Test of Aruba Networks APINR155, APINR15P

To: FCC 47 CFR Part 15.407 & IC RSS-210

Test Report Serial No.: ARUB154-U2 Rev A

TEST REPORT

FROM

Test of Aruba Networks APINR155, APINR15P

to

To FCC 47 CFR Part 15.407 & IC RSS-210

Test Report Serial No.: ARUB154-U2 Rev A

Note: this report contains data with regard to the 5,150 - 5,250 MHz band for Aruba Networks, APINR155 and APINR15P Wireless Access Point. 2.4 and 5.8 GHz test data are reported in MiCOM Labs test report ARUB154-U1

This report supersedes None

Applicant: Aruba Networks
1344 Crossman Avenue
Sunnyvale, California 94089
USA

Product Function: Remote Access Point

Copy No: pdf Issue Date: 21st May 2013

This Test Report is Issued Under the Authority of;

MiCOM Labs, Inc.
440 Boulder Court, Suite 200
Pleasanton, CA 94566 USA
Phone: +1 (925) 462-0304
Fax: +1 (925) 462-0306
www.micomlabs.com

ACCREDITED
TEST CERTIFICATE #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

This page has been left intentionally blank

TABLE OF CONTENTS

ACCREDITATION, LISTINGS & RECOGNITION

TESTING ACCREDITATION

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


ilac-MRA

A2LA World Class Accreditation

The American Association for Laboratory Accreditation

Accredited Laboratory

A2LA has accredited

MICOM LABS

Pleasanton, CA

for technical competence in the field of

Electrical Testing

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

Presented this 27th day of March 2012.

President & CEO
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2013

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

RECOGNITION

MiCOM Labs, Inc has widely recognized Electrical testing capabilities. Our international recognition includes Conformity Assessment Body designation by APEC MRA** countries. Our test reports are widely accepted for global type approvals.

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

**APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement.
Is a 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
N/A – Not Applicable

**EU MRA – European Union Mutual Recognition Agreement.
Is a recognition agreement under which test lab is accredited to regulatory standards of the EU member countries.

**NB – Notified Body

PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard EN ISO/IEC Guide 65. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-02.pdf

USA Telecommunication Certification Body (TCB) - TCB Identifier – US0159

Industry Canada Certification Body - CAB Identifier – US0159

European Notified Body - Notified Body Identifier - 2280

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

DOCUMENT HISTORY

Document History		
Revision	**Date**	**Comments**
Draft		
Rev A	21st May 2013	Initial release

1. TEST RESULT CERTIFICATE

Applicant:	Aruba Networks 1344 Crossman Avenue Sunnyvale, California 94089 USA	Tested By:	MiCOM Labs, Inc. 440 Boulder Court Suite 200 Pleasanton California, 94566, USA
EUT:	Wireless Remote Access Point	Tel:	+1 925 462 0304
Model:	APINR155, APINR15P	Fax:	+1 925 462 0306
S/N:	CC00000002		
Test Date(s):	23rd - 30th March 2013	Website:	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC 47 CFR Part 15.407 & IC RSS-210	EQUIPMENT COMPLIES

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

Notes:

1. This document reports conditions under which testing was conducted and the results of testing performed.
2. Details of test methods used have been recorded and kept on file by the laboratory.
3. Test results apply only to the item(s) tested.

ACCREDITED
TESTING CERTIFICATE #2381.01

Approved & Released for MiCOM Labs, Inc. by:

Graeme Grieve
Quality Manager MiCOM Labs,

Gordon Hurst
President & CEO MiCOM Labs, Inc.

2. REFERENCES AND MEASUREMENT UNCERTAINTY

2.1. Normative References

Ref.	Publication	Year	Title
(i)	FCC 47 CFR Part 15.407	2012	Code of Federal Regulations
(ii)	FCC 06-96	June 2006	Memorandum Opinion and Order
(iii)	FCC OET KDB 662911	4th April 2011	Emissions Testing of Transmitters with Multiple Outputs in the Same Band
(iv)	Industry Canada RSS-210	2010	Low Power License-Exempt Radiocommunication Devices (All Frequency Bands): Category 1 Equipment
(v)	Industry Canada RSS-Gen	2010	General Requirements and Information for the Certification of Radiocommunication Equipment
(vi)	ANSI C63.4	2009	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
(vii)	CISPR 22/ EN 55022	2008 2006+A1:2007	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
(viii)	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
(ix)	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
(x)	ETSI TR 100 028	2001	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
(xi)	A2LA	July 2012	Reference to A2LA Accreditation Status – A2LA Advertising Policy
(xii)	FCC Public Notice – DA 02-2138	2002	Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices

2.2. Test and Uncertainty Procedures

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.

3. PRODUCT DETAILS AND TEST CONFIGURATIONS

3.1. Technical Details

Details	Description
Purpose:	Test of the Aruba Networks APINR155, APINR15P in the frequency range 5,150 - 5,250, 5,250 – 5,350 and 5,470 - 5725 MHz to FCC Part 15.407 and Industry Canada RSS-210 regulations.
Applicant:	Aruba Networks 1344 Crossman Avenue Sunnyvale, California 94089 USA
Manufacturer:	As applicant
Laboratory performing the tests:	MiCOM Labs, Inc. 440 Boulder Court, Suite 200 Pleasanton, California 94566 USA
Test report reference number:	ARUB154-U2 Rev A
Date EUT received:	22nd March 2013
Standard(s) applied:	FCC 47 CFR Part 15.407 & IC RSS-210
Dates of test (from - to):	23rd - 30th March 2013
No of Units Tested:	One
Type of Equipment:	802.11a/b/g/n Wireless Access Point 2.4 GHz: 2x2, 5 GHz: 3x3 Spatial Multiplexing MIMO configuration
Applicants Trade Name:	Wireless Remote Access Point
Model(s):	APINR155, APINR15P
Location for use:	Indoor only
Declared Frequency Range(s):	5,150 – 5,250, 5250 – 5,350 and 5,470 – 5,725 MHz
Hardware Rev	Rev A
Software Rev	armv5teart.ari
Type of Modulation:	Per 802.11 – OFDM
EUT Modes of Operation:	Legacy 802.11a, 802.11n HT-20, HT-40
Declared Nominal Output Power: (Average Power)	802.11a: Legacy +14 dBm 802.11n: HT-20 +14 dBm 802.11n: HT-40 +16 dBm
Transmit/Receive Operation:	Time Division Duplex
Rated Input Voltage and Current:	APINR155 12 Vdc 1.5 A APINR15P 54 Vdc 1.0 A
Operating Temperature Range:	Declared range 0° to +40ºC
ITU Emission Designator:	802.11a 16M8D1D 802.11n HT-20 17M9D1D 802.11n HT-40 36M3D1D
Equipment Dimensions:	185mm (W) x 245mm (H) x 65mm (D)
Weight:	700 g
Primary function of equipment:	Wireless Access Point for transmitting data and voice.

3.2. Scope of Test Program

Aruba Networks APINR155 and APINR15P Access Point RF Testing
The scope of the test program was to test the Aruba Networks APINR155, APINR15P Wireless LAN Access Point, 3X3 Spatial Multiplexing MIMO configurations in the frequency range 5,150 - 5,250, 5,250 – 5,350 and 5,470 – 5,725 MHz for compliance against FCC 47 CFR Part 15.407 and Industry Canada RSS-210 specifications.

FCC OET KDB Implementation
This test program implements the following FCC KDB – 662911 4/4/2011;
Emissions Testing of Transmitters with Multiple Outputs in the Same Band

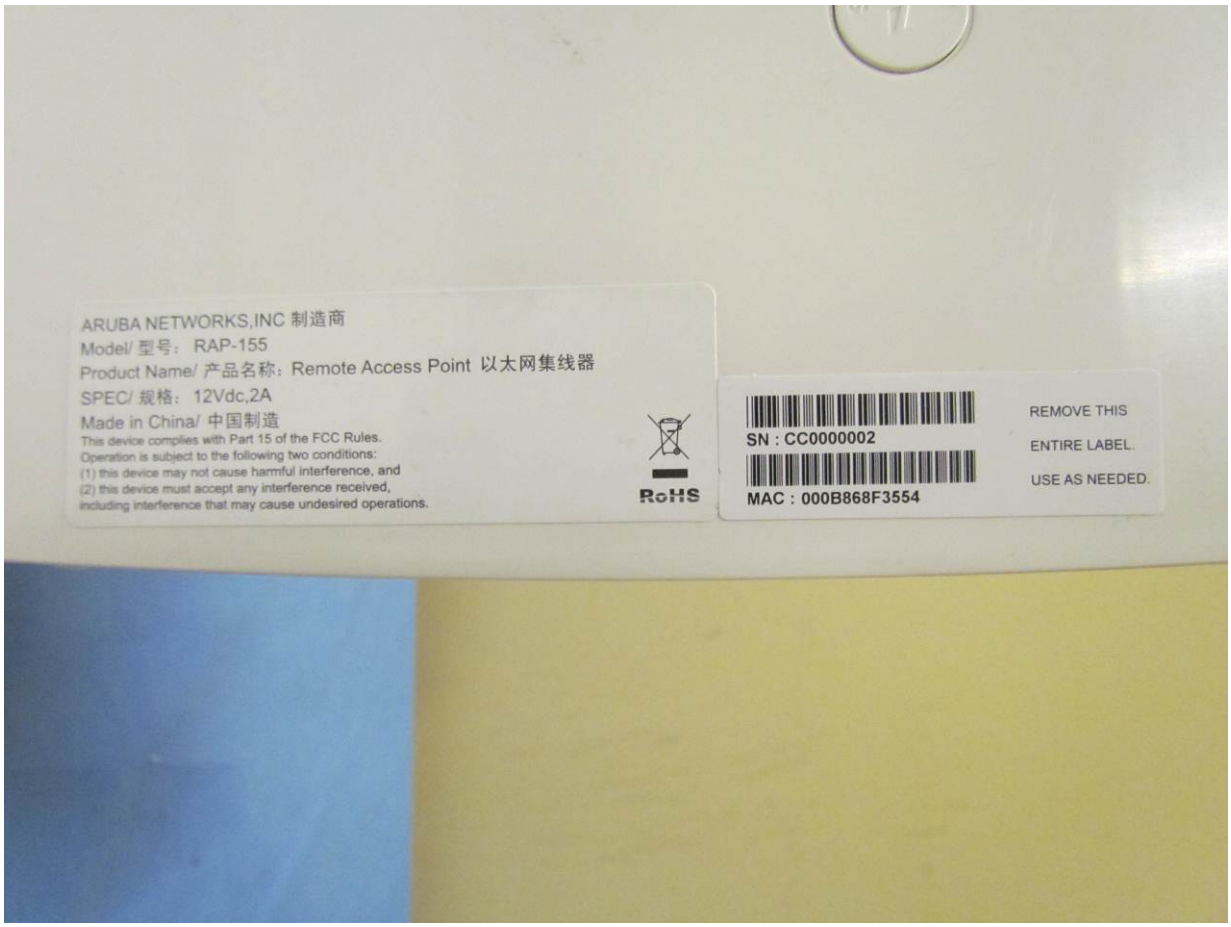
The KDB document provides guidance for measurements of conducted output emissions of devices that employ a single transmitter with multiple outputs in the same band, with the outputs occupying the same or overlapping frequency ranges. It applies to EMC compliance measurements on devices that transmit on multiple antennas simultaneously in the same or overlapping frequency ranges through a coordinated process. Examples include, but are not limited to, devices employing beam forming or multiple-input and multiple-output (MIMO.) This guidance applies to both licensed and unlicensed devices wherever the FCC rules call for conducted output measurements. Guidance is provided for in-band, out-of-band and spurious emission measurements.

This guidance does not apply to the multiple transmitters included in a composite device, such as a device that combines an 802.11 modem with a cell phone in one enclosure with each driving its own antenna.

APINR155 Wireless LAN Access Point

APINR155 Wireless LAN Access Point

APINR155, APINR15P Wireless LAN Access Point Label	Device has an electronic label



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

Type (EUT/ Support)	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
EUT	Wireless LAN Access Point	Aruba Networks	RAP-155	CC00000002
Support	Laptop PC	IBM	Thinkpad	None

3.4. Antenna Details

Model	Type	Gain (dBi)	Freq. Band (MHz)	Note
Integral	Omni Directional	3.0	5150 - 5850	3x per unit

3.5. Cabling and I/O Ports

Number and type of I/O ports

Port Type	Port Description	Qty	Screened (Yes/ No)	Length
Ethernet	Ethernet PoE	1	NO	> 10m
Ethernet	Ethernet	1	NO	3m-10m
12 Vdc Input	Power	1	NO	1m-3m
Serial RS 323 (RJ45)	Serial Console	1	NO	1m-3m
USB	USB port	1	NO	1m-3m

3.6. Test Configurations

Testing was performed to determine the highest power level versus bit rate. The variant with the highest power was used to exercise the product.

Matrix of test configurations

Operational Mode(s) (802.11)	Variant	Data Rates with Highest Power	Frequencies (MHz)
5150-5250	Legacy	6 MBit/s	5180/5200/5240
	HT-20	6.5 MCS	
	HT-40	13.5 MCS	5190, 5230

Spurious Emission and Band-Edge Test Strategy
Bands 5,150 – 5250

11a	11n HT-20	11n HT-40
SE 5180	SE 5180	SE 5190
SE 5200	SE 5200	
SE 5240	SE 5240	SE 5230
BE 5150	BE 5150	BE 5150

KEY:-

SE – Spurious Emissions

BE – Band-Edge

3.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:

1. Peak Power Spectral Density and Conducted Power

   In order to comply with the Peak Power Spectral Density for the 5150 – 5250 MHz band the EUT output power was set as summarized in the following tables;-

NART Power Settings

	5180 MHz	5200 MHz	5240 MHz
11a	11.0	11.5	11.5
11n HT-20	11.0	11.5	11.5

NART Power Settings

	5190 MHz	5230 MHz
11n HT-40	13.5	13.5

3.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

1. NONE

3.9. Subcontracted Testing or Third Party Data

1. NONE

4. TESTING EQUIPMENT CONFIGURATION(S)

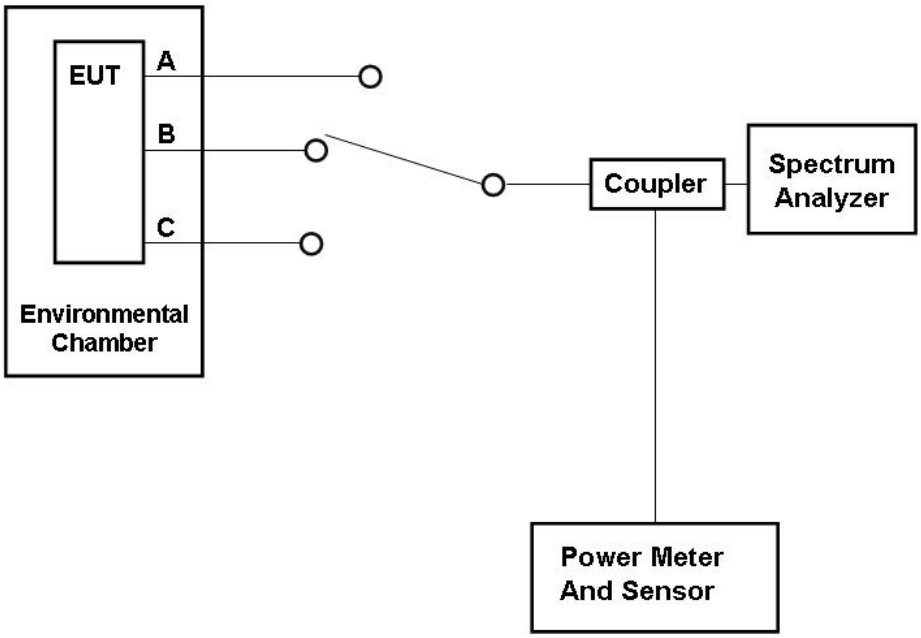
4.1. Conducted RF Emission Test Set-up

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

1. Section 6.1.1.1. 26 dB and 99% Bandwidth
2. Section 6.1.1.2. Maximum Conducted Output Power
3. Section 6.1.1.3. Peak Power Spectral Density
4. Section 6.1.1.4. Peak Excursion Ratio

Conducted Test Set-Up Pictorial Representation

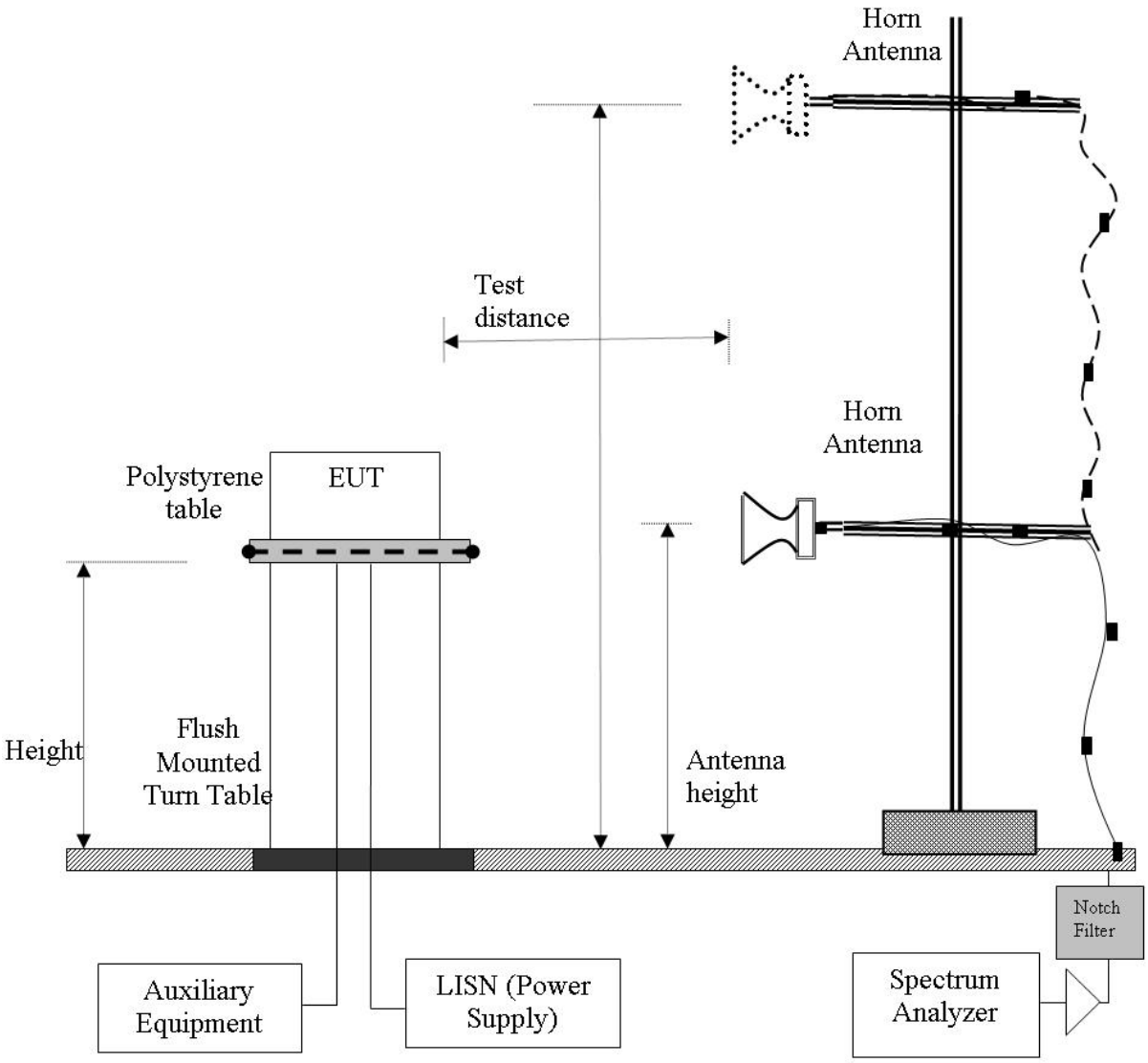
3 - Port Test Configuration



4.2. Radiated Spurious Emission Test Set-up > 1 GHz

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

Radiated Emission Measurement Setup – Above 1 GHz

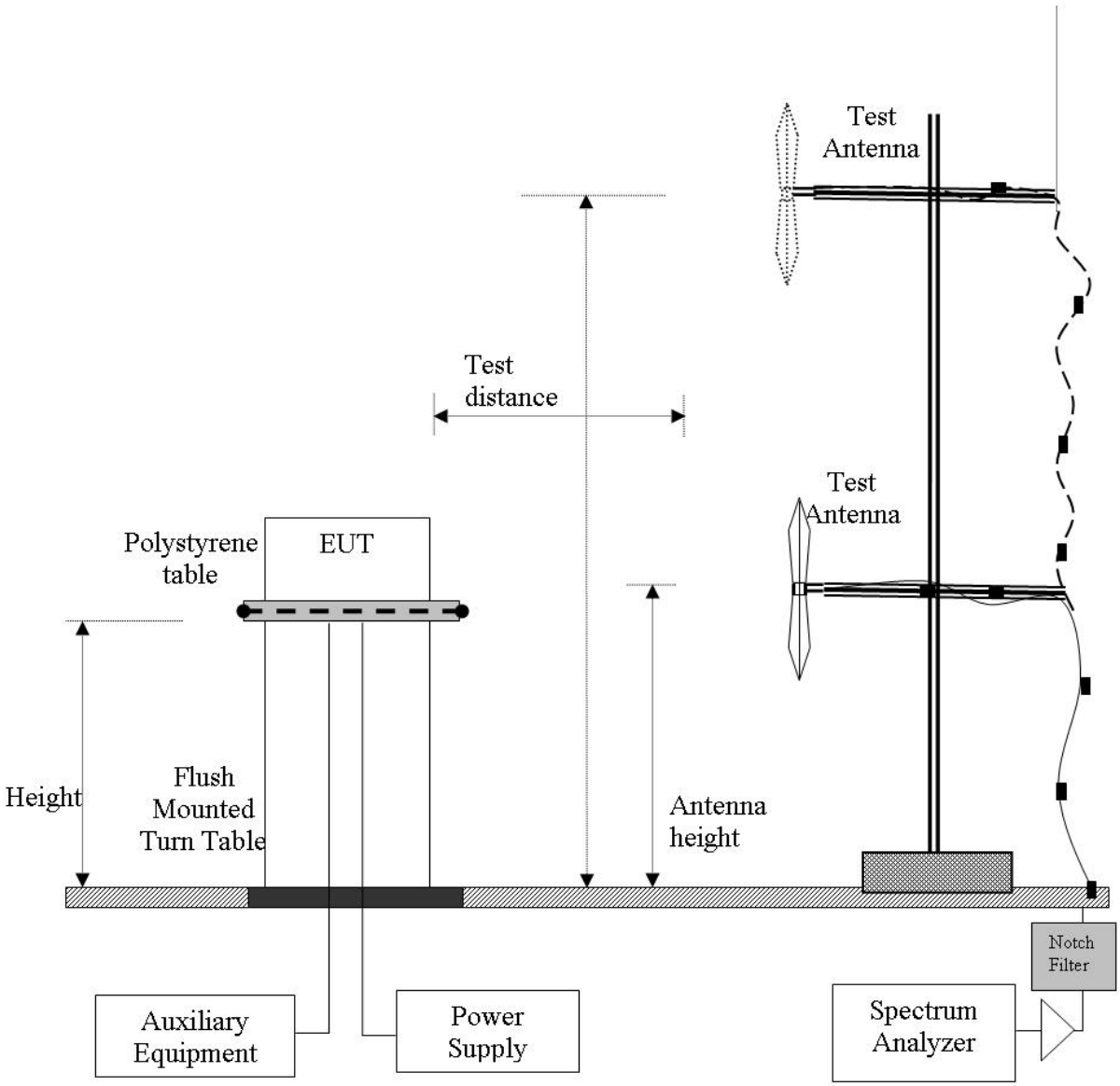


4.3. Digital Emissions Test Set-up (0.03 – 1 GHz)

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

1. Section 6.1.2.4. Digital Emissions

Digital Emission Measurement Setup – Below 1 GHz

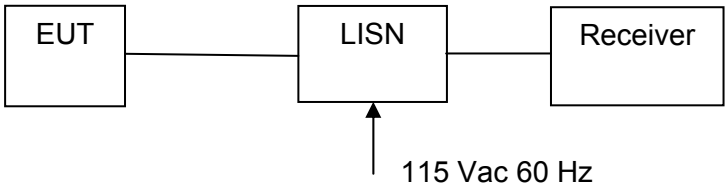


4.4. ac Wireline Emission Test Set-up

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

1. Section 6.1.3 ac Wireline Conducted Emissions

Conducted Test Set-Up Pictorial Representation



Measurement set up for ac Wireline Conducted Emissions Test

5. TEST SUMMARY

List of Measurements

The following table represents the list of measurements required under the **FCC CFR47 Part 15.407** and **Industry Canada RSS-210**.and **Industry Canada RSS-Gen**.

Section(s)	Test Items	Description	Condition	Result	Test Report Section
15.407(a) **A9.2(2)** **4.4**	26dB and 99% Emission BW	Emission bandwidth measurement	Conducted	Complies	6.1.1.1 A.1.1
15.407(a) **A9.2(2)** **4.6**	Maximum Conducted Output Power	Power Measurement	Conducted	Complies	6.1.1.2
15.407(a) **A9.2(2)**	Peak Power Spectral Density	PPSD	Conducted	Complies	6.1.1.3 A.1.2
15.407(a)(6)	Peak Excursion Ratio	<13dB in any 1MHz bandwidth	Conducted	Complies	6.1.1.4 A.1.3
15.407(g) **15.31** **2.1** **4.5**	Frequency Stability	Limits: contained within band of operation at all times.	Applicant declaration	Complies	6.1.1.5
15.407(f) **5.5**	Radio Frequency Radiation Exposure	Exposure to radio frequency energy levels, Maximum Permissible Exposure (MPE)	Conducted	See included MPE exhibit	--

List of Measurements (continued)

The following table represents the list of measurements required under the **FCC CFR47 Part 15.407** and **Industry Canada RSS-210** and **Industry Canada RSS-Gen**.

Section(s)	Test Items	Description	Condition	Result	Test Report Section
15.407(b)(2) **15.205(a)** **15.209(a)** **2.2** **2.6** **A9.3(2)** **4.7**	Radiated Emissions		Radiated		6.1.2
	Transmitter Radiated Spurious Emissions	Emissions above 1 GHz		Complies	*6.1.2.1* *6.1.2.2* *6.1.2.3*
	Radiated Band Edge	Band edge results		Complies	*6.1.2.1* *6.1.2.2* *6.1.2.3*
15.407(b)(6) **15.205(a)** **15.209(a)** **2.2**	Radiated Emissions	Emissions <1 GHz (30M-1 GHz)		Complies	*6.1.2.4*
15.407(b)(6) **15.207** **7.2.2**	AC Wireline Conducted Emissions 150 kHz–30 MHz	Conducted Emissions	Conducted	Complies	6.1.3

Note 1: Test results reported in this document relate only to the items tested

Note 2: The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria

Note 3: Section 3.7 Equipment Modifications highlights the equipment modifications that were required to bring the product into compliance with the above test matrix

6. TEST RESULTS

6.1. Device Characteristics

6.1.1. Conducted Testing

6.1.1.1. 26 dB and 99 % Bandwidth

Conducted Test Conditions for 26 dB and 99% Bandwidth			
Standard:	FCC CFR 47:15.407	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	26 dB and 99 % Bandwidth	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.407 (a)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	KDB 789033 - D01 DTS General UNII Test Procedures v01		

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. KDB 789033 Section 5.1 Emission Bandwidth was used in order to prove compliance. The Resolution Bandwidth was set to approximately 1% of the emission bandwidth.

Measurement Results for 26 dB and 99 % Operational Bandwidth(s)

Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	802.11a	**Duty Cycle (%):**	100%
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable		
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz) Port(s)				26 dB Bandwidth (MHz)			
MHz	a	b	c	d	Highest	Lowest		
5180.0	22.745	22.144	22.144	--	22.745	22.144		
5200.0	22.244	22.345	21.944	--	22.345	21.944		
5240.0	22.244	22.345	22.144	--	22.345	22.144		

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				99% Bandwidth (MHz)			
MHz	a	b	c	d	Highest	Lowest		
5180.0	16.733	16.633	16.633	--	16.733	16.633		
5200.0	16.733	16.633	16.533	--	16.733	16.533		
5240.0	16.733	16.633	16.633	--	16.733	16.633		

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

Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	802.11n HT-20	**Duty Cycle (%):**	100%
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable		
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz) Port(s)				26 dB Bandwidth (MHz)			
MHz	a	b	c	d	Highest	Lowest		
5180.0	23.146	22.846	23.146	--	23.146	22.846		
5200.0	23.347	23.146	22.846	--	23.347	22.846		
5240.0	23.647	23.447	23.146	--	23.647	23.146		

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

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

Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	802.11n HT-40	**Duty Cycle (%):**	100%
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable		
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz) Port(s)				26 dB Bandwidth (MHz)			
MHz	a	b	c	d	Highest	Lowest		
5190.0	43.888	43.687	44.890	--	44.890	43.687		
5230.0	44.088	43.687	44.289	--	44.289	43.687		

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				99% Bandwidth (MHz)			
MHz	a	b	c	d	Highest	Lowest		
5190.0	36.072	36.072	36.273	--	36.273	36.072		
5230.0	36.273	36.273	36.273	--	36.273	36.273		

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

Specification

Limits

FCC, Part 15 §15.407 (a)(1), (a)(2) and Industry Canada RSS-210 § A9.2(2)

(a)(1) For the band 5.15-5.25 GHz the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or +4 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed +4 dBm in any 1 megahertz band.

(a)(2) For the 5.25-5.35 GHz band the maximum conducted output power over the frequency band 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 peak power spectral density shall not exceed +11 dBm in any 1 megahertz band.

Industry Canada RSS-Gen 4.4

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

Traceability

Test Equipment Used
0158, 0287, 0252, 0313, 0314, 0070, 0116, 0117

6.1.1.2. Maximum Conducted Output Power

Conducted Test Conditions for Maximum Conducted Output Power			
Standard:	FCC CFR 47:15.407	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Maximum Conducted Output Power	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.407 (a)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	KDB 789033 - D01 DTS General UNII Test Procedures v01		

Test Procedure for Maximum Conducted Output Power Measurement

Method PM (Measurement using an RF average power meter). Section C) 4) of 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 cable losses and offsets were taken into consideration in the measured result. All operational modes and frequency bands were measured independently and the resultant calculated. For multiple outputs, the measurements were made simultaneously on each output port and summed in a linear fashion. This technique was used in order to prove compliance.

Antenna Beam and Non-Beam Forming Power Levels

15. 407 (a)(1), (a) (2) Operation with directional antenna gains greater than 6 dBi.

If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Further FCC KDB 662911 D01 Multiple Transmitter Output v01 requires that the gain of antennas transmitting the same data (legacy 802.11a mode) must be increased by 10 * Log (N) when N is the number of antenna elements.

Operating Frequency Band 5150-5250 MHz

5150 – 5250 MHz Uncorrelated Operation (MIMO)

Antenna	Gain	Max. Allowable Conducted Peak Power (dBm)		Maximum EIRP
(dB)	(dBi)	Uncorrelated	Max. Power Per Chain	(dBm)
Integral	3.0	+17.00	+12.23	+20.0

5150 – 5250 MHz Correlated Operation (Non-MIMO i.e. Legacy)

Antenna	Gain dBi	Antenna Gain Increase V's No. Antenna Ports		Total Gain	Max. Allowable Conducted Peak Power	Maximum EIRP
(dB)		Ports	dB	dBi	∑ (dBm)	(dBm)
Integral	3.0	3	4.77	7.77	+15.33	+23.0

The RAP-155 and RAP-155P does not implement beam-forming

Maximum Transmit (Conducted) Power, FCC Limits and Industry Canada Limits

Bands 5150 – 5250 MHz

FCC Limits

Conducted Power Limit lesser of: 50 mW or 4 dBm + 10 log (B) dBm. B is the 26 dB emission bandwidth in MHz.

Mode	Frequency Range (MHz)	Minimum 26 dB Bandwidth (MHz)	4 + 10 Log (B) (dBm)	Limit (dBm)
a	5150 – 5250	21.94	+17.41	+17.00
HT-20		22.85	+17.59	+17.00
HT-40		43.67	+20.40	+17.00

Industry Canada Limits

EIRP Limit 5150 – 5250 MHz: Lesser of 200 mW (+23 dBm) or 10 + 10 Log (B) dBm. B is the 99% emission bandwidth in MHz.

Mode	Frequency Range (MHz)	Minimum 99 % Bandwidth (MHz)	4 + 10 Log (B) (dBm)	Limit (dBm)
a	5150 – 5250	16.53	+16.18	+16.18
HT-20		17.74	+16.49	+16.49
HT-40		36.07	+19.57	+17.00

Equipment Configuration for Peak Transmit Power			
Variant:	802.11a	**Duty Cycle (%):**	100%
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	3
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable		
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5180.0	8.24	9.80	8.82	--	13.77	22.144	17.00	-3.23	11.00
5200.0	9.00	10.07	8.91	--	14.13	21.944	17.00	-2.87	11.50
5240.0	8.65	10.34	7.60	--	13.78	22.144	17.00	-3.22	11.50

Variant:	802.11n HT-20	**Duty Cycle (%):**	100%
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	3
Modulation:	OFDM	**Beam Forming Gain (Y):**	N/A
TPC:	N/A		
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5180.0	8.48	9.80	8.83	--	13.84	22.846	17.00	-3.16	11.00
5200.0	9.07	10.07	8.88	--	14.14	22.846	17.00	-2.86	11.50
5240.0	8.50	10.17	7.50	--	13.64	23.146	17.00	-3.36	11.50

Variant:	802.11n HT-40	**Duty Cycle (%):**	100%
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	3
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable		
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5190.0	11.64	12.41	10.90	--	16.46	43.687	17.00	-0.54	13.50
5230.0	11.69	12.00	10.98	--	16.35	43.687	17.00	-0.65	13.50

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

Measurement Results for Maximum Conducted Output Power

Specification Limits

FCC, Part 15 §15.407 (a)(1), (a)(2) and Industry Canada RSS-210 § A9.2(2)

(a)(1) For the band 5.15-5.25 GHz the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or +4 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed +4 dBm in any 1 megahertz band.

(a)(2) For the 5.25-5.35 and 5470-5725 MHz GHz band the maximum conducted output power over the frequency band 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 peak power spectral density shall not exceed +11 dBm in any 1 megahertz band.

Industry Canada RSS-210 §A9.2(2)
For the band 5150-5250 MHz, the maximum equivalent isotropically radiated power (e.i.r.p.) shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

For the band 5250-5350 MHz and 5470-5725 MHz, the maximum conducted output power shall not exceed 250 mW or 11 + 10 log10 B, dBm, whichever power is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band. The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

Traceability

Test Equipment Used
0158, 0287, 0252, 0313, 0314, 0070, 0116, 0117

6.1.1.3. Peak Power Spectral Density

Conducted Test Conditions for Power Spectral Density			
Standard:	FCC CFR 47:15.407	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Power Spectral Density	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.247 (a)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	KDB 789033 - D01 DTS General UNII Test Procedures v01		

Test Procedure for Power Spectral Density

The In-Band power spectral density was measured using the measure and sum approach per FCC KDB 662911 (D01 Multiple Transmitter Output v01.)

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 N 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 calculated on a computer, and the results read back into the spectrum analyzer as a data file to produce a representative plot of total spectral power density.

Calculated Power = A + 10 log (1/x) dBm

A = Total Power Spectral Density [10 Log10 (10a/10 + 10 b/10 + 10c/10 + 10d/10)]

x = Duty Cycle

Equipment Configuration for Peak Power Spectral Density			
Variant:	802.11a	**Duty Cycle (%):**	100%
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable		
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBm) Port(s)				Calculated Total Power Spectral Density (dBm)	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**Σ Port(s)**	**dBm**	**dB**
5180.0	-2.554	-1.022	-2.007	--	2.957	≤ 4.00	-1.04
5200.0	-2.071	-0.980	-1.861	--	3.160	≤ 4.00	-0.84
5240.0	-2.175	-0.458	-3.338	--	2.944	≤ 4.00	-1.06

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

Equipment Configuration for Peak Power Spectral Density			
Variant:	802.11n HT-20	**Duty Cycle (%):**	100%
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable		
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBm) Port(s)				Calculated Total Power Spectral Density (dBm)	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**Σ Port(s)**	**dBm**	**dB**
5180.0	-2.978	-1.366	-2.071	--	2.682	≤ 4.00	-1.32
5200.0	-2.394	-1.121	-1.999	--	2.966	≤ 4.00	-1.03
5240.0	-2.778	-0.817	-3.492	--	2.561	≤ 4.00	-1.44

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

Equipment Configuration for Peak Power Spectral Density			
Variant:	802.11n HT-40	**Duty Cycle (%):**	100%
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable		
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBm) Port(s)				Calculated Total Power Spectral Density (dBm)	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**Σ Port(s)**	**dBm**	**dB**
5190.0	-2.459	-1.558	-3.071	--	2.453	≤ 4.00	-1.55
5230.0	-2.402	-2.042	-3.257	--	2.234	≤ 4.00	-1.77

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

Specification

FCC, Part 15 §15.407 (a)(1), (a)(2)
5150 – 5250 MHz
(a)(1) The peak power spectral density shall not exceed +4 dBm in any 1 megahertz band.

5250 – 5350 MHz & 5470 – 5725 MHz
(a)(2) The peak power spectral density shall not exceed +11 dBm in any 1 megahertz band.

Industry Canada RSS-210 § **A9.2(1), A9.2(2)**
5150 – 5250 MHz
§ **A9.2(1)** The eirp spectral density shall not exceed +10 dBm in any 1 MHz band

5250 – 5350 MHz & 5470 – 5725 MHz
§ **A9.2(2)** The power spectral density shall not exceed +11 dBm in any 1 MHz band

Traceability

Test Equipment Used
0158, 0287, 0252, 0313, 0314, 0070, 0116, 0117

6.1.1.4. Peak Excursion Ratio

Conducted Test Conditions for Peak Excursion Ratio			
Standard:	FCC CFR 47:15.407	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Peak Excursion Ratio	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.407 (a)(6)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	KDB 789033 - D01 DTS General UNII Test Procedures v01		

Test Procedure for Peak Excursion Ratio

Compliance with the peak excursion requirement is demonstrated by confirming the ratio of the maximum of the peak-hold spectrum to the maximum of the average spectrum during continuous transmission. Section F) of KDB 789033 was used in order to prove compliance. This is a conducted measurement using a spectrum analyzer using dual traces. Peak Excursion Ratio is the difference in amplitude (dB) between both traces; The following identifies two spectrum traces on the same plot. Trace 1 is the max hold Peak detector, and Trace 2 is the recalled trace data from Peak Power Spectral Density measurements. Each frequency and operational mode is recalled in order to prove compliance.

Equipment Configuration for Peak Excursion Ratio			
Variant:	802.11a	**Duty Cycle (%):**	100%
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable		
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Peak Excursion (dB) Port(s)				Ratio (dB)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	dB	MHz
5180.0	8.75	--	--	--	8.75	8.75	13.0	-4.25

Equipment Configuration for Peak Excursion Ratio			
Variant:	802.11n HT-20	**Duty Cycle (%):**	100%
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable		
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Peak Excursion (dB) Port(s)				Ratio (dB)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	dB	MHz
5180.0	8.86	--	--	--	8.86	8.86	13.0	-4.14

Equipment Configuration for Peak Excursion Ratio			
Variant:	802.11n HT-40	**Duty Cycle (%):**	100%
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable		
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Peak Excursion (dB) Port(s)				Ratio (dB)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	dB	MHz
5190.0	9.07	--	--	--	9.07	9.07	13.0	-3.93

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

Specification

Limits

§15.407 (a)(6) The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified in this paragraph) shall not exceed 13dB across any 1MHz bandwidth or the emission bandwidth whichever is less

Traceability

Test Equipment Used
0158, 0287, 0252, 0313, 0314, 0070, 0116, 0117

6.1.1.5. Frequency Stability

FCC, Part 15 Subpart C §15.407(g)
Industry Canada RSS-210 §2.1

Test Procedure

The manufacturer of the equipment is responsible for ensuring that the frequency stability is such that emissions are always maintained within the band of operation under all conditions.

Manufacturer Declaration

The frequency stability of the reference oscillator sets the frequency stability of the RF transceiver signals. Therefore all of the RF signals should have ±20ppm stability.
This stability accounts for room temp tolerance of the crystal oscillator circuit, frequency variation across temperature, and crystal ageing.

±20ppm at 5.250 GHz translates to a maximum frequency shift of ±105 KHz. As the edge of the channels is at least one MHz from either of the band edges, ±105 KHz is more than sufficient to guarantee that the intentional emission will remain in the band over the entire operating range of the EUT.

Specification

Limits

§15.407 (g) Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

6.1.2. Radiated Emission Testing

FCC, Part 15 Subpart C §15.407(b)(2), §15.205(a)/15.209(a)
Industry Canada RSS-210 §A9.3(2); §2.2; §2.6; RSS-Gen §4.7

Test Procedure
Testing was performed in a 3-meter anechoic chamber. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. Preliminary emissions were recorded with in Spectrum Analyzer mode, using a maximum peak detector while in peak hold mode. Depending on the frequency band spanned a notch filter and/or waveguide filter was used to remove the fundamental frequency.

Emissions nearest the limits were chosen for maximization and formal measurement using a CISPR compliant receiver. Emissions above 1000 MHz are measured utilizing a CISPR compliant average detector with a tuned receiver, using a bandwidth of 1 MHz. Emissions from 30 MHz – 1000 MHz are measured utilizing a CISPR compliant quasi-peak detector with a tuned receiver, using a bandwidth of 120 kHz. Only the highest emissions relative to the limit are listed.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

FS = R + AF + CORR – FO

FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor

CORR = Correction Factor = CL – AG + NFL

CL = Cable Loss
AG = Amplifier Gain
FO = Distance Falloff Factor
NFL = Notch Filter Loss or Waveguide Loss

Field Strength Calculation Example:

Given receiver input reading of 51.5 dBμV; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength of the measured emission is:

FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3 dBμV/m

Conversion between dBμV/m (or dBμV) and μV/m (or μV) are done as:

Level (dBμV/m) = 20 * Log (level (μV/m))

40 dBμV/m = 100 μV/m
48 dBμV/m = 250 μV/m

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

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

where P is the EIRP in Watts

Therefore: -27 dBm/MHz = 68.23 dBuV/m

Note: The data in this Section identifies that the EUT is in compliance with the -27dBm/MHz EIRP limit (68.23 dBµV/m) for out of band emissions. All out of band emissions are less than 68.23 dB µV/m.

Operational Mode
As 802.11a mode has the highest power spectral density this mode was selected for radiated emissions.

Specification

Radiated Spurious Emissions

15.407 (b)(2). All emissions outside of the 5,150-5,350MHz band shall not exceed an EIRP of -27dBm/MHz.

FCC §15.205 (a) Except as shown in paragraph (d) of 15.205 (a), only spurious emissions are permitted in any of the frequency bands listed.

FCC §15.205 (a) Except as shown in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

FCC §15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

RSS-210 §A9.3(2) For transmitters operating in the 5250-5350 MHz band, all emissions outside the 5150-5350 MHz band shall not exceed -27 dBm/MHz e.i.r.p. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band shall not exceed out of band emission limit of 27 dBm/MHz e.i.r.p. in the 5150-5250 MHz band in order to operate indoor/outdoor, or alternatively shall comply with the spectral power density for operation within the 5150-5250 MHz band and shall be labeled “for indoor use only”.

RSS-Gen §4.7 The search for unwanted emissions shall be from the lowest frequency internally generated or used in the device (local oscillator, intermediate of carrier frequency), or from 30 MHz , whichever is the lowest frequency, to the 5th harmonic of the highest frequency generated without exceeding 40 GHz.

RSS-Gen §6 Receiver Spurious Emission Standard
If a radiated measurement is made, all spurious emissions shall comply with the limits of the following Table. The resolution bandwidth of the spectrum analyzer shall be 100 kHz for spurious emission measurements below 1.0 GHz and 1.0 MHz for measurements above 1.0 GHz

Table 1: FCC 15.209 Spurious Emissions Limits

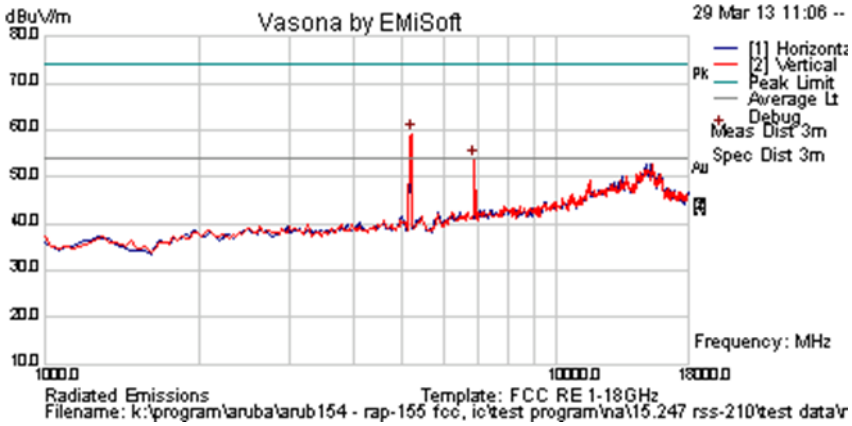
Frequency (MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)	Measurement Distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Traceability:

Test Equipment Used
0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312

6.1.2.1. Radiated Spurious - Integral Antenna

Test Freq.	5180 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	22.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	Target	**Press. (mBars)**	1005
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT Position = Vertical; AC/DC Adapter on table; Ethernet cables plugged into EUT;		
Test Notes 2			

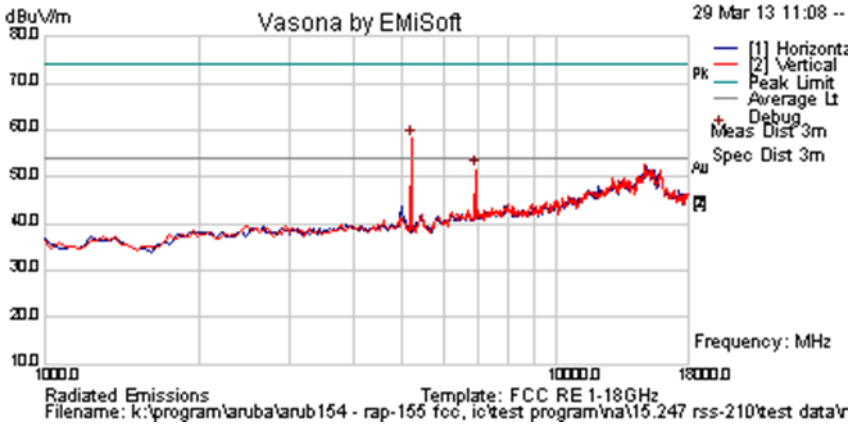


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	64.4	4.8	-9.9	59.3	Peak [Scan]	V	100	0				FUND
6893.78758	54.9	5.6	-6.5	54.0	Peak [Scan]	V	100	0				NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5200 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	22.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	Target	**Press. (mBars)**	1005
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT Position = Vertical; AC/DC Adapter on table; Ethernet cables plugged into EUT;		
Test Notes 2			

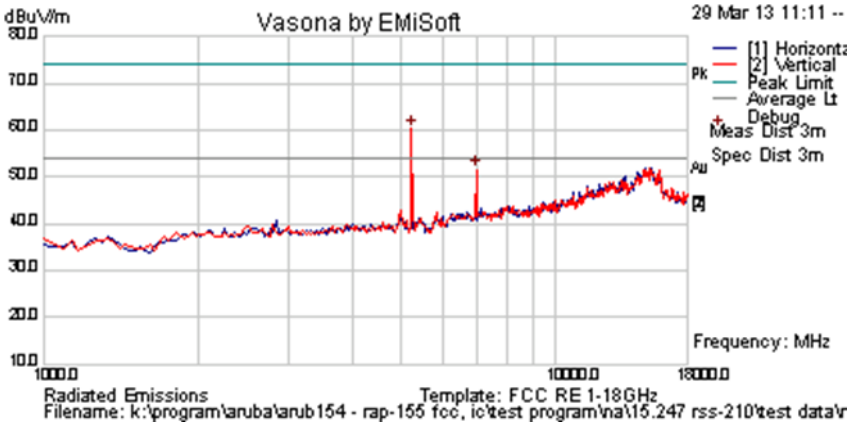


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	63.3	4.8	-9.9	58.2	Peak [Scan]	V	100	0				FUND
6927.85571	52.4	5.7	-6.5	51.6	Peak [Scan]	V	100	0				NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5240 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	22.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	36
Power Setting	Target	**Press. (mBars)**	1005
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT Position = Vertical; AC/DC Adapter on table; Ethernet cables plugged into EUT;		
Test Notes 2			



Formally measured emission peaks

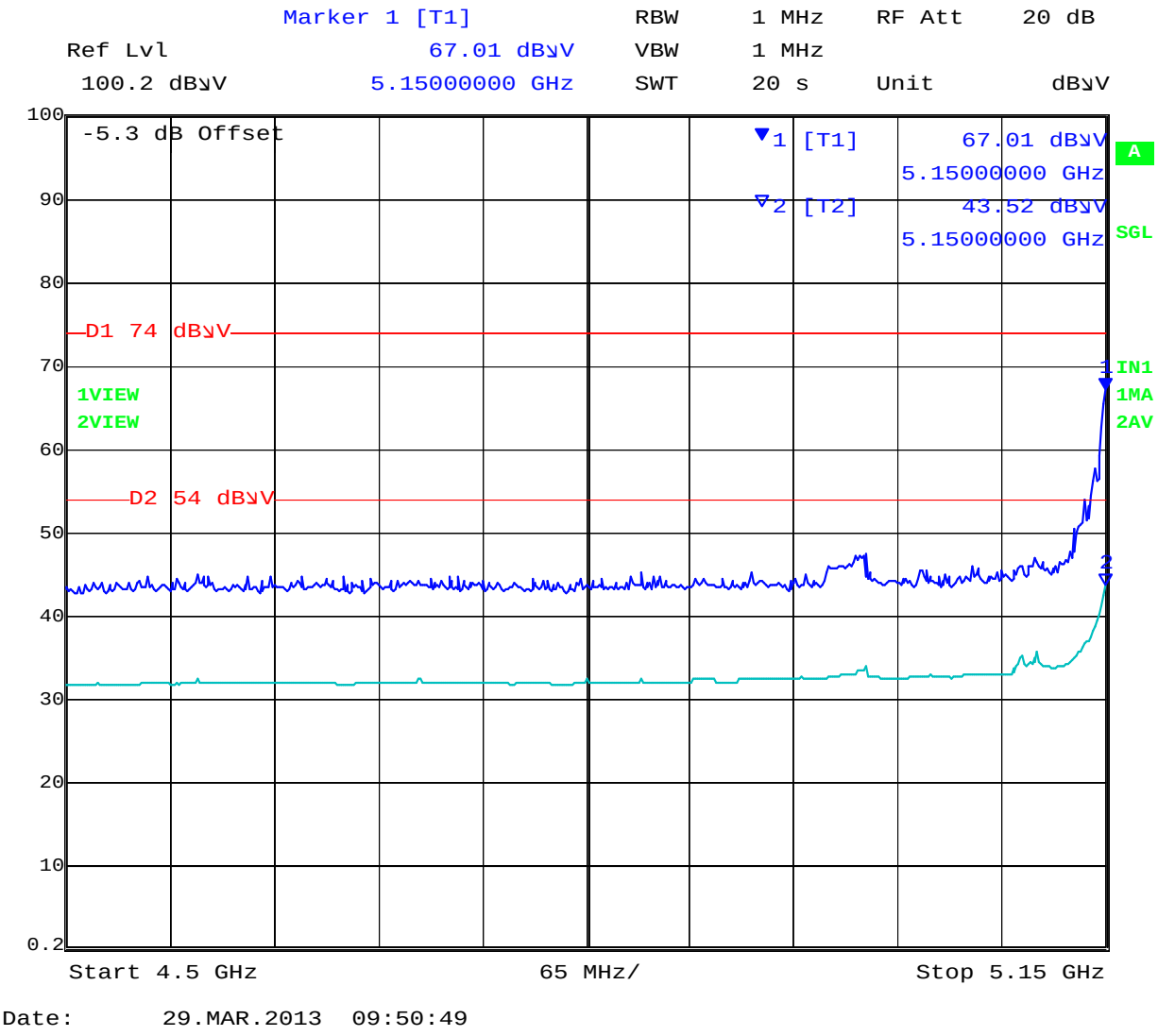
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5224.449	65.4	4.8	-9.8	60.4	Peak [Scan]	V	100	0				FUND
6995.99198	52.2	5.7	-6.4	51.6	Peak [Scan]	V	100	0				NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

6.1.2.2. Radiated Band-Edge - Integral Antenna

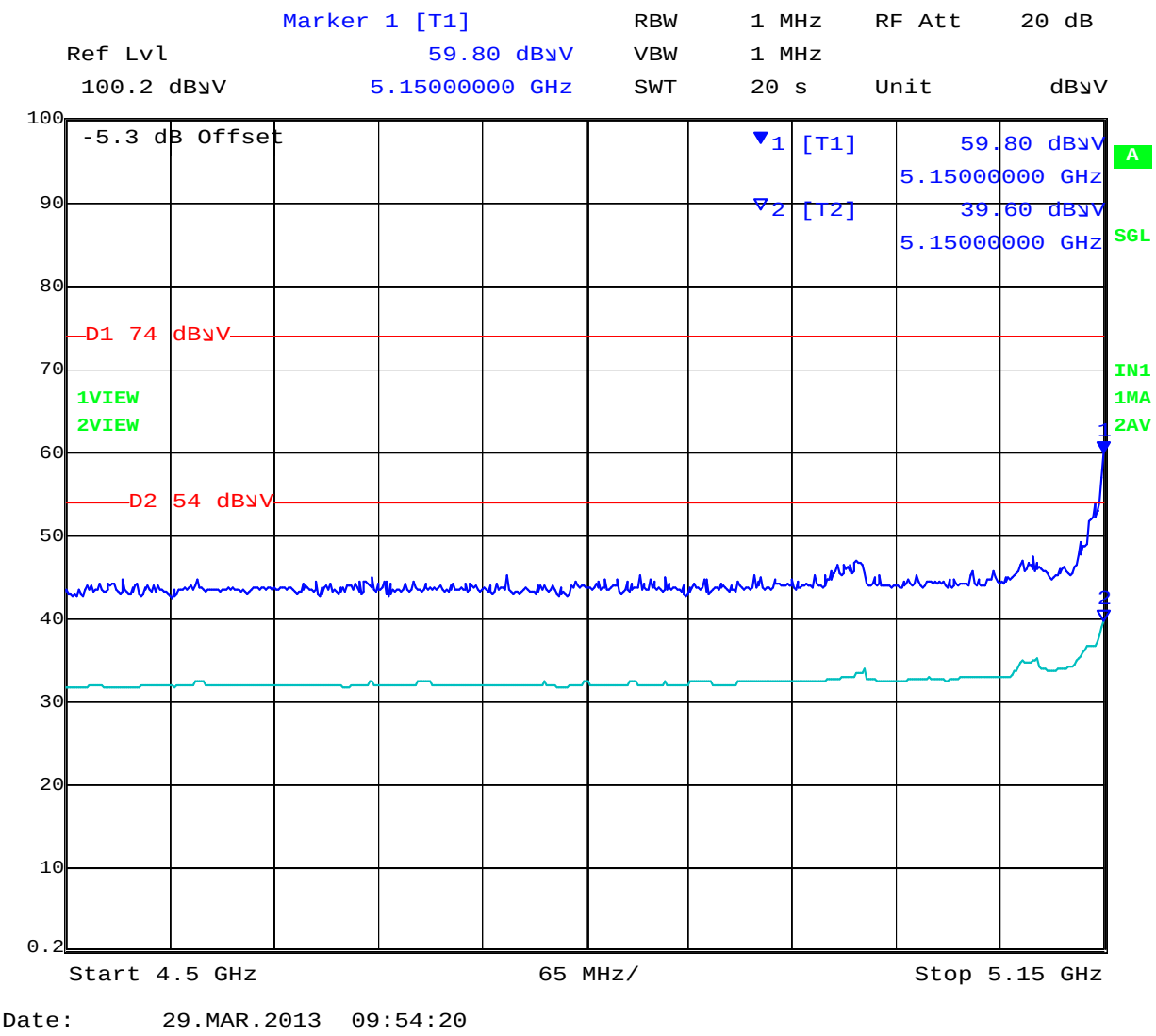
802.11a 5150 Restricted Band-edge

Power Setting = Target Power



802.11n HT-20 5150 Restricted Band-edge

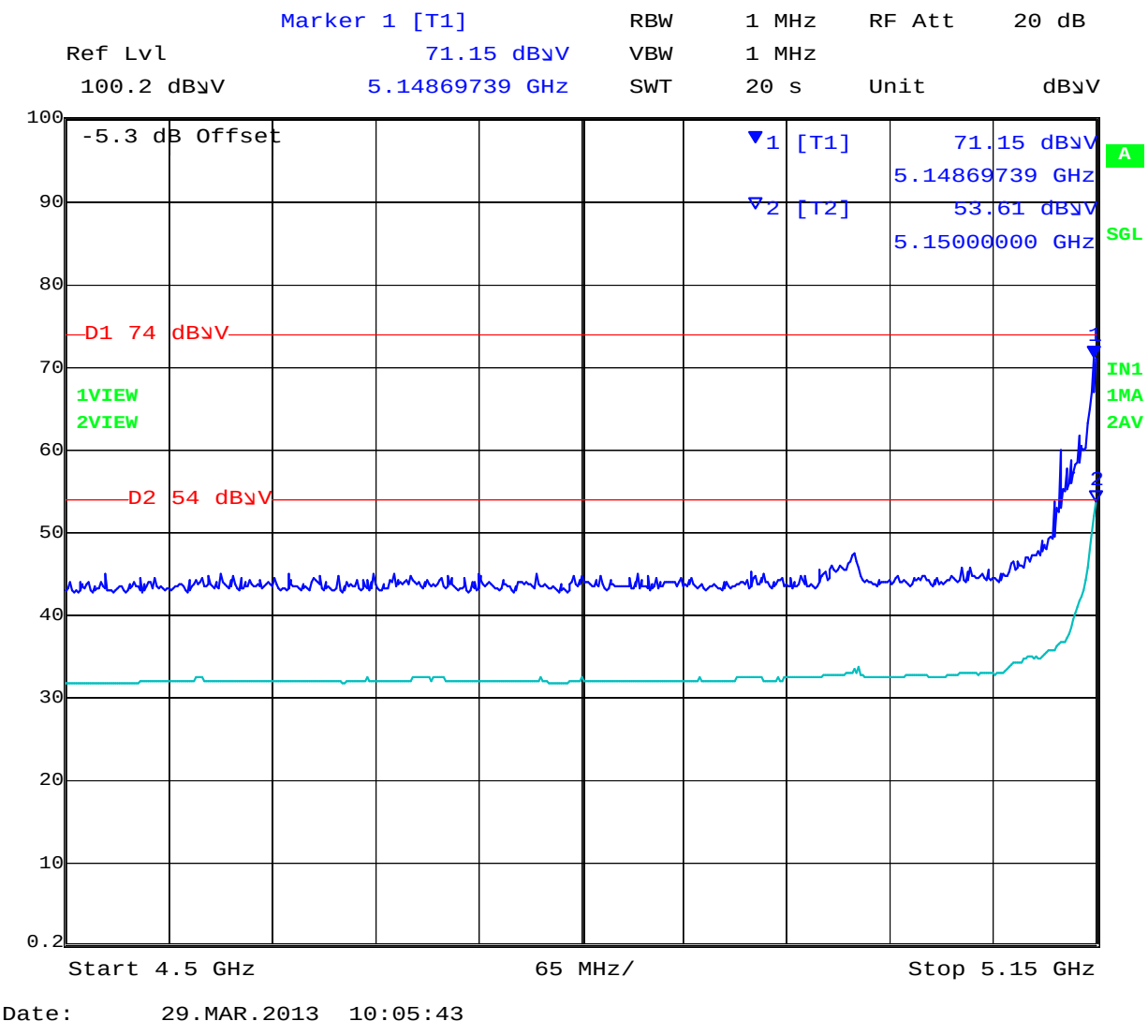
Power Setting = Target Power



Date: 29.MAR.2013 09:54:20

802.11n HT-40 5150 Restricted Band-edge

Power Setting = 16



Date: 29.MAR.2013 10:05:43

6.1.2.3. Digital Emissions (30M-1 GHz)

FCC, Part 15 Subpart C §15.205/ §15.209
Industry Canada RSS-210 §2.2

Test Procedure

Testing 30M-1 GHz was performed in a 3-meter anechoic chamber using a CISPR compliant receiver. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. To further maximize emissions the receive antenna was varied between 1 and 4 meters. The emissions are recorded with receiver in peak hold mode. Emissions closest to the limits are measured in the quasi-peak mode with the tuned receiver using a bandwidth of 120 kHz. Only the highest emissions relative to the limit are listed. The anechoic chamber test set-up is identified in Section 6 Test Set-Up Photographs.

The EUT had two methods of powering on ac/dc converter and Power over Ethernet (POE). Both modes were tested for emissions below 1GHz.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. In this test facility, the Antenna Factor, Cable Loss, and Amplifier Gains are loaded into the Rohde & Schwarz Receiver and the corrected field strength can be read directly on the receiver.

$$FS = R + AF + CORR$$

where:

FS = Field Strength
R = Measured Receiver Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain

For example:
Given a Receiver input reading of 51.5dBμV; Antenna Factor of 8.5dB; Cable Loss of 1.3dB; Falloff Factor of 0dB, an Amplifier Gain of 26dB and Notch Filter Loss of 1dB. The Field Strength of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 dB\mu V/m$$

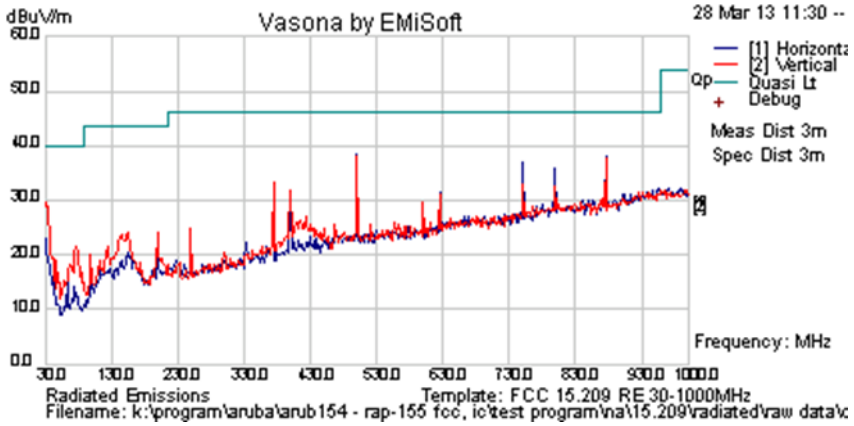
Conversion between dBμV/m (or dBμV) and μV/m (or μV) are done as:

$$Level\ (dB\mu V/m) = 20 * Log\ (level\ (\mu V/m))$$

40 dBμV/m = 100μV/m
48 dBμV/m = 250μV/m

APINR155

Test Freq.	2437 MHz	**Engineer**	SB
Variant	Digital Emissions	**Temp (ºC)**	22
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum.(%)**	33
Power Setting	Target	**Press. (mBars)**	1003
Antenna	Integral		
Test Notes 1	EUT Position = Vertical; AC/DC Power Supply 120VAC/12VDC.		
Test Notes 2			



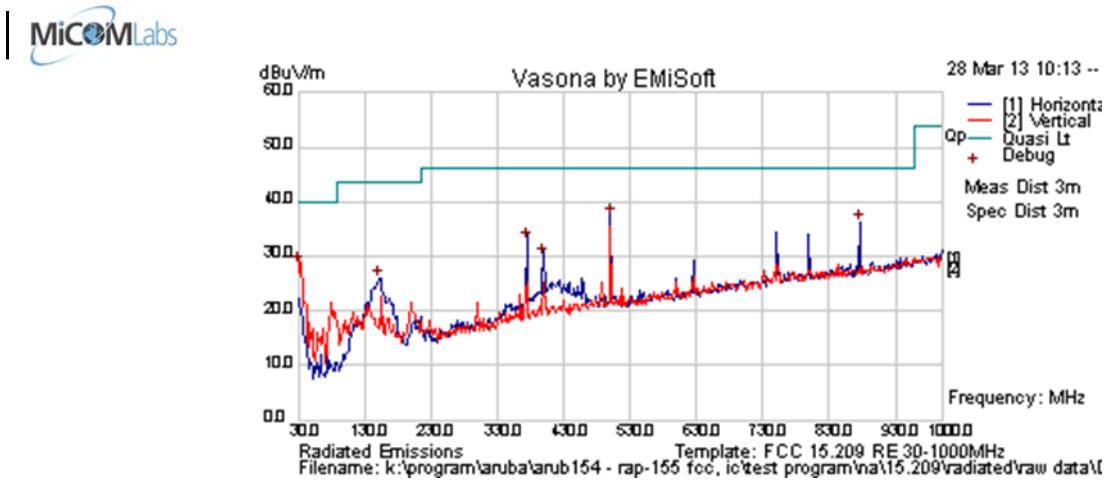
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
500.368	44.8	5.8	-12.8	37.8	Peak [Scan]	V	98	360	46	-8.2	Pass	
799.846	37.7	6.9	-8.9	35.7	Peak [Scan]	H	98	360	46	-10.3	Pass	
32.563	37.6	3.5	-11.7	29.4	Peak [Scan]	V	98	360	40	-10.6	Pass	
751.531	37.8	6.7	-9.4	35.2	Peak [Scan]	H	98	360	46	-10.9	Pass	
373.966	42.5	5.4	-15.3	32.6	Peak [Scan]	V	98	360	46	-13.4	Pass	
154.782	38.7	4.4	-18.9	24.2	Peak [Scan]	V	98	360	43.5	-19.3	Pass	

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

APINR155

Test Freq.	2437 MHz	**Engineer**	SB
Variant	Digital Emissions	**Temp (ºC)**	22
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum.(%)**	33
Power Setting	Target	**Press. (mBars)**	1003
Antenna	Integral		
Test Notes 1	EUT Position = Horizontal; AC/DC Power Supply 120VAC/12VDC.		
Test Notes 2			

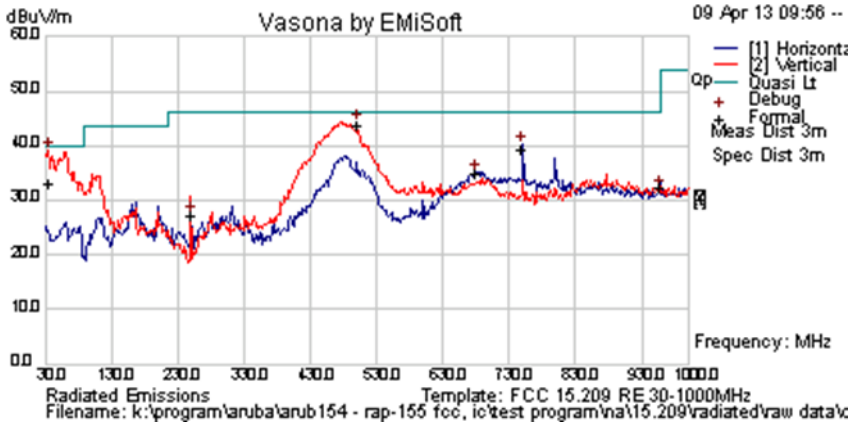


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
500.585	44.1	5.8	-12.8	37.0	Peak [Scan]	H	98	360	46.0	-9.0	Pass	
875.546	37.2	7.1	-8.1	36.2	Peak [Scan]	H	98	360	46.0	-9.8	Pass	
30.970	35.5	3.5	-10.6	28.4	Peak [Scan]	V	98	360	40.0	-11.6	Pass	
374.341	42.6	5.4	-15.4	32.6	Peak [Scan]	H	98	360	46.0	-13.4	Pass	
399.644	39.1	5.5	-14.8	29.8	Peak [Scan]	H	98	360	46.0	-16.2	Pass	
151.735	40.2	4.4	-18.9	25.8	Peak [Scan]	H	98	360	43.5	-17.7	Pass	
Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency											
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band											

EUT APINR15P

Test Freq.	2437 MHz	**Engineer**	SB
Variant	Digital Emissions	**Temp (ºC)**	22
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum.(%)**	33
Power Setting	Target	**Press. (mBars)**	1003
Antenna	Integral		
Test Notes 1	EUT Position = Vert; AC/DC Power Supply 120VAC/54VDC (Sunny Switching Adapter SYS1443-5454-T3)		
Test Notes 2	POE Port 1 & 2 active (two separate units powered up under turn table); Port 3 & 4 active via ENET		



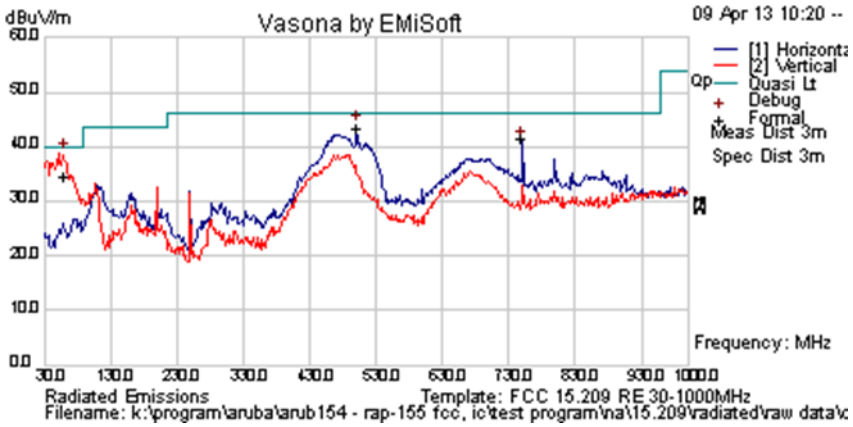
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
35.118	43.3	3.6	-13.7	33.3	Quasi Max	V	138	271	40	-6.7	Pass	
499.999	49.3	5.8	-12.8	42.3	Quasi Peak	H	173	322	46	-3.7	Pass	
750.008	42.0	6.7	-9.4	39.2	Quasi Max	H	98	165	46	-6.8	Pass	
680.385	38.9	6.5	-10.4	34.9	Peak [Scan]	H	98	165	46	-11.1	Pass	
958.290	32.0	7.3	-7.1	32.2	Peak [Scan]	H	98	165	46	-13.8	Pass	
250.078	41.2	4.9	-19.0	27.1	Peak [Scan]	V	98	165	46	-18.9	Pass	

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

EUT APINR15P

Test Freq.	2437 MHz	**Engineer**	SB
Variant	Digital Emissions	**Temp (ºC)**	22
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum.(%)**	33
Power Setting	Target	**Press. (mBars)**	1003
Antenna	Integral		
Test Notes 1	EUT Position = Hor.; AC/DC Power Supply 120VAC/54VDC (Sunny Switching Adapter SYS1443-5454-T3)		
Test Notes 2	POE Port 1 & 2 active (two separate units powered up under turn table); Port 3 & 4 active via ENET		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
58.934	54.8	3.8	-24.1	34.4	Quasi Max	V	112	309	40.0	-5.6	Pass	
499.999	49.3	5.8	-12.8	42.3	Quasi Peak	H	173	322	46	-3.7	Pass	
750.015	44.2	6.7	-9.4	41.5	Quasi Max	H	119	0	46.0	-4.5	Pass	
680.385	38.9	6.5	-10.4	34.9	Peak [Scan]	H	98	165	46.0	-11.1	Pass	
958.290	32.0	7.3	-7.1	32.2	Peak [Scan]	H	98	165	46.0	-13.8	Pass	
250.078	41.2	4.9	-19.0	27.1	Peak [Scan]	V	98	165	46.0	-18.9	Pass	
Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency											
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band											

Specification

Limits

§15.205 (a) Except as shown in paragraph (d) of 15.205 (a), only spurious emissions are permitted in any of the frequency bands listed.

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

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

§15.209 (a) and **RSS-Gen §2.2** Limit Matrix

Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Laboratory Measurement Uncertainty for Radiated Emissions

Measurement uncertainty	+5.6/ -4.5 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of Radiated Emissions'	0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312

6.1.3. AC Wireline Conducted Emissions (150 kHz – 30 MHz)

FCC, Part 15 Subpart C §15.207
Industry Canada RSS-Gen §7.2.2

Test Procedure

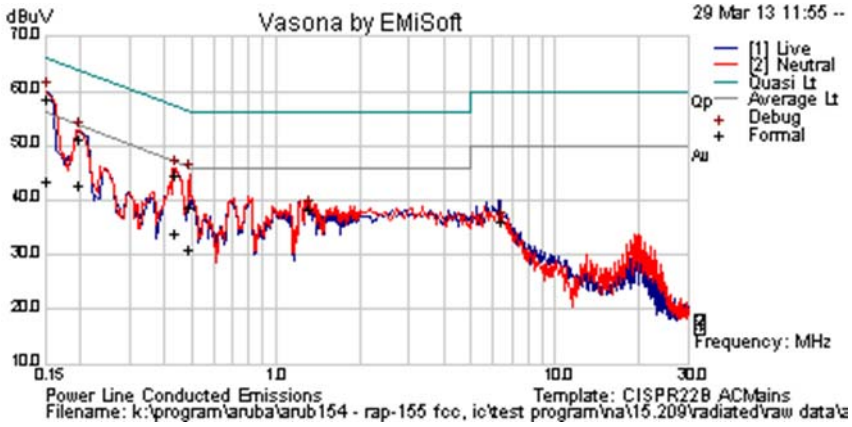
The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions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

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

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

EUT APINR155

Test Freq.	N/A	**Engineer**	SB
Variant	AC Line Emissions	**Temp (ºC)**	23
Freq. Range	0.150 MHz - 30 MHz	**Rel. Hum.(%)**	36
Power Setting	Target	**Press. (mBars)**	1005
Antenna	Integral		
Test Notes 1	EUT Position = Vertical; AC/DC Adapter on table; Ethernet cables plugged into EUT;		
Test Notes 2			



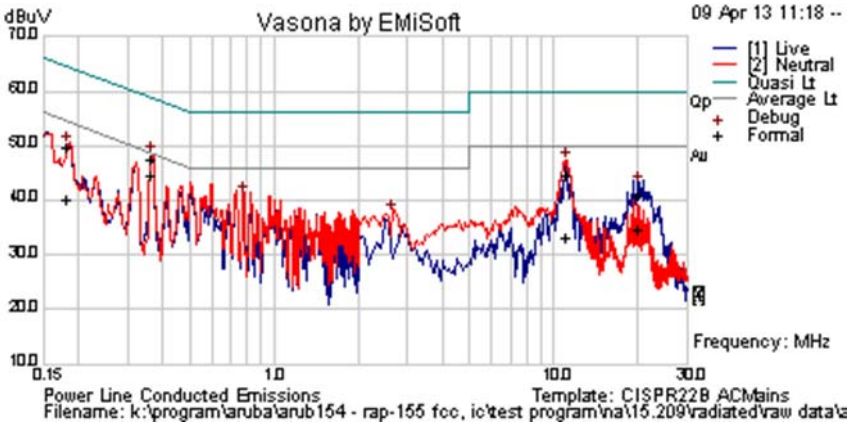
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
0.152	48.7	9.9	0.1	58.7	Quasi Peak	Neutral	65.9	-7.3	Pass	
0.199	41.3	9.9	0.1	51.3	Quasi Peak	Neutral	63.65	-12.4	Pass	
0.492	28.5	9.9	0.1	38.5	Quasi Peak	Neutral	56.13	-17.6	Pass	
0.437	34.6	9.9	0.1	44.6	Quasi Peak	Neutral	57.12	-12.6	Pass	
0.152	33.5	9.9	0.1	43.5	Average	Neutral	55.9	-12.4	Pass	
0.199	32.7	9.9	0.1	42.7	Average	Neutral	53.65	-11.0	Pass	
0.492	20.9	9.9	0.1	30.9	Average	Neutral	46.13	-15.3	Pass	
0.437	23.8	9.9	0.1	33.7	Average	Neutral	47.12	-13.4	Pass	
1.331	28.3	10.0	0.1	38.3	Peak [Scan]	Neutral	46	-7.7	Pass	
6.488	25.6	10.2	0.3	36.1	Peak [Scan]	Neutral	50	-13.9	Pass	

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

EUT APINR155

Test Freq.	N/A	**Engineer**	SB
Variant	AC Line Emissions	**Temp (ºC)**	23
Freq. Range	0.150 MHz - 30 MHz	**Rel. Hum.(%)**	36
Power Setting	Target	**Press. (mBars)**	1005
Antenna	Integral		
Test Notes 1	EUT Position = Hor; AC/DC Pwr Supply 120VAC/54VDC (Sunny Switching Adapter SYS1443-5454-T3)		
Test Notes 2	POE Port 1 & 2 active (two separate units powered up under turn table); Port 3 & 4 active via ENET		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
20.033	29.7	10.5	0.7	41.0	Quasi Peak	Live	60	-19.1	Pass	
0.368	37.5	9.9	0.1	47.5	Quasi Peak	Neutral	58.55	-11.1	Pass	
11.170	34.0	10.3	0.4	44.7	Quasi Peak	Neutral	60	-15.3	Pass	
0.184	39.8	9.9	0.1	49.8	Quasi Peak	Neutral	64.3	-14.5	Pass	
20.033	23.3	10.5	0.7	34.6	Average	Live	50	-15.4	Pass	
0.368	34.6	9.9	0.1	44.5	Average	Neutral	48.55	-4.0	Pass	
11.170	22.5	10.3	0.4	33.2	Average	Neutral	50	-16.8	Pass	
0.184	30.2	9.9	0.1	40.2	Average	Neutral	54.3	-14.1	Pass	
0.184	40.2	9.9	0.1	50.2	Peak [Scan]	Neutral	54.3	-4.1	Pass	
0.786	30.8	10.0	0.1	40.9	Peak [Scan]	Neutral	46	-5.2	Pass	
2.664	27.5	10.1	0.1	37.7	Peak [Scan]	Neutral	46	-8.3	Pass	

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

Specification

Limit

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

RSS-Gen §7.2.2
The radio frequency voltage that is conducted back into the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table below. The tighter limit applies at the frequency range boundaries.

§15.207 (a) and **RSS-Gen §7.2.2** Limit Matrix
The lower limit applies at the boundary between frequency ranges

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency

Laboratory Measurement Uncertainty for Conducted Emissions

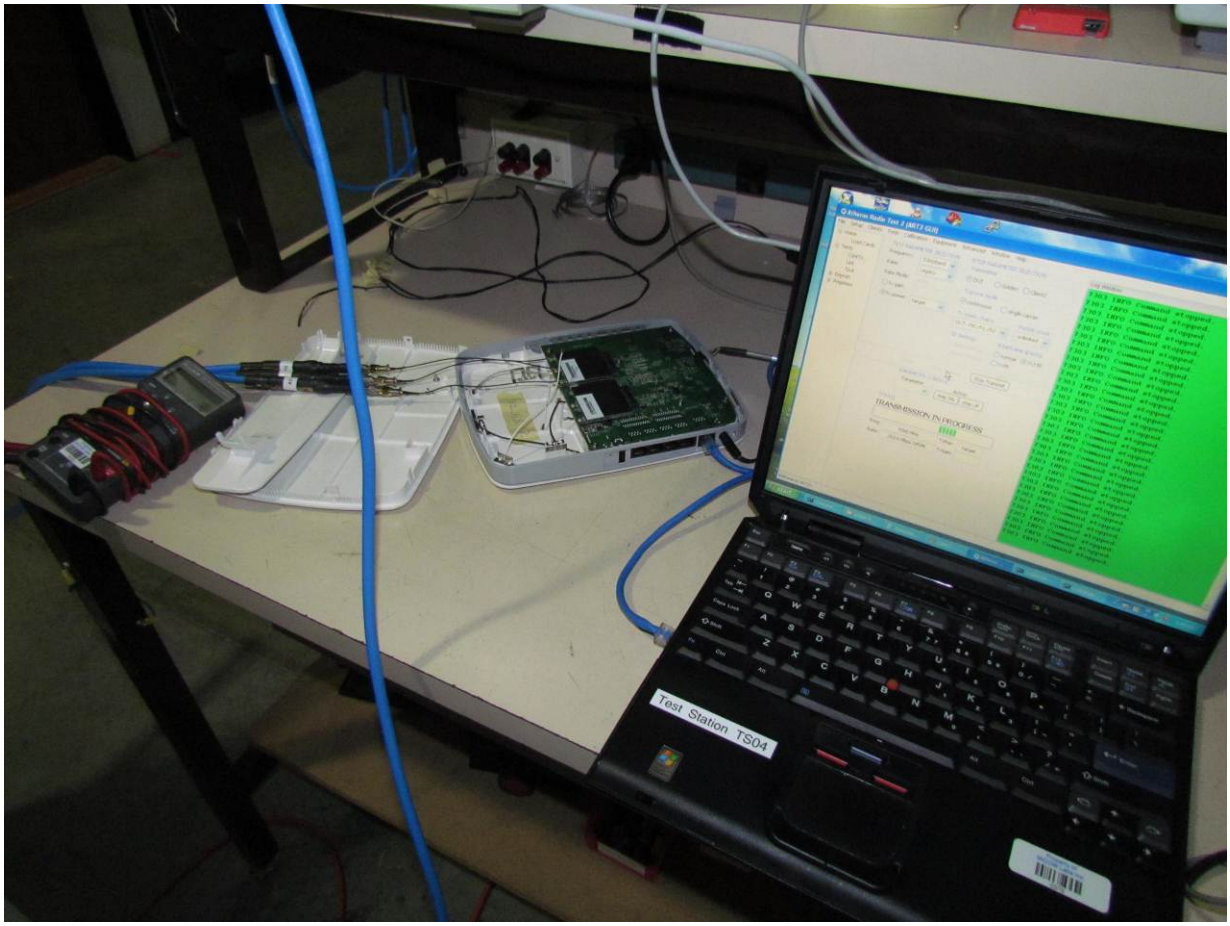
Measurement uncertainty	±2.64 dB

Traceability

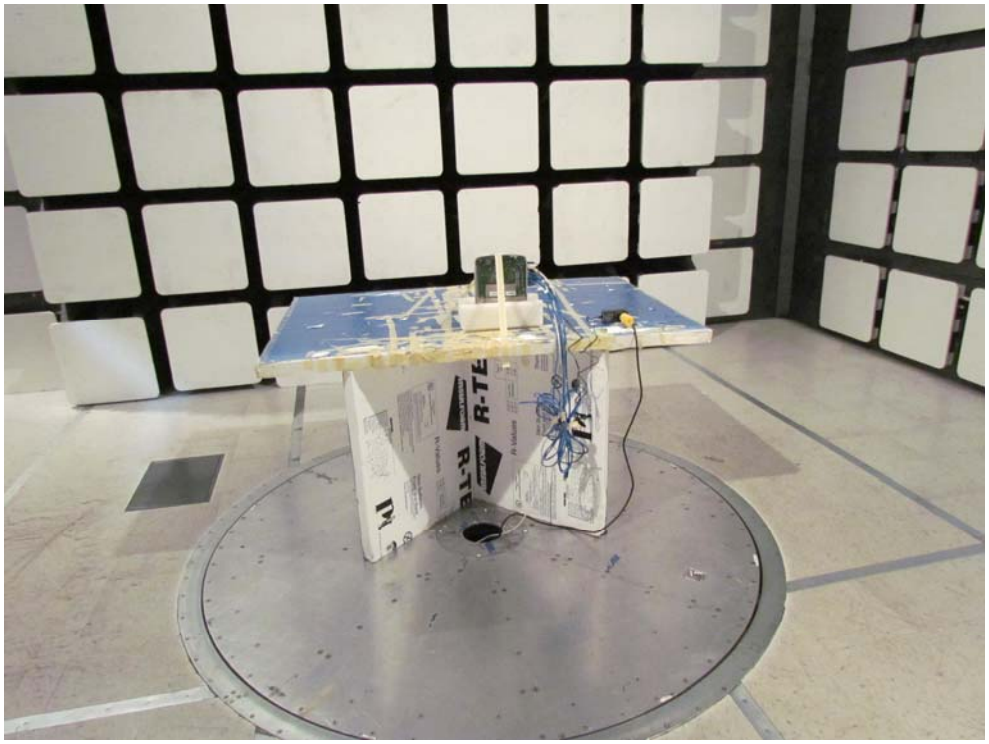
Method	Test Equipment Used
Measurements were made per work instruction WI-EMC-01 'Measurement of Conducted Emissions'	0158, 0184, 0287, 0190, 0293, 0307

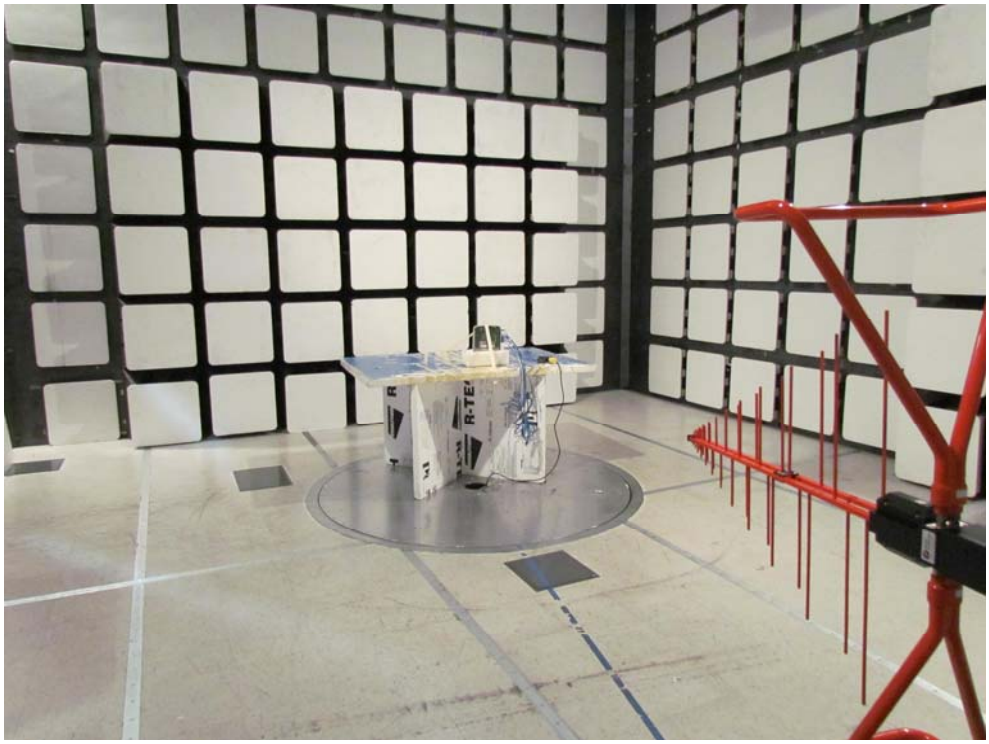
7. PHOTOGRAPHS

7.1. Test Setup - Conducted

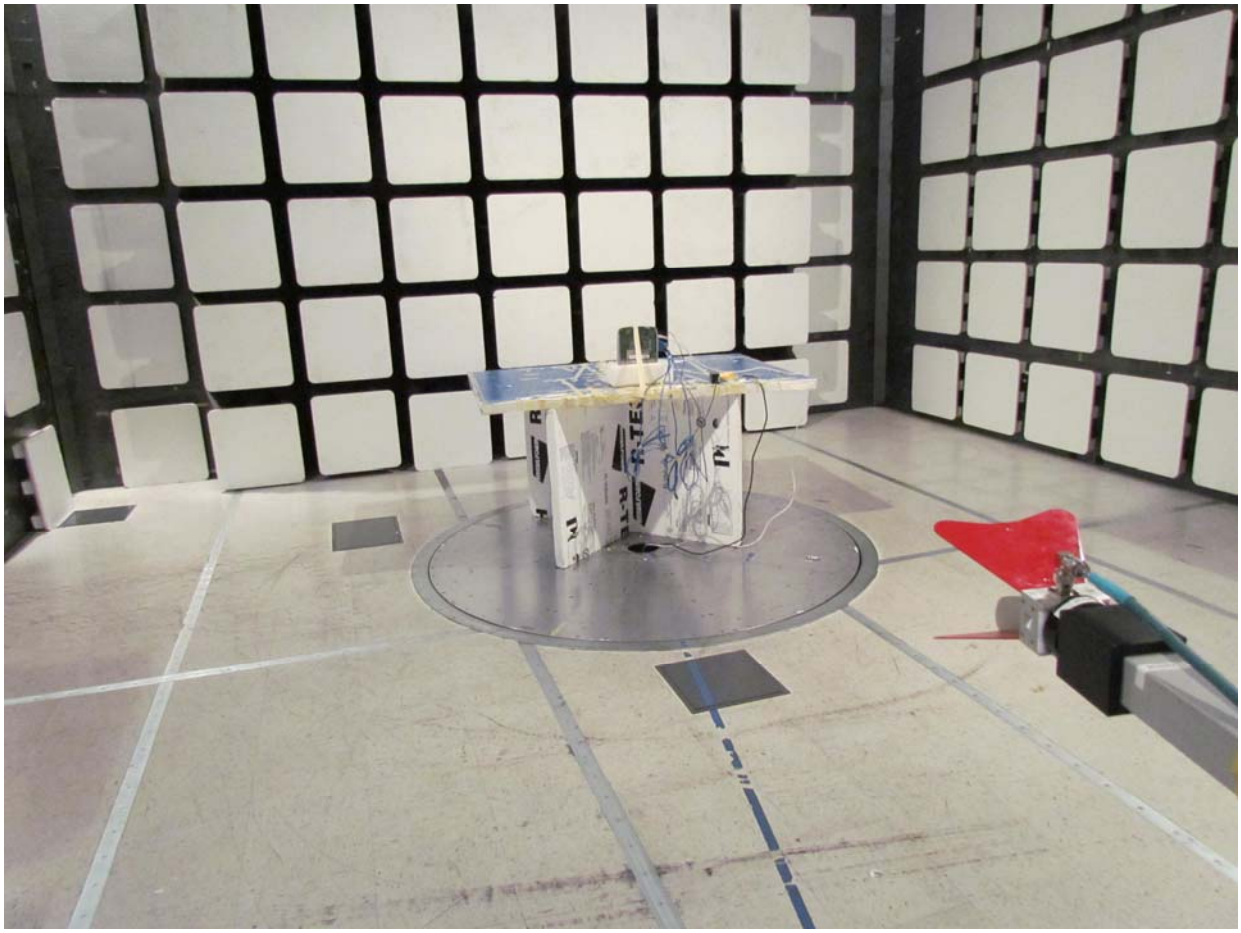


7.2. Test Setup - Digital Emissions below 1 GHz





7.3. Radiated Emissions Test Setup >1 GHz



8. TEST EQUIPMENT DETAILS

9. Asset #	Instrument	Manufacturer	Part #	Serial #	Calibration Due Date
0070	Power Meter	Hewlett Packard	437B	3125U11552	28th Nov 13
0117	Power Sensor	Hewlett Packard	8487D	3318A00371	15th Nov 13
0223	Power Meter	Hewlett Packard	EPM-442A	US37480256	15th Nov 13
0374	Power Sensor	Hewlett Packard	8485A	3318A19694	29th Nov 13
0158	Barometer /Thermometer	Control Co.	4196	E2846	8th Dec 13
0193	EMI Receiver	Rhode & Schwartz	ESI 7	838496/007	2nd Dec 13
0287	EMI Receiver	Rhode & Schwartz	ESIB40	100201	16th Nov 13
0338	30 - 3000 MHz Antenna	Sunol	JB3	A052907	8th Nov 13
0335	1-18 GHz Horn Antenna	EMCO	3117	00066580	7th Nov 13
0252	SMA Cable	Megaphase	Sucoflex 104	None	N/A
0293	BNC Cable	Megaphase	1689 1GVT4	15F50B001	N/A
0307	BNC Cable	Megaphase	1689 1GVT4	15F50B002	N/A
0310	2m SMA Cable	Micro-Coax	UFA210A-0-0787-3G03G0	209089-001	N/A
0312	3m SMA Cable	Micro-Coax	UFA210A-1-1181-3G0300	209092-001	N/A
0314	30dB N-Type Attenuator	ARRA	N9444-30	1623	N/A
	EMC Test Software	EMISoft	Vasona	5.0051	N/A
	RF Conducted Test Software	National Instruments	Labview	Version 8.2	N/A
	RF Conducted Test Software	MiCOM Labs ATS		Version 1.5	N/A

APPENDIX

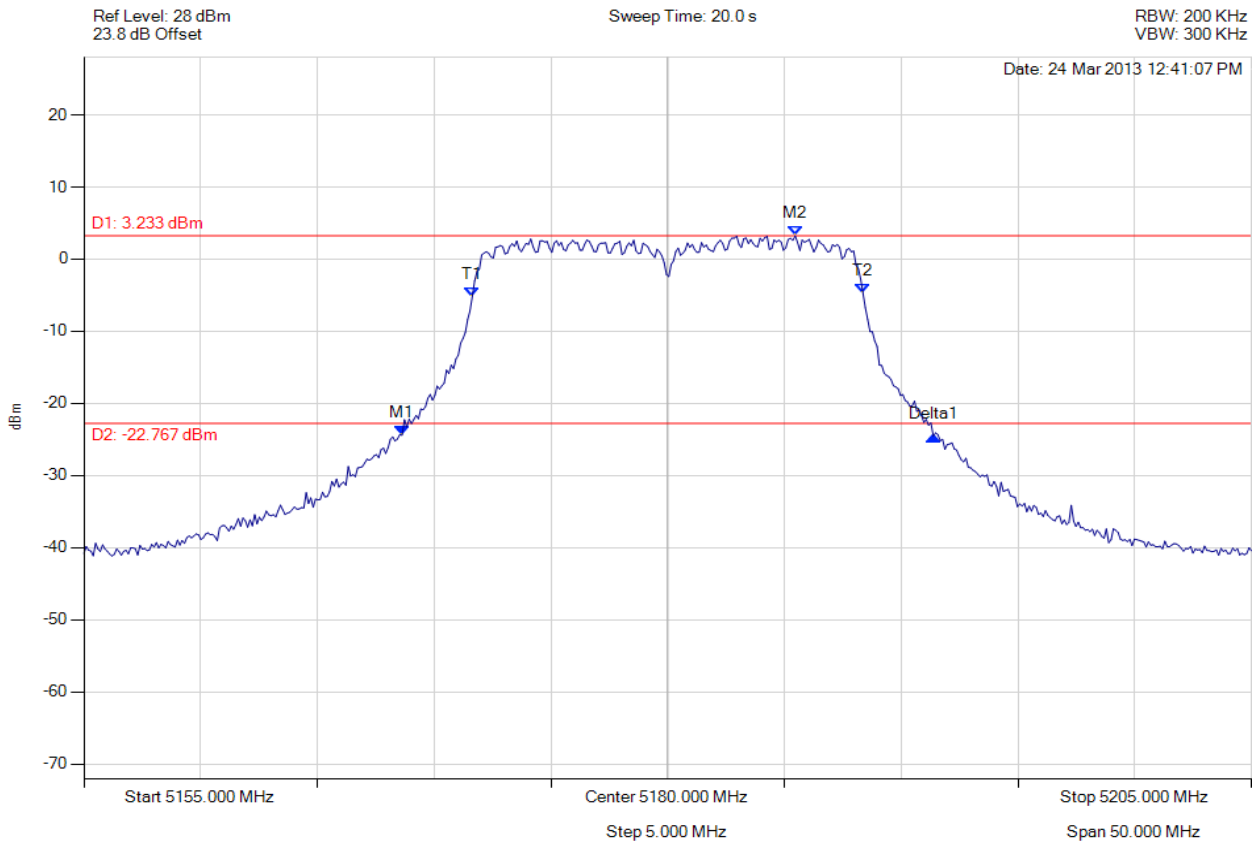
A. SUPPORTING INFORMATION

A.1. CONDUCTED TEST PLOTS

A.1.1. 26 dB & 99% Bandwidth

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5180.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

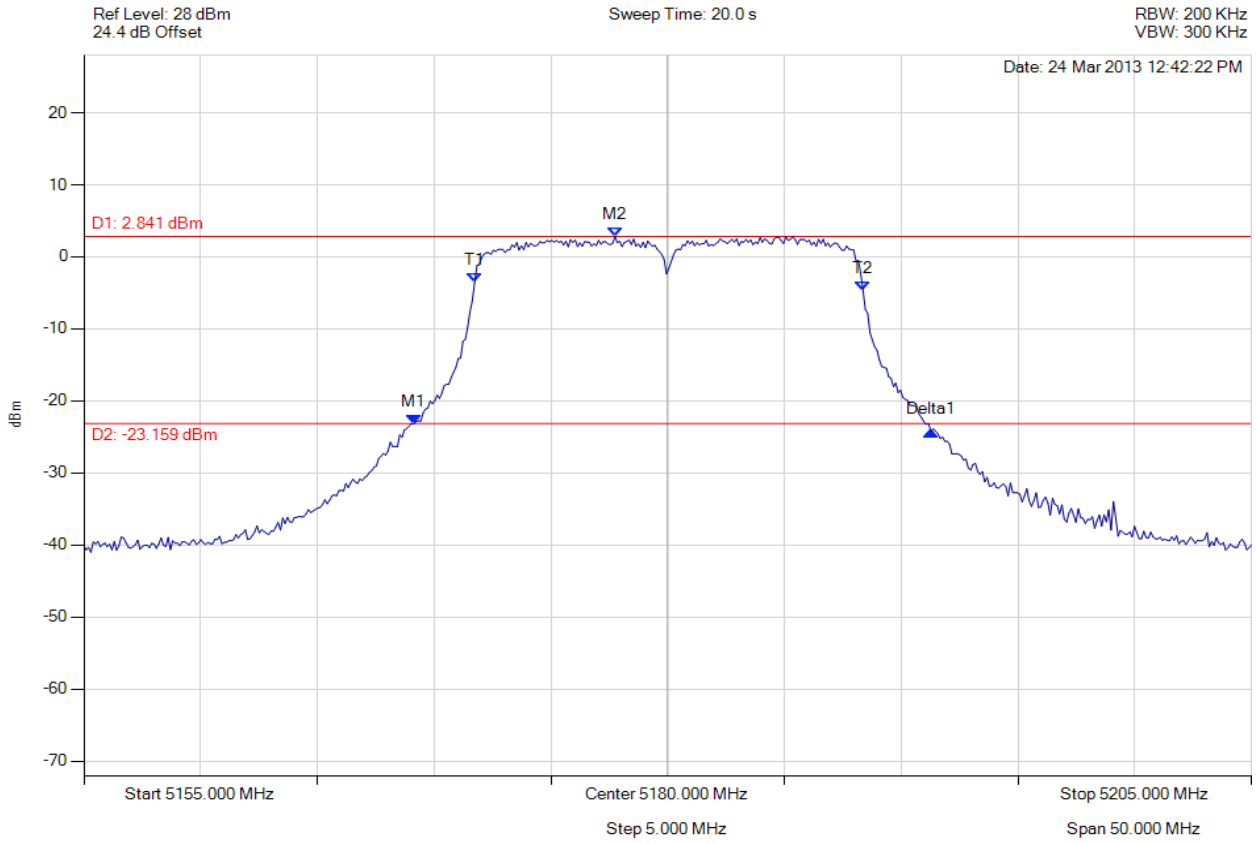


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5168.627 MHz : -24.406 dBm M2 : 5185.461 MHz : 3.233 dBm Delta1 : 22.745 MHz : -0.102 dB T1 : 5171.633 MHz : -5.183 dBm T2 : 5188.367 MHz : -4.766 dBm OBW : 16.733 MHz	Measured 26 dB Bandwidth: 22.745 MHz Measured 99% Bandwidth: 16.733 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5180.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

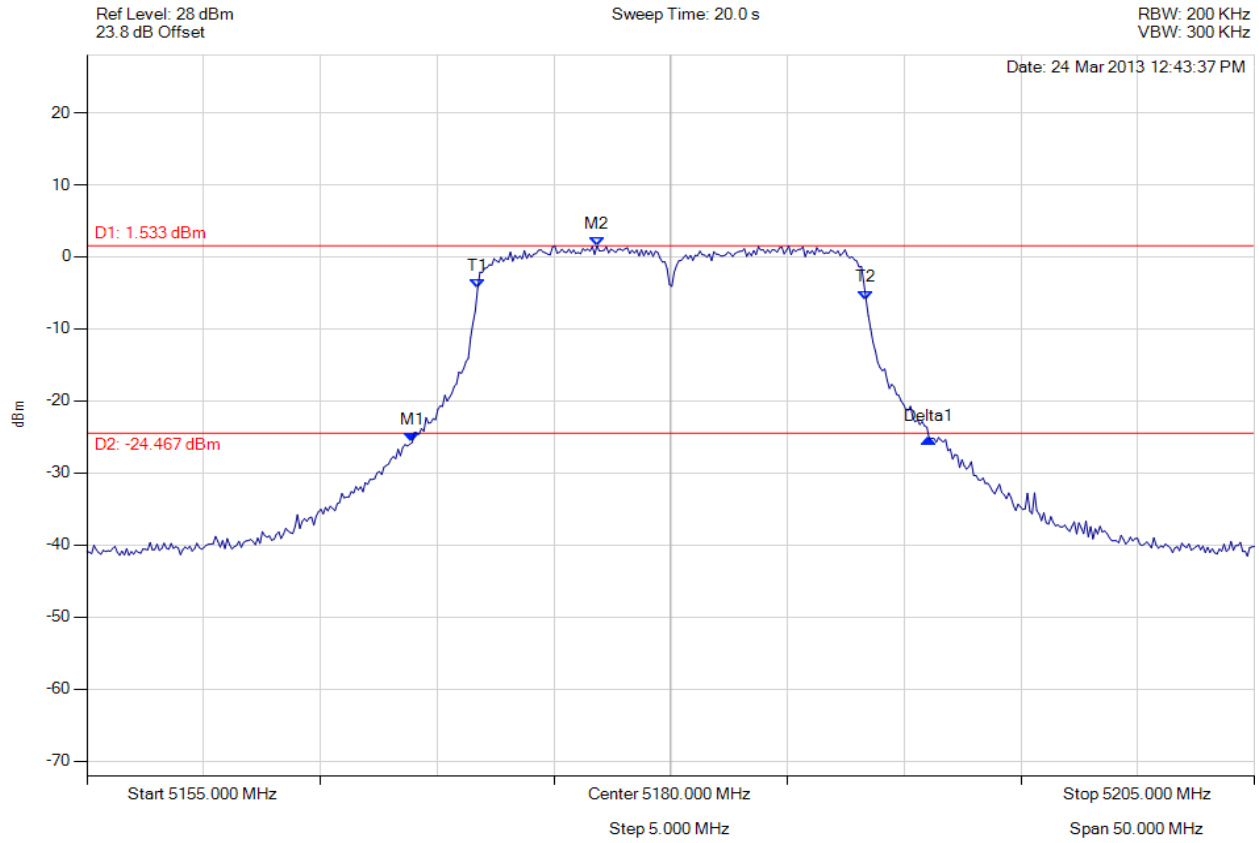


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5169.128 MHz : -23.214 dBm M2 : 5177.745 MHz : 2.841 dBm Delta1 : 22.144 MHz : -1.007 dB T1 : 5171.733 MHz : -3.576 dBm T2 : 5188.367 MHz : -4.707 dBm OBW : 16.633 MHz	Measured 26 dB Bandwidth: 22.144 MHz Measured 99% Bandwidth: 16.633 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5180.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc

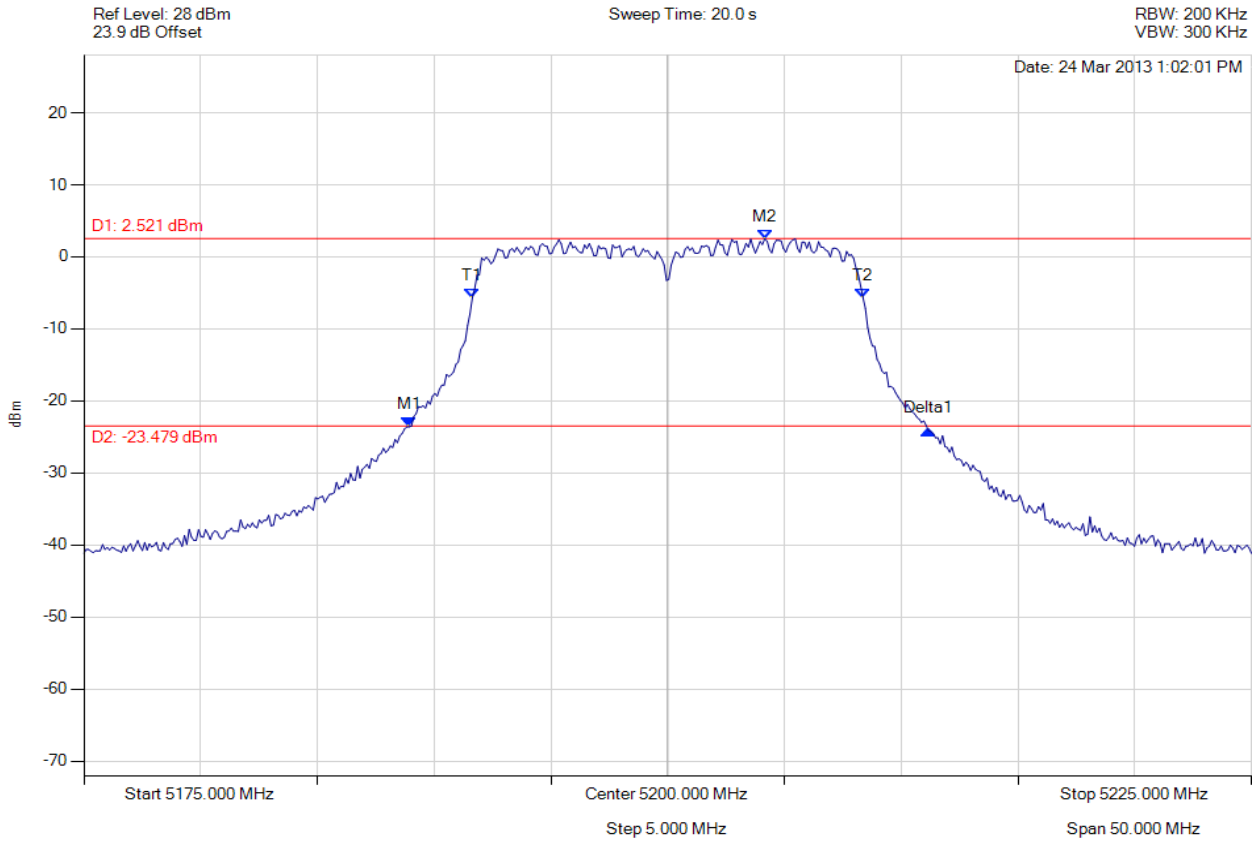


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5168.928 MHz : -25.786 dBm M2 : 5176.844 MHz : 1.533 dBm Delta1 : 22.144 MHz : 0.513 dB T1 : 5171.733 MHz : -4.410 dBm T2 : 5188.367 MHz : -5.955 dBm OBW : 16.633 MHz	Measured 26 dB Bandwidth: 22.144 MHz Measured 99% Bandwidth: 16.633 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5200.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

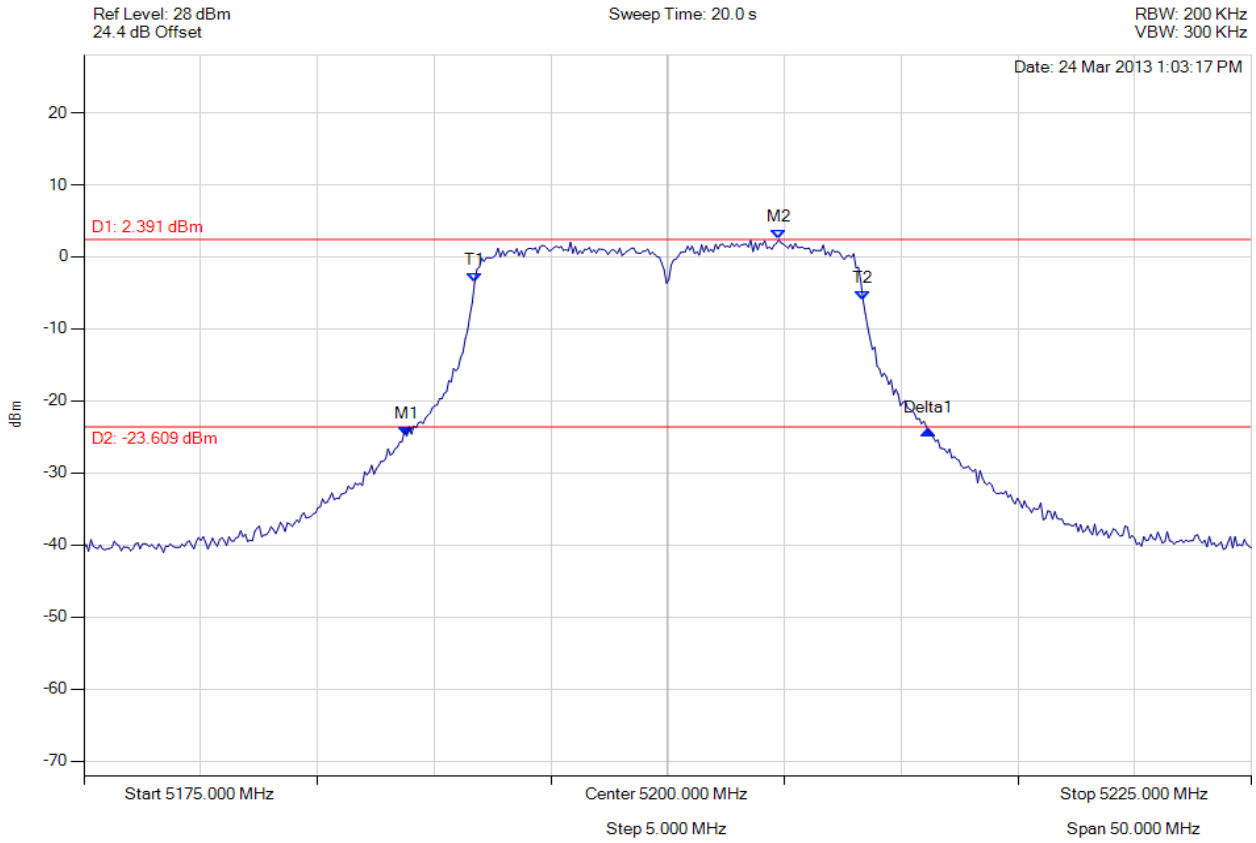


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5188.928 MHz : -23.600 dBm M2 : 5204.158 MHz : 2.521 dBm Delta1 : 22.244 MHz : -0.504 dB T1 : 5191.633 MHz : -5.734 dBm T2 : 5208.367 MHz : -5.699 dBm OBW : 16.733 MHz	Measured 26 dB Bandwidth: 22.244 MHz Measured 99% Bandwidth: 16.733 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5200.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

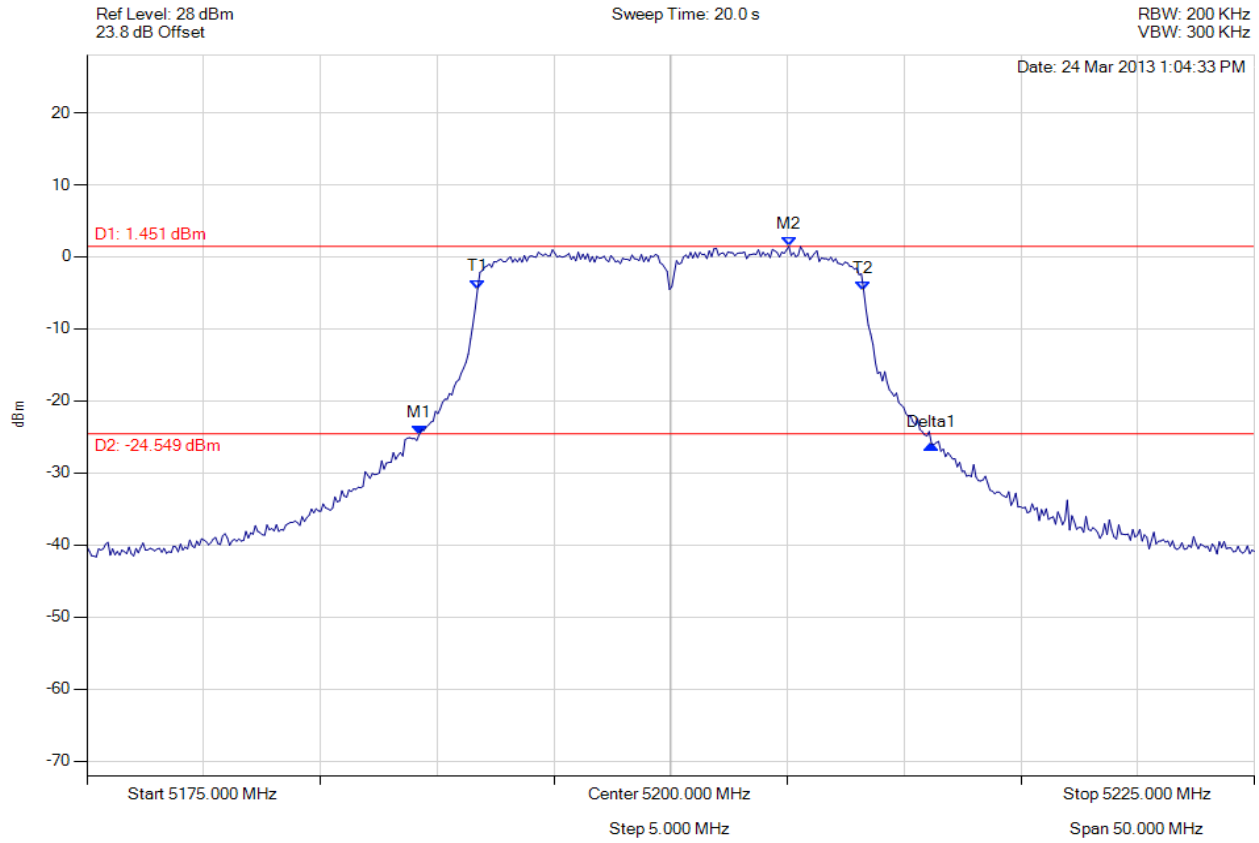


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5188.828 MHz : -24.910 dBm M2 : 5204.760 MHz : 2.391 dBm Delta1 : 22.345 MHz : 0.783 dB T1 : 5191.733 MHz : -3.572 dBm T2 : 5208.367 MHz : -6.021 dBm OBW : 16.633 MHz	Measured 26 dB Bandwidth: 22.345 MHz Measured 99% Bandwidth: 16.633 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5200.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc

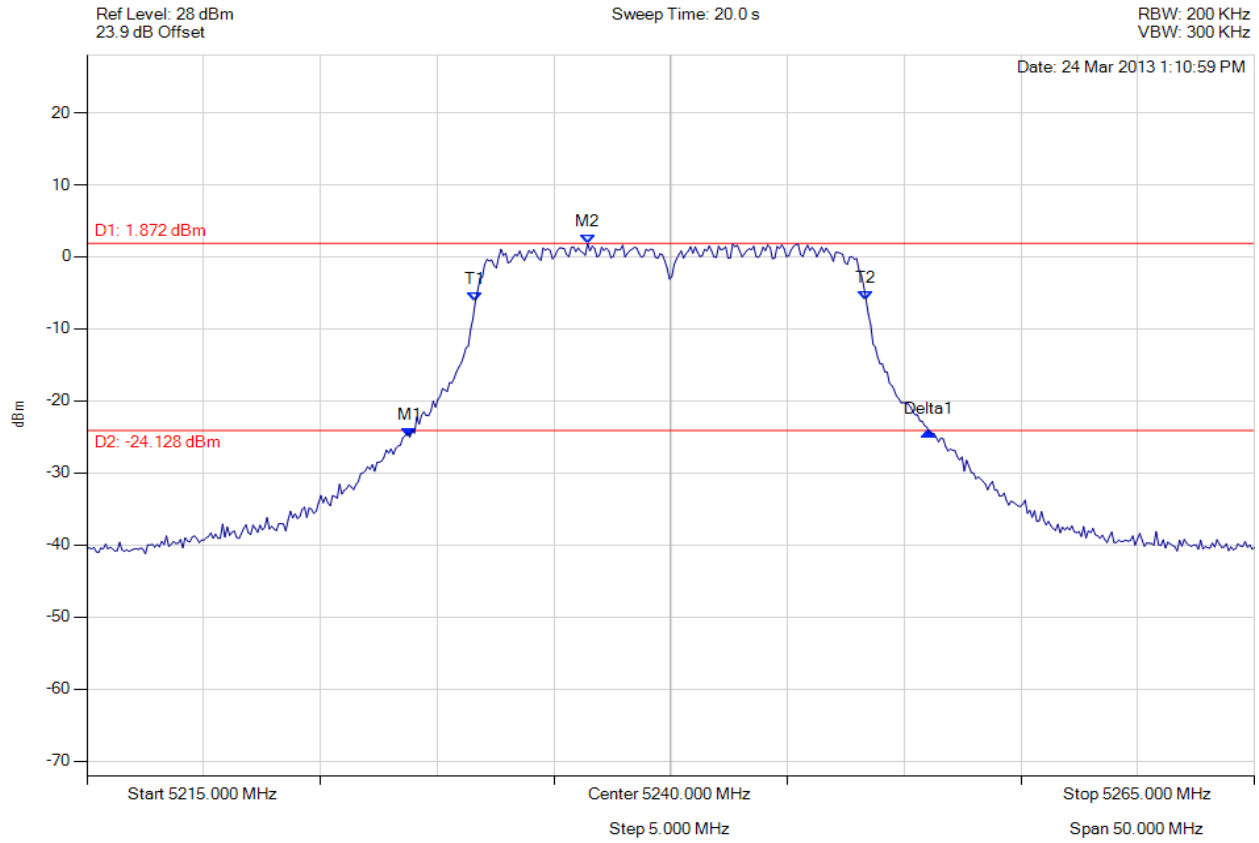


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5189.228 MHz : -24.676 dBm M2 : 5205.060 MHz : 1.451 dBm Delta1 : 21.944 MHz : -1.332 dB T1 : 5191.733 MHz : -4.457 dBm T2 : 5208.267 MHz : -4.652 dBm OBW : 16.533 MHz	Measured 26 dB Bandwidth: 21.944 MHz Measured 99% Bandwidth: 16.533 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5240.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

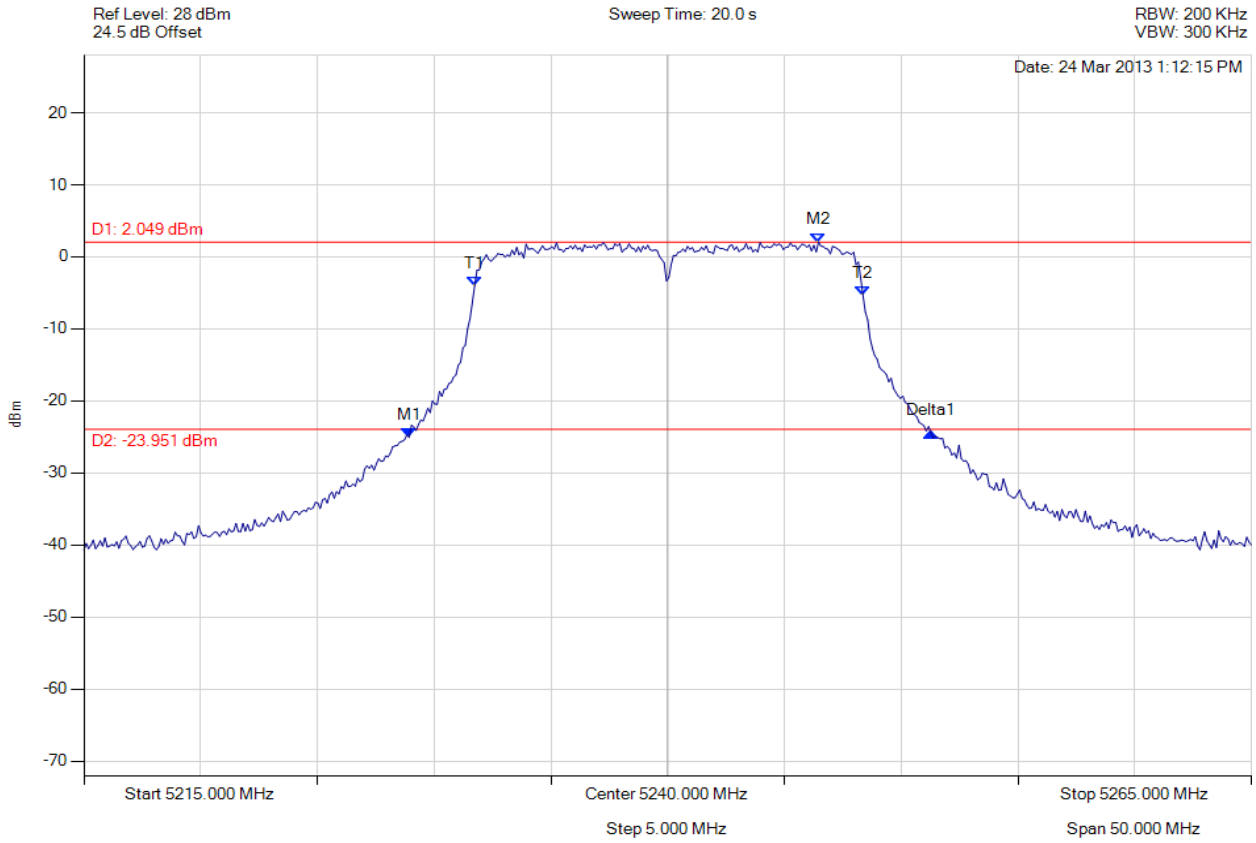


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5228.828 MHz : -25.048 dBm M2 : 5236.443 MHz : 1.872 dBm Delta1 : 22.244 MHz : 0.771 dB T1 : 5231.633 MHz : -6.222 dBm T2 : 5248.367 MHz : -6.002 dBm OBW : 16.733 MHz	Measured 26 dB Bandwidth: 22.244 MHz Measured 99% Bandwidth: 16.733 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5240.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

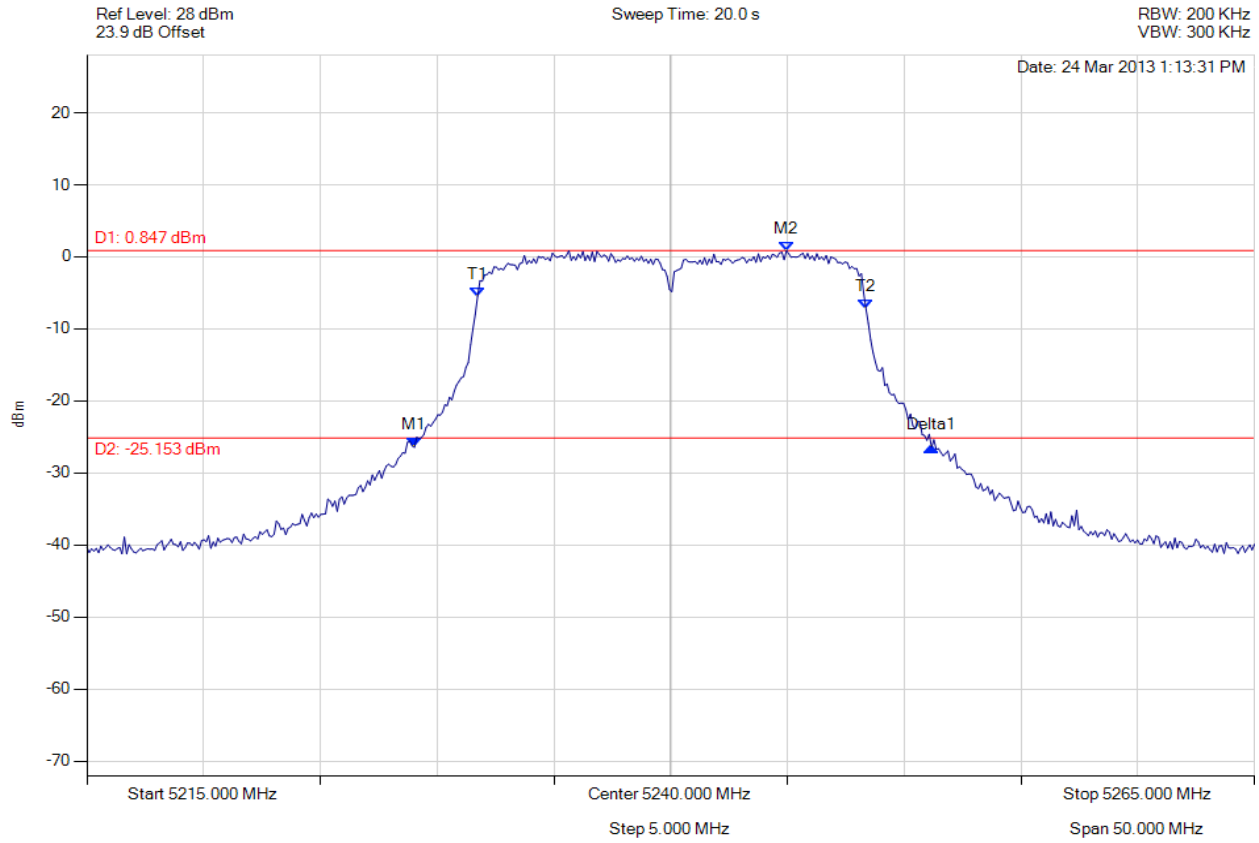


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5228.928 MHz : -25.073 dBm M2 : 5246.463 MHz : 2.049 dBm Delta1 : 22.345 MHz : 0.746 dB T1 : 5231.733 MHz : -4.058 dBm T2 : 5248.367 MHz : -5.419 dBm OBW : 16.633 MHz	Measured 26 dB Bandwidth: 22.345 MHz Measured 99% Bandwidth: 16.633 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5240.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc

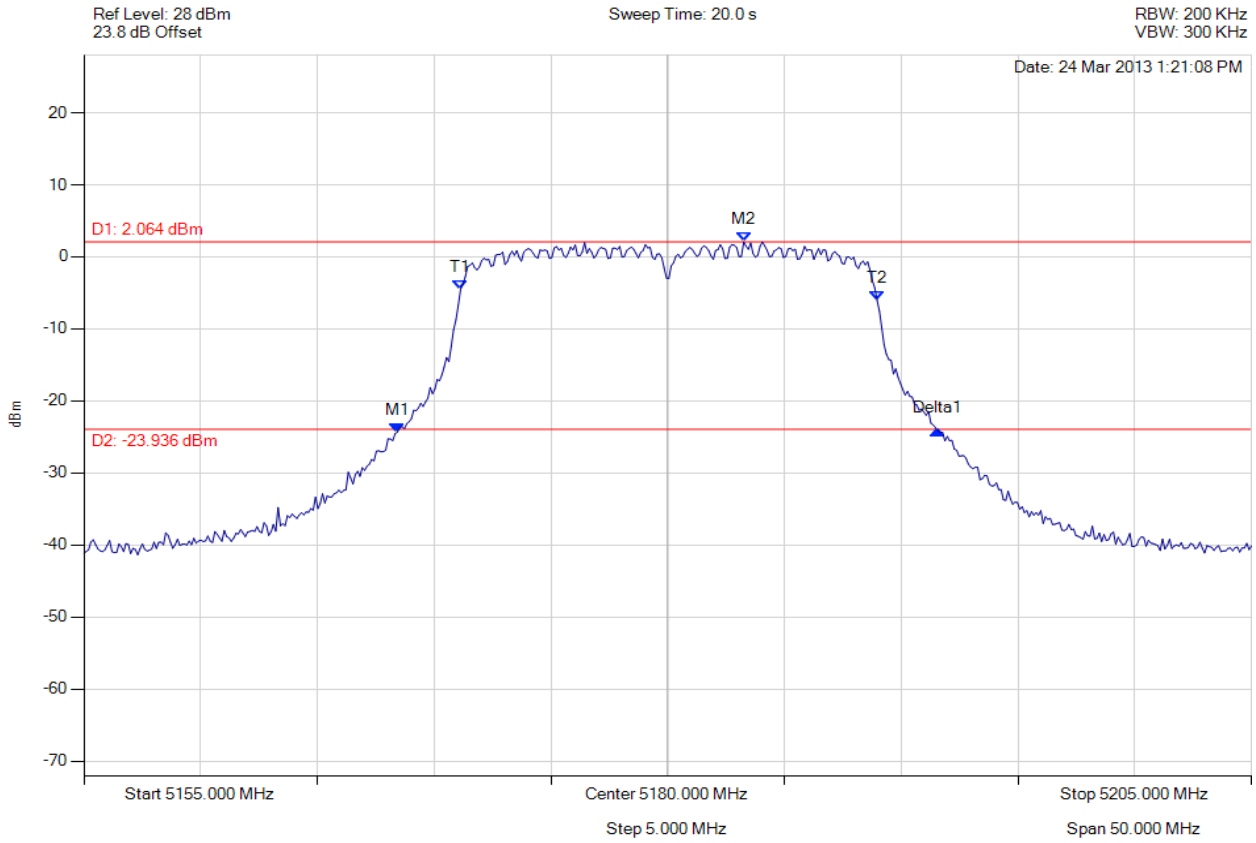


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5229.028 MHz : -26.437 dBm M2 : 5244.960 MHz : 0.847 dBm Delta1 : 22.144 MHz : 0.016 dB T1 : 5231.733 MHz : -5.473 dBm T2 : 5248.367 MHz : -7.283 dBm OBW : 16.633 MHz	Measured 26 dB Bandwidth: 22.144 MHz Measured 99% Bandwidth: 16.633 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

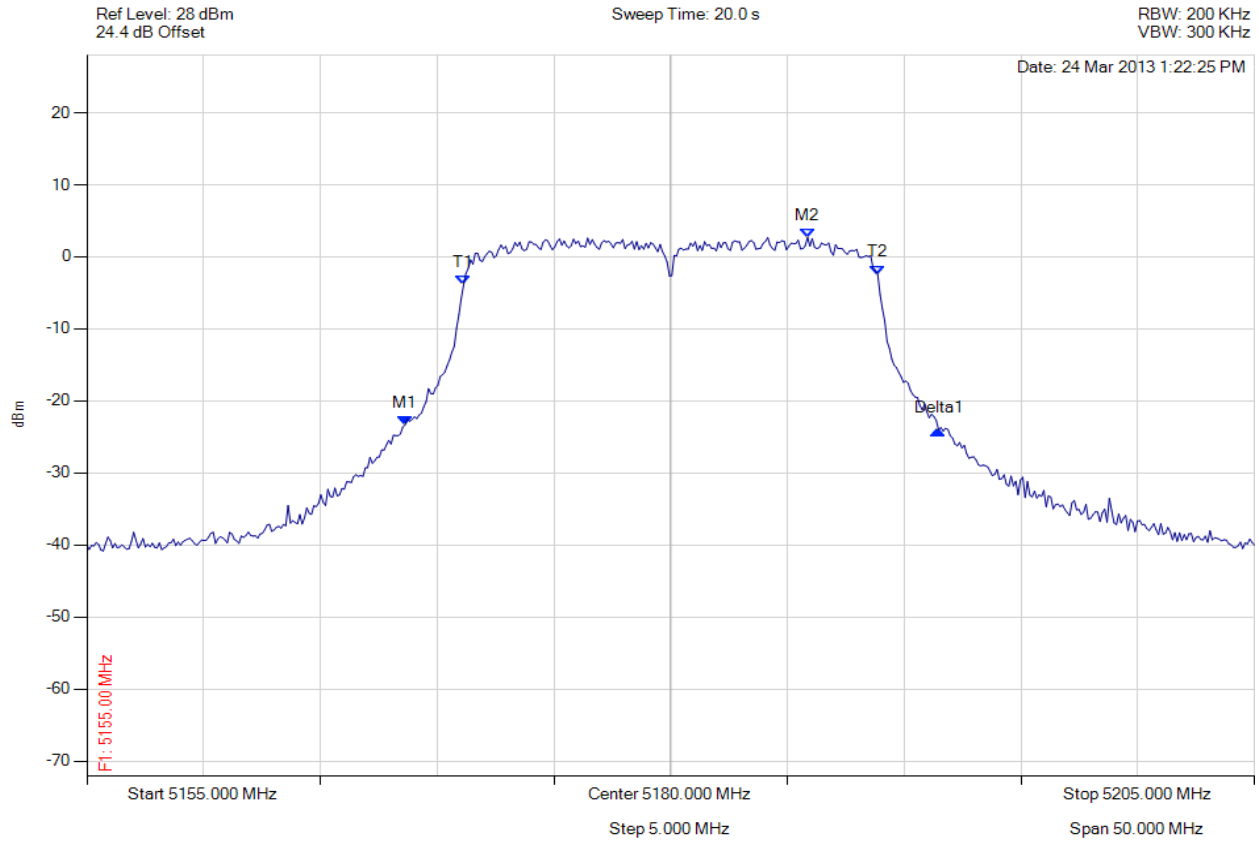


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5168.427 MHz : -24.320 dBm M2 : 5183.257 MHz : 2.064 dBm Delta1 : 23.146 MHz : 0.218 dB T1 : 5171.132 MHz : -4.485 dBm T2 : 5188.968 MHz : -6.063 dBm OBW : 17.836 MHz	Measured 26 dB Bandwidth: 23.146 MHz Measured 99% Bandwidth: 17.836 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

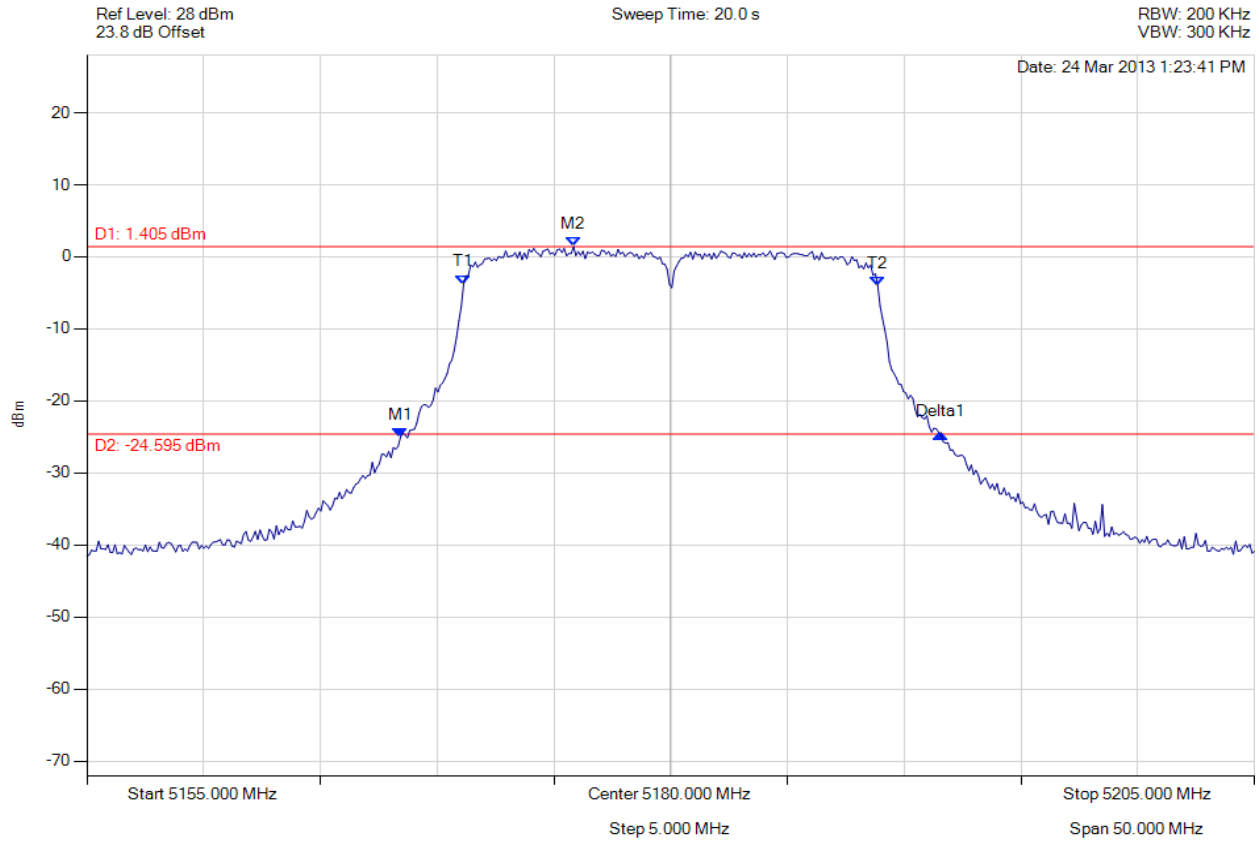


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5168.627 MHz : -23.311 dBm M2 : 5185.862 MHz : 2.704 dBm Delta1 : 22.846 MHz : -0.710 dB T1 : 5171.132 MHz : -3.895 dBm T2 : 5188.868 MHz : -2.451 dBm OBW : 17.735 MHz	Measured 26 dB Bandwidth: 22.846 MHz Measured 99% Bandwidth: 17.735 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc

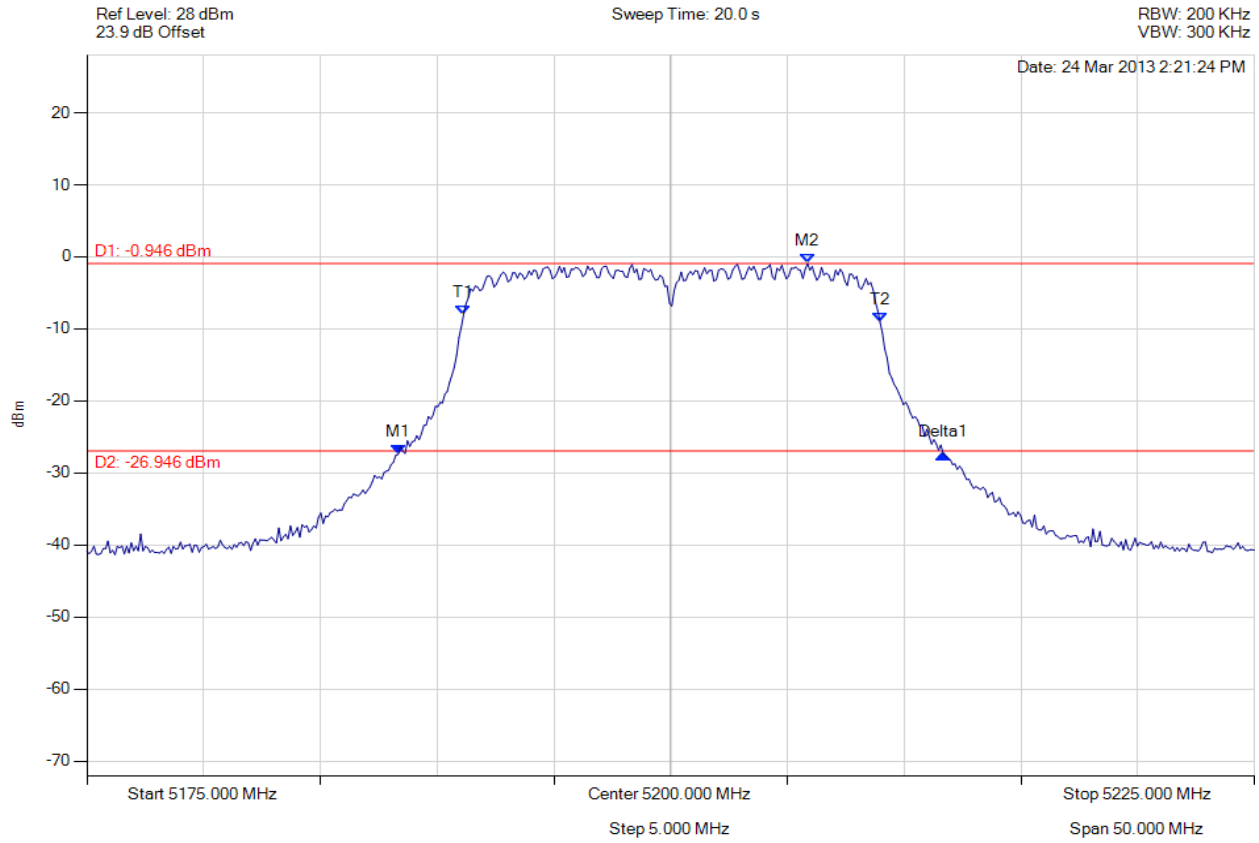


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5168.427 MHz : -25.079 dBm M2 : 5175.842 MHz : 1.405 dBm Delta1 : 23.146 MHz : 0.464 dB T1 : 5171.132 MHz : -3.785 dBm T2 : 5188.868 MHz : -3.970 dBm OBW : 17.735 MHz	Measured 26 dB Bandwidth: 23.146 MHz Measured 99% Bandwidth: 17.735 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

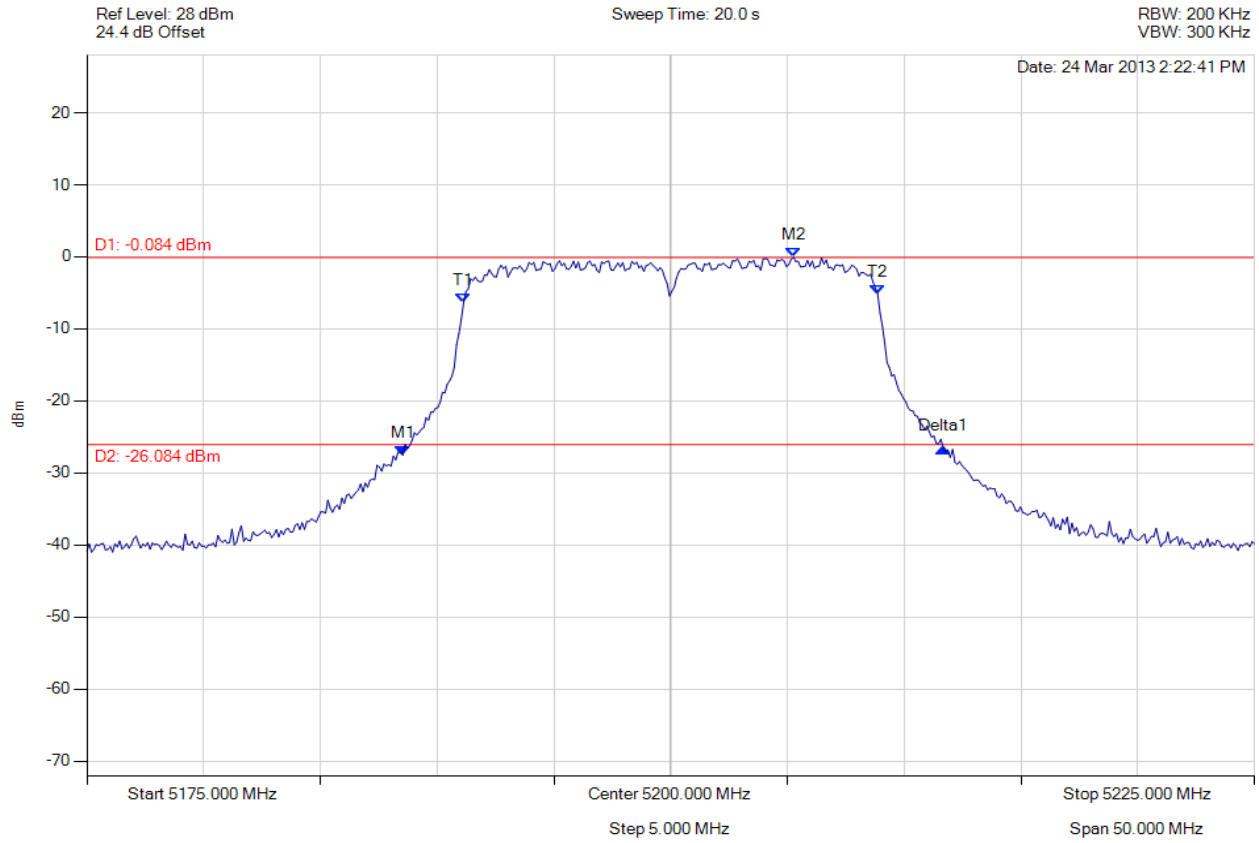


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5188.327 MHz : -27.426 dBm M2 : 5205.862 MHz : -0.946 dBm Delta1 : 23.347 MHz : 0.037 dB T1 : 5191.132 MHz : -7.975 dBm T2 : 5208.968 MHz : -9.093 dBm OBW : 17.836 MHz	Measured 26 dB Bandwidth: 23.347 MHz Measured 99% Bandwidth: 17.836 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

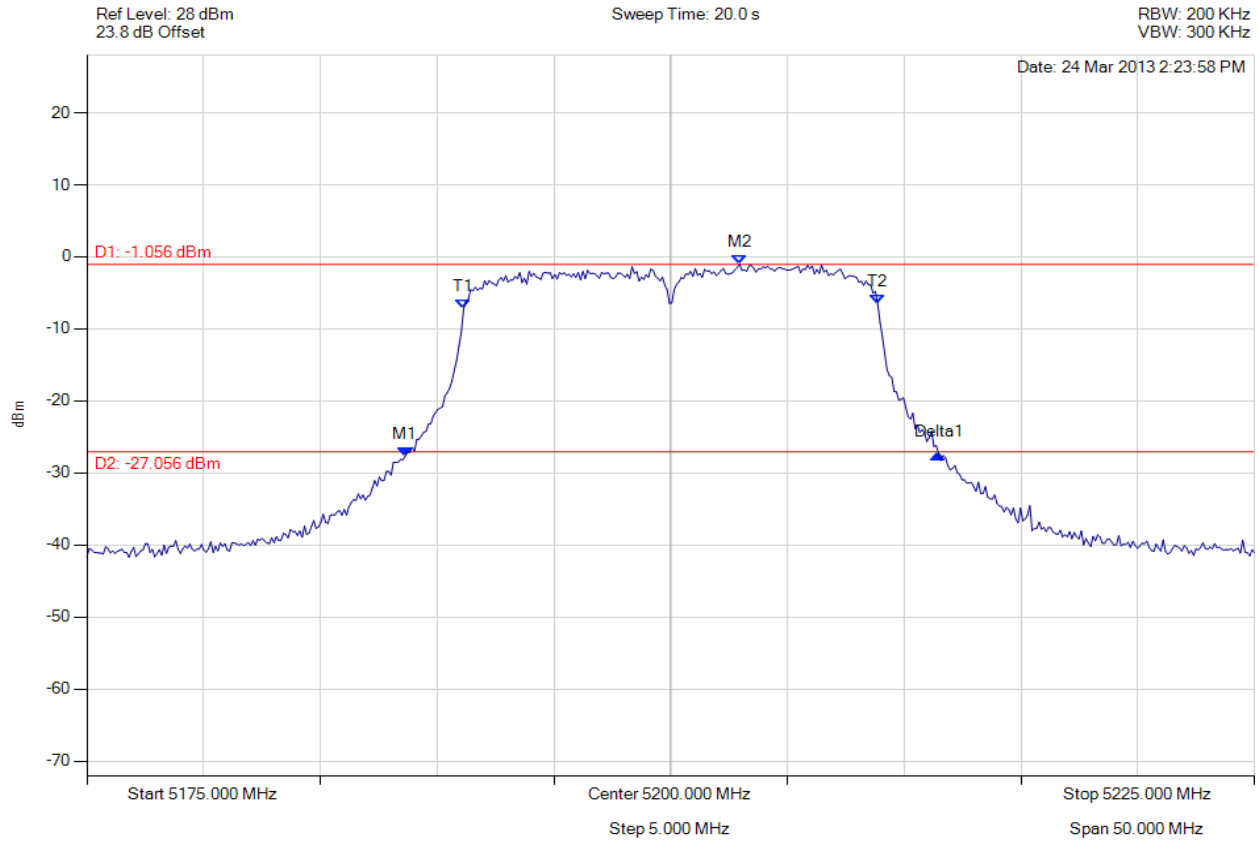


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5188.527 MHz : -27.548 dBm M2 : 5205.261 MHz : -0.084 dBm Delta1 : 23.146 MHz : 1.021 dB T1 : 5191.132 MHz : -6.397 dBm T2 : 5208.868 MHz : -5.197 dBm OBW : 17.735 MHz	Measured 26 dB Bandwidth: 23.146 MHz Measured 99% Bandwidth: 17.735 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc

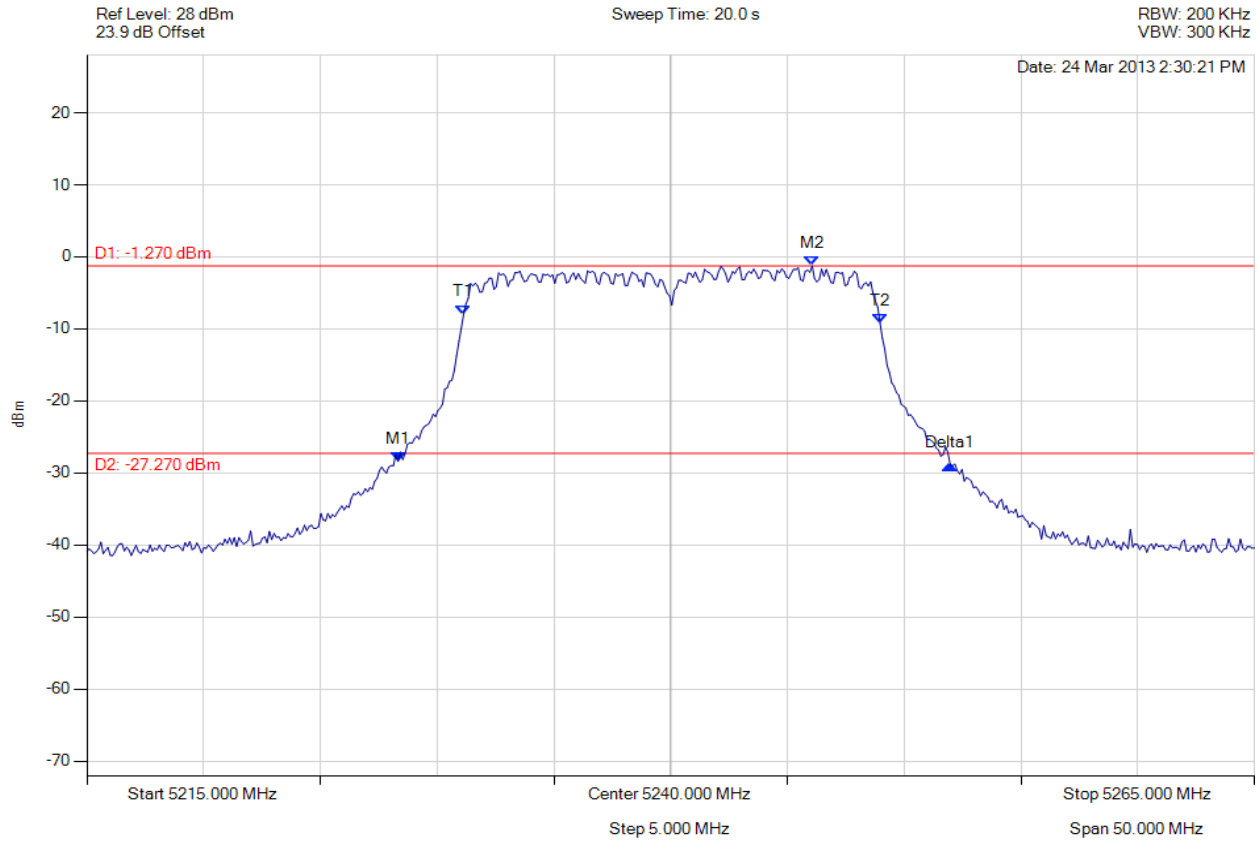


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5188.627 MHz : -27.723 dBm M2 : 5202.956 MHz : -1.056 dBm Delta1 : 22.846 MHz : 0.407 dB T1 : 5191.132 MHz : -7.271 dBm T2 : 5208.868 MHz : -6.576 dBm OBW : 17.735 MHz	Measured 26 dB Bandwidth: 22.846 MHz Measured 99% Bandwidth: 17.735 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

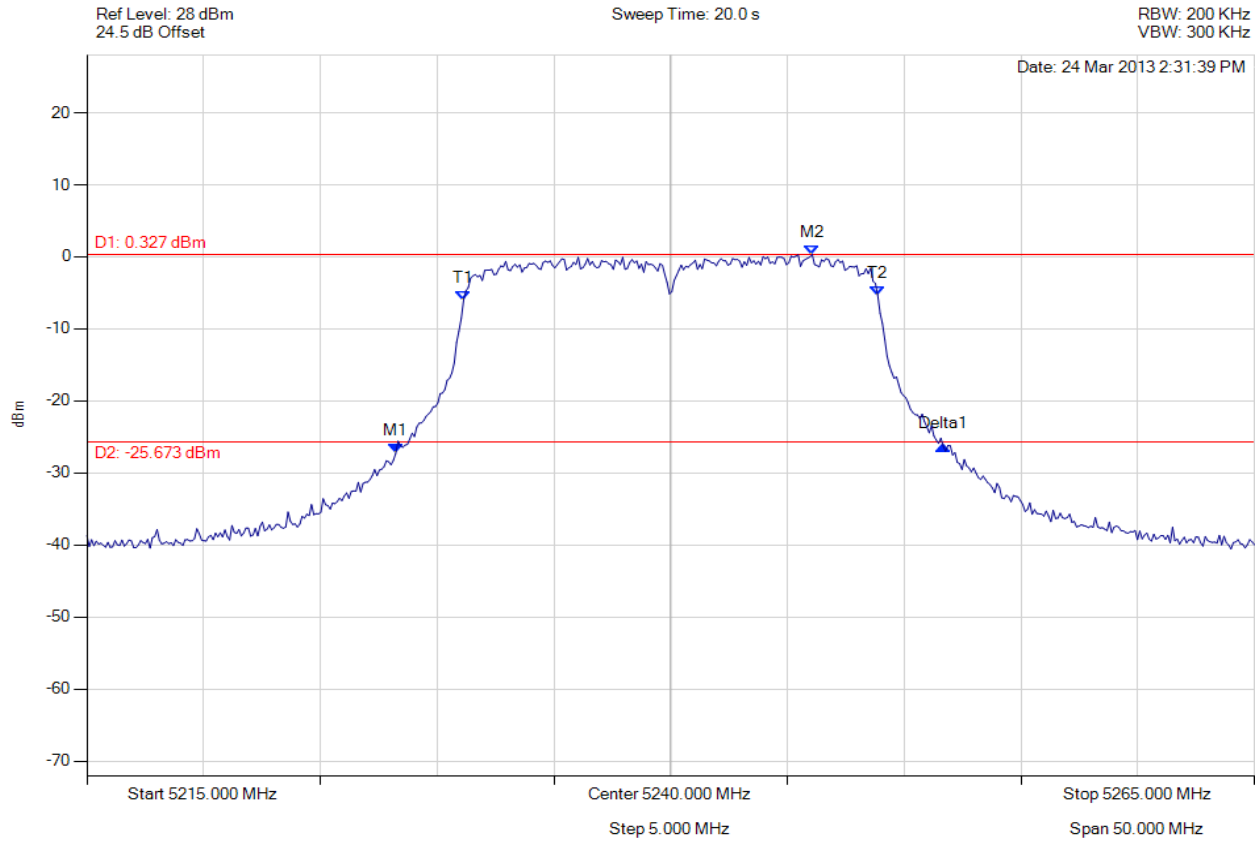


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5228.327 MHz : -28.394 dBm M2 : 5246.062 MHz : -1.270 dBm Delta1 : 23.647 MHz : -0.504 dB T1 : 5231.132 MHz : -7.961 dBm T2 : 5248.968 MHz : -9.252 dBm OBW : 17.836 MHz	Measured 26 dB Bandwidth: 23.647 MHz Measured 99% Bandwidth: 17.836 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

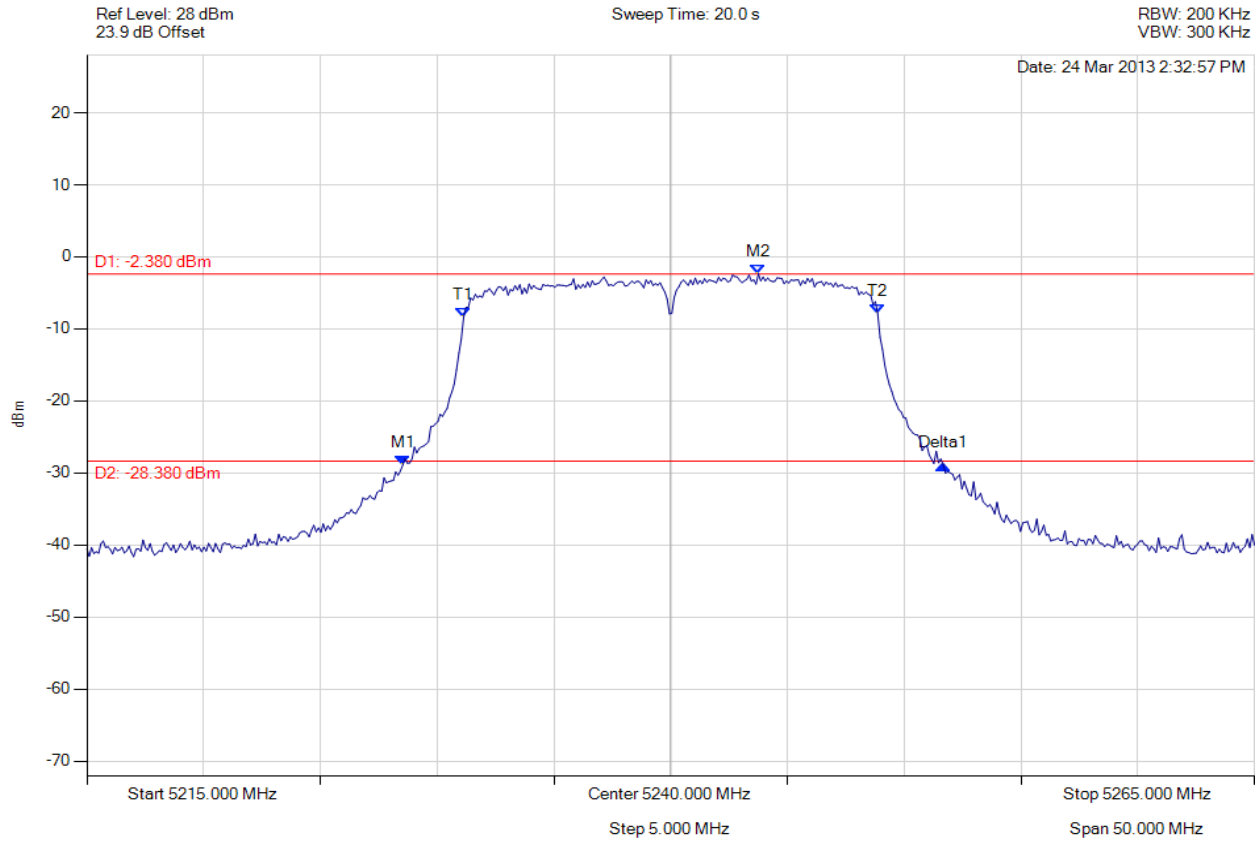


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5228.226 MHz : -27.293 dBm M2 : 5246.062 MHz : 0.327 dBm Delta1 : 23.447 MHz : 1.011 dB T1 : 5231.132 MHz : -5.988 dBm T2 : 5248.868 MHz : -5.331 dBm OBW : 17.735 MHz	Measured 26 dB Bandwidth: 23.447 MHz Measured 99% Bandwidth: 17.735 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc

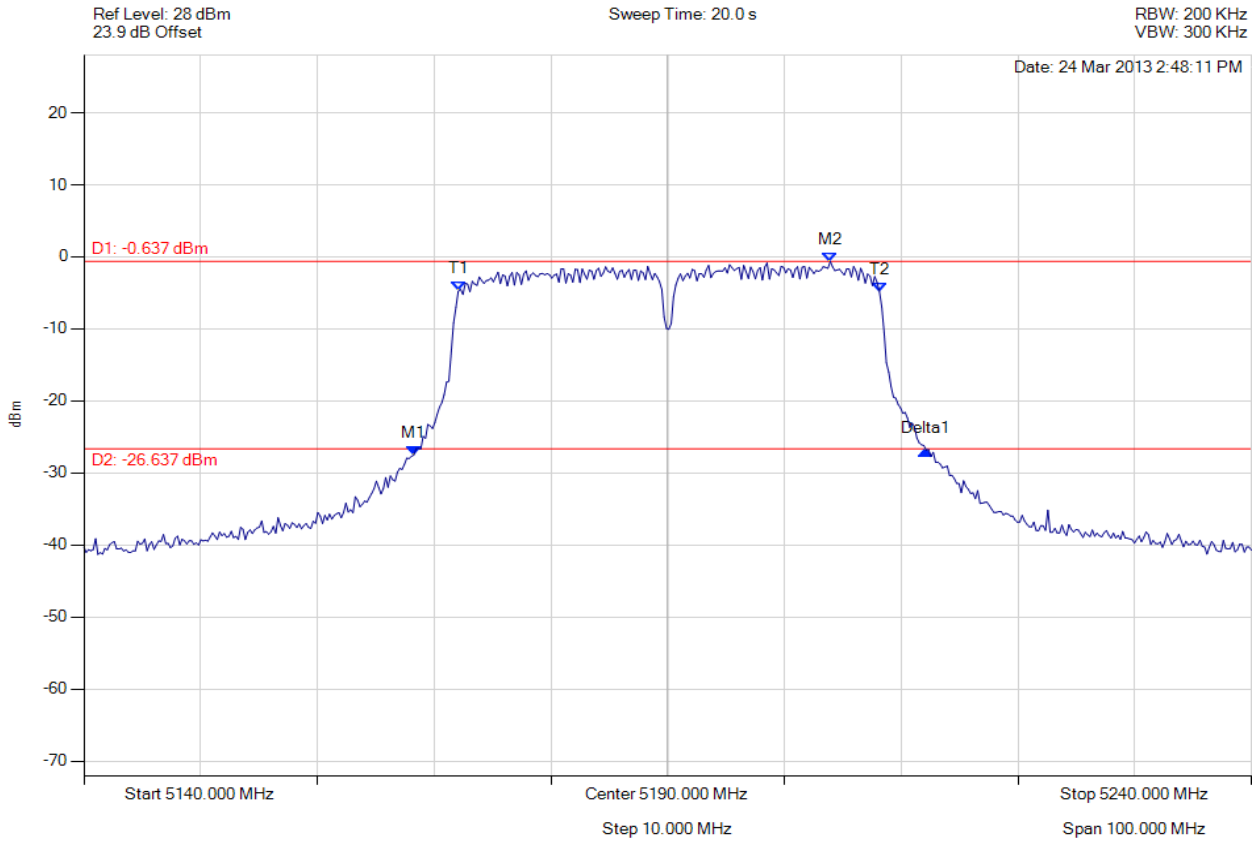


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5228.527 MHz : -28.886 dBm M2 : 5243.758 MHz : -2.380 dBm Delta1 : 23.146 MHz : 0.043 dB T1 : 5231.132 MHz : -8.400 dBm T2 : 5248.868 MHz : -7.914 dBm OBW : 17.735 MHz	Measured 26 dB Bandwidth: 23.146 MHz Measured 99% Bandwidth: 17.735 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

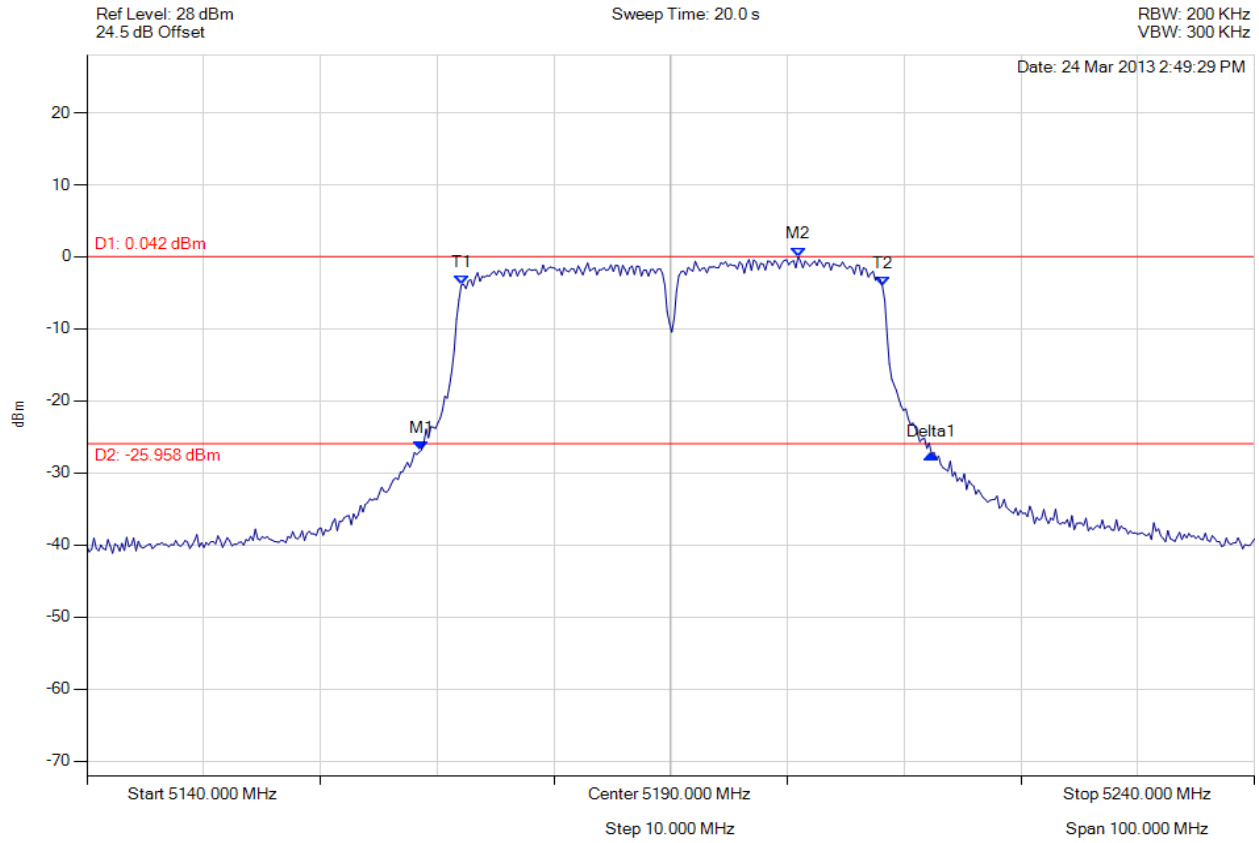


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5168.257 MHz : -27.517 dBm M2 : 5203.928 MHz : -0.637 dBm Delta1 : 43.888 MHz : 0.673 dB T1 : 5172.064 MHz : -4.778 dBm T2 : 5208.136 MHz : -4.810 dBm OBW : 36.072 MHz	Measured 26 dB Bandwidth: 43.888 MHz Measured 99% Bandwidth: 36.072 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

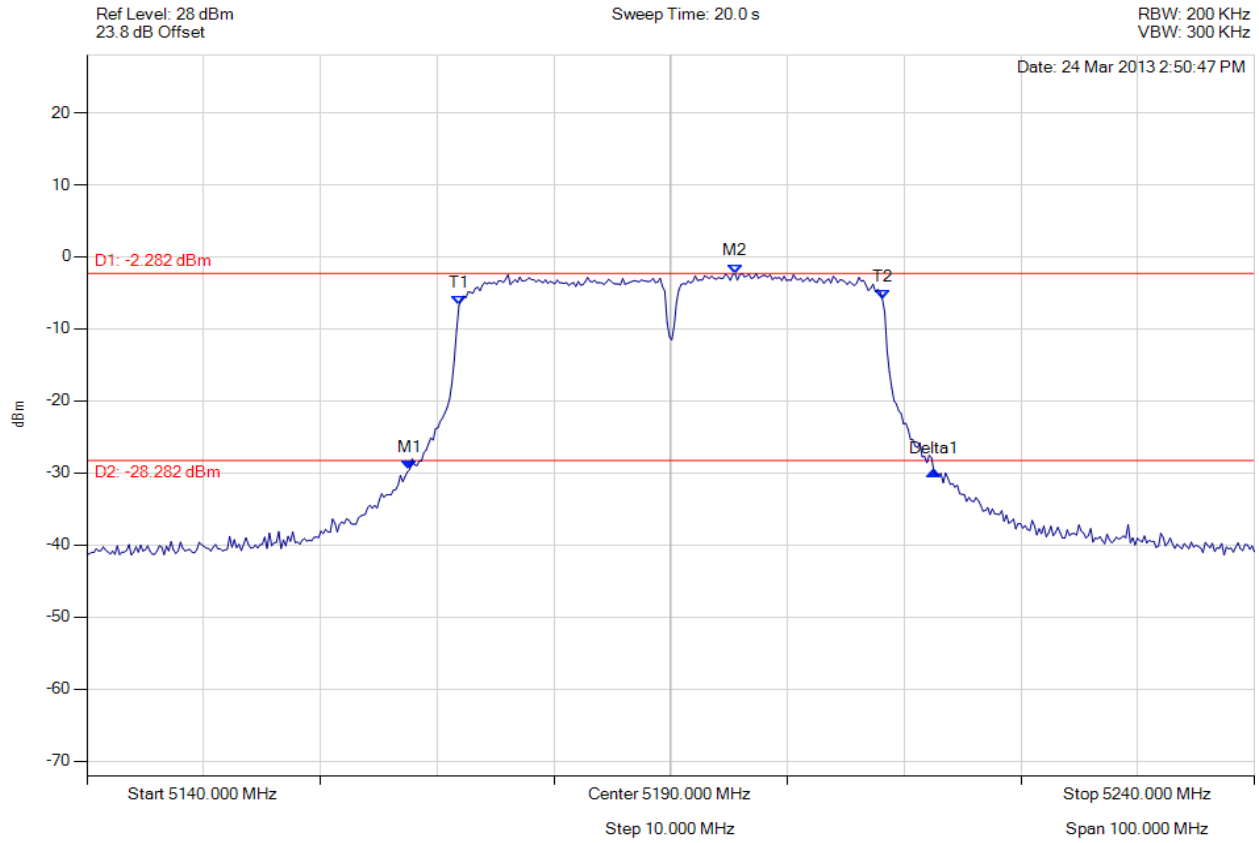


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5168.657 MHz : -26.824 dBm M2 : 5200.922 MHz : 0.042 dBm Delta1 : 43.687 MHz : -0.567 dB T1 : 5172.064 MHz : -3.909 dBm T2 : 5208.136 MHz : -4.072 dBm OBW : 36.072 MHz	Measured 26 dB Bandwidth: 43.687 MHz Measured 99% Bandwidth: 36.072 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc

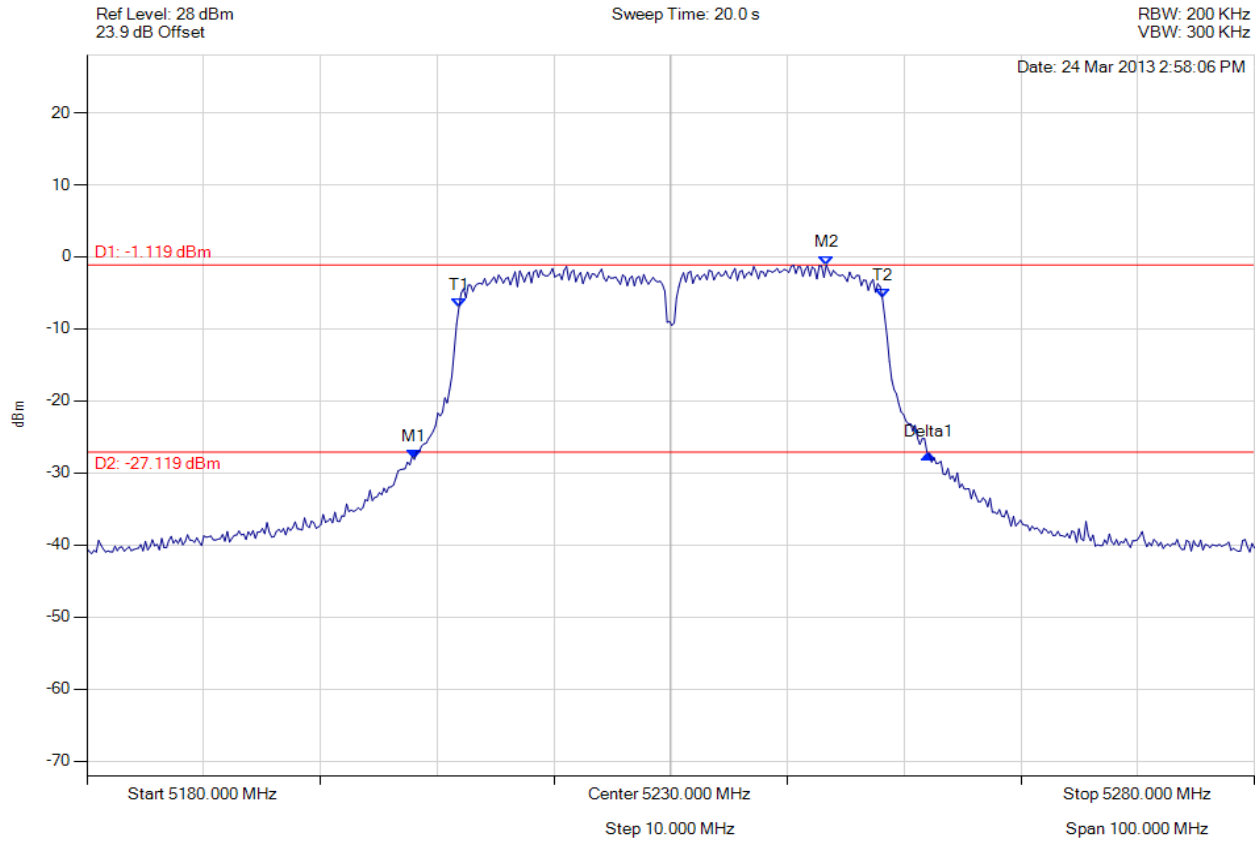


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5167.655 MHz : -29.502 dBm M2 : 5195.511 MHz : -2.282 dBm Delta1 : 44.890 MHz : -0.287 dB T1 : 5171.864 MHz : -6.777 dBm T2 : 5208.136 MHz : -5.882 dBm OBW : 36.273 MHz	Measured 26 dB Bandwidth: 44.890 MHz Measured 99% Bandwidth: 36.273 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

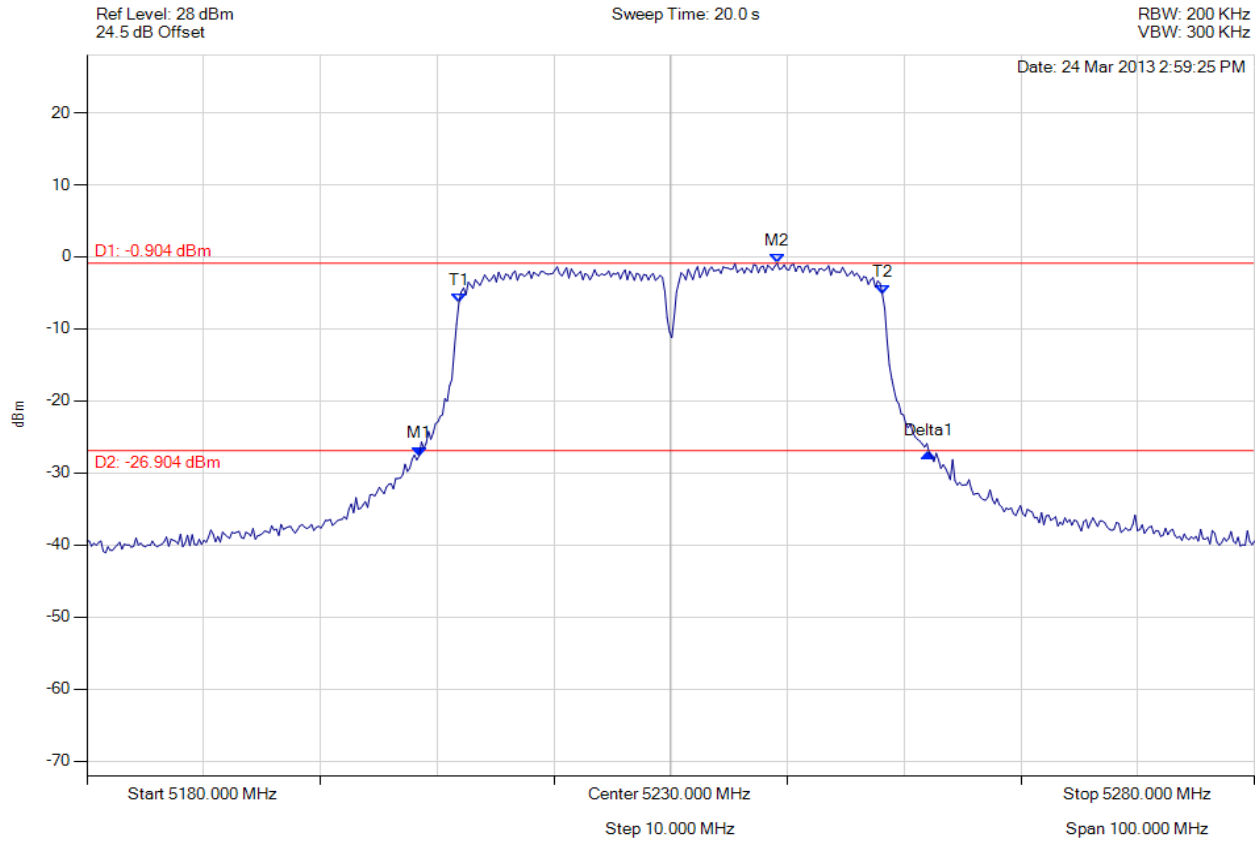


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5208.056 MHz : -28.121 dBm M2 : 5243.327 MHz : -1.119 dBm Delta1 : 44.088 MHz : 0.777 dB T1 : 5211.864 MHz : -6.997 dBm T2 : 5248.136 MHz : -5.758 dBm OBW : 36.273 MHz	Measured 26 dB Bandwidth: 44.088 MHz Measured 99% Bandwidth: 36.273 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

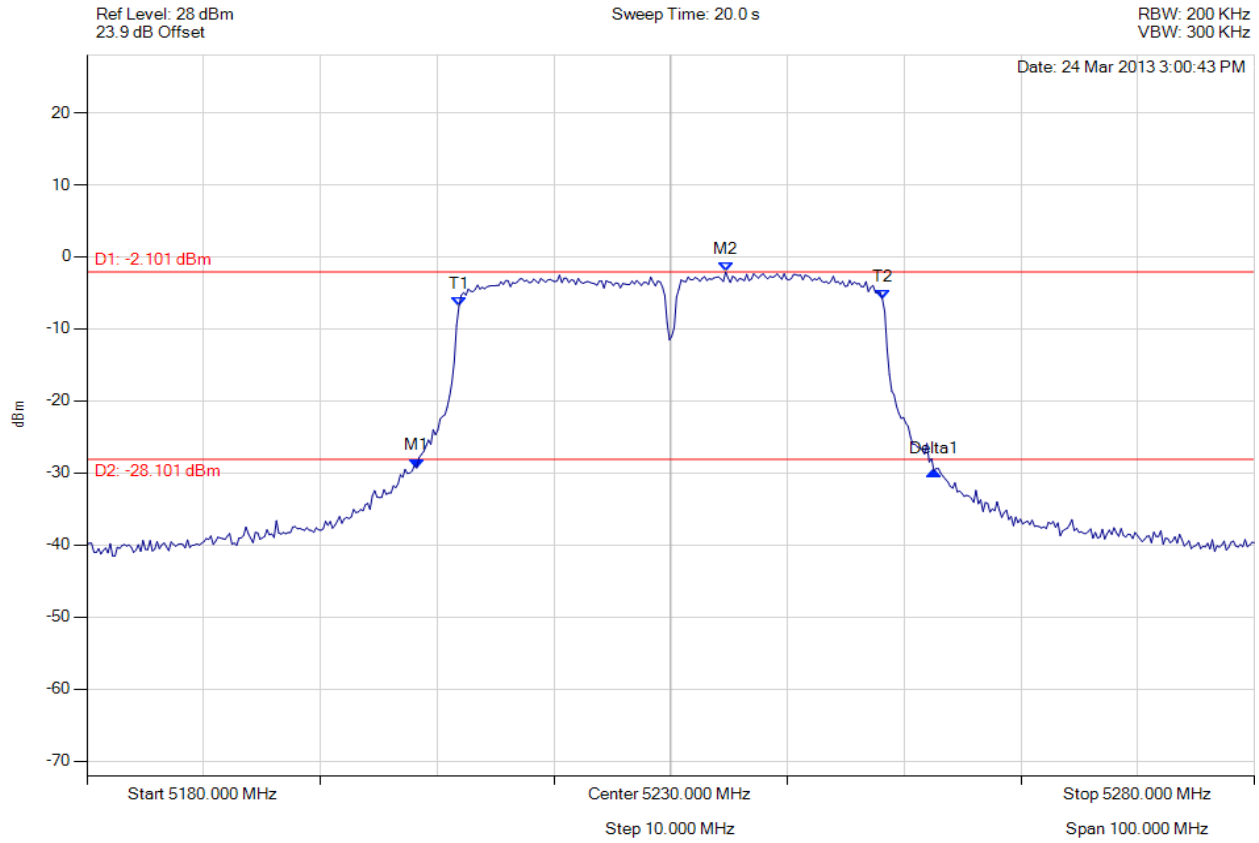


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5208.457 MHz : -27.639 dBm M2 : 5239.118 MHz : -0.904 dBm Delta1 : 43.687 MHz : 0.431 dB T1 : 5211.864 MHz : -6.305 dBm T2 : 5248.136 MHz : -5.223 dBm OBW : 36.273 MHz	Measured 26 dB Bandwidth: 43.687 MHz Measured 99% Bandwidth: 36.273 MHz

Back to the Matrix

26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc



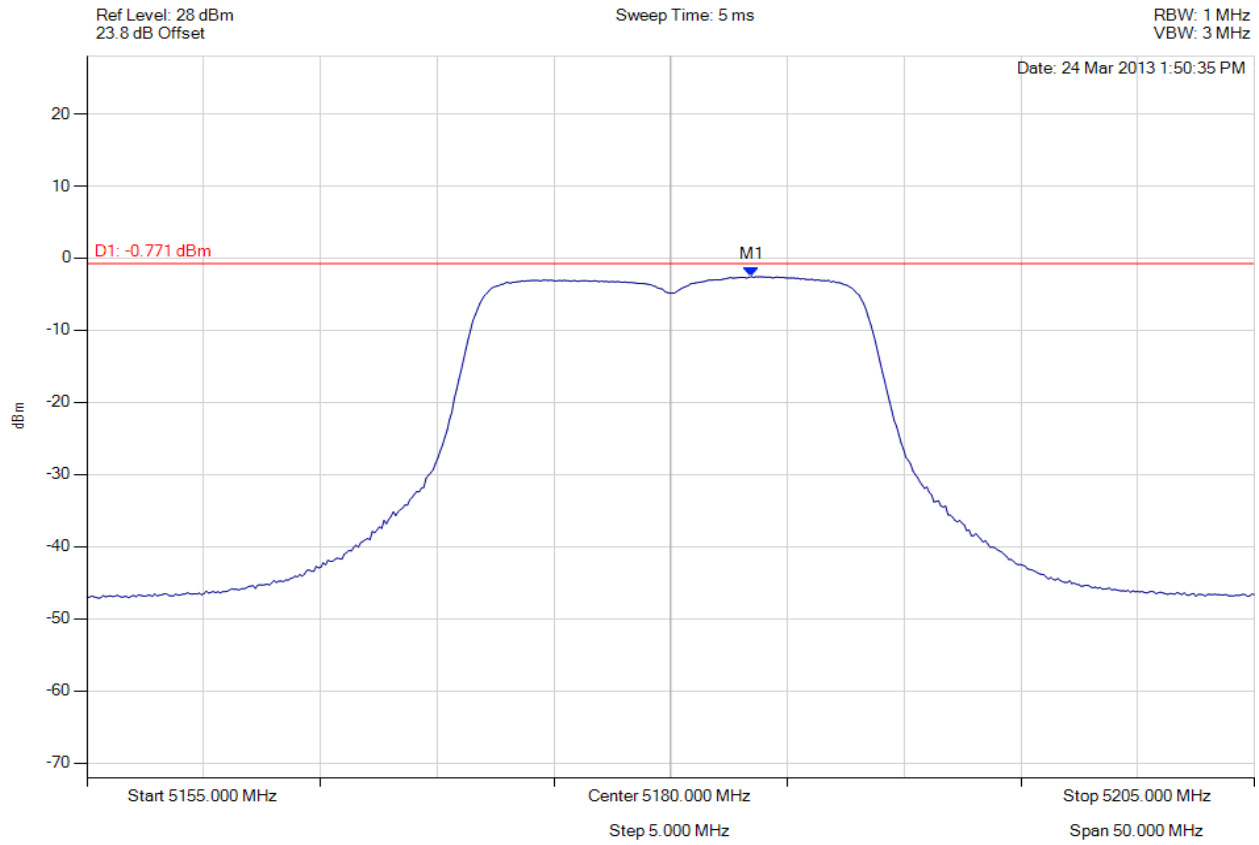
Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5208.257 MHz : -29.311 dBm M2 : 5234.709 MHz : -2.101 dBm Delta1 : 44.289 MHz : -0.388 dB T1 : 5211.864 MHz : -6.883 dBm T2 : 5248.136 MHz : -5.882 dBm OBW : 36.273 MHz	Measured 26 dB Bandwidth: 44.289 MHz Measured 99% Bandwidth: 36.273 MHz

Back to the Matrix

A.1.2. Peak Power Spectral Density

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5180.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

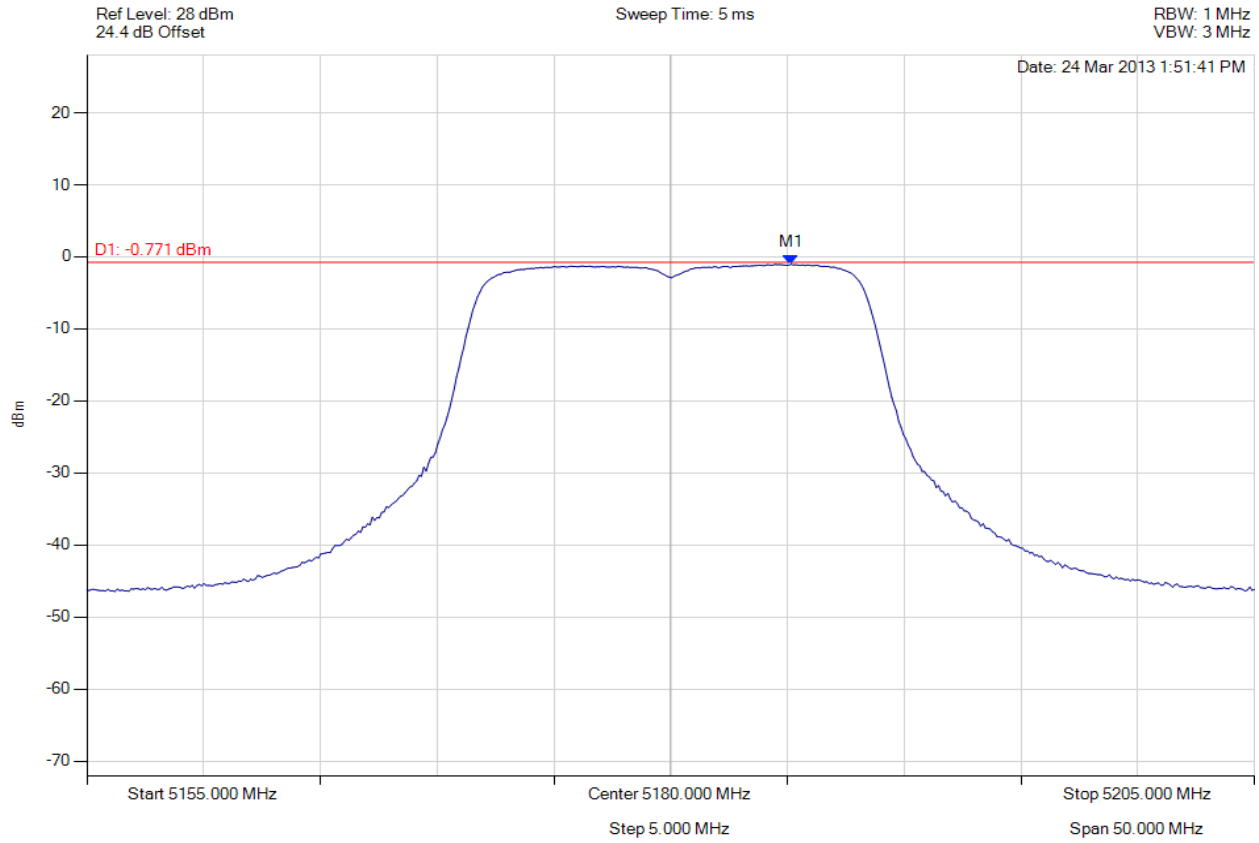


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5183.457 MHz : -2.554 dBm	Limit: ≤ -0.771 dBm Margin: -1.78 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5180.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

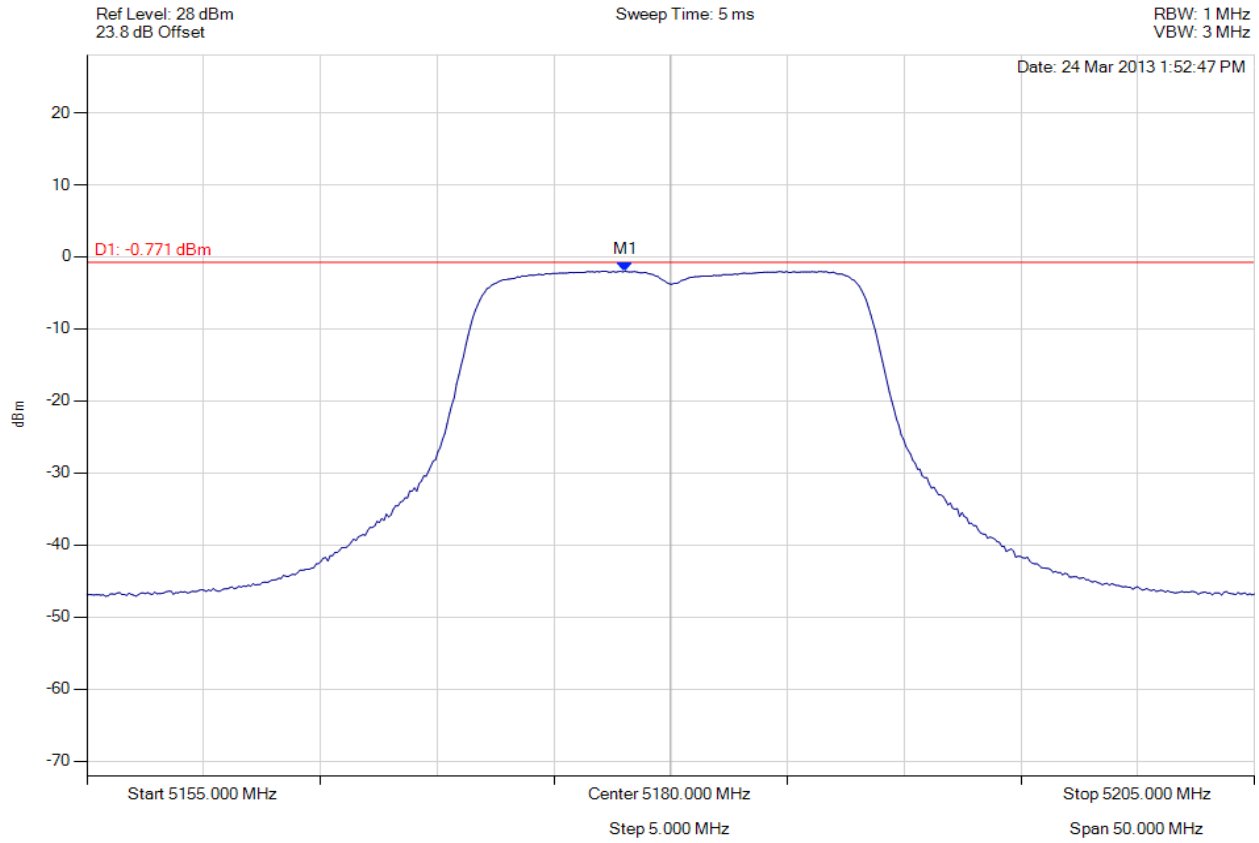


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5185.160 MHz : -1.022 dBm	Limit: ≤ -0.771 dBm Margin: -0.25 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5180.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc

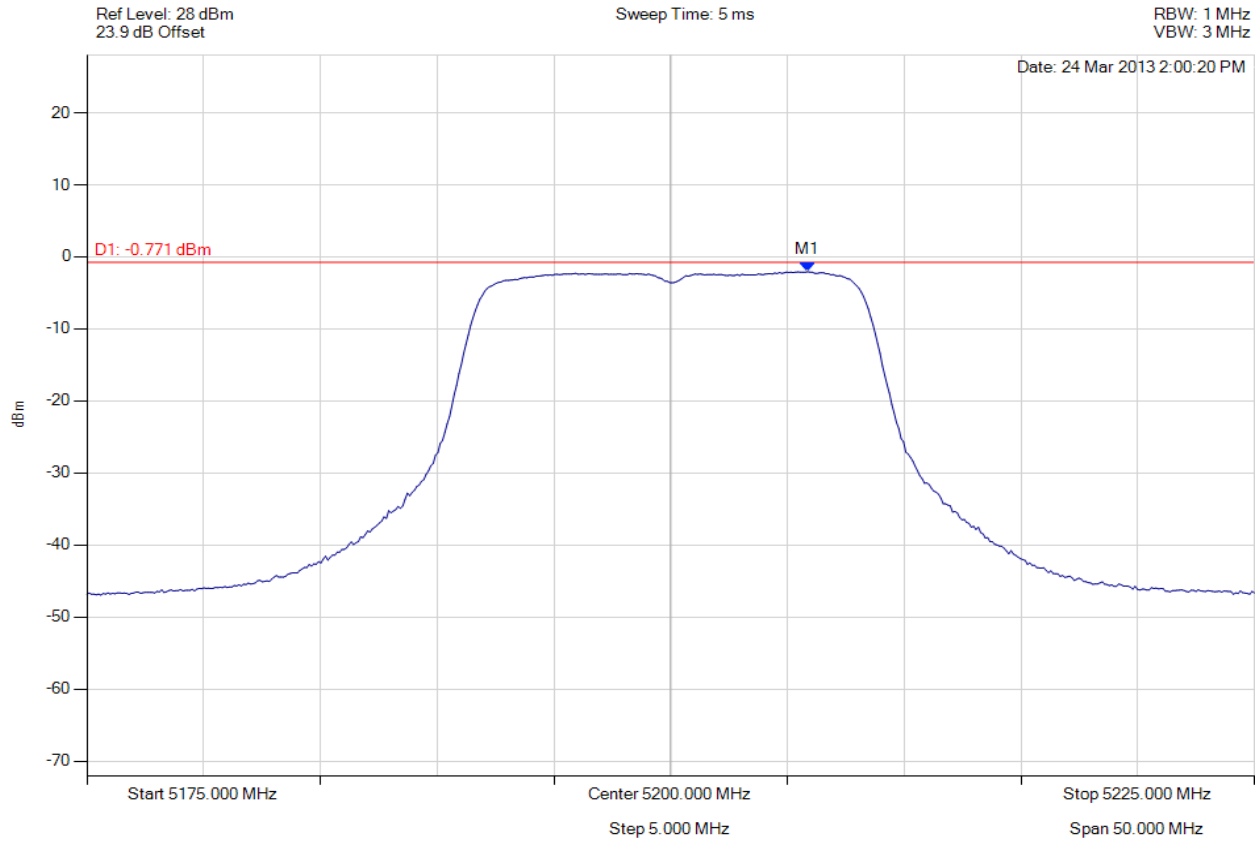


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5178.046 MHz : -2.007 dBm	Limit: ≤ -0.771 dBm Margin: -1.24 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5200.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

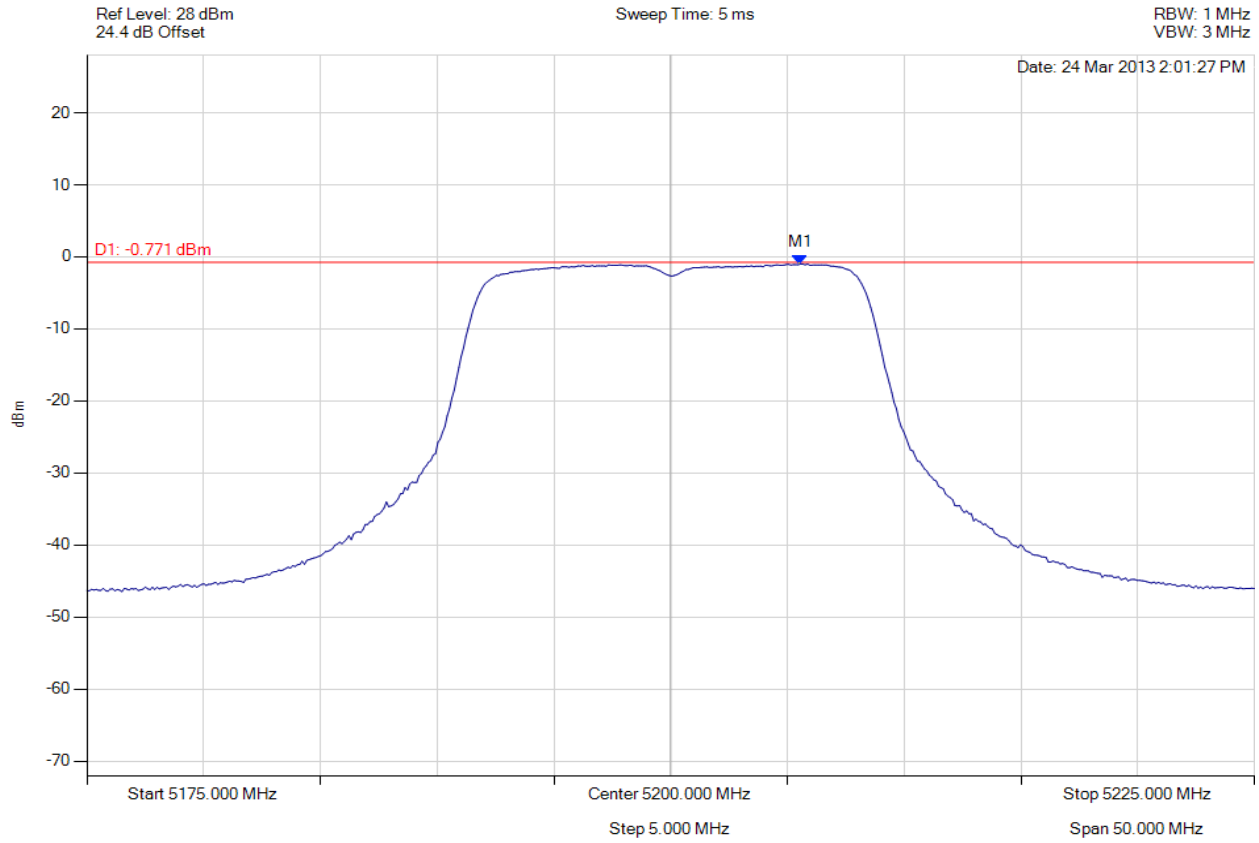


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5205.862 MHz : -2.071 dBm	Limit: ≤ -0.771 dBm Margin: -1.30 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5200.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

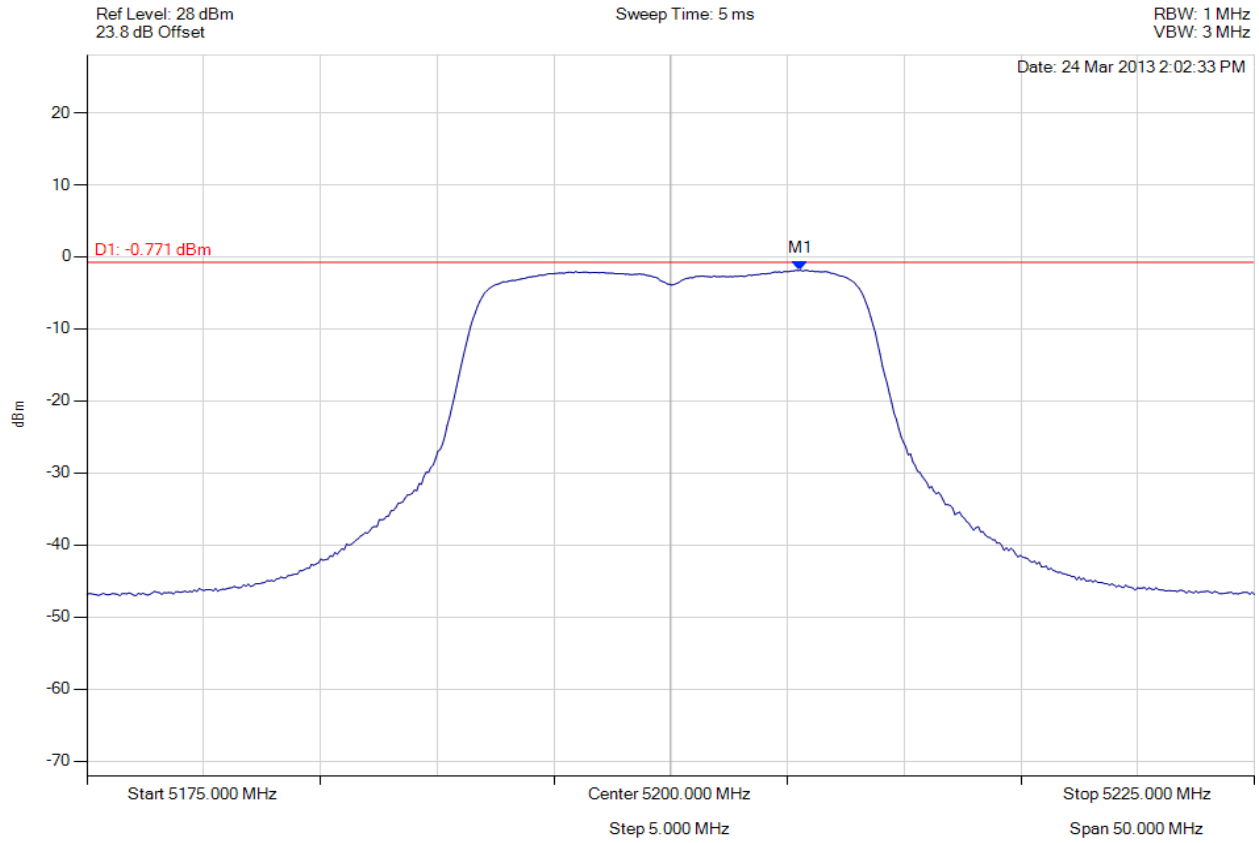


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5205.561 MHz : -0.980 dBm	Limit: ≤ -0.771 dBm Margin: -0.21 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5200.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc

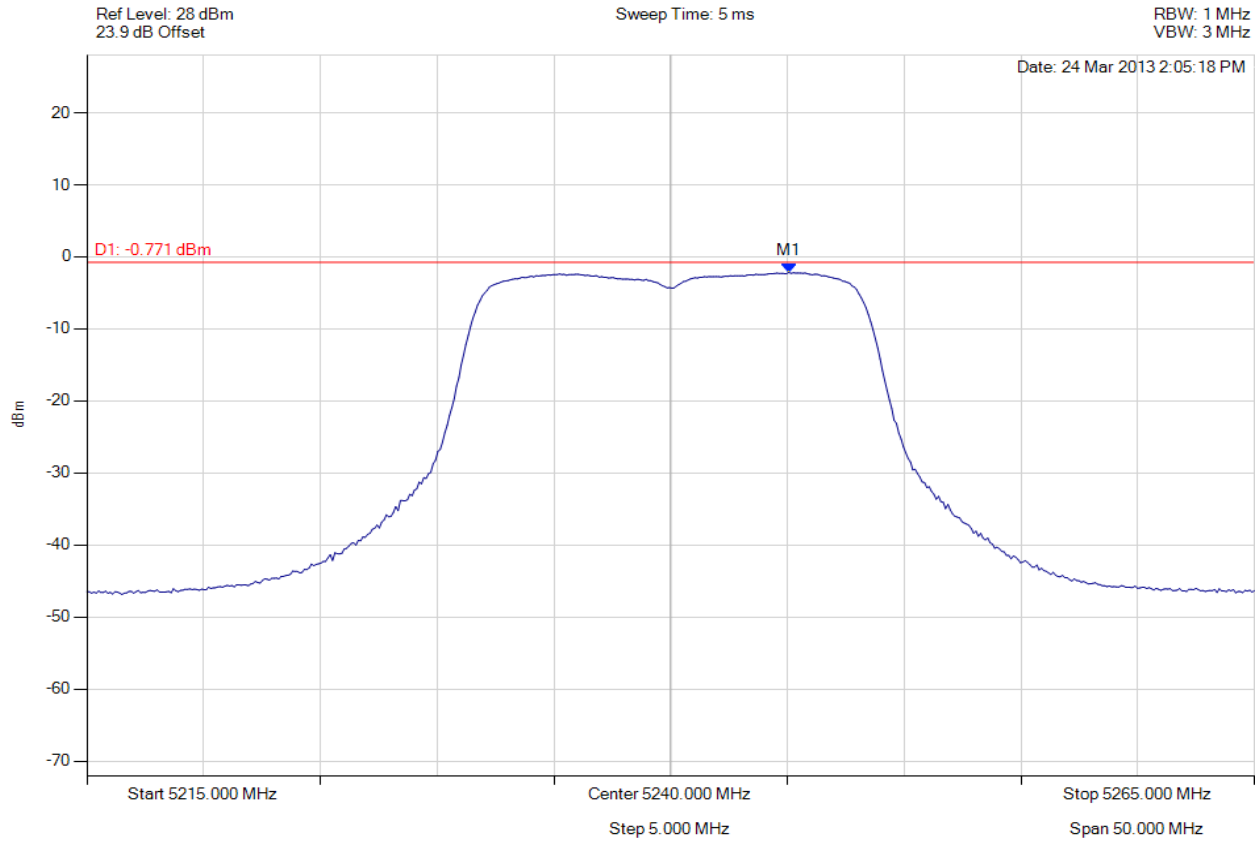


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5205.561 MHz : -1.861 dBm	Limit: ≤ -0.771 dBm Margin: -1.09 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5240.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

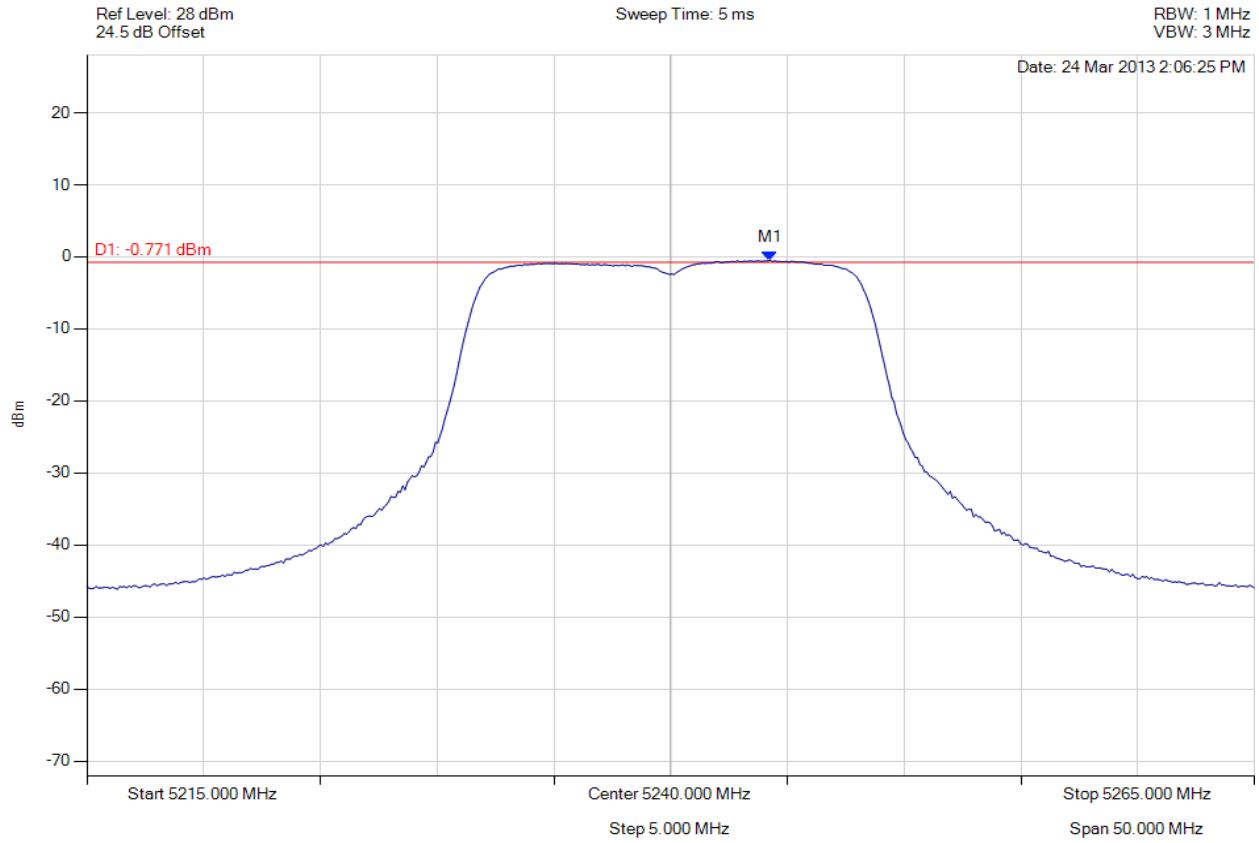


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5245.060 MHz : -2.175 dBm	Limit: ≤ -0.771 dBm Margin: -1.40 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5240.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

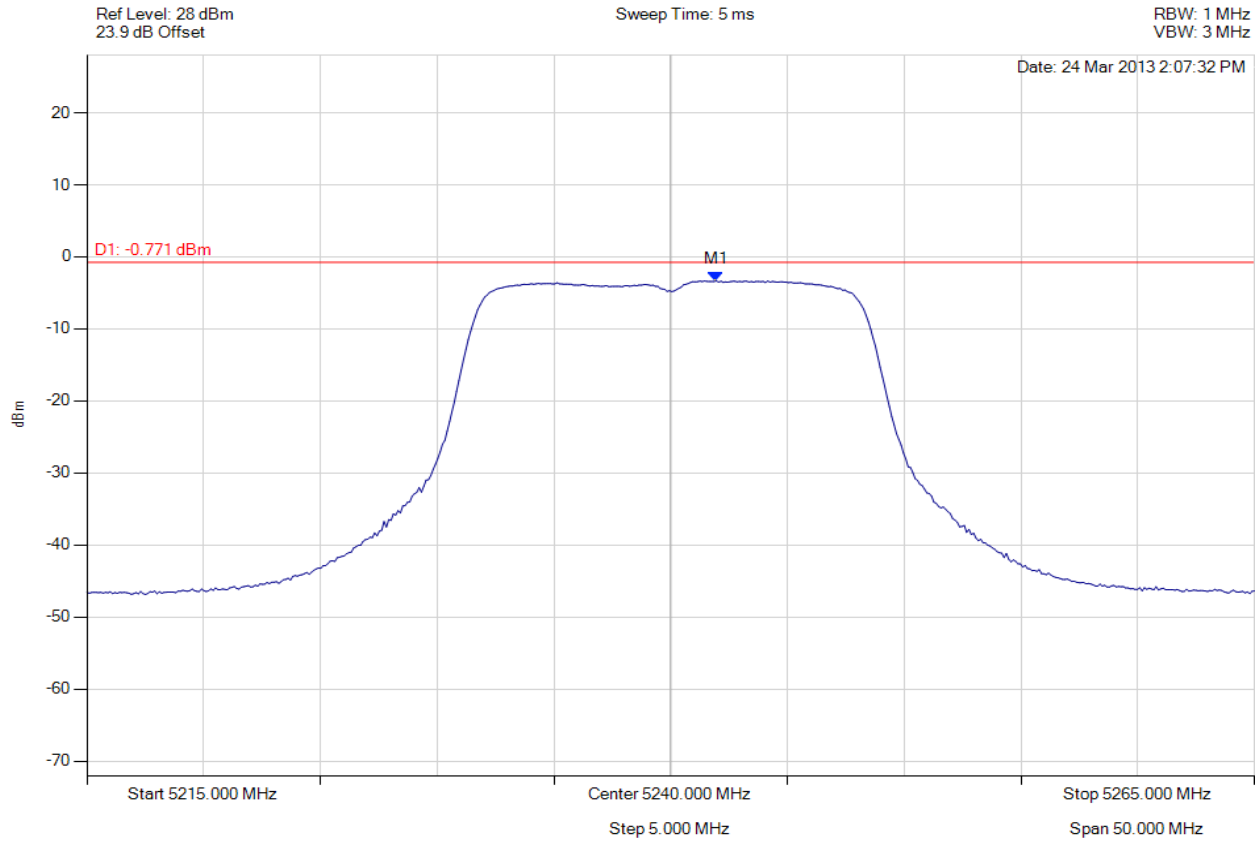


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5244.259 MHz : -0.458 dBm	Limit: ≤ -0.771 dBm Margin: 0.31 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11a, Channel: 5240.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc

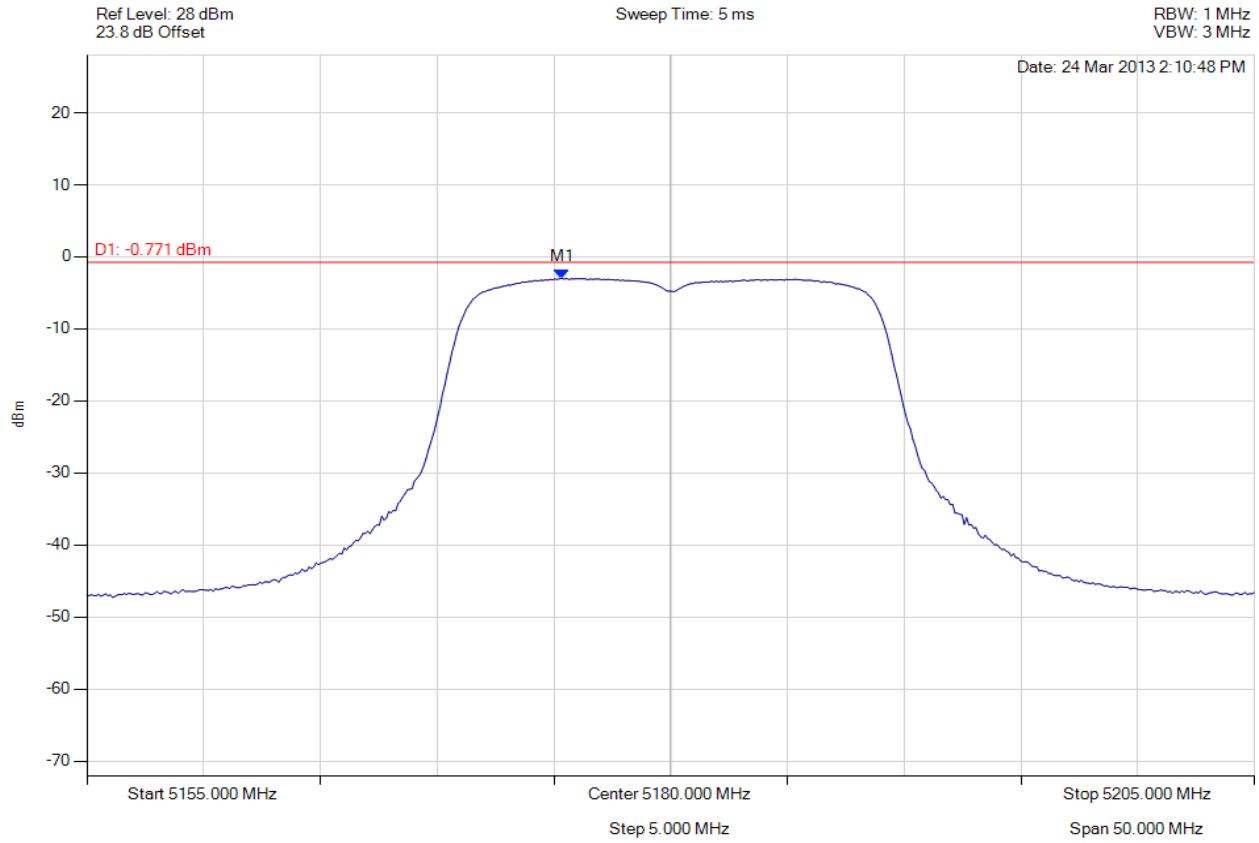


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5241.954 MHz : -3.338 dBm	Limit: ≤ -0.771 dBm Margin: -2.57 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

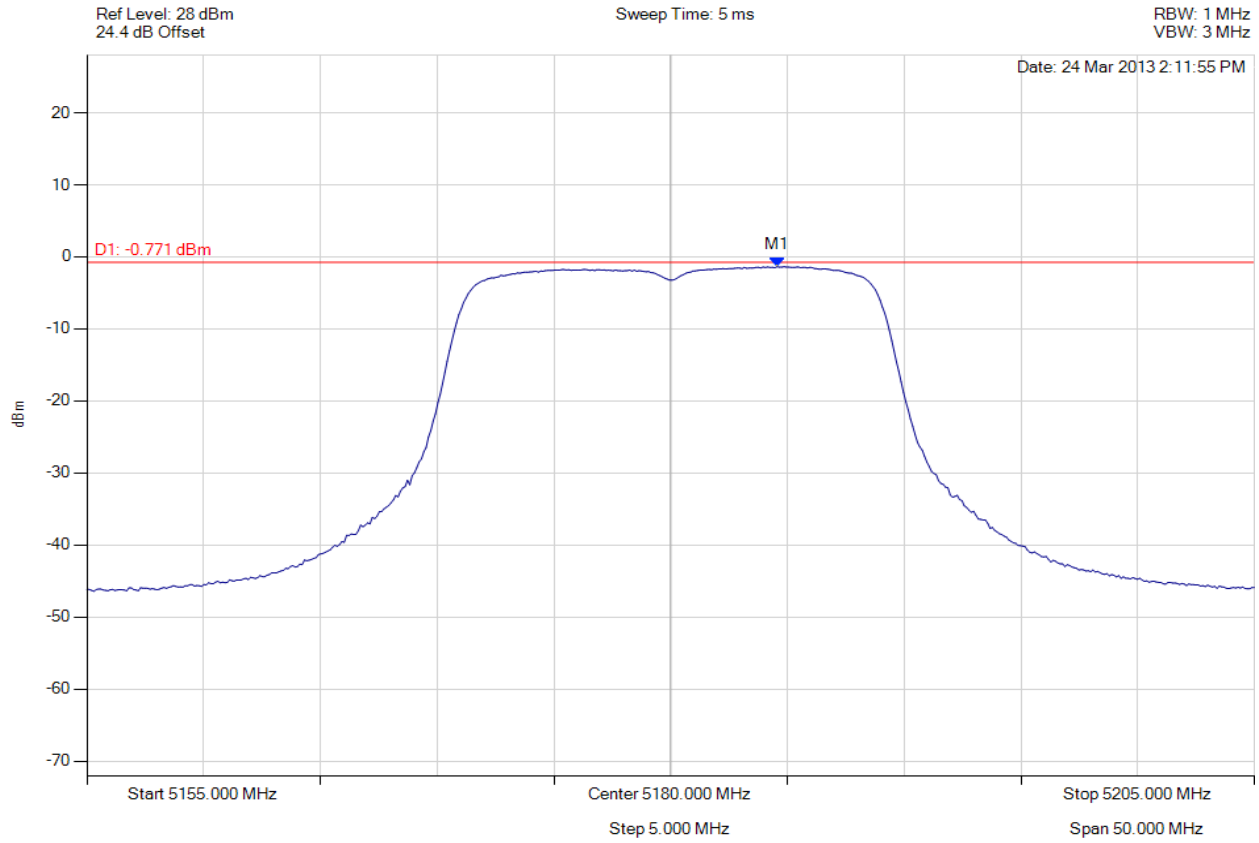


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5175.341 MHz : -2.978 dBm	Limit: ≤ -0.771 dBm Margin: -2.21 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

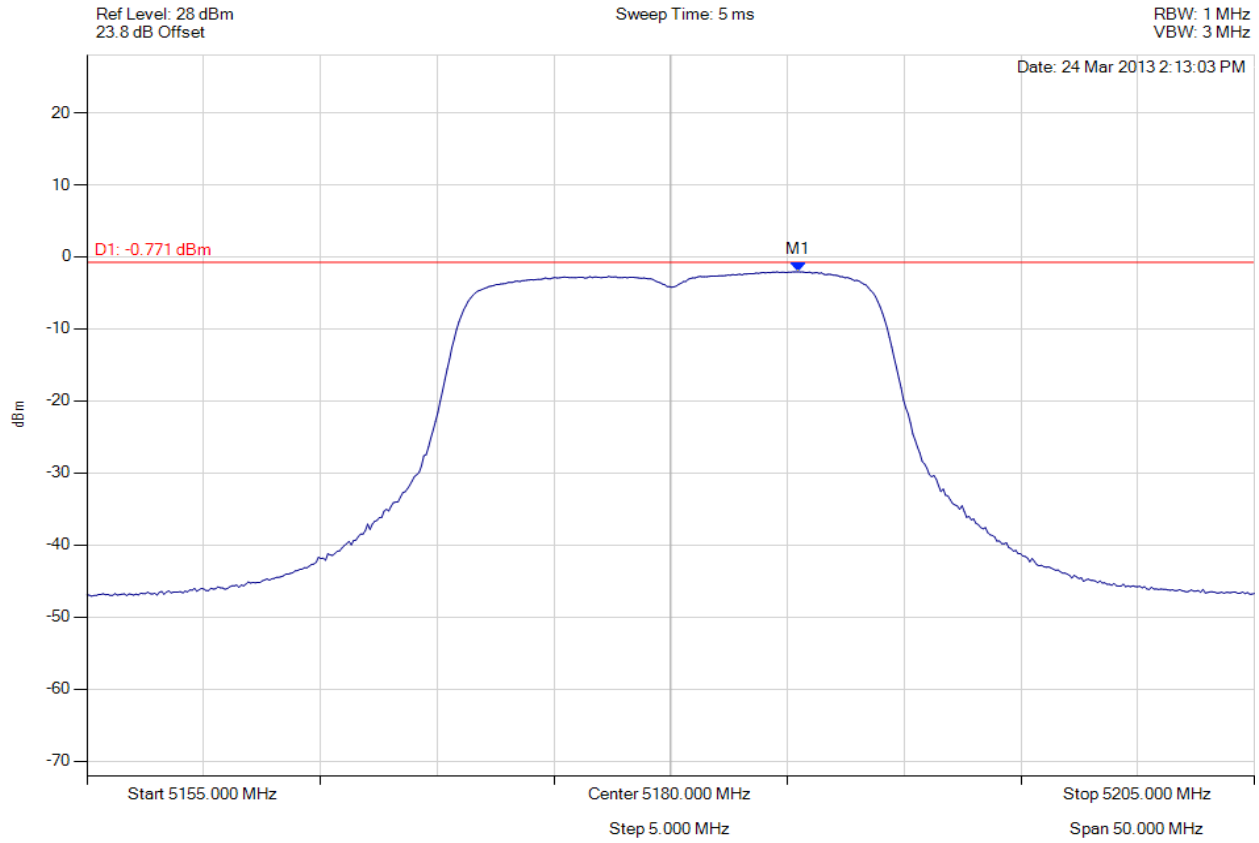


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5184.559 MHz : -1.366 dBm	Limit: ≤ -0.771 dBm Margin: -0.59 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc

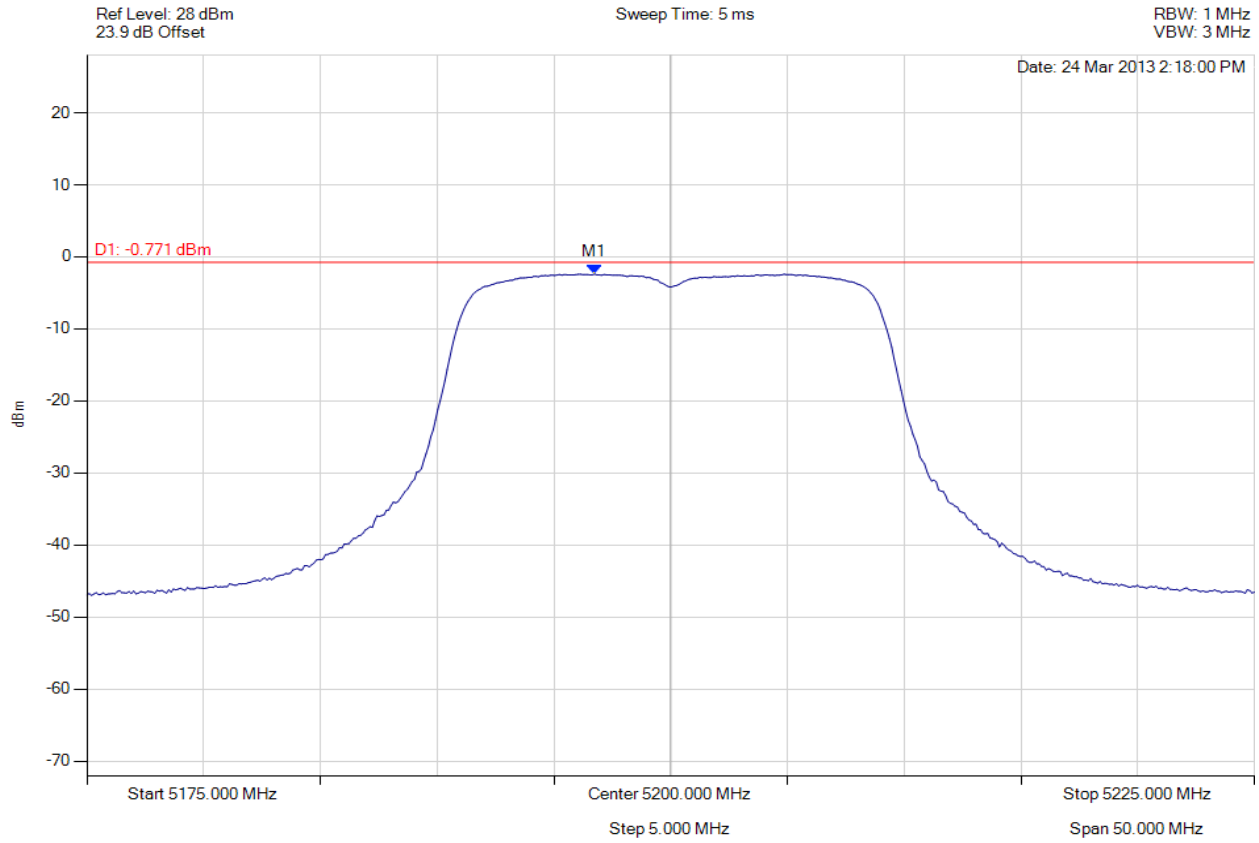


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5185.461 MHz : -2.071 dBm	Limit: ≤ -0.771 dBm Margin: -1.30 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

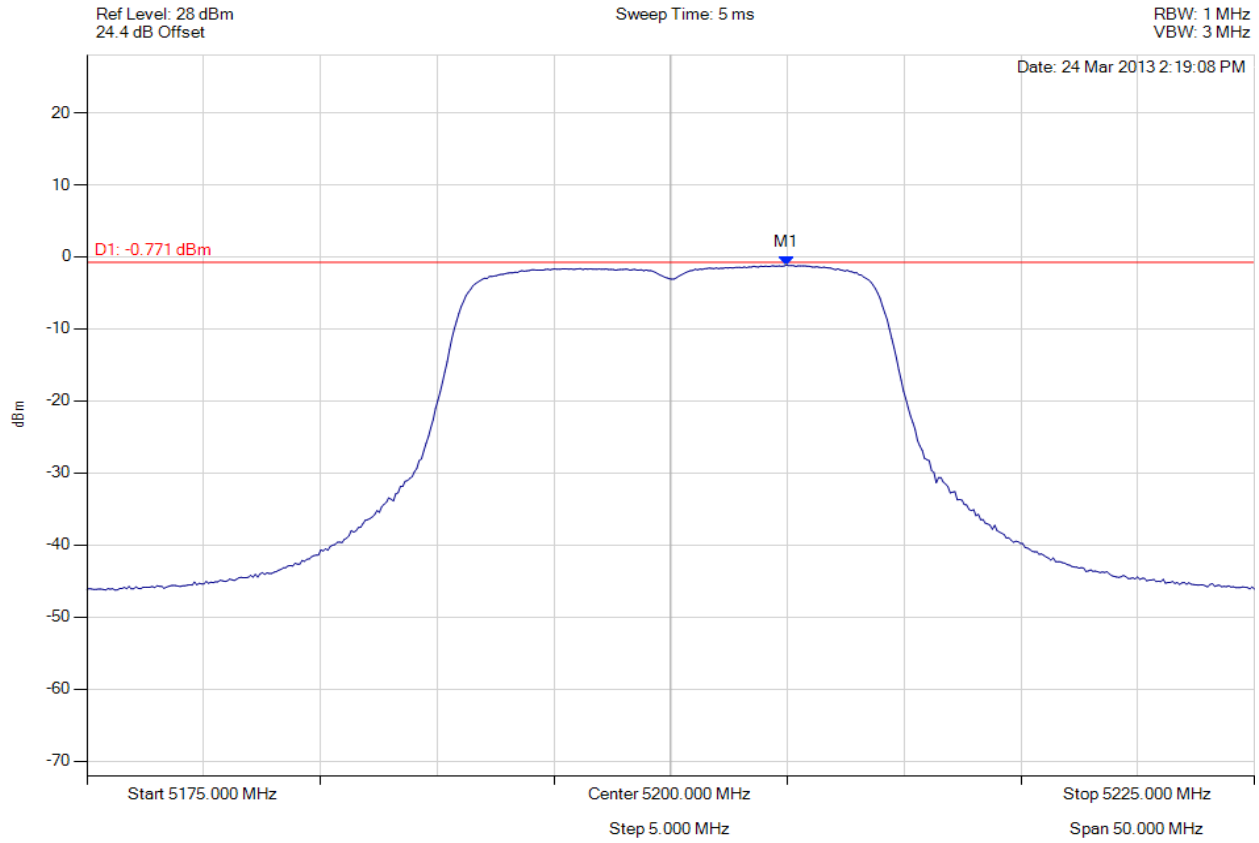


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5196.743 MHz : -2.394 dBm	Limit: ≤ -0.771 dBm Margin: -1.62 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

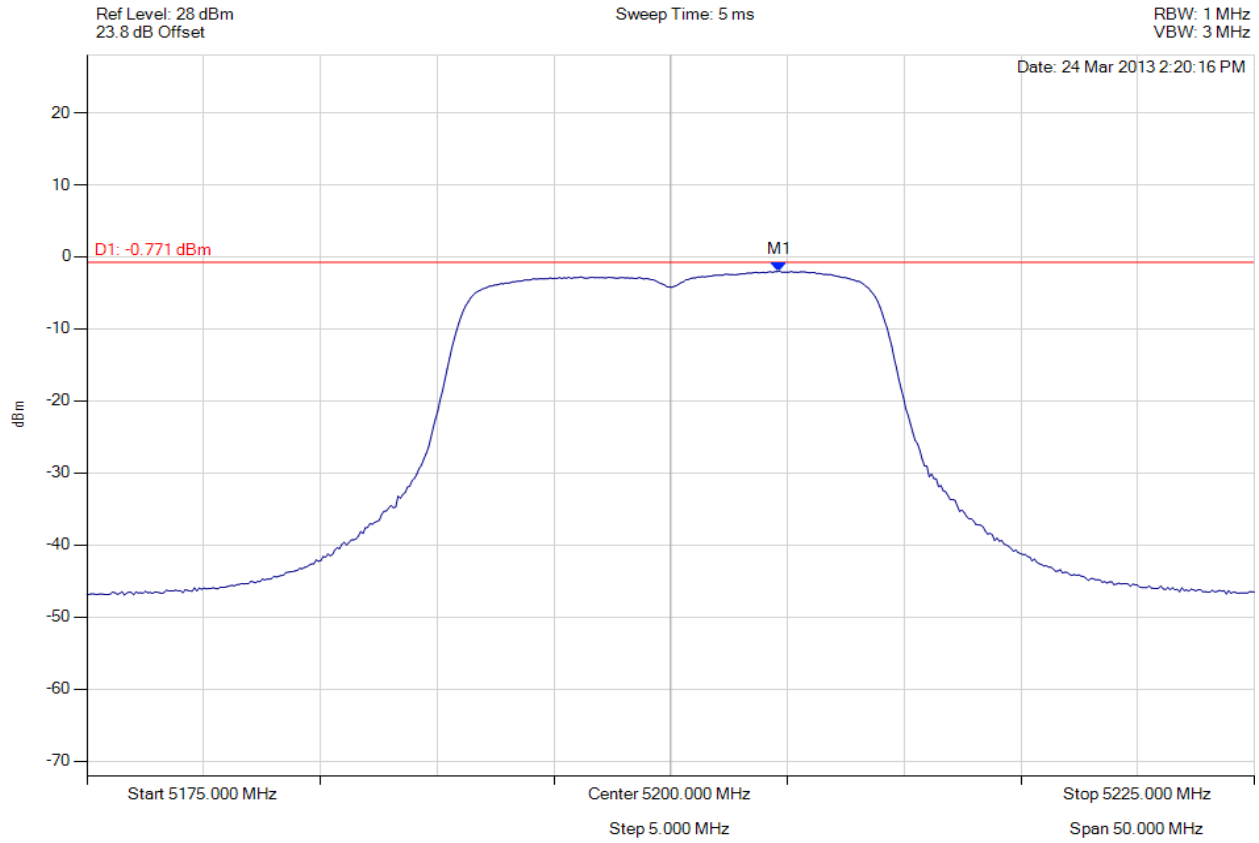


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5204.960 MHz : -1.121 dBm	Limit: ≤ -0.771 dBm Margin: -0.35 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5200.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc

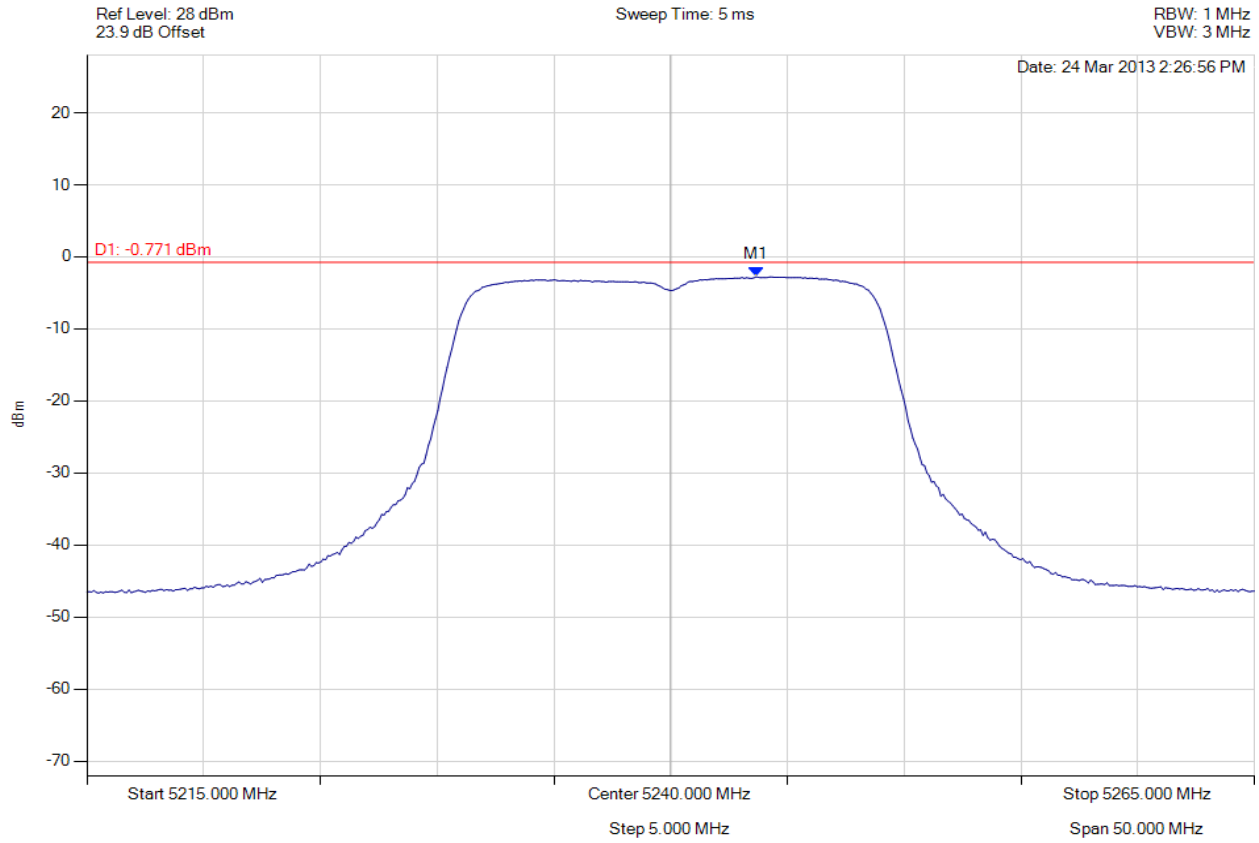


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5204.659 MHz : -1.999 dBm	Limit: ≤ -0.771 dBm Margin: -1.23 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

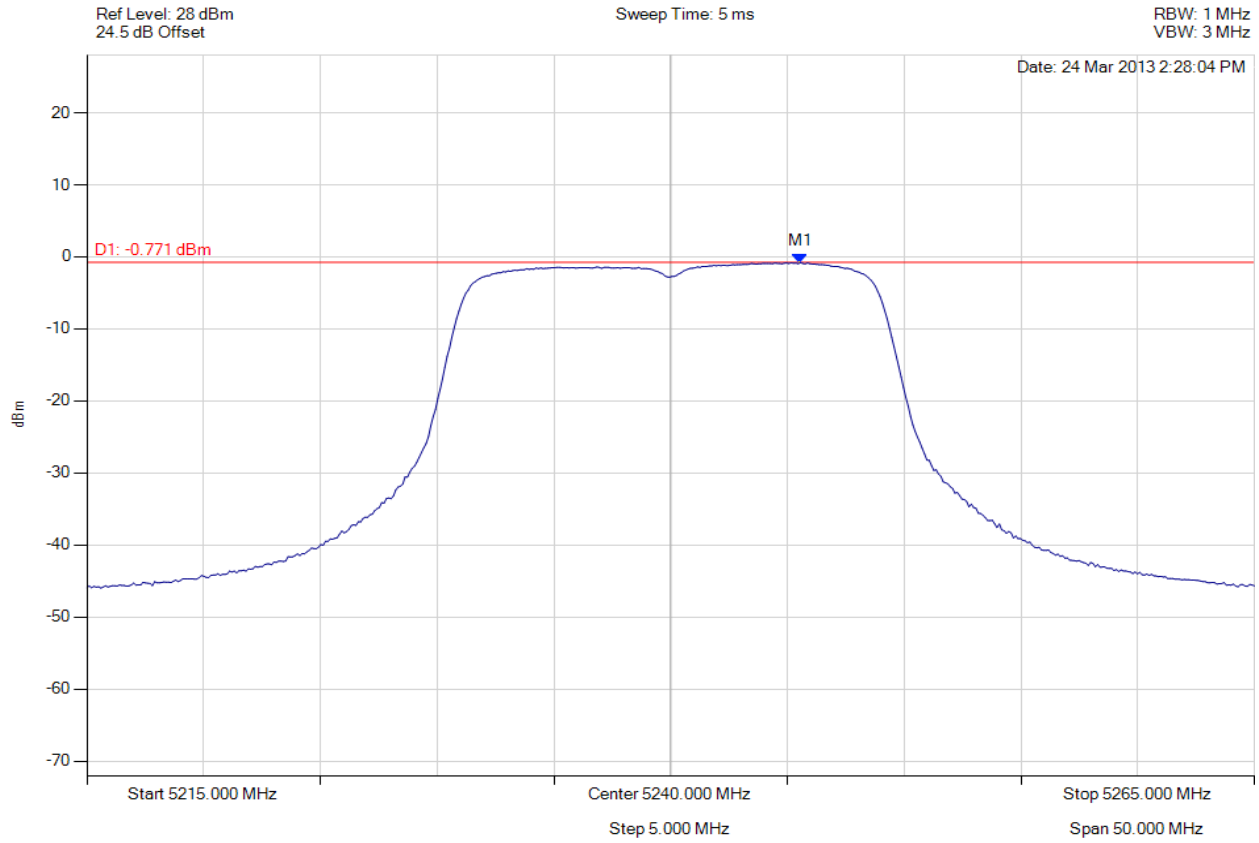


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5243.657 MHz : -2.778 dBm	Limit: ≤ -0.771 dBm Margin: -2.01 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

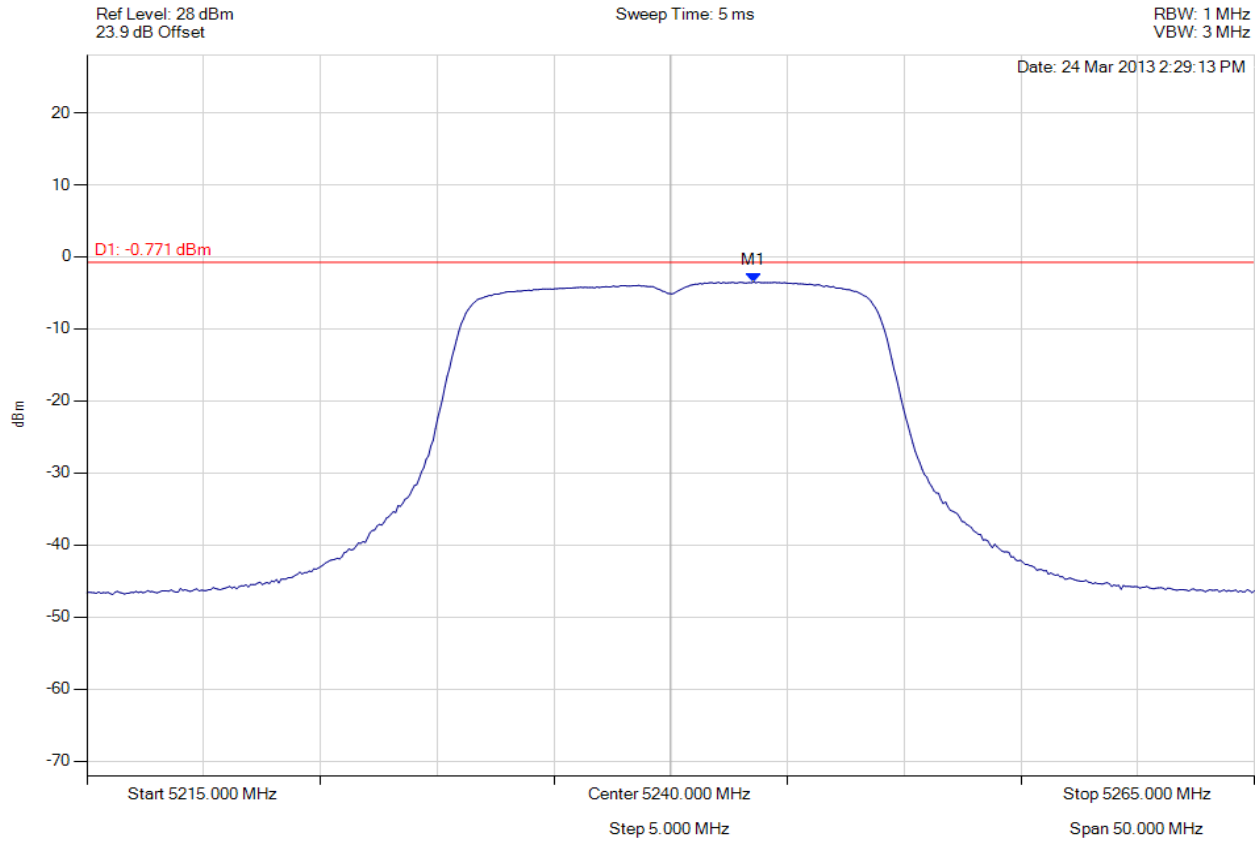


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5245.561 MHz : -0.817 dBm	Limit: ≤ -0.771 dBm Margin: -0.05 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-20, Channel: 5240.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc

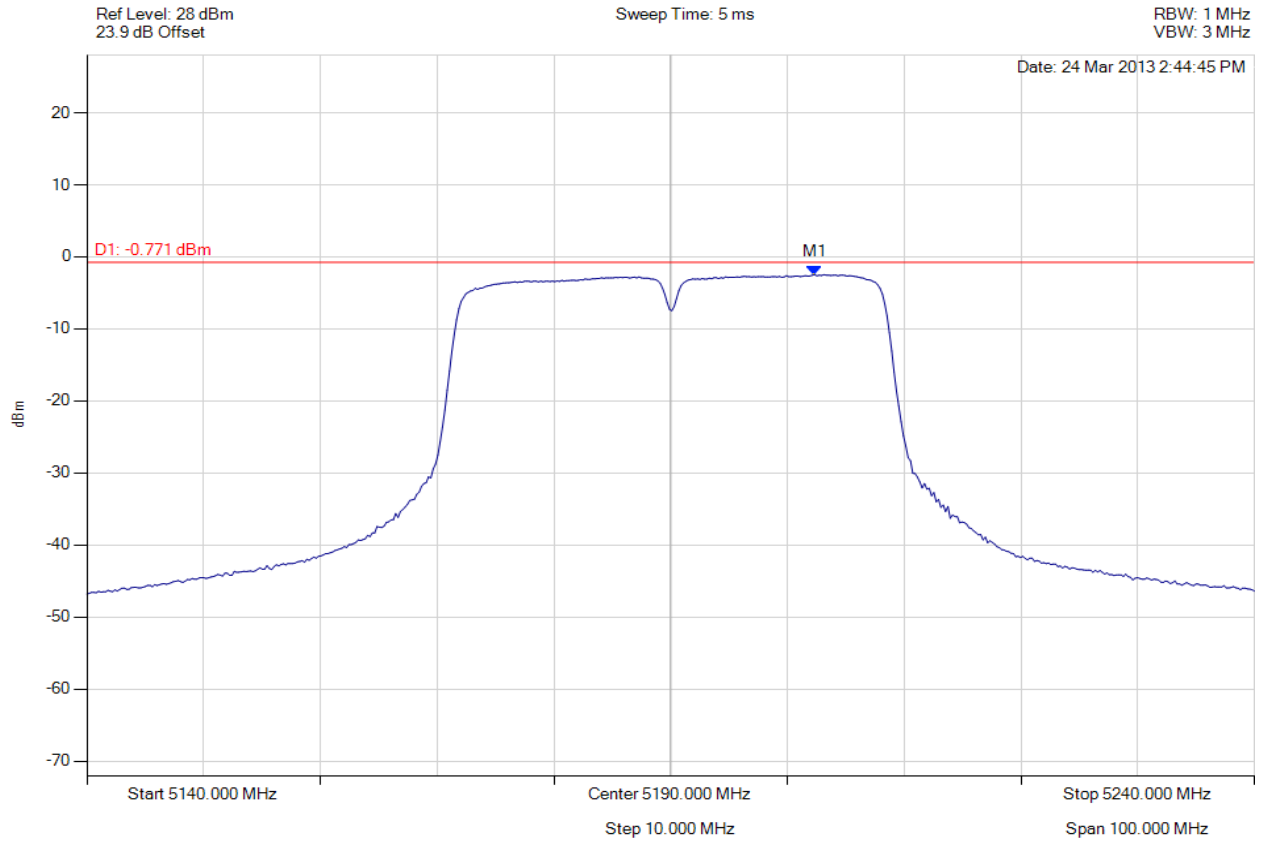


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5243.557 MHz : -3.492 dBm	Limit: ≤ -0.771 dBm Margin: -2.72 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

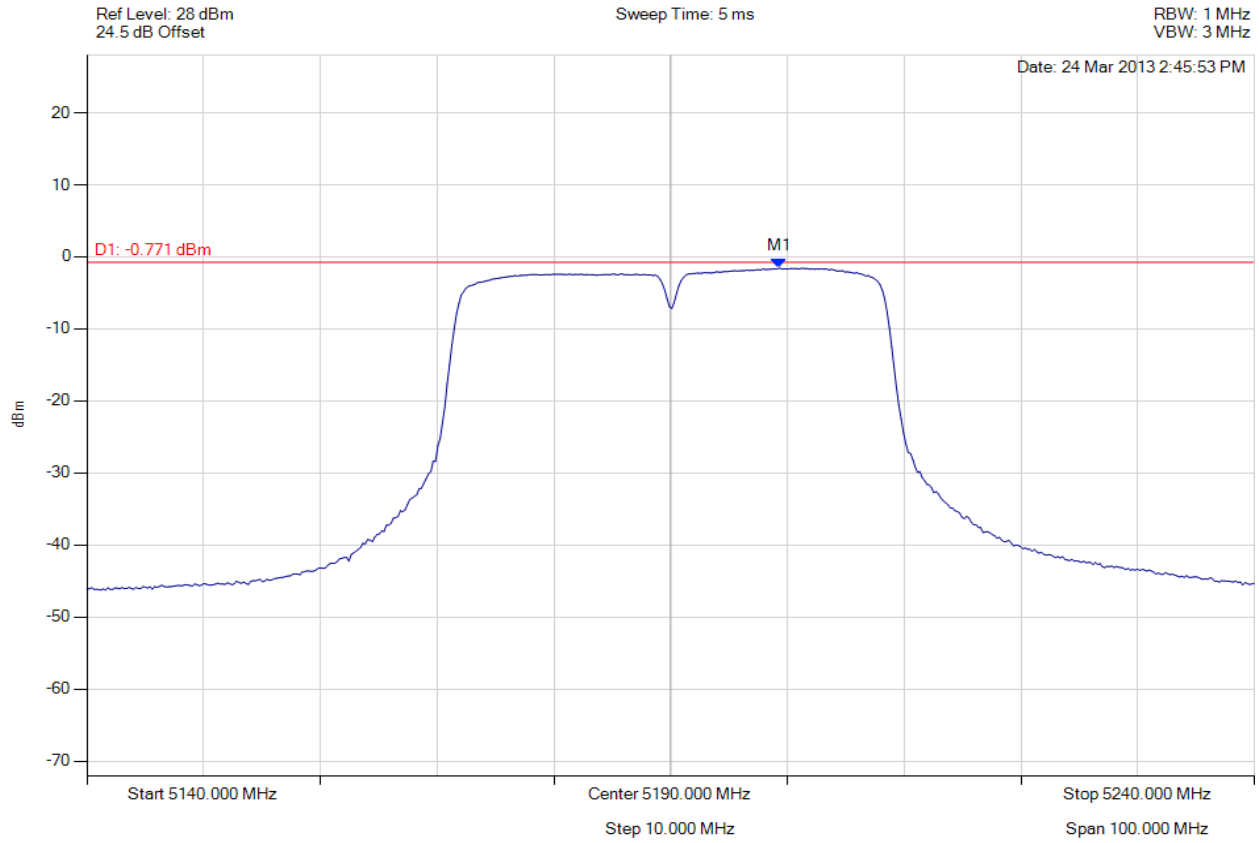


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5202.325 MHz : -2.459 dBm	Limit: ≤ -0.771 dBm Margin: -1.69 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

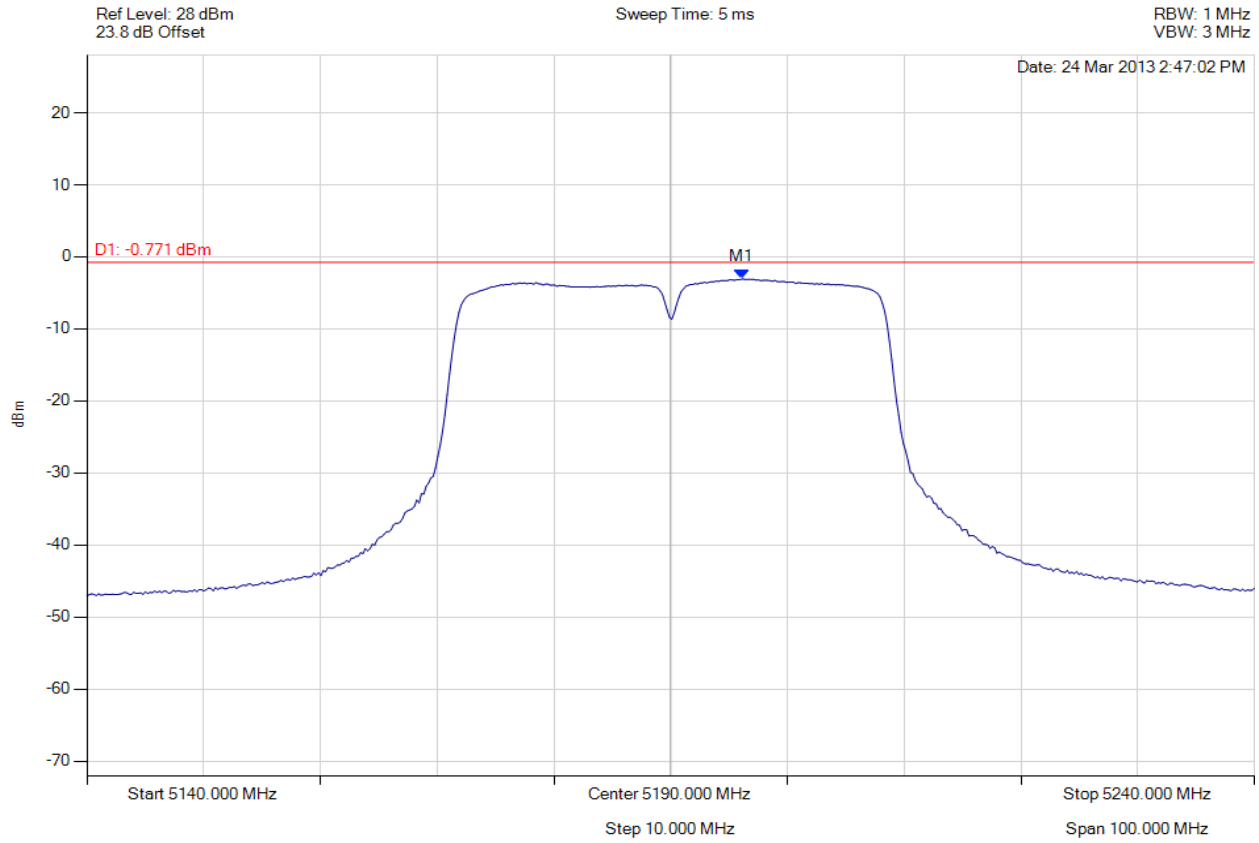


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5199.319 MHz : -1.558 dBm	Limit: ≤ -0.771 dBm Margin: -0.79 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc

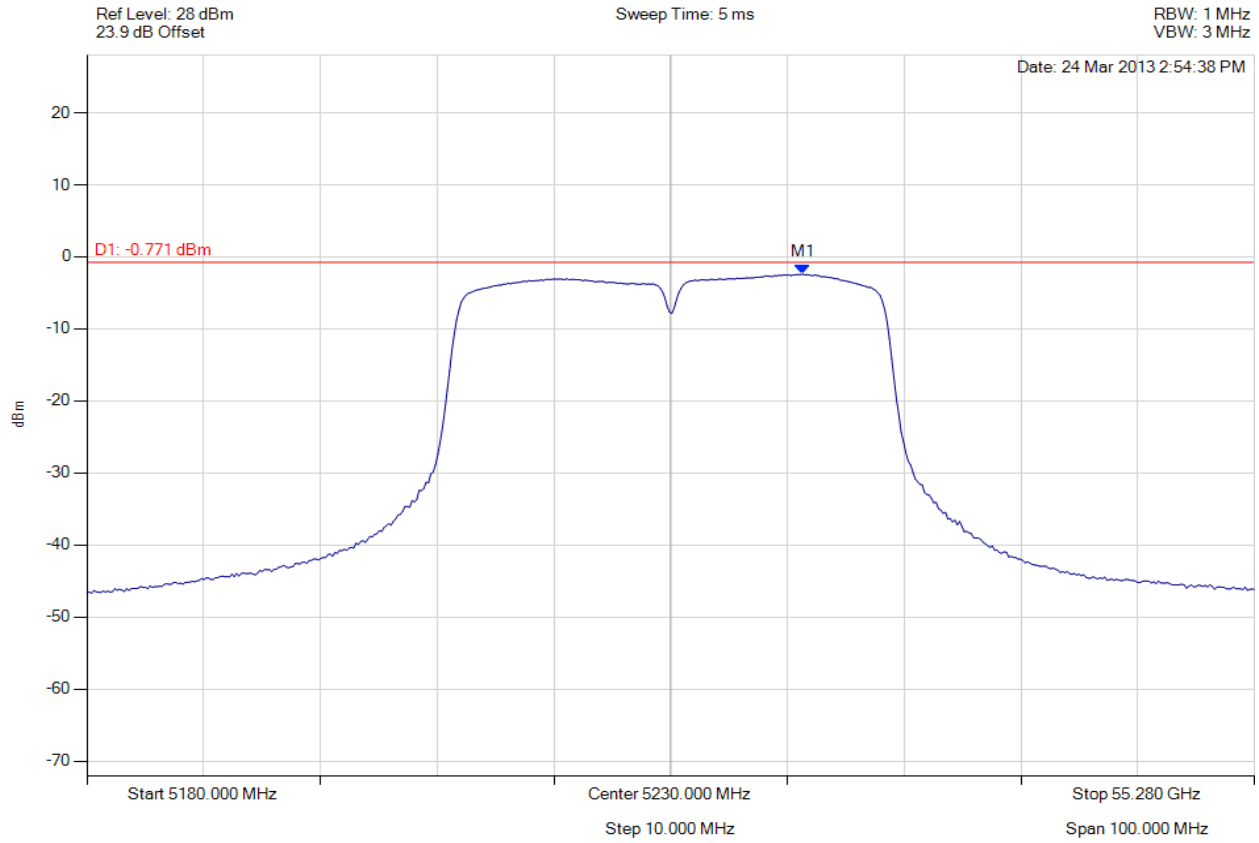


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5196.112 MHz : -3.071 dBm	Limit: ≤ -0.771 dBm Margin: -2.30 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

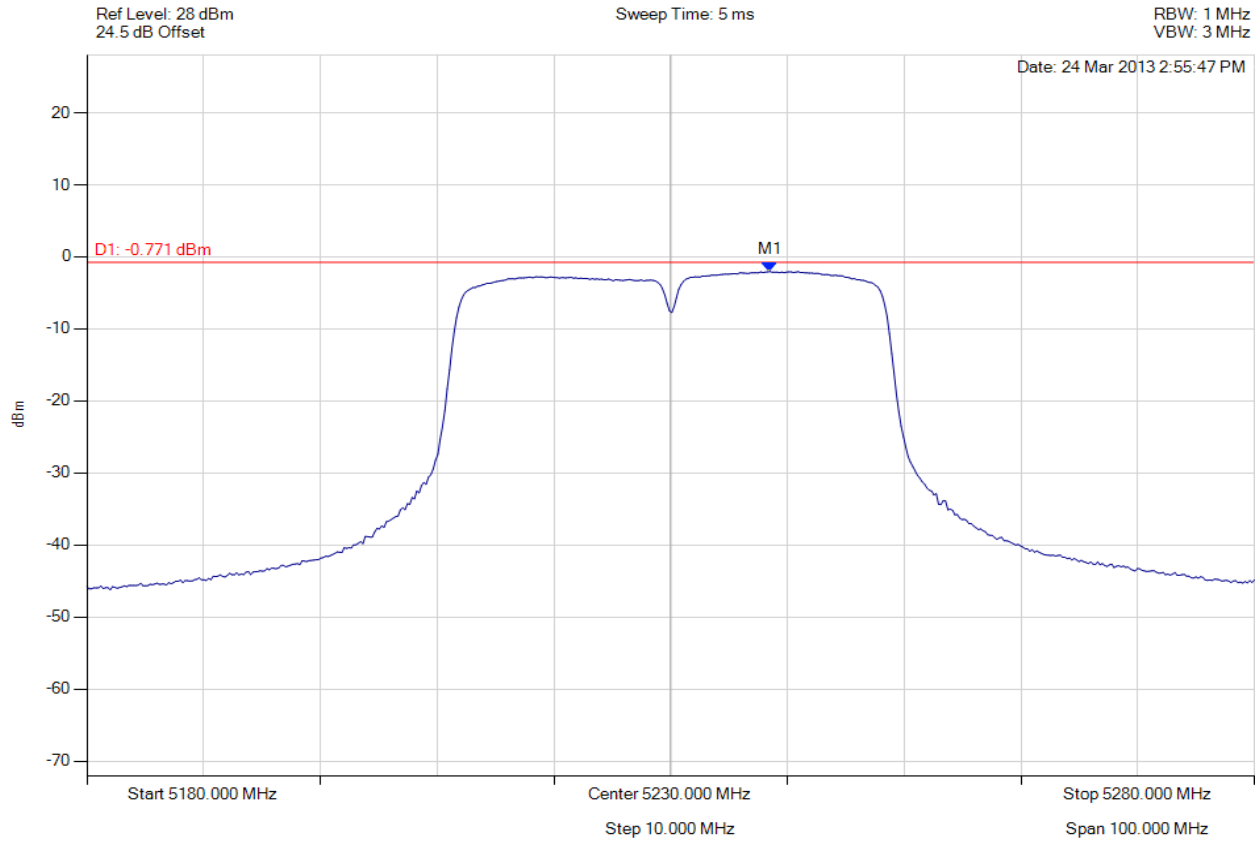


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5241.323 MHz : -2.402 dBm	Limit: ≤ -0.771 dBm Margin: -1.63 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain b, Temp: Ambient, Voltage: 12 Vdc

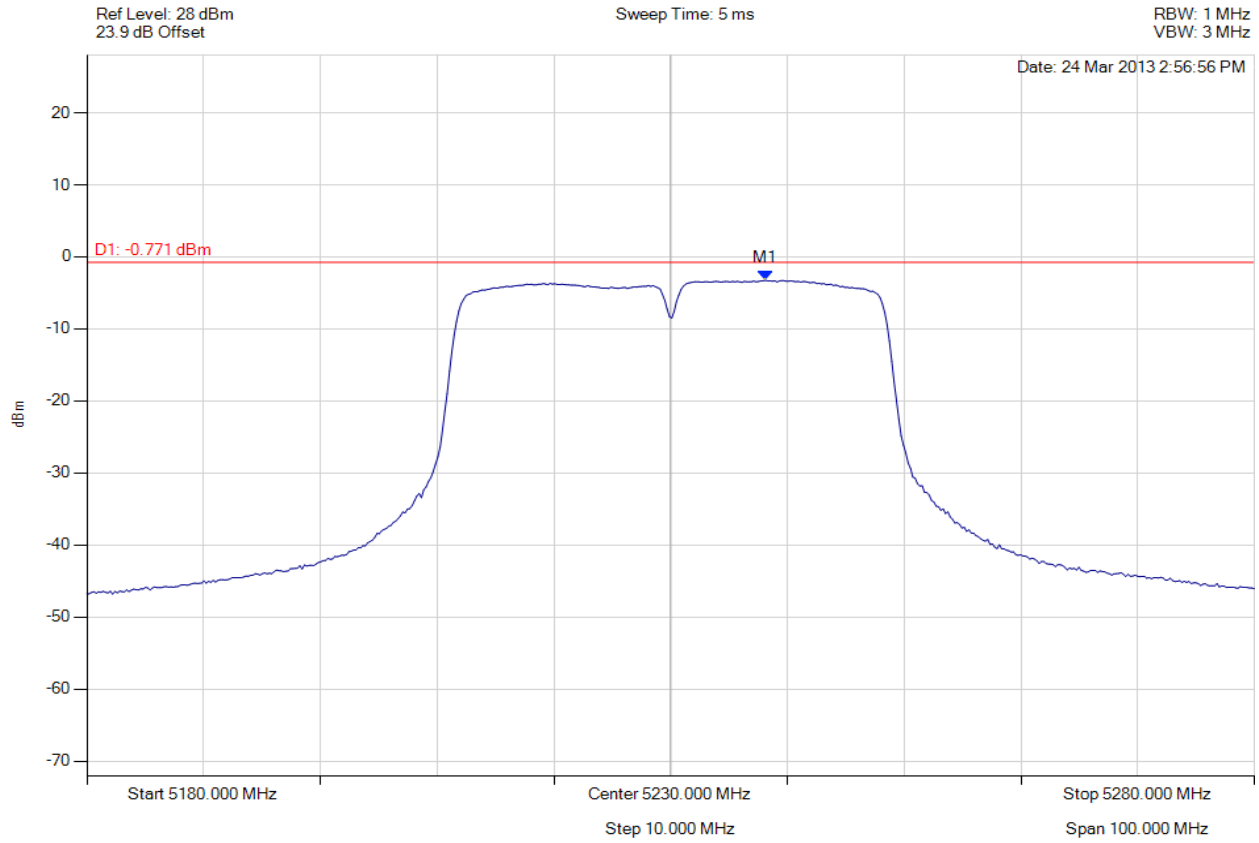


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5238.517 MHz : -2.042 dBm	Limit: ≤ -0.771 dBm Margin: -1.27 dB

Back to the Matrix

PEAK POWER SPECTRAL DENSITY

Variant: 802.11n HT-40, Channel: 5230.00 MHz, Chain c, Temp: Ambient, Voltage: 12 Vdc



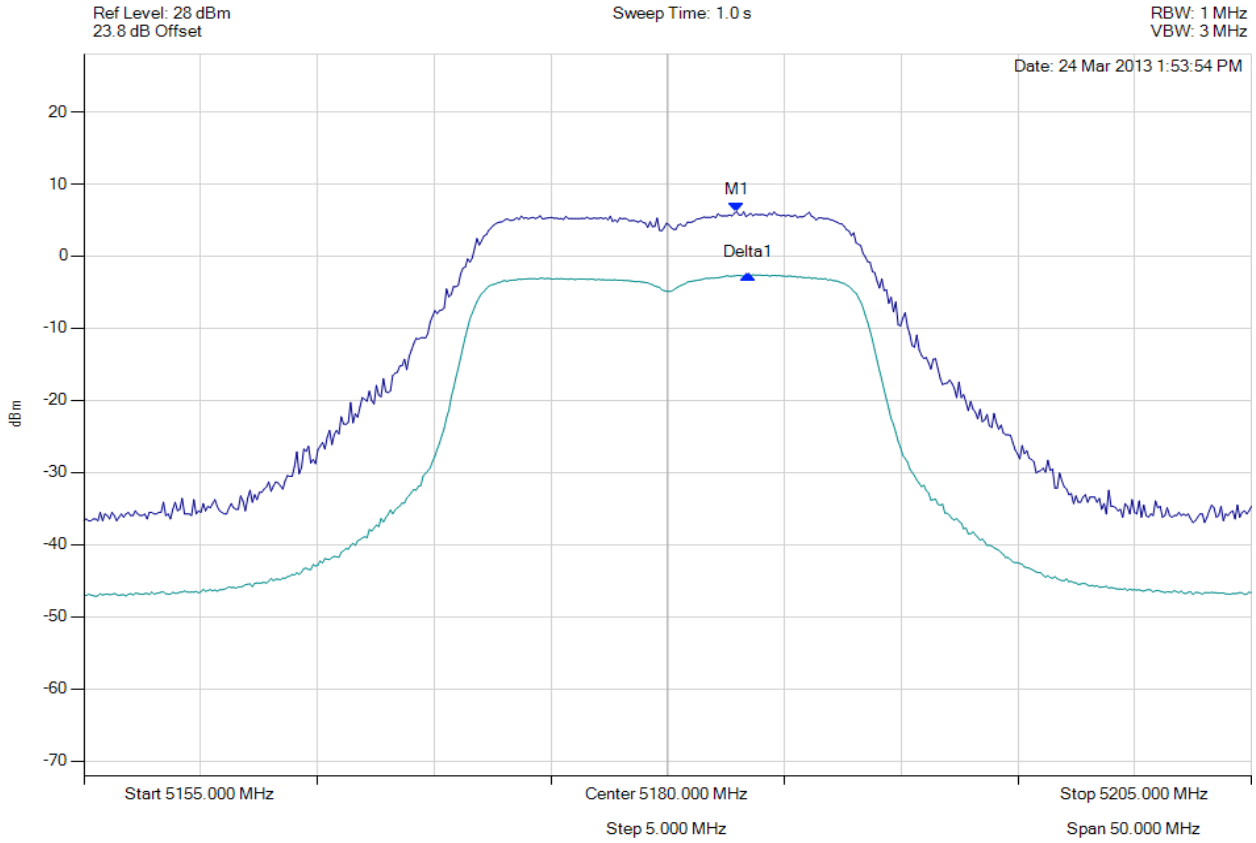
Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = RMS Sweep Count = 100 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5238.116 MHz : -3.257 dBm	Limit: ≤ -0.771 dBm Margin: -2.49 dB

Back to the Matrix

A.1.3. Peak Excursion Ratio

PEAK EXCURSION RATIO

Variant: 802.11a, Channel: 5180.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

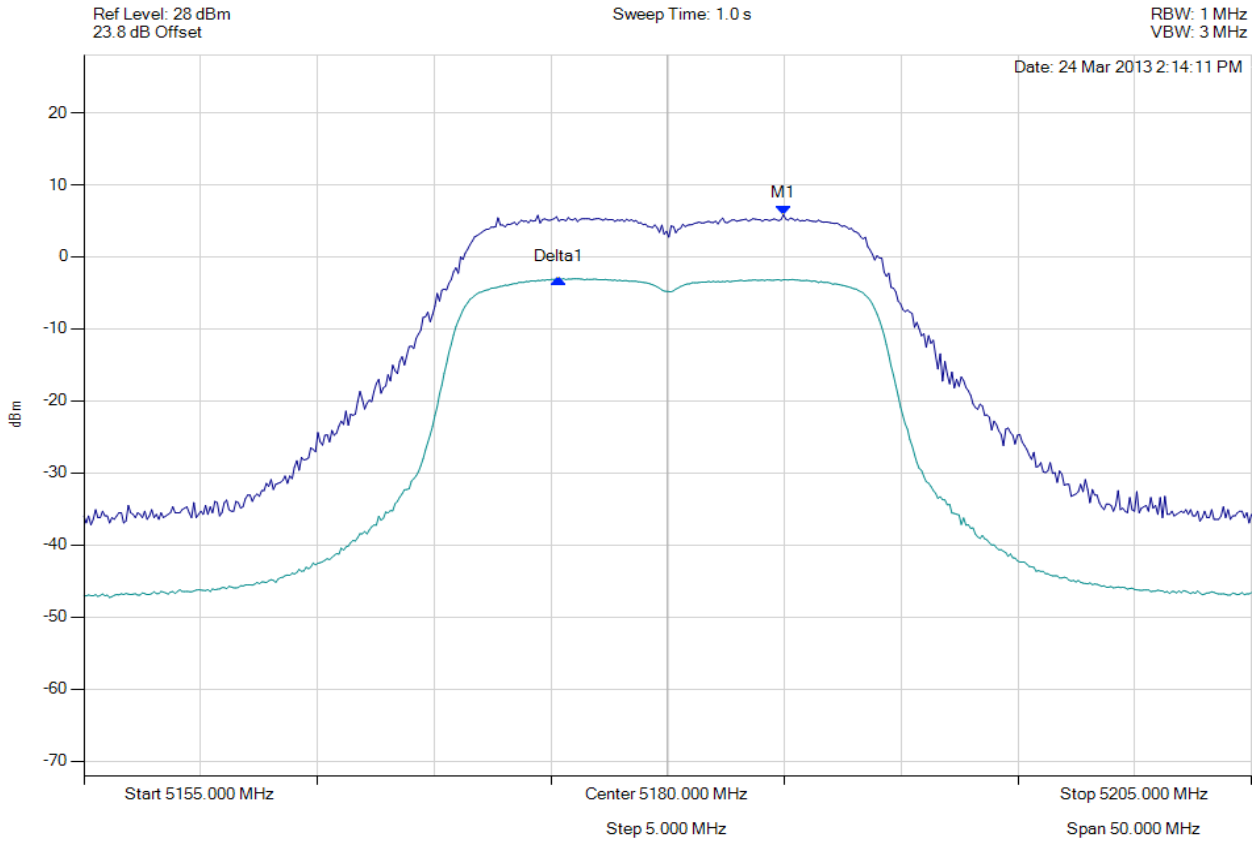


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Sweep Count = 0 RF Atten (dB) = 20 TRACE 1: Detector = MAX PEAK Trace Mode = VIEW TRACE 2: Detector = RMS Trace Mode = VIEW	M1 : 5182.956 MHz : 6.175 dBm Delta1 : 501 KHz : -8.754 dB	Measured Excursion Ratio: -8.75 dB Limit: 13.0 dB Margin: -4.25 dB

Back to the Matrix

PEAK EXCURSION RATIO

Variant: 802.11n HT-20, Channel: 5180.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc

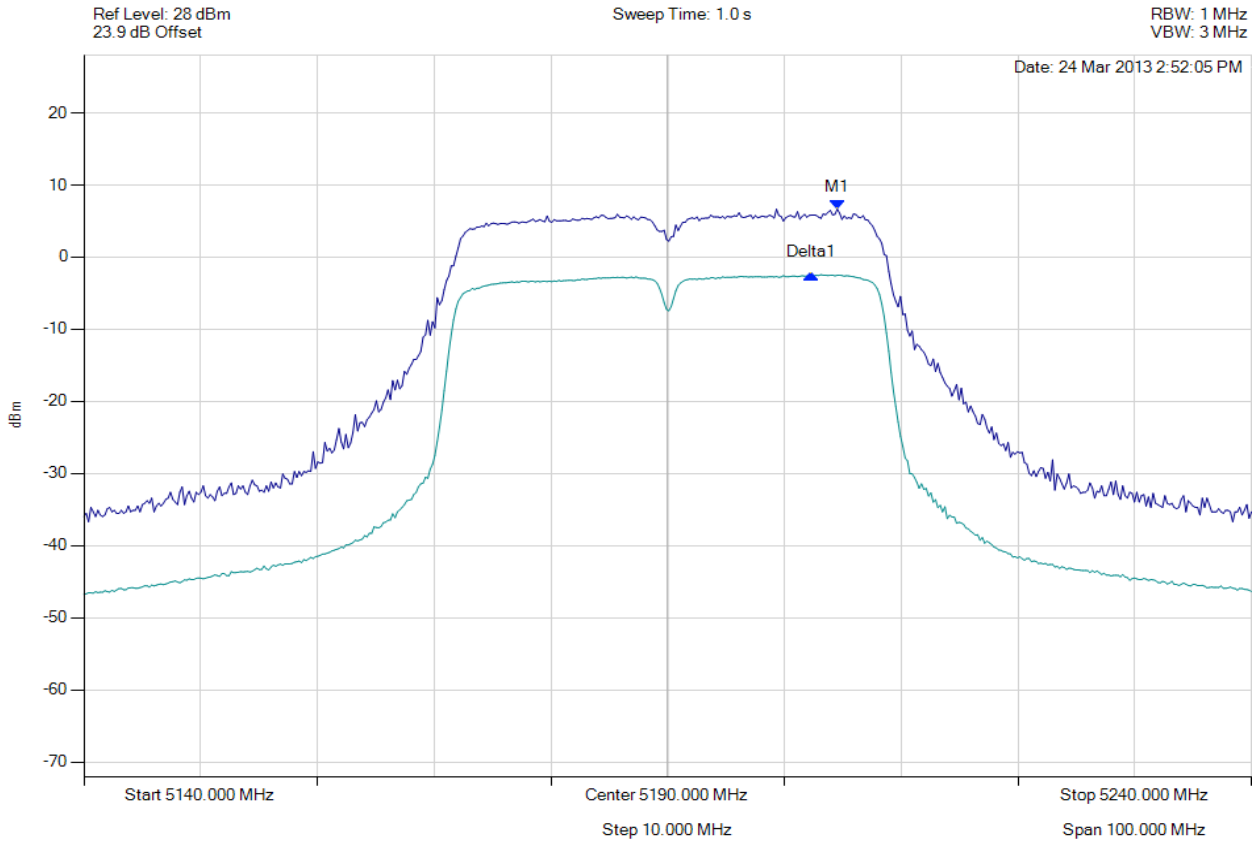


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Sweep Count = 0 RF Atten (dB) = 20 TRACE 1: Detector = MAX PEAK Trace Mode = VIEW TRACE 2: Detector = RMS Trace Mode = VIEW	M1 : 5184.960 MHz : 5.853 dBm Delta1 : -9619238 Hz : -8.856 dB	Measured Excursion Ratio: 8.86 dB Limit: 13.0 dB Margin: -4.14 dB

Back to the Matrix

PEAK EXCURSION RATIO

Variant: 802.11n HT-40, Channel: 5190.00 MHz, Chain a, Temp: Ambient, Voltage: 12 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Sweep Count = 0 RF Atten (dB) = 20 TRACE 1: Detector = MAX PEAK Trace Mode = VIEW TRACE 2: Detector = RMS Trace Mode = VIEW	M1 : 5204.529 MHz : 6.654 dBm Delta1 : -2204409 Hz : -9.071 dB	Measured Excursion Ratio: 9.07 dB Limit: 13.0 dB Margin: -3.93 dB

Back to the Matrix

440 Boulder Court, Suite 200
Pleasanton, CA 94566, USA
Tel: 1.925.462.0304
Fax: 1.925.462.0306
www.micomlabs.com