

Company: Aruba Networks

Test of: APEX0104

To: FCC CFR 47 Part 15 Subpart E 15.407

Report No.: ARUB199-U6 Rev A





Test of: Aruba Networks APEX0104 a/b/g/n/ac Access Point  
to

To: FCC CFR 47 Part 15 Subpart E 15.407

Test Report Serial No.: ARUB199-U6 Rev A

Note: this report is one of a set of reports that together address the requirements for FCC 15.247, FCC 15.407 and Industry Canada RSS-247 compliance

Report Number	Test Report Type
ARUB199-U3	FCC 15.247 + IC RSS-247 2.4 GHz Test Report
ARUB198-U6	FCC 15.407 Non-DFS Bands Conducted Test Report
ARUB198-U7	IC RSS-247 Non-DFS Bands Conducted Test Report
ARUB199-U9a	FCC 15.247 + IC RSS-247 DFS Bands Conducted & Radiated Test Report
ARUB199-U9b	FCC 15.247 + IC RSS-247 DFS Test Report

This report supersedes: NONE

Applicant: Aruba Networks  
1344 Crossman Ave.  
Sunnyvale, 94089-1113  
USA

Product Function: Wireless Access Point

Issue Date: 27<sup>th</sup> August 2015

**This Test Report is Issued Under the Authority of:**

**MiCOM Labs, Inc.**  
575 Boulder Court  
Pleasanton California 94566  
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**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](http://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>



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## 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

### 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](http://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>



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

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**Title:** Aruba Networks APEX0104  
**To:** FCC CFR 47 Part 15 Subpart E 15.407  
**Serial #:** ARUB199-U6 Rev A  
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## 2. DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft	13 <sup>th</sup> July 2015	
Draft #2	21 <sup>st</sup> August 2015	
Draft #3	27 <sup>th</sup> August 2015	
Rev A	27 <sup>th</sup> August 2015	Initial Release
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In the above table the latest report revision will replace all earlier versions.

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### 3. TEST RESULT CERTIFICATE

<b>Manufacturer:</b> Aruba Networks 1344 Crossman Ave. Sunnyvale 94089-1113 USA	<b>Tested By:</b> MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
<b>Model:</b> APEX0104	<b>Telephone:</b> +1 925 462 0304 <b>Fax:</b> +1 925 462 0306
<b>Type Of Equipment:</b> Wireless LAN Access Point	
<b>S/N's:</b> 6140570	
<b>Test Date(s):</b> 13 <sup>th</sup> – 24 <sup>th</sup> July 2015	<b>Website:</b> www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC CFR 47 Part 15 Subpart E 15.407	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.

**Approved & Released for MiCOM Labs, Inc. by:**



\_\_\_\_\_  
Graeme Grieve  
Quality Manager MiCOM Labs, Inc.

\_\_\_\_\_  
Gordon Hurst  
President & CEO MiCOM Labs, Inc.

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## 4. REFERENCES AND MEASUREMENT UNCERTAINTY

### 4.1. Normative References

REF.	PUBLICATION	YEAR	TITLE
I	KDB 662911	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 v01	10th June 2015	Test guidance to demonstrate compliance for U-NII devices subject to DFS requirements.
III	KDB 926956 DO1 v01r02	17th October 2014	U-NII Device Transition Plan
IV	KDB 789033 D02 v01	6th June 2014	General UNII Test Procedures New Rules V01
V	KDB 905462 D02 v01r02	15 May 2015	UNII DFS Compliance Procedures New Rules
VI	A2LA	June 2015	R105 - Requirement's When Making Reference to A2LA Accreditation Status
VII	ANSI C63.10	2013	American National Standard for Testing Unlicensed Wireless Devices
VIII	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
IX	CISPR 22	2008	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
X	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
XI	FCC 06-96	Jun 3 2006	Memorandum Opinion and Order
XII	FCC 47 CFR Part 15.407	2014	Radio Frequency Devices; Subpart E –Unlicensed National Information Infrastructure Devices
XIII	ICES-003	Issue 5 2012	Spectrum Management and Telecommunications; Interference-Causing Equipment Standard. Information Technology Equipment (ITE) – Limits and methods of measurement.
XV	M 3003	Edition 3 Nov. 2012	Expression of Uncertainty and Confidence in Measurements
XVI	KDB 644545 D03 v01	August 14th 2014	Guidance for IEEE 802.11ac New Rules
XVII	FCC 47 CFR Part 2.1033	2014	FCC requirements and rules regarding photographs and test setup diagrams.

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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 Aruba Networks APEX0104 802.11 a/b/g/n/ac Access point to FCC CFR 47 Part 15 Subpart E 15.407. Radio Frequency Devices; Subpart E –Unlicensed National Information Infrastructure Devices
Applicant:	Aruba Networks 1344 Crossman Ave. Sunnyvale 94089-1113 USA
Manufacturer:	As Applicant
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
Test report reference number:	ARUB199 - 27x FCC IC New Rules
Date EUT received:	10 <sup>th</sup> July 2015
Standard(s) applied:	FCC CFR 47 Part 15 Subpart E 15.407
Dates of test (from - to):	13 <sup>th</sup> – 24 <sup>th</sup> July 2015
No of Units Tested:	1
Type of Equipment:	802.11a/b/g/n/ac Wireless Access Point 3x3 Spatial Multiplexing MIMO configuration
Product Family Name:	Wireless Access Point
Model(s):	APEX0104
Location for use:	Outdoor only
Declared Frequency Range(s):	5150 - 5250 MHz; 5250 - 5350 MHz; 5470 - 5725 MHz; 5725 - 5850 MHz;
Primary function of equipment:	Wireless Access Point for transmitting data and voice.
Secondary function of equipment:	None Provided
Type of Modulation:	Per 802.11 – OFDM
EUT Modes of Operation:	5150 - 5250 & 5725 – 5850 MHz: 802.11a; 802.11ac-80; 802.11n HT-20; 802.11n HT-40;
Declared Nominal Output Power (Ave):	5150 - 5250 & 5725 - 5850 MHz: +30 dBm
Transmit/Receive Operation:	Transceiver - Half Duplex
Rated Input Voltage and Current:	ac Adapter Input 100-240Vac 50-60 Hz, 1A ; Output 12Vdc, 3A POE (POE adaptor NOT sold with unit) 48Vdc
Operating Temperature Range:	Declared Range -40°C to +65°C
ITU Emission Designator:	802.11a: 16M4D1D 802.11ac-80: 75M9D1D 802.11n HT-20: 17M7D1D 802.11n HT-40: 36M2D1D
Equipment Dimensions:	215mm x 295mm x 229mm
Weight:	3.8kg
Hardware Rev:	2.0
Software Rev:	2.0

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## **5.2. Scope Of Test Program**

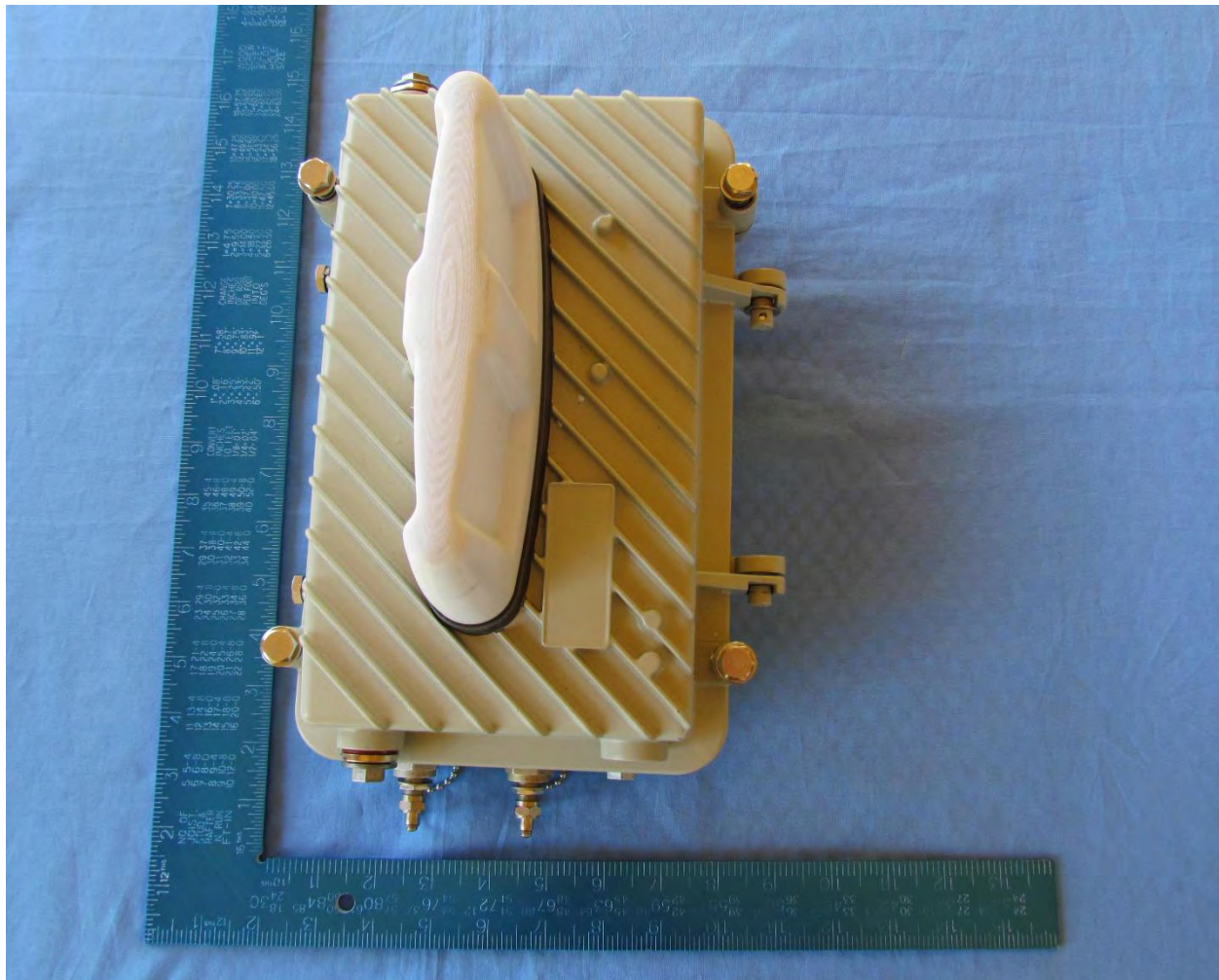
### **Aruba Networks APEX0104 Wireless LAN Access Point**

The scope of the test program was to test the Aruba Networks APEX0104 Wireless LAN Access Point, 3x3 Spatial Multiplexing MIMO configurations in the frequency ranges 5150 - 5250 & 5725 - 5850 MHz; for compliance against the following specification:

### **FCC CFR 47 Part 15 Subpart E 15.407**

Radio Frequency Devices; Subpart E – Unlicensed National Information Infrastructure Devices

### **Aruba Networks APEX0104 Wireless LAN Access Point**



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

Type	Manufacturer	Model	Family	Serial no.
EUT	Aruba Networks	APEX0104	802.11a/b/g/n Wireless Access Point	6140570
Support	CUI Inc.	ETSA480083U	ac Adapter	None
Support	Laptop PC with 11ac client PCM CIA	LATITUDE E5440	DELL	None

### 5.4. Antenna Details

Type	Manufacturer	Model	Family	Gain (dBi)	BF Gain	Dir BW	X-Pol	Frequency Band (MHz)
integral	Aruba Networks	Unknown	Dipole	3.6	-	360	-	5150 - 5250
integral	Aruba Networks	Unknown	Dipole	3.6	-	360	-	5250 - 5350
integral	Aruba Networks	Unknown	Dipole	3.6	-	360	-	5470 - 5725
integral	Aruba Networks	Unknown	Dipole	3.6	-	360	-	5725 - 5850
integral	Aruba Networks	Unknown	Dipole	3.6	-	360	-	5725 - 5850

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	POE 100m	1	N	RJ-45	Packet Data
Ethernet	1	1	N	RJ-45	Packet Data
USB	15m	1	Y	USB	Digital

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## 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
<b>5150 - 5250 MHz</b>				
802.11a	6	5180.00	5200.00	5,240.00
802.11ac-80	29.3	--	--	5,210.00
802.11n HT-20	6.5	5180.00	5200.00	5,240.00
802.11n HT-40	13.5	5190.00	--	5,230.00
<b>5725 - 5850 MHz</b>				
802.11a	6	5745.00	5785.00	5,825.00
802.11ac-80	29.3	5775.00	--	5,775.00
802.11n HT-20	6.5	5745.00	5785.00	5,825.00
802.11n HT-40	13.5	5755.00	--	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. NONE



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## 6. TEST SUMMARY

List of Measurements

Test Header	Result	Data Link
<b>CONDUCTED TEST RESULTS</b>	Complies	
(a) Peak Transmit Power	Complies	<a href="#">View Data</a>
(a) 26 dB & 99% Bandwidth	Complies	<a href="#">View Data</a>
(a)(5) Power Spectral Density	Complies	<a href="#">View Data</a>
<b>RADIATED EMISSION RESULTS</b>		
Radiated Spurious Emissions	Complies	<a href="#">View Data</a>
Restricted Band-Edge Emissions	Complies	<a href="#">View Data</a>
Digital Emissions (0.03 – 1 GHz)	Complies	<a href="#">View Data</a>
<b>ac WIRELINE EMISSION RESULTS</b>		
ac Wireline Emissions	Complies	<a href="#">View Data</a>

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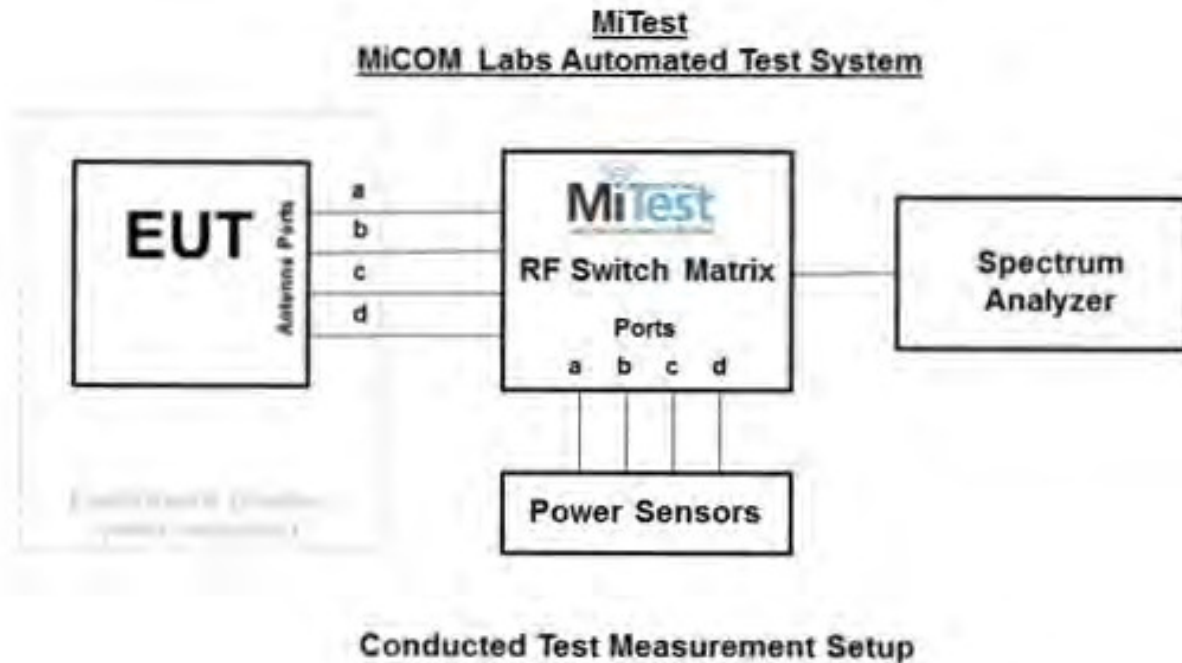
## **7. TEST EQUIPMENT CONFIGURATION(S)**

### **7.1. Conducted Testing**

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. Power Spectral Density



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.



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Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	04 Dec 2015
249	Resistance Thermometer	Thermotronics	GR2105-02	9340 #2	30 Oct 2015
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	31 Jul 2015
361	Desktop for RF#1, Labview Software installed	Dell	Vostro 220	WS RF#1	Not Required
380	4x4 RF Switch Box	MiCOM Labs	MiTest RF Switch Box	MIC001	20 Dec 2015
390	USB Power Head 50MHz - 24GHz -60 to +20dBm	Agilent	U2002A	MY50000103	17 Oct 2015
398	Test Software	MiCOM	MiTest ATS	Version 1.9	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
436	USB Wideband Power Sensor	Boonton	55006	8731	31 Jul 2015
437	USB Wideband Power Sensor	Boonton	55006	8759	31 Jul 2015
445	PoE Injector	D-Link	DPE-101GL	QTAH1E2000625	Not Required
75	Environmental Chamber	Thermatron	SE-300-2-2	27946	28 Nov 2015
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	20 Dec 2015
RF#1 SMA#1	EUT to Mitest box port 1	Flexco	SMA Cable port1	None	20 Dec 2015
RF#1 SMA#2	EUT to Mitest box port 2	Flexco	SMA Cable port2	None	20 Dec 2015
RF#1 SMA#3	EUT to Mitest box port 3	Flexco	SMA Cable port3	None	20 Dec 2015
RF#1 SMA#4	EUT to Mitest box port 4	Flexco	SMA Cable port4	None	20 Dec 2015
RF#1 USB#1	USB Cable to Mitest Box	Dynex	USB Cable	None	Not Required

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Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	04 Dec 2015
170	Video System Controller for Semi Anechoic Chamber	Panasonic	WV-CY101	04R08507	Not Required
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	31 Jul 2015
310	SMA Cable	Micro-Coax	UFA210A-0-0787-3G03G0	209089-001	30 Oct 2015
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	14 Aug 2015
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	23 Oct 2015
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	10 Oct 2015
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	28 May 2016
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
413	Mast Controller	Sunol Science	TWR95-4	030801-3	Not Required
415	Turntable Controller	Sunol Sciences	Turntable Controller	None	Not Required
416	Gigabit ethernet filter	ETS-Lingren	Gigafoil 260366	None	Not Required
462	Schwarzbeck cable from Antenna to Amplifier.	Schwarzbeck	AK 9513	462	25 Aug 2015
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	25 Aug 2015
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	25 Aug 2015
465	Low Pass Filter DC-1000 MHz	Mini-Circuits	NLP-1200+	VUU01901402	25 Aug 2015
CC05	Confidence Check	MiCOM	CC05	None	1 Aug 2015

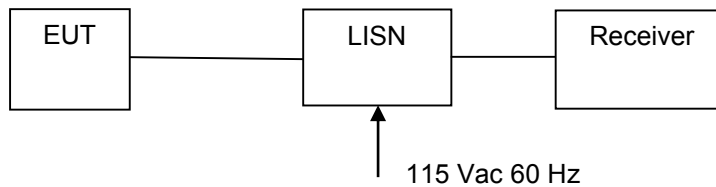
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### 7.3. ac Wireline Emission Testing

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

1. Section 10.5 ac Wireline Conducted Emissions

#### Test Measurement Set up



Measurement set up for AC Wireline Conducted Emissions Test

#### Traceability of Test Equipment Utilized for ac Wireline Emission Testing

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	04 Dec 2015
184	Pulse Limiter	Rhode & Schwarz	ESH3Z2	357.8810.52	Cal when used
190	LISN (two-line V-network)	Rhode & Schwarz	ESH3Z5	836679/006	12 Sep 2015
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	31 Jul 2015
316	Dell desktop computer workstation with Vasona	Dell	Desktop	WS04	Not Required

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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)

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## 9. WORST CASE MEASUREMENT RESULTS

### 10. TEST RESULTS

#### 10.1. Peak Transmit Power

Conducted Test Conditions for Maximum Conducted Output Power			
<b>Standard:</b>	FCC CFR 47:15.407	<b>Ambient Temp. (°C):</b>	24.0 - 27.5
<b>Test Heading:</b>	Maximum Conducted Output Power	<b>Rel. Humidity (%):</b>	32 - 45
<b>Standard Section(s):</b>	15.407 (a)	<b>Pressure (mBars):</b>	999 - 1001
<b>Reference Document(s):</b>	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 ( $\Sigma$ ) 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 [ $10 \cdot \text{Log}_{10} (10^{a/10} + 10^{b/10} + 10^{c/10} + 10^{d/10})$ ]

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

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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.

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**Equipment Configuration for Peak Transmit Power**

<b>Variant:</b>	802.11a	<b>Duty Cycle (%):</b>	99.0
<b>Data Rate:</b>	6 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**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	22.88	19.38	22.15	--	26.53	--	30.00	-3.47	23.00
5200.0	22.53	19.66	22.07	--	26.40	--	30.00	-3.60	23.00
5240.0	23.10	20.72	22.62	--	27.08	--	30.00	-2.92	23.00

**Traceability to Industry Recognized Test Methodologies**

Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

<b>Variant:</b>	802.11ac-80	<b>Duty Cycle (%):</b>	92.0
<b>Data Rate:</b>	29.3 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**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	23.24	21.85	24.00	--	28.25	--	30.00	-1.75	25.00

**Traceability to Industry Recognized Test Methodologies**

Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	

DCCF - Duty Cycle Correction Factor

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**Equipment Configuration for Peak Transmit Power**

<b>Variant:</b>	802.11n HT-20	<b>Duty Cycle (%):</b>	99.0
<b>Data Rate:</b>	6.5 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**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	22.66	19.99	21.78	--	26.43	--	30.00	-3.57	23.00
5200.0	23.64	21.02	22.74	--	27.41	--	30.00	-2.59	24.00
5240.0	23.03	21.03	28.03	--	29.88	--	30.00	-0.12	23.00

**Traceability to Industry Recognized Test Methodologies**

Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

**Equipment Configuration for Peak Transmit Power**

<b>Variant:</b>	802.11n HT-40	<b>Duty Cycle (%):</b>	97.0
<b>Data Rate:</b>	13.5 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**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	23.13	21.64	23.84	--	27.87	--	30.00	-2.13	25.00
5230.0	23.82	22.45	24.26	--	28.48	--	30.00	-1.52	25.00

**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**

<b>Variant:</b>	802.11a	<b>Duty Cycle (%):</b>	99.0
<b>Data Rate:</b>	6 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**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	
5745.0	23.99	22.45	24.22	--	28.44	--	30.00	-1.56	24.00
5785.0	24.13	23.11	24.27	--	28.68	--	30.00	-1.32	24.00
5825.0	24.01	22.96	23.74	--	28.41	--	30.00	-1.59	24.00

**Traceability to Industry Recognized Test Methodologies**

Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

**Equipment Configuration for Peak Transmit Power**

<b>Variant:</b>	802.11ac-80	<b>Duty Cycle (%):</b>	92.0
<b>Data Rate:</b>	29.3 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**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	
5775.0	25.23	23.95	24.61	--	29.76	--	30.00	-0.24	25.00

**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**

<b>Variant:</b>	802.11n HT-20	<b>Duty Cycle (%):</b>	99.0
<b>Data Rate:</b>	6.5 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**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	
5745.0	24.08	22.29	23.88	--	28.30	--	30.00	-1.70	24.00
5785.0	24.08	23.16	23.61	--	28.45	--	30.00	-1.55	24.00
5825.0	23.99	23.08	23.08	--	28.22	--	30.00	-1.78	24.00

**Traceability to Industry Recognized Test Methodologies**

Work Instruction:	WI-01 MEASURING RF OUTPUT POWER
Measurement Uncertainty:	±1.33 dB

**Equipment Configuration for Peak Transmit Power**

<b>Variant:</b>	802.11n HT-40	<b>Duty Cycle (%):</b>	97.0
<b>Data Rate:</b>	13.5 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**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	
5755.0	24.93	23.57	24.60	--	29.31	--	30.00	-0.69	25.00
5795.0	25.17	24.32	24.60	--	29.61	--	30.00	-0.39	25.00

**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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## 10.2. 26 dB & 99% Bandwidth

Conducted Test Conditions for 26 dB and 99% Bandwidth			
<b>Standard:</b>	FCC CFR 47:15.407	<b>Ambient Temp. (°C):</b>	24.0 - 27.5
<b>Test Heading:</b>	26 dB and 99 % Bandwidth	<b>Rel. Humidity (%):</b>	32 - 45
<b>Standard Section(s):</b>	15.407 (a)	<b>Pressure (mBars):</b>	999 - 1001
<b>Reference Document(s):</b>	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**

<b>Variant:</b>	802.11a	<b>Duty Cycle (%):</b>	99.0
<b>Data Rate:</b>	6.00 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**Test Measurement Results**

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5180.0	<a href="#">30.830</a>	<a href="#">26.420</a>	<a href="#">22.170</a>	--	30.830	22.170		
5200.0	<a href="#">23.830</a>	<a href="#">21.420</a>	<a href="#">20.580</a>	--	23.830	20.580		
5240.0	<a href="#">23.080</a>	<a href="#">20.330</a>	<a href="#">20.500</a>	--	23.080	20.330		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5180.0	<a href="#">17.099</a>	<a href="#">17.057</a>	<a href="#">16.846</a>	--	17.099	16.846		
5200.0	<a href="#">16.880</a>	<a href="#">16.817</a>	<a href="#">16.767</a>	--	16.880	16.767		
5240.0	<a href="#">16.872</a>	<a href="#">16.743</a>	<a href="#">16.750</a>	--	16.872	16.743		

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**

<b>Variant:</b>	802.11ac-80	<b>Duty Cycle (%):</b>	92.0
<b>Data Rate:</b>	29.30 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**Test Measurement Results**

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5210.0	<a href="#">140.000</a>	<a href="#">154.000</a>	<a href="#">142.700</a>	--	154.000	140.000		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5210.0	<a href="#">76.522</a>	<a href="#">77.480</a>	<a href="#">76.784</a>	--	77.480	76.522		

**Traceability to Industry Recognized Test Methodologies**

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

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**Equipment Configuration for 26 dB & 99% Occupied Bandwidth**

<b>Variant:</b>	802.11n HT-20	<b>Duty Cycle (%):</b>	99.0
<b>Data Rate:</b>	6.50 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**Test Measurement Results**

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5180.0	<a href="#">24.830</a>	<a href="#">34.250</a>	<a href="#">20.830</a>	--	34.250	20.830		
5200.0	<a href="#">24.920</a>	<a href="#">31.670</a>	<a href="#">21.750</a>	--	31.670	21.750		
5240.0	<a href="#">28.330</a>	<a href="#">30.000</a>	<a href="#">22.000</a>	--	30.000	22.000		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5180.0	<a href="#">17.950</a>	<a href="#">18.277</a>	<a href="#">17.852</a>	--	18.277	17.852		
5200.0	<a href="#">17.994</a>	<a href="#">18.169</a>	<a href="#">17.866</a>	--	18.169	17.866		
5240.0	<a href="#">18.016</a>	<a href="#">18.026</a>	<a href="#">17.856</a>	--	18.026	17.856		

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**

<b>Variant:</b>	802.11n HT-40	<b>Duty Cycle (%):</b>	97.0
<b>Data Rate:</b>	13.50 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**Test Measurement Results**

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5190.0	<a href="#">68.330</a>	<a href="#">79.170</a>	<a href="#">73.170</a>	--	79.170	68.330		
5230.0	<a href="#">77.000</a>	<a href="#">72.670</a>	<a href="#">70.830</a>	--	77.000	70.830		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5190.0	<a href="#">36.756</a>	<a href="#">37.414</a>	<a href="#">36.975</a>	--	37.414	36.756		
5230.0	<a href="#">36.769</a>	<a href="#">36.759</a>	<a href="#">36.825</a>	--	36.825	36.759		

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**

<b>Variant:</b>	802.11a	<b>Duty Cycle (%):</b>	99.0
<b>Data Rate:</b>	6.00 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**Test Measurement Results**

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5745.0	<a href="#">20.080</a>	<a href="#">49.920</a>	<a href="#">20.250</a>	--	49.920	20.080		
5785.0	<a href="#">20.000</a>	<a href="#">20.330</a>	<a href="#">20.580</a>	--	20.580	20.000		
5825.0	<a href="#">20.000</a>	<a href="#">20.330</a>	<a href="#">20.330</a>	--	20.330	20.000		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5745.0	<a href="#">16.697</a>	<a href="#">16.605</a>	<a href="#">16.689</a>	--	16.697	16.605		
5785.0	<a href="#">16.745</a>	<a href="#">16.668</a>	<a href="#">16.731</a>	--	16.745	16.668		
5825.0	<a href="#">16.723</a>	<a href="#">16.682</a>	<a href="#">16.725</a>	--	16.725	16.682		

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**

<b>Variant:</b>	802.11ac-80	<b>Duty Cycle (%):</b>	92.0
<b>Data Rate:</b>	29.30 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**Test Measurement Results**

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5775.0	<a href="#">138.300</a>	<a href="#">141.000</a>	<a href="#">113.300</a>	--	141.000	113.300		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5775.0	<a href="#">76.429</a>	<a href="#">76.467</a>	<a href="#">76.287</a>	--	76.467	76.287		

**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**

<b>Variant:</b>	802.11n HT-20	<b>Duty Cycle (%):</b>	99.0
<b>Data Rate:</b>	6.50 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**Test Measurement Results**

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5745.0	<a href="#">20.830</a>	<a href="#">23.750</a>	<a href="#">21.080</a>	--	23.750	20.830		
5785.0	<a href="#">20.170</a>	<a href="#">22.170</a>	<a href="#">20.080</a>	--	22.170	20.080		
5825.0	<a href="#">20.750</a>	<a href="#">28.670</a>	<a href="#">20.170</a>	--	28.670	20.170		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5745.0	<a href="#">17.842</a>	<a href="#">17.807</a>	<a href="#">17.829</a>	--	17.842	17.807		
5785.0	<a href="#">17.811</a>	<a href="#">17.814</a>	<a href="#">17.816</a>	--	17.816	17.811		
5825.0	<a href="#">17.818</a>	<a href="#">17.831</a>	<a href="#">17.789</a>	--	17.831	17.789		

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

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**Equipment Configuration for 26 dB & 99% Occupied Bandwidth**

<b>Variant:</b>	802.11n HT-40	<b>Duty Cycle (%):</b>	97.0
<b>Data Rate:</b>	13.50 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**Test Measurement Results**

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5755.0	<a href="#">61.330</a>	<a href="#">60.830</a>	<a href="#">70.830</a>	--	70.830	60.830		
5795.0	<a href="#">65.670</a>	<a href="#">51.170</a>	<a href="#">70.330</a>	--	70.330	51.170		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5755.0	<a href="#">36.686</a>	<a href="#">36.542</a>	<a href="#">36.721</a>	--	36.721	36.542		
5795.0	<a href="#">36.705</a>	<a href="#">36.510</a>	<a href="#">36.613</a>	--	36.705	36.510		

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

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### 10.3. Power Spectral Density

Conducted Test Conditions for Power Spectral Density			
<b>Standard:</b>	FCC CFR 47:15.407	<b>Ambient Temp. (°C):</b>	24.0 - 27.5
<b>Test Heading:</b>	Power Spectral Density	<b>Rel. Humidity (%):</b>	32 - 45
<b>Standard Section(s):</b>	15.407 (a)	<b>Pressure (mBars):</b>	999 - 1001
<b>Reference Document(s):</b>	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 (∑) 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 [ $10^a \cdot \log_{10} (10^{a/10} + 10^{b/10} + 10^{c/10} + 10^{d/10})$ ]

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.

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(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.

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**Equipment Configuration for Power Spectral Density**

<b>Variant:</b>	802.11a	<b>Duty Cycle (%):</b>	99.0
<b>Data Rate:</b>	6 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

Test Measurement Results							
Test Frequency	Measured Power Spectral Density				Amplitude Summation + DCCF (+0.04 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5180.0	<a href="#">12.647</a>	<a href="#">9.611</a>	<a href="#">12.867</a>	--	<a href="#">16.624</a>	17.0	-0.3
5200.0	<a href="#">12.388</a>	<a href="#">9.647</a>	<a href="#">12.563</a>	--	<a href="#">16.367</a>	17.0	-0.6
5240.0	<a href="#">12.924</a>	<a href="#">10.911</a>	<a href="#">13.155</a>	--	<a href="#">16.994</a>	17.0	-0.0

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**

<b>Variant:</b>	802.11ac-80	<b>Duty Cycle (%):</b>	92.0
<b>Data Rate:</b>	29.30 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**Test Measurement Results**

Test Frequency	Measured Power Spectral Density				Amplitude Summation + DCCF (+0.36 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5210.0	<a href="#">6.228</a>	<a href="#">5.044</a>	<a href="#">9.013</a>	--	<a href="#">12.015</a>	17.0	-5.0

**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 Power Spectral Density**

<b>Variant:</b>	802.11n HT-20	<b>Duty Cycle (%):</b>	99.0
<b>Data Rate:</b>	6.50 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

Test Measurement Results							
Test Frequency	Measured Power Spectral Density				Amplitude Summation + DCCF (+0.04 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5180.0	<a href="#">12.126</a>	<a href="#">9.288</a>	<a href="#">12.118</a>	--	<a href="#">16.094</a>	17.0	-0.9
5200.0	<a href="#">12.899</a>	<a href="#">10.119</a>	<a href="#">12.923</a>	--	<a href="#">16.906</a>	17.0	-0.1
5240.0	<a href="#">12.349</a>	<a href="#">10.240</a>	<a href="#">12.621</a>	--	<a href="#">16.599</a>	17.0	-0.4

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

DCCF - Duty Cycle Correction Factor

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**Equipment Configuration for Power Spectral Density**

<b>Variant:</b>	802.11n HT-40	<b>Duty Cycle (%):</b>	97.0
<b>Data Rate:</b>	13.50 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

Test Measurement Results							
Test Frequency	Measured Power Spectral Density				Amplitude Summation + DCCF (+0.13 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5190.0	<a href="#">9.521</a>	<a href="#">7.769</a>	<a href="#">11.220</a>	--	<a href="#">14.587</a>	17.0	-2.4
5230.0	<a href="#">10.230</a>	<a href="#">8.844</a>	<a href="#">11.882</a>	--	<a href="#">15.356</a>	17.0	-1.6

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

DCCF - Duty Cycle Correction Factor

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**Equipment Configuration for Power Spectral Density**

<b>Variant:</b>	802.11a	<b>Duty Cycle (%):</b>	99.0
<b>Data Rate:</b>	6.00 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

Test Measurement Results							
Test Frequency	Measured Power Spectral Density				Amplitude Summation + DCCF (+0.04 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5745.0	<a href="#">10.933</a>	<a href="#">9.205</a>	<a href="#">13.662</a>	--	<a href="#">16.458</a>	17.0	-0.5
5785.0	<a href="#">11.164</a>	<a href="#">9.878</a>	<a href="#">13.048</a>	--	<a href="#">16.348</a>	17.0	-0.6
5825.0	<a href="#">10.992</a>	<a href="#">9.722</a>	<a href="#">12.215</a>	--	<a href="#">15.813</a>	17.0	-1.2

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 Power Spectral Density**

<b>Variant:</b>	802.11ac-80	<b>Duty Cycle (%):</b>	92.0
<b>Data Rate:</b>	29.30 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

**Test Measurement Results**

Test Frequency	Measured Power Spectral Density				Amplitude Summation + DCCF (+0.36 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5775.0	<a href="#">6.152</a>	<a href="#">4.548</a>	<a href="#">7.878</a>	--	<a href="#">14.022</a>	17.0	-2.9

**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 Power Spectral Density**

<b>Variant:</b>	802.11n HT-20	<b>Duty Cycle (%):</b>	99.0
<b>Data Rate:</b>	6.50 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

Test Measurement Results							
Test Frequency	Measured Power Spectral Density				Amplitude Summation + DCCF (+0.04 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5745.0	<a href="#">10.904</a>	<a href="#">8.938</a>	<a href="#">12.889</a>	--	<a href="#">15.928</a>	17.0	-1.0
5785.0	<a href="#">10.710</a>	<a href="#">9.421</a>	<a href="#">12.295</a>	--	<a href="#">15.667</a>	17.0	-1.3
5825.0	<a href="#">10.548</a>	<a href="#">9.654</a>	<a href="#">11.463</a>	--	<a href="#">15.357</a>	17.0	-1.6

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**

<b>Variant:</b>	802.11n HT-40	<b>Duty Cycle (%):</b>	97.0
<b>Data Rate:</b>	13.50 MBit/s	<b>Antenna Gain (dBi):</b>	3.60
<b>Modulation:</b>	OFDM	<b>Beam Forming Gain (Y)(dB):</b>	Not Applicable
<b>TPC:</b>	Not Applicable	<b>Tested By:</b>	CC
<b>Engineering Test Notes:</b>			

Test Measurement Results							
Test Frequency	Measured Power Spectral Density				Amplitude Summation + DCCF (+0.13 dB)	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5755.0	<a href="#">8.638</a>	<a href="#">7.446</a>	<a href="#">10.692</a>	--	<a href="#">13.962</a>	17.0	-3.0
5795.0	<a href="#">9.015</a>	<a href="#">7.874</a>	<a href="#">10.534</a>	--	<a href="#">14.142</a>	17.0	-2.8

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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## 10.4. Radiated Emissions

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

### 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

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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 (dB $\mu$ V/m);

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

where P is the EIRP in Watts

Therefore: -27 dBm/MHz equates to 68.23 dB $\mu$ V/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.

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- (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).

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#### 10.4.1. Radiated Spurious Emissions

<b>Equipment Configuration for Radiated Spurious - Restricted Band Emissions</b>			
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<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11a
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5180.00	<b>Data Rate:</b>	6.00 MBit/s
<b>Power Setting:</b>	23	<b>Tested By:</b>	JMH

<b>Test Measurement Results</b>
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[Click here to view measurement data...](#)

Test Notes: EUT on Table connected to laptop outside chamber via Telnet

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<b>Equipment Configuration for Radiated Spurious - Restricted Band Emissions</b>
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<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11a
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5200.00	<b>Data Rate:</b>	6.00 MBit/s
<b>Power Setting:</b>	23	<b>Tested By:</b>	JMH

<b>Test Measurement Results</b>
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<a href="#">Click here to view measurement data...</a>
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Test Notes: EUT on Table connected to laptop outside chamber via Telnet
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<b>Equipment Configuration for Radiated Spurious - Restricted Band Emissions</b>
--

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11a
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5240.00	<b>Data Rate:</b>	6.00 MBit/s
<b>Power Setting:</b>	23	<b>Tested By:</b>	JMH

<b>Test Measurement Results</b>
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Test Notes: EUT on Table connected to laptop outside chamber via Telnet
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**Equipment Configuration for Radiated Spurious - Restricted Band Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11a
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5745.00	<b>Data Rate:</b>	6.00 MBit/s
<b>Power Setting:</b>	24	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dB $\mu$ V	Cable Loss	AF dB	Level dB $\mu$ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB $\mu$ V/m	Margin dB	Pass /Fail
#1	6227.23	36.17	6.82	-8.72	34.27	Max Avg	Horizontal	118	59	54.0	-19.7	Pass
#2	6227.23	46.07	6.82	-8.72	44.17	Max Peak	Horizontal	118	59	74.0	-29.8	Pass
#3	11488.69	31.57	9.47	-4.85	36.19	Max Avg	Horizontal	100	340	54.0	-17.8	Pass
#4	11488.69	45.58	9.47	-4.85	50.20	Max Peak	Horizontal	100	340	74.0	-23.8	Pass

Test Notes: EUT on Table connected to laptop outside chamber via Telnet

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**Equipment Configuration for Radiated Spurious - Restricted Band Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11a
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5785.00	<b>Data Rate:</b>	6.00 MBit/s
<b>Power Setting:</b>	24	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dB $\mu$ V	Cable Loss	AF dB	Level dB $\mu$ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB $\mu$ V/m	Margin dB	Pass /Fail
#1	6271.02	36.19	6.86	-8.51	34.54	Max Avg	Horizontal	117	60	54.0	-19.5	Pass
#2	6271.02	47.26	6.86	-8.51	45.61	Max Peak	Horizontal	117	60	74.0	-28.4	Pass
#3	11570.68	30.91	9.59	-4.64	35.86	Max Avg	Horizontal	100	18	54.0	-18.1	Pass
#4	11570.68	42.42	9.59	-4.64	47.37	Max Peak	Horizontal	100	18	74.0	-26.6	Pass

Test Notes: EUT on Table connected to laptop outside chamber via Telnet

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**Equipment Configuration for Radiated Spurious - Restricted Band Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11a
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5825.00	<b>Data Rate:</b>	6.00 MBit/s
<b>Power Setting:</b>	24	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	6067.84	31.88	6.62	-9.61	28.89	Max Avg	Horizontal	100	79	54.0	-25.1	Pass
#2	6067.84	43.45	6.62	-9.61	40.46	Max Peak	Horizontal	100	79	74.0	-33.5	Pass
#3	6309.82	39.43	6.76	-8.37	37.82	Max Avg	Horizontal	105	68	54.0	-16.2	Pass
#4	6309.82	47.94	6.76	-8.37	46.33	Max Peak	Horizontal	105	68	74.0	-27.7	Pass
#5	11648.78	36.29	9.64	-4.47	41.46	Max Avg	Horizontal	100	330	54.0	-12.5	Pass
#6	11648.78	47.54	9.64	-4.47	52.71	Max Peak	Horizontal	100	330	74.0	-25.3	Pass

Test Notes: EUT on Table connected to laptop outside chamber via Telnet

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### 10.4.2. Restricted Band-Edge Emissions

Integral Antenna

#### RESULTS SUMMARY FOR RADIATED RESTRICTED BAND-EDGE EMISSIONS

Unknown		Band-Edge Freq	Peak (Limit 74.0dBµV/m)	Average (Limit 54.0dBµV/m)	Power Setting
Operational Mode	Operating Frequency (MHz)	MHz	dBµV/m	dBµV/m	
802.11a	5180.00	5150.00	69.55	51.71	23.00
802.11a	5320.00	5350.00	55.46	44.44	14.00
802.11a	5500.00	5470.00	55.71	44.64	14.00
802.11n HT-20	5180.00	5150.00	70.41	52.72	23.00
802.11n HT-20	5320.00	5350.00	53.57	39.40	12.50
802.11n HT-20	5500.00	5470.00	53.65	41.37	12.25
802.11n HT-40	5190.00	5150.00	71.05	53.71	20.50
802.11n HT-40	5310.00	5350.00	66.32	50.52	17.50
802.11n HT-40	5510.00	5470.00	52.95	41.11	15.50
802.11ac-80	5210.00	5150.00	69.27	53.58	15.00
802.11ac-80	5290.00	5350.00	67.09	53.61	17.25
802.11ac-80	5530.00	5470.00	64.06	48.75	16.50

Click on the links to view the data.



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**Equipment Configuration for Restricted Lower Band-Edge Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11a
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5180.00	<b>Data Rate:</b>	6.00 MBit/s
<b>Power Setting:</b>	23	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dBμV	Cable Loss	AF dB	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
#1	5146.09	75.07	6.08	-11.60	69.55	Max Peak	Horizontal	136	57	74.0	-4.5	Pass
#2	5147.39	57.22	6.08	-11.59	51.71	Max Avg	Horizontal	136	57	54.0	-2.3	Pass

Test Notes: EUT on table connected via telnet to laptop outside chamber

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**Equipment Configuration for Restricted Lower Band-Edge Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11ac-80
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5210.00	<b>Data Rate:</b>	29.30 MBit/s
<b>Power Setting:</b>	15	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5148.70	74.78	6.08	-11.59	69.27	Max Peak	Horizontal	136	57	74.0	-4.7	Pass
#2	5150.00	59.09	6.08	-11.59	53.58	Max Avg	Horizontal	136	57	54.0	-0.4	Pass

Test Notes: EUT on Table connected via telnet to Laptop outside chamber. Power reduced to ps 15

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**Equipment Configuration for Restricted Lower Band-Edge Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11n HT-20
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5180.00	<b>Data Rate:</b>	6.50 MBit/s
<b>Power Setting:</b>	23	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5150.00	58.23	6.08	-11.59	52.72	Max Avg	Horizontal	136	57	54.0	-1.3	Pass
#2	5150.00	75.92	6.08	-11.59	70.41	Max Peak	Horizontal	136	57	74.0	-3.6	Pass

Test Notes: EUT on Table connected via telnet to Laptop outside chamber.

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**Serial #:** ARUB199-U6 Rev A  
**Issue Date:** 27<sup>th</sup> August 2015  
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**Equipment Configuration for Restricted Lower Band-Edge Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11n HT-40
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5190.00	<b>Data Rate:</b>	13.50 MBit/s
<b>Power Setting:</b>	20.5	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dBμV	Cable Loss	AF dB	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
#1	5148.70	76.56	6.08	-11.59	71.05	Max Peak	Horizontal	136	57	74.0	-3.0	Pass
#2	5150.00	59.22	6.08	-11.59	53.71	Max Avg	Horizontal	136	57	54.0	-0.3	Pass

Test Notes: EUT on Table connected via telnet to Laptop outside chamber. Power reduction ps 20.5 ( -q 82)

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**Equipment Configuration for Restricted Lower Band-Edge Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11a
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5500.00	<b>Data Rate:</b>	6.00 MBit/s
<b>Power Setting:</b>	14	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5385.71	60.61	6.22	-11.12	55.71	Max Peak	Horizontal	124	283	74.0	-18.3	Pass
#2	5386.37	49.54	6.22	-11.12	44.64	Max Avg	Horizontal	124	283	54.0	-9.4	Pass

Test Notes: EUT on Table connected via telnet to Laptop outside chamber.

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**Equipment Configuration for Restricted Lower Band-Edge Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11ac-80
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5530.00	<b>Data Rate:</b>	29.30 MBit/s
<b>Power Setting:</b>	16.5	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dBμV	Cable Loss	AF dB	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
#1	5457.35	69.03	6.26	-11.23	64.06	Max Peak	Horizontal	124	283	74.0	-9.9	Pass
#2	5460.00	53.71	6.26	-11.22	48.75	Max Avg	Horizontal	124	283	54.0	-5.3	Pass

Test Notes: EUT on Table connected via telnet to Laptop outside chamber.

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**Equipment Configuration for Restricted Lower Band-Edge Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11n HT-20
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5500.00	<b>Data Rate:</b>	6.50 MBit/s
<b>Power Setting:</b>	12.25	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dBμV	Cable Loss	AF dB	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
#1	5381.96	46.26	6.21	-11.10	41.37	Max Avg	Horizontal	124	283	54.0	-12.6	Pass
#2	5381.96	58.54	6.21	-11.10	53.65	Max Peak	Horizontal	124	283	74.0	-20.4	Pass

Test Notes: EUT on Table connected via telnet to Laptop outside chamber.

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**Equipment Configuration for Restricted Lower Band-Edge Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11n HT-40
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5510.00	<b>Data Rate:</b>	13.50 MBit/s
<b>Power Setting:</b>	15.5	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dBμV	Cable Loss	AF dB	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
#1	5356.17	45.99	6.16	-11.04	41.11	Max Avg	Horizontal	124	283	54.0	-12.9	Pass
#2	5386.81	57.85	6.22	-11.12	52.95	Max Peak	Horizontal	124	283	74.0	-21.1	Pass

Test Notes: EUT on Table connected via telnet to Laptop outside chamber.

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**Equipment Configuration for Restricted Upper Band-Edge Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11a
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5320.00	<b>Data Rate:</b>	6.00 MBit/s
<b>Power Setting:</b>	14	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dBμV	Cable Loss	AF dB	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
#1	5437.52	60.44	6.23	-11.21	55.46	Max Peak	Horizontal	114	284	74.0	-18.5	Pass
#2	5437.74	49.42	6.23	-11.21	44.44	Max Avg	Horizontal	114	284	54.0	-9.6	Pass

Test Notes: EUT on Table connected via telnet to Laptop outside chamber.

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**Equipment Configuration for Restricted Upper Band-Edge Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11ac-80
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5290.00	<b>Data Rate:</b>	29.30 MBit/s
<b>Power Setting:</b>	17.25	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dBμV	Cable Loss	AF dB	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
#1	5350.00	58.47	6.16	-11.02	53.61	Max Avg	Horizontal	114	284	54.0	-0.4	Pass
#2	5350.22	71.95	6.16	-11.02	67.09	Max Peak	Horizontal	114	284	74.0	-6.9	Pass

Test Notes: EUT on Table connected via telnet to Laptop outside chamber.

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**Equipment Configuration for Restricted Upper Band-Edge Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11n HT-20
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5320.00	<b>Data Rate:</b>	6.50 MBit/s
<b>Power Setting:</b>	12.5	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dB $\mu$ V	Cable Loss	AF dB	Level dB $\mu$ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB $\mu$ V/m	Margin dB	Pass /Fail
#1	5437.29	58.56	6.22	-11.21	53.57	Max Peak	Horizontal	114	284	74.0	-20.4	Pass
#2	5437.96	44.38	6.23	-11.21	39.40	Max Avg	Horizontal	114	284	54.0	-14.6	Pass

Test Notes: EUT on Table connected via telnet to Laptop outside chamber.

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**Equipment Configuration for Restricted Upper Band-Edge Emissions**

<b>Antenna:</b>	Integral	<b>Variant:</b>	802.11n HT-40
<b>Antenna Gain (dBi):</b>	3.60	<b>Modulation:</b>	OFDM
<b>Beam Forming Gain (Y):</b>	Not Applicable	<b>Duty Cycle (%):</b>	100
<b>Channel Frequency (MHz):</b>	5310.00	<b>Data Rate:</b>	13.50 MBit/s
<b>Power Setting:</b>	17.5	<b>Tested By:</b>	JMH

**Test Measurement Results**

Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5350.22	55.38	6.16	-11.02	50.52	Max Avg	Horizontal	114	284	54.0	-3.5	Pass
#2	5354.63	71.20	6.16	-11.04	66.32	Max Peak	Horizontal	114	284	74.0	-7.7	Pass

Test Notes: EUT on Table connected via telnet to Laptop outside chamber.

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### 10.4.3. Digital Emissions (0.03 – 1 GHz)

#### Equipment Configuration for Digital Emissions (0.03 - 1 GHz)

<b>Antenna:</b> Integral	<b>Variant:</b> 802.11b
<b>Antenna Gain (dBi):</b> 2.80	<b>Modulation:</b> CCK
<b>Beam Forming Gain (Y):</b> Not Applicable	<b>Duty Cycle (%):</b> 100
<b>Channel Frequency (MHz):</b> 2437.00	<b>Data Rate:</b> 1.00 MBit/s
<b>Power Setting:</b> NA	<b>Tested By:</b> JMH

#### Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	36.14	41.87	3.47	-14.37	30.97	MaxQP	Vertical	114	202	40.0	-9.0	Pass
#2	37.79	44.19	3.48	-16.06	31.61	MaxQP	Vertical	123	0	40.0	-8.4	Pass
#3	39.49	47.94	3.49	-16.67	34.76	MaxQP	Vertical	103	358	40.0	-5.2	Pass
#4	213.18	51.70	4.39	-20.00	36.09	MaxQP	Horizontal	119	271	43.0	-6.9	Pass
#5	479.99	44.31	5.28	-12.80	36.79	MaxQP	Horizontal	207	355	46.0	-9.2	Pass
#6	937.50	39.87	6.47	-7.20	39.14	MaxQP	Horizontal	144	52	46.0	-6.9	Pass

Test Notes: EUT on table connected to Laptop outside chamber

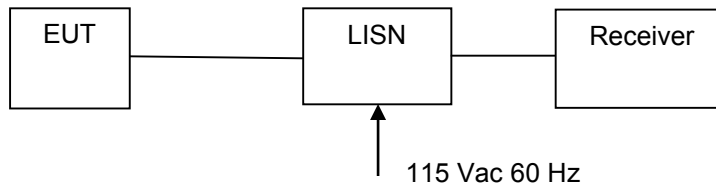
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## 10.5. ac Wireline Conducted Emissions

### 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.

### Test Measurement Set up

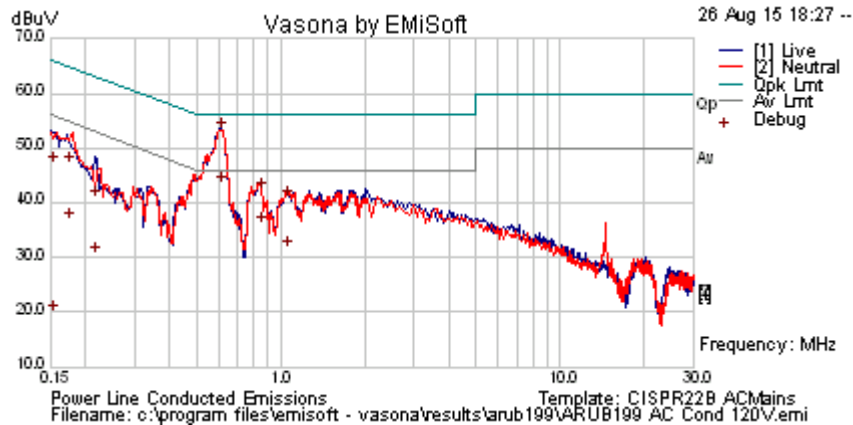


Measurement set up for AC Wireline Conducted Emissions Test



**Measurement Results for AC Wireline Conducted Emissions (150 kHz – 30 MHz)**

<b>Model Number</b>	APEX0104	<b>Engineer</b>	JMH
<b>Variant</b>	ac Wireline 120V	<b>Temp (°C)</b>	29
<b>Freq. Range</b>	0.150 MHz - 30 MHz	<b>Rel. Hum.(%)</b>	37
<b>Power Setting</b>	N/A	<b>Press. (mBars)</b>	1005
<b>Antenna</b>	Integral		
<b>Test Notes 1</b>	EUT SN#614570, powered by AC/DC Adapter 120V		
<b>Test Notes 2</b>	Class B Limits		



**Formally measured emission peaks**

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
0.152	9.70	9.9	0.08	19.67	Average	Live	55.89	-36.2	Pass	
0.152	36.7	9.9	0.08	46.67	Quasi Peak	Live	65.89	-19.2	Pass	
0.175	37.0	9.9	0.08	46.93	Quasi Peak	Neutral	64.72	-17.8	Pass	
0.175	26.6	9.9	0.08	36.54	Average	Neutral	54.72	-18.2	Pass	
0.216	30.4	9.9	0.1	40.4	Quasi Peak	Live	62.97	-22.6	Pass	
0.216	20.4	9.9	0.1	30.4	Average	Live	52.97	-22.6	Pass	
0.605	33.3	9.9	0.1	43.3	Average	Live	46	-2.7	Pass	
0.605	42.9	9.9	0.1	52.9	Quasi Peak	Live	56	-3.1	Pass	
0.846	25.7	9.9	0.1	35.7	Average	Neutral	46	-10.3	Pass	
0.846	32.0	9.9	0.1	42.1	Quasi Peak	Neutral	56	-13.9	Pass	
1.054	21.4	9.9	0.1	31.5	Average	Live	46	-14.6	Pass	
1.054	30.6	9.9	0.1	40.6	Quasi Peak	Live	56	-15.4	Pass	

**Legend:** DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency  
 NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

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## Specification

### Limits

**§15.207 (a)** Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu\Omega$  line impedance stabilization network (LISN), see §15.207 (a) matrix below. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

### §15.207 (a) Limit Matrix

The lower limit applies at the boundary between frequency ranges

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency

### Laboratory Measurement Uncertainty for Conducted Emissions

Measurement uncertainty	$\pm 2.64$ dB
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## **A. APPENDIX - GRAPHICAL IMAGES**

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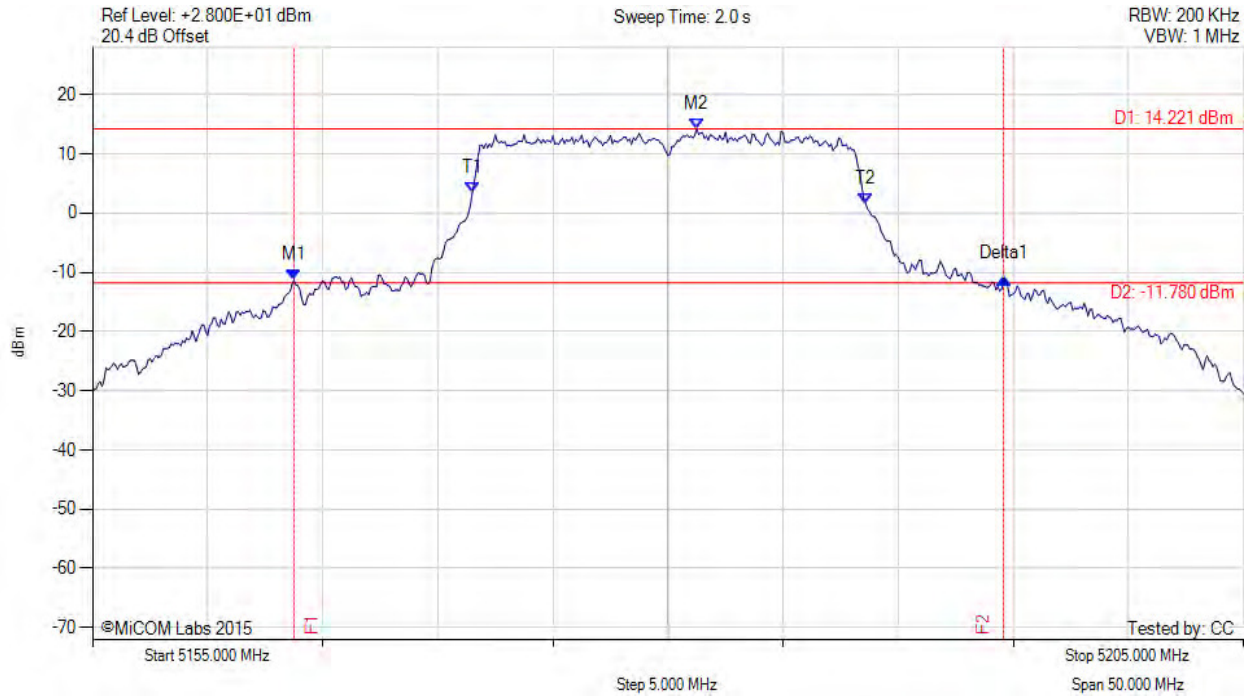
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## A.1. 26 dB & 99% Bandwidth



### 26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5180.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5163.750 MHz : -11.335 dBm M2 : 5181.250 MHz : 14.221 dBm Delta1 : 30.830 MHz : 0.298 dB T1 : 5171.500 MHz : 3.427 dBm T2 : 5188.583 MHz : 1.651 dBm OBW : 17.099 MHz	Measured 26 dB Bandwidth: 30.830 MHz Measured 99% Bandwidth: 17.099 MHz

[back to matrix](#)

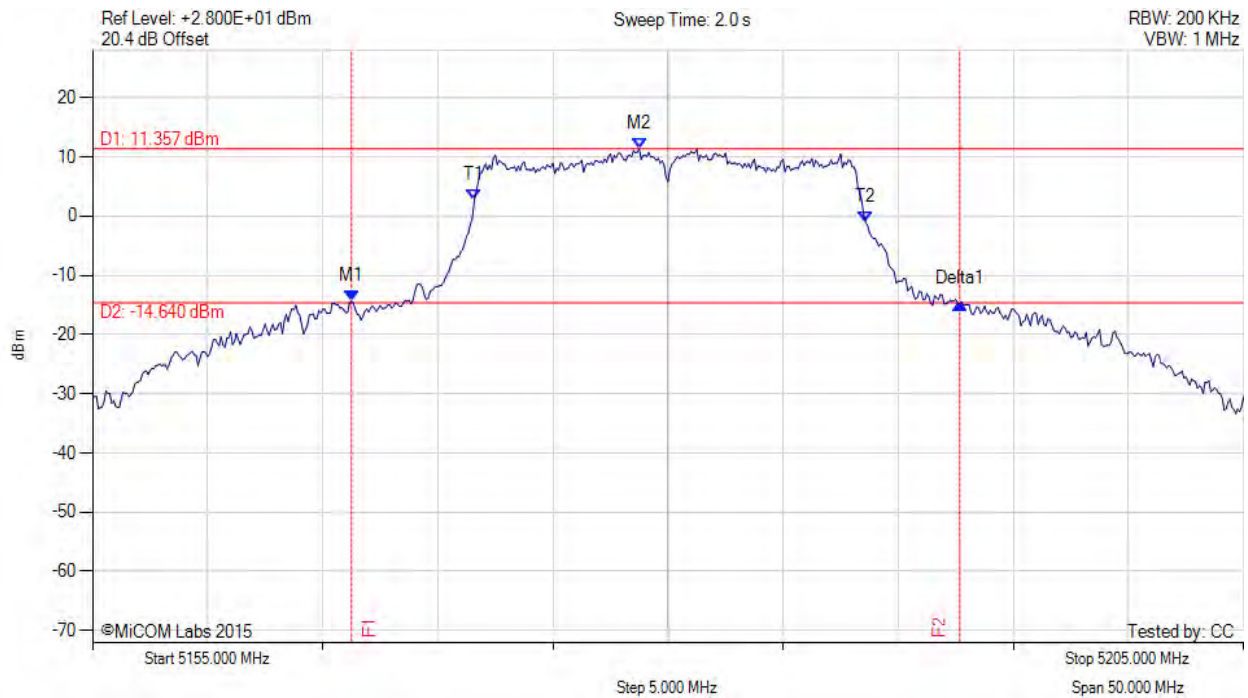
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26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5180.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5166.250 MHz : -14.348 dBm M2 : 5178.750 MHz : 11.357 dBm Delta1 : 26.420 MHz : -0.414 dB T1 : 5171.583 MHz : 2.636 dBm T2 : 5188.583 MHz : -1.094 dBm OBW : 17.057 MHz	Measured 26 dB Bandwidth: 26.420 MHz Measured 99% Bandwidth: 17.057 MHz

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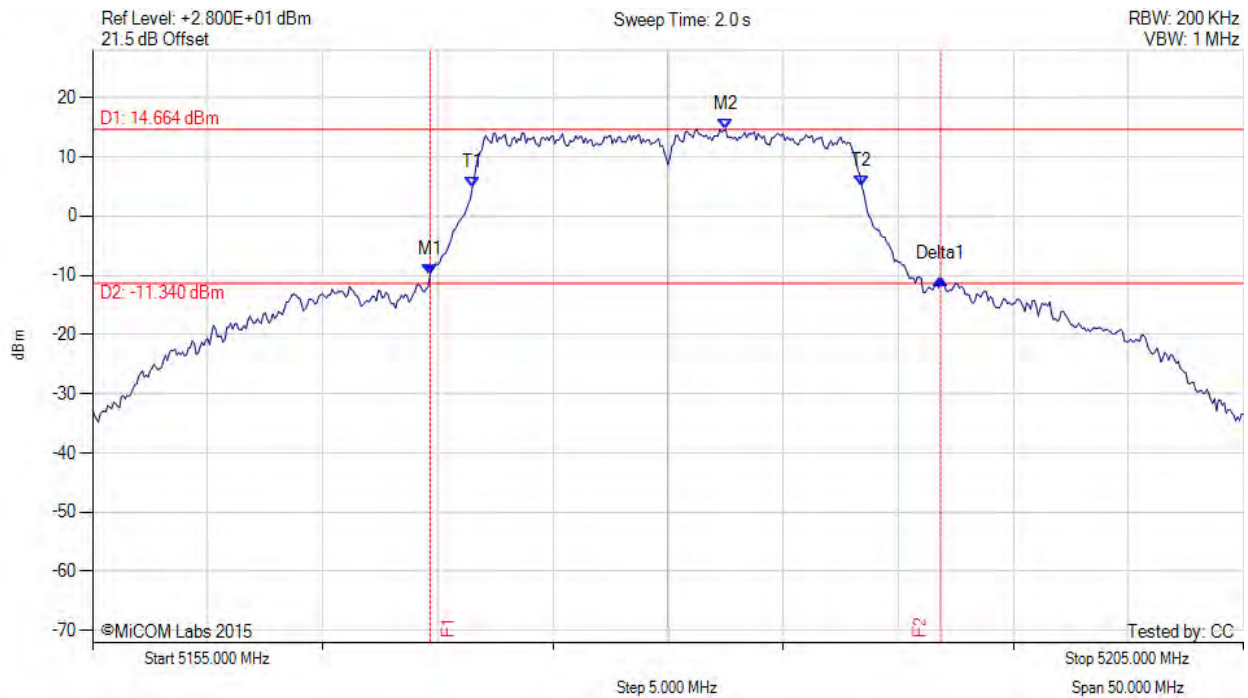
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26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5180.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5169.670 MHz : -9.787 dBm M2 : 5182.500 MHz : 14.664 dBm Delta1 : 22.170 MHz : -0.803 dB T1 : 5171.500 MHz : 4.862 dBm T2 : 5188.417 MHz : 5.075 dBm OBW : 16.846 MHz	Measured 26 dB Bandwidth: 22.170 MHz Measured 99% Bandwidth: 16.846 MHz

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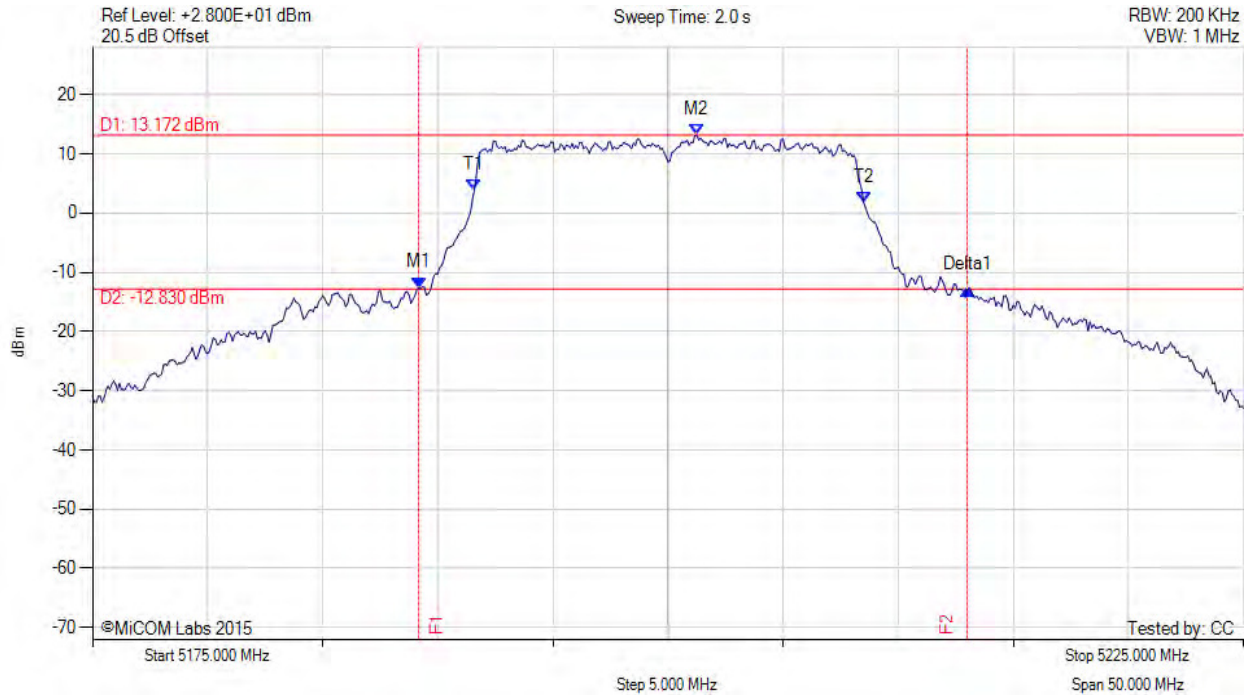
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26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5200.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5189.170 MHz : -12.587 dBm M2 : 5201.250 MHz : 13.172 dBm Delta1 : 23.830 MHz : -0.389 dB T1 : 5191.583 MHz : 3.898 dB T2 : 5208.500 MHz : 1.770 dBm OBW : 16.880 MHz	Measured 26 dB Bandwidth: 23.830 MHz Measured 99% Bandwidth: 16.880 MHz

[back to matrix](#)

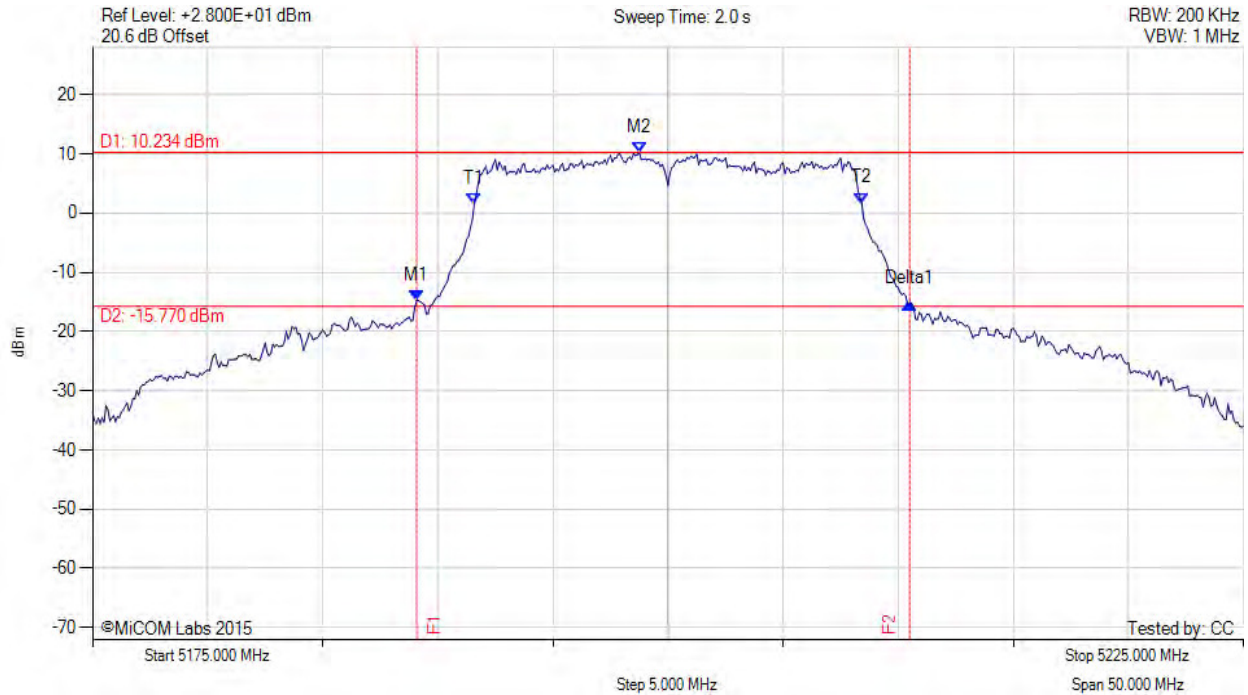
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26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5200.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5189.080 MHz : -14.758 dBm M2 : 5198.750 MHz : 10.234 dBm Delta1 : 21.420 MHz : -0.596 dB T1 : 5191.583 MHz : 1.589 dBm T2 : 5208.417 MHz : 1.692 dBm OBW : 16.817 MHz	Measured 26 dB Bandwidth: 21.420 MHz Measured 99% Bandwidth: 16.817 MHz

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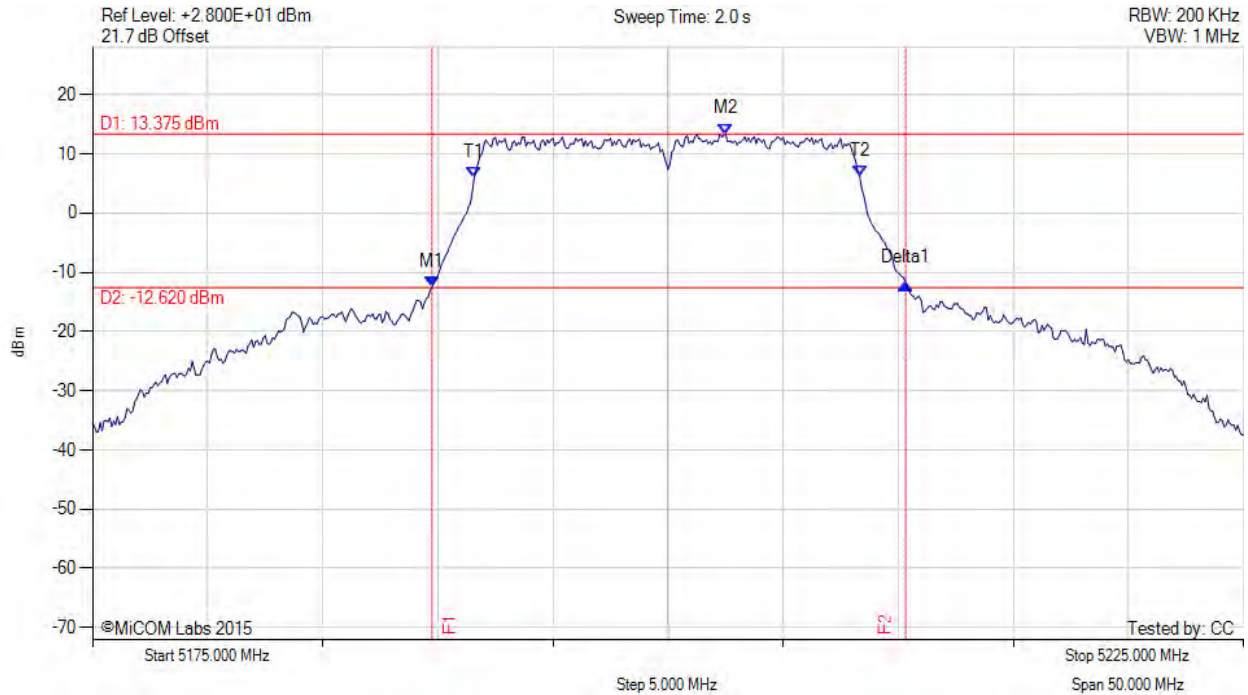




26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5200.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5189.750 MHz : -12.496 dBm M2 : 5202.500 MHz : 13.375 dBm Delta1 : 20.580 MHz : 0.613 dB T1 : 5191.583 MHz : 6.091 dBm T2 : 5208.333 MHz : 6.265 dBm OBW : 16.767 MHz	Measured 26 dB Bandwidth: 20.580 MHz Measured 99% Bandwidth: 16.767 MHz

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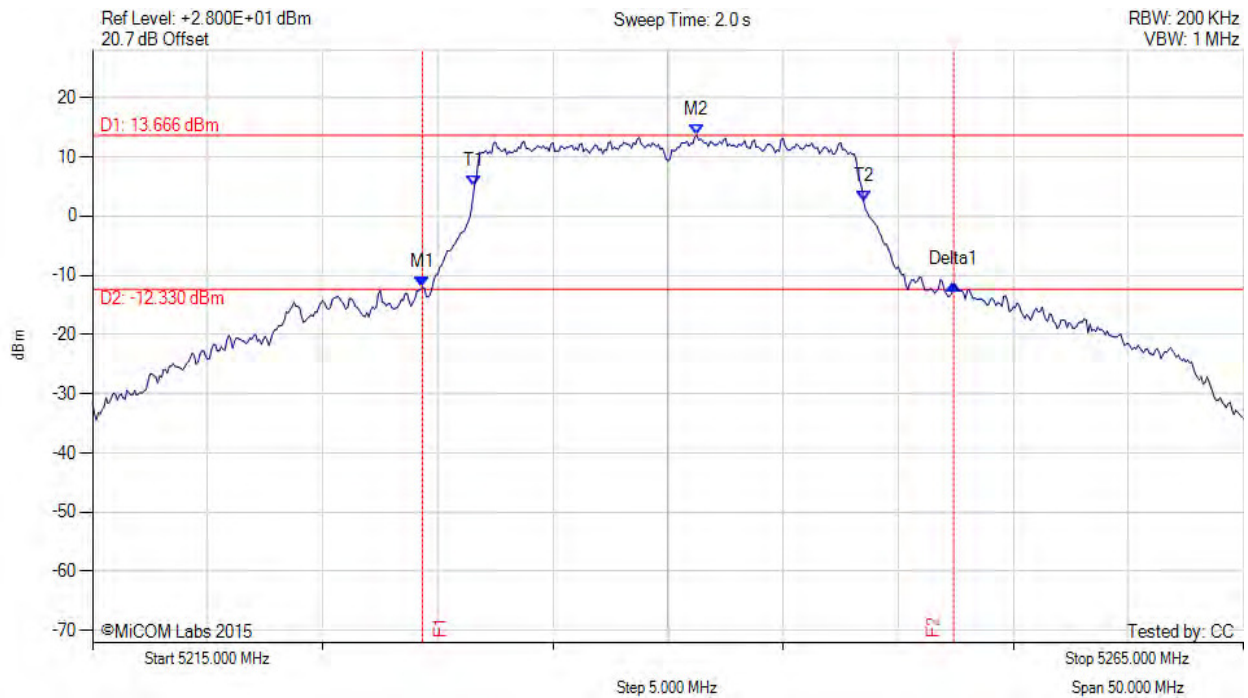




26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5240.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5229.330 MHz : -12.024 dBm M2 : 5241.250 MHz : 13.666 dBm Delta1 : 23.080 MHz : 0.549 dB T1 : 5231.583 MHz : 4.978 dBm T2 : 5248.500 MHz : 2.443 dBm OBW : 16.872 MHz	Measured 26 dB Bandwidth: 23.080 MHz Measured 99% Bandwidth: 16.872 MHz

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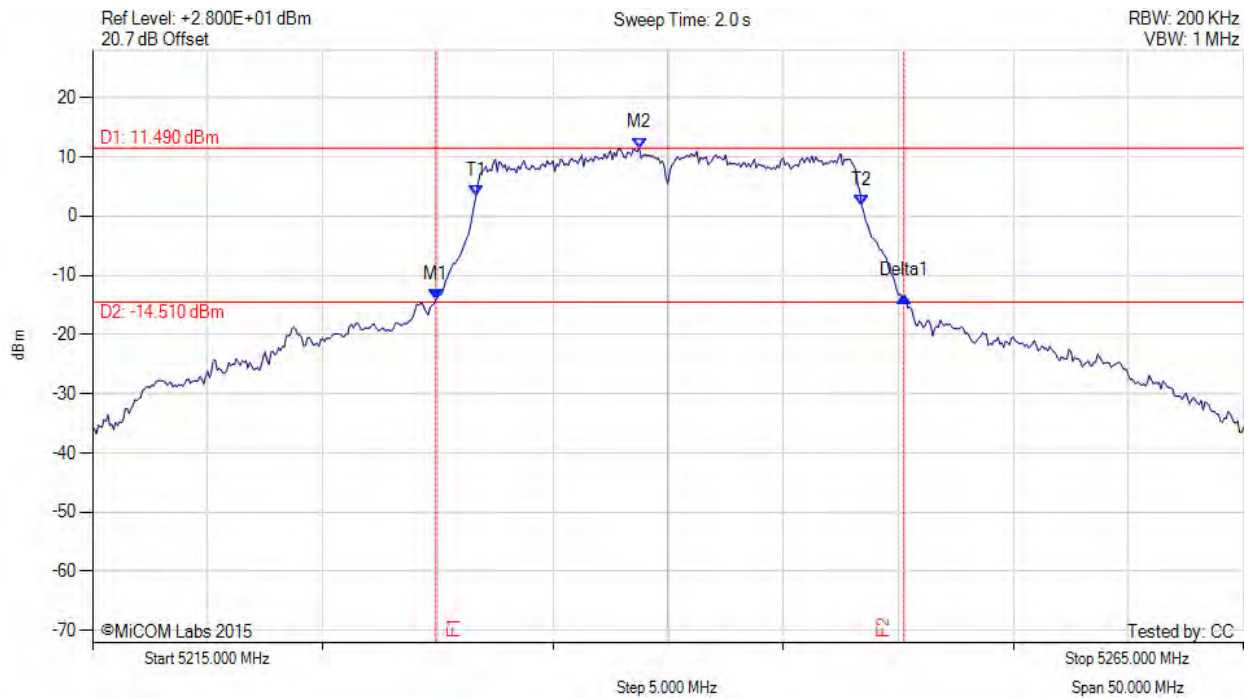
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26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5240.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5229.920 MHz : -14.125 dBm M2 : 5238.750 MHz : 11.490 dBm Delta1 : 20.330 MHz : 0.603 dB T1 : 5231.667 MHz : 3.450 dBm T2 : 5248.417 MHz : 1.809 dBm OBW : 16.743 MHz	Measured 26 dB Bandwidth: 20.330 MHz Measured 99% Bandwidth: 16.743 MHz

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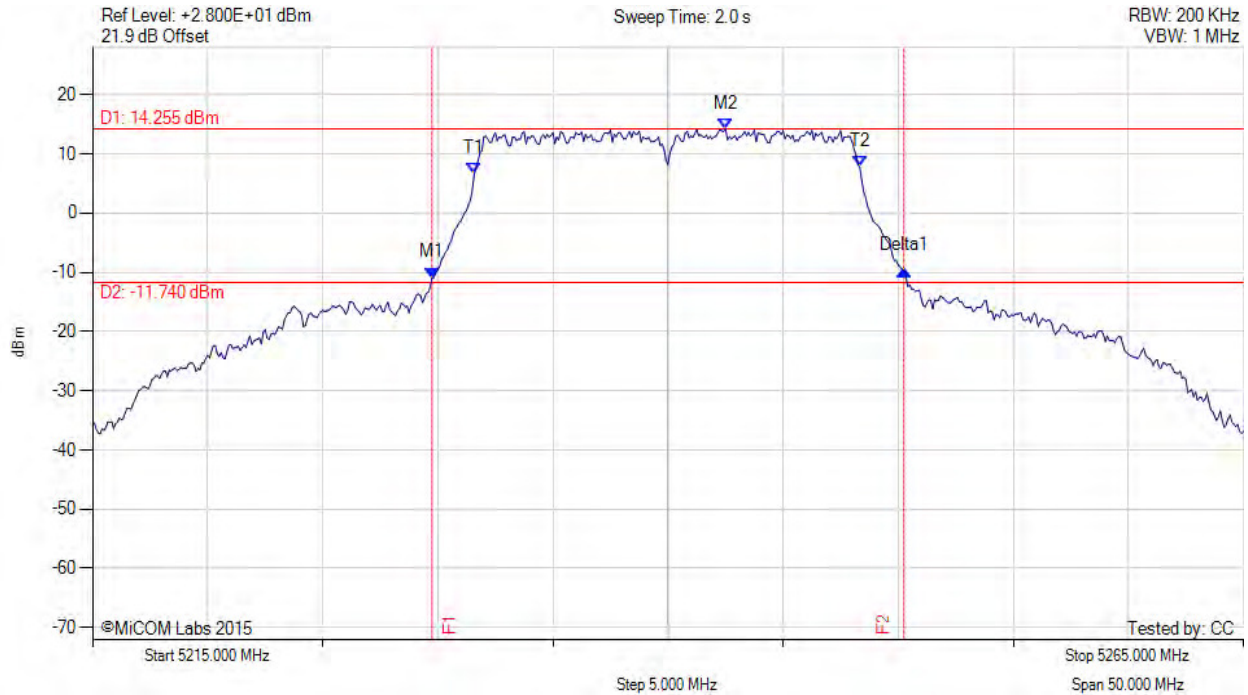
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26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5240.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5229.750 MHz : -10.932 dBm M2 : 5242.500 MHz : 14.255 dBm Delta1 : 20.500 MHz : 1.293 dB T1 : 5231.583 MHz : 6.636 dBm T2 : 5248.333 MHz : 7.772 dBm OBW : 16.750 MHz	Measured 26 dB Bandwidth: 20.500 MHz Measured 99% Bandwidth: 16.750 MHz

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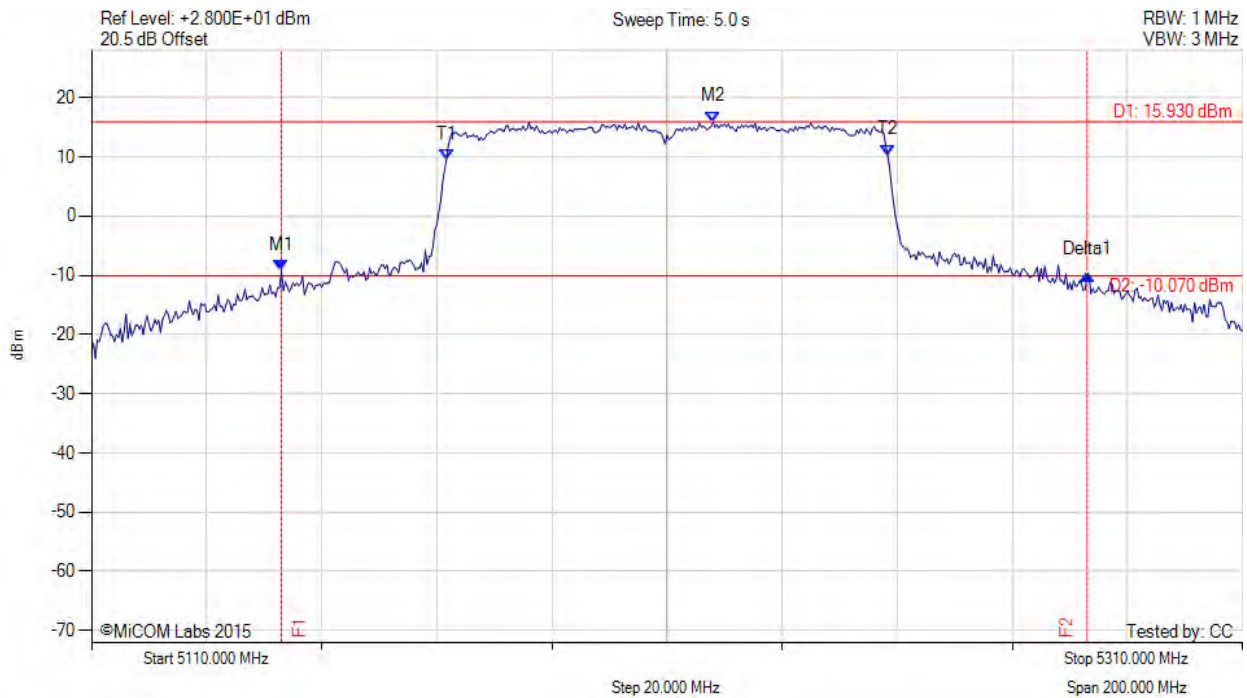


**Title:** Aruba Networks APEX0104  
**To:** FCC CFR 47 Part 15 Subpart E 15.407  
**Serial #:** ARUB199-U6 Rev A  
**Issue Date:** 27<sup>th</sup> August 2015  
**Page:** 84 of 227

26 dB & 99% BANDWIDTH



Variante: 802.11ac-80, Channel: 5210.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5143.000 MHz : -9.240 dBm M2 : 5218.000 MHz : 15.930 dBm Delta1 : 140.000 MHz : -0.660 dB T1 : 5171.667 MHz : 9.416 dBm T2 : 5248.333 MHz : 10.339 dBm OBW : 76.522 MHz	Measured 26 dB Bandwidth: 140.000 MHz Measured 99% Bandwidth: 76.522 MHz

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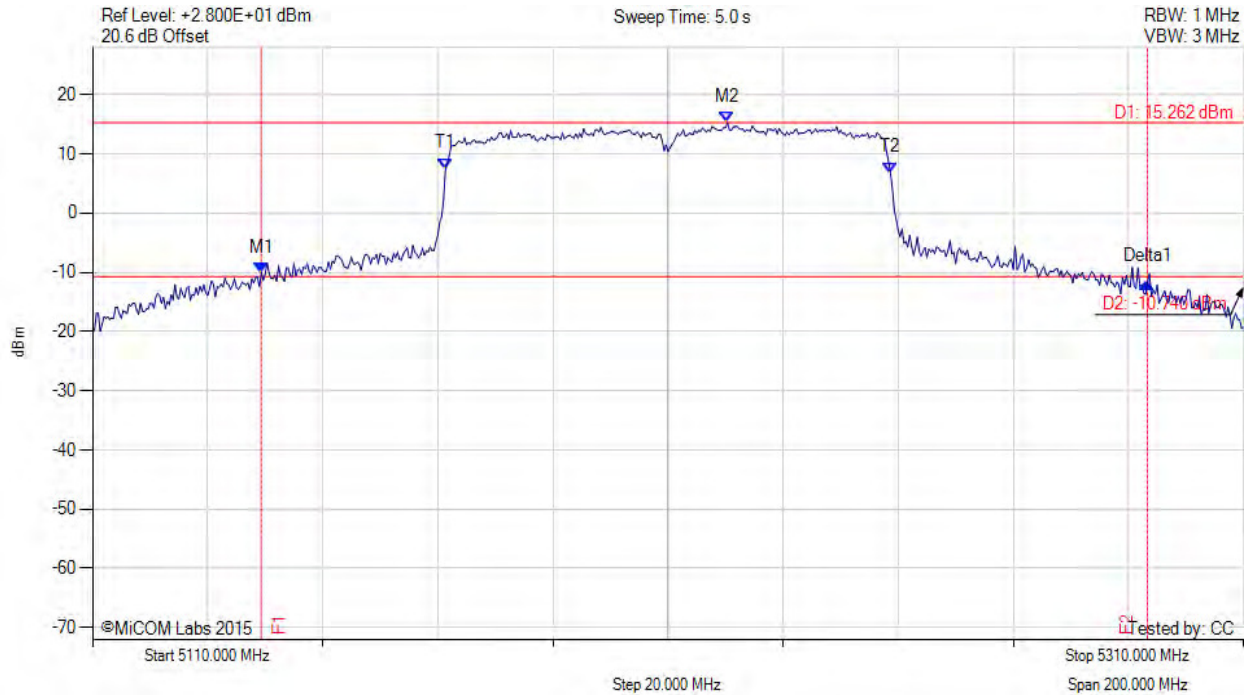
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26 dB & 99% BANDWIDTH



Variante: 802.11ac-80, Channel: 5210.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5139.300 MHz : -10.059 dBm M2 : 5220.300 MHz : 15.262 dBm Delta1 : 154.000 MHz : -1.581 dB T1 : 5171.333 MHz : 7.531 dBm T2 : 5248.667 MHz : 6.818 dBm OBW : 77.480 MHz	Measured 26 dB Bandwidth: 154.000 MHz Measured 99% Bandwidth: 77.480 MHz

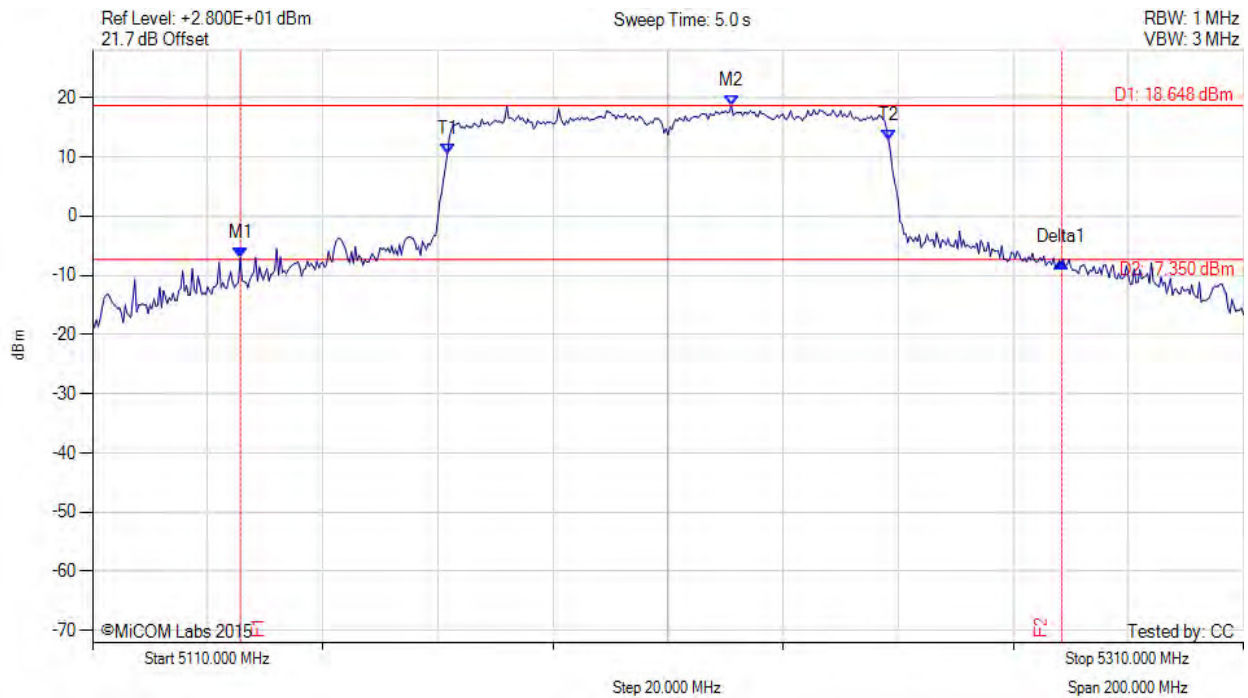
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26 dB & 99% BANDWIDTH



Variante: 802.11ac-80, Channel: 5210.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5135.700 MHz : -7.088 dBm M2 : 5221.000 MHz : 18.648 dBm Delta1 : 142.700 MHz : -0.798 dB T1 : 5171.667 MHz : 10.515 dBm T2 : 5248.333 MHz : 12.842 dBm OBW : 76.784 MHz	Measured 26 dB Bandwidth: 142.700 MHz Measured 99% Bandwidth: 76.784 MHz

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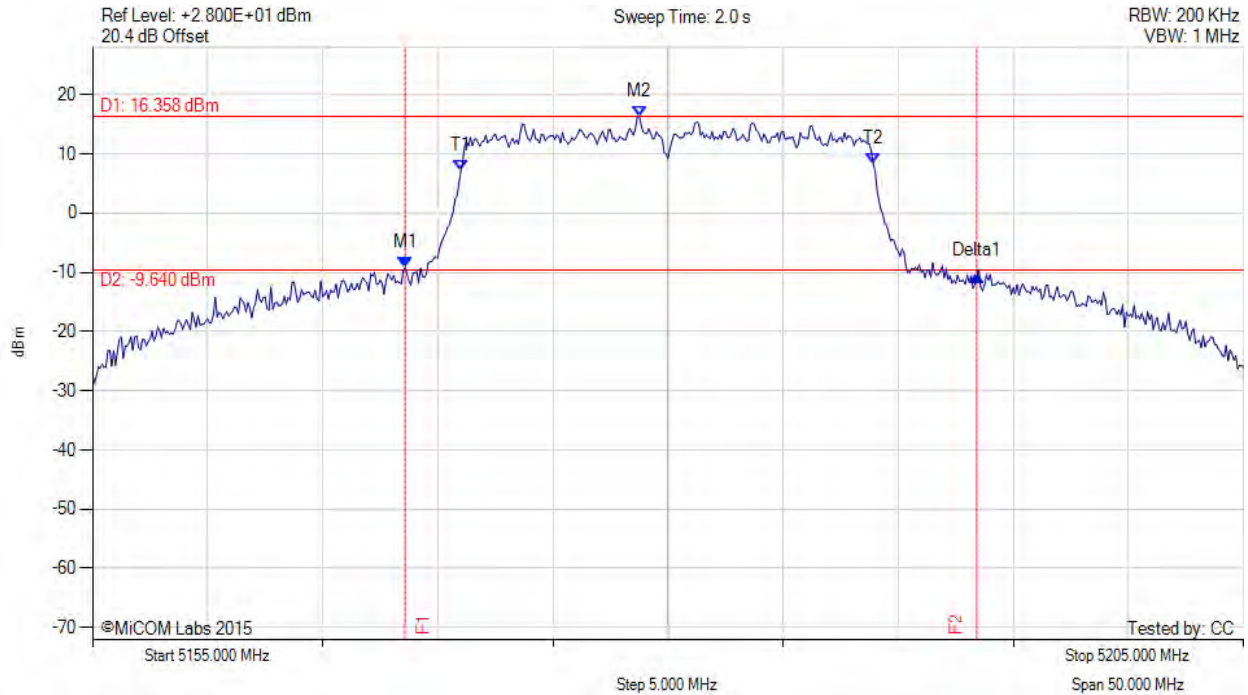




26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5168.580 MHz : -9.224 dBm M2 : 5178.750 MHz : 16.358 dBm Delta1 : 24.830 MHz : -1.402 dB T1 : 5171.000 MHz : 7.078 dBm T2 : 5188.917 MHz : 8.299 dBm OBW : 17.950 MHz	Measured 26 dB Bandwidth : 24.830 MHz Measured 99% Bandwidth: 17.950 MHz

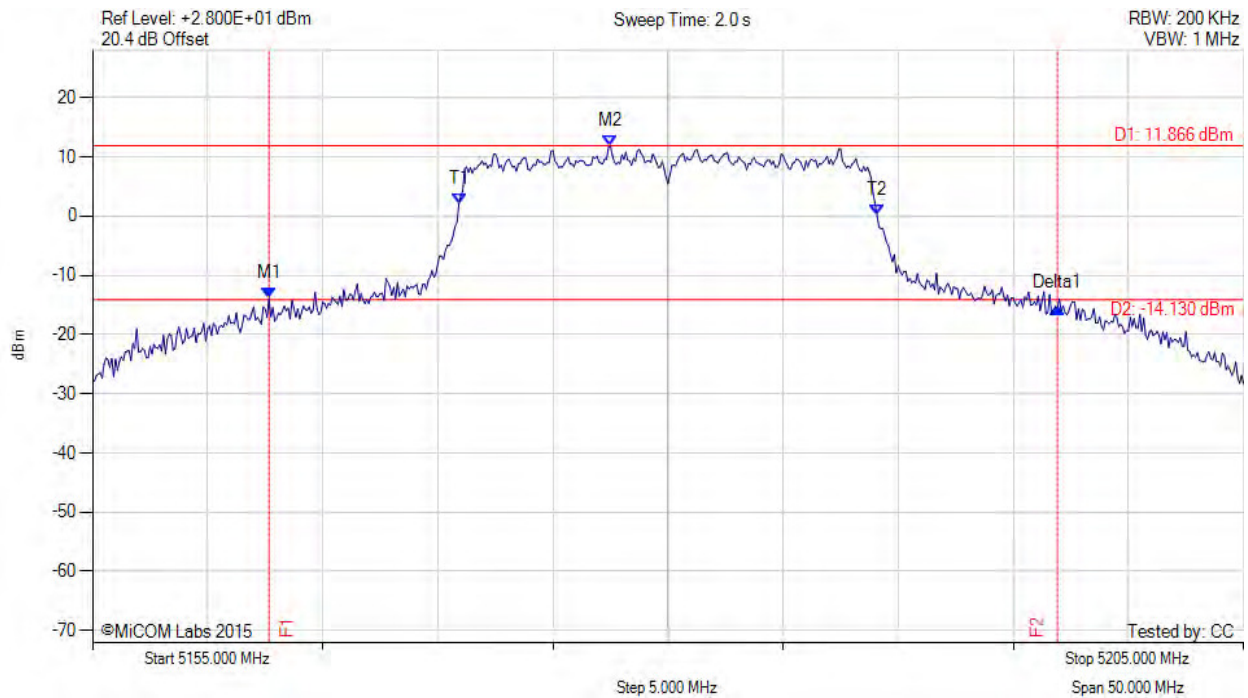
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5162.670 MHz : -13.934 dBm M2 : 5177.500 MHz : 11.866 dBm Delta1 : 34.250 MHz : -1.547 dB T1 : 5170.917 MHz : 2.044 dBm T2 : 5189.083 MHz : 0.129 dBm OBW : 18.277 MHz	Measured 26 dB Bandwidth: 34.250 MHz Measured 99% Bandwidth: 18.277 MHz

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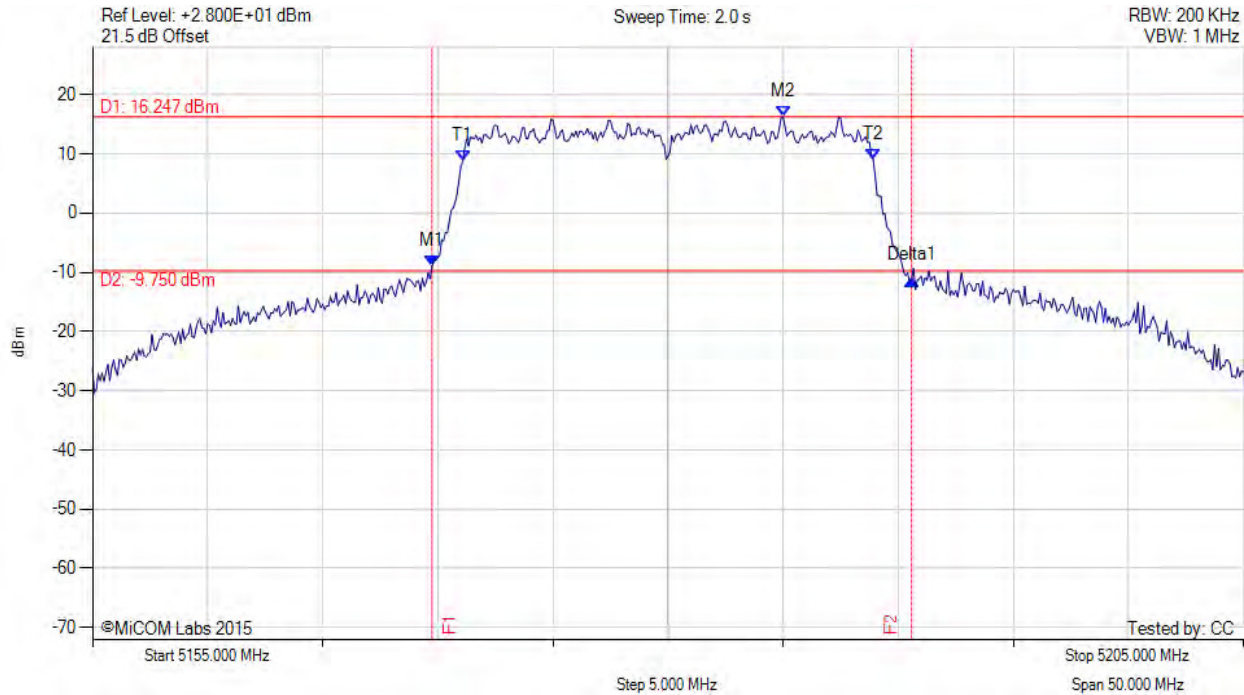




26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5169.750 MHz : -8.954 dBm M2 : 5185.000 MHz : 16.247 dBm Delta1 : 20.830 MHz : -2.321 dB T1 : 5171.083 MHz : 8.708 dBm T2 : 5188.917 MHz : 8.996 dBm OBW : 17.852 MHz	Measured 26 dB Bandwidth: 20.830 MHz Measured 99% Bandwidth: 17.852 MHz

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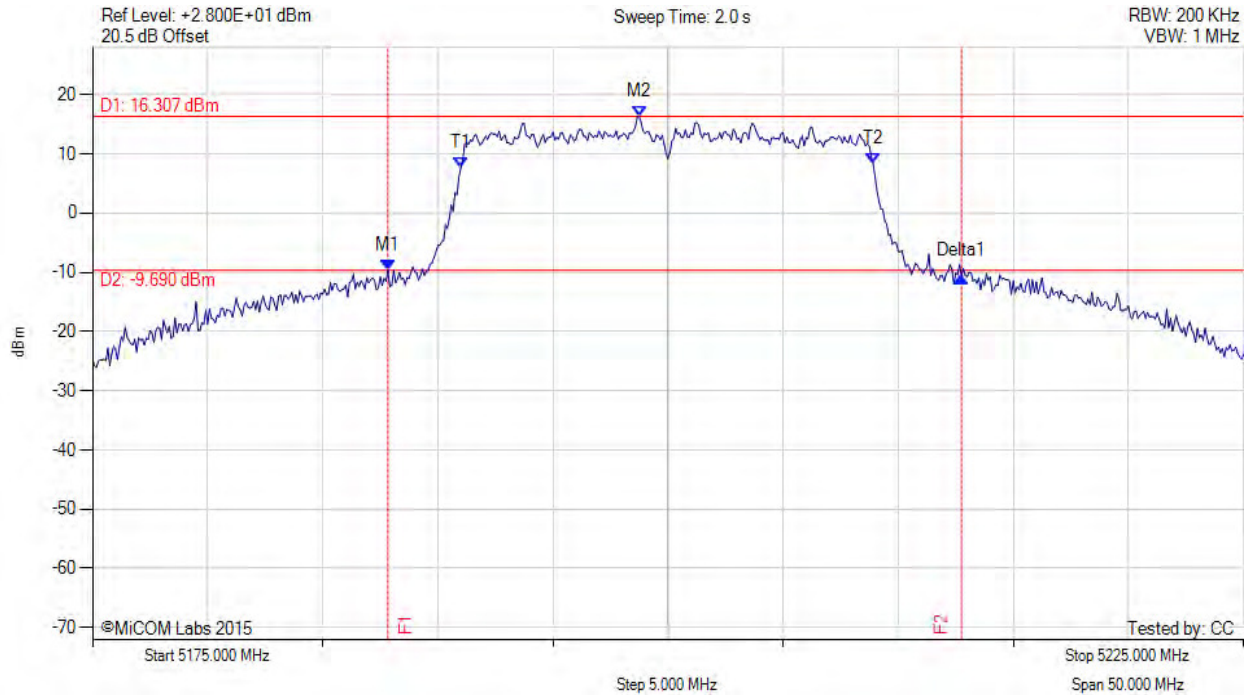
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5187.830 MHz : -9.633 dBm M2 : 5198.750 MHz : 16.307 dBm Delta1 : 24.920 MHz : -1.069 dB T1 : 5191.000 MHz : 7.690 dBm T2 : 5208.917 MHz : 8.269 dBm OBW : 17.994 MHz	Measured 26 dB Bandwidth : 24.920 MHz Measured 99% Bandwidth : 17.994 MHz

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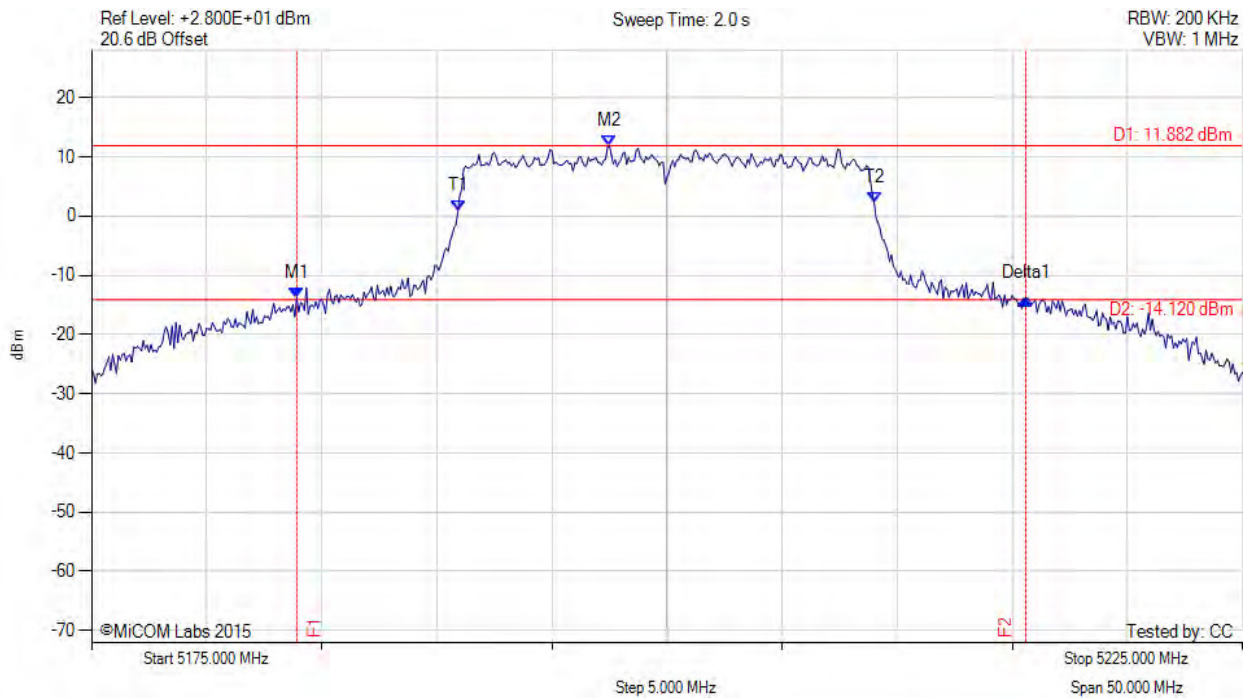
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5183.920 MHz : -13.781 dBm M2 : 5197.500 MHz : 11.882 dBm Delta1 : 31.670 MHz : -0.200 dB T1 : 5190.917 MHz : 0.812 dBm T2 : 5209.000 MHz : 2.309 dBm OBW : 18.169 MHz	Measured 26 dB Bandwidth: 31.670 MHz Measured 99% Bandwidth: 18.169 MHz

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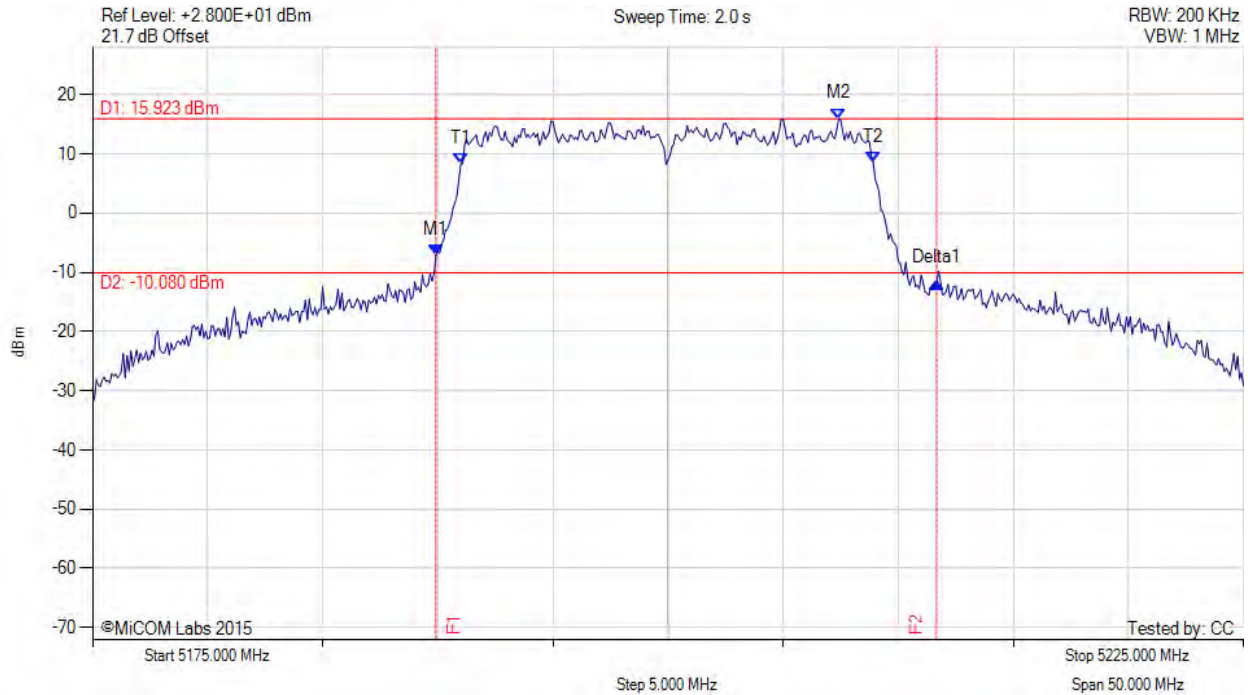
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5189.920 MHz : -7.150 dBm M2 : 5207.420 MHz : 15.923 dBm Delta1 : 21.750 MHz : -4.699 dB T1 : 5191.000 MHz : 8.283 dBm T2 : 5208.917 MHz : 8.561 dBm OBW : 17.866 MHz	Measured 26 dB Bandwidth: 21.750 MHz Measured 99% Bandwidth: 17.866 MHz

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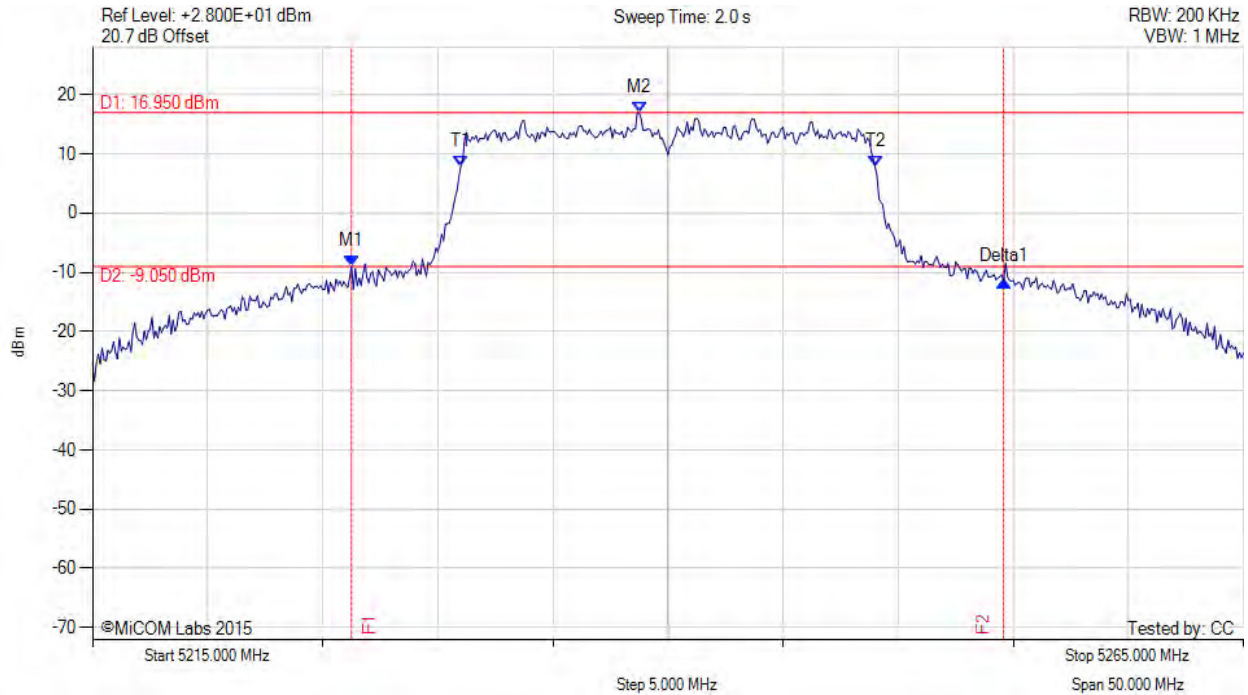
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5226.250 MHz : -8.987 dBm M2 : 5238.750 MHz : 16.950 dBm Delta1 : 28.330 MHz : -2.568 dB T1 : 5231.000 MHz : 7.934 dBm T2 : 5249.000 MHz : 7.771 dBm OBW : 18.016 MHz	Measured 26 dB Bandwidth: 28.330 MHz Measured 99% Bandwidth: 18.016 MHz

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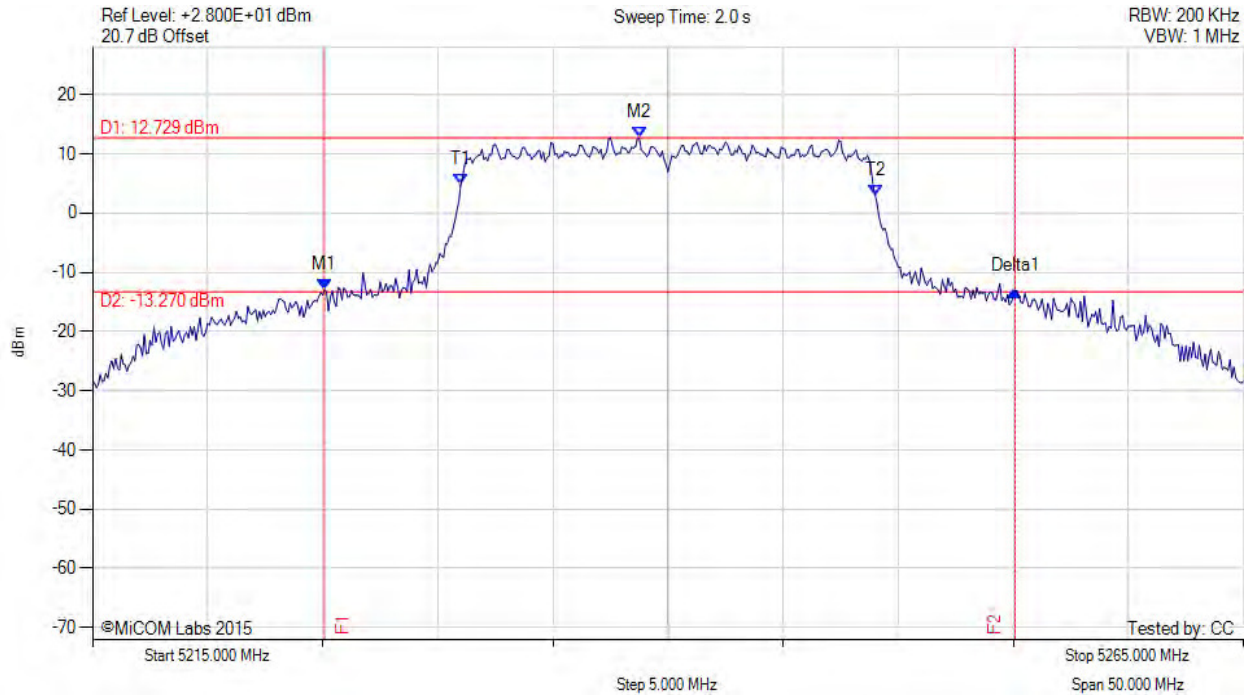
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5225.080 MHz : -12.917 dBm M2 : 5238.750 MHz : 12.729 dBm Delta1 : 30.000 MHz : -0.301 dB T1 : 5231.000 MHz : 4.894 dBm T2 : 5249.000 MHz : 3.042 dBm OBW : 18.026 MHz	Measured 26 dB Bandwidth: 30.000 MHz Measured 99% Bandwidth: 18.026 MHz

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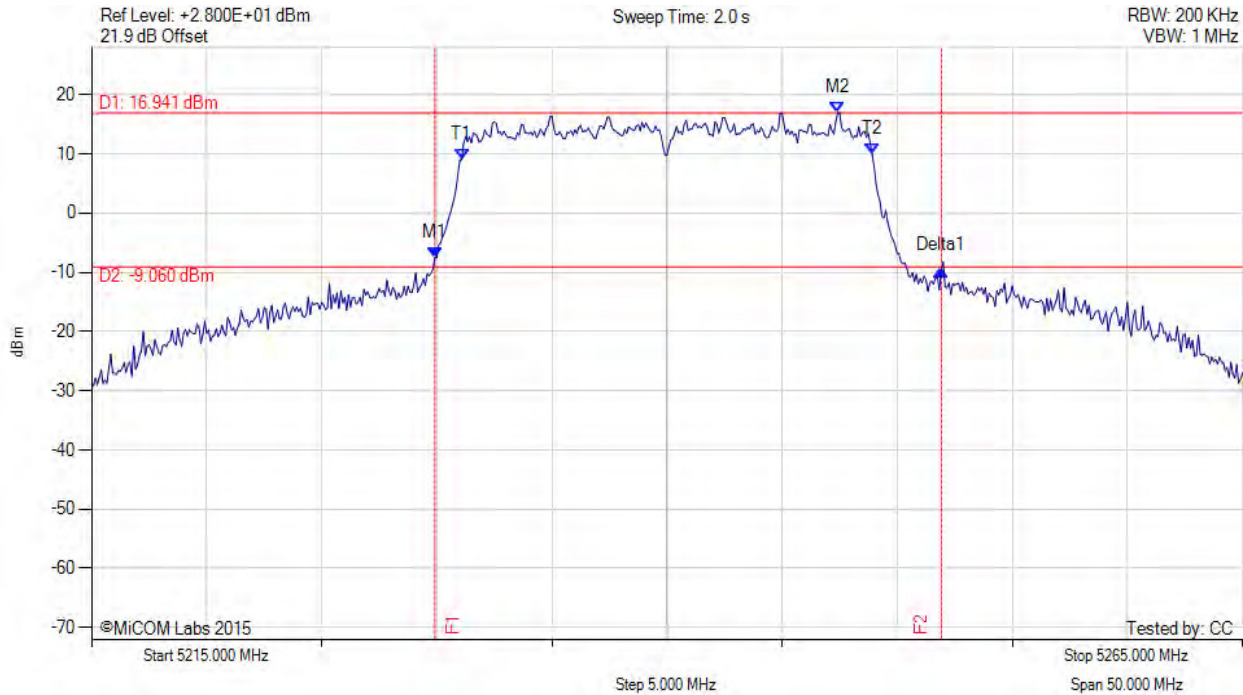




26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5229.920 MHz : -7.504 dBm M2 : 5247.420 MHz : 16.941 dBm Delta1 : 22.000 MHz : -2.214 dB T1 : 5231.083 MHz : 9.006 dBm T2 : 5248.917 MHz : 9.909 dBm OBW : 17.856 MHz	Measured 26 dB Bandwidth: 22.000 MHz Measured 99% Bandwidth: 17.856 MHz

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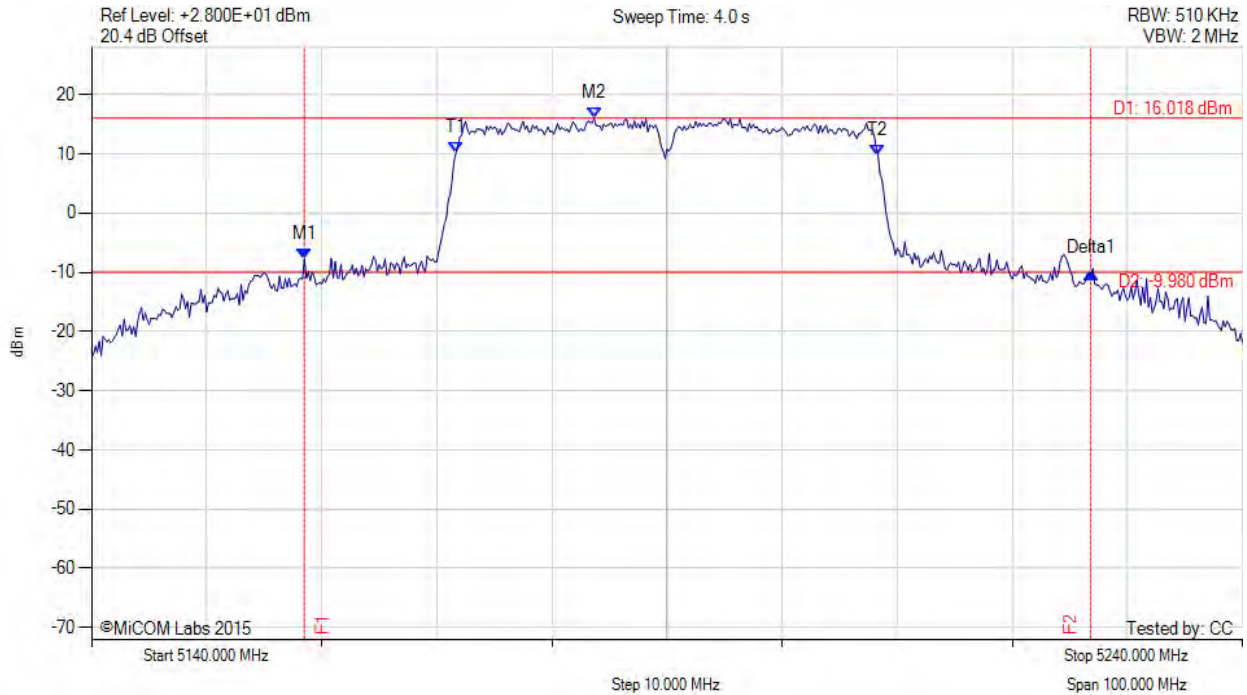
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5158.500 MHz : -7.742 dBm M2 : 5183.670 MHz : 16.018 dBm Delta1 : 68.330 MHz : -2.451 dB T1 : 5171.667 MHz : 10.243 dBm T2 : 5208.333 MHz : 9.835 dBm OBW : 36.756 MHz	Measured 26 dB Bandwidth: 68.330 MHz Measured 99% Bandwidth: 36.756 MHz

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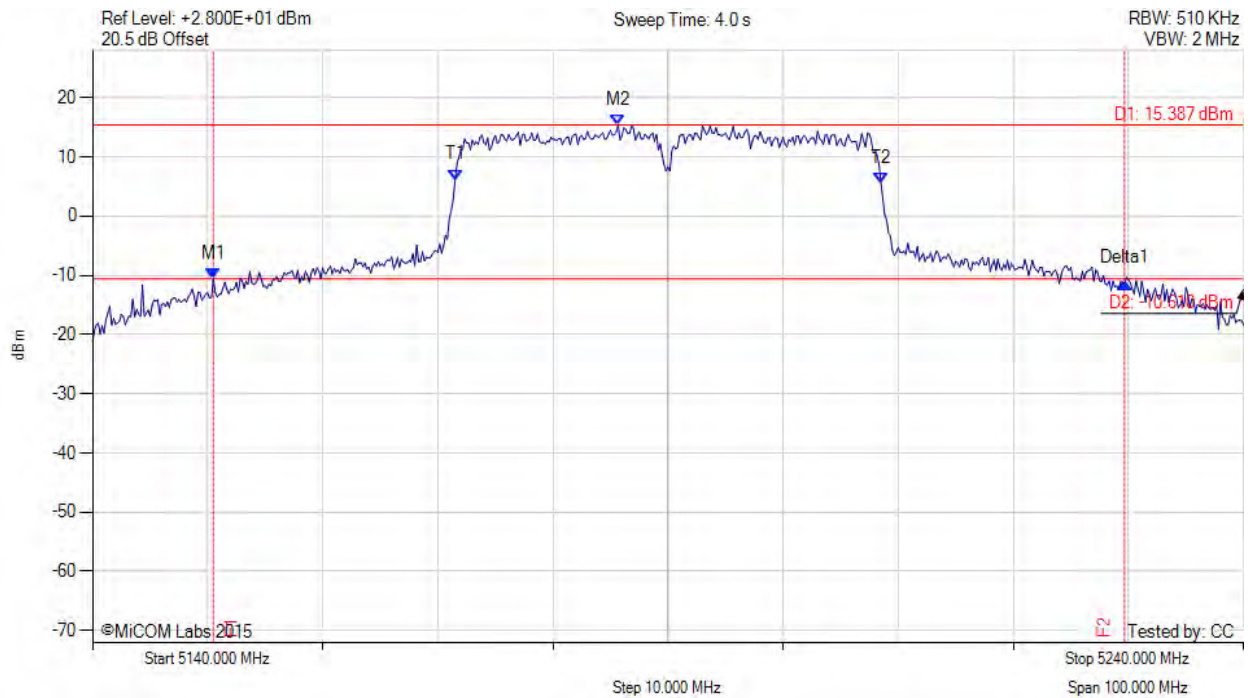


**Title:** Aruba Networks APEX0104  
**To:** FCC CFR 47 Part 15 Subpart E 15.407  
**Serial #:** ARUB199-U6 Rev A  
**Issue Date:** 27<sup>th</sup> August 2015  
**Page:** 97 of 227

26 dB & 99% BANDWIDTH



Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5150.500 MHz : -10.532 dBm M2 : 5185.670 MHz : 15.387 dBm Delta1 : 79.170 MHz : -0.848 dB T1 : 5171.500 MHz : 6.129 dBm T2 : 5208.500 MHz : 5.555 dBm OBW : 37.414 MHz	Measured 26 dB Bandwidth: 79.170 MHz Measured 99% Bandwidth: 37.414 MHz

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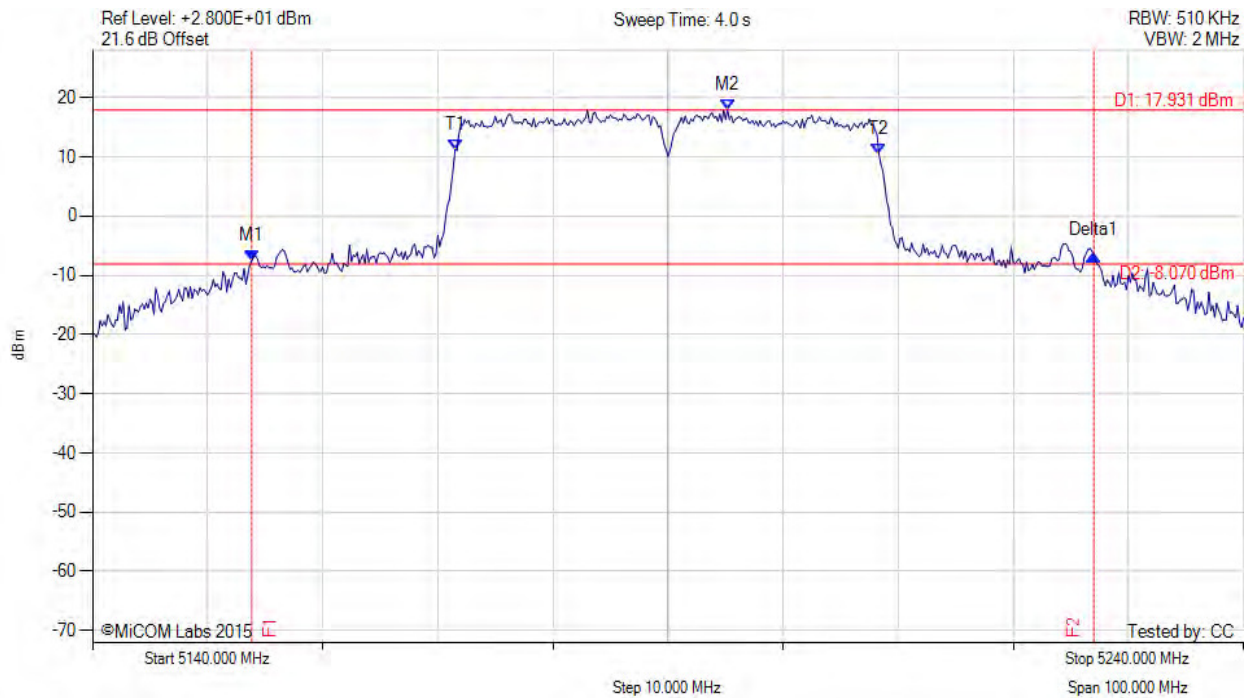
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5153.830 MHz : -7.506 dBm M2 : 5195.170 MHz : 17.931 dBm Delta1 : 73.170 MHz : 0.960 dB T1 : 5171.500 MHz : 11.239 dBm T2 : 5208.333 MHz : 10.446 dBm OBW : 36.975 MHz	Measured 26 dB Bandwidth: 73.170 MHz Measured 99% Bandwidth: 36.975 MHz

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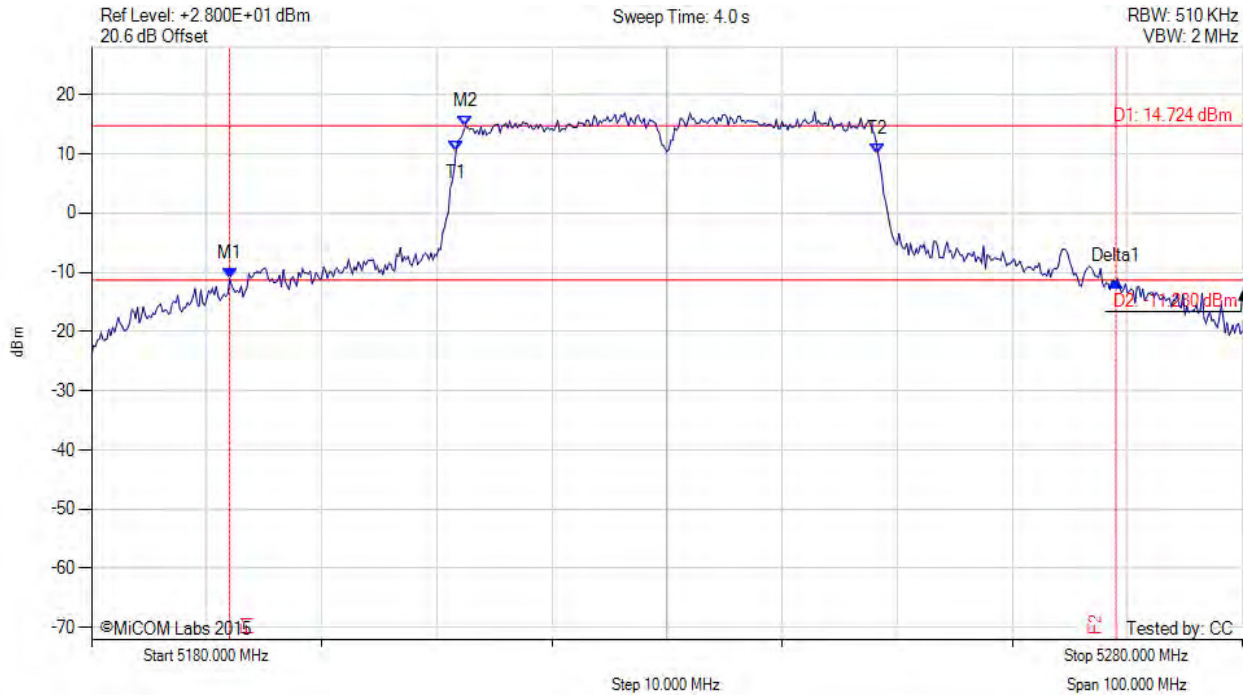
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5192.000 MHz : -11.135 dBm M2 : 5212.500 MHz : 14.724 dBm Delta1 : 77.000 MHz : -0.391 dB T1 : 5211.667 MHz : 10.387 dBm T2 : 5248.333 MHz : 10.021 dBm OBW : 36.769 MHz	Measured 26 dB Bandwidth: 77.000 MHz Measured 99% Bandwidth: 36.769 MHz

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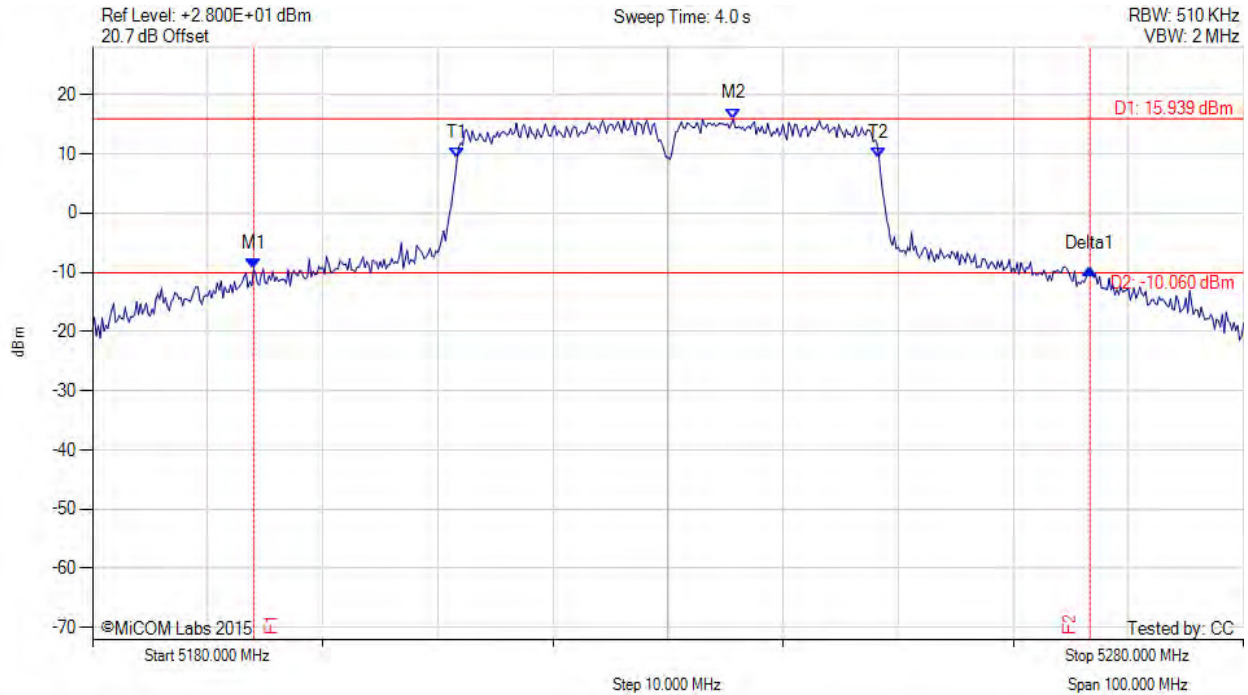
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5194.000 MHz : -9.402 dBm M2 : 5235.670 MHz : 15.939 dBm Delta1 : 72.670 MHz : -0.112 dB T1 : 5211.667 MHz : 9.186 dBm T2 : 5248.333 MHz : 9.345 dBm OBW : 36.759 MHz	Measured 26 dB Bandwidth: 72.670 MHz Measured 99% Bandwidth: 36.759 MHz

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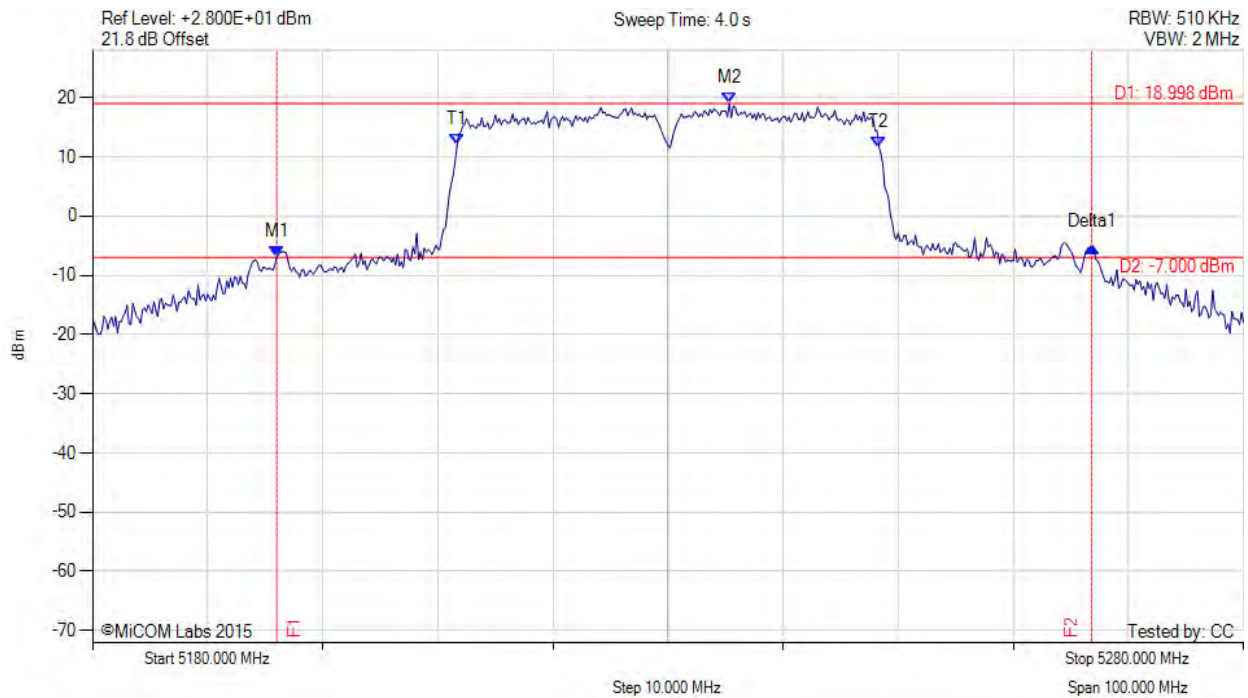
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5196.000 MHz : -6.949 dBm M2 : 5235.330 MHz : 18.998 dBm Delta1 : 70.830 MHz : 1.734 dB T1 : 5211.667 MHz : 11.986 dBm T2 : 5248.333 MHz : 11.668 dBm OBW : 36.825 MHz	Measured 26 dB Bandwidth: 70.830 MHz Measured 99% Bandwidth: 36.825 MHz

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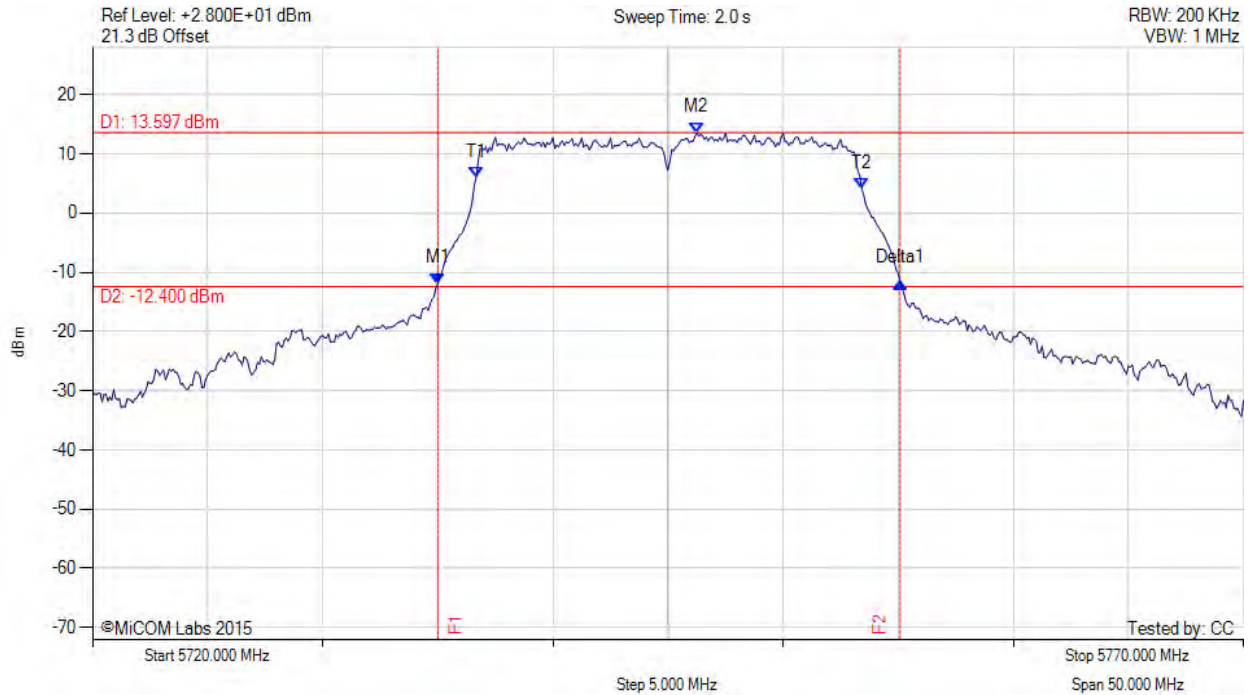
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26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5745.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5735.000 MHz : -11.887 dBm M2 : 5746.250 MHz : 13.597 dBm Delta1 : 20.080 MHz : 0.144 dB T1 : 5736.667 MHz : 6.089 dBm T2 : 5753.417 MHz : 4.162 dBm OBW : 16.697 MHz	Measured 26 dB Bandwidth: 20.080 MHz Measured 99% Bandwidth: 16.697 MHz

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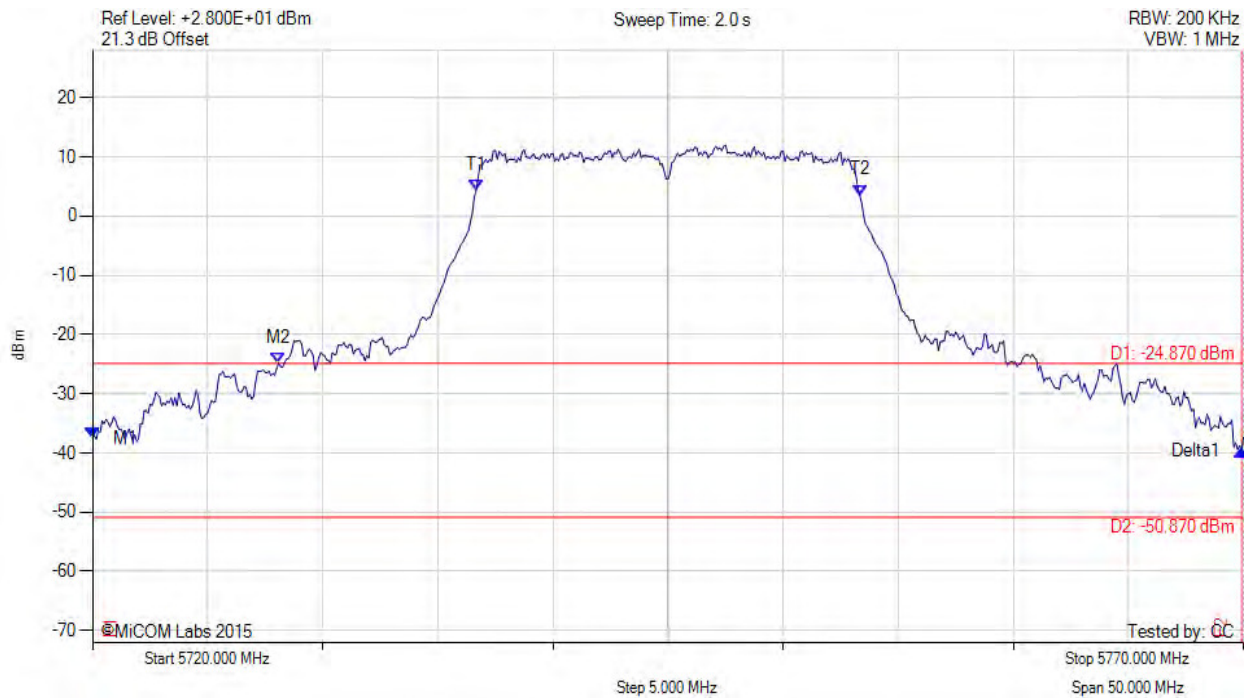


**Title:** Aruba Networks APEX0104  
**To:** FCC CFR 47 Part 15 Subpart E 15.407  
**Serial #:** ARUB199-U6 Rev A  
**Issue Date:** 27<sup>th</sup> August 2015  
**Page:** 103 of 227

26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5745.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5720.000 MHz : -37.517 dBm M2 : 5728.080 MHz : -24.870 dBm Delta1 : 49.920 MHz : -2.126 dB T1 : 5736.667 MHz : 4.337 dBm T2 : 5753.333 MHz : 3.553 dBm OBW : 16.605 MHz	Measured 26 dB Bandwidth: 49.920 MHz Measured 99% Bandwidth: 16.605 MHz

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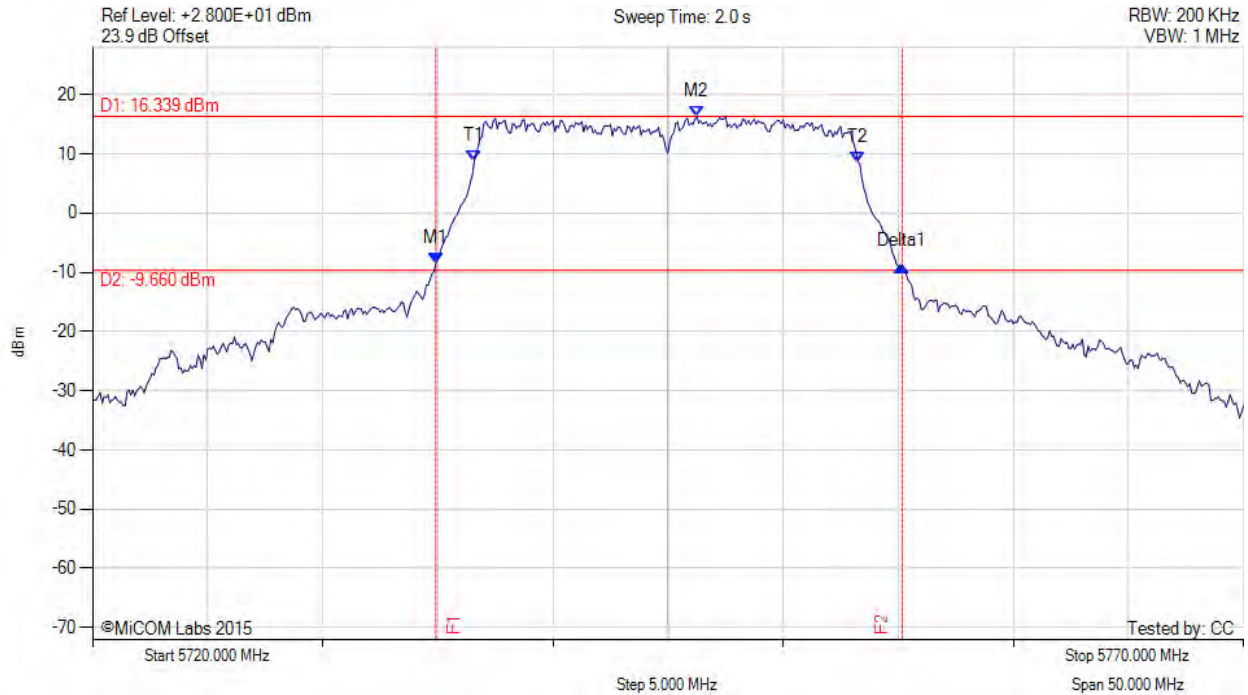
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26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5745.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5734.920 MHz : -8.430 dBm M2 : 5746.250 MHz : 16.339 dBm Delta1 : 20.250 MHz : -0.499 dB T1 : 5736.583 MHz : 8.772 dBm T2 : 5753.250 MHz : 8.627 dBm OBW : 16.689 MHz	Measured 26 dB Bandwidth: 20.250 MHz Measured 99% Bandwidth: 16.689 MHz

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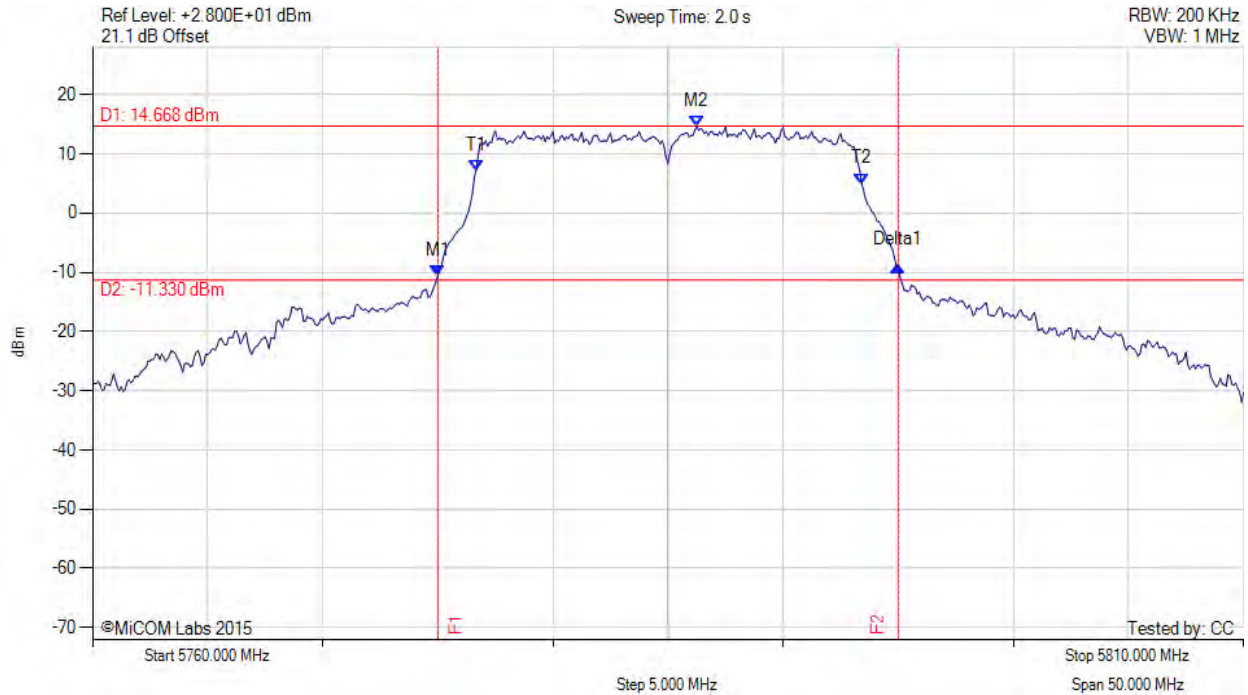




26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5785.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5775.000 MHz : -10.530 dBm M2 : 5786.250 MHz : 14.668 dBm Delta1 : 20.000 MHz : 1.679 dB T1 : 5776.667 MHz : 7.238 dBm T2 : 5793.417 MHz : 4.961 dBm OBW : 16.745 MHz	Measured 26 dB Bandwidth: 20.000 MHz Measured 99% Bandwidth: 16.745 MHz

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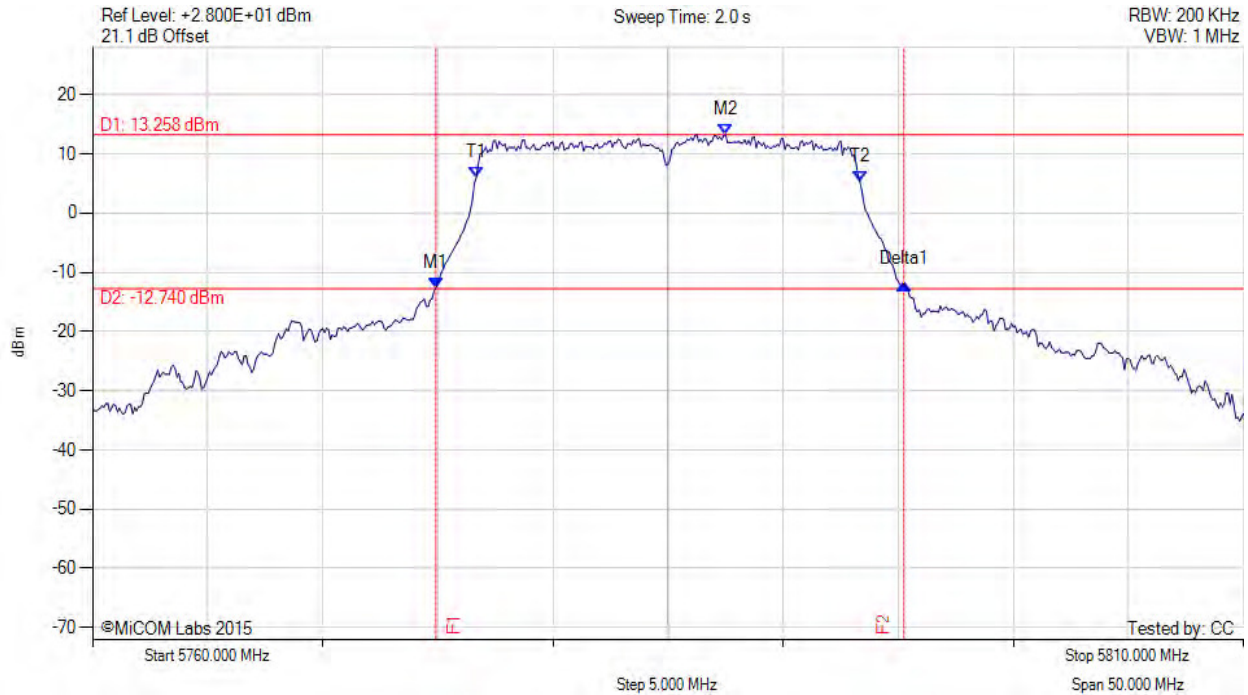
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26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5785.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5774.920 MHz : -12.613 dBm M2 : 5787.500 MHz : 13.258 dBm Delta1 : 20.330 MHz : 0.697 dB T1 : 5776.667 MHz : 5.943 dBm T2 : 5793.333 MHz : 5.354 dBm OBW : 16.668 MHz	Measured 26 dB Bandwidth: 20.330 MHz Measured 99% Bandwidth: 16.668 MHz

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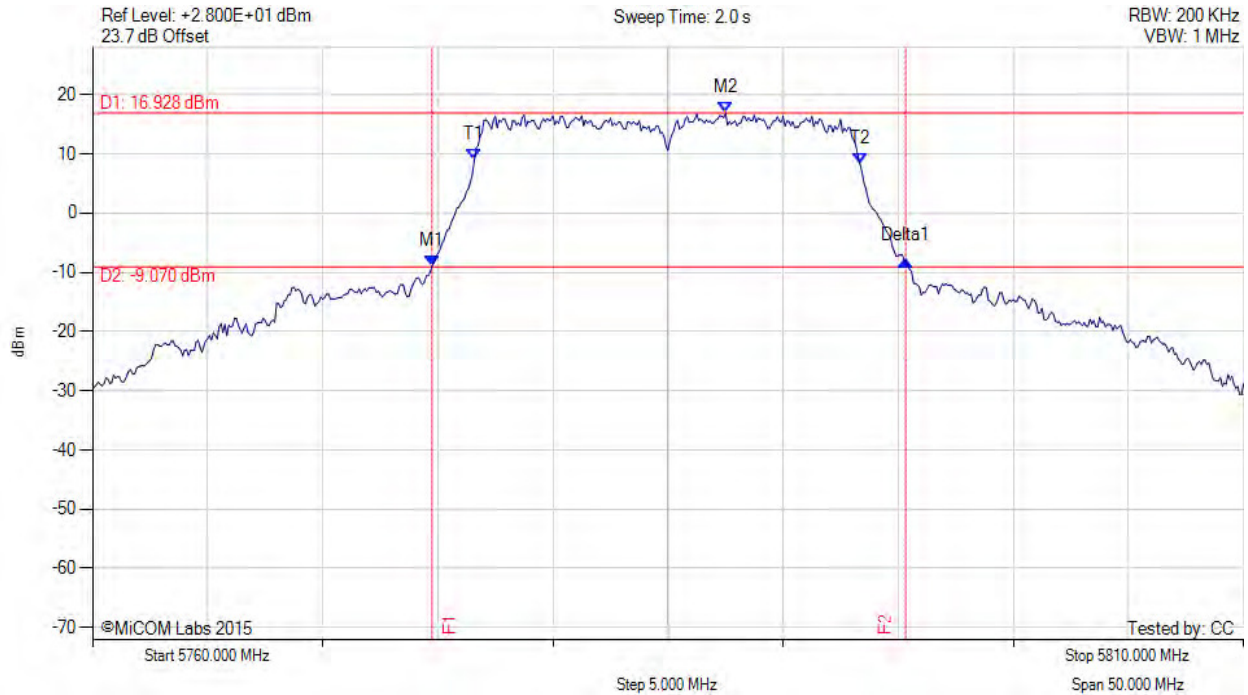
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26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5785.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5774.750 MHz : -8.912 dBm M2 : 5787.500 MHz : 16.928 dBm Delta1 : 20.580 MHz : 0.972 dB T1 : 5776.583 MHz : 8.975 dBm T2 : 5793.333 MHz : 8.398 dBm OBW : 16.731 MHz	Measured 26 dB Bandwidth: 20.580 MHz Measured 99% Bandwidth: 16.731 MHz

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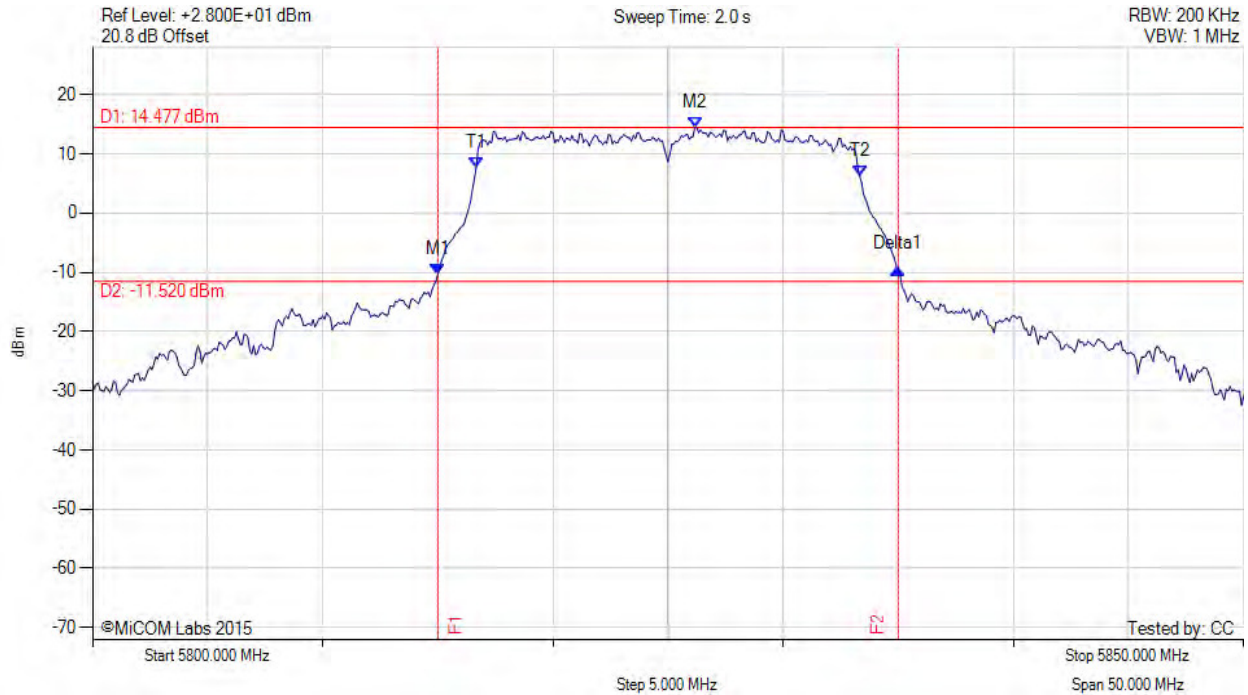
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26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5825.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5815.000 MHz : -10.296 dBm M2 : 5826.170 MHz : 14.477 dBm Delta1 : 20.000 MHz : 0.947 dB T1 : 5816.667 MHz : 7.632 dBm T2 : 5833.333 MHz : 6.258 dBm OBW : 16.723 MHz	Measured 26 dB Bandwidth: 20.000 MHz Measured 99% Bandwidth: 16.723 MHz

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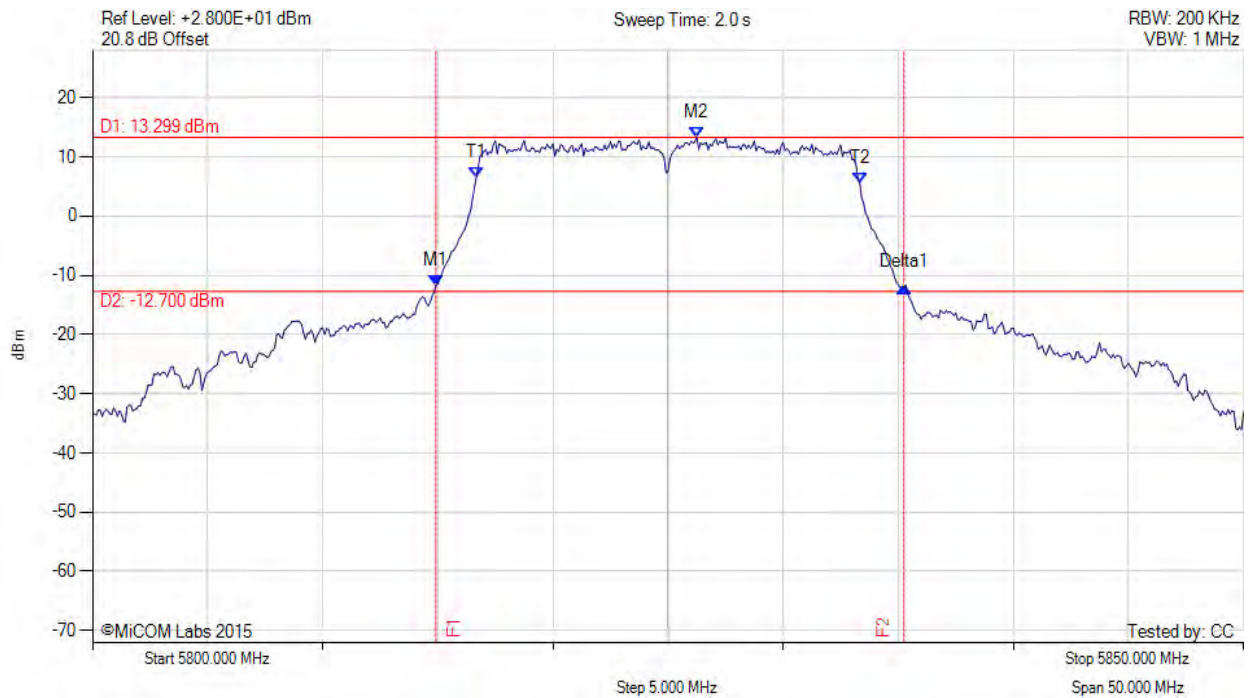
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26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5825.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5814.920 MHz : -11.767 dBm M2 : 5826.250 MHz : 13.299 dBm Delta1 : 20.330 MHz : -0.190 dB T1 : 5816.667 MHz : 6.399 dBm T2 : 5833.333 MHz : 5.548 dBm OBW : 16.682 MHz	Measured 26 dB Bandwidth: 20.330 MHz Measured 99% Bandwidth: 16.682 MHz

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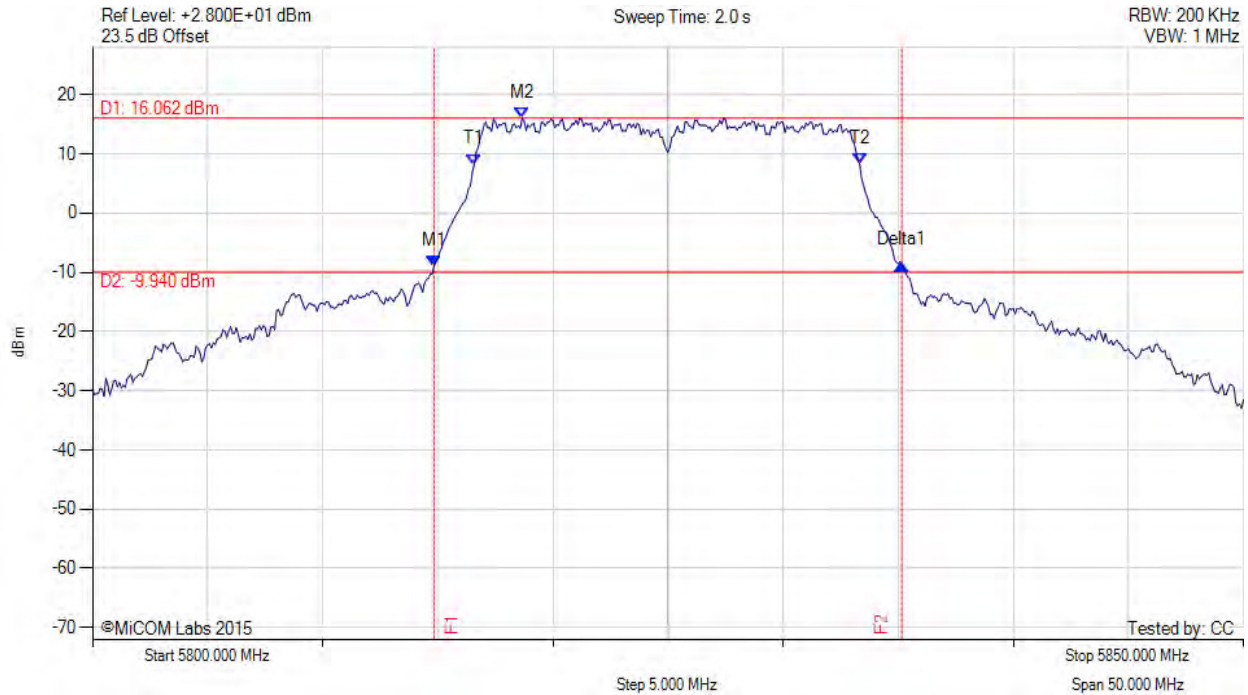
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26 dB & 99% BANDWIDTH



Variant: 802.11a, Channel: 5825.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5814.830 MHz : -8.994 dBm M2 : 5818.670 MHz : 16.062 dBm Delta1 : 20.330 MHz : 0.172 dB T1 : 5816.583 MHz : 8.231 dBm T2 : 5833.333 MHz : 8.262 dBm OBW : 16.725 MHz	Measured 26 dB Bandwidth: 20.330 MHz Measured 99% Bandwidth: 16.725 MHz

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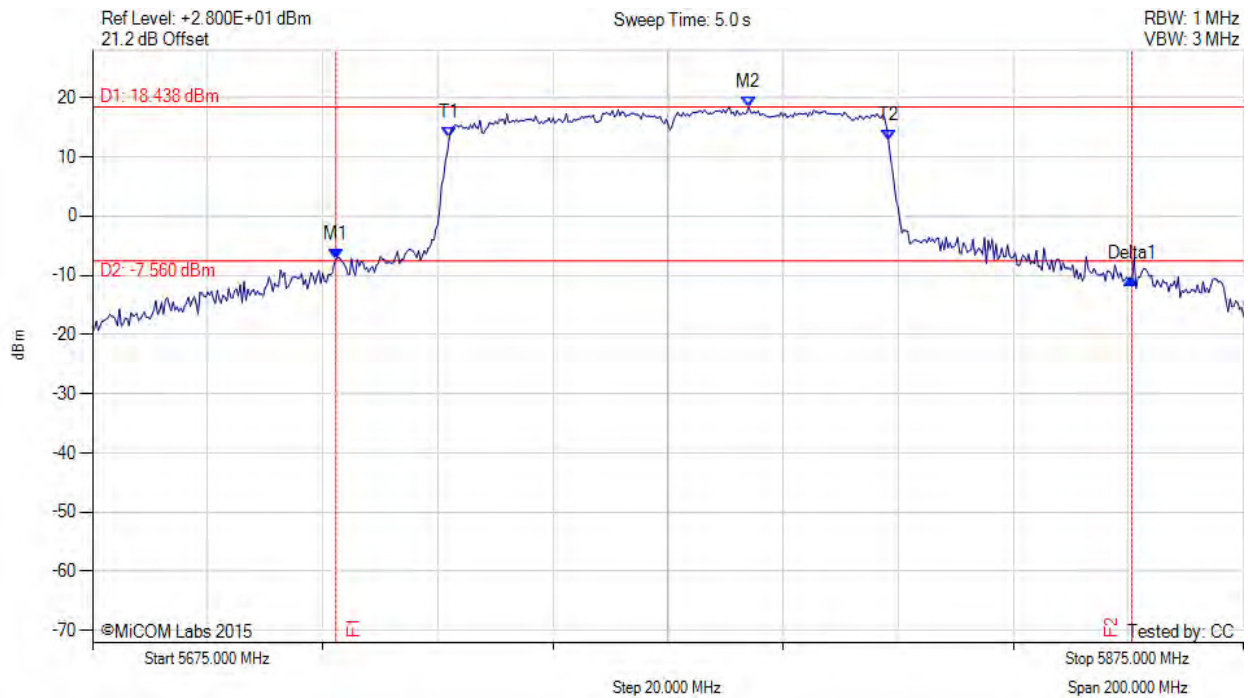




26 dB & 99% BANDWIDTH



Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5717.300 MHz : -7.269 dBm M2 : 5789.000 MHz : 18.438 dBm Delta1 : 138.300 MHz : -3.376 dB T1 : 5737.000 MHz : 13.208 dBm T2 : 5813.333 MHz : 12.682 dBm OBW : 76.429 MHz	Measured 26 dB Bandwidth: 138.300 MHz Measured 99% Bandwidth: 76.429 MHz

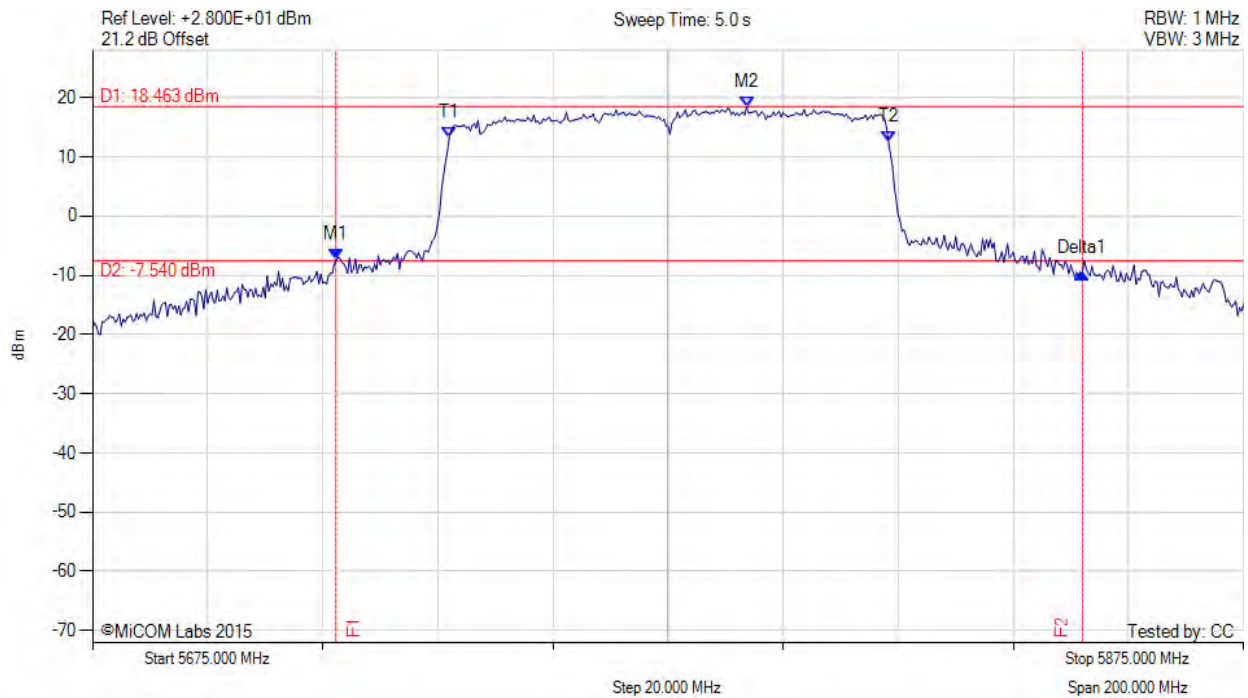
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26 dB & 99% BANDWIDTH



Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5717.300 MHz : -7.421 dBm M2 : 5788.700 MHz : 18.463 dBm Delta1 : 129.700 MHz : -2.328 dB T1 : 5737.000 MHz : 13.329 dBm T2 : 5813.333 MHz : 12.466 dBm OBW : 76.455 MHz	Channel Frequency: 5775.00 MHz

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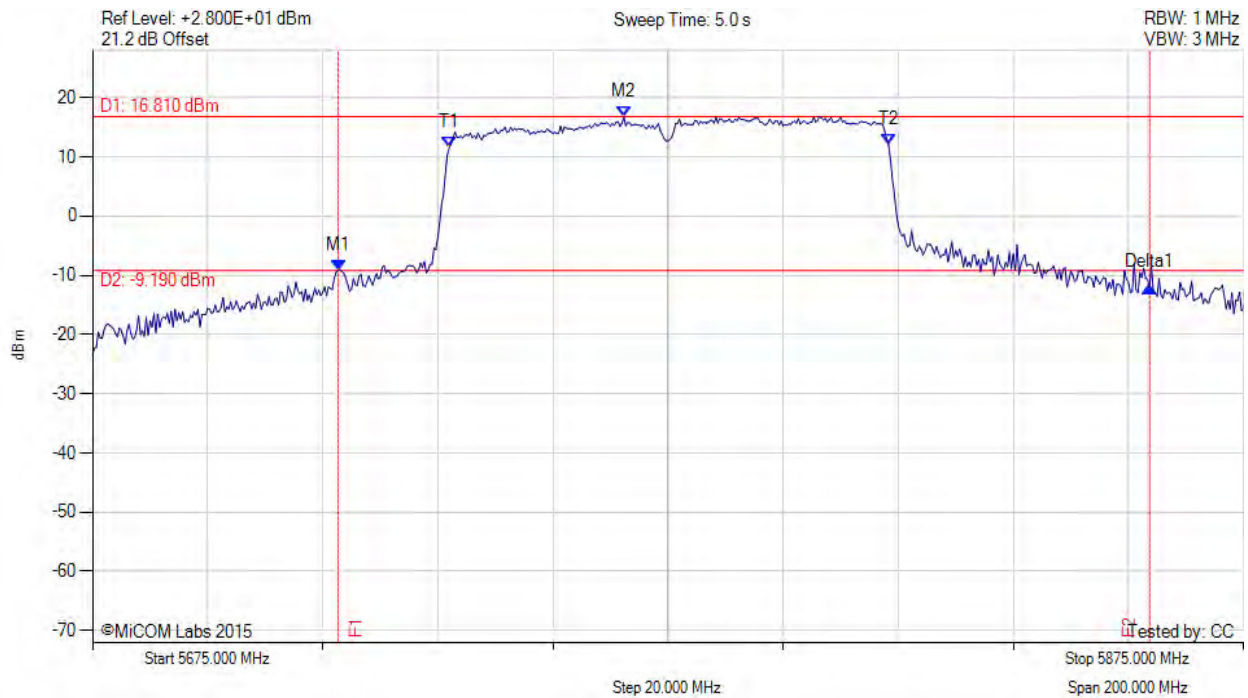




26 dB & 99% BANDWIDTH



Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5717.700 MHz : -9.153 dBm M2 : 5767.300 MHz : 16.810 dBm Delta1 : 141.000 MHz : -2.897 dB T1 : 5737.000 MHz : 11.575 dBm T2 : 5813.333 MHz : 12.049 dBm OBW : 76.467 MHz	Measured 26 dB Bandwidth: 141.000 MHz Measured 99% Bandwidth: 76.467 MHz

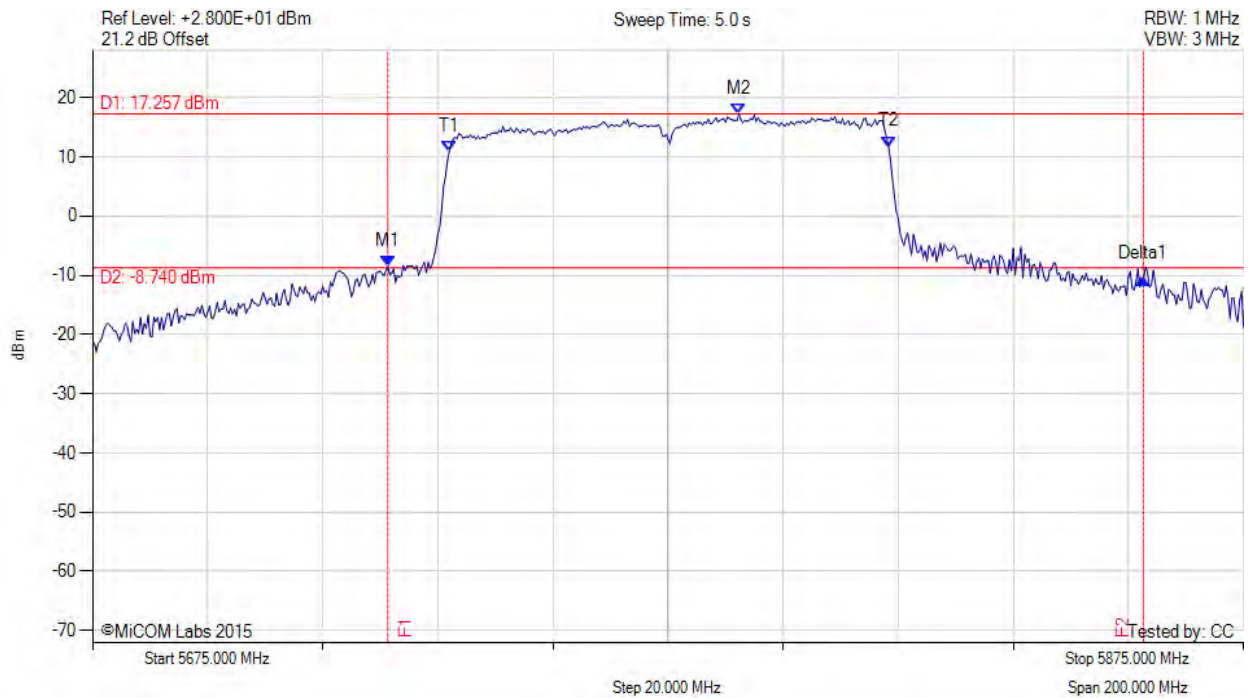
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26 dB & 99% BANDWIDTH



Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5726.300 MHz : -8.478 dBm M2 : 5787.300 MHz : 17.257 dBm Delta1 : 131.300 MHz : -2.076 dB T1 : 5737.000 MHz : 10.976 dBm T2 : 5813.333 MHz : 11.730 dBm OBW : 76.374 MHz	Channel Frequency: 5775.00 MHz

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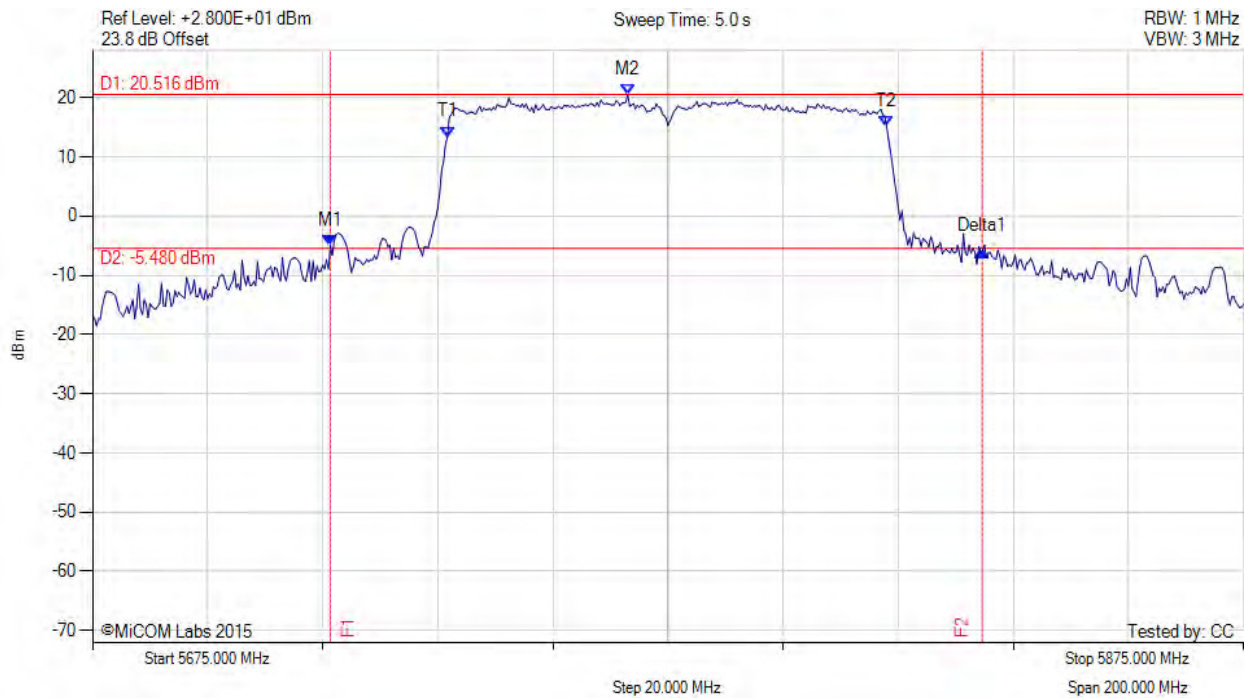
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26 dB & 99% BANDWIDTH



Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5716.300 MHz : -4.958 dBm M2 : 5768.000 MHz : 20.516 dBm Delta1 : 113.300 MHz : -0.870 dB T1 : 5736.667 MHz : 13.363 dBm T2 : 5813.000 MHz : 15.160 dBm OBW : 76.287 MHz	Measured 26 dB Bandwidth: 113.300 MHz Measured 99% Bandwidth: 76.287 MHz

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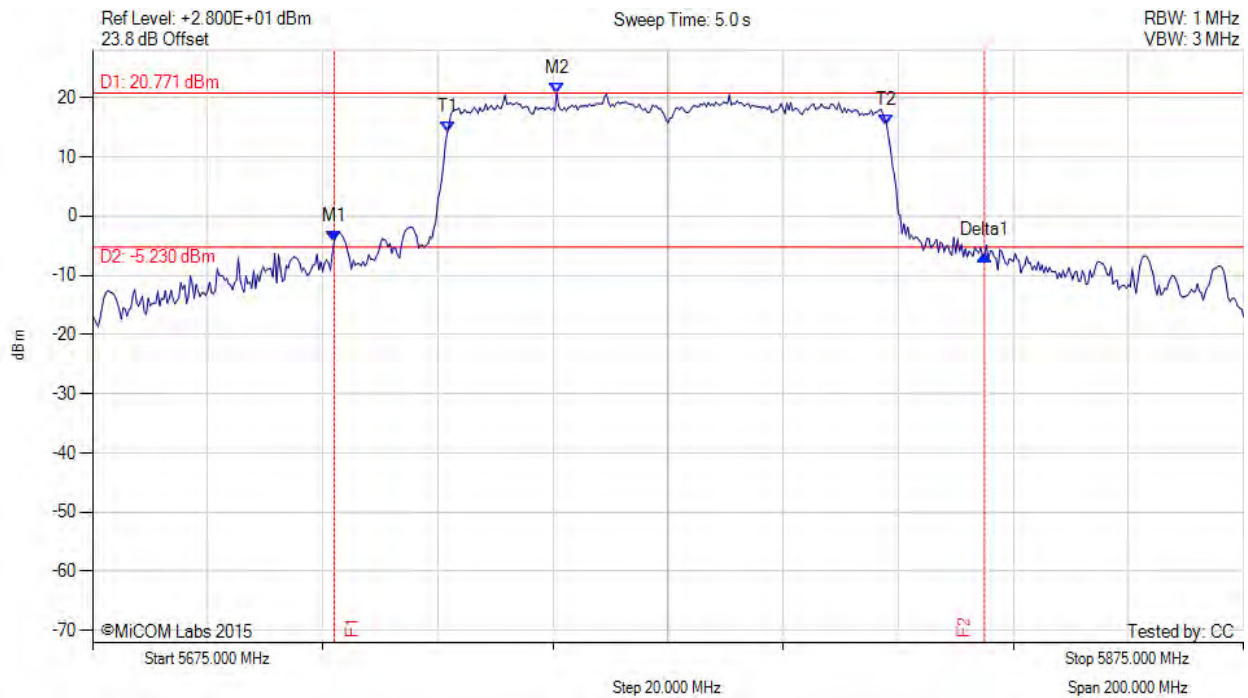
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26 dB & 99% BANDWIDTH



Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5717.000 MHz : -4.207 dBm M2 : 5755.700 MHz : 20.771 dBm Delta1 : 113.000 MHz : -2.379 dB T1 : 5736.667 MHz : 14.127 dBm T2 : 5813.000 MHz : 15.378 dBm OBW : 76.375 MHz	Channel Frequency: 5775.00 MHz

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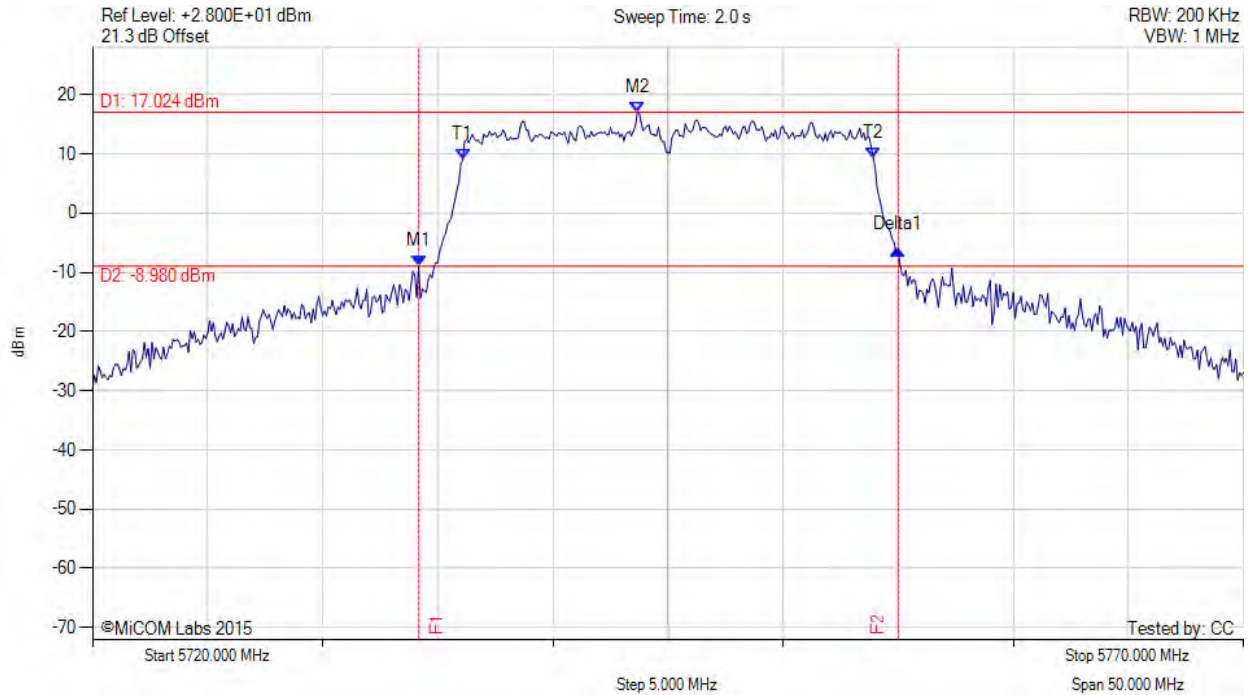
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5745.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5734.170 MHz : -8.894 dBm M2 : 5743.670 MHz : 17.024 dBm Delta1 : 20.830 MHz : 2.647 dB T1 : 5736.083 MHz : 8.945 dBm T2 : 5753.917 MHz : 9.290 dBm OBW : 17.842 MHz	Measured 26 dB Bandwidth: 20.830 MHz Measured 99% Bandwidth: 17.842 MHz

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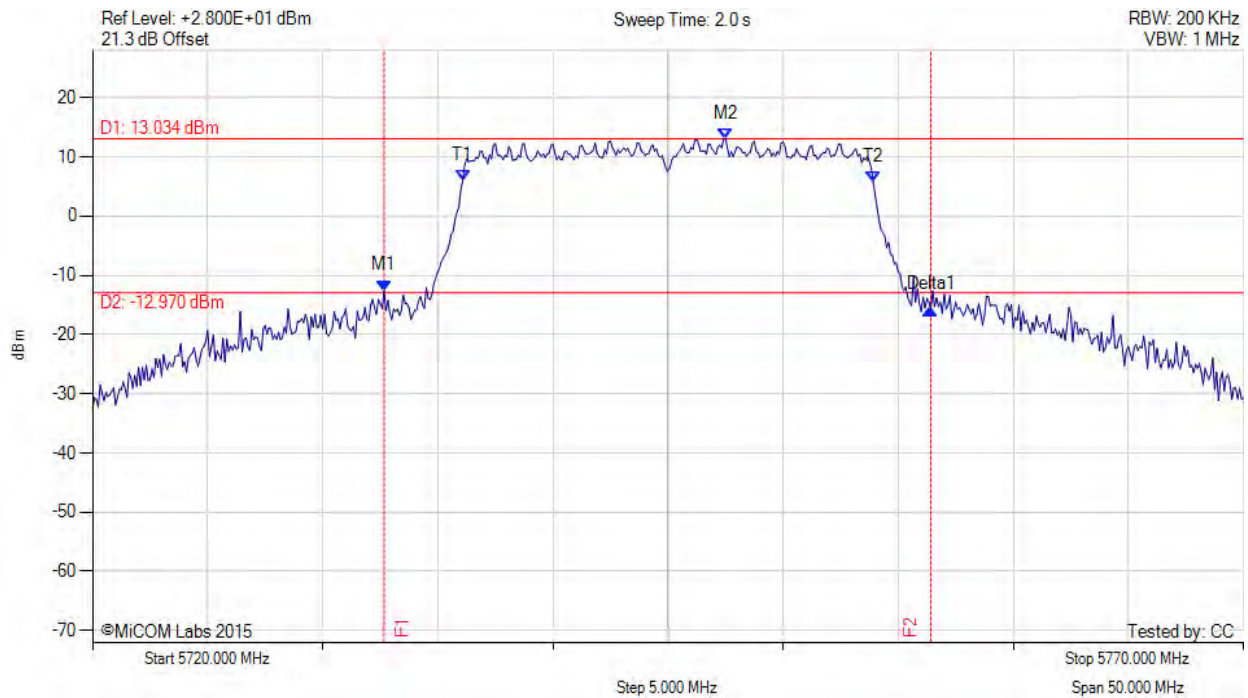
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5745.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5732.670 MHz : -12.567 dBm M2 : 5747.500 MHz : 13.034 dBm Delta1 : 23.750 MHz : -3.190 dB T1 : 5736.083 MHz : 6.085 dBm T2 : 5753.917 MHz : 5.707 dBm OBW : 17.807 MHz	Measured 26 dB Bandwidth: 23.750 MHz Measured 99% Bandwidth: 17.807 MHz

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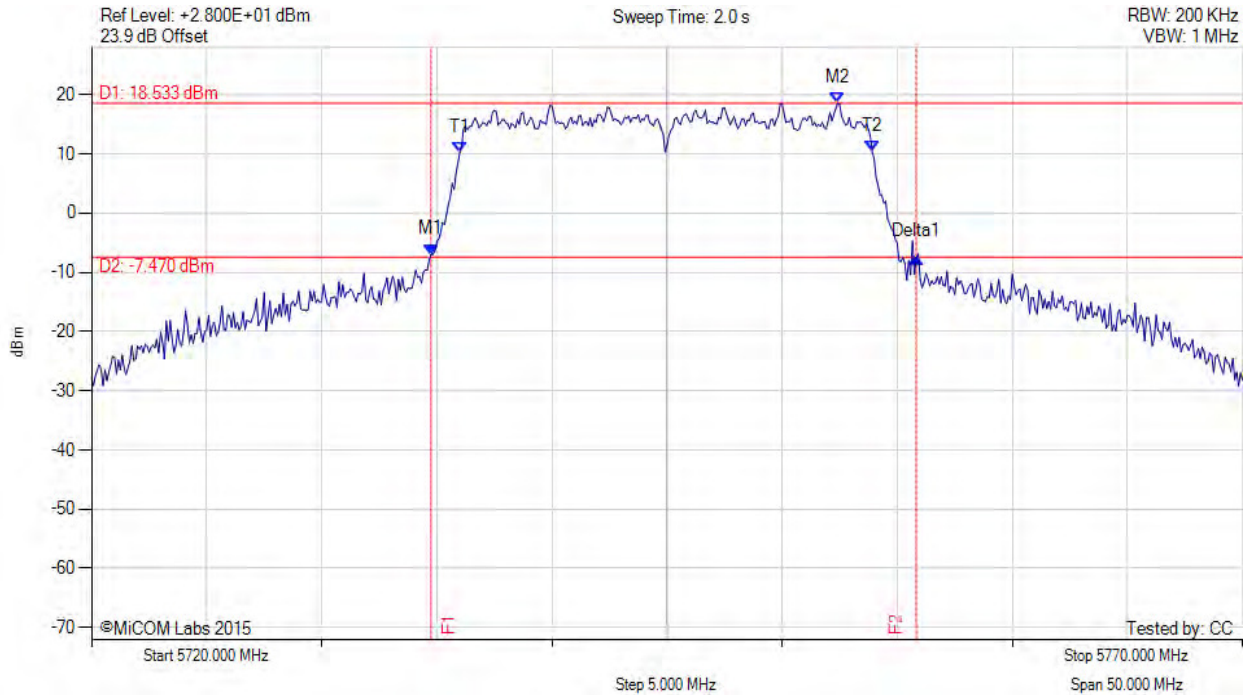




26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5745.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5734.750 MHz : -6.962 dBm M2 : 5752.420 MHz : 18.533 dBm Delta1 : 21.080 MHz : -0.461 dB T1 : 5736.000 MHz : 10.221 dBm T2 : 5753.917 MHz : 10.346 dBm OBW : 17.829 MHz	Measured 26 dB Bandwidth: 21.080 MHz Measured 99% Bandwidth: 17.829 MHz

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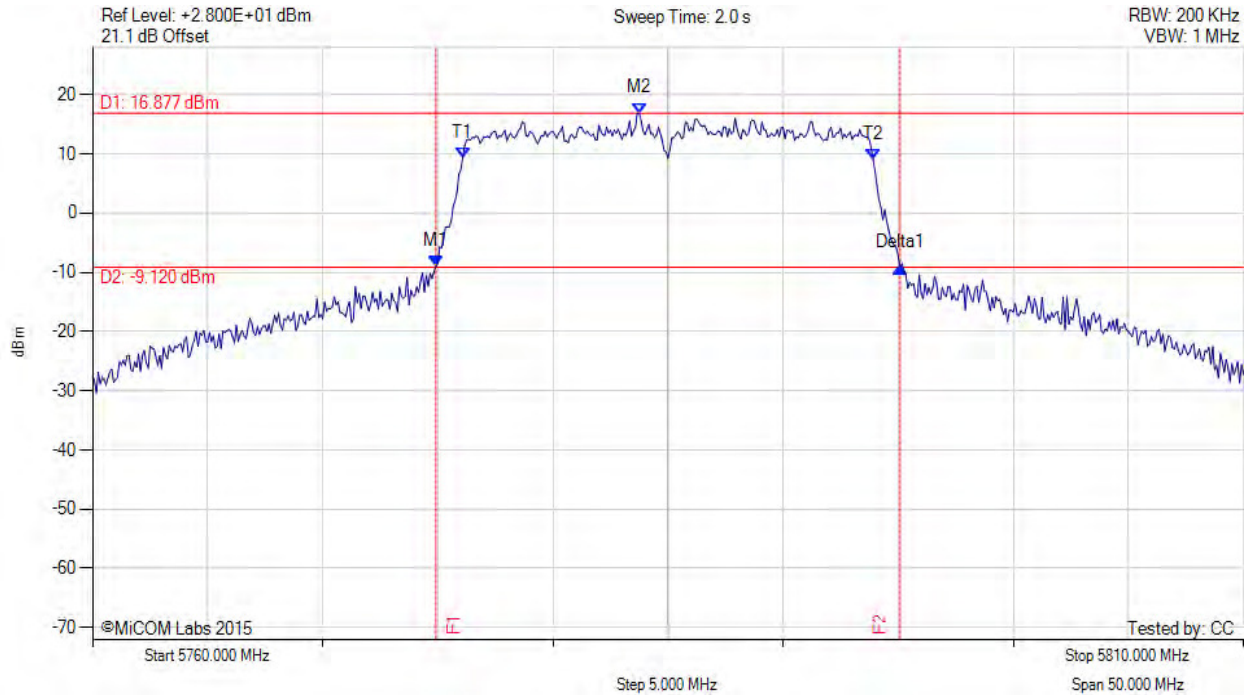
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5785.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5774.920 MHz : -9.013 dBm M2 : 5783.750 MHz : 16.877 dBm Delta1 : 20.170 MHz : -0.144 dB T1 : 5776.083 MHz : 9.371 dBm T2 : 5793.917 MHz : 8.970 dBm OBW : 17.811 MHz	Measured 26 dB Bandwidth: 20.170 MHz Measured 99% Bandwidth: 17.811 MHz

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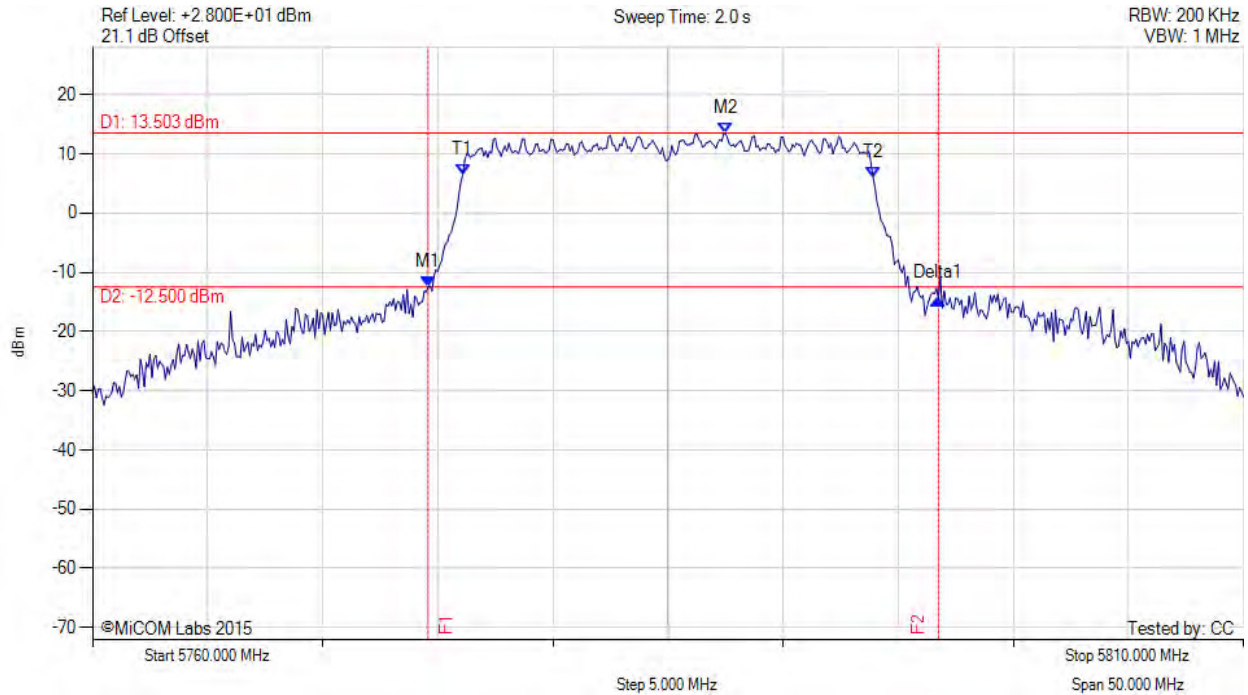




26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5785.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5774.580 MHz : -12.405 dBm M2 : 5787.500 MHz : 13.503 dBm Delta1 : 22.170 MHz : -2.034 dB T1 : 5776.083 MHz : 6.484 dBm T2 : 5793.917 MHz : 5.934 dBm OBW : 17.814 MHz	Measured 26 dB Bandwidth: 22.170 MHz Measured 99% Bandwidth: 17.814 MHz

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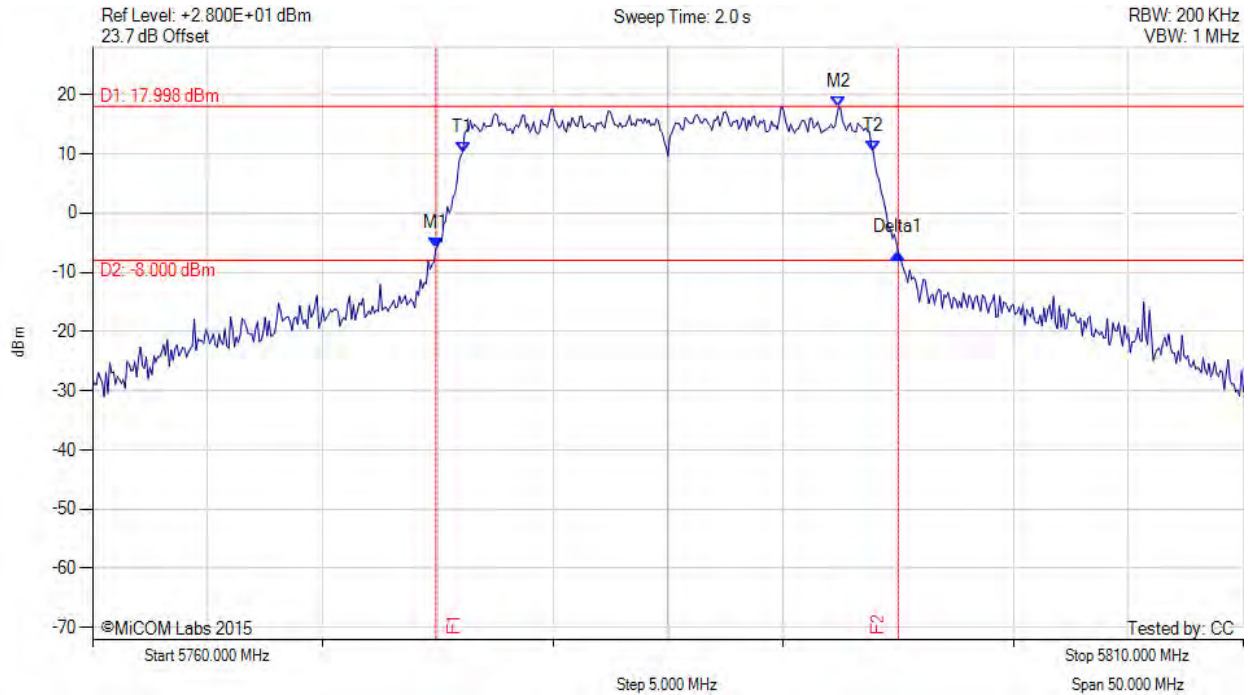
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5785.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5774.920 MHz : -5.945 dBm M2 : 5792.420 MHz : 17.998 dBm Delta1 : 20.080 MHz : -0.791 dB T1 : 5776.083 MHz : 10.308 dBm T2 : 5793.917 MHz : 10.344 dBm OBW : 17.816 MHz	Measured 26 dB Bandwidth: 20.080 MHz Measured 99% Bandwidth: 17.816 MHz

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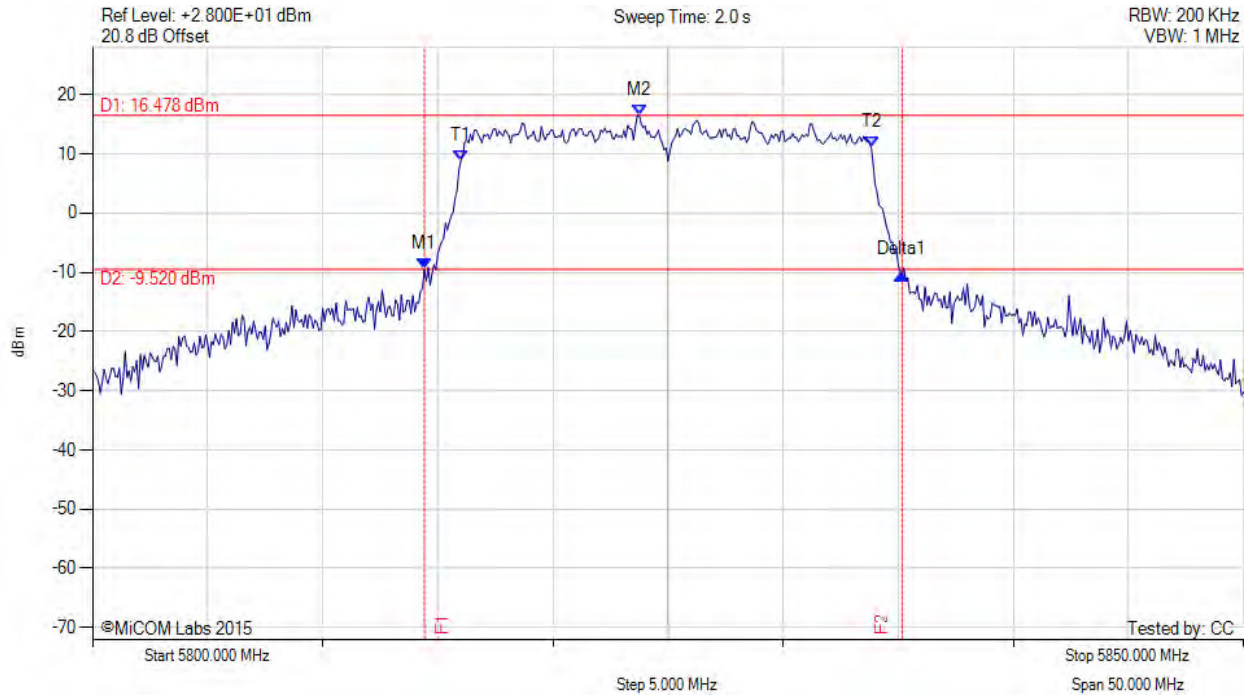
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5825.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5814.420 MHz : -9.496 dBm M2 : 5823.750 MHz : 16.478 dBm Delta1 : 20.750 MHz : -0.923 dB T1 : 5816.000 MHz : 8.850 dBm T2 : 5833.833 MHz : 11.129 dBm OBW : 17.818 MHz	Measured 26 dB Bandwidth: 20.750 MHz Measured 99% Bandwidth: 17.818 MHz

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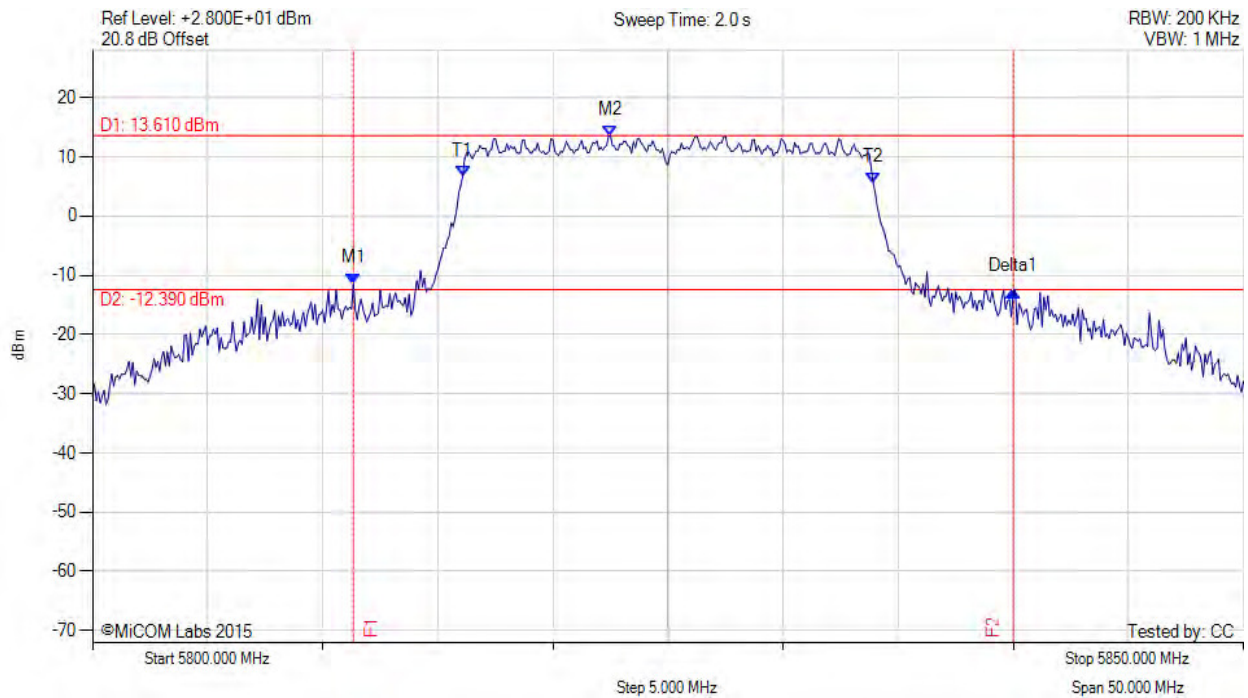
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5825.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5811.330 MHz : -11.420 dBm M2 : 5822.500 MHz : 13.610 dBm Delta1 : 28.670 MHz : -1.363 dB T1 : 5816.083 MHz : 6.805 dBm T2 : 5833.917 MHz : 5.653 dBm OBW : 17.831 MHz	Measured 26 dB Bandwidth: 28.670 MHz Measured 99% Bandwidth: 17.831 MHz

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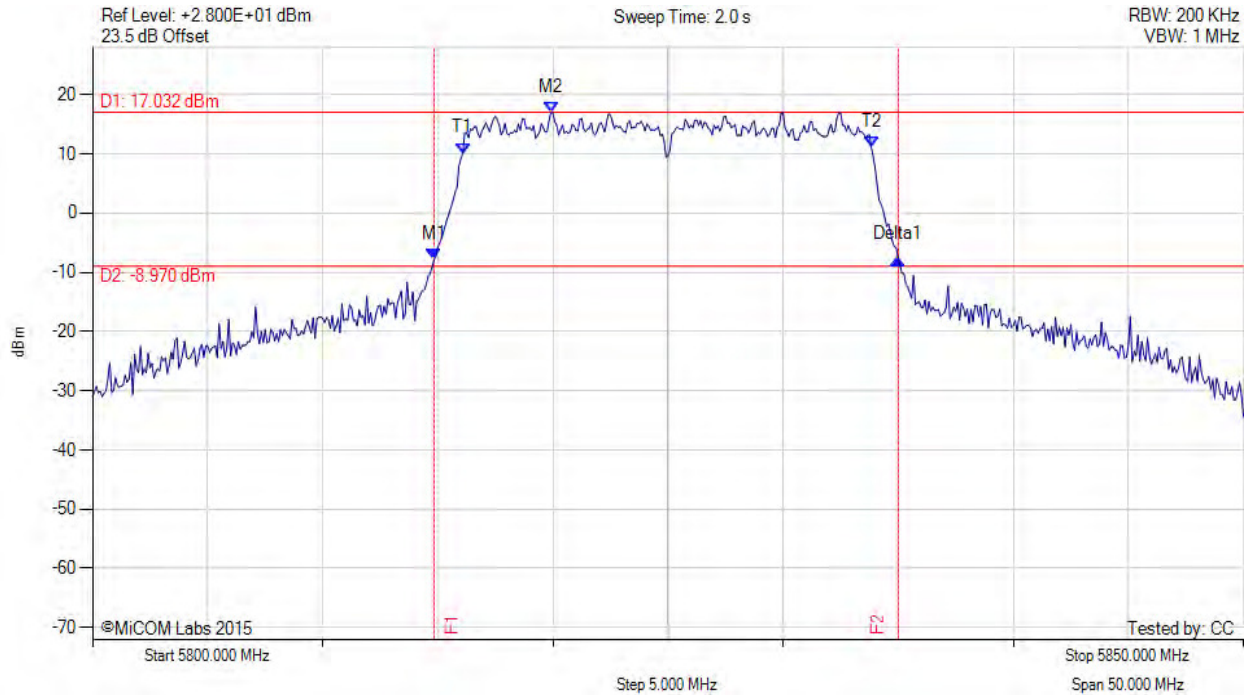
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-20, Channel: 5825.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5814.830 MHz : -7.813 dBm M2 : 5819.920 MHz : 17.032 dBm Delta1 : 20.170 MHz : 0.094 dB T1 : 5816.083 MHz : 10.095 dBm T2 : 5833.833 MHz : 11.135 dBm OBW : 17.789 MHz	Measured 26 dB Bandwidth: 20.170 MHz Measured 99% Bandwidth: 17.789 MHz

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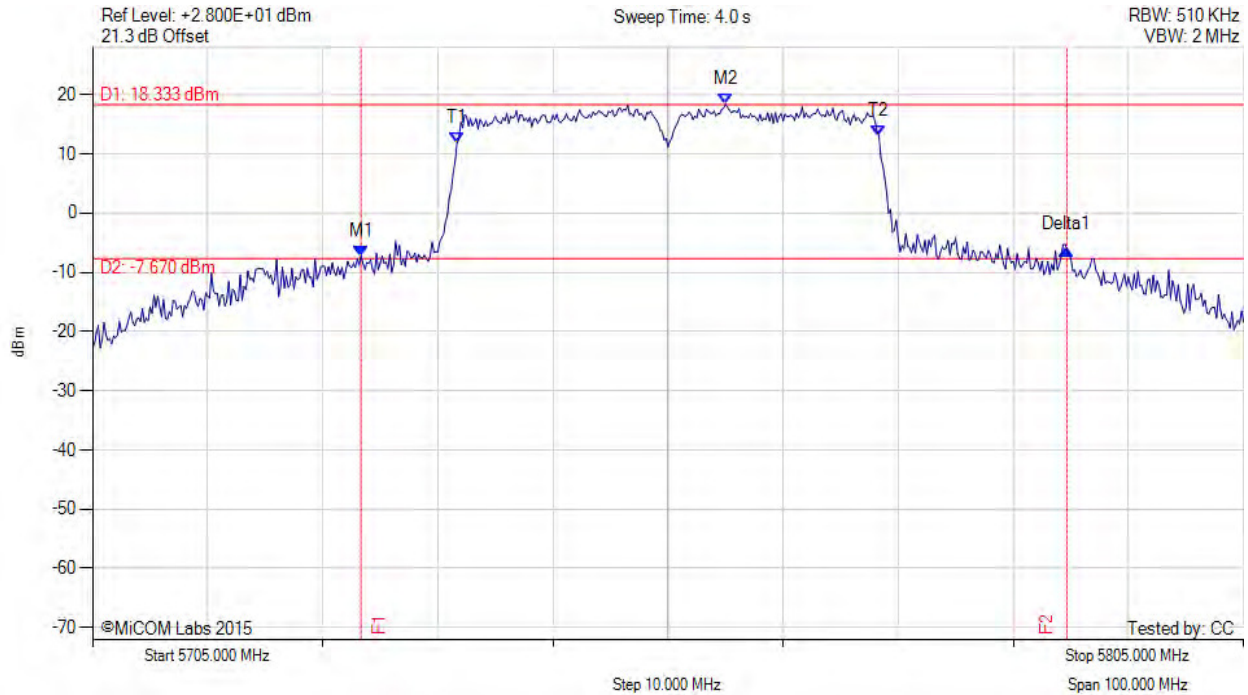
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-40, Channel: 5755.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5728.330 MHz : -7.254 dBm M2 : 5760.000 MHz : 18.333 dBm Delta1 : 61.330 MHz : 1.202 dB T1 : 5736.667 MHz : 11.858 dBm T2 : 5773.333 MHz : 12.987 dBm OBW : 36.686 MHz	Measured 26 dB Bandwidth: 61.330 MHz Measured 99% Bandwidth: 36.686 MHz

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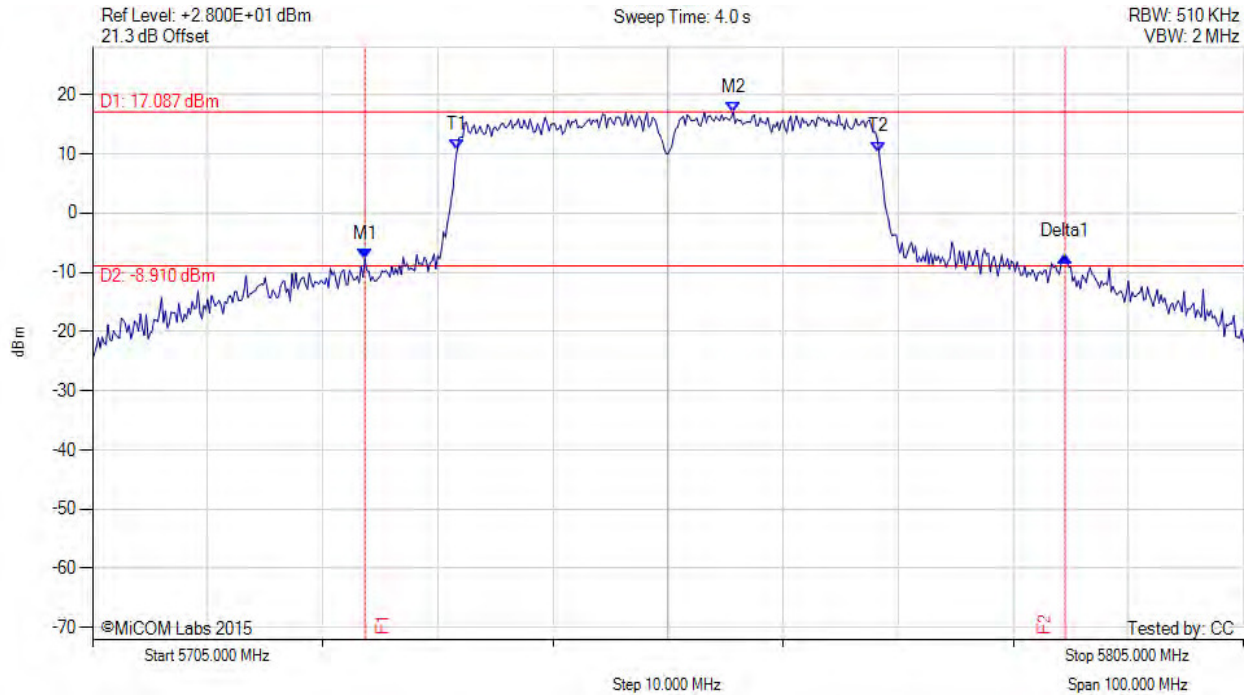




26 dB & 99% BANDWIDTH



Variant: 802.11n HT-40, Channel: 5755.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5728.670 MHz : -7.767 dBm M2 : 5760.670 MHz : 17.087 dBm Delta1 : 60.830 MHz : 0.352 dB T1 : 5736.667 MHz : 10.591 dBm T2 : 5773.333 MHz : 10.313 dBm OBW : 36.542 MHz	Measured 26 dB Bandwidth: 60.830 MHz Measured 99% Bandwidth: 36.542 MHz

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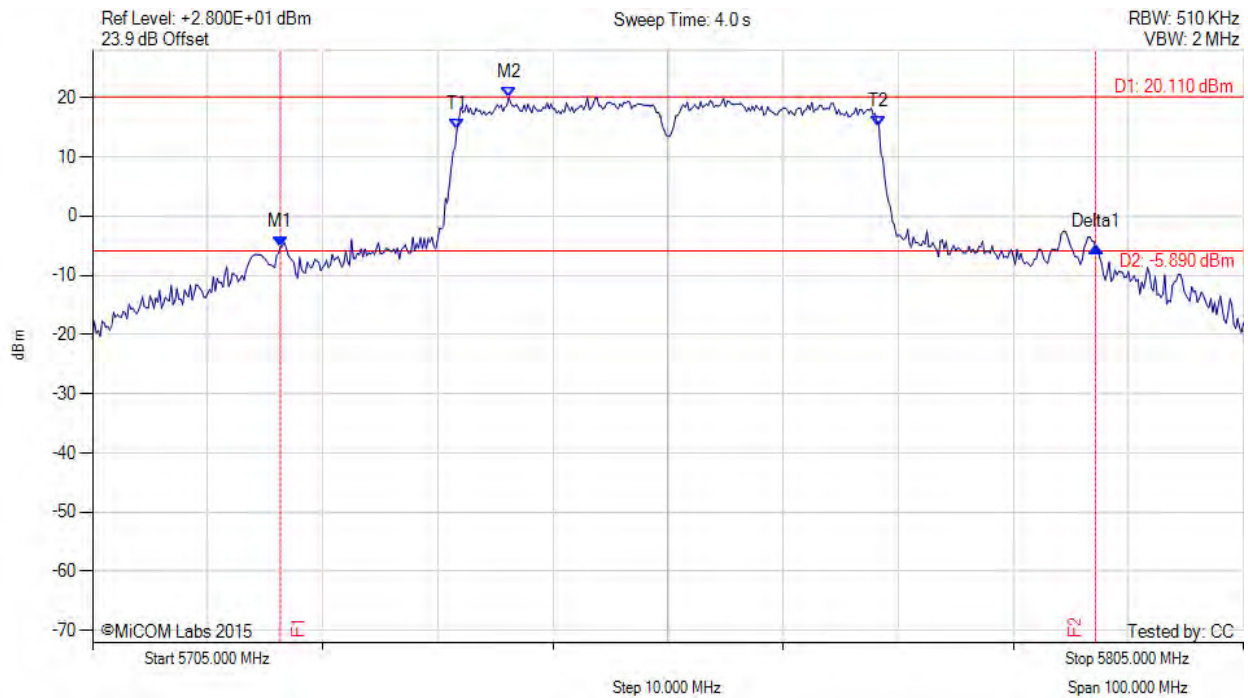
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-40, Channel: 5755.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5721.330 MHz : -5.225 dBm M2 : 5741.170 MHz : 20.110 dBm Delta1 : 70.830 MHz : -0.067 dB T1 : 5736.667 MHz : 14.650 dBm T2 : 5773.333 MHz : 15.146 dBm OBW : 36.721 MHz	Measured 26 dB Bandwidth: 70.830 MHz Measured 99% Bandwidth: 36.721 MHz

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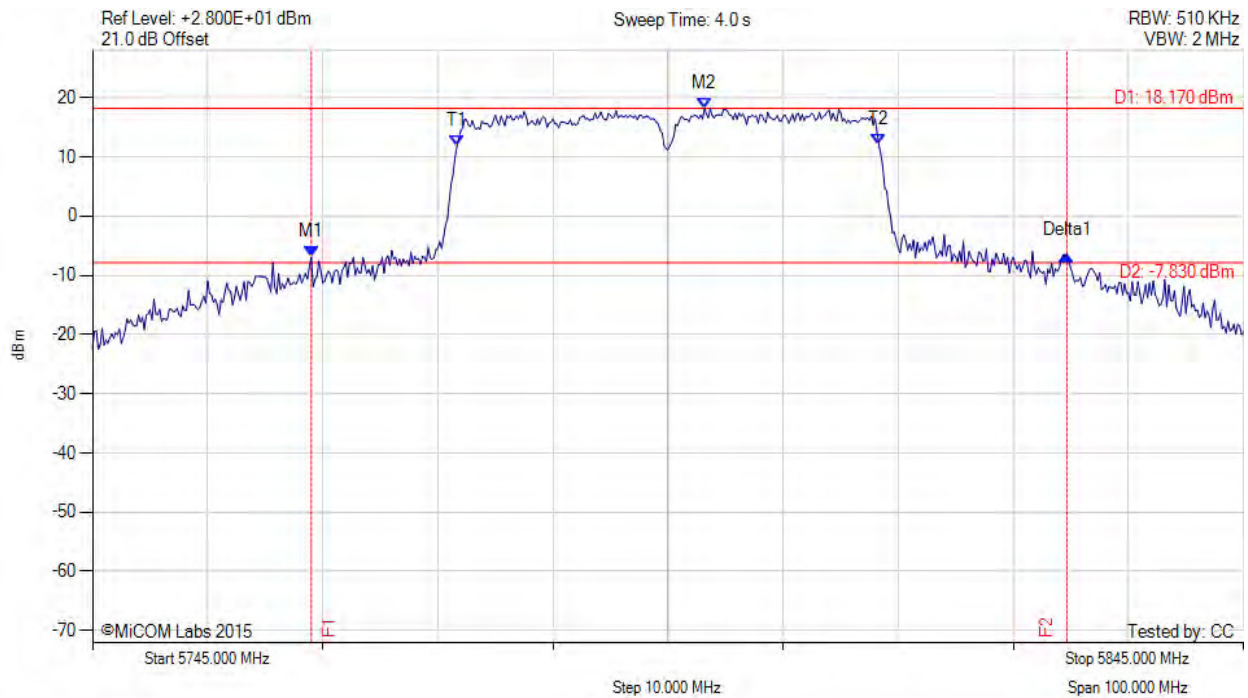
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-40, Channel: 5795.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5764.000 MHz : -6.951 dBm M2 : 5798.170 MHz : 18.170 dBm Delta1 : 65.670 MHz : 0.251 dB T1 : 5776.667 MHz : 11.829 dBm T2 : 5813.333 MHz : 11.993 dBm OBW : 36.705 MHz	Measured 26 dB Bandwidth: 65.670 MHz Measured 99% Bandwidth: 36.705 MHz

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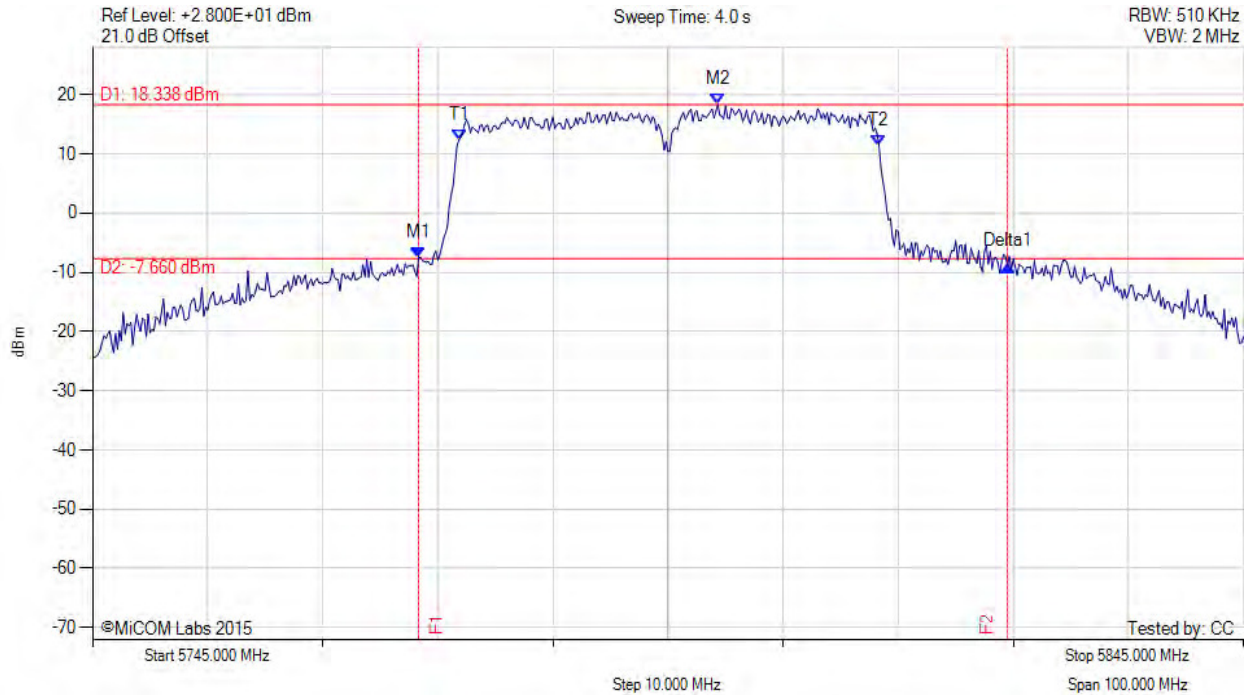
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-40, Channel: 5795.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5773.330 MHz : -7.463 dBm M2 : 5799.330 MHz : 18.338 dBm Delta1 : 51.170 MHz : -1.483 dB T1 : 5776.833 MHz : 12.348 dBm T2 : 5813.333 MHz : 11.458 dBm OBW : 36.510 MHz	Measured 26 dB Bandwidth: 51.170 MHz Measured 99% Bandwidth: 36.510 MHz

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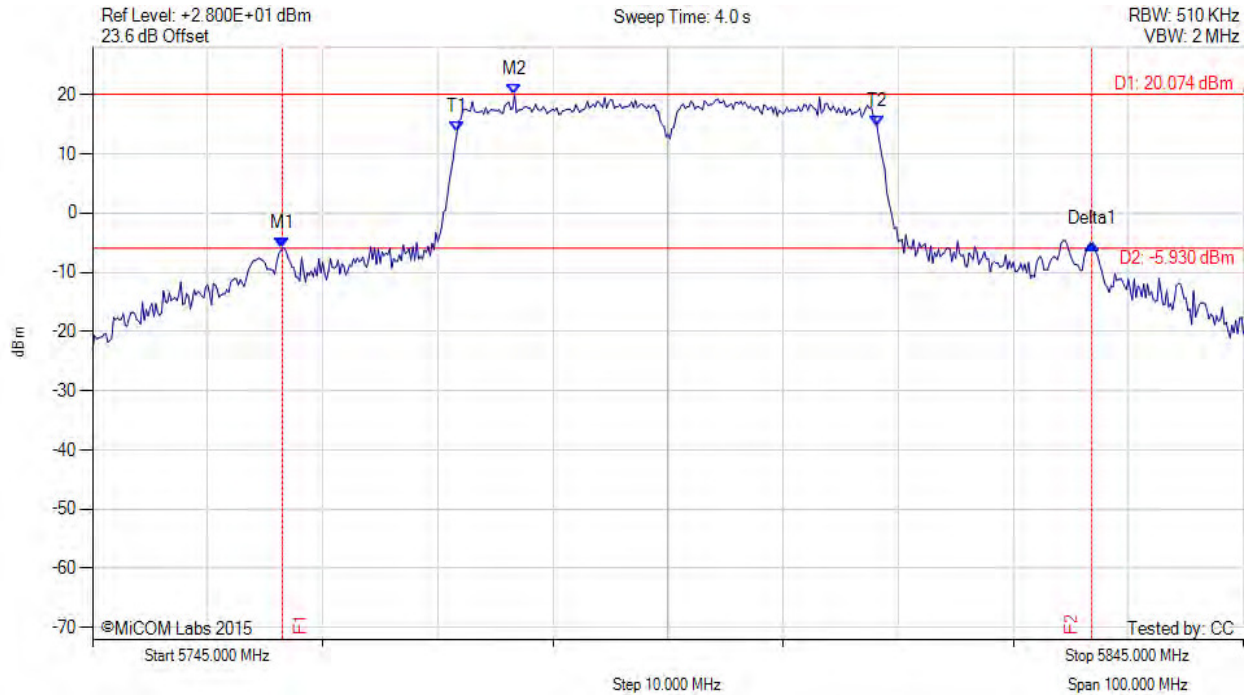
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26 dB & 99% BANDWIDTH



Variant: 802.11n HT-40, Channel: 5795.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = POS Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = MAXH	M1 : 5761.500 MHz : -5.895 dBm M2 : 5781.670 MHz : 20.074 dBm Delta1 : 70.330 MHz : 0.649 dB T1 : 5776.667 MHz : 13.624 dBm T2 : 5813.167 MHz : 14.654 dBm OBW : 36.613 MHz	Measured 26 dB Bandwidth: 70.330 MHz Measured 99% Bandwidth: 36.613 MHz

[back to matrix](#)

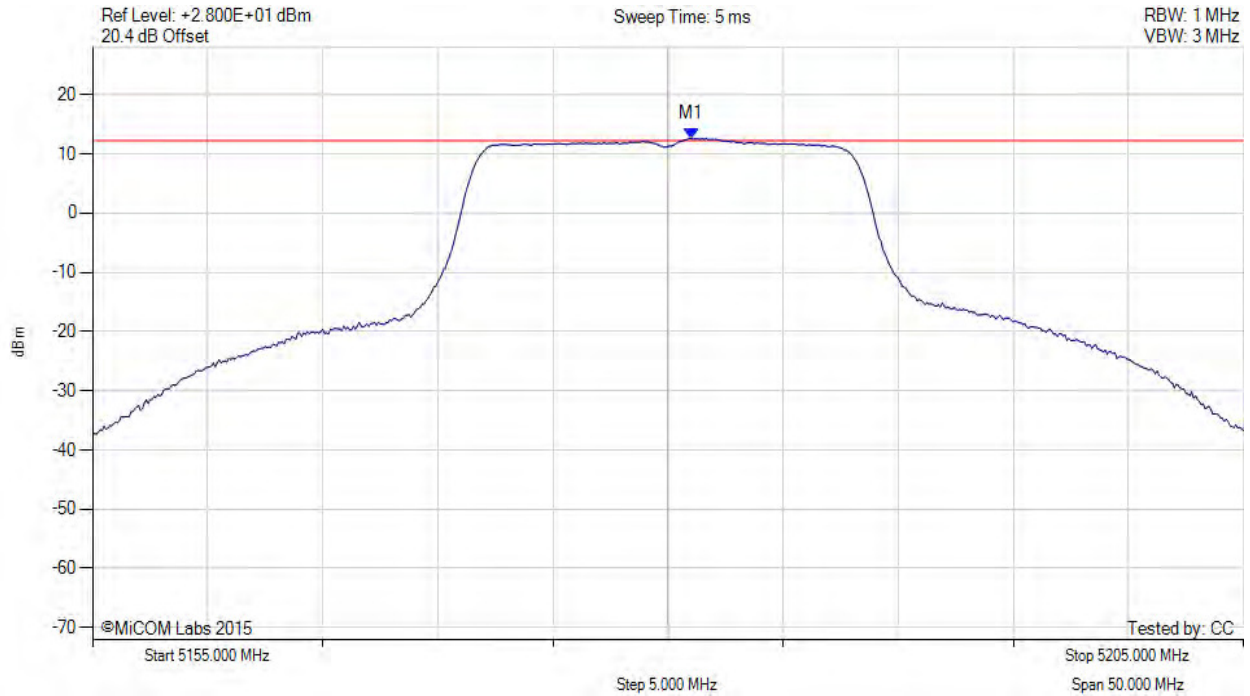
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## A.2. Power Spectral Density



### POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5180.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5181.000 MHz : 12.647 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

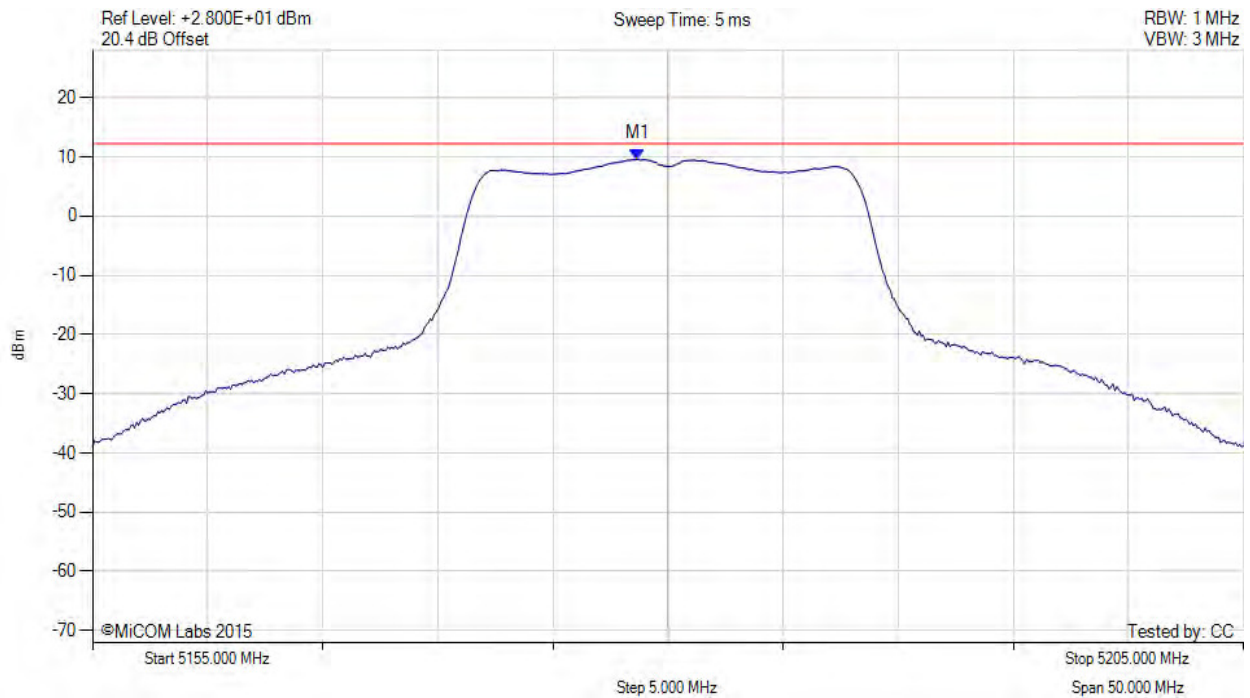
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**POWER SPECTRAL DENSITY**



Variant: 802.11a, Channel: 5180.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5178.670 MHz : 9.611 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

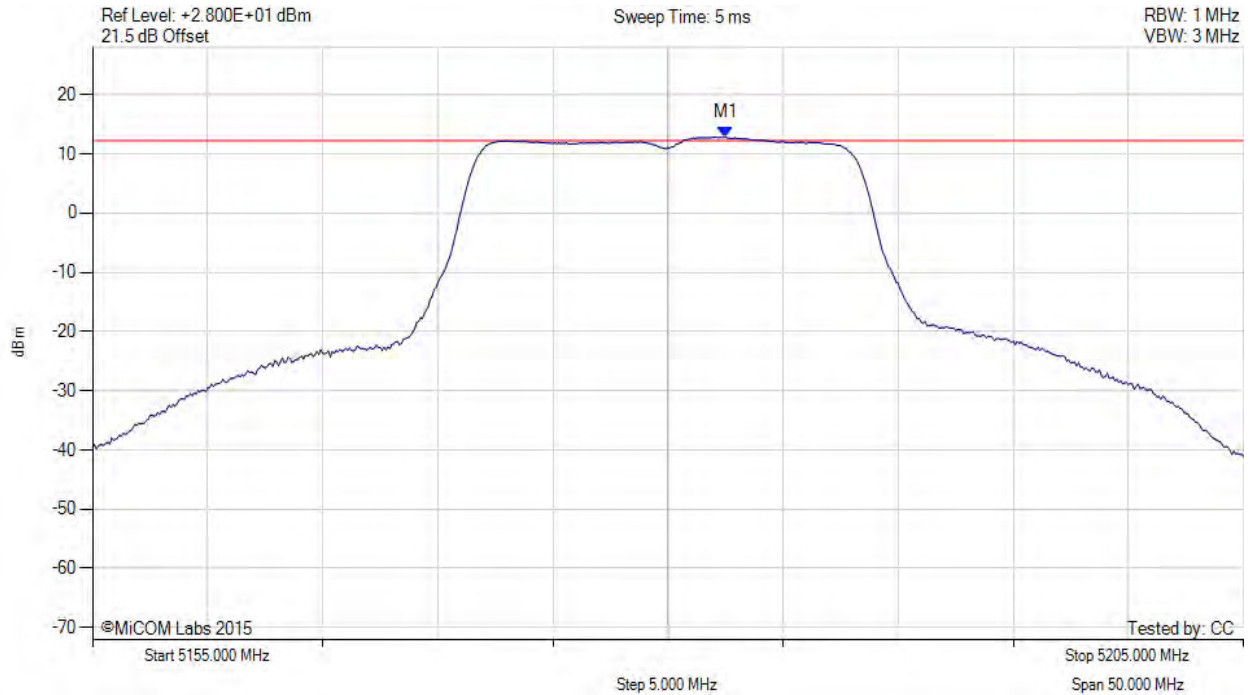
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POWER SPECTRAL DENSITY



Variant: 802.11a, Channel: 5180.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5182.500 MHz : 12.867 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

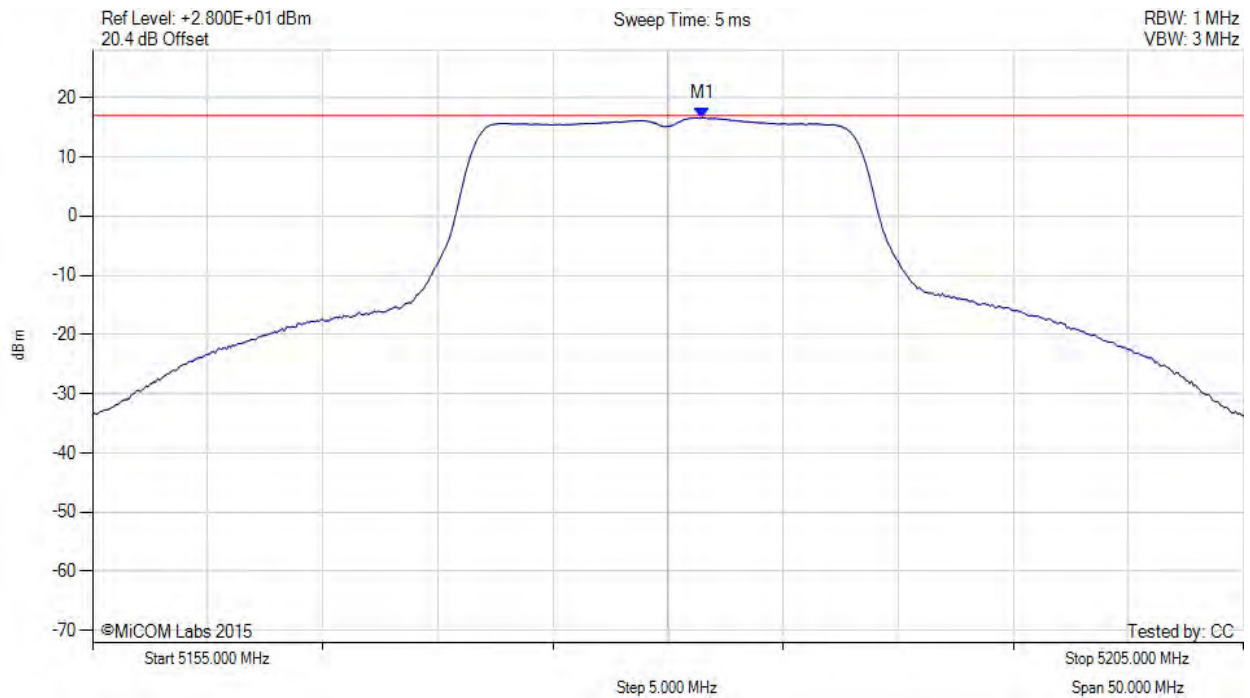
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POWER SPECTRAL DENSITY



Variant: 802.11a, Channel: 5180.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5181.500 MHz : 16.580 dBm M1 + DCCF : 5181.500 MHz : 16.624 dBm Duty Cycle Correction Factor : +0.04 dB	Limit: $\leq 17.0$ dBm Margin: $-0.3$ dB

[back to matrix](#)

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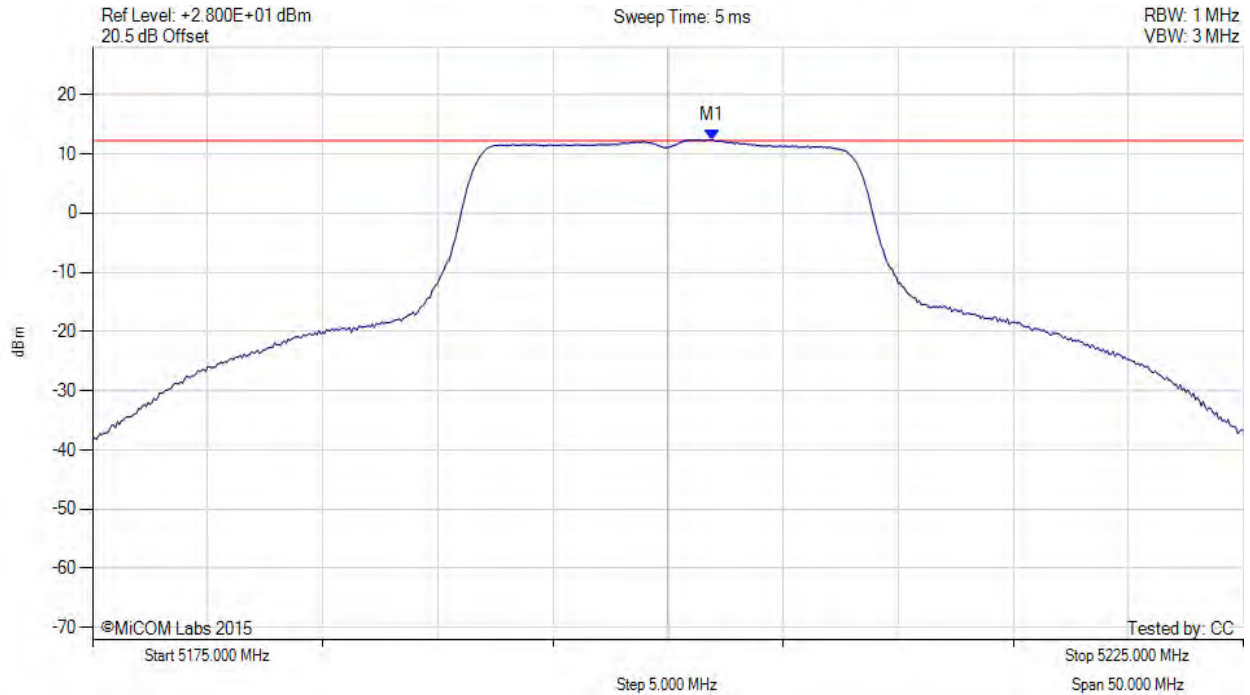




POWER SPECTRAL DENSITY



Variant: 802.11a, Channel: 5200.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5201.920 MHz : 12.388 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

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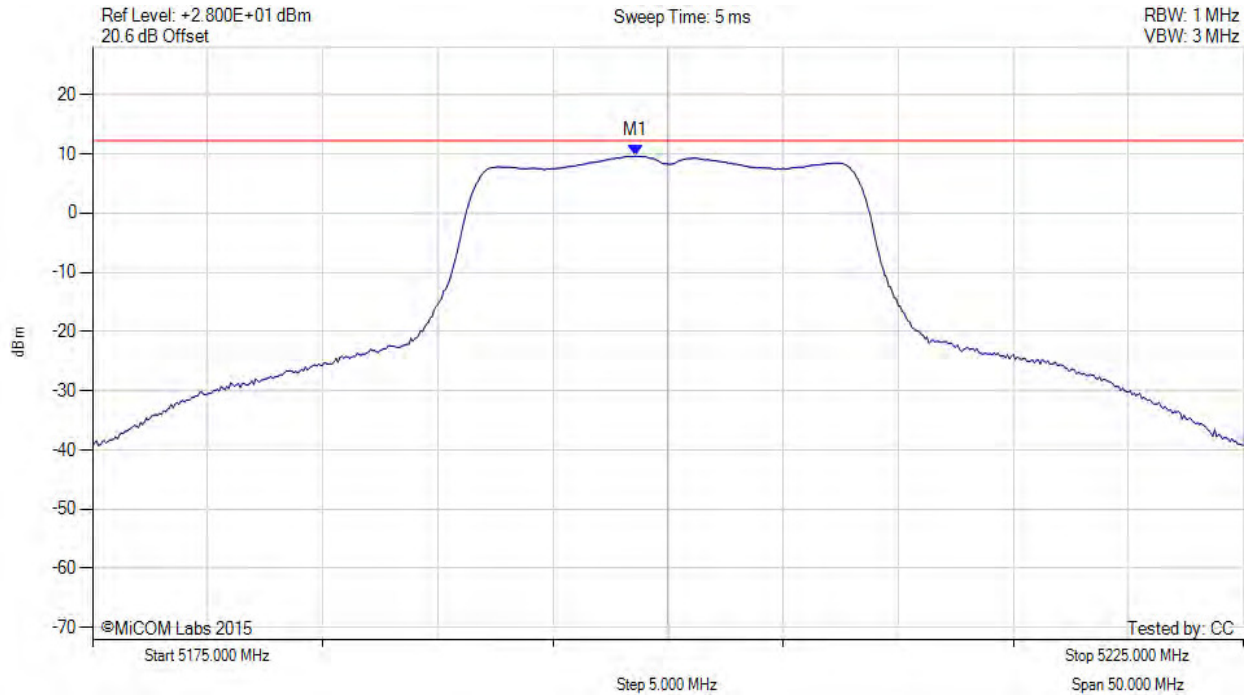




**POWER SPECTRAL DENSITY**



Variant: 802.11a, Channel: 5200.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5198.580 MHz : 9.647 dBm	Channel Frequency: 5200.00 MHz

[back to matrix](#)

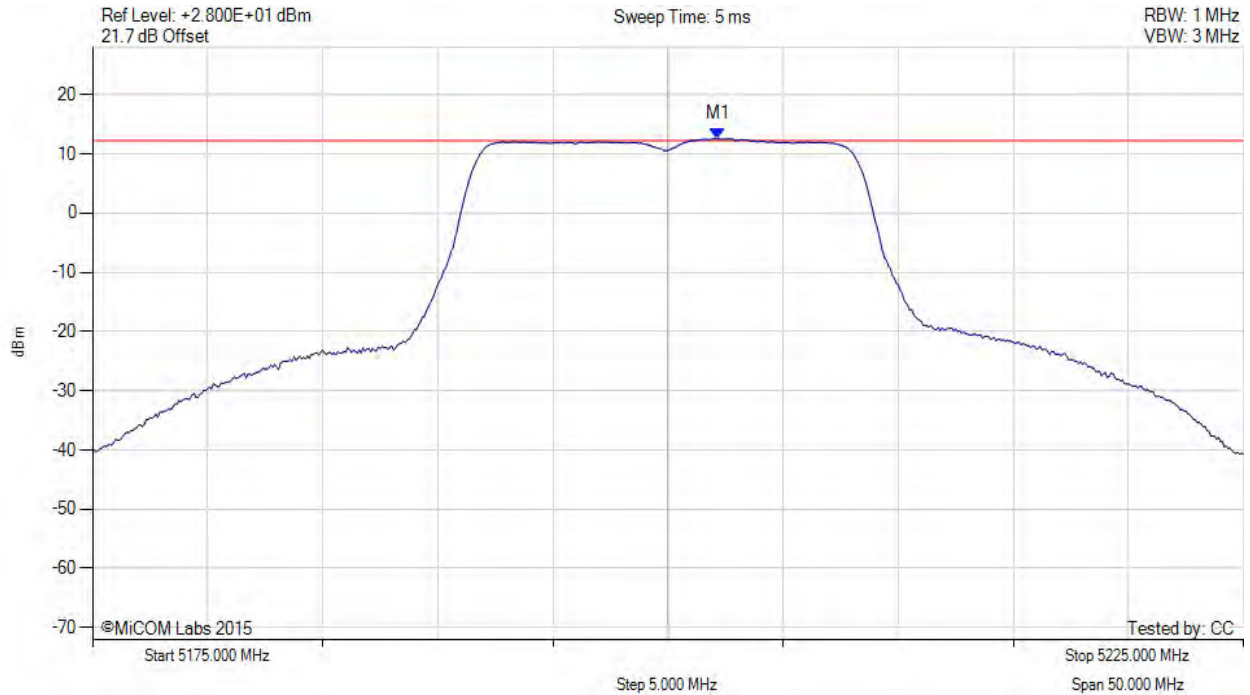
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POWER SPECTRAL DENSITY



Variant: 802.11a, Channel: 5200.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5202.170 MHz : 12.563 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

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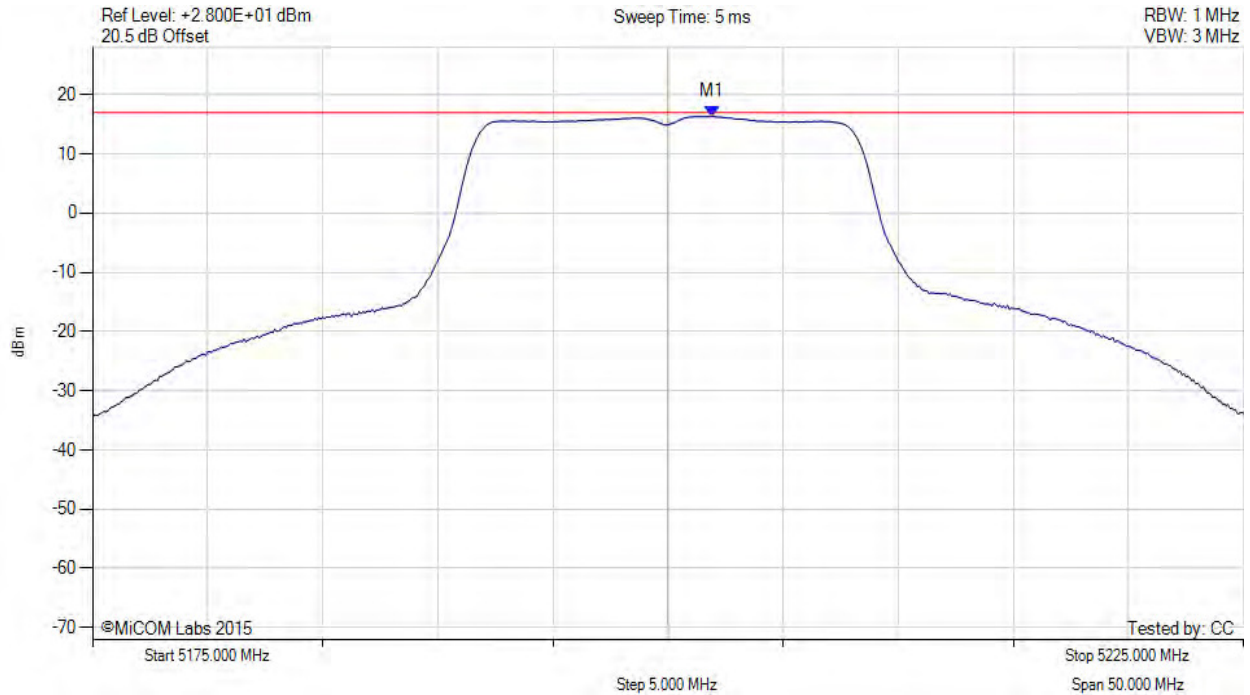


**Title:** Aruba Networks APEX0104  
**To:** FCC CFR 47 Part 15 Subpart E 15.407  
**Serial #:** ARUB199-U6 Rev A  
**Issue Date:** 27<sup>th</sup> August 2015  
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**POWER SPECTRAL DENSITY**



Variant: 802.11a, Channel: 5200.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5201.900 MHz : 16.323 dBm M1 + DCCF : 5201.900 MHz : 16.367 dBm Duty Cycle Correction Factor : +0.04 dB	Limit: $\leq 17.0$ dBm Margin: $-0.6$ dB

[back to matrix](#)

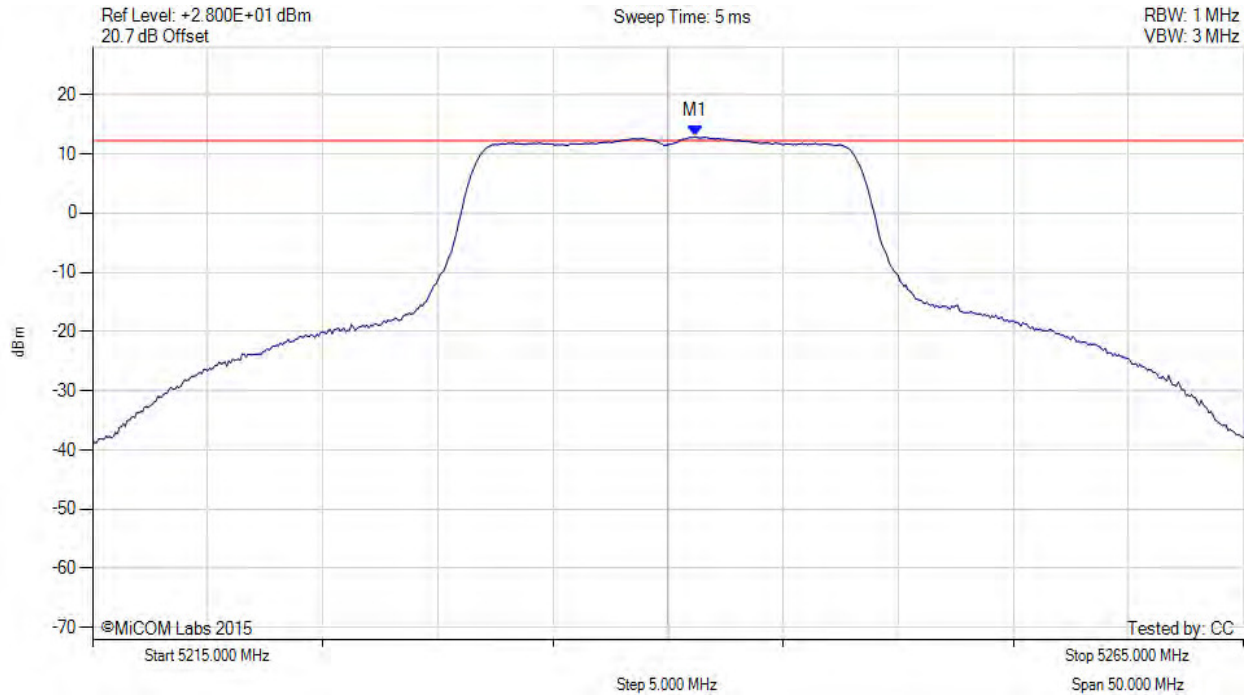
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POWER SPECTRAL DENSITY



Variant: 802.11a, Channel: 5240.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5241.170 MHz : 12.924 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

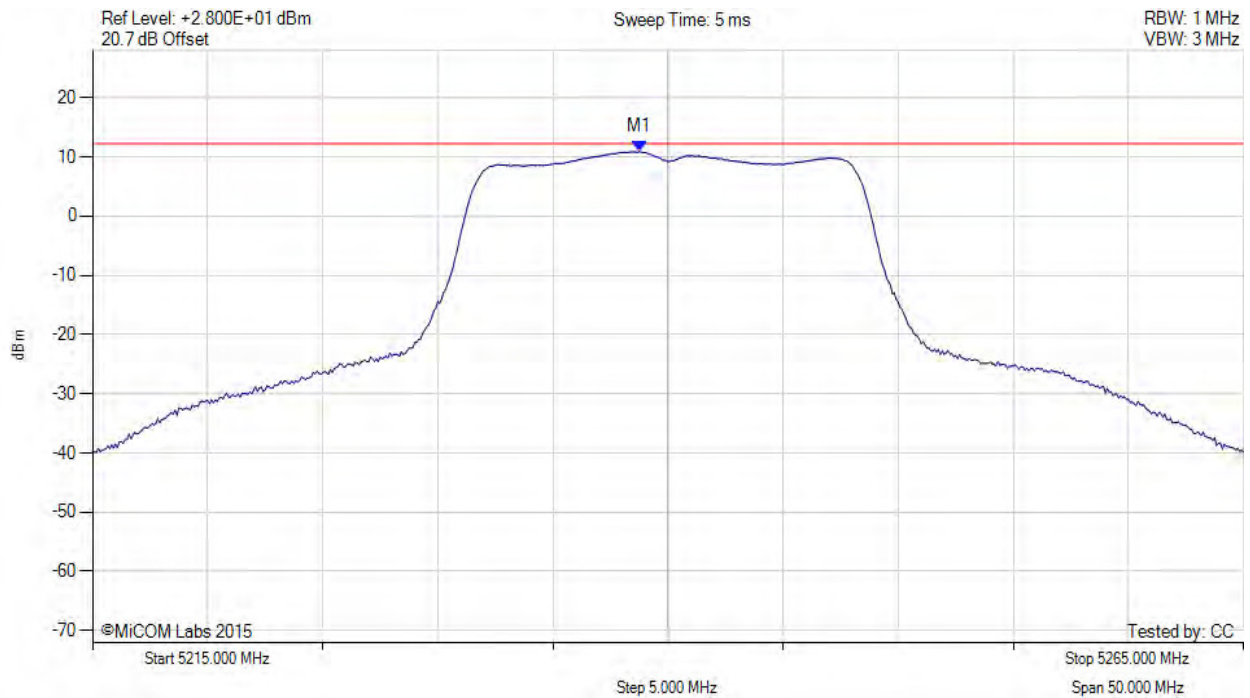
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POWER SPECTRAL DENSITY



Variant: 802.11a, Channel: 5240.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5238.750 MHz : 10.911 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

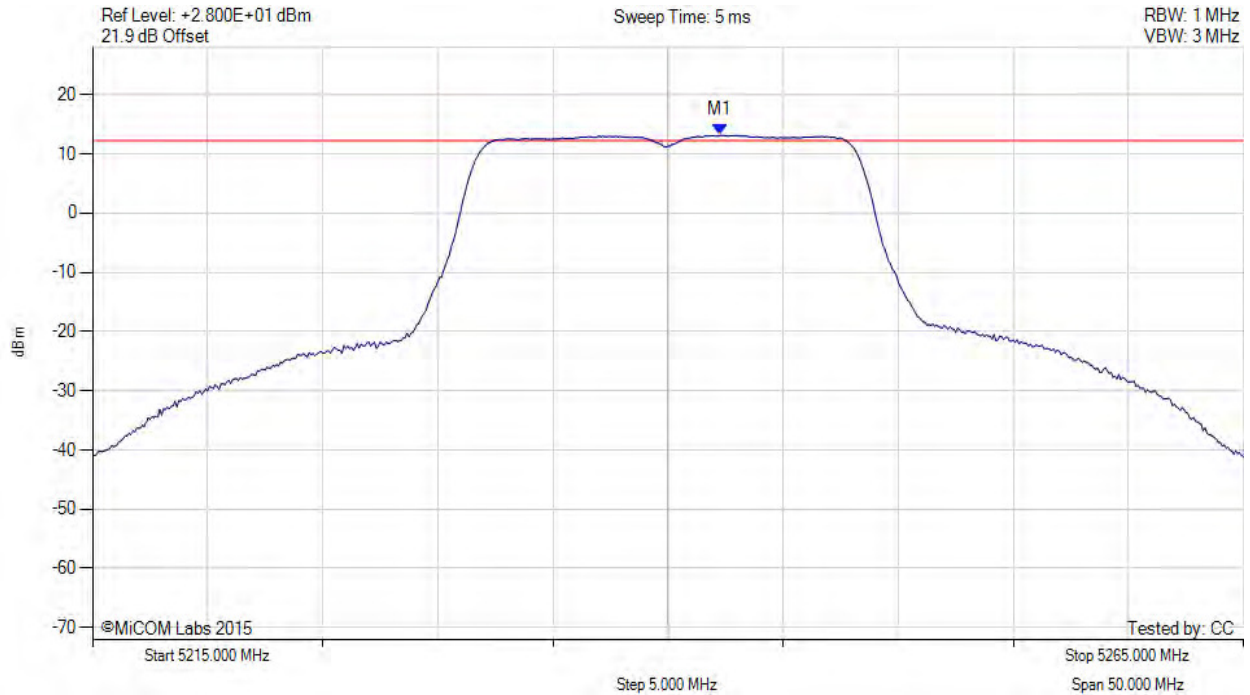
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POWER SPECTRAL DENSITY



Variant: 802.11a, Channel: 5240.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5242.250 MHz : 13.155 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

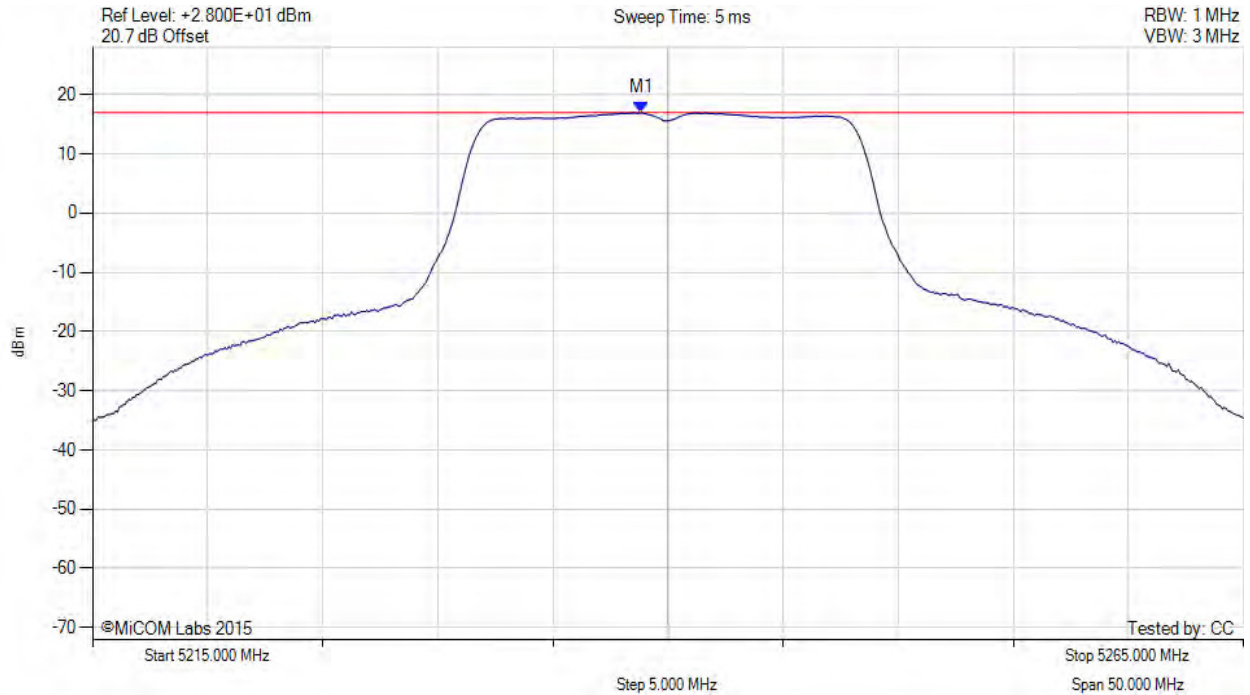
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POWER SPECTRAL DENSITY



Variante: 802.11a, Channel: 5240.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5238.800 MHz : 16.950 dBm M1 + DCCF : 5238.800 MHz : 16.994 dBm Duty Cycle Correction Factor : +0.04 dB	Limit: $\leq 17.0$ dBm Margin: 0.0 dB

[back to matrix](#)

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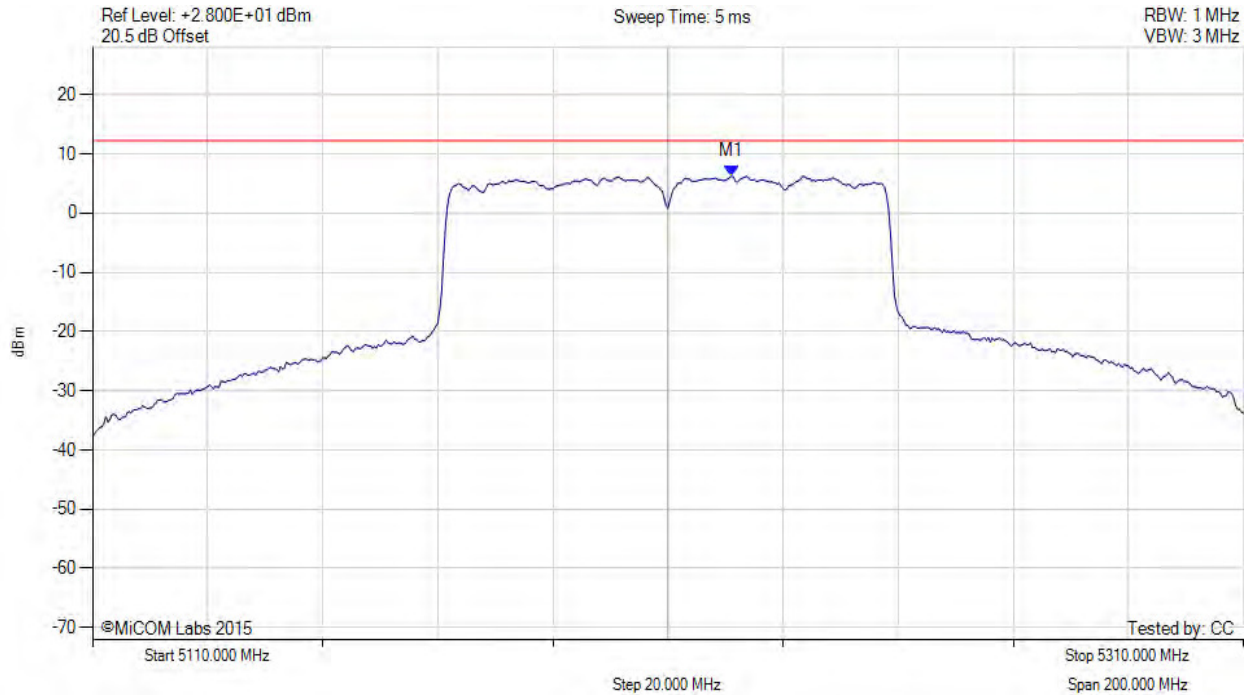




**POWER SPECTRAL DENSITY**



Variante: 802.11ac-80, Channel: 5210.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5221.000 MHz : 6.228 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

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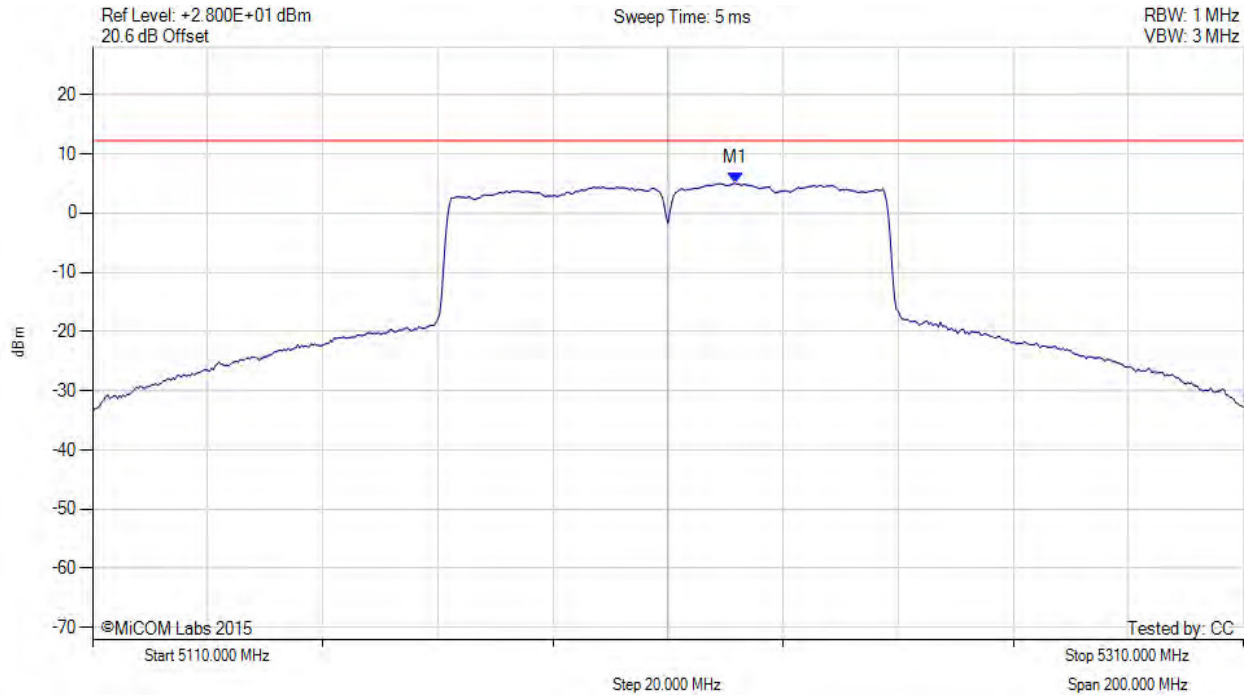


**Title:** Aruba Networks APEX0104  
**To:** FCC CFR 47 Part 15 Subpart E 15.407  
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**POWER SPECTRAL DENSITY**



Variante: 802.11ac-80, Channel: 5210.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5221.700 MHz : 5.044 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

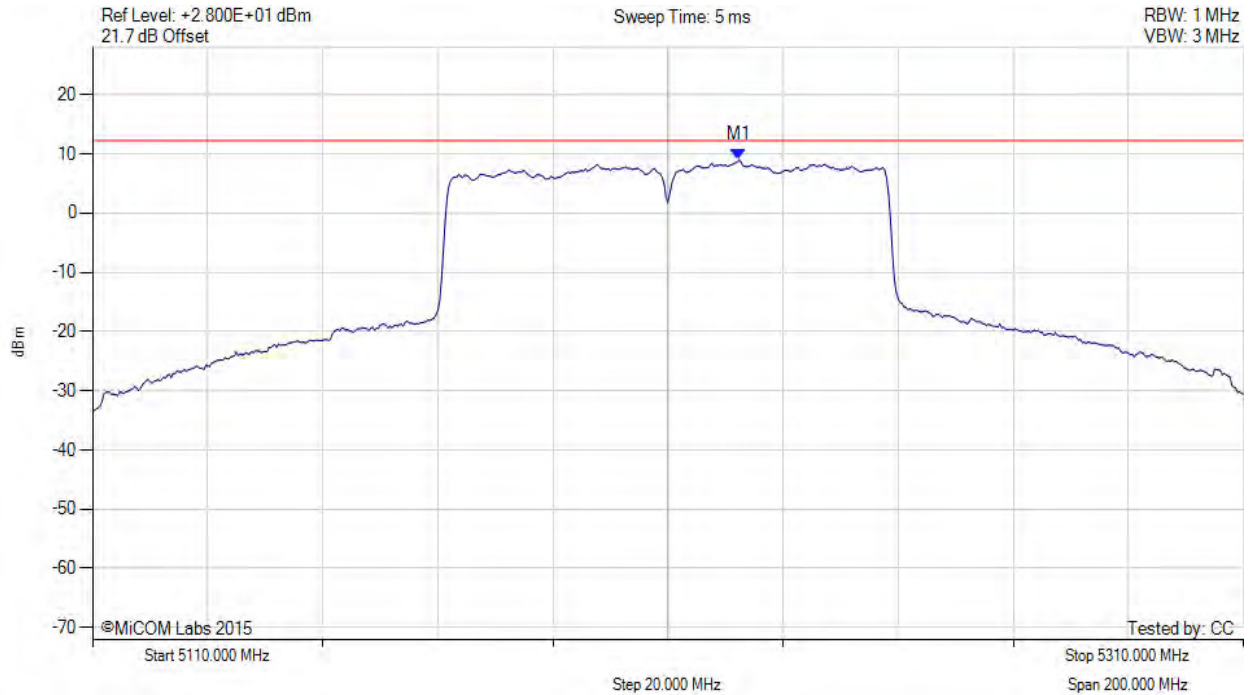
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POWER SPECTRAL DENSITY



Variants: 802.11ac-80, Channel: 5210.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5222.300 MHz : 9.013 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

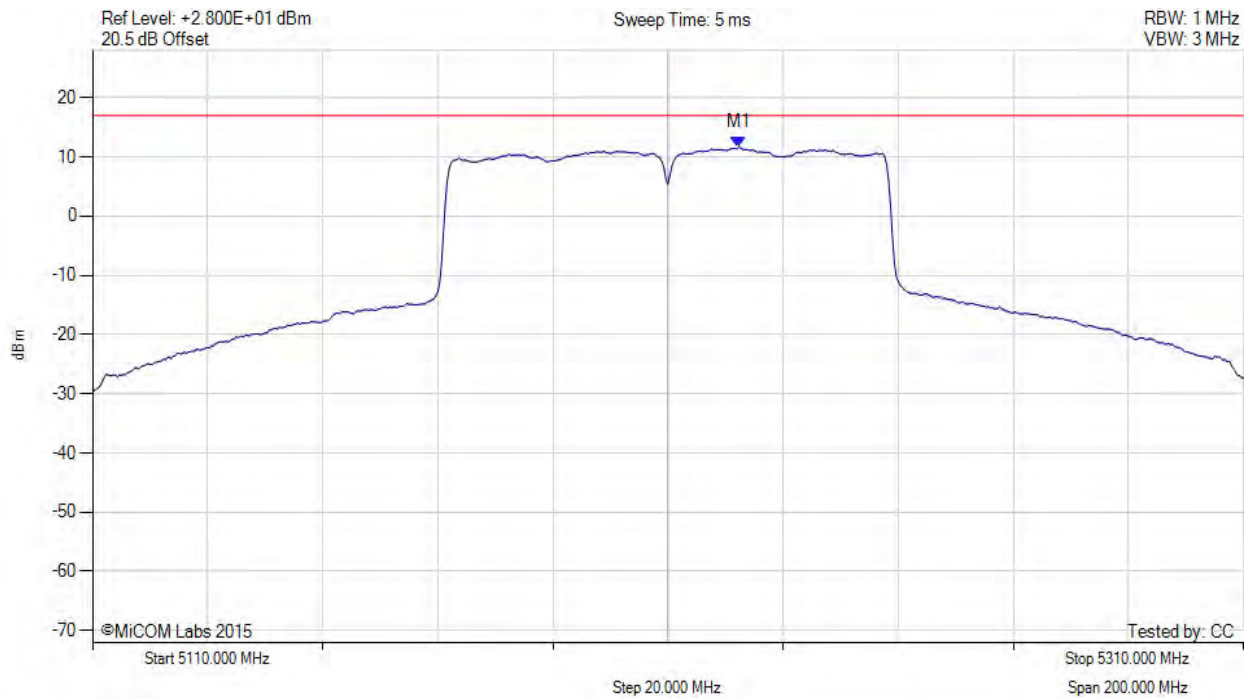
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**POWER SPECTRAL DENSITY**



Variant: 802.11ac-80, Channel: 5210.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5222.300 MHz : 11.653 dBm M1 + DCCF : 5222.300 MHz : 12.015 dBm Duty Cycle Correction Factor : +0.36 dB	Limit: ≤ 17.0 dBm Margin: -5.0 dB

[back to matrix](#)

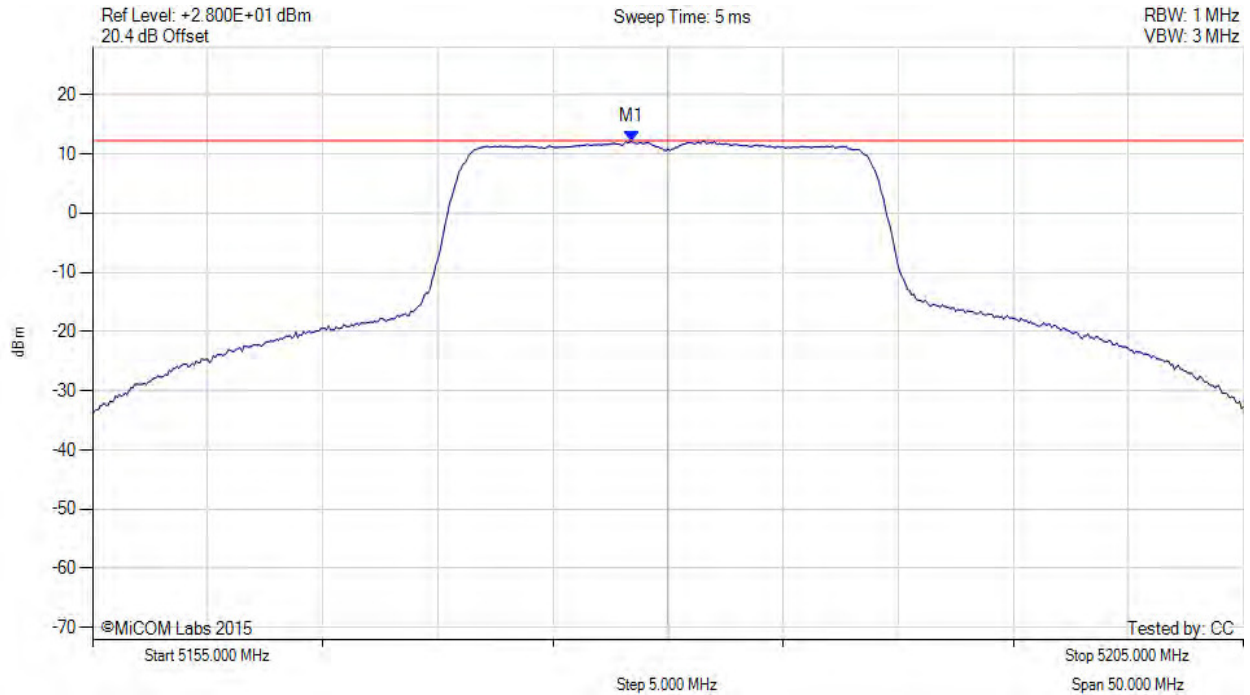
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5178.420 MHz : 12.126 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

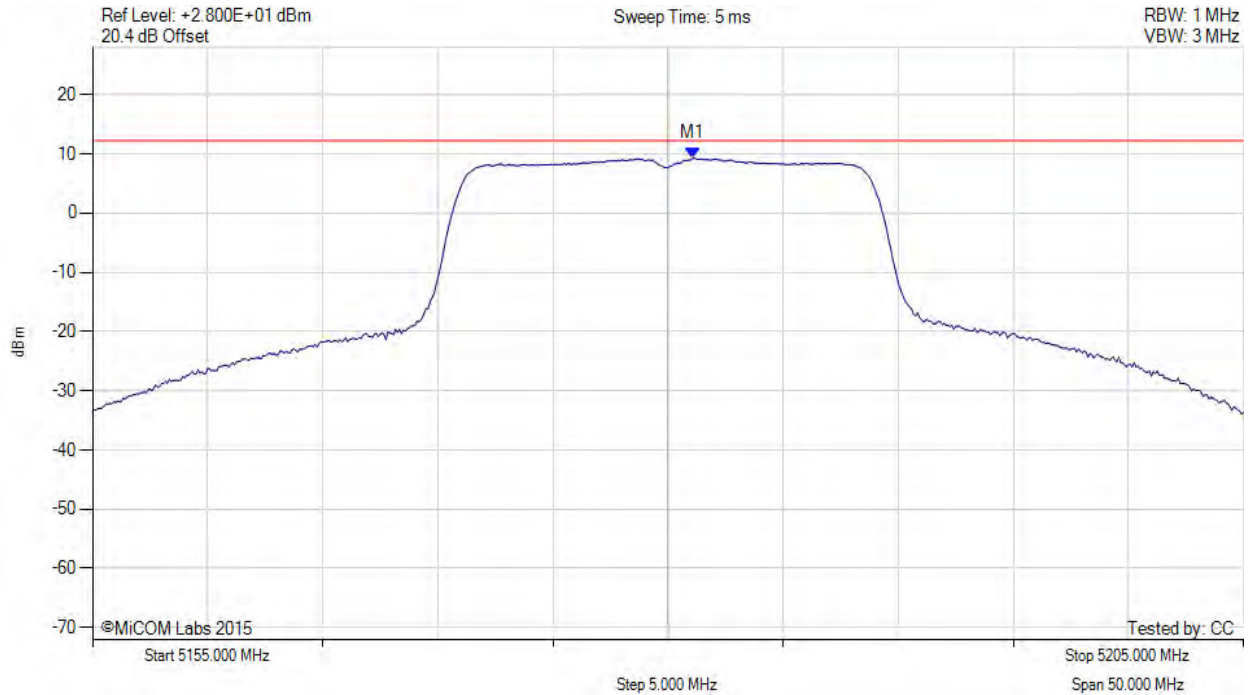
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5181.080 MHz : 9.288 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

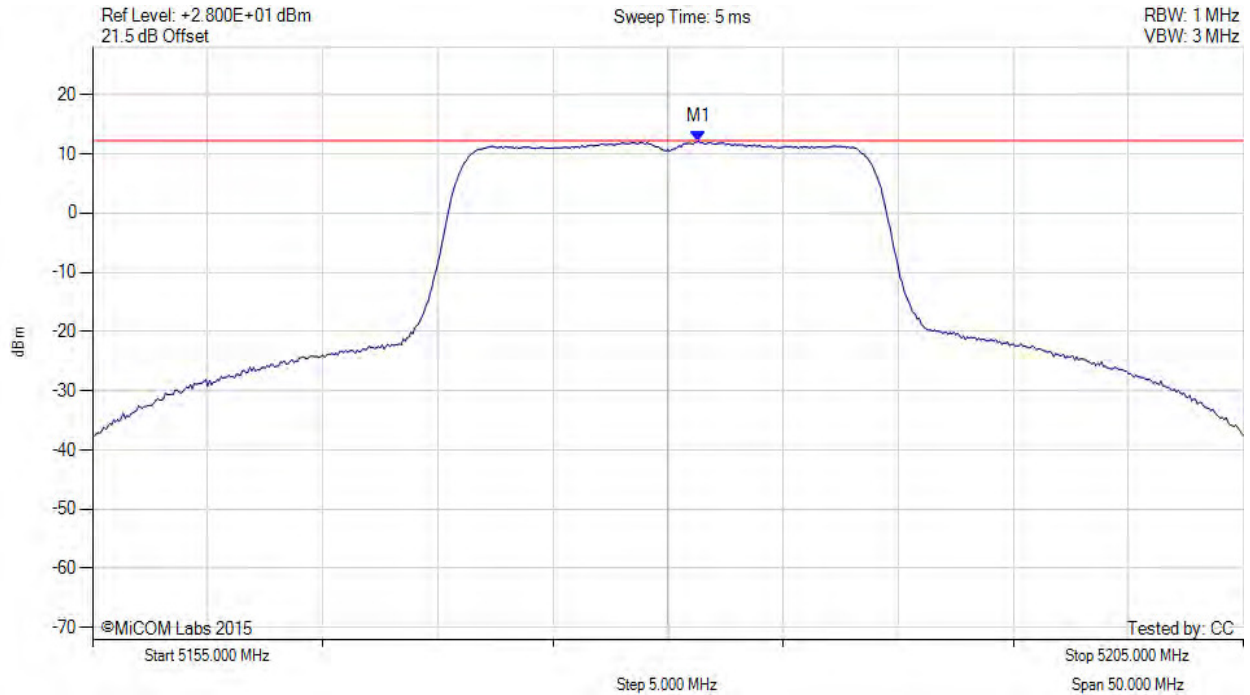
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5181.330 MHz : 12.118 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

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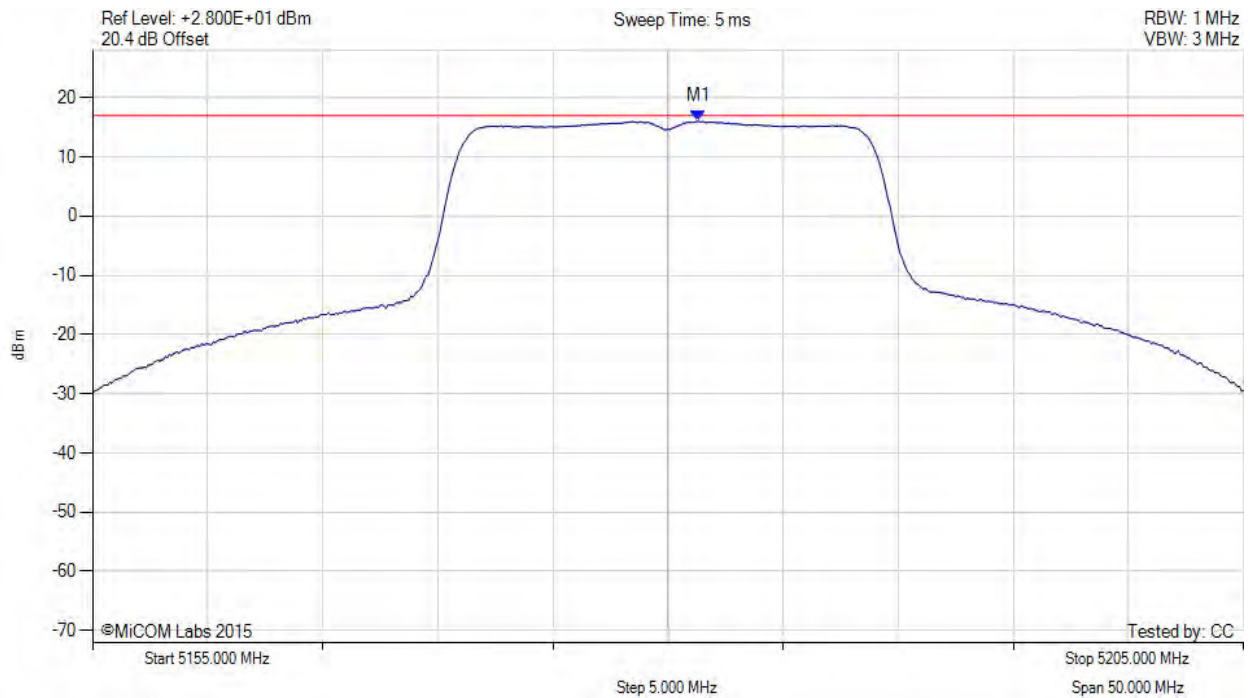


**Title:** Aruba Networks APEX0104  
**To:** FCC CFR 47 Part 15 Subpart E 15.407  
**Serial #:** ARUB199-U6 Rev A  
**Issue Date:** 27<sup>th</sup> August 2015  
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**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-20, Channel: 5180.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5181.300 MHz : 16.050 dBm M1 + DCCF : 5181.300 MHz : 16.094 dBm Duty Cycle Correction Factor : +0.04 dB	Limit: $\leq 17.0$ dBm Margin: $-0.9$ dB

[back to matrix](#)

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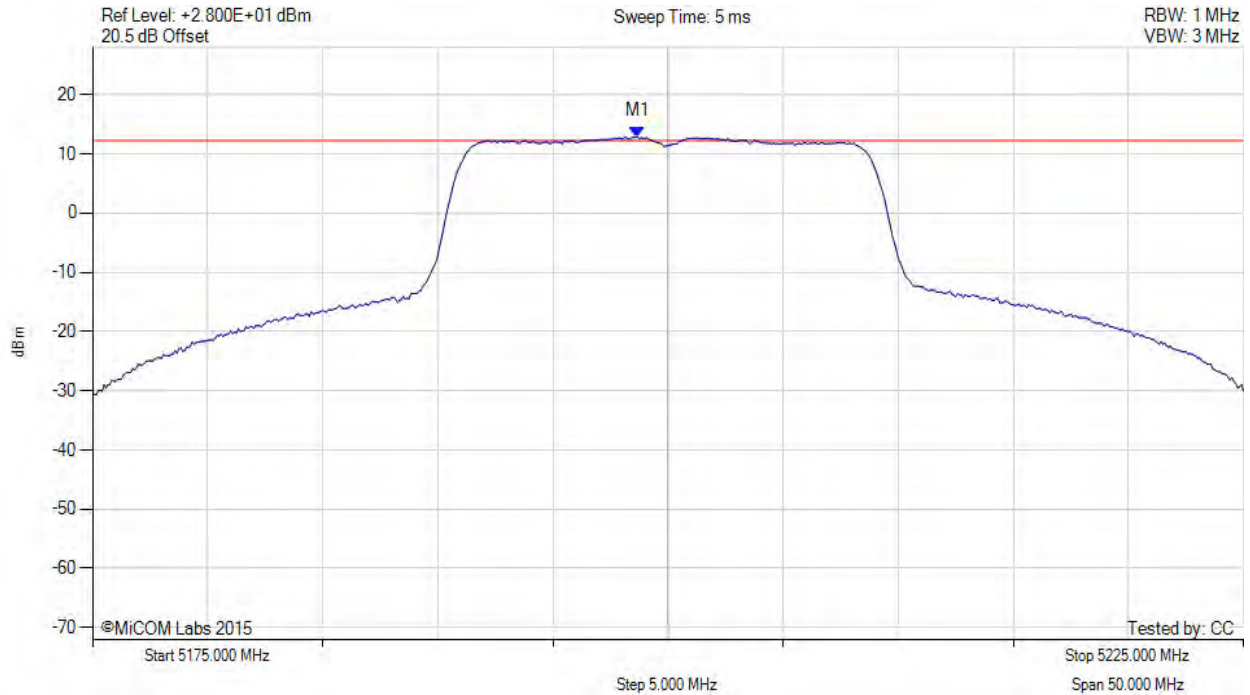




POWER SPECTRAL DENSITY



Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5198.670 MHz : 12.899 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

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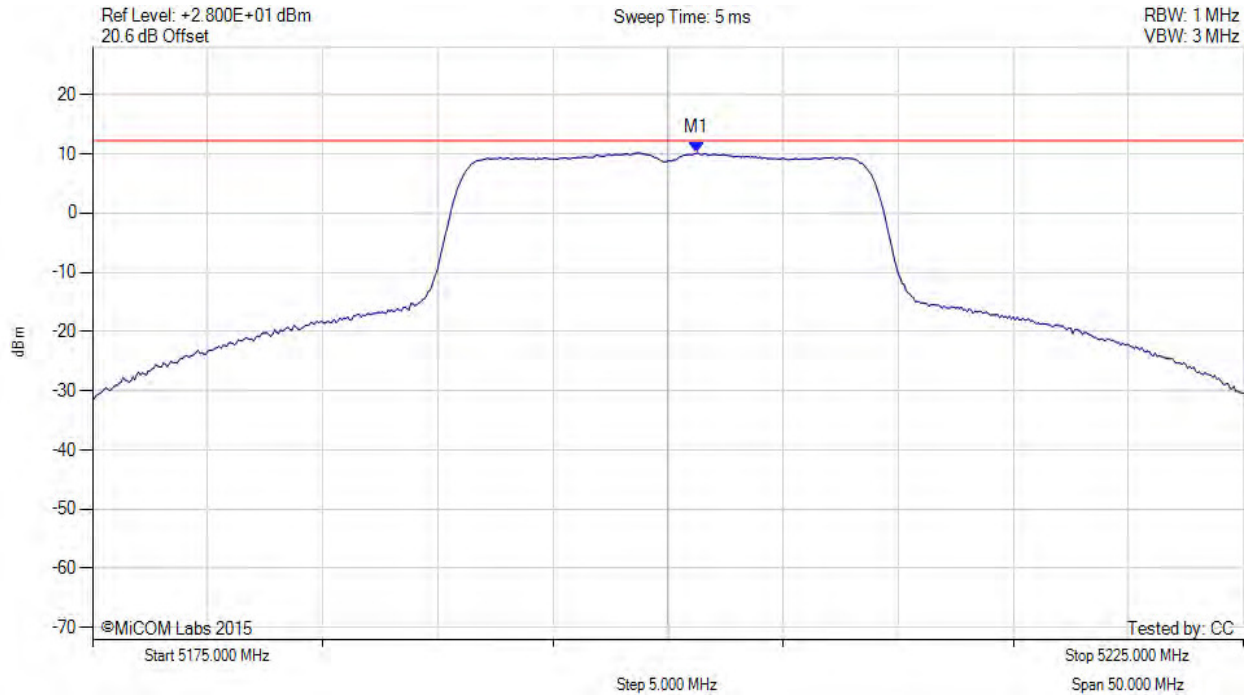




**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5201.250 MHz : 10.119 dBm	Channel Frequency: 5200.00 MHz

[back to matrix](#)

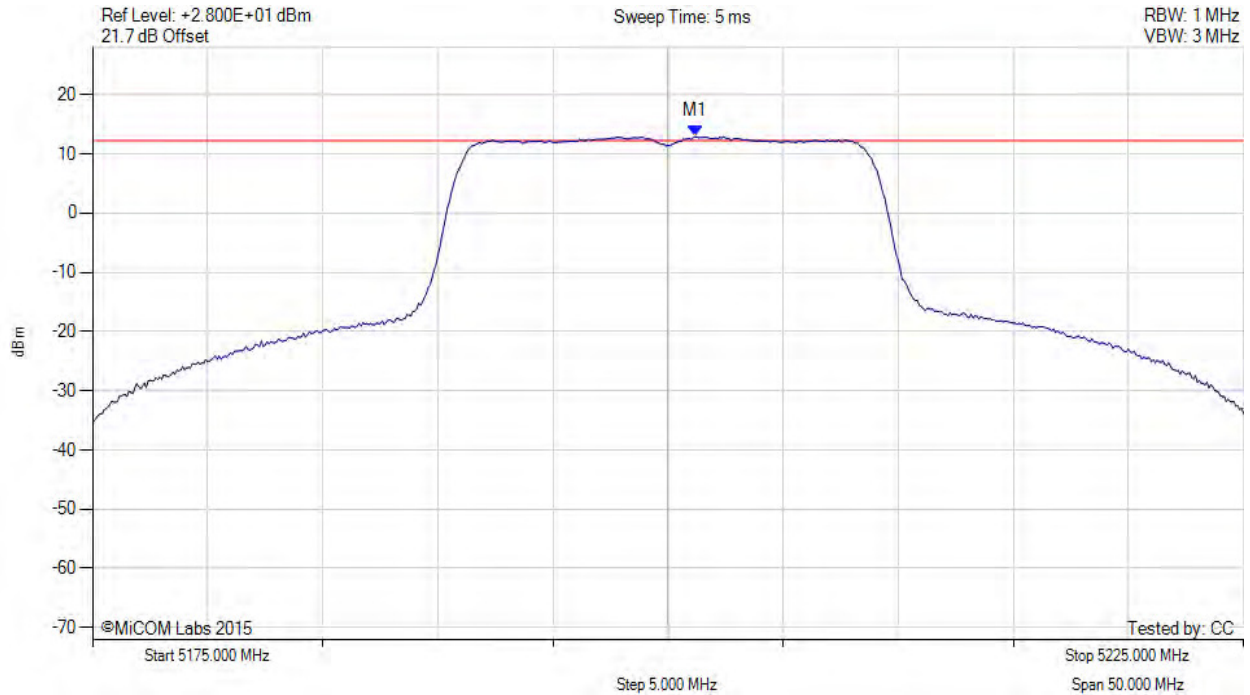
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5201.170 MHz : 12.923 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

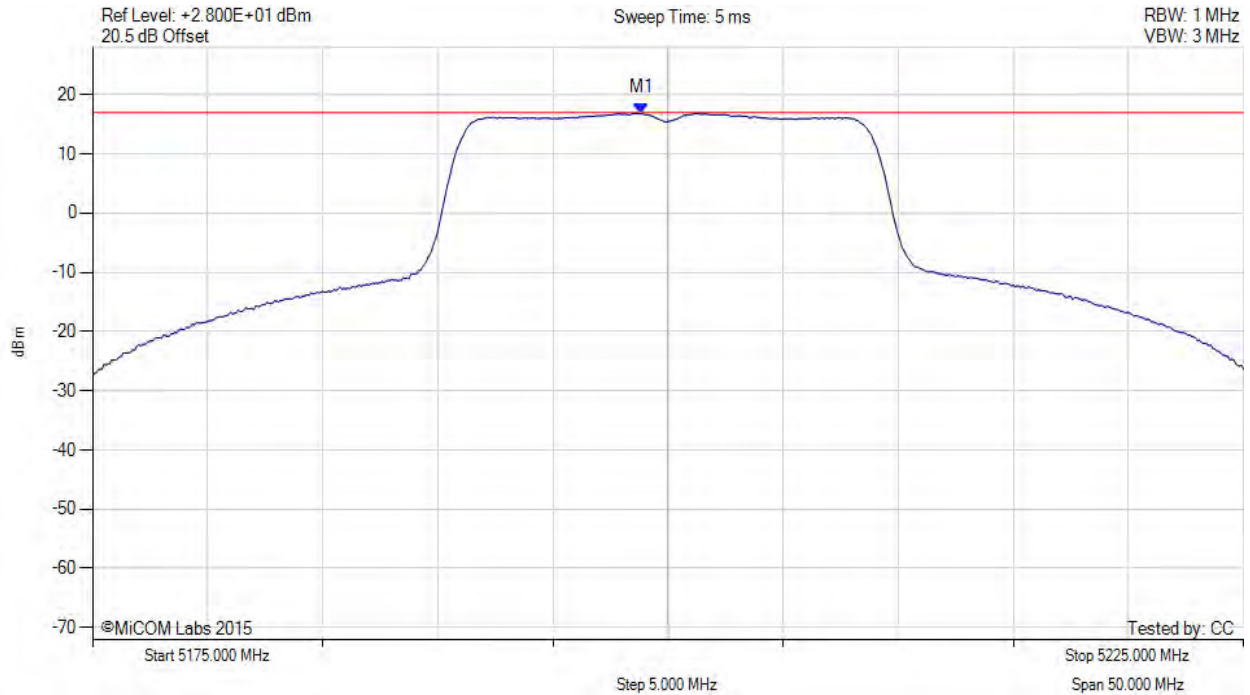
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POWER SPECTRAL DENSITY



Variants: 802.11n HT-20, Channel: 5200.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5198.800 MHz : 16.862 dBm M1 + DCCF : 5198.800 MHz : 16.906 dBm Duty Cycle Correction Factor : +0.04 dB	Limit: $\leq 17.0$ dBm Margin: $-0.1$ dB

[back to matrix](#)

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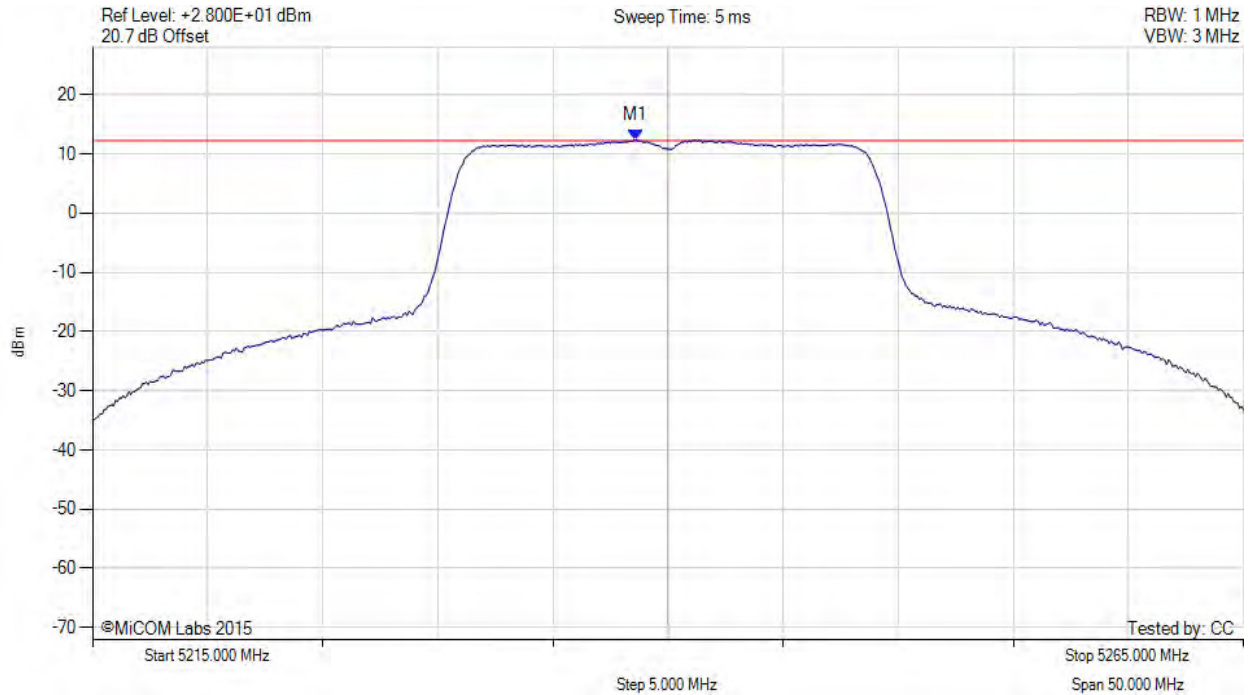


**Title:** Aruba Networks APEX0104  
**To:** FCC CFR 47 Part 15 Subpart E 15.407  
**Serial #:** ARUB199-U6 Rev A  
**Issue Date:** 27<sup>th</sup> August 2015  
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5238.580 MHz : 12.349 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

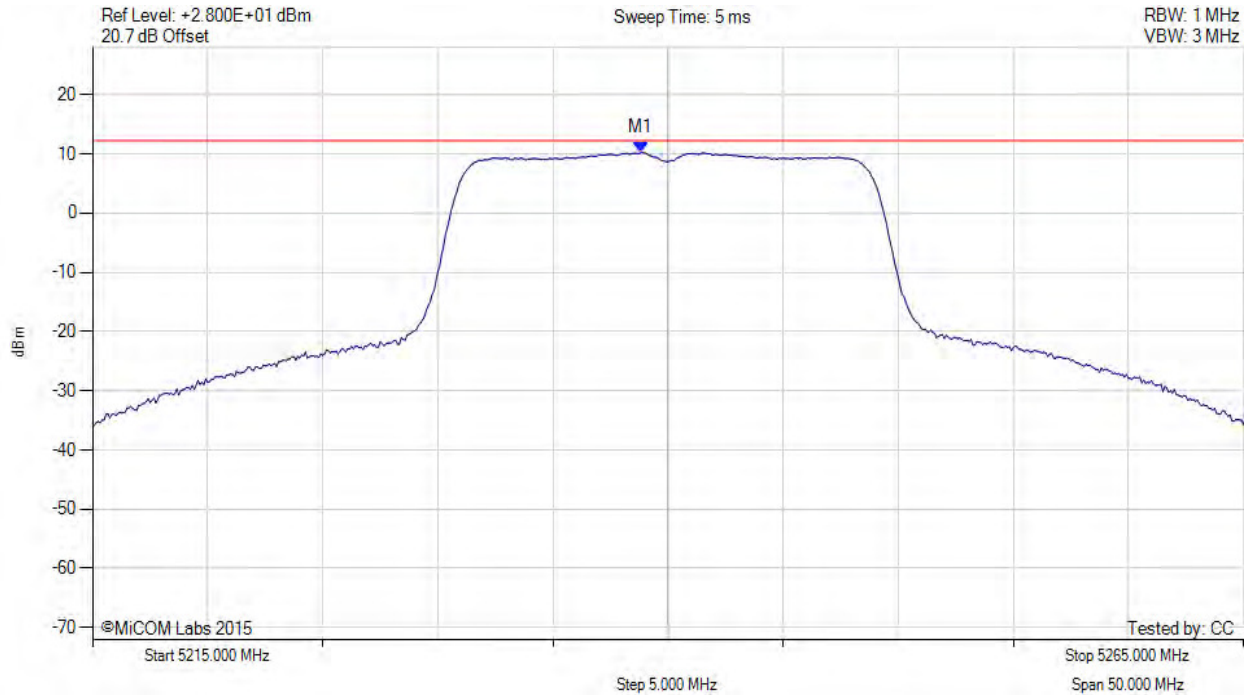
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5238.830 MHz : 10.240 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

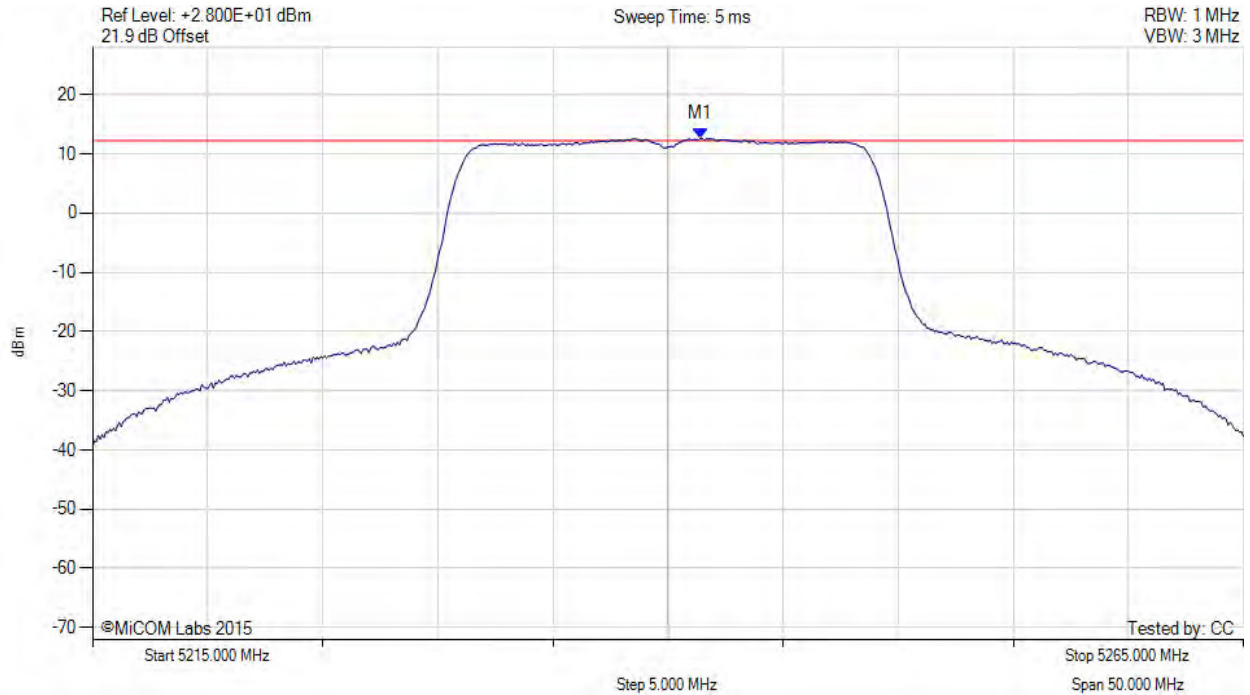
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5241.420 MHz : 12.621 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

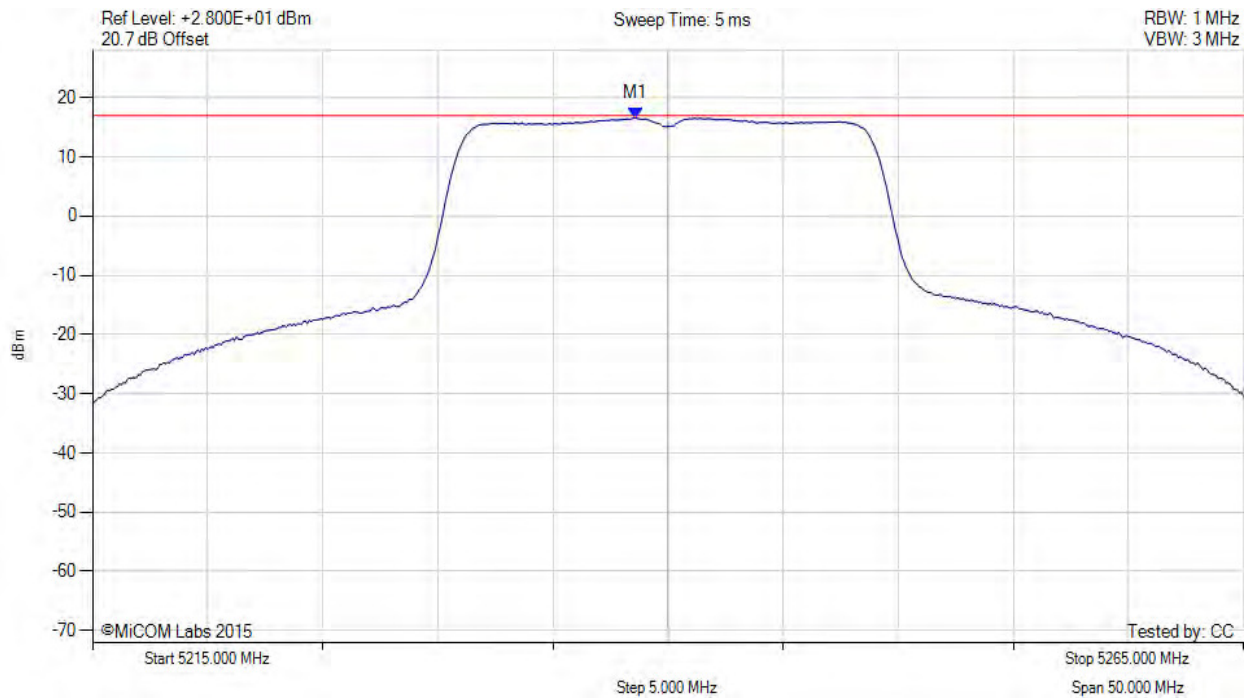
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POWER SPECTRAL DENSITY



Variants: 802.11n HT-20, Channel: 5240.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5238.600 MHz : 16.555 dBm M1 + DCCF : 5238.600 MHz : 16.599 dBm Duty Cycle Correction Factor : +0.04 dB	Limit: $\leq 17.0$ dBm Margin: $-0.4$ dB

[back to matrix](#)

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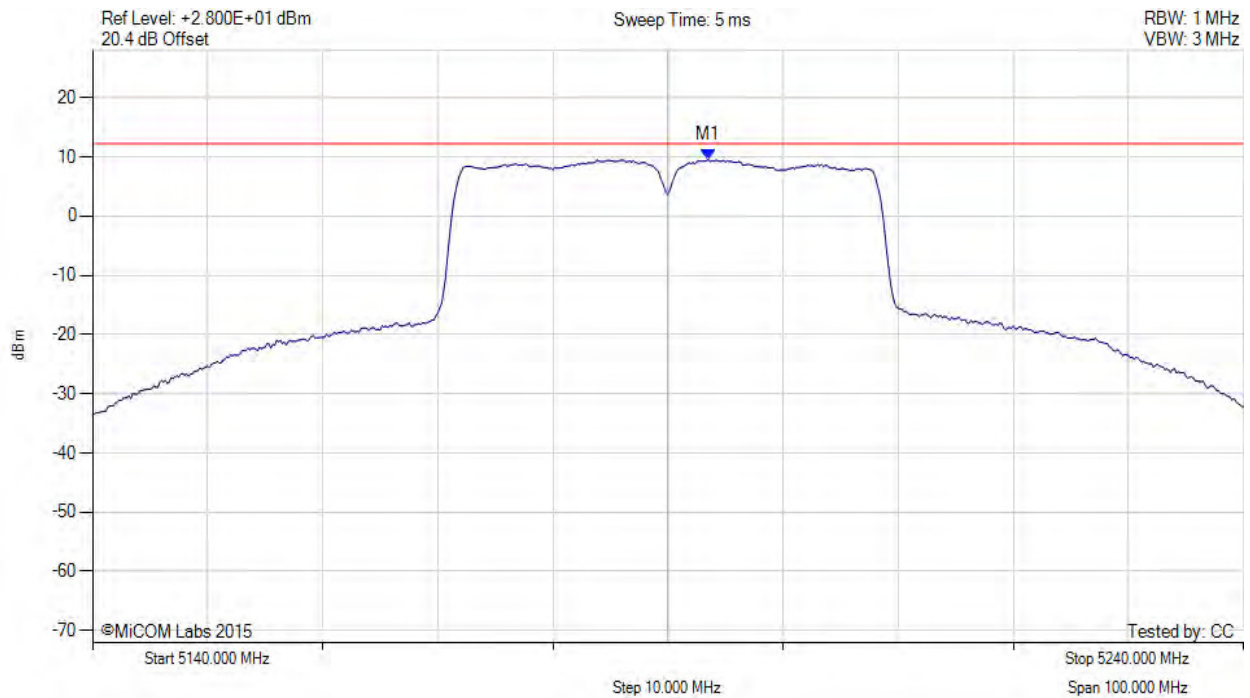




POWER SPECTRAL DENSITY



Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5193.500 MHz : 9.521 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

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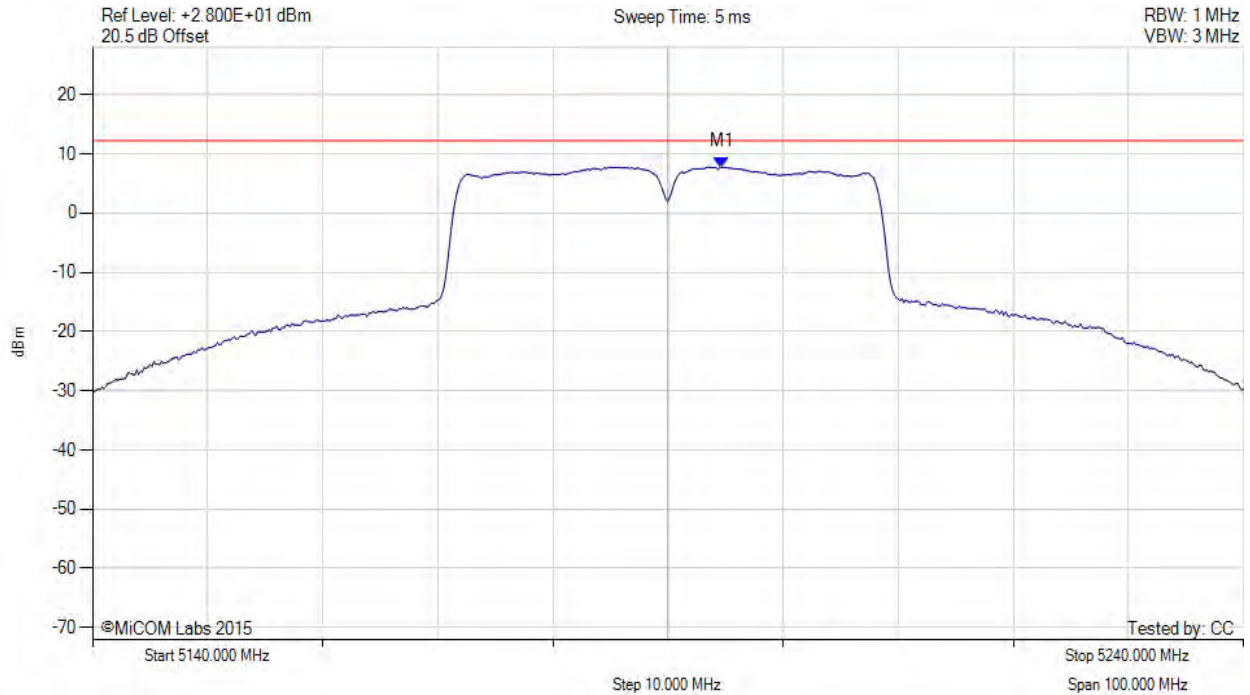




POWER SPECTRAL DENSITY



Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5194.670 MHz : 7.769 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

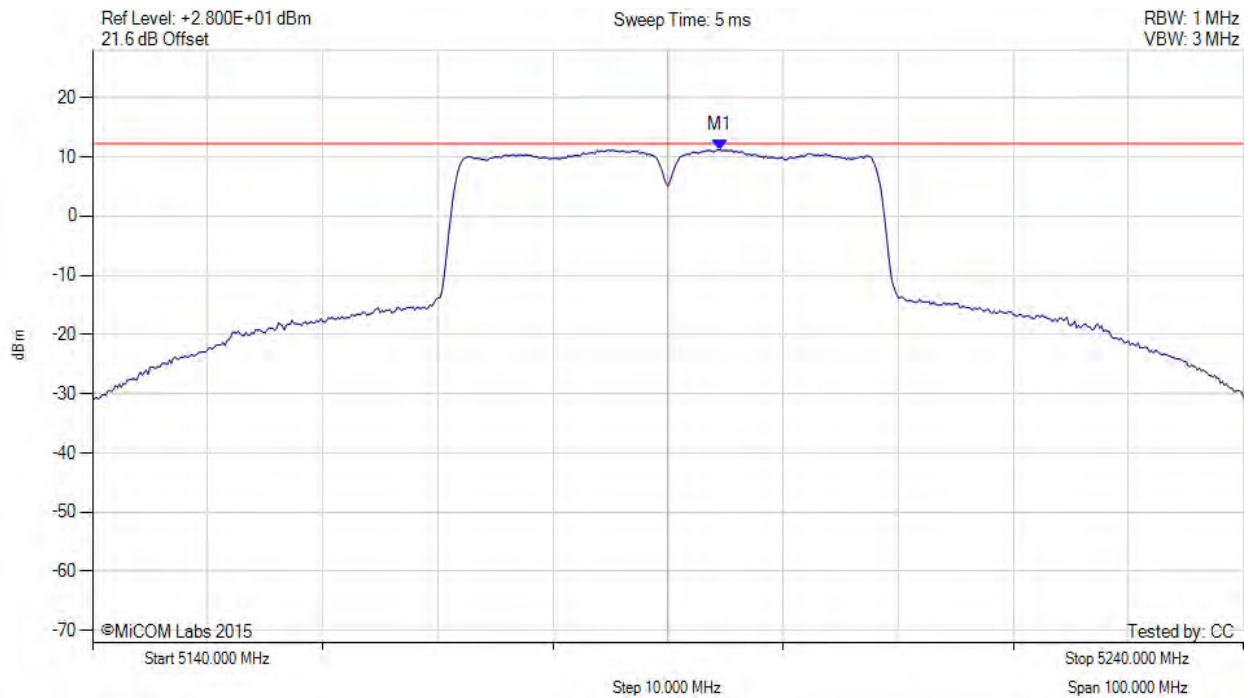
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5194.500 MHz : 11.220 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

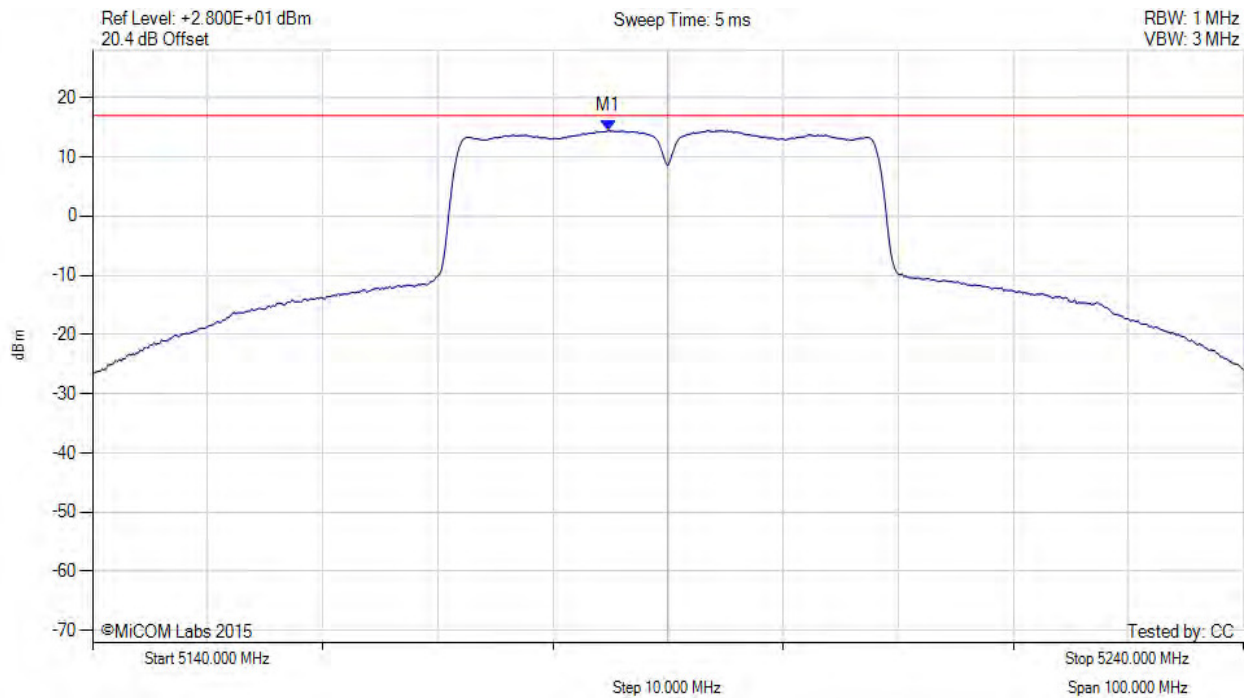
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-40, Channel: 5190.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5184.800 MHz : 14.455 dBm M1 + DCCF : 5184.800 MHz : 14.587 dBm Duty Cycle Correction Factor : +0.13 dB	Limit: $\leq 17.0$ dBm Margin: -2.4 dB

[back to matrix](#)

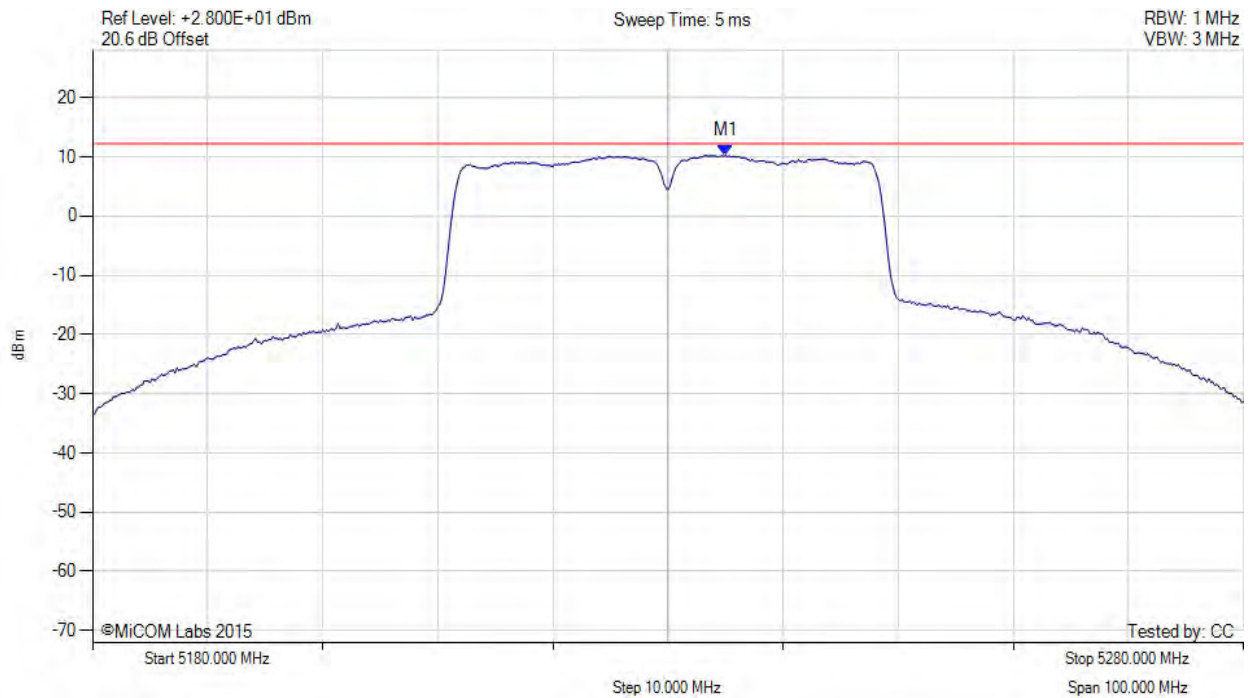
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5235.000 MHz : 10.230 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

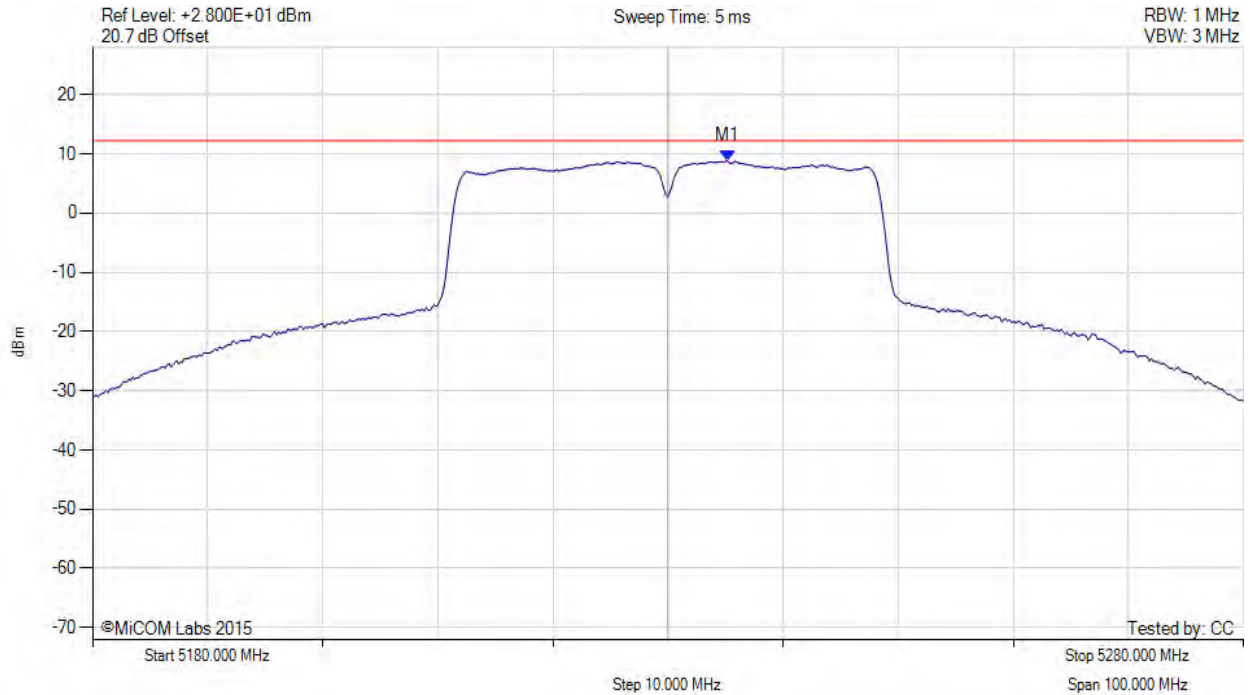
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5235.170 MHz : 8.844 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

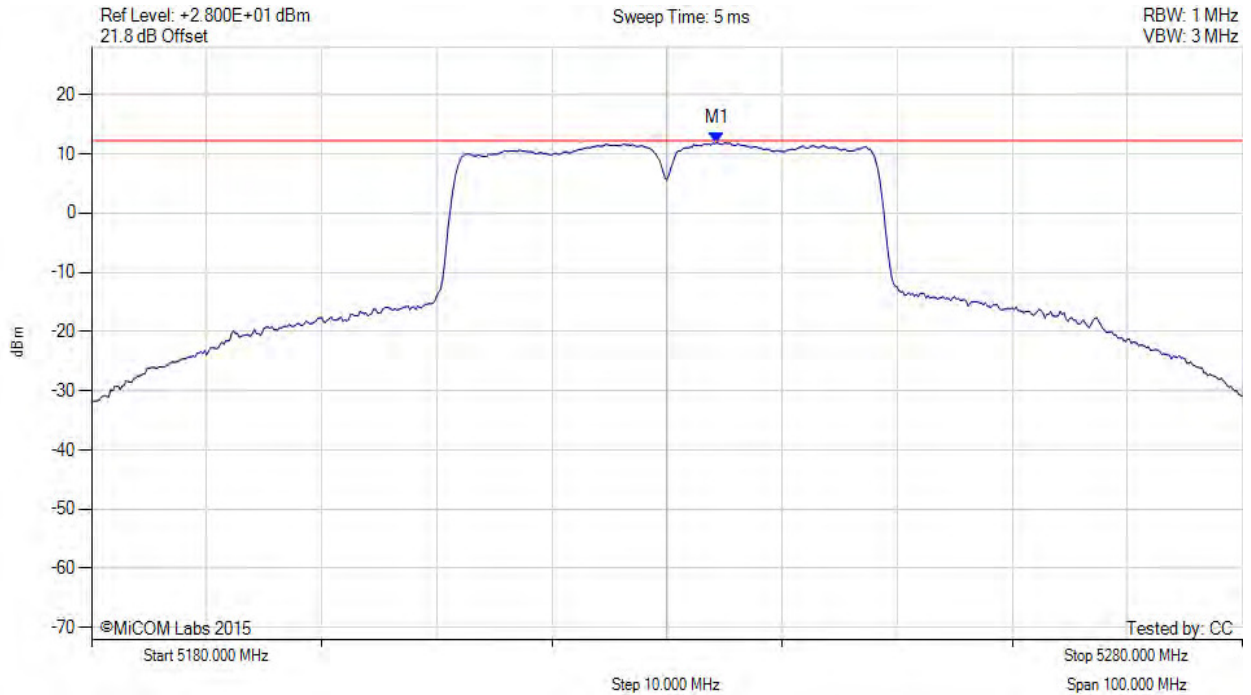
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



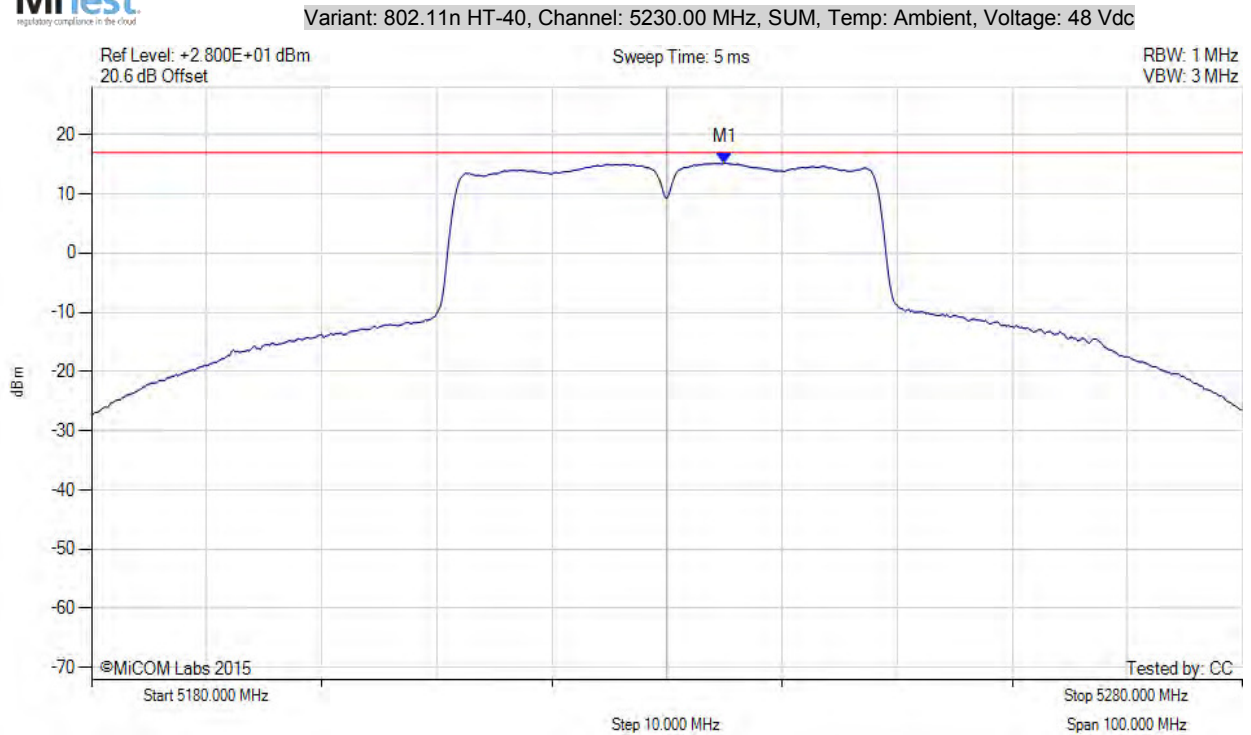
Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5234.330 MHz : 11.882 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

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POWER SPECTRAL DENSITY



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5235.000 MHz : 15.224 dBm M1 + DCCF : 5235.000 MHz : 15.356 dBm Duty Cycle Correction Factor : +0.13 dB	Limit: ≤ 17.0 dBm Margin: -1.6 dB

[back to matrix](#)

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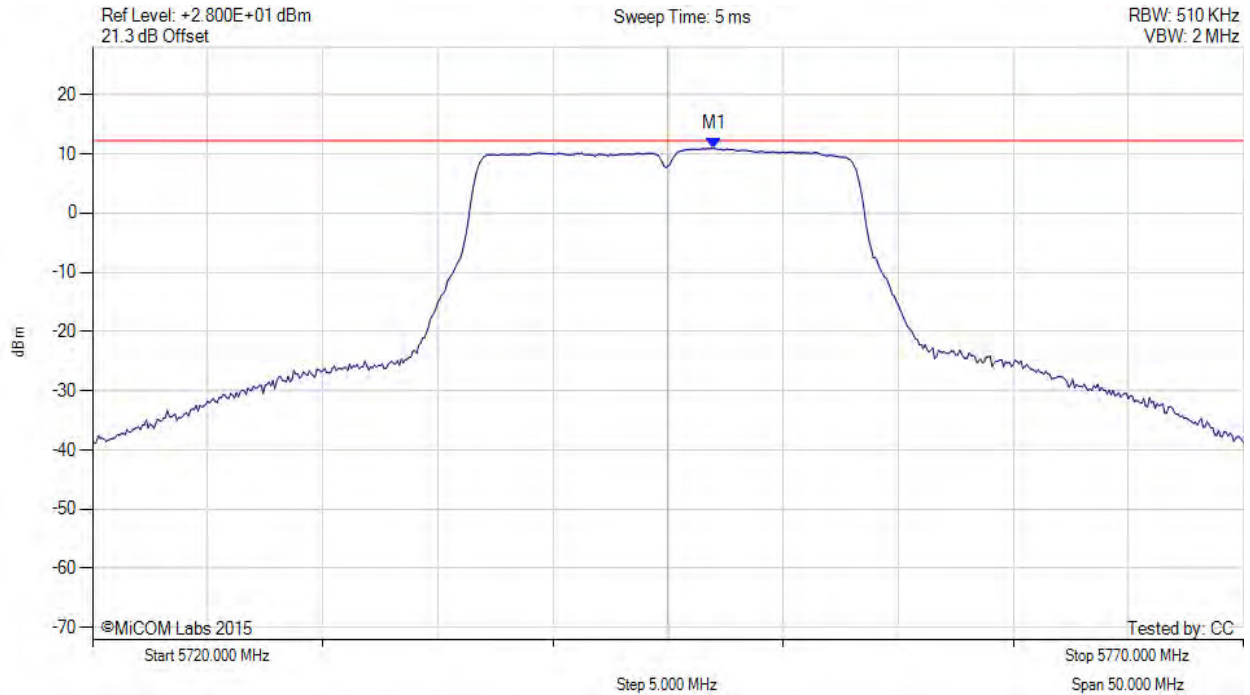




POWER SPECTRAL DENSITY



Variant: 802.11a, Channel: 5745.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5747.000 MHz : 10.933 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

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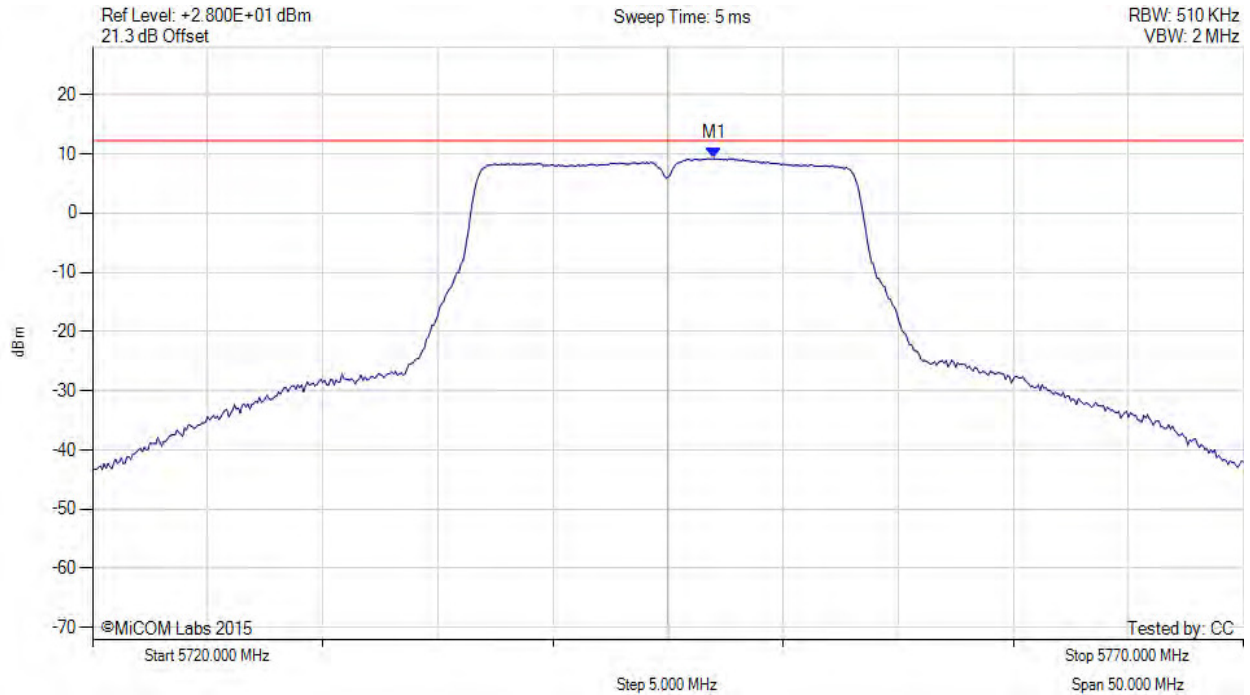




POWER SPECTRAL DENSITY



Variant: 802.11a, Channel: 5745.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5747.000 MHz : 9.205 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

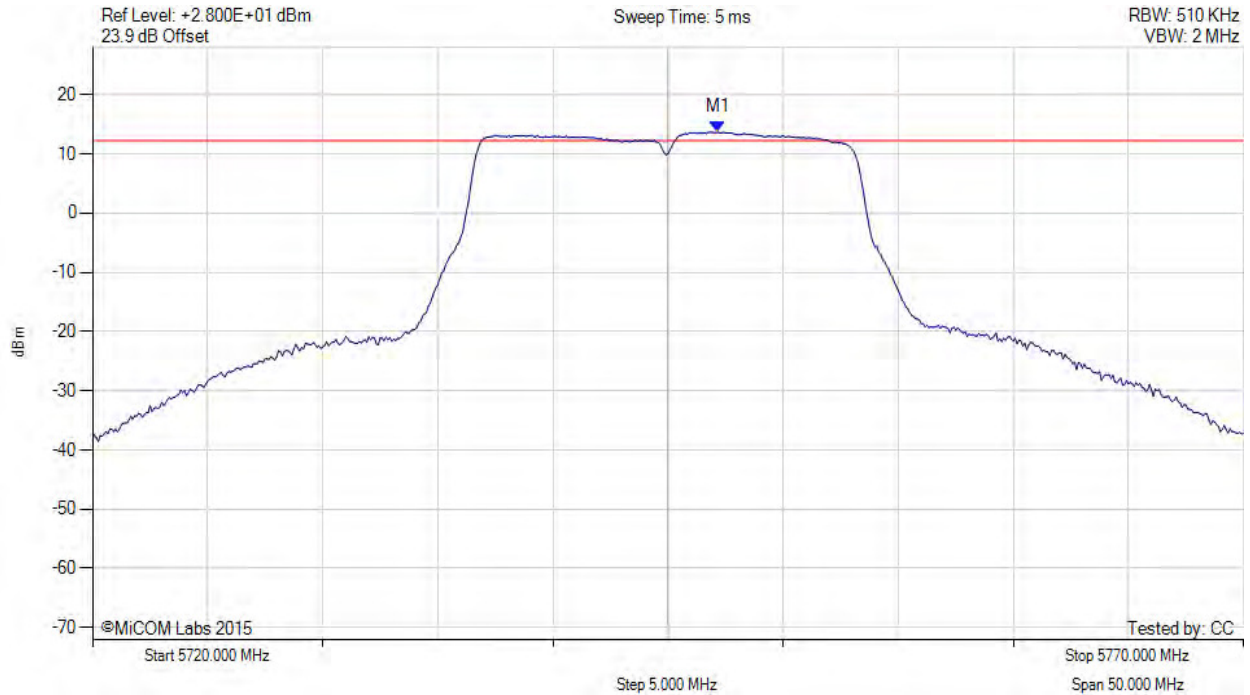
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POWER SPECTRAL DENSITY



Variant: 802.11a, Channel: 5745.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5747.170 MHz : 13.662 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

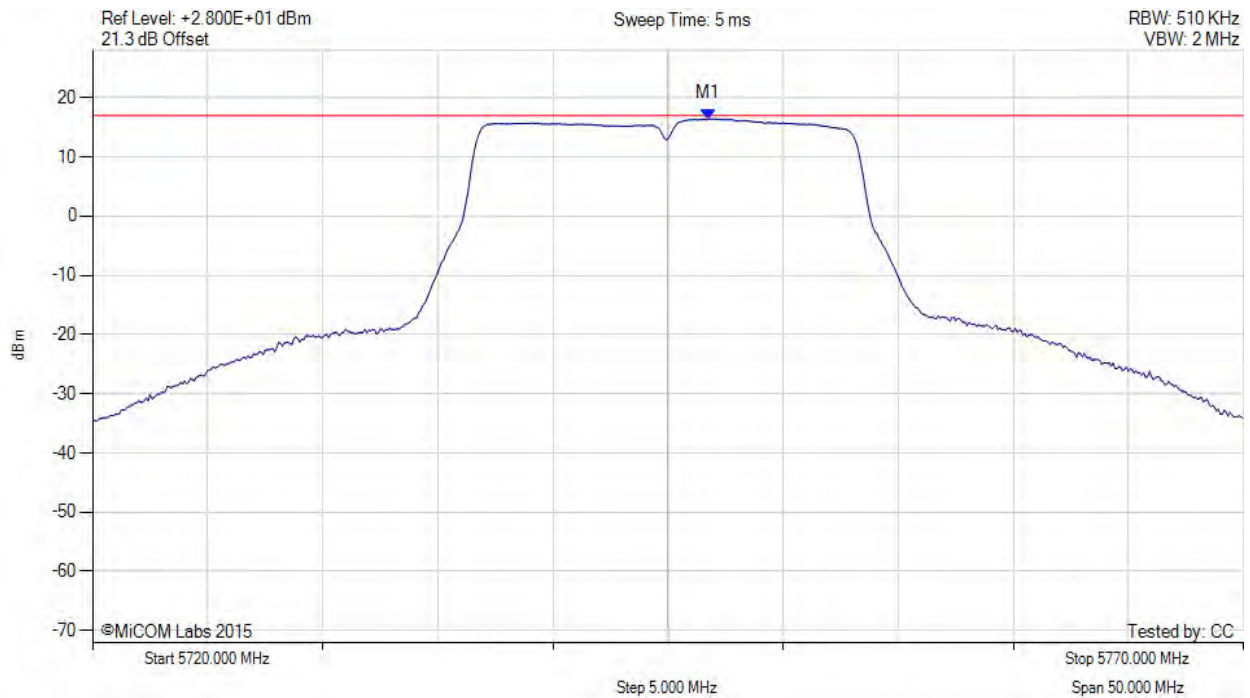
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**POWER SPECTRAL DENSITY**



Variante: 802.11a, Channel: 5745.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5746.800 MHz : 16.414 dBm M1 + DCCF : 5746.800 MHz : 16.458 dBm Duty Cycle Correction Factor : +0.04 dB	Limit: ≤ 17.0 dBm Margin: -0.5 dB

[back to matrix](#)

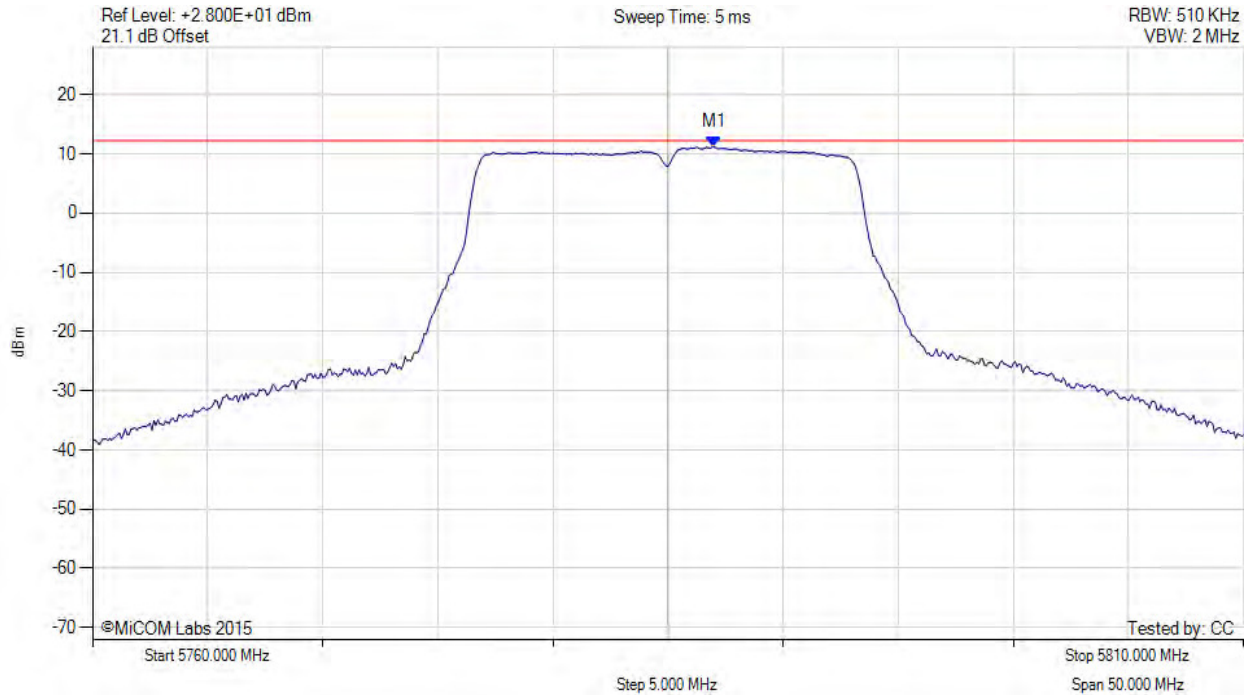
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POWER SPECTRAL DENSITY



Variant: 802.11a, Channel: 5785.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5787.000 MHz : 11.164 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

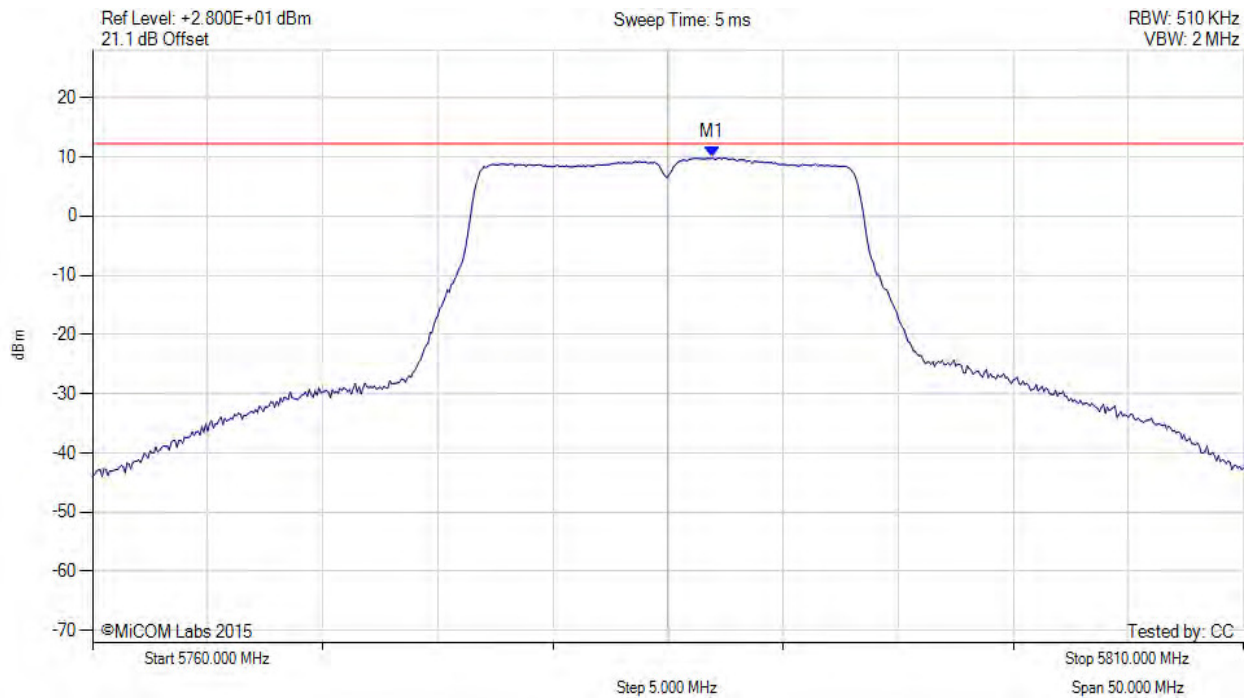
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POWER SPECTRAL DENSITY



Variant: 802.11a, Channel: 5785.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5786.920 MHz : 9.878 dBm	Channel Frequency: 5785.00 MHz

[back to matrix](#)

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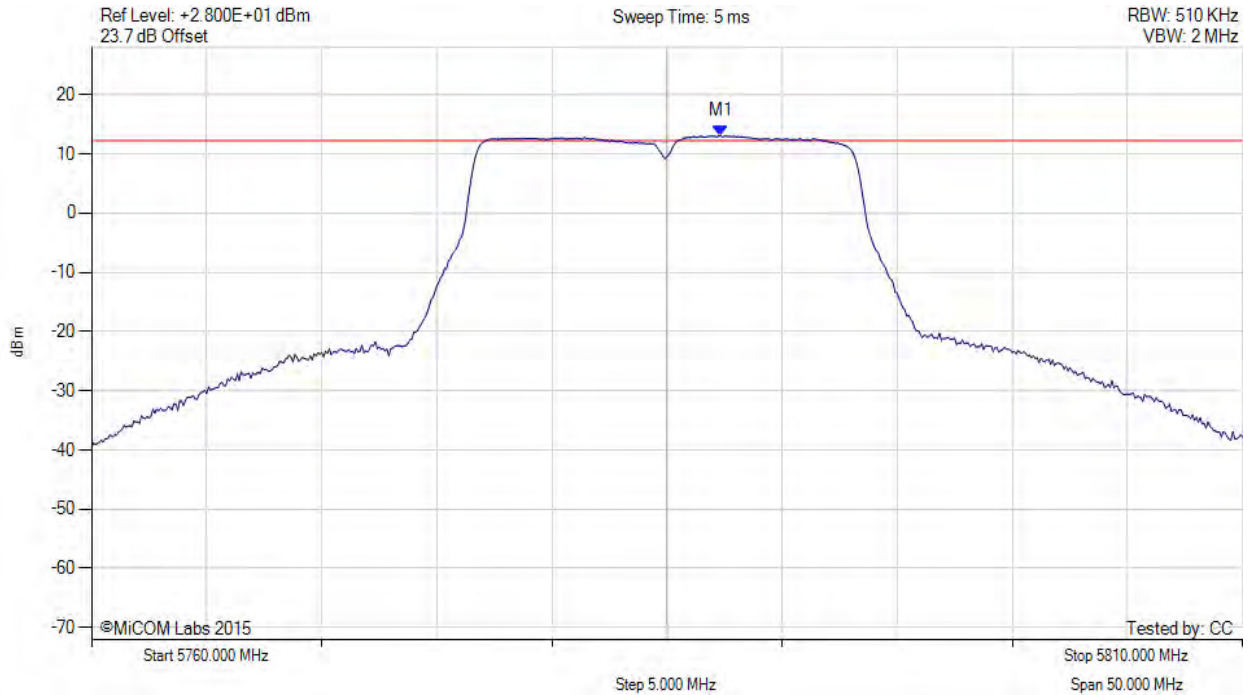


**Title:** Aruba Networks APEX0104  
**To:** FCC CFR 47 Part 15 Subpart E 15.407  
**Serial #:** ARUB199-U6 Rev A  
**Issue Date:** 27<sup>th</sup> August 2015  
**Page:** 174 of 227

**POWER SPECTRAL DENSITY**



Variant: 802.11a, Channel: 5785.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5787.330 MHz : 13.048 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

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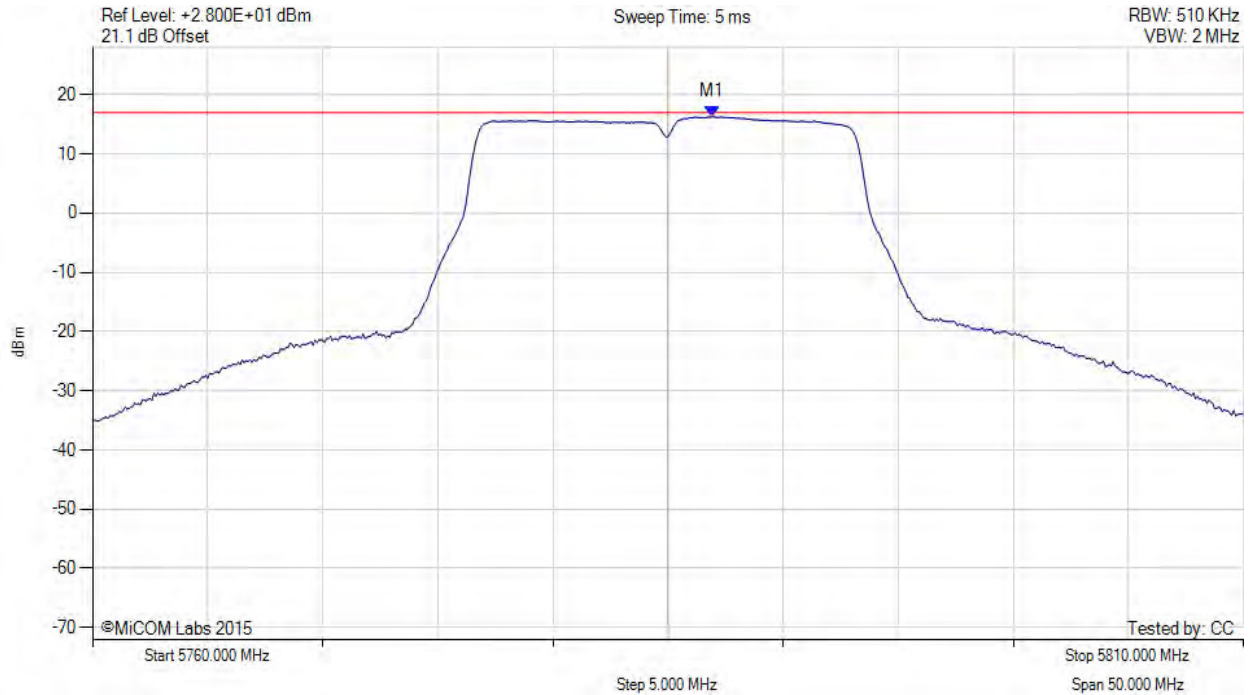


**Title:** Aruba Networks APEX0104  
**To:** FCC CFR 47 Part 15 Subpart E 15.407  
**Serial #:** ARUB199-U6 Rev A  
**Issue Date:** 27<sup>th</sup> August 2015  
**Page:** 175 of 227

POWER SPECTRAL DENSITY



Variante: 802.11a, Channel: 5785.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5786.900 MHz : 16.304 dBm M1 + DCCF : 5786.900 MHz : 16.348 dBm Duty Cycle Correction Factor : +0.04 dB	Limit: $\leq 17.0$ dBm Margin: $-0.6$ dB

[back to matrix](#)

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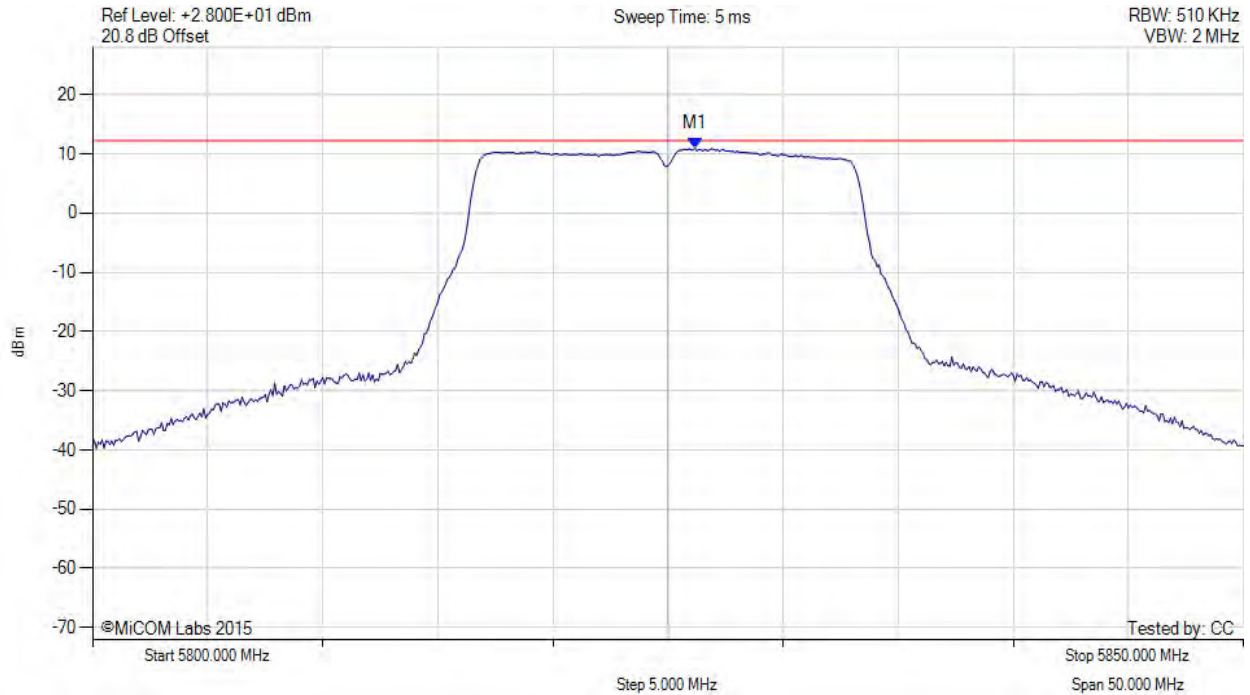




POWER SPECTRAL DENSITY



Variant: 802.11a, Channel: 5825.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5826.170 MHz : 10.992 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

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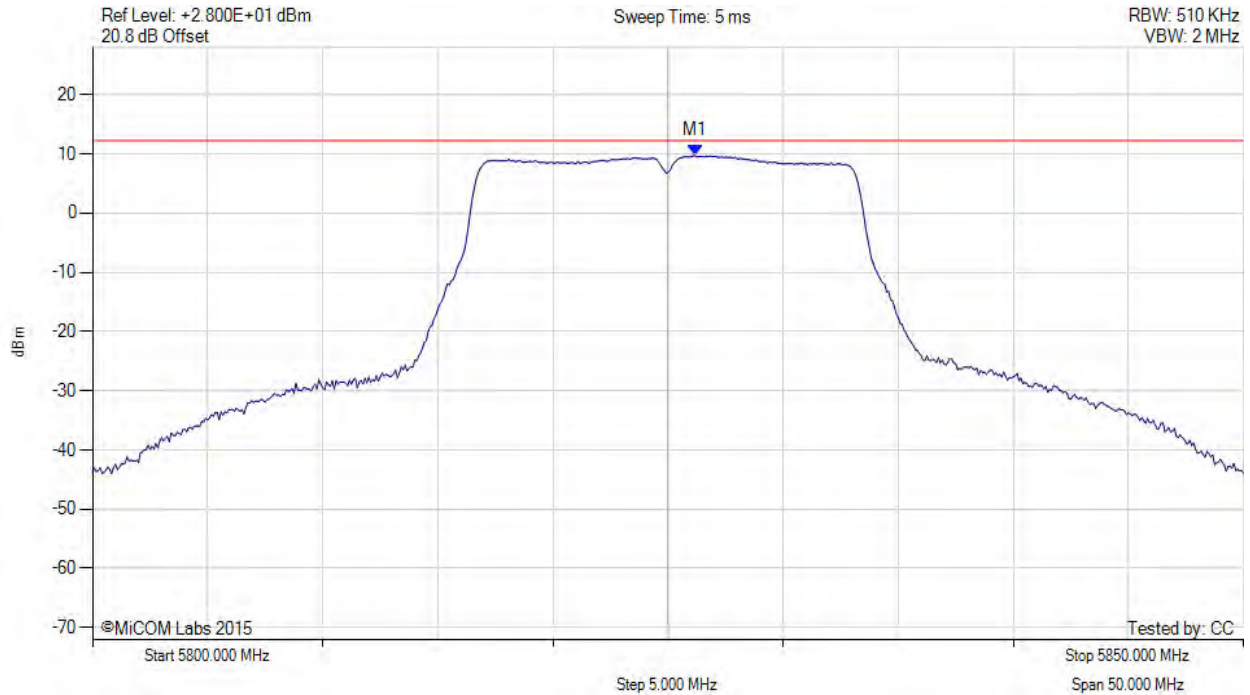




POWER SPECTRAL DENSITY



Variant: 802.11a, Channel: 5825.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5826.170 MHz : 9.722 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

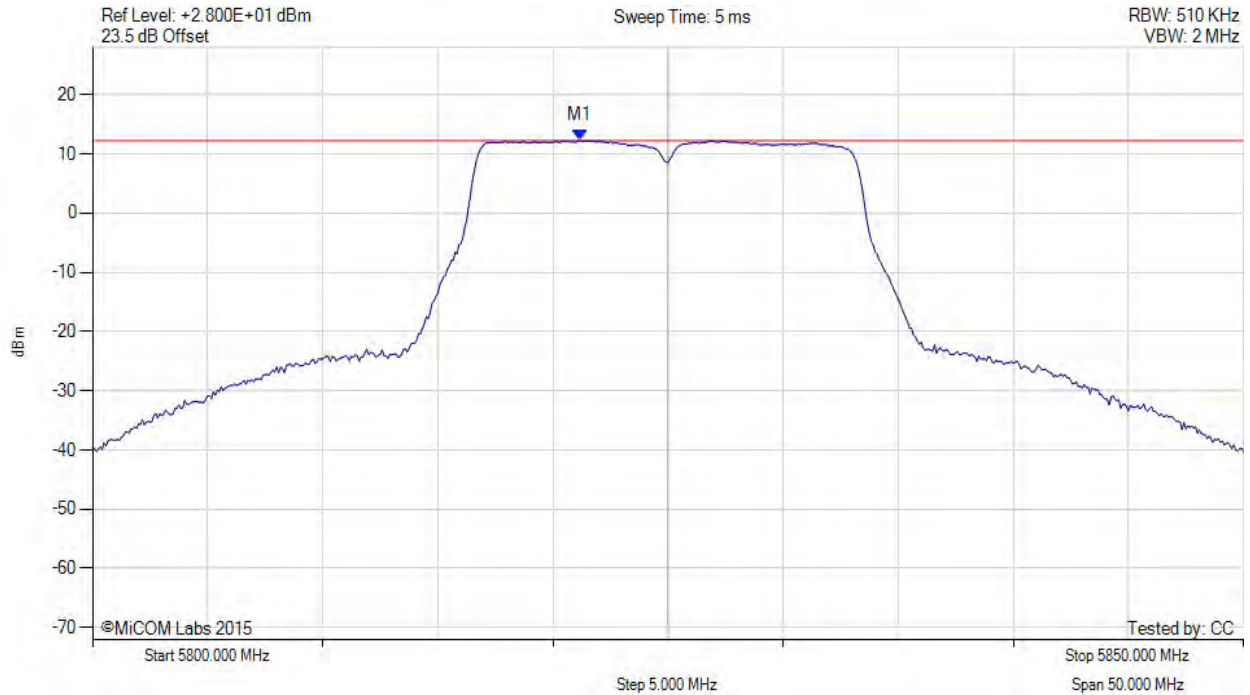
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**POWER SPECTRAL DENSITY**



Variant: 802.11a, Channel: 5825.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5821.170 MHz : 12.215 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

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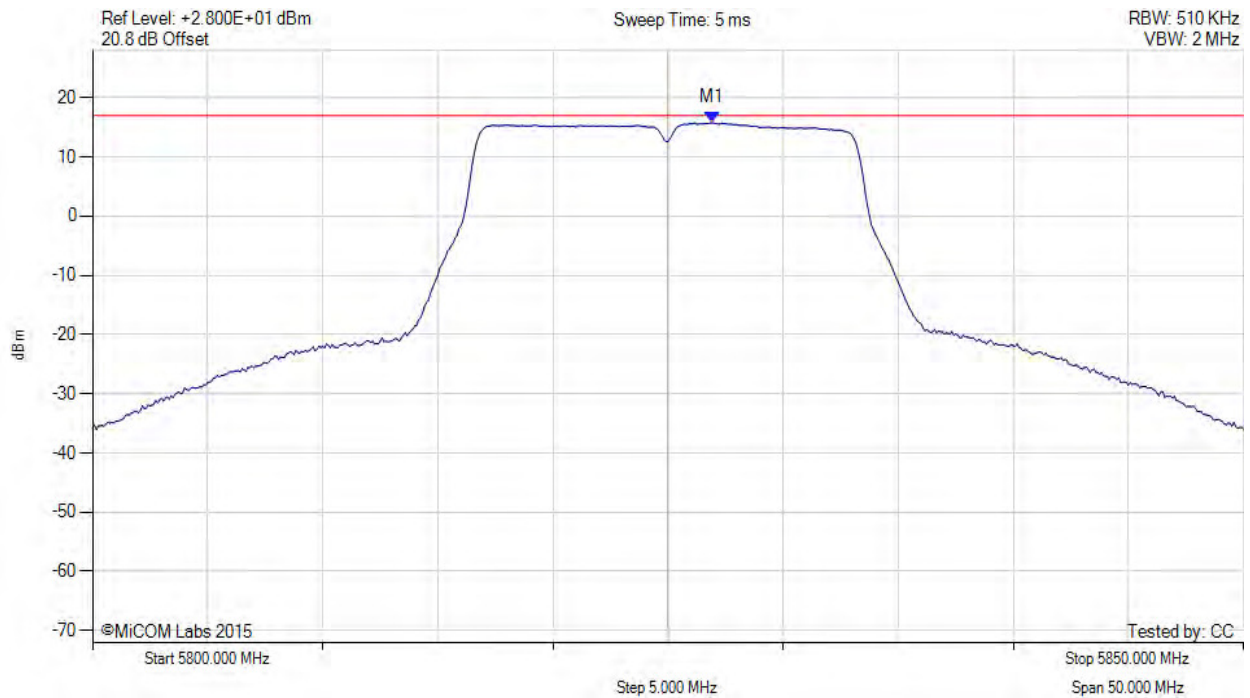


**Title:** Aruba Networks APEX0104  
**To:** FCC CFR 47 Part 15 Subpart E 15.407  
**Serial #:** ARUB199-U6 Rev A  
**Issue Date:** 27<sup>th</sup> August 2015  
**Page:** 179 of 227

POWER SPECTRAL DENSITY



Variante: 802.11a, Channel: 5825.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5826.900 MHz : 15.769 dBm M1 + DCCF : 5826.900 MHz : 15.813 dBm Duty Cycle Correction Factor : +0.04 dB	Limit: $\leq 17.0$ dBm Margin: -1.2 dB

[back to matrix](#)

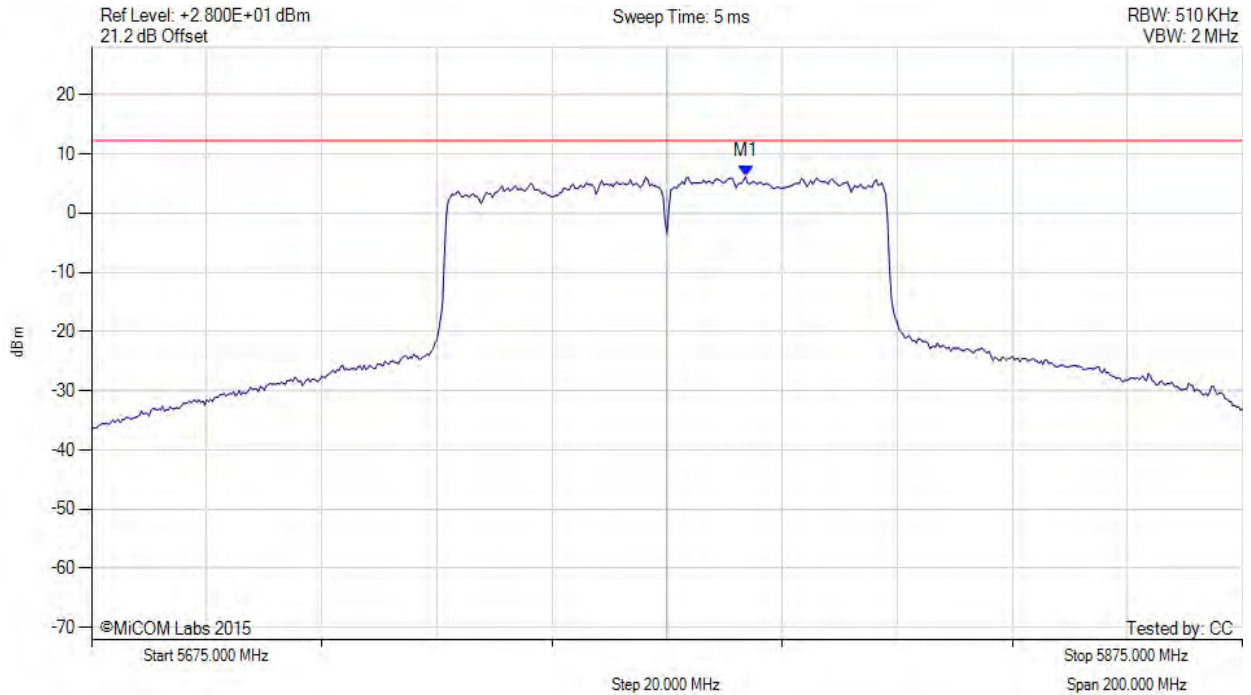
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**POWER SPECTRAL DENSITY**



Variante: 802.11ac-80, Channel: 5775.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5788.700 MHz : 6.152 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

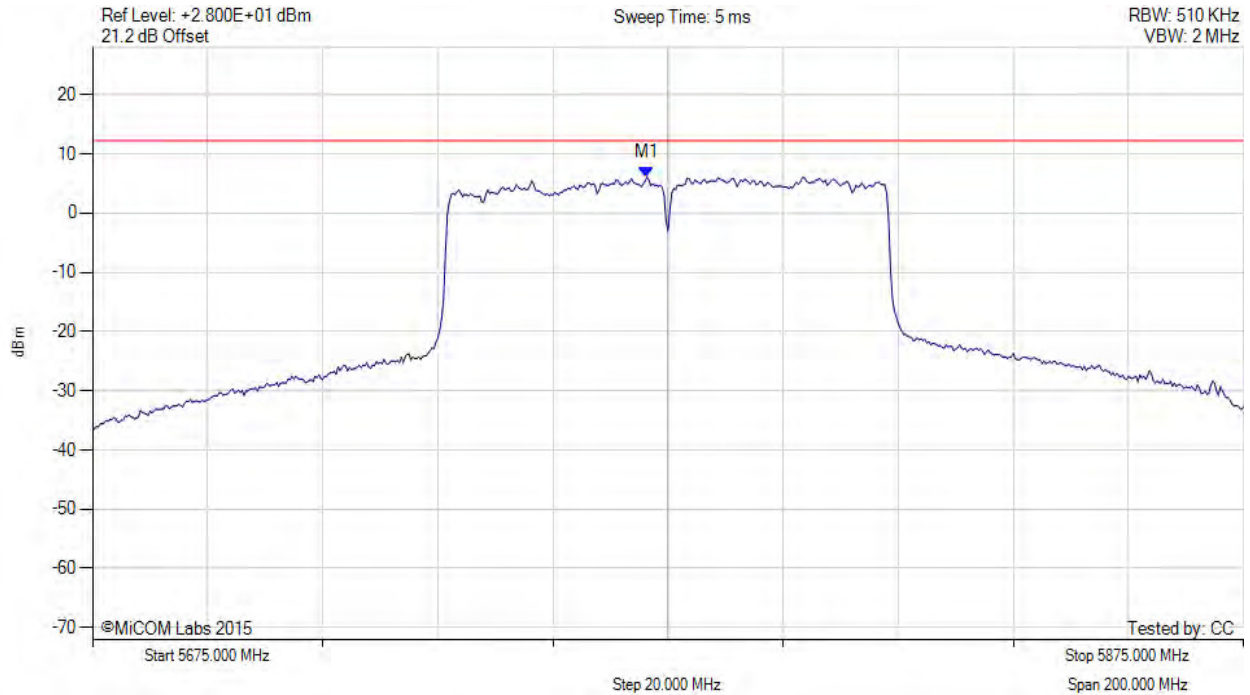
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**POWER SPECTRAL DENSITY**



Variante: 802.11ac-80, Channel: 5775.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5771.300 MHz : 6.068 dBm	Channel Frequency: 5775.00 MHz

[back to matrix](#)

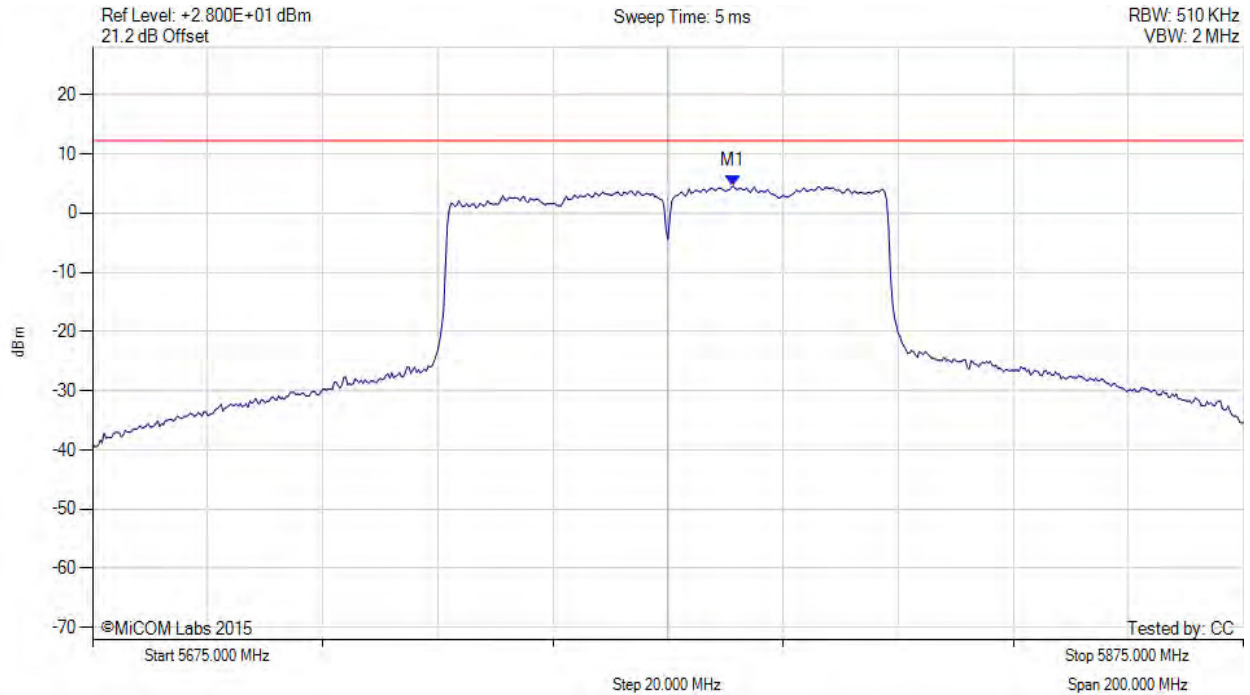
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**POWER SPECTRAL DENSITY**



Variante: 802.11ac-80, Channel: 5775.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5786.300 MHz : 4.548 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

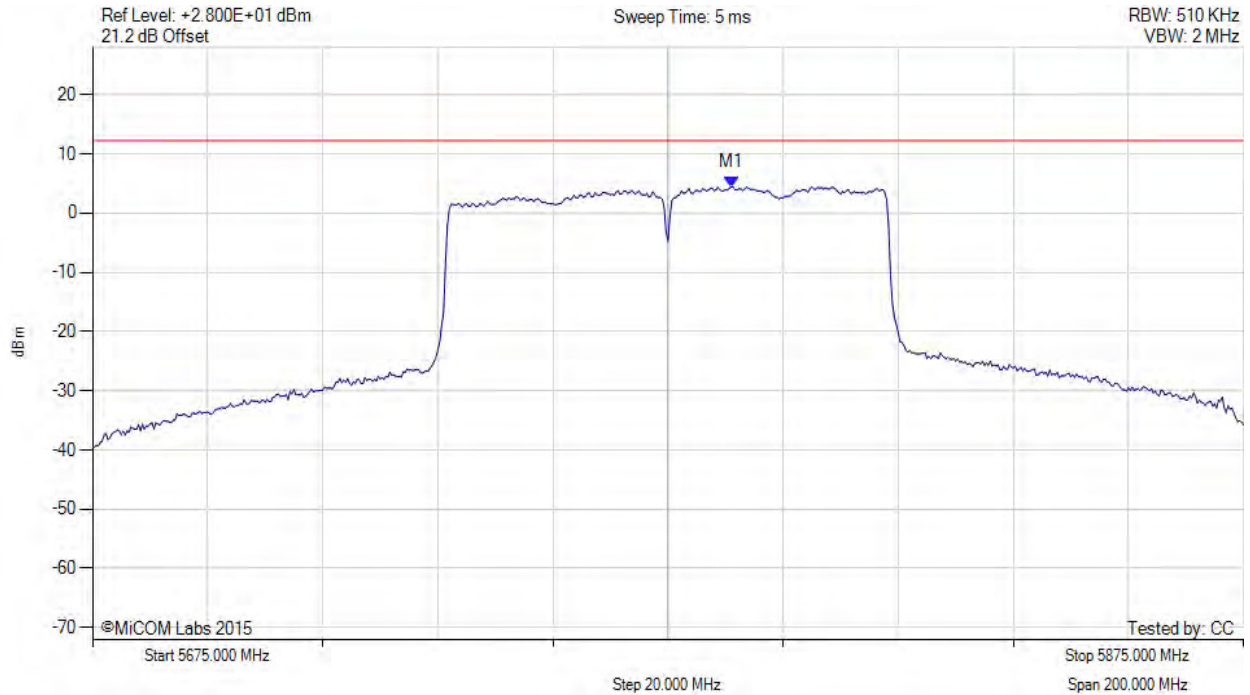
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POWER SPECTRAL DENSITY



Variante: 802.11ac-80, Channel: 5775.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5786.000 MHz : 4.423 dBm	Channel Frequency: 5775.00 MHz

[back to matrix](#)

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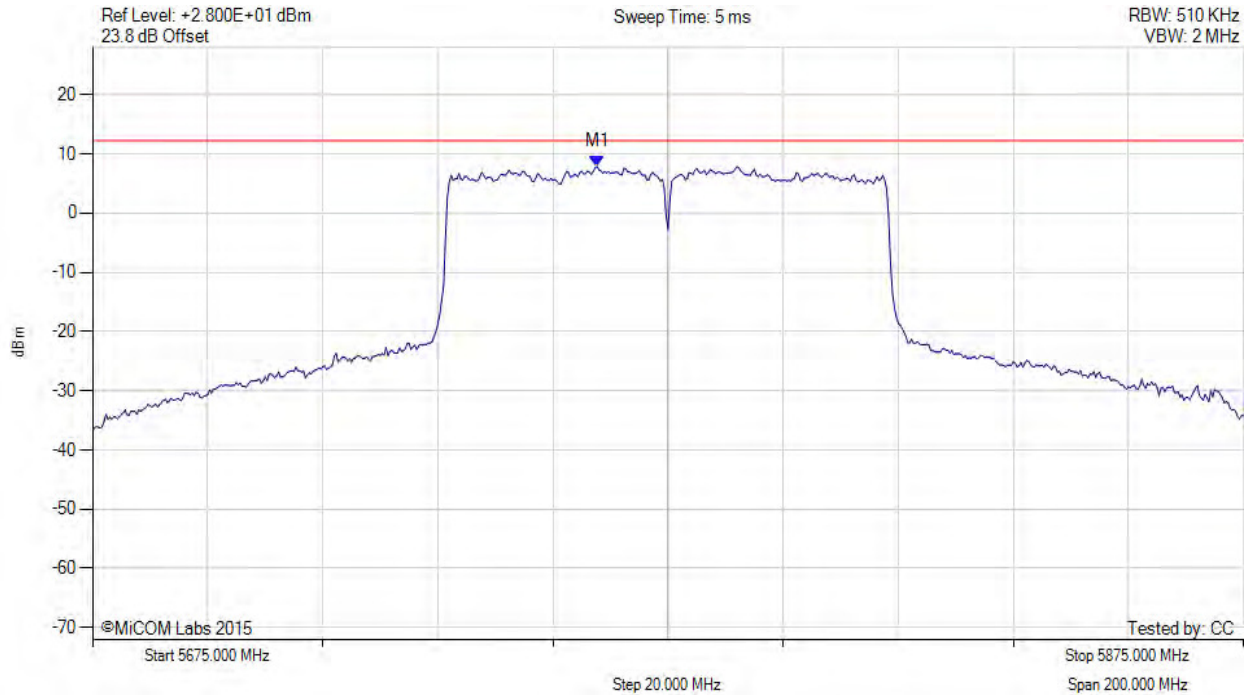




**POWER SPECTRAL DENSITY**



Variant: 802.11ac-80, Channel: 5775.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5762.700 MHz : 7.878 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

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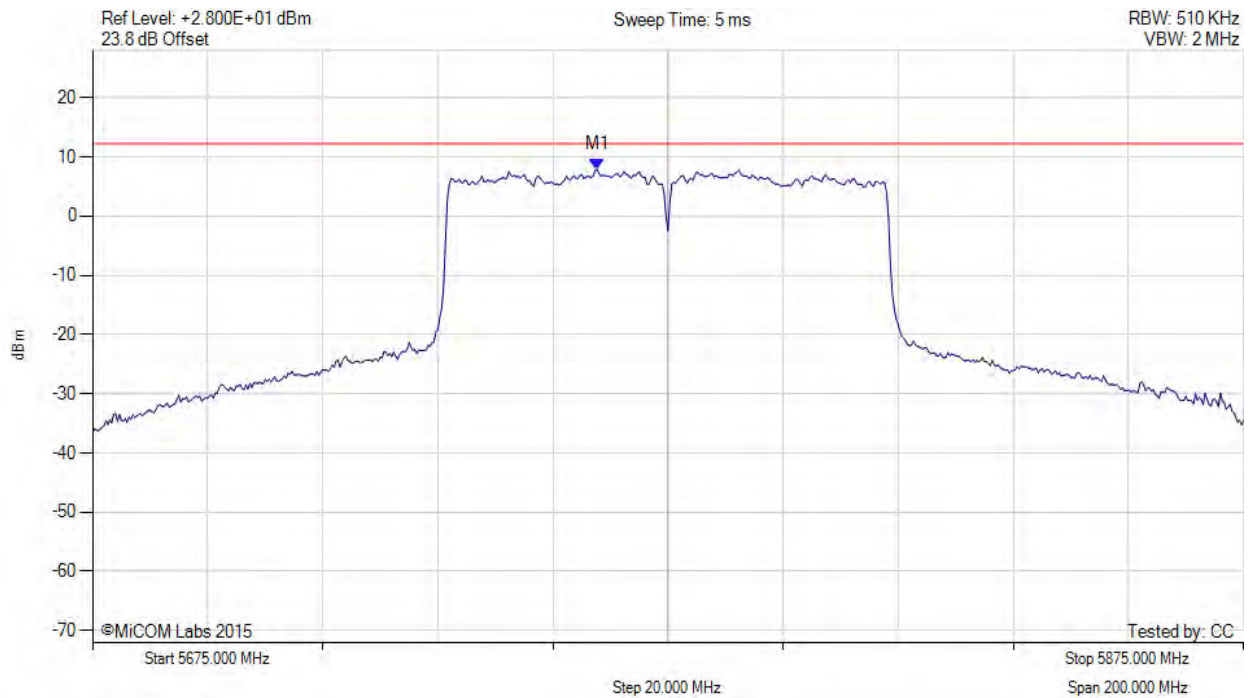




**POWER SPECTRAL DENSITY**



Variante: 802.11ac-80, Channel: 5775.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5762.700 MHz : 7.899 dBm	Channel Frequency: 5775.00 MHz

[back to matrix](#)

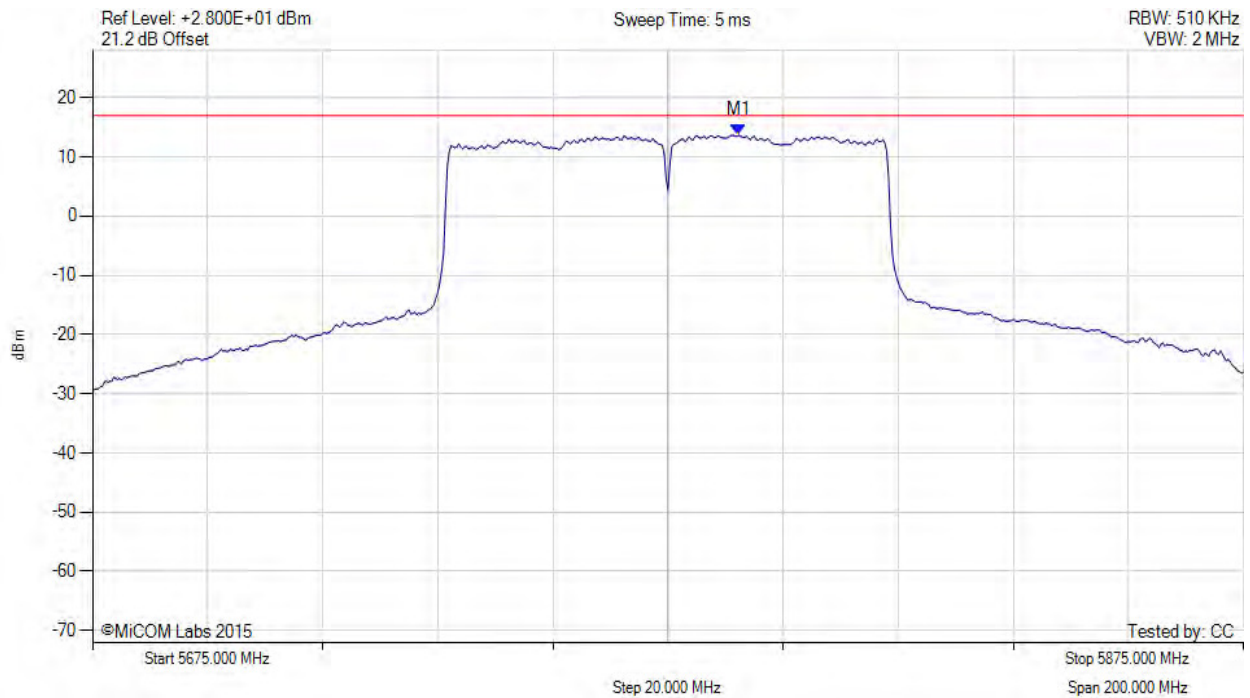
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POWER SPECTRAL DENSITY



Variant: 802.11ac-80, Channel: 5775.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5787.300 MHz : 13.660 dBm M1 + DCCF : 5787.300 MHz : 14.022 dBm Duty Cycle Correction Factor : +0.36 dB	Limit: $\leq 17.0$ dBm Margin: $-2.9$ dB

[back to matrix](#)

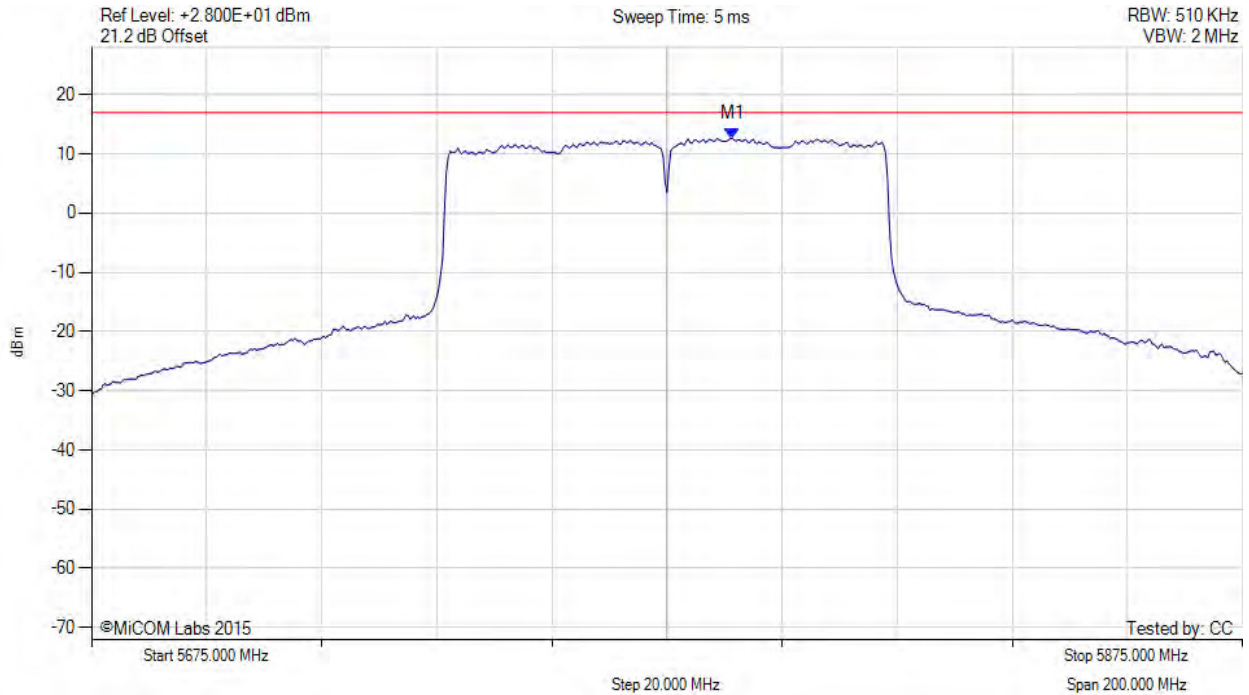
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POWER SPECTRAL DENSITY



Variant: 802.11ac-80, Channel: 5775.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5786.300 MHz : 12.622 dBm M1 + DCCF : 5786.300 MHz : 12.984 dBm Duty Cycle Correction Factor : +0.36 dB	Limit: ≤ 17.0 dBm Margin: -4.0 dB

[back to matrix](#)

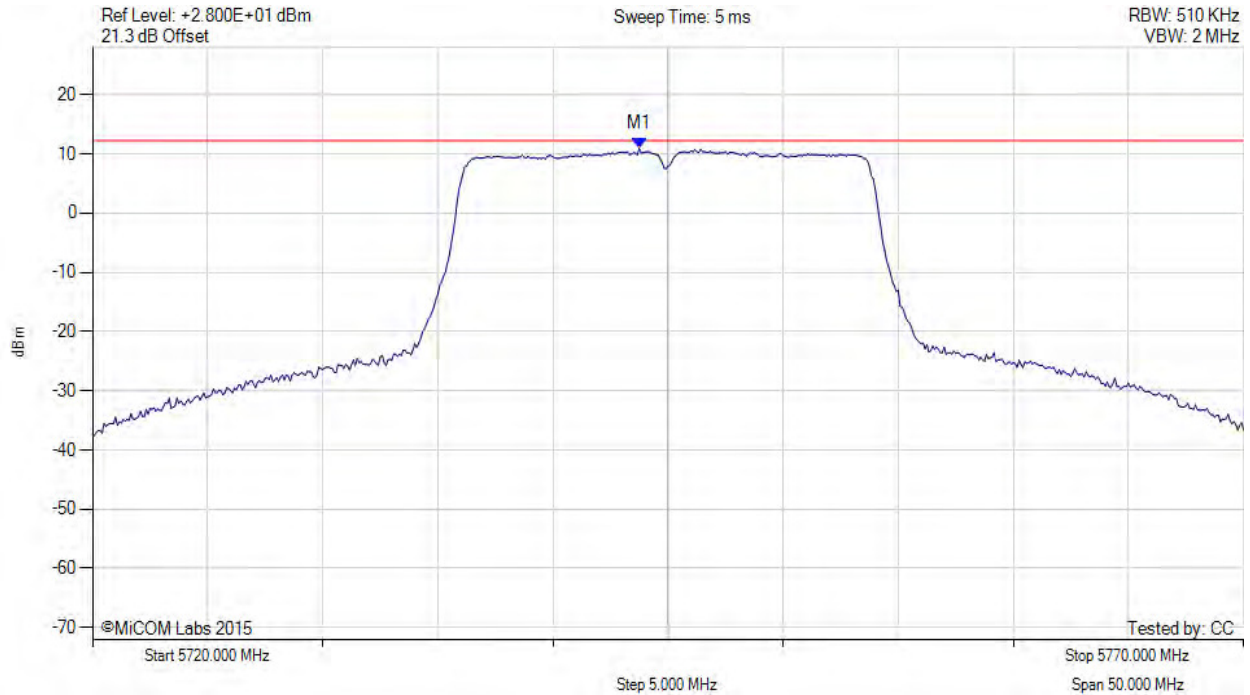
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**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-20, Channel: 5745.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5743.750 MHz : 10.904 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

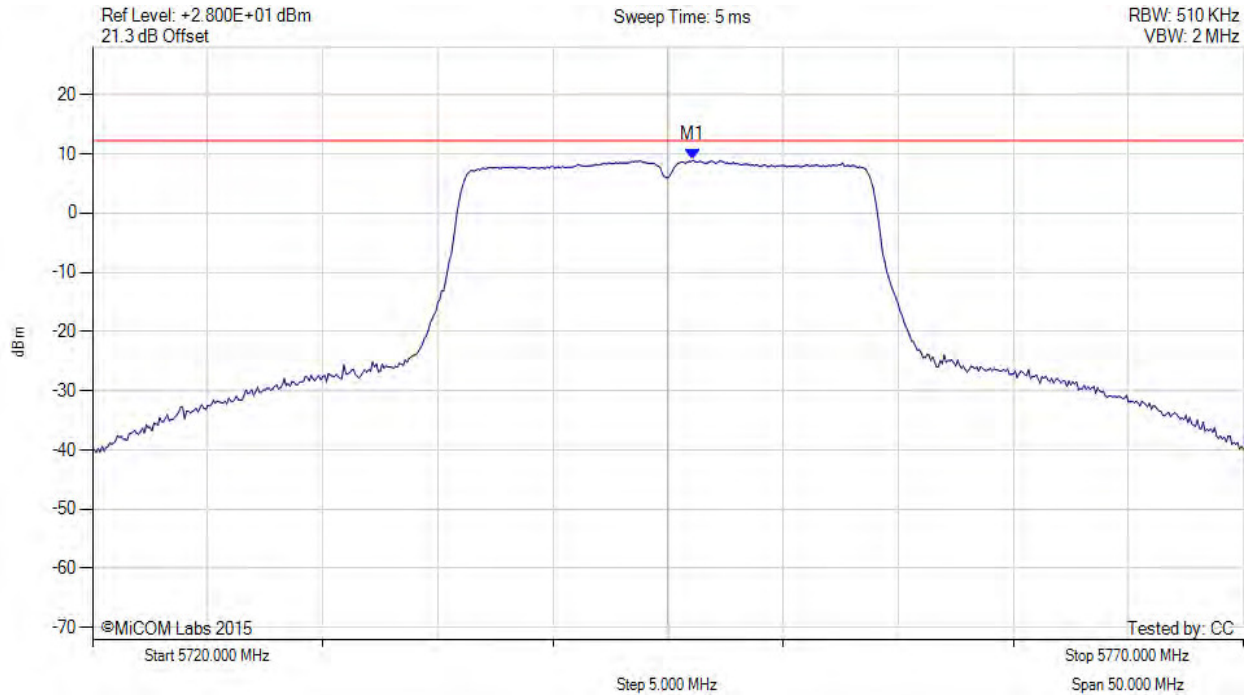
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-20, Channel: 5745.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5746.080 MHz : 8.938 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

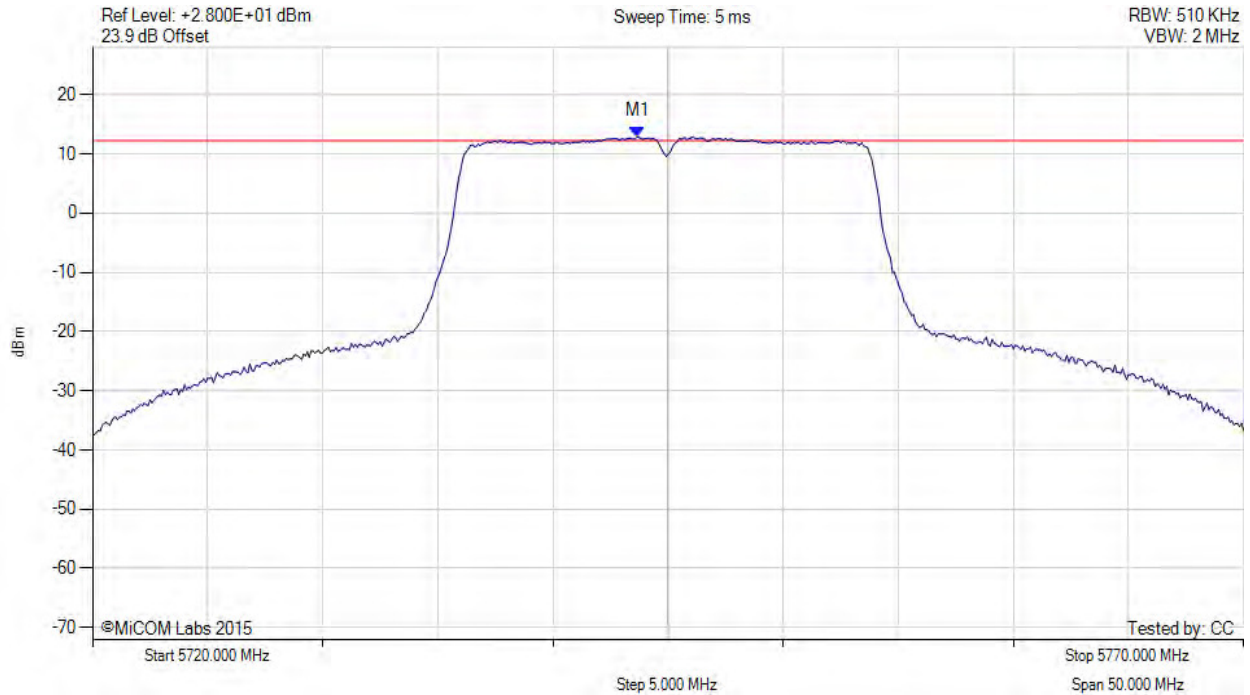
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**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-20, Channel: 5745.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5743.670 MHz : 12.889 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

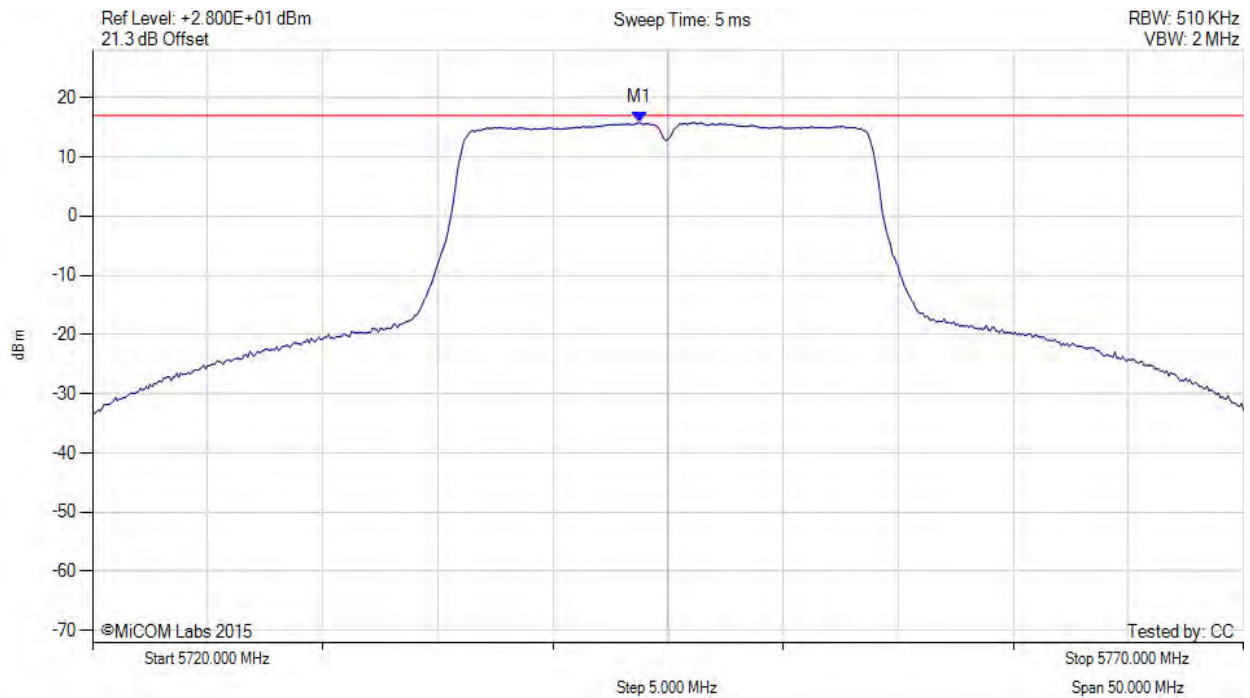
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**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-20, Channel: 5745.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5743.800 MHz : 15.884 dBm M1 + DCCF : 5743.800 MHz : 15.928 dBm Duty Cycle Correction Factor : +0.04 dB	Limit: ≤ 17.0 dBm Margin: -1.0 dB

[back to matrix](#)

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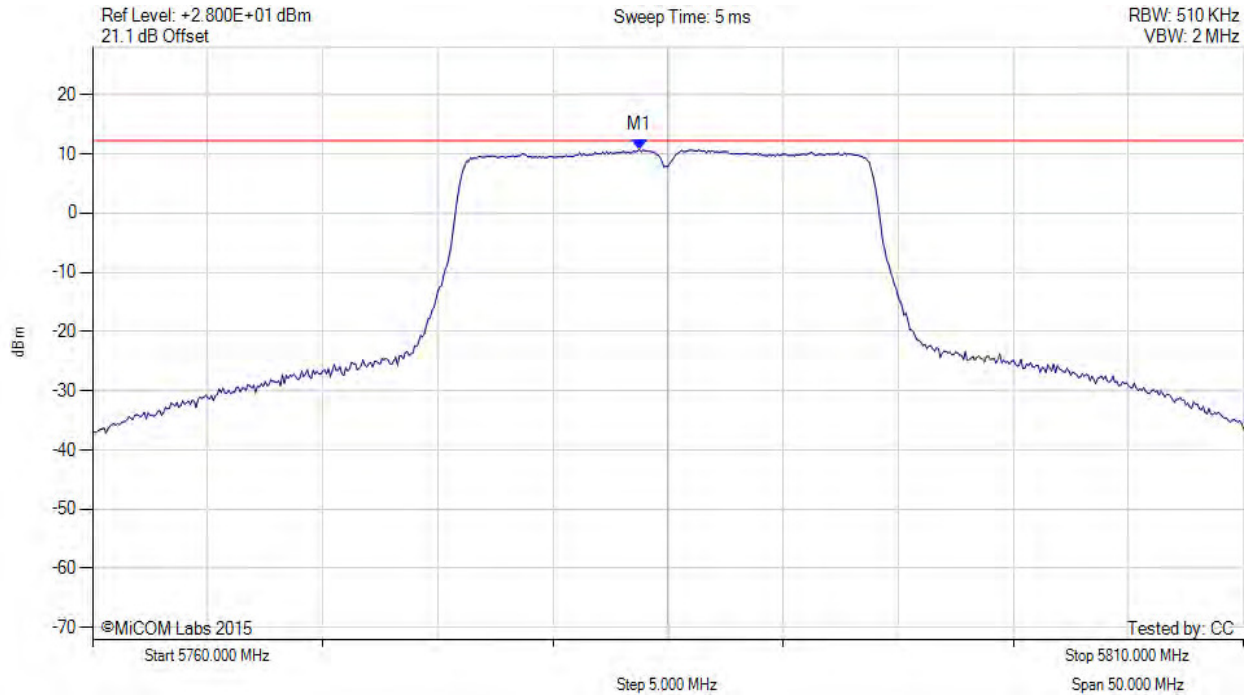




**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-20, Channel: 5785.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5783.750 MHz : 10.710 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

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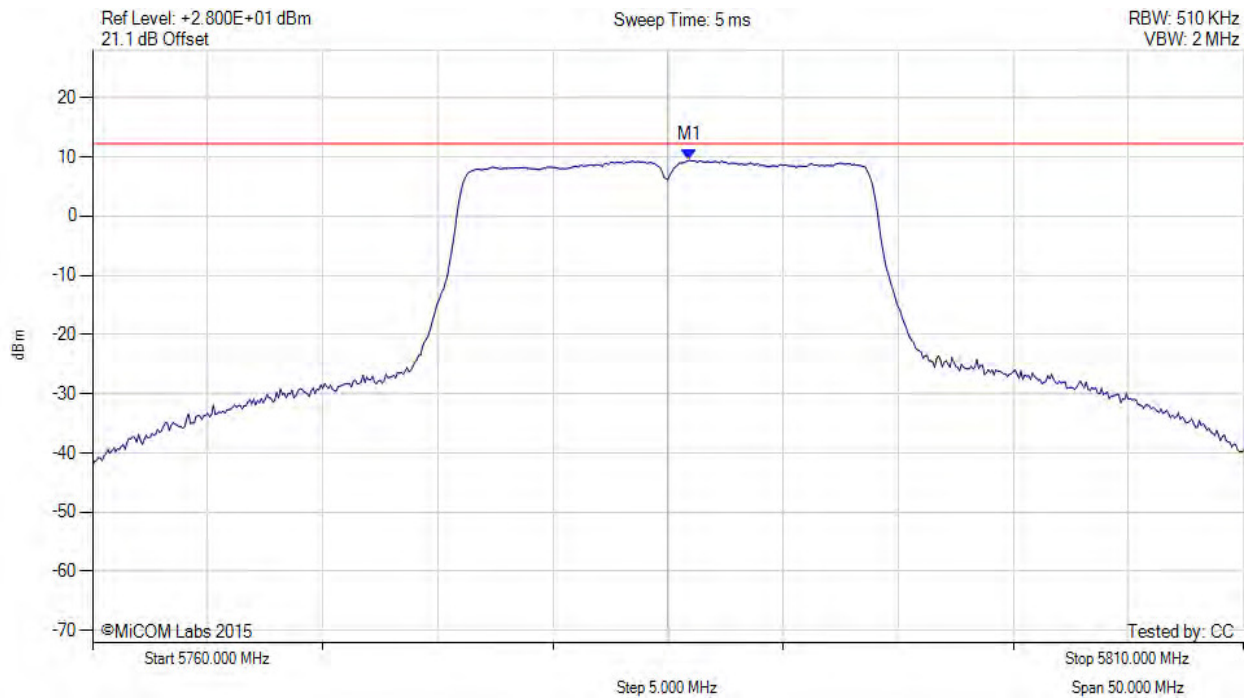




**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-20, Channel: 5785.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5785.920 MHz : 9.421 dBm	Channel Frequency: 5785.00 MHz

[back to matrix](#)

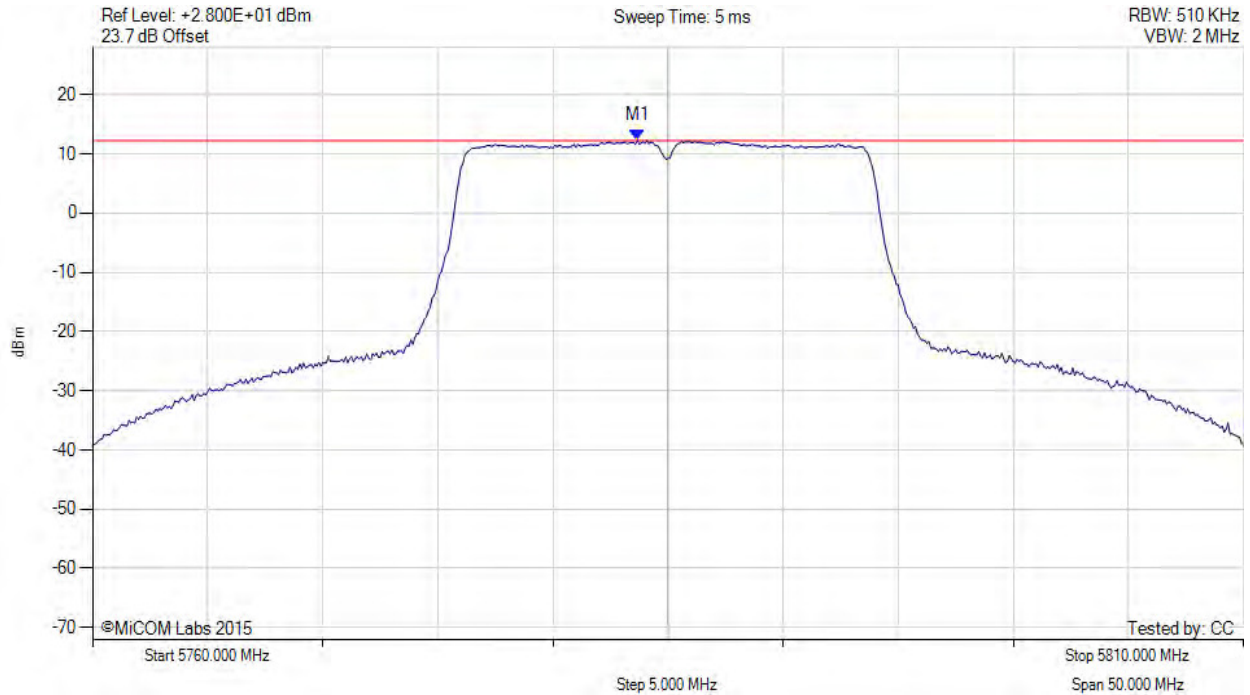
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-20, Channel: 5785.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5783.670 MHz : 12.295 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

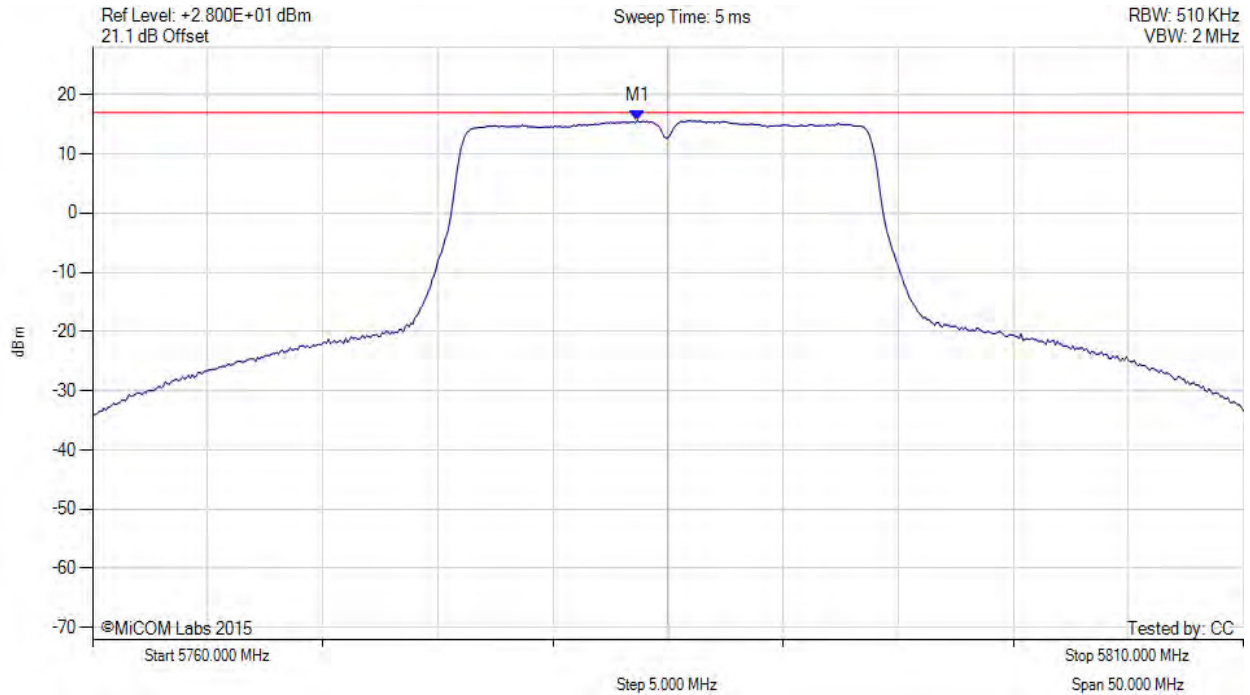
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**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-20, Channel: 5785.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5783.700 MHz : 15.623 dBm M1 + DCCF : 5783.700 MHz : 15.667 dBm Duty Cycle Correction Factor : +0.04 dB	Limit: $\leq 17.0$ dBm Margin: -1.3 dB

[back to matrix](#)

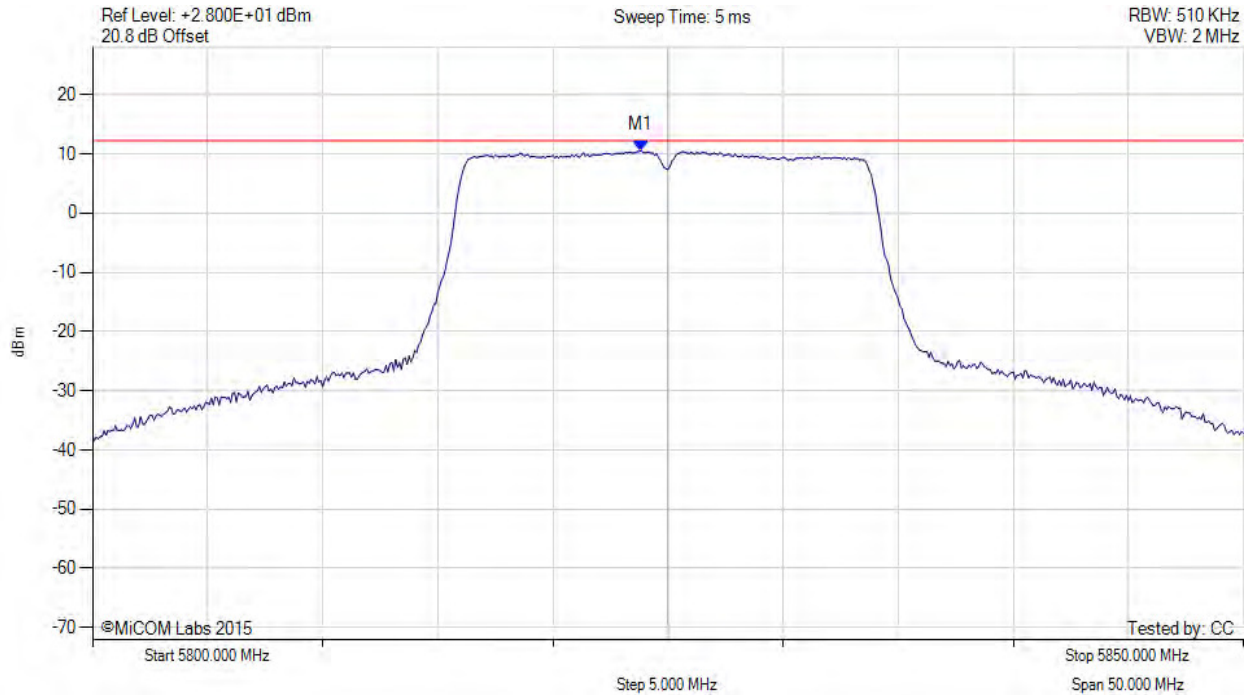
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**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-20, Channel: 5825.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5823.830 MHz : 10.548 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

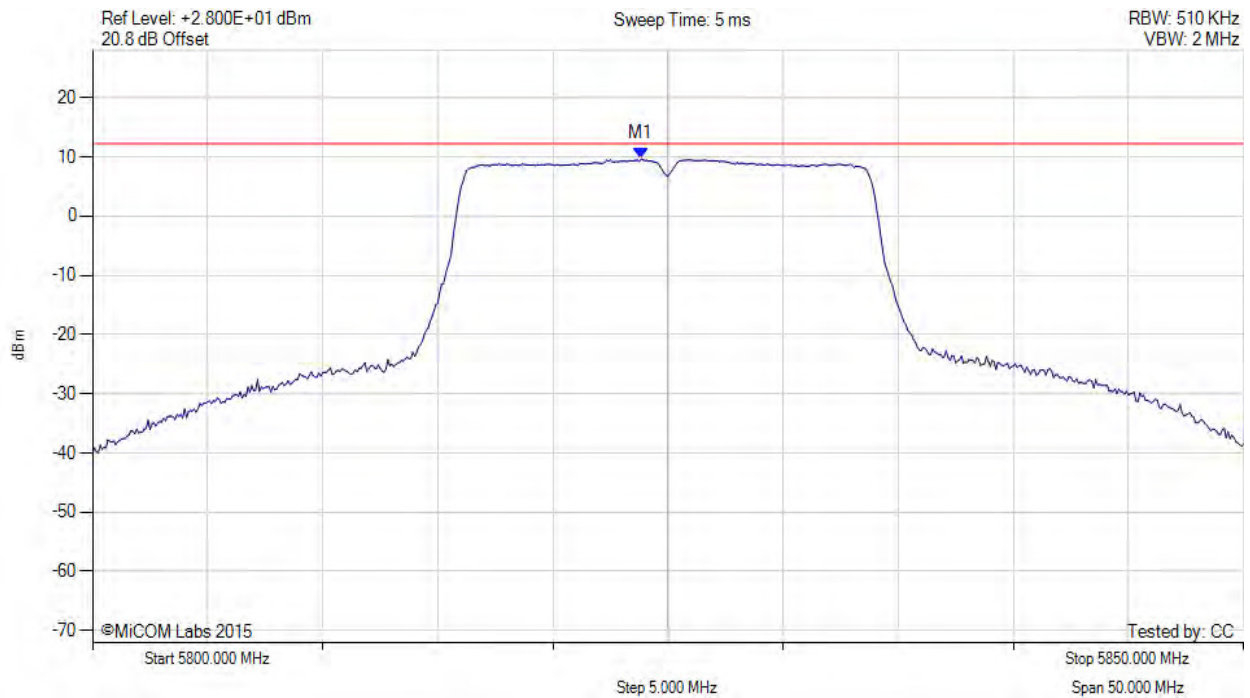
This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



POWER SPECTRAL DENSITY



Variant: 802.11n HT-20, Channel: 5825.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5823.830 MHz : 9.654 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

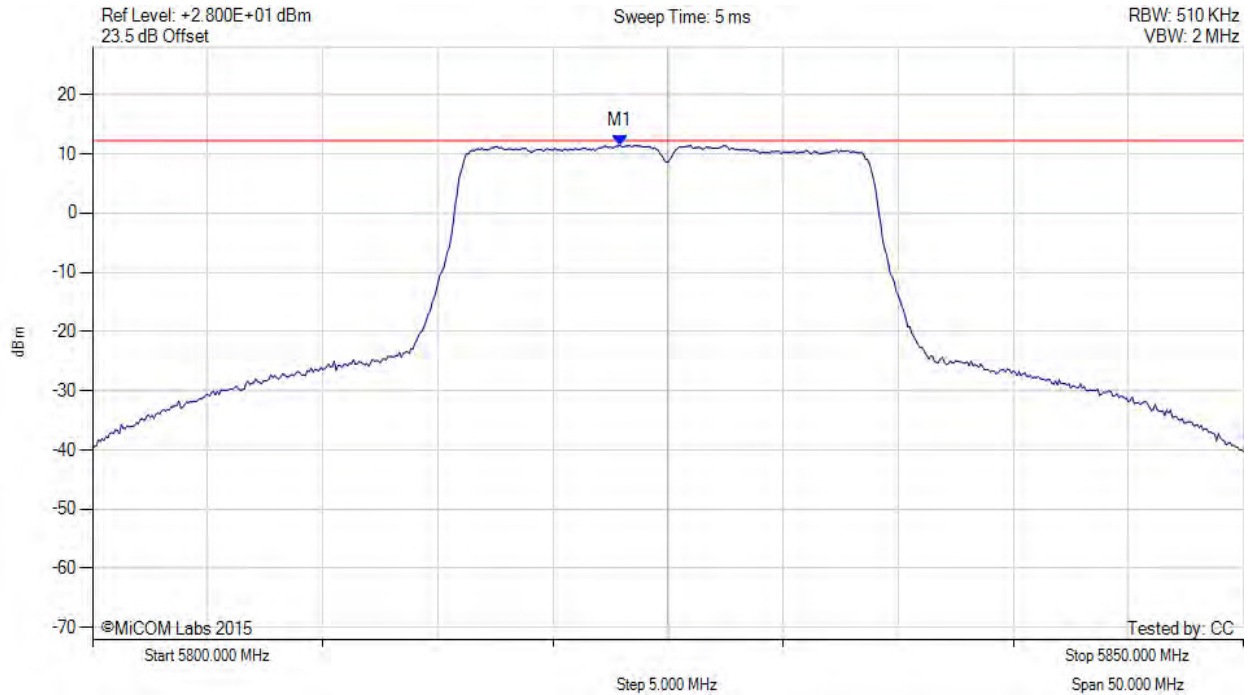
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**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-20, Channel: 5825.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5822.920 MHz : 11.463 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

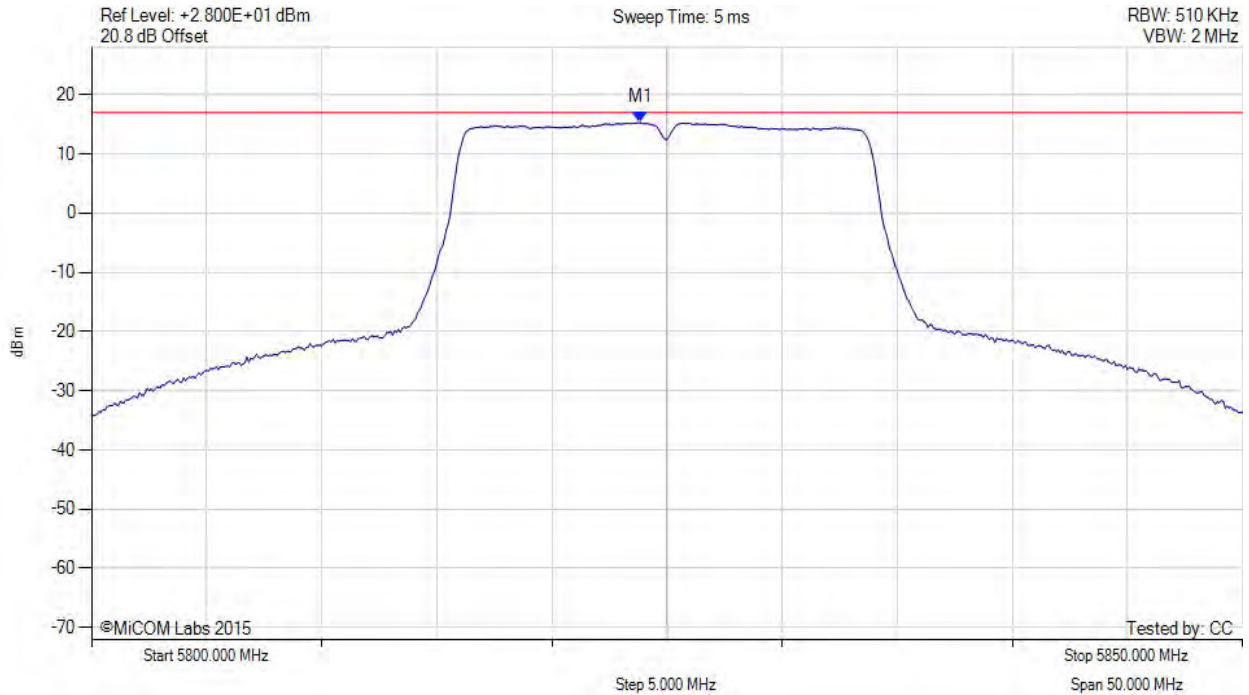
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POWER SPECTRAL DENSITY



Variante: 802.11n HT-20, Channel: 5825.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5823.800 MHz : 15.313 dBm M1 + DCCF : 5823.800 MHz : 15.357 dBm Duty Cycle Correction Factor : +0.04 dB	Limit: ≤ 17.0 dBm Margin: -1.6 dB

[back to matrix](#)

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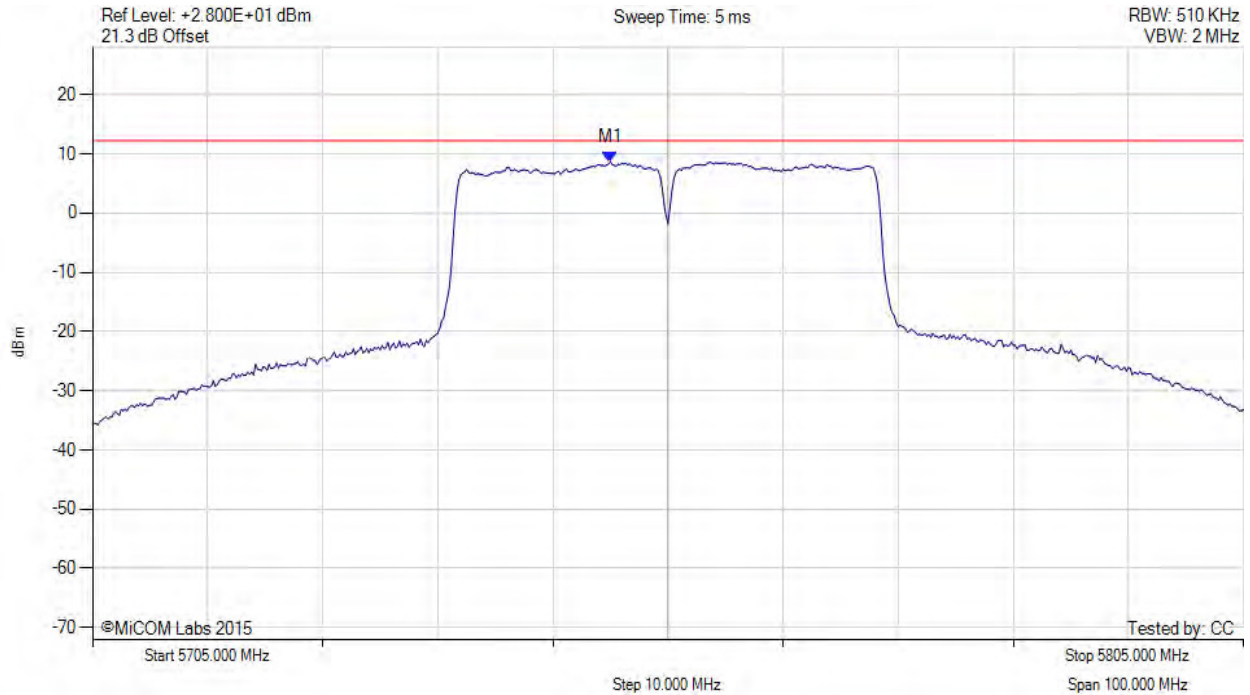




**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-40, Channel: 5755.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5750.000 MHz : 8.638 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

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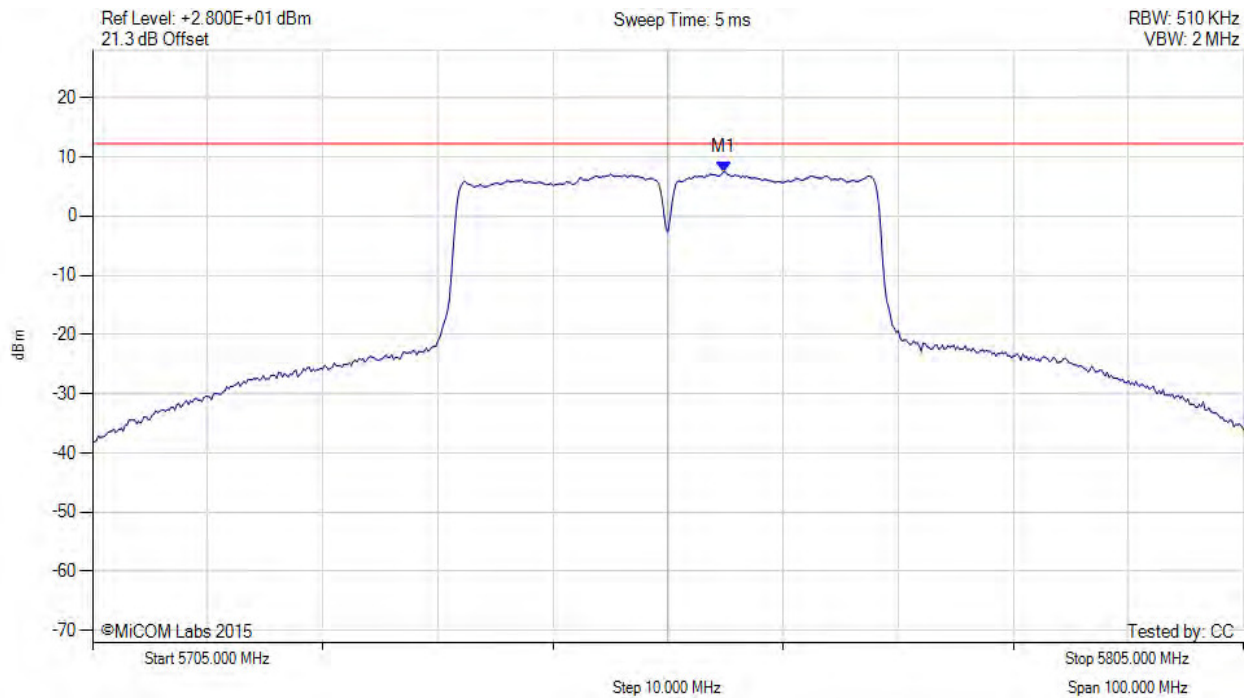




**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-40, Channel: 5755.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5759.830 MHz : 7.446 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

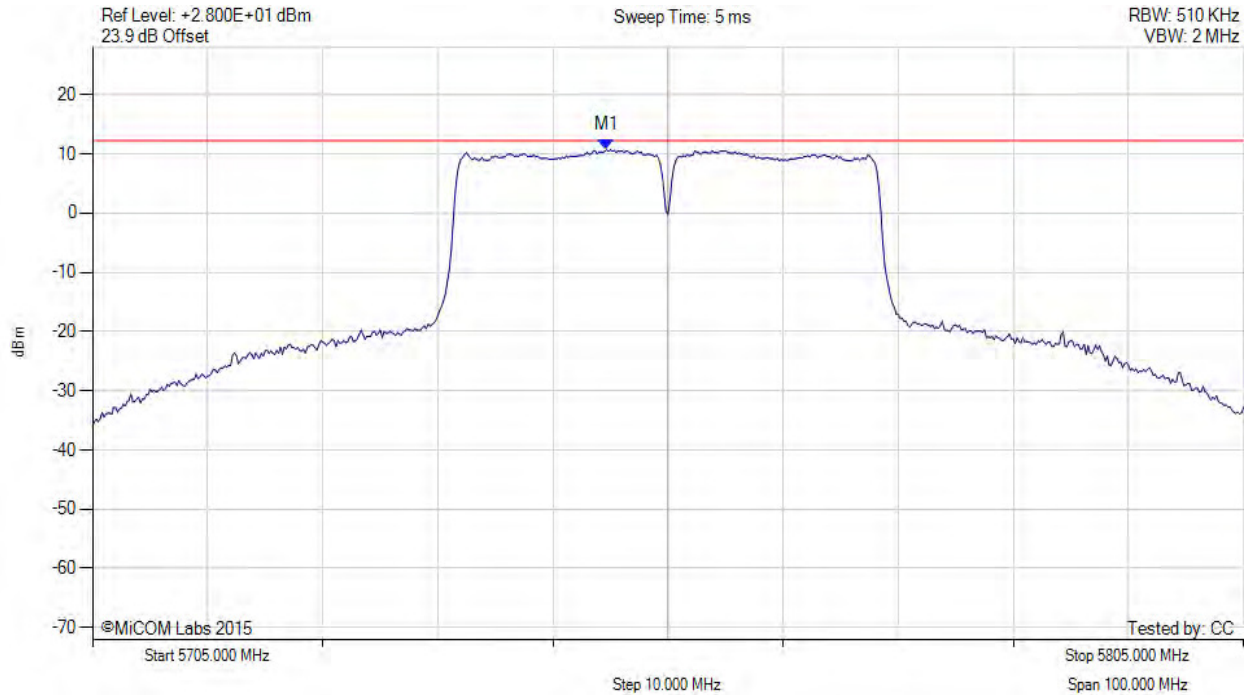
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-40, Channel: 5755.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5749.670 MHz : 10.692 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

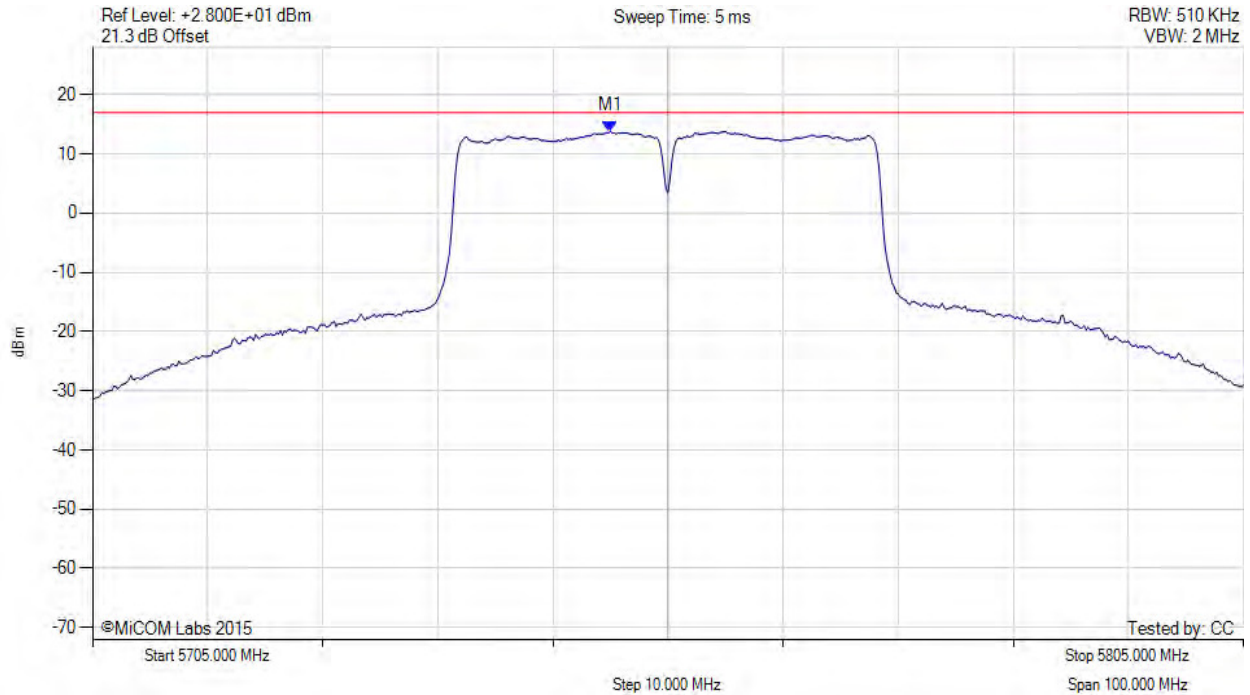
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**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-40, Channel: 5755.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5750.000 MHz : 13.830 dBm M1 + DCCF : 5750.000 MHz : 13.962 dBm Duty Cycle Correction Factor : +0.13 dB	Limit: ≤ 17.0 dBm Margin: -3.0 dB

[back to matrix](#)

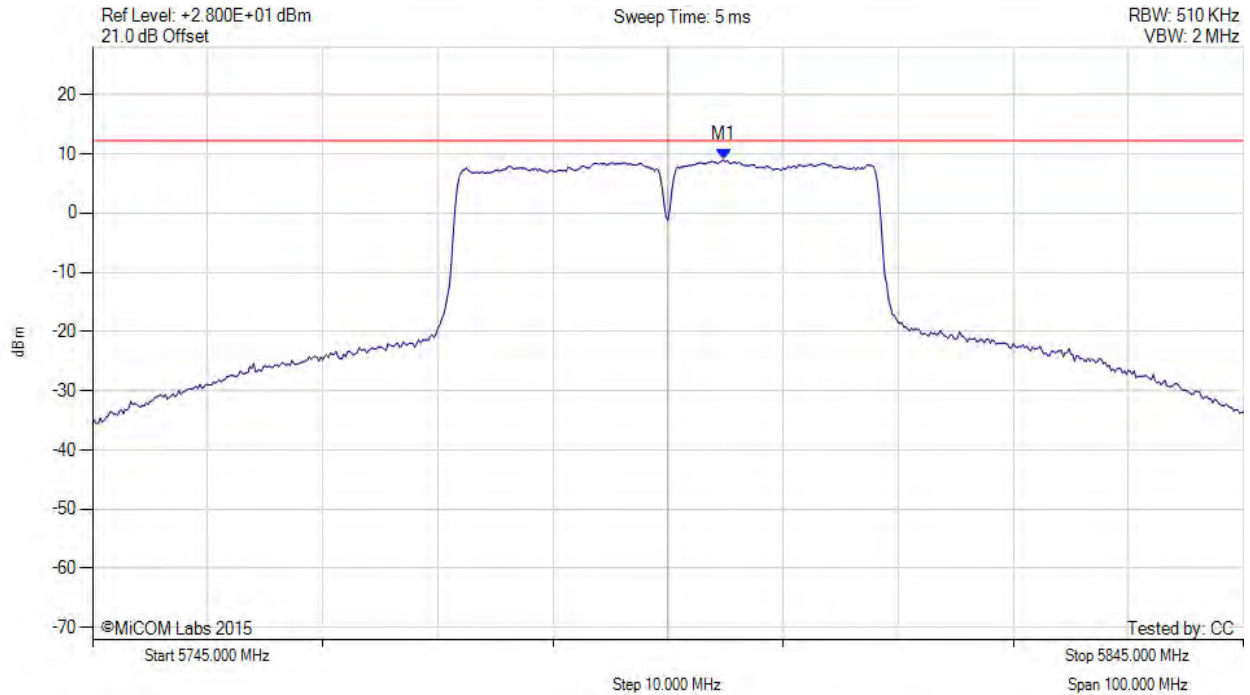
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**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-40, Channel: 5795.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5799.830 MHz : 9.015 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

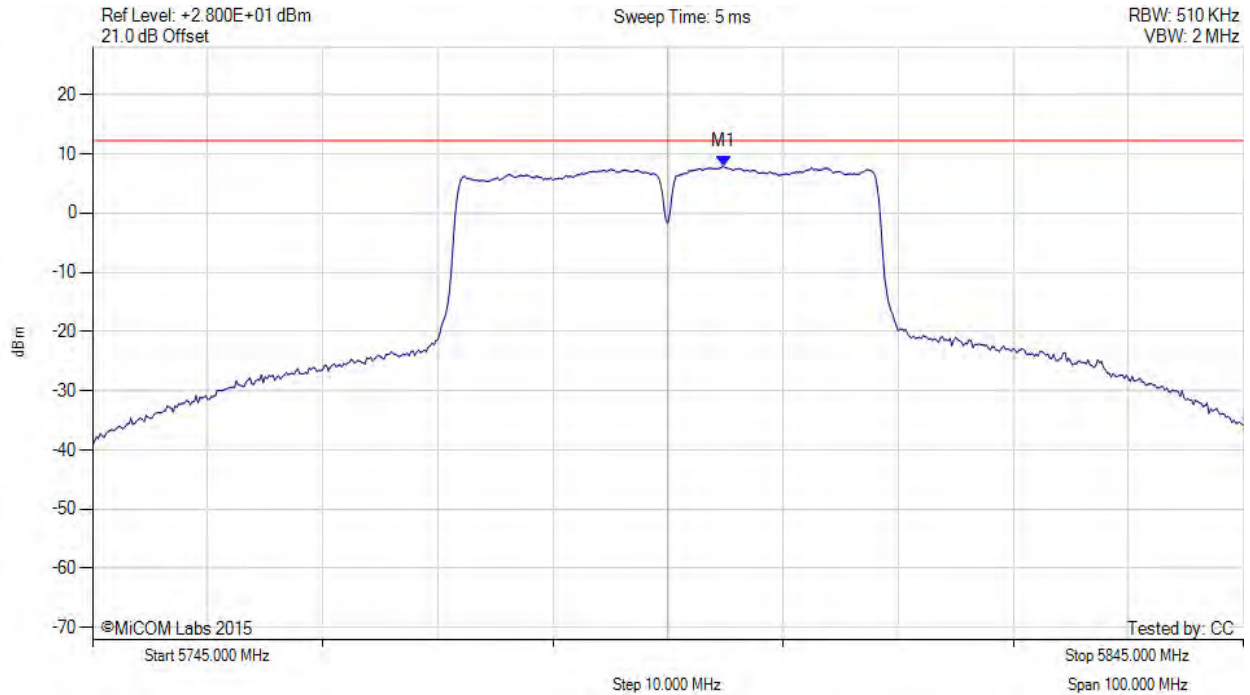
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POWER SPECTRAL DENSITY



Variant: 802.11n HT-40, Channel: 5795.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5799.830 MHz : 7.874 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

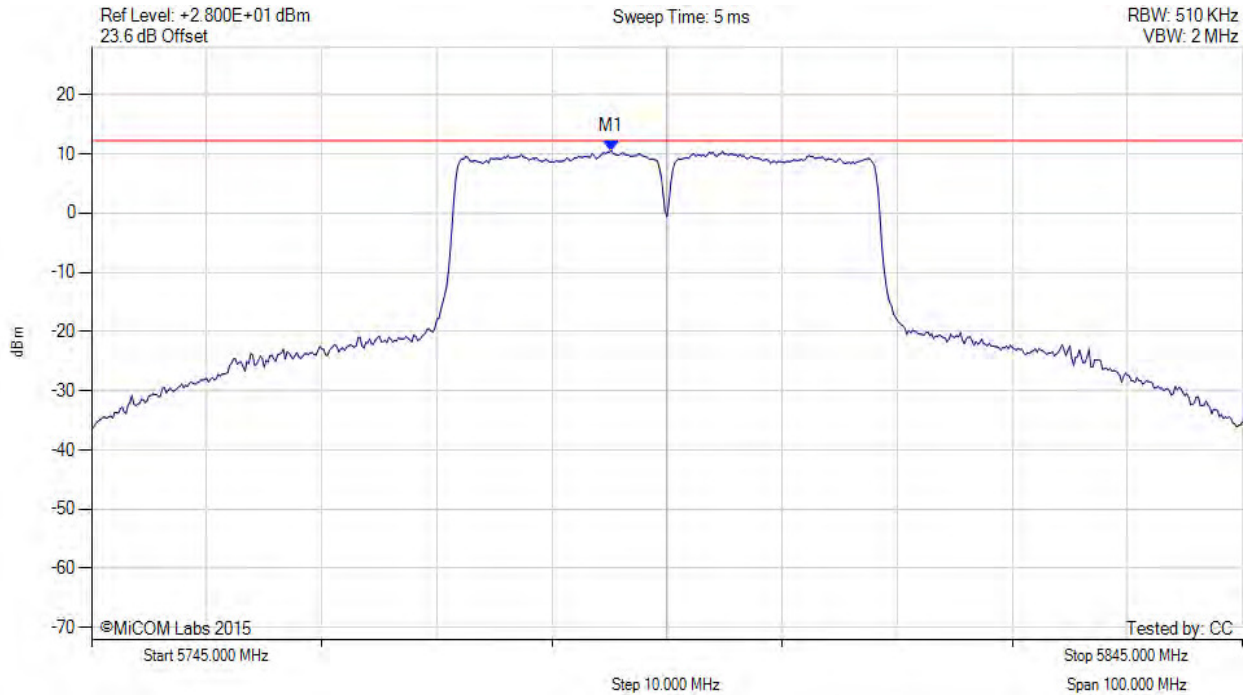
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**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-40, Channel: 5795.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5790.170 MHz : 10.534 dBm	Limit: ≤ 12.230 dBm

[back to matrix](#)

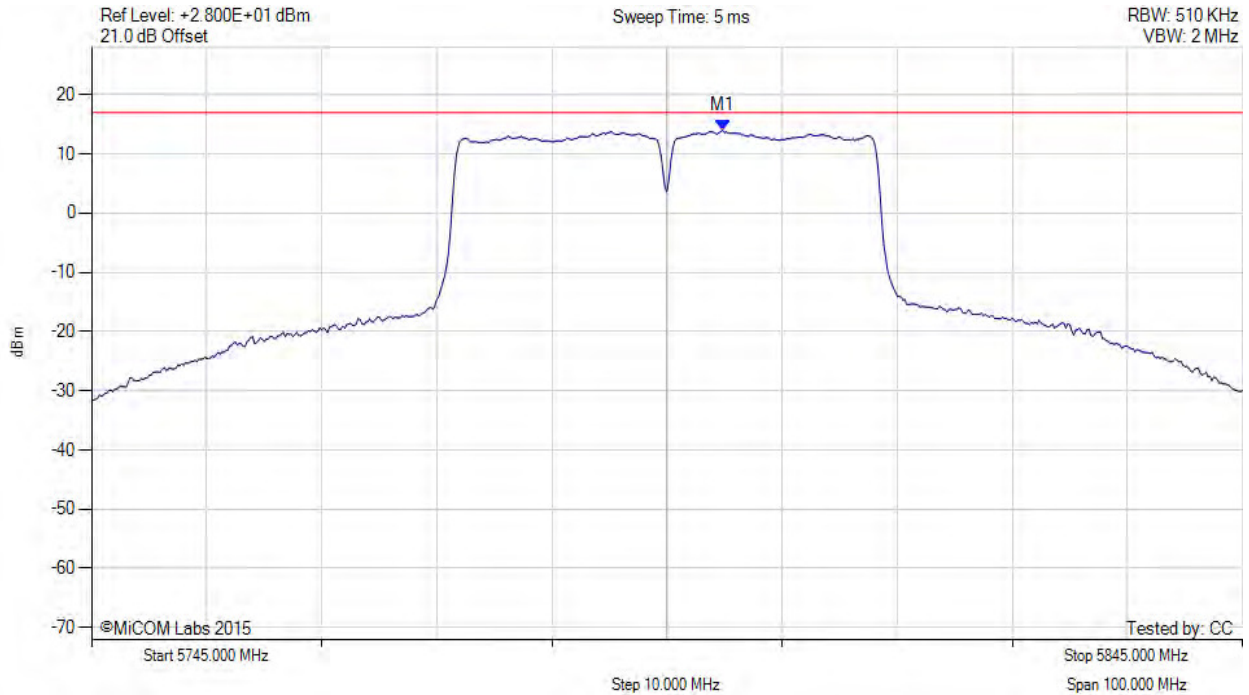
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**POWER SPECTRAL DENSITY**



Variant: 802.11n HT-40, Channel: 5795.00 MHz, SUM, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = AVER Sweep Count = +100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5799.800 MHz : 14.010 dBm M1 + DCCF : 5799.800 MHz : 14.142 dBm Duty Cycle Correction Factor : +0.13 dB	Limit: $\leq 17.0$ dBm Margin: $-2.8$ dB

[back to matrix](#)

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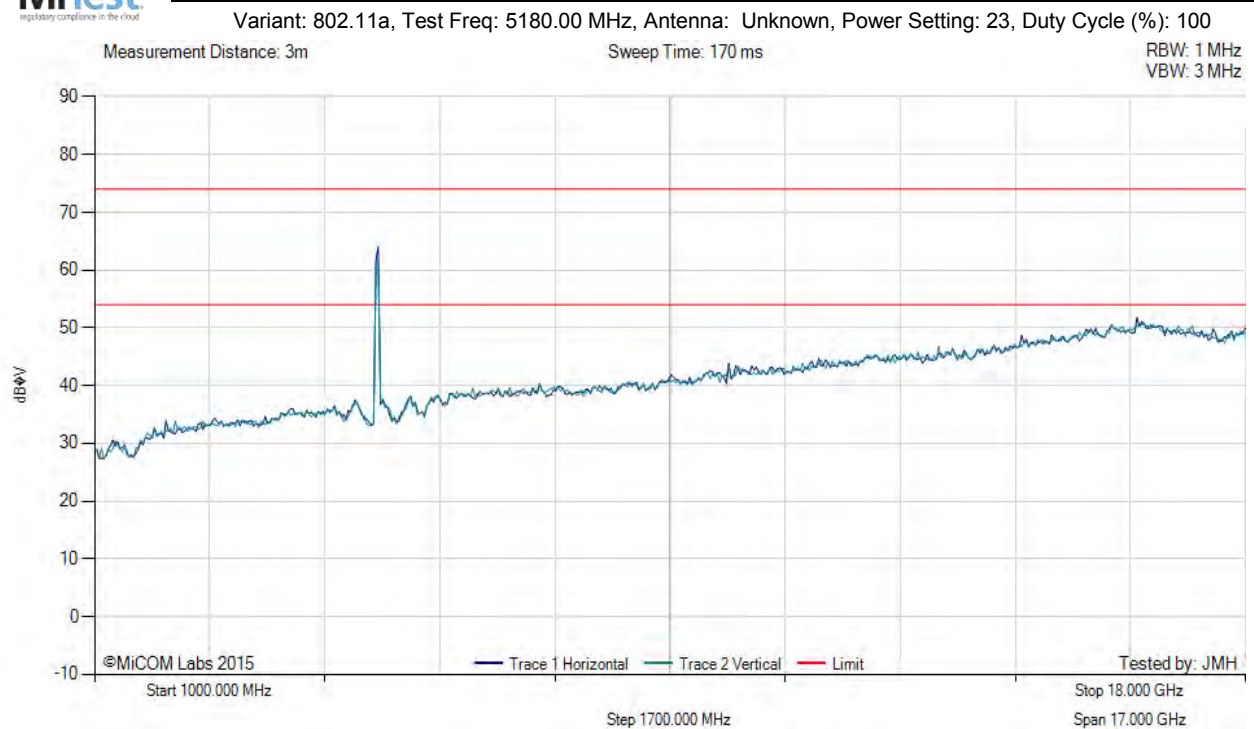




### A.3. Radiated Spurious Emissions



#### RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS



There are no emissions found within 6dB of the limit line.

**Test Notes:** EUT on Table connected to laptop outside chamber via Telnet

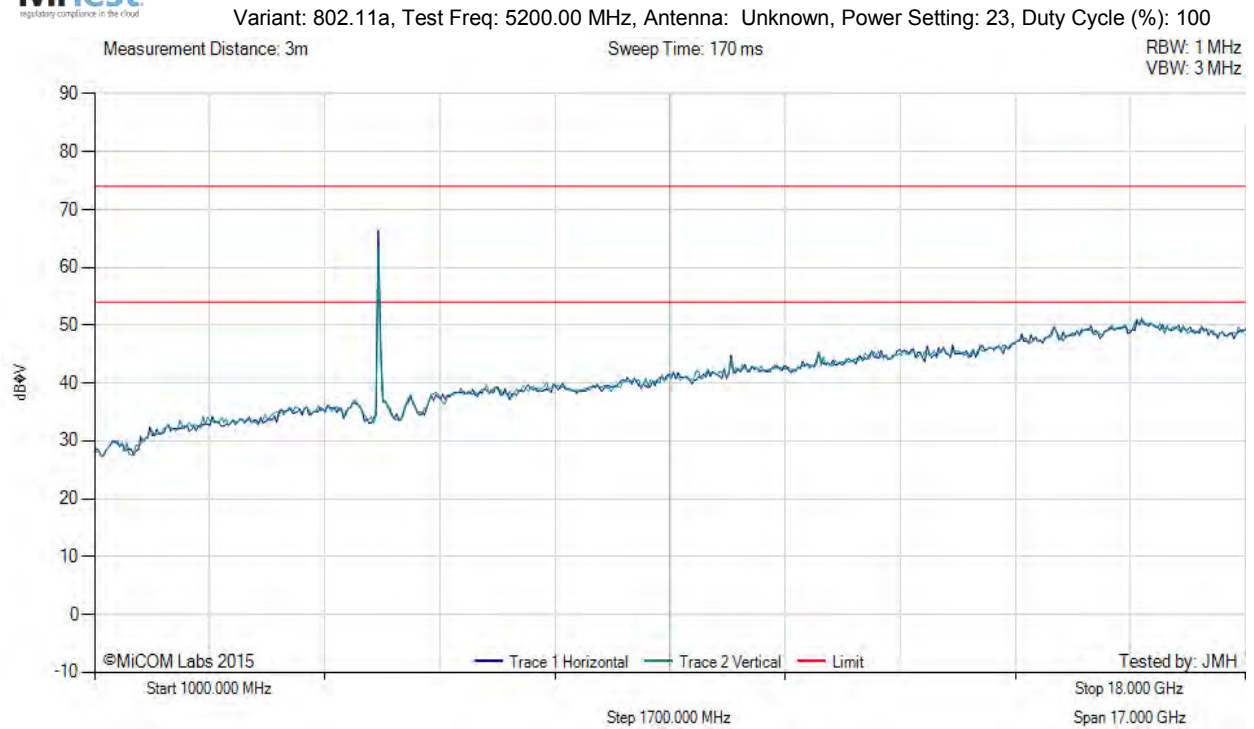
[back to matrix](#)

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RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS



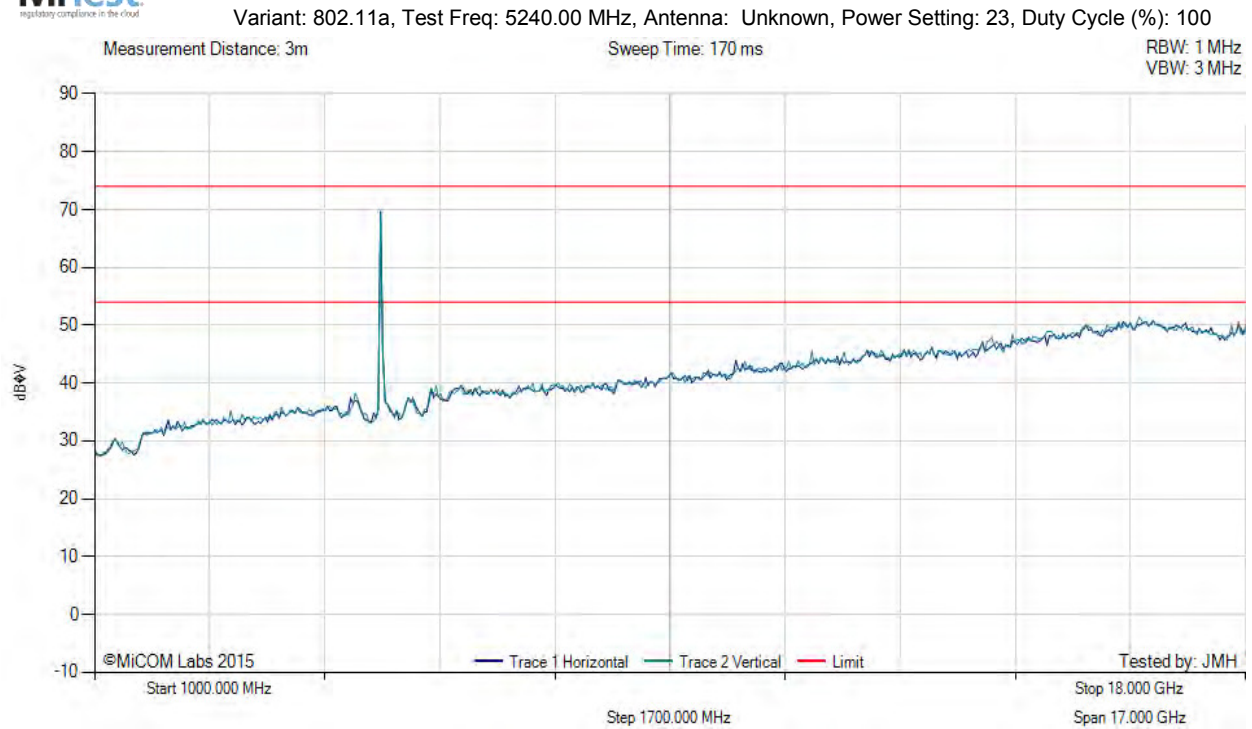
There are no emissions found within 6dB of the limit line.

**Test Notes:** EUT on Table connected to laptop outside chamber via Telnet

[back to matrix](#)



RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS



There are no emissions found within 6dB of the limit line.

**Test Notes:** EUT on Table connected to laptop outside chamber via Telnet

[back to matrix](#)



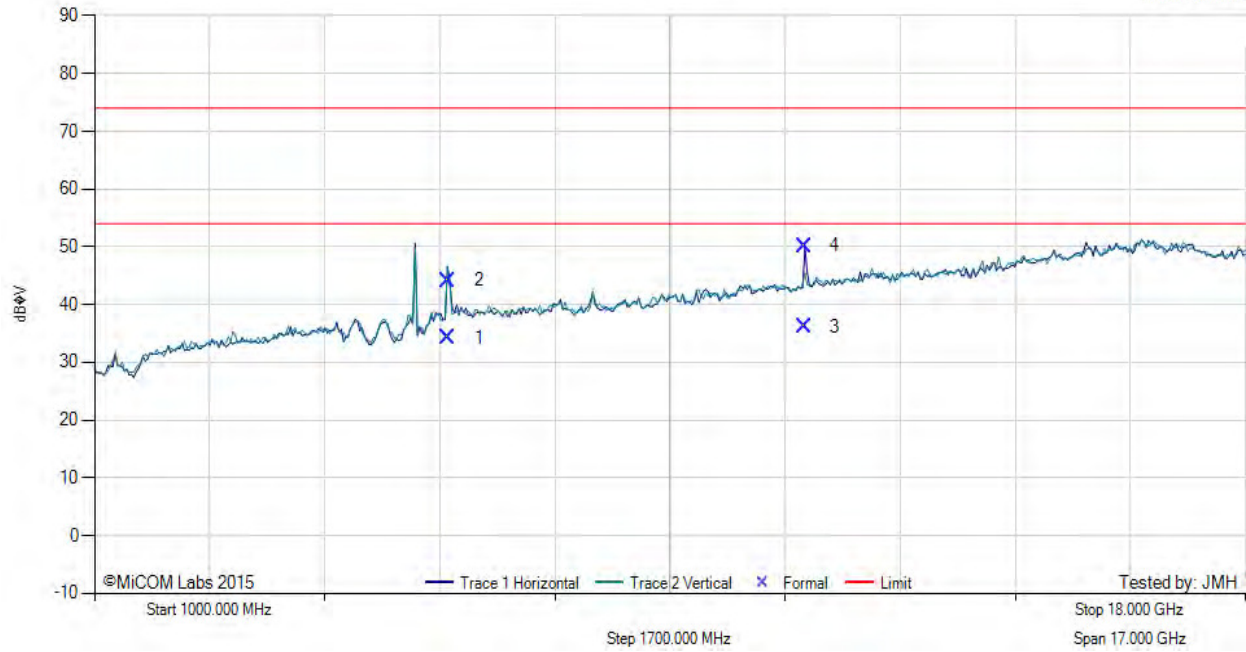
RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS

Variant: 802.11a, Test Freq: 5745.00 MHz, Antenna: Unknown, Power Setting: 24, Duty Cycle (%): 100

Measurement Distance: 3m

Sweep Time: 170 ms

RBW: 1 MHz  
VBW: 3 MHz



Num	Frequency MHz	Raw dBμV	Cable Loss	AF dB	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
1	6227.23	36.17	6.82	-8.72	34.27	Max Avg	Horizontal	118	59	54.0	-19.7	Pass
2	6227.23	46.07	6.82	-8.72	44.17	Max Peak	Horizontal	118	59	74.0	-29.8	Pass
3	11488.69	31.57	9.47	-4.85	36.19	Max Avg	Horizontal	100	340	54.0	-17.8	Pass
4	11488.69	45.58	9.47	-4.85	50.20	Max Peak	Horizontal	100	340	74.0	-23.8	Pass

**Test Notes:** EUT on Table connected to laptop outside chamber via Telnet

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**Title:** Aruba Networks APEX0104  
**To:** FCC CFR 47 Part 15 Subpart E 15.407  
**Serial #:** ARUB199-U6 Rev A  
**Issue Date:** 27<sup>th</sup> August 2015  
**Page:** 212 of 227



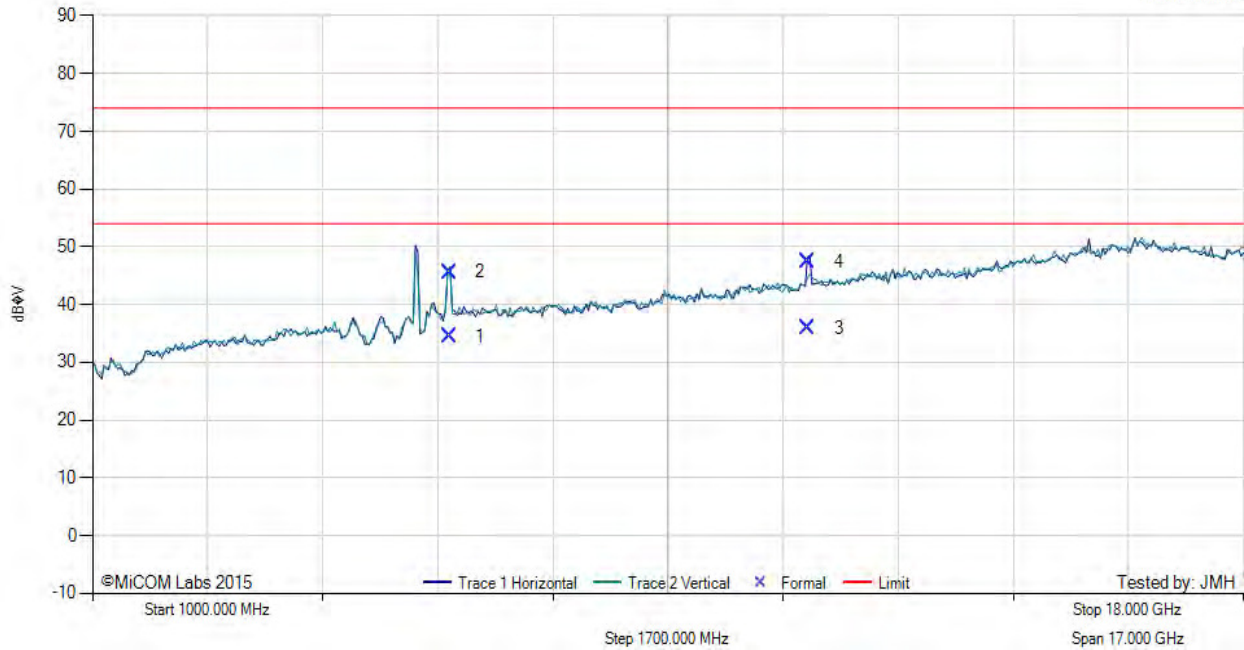
RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS

Variant: 802.11a, Test Freq: 5785.00 MHz, Antenna: Unknown, Power Setting: 24, Duty Cycle (%): 100

Measurement Distance: 3m

Sweep Time: 170 ms

RBW: 1 MHz  
VBW: 3 MHz



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	6271.02	36.19	6.86	-8.51	34.54	Max Avg	Horizontal	117	60	54.0	-19.5	Pass
2	6271.02	47.26	6.86	-8.51	45.61	Max Peak	Horizontal	117	60	74.0	-28.4	Pass
3	11570.68	30.91	9.59	-4.64	35.86	Max Avg	Horizontal	100	18	54.0	-18.1	Pass
4	11570.68	42.42	9.59	-4.64	47.37	Max Peak	Horizontal	100	18	74.0	-26.6	Pass

**Test Notes:** EUT on Table connected to laptop outside chamber via Telnet

[back to matrix](#)

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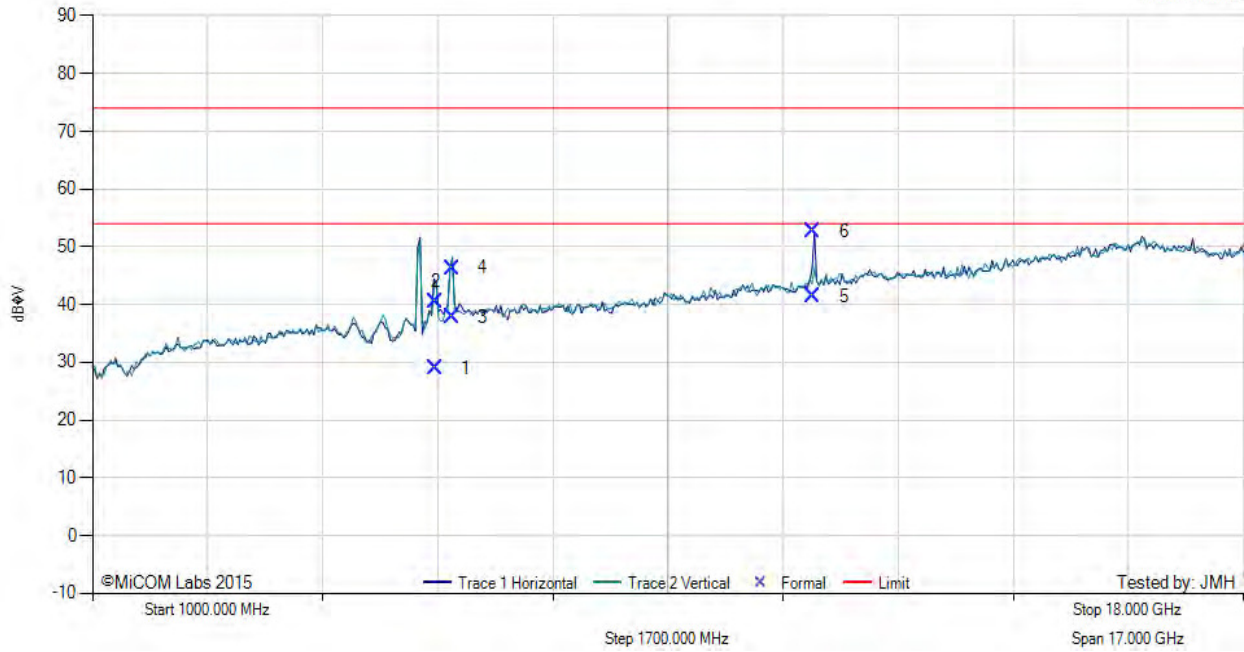
RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS

Variant: 802.11a, Test Freq: 5825.00 MHz, Antenna: Unknown, Power Setting: 24, Duty Cycle (%): 100

Measurement Distance: 3m

Sweep Time: 170 ms

RBW: 1 MHz  
VBW: 3 MHz



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	6067.84	31.88	6.62	-9.61	28.89	Max Avg	Horizontal	100	79	54.0	-25.1	Pass
2	6067.84	43.45	6.62	-9.61	40.46	Max Peak	Horizontal	100	79	74.0	-33.5	Pass
3	6309.82	39.43	6.76	-8.37	37.82	Max Avg	Horizontal	105	68	54.0	-16.2	Pass
4	6309.82	47.94	6.76	-8.37	46.33	Max Peak	Horizontal	105	68	74.0	-27.7	Pass
5	11648.78	36.29	9.64	-4.47	41.46	Max Avg	Horizontal	100	330	54.0	-12.5	Pass
6	11648.78	47.54	9.64	-4.47	52.71	Max Peak	Horizontal	100	330	74.0	-25.3	Pass

**Test Notes:** EUT on Table connected to laptop outside chamber via Telnet

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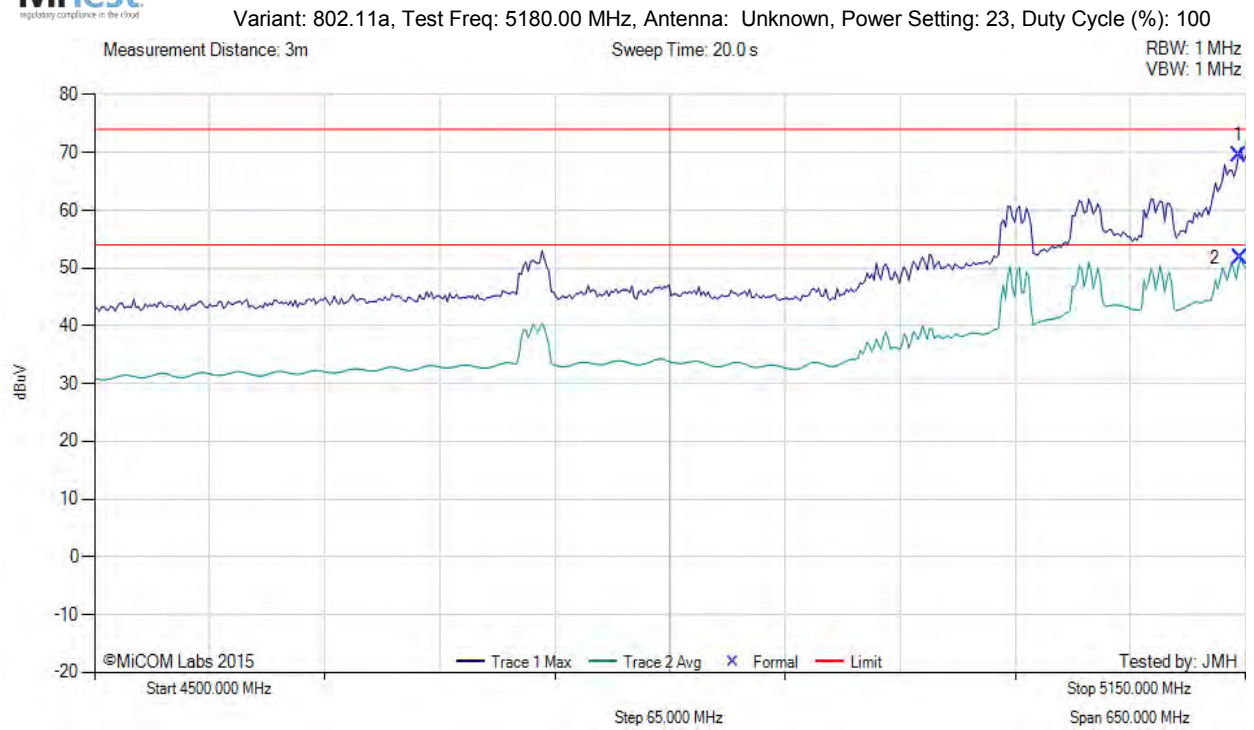
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#### A.4. Restricted Band-Edge Emissions



#### RESTRICTED LOWER BAND-EDGE EMISSIONS



Num	Frequency MHz	Raw dB $\mu$ V	Cable Loss	AF dB	Level dB $\mu$ V/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dB $\mu$ V/m	Margin dB	Pass /Fail
1	5146.09	75.07	6.08	-11.60	69.55	Max Peak	Horizontal	136	57	74.0	-4.5	Pass
2	5147.39	57.22	6.08	-11.59	51.71	Max Avg	Horizontal	136	57	54.0	-2.3	Pass

**Test Notes:** EUT on table connected via telnet to laptop outside chamber

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RESTRICTED LOWER BAND-EDGE EMISSIONS

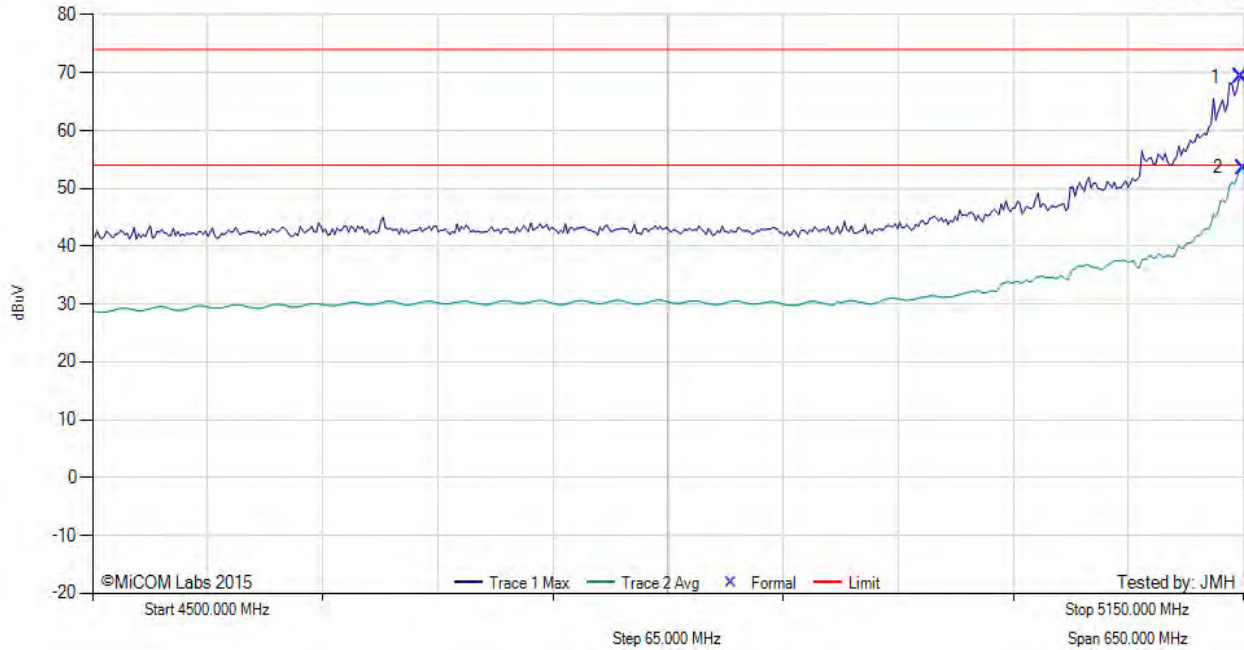


Variant: 802.11ac-80, Test Freq: 5210.00 MHz, Antenna: Unknown, Power Setting: 15, Duty Cycle (%): 100

Measurement Distance: 3m

Sweep Time: 20.0 s

RBW: 1 MHz  
VBW: 1 MHz



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5148.70	74.78	6.08	-11.59	69.27	Max Peak	Horizontal	136	57	74.0	-4.7	Pass
2	5150.00	59.09	6.08	-11.59	53.58	Max Avg	Horizontal	136	57	54.0	-0.4	Pass

**Test Notes:** EUT on Table connected via telnet to Laptop outside chamber. Power reduced to ps 15

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RESTRICTED LOWER BAND-EDGE EMISSIONS

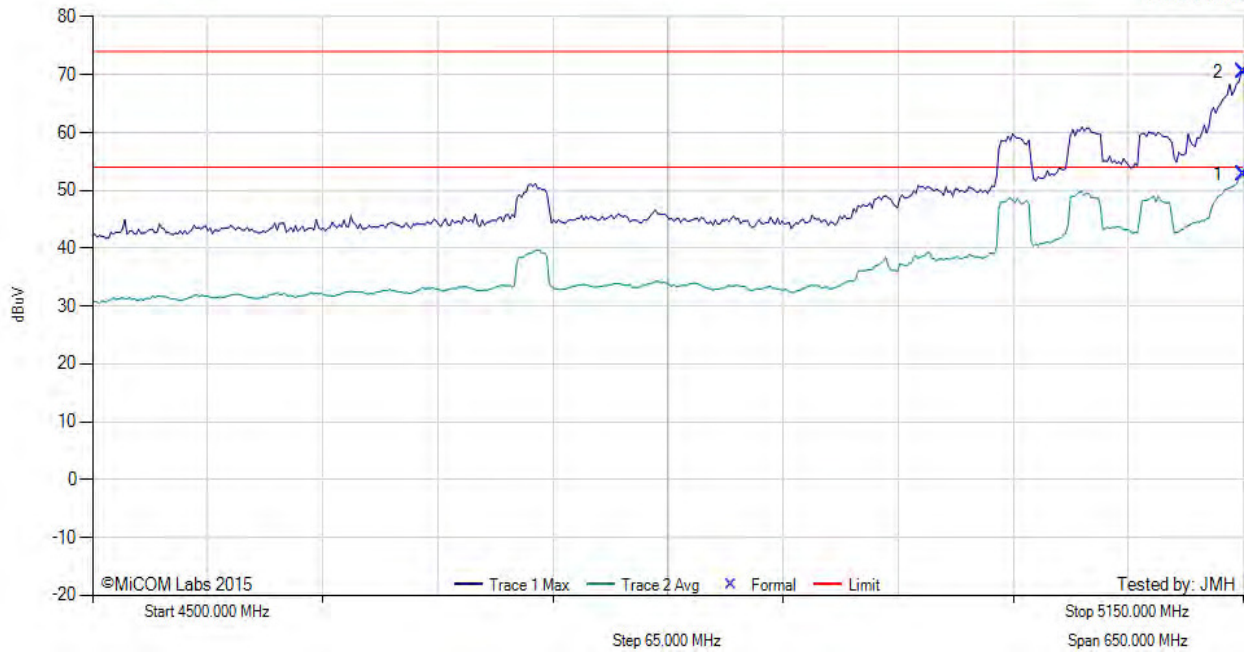


Variant: 802.11n HT-20, Test Freq: 5180.00 MHz, Antenna: Unknown, Power Setting: 23, Duty Cycle (%): 100

Measurement Distance: 3m

Sweep Time: 20.0 s

RBW: 1 MHz  
VBW: 1 MHz



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5150.00	58.23	6.08	-11.59	52.72	Max Avg	Horizontal	136	57	54.0	-1.3	Pass
2	5150.00	75.92	6.08	-11.59	70.41	Max Peak	Horizontal	136	57	74.0	-3.6	Pass

**Test Notes:** EUT on Table connected via telnet to Laptop outside chamber.

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RESTRICTED LOWER BAND-EDGE EMISSIONS

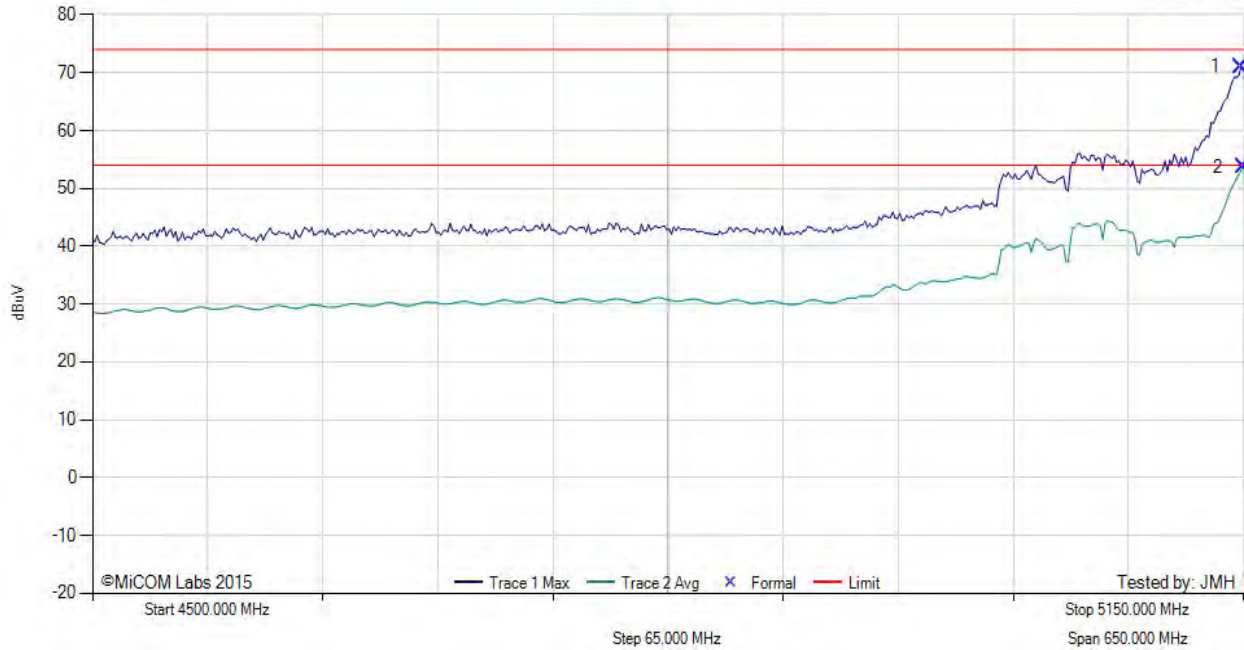


Variant: 802.11n HT-40, Test Freq: 5190.00 MHz, Antenna: Unknown, Power Setting: 20.5, Duty Cycle (%): 100

Measurement Distance: 3m

Sweep Time: 20.0 s

RBW: 1 MHz  
VBW: 1 MHz



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5148.70	76.56	6.08	-11.59	71.05	Max Peak	Horizontal	136	57	74.0	-3.0	Pass
2	5150.00	59.22	6.08	-11.59	53.71	Max Avg	Horizontal	136	57	54.0	-0.3	Pass

**Test Notes:** EUT on Table connected via telnet to Laptop outside chamber. Power reduction ps 20.5 ( -q 82)

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**Title:** Aruba Networks APEX0104  
**To:** FCC CFR 47 Part 15 Subpart E 15.407  
**Serial #:** ARUB199-U6 Rev A  
**Issue Date:** 27<sup>th</sup> August 2015  
**Page:** 218 of 227

RESTRICTED LOWER BAND-EDGE EMISSIONS

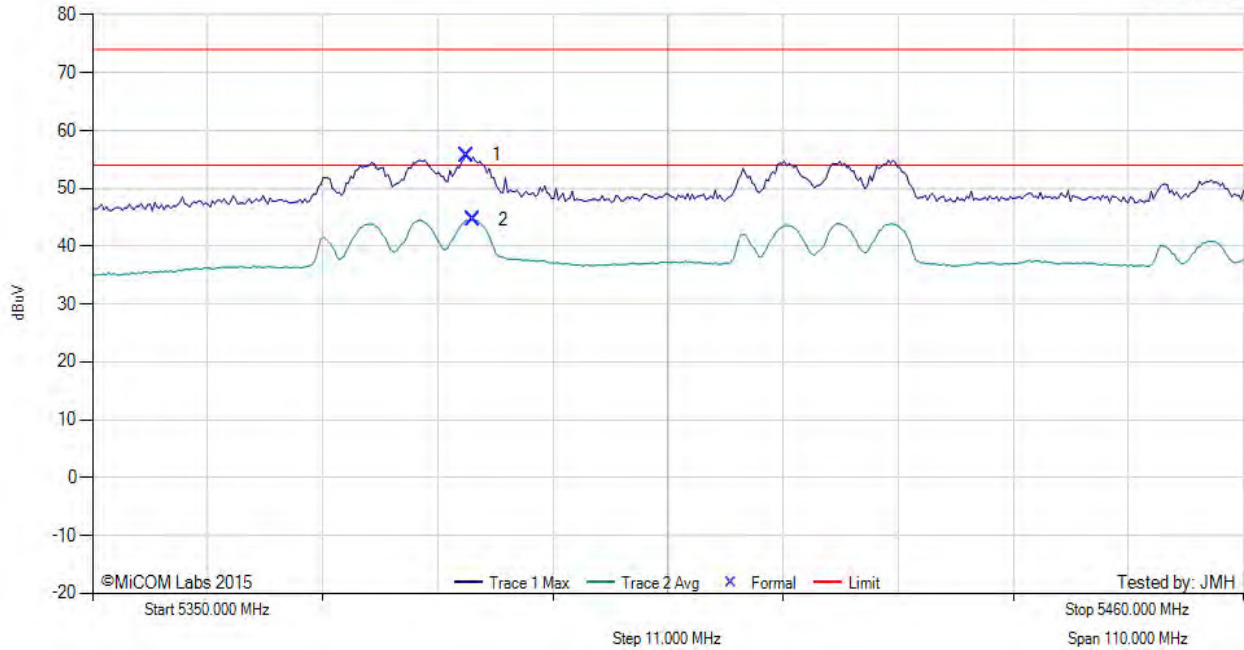


Variation: 802.11a, Test Freq: 5500.00 MHz, Antenna: Unknown, Power Setting: 14, Duty Cycle (%): 100

Measurement Distance: 3m

Sweep Time: 20.0 s

RBW: 1 MHz  
VBW: 1 MHz



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5385.71	60.61	6.22	-11.12	55.71	Max Peak	Horizontal	124	283	74.0	-18.3	Pass
2	5386.37	49.54	6.22	-11.12	44.64	Max Avg	Horizontal	124	283	54.0	-9.4	Pass

**Test Notes:** EUT on Table connected via telnet to Laptop outside chamber.

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RESTRICTED LOWER BAND-EDGE EMISSIONS

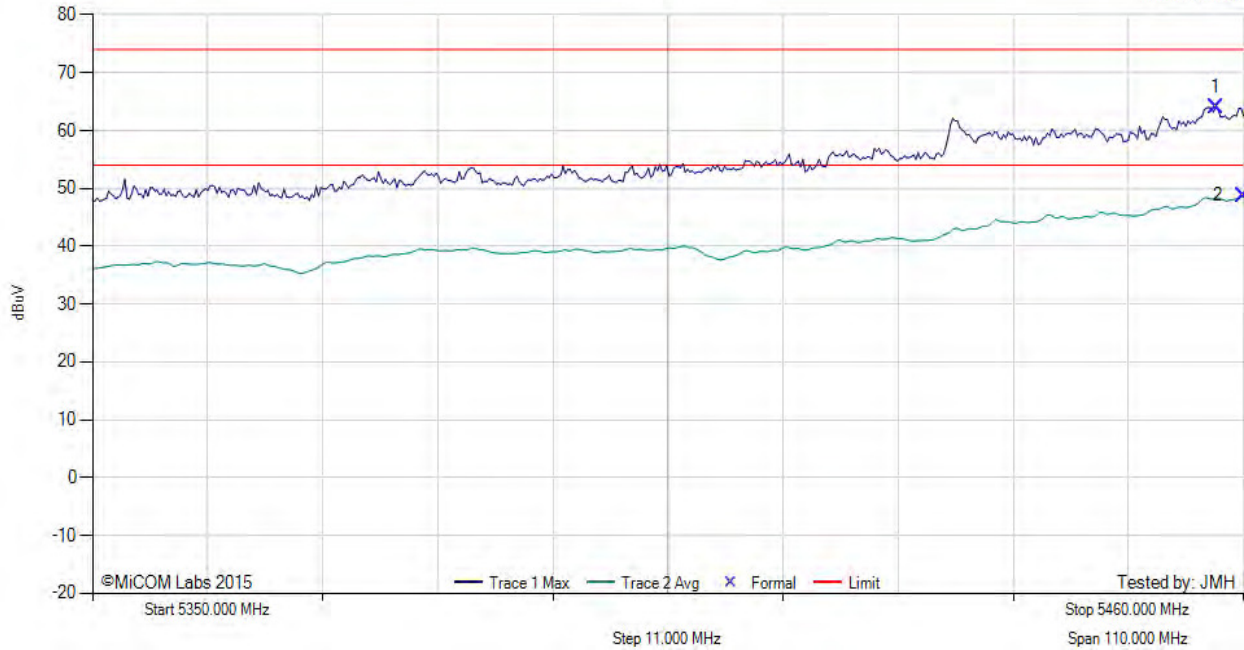


Variant: 802.11ac-80, Test Freq: 5530.00 MHz, Antenna: Unknown, Power Setting: 16.5, Duty Cycle (%): 100

Measurement Distance: 3m

Sweep Time: 20.0 s

RBW: 1 MHz  
VBW: 1 MHz



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5457.35	69.03	6.26	-11.23	64.06	Max Peak	Horizontal	124	283	74.0	-9.9	Pass
2	5460.00	53.71	6.26	-11.22	48.75	Max Avg	Horizontal	124	283	54.0	-5.3	Pass

**Test Notes:** EUT on Table connected via telnet to Laptop outside chamber.

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RESTRICTED LOWER BAND-EDGE EMISSIONS

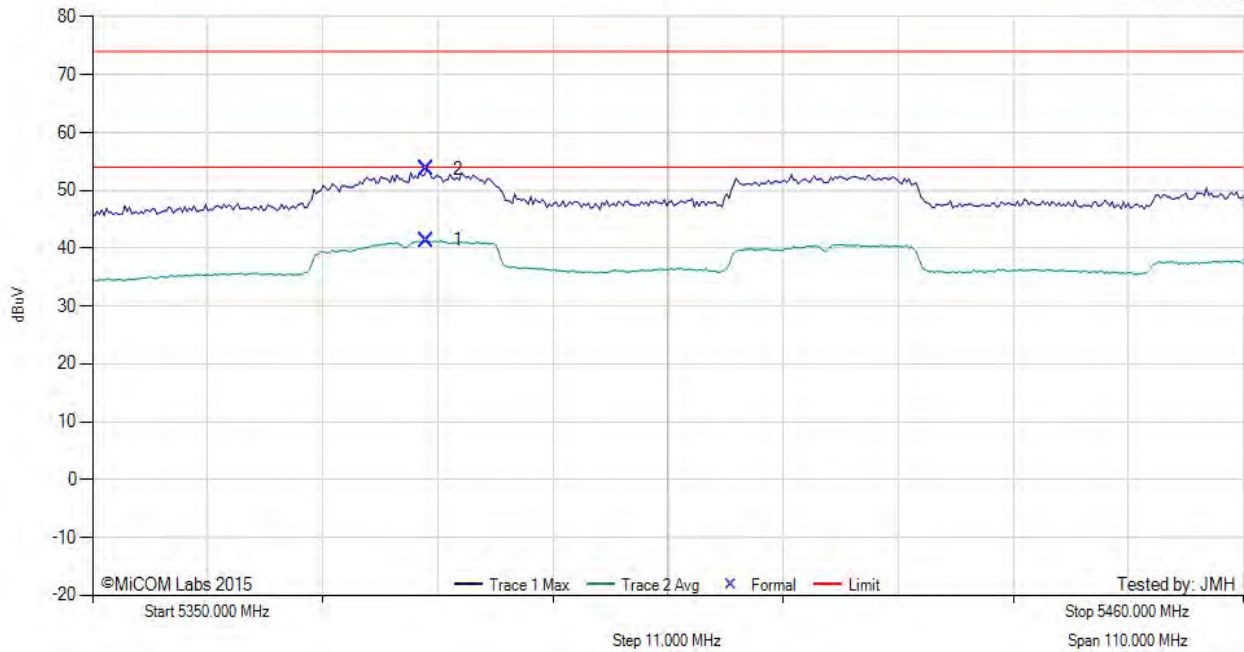


Variant: 802.11n HT-20, Test Freq: 5500.00 MHz, Antenna: Unknown, Power Setting: 12.25, Duty Cycle (%): 100

Measurement Distance: 3m

Sweep Time: 20.0 s

RBW: 1 MHz  
VBW: 1 MHz



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5381.96	46.26	6.21	-11.10	41.37	Max Avg	Horizontal	124	283	54.0	-12.6	Pass
2	5381.96	58.54	6.21	-11.10	53.65	Max Peak	Horizontal	124	283	74.0	-20.4	Pass

**Test Notes:** EUT on Table connected via telnet to Laptop outside chamber.

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RESTRICTED LOWER BAND-EDGE EMISSIONS

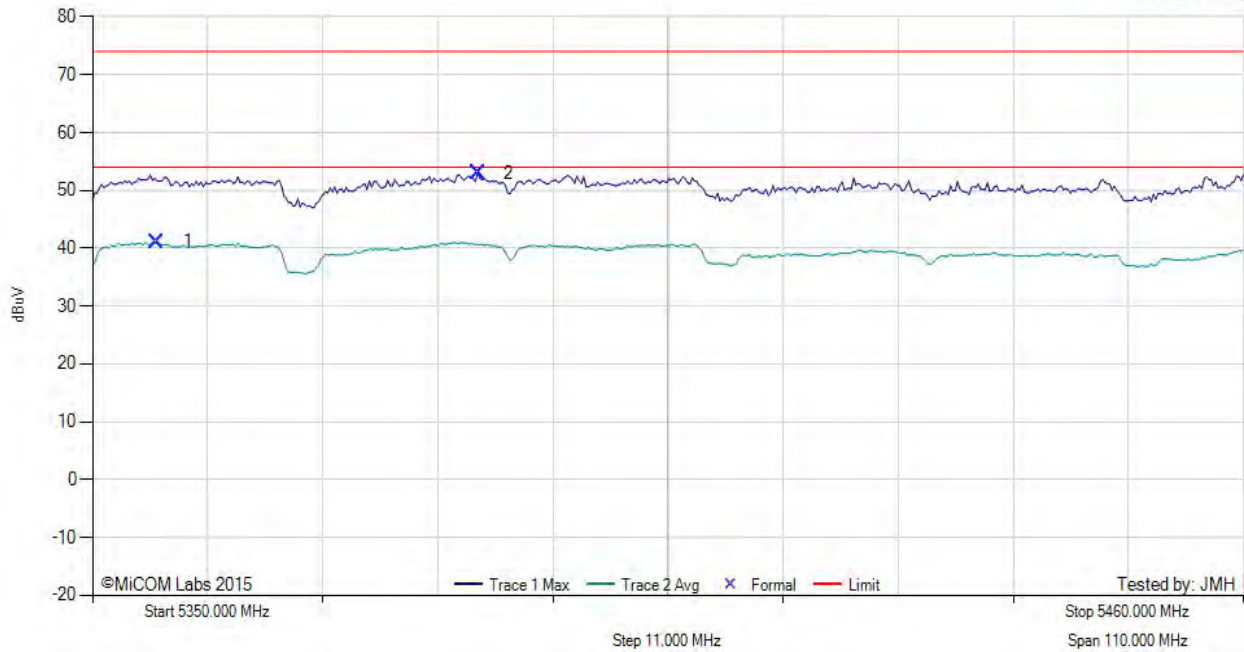


Variant: 802.11n HT-40, Test Freq: 5510.00 MHz, Antenna: Unknown, Power Setting: 15.5, Duty Cycle (%): 100

Measurement Distance: 3m

Sweep Time: 20.0 s

RBW: 1 MHz  
VBW: 1 MHz



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5356.17	45.99	6.16	-11.04	41.11	Max Avg	Horizontal	124	283	54.0	-12.9	Pass
2	5386.81	57.85	6.22	-11.12	52.95	Max Peak	Horizontal	124	283	74.0	-21.1	Pass

**Test Notes:** EUT on Table connected via telnet to Laptop outside chamber.

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RESTRICTED UPPER BAND-EDGE EMISSIONS

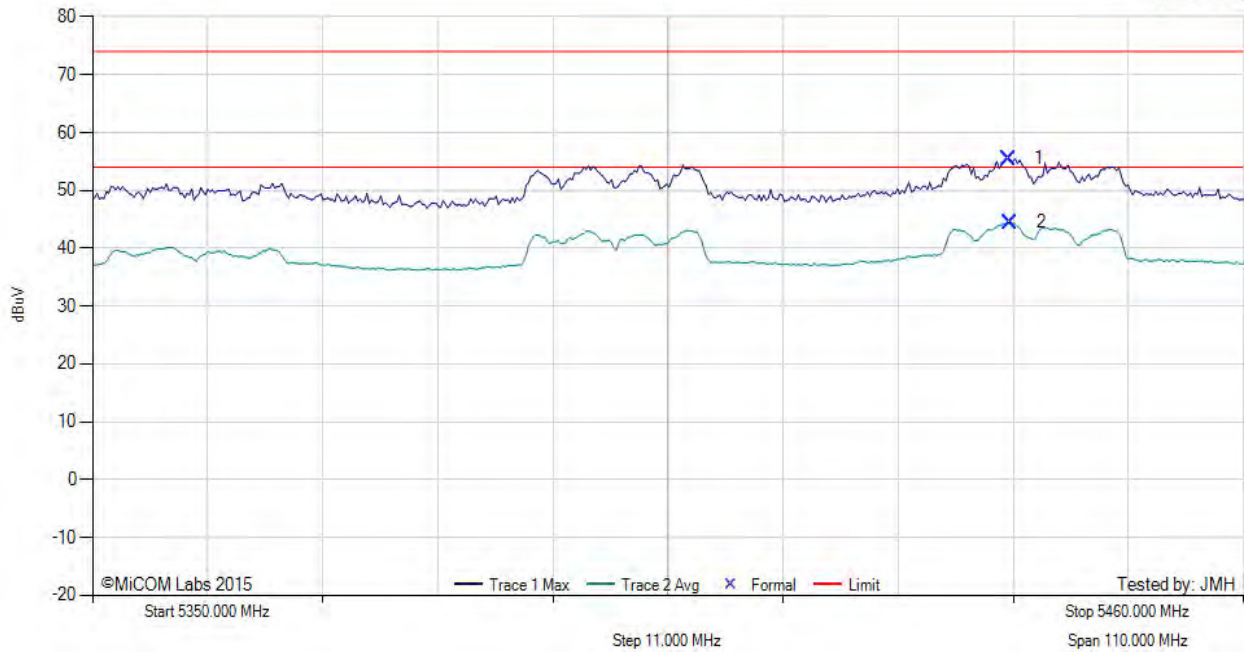


Variante: 802.11a, Test Freq: 5320.00 MHz, Antenna: Unknown, Power Setting: 14, Duty Cycle (%): 100

Measurement Distance: 3m

Sweep Time: 20.0 s

RBW: 1 MHz  
VBW: 1 MHz



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5437.52	60.44	6.23	-11.21	55.46	Max Peak	Horizontal	114	284	74.0	-18.5	Pass
2	5437.74	49.42	6.23	-11.21	44.44	Max Avg	Horizontal	114	284	54.0	-9.6	Pass

**Test Notes:** EUT on Table connected via telnet to Laptop outside chamber.

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RESTRICTED UPPER BAND-EDGE EMISSIONS

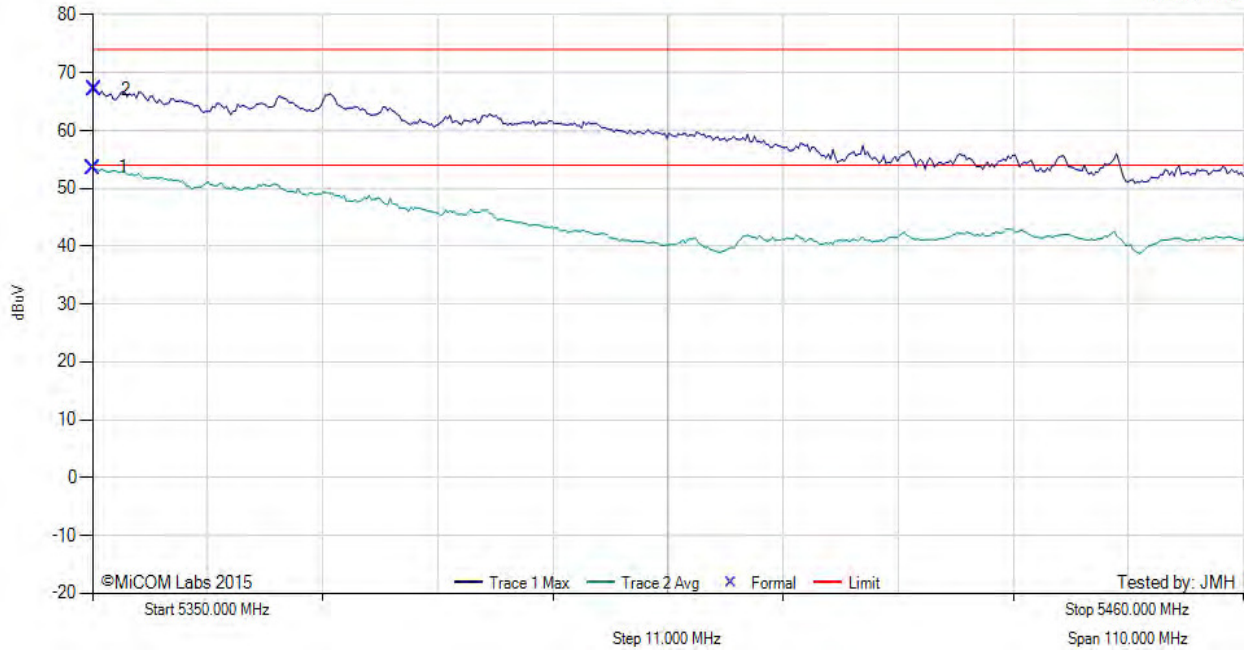


Variant: 802.11ac-80, Test Freq: 5290.00 MHz, Antenna: Unknown, Power Setting: 17.25, Duty Cycle (%): 100

Measurement Distance: 3m

Sweep Time: 20.0 s

RBW: 1 MHz  
VBW: 1 MHz



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5350.00	58.47	6.16	-11.02	53.61	Max Avg	Horizontal	114	284	54.0	-0.4	Pass
2	5350.22	71.95	6.16	-11.02	67.09	Max Peak	Horizontal	114	284	74.0	-6.9	Pass

**Test Notes:** EUT on Table connected via telnet to Laptop outside chamber.

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RESTRICTED UPPER BAND-EDGE EMISSIONS

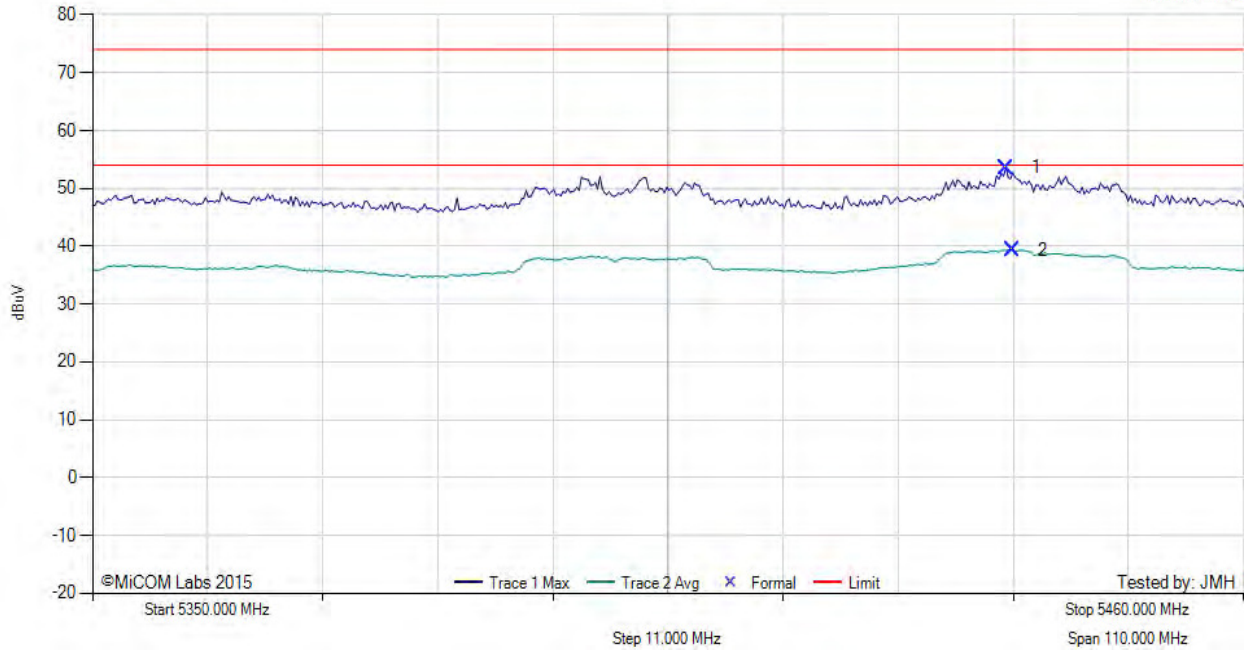


Variant: 802.11n HT-20, Test Freq: 5320.00 MHz, Antenna: Unknown, Power Setting: 12.5, Duty Cycle (%): 100

Measurement Distance: 3m

Sweep Time: 20.0 s

RBW: 1 MHz  
VBW: 1 MHz



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5437.29	58.56	6.22	-11.21	53.57	Max Peak	Horizontal	114	284	74.0	-20.4	Pass
2	5437.96	44.38	6.23	-11.21	39.40	Max Avg	Horizontal	114	284	54.0	-14.6	Pass

**Test Notes:** EUT on Table connected via telnet to Laptop outside chamber.

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RESTRICTED UPPER BAND-EDGE EMISSIONS

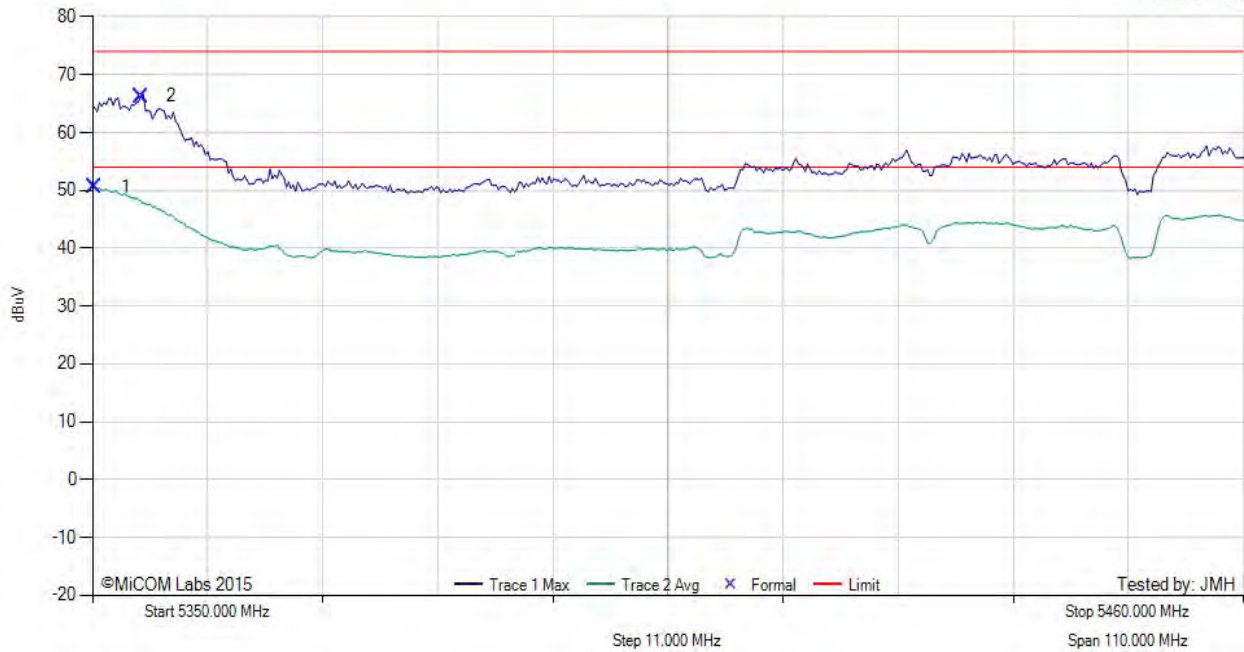


Variant: 802.11n HT-40, Test Freq: 5310.00 MHz, Antenna: Unknown, Power Setting: 17.5, Duty Cycle (%): 100

Measurement Distance: 3m

Sweep Time: 20.0 s

RBW: 1 MHz  
VBW: 1 MHz



Num	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
1	5350.22	55.38	6.16	-11.02	50.52	Max Avg	Horizontal	114	284	54.0	-3.5	Pass
2	5354.63	71.20	6.16	-11.04	66.32	Max Peak	Horizontal	114	284	74.0	-7.7	Pass

**Test Notes:** EUT on Table connected via telnet to Laptop outside chamber.

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### A.5. Digital Emissions (0.03 – 1 GHz)



#### DIGITAL EMISSIONS (0.03 - 1 GHz)

Variant: 802.11b, Test Freq: 2437.00 MHz, Antenna: Unknown, Power Setting: NA, Duty Cycle (%): 100



Num	Frequency MHz	Raw dBμV	Cable Loss	AF dB	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
1	36.14	41.87	3.47	-14.37	30.97	MaxQP	Vertical	114	202	40.0	-9.0	Pass
2	37.79	44.19	3.48	-16.06	31.61	MaxQP	Vertical	123	0	40.0	-8.4	Pass
3	39.49	47.94	3.49	-16.67	34.76	MaxQP	Vertical	103	358	40.0	-5.2	Pass
4	213.18	51.70	4.39	-20.00	36.09	MaxQP	Horizontal	119	271	43.0	-6.9	Pass
5	479.99	44.31	5.28	-12.80	36.79	MaxQP	Horizontal	207	355	46.0	-9.2	Pass
6	937.50	39.87	6.47	-7.20	39.14	MaxQP	Horizontal	144	52	46.0	-6.9	Pass

**Test Notes:** EUT on table connected to Laptop outside chamber

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