Company: MikroTik

Test of: 802.11a/n/ac WLAN access point

To: FCC CFR 47 Part 15.407
&
Industry Canada RSS-247

Report No.: MIKO51-U3 Rev A

CONDUCTED, RADIATED TEST REPORT

MiCOM Labs

opening wireless markets

CONDUCTED, RADIATED TEST REPORT

FROM

Test of: MikroTik RBOmniTikPG-5HacD

to

To: CFR 47 Part 15.407
&
Industry Canada RSS-247

Test Report Serial No.: MIKO51-U3 Rev A

This report supersedes: NONE

Applicant:	MikroTik Aizkraukles iela 23 Riga, LV 1006 Latvia
Product Function:	Wireless Access Point
Issue Date:	16th August 2016

This Test Report is Issued Under the Authority of:

MiCOM Labs, Inc.
575 Boulder Court
Pleasanton California 94566
USA
Phone: +1 (925) 462-0304
Fax: +1 (925) 462-0306
www.micomlabs.com

ACCREDITED
TESTING CERT #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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1. ACCREDITATION, LISTINGS & RECOGNITION

1.1. TESTING ACCREDITATION

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard ISO/IEC 17025:2005. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-01.pdf

Accredited Laboratory

A2LA has accredited

MICOM LABS

Pleasanton, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 4th day of February 2016.

Senior Director of Quality & Communications
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2017

For the tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

1.2. RECOGNITION

MiCOM Labs, Inc has widely recognized wireless testing capabilities. Our international recognition includes Conformity Assessment Body designation by APEC MRA countries. MiCOM Labs test reports are accepted globally.

Country	Recognition Body	Status	Phase	Identification No.
USA	Federal Communications Commission (FCC)	TCB	-	US0159 Listing #: 102167
Canada	Industry Canada (IC)	FCB	APEC MRA 2	US0159 Listing #: 4143A-2 4143A-3
Japan	MIC (Ministry of Internal Affairs and Communication)	CAB	APEC MRA 2	RCB 210
	VCCI	--	--	A-0012
Europe	European Commission	NB	EU MRA	NB 2280
Australia	Australian Communications and Media Authority (ACMA)	CAB	APEC MRA 1	US0159
Hong Kong	Office of the Telecommunication Authority (OFTA)	CAB	APEC MRA 1	
Korea	Ministry of Information and Communication Radio Research Laboratory (RRL)	CAB	APEC MRA 1	
Singapore	Infocomm Development Authority (IDA)	CAB	APEC MRA 1	
Taiwan	National Communications Commission (NCC) Bureau of Standards, Metrology and Inspection (BSMI)	CAB	APEC MRA 1	
Vietnam	Ministry of Communication (MIC)	CAB	APEC MRA 1	

EU MRA – European Union Mutual Recognition Agreement.
NB – Notified Body
APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement. Recognition agreement under which test lab is accredited to regulatory standards of the APEC member countries.

Phase I - recognition for product testing
Phase II – recognition for both product testing and certification

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1.3. PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard ISO/IEC 17065:2012. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-02.pdf

Accredited Product Certification Body

A2LA has accredited

MICOM LABS

Pleasanton, CA

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC 17065:2012 *Requirements for bodies certifying products, processes and services*. This accreditation demonstrates technical competence for a defined scope and the operation of a management system.

Presented this 4th day of February 2016.

Senior Director of Quality & Communications
For the Accreditation Council
Certificate Number 2381.02
Valid to November 30, 2017

For the product certification schemes to which this accreditation applies, please refer to the organization's Product Certification Scope of Accreditation.

United States of America – Telecommunication Certification Body (TCB)

Industry Canada – Certification Body, CAB Identifier – US0159

Europe – Notified Body (NB), NB Identifier - 2280

Japan – Recognized Certification Body (RCB), RCB Identifier - 210

2. DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft		
Rev A	16th August 2016	Initial release.
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In the above table the latest report revision will replace all earlier versions.

3. TEST RESULT CERTIFICATE

Manufacturer:	MikroTik Aizkraukles iela 23 Riga LV 1006 Latvia	**Tested by:**	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
Model:	RBOmniTikPG-5HacD	**Telephone:** **Fax:**	+1 925 462 0304 +1 925 462 0306
Type of Equipment:	802.11a/n/ac WLAN access point		
S/N's:	6CDE05988198/517 6CDE057F32C7/617		
Test Date(s):	21st - 25th July 2016	**Website:**	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC CFR 47 Part 15.407 & RSS-247	**EQUIPMENT COMPLIES**

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Notes:

1. This document reports conditions under which testing was conducted and the results of testing performed.

2. Details of test methods used have been recorded and kept on file by the laboratory.

3. Test results apply only to the item(s) tested.

ACCREDITED
TESTING CERT #2381.01

Approved & Released for MiCOM Labs, Inc. by:

Graeme Grieve
Quality Manager MiCOM Labs, Inc.

Gordon Hurst
President & CEO MiCOM Labs, Inc.

4. REFERENCES AND MEASUREMENT UNCERTAINTY

4.1. Normative References

REF.	PUBLICATION	YEAR	TITLE
I	KDB 662911 D01 & D02	Oct 31 2013	Guidance for measurement of output emission of devices that employ single transmitter with multiple outputs or systems with multiple transmitters operating simultaneously in the same frequency band
II	KDB 905462 D07 v01r01	8th April 2016	Test guidance to demonstrate compliance for U-NII devices subject to DFS requirements.
III	KDB 926956 D01 v01r06	8th April 2016	U-NII Device Transition Plan
IV	KDB 789033 D02 v01r02	8th April 2016	General UNII Test Procedures New Rules V01
V	A2LA	June 2015	R105 - Requirement's When Making Reference to A2LA Accreditation Status
VI	ANSI C63.10	2013	American National Standard for Testing Unlicensed Wireless Devices
VII	ANSI C63.4	2014	American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
VIII	CISPR 22/ EN 55022	2008/ 2010	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
IX	ETSI TR 100 028	2001-12	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
X	FCC 06-96	Jun 30 2006	Memorandum Opinion and Order
XI	FCC 47 CFR Part 15.407	2016	Radio Frequency Devices; Subpart E –Unlicensed National Information Infrastructure Devices
XII	ICES-003	Issue 6, January 2016	Spectrum Management and Telecommunications; Interference-Causing Equipment Standard. Information Technology Equipment (ITE) – Limits and methods of measurement.
XIII	M 3003	Edition 3 Nov. 2012	Expression of Uncertainty and Confidence in Measurements
XIV	RSS-247 Issue 1	May 2015	Digital Transmission Systems (DTSs), Frequency Hopping System (FHSs) and License-Exempt Local Area Network (LE-LEN) Devices
XV	ICES-003	Issue 6 Jan 2016	Spectrum Management and Telecommunications; Interference-Causing Equipment Standard. Information Technology Equipment (Including Digital Apparatus) – Limits and methods of measurement.
XVI	M 3003	Edition 3 Nov.2012	Expression of Uncertainty and Confidence in Measurements
XVII	RSS-Gen Issue 4	November 2014	General Requirements and Information for the Certification of Radio Communication Equipment
XVIII	FCC 47 CFR Part	2016	FCC requirements and rules regarding photographs and

	2.1033		test setup diagrams.
XIX	KDB 644545 D03 v01	August 14th 2014	Guidance for IEEE 802.11ac New Rules

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4.2. Test and Uncertainty Procedure

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.

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5. PRODUCT DETAILS AND TEST CONFIGURATIONS

5.1. Technical Details

Details	Description
Purpose:	Test of the MikroTik RBOmniTikPG-5HacD to FCC CFR 47 Part 15.407. Radio Frequency Devices; Subpart E –Unlicensed National Information Infrastructure Devices
Applicant:	MikroTik Aizkraukles iela 23 Riga LV 1006 Latvia
Manufacturer:	As Applicant
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
Test report reference number:	MIKO51-U3 Rev A
Date EUT received:	13 June 2016
Standard(s) applied:	FCC CFR 47 Part 15.407 & Industry Canada RSS-247
Dates of test (from - to):	21st – 25th July 2016
No of Units Tested:	1
Type of Equipment:	802.11a/n/ac WLAN access point
Product Family Name:	OmniTIK 5 PoE ac
Model(s):	RBOmniTikPG-5HacD,
Location for use:	Both
Declared Frequency Range(s):	5150 - 5250 MHz; 5725-5850 MHz
Primary function of equipment:	Wireless Access Point
Secondary function of equipment:	n/a
Type of Modulation:	OFDM
EUT Modes of Operation:	5150 - 5250 MHz: 802.11a; 802.11ac-80; 802.11n HT-20; 802.11n HT-40; 5725 - 5850 MHz: 802.11a; 802.11ac-80; 802.11n HT-20; 802.11n HT-40;
Declared Nominal Output Power (Ave):	FCC; 5150 - 5250 MHz: 28.5 dBm; 5725 - 5850 MHz: 28.5 dBm IC; 5150 - 5250 MHz: 15.5 dBm; 5725 - 5850 MHz: 28.5 dBm
Transmit/Receive Operation:	Transceiver -
Rated Input Voltage and Current:	POE (POE adaptor sold with unit) 28Vdc
Operating Temperature Range:	Declared Range -40°C to +70°C
ITU Emission Designator:	802.11a: 16M5D1D 802.11n HT-20: 17M6D1D 802.11n HT-40: 36M2D1D 802.11ac-80: 75M7D1D
Equipment Dimensions:	416 x 58 x 129 mm (W x D x H)
Weight:	620g
Hardware Rev:	r1
Software Rev:	MikroTik RouterOS v6.36

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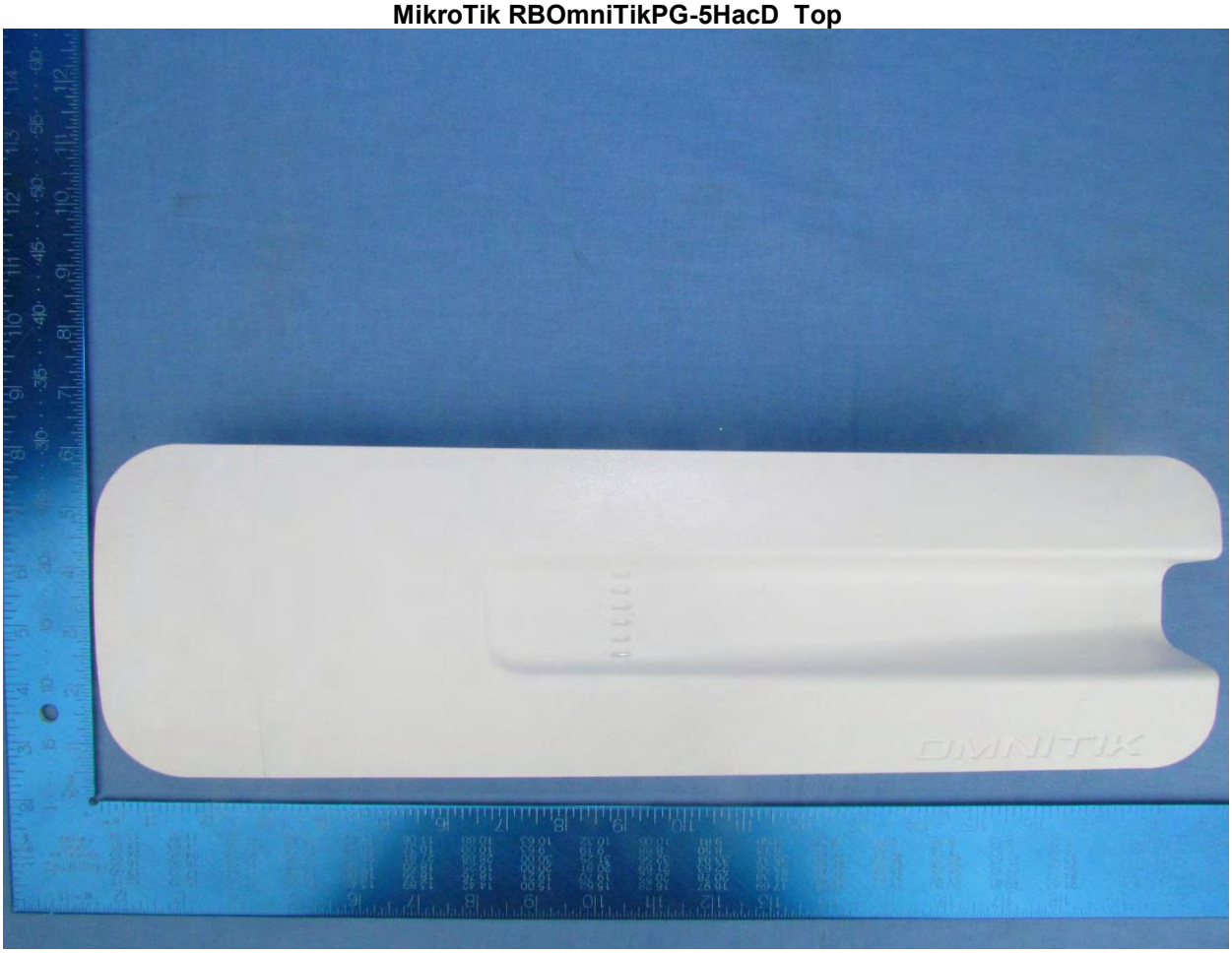
5.2. Scope Of Test Program

MikroTik RBOmniTikPG-5HacD

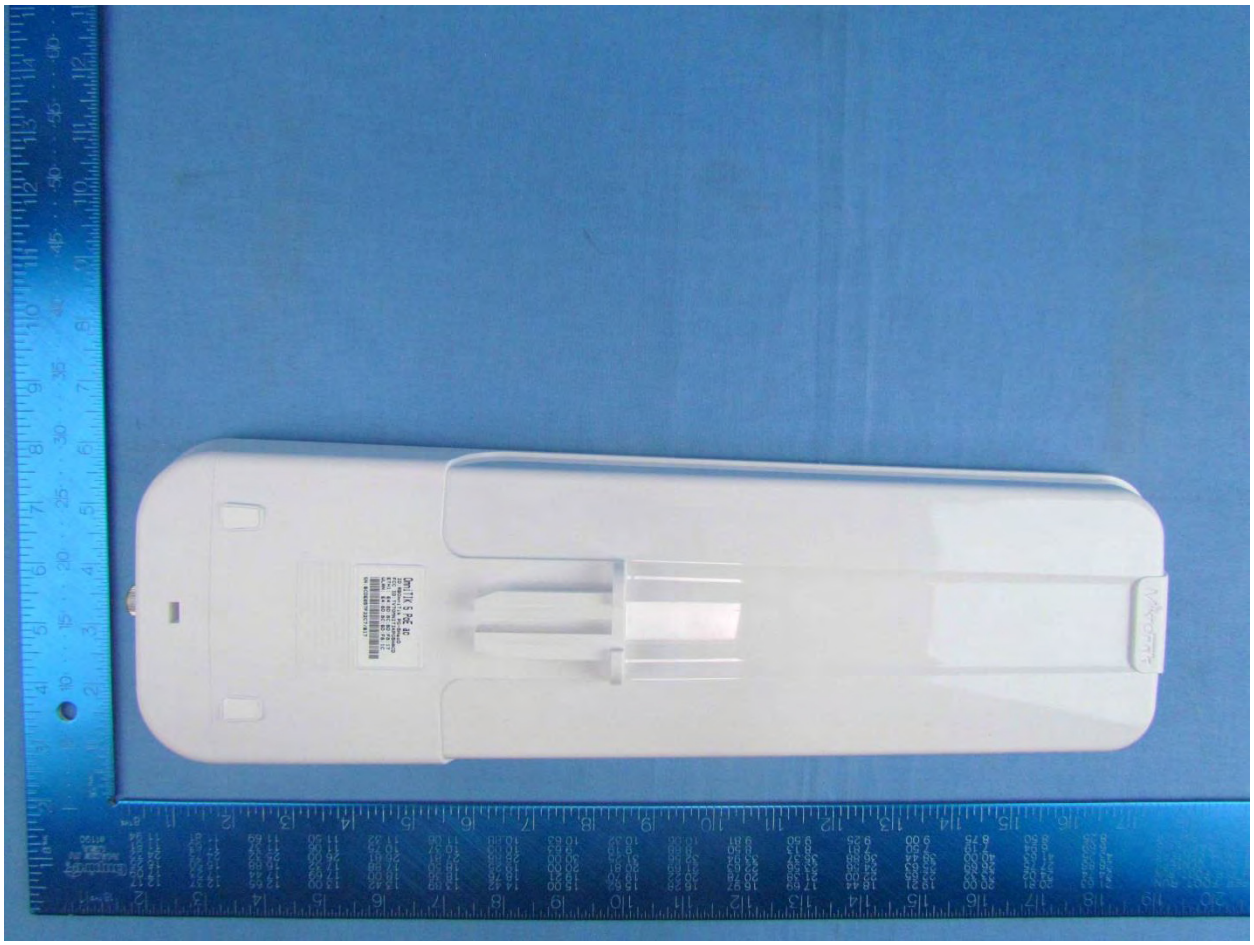
The scope of the test program was to test the MikroTik RBOmniTikPG-5HacD, 802.11a/n/ac WLAN access point configurations in the frequency ranges 5150 - 5250 MHz;5725-5850 MHz for compliance against the following specification:

FCC CFR 47 Part 15.407 & IC RSS-247
Radio Frequency Devices; Subpart E –Unlicensed National Information Infrastructure Devices

MikroTik RBOmniTikPG-5HacD Top



MikroTik RBOmniTikPG-5HacD Bottom



POE Injector PS

5.3. Equipment Model(s) and Serial Number(s)

Type	Description	Manufacturer	Model	Serial no.	Delivery Date
EUT	802.11a/n/ac WLAN access point	OmniTIK 5 PoE ac	RBOmniTikPG-5HacD	6CDE05988198/517	13 June 2016
EUT	802.11 a/n/ac Wlan access point	OmniTik 5 PoE ac	RBOmnitikPG-5HacD	6CDE057F32C7/617	13 June 2016
Support Equipment	28V-2.57A DC Power supply and PoE adapter	AC/DC Adapter	DQS751-280257-3	#MIKO51-1	13 June 2016
Support Equipment	28V-2.57A DC Power supply and PoE adapter	AC/DC Adapter	DQS751-280257-3	#MIKO51-2	13 June 2016

5.4. Antenna Details

Type	Manufacturer	Model	Family	Gain (dBi)	BF Gain	Dir BW	X-Pol	Frequency Band (MHz)
integral	MikroTik	5HacD	OMNI	7.5	-	360	V	5725 - 5850
integral	MikroTik	5HacD	OMNI	6.5	-	360	H	5725 - 5850
integral	MikroTik	5HacD	OMNI	7.5	-	360	V	5150 - 5250
integral	MikroTik	5HacD	OMNI	6.5	-	360	H	5150 - 5250

BF Gain - Beamforming Gain
Dir BW - Directional BeamWidth
X-Pol - Cross Polarization

5.5. Cabling and I/O Ports

Port Type	Max Cable Length	# Of Ports	Screened	Conn Type	Data Type
Ethernet	N/A	5	N	RJ45	Data

5.6. Test Configurations

Results for the following configurations are provided in this report:

Operational Mode(s) (802.11a/b/g/n/ac)	Data Rate with Highest Power MBit/s	Channel Frequency (MHz)		
		Low	Mid	High
5150 - 5250 MHz				
802.11a	6	5,180.00	5,200.00	5,240.00
802.11ac-80	29.3	5,210.00	--	--
802.11n HT-20	6.5	5,180.00	5,200.00	5,240.00
802.11n HT-40	13.5	5,190.00	--	5,230.00
5725 - 5850 MHz				
802.11a	6	5,745.00	5,785.00	5,825.00
802.11ac-80	29.3	--	5,775.00	--
802.11n HT-20	6.5	5,745.00	5,785.00	5,825.00
802.11n HT-40	13.5	5,755.00	--	5,795.00

5.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:
1. NONE

5.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:
1. EUT was tested at the lower power levels in the 5150 – 5250 MHz band required to meet the EIRP requirements of IC RSS-247 of 200 mW rather than the FCC 15.407 conducted limit of 1 W. This was done solely at the request of the client.

6. TEST SUMMARY

List of Measurements

Test Header	Result	Data Link
(a) Peak Transmit Power	Complies	View Data
(a) 26 dB & 99% Bandwidth	Complies	View Data
(a)(5) Peak Power Spectral Density	Complies	View Data
(b)(2) Radiated	Complies	-
i).. Restricted Band Emissions	Complies	View Data
ii).. Restricted Band-Edge Emissions	Complies	View Data
iii).. Digital Emissions	Complies	-
AC Mains Conducted Emissions	Complies	-

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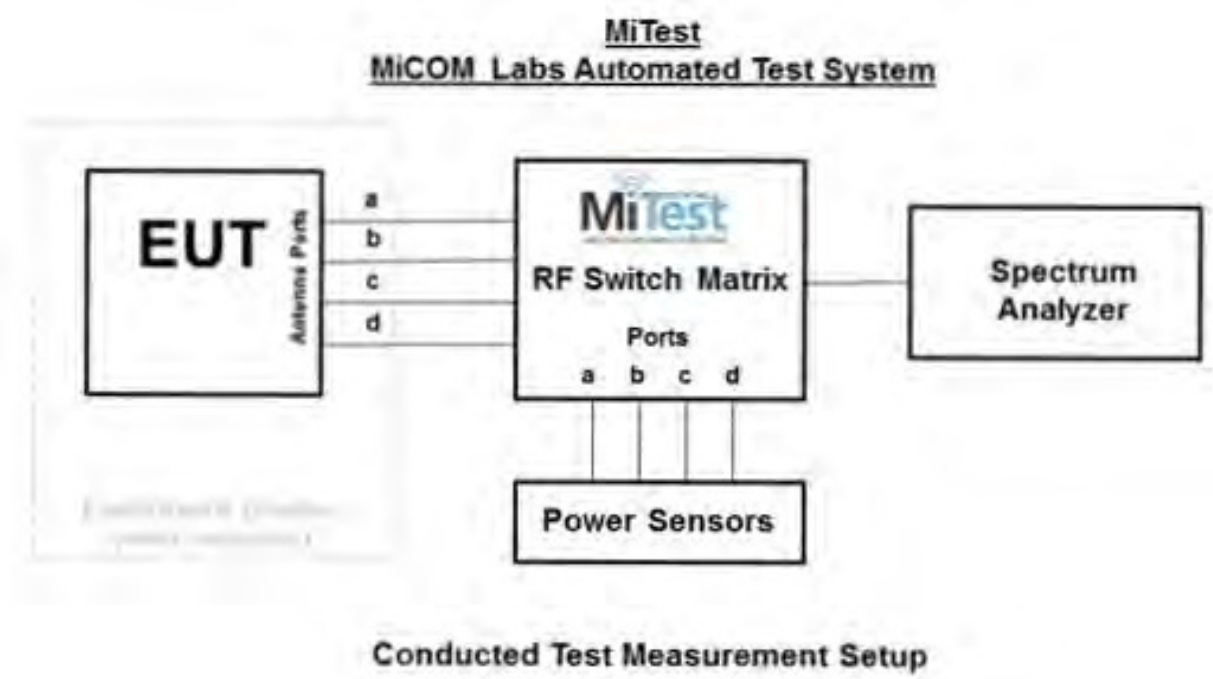
7. TEST EQUIPMENT CONFIGURATION(S)

7.1. Conducted

Conducted RF Emission Test Set-up(s)
The following tests were performed using the conducted test set-up shown in the diagram below.
1. PEAK TRANSMIT POWER
2. 26 dB & 99% BANDWIDTH
3. PEAK POWER SPECTRAL DENSITY
4. PEAK EXCURSION RATIO
5. TRANSMIT POWER CONTROL (TPC)



Conducted Test Measurement Setup

A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	01 Dec 2016
249	Resistance Thermometer	Thermotronics	GR2105-02	9340 #2	23 Oct 2016
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	02 May 2017
361	Desktop for RF#1, Labview Software installed	Dell	Vostro 220	WS RF#1	Not Required
378	Rohde & Schwarz 40	Rhode &	ESIB40	100107/040	04 Aug 2017

	GHz Receiver with Generator	Schwarz			
380	4x4 RF Switch Box	MiCOM Labs	MiTest RF Switch Box	MIC001	06 Dec 2016
390	USB Power Head 50MHz - 24GHz -60 to +20dBm	Agilent	U2002A	MY50000103	17 Oct 2016
398	Test Software	MiCOM	MiTest ATS	Version 3.0.0.16	Not Required
405	DC Power Supply 0-60V	Agilent	6654A	MY4001826	Cal when used
408	USB to GPIB interface	National Instruments	GPIB-USB HS	14C0DE9	Not Required
435	USB Wideband Power Sensor	Boonton	55006	8730	31 Aug 2016
436	USB Wideband Power Sensor	Boonton	55006	8731	31 Aug 2016
437	USB Wideband Power Sensor	Boonton	55006	8759	31 Aug 2016
441	USB Wideband Power Sensor	Boonton	55006	9179	25 Sep 2016
445	PoE Injector	D-Link	DPE-101GL	QTAH1E2000625	Not Required
461	Spectrum Analyzer	Agilent	E4440A	MY46185537	13 Aug 2017
75	Environmental Chamber	Thermatron	SE-300-2-2	27946	24 Nov 2016
RF#1 GPIB#1	GPIB cable to Power Supply	HP	GPIB	None	Not Required
RF#1 SMA SA #452	Precision SMA Male RG-402 Spectrun Analyzer	Fairview Microwave	Precision SMA Male RG 402 coax	None	06 Dec 2016
RF#1 SMA#1	EUT to Mitest box port 1	Flexco	SMA Cable port1	None	06 Dec 2016
RF#1 SMA#2	EUT to Mitest box port 2	Flexco	SMA Cable port2	None	06 Dec 2016
RF#1 SMA#3	EUT to Mitest box port 3	Flexco	SMA Cable port3	None	06 Dec 2016
RF#1 SMA#4	EUT to Mitest box port 4	Flexco	SMA Cable port4	None	06 Dec 2016
RF#1 USB#1	USB Cable to Mitest Box	Dynex	USB Cable	None	Not Required

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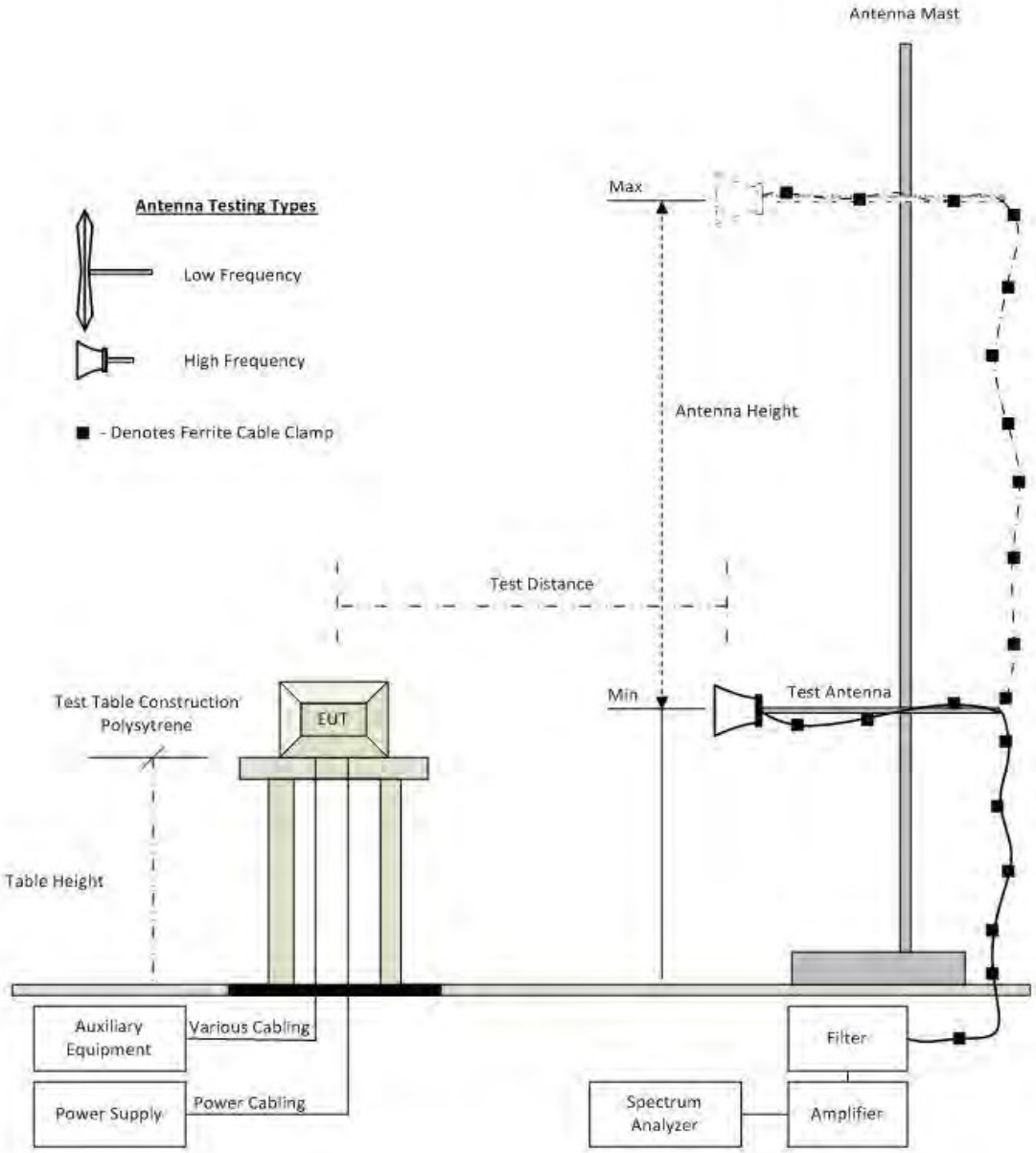
7.2. Radiated Emissions - 3m Chamber

The following tests were performed using the radiated test set-up shown in the diagram below.

Radiated emissions below 1GHz.; and Radiated Emissions above 1GHz.



Radiated Emission Test Setup

A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	01 Dec 2016
170	Video System Controller for Semi Anechoic Chamber	Panasonic	WV-CU101	04R08507	Not Required
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	02 May 2017
301	5470 to 5725 MHz Notch Filter	Microtronics	RBC50704	001	18 Aug 2016
302	5150 to 5350 MHz Notch Filter	Microtronics	BRC50703	002	18 Aug 2016
303	5725 to 5875 MHz Notch filter	Microtronics	BRC50705	003	18 Aug 2016
330	Variac 0-280 Vac	Staco Energy Co	3PN1020B	0546	Cal when used
336	Active loop Ant 10kHz to 30 MHz	EMCO	EMCO 6502	00060498	23 Sep 2016
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	15 Aug 2016
341	900MHz Notch Filter	EWT	EWT-14-0199	H1	18 Aug 2016
342	2.4 GHz Notch Filter	EWT	EWT-14-0203	H1	18 Aug 2016
343	5.15 GHz Notch Filter	EWT	EWT-14-0200	H1	18 Aug 2016
344	5.35 GHz Notch Filter	EWT	EWT-14-0201	H1	18 Aug 2016
345	5.46 GHz Notch Filter	EWT	EWT-14-0202	H1	18 Aug 2016
346	1.6 TO 10GHz High Pass Filter	EWT	EWT-57-0112	H1	18 Aug 2016
373	26III RMS Multimeter	Fluke	Fluke 26 series III	76080720	26 Oct 2016
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	04 Aug 2017
393	DC - 1050 MHz Low Pass Filter	Microcircuits	VLFX-1050	N/A	08 Oct 2016
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	09 Jun 2017
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	10 Oct 2016
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	09 Jun 2017
410	Desktop Computer	Dell	Inspiron 620	WS38	Not Required
411	Mast/Turntable Controller	Sunol Sciences	SC98V	060199-1D	Not Required
412	USB to GPIB Interface	National Instruments	GPIB-USB HS	11B8DC2	Not Required

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413	Mast Controller	Sunol Science	TWR95-4	030801-3	Not Required
414	DC Power Supply 0-60V	HP	6274	1029A01285	Cal when used
415	Turntable Controller	Sunol Sciences	Turntable Controller	None	Not Required
416	Gigabit ethernet filter	ETS-Lingren	Gigafoil 260366	None	Not Required
447	Rad Emissions Test Software	MiCOM	Rad Emissions Test Software Version 1.0.109	447	Not Required
462	Schwarzbeck cable from Antenna to Amplifier.	Schwarzbeck	AK 9513	462	31 May 2017
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	31 May 2017
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	31 May 2017
465	Low Pass Filter DC-1000 MHz	Mini-Circuits	NLP-1200+	VUU01901402	02 Jun 2017
466	Low Pass Filter DC-1500 MHz	Mini-Circuits	NLP-1750+	VUU10401438	02 Jun 2017
467	2495 to 2650 MHz notch filter	MicroTronics	BRM50709	011	18 Aug 2016
468	Low pass filter	Mini Circuits	SLP-550	None	18 Aug 2016
469	Low pass filter	Mini Circuit	SLP-1000	None	18 Aug 2016
470	High Pass filter	Mini Circuits	SHP-700	None	18 Aug 2016
476	Low Pass dc-2200MHz filter	Mini Circuits	15542 NLP-2400+	VUU13801345	18 Aug 2016
480	Cable - Bulkhead to Amp	SRC Haverhill	157-157-3050360	480	02 Jun 2017
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-151-3050787	481	02 Jun 2017
482	Cable - Amp to Antenna	SRC Haverhill	157-157-3051574	482	02 Jun 2017
502	Test Software for Radiated Emissions	EMISoft	Vasona	Version 5 Build 59	Not Required
87	Uninterruptible Power Supply	Falcon Electric	ED2000-1/2LC	F3471 02/01	Cal when used
VLF-1700	Low pass filter DC-1700 MHz	Mini Circuits	VLF-1700	None	31 May 2017

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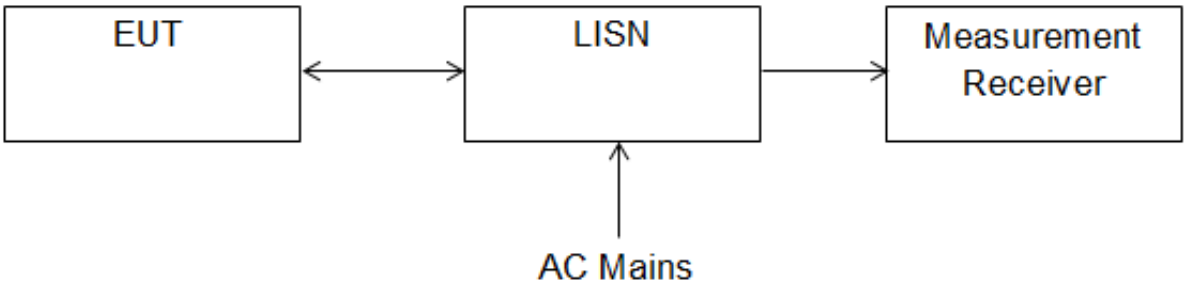
7.3. AC Mains Conducted Emissions



A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	01 Dec 2016
184	Pulse Limiter	Rhode & Schwarz	ESH3Z2	357.8810.52	27 Oct 2016
190	LISN (two-line V-network)	Rhode & Schwarz	ESH3Z5	836679/006	29 Oct 2016
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	02 May 2017
307	BNC-CABLE	Megaphase	1689 1GVT4	15F50B002	27 Oct 2016
316	Dell desktop computer workstation with Vasona	Dell	Desktop	WS04	Not Required
351	Data Impedance Stabilization Network	Teseq	ISN T800	24809	30 Nov 2016
372	AC Variable PS	California Instruments	1251P	L06951	Cal when used
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	04 Aug 2017
388	LISN (3 Phase) 9kHz - 30MHz	Rohde & Schwarz	ESH2-Z5	892107/022	30 Oct 2016
496	MiTest Conducted Emissions test software.	MiCOM	Conducted Emissions Test Software Version 1.0.87	496	Not Required
ADAPT SMA#1	SMA Cable	Megaphase	SMA Cable #1	None	27 Oct 2016
CCEMC01	Confidence Check.	MiCOM	CCEMC01	None	27 Oct 2016

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8. MEASUREMENT AND PRESENTATION OF TEST DATA

The measurement and graphical data presented in this test report was generated automatically using state-of-the-art technology creating an easy to read report structure. Numerical measurement data is separated from supporting graphical data (plots) through hyperlinks. Numerical measurement data can be reviewed without scrolling through numerous graphical pages to arrive at the next data matrix.

Plots have been relegated into the Appendix 'Graphical Data'.

Test and report automation was performed by MiTest. MiTest is an automated test system developed by MiCOM Labs. MiTest is the first cloud based modular test system enabling end-to-end automation of regulatory compliance testing for conducted RF testing.

The MiCOM Labs "MiTest" Automated Test System" (Patent Pending)

9. TEST RESULTS

9.1. Peak Transmit Power FCC 15.407

Conducted Test Conditions for Maximum Conducted Output Power			
Standard:	FCC CFR 47:15.407	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Maximum Conducted Output Power	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.407 (a)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Maximum Conducted Output Power Measurement
Method PM (Measurement using an RF average power meter). KDB 789033 defines a methodology using an average wideband power meter. Measurements were made while the EUT was operating in a continuous transmission mode (100% duty cycle) at the appropriate center frequency. All operational modes and frequency bands were measured independently and the resultant calculated. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported separately. A summation (Σ) of each antenna port output power is provided which includes any offset due to Duty Cycle Correction Factor (DCCF). Testing was performed under ambient conditions at nominal voltage.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.
Supporting Information
Calculated Power = A + G + Y+ 10 log (1/x) dBm

A = Total Power [10*Log10 ($10^{a/10}$ + $10^{b/10}$ + $10^{c/10}$ + $10^{d/10}$)]
G = Antenna Gain
Y = Beamforming Gain
x = Duty Cycle (average power measurements only)

Limits Maximum Conducted Output Power

Operating Frequency Band 5150-5250 MHz

15. 407 (a)(1)
(i) For an outdoor 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(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.

(iii) For fixed point-to-point access points 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. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. 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.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band

of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 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.

Operating Frequency Band 5250-5350 and 5470 – 5725 MHz

15. 407 (a)(2)
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 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.

Operating Frequency Band 5725 – 5850 MHz

15. 407 (a)(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.

Equipment Configuration for Peak Transmit Power			
Variant:	802.11a	**Duty Cycle (%):**	97
Data Rate:	6.00 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5180.0	11.70	11.95			14.97	22.144	15.50	-0.53	20.00
5200.0	11.50	11.89			14.84	22.144	15.50	-0.66	20.00
5240.0	12.16	12.43			15.44	21.844	15.50	-0.06	20.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

Limit is reduced by 1.5 dB per the standard as the antenna for this EUT is over 6 dBi (7.5 dBi)

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11ac-80	**Duty Cycle (%):**	73
Data Rate:	29.30 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5210.0	10.17	10.21			14.57	84.569	15.50	-0.93	20.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

Limit is reduced by 1.5 dB per the standard as the antenna for this EUT is over 6 dBi (7.5 dBi)

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5180.0	10.90	11.41			14.31	27.756	15.50	-1.19	20.00
5200.0	10.85	11.35			14.25	27.655	15.50	-1.25	20.00
5240.0	11.59	12.04			14.96	26.954	15.50	-0.54	20.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

Limit is reduced by 1.5 dB per the standard as the antenna for this EUT is over 6 dBi (7.5 dBi)

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11n HT-40	**Duty Cycle (%):**	96
Data Rate:	13.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5190.0	11.77	12.02			15.08	43.687	15.50	-0.42	21.00
5230.0	12.07	12.29			15.37	43.086	15.50	-0.13	21.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

Limit is reduced by 1.5 dB per the standard as the antenna for this EUT is over 6 dBi (7.5 dBi)

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11a	**Duty Cycle (%):**	97.0
Data Rate:	6.00 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power + DCCF (+0.13 dB) (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5745.0	22.35	23.52			25.99	--	30.00	-4.01	30.00
5785.0	21.55	22.75			25.20	--	30.00	-4.80	30.00
5825.0	21.52	22.35			24.97	--	30.00	-5.03	30.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

DCCF - Duty Cycle Correction Factor

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11ac-80	**Duty Cycle (%):**	73.0
Data Rate:	29.30 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power + DCCF (+1.37 dB) (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5775.0	20.74	22.20			24.54	--	30.00	-5.46	30.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

DCCF - Duty Cycle Correction Factor

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97.0
Data Rate:	6.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power + DCCF (+0.13 dB) (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5745.0	21.13	22.51			24.89	--	30.00	-5.11	30.00
5785.0	21.28	22.42			24.90	--	30.00	-5.10	30.00
5825.0	21.03	22.31			24.73	--	30.00	-5.27	30.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

DCCF - Duty Cycle Correction Factor

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95.0
Data Rate:	13.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power + DCCF (+0.22 dB) (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5755.0	20.27	21.74			24.08	--	30.00	-5.92	30.00
5795.0	20.36	21.47			23.96	--	30.00	-6.04	30.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

DCCF - Duty Cycle Correction Factor

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9.3. Peak Transmit Power IC RSS-247

Conducted Test Conditions for Maximum Conducted Output Power			
Standard:	Industry Canada RSS-247	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Maximum Conducted Output Power	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	6.2.1 (1), 6.2.4 (1)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Maximum Conducted Output Power Measurement
Method PM (Measurement using an RF average power meter). KDB 789033 defines a methodology using an average wideband power meter. Measurements were made while the EUT was operating in a continuous transmission mode (100% duty cycle) at the appropriate center frequency. All operational modes and frequency bands were measured independently and the resultant calculated. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported separately. A summation (Σ) of each antenna port output power is provided which includes any offset due to Duty Cycle Correction Factor (DCCF). Testing was performed under ambient conditions at nominal voltage.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.
Supporting Information
Calculated Power = A + G + Y+ 10 log (1/x) dBm

A = Total Power [10*Log10 ($10^{a/10}$ + $10^{b/10}$ + $10^{c/10}$ + $10^{d/10}$)]
G = Antenna Gain
Y = Beamforming Gain
x = Duty Cycle (average power measurements only)

Limits Maximum Conducted Output Power
6.2.1 Operating Frequency Band 5150-5250 MHz
(1) Power Limits

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

6.2.2 Operating Frequency Band 5250-5350 MHz
(1) Power Limits

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.
The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

6.2.3 Operating Frequency Band 5470 – 5600 and 5650 – 5725 MHz
Until further notice, devices subject to this section shall not be capable of transmitting in the band
5600-5650 MHz. This restriction is for the protection of Environment Canada's weather radars operating in this band
(1) Power Limits

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band. The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

6.2.4 Operating Frequency Band 5725-5850 MHz
(1) Power Limits

For equipment operating in the band 5725-5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz.

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-multipoint systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11a	**Duty Cycle (%):**	97
Data Rate:	6.00 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Calculated Total EIRP	EIRP Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	dBn	dBm	dBm	
5180.0	11.70	11.95			14.97	22.47	23.00	-0.53	20
5200.0	11.50	11.89			14.84	22.34	23.00	-0.66	20
5240.0	12.16	12.43			15.44	22.94	23.00	-0.06	20

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11ac-80	**Duty Cycle (%):**	73
Data Rate:	29.30 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Calculated Total EIRP	EIRP Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	dBm	dBm	dBm	
5210.0	10.17	10.21			14.57	22.07	23.00	-0.93	20.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Calculated Total EIRP	EIRP Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	dBm	dBm	dBm	
5180.0	10.90	11.41			14.31	21.81	23.00	-1.19	20.00
5200.0	10.85	11.35			14.25	21.75	23.00	-1.25	20.00
5240.0	11.59	12.04			14.96	22.46	23.00	-0.54	20.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11n HT-40	**Duty Cycle (%):**	96
Data Rate:	13.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Calculated Total EIRP	EIRP Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	dBm	dBm	dBm	
5190.0	11.77	12.02			15.08	22.58	23.00	-0.42	21
5230.0	12.27	12.49			15.57	22.87	23.00	-0.13	21

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11a	**Duty Cycle (%):**	97.0
Data Rate:	6.00 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power + DCCF (+0.13 dB) (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5745.0	22.35	23.52			25.99	--	30.00	-4.01	30.00
5785.0	21.55	22.75			25.20	--	30.00	-4.80	30.00
5825.0	21.52	22.35			24.97	--	30.00	-5.03	30.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

DCCF - Duty Cycle Correction Factor

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11ac-80	**Duty Cycle (%):**	73.0
Data Rate:	29.30 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power + DCCF (+1.37 dB) (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5775.0	20.74	22.20			24.54	--	30.00	-5.46	30.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

DCCF - Duty Cycle Correction Factor

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97.0
Data Rate:	6.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power + DCCF (+0.13 dB) (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5745.0	21.13	22.51			24.89	--	30.00	-5.11	30.00
5785.0	21.28	22.42			24.90	--	30.00	-5.10	30.00
5825.0	21.03	22.31			24.73	--	30.00	-5.27	30.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

DCCF - Duty Cycle Correction Factor

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Equipment Configuration for Peak Transmit Power			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95.0
Data Rate:	13.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power + DCCF (+0.22 dB) (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dB	
5755.0	20.27	21.74			24.08	--	30.00	-5.92	30.00
5795.0	20.36	21.47			23.96	--	30.00	-6.04	30.00

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

DCCF - Duty Cycle Correction Factor

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9.4. 26 dB & 99% Bandwidth

Conducted Test Conditions for 26 dB and 99% Bandwidth			
Standard:	FCC CFR 47:15.407 & IC RSS-247	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	26 dB and 99 % Bandwidth	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.407 (a)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for 26 dB and 99% Bandwidth Measurement
The bandwidth at 26 dB and 99 % is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency. The Resolution Bandwidth was set to approximately 1% of the emission bandwidth.
Testing was performed under ambient conditions at nominal voltage. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.

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Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	802.11a	**Duty Cycle (%):**	97
Data Rate:	6.00 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	**a**	**b**	**c**	**d**	**Highest**	**Lowest**		
5180.0	26.453	27.555			27.555	26.453		
5200.0	27.255	27.756			27.756	27.255		
5240.0	26.353	27.756			27.756	26.353		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	**a**	**b**	**c**	**d**	**Highest**	**Lowest**		
5180.0	17.134	17.335			17.335	17.134		
5200.0	17.435	17.635			17.635	17.435		
5240.0	17.435	17.234			17.435	17.234		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	802.11ac-80	**Duty Cycle (%):**	73
Data Rate:	29.30 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results								
Test Frequency	**Measured 26 dB Bandwidth (MHz)**				**26 dB Bandwidth (MHz)**			
	Port(s)							
MHz	**a**	**b**	**c**	**d**	**Highest**	**Lowest**		
5210.0	84.168	84.569			84.569	84.168		
Test Frequency	**Measured 99% Bandwidth (MHz)**				**99% Bandwidth (MHz)**			
	Port(s)							
MHz	**a**	**b**	**c**	**d**	**Highest**	**Lowest**		
5210.0	75.752	75.752			75.752	75.752		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.50 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5180.0	22.745	22.745			22.745	22.745		
5200.0	23.146	22.645			23.146	22.645		
5240.0	22.345	22.846			22.846	22.345		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5180.0	17.836	17.735			17.836	17.735		
5200.0	17.836	17.836			17.836	17.836		
5240.0	17.836	17.836			17.836	17.836		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-40	**Duty Cycle (%):**	96
Data Rate:	13.50 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5190.0	43.687	42.886			43.687	42.886		
5230.0	43.487	42.886			43.487	42.886		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5190.0	36.273	36.273			36.273	36.273		
5230.0	36.273	36.273			36.273	36.273		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11a	**Duty Cycle (%):**	97.0
Data Rate:	6.00 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5745.0	22.044	22.144			22.144	22.044		
5785.0	21.543	21.242			21.543	21.242		
5825.0	21.042	21.343			21.343	21.042		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5745.0	16.633	16.533			16.633	16.533		
5785.0	16.533	16.533			16.533	16.533		
5825.0	16.633	16.533			16.633	16.533		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	802.11ac-80	**Duty Cycle (%):**	73.0
Data Rate:	29.30 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results								
Test Frequency	**Measured 26 dB Bandwidth (MHz)**				**26 dB Bandwidth (MHz)**			
	Port(s)							
MHz	**a**	**b**	**c**	**d**	**Highest**	**Lowest**		
5775.0	88.176	89.780			89.780	88.176		
Test Frequency	**Measured 99% Bandwidth (MHz)**				**99% Bandwidth (MHz)**			
	Port(s)							
MHz	**a**	**b**	**c**	**d**	**Highest**	**Lowest**		
5775.0	76.553	76.152			76.553	76.152		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97.0
Data Rate:	6.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	**a**	**b**	**c**	**d**	**Highest**	**Lowest**		
5745.0	26.954	26.854			26.954	26.854		
5785.0	26.052	25.451			26.052	25.451		
5825.0	25.150	26.052			26.052	25.150		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	**a**	**b**	**c**	**d**	**Highest**	**Lowest**		
5745.0	17.936	18.036			18.036	17.936		
5785.0	17.936	18.036			18.036	17.936		
5825.0	17.936	17.936			17.936	17.936		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95.0
Data Rate:	13.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	**a**	**b**	**c**	**d**	**Highest**	**Lowest**		
5755.0	44.489	45.691			45.691	44.489		
5795.0	45.291	44.489			45.291	44.489		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	**a**	**b**	**c**	**d**	**Highest**	**Lowest**		
5755.0	36.673	36.473			36.673	36.473		
5795.0	36.473	36.473			36.473	36.473		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

9.5. Peak Power Spectral Density FCC 15.407

Conducted Test Conditions for Power Spectral Density			
Standard:	FCC CFR 47:15.407	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Power Spectral Density	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.407 (a)(5)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Power Spectral Density
The in-band power spectral density was measured using the test technique specified in KDB 789033. A 1 MHz measurement bandwidth was implemented for the analyzer sweep. Once the sweep is complete the analyzer trace data is downloaded and used for post processing purposes.
Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured separately. The Peak Power Spectral Density is the highest level found across the emission bandwidth. With multiple antenna port measurements the numerical analyzer data from each port is summed (å) and a link to this additional graphic is provided.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.

Measure and sum the spectra across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The individual spectra are then summed mathematically in linear power units. Unlike in-band power measurements, in which the sum involves a single measured value (output power) from each output, measurements for compliance with PSD limits involve summing entire spectra across corresponding frequency bins on the various outputs. Consistency is maintained for any device with multiple transmitter outputs to be certain the individual outputs are all aligned with the same span and same number of points. In this instance, the linear power spectrum value within the first spectral bin of output 0 is summed with that in the first spectral bin of output 1, and the first spectral bin of output 2, and so on up to the Nth output to obtain the true value for the first frequency bin of the summed spectrum. The summed spectrum value for each frequency bin is computed in this fashion. These summed spectral values were post processed and the resulting numerical and graphical data presented.

NOTE: It may be observed that spectrum in some plots break the limit line however this in itself does NOT constitute a failure. In all cases a spectrum summation plot is provided in order to prove compliance. A failure occurs only after the summation of all spectrum plots have been summed and are found to be greater than the limit line.

Supporting Information
Calculated Power = A + 10 log (1/x) dBm
A = Total Power Spectral Density [10*Log10 ($10^{a/10} + 10^{b/10} + 10^{c/10} + 10^{d/10}$)]
x = Duty Cycle

Limits Power Spectral Density

Operating Frequency Band 5150-5250 MHz

15. 407 (a)(1)
(i) For an outdoor 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(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.

(iii) For fixed point-to-point access points 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. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. 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.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 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.

Operating Frequency Band 5250-5350 and 5470 – 5725 MHz

15. 407 (a)(2)
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 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.

Operating Frequency Band 5725 – 5850 MHz

15. 407 (a)(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.

Equipment Configuration for Peak Power Spectral Density			
Variant:	802.11a	**Duty Cycle (%):**	97.0
Data Rate:	6.00 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/MHz)				Amplitude Summation	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/MHz**	**dBm/MHz**	**dB**
5180.0	-0.327	0.457			2.466	15.50	-13.00
5200.0	-0.507	-0.451			1.687	15.50	-13.80
5240.0	0.311	0.240			2.339	15.50	-13.20

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for Peak Power Spectral Density			
Variant:	802.11ac-80	**Duty Cycle (%):**	73.0
Data Rate:	29.30 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results							
Test Frequency	**Measured Power Spectral Density**				**Amplitude Summation**	**Limit**	**Margin**
	Port(s) (dBm/MHz)						
MHz	**a**	**b**	**c**	**d**	**dBm/MHz**	**dBm/MHz**	**dB**
5210.0	-11.451	-9.842			-10.295	15.50	-25.8

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for Peak Power Spectral Density			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97.0
Data Rate:	6.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/MHz)				Amplitude Summation	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/MHz**	**dBm/MHz**	**dB**
5180.0	-0.733	-1.013			1.592	15.50	-13.90
5200.0	-1.859	-0.304			1.400	15.50	-14.10
5240.0	-1.021	-0.704			1.792	15.50	-13.70

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for Peak Power Spectral Density			
Variant:	802.11n HT-40	**Duty Cycle (%):**	96.0
Data Rate:	13.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/MHz)				Amplitude Summation	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/MHz**	**dBm/MHz**	**dB**
5190.0	-3.951	-4.070			-2.397	15.50	-17.90
5230.0	-5.584	-3.480			-1.745	15.50	-17.30

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for Power Spectral Density			
Variant:	802.11a	**Duty Cycle (%):**	97.0
Data Rate:	6.00 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/500 KHz)				Summation Peak Marker + DCCF (+0.13 dB)	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/500 KHz**	**dBm/500 KHz**	**dB**
5745.0	6.651	8.904			10.575	30.0	-19.4
5785.0	6.093	8.099			9.569	30.0	-20.4
5825.0	5.537	6.558			8.880	30.0	-21.1

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for Power Spectral Density			
Variant:	802.11ac-80	**Duty Cycle (%):**	73.0
Data Rate:	29.30 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results							
Test Frequency	**Measured Power Spectral Density**				**Summation Peak Marker + DCCF (+1.37 dB)**	**Limit**	**Margin**
	Port(s) (dBm/500 KHz)						
MHz	**a**	**b**	**c**	**d**	**dBm/500 KHz**	**dBm/500 KHz**	**dB**
5775.0	-5.633	-6.020			-0.380	30.0	-30.4

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for Power Spectral Density			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97.0
Data Rate:	6.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/500 KHz)				Summation Peak Marker + DCCF (+0.13 dB)	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/500 KHz**	**dBm/500 KHz**	**dB**
5745.0	5.064	7.138			9.121	30.0	-20.9
5785.0	5.348	6.881			8.587	30.0	-21.4
5825.0	4.951	5.897			8.378	30.0	-21.6

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for Power Spectral Density			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95.0
Data Rate:	13.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/500 KHz)				Summation Peak Marker + DCCF (+0.22 dB)	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/500 KHz**	**dBm/500 KHz**	**dB**
5755.0	-0.441	1.253			2.532	30.0	-27.5
5795.0	0.562	0.959			2.747	30.0	-27.3

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

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9.6. Peak Power Spectral Density IC RSS-247

Conducted Test Conditions for Power Spectral Density			
Standard:	IC RSS-247	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Power Spectral Density	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	6.2.x (1)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Maximum Conducted Output Power Measurement
Method PM (Measurement using an RF average power meter). KDB 789033 defines a methodology using an average wideband power meter. Measurements were made while the EUT was operating in a continuous transmission mode (100% duty cycle) at the appropriate center frequency. All operational modes and frequency bands were measured independently and the resultant calculated. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported separately. A summation (Σ) of each antenna port output power is provided which includes any offset due to Duty Cycle Correction Factor (DCCF). Testing was performed under ambient conditions at nominal voltage.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.
Supporting Information
Calculated Power = A + G + Y+ 10 log (1/x) dBm

A = Total Power [10*Log10 ($10^{a/10}$ + $10^{b/10}$ + $10^{c/10}$ + $10^{d/10}$)]
G = Antenna Gain
Y = Beamforming Gain
x = Duty Cycle (average power measurements only)

Limits Maximum Conducted Output Power
6.2.1 Operating Frequency Band 5150-5250 MHz
(1) Power Limits

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

6.2.2 Operating Frequency Band 5250-5350 MHz
(1) Power Limits

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.
The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

6.2.3 Operating Frequency Band 5470 – 5600 and 5650 – 5725 MHz
Until further notice, devices subject to this section shall not be capable of transmitting in the band
5600-5650 MHz. This restriction is for the protection of Environment Canada's weather radars operating in this band
(1) Power Limits

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band. The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than
500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

6.2.4 Operating Frequency Band 5725-5850 MHz
(1) Power Limits

For equipment operating in the band 5725-5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz. Digital Transmission

Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices RSS-247 10 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.

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Equipment Configuration for Peak Power Spectral Density			
Variant:	802.11a	**Duty Cycle (%):**	97.0
Data Rate:	6.00 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/MHz)				Amplitude Summation	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/MHz**	**dBm/MHz**	**dB**
5180.0	-0.327	0.457			2.466	10.0	-7.5
5200.0	-0.507	-0.451			1.687	10.0	-8.3
5240.0	0.311	0.240			2.339	10.0	-7.7

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for Peak Power Spectral Density			
Variant:	802.11ac-80	**Duty Cycle (%):**	73.0
Data Rate:	29.30 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results							
Test Frequency	**Measured Power Spectral Density**				**Amplitude Summation**	**Limit**	**Margin**
	Port(s) (dBm/MHz)						
MHz	**a**	**b**	**c**	**d**	**dBm/MHz**	**dBm/MHz**	**dB**
5210.0	-11.451	-9.842			-10.295	10.0	-20.3

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for Peak Power Spectral Density			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97.0
Data Rate:	6.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/MHz)				Amplitude Summation	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/MHz**	**dBm/MHz**	**dB**
5180.0	-0.733	-1.013			1.592	10.0	-8.4
5200.0	-1.859	-0.304			1.400	10.0	-8.6
5240.0	-1.021	-0.704			1.792	10.0	-8.2

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for Peak Power Spectral Density			
Variant:	802.11n HT-40	**Duty Cycle (%):**	96.0
Data Rate:	13.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/MHz)				Amplitude Summation	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/MHz**	**dBm/MHz**	**dB**
5190.0	-3.951	-4.070			-2.397	10.0	-12.4
5230.0	-5.584	-3.480			-1.745	10.0	-11.8

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for Power Spectral Density			
Variant:	802.11a	**Duty Cycle (%):**	97.0
Data Rate:	6.00 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/500 KHz)				Summation Peak Marker + DCCF (+0.13 dB)	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/500 KHz**	**dBm/500 KHz**	**dB**
5745.0	6.651	8.904			10.575	30.0	-19.4
5785.0	6.093	8.099			9.569	30.0	-20.4
5825.0	5.537	6.558			8.880	30.0	-21.1

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for Power Spectral Density			
Variant:	802.11ac-80	**Duty Cycle (%):**	73.0
Data Rate:	29.30 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/500 KHz)				Summation Peak Marker + DCCF (+1.37 dB)	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/500 KHz**	**dBm/500 KHz**	**dB**
5775.0	-5.633	-6.020			-0.380	30.0	-30.4

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for Power Spectral Density			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97.0
Data Rate:	6.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/500 KHz)				Summation Peak Marker + DCCF (+0.13 dB)	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/500 KHz**	**dBm/500 KHz**	**dB**
5745.0	5.064	7.138			9.121	30.0	-20.9
5785.0	5.348	6.881			8.587	30.0	-21.4
5825.0	4.951	5.897			8.378	30.0	-21.6

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

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Equipment Configuration for Power Spectral Density			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95.0
Data Rate:	13.50 MBit/s	**Antenna Gain (dBi):**	7.50
Modulation:	OFDM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/500 KHz)				Summation Peak Marker + DCCF (+0.22 dB)	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/500 KHz**	**dBm/500 KHz**	**dB**
5755.0	-0.441	1.253			2.532	30.0	-27.5
5795.0	0.562	0.959			2.747	30.0	-27.3

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

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9.7. Radiated

Radiated Test Conditions for Radiated Spurious and Band-Edge Emissions			
Standard:	FCC CFR 47:15.407	**Ambient Temp. (ºC):**	20.0 - 24.5
Test Heading:	Radiated Spurious and Band-Edge Emissions	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.407 (b), 15.205, 15.209	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

FCC, Part §15.407(b)(2), §15.205(a)/15.209(a)
Industry Canada RSS-247; RSS-Gen §8.10

Test Procedure for Radiated Spurious and Band-Edge Emissions
Radiated emissions for restricted bands above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned. Measurements on any restricted band frequency or frequencies above 1 GHz are based on the use of measurement instrumentation employing peak and average detectors. All measurements were performed using a resolution bandwidth of 1 MHz.

Test configuration and setup for Undesirable Measurement were per the Radiated Test Set-up specified in this document.

15.407 (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.

(2) For transmitters operating in the 5.25-5.35 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.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

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

(8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

Limits for Restricted Bands (15.205, 15.209)
Peak emission: 74 dBuV/m
Average emission: 54 dBuV/m

Field Strength Calculation
The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the

measured reading. All factors are included in the reported data.
FS = R + AF + CORR - FO

where:
FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain
FO = Distance Falloff Factor
NFL = Notch Filter Loss or Waveguide Loss

Example:
The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength (dBµV/m);

$$E = 1000000 \times \sqrt{30P} / 3 \ \mu V/m$$

where P is the EIRP in Watts

Therefore: -27 dBm/MHz equates to 68.23 dBuV/m

Conversion between dBmV/m (or dBmV) and mV/m (or mV) are as follows:
Level (dBmV/m) = 20 * Log (level (mV/m))

40 dBmV/m = 100 mV/m
48 dBmV/m = 250 mV/m

Restricted Bands of Operation (15.205)
(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

Frequency Band			
MHz	**MHz**	**MHz**	**GHz**
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

(b) Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

(c) Except as provided in paragraphs (d) and (e) of this section, regardless of the field strength limits specified elsewhere in this

subpart, the provisions of this section apply to emissions from any intentional radiator.

(d) The following devices are exempt from the requirements of this section:

(1) Swept frequency field disturbance sensors operating between 1.705 and 37 MHz provided their emissions only sweep through the bands listed in paragraph (a) of this section, the sweep is never stopped with the fundamental emission within the bands listed in paragraph (a) of this section, and the fundamental emission is outside of the bands listed in paragraph (a) of this section more than 99% of the time the device is actively transmitting, without compensation for duty cycle.

(2) Transmitters used to detect buried electronic markers at 101.4 kHz which are employed by telephone companies.

(3) Cable locating equipment operated pursuant to §15.213.

(4) Any equipment operated under the provisions of §15.253, 15.255, and 15.256 in the frequency band 75-85 GHz, or §15.257 of this part.

(5) Biomedical telemetry devices operating under the provisions of §15.242 of this part are not subject to the restricted band 608-614 MHz but are subject to compliance within the other restricted bands.

(6) Transmitters operating under the provisions of subparts D or F of this part.

(7) Devices operated pursuant to §15.225 are exempt from complying with this section for the 13.36-13.41 MHz band only.

(8) Devices operated in the 24.075-24.175 GHz band under §15.245 are exempt from complying with the requirements of this section for the 48.15-48.35 GHz and 72.225-72.525 GHz bands only, and shall not exceed the limits specified in §15.245(b).

(9) Devices operated in the 24.0-24.25 GHz band under §15.249 are exempt from complying with the requirements of this section for the 48.0-48.5 GHz and 72.0-72.75 GHz bands only, and shall not exceed the limits specified in §15.249(a).

(e) Harmonic emissions appearing in the restricted bands above 17.7 GHz from field disturbance sensors operating under the provisions of §15.245 shall not exceed the limits specified in §15.245(b).

RSS-247 Radiated emissions for restricted bands above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned. Measurements on any restricted band frequency or frequencies above 1 GHz are based on the use of measurement instrumentation employing peak and average detectors. All measurements were performed using a resolution bandwidth of 1 MHz.

Test configuration and setup for Undesirable Measurement were per the Radiated Test Set-up specified in this document. Unwanted emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

6.2.1. (2) Frequency Band 5150-5250 MHz
For transmitters operating in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, any unwanted emissions that fall into the band 5250-5350 MHz must be 26 dBc, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth, above 5.25 GHz. Otherwise, the transmission is considered as intentional and the devices shall implement dynamic frequency selection (DFS) and transmitter power control (TPC) as per the requirements for the band 5250-5350 MHz

6.2.4 (2) Frequency Bands 5725-5850 MHz
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.

Limits for Restricted Bands (15.205, 15.209)
Peak emission: 74 dBuV/m
Average emission: 54 dBuV/m
Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.
FS = R + AF + CORR - FO

where:
FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain
FO = Distance Falloff Factor
NFL = Notch Filter Loss or Waveguide Loss

Example:
The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength (dBµV/m);

$$E = {1000000 \times \sqrt{30P}}/{3} \ \mu V/m$$

where P is the EIRP in Watts

Therefore: -27 dBm/MHz equates to 68.23 dBuV/m

Conversion between dBmV/m (or dBmV) and mV/m (or mV) are as follows:
Level (dBmV/m) = 20 * Log (level (mV/m))

40 dBmV/m = 100 mV/m
48 dBmV/m = 250 mV/m

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Restricted Bands of Operation

Industry Canada Restricted Frequency Bands			
MHz	**MHz**	**MHz**	**GHz**
0.090-0.110	12.51975-12.52025	322-335.4	7250-7750
2.1735-2.1905	12.57675-12.57725	399.9-410	8025-8500
3.020-3.026	13.36-13.41	608-614	9000-9200
4.125-4.128	16.42-16.423	960-1427	9300-9500
4.17725-4.17775	16.80425-16.80475	1435-1626.5	10600-12700
4.20725-4.20775	25.5-25.67	1645.5-1646.5	13250-13400
5.677-5.683	37.5-38.25	1660-1710	14470-14500
6.215-6.218	73-74.6	1718.8-1722.2	15350-16200
6.26775-6.26825	74.8-75.2	2200-2300	17700-21400
6.31175-6.31225	108-138	2310-2390	22.01-23.12
8.291-8.294	156.52475-156.52525	2655-2900	23.6-24.0
8.362-8.366	156.7-156.9	3260-3267	31.2-31.8
8.37625-8.38675	162.0125-167.17	3332-3339	36.43-36.5
8.41425-8.41475	167.72-173.2	4500-5150	Above 38.6
12.29-12.293	240-285	5350-5460	

The measurement method shall be described in the test report. When the applicable unwanted emissions limits are defined in relative terms, the same parameter, peak power or average power, used for the transmitter's output power measurement shall also be used for the unwanted emission measurements.

In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to at least the frequency given below:

(a) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(b) If the equipment operates at or above 10 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

Particular attention should be paid to harmonics and sub-harmonics of the carrier frequency, as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value need not be reported.

When limits are expressed in absolute terms, compliance with the emission limits below 1000 MHz shall be demonstrated using a CISPR quasi-peak detector and the related measurement bandwidth. As an alternative to CISPR quasi-peak measurement, compliance with the emission limits can be demonstrated using measuring equipment employing a peak detector function properly adjusted for factors such as pulse desensitization as required, with an equal or greater measurement bandwidth relative to the applicable CISPR quasi-peak bandwidth.

Above 1000 MHz, compliance with the emission limits shall be demonstrated using an average detector with a minimum resolution bandwidth of 1 MHz.

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9.7.1. Restricted Band Emissions

9.7.1.1. MikroTik 5HacD

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	5HacD	**Variant:**	802.11a
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5180.00	**Data Rate:**	6.00 MBit/s
Power Setting:	20	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5182.40	67.19	3.69	-11.50	59.38	Fundamental	Horizontal	101	1	--	--	
#2	6946.55	51.22	4.13	-7.47	47.88	Peak (NRB)	Horizontal	101	1	--	--	Pass

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	5HacD	**Variant:**	802.11a
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5200.00	**Data Rate:**	6.00 MBit/s
Power Setting:	20	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5203.01	72.51	3.65	-11.45	64.71	Fundamental	Horizontal	101	0	--	--	
#2	6973.25	51.68	4.14	-7.45	48.37	Peak (NRB)	Horizontal	101	0	--	--	Pass

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	5HacD	**Variant:**	802.11a
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5240.00	**Data Rate:**	6.00 MBit/s
Power Setting:	20	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5233.63	74.62	3.63	-11.38	66.87	Fundamental	Vertical	150	1	--	--	
#2	7026.64	54.88	4.16	-7.39	51.65	Peak (NRB)	Horizontal	150	1	--	--	Pass

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	5HacD	**Variant:**	802.11a
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5745.00	**Data Rate:**	6.00 MBit/s
Power Setting:	30	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5739.92	60.36	3.83	-10.67	53.52	Fundamental	Vertical	166	1	--	--	
#2	11492.55	56.04	5.44	-4.84	56.64	Max Peak	Vertical	192	343	74.0	-17.4	Pass
#3	11492.55	41.81	5.44	-4.84	42.41	Max Avg	Vertical	192	343	54.0	-11.6	Pass

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	5HacD	**Variant:**	802.11a
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5785.00	**Data Rate:**	6.00 MBit/s
Power Setting:	30	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5791.82	60.61	3.78	-10.40	53.99	Fundamental	Vertical	200	1	--	--	
#2	11571.55	57.09	5.42	-4.63	57.88	Max Peak	Vertical	197	345	74.0	-16.1	Pass
#3	11571.55	42.54	5.42	-4.63	43.33	Max Avg	Vertical	197	345	54.0	-10.7	Pass

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	5HacD	**Variant:**	802.11a
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5825.00	**Data Rate:**	6.00 MBit/s
Power Setting:	30	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5827.42	62.23	3.84	-10.24	55.83	Fundamental	Vertical	200	1	--	--	
#2	11646.48	52.99	5.46	-4.47	53.98	Max Peak	Vertical	191	344	74.0	-20.0	Pass
#3	11646.48	38.38	5.46	-4.47	39.37	Max Avg	Vertical	191	344	54.0	-14.6	Pass

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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9.7.2. Restricted Band-Edge Emissions

9.7.2.2. MikroTik 5HacD

RESULTS SUMMARY FOR RADIATED BAND-EDGE EMISSIONS

5150 - 5250 MHz

5HacD		Band-Edge Freq	Limit 74.0dBµV/m	Limit 54.0dBµV/m	Power Setting
Operational Mode	Operating Frequency (MHz)	MHz	dBµV/m	dBµV/m	
802.11a	5180.00	5150.00	67.94	45.86	20
802.11ac-80	5210.00	5150.00	64.63	48.75	20
802.11n HT-20	5180.00	5150.00	67.05	45.39	20
802.11n HT-40	5190.00	5150.00	66.28	47.71	21

5725 - 5850 MHz

5HacD		Band-Edge Freq	Limit 78.2dBµV/m	Limit 68.2dBµV/m	Power Setting
Operational Mode	Operating Frequency (MHz)	MHz	dBµV/m	dBµV/m	
802.11a	5745.00	5725.00	68.86	63.85	30
802.11ac-80	5775.00	5725.00	69.93	67.41	30
802.11n HT-20	5745.00	5725.00	70.33	63.85	30
802.11n HT-40	5755.00	5725.00	71.38	66.22	30

5725 - 5850 MHz

5HacD		Band-Edge Freq	Limit 78.2dBµV/m	Limit 68.2dBµV/m	Power Setting
Operational Mode	Operating Frequency (MHz)	MHz	dBµV/m	dBµV/m	
802.11a	5825.00	5850.00	71.65	62.40	24
802.11ac-80	5775.00	5850.00	63.00	63.00	30
802.11n HT-20	5825.00	5850.00	77.27	62.40	23
802.11n HT-40	5795.00	5850.00	63.91	64.29	30

Click on the links to view the data.

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Equipment Configuration for Restricted Lower Band-Edge Emissions

Antenna:	5HacD	**Variant:**	802.11a
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5180.00	**Data Rate:**	6.00 MBit/s
Power Setting:	20	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5150.00	8.08	3.67	34.11	45.86	Max Avg	Horizontal	165	358	54.0	-8.1	Pass
#2	5150.00	30.16	3.67	34.11	67.94	Max Peak	Horizontal	165	358	74.0	-6.1	Pass
#3	5150.00	--	--	--	--	Restricted-Band	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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Equipment Configuration for Restricted Lower Band-Edge Emissions

Antenna:	5HacD	**Variant:**	802.11ac-80
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5210.00	**Data Rate:**	29.30 MBit/s
Power Setting:	20	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5150.00	10.97	3.67	34.11	48.75	Max Avg	Horizontal	165	358	54.0	-5.3	Pass
#2	5150.00	26.85	3.67	34.11	64.63	Max Peak	Horizontal	165	358	74.0	-9.4	Pass
#3	5150.00	--	--	--	--	Restricted-Band	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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Equipment Configuration for Restricted Lower Band-Edge Emissions

Antenna:	5HacD	**Variant:**	802.11n HT-20
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5180.00	**Data Rate:**	6.50 MBit/s
Power Setting:	20	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5150.00	7.61	3.67	34.11	45.39	Max Avg	Horizontal	165	358	54.0	-8.6	Pass
#2	5150.00	29.27	3.67	34.11	67.05	Max Peak	Horizontal	165	358	74.0	-7.0	Pass
#3	5150.00	--	--	--	--	Restricted-Band	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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Equipment Configuration for Restricted Lower Band-Edge Emissions

Antenna:	5HacD	**Variant:**	802.11n HT-40
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5190.00	**Data Rate:**	13.50 MBit/s
Power Setting:	21	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5150.00	9.93	3.67	34.11	47.71	Max Avg	Horizontal	165	358	54.0	-6.3	Pass
#2	5150.00	28.50	3.67	34.11	66.28	Max Peak	Horizontal	165	358	74.0	-7.7	Pass
#3	5150.00	--	--	--	--	Restricted-Band	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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Equipment Configuration for 5725 MHz Radiated Band-Edge Emissions

Antenna:	5HacD	**Variant:**	802.11a
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5745.00	**Data Rate:**	6.00 MBit/s
Power Setting:	30	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5645.00	25.91	3.76	34.18	63.85	Max Avg	Horizontal	176	358	68.2	-4.4	Pass
#2	5725.00	30.72	3.79	34.35	68.86	Max Avg	Horizontal	176	358	78.2	-9.4	Pass
#3	5725.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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Equipment Configuration for 5725 MHz Radiated Band-Edge Emissions

Antenna:	5HacD	**Variant:**	802.11ac-80
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5775.00	**Data Rate:**	29.30 MBit/s
Power Setting:	30	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5715.00	29.26	3.81	34.34	67.41	Max Avg	Horizontal	176	358	68.2	-0.8	Pass
#2	5725.00	31.79	3.79	34.35	69.93	Max Avg	Horizontal	176	358	78.2	-8.3	Pass
#3	5725.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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Equipment Configuration for 5725 MHz Radiated Band-Edge Emissions

Antenna:	5HacD	**Variant:**	802.11n HT-20
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5745.00	**Data Rate:**	6.50 MBit/s
Power Setting:	30	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5645.00	25.91	3.76	34.18	63.85	Max Avg	Horizontal	176	358	68.2	-4.4	Pass
#2	5725.00	32.19	3.79	34.35	70.33	Max Avg	Horizontal	176	358	78.2	-7.9	Pass
#3	5725.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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Equipment Configuration for 5725 MHz Radiated Band-Edge Emissions

Antenna:	5HacD	**Variant:**	802.11n HT-40
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5755.00	**Data Rate:**	13.50 MBit/s
Power Setting:	30	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5715.00	28.07	3.81	34.34	66.22	Max Avg	Horizontal	176	358	68.2	-2.0	Pass
#2	5725.00	33.24	3.79	34.35	71.38	Max Avg	Horizontal	176	358	78.2	-6.9	Pass
#3	5725.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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Equipment Configuration for 5850 MHz Radiated Band-Edge Emissions

Antenna:	5HacD	**Variant:**	802.11a
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5825.00	**Data Rate:**	6.00 MBit/s
Power Setting:	24	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#2	5855.05	33.18	3.83	34.64	71.65	Max Avg	Horizontal	176	358	78.2	-6.6	Pass
#3	5860.00	23.89	3.86	34.65	62.40	Max Avg	Horizontal	176	358	68.2	-5.8	Pass
#1	5850.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor. Power Reduced to meet band Edge Limit

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Equipment Configuration for 5850 MHz Radiated Band-Edge Emissions

Antenna:	5HacD	**Variant:**	802.11ac-80
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5775.00	**Data Rate:**	29.30 MBit/s
Power Setting:	30	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#2	5858.60	24.50	3.85	34.65	63.00	Max Avg	Horizontal	176	358	78.2	-15.2	Pass
#3	5860.00	24.49	3.86	34.65	63.00	Max Avg	Horizontal	176	358	68.2	-5.2	Pass
#1	5850.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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Equipment Configuration for 5850 MHz Radiated Band-Edge Emissions

Antenna:	5HacD	**Variant:**	802.11n HT-20
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5825.00	**Data Rate:**	6.50 MBit/s
Power Setting:	23	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#2	5855.05	38.80	3.83	34.64	77.27	Max Avg	Horizontal	176	358	78.2	-1.0	Pass
#3	5860.00	23.89	3.86	34.65	62.40	Max Avg	Horizontal	176	358	68.2	-5.8	Pass
#1	5850.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor. Power Reduced to meet band Edge Limit

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Equipment Configuration for 5850 MHz Radiated Band-Edge Emissions

Antenna:	5HacD	**Variant:**	802.11n HT-40
Antenna Gain (dBi):	7.50	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5795.00	**Data Rate:**	13.50 MBit/s
Power Setting:	30	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#2	5858.38	25.41	3.85	34.65	63.91	Max Avg	Horizontal	176	358	78.2	-14.3	Pass
#3	5878.08	25.78	3.81	34.70	64.29	Max Avg	Horizontal	176	358	68.2	-3.9	Pass
#1	5850.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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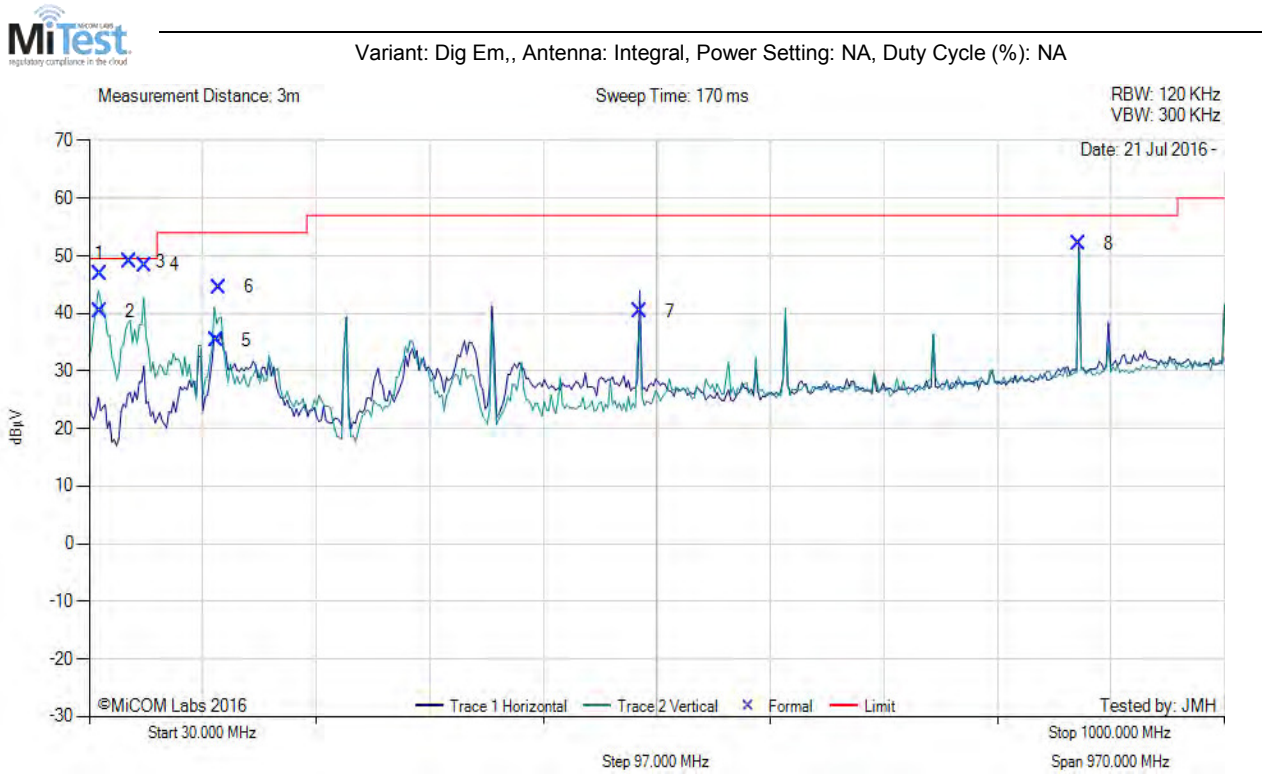
9.7.3. Digital Emissions

Equipment Configuration for Radiated Digital Emissions (0.03 - 1 GHz) Class A			
Antenna:	Integral	**Variant:**	Dig Emissions
Antenna Gain (dBi):	Not Applicable	**Modulation:**	NA
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	NA
Channel Frequency (MHz):	0.00	**Data Rate:**	NA
Power Setting:	NA	**Tested By:**	JMH

Test Measurement Results



Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	38.94	60.02	3.49	-16.67	46.84	MaxQP	Vertical	100	249	49.5	-2.7	Pass
2	39.53	54.45	3.50	-17.56	40.39	MaxQP	Vertical	102	244	49.5	-9.1	Pass
3	64.75	68.85	3.67	-23.51	49.01	MaxQP	Vertical	106	151	49.5	-0.5	Pass
4	77.18	67.91	3.76	-23.26	48.41	MaxQP	Vertical	100	0	49.5	-1.1	Pass
5	138.35	49.26	4.07	-18.05	35.28	MaxQP	Vertical	100	299	54.0	-18.7	Pass
6	141.18	58.79	4.08	-18.35	44.52	MaxQP	Vertical	100	305	54.0	-9.5	Pass
7	499.99	47.90	5.33	-12.85	40.38	MaxQP	Horizontal	100	122	57.0	-16.6	Pass
8	874.98	53.95	6.27	-8.09	52.13	MaxQP	Horizontal	100	236	57.0	-4.9	Pass

Test Notes: EUT on 80cm table powered by DQS751-280257-3 POE injector. EUT POE output is loaded and other enet cables connected to enet hub. EUT grounded to turntable floor

9.8. AC Mains Conducted Emissions

Standard Reference

FCC, Part §15.107

Scope

This test assesses the ability of the EUT to limit its internal noise from being present on the AC mains power input/output ports.

Test Procedure

The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

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Limits

The equipment shall meet the class B limits given in FCC Part 15: 107. Alternatively, for equipment intended to be used in non-residential environments, the class A limits given in FCC Part 15: 107 may be used.

Limits for conducted disturbance at the mains ports of class B ITE

Frequency of emission (MHz)	Quasi-peak dBuV	Average dBuV
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50
Note 1	* Decreases with the logarithm of the frequency	
Note 2	* The lower limit applies at the boundary between frequency ranges	

Limits for conducted disturbance at the mains ports of class A ITE

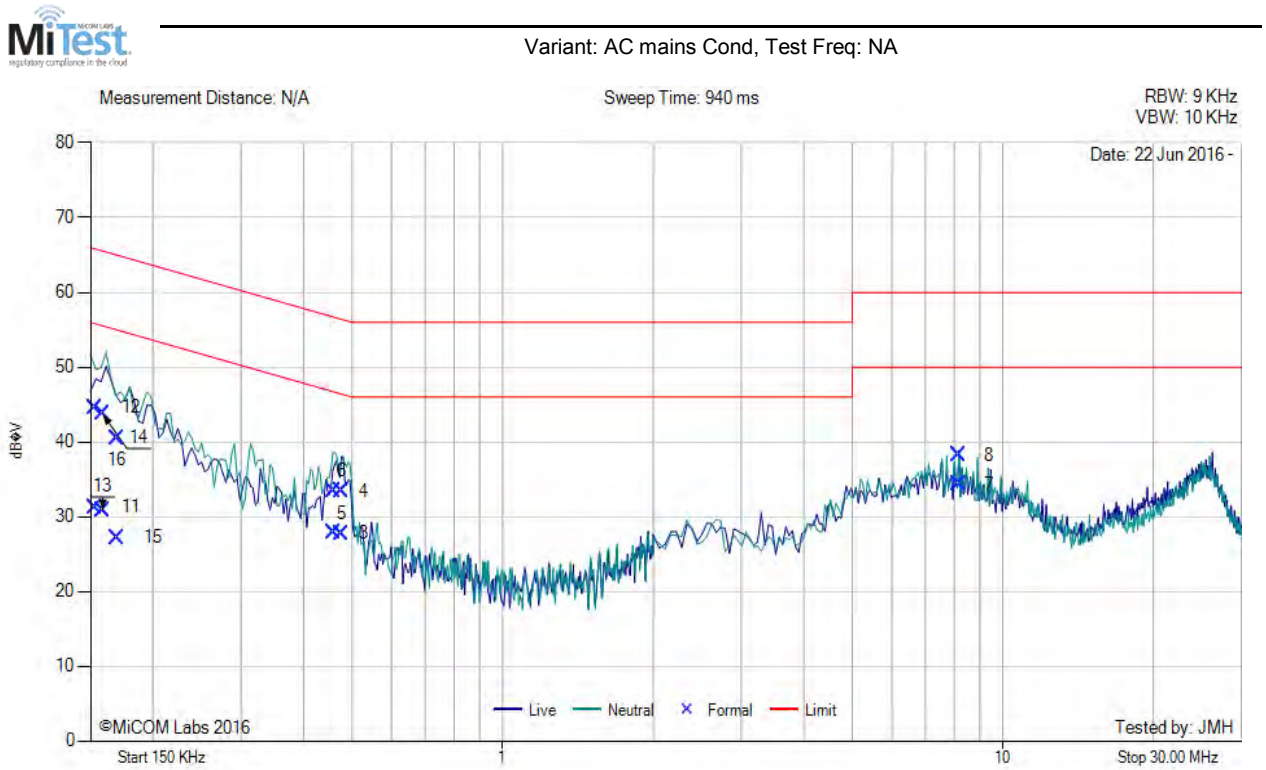
Frequency of emission (MHz)	Quasi-peak dBuV	Average dBuV
0.15–0.5	79	66
0.5–30	73	60
Note 1	* The lower limit shall apply at the transition frequency.	

Traceability
All conducted emission measurements are traceable to national standards. The uncertainty of measurement at a confidence level of not less than 95 %, with a coverage factor of k=2, in the range 9 kHz – 30 MHz (Average & Quasi-peak) is ±2.64 dB.

Laboratory Measurement Uncertainty	
Measurement uncertainty	±2.64 dB

Method
Measurements were made per work instruction WI-EMC-01 'Measurement of Conducted Emissions'

AC Mains Conducted Emissions Measurement Results



Num	Frequency MHz	Raw dBµV	Cable Loss	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV	Margin dB	Pass /Fail
1	0.065	22.51	0.05	9.92	9.97	32.48	Max Avg	Neutral	56.0	-23.5	Pass
2	0.065	25.00	0.05	9.92	9.97	34.97	Max Qp	Neutral	66.0	-31.0	Pass
3	0.459	17.82	0.07	9.93	10.00	27.82	Max Avg	Neutral	47.2	-19.4	Pass
4	0.459	23.41	0.07	9.93	10.00	33.41	Max Qp	Neutral	57.2	-23.8	Pass
5	0.476	17.67	0.08	9.93	10.01	27.68	Max Avg	Live	46.7	-19.0	Pass
6	0.476	23.37	0.08	9.93	10.01	33.38	Max Qp	Live	56.7	-23.3	Pass
7	8.171	23.73	0.44	10.18	10.62	34.35	Max Avg	Live	50.0	-15.7	Pass
8	8.171	27.63	0.44	10.18	10.62	38.25	Max Qp	Live	60.0	-21.8	Pass
9	0.064	25.01	0.05	9.92	9.97	34.98	Max Avg	Neutral	56.0	-21.0	Pass
10	0.064	28.63	0.05	9.92	9.97	38.60	Max Qp	Neutral	66.0	-27.4	Pass
11	0.153	21.34	0.05	9.92	9.97	31.31	Max Avg	Neutral	55.9	-24.6	Pass
12	0.153	34.66	0.05	9.92	9.97	44.63	Max Qp	Neutral	65.9	-21.3	Pass
13	0.159	20.89	0.05	9.92	9.97	30.86	Max Avg	Neutral	55.7	-24.9	Pass
14	0.159	33.76	0.05	9.92	9.97	43.73	Max Qp	Neutral	65.7	-22.0	Pass
15	0.170	17.26	0.05	9.92	9.97	27.23	Max Avg	Neutral	55.4	-28.2	Pass
16	0.170	30.50	0.05	9.92	9.97	40.47	Max Qp	Neutral	65.4	-25.0	Pass

Test Notes: EUT powered by POE injector DQS751-280257-3. POE output ENET connected to HUB and Routerboard 911 5HacD as POE load. AC Mains 120V 60 Hz

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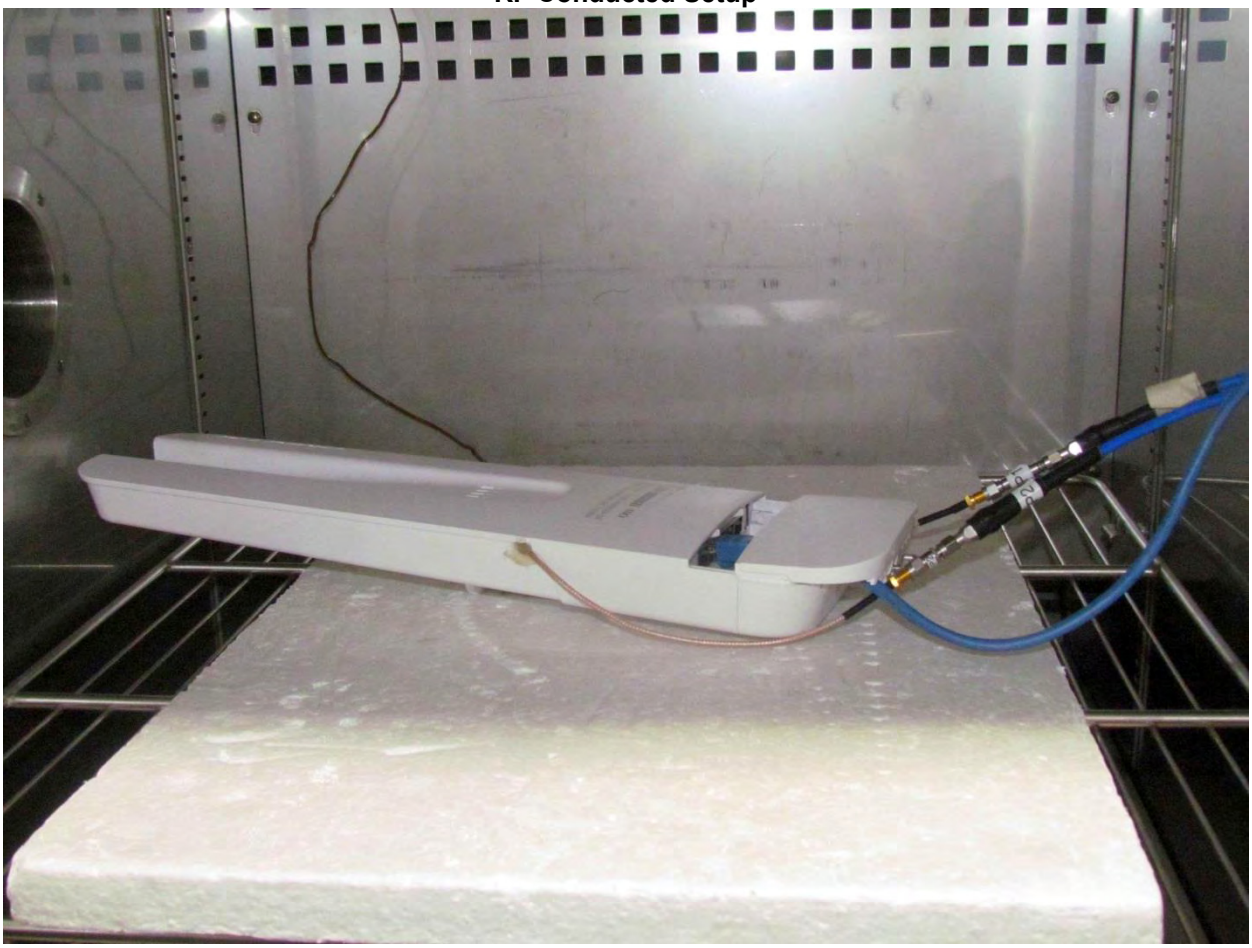
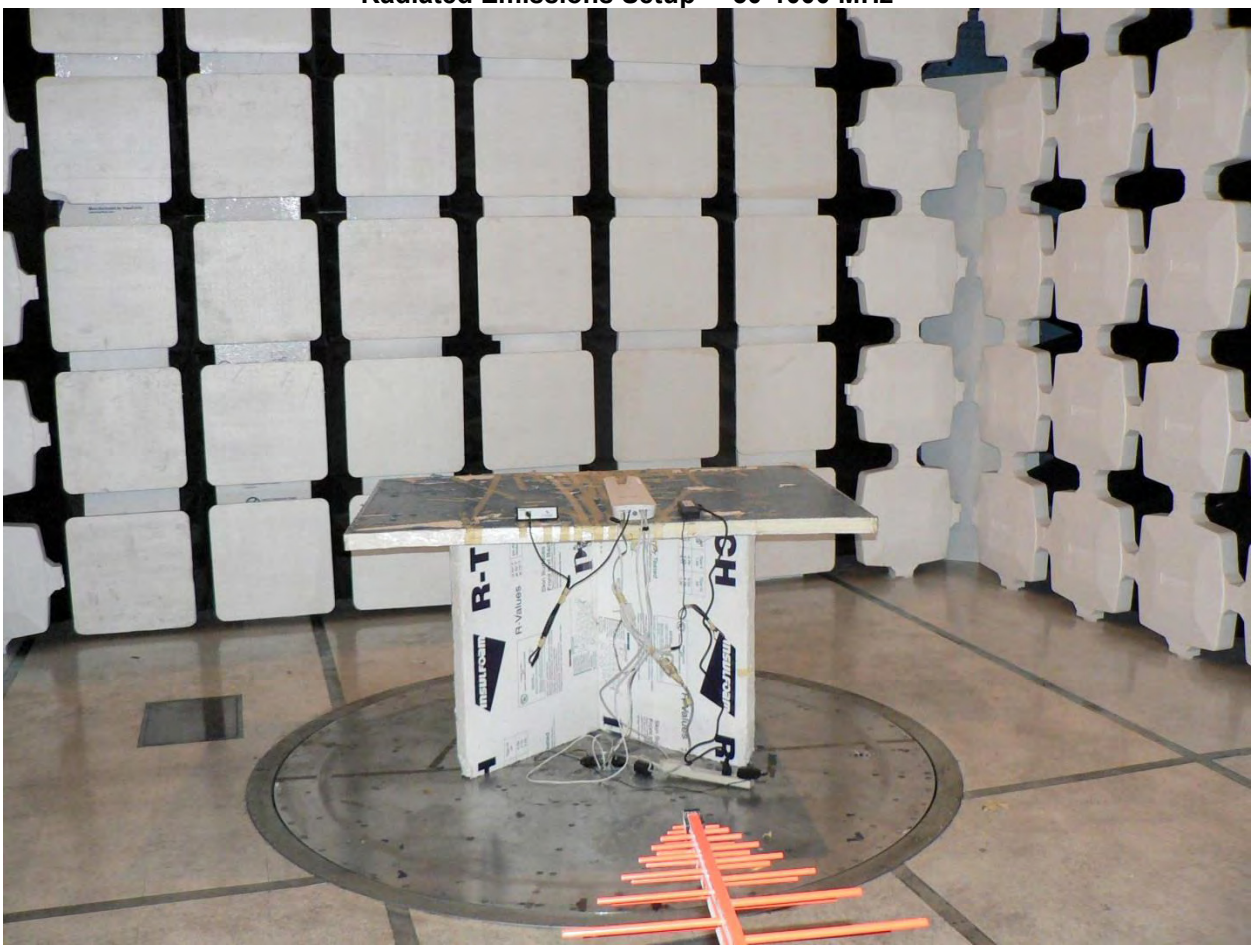
10. PHOTOGRAPHS

RF Conducted Setup



Radiated Emissions Setup – 30-1000 MHz



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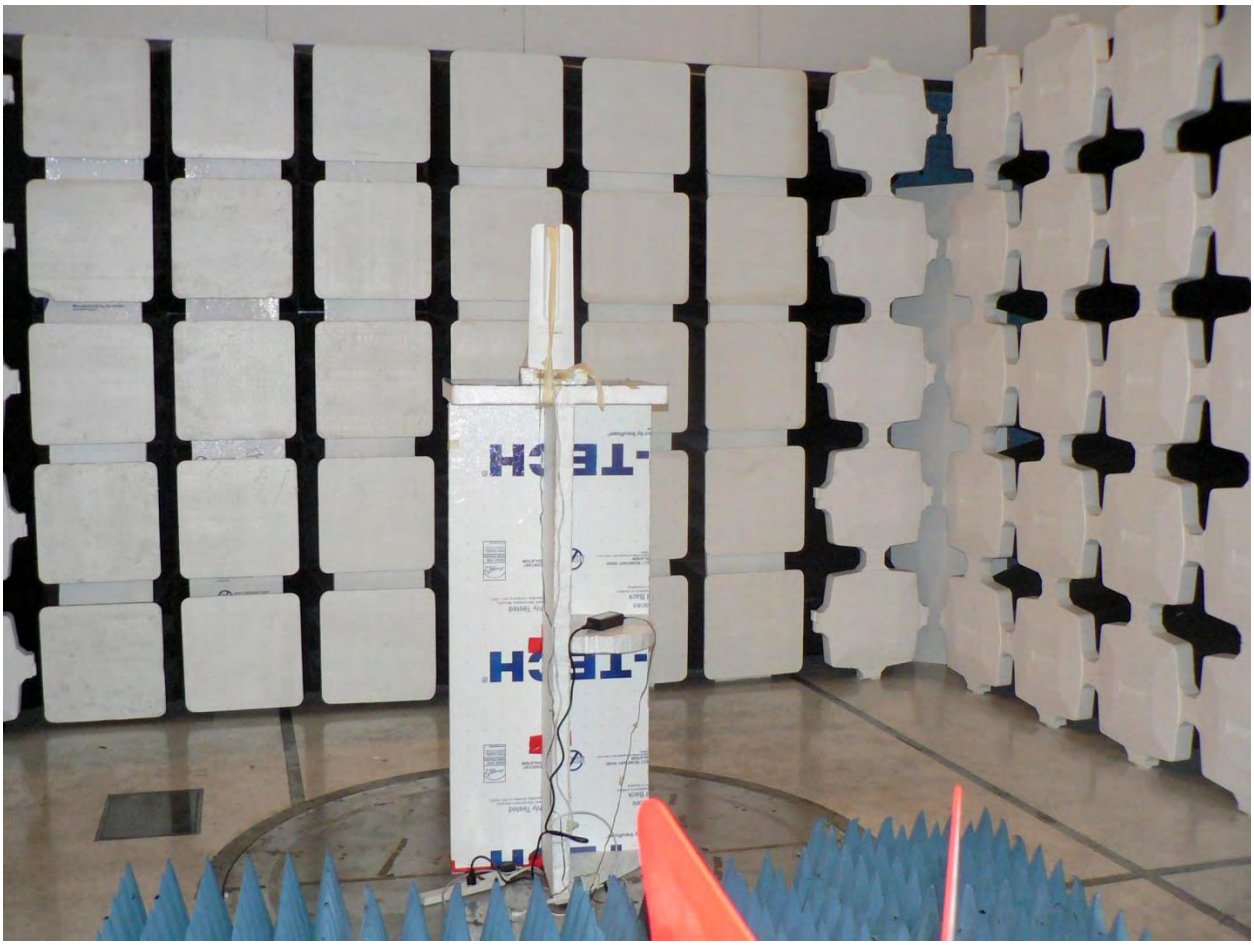
TX Spur Radiated Emissions Setup –



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AC Wireline Emissions Setup - Front

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AC Wireline Emissions Setup - Side

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A. APPENDIX - GRAPHICAL IMAGES

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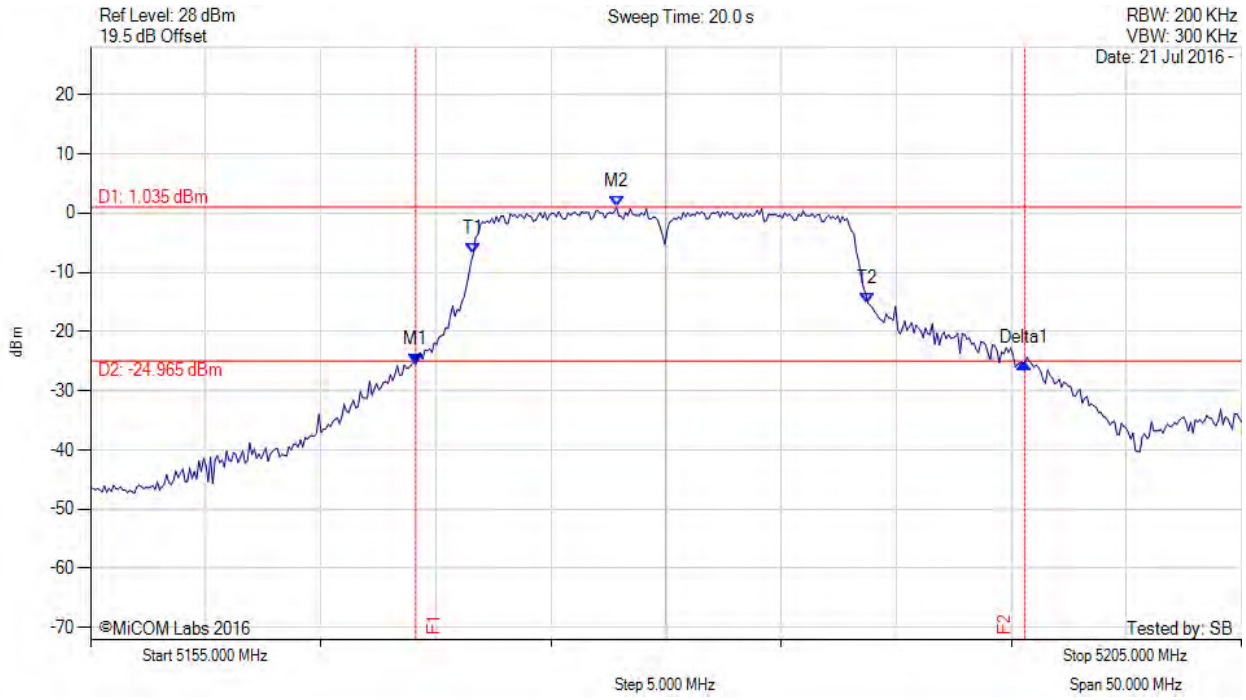
A.1. 26 dB & 99% Bandwidth

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5180.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc

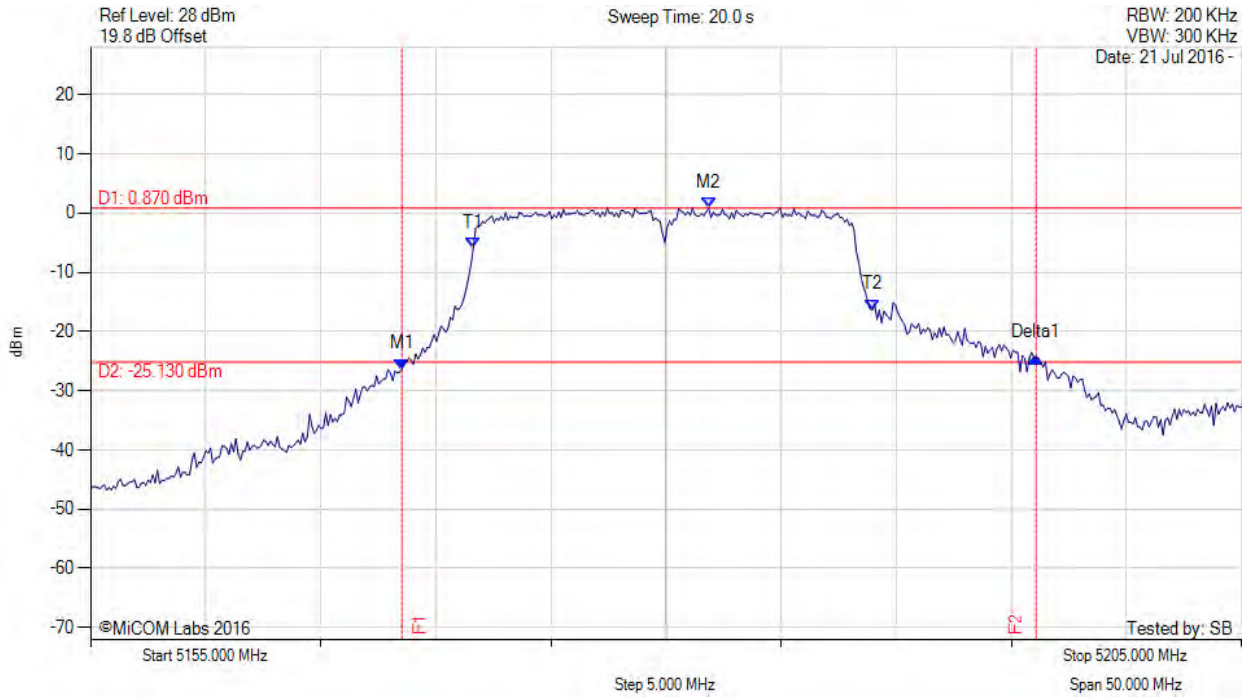


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5169.128 MHz : -25.471 dBm M2 : 5177.846 MHz : 1.035 dBm Delta1 : 26.453 MHz : 0.094 dB T1 : 5171.633 MHz : -6.822 dBm T2 : 5188.768 MHz : -15.168 dBm OBW : 17.134 MHz	Measured 26 dB Bandwidth: 26.453 MHz Measured 99% Bandwidth: 17.134 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5180.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc

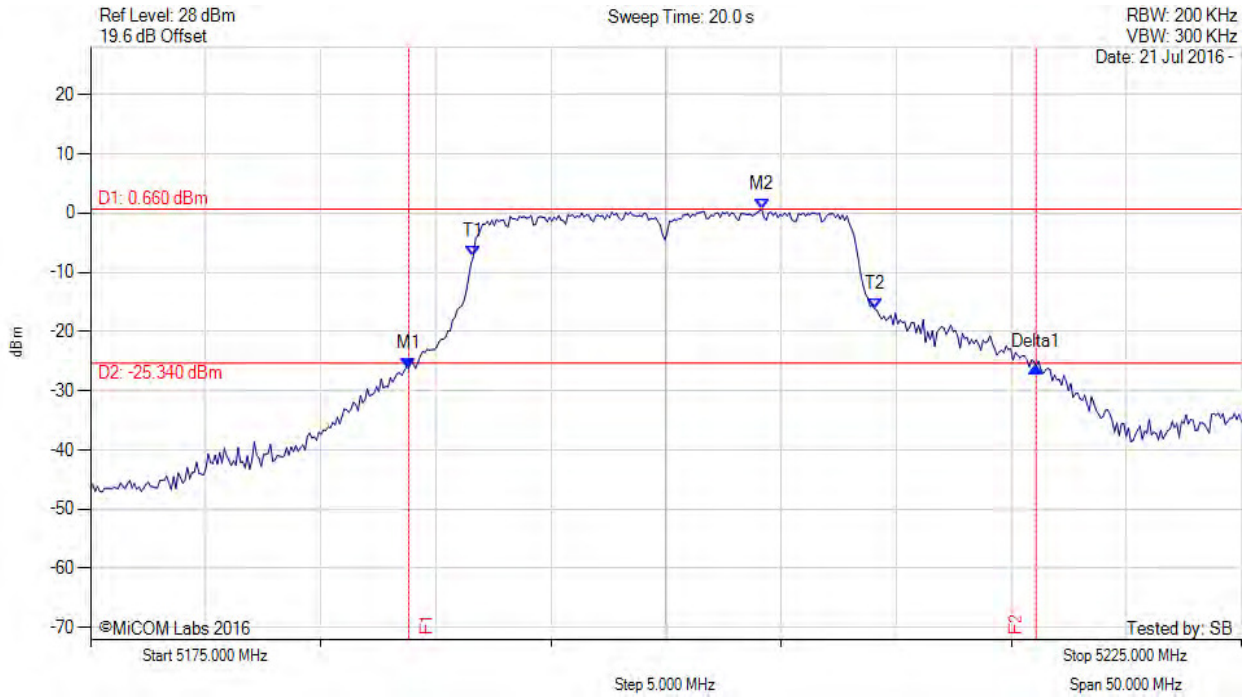


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5168.527 MHz : -26.378 dBm M2 : 5181.854 MHz : 0.870 dBm Delta1 : 27.555 MHz : 1.952 dB T1 : 5171.633 MHz : -5.884 dBm T2 : 5188.968 MHz : -16.319 dBm OBW : 17.335 MHz	Measured 26 dB Bandwidth: 27.555 MHz Measured 99% Bandwidth: 17.335 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5200.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc

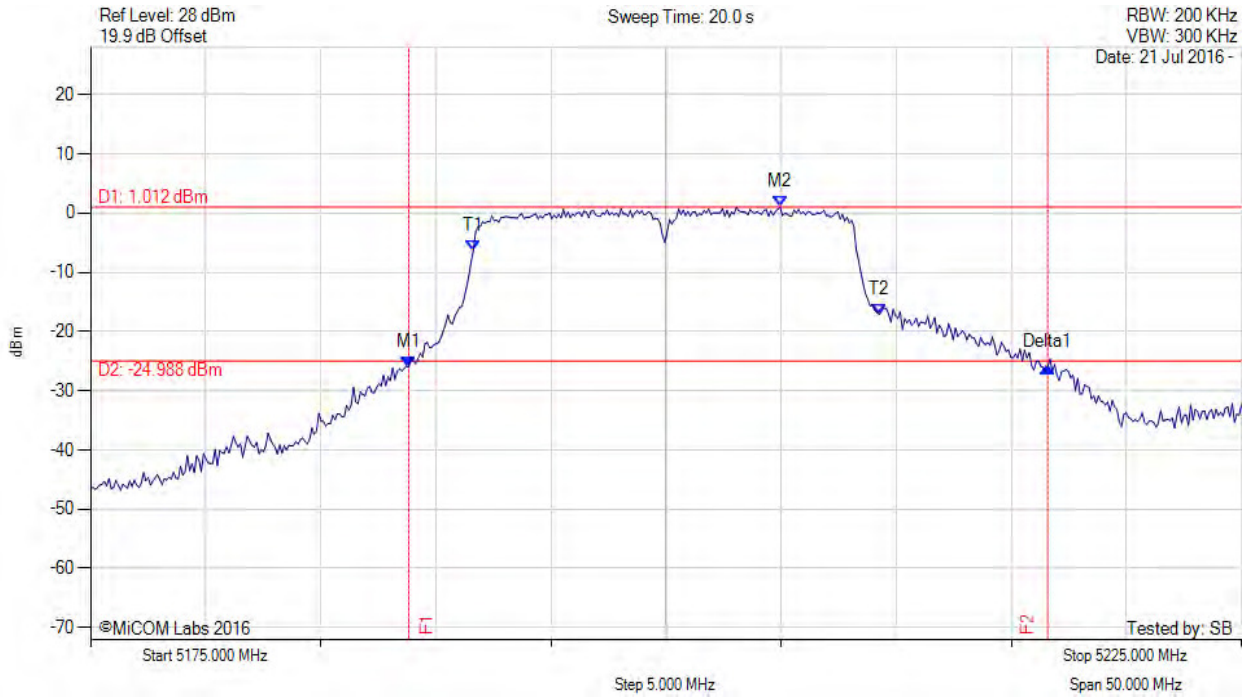


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5188.828 MHz : -26.299 dBm M2 : 5204.158 MHz : 0.660 dBm Delta1 : 27.255 MHz : 0.319 dB T1 : 5191.633 MHz : -7.259 dBm T2 : 5209.068 MHz : -16.191 dBm OBW : 17.435 MHz	Measured 26 dB Bandwidth: 27.255 MHz Measured 99% Bandwidth: 17.435 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5200.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc

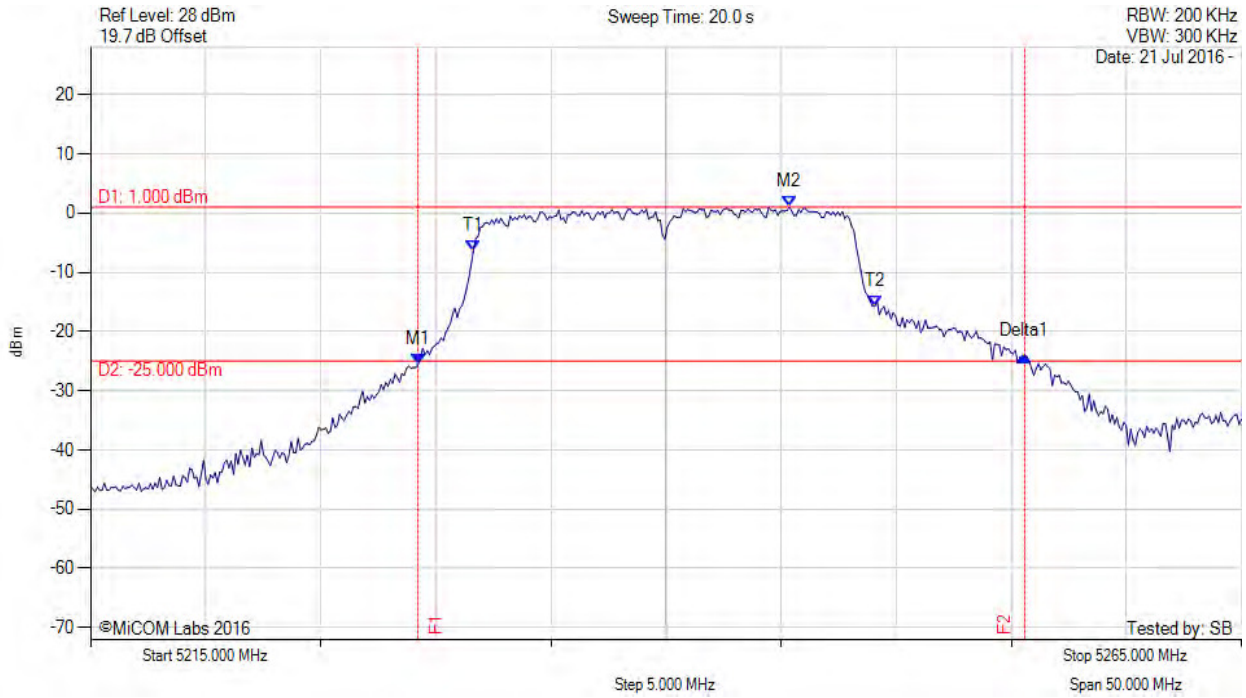


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5188.828 MHz : -26.002 dBm M2 : 5204.960 MHz : 1.012 dBm Delta1 : 27.756 MHz : 0.037 dB T1 : 5191.633 MHz : -6.321 dBm T2 : 5209.269 MHz : -17.125 dBm OBW : 17.635 MHz	Measured 26 dB Bandwidth: 27.756 MHz Measured 99% Bandwidth: 17.635 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5240.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc

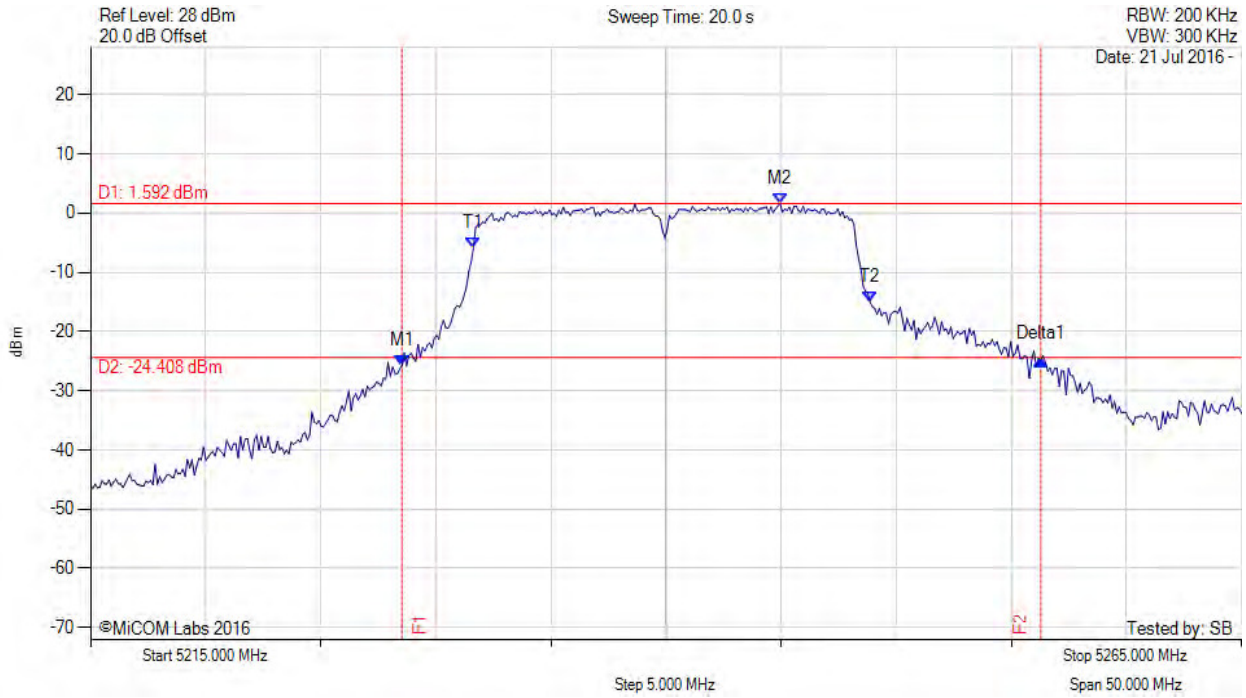


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5229.228 MHz : -25.494 dBm M2 : 5245.361 MHz : 1.000 dBm Delta1 : 26.353 MHz : 1.381 dB T1 : 5231.633 MHz : -6.393 dBm T2 : 5249.068 MHz : -15.730 dBm OBW : 17.435 MHz	Measured 26 dB Bandwidth: 26.353 MHz Measured 99% Bandwidth: 17.435 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5240.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5228.527 MHz : -25.687 dBm M2 : 5244.960 MHz : 1.592 dBm Delta1 : 27.756 MHz : 0.954 dB T1 : 5231.633 MHz : -5.970 dBm T2 : 5248.868 MHz : -15.109 dBm OBW : 17.234 MHz	Measured 26 dB Bandwidth: 27.756 MHz Measured 99% Bandwidth: 17.234 MHz

back to matrix

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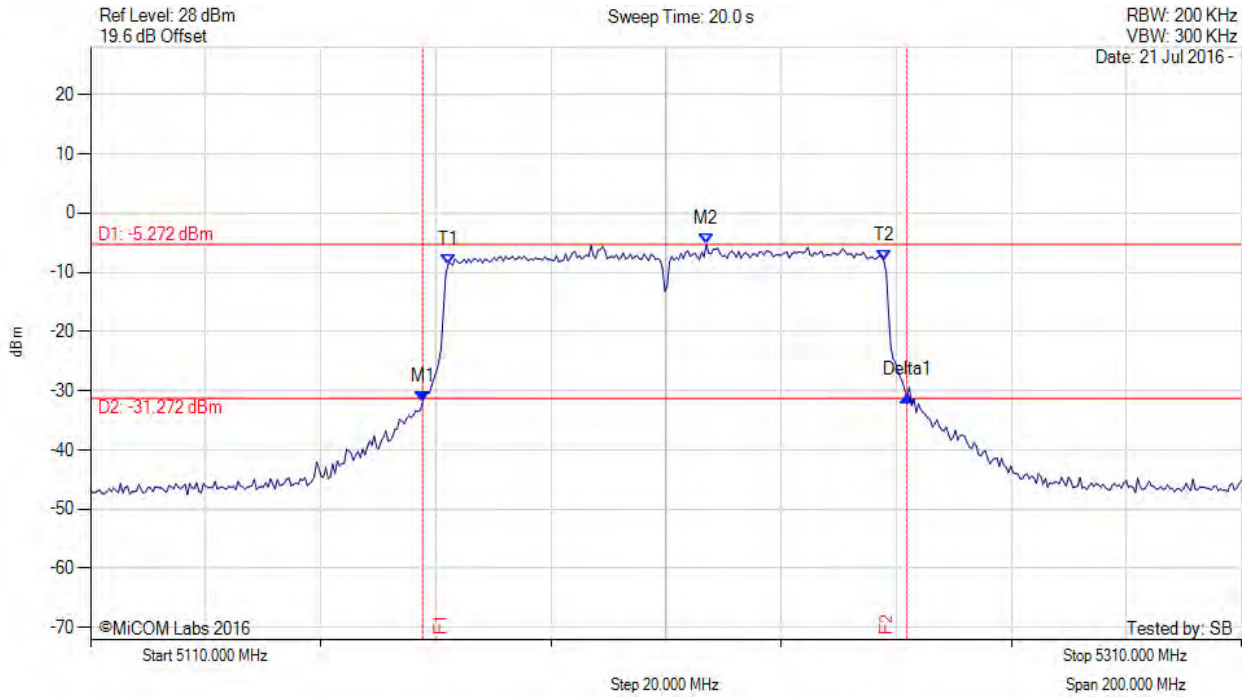
26 dB & 99% BANDWIDTH

Variant: 802.11ac-80, Channel: 5210.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc

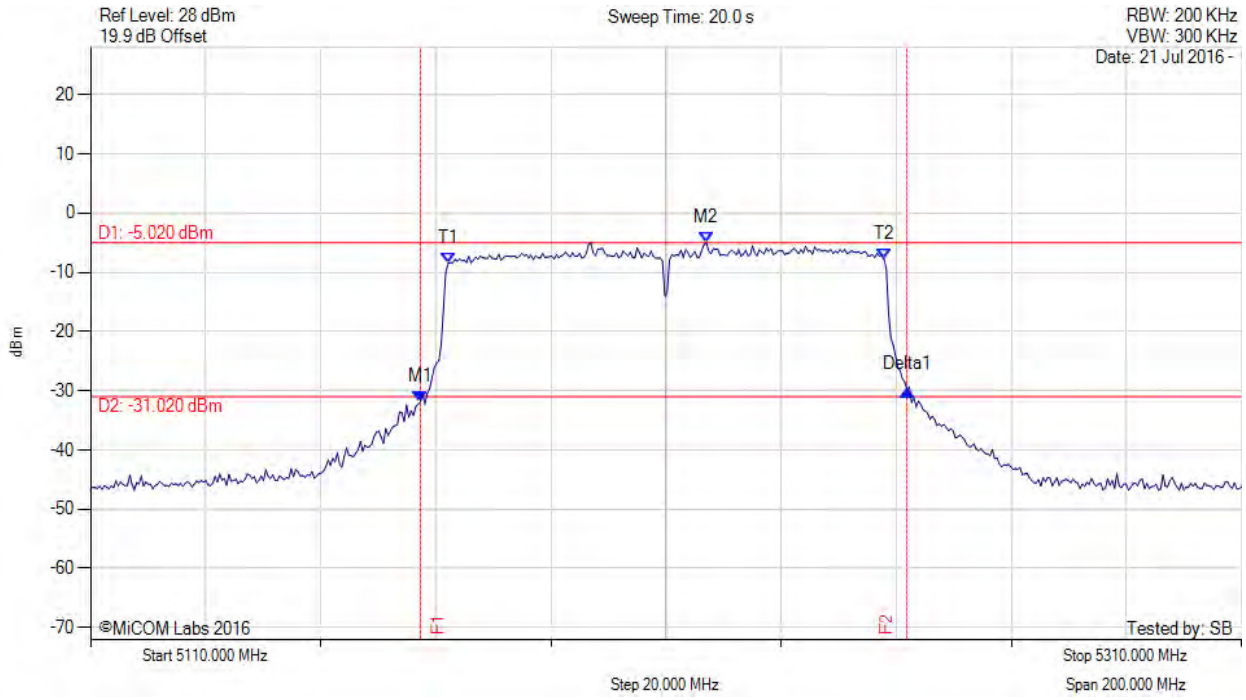


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5167.715 MHz : -31.804 dBm M2 : 5217.014 MHz : -5.272 dBm Delta1 : 84.168 MHz : 0.995 dB T1 : 5172.124 MHz : -8.754 dBm T2 : 5247.876 MHz : -8.091 dBm OBW : 75.752 MHz	Measured 26 dB Bandwidth: 84.168 MHz Measured 99% Bandwidth: 75.752 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11ac-80, Channel: 5210.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc

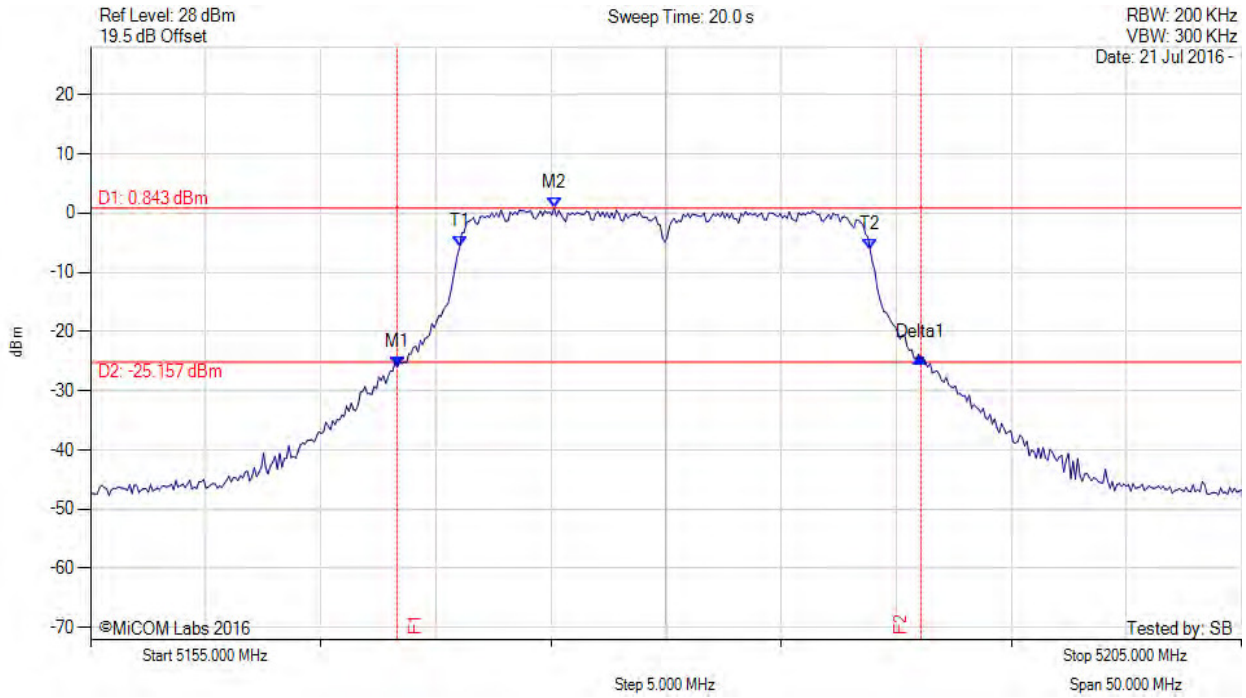


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5167.315 MHz : -31.865 dBm M2 : 5217.014 MHz : -5.020 dBm Delta1 : 84.569 MHz : 1.993 dB T1 : 5172.124 MHz : -8.500 dBm T2 : 5247.876 MHz : -7.814 dBm OBW : 75.752 MHz	Measured 26 dB Bandwidth: 84.569 MHz Measured 99% Bandwidth: 75.752 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc

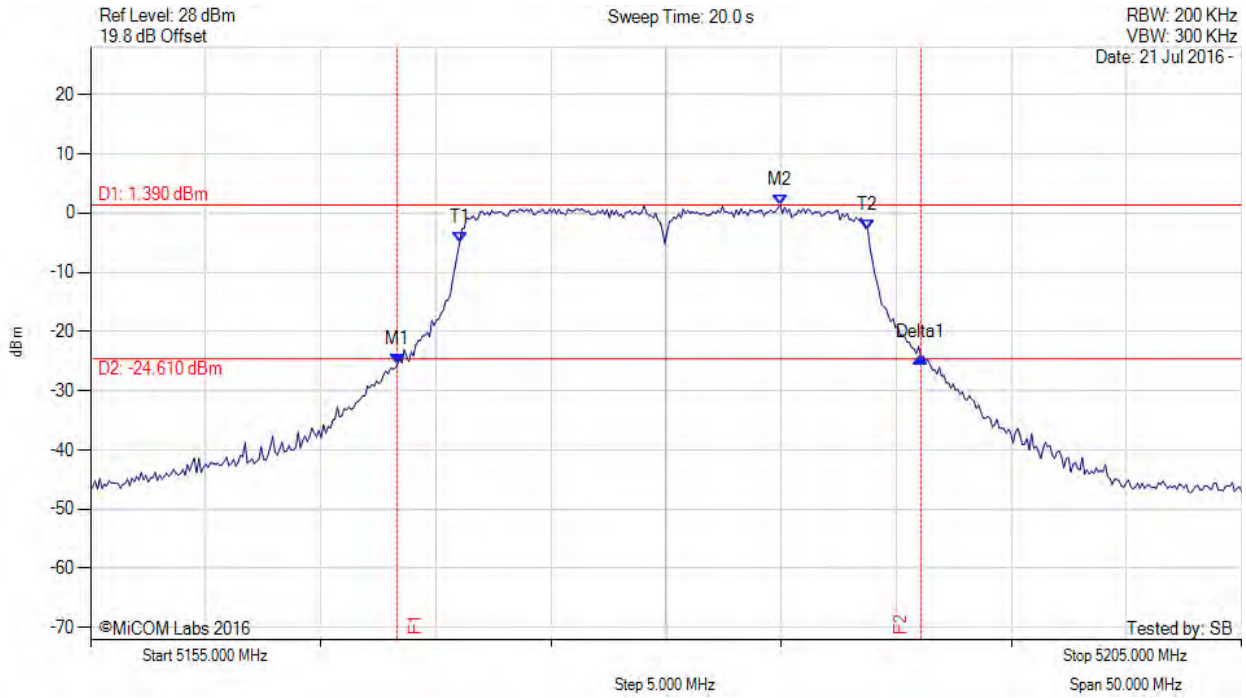


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5168.327 MHz : -25.972 dBm M2 : 5175.140 MHz : 0.843 dBm Delta1 : 22.745 MHz : 1.525 dB T1 : 5171.032 MHz : -5.770 dBm T2 : 5188.868 MHz : -6.218 dBm OBW : 17.836 MHz	Measured 26 dB Bandwidth: 22.745 MHz Measured 99% Bandwidth: 17.836 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc

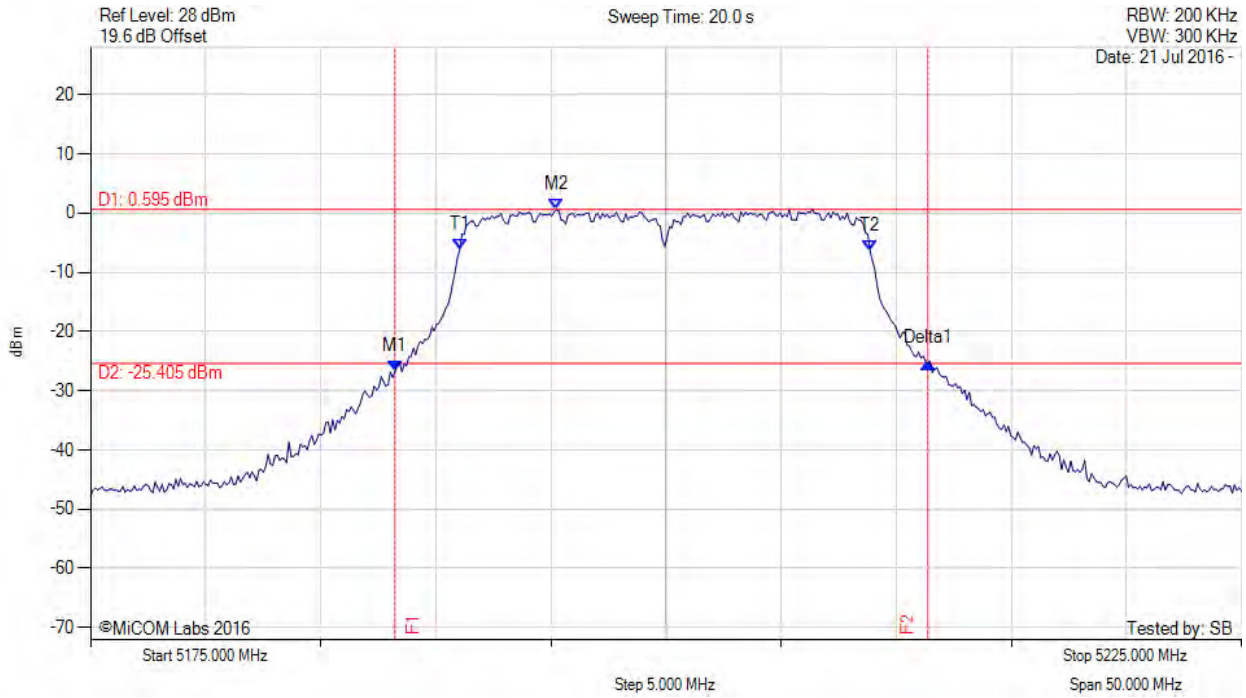


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5168.327 MHz : -25.557 dBm M2 : 5184.960 MHz : 1.390 dBm Delta1 : 22.745 MHz : 1.202 dB T1 : 5171.032 MHz : -5.040 dBm T2 : 5188.768 MHz : -2.860 dBm OBW : 17.735 MHz	Measured 26 dB Bandwidth: 22.745 MHz Measured 99% Bandwidth: 17.735 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5188.226 MHz : -26.809 dBm M2 : 5195.240 MHz : 0.595 dBm Delta1 : 23.146 MHz : 1.509 dB T1 : 5191.032 MHz : -6.199 dBm T2 : 5208.868 MHz : -6.486 dBm OBW : 17.836 MHz	Measured 26 dB Bandwidth: 23.146 MHz Measured 99% Bandwidth: 17.836 MHz

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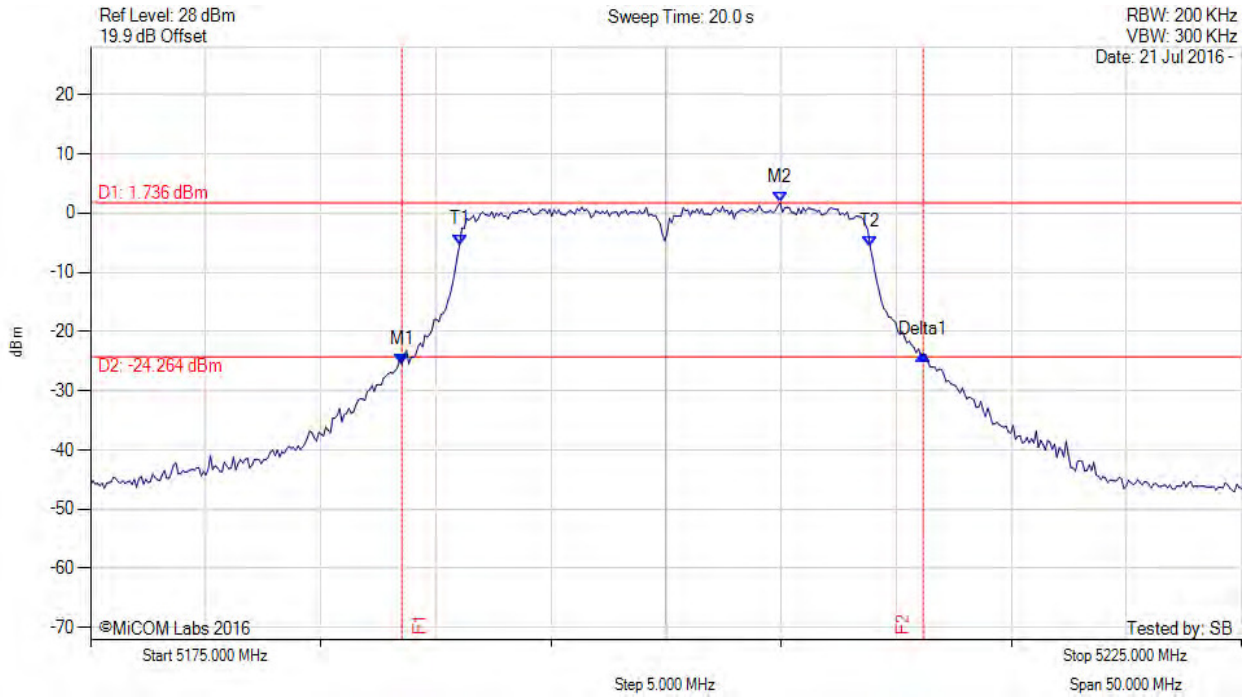
This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5188.527 MHz : -25.583 dBm M2 : 5204.960 MHz : 1.736 dBm Delta1 : 22.645 MHz : 1.763 dB T1 : 5191.032 MHz : -5.321 dBm T2 : 5208.868 MHz : -5.697 dBm OBW : 17.836 MHz	Measured 26 dB Bandwidth: 22.645 MHz Measured 99% Bandwidth: 17.836 MHz

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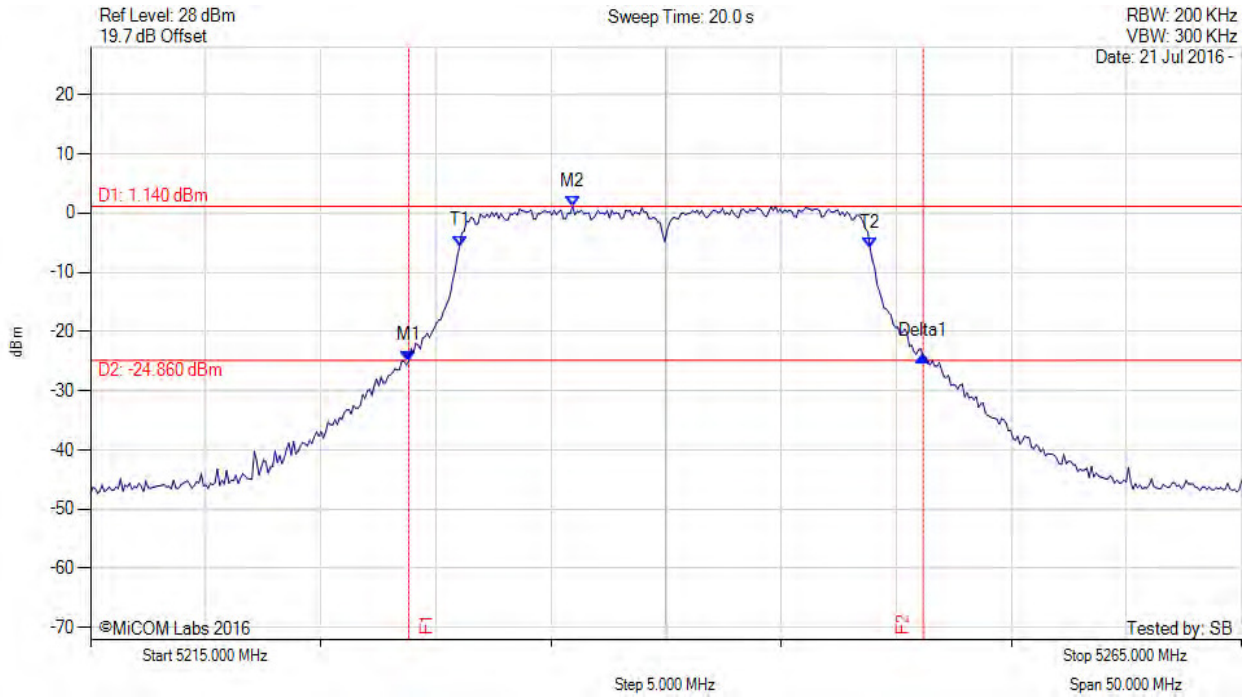
26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5228.828 MHz : -24.967 dBm M2 : 5235.942 MHz : 1.140 dBm Delta1 : 22.345 MHz : 0.738 dB T1 : 5231.032 MHz : -5.573 dBm T2 : 5248.868 MHz : -5.982 dBm OBW : 17.836 MHz	Measured 26 dB Bandwidth: 22.345 MHz Measured 99% Bandwidth: 17.836 MHz

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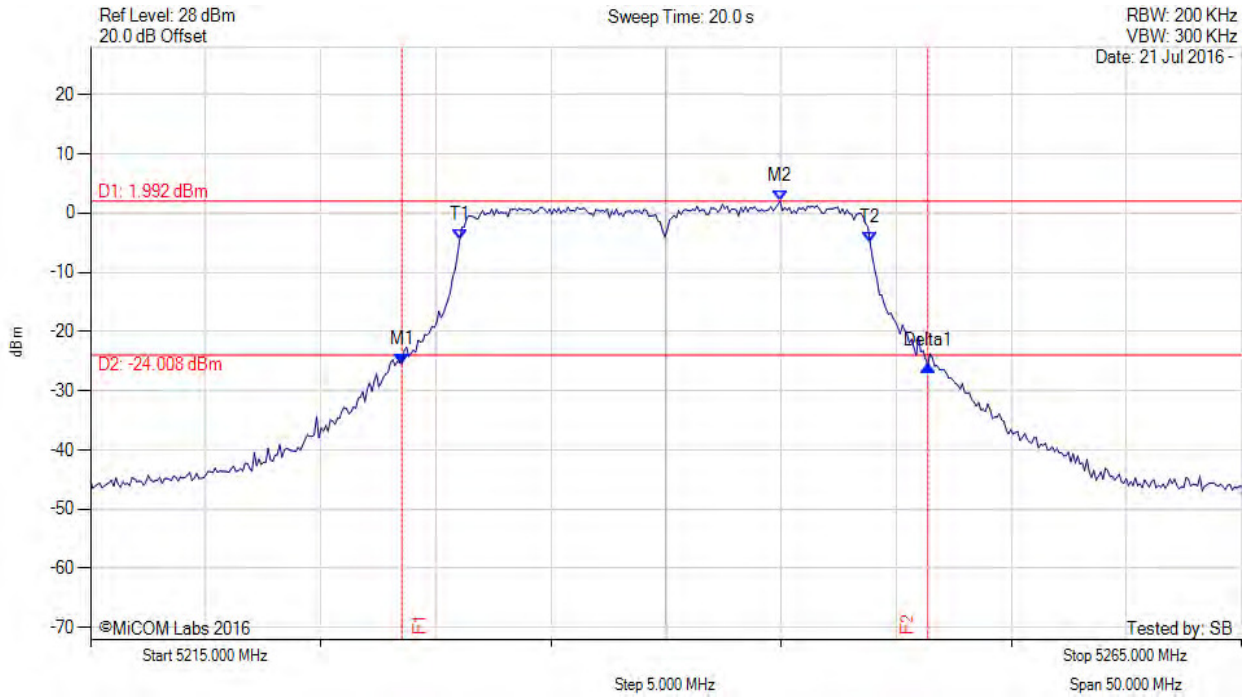
26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5228.527 MHz : -25.451 dBm M2 : 5244.960 MHz : 1.992 dBm Delta1 : 22.846 MHz : -0.364 dB T1 : 5231.032 MHz : -4.564 dBm T2 : 5248.868 MHz : -5.034 dBm OBW : 17.836 MHz	Measured 26 dB Bandwidth: 22.846 MHz Measured 99% Bandwidth: 17.836 MHz

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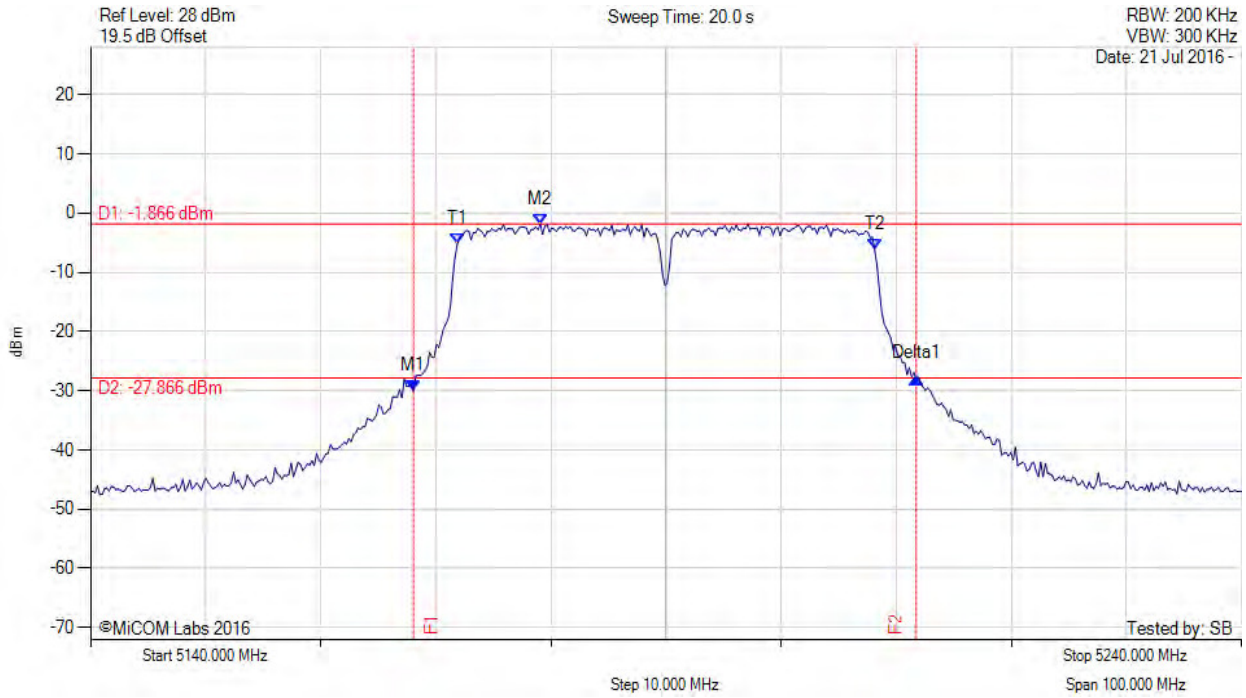
26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc

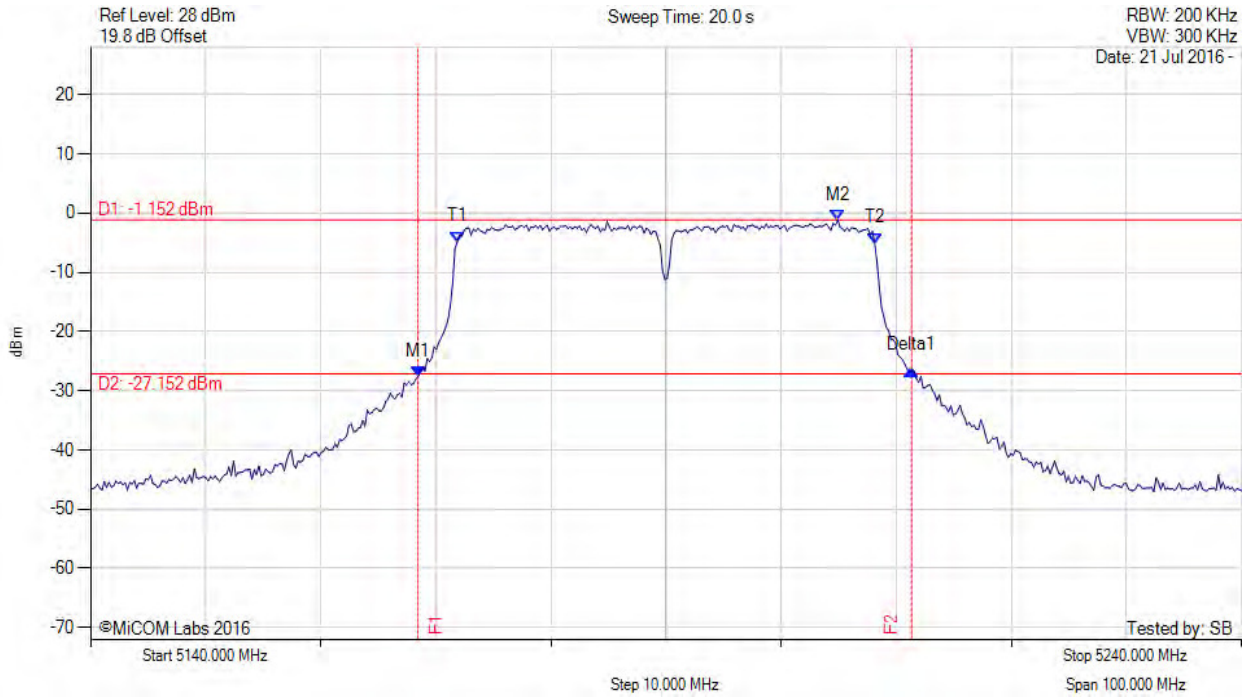


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5168.056 MHz : -30.047 dBm M2 : 5179.078 MHz : -1.866 dBm Delta1 : 43.687 MHz : 2.064 dB T1 : 5171.864 MHz : -5.248 dBm T2 : 5208.136 MHz : -6.206 dBm OBW : 36.273 MHz	Measured 26 dB Bandwidth: 43.687 MHz Measured 99% Bandwidth: 36.273 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc

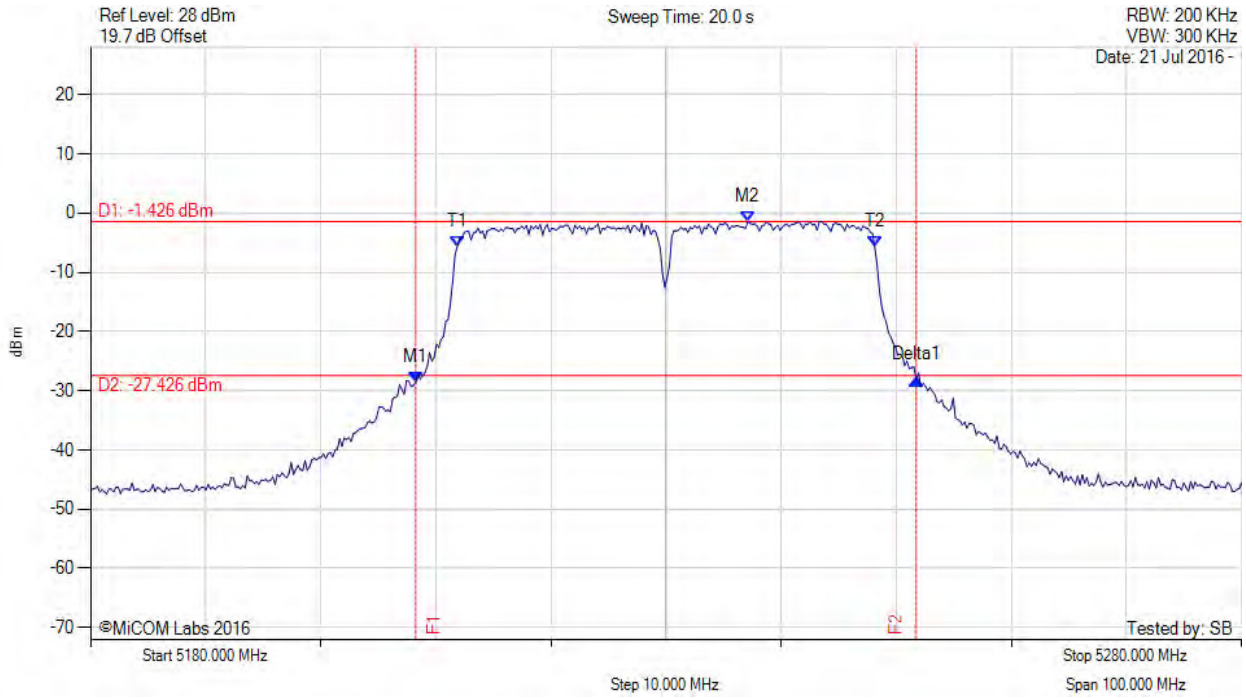


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5168.457 MHz : -27.592 dBm M2 : 5204.930 MHz : -1.152 dBm Delta1 : 42.886 MHz : 1.043 dB T1 : 5171.864 MHz : -4.873 dBm T2 : 5208.136 MHz : -5.089 dBm OBW : 36.273 MHz	Measured 26 dB Bandwidth: 42.886 MHz Measured 99% Bandwidth: 36.273 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5208.257 MHz : -28.552 dBm M2 : 5237.114 MHz : -1.426 dBm Delta1 : 43.487 MHz : 0.484 dB T1 : 5211.864 MHz : -5.593 dBm T2 : 5248.136 MHz : -5.663 dBm OBW : 36.273 MHz	Measured 26 dB Bandwidth: 43.487 MHz Measured 99% Bandwidth: 36.273 MHz

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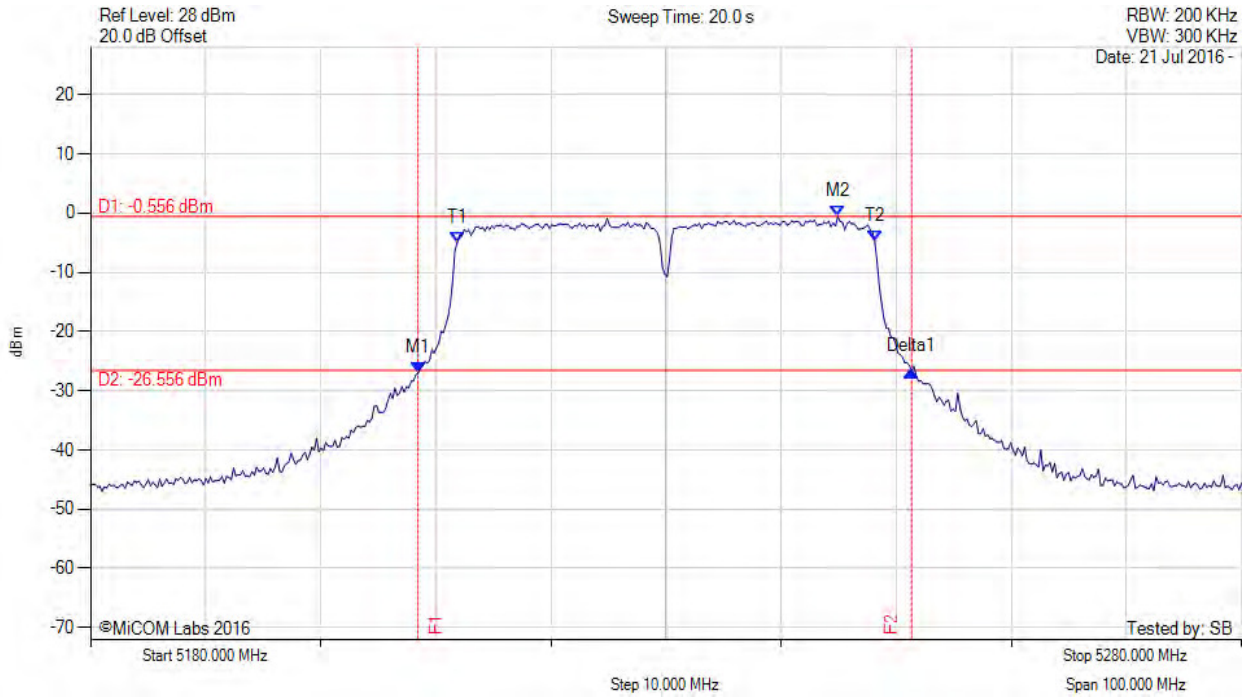
26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5208.457 MHz : -27.003 dBm M2 : 5244.930 MHz : -0.556 dBm Delta1 : 42.886 MHz : 0.350 dB T1 : 5211.864 MHz : -5.000 dBm T2 : 5248.136 MHz : -4.660 dBm OBW : 36.273 MHz	Measured 26 dB Bandwidth: 42.886 MHz Measured 99% Bandwidth: 36.273 MHz

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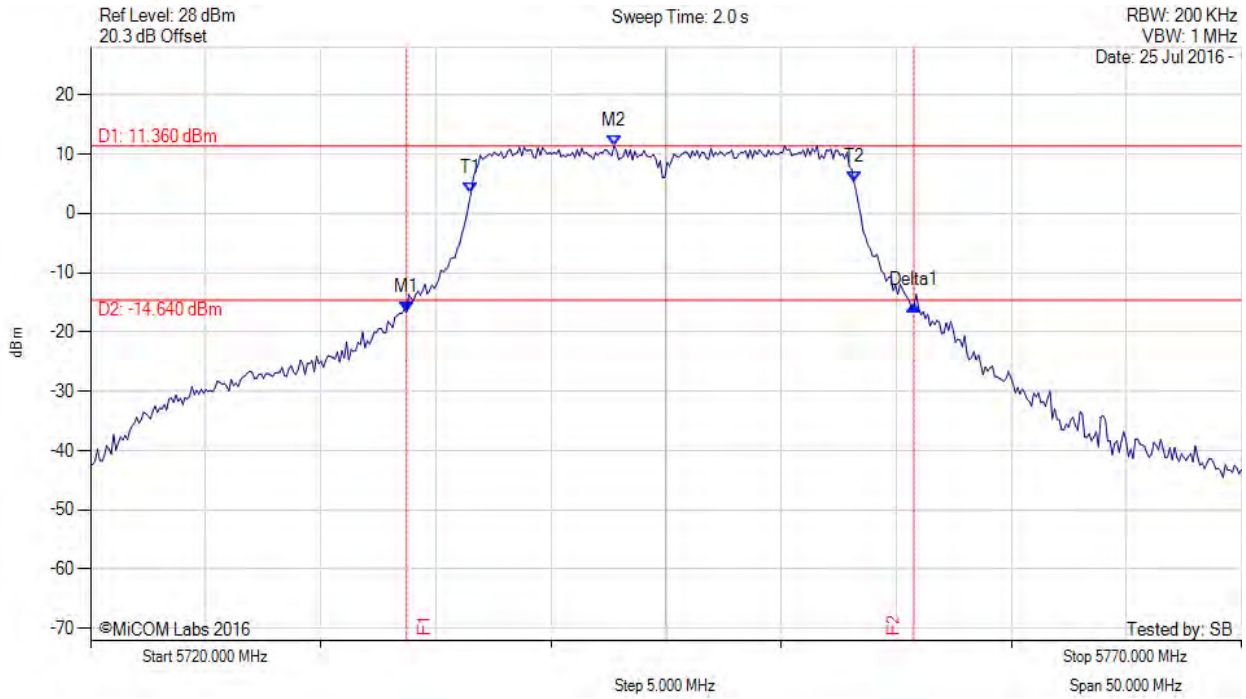
26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5745.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5733.727 MHz : -16.708 dBm M2 : 5742.745 MHz : 11.360 dBm Delta1 : 22.044 MHz : 1.237 dB T1 : 5736.533 MHz : 3.463 dBm T2 : 5753.166 MHz : 5.322 dBm OBW : 16.633 MHz	Measured 26 dB Bandwidth: 22.044 MHz Measured 99% Bandwidth: 16.633 MHz

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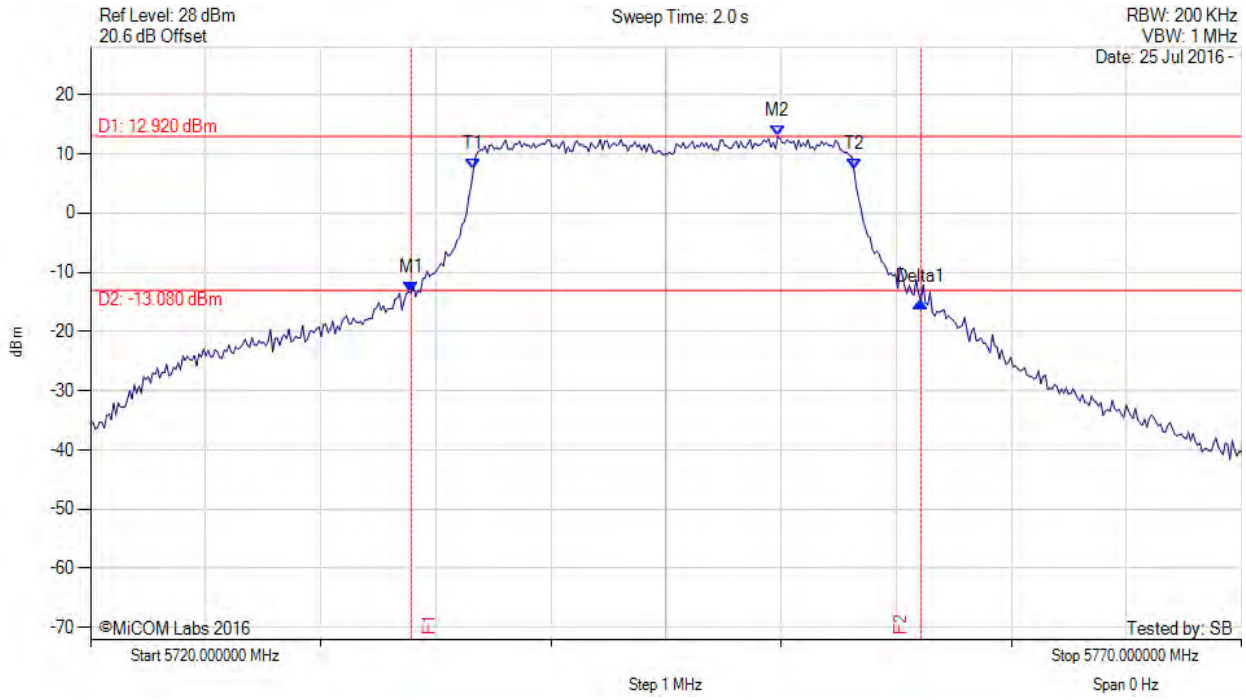
26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5745.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5733.928 MHz : -13.434 dBm M2 : 5749.860 MHz : 12.920 dBm Delta1 : 22.144 MHz : -1.666 dB T1 : 5736.633 MHz : 7.370 dBm T2 : 5753.166 MHz : 7.343 dBm OBW : 16.533 MHz	Measured 26 dB Bandwidth: 22.144 MHz Measured 99% Bandwidth: 16.533 MHz

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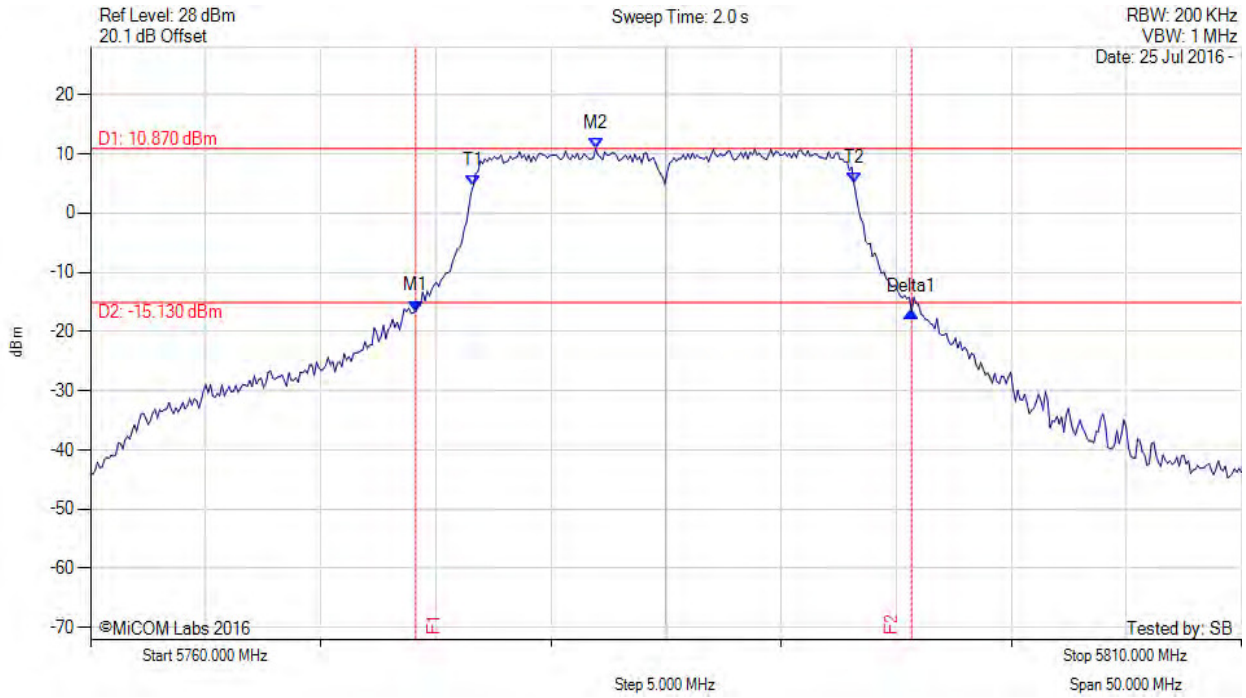
26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5785.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5774.128 MHz : -16.563 dBm M2 : 5781.944 MHz : 10.870 dBm Delta1 : 21.543 MHz : -0.189 dB T1 : 5776.633 MHz : 4.687 dBm T2 : 5793.166 MHz : 4.988 dBm OBW : 16.533 MHz	Measured 26 dB Bandwidth: 21.543 MHz Measured 99% Bandwidth: 16.533 MHz

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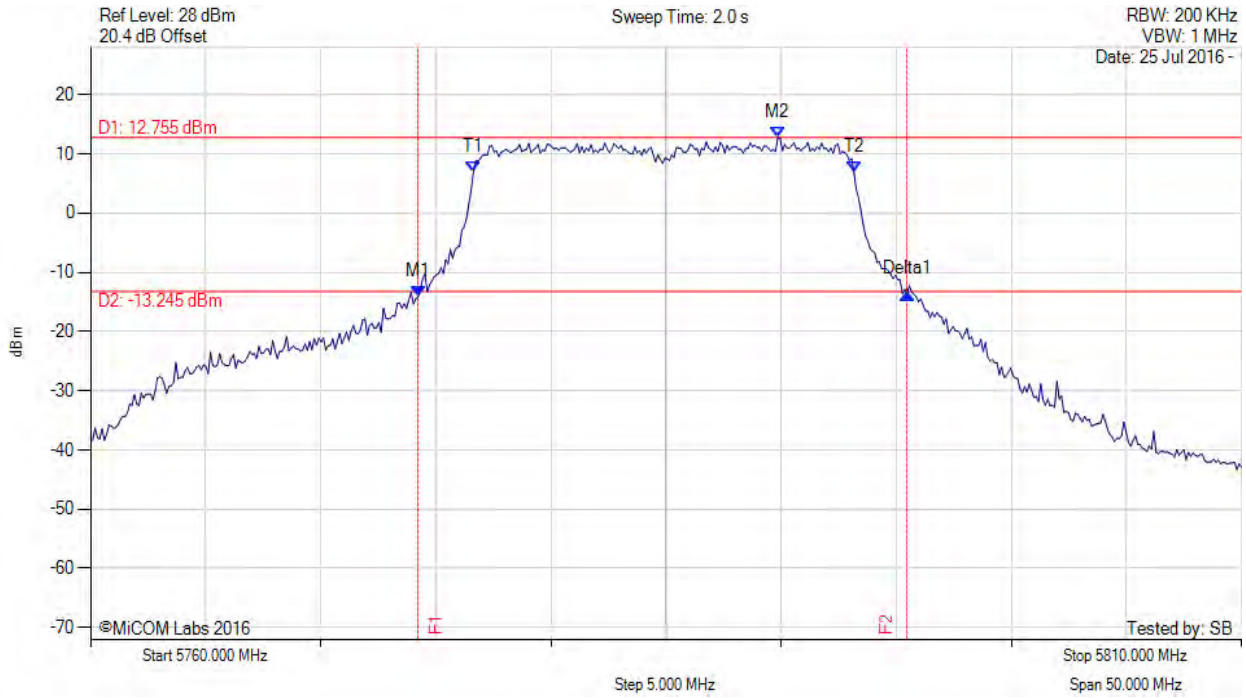
26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5785.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5774.228 MHz : -14.129 dBm M2 : 5789.860 MHz : 12.755 dBm Delta1 : 21.242 MHz : 0.523 dB T1 : 5776.633 MHz : 6.924 dBm T2 : 5793.166 MHz : 6.910 dBm OBW : 16.533 MHz	Measured 26 dB Bandwidth: 21.242 MHz Measured 99% Bandwidth: 16.533 MHz

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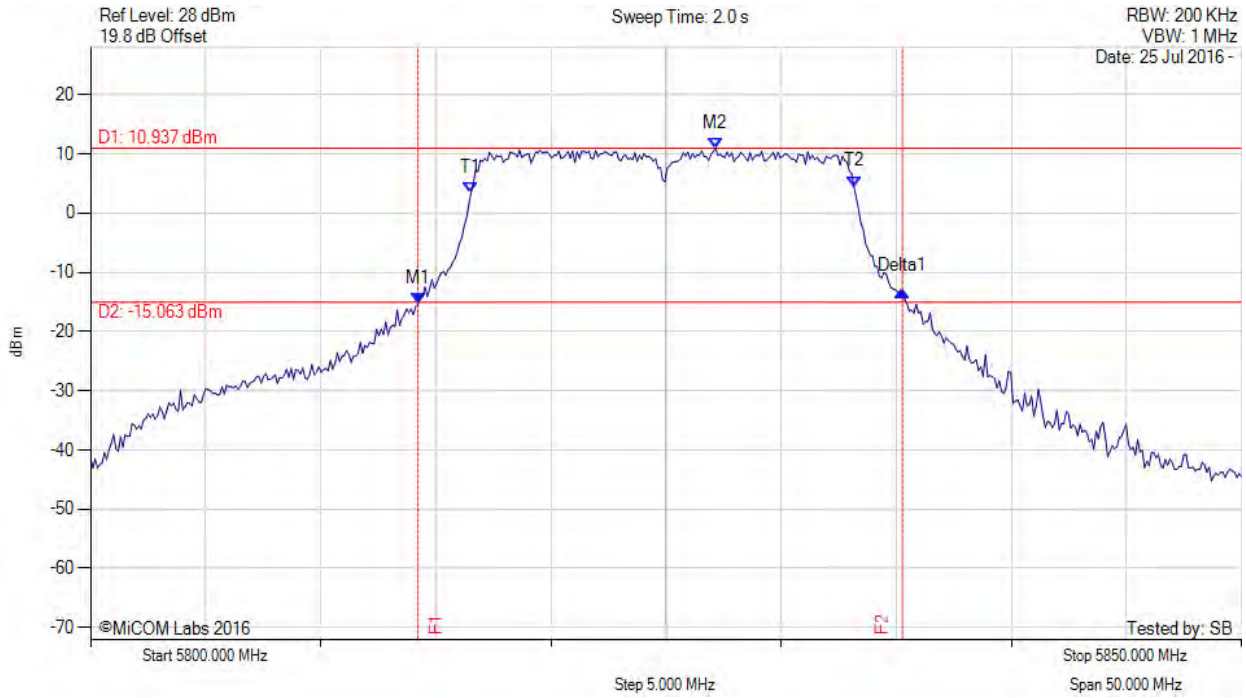
26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5825.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5814.228 MHz : -15.319 dBm M2 : 5827.154 MHz : 10.937 dBm Delta1 : 21.042 MHz : 2.085 dB T1 : 5816.533 MHz : 3.406 dBm T2 : 5833.166 MHz : 4.472 dBm OBW : 16.633 MHz	Measured 26 dB Bandwidth: 21.042 MHz Measured 99% Bandwidth: 16.633 MHz

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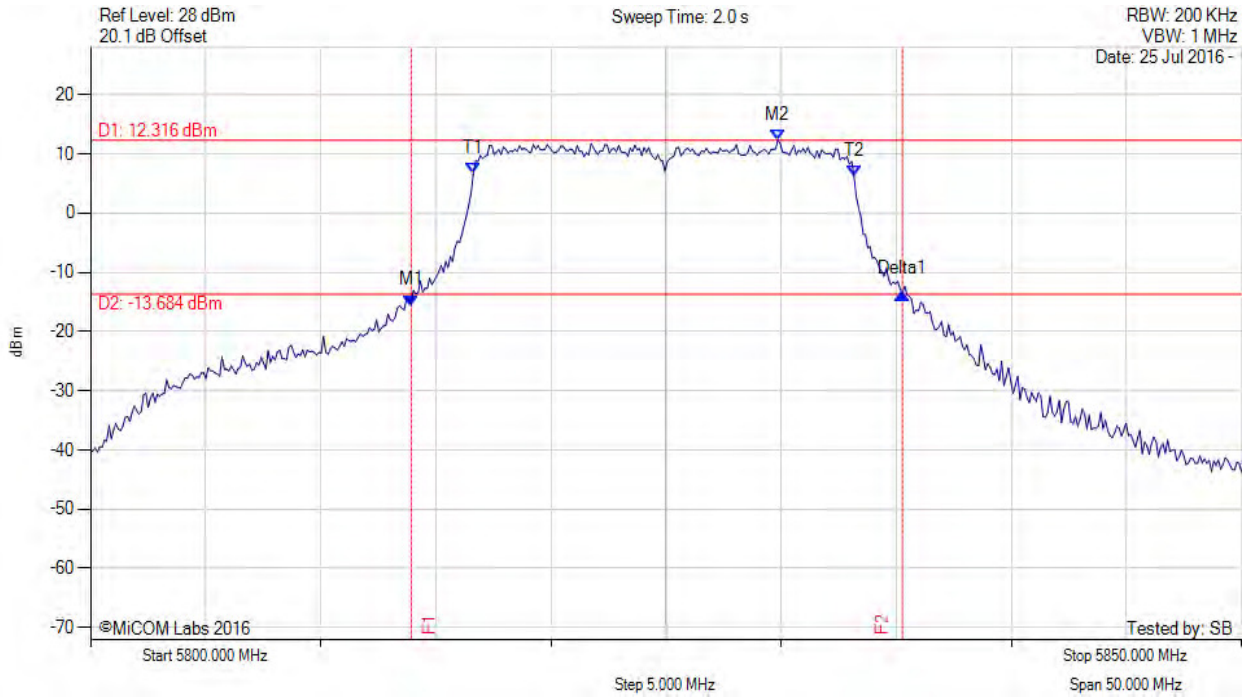
26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5825.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5813.928 MHz : -15.622 dBm M2 : 5829.860 MHz : 12.316 dBm Delta1 : 21.343 MHz : 2.007 dB T1 : 5816.633 MHz : 6.737 dBm T2 : 5833.166 MHz : 6.282 dBm OBW : 16.533 MHz	Measured 26 dB Bandwidth: 21.343 MHz Measured 99% Bandwidth: 16.533 MHz

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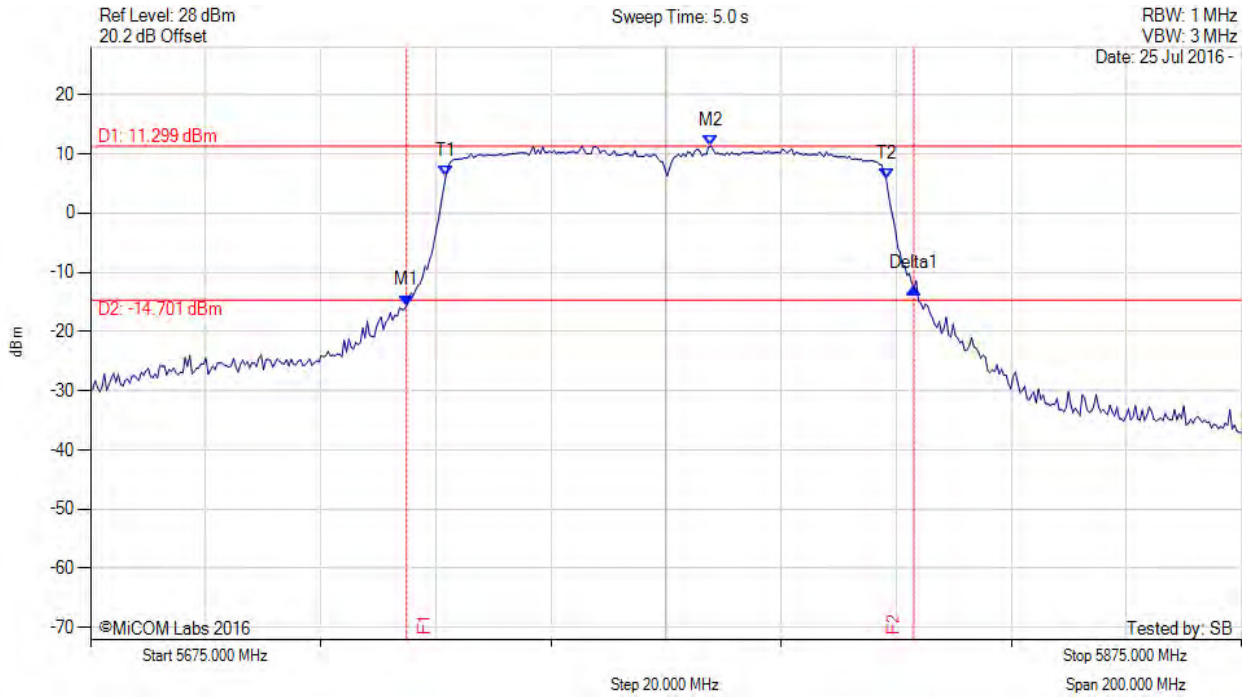
26 dB & 99% BANDWIDTH

Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5729.910 MHz : -15.604 dBm M2 : 5782.816 MHz : 11.299 dBm Delta1 : 88.176 MHz : 2.857 dB T1 : 5736.723 MHz : 6.178 dBm T2 : 5813.277 MHz : 5.787 dBm OBW : 76.553 MHz	Measured 26 dB Bandwidth: 88.176 MHz Measured 99% Bandwidth: 76.553 MHz

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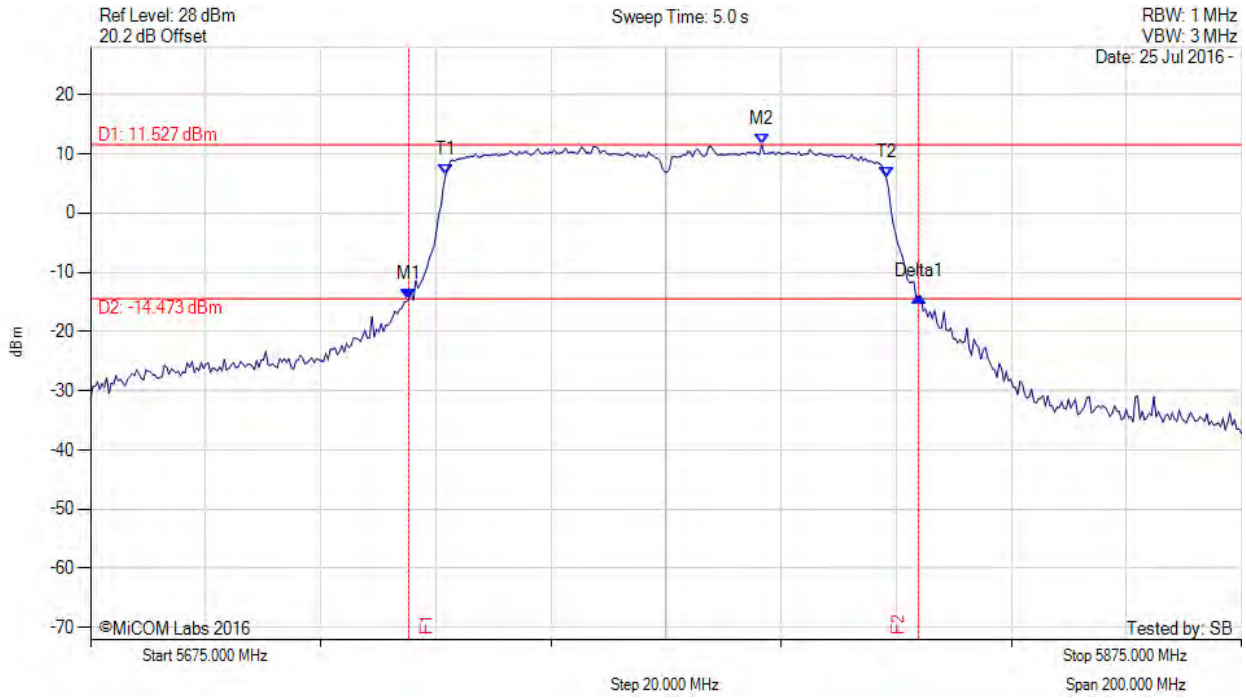
26 dB & 99% BANDWIDTH

Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc

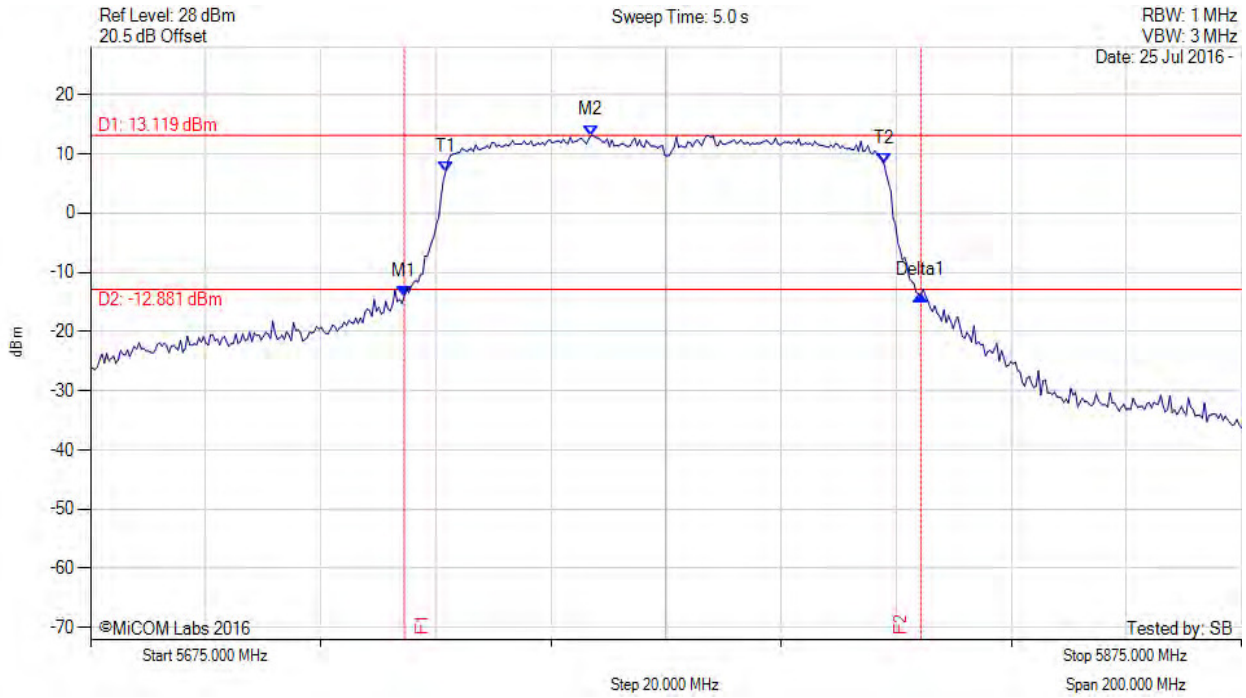


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5730.311 MHz : -14.520 dBm M2 : 5791.633 MHz : 11.527 dBm Delta1 : 88.577 MHz : 0.350 dB T1 : 5736.723 MHz : 6.446 dBm T2 : 5813.277 MHz : 5.966 dBm OBW : 76.553 MHz	Channel Frequency: 5775.00 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5729.509 MHz : -13.997 dBm M2 : 5761.974 MHz : 13.119 dBm Delta1 : 89.780 MHz : 0.114 dB T1 : 5736.723 MHz : 7.010 dBm T2 : 5812.876 MHz : 8.411 dBm OBW : 76.152 MHz	Measured 26 dB Bandwidth: 89.780 MHz Measured 99% Bandwidth: 76.152 MHz

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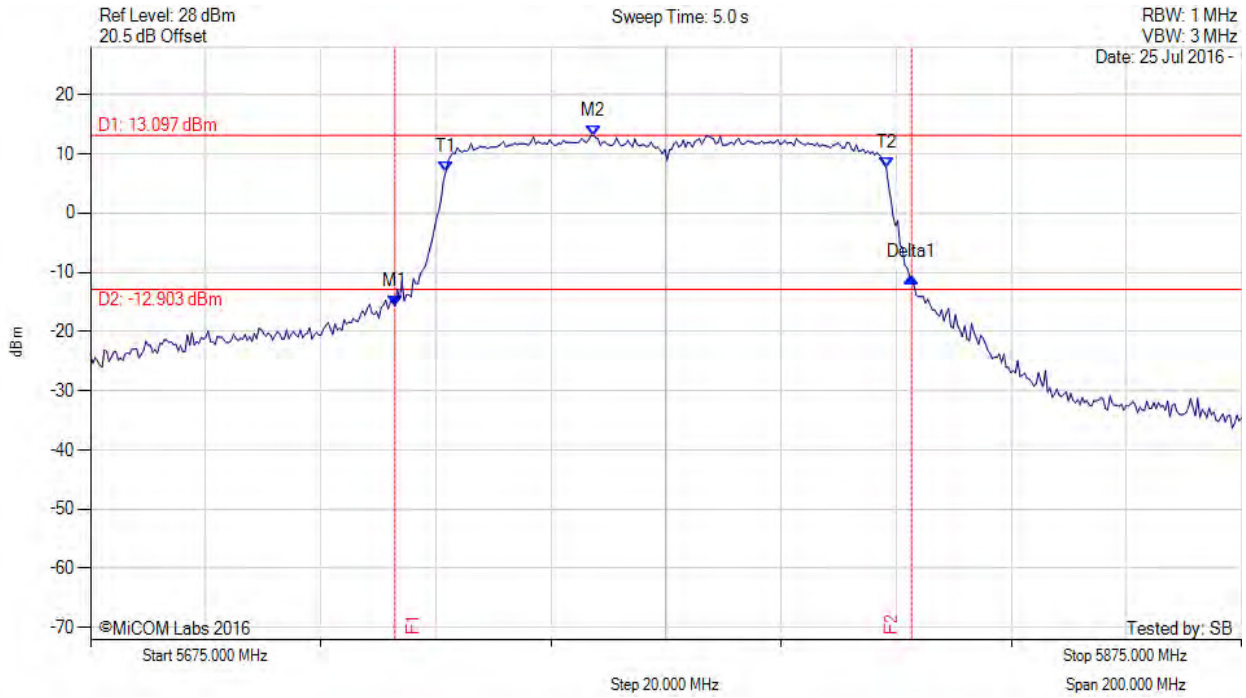
26 dB & 99% BANDWIDTH

Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc

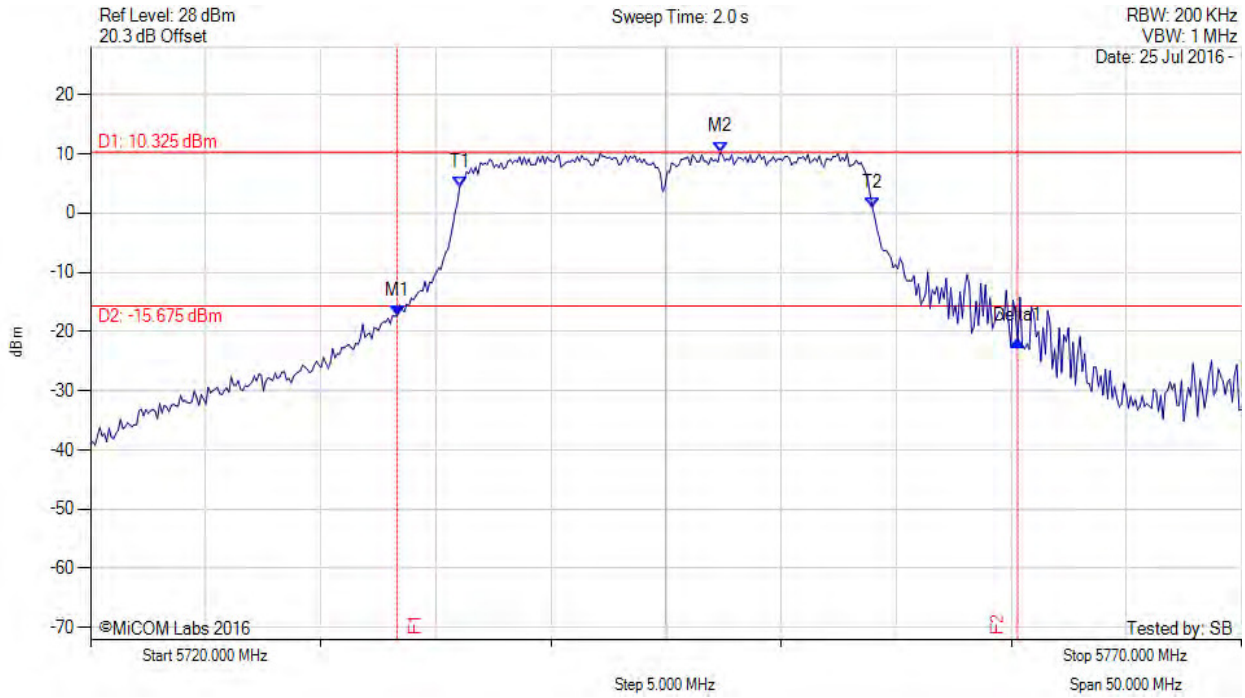


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5727.906 MHz : -15.683 dBm M2 : 5762.375 MHz : 13.097 dBm Delta1 : 89.780 MHz : 4.785 dB T1 : 5736.723 MHz : 6.936 dBm T2 : 5813.277 MHz : 7.691 dBm OBW : 76.553 MHz	Channel Frequency: 5775.00 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5745.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5733.327 MHz : -17.283 dBm M2 : 5747.355 MHz : 10.325 dBm Delta1 : 26.954 MHz : -4.240 dB T1 : 5736.032 MHz : 4.335 dBm T2 : 5753.968 MHz : 0.902 dBm OBW : 17.936 MHz	Measured 26 dB Bandwidth: 26.954 MHz Measured 99% Bandwidth: 17.936 MHz

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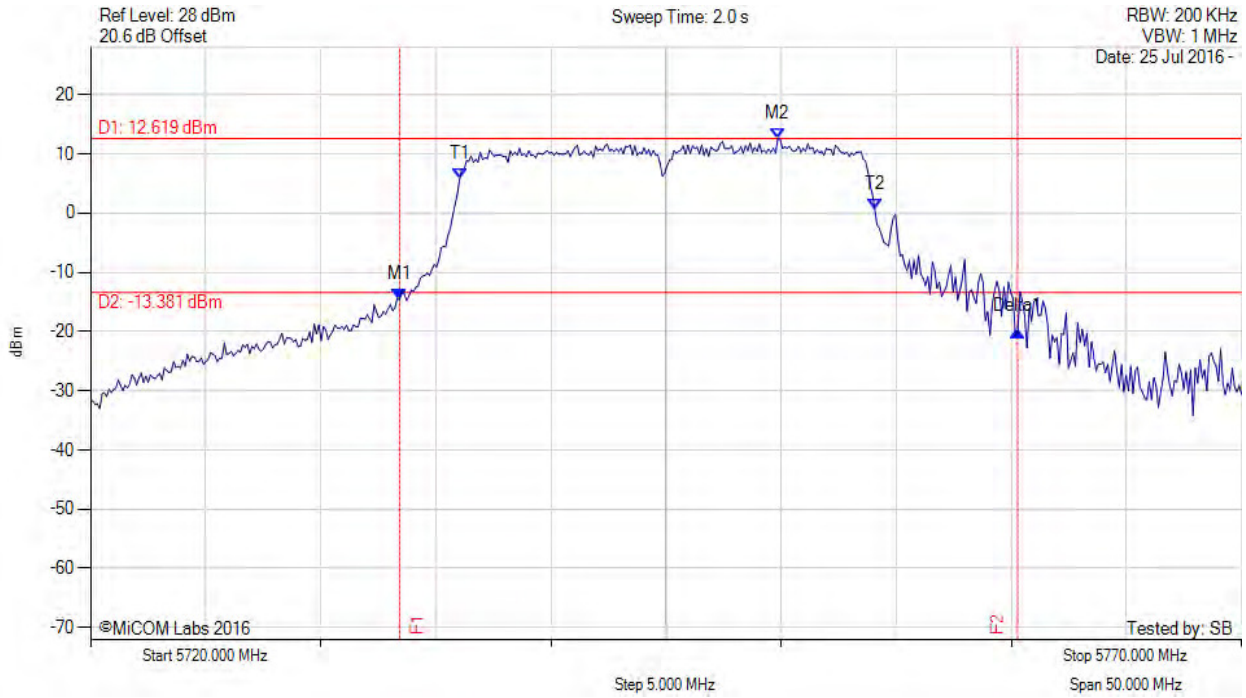
26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5745.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5733.427 MHz : -14.621 dBm M2 : 5749.860 MHz : 12.619 dBm Delta1 : 26.854 MHz : -5.398 dB T1 : 5736.032 MHz : 5.702 dBm T2 : 5754.068 MHz : 0.699 dBm OBW : 18.036 MHz	Measured 26 dB Bandwidth: 26.854 MHz Measured 99% Bandwidth: 18.036 MHz

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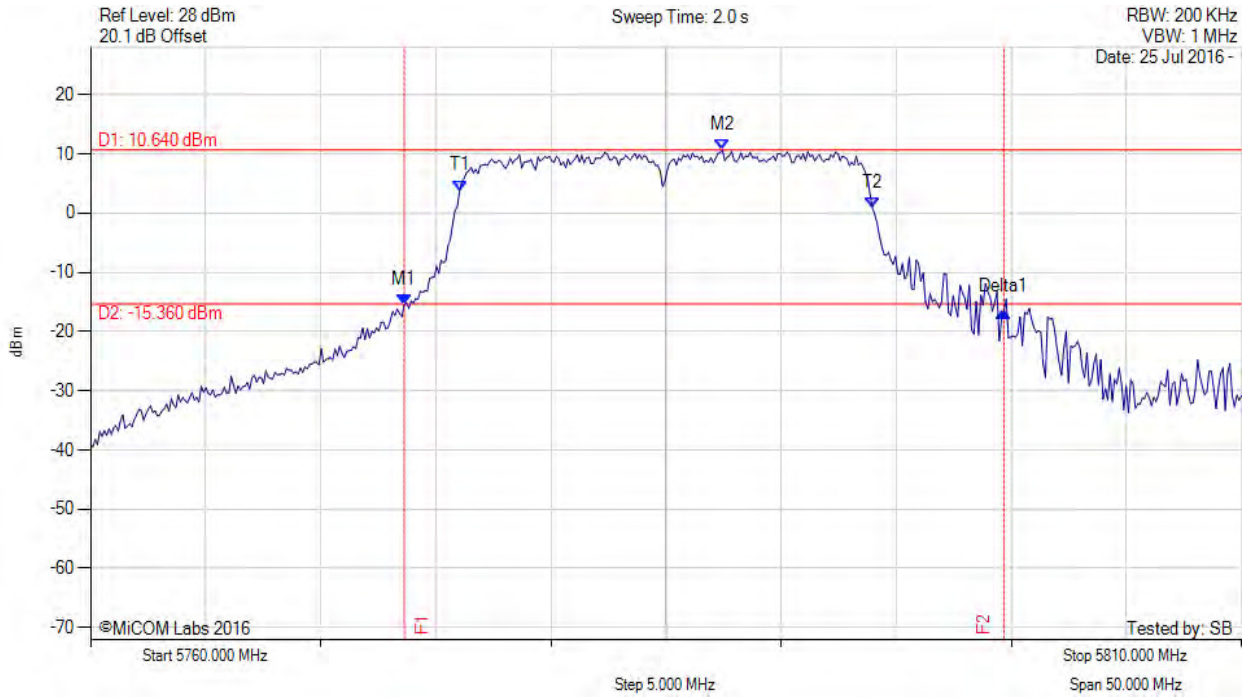
26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5785.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc

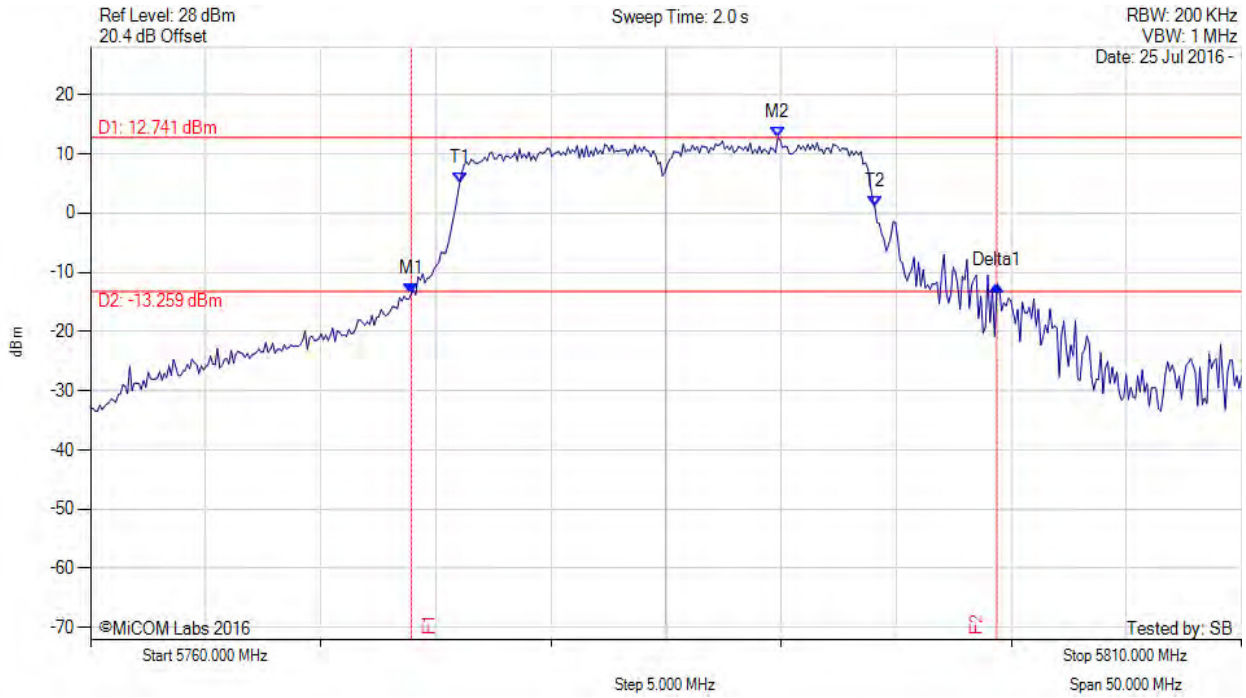


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5773.627 MHz : -15.484 dBm M2 : 5787.455 MHz : 10.640 dBm Delta1 : 26.052 MHz : -1.204 dB T1 : 5776.032 MHz : 3.776 dBm T2 : 5793.968 MHz : 0.908 dBm OBW : 17.936 MHz	Measured 26 dB Bandwidth: 26.052 MHz Measured 99% Bandwidth: 17.936 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5785.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5773.928 MHz : -13.722 dBm M2 : 5789.860 MHz : 12.741 dBm Delta1 : 25.451 MHz : 1.489 dB T1 : 5776.032 MHz : 5.065 dBm T2 : 5794.068 MHz : 1.173 dBm OBW : 18.036 MHz	Measured 26 dB Bandwidth: 25.451 MHz Measured 99% Bandwidth: 18.036 MHz

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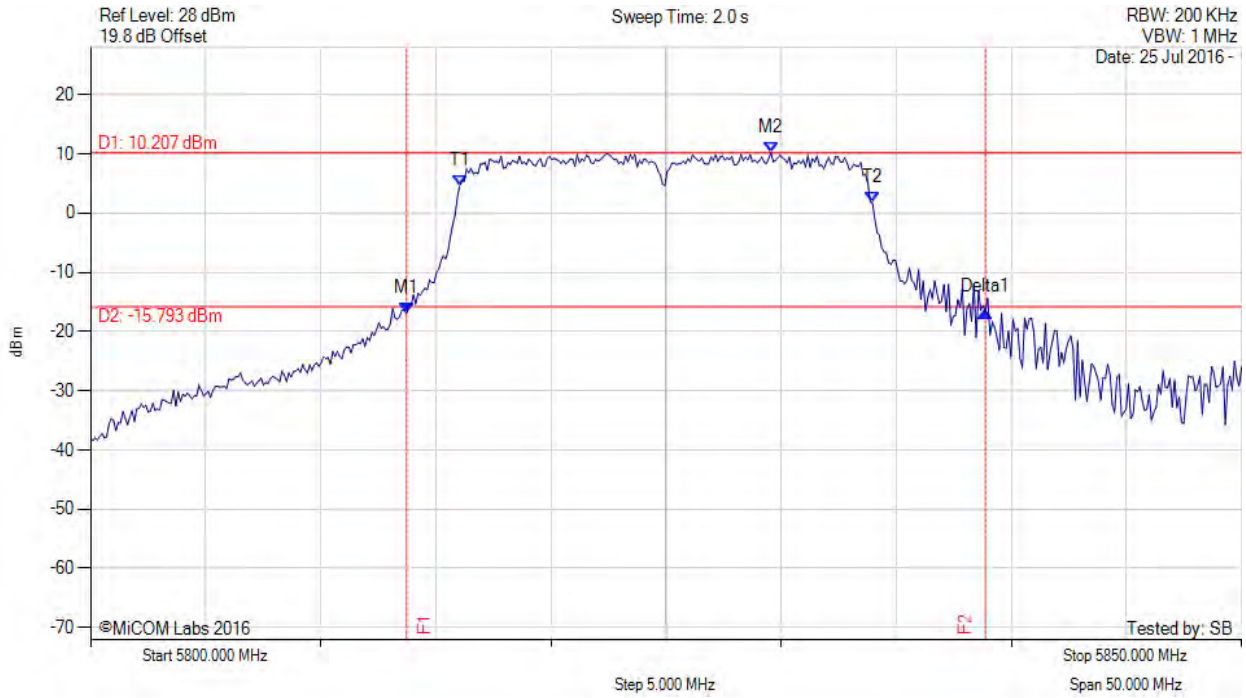
26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5825.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5813.727 MHz : -16.950 dBm M2 : 5829.559 MHz : 10.207 dBm Delta1 : 25.150 MHz : 0.336 dB T1 : 5816.032 MHz : 4.651 dBm T2 : 5833.968 MHz : 1.767 dBm OBW : 17.936 MHz	Measured 26 dB Bandwidth: 25.150 MHz Measured 99% Bandwidth: 17.936 MHz

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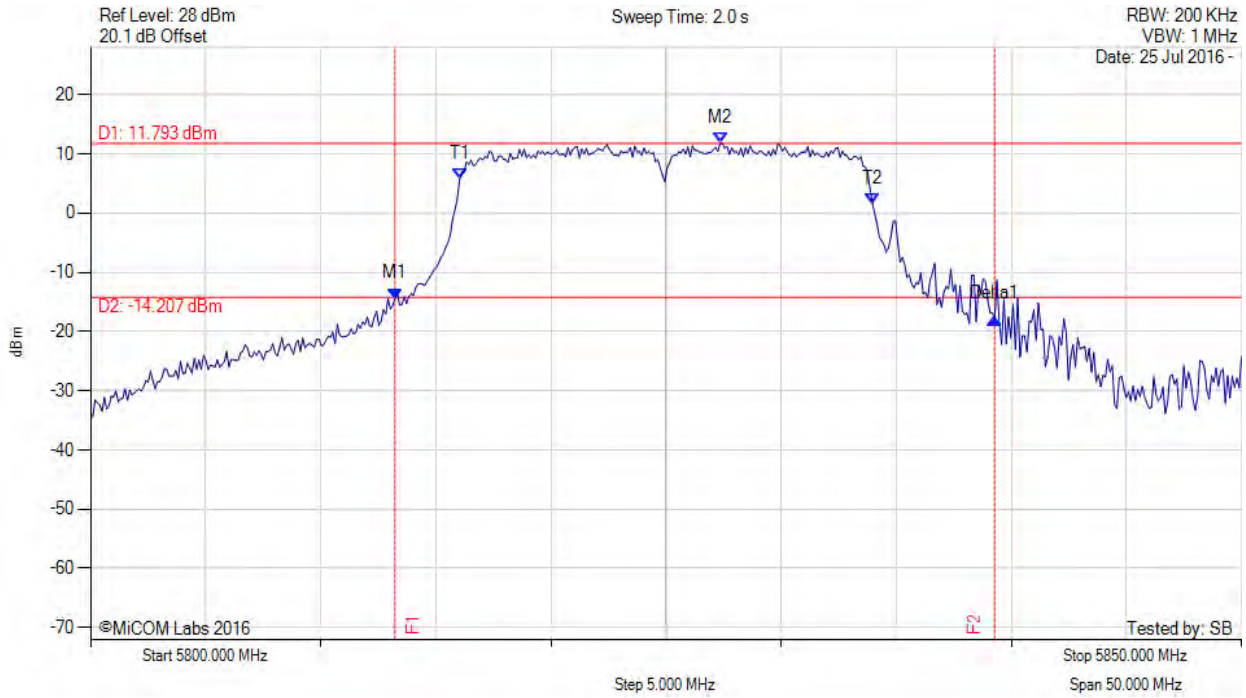
26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5825.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5813.226 MHz : -14.442 dBm M2 : 5827.355 MHz : 11.793 dBm Delta1 : 26.052 MHz : -3.384 dB T1 : 5816.032 MHz : 5.704 dBm T2 : 5833.968 MHz : 1.643 dBm OBW : 17.936 MHz	Measured 26 dB Bandwidth: 26.052 MHz Measured 99% Bandwidth: 17.936 MHz

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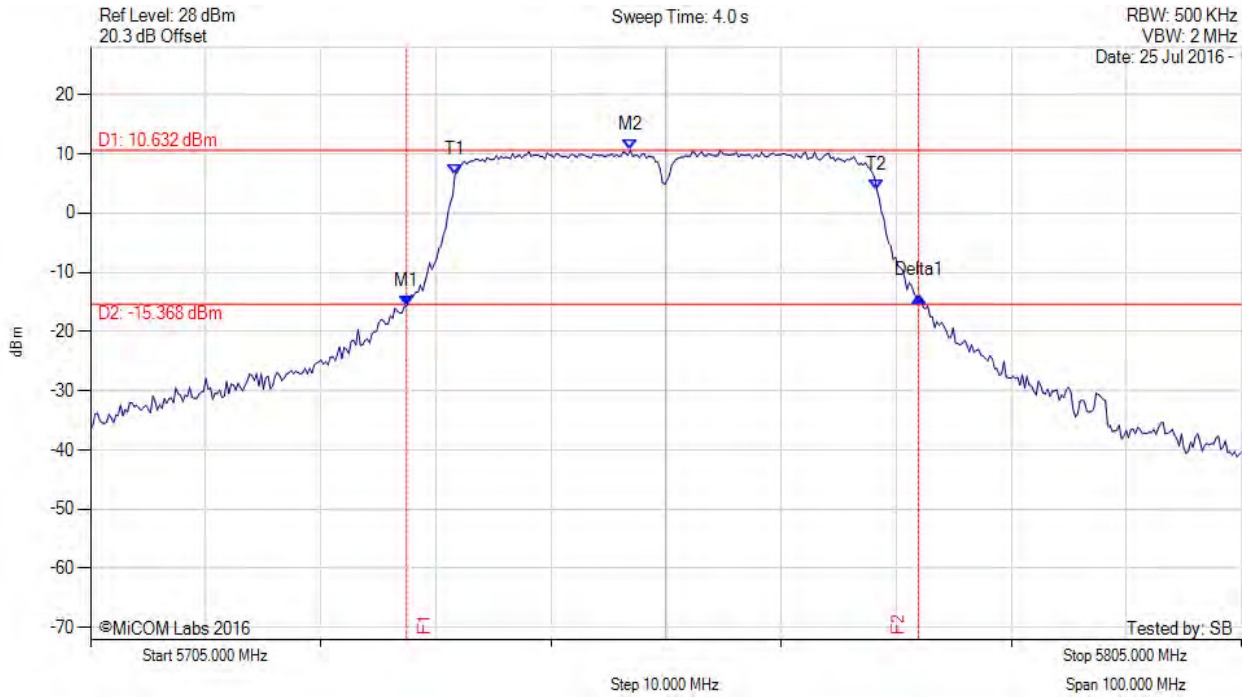
26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5755.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc

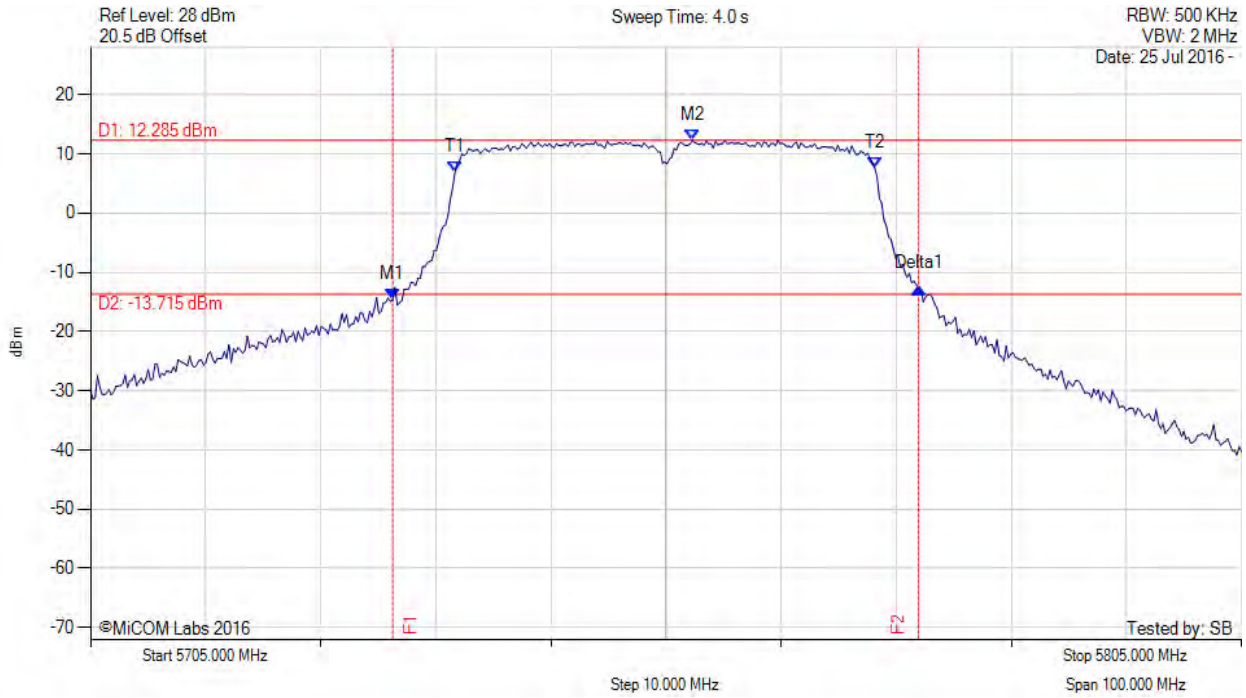


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5732.455 MHz : -15.695 dBm M2 : 5751.894 MHz : 10.632 dBm Delta1 : 44.489 MHz : 1.719 dB T1 : 5736.663 MHz : 6.442 dBm T2 : 5773.337 MHz : 3.802 dBm OBW : 36.673 MHz	Measured 26 dB Bandwidth: 44.489 MHz Measured 99% Bandwidth: 36.673 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5755.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc

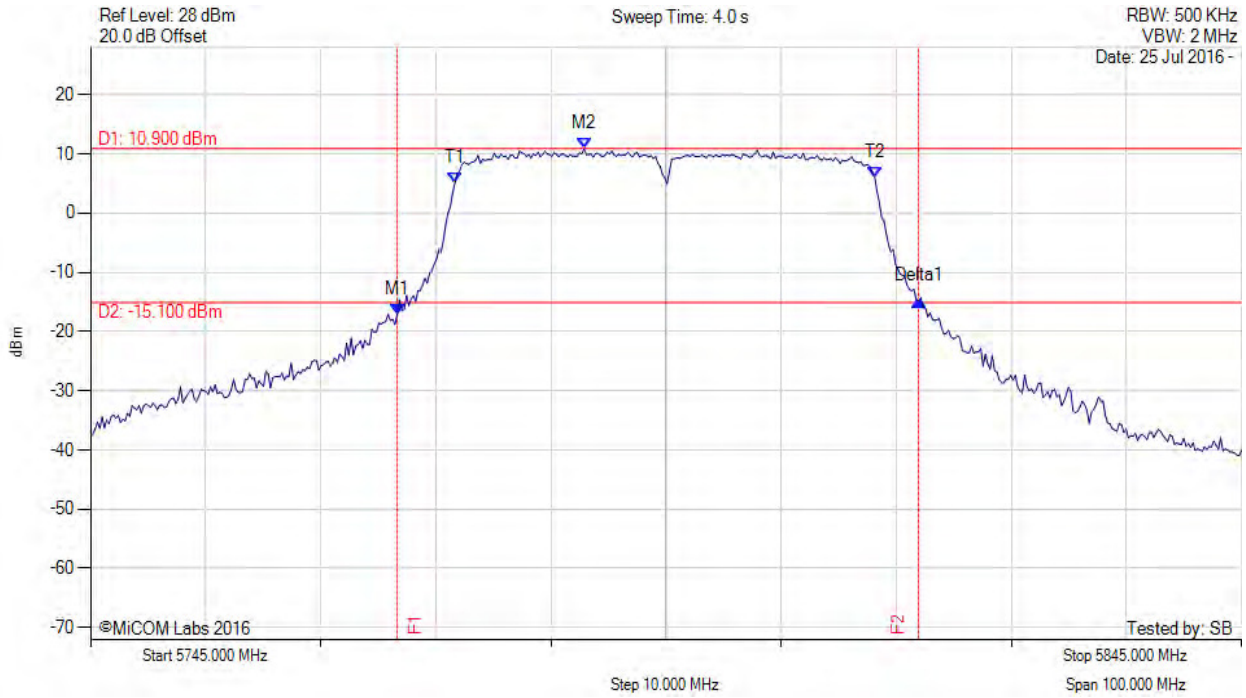


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5731.253 MHz : -14.637 dBm M2 : 5757.305 MHz : 12.285 dBm Delta1 : 45.691 MHz : 1.983 dB T1 : 5736.663 MHz : 6.851 dBm T2 : 5773.136 MHz : 7.656 dBm OBW : 36.473 MHz	Measured 26 dB Bandwidth: 45.691 MHz Measured 99% Bandwidth: 36.473 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5795.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc

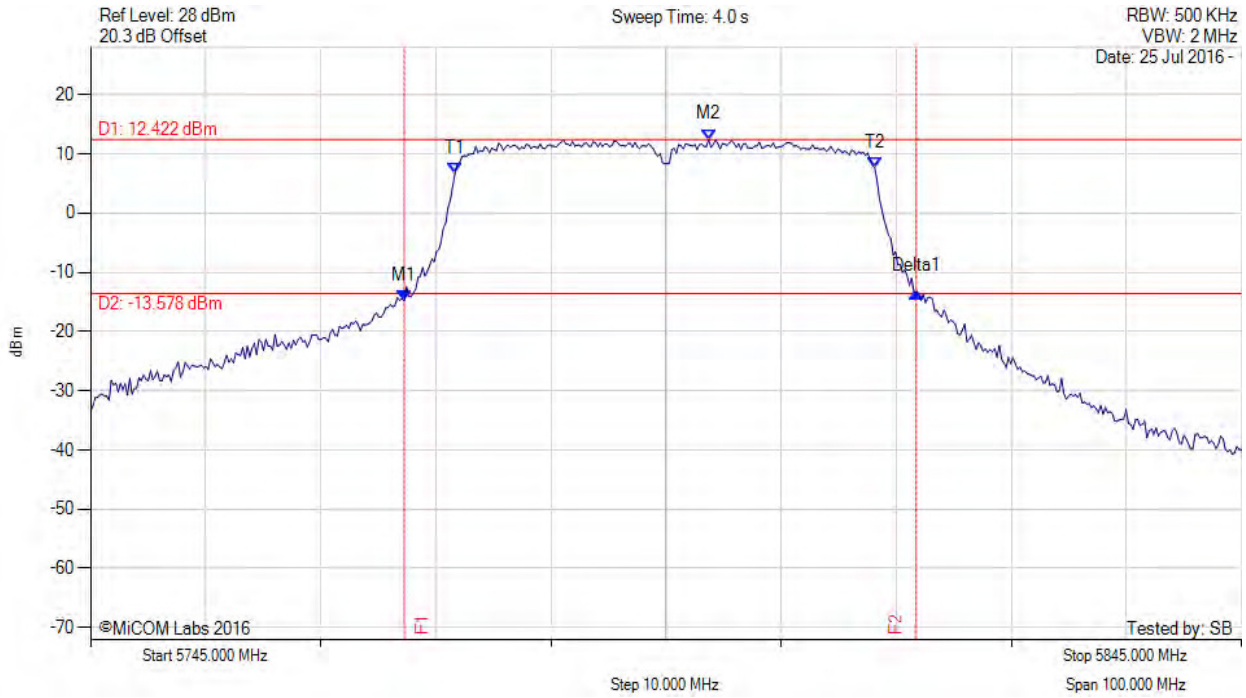


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5771.653 MHz : -17.041 dBm M2 : 5787.886 MHz : 10.900 dBm Delta1 : 45.291 MHz : 2.209 dB T1 : 5776.663 MHz : 5.053 dBm T2 : 5813.136 MHz : 6.048 dBm OBW : 36.473 MHz	Measured 26 dB Bandwidth: 45.291 MHz Measured 99% Bandwidth: 36.473 MHz

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5795.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



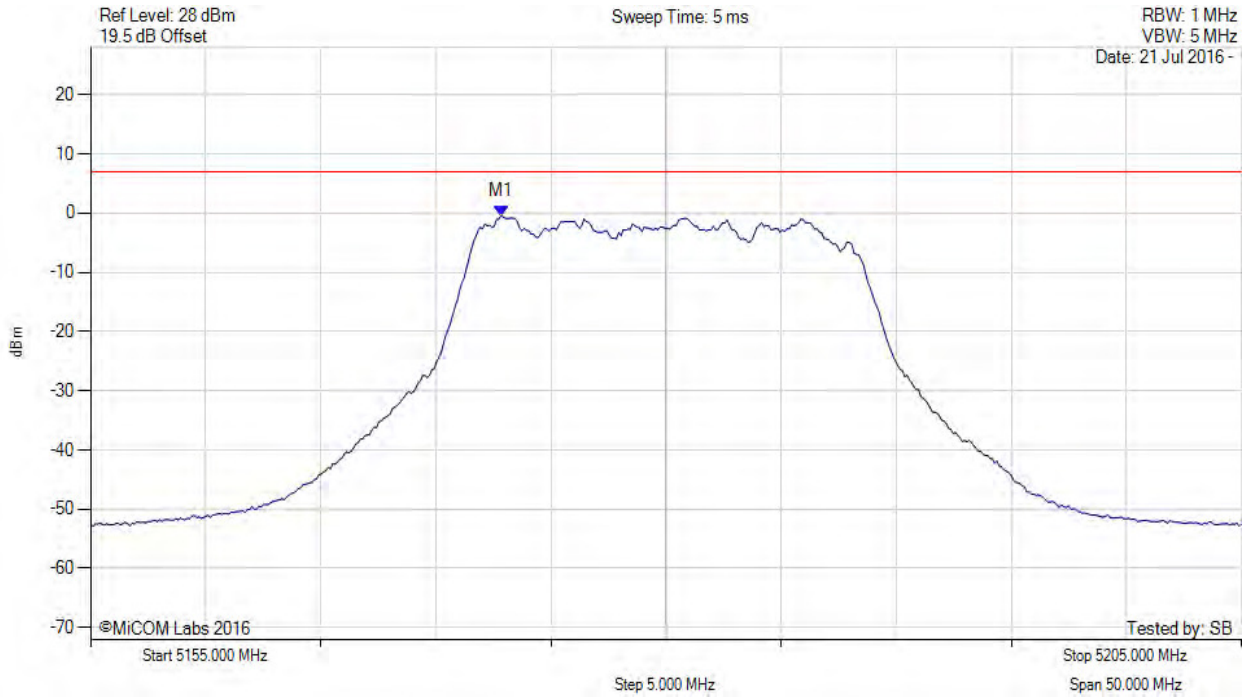
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAX HOLD	M1 : 5772.255 MHz : -14.770 dBm M2 : 5798.707 MHz : 12.422 dBm Delta1 : 44.489 MHz : 1.485 dB T1 : 5776.663 MHz : 6.648 dBm T2 : 5813.136 MHz : 7.703 dBm OBW : 36.473 MHz	Measured 26 dB Bandwidth: 44.489 MHz Measured 99% Bandwidth: 36.473 MHz

back to matrix

A.2. Peak Power Spectral Density

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5180.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5172.836 MHz : -0.459 dBm	Limit: ≤ 6.990 dBm Margin: 7.32 dB

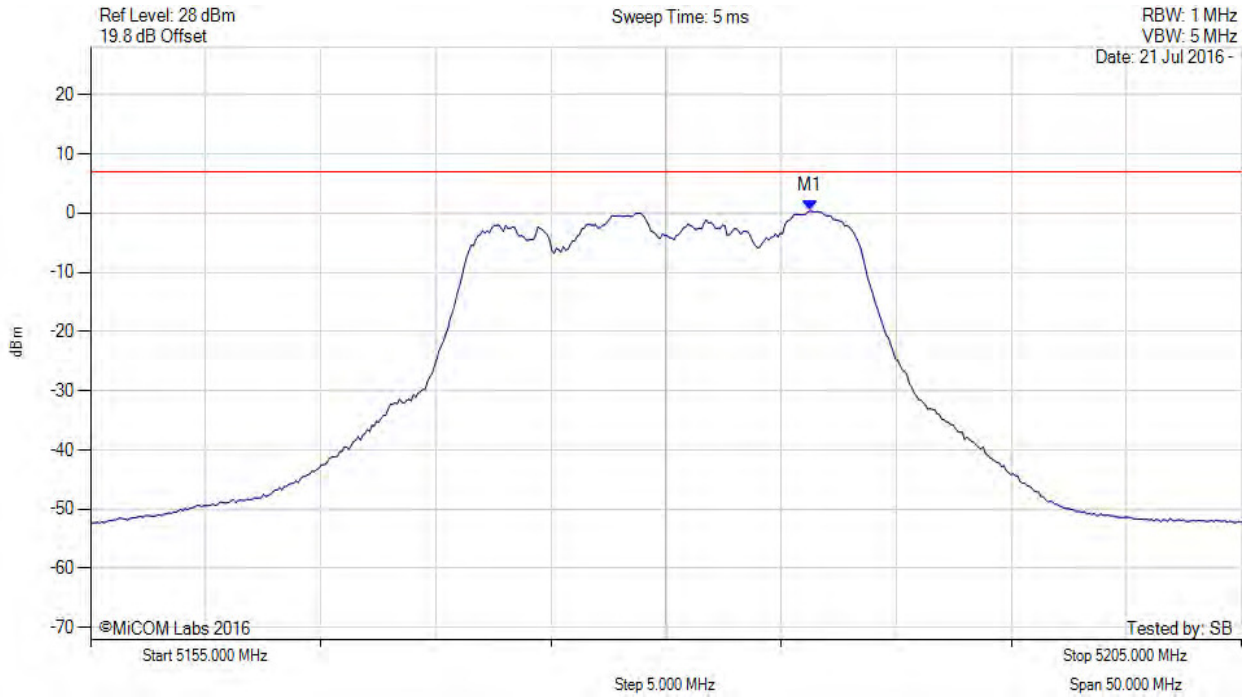
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5180.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5186.263 MHz : 0.325 dBm	Limit: ≤ 6.990 dBm Margin: -6.53 dB

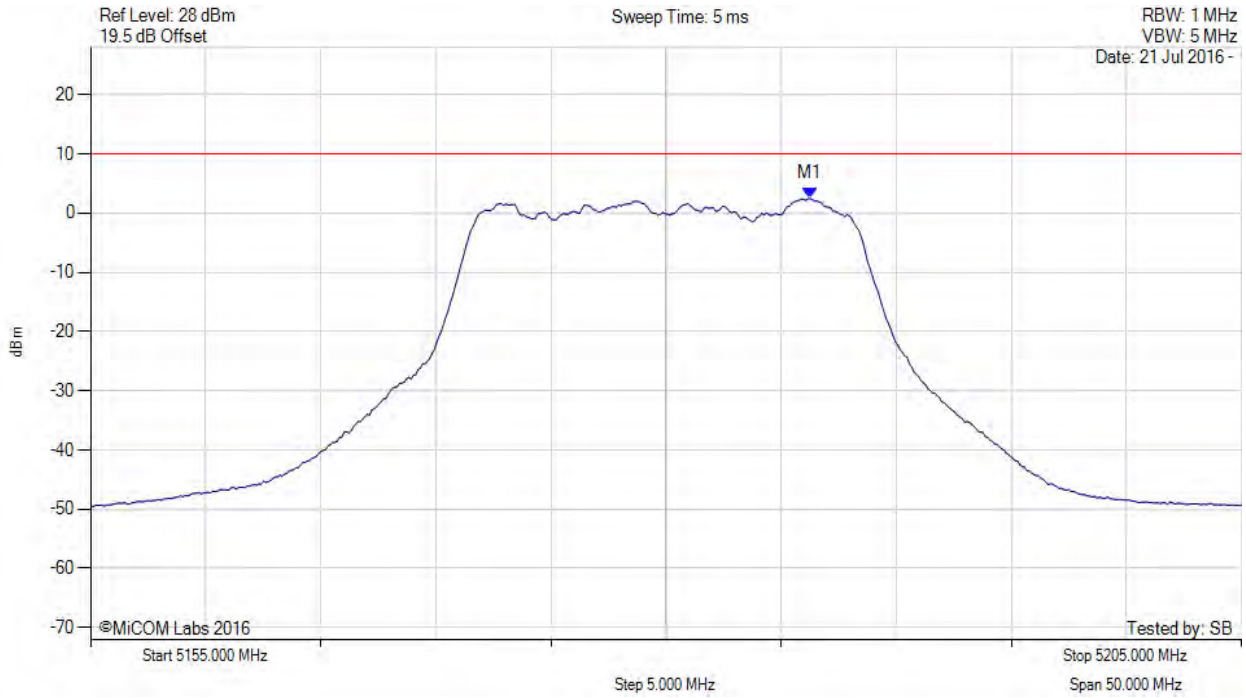
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5180.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5186.263 MHz : 2.466 dBm	Limit: ≤ 10.0 dBm Margin: -7.5 dB

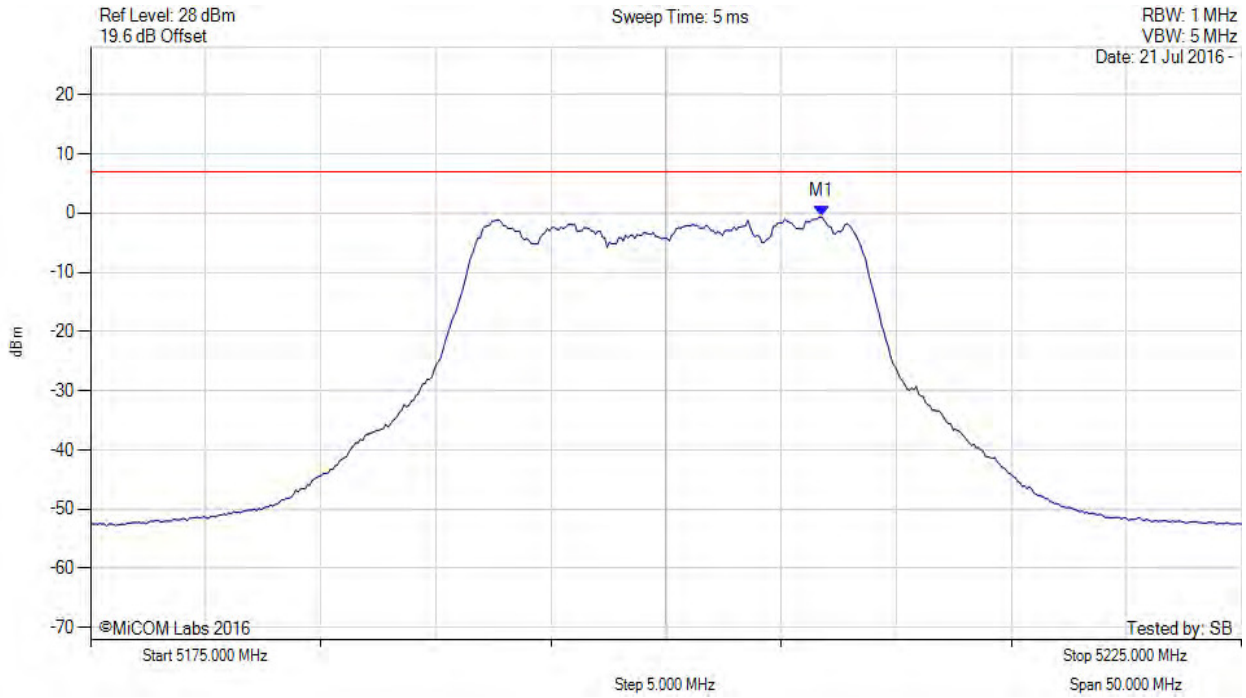
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5200.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5206.764 MHz : -0.639 dBm	Limit: ≤ 6.990 dBm Margin: 7.50 dB

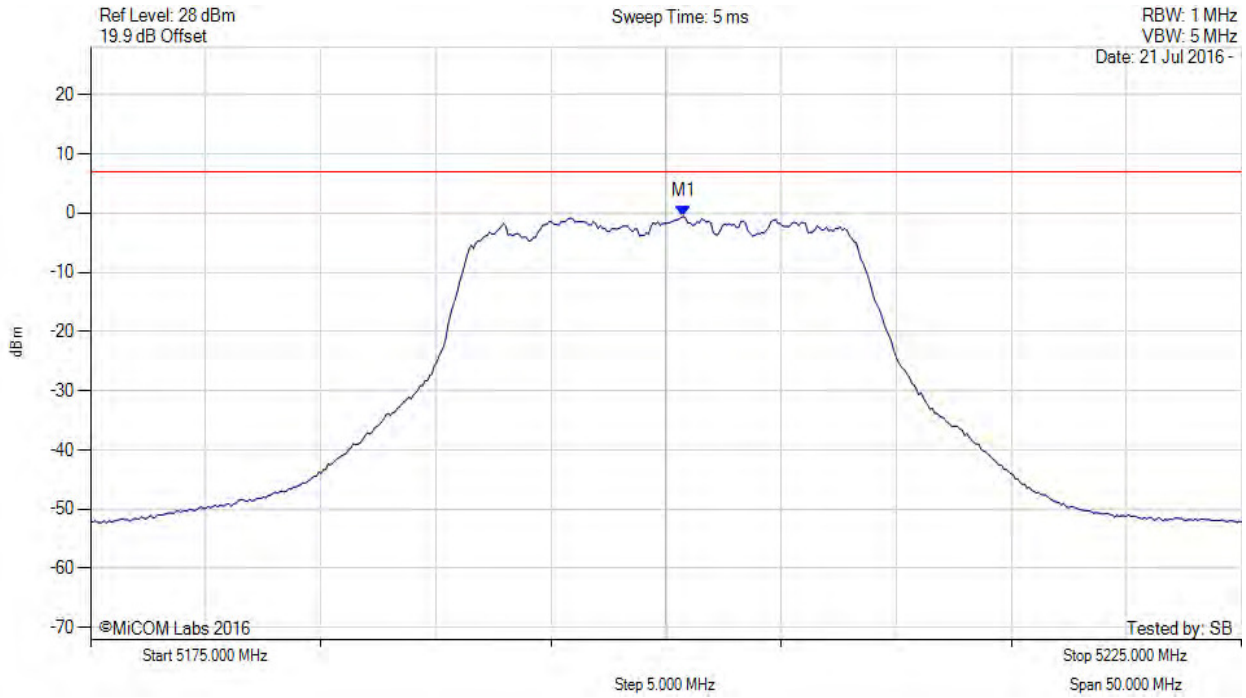
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5200.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5200.752 MHz : -0.583 dBm	Limit: ≤ 6.990 dBm Margin: 7.44 dB

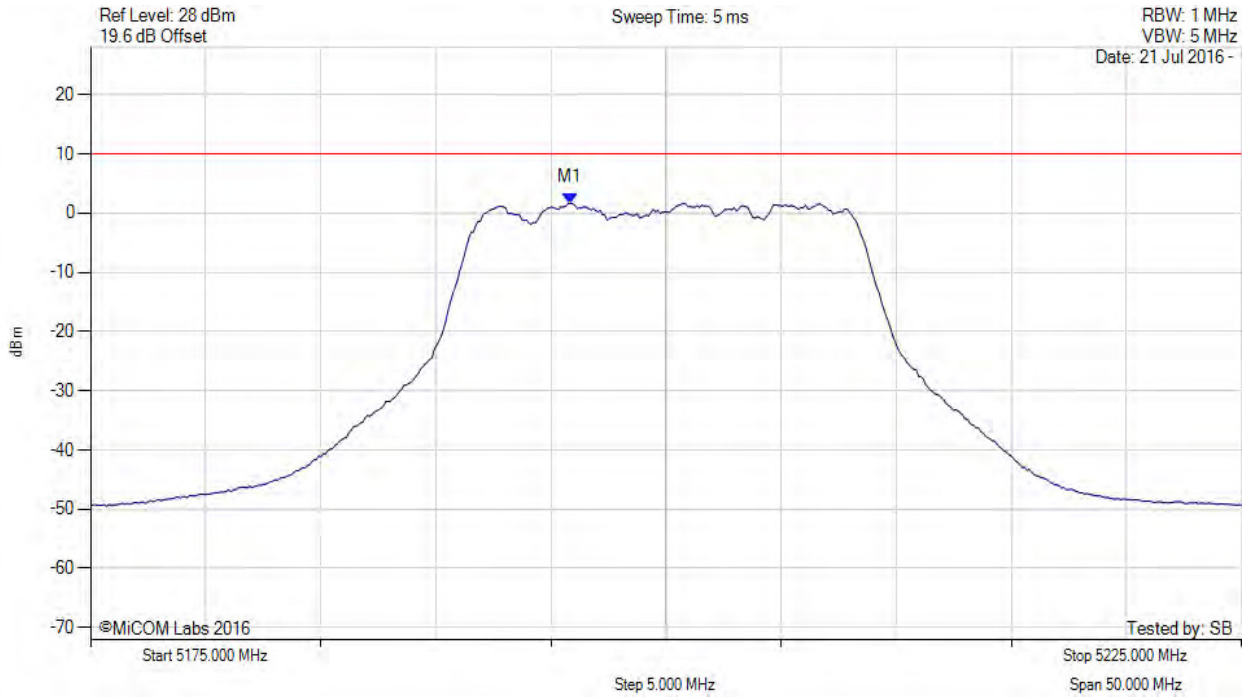
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5200.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5195.842 MHz : 1.687 dBm	Limit: ≤ 10.0 dBm Margin: -8.3 dB

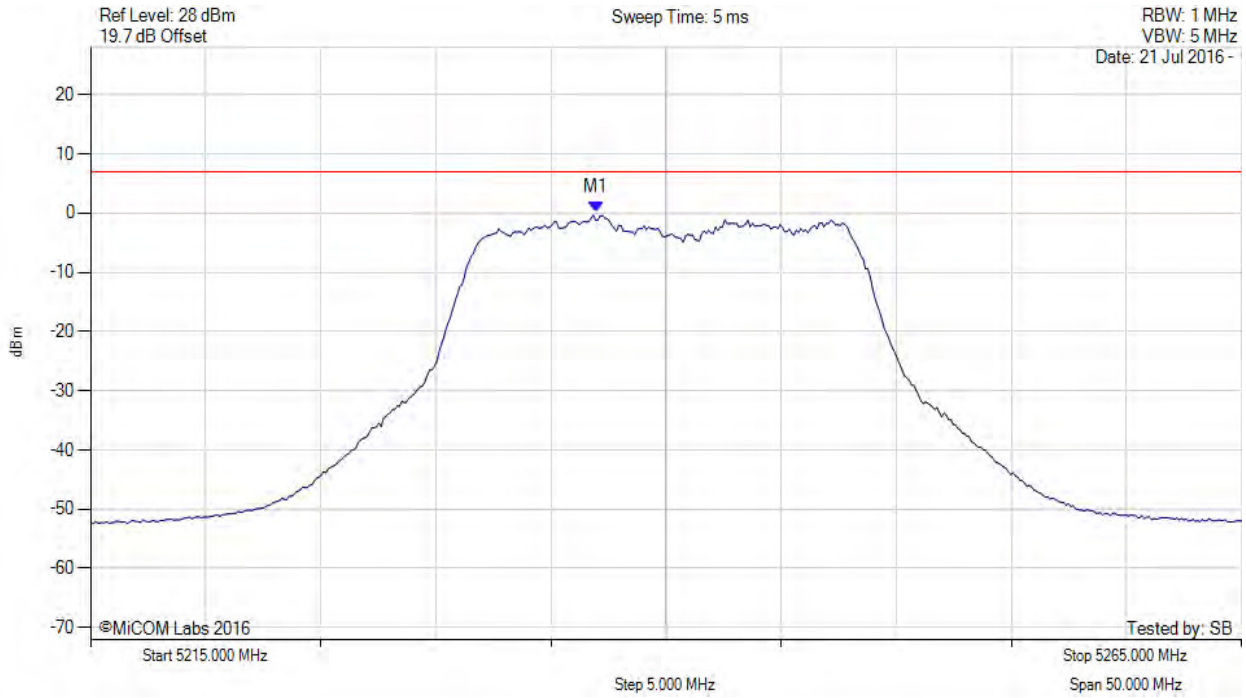
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5240.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5236.944 MHz : 0.179 dBm	Limit: ≤ 6.990 dBm Margin: -6.68 dB

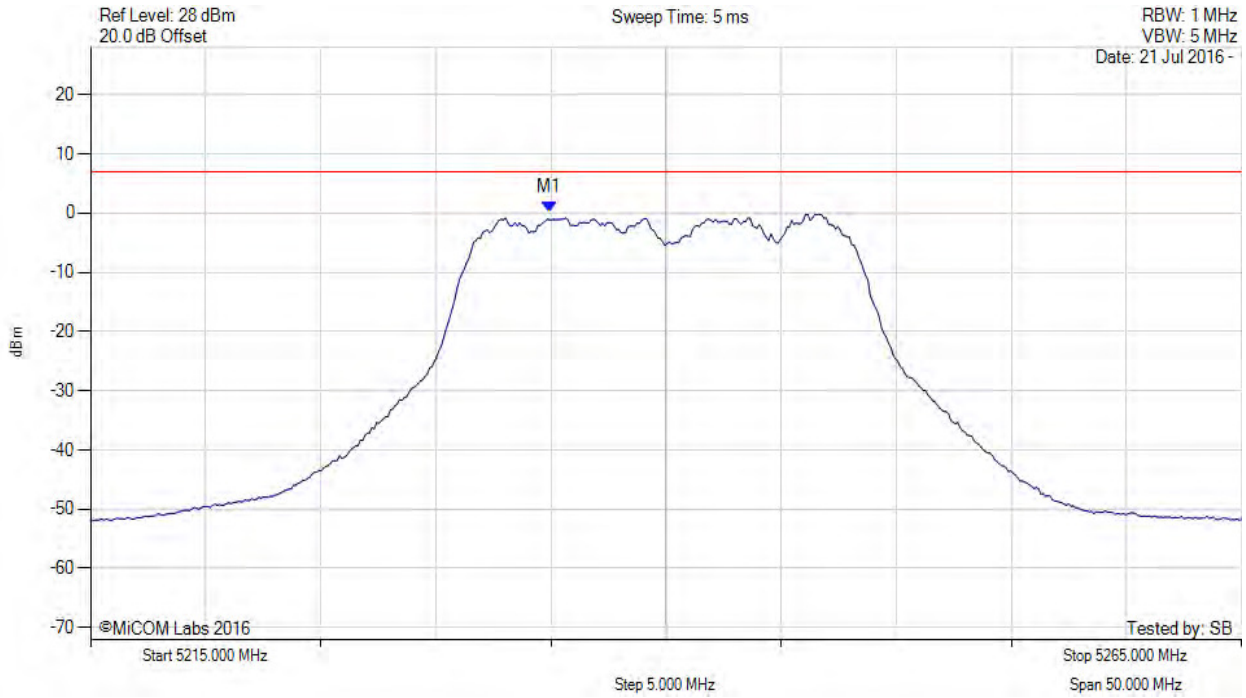
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5240.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5234.940 MHz : 0.108 dBm	Limit: ≤ 6.990 dBm Margin: -6.75 dB

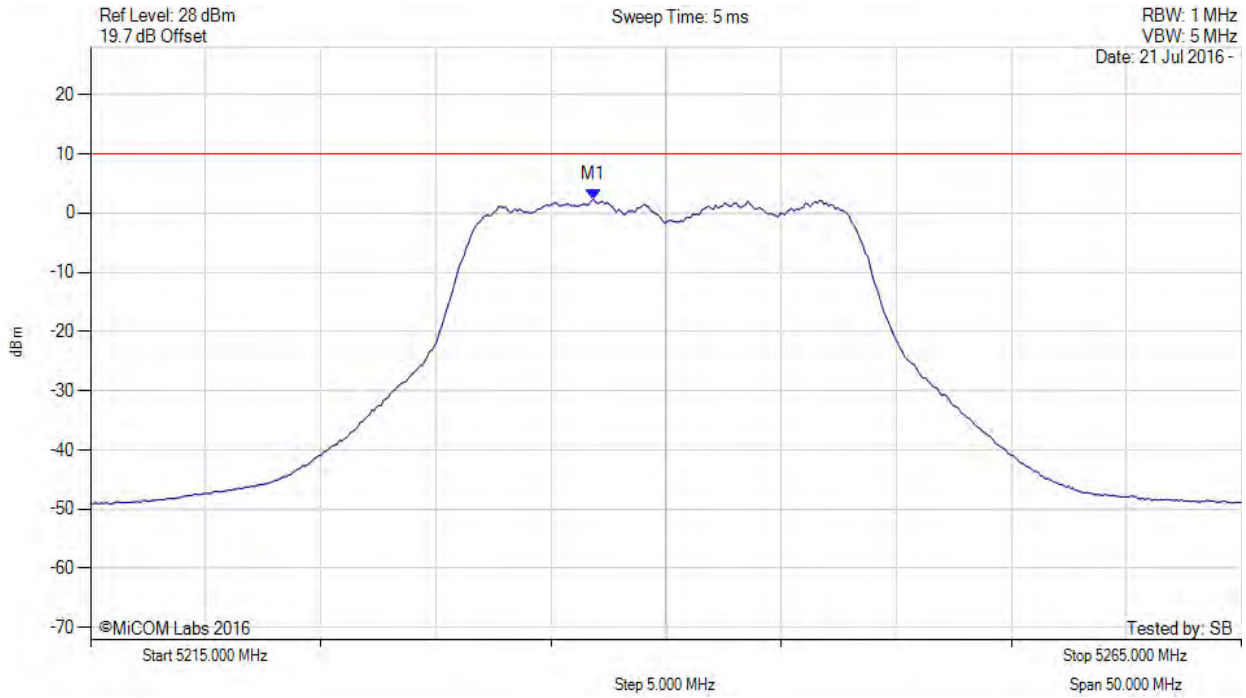
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5240.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5236.844 MHz : 2.339 dBm	Limit: ≤ 10.0 dBm Margin: -7.7 dB

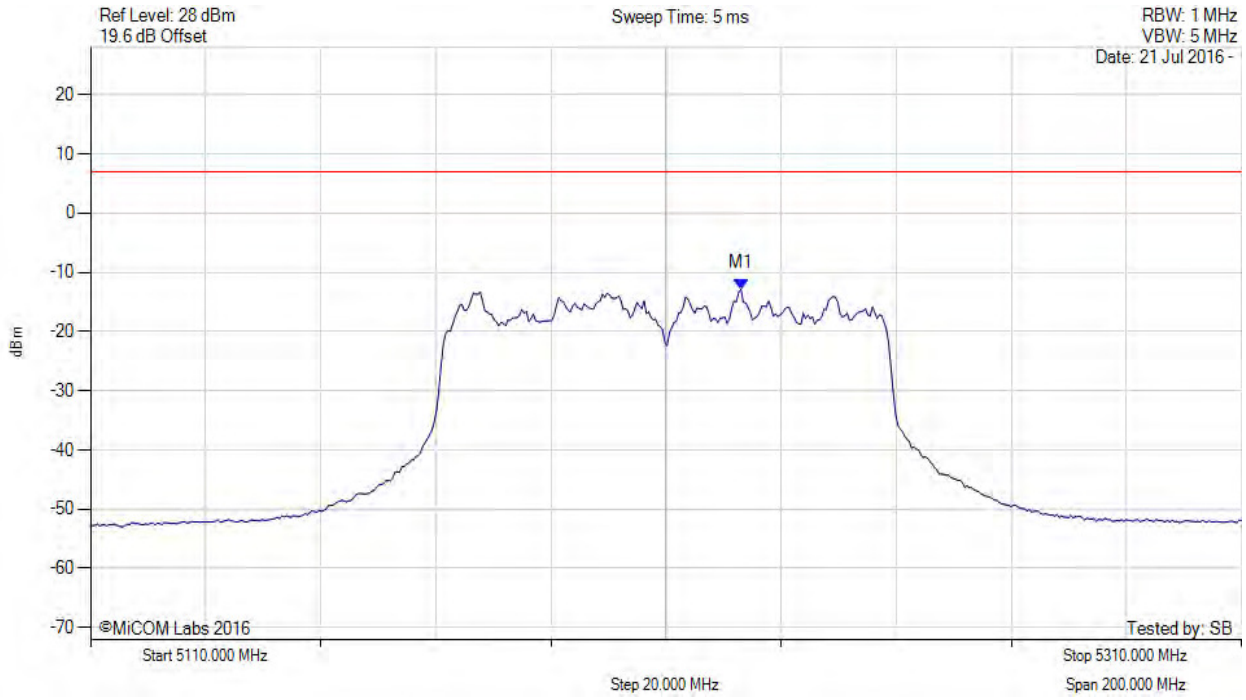
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11ac-80, Channel: 5210.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5223.026 MHz : -12.818 dBm	Limit: ≤ 6.990 dBm Margin: 18.44 dB

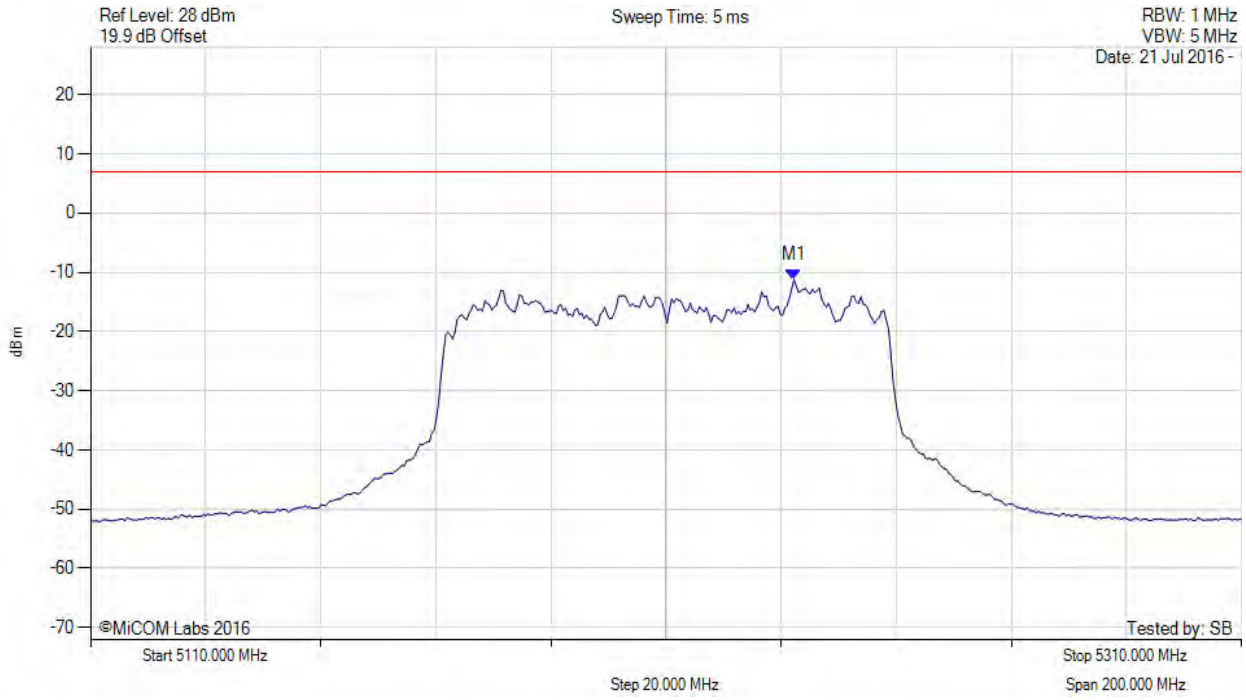
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11ac-80, Channel: 5210.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5232.244 MHz : -11.209 dBm	Limit: ≤ 6.990 dBm Margin: 16.83 dB

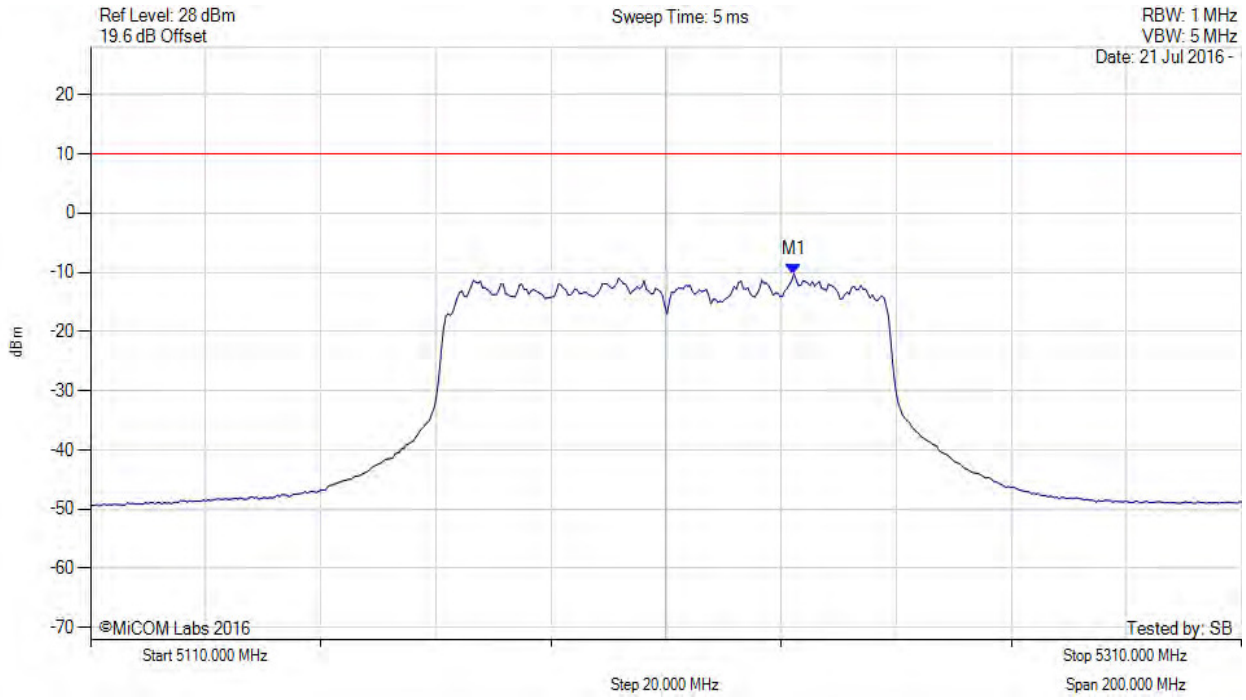
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11ac-80, Channel: 5210.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5232.244 MHz : -10.295 dBm	Limit: ≤ 10.0 dBm Margin: -20.3 dB

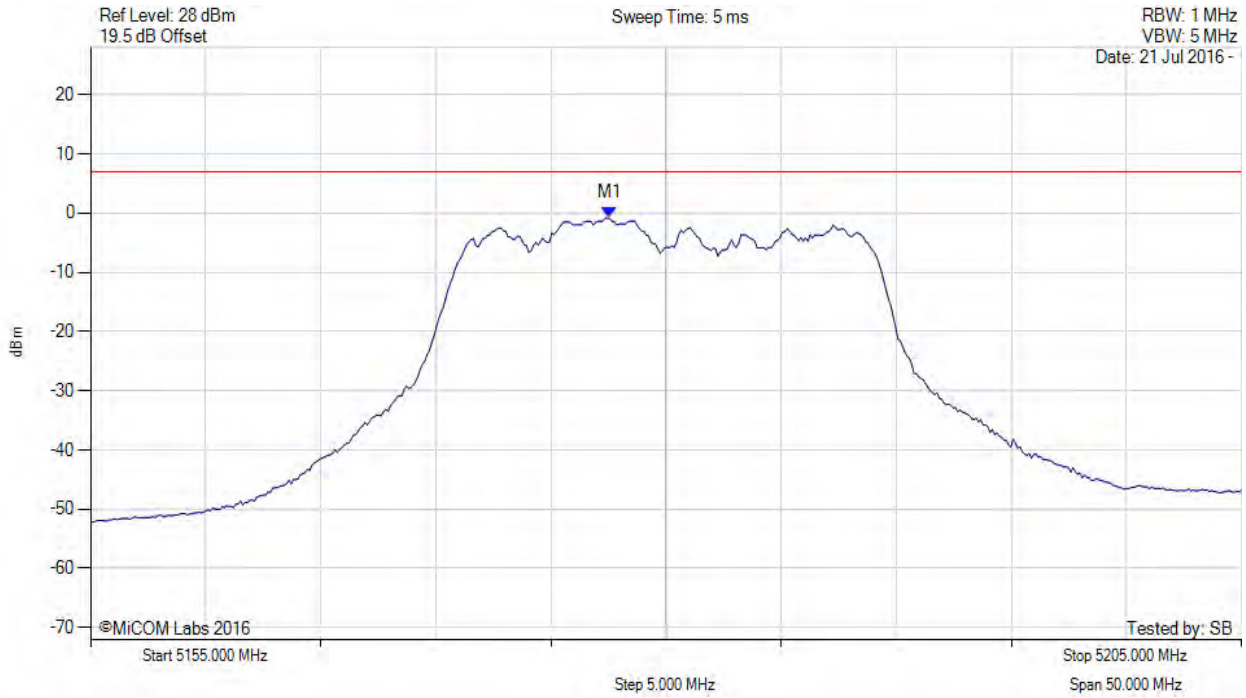
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5177.545 MHz : -0.865 dBm	Limit: ≤ 6.990 dBm Margin: 7.72 dB

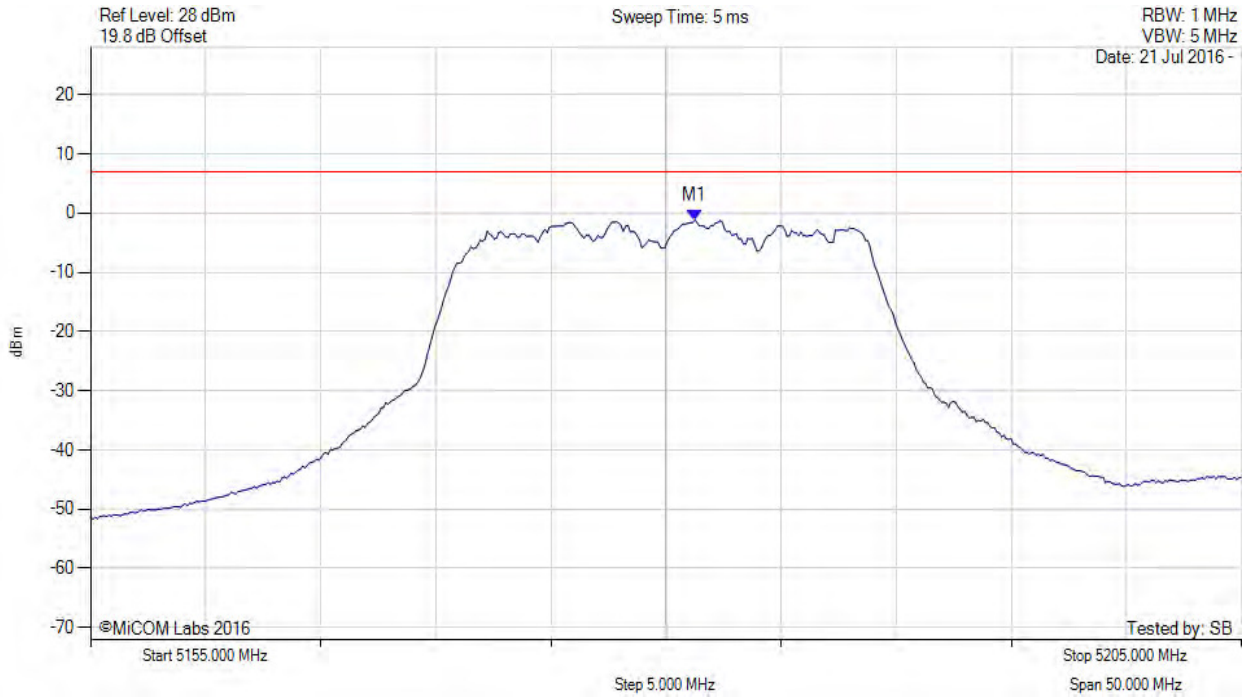
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5181.253 MHz : -1.145 dBm	Limit: ≤ 6.990 dBm Margin: 8.00 dB

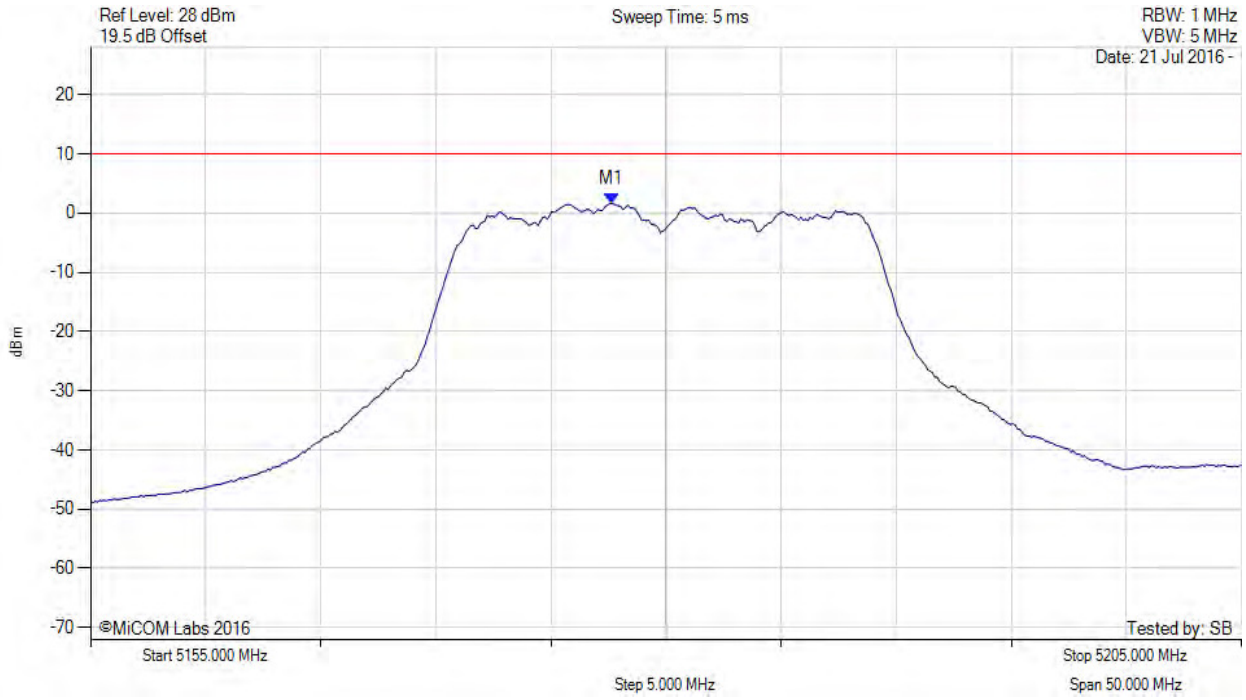
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5180.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5177.645 MHz : 1.592 dBm	Limit: ≤ 10.0 dBm Margin: -8.4 dB

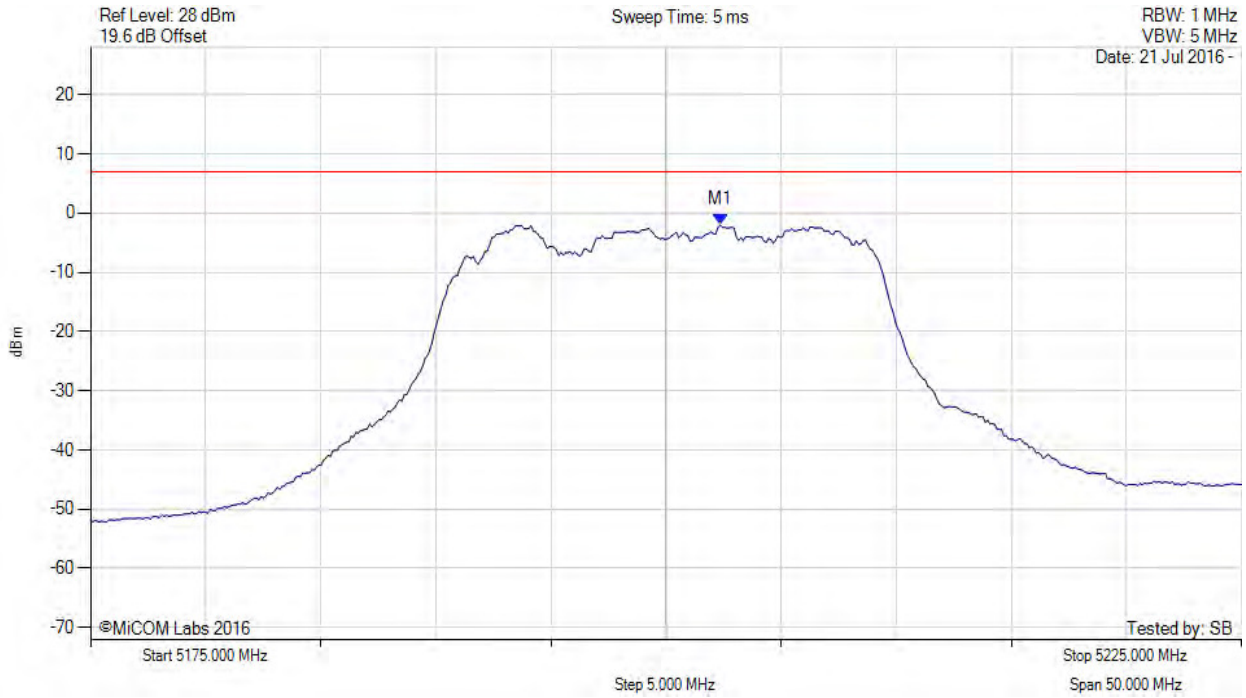
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5202.355 MHz : -1.991 dBm	Limit: ≤ 6.990 dBm Margin: 8.85 dB

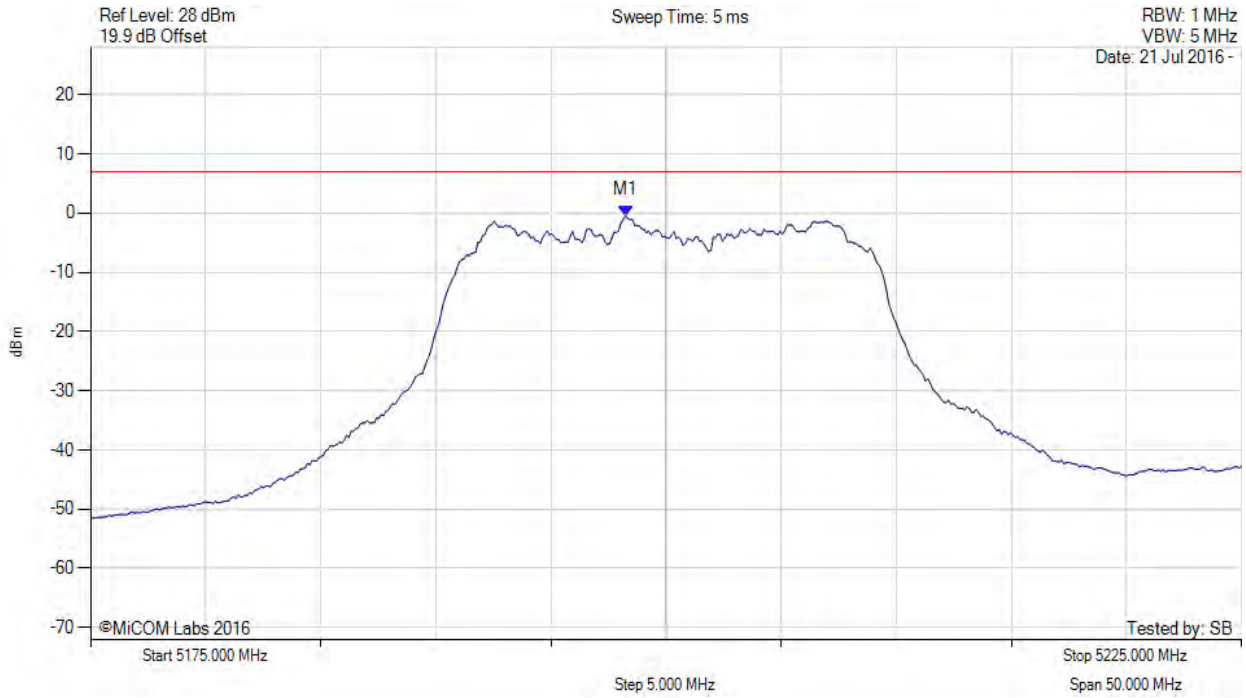
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5198.246 MHz : -0.436 dBm	Limit: ≤ 6.990 dBm Margin: 7.29 dB

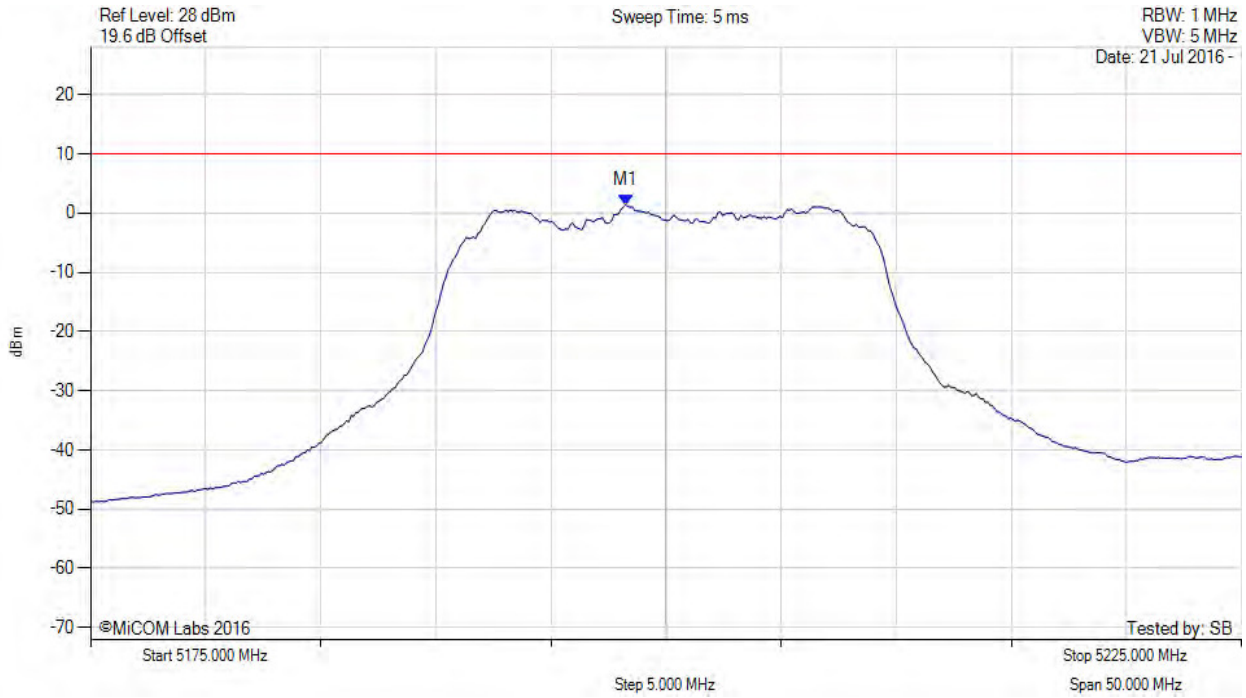
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5200.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5198.246 MHz : 1.400 dBm	Limit: ≤ 10.0 dBm Margin: -8.6 dB

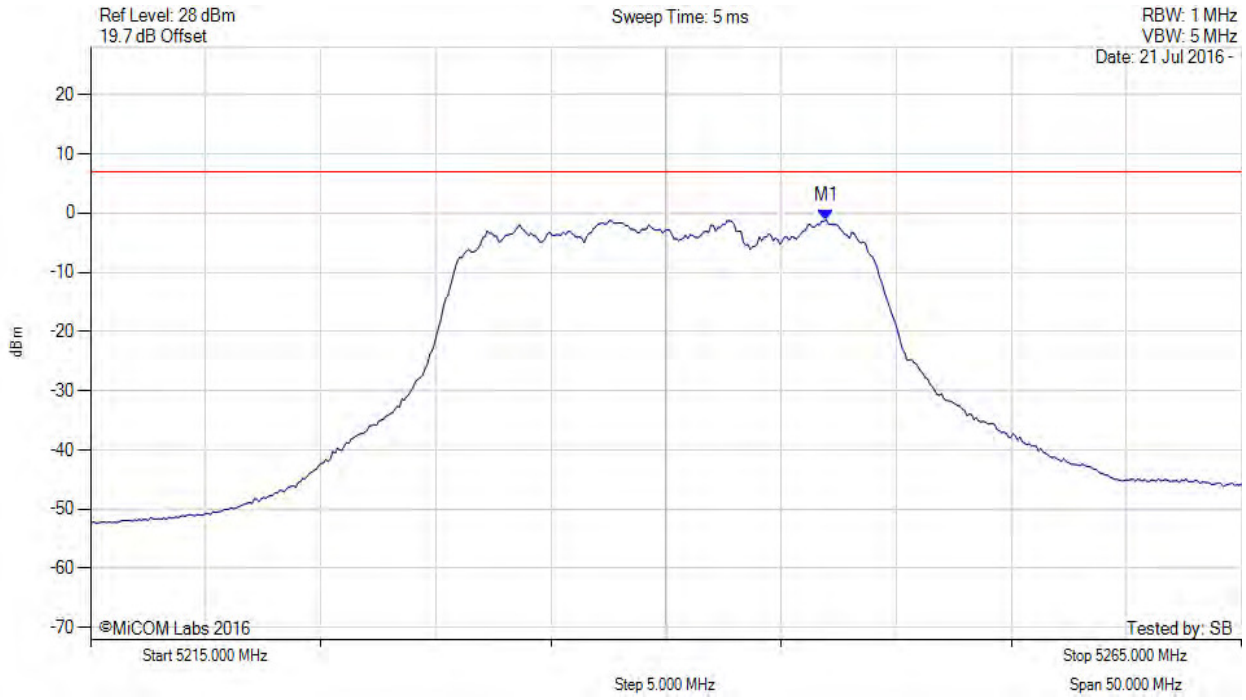
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5246.964 MHz : -1.153 dBm	Limit: ≤ 6.990 dBm Margin: 8.01 dB

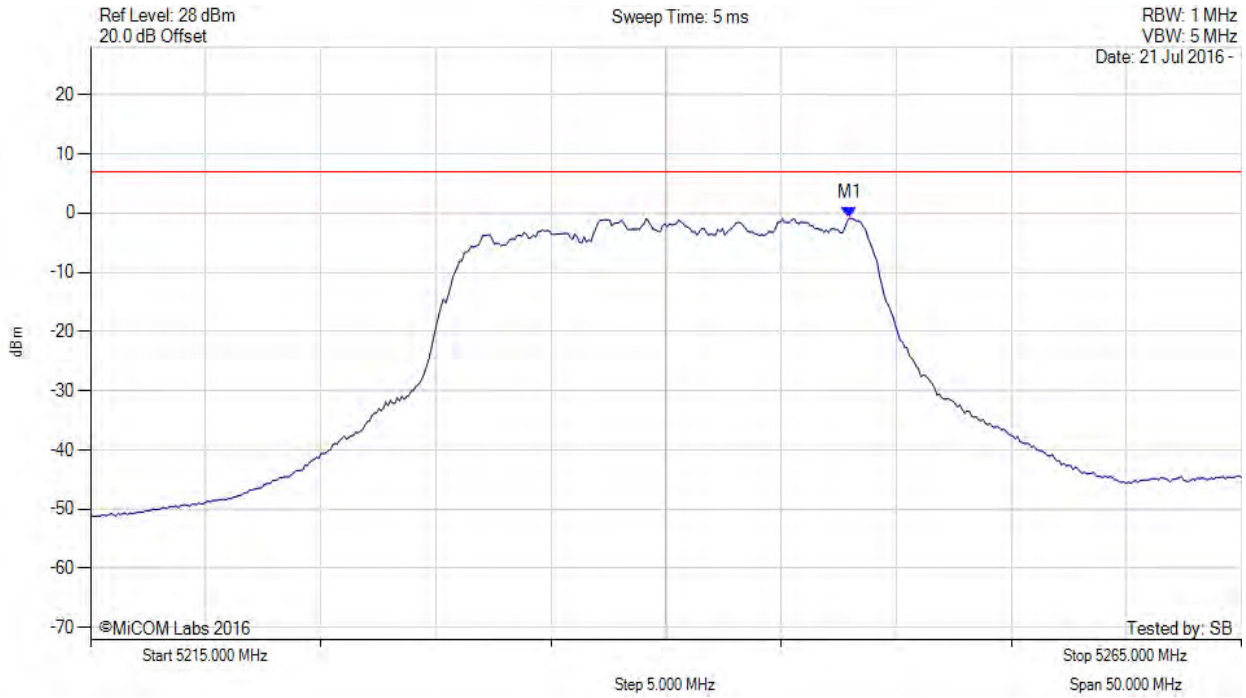
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5247.966 MHz : -0.836 dBm	Limit: ≤ 6.990 dBm Margin: 7.69 dB

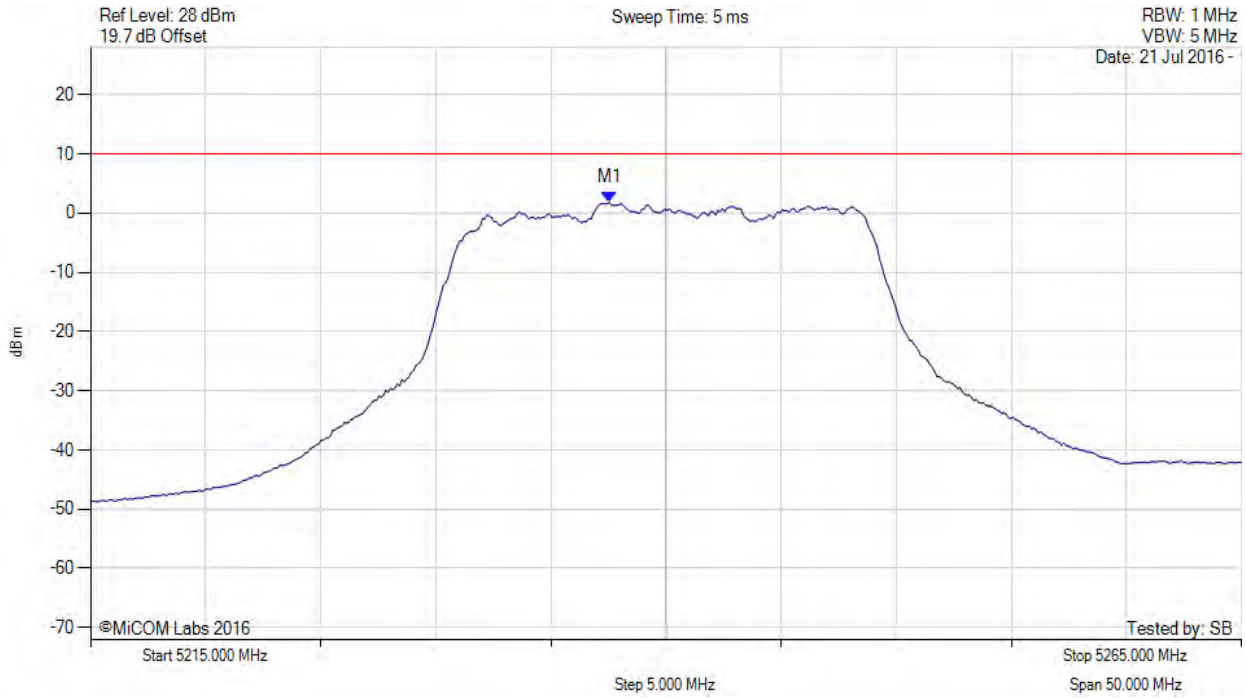
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5240.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5237.545 MHz : 1.792 dBm	Limit: ≤ 10.0 dBm Margin: -8.2 dB

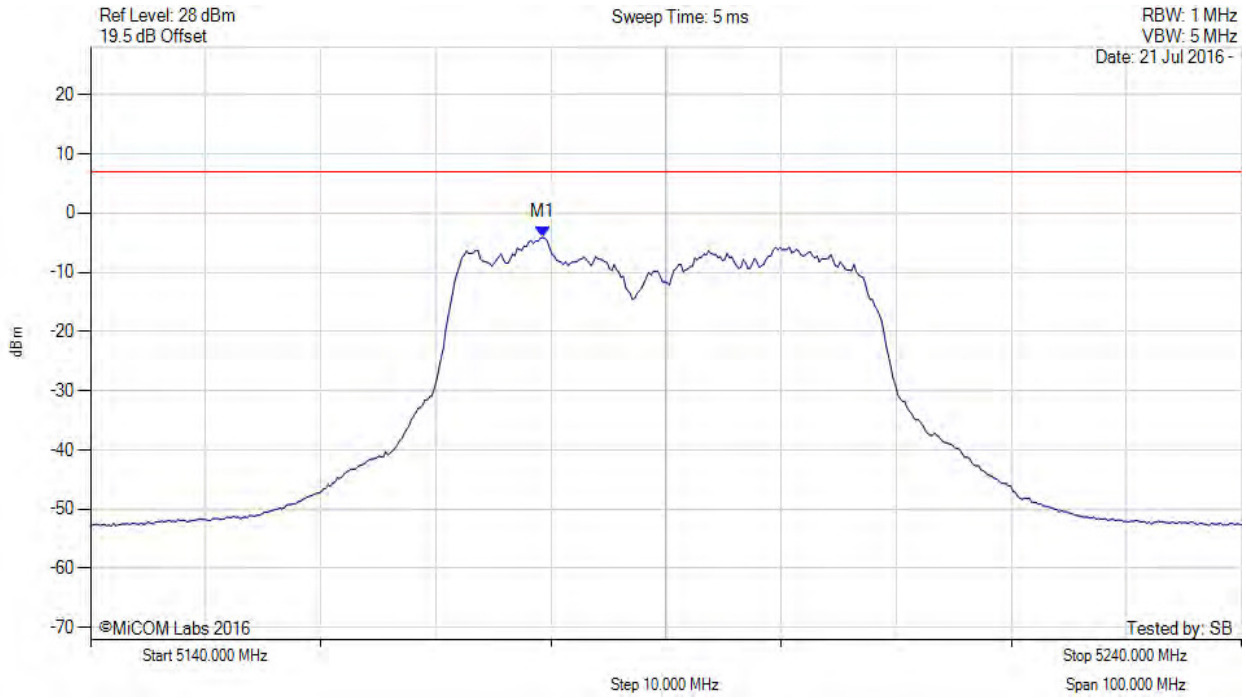
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5179.279 MHz : -4.128 dBm	Limit: ≤ 6.990 dBm Margin: 10.94 dB

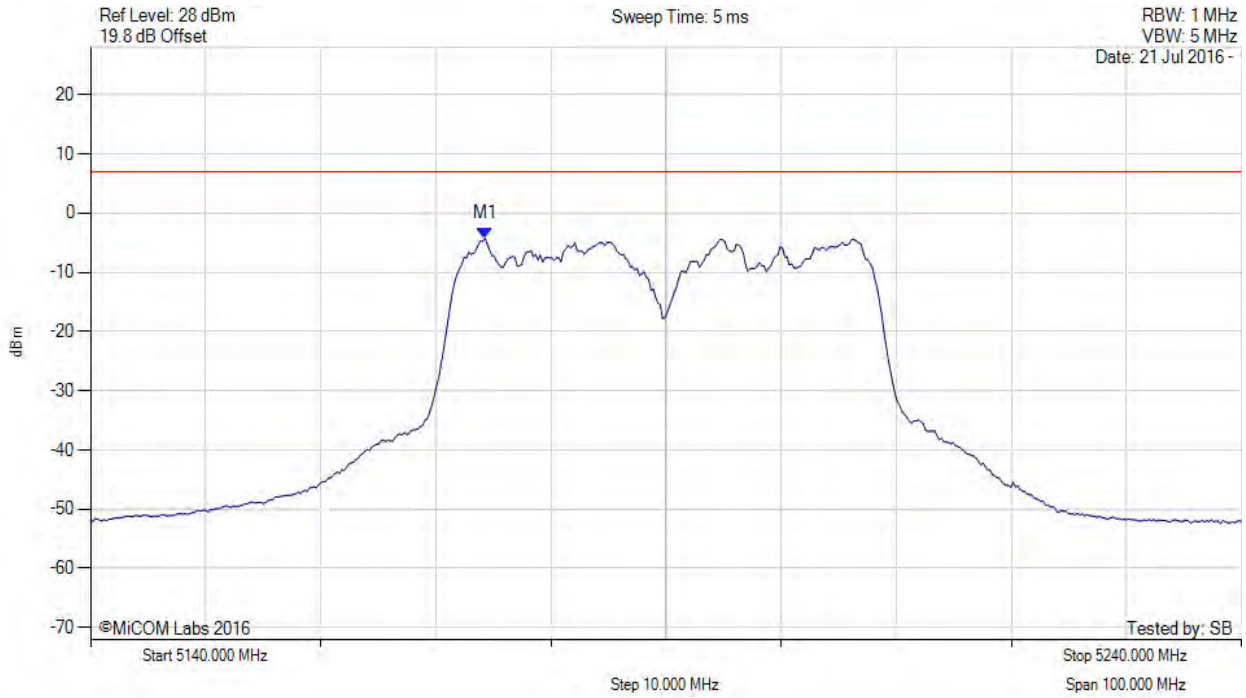
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5174.269 MHz : -4.247 dBm	Limit: ≤ 6.990 dBm Margin: 11.06 dB

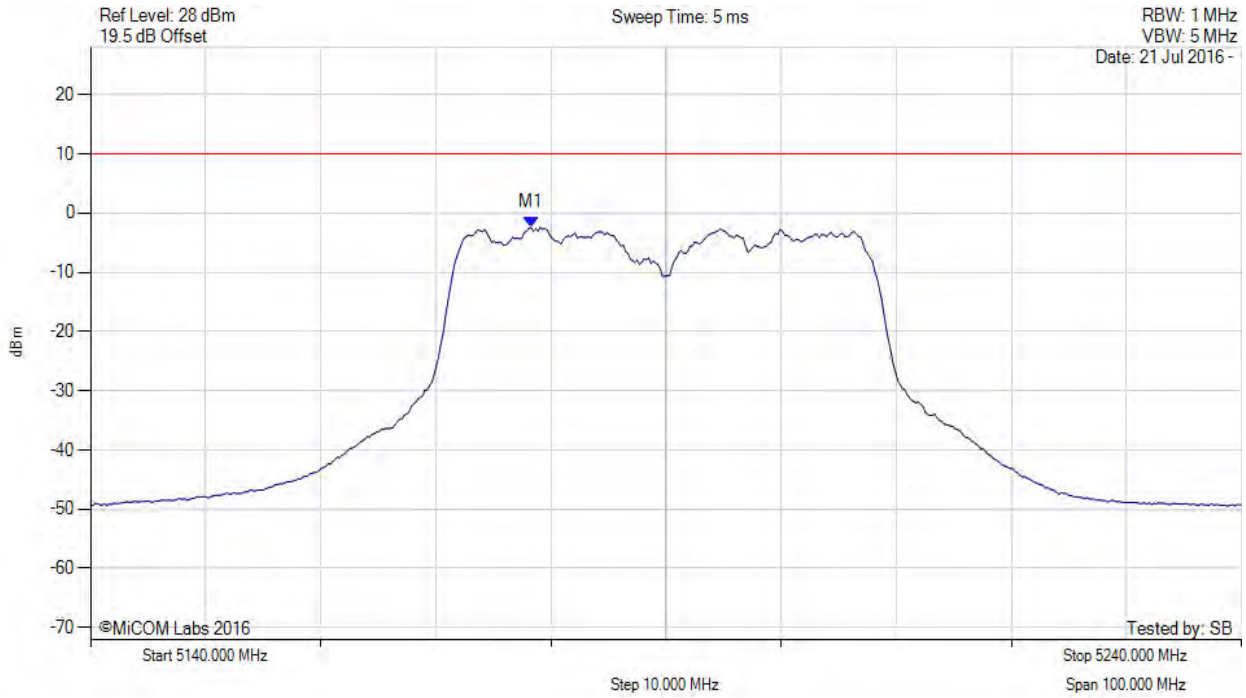
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5190.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5178.277 MHz : -2.397 dBm	Limit: ≤ 10.0 dBm Margin: -12.4 dB

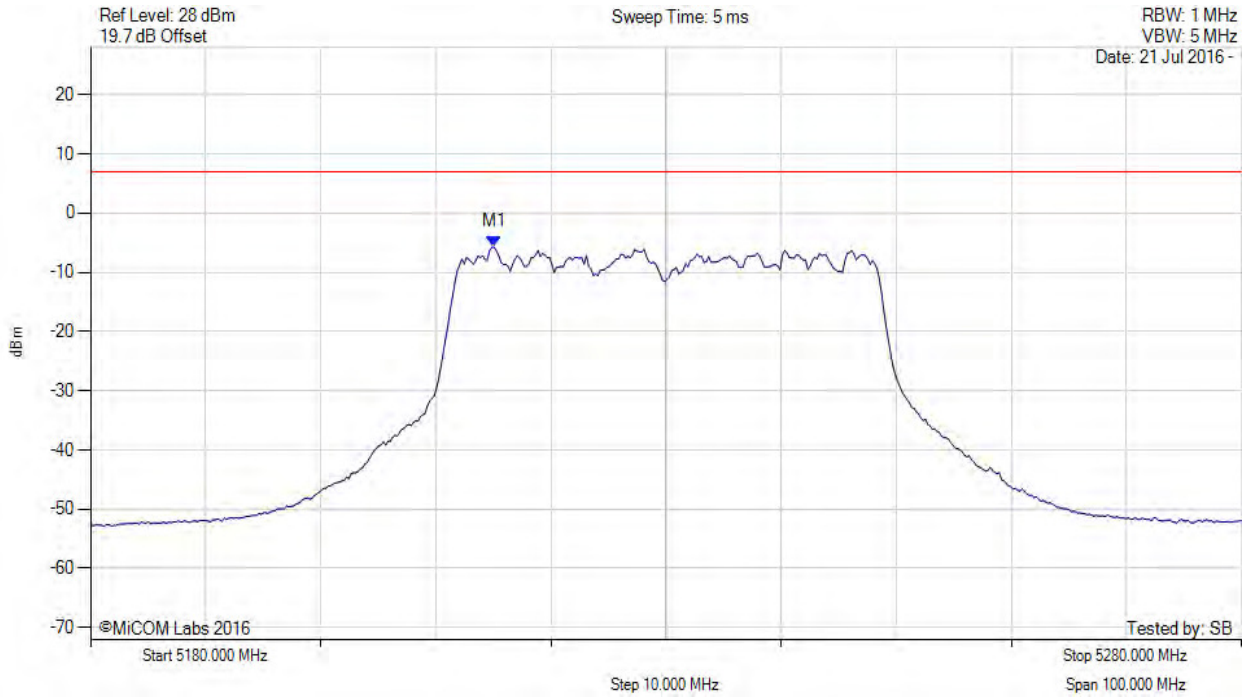
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5215.070 MHz : -5.761 dBm	Limit: ≤ 6.990 dBm Margin: 12.57 dB

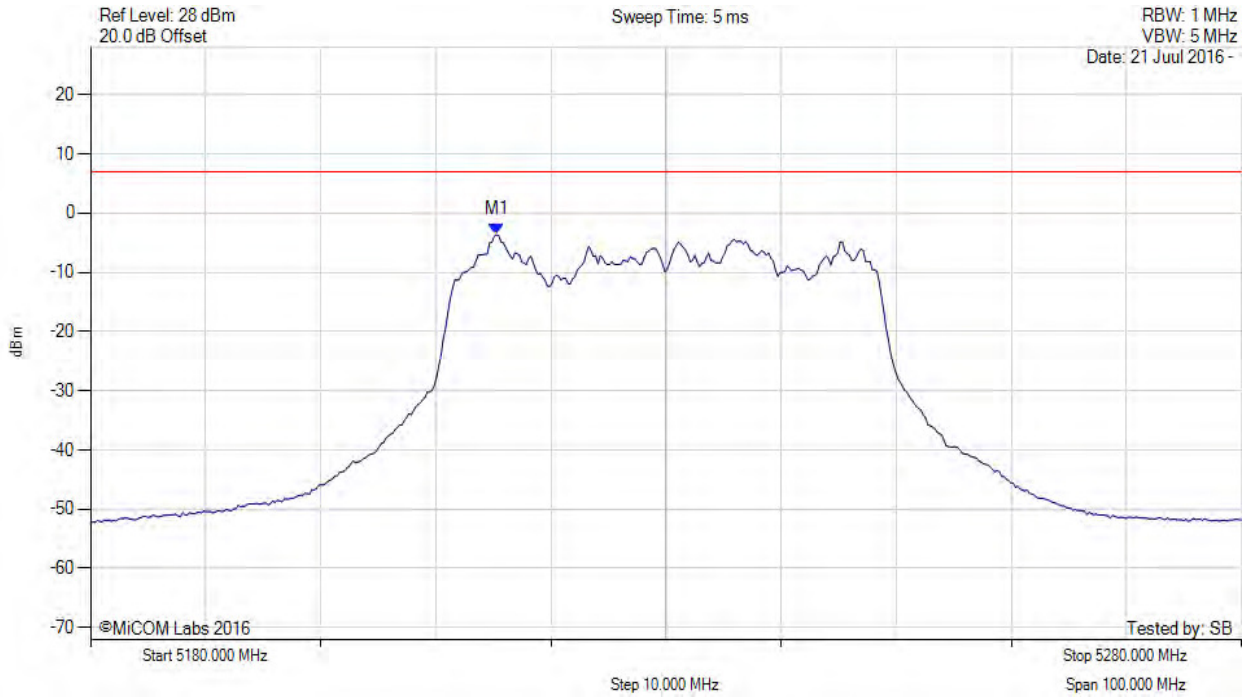
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5215.271 MHz : -3.657 dBm	Limit: ≤ 6.990 dBm Margin: 10.47 dB

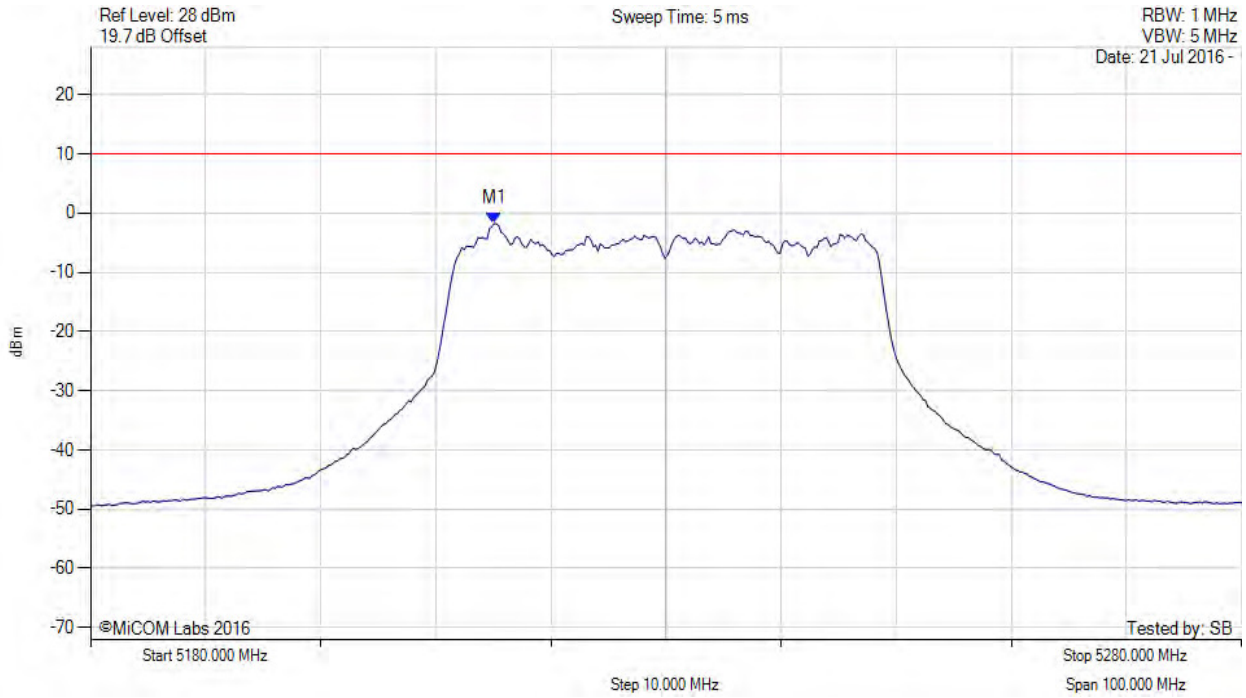
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5230.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5215.070 MHz : -1.745 dBm	Limit: ≤ 10.0 dBm Margin: -11.7 dB

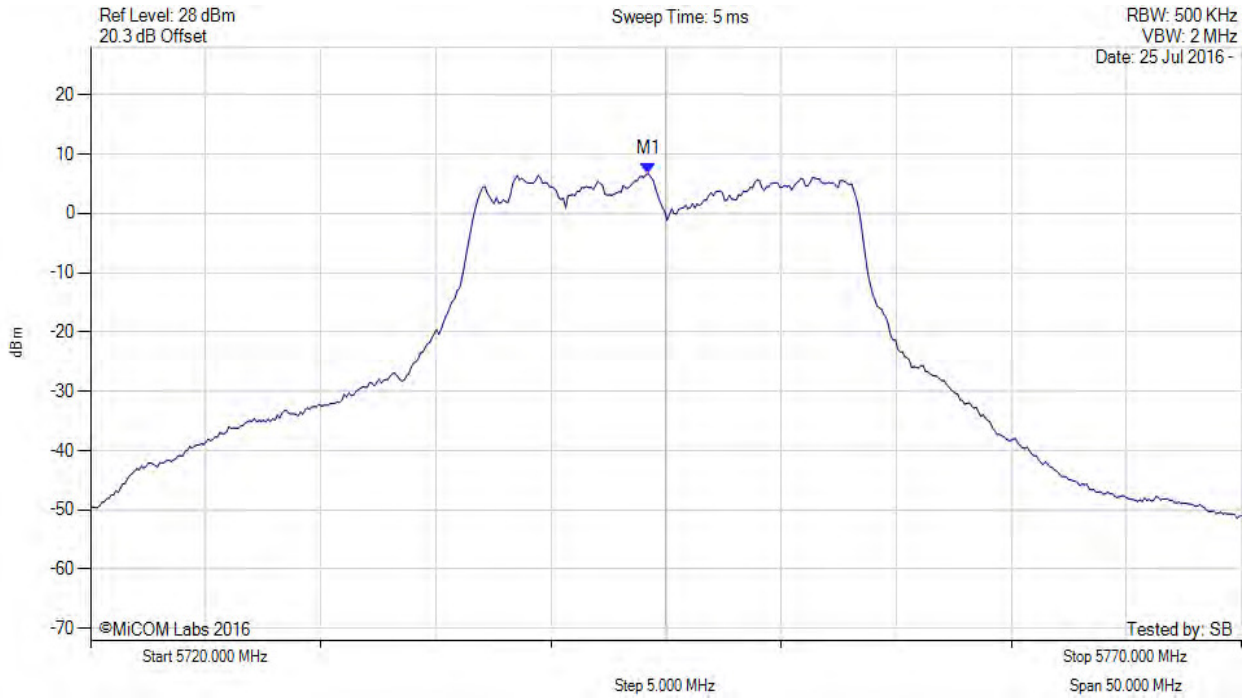
back to matrix IC RSS-247

back to matrix FCC 15.407

Note: FCC 15.407 Limit is 17 dBm/MHz however, EUT was tested at the lower limit per IC RSS-247 of 10 dBm/MHz

POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5745.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



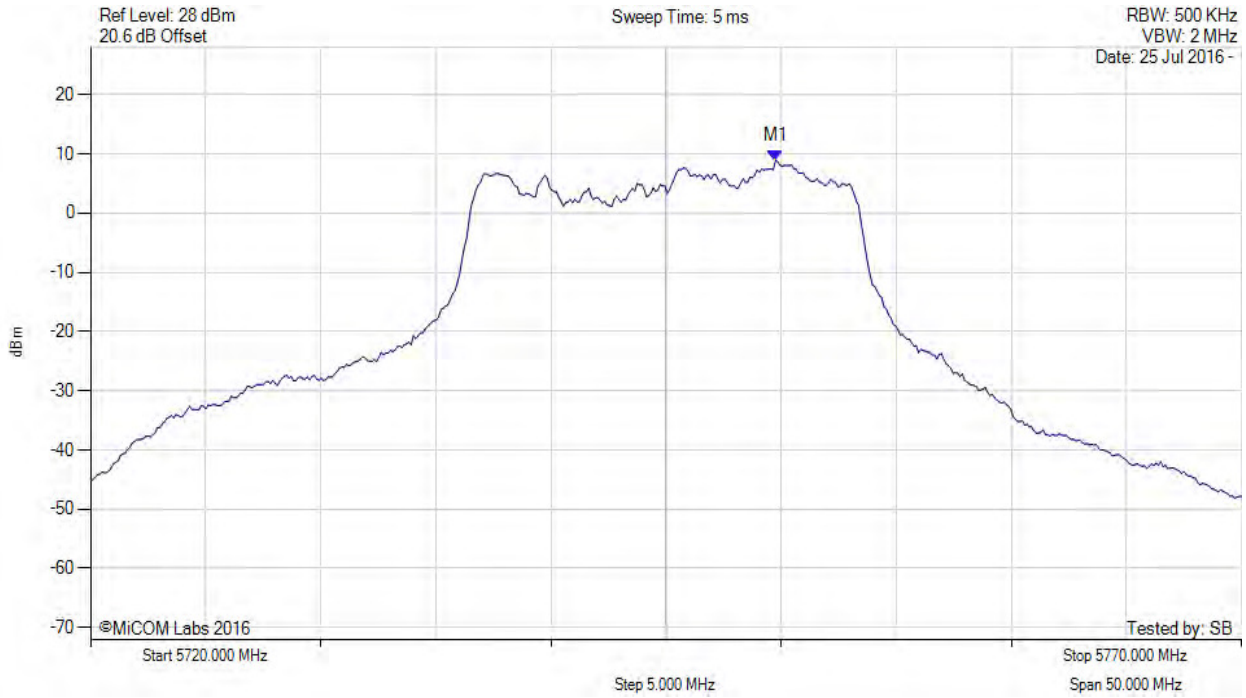
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5744.248 MHz : 6.651 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5745.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



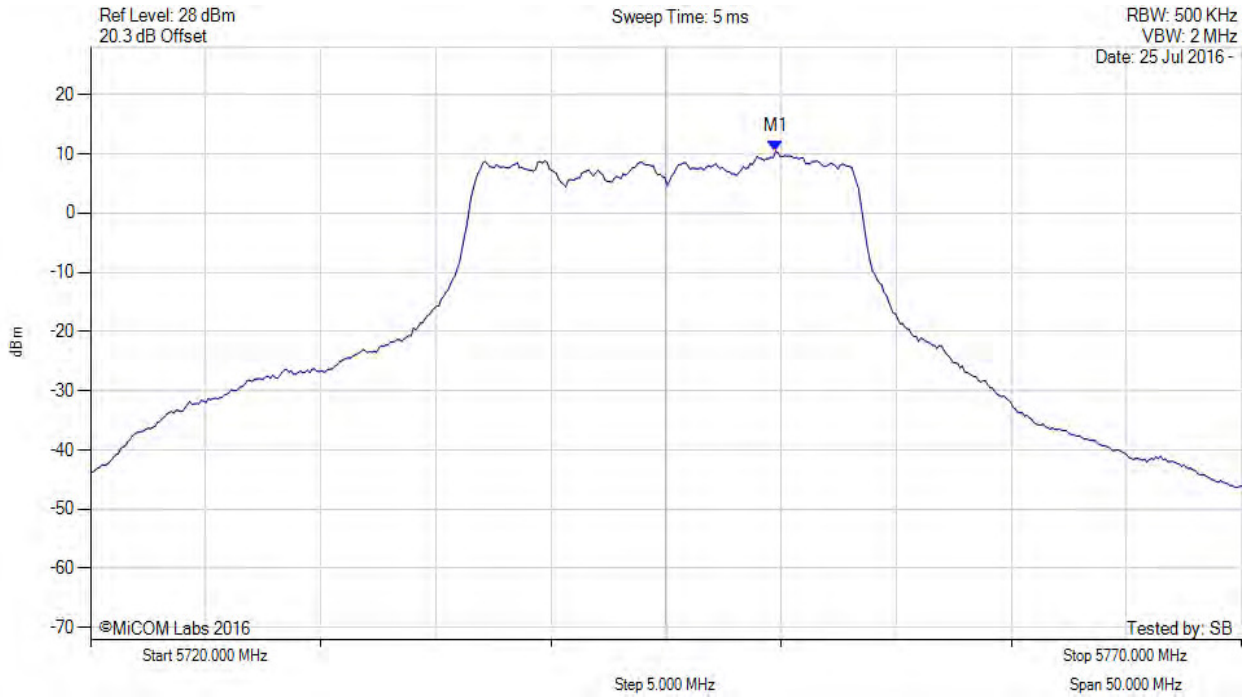
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5749.760 MHz : 8.904 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5745.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



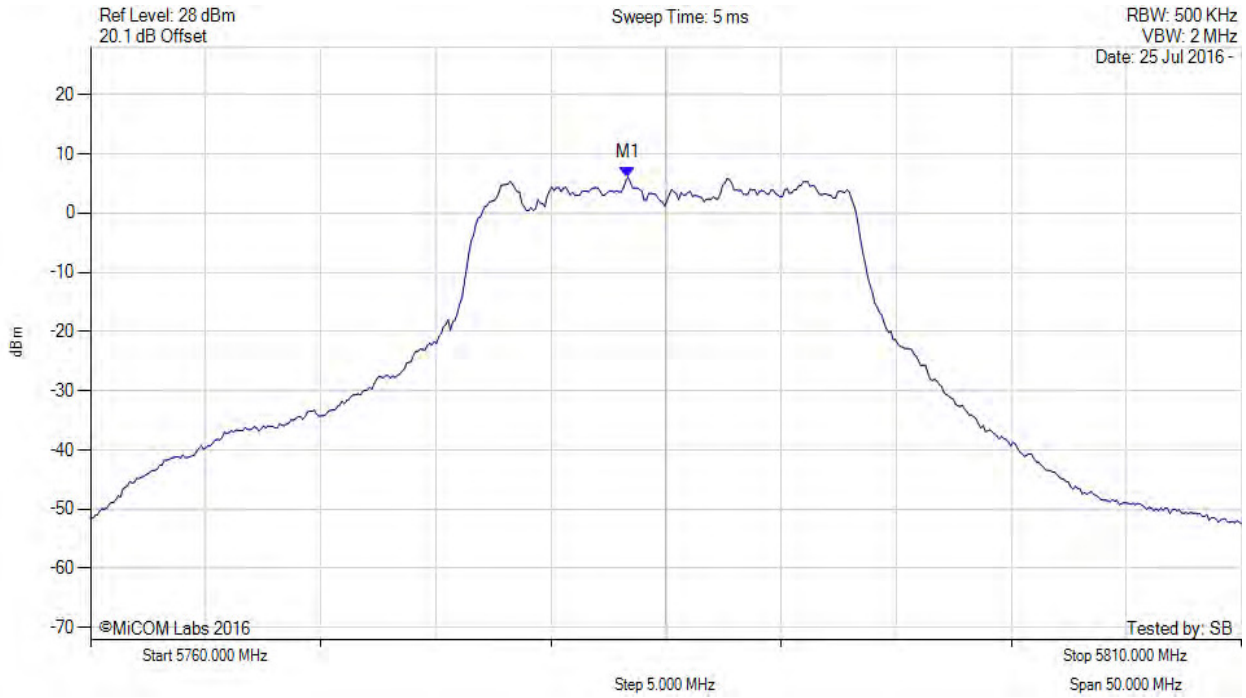
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5749.800 MHz : 10.443 dBm M1 + DCCF : 5749.800 MHz : 10.575 dBm Duty Cycle Correction Factor : +0.13 dB	Limit: ≤ 33.0 dBm Margin: -22.4 dB

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5785.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



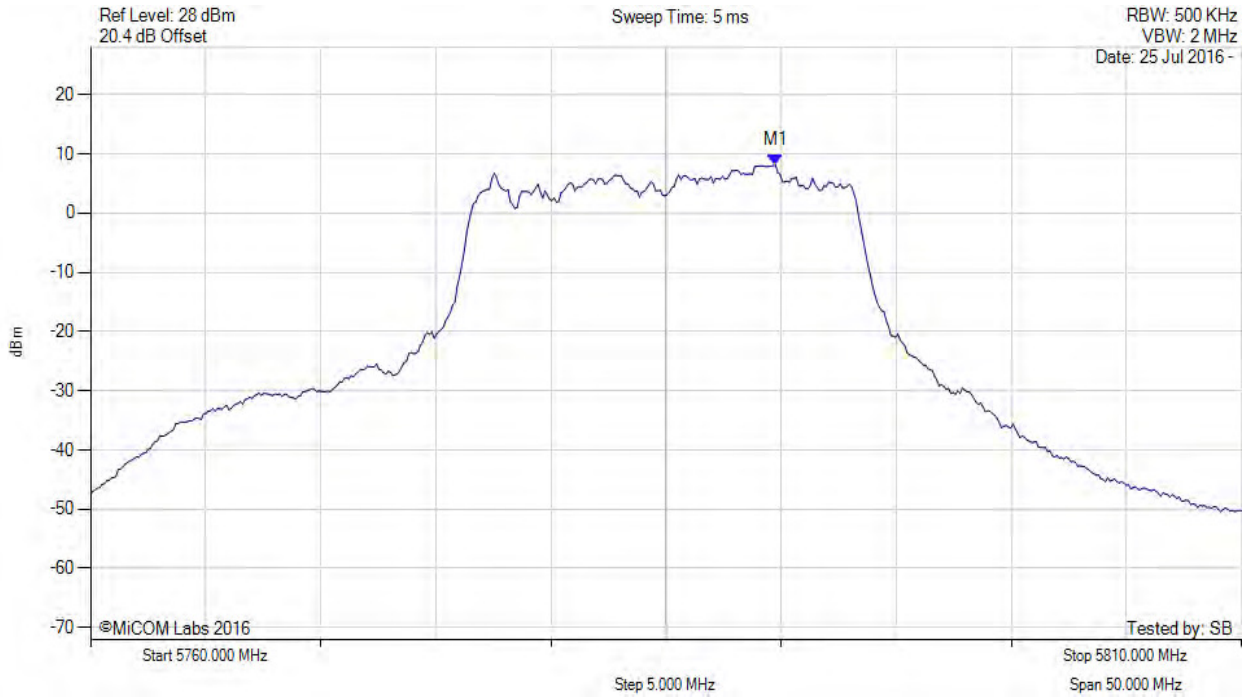
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5783.347 MHz : 6.093 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5785.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



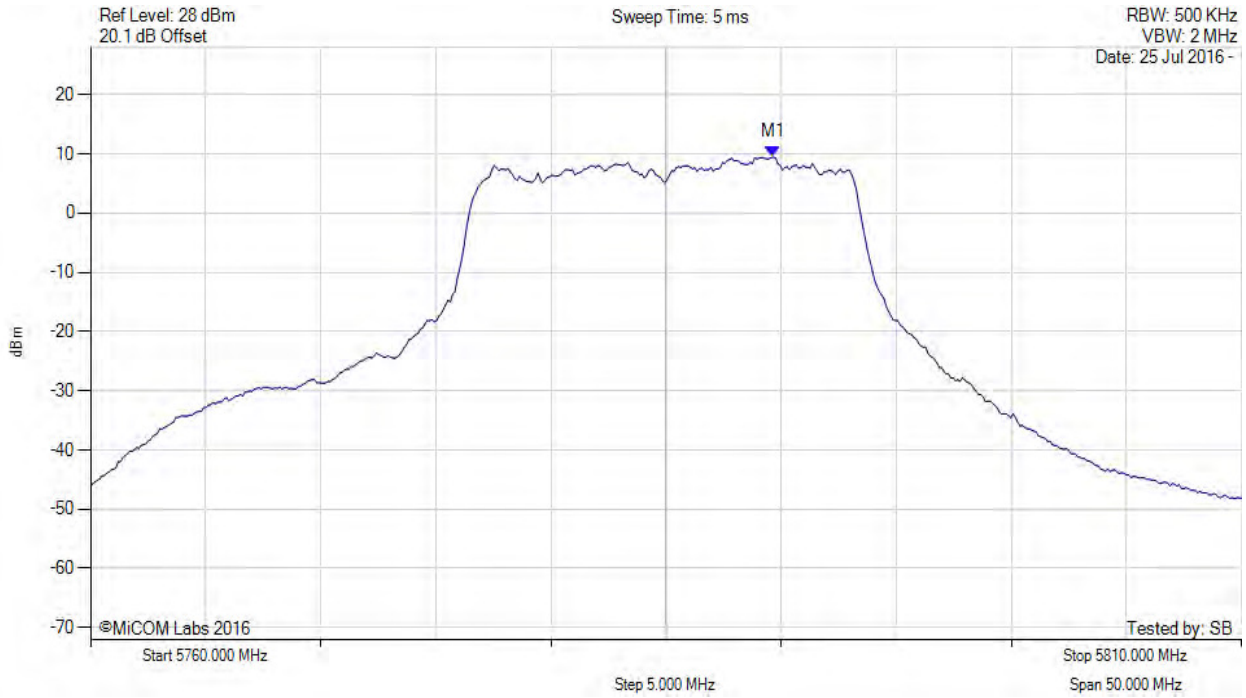
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5789.760 MHz : 8.099 dBm	Channel Frequency: 5785.00 MHz

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5785.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



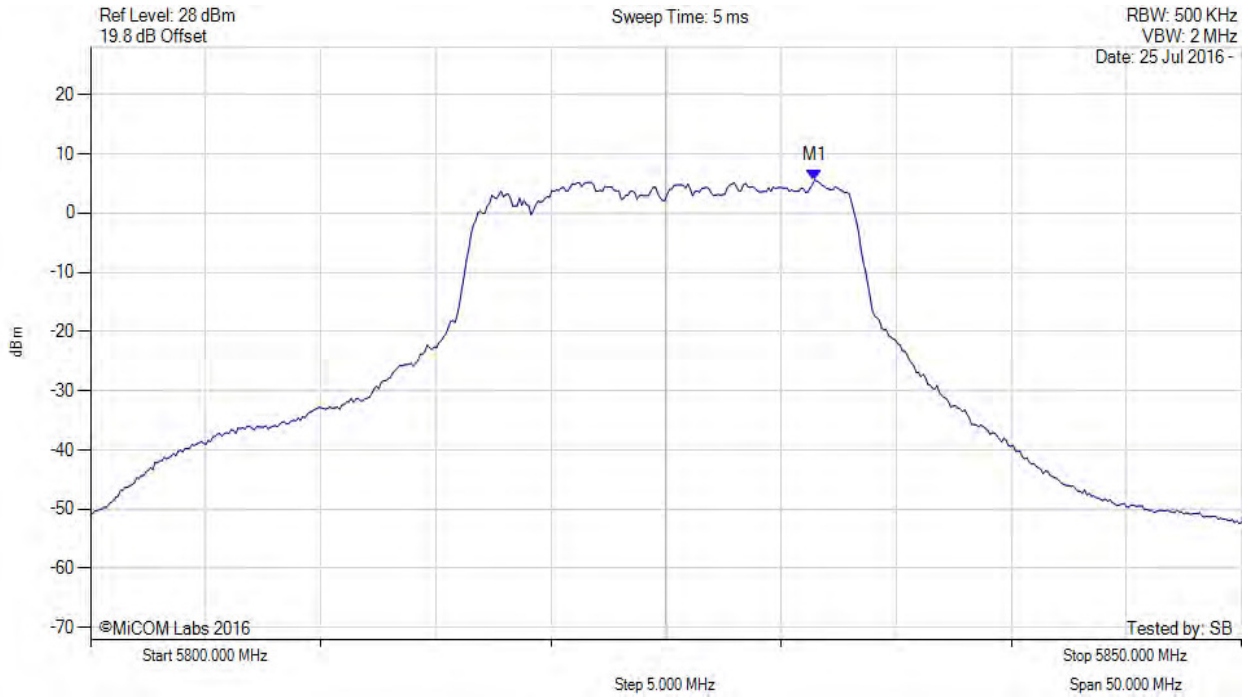
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5789.700 MHz : 9.437 dBm M1 + DCCF : 5789.700 MHz : 9.569 dBm Duty Cycle Correction Factor : +0.13 dB	Limit: ≤ 33.0 dBm Margin: -23.4 dB

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5825.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5831.463 MHz : 5.537 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

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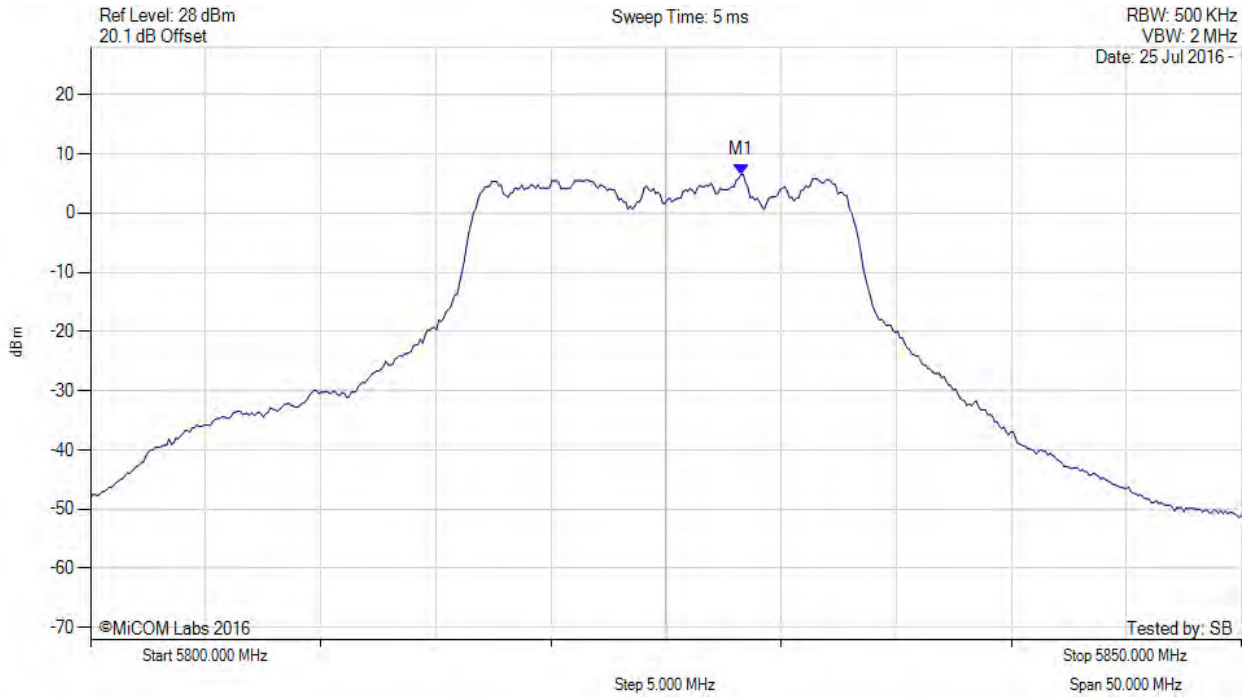
POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5825.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



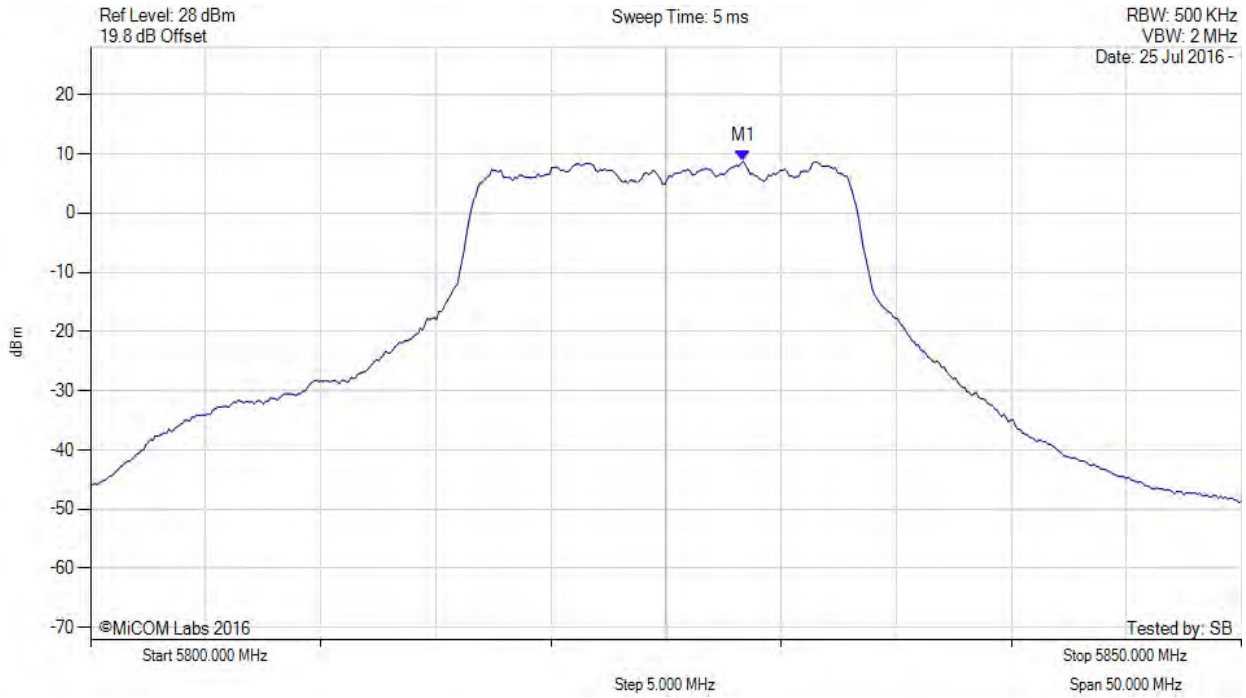
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5828.257 MHz : 6.558 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5825.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



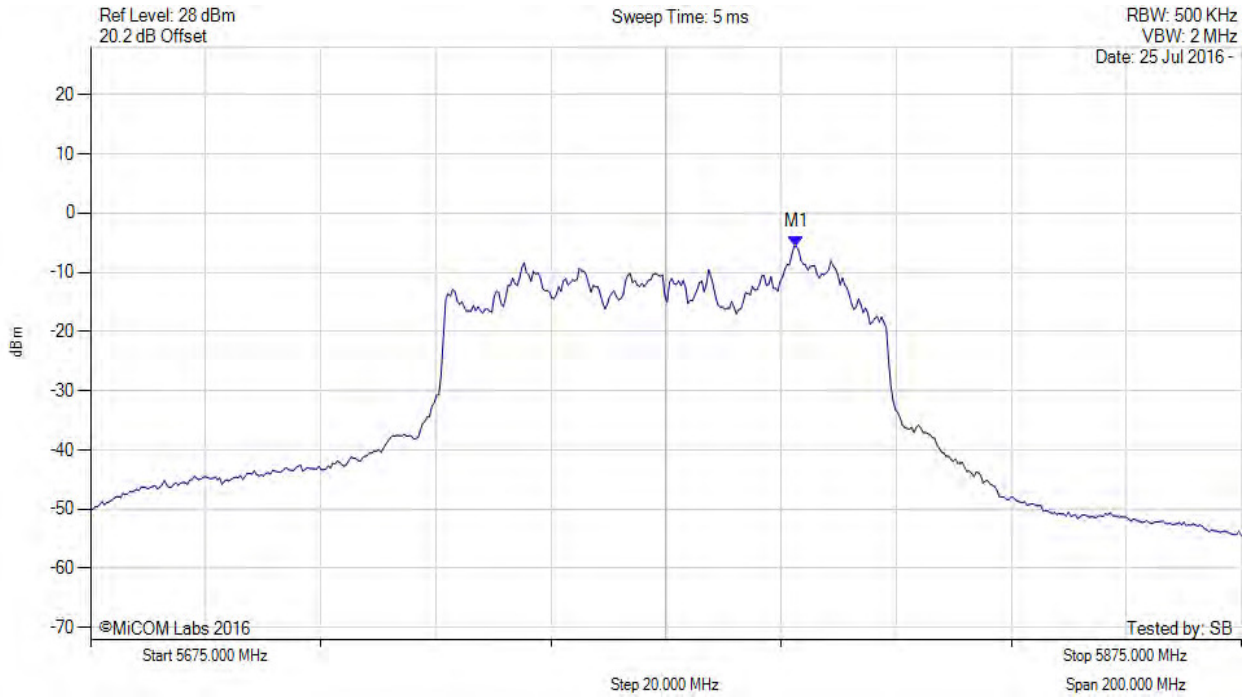
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5828.400 MHz : 8.748 dBm M1 + DCCF : 5828.400 MHz : 8.880 dBm Duty Cycle Correction Factor : +0.13 dB	Limit: ≤ 33.0 dBm Margin: -24.1 dB

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



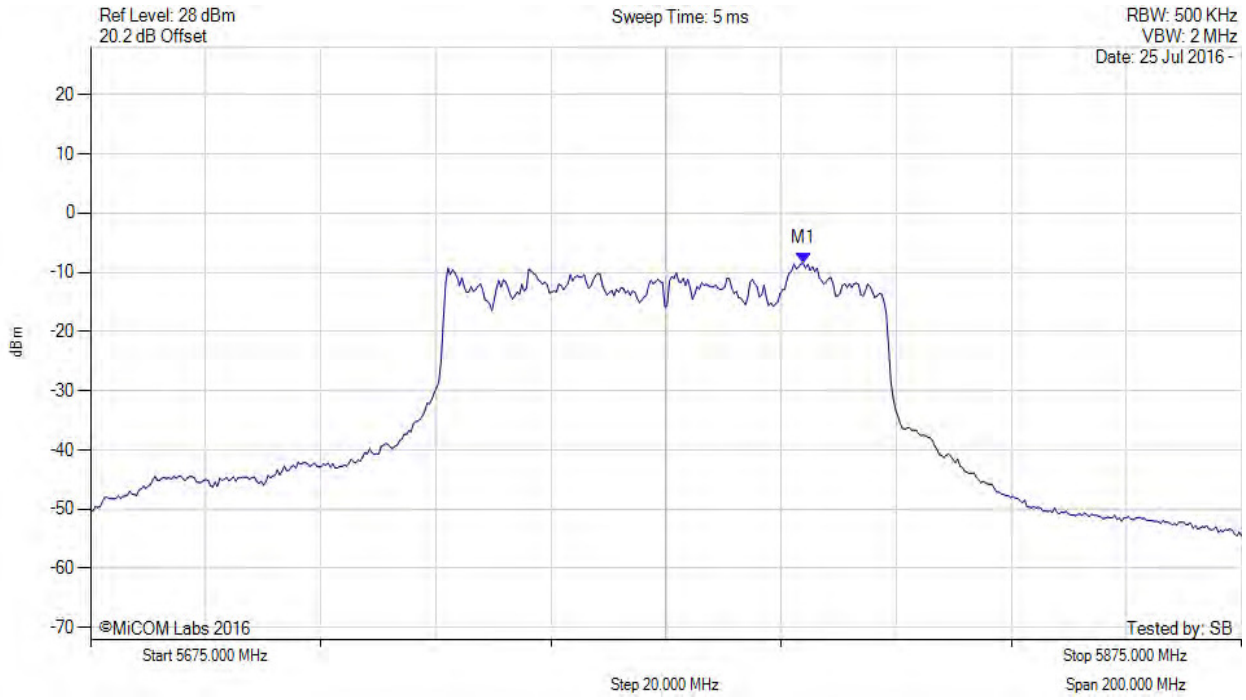
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5797.645 MHz : -5.633 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



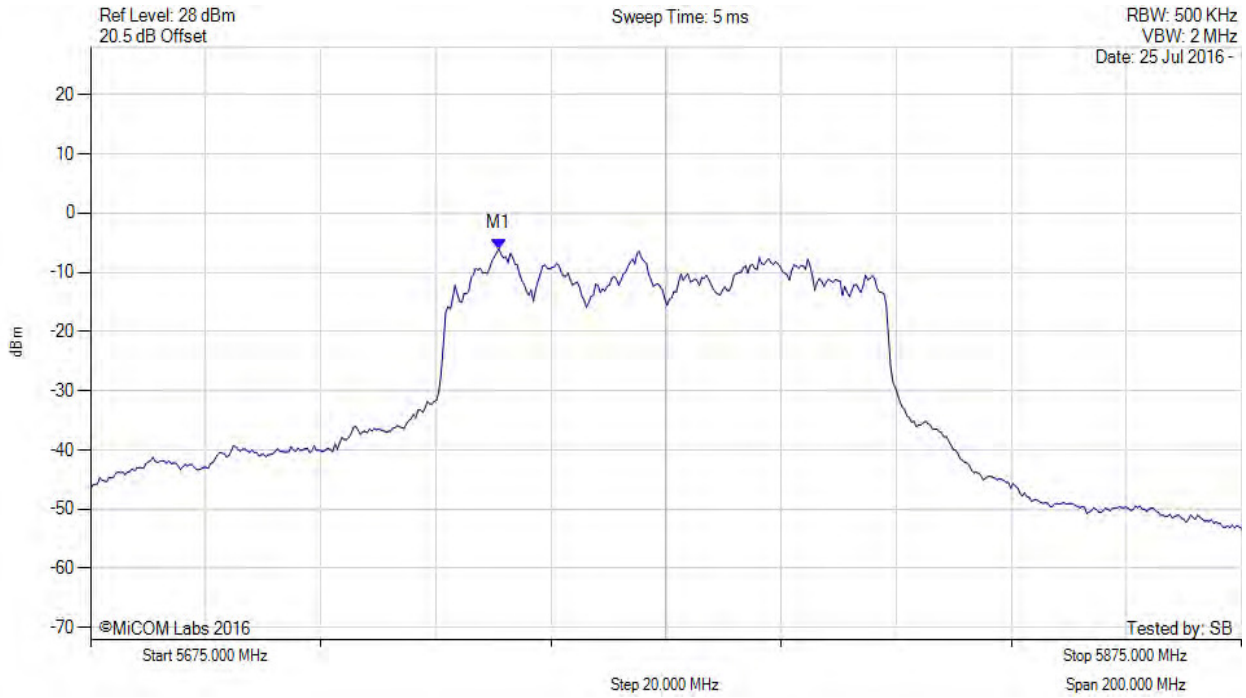
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5798.848 MHz : -8.501 dBm	Channel Frequency: 5775.00 MHz

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



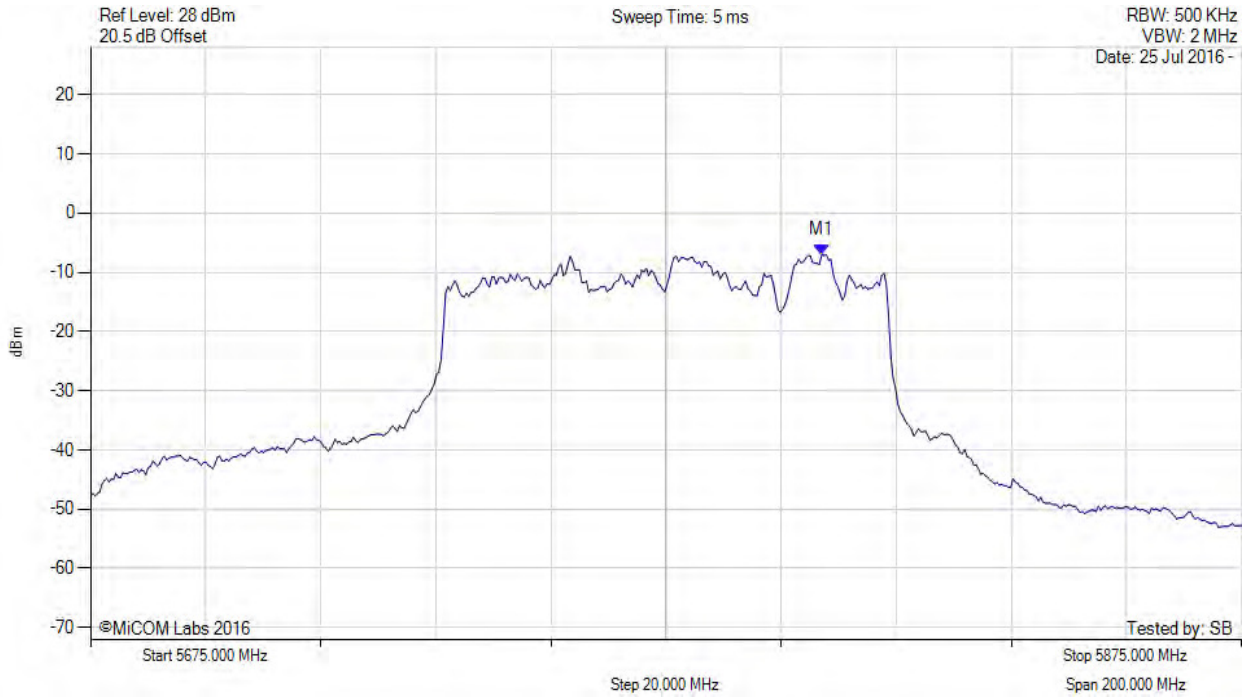
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5745.942 MHz : -6.020 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



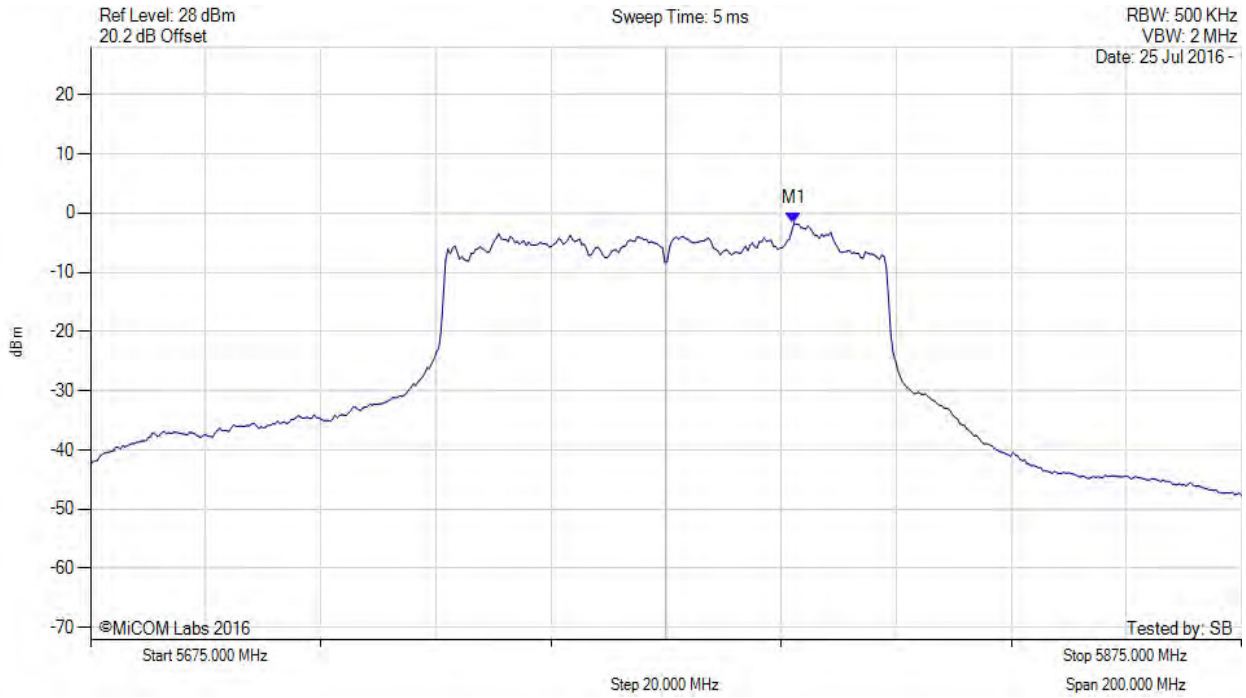
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5802.054 MHz : -7.038 dBm	Channel Frequency: 5775.00 MHz

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11ac-80, Channel: 5775.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



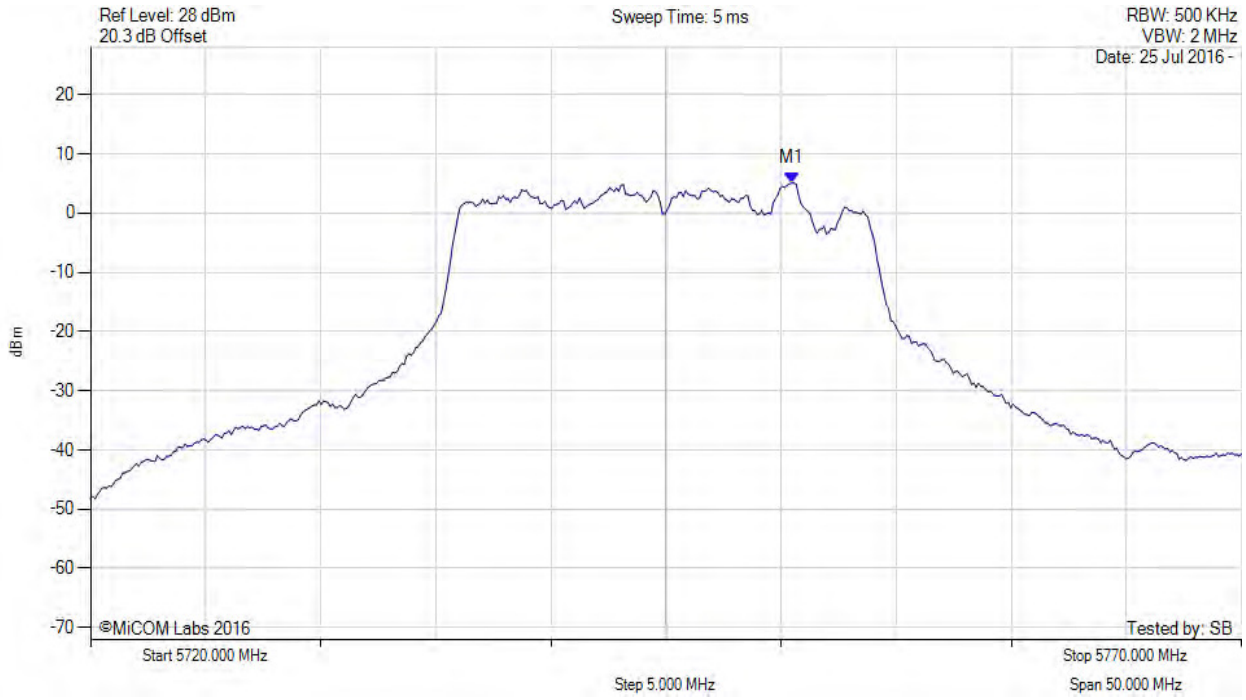
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5797.200 MHz : -1.747 dBm M1 + DCCF : 5797.200 MHz : -0.380 dBm Duty Cycle Correction Factor : +1.37 dB	Limit: ≤ 33.0 dBm Margin: -33.4 dB

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5745.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



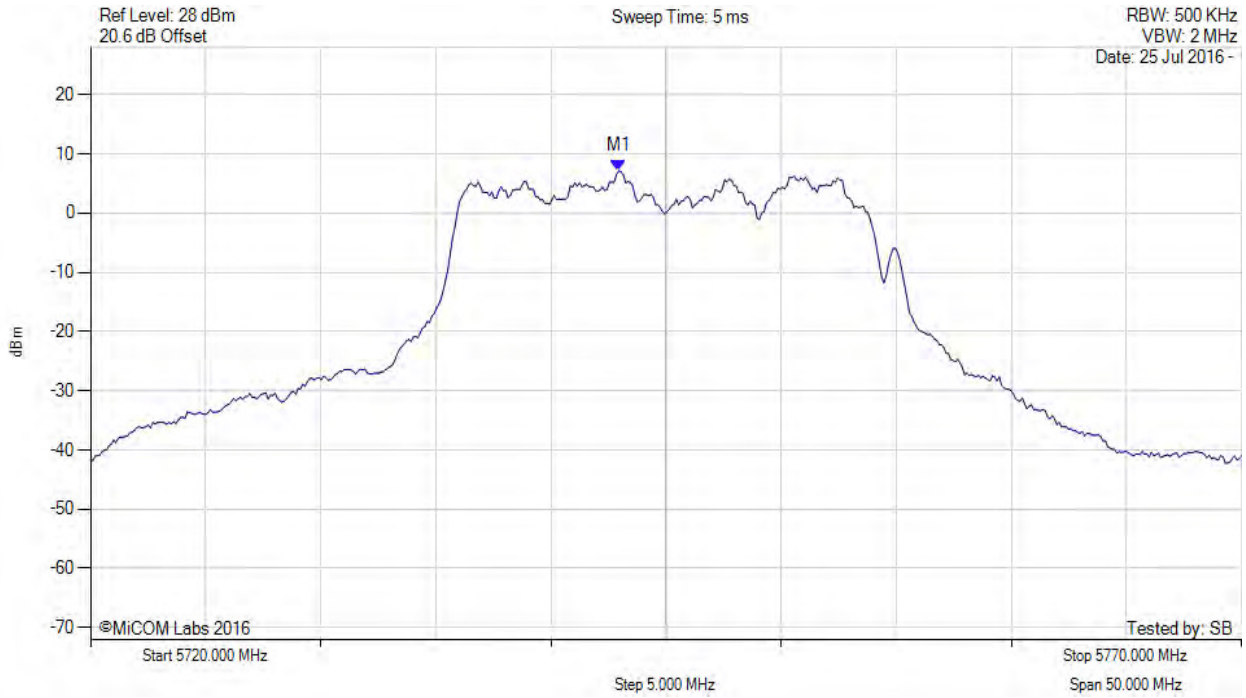
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5750.461 MHz : 5.064 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5745.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



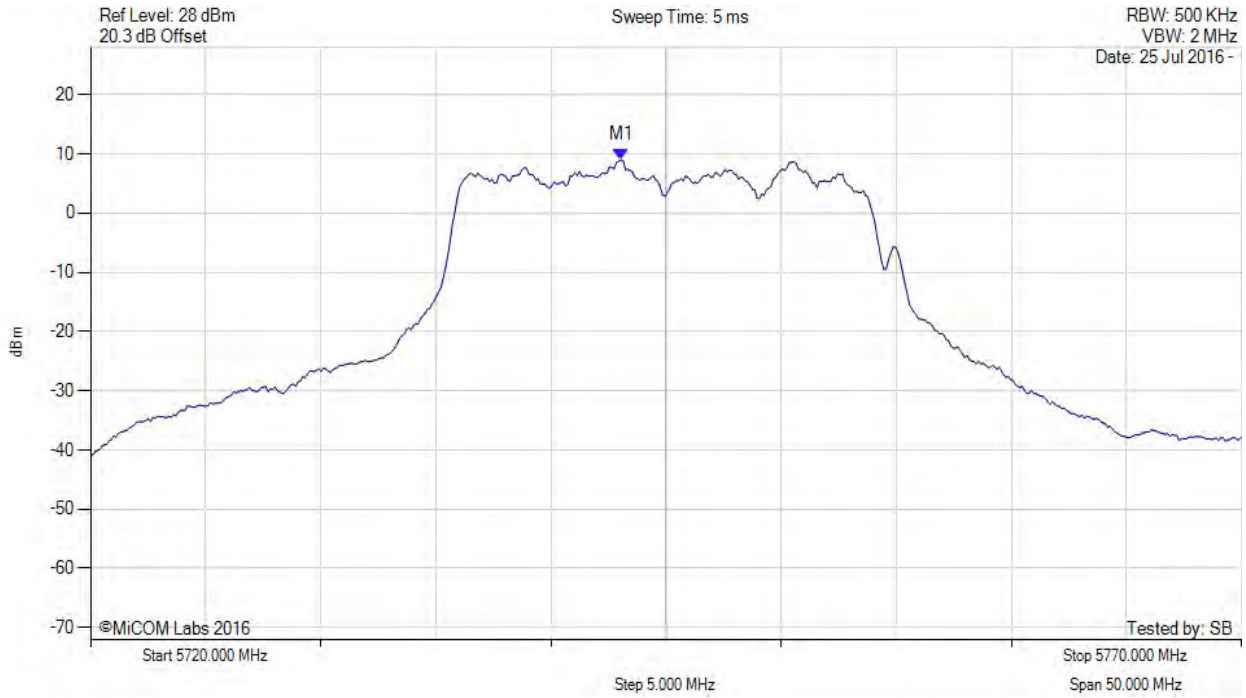
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5742.946 MHz : 7.138 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5745.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



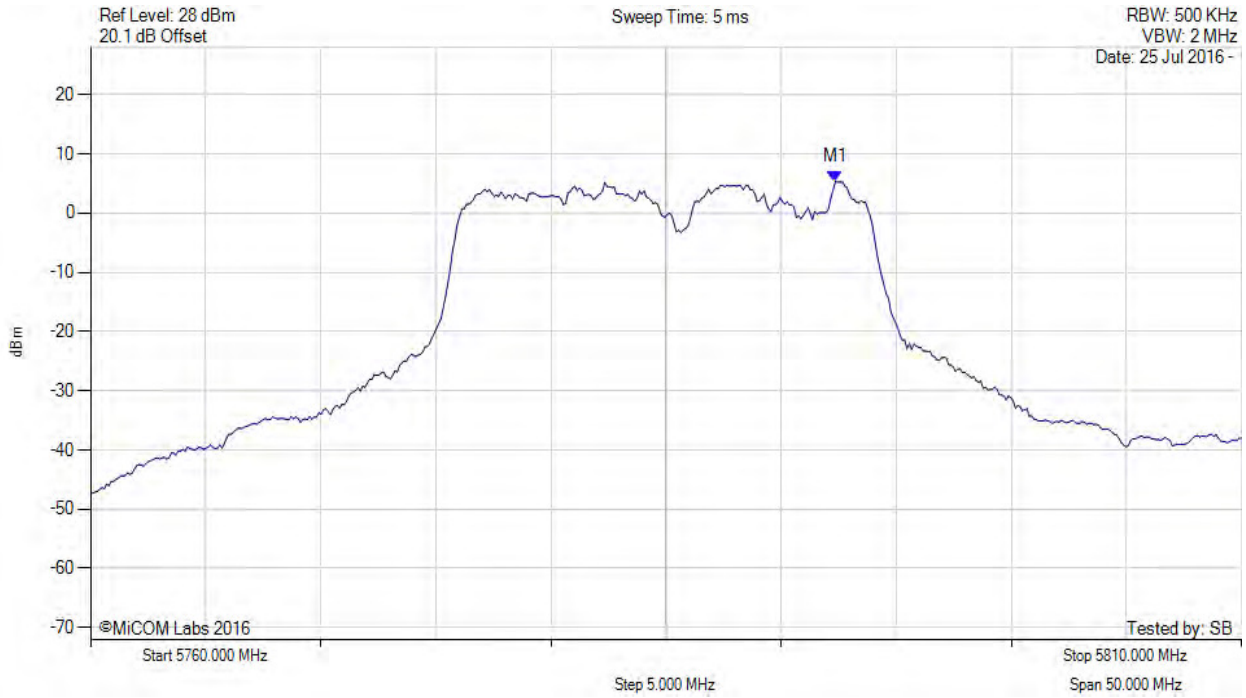
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5743.000 MHz : 8.989 dBm M1 + DCCF : 5743.000 MHz : 9.121 dBm Duty Cycle Correction Factor : +0.13 dB	Limit: ≤ 33.0 dBm Margin: -23.9 dB

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5785.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



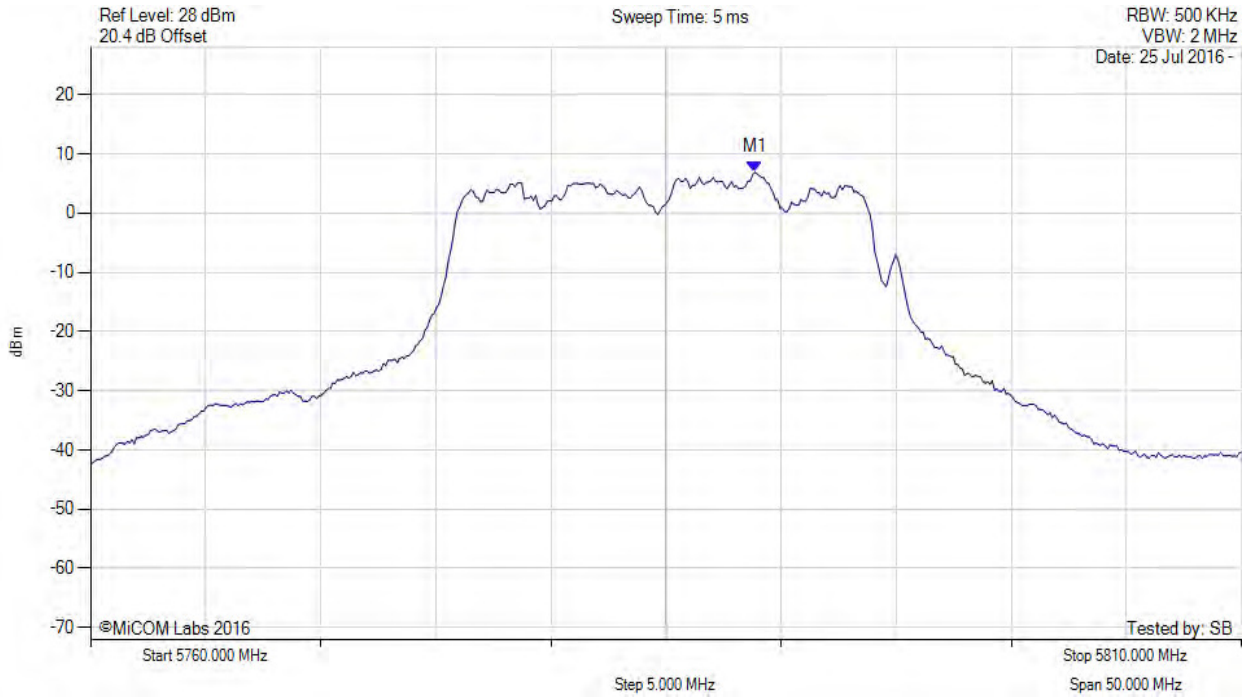
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5792.365 MHz : 5.348 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5785.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



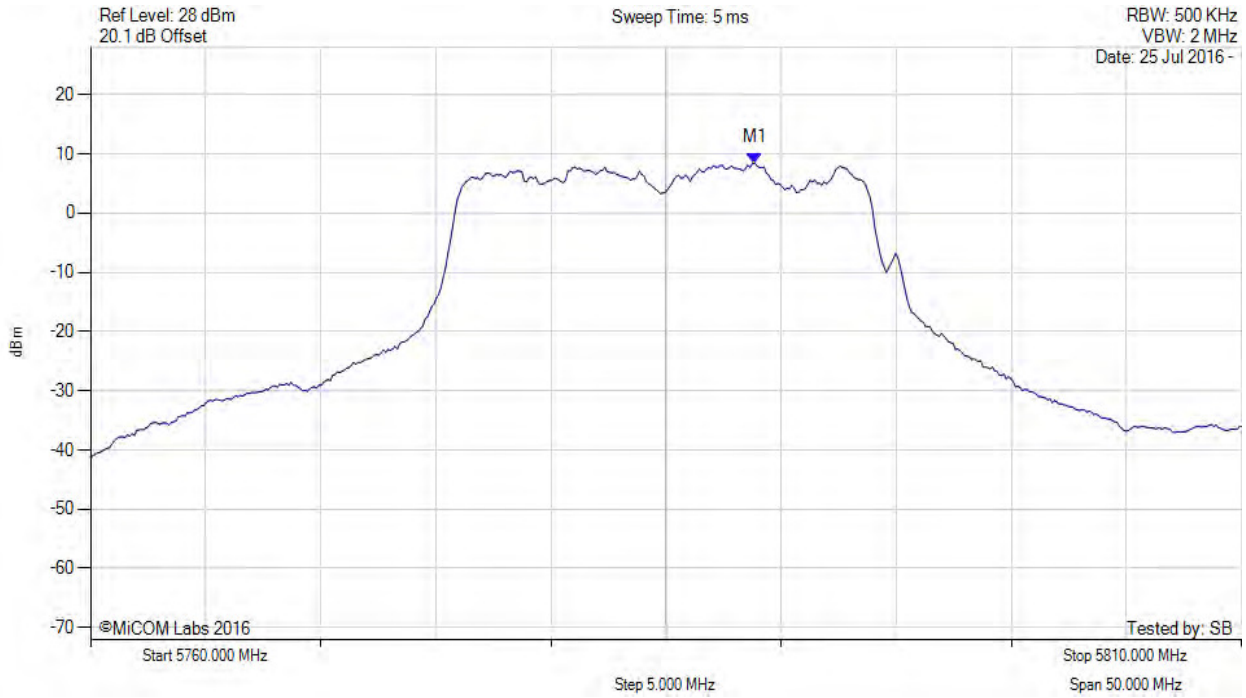
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5788.858 MHz : 6.881 dBm	Channel Frequency: 5785.00 MHz

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5785.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



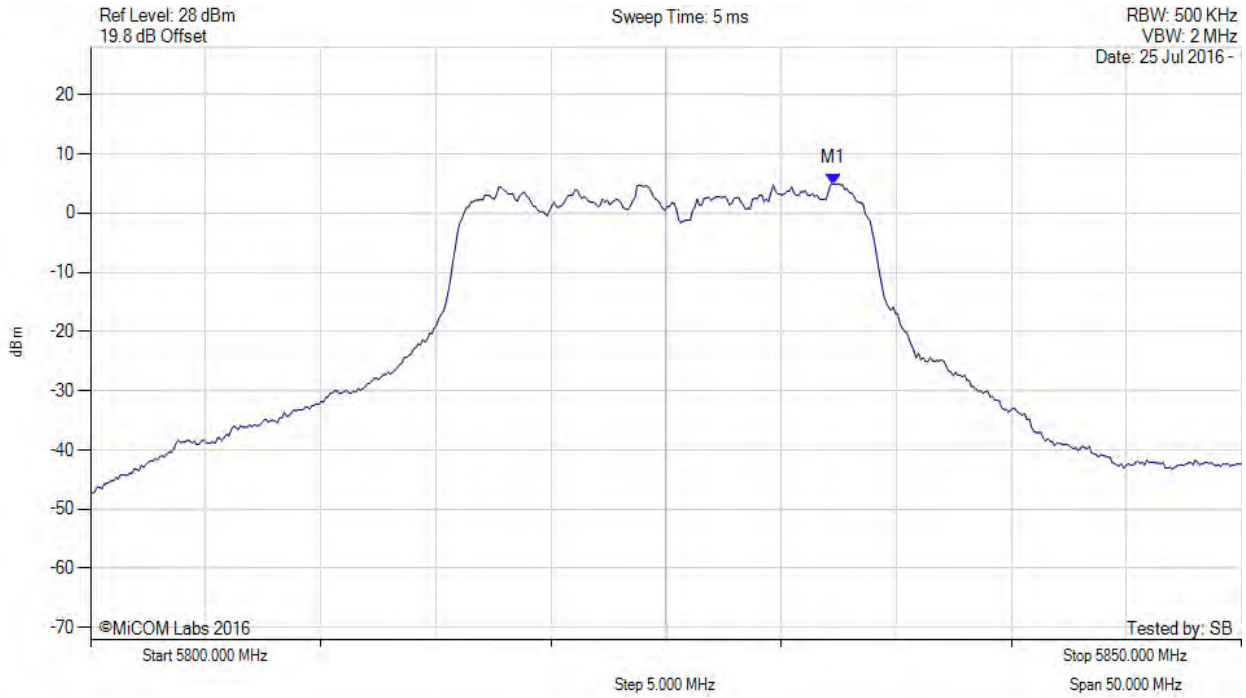
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5788.900 MHz : 8.455 dBm M1 + DCCF : 5788.900 MHz : 8.587 dBm Duty Cycle Correction Factor : +0.13 dB	Limit: ≤ 33.0 dBm Margin: -24.4 dB

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5825.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



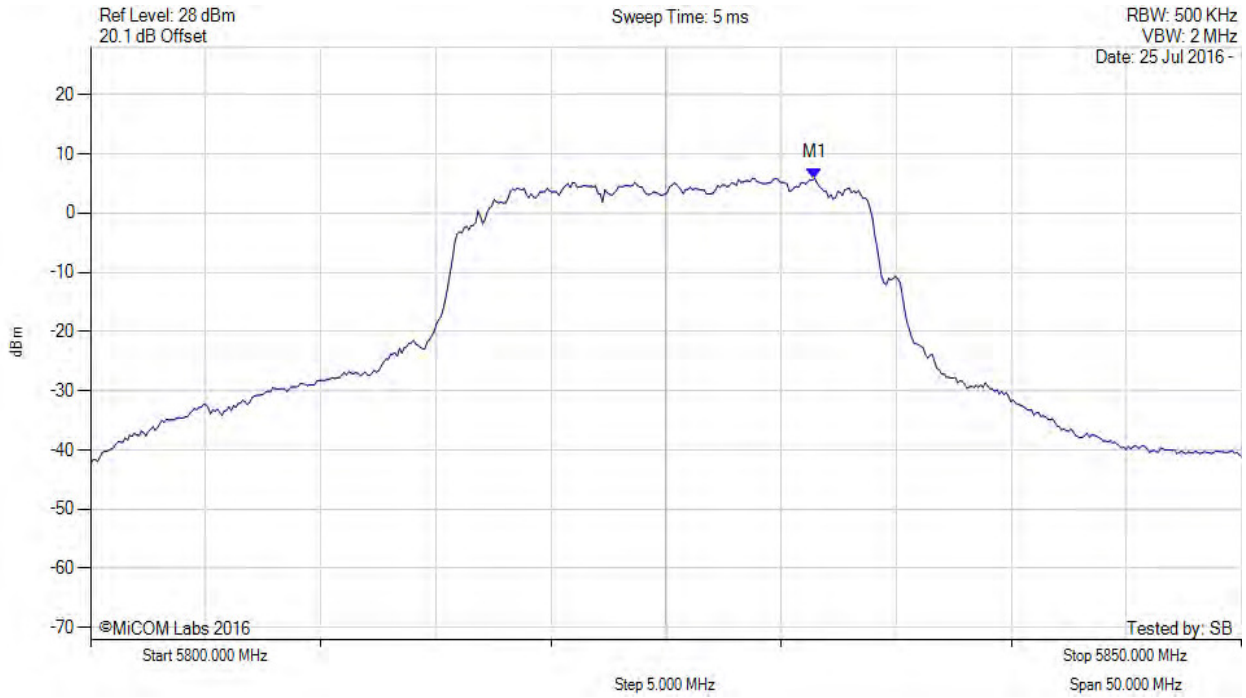
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5832.265 MHz : 4.951 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5825.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



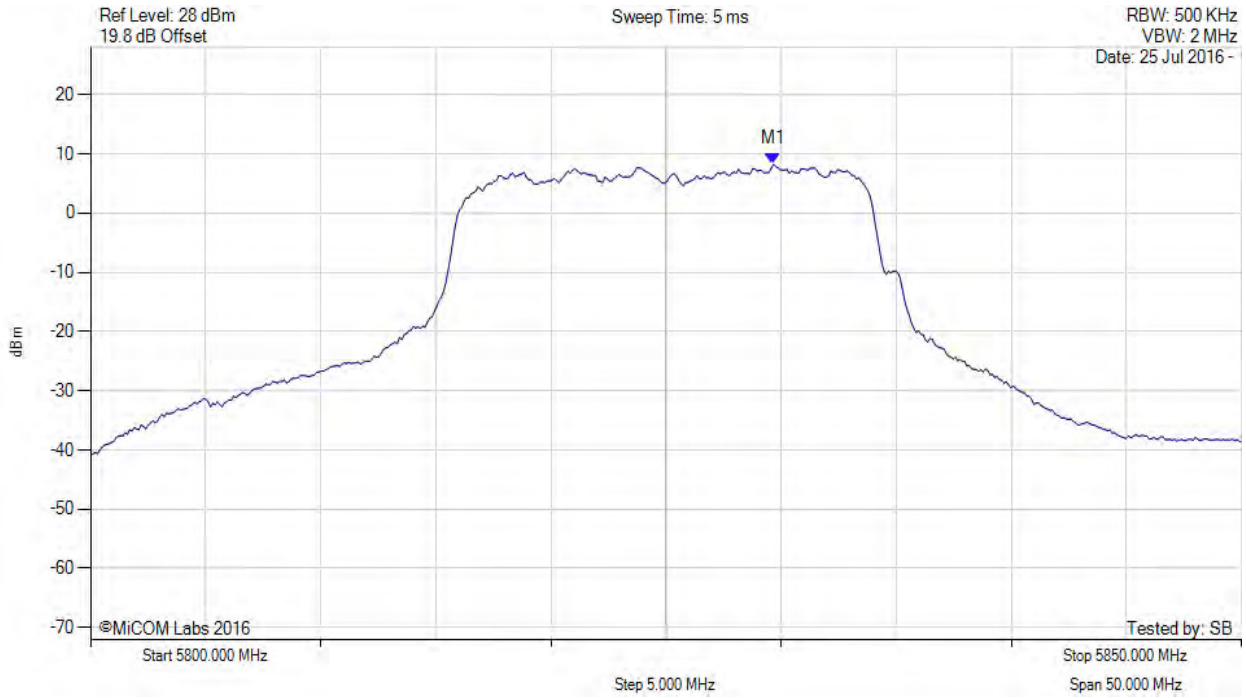
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5831.463 MHz : 5.897 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5825.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



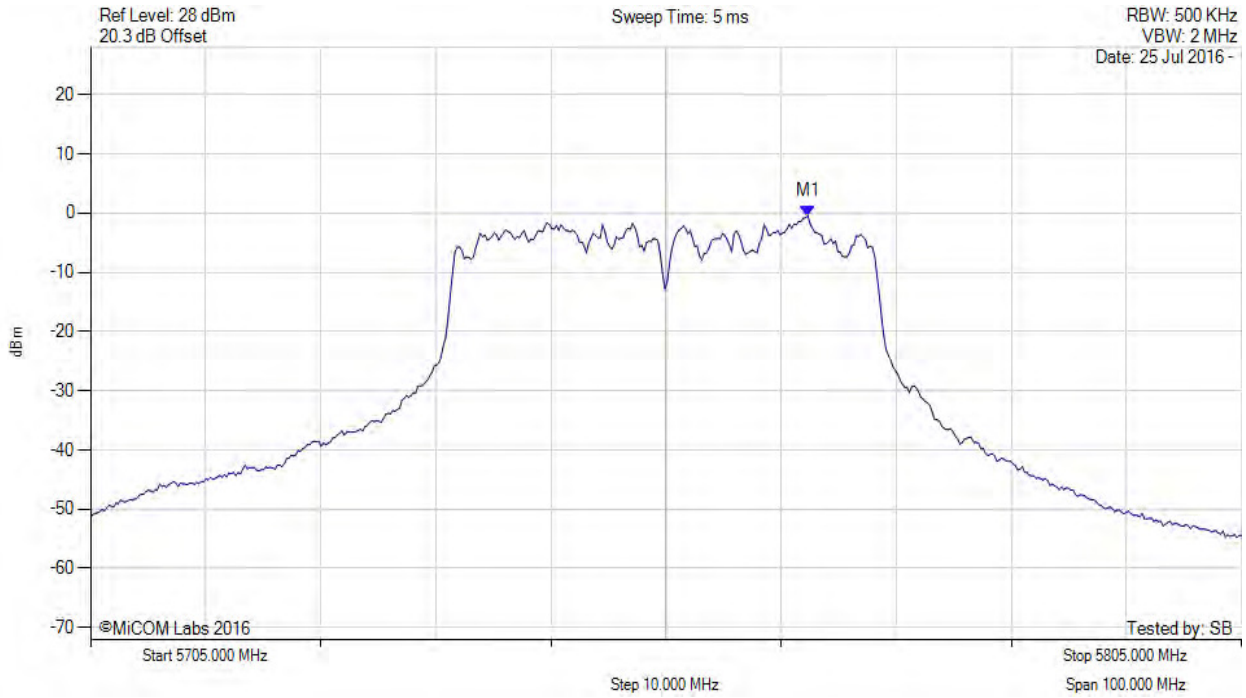
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5829.700 MHz : 8.246 dBm M1 + DCCF : 5829.700 MHz : 8.378 dBm Duty Cycle Correction Factor : +0.13 dB	Limit: ≤ 33.0 dBm Margin: -24.6 dB

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5755.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



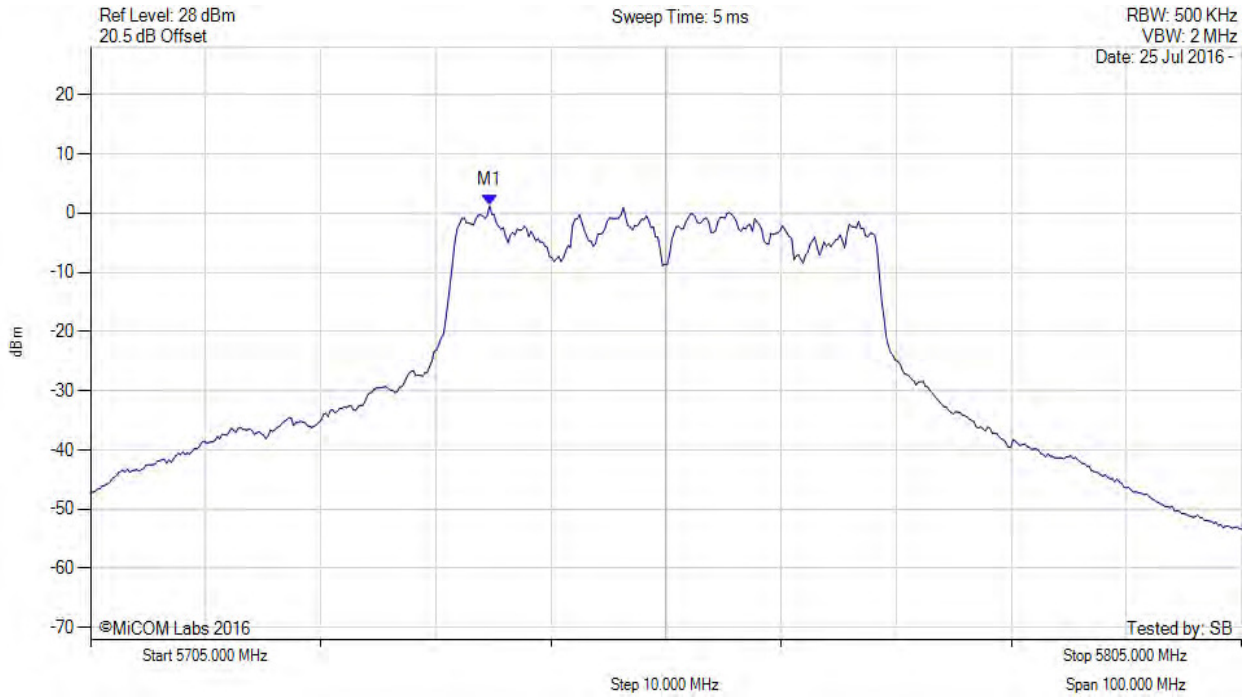
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5767.325 MHz : -0.441 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5755.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



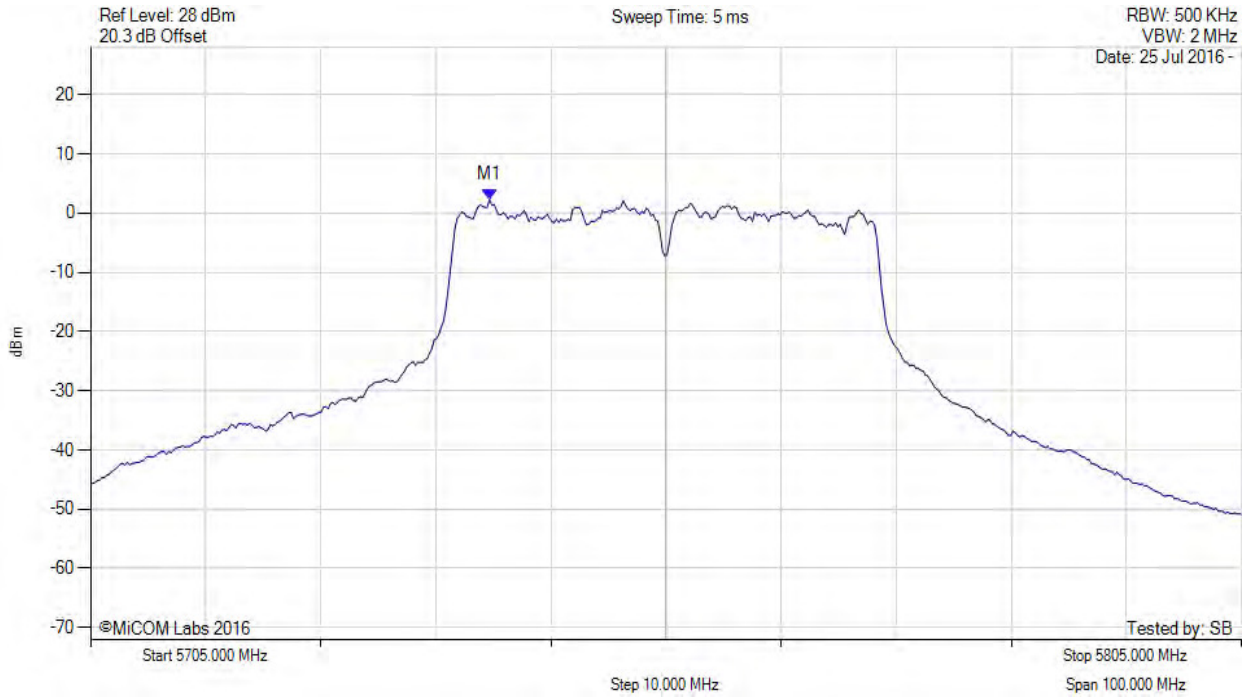
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5739.669 MHz : 1.253 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5755.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



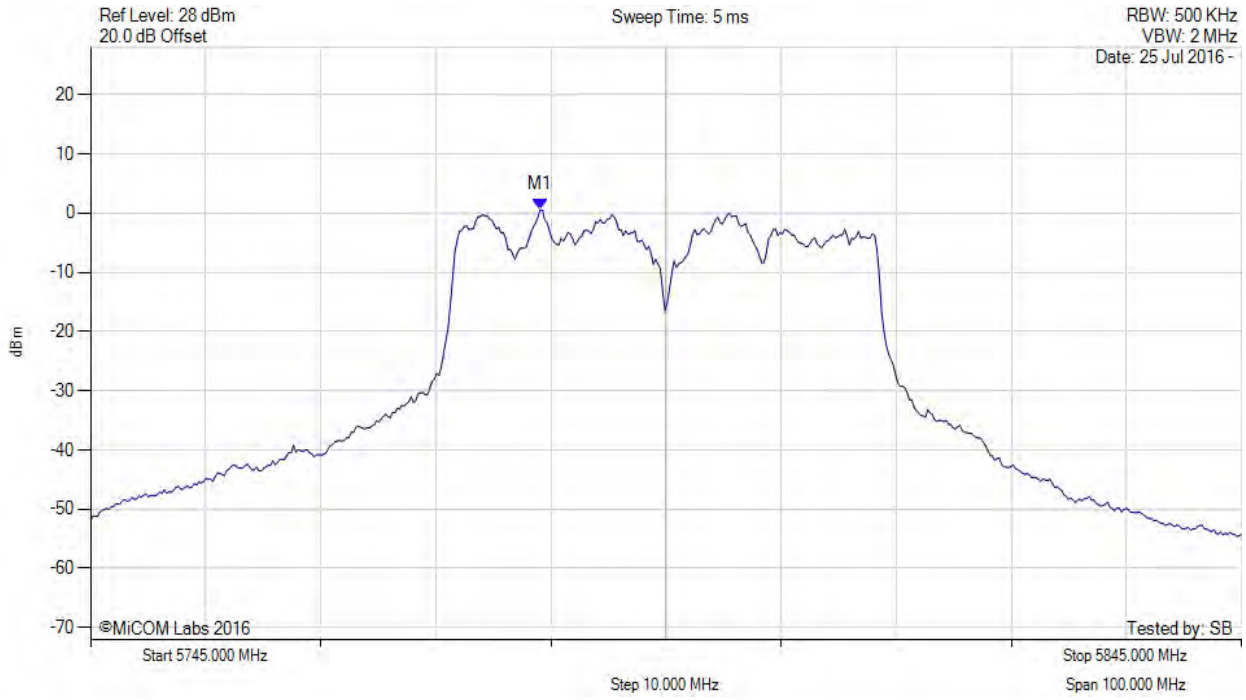
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5739.700 MHz : 2.309 dBm M1 + DCCF : 5739.700 MHz : 2.532 dBm Duty Cycle Correction Factor : +0.22 dB	Limit: ≤ 33.0 dBm Margin: -30.5 dB

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5795.00 MHz, Chain a, Temp: 20, Voltage: 28 Vdc



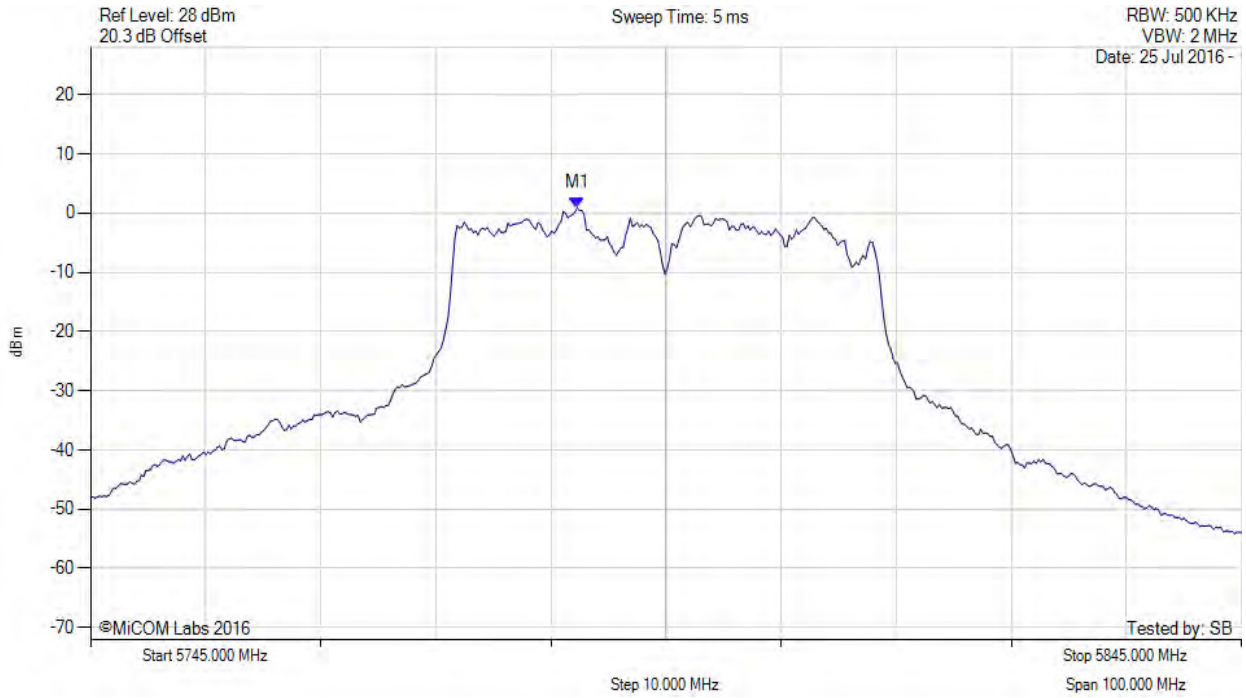
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5784.078 MHz : 0.562 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5795.00 MHz, Chain b, Temp: 20, Voltage: 28 Vdc



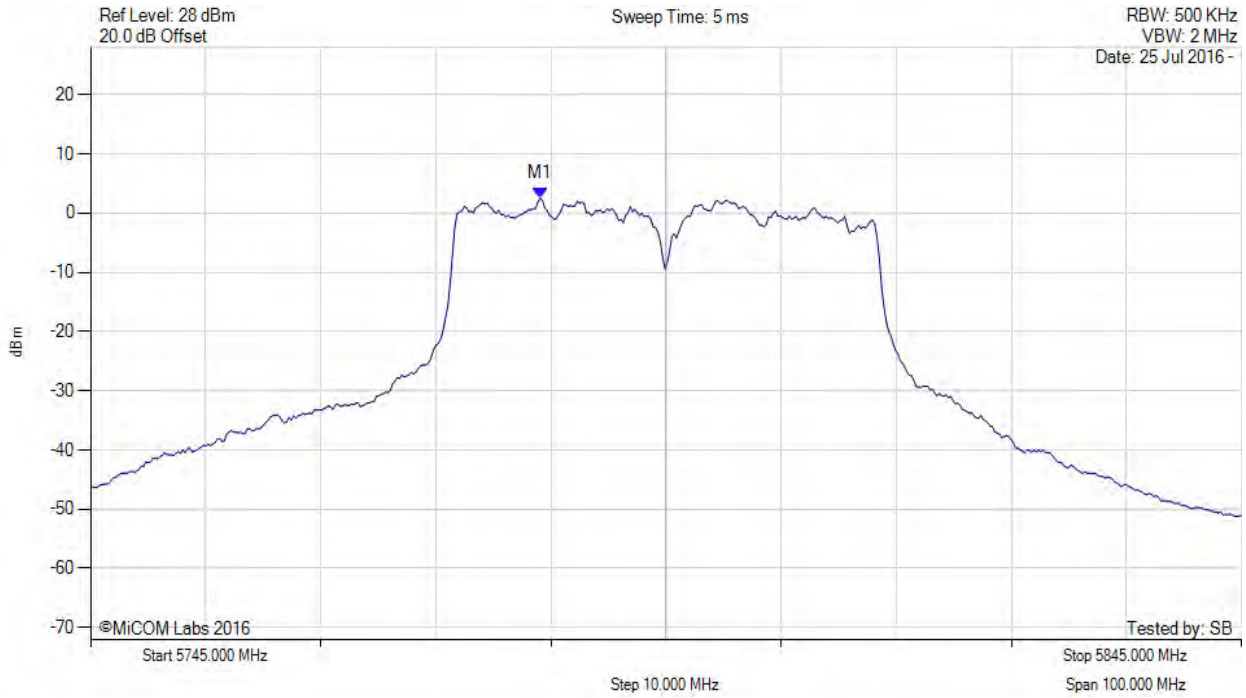
Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5787.285 MHz : 0.959 dBm	Limit: ≤ 30.000 dBm

back to matrix FCC 15.407

back to matrix IC RSS-247

POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5795.00 MHz, SUM, Temp: 20, Voltage: 28 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5784.100 MHz : 2.524 dBm M1 + DCCF : 5784.100 MHz : 2.747 dBm Duty Cycle Correction Factor : +0.22 dB	Limit: ≤ 33.0 dBm Margin: -30.3 dB

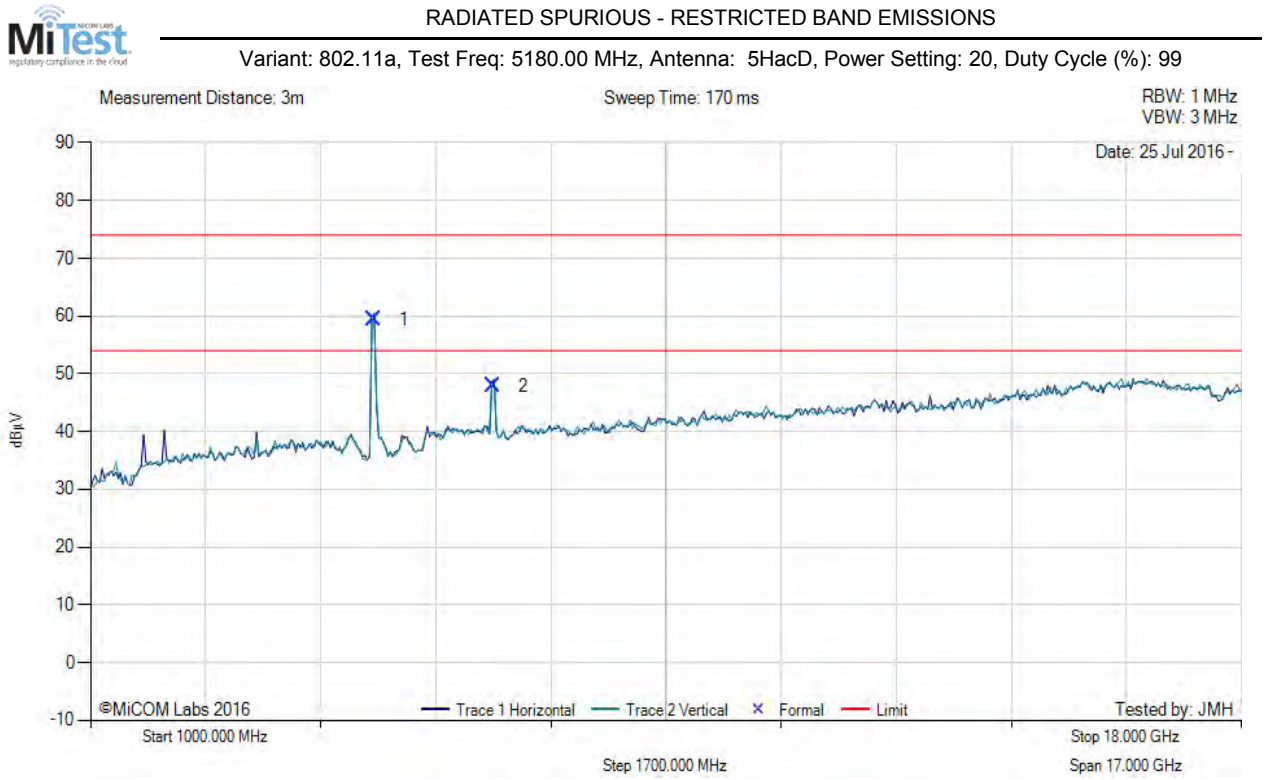
back to matrix FCC 15.407

back to matrix IC RSS-247

A.3. Radiated

A.3.1. Restricted Band Emissions

A.3.1.1. MikroTik 5HacD



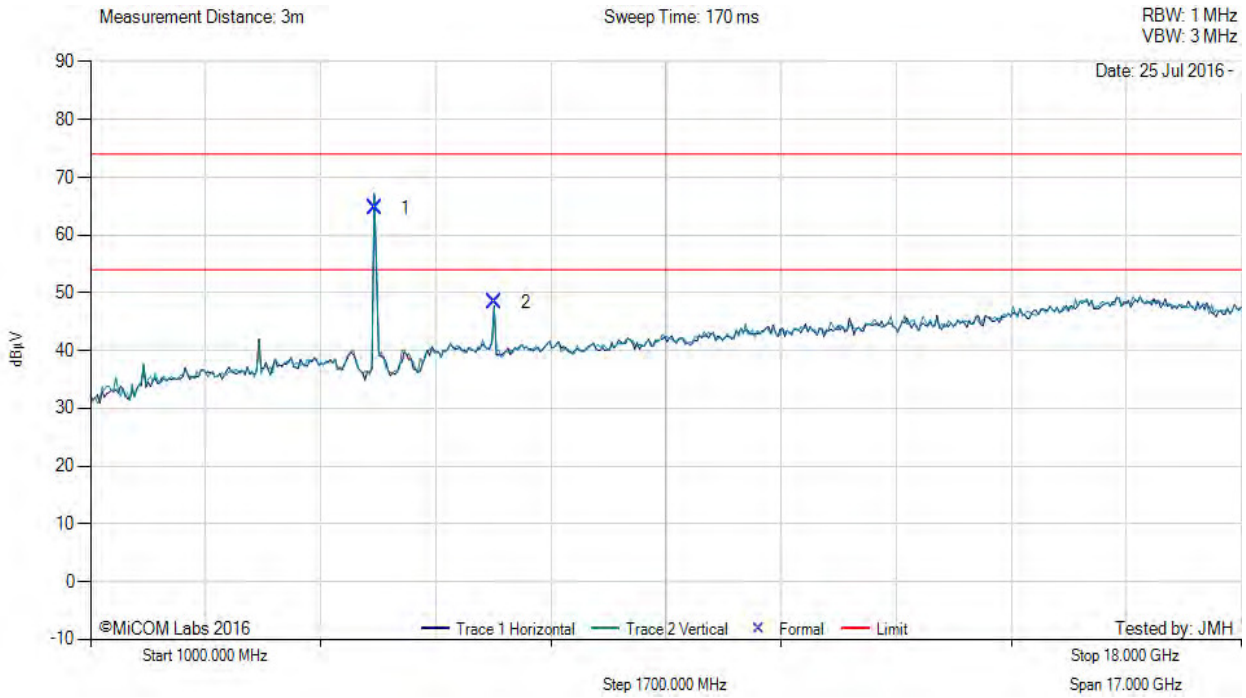
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5182.40	67.19	3.69	-11.50	59.38	Fundamental	Horizontal	101	1	--	--	
2	6946.55	51.22	4.13	-7.47	47.88	Peak (NRB)	Horizontal	101	1	--	--	Pass

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

back to matrix

RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS

Variant: 802.11a, Test Freq: 5200.00 MHz, Antenna: 5HacD, Power Setting: 20, Duty Cycle (%): 99



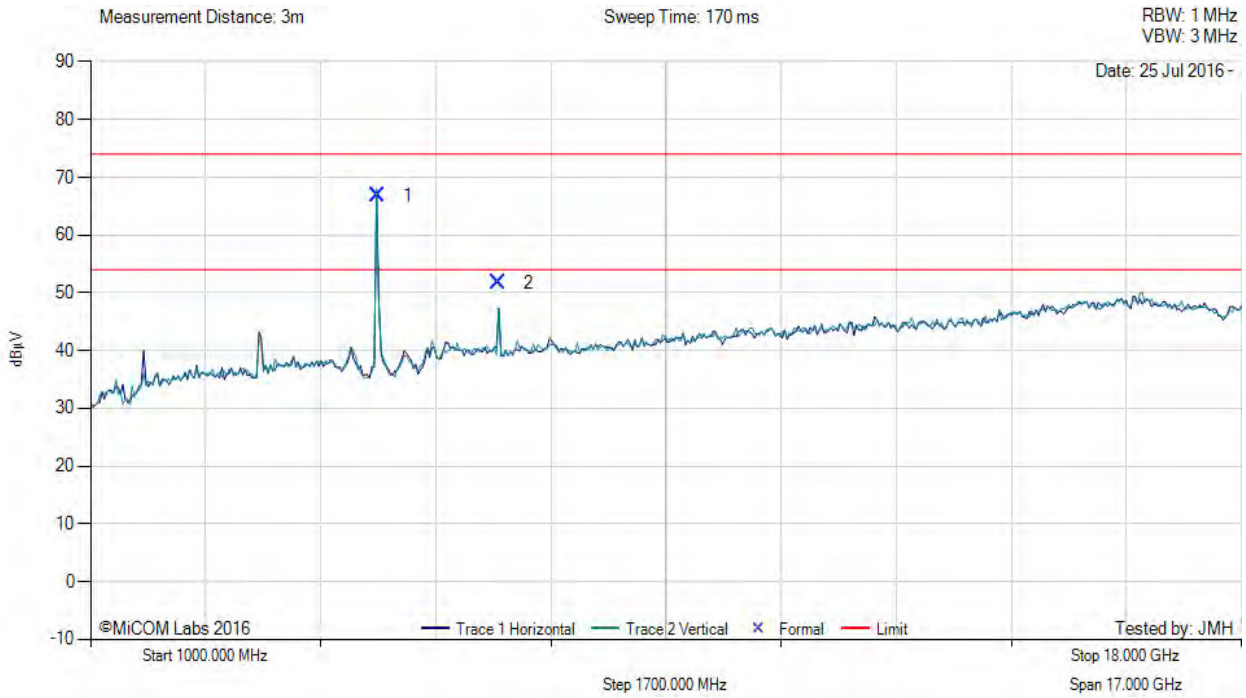
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5203.01	72.51	3.65	-11.45	64.71	Fundamental	Horizontal	101	0	--	--	
2	6973.25	51.68	4.14	-7.45	48.37	Peak (NRB)	Horizontal	101	0	--	--	Pass

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

back to matrix

RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS

Variant: 802.11a, Test Freq: 5240.00 MHz, Antenna: 5HacD, Power Setting: 20, Duty Cycle (%): 99



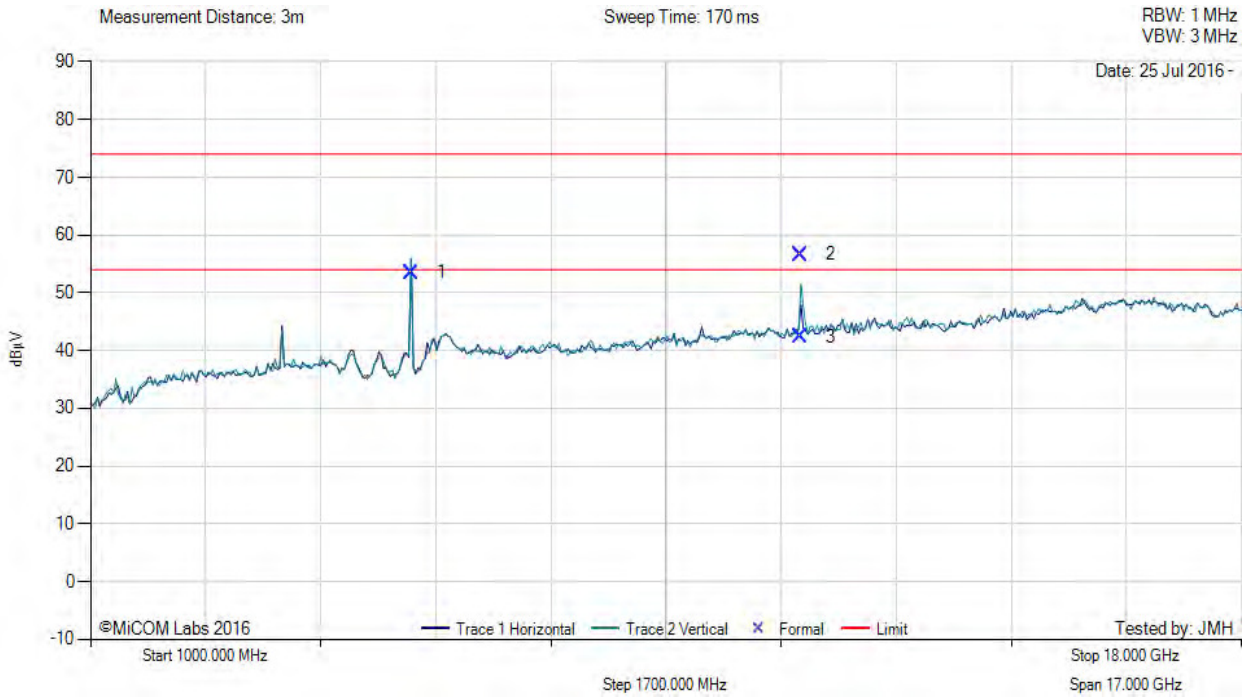
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5233.63	74.62	3.63	-11.38	66.87	Fundamental	Vertical	150	1	--	--	
2	7026.64	54.88	4.16	-7.39	51.65	Peak (NRB)	Horizontal	150	1	--	--	Pass

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

back to matrix

RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS

Variant: 802.11a, Test Freq: 5745.00 MHz, Antenna: 5HacD, Power Setting: 30, Duty Cycle (%): 99



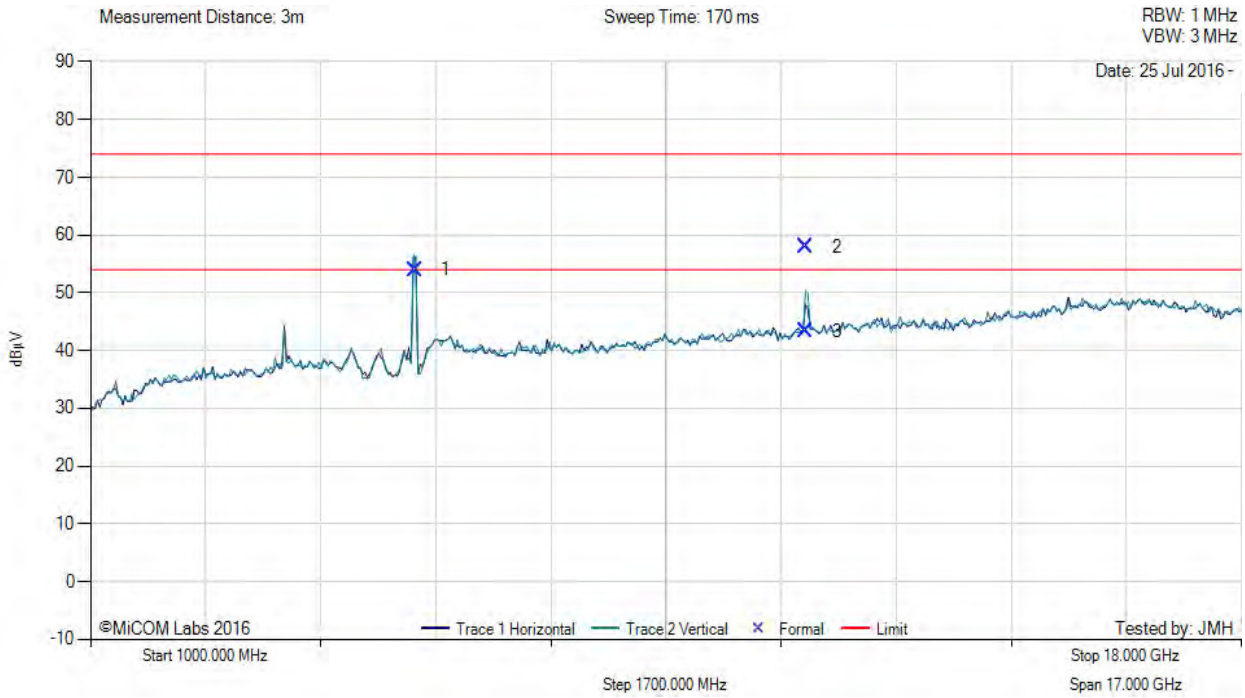
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5739.92	60.36	3.83	-10.67	53.52	Fundamental	Vertical	166	1	--	--	
2	11492.55	56.04	5.44	-4.84	56.64	Max Peak	Vertical	192	343	74.0	-17.4	Pass
3	11492.55	41.81	5.44	-4.84	42.41	Max Avg	Vertical	192	343	54.0	-11.6	Pass

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

back to matrix

RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS

Variant: 802.11a, Test Freq: 5785.00 MHz, Antenna: 5HacD, Power Setting: 30, Duty Cycle (%): 99



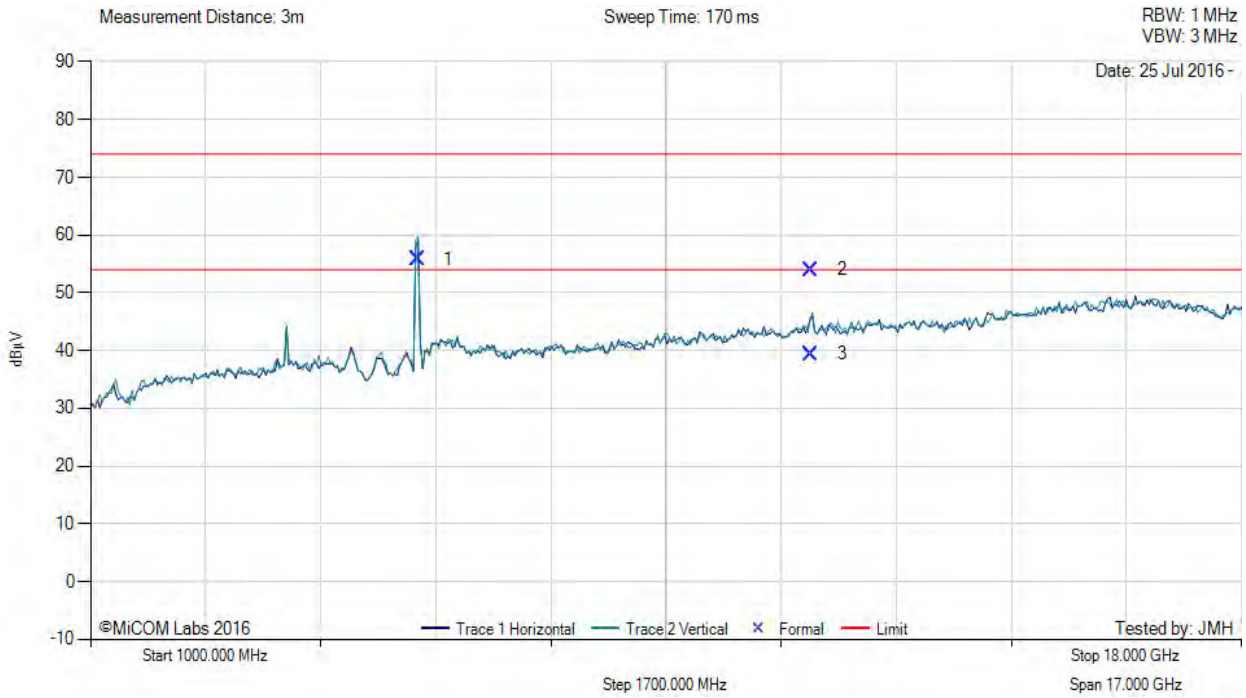
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5791.82	60.61	3.78	-10.40	53.99	Fundamental	Vertical	200	1	--	--	
2	11571.55	57.09	5.42	-4.63	57.88	Max Peak	Vertical	197	345	74.0	-16.1	Pass
3	11571.55	42.54	5.42	-4.63	43.33	Max Avg	Vertical	197	345	54.0	-10.7	Pass

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

back to matrix

RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS

Variant: 802.11a, Test Freq: 5825.00 MHz, Antenna: 5HacD, Power Setting: 30, Duty Cycle (%): 99



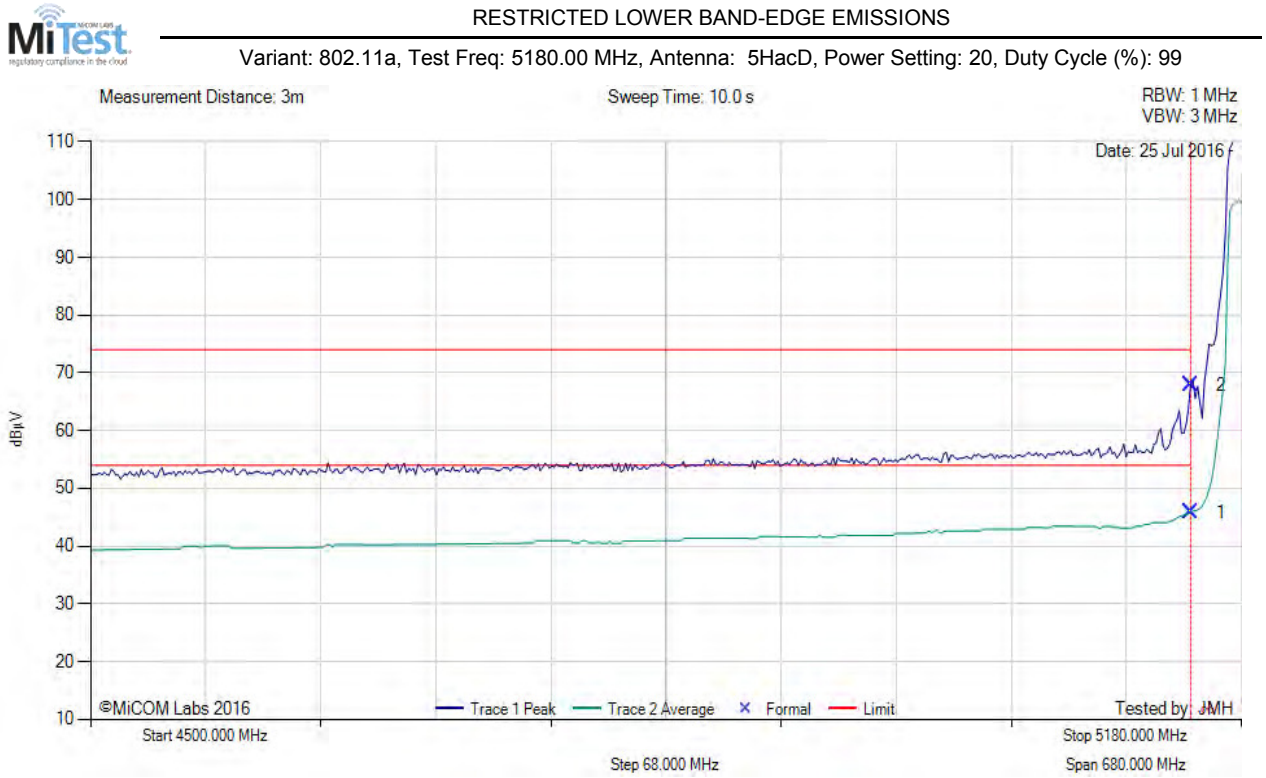
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5827.42	62.23	3.84	-10.24	55.83	Fundamental	Vertical	200	1	--	--	
2	11646.48	52.99	5.46	-4.47	53.98	Max Peak	Vertical	191	344	74.0	-20.0	Pass
3	11646.48	38.38	5.46	-4.47	39.37	Max Avg	Vertical	191	344	54.0	-14.6	Pass

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

back to matrix

A.3.2. Restricted Band-Edge Emissions

A.3.2.2. MikroTik 5HacD



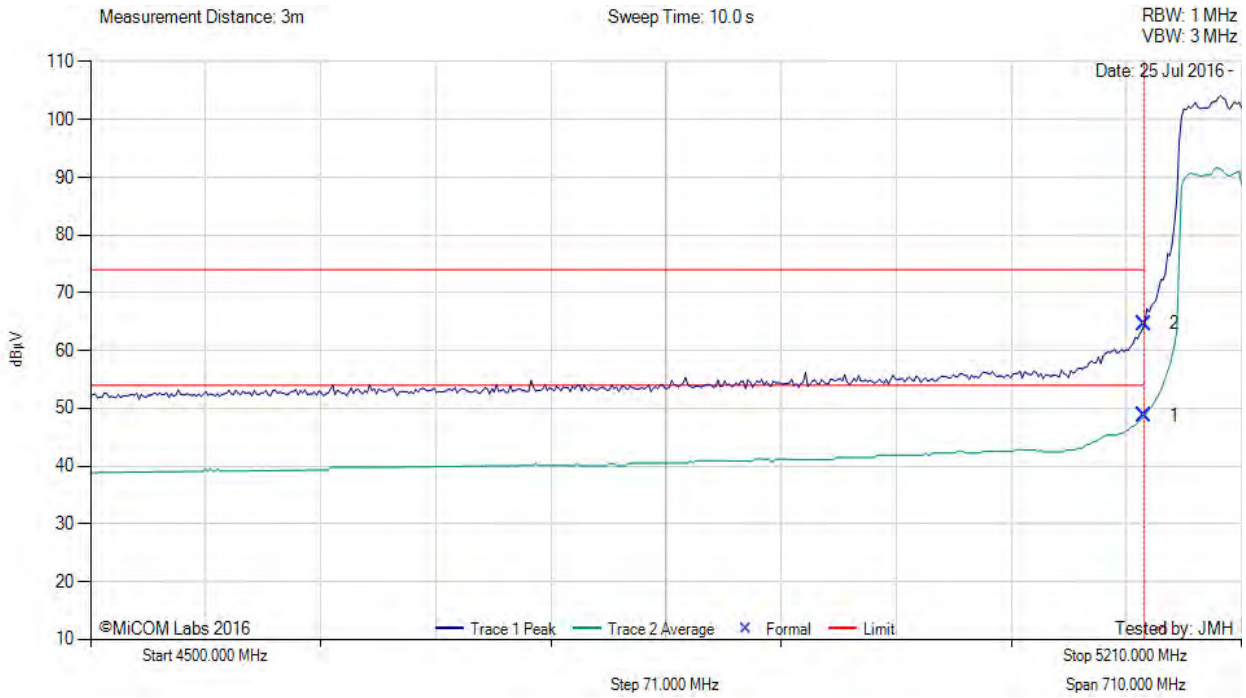
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5150.00	8.08	3.67	34.11	45.86	Max Avg	Horizontal	165	358	54.0	-8.1	Pass
2	5150.00	30.16	3.67	34.11	67.94	Max Peak	Horizontal	165	358	74.0	-6.1	Pass
3	5150.00	--	--	--	--	Restricted-Band	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

back to matrix

RESTRICTED LOWER BAND-EDGE EMISSIONS

Variant: 802.11ac-80, Test Freq: 5210.00 MHz, Antenna: 5HacD, Power Setting: 20, Duty Cycle (%): 99



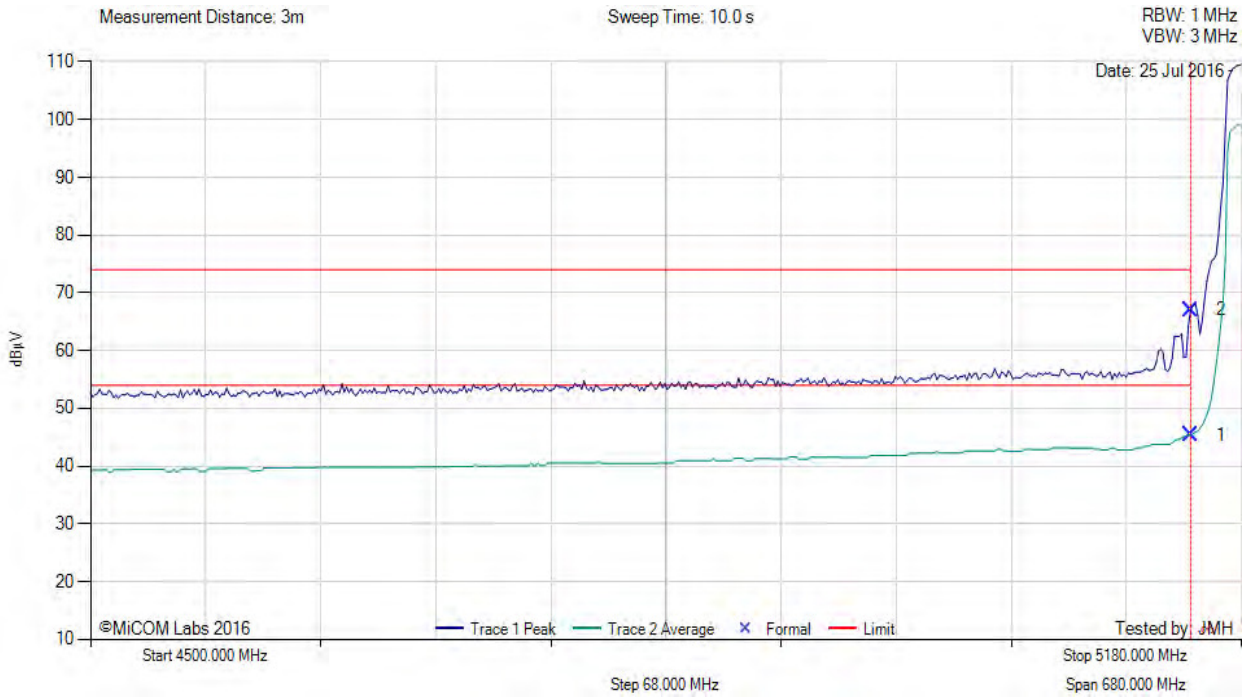
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5150.00	10.97	3.67	34.11	48.75	Max Avg	Horizontal	165	358	54.0	-5.3	Pass
2	5150.00	26.85	3.67	34.11	64.63	Max Peak	Horizontal	165	358	74.0	-9.4	Pass
3	5150.00	--	--	--	--	Restricted-Band	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

back to matrix

RESTRICTED LOWER BAND-EDGE EMISSIONS

Variant: 802.11n HT-20, Test Freq: 5180.00 MHz, Antenna: 5HacD, Power Setting: 20, Duty Cycle (%): 99



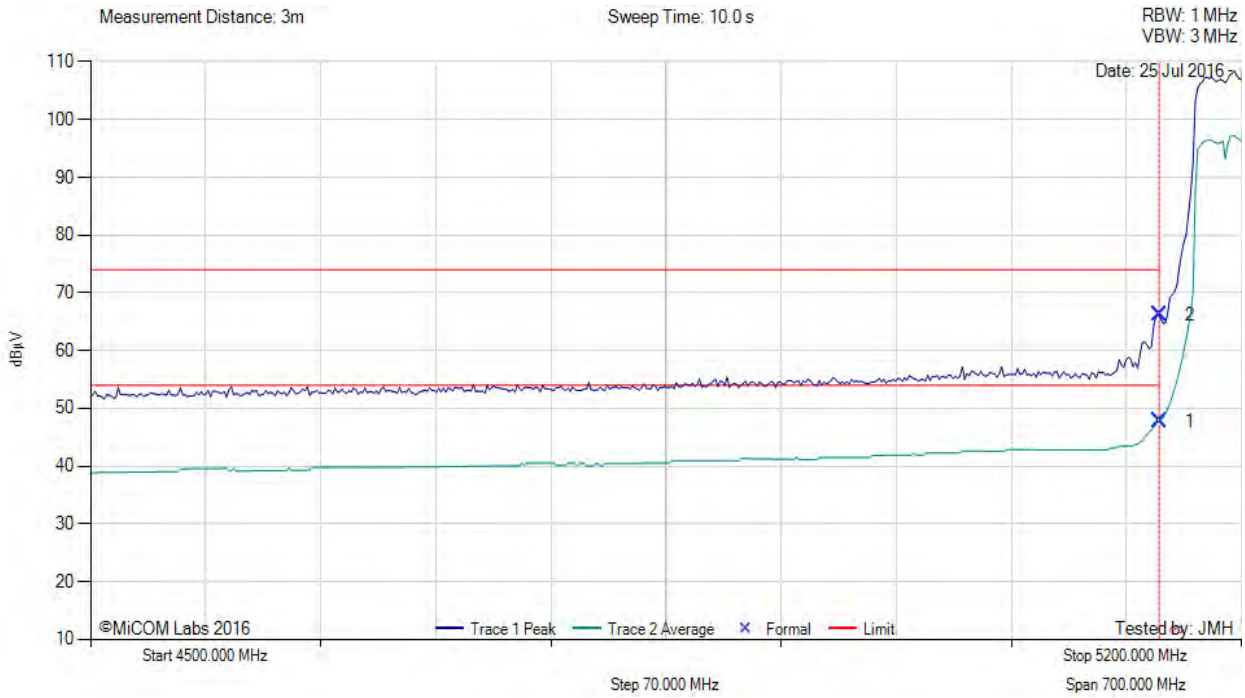
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5150.00	7.61	3.67	34.11	45.39	Max Avg	Horizontal	165	358	54.0	-8.6	Pass
2	5150.00	29.27	3.67	34.11	67.05	Max Peak	Horizontal	165	358	74.0	-7.0	Pass
3	5150.00	--	--	--	--	Restricted-Band	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

back to matrix

RESTRICTED LOWER BAND-EDGE EMISSIONS

Variant: 802.11n HT-40, Test Freq: 5190.00 MHz, Antenna: 5HacD, Power Setting: 21, Duty Cycle (%): 99



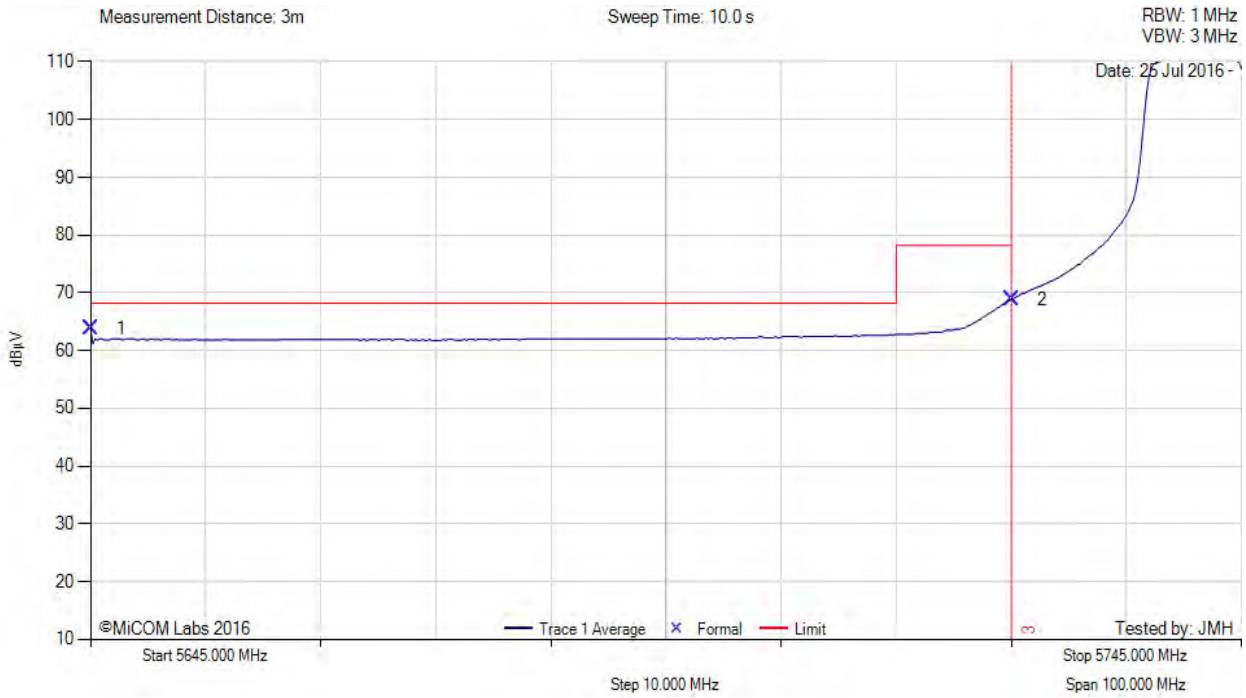
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5150.00	9.93	3.67	34.11	47.71	Max Avg	Horizontal	165	358	54.0	-6.3	Pass
2	5150.00	28.50	3.67	34.11	66.28	Max Peak	Horizontal	165	358	74.0	-7.7	Pass
3	5150.00	--	--	--	--	Restricted-Band	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

back to matrix

5725 MHz RADIATED BAND-EDGE EMISSIONS

Variant: 802.11a, Test Freq: 5745.00 MHz, Antenna: 5HacD, Power Setting: 30, Duty Cycle (%): 99



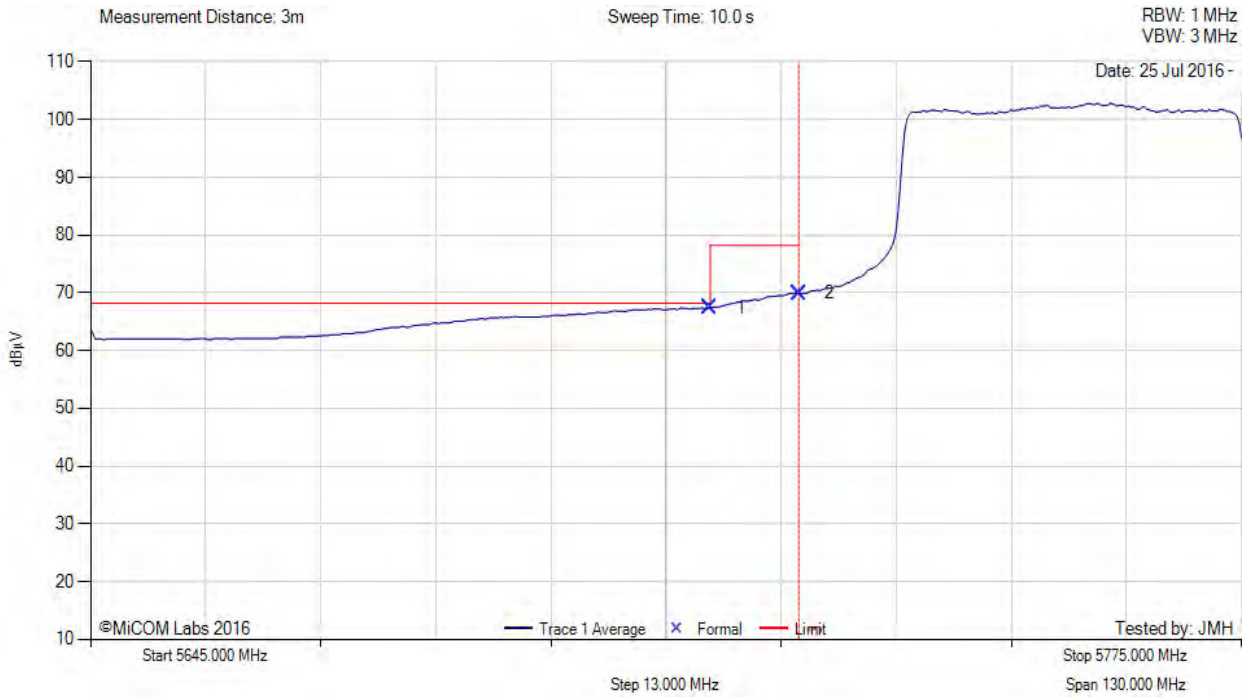
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5645.00	25.91	3.76	34.18	63.85	Max Avg	Horizontal	176	358	68.2	-4.4	Pass
2	5725.00	30.72	3.79	34.35	68.86	Max Avg	Horizontal	176	358	78.2	-9.4	Pass
3	5725.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

back to matrix

5725 MHz RADIATED BAND-EDGE EMISSIONS

Variant: 802.11ac-80, Test Freq: 5775.00 MHz, Antenna: 5HacD, Power Setting: 30, Duty Cycle (%): 99



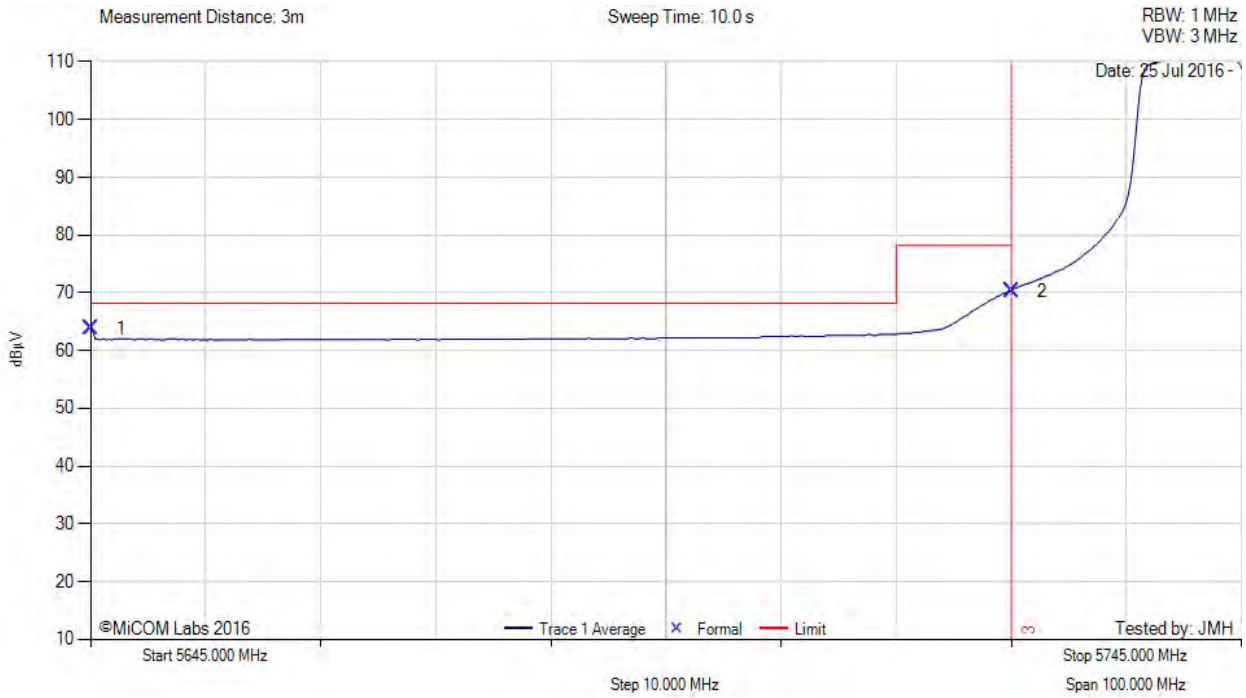
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5715.00	29.26	3.81	34.34	67.41	Max Avg	Horizontal	176	358	68.2	-0.8	Pass
2	5725.00	31.79	3.79	34.35	69.93	Max Avg	Horizontal	176	358	78.2	-8.3	Pass
3	5725.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

back to matrix

5725 MHz RADIATED BAND-EDGE EMISSIONS

Variant: 802.11n HT-20, Test Freq: 5745.00 MHz, Antenna: 5HacD, Power Setting: 30, Duty Cycle (%): 99



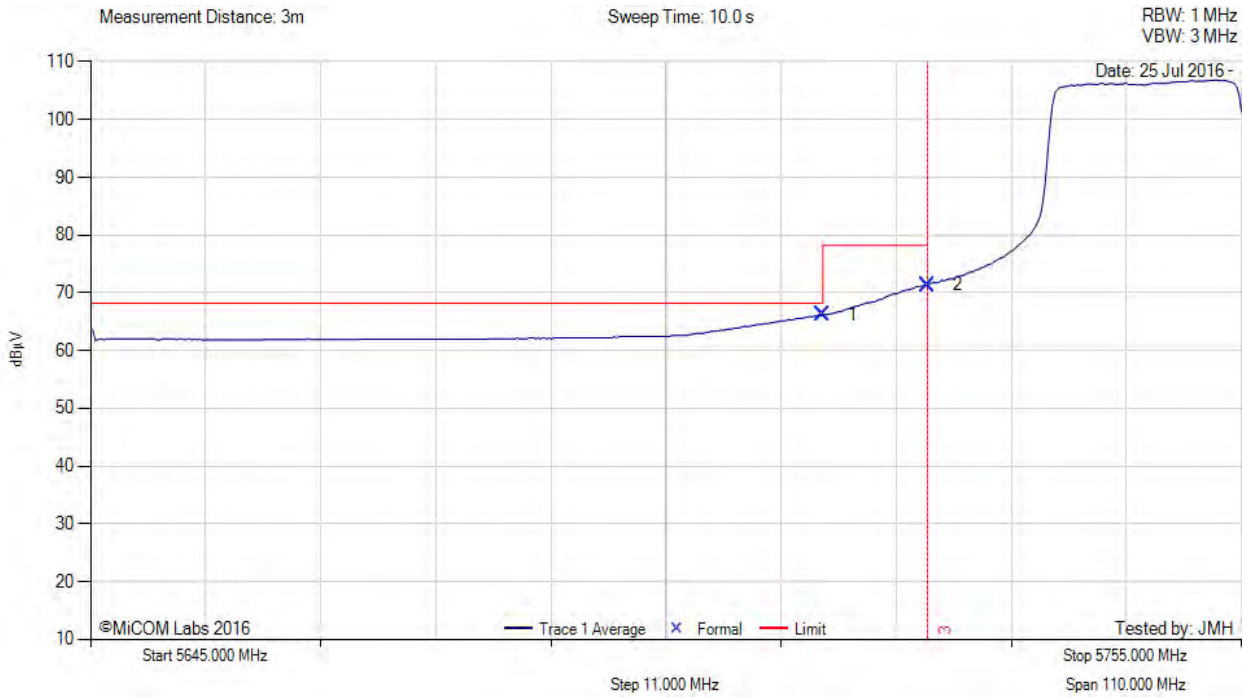
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5645.00	25.91	3.76	34.18	63.85	Max Avg	Horizontal	176	358	68.2	-4.4	Pass
2	5725.00	32.19	3.79	34.35	70.33	Max Avg	Horizontal	176	358	78.2	-7.9	Pass
3	5725.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

back to matrix

5725 MHz RADIATED BAND-EDGE EMISSIONS

Variant: 802.11n HT-40, Test Freq: 5755.00 MHz, Antenna: 5HacD, Power Setting: 30, Duty Cycle (%): 99



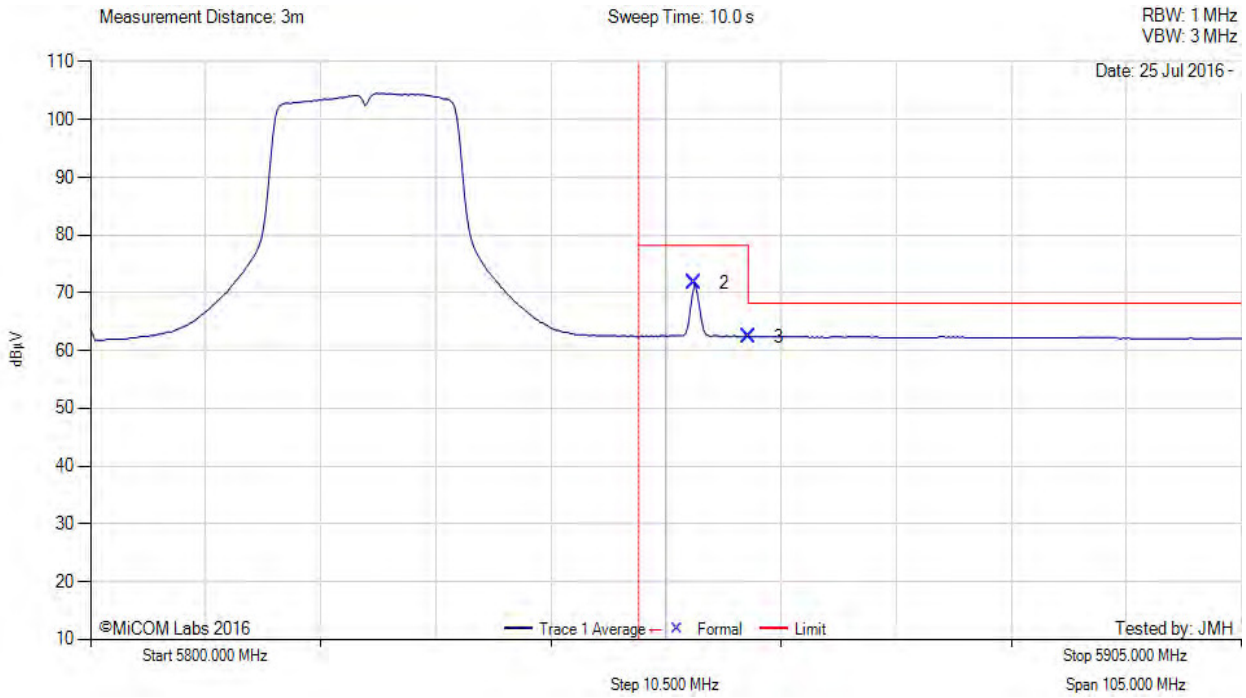
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5715.00	28.07	3.81	34.34	66.22	Max Avg	Horizontal	176	358	68.2	-2.0	Pass
2	5725.00	33.24	3.79	34.35	71.38	Max Avg	Horizontal	176	358	78.2	-6.9	Pass
3	5725.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

back to matrix

5850 MHz RADIATED BAND-EDGE EMISSIONS

Variant: 802.11a, Test Freq: 5825.00 MHz, Antenna: 5HacD, Power Setting: 24, Duty Cycle (%): 99



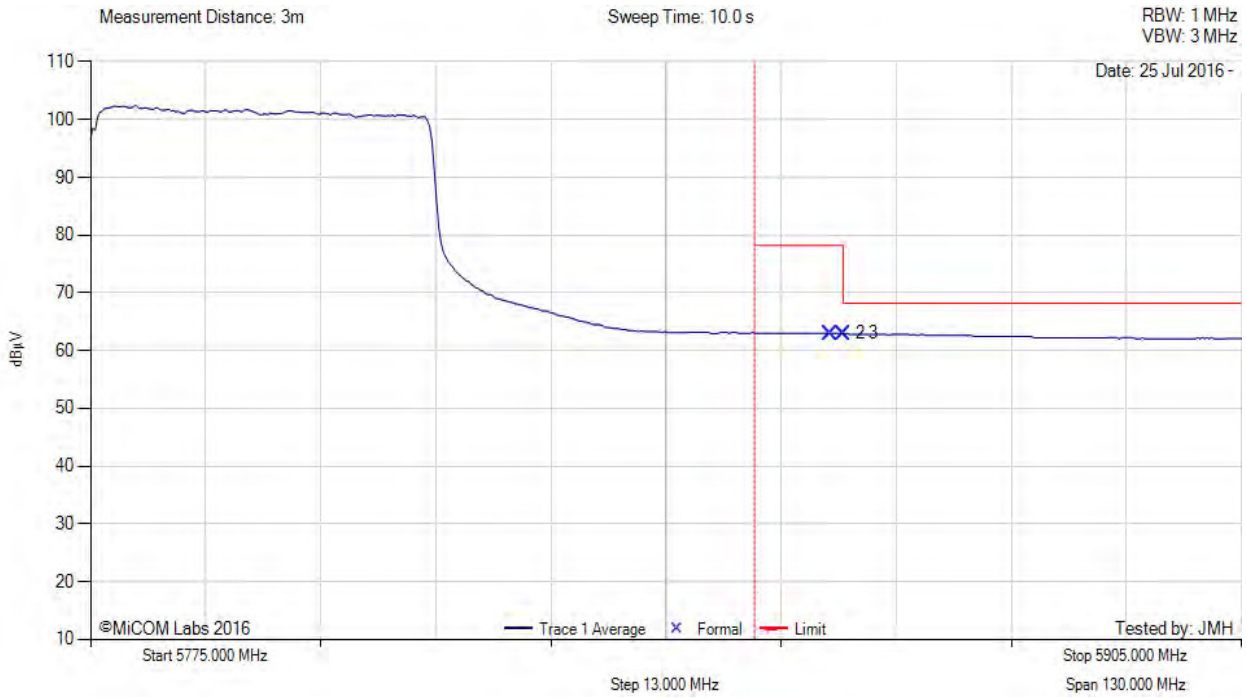
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
2	5855.05	33.18	3.83	34.64	71.65	Max Avg	Horizontal	176	358	78.2	-6.6	Pass
3	5860.00	23.89	3.86	34.65	62.40	Max Avg	Horizontal	176	358	68.2	-5.8	Pass
1	5850.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor. Power Reduced to meet band Edge Limit

back to matrix

5850 MHz RADIATED BAND-EDGE EMISSIONS

Variant: 802.11ac-80, Test Freq: 5775.00 MHz, Antenna: 5HacD, Power Setting: 30, Duty Cycle (%): 99



Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
2	5858.60	24.50	3.85	34.65	63.00	Max Avg	Horizontal	176	358	78.2	-15.2	Pass
3	5860.00	24.49	3.86	34.65	63.00	Max Avg	Horizontal	176	358	68.2	-5.2	Pass
1	5850.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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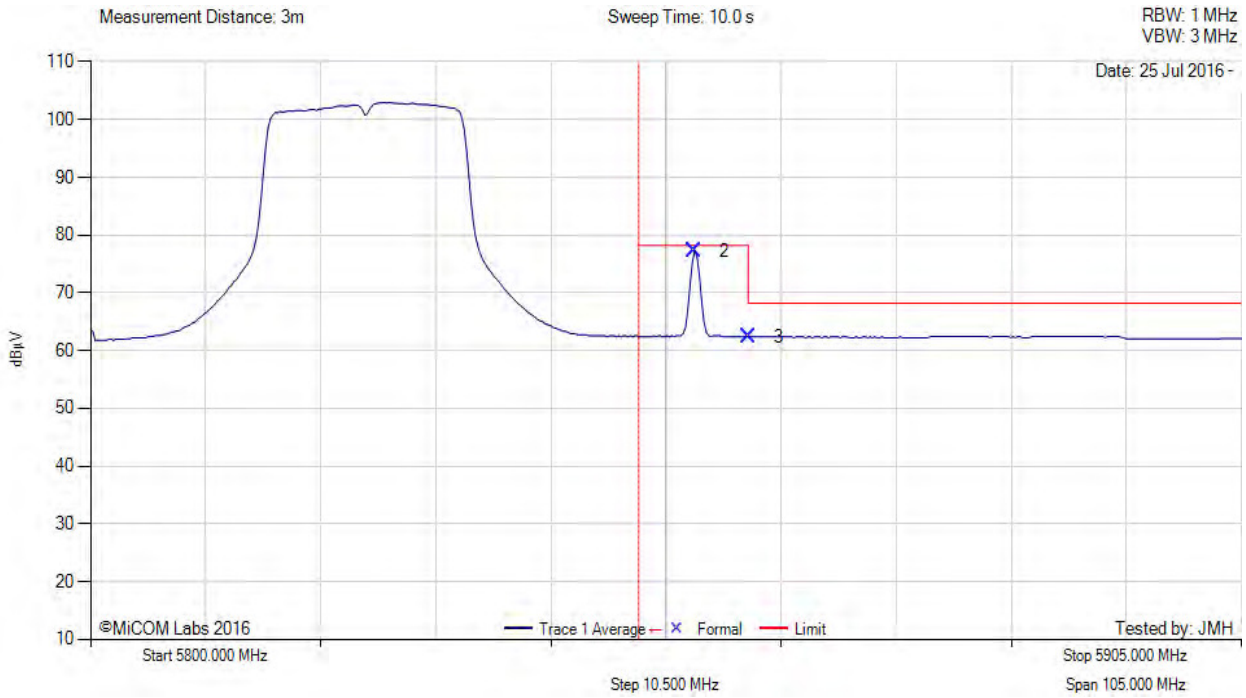
5850 MHz RADIATED BAND-EDGE EMISSIONS

Variant: 802.11n HT-20, Test Freq: 5825.00 MHz, Antenna: 5HacD, Power Setting: 23, Duty Cycle (%): 99



Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
2	5855.05	38.80	3.83	34.64	77.27	Max Avg	Horizontal	176	358	78.2	-1.0	Pass
3	5860.00	23.89	3.86	34.65	62.40	Max Avg	Horizontal	176	358	68.2	-5.8	Pass
1	5850.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor. Power Reduced to meet band Edge Limit

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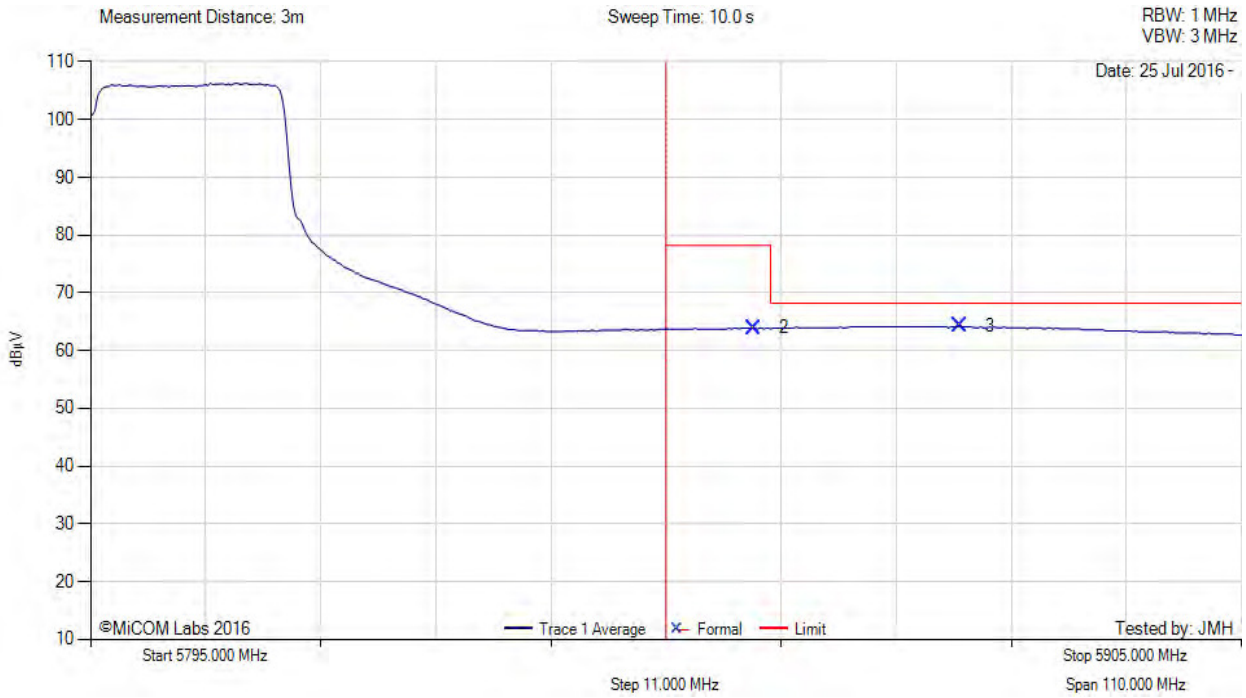
5850 MHz RADIATED BAND-EDGE EMISSIONS

Variant: 802.11n HT-40, Test Freq: 5795.00 MHz, Antenna: 5HacD, Power Setting: 30, Duty Cycle (%): 99



Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
2	5858.38	25.41	3.85	34.65	63.91	Max Avg	Horizontal	176	358	78.2	-14.3	Pass
3	5878.08	25.78	3.81	34.70	64.29	Max Avg	Horizontal	176	358	68.2	-3.9	Pass
1	5850.00	--	--	--	--	Band-Edge	--	--	--	--	--	--

Test Notes: EUT on 150cm table powered by DQS751-280257-3 POE injector. EUT grounded to turntable floor.

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575 Boulder Court
Pleasanton, California 94566, USA
Tel: +1 (925) 462 0304
Fax: +1 (925) 462 0306
www.micomlabs.com