were measured by the gated power meter used for measurements in section 4.1 of this report. Beamforming (802.11ac) duty cycles were measured with a spectrum analyzer.

Mode	Measured Duty Cycle	Duty Cycle Correction Factor (dB)
802.11a (No HT)	96.7%	0.1
802.11n HT40	93.7%	0.3
802.11ac VHT80	87.4%	0.6
802.11ac VHT80+80	82.0%	0.9
802.11ac VHT20 (BF)	94.3%	0.3
802.11ac VHT40 (BF)	94.1%	0.3
802.11ac VHT80 (BF)	94.3%	0.3
802.11ac VHT80+80 (BF)	94.9%	0.2

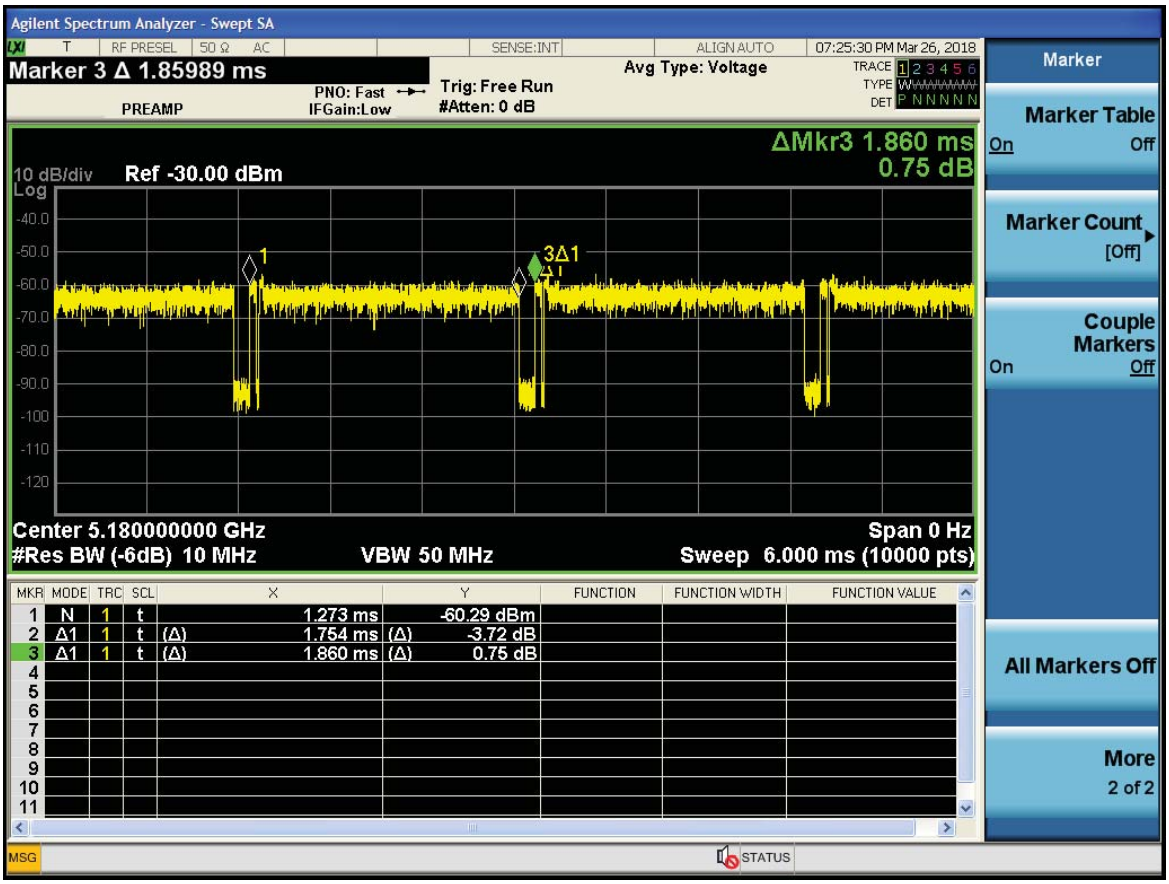


Figure 44: Duty Cycle for 802.11ac VHT20 (BF)

1279 Quarry Lane, Ste. A, Pleasanton, CA 95466
Tel: (925) 249-9123, Fax: (925) 249-9124

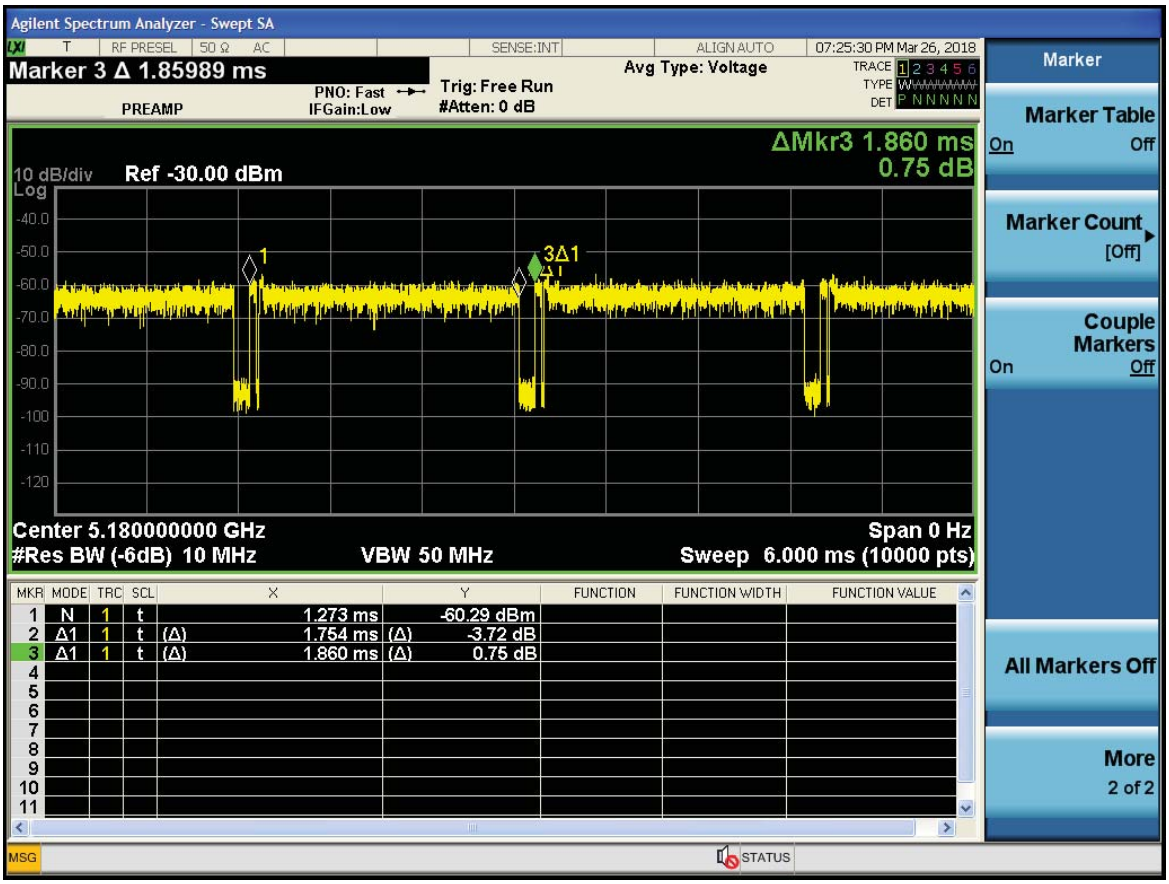


Figure 45: Duty Cycle for 802.11ac VHT40 (BF)

1279 Quarry Lane, Ste. A, Pleasanton, CA 95466
Tel: (925) 249-9123, Fax: (925) 249-9124

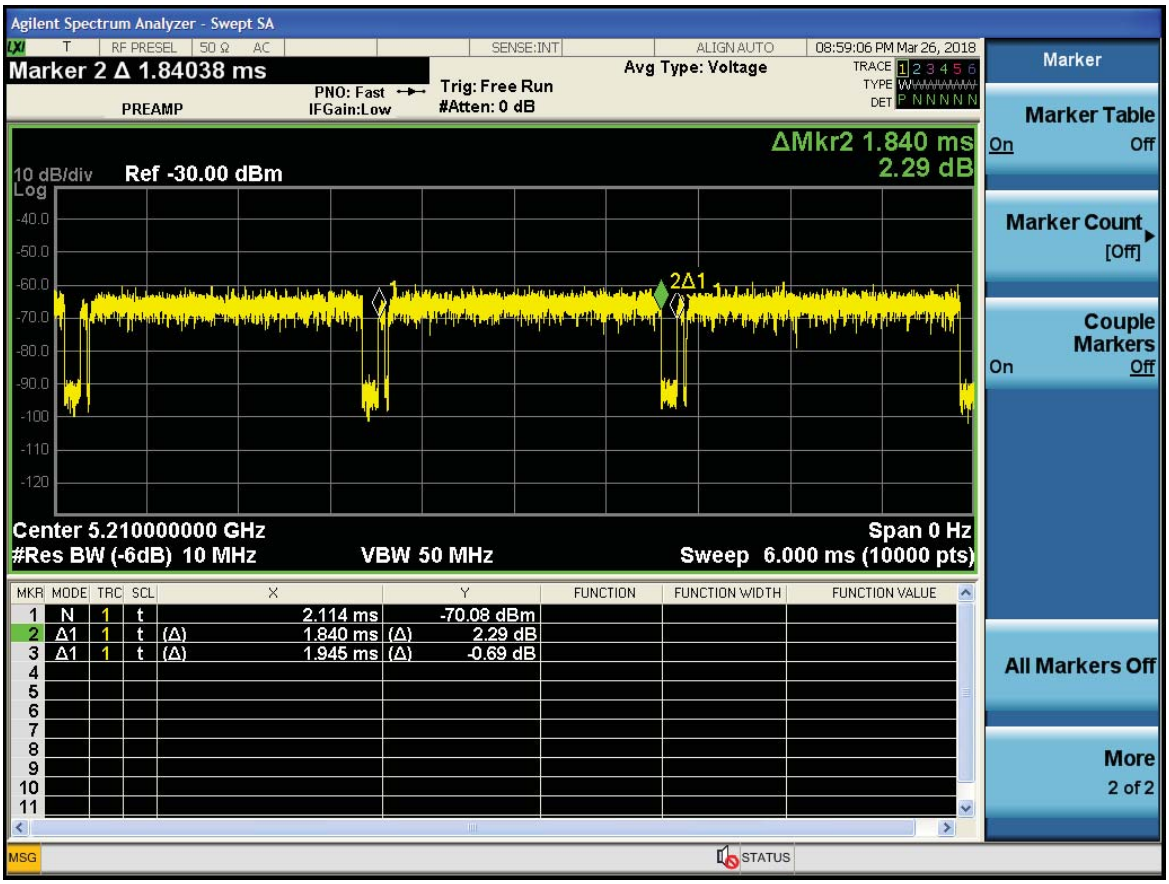


Figure 46: Duty Cycle for 802.11ac VHT80 (BF)

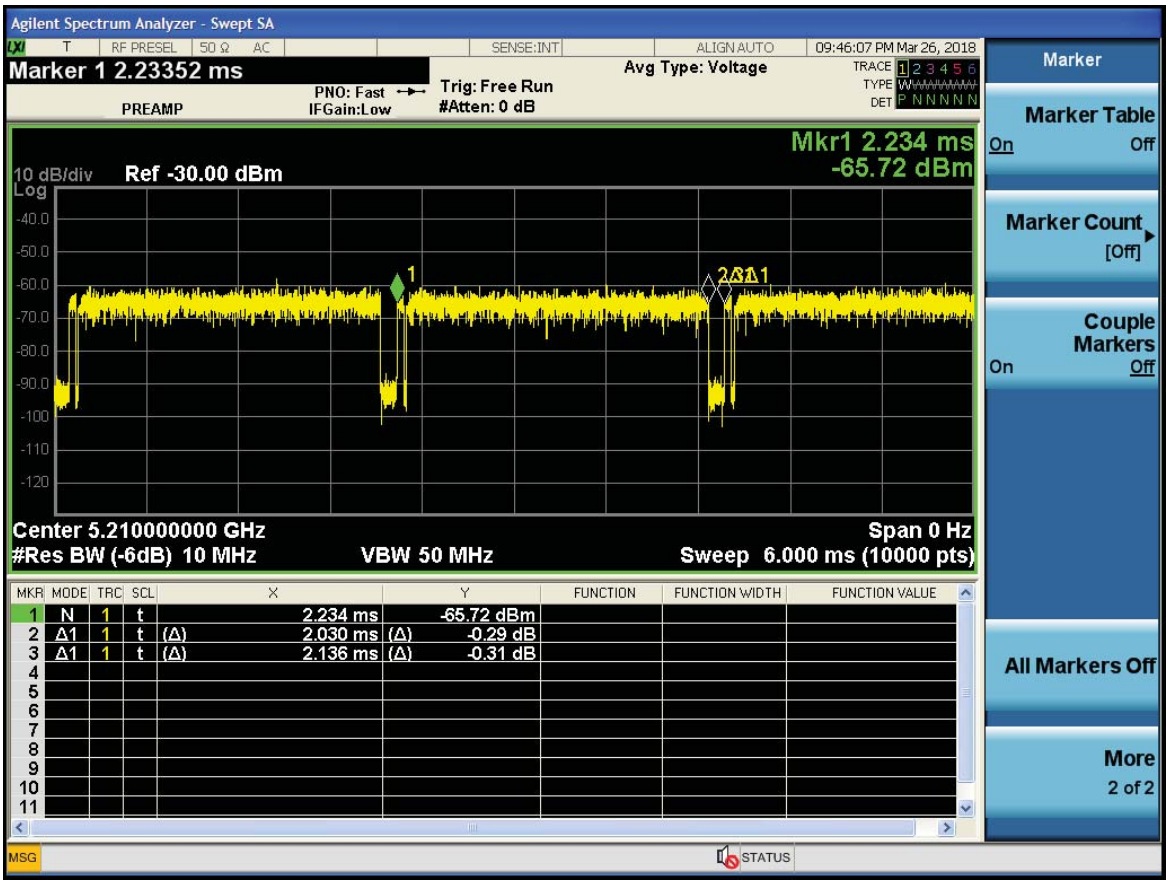


Figure 47: Duty Cycle for 802.11ac VHT80+80 (BF)

4.4.5 Test Results

Table 10: Emissions at the UNII-1 Low Band-Edge – Test Results

Test Conditions: Radiated Measurement, Normal Temperature and Voltage							
Antenna Type: Stampled Metal			**Power Setting:** See Section 4.1.4.1				
Max. Antenna Gain: 2.5 dBi							
Signal State: See Section 3.5.2							
Ambient Temp.: 22° C			**Relative Humidity:** 38%				
CDD Mode							
Freq. (MHz)	**Mode**	**Channel**	**Detector (Average/ Peak)**	**Measured (dBuV/m)**	**Limit (dBuV/m)**	**Margin**	**Results**
5175.5	802.11a (No HT) 6Mbps	36	Average	50.6	54	3.4	Pass
5149.1	802.11a (No HT) 6Mbps	36	Peak	66.5	74	7.5	Pass
5149.5	802.11n HT40 MCS0	38	Average	51.2	54	2.8	Pass
5149.9	802.11n HT40 MCS0	38	Peak	65.5	74	8.5	Pass
5150.0	802.11ac VHT80 MCS0	42	Average	50.9	54	3.1	Pass
5146.8	802.11ac VHT80 MCS0	42	Peak	64.5	74	9.5	Pass
5146.1	802.11ac VHT80+80 MCS0	42 & 155	Average	51.5	54	2.5	Pass
5146.6	802.11ac VHT80+80 MCS0	42 & 155	Peak	65.2	74	8.8	Pass
Beamforming Mode							
Freq. (MHz)	**Mode**	**Channel**	**Detector (Average/ Peak)**	**Measured (dBuV/m)**	**Limit (dBuV/m)**	**Margin**	**Results**
5149.9	802.11ac VHT20 MCS0	36	Average	50.5	54	3.5	Pass
5144.8	802.11ac VHT20 MCS0	36	Peak	64.6	74	9.4	Pass
5149.9	802.11ac VHT40 MCS0	38	Average	50.5	54	3.5	Pass
5146.6	802.11ac VHT40 MCS0	38	Peak	64.7	74	9.3	Pass

5149.3	802.11ac VHT80 MCS0	42	Average	50.5	54	3.5	Pass
5145.7	802.11ac VHT80 MCS0	42	Peak	64.2	74	9.8	Pass
5149.0	802.11ac VHT80+80 MCS0	42 & 155	Average	49.9	54	4.1	Pass
5149.1	802.11ac VHT80+80 MCS0	42 & 155	Peak	64.1	74	9.9	Pass
Note: 1. The DCCF (Average Detector) is included in this table, the following plots are uncorrected.							

4.4.5.1 Plots: UNII-1 Low Band Edge CDD Mode

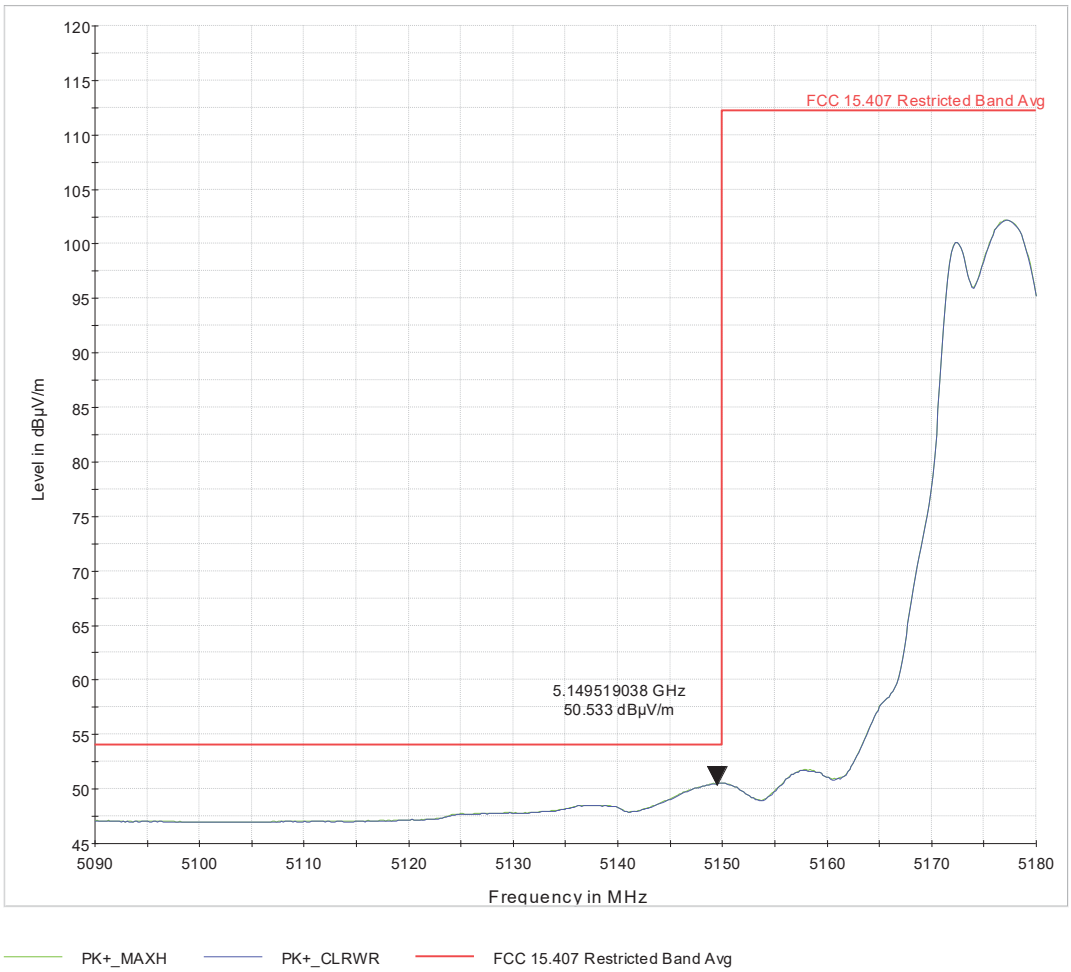


Figure 48: UNII-1 Low Band Edge for 802.11a No HT 6Mbps at 5180 MHz-Average