

Test of Miltope Corporation, nMAP

To: FCC 47 CFR Part 15.247 & IC RSS-210

Test Report Serial No.:MLTP04-U1 Rev A



TEST REPORT

From



Test of: Miltope Corporation, nMAP

To: FCC 47 CFR Part 15.247 & IC RSS-210

Test Report Serial No.: MLTP04-U1 Rev A

Note: this report only contains data with regard to the 2,400 to 2,483.5 MHz and 5,725 to 5,850 MHz operational modes of the nMap. Test results for operation in the range 5,150 to 5,350 MHz and 5,470 to 5,725 MHz are reported in MiCOM Labs test report MLTP04-U2.

This report supersedes: None

Applicant: VT Miltope Corporation
3800 Richardson Road South
Hope Hull, AL 36043
USA

Product Function: Access Point

Copy No: pdf **Issue Date:** 10th December 2010

This Test Report is Issued Under the Authority of:

MiCOM Labs, Inc.
440 Boulder Court, Suite 200
Pleasanton, CA 94566 USA
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TESTING CERTIFICATE #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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1. 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>



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 14th day of April 2010.

President & CEO
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2011



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

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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	-	Listing #: 102167
Canada	Industry Canada (IC)	FCB	APEC MRA 2	Listing #: 4143A
Japan	VCCI	-	-	No. 2959
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

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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>



The American Association for Laboratory Accreditation

World Class Accreditation

Accredited Product Certification Body

A2LA has accredited

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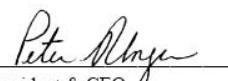
for technical competence as a

Product Certification Body

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC Guide 65:1996 *General requirements for bodies operating product certification systems*. This accreditation demonstrates technical competence for a defined scope and the operation of a quality management system for a Telecommunications Certification Body (TCB) meeting FCC (U.S.), and IC (Canada) requirements.

Presented this 24th day of June 2010.




Peter Meyer
President & CEO
For the Accreditation Council
Certificate Number 2381.02
Valid to November 30, 2011

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

United States of America – Telecommunication Certification Body

TCB Identifier – US0159

Industry Canada – Certification Body

CAB Identifier – US0159

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2. DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft		
Rev A	10th December 2010	Initial Release

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3. TEST RESULT CERTIFICATE

Applicant:	Miltope Corp 3800 Richardson Road South Hope Hull AL , 36043 USA	Tested By:	MiCOM Labs, Inc. 440 Boulder Court Suite 200 Pleasanton California, 94566, USA
Product:	nMAP	Telephone:	+1 925 462 0304
Model No.:	920693-1	Fax:	+1 925 462 0306
S/No's:	Conducted: nMAP-00014 Radiated: nMAP-00012		
Date(s) Tested:	11 th to 19 th October 2010	Website:	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC 47 CFR Part 15.247 & 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:

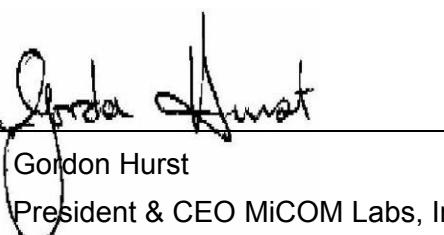
1. This document reports conditions under which testing was conducted and the results of testing performed.
2. Details of test methods used have been recorded and kept on file by the laboratory.
3. Test results apply only to the item(s) tested.

Approved & Released for MiCOM Labs, Inc. by:


Graeme Grieve
Quality Manager MiCOM Labs, Inc.



TESTING CERTIFICATE #2381.01


Gordon Hurst
President & CEO MiCOM Labs, Inc.

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4. REFERENCES AND MEASUREMENT UNCERTAINTY

Normative References

Ref.	Publication	Year	Title
i.	47 CFR Part 15.247	2007	For Digitally Modulated Intentional Radiators
ii.	Industry Canada RSS-210	Issue 7 2007	Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment
iii.	Industry Canada RSS-Gen	Issue 2 2007	General Requirements and Information for the Certification of Radiocommunication Equipment
iv.	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
v.	CISPR 22/ EN 55022	2008 2006+A1:2 007	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
vi.	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
vii.	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
viii.	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
ix.	A2LA	9th June 2010	Reference to A2LA Accreditation Status – A2LA Advertising Policy

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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.

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5. TEST SUMMARY

List of Measurements: The following table represents the list of measurements required under **FCC 47 CFR Part 15.247**, **Industry Canada RSS-210** and **Industry Canada RSS-Gen.**

Standard Section(s)	Test Description (Transmitter)	Condition	Result	Test Report Section
15.247(a)(2) A8.2(1) 4.4	6 dB Occupied Bandwidth (MIMO & Legacy abg operational modes)	Conducted	Complies	7.1
15.247(b)(3) (b)(4) 15.31(e) A8.4(4)	Peak Output Power (MIMO & Legacy abg operational modes)	Conducted	Complies	7.2
15.247(e) A8.2	Peak Power Spectral Density (MIMO & Legacy abg operational modes)	Conducted	Complies	7.3
15.247(i) 5.5	Maximum Permissible Exposure	Calculation	Complies	7.4
15.247(d) 15.205 / 15.209 A8.5, 2.2, 4.7	Spurious Emissions (MIMO & Legacy abg operational modes)	Conducted	Complies	7.5
15.247(d) 15.205 / 15.209 A8.5, 2.2, 2.6 4.7	Transmitter Radiated Spurious Emissions (MIMO & Legacy abg operational modes)	Radiated	Complies	7.6
15.205 / 15.209	Radiated Band-Edge (MIMO & Legacy abg operational modes)	Radiated	Complies	7.7
15.205 / 15.209 2.2	Radiated (Digital) Emissions	Radiated	Complies	7.8
15.207 7.2.2	AC Wireline Emissions 0.15 – 30 MHz	Not Tested	See Note 4	7.9

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Receiver

Standard Section(s)	Test Description (Receiver)	Condition	Result	Test Report Section
Industry Canada only RSS-Gen §4.10, §6	Receiver Radiated Emissions	Radiated	Complies	7.10

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 6.11 Equipment Modifications highlights the equipment modifications that were required to bring the product into compliance with the above test matrix

Note 4: Although the nMAP can be powered from 115 Vac it does not connect to the Public Utility Network and therefore ac Wireline Emissions were not tested.

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6. PRODUCT DETAILS AND TEST CONFIGURATIONS

6.1. Test Program Scope

The scope of the test program was to test the Miltope Corporation nMAP 802.11 access point for compliance against FCC 47 CFR Part 15.247 & IC RSS-210. The nMap contains two 802.11a/b/g/n MIMO devices operating in the 2.4 GHz and 5 GHz frequency bands. Although both wireless modules are exactly the same (DMNA-83) they are configured differently. The wireless devices are configured as follows;

- 1).. 1st wireless module - 802.11a/b/g/n 3x3 Spatial Multiplexing MIMO.
- 2).. 2nd wireless module 802.11a/b/g legacy device

The manufacturer declared that both wireless modules will never transmit on the same frequency at any given time.

Collocation of Antenna

The manufacturer declared that the antenna spacing will be greater than 20cm therefore collocation testing is not required.

The nMap operates in the 2.4 GHz and 5 GHz frequency bands. Only the 2.4 GHz and 5.8 GHz measurements are reported in this test report (MLTP04-U1), 5.15-5.35 GHz and 5.47 – 5.725 GHz results are reported in MiCOM Labs test report MLTP04-U2.

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APPLICANT: VT Miltope Corporation

PRODUCT: nMAP



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APPLICANT: VT MILTOPE CORPORATION

PRODUCT: NMAP



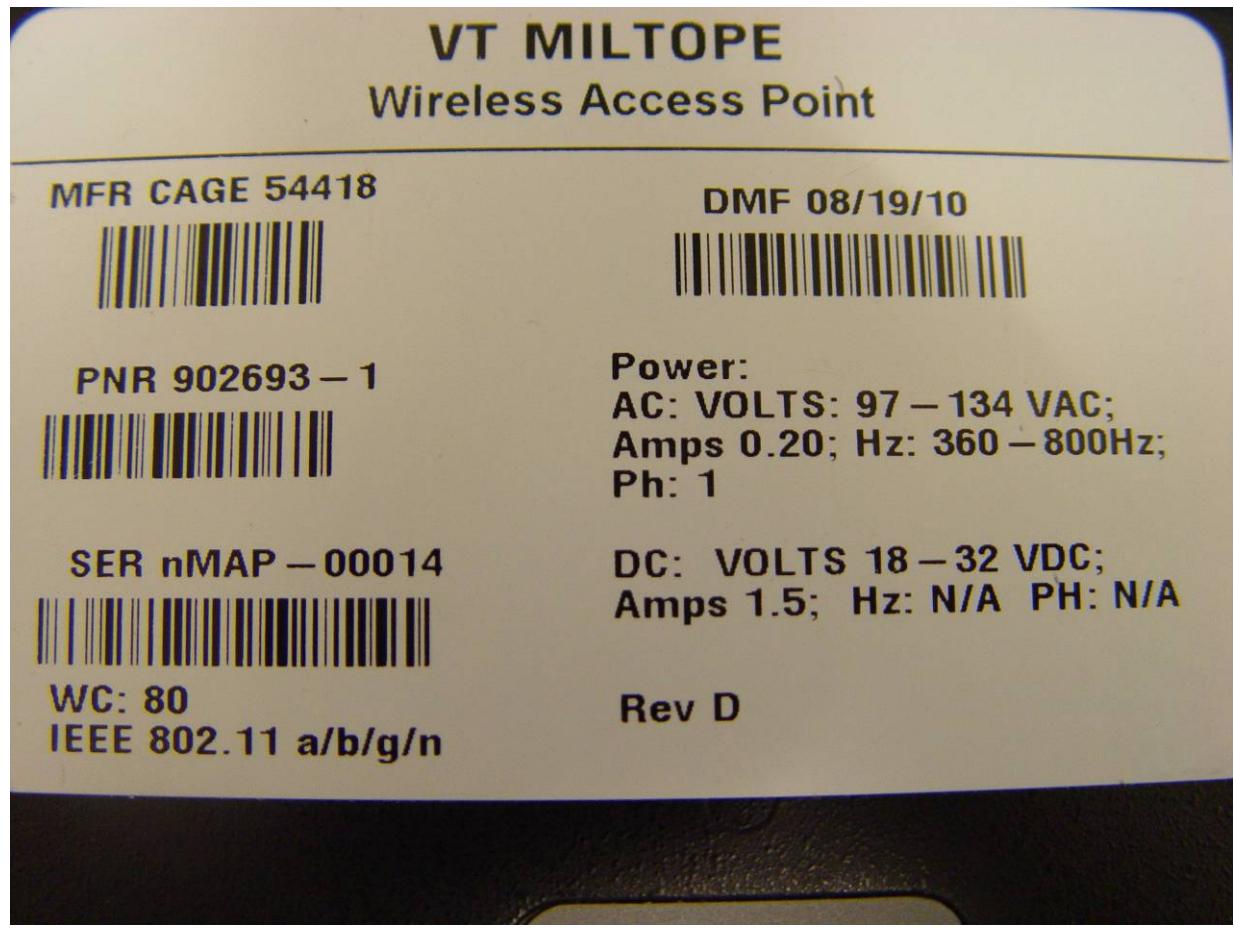
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APPLICANT: VT MILTOPE CORPORATION

PRODUCT: NMAP - LABEL



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6.2. EUT Details

DETAIL	DESCRIPTION
Purpose:	Test of the Miltope Corp nMAP 802.11a/b/g/n access point for compliance against FCC 47 CFR Part 15.247 & IC RSS-210
Applicant:	Miltope Corp 3800 Richardson Road South Hope Hull, AL 36043 USA
Manufacturer:	As Applicant
Test Laboratory:	MiCOM Labs, Inc. 440 Boulder Court, Suite 200 Pleasanton, California 94566 USA
Test report reference number:	MLTP04-E1
Date EUT received:	7 th October 2010
Dates of test (from - to):	11 th – 19 th October 2010
No of Units Tested:	2 Devices Conducted nMAP-00014, Radiated nMAP-00012
Product Name:	nMAP
Manufacturers Trade Name:	VT Miltope
Model No.:	902693-1
Equipment Primary Function:	Data and voice transmission
Equipment Secondary Function(s):	Aircraft In-Flight Entertainment (IFE) System
Type of Technology:	802.11 a/b/g/n, 3x3 Spatial Multiplexing MIMO 802.11a/b/g
Installation type:	Fixed
Construction/Location for Use:	Indoor only (aircraft)
Software/Firmware Release:	999175 A1
Hardware Release:	902693-1 Rev D
Test Software Release:	M_dfap128-DRAGONFLY-DRAGON FLY_AP_128_11N_ART_Manfu-B7177-ALL-OEM.com
Transmit/Receive Operation:	Simplex
Output Power Type	Fixed
Automatic Transmit Power Control Available:	N/A
Remote Frequency Control Available:	N/A
ITU Emission Designator(s):	2412 – 2462 MHz 802.11b 15M3G1D 2412 – 2462 MHz 802.11g 16M5D1D 2412 – 2462 MHz 802.11n – HT-20 17M8D1D 2422 – 2462 MHz 802.11n – HT-40 36M4D1D
Long Term Frequency Stability:	20 ppm
Equipment Dimensions:	11.50 x 7.49 x 2.40
Weight:	5lbs

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6.3. External A.C/D.C Power Adaptor

No ac/dc power adapter

Detail	Description	

6.4. Operational Power Range

Declared O/P Power Range	Mode 1		Mode 2		Mode 3		Mode 4		Mode 5	
	3x3 MIMO	Legacy abg	Max	Min	Max	Min	Max	Min	Max	Min
802.11b	17.0		17.0							
802.11g	16.0		16.0							
802.11n HT-20	16.0		16.0							
802.11n HT-40	16.0		16.0							

6.5. Types of Modulation Supported

Modulation / Mode	Modulation Type
802.11b	CCK, BPSK, QPSK, DSSS
802.11g	OFDM
802.11a	OFDM
802.11n HT-20	OFDM
802.11n HT-40	OFDM

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6.6. Antenna Details

The following is a description of the EUT antennas.

Antenna Type:	Manufacturer	Model	Gain (dBi)	Frequency Range
Dipole	VT Miltope	901167-2	+2.6 dBi Peak	2.45 GHz
Dipole	VT Miltope	901167-2	+1.2 dBi Peak	5.8 GHz
Leaky Coaxial	Gore	GSC-10-84156-90	-10 dBi	2.45 GHz
Leaky Coaxial	Gore	GSC-10-84156-90	-10 dBi	5.8 GHz

6.7. Cabling and I/O Ports

The following is a description of the cable and input, output ports available on the EUT.

Type of I/O Ports	Description	Screened (y/n)	Description	Qty	Tested
Mil-Rnd	Ethernet LAN	Y	> 1m	1	Y
Mil-Rnd	Input Power	Y	> 1m	1	Y
TNC	RF Output	Y	> 1m	4	Y



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6.8. EUT Configurations

LEGACY

Band (GHz)	Mode	Freq Band (MHz)	Freq Range (MHz)	Low ch	Mid ch	High ch	# Ch	Ch Spacing (MHz)	Ch BW (MHz)
2.4	802.11 b	2400 - 2483.5	2412 - 2462	2412	2437	2462	11	20	20
2.4	802.11 g	2400 - 2483.5	2412 - 2462	2412	2437	2462	11	20	20
5.8	802.11 a	5725 - 5850	5745 - 5825	5745	5785	5825	5	20	20

MIMO

Band (GHz)	Mode	Freq Band (MHz)	Freq Range (MHz)	Low ch	Mid ch	High ch	# Ch	Ch Spacing (MHz)	Ch BW (MHz)
2.4	802.11 n HT-20	2400 - 2483.5	2412 - 2472	2412	2437	2462	11	20	20
2.4	802.11 n HT-40	2400 - 2483.5	2422 - 2452	2422	2437	2452	7	40	40
5.8	802.11 n HT-20	5725 - 5850	5745 - 5825	5745	5785	5825	5	20	20
5.8	802.11 n HT-40	5725 - 5850	5755 - 5815	5755	5785	5815	3	40	40

6.9. Equipment Details

The following is a description of EUT and supporting equipment used during the test program.

Type (EUT/Support)	Equipment Description	Manufacturer	Model No.	Serial No (s).
EUT (Conducted)	2.4 and 5 GHz nMap MIMO Device	Miltope	902693-1	nMAP-00014
EUT (Radiated)	2.4 and 5 GHz nMap MIMO Device	Miltope	902693-1	nMAP-00012
Support	Test Box	Miltope	n/a	002

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6.10. Test Configurations

Operational Mode(s)	Data Rate Tested	Duty Cycle
b	1 MBit/s	100
g	6 MBit/s	100
a	6 MBit/s	100
HT-20	6.5 MBit/s	100
HT-40	13.5 MBit/s	100

6.11. Equipment Modifications

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

No modifications were required to bring the device into compliance.

No.	Test	Problem	Modification Required

6.12. Deviations from the Test Standard

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

No test deviations were required during the test program

No.	Test / Standard	Deviation	Rationale

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7. TEST RESULTS

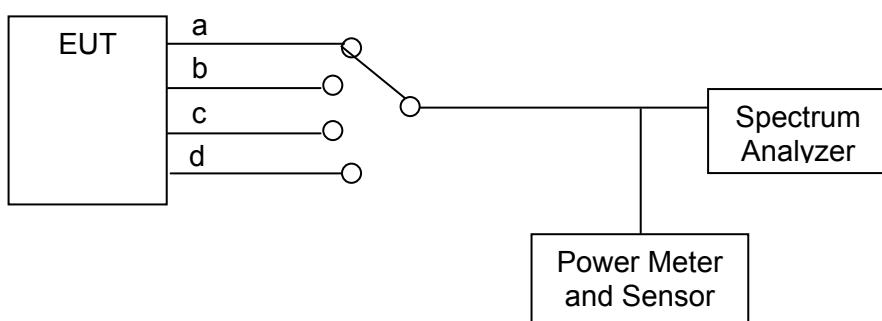
7.1. 6 dB and 99% Bandwidth

Test Procedure

The test methodology and conditions utilized for each measurement is referenced in the following test results matrix. 6 dB and 99% bandwidth were measured per the Test Configuration identified below.

Testing was restricted to a single port.

Test Configuration



Test configuration for 6 dB & 99% Bandwidth

Specification

Limits

§15.247 (a)(2)

The minimum 6 dB bandwidth shall be at least 500 kHz.

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of RF Spectrum Mask'	0073, 0074, 0116, 0158, 0223, 0251, 0252, 0253, 0256, 0287, 0310

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MIMO 6 dB and 99% Bandwidth Results: 802.11 b

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11 b	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A	Antenna Gain:	2.6 dBi
Applied Voltage:	28.00	Vdc	
Notes 1:			
Notes 2:			

6 dB Bandwidth

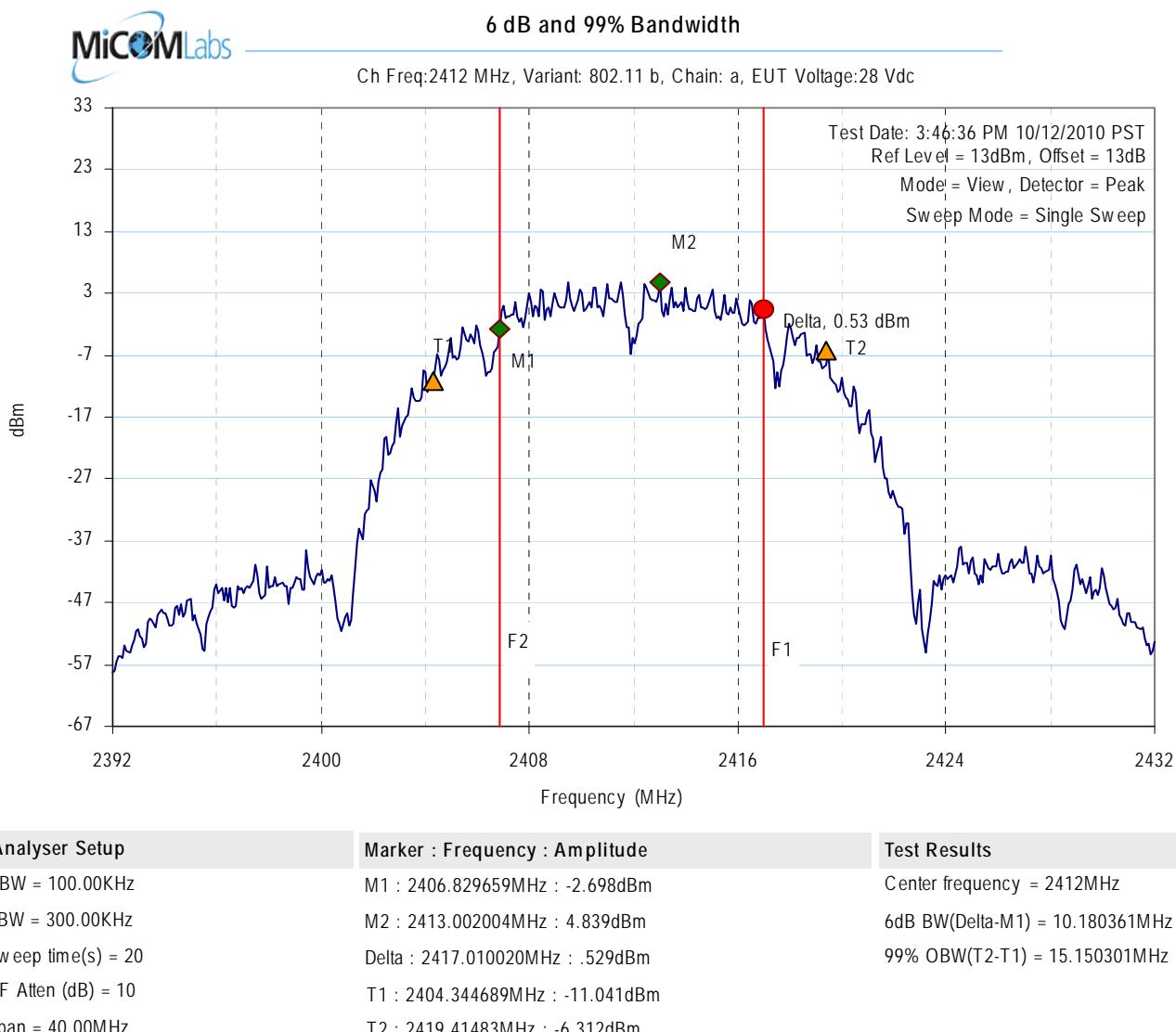
Test Frequency	6 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
2412.000	10.180000	12.104000	11.142000	--	500	0.5	-9.680000
2437.000	10.100000	11.142000	11.062000	--			-9.600000
2462.000	10.180000	11.623000	11.062000	--			-9.680000

99% Bandwidth

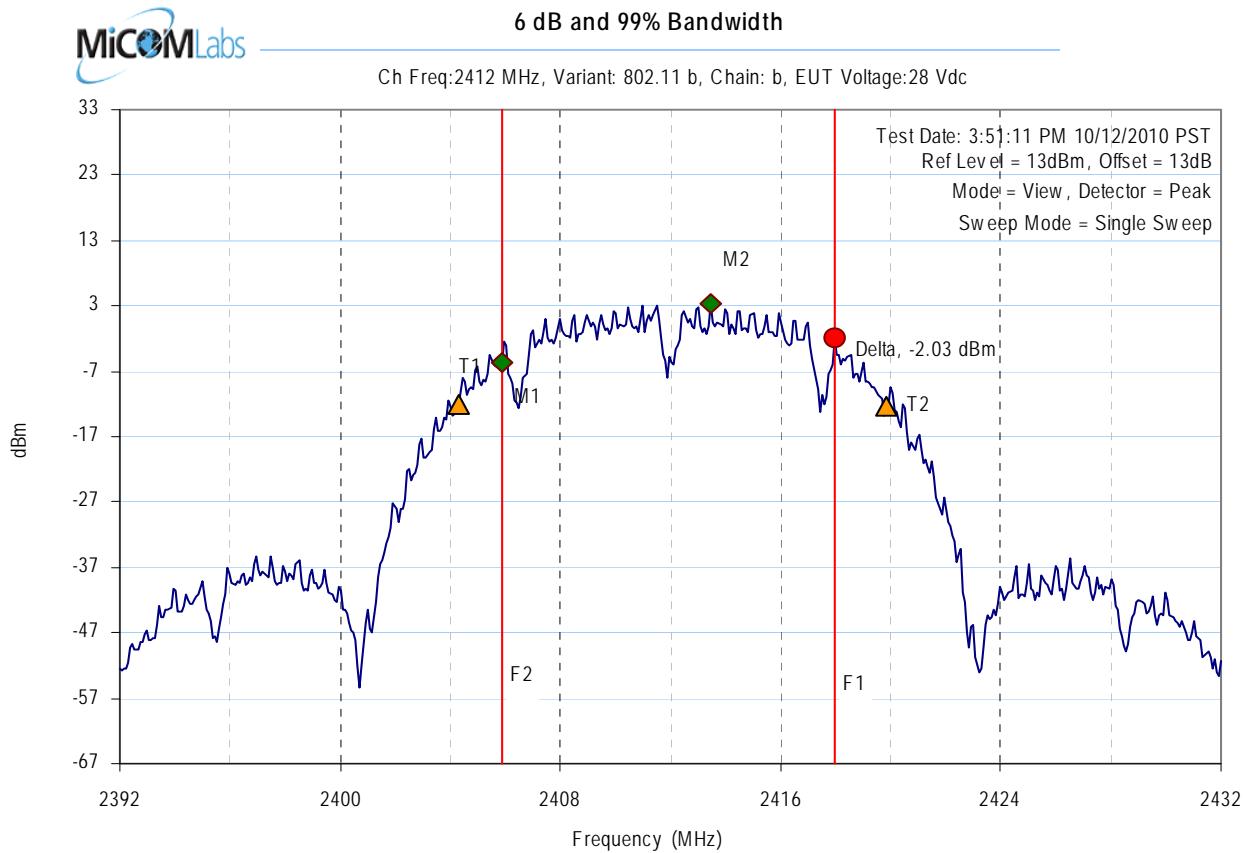
Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
2412.000	15.150000	15.551000	15.471000	--			
2437.000	15.311000	15.150000	14.990000	--			
2462.000	15.230000	15.551000	15.391000	--			

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

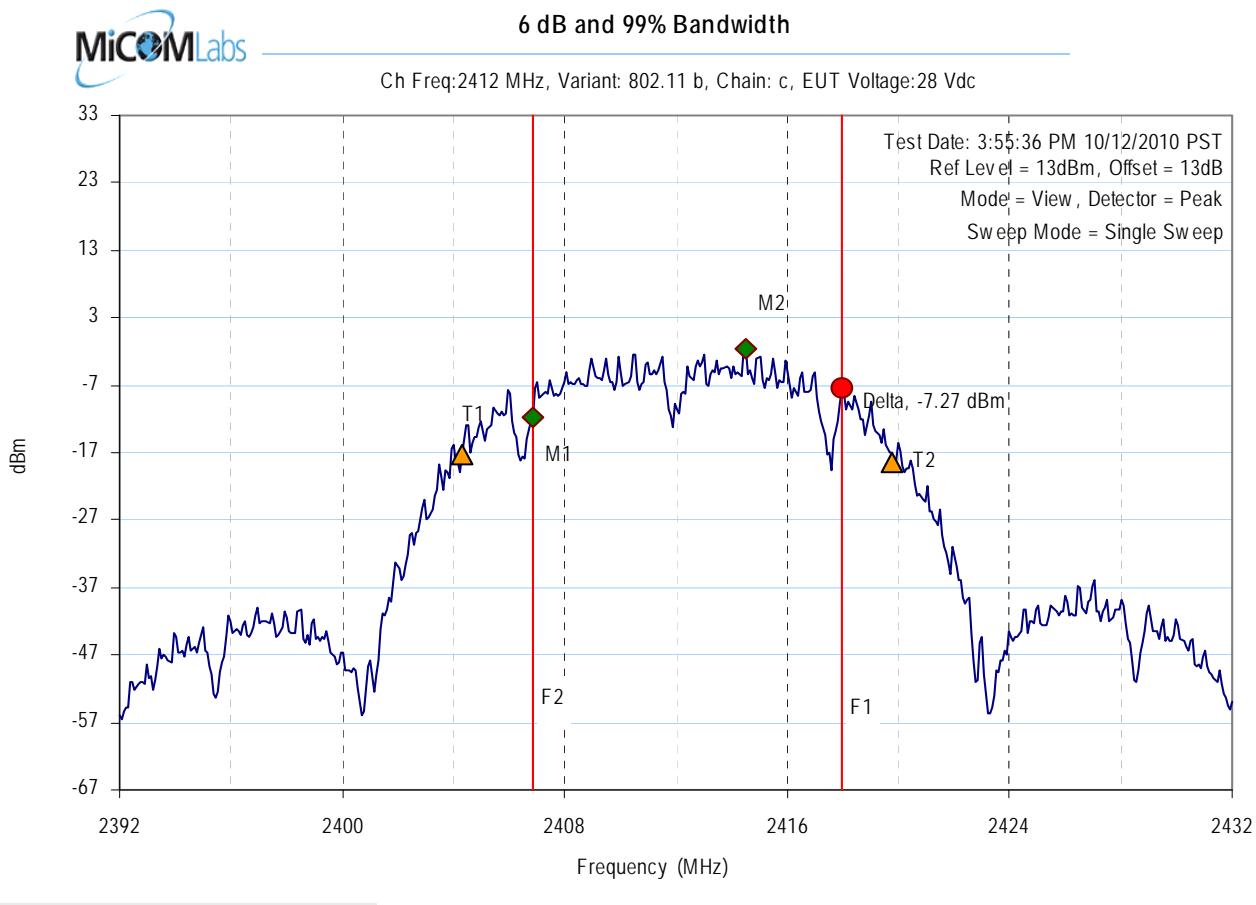
Marker : Frequency : Amplitude

M1 : 2405.867735MHz : -5.704dBm
 M2 : 2413.482966MHz : 3.344dBm
 Delta : 2417.971944MHz : -2.025dBm
 T1 : 2404.344689MHz : -12.135dBm
 T2 : 2419.815631MHz : -12.359dBm

Test Results

Center frequency = 2412MHz
 6dB BW(Delta-M1) = 12.104208MHz
 99% OBW(T2-T1) = 15.551102MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

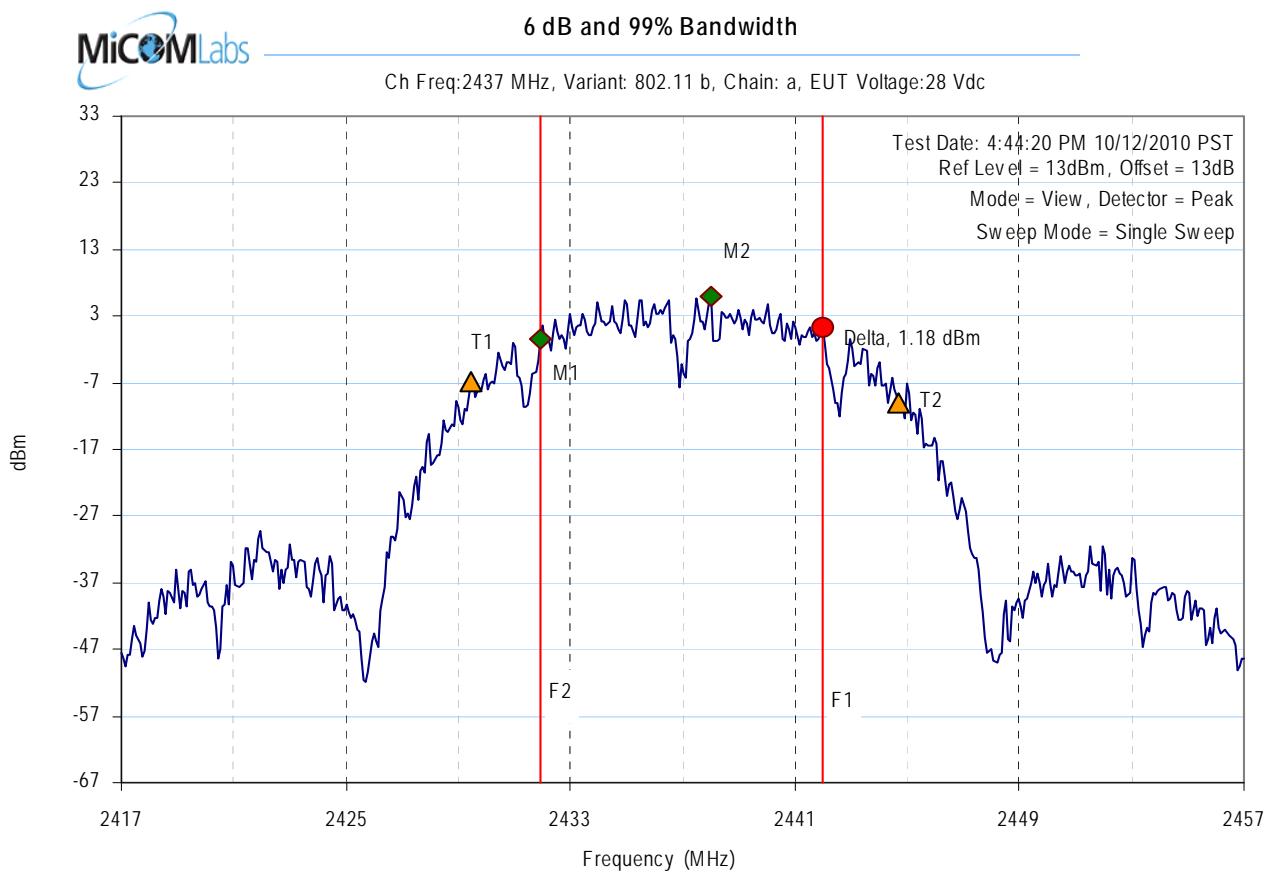
Marker : Frequency : Amplitude

M1 : 2406.829659MHz : -11.647dBm
 M2 : 2414.525050MHz : -1.586dBm
 Delta : 2417.971944MHz : -7.268dBm
 T1 : 2404.344689MHz : -17.315dBm
 T2 : 2419.735471MHz : -18.411dBm

Test Results

Center frequency = 2412MHz
 6dB BW(Delta-M1) = 11.142285MHz
 99% OBW(T2-T1) = 15.470942MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

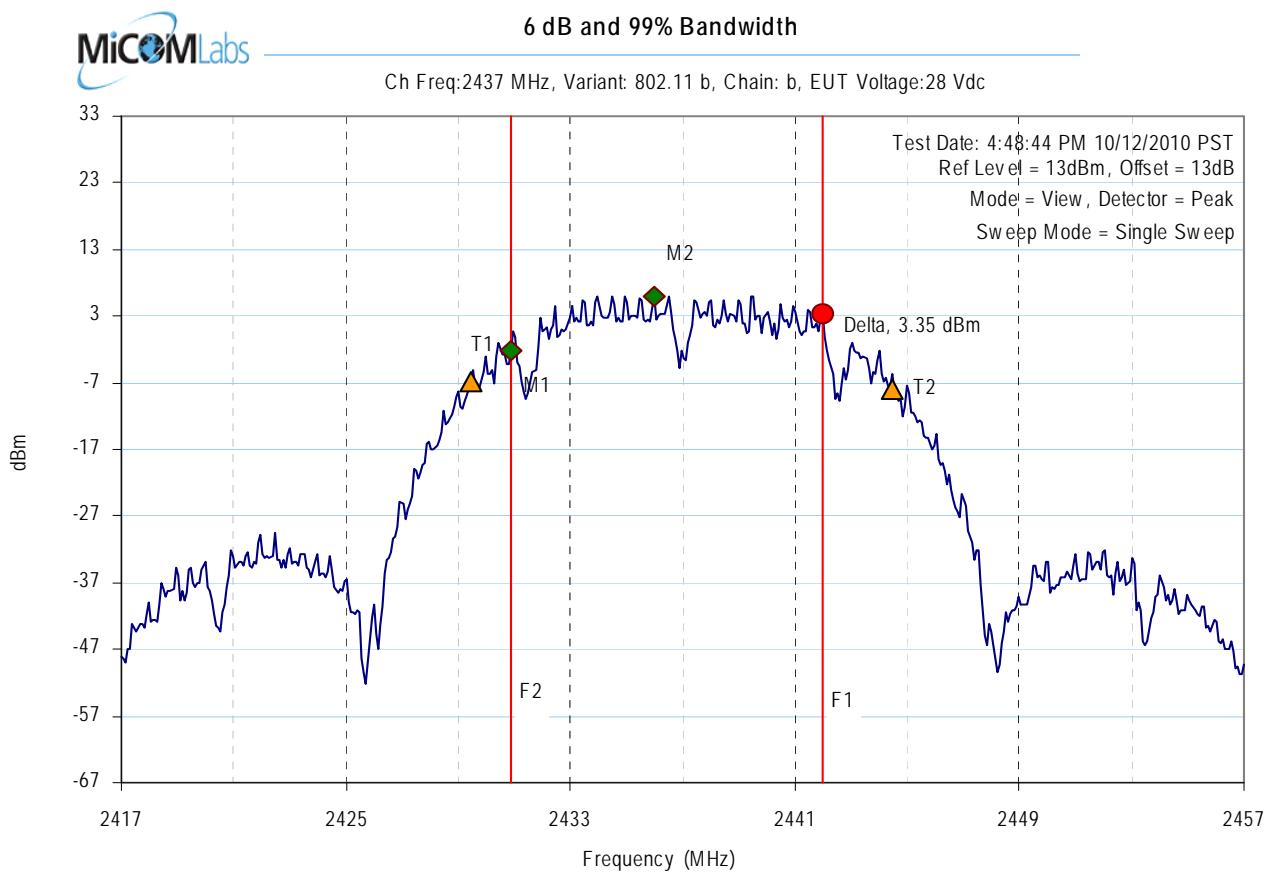
Marker : Frequency : Amplitude

M1 : 2431.909820MHz : -.522dBm
 M2 : 2438.002004MHz : 5.896dBm
 Delta : 2442.010020MHz : 1.178dBm
 T1 : 2429.424850MHz : -6.916dBm
 T2 : 2444.655311MHz : -9.981dBm

Test Results

Center frequency = 2437MHz
 6dB BW(Delta-M1) = 10.100200MHz
 99% OBW(T2-T1) = 15.310621MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

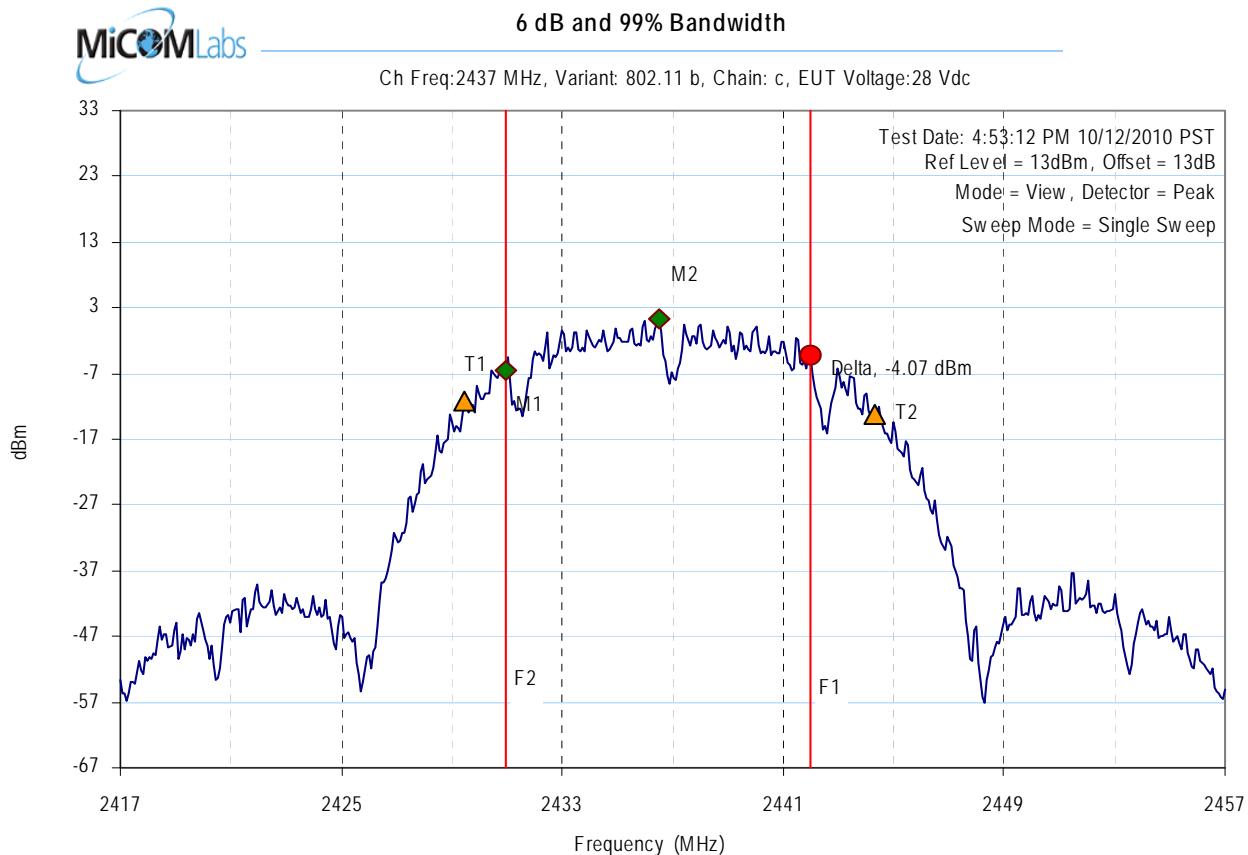
Marker : Frequency : Amplitude

M1 : 2430.867735MHz : -2.316dBm
 M2 : 2435.997996MHz : 6.093dBm
 Delta : 2442.010020MHz : 3.352dBm
 T1 : 2429.424850MHz : -6.687dBm
 T2 : 2444.49499MHz : -7.848dBm

Test Results

Center frequency = 2437MHz
 6dB BW(Delta-M1) = 11.142285MHz
 99% OBW(T2-T1) = 15.150301MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

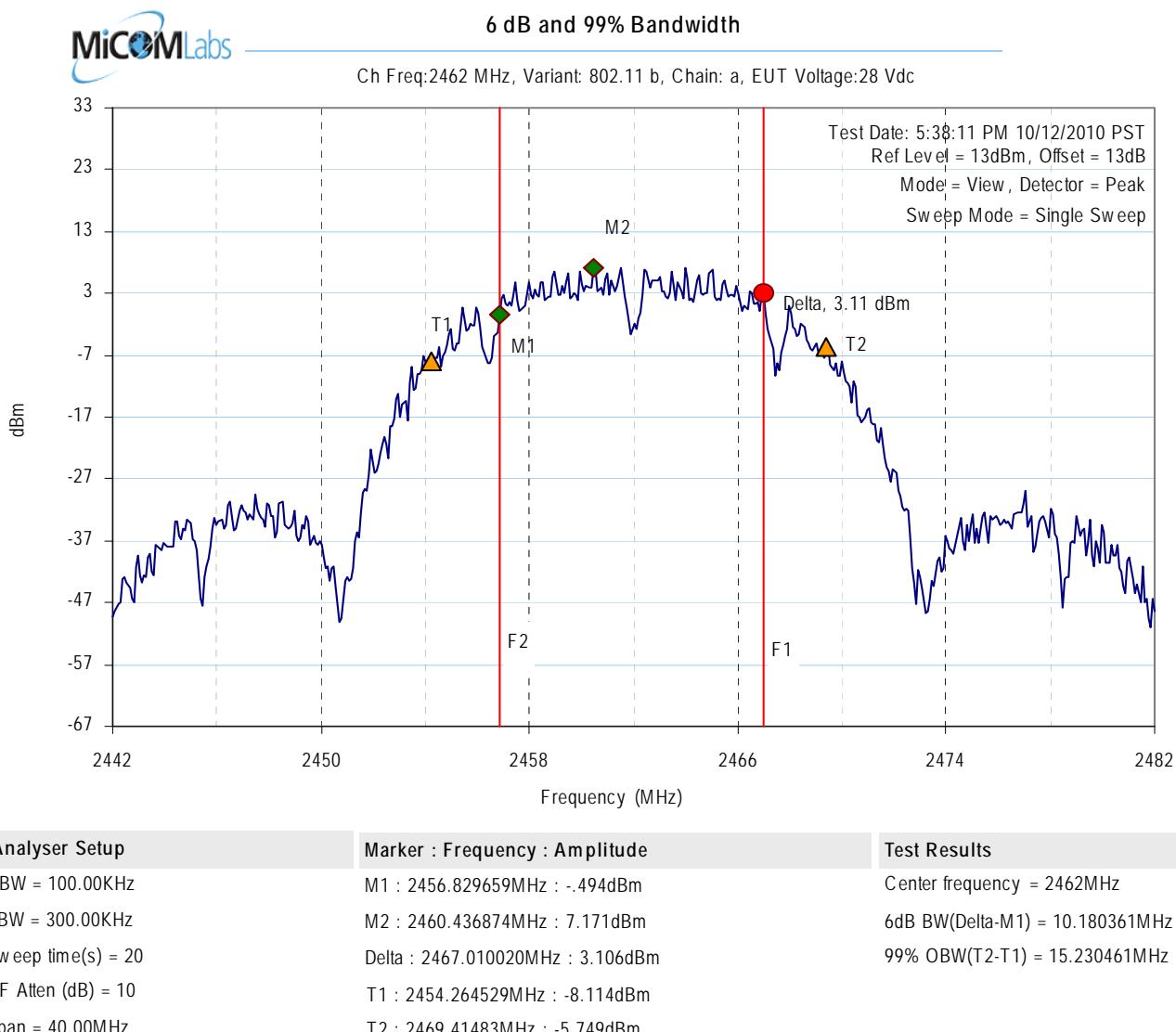
Marker : Frequency : Amplitude

M1 : 2430.947896MHz : -6.672dBm
 M2 : 2436.478958MHz : 1.267dBm
 Delta : 2442.010020MHz : -4.071dBm
 T1 : 2429.424850MHz : -11.051dBm
 T2 : 2444.334669MHz : -13.25dBm

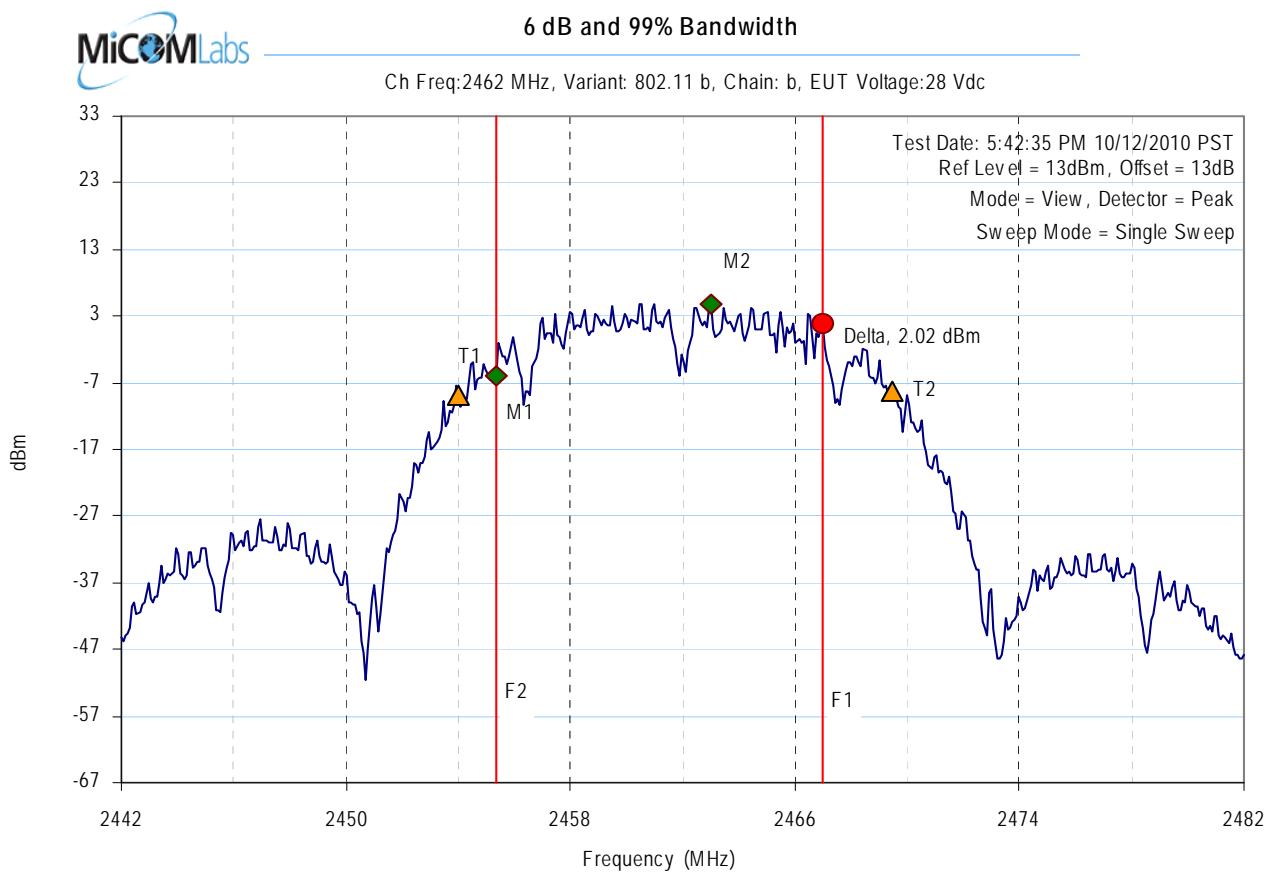
Test Results

Center frequency = 2437MHz
 6dB BW(Delta-M1) = 11.062124MHz
 99% OBW(T2-T1) = 14.989980MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

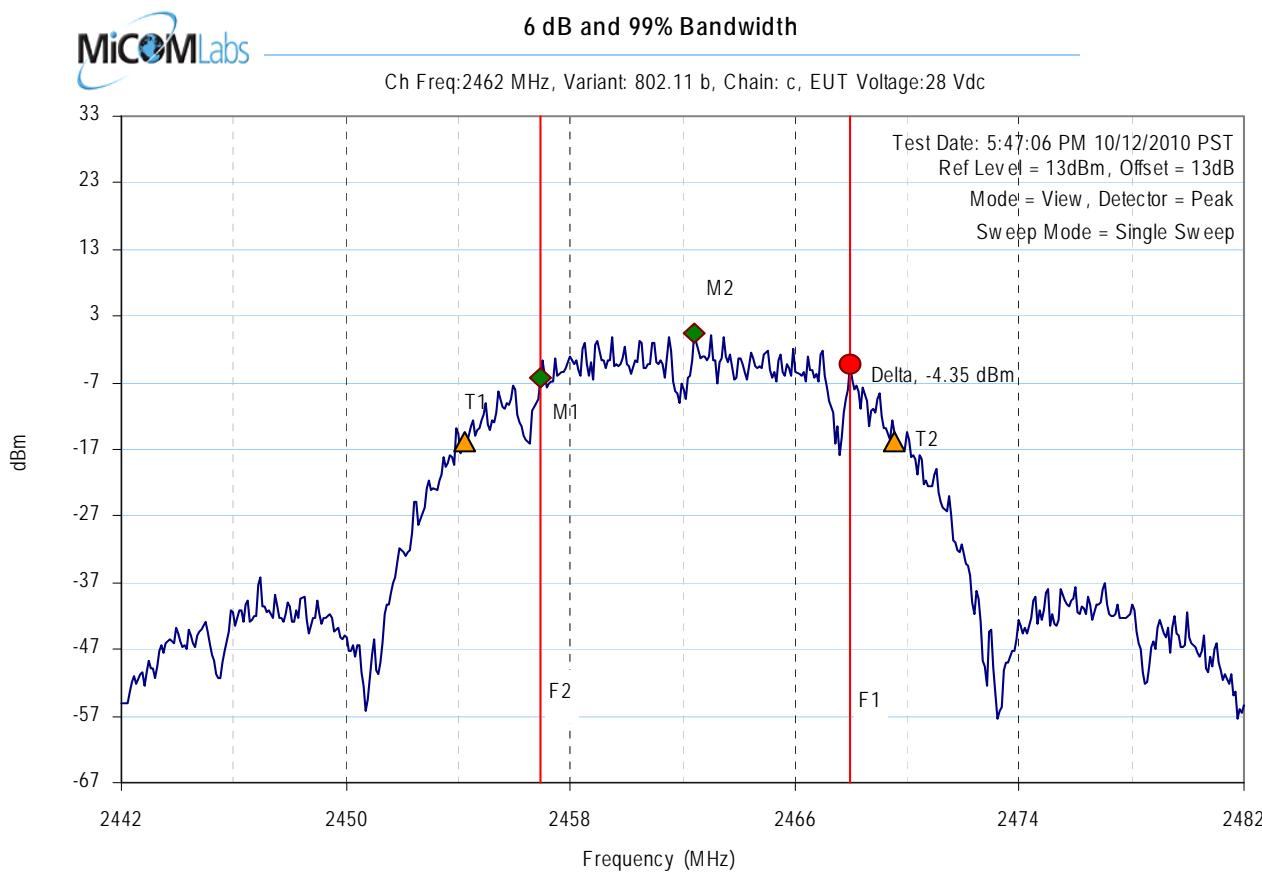
Marker : Frequency : Amplitude

M1 : 2455.386774MHz : -5.820dBm
 M2 : 2463.002004MHz : 4.932dBm
 Delta : 2467.010020MHz : 2.024dBm
 T1 : 2454.024048MHz : -8.891dBm
 T2 : 2469.49499MHz : -8.2dBm

Test Results

Center frequency = 2462MHz
 6dB BW(Delta-M1) = 11.623246MHz
 99% OBW(T2-T1) = 15.551102MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

Marker : Frequency : Amplitude

M1 : 2456.909820MHz : -6.319dBm
 M2 : 2462.440882MHz : .389dBm
 Delta : 2467.971944MHz : -4.348dBm
 T1 : 2454.264529MHz : -15.824dBm
 T2 : 2469.57515MHz : -15.912dBm

Test Results

Center frequency = 2462MHz
 6dB BW(Delta-M1) = 11.062124MHz
 99% OBW(T2-T1) = 15.390782MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 33 of 362

MIMO 6 dB and 99% Bandwidth Results: 802.11 g

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11 g	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A dB	Antenna Gain:	2.6 dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

6 dB Bandwidth

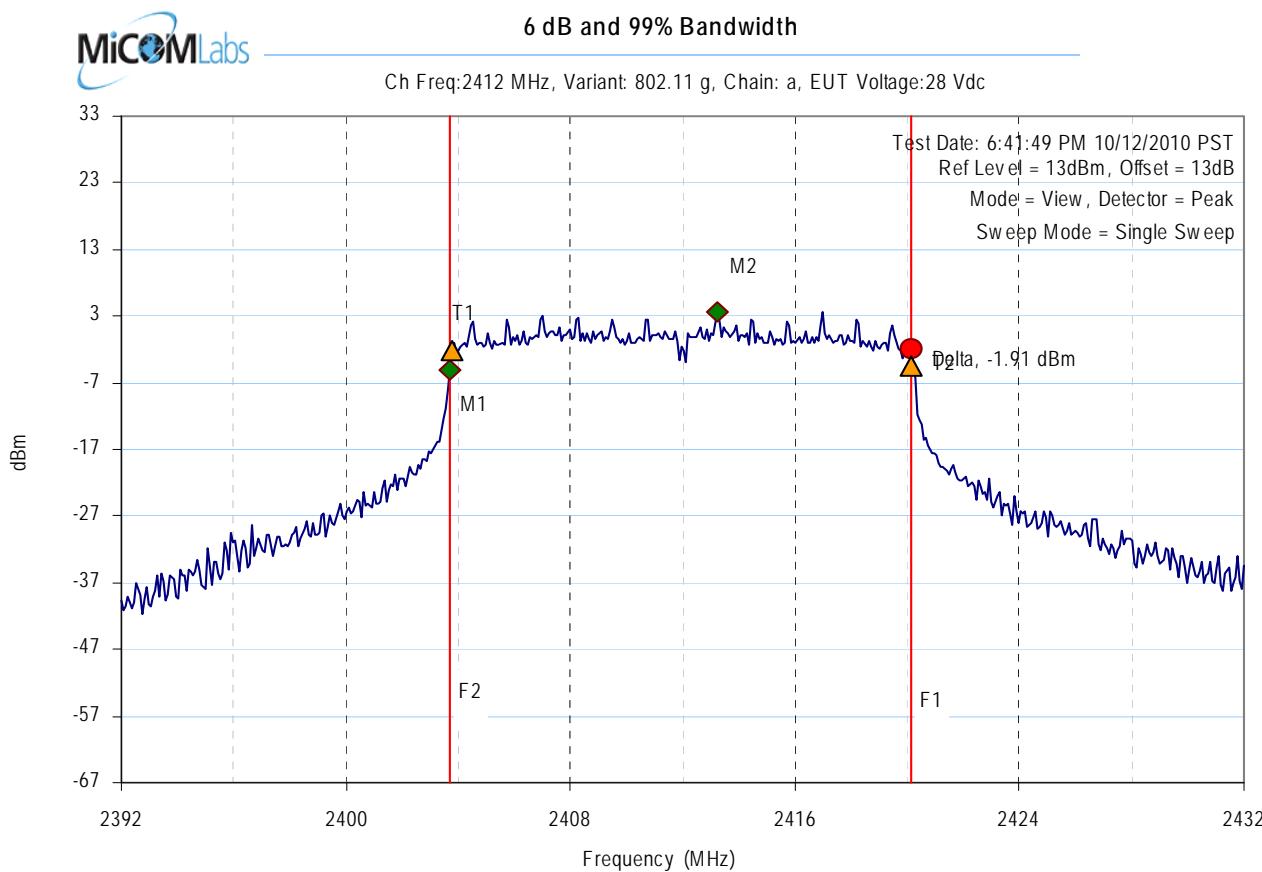
Test Frequency	6 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
2412.000	16.433000	16.433000	16.192000	--	500	0.5	-15.692000
2437.000	16.353000	16.353000	15.792000	--			-15.292000
2462.000	16.353000	16.433000	16.433000	--			-15.853000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
2412.000	16.433000	16.513000	16.994000	--			
2437.000	16.513000	16.513000	16.593000	--			
2462.000	16.513000	16.593000	16.593000	--			

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

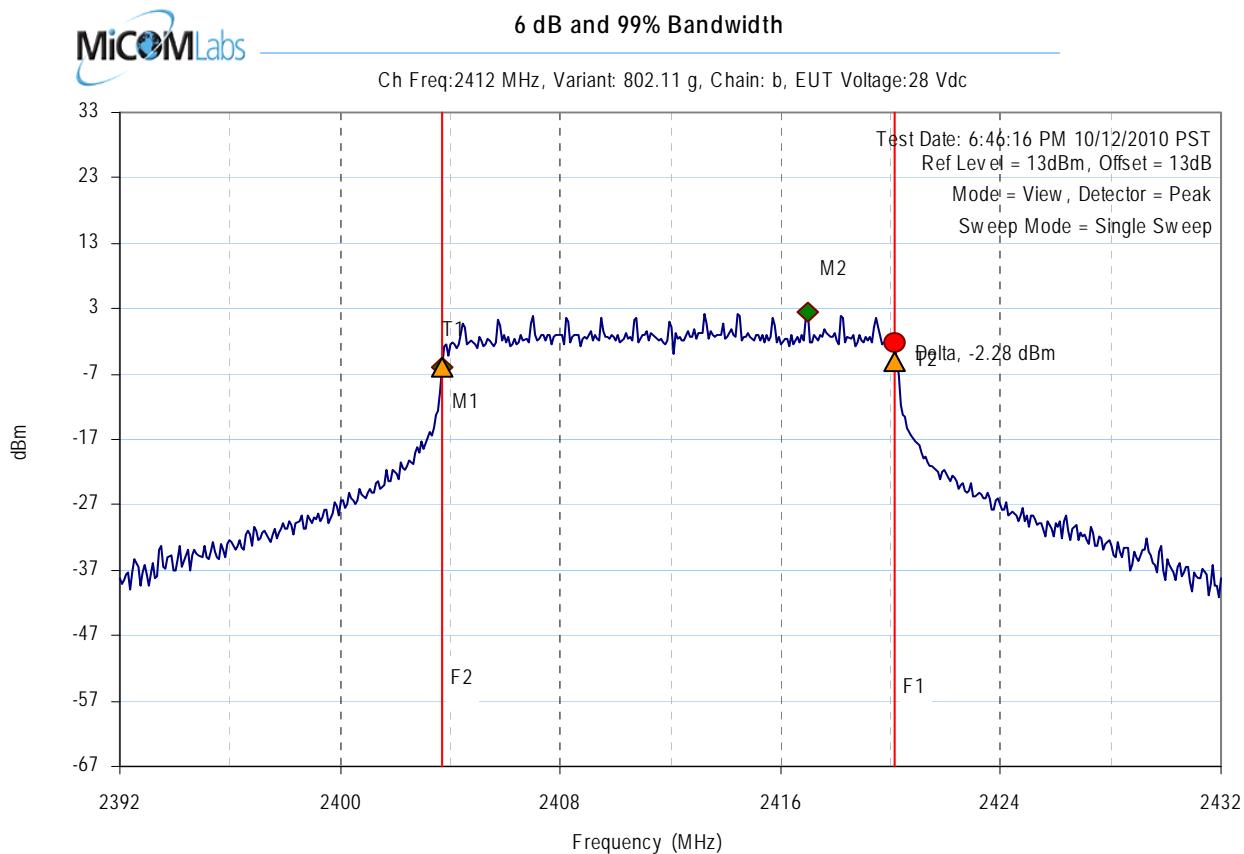
Marker : Frequency : Amplitude

M1 : 2403.703407MHz : -5.220dBm
 M2 : 2413.242485MHz : 3.624dBm
 Delta : 2420.136273MHz : -1.911dBm
 T1 : 2403.783567MHz : -2.068dBm
 T2 : 2420.136273MHz : -4.429dBm

Test Results

Center frequency = 2412MHz
 6dB BW(Delta-M1) = 16.432866MHz
 99% OBW(T2-T1) = 16.432866MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

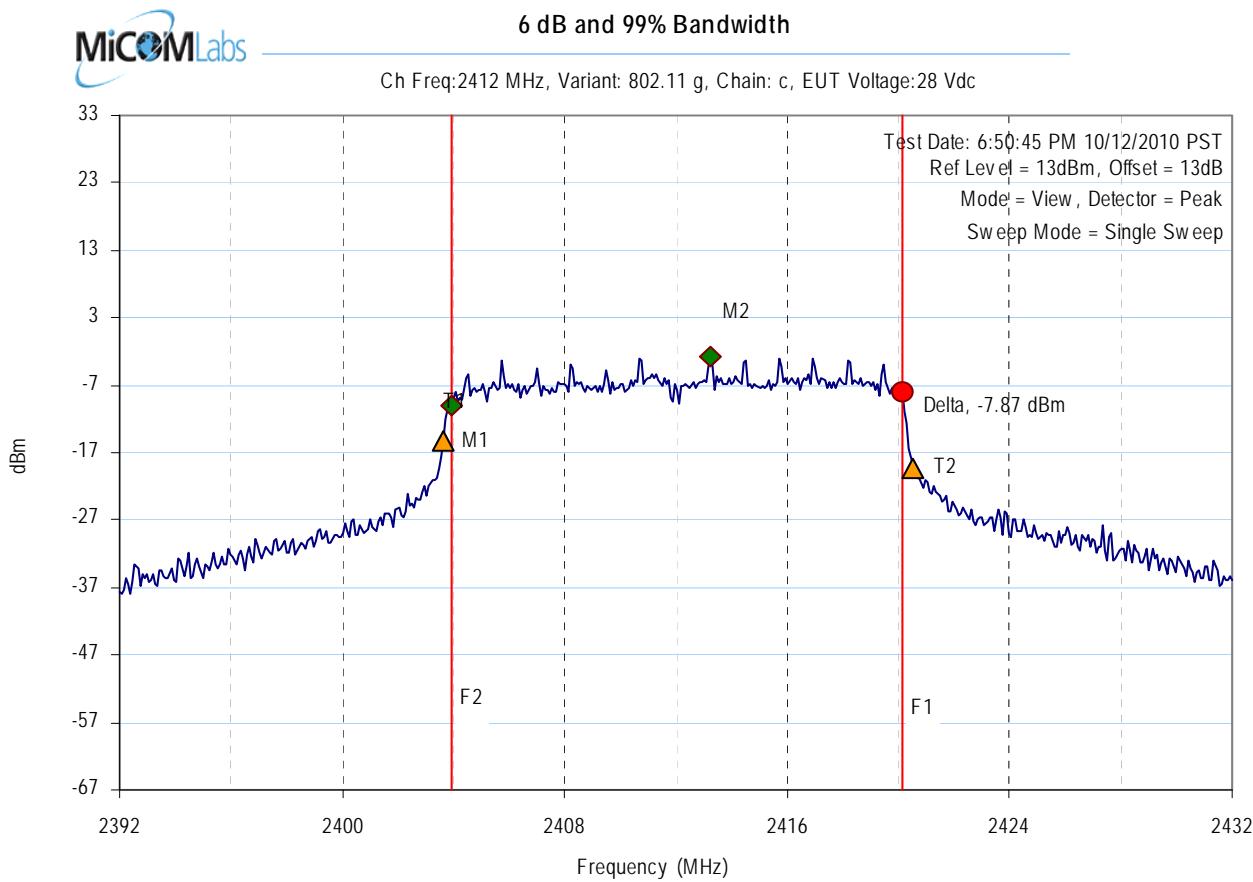
Marker : Frequency : Amplitude

Marker	Frequency (MHz)	Amplitude (dBm)
M1	2403.703407	-5.987
M2	2417.010020	2.408
Delta	2420.136273	-2.282
T1	2403.703407	-5.987
T2	2420.136273	-5.163

Test Results

Parameter	Value
Center frequency	2412MHz
6dB BW(Delta-M1)	16.432866MHz
99% OBW(T2-T1)	16.513026MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

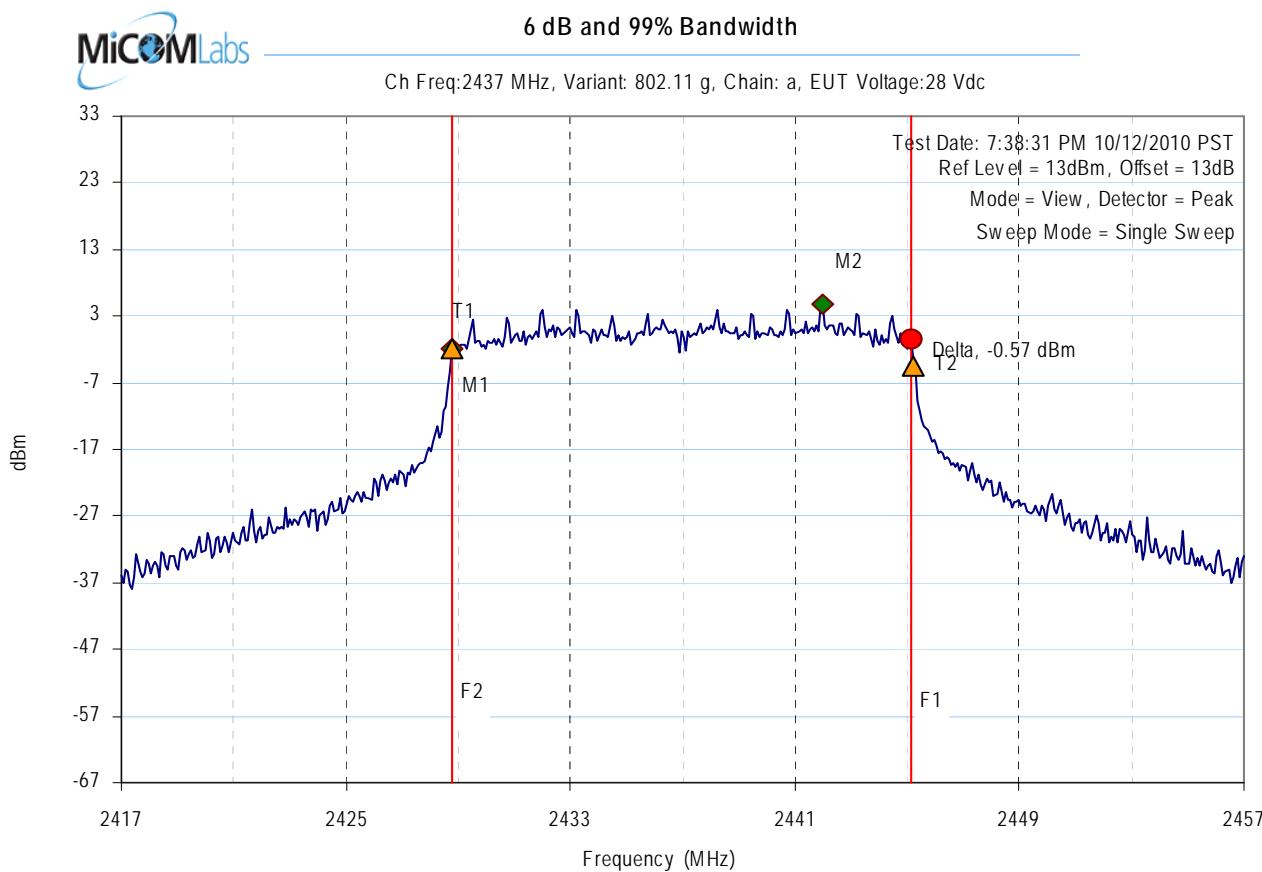
Marker : Frequency : Amplitude

M1 : 2403.943888MHz : -9.955dBm
 M2 : 2413.242485MHz : -2.886dBm
 Delta : 2420.136273MHz : -7.866dBm
 T1 : 2403.623246MHz : -15.338dBm
 T2 : 2420.537074MHz : -19.365dBm

Test Results

Center frequency = 2412MHz
 6dB BW(Delta-M1) = 16.192385MHz
 99% OBW(T2-T1) = 16.993988MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

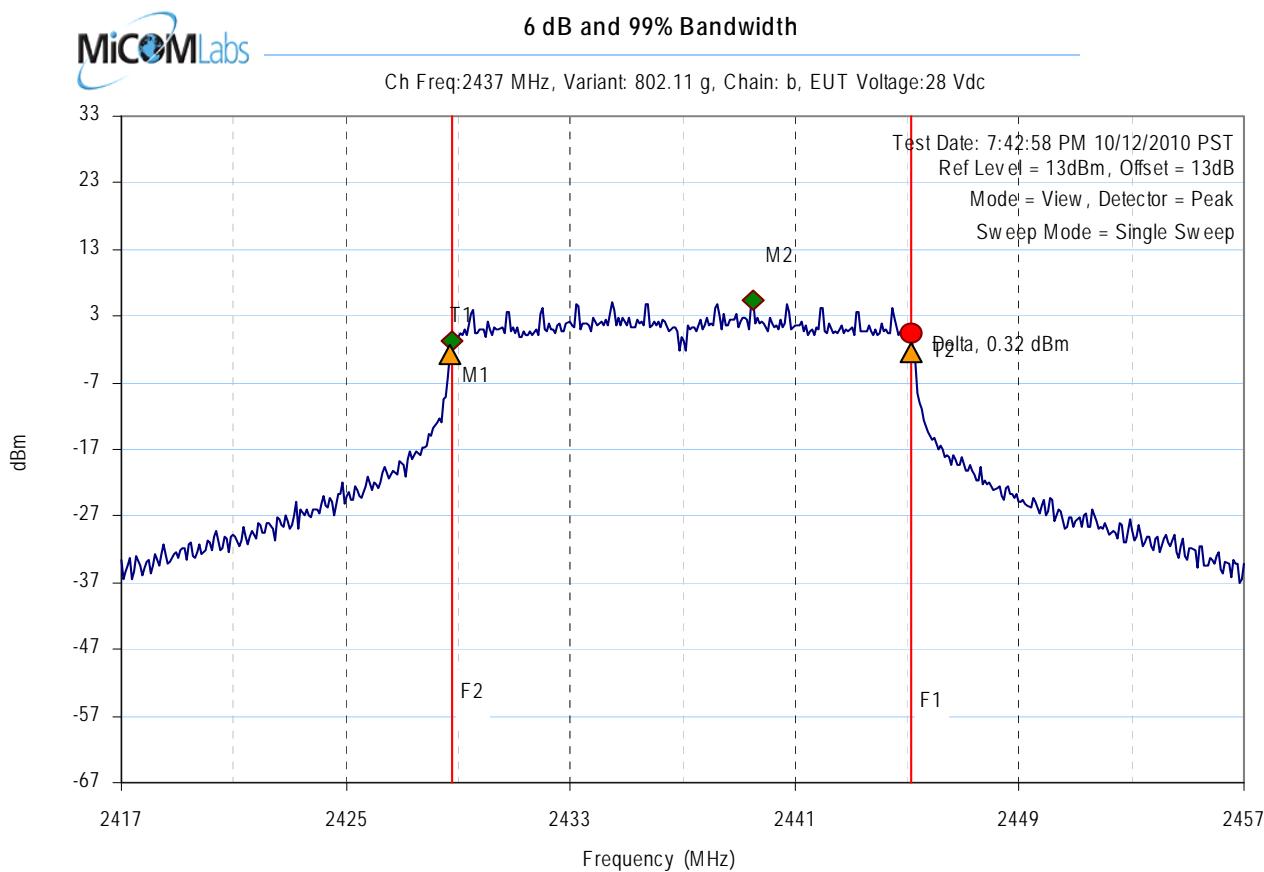
Marker : Frequency : Amplitude

Marker	Frequency (MHz)	Amplitude (dBm)
M1	2428.783567	-1.753
M2	2442.010020	4.908
Delta	2445.136273	-.565
T1	2428.783567	-1.753
T2	2445.216433	-4.425

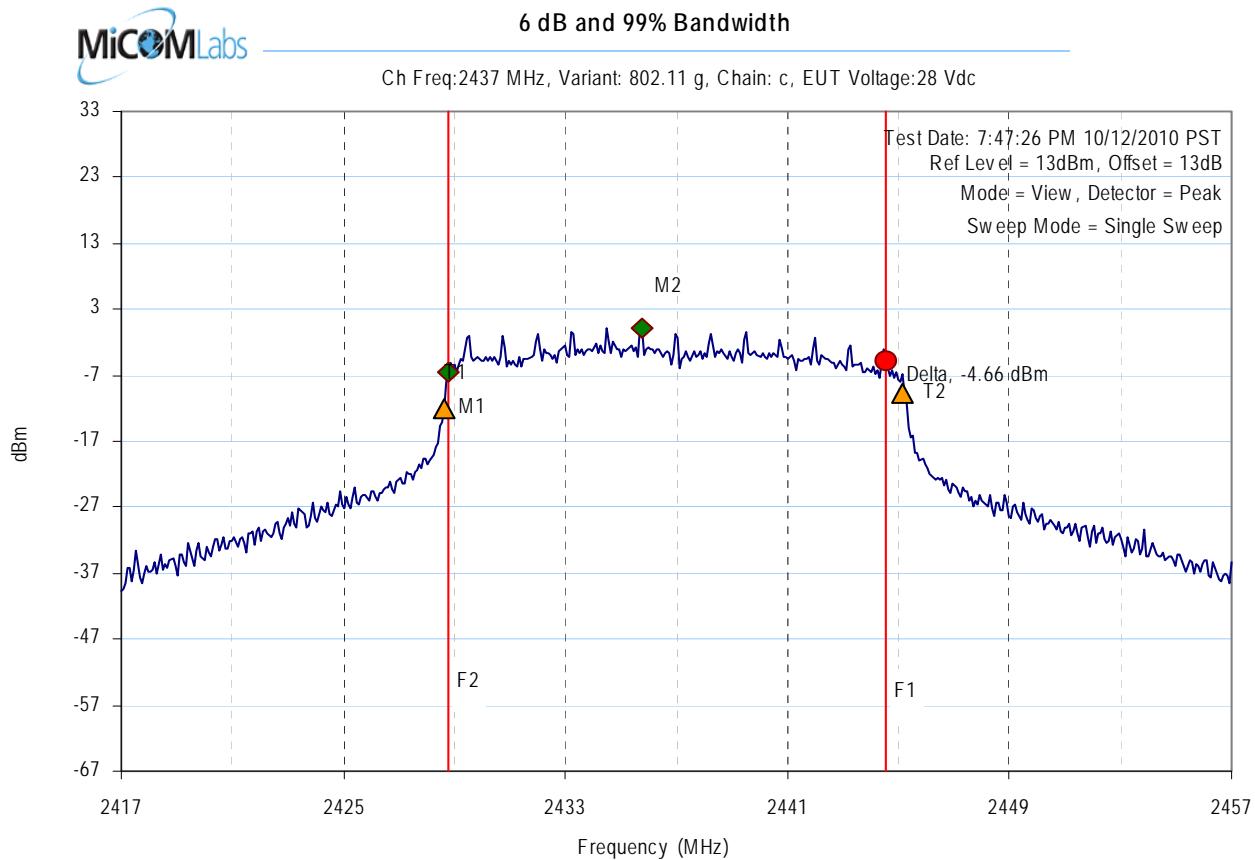
Test Results

Parameter	Value
Center frequency	2437MHz
6dB BW(Delta-M1)	16.352705MHz
99% OBW(T2-T1)	16.513026MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

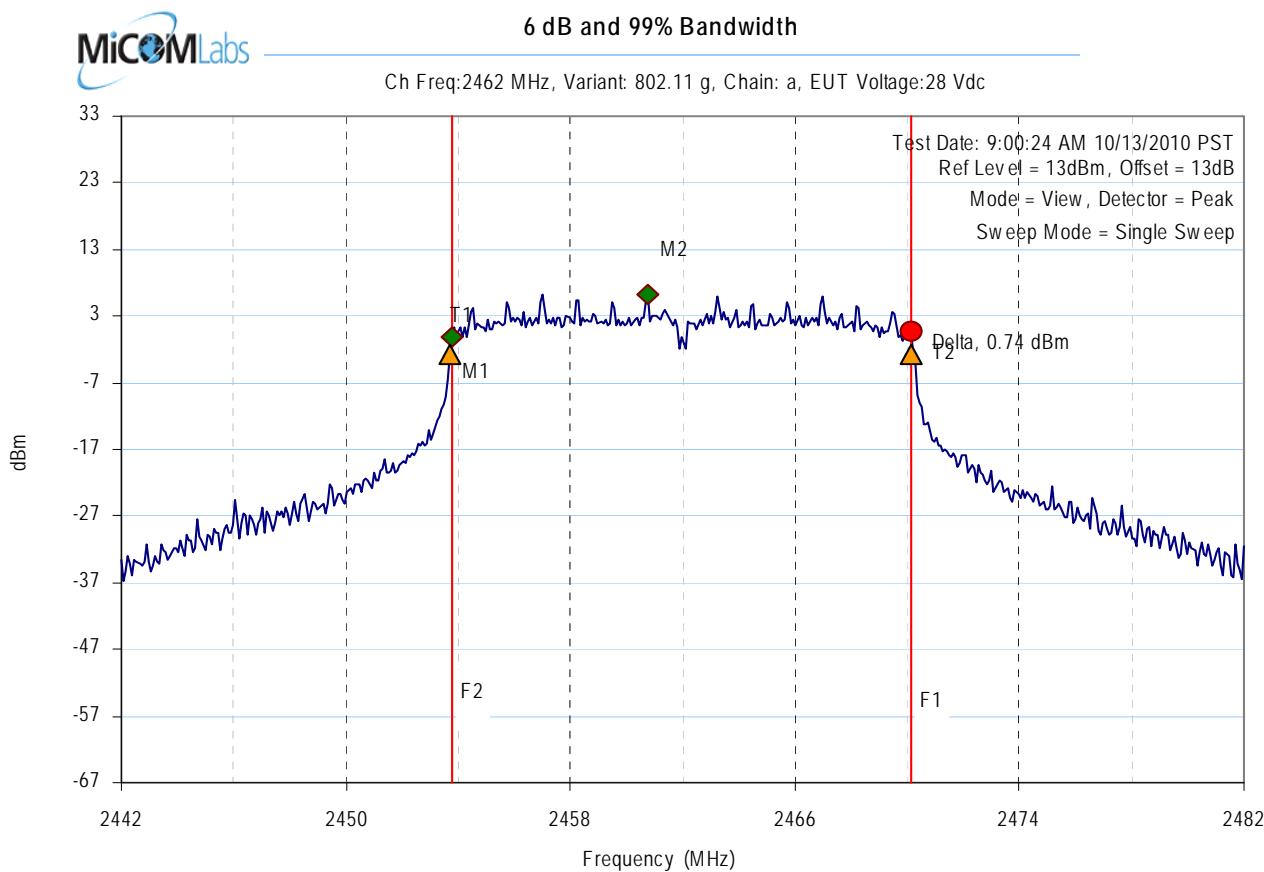
Marker : Frequency : Amplitude

M1 : 2428.783567MHz : -6.666dBm
 M2 : 2435.757515MHz : .175dBm
 Delta : 2444.575150MHz : -4.657dBm
 T1 : 2428.623246MHz : -11.962dBm
 T2 : 2445.136273MHz : -9.711dBm

Test Results

Center frequency = 2437MHz
 6dB BW(Delta-M1) = 15.791583MHz
 99% OBW(T2-T1) = 16.593186MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

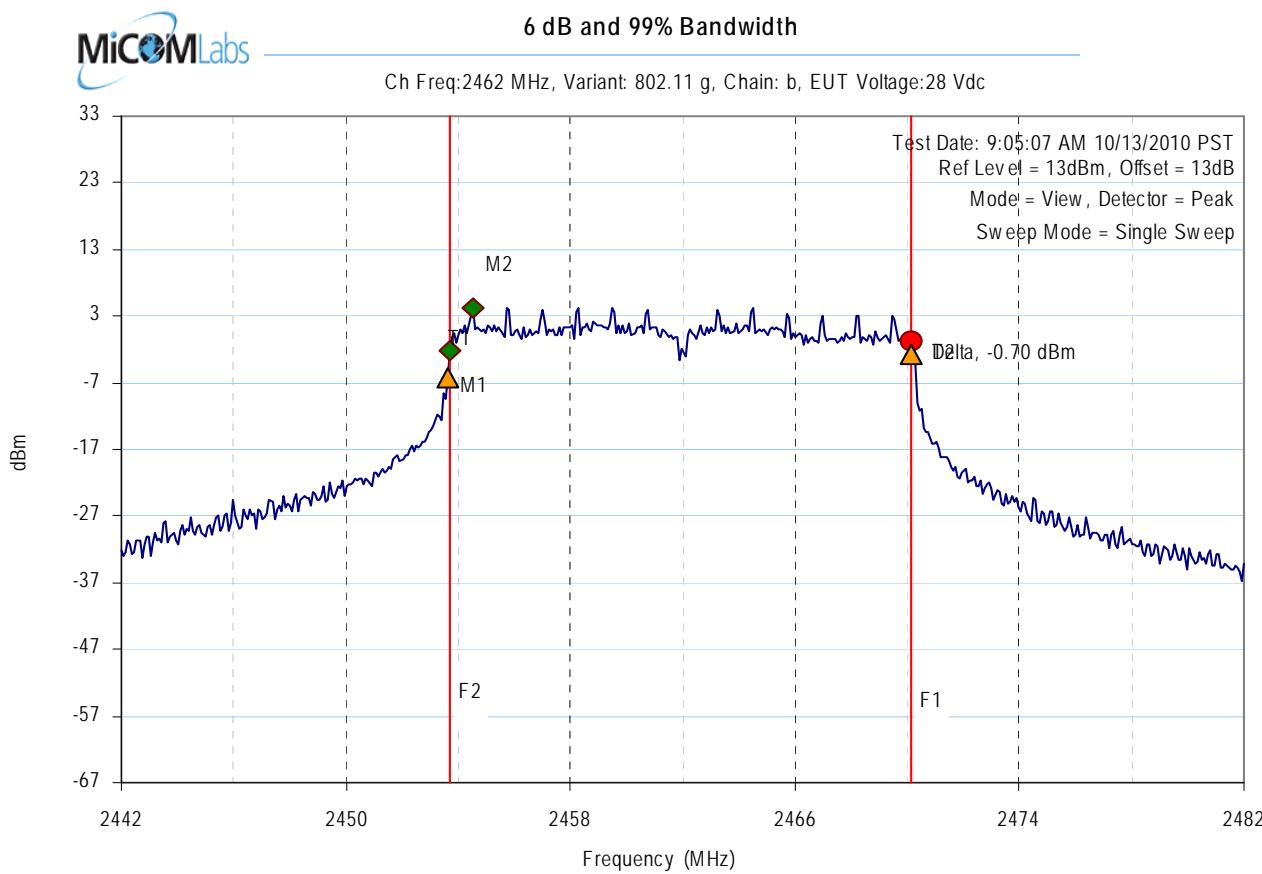
Marker : Frequency : Amplitude

M1 : 2453.783567MHz : -.132dBm
 M2 : 2460.757515MHz : 6.146dBm
 Delta : 2470.136273MHz : .745dBm
 T1 : 2453.703407MHz : -2.898dBm
 T2 : 2470.136273MHz : -2.69dBm

Test Results

Center frequency = 2462MHz
 6dB BW(Delta-M1) = 16.352705MHz
 99% OBW(T2-T1) = 16.513026MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

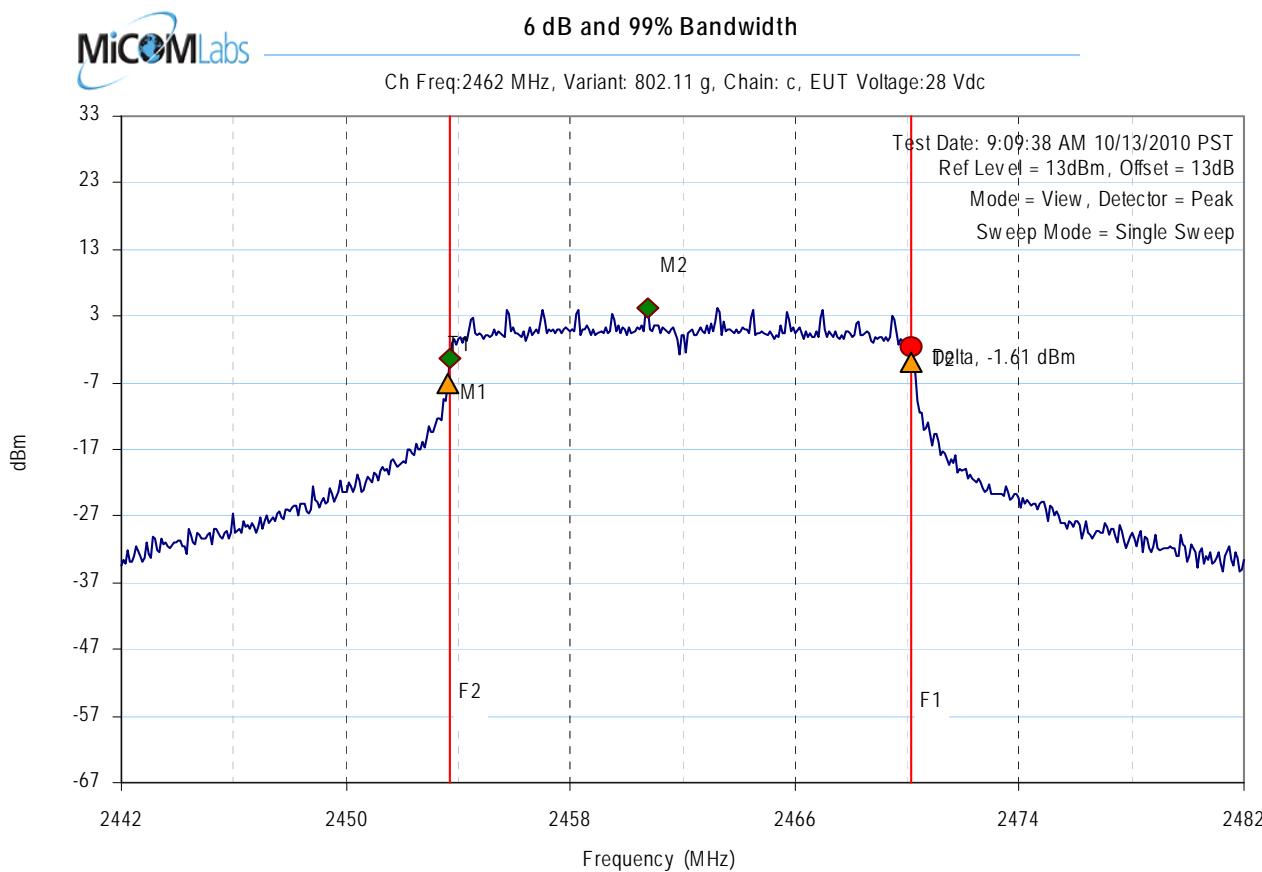
Marker : Frequency : Amplitude

Marker	Frequency (MHz)	Amplitude (dBm)
M1	2453.703407	-2.314
M2	2454.505010	4.316
Delta	2470.136273	-0.70
T1	2453.623246	-6.375
T2	2470.136273	-2.668

Test Results

Parameter	Value
Center frequency	2462MHz
6dB BW(Delta-M1)	16.432866MHz
99% OBW(T2-T1)	16.593186MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

Marker : Frequency : Amplitude

M1 : 2453.703407MHz : -3.286dBm
 M2 : 2460.757515MHz : 4.342dBm
 Delta : 2470.136273MHz : -1.608dBm
 T1 : 2453.623246MHz : -7.201dBm
 T2 : 2470.136273MHz : -3.953dBm

Test Results

Center frequency = 2462MHz
 6dB BW(Delta-M1) = 16.432866MHz
 99% OBW(T2-T1) = 16.593186MHz

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



Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 43 of 362

MIMO 6 dB and 99% Bandwidth Results: 802.11 HT-20

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-20	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	2.6 dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

6 dB Bandwidth

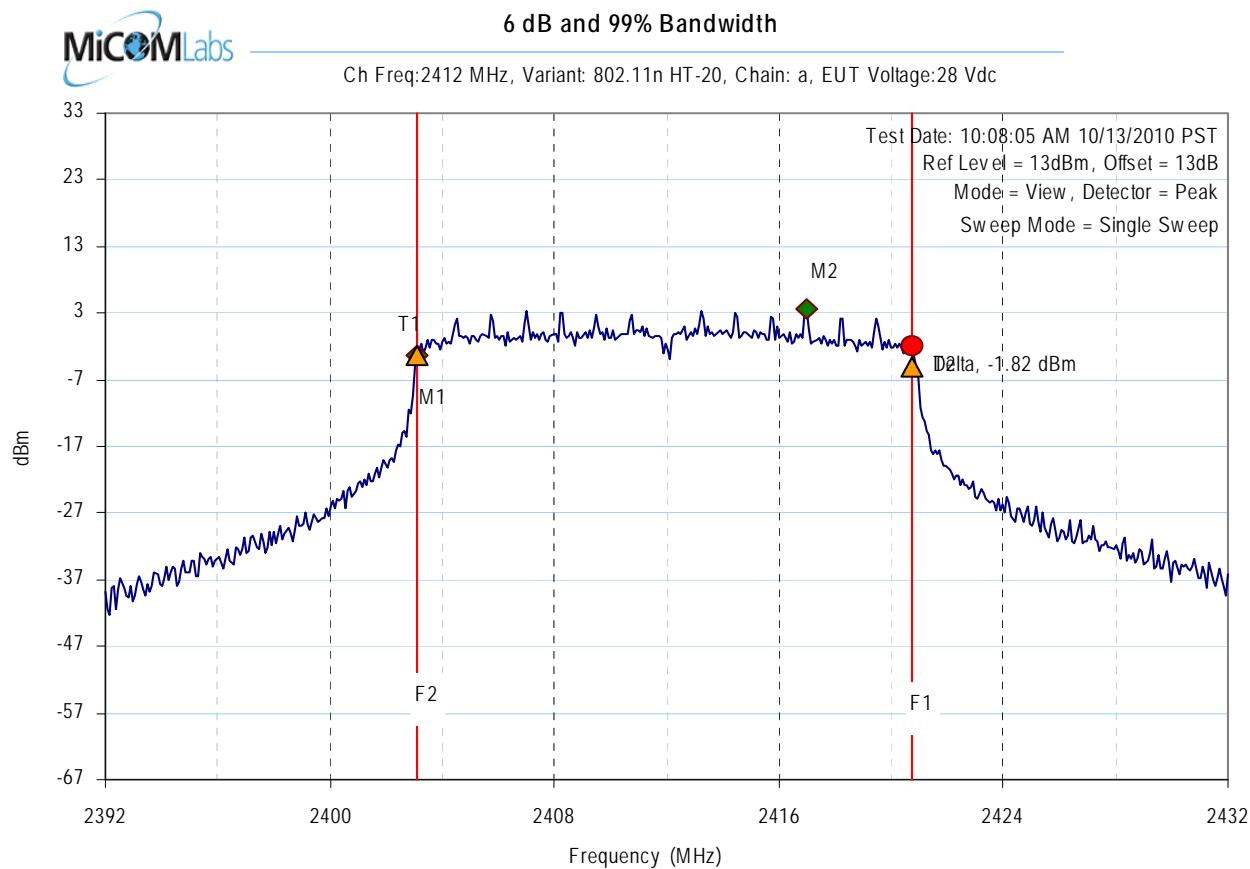
Test Frequency	6 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz				kHz	MHz	
MHz	a	b	c	d			
2412.000	17.635000	17.635000	17.635000	--	500	0.5	-17.135000
2437.000	16.593000	17.154000	16.994000	--			-16.093000
2462.000	17.154000	17.395000	17.395000	--			-16.654000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
2412.000	17.715000	17.715000	17.715000	--			
2437.000	17.715000	17.715000	17.715000	--			
2462.000	17.715000	17.715000	17.796000	--			

Measurement uncertainty:	±2.81 dB
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This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. Any changes will be noted in the Document History section of the report.


Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Alten (dB) = 10
 Span = 40.00MHz

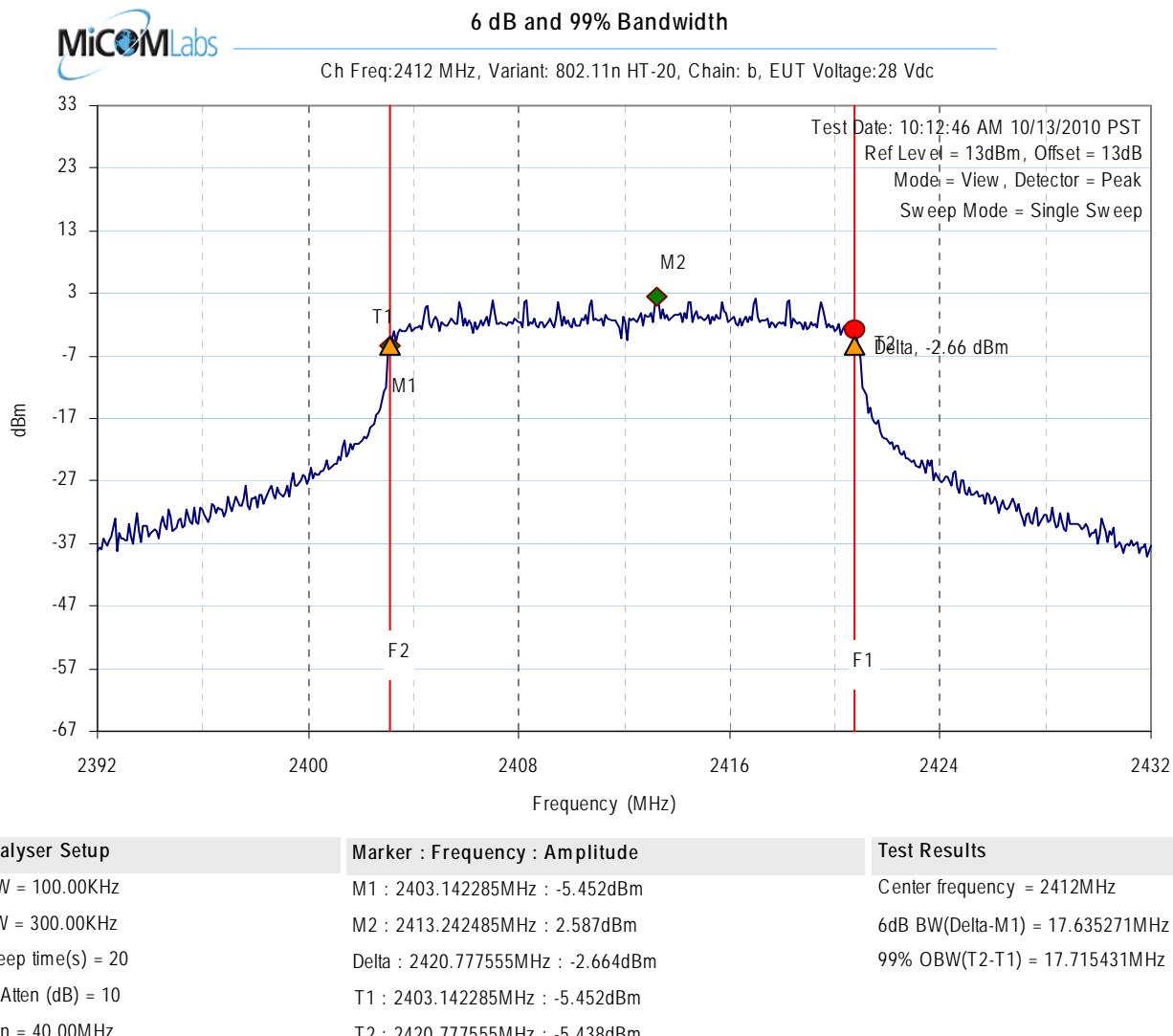
Marker : Frequency : Amplitude

M1 : 2403.142285MHz : -3.201dBm
 M2 : 2417.010020MHz : 3.681dBm
 Delta : 2420.777555MHz : -1.818dBm
 T1 : 2403.142285MHz : -3.201dBm
 T2 : 2420.777555MHz : -5.131dBm

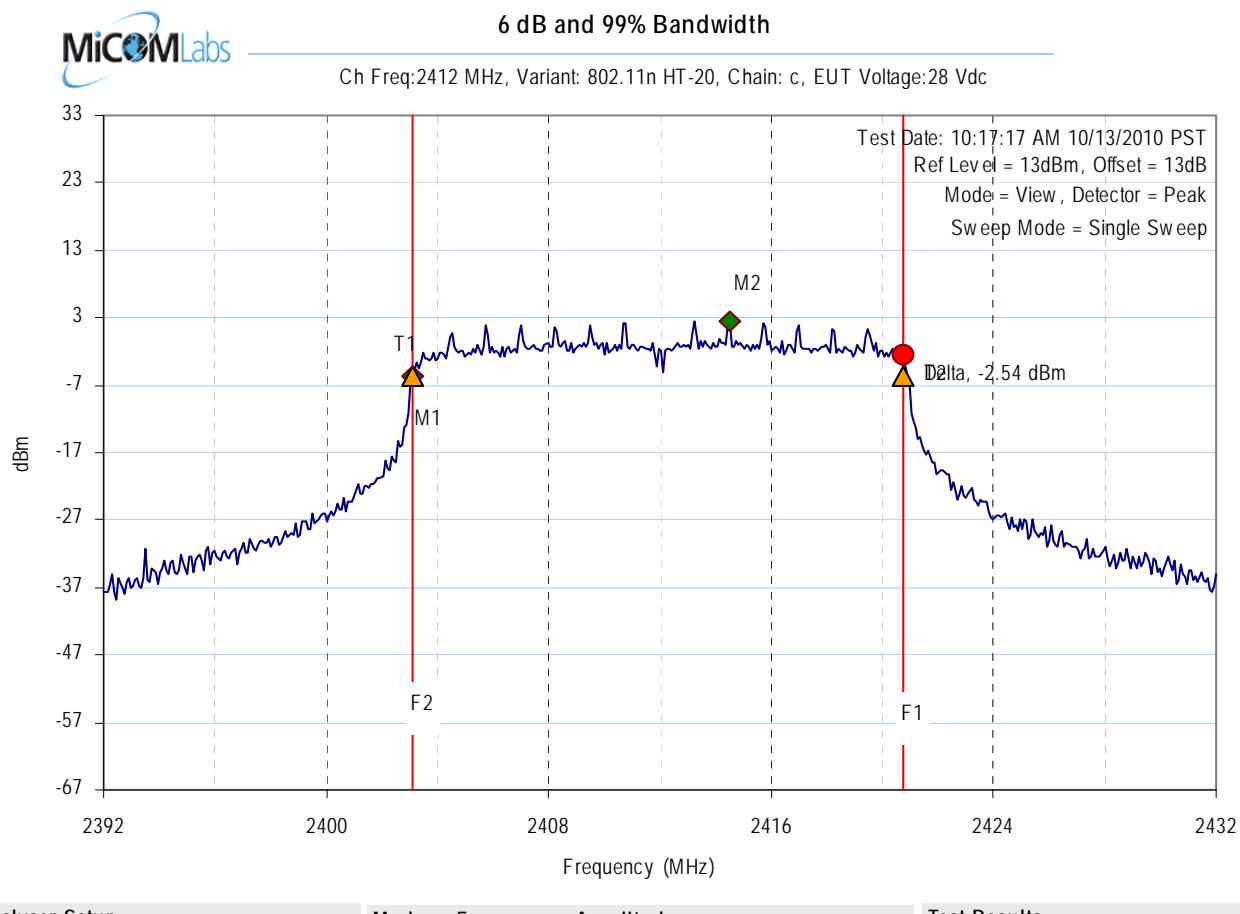
Test Results

Center frequency = 2412MHz
 6dB BW(Delta-M1) = 17.635271MHz
 99% OBW(T2-T1) = 17.715431MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

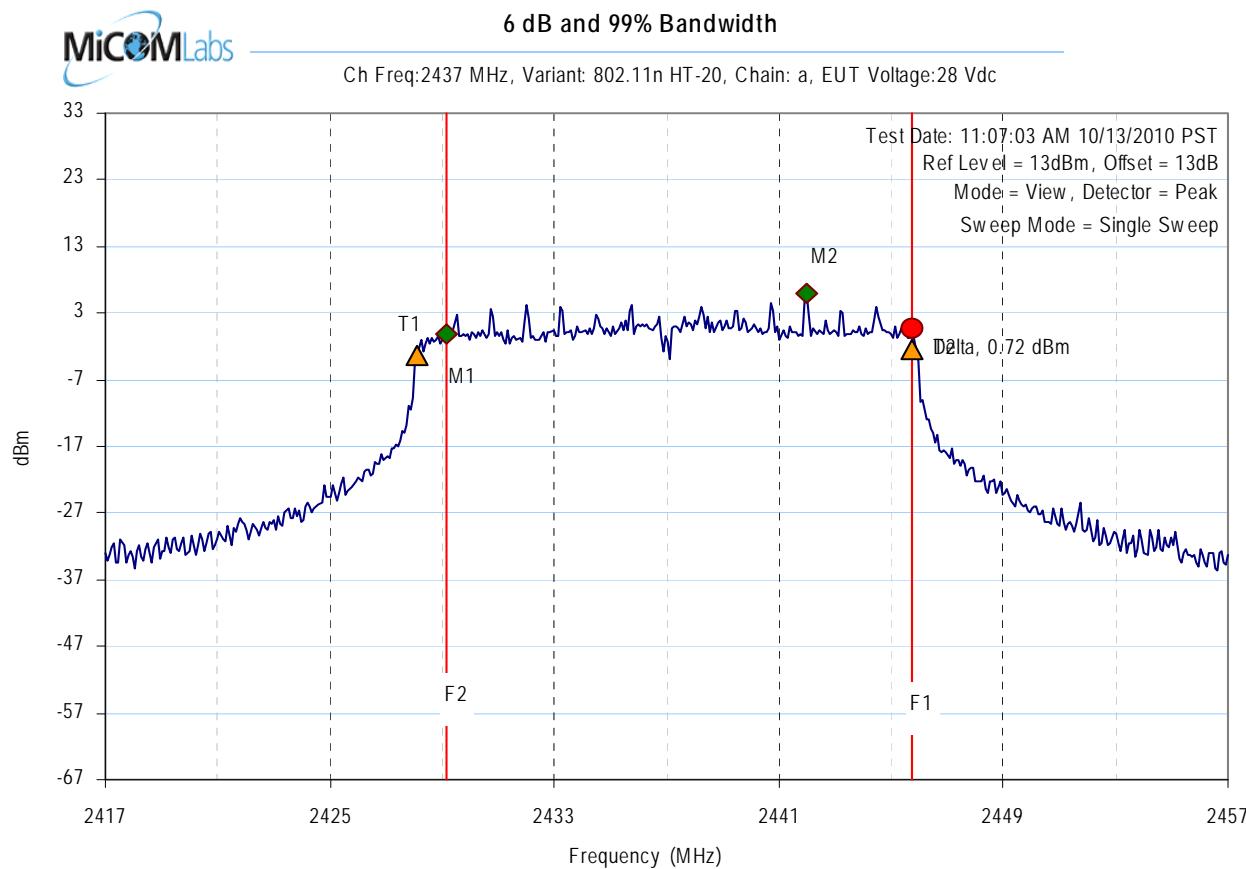
Marker : Frequency : Amplitude

M1 : 2403.142285MHz : -5.798dBm
 M2 : 2414.525050MHz : 2.437dBm
 Delta : 2420.777555MHz : -2.542dBm
 T1 : 2403.142285MHz : -5.798dBm
 T2 : 2420.777555MHz : -5.623dBm

Test Results

Center frequency = 2412MHz
 6dB BW(Delta-M1) = 17.635271MHz
 99% OBW(T2-T1) = 17.715431MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Alten (dB) = 10
 Span = 40.00MHz

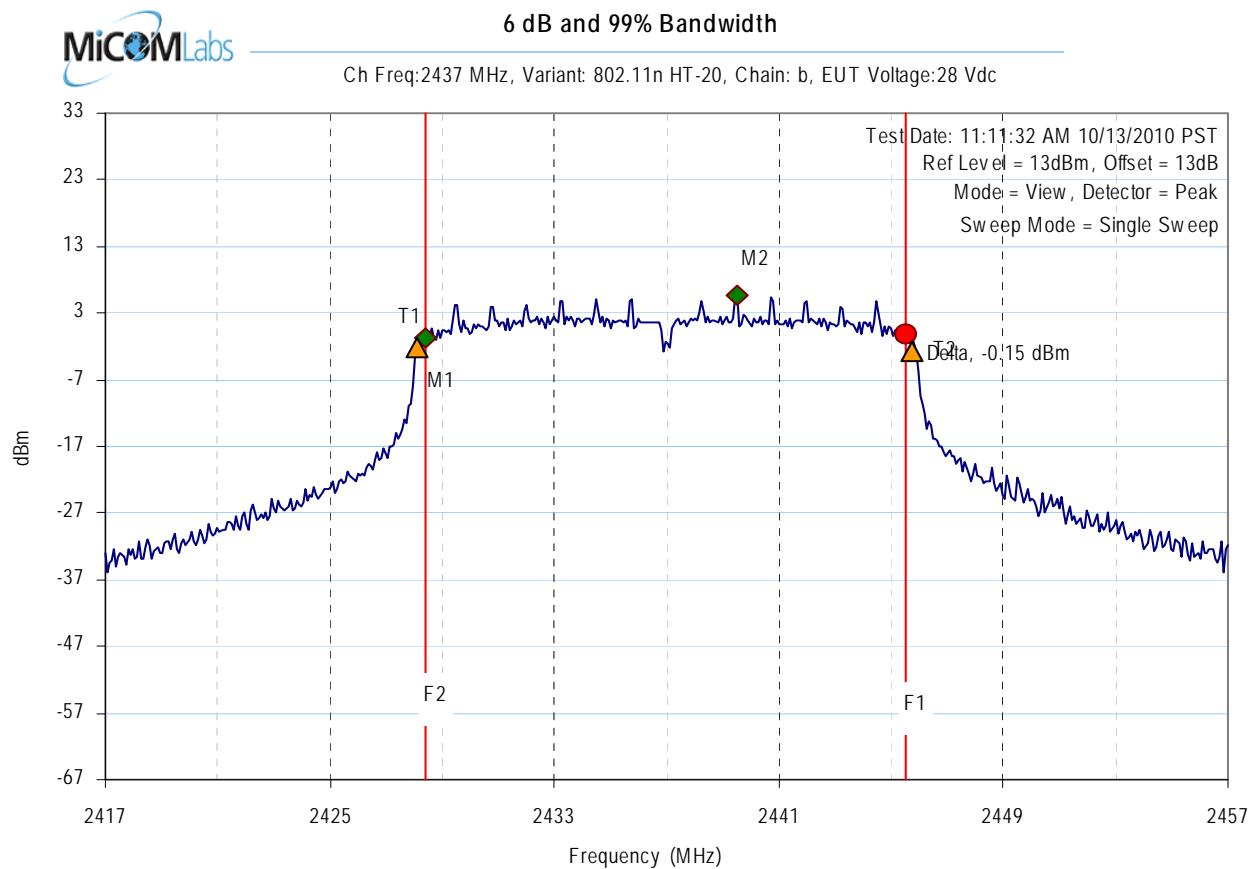
Marker : Frequency : Amplitude

M1 : 2429.184369MHz : -.189dBm
 M2 : 2442.010020MHz : 5.890dBm
 Delta : 2445.777555MHz : .722dBm
 T1 : 2428.142285MHz : -3.321dBm
 T2 : 2445.777555MHz : -2.601dBm

Test Results

Center frequency = 2437MHz
 6dB BW(Delta-M1) = 16.593186MHz
 99% OBW(T2-T1) = 17.715431MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Alten (dB) = 10
 Span = 40.00MHz

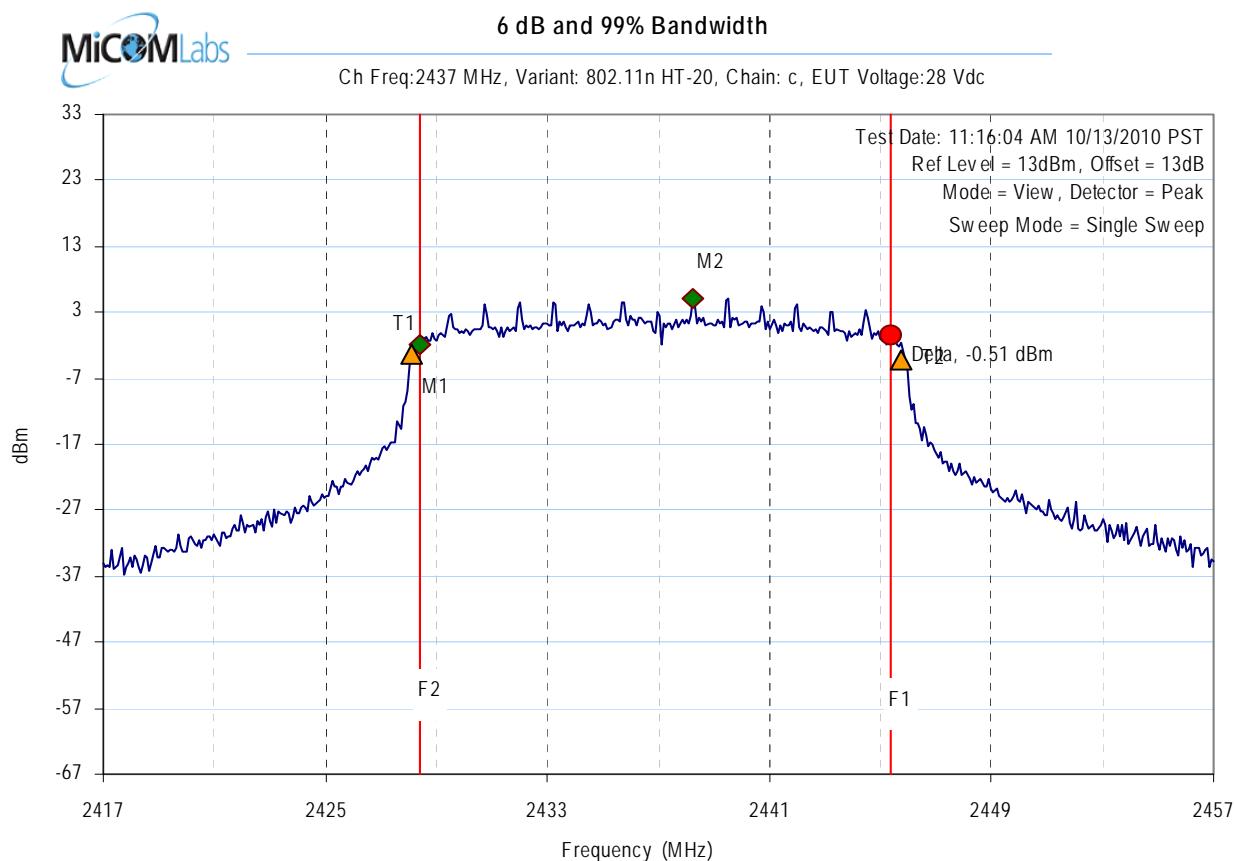
Marker : Frequency : Amplitude

M1 : 2428.382766MHz : -.840dBm
 M2 : 2439.525050MHz : 5.782dBm
 Delta : 2445.537074MHz : -.150dBm
 T1 : 2428.142285MHz : -2.302dBm
 T2 : 2445.777555MHz : -2.766dBm

Test Results

Center frequency = 2437MHz
 6dB BW(Delta-M1) = 17.154309MHz
 99% OBW(T2-T1) = 17.715431MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

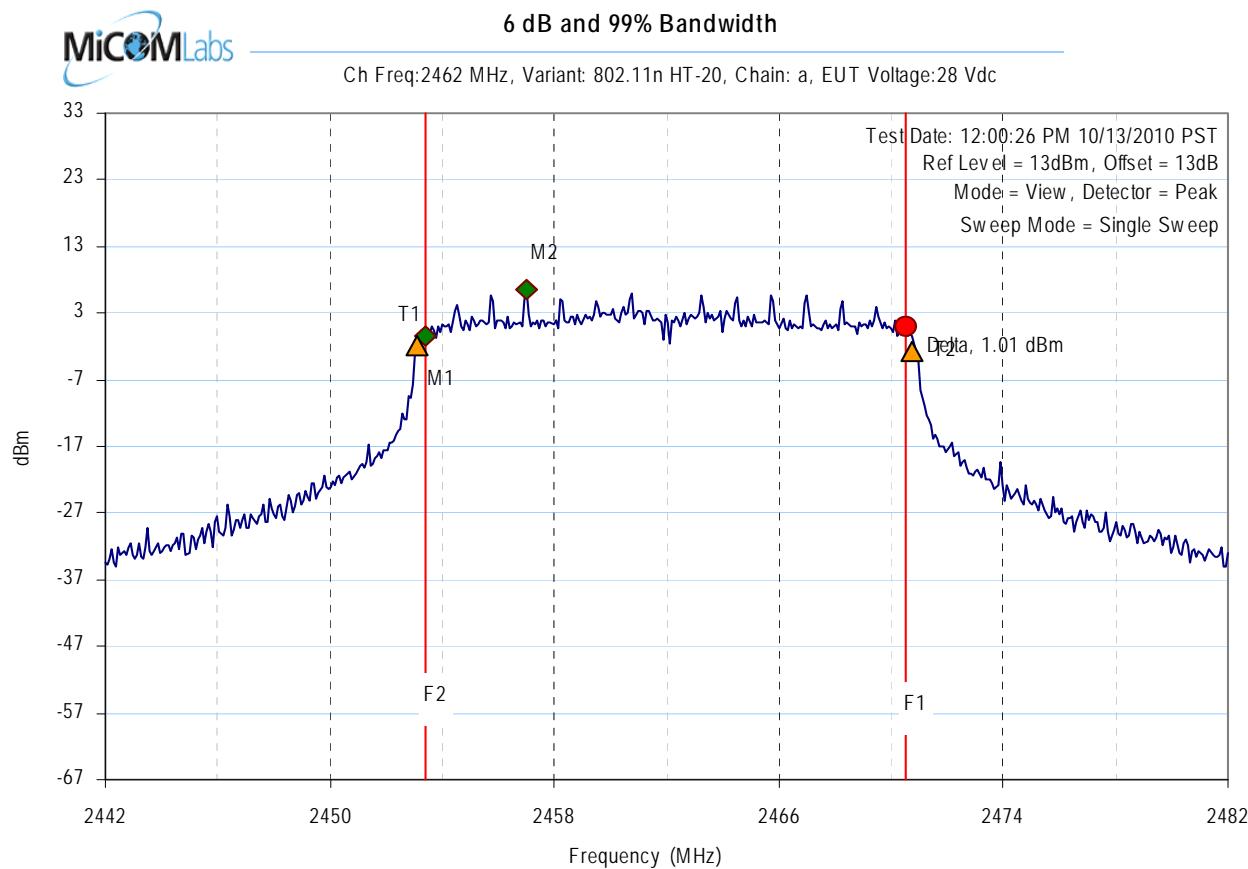
Marker : Frequency : Amplitude

M1 : 2428.382766MHz : -1.865dBm
 M2 : 2438.242485MHz : 5.109dBm
 Delta : 2445.376754MHz : -.514dBm
 T1 : 2428.142285MHz : -3.467dBm
 T2 : 2445.777555MHz : -4.332dBm

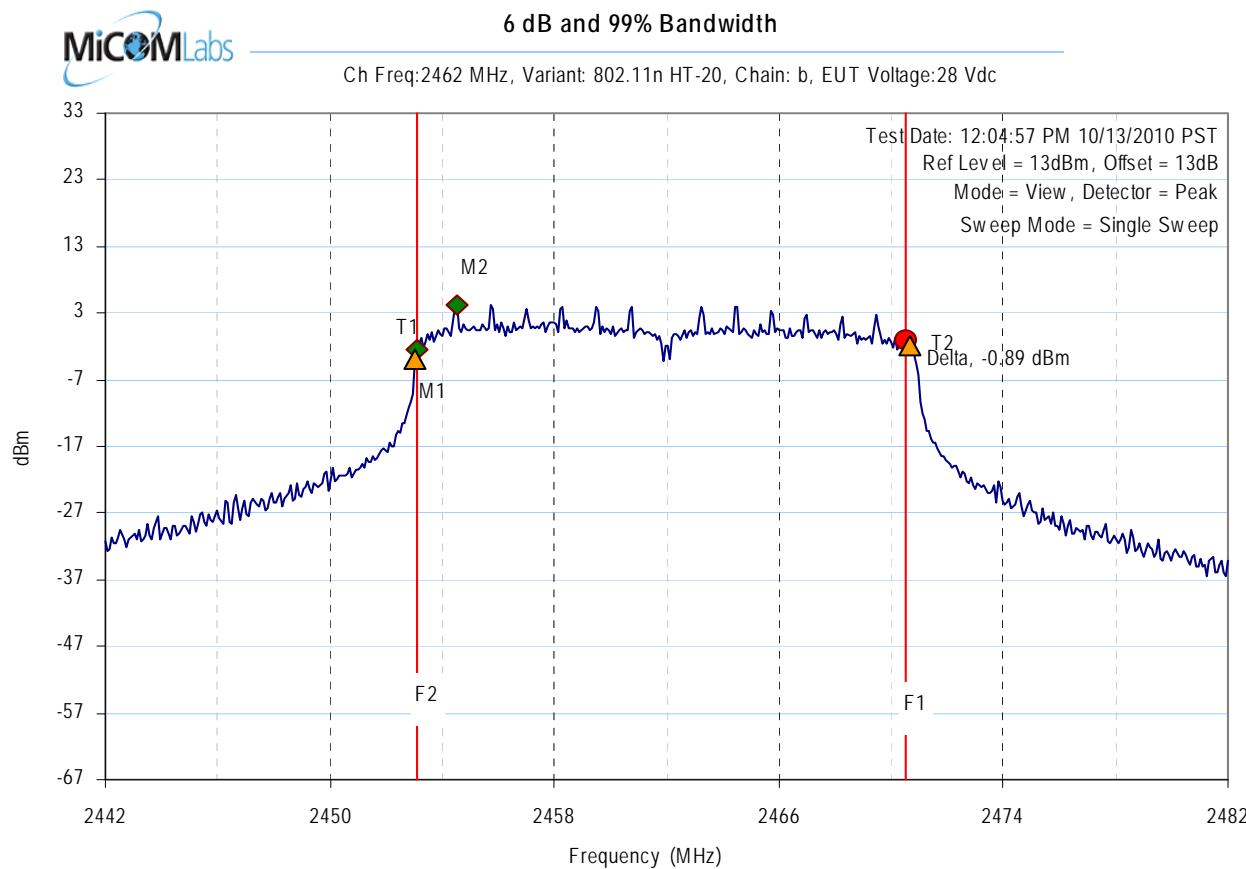
Test Results

Center frequency = 2437MHz
 6dB BW(Delta-M1) = 16.993988MHz
 99% OBW(T2-T1) = 17.715431MHz

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


Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Alten (dB) = 10
 Span = 40.00MHz

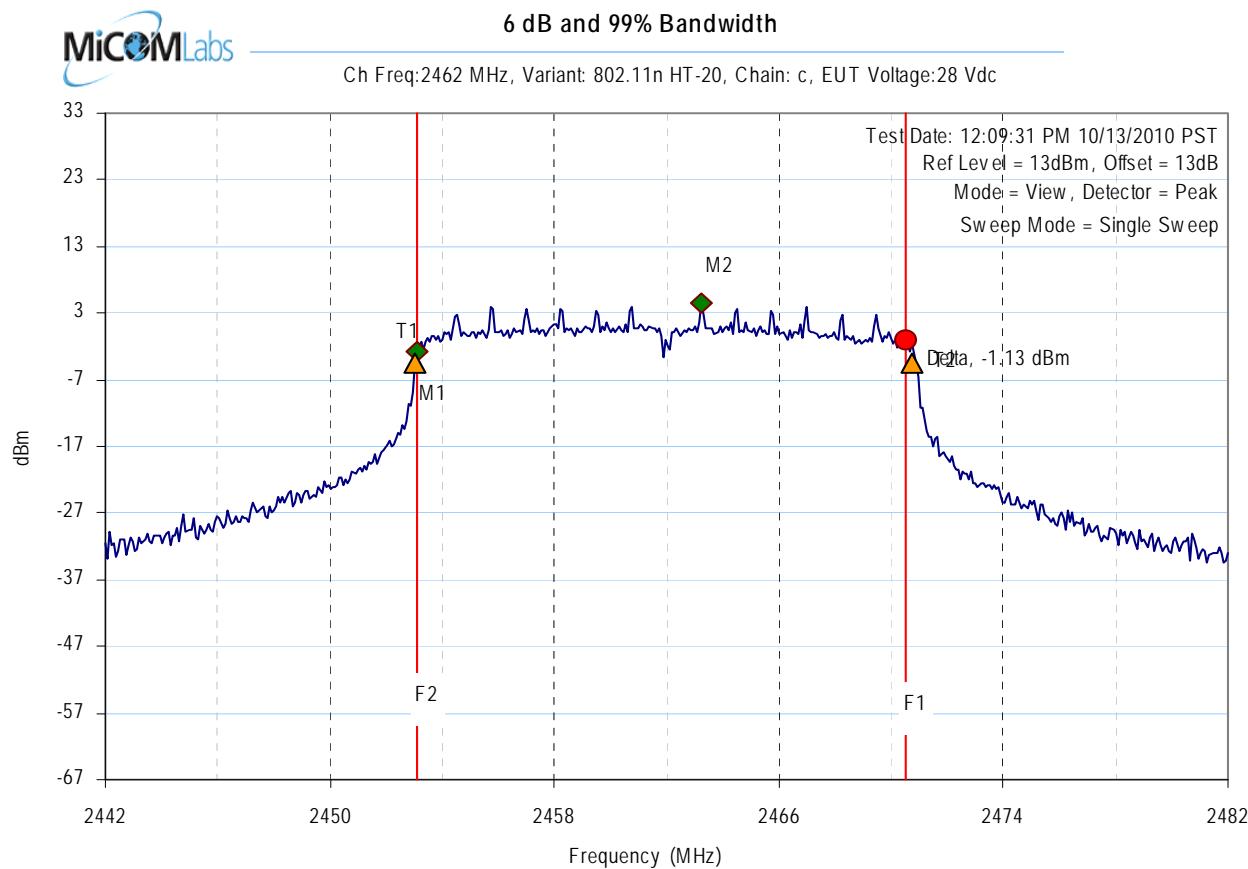
Marker : Frequency : Amplitude

M1 : 2453.142285MHz : -2.393dBm
 M2 : 2454.505010MHz : 4.269dBm
 Delta : 2470.537074MHz : -.886dBm
 T1 : 2453.062124MHz : -3.898dBm
 T2 : 2470.697395MHz : -1.875dBm

Test Results

Center frequency = 2462MHz
 6dB BW(Delta-M1) = 17.394790MHz
 99% OBW(T2-T1) = 17.715431MHz

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


Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Alten (dB) = 10
 Span = 40.00MHz

Marker : Frequency : Amplitude

M1 : 2453.142285MHz : -2.857dBm
 M2 : 2463.242485MHz : 4.399dBm
 Delta : 2470.537074MHz : -1.128dBm
 T1 : 2453.062124MHz : -4.374dBm
 T2 : 2470.777555MHz : -4.415dBm

Test Results

Center frequency = 2462MHz
 6dB BW(Delta-M1) = 17.394790MHz
 99% OBW(T2-T1) = 17.795591MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 53 of 362

MIMO 6 dB and 99% Bandwidth Results: 802.11n HT-40

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-40	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A dB	Antenna Gain:	2.6 dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

6 dB Bandwidth

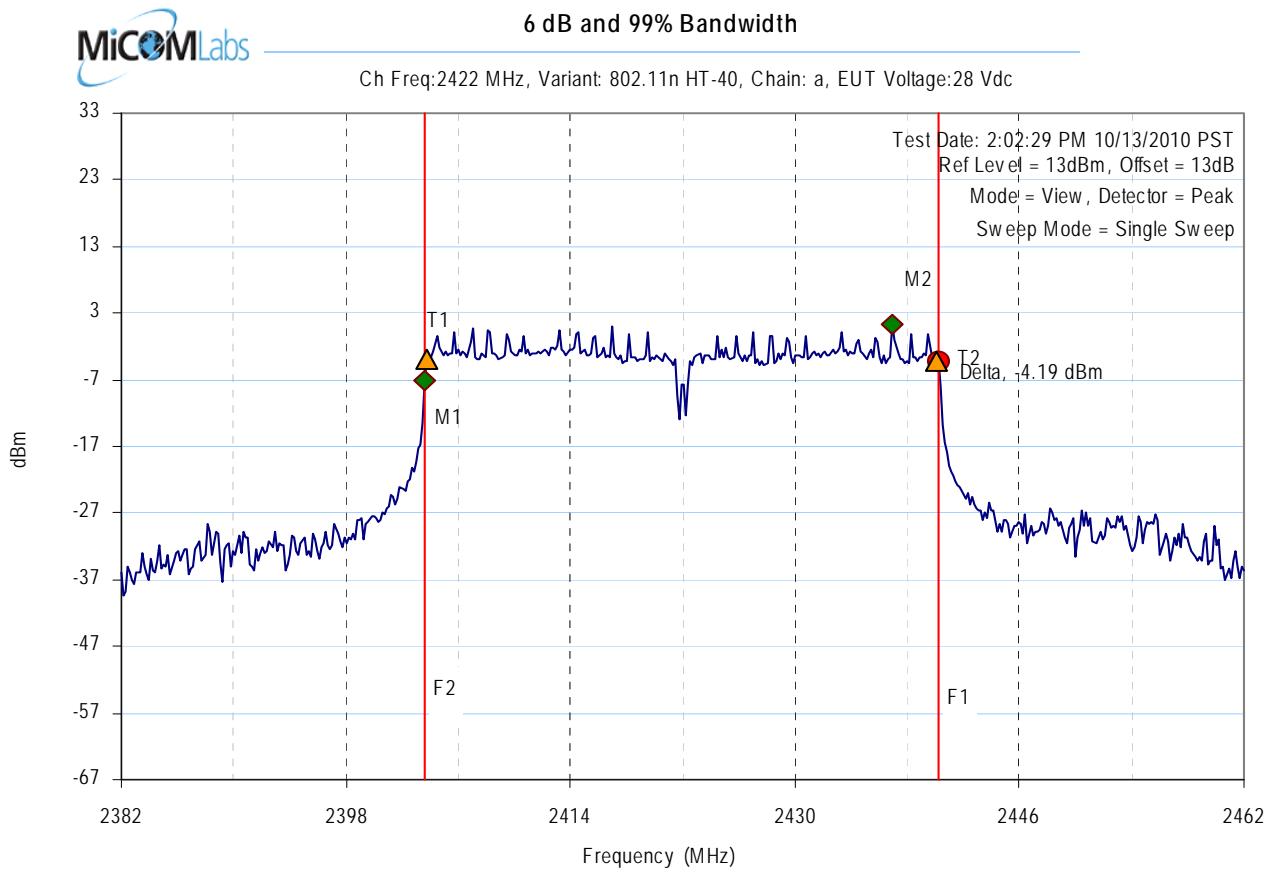
Test Frequency	6 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz				kHz	MHz	
MHz	a	b	c	d			
2422.000	36.553000	36.232000	36.232000	--	500	0.5	-35.732000
2437.000	36.553000	36.072000	29.018000	--			-28.518000
2452.000	36.553000	35.912000	35.591000	--			-35.091000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
2422.000	36.393000	36.393000	36.393000	--			
2437.000	36.393000	36.232000	36.072000	--			
2452.000	36.393000	36.232000	36.232000	--			

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 80.00MHz

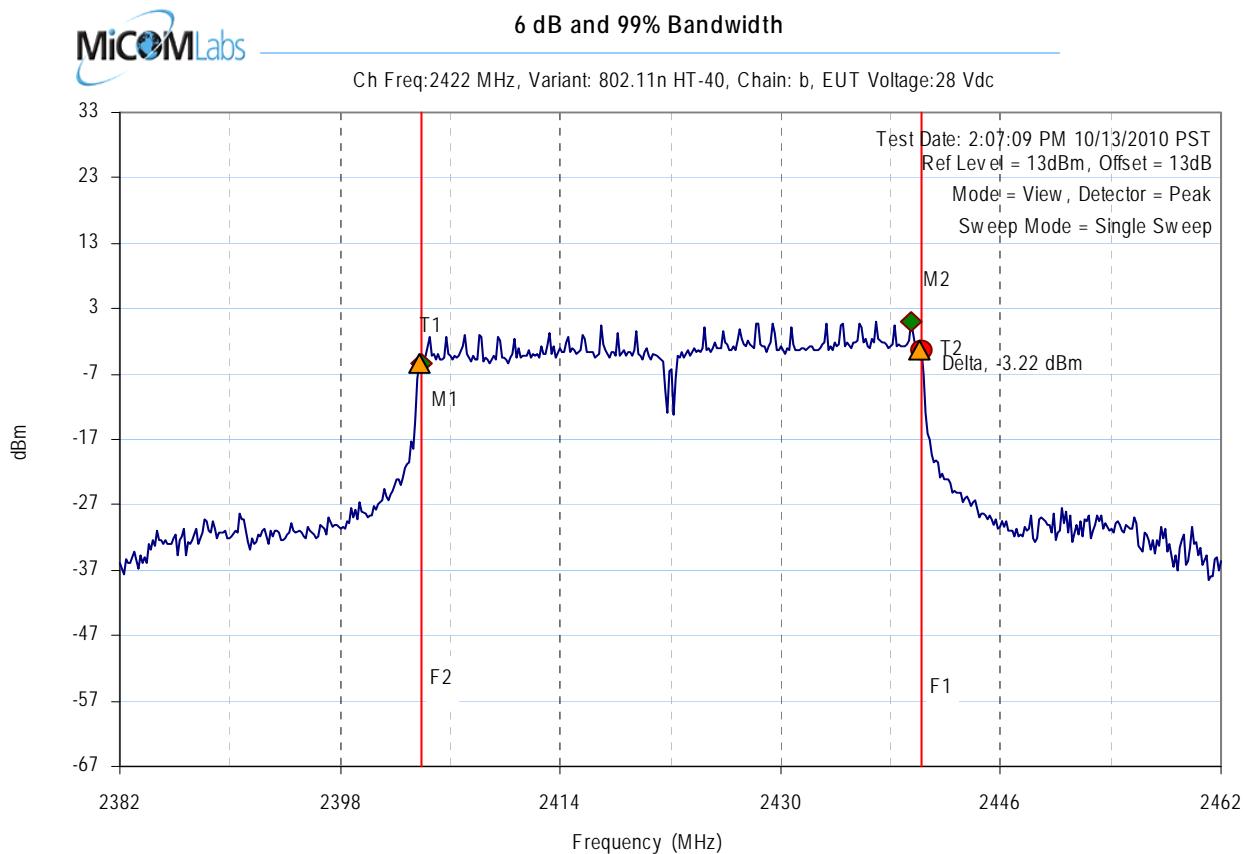
Marker : Frequency : Amplitude

M1 : 2403.643287MHz : -7.026dBm
 M2 : 2436.989980MHz : 1.265dBm
 Delta : 2440.196393MHz : -4.187dBm
 T1 : 2403.803607MHz : -4.002dBm
 T2 : 2440.036072MHz : -4.187dBm

Test Results

Center frequency = 2422MHz
 6dB BW(Delta-M1) = 36.553106MHz
 99% OBW(T2-T1) = 36.392786MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 80.00MHz

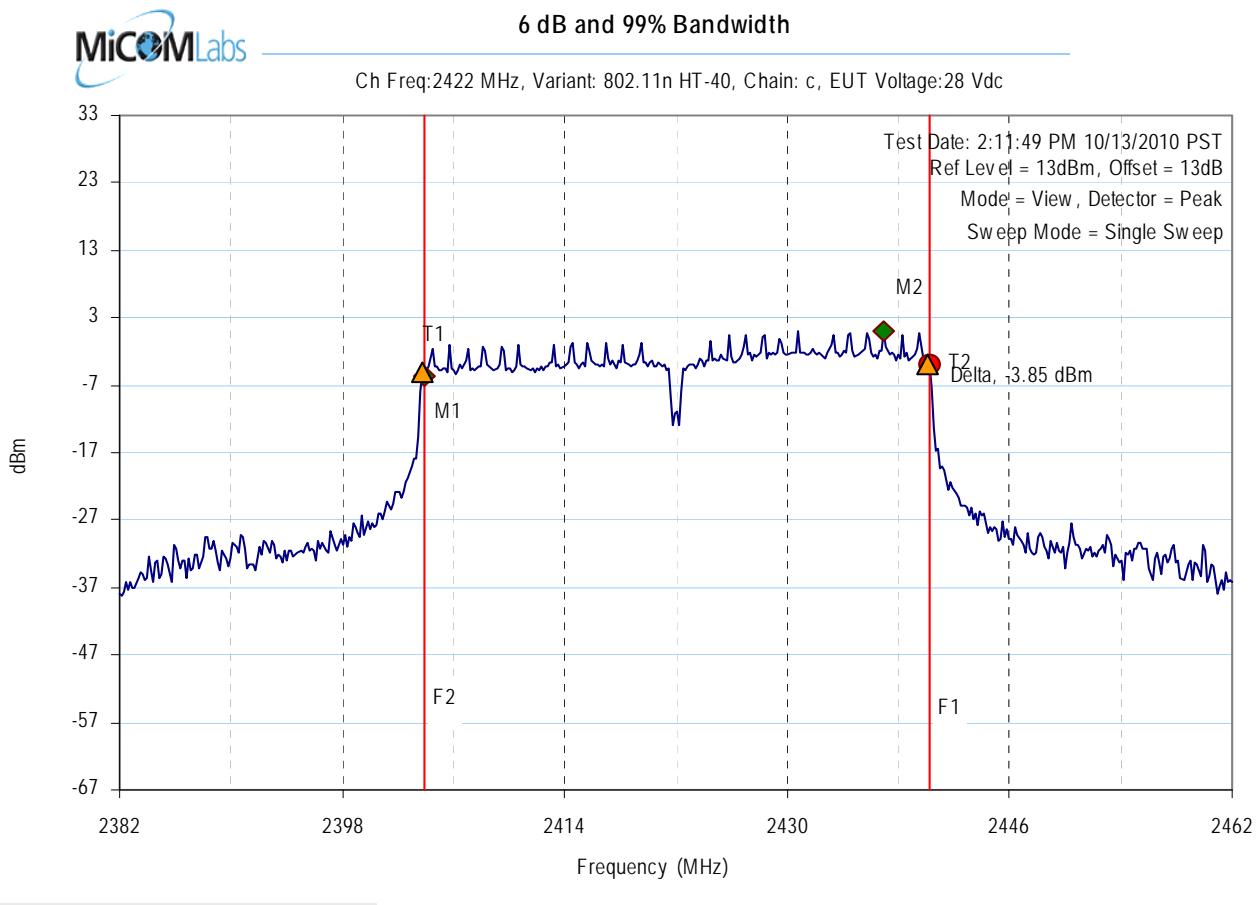
Marker : Frequency : Amplitude

Marker	Frequency (MHz)	Amplitude (dBm)
M1	2403.963928MHz	-5.233dBm
M2	2439.555110MHz	1.052dBm
Delta	2440.196393MHz	-3.219dBm
T1	2403.803607MHz	-5.509dBm
T2	2440.036072MHz	-3.219dBm

Test Results

Parameter	Value
Center frequency	2422MHz
6dB BW(Delta-M1)	36.232465MHz
99% OBW(T2-T1)	36.392786MHz

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Analyser Setup

RBW = 100.000KHz
 VBW = 300.000KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 80.00MHz

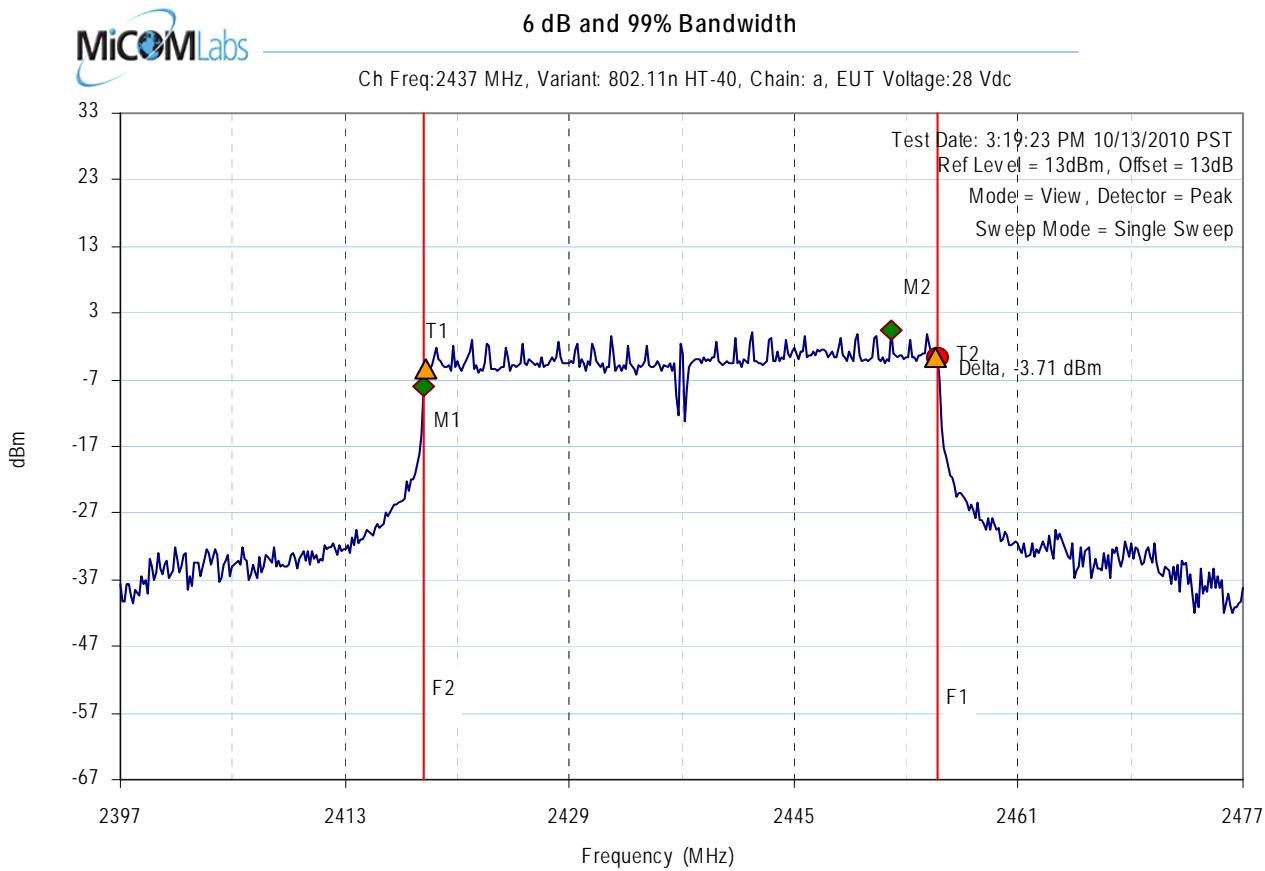
Marker : Frequency : Amplitude

M1 : 2403.963928MHz : -5.662dBm
 M2 : 2436.989980MHz : 1.066dBm
 Delta : 2440.196393MHz : -3.846dBm
 T1 : 2403.803607MHz : -5.027dBm
 T2 : 2440.036072MHz : -3.846dBm

Test Results

Center frequency = 2422MHz
 6dB BW(Delta-M1) = 36.232465MHz
 99% OBW(T2-T1) = 36.392786MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 80.00MHz

Marker : Frequency : Amplitude

M1 : 2418.643287MHz : -7.986dBm
 M2 : 2451.989980MHz : .556dBm
 Delta : 2455.196393MHz : -3.713dBm
 T1 : 2418.803607MHz : -5.296dBm
 T2 : 2455.036072MHz : -3.713dBm

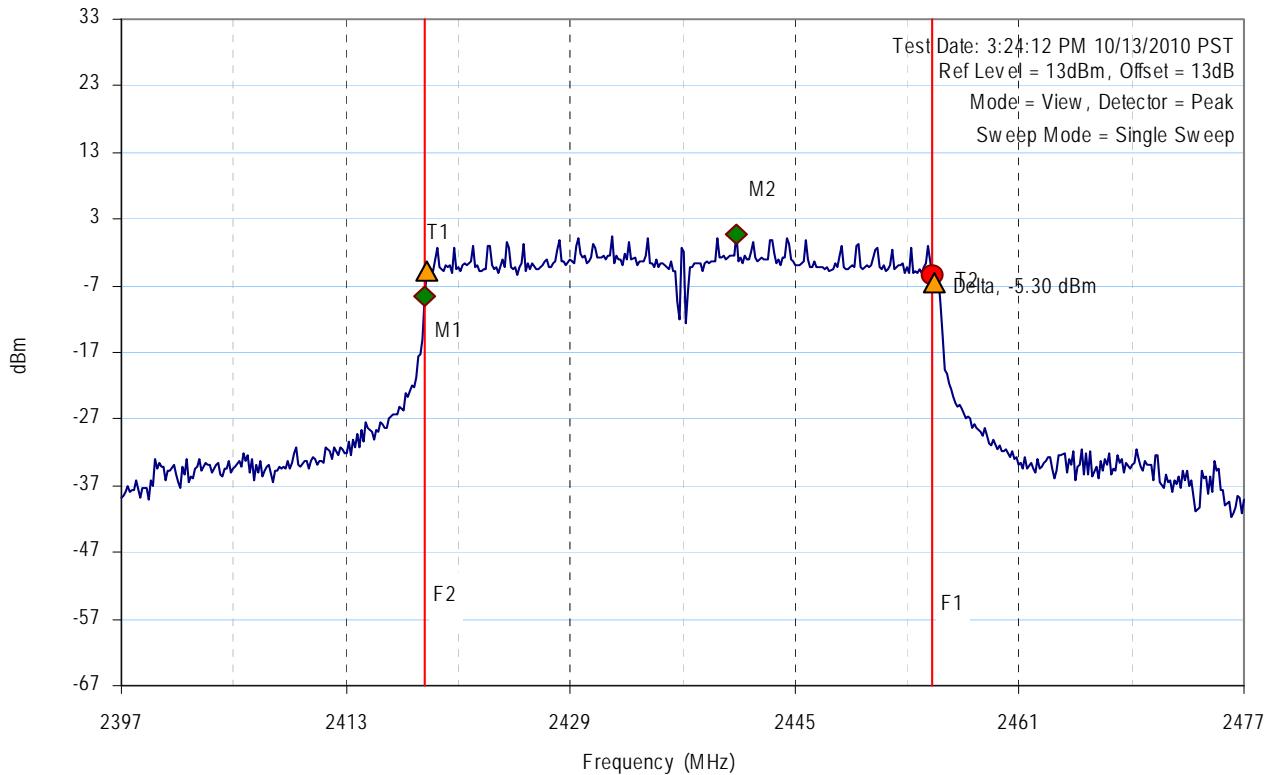
Test Results

Center frequency = 2437MHz
 6dB BW(Delta-M1) = 36.553106MHz
 99% OBW(T2-T1) = 36.392786MHz

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6 dB and 99% Bandwidth

Ch Freq:2437 MHz, Variant: 802.11n HT-40, Chain: b, EUT Voltage:28 Vdc



Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 80.00MHz

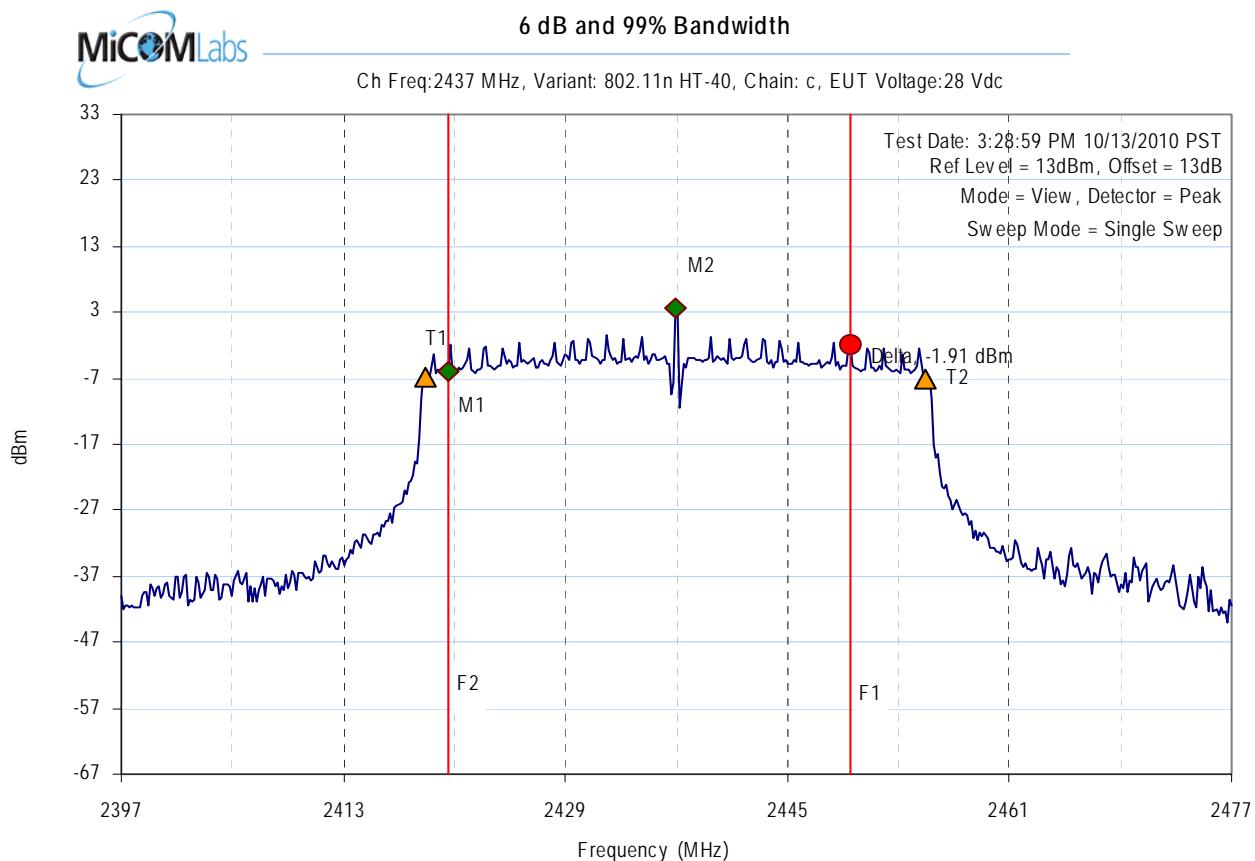
Marker : Frequency : Amplitude

M1 : 2418.643287MHz : -8.702dBm
 M2 : 2440.767535MHz : .592dBm
 Delta : 2454.715431MHz : -5.298dBm
 T1 : 2418.803607MHz : -4.885dBm
 T2 : 2454.875752MHz : -6.607dBm

Test Results

Center frequency = 2437MHz
 6dB BW(Delta-M1) = 36.072144MHz
 99% OBW(T2-T1) = 36.232465MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 80.00MHz

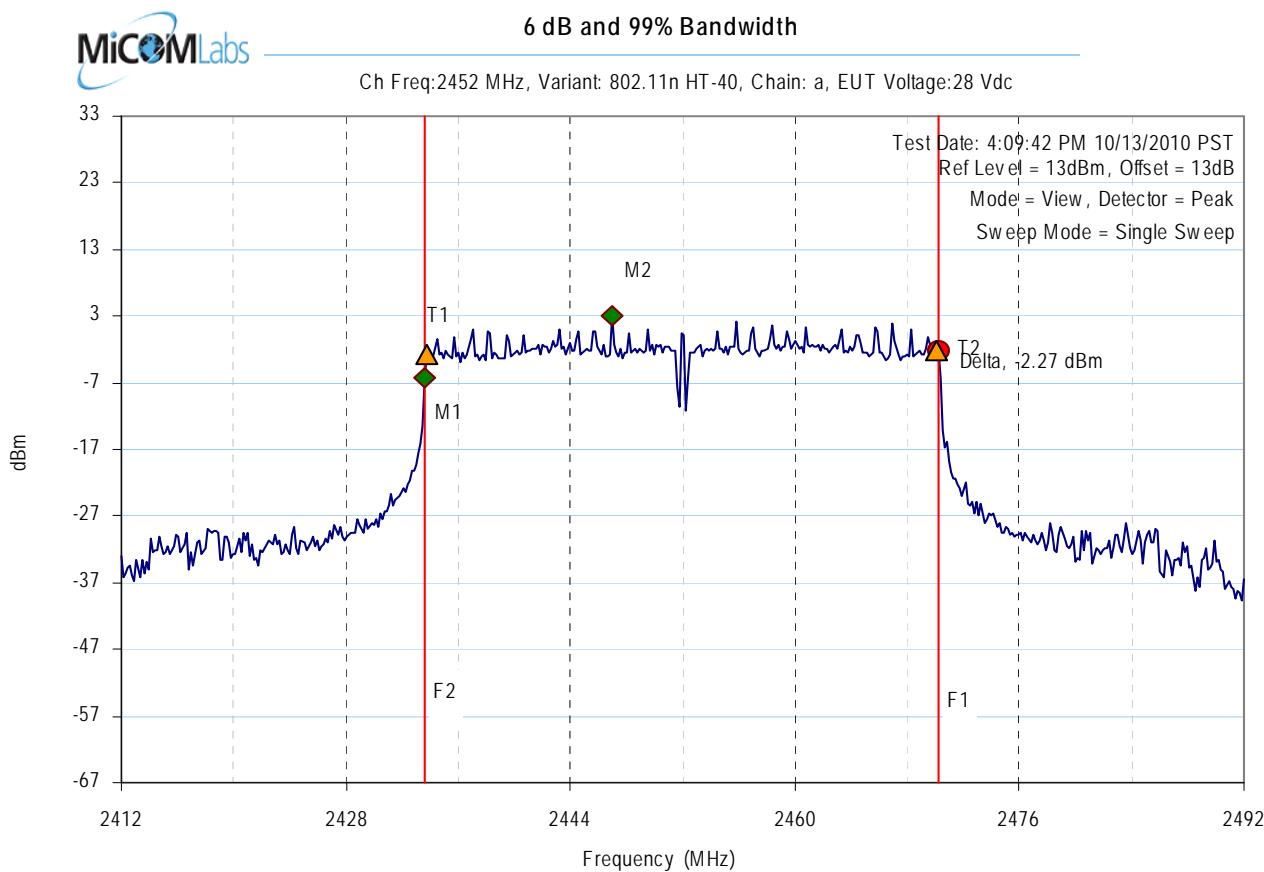
Marker : Frequency : Amplitude

M1 : 2420.567134MHz : -5.873dBm
 M2 : 2436.919840MHz : 3.696dBm
 Delta : 2449.585170MHz : -1.909dBm
 T1 : 2418.963928MHz : -6.784dBm
 T2 : 2454.875752MHz : -7.032dBm

Test Results

Center frequency = 2437MHz
 6dB BW(Delta-M1) = 29.018036MHz
 99% OBW(T2-T1) = 36.072144MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 80.00MHz

Marker : Frequency : Amplitude

M1 : 2433.643287MHz : -6.310dBm
 M2 : 2446.949900MHz : 2.990dBm
 Delta : 2470.196393MHz : -2.271dBm
 T1 : 2433.803607MHz : -2.790dBm
 T2 : 2470.036072MHz : -2.271dBm

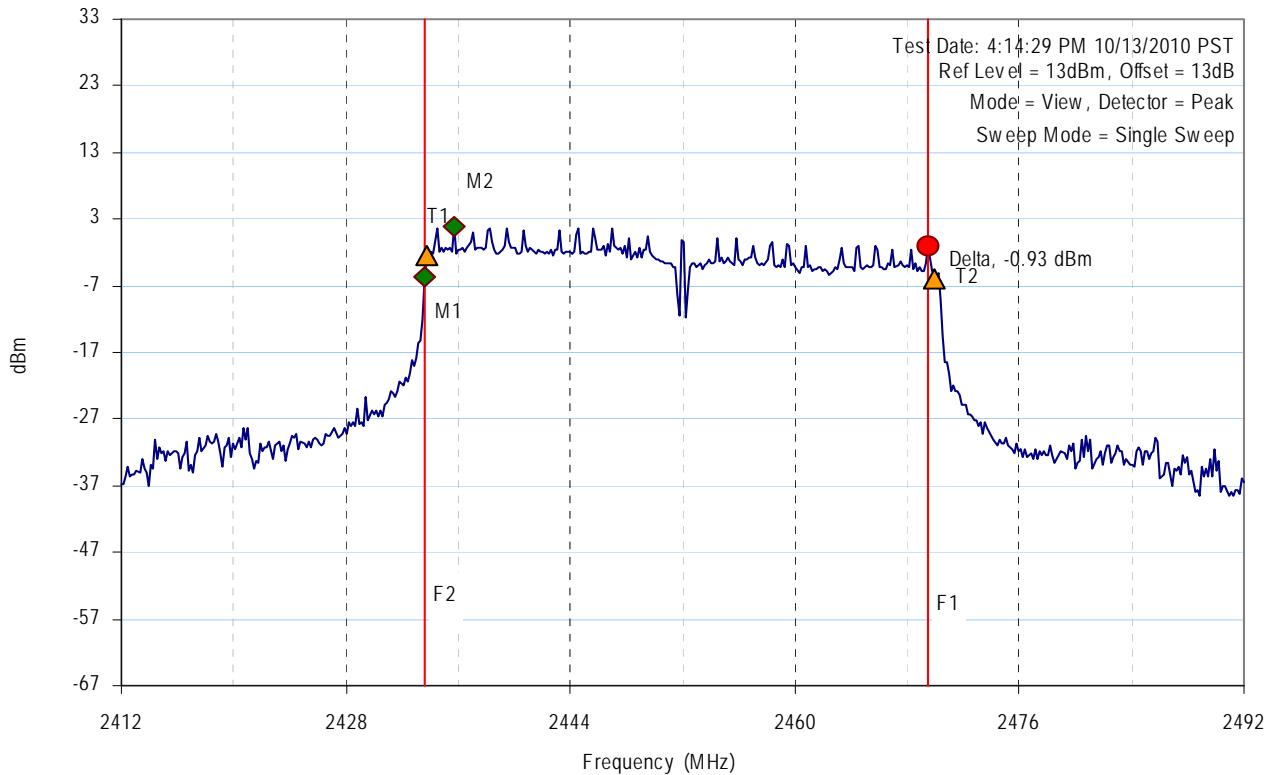
Test Results

Center frequency = 2452MHz
 6dB BW(Delta-M1) = 36.553106MHz
 99% OBW(T2-T1) = 36.392786MHz

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6 dB and 99% Bandwidth

Ch Freq:2452 MHz, Variant: 802.11n HT-40, Chain: b, EUT Voltage:28 Vdc



Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 80.00MHz

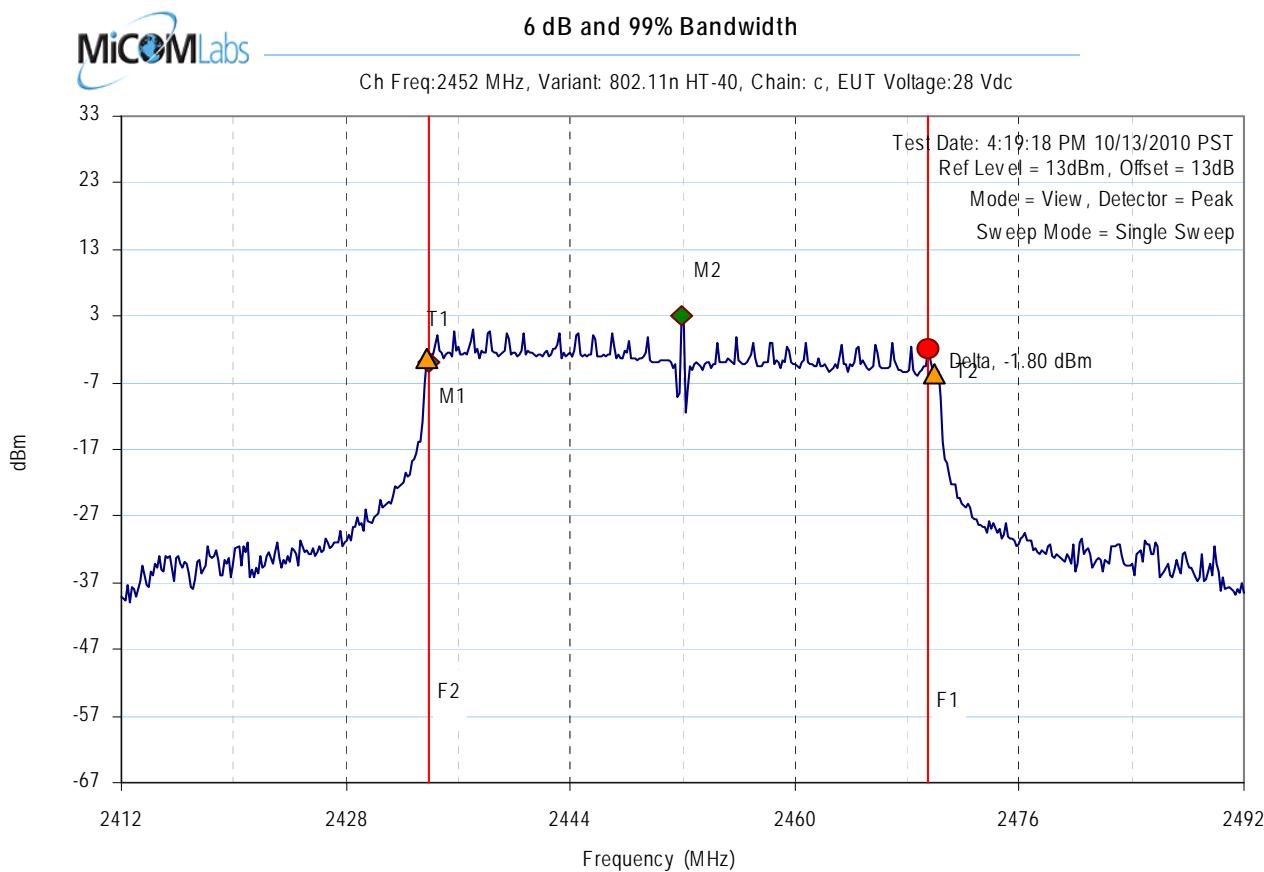
Marker : Frequency : Amplitude

M1 : 2433.643287MHz : -5.605dBm
 M2 : 2435.727455MHz : 1.879dBm
 Delta : 2469.555110MHz : -.933dBm
 T1 : 2433.803607MHz : -2.524dBm
 T2 : 2469.875752MHz : -5.893dBm

Test Results

Center frequency = 2452MHz
 6dB BW(Delta-M1) = 35.911824MHz
 99% OBW(T2-T1) = 36.232465MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 80.00MHz

Marker : Frequency : Amplitude

M1 : 2433.963928MHz : -4.033dBm
 M2 : 2451.919840MHz : 3.010dBm
 Delta : 2469.555110MHz : -1.796dBm
 T1 : 2433.803607MHz : -3.443dBm
 T2 : 2469.875752MHz : -5.792dBm

Test Results

Center frequency = 2452MHz
 6dB BW(Delta-M1) = 35.591182MHz
 99% OBW(T2-T1) = 36.232465MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 63 of 362

MIMO 6 dB and 99% Bandwidth Results: 802.11a

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35	to	42
Variant:	802.11a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	1.2	dbi	
Applied Voltage:	28.00 Vdc				
Notes 1:					
Notes 2:					

6 dB Bandwidth

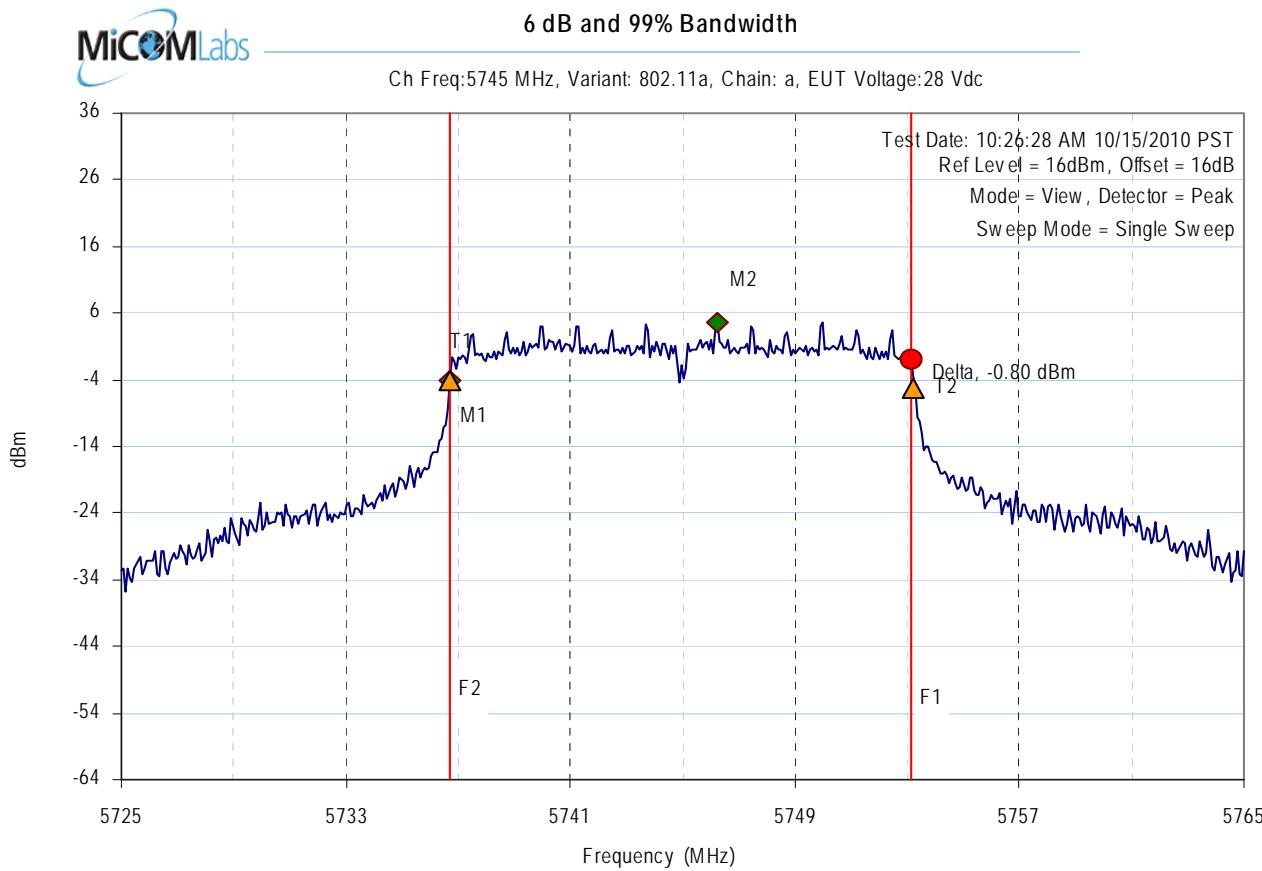
Test Frequency	6 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz				kHz	MHz	
MHz	a	b	c	d			
5745.000	16.433000	16.112000	15.952000	--	500	0.5	-15.452000
5785.000	16.112000	16.433000	15.952000	--			-15.452000
5825.000	15.792000	16.353000	16.353000	--			-15.292000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz				kHz	MHz	
MHz	a	b	c	d			
5745.000	16.593000	18.597000	16.513000	--			
5785.000	17.876000	20.521000	16.673000	--			
5825.000	19.639000	19.559000	17.876000	--			

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

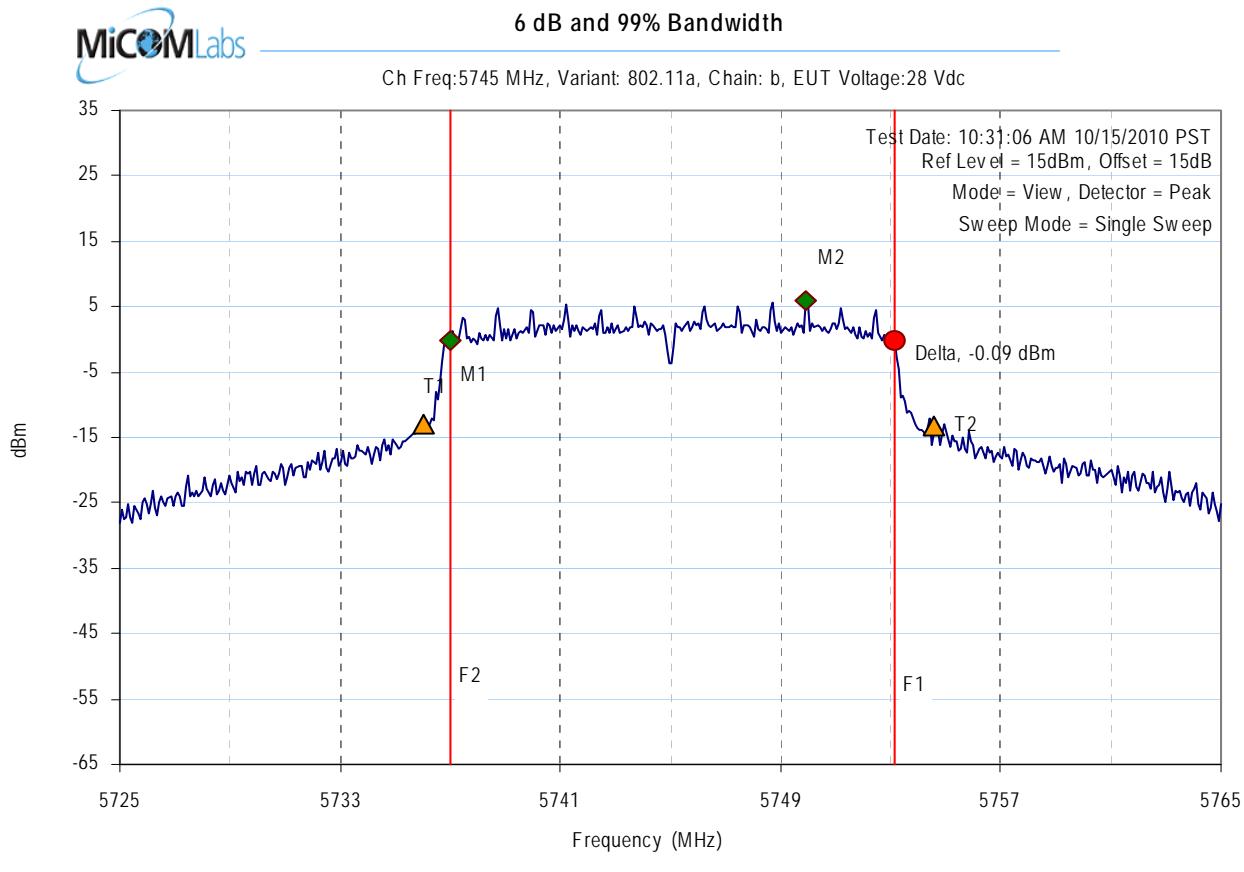
Marker : Frequency : Amplitude

M1 : 5736.703407MHz : -4.232dBm
 M2 : 5746.242485MHz : 4.721dBm
 Delta : 5753.136273MHz : -.797dBm
 T1 : 5736.703407MHz : -4.232dBm
 T2 : 5753.216433MHz : -5.326dBm

Test Results

Center frequency = 5745MHz
 6dB BW(Delta-M1) = 16.432866MHz
 99% OBW(T2-T1) = 16.593186MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

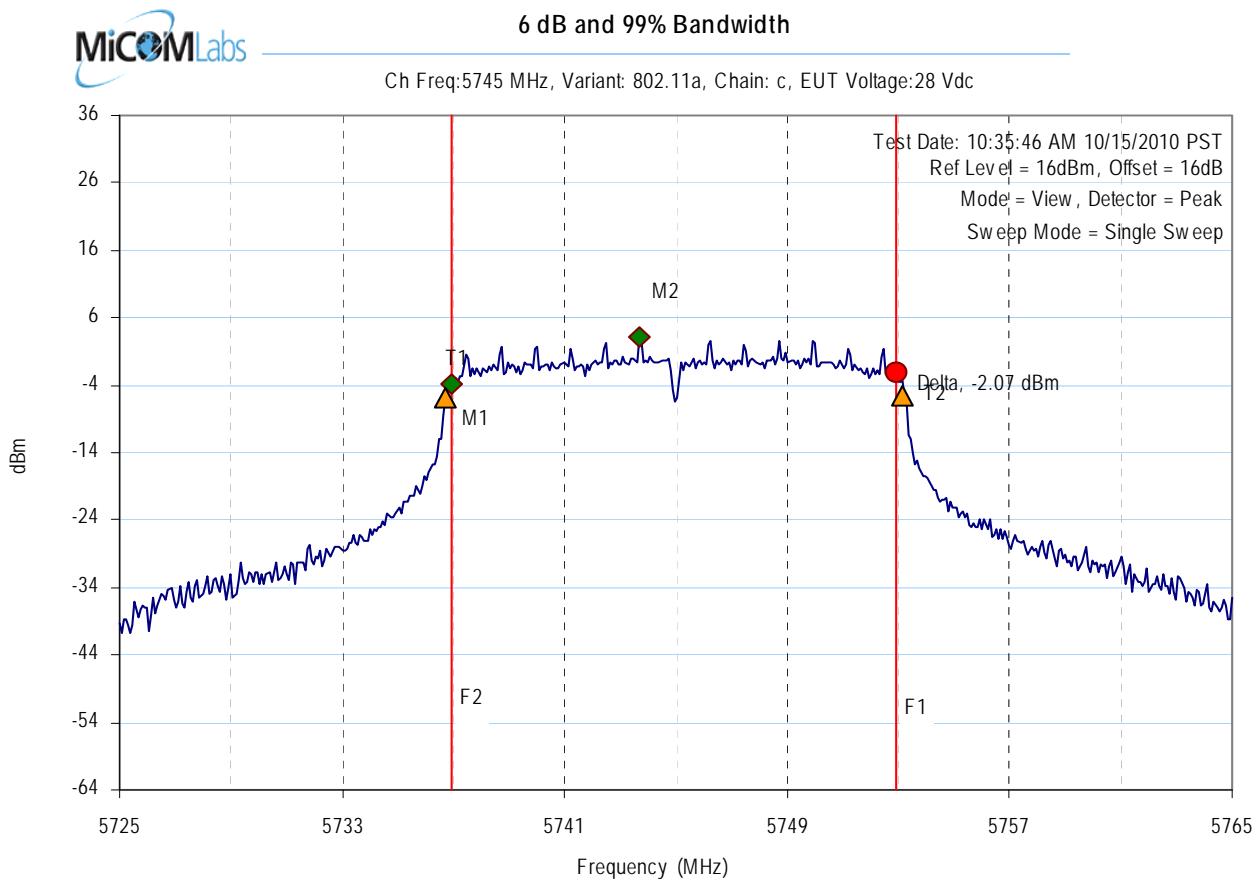
Marker : Frequency : Amplitude

M1 : 5737.024048MHz : -.310dBm
 M2 : 5749.929860MHz : 5.868dBm
 Delta : 5753.136273MHz : -.090dBm
 T1 : 5736.062124MHz : -13.053dBm
 T2 : 5754.579158MHz : -13.395dBm

Test Results

Center frequency = 5745MHz
 6dB BW(Delta-M1) = 16.112224MHz
 99% OBW(T2-T1) = 18.597194MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

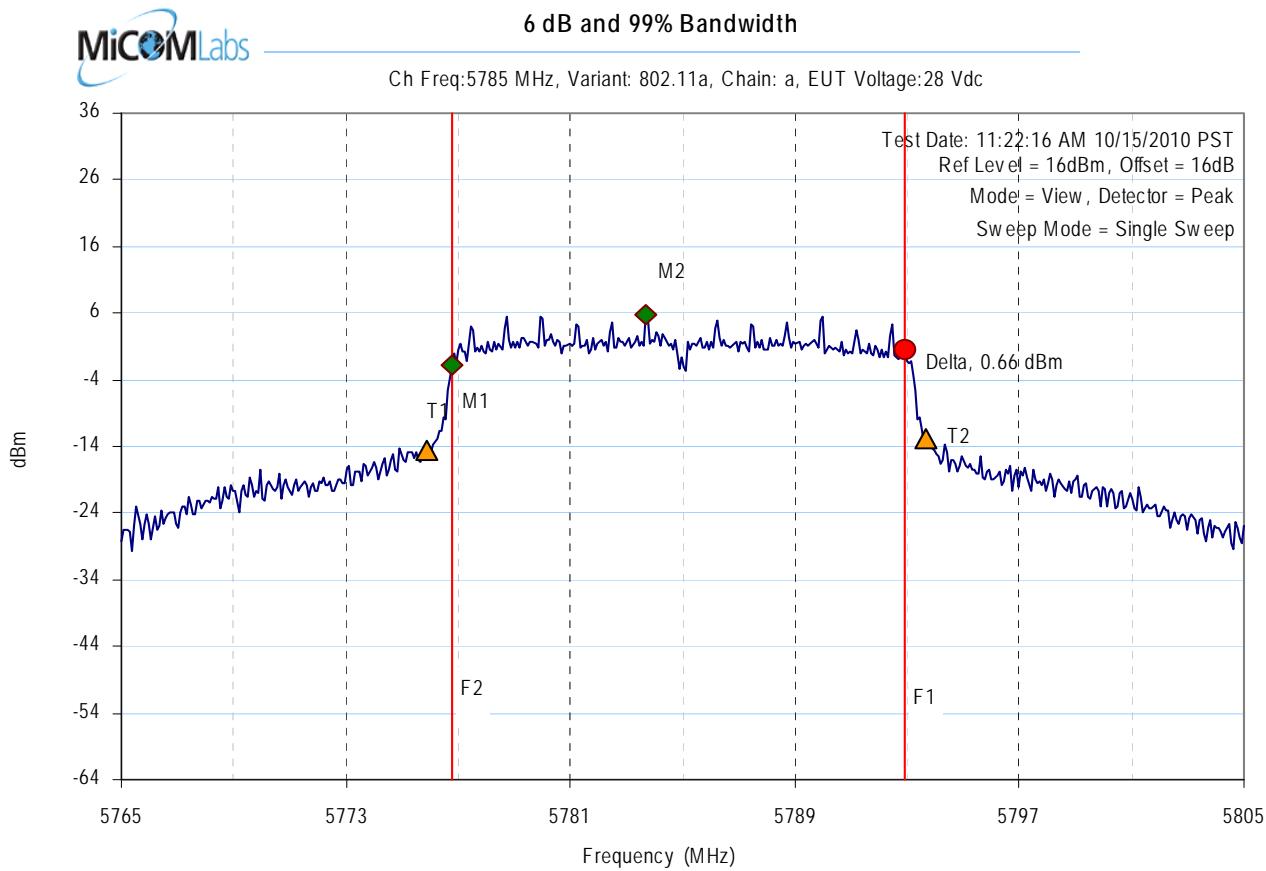
Marker : Frequency : Amplitude

M1 : 5736.943888MHz : -3.890dBm
 M2 : 5743.677355MHz : 3.053dBm
 Delta : 5752.895792MHz : -2.066dBm
 T1 : 5736.703407MHz : -5.995dBm
 T2 : 5753.136273MHz : -5.513dBm

Test Results

Center frequency = 5745MHz
 6dB BW(Delta-M1) = 15.951904MHz
 99% OBW(T2-T1) = 16.513026MHz

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


Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

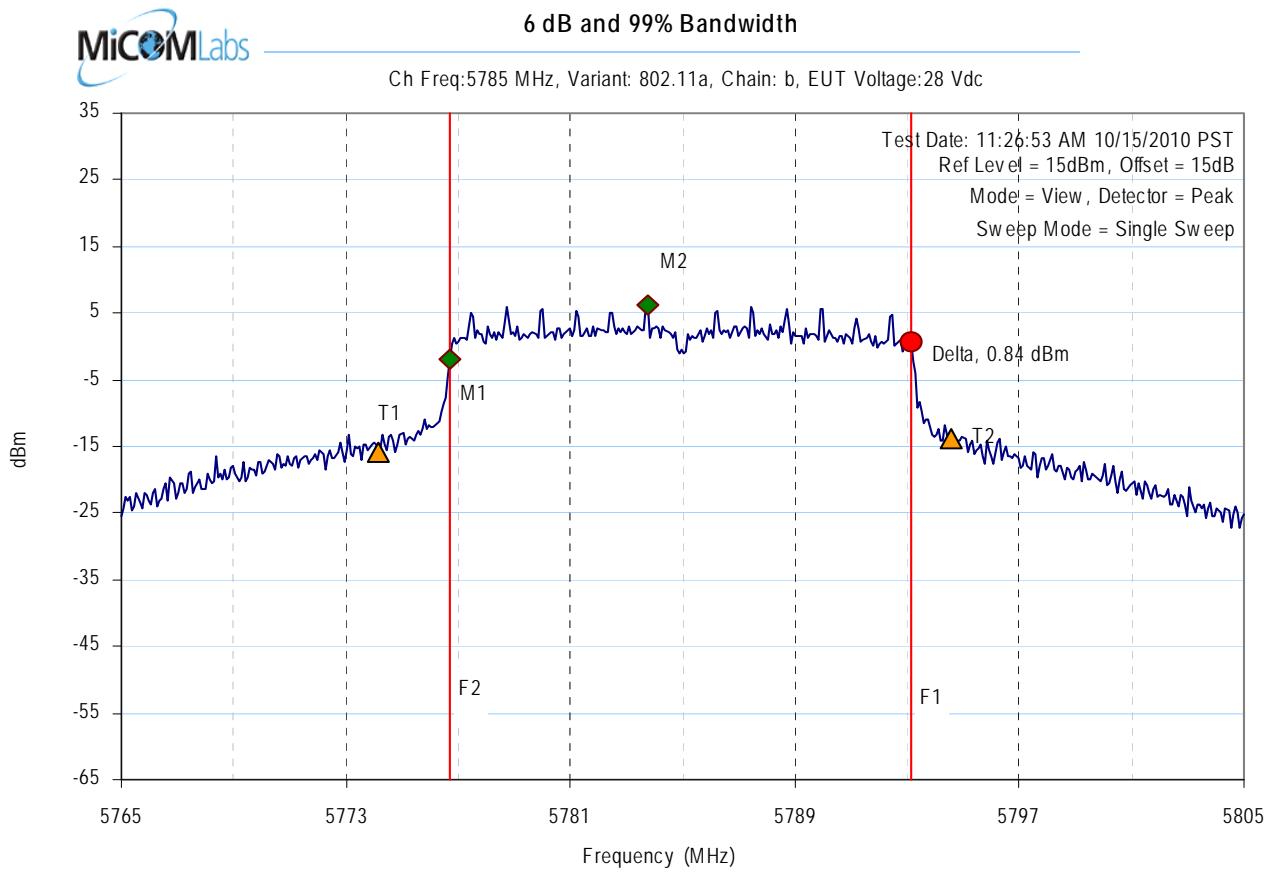
Marker : Frequency : Amplitude

M1 : 5776.783567MHz : -1.677dBm
 M2 : 5783.677355MHz : 5.884dBm
 Delta : 5792.895792MHz : .659dBm
 T1 : 5775.901804MHz : -14.669dBm
 T2 : 5793.697395MHz : -12.743dBm

Test Results

Center frequency = 5785MHz
 6dB BW(Delta-M1) = 16.112224MHz
 99% OBW(T2-T1) = 17.875752MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

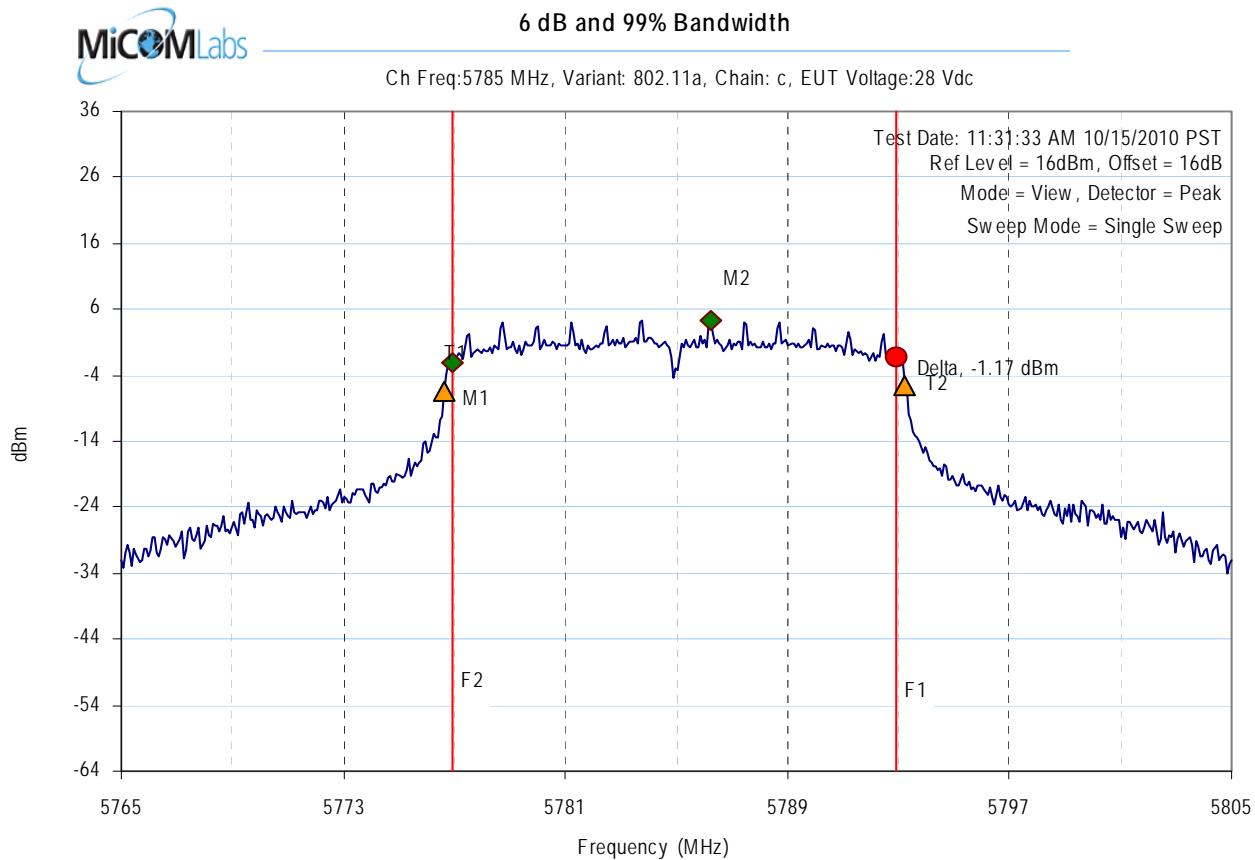
Marker : Frequency : Amplitude

M1 : 5776.703407MHz : -1.994dBm
 M2 : 5783.757515MHz : 6.342dBm
 Delta : 5793.136273MHz : .837dBm
 T1 : 5774.138277MHz : -15.925dBm
 T2 : 5794.579158MHz : -13.952dBm

Test Results

Center frequency = 5785MHz
 6dB BW(Delta-M1) = 16.432866MHz
 99% OBW(T2-T1) = 20.521042MHz

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


Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

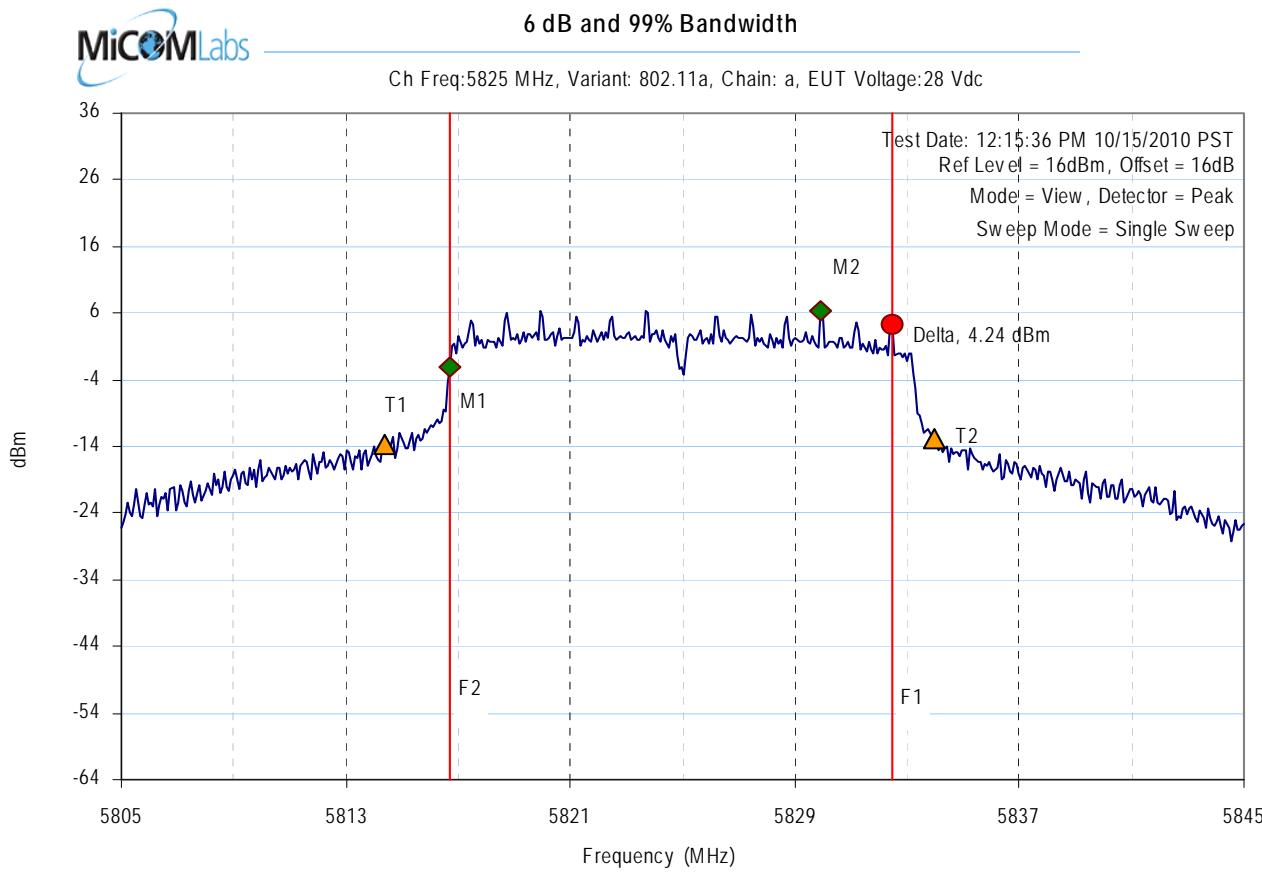
Marker : Frequency : Amplitude

M1 : 5776.943888MHz : -1.982dBm
 M2 : 5786.242485MHz : 4.452dBm
 Delta : 5792.895792MHz : -1.167dBm
 T1 : 5776.623246MHz : -6.477dBm
 T2 : 5793.216433MHz : -5.7dBm

Test Results

Center frequency = 5785MHz
 6dB BW(Delta-M1) = 15.951904MHz
 99% OBW(T2-T1) = 16.673347MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

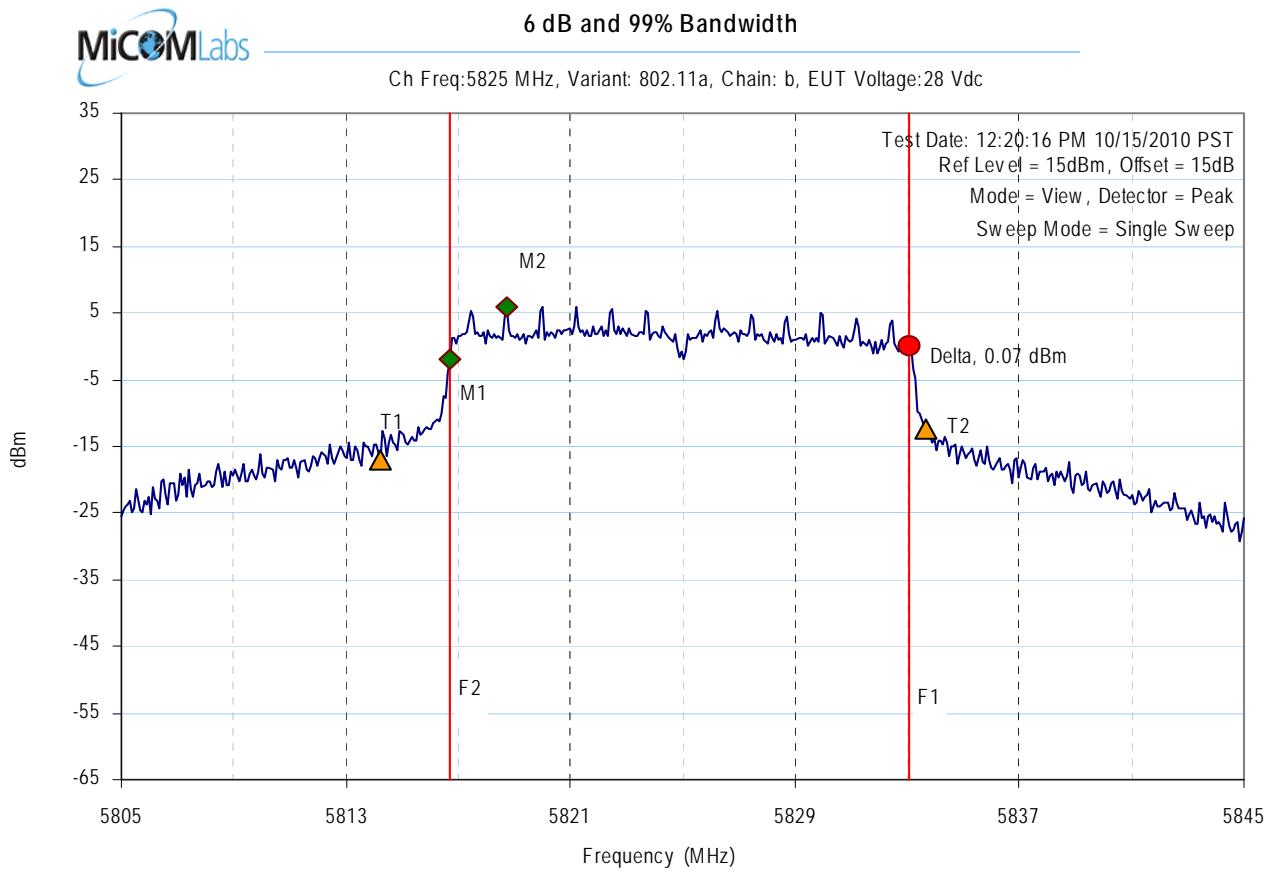
Marker : Frequency : Amplitude

Marker	Frequency (MHz)	Amplitude (dBm)
M1	5816.703407	-2.121
M2	5829.929860	6.384
Delta	5832.494990	4.239
T1	5814.378758	-13.748
T2	5833.937876	-12.865

Test Results

Parameter	Value
Center frequency	5825MHz
6dB BW(Delta-M1)	15.791583MHz
99% OBW(T2-T1)	19.639279MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

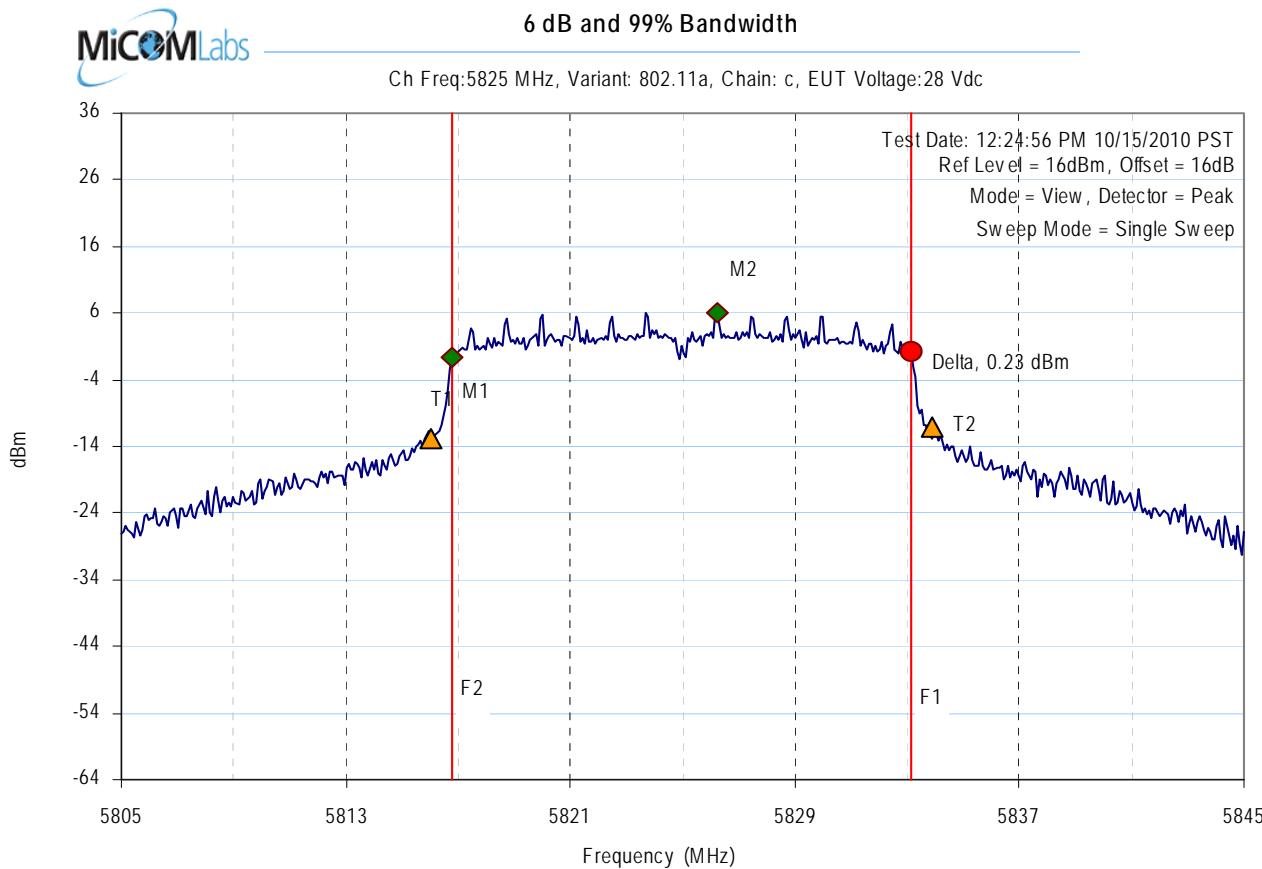
Marker : Frequency : Amplitude

M1 : 5816.703407MHz : -2.053dBm
 M2 : 5818.707415MHz : 5.877dBm
 Delta : 5833.056112MHz : .066dBm
 T1 : 5814.218437MHz : -16.970dBm
 T2 : 5833.697395MHz : -12.289dBm

Test Results

Center frequency = 5825MHz
 6dB BW(Delta-M1) = 16.352705MHz
 99% OBW(T2-T1) = 19.559118MHz

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


Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

Marker : Frequency : Amplitude

M1 : 5816.783567MHz : -0.553dBm
 M2 : 5826.242485MHz : 6.120dBm
 Delta : 5833.136273MHz : .232dBm
 T1 : 5816.062124MHz : -12.824dBm
 T2 : 5833.857715MHz : -11.108dBm

Test Results

Center frequency = 5825MHz
 6dB BW(Delta-M1) = 16.352705MHz
 99% OBW(T2-T1) = 17.875752MHz

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



Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 73 of 362

MIMO 6 dB and 99% Bandwidth Results: 802.11n HT-20

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-20	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A dB	Antenna Gain:	1.2 dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

6 dB Bandwidth

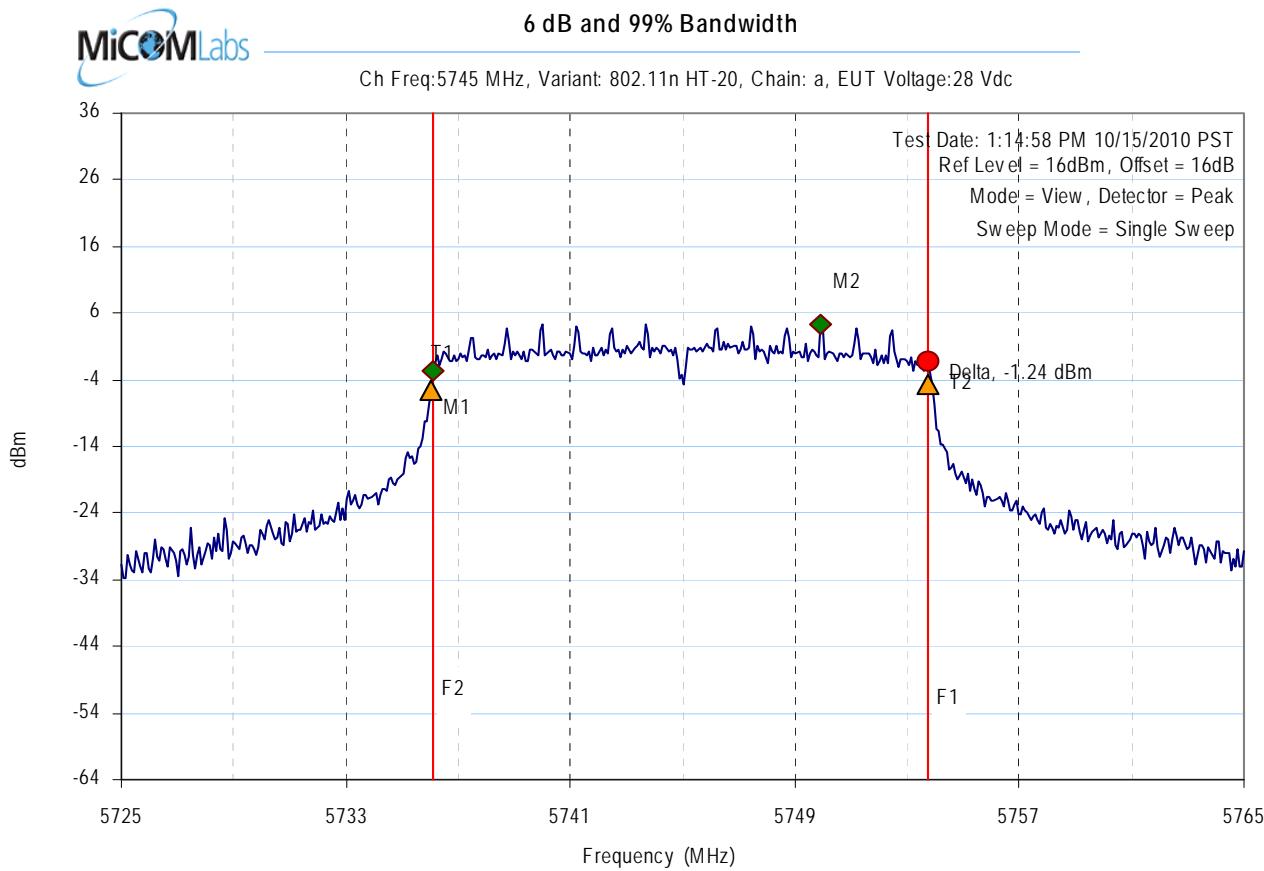
Test Frequency	6 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5745.000	17.635000	17.315000	16.994000	--	500	0.5	-16.494000
5785.000	16.754000	17.234000	17.074000	--			-16.254000
5825.000	16.994000	16.433000	17.074000	--			-15.933000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
5745.000	17.796000	19.238000	17.635000	--			
5785.000	18.437000	20.922000	17.796000	--			
5825.000	19.880000	19.880000	17.796000	--			

Measurement uncertainty:	±2.81 dB
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This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. Any changes will be noted in the Document History section of the report.



Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

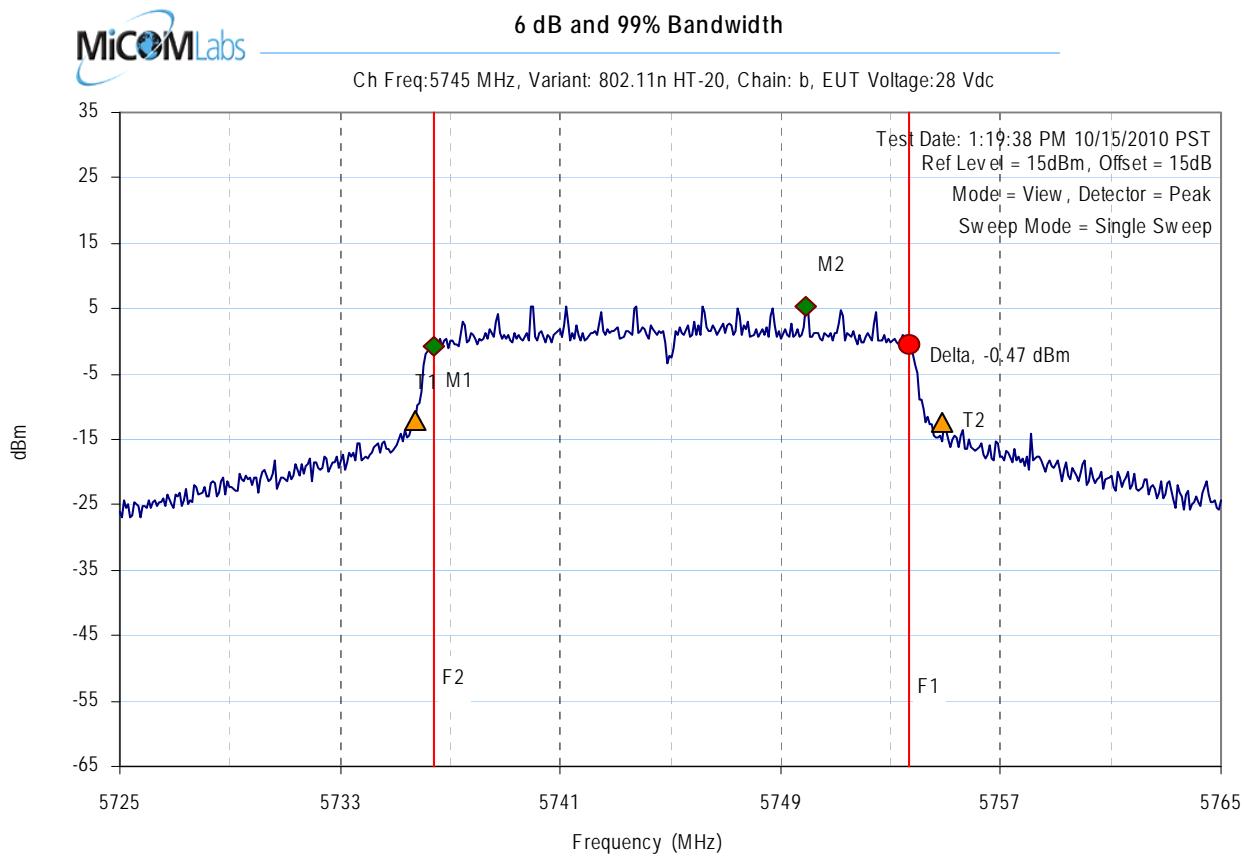
Marker : Frequency : Amplitude

M1 : 5736.142285MHz : -2.558dBm
M2 : 5749.929860MHz : 4.440dBm
Delta : 5753.777555MHz : -1.242dBm
T1 : 5736.062124MHz : -5.450dBm
T2 : 5753.777555MHz : -4.681dBm

Test Results

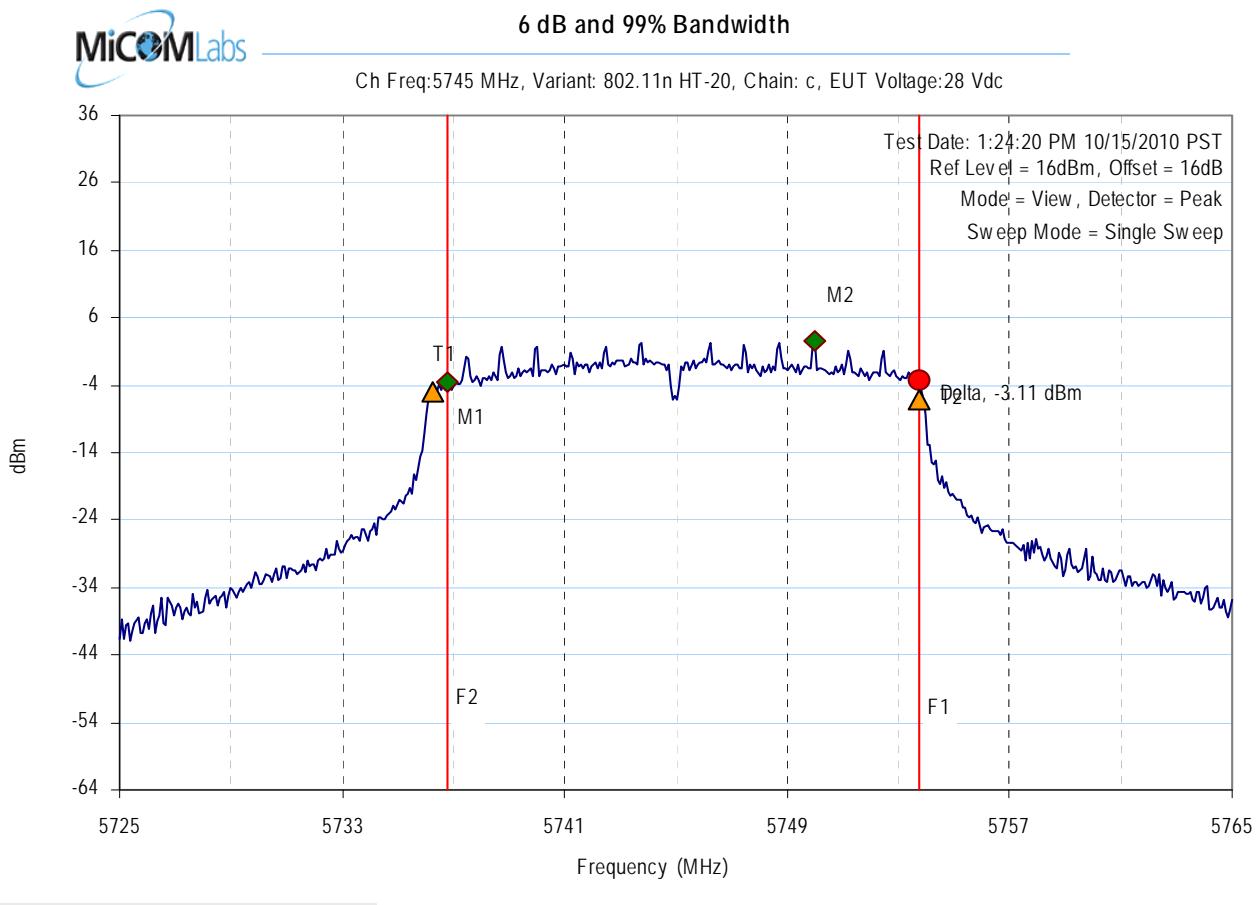
Center frequency = 5745MHz
6dB BW(Delta-M1) = 17.635271MHz
99% OBW(T2-T1) = 17.795591MHz

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Analyser Setup	Marker : Frequency : Amplitude	Test Results
RBW = 100.00KHz	M1 : 5736.382766MHz : -.696dBm	Center frequency = 5745MHz
VBW = 300.00KHz	M2 : 5749.929860MHz : 5.478dBm	6dB BW(Delta-M1) = 17.314629MHz
Sweep time(s) = 20	Delta : 5753.697395MHz : -.475dBm	99% OBW(T2-T1) = 19.238477MHz
RF Atten (dB) = 10	T1 : 5735.741483MHz : -12.187dBm	
Span = 40.00MHz	T2 : 5754.8998MHz : -12.38dBm	

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

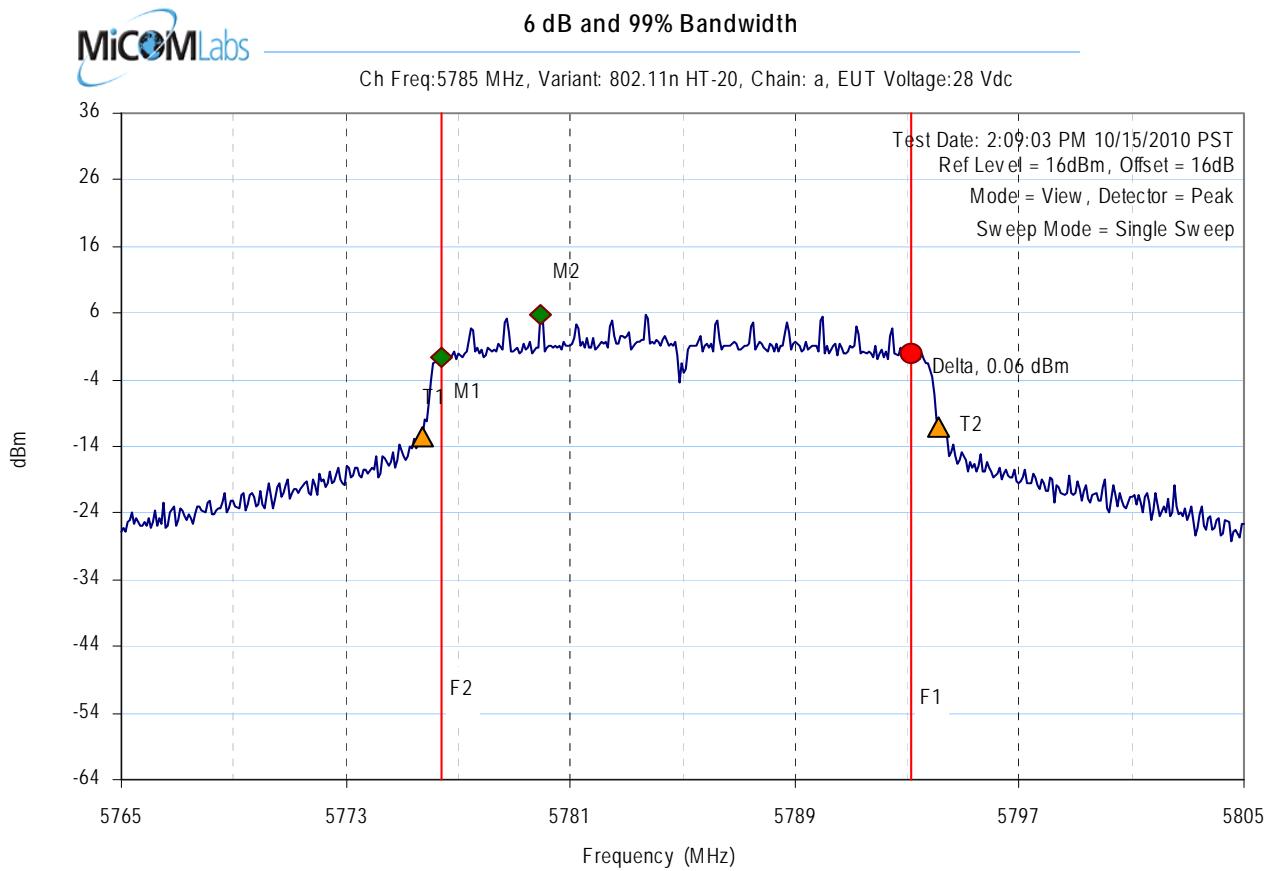
Marker : Frequency : Amplitude

M1 : 5736.783567MHz : -3.565dBm
 M2 : 5750.010020MHz : 2.533dBm
 Delta : 5753.777555MHz : -3.107dBm
 T1 : 5736.222445MHz : -4.923dBm
 T2 : 5753.777555MHz : -6.16dBm

Test Results

Center frequency = 5745MHz
 6dB BW(Delta-M1) = 16.993988MHz
 99% OBW(T2-T1) = 17.635271MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

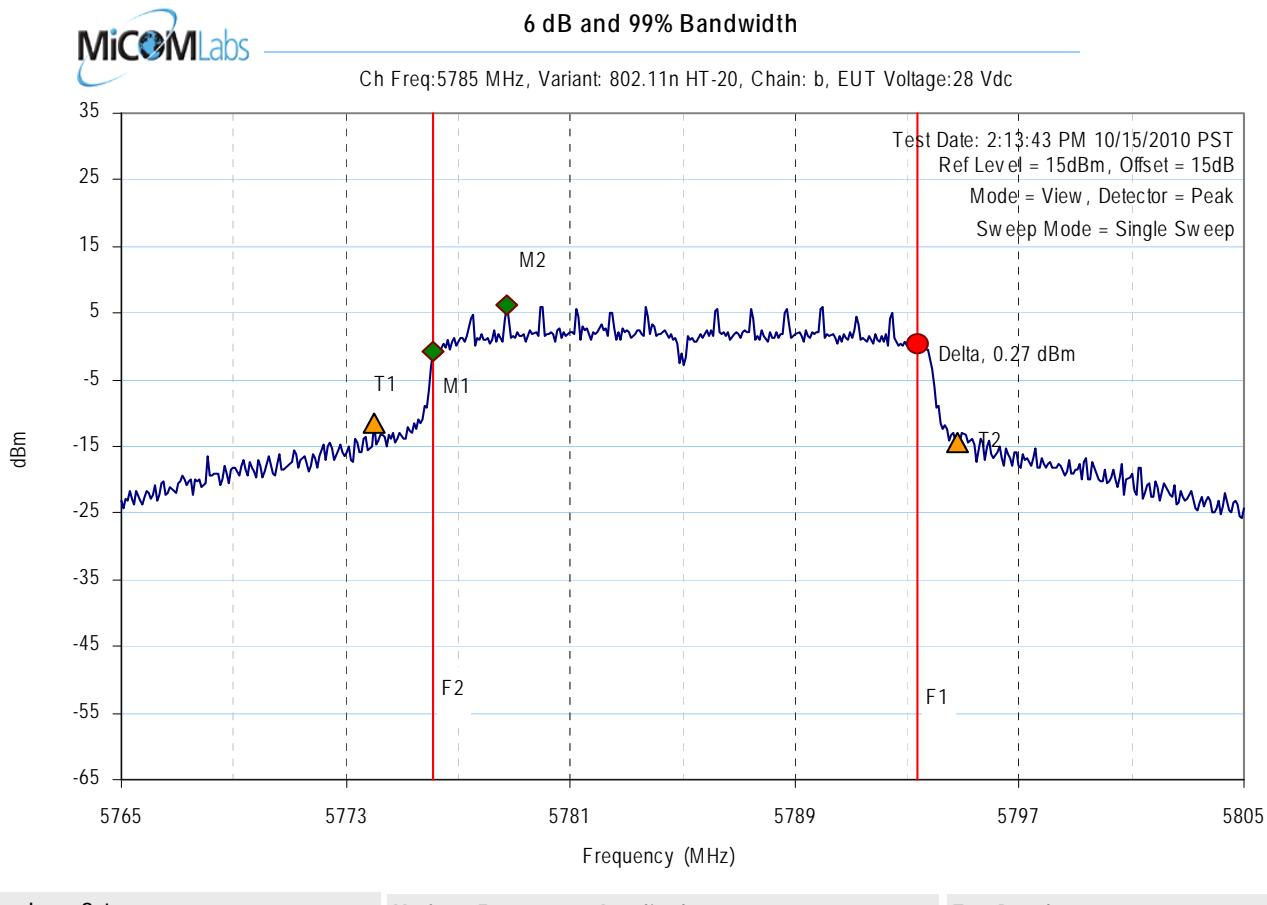
Marker : Frequency : Amplitude

M1 : 5776.382766MHz : -.622dBm
 M2 : 5779.909820MHz : 5.886dBm
 Delta : 5793.136273MHz : .055dBm
 T1 : 5775.741483MHz : -12.653dBm
 T2 : 5794.098196MHz : -10.959dBm

Test Results

Center frequency = 5785MHz
 6dB BW(Delta-M1) = 16.753507MHz
 99% OBW(T2-T1) = 18.436874MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

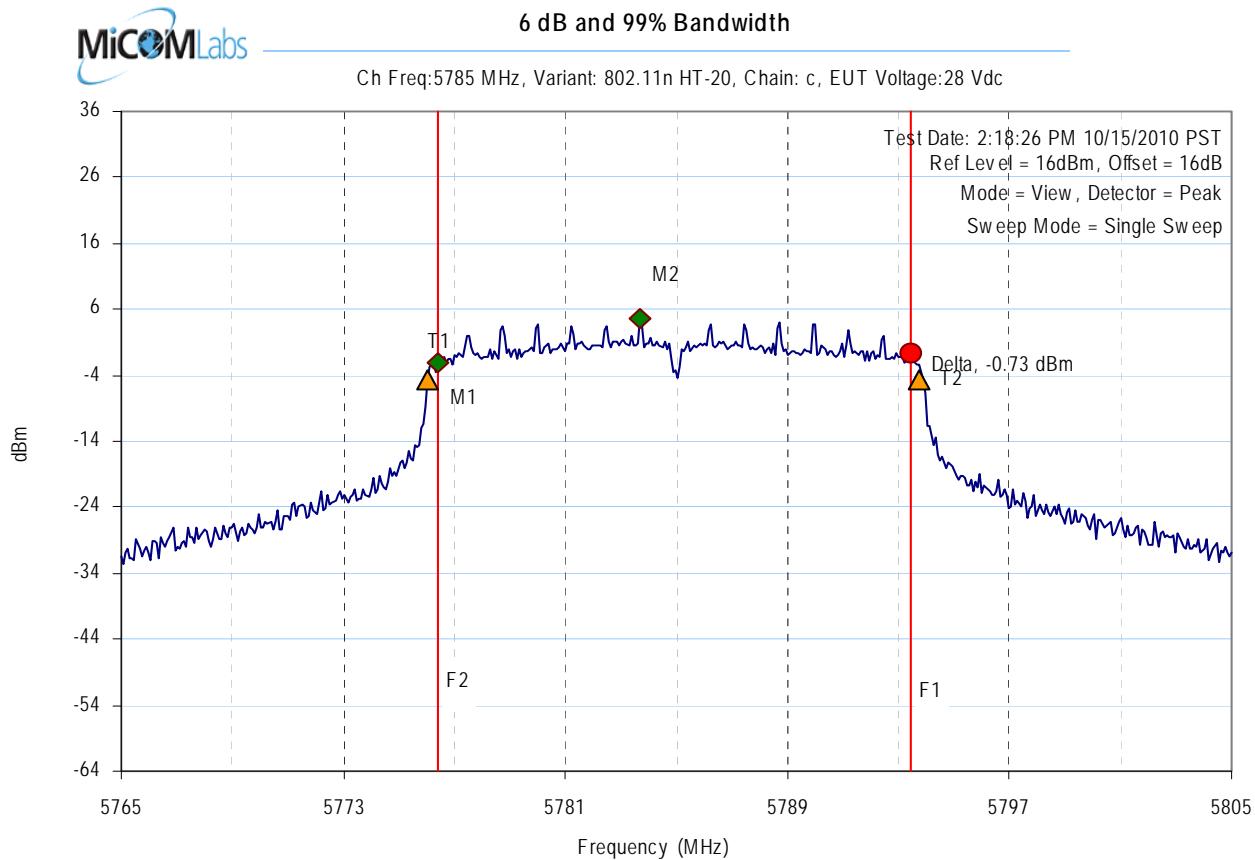
Marker : Frequency : Amplitude

M1 : 5776.142285MHz : -0.851dBm
 M2 : 5778.707415MHz : 6.121dBm
 Delta : 5793.376754MHz : 0.268dBm
 T1 : 5773.977956MHz : -11.603dBm
 T2 : 5794.819639MHz : -14.386dBm

Test Results

Center frequency = 5785MHz
 6dB BW(Delta-M1) = 17.234469MHz
 99% OBW(T2-T1) = 20.921844MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

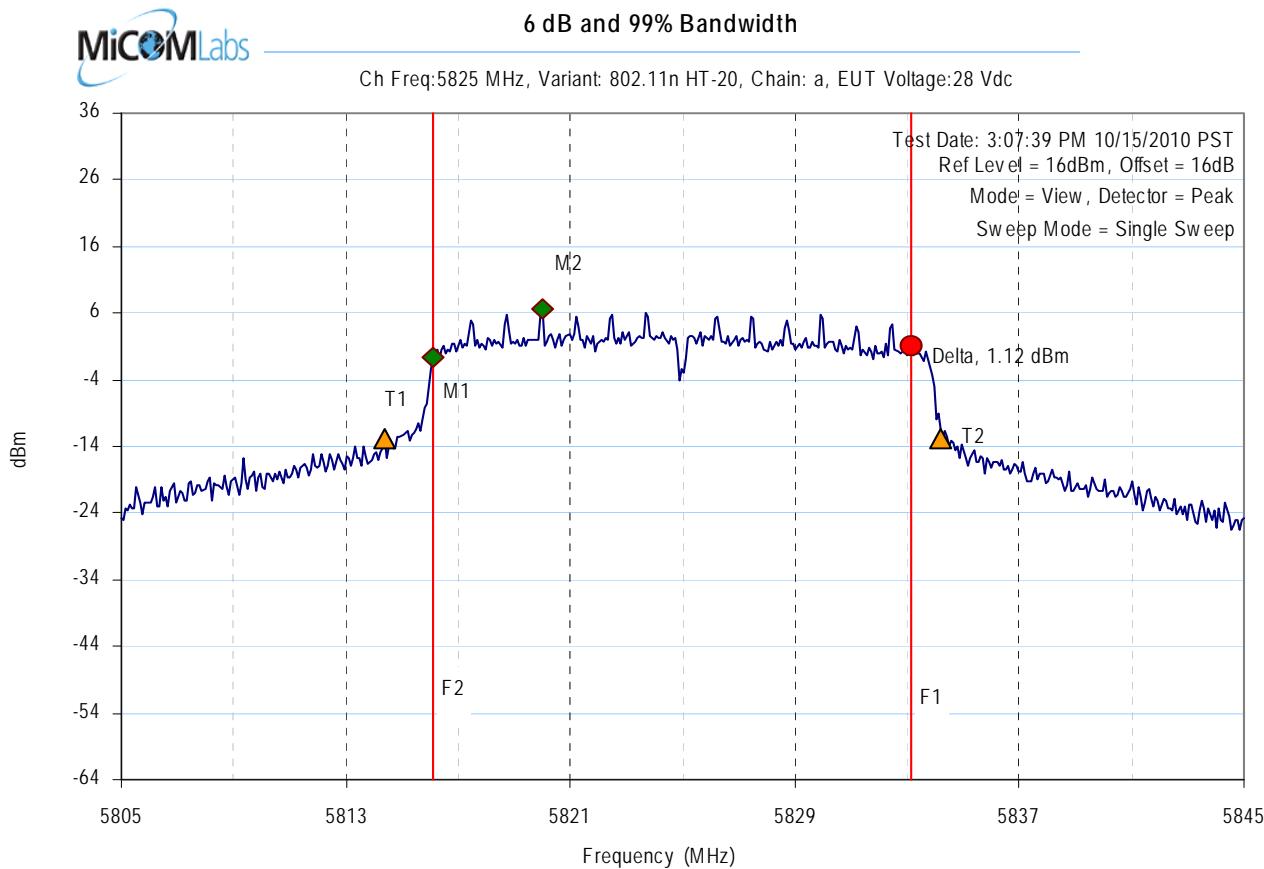
Marker : Frequency : Amplitude

M1 : 5776.382766MHz : -2.202dBm
 M2 : 5783.677355MHz : 4.548dBm
 Delta : 5793.456914MHz : -7.28dBm
 T1 : 5776.062124MHz : -4.819dBm
 T2 : 5793.777555MHz : -4.781dBm

Test Results

Center frequency = 5785MHz
 6dB BW(Delta-M1) = 17.074148MHz
 99% OBW(T2-T1) = 17.795591MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

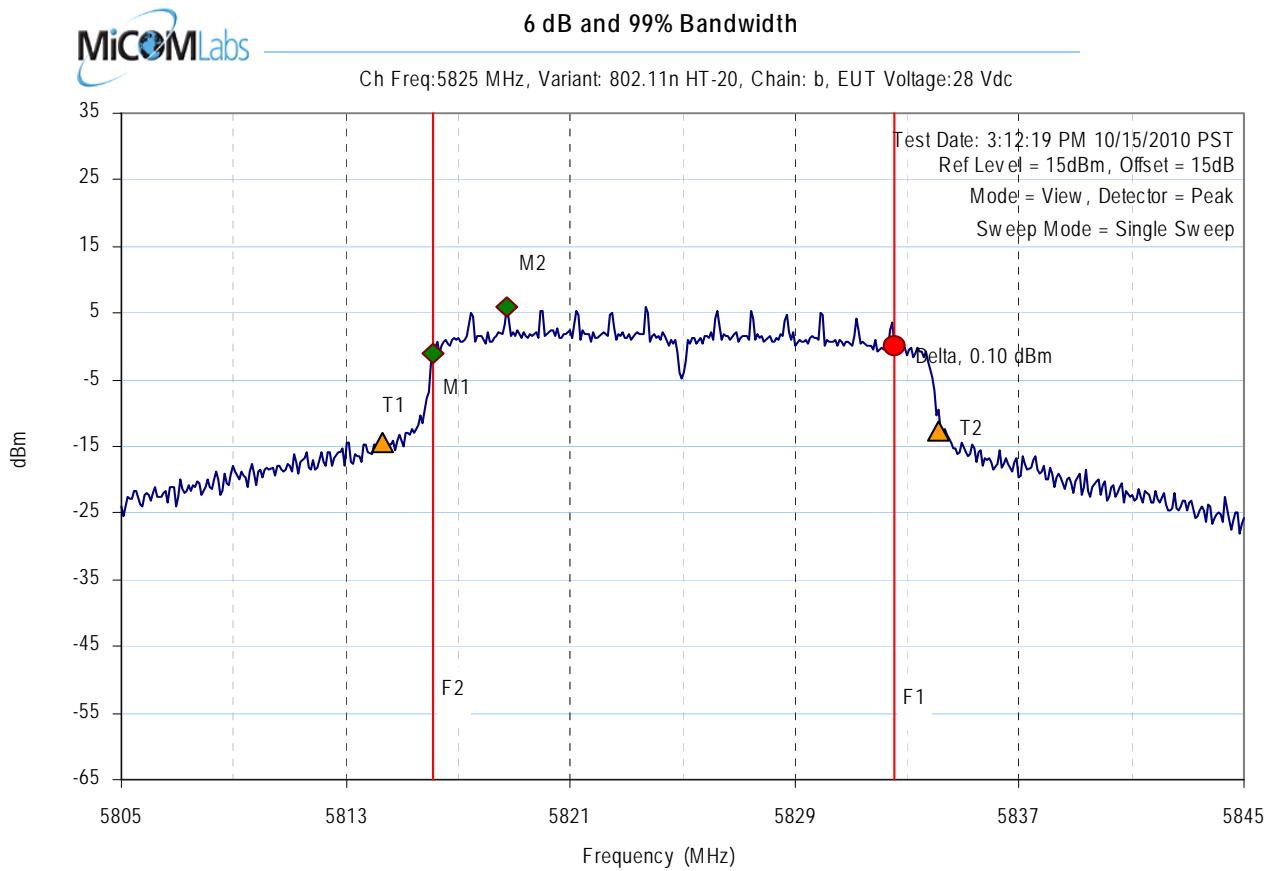
Marker : Frequency : Amplitude

M1 : 5816.142285MHz : -0.768dBm
 M2 : 5819.989980MHz : 6.498dBm
 Delta : 5833.136273MHz : 1.121dBm
 T1 : 5814.378758MHz : -12.961dBm
 T2 : 5834.178357MHz : -12.855dBm

Test Results

Center frequency = 5825MHz
 6dB BW(Delta-M1) = 16.993988MHz
 99% OBW(T2-T1) = 19.879760MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

Marker : Frequency : Amplitude

M1 : 5816.142285MHz : -1.168dBm
 M2 : 5818.707415MHz : 6.021dBm
 Delta : 5832.575150MHz : .097dBm
 T1 : 5814.298597MHz : -14.310dBm
 T2 : 5834.098196MHz : -12.549dBm

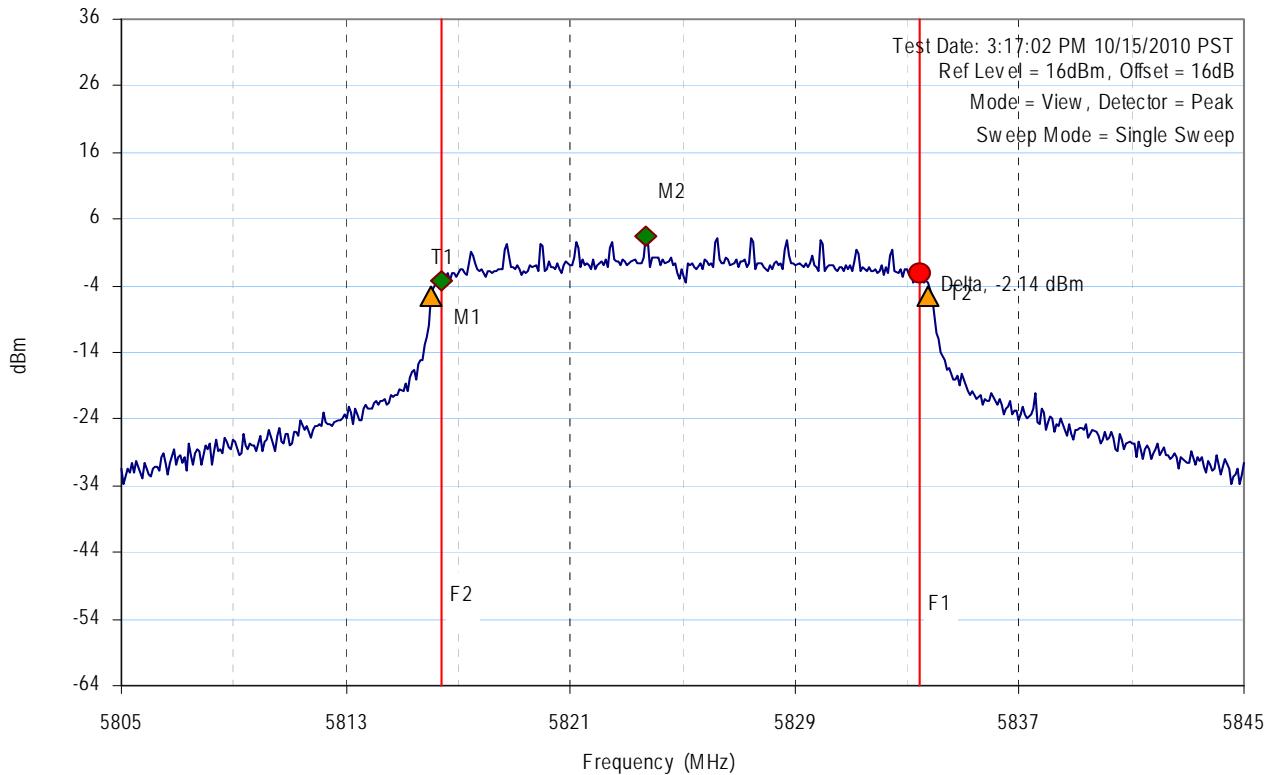
Test Results

Center frequency = 5825MHz
 6dB BW(Delta-M1) = 16.432866MHz
 99% OBW(T2-T1) = 19.879760MHz

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6 dB and 99% Bandwidth

Ch Freq:5825 MHz, Variant: 802.11n HT-20, Chain: c, EUT Voltage:28 Vdc



Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

Marker : Frequency : Amplitude

M1 : 5816.382766MHz : -3.158dBm
 M2 : 5823.677355MHz : 3.350dBm
 Delta : 5833.456914MHz : -2.141dBm
 T1 : 5816.062124MHz : -5.649dBm
 T2 : 5833.777555MHz : -5.495dBm

Test Results

Center frequency = 5825MHz
 6dB BW(Delta-M1) = 17.074148MHz
 99% OBW(T2-T1) = 17.795591MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 83 of 362

MIMO 6 dB and 99% Bandwidth Results: 802.11n HT-40

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-40	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A dB	Antenna Gain:	1.2 dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

6 dB Bandwidth

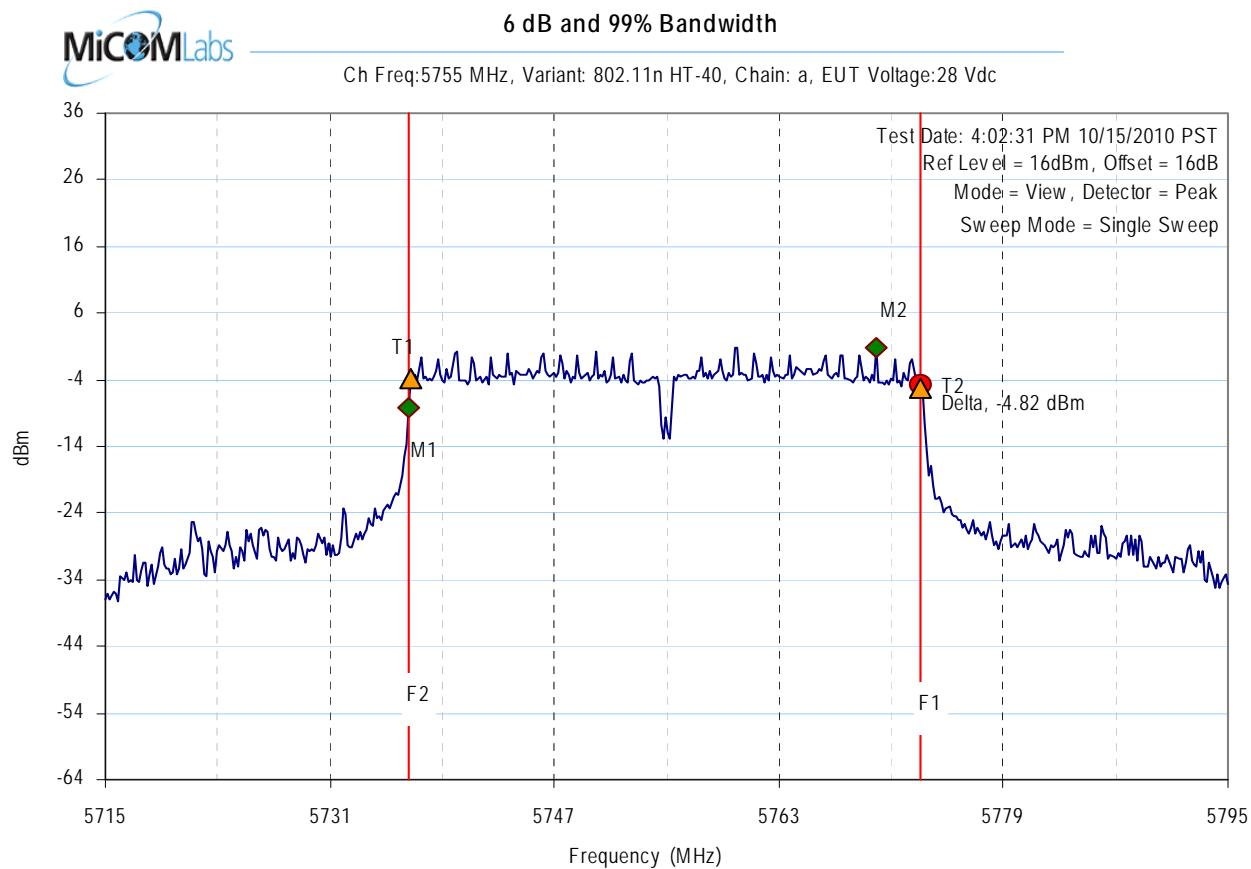
Test Frequency	6 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5755.000	36.393000	36.232000	35.912000	--	500	0.5	-35.412000
5785.000	36.232000	36.553000	36.232000	--			-35.732000
5815.000	35.912000	35.912000	36.553000	--			-35.412000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
5755.000	36.393000	36.713000	36.232000	--			
5785.000	36.553000	38.637000	36.393000	--			
5815.000	36.713000	37.355000	36.393000	--			

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Alten (dB) = 10
 Span = 80.00MHz

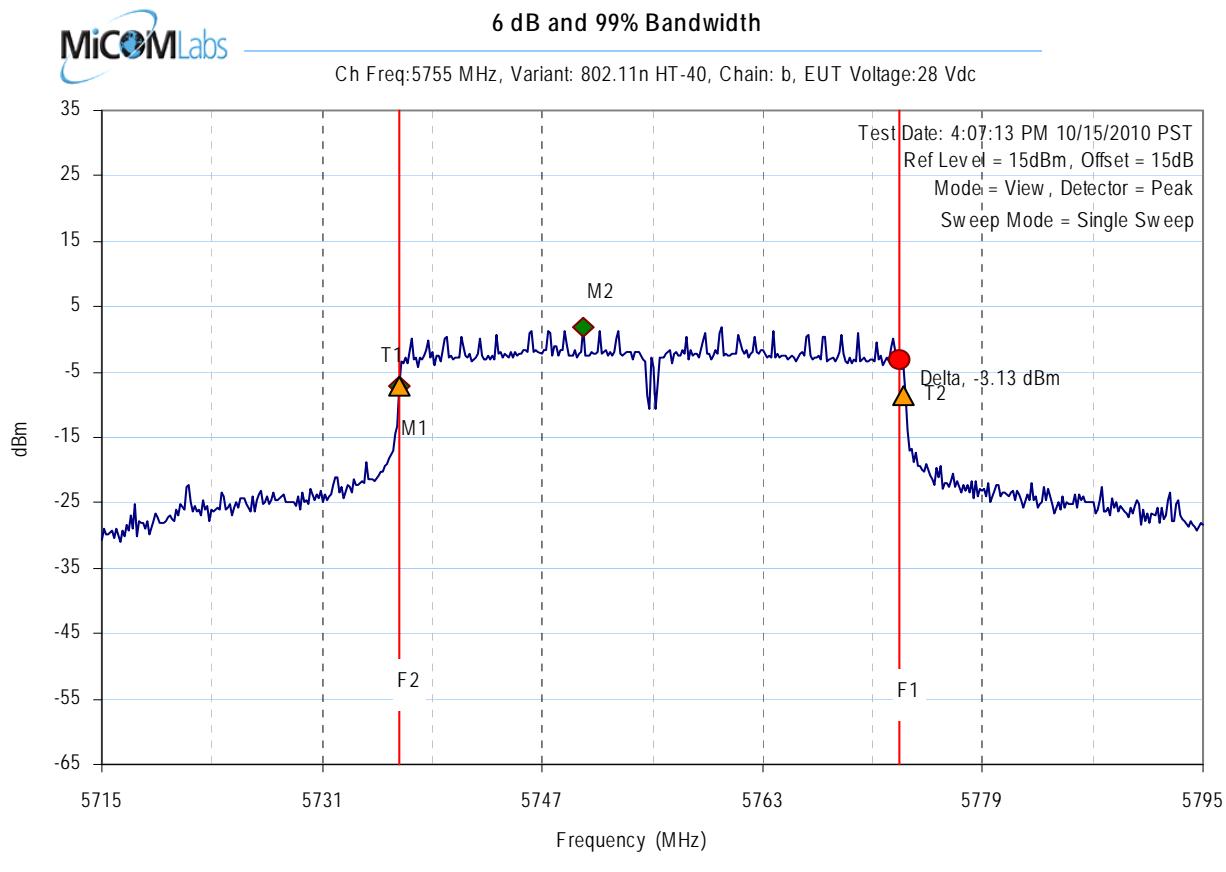
Marker : Frequency : Amplitude

M1 : 5736.643287MHz : -8.320dBm
 M2 : 5769.989980MHz : .952dBm
 Delta : 5773.036072MHz : -4.817dBm
 T1 : 5736.803607MHz : -3.963dBm
 T2 : 5773.036072MHz : -5.332dBm

Test Results

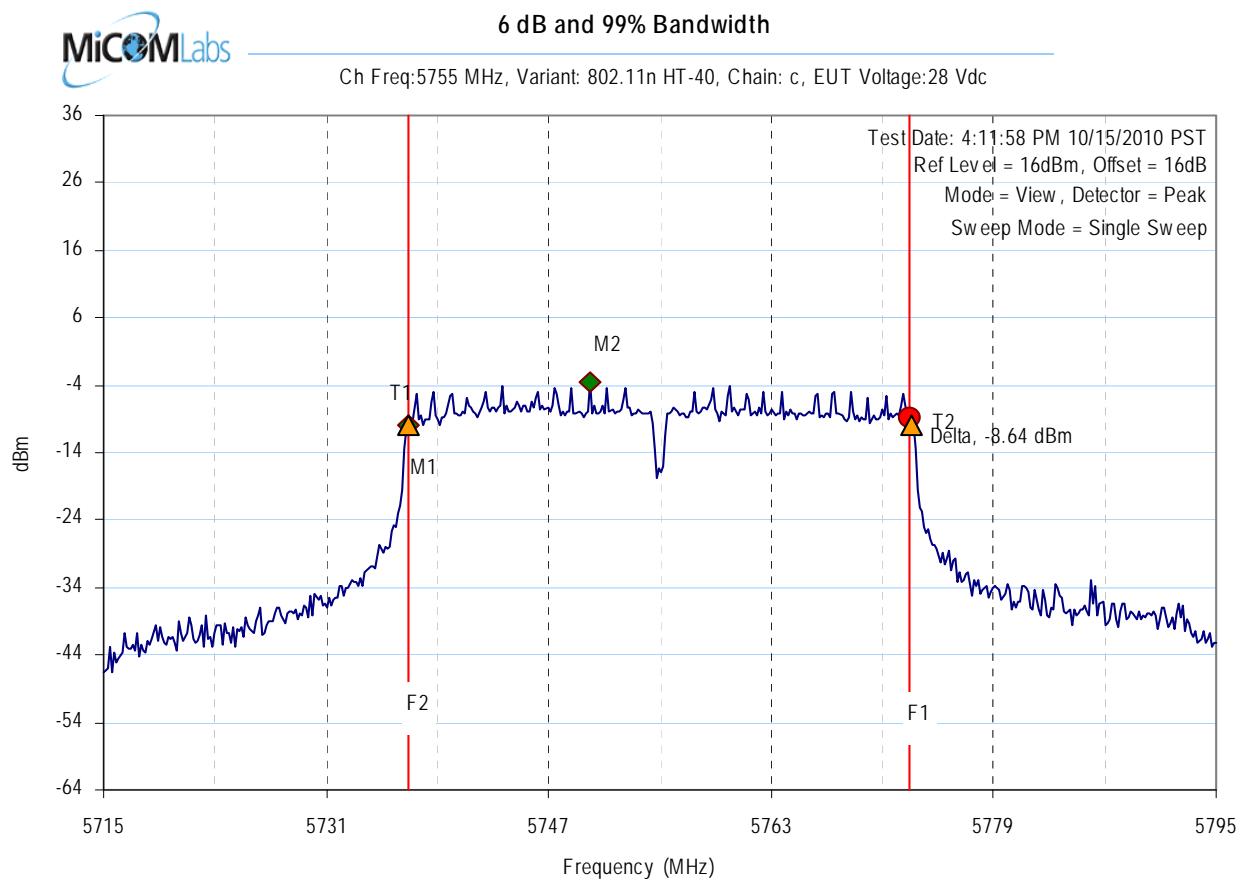
Center frequency = 5755MHz
 6dB BW(Delta-M1) = 36.392786MHz
 99% OBW(T2-T1) = 36.392786MHz

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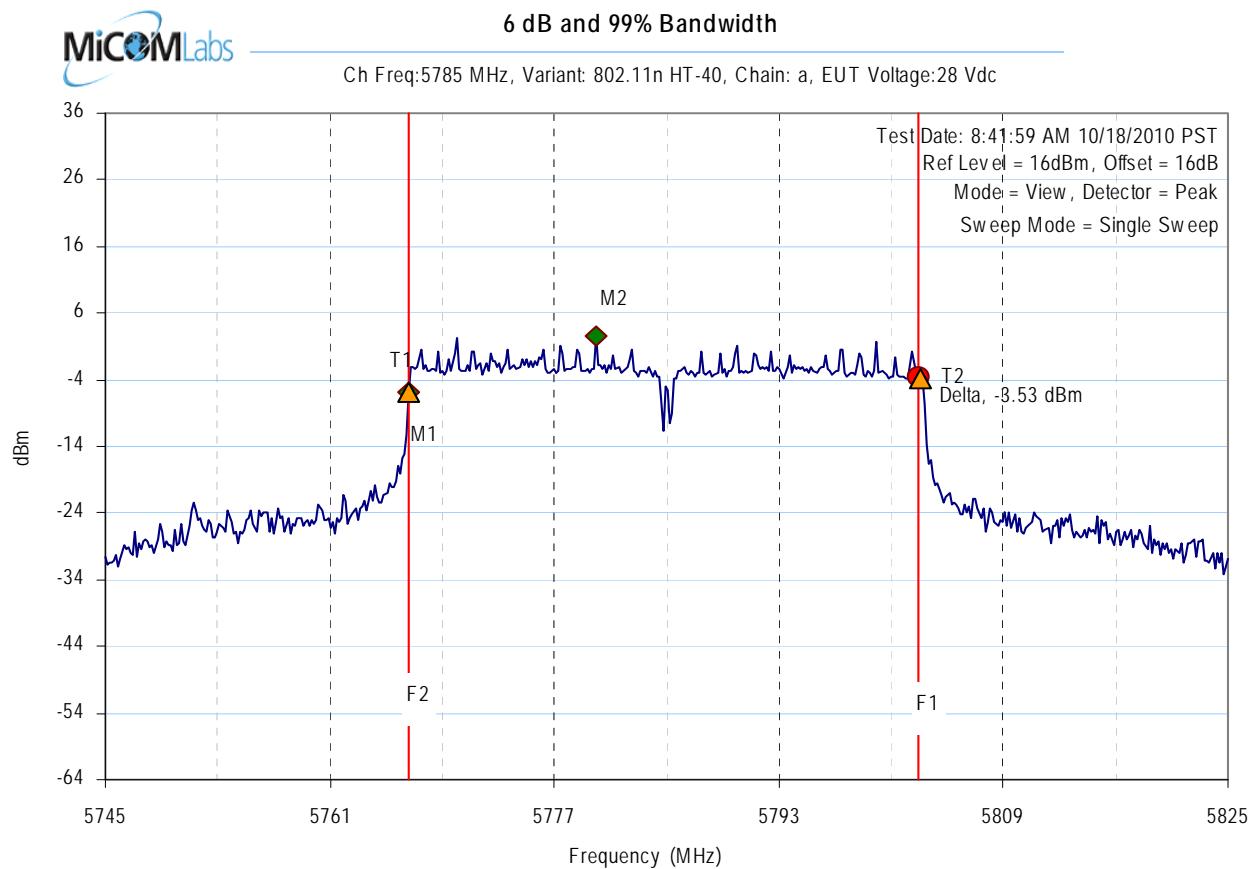
Analyser Setup	Marker : Frequency : Amplitude	Test Results
RBW = 100.00KHz	M1 : 5736.643287MHz : -7.125dBm	Center frequency = 5755MHz
VBW = 300.00KHz	M2 : 5749.949900MHz : 1.976dBm	6dB BW(Delta-M1) = 36.232465MHz
Sweep time(s) = 20	Delta : 5772.875752MHz : -3.129dBm	99% OBW(T2-T1) = 36.713427MHz
RF Atten (dB) = 10	T1 : 5736.643287MHz : -7.125dBm	
Span = 80.00MHz	T2 : 5773.196393MHz : -8.49dBm	

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Analyser Setup	Marker : Frequency : Amplitude	Test Results
RBW = 100.00KHz	M1 : 5736.963928MHz : -9.871dBm	Center frequency = 5755MHz
VBW = 300.00KHz	M2 : 5749.949900MHz : -3.554dBm	6dB BW(Delta-M1) = 35.911824MHz
Sweep time(s) = 20	Delta : 5772.875752MHz : -8.643dBm	99% OBW(T2-T1) = 36.232465MHz
RF Atten (dB) = 10	T1 : 5736.963928MHz : -9.871dBm	
Span = 80.00MHz	T2 : 5773.036072MHz : -9.892dBm	

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Alten (dB) = 10
 Span = 80.00MHz

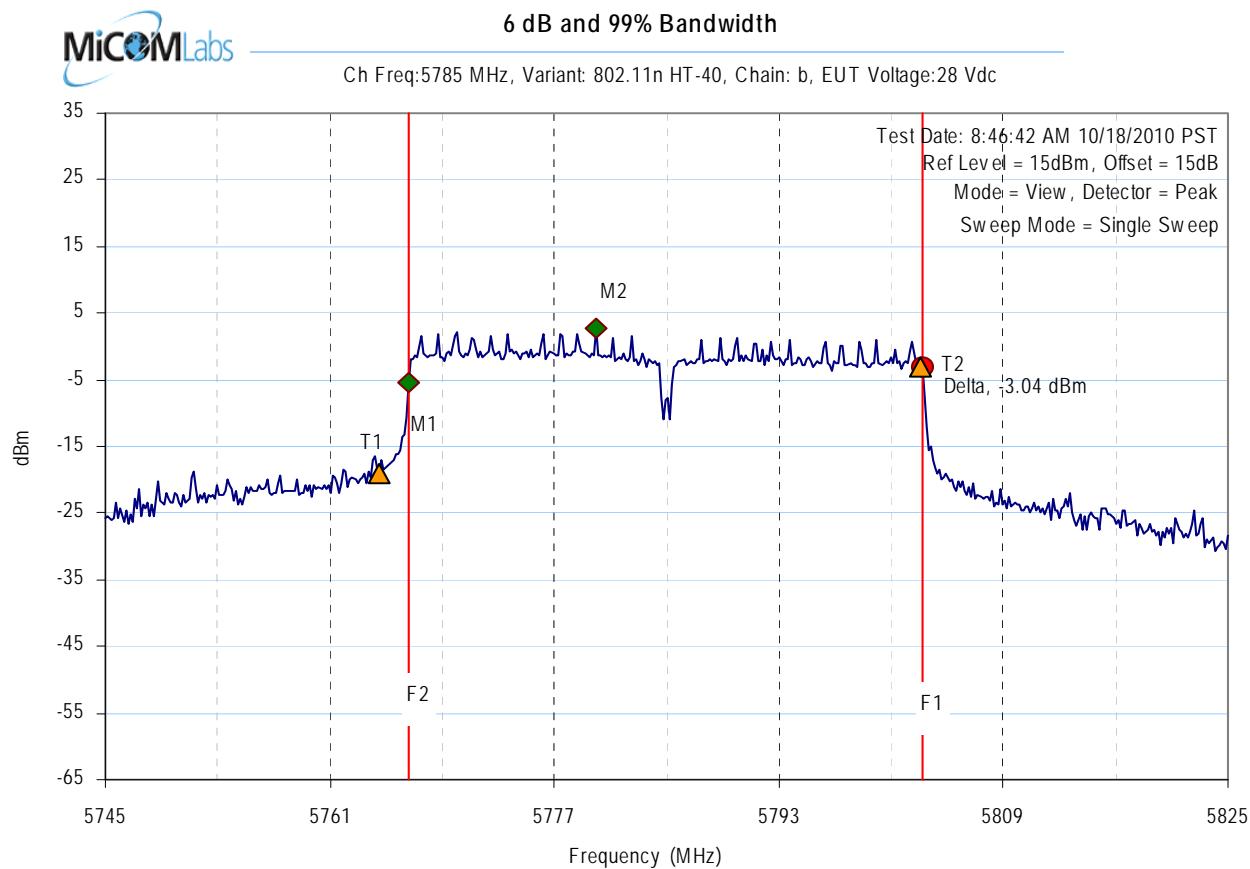
Marker : Frequency : Amplitude

M1 : 5766.643287MHz : -5.981dBm
 M2 : 5779.949900MHz : 2.451dBm
 Delta : 5802.875752MHz : -3.528dBm
 T1 : 5766.643287MHz : -5.981dBm
 T2 : 5803.036072MHz : -3.752dBm

Test Results

Center frequency = 5785MHz
 6dB BW(Delta-M1) = 36.232465MHz
 99% OBW(T2-T1) = 36.553106MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Alten (dB) = 10
 Span = 80.00MHz

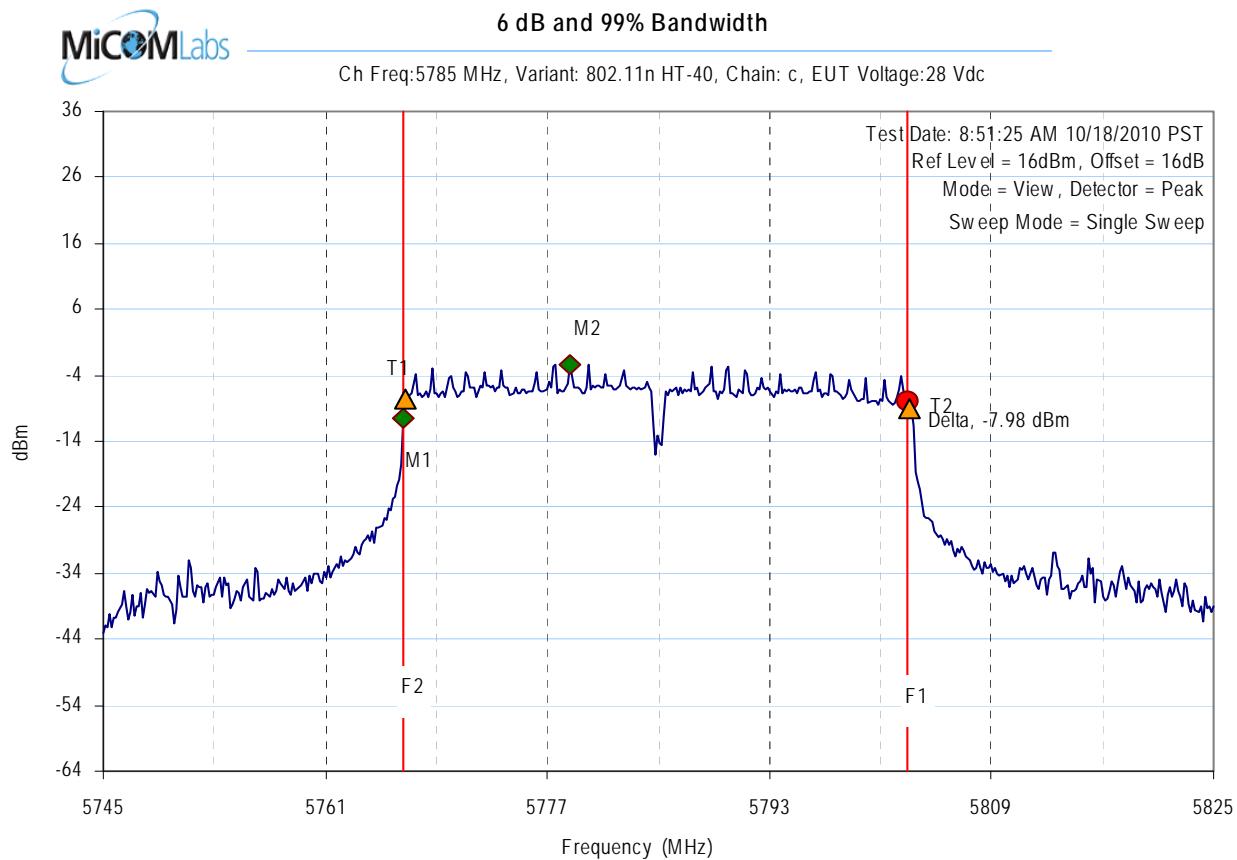
Marker : Frequency : Amplitude

M1 : 5766.643287MHz : -5.405dBm
 M2 : 5779.949900MHz : 2.643dBm
 Delta : 5803.196393MHz : -3.037dBm
 T1 : 5764.559118MHz : -19.067dBm
 T2 : 5803.036072MHz : -3.037dBm

Test Results

Center frequency = 5785MHz
 6dB BW(Delta-M1) = 36.553106MHz
 99% OBW(T2-T1) = 38.637275MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 80.00MHz

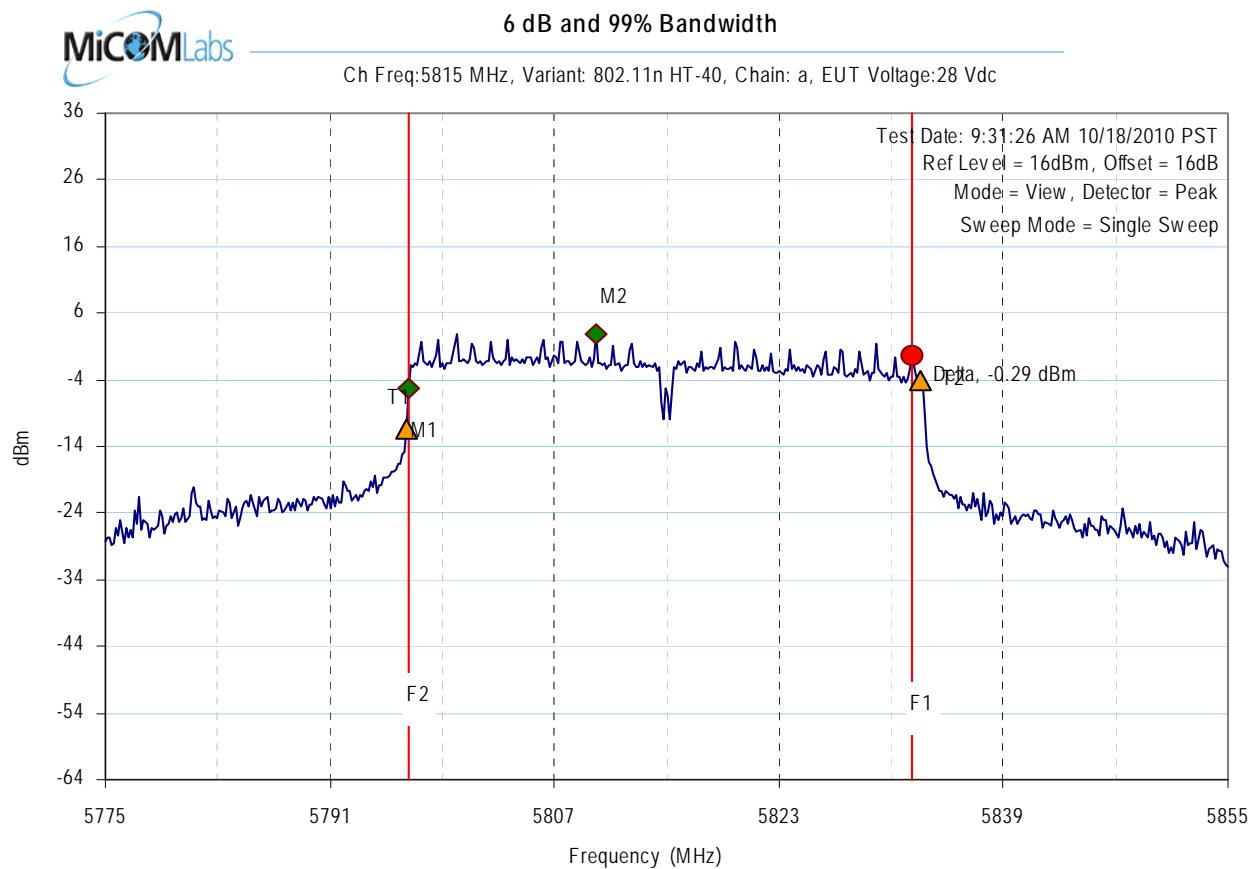
Marker : Frequency : Amplitude

M1 : 5766.643287MHz : -10.498dBm
 M2 : 5778.667335MHz : -2.387dBm
 Delta : 5802.875752MHz : -7.982dBm
 T1 : 5766.803607MHz : -7.703dBm
 T2 : 5803.036072MHz : -9.133dBm

Test Results

Center frequency = 5785MHz
 6dB BW(Delta-M1) = 36.232465MHz
 99% OBW(T2-T1) = 36.392786MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Alten (dB) = 10
 Span = 80.00MHz

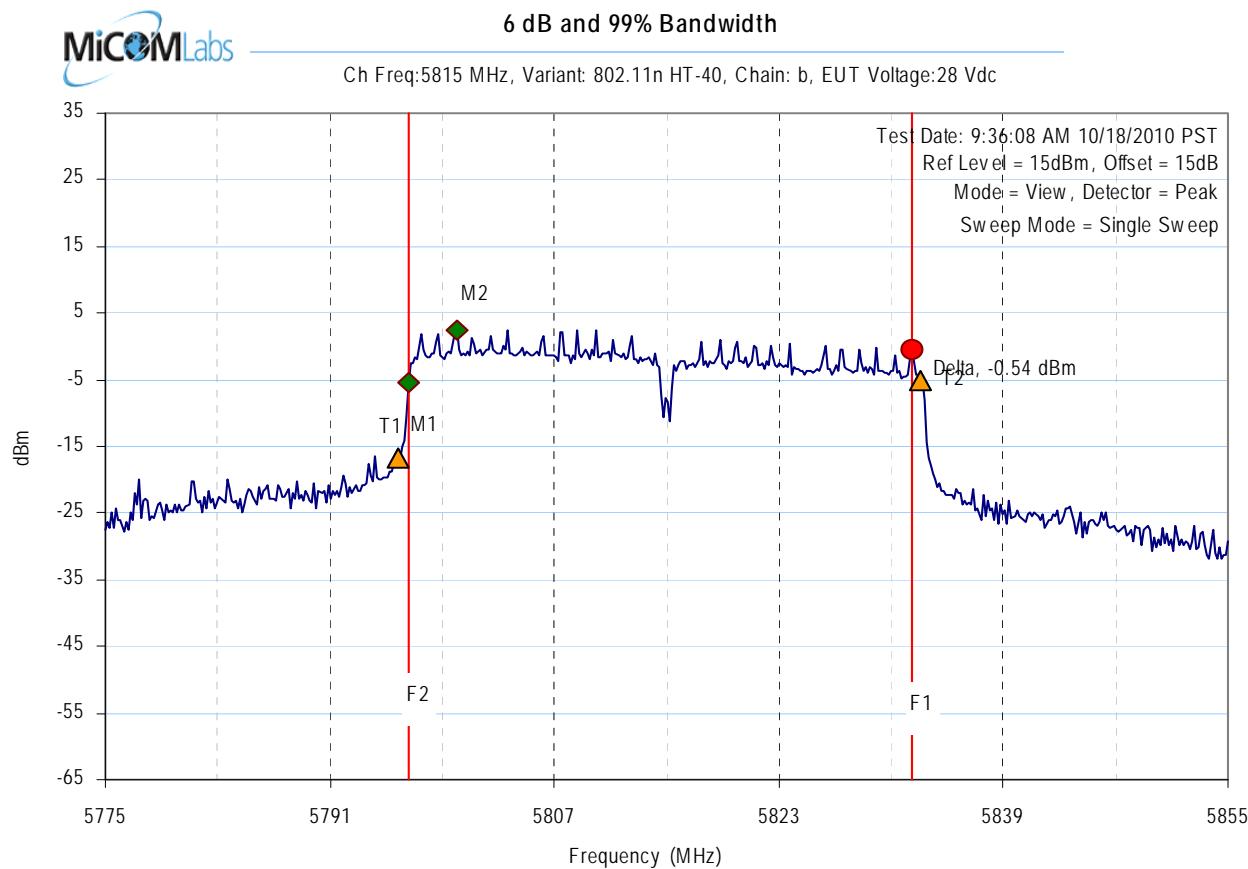
Marker : Frequency : Amplitude

M1 : 5796.643287MHz : -5.411dBm
 M2 : 5809.949900MHz : 2.909dBm
 Delta : 5832.555110MHz : -.290dBm
 T1 : 5796.482966MHz : -11.366dBm
 T2 : 5833.036072MHz : -4.195dBm

Test Results

Center frequency = 5815MHz
 6dB BW(Delta-M1) = 35.911824MHz
 99% OBW(T2-T1) = 36.713427MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Alten (dB) = 10
 Span = 80.00MHz

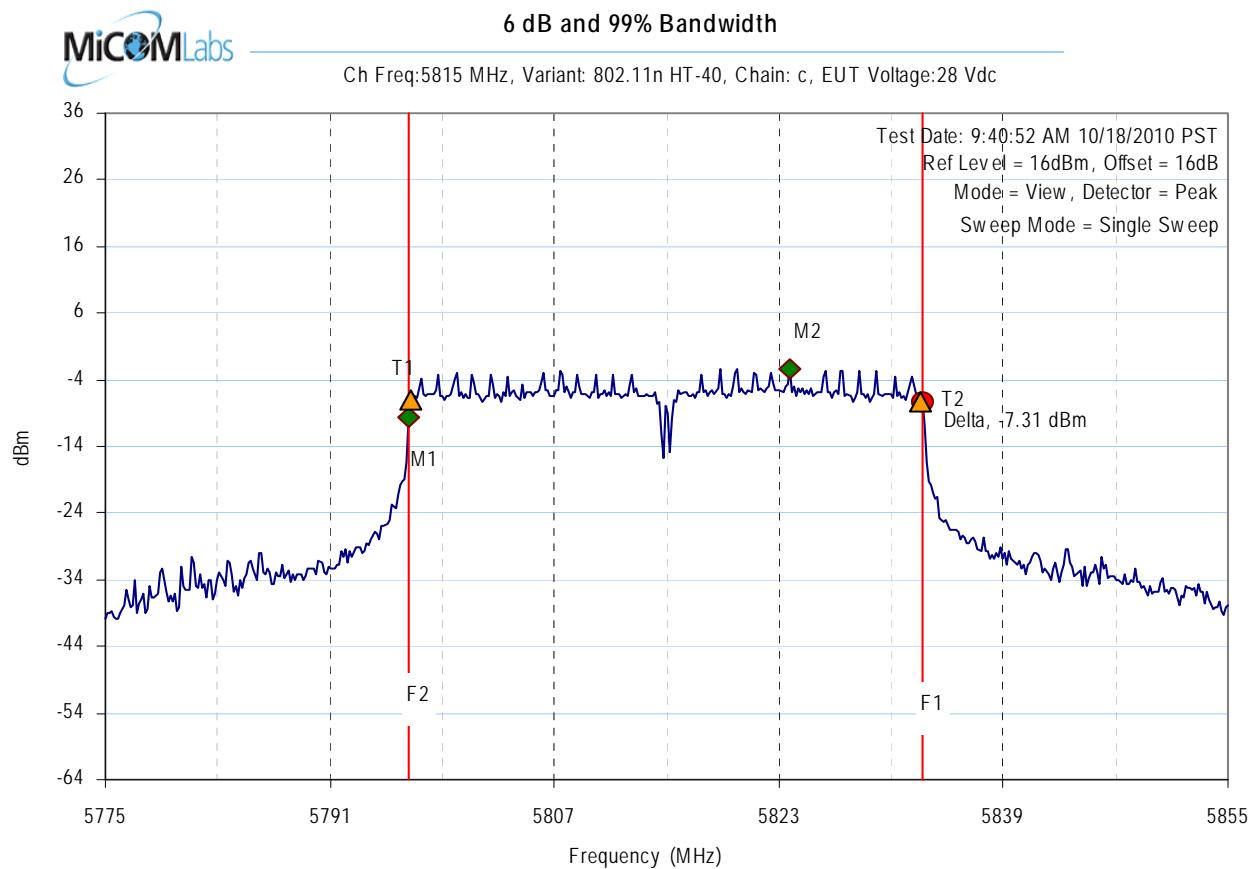
Marker : Frequency : Amplitude

M1 : 5796.643287MHz : -5.451dBm
 M2 : 5800.010020MHz : 2.582dBm
 Delta : 5832.555110MHz : -.542dBm
 T1 : 5795.841683MHz : -16.733dBm
 T2 : 5833.036072MHz : -5.126dBm

Test Results

Center frequency = 5815MHz
 6dB BW(Delta-M1) = 35.911824MHz
 99% OBW(T2-T1) = 37.354709MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 80.00MHz

Marker : Frequency : Amplitude

M1 : 5796.643287MHz : -9.532dBm
 M2 : 5823.737475MHz : -2.267dBm
 Delta : 5833.196393MHz : -7.313dBm
 T1 : 5796.803607MHz : -7.034dBm
 T2 : 5833.036072MHz : -7.313dBm

Test Results

Center frequency = 5815MHz
 6dB BW(Delta-M1) = 36.553106MHz
 99% OBW(T2-T1) = 36.392786MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 93 of 362

Legacy 6 dB and 99% Bandwidth Results: 802.11 b

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11 b	Ambient Temp. (°C):	19 to 22
TPC:	N/A	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A dB	Antenna Gain:	2.6 dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

6 dB Bandwidth

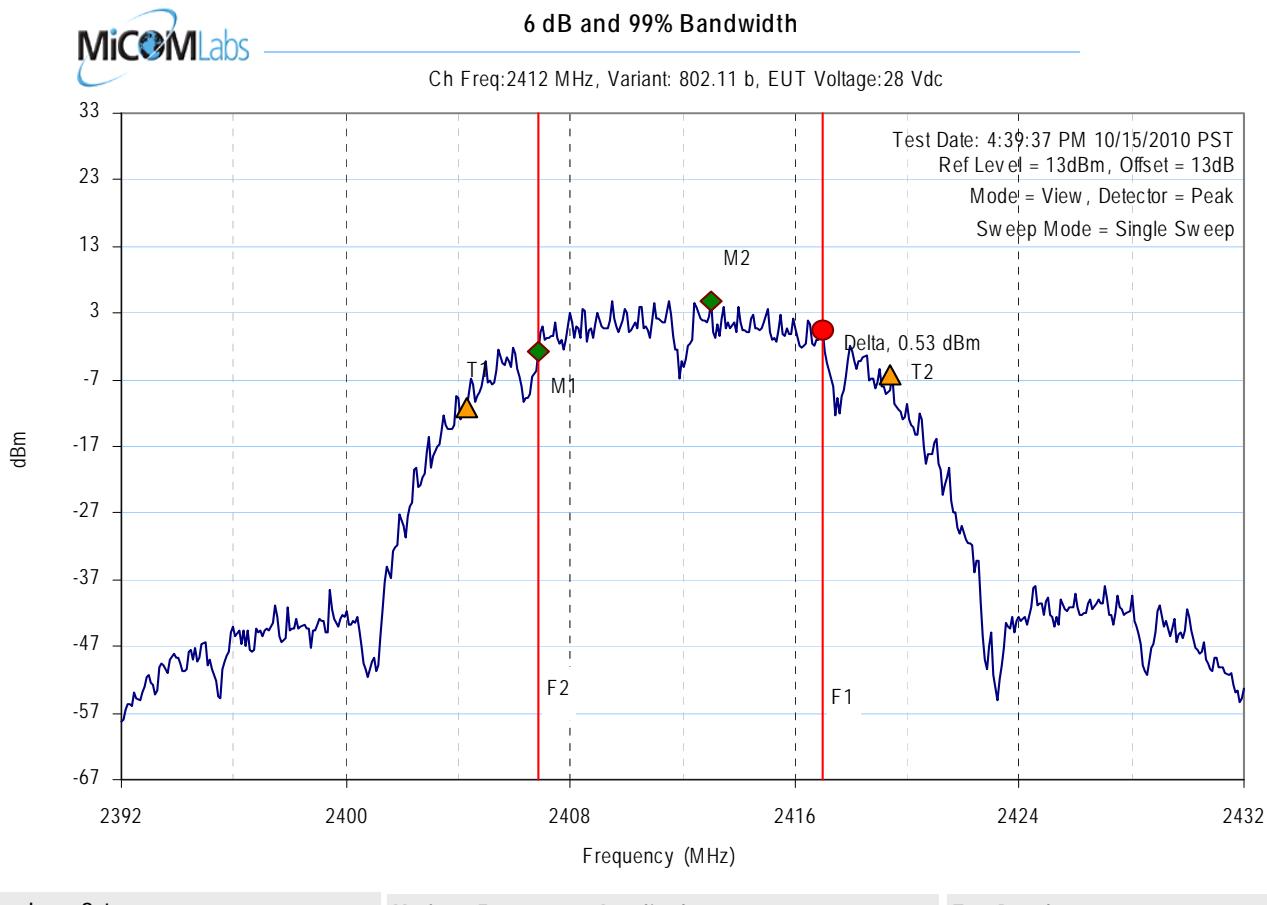
Test Frequency	6 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz				kHz	MHz	
MHz	a	b	c	d			
2412.000	10.270000	--	--	--	500	0.5	-9.770000
2437.000	10.100000	--	--	--			-9.600000
2462.000	10.190000	--	--	--			-9.690000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
2412.000	15.160000	--	--	--			
2437.000	15.310000	--	--	--			
2462.000	15.210000	--	--	--			

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

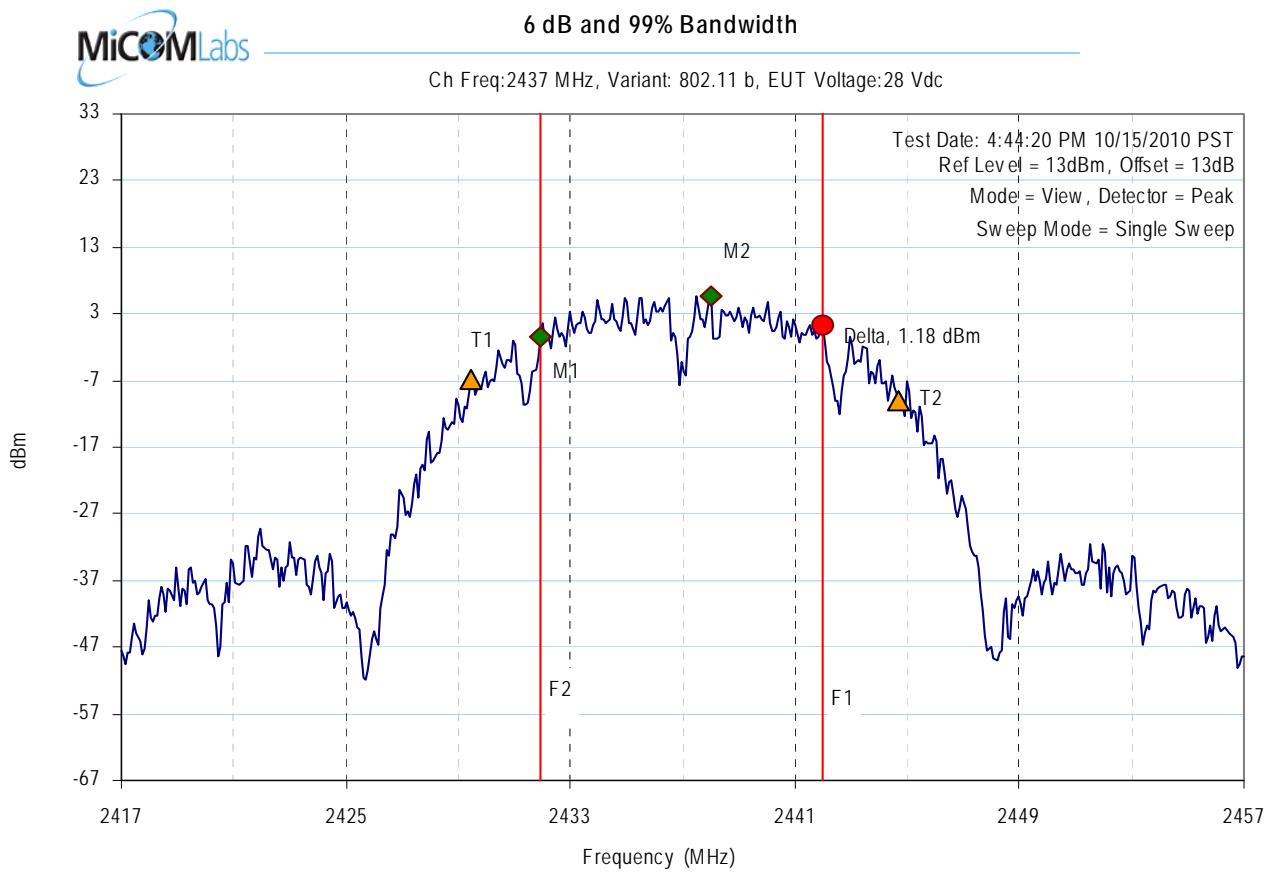
Marker : Frequency : Amplitude

M1 : 2406.829659MHz : -2.698dBm
 M2 : 2413.002004MHz : 4.839dBm
 Delta : 2417.010020MHz : .529dBm
 T1 : 2404.344689MHz : -11.041dBm
 T2 : 2419.41483MHz : -6.312dBm

Test Results

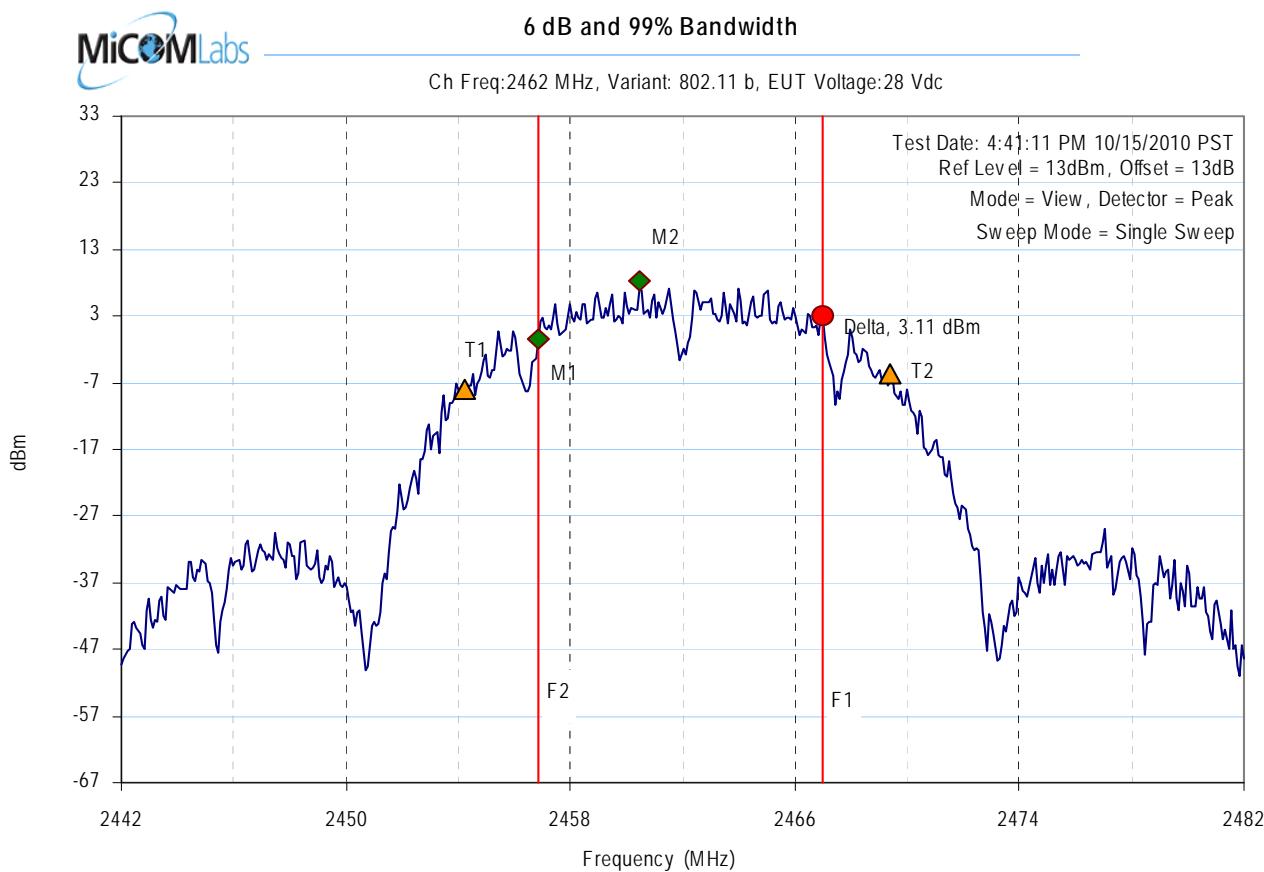
Center frequency = 2412MHz
 6dB BW(Delta-M1) = 10.270361MHz
 99% OBW(T2-T1) = 15.161301MHz

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Analyser Setup	Marker : Frequency : Amplitude	Test Results
RBW = 100.00KHz	M1 : 2431.909820MHz : -.522dBm	Center frequency = 2437MHz
VBW = 300.00KHz	M2 : 2438.002004MHz : 5.795dBm	6dB BW(Delta-M1) = 10.100200MHz
Sweep time(s) = 20	Delta : 2442.010020MHz : 1.178dBm	99% OBW(T2-T1) = 15.310621MHz
RF Atten (dB) = 10	T1 : 2429.424850MHz : -6.916dBm	
Span = 40.00MHz	T2 : 2444.655311MHz : -9.981dBm	

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

Marker : Frequency : Amplitude

M1 : 2456.829659MHz : -0.494dBm
 M2 : 2460.436874MHz : 8.321dBm
 Delta : 2467.010020MHz : 3.106dBm
 T1 : 2454.264529MHz : -8.114dBm
 T2 : 2469.41483MHz : -5.749dBm

Test Results

Center frequency = 2462MHz
 6dB BW(Delta-M1) = 10.190361MHz
 99% OBW(T2-T1) = 15.330461MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 97 of 362

Legacy 6 dB and 99% Bandwidth Results: 802.11 g

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11 g	Ambient Temp. (°C):	19 to 22
TPC:	N/A	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A dB	Antenna Gain:	2.6 dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

6 dB Bandwidth

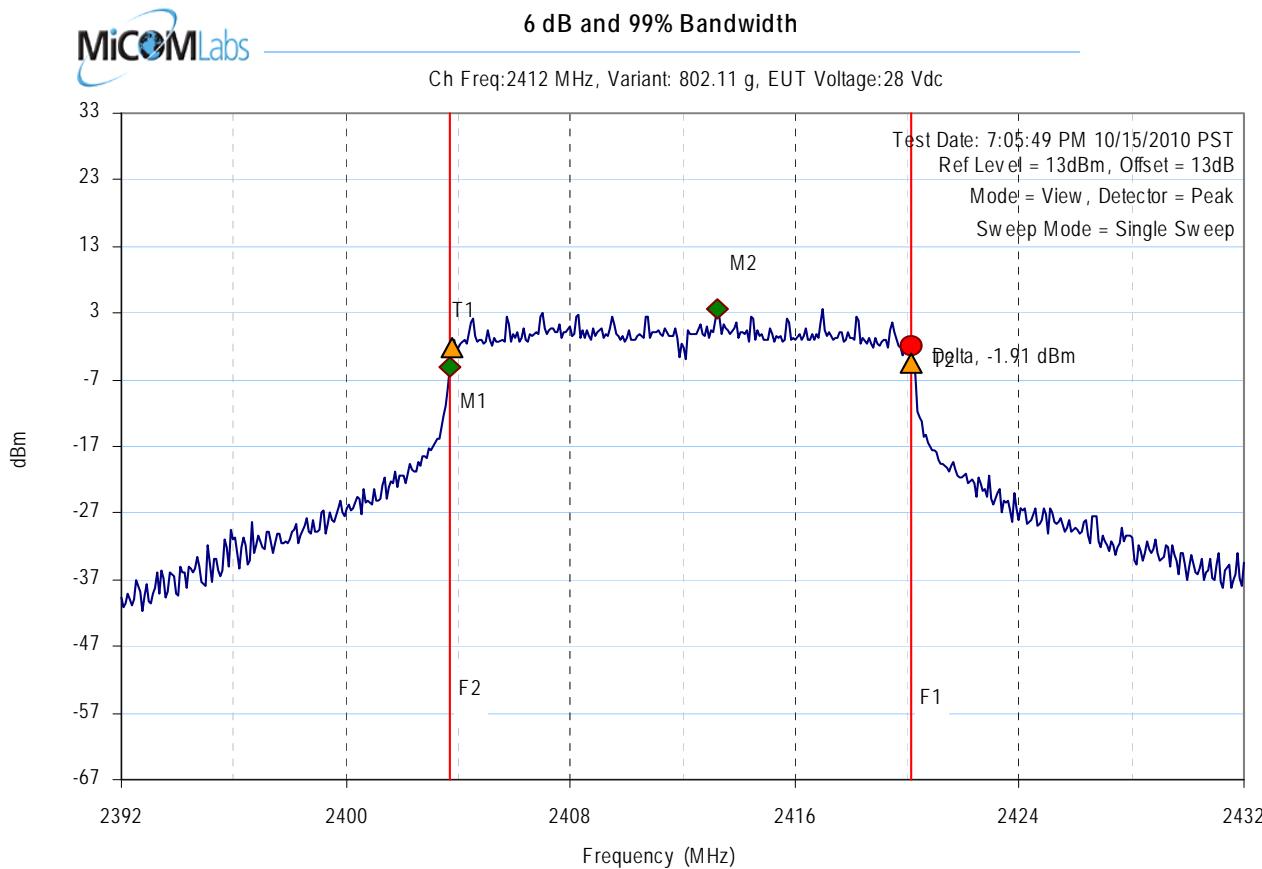
Test Frequency	6 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
2412.000	16.433000	--	--	--	500	0.5	-15.692000
2437.000	16.353000	--	--	--			-15.292000
2462.000	16.353000	--	--	--			-15.853000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
2412.000	16.433000	--	--	--			
2437.000	16.513000	--	--	--			
2462.000	16.513000	--	--	--			

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

Marker : Frequency : Amplitude

M1 : 2403.703407MHz : -5.220dBm
 M2 : 2413.242485MHz : 4.323dBm
 Delta : 2420.136273MHz : -1.911dBm
 T1 : 2403.783567MHz : -2.068dBm
 T2 : 2420.136273MHz : -4.429dBm

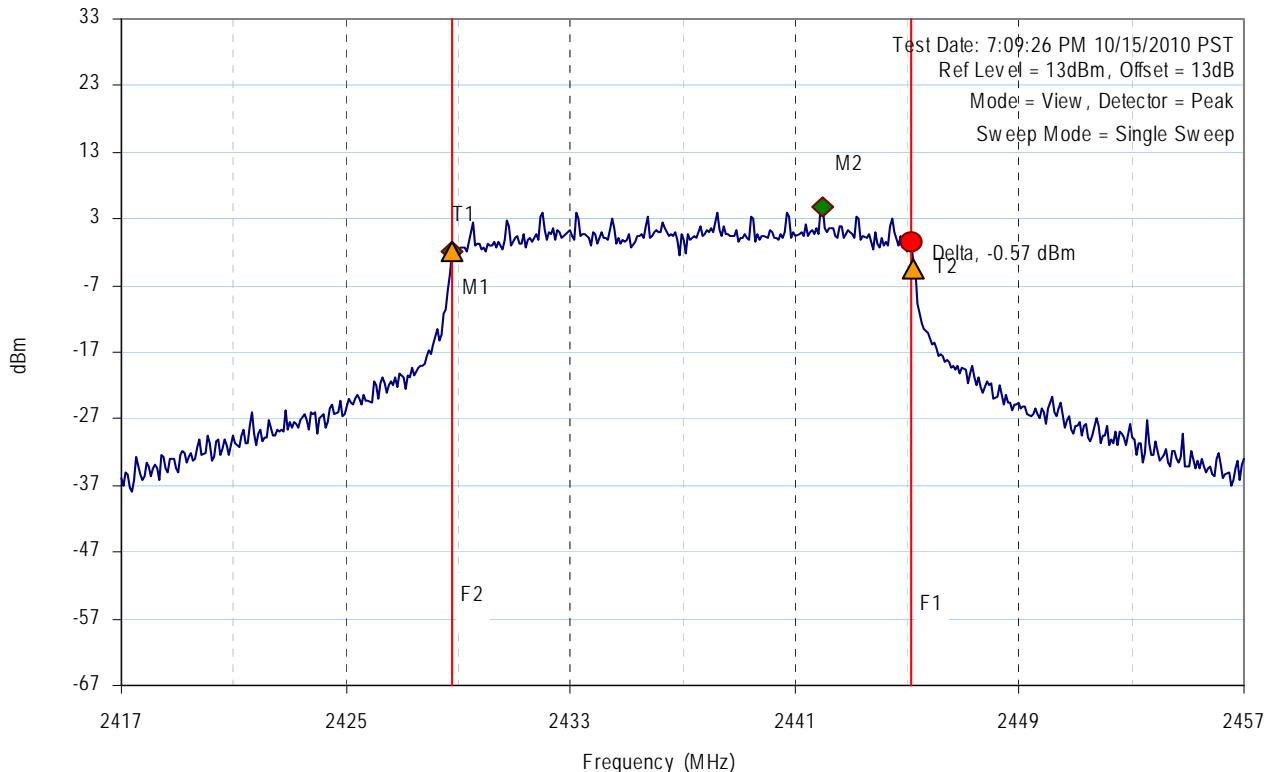
Test Results

Center frequency = 2412MHz
 6dB BW(Delta-M1) = 16.432866MHz
 99% OBW(T2-T1) = 16.432866MHz

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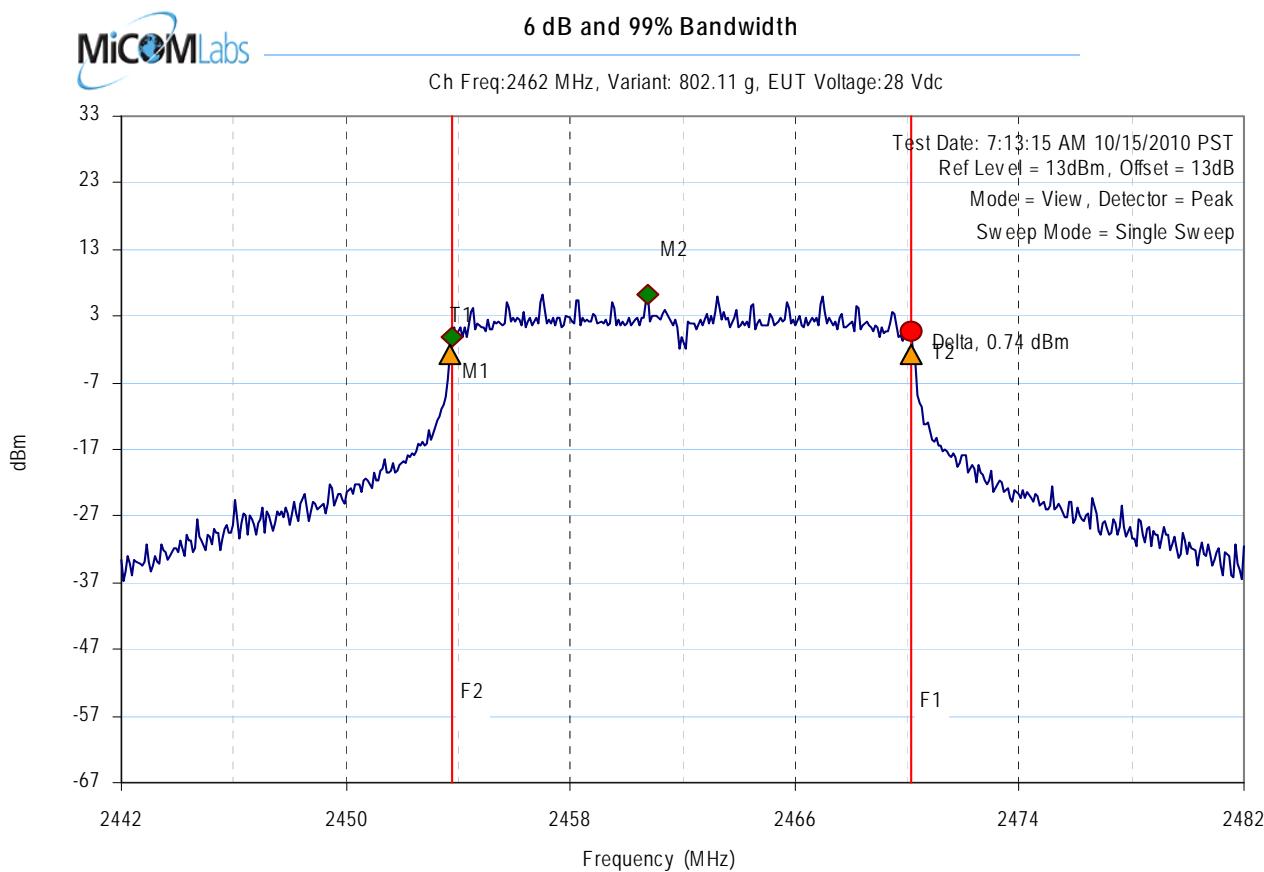
6 dB and 99% Bandwidth

Ch Freq:2437 MHz, Variant: 802.11 g, EUT Voltage:28 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
RBW = 100.00KHz	M1 : 2428.783567MHz : -1.753dBm	Center frequency = 2437MHz
VBW = 300.00KHz	M2 : 2442.010020MHz : 4.908dBm	6dB BW(Delta-M1) = 16.352705MHz
Sweep time(s) = 20	Delta : 2445.136273MHz : -.565dBm	99% OBW(T2-T1) = 16.513026MHz
RF Atten (dB) = 10	T1 : 2428.783567MHz : -1.753dBm	
Span = 40.00MHz	T2 : 2445.216433MHz : -4.425dBm	

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

Marker : Frequency : Amplitude

M1 : 2453.783567MHz : -.132dBm
 M2 : 2460.757515MHz : 6.146dBm
 Delta : 2470.136273MHz : .745dBm
 T1 : 2453.703407MHz : -2.898dBm
 T2 : 2470.136273MHz : -2.69dBm

Test Results

Center frequency = 2462MHz
 6dB BW(Delta-M1) = 16.352705MHz
 99% OBW(T2-T1) = 16.513026MHz

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Legacy 6 dB and 99% Bandwidth Results: 802.11 a

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11a	Ambient Temp. (°C):	19 to 22
TPC:	N/A	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain (Y):	N/A dB	Antenna Gain:	1.2 dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

6 dB Bandwidth

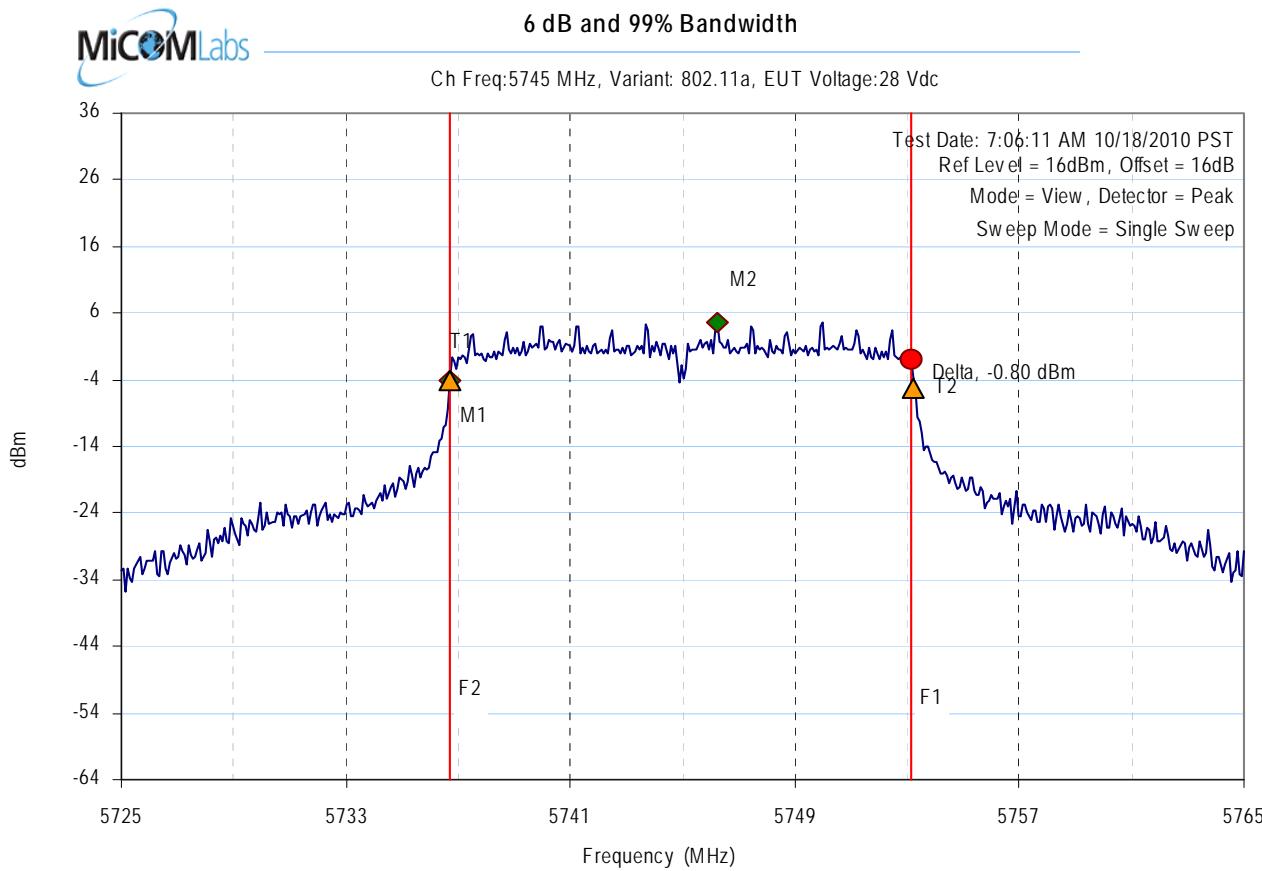
Test Frequency	6 dB Bandwidth				Minimum 6dB Bandwidth Limit		Margin
	MHz						
MHz	a	b	c	d	kHz	MHz	MHz
5745.000	16.433000	--	--	--	500	0.5	-15.922000
5785.000	16.112000	--	--	--			-15.612000
5825.000	15.792000	--	--	--			-15.292000

99% Bandwidth

Test Frequency	99 % Bandwidth						
	MHz						
MHz	a	b	c	d			
5745.000	16.593000	--	--	--			
5785.000	17.876000	--	--	--			
5825.000	18.812000	--	--	--			

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

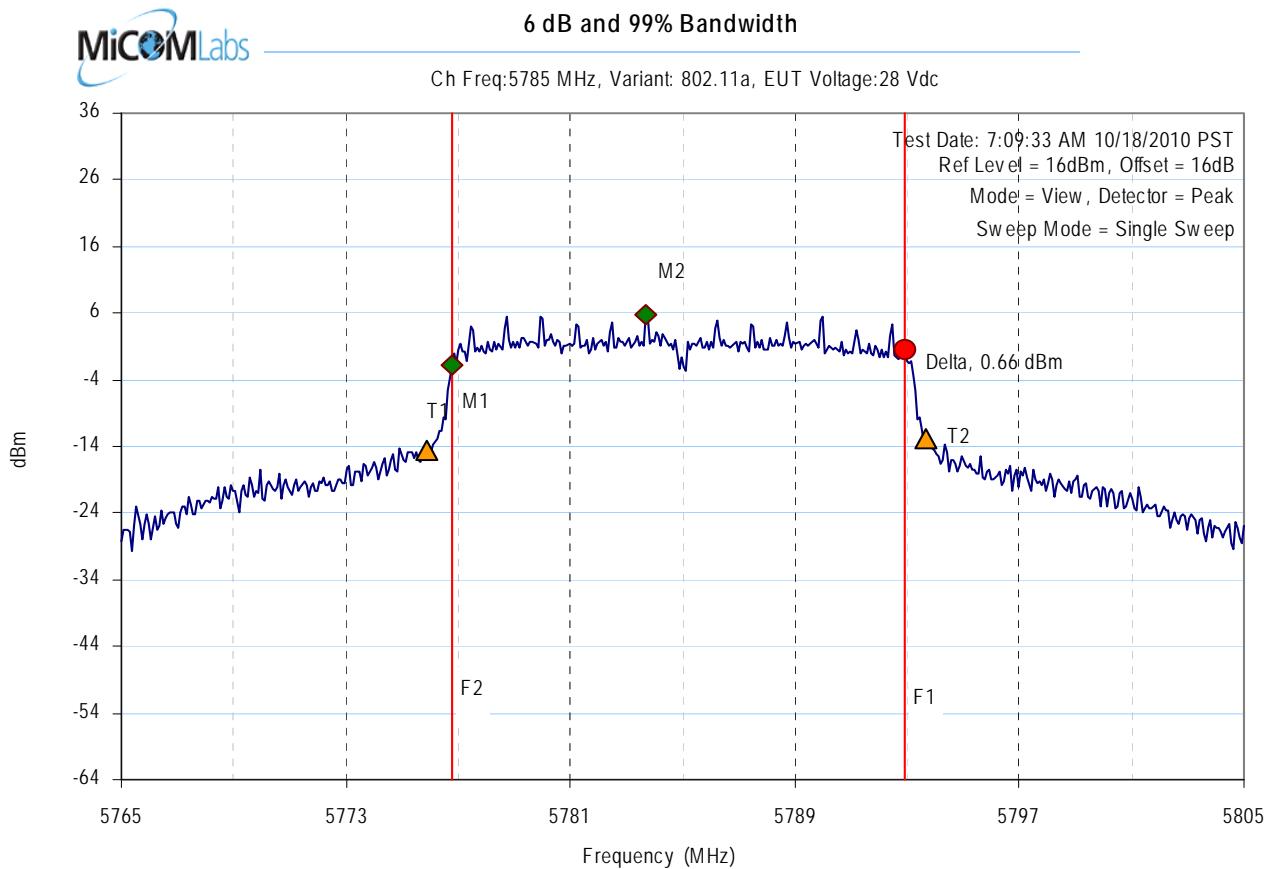
Marker : Frequency : Amplitude

Marker	Frequency (MHz)	Amplitude (dBm)
M1	5736.703407	-4.232
M2	5746.242485	5.651
Delta	5753.136273	-.797
T1	5736.703407	-4.232
T2	5753.216433	-5.326

Test Results

Parameter	Value
Center frequency	5745MHz
6dB BW(Delta-M1)	16.432866MHz
99% OBW(T2-T1)	16.593186MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

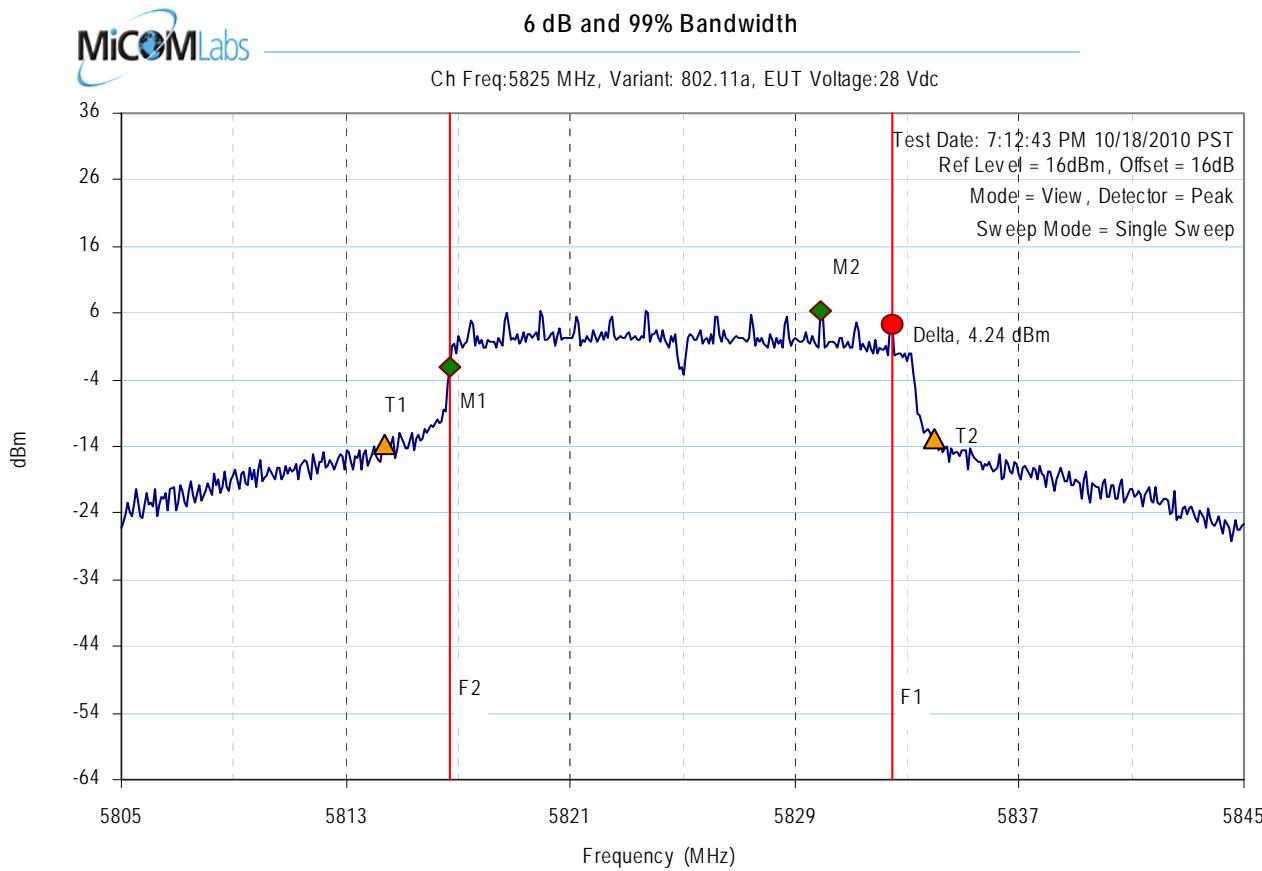
Marker : Frequency : Amplitude

M1 : 5776.783567MHz : -1.677dBm
 M2 : 5783.677355MHz : 6.225dBm
 Delta : 5792.895792MHz : .659dBm
 T1 : 5775.901804MHz : -14.669dBm
 T2 : 5793.697395MHz : -12.743dBm

Test Results

Center frequency = 5785MHz
 6dB BW(Delta-M1) = 16.112224MHz
 99% OBW(T2-T1) = 17.875752MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 40.00MHz

Marker : Frequency : Amplitude

M1 : 5816.703407MHz : -2.121dBm
 M2 : 5829.929860MHz : 6.384dBm
 Delta : 5832.494990MHz : 4.239dBm
 T1 : 5815.028911MHz : -13.748dBm
 T2 : 5833.841257MHz : -12.865dBm

Test Results

Center frequency = 5825MHz
 6dB BW(Delta-M1) = 15.791583MHz
 99% OBW(T2-T1) = 18.812346MHz

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7.2. Maximum Permissible Exposure

FCC, Part 15 Subpart C §15.247(i)
Industry Canada RSS-Gen §5.5

Calculations for Maximum Permissible Exposure Levels

$$\text{Power Density} = P_d \text{ (mW/cm}^2\text{)} = \text{EIRP}/(4\pi d^2)$$

$$\text{EIRP} = P * G$$

P = Peak output power (mW)

G = Antenna numeric gain (numeric)

d = Separation distance (cm)

$$\text{Numeric Gain} = 10 ^ (G \text{ (dBi)})/10$$

The peak power in the table below is calculated by assuming a worst case scenario where all of the EUT transmitters for both the MIMO 3x3 and legacy radio are operating simultaneously in the same band. The Peak Power in mW is the highest transmitter power measured and combined for both radios.

Because the EUT belongs to the General Population/Uncontrolled Exposure the limit of power density is 1.0 mW/cm²

Freq. Band (MHz)	Ant Gain (dBi)	Antenna Numeric Gain (numeric)	Radio1 Pk Power (dBm)	Radio2 Pk Power (dBm)	Peak Output Power (mW)	Calculated Safe Distance @ 1mW/cm ² Limit(cm)	Minimum Separation Distance (cm)
2400 – 2500	2.6	1.820	+18.73	+16.21	116.43	4.1	20.00
5725 - 5850	1.2	1.318	+20.16	+15.36	138.11	3.8	20.00

Note: for mobile or fixed location transmitters the minimum separation distance is 20cm, even if calculations indicate the MPE distance to be less.

Specification Maximum Permissible Exposure Limits

FCC §1.1310 Limit = 1mW / cm² from 1.310 Table 1

RSS-Gen §5.5 Before equipment certification is granted, the application requirements of RSS-102 shall be met.

Laboratory Measurement Uncertainty for Power Measurements

Measurement uncertainty	±1.33 dB
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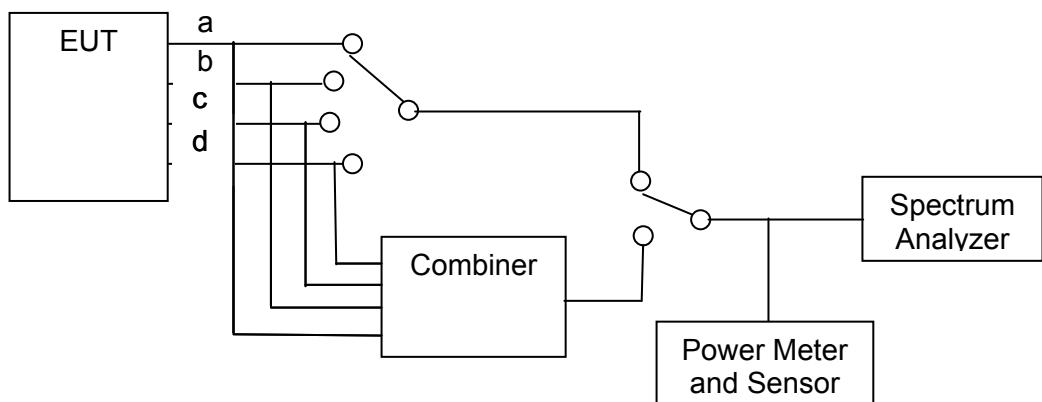
7.3. Peak Output Power

Test Procedure

The test methodology and conditions utilized for each measurement is referenced in the test results matrix. The average output power was measured per the test configuration identified below.

Per the standard measurements were taken at ambient conditions, nominal voltage.

Test Configuration



Measurement set-up for Peak Output Power

$$\text{Total Power} = A + G + Y + 10 \log (1/x) \text{ dBm}$$

$A = \text{Total Power} [10 \log_{10} (10^{a/10} + 10^{b/10} + 10^{c/10} + 10^{d/10})]$, $G = \text{Antenna Gain}$,

$Y = \text{Beam Forming Gain}$, $x = \text{Duty Cycle}$

Specification

Limits

§15.247 (b) The maximum peak output power of the intentional radiator shall not exceed the following:

§15.247 (b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands: 1.0 watt.

15.247 (b) (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

15.247 (c) Operation with directional antenna gains greater than 6 dBi.

(1) Fixed point-to-point operation:

(i) Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

(ii) Systems operating in the 5725–5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

§15.31 (e) For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-01 'Measuring RF Output Power'	0073, 0074, 0116, 0158, 0223, 0251, 0252, 0253, 0256, 0287, 0310

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Measurement Results: MIMO 802.11 b

Test Conditions:	15.247 (b)	Rel. Humidity (%):	35 to 42
Variant:	802.11 b	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A dB	Antenna Gain:	2.6 dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
2412	14.66	11.95	6.38	--	15.81	16.92	30.00	-14.19
2437	14.94	14.99	10.11	--	18.07	18.63	30.00	-11.93
2462	16.80	14.07	7.95	--	16.76	19.01	30.00	-13.24

Measurement uncertainty:	±1.33 dB
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Margins are calculated based on actual combined measurements. Calculated values are inserted for reference only and are based on individual chains.

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Measurement Results: MIMO 802.11 g

Test Conditions:	15.247 (b)	Rel. Humidity (%):	35	to	42
Variant:	802.11 g	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming	N/A	Antenna Gain:	2.6	dBi	
Applied Voltage:	28.00	Vdc			
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
2412	14.42	12.49	6.58	--	15.87	16.99	30.00	-14.13
2437	14.90	15.23	9.70	--	16.96	18.67	30.00	-13.04
2462	16.56	14.07	14.46	--	18.73	19.95	30.00	-11.27

Measurement uncertainty:	±1.33 dB
---------------------------------	----------

Margins are calculated based on actual combined measurements. Calculated values are inserted for reference only and are based on individual chains.

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Measurement Results: MIMO 802.11n HT-20

Test Conditions:	15.247 (b)	Rel. Humidity (%):	35	to	42
Variant:	802.11n HT-20	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming	N/A	Antenna Gain:	2.6	dBi	
Applied Voltage:	28.00	Vdc			
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)	a	b	c	d	Combined	Calculated	
2412	14.31	12.31	12.55	--	17.67	17.92	30.00	-12.33
2437	14.67	15.07	15.07	--	18.31	19.71	30.00	-11.69
2462	16.36	13.93	14.32	--	18.45	19.78	30.00	-11.55

Measurement uncertainty:	±1.33 dB
---------------------------------	----------

Margins are calculated based on actual combined measurements. Calculated values are inserted for reference only and are based on individual chains.

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Measurement Results: MIMO 802.11n HT-40

Test Conditions:	15.247 (b)	Rel. Humidity (%):	35	to	42
Variant:	802.11n HT-40	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming	N/A	Antenna Gain:	2.6	dB	
Applied Voltage:	28.00	Vdc			
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)							
MHz	a	b	c	d	Combined	Calculated	dBm	dB
2422	14.12	13.05	13.56	--	17.68	18.37	30.00	-12.32
2437	12.99	12.78	12.54	--	16.50	17.55	30.00	-13.50
2452	14.96	13.68	13.67	--	17.55	18.92	30.00	-12.45

Measurement uncertainty:	±1.33 dB
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Margins are calculated based on actual combined measurements. Calculated values are inserted for reference only and are based on individual chains.

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Measurement Results: MIMO 802.11a

Test Conditions:	15.247 (b)	Rel. Humidity (%):	35	to	42
Variant:	802.11a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain	N/A	Antenna Gain:	1.2	dB	
Applied Voltage:	28.00	Vdc			
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d				
5745	13.67	14.43	12.59	--	18.94	18.40	30.00	-11.06
5785	14.41	15.06	14.20	--	19.30	19.34	30.00	-10.70
5825	15.38	14.89	16.00	--	20.16	20.22	30.00	-9.84

Measurement uncertainty:	±1.33 dB
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Margins are calculated based on actual combined measurements. Calculated values are inserted for reference only and are based on individual chains.

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Measurement Results: MIMO 802.11n HT-20

Test Conditions:	15.247 (b)	Rel. Humidity (%):	35	to	42
Variant:	802.11n HT-20	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming	N/A	Antenna Gain:	1.2	dB	
Applied Voltage:	28.00	Vdc			
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)							
MHz	a	b	c	d	Combined	Calculated	dBm	dB
5745	13.65	14.44	12.29	--	18.55	18.32	30.00	-11.45
5785	14.39	15.06	11.07	--	18.57	18.59	30.00	-11.43
5825	15.37	14.94	12.91	--	19.30	19.30	30.00	-10.70

Measurement uncertainty:	±1.33 dB
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Margins are calculated based on actual combined measurements. Calculated values are inserted for reference only and are based on individual chains.

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Measurement Results: MIMO 802.11n HT-40

Test Conditions:	15.247 (b)	Rel. Humidity (%):	35	to	42
Variant:	802.11n HT-40	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain	N/A dB	Antenna Gain:	1.2	dB	
Applied Voltage:	28.00 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d				
5755	12.79	14.05	8.17	--	16.91	17.07	30.00	-13.09
5785	13.88	14.62	9.78	--	17.79	17.99	30.00	-12.21
5815	14.82	14.51	11.16	--	18.56	18.55	30.00	-11.44

Measurement uncertainty:	±1.33 dB
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Margins are calculated based on actual combined measurements. Calculated values are inserted for reference only and are based on individual chains.

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Measurement Results: Legacy 802.11b

Test Conditions:	15.247 (b)	Rel. Humidity (%):	35	to	42
Variant:	802.11 b	Ambient Temp. (°C):	19	to	22
TPC:	N/A	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain	N/A dB	Antenna Gain:	2.6	dB	
Applied Voltage:	28.00 Vdc				
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d				
2412	14.61	--	--	--	--	--	30.00	-15.39
2437	14.88	--	--	--	--	--	30.00	-15.12
2462	15.95	--	--	--	--	--	30.00	-14.05

Measurement uncertainty:	±1.33 dB
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Measurement Results: Legacy 802.11g

Test Conditions:	15.247 (b)	Rel. Humidity (%):	35 to 42
Variant:	802.11 g	Ambient Temp. (°C):	19 to 22
TPC:	N/A	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming	N/A dB	Antenna Gain:	2.6 dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
2412	14.56	--	--	--	--	--	30.00	-15.44
2437	14.87	--	--	--	--	--	30.00	-15.13
2462	16.21	--	--	--	--	--	30.00	-13.79

Measurement uncertainty:	±1.33 dB
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Measurement Results: Legacy 802.11a

Test Conditions:	15.247 (b)	Rel. Humidity (%):	35	to	42
Variant:	802.11a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain	N/A	Antenna Gain:	1.2	dB	
Applied Voltage:	28.00	Vdc			
Notes 1:					
Notes 2:					

Test Frequency	Measured Peak Power				Total Power (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d				
5745	13.99	--	--	--			30.00	-16.01
5785	14.52	--	--	--			30.00	-15.48
5825	15.36	--	--	--			30.00	-14.64

Measurement uncertainty:	±1.33 dB
---------------------------------	----------

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7.4. Peak Power Spectral Density

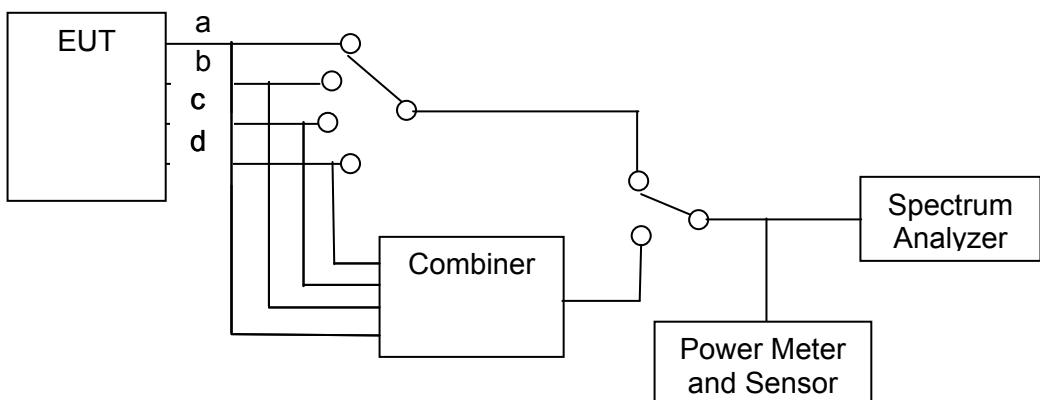
Test Procedure

The test methodology and conditions utilized for each measurement is referenced in the following test results matrix. RF output power, transmit power control and power density were measured per the Test Configuration identified below.

Testing was performed on the highest and lowest power settings of the equipment.

Per the standard measurements were taken at ambient and extreme temperature conditions at nominal and extreme voltage levels.

Test Configuration



Measurement set-up for Peak Power Spectral Density

Specification

Peak Power Spectral Density Limits

§15.247 (e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than +8 dBm in any 3 kHz band during any time interval of continuous transmission

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-01 'Measuring RF Output Power'	0073, 0074, 0116, 0158, 0223, 0251, 0252, 0253, 0256, 0287, 0310

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
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Measurement results for MIMO 802.11 b

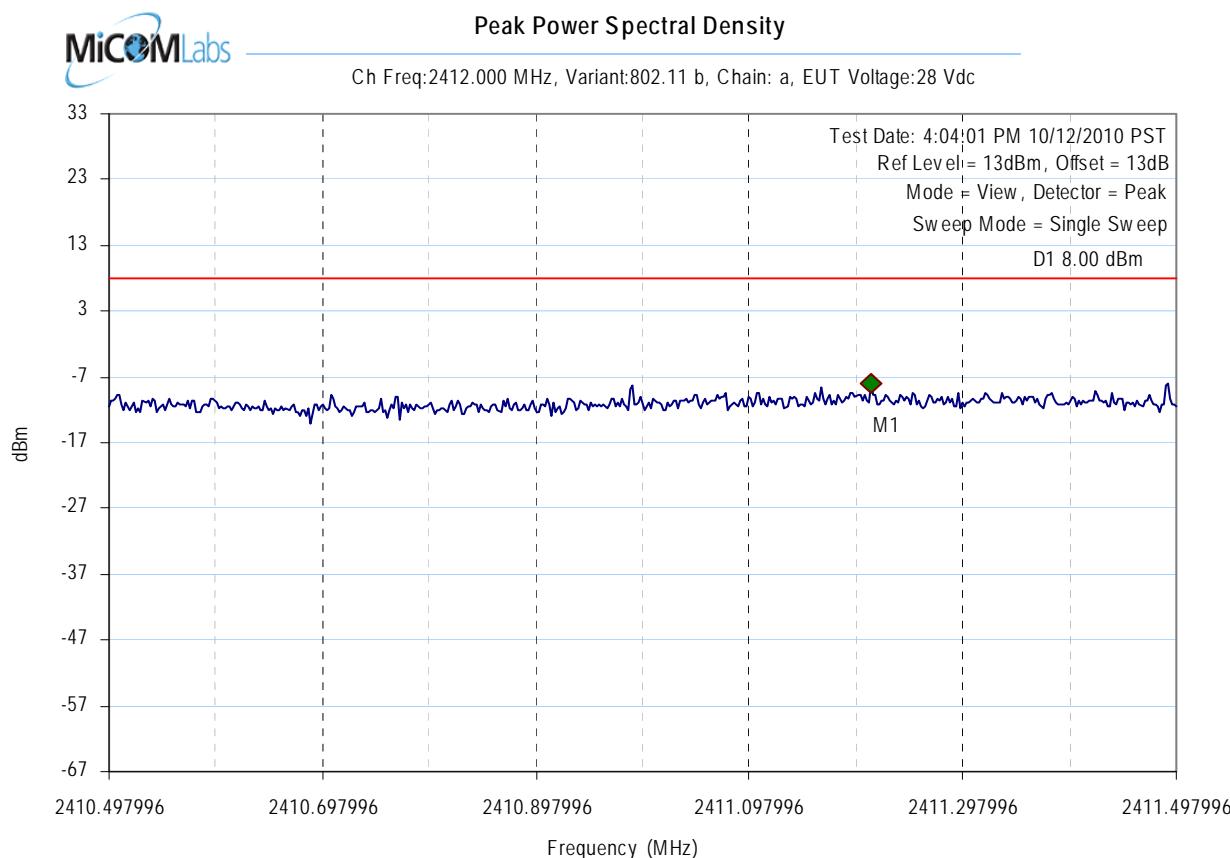
Test Conditions:	15.247 (e)	Rel. Humidity (%):	35	to	42
Variant:	802.11 b	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain	N/A	Antenna Gain:	2.6	dBi	
Applied Voltage:	28.00	Vdc			
Notes 1:					
Notes 2:					

Test Frequency	Measured Power Density				Total Peak Power Spectral Density (dBm)		Limit	Margin
	RF Port (dBm)	a	b	c	d	Combined	Calculated	
MHz							dBm	dB
2412.000	-8.03	-9.35	-14.51	--	-3.04	-5.10	8.00	-11.04
2437.000	-7.02	-7.03	-12.06	--	-1.99	-3.38	8.00	-9.99
2462.000	-5.73	-7.77	-13.03	--	-2.50	-3.15	8.00	-10.50

Measurement uncertainty:	± 1.33 dB
---------------------------------	-----------

Margins are calculated based on actual combined measurements. Calculated values are inserted for reference only and are based on individual chains.

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

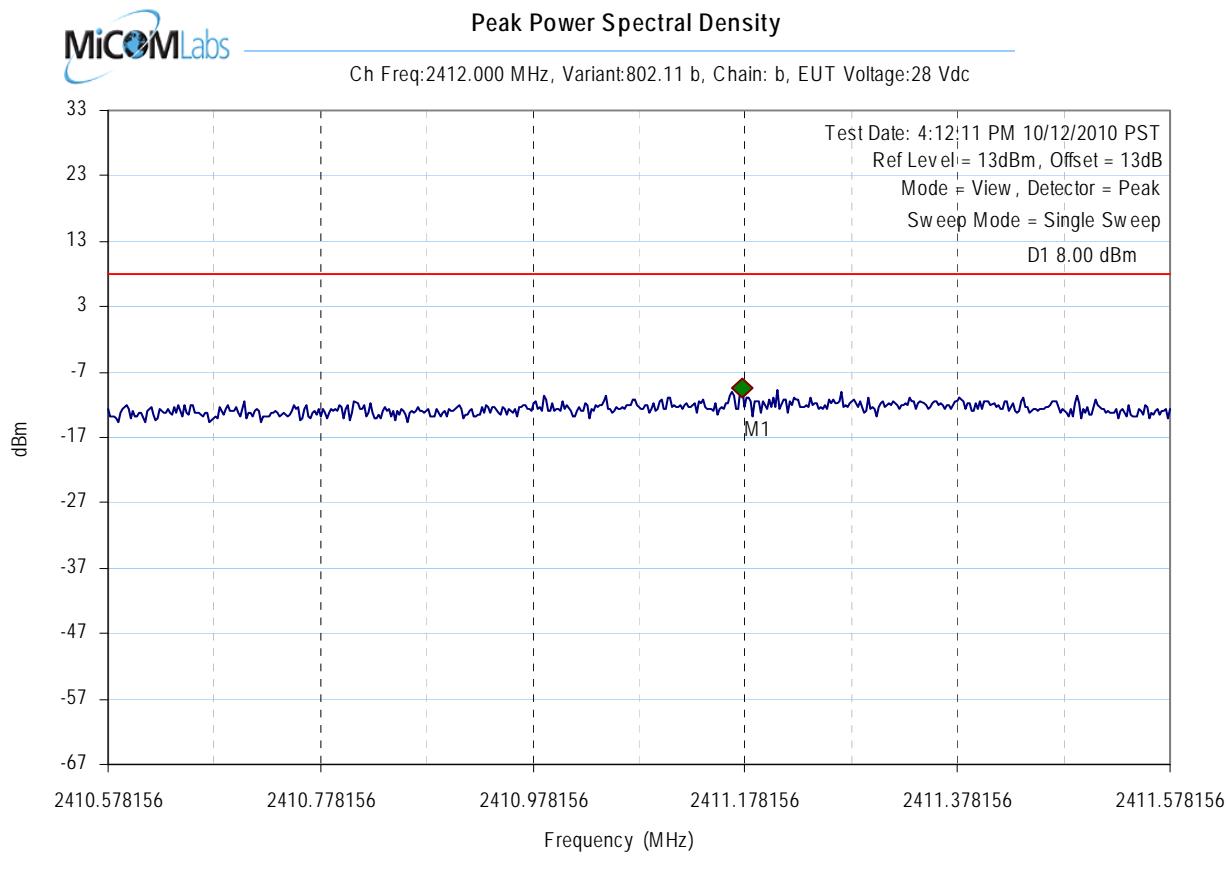
Marker : Frequency : Amplitude

M1 : 2411.211423MHz : -8.025dBm

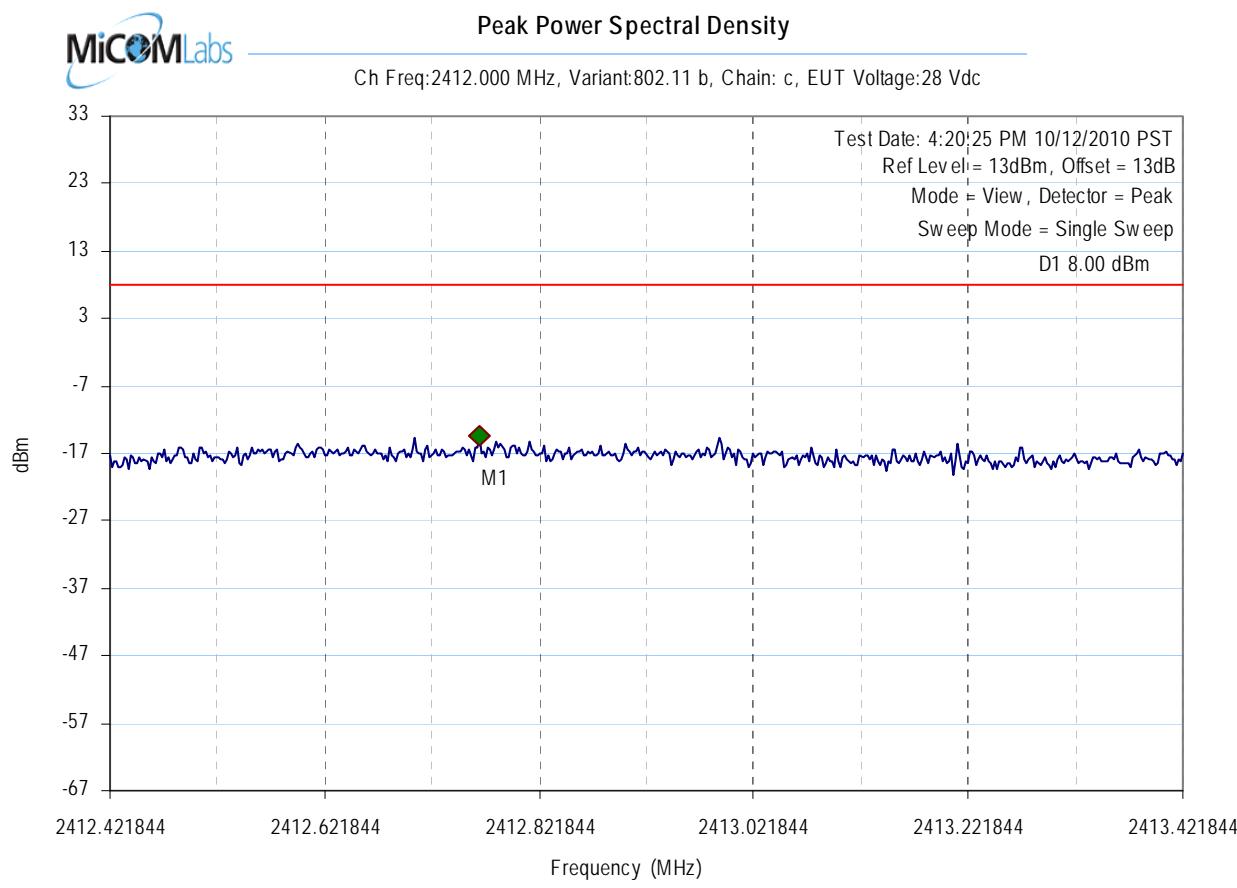
Test Results

Center frequency = 2412MHz

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



Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

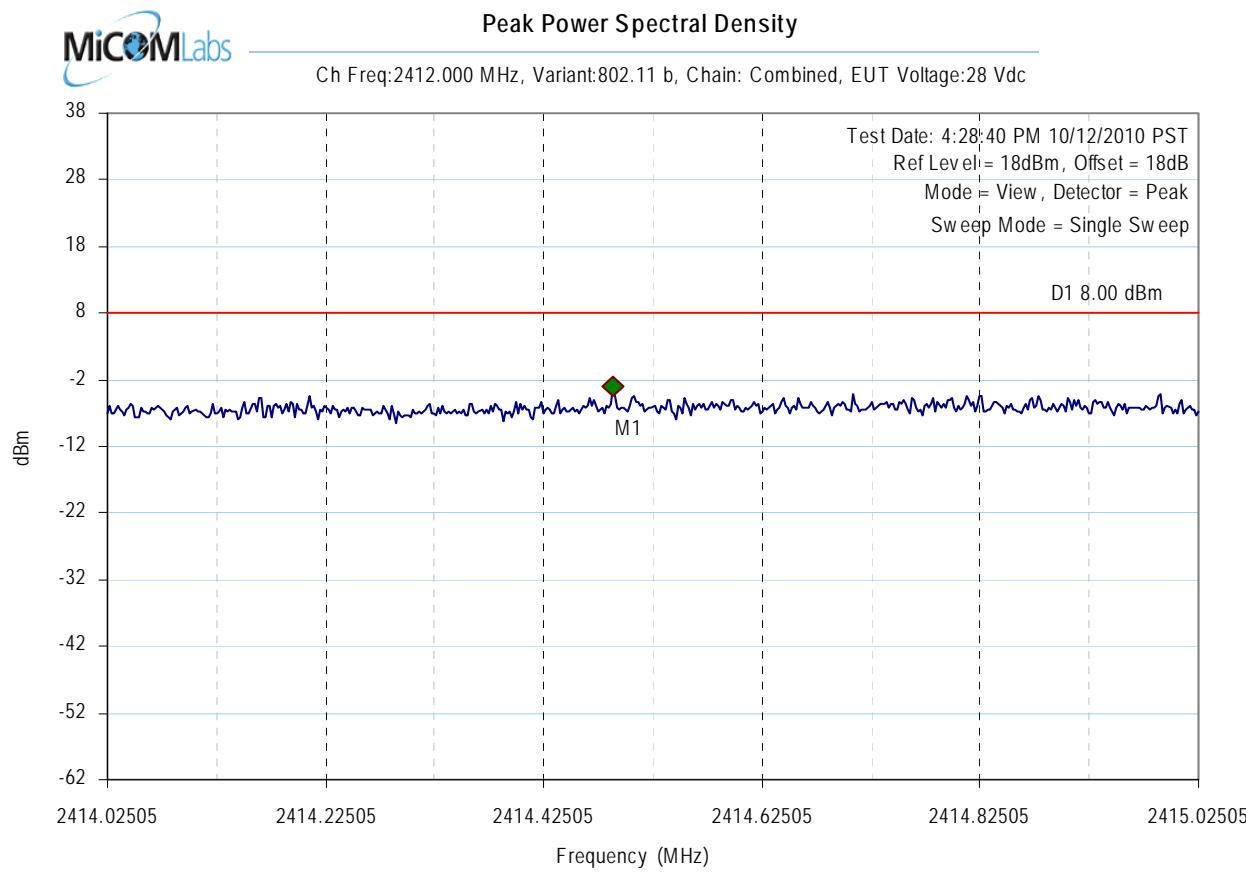
Marker : Frequency : Amplitude

M1 : 2412.766533MHz : -14.510dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

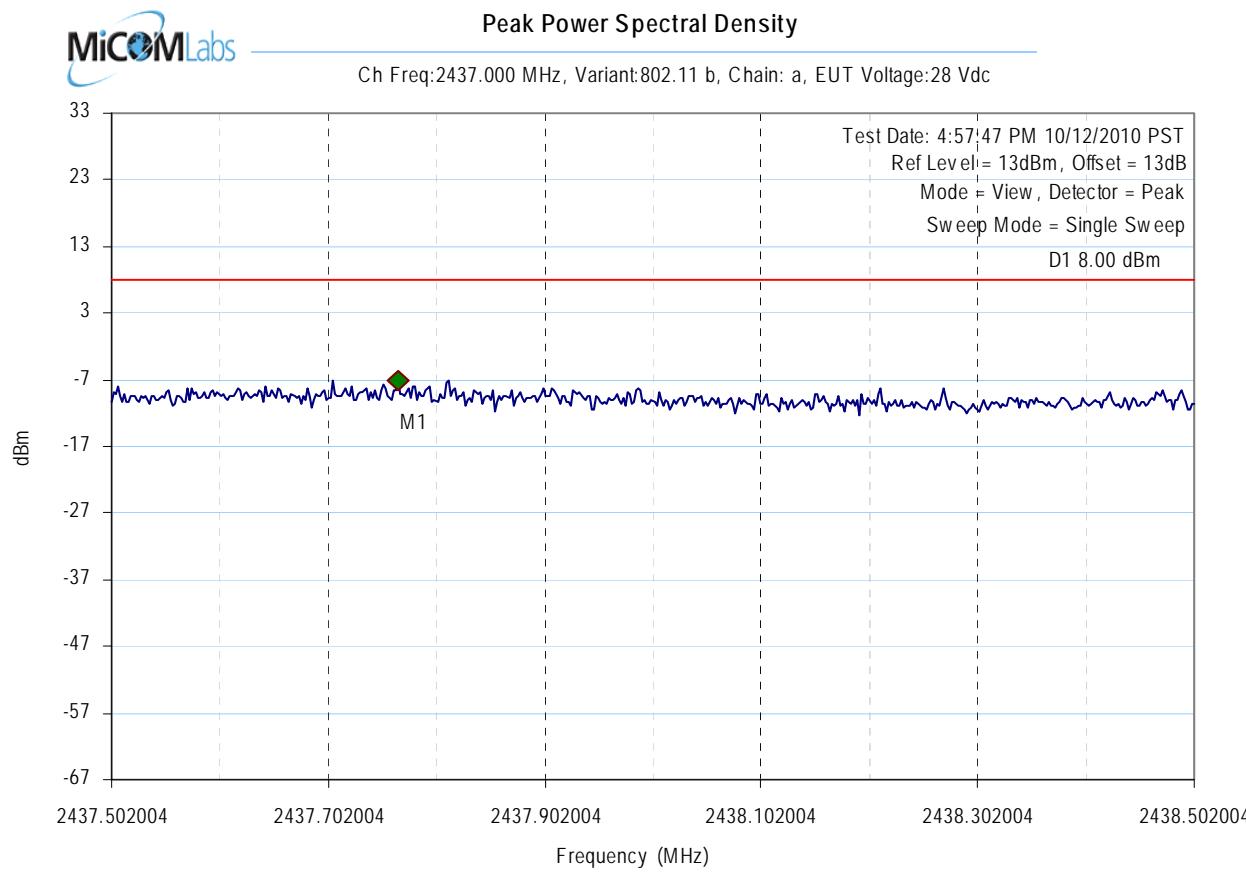
Marker : Frequency : Amplitude

M1 : 2414.487976MHz : -3.043dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

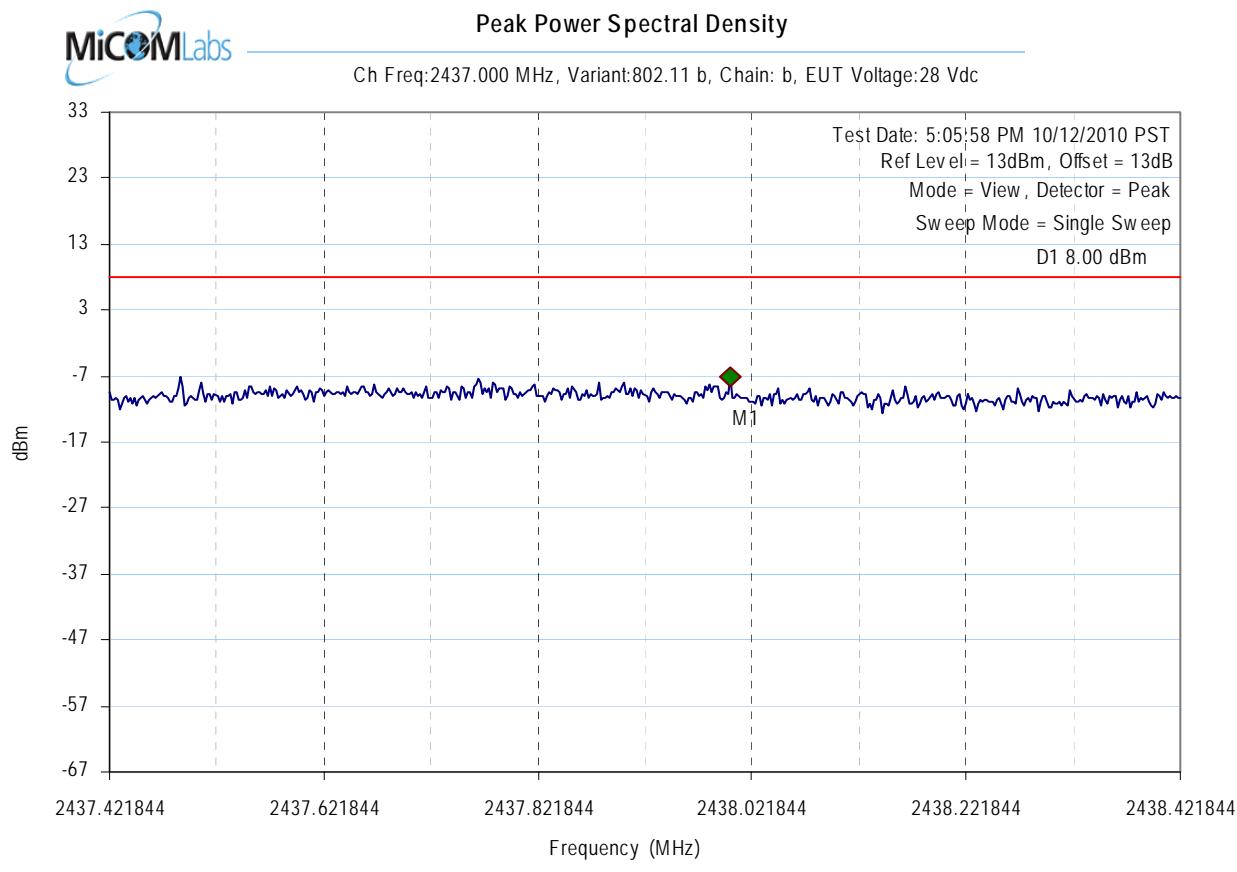
Marker : Frequency : Amplitude

M1 : 2437.766533MHz : -7.020dBm

Test Results

Center frequency = 2437MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

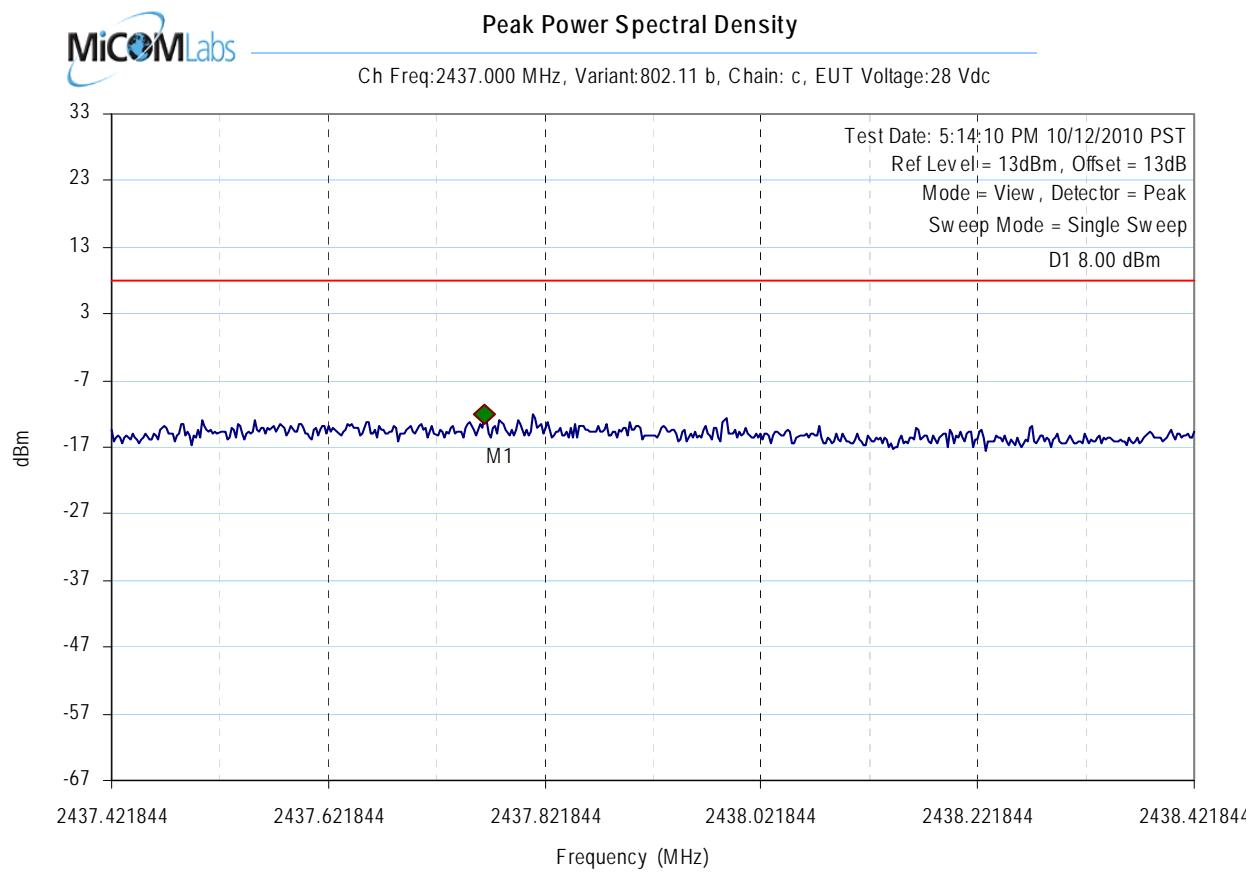
Marker : Frequency : Amplitude

M1 : 2438.001002MHz : -7.028dBm

Test Results

Center frequency = 2437MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

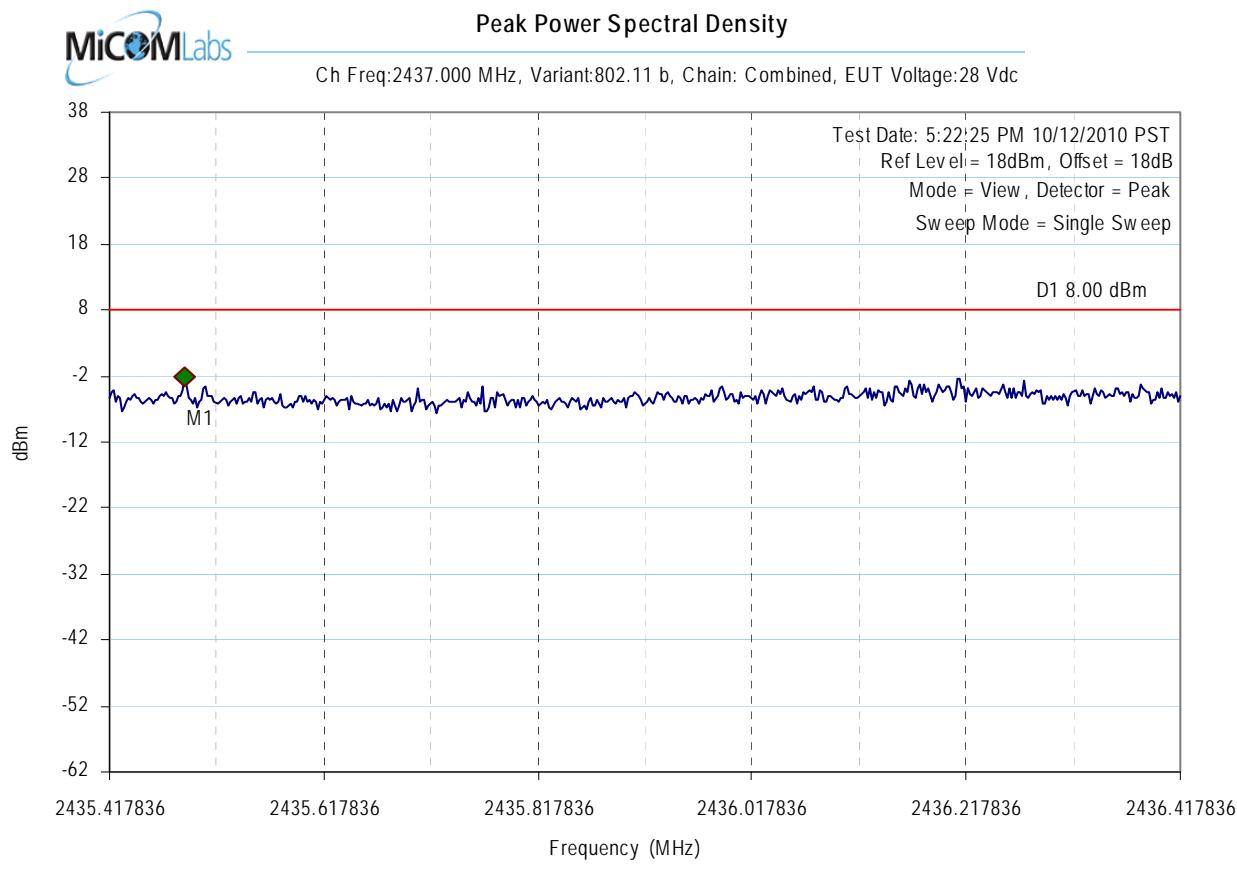
Marker : Frequency : Amplitude

M1 : 2437.766533MHz : -12.056dBm

Test Results

Center frequency = 2437MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

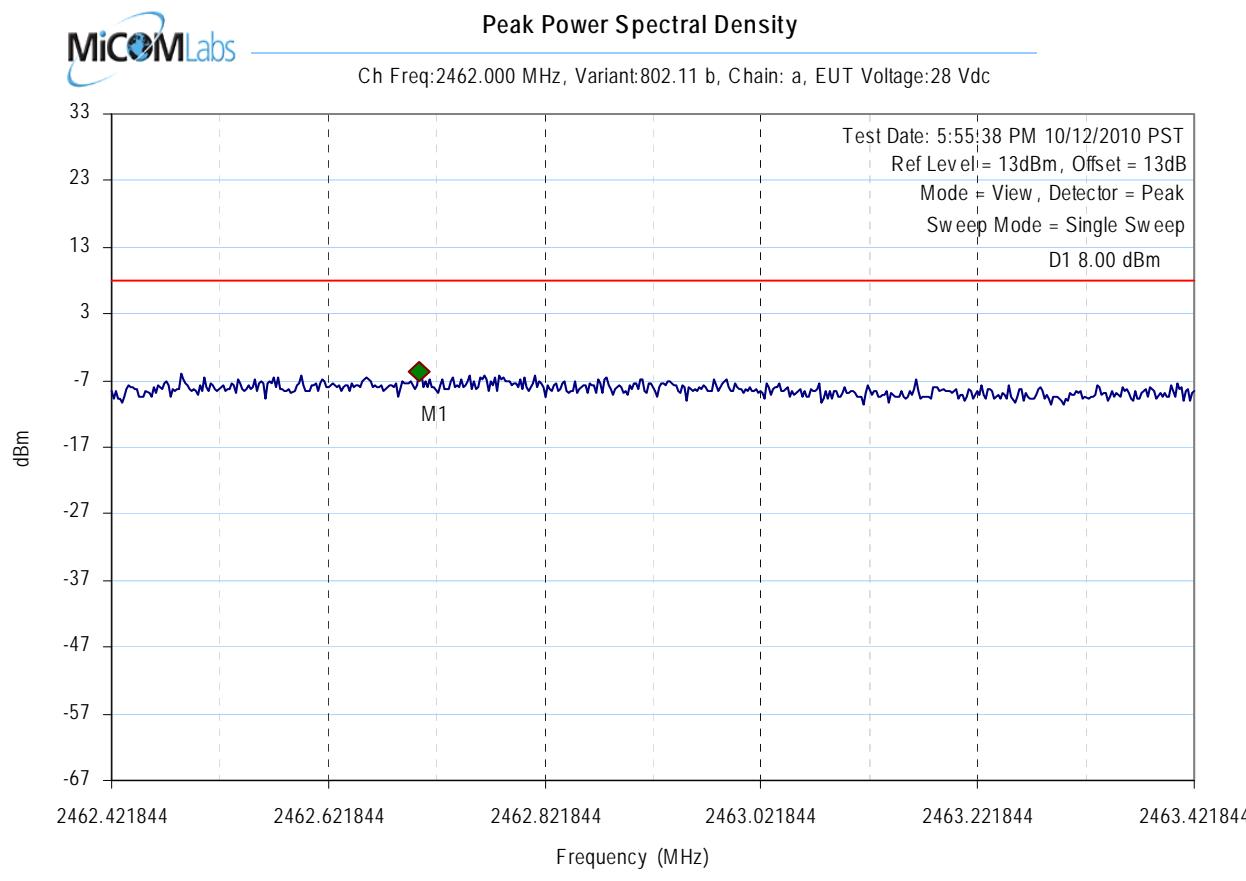
Marker : Frequency : Amplitude

M1 : 2435.487976MHz : -1.994dBm

Test Results

Center frequency = 2437MHz

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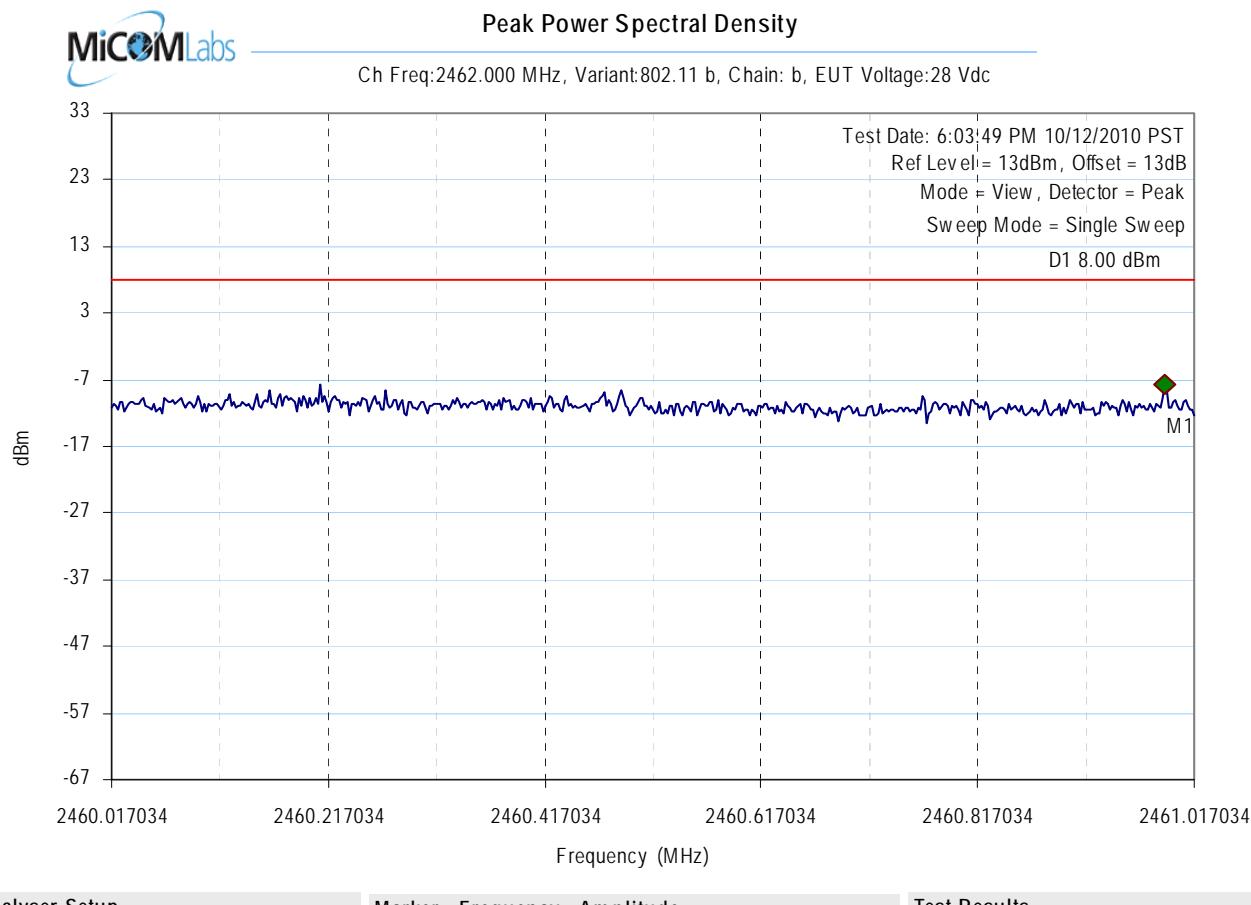
Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

Test Results

Center frequency = 2462MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Attenuation (dB) = 20

Span = 1.00MHz

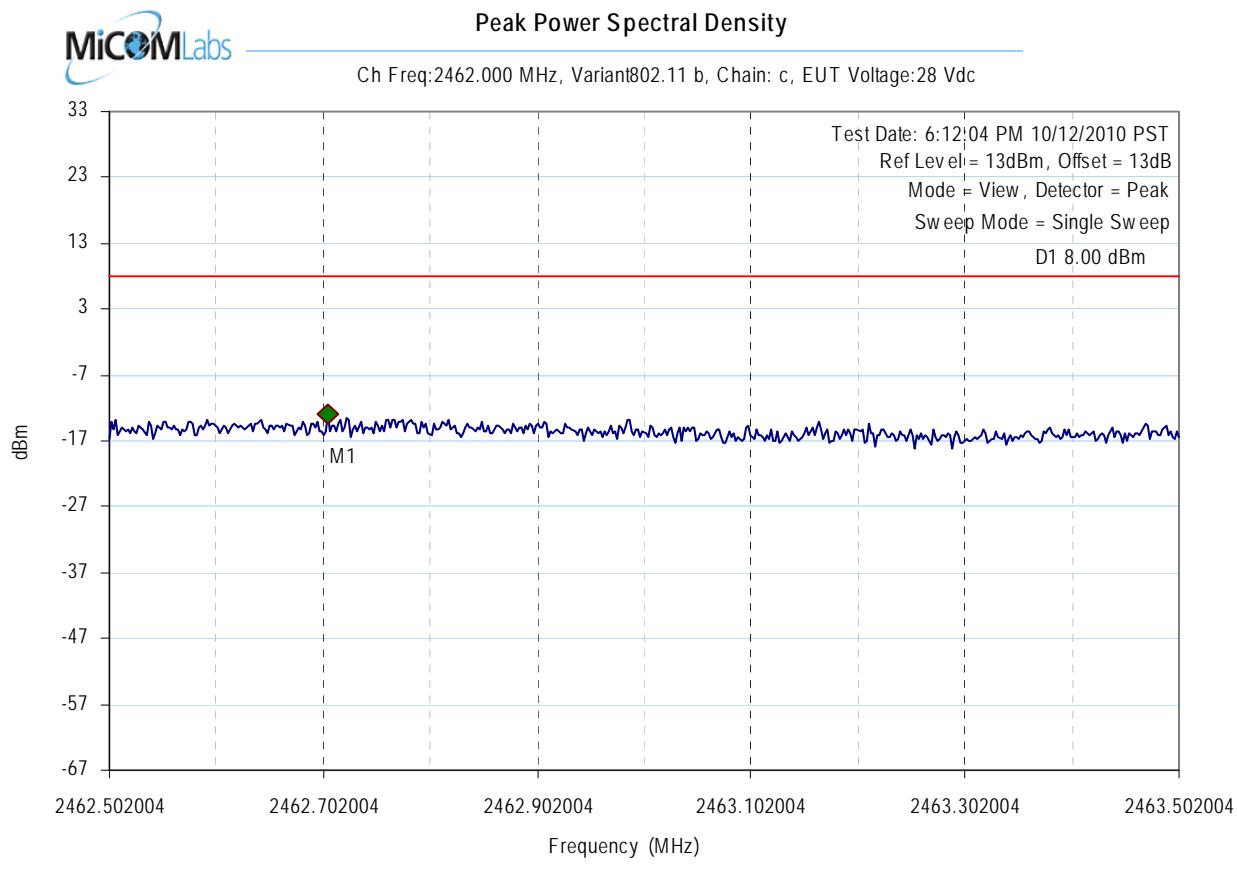
Marker : Frequency : Amplitude

M1 : 2460.988978MHz : -7.765dBm

Test Results

Center frequency = 2462MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

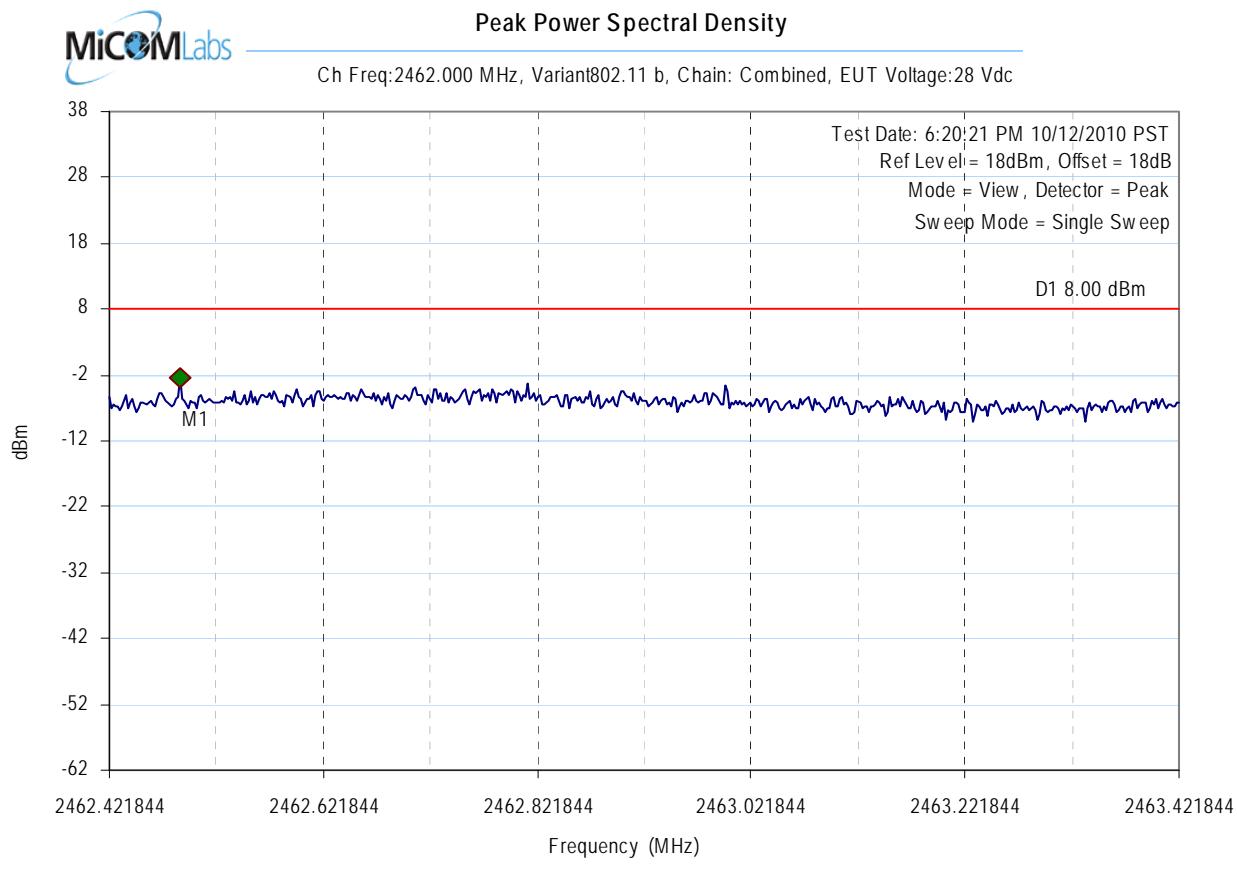
RF Atten (dB) = 20

Span = 1.00MHz

Test Results

Center frequency = 2462MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

Marker : Frequency : Amplitude

M1 : 2462.487976MHz : -2.504dBm

Test Results

Center frequency = 2462MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 132 of 362

Measurement results for MIMO 802.11 g

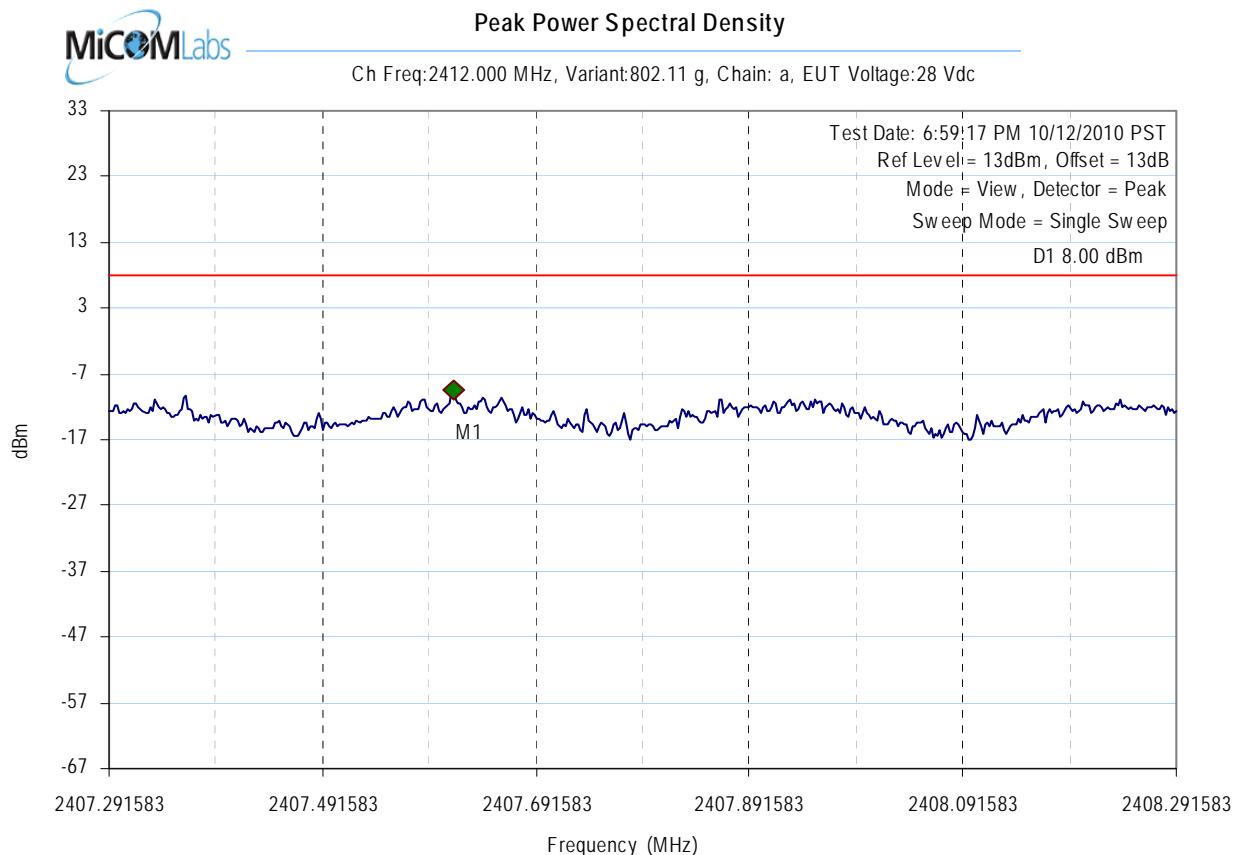
Test Conditions:	15.247 (e)	Rel. Humidity (%):	35 to 42
Variant:	802.11 g	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A dB	Antenna Gain:	2.6 dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

Test Frequency	Measured Power Density				Total Peak Power Spectral Density (dBm)		Limit	Margin
	RF Port (dBm)	a	b	c	d	Combined	Calculated	
MHz							dBm	dB
2412.000	-9.37	-12.07	-16.27	--	-5.11	-6.96	8.00	-13.11
2437.000	-2.40	-7.53	-2.33	--	-3.85	1.26	8.00	-11.85
2462.000	-7.12	-8.34	-9.50	--	-0.71	-3.44	8.00	-8.71

Measurement uncertainty:	± 1.33 dB
---------------------------------	-----------

Margins are calculated based on actual combined measurements. Calculated values are inserted for reference only and are based on individual chains.

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

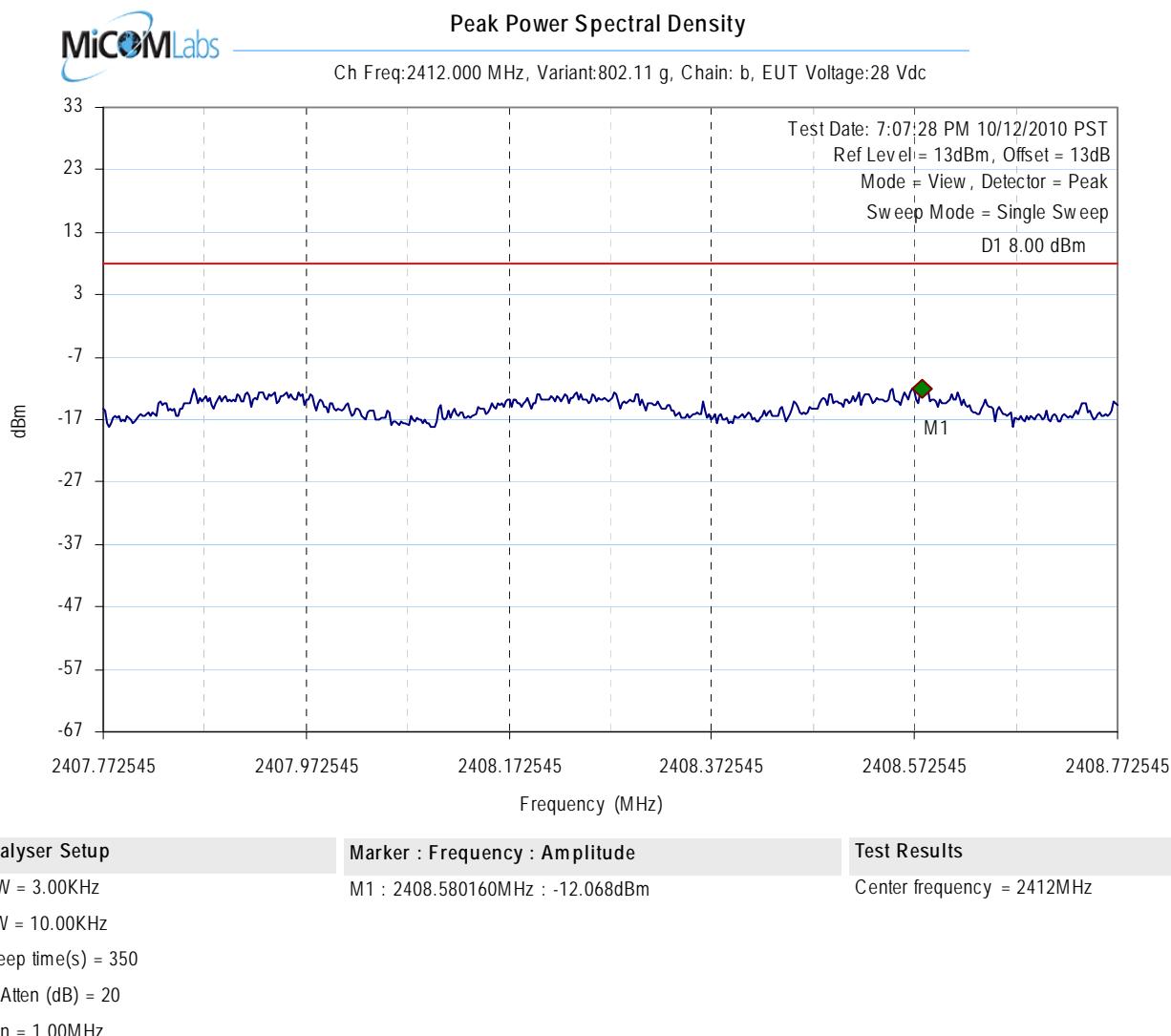
Marker : Frequency : Amplitude

M1 : 2407.614228MHz : -9.367dBm

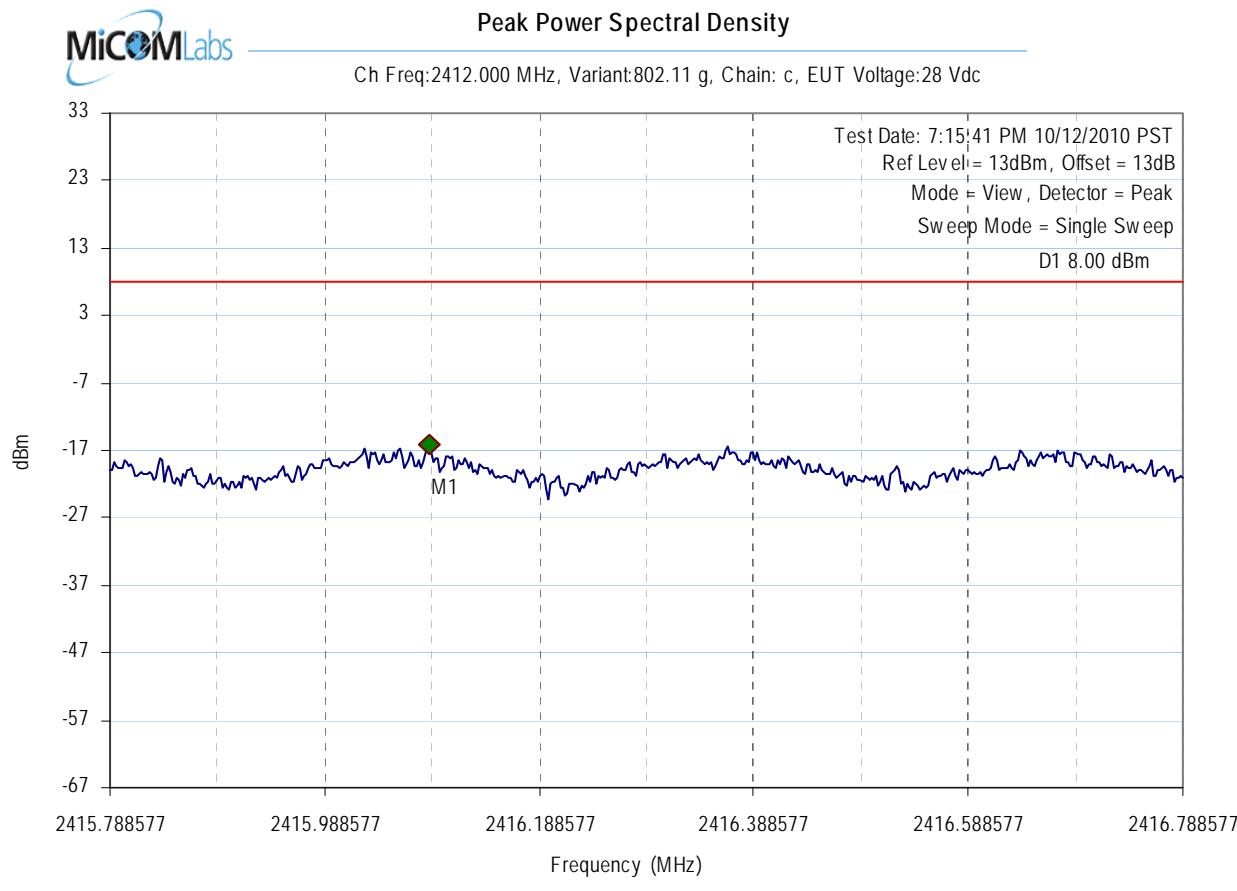
Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

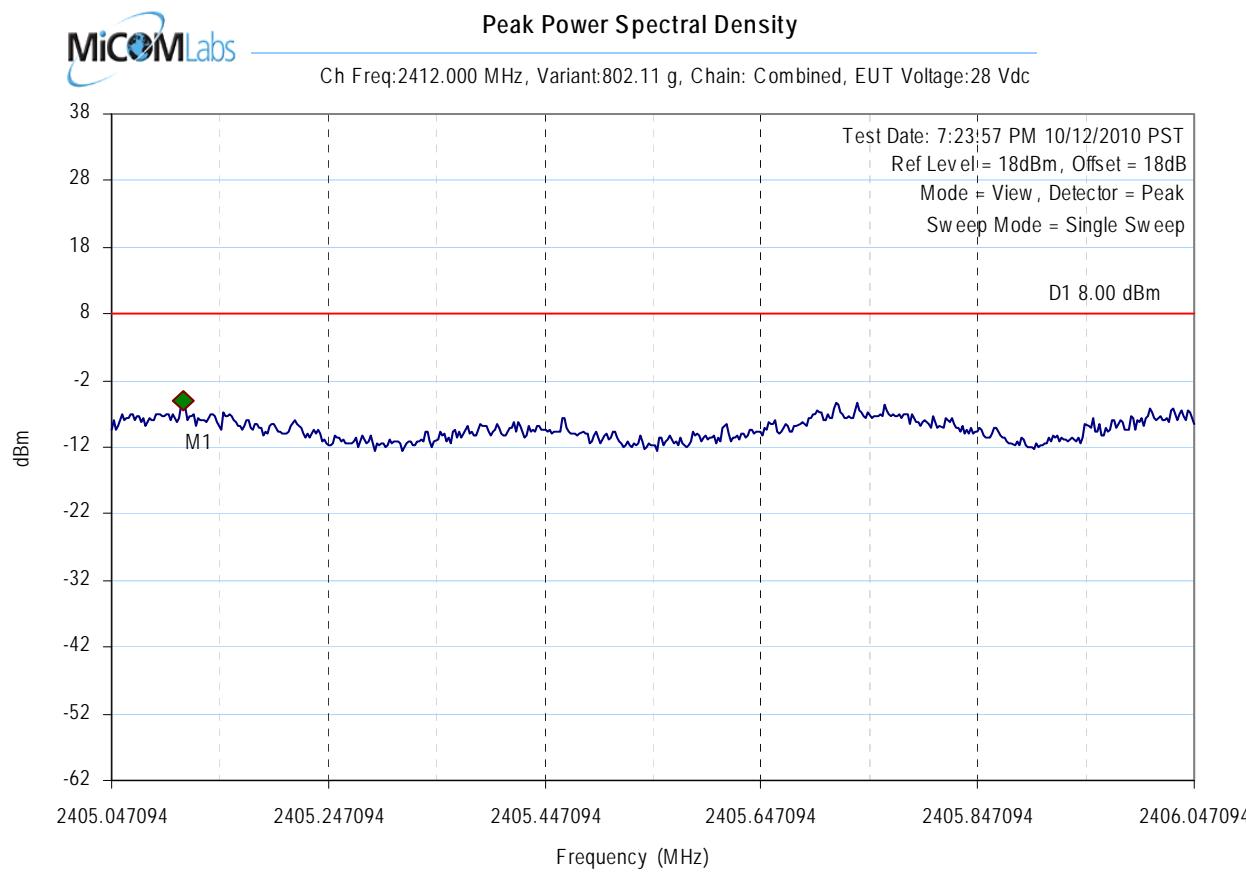
Marker : Frequency : Amplitude

M1 : 2416.087174MHz : -16.270dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

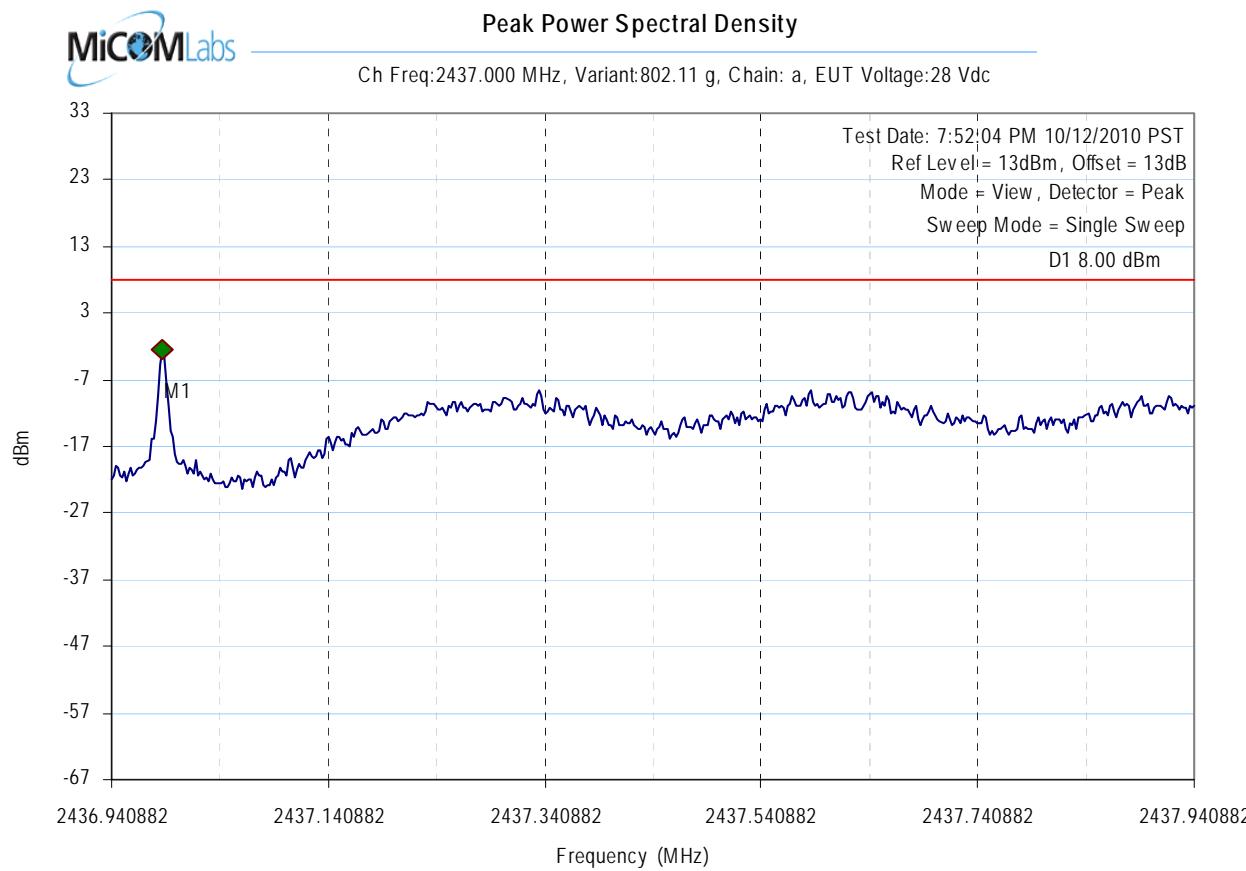
Marker : Frequency : Amplitude

M1 : 2405.113226MHz : -5.111dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

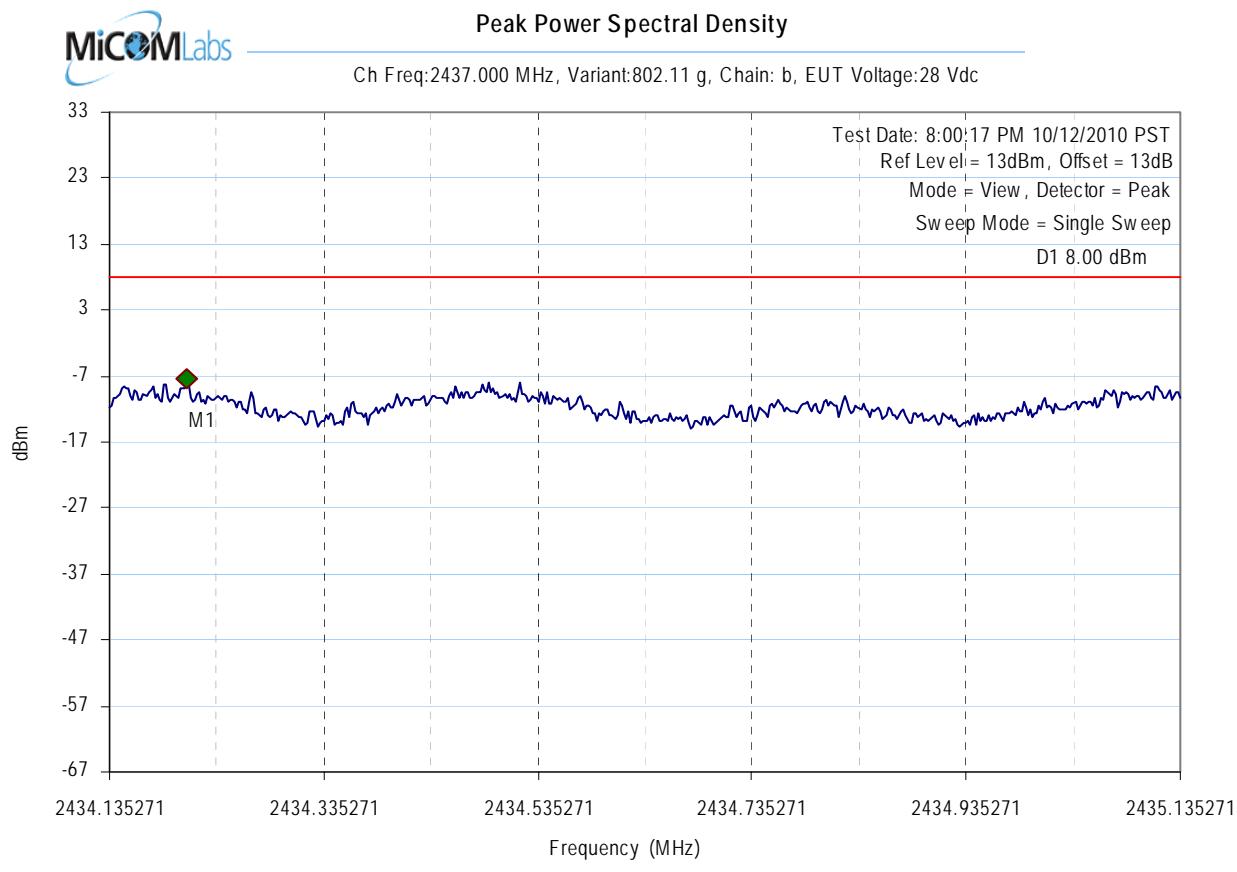
Marker : Frequency : Amplitude

M1 : 2436.986974MHz : -2.400dBm

Test Results

Center frequency = 2437MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

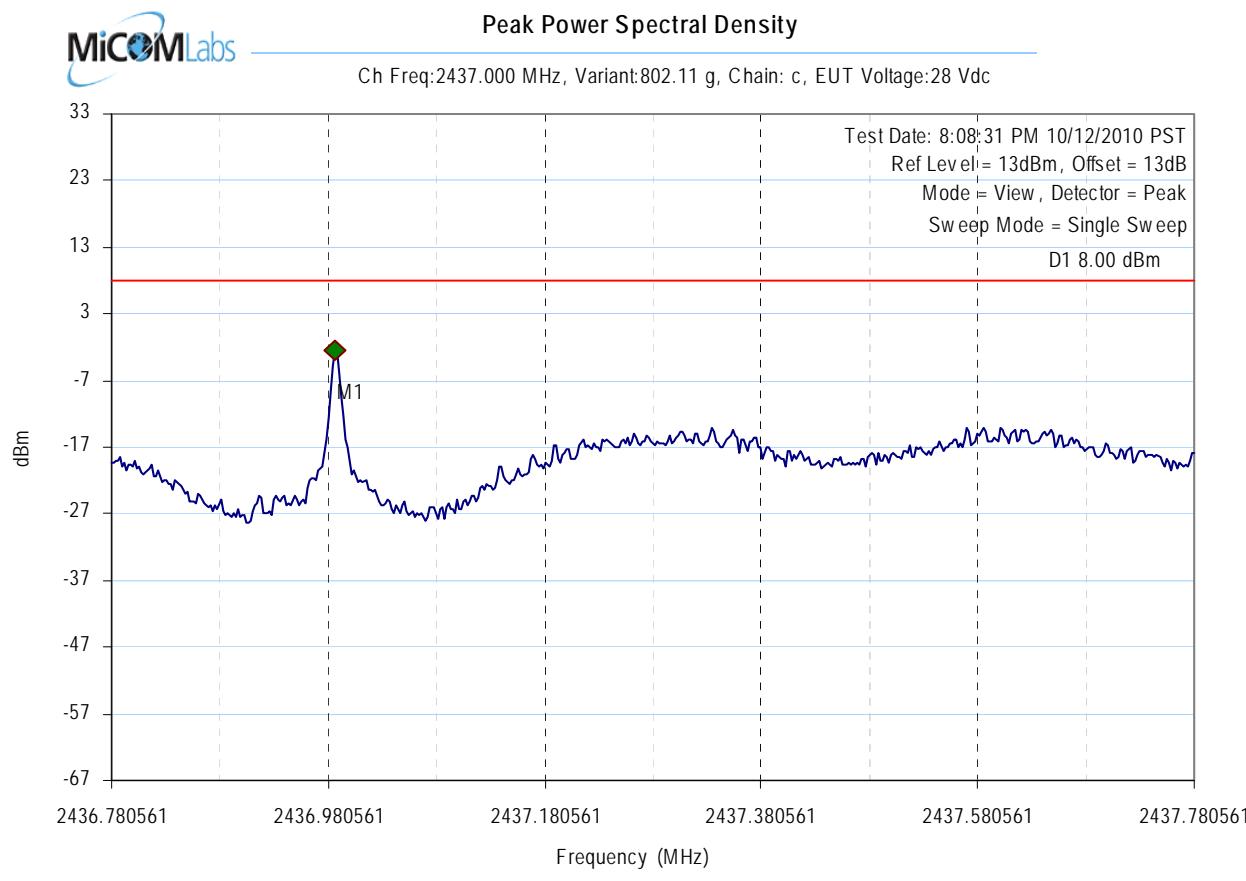
Marker : Frequency : Amplitude

M1 : 2434.207415MHz : -7.525dBm

Test Results

Center frequency = 2437MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

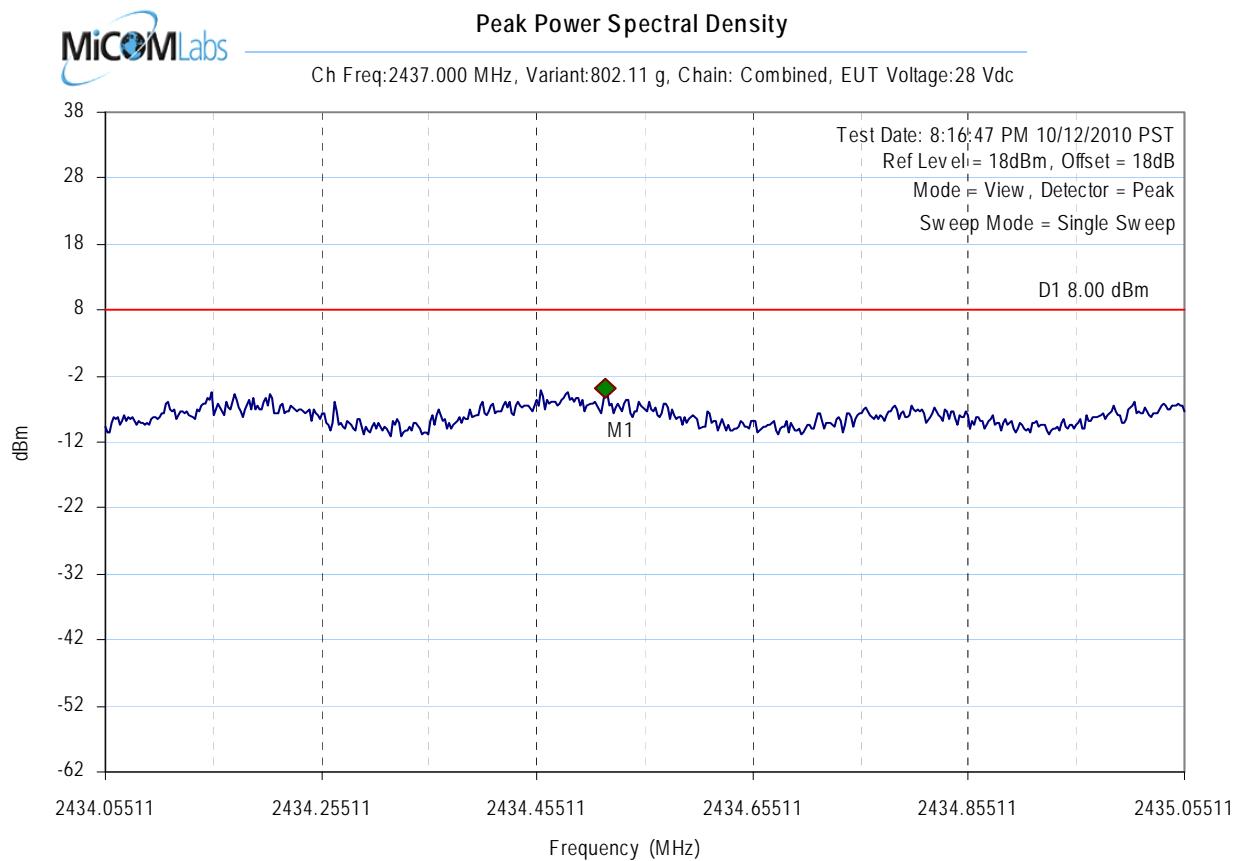
Marker : Frequency : Amplitude

M1 : 2436.986974MHz : -2.330dBm

Test Results

Center frequency = 2437MHz

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Analyser Setup

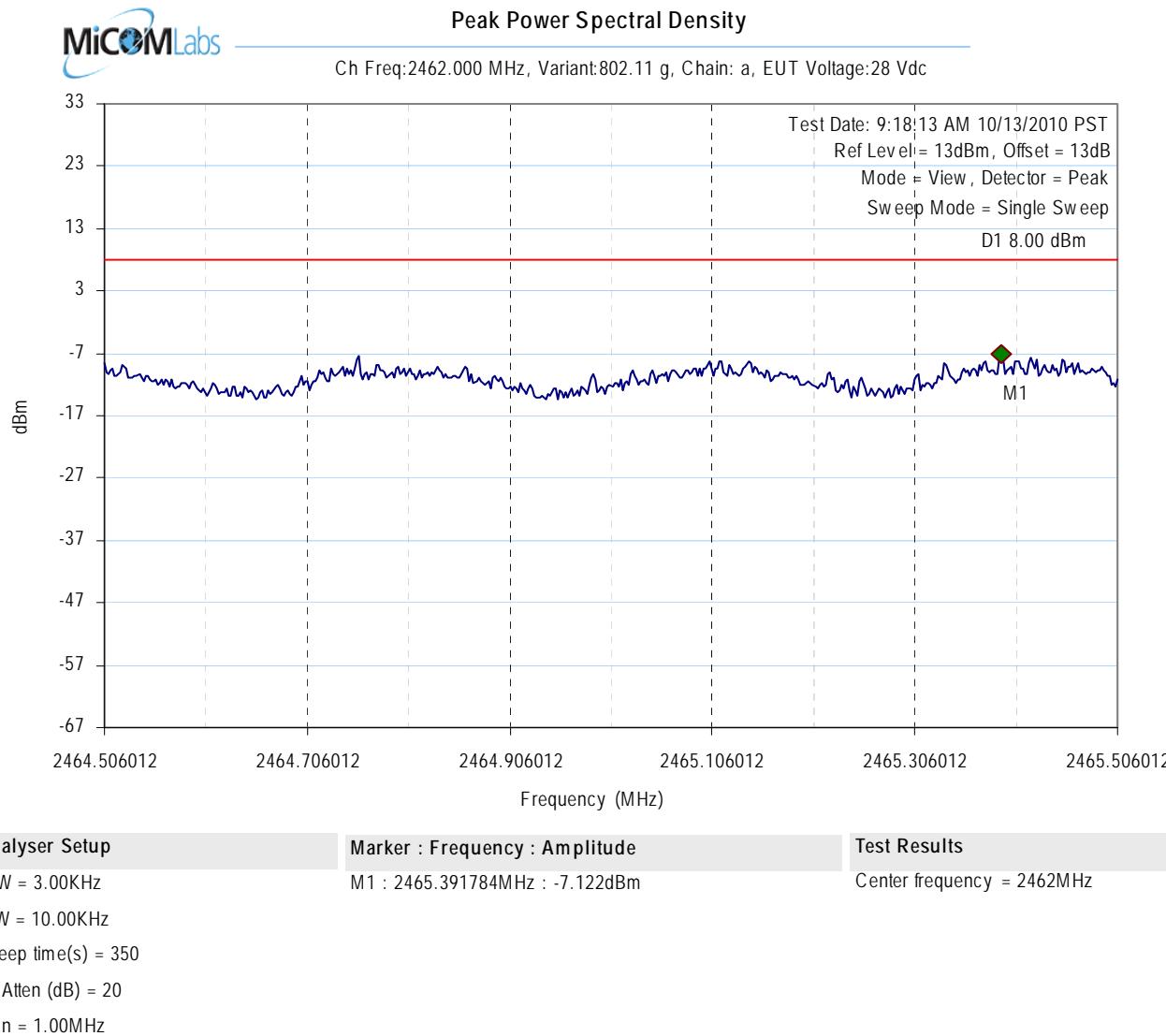
RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

Marker : Frequency : Amplitude

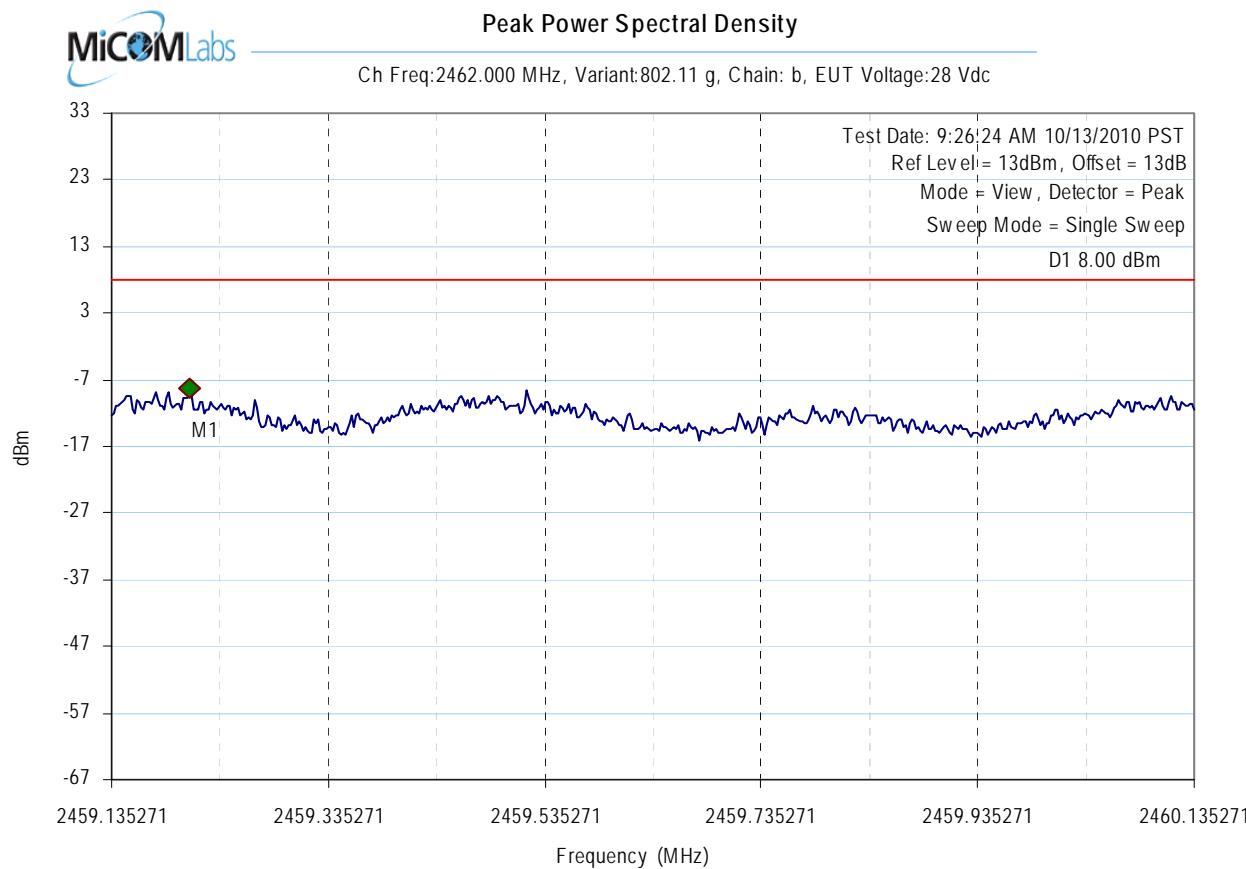
Test Results

Center frequency = 2437MHz

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



Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Attenuation (dB) = 20
 Span = 1.00MHz

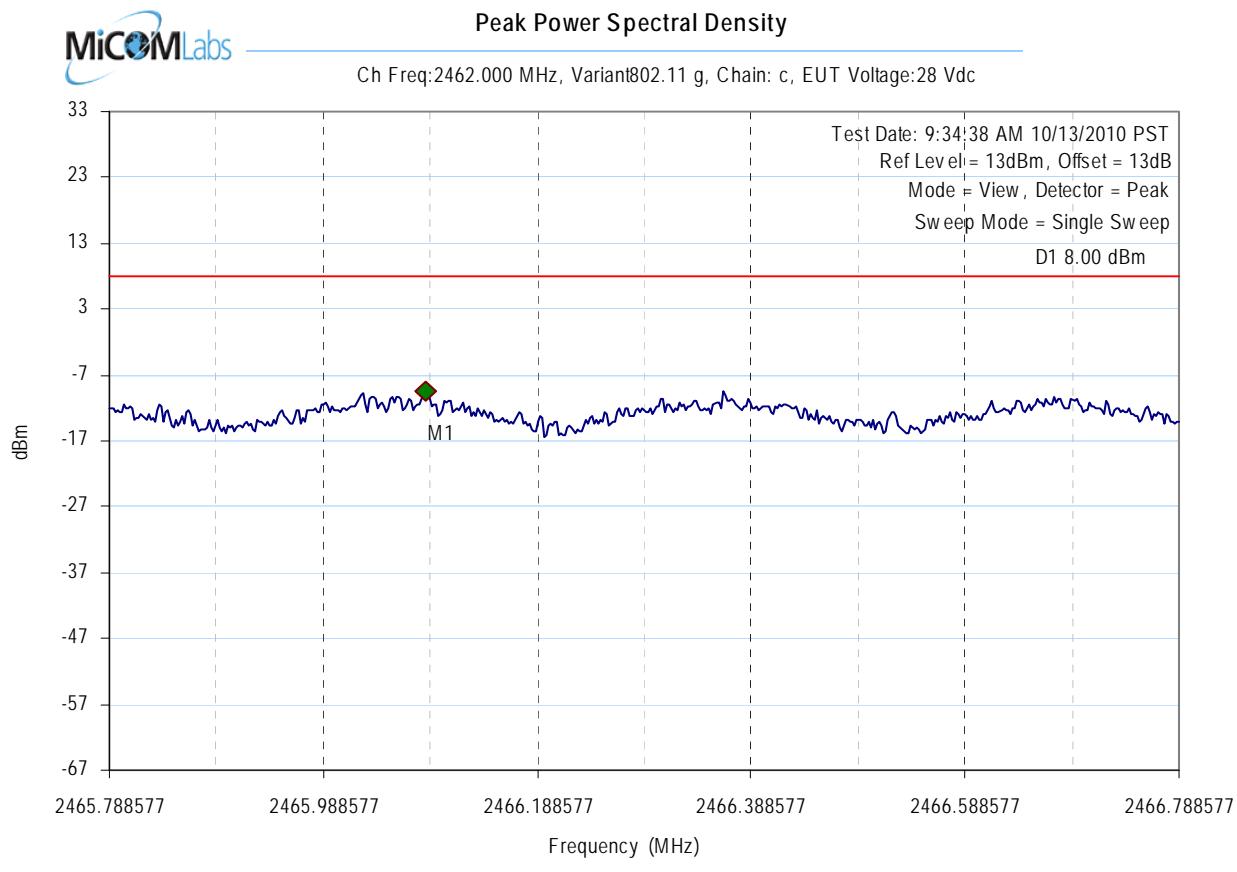
Marker : Frequency : Amplitude

M1 : 2459.207415MHz : -8.336dBm

Test Results

Center frequency = 2462MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

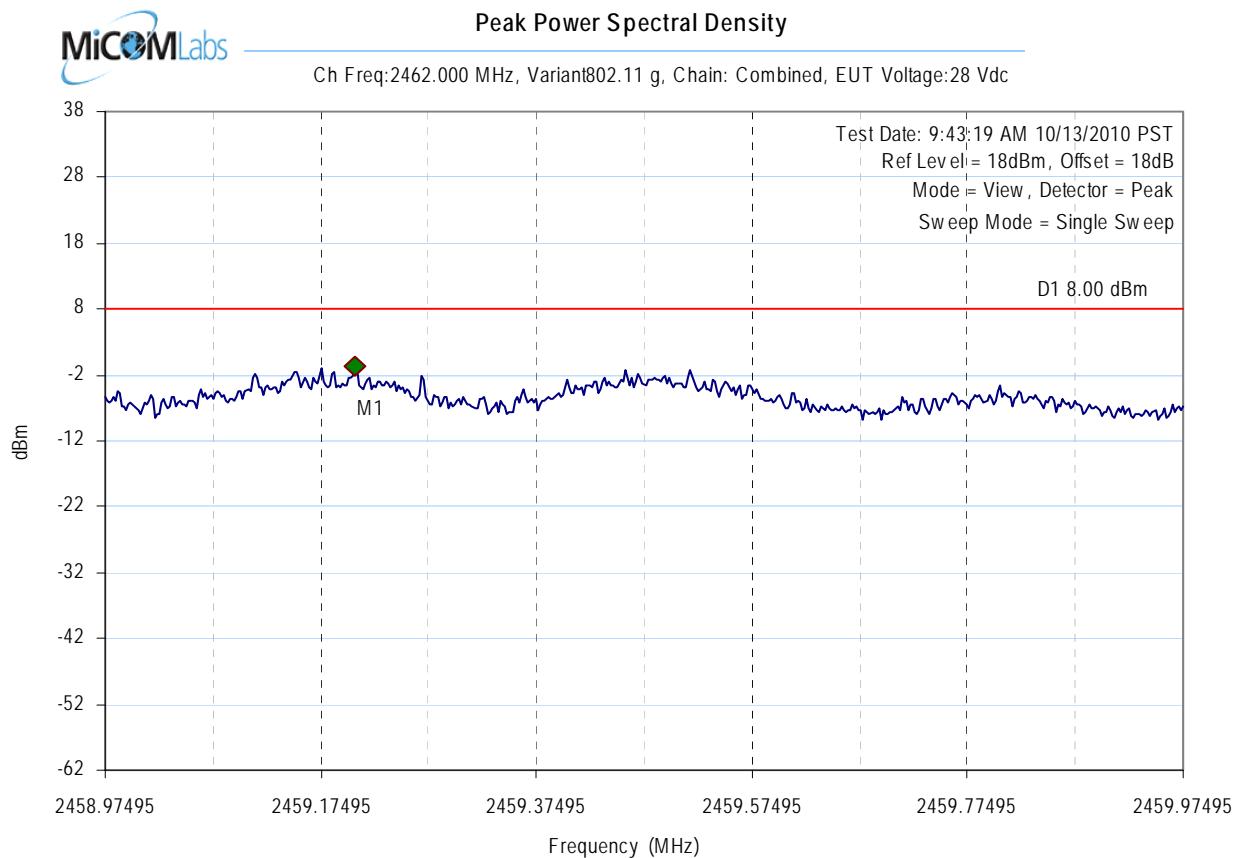
Marker : Frequency : Amplitude

M1 : 2466.085170MHz : -9.497dBm

Test Results

Center frequency = 2462MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

Marker : Frequency : Amplitude

M1 : 2459.207415MHz : -.712dBm

Test Results

Center frequency = 2462MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 145 of 362

Measurement results for MIMO 802.11n HT-20

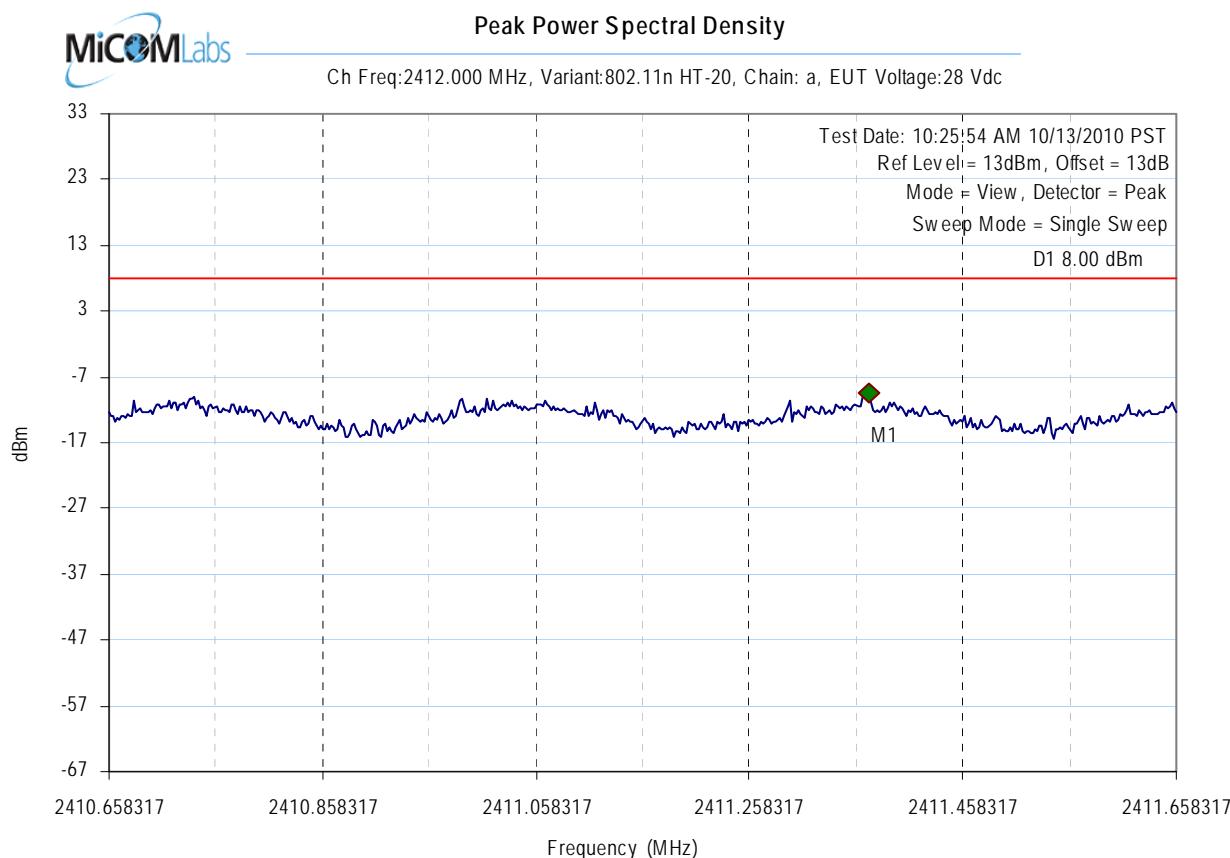
Test Conditions:	15.247 (e)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-20	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A	Antenna Gain:	2.6 dBi
Applied Voltage:	28.00	Vdc	
Notes 1:			
Notes 2:			

Test Frequency	Measured Power Density				Total Peak Power Spectral Density (dBm)		Limit	Margin
	RF Port (dBm)	a	b	c	d	Combined	Calculated	
MHz							dBm	dB
2412.000	-9.41	-9.76	-11.06	--	-2.25	-5.25	8.00	-10.25
2437.000	-4.76	-7.86	-8.78	--	-1.59	-2.00	8.00	-9.59
2462.000	-9.23	-9.21	-4.30	--	-1.53	-2.14	8.00	-9.53

Measurement uncertainty:	± 1.33 dB
---------------------------------	-----------

Margins are calculated based on actual combined measurements. Calculated values are inserted for reference only and are based on individual chains.

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

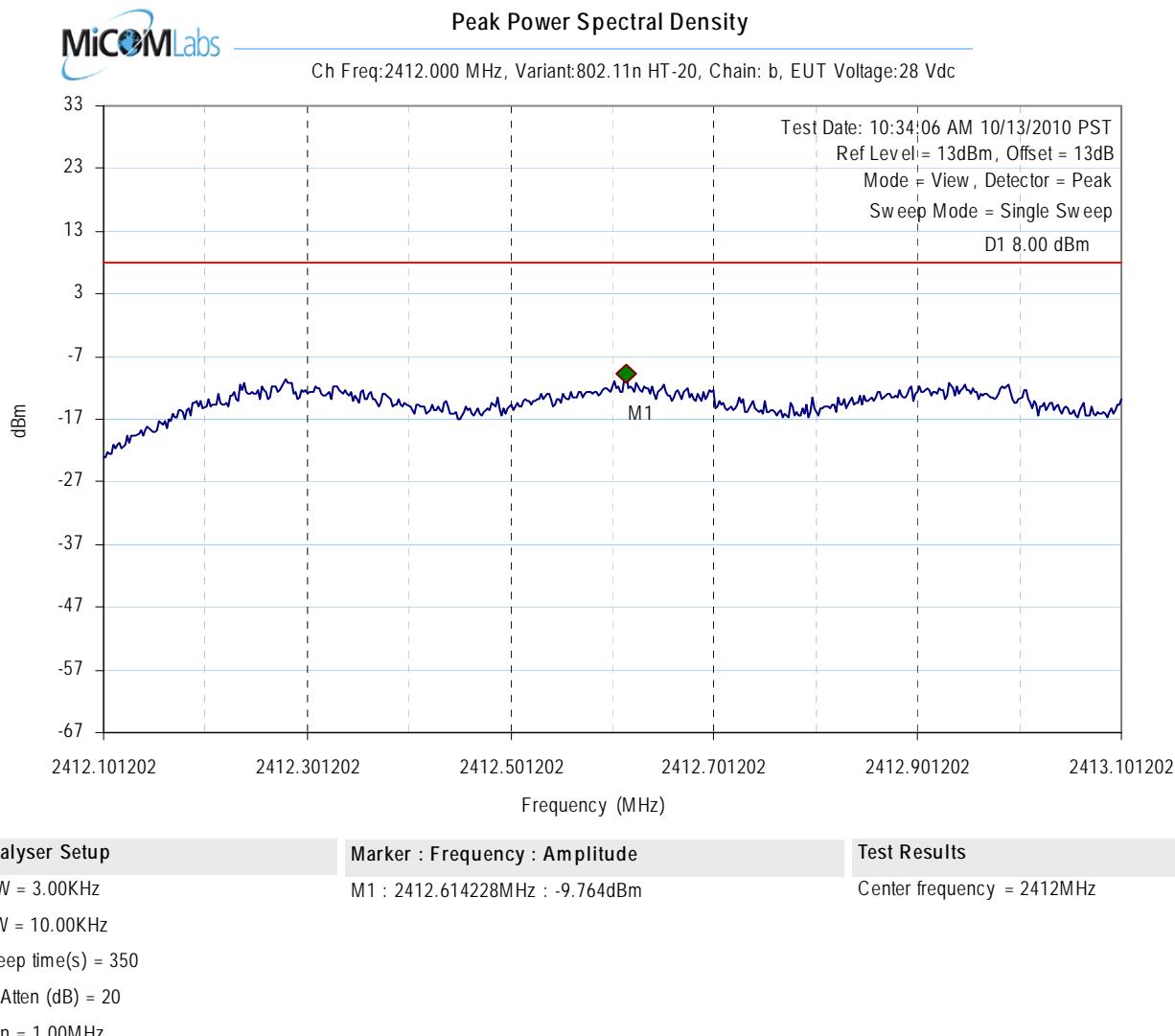
RF Atten (dB) = 20

Span = 1.00MHz

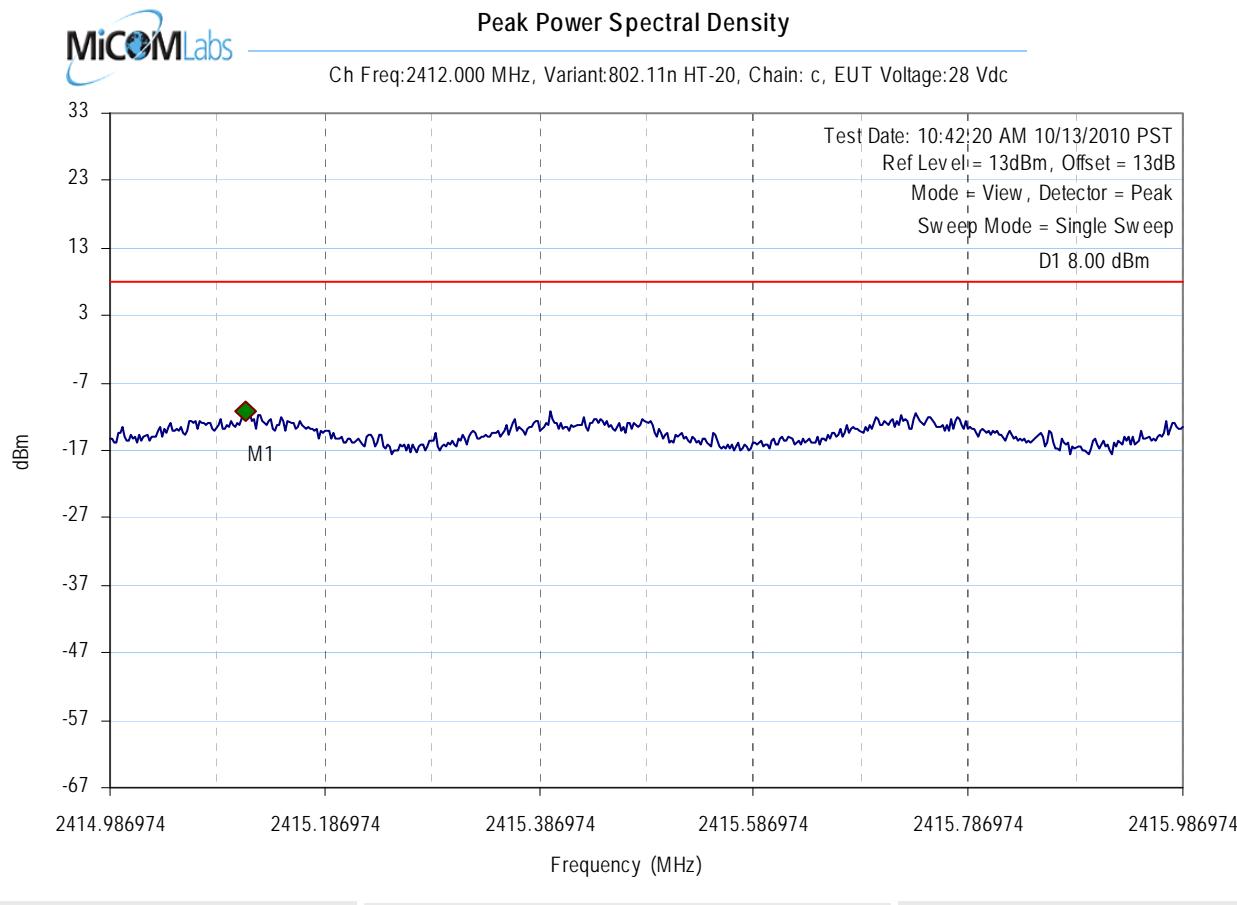
Test Results

Center frequency = 2412MHz

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


Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

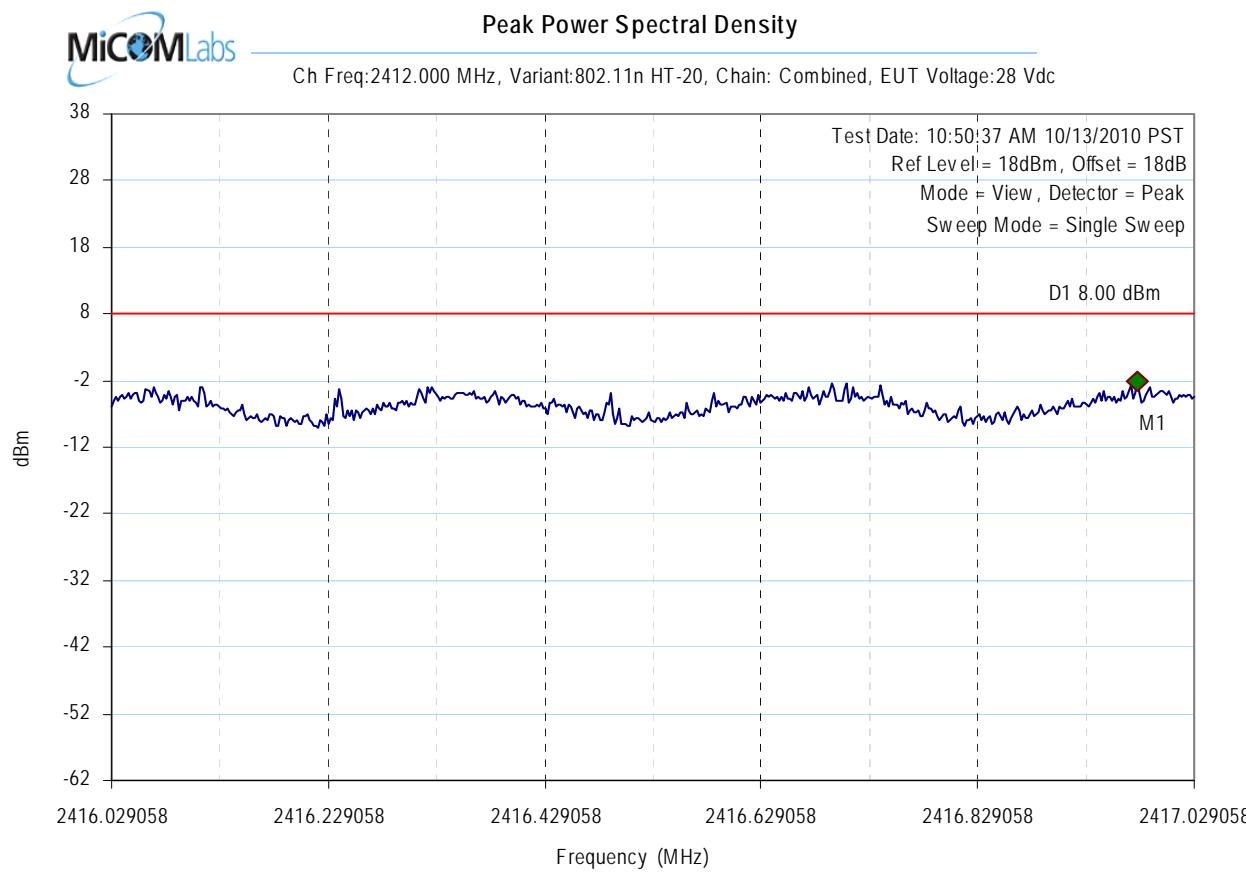
Marker : Frequency : Amplitude

M1 : 2415.113226MHz : -11.063dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

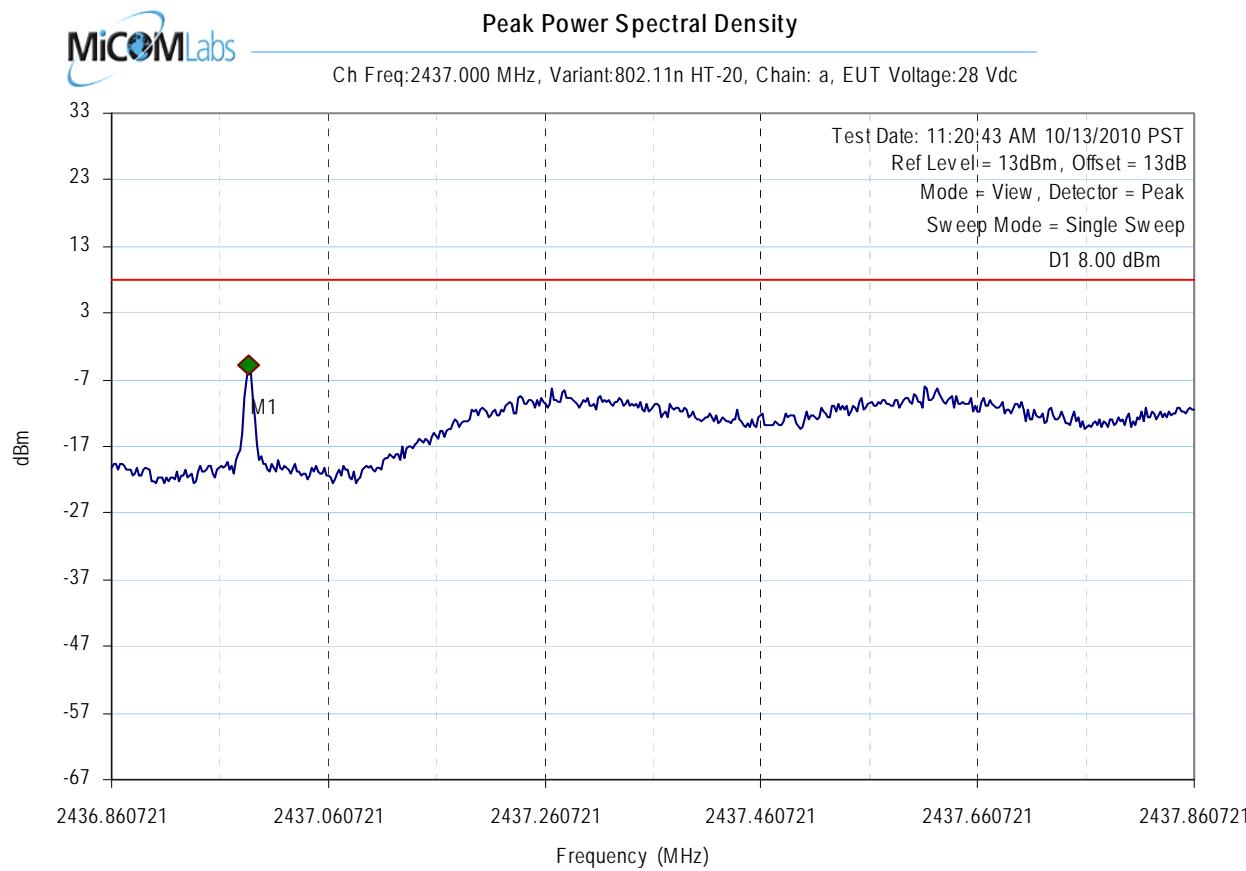
Marker : Frequency : Amplitude

M1 : 2416.976954MHz : -2.250dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

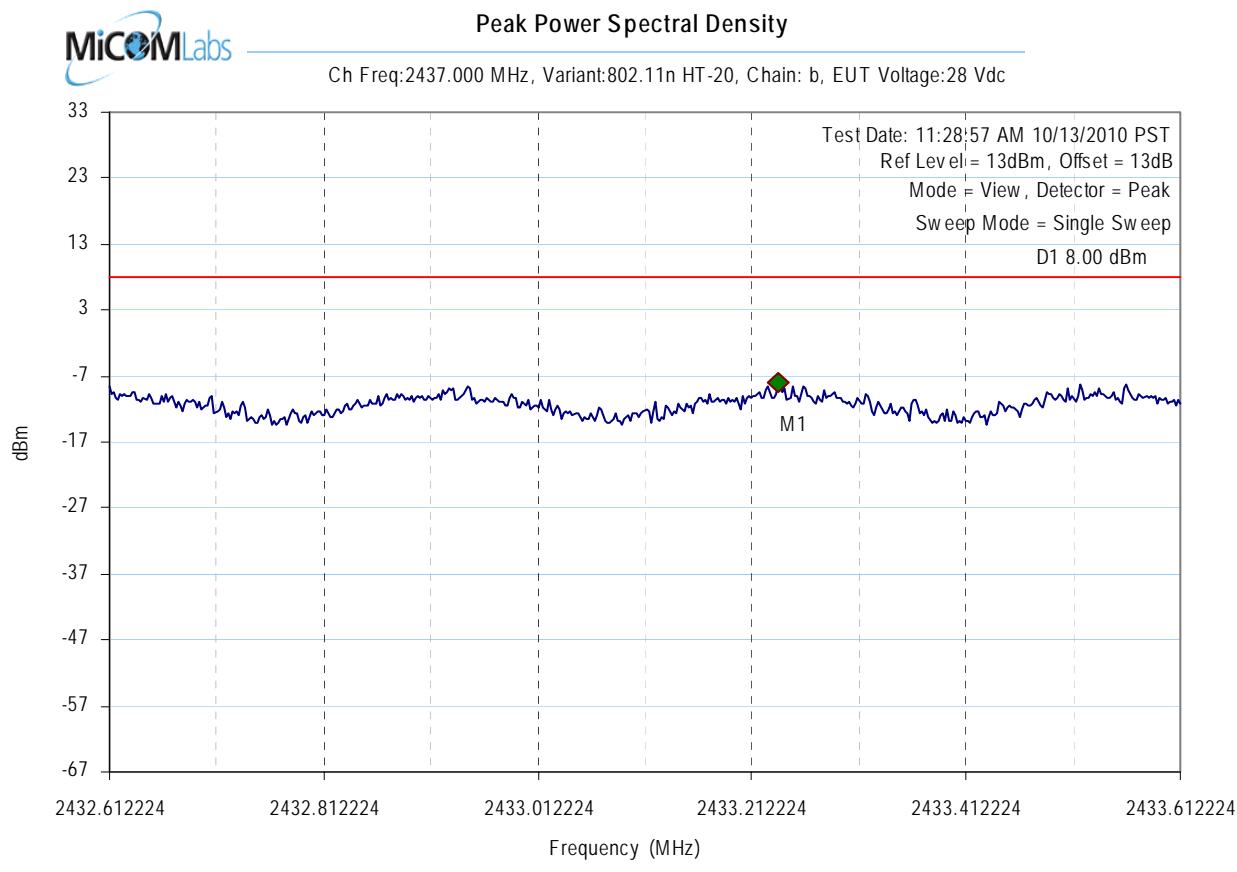
Marker : Frequency : Amplitude

M1 : 2436.986974MHz : -4.761dBm

Test Results

Center frequency = 2437MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

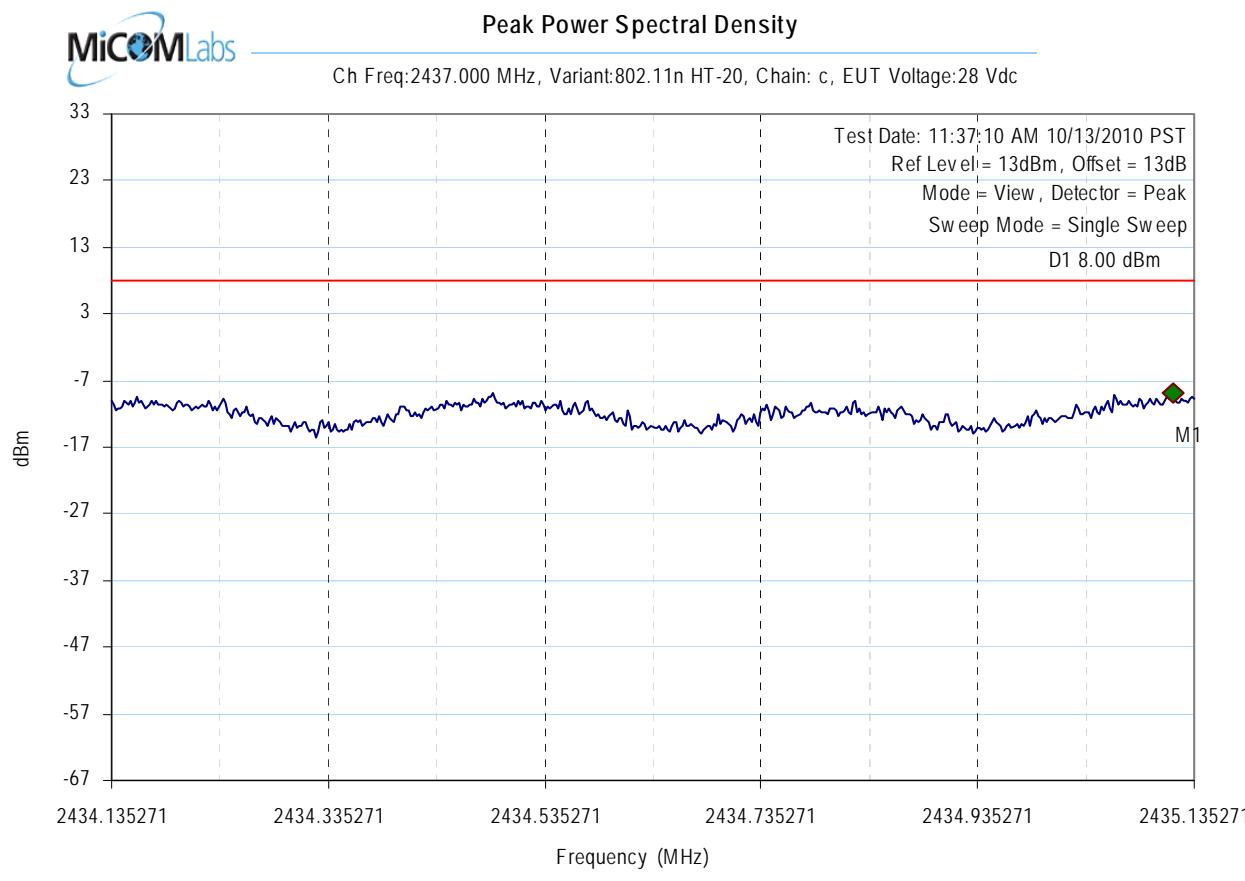
Marker : Frequency : Amplitude

M1 : 2433.237475MHz : -7.856dBm

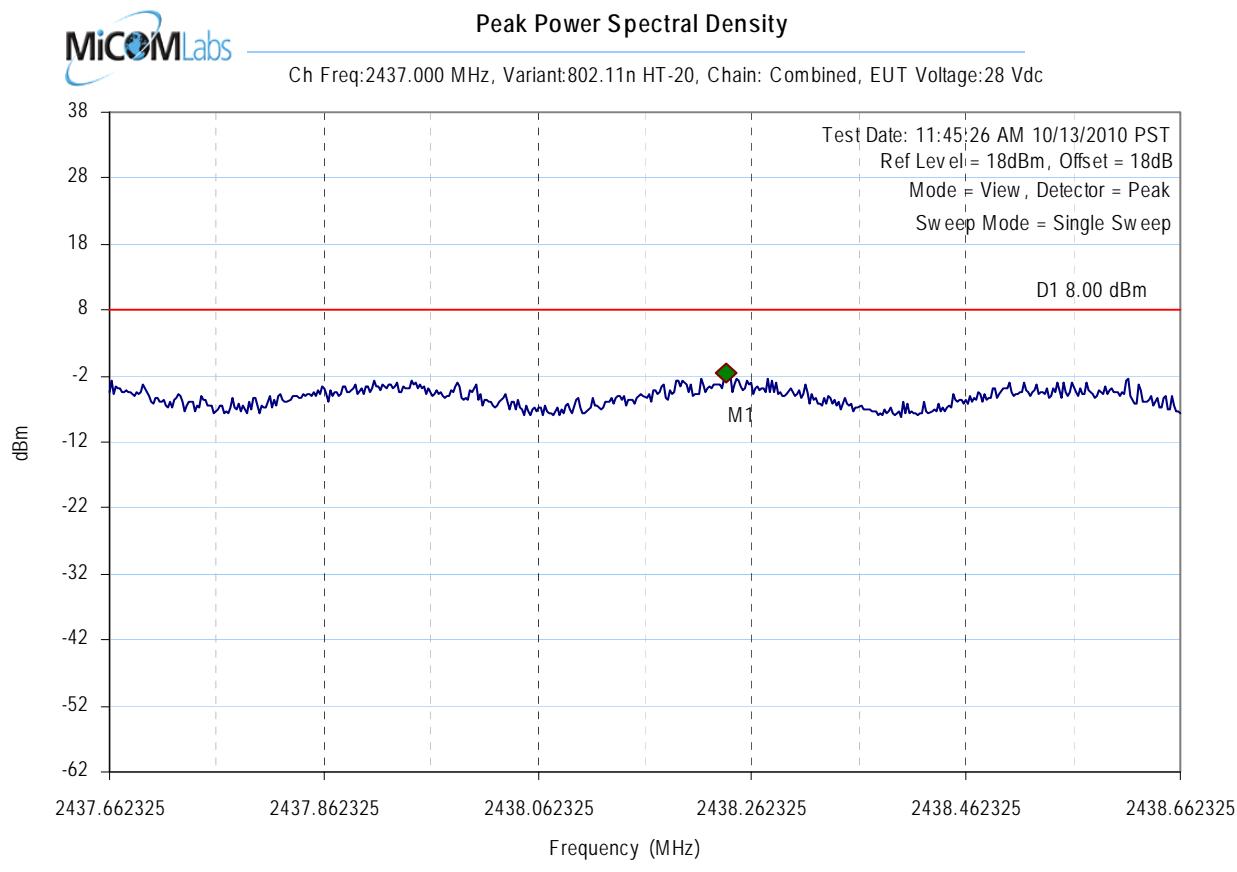
Test Results

Center frequency = 2437MHz

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



Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

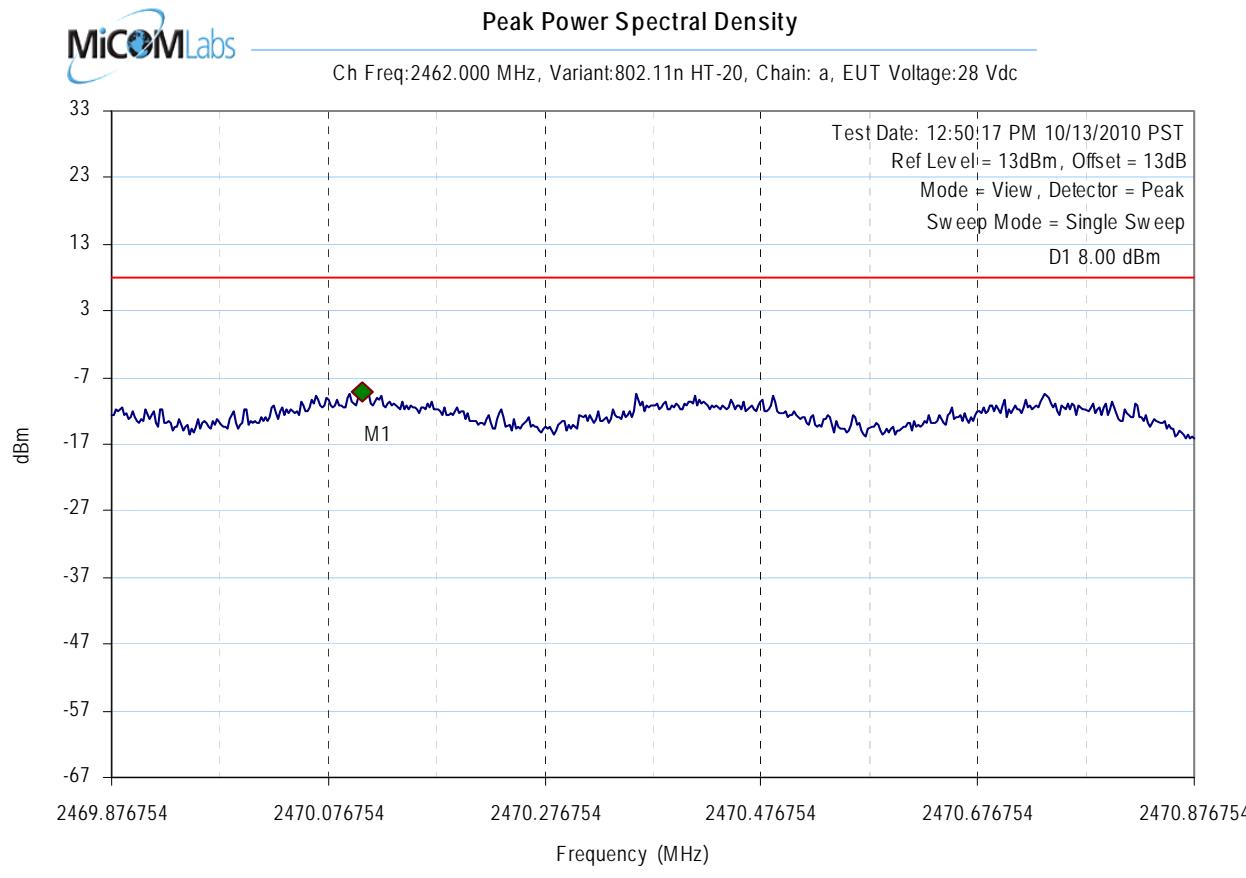
Marker : Frequency : Amplitude

M1 : 2438.237475MHz : -1.585dBm

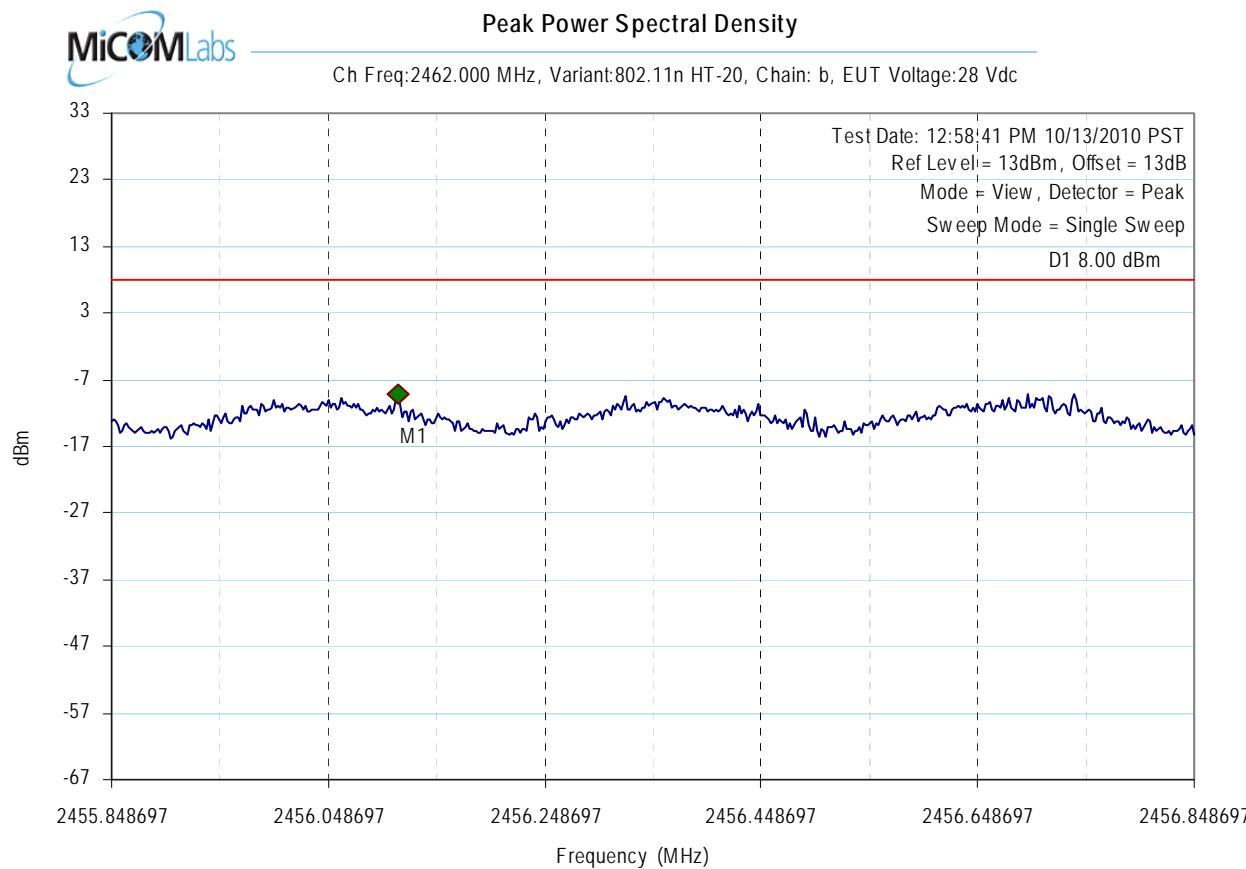
Test Results

Center frequency = 2437MHz

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



Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

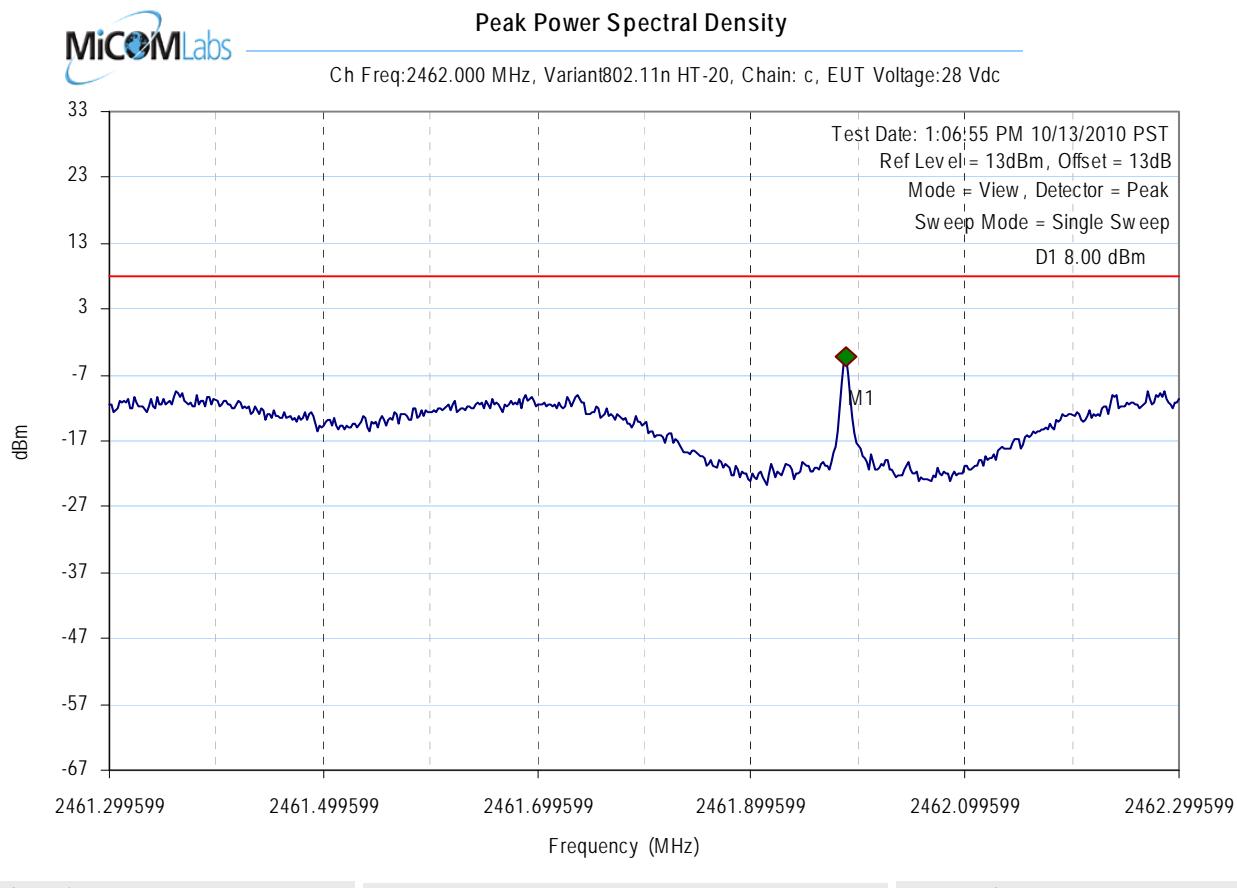
Marker : Frequency : Amplitude

M1 : 2456.113226MHz : -9.211dBm

Test Results

Center frequency = 2462MHz

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


Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

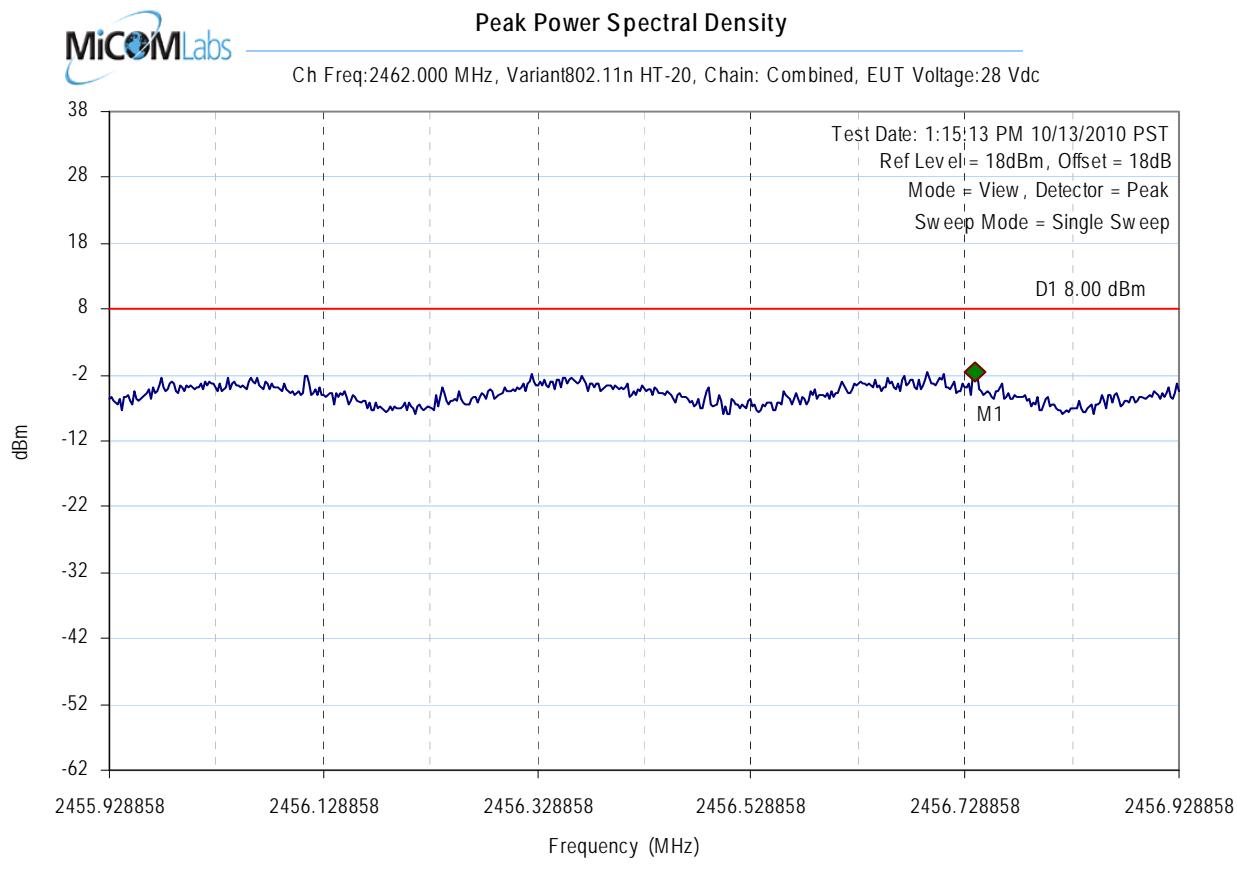
Marker : Frequency : Amplitude

M1 : 2461.988978MHz : -4.301dBm

Test Results

Center frequency = 2462MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

Marker : Frequency : Amplitude

M1 : 2456.738477MHz : -1.528dBm

Test Results

Center frequency = 2462MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 158 of 362

Measurement results for MIMO 802.11n HT-40

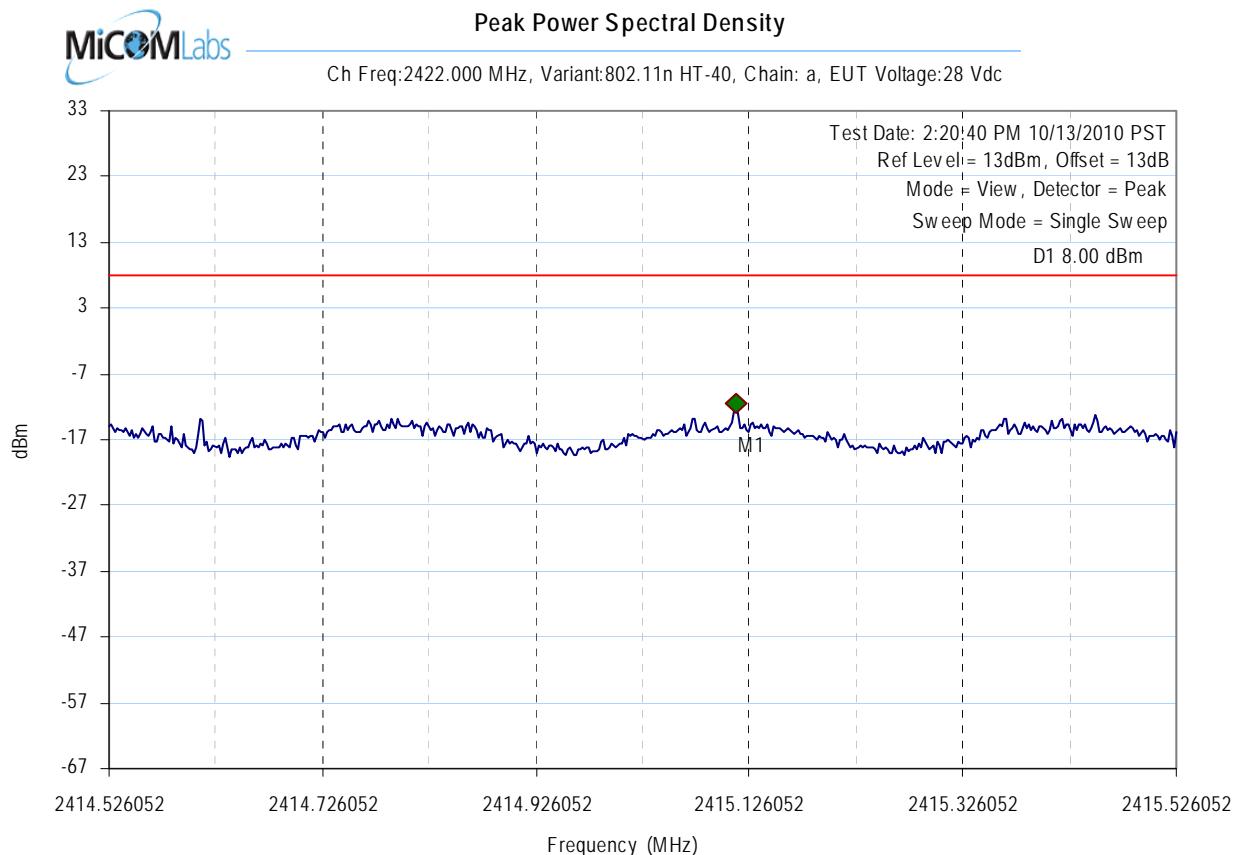
Test Conditions:	15.247 (e)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-40	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming	N/A	Antenna Gain:	2.6 dBi
Applied Voltage:	28.00	Vdc	
Notes 1:			
Notes 2:			

Test Frequency	Measured Power Density				Total Peak Power Spectral Density (dBm)		Limit	Margin
	RF Port (dBm)	a	b	c	d	Combined	Calculated	
MHz								
2422.000	-11.52	-10.52	-11.58	--	-4.80	-6.40	8.00	-12.80
2437.000	-11.33	-13.23	2.87	--	-6.47	3.14	8.00	-14.47
2452.000	-10.40	-8.85	-10.33	--	-4.22	-5.03	8.00	-12.22

Measurement uncertainty:	± 1.33 dB
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Margins are calculated based on actual combined measurements. Calculated values are inserted for reference only and are based on individual chains.

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


Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

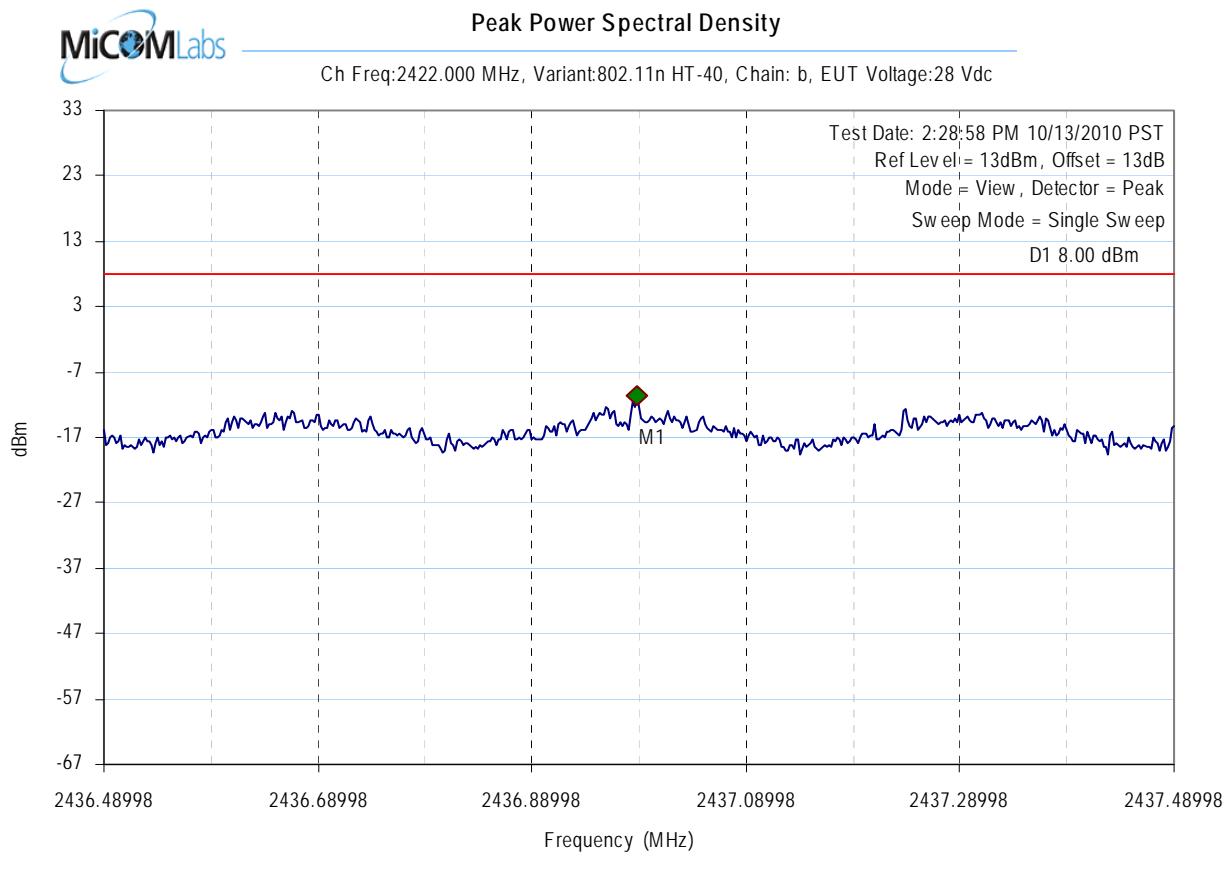
Marker : Frequency : Amplitude

M1 : 2415.113226MHz : -11.515dBm

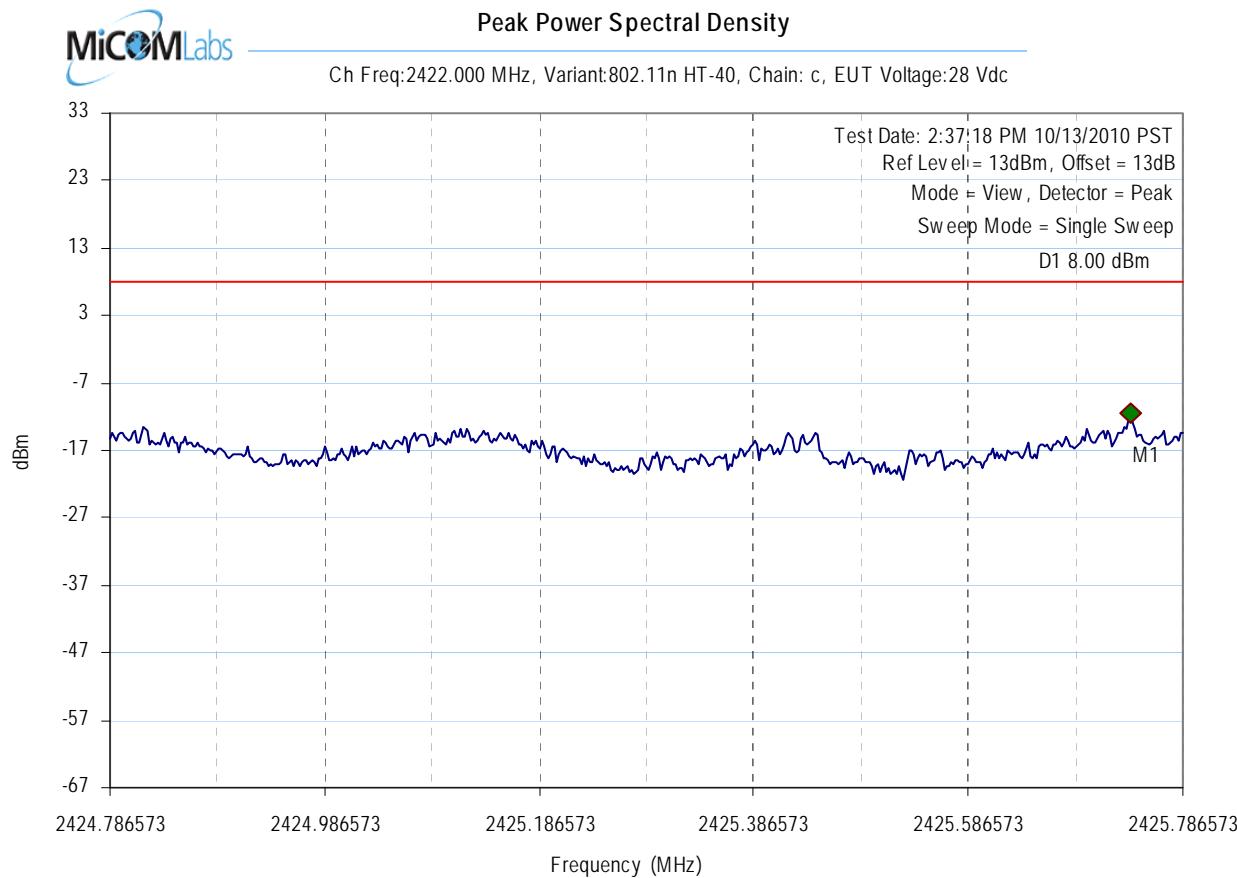
Test Results

Center frequency = 2422MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

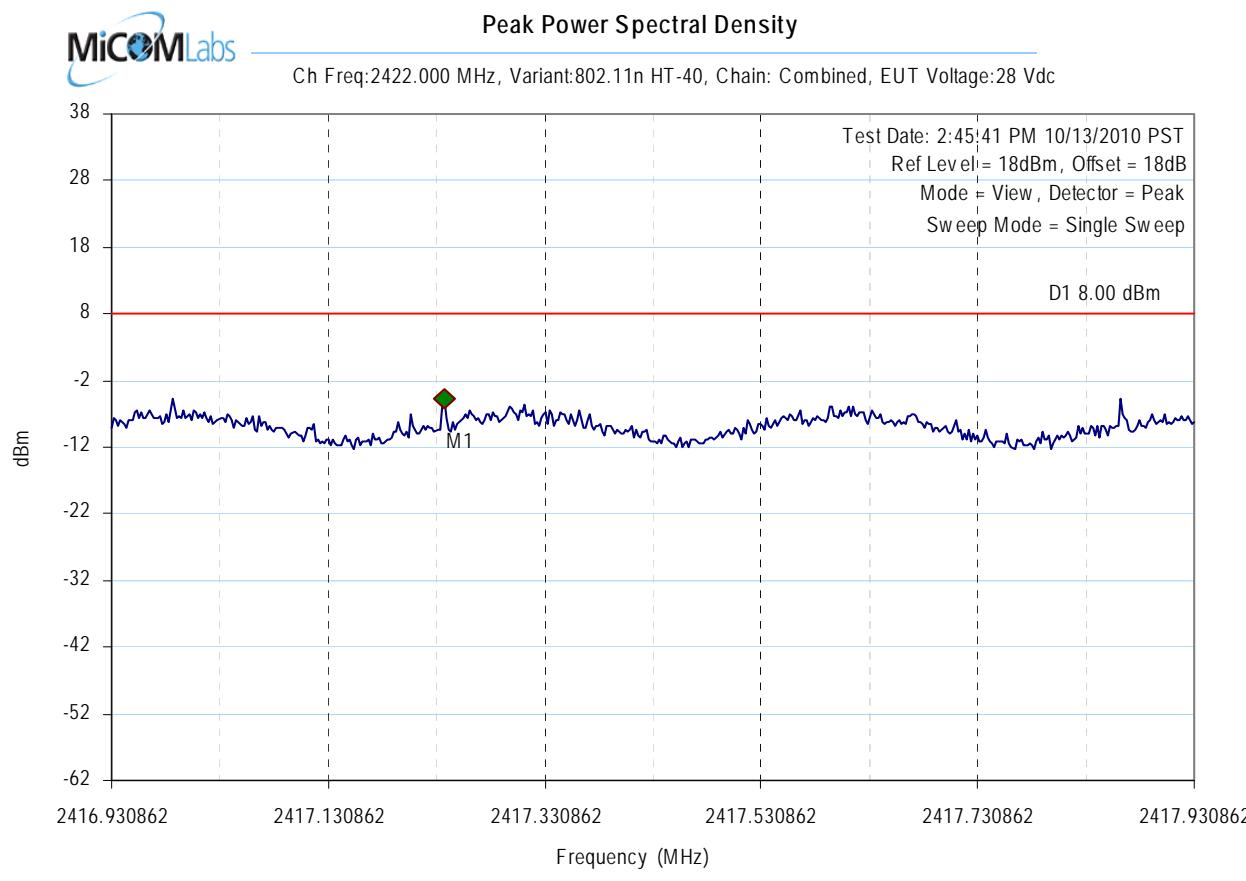
Marker : Frequency : Amplitude

M1 : 2425.738477MHz : -11.578dBm

Test Results

Center frequency = 2422MHz

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


Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

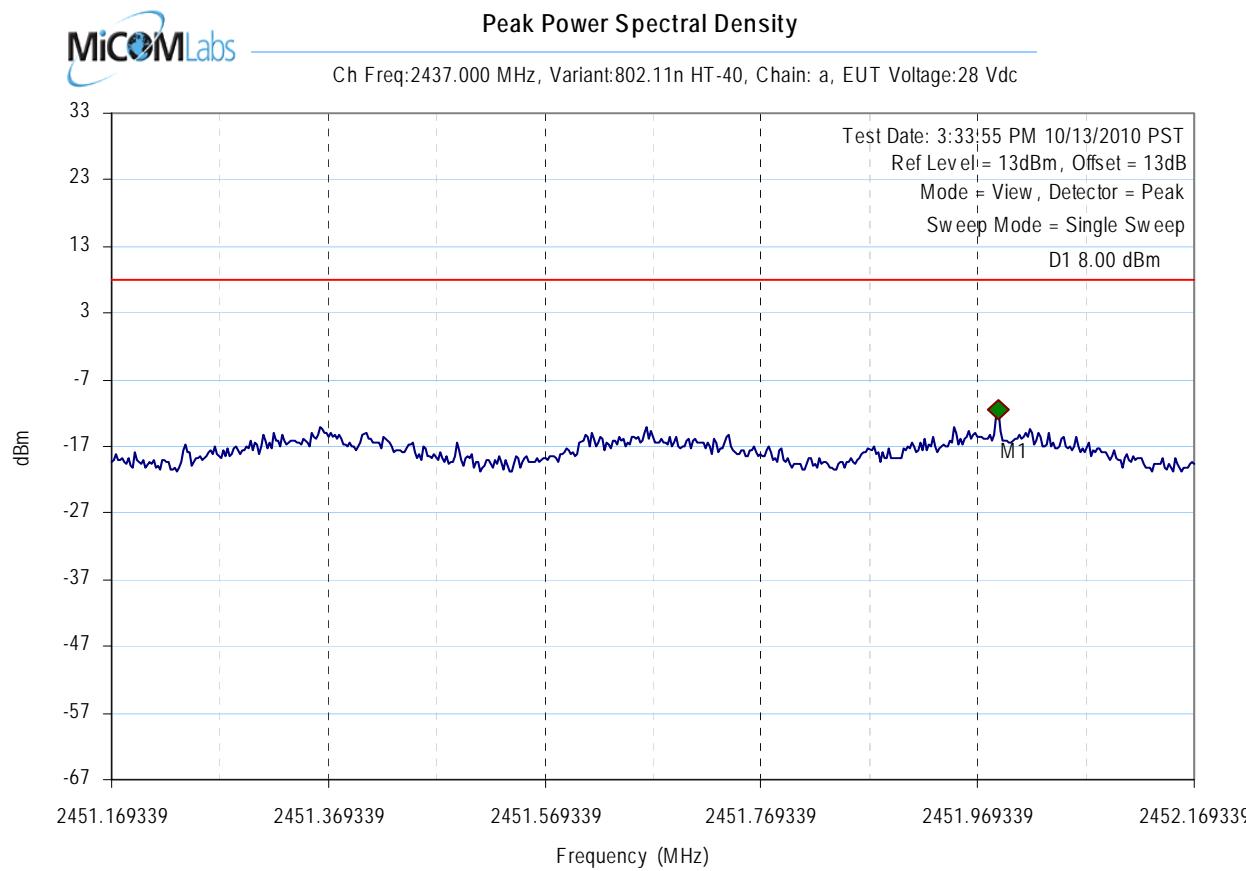
Marker : Frequency : Amplitude

M1 : 2417.237475MHz : -4.804dBm

Test Results

Center frequency = 2422MHz

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


Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

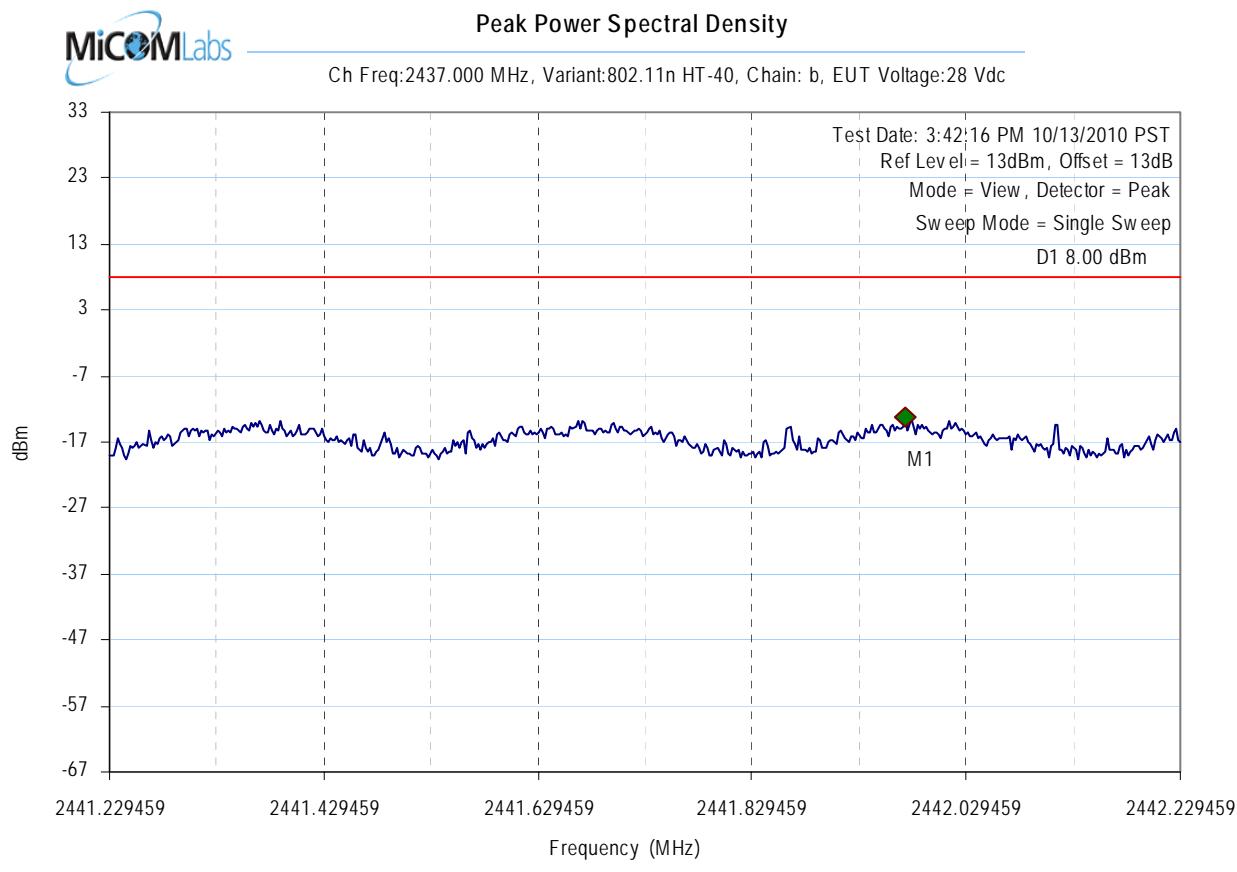
Marker : Frequency : Amplitude

M1 : 2451.988978MHz : -11.332dBm

Test Results

Center frequency = 2437MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

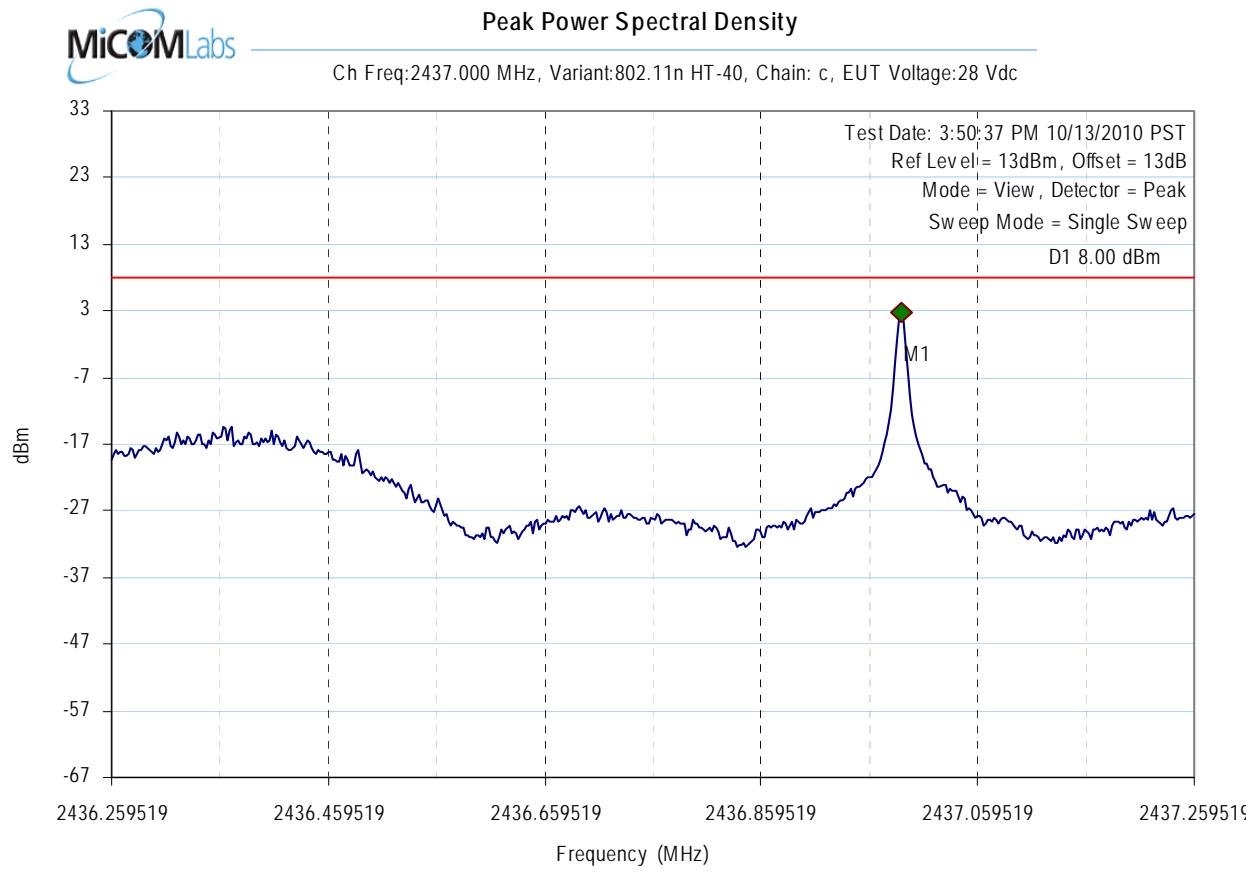
Marker : Frequency : Amplitude

M1 : 2441.972946MHz : -13.231dBm

Test Results

Center frequency = 2437MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

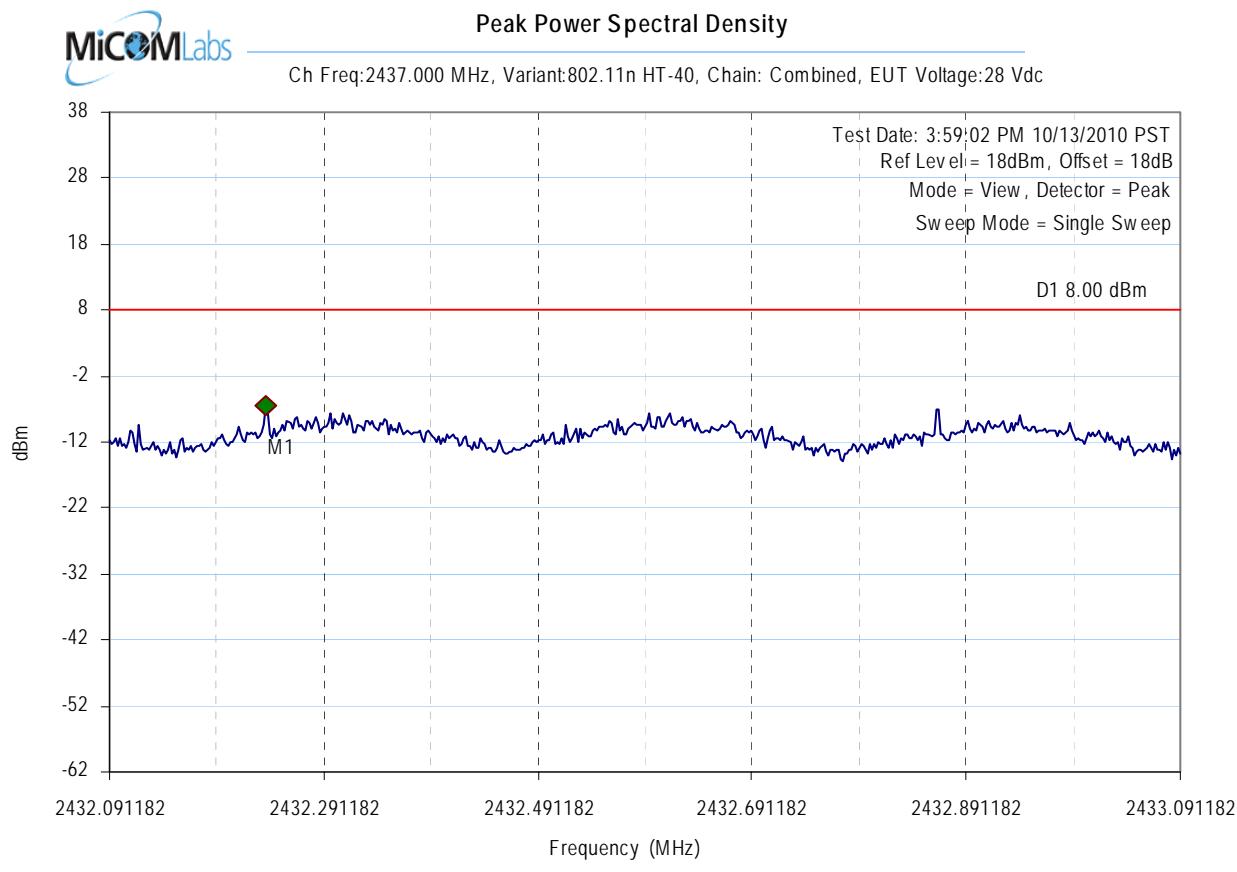
Marker : Frequency : Amplitude

M1 : 2436.988978MHz : 2.874dBm

Test Results

Center frequency = 2437MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

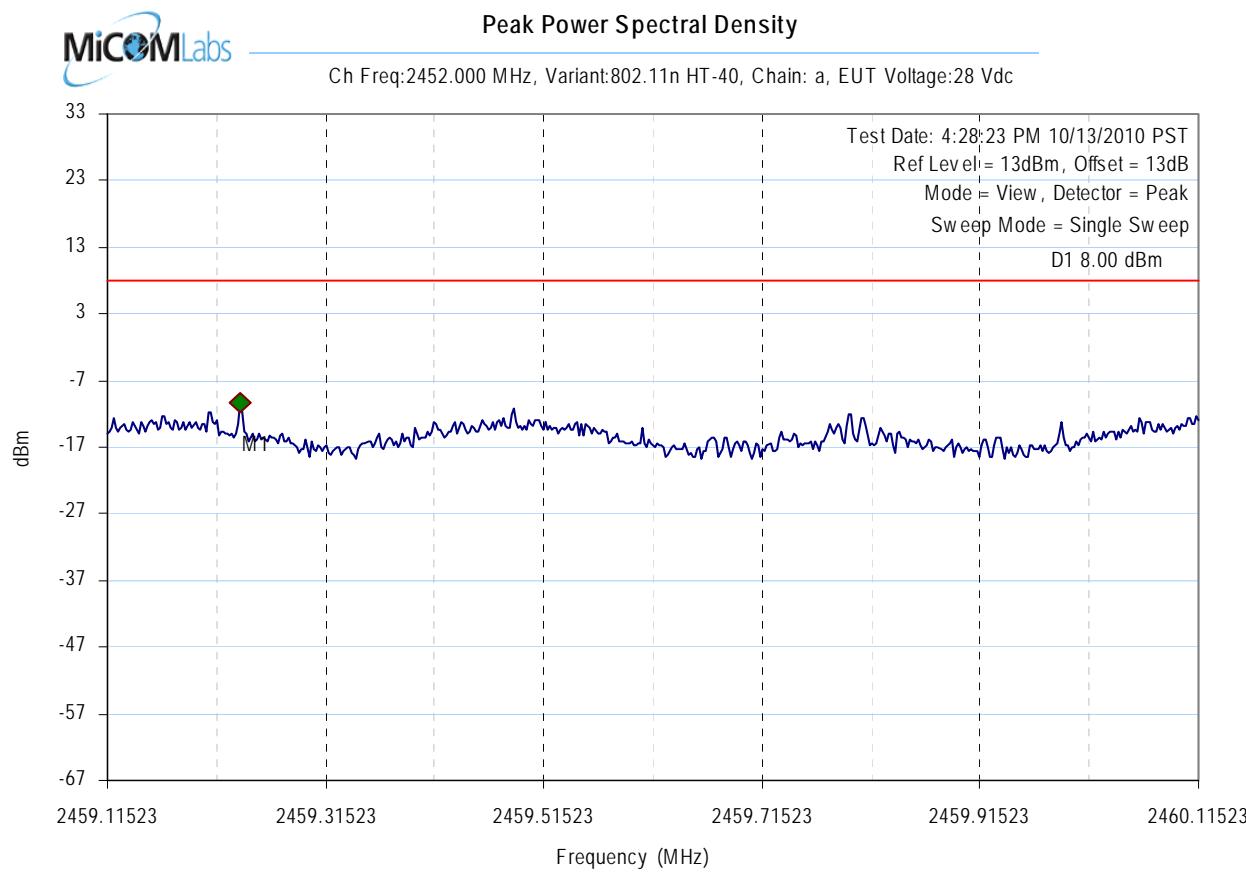
Marker : Frequency : Amplitude

M1 : 2432.237475MHz : -6.468dBm

Test Results

Center frequency = 2437MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

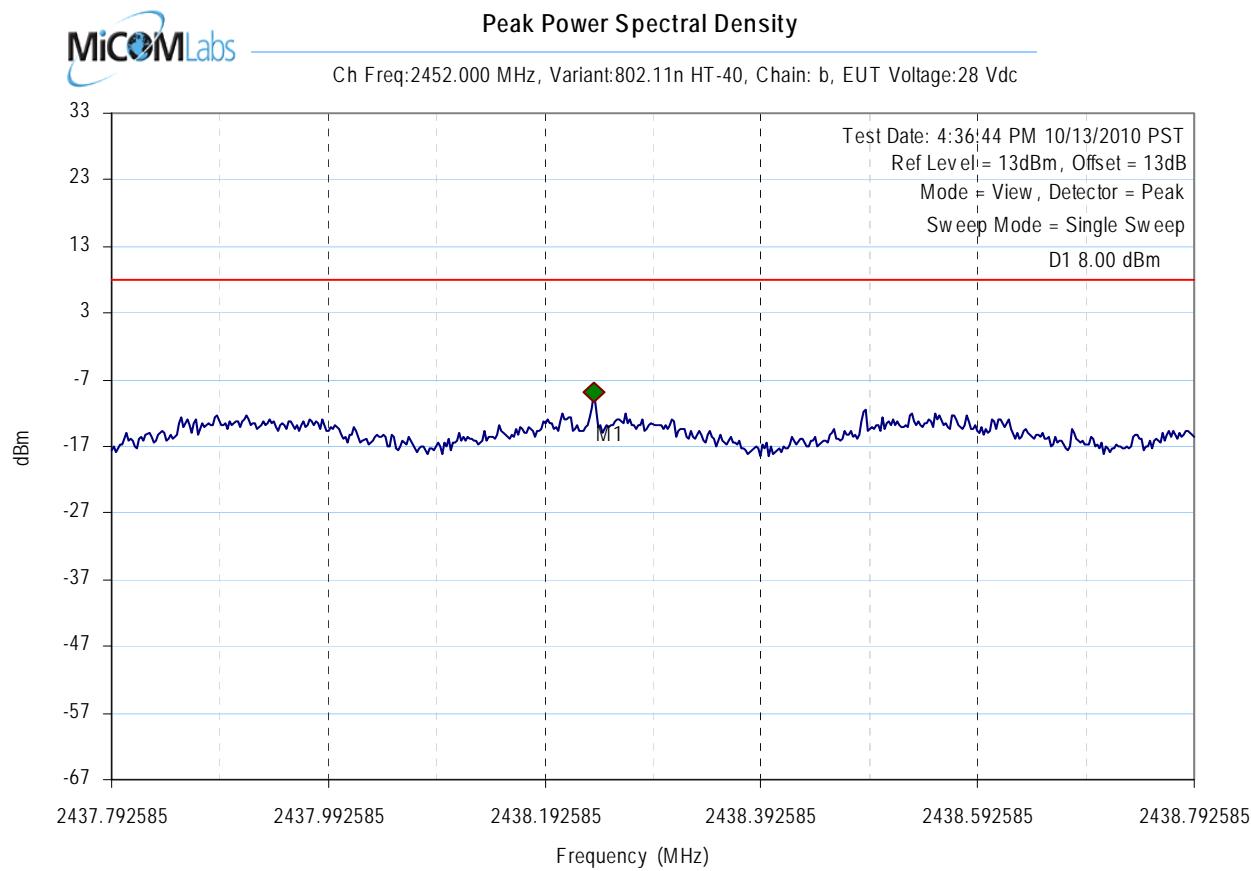
Marker : Frequency : Amplitude

M1 : 2459.237475MHz : -10.402dBm

Test Results

Center frequency = 2452MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

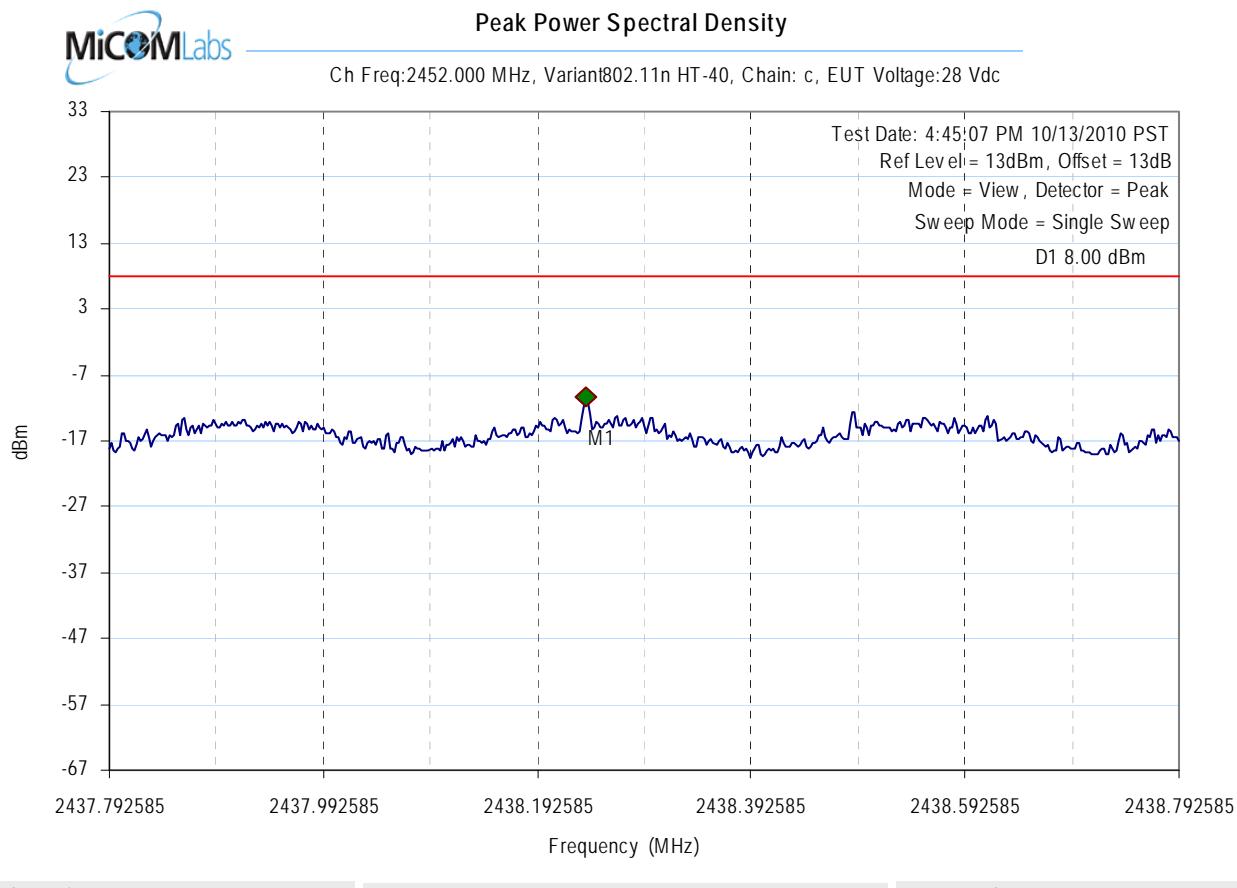
Marker : Frequency : Amplitude

M1 : 2438.237475MHz : -8.853dBm

Test Results

Center frequency = 2452MHz

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


Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

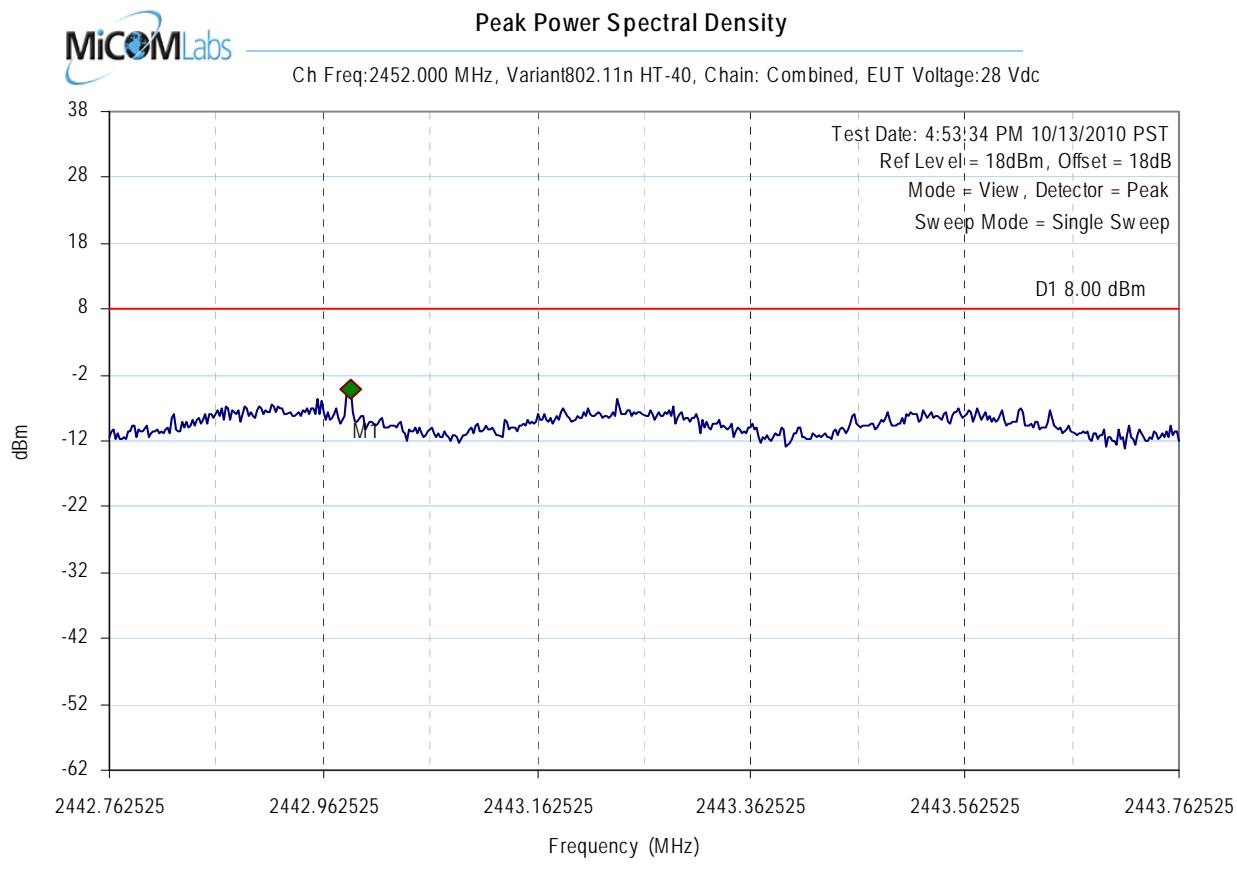
Marker : Frequency : Amplitude

M1 : 2438.237475MHz : -10.329dBm

Test Results

Center frequency = 2452MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

Marker : Frequency : Amplitude

M1 : 2442.988978MHz : -4.215dBm

Test Results

Center frequency = 2452MHz

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



Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 171 of 362

Measurement results for MIMO 802.11 a

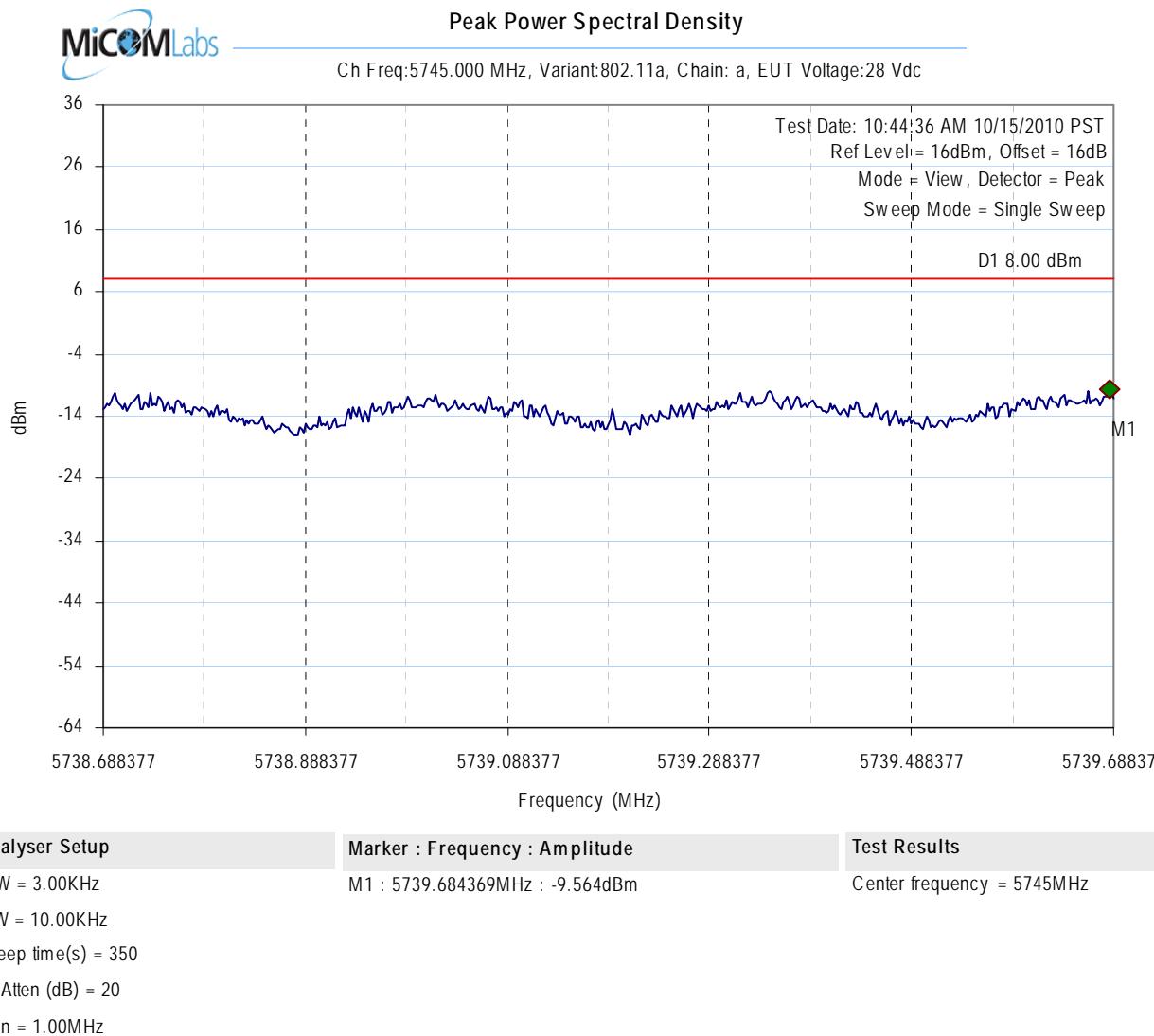
Test Conditions:	15.247 (e)	Rel. Humidity (%):	35	to	42
Variant:	802.11a	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming	N/A	Antenna Gain:	1.2	dbi	
Applied Voltage:	28.00	Vdc			
Notes 1:					
Notes 2:					

Test Frequency	Measured Power Density				Total Peak Power Spectral Density (dBm)		Limit	Margin
	MHz	a	b	c	d	Combined	Calculated	
5745.000	-9.56	-8.43	-10.98	--	-1.73	-4.76	8.00	-9.73
5785.000	-7.60	-7.25	-9.79	--	-0.08	-3.30	8.00	-8.08
5825.000	-8.26	-8.31	-3.51	--	0.86	-1.29	8.00	-7.14

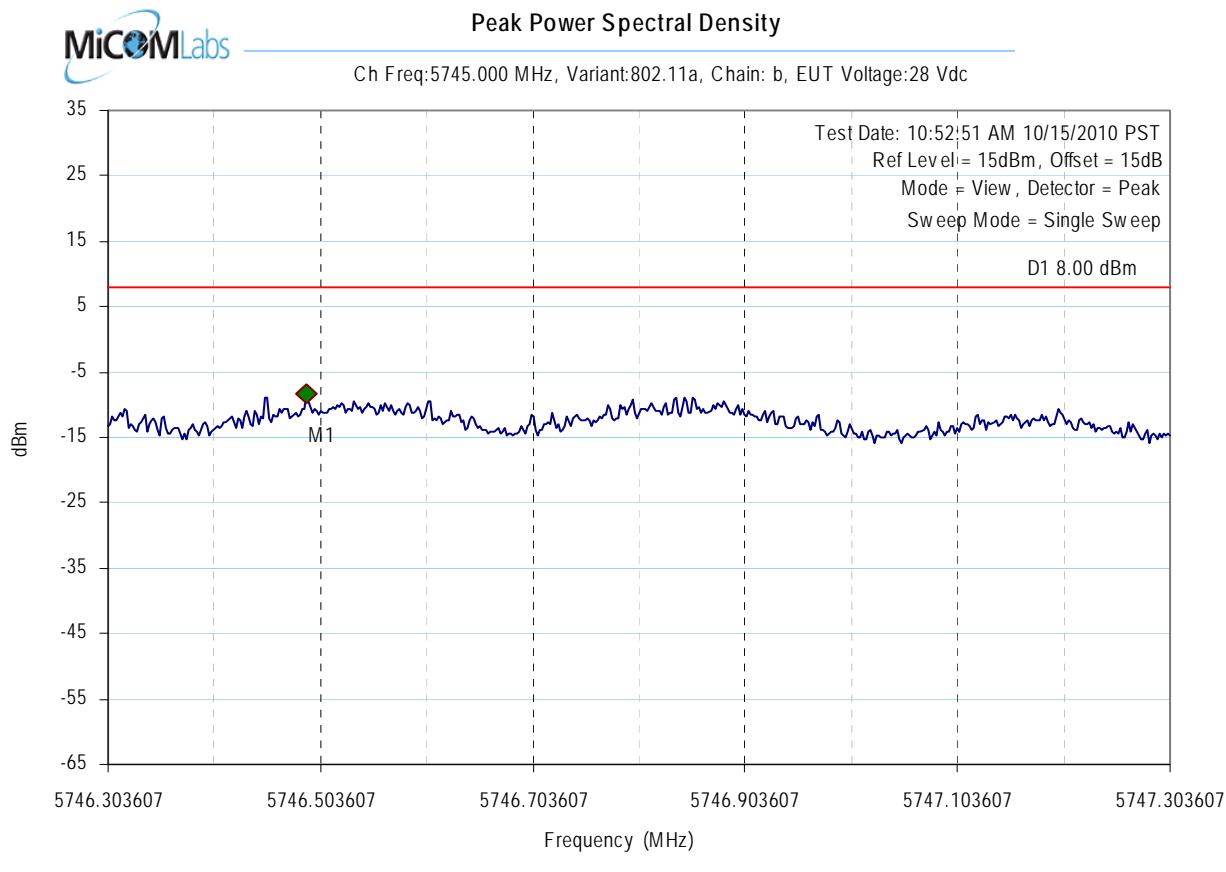
Measurement uncertainty:	± 1.33 dB
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Margins are calculated based on actual combined measurements. Calculated values are inserted for reference only and are based on individual chains.

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



Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

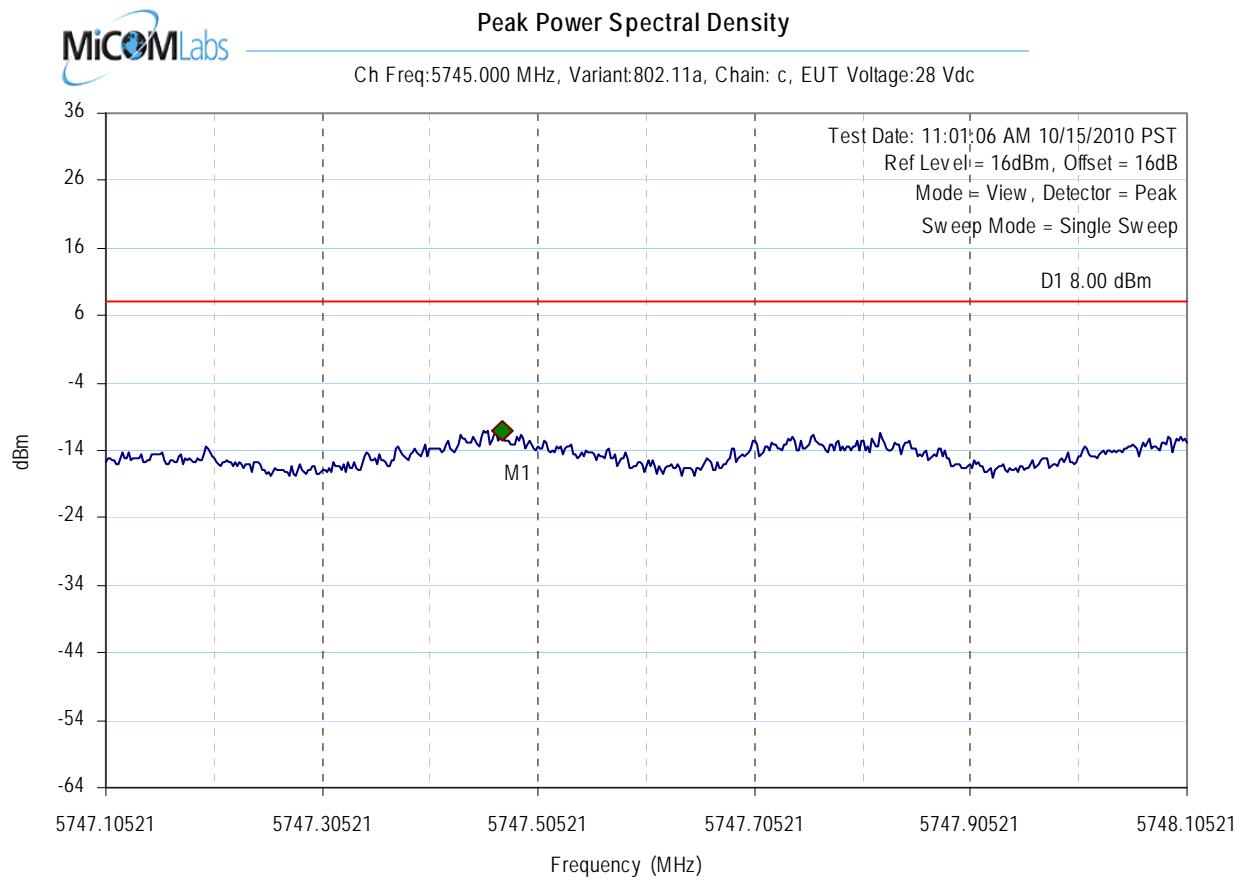
Marker : Frequency : Amplitude

M1 : 5746.489980MHz : -8.431dBm

Test Results

Center frequency = 5745MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

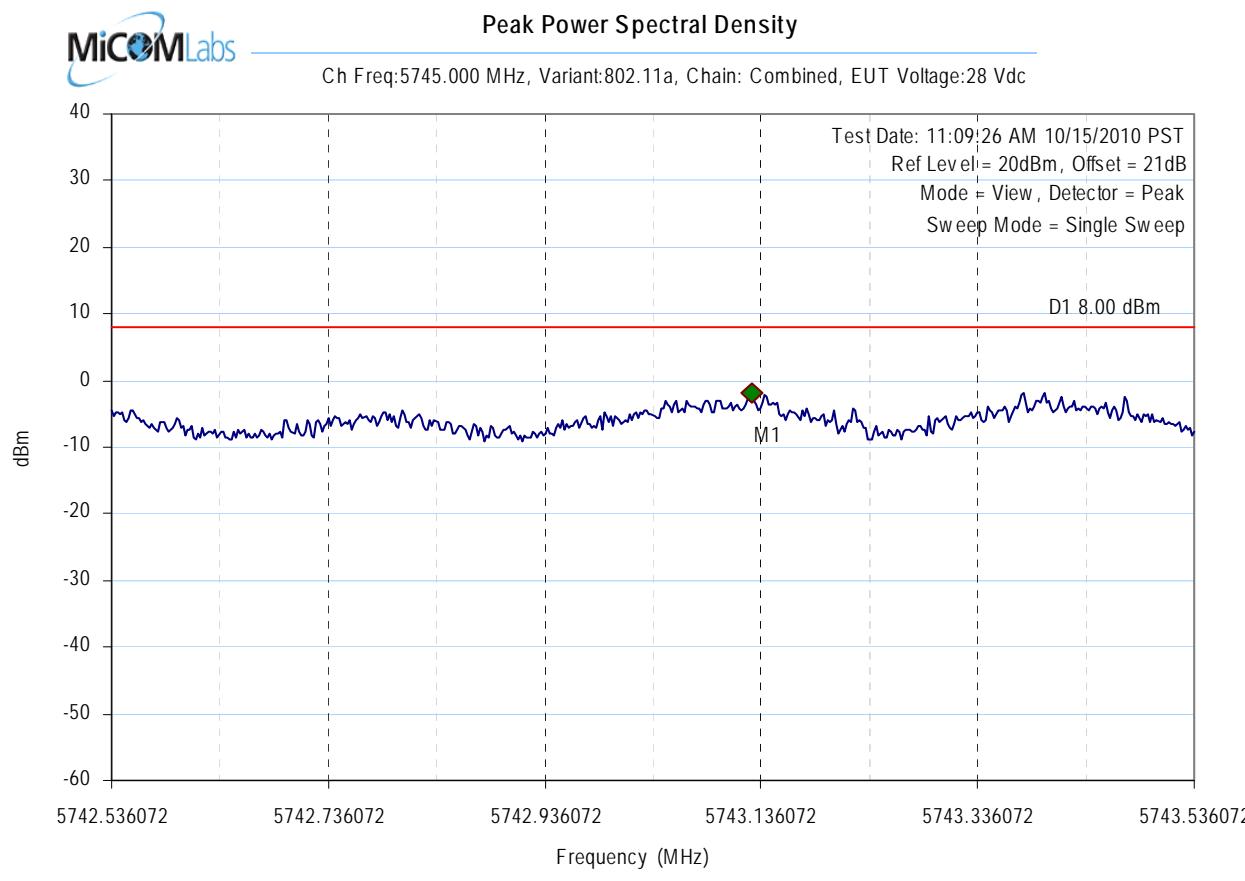
Marker : Frequency : Amplitude

M1 : 5747.471944MHz : -10.982dBm

Test Results

Center frequency = 5745MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

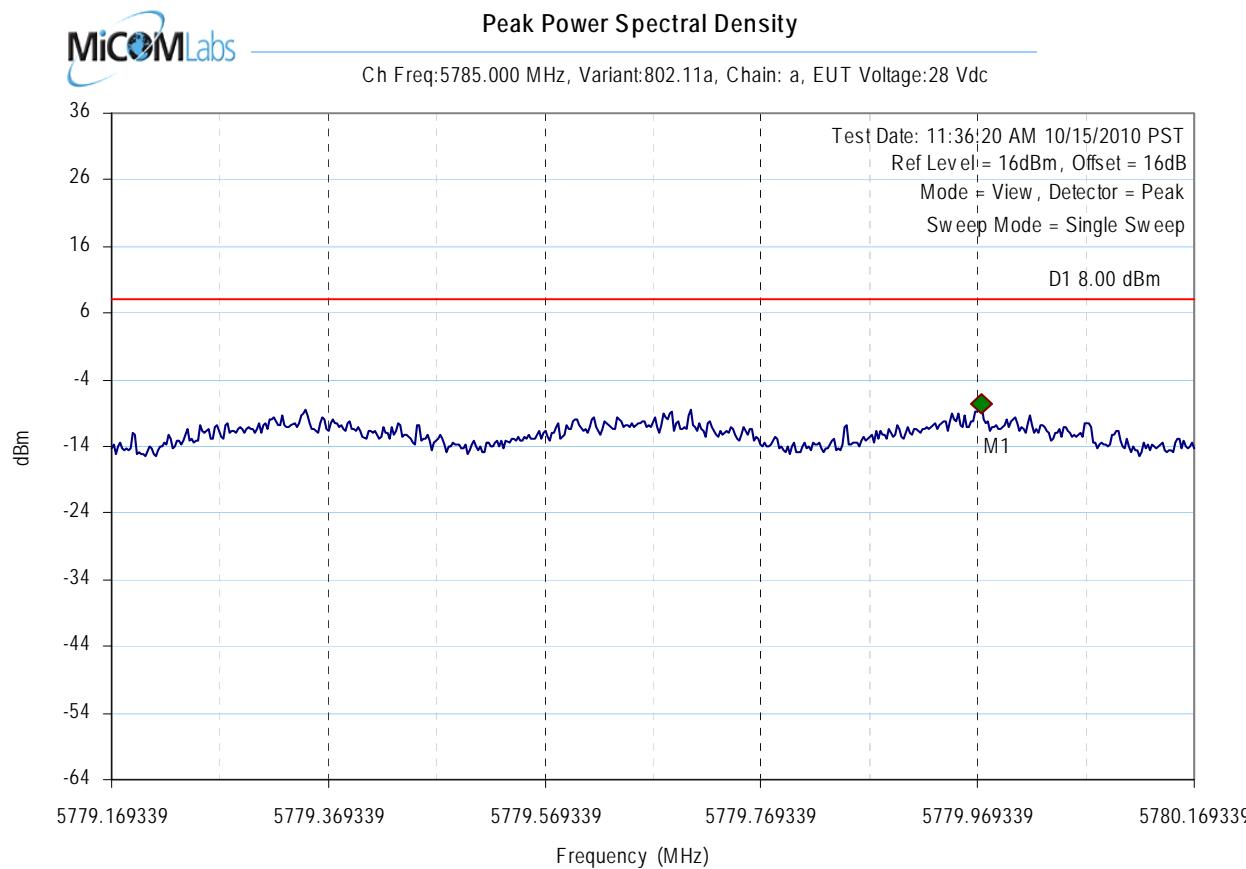
Marker : Frequency : Amplitude

M1 : 5743.127255MHz : -1.733dBm

Test Results

Center frequency = 5745MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

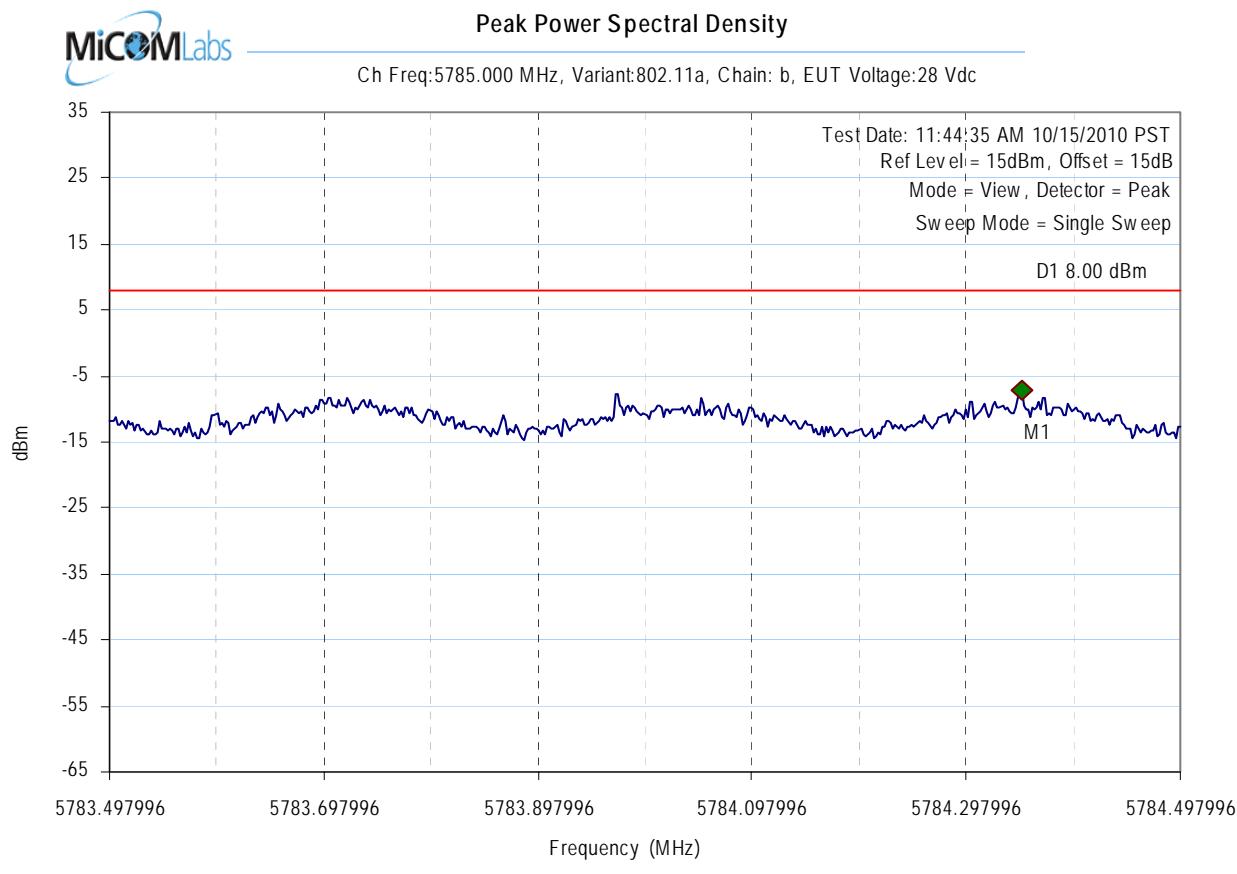
Marker : Frequency : Amplitude

M1 : 5779.972946MHz : -7.602dBm

Test Results

Center frequency = 5785MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

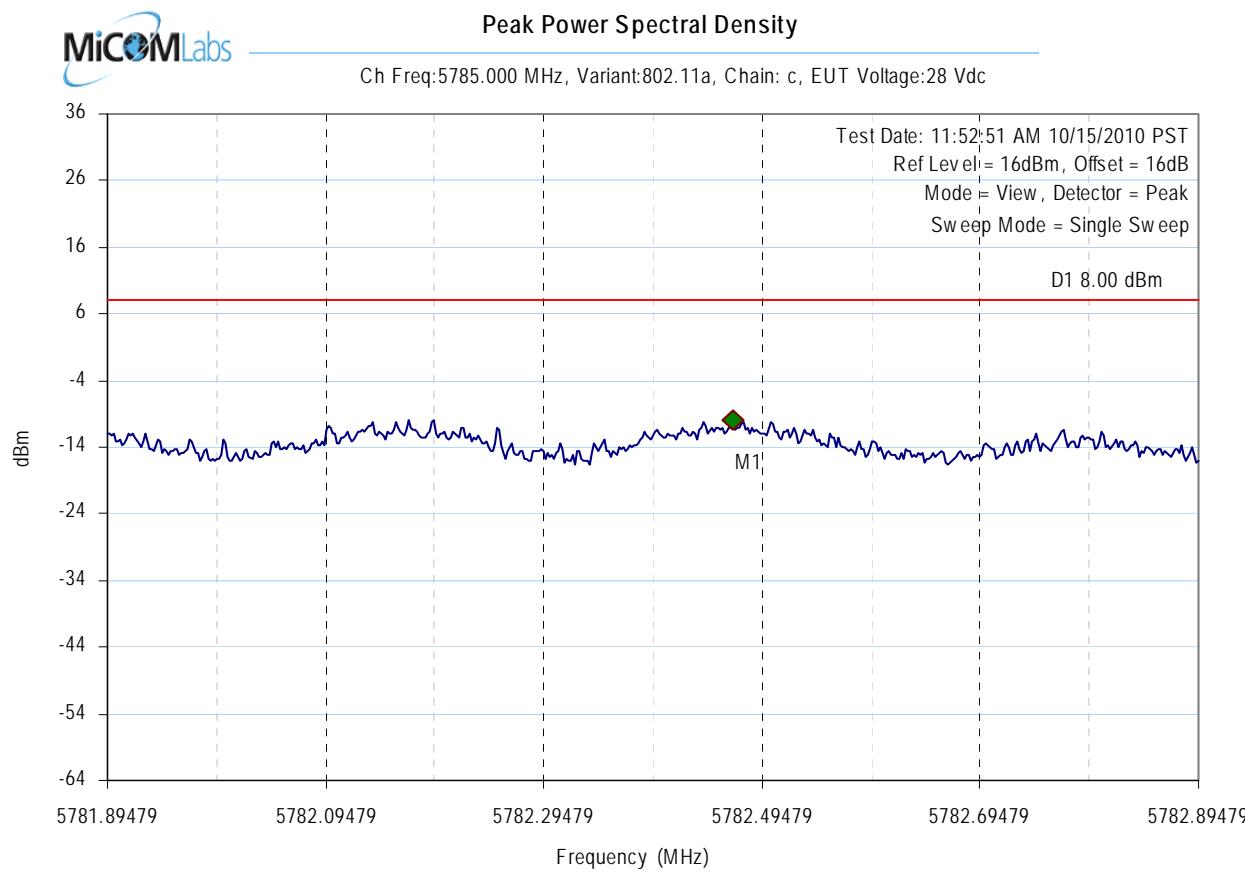
Marker : Frequency : Amplitude

M1 : 5784.349699MHz : -7.245dBm

Test Results

Center frequency = 5785MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

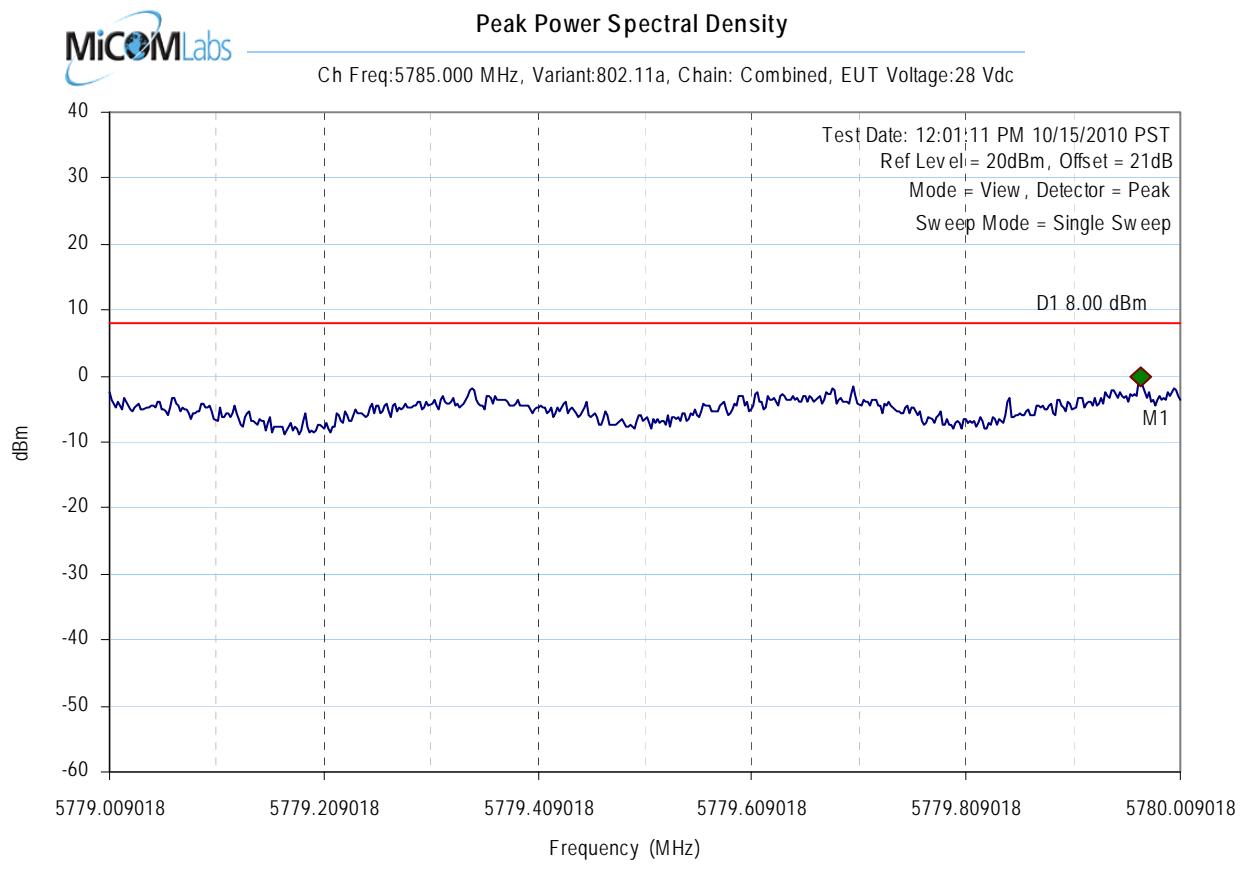
Marker : Frequency : Amplitude

M1 : 5782.467936MHz : -9.786dBm

Test Results

Center frequency = 5785MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

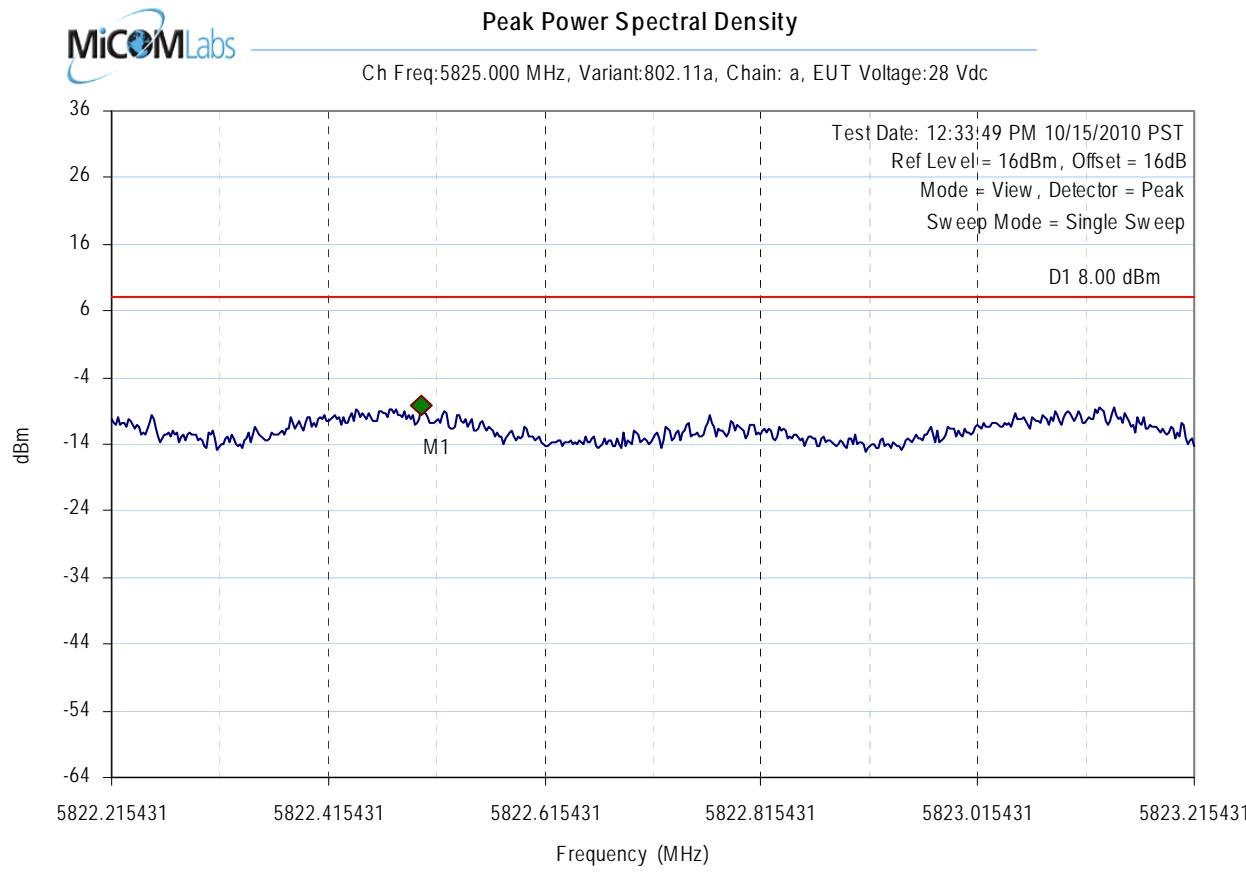
Marker : Frequency : Amplitude

M1 : 5779.972946MHz : -.081dBm

Test Results

Center frequency = 5785MHz

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Analyser Setup

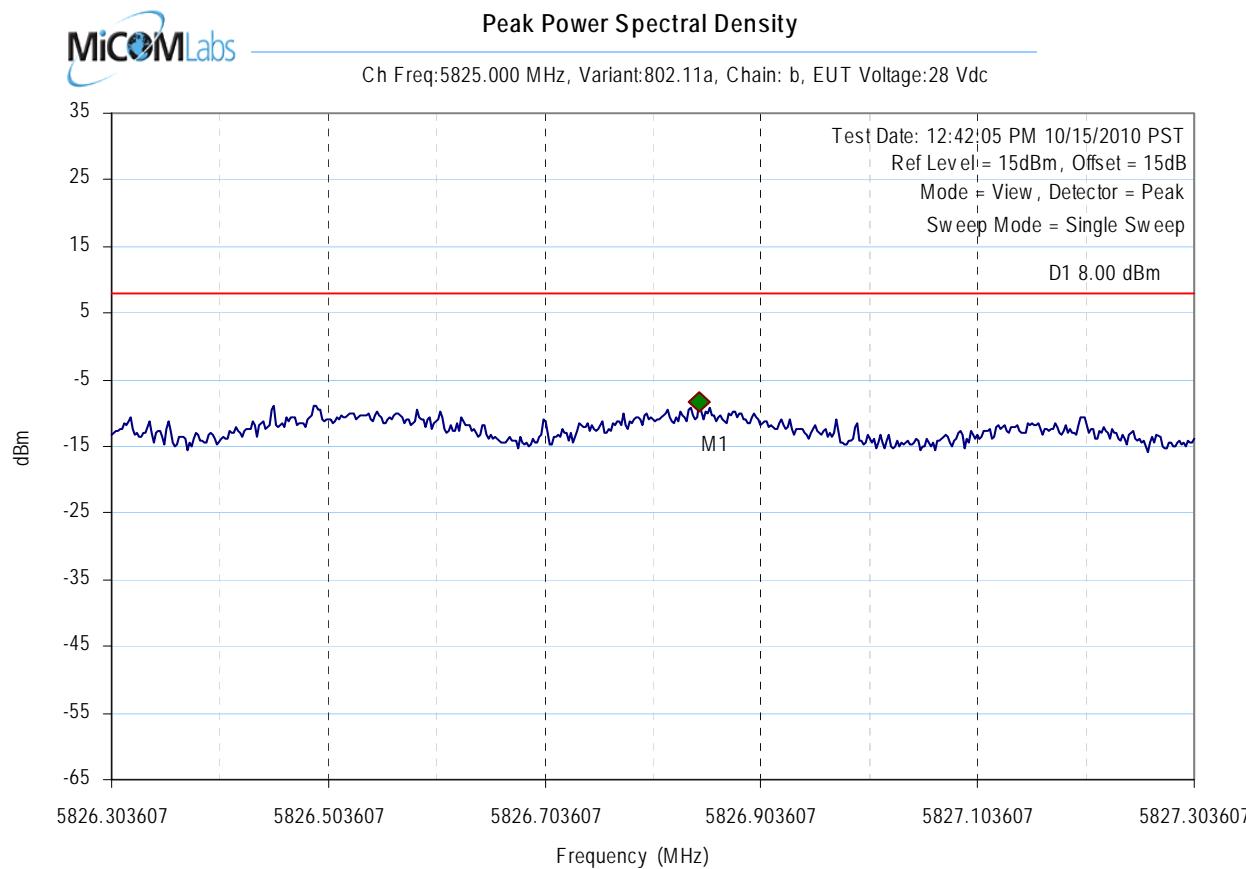
RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

Marker : Frequency : Amplitude

Test Results

Center frequency = 5825MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

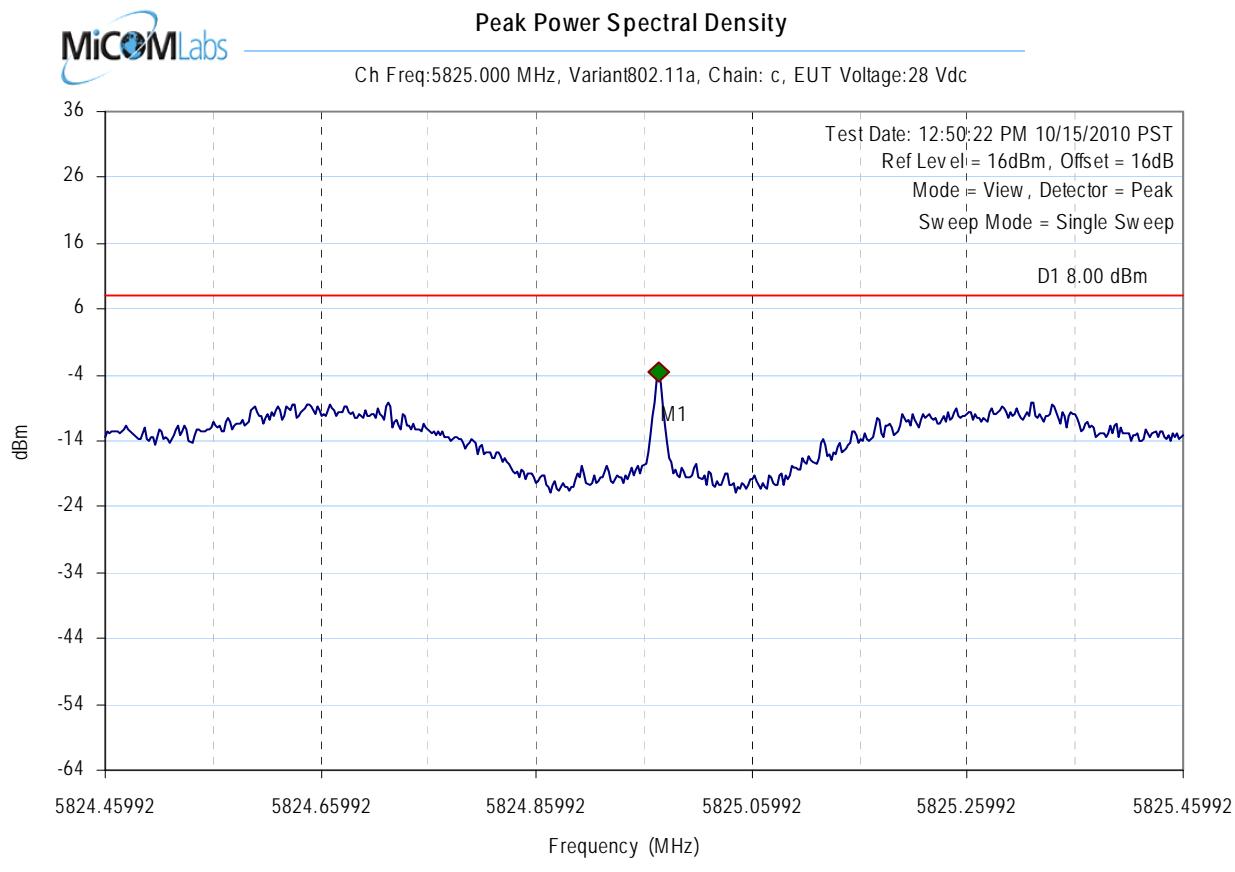
Marker : Frequency : Amplitude

M1 : 5826.846693MHz : -8.311dBm

Test Results

Center frequency = 5825MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

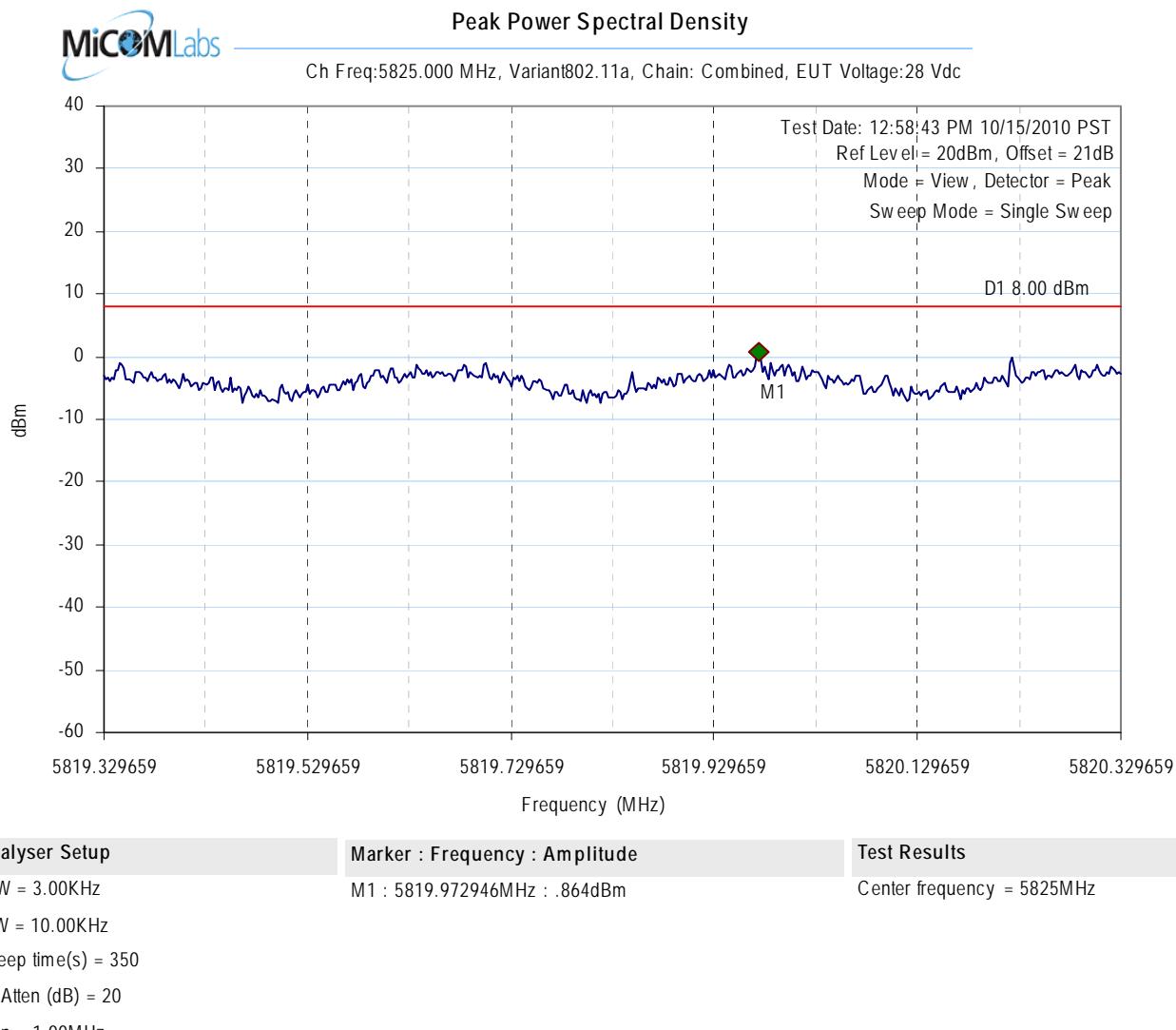
Marker : Frequency : Amplitude

M1 : 5824.972946MHz : -3.506dBm

Test Results

Center frequency = 5825MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 184 of 362

Measurement results for MIMO 802.11n HT-20

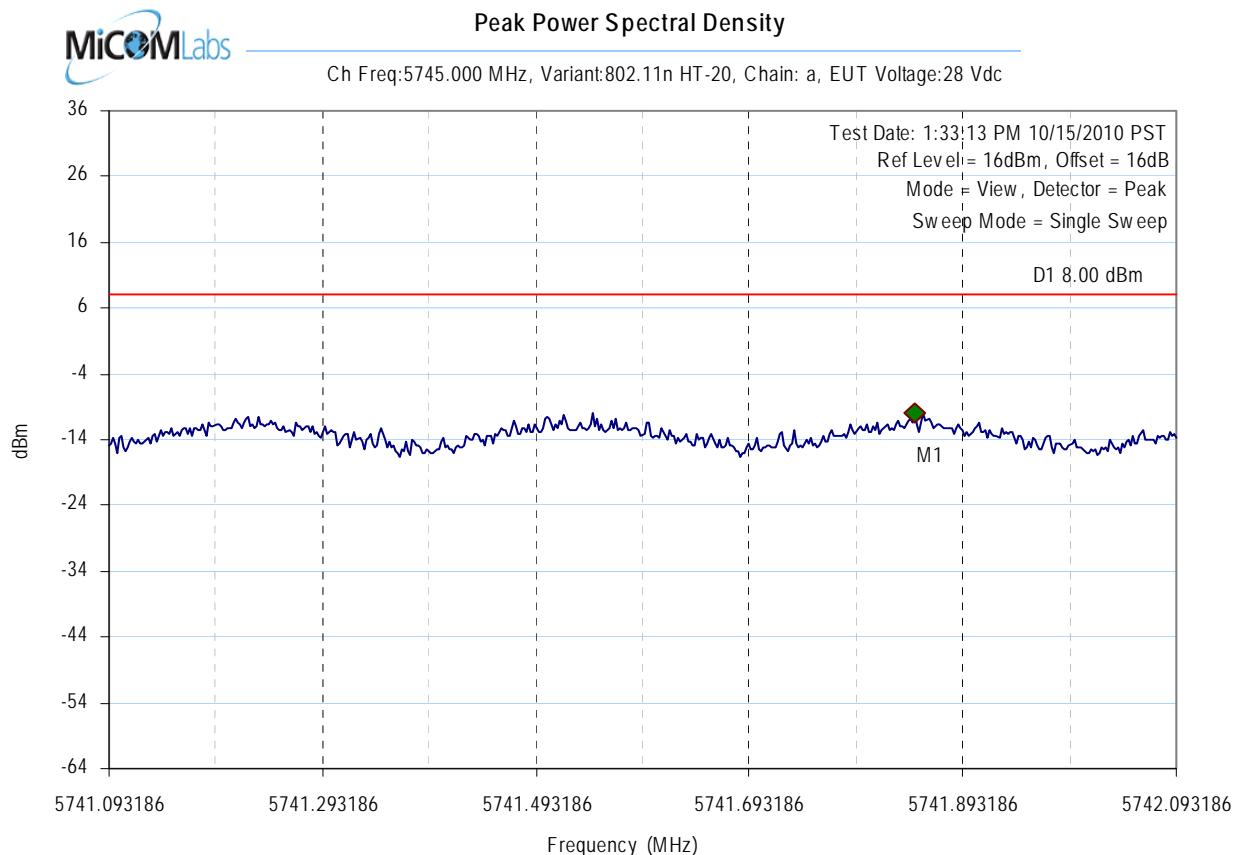
Test Conditions:	15.247 (e)	Rel. Humidity (%):	35	to	42
Variant:	802.11n HT-20	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming	N/A	Antenna Gain:	1.2	dB	
Applied Voltage:	28.00	Vdc			
Notes 1:					
Notes 2:					

Test Frequency	Measured Power Density				Total Peak Power Spectral Density (dBm)		Limit	Margin	
	RF Port (dBm)	a	b	c	d	Combined	Calculated		
5745.000	-9.90	-7.85	-10.26	--	--	-1.90	-4.43	8.00	-9.90
5785.000	-8.51	-8.34	-11.58	--	--	-1.06	-4.47	8.00	-9.06
5825.000	-6.99	-8.06	-10.49	--	--	-1.37	-3.51	8.00	-9.37

Measurement uncertainty:	± 1.33 dB
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Margins are calculated based on actual combined measurements. Calculated values are inserted for reference only and are based on individual chains.

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

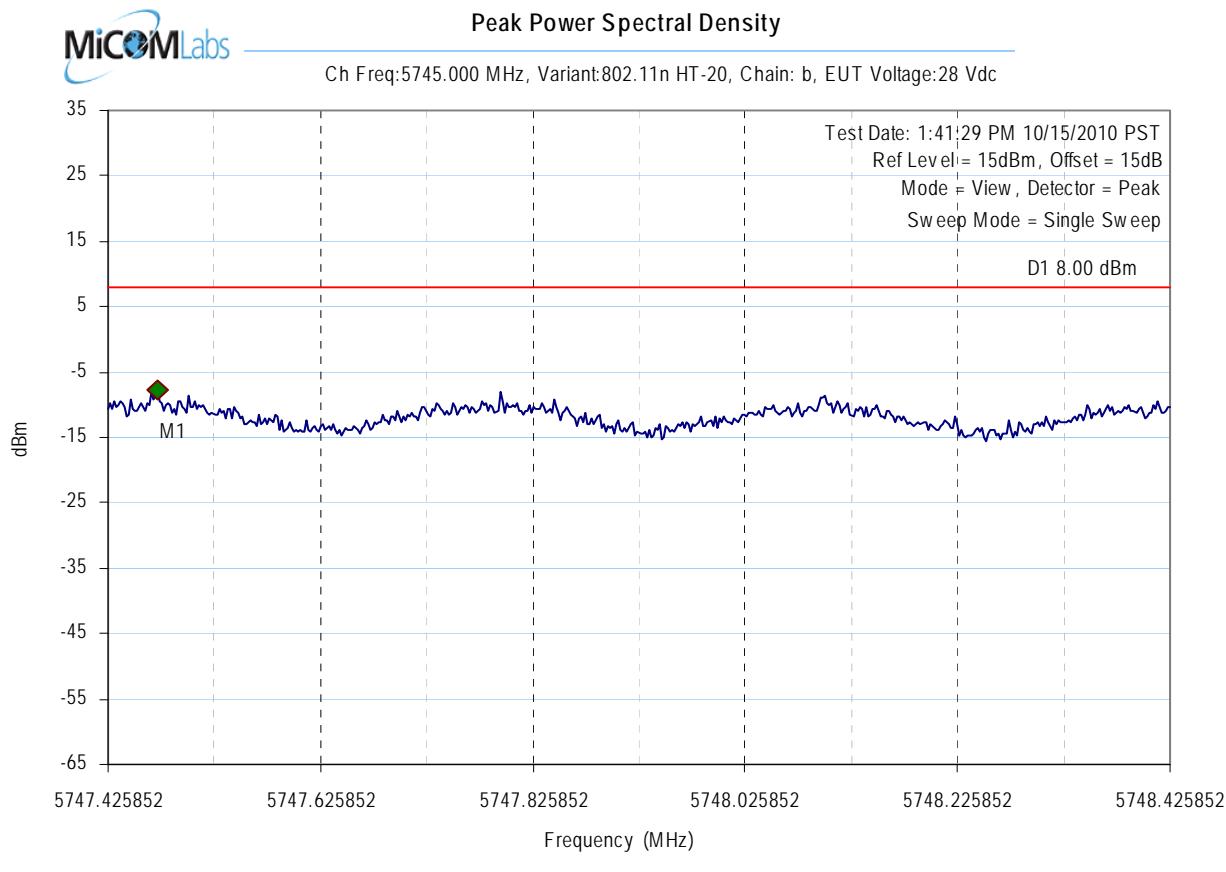
Marker : Frequency : Amplitude

M1 : 5741.848697MHz : -9.898dBm

Test Results

Center frequency = 5745MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

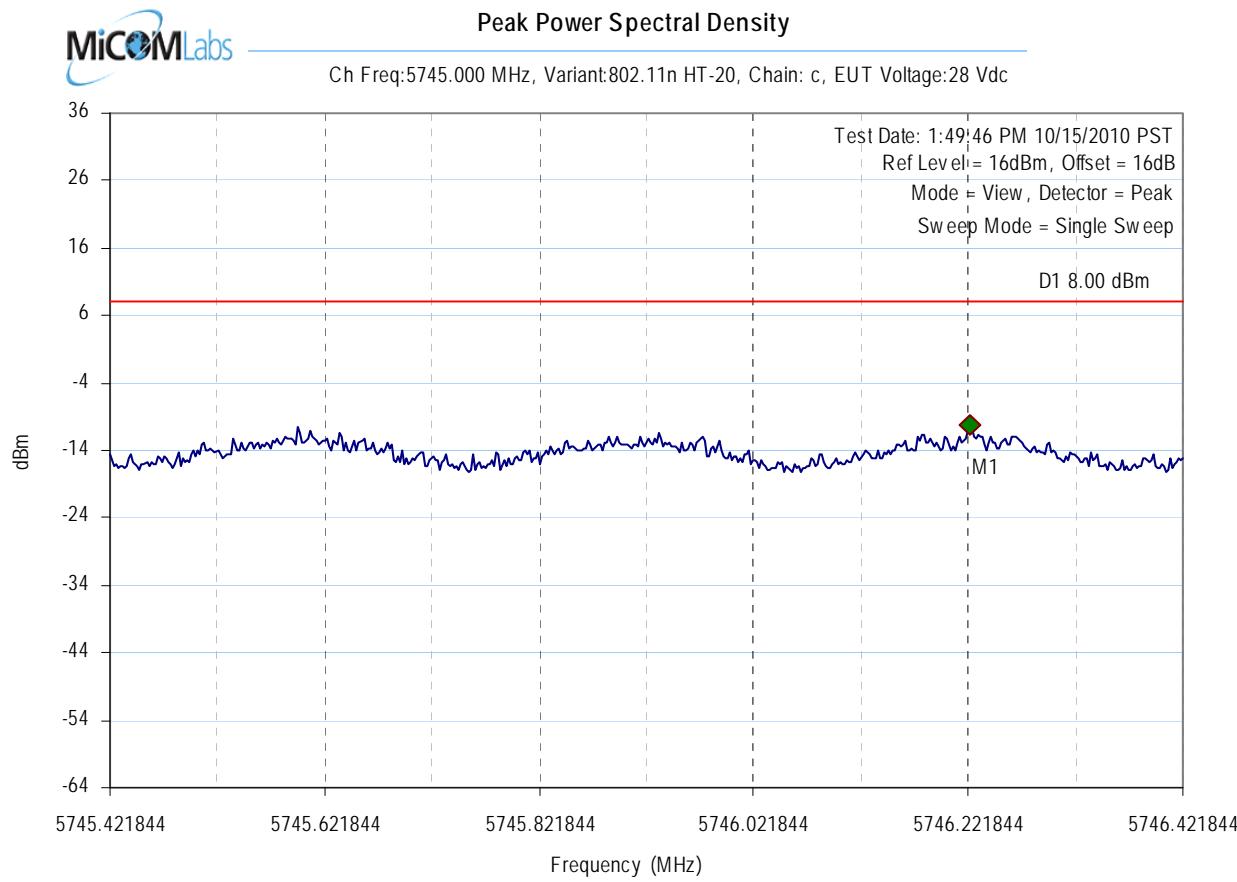
Marker : Frequency : Amplitude

M1 : 5747.471944MHz : -7.853dBm

Test Results

Center frequency = 5745MHz

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



Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

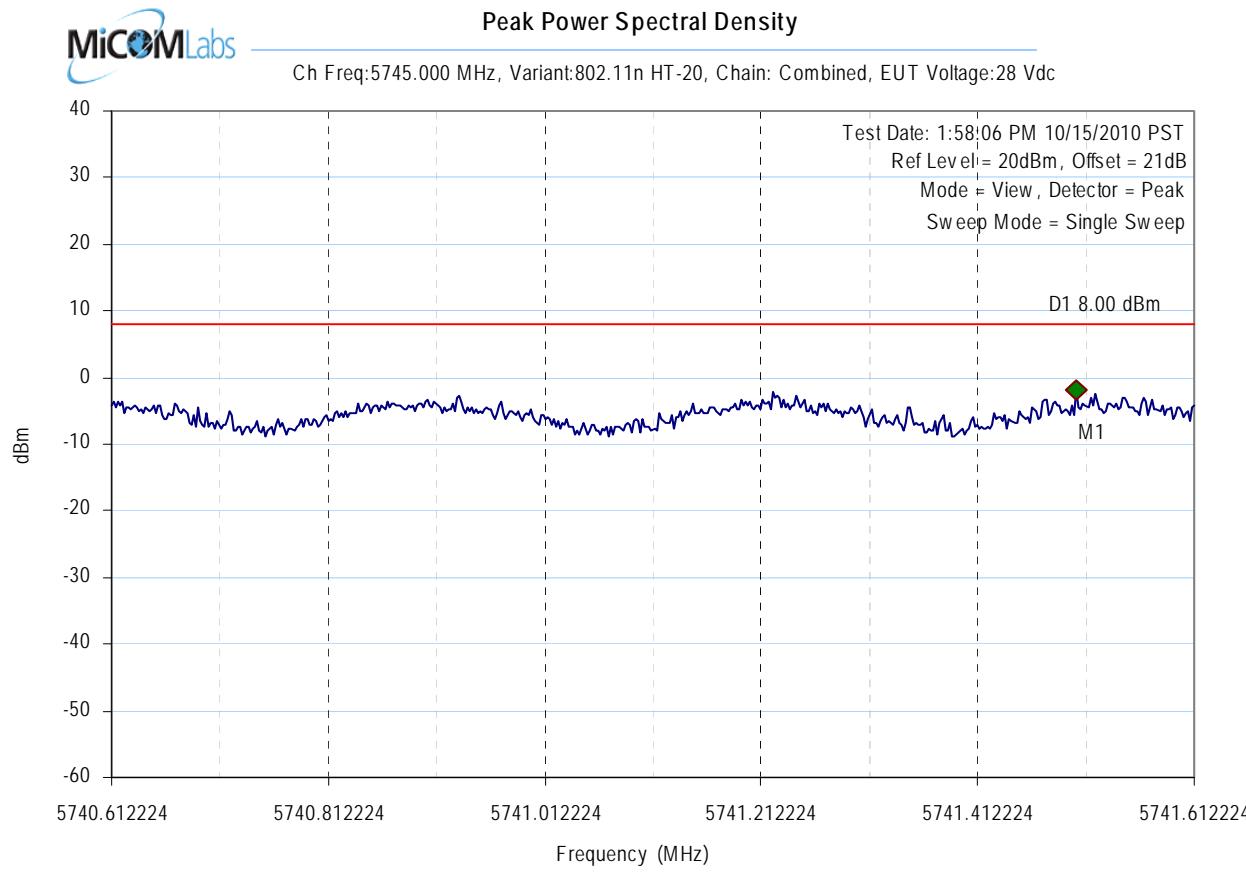
Marker : Frequency : Amplitude

M1 : 5746.223447MHz : -10.260dBm

Test Results

Center frequency = 5745MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

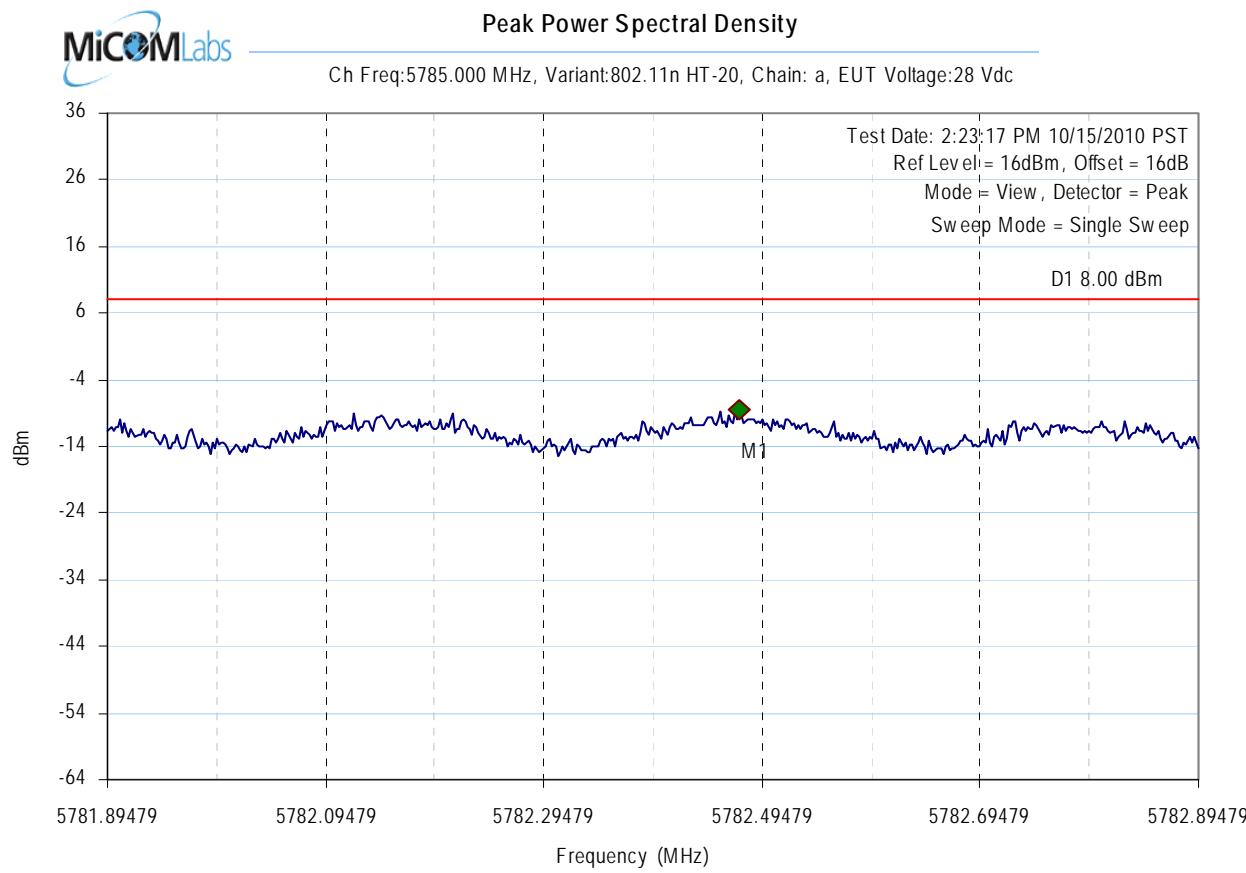
Marker : Frequency : Amplitude

M1 : 5741.504008MHz : -1.901dBm

Test Results

Center frequency = 5745MHz

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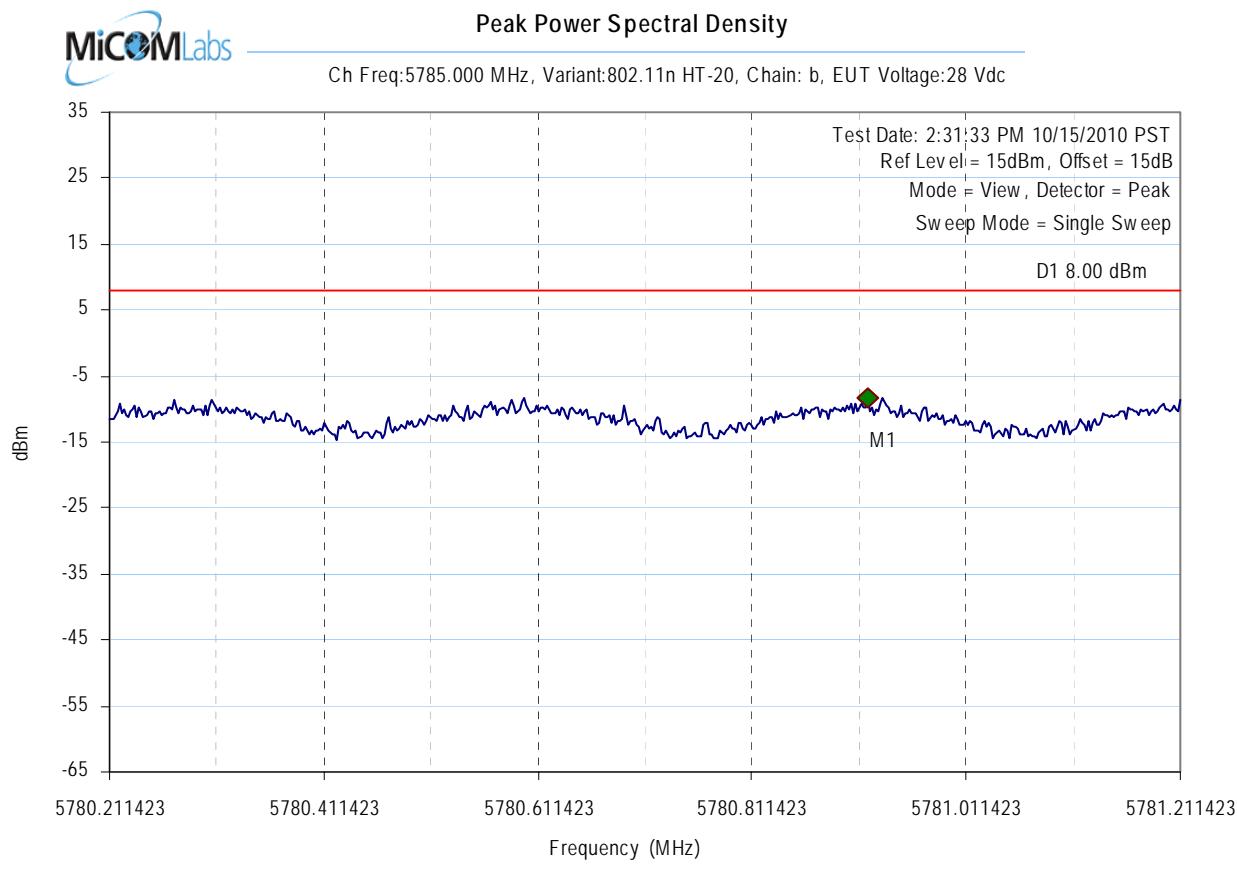
Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

Test Results

Center frequency = 5785MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

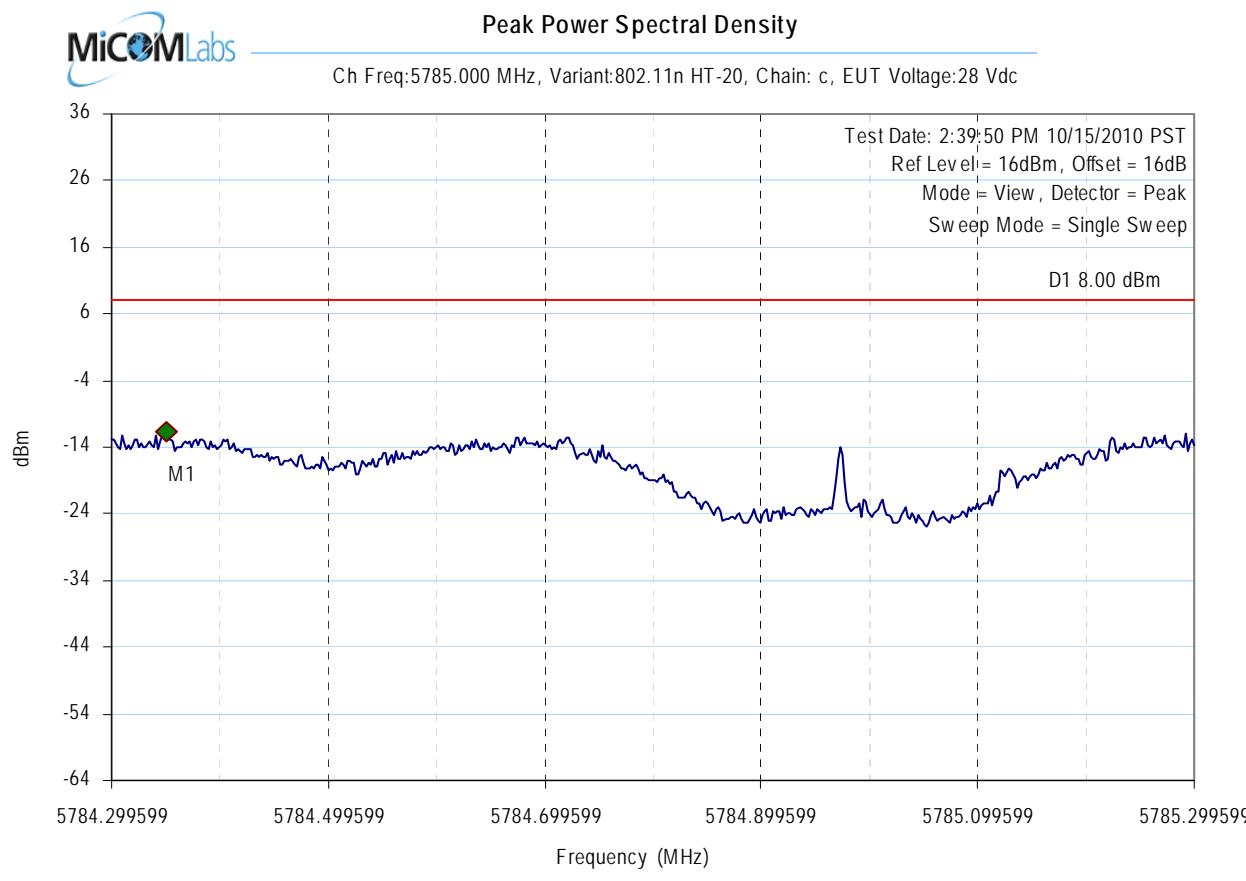
Marker : Frequency : Amplitude

M1 : 5780.918838MHz : -8.341dBm

Test Results

Center frequency = 5785MHz

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Analyser Setup

RBW = 3.00KHz

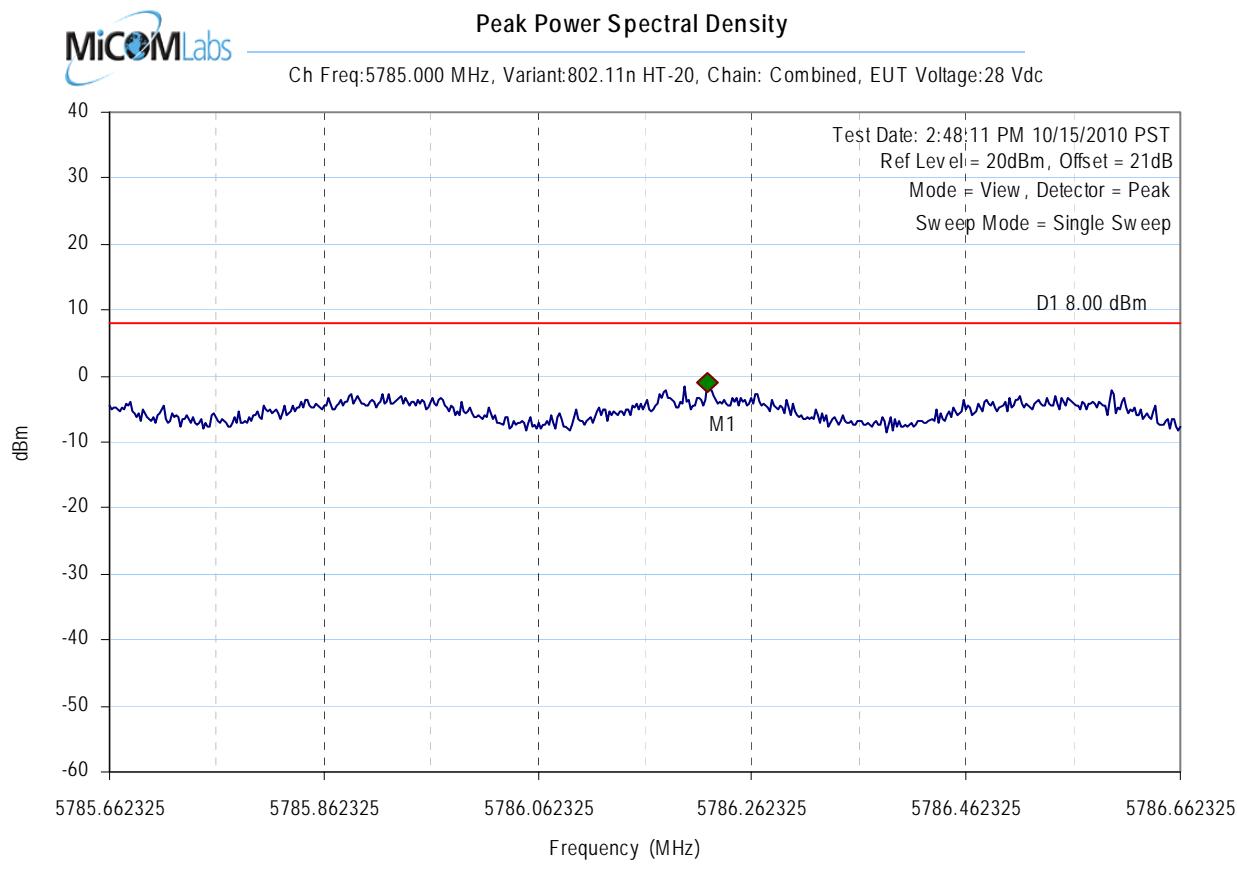
VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

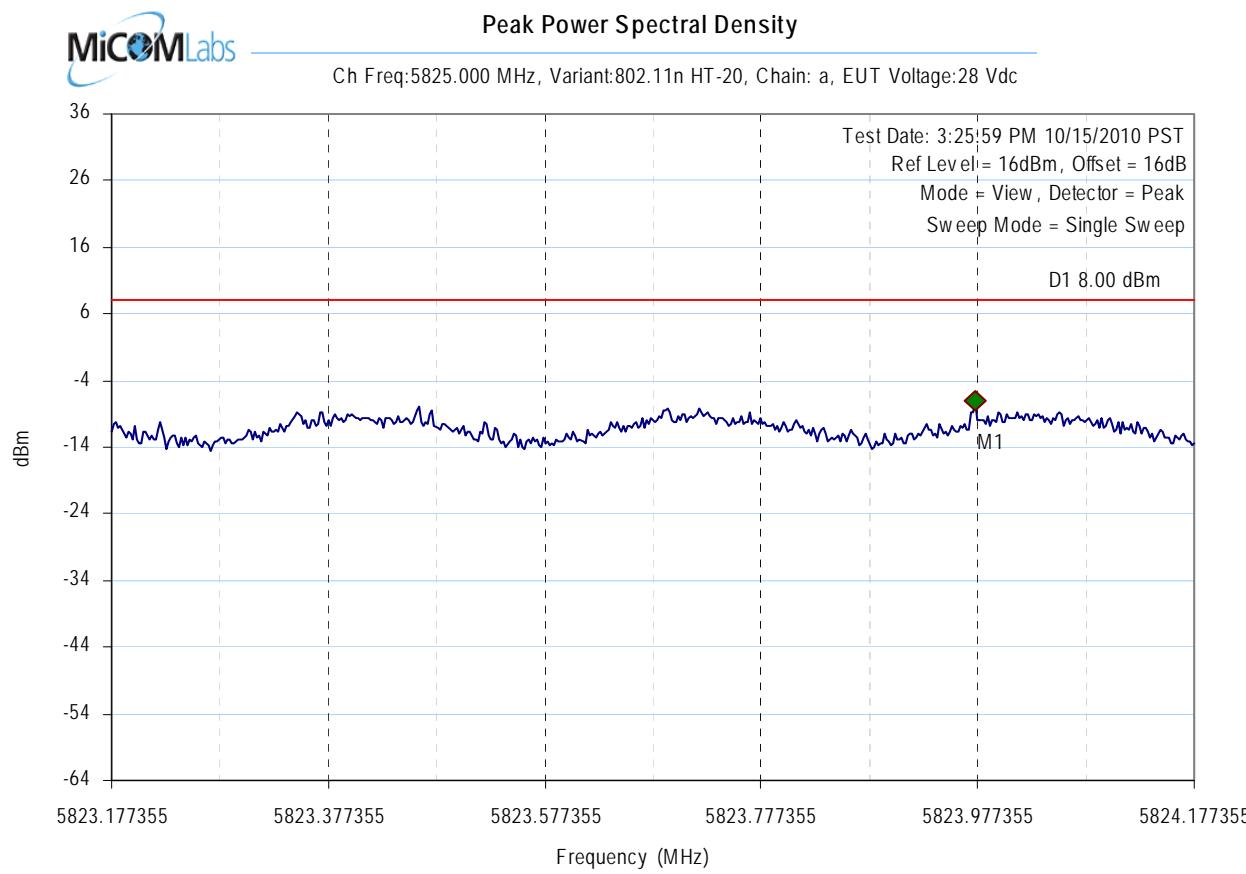
Marker : Frequency : Amplitude

M1 : 5786.221443MHz : -1.059dBm

Test Results

Center frequency = 5785MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

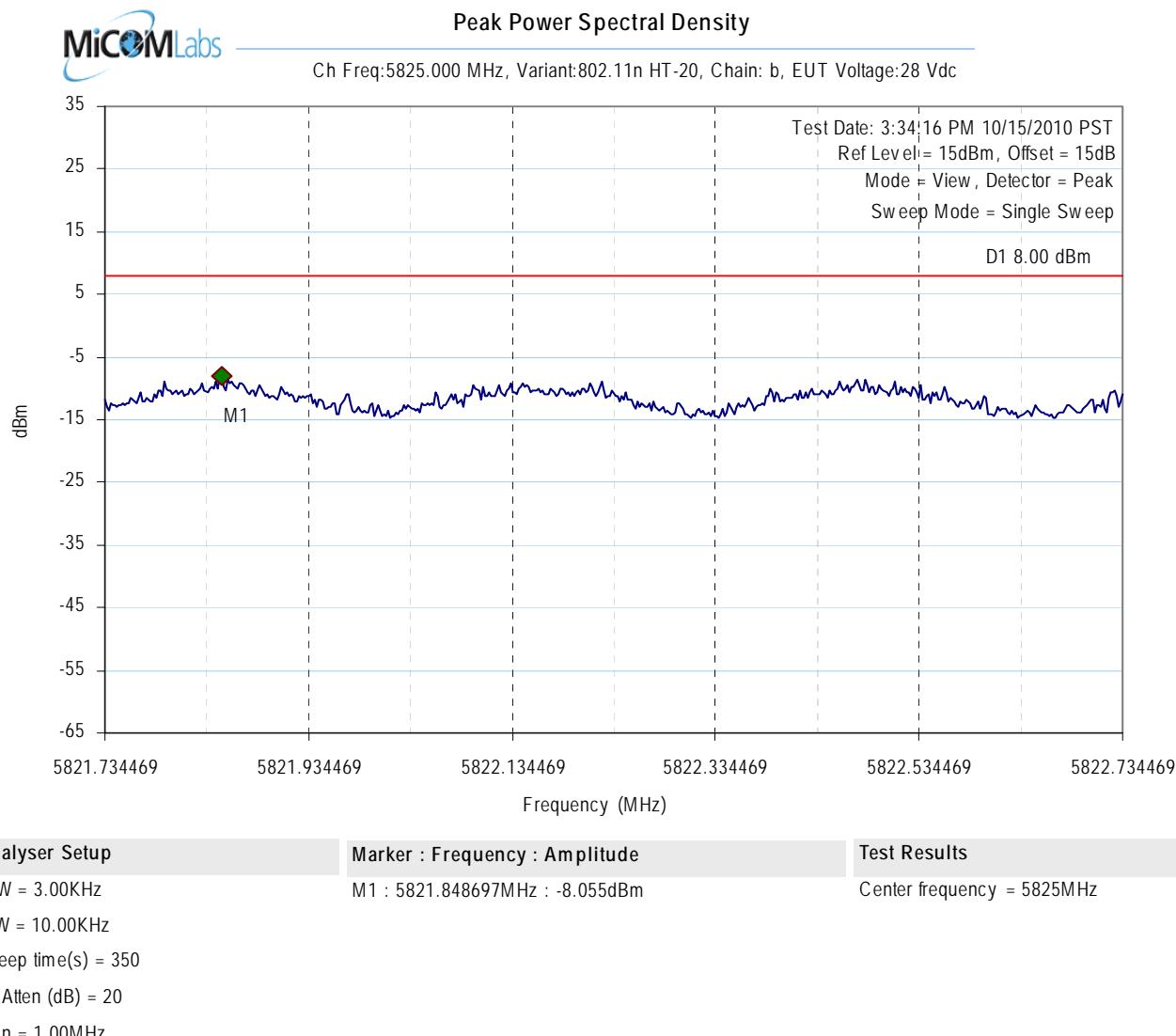
Marker : Frequency : Amplitude

M1 : 5823.974950MHz : -6.987dBm

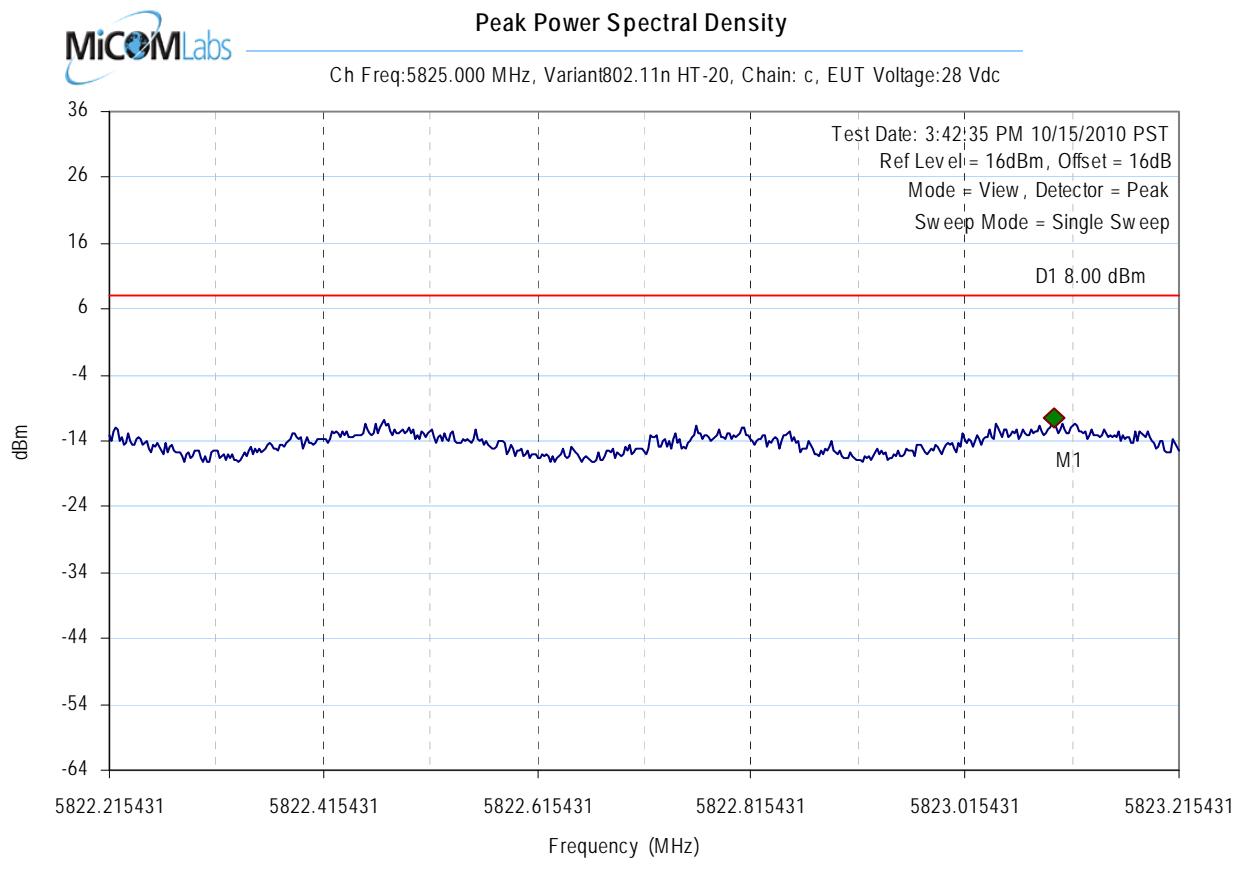
Test Results

Center frequency = 5825MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

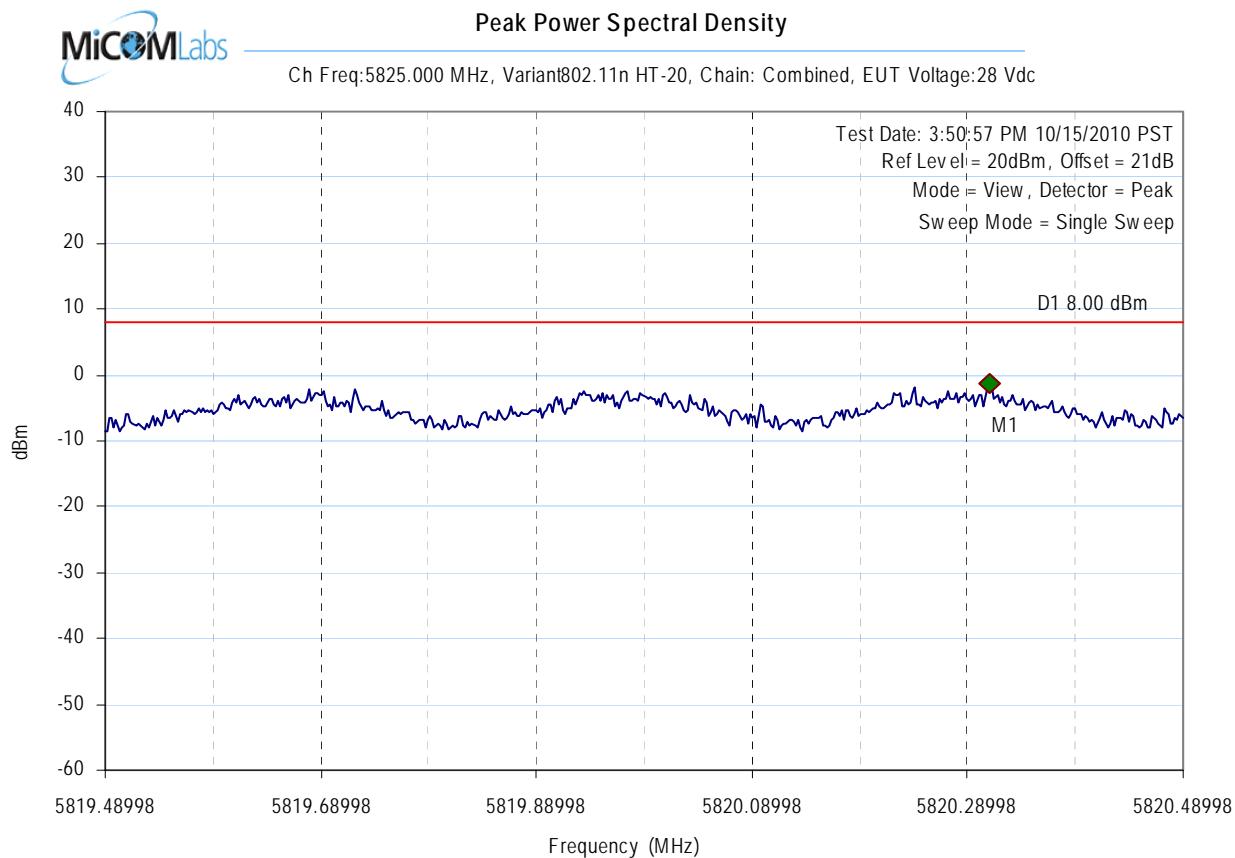
Marker : Frequency : Amplitude

M1 : 5823.099198MHz : -10.494dBm

Test Results

Center frequency = 5825MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

Marker : Frequency : Amplitude

M1 : 5820.309619MHz : -1.367dBm

Test Results

Center frequency = 5825MHz

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Measurement results for MIMO 802.11n HT-40

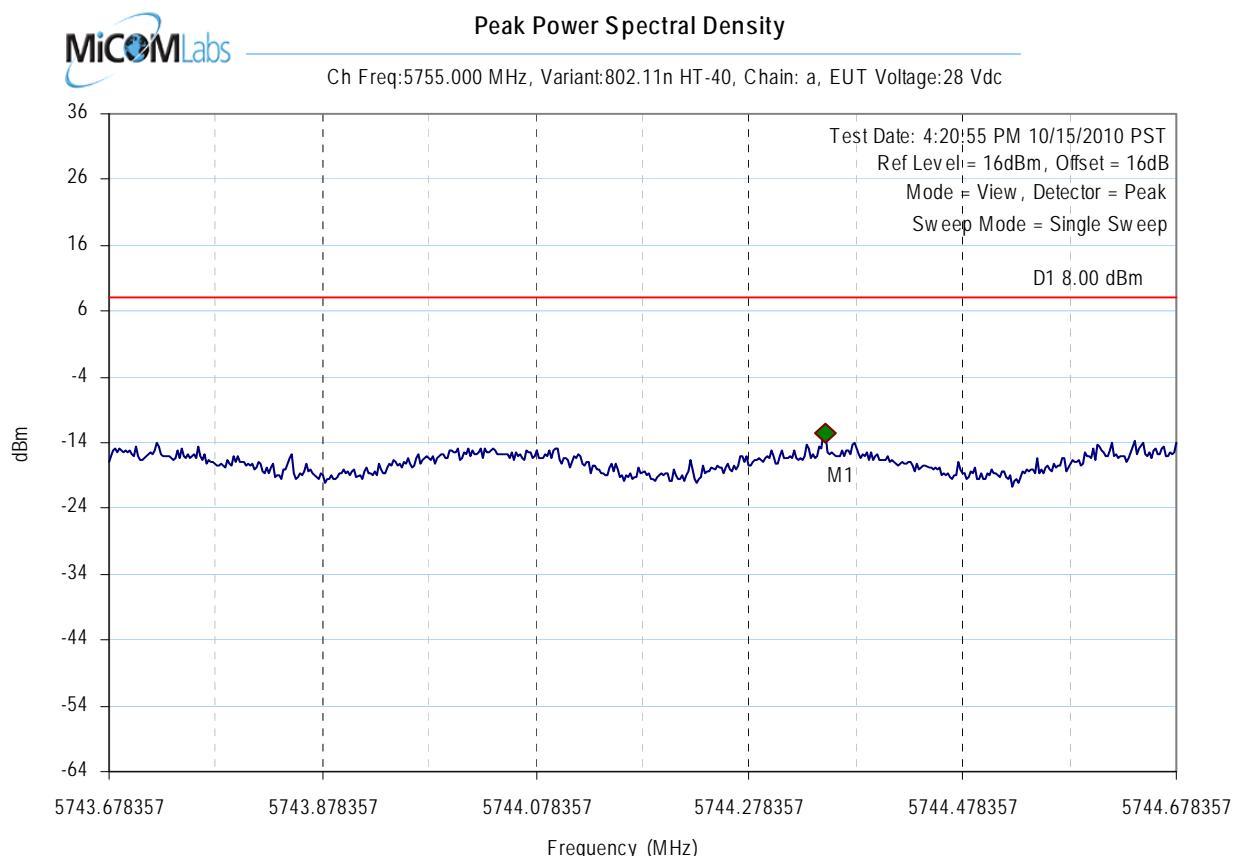
Test Conditions:	15.247 (e)	Rel. Humidity (%):	35	to	42	
Variant:	802.11n HT-40		Ambient Temp. (°C):	19	to	22
TPC:	HIGH		Pressure (mBars):	998	to	1003
Modulation:	ON		Duty Cycle (%):	100		
Beam Forming	N/A	dB	Antenna Gain:	1.2	dBi	
Applied Voltage:	28.00	Vdc				
Notes 1:						
Notes 2:						

Test Frequency	Measured Power Density				Total Peak Power Spectral Density (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
5755.000	-12.66	-11.23	-16.80	--	-5.40	-8.23	8.00	-13.40
5785.000	-12.18	-10.10	-15.13	--	-4.47	-7.24	8.00	-12.47
5815.000	-11.44	-8.59	-15.42	--	-3.03	-6.22	8.00	-11.03

Measurement uncertainty:	± 1.33 dB
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Margins are calculated based on actual combined measurements. Calculated values are inserted for reference only and are based on individual chains.

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

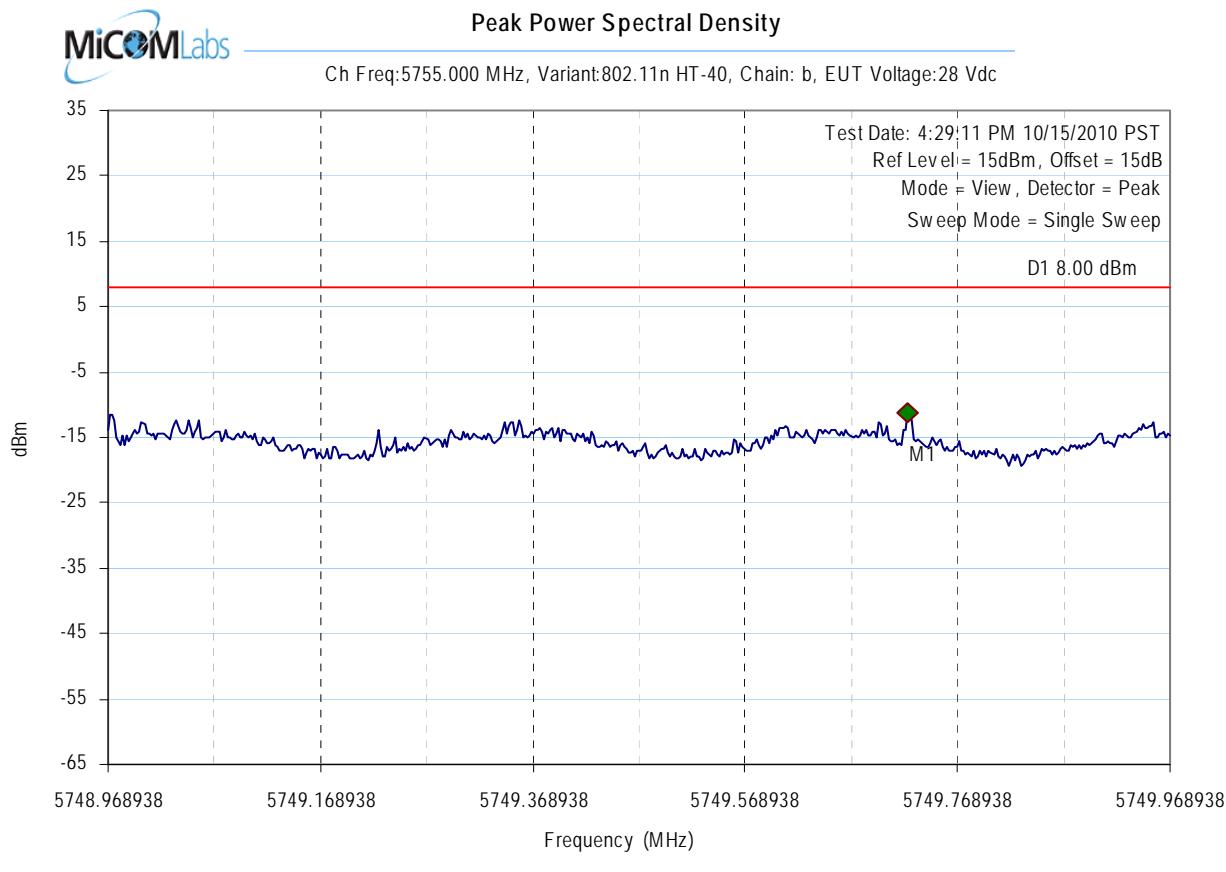
RF Atten (dB) = 20

Span = 1.00MHz

Test Results

Center frequency = 5755MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

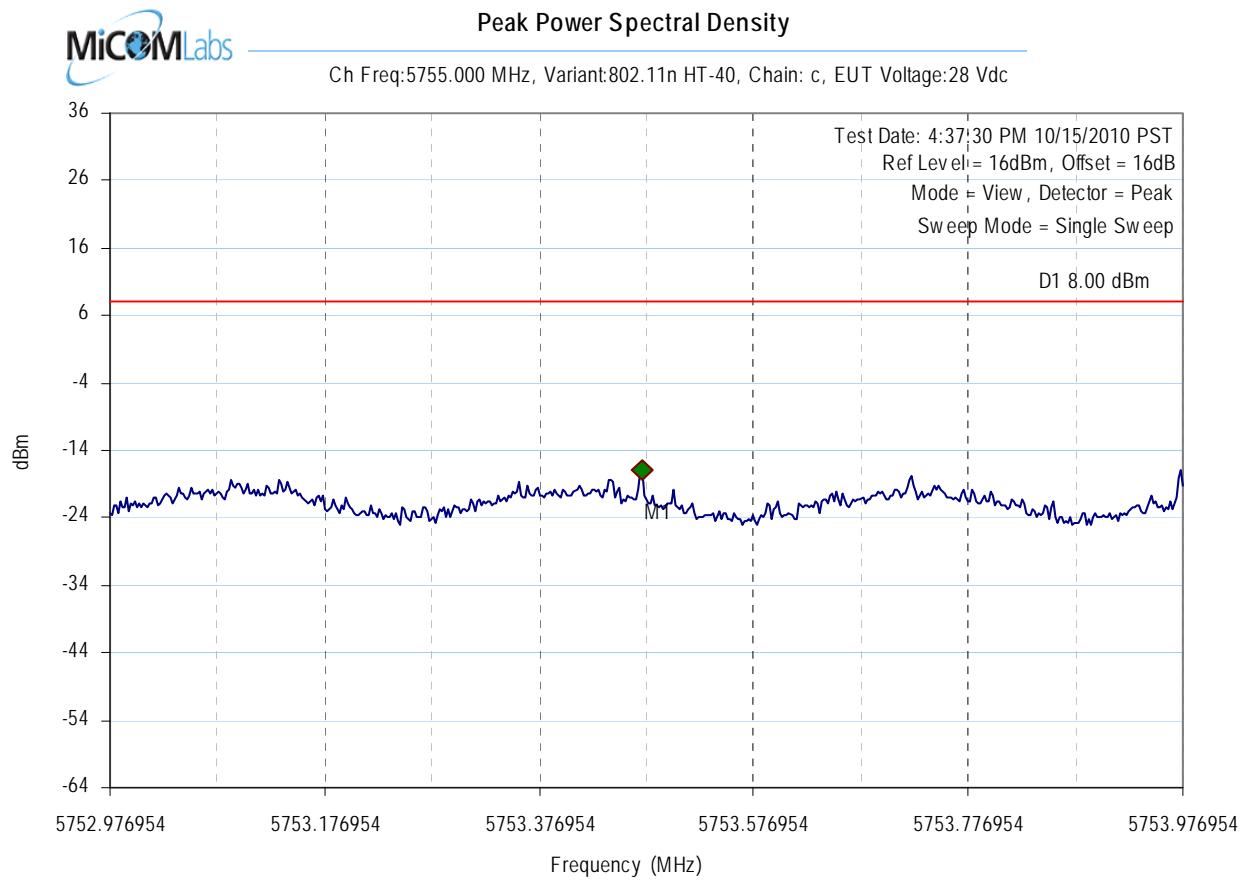
Marker : Frequency : Amplitude

M1 : 5749.722445MHz : -11.227dBm

Test Results

Center frequency = 5755MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

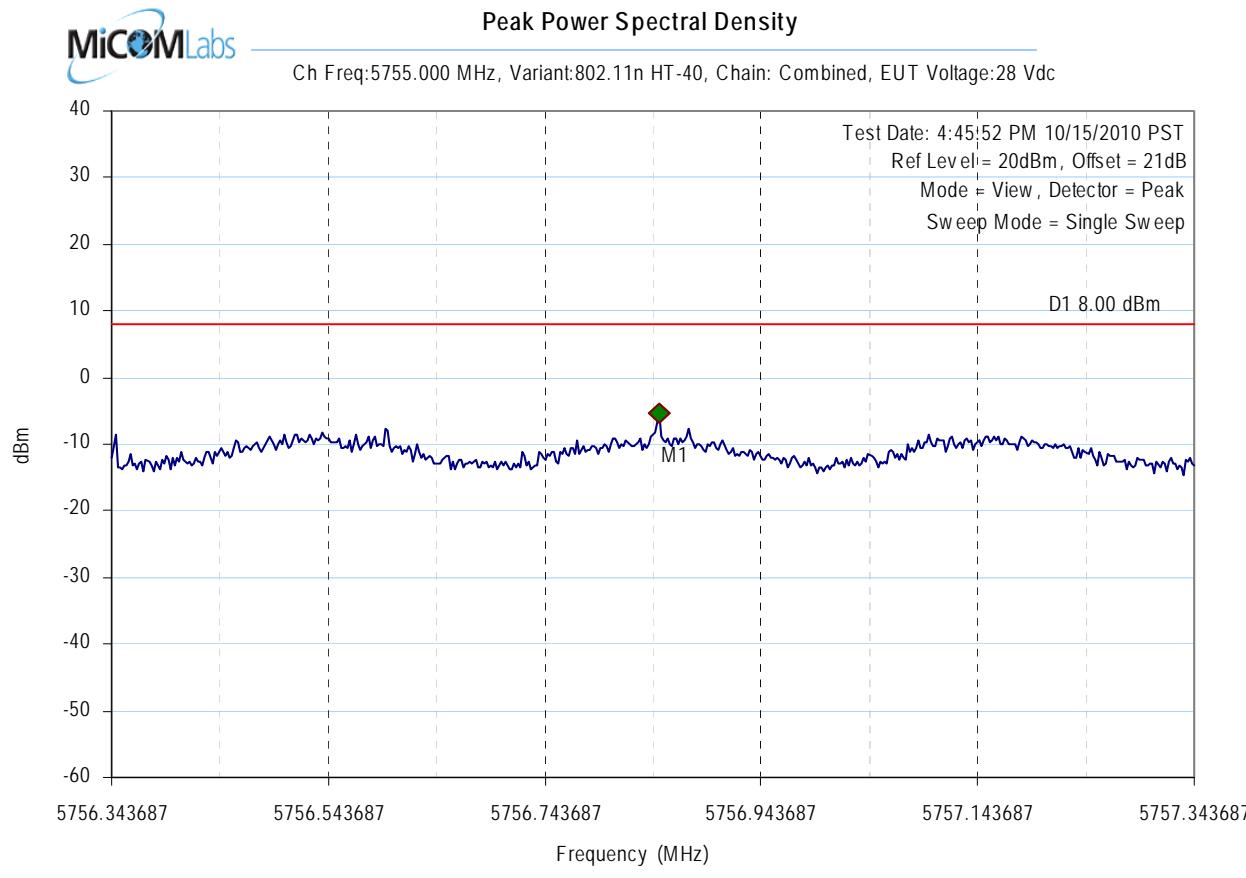
Marker : Frequency : Amplitude

M1 : 5753.473948MHz : -16.802dBm

Test Results

Center frequency = 5755MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

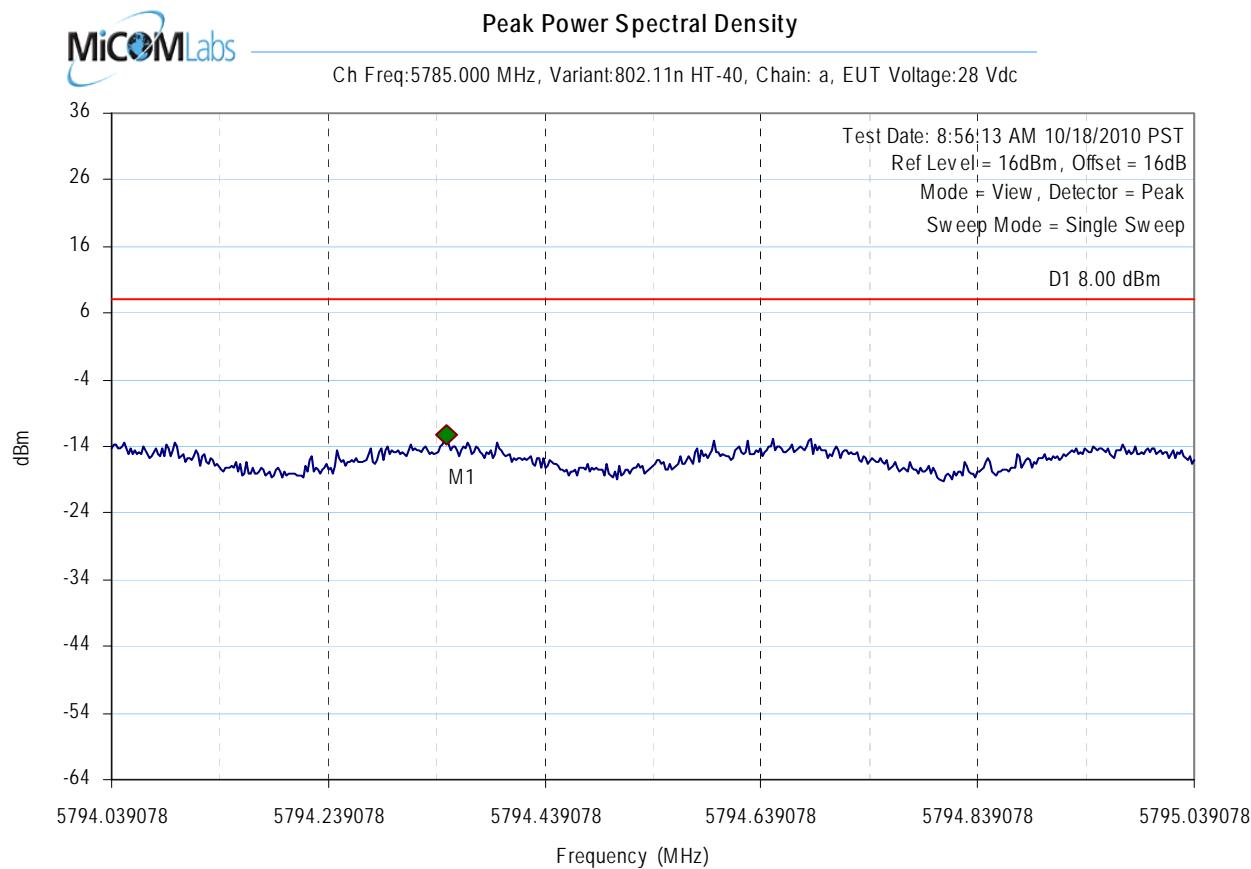
Marker : Frequency : Amplitude

M1 : 5756.848697MHz : -5.397dBm

Test Results

Center frequency = 5755MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

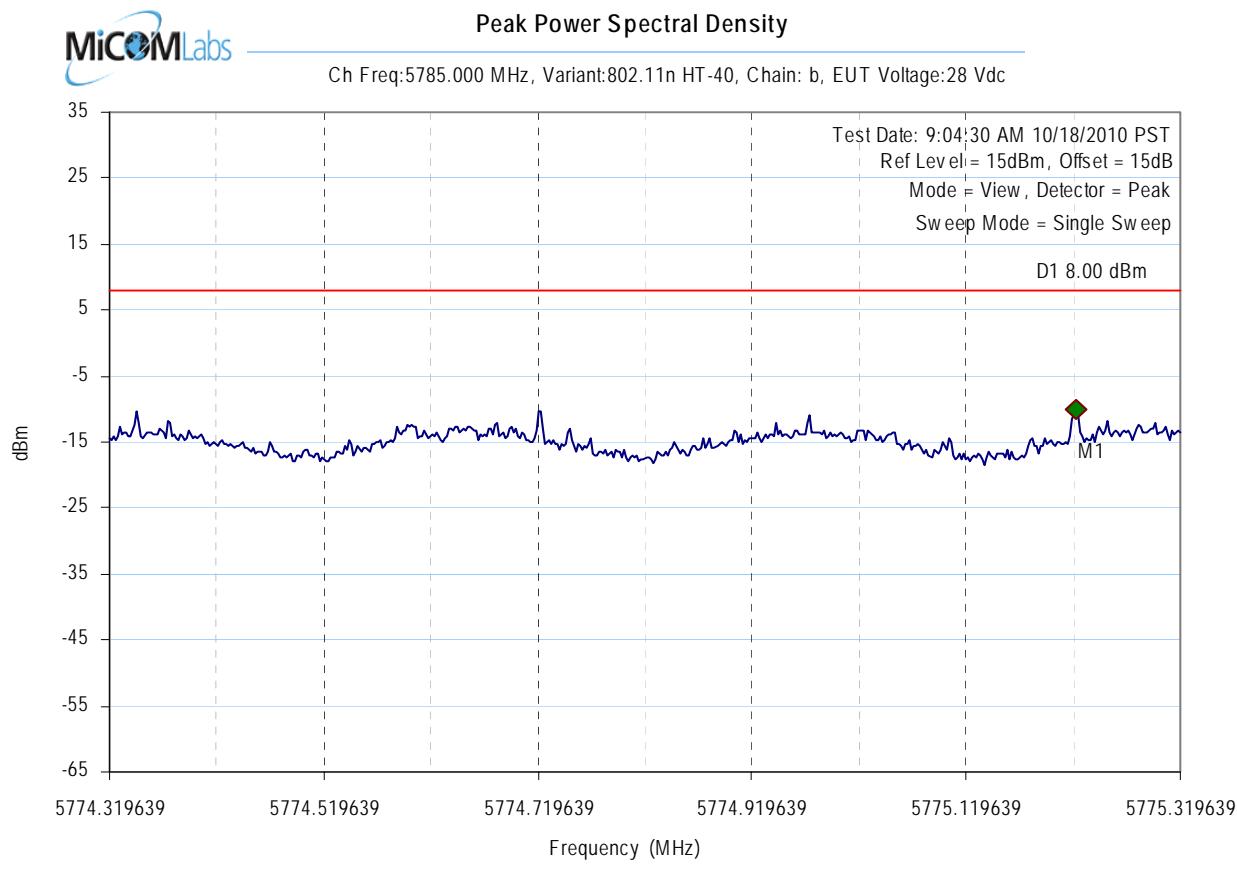
Marker : Frequency : Amplitude

M1 : 5794.347695MHz : -12.178dBm

Test Results

Center frequency = 5785MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

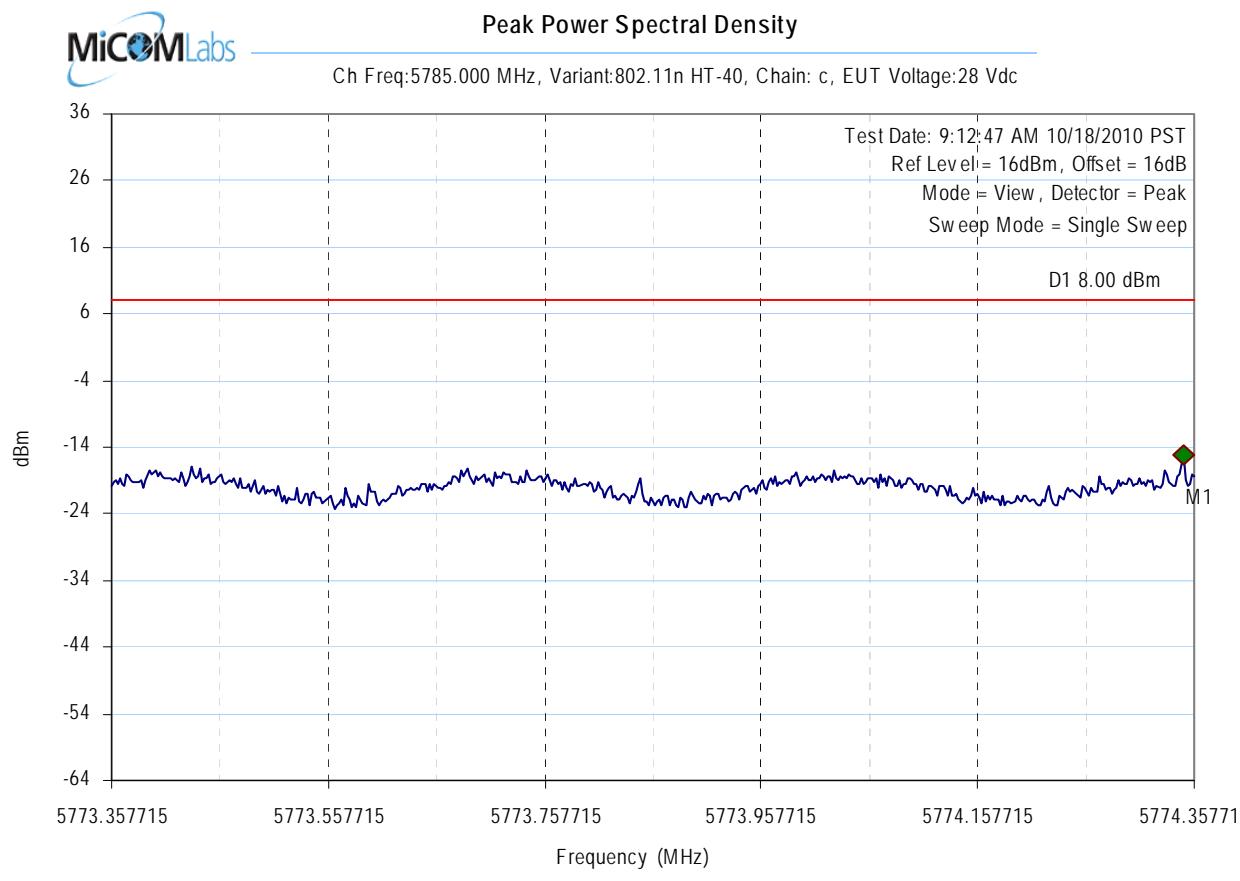
Marker : Frequency : Amplitude

M1 : 5775.221443MHz : -10.103dBm

Test Results

Center frequency = 5785MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

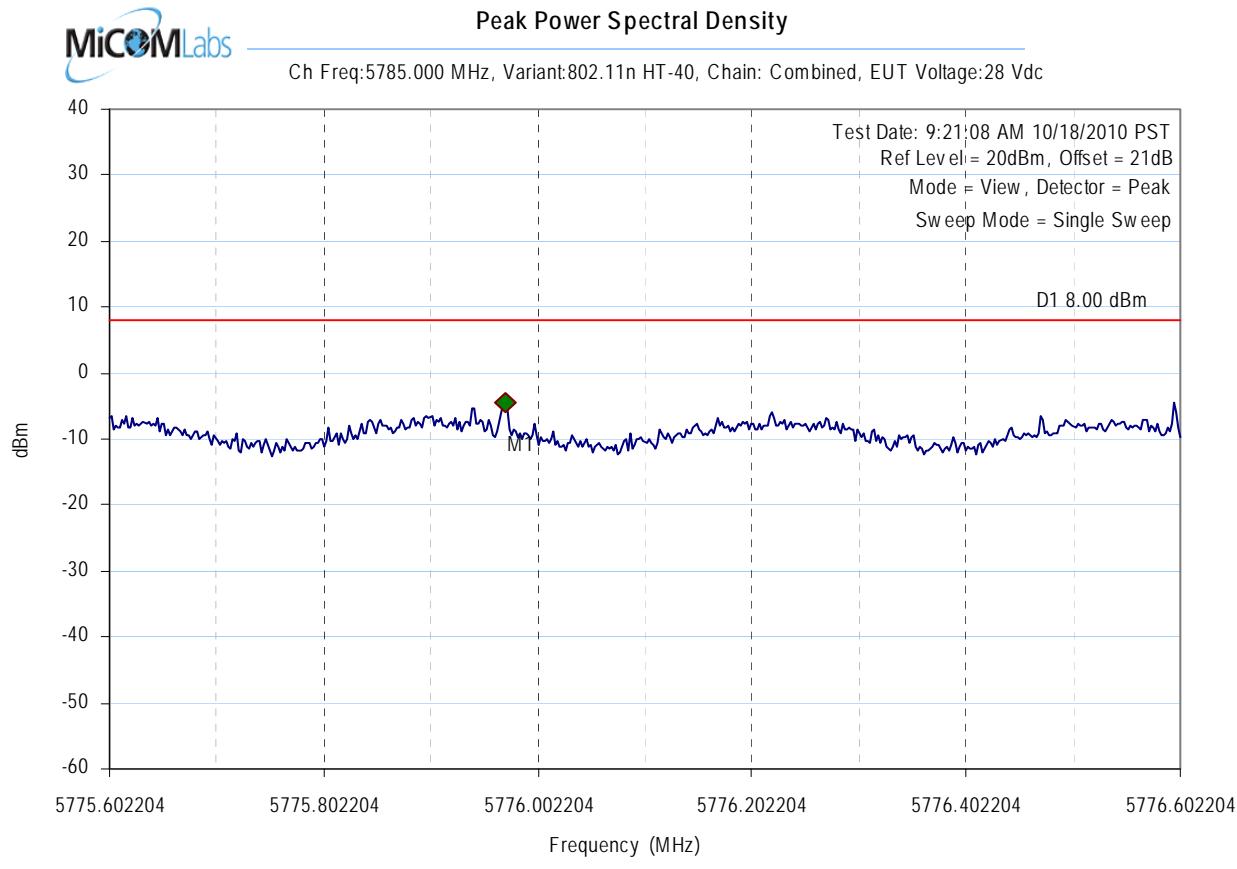
Marker : Frequency : Amplitude

M1 : 5774.347695MHz : -15.129dBm

Test Results

Center frequency = 5785MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

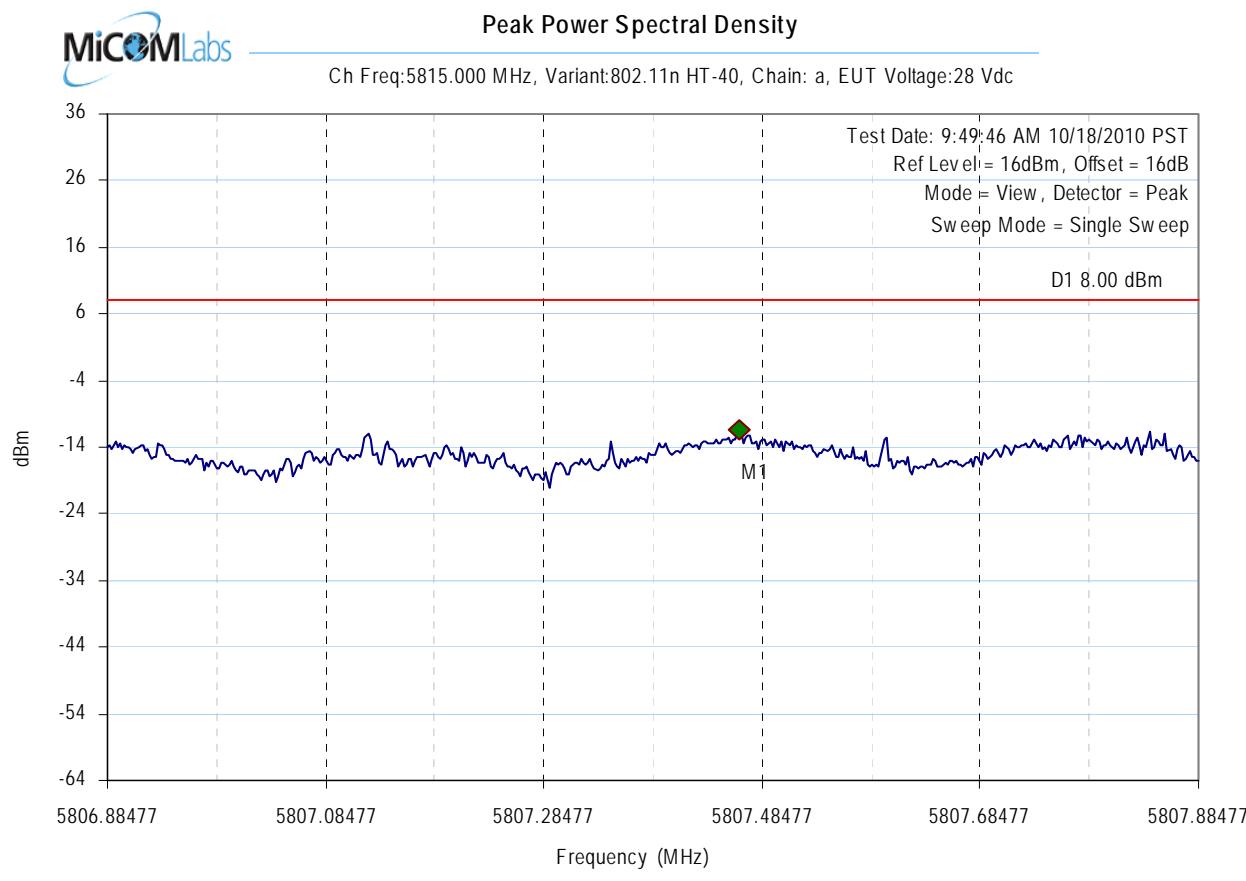
Marker : Frequency : Amplitude

M1 : 5775.970942MHz : -4.466dBm

Test Results

Center frequency = 5785MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

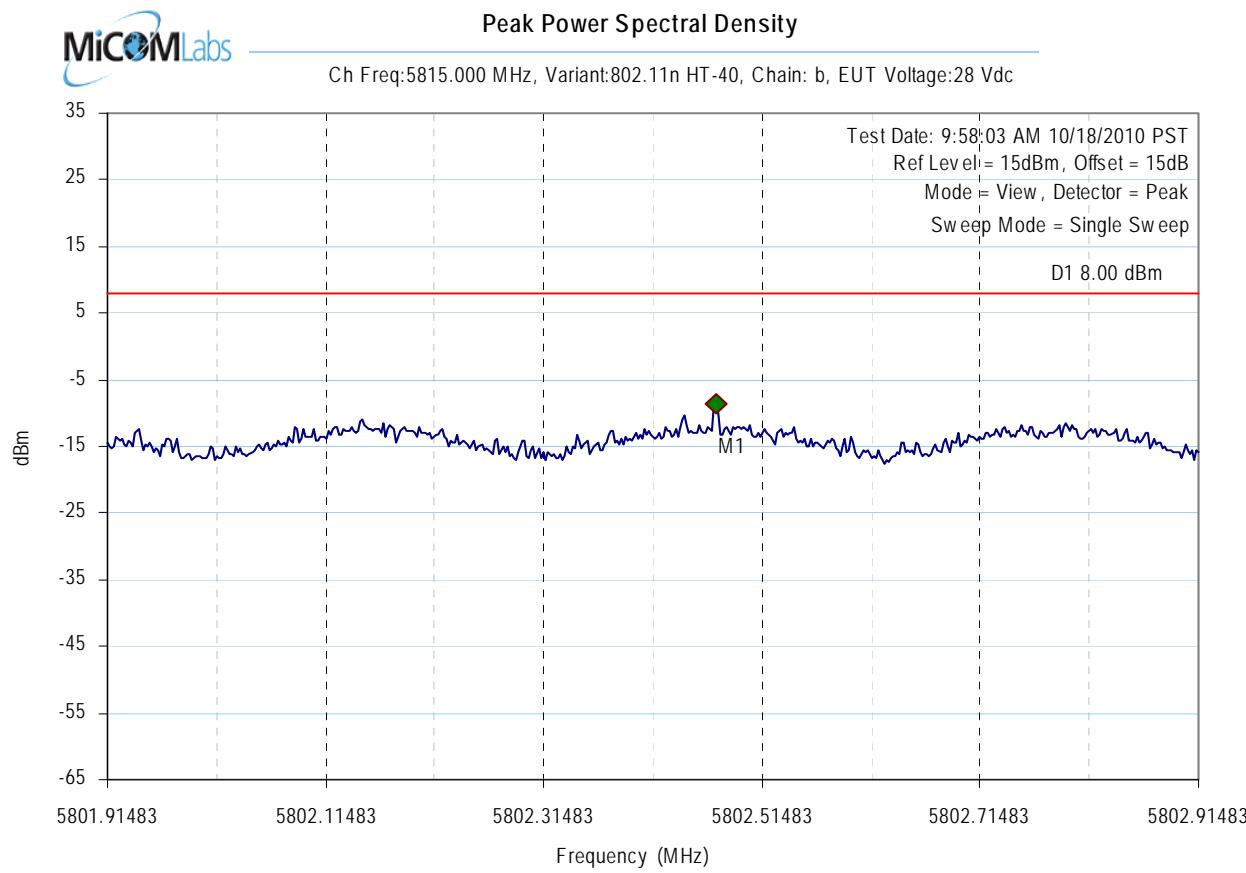
Marker : Frequency : Amplitude

M1 : 5807.463928MHz : -11.437dBm

Test Results

Center frequency = 5815MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

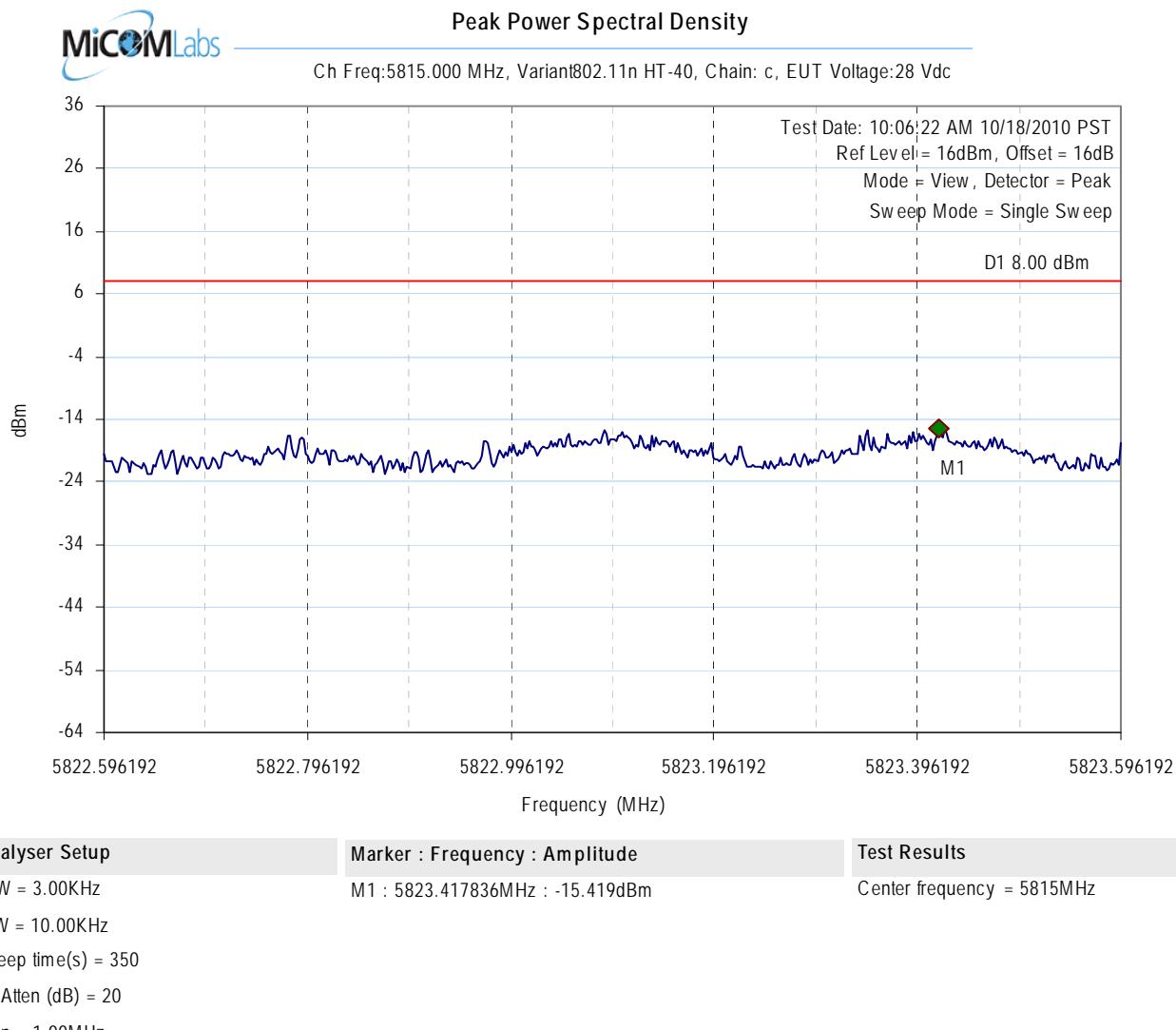
Marker : Frequency : Amplitude

M1 : 5802.471944MHz : -8.591dBm

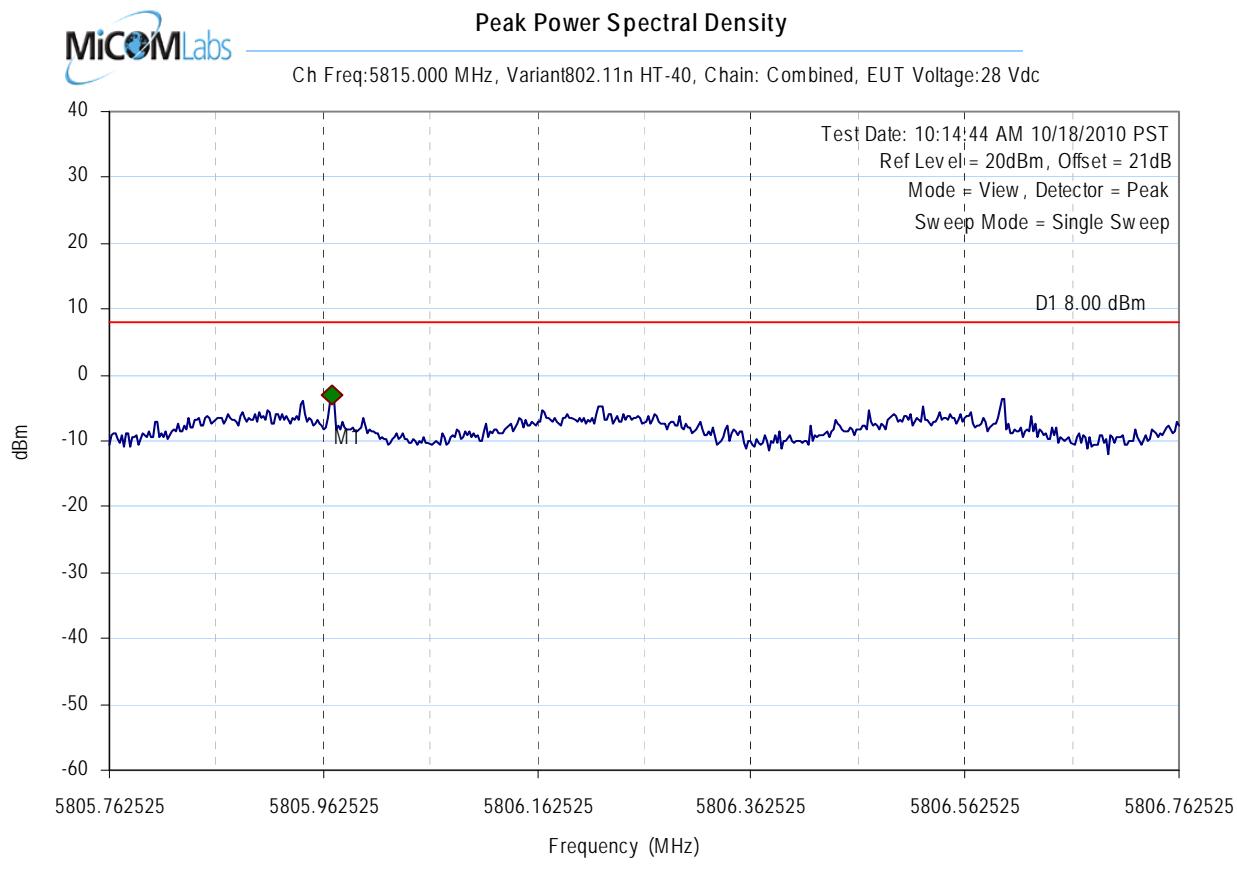
Test Results

Center frequency = 5815MHz

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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

RF Atten (dB) = 20

Span = 1.00MHz

Marker : Frequency : Amplitude

M1 : 5805.970942MHz : -3.032dBm

Test Results

Center frequency = 5815MHz

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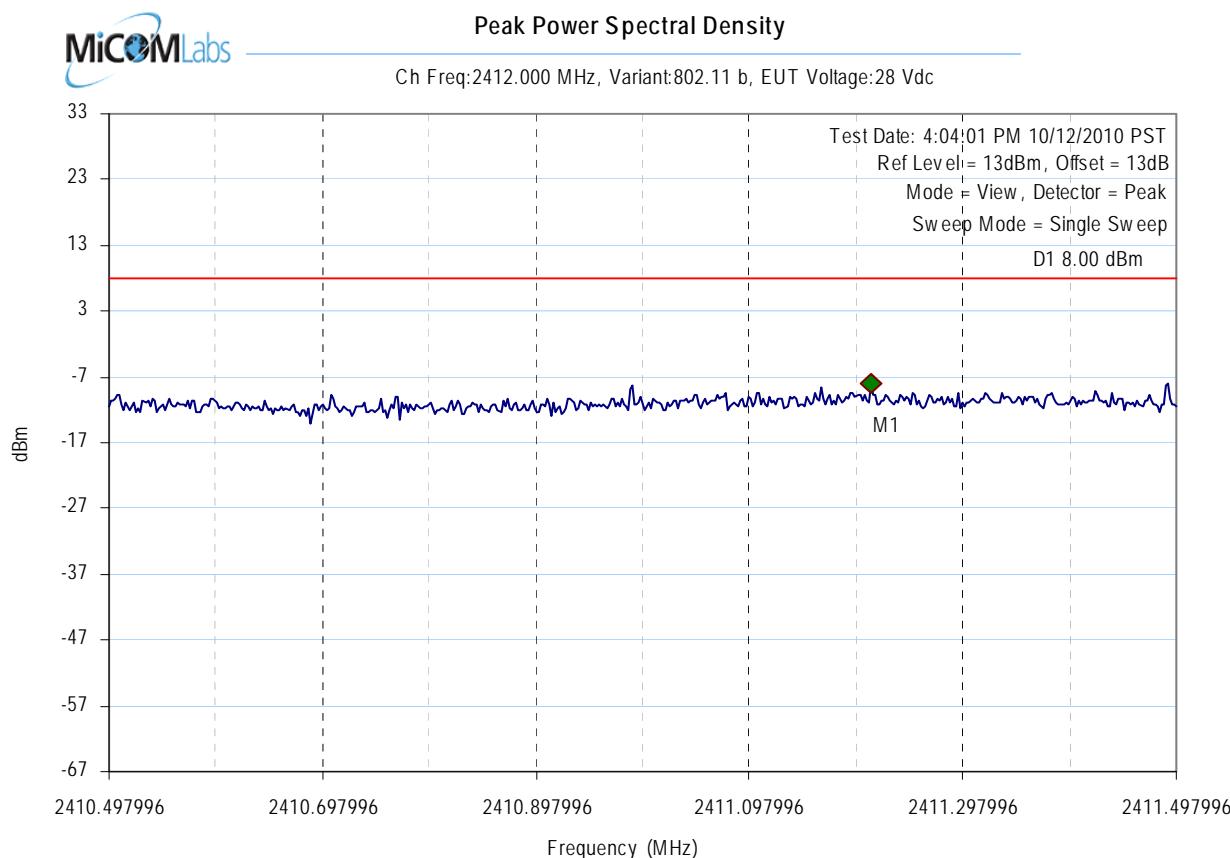
Measurement results for Legacy 802.11b

Test Conditions:	15.247 (e)	Rel. Humidity (%):	35 to 42
Variant:	802.11 b	Ambient Temp. (°C):	19 to 22
TPC:	N/A	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A dB	Antenna Gain:	2.6 dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

Test Frequency	Measured Power Density				Total Peak Power Spectral Density (dBm)		Limit	Margin
	RF Port (dBm)				Combined	Calculated		
MHz	a	b	c	d			dBm	dB
2412.000	-8.03	--	--	--	--	--	8.00	-16.03
2437.000	-7.02	--	--	--	--	--	8.00	-15.02
2462.000	-5.73	--	--	--	--	--	8.00	-13.73

Measurement uncertainty:	± 1.33 dB
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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

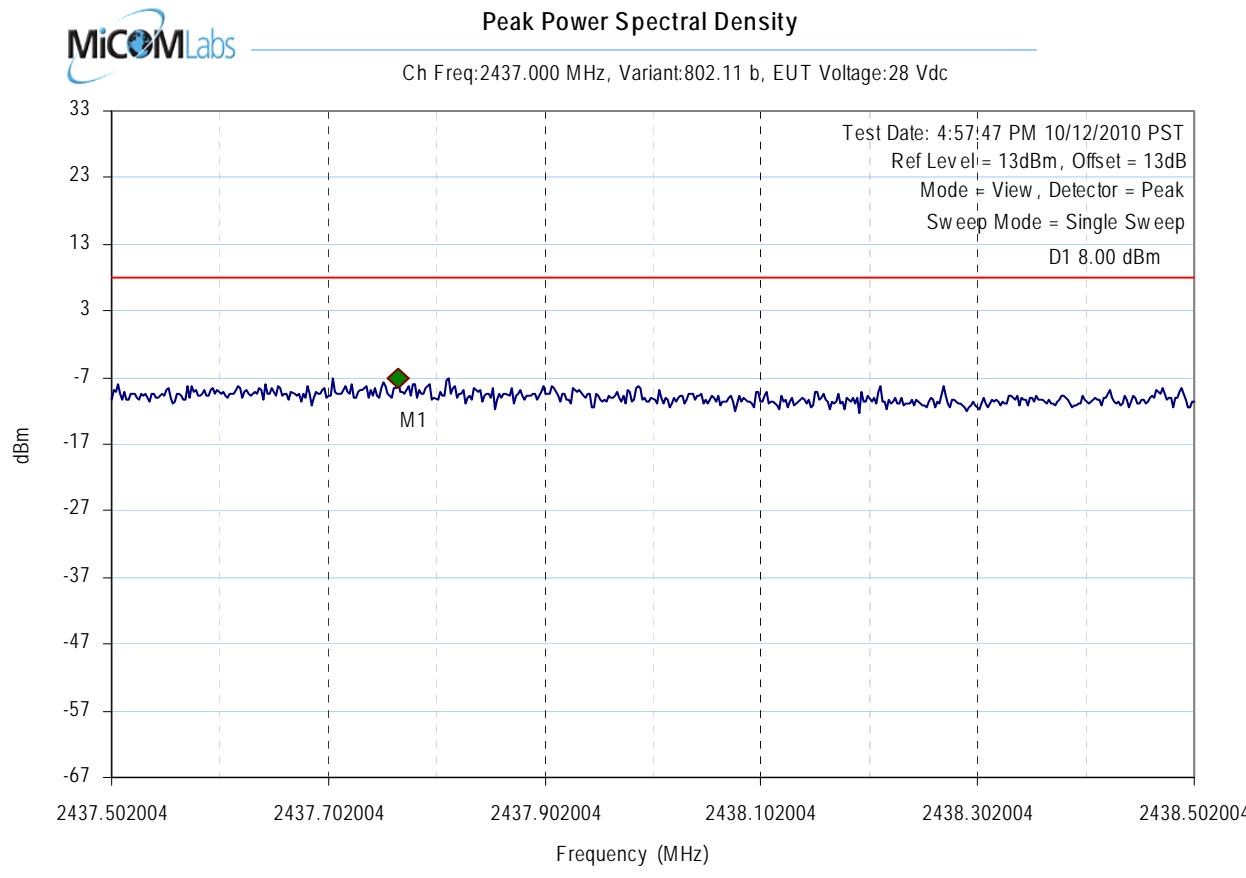
RF Atten (dB) = 20

Span = 1.00MHz

Test Results

Center frequency = 2412MHz

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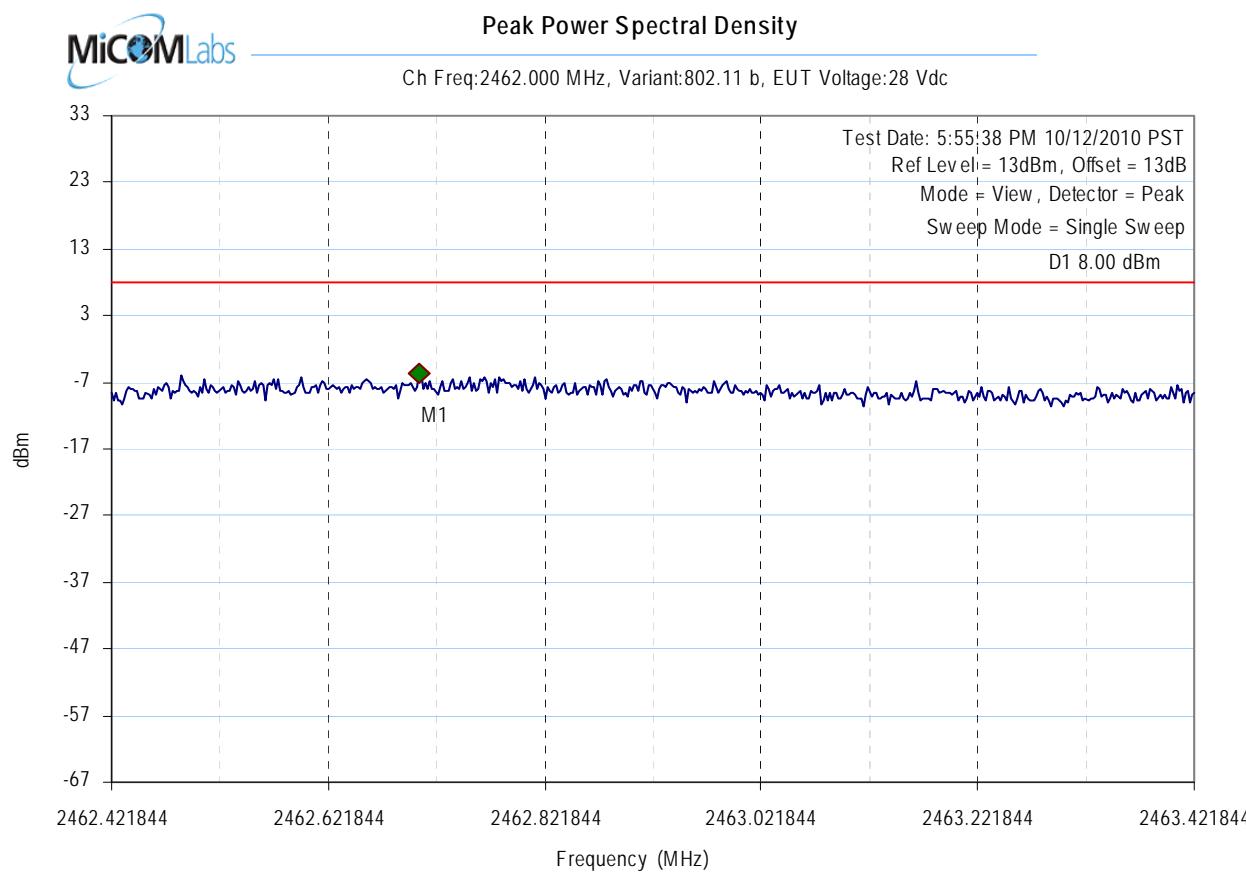

Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

Test Results

Center frequency = 2437MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

Marker : Frequency : Amplitude

M1 : 2462.706413MHz : -5.731dBm

Test Results

Center frequency = 2462MHz

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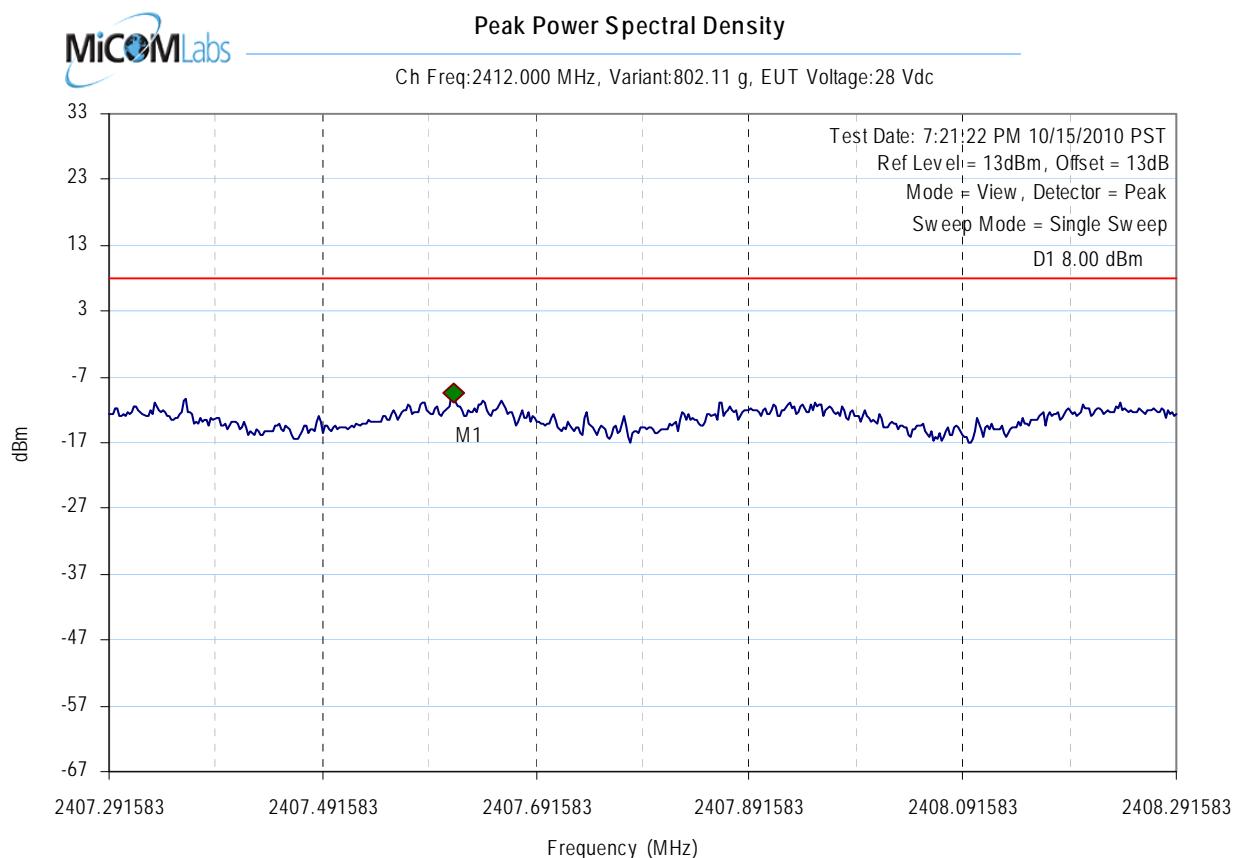
Measurement results for Legacy 802.11g

Test Conditions:	15.247 (e)	Rel. Humidity (%):	35 to 42
Variant:	802.11 g	Ambient Temp. (°C):	19 to 22
TPC:	N/A	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A dB	Antenna Gain:	2.6 dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

Test Frequency	Measured Power Density				Total Peak Power Spectral Density (dBm)		Limit	Margin
	RF Port (dBm)	a	b	c	d	Combined	Calculated	
MHz							dBm	dB
2412.000	-9.22	--	--	--	--	--	8.00	-17.22
2437.000	-6.23	--	--	--	--	--	8.00	-14.23
2462.000	-7.36	--	--	--	--	--	8.00	-15.36

Measurement uncertainty:	± 1.33 dB
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Analyser Setup

RBW = 3.00KHz

VBW = 10.00KHz

Sweep time(s) = 350

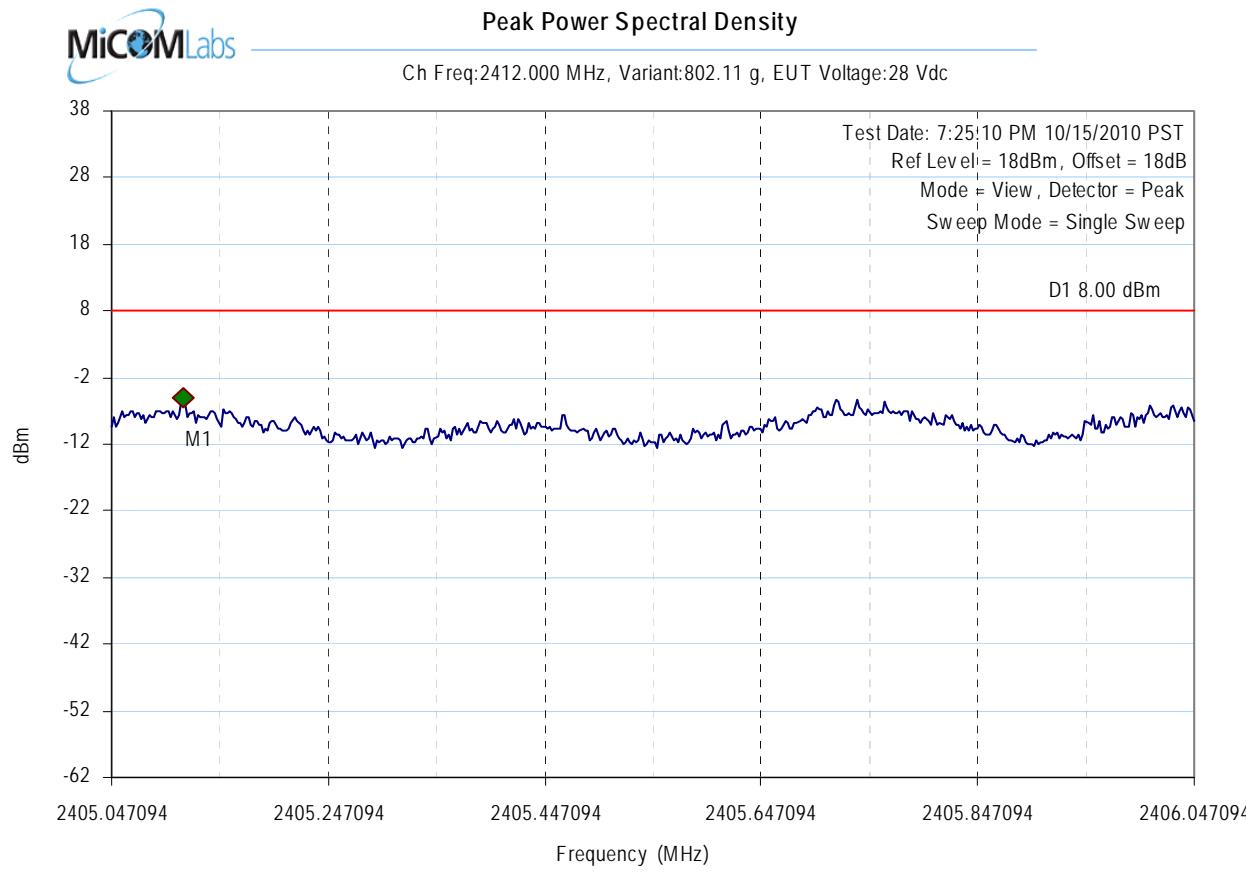
RF Atten (dB) = 20

Span = 1.00MHz

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

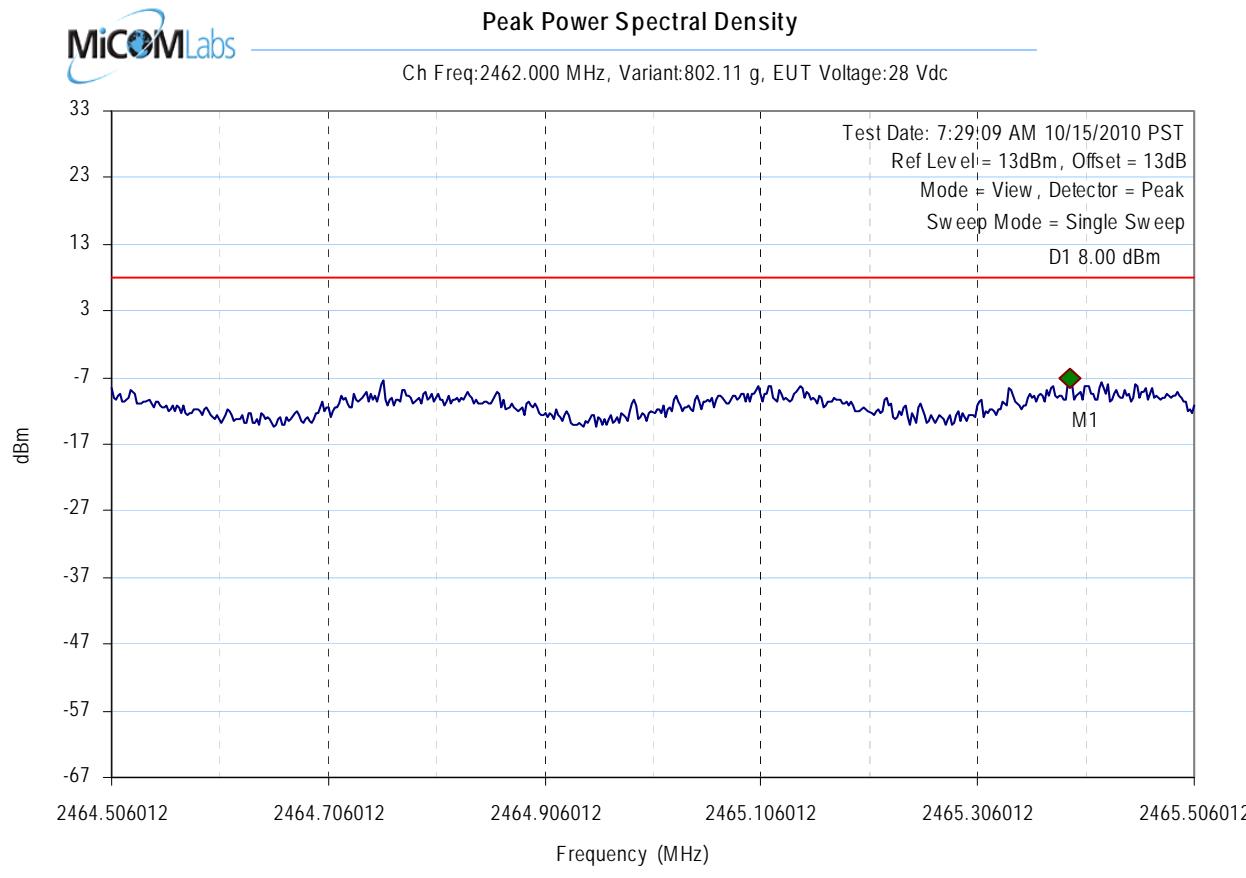
Marker : Frequency : Amplitude

M1 : 2405.113226MHz : -6.231dBm

Test Results

Center frequency = 2412MHz

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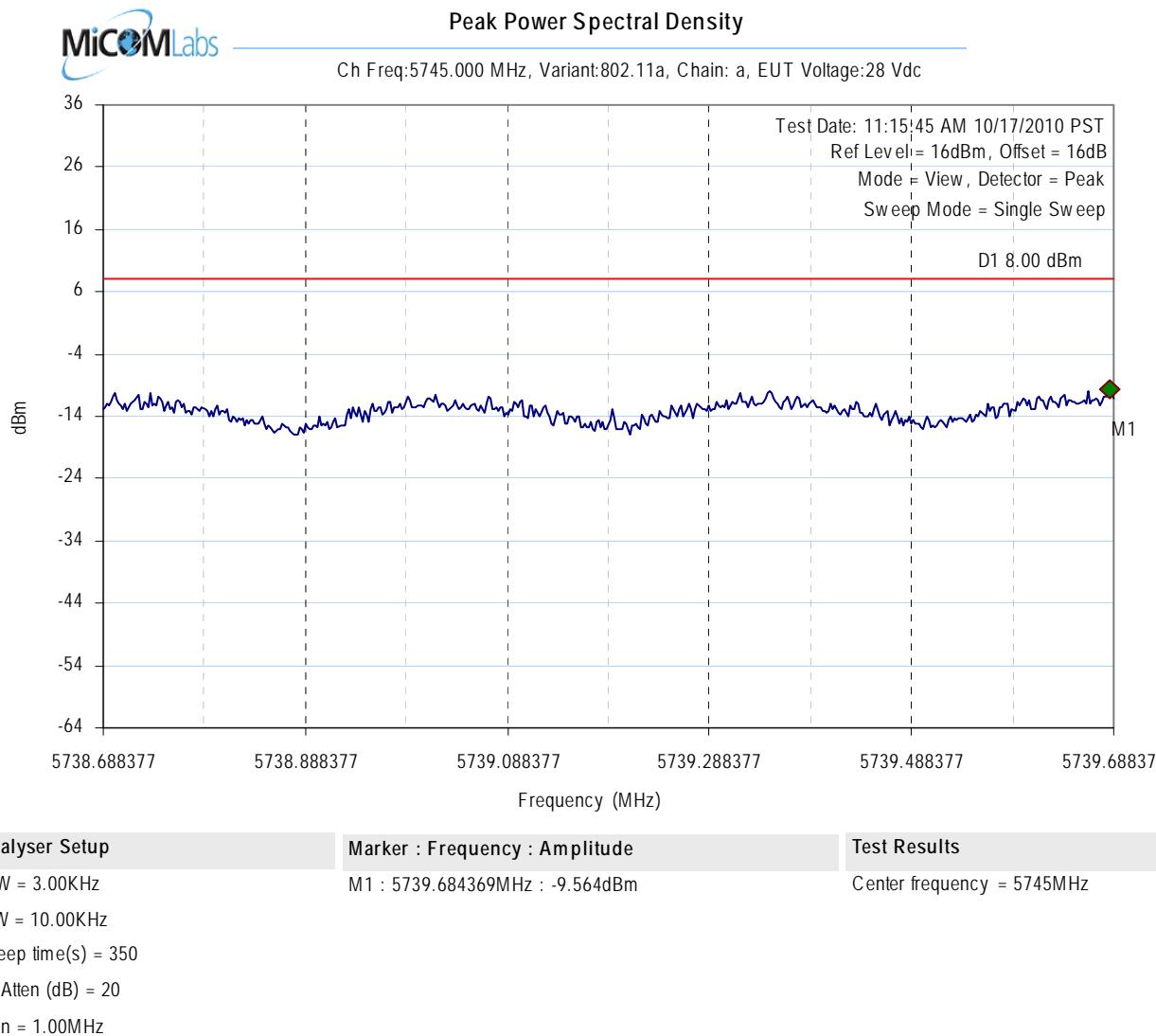
Measurement results for Legacy 802.11a

Test Conditions:	15.247 (e)	Rel. Humidity (%):	35	to	42
Variant:	802.11a	Ambient Temp. (°C):	19	to	22
TPC:	N/A	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming	N/A	Antenna Gain:	1.2	dB	
Applied Voltage:	28.00	Vdc			
Notes 1:					
Notes 2:					

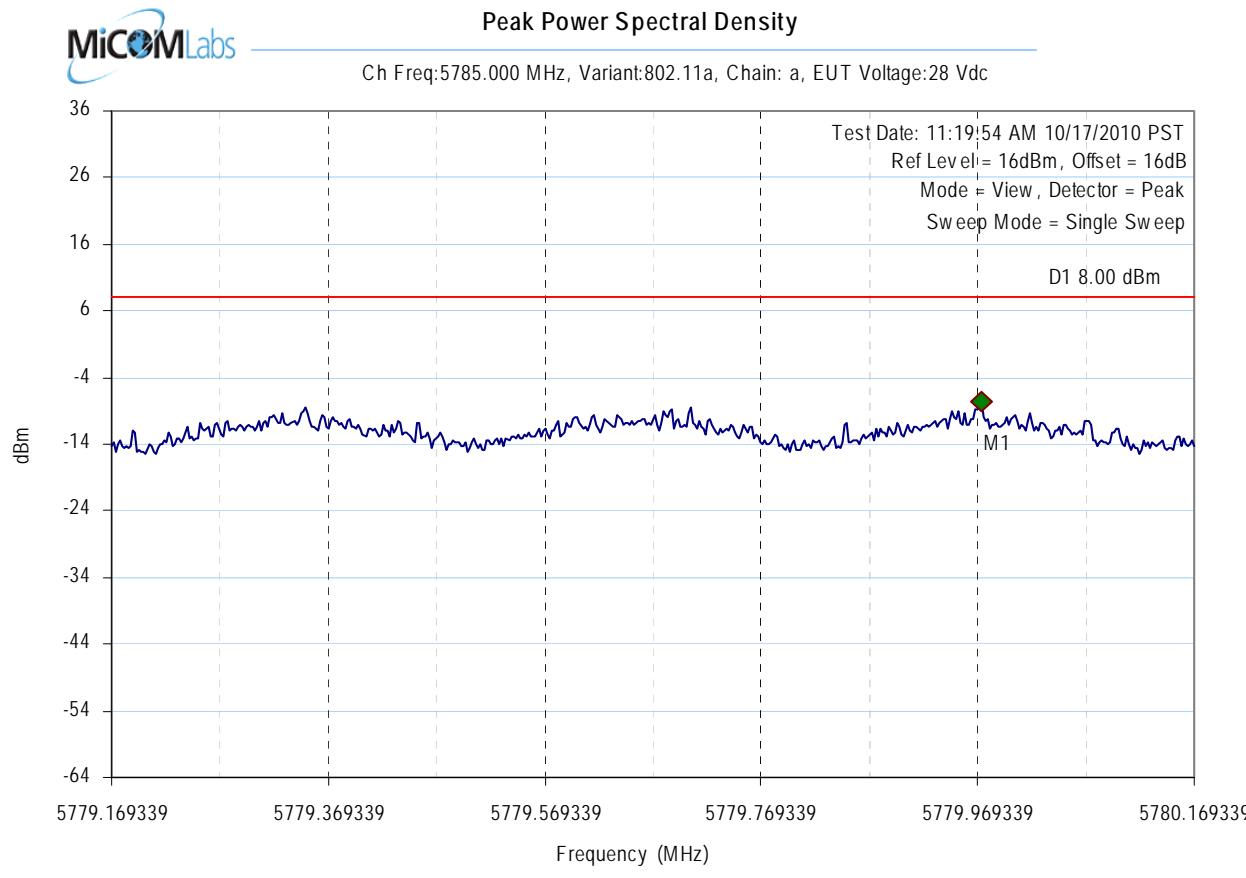
Test Frequency	Measured Power Density				Total Peak Power Spectral Density (dBm)		Limit	Margin
	MHz	a	b	c	d	Combined	Calculated	
5745.000	-9.56	--	--	--	--	--	8.00	-17.56
5785.000	-7.60	--	--	--	--	--	8.00	-15.60
5825.000	-8.26	--	--	--	--	--	8.00	-16.26

Measurement uncertainty:	± 1.33 dB
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This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. Any changes will be noted in the Document History section of the report.



Analyser Setup

RBW = 3.00KHz
 VBW = 10.00KHz
 Sweep time(s) = 350
 RF Atten (dB) = 20
 Span = 1.00MHz

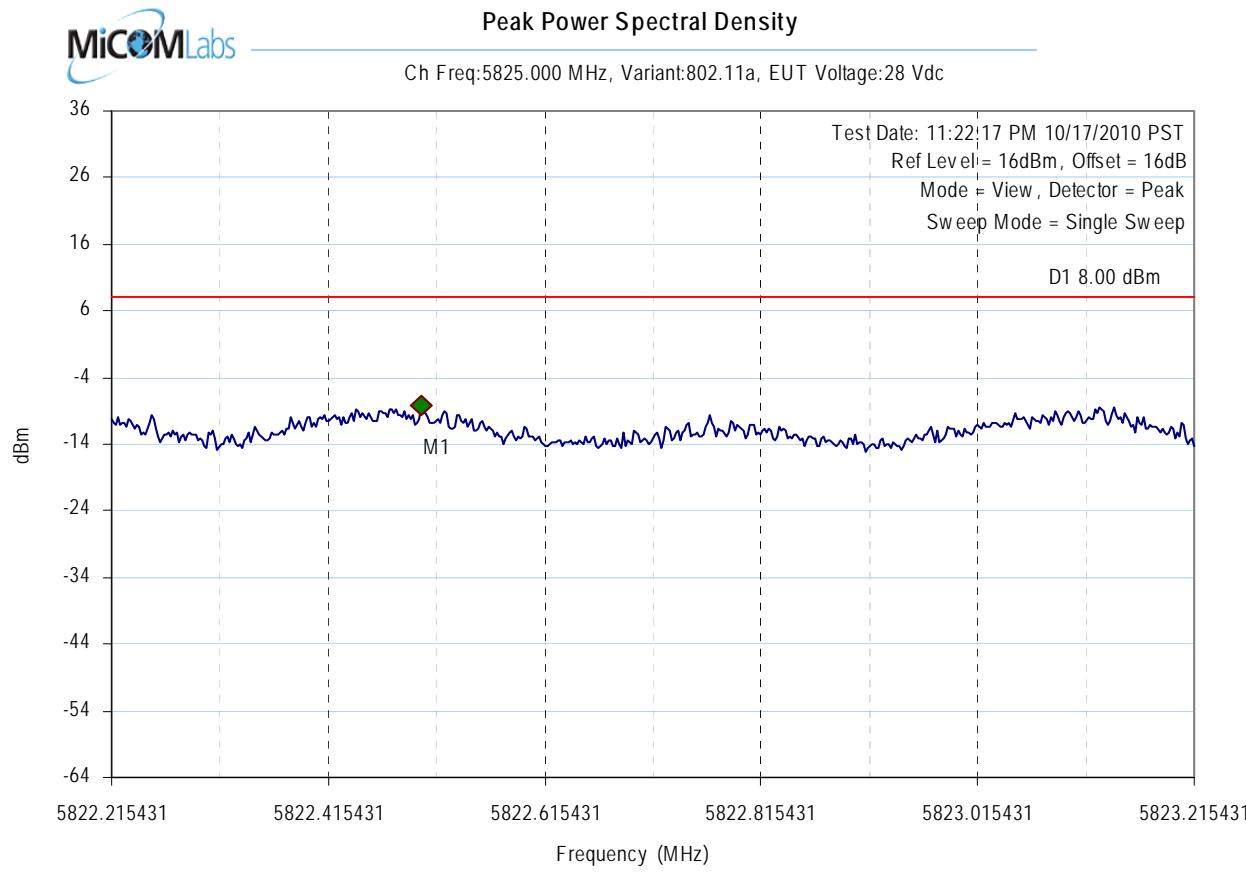
Marker : Frequency : Amplitude

M1 : 5779.972946MHz : -7.602dBm

Test Results

Center frequency = 5785MHz

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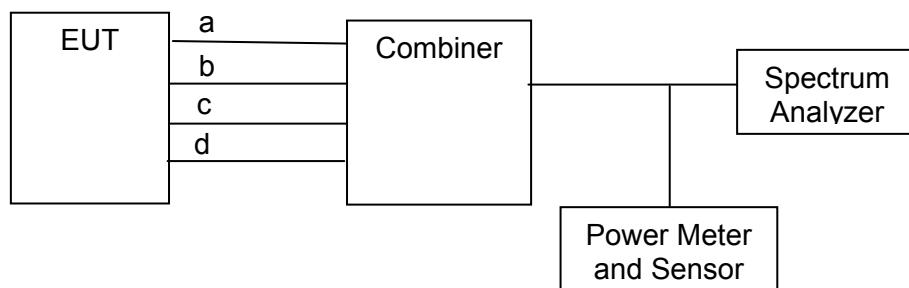
7.5. Conducted Spurious

Test Procedure

Conducted emissions were measured at a limit of 20 dB below the highest in-band spectral density measured with a spectrum analyzer connected to the antenna terminal. Emissions at the band edge were measured and recorded. Measurements were made while EUT was operating in transmit mode of operation at the appropriate center frequency.

Measurements were made using a combiner with the transmitter tuned to the channel closest to the band-edge being measured. All emissions were maximized during measurement. Limits which were derived from the peak emission.

Test Measurement Set up



Conducted Spurious Emission measurement test configuration

Specification

Limits Band-Edge

Lower Limit Band-edge	Upper Limit Band-edge	Limit below highest level of desired power
2,400 MHz	2,483.5 MHz	≥ 20 dB
5725 MHz	5850 MHz	

§15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

§15.247(d)

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section §15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(a)).

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-05 'Measurement of Spurious Emissions'	0073, 0074, 0116, 0158, 0223, 0251, 0252, 0253, 0256, 0287, 0310



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2.4 GHz MIMO Results

Measurement Results for MIMO 802.11 b

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11 b	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A dB	Antenna Gain:	N/A dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

Conducted Spurious Measurement

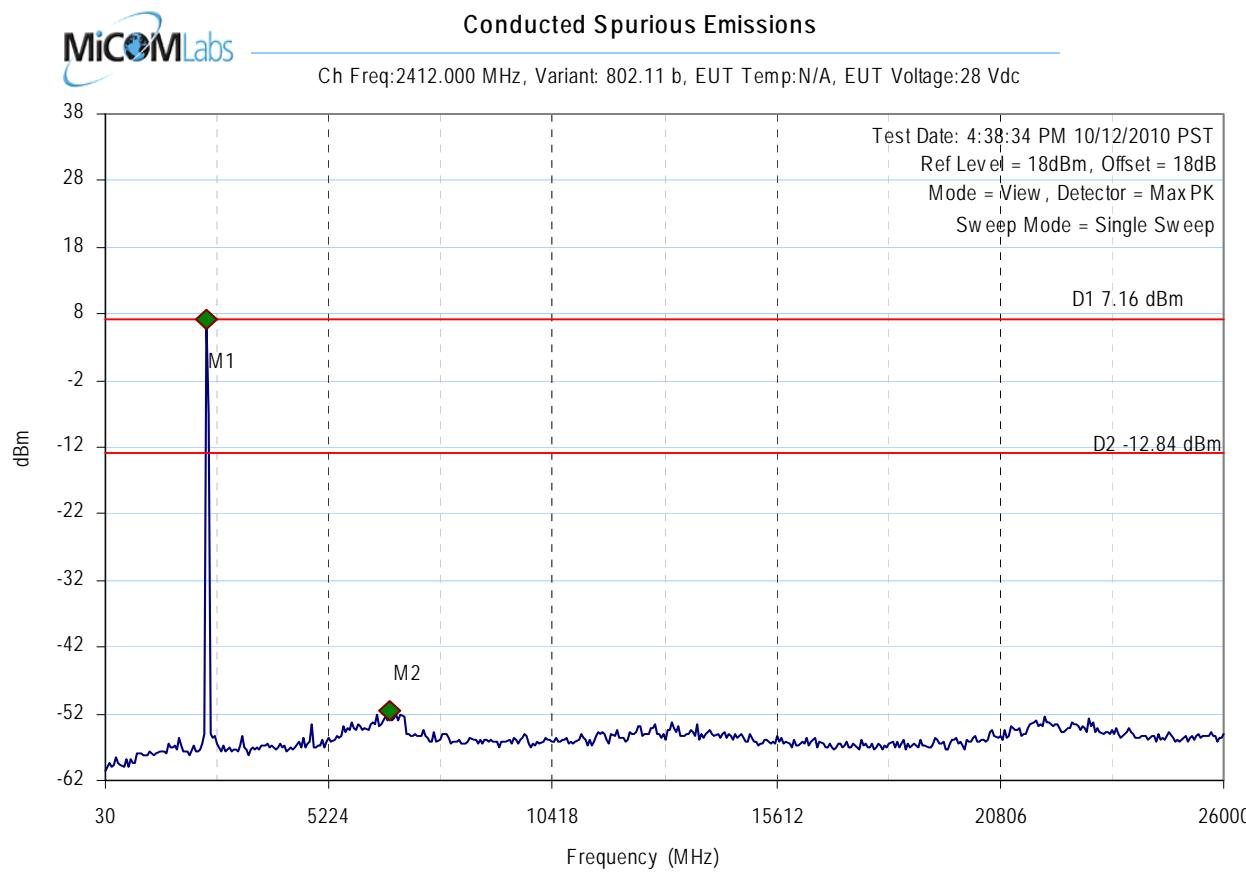
Test Frequency	Start Frequency	Stop Frequency	Maximum Observed Emission	Limit (20 dB below peak of fundamental)
MHz	MHz	MHz	dBm	dBm
2412.000	30.00	26000.00	-51.51	-12.84
2437.000	30.00	26000.00	-51.03	-10.00
2462.000	30.00	26000.00	-51.40	-13.97

Band-edge Measurement

Test Frequency	Band-edge Frequency	Emission Amplitude @ Band-edge	Limit (20 dB below peak of fundamental)	Margin
MHz	MHz	dBm	dBm	dB
2412.000	2400.00	-37.12	-10.59	-26.53
2462.000	2483.50	-48.77	-10.95	-37.82

Measurement uncertainty: ±2.81 dB

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

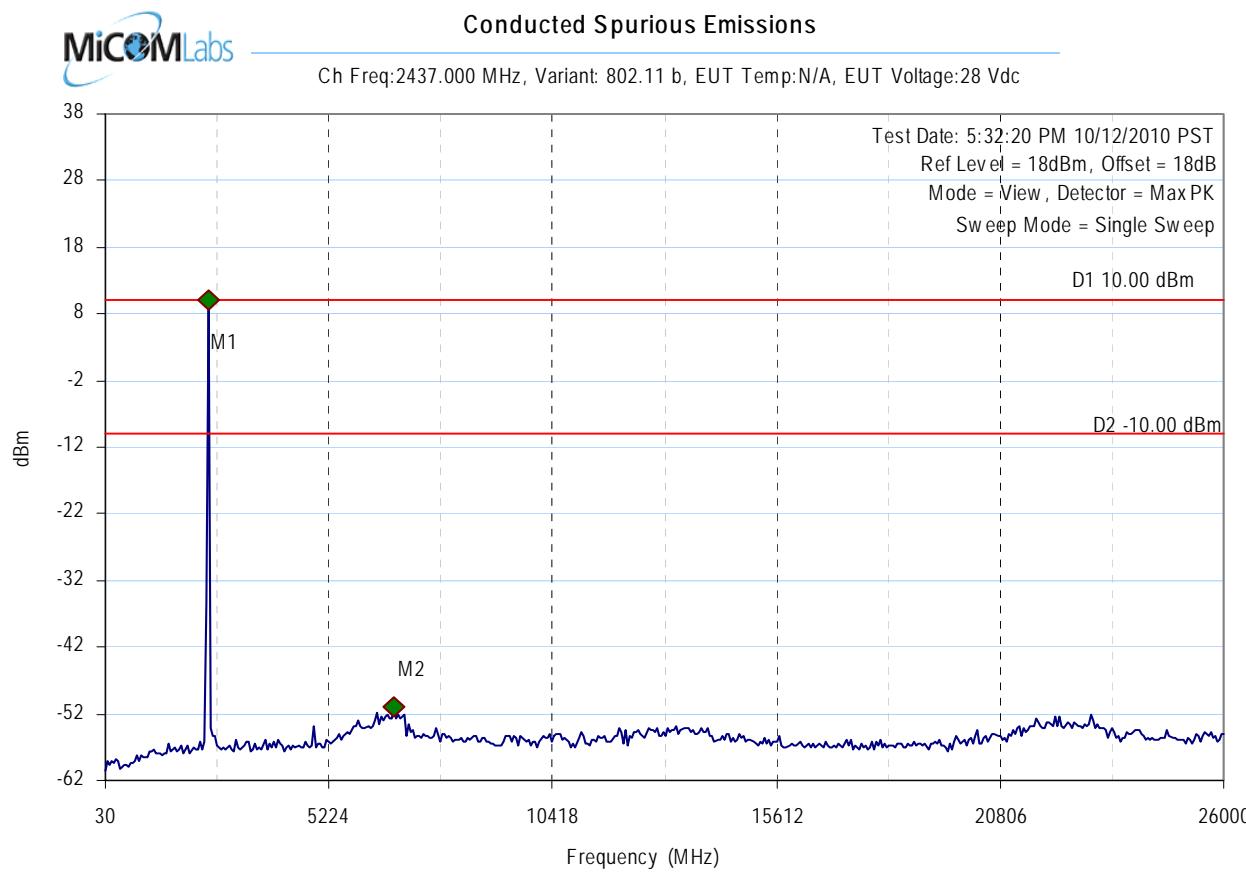
Marker : Frequency : Amplitude

M1 : 2371.983968MHz : 7.156dBm
 M2 : 6639.599198MHz : -51.507dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

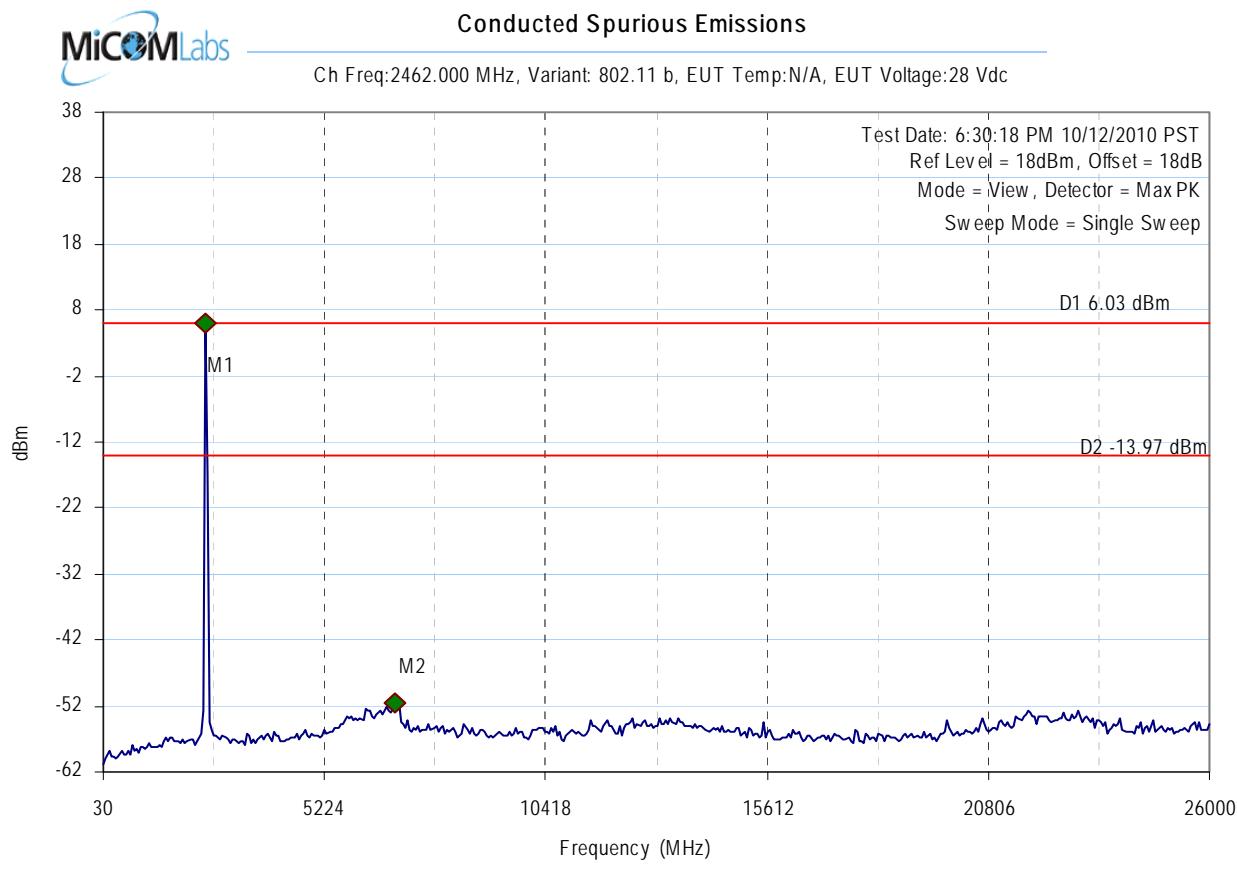
Marker : Frequency : Amplitude

M1 : 2424.028056MHz : 10.003dBm
 M2 : 6743.687375MHz : -51.027dBm

Test Results

Center frequency = 2437MHz

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Analyser Setup	Marker : Frequency : Amplitude	Test Results
RBW = 100.000KHz	M1 : 2424.028056MHz : 6.031dBm	Center frequency = 2462MHz
VBW = 300.000KHz	M2 : 6899.819639MHz : -51.395dBm	
Sweep time(s) = 60		
RF Atten (dB) = 10		
Span = 25.97GHz		

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

Marker : Frequency : Amplitude

M1 : 2400.000000MHz : -37.115dBm
 M2 : 2402.809619MHz : -23.920dBm
 M3 : 2414.064128MHz : 9.411dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

Marker : Frequency : Amplitude

M1 : 2460.945892MHz : 9.052dBm
 M2 : 2470.613226MHz : -13.560dBm
 M3 : 2483.500000MHz : -48.766dBm

Test Results

Center frequency = 2462MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 230 of 362

Measurement Results for MIMO 802.11 g

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35	to	42
Variant:	802.11 g	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain	N/A	Antenna Gain:	N/A	dB	dBi
Applied Voltage:	28.00	Vdc			
Notes 1:					
Notes 2:					

Conducted Spurious Measurement

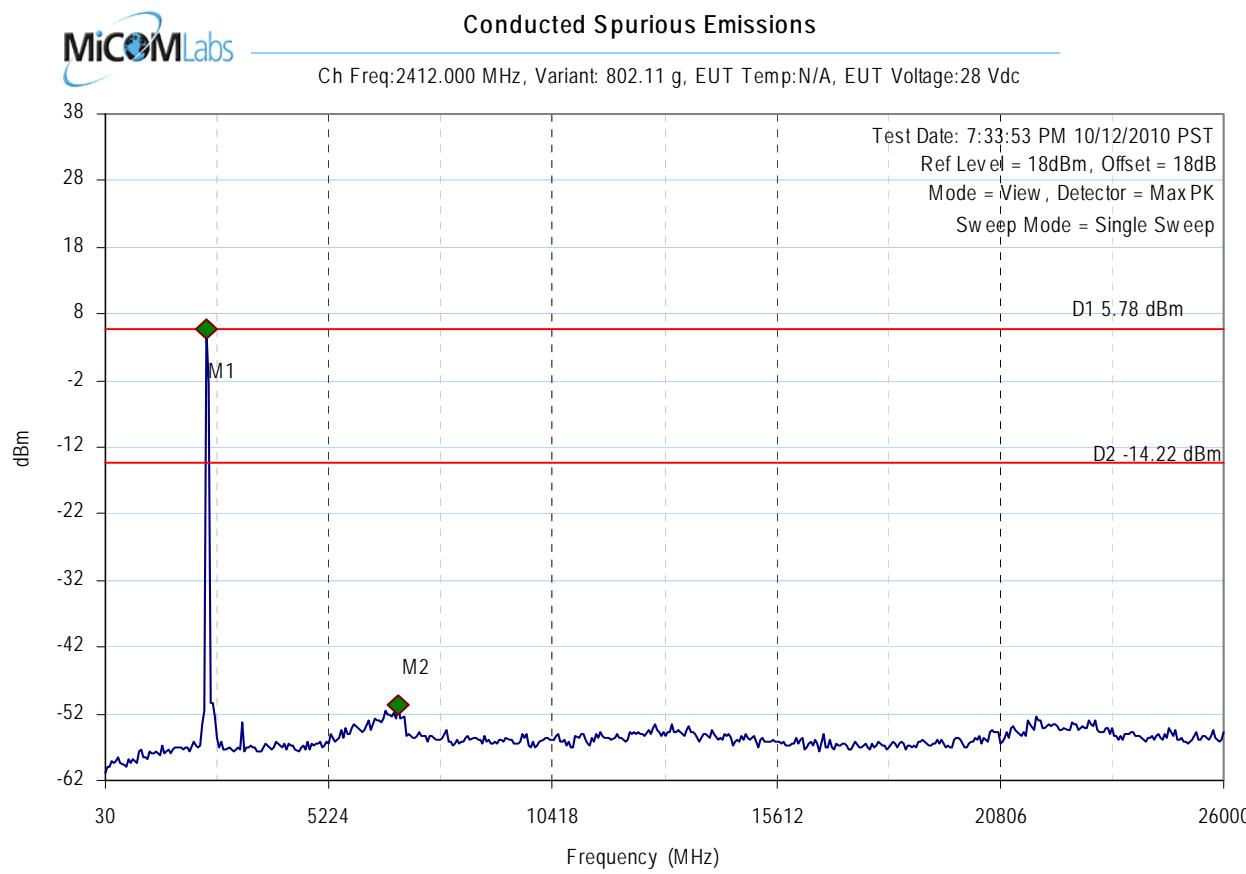
Test Frequency	Start Frequency	Stop Frequency	Maximum Observed Emission	Limit (20 dB below peak of fundamental)
MHz	MHz	MHz	dBm	dBm
2412.000	30.00	26000.00	-50.72	-14.22
2437.000	30.00	26000.00	-51.40	-14.10
2462.000	30.00	26000.00	-48.39	-12.41

Band-edge Measurement

Test Frequency	Band-edge Frequency	Emission Amplitude @ Band-edge	Limit (20 dB below peak of fundamental)	Margin
MHz	MHz	dBm	dBm	dB
2412.000	2400.00	-24.57	-11.44	-13.13
2462.000	2483.50	-33.64	-8.16	-25.48

Measurement uncertainty: ±2.81 dB

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

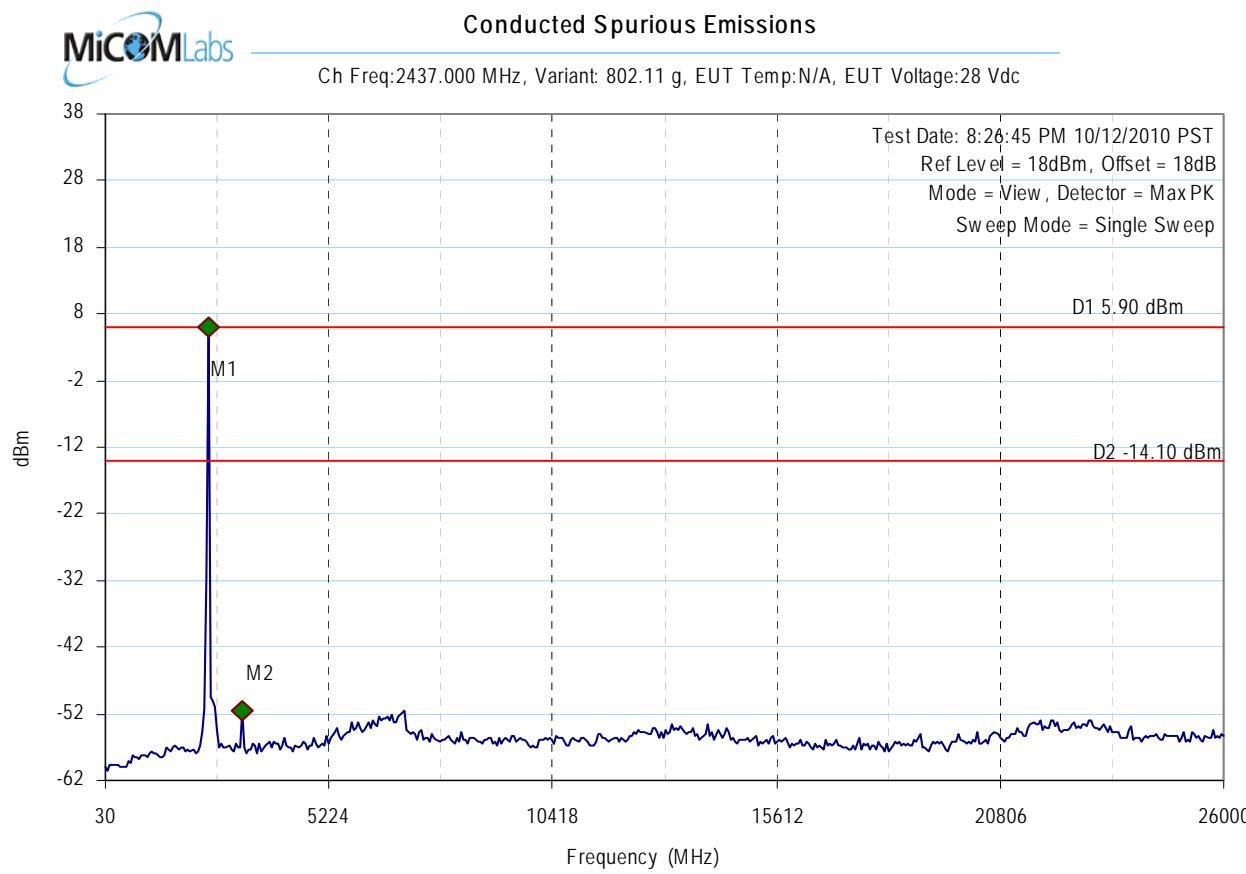
Marker : Frequency : Amplitude

M1 : 2371.983968MHz : 5.779dBm
 M2 : 6847.775551MHz : -50.718dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

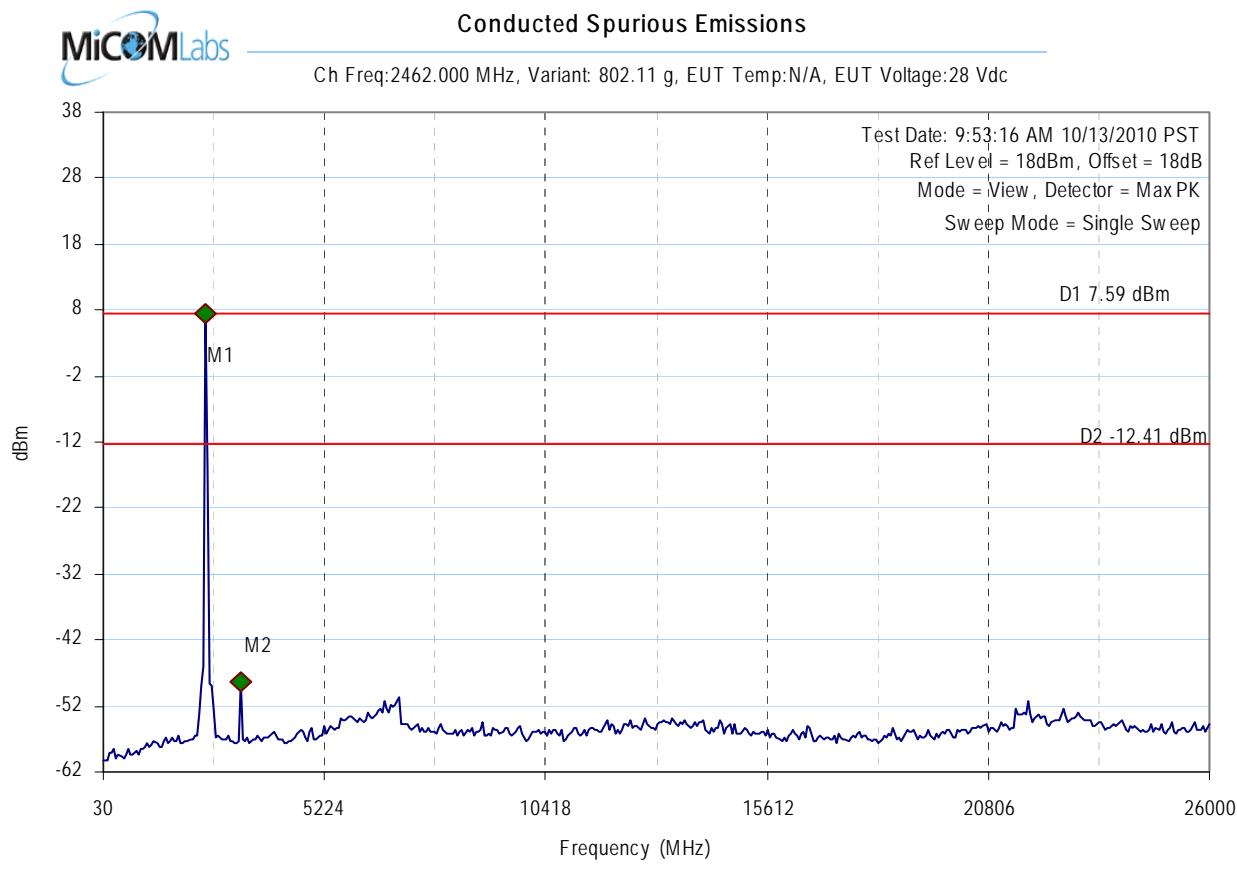
Marker : Frequency : Amplitude

M1 : 2424.028056MHz : 5.897dBm
 M2 : 3204.689379MHz : -51.395dBm

Test Results

Center frequency = 2437MHz

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Analyser Setup

RBW = 100.000KHz
 VBW = 300.000KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

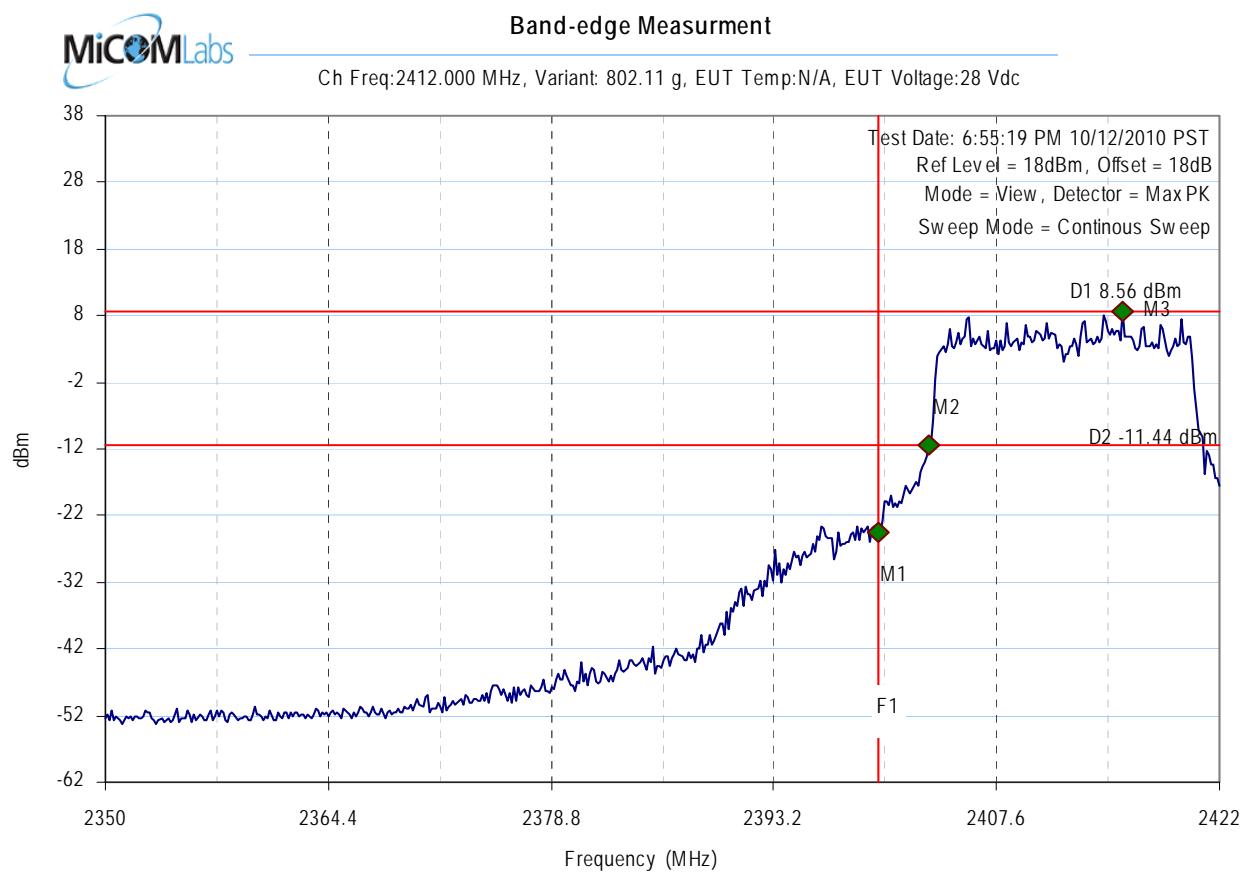
Marker : Frequency : Amplitude

M1 : 2424.028056MHz : 7.593dBm
 M2 : 3256.733467MHz : -48.390dBm

Test Results

Center frequency = 2462MHz

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Analyser Setup

RBW = 100.000KHz
 VBW = 300.000KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

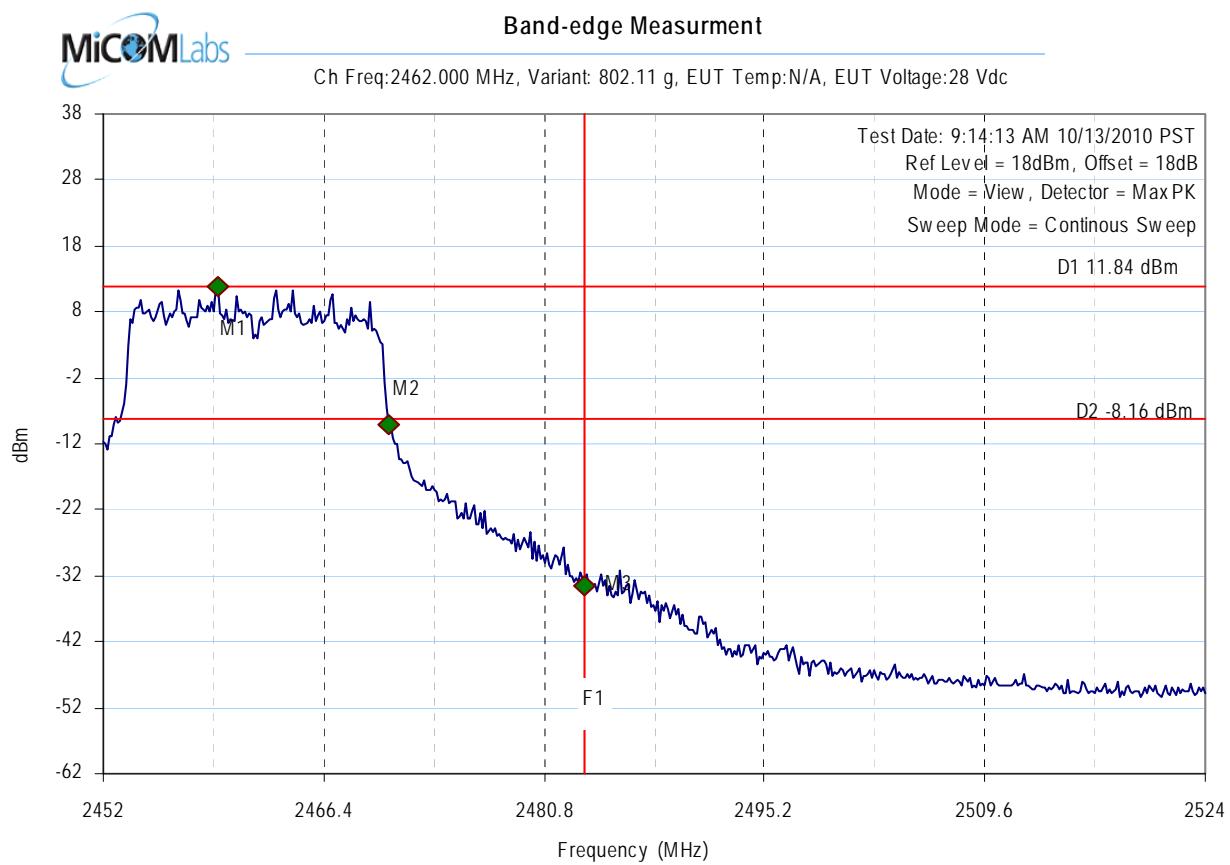
Marker : Frequency : Amplitude

M1 : 2400.000000MHz : -24.566dBm
 M2 : 2403.242485MHz : -11.461dBm
 M3 : 2415.795591MHz : 8.559dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

Marker : Frequency : Amplitude

M1 : 2459.503006MHz : 11.838dBm
 M2 : 2470.613226MHz : -9.226dBm
 M3 : 2483.500000MHz : -33.641dBm

Test Results

Center frequency = 2462MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 236 of 362

Measurement Results for MIMO 802.11n HT-20

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-20	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming	N/A dB	Antenna Gain:	N/A dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

Conducted Spurious Measurement

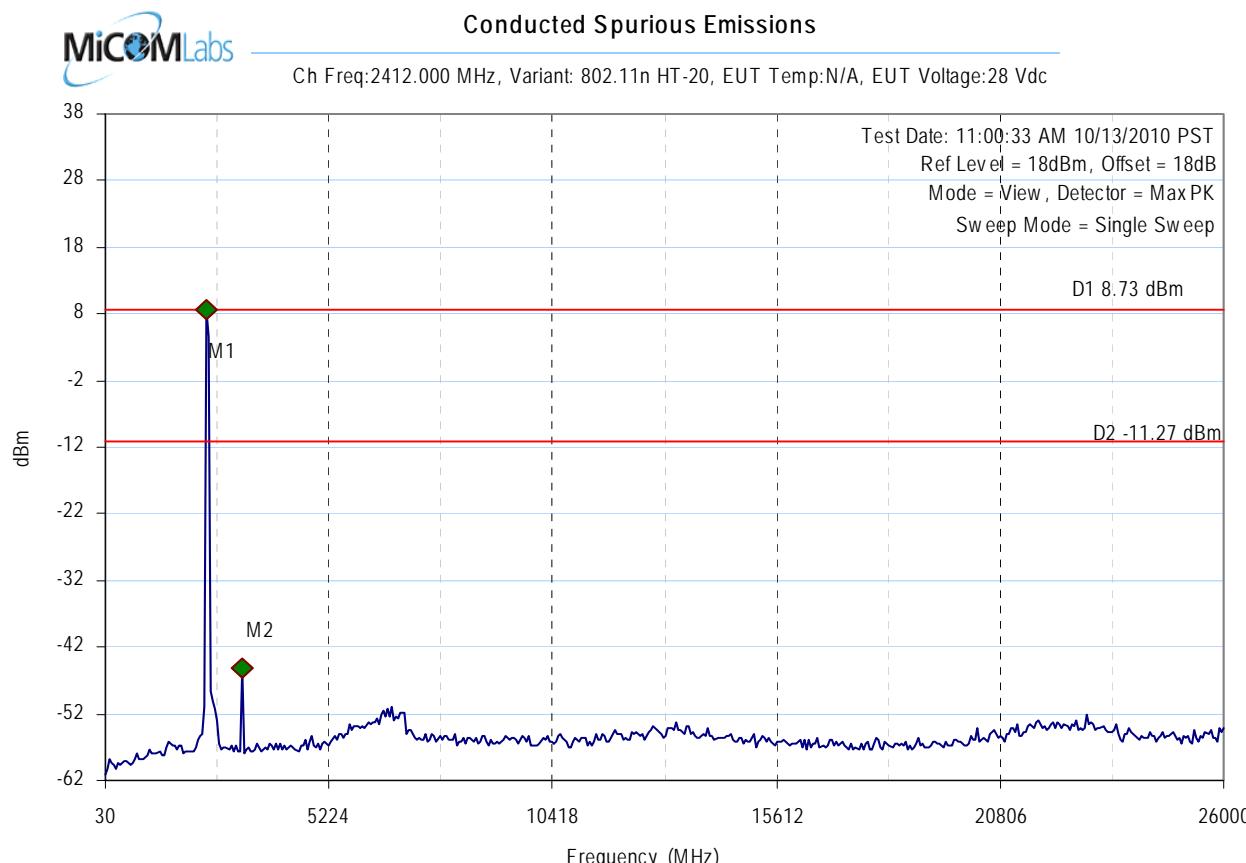
Test Frequency	Start Frequency	Stop Frequency	Maximum Observed Emission	Limit (20 dB below peak of fundamental)
MHz	MHz	MHz	dBm	dBm
2412.000	30.00	26000.00	-45.09	-11.27
2437.000	30.00	26000.00	-46.18	-12.84
2462.000	30.00	26000.00	-47.36	-11.99

Band-edge Measurement

Test Frequency	Band-edge Frequency	Emission Amplitude @ Band-edge	Limit (20 dB below peak of fundamental)	Margin
MHz	MHz	dBm	dBm	dB
2412.000	2400.00	-21.94	-8.77	-13.17
2462.000	2483.50	-30.88	-8.34	-22.55

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

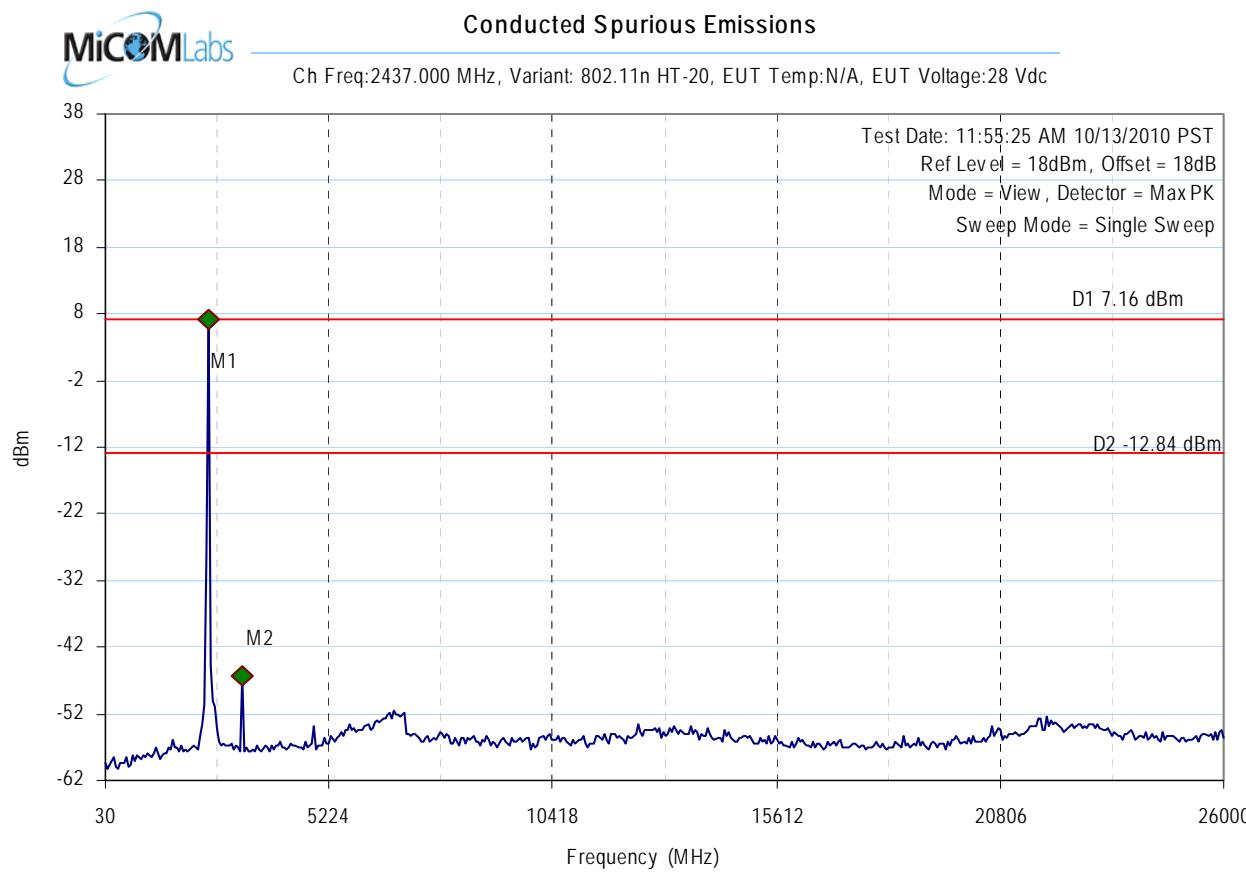
Marker : Frequency : Amplitude

M1 : 2371.983968MHz : 8.728dBm
 M2 : 3204.689379MHz : -45.089dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

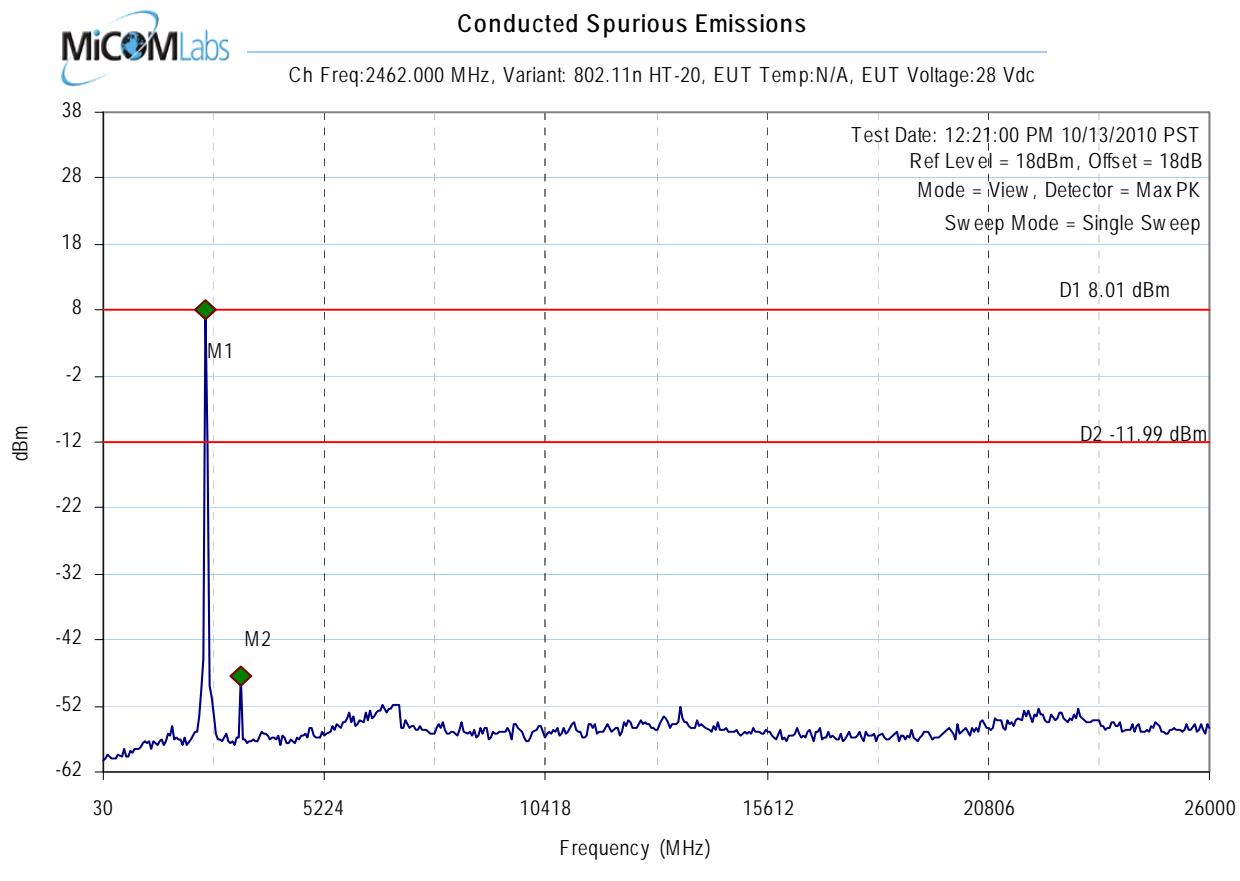
Marker : Frequency : Amplitude

M1 : 2424.028056MHz : 7.156dBm
 M2 : 3204.689379MHz : -46.181dBm

Test Results

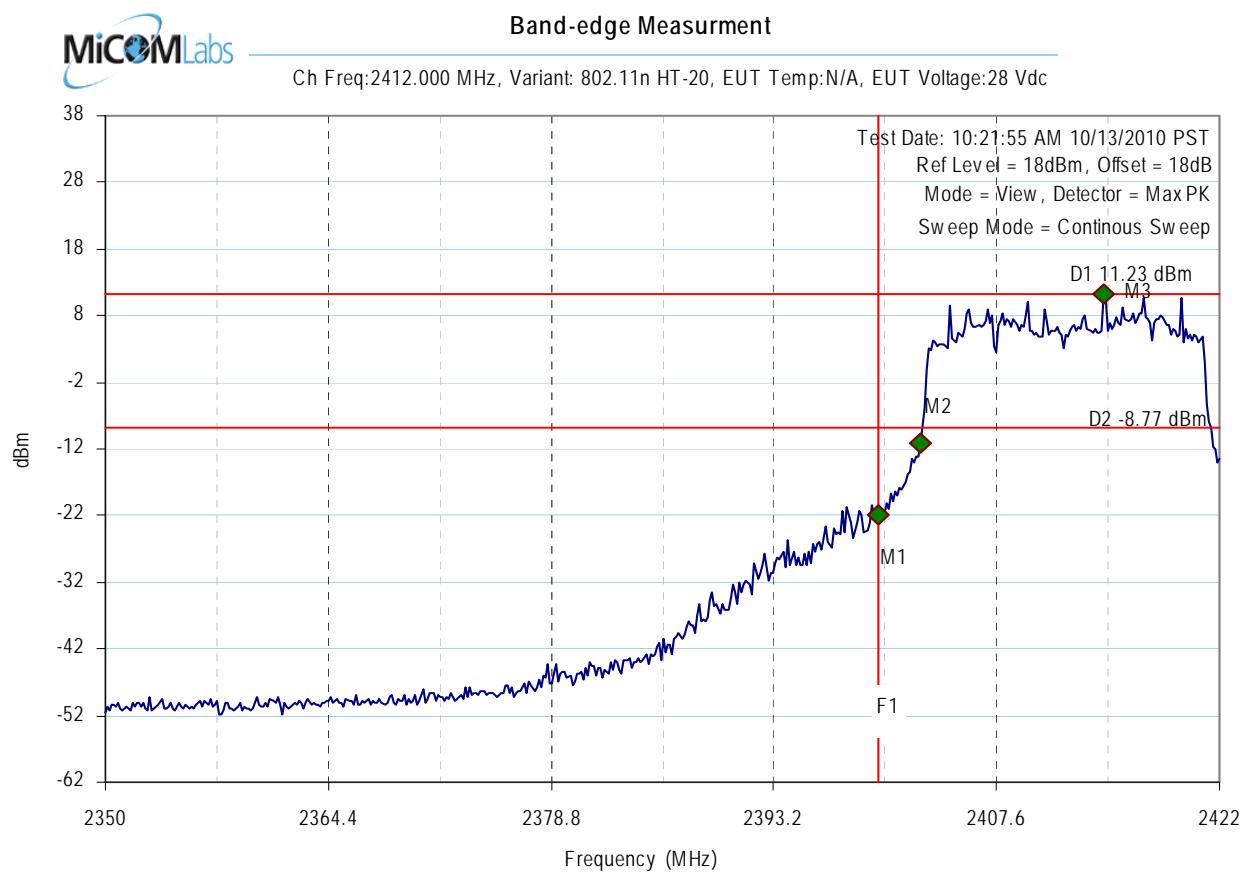
Center frequency = 2437MHz

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Analyser Setup	Marker : Frequency : Amplitude	Test Results
RBW = 100.000KHz	M1 : 2424.028056MHz : 8.014dBm	Center frequency = 2462MHz
VBW = 300.000KHz	M2 : 3256.733467MHz : -47.363dBm	
Sweep time(s) = 60		
RF Atten (dB) = 10		
Span = 25.97GHz		

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Analyser Setup

RBW = 100.000KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

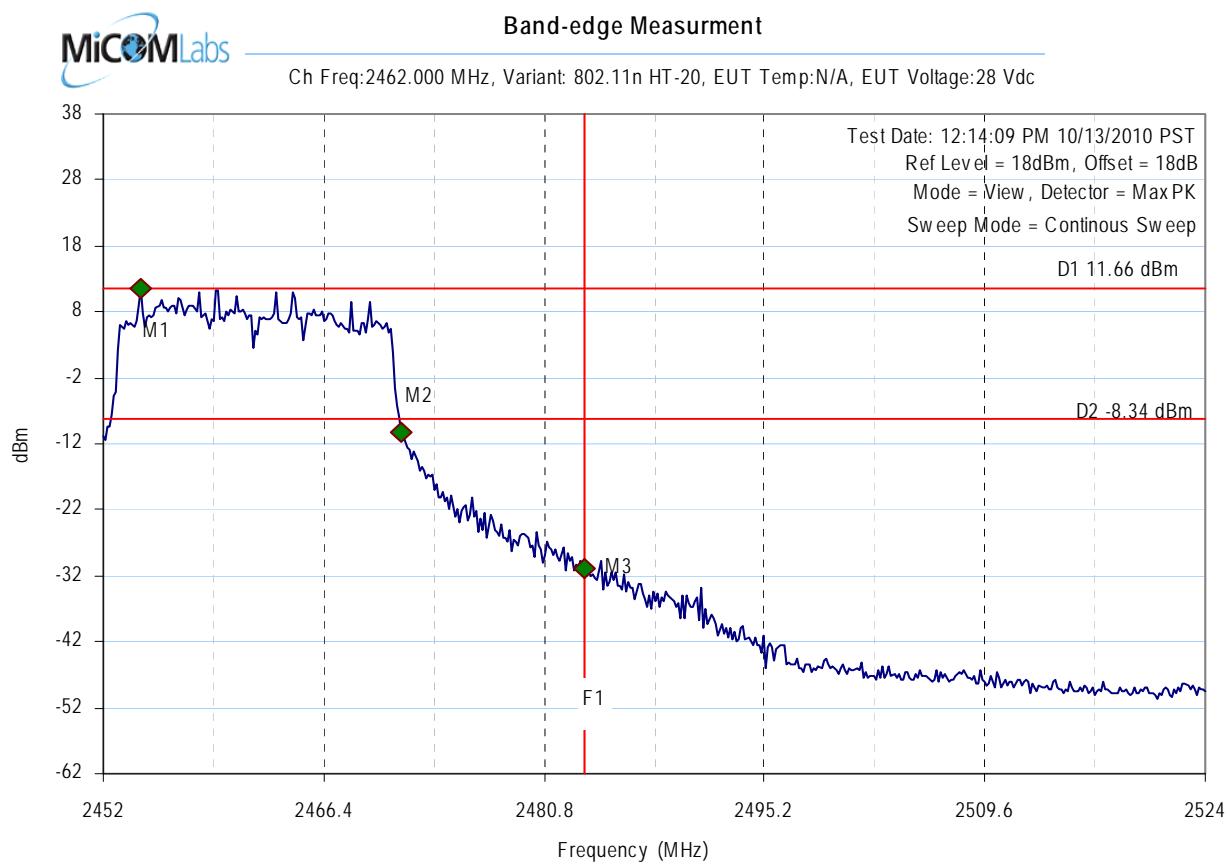
Marker : Frequency : Amplitude

M1 : 2400.000000MHz : -21.935dBm
 M2 : 2402.665331MHz : -11.099dBm
 M3 : 2414.496994MHz : 11.232dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

Marker : Frequency : Amplitude

M1 : 2454.452906MHz : 11.665dBm
 M2 : 2471.478958MHz : -10.147dBm
 M3 : 2483.500000MHz : -30.881dBm

Test Results

Center frequency = 2462MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
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Measurement Results for MIMO 802.11n HT-40

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-40	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming	N/A dB	Antenna Gain:	N/A dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

Conducted Spurious Measurement

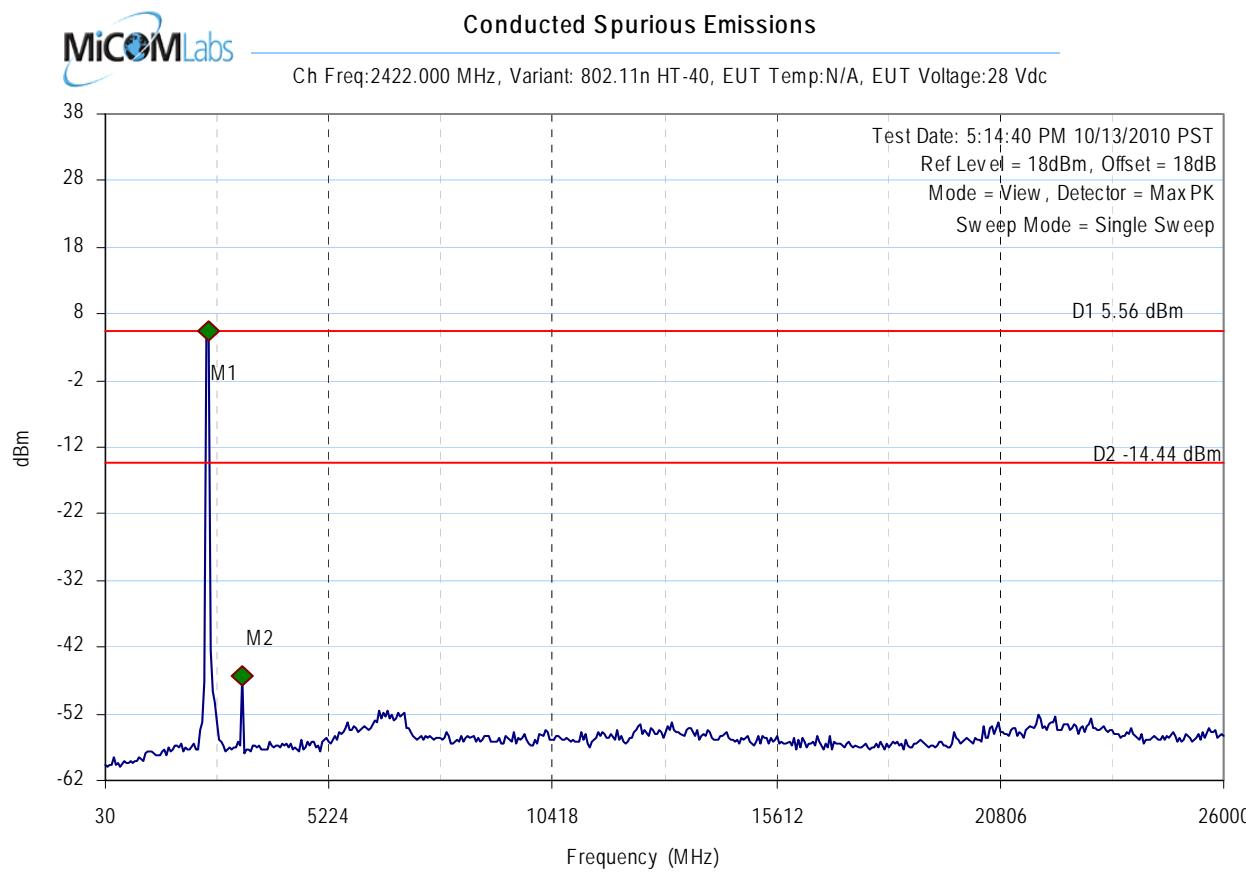
Test Frequency	Start Frequency	Stop Frequency	Maximum Observed Emission	Limit (20 dB below peak of fundamental)
MHz	MHz	MHz	dBm	dBm
2422.000	30.00	26000.00	-46.39	-14.44
2437.000	30.00	26000.00	-45.42	-12.66
2452.000	30.00	26000.00	-48.05	-16.22

Band-edge Measurement

Test Frequency	Band-edge Frequency	Emission Amplitude @ Band-edge	Limit (20 dB below peak of fundamental)	Margin
MHz	MHz	dBm	dBm	dB
2422.000	2400.00	-22.92	-11.62	-11.30
2452.000	2483.50	-29.00	-11.24	-17.76

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

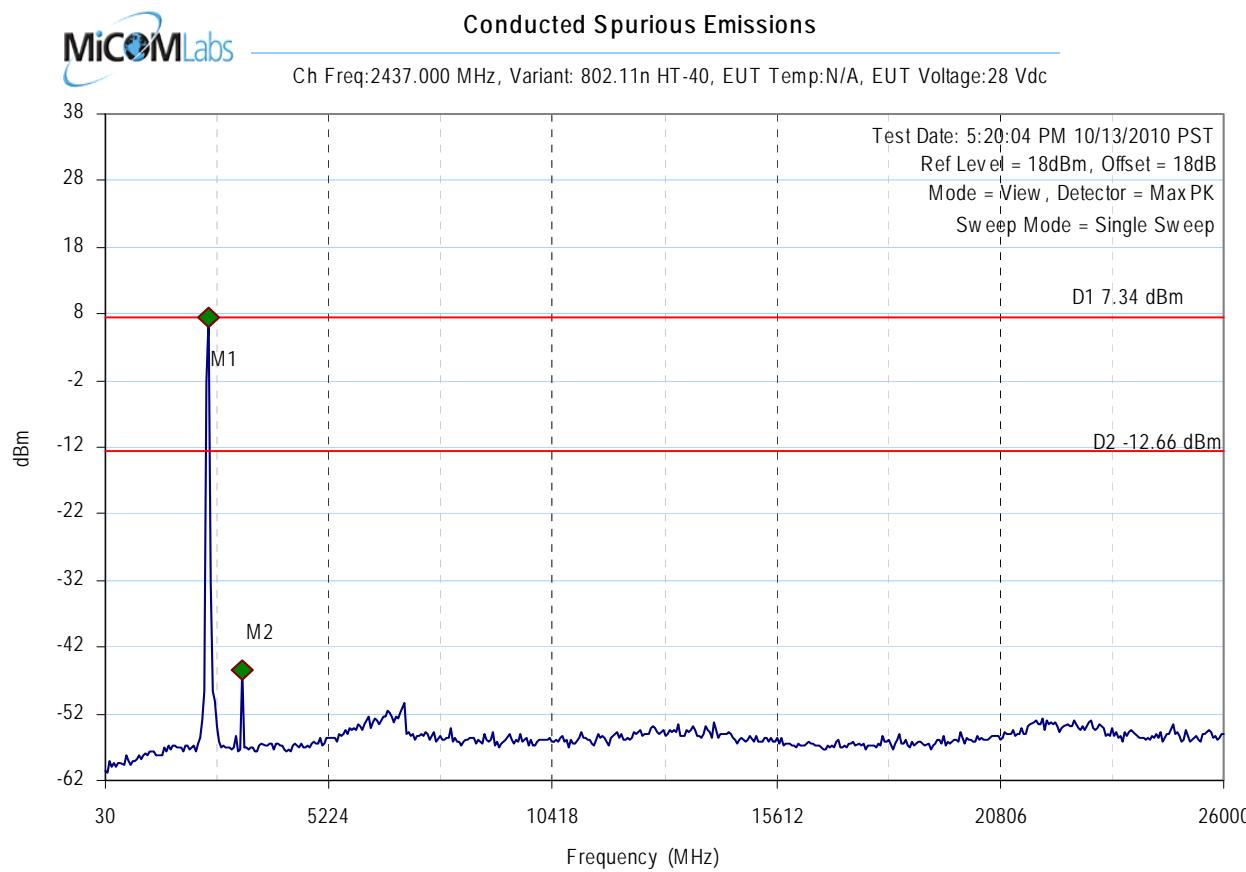
Marker : Frequency : Amplitude

M1 : 2424.028056MHz : 5.558dBm
 M2 : 3204.689379MHz : -46.386dBm

Test Results

Center frequency = 2422MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

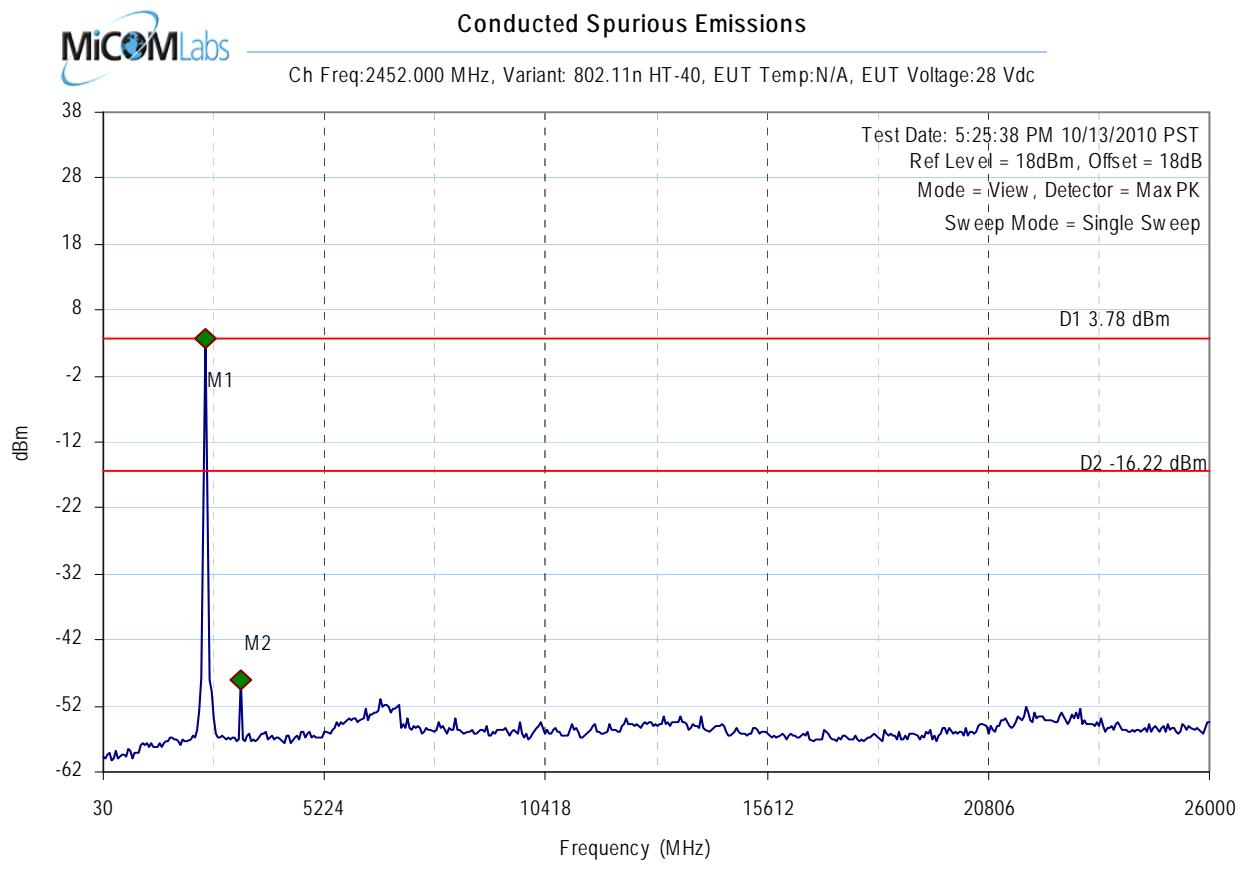
Marker : Frequency : Amplitude

M1 : 2424.028056MHz : 7.341dBm
 M2 : 3204.689379MHz : -45.420dBm

Test Results

Center frequency = 2437MHz

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



Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

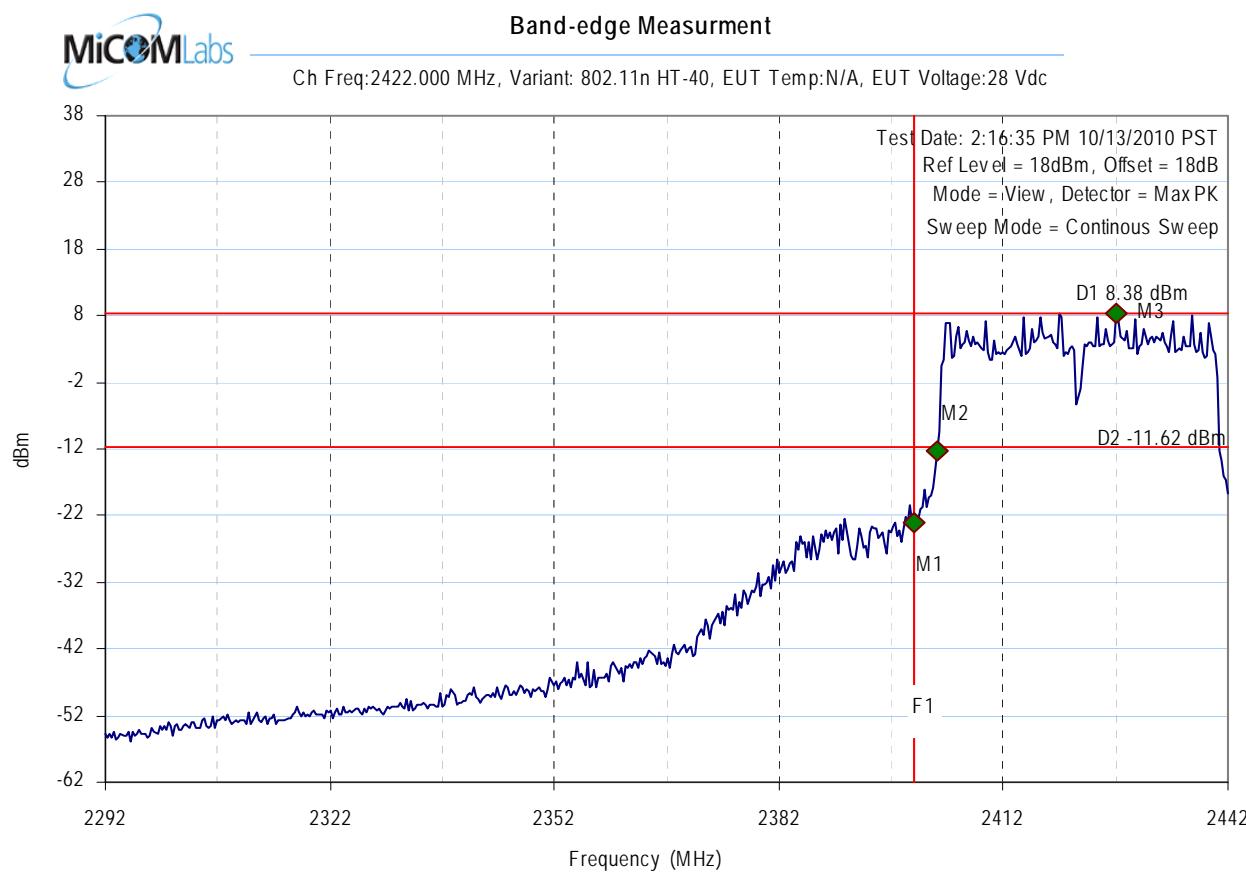
Marker : Frequency : Amplitude

M1 : 2424.028056MHz : 3.778dBm
 M2 : 3256.733467MHz : -48.054dBm

Test Results

Center frequency = 2452MHz

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Analyser Setup

RBW = 100.000KHz
 VBW = 300.000KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 150.00MHz

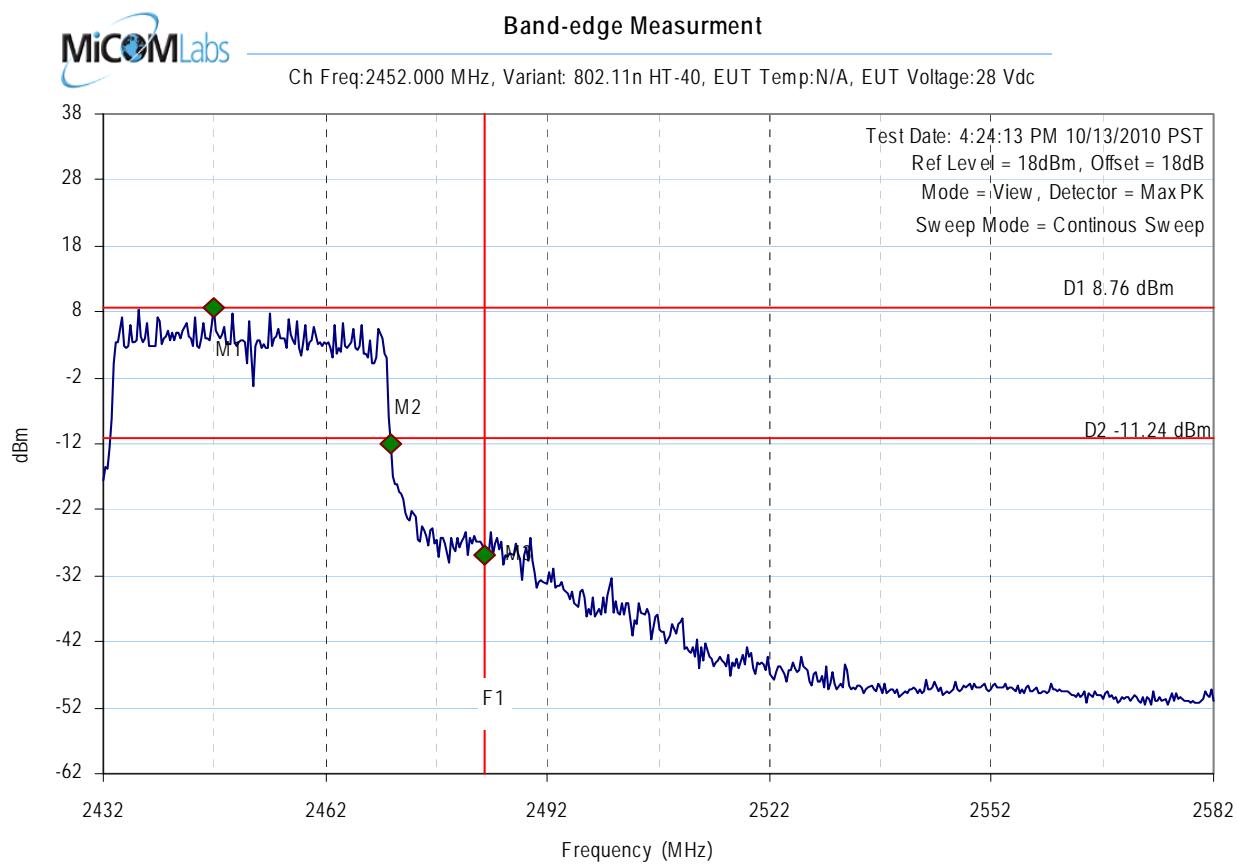
Marker : Frequency : Amplitude

M1 : 2400.000000MHz : -22.919dBm
 M2 : 2403.222445MHz : -12.173dBm
 M3 : 2426.969940MHz : 8.384dBm

Test Results

Center frequency = 2422MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 150.00MHz

Marker : Frequency : Amplitude

M1 : 2447.030060MHz : 8.763dBm
 M2 : 2470.777555MHz : -11.857dBm
 M3 : 2483.500000MHz : -28.996dBm

Test Results

Center frequency = 2452MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 248 of 362

5 GHz MIMO Results

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11a	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A dB	Antenna Gain:	N/A dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

Conducted Spurious Measurement

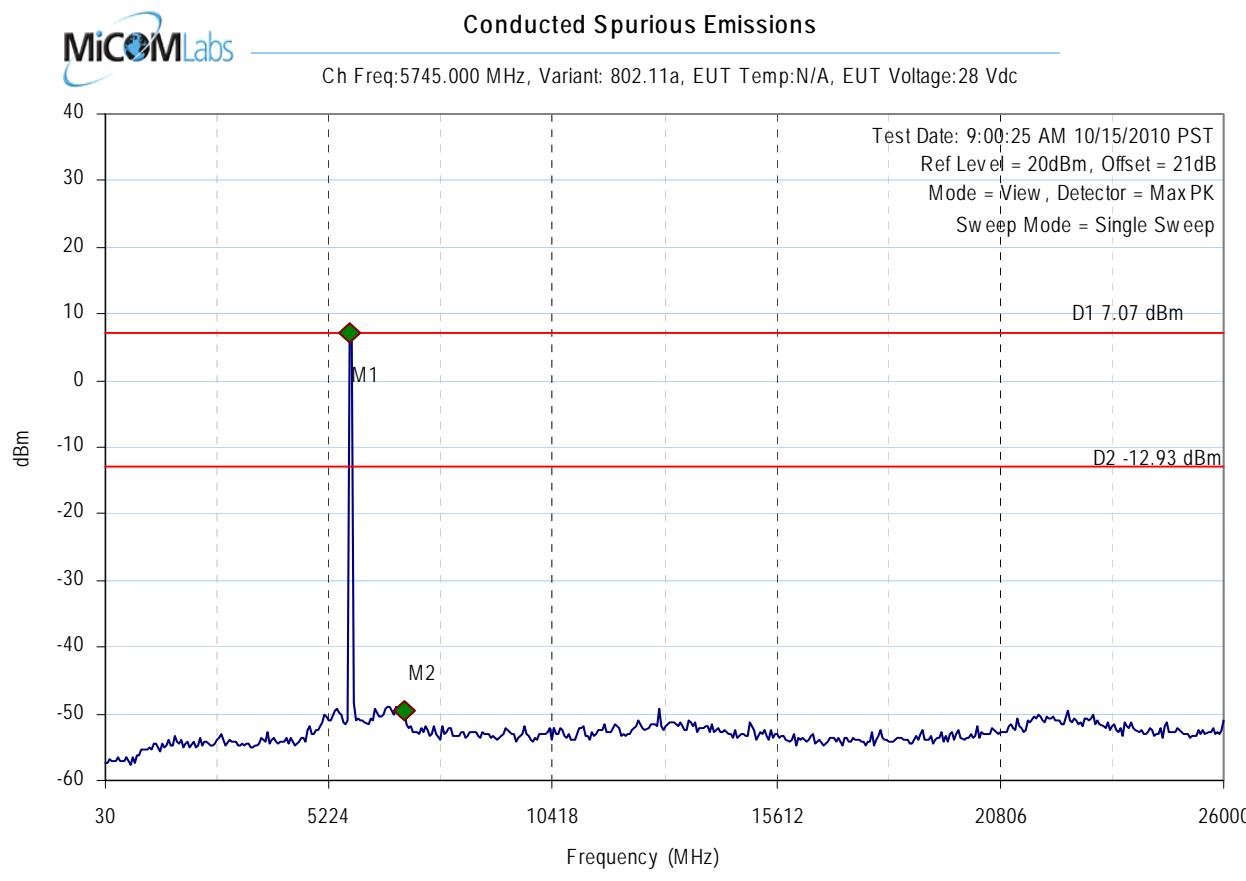
Test Frequency	Start Frequency	Stop Frequency	Maximum Observed Emission	Limit (20 dB below peak of fundamental)
MHz	MHz	MHz	dBm	dBm
5745.000	30.00	26000.00	-49.51	-12.93
5785.000	30.00	26000.00	-48.47	-13.48
5825.000	30.00	26000.00	-48.45	-11.31

Band-edge Measurement

Test Frequency	Band-edge Frequency	Emission Amplitude @ Band-edge	Limit (20 dB below peak of fundamental)	Margin
MHz	MHz	dBm	dBm	dB
5745.000	5725.00	-23.77	-8.35	-15.42
5825.000	5850.00	-27.38	-6.16	-21.22

Measurement uncertainty: ±2.81 dB

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

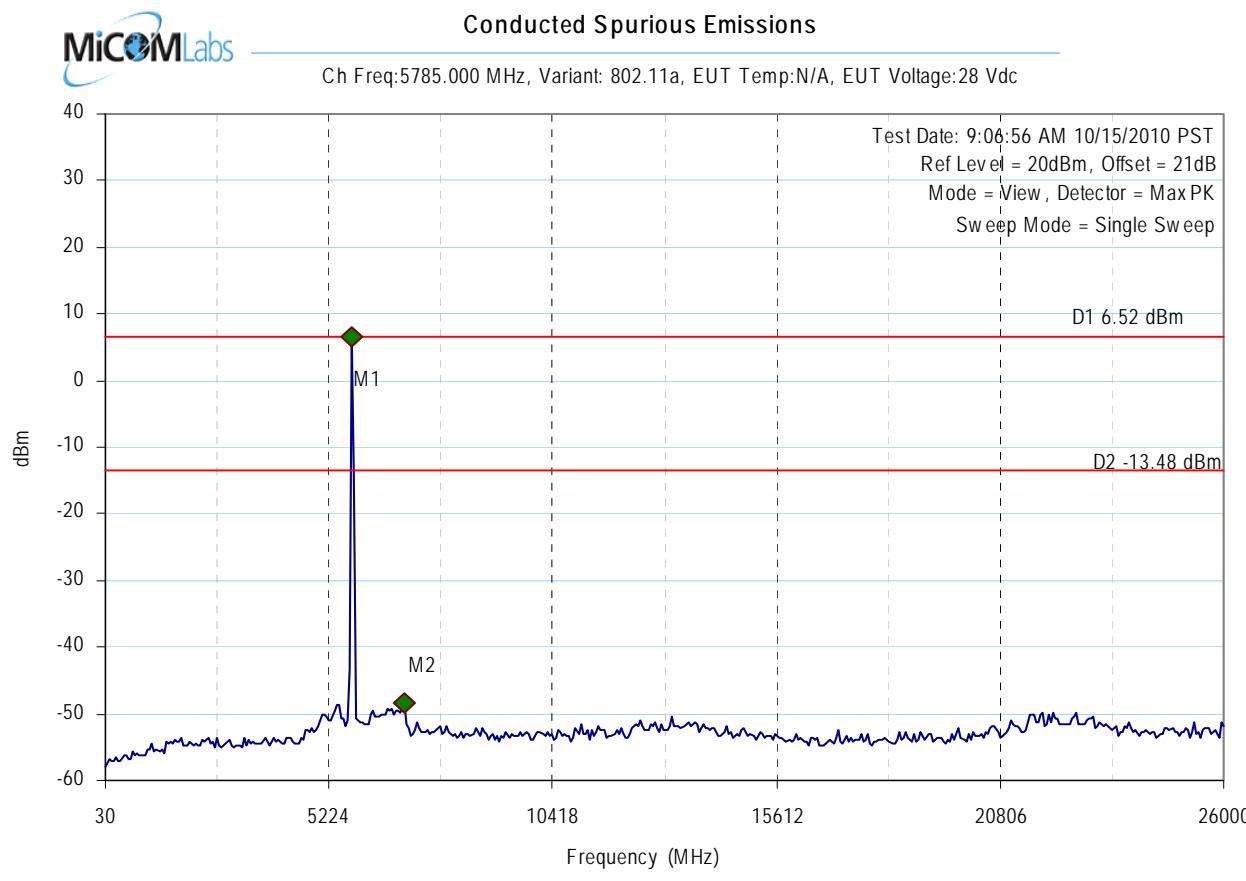
Marker : Frequency : Amplitude

M1 : 5702.805611MHz : 7.074dBm
 M2 : 6951.863727MHz : -49.511dBm

Test Results

Center frequency = 5745MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

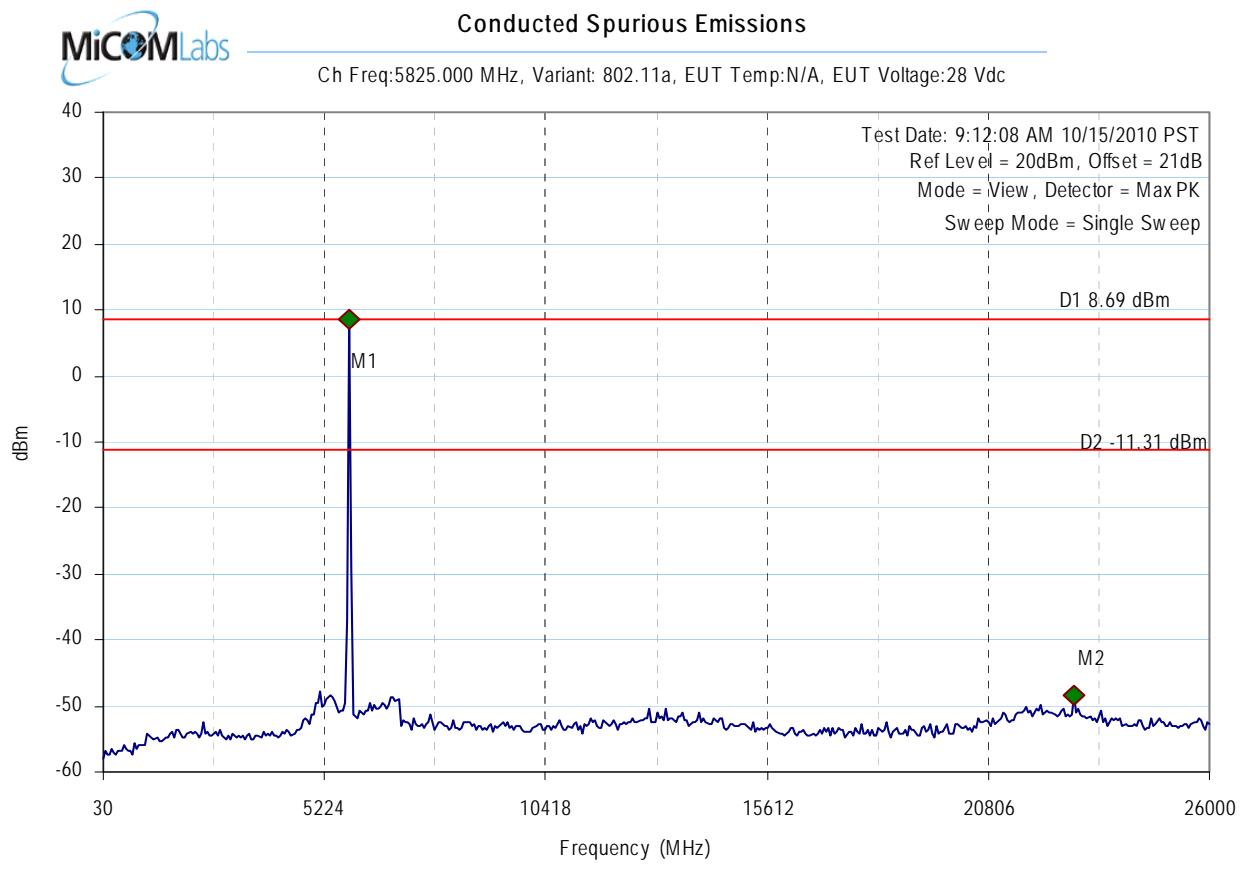
Marker : Frequency : Amplitude

M1 : 5754.849699MHz : 6.522dBm
 M2 : 6951.863727MHz : -48.468dBm

Test Results

Center frequency = 5785MHz

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



Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

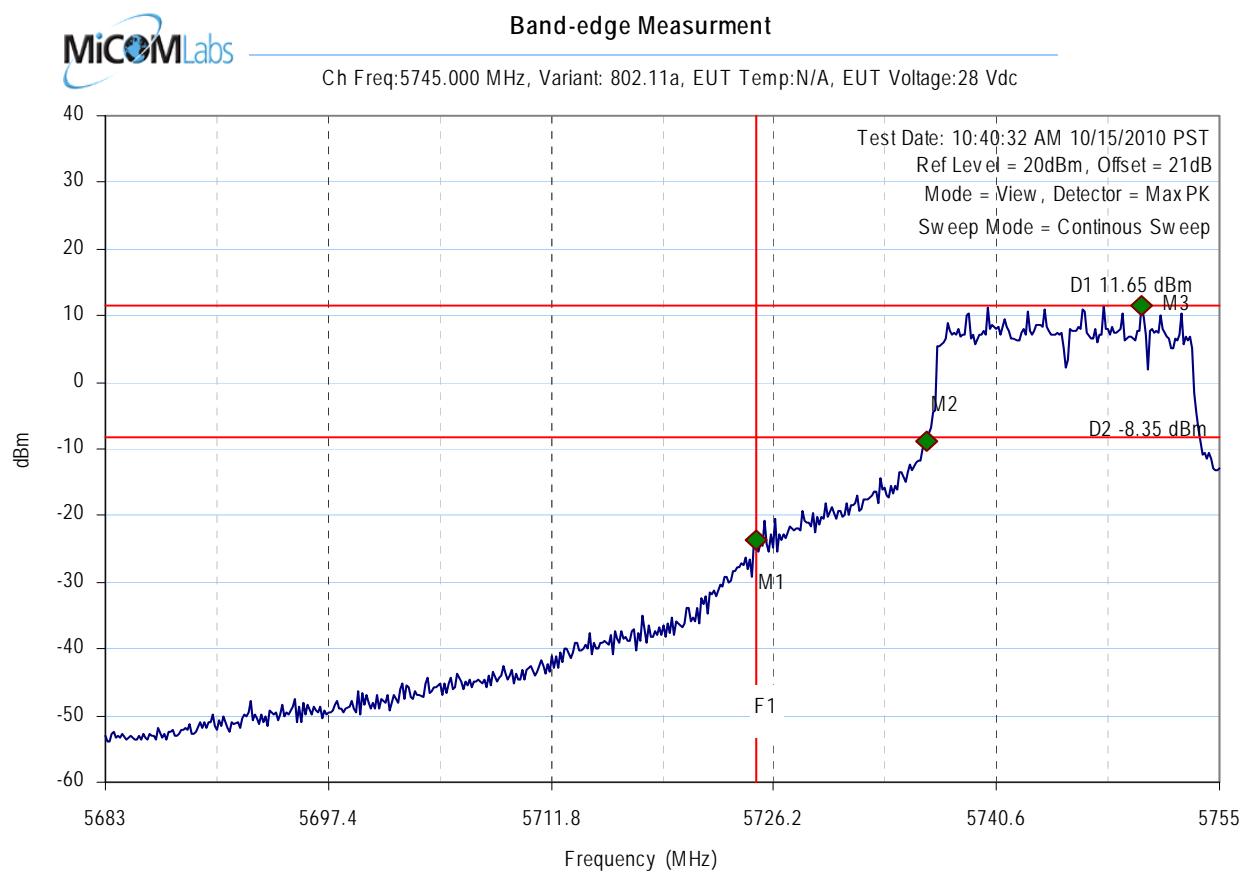
Marker : Frequency : Amplitude

M1 : 5806.893788MHz : 8.694dBm
 M2 : 22825.310621MHz : -48.446dBm

Test Results

Center frequency = 5825MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

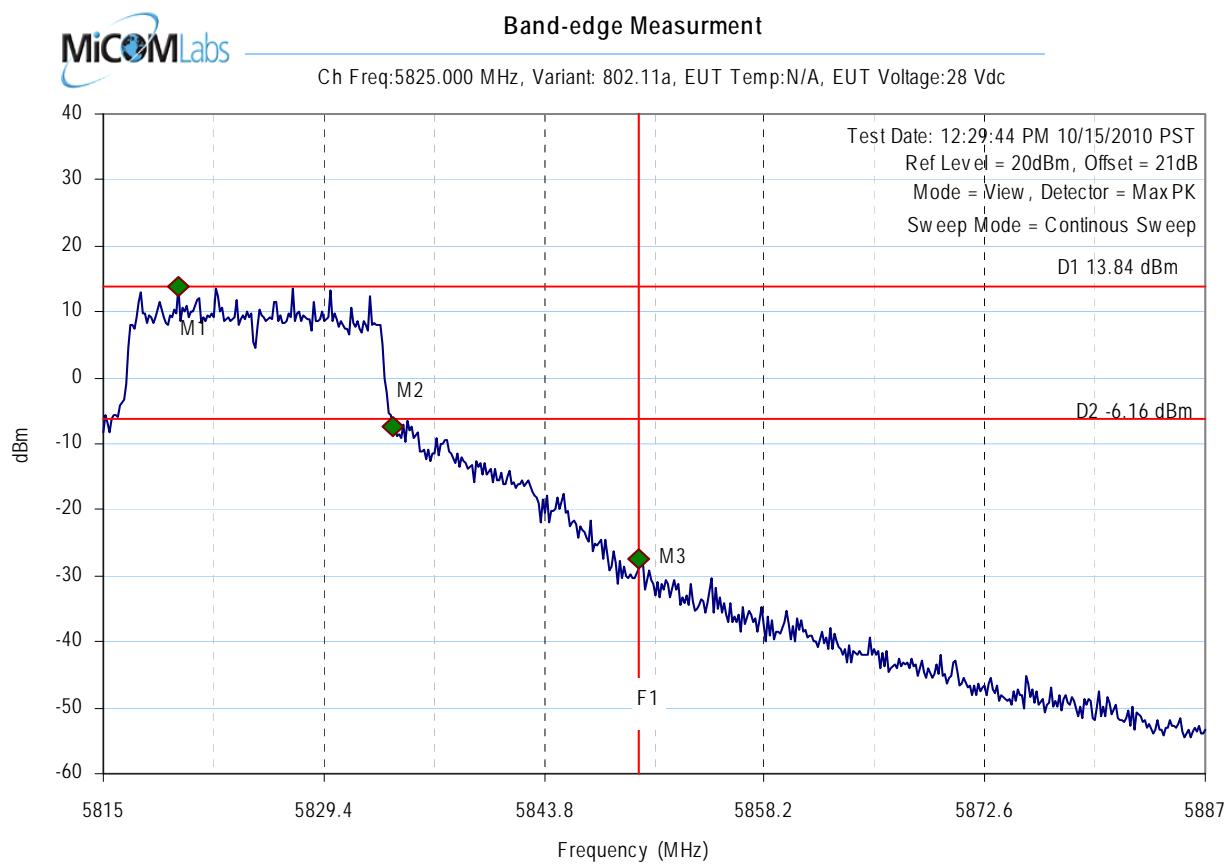
Marker : Frequency : Amplitude

M1 : 5725.000000MHz : -23.766dBm
 M2 : 5736.098196MHz : -8.891dBm
 M3 : 5749.949900MHz : 11.654dBm

Test Results

Center frequency = 5745MHz

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



Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 254 of 362

Measurement Results for MIMO 802.11n HT-20

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11n HT-20	Ambient Temp. (°C):	19 to 22
TPC:	HIGH	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming	N/A dB	Antenna Gain:	N/A dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

Conducted Spurious Measurement

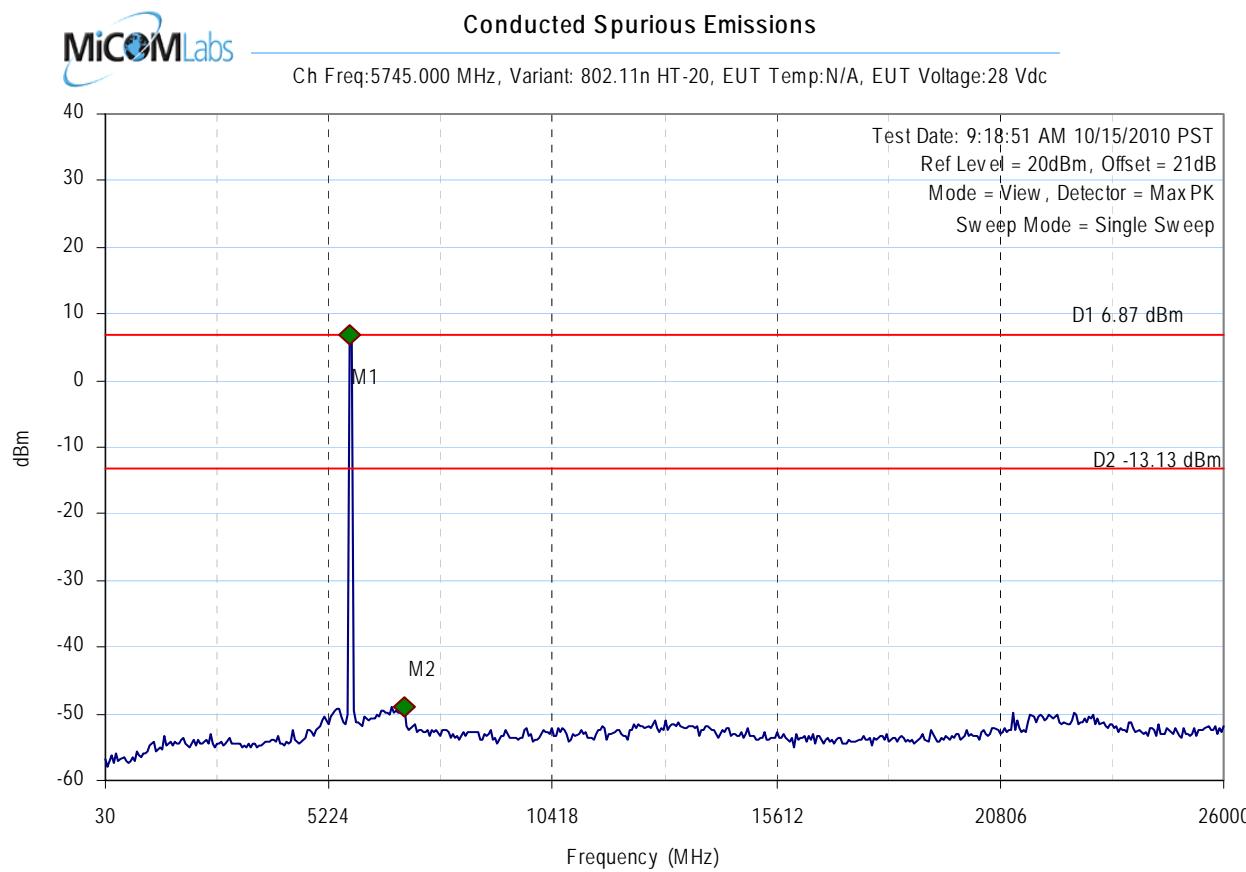
Test Frequency	Start Frequency	Stop Frequency	Maximum Observed Emission	Limit (20 dB below peak of fundamental)
MHz	MHz	MHz	dBm	dBm
5745.000	30.00	26000.00	-49.90	-13.13
5785.000	30.00	26000.00	-48.64	-11.76
5825.000	30.00	26000.00	-47.71	-10.35

Band-edge Measurement

Test Frequency	Band-edge Frequency	Emission Amplitude @ Band-edge	Limit (20 dB below peak of fundamental)	Margin
MHz	MHz	dBm	dBm	dB
5745.000	5725.00	-24.67	-8.43	-16.24
5825.000	5850.00	-29.54	-7.28	-22.26

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

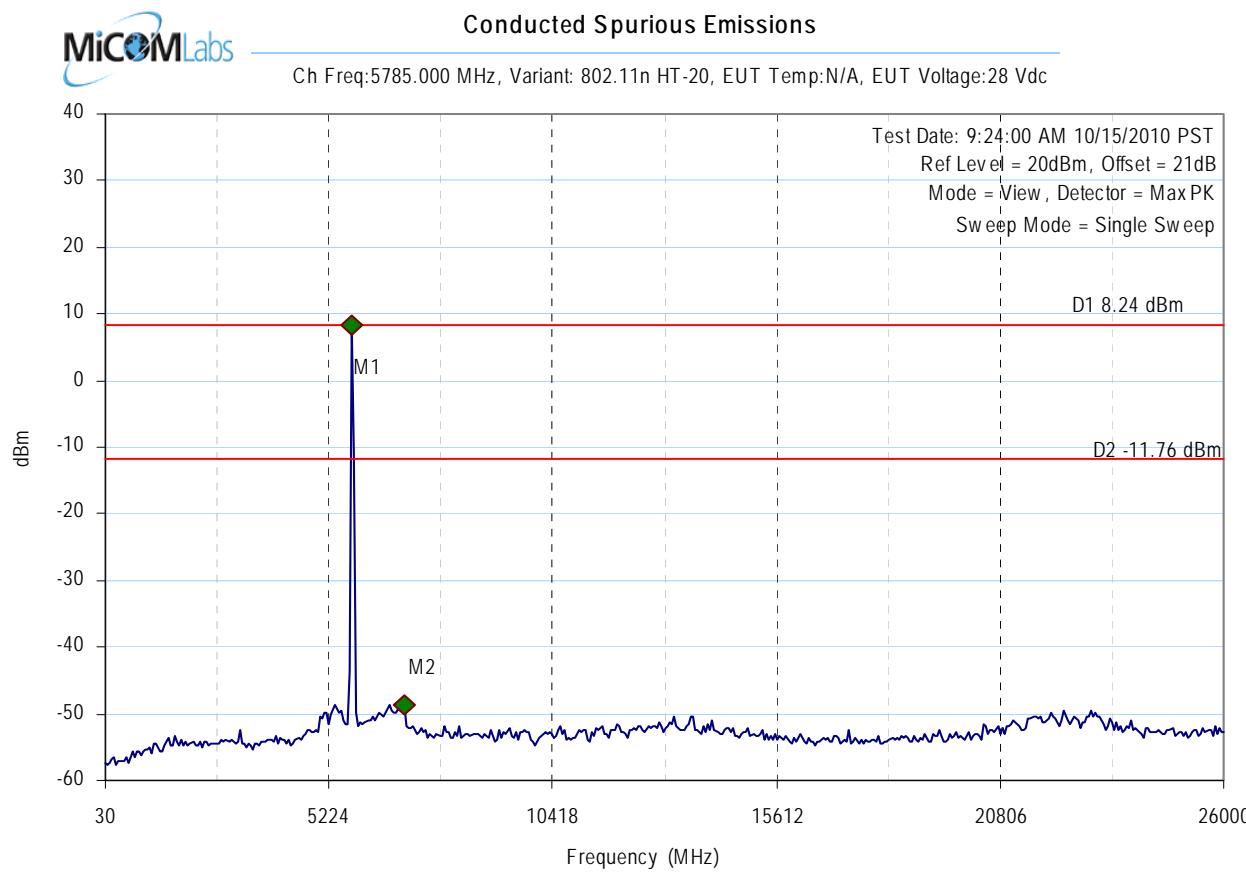
Marker : Frequency : Amplitude

M1 : 5702.805611MHz : 6.866dBm
 M2 : 6951.863727MHz : -48.903dBm

Test Results

Center frequency = 5745MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

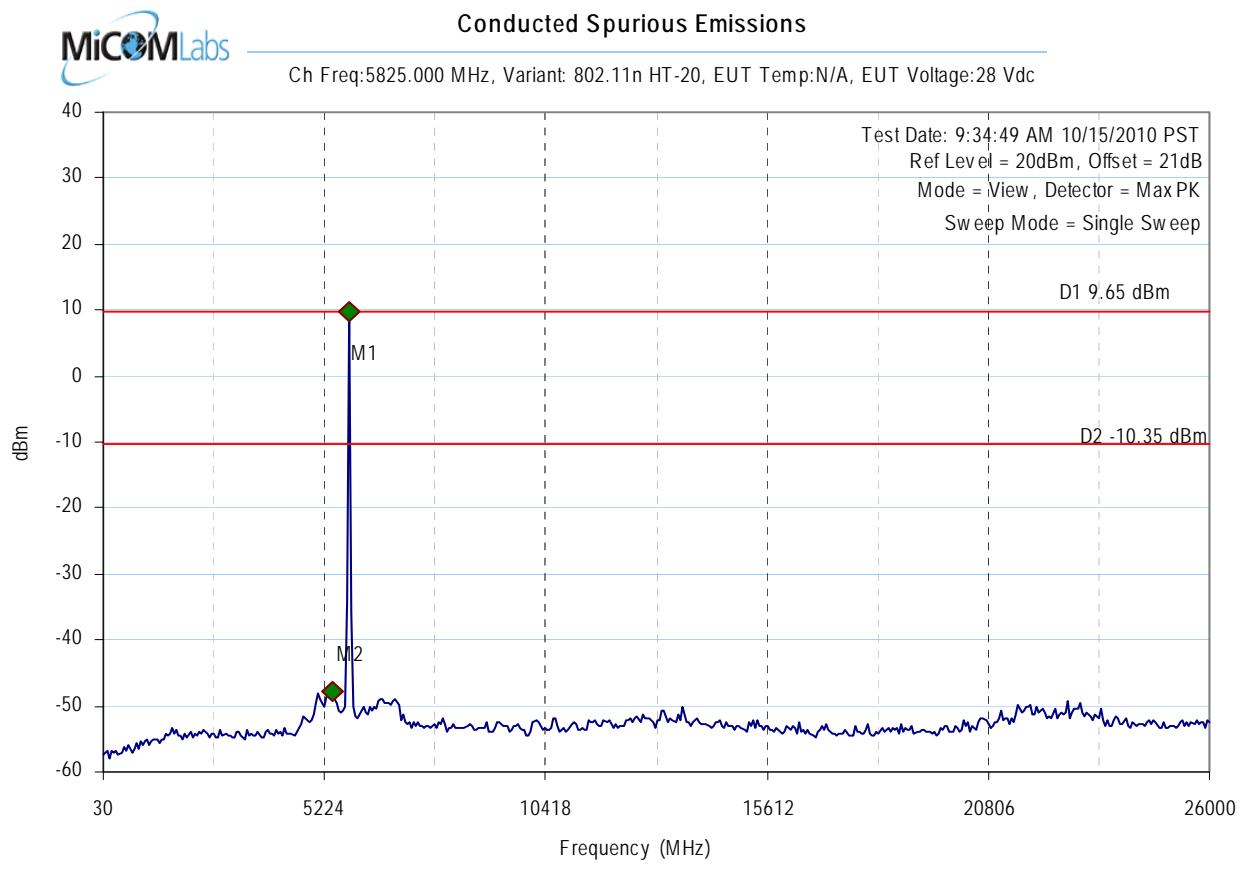
Marker : Frequency : Amplitude

M1 : 5754.849699MHz : 8.245dBm
 M2 : 6951.863727MHz : -48.643dBm

Test Results

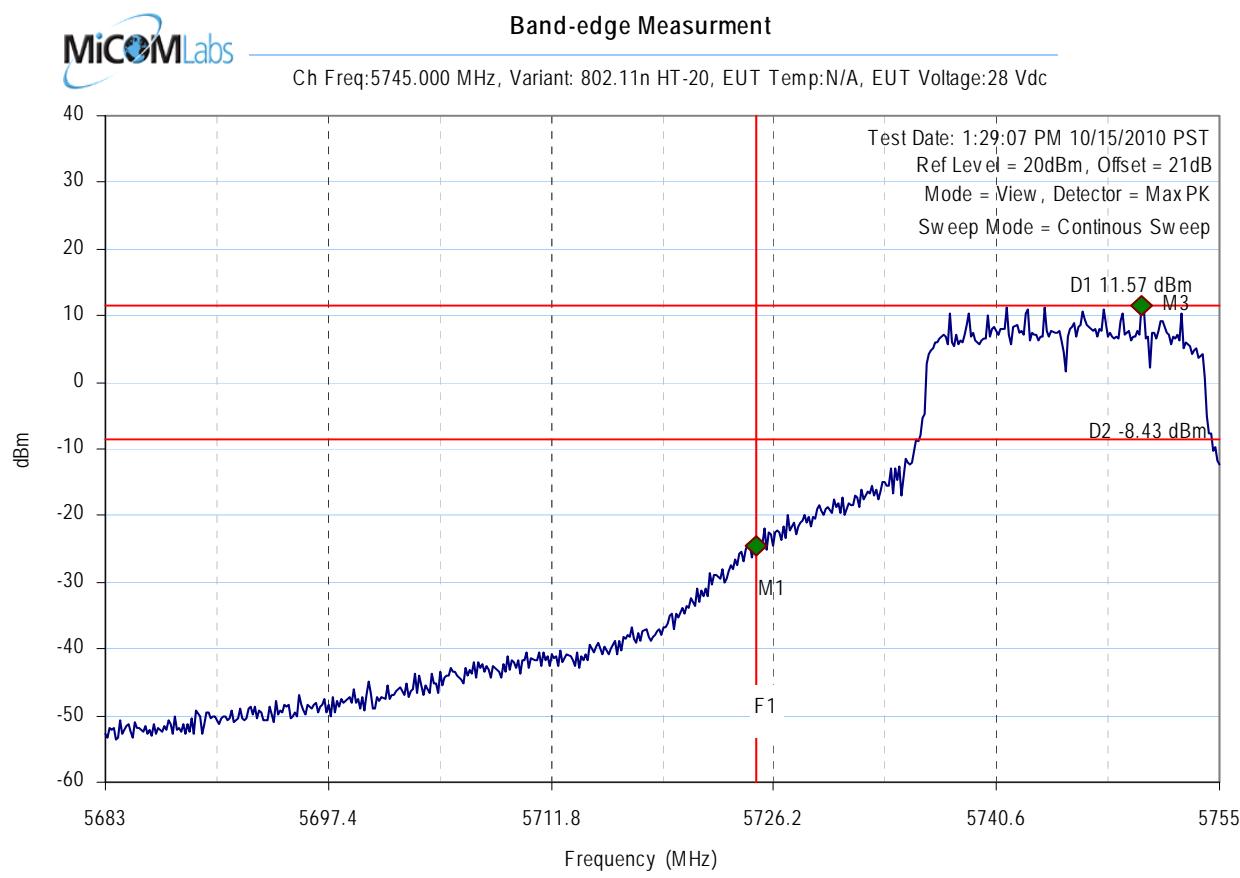
Center frequency = 5785MHz

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Analyser Setup	Marker : Frequency : Amplitude	Test Results
RBW = 100.00KHz	M1 : 5806.893788MHz : 9.650dBm	Center frequency = 5825MHz
VBW = 300.00KHz	M2 : 5390.541082MHz : -47.714dBm	
Sweep time(s) = 60		
RF Atten (dB) = 10		
Span = 25.97GHz		

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Analyser Setup

RBW = 100.000KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

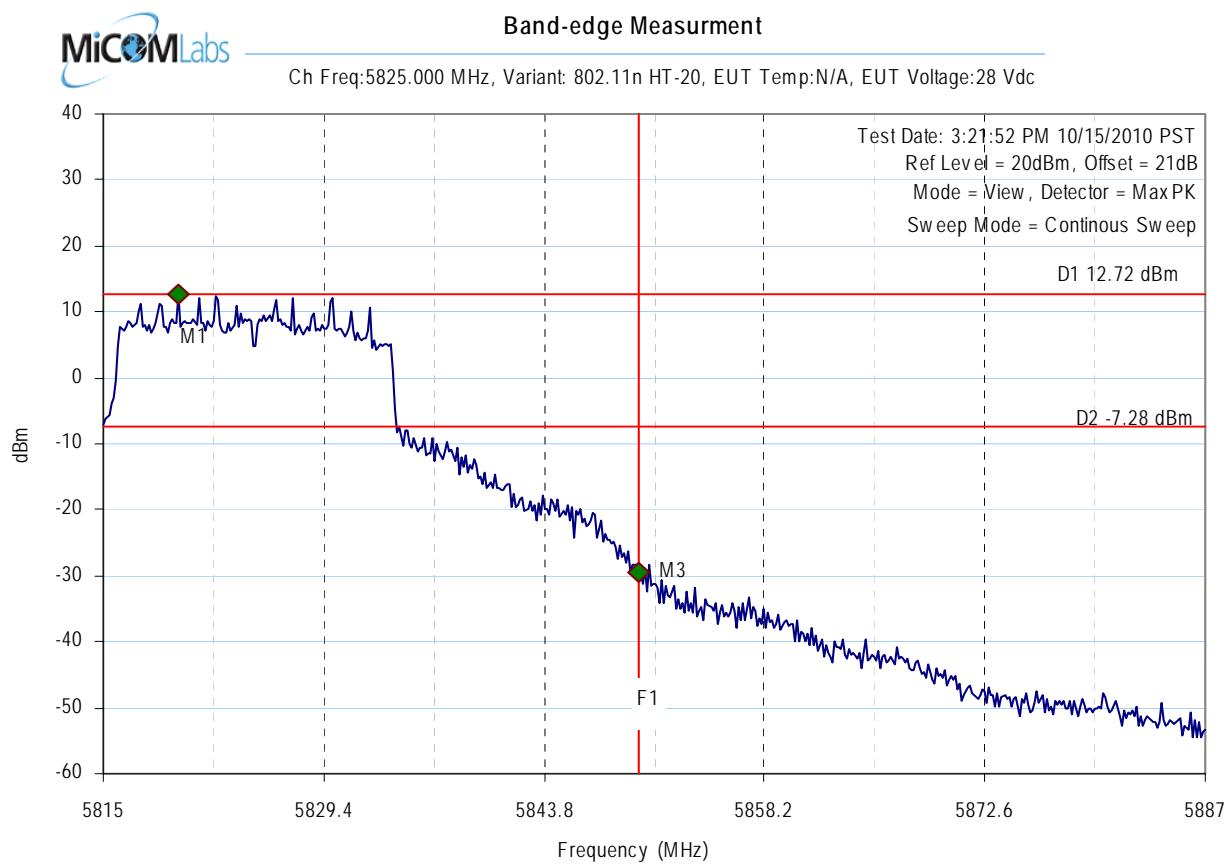
Marker : Frequency : Amplitude

M1 : 5725.000000MHz : -24.665dBm
 M2 : 6951.863727MHz : -48.903dBm
 M3 : 5749.949900MHz : 11.574dBm

Test Results

Center frequency = 5745MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

Marker : Frequency : Amplitude

M1 : 5819.905812MHz : 12.717dBm
 M2 : 6951.863727MHz : -48.903dBm
 M3 : 5850.000000MHz : -29.538dBm

Test Results

Center frequency = 5825MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
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Measurement Results for MIMO 802.11n HT-40

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35	to	42
Variant:	802.11n HT-40	Ambient Temp. (°C):	19	to	22
TPC:	HIGH	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming	N/A	Antenna Gain:	N/A		dBi
Applied Voltage:	28.00	Vdc			
Notes 1:					
Notes 2:					

Conducted Spurious Measurement

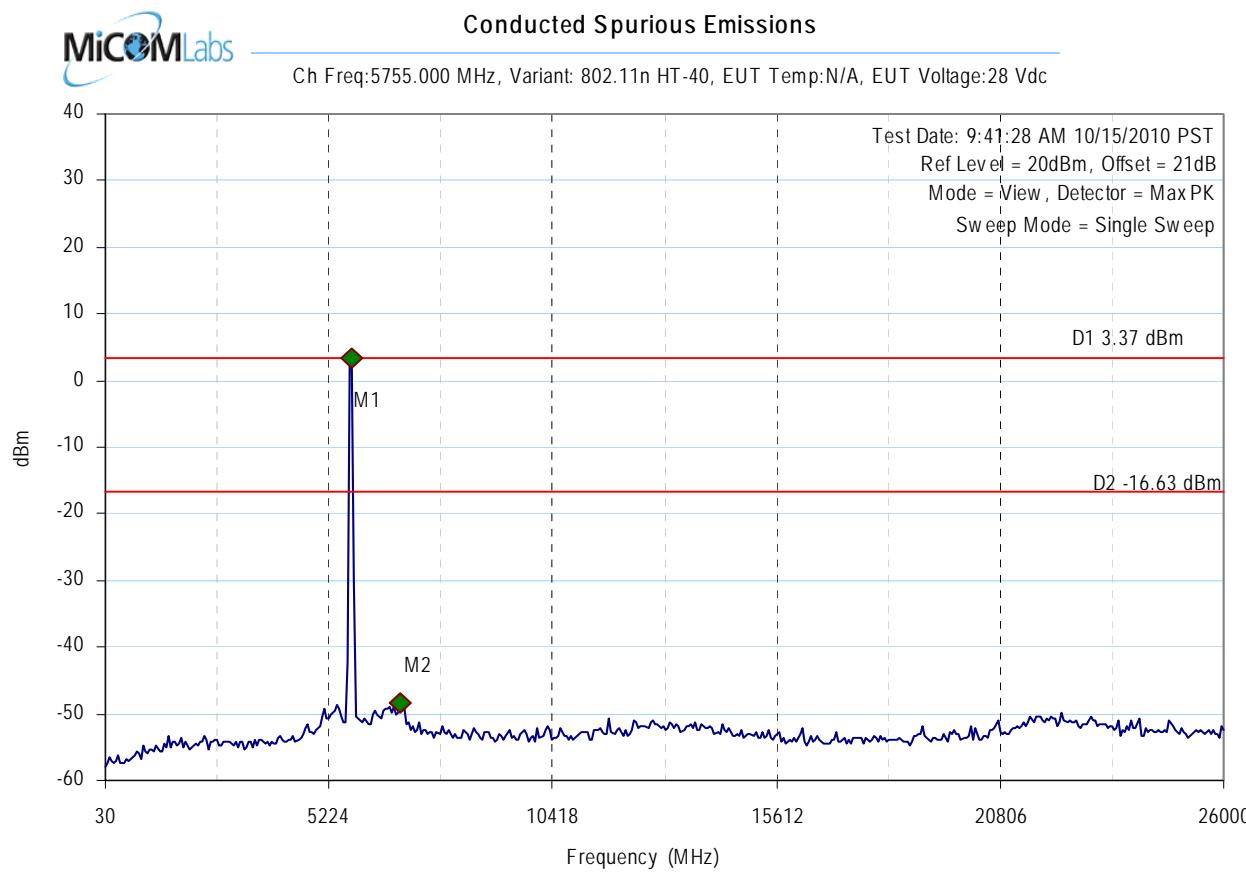
Test Frequency	Start Frequency	Stop Frequency	Maximum Observed Emission	Limit (20 dB below peak of fundamental)
MHz	MHz	MHz	dBm	dBm
5755.000	30.00	26000.00	-48.24	-16.63
5785.000	30.00	26000.00	-47.93	-12.42
5815.000	30.00	26000.00	-48.21	-13.89

Band-edge Measurement

Test Frequency	Band-edge Frequency	Emission Amplitude @ Band-edge	Limit (20 dB below peak of fundamental)	Margin
MHz	MHz	dBm	dBm	dB
5755.000	5725.00	-22.84	-13.27	-9.57
5815.000	5850.00	-22.47	-11.57	-10.90

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

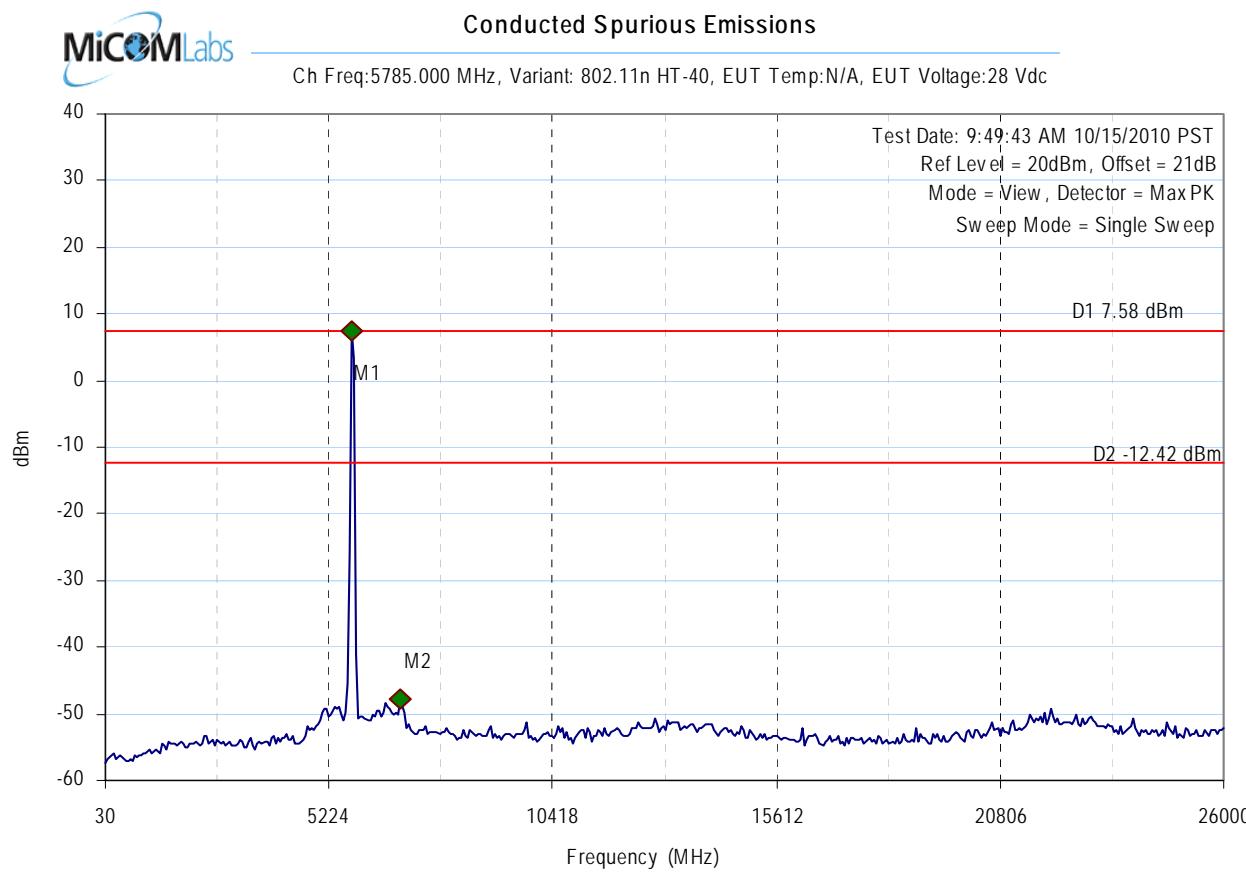
Marker : Frequency : Amplitude

M1 : 5754.849699MHz : 3.368dBm
 M2 : 6899.819639MHz : -48.244dBm

Test Results

Center frequency = 5755MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

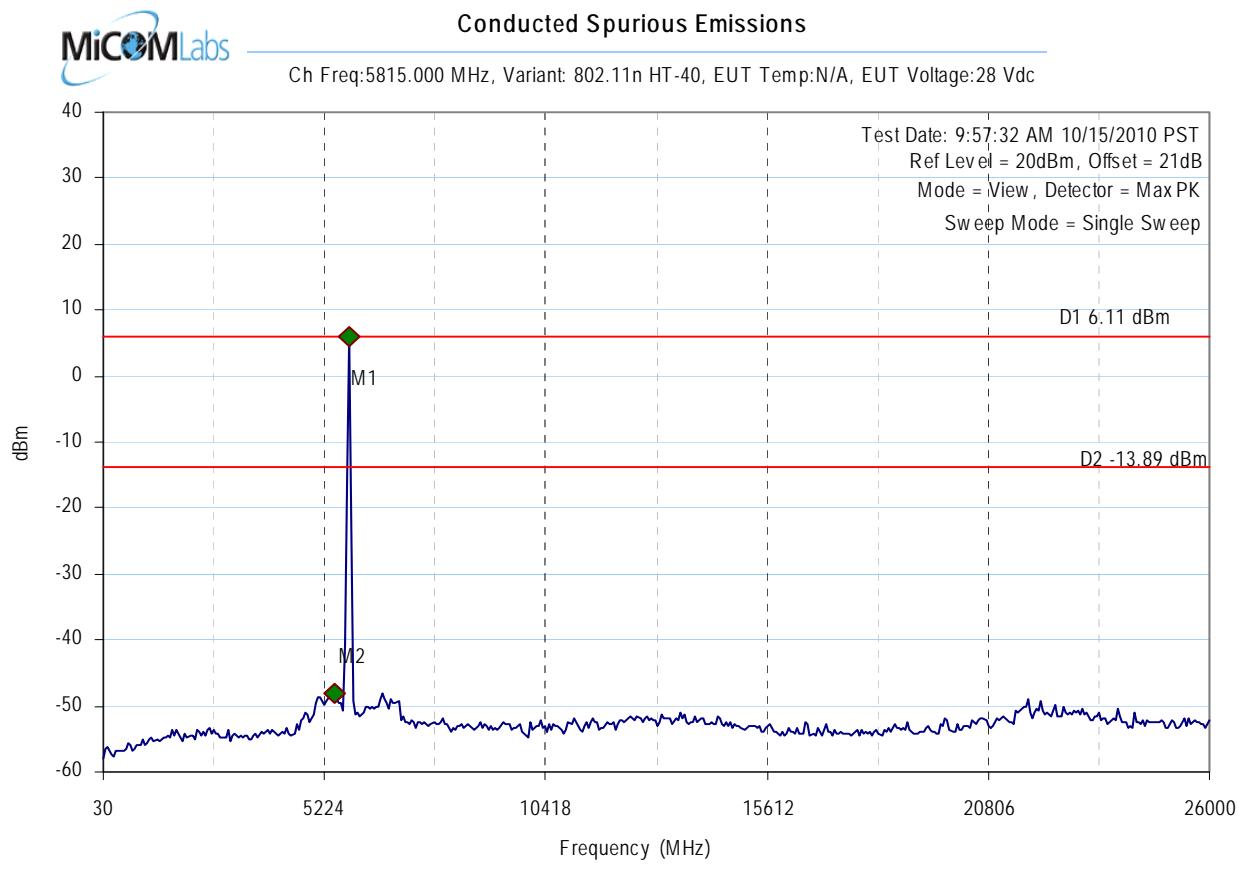
Marker : Frequency : Amplitude

M1 : 5754.849699MHz : 7.578dBm
 M2 : 6899.819639MHz : -47.929dBm

Test Results

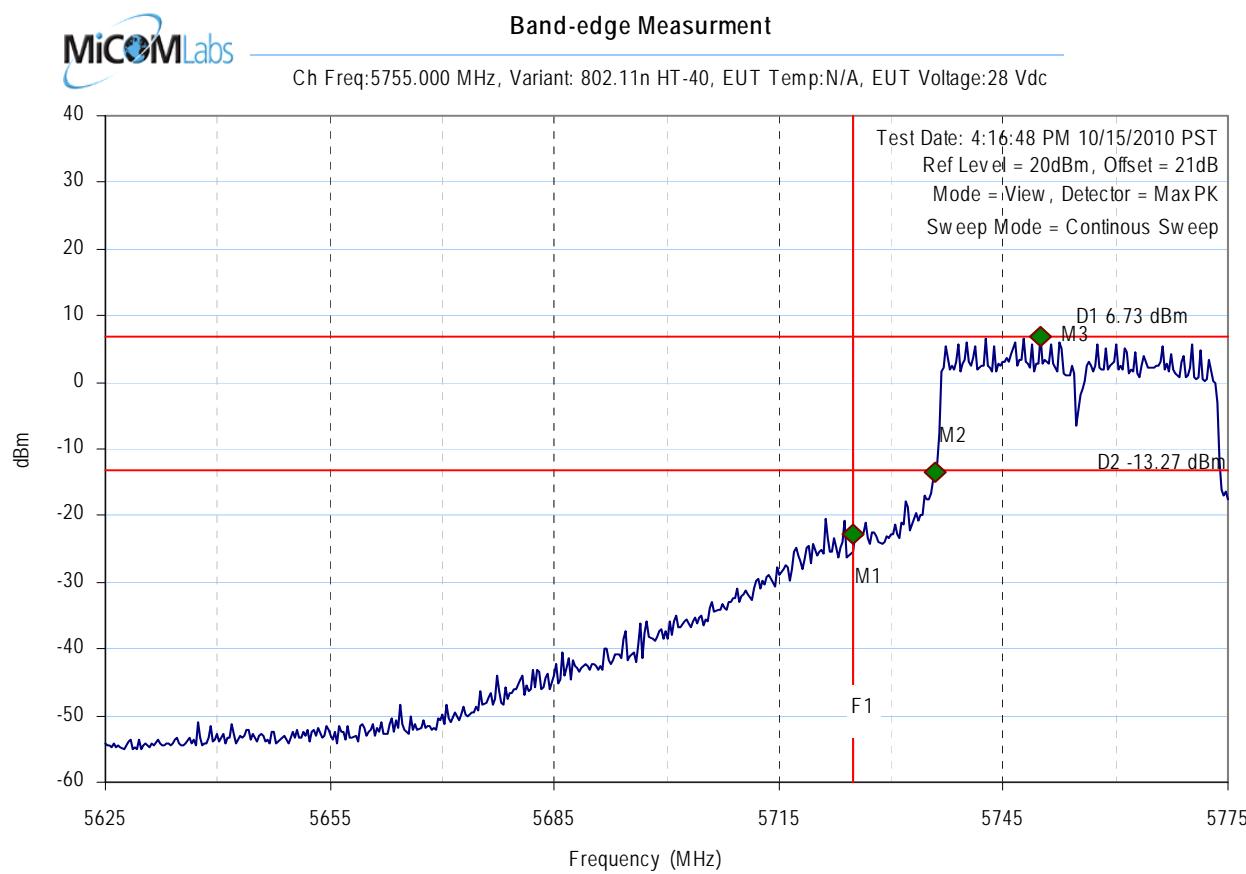
Center frequency = 5785MHz

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Analyser Setup	Marker : Frequency : Amplitude	Test Results
RBW = 100.00KHz	M1 : 5806.893788MHz : 6.114dBm	Center frequency = 5815MHz
VBW = 300.00KHz	M2 : 5442.585170MHz : -48.210dBm	
Sweep time(s) = 60		
RF Atten (dB) = 10		
Span = 25.97GHz		

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Analyser Setup

RBW = 100.000KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 150.00MHz

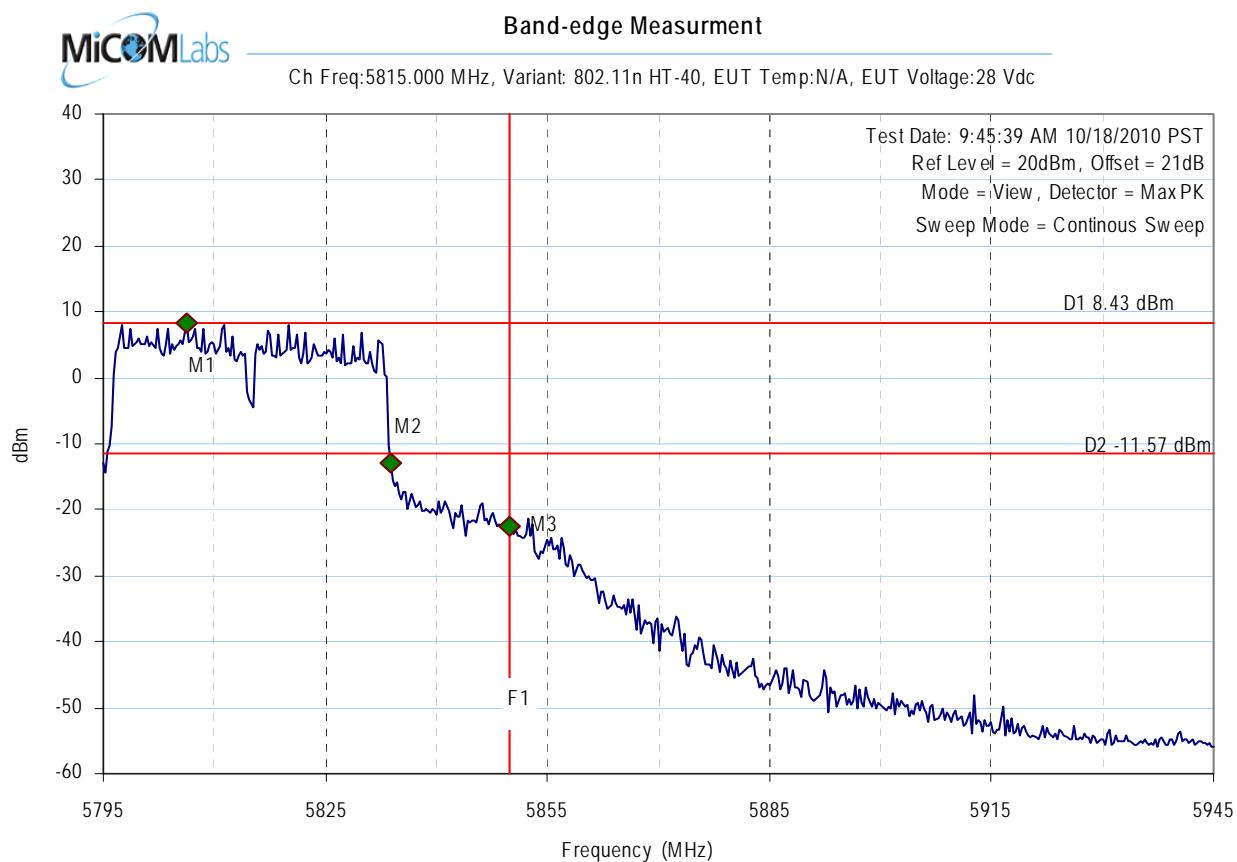
Marker : Frequency : Amplitude

M1 : 5725.000000MHz : -22.839dBm
 M2 : 5735.921844MHz : -13.477dBm
 M3 : 5750.050100MHz : 6.734dBm

Test Results

Center frequency = 5755MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 150.00MHz

Marker : Frequency : Amplitude

M1 : 5806.122244MHz : 8.426dBm
 M2 : 5833.777555MHz : -12.814dBm
 M3 : 5850.000000MHz : -22.471dBm

Test Results

Center frequency = 5815MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
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Measurement results for Legacy 802.11b

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35 to 42
Variant:	802.11 b	Ambient Temp. (°C):	19 to 22
TPC:	N/A	Pressure (mBars):	998 to 1003
Modulation:	ON	Duty Cycle (%):	100
Beam Forming Gain	N/A dB	Antenna Gain:	N/A dBi
Applied Voltage:	28.00 Vdc		
Notes 1:			
Notes 2:			

Conducted Spurious Measurement

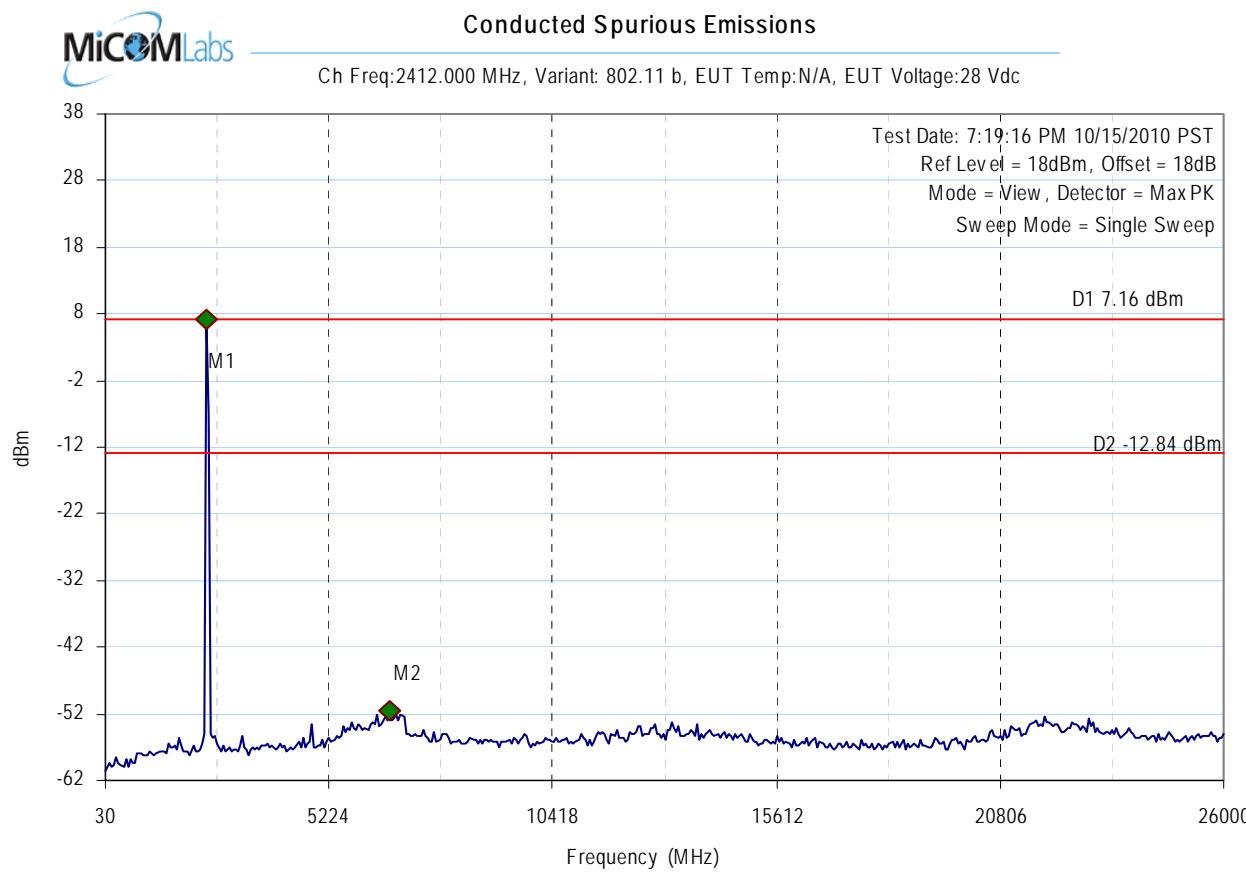
Test Frequency	Start Frequency	Stop Frequency	Maximum Observed Emission	Limit (20 dB below peak of fundamental)
MHz	MHz	MHz	dBm	dBm
2412.000	30.00	26000.00	-52.51	-12.84
2437.000	30.00	26000.00	-52.04	-10.00
2462.000	30.00	26000.00	-52.70	-13.97

Band-edge Measurement

Test Frequency	Band-edge Frequency	Emission Amplitude @ Band-edge	Limit (20 dB below peak of fundamental)	Margin
MHz	MHz	dBm	dBm	dB
2412.000	2400.00	-38.32	-10.59	-27.73
2462.000	2483.50	-49.62	-10.95	-38.67

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

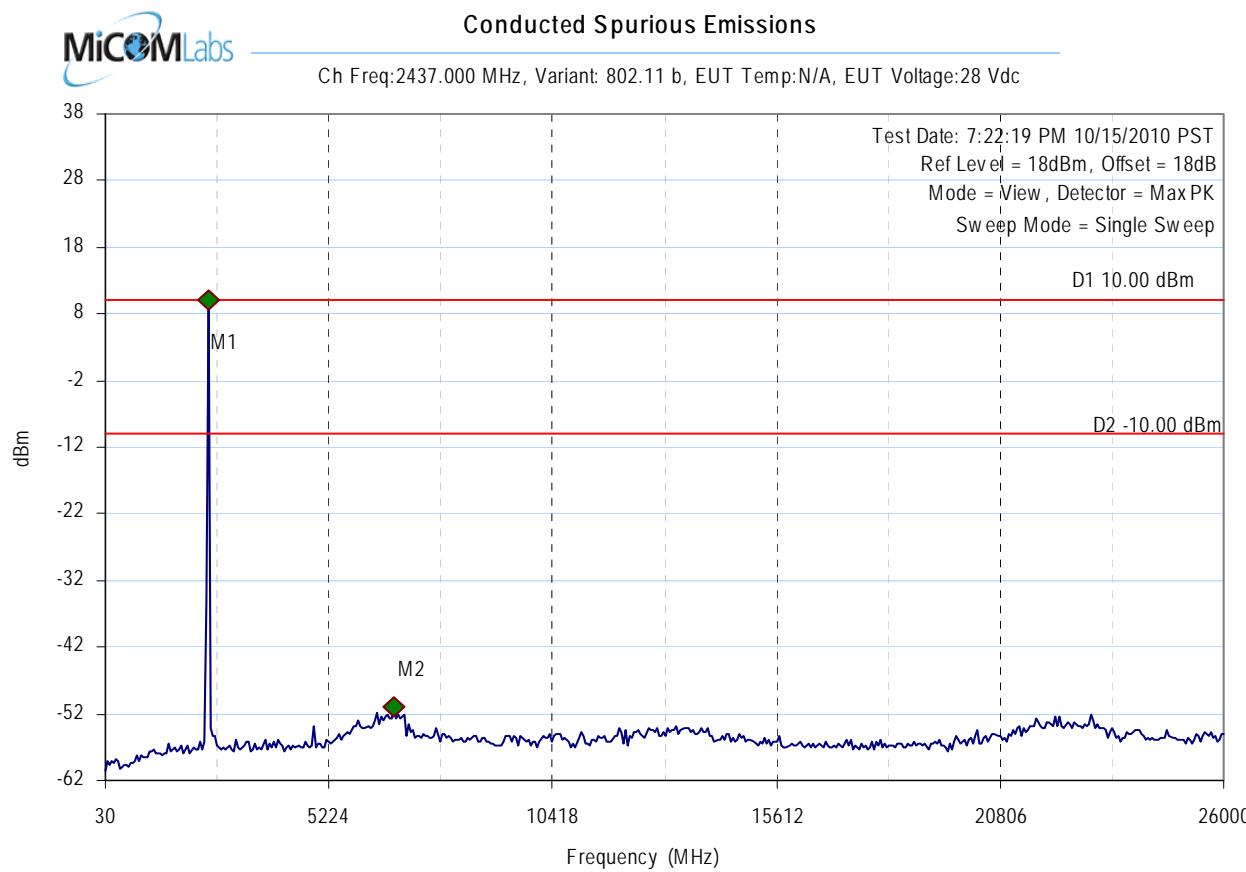
Marker : Frequency : Amplitude

M1 : 2371.983968MHz : 7.156dBm
 M2 : 6639.599198MHz : -52.510dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

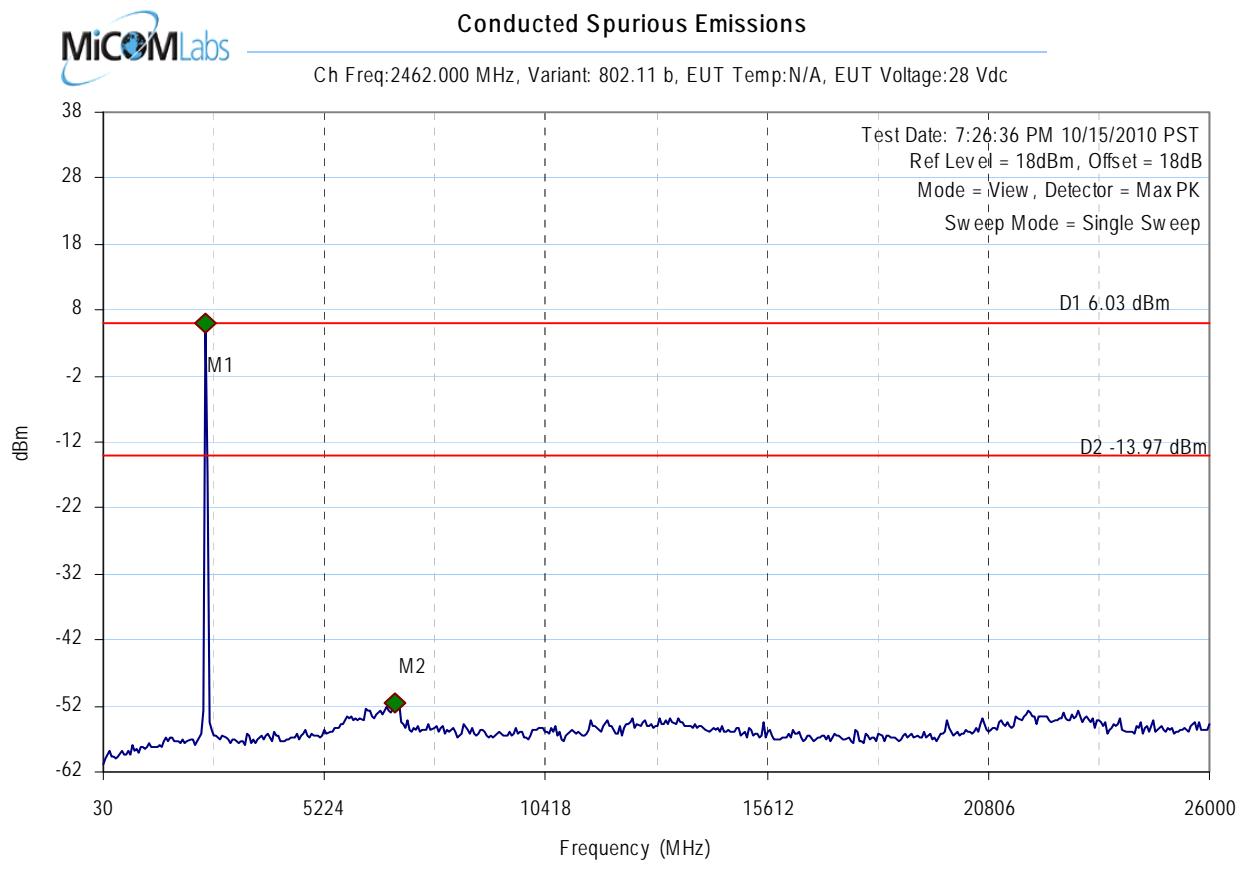
Marker : Frequency : Amplitude

M1 : 2424.028056MHz : 10.003dBm
 M2 : 6743.687375MHz : -52.041dBm

Test Results

Center frequency = 2437MHz

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Analyser Setup	Marker : Frequency : Amplitude	Test Results
RBW = 100.000KHz	M1 : 2424.028056MHz : 6.031dBm	Center frequency = 2462MHz
VBW = 300.000KHz	M2 : 6899.819639MHz : -52.702dBm	
Sweep time(s) = 60		
RF Atten (dB) = 10		
Span = 25.97GHz		

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Analyser Setup

RBW = 100.000KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

Marker : Frequency : Amplitude

M1 : 2400.000000MHz : -38.324dBm
 M2 : 2402.809619MHz : -23.920dBm
 M3 : 2414.064128MHz : 9.411dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

Marker : Frequency : Amplitude

M1 : 2460.945892MHz : 9.05dBm
 M2 : 2470.613226MHz : -13.560dBm
 M3 : 2483.500000MHz : -49.616dBm

Test Results

Center frequency = 2462MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
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Measurement results for Legacy 802.11g

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35	to	42
Variant:	802.11 g	Ambient Temp. (°C):	19	to	22
TPC:	N/A	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain	N/A	dB	Antenna Gain:	N/A	dBi
Applied Voltage:	28.00	Vdc			
Notes 1:					
Notes 2:					

Conducted Spurious Measurement

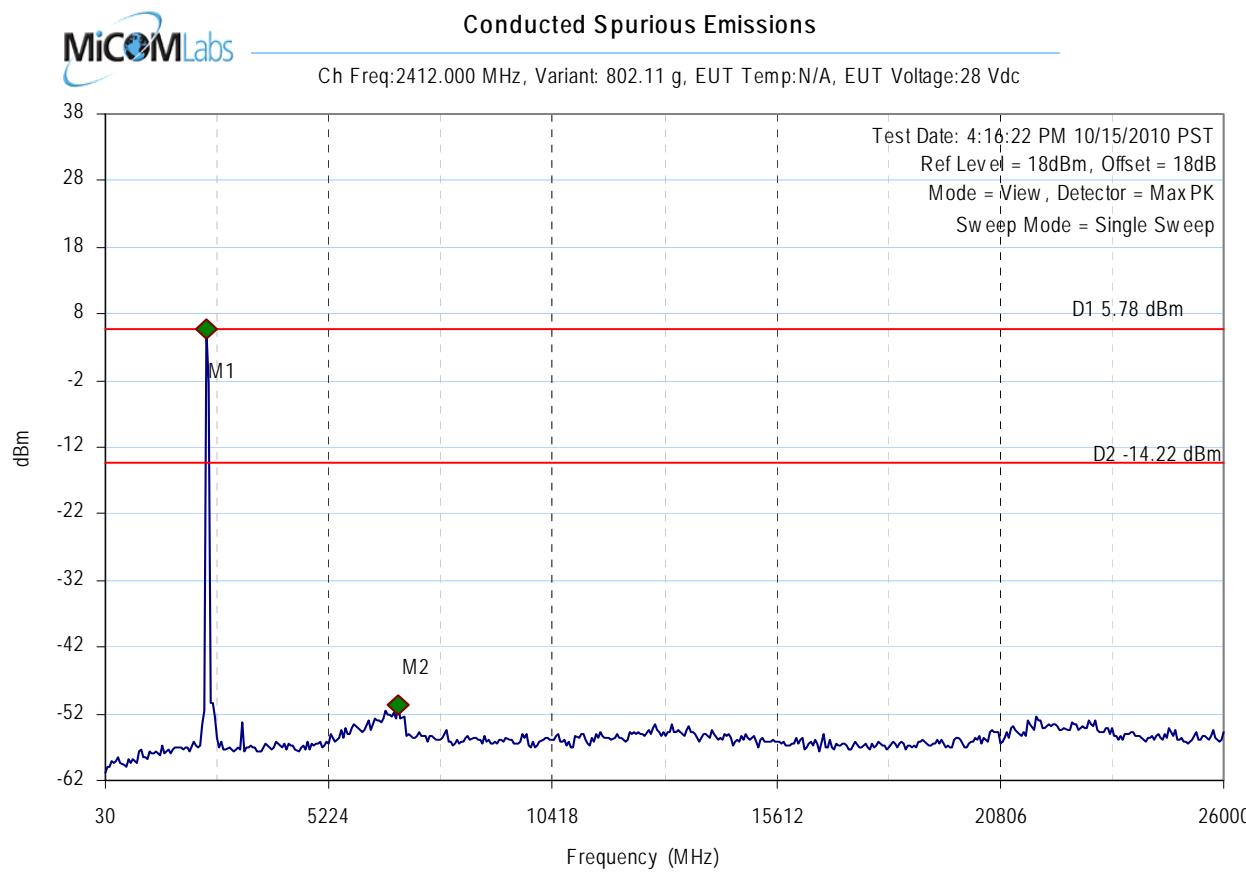
Test Frequency	Start Frequency	Stop Frequency	Maximum Observed Emission	Limit (20 dB below peak of fundamental)
MHz	MHz	MHz	dBm	dBm
2412.000	30.00	26000.00	-51.56	-14.22
2437.000	30.00	26000.00	-51.59	-14.10
2462.000	30.00	26000.00	-49.22	-12.41

Band-edge Measurement

Test Frequency	Band-edge Frequency	Emission Amplitude @ Band-edge	Limit (20 dB below peak of fundamental)	Margin
MHz	MHz	dBm	dBm	dB
2412.000	2400.00	-25.11	-11.44	-13.67
2462.000	2483.50	-34.26	-8.16	-26.10

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

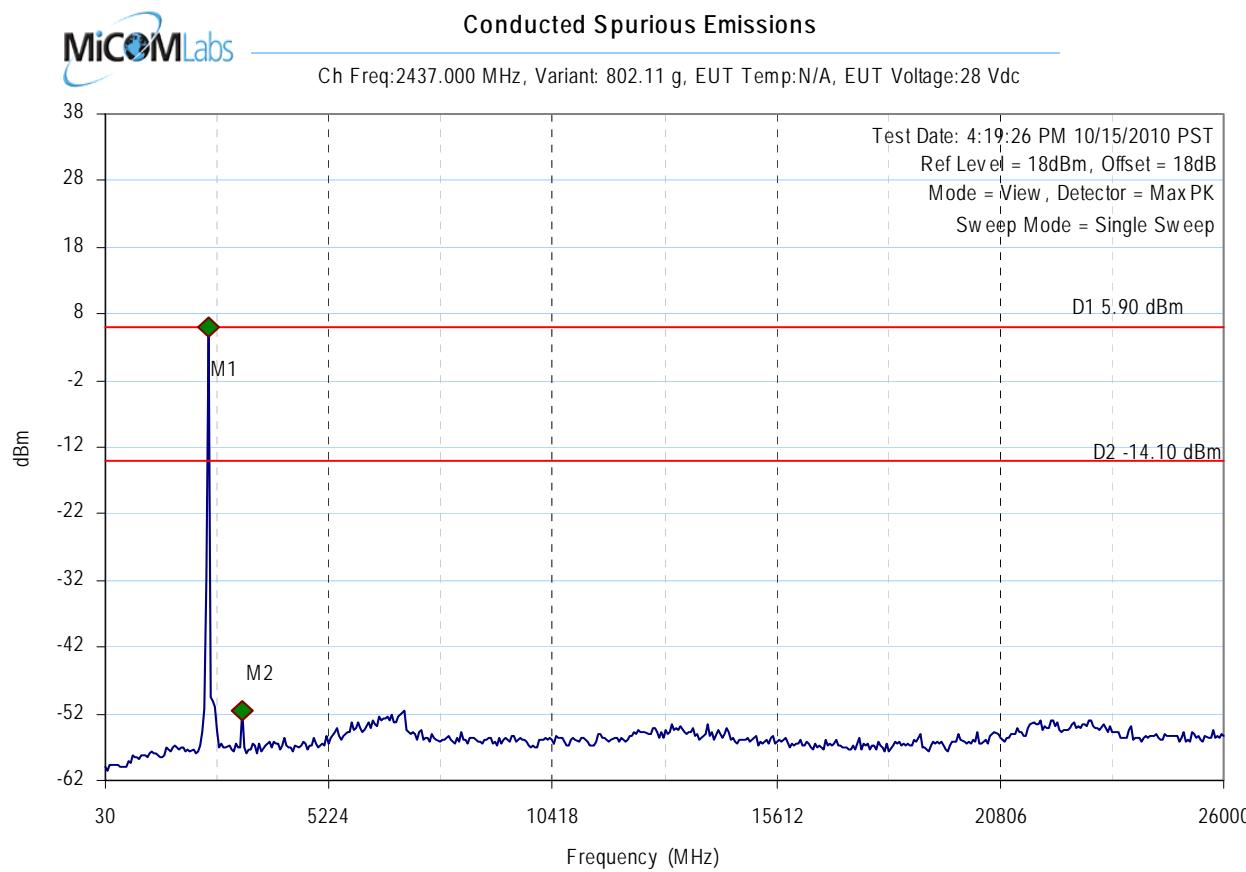
Marker : Frequency : Amplitude

M1 : 2371.983968MHz : 5.779dBm
 M2 : 6847.775551MHz : -51.561dBm

Test Results

Center frequency = 2412MHz

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


Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

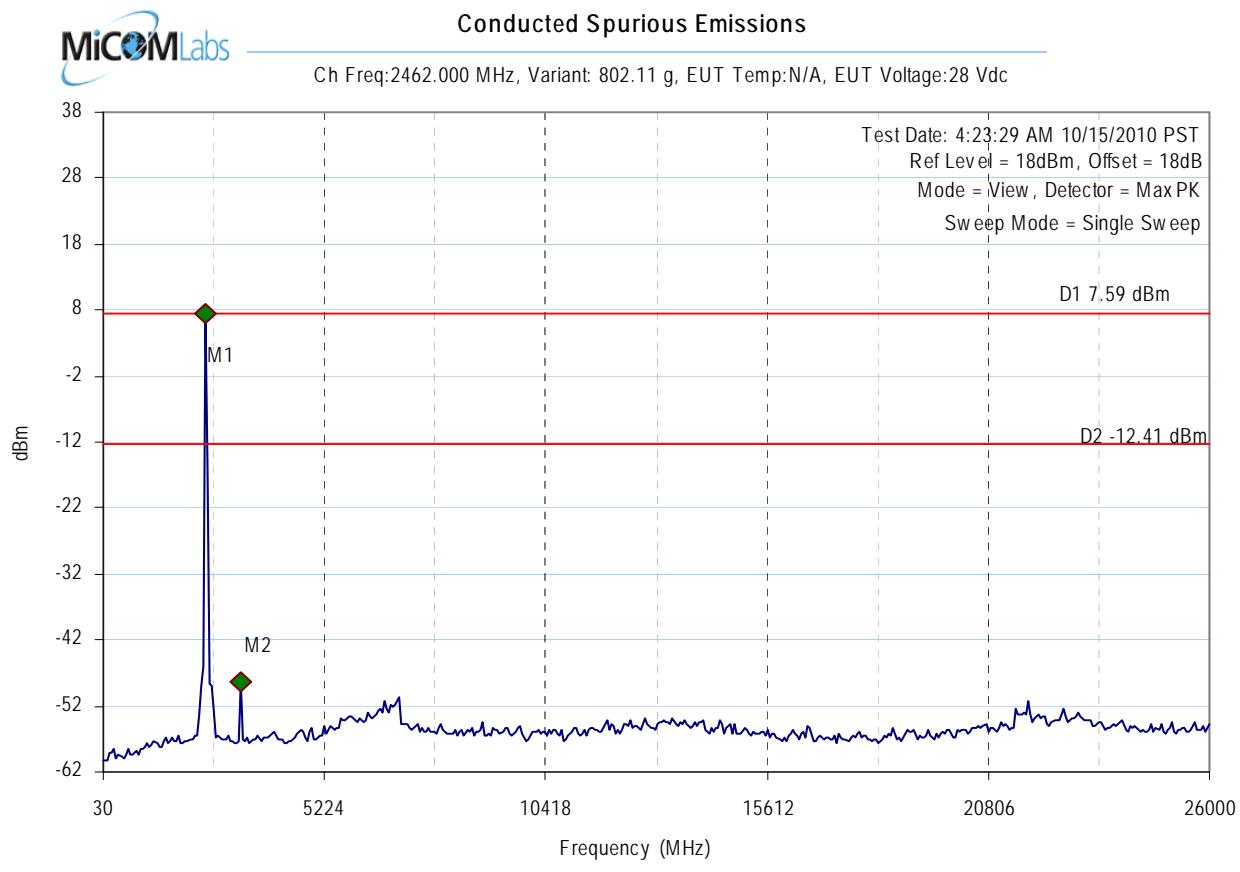
Marker : Frequency : Amplitude

M1 : 2424.028056MHz : 5.897dBm
 M2 : 3204.689379MHz : -51.594dBm

Test Results

Center frequency = 2437MHz

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



Analyser Setup

RBW = 100.000KHz
 VBW = 300.000KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

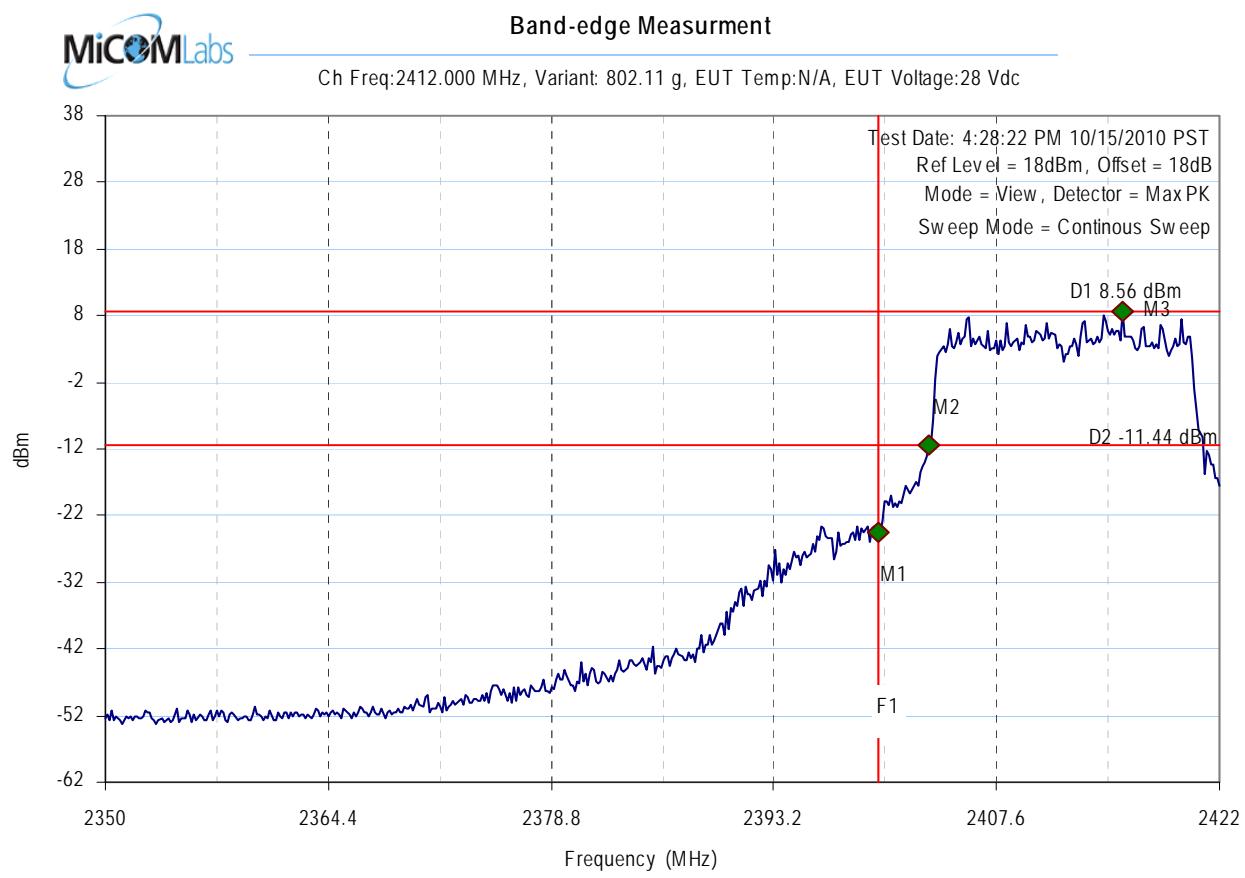
Marker : Frequency : Amplitude

M1 : 2424.028056MHz : 7.593dBm
 M2 : 3256.733467MHz : -49.221dBm

Test Results

Center frequency = 2462MHz

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Analyser Setup

RBW = 100.000KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

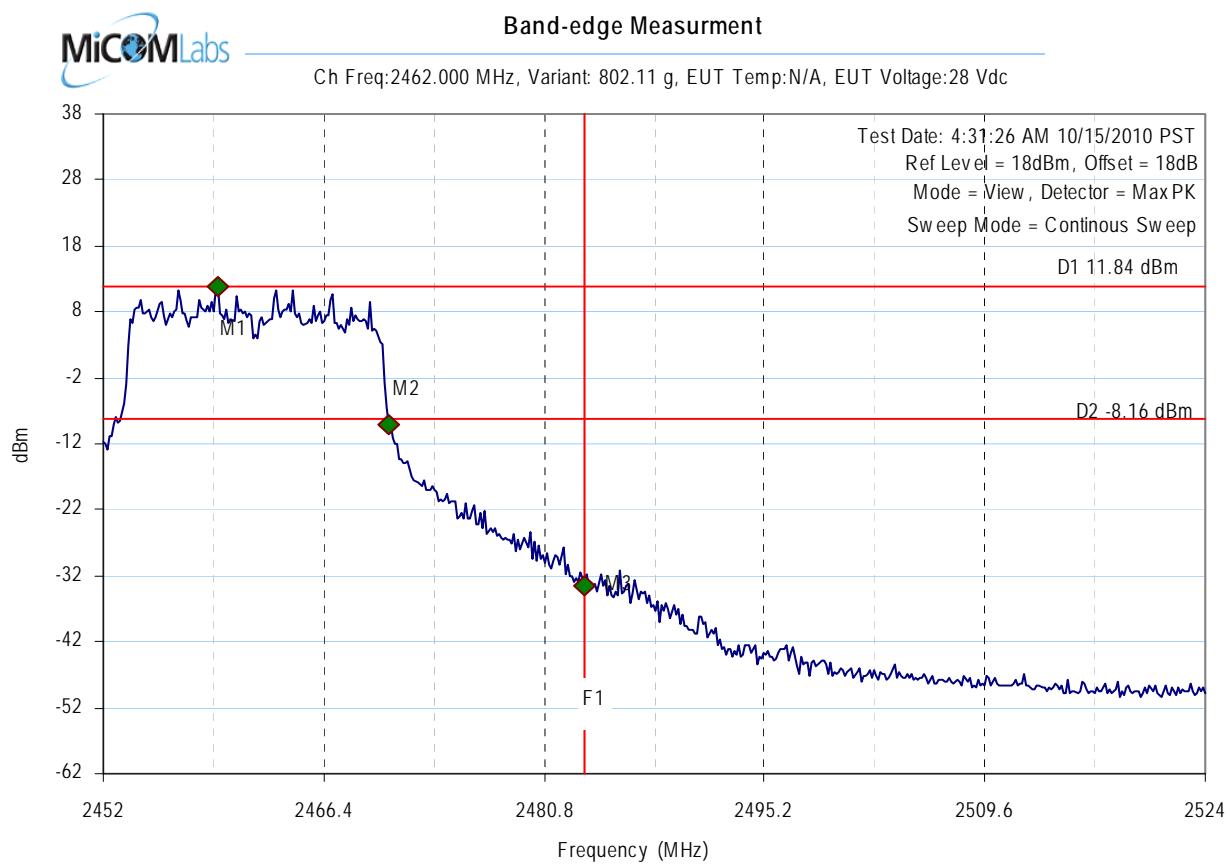
Marker : Frequency : Amplitude

M1 : 2400.000000MHz : -25.114dBm
 M2 : 2403.242485MHz : -11.461dBm
 M3 : 2415.795591MHz : 8.559dBm

Test Results

Center frequency = 2412MHz

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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

Marker : Frequency : Amplitude

M1 : 2459.503006MHz : 11.838dBm
 M2 : 2470.613226MHz : -9.226dBm
 M3 : 2483.500000MHz : -34.26dBm

Test Results

Center frequency = 2462MHz

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
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Measurement results for Legacy 802.11a

Test Conditions:	15.247 (a)(2)	Rel. Humidity (%):	35	to	42
Variant:	802.11a	Ambient Temp. (°C):	19	to	22
TPC:	N/A	Pressure (mBars):	998	to	1003
Modulation:	ON	Duty Cycle (%):	100		
Beam Forming Gain	N/A	dB	Antenna Gain:	N/A	dBi
Applied Voltage:	28.00	Vdc			
Notes 1:					
Notes 2:					

Conducted Spurious Measurement

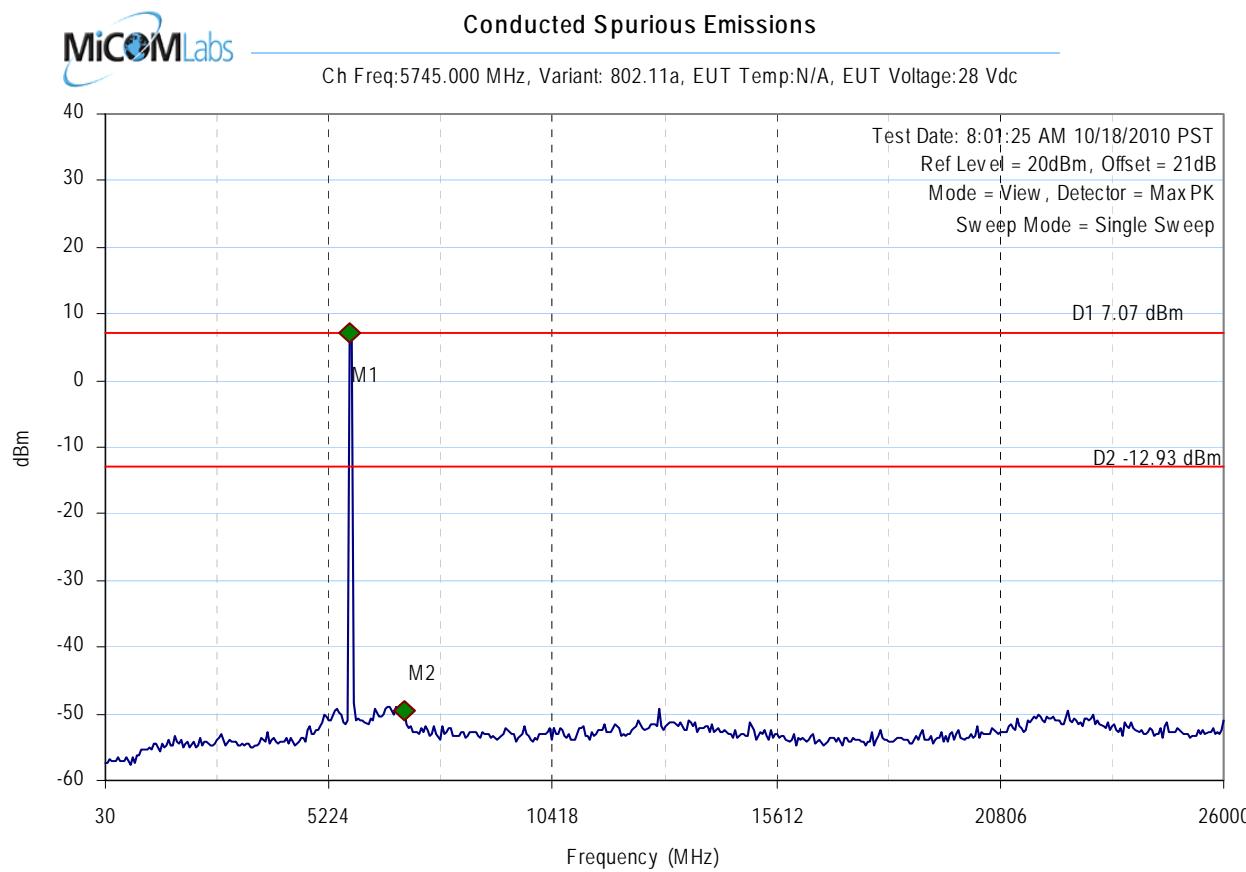
Test Frequency	Start Frequency	Stop Frequency	Maximum Observed Emission	Limit (20 dB below peak of fundamental)
MHz	MHz	MHz	dBm	dBm
5745.000	30.00	26000.00	-50.23	-12.93
5785.000	30.00	26000.00	-49.79	-13.48
5825.000	30.00	26000.00	-48.45	-11.31

Band-edge Measurement

Test Frequency	Band-edge Frequency	Emission Amplitude @ Band-edge	Limit (20 dB below peak of fundamental)	Margin
MHz	MHz	dBm	dBm	dB
5745.000	5725.00	-24.17	-8.35	-15.42
5825.000	5850.00	-27.12	-6.16	-21.22

Measurement uncertainty:	±2.81 dB
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Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

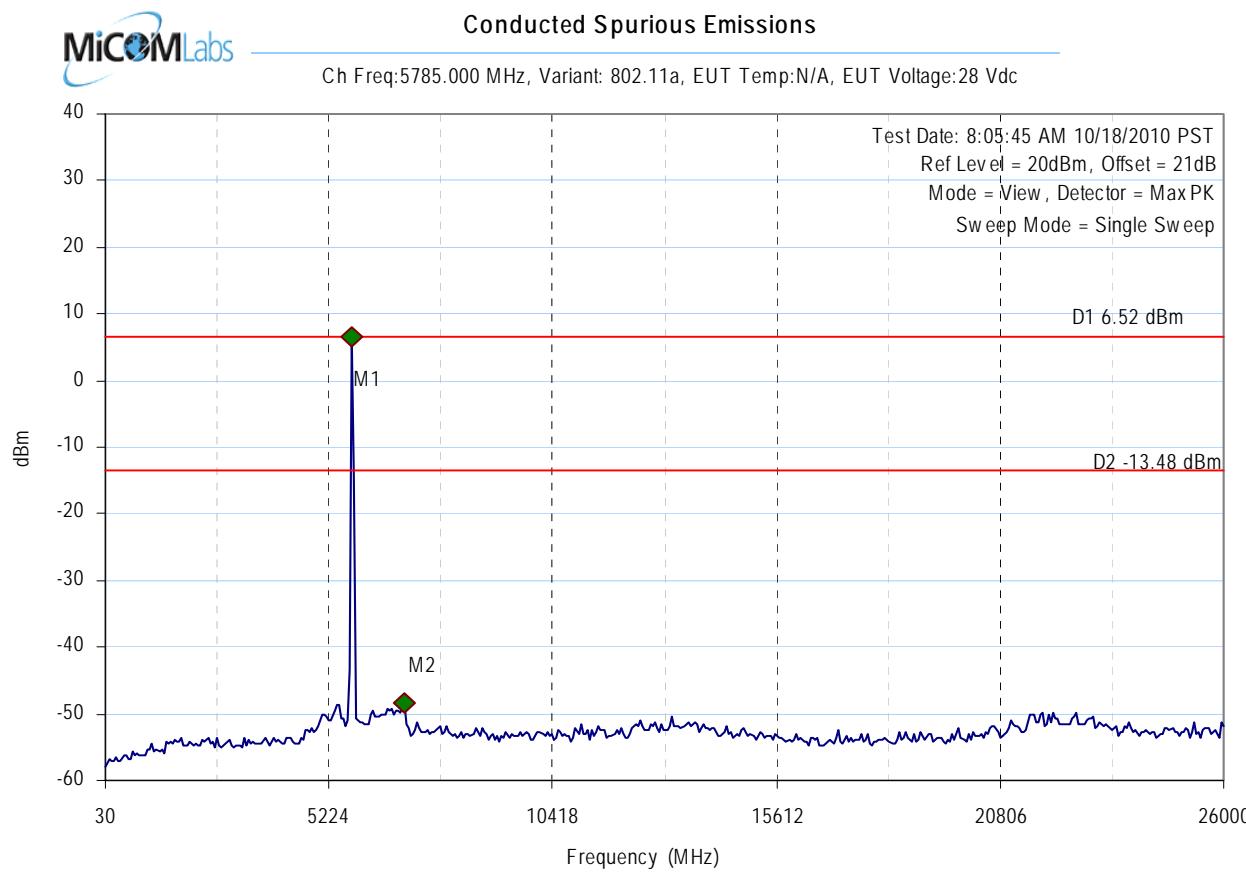
Marker : Frequency : Amplitude

M1 : 5702.805611MHz : 7.074dBm
 M2 : 6951.863727MHz : -50.231dBm

Test Results

Center frequency = 5745MHz

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


Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 60
 RF Atten (dB) = 10
 Span = 25.97GHz

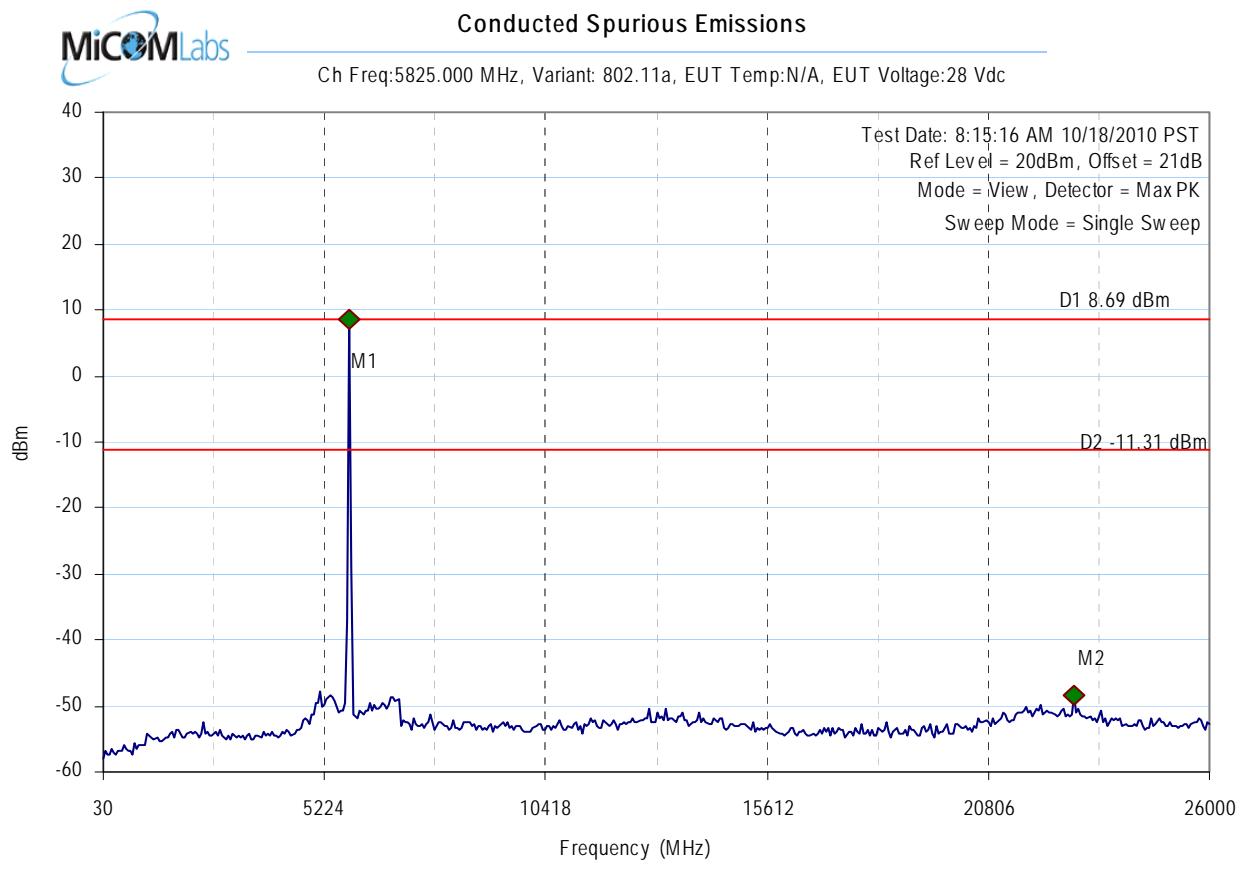
Marker : Frequency : Amplitude

M1 : 5754.849699MHz : 6.522dBm
 M2 : 6951.863727MHz : -49.791dBm

Test Results

Center frequency = 5785MHz

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

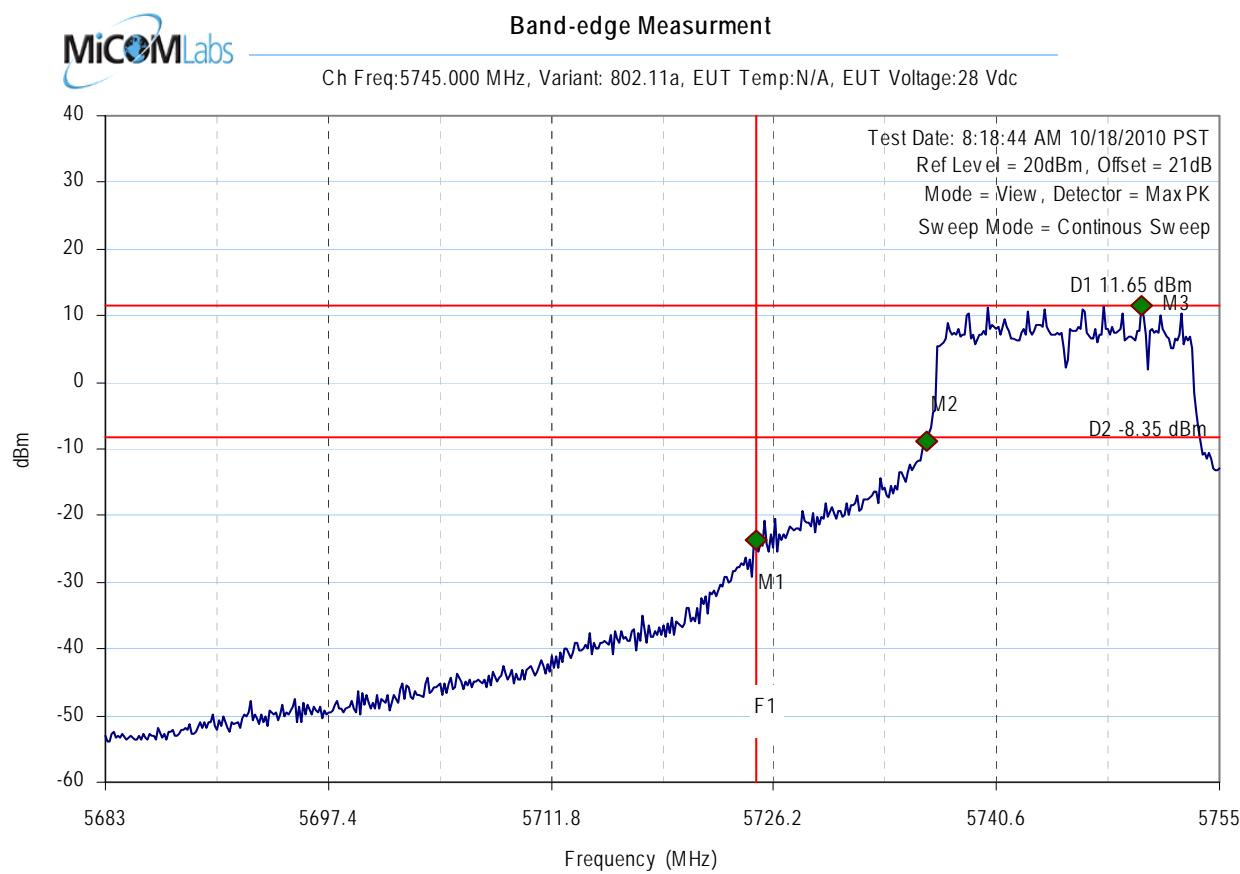


Analyser Setup
RBW = 100.00KHz
VBW = 300.00KHz
Sweep time(s) = 60
RF Atten (dB) = 10
Span = 25.97GHz

Marker : Frequency : Amplitude
M1 : 5806.893788MHz : 8.694dBm
M2 : 22825.310621MHz : -48.451dBm

Test Results
Center frequency = 5825MHz

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


Analyser Setup

RBW = 100.000KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

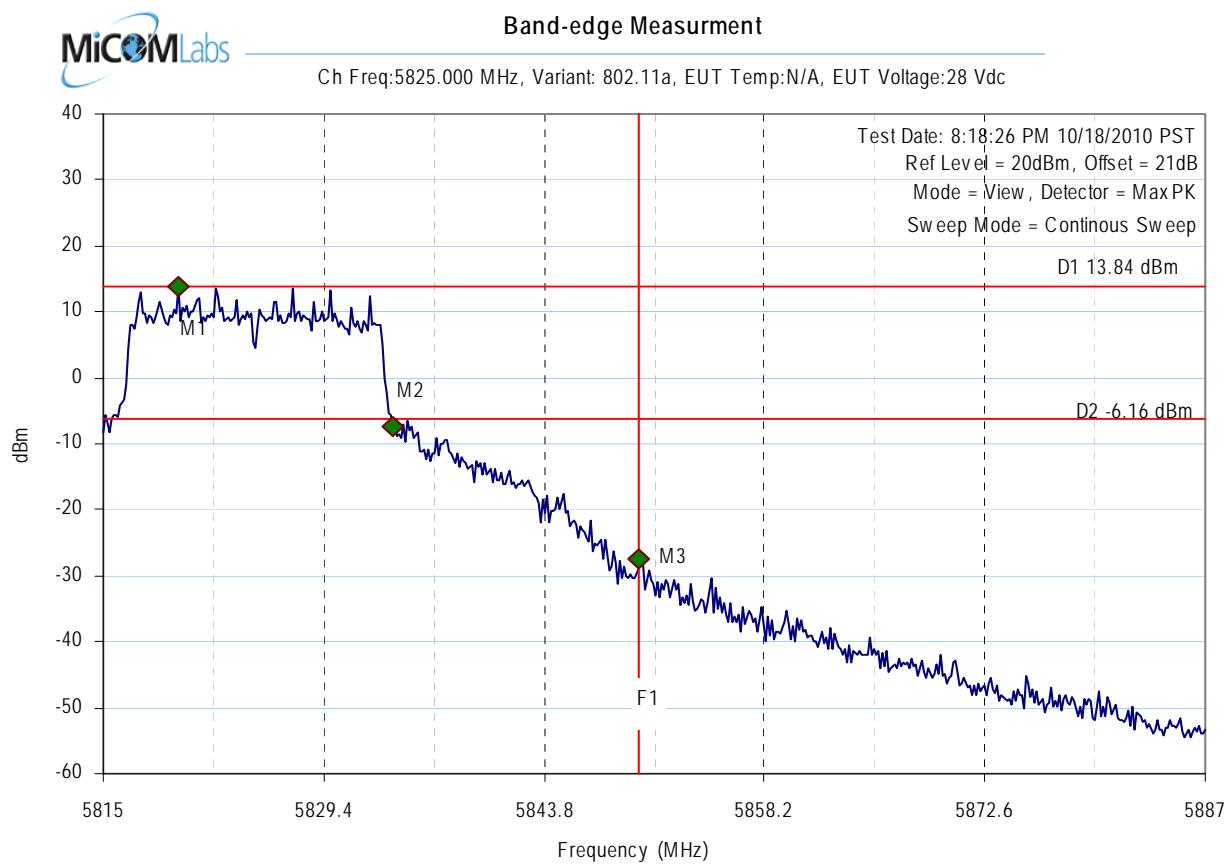
Marker : Frequency : Amplitude

M1 : 5725.000000MHz : -24.172dBm
 M2 : 5736.098196MHz : -8.891dBm
 M3 : 5749.949900MHz : 11.654dBm

Test Results

Center frequency = 5745MHz

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



Analyser Setup

RBW = 100.00KHz
 VBW = 300.00KHz
 Sweep time(s) = 20
 RF Atten (dB) = 10
 Span = 72.00MHz

Marker : Frequency : Amplitude

M1 : 5819.905812MHz : 13.840dBm
 M2 : 5833.901804MHz : -7.496dBm
 M3 : 5850.000000MHz : -27.120dBm

Test Results

Center frequency = 5825MHz

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



Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
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7.6. Radiated Spurious Emissions - Radio Device

Test Procedure

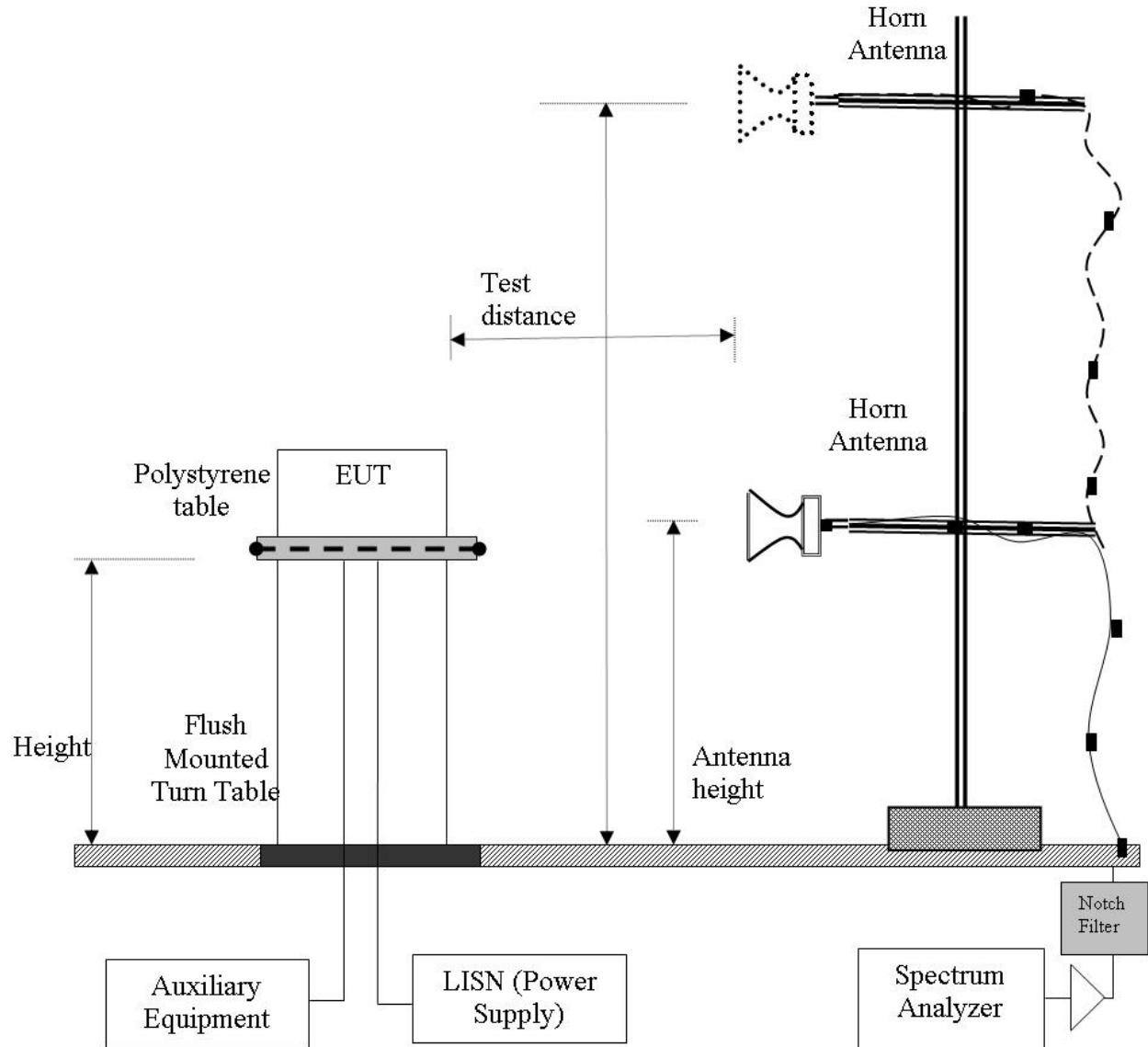
Testing was performed in a 3-meter anechoic chamber. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. Preliminary emissions were recorded with in Spectrum Analyzer mode, using a maximum peak detector while in peak hold mode.

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.

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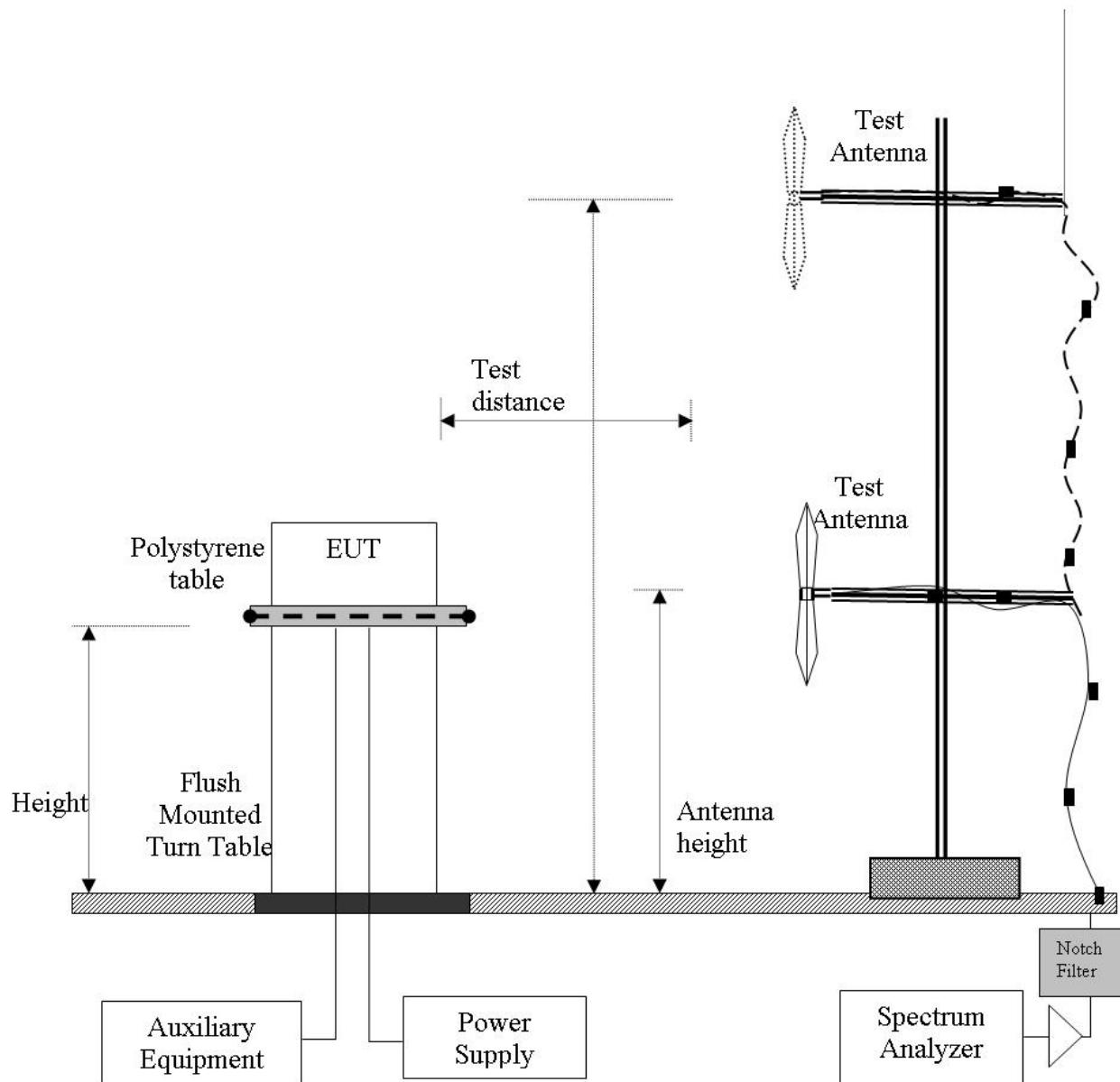
Test Measurement Set Up

Radiated emissions above 1 GHz



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Radiated emissions below 1 GHz



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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.

$$\mathbf{FS = R + AF + CORR - FO}$$

FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

$$\mathbf{CORR = Correction\ Factor = CL - AG + NFL}$$

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 dB μ V; 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:

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

Conversion between dB μ V/m (or dB μ V) and μ V/m (or μ V) are done as:

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

$$\mathbf{40\ dB\mu V/m = 100\ \mu V/m}$$

$$\mathbf{48\ dB\mu V/m = 250\ \mu V/m}$$

Specification

Transmitter Radiated Spurious Emissions

FCC §15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section §15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(a)).

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.



Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 289 of 362

Table 1: FCC 15.209 Spurious Emissions Limits

Frequency (MHz)	Field Strength (μ V/m)	Field Strength (dB μ V/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 Spectrum Measurement

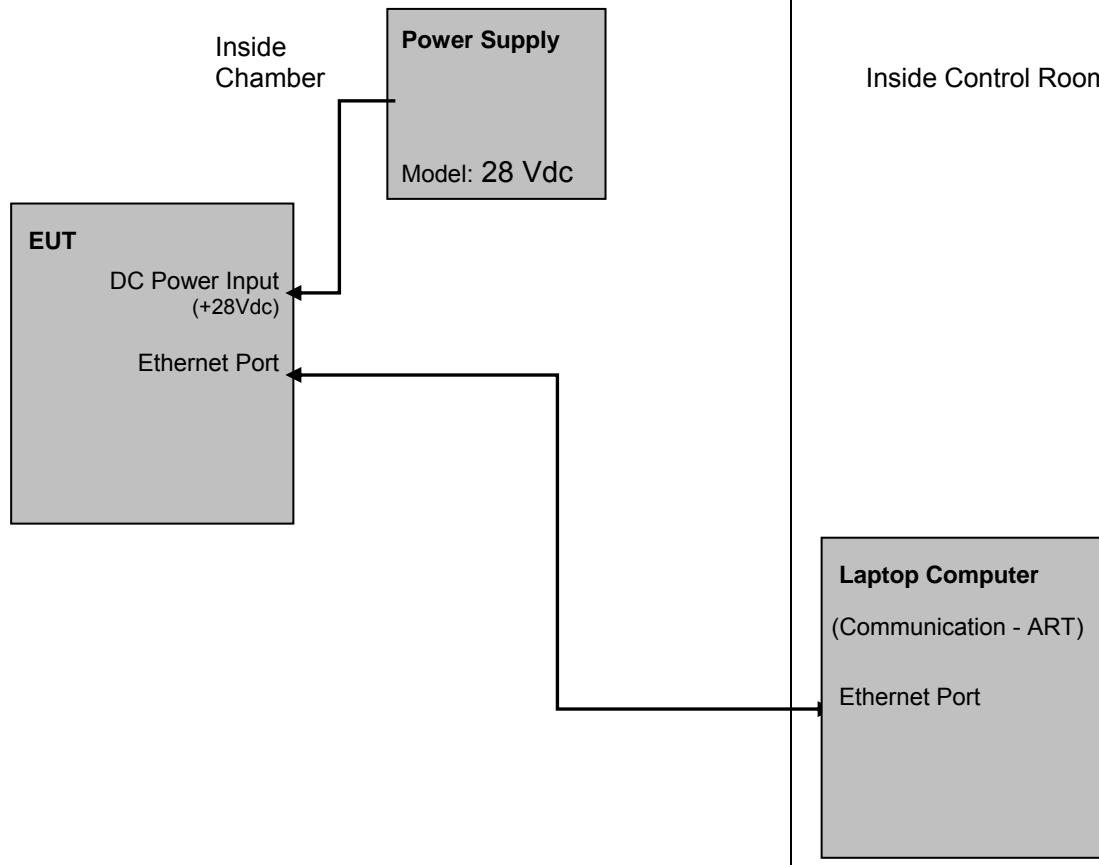
Measurement Uncertainty	+5.6/ -4.5 dB
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Traceability:

Method	Test Equipment Used
Work instruction WI-03	0116, 0134, 0223, 0287, 0303, 0304, 0312, 0335, 0338, Automated s/w, Anechoic Chamber, EMCO Positioner, Dell Computer

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EUT Setup Diagram

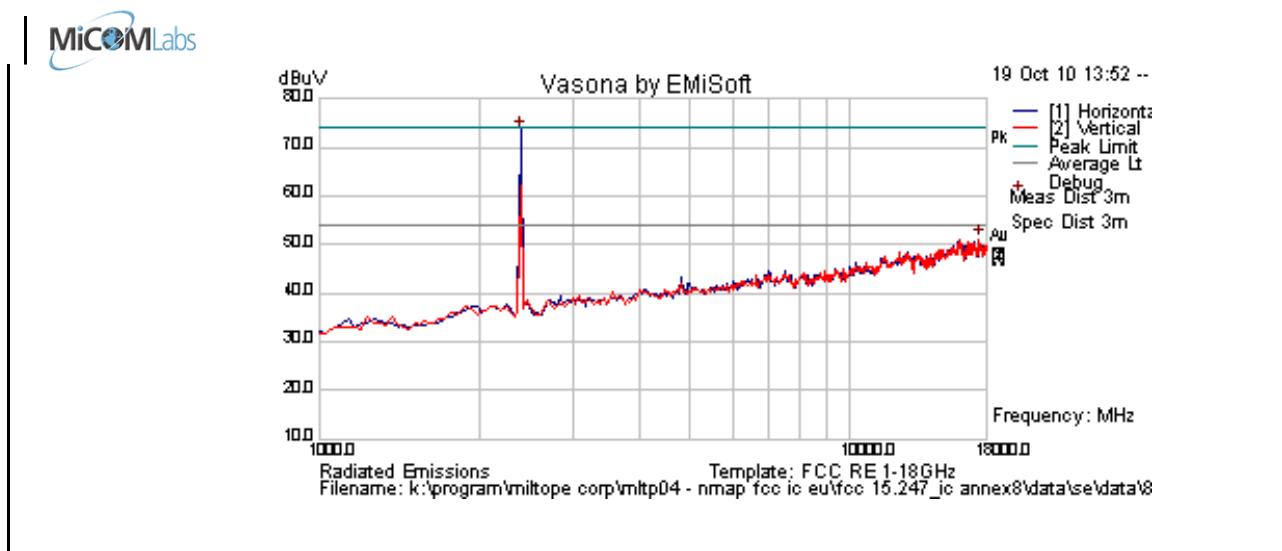


Test Setup Description

Both Vertical (Wall Mount) and Horizontal (Table Top Mount) positions were investigated during preliminary testing.

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Test Freq.	2412 MHz	Engineer	SB
Variant	802.11b; 1 Mbs	Temp (°C)	25.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1001
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

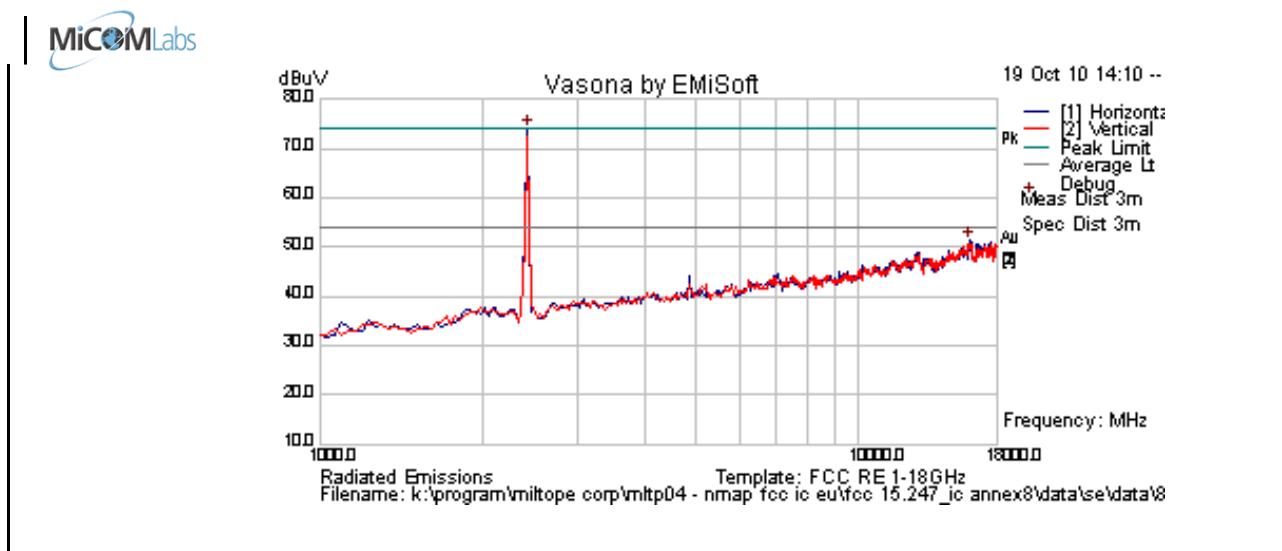


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
17459.473	42.3	8.8	2.0	53.0	Peak Max	V	144	160	74.0	-21.0	Pass	NRB
17459.473	29.2	8.8	2.0	40.0	Average Max	V	144	160	54.0	-14.0	Pass	NRB
2396.794	81.9	3.0	-11.2	73.7	Peak [Scan]	H	150	0	54	19.7	Fail	Fund
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak												

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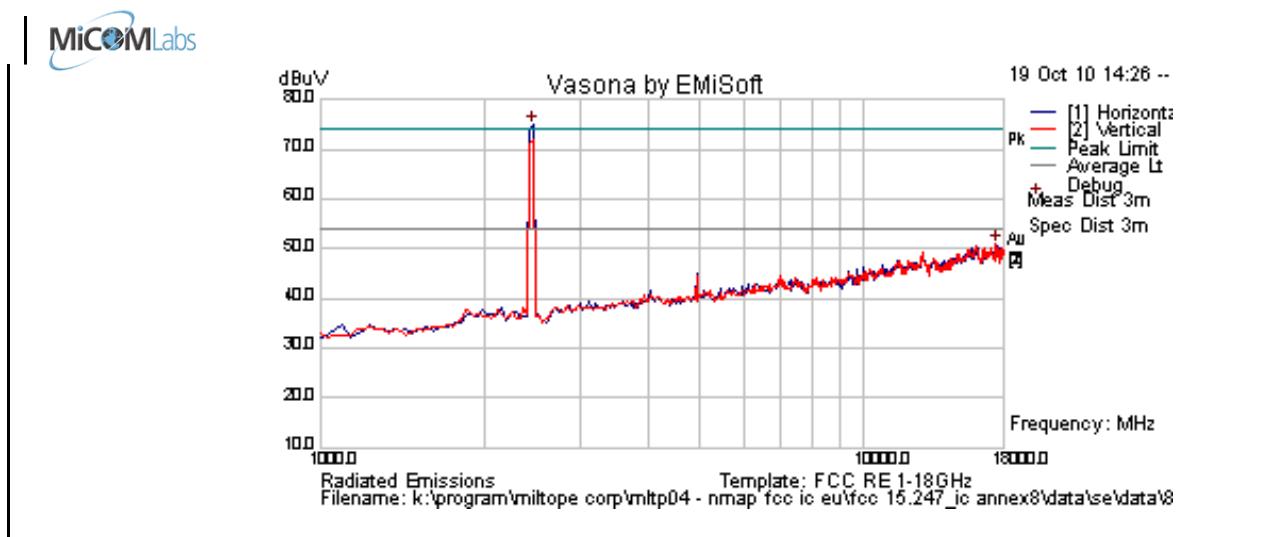
Test Freq.	2437 MHz	Engineer	SB
Variant	802.11b; 1 Mbs	Temp (°C)	25.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1001
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks												
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2430.862	82.0	3.0	-11.1	73.9	Peak [Scan]	H	150	0	54.0	19.9	Fail	Fund
16047.695	43.3	9.0	0.6	53.0	Peak Max	H	170	195	74.0	-21.1	Pass	RB
16047.695	29.8	9.0	0.6	39.4	Average Max	H	170	195	54	-14.6	Pass	RB
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak												

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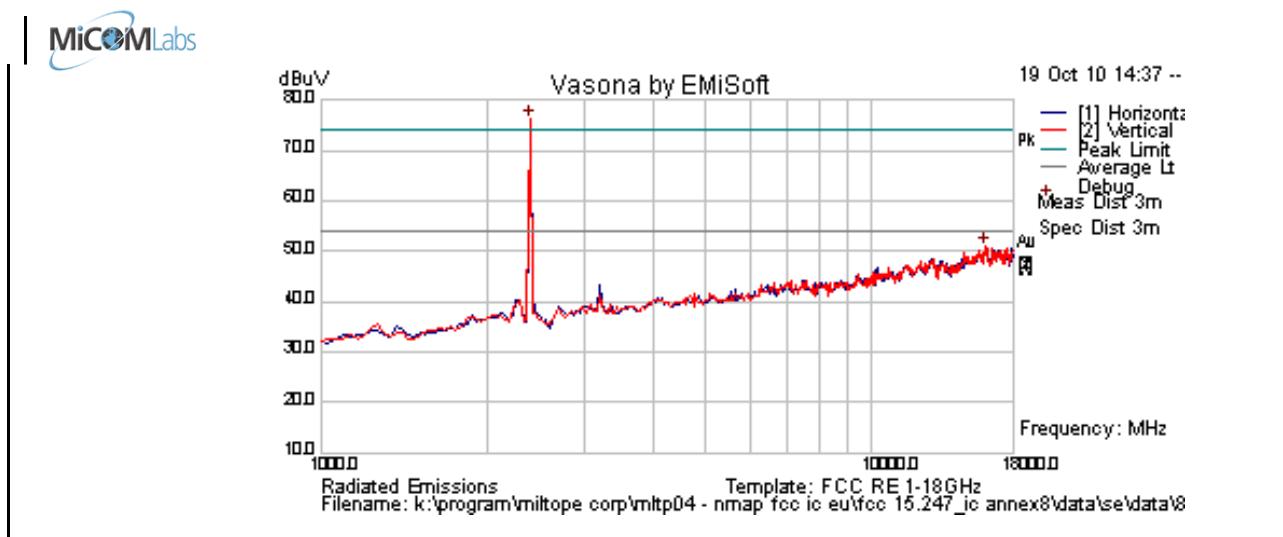
Test Freq.	2462 MHz	Engineer	SB
Variant	802.11b; 1 Mbs	Temp (°C)	25.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1001
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks												
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2464.930	83.0	3.0	-11.1	74.9	Peak [Scan]							Fund
17454.91	40.2	8.7	2.0	51.0	Peak [Scan]	V	150	0	54.0	-3.0	Pass	NRB
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak										

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Test Freq.	2412 MHz	Engineer	SB
Variant	802.11g; 6 Mbs	Temp (°C)	25.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1001
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

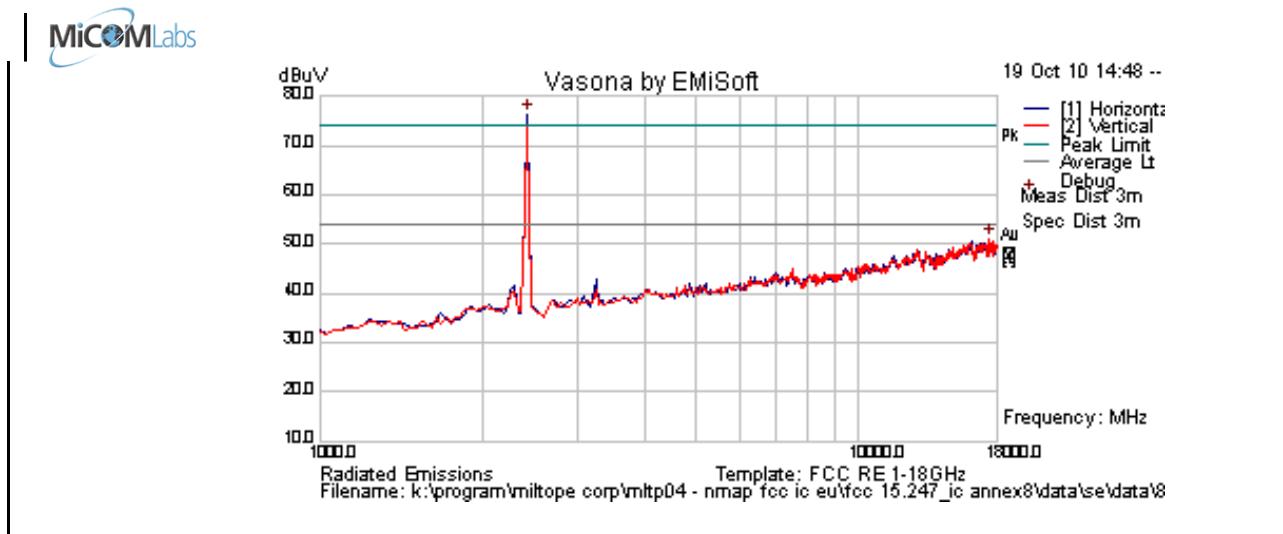


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2396.794	84.3	3.0	-11.2	76.1	Peak [Scan]							Fund
16058.116	41.1	9.0	0.8	50.9	Peak [Scan]	V	200	0	54.0	-3.1	Pass	
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission												
RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak												

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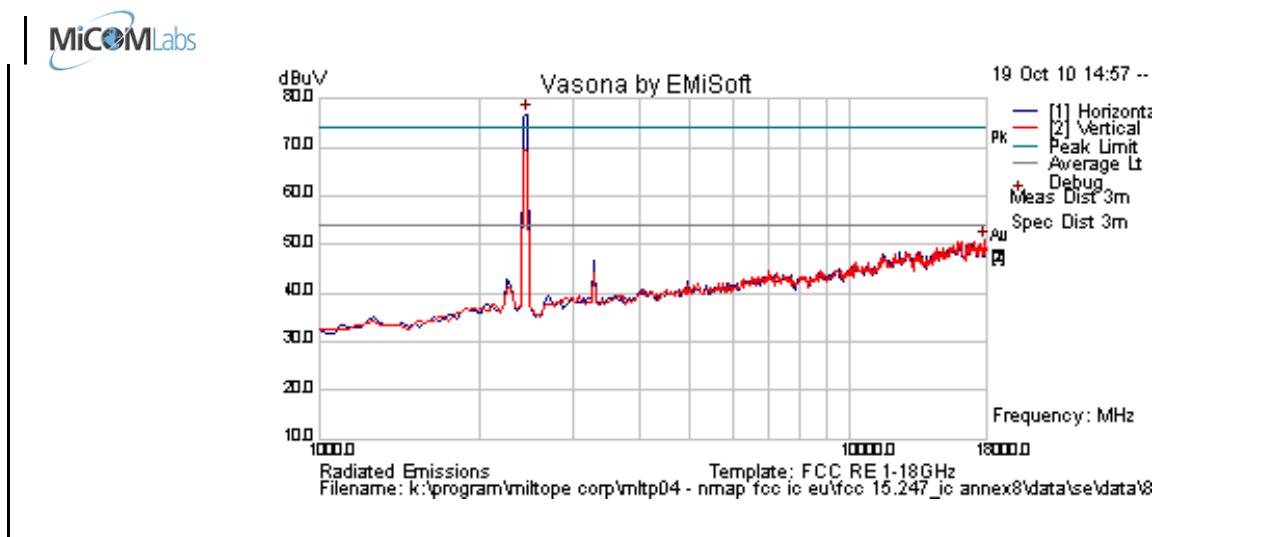
Test Freq.	2437 MHz	Engineer	SB
Variant	802.11g; 6 Mbs	Temp (°C)	25.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1001
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks												
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2430.862	84.6	3.0	-11.1	76.4	Peak [Scan]							Fund
17454.91	40.3	8.7	2.0	51.1	Peak [Scan]	V	150	0	54.0	-2.9	Pass	NRB
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak										

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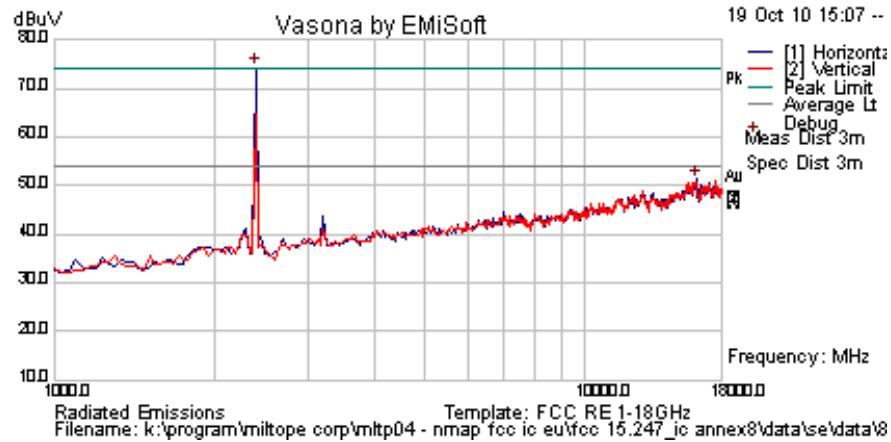
Test Freq.	2462 MHz	Engineer	SB
Variant	802.11g; 6 Mbs	Temp (°C)	25.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1001
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks												
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2464.930	85.0	3.0	-11.1	76.9	Peak [Scan]							Fund
17897.796	41.1	8.8	0.9	50.8	Peak [Scan]	V	150	0	54.0	-3.2	Pass	NRB
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak										

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Test Freq.	2412 MHz	Engineer	SB
Variant	802.11n; HT-20; 6.5 MCS	Temp (°C)	25.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1001
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

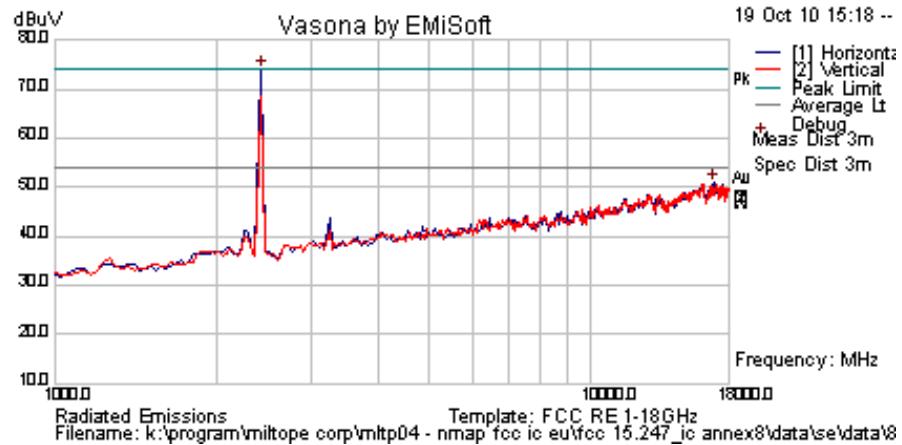


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2396.794	82.5	3.0	-11.2	74.3	Peak [Scan]							Fund
16160.321	41.3	9.0	1.0	51.2	Peak [Scan]	H	150	0	54.0	-2.8	Pass	
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
		RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak										

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Test Freq.	2437 MHz	Engineer	SB
Variant	802.11n; HT-20; 6.5 MCS	Temp (°C)	25.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1001
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

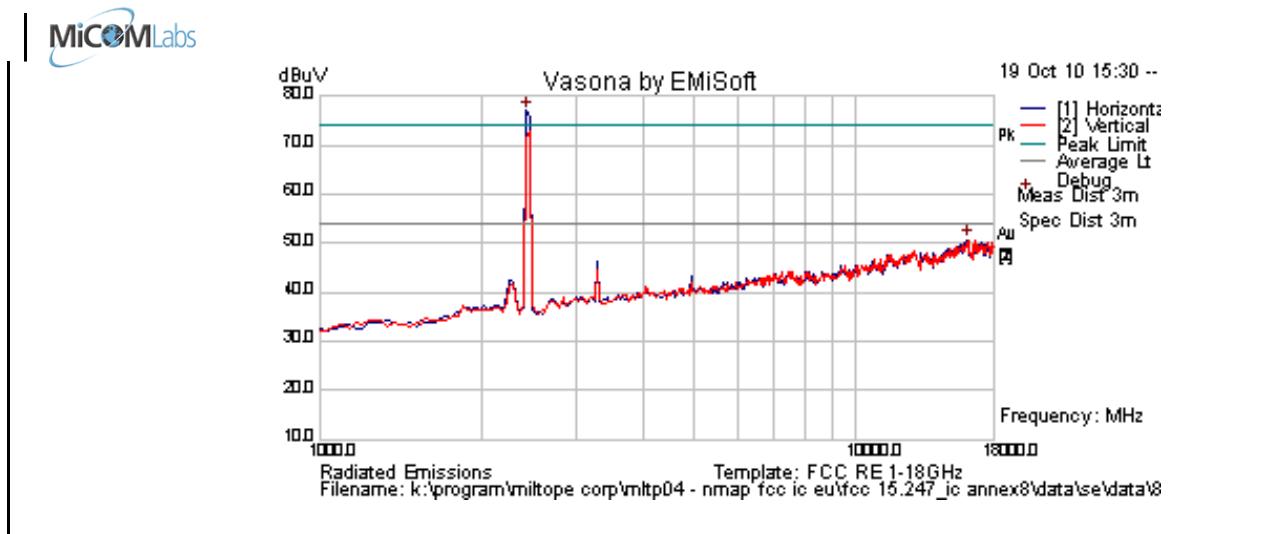



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2430.862	82.1	3.0	-11.1	74.0	Peak [Scan]							Fund
16875.752	41.2	8.6	1.1	50.9	Peak [Scan]	H	100	0	54.0	-3.1	Pass	
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
		RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak										

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Test Freq.	2462 MHz	Engineer	SB
Variant	802.11n; HT-20; 6.5 MCS	Temp (°C)	25.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1001
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

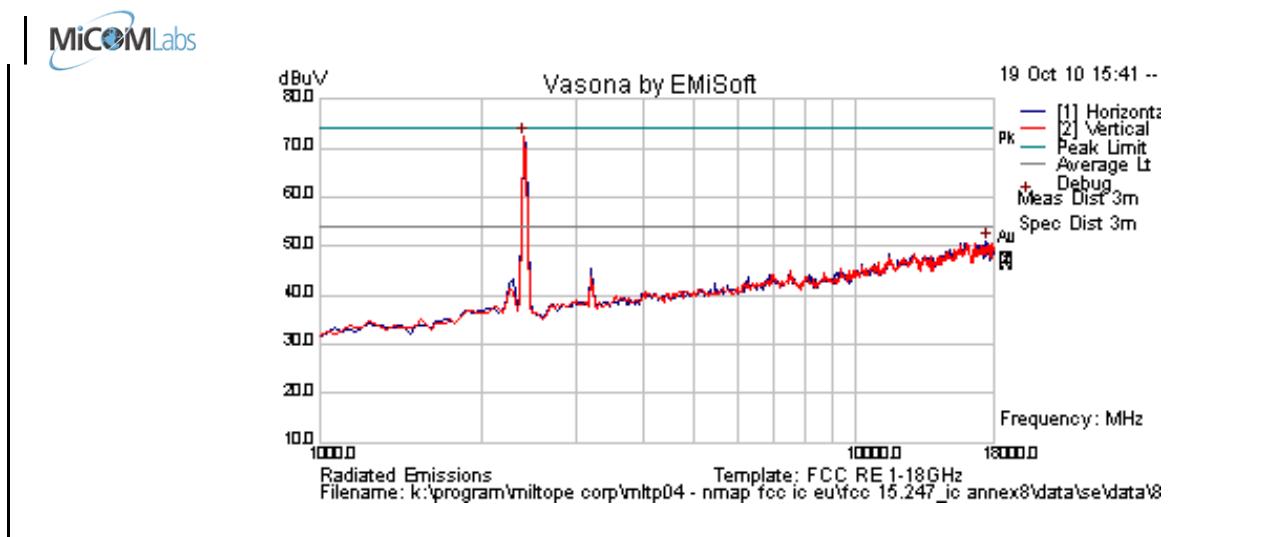


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2430.862	85.1	3.0	-11.1	77.0	Peak [Scan]							Fund
16092.184	40.9	9.0	0.8	50.7	Peak [Scan]	H	200	0	54.0	-3.4	Pass	NRB
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
		RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak										

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Test Freq.	2422 MHz	Engineer	SB
Variant	802.11n; HT-40; 13.5 MCS	Temp (°C)	25.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1001
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

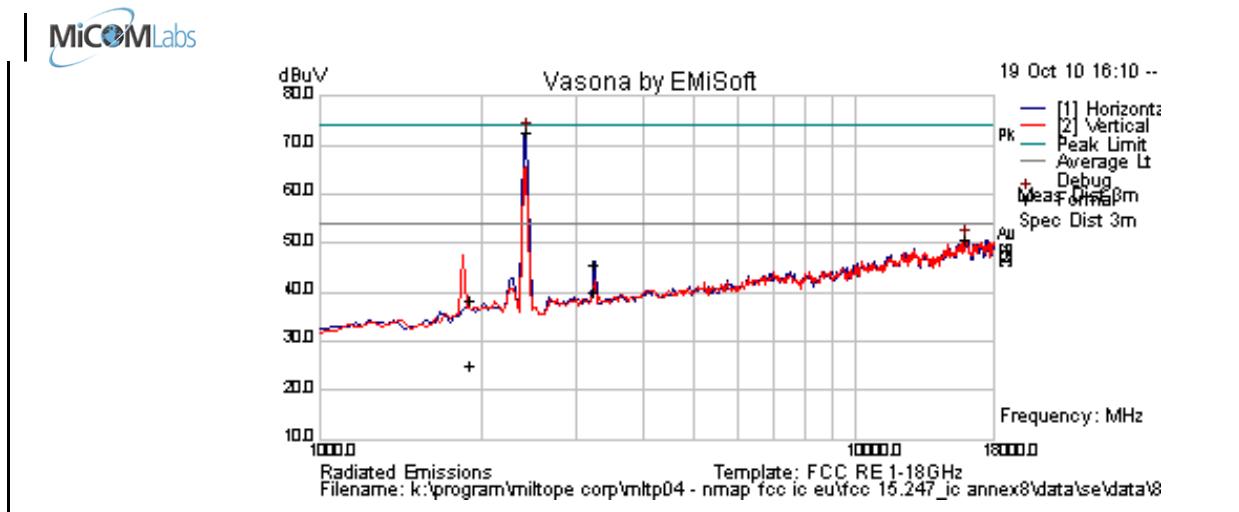


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2396.794	80.4	3.0	-11.2	72.2	Peak [Scan]							Fund
17454.91	40.0	8.7	2.0	50.8	Peak [Scan]	H	200	0	54.0	-3.2	Pass	NRB
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
		RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak										

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Test Freq.	2437 MHz	Engineer	SB
Variant	802.11n; HT-40; 13.5 MCS	Temp (°C)	25.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1001
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			



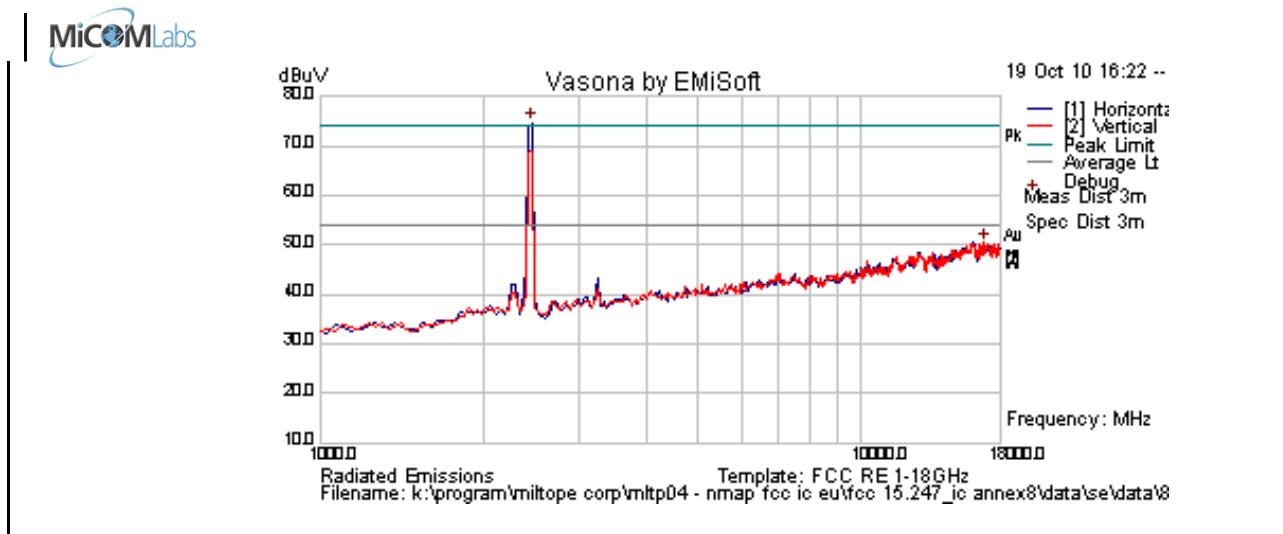
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
3249.209	53.6	3.5	-11.3	45.8	Peak Max	V	98	184	74.0	-28.2	Pass	
1912.814	47.3	2.7	-11.8	38.1	Peak Max	V	154	38	74.0	-35.9	Pass	NRB
3249.209	47.7	3.5	-11.3	39.9	Average Max	V	98	184	54	-14.1	Pass	
1912.814	34.4	2.7	-11.8	25.2	Average Max	V	154	38	54	-28.8	Pass	NRB
2430.862	80.8	3.0	-11.1	72.7	Peak [Scan]							Fund
16058.116	41.0	9.0	0.8	50.7	Peak [Scan]	H	200	0	54	-3.3	Pass	

Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak

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Test Freq.	2452 MHz	Engineer	SB
Variant	802.11n; HT-40; 13.5 MCS	Temp (°C)	25.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1001
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

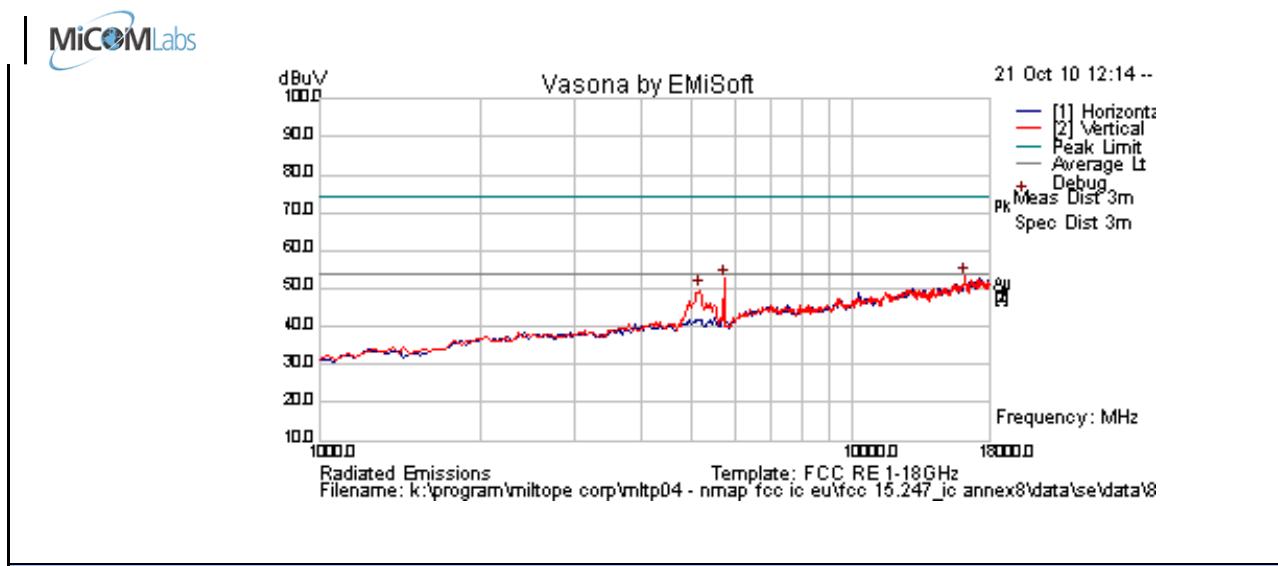


Formally measured emission peaks												
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2464.930	82.8	3.0	-11.1	74.7	Peak [Scan]							Fund
16841.683	40.2	8.6	1.8	50.5	Peak [Scan]	V	150	0	54.0	-3.5	Pass	NRB
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak										

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5.8 GHz Band Spurious Emissions

Test Freq.	5745 MHz	Engineer	SB
Variant	802.11a; 6.5 Mbs	Temp (°C)	24
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum. (%)	33
Power Setting	18	Press. (mBars)	1002
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

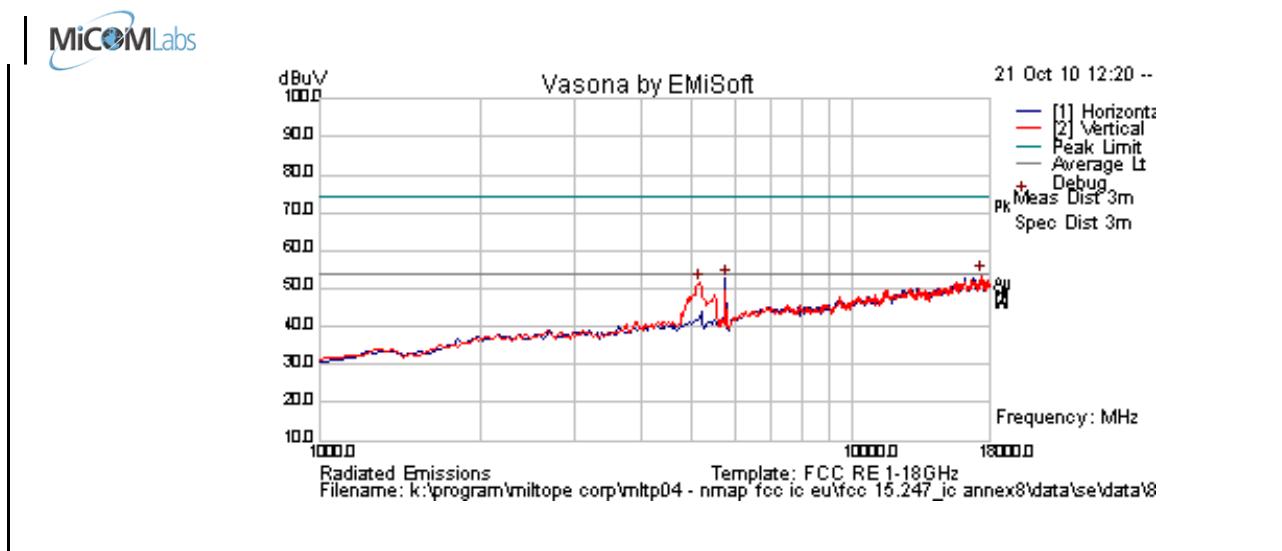


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
16294.389	43.0	8.9	1.3	53.3	Peak [Scan]	V	150	0	54.0	-0.8	Pass	
5735.47094	56.2	4.8	-8.2	52.7	Peak [Scan]							Fund
5156.313	54.1	4.6	-9.0	49.7	Peak [Scan]	V	150	0	54	-4.3	Pass	B.E
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
		RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak										

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Test Freq.	5785 MHz	Engineer	SB
Variant	802.11a; 6.5 Mbs	Temp (°C)	24
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	33
Power Setting	18	Press. (mBars)	1002
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

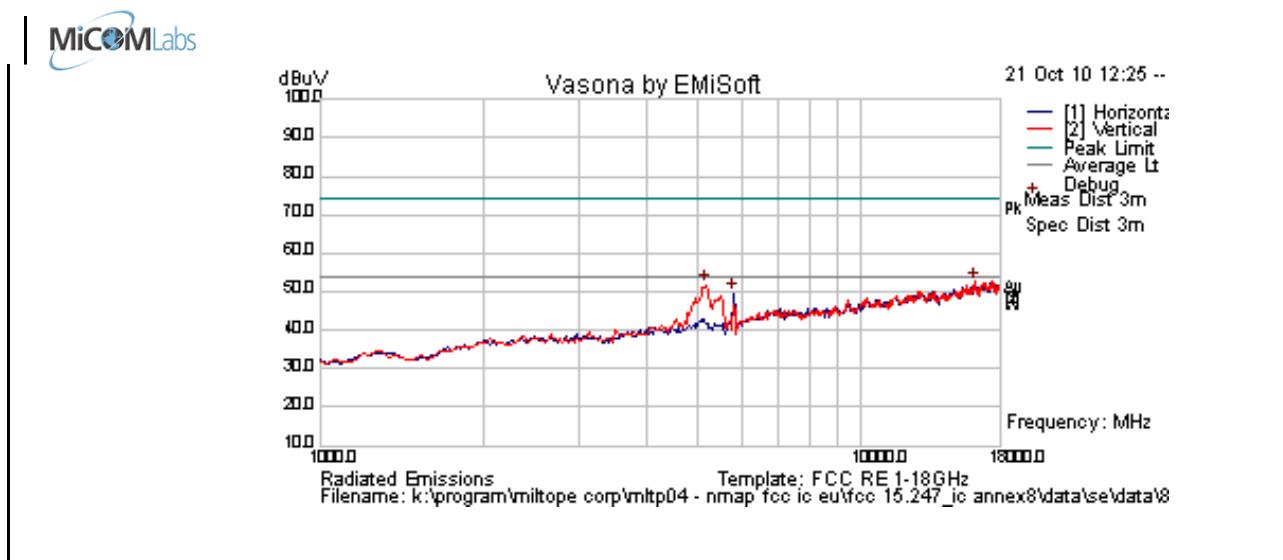


Formally measured emission peaks													
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments	
17420.842	43.2	8.7	1.9	53.9	Peak [Scan]	V	200	0	54.0	-0.2	Pass	NRB	
5769.53908	56.3	4.8	-8.3	52.7	Peak [Scan]							Fund	
5156.313	55.8	4.6	-9.0	51.4	Peak [Scan]	V	100	0	54	-2.6	Pass	B.E	

Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak

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Test Freq.	5825 MHz	Engineer	SB
Variant	802.11a; 6.5 Mbs	Temp (°C)	24
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	33
Power Setting	18	Press. (mBars)	1002
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

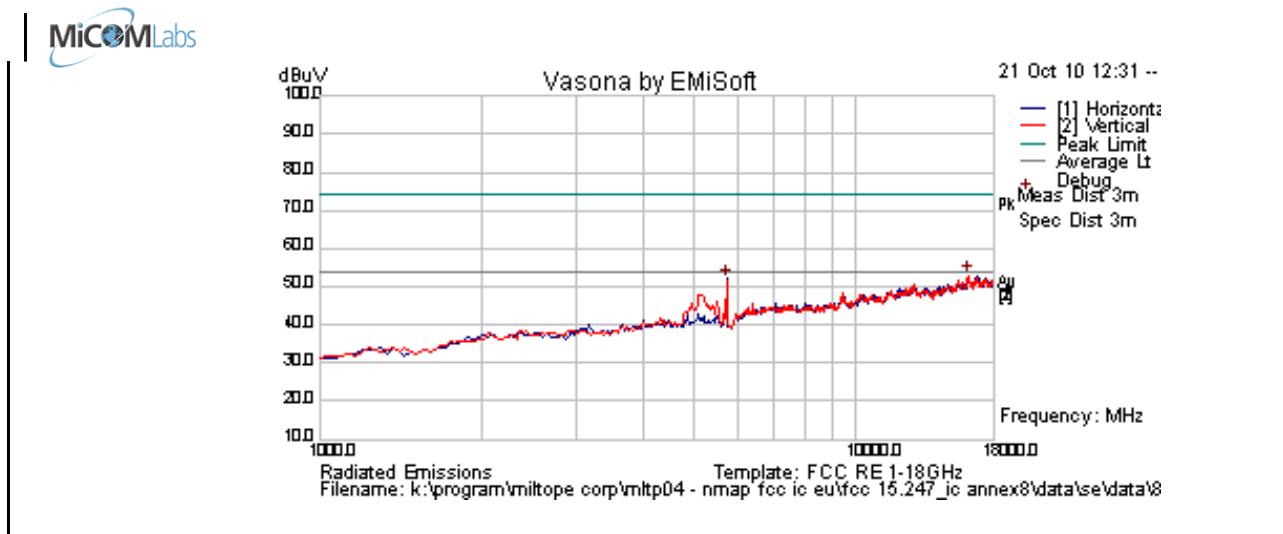


Formally measured emission peaks													
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments	
16260.321	42.8	9.0	1.0	52.7	Peak [Scan]	V	150	0	54.0	-1.3	Pass	NRB	
5156.31263	56.1	4.6	-9.0	51.8	Peak [Scan]	V	150	0	54.0	-2.2	Pass	BE	
5803.607	53.1	4.8	-8.3	49.6	Peak [Scan]							Fund	

Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak

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Test Freq.	5745 MHz	Engineer	SB
Variant	802.11n; HT-20; 6.5 MCS	Temp (°C)	24
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	33
Power Setting	18	Press. (mBars)	1002
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

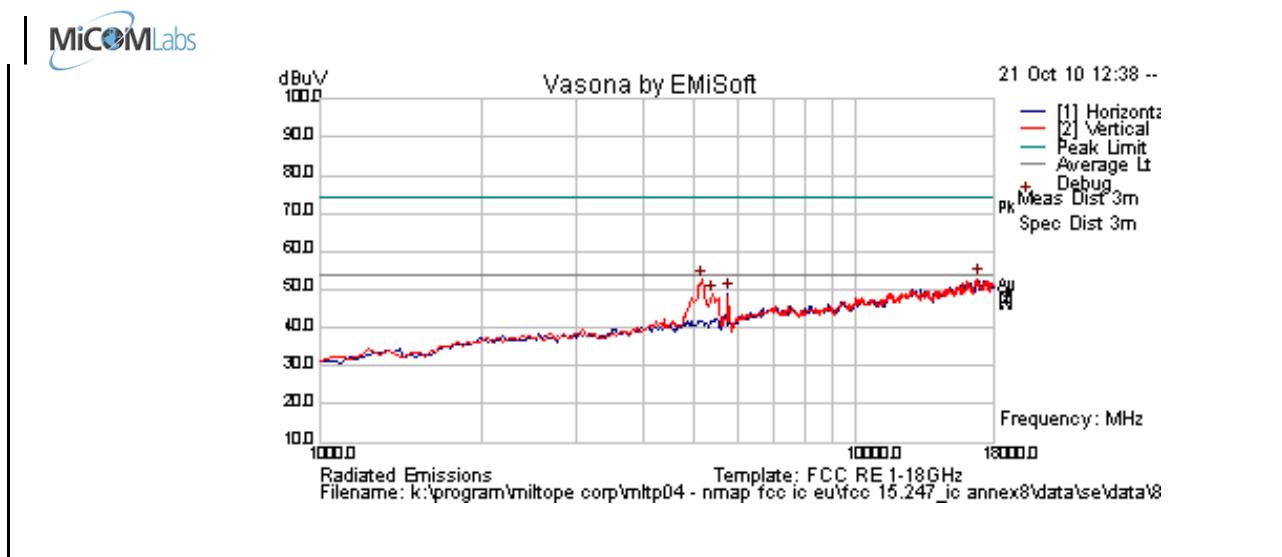


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
16260.321	43.1	9.0	1.0	53.0	Peak [Scan]	H	100	0	54.0	-1.0	Pass	NRB
5735.47094	55.5	4.8	-8.2	52.0	Peak [Scan]							Fund
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
		RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak										

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Test Freq.	5785 MHz	Engineer	SB
Variant	802.11n; HT-20; 6.5 MCS	Temp (°C)	24
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	33
Power Setting	18	Press. (mBars)	1002
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
16841.683	42.5	8.6	1.8	52.8	Peak [Scan]	V	200	0	54.0	-1.2	Pass	NRB
5156.31263	56.9	4.6	-9.0	52.5	Peak [Scan]	V	150	0	54.0	-1.5	Pass	BE
5769.539	52.6	4.8	-8.3	49.1	Peak [Scan]							Fund
5394.790	53.4	4.6	-9.3	48.8	Peak [Scan]	V	100	0	54	-5.2	Pass	BE

Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission

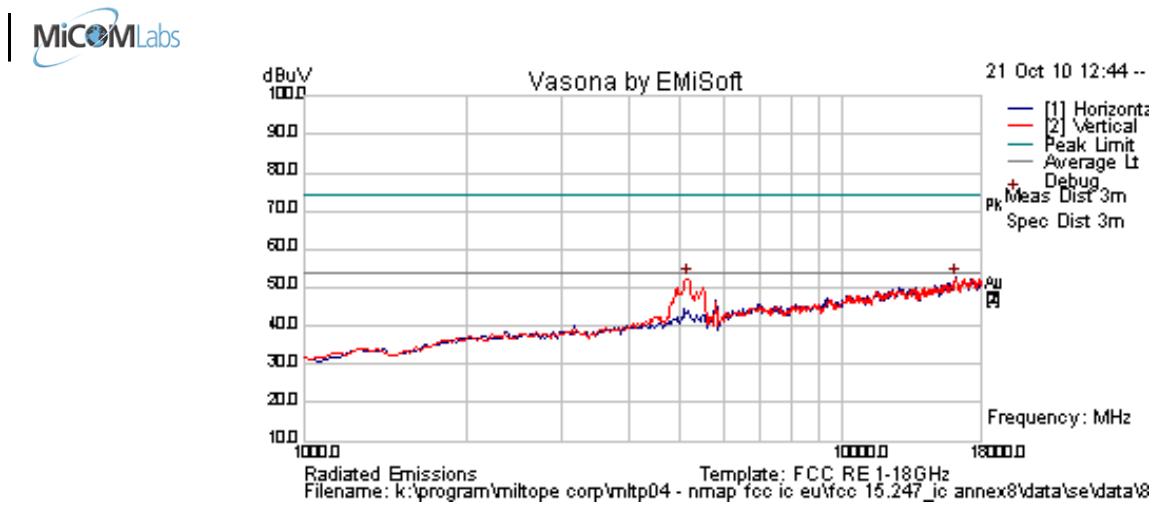
RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 308 of 362

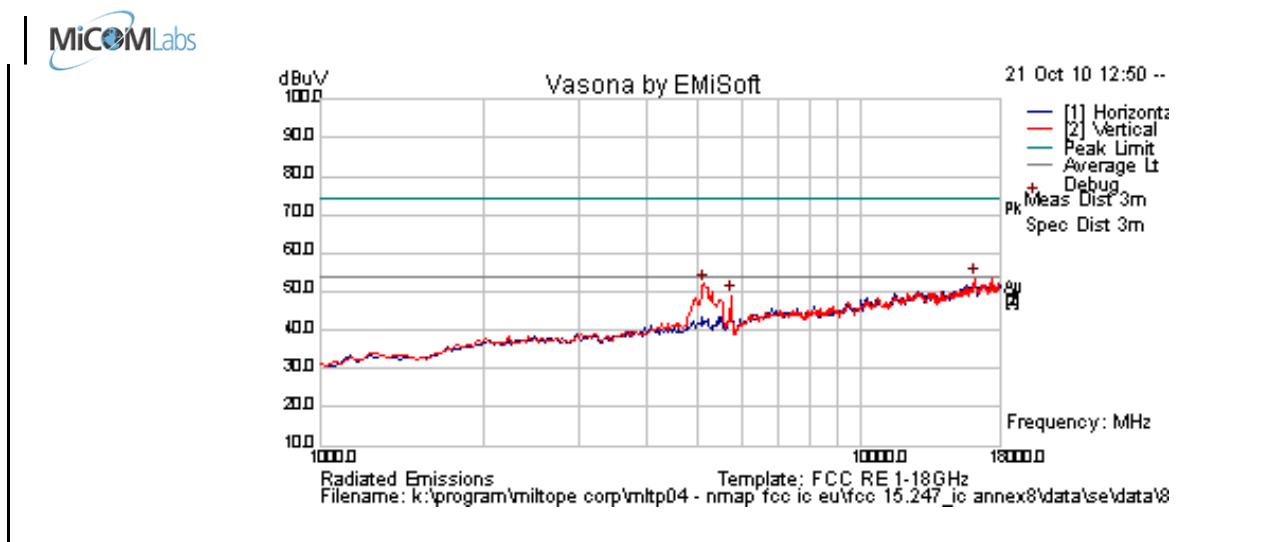
Test Freq.	5825 MHz	Engineer	SB
Variant	802.11n; HT-20; 6.5 MCS	Temp (°C)	24
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	33
Power Setting	18	Press. (mBars)	1002
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

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Test Freq.	5755 MHz	Engineer	SB
Variant	802.11n; HT-40; 13.5 MCS	Temp (°C)	24
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	33
Power Setting	17	Press. (mBars)	1002
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

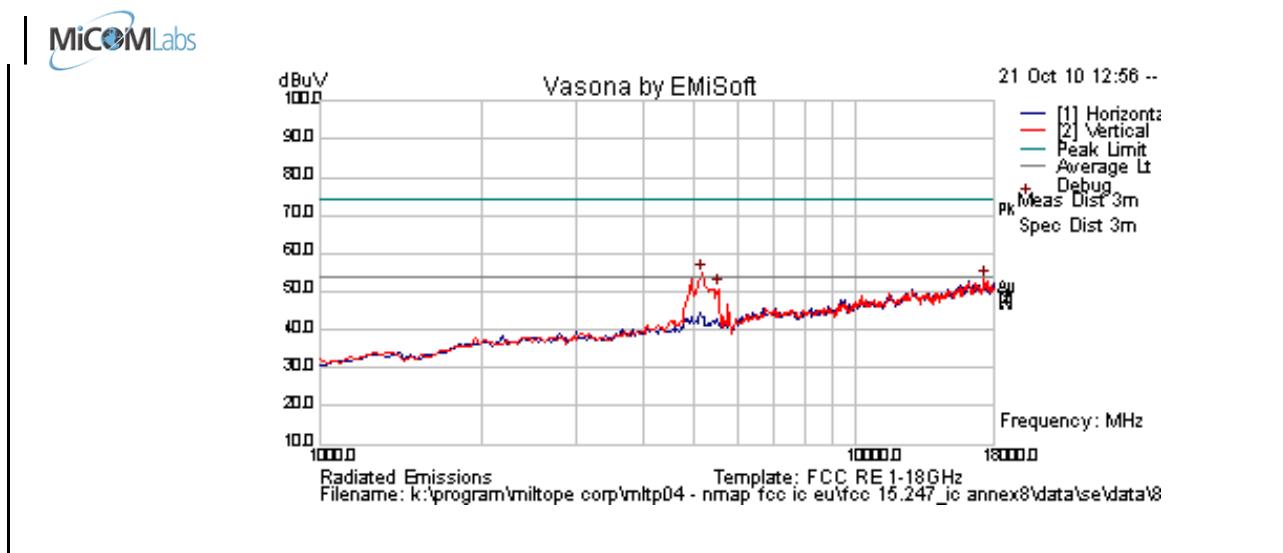


Formally measured emission peaks												
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5122.244	56.4	4.6	-9.0	52.1	Peak [Scan]	V	100	0	54.0	-1.9	Pass	BE
5735.47094	52.5	4.8	-8.2	49.0	Peak [Scan]							Fund
16226.253	43.6	8.9	1.1	53.7	Peak [Scan]	V	150	0	54	-0.3	Pass	NRB

Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak

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Test Freq.	5785 MHz	Engineer	SB
Variant	802.11n; HT-40; 13.5 MCS	Temp (°C)	24
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	33
Power Setting	17	Press. (mBars)	1002
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

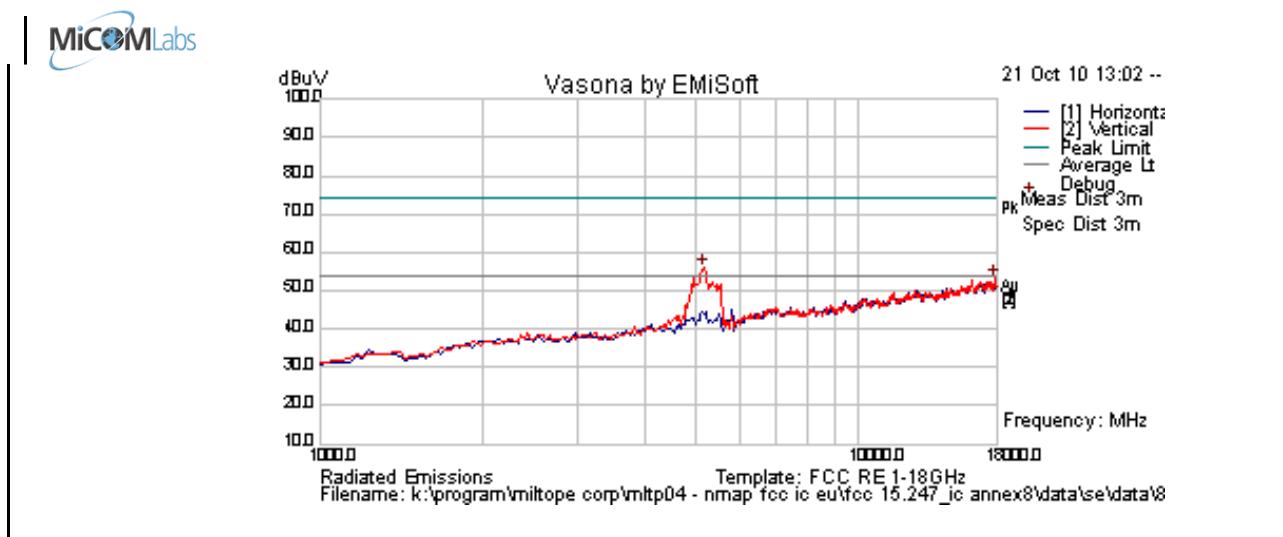


Formally measured emission peaks													
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments	
5156.313	59.2	4.6	-9.0	54.9	Peak [Scan]	V	150	0	54.0	0.9	Fail	BE	
17318.637	42.9	8.7	1.7	53.3	Peak [Scan]	V	150	0	54.0	-0.7	Pass	NRB	
5531.062	54.9	4.6	-8.7	50.8	Peak [Scan]							Fund	

Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak

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Test Freq.	5815 MHz	Engineer	SB
Variant	802.11n; HT-40; 13.5 MCS	Temp (°C)	24
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	33
Power Setting	17	Press. (mBars)	1002
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

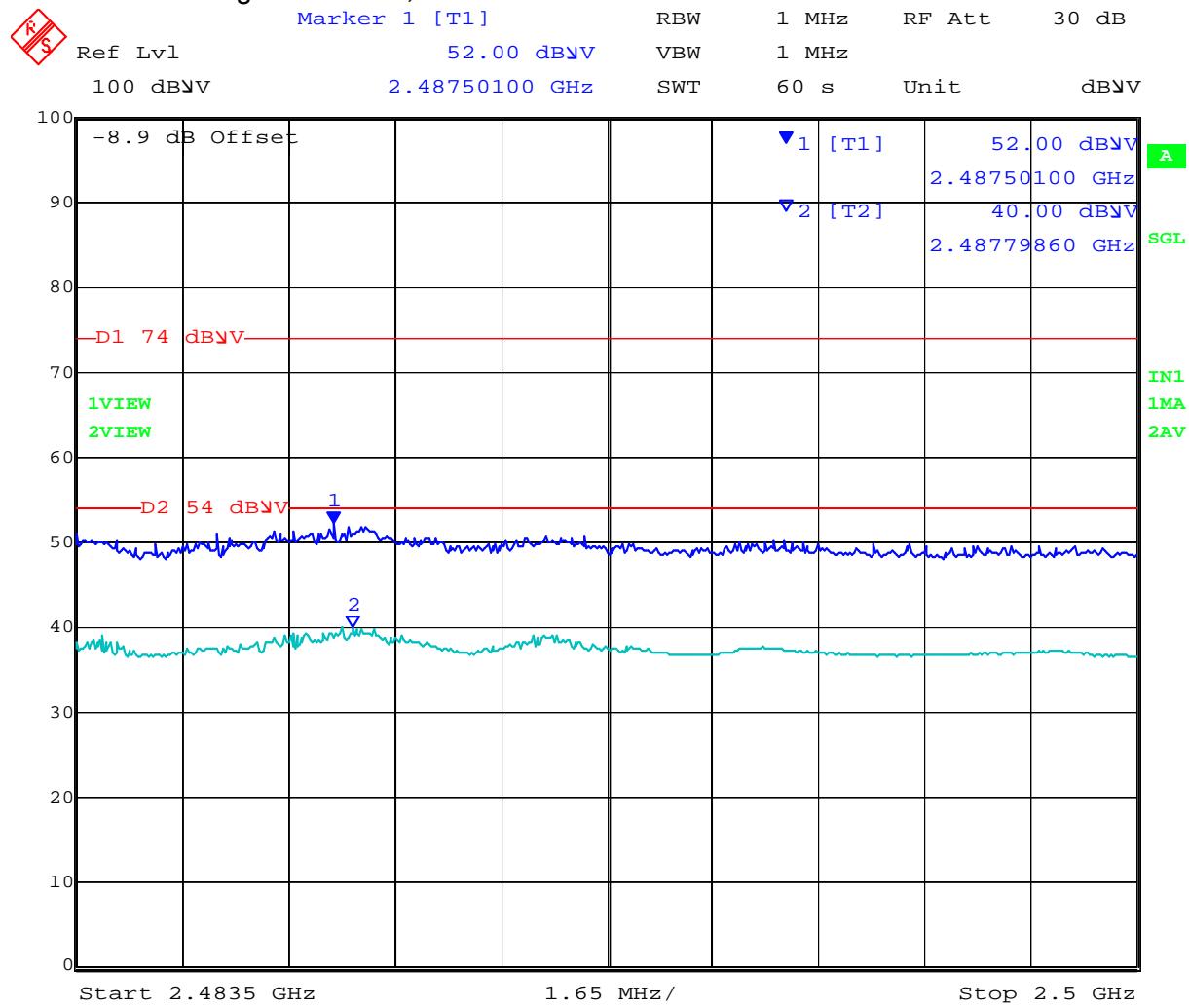


Formally measured emission peaks												
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
5156.313	60.4	4.6	-9.0	56.0	Peak [Scan]							Fund
17829.659	43.9	8.8	0.6	53.2	Peak [Scan]	V	100	0	54.0	-0.8	Pass	
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission RB = Restricted Band (15.209 Limits); NRB = Non Restricted Band, Limit is 20dB below fundamental peak										

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7.7. Radiated Band-Edge and Peak Emissions

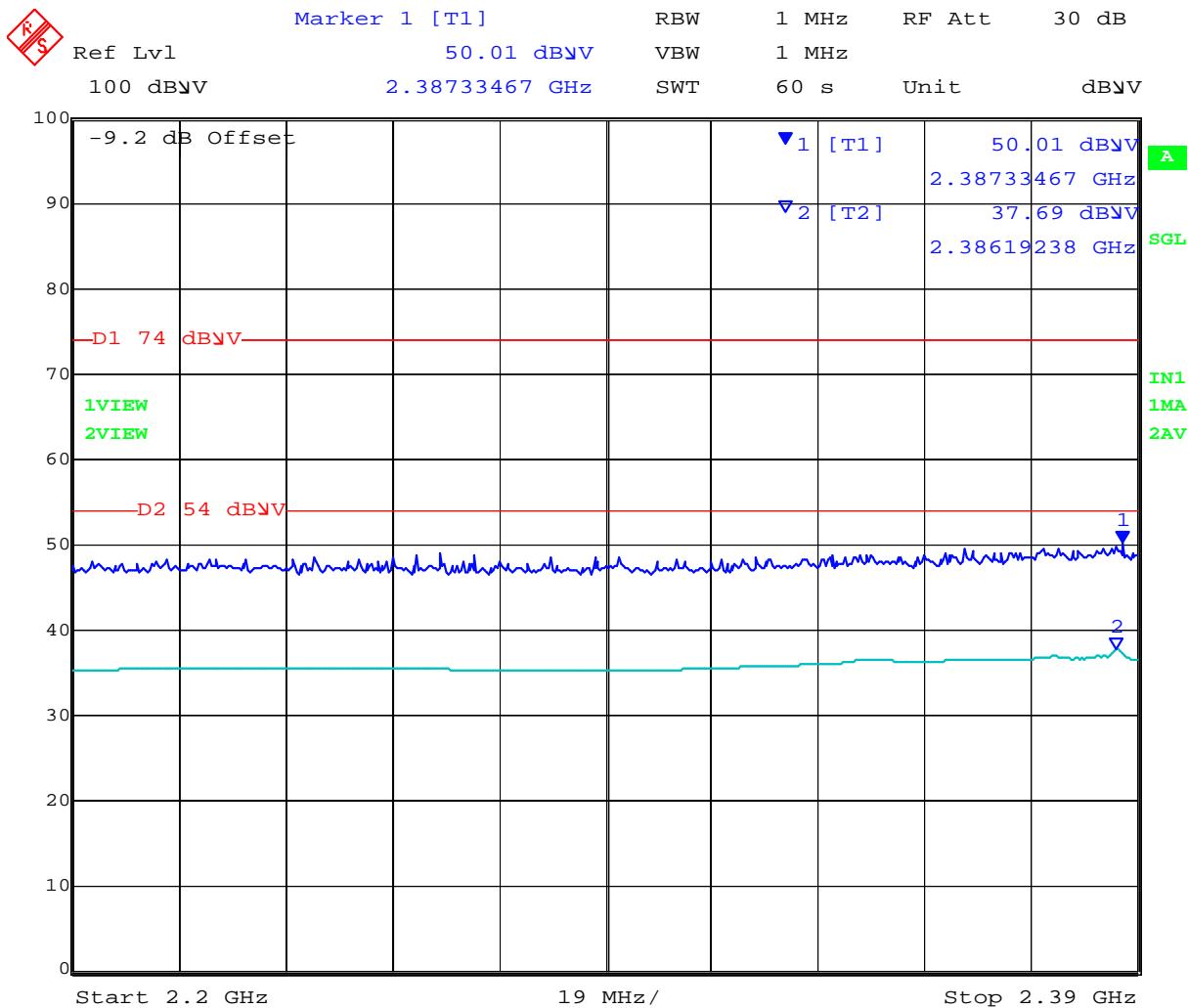
MLTP04 Band Edge 2412 MHz; 802.11b 2200-2390 MHz



Date: 21.OCT.2010 14:03:47

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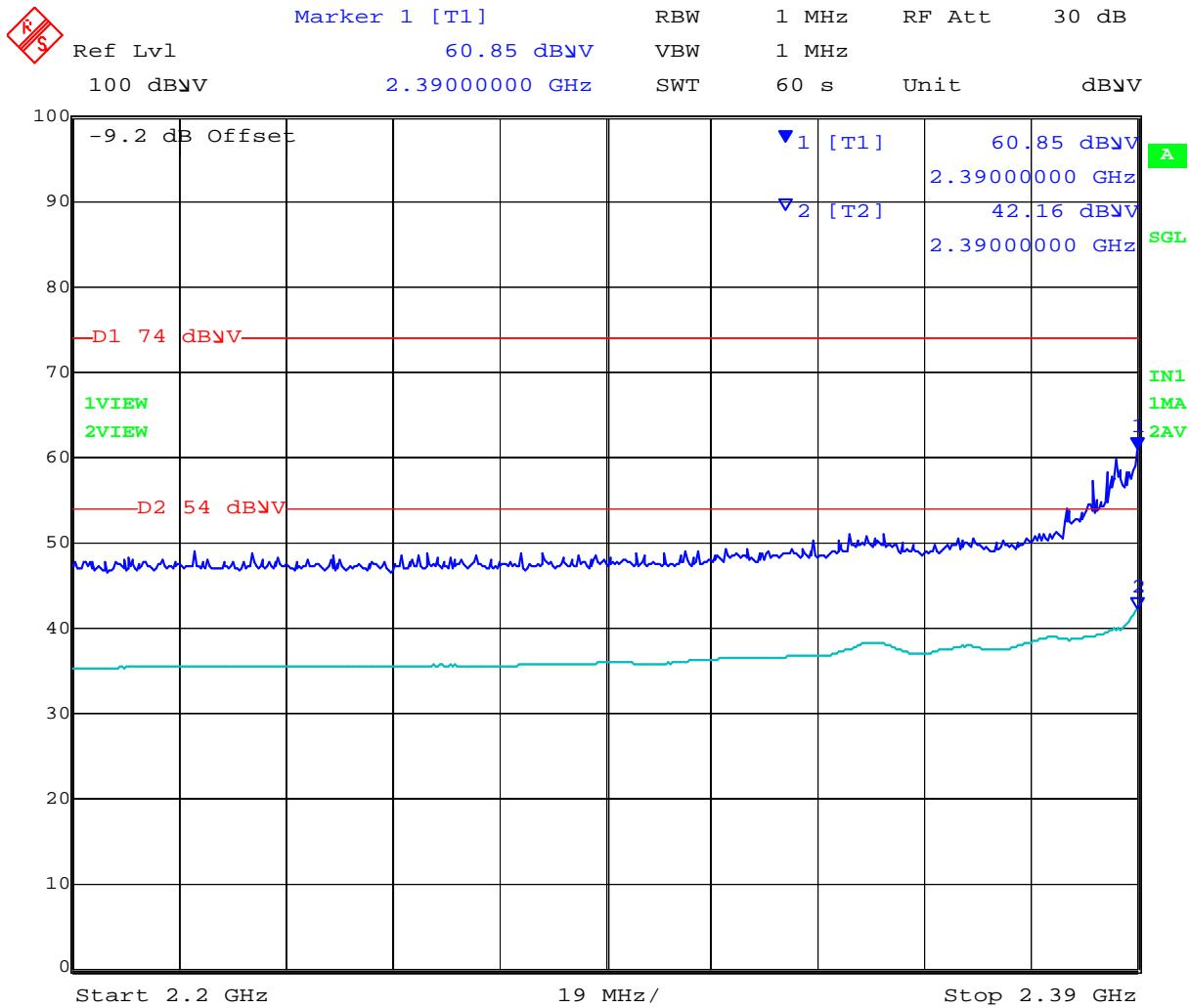
MLTP04 Band Edge 2462 MHz; 802.11b 2483.5-2500 MHz



Date: 21.OCT.2010 13:48:25

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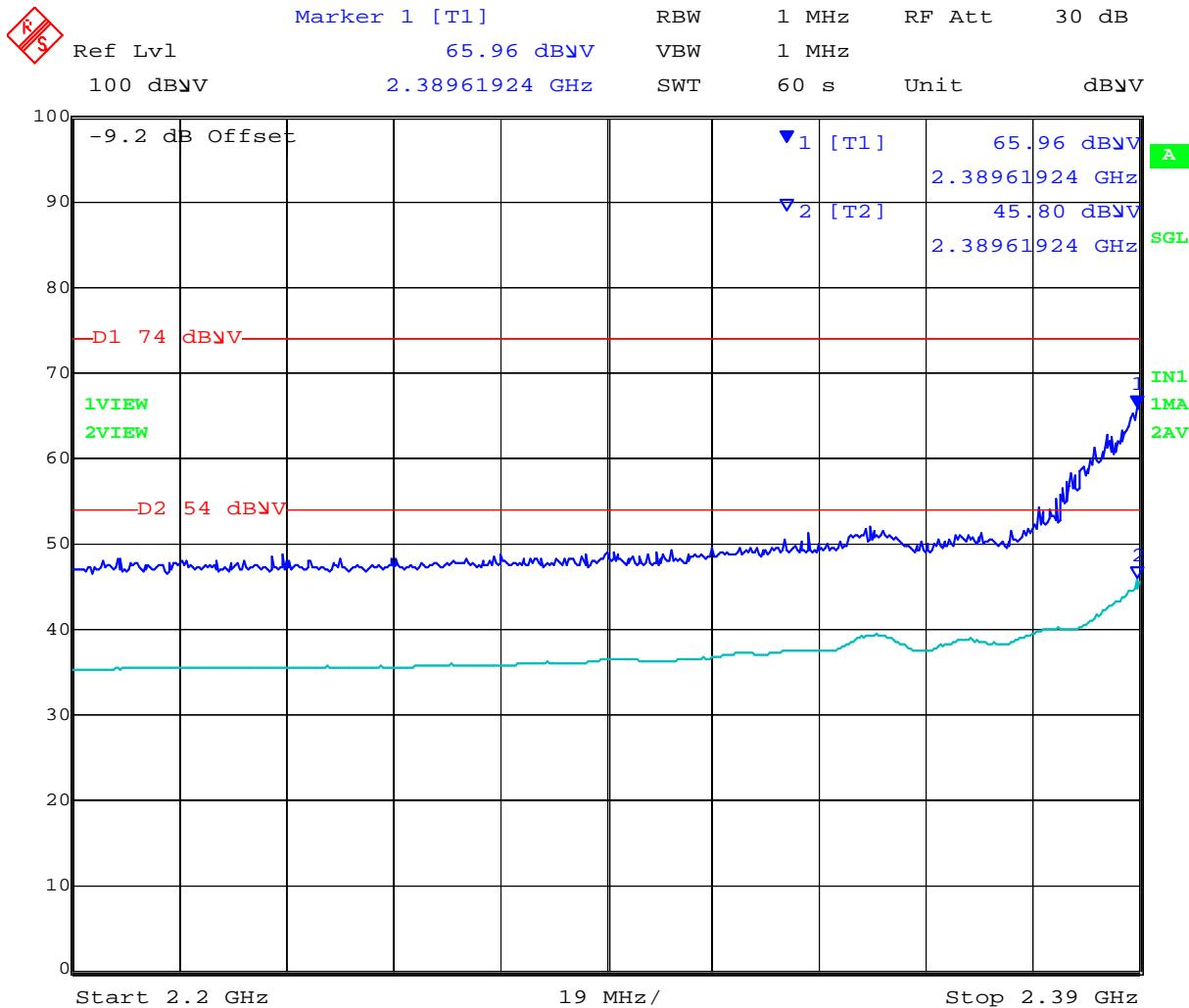
MLTP04 Band Edge 2412 MHz; 802.11g 2200-2390 MHz



Date: 21.OCT.2010 13:46:18

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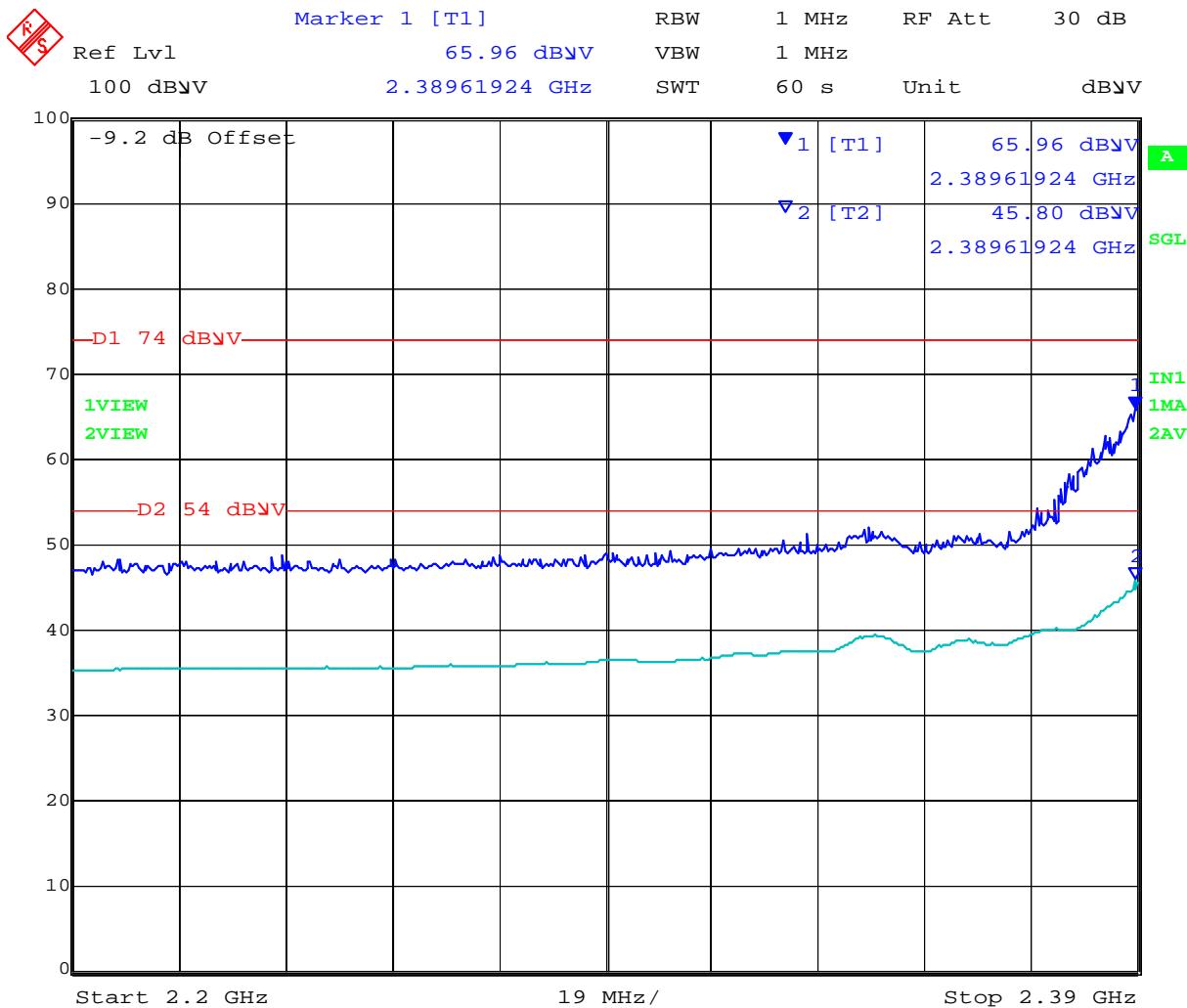
MLTP04 Band Edge 2462 MHz; 802.11g 2483.5-2500 MHz



Date: 21.OCT.2010 13:50:21

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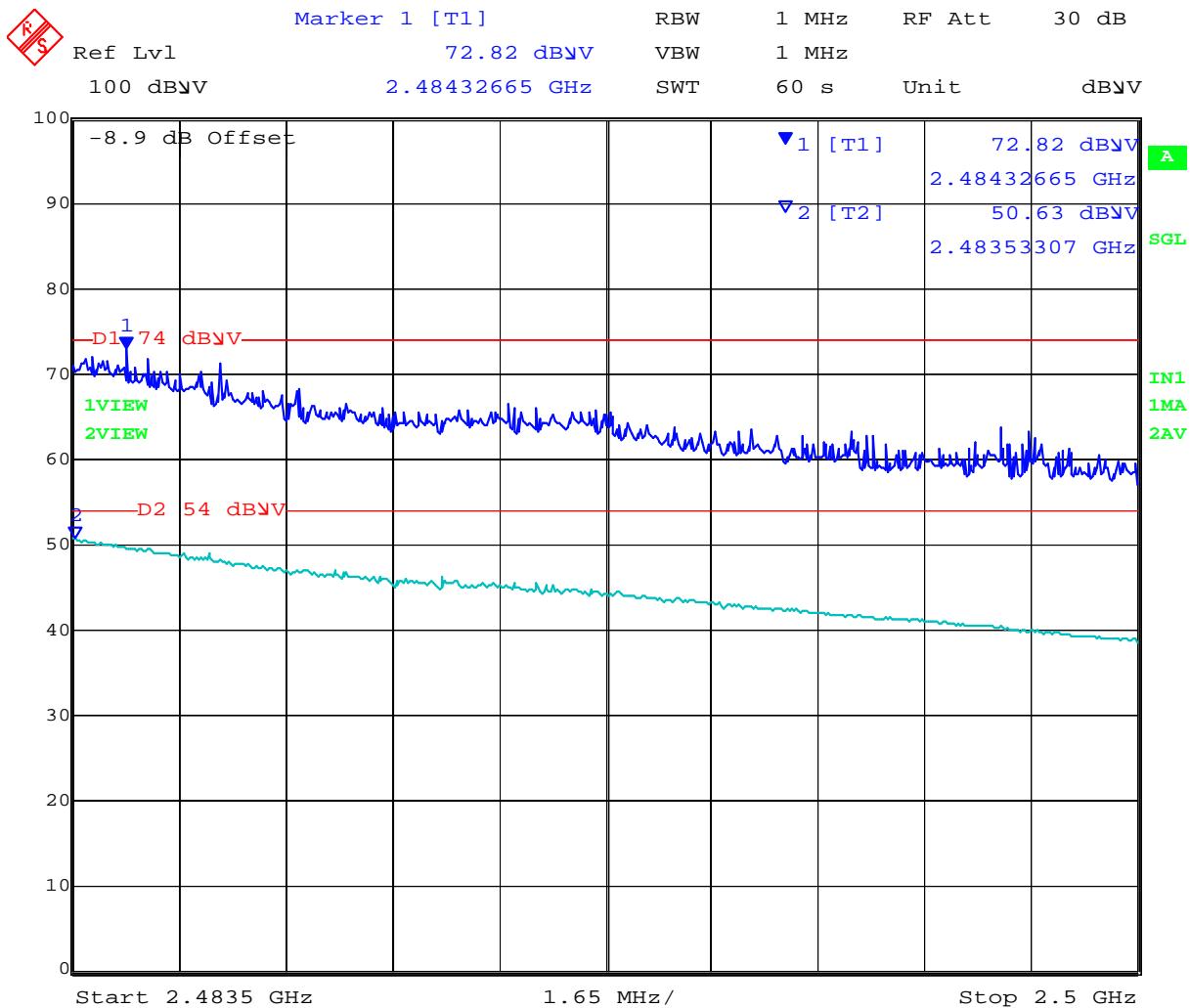
MLTP04 Band Edge 2412 MHz; 802.11n HT-20 2200-2390 MHz



Date: 21.OCT.2010 13:50:21

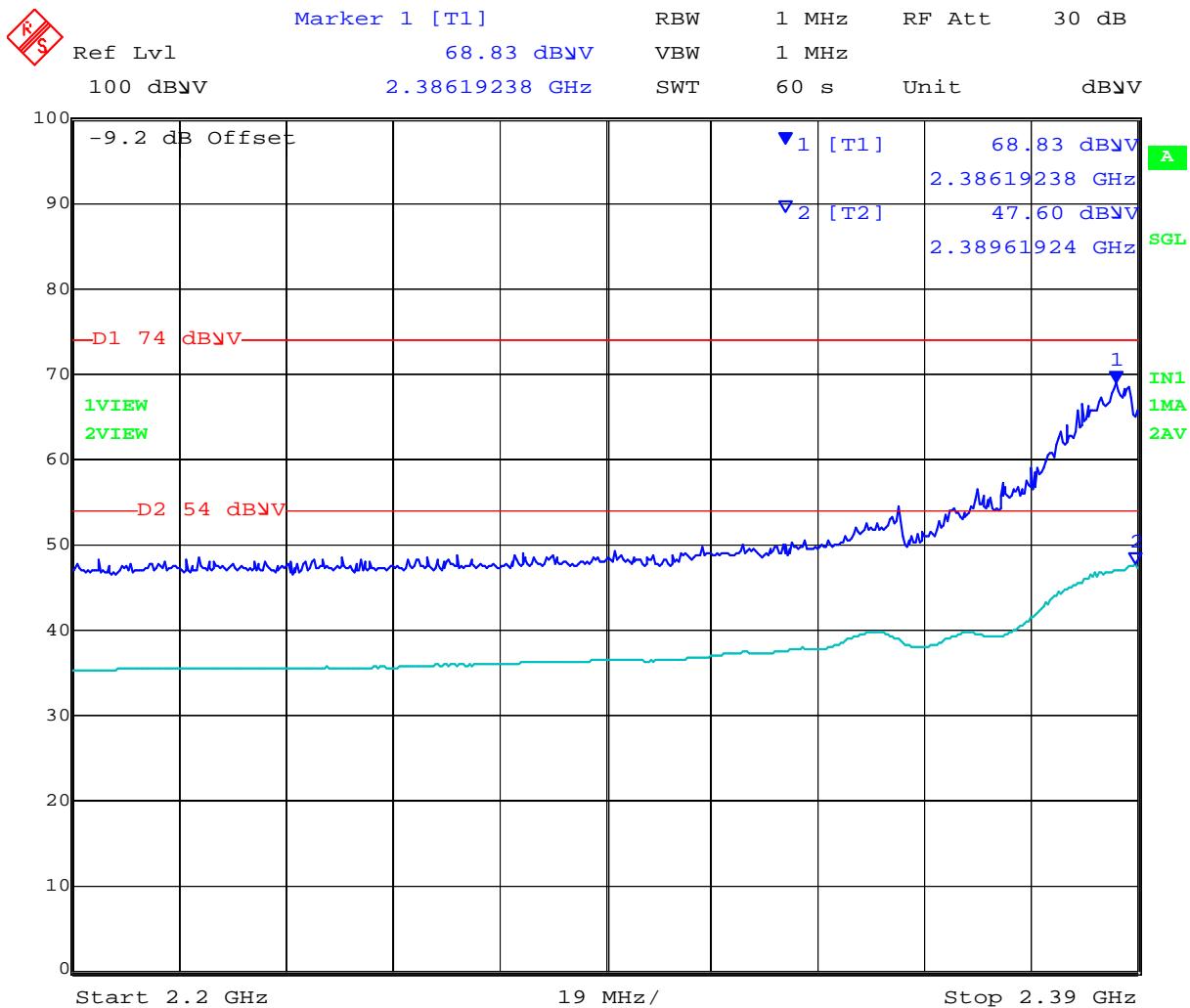
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MLTP04 Band Edge 2462 MHz; 802.11n HT-20 2483.5-2500 MHz



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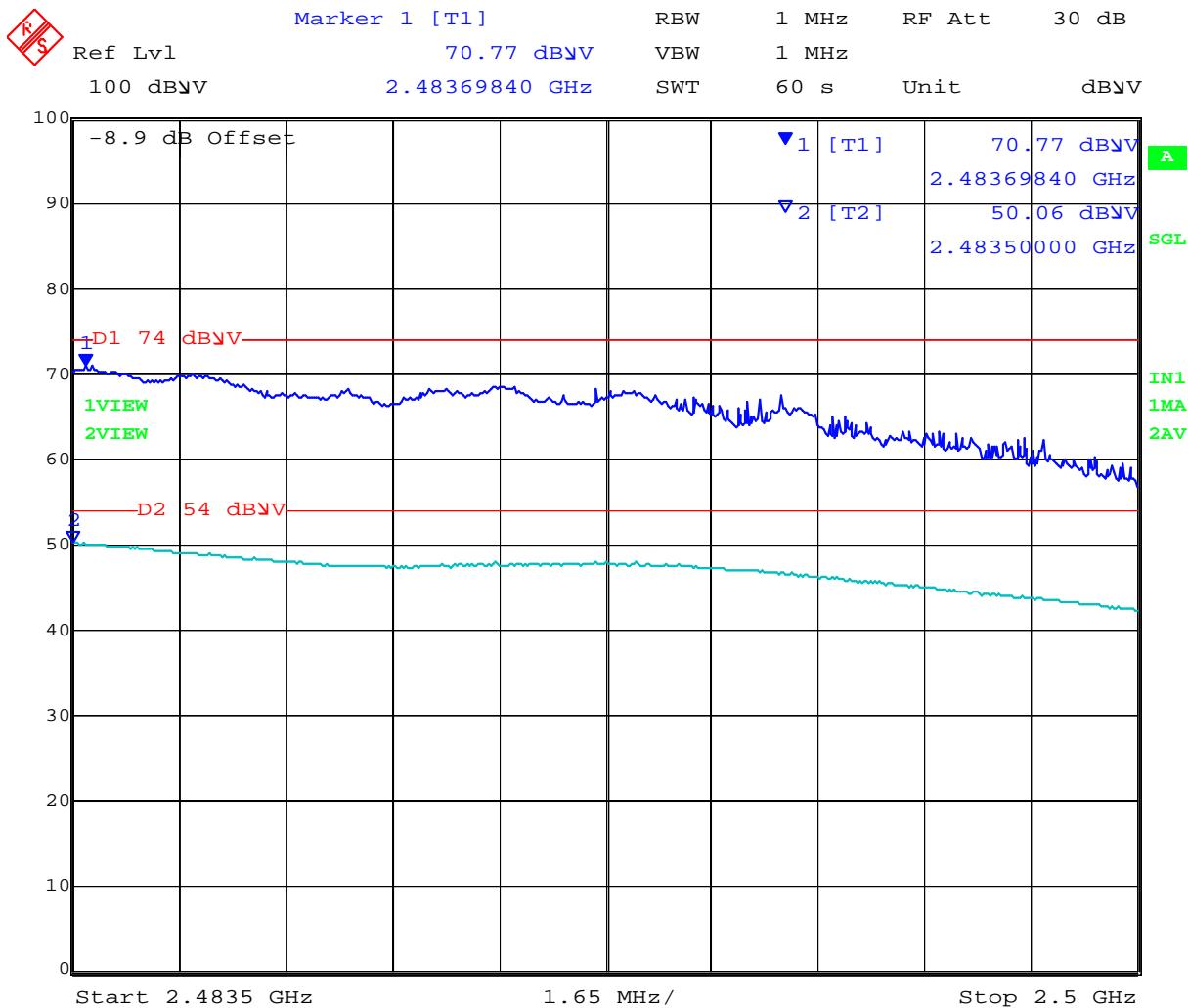
MLTP04 Band Edge 2422 MHz; 802.11n HT-40 2200-2390 MHz



Date: 21.OCT.2010 14:09:23

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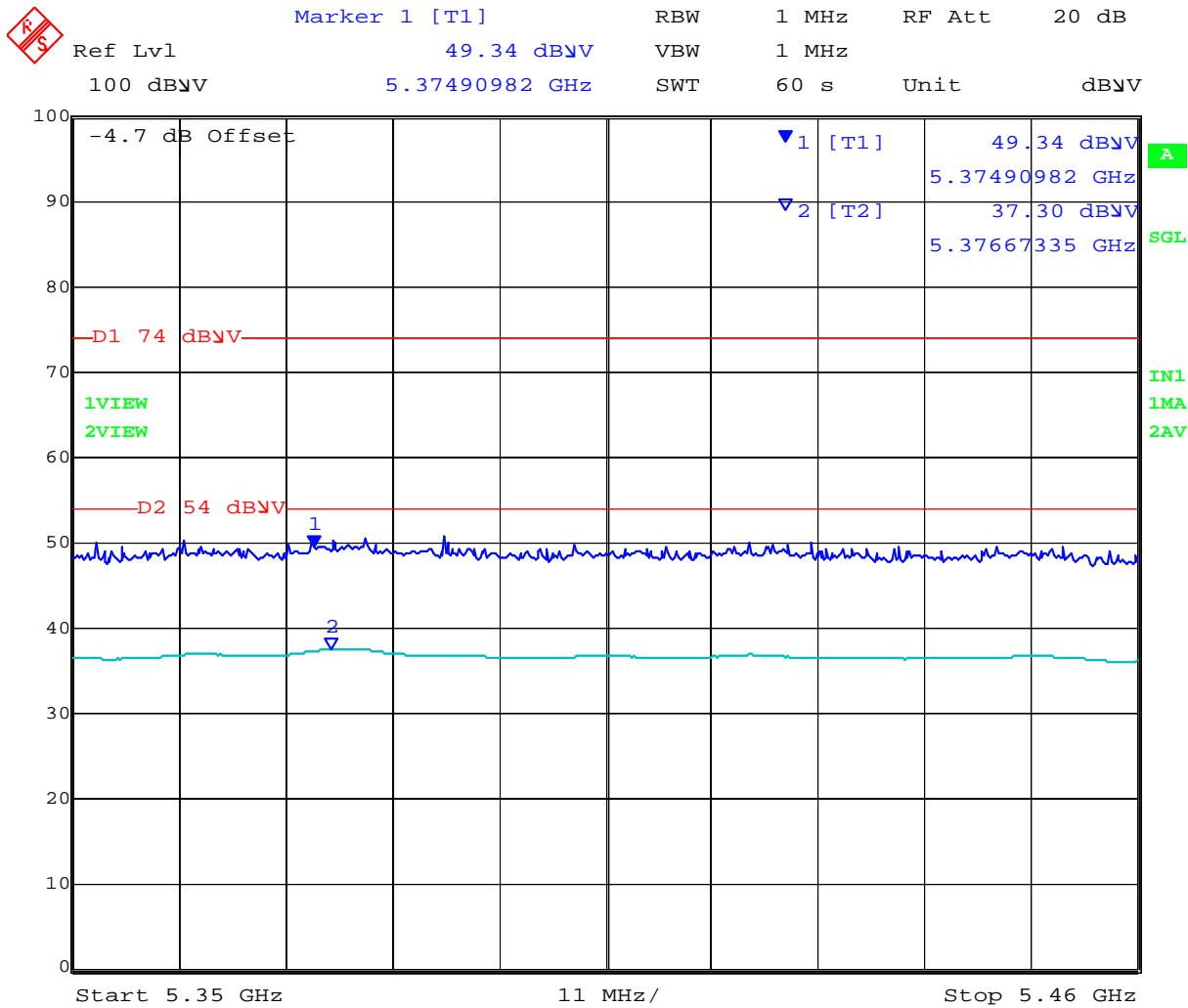
MLTP04 Band Edge 2452 MHz; 802.11n HT-40 2483.5-2500 MHz



Date: 21.OCT.2010 14:07:30

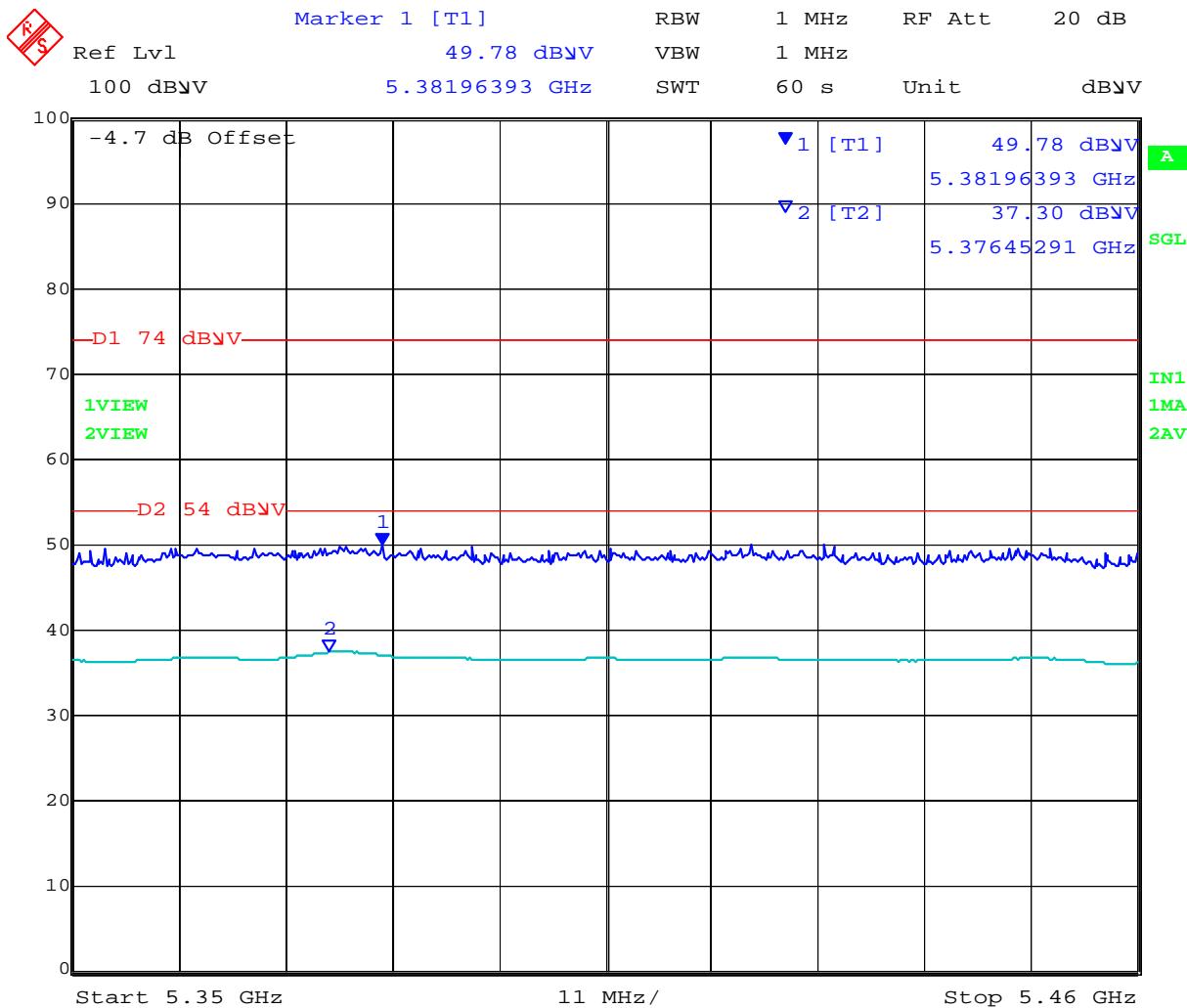
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MLTP04 Band Edge 5745 MHz; 802.11a 5350 - 5460 MHz



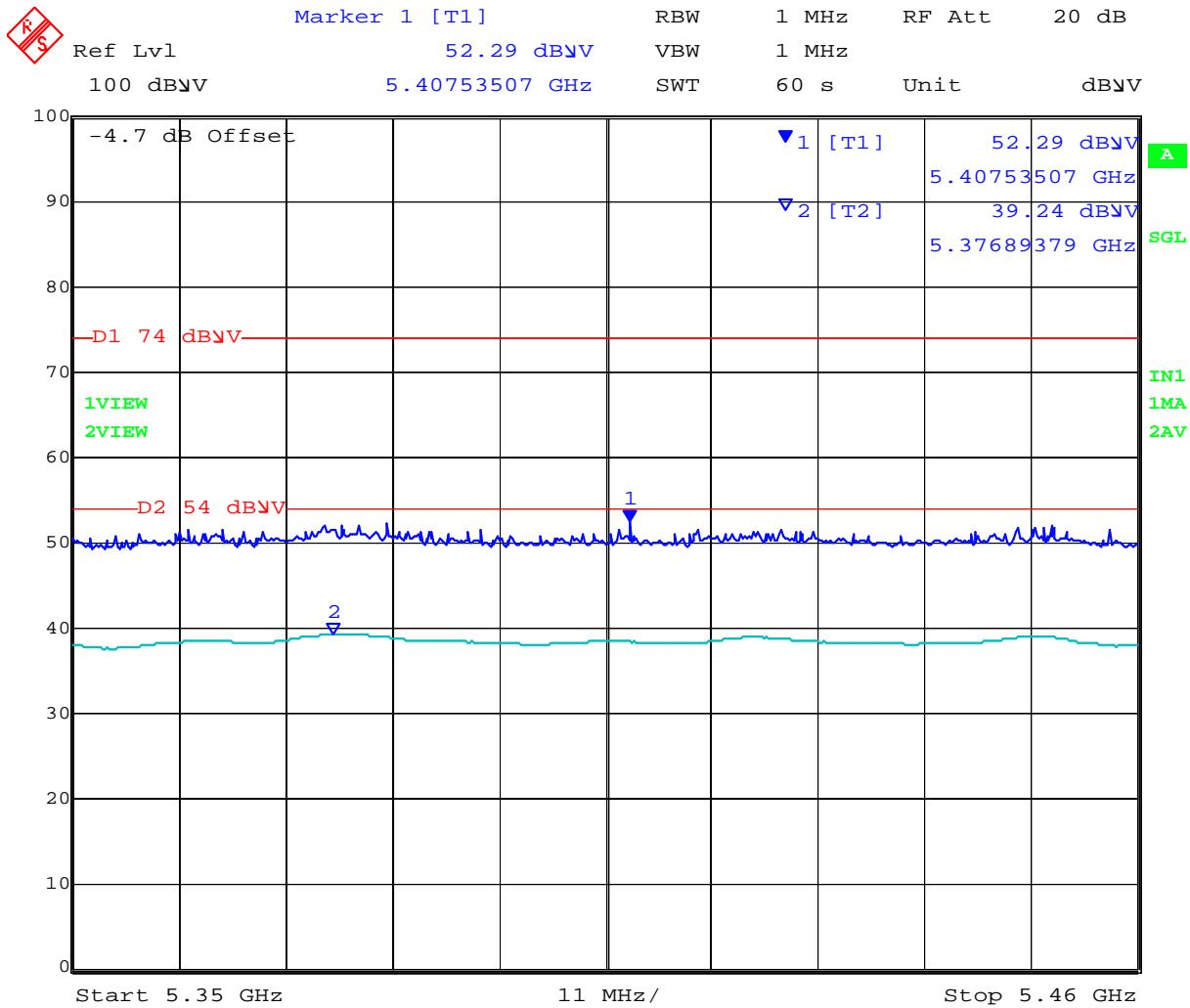
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MLTP04 Band Edge 5745 MHz; 802.11n HT-20 5350 - 5460 MHz



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MLTP04 Band Edge 5745 MHz; 802.11n HT-40 5350 - 5460 MHz

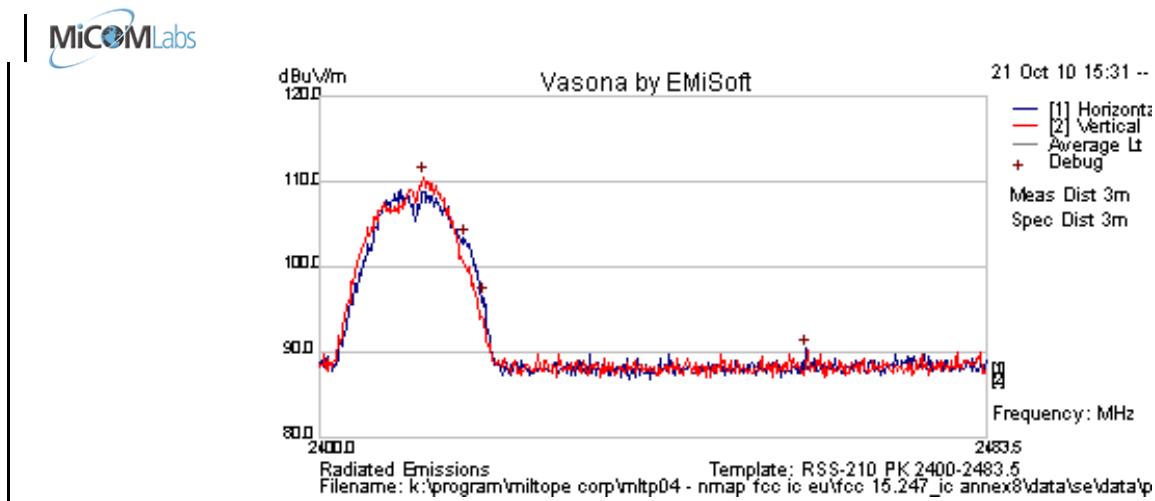


Date: 21.OCT.2010 13:36:14

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2.4 GHz Peak Transmitter Emissions

Test Freq.	2412 MHz	Engineer	SB
Variant	802.11b; 1 Mbs	Temp (°C)	26.5
Freq. Range	2400 - 2483.5 MHz	Rel. Hum. (%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

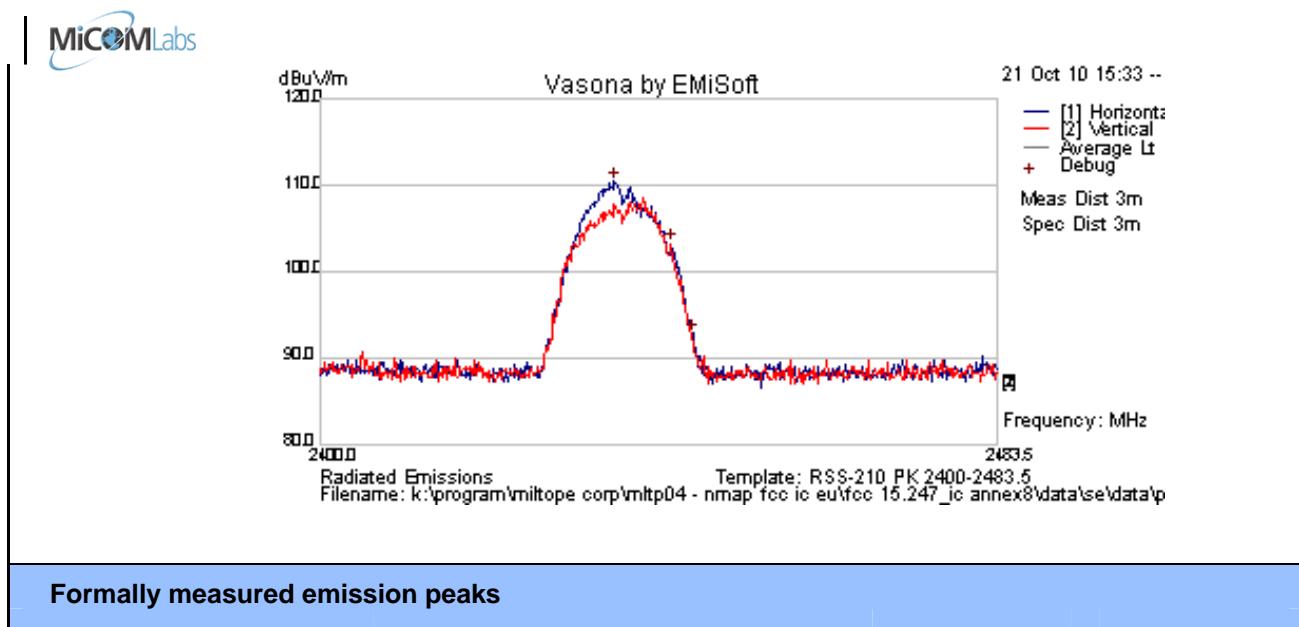


Formally measured emission peaks

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
2412.885	65.5	13.0	32.2	110.6	Peak [Scan]	V						Pk
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission												
PK = Peak emissions of Fundamental												

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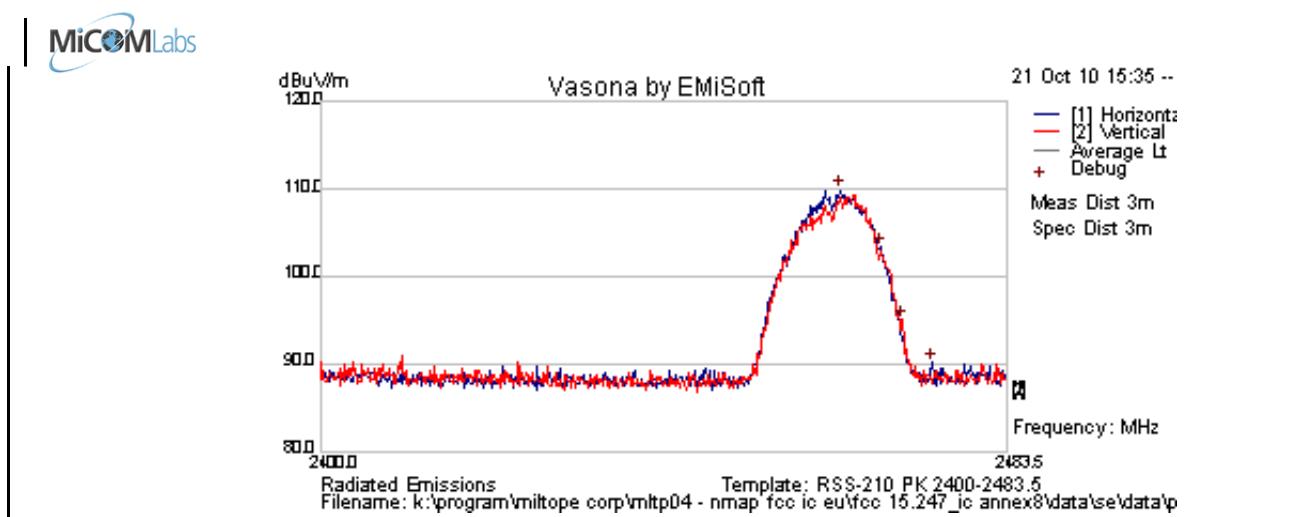
Test Freq.	2437 MHz	Engineer	SB
Variant	802.11b; 1 Mbs	Temp (°C)	26.5
Freq. Range	2400 - 2483.5 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			



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
2435.977	65.3	13.0	32.2	110.5	Peak [Scan]	H						Pk
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
PK = Peak emissions of Fundamental												

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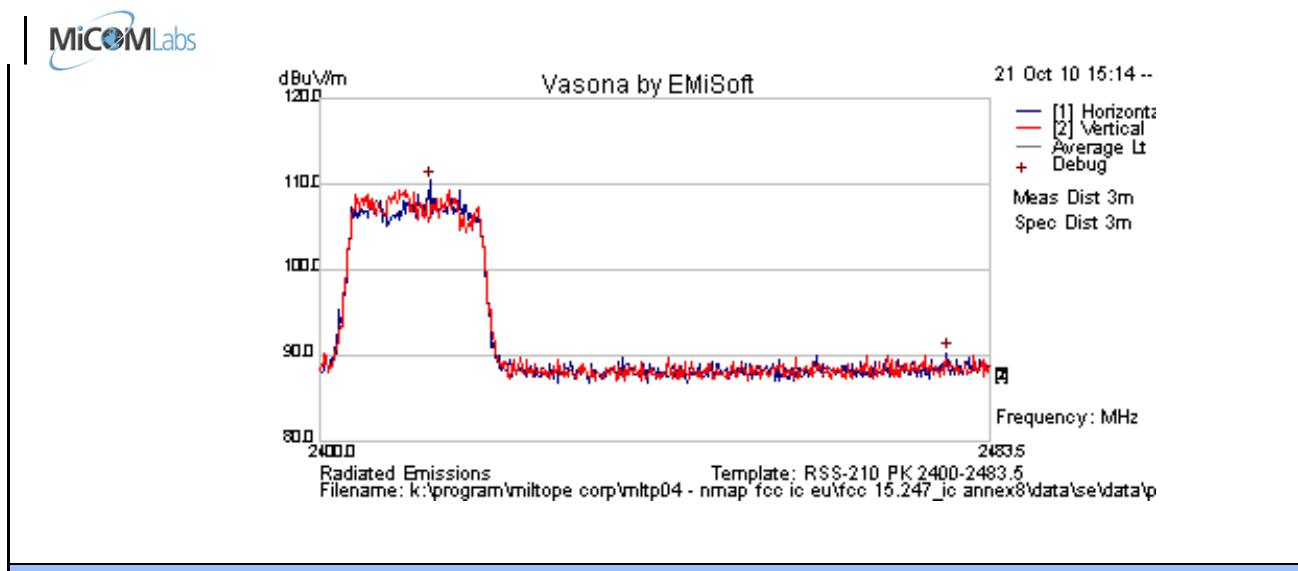
Test Freq.	2462 MHz	Engineer	SB
Variant	802.11b; 1 Mbs	Temp (°C)	26.5
Freq. Range	2400 - 2483.5 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			



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
2462.918	64.6	13.0	32.3	109.9	Peak [Scan]	H						Pk
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
PK = Peak emissions of Fundamental												

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Test Freq.	2412 MHz	Engineer	SB
Variant	802.11g; 6 Mbs	Temp (°C)	26.5
Freq. Range	2400 - 2483.5 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

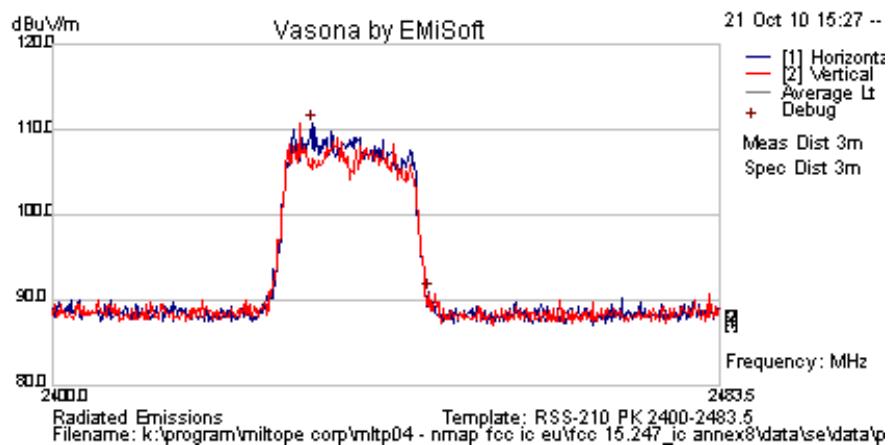


Formally measured emission peaks

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
2413.721	65.3	13.0	32.2	110.5	Peak [Scan]	H						PK
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission PK = Peak emissions of Fundamental												

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Test Freq.	2437 MHz	Engineer	SB
Variant	802.11g; 6 Mbs	Temp (°C)	26.5
Freq. Range	2400 - 2483.5 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

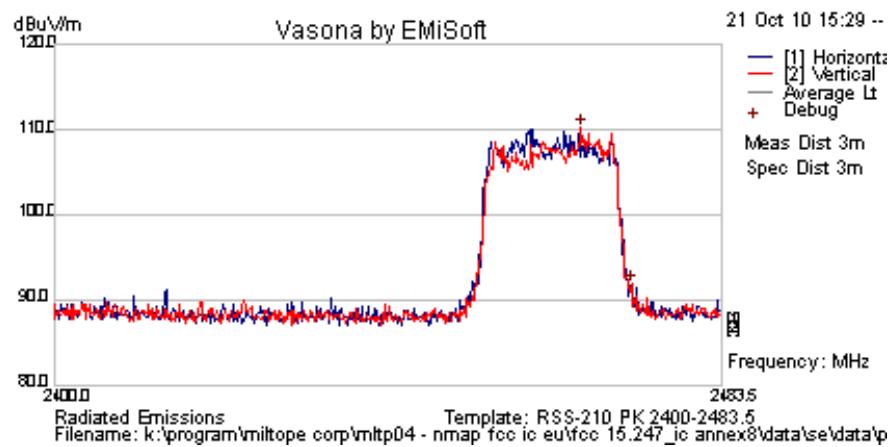


Formally measured emission peaks

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
2432.128	65.5	13.0	32.2	110.7	Peak [Scan]	H						Pk
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission												
PK = Peak emissions of Fundamental												

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Test Freq.	2462 MHz	Engineer	SB
Variant	802.11g; 6 Mbs	Temp (°C)	26.5
Freq. Range	2400 - 2483.5 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

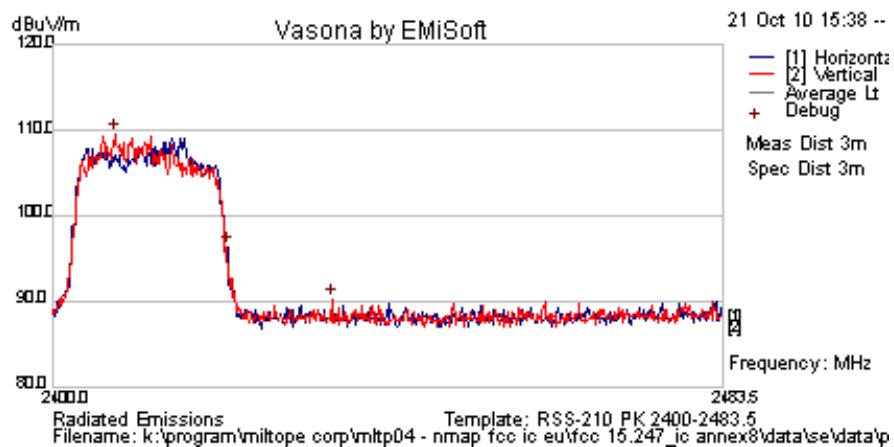


Formally measured emission peaks

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
2465.763	64.9	13.0	32.3	110.2	Peak [Scan]	V						
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission												
PK = Peak emissions of Fundamental												

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Test Freq.	2412 MHz	Engineer	SB
Variant	802.11n HT-20; 6.5 MCS	Temp (°C)	26.5
Freq. Range	2400 - 2483.5 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

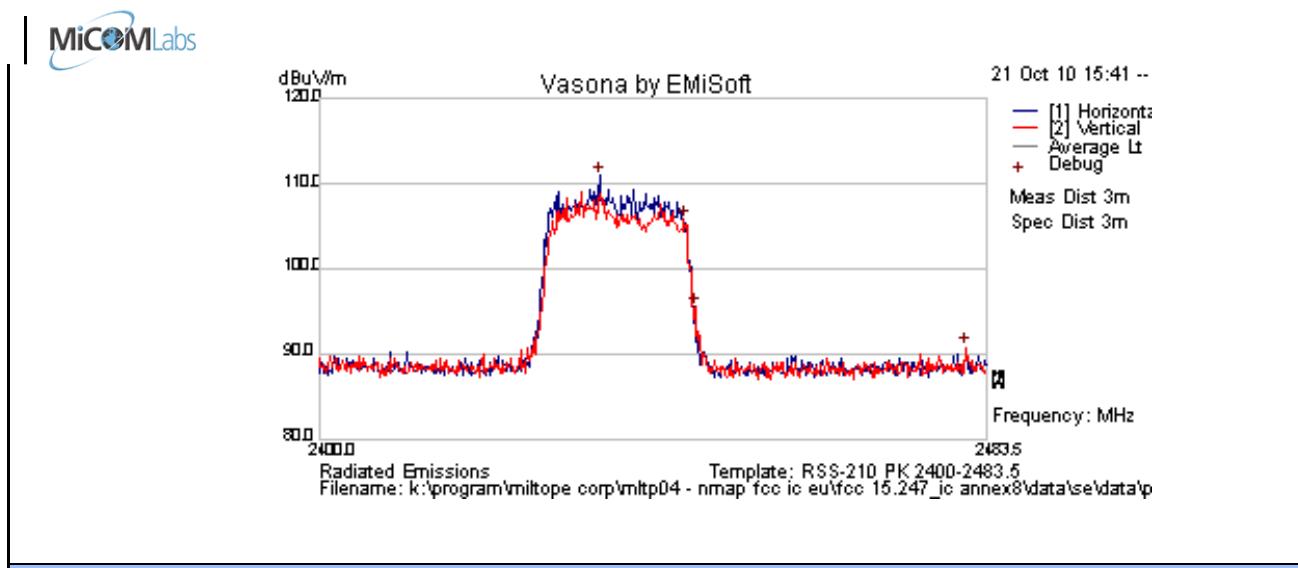


Formally measured emission peaks

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
2407.697	64.5	13.0	32.2	109.6	Peak [Scan]	V						Pk
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission PK = Peak emissions of Fundamental												

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Test Freq.	2437 MHz	Engineer	SB
Variant	802.11n HT-20; 6.5 MCS	Temp (°C)	26.5
Freq. Range	2400 - 2483.5 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

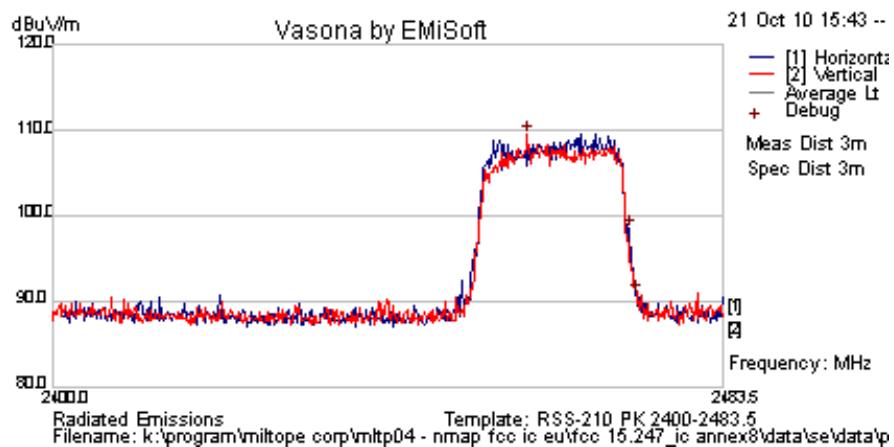


Formally measured emission peaks

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
2434.806	65.8	13.0	32.2	111.0	Peak [Scan]	H						Pk
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
PK = Peak emissions of Fundamental												

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Test Freq.	2462 MHz	Engineer	SB
Variant	802.11n HT-20; 6.5 MCS	Temp (°C)	26.5
Freq. Range	2400 - 2483.5 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

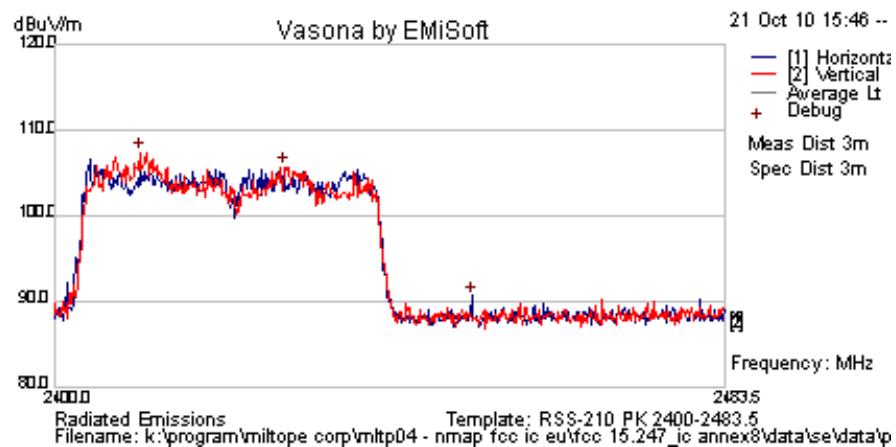


Formally measured emission peaks

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
2458.902	64.2	13.0	32.3	109.5	Peak [Scan]	V						Pk
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission												
PK = Peak emissions of Fundamental												

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Test Freq.	2422 MHz	Engineer	SB
Variant	802.11n HT-40; 13.5 MCS	Temp (°C)	26.5
Freq. Range	2400 - 2483.5 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

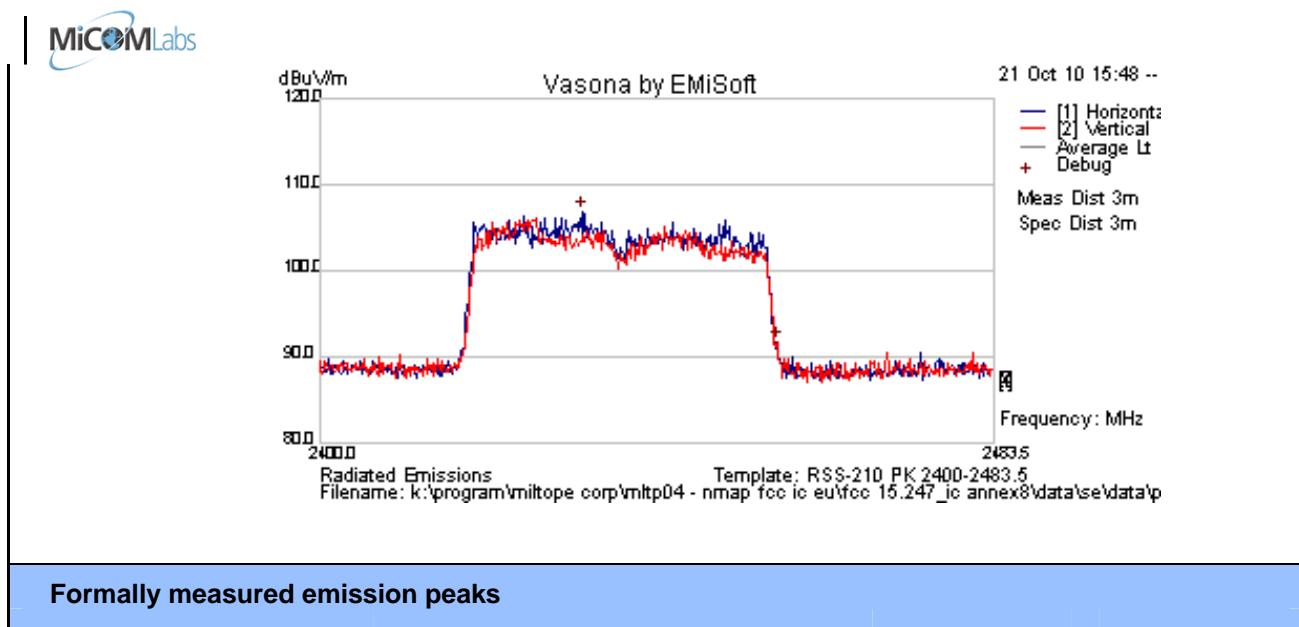


Formally measured emission peaks

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
2410.542	62.3	13.0	32.2	107.4	Peak [Scan]	V						Pk
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission												
PK = Peak emissions of Fundamental												

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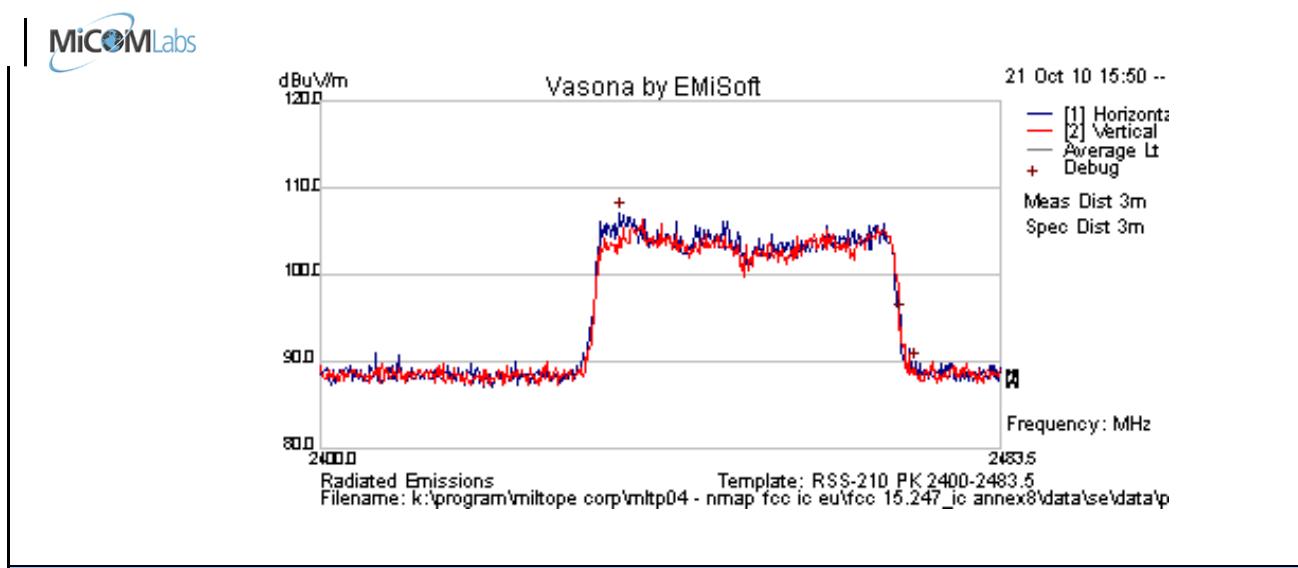
Test Freq.	2437 MHz	Engineer	SB
Variant	802.11n HT-40; 13.5 MCS	Temp (°C)	26.5
Freq. Range	2400 - 2483.5 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			



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
2432.128	61.7	13.0	32.2	106.9	Peak [Scan]	H						Pk
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
PK = Peak emissions of Fundamental												

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Test Freq.	2452 MHz	Engineer	SB
Variant	802.11n HT-40; 13.5 MCS	Temp (°C)	26.5
Freq. Range	2400 - 2483.5 MHz	Rel. Hum. (%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			



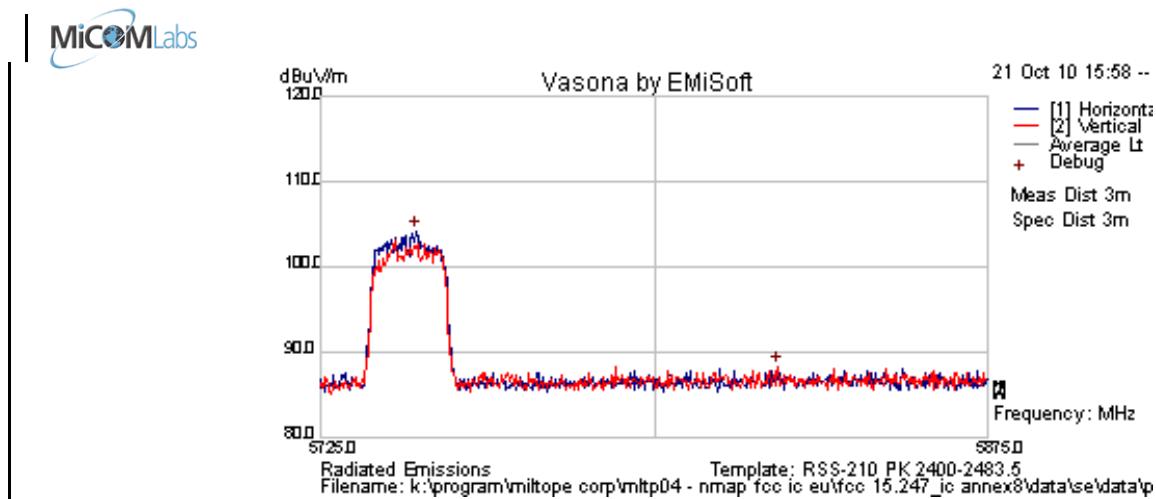
Formally measured emission peaks

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
2436.479	61.9	13.0	32.2	107.1	Peak [Scan]	H						Pk
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
PK = Peak emissions of Fundamental												

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5.8 GHz Peak Transmitter Emissions

Test Freq.	5745 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	26.5
Freq. Range	5725 - 5850 MHz	Rel. Hum. (%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

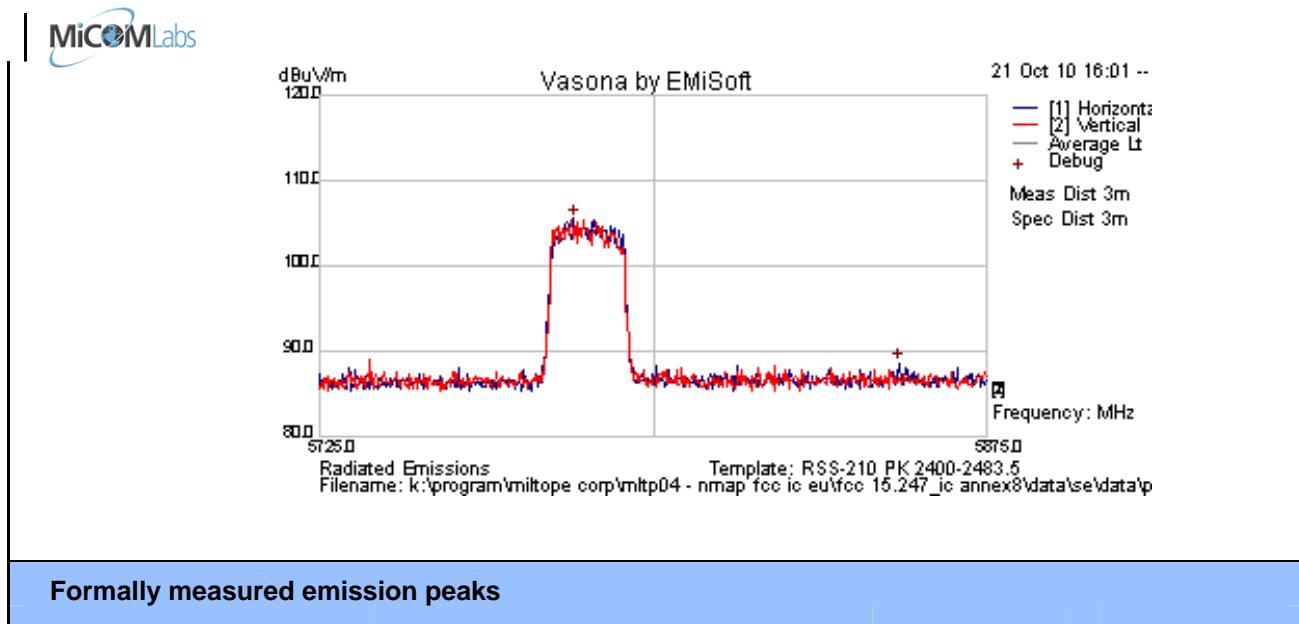


Formally measured emission peaks

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
5746.343	54.4	14.8	35.0	104.2	Peak [Scan]	H						Pk
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
PK = Peak emissions of Fundamental												

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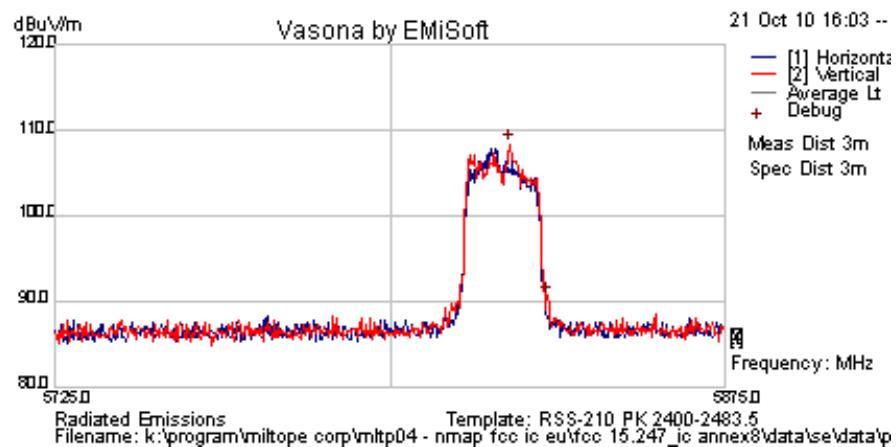
Test Freq.	5785 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	26.5
Freq. Range	5725 - 5850 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			



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
5781.814	55.8	14.8	35.0	105.6	Peak [Scan]	H						Pk
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
PK = Peak emissions of Fundamental												

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Test Freq.	5825 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	26.5
Freq. Range	5725 - 5850 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

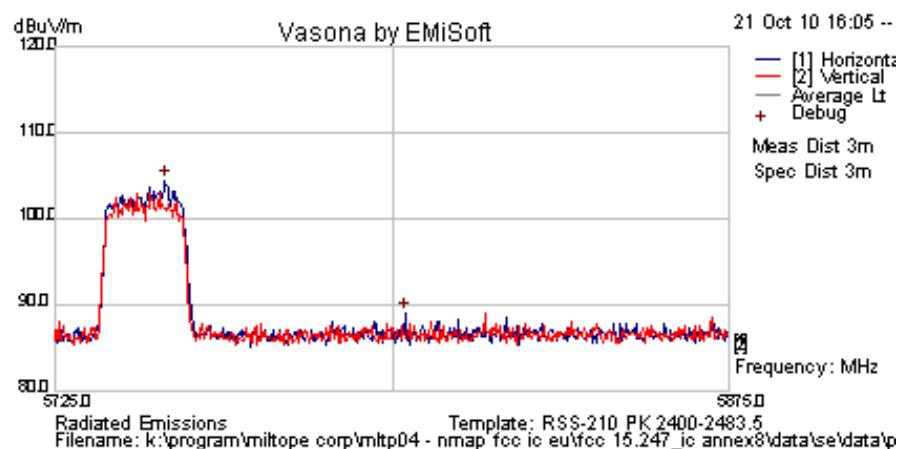


Formally measured emission peaks

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
5826.603	58.6	14.8	35.0	108.4	Peak [Scan]	V						Pk
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission PK = Peak emissions of Fundamental												

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Test Freq.	5745 MHz	Engineer	SB
Variant	802.11n HT-20; 6.5 MCS	Temp (°C)	26.5
Freq. Range	5725 - 5850 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

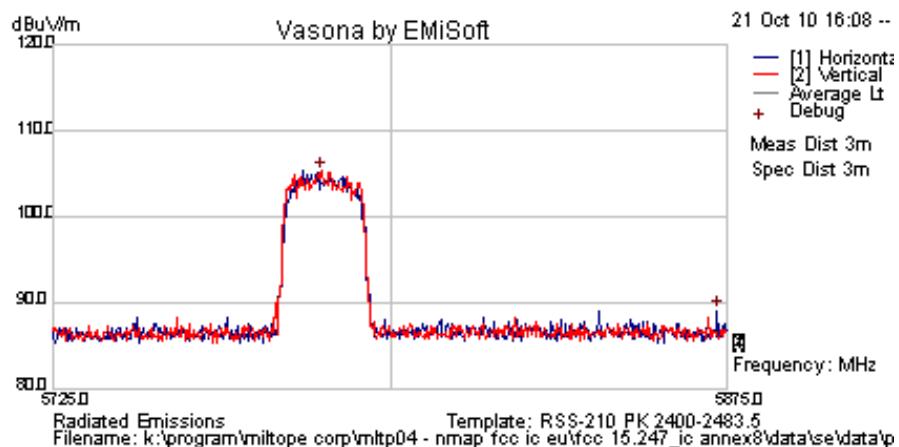


Formally measured emission peaks

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
5749.349	54.7	14.8	35.0	104.5	Peak [Scan]	H						Pk
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission												
PK = Peak emissions of Fundamental												

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Test Freq.	5785 MHz	Engineer	SB
Variant	802.11n HT-20; 6.5 MCS	Temp (°C)	26.5
Freq. Range	5725 - 5850 MHz	Rel. Hum. (%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

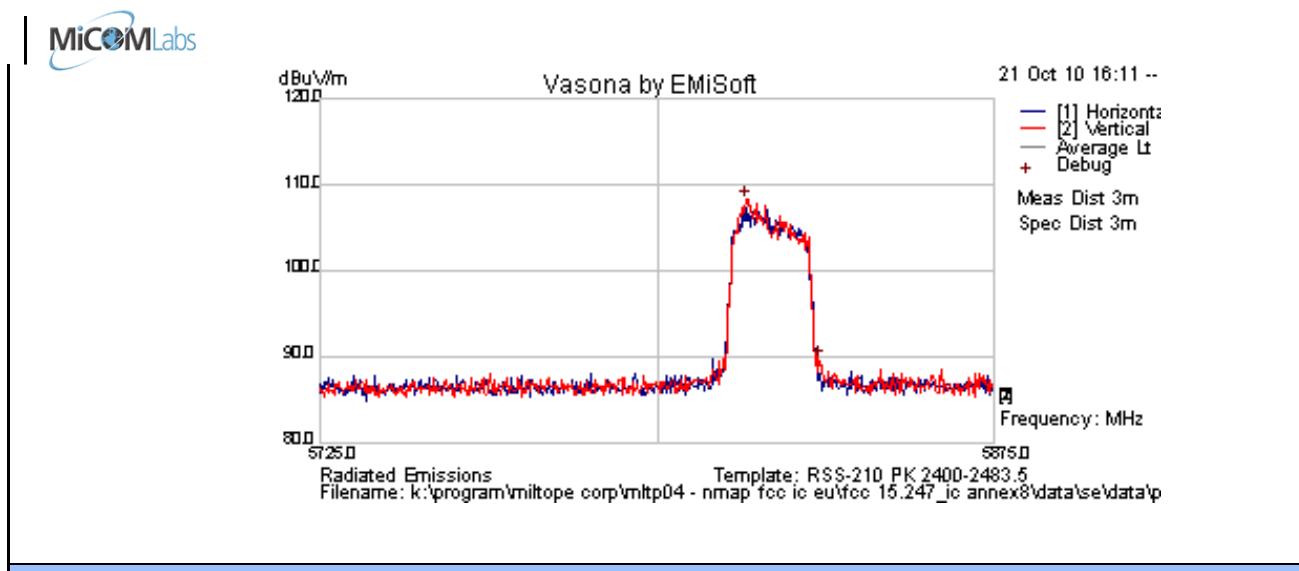


Formally measured emission peaks

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
5784.519	55.6	14.8	35.0	105.3	Peak [Scan]	V						Pk
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission												
PK = Peak emissions of Fundamental												

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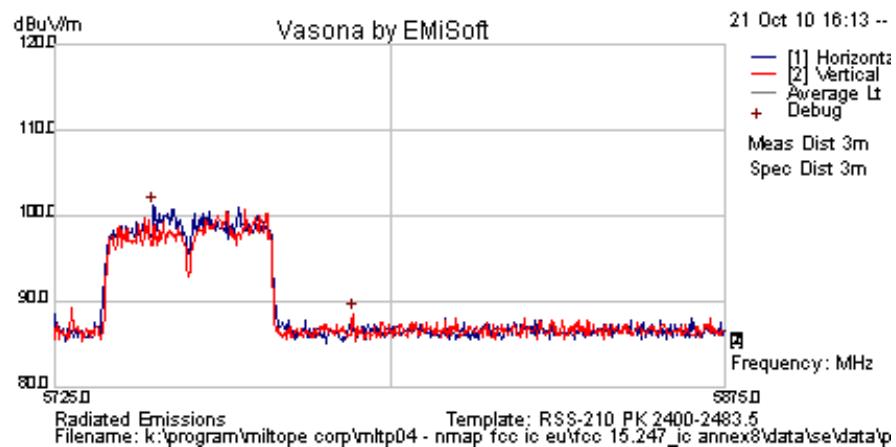
Test Freq.	5825 MHz	Engineer	SB
Variant	802.11n HT-20; 6.5 MCS	Temp (°C)	26.5
Freq. Range	5725 - 5850 MHz	Rel. Hum.(%)	32
Power Setting	18	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			



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
5819.389	58.5	14.8	35.0	108.3	Peak [Scan]	V						Pk
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
PK = Peak emissions of Fundamental												

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Test Freq.	5755 MHz	Engineer	SB
Variant	802.11n HT-40; 13.5 MCS	Temp (°C)	26.5
Freq. Range	5725 - 5850 MHz	Rel. Hum.(%)	32
Power Setting	17	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

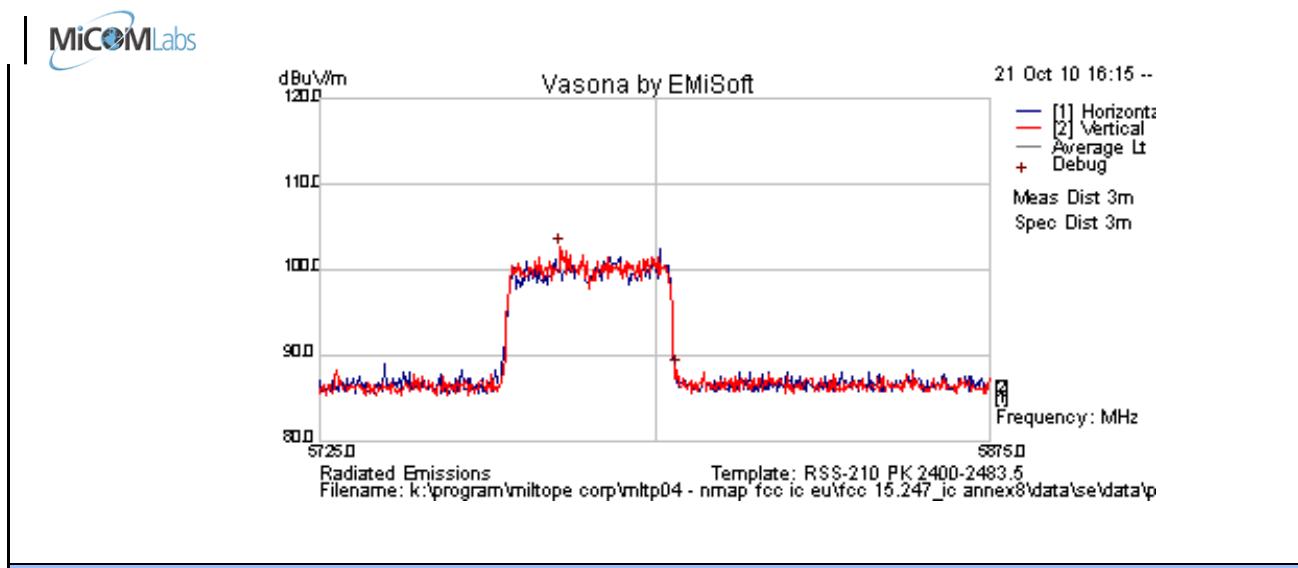


Formally measured emission peaks

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
5746.944	51.4	14.8	35.0	101.2	Peak [Scan]	H						Pk
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission												
PK = Peak emissions of Fundamental												

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Test Freq.	5785 MHz	Engineer	SB
Variant	802.11n HT-40; 13.5 MCS	Temp (°C)	26.5
Freq. Range	5725 - 5850 MHz	Rel. Hum. (%)	32
Power Setting	17	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
Test Notes 2			

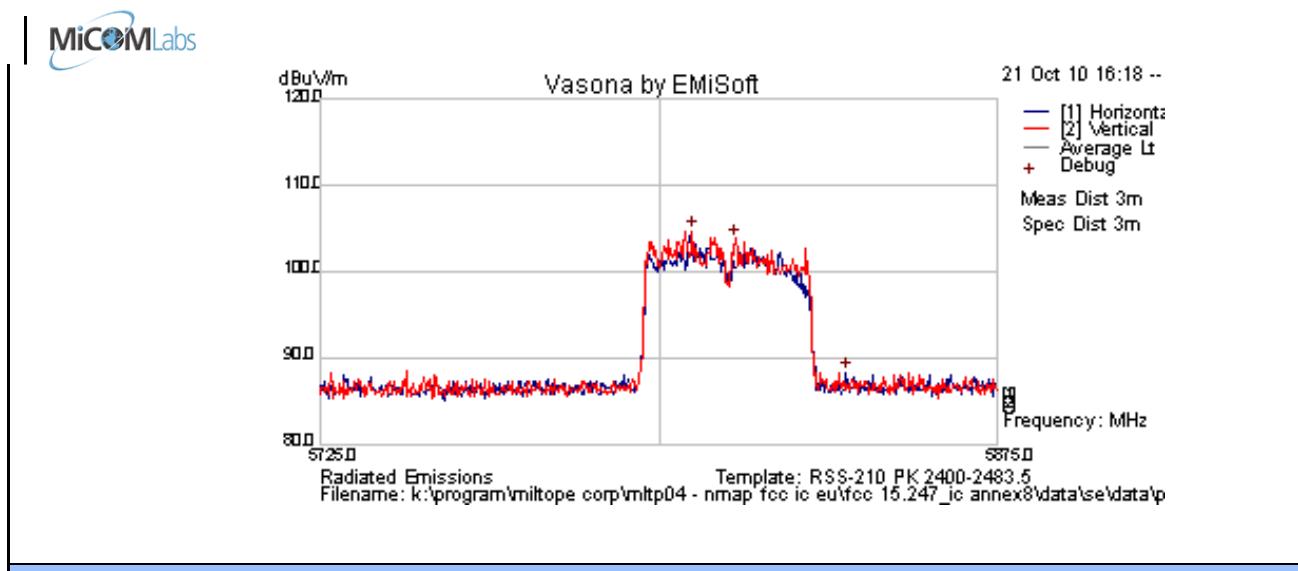


Formally measured emission peaks

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
5778.507	52.9	14.8	35.0	102.6	Peak [Scan]	V						Pk
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
PK = Peak emissions of Fundamental												

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Test Freq.	5815 MHz	Engineer	SB
Variant	802.11n HT-40; 13.5 MCS	Temp (°C)	26.5
Freq. Range	5725 - 5850 MHz	Rel. Hum.(%)	32
Power Setting	17	Press. (mBars)	1003
Antenna	1TLP3 / 901167-2 Rev D	Duty Cycle (%)	100
Test Notes 1			
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
5807.064	54.9	14.8	35.0	104.7	Peak [Scan]	V						Pk
Legend:		TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission										
PK = Peak emissions of Fundamental												

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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
Page: Page 344 of 362

7.8. Radiated Spurious Emissions – Digital Apparatus

Standard Reference

FCC, Part 15 Subpart B §15.109
Industry Canada ICES-003 §5

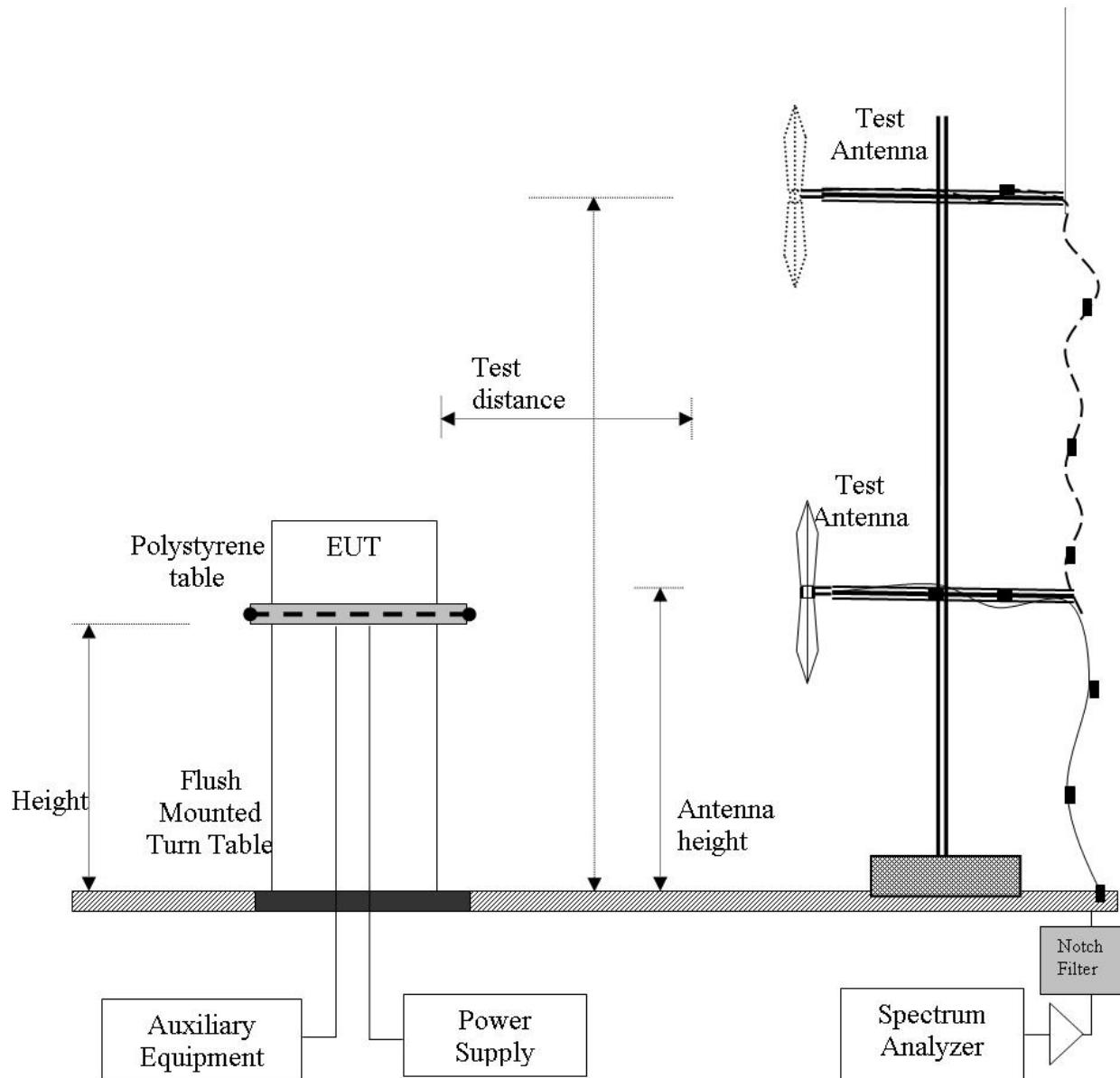
Test Procedure

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.

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

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Test Measurement Set up



Measurement set up for Radiated Emission Test

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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.

$$\mathbf{FS = R + AF + CORR - FO}$$

FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

$$\mathbf{CORR = Correction\ Factor = CL - AG + NFL}$$

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 dB μ V; 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:

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

Conversion between dB μ V/m (or dB μ V) and μ V/m (or μ V) are done as:

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

$$\mathbf{40\ dB\mu V/m = 100\ \mu V/m}$$

$$\mathbf{48\ dB\mu V/m = 250\ \mu V/m}$$



Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
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Specification

Radiated Spurious Emissions – Digital Apparatus

FCC, Part 15 Subpart B §15.109

A representative type or model of each digital apparatus shall be tested in accordance with the measurement methods described in FCC Part 15; Subpart A - General and FCC Subpart B – Unintentional Radiators.

Industry Canada ICES-003

A representative type or model of each digital apparatus shall be tested in accordance with the measurement method described in the publication referred to in Section 7.1 [Canadian Standards Association Standard CAN/CSA-CEI/IEC CISPR 22:02, "Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment."].

FCC, Part 15 Subpart B §15.109 Spurious Emissions Limits

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values.

Frequency (MHz)	Field Strength (μ V/m)	Field Strength (dB μ V/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

Field Strength of radiated emissions for a Class A digital device are as follows.

Frequency (MHz)	Field Strength (μ V/m)	Field Strength (dB μ V/m)	Measurement Distance (meters)
30-88	100	49.5	3
88-216	150	54.0	3
216-960	200	57.0	3
Above 960	500	60.0	3

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RSS-ICES §5 Spurious Emissions Limits

Class A Digital Device: The field intensity of radio noise emissions that are radiated from a Class A digital apparatus shall not exceed the limits specified in Table 5 of the publication referred to in Section 7.1, within the indicated frequency range.

Frequency range MHz	Quasi-peak limits dB(µV/m) @ 10m	Quasi-peak limits dB(µV/m) @ 3m
30 to 230	40	50.5
230 to 1 000	47	57.5
NOTE 1	The lower limit shall apply at the transition frequency.	
NOTE 2	Additional provisions may be required for cases where interference occurs	

Class B Digital Device: The field intensity of radio noise emissions that are radiated from a Class B digital apparatus shall not exceed the limits specified in Table 6 of the publication referred to in Section 7.1, within the indicated frequency range.

Frequency range MHz	Quasi-peak limits dB(µV/m) @ 10m	Quasi-peak limits dB(µV/m) @ 3m
30 to 230	30	40.5
230 to 1 000	37	47.5
NOTE 1	The lower limit shall apply at the transition frequency.	
NOTE 2	Additional provisions may be required for cases where interference occurs	

Laboratory Measurement Uncertainty for Spectrum Measurement

Measurement Uncertainty	+5.6/ -4.5 dB
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Traceability

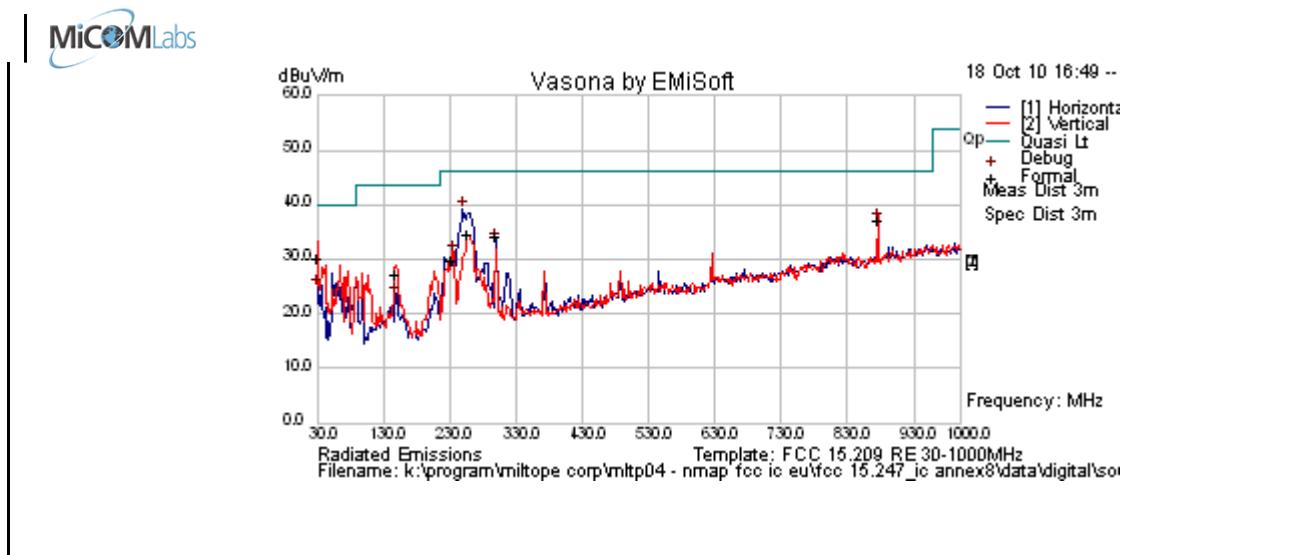
Method	Test Equipment Used
Work instruction WI-03	0116, 0134, 0223, 0287, 0335, 0338, Automated s/w, Anechoic Chamber, EMCO Positioner, Dell Computer

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Measurement Results for Radiated Digital Apparatus

28Vdc Operation

Test Freq.	2437 MHz	Engineer	GMH
Variant	Digital Emissions	Temp (°C)	24
Freq. Range	30 MHz - 1000 MHz	Rel. Hum.(%)	33
Power Setting	18	Press. (mBars)	1004
Antenna	3xDipole J2, J4, J5 + 1 Leaky Coax J3		
Test Notes 1	28Vdc, 802.11g - data rate 6 Mbit/s		
Test Notes 2	2.4 GHz notch filter used to attenuate the fundamental frequency		



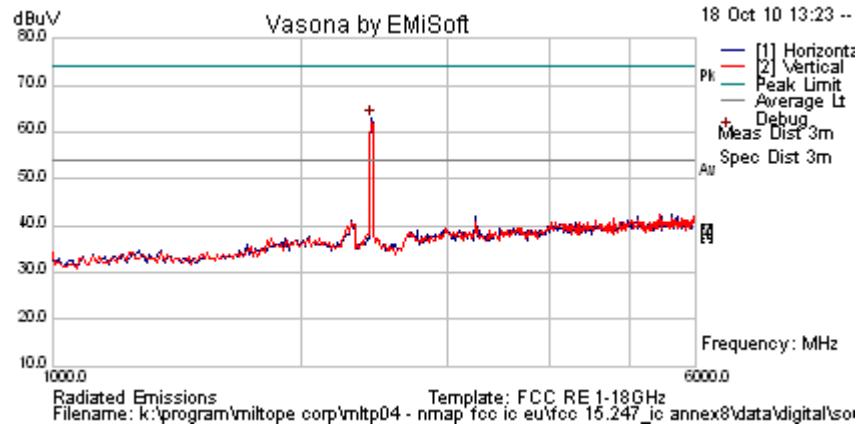
Formally measured emission peaks

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
257.124	48.2	5.0	-18.7	34.6	Quasi Max	H	147	361	46	-11.5	Pass	
875.021	37.7	7.2	-7.6	37.3	Quasi Max	V	118	205	46	-8.7	Pass	
300.001	45.7	5.2	-16.9	34.1	Quasi Max	H	101	295	46	-11.9	Pass	
233.482	43.7	4.9	-18.9	29.8	Quasi Max	V	98	118	46	-16.3	Pass	
30.656	36.8	3.4	-10.0	30.2	Quasi Max	V	98	98	40	-9.8	Pass	
148.109	41.1	4.5	-18.3	27.2	Quasi Max	V	105	352	43.5	-16.3	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												

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28Vdc Operation

Test Freq.	2437 MHz	Engineer	GMH
Variant	Digital Emissions	Temp (°C)	24
Freq. Range	1000 MHz - 6000 MHz	Rel. Hum.(%)	33
Power Setting	18	Press. (mBars)	1004
Antenna	3xDipole J2, J4, J5 + 1 Leaky Coax J3		
Test Notes 1	28Vdc, 802.11g - data rate 6 Mbit/s		
Test Notes 2	2.4 GHz notch filter used to attenuate the fundamental frequency		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2432.866	71.0	3.0	-11.1	62.9	Peak [Scan]	H	100	0				FUND
Legend: DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency												
NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band												

Emission breaking the limit line is the fundamental. No spurious emissions found within 6 dB of the limit

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115 Vac Operation

Test Freq.	2437 MHz	Engineer	GMH
Variant	Digital Emissions	Temp (°C)	24
Freq. Range	30 MHz - 1000 MHz	Rel. Hum. (%)	33
Power Setting	18	Press. (mBars)	1004
Antenna	3xDipole J2, J4, J5 + 1 Leaky Coax J3		
Test Notes 1	115Vac, 802.11g - data rate 6 Mbit/s		
Test Notes 2	2.4 GHz notch filter used to attenuate the fundamental frequency		



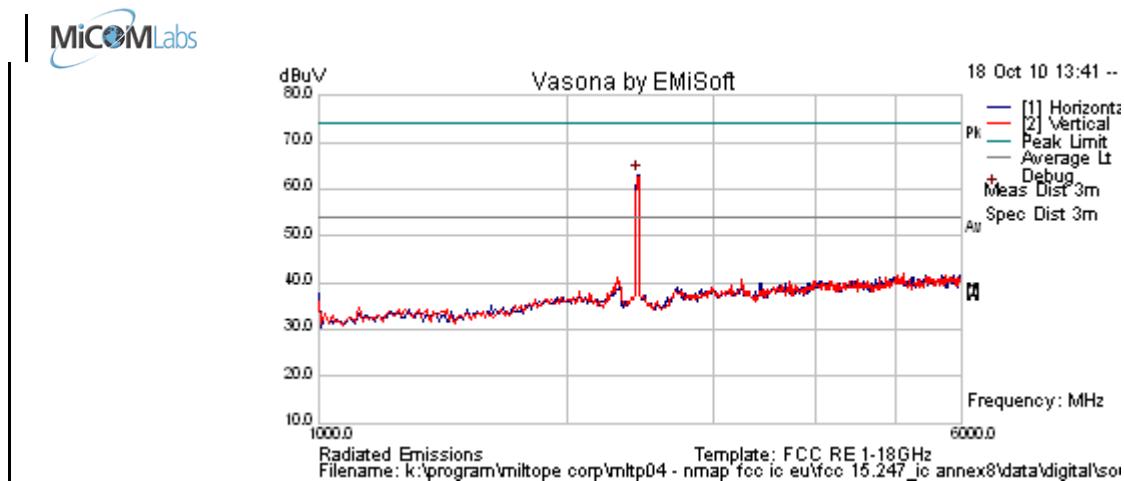
Formally measured emission peaks

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
74.559	43.5	3.9	-22.8	24.6	Quasi Max	H	354	187	40	-15.4	Pass	
30.589	37.0	3.4	-9.9	30.5	Quasi Max	V	110	343	40	-9.5	Pass	
64.783	47.5	3.9	-23.2	28.1	Quasi Max	V	262	124	40	-11.9	Pass	
149.995	41.0	4.5	-18.3	27.2	Quasi Max	V	152	167	43.5	-16.3	Pass	
874.998	39.5	7.2	-7.6	39.1	Quasi Max	V	98	178	46	-6.9	Pass	
256.885	48.9	5.0	-18.7	35.2	Quasi Max	H	142	348	46	-10.8	Pass	
Legend: DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band												

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115 Vac Operation

Test Freq.	2437 MHz	Engineer	GMH
Variant	Digital Emissions	Temp (°C)	24
Freq. Range	1000 MHz - 6000 MHz	Rel. Hum.(%)	33
Power Setting	18	Press. (mBars)	1004
Antenna	3xDipole J2, J4, J5 + 1 Leaky Coax J3		
Test Notes 1	115Vac, 802.11g - data rate 6 Mbit/s		
Test Notes 2	2.4 GHz notch filter used to attenuate the fundamental frequency		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2432.866	71.2	3.0	-11.1	63.0	Peak [Scan]	H	100	0				FUND
Legend: DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency												
NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band												

Emission breaking the limit line is the fundamental. No spurious emissions found within 6 dB of the limit

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7.9. ac Wireline Emissions

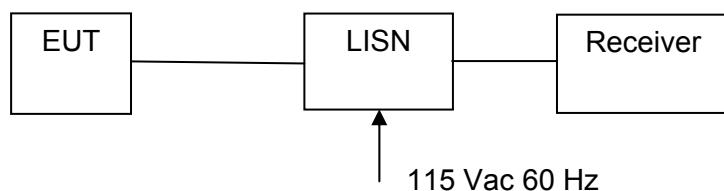
FCC, Part 15 Subpart C §15.207
Industry Canada RSS-Gen §7.2.2

Although the nMAP can be powered from 115 Vac it does not connect to the Public Utility Network and therefore ac Wireline Emissions were untested

Test Procedure

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

Test Measurement Set up



Measurement set up for AC Wireline Conducted Emissions Test

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

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7.10. Receiver Radiated Spurious Emissions (above 1 GHz)

Industry Canada RSS-Gen §4.10, §6

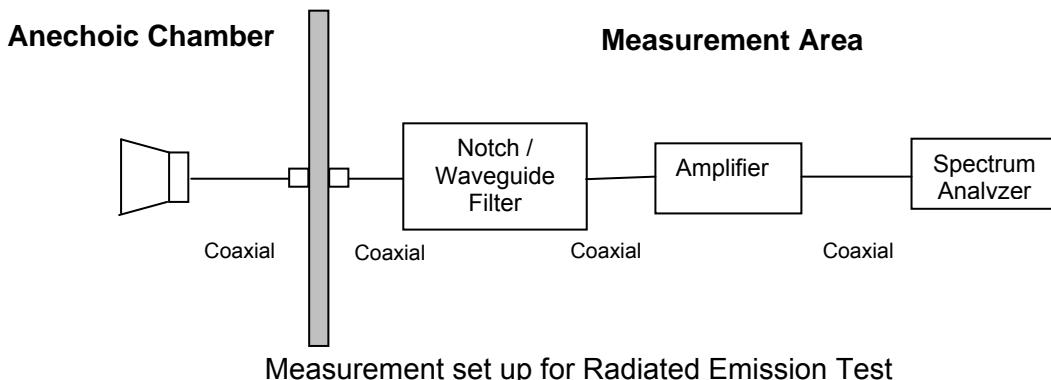
Test Procedure

Radiated emissions above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned.

All measurements on any frequency or frequencies over 1 MHz are based on the use of measurement instrumentation employing an average detector function. All measurements above 1 GHz were performed using a minimum resolution bandwidth of 1 MHz.

All Sectors of the EUT were tested simultaneously

Test Measurement Set up



Field Strength Calculation

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

$$FS = R + AF + CORR - FO$$

where: FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL - AG + NFL

CL = Cable Loss

AG = Amplifier Gain

FO = Distance Falloff Factor

NFL = Notch Filter Loss or Waveguide Loss

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For example:

Given receiver input reading of 51.5 dB μ V; 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:

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

Conversion between dB μ V/m (or dB μ V) and μ V/m (or μ V) are done as:

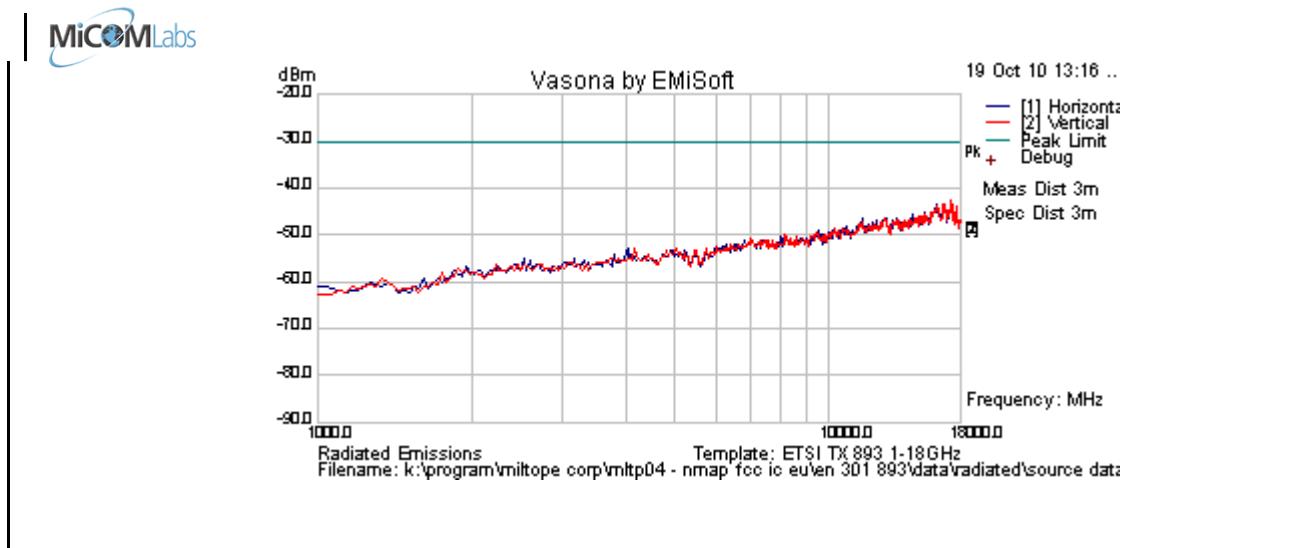
$$\text{Level (dB}\mu\text{V/m)} = 20 * \text{Log}(\text{level (}\mu\text{V/m)})$$

$$40 \text{ dB}\mu\text{V/m} = 100 \mu\text{V/m}$$

$$48 \text{ dB}\mu\text{V/m} = 250 \mu\text{V/m}$$

Receiver Radiated Spurious Emissions above 1 GHz

Test Freq.	All	Engineer	SB
Variant	802.11n; HT-40; 13.5 MCS	Temp (°C)	24.5
Freq. Range	1000 MHz - 12750 MHz	Rel. Hum.(%)	31
Power Setting	N/A	Press. (mBars)	1001
Antenna	1TLP3 / 901167-2 Rev D		
Test Notes 1			
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
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency												
ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps												

No receiver emissions observed

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Specification

Receiver Radiated Spurious Emissions

Industry Canada RSS-Gen §4.10,

The search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is the higher, to at least 3 times the highest tunable or local oscillator frequency, whichever is the higher, without exceeding 40 GHz.

RSS-Gen §6

The following receiver spurious emission limits shall be complied with;

(a) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table 1.

Frequency (MHz)	Field Strength (μ V/m)	Field Strength (dB μ V/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
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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

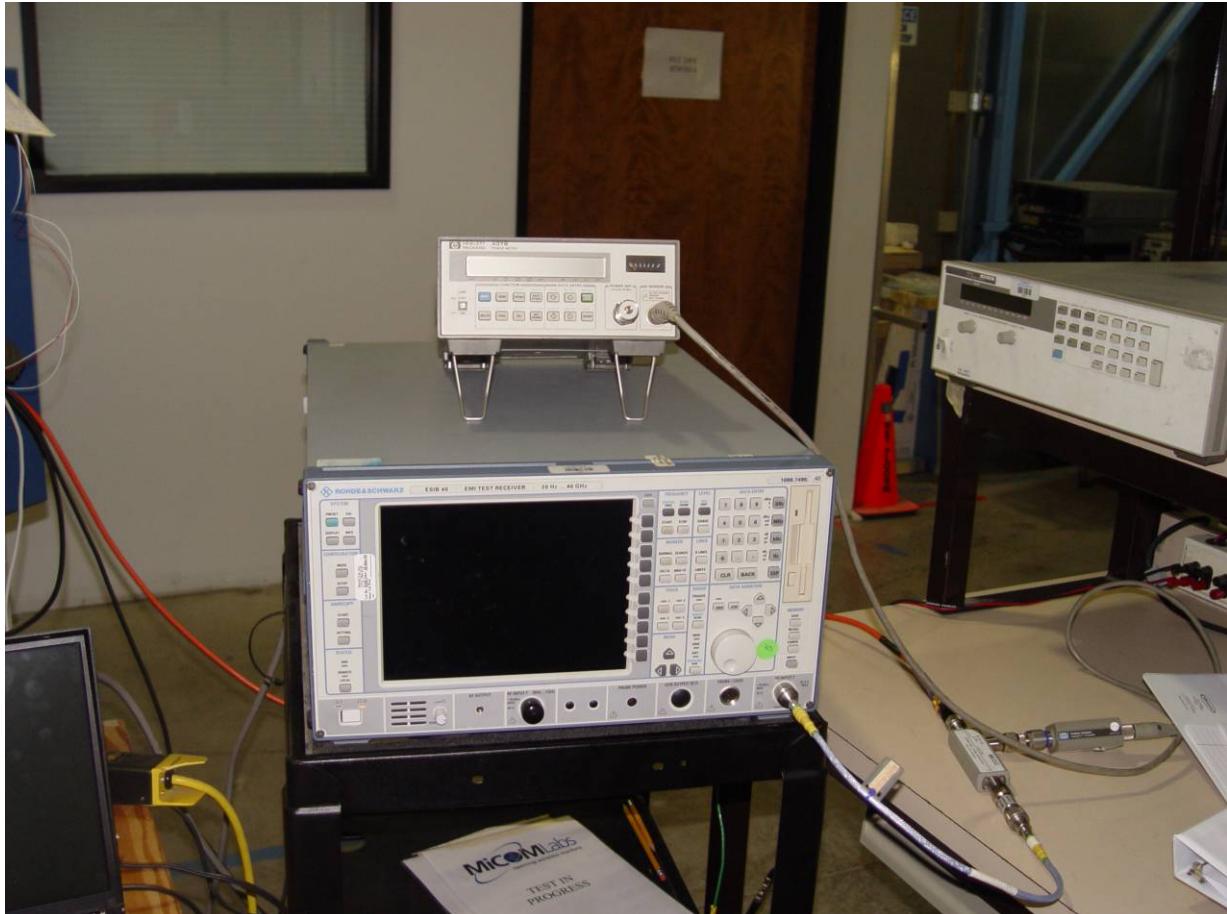
8. PHOTOGRAPHS

8.1. Environmental Test Set-up



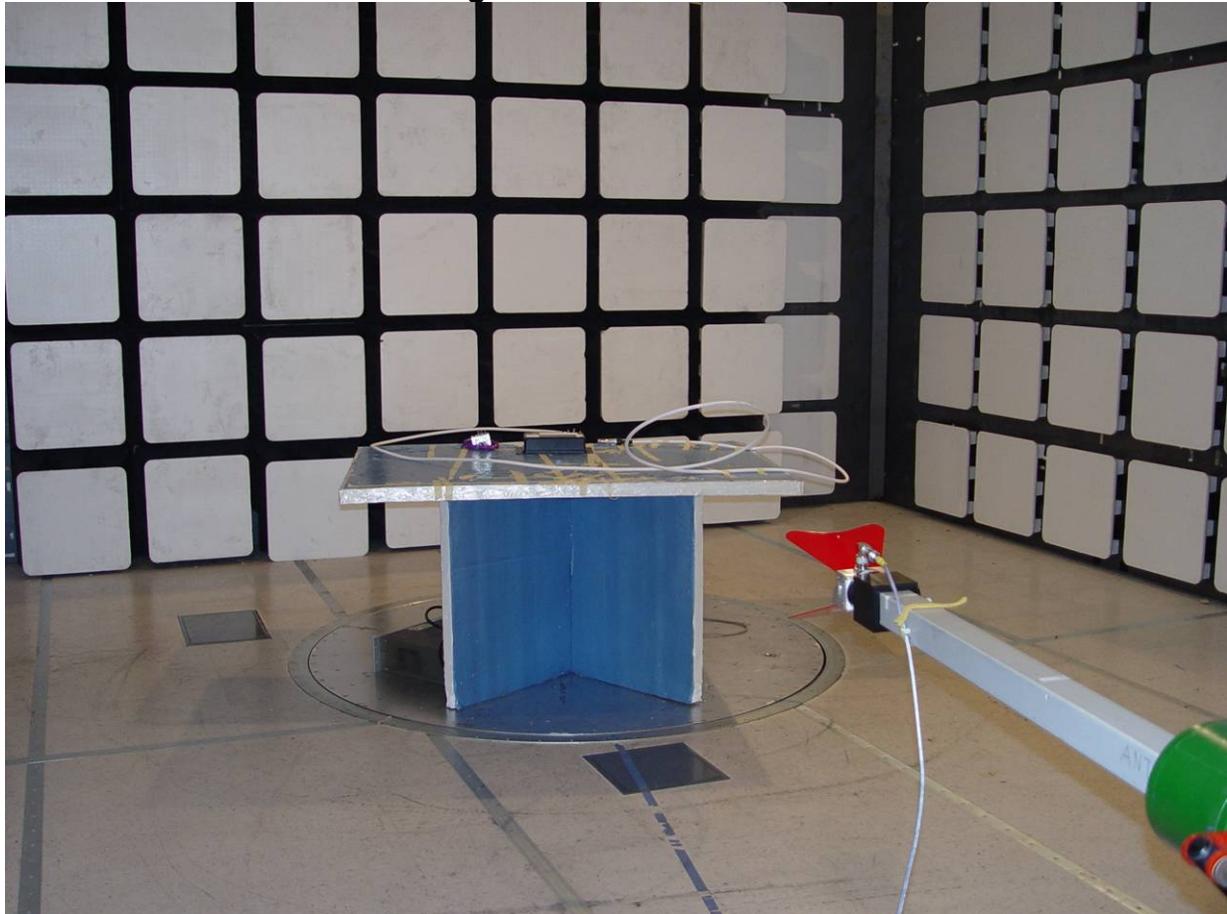
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8.2. Test Instrumentation



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8.3. Radiated Emission Testing



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Title: Miltope Corporation nMAP
To: FCC 47 CFR Part 15.247 & IC RSS-210
Serial #: MLTP04-U1 Rev A
Issue Date: 10th December 2010
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9. TEST EQUIPMENT DETAILS

Asset #	Instrument	Manufacturer	Model #	Serial #
0072	Signal Generator	Hewlett Packard	HP 83640A	2927A00105
0073	Power Supply Unit	Hewlett Packard	HP 6574A	US36340203
0074	Environmental Chamber	Tenney	TTC	12808-1
0075	Environmental Chamber	Thermatron	SE-300-2-2	27946
0083	Coupler	Hewlett Packard	HP 87301D	3116A00389
0098	Oscilloscope	Hewlett Packard	54810A	US38100105
0116	Power Sensor	Hewlett Packard	8485A	3318A19694
0117	Power Sensor	Hewlett Packard	8487D	3318A00371
0134	Amplifier	ComPower	PA-122	181910
0158	Barometer /Thermometer	Control Co.	4196	E2844
0193	EMI Receiver	Rhode & Schwartz	ESI 7	838496/007
0223	Power Meter	Hewlett Packard	HP EPM-442A	US37480256
0251	K-Cable	Megaphase	Sucoflex 104	Unknown
0252	K-Cable	Megaphase	Sucoflex 104	Unknown
0253	K-Cable	Megaphase	Sucoflex 104	Unknown
0256	K-Cable	Megaphase	Sucoflex 104	Unknown
0287	EMI Receiver	Rhode & Schwartz	ESIB 40	100201
0303	5.8 GHz Notch Filter	Micro-Tronics	BR50705	003
0304	2.4 GHz Notch Filter	MicroTronics	2.4 Notch	0001
0305	20M-2GHz Amplifier	ML	ML001	001
0310	2m SMA Cable	Micro-Coax	UFA210A-0-0787-3G03G0	209089-001
0312	3m SMA Cable	Micro-Coax	UFA210A-1-1181-3G0300	209092-001
0313	Coupler	Hewlett Packard	86205A	3140A01285
0314	30 dB N-Type Attenuator	ARRA	N944-30	1623
0335	Horn Antenna	The Electro-Mechanics Company	3117	00066580
0338	Antenna (30M-3GHz)	Sunol Sciences	JB3	A052907
Dipole	20MHz-1GHz Dipole Antennas	EMCO	3121C	9009-505

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