Company: Actiontec Electronics Inc.

Test of: M6240V To: FCC CFR 47 Part 15 Subpart E 15.407

Report No.: ATEC06-U11a Rev A

### CONDUCTED TEST REPORT



CONDUCTED TEST REPORT



# Test of: Actiontec Electronics Inc. M6240V to

# To: FCC CFR 47 Part 15 Subpart E 15.407

Test Report Serial No.: ATEC06-U11a Rev A

Note: this report is one of a set of three reports that together address the requirements for FCC 15.407

Report Number	Test Report Type
ATEC06-U11a	Conducted Test Report
ATEC06-U11b	Radiated Test Report
ATEC06-U11c	DFS Test Report

This report supersedes: NONE

Applicant: Actiontec Electronics Inc. 760 N Mary Avenue Sunnyvale, 94085 USA

Product Function: Gigabit Wireless Router

Issue Date: 28th July 2015

# This Test Report is Issued Under the Authority of:

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



MiCOM Labs is an ISO 17025 Accredited Testing Laboratory



Actiontec Electronics Inc. M6240V FCC CFR 47 Part 15 Subpart E 15.407 ATEC06-U11a Rev A 28th July 2015 3 of 354

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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) <u>www.a2la.org</u> test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; <u>http://www.a2la.org/scopepdf/2381-01.pdf</u>





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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)	ТСВ	-	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	
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	US0159
Taiwan	National Communications Commission (NCC) Bureau of Standards, Metrology and Inspection (BSMI)	САВ	APEC MRA 1	
Vietnam	Ministry of Communication (MIC)	CAB	APEC MRA 1	

EU MRA – European Union Mutual Recognition Agreement.

NB - Notified Body

APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement. Recognition agreement under which test lab is accredited to regulatory standards of the APEC member countries. Phase I - recognition for product testing

Phase II – recognition for both product testing and certification



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# 1.3. PRODUCT CERTIFICATION

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



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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# 2. DOCUMENT HISTORY

Document History				
Revision	Date	Comments		
Draft				
Rev A	28 <sup>th</sup> July 2015	Initial release.		

In the above table the latest report revision will replace all earlier versions.



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# 3. TEST RESULT CERTIFICATE

Manufacturer: Actiontec Electronics Inc. 760 N Mary Avenue Sunnyvale 94085 USA

Model: M6240V

Type Of Equipment: Gigabit Wireless Router

**S/N's:** 5190700005

Test Date(s): 16 - 17 June 2015

Tested By: MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA

Telephone: +1 925 462 0304 Fax: +1 925 462 0306

**TEST RESULTS** 

EQUIPMENT COMPLIES

Website: www.micomlabs.com

TESTING CERT #2381.01

### STANDARD(S)

### FCC CFR 47 Part 15 Subpart E 15.407 Conducted RF Requirements

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
П	KDB 905462 D07 v01	10 <sup>th</sup> June 2015	Test guidance to demonstrate compliance for U-NII devices subject to DFS requirements.
ш	KDB 926956 D01 v01r02	June 3,2014	U-NII Device Transition Plan
IV	KDB 443999 V01r3	17 <sup>th</sup> October 2014	Approval of DFS UNII The current interim procedures to approve UNII devices operating in the 5470 - 5725 MHz band with radar detection and DFS capabilities
V	KDB 789033 D02 v01	6 <sup>th</sup> June 2014	General UNII Test Procedures New Rules V01
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.
XIV	M 3003	Edition 3 Nov. 2012	Expression of Uncertainty and Confidence in Measurements
XV	RSS-Gen Issue 4	November 2014	General Requirements and Information for the Certification of Radiocommunication Equipment
XVI	KDB 644545 D03 v01	August 14th 2014	Guidance for IEEE 802.11ac New Rules v01
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

Dotaile	Description
	Test of the Actiontec Electronics Inc. M6240V
Purpose.	to FCC CFR 47 Part 15 Subpart E 15.407.
	Radio Frequency Devices; Subpart E –Unlicensed National Information
	Infrastructure Devices
Applicant:	Actiontec Electronics Inc.
	760 N Mary Avenue
	Sunnyvale 94085 USA
Manufacturer:	
Laboratory performing the tests:	MiCOM Labs, Inc.
	575 Boulder Court
	Pleasanton California 94566 USA
Test report reference number:	ATEC06-U11a Rev A
Date EUT received:	15th June 2015
Standard(s) applied:	FCC CFR 47 Part 15 Subpart E 15.407
Dates of test (from - to):	16th – 17th June 2015
No of Units Tested:	2
Type of Equipment:	Gigabit Wireless Router
Product Family Name:	GbE 11ac Fiber Gateway
Model(s):	M6240V (Device tested)
	M6240
	M6240L
Location for use:	Indoor
Declared Frequency Range(s):	5150 - 5250 MHz; 5250 - 5350 MHz; 5470 - 5725 MHz; 5725 - 5850 MHz;
Primary function of equipment:	Gigabit Wireless Router
Secondary function of equipment:	Residential Gateway
Type of Modulation:	OFDM
EUT Modes of Operation:	802.11a; 802.11ac-80; 802.11n HT-20; 802.11n HT-40;
Declared Nominal Output Power	5150 - 5250 MHz: + 22dBm
(Ave):	5250 - 5350 MHz: +17dBm
	5470 - 5725 MHz: +17dBm
	5725 - 5850 MHz: +22dBm
Transmit/Receive Operation:	Transceiver - Half Duplex
·	AC/ DC adaptor (adaptor sold with unit) 12 V DC/3.5A
Operating Temperature Range:	
ITU Emission Designator:	802.11a: 16M4D1D
	802.11ac-80: 75M9D1D
	802.11n HT-20: 17M7D1D
	802.11n HT-40: 36M2D1D
Equipment Dimensions:	
Weight:	1.6 lbs

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Hardware Rev:	AM3
Software Rev:	62.0.10



### 5.2. Scope Of Test Program

### Actiontec Electronics Inc. M6240V

The scope of the test program was to test the Actiontec Electronics Inc. M6240V configurations in the frequency ranges 5150 - 5250 MHz; 5250 - 5350 MHz; 5470 - 5725 MHz; 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

### Manufacturers Declaration of Similarity

Re: FCC ID: LNQM6240V Actiontec Models: M6240V, M6240, M6240L

To whom it may concern:

We, Actiontec Electronics, Inc., hereby declare the above mentioned 3 models have electrically identical Wireless circuitry with the same electromagnetic emissions and electromagnetic compatibility characteristics.

The differences among these 3 models are as follows -

M6240V – GbE 11ac Fiber Gateway with MoCA LAN/WAN and VoIP M6240 – GbE 11ac Fiber Gateway with MoCA LAN, without MoCA WAN/VoIP M6240L – GbE 11ac Fiber Gateway with MoCA LAN/VoIP, without MoCA WAN



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### Actiontec Electronics Inc. M6240V





Title: To:

Actiontec Electronics Inc. M6240V FCC CFR 47 Part 15 Subpart E 15.407 Serial #: ATEC06-U11a Rev A Issue Date: 28th July 2015 Page: 15 of 354

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

Type (EUT/ Support)	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
EUT	Wireless Router	Actiontec	M6240V	5190700005
EUT	Power Adapter 100 - 240Vac 50/60Hz 1.0A 12 Vdc 3.5 A	Actiontec	NBS40C120350VU	1512
Support	Laptop PC	IBM	Thinkpad	None

### 5.4. Antenna Details

Туре	Manufacturer	Model	Family	Gain (dBi)	BF Gain	Dir BW	X-Pol	Frequency Band (MHz)
integral	Galtronics	Custom PCB	Dipole	3.0	2.9	360	-	5150 - 5250
integral	Galtronics	Custom PCB	Dipole	3.0	2.8	360	-	5250 - 5350
integral	Galtronics	Custom PCB	Dipole	3.0	2.6	360	-	5470 - 5725
integral	Galtronics	Custom PCB	Dipole	3.0	2.0	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	100m	4	Ν	RJ45	Packet Data
Ethernet	100m	1	N	RJ45	Packet Data
USB	15m	2	N	USB 3.0	Digital
Optical	SFP	1	Ν		Digital

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# 5.6. Test Configurations

Results for the following configurations are provided in this report:

Operational Data Rate with Mode(s) Highest Power		Channel Frequency (MHz)					
(802.11a/b/g/n/ac)	MBit/s	Low	Mid	High			
		5150 - 5250 MHz					
802.11a	6	5,180.00	5,200.00	5,240.00			
802.11ac-80	29.3			5,210.00			
802.11n HT-20	6.5	5,180.00	5,200.00	5,240.00			
802.11n HT-40	13.5	5,190.00		5,230.00			
		5250 - 5350 MHz					
802.11a	6	5,260.00	5,300.00	5,320.00			
802.11ac-80	29.3			5,290.00			
802.11n HT-20	6.5	5,260.00	5,300.00	5,320.00			
802.11n HT-40	13.5	5,270.00		5,310.00			
		5470 - 5725 MHz					
802.11a	6	5,500.00	5,580.00	5,720.00			
802.11ac-80	29.3	5,530.00	5,610.00	5,690.00			
802.11n HT-20	6.5	5,500.00	5,580.00	5,720.00			
802.11n HT-40	13.5	5,510.00	5,550.00	5,710.00			
5725 - 5850 MHz							
802.11a	6	5,745.00	5,785.00	5,825.00			
802.11ac-80	29.3	5,775.00		5,775.00			
802.11n HT-20	6.5	5,745.00	5,785.00	5,825.00			
802.11n HT-40	13.5	5,755.00		5,795.00			

### 5.7. Equipment Modifications

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

# 5.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program: 1. NONE



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# 6. TEST SUMMARY

List of Measurements							
Test Header	Result	Data Link					
(a) Peak Transmit Power	Complies	-					
(a) 26 dB & 99% Bandwidth	Complies	View Data					
(a)(5) Power Spectral Density	Complies	View Data					
(h)(1) Transmit Power Control (TPC)	Complies	-					



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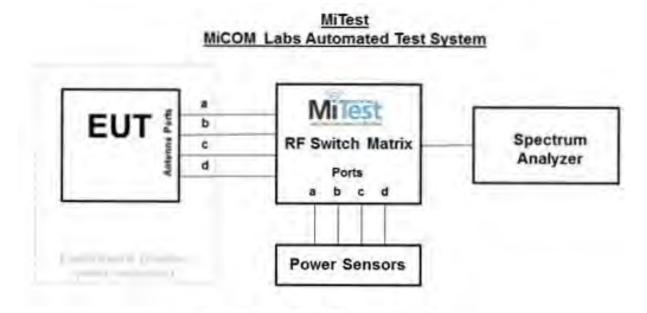
# 7. TEST EQUIPMENT CONFIGURATION(S)

# 7.1. Conducted

Conducted RF Emission Test Set-up(s)

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

- 1. Peak Transmit Power, report section 9.1
- 2. 26 dB & 99% Bandwidth, report section 9.2
- 3. Power Spectral Density, report section 9.3
- 4. Transmit Power Control, report section 9.4



### Conducted Test Measurement Setup

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



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Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	04 Dec 2015
193	Receiver 20 Hz to 7 GHz	Rhode & Schwarz	ESI 7	838496/007	14 Jan 2016
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
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	17 Jul 2015
380	4x4 RF Switch Box	MiCOM Labs	MiTest RF Switch Box	MIC001	30 Jun 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#1	EUT to Mitest box port 1	Flexco	SMA Cable port1	None	30 Jun 2015
RF#1 SMA#2	EUT to Mitest box port 2	Flexco	SMA Cable port2	None	30 Jun 2015
RF#1 SMA#3	EUT to Mitest box port 3	Flexco	SMA Cable port3	None	30 Jun 2015
RF#1 SMA#4	EUT to Mitest box port 4	Flexco	SMA Cable port4	None	30 Jun 2015
RF#1 SMA#SA	Mitest box to SA	Flexco	SMA Cable SA	None	30 Jun 2015
RF#1 USB#1	USB Cable to Mitest Box	Dynex	USB Cable	None	Not Required

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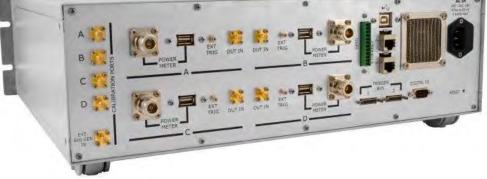
# 8. MEASUREMENT AND PRESENTATION OF TEST DATA

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 <u>MiTest</u>. <u>MiTest</u> is an automated test system developed by MiCOM Labs. <u>MiTest</u> 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)



Actiontec Electronics Inc. M6240V FCC CFR 47 Part 15 Subpart E 15.407 ATEC06-U11a Rev A 28th July 2015 21 of 354

# 9. TEST RESULTS

# 9.1. Peak Transmit Power

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

### Test Procedure for Maximum Conducted Output Power Measurement

Method PM (Measurement using an RF average power meter). KDB 789033 defines a methodology using an average wideband power meter. Measurements were made while the EUT was operating in a continuous transmission mode (100% duty cycle) at the appropriate center frequency. All operational modes and frequency bands were measured independently and the resultant calculated. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported separately. A summation ( $\Sigma$ ) 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  $[10*Log10 (10^{a/10} + 10^{b/10} + 10^{c/10} + 10^{d/10})]$ 

G = Antenna Gain

Y = Beamforming Gain

x = Duty Cycle (average power measurements only)

Limits Maximum Conducted Output Power

### Operating Frequency Band 5150-5250 MHz

15. 407 (a)(1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

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

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring

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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

Variant:	802.11a	Duty Cycle (%):	99.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	5.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.90
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results									
Test	Measured Conducted Output Power (dBm)					Minimum	Lineit		
Frequency	Port(s)				Total Power	26 dB Bandwidth	26 dB Limit andwidth	Margin	EUT Power
MHz	а	b	С	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting
5180.0	21.44	21.96	22.98	21.63	28.11		30.00	-1.89	23.00
5200.0	21.38	21.99	22.89	21.26	27.99		30.00	-2.01	23.00
5240.0	21.34	21.57	22.71	20.92	27.75		30.00	-2.25	23.00

### Traceability to Industry Recognized Test Methodologies

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

DCCF - Duty Cycle Correction Factor



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Variant:	802.11ac-80	Duty Cycle (%):	97.8
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	5.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.90
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results									
Test	Measure	d Conducted	Output Pow	er (dBm)	Calculated				
Frequency	Port(s)				Total Power	26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	а	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting
5210.0	14.34	14.57	15.71	13.92	20.85	-	30.00	-9.15	16.00

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

DCCF - Duty Cycle Correction Factor



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### Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-20	Duty Cycle (%):	99.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	5.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.90
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results									
Test Frequency	Measured Conducted Output Power (dBm) V Port(s)				Calculated Total	Minimum 26 dB	Limit	Margin	EUT Power
Trequency		Por	u(s)		Power	r Bandwidth			Setting
MHz	а	b	С	d	Σ Port(s) dBm	MHz	dBm	dBm	g
5180.0	21.14	21.28	22.77	20.88	27.65		30.00	-2.35	23.00
5200.0	20.96	21.34	22.82	20.86	27.63		30.00	-2.37	23.00
5240.0	21.16	21.53	22.75	20.67	27.66		30.00	-2.34	23.00

### Traceability to Industry Recognized Test Methodologies

		0	
		Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
		Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor



Actiontec Electronics Inc. M6240V FCC CFR 47 Part 15 Subpart E 15.407 ATEC06-U11a Rev A Issue Date: 28th July 2015 26 of 354

### Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	5.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.90
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measu	Test Measurement Results								
Test	Measured Conducted Output Power (dBm)				Calculated	Minimum	1.1	Manula	
Frequency	Port(s)			Total Power	26 dB Bandwidth	Limit	Margin	EUT Power Setting	
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting
5190.0	21.78	22.10	23.45	21.48	28.35		30.00	-1.65	23.00
5230.0	21.65	22.01	23.33	21.46	28.25		30.00	-1.75	23.00

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

DCCF - Duty Cycle Correction Factor



Actiontec Electronics Inc. M6240V FCC CFR 47 Part 15 Subpart E 15.407 ATEC06-U11a Rev A 28th July 2015 27 of 354

### Equipment Configuration for Peak Transmit Power

Variant:	802.11a	Duty Cycle (%):	99.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	5.80
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.80
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results									
Test	Measure	d Conducted	Output Pow	er (dBm)	Calculated	Minimum	Lineit	Manain	
Frequency	Port(s)			Total Power	26 dB Bandwidth	Limit	Margin	EUT Power Setting	
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting
5260.0	16.59	16.94	17.85	16.94	23.17	21.944	24.00	-0.83	18.00
5300.0	16.68	17.05	18.25	16.85	23.32	22.144	24.00	-0.68	18.00
5320.0	17.03	17.08	18.23	16.48	23.32	22.144	24.00	-0.68	18.00

### Traceability to Industry Recognized Test Methodologies

	5
Work	Instruction: WI-03 MEASURING RF SPECTRUM MASK
Measurement l	Jncertainty: ±2.81 dB

DCCF - Duty Cycle Correction Factor



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Variant:	802.11ac-80	Duty Cycle (%):	97.8
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	5.80
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.80
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measu	Test Measurement Results								
Test	Measure	d Conducted	Output Pow	er (dBm)	Calculated	Minimum	1.1		
Frequency	Port(s)			Total Power	26 dB Bandwidth	Limit	Margin	EUT Power	
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting
5290.0	14.9	15.01	16.11	14.52	21.33	83.768	24.00	-2.67	16.00

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

DCCF - Duty Cycle Correction Factor



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### Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-20	Duty Cycle (%):	99.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	5.80
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.80
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results									
Test	Measure	d Conducted	Output Pow	er (dBm)	Calculated	Minimum	Lineld	Manain	
Frequency	Port(s)			Total Power	26 dB Bandwidth	Limit	Margin	EUT Power Setting	
MHz	а	b	С	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting
5260.0	16.57	17.20	18.19	16.23	23.18	23.547	24.00	-0.82	18.00
5300.0	17.05	17.02	18.17	16.20	23.23	23.447	24.00	-0.77	18.00
5320.0	16.62	17.16	17.83	16.36	23.09	23.547	24.00	-0.91	18.00

### Traceability to Industry Recognized Test Methodologies

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

DCCF - Duty Cycle Correction Factor



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### Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	5.80
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.80
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measu	Test Measurement Results									
Test	Measure	d Conducted	Output Pow	er (dBm)	Calculated	Minimum	1.1		EUT Power Setting	
Frequency		Por	t(s)		Total Power	26 dB Bandwidth	Limit	Margin		
MHz	а	b	С	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting	
5270.0	17.12	17.43	18.55	17.10	23.67	42.685	24.00	-0.33	18.00	
5310.0	17.48	17.50	18.66	16.96	23.77	42.685	24.00	-0.23	18.00	

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

DCCF - Duty Cycle Correction Factor



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### Equipment Configuration for Peak Transmit Power

Variant:	802.11a	Duty Cycle (%):	99.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	5.60
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measu	Test Measurement Results									
Test	Measure	d Conducted	Output Pow	er (dBm)	Calculated	Minimum	Lineit			
Frequency		Por	t(s)		Total 26 dB Limit Margin E Power Bandwidth			EUT Power		
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting	
5500.0	16.59	16.59	18.01	17.11	23.18	21.844	24.00	-0.82	18.00	
5580.0	16.40	17.27	18.22	17.23	23.39	21.944	24.00	-0.61	18.00	
5720.0	16.81	16.90	17.12	17.32	23.11	22.144	24.00	-0.89	18.00	

### Traceability to Industry Recognized Test Methodologies

 	0	
	Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
	Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor



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### Equipment Configuration for Peak Transmit Power

Variant:	802.11ac-80	Duty Cycle (%):	97.8
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	5.60
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measu	Test Measurement Results								
Test	Measure	d Conducted	Output Pow	er (dBm)	Calculated	Minimum	Linait	Morgin	
Frequency		Por	t(s)		Total 26 dB Limit Margin E Power Bandwidth				EUT Power
MHz	а	b	С	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting
5530.0	15.77	15.84	17.25	15.86	22.35	82.966	24.00	-1.65	17.00
5610.0	16.33	17.11	17.87	16.70	23.16	83.367	24.00	-0.84	18.00
5690.0	16.30	17.03	17.89	16.83	23.17	83.367	24.00	-0.83	18.00

### Traceability to Industry Recognized Test Methodologies

		0	
		Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
		Measurement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor



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### Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-20	Duty Cycle (%):	99.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	5.60
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measur	Test Measurement Results								
Test Frequency	Measure	d Conducted Por	•	er (dBm)	Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power
MHz	а	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting
5500.0	16.45	16.54	18.28	16.55	23.09	23.747	24.00	-0.91	18.00
5580.0	16.26	17.28	17.96	16.98	23.23	23.547	24.00	-0.77	18.00
5720.0	16.89	16.68	16.84	17.24	22.98	23.647	24.00	-1.02	18.00

### Traceability to Industry Recognized Test Methodologies

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

DCCF - Duty Cycle Correction Factor



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### Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	5.60
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measur	Test Measurement Results								
Test Frequency					Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power
MHz	а	b	С	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting
5510.0	17.08	17.23	18.56	17.51	23.71	42.685	24.00	-0.29	18.00
5550.0	16.49	17.07	18.43	16.88	23.36	42.685	24.00	-0.64	18.00
5710.0	17.55	17.35	17.40	17.75	23.59	42.685	24.00	-0.41	18.00

### Traceability to Industry Recognized Test Methodologies

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

DCCF - Duty Cycle Correction Factor



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### Equipment Configuration for Peak Transmit Power

Variant:	802.11a	Duty Cycle (%):	99.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measu	Test Measurement Results								
Test	Measure	d Conducted	Output Pow	ver (dBm)	Calculated	Minimum	Lineit	Manain	
Frequency	y Port(s)				Total Power	26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting
5745.0	21.69	21.04	20.96	21.72	27.43		30.00	-2.57	23.00
5785.0	21.35	20.99	20.80	21.09	27.13		30.00	-2.87	23.00
5825.0	21.18	20.69	20.45	20.77	26.84		30.00	-3.16	23.00

### Traceability to Industry Recognized Test Methodologies

, , ,	0	
	Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Meas	surement Uncertainty:	±2.81 dB

DCCF - Duty Cycle Correction Factor



### Equipment Configuration for Peak Transmit Power

Variant:	802.11ac-80	Duty Cycle (%):	97.8
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measu	Test Measurement Results								
Test Measured Conducted Output Power (dBm)					Calculated	Minimum	1.1		
Frequency	Port(s)				Total Power	26 dB Bandwidth	Limit	Margin	EUT Power
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting
5775.0	21.60	21.00	21.09	21.55	27.44		30.00	-2.56	23.00

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

DCCF - Duty Cycle Correction Factor



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#### Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-20	Duty Cycle (%):	99.0
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measu	Test Measurement Results									
Test	Measure	red Conducted Output Power (dBm) Calculated			Minimum	Lineit				
Frequency		Por	t(s)		Total Power				EUT Power Setting	
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting	
5745.0	21.81	21.34	21.35	21.44	27.55		30.00	-2.45	23.00	
5785.0	21.50	21.11	20.69	21.34	27.23		30.00	-2.77	23.00	
5825.0	21.19	20.66	20.37	20.80	26.83		30.00	-3.17	23.00	

### Traceability to Industry Recognized Test Methodologies

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

DCCF - Duty Cycle Correction Factor



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#### Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measu	Test Measurement Results								
Test	Measured Conducted Output Power (dBm)			Calculated	Minimum				
Frequency		Por	t(s)		Total 26 dB Power Bandwidth		Limit	Margin	EUT Power Setting
MHz	а	b	с	d	Σ Port(s) dBm	MHz	dBm	dBm	Setting
5755.0	22.41	21.94	21.61	22.02	28.08		30.00	-1.92	23.00
5795.0	21.69	21.25	21.28	21.65	27.55		30.00	-2.45	23.00

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

DCCF - Duty Cycle Correction Factor



## 9.2. 26 dB & 99% Bandwidth

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

#### Test Procedure for 26 dB and 99% Bandwidth Measurement

The bandwidth at 26 dB and 99 % is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency. The Resolution Bandwidth was set to approximately 1% of the emission bandwidth.

Testing was performed under ambient conditions at nominal voltage. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported.

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



5200.0

5240.0

16.834

<u>16.834</u>

16.834

16.834

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

Engineering Test Notes:			
TPC: N	Not Applicable	Tested By:	SB
Modulation: O	OFDM	Beam Forming Gain (Y)(dB):	2.90
Data Rate: 6.	6.00 MBit/s	Antenna Gain (dBi):	5.90
Variant: 80	302.11a	Duty Cycle (%):	99.0

Test Measure	ment Results						
Test	Me	Measured 26 dB Bandwidth (MHz)					
Frequency		Poi	rt(s)		26 dB Band	width (MHz)	
MHz	а	b	С	d	Highest	Lowest	
5180.0	<u>22.044</u>	<u>23.347</u>	<u>23.347</u>	<u>23.347</u>	23.347	22.044	
5200.0	22.044	23.447	<u>23.347</u>	<u>23.447</u>	23.447	22.044	
5240.0	<u>22.445</u>	<u>23.347</u>	<u>23.347</u>	<u>23.347</u>	23.347	22.445	
Test	м	easured 99% I	Randwidth (MF	47)			
Frequency			rt(s)	12)	99% Bandy	width (MHz)	
MHz	а	b	с	d	Highest	Lowest	
5180.0	<u>16.834</u>	<u>16.834</u>	<u>16.934</u>	<u>16.834</u>	16.934	16.834	

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

<u>16.834</u>

<u>16.834</u>

16.934

16.934

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

16.834

<u>16.834</u>

<u>16.934</u>

<u>16.934</u>



Variant:	802.11ac-80	Duty Cycle (%):	97.8
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results								
Ме	asured 26 dB	Bandwidth (M	Hz)	26 dB Band				
	Ροι	t(s)						
а	b	С	d	Highest	Lowest			
<u>102.605</u>	<u>103.006</u>	<u>112.625</u>	<u>103.006</u>	112.625	102.605			
				•			- -	
Test Measured 99% Bandwidth (MHz)			lz)	00% Bandy	width (MU-)			
	Port(s)			55% Balluv				
а	b	С	d	Highest	Lowest			
<u>76.152</u>	<u>76.152</u>	<u>76.553</u>	<u>76.152</u>	76.553	76.152			
	Me <u>a</u> <u>102.605</u> Ma	Measured 26 dB           Por           a         b           102.605         103.006           Measured 99% E           Por           a         b	Measured 26 dB Bandwidth (Miter Port(s)           a         b         c           102.605         103.006         112.625           Measured 99% Bandwidth (Miter Port(s)         Port(s)           a         b         c	Measured 26 dB Bandwidth (MHz)           Port(s)           a         b         c         d           102.605         103.006         112.625         103.006           Measured 99% Bandwidth (MHz)         Port(s)           Port(s)           a         b         c         d	Measured 26 dB Bandwidth (MHz)         26 dB Bandwidth (MHz)           Port(s)         26 dB Bandwidth (MHz)           a         b         c         d         Highest           102.605         103.006         112.625         103.006         112.625           Measured 99% Bandwidth (MHz)         99% Bandwidth (MHz)         99% Bandwidth (MHz)           Port(s)         C         d         Highest	Measured 26 dB Bandwidth (MHz)         26 dB Bandwidth (MHz)           Port(s)         26 dB Bandwidth (MHz)           a         b         c         d         Highest         Lowest           102.605         103.006         112.625         103.006         112.625         102.605           Measured 99% Bandwidth (MHz)         99% Bandwidth (MHz)         99% Bandwidth (MHz)           Port(s)         Dott(s)         Difference         Lowest	Measured 26 dB Bandwidth (MHz)         26 dB Bandwidth (MHz)           Port(s)         26 dB Bandwidth (MHz)           a         b         c         d         Highest         Lowest           102.605         103.006         112.625         103.006         112.625         102.605           Measured 99% Bandwidth (MHz)         99% Bandwidth (MHz)         99% Bandwidth (MHz)         102.605         102.605           102.605         103.006         112.625         103.006         112.625         102.605	

## 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).



Engineering Test Notes:			
TPC:	Not Applicable	Tested By:	SB
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.90
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	5.90
Variant:	802.11n HT-20	Duty Cycle (%):	99.0

Test	Me	easured 26 dB	Bandwidth (M	Hz)	26 dB Bandwidth (MHz)			
Frequency		Ро	rt(s)		26 dB Band	width (WHZ)		
MHz	а	b	с	d	Highest	Lowest		
5180.0	<u>23.848</u>	<u>23.747</u>	<u>23.747</u>	<u>23.747</u>	23.848	23.747		
5200.0	<u>23.747</u>	<u>23.547</u>	<u>23.747</u>	<u>23.547</u>	23.747	23.547		
5240.0	<u>23.647</u>	<u>23.747</u>	<u>24.349</u>	<u>23.747</u>	24.349	23.647		
Test	Measured 99% Bandwidth (MHz)			łz)	99% Bandy	width (MHz)		
Frequency	D =+(-)			55 /6 Dalluv		99% Bandwidth (MHz)		

Test			Sanawiaan (im	.=,	99% Bandwidth (MHz)		
Frequency	Port(s)						
MHz	а	b	с	d	Highest	Lowest	
5180.0	<u>18.136</u>	<u>18.136</u>	<u>18.036</u>	<u>18.136</u>	18.136	18.036	
5200.0	<u>18.136</u>	<u>18.036</u>	<u>18.136</u>	<u>18.036</u>	18.136	18.036	
5240.0	<u>18.136</u>	<u>18.036</u>	<u>18.036</u>	<u>18.036</u>	18.136	18.036	

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).



Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	5.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.90
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measure	Test Measurement Results							
Test	Me	asured 26 dB	Bandwidth (M	Hz)	26 dB Bandwidth (MHz)			
Frequency		Ροι	rt(s)					
MHz	а	b	С	d	Highest	Lowest		
5190.0	<u>52.505</u>	<u>42.685</u>	<u>44.689</u>	<u>42.685</u>	52.505	42.685		
5230.0	<u>46.894</u>	<u>42.886</u>	<u>47.094</u>	<u>42.886</u>	47.094	42.886		
Test	Measured 99% Bandwidth (MHz)			lz)	00% Bandy			
Frequency	Port(s)		99% Bandwidth (MHz)					
MHz	а	b	С	d	Highest	Lowest		
5190.0	<u>36.874</u>	<u>36.673</u>	<u>36.874</u>	<u>36.673</u>	36.874	36.673		

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

36.673

36.874

36.673

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

36.673

<u>36.874</u>

36.874

5230.0



TPC: Not	ot Applicable	Tested By:	SB
Modulation: OF	FDM	Beam Forming Gain (Y)(dB):	2.80
Data Rate: 6.0	.00 MBit/s	Antenna Gain (dBi):	5.80
Variant: 802	)2.11a	Duty Cycle (%):	99.0

Test	Me	asured 26 dB	Bandwidth (M					
Frequency		Po	rt(s)		26 dB Bandwidth (MHz)			
MHz	а	b	с	d	Highest	Lowest		
5260.0	<u>21.944</u>	<u>22.946</u>	<u>22.946</u>	<u>22.946</u>	22.946	21.944		
5300.0	<u>22.144</u>	<u>22.745</u>	<u>22.846</u>	<u>22.745</u>	22.846	22.144		
5320.0	<u>22.144</u>	<u>23.046</u>	<u>22.946</u>	<u>23.046</u>	23.046	22.144		
Test Frequency	Measured 99% Bandwidth (MHz)			72)	99% Bandy	vidth (MHz)		

Test				,	99% Bandwidth (MHz)		
Frequency	Port(s)				35% Dandwidth (Miliz)		
MHz	а	b	С	d	Highest	Lowest	
5260.0	<u>16.733</u>	<u>16.834</u>	<u>16.733</u>	<u>16.834</u>	16.834	16.733	
5300.0	<u>16.733</u>	<u>16.834</u>	<u>16.733</u>	<u>16.834</u>	16.834	16.733	
5320.0	<u>16.733</u>	<u>16.834</u>	<u>16.834</u>	<u>16.834</u>	16.834	16.733	
5320.0	<u>16.733</u>	<u>16.834</u>	<u>16.834</u>	<u>16.834</u>	16.834	16.733	

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).



	29.30 MBit/s	Antenna Gain (dBi):	
Modulation:	-	Beam Forming Gain (Y)(dB):	
TPC: Engineering Test Notes:	Not Applicable	Tested By:	SB

ment Results							
Measured 26 dB Bandwidth (MHz)							
	Por	t(s)		Highest Lowest			
а	b	С	d				
<u>83.768</u>	<u>83.768</u>	<u>85.772</u>	<u>83.768</u>	85.772	83.768		
			•				
Test Measured 99% Bandwidth (MHz)		łz)					
	Port(s)			99% Banuv			
а	b	С	d	Highest	Lowest		
<u>75.752</u>	<u>75.752</u>	<u>75.752</u>	<u>75.752</u>	75.752	75.752		
	Me <u>a</u> <u>83.768</u> Ma	Measured 26 dB           Por           a         b           83.768         83.768           Measured 99% E           Por           a         b	Measured 26 dB Bandwidth (M       Port(s)       a     b     c       83.768     83.768     85.772       Measured 99% Bandwidth (MH       Port(s)       a     b     c	Measured 26 dB Bandwidth (MHz)           Port(s)           a         b         c         d           83.768         83.768         85.772         83.768           Measured 99% Bandwidth (MHz)           Port(s)           a         b         c         d           A a         b         c	Measured 26 dB Bandwidth (MHz)     26 dB Bandwidth (MHz)       Port(s)     26 dB Bandwidth (MHz)       a     b     c     d       83.768     83.768     85.772     83.768       Measured 99% Bandwidth (MHz)     99% Bandwidth (MHz)       Port(s)     99% Bandwidth (MHz)       a     b     c     d	Measured 26 dB Bandwidth (MHz)         26 dB Bandwidth (MHz)           Port(s)         26 dB Bandwidth (MHz)           a         b         c         d         Highest         Lowest           83.768         83.768         85.772         83.768         85.772         83.768           Measured 99% Bandwidth (MHz)         99% Bandwidth (MHz)           Port(s)         99% Bandwidth (MHz)           A         b         c         d         Highest         Lowest	Measured 26 dB Bandwidth (MHz)         26 dB Bandwidth (MHz)           Port(s)         26 dB Bandwidth (MHz)           a         b         c         d         Highest         Lowest           83.768         83.768         85.772         83.768         85.772         83.768           Measured 99% Bandwidth (MHz)           99% Bandwidth (MHz)           Port(s)           a         b         c         d         Highest         Lowest           a         b         c         d         Highest         Lowest

## 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).



Engineering Test Notes:			
TPC:	Not Applicable	Tested By:	SB
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.80
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	5.80
Variant:	802.11n HT-20	Duty Cycle (%):	99.0

	ment Results		Bandwidth (M	H7)			
Test Frequency	Measured 26 dB Bandwidth (MHz) Port(s)				26 dB Bandwidth (MHz)		
MHz	а	b	С	d	Highest	Lowest	
5260.0	<u>23.547</u>	<u>23.647</u>	<u>23.848</u>	<u>23.647</u>	23.848	23.547	
5300.0	<u>23.447</u>	<u>23.747</u>	<u>23.747</u>	<u>23.747</u>	23.747	23.447	
5320.0	<u>23.848</u>	<u>23.747</u>	<u>23.547</u>	<u>23.747</u>	23.848	23.547	
				•			
Test	М	easured 99% E	Bandwidth (MH	łz)	00% Bandu	vidth (MHz)	

Test	IVI	easured 99% c	Sandwidth (MF	12)	99% Bandy	vidth (MHz)	
Frequency	Port(s)			5576 Danu			
MHz	а	b	С	d	Highest	Lowest	
5260.0	<u>18.136</u>	<u>18.036</u>	<u>18.036</u>	<u>18.036</u>	18.136	18.036	
5300.0	<u>18.036</u>	<u>18.036</u>	<u>18.036</u>	<u>18.036</u>	18.036	18.036	
5320.0	<u>18.036</u>	<u>18.036</u>	<u>18.036</u>	<u>18.036</u>	18.036	18.036	

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).



5310.0

<u>36.673</u>

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

Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	5.80
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.80
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measure	ment Results						
Test	Measured 26 dB Bandwidth (MHz)						
Frequency		Ροι	rt(s)		26 dB Bandwidth (MHz)		
MHz	а	b	с	d	Highest	Lowest	
5270.0	<u>42.685</u>	<u>42.886</u>	<u>42.685</u>	<u>42.886</u>	42.886	42.685	
5310.0	<u>42.685</u>	<u>42.685</u>	<u>42.685</u>	<u>42.685</u>	42.685	42.685	
Test	M	easured 99% E	Bandwidth (MF	lz)	99% Bandv	vidth (MU-)	
Frequency		Ροι	rt(s)		99% Banuv		
MHz	а	b	с	d	Highest	Lowest	
5270.0	<u>36.673</u>	<u>36.673</u>	<u>36.673</u>	<u>36.673</u>	36.673	36.673	

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

36.673

36.673

36.673

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

36.673

<u>36.673</u>



	•		
TPC: Not	ot Applicable	Tested By:	SB
Modulation: OFE	<sup>-</sup> DM	Beam Forming Gain (Y)(dB):	2.60
Data Rate: 6.00	00 MBit/s	Antenna Gain (dBi):	5.60
Variant: 802	2.11a	Duty Cycle (%):	99.0

Test	Measured 26 dB Bandwidth (MHz)							
Frequency	equency	Port(s)				26 dB Bandwidth (MHz)		
MHz	а	b	с	d	Highest	Lowest		
5500.0	<u>21.844</u>	<u>22.745</u>	<u>22.745</u>	<u>22.745</u>	22.745	21.844		
5580.0	<u>21.944</u>	<u>22.846</u>	<u>22.745</u>	<u>22.846</u>	22.846	21.944		
5720.0	<u>22.144</u>	22.846	23.046	22.846	23.046	22.144		

Test	M	Measured 99% Bandwidth (MHz) 99% Bandwidth (MHz)				width (MHz)	
Frequency	Port(s)				55% Danuwidth (Milz)		
MHz	а	b	С	d	Highest	Lowest	
5500.0	<u>16.733</u>	<u>16.834</u>	<u>16.834</u>	<u>16.834</u>	16.834	16.733	
5580.0	<u>16.733</u>	<u>16.834</u>	<u>16.834</u>	<u>16.834</u>	16.834	16.733	
5720.0	<u>16.733</u>	<u>16.834</u>	<u>16.834</u>	<u>16.834</u>	16.834	16.733	

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

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



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

Variant:	802.11ac-80	Duty Cycle (%):	97.8
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	5.60
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

			Bandwidth (M	HZ)				
5530.0		Port(s)				26 dB Bandwidth (MHz)		
	а	b	с	d	Highest	Lowest		
5610.0	<u>82.966</u>	<u>83.768</u>	<u>83.367</u>	<u>83.768</u>	83.768	82.966		
0010.0	<u>83.367</u>	<u>83.768</u>	<u>83.367</u>	<u>83.768</u>	83.768	83.367		
5690.0	<u>83.367</u>	<u>84.168</u>	<u>83.768</u>	<u>84.168</u>	84.168	83.367		
Test	Me	easured 99% E	Bandwidth (MF	lz)	99% Bandy	vidth (MHz)		

IVI	easureu 99% c	Sanuwiuun (Mir	12)	99% Bandy	vidth (MHz)	MHz)		
	Port(s)				55% Danawiath (WHZ)			
а	b	с	d	Highest	Lowest			
<u>75.752</u>	<u>75.752</u>	<u>75.752</u>	<u>75.752</u>	75.752	75.752			
<u>75.752</u>	<u>75.752</u>	<u>75.752</u>	<u>75.752</u>	75.752	75.752			
<u>75.752</u>	<u>75.752</u>	<u>75.752</u>	<u>75.752</u>	75.752	75.752			
	a <u>75.752</u> 75.752	a         b           75.752         75.752           75.752         75.752           75.752         75.752	Port(s)           a         b         c           75.752         75.752         75.752           75.752         75.752         75.752           75.752         75.752         75.752	a         b         c         d           75.752         75.752         75.752         75.752           75.752         75.752         75.752         75.752           75.752         75.752         75.752         75.752	a         b         c         d         Highest           75.752         75.752         75.752         75.752         75.752         75.752           75.752         75.752         75.752         75.752         75.752         75.752	a         b         c         d         Highest         Lowest           75.752<	a         b         c         d         Highest         Lowest           75.752         75.752         75.752         75.752         75.752         75.752         75.752           75.752         75.752         75.752         75.752         75.752         75.752         75.752	

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

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



Engineering Test Notes:			
TPC:	Not Applicable	Tested By:	SB
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	5.60
Variant:	802.11n HT-20	Duty Cycle (%):	99.0

Test	Me	asured 26 dB	Bandwidth (M	Hz)	26 dB Band			
Frequency		Port(s)				26 dB Bandwidth (MHz)		
MHz	а	b	с	d	Highest	Lowest		
5500.0	<u>24.048</u>	<u>23.747</u>	<u>24.048</u>	<u>23.747</u>	24.048	23.747		
5580.0	<u>23.647</u>	<u>23.848</u>	<u>23.547</u>	<u>23.848</u>	23.848	23.547		
5720.0	<u>23.948</u>	<u>23.647</u>	<u>23.647</u>	<u>23.647</u>	23.948	23.647		

Test	M	Measured 99% Bandwidth (MHz) 99% Bandwidth (MHz)					
Frequency	Port(s)				55% Danuwidth (Milz)		
MHz	а	b	с	d	Highest	Lowest	
5500.0	<u>18.036</u>	<u>18.036</u>	<u>18.036</u>	<u>18.036</u>	18.036	18.036	
5580.0	<u>18.036</u>	<u>18.036</u>	<u>18.036</u>	<u>18.036</u>	18.036	18.036	
5720.0	<u>18.136</u>	<u>18.036</u>	<u>18.036</u>	<u>18.036</u>	18.136	18.036	

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).



Engineering Test Notes:		·······	
TPC:	Not Applicable	Tested By:	SB
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	5.60
Variant:	802.11n HT-40	Duty Cycle (%):	98.7

Test Measure	Test Measurement Results										
Test	Me	asured 26 dB	Bandwidth (M	Hz)	26 dB Bond	width (MU-)					
Frequency		Ροι	Port(s)			26 dB Bandwidth (MHz)					
MHz	а	b	С	d	Highest	Lowest					
5510.0	<u>42.685</u>	<u>42.886</u>	<u>42.685</u>	<u>42.886</u>	42.886	42.685					
5550.0	<u>42.685</u>	<u>42.886</u>	<u>42.886</u>	<u>42.886</u>	42.886	42.685					
5710.0	<u>42.685</u>	<u>42.685</u>	<u>42.886</u>	<u>42.685</u>	42.886	42.685					
Test	Μ	Measured 99% Bandwidth (MHz)				vidth (MHz)					

	Test	INI	easured 99% E	sandwidth (MH	iz)	99% Bandwidth (MHz)			
F	requency		Port(s)						
	MHz	а	b	С	d	Highest	Lowest		
	5510.0	<u>36.673</u>	<u>36.673</u>	<u>36.673</u>	<u>36.673</u>	36.673	36.673		
	5550.0	<u>36.673</u>	<u>36.673</u>	<u>36.673</u>	<u>36.673</u>	36.673	36.673		
	5710.0	<u>36.673</u>	<u>36.673</u>	<u>36.673</u>	<u>36.673</u>	36.673	36.673		

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).



5745.0

<u>16.834</u>

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

Variant:	802.11a	Duty Cycle (%):	99.0
Data Rate:	6.00 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measure								1
Test	Me	asured 26 dB	Bandwidth (M	Hz)	26 dB Bond	width (MU=)		
Frequency		Por	t(s)		26 dB Band			
MHz	а	b	С	d	Highest	Lowest		
5745.0	<u>22.244</u>	<u>22.846</u>	<u>22.445</u>	<u>22.846</u>	22.846	22.244		
5785.0	22.044	<u>22.846</u>	<u>23.146</u>	<u>22.846</u>	23.146	22.044		
5825.0	<u>22.244</u>	<u>22.946</u>	<u>23.447</u>	<u>22.946</u>	23.447	22.244		
		•			•	•		
Test	М	easured 99% E	Bandwidth (MF	łz)				
Frequency		Port(s)				99% Bandwidth (MHz)		
MHz	а	b	с	d	Highest	Lowest		

5785.0	<u>16.733</u>	<u>16.834</u>	<u>16.834</u>	<u>16.834</u>	16.834	16.733		
5825.0	<u>16.733</u>	<u>16.834</u>	<u>16.834</u>	<u>16.834</u>	16.834	16.733		
Traceability to	o Industry Rec	ognized Test	Methodologies	6				
			Work Inst	ruction: WI-03	MEASURING I	RF SPECTRUN	/ MASK	
		Mea	surement Unce	ertainty: ±2.81	dB			

<u>16.834</u>

16.834

16.834

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

16.834

<u>16.834</u>



Variant:	802.11ac-80	Duty Cycle (%):	97.8
Data Rate:	29.30 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results							
Test	Ме	asured 26 dB	Bandwidth (M	Hz)	26 dB Band		
Frequency		Ροι	rt(s)			width (MHz)	
MHz	а	b	С	d	Highest	Lowest	
5775.0	<u>101.403</u>	<u>98.196</u>	<u>96.994</u>	<u>98.196</u>	101.403	96.994	
Test	M	Measured 99% Bandwidth (MHz)			00% Band	width (MU-)	
Frequency		Ροι	rt(s)		99% Bandwidth (MHz)		
MHz	а	b	с	d	Highest	Lowest	
5775.0	<u>76.152</u>	<u>76.152</u>	<u>76.152</u>	<u>76.152</u>	76.152	76.152	

## Traceability to Industry Recognized Test Methodologies

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

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



Engineering Test Notes:			
TPC:	Not Applicable	Tested By:	SB
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
Data Rate:	6.50 MBit/s	Antenna Gain (dBi):	5.00
Variant:	802.11n HT-20	Duty Cycle (%):	99.0

Test	Me	asured 26 dB	Bandwidth (M	Hz)		26 dB Bandwidth (MHz)		
Frequency		Po	rt(s)			wiath (WHZ)		
MHz	а	b	С	d	Highest	Lowest		
5745.0	<u>23.848</u>	<u>23.547</u>	<u>23.547</u>	<u>23.547</u>	23.848	23.547		
5785.0	<u>23.848</u>	<u>23.447</u>	<u>23.747</u>	<u>23.447</u>	23.848	23.447		
5825.0	<u>24.048</u>	<u>23.747</u>	<u>23.547</u>	<u>23.747</u>	24.048	23.547		
Test	М	easured 99% I	Bandwidth (Mł	Hz)	99% Bandy	vidth (MHz)		
Frequency		Do	rt(a)		oo /o Banar	mater (mm 12)		

Test					99% Bandwidth (MHz)			
Frequency		Por	t(s)	)		55% Danawiath (Minz)		
MHz	а	b	С	d	Highest	Lowest		
5745.0	<u>18.136</u>	<u>18.036</u>	<u>18.036</u>	<u>18.036</u>	18.136	18.036		
5785.0	<u>18.136</u>	<u>18.036</u>	<u>18.036</u>	<u>18.036</u>	18.136	18.036		
5825.0	<u>18.136</u>	<u>18.136</u>	<u>18.136</u>	<u>18.136</u>	18.136	18.136		

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).



5795.0

36.673

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

Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.50 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results								
Test	Me	asured 26 dB	Bandwidth (M	Hz)	26 dB Bandwidth (MHz)			
Frequency		Ροι	rt(s)		20 UB Ballu	wiath (WHZ)		
MHz	а	b	С	d	Highest	Lowest		
5755.0	<u>42.685</u>	<u>42.886</u>	<u>42.886</u>	<u>42.886</u>	42.886	42.685		
5795.0	<u>42.886</u>	<u>42.886</u>	<u>43.086</u>	<u>42.886</u>	43.086	42.886		
Test	Measured 99% Bandwidth (MHz)							
Frequency		Ροι	rt(s)		99% Bandwidth (MHz)			
MHz	а	b	С	d	Highest	Lowest		
5755.0	<u>36.673</u>	<u>36.673</u>	<u>36.673</u>	<u>36.673</u>	36.673	36.673		

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

36.673

36.673

36.673

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

36.673

36.673



# 9.3. Power Spectral Density

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

#### **Test Procedure for Power Spectral Density**

The in-band power spectral density was measured using the test technique specified in KDB 789033. A 1 MHz measurement bandwidth was implemented for the analyzer sweep. Once the sweep is complete the analyzer trace data is downloaded and used for post processing purposes.

Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured separately. The Peak Power Spectral Density is the highest level found across the emission bandwidth. With multiple antenna port measurements the numerical analyzer data from each port is summed (å) and a link to this additional graphic is provided.

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

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

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

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

#### Limits Power Spectral Density

#### **Operating Frequency Band 5150-5250 MHz**

#### 15.407 (a)(1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

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

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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 transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.



#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11a	Duty Cycle (%):	99.0
Data Rate:	6 MBit/s	Antenna Gain (dBi):	5.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.90
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### **Test Measurement Results** Amplitude Measured Power Spectral Density Test Summation + Limit Margin DCCF (+0.04 Frequency Port(s) (dBm/MHz) dB) MHz d dBm/MHz dBm/MHz b dB а С 5180.0 10.033 <u>10.038</u> 15.117 17.0 -1.9 11.400 5200.0 10.289 10.539 11.409 15.488 17.0 -1.5 <u>15.399</u> 5240.0 10.225 10.330 17.0 -1.6 <u>11.378</u>

# Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 ±2.81 dB

#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11a	Duty Cycle (%):	99.0
Data Rate:	6 MBit/s	Antenna Gain (dBi):	5.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.90
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### **Test Measurement Results** Amplitude **Measured Power Spectral Density** Summation + Test Limit Margin Frequency DCCF (+0.04 Port(s) (dBm/MHz) dB) dBm/MHz MHz b d dBm/MHz dB а С 5180.0 11.400 11.400 17.0 -5.6 5200.0 <u>11.409</u> 11.409 17.0 -5.6 5240.0 11.378 17.0 11.378 -5.6

Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 ±2.81 dB

DCCF - Duty Cycle Correction Factor

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

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#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11ac-80	Duty Cycle (%):	97.8
Data Rate:	29.3 MBit/s	Antenna Gain (dBi):	5.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### **Test Measurement Results Measured Power Spectral Density** Amplitude Summation + Test Limit Margin DCCF (+0.09 Frequency Port(s) (dBm/MHz) dB) MHz b d dBm/MHz dBm/MHz dB а С 5210.0 <u>3.932</u> <u>5.171</u> <u>5.386</u> <u>9.239</u> 17.0 -7.7

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

#### Equipment Configuration for Power Spectral Density

Variant:	802.11ac-80	Duty Cycle (%):	97.8
Data Rate:	29.3 MBit/s	Antenna Gain (dBi):	5.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results								
Measured Power Spectral Density				Amplitude				
Test Frequency		Port(s) (dBm/MHz)			Summation + DCCF (+0.09 dB)	Limit	Margin	
MHz	a b c d			dBm/MHz	dBm/MHz	dB		
5210.0				<u>5.386</u>	<u>5.386</u>	17.0	-11.6	

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

DCCF - Duty Cycle Correction Factor

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



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#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-20	Duty Cycle (%):	99.0
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	5.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.90
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

# Test Measurement Results

Test	N	leasured Power	Spectral Densit	з <b>у</b>	Amplitude Summation +		
Frequency	Port(s) (dBm/MHz)				DCCF (+0.04 dB)	Limit	Margin
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5180.0	<u>9.926</u>	<u>10.404</u>	<u>11.389</u>		<u>15.341</u>	17.0	-1.6
5200.0	<u>10.101</u>	<u>10.671</u>	<u>11.858</u>		<u>15.704</u>	17.0	-1.3
5240.0	<u>10.000</u>	<u>10.213</u>	<u>11.594</u>		<u>15.375</u>	17.0	-1.6

#### Traceability to Industry Recognized Test Methodologies

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

#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-20	Duty Cycle (%):	99.0
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	5.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.90
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### **Test Measurement Results** Amplitude **Measured Power Spectral Density** Summation + Test Limit Frequency DCCF (+0.04 Port(s) (dBm/MHz) dB) dBm/MHz MHz b d dBm/MHz а С 5180.0 <u>11.389</u> 11.389 17.0 5200.0 17.0 <u>11.858</u> <u>11.858</u> 5240.0 <u>11.594</u> 11.594 17.0

Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 ±2.81 dB

Margin

dB

-5.6

-5.1

-5.4

DCCF - Duty Cycle Correction Factor

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

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#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	5.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.90
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### Test Measurement Results

Test	N	leasured Power	Spectral Densit	ty	Amplitude Summation +		
Frequency	Port(s) (dBm/MHz)				DCCF (+0.04 dB)	Limit	Margin
MHz	а	b	с	d	dBm/MHz	dBm/MHz	dB
5190.0	<u>7.363</u>	<u>7.718</u>	<u>8.719</u>		<u>12.563</u>	17.0	-4.4
5230.0	<u>7.138</u>	<u>7.530</u>	<u>8.769</u>		<u>12.498</u>	17.0	-4.5

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

#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	5.90
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.90
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### Test Measurement Results

lest measuren	lent Results						
Teet	N	leasured Power	Spectral Densit	Amplitude			
Test Frequency	Port(s) (dBm/MHz)				Summation + DCCF (+0.04 dB)	Limit	Margin
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5190.0				<u>8.719</u>	<u>8.719</u>	17.0	-8.3
5230.0				<u>8.769</u>	<u>8.769</u>	17.0	-8.2

#### Traceability to Industry Recognized Test Methodologies

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

DCCF - Duty Cycle Correction Factor

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



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#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11a	Duty Cycle (%):	99.0
Data Rate:	6 MBit/s	Antenna Gain (dBi):	5.80
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.80
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

## Test Measurement Results

Test	Ν	leasured Power	Spectral Densit	у	Amplitude Summation +		
Frequency	Port(s) (dBm/MHz)				DCCF (+0.04 dB)	Limit	Margin
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5260.0	<u>5.444</u>	<u>5.711</u>	<u>6.792</u>		<u>10.616</u>	11.0	-0.4
5300.0	<u>5.560</u>	<u>5.639</u>	<u>6.826</u>		<u>10.670</u>	11.0	-0.3
5320.0	<u>5.547</u>	<u>5.637</u>	<u>7.061</u>		<u>10.787</u>	11.0	-0.2

### Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 ±2.81 dB

#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11a	Duty Cycle (%):	99.0
Data Rate:	6 MBit/s	Antenna Gain (dBi):	5.80
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.80
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

## Test Measurement Results

Teet	N	leasured Power	Spectral Densit	Amplitude				
Test Frequency	Port(s) (dBm/MHz)				Summation + DCCF (+0.04 dB)	Limit	Margin	
MHz	а	b	с	d	dBm/MHz	dBm/MHz	dB	
5260.0				<u>6.792</u>	<u>6.792</u>	11.0	-4.2	
5300.0				<u>6.826</u>	<u>6.826</u>	11.0	-4.2	
5320.0				<u>7.061</u>	<u>7.061</u>	11.0	-3.9	

#### Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 ±2.81 dB

DCCF - Duty Cycle Correction Factor

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

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#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11ac-80	Duty Cycle (%):	97.8
Data Rate:	29.3 MBit/s	Antenna Gain (dBi):	5.80
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results							
Test	N	leasured Power	Amplitude				
Test Frequency	Port(s) (dBm/MHz)			Summation + DCCF (+0.09 dB)	Limit	Margin	
MHz	a b c d				dBm/MHz	dBm/MHz	dB
5290.0	<u>-0.107</u>	<u>0.672</u>	<u>1.613</u>		<u>5.158</u>	11.0	-5.8

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

#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11ac-80	Duty Cycle (%):	97.8
Data Rate:			
		Antenna Gain (dBi):	5.60
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurem	ent Results						
Test	Measured Power Spectral Density						
Frequency		Port(s) (dBm/MHz)			Summation + DCCF (+0.09 dB)	Limit	Margin
MHz	а	a b c d			dBm/MHz	dBm/MHz	dB
5290.0				<u>1.613</u>	<u>1.613</u>	11.0	-9.4

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

DCCF - Duty Cycle Correction Factor

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

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#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-20	Duty Cycle (%):	99.0
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	5.80
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.80
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### **Test Measurement Results** Amplitude Measured Power Spectral Density Summation + Test Limit Margin DCCF (+0.04 Frequency Port(s) (dBm/MHz) dB) MHz d dBm/MHz dBm/MHz dB b а С 5260.0 5.950 <u>5.063</u> 10.840 11.0 -0.1 <u>6.974</u> 5300.0 5.712 5.591 7.002 10.834 11.0 -0.1 5320.0 11.0 -0.7 <u>5.681</u> <u>4.726</u> 5.988 10.248

#### Traceability to Industry Recognized Test Methodologies

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

#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-20	Duty Cycle (%):	99.0
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	5.80
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.80
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### **Test Measurement Results** Amplitude **Measured Power Spectral Density** Summation + Test Limit Margin Frequency DCCF (+0.04 Port(s) (dBm/MHz) dB) dBm/MHz MHz b d dBm/MHz dB а С 5260.0 <u>6.974</u> <u>6.974</u> 11.0 -4.0 5300.0 7.002 7.002 11.0 -4.0 5320.0 <u>5.988</u> <u>5.988</u> 11.0 -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

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

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#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	5.80
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.80
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### Test Measurement Results

Test	N	leasured Power	Spectral Densit	у	Amplitude Summation +		
Frequency	/ Port(s) (dBm/MHz)			DCCF (+0.04 dB)	Limit	Margin	
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5270.0	<u>2.474</u>	<u>2.880</u>	<u>4.601</u>		<u>7.970</u>	11.0	-3.0
5310.0	<u>2.963</u>	<u>3.164</u>	<u>4.289</u>		<u>8.134</u>	11.0	-2.8

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

#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	5.80
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.80
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### Test Measurement Results

Test measurement Results							
Teet	N	leasured Power	Spectral Densit	Amplitude			
Test Frequency	Port(s) (dBm/MHz)			Summation + DCCF (+0.04 dB)	Limit	Margin	
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5270.0				<u>4.601</u>	<u>4.601</u>	11.0	-6.4
5310.0				<u>4.289</u>	<u>4.289</u>	11.0	-6.7

#### Traceability to Industry Recognized Test Methodologies

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

DCCF - Duty Cycle Correction Factor

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

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#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11a	Duty Cycle (%):	99.0
Data Rate:	6 MBit/s	Antenna Gain (dBi):	5.60
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results							
Test	N	leasured Power	Spectral Densit	Amplitude Summation +			
Frequency	Port(s)				DCCF (+0.04	Limit	Margin
MHz	а	b	с	d	dBm/MHz	dBm/MHz	dB
5500.0	<u>5.239</u>	<u>5.686</u>	<u>6.996</u>		<u>10.773</u>	11.0	-0.2
5580.0	<u>4.878</u>	<u>5.398</u>	<u>6.227</u>		<u>10.164</u>	11.0	-0.8
5720.0	<u>5.112</u>	<u>5.040</u>	<u>5.052</u>		<u>9.801</u>	11.0	-1.2

#### Traceability to Industry Recognized Test Methodologies

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

#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11a	Duty Cycle (%):	99.0
Data Rate:	6 MBit/s	Antenna Gain (dBi):	5.60
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### **Test Measurement Results** Amplitude **Measured Power Spectral Density** Summation + Test Limit Margin Frequency DCCF (+0.04 Port(s) (dBm/MHz) dB) dBm/MHz dB MHz b d dBm/MHz а С 5500.0 <u>6.996</u> <u>6.996</u> 11.0 -4.0 5580.0 11.0 <u>6.227</u> <u>6.227</u> -4.8 5720.0 5.052 <u>5.052</u> 11.0 -5.9

Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 ±2.81 dB

DCCF - Duty Cycle Correction Factor

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

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#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11ac-80	Duty Cycle (%):	97.8
Data Rate:	29.3 MBit/s	Antenna Gain (dBi):	5.60
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

## Test Measurement Results

Test	Measured Power Spectral Density				Amplitude Summation +			
Frequency		Port(s) (d	IBm/MHz)		DCCF (+0.09 dB)	Limit	Margin	
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB	
5530.0	<u>-0.630</u>	<u>0.120</u>	<u>2.062</u>		<u>5.333</u>	11.0	-5.6	
5610.0	<u>-0.693</u>	<u>-0.285</u>	<u>1.190</u>		<u>4.847</u>	11.0	-6.1	
5690.0	<u>-1.062</u>	<u>-0.760</u>	<u>0.199</u>		<u>4.159</u>	11.0	-6.8	

## Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 ±2.81 dB

## **Equipment Configuration for Power Spectral Density**

			1
Variant:	802.11ac-80	Duty Cycle (%):	97.8
Data Rate:	29.3 MBit/s	Antenna Gain (dBi):	5.60
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

# Test Measurement Results \_\_\_\_\_ Measured Power Sp

Test Frequency	Measured Power Spectral Density Port(s) (dBm/MHz)				Amplitude Summation + DCCF (+0.09 dB)	Limit	Margin
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5530.0				<u>2.062</u>	<u>2.062</u>	11.0	-8.9
5610.0				<u>1.190</u>	<u>1.190</u>	11.0	-9.8
5690.0				<u>0.199</u>	<u>0.199</u>	11.0	-10.8

#### Traceability to Industry Recognized Test Methodologies

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

DCCF - Duty Cycle Correction Factor

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#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-20	Duty Cycle (%):	99.0
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	5.60
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### **Test Measurement Results** Amplitude Measured Power Spectral Density Summation + Test Limit Margin DCCF (+0.04 Frequency Port(s) (dBm/MHz) dB) MHz d dBm/MHz dBm/MHz dB b а С <u>5.901</u> 5500.0 10.586 <u>5.828</u> <u>6.210</u> 11 0 -0.4 5580.0 3.771 4.741 5.586 9.432 11.0 -1.5 5720.0 11.0 -1.0 5.328 4.994 5.536 <u>9.996</u>

## Traceability to Industry Recognized Test Methodologies

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

#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-20	Duty Cycle (%):	99.0
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	5.60
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### **Test Measurement Results** Amplitude **Measured Power Spectral Density** Summation + Test Limit Frequency DCCF (+0.04 Port(s) (dBm/MHz) dB) dBm/MHz MHz b d dBm/MHz а С 5500.0 <u>6.210</u> <u>6.210</u> 11.0 5580.0 5.586 <u>5.586</u> 11.0 5720.0 <u>5.536</u> <u>5.536</u> 11.0

Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 ±2.81 dB

Margin

dB

-4.8

-5.4

-5.5

DCCF - Duty Cycle Correction Factor

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

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#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	5.60
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

## Test Measurement Results

Test	N	leasured Power	Spectral Densit	Amplitude Summation +			
Frequency	Port(s) (dBm/MHz)				DCCF (+0.04 dB)	Limit	Margin
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5510.0	<u>2.554</u>	<u>2.870</u>	<u>4.121</u>		<u>7.682</u>	11.0	-3.3
5550.0	<u>2.353</u>	<u>2.756</u>	4.347		<u>8.026</u>	11.0	-2.9
5710.0	<u>2.641</u>	<u>2.443</u>	<u>2.806</u>		<u>7.099</u>	11.0	-3.9

### Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 ±2.81 dB

#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	5.60
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.60
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

## Test Measurement Results

Test	N	leasured Power	Spectral Densit	Amplitude Summation +			
Frequency	Port(s) (dBm/MHz)			DCCF (+0.04 dB)	Limit	Margin	
MHz	а	b	с	d	dBm/MHz	dBm/MHz	dB
5510.0				<u>4.121</u>	<u>4.121</u>	11.0	-6.9
5550.0				<u>4.347</u>	<u>4.347</u>	11.0	-6.7
5710.0				<u>2.806</u>	<u>2.806</u>	11.0	-8.2

#### Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 ±2.81 dB

DCCF - Duty Cycle Correction Factor

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

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#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11a	Duty Cycle (%):	99.0
Data Rate:	6 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### **Test Measurement Results** Amplitude Measured Power Spectral Density Summation + Test Limit Margin DCCF (+0.04 Frequency Port(s) (dBm/MHz) dB) MHz d dBm/MHz dBm/MHz b dB а С 5745.0 <u>6.710</u> 6.429 11.114 33.0 <u>6.104</u> -21.9 5785.0 6.517 5.909 5.947 10.817 33.0 -22.2 5825.0 5.599 33.0 <u>6.268</u> <u>5.651</u> 10.467 -22.5

#### Traceability to Industry Recognized Test Methodologies

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

#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11a	Duty Cycle (%):	99.0
Data Rate:	6 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### **Test Measurement Results** Amplitude **Measured Power Spectral Density** Summation + Test Limit Margin Frequency DCCF (+0.04 Port(s) (dBm/MHz) dB) dBm/MHz MHz b d dBm/MHz dB а С 5745.0 <u>6.710</u> <u>6.710</u> 33.0 -26.3 5785.0 <u>6.517</u> <u>6.517</u> 33.0 -26.5 5825.0 33.0 6.268 <u>6.268</u> -26.7

Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 ±2.81 dB

DCCF - Duty Cycle Correction Factor

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

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#### Equipment Configuration for Power Spectral Density

Variant:	802.11ac-80	Duty Cycle (%):	97.8
Data Rate:	29.3 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

## Test Measurement Results

Test	N	Measured Power Spectral Density					
Frequency	Port(s) (dBm/MHz)			Summation + DCCF (+0.09 dB)	Limit	Margin	
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5775.0	<u>1.491</u>	<u>0.699</u>	<u>0.026</u>		<u>8.310</u>	33.00	-24.7

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

#### Equipment Configuration for Power Spectral Density

Engineering Test Notes:	•		-
TPC: 1	Not Applicable	Tested By:	SB
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
Data Rate: 2	29.3 MBit/s	Antenna Gain (dBi):	5.00
Variant:	802.11ac-80	Duty Cycle (%):	97.8

Test Measurement Results							
Test	N	leasured Power	Spectral Densit	Amplitude			
Test Frequency	Port(s) (dBm/MHz)			Summation + DCCF (+0.09 dB)	Limit	Margin	
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5775.0				<u>1.491</u>	<u>1.491</u>	33.00	-31.5

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

DCCF - Duty Cycle Correction Factor

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



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#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-20	Duty Cycle (%):	99.0
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### **Test Measurement Results** Amplitude Measured Power Spectral Density Summation + Test Limit Margin DCCF (+0.04 Frequency Port(s) (dBm/MHz) dB) MHz d dBm/MHz dBm/MHz b dB а С 5745.0 <u>6.640</u> <u>7.170</u> 6.471 11.499 33.0 -21.5 5785.0 7.188 6.357 6.071 11.139 33.0 -21.9 5825.0 <u>6.835</u> 33.0 <u>6.210</u> 6.244 <u>11.124</u> -21.9

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

#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-20	Duty Cycle (%):	99.0
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

#### **Test Measurement Results** Amplitude **Measured Power Spectral Density** Summation + Test Limit Margin Frequency DCCF (+0.04 Port(s) (dBm/MHz) dB) dBm/MHz MHz b d dBm/MHz dB а С 5745.0 <u>7.170</u> 7.170 33.0 -25.8 5785.0 7.188 <u>7.188</u> 33.0 -25.8 5825.0 6.835 33.0 <u>6.835</u> -26.2

Traceability to Industry Recognized Test Methodologies

 Work Instruction:
 WI-03 MEASURING RF SPECTRUM MASK

 Measurement Uncertainty:
 ±2.81 dB

DCCF - Duty Cycle Correction Factor

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

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#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurem	Test Measurement Results						
Test	est Measured Power Spectral Density		y	Amplitude Summation +	Limit	Margin	
Frequency		Port(s) (d	) (dBm/MHz)		DCCF (+0.04 dB)	Linin	wargin
MHz	а	b	с	d	dBm/MHz	dBm/MHz	dB
5755.0	<u>4.161</u>	<u>3.678</u>	<u>3.984</u>		<u>8.499</u>	33.0	-24.5
5795.0	<u>3.879</u>	<u>3.534</u>	<u>3.426</u>		<u>8.035</u>	33.0	-25.0

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

#### **Equipment Configuration for Power Spectral Density**

Variant:	802.11n HT-40	Duty Cycle (%):	98.7
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y)(dB):	2.00
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurem	Test Measurement Results						
Test	Measured Power Spectral Density				Amplitude Summation + DCCF (+0.04 dB)	Limit	Margin
Test Frequency	Port(s) (dBm/MHz)						
MHz	а	b	С	d	dBm/MHz	dBm/MHz	dB
5755.0				<u>4.161</u>	<u>4.161</u>	33.0	-28.8
5795.0				<u>3.879</u>	<u>3.879</u>	33.0	-29.1

Traceability to Industry Recognized Test Methodologies

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

DCCF - Duty Cycle Correction Factor

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

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## 9.4. Transmit Power Control (TPC)

Conducted Test Conditions for Transmit Power Control (TPC)					
Standard:	FCC CFR 47:15.407	CC CFR 47:15.407         Ambient Temp. (°C):         20.0 - 24.5			
Test Heading:	Transmit Power Control (TPC) Rel. Humidity (%): 32 - 45				
Standard Section(s):	15.247 (h) Pressure (mBars): 999 - 1001				
	See Section "Normative References" KDB 789033 - D02 DTS General UNII Test Procedures KDB 662911 - Measurement of Transmitters with Multiple Output, MIMO, Smart Antenna				

#### **Test Procedure for Transmit Power Control**

Transmit power control (TPC). U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

Transmit Power Control measurement test setup diagram is provided in Section "Test Equipment Measurement Setup \ Conducted RF Emissions".

From the Peak Transmit Power section in this document it was found that the device EIRP was greater than 500 mW therefore Transmit Power Control implementation is required. Testing was performed and the unit TPC function was greater than 6 dB.

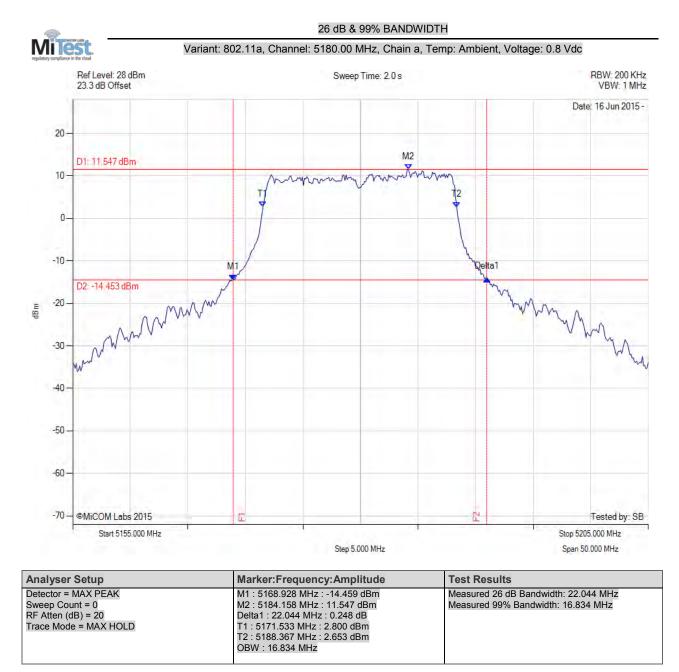
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# A. APPENDIX - GRAPHICAL IMAGES

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

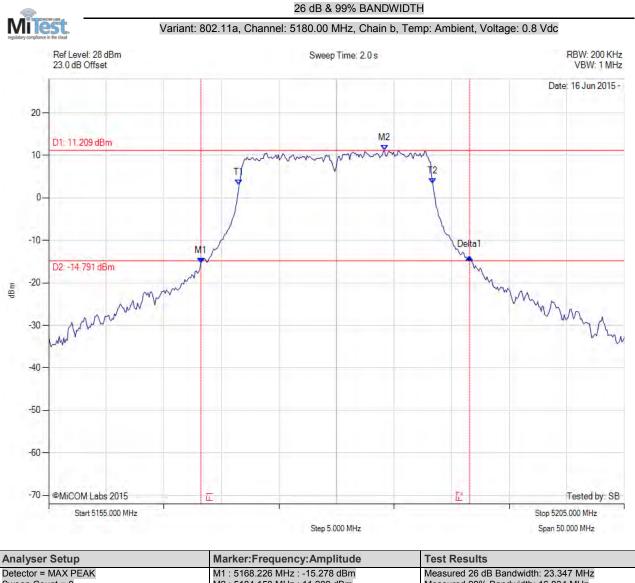


#### back to matrix

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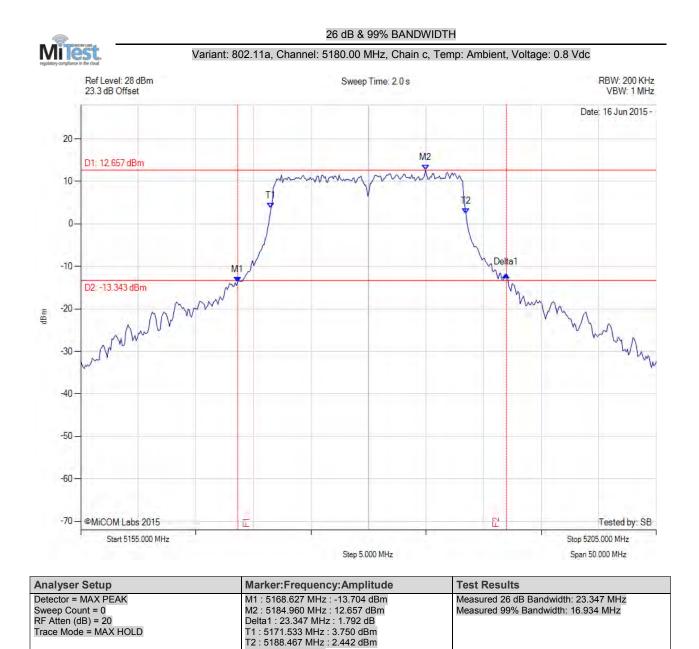
Analyser Setup	Marker:Frequency:Amplitude	Test Results	
Detector = MAX PEAK	M1 : 5168.226 MHz : -15.278 dBm	Measured 26 dB Bandwidth: 23.347 MHz	
Sweep Count = 0	M2 : 5184.158 MHz : 11.209 dBm	Measured 99% Bandwidth: 16.834 MHz	
RF Atten (dB) = 20	Delta1 : 23.347 MHz : 1.350 dB		
Trace Mode = MAX HOLD	T1 : 5171.533 MHz : 2.999 dBm		
	T2 : 5188.367 MHz : 3.373 dBm		
	OBW : 16.834 MHz		

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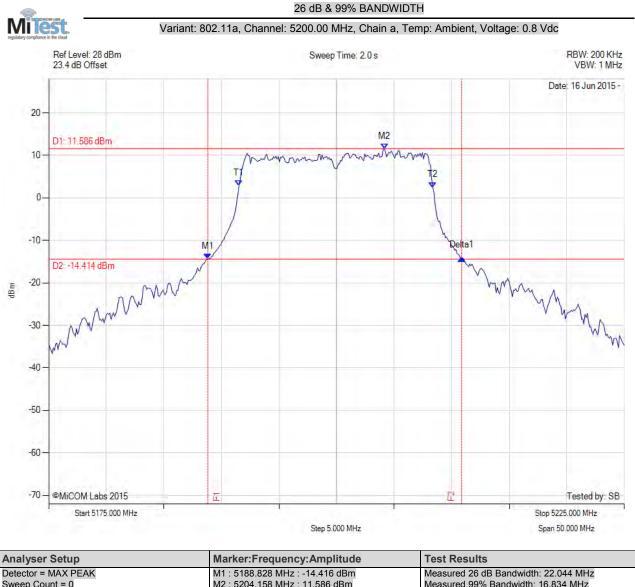
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OBW : 16.934 MHz



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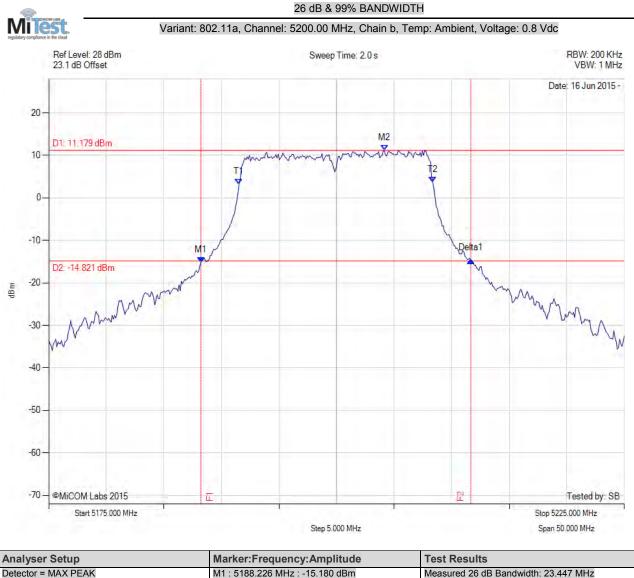
Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK	M1 : 5188.828 MHz : -14.416 dBm	Measured 26 dB Bandwidth: 22.044 MHz
Sweep Count = 0	M2 : 5204.158 MHz : 11.586 dBm	Measured 99% Bandwidth: 16.834 MHz
RF Atten (dB) = 20	Delta1 : 22.044 MHz : 0.291 dB	
Trace Mode = MAX HOLD	T1 : 5191.533 MHz : 2.956 dBm	
	T2:5208.367 MHz:2.489 dBm	
	OBW : 16.834 MHz	

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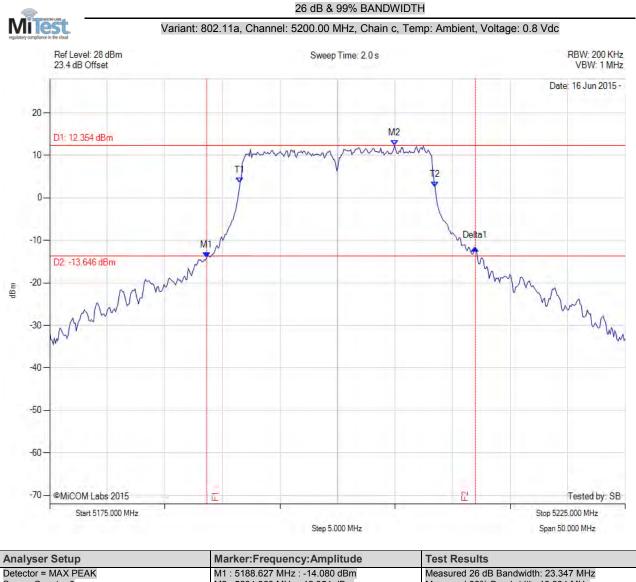
Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK	M1 : 5188.226 MHz : -15.180 dBm	Measured 26 dB Bandwidth: 23.447 MHz
Sweep Count = 0	M2 : 5204.158 MHz : 11.179 dBm	Measured 99% Bandwidth: 16.834 MHz
RF Atten (dB) = 20	Delta1 : 23.447 MHz : 0.431 dB	
Trace Mode = MAX HOLD	T1 : 5191.533 MHz : 3.264 dBm	
	T2 : 5208.367 MHz : 3.638 dBm	
	OBW : 16.834 MHz	

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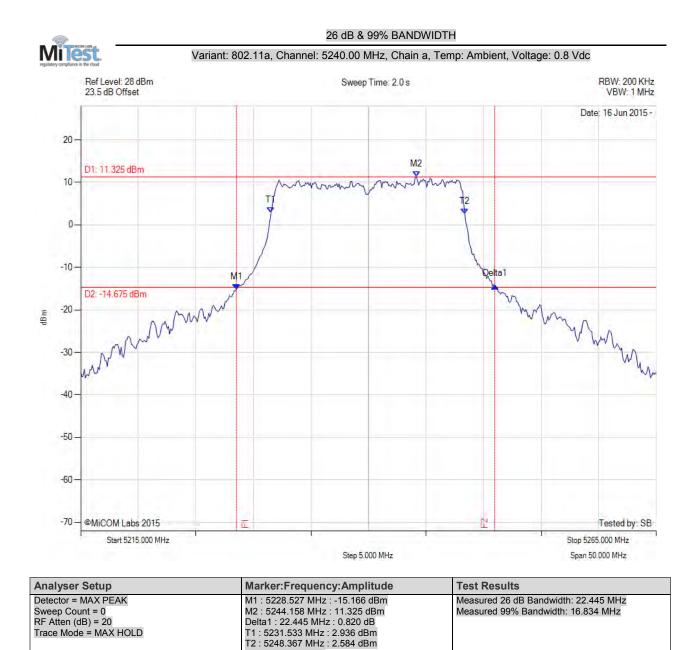
Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK	M1 : 5188.627 MHz : -14.080 dBm	Measured 26 dB Bandwidth: 23.347 MHz
Sweep Count = 0	M2 : 5204.960 MHz : 12.354 dBm	Measured 99% Bandwidth: 16.934 MHz
RF Atten (dB) = 20	Delta1 : 23.347 MHz : 2.290 dB	
Trace Mode = MAX HOLD	T1 : 5191.533 MHz : 3.532 dBm	
	T2 : 5208.467 MHz : 2.611 dBm	
	OBW : 16.934 MHz	

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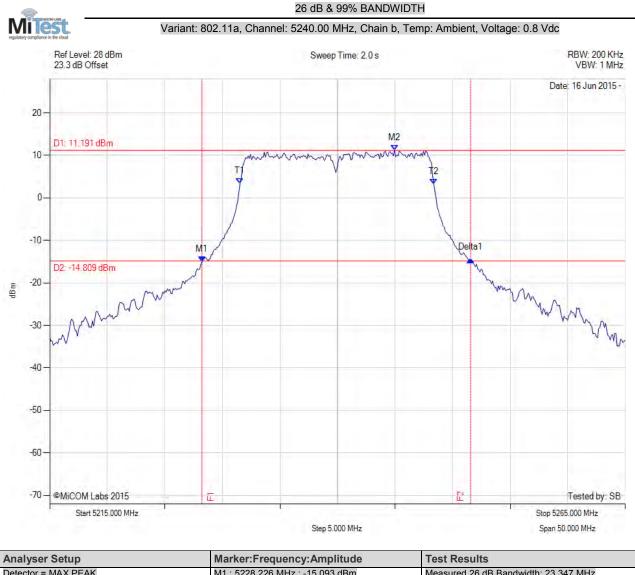
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OBW : 16.834 MHz



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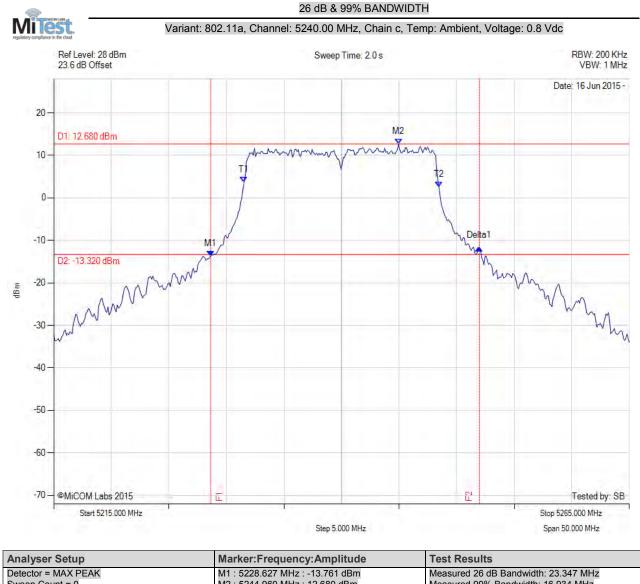
Analyser Setup	Marker:Frequency:Amplitude	Test Results	
Detector = MAX PEAK	M1 : 5228.226 MHz : -15.093 dBm	Measured 26 dB Bandwidth: 23.347 MHz	
Sweep Count = 0	M2 : 5244.960 MHz : 11.191 dBm	Measured 99% Bandwidth: 16.834 MHz	
RF Atten (dB) = 20	Delta1 : 23.347 MHz : 0.616 dB		
Trace Mode = MAX HOLD	T1 : 5231.533 MHz : 3.445 dBm		
	T2 : 5248.367 MHz : 3.278 dBm		
	OBW : 16.834 MHz		
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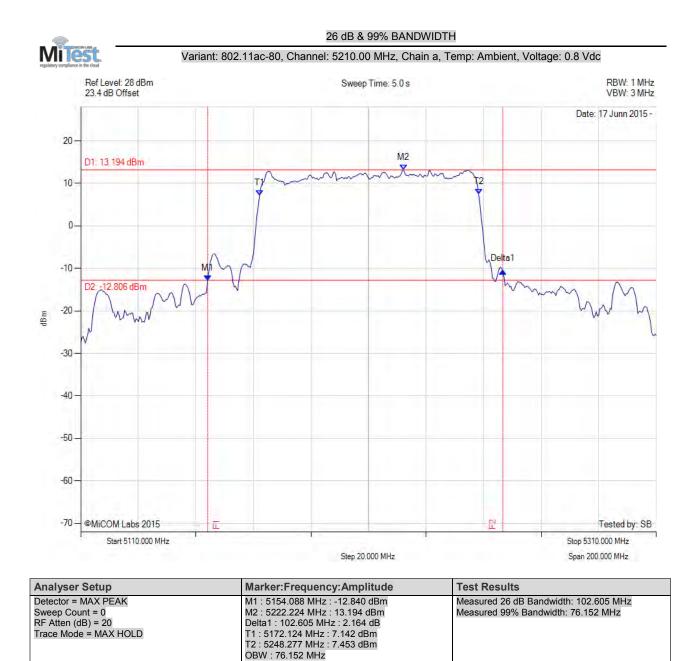
Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK	M1 : 5228.627 MHz : -13.761 dBm	Measured 26 dB Bandwidth: 23.347 MHz
Sweep Count = 0	M2 : 5244.960 MHz : 12.680 dBm	Measured 99% Bandwidth: 16.934 MHz
RF Atten (dB) = 20	Delta1 : 23.347 MHz : 2.028 dB	
Trace Mode = MAX HOLD	T1 : 5231.533 MHz : 3.695 dBm	
	T2 : 5248.467 MHz : 2.503 dBm	
	OBW : 16.934 MHz	

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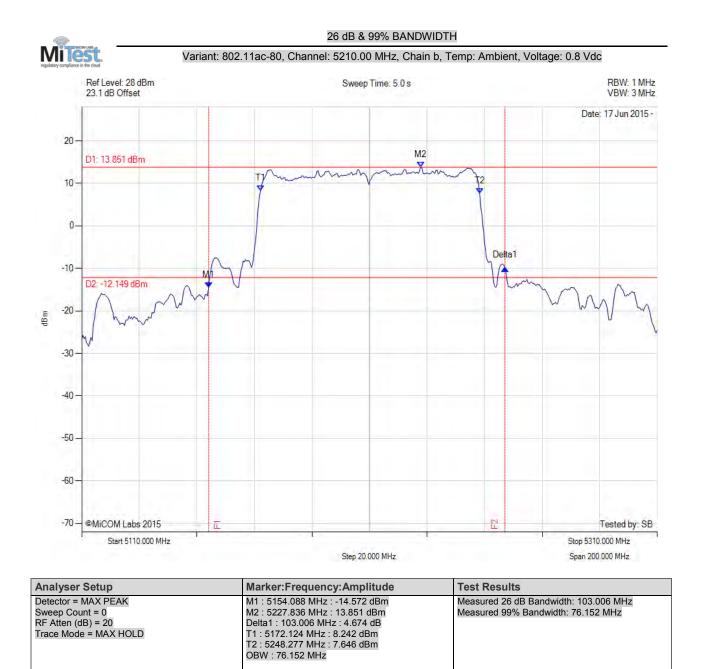


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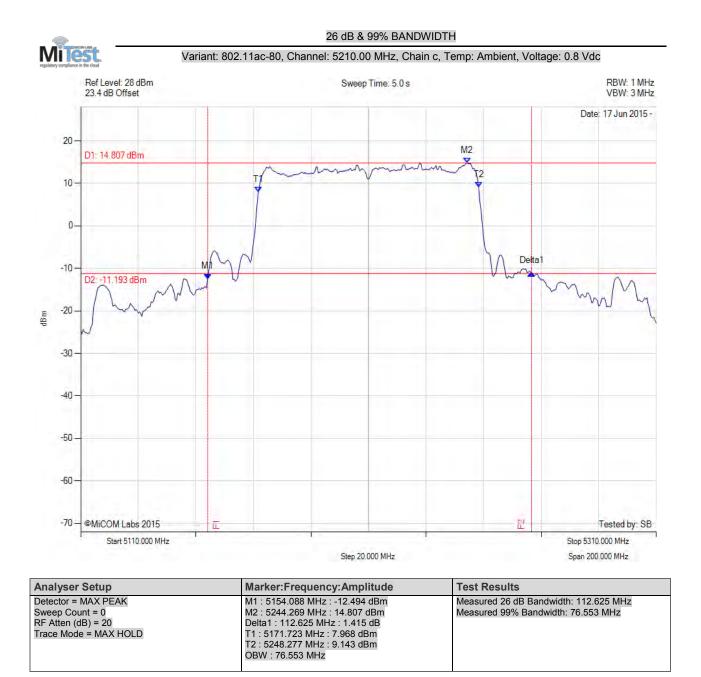


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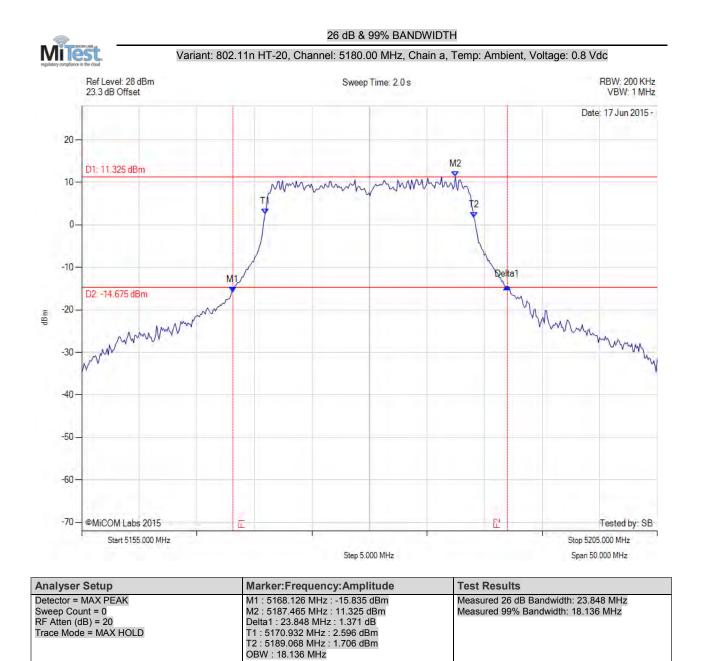


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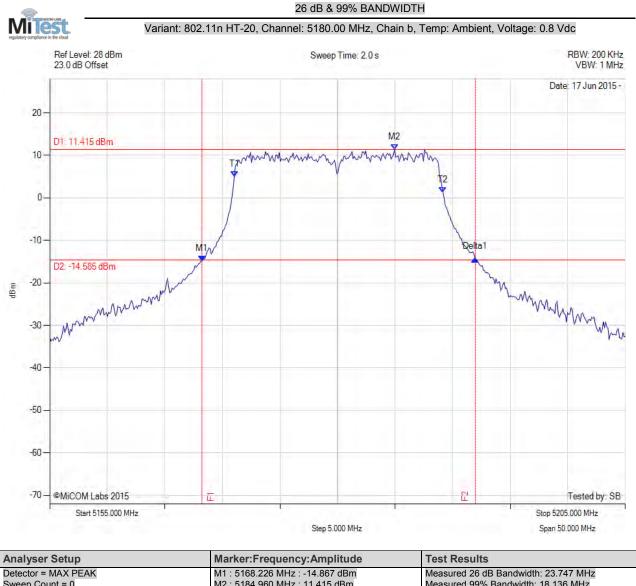


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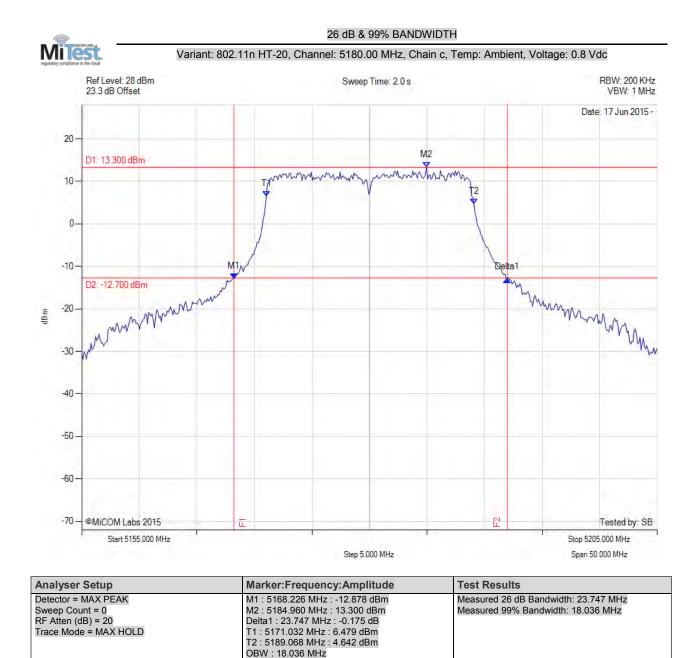
Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK	M1 : 5168.226 MHz : -14.867 dBm	Measured 26 dB Bandwidth: 23.747 MHz
Sweep Count = 0	M2 : 5184.960 MHz : 11.415 dBm	Measured 99% Bandwidth: 18.136 MHz
RF Atten (dB) = 20	Delta1 : 23.747 MHz : 0.474 dB	
Trace Mode = MAX HOLD	T1 : 5171.032 MHz : 4.980 dBm	
	T2 : 5189.168 MHz : 1.323 dBm	
	OBW : 18.136 MHz	

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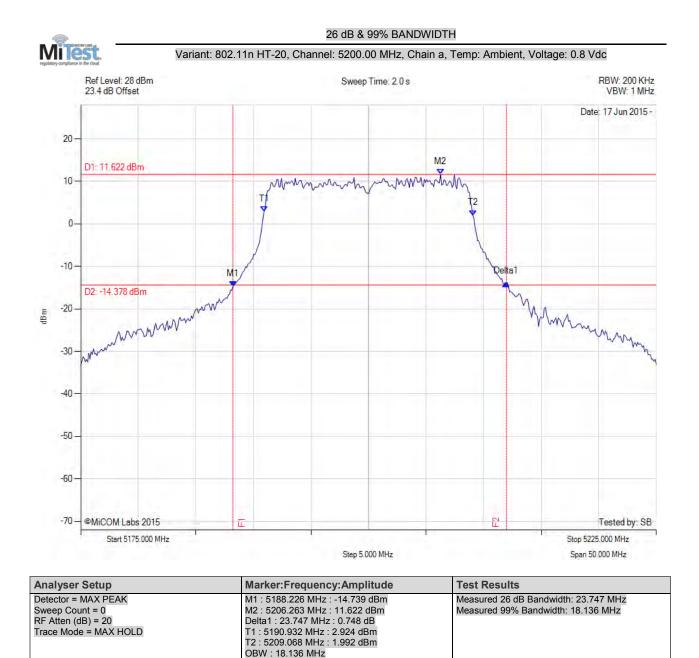


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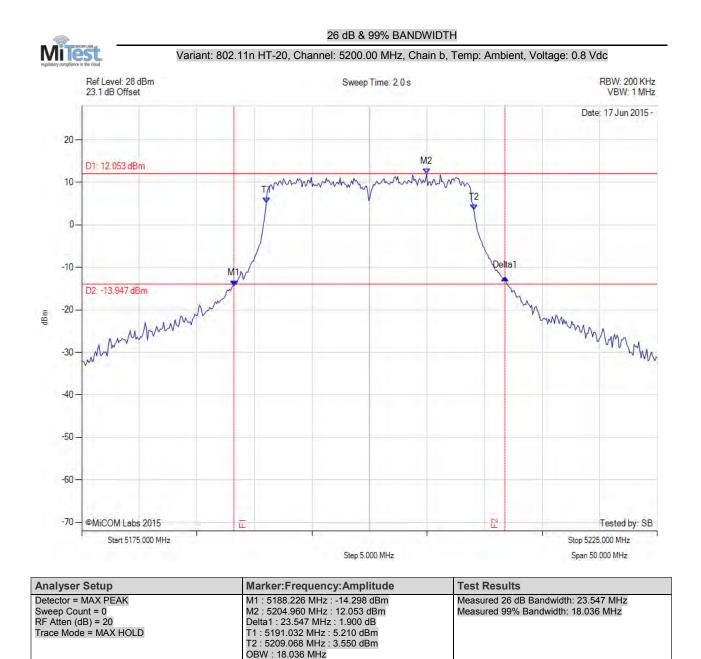


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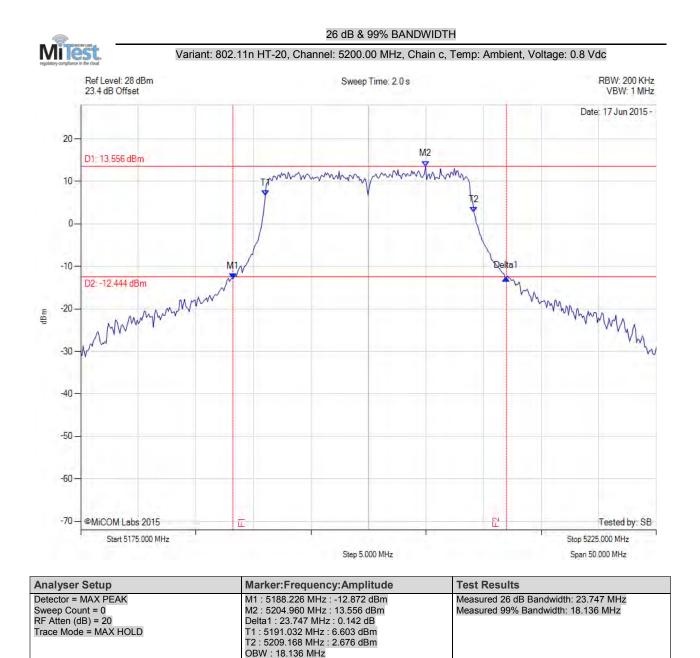


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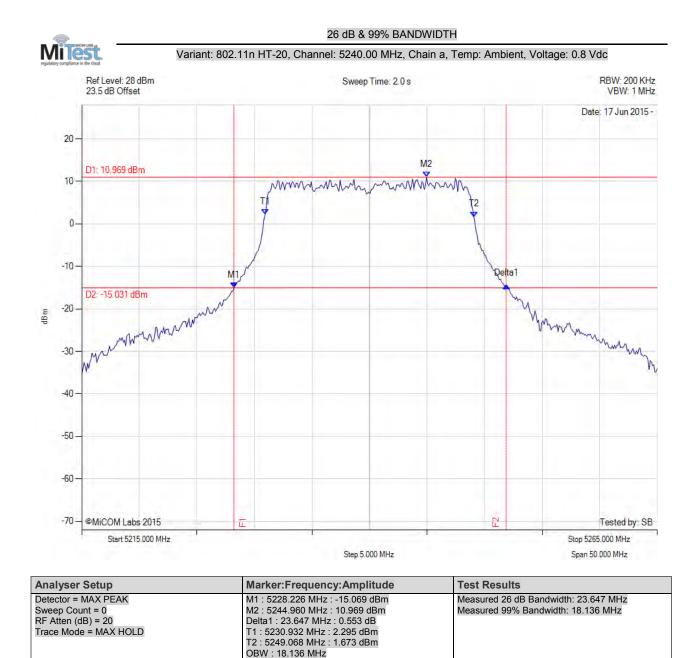


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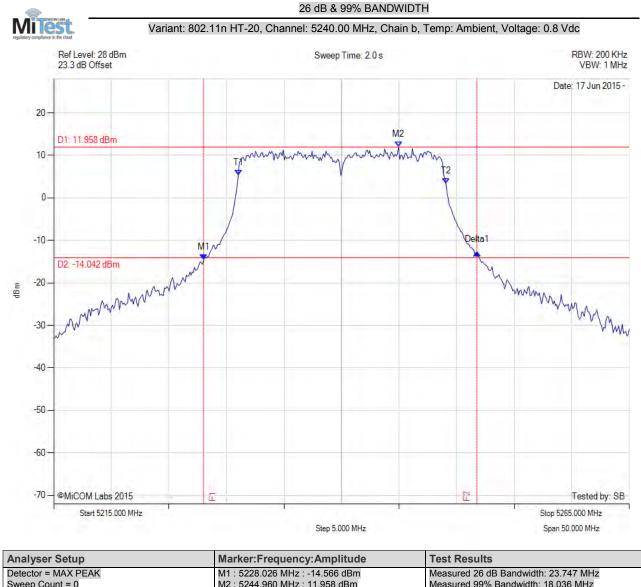


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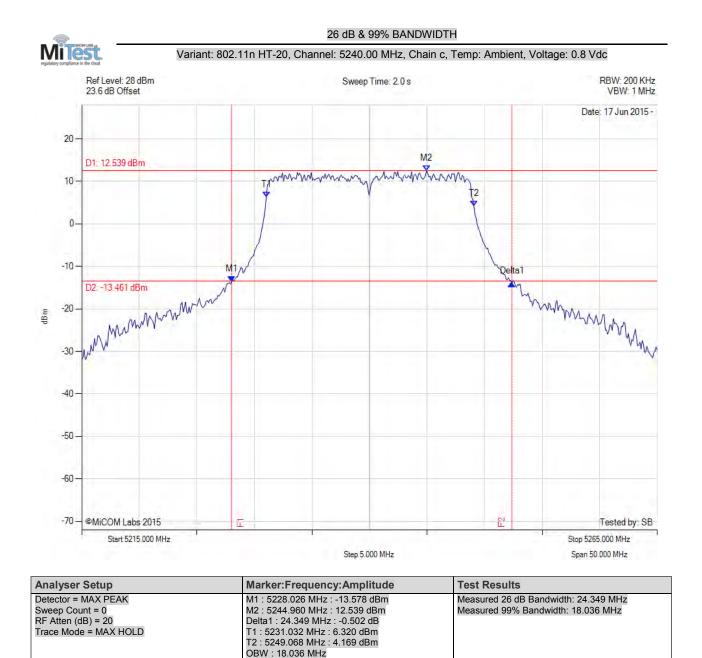
Analyser Setup	Marker:Frequency:Amplitude	Test Results	
Detector = MAX PEAK	M1 : 5228.026 MHz : -14.566 dBm	Measured 26 dB Bandwidth: 23.747 MHz	
Sweep Count = 0	M2 : 5244.960 MHz : 11.958 dBm	Measured 99% Bandwidth: 18.036 MHz	
RF Atten (dB) = 20	Delta1 : 23.747 MHz : 1.737 dB		
Trace Mode = MAX HOLD	T1 : 5231.032 MHz : 5.348 dBm		
	T2 : 5249.068 MHz : 3.416 dBm		
	OBW : 18.036 MHz		

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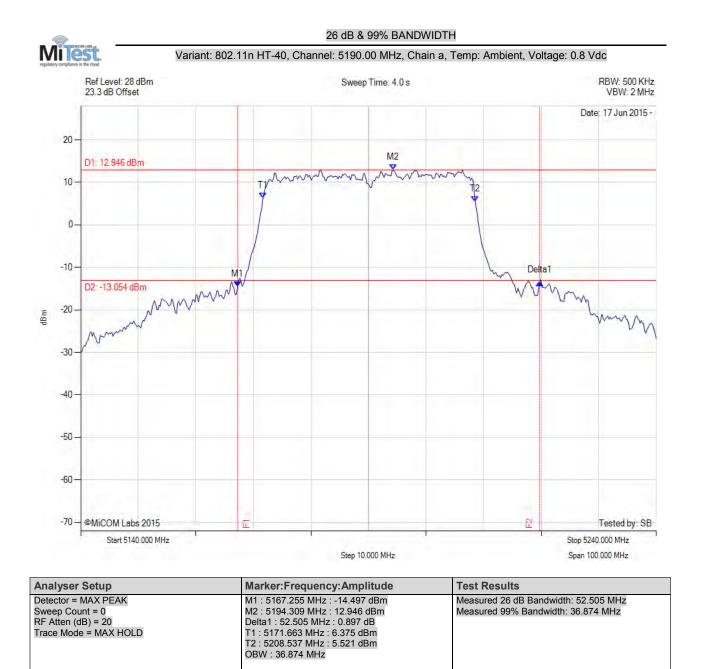


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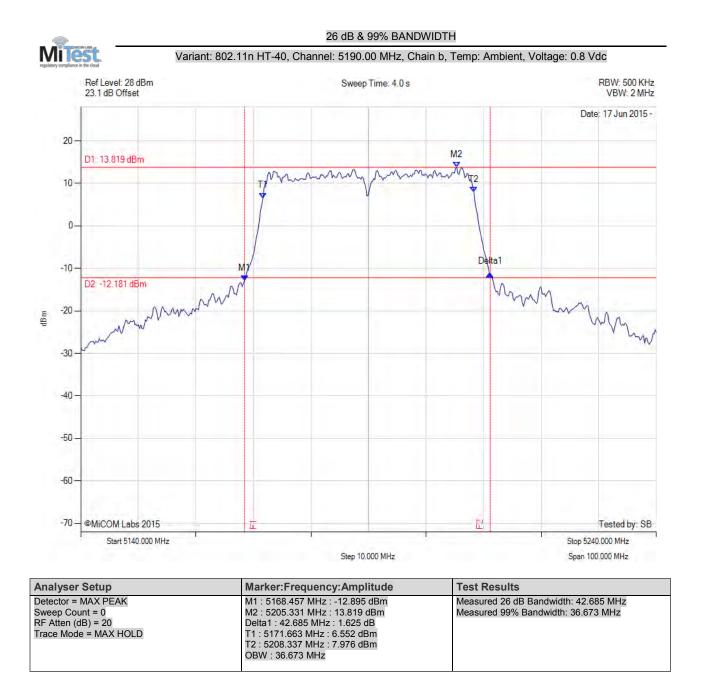


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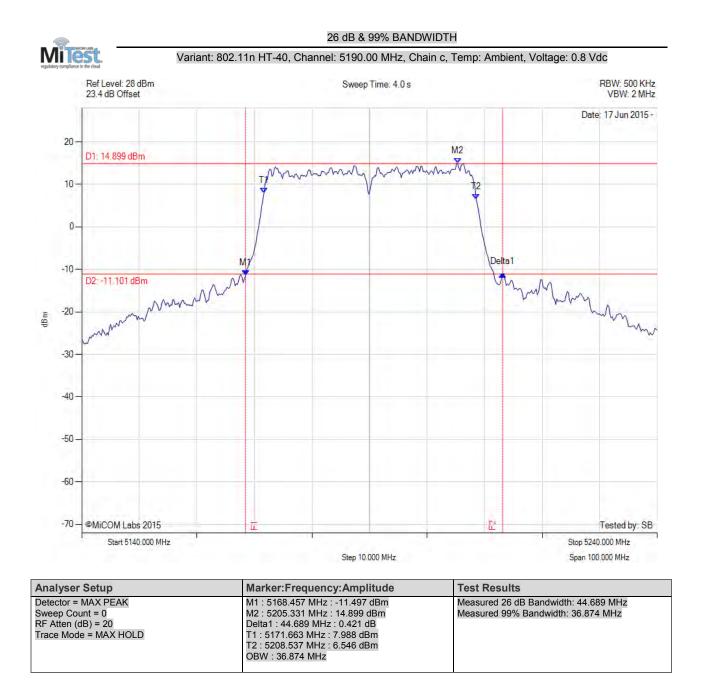


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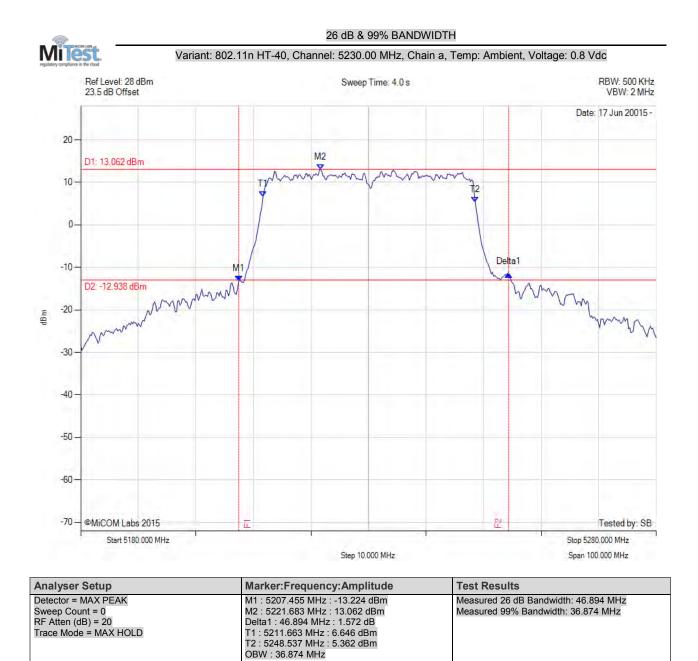


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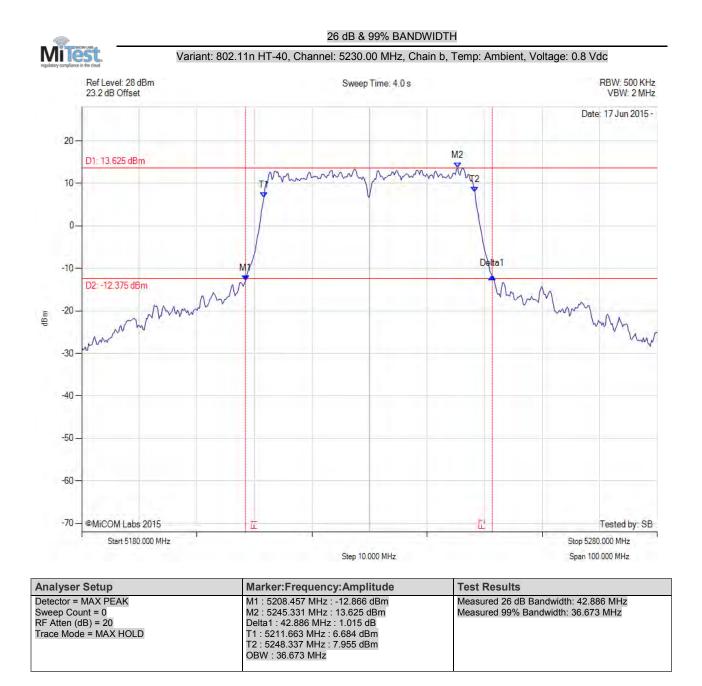


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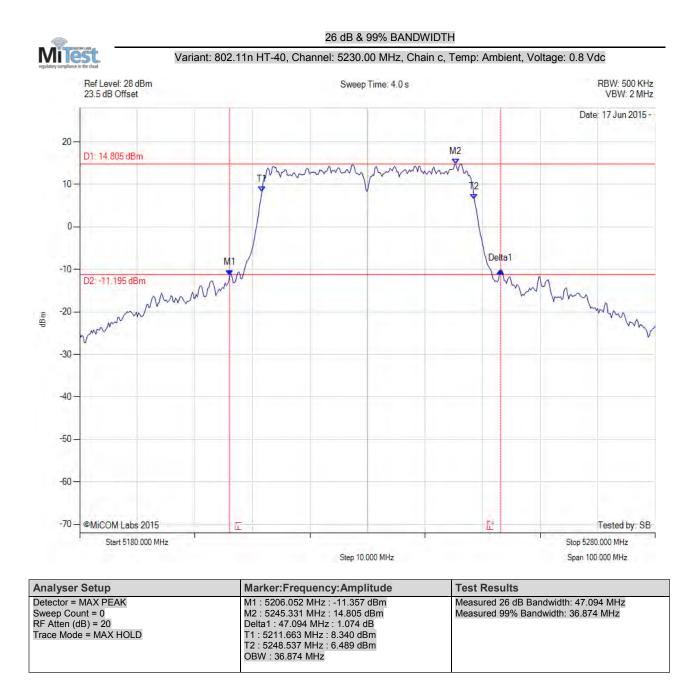


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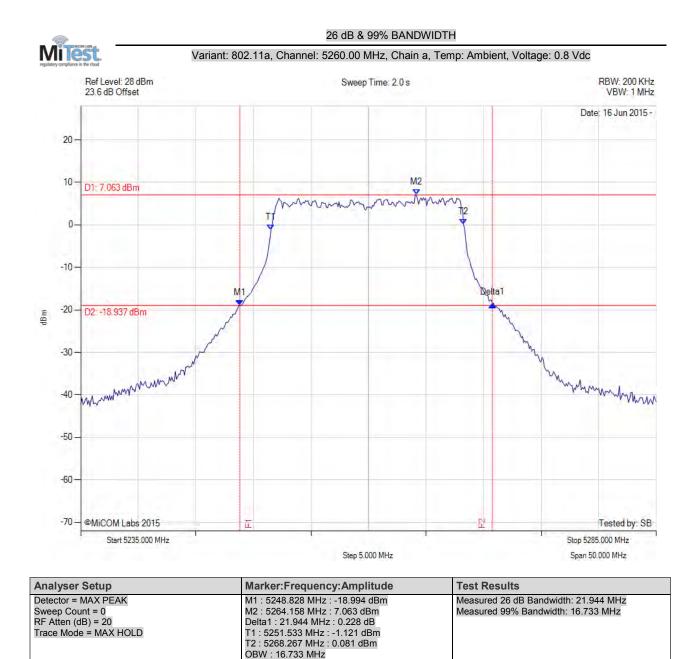


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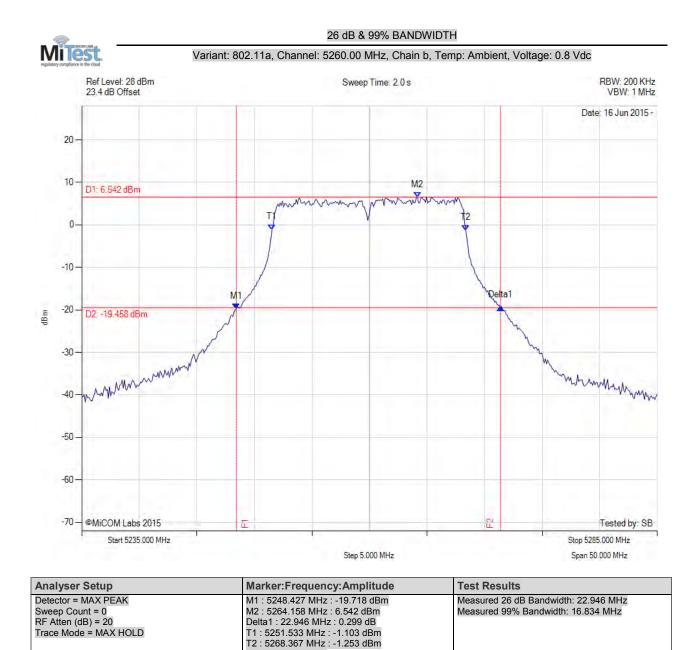


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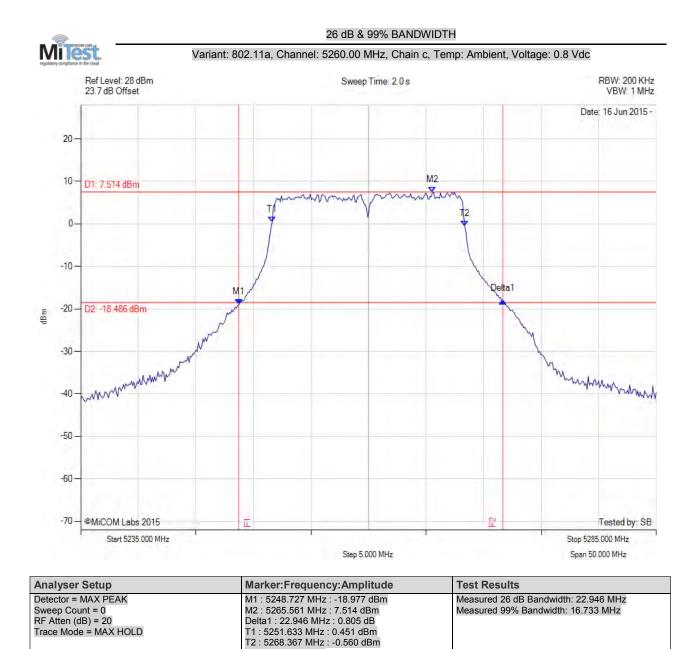
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OBW : 16.834 MHz



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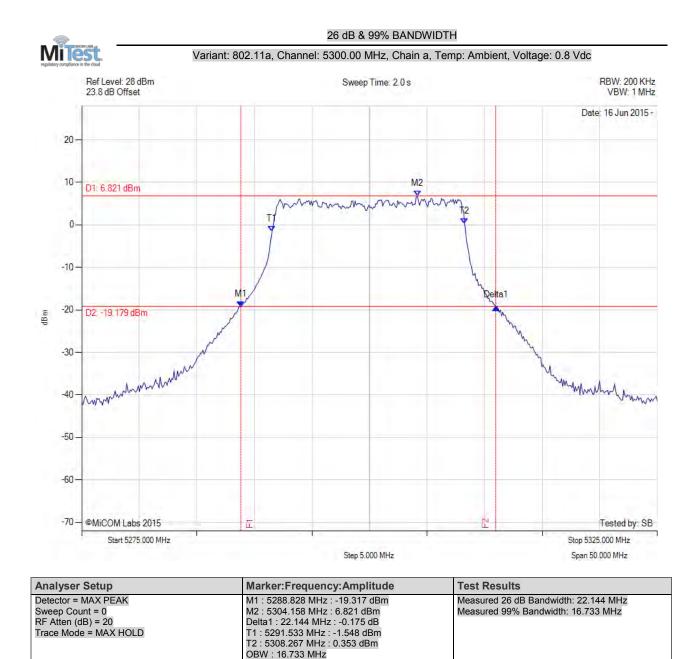
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OBW : 16.733 MHz



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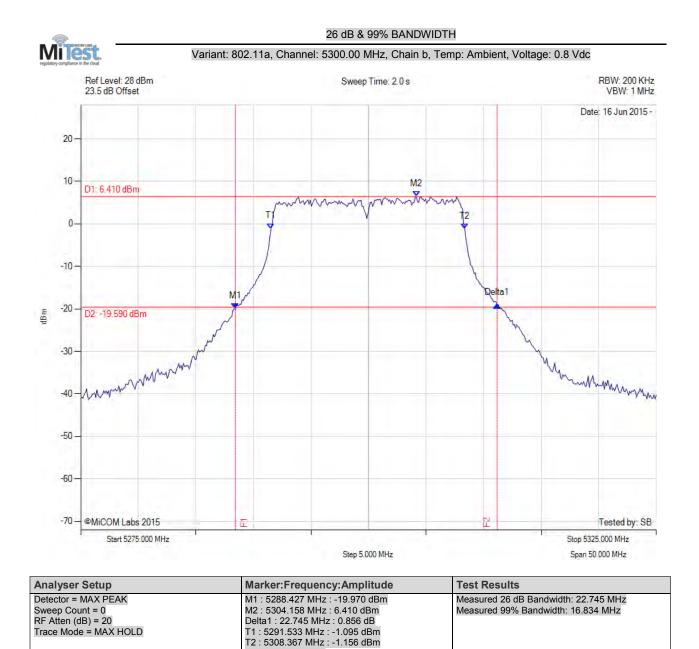


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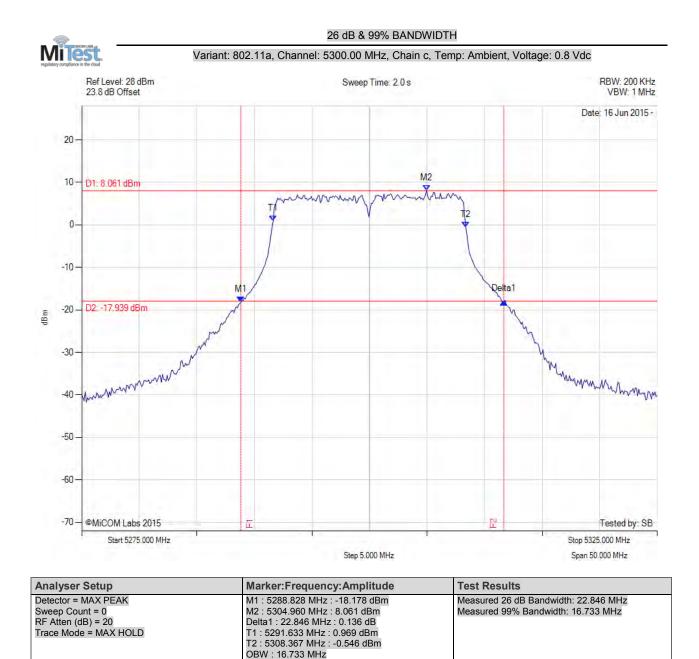
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OBW : 16.834 MHz



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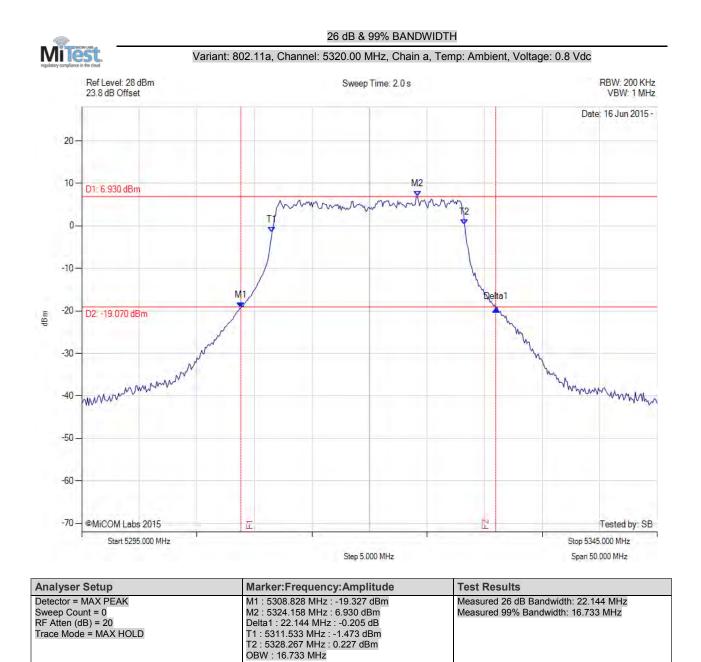


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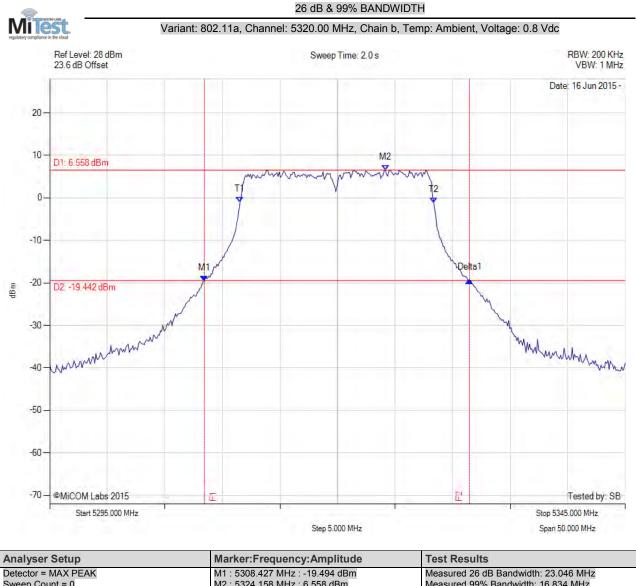


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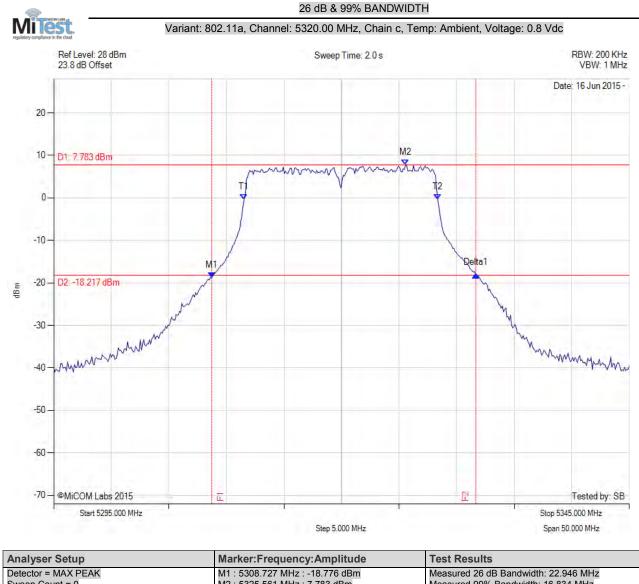
	Analyser Setup	Marker:Frequency:Amplitude	Test Results
ſ	Detector = MAX PEAK	M1 : 5308.427 MHz : -19.494 dBm	Measured 26 dB Bandwidth: 23.046 MHz
	Sweep Count = 0	M2 : 5324.158 MHz : 6.558 dBm	Measured 99% Bandwidth: 16.834 MHz
	RF Atten (dB) = 20	Delta1 : 23.046 MHz : 0.159 dB	
	Trace Mode = MAX HOLD	T1 : 5311.533 MHz : -0.940 dBm	
		T2 : 5328.367 MHz : -1.089 dBm	
		OBW : 16.834 MHz	
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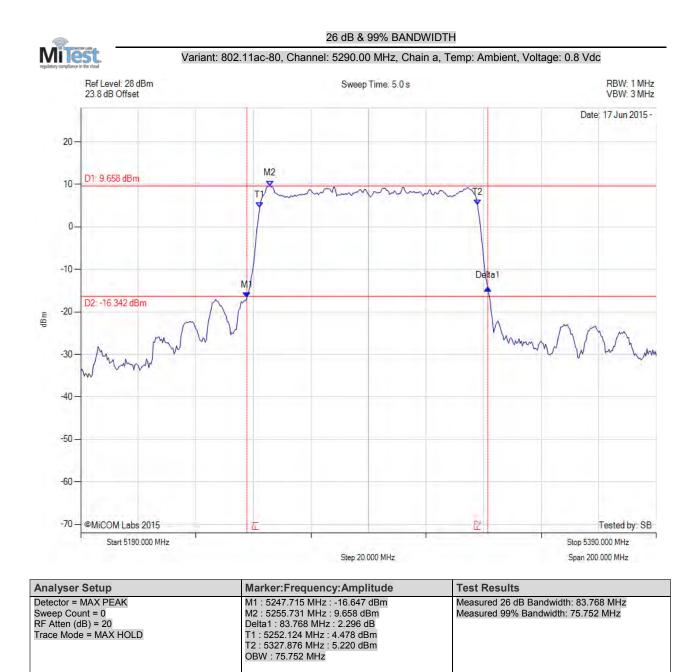
Analyser Setup	warker.Frequency.Amplitude	Test Results	
Detector = MAX PEAK	M1 : 5308.727 MHz : -18.776 dBm	Measured 26 dB Bandwidth: 22.946 MHz	
Sweep Count = 0	M2 : 5325.561 MHz : 7.783 dBm	Measured 99% Bandwidth: 16.834 MHz	
RF Atten (dB) = 20	Delta1 : 22.946 MHz : 0.669 dB		
Trace Mode = MAX HOLD	T1 : 5311.533 MHz : -0.424 dBm		
	T2 : 5328.367 MHz : -0.411 dBm		
	OBW : 16.834 MHz		

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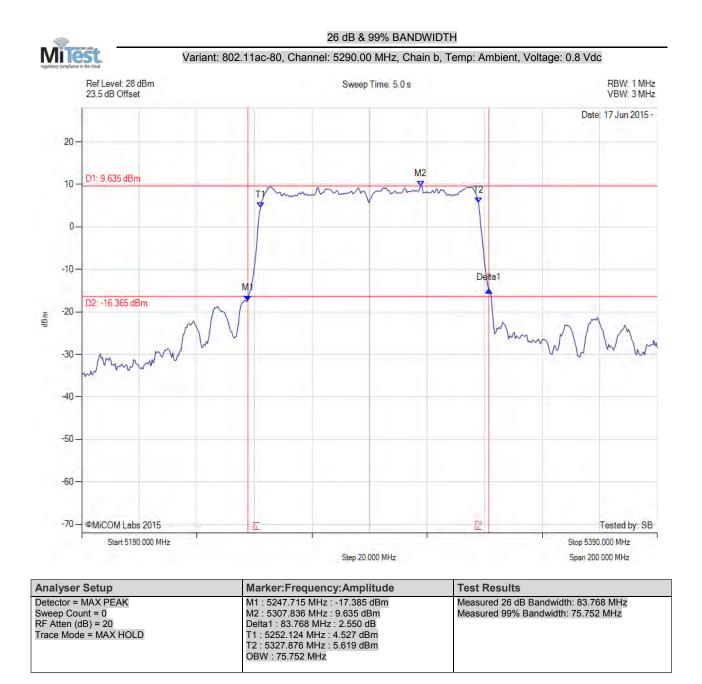


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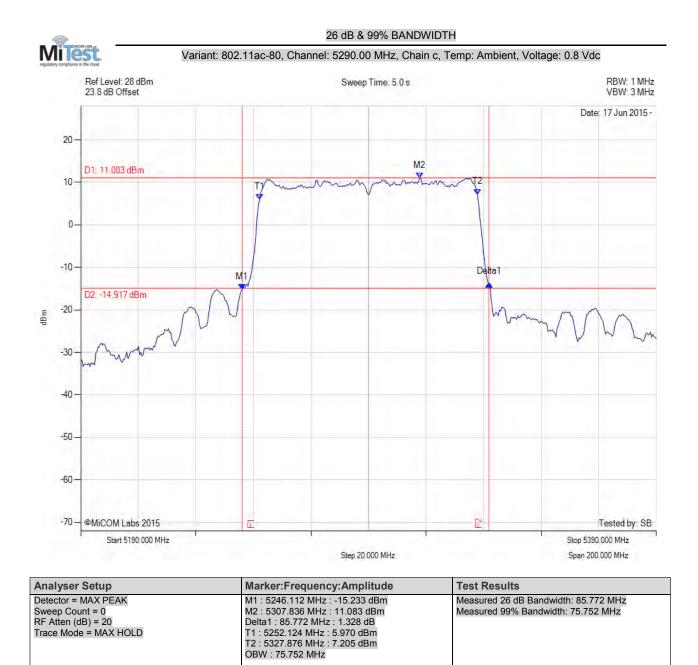


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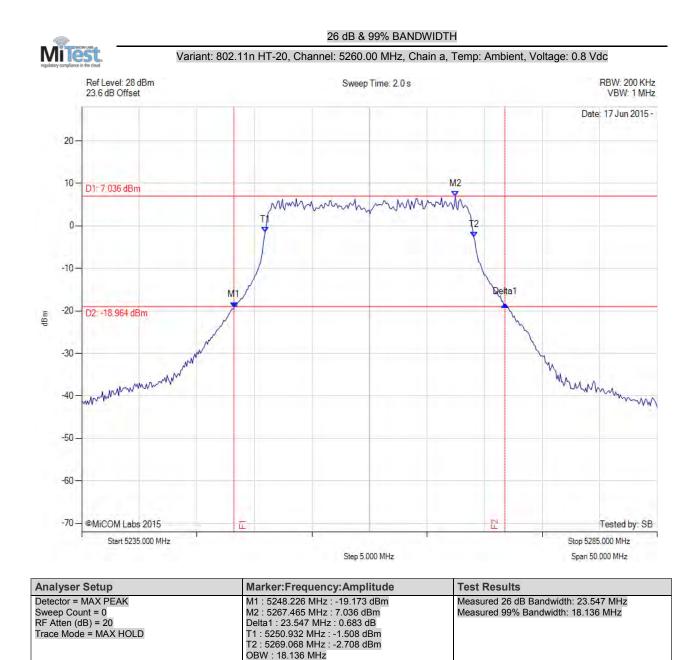


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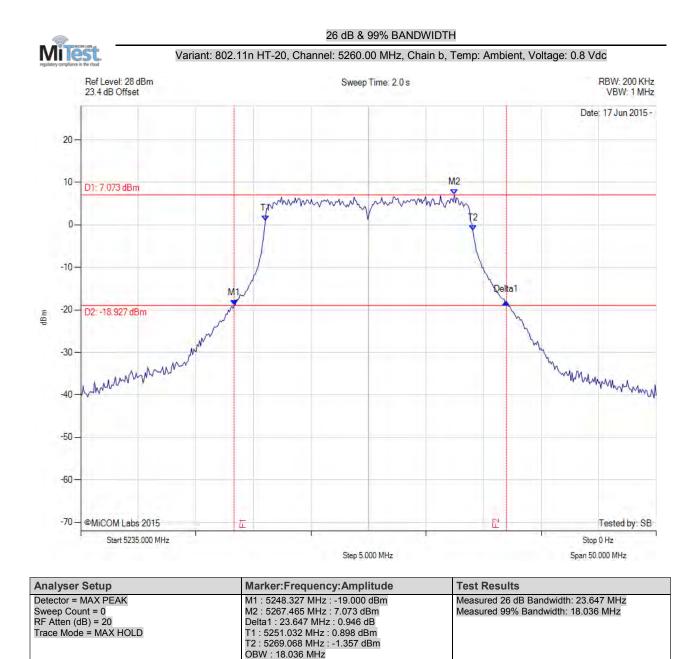


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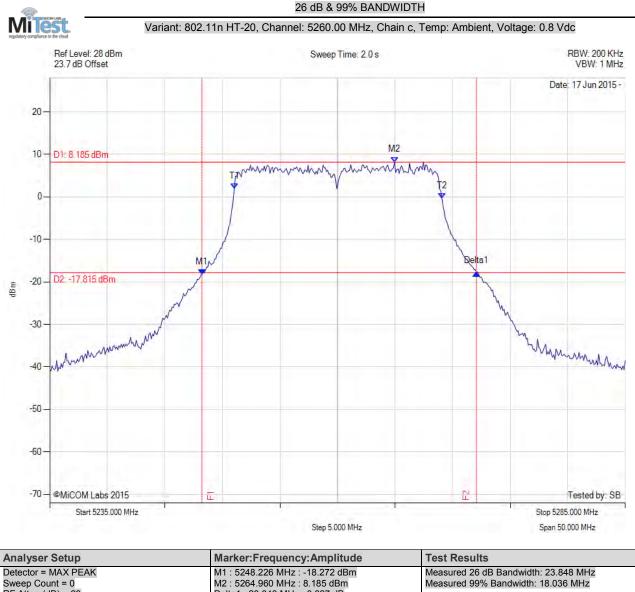


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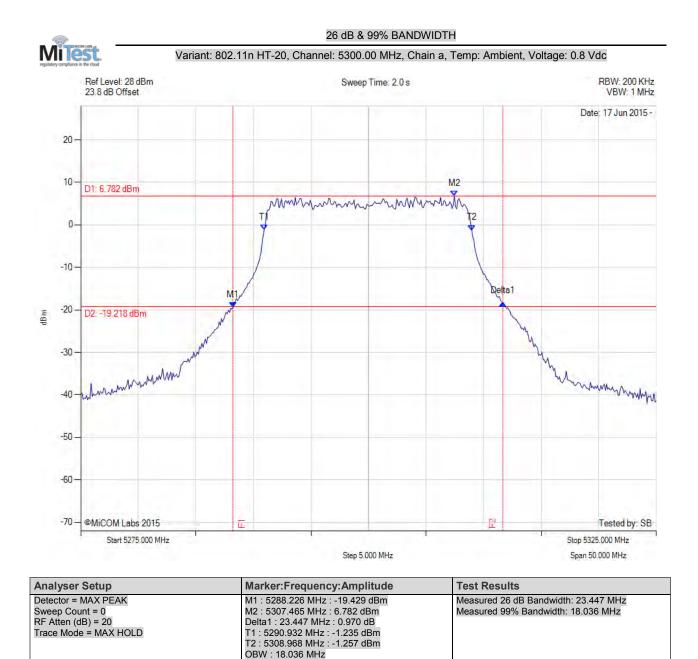
RF Atten (dB) = 20 Trace Mode = MAX HOLD	Delta1 : 23.848 MHz : 0.327 dB T1 : 5251.032 MHz : 1.986 dBm T2 : 5269.068 MHz : -0.318 dBm OBW : 18.036 MHz

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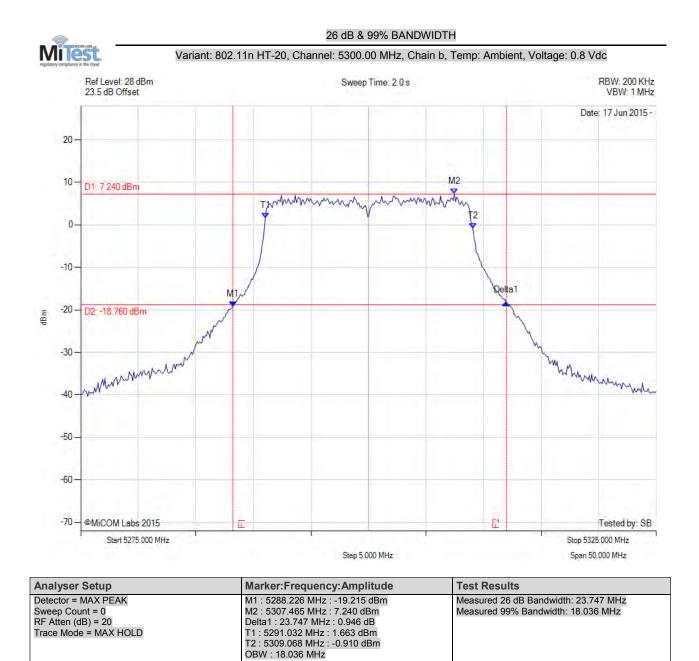


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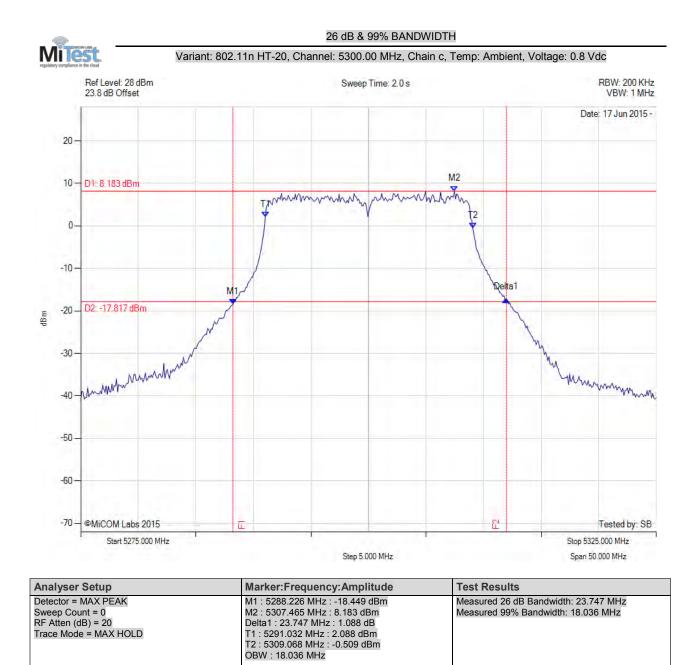


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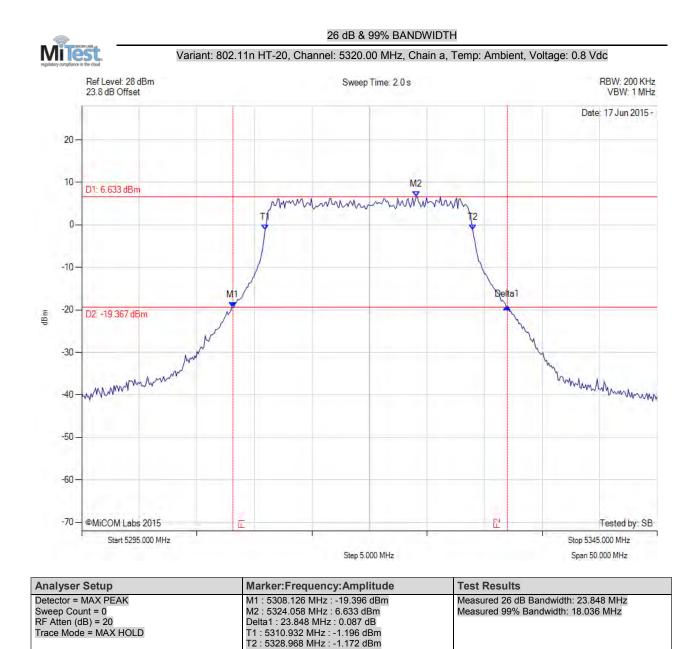


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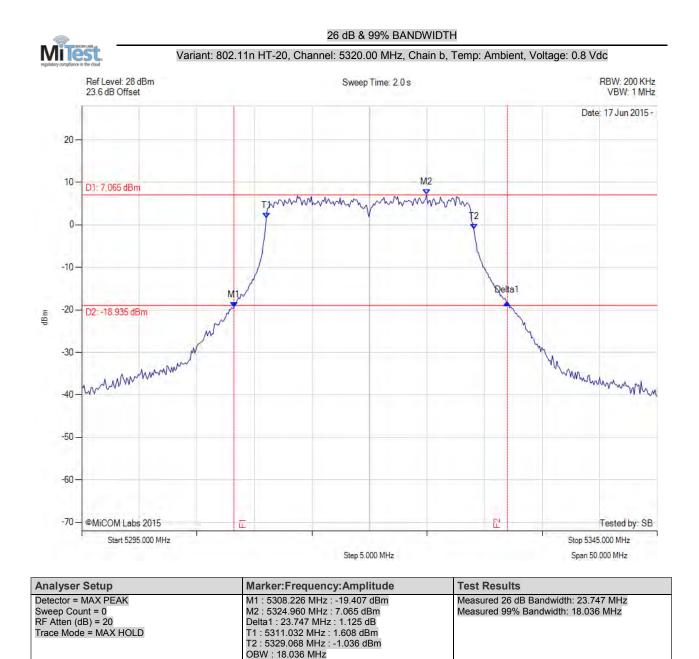
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OBW : 18.036 MHz



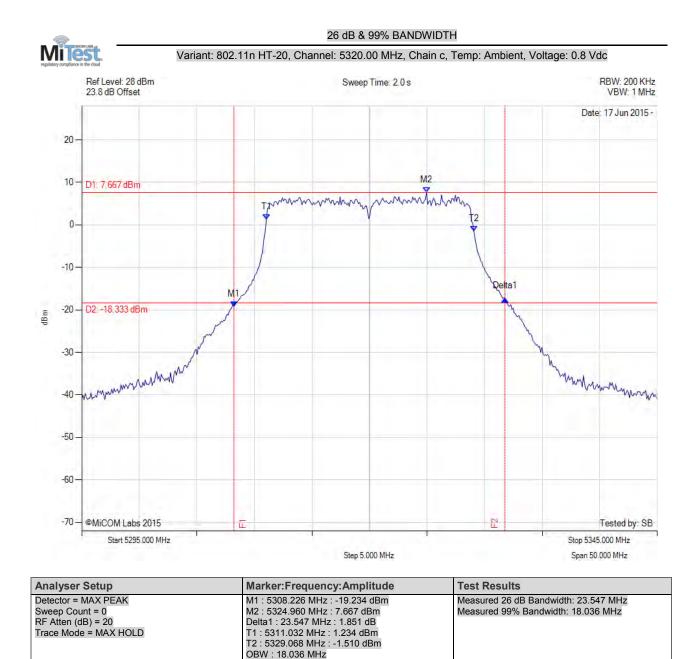
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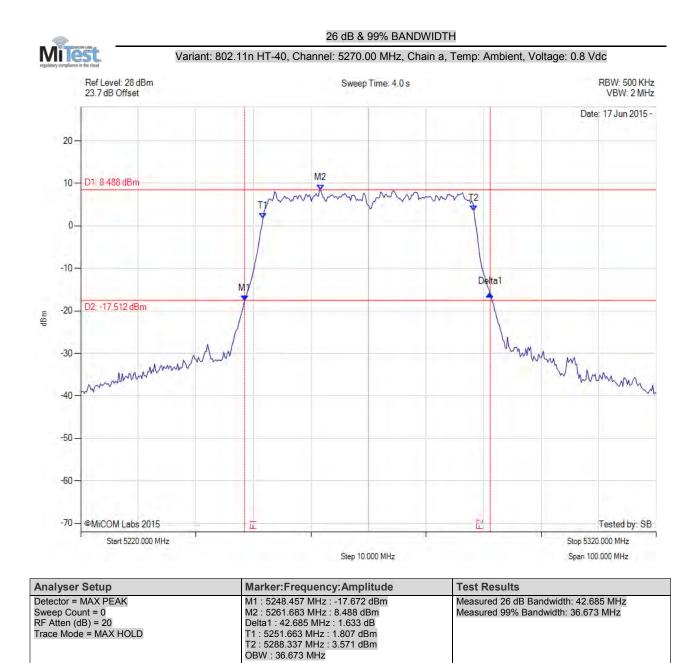


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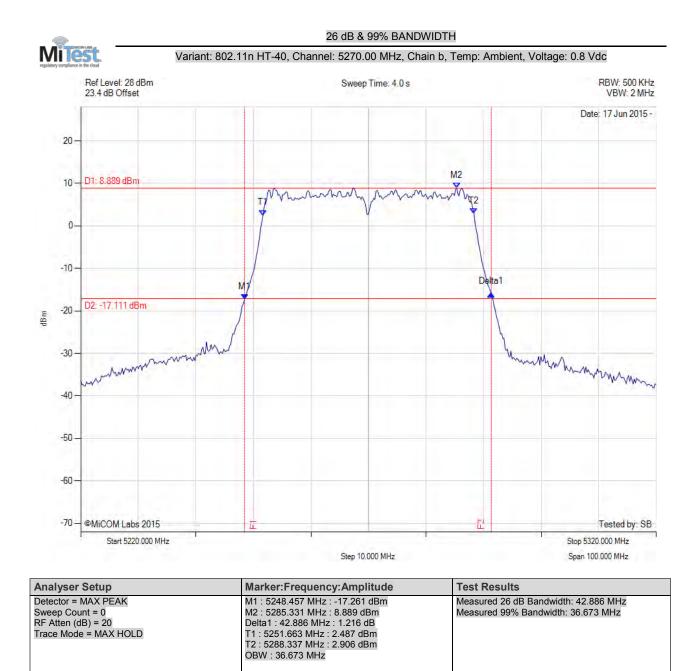


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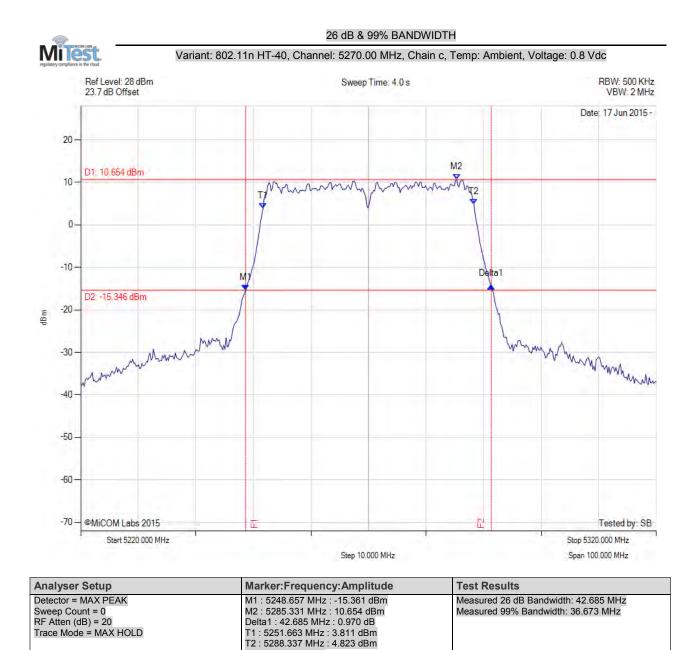


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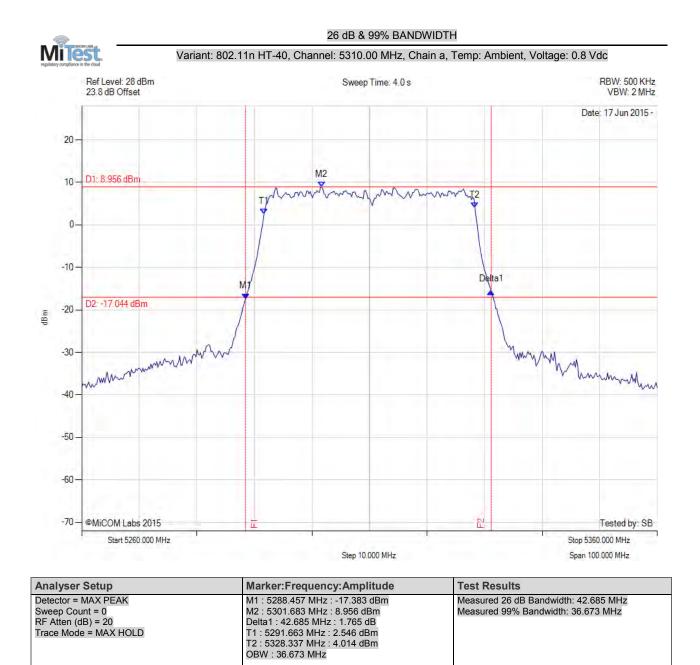
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OBW : 36.673 MHz



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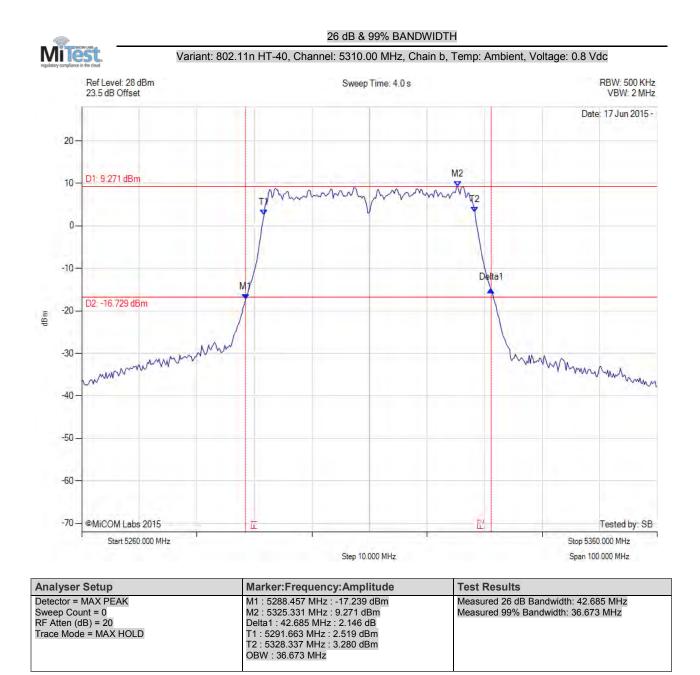


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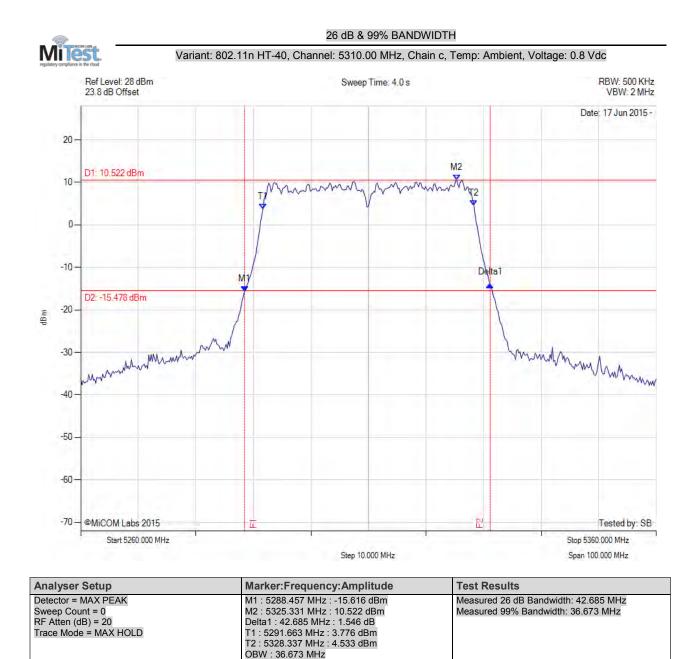


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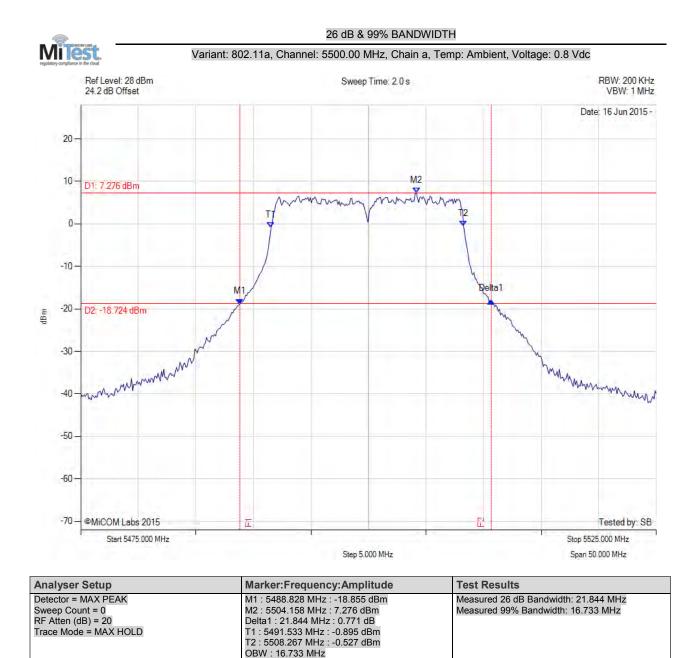


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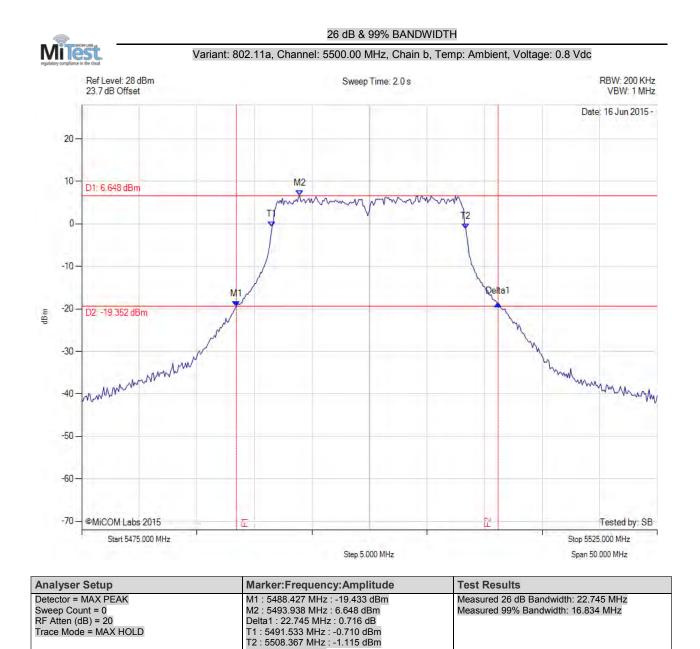


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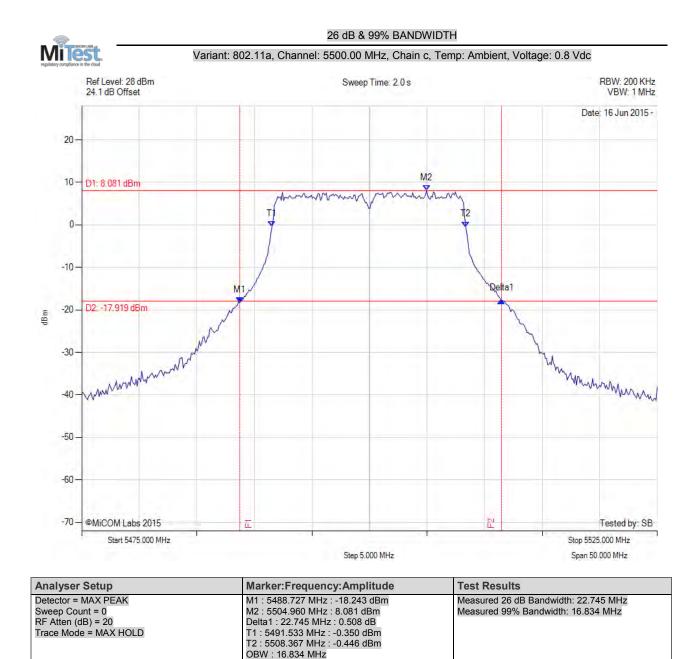
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OBW : 16.834 MHz



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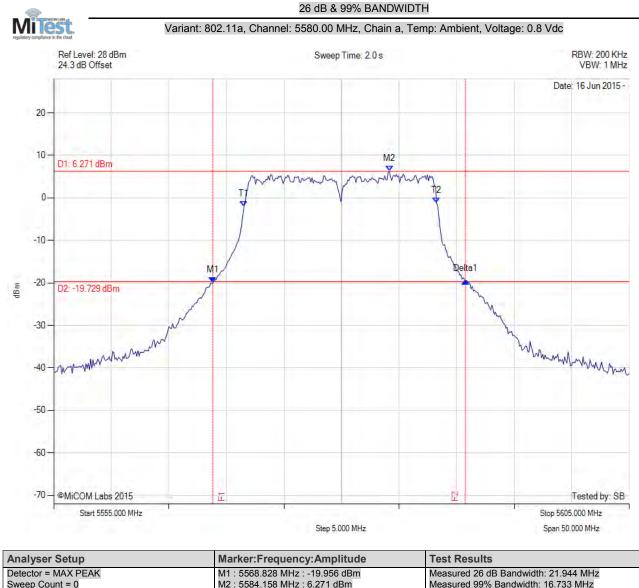


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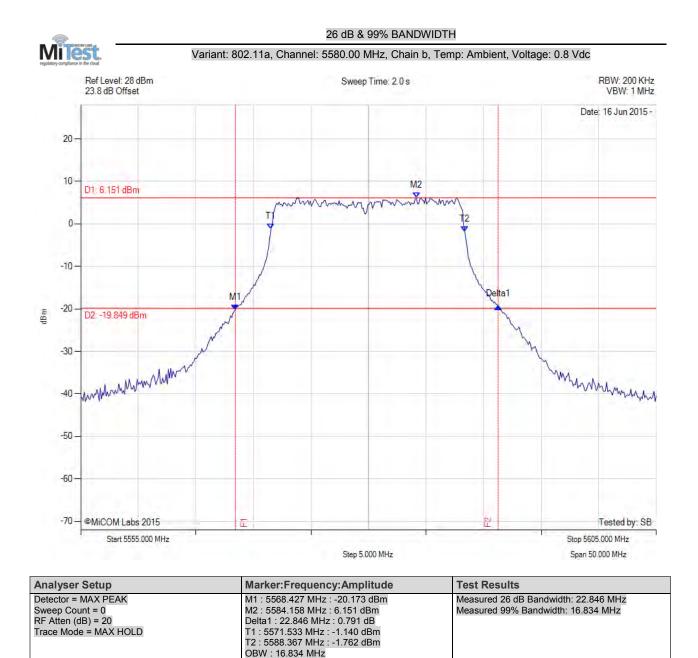
Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK	M1 : 5568.828 MHz : -19.956 dBm	Measured 26 dB Bandwidth: 21.944 MHz
Sweep Count = 0	M2 : 5584.158 MHz : 6.271 dBm	Measured 99% Bandwidth: 16.733 MHz
RF Atten (dB) = 20	Delta1 : 21.944 MHz : 0.350 dB	
Trace Mode = MAX HOLD	T1 : 5571.533 MHz : -1.986 dBm	
	T2 : 5588.267 MHz : -1.233 dBm	
	OBW : 16.733 MHz	
		1

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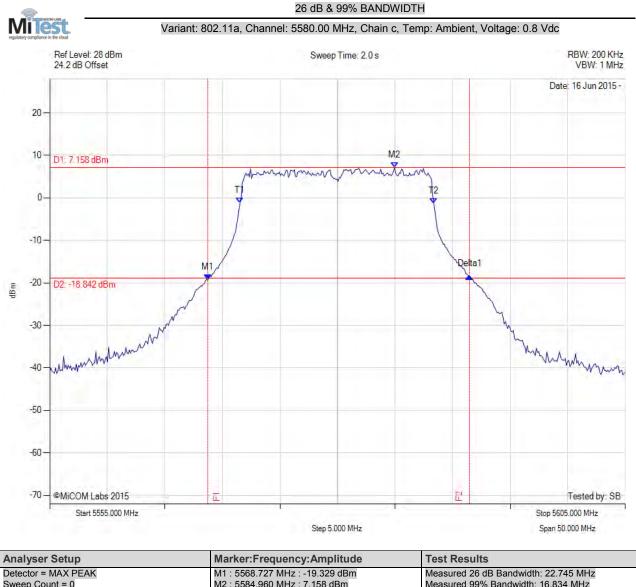


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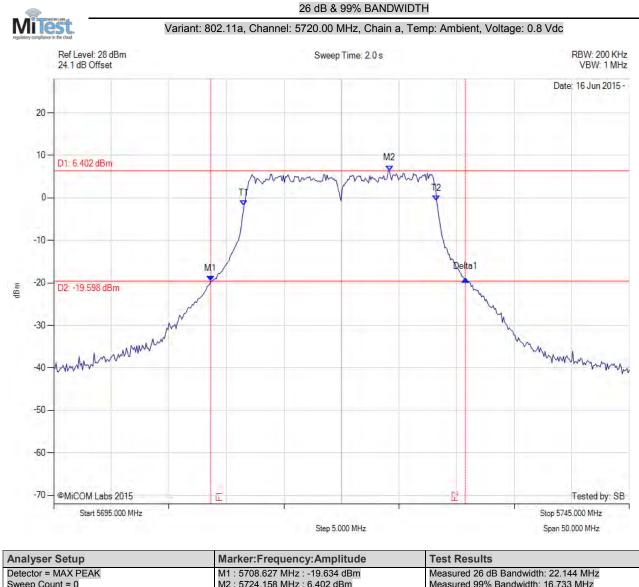
Analyser Setup	Marker:Frequency:Amplitude	Test Results	
Detector = MAX PEAK	M1 : 5568.727 MHz : -19.329 dBm	Measured 26 dB Bandwidth: 22.745 MHz	
Sweep Count = 0	M2 : 5584.960 MHz : 7.158 dBm	Measured 99% Bandwidth: 16.834 MHz	
RF Atten (dB) = 20	Delta1 : 22.745 MHz : 0.901 dB		
Trace Mode = MAX HOLD	T1 : 5571.533 MHz : -1.225 dBm		
	T2 : 5588.367 MHz : -1.298 dBm		
	OBW : 16.834 MHz		

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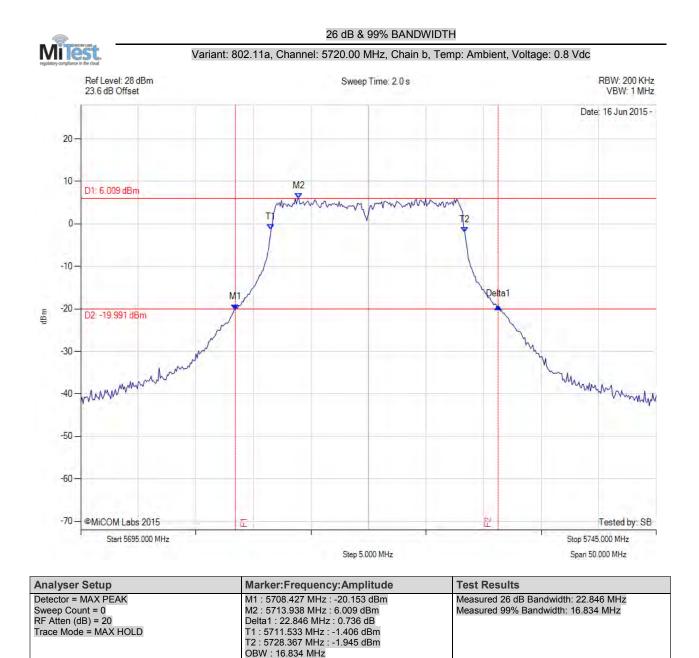
Analyser Setup	warker:Frequency:Amplitude	Test Results	
Detector = MAX PEAK	M1 : 5708.627 MHz : -19.634 dBm	Measured 26 dB Bandwidth: 22.144 MHz	
Sweep Count = 0	M2 : 5724.158 MHz : 6.402 dBm	Measured 99% Bandwidth: 16.733 MHz	
RF Atten (dB) = 20	Delta1 : 22.144 MHz : 0.547 dB		
Trace Mode = MAX HOLD	T1 : 5711.533 MHz : -1.827 dBm		
	T2 : 5728.267 MHz : -0.633 dBm		
	OBW : 16.733 MHz		

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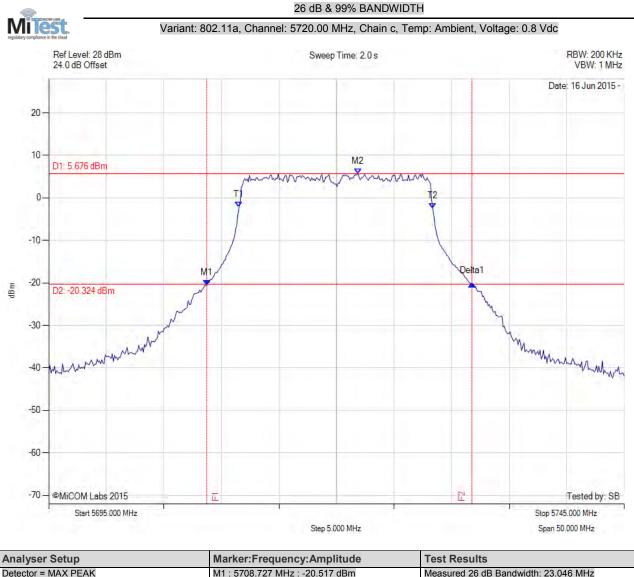


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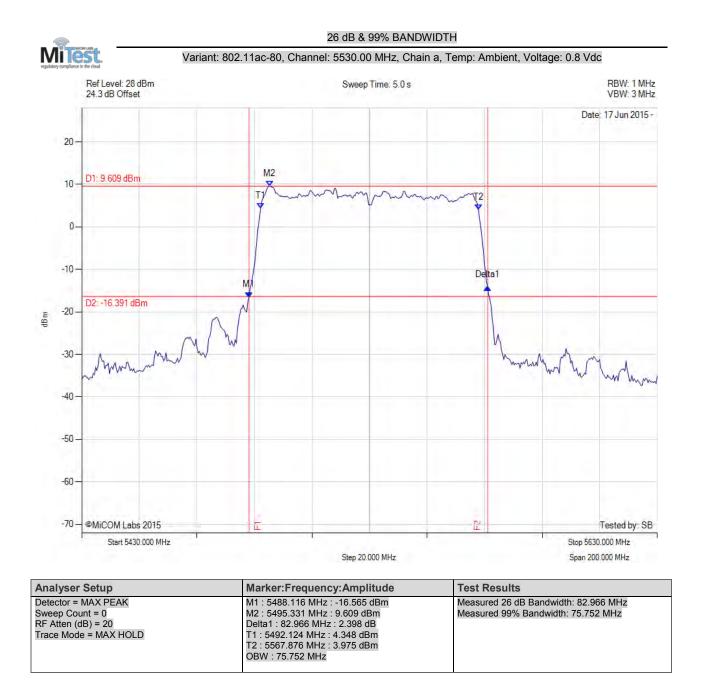
Analyser Setup	Marker:Frequency:Amplitude	Test Results	
Detector = MAX PEAK	M1 : 5708.727 MHz : -20.517 dBm	Measured 26 dB Bandwidth: 23.046 MHz	
Sweep Count = 0	M2 : 5721.854 MHz : 5.676 dBm	Measured 99% Bandwidth: 16.834 MHz	
RF Atten (dB) = 20	Delta1 : 23.046 MHz : 0.364 dB		
Trace Mode = MAX HOLD	T1 : 5711.533 MHz : -2.226 dBm		
	T2 : 5728.367 MHz : -2.512 dBm		
	OBW : 16.834 MHz		
		1	

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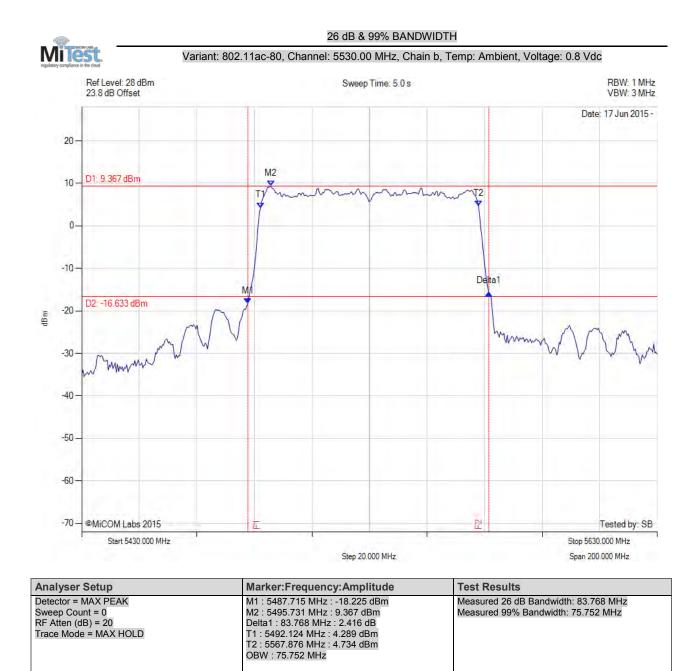


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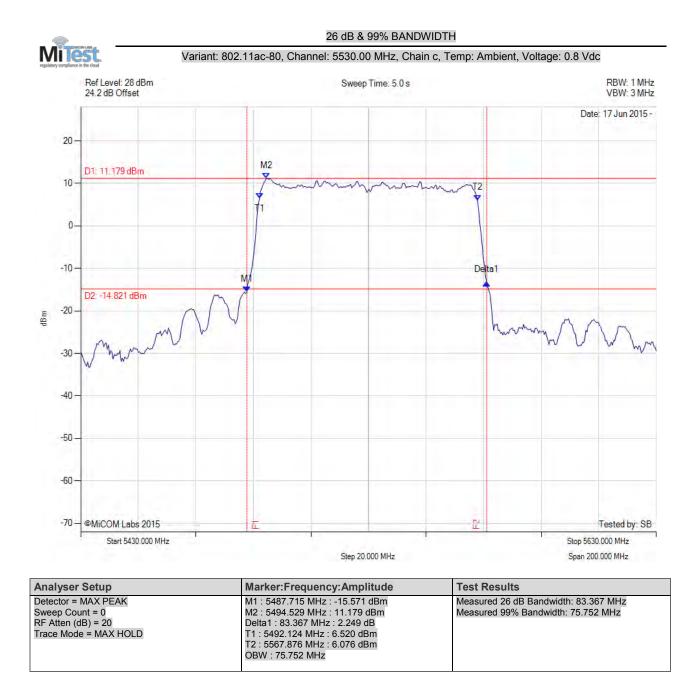


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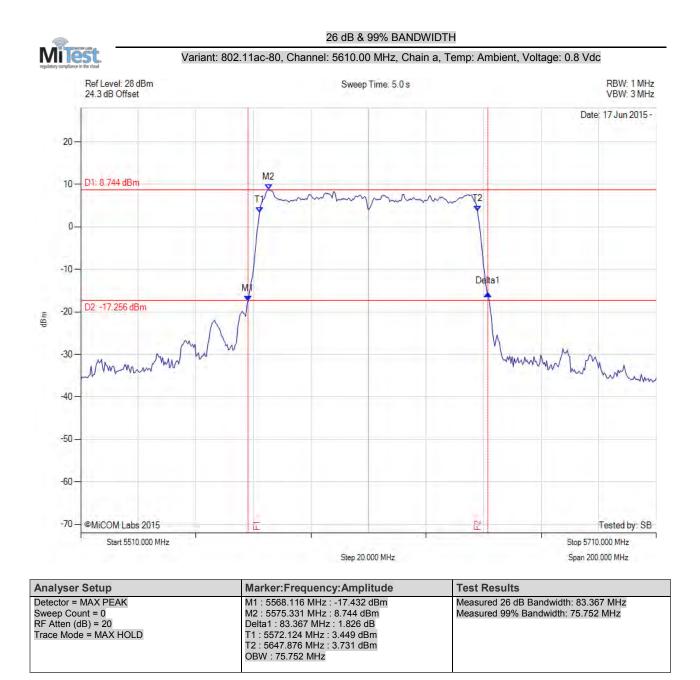


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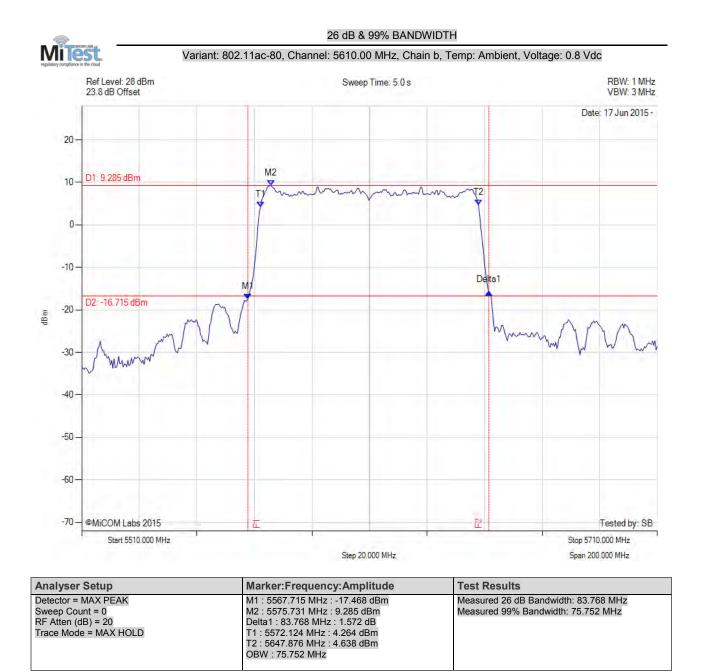


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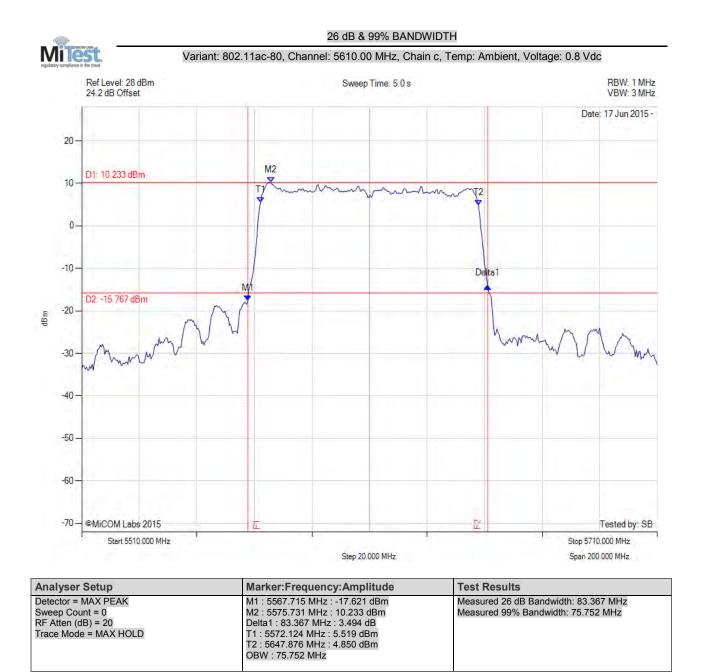


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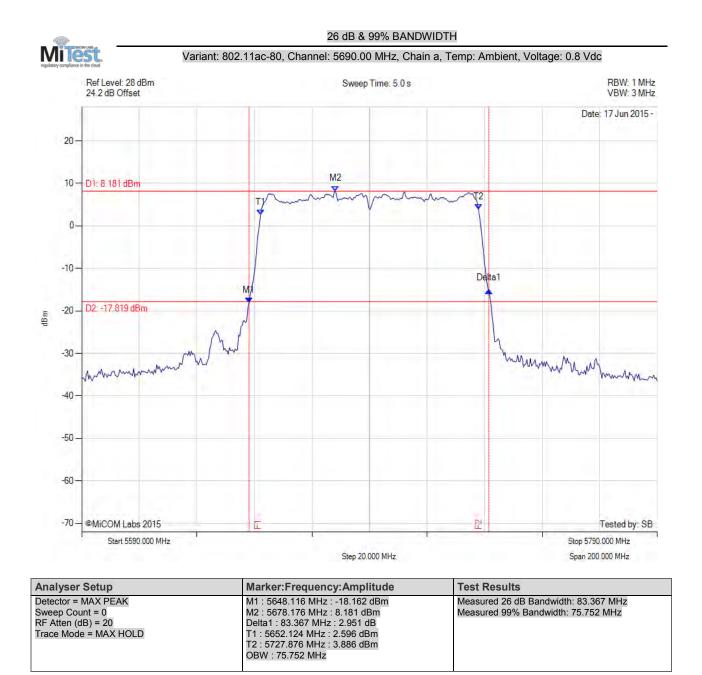


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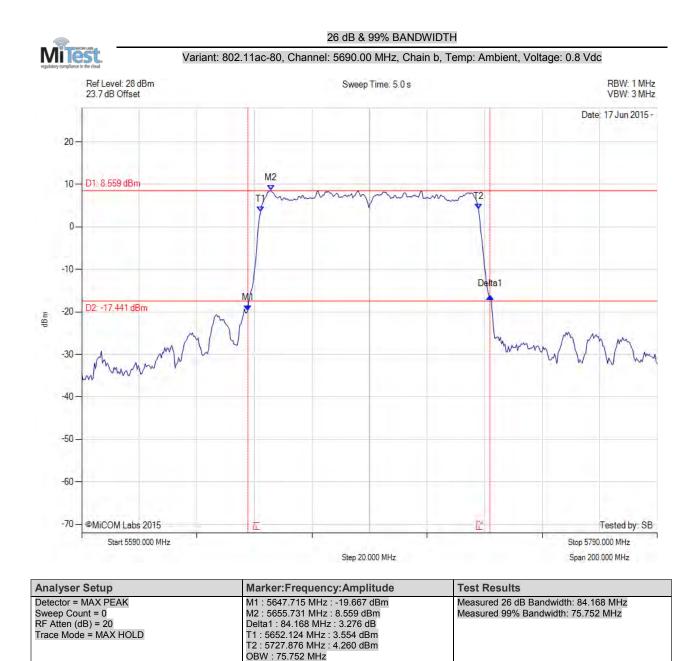


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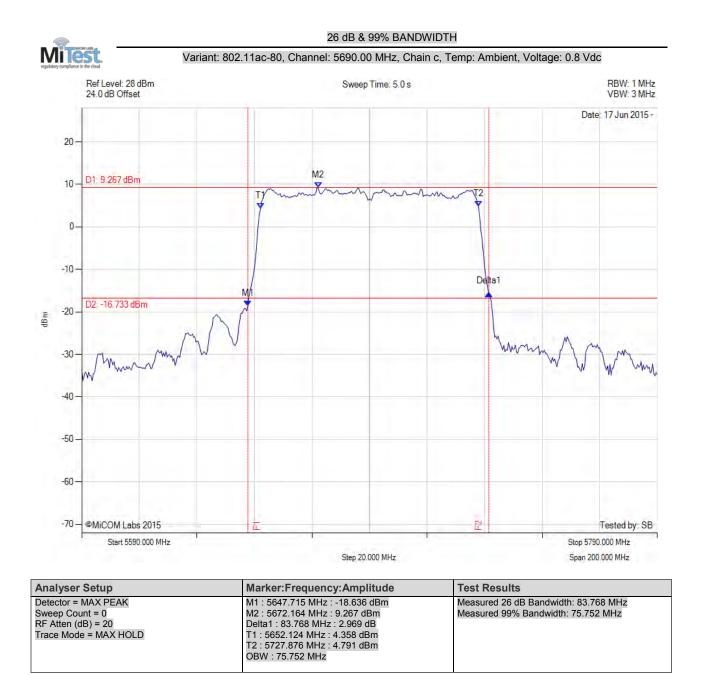


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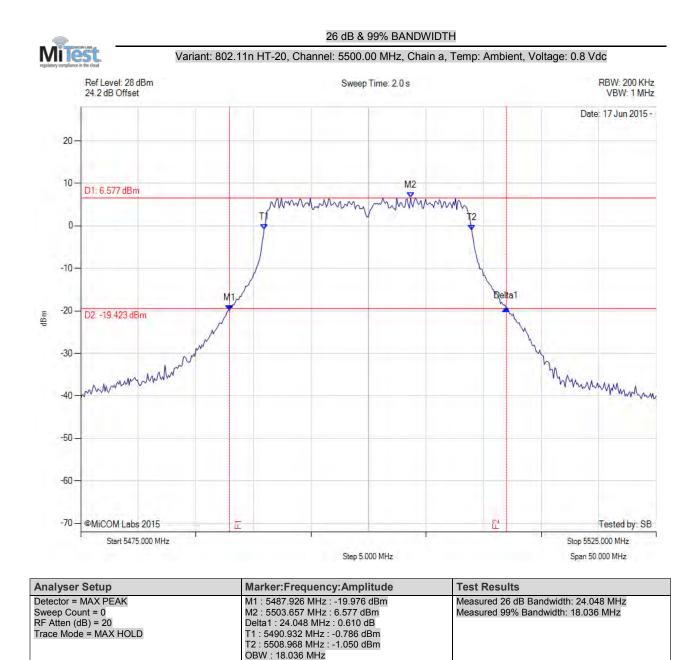


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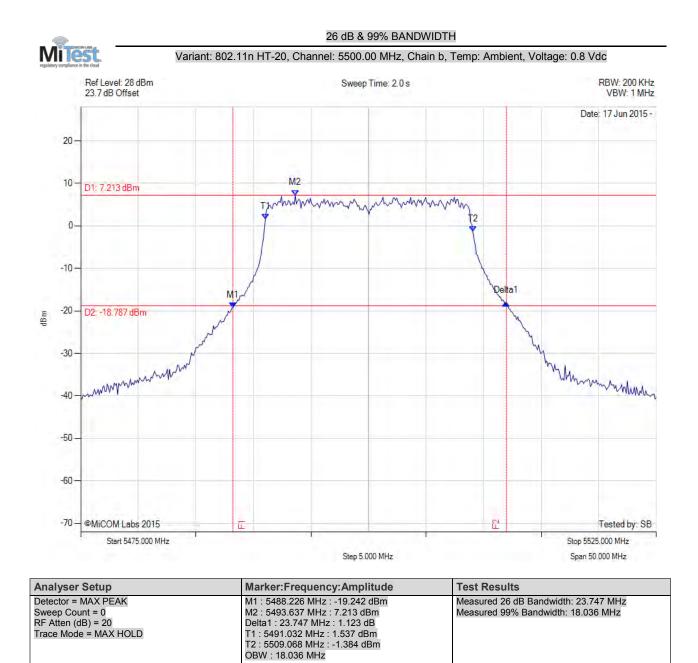


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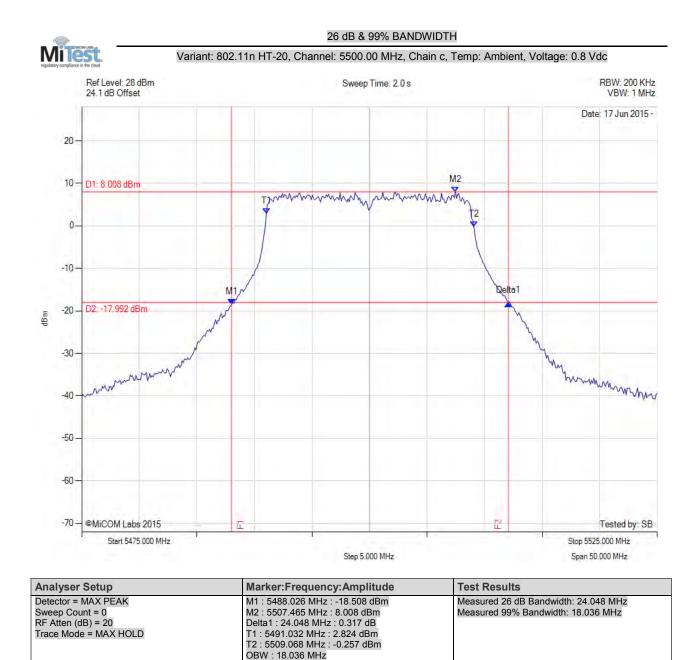


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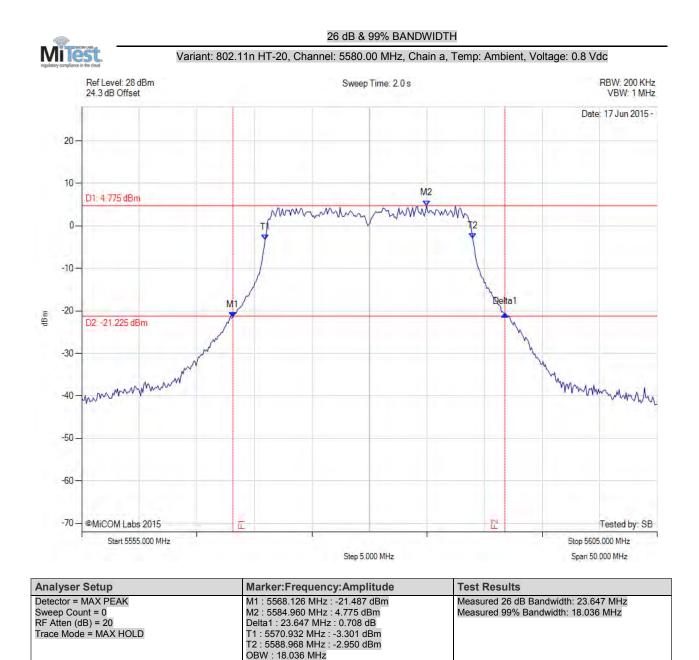


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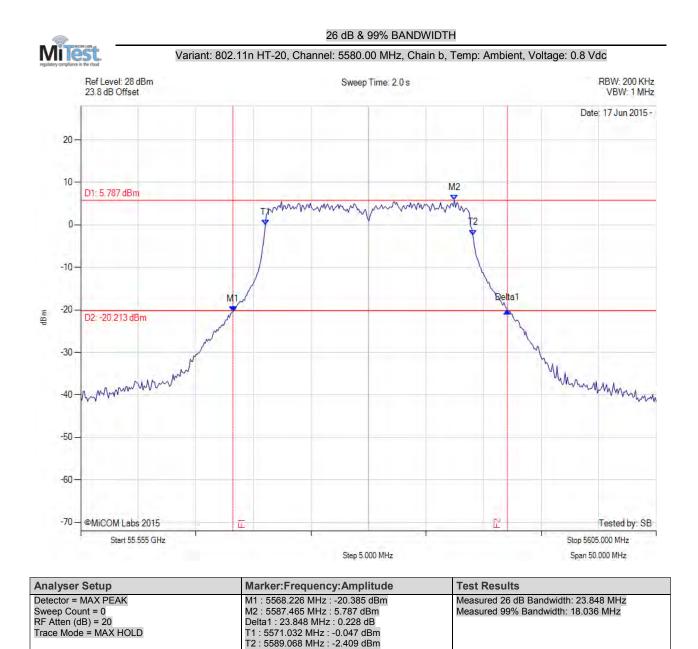


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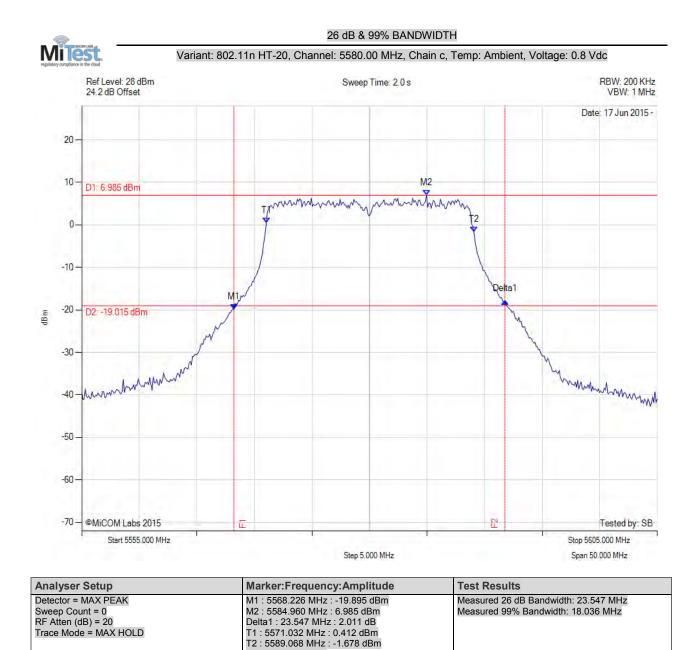
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OBW : 18.036 MHz



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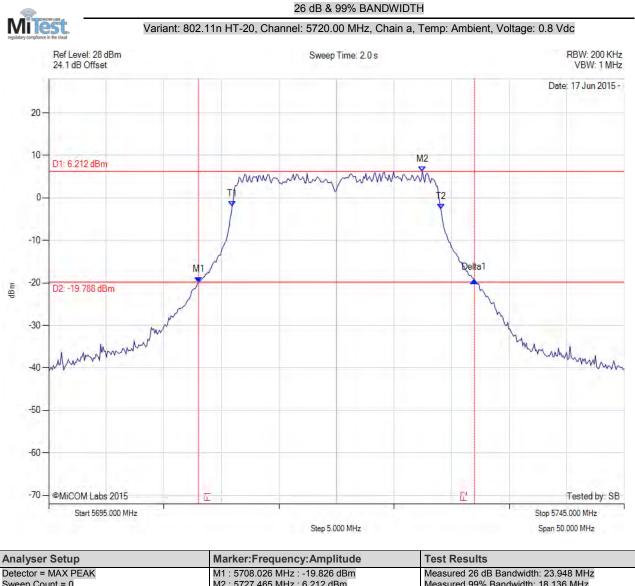
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OBW : 18.036 MHz



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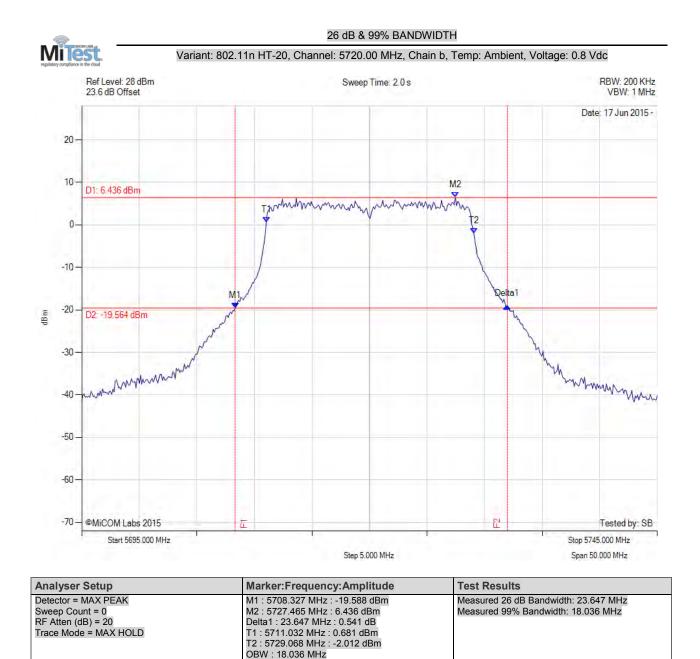
Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK	M1 : 5708.026 MHz : -19.826 dBm	Measured 26 dB Bandwidth: 23.948 MHz
Sweep Count = 0	M2 : 5727.465 MHz : 6.212 dBm	Measured 99% Bandwidth: 18.136 MHz
RF Atten (dB) = 20	Delta1 : 23.948 MHz : 0.478 dB	
Trace Mode = MAX HOLD	T1 : 5710.932 MHz : -1.984 dBm	
	T2:5729.068 MHz:-2.669 dBm	
	OBW : 18.136 MHz	

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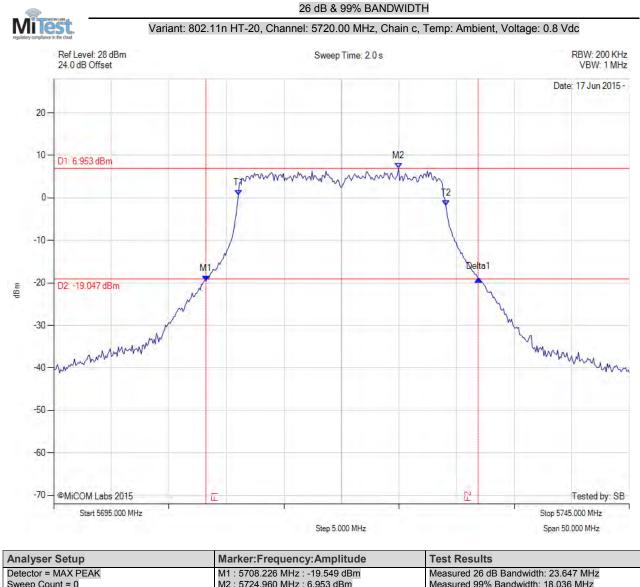


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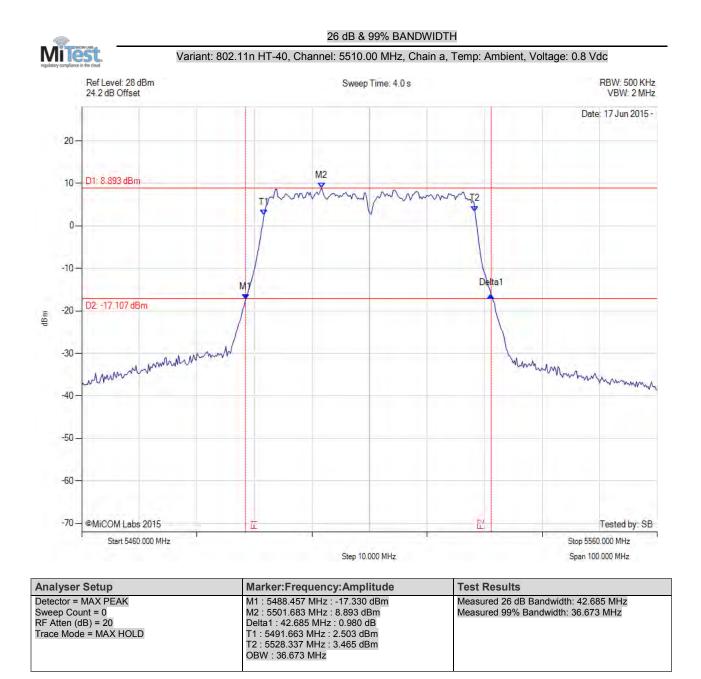
Analyser Setup	warker:Frequency:Amplitude	Test Results	
Detector = MAX PEAK	M1 : 5708.226 MHz : -19.549 dBm	Measured 26 dB Bandwidth: 23.647 MHz	
Sweep Count = 0	M2 : 5724.960 MHz : 6.953 dBm	Measured 99% Bandwidth: 18.036 MHz	
RF Atten (dB) = 20	Delta1 : 23.647 MHz : 0.476 dB		
Trace Mode = MAX HOLD	T1 : 5711.032 MHz : 0.546 dBm		
	T2 : 5729.068 MHz : -1.803 dBm		
	OBW : 18.036 MHz		

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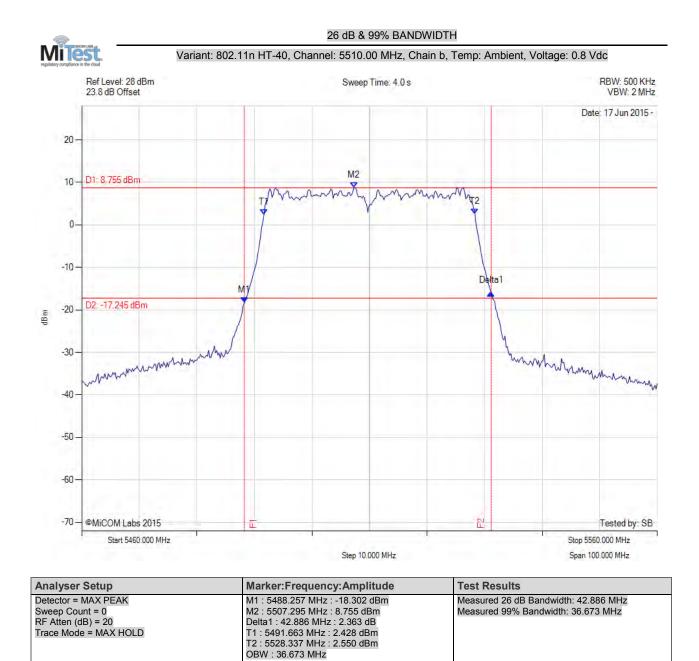


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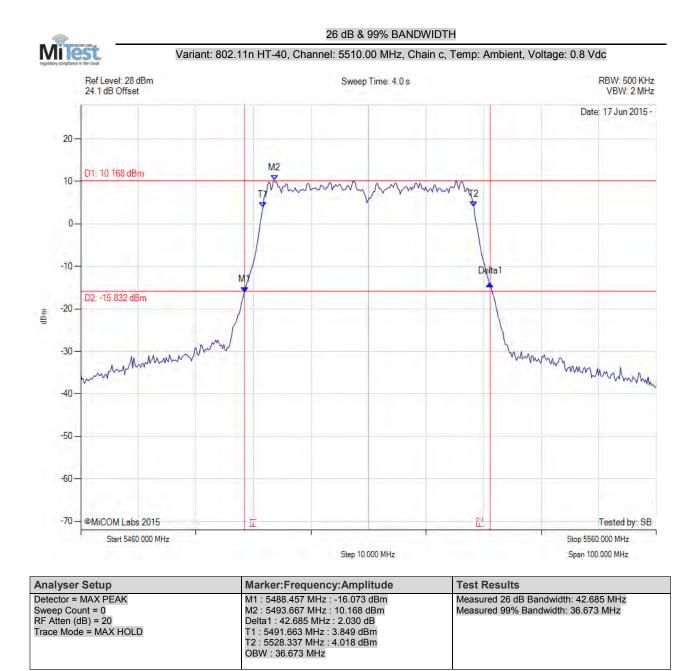


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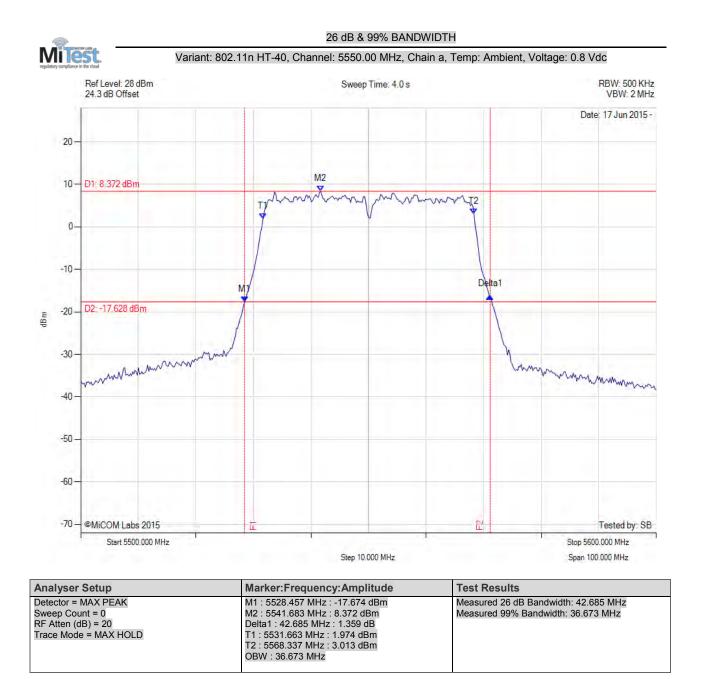


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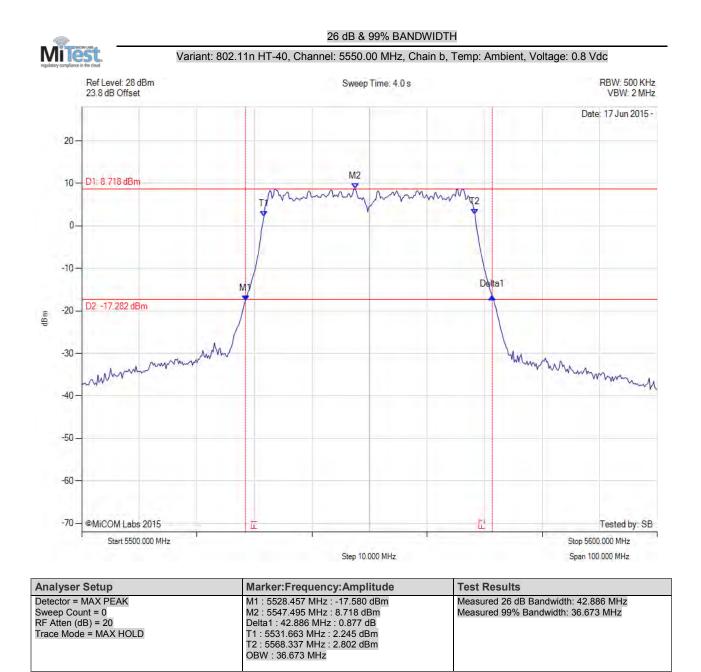


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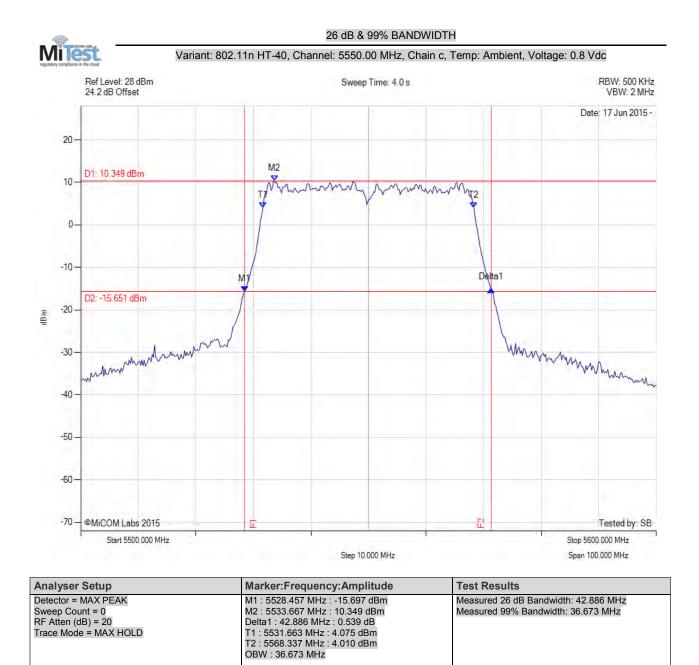


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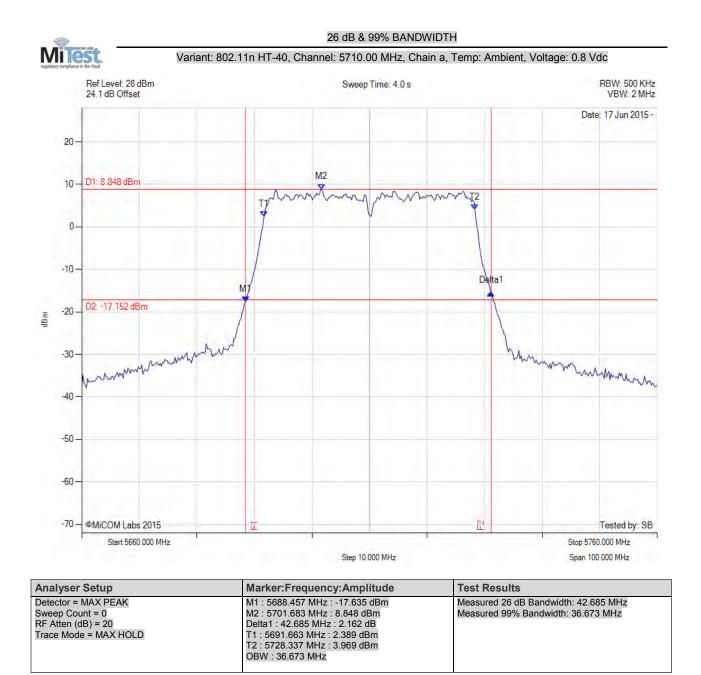


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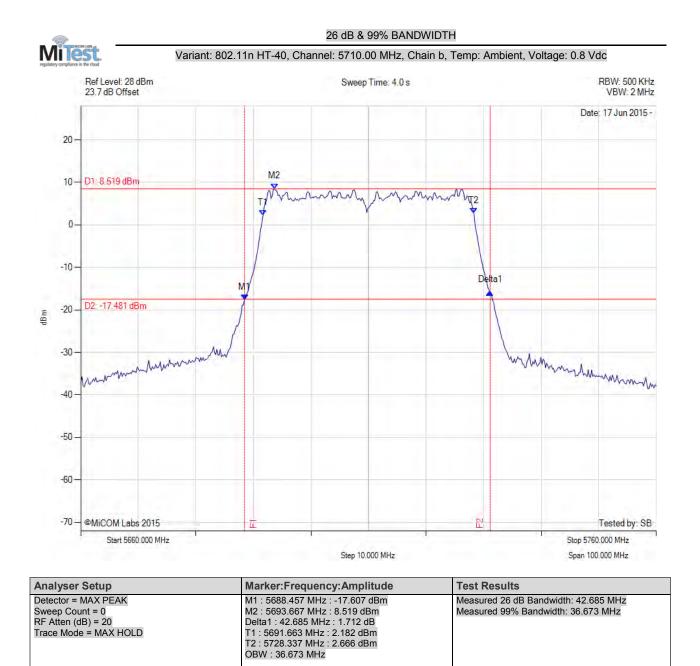


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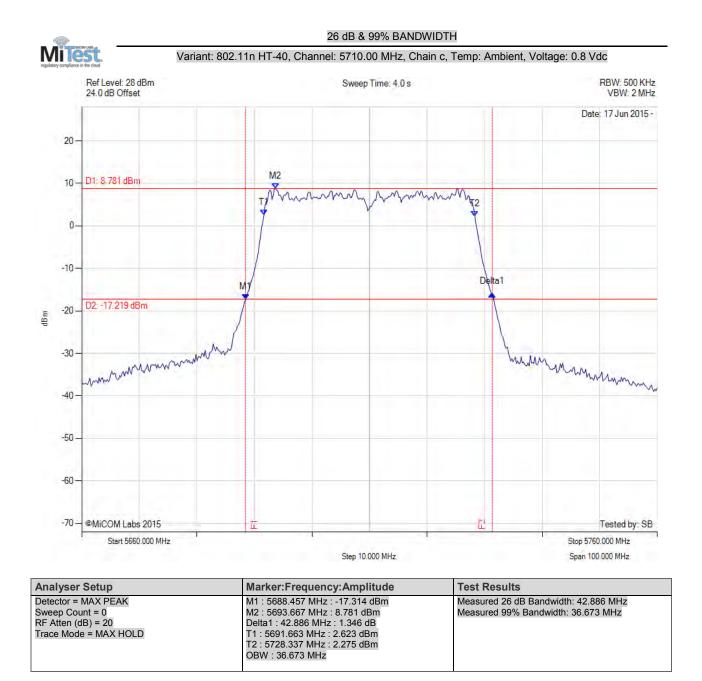


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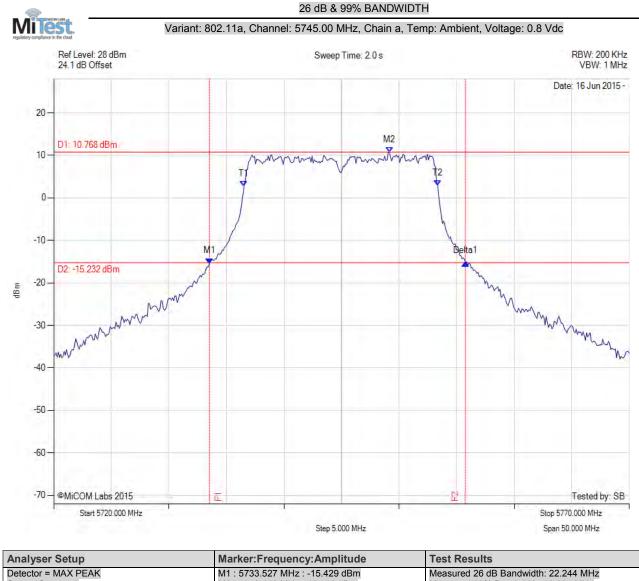


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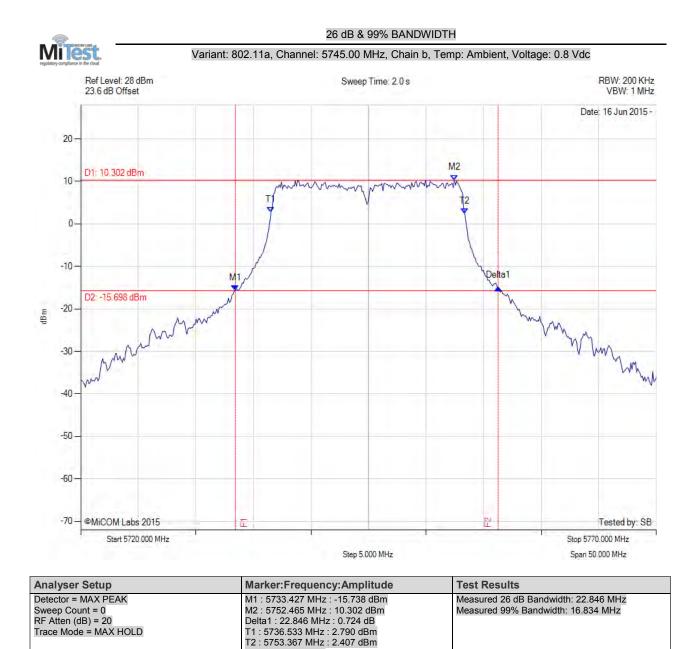
Analyser Setup	Marker:Frequency:Amplitude	Test Results	
Detector = MAX PEAK	M1 : 5733.527 MHz : -15.429 dBm	Measured 26 dB Bandwidth: 22.244 MHz	
Sweep Count = 0	M2 : 5749.158 MHz : 10.768 dBm	Measured 99% Bandwidth: 16.834 MHz	
RF Atten (dB) = 20	Delta1 : 22.244 MHz : 0.041 dB		
Trace Mode = MAX HOLD	T1 : 5736.533 MHz : 2.741 dBm		
	T2 : 5753.367 MHz : 2.912 dBm		
	OBW : 16.834 MHz		

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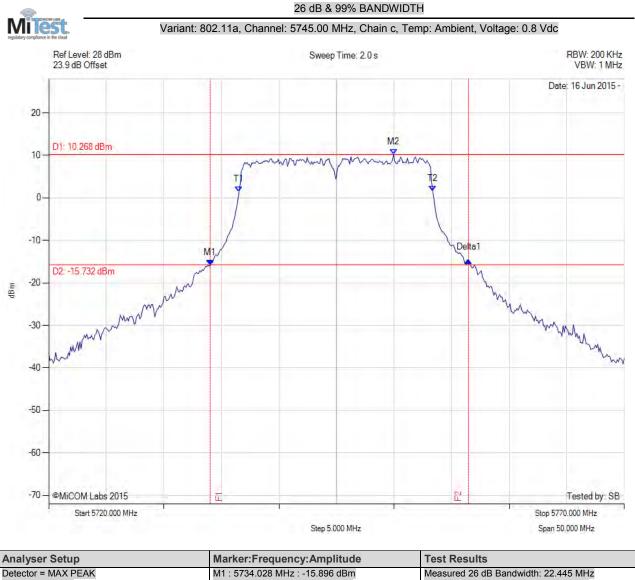
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OBW : 16.834 MHz



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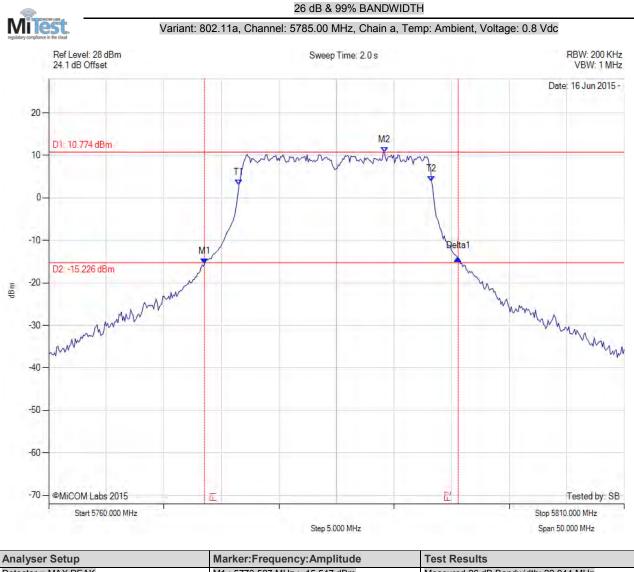
Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK	M1 : 5734.028 MHz : -15.896 dBm	Measured 26 dB Bandwidth: 22.445 MHz
Sweep Count = 0	M2 : 5749.960 MHz : 10.268 dBm	Measured 99% Bandwidth: 16.834 MHz
RF Atten (dB) = 20	Delta1 : 22.445 MHz : 1.277 dB	
Trace Mode = MAX HOLD	T1 : 5736.533 MHz : 1.488 dBm	
	T2 : 5753.367 MHz : 1.523 dBm	
	OBW : 16.834 MHz	

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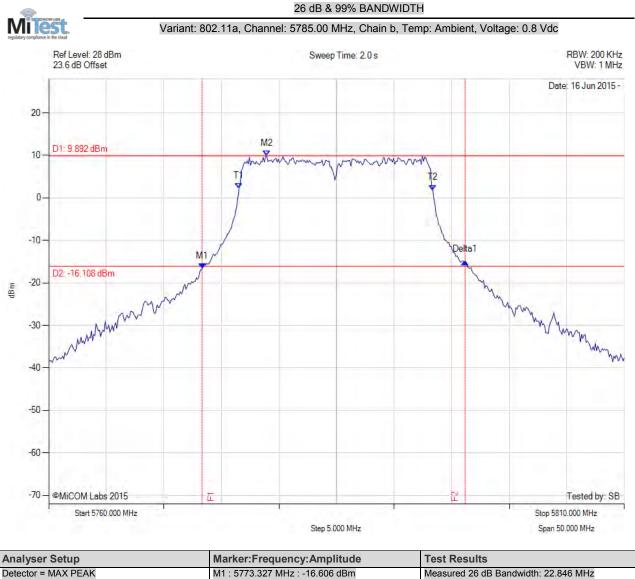
Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK	M1 : 5773.527 MHz : -15.547 dBm	Measured 26 dB Bandwidth: 22.044 MHz
Sweep Count = 0	M2 : 5789.158 MHz : 10.774 dBm	Measured 99% Bandwidth: 16.733 MHz
RF Atten (dB) = 20	Delta1 : 22.044 MHz : 1.310 dB	
Trace Mode = MAX HOLD	T1 : 5776.533 MHz : 3.121 dBm	
	T2 : 5793.267 MHz : 3.916 dBm	
	OBW : 16.733 MHz	

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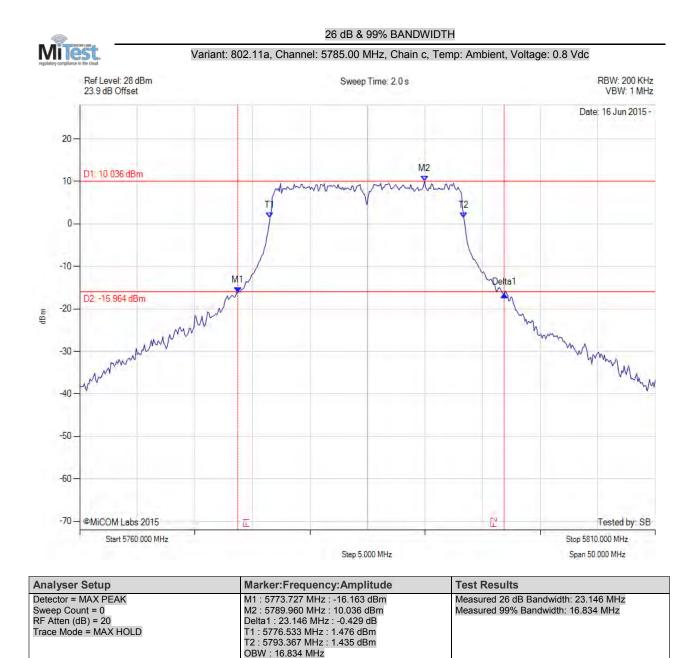
Analyser Setup	Marker:Frequency:Amplitude	Test Results	
Detector = MAX PEAK	M1 : 5773.327 MHz : -16.606 dBm	Measured 26 dB Bandwidth: 22.846 MHz	
Sweep Count = 0	M2 : 5778.938 MHz : 9.892 dBm	Measured 99% Bandwidth: 16.834 MHz	
RF Atten (dB) = 20	Delta1 : 22.846 MHz : 1.525 dB		
Trace Mode = MAX HOLD	T1 : 5776.533 MHz : 2.275 dBm		
	T2 : 5793.367 MHz : 1.842 dBm		
	OBW : 16.834 MHz		

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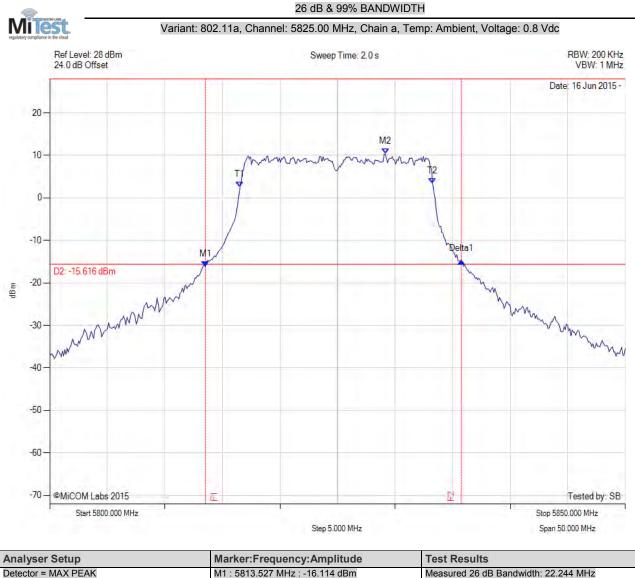


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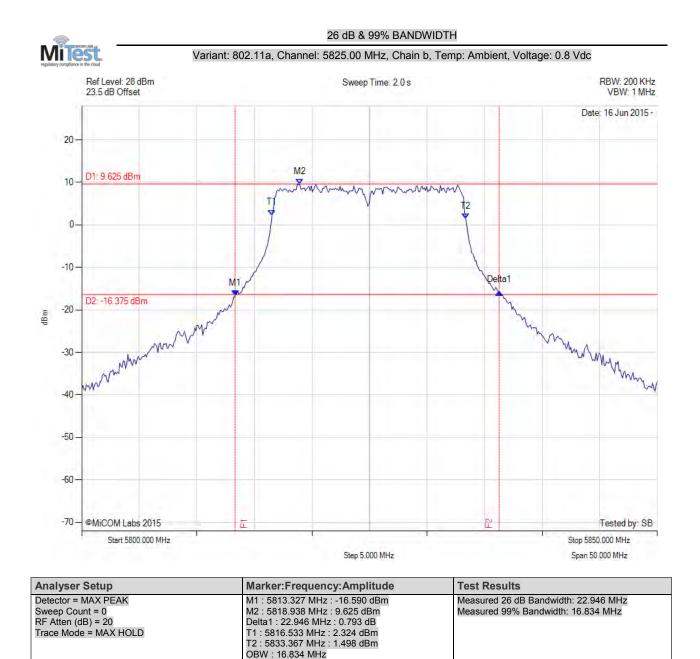
Analyser Setup	Marker:Frequency:Amplitude	Test Results	
Detector = MAX PEAK	M1 : 5813.527 MHz : -16.114 dBm	Measured 26 dB Bandwidth: 22.244 MHz	
Sweep Count = 0	M2 : 5829.158 MHz : 10.384 dBm	Measured 99% Bandwidth: 16.733 MHz	
RF Atten (dB) = 20	Delta1 : 22.244 MHz : 1.202 dB		
Trace Mode = MAX HOLD	T1 : 5816.533 MHz : 2.548 dBm		
	T2 : 5833.267 MHz : 3.394 dBm		
	OBW : 16.733 MHz		

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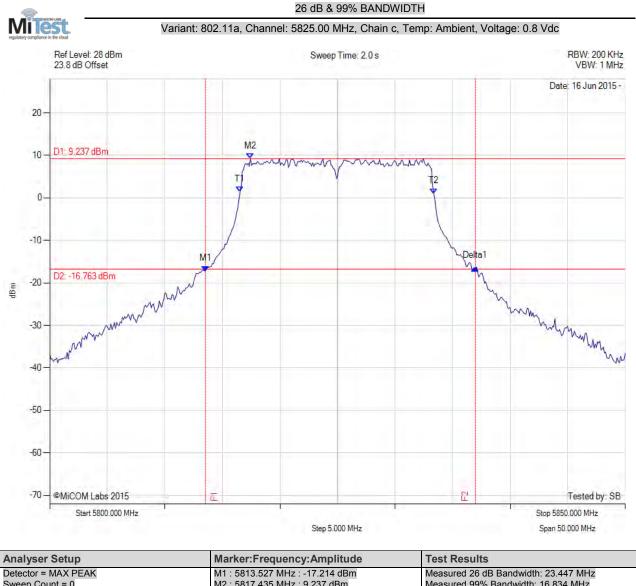


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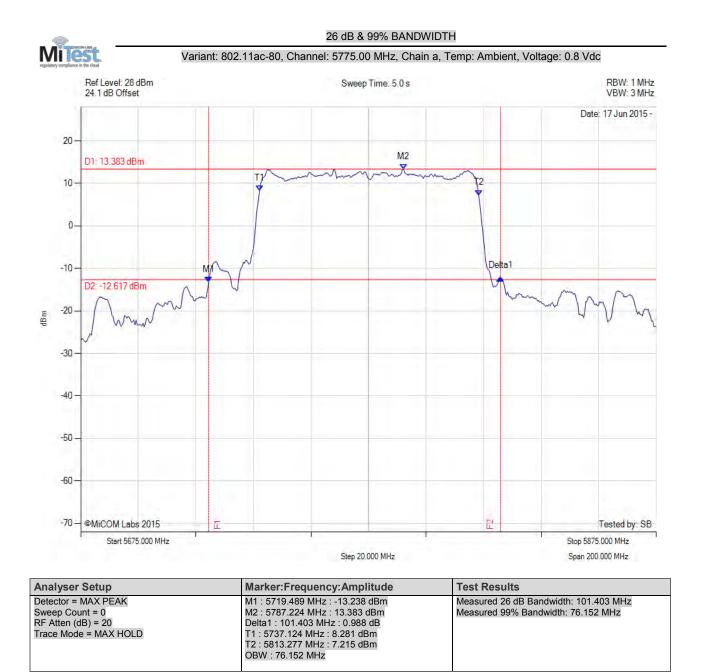
Analyser Setup	Marker:Frequency:Amplitude	Test Results
Detector = MAX PEAK	M1 : 5813.527 MHz : -17.214 dBm	Measured 26 dB Bandwidth: 23.447 MHz
Sweep Count = 0	M2 : 5817.435 MHz : 9.237 dBm	Measured 99% Bandwidth: 16.834 MHz
RF Atten (dB) = 20	Delta1 : 23.447 MHz : 0.714 dB	
Trace Mode = MAX HOLD	T1 : 5816.533 MHz : 1.366 dBm	
	T2 : 5833.367 MHz : 1.024 dBm	
	OBW : 16.834 MHz	

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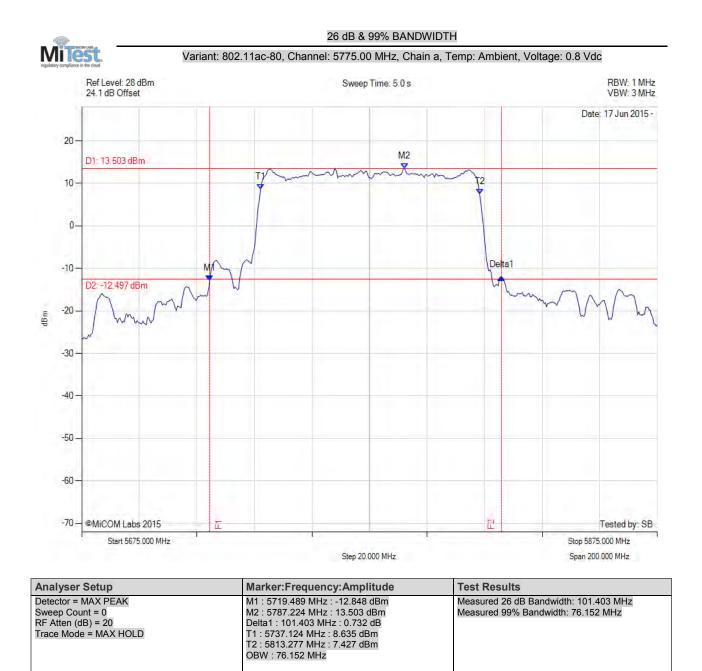


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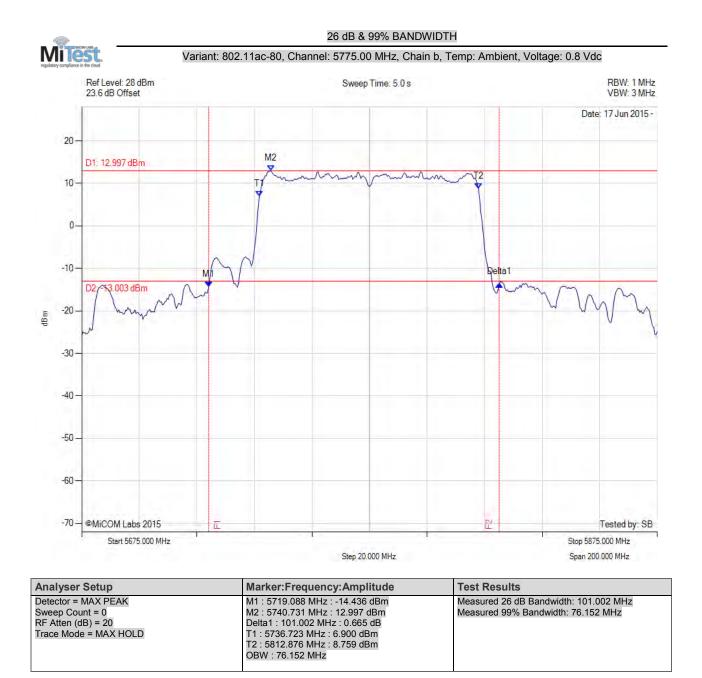


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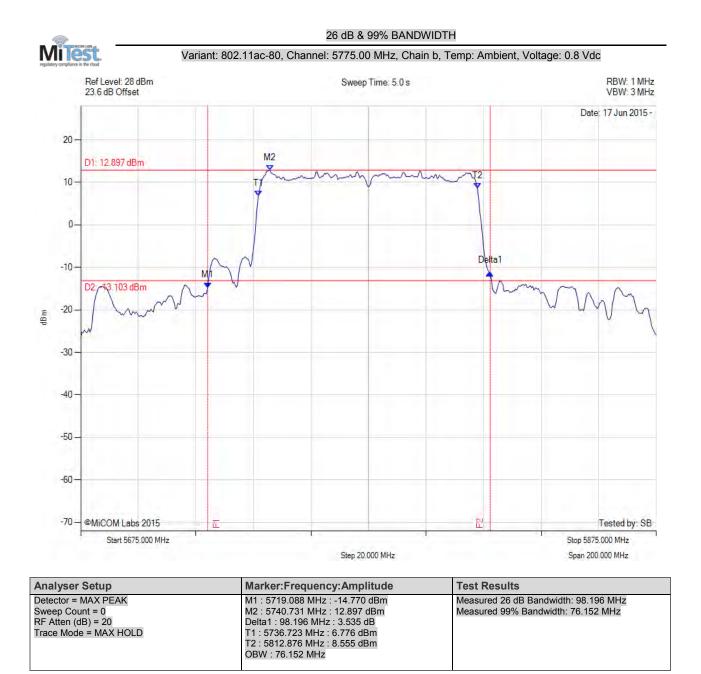


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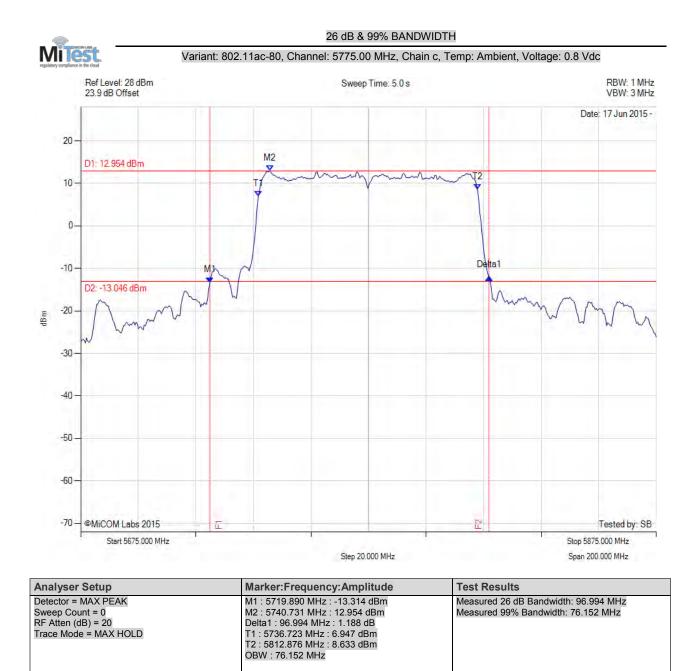


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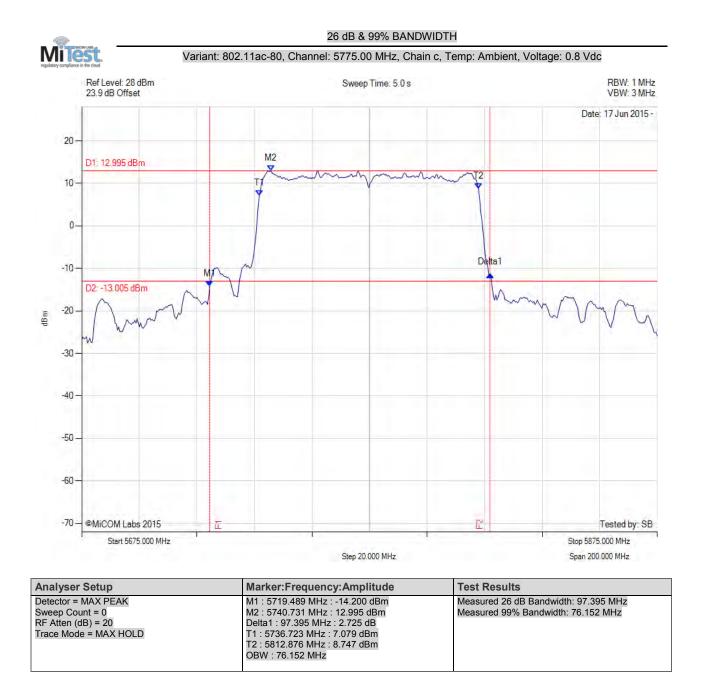


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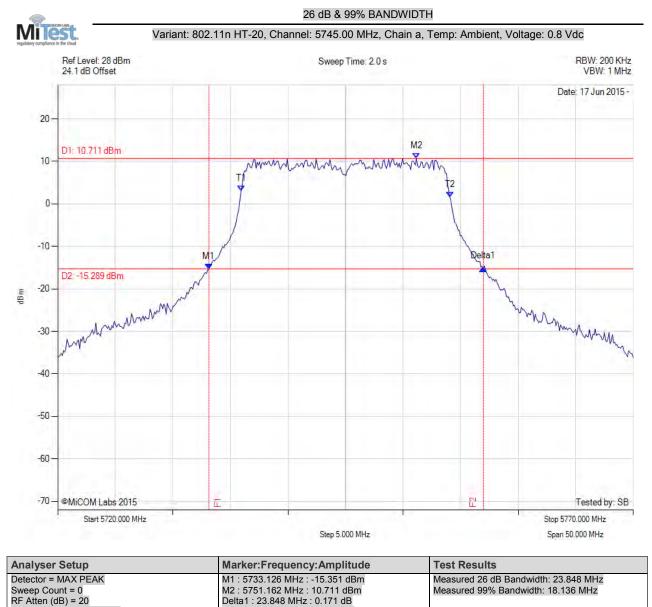


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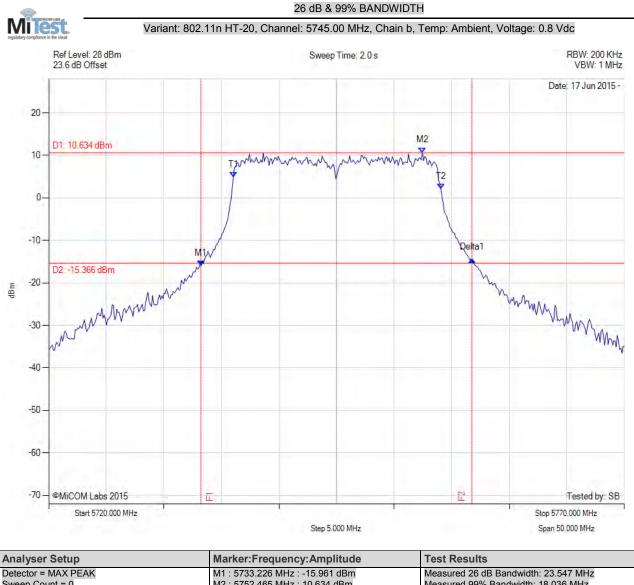


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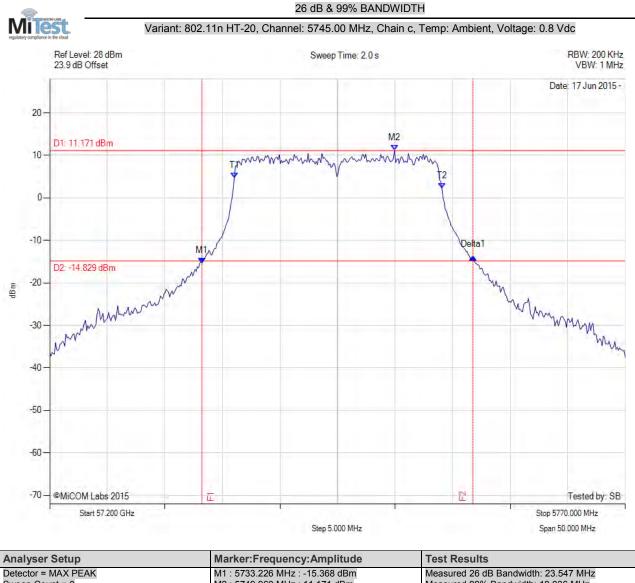
Analyser Setup	Marker:Frequency:Amplitude	Test Results	
Detector = MAX PEAK	M1 : 5733.226 MHz : -15.961 dBm	Measured 26 dB Bandwidth: 23.547 MHz	
Sweep Count = 0	M2 : 5752.465 MHz : 10.634 dBm	Measured 99% Bandwidth: 18.036 MHz	
RF Atten (dB) = 20	Delta1 : 23.547 MHz : 1.373 dB		
Trace Mode = MAX HOLD	T1 : 5736.032 MHz : 4.811 dBm		
	T2 : 5754.068 MHz : 2.129 dBm		
	OBW : 18.036 MHz		

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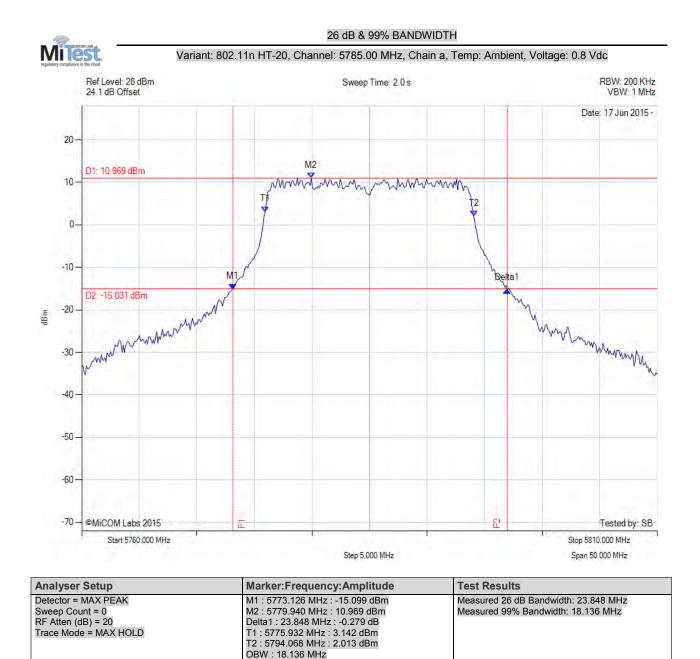
Analyser Setup	Marker:Frequency:Amplitude	Test Results	
Detector = MAX PEAK	M1 : 5733.226 MHz : -15.368 dBm	Measured 26 dB Bandwidth: 23.547 MHz	
Sweep Count = 0	M2 : 5749.960 MHz : 11.171 dBm	Measured 99% Bandwidth: 18.036 MHz	
RF Atten (dB) = 20	Delta1 : 23.547 MHz : 1.501 dB		
Trace Mode = MAX HOLD	T1 : 5736.032 MHz : 4.705 dBm		
	T2 : 5754.068 MHz : 2.304 dBm		
	OBW : 18.036 MHz		

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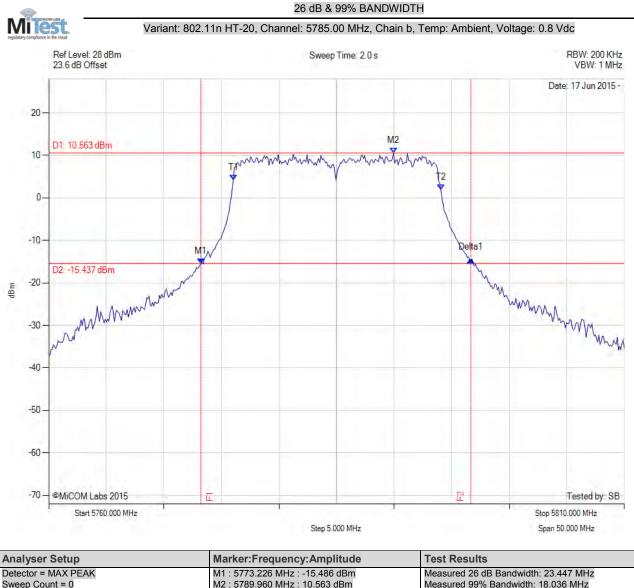


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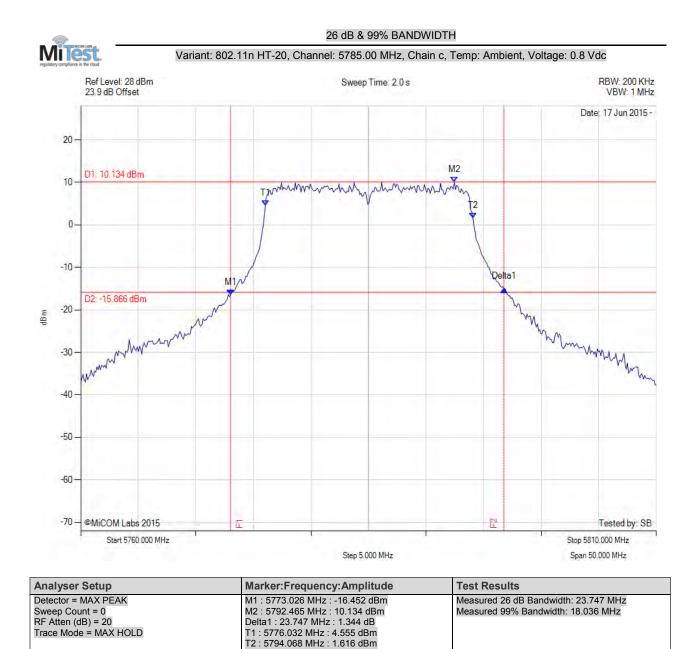
Analyser Setup	Marker:Frequency:Amplitude	Test Results	
Detector = MAX PEAK	M1 : 5773.226 MHz : -15.486 dBm	Measured 26 dB Bandwidth: 23.447 MHz	
Sweep Count = 0	M2 : 5789.960 MHz : 10.563 dBm	Measured 99% Bandwidth: 18.036 MHz	
RF Atten (dB) = 20	Delta1 : 23.447 MHz : 0.881 dB		
Trace Mode = MAX HOLD	T1 : 5776.032 MHz : 4.223 dBm		
	T2 : 5794.068 MHz : 1.901 dBm		
	OBW : 18.036 MHz		

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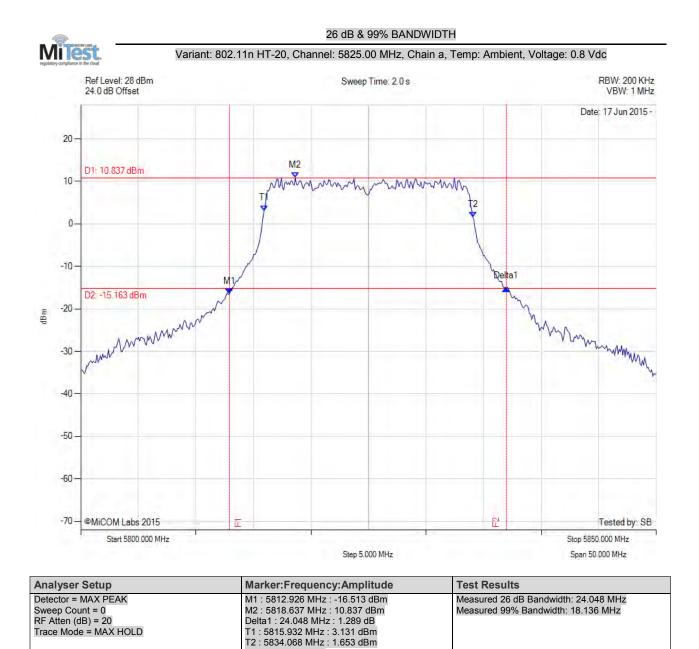
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OBW : 18.036 MHz



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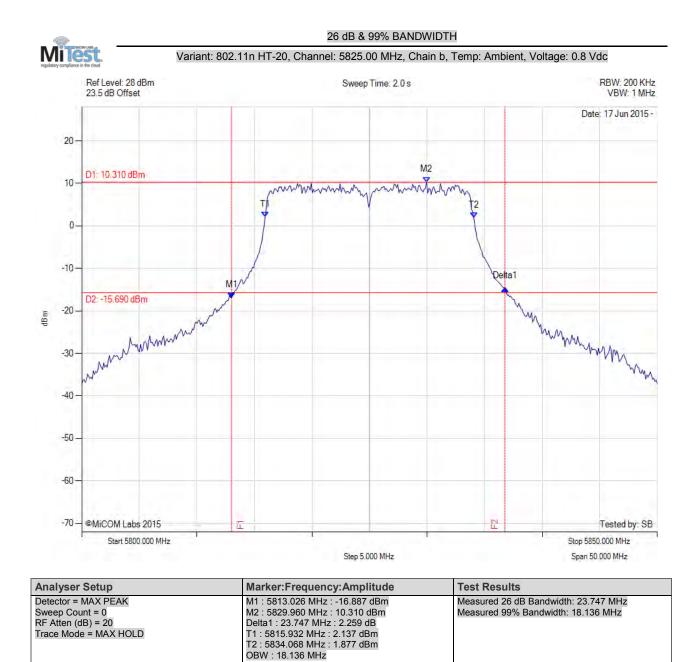
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OBW : 18.136 MHz



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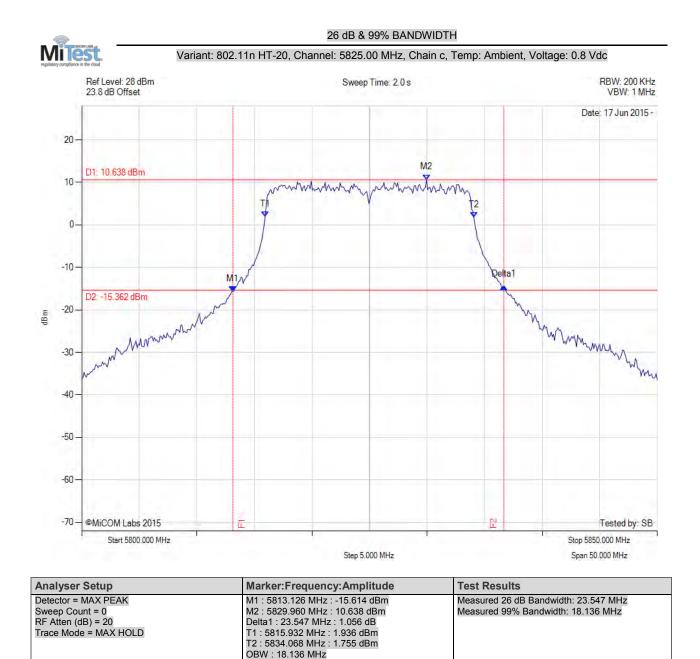


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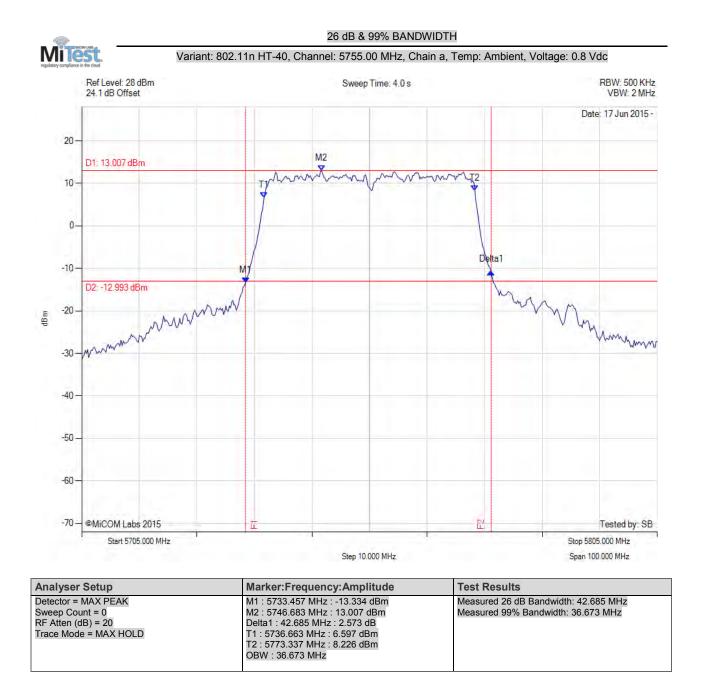


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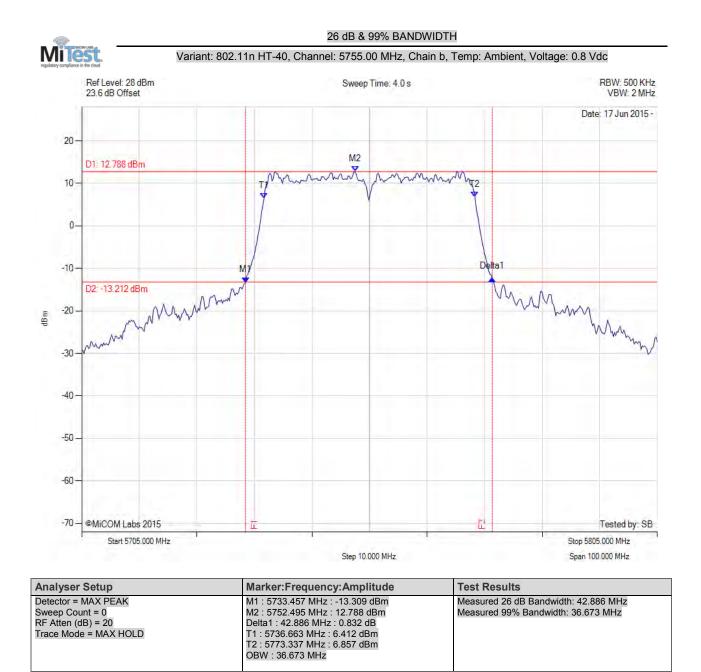


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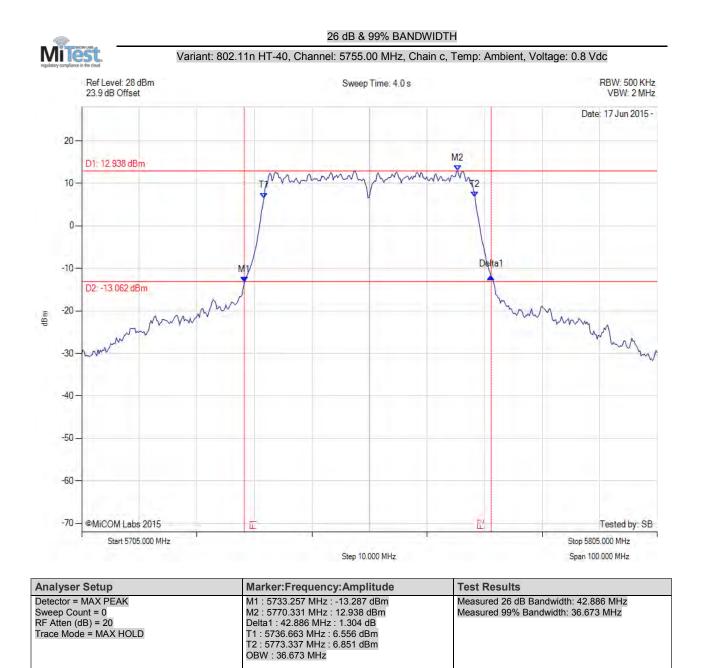


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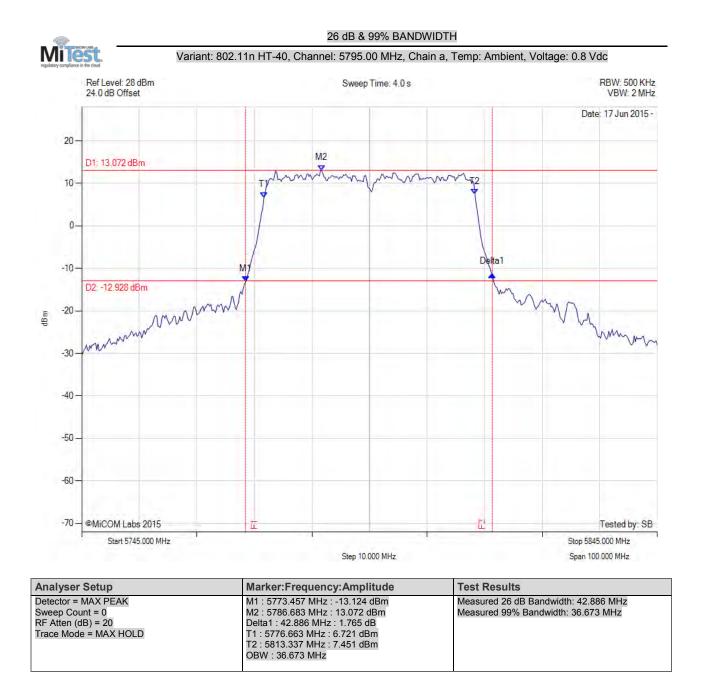


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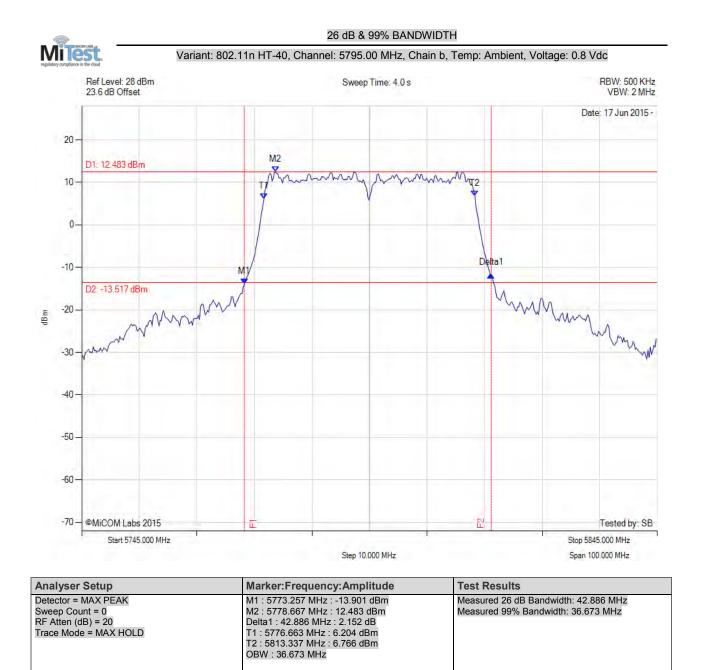


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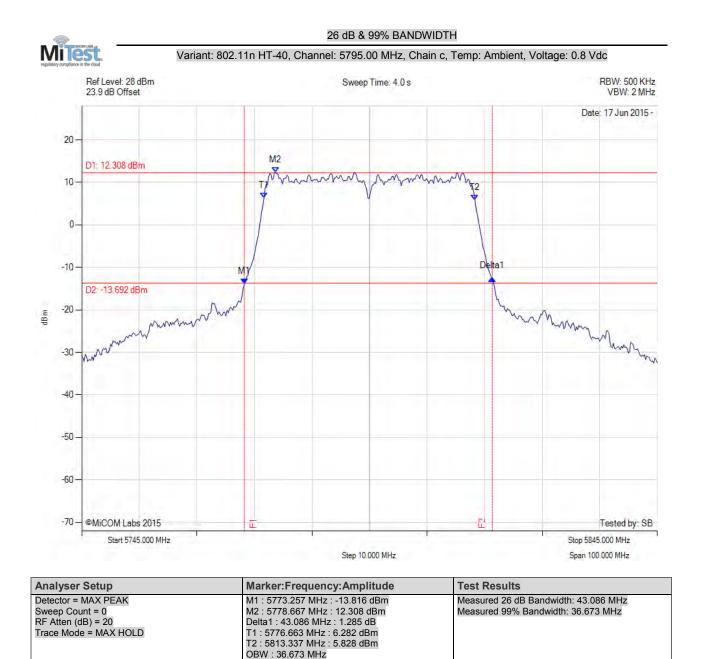


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