Test of GoNet Systems, GoBeam8000F (2x2)

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

Test Report Serial No.: GNET08-U3 (2x2) Rev C

TEST REPORT

FROM

Test of GoNet Systems, GoBeam8000F (2x2)

to

To FCC 47 CFR Part 15.247 & IC RSS-210

Test Report Serial No.: GNET08-U3 (2x2) Rev C

This report supersedes: GNET08-U3 (2x2) Rev B

Applicant: GoNet Systems
34 Habarzel Street
Tel Aviv 69710
Israel

Product Function: Wireless Access Point

Copy No: pdf Issue Date: 12th March 2014

This Test Report is Issued Under the Authority of;

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

ACCREDITED
TESTING CERT #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

This page has been left intentionally blank

TABLE OF CONTENTS

ACCREDITATION, LISTINGS & RECOGNITION

ACCREDITATION & LISTINGS

MiCOM Labs, Inc. an accredited laboratory complies with the international standard BS 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

RECOGNITION

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

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

**APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement.
Is a recognition agreement under which test lab is accredited to regulatory standards of the APEC member countries.
Phase I - recognition for product testing
Phase II – recognition for both product testing and certification
N/A – Not Applicable

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

**NB – Notified Body

PRODUCT CERTIFICATION

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

United States of America – Telecommunication Certification Body (TCB)
TCB Identifier – US0159

Industry Canada – Certification Body
CAB Identifier – US0159

Europe – Notified Body
Notified Body Identifier - 2280

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

DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft		
Rev C	11th March 2014	Section 5.1.1.2 Peak Output Power, for the lower gain antennas removed statement "NOTE: the antenna gain (dBi) includes beamforming gain"
Rev B	3rd March 2014	Implemented different FCC Section for Output Power limits, Section 15.247 (c) (2) (ii)
Rev A	27th February 2014	Initial release.

TEST RESULT CERTIFICATE

Manufacturer:	Go Net Systems Ltd 34 Habarzel Street Tel Aviv 69710 Israel	Tested By:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California, 94566, USA
EUT:	802.11a/b/g/n Wireless Access Point	Telephone:	+1 925 462 0304
Model:	GoBeam8000F (2x2)	Fax:	+1 925 462 0306
S/N's:	Not Available		
Test Date(s):	25th Nov 2013 - 10th Feb 2014	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:

ACCREDITED
TESTING CERT #2381.01

Graeme Grieve
Quality Manager MiCOM Labs,

Gordon Hurst
President & CEO MiCOM Labs, Inc.

1. REFERENCES AND MEASUREMENT UNCERTAINTY

1.1. Normative References

REF.	PUBLICATION	YEAR	TITLE
i.	FCC 47 CFR Part 15, Subpart C	2010	Title 47: Telecommunication PART 15—RADIO FREQUENCY DEVICES Subpart C—Intentional Radiators
ii.	RSS-210 Annex 8	2010	Radio Standards Specification 210, Issue 8, Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment
iii.	FCC OET KDB 662911	4th April 2011	Emissions Testing of Transmitters with Multiple Outputs in the Same Band
iv.	DA 00-705	2000	FCC DA 00-705 "Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems" released March 30, 2000
v.	RSS-GEN	2010	Radio Standards Specification-Gen, Issue 3, General Requirements and Information for the Certification of Radiocommunication Equipment
vi.	FCC 47 CFR Part 15, Subpart B	2010	47 CFR Part 15, SubPart B; Unintentional Radiators
vii.	ICES-003	2004	Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard Digital Apparatus; Issue 4
viii.	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
ix.	CISPR 22/ EN 55022	2008 2006+A1:2007	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
x.	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
xi.	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
xii.	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
xiii.	A2LA	July 2012	Reference to A2LA Accreditation Status – A2LA Advertising Policy

1.2. Test and Uncertainty Procedures

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

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

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

2. PRODUCT DETAILS AND TEST CONFIGURATIONS

2.1. Technical Details

Details	Description
Purpose:	Test of the GoNet Systems, GoBeam8000F (2x2) to FCC Part 15.247 and Industry Canada RSS-210 regulations.
Applicant:	Go Net Systems Ltd 34 Habarzel Street Tel Aviv 69710 Israel
Manufacturer:	**Manufacturer #1** Joy Technology (Shen Zhen) Co Ltd Shiyan Town, Shenzhen, China **Manufacturer #2** Accton Technology Corp 1 Creation 3rd Rd, Science-Based Industrial Park Hsinchu 300, Taiwan **Manufacturer #3** USR Electronic Systems 19 Napach St, Karmiel 21617 Israel **Manufacturer #4** RH Technologies 5 Ha'tzoref St., Har Yona Industrial Area Nazareth Ilite 17000 Israel
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton, California 94566 USA
Test report reference number:	GNET08-U3 (2x2) Rev C
Date EUT received:	25th November 2013
Standard(s) applied:	FCC 47 CFR Part 15.247 & IC RSS-210
Dates of test (from - to):	25th Nov 2013 - 10th Feb 2014
No of Units Tested:	One
Type of Equipment:	802.11a/b/g/n Wireless Access Point 2x2 Spatial Multiplexing MIMO configuration
Manufacturers Trade Name:	Wireless Access Point
Model(s):	GoBeam8000F
Location for use:	Outdoor
Declared Frequency Range(s):	2,400 – 2483.5, 5725 - 5850 MHz
Hardware Rev	1.0
Software Rev	4.17
EUT Modes of Operation:	Legacy 802.11a/b/g 802.11n HT-20, HT-40
Type of Modulation:	Per 802.11 – CCK, BPSK, QPSK, DSSS, OFDM
Declared NomOP Power (Ave):	+30 dBm
Transmit/Receive Operation:	Time Division Duplex

Technical Details Cont'd

Details	Description
System Beam Forming:	GoBeam8000F has antenna beam-forming capability
Rated Input Voltage and Current:	POE 56 Vdc, 1 A (Transmission mode)
Operating Temperature Range:	Declared range -40º to +55ºC
ITU Emission Designator:	802.11b 14M0G1D 802.11g 16M5D1D 802.11n HT-20 17M9D1D 802.11n HT-40 36M5D1D 802.11a 16M5D1D
Equipment Dimensions:	34.3 x 34.7 x 8.9 cm
Weight:	5 kg
Primary function of equipment:	Wireless Access Point for transmitting data and voice.

2.2. Scope of Test Program

GoBeam8000F 802.11 a/b/g/n Wireless Access Point

Operation of the GoBeam8000F
The GoBeam8000F can be used in multiple operational modes namely;

3x3 Spatial Multiplexing MIMO
2x2 Spatial Multiplexing MIMO
1x1 Single Chain

Through software control the same device can operate in any of the above operational modes. The GoBeam8000F will adjust the total output power depending on which mode is selected. It is for this reason that each of the above operational modes were tested against the standard. There are three test reports one for each mode;

MiCOM Labs Test Report GNET08-U3 (3x3)
MiCOM Labs Test Report GNET08-U3 (2x2)
MiCOM Labs Test Report GNET08-U3 (1x1)

The scope of the test program was to test the GoNet Systems, GoBeam8000F (2x2), configuration 2x2 Spatial Multiplexing MIMO in the frequency range 2400 – 2483.5 and 5725 – 5850 MHz for compliance against FCC 47 CFR Part 15.247 and Industry Canada RSS-210 specifications.

Two antenna types integral and external antennas were tested during the 2x2 program. As a result of being electrically different paths both paths required to be exercised. The exteral antenna port is limited to 5725 – 5850 MHz frequency band.

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

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

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

GoNet Systems, GoBeam8000F (2x2)

GoNet Systems, GoBeam8000F (2x2)

GoNet Systems, GoBeam8000F (2x2)

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

Type (EUT/ Support)	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
EUT	802.11a/b/g/n Wireless Access Point	GoNet Systems	GoBeam8000F	Unknown
Support	Power Over Ethernet	--	--	--
Support	Laptop PC	--	--	--

2.4. Antenna Details

Antenna Type:	Manufacturer	Model	Gain (dBi)	Frequency Range (MHz)
Patch (Sector)	GoNet Systems	AN000801	8.0	2400-2500
Directional Beam	GoNet Systems	AN000802	13.0	2400-2500
Patch (Sector)	GoNet Systems	AN000803	9.0	5725-5850
Directional Beam	GoNet Systems	AN000804	14.0	5725-5850

Beam forming Gain:	6 dB, applies to both 2.4 and 5.8 GHz frequency bands

2.5. Cabling and I/O Ports

Number and type of I/O ports

1. 1 x 100/1000 POE Ethernet
2. 1 x 100/1000 Ethernet
3. 1 x Serial Control
4. 1 x Ground Connection

2.6. Test Configurations

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

Operational Mode(s) (802.11a/n/ac)	Variant	Data Rate with Highest Power	Frequencies (MHz)
2.4 GHz			
b	Legacy	1 MBit/s	2,412 2,437 2,462
g	Legacy	6 MBit/s	
n	HT-20	6.5 (MCS 0)	
	HT-40	13.5 (MCS 0)	2,422 2,437 2,452
5.8 GHz			
a	Legacy	6 MBit/s	5,745 5,785 5,825
n	HT-20	6.5 (MCS 0)	
	HT-40	13.5 (MCS 0)	5,755 5,795

Legacy – data rates for 802.11abg products
Results for the above configurations are provided in this report

2.4 GHz Intended System Deployment

ANT1 Gain [dBi]	ANT2 Gain [dBi]	ANT3 Gain [dBi]	# Tx Channels	Correlated Array Gain [dBi]	Remarks
13.0	NA	NA	1	13.00	Single Antenna
8.0	8.0	NA	2	8.00	1. ANT1 & ANT2 are cross-polarized. 2. Signals can be either correlated or uncorrelated.
13.0	13.0	NA	2	13.00	1. ANT1 & ANT2 are cross-polarized. 2. Signals can be either correlated or uncorrelated.
13.0	13.0	8.0	3	13.00	1. Correlated signals 2. ANT1 & ANT2 are cross-polarized. 3. ANT2 & ANT3 are unequal antenna gains with equal transmit powers.
13.0	13.0	13.0	3	13.00	1. Correlated Signals 2. ANT1 & ANT2 are cross-polarized.
13.0	13.0	8.0	3	13.00	Uncorrelated signals
13.0	13.0	13.0	3	13.00	Uncorrelated signals

5.8 GHz Intended System Deployment

ANT1 Gain [dBi]	ANT2 Gain [dBi]	ANT3 Gain [dBi]	# Tx Channels	Correlated Array Gain [dBi]	Remarks
14.0	NA	NA	1	14.00	Single Antenna
9.0	9.0	NA	2	9.00	1. ANT1 & ANT2 are cross-polarized. 2. Signals can be either correlated or uncorrelated.
14.0	14.0	NA	2	14.00	1. ANT1 & ANT2 are cross-polarized. 2. Signals can be either correlated or uncorrelated.
14.0	14.0	9.0	3	14.00	1. Correlated signals 2. ANT1 & ANT2 are cross-polarized. 3. ANT2 & ANT3 are unequal antenna gains with equal transmit powers.
14.0	14.0	14.0	3	14.00	1. Correlated Signals 2. ANT1 & ANT2 are cross-polarized.
14.0	14.0	9.0	3	14.00	Uncorrelated signals
14.0	14.0	14.0	3	14.00	Uncorrelated signals
16.0	16.0	NA	2	16.00	1. ANT1 & ANT2 are cross-polarized. 2. Signals can be either correlated or uncorrelated. 3. Point to point application.

2.7. Equipment Modifications

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

1. NONE

2.8. Deviations from the Test Standard

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

1. NONE

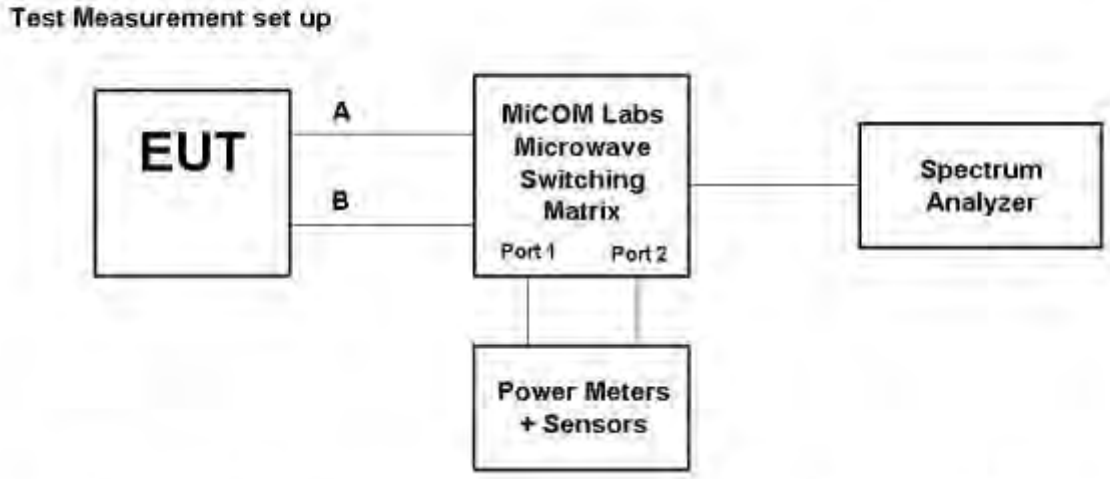
3. TEST EQUIPMENT CONFIGURATION(S)

3.1. Conducted RF Emission Test Set-up

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

1. Section 5.1.1.1. 6 dB and 99% Bandwidth
2. Section 5.1.1.2. Peak Output Power
3. Section 5.1.1.3. Power Spectral Density
4. Section 5.1.1.4. Conducted Spurious Emissions

Conducted Test Set-Up Pictorial Representation

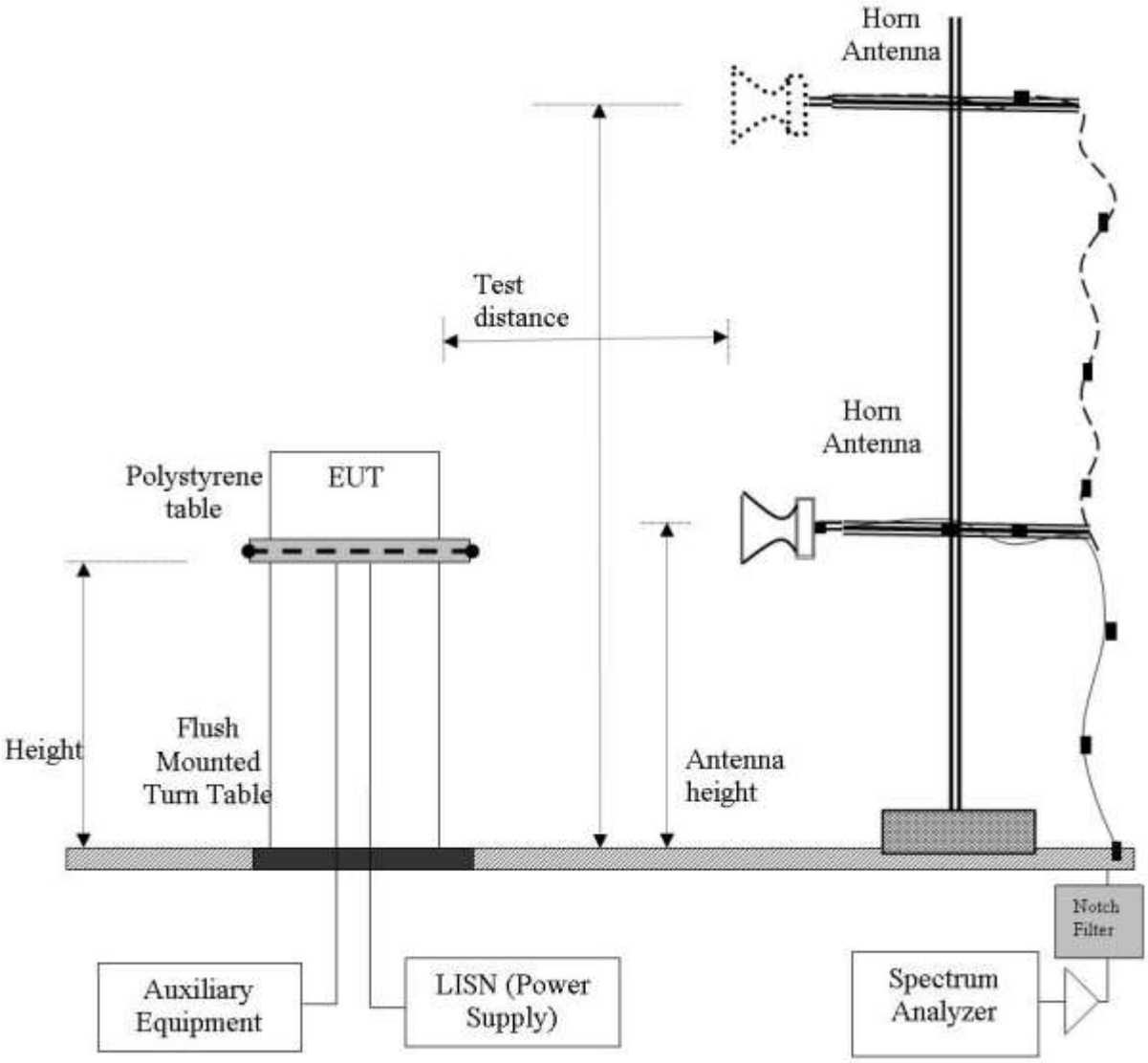


Conducted Test Measurement Setup with Environmental Temperature Cycling

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

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

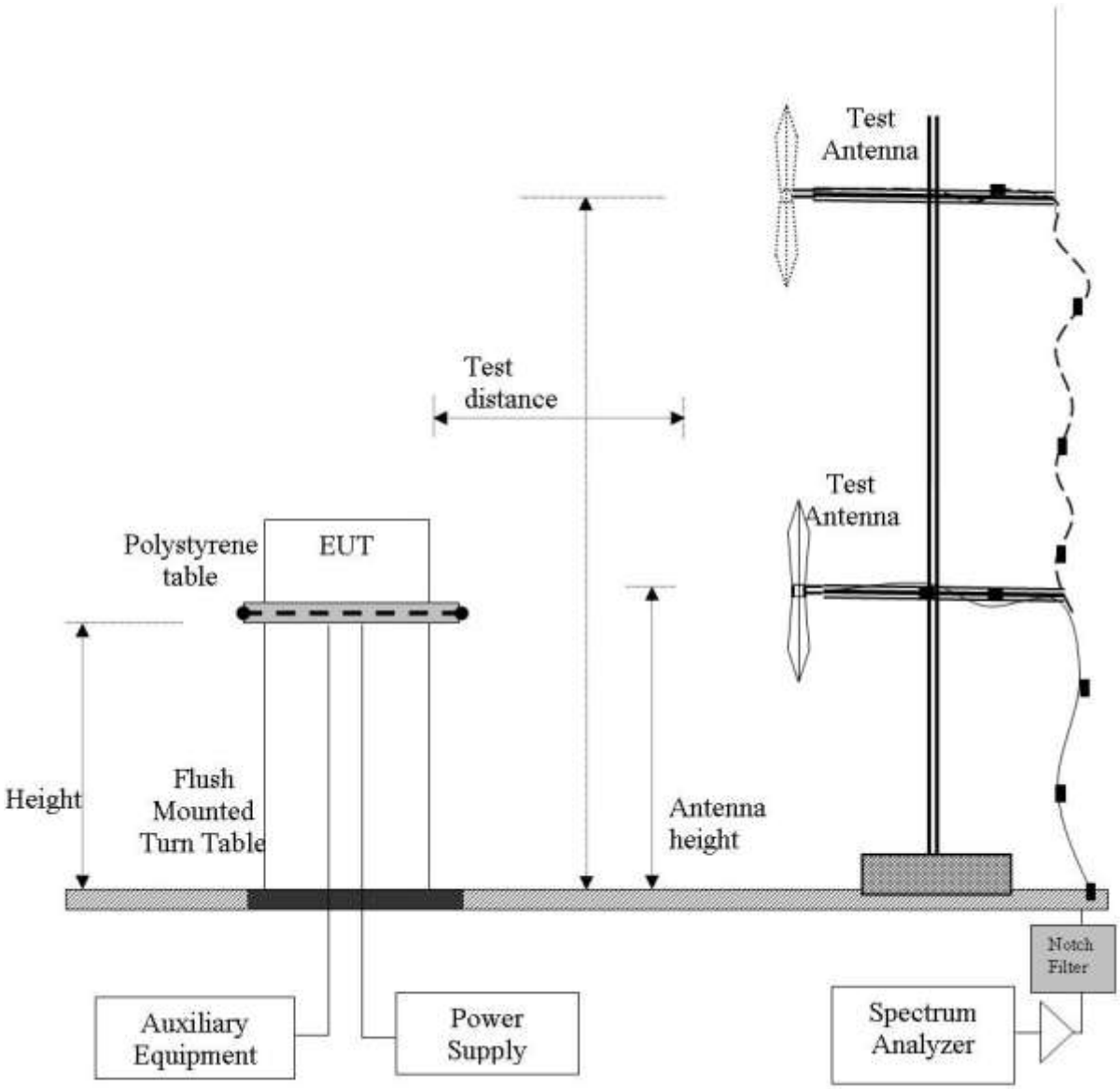
Radiated Emission Measurement Setup – Above 1 GHz



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

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

Digital Emission Measurement Setup – Below 1 GHz

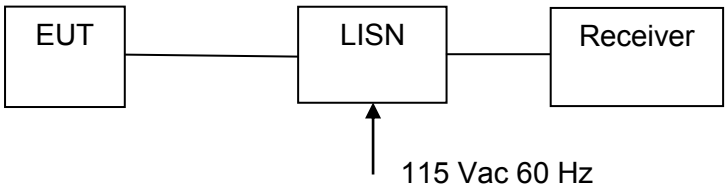


3.4. ac Wireline Emission Test Set-up

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

1. Section 5.1.3 ac Wireline Conducted Emissions

Conducted Test Set-Up Pictorial Representation



4. TEST SUMMARY

List of Measurements

The following table represents the list of measurements required under the **FCC CFR47 Part 15.247** and **Industry Canada RSS-210** and **Industry Canada RSS-Gen.**

Section(s)	Test Items	Description	Condition	Result	Test Report Section
15.247(a)(2) **A8.2(1)** **4.4**	6 dB and 99 % Bandwidths	≥500 kHz	Conducted	Complies	5.1.1.1
15.247(b)(3) **15.31(e)** **A8.4(4)**	Peak Output Power Voltage Variation	Shall not exceed 1W Variation of supply voltage 85 % -115 %	Conducted	Complies	5.1.1.2
15.247(e) **A8.2**	Peak Power Spectral Density	Shall not be greater than +8 dBm in any 3 kHz band	Conducted	Complies	5.1.1.3
15.247(d) **15.205 / 15.209** **A8.5** **2.2** **4.7**	Spurious Emissions (30MHz - 26 GHz b/g and 30 MHz – 40 GHz a)	The radiated emission in any 100 kHz of out-band shall be at least 20 dB below the highest in-band spectral density	Conducted	Complies	5.1.1.4

List of Measurements (continued)

The following table represents the list of measurements required under the **FCC CFR47 Part 15.247, Industry Canada RSS-210,** and **Industry Canada RSS-Gen.**

Section(s)	Test Items	Description	Condition	Result	Test Report Section
15.247(d) **15.205 /** **15.209** **A8.5** **2.2** **2.6** **4.7**	Radiated Emissions	Restricted Bands	Radiated	Complies	5.1.2
	Transmitter Radiated Spurious Emissions	Emissions above 1 GHz		Complies	
	Radiated Band Edge	Band-edge results Peak Emissions		Complies	
15.205 / **15.209** **2.2**	Radiated Spurious Emissions	Emissions <1 GHz (30M-1 GHz)	Radiated	Complies	*5.1.2.4*
15.207 **7.2.2**	AC Wireline Conducted Emissions 150 kHz–30 MHz	Conducted Emissions	Conducted	Complies	*5.1.3*

Note 1: *Test results reported in this document relate only to the items tested*
Note 2: *The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria*
Note 3: *Section 2.7 Equipment Modifications highlights the equipment modifications that were required to bring the product into compliance with the above test matrix*

5. TEST RESULTS

5.1. Device Characteristics

5.1.1. Conducted Testing

5.1.1.1. 6 dB and 99 % Bandwidth

Conducted Test Conditions for 6 dB and 99% Bandwidth			
Standard:	FCC CFR 47:15.247	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	6 dB and 99 % Bandwidth	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.247 (a)(2)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	KDB 558074 - D01 DTS Measurement Guidance v01: Section 5.1 Emission Bandwidth		

Test Procedure for 6 dB and 99% Bandwidth Measurement
The bandwidth at 6 dB and 99 % was measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

Integral Antenna Ports

Equipment Configuration for 6 dB & 99% Bandwidth

Variant:	802.11b	**Duty Cycle (%):**	99
Data Rate:	1 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	CCK	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
2412.0	10.261	10.261	--	--	10.261	10.261	≥500.0	-9.76
2437.0	10.261	10.261	--	--	10.261	10.261	≥500.0	-9.76
2462.0	10.180	10.180	--	--	10.180	10.180	≥500.0	-9.68

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
2412.0	14.028	14.028	--	--	14.028		
2437.0	14.269	14.028	--	--	14.269		
2462.0	13.788	13.788	--	--	13.788		

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

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

Equipment Configuration for 6 dB & 99% Bandwidth			
Variant:	802.11g	**Duty Cycle (%):**	97
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
2412.0	15.952	15.952	--	--	15.952	15.952	≥500.0	-15.45
2437.0	16.513	16.513	--	--	16.513	16.513	≥500.0	-16.01
2462.0	15.872	15.872	--	--	15.872	15.872	≥500.0	-15.37

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
2412.0	18.918	18.838	--	--	18.918		
2437.0	17.555	16.754	--	--	17.555		
2462.0	17.315	16.673	--	--	17.315		

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

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

Equipment Configuration for 6 dB & 99% Bandwidth			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
2412.0	16.513	16.513	--	--	16.513	16.513	≥500.0	-16.01
2437.0	17.555	17.715	--	--	17.715	17.555	≥500.0	-17.06
2462.0	16.513	16.513	--	--	16.513	16.513	≥500.0	-16.01

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
2412.0	18.597	18.597	--	--	18.597		
2437.0	18.517	17.876	--	--	18.517		
2462.0	18.277	17.715	--	--	18.277		

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

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

Equipment Configuration for 6 dB & 99% Bandwidth			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
2422.0	36.072	36.072	--	--	36.072	36.072	≥500.0	-35.57
2437.0	36.553	36.072	--	--	36.553	36.072	≥500.0	-35.57
2452.0	36.072	36.072	--	--	36.072	36.072	≥500.0	-35.57

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
2422.0	38.798	36.874	--	--	38.798		
2437.0	36.553	36.553	--	--	36.553		
2452.0	37.515	36.393	--	--	37.515		

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

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

Equipment Configuration for 6 dB & 99% Bandwidth

Variant:	802.11a	**Duty Cycle (%):**	97
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
5745.0	15.711	16.433	--	--	16.433	15.711	≥500.0	-15.21
5785.0	16.513	15.872	--	--	16.513	15.872	≥500.0	-15.37
5825.0	16.513	14.429	--	--	16.513	14.429	≥500.0	-13.93

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
5745.0	16.593	16.593	--	--	16.593		
5785.0	16.673	16.513	--	--	16.673		
5825.0	17.074	16.433	--	--	17.074		

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

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

Equipment Configuration for 6 dB & 99% Bandwidth			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
5745.0	15.391	17.475	--	--	17.475	15.391	≥500.0	-14.89
5785.0	15.952	17.234	--	--	17.234	15.952	≥500.0	-15.45
5825.0	15.311	17.395	--	--	17.395	15.311	≥500.0	-14.81

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
5745.0	17.475	17.876	--	--	17.876		
5785.0	17.635	17.796	--	--	17.796		
5825.0	17.796	17.796	--	--	17.796		

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

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

Equipment Configuration for 6 dB & 99% Bandwidth			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
5755.0	36.072	35.752	--	--	36.072	35.752	≥500.0	-35.25
5795.0	35.591	36.232	--	--	36.232	35.591	≥500.0	-35.09

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
5755.0	36.713	36.713	--	--	36.713		
5795.0	36.393	36.393	--	--	36.393		

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

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

External Antenna Ports

Equipment Configuration for 6 dB & 99% Bandwidth			
Variant:	802.11a	**Duty Cycle (%):**	96
Data Rate:	6.0 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Test Frequency	Measured 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
5745.0	16.192	16.433	--	--	16.433	16.192	≥500.0	-15.69
5785.0	16.273	16.273	--	--	16.273	16.273	≥500.0	-15.77
5825.0	16.273	16.192	--	--	16.273	16.192	≥500.0	-15.69

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
5745.0	18.036	18.838	--	--	18.838		
5785.0	17.475	17.475	--	--	17.475		
5825.0	17.635	17.555	--	--	17.635		

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

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

Equipment Configuration for 6 dB & 99% Bandwidth			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Test Frequency	Measured 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
5745.0	17.555	17.315	--	--	17.555	17.315	≥500.0	-16.82
5785.0	17.315	17.555	--	--	17.555	17.315	≥500.0	-16.82
5825.0	17.315	17.234	--	--	17.315	17.234	≥500.0	-16.73

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
5745.0	18.998	19.158	--	--	19.158		
5785.0	18.277	18.277	--	--	18.277		
5825.0	18.597	18.196	--	--	18.597		

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

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

Equipment Configuration for 6 dB & 99% Bandwidth			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Test Frequency	Measured 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
5755.0	36.232	36.072	--	--	36.232	36.072	≥500.0	-35.57
5795.0	35.912	36.553	--	--	36.553	35.912	≥500.0	-35.41

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
5755.0	36.553	37.034	--	--	37.034		
5795.0	36.553	36.553	--	--	36.553		

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

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

Specification Limits

§15.247 (a)(2) & RSS-210 §A8.2(1)
The minimum 6 dB bandwidth shall be at least 500 kHz.

§ IC RSS-Gen 4.4.1 Occupied Bandwidth When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

§ IC RSS-Gen 4.4.2 6 dB Bandwidth Where indicated, the 6 dB bandwidth is measured at the points when the spectral density of the signal is 6 dB down from the in –band spectral density of the modulated signal, with the transmitter modulated by a representative signal.

Traceability

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

5.1.1.2. Peak Output Power

Conducted Test Conditions for Fundamental Emission Output Power			
Standard:	FCC CFR 47:15.247	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Emission Output Power	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.247 (a)(2)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	KDB 558074 - D01 DTS Measurement Guidance v01: Section 5.2 Fundamental Emission Output Power KDB 662911 was implemented for In-band power measurements. The measure and sum technique was implemented in all cases.		

Test Procedure for Fundamental Emission Output Power Measurement

Selection of the detector type is determined by the client, either a peak detector or average power detector can be selected however the same detector type **must** be used for each of the following tests;

A). Output Power

B).. Power Density

C).. Conducted Spurious Emissions

Average Power
To measure average power a power meter measuring average power is implemented

Peak Detector
To measure peak power a spectrum analyser is used with the peak detector selected. The transmitter terminal of EUT was connected to the input of the spectrum analyser. The resolution filter bandwidth was set for 6 dB and the analyzers built-in power function used to integrate peak power over the EUT's 20 dB bandwidth.

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

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

(2) In addition to the provisions in paragraphs (b)(1), (b)(3), (b)(4) and (c)(1)(i) of this section, transmitters operating in the 2400-2483.5 MHz band that emit multiple directional beams, simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers provided the emissions comply with the following:

(i) Different information must be transmitted to each receiver

(ii) If the transmitter employs an antenna system that emits multiple directional beams but does not do emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device, i.e., the sum of the power supplied to all antennas, antenna elements, staves, etc. and summed across all carriers or frequency channels, shall not exceed the limit specified in paragraph (b)(1) or (b)(3) of this section, as applicable. However, the total conducted output power shall be reduced by 1 dB below the specified limits for each 3 dB that the directional gain of the antenna/antenna array exceeds 6 dBi. The directional antenna gain shall be computed as follows:

(A) The directional gain shall be calculated as the sum of 10 log (number of array elements or staves) plus the directional gain of the element or stave having the highest gain.

(B) A lower value for the directional gain than that calculated in paragraph (c) (2) (ii) (A) of this section will be accepted if sufficient evidence is presented, e.g., due to shading of the array or coherence loss in the beamforming.

Integral Antenna Ports

Equipment Configuration for Average Output Power			
Variant:	802.11b	**Duty Cycle (%):**	99.0
Data Rate:	1 MBit/s	**Antenna Gain (dBi):**	8.00
Modulation:	CCK	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
2412.0	24.63	23.95	--	--	27.32	28.00	-0.68	19.50
2437.0	24.64	24.09	--	--	27.39	28.00	-0.61	19.00
2462.0	24.66	23.46	--	--	27.12	28.00	-0.88	18.00

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

Equipment Configuration for Average Output Power			
Variant:	802.11g	**Duty Cycle (%):**	97.1
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	8.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
2412.0	24.58	24.26	--	--	27.43	28.00	-0.57	18.50
2437.0	24.71	23.81	--	--	27.29	28.00	-0.71	18.00
2462.0	24.66	23.39	--	--	27.08	28.00	-0.92	18.00

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

Equipment Configuration for Average Output Power

Variant:	802.11n HT-20	**Duty Cycle (%):**	96.9
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	8.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
2412.0	24.59	23.52	--	--	27.09	28.00	-0.91	19.00
2437.0	24.49	24.05	--	--	27.28	28.00	-0.72	18.00
2462.0	24.50	23.30	--	--	26.95	28.00	-1.05	18.00

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

Equipment Configuration for Average Output Power

Variant:	802.11n HT-40	**Duty Cycle (%):**	95.0
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	8.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
2422.0	24.49	24.89	--	--	27.71	28.00	-0.29	18.50
2437.0	24.63	25.00	--	--	27.83	28.00	-0.17	18.00
2452.0	24.54	25.22	--	--	27.91	28.00	-0.09	18.50

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

Equipment Configuration for Average Output Power

Variant:	802.11a	**Duty Cycle (%):**	96.9
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	9.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5745.0	23.22	23.65	--	--	26.45	27.00	-0.55	20.00
5785.0	22.79	23.92	--	--	26.40	27.00	-0.60	20.00
5825.0	23.60	24.09	--	--	26.86	27.00	-0.14	20.00

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

Equipment Configuration for Average Output Power

Variant:	802.11n HT-20	**Duty Cycle (%):**	96.9
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	9.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5745.0	22.59	23.42	--	--	26.03	27.00	-0.97	19.50
5785.0	23.39	23.21	--	--	26.31	27.00	-0.69	20.50
5825.0	23.80	23.47	--	--	26.65	27.00	-0.35	20.00

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

Equipment Configuration for Average Output Power

Variant:	802.11n HT-40	**Duty Cycle (%):**	94.9
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	9.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5755.0	23.04	22.64	--	--	25.85	27.00	-1.15	24.00
5795.0	22.75	22.11	--	--	25.45	27.00	-1.55	22.00

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

External Antenna Ports

As a result of a 2nd harmonic issue with the external antenna ports on the 5725 – 5850 MHz the power setting was reduced from 24 to 16. The conducted power values in the following table were found to be maximum to meet regulatory compliance requirements.

Equipment Configuration for Average Output Power

Variant:	802.11a	**Duty Cycle (%):**	96.4
Data Rate:	6.0 MBit/s	**Antenna Gain (dBi):**	16.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5745.0	13.01	14.01	--	--	16.55	30.00	-13.45	16
5785.0	13.51	12.42	--	--	16.01	30.00	-13.99	16
5825.0	14.94	12.8	--	--	17.01	30.00	-12.99	16

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

NOTE: the antenna gain (dBi) includes beamforming gain

Limits - 15.247 (b) (4) (ii) 5725 – 5850 MHz Pt-Pt Operation

Equipment Configuration for Average Output Power

Variant:	802.11n HT-20	**Duty Cycle (%):**	96.6
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	16.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5745.0	13.21	13.21	--	--	16.22	30.00	-13.78	16
5785.0	13.32	12.41	--	--	15.90	30.00	-14.10	16
5825.0	15.01	12.75	--	--	17.04	30.00	-12.96	16

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

NOTE: the antenna gain (dBi) includes beamforming gain

Limits - 15.247 (b) (4) (ii) 5725 – 5850 MHz Pt-Pt Operation

Equipment Configuration for Average Output Power			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95.0
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	16.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5755.0	13.40	13.35	--	--	16.39	30.00	-13.61	16
5795.0	13.75	12.32	--	--	16.10	30.00	-13.90	16

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

NOTE: the antenna gain (dBi) includes beamforming gain

Limits - 15.247 (b) (4) (ii) 5725 – 5850 MHz Pt-Pt Operation

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.

§ RSS-210 A8.4(4) For systems employing digital modulation techniques operating in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands the maximum peak conducted power shall not exceed 1 watt.

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-01 'Measuring RF Output Power'	0158, 0287, 0252, 0313, 0314, 0070, 0116, 0117

5.1.1.3. Power Spectral Density

Conducted Test Conditions for Power Spectral Density			
Standard:	FCC CFR 47:15.247	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Power Spectral Density	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.247 (e)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	KDB 558074 - D01 DTS Measurement Guidance v01: Section 5.3 Maximum Power Spectral Density Level in the Emission Bandwidth		

Test Procedure for Power Spectral Density

The transmitter output was connected to a spectrum analyzer and the maximum spectral emission was measured in a 30 kHz bandwidth for each antenna chain. Sweep time was auto selected by the analyzer which was set for max hold. Once the maximum emission was found the emission(s) were summed for each chain.

As the FCC limit is provided for a 3 kHz resolution bandwidth the measured data required to be converted.

Spectral Density Conversion Factor

10 * Log (3 kHz / measurement bandwidth) = 10 * Log (3/30) = -10dB

Detector Selection

Selection of the analyzer detector is determined by the client, however the same detector type **must** be used for each of the following tests;

A). Output Power
B).. Power Density
C).. Conducted Spurious Emissions

Supporting Information

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

Limit Line: KDB 662911 was implemented for In-band power spectral density (PSD) measurements - Option (2) measure and subtract 10 log (N) dB from the limit for devices with multiple RF ports.

Integral Antenna Ports

Equipment Configuration for Power Spectral Density - Average

Variant:	802.11b	**Duty Cycle (%):**	99
Data Rate:	1 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	CCK	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBm)				Calculated Total Power Spectral Density		Limit	Margin
	Port(s)				dBm			
MHz	a	b	c	d	Σ Port(s) per 30kHz RBW	Conversion to 3 kHz RBW	dBm	dB
2412.0	5.591	4.580	--	--	8.125	-1.875	8.00	-9.88
2437.0	5.158	4.616	--	--	7.906	-2.094	8.00	-10.09
2462.0	4.573	3.332	--	--	7.007	-2.993	8.00	-10.99

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

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

Equipment Configuration for Power Spectral Density - Average			
Variant:	802.11g	**Duty Cycle (%):**	97
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBm)				Calculated Total Power Spectral Density		Limit	Margin
	Port(s)				dBm			
MHz	a	b	c	d	Σ Port(s) per 30kHz RBW	Conversion to 3 kHz RBW	dBm	dB
2412.0	3.825	3.076	--	--	6.477	-3.523	8.00	-11.52
2437.0	2.560	1.756	--	--	5.187	-4.813	8.00	-12.81
2462.0	3.090	1.933	--	--	5.560	-4.440	8.00	-12.44

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

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

Equipment Configuration for Power Spectral Density - Average			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBm)				Calculated Total Power Spectral Density		Limit	Margin
	Port(s)				dBm			
MHz	a	b	c	d	Σ Port(s) per 30kHz RBW	Conversion to 3 kHz RBW	dBm	dB
2412.0	3.531	2.160	--	--	5.910	-4.090	8.00	-12.09
2437.0	3.097	2.124	--	--	5.648	-4.352	8.00	-12.35
2462.0	2.901	1.728	--	--	5.364	-4.636	8.00	-12.64

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

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

Equipment Configuration for Power Spectral Density - Average			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBm)				Calculated Total Power Spectral Density		Limit	Margin
	Port(s)				dBm			
MHz	a	b	c	d	Σ Port(s) per 30kHz RBW	Conversion to 3 kHz RBW	dBm	dB
2422.0	-1.246	-0.018	--	--	2.422	-7.578	8.00	-15.58
2437.0	-1.791	-1.604	--	--	1.314	-8.686	8.00	-16.69
2452.0	-0.908	-2.003	--	--	1.589	-8.411	8.00	-16.41

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

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

Equipment Configuration for Power Spectral Density - Average			
Variant:	802.11a	**Duty Cycle (%):**	97
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBm)				Calculated Total Power Spectral Density		Limit	Margin
	Port(s)				dBm			
MHz	a	b	c	d	Σ Port(s) per 30kHz RBW	Conversion to 3 kHz RBW	dBm	dB
5745.0	2.943	5.486	--	--	7.408	-2.592	8.00	-10.59
5785.0	2.637	3.966	--	--	6.362	-3.638	8.00	-11.64
5825.0	2.724	5.238	--	--	7.171	-2.829	8.00	-10.83

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

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

Equipment Configuration for Power Spectral Density - Average			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBm)				Calculated Total Power Spectral Density		Limit	Margin
	Port(s)				dBm			
MHz	a	b	c	d	Σ Port(s) per 30kHz RBW	Conversion to 3 kHz RBW	dBm	dB
5745.0	2.979	2.893	--	--	5.947	-4.053	8.00	-12.05
5785.0	2.349	3.348	--	--	5.887	-4.113	8.00	-12.11
5825.0	4.380	3.334	--	--	6.899	-3.101	8.00	-11.10

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

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

Equipment Configuration for Power Spectral Density - Average			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBm)				Calculated Total Power Spectral Density		Limit	Margin
	Port(s)				dBm			
MHz	a	b	c	d	Σ Port(s) per 30kHz RBW	Conversion to 3 kHz RBW	dBm	dB
5755.0	-2.431	-0.610	--	--	1.585	-8.415	8.00	-16.42
5795.0	-2.825	-4.566	--	--	-0.599	-10.599	8.00	-18.60

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

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

External Antenna Ports

Equipment Configuration for Power Spectral Density - Average

Variant:	802.11a	**Duty Cycle (%):**	96
Data Rate:	6.0 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBm)				Calculated Total Power Spectral Density		Limit	Margin
	Port(s)				dBm			
MHz	a	b	c	d	Σ Port(s) per 30kHz RBW	Conversion to 3 kHz RBW	dBm	dB
5745.0	1.624	3.323	--	--	5.566	-4.434	8.00	-12.43
5785.0	1.476	0.151	--	--	3.874	-6.126	8.00	-14.13
5825.0	2.841	1.234	--	--	5.122	-4.878	8.00	-12.88

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

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

Equipment Configuration for Power Spectral Density - Average			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBm)				Calculated Total Power Spectral Density		Limit	Margin
	Port(s)				dBm			
MHz	a	b	c	d	Σ Port(s) per 30kHz RBW	Conversion to 3 kHz RBW	dBm	dB
5745.0	1.314	1.263	--	--	4.299	-5.701	8.00	-13.70
5785.0	1.283	0.153	--	--	3.765	-6.235	8.00	-14.24
5825.0	2.559	0.311	--	--	4.589	-5.411	8.00	-13.41

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

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

Equipment Configuration for Power Spectral Density - Average			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBm)				Calculated Total Power Spectral Density		Limit	Margin
	Port(s)				dBm			
MHz	a	b	c	d	Σ Port(s) per 30kHz RBW	Conversion to 3 kHz RBW	dBm	dB
5755.0	-3.733	-3.293	--	--	-0.497	-10.497	8.00	-18.50
5795.0	-2.803	-3.986	--	--	-0.344	-10.344	8.00	-18.34

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

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 **RSS-210** §**A8.2(2)** The transmitter power spectral density (into the antenna) shall not be greater than +8 dBm in any 3 kHz band during any time interval of continuous transmission or over 1.0 second if the transmission exceeds 1.0 second duration.

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-01 'Measuring RF Output Power'	0158, 0287, 0252, 0313, 0314, 0070, 0116, 0117

5.1.1.4. Conducted Spurious Emissions

Conducted Test Conditions for Transmitter Conducted Spurious and Band-Edge Emissions			
Standard:	FCC CFR 47:15.247	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Max Unwanted Emission Levels	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.247 (d)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	KDB 558074 - D01 DTS Measurement Guidance v01: Section 5.4 Maximum Unwanted Emission Levels		

Test Procedure for Transmitter Conducted Spurious and Band-Edge Emissions Measurement
Transmitter Conducted Spurious and Band-Edge emissions were measured with a spectrum analyzer connected to the antenna terminal using one of the following limits;

1).. Peak Detector - 20 dB below the highest in-band spectral density (i.e. 20 dBc)

2).. Average Detector – 30 dB below the highest in-band spectral density (i.e. 30 dBc)

Selection of the analyzer detector is determined by the client, however the same detector type **must** be used for each of the following tests;

A). Output Power

B).. Power Density

C).. Conducted Spurious Emissions

Measurements were made while EUT was operating in transmit mode of operation at the appropriate centre frequency closest to the band-edge. Emissions were maximized during the measurement and limits derived from the peak spectral power and drawn on each plot.

Integral Antenna Ports

Equipment Configuration for Conducted Low Band-Edge Emissions - Average

Variant:	802.11b	**Duty Cycle (%):**	99
Data Rate:	1 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	CCK	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Channel Frequency:	2412.0 MHz
Band-Edge Frequency:	2400.0 MHz
Test Frequency Range:	2350.0 - 2422.0 MHz

Port(s)	Band-Edge Markers and Limit			Amended Limit		Margin
	M1 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
a	-50.16	-23.38	2403.10	--	--	-3.100
b	-51.34	-24.18	2403.10	--	--	-3.100

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted Low Band-Edge Emissions - Average			
Variant:	802.11g	**Duty Cycle (%):**	97
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Channel Frequency:	2412.0 MHz
Band-Edge Frequency:	2400.0 MHz
Test Frequency Range:	2350.0 - 2422.0 MHz

Port(s)	Band-Edge Markers and Limit			Amended Limit		Margin
	M1 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
a	-26.87	-25.02	2400.40	--	--	-0.400
b	-28.34	-26.00	2400.60	--	--	-0.600

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted Low Band-Edge Emissions - Average			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Channel Frequency:	2412.0 MHz
Band-Edge Frequency:	2400.0 MHz
Test Frequency Range:	2350.0 - 2422.0 MHz

Port(s)	Band-Edge Markers and Limit			Amended Limit		Margin
	M1 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
a	-28.22	-25.79	2400.60	--	--	-0.600
b	-29.57	-27.03	2400.90	--	--	-0.900

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted Low Band-Edge Emissions - Average			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Channel Frequency:	2422.0 MHz
Band-Edge Frequency:	2400.0 MHz
Test Frequency Range:	2292.0 - 2442.0 MHz

Port(s)	Band-Edge Markers and Limit			Amended Limit		Margin
	M1 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
a	-30.86	-29.13	2400.50	--	--	-0.500
b	-30.36	-28.49	2400.50	--	--	-0.500

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted Low Band-Edge Emissions - Average			
Variant:	802.11a	**Duty Cycle (%):**	97
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Channel Frequency:	5745.0 MHz
Band-Edge Frequency:	5725.0 MHz
Test Frequency Range:	5683.0 - 5755.0 MHz

Port(s)	Band-Edge Markers and Limit			Amended Limit		Margin
	M1 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
a	-36.55	-26.24	5733.10	--	--	-8.100
b	-36.85	-24.29	5734.20	--	--	-9.200

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted Low Band-Edge Emissions - Average			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Channel Frequency:	5745.0 MHz
Band-Edge Frequency:	5725.0 MHz
Test Frequency Range:	5683.0 - 5755.0 MHz

Port(s)	Band-Edge Markers and Limit			Amended Limit		Margin
	M1 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
a	-38.60	-26.95	5733.60	--	--	-8.600
b	-38.30	-25.73	5733.10	--	--	-8.100

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted Low Band-Edge Emissions - Average			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Channel Frequency:	5755.0 MHz
Band-Edge Frequency:	5725.0 MHz
Test Frequency Range:	5625.0 - 5775.0 MHz

Port(s)	Band-Edge Markers and Limit			Amended Limit		Margin
	M1 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
a	-34.60	-32.55	5730.20	--	--	-5.200
b	-33.42	-31.45	5729.30	--	--	-4.300

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted High Band-Edge Emissions - Average			
Variant:	802.11b	**Duty Cycle (%):**	99
Data Rate:	1 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	CCK	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Channel Frequency:	2462.0 MHz
Band-Edge Frequency:	2483.5 MHz
Test Frequency Range:	2452.0 - 2524.0 MHz

Port(s)	Band-Edge Markers and Limit			Amended Limit		Margin
	M3 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
a	-59.90	-23.94	2470.80	--	--	-12.700
b	-69.15	-25.06	2470.80	--	--	-12.700

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted High Band-Edge Emissions - Average			
Variant:	802.11g	**Duty Cycle (%):**	97
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Channel Frequency:	2462.0 MHz
Band-Edge Frequency:	2483.5 MHz
Test Frequency Range:	2452.0 - 2524.0 MHz

Port(s)	Band-Edge Markers and Limit			Amended Limit		Margin
	M3 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
a	-59.90	-26.10	2472.30	--	--	-11.200
b	-65.62	-27.69	2472.50	--	--	-11.000

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted High Band-Edge Emissions - Average			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Channel Frequency:	2462.0 MHz
Band-Edge Frequency:	2483.5 MHz
Test Frequency Range:	2452.0 - 2524.0 MHz

Port(s)	Band-Edge Markers and Limit			Amended Limit		Margin
	M3 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
a	-58.56	-26.31	2472.80	--	--	-10.700
b	-63.12	-27.97	2472.80	--	--	-10.700

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted High Band-Edge Emissions - Average			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Channel Frequency:	2452.0 MHz
Band-Edge Frequency:	2483.5 MHz
Test Frequency Range:	2432.0 - 2582.0 MHz

Port(s)	Band-Edge Markers and Limit			Amended Limit		Margin
	M3 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
a	-50.86	-29.34	2473.80	--	--	-9.700
b	-53.58	-30.11	2473.80	--	--	-9.700

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted High Band-Edge Emissions - Average			
Variant:	802.11a	**Duty Cycle (%):**	97
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Channel Frequency:	5825.0 MHz
Band-Edge Frequency:	5850.0 MHz
Test Frequency Range:	5815.0 - 5887.0 MHz

Port(s)	Band-Edge Markers and Limit			Amended Limit		Margin
	M3 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
a	-42.52	-26.10	5839.50	--	--	-10.500
b	-44.52	-24.37	5835.50	--	--	-14.500

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted High Band-Edge Emissions - Average			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Channel Frequency:	5825.0 MHz
Band-Edge Frequency:	5850.0 MHz
Test Frequency Range:	5815.0 - 5887.0 MHz

Port(s)	Band-Edge Markers and Limit			Amended Limit		Margin
	M3 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
a	-42.84	-25.52	5838.50	--	--	-11.500
b	-44.12	-25.83	5837.10	--	--	-12.900

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted High Band-Edge Emissions - Average			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Channel Frequency:	5795.0 MHz
Band-Edge Frequency:	5850.0 MHz
Test Frequency Range:	5775.0 - 5925.0 MHz

Port(s)	Band-Edge Markers and Limit			Amended Limit		Margin
	M3 Amplitude (dBm)	Plot Limit (dBm)	M2 Frequency (MHz)	Amplitude (dBm)	M2A Frequency (MHz)	(MHz)
a	-48.64	-31.55	5819.50	--	--	-30.500
b	-54.16	-32.66	5819.80	--	--	-30.200

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Transmitter Conducted Spurious Emissions

Variant:	802.11b	**Duty Cycle (%):**	99
Data Rate:	1 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	CCK	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
2412.0	30.0 - 26000.0	-63.982	-38.22	-63.286	-39.11	--	--	--	--
2437.0	30.0 - 26000.0	-63.982	-38.12	-63.982	-38.64	--	--	--	--
2462.0	30.0 - 26000.0	-63.982	-38.77	-63.982	-39.97	--	--	--	--

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Transmitter Conducted Spurious Emissions

Variant:	802.11g	**Duty Cycle (%):**	97
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
2412.0	30.0 - 26000.0	-62.643	-37.41	-63.286	-38.28	--	--	--	--
2437.0	30.0 - 26000.0	-63.982	-36.79	-63.286	-37.84	--	--	--	--
2462.0	30.0 - 26000.0	-63.982	-37.54	-63.982	-38.98	--	--	--	--

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Transmitter Conducted Spurious Emissions

Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
2412.0	30.0 - 26000.0	-63.286	-37.98	-63.286	-38.97	--	--	--	--
2437.0	30.0 - 26000.0	-63.982	-36.59	-63.286	-37.47	--	--	--	--
2462.0	30.0 - 26000.0	-63.982	-37.31	-63.982	-38.62	--	--	--	--

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Transmitter Conducted Spurious Emissions

Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
2422.0	30.0 - 26000.0	-63.286	-37.71	-63.286	-37.43	--	--	--	--
2437.0	30.0 - 26000.0	-63.982	-34.24	-63.286	-33.81	--	--	--	--
2452.0	30.0 - 26000.0	-63.982	-34.55	-63.982	-33.93	--	--	--	--

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Transmitter Conducted Spurious Emissions			
Variant:	802.11a	**Duty Cycle (%):**	97
Data Rate:	6 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
5745.0	30.0 - 26000.0	-55.738	-43.24	-56.622	-42.20	--	--	--	--
5785.0	30.0 - 26000.0	-53.310	-38.90	-53.100	-37.95	--	--	--	--
5825.0	30.0 - 26000.0	-53.310	-37.98	-52.896	-37.64	--	--	--	--

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Transmitter Conducted Spurious Emissions

Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	GMH
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
5745.0	30.0 - 26000.0	-55.738	-43.41	-56.938	-42.86	--	--	--	--
5785.0	30.0 - 26000.0	-53.310	-38.15	-53.100	-38.10	--	--	--	--
5825.0	30.0 - 26000.0	-53.100	-37.61	-52.896	-37.93	--	--	--	--

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Transmitter Conducted Spurious Emissions			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Integral Antenna Ports		

Test Measurement Results

Test Frequency	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
5755.0	30.0 - 26000.0	-59.990	-37.09	-56.938	-35.10	--	--	--	--
5795.0	30.0 - 26000.0	-59.990	-41.61	-59.121	-42.11	--	--	--	--

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

External Antenna Ports

Equipment Configuration for Conducted Low Band-Edge Emissions - Average

Variant:	802.11a	**Duty Cycle (%):**	96
Data Rate:	6.0 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Channel Frequency:	5745.0 MHz					
Band-Edge Frequency:	5725.0 MHz					
Test Frequency Range:	5683.0 - 5755.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-30.53	-28.04	5726.40	--	--	-1.400
b	-28.82	-26.81	5726.70	--	--	-1.700

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted High Band-Edge Emissions - Average			
Variant:	802.11a	**Duty Cycle (%):**	96
Data Rate:	6.0 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Channel Frequency:	5825.0 MHz					
Band-Edge Frequency:	5850.0 MHz					
Test Frequency Range:	5815.0 - 5887.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-41.64	-26.10	5841.70	--	--	-8.300
b	-42.34	-28.77	5841.40	--	--	-8.600

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Transmitter Conducted Spurious Emissions			
Variant:	802.11a	**Duty Cycle (%):**	96
Data Rate:	6.0 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Test Frequency	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
5745.0	30.0 - 26000.0	-59.990	-43.51	-63.982	-42.97	--	--	--	--
5785.0	30.0 - 26000.0	-56.317	-38.98	-57.266	-40.33	--	--	--	--
5825.0	30.0 - 26000.0	-53.100	-37.35	-57.266	-39.59	--	--	--	--

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted Low Band-Edge Emissions - Average			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Channel Frequency:	5745.0 MHz					
Band-Edge Frequency:	5725.0 MHz					
Test Frequency Range:	5683.0 - 5755.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-29.25	-28.31	5726.10	--	--	-1.100
b	-28.43	-27.73	5725.60	--	--	-0.600

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted High Band-Edge Emissions - Average			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Channel Frequency:	5825.0 MHz					
Band-Edge Frequency:	5850.0 MHz					
Test Frequency Range:	5815.0 - 5887.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-38.60	-26.63	5843.90	--	--	-6.100
b	-40.86	-29.43	5841.70	--	--	-8.300

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Transmitter Conducted Spurious Emissions			
Variant:	802.11n HT-20	**Duty Cycle (%):**	97
Data Rate:	6.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Test Frequency	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
5745.0	30.0 - 26000.0	-60.460	-43.64	-62.044	-42.93	--	--	--	--
5785.0	30.0 - 26000.0	-53.524	-39.06	-57.607	-40.03	--	--	--	--
5825.0	30.0 - 26000.0	-53.524	-37.10	-57.607	-39.38	--	--	--	--

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted Low Band-Edge Emissions - Average			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Channel Frequency:	5755.0 MHz					
Band-Edge Frequency:	5725.0 MHz					
Test Frequency Range:	5625.0 - 5775.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-29.32	-26.81	5733.20	--	--	-8.200
b	-28.28	-26.81	5730.80	--	--	-5.800

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Conducted High Band-Edge Emissions - Average			
Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Channel Frequency:	5795.0 MHz					
Band-Edge Frequency:	5850.0 MHz					
Test Frequency Range:	5775.0 - 5925.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-44.72	-31.32	5832.70	--	--	-17.300
b	-51.07	-33.09	5829.10	--	--	-20.900

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

Equipment Configuration for Transmitter Conducted Spurious Emissions

Variant:	802.11n HT-40	**Duty Cycle (%):**	95
Data Rate:	13.5 MBit/s	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	External Antenna Ports		

Test Measurement Results

Test Frequency	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
5755.0	30.0 - 26000.0	-64.737	-38.07	-64.737	-38.31	--	--	--	--
5795.0	30.0 - 26000.0	-62.044	-41.54	-63.982	-42.71	--	--	--	--

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-05 MEASUREMENT OF SPURIOUS EMISSIONS
Measurement Uncertainty:	≤40 GHz ±2.37 dB, > 40 GHz ±4.6 dB

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

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) and RSS-210 §A8.5 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)).

RSS-210 §A8.5 If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

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

Laboratory Measurement Uncertainty for Conducted Spurious Emissions

Measurement uncertainty	±2.37 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-05 'Measurement of Spurious Emissions'	0088, 0158, 0287, 0252, 0313, 0314, 0070, 0116, 0117.

5.1.2. Radiated Emission Testing

Transmitter Radiated Spurious Emissions (above 1 GHz); Peak Field Strength Measurements; and Radiated Band Edge Measurements – Restricted Bands

FCC, Part 15 Subpart C §15.247(d) 15.205; 15.209
Industry Canada RSS-210 §A8.5, §2.2, §2.6
Industry Canada RSS-Gen §4.7

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.

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

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

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

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

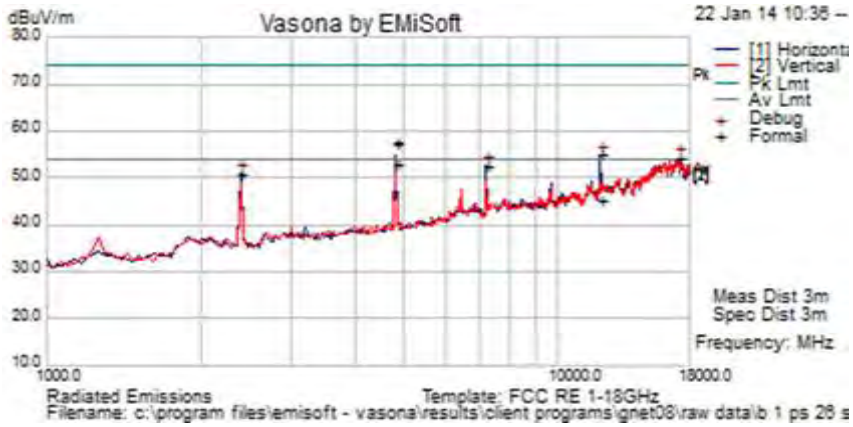
Level (dBμV/m) = 20 * Log (level (μV/m))

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

NOTE: KDB 662911 was implemented for Out-of-Band measurements. Where necessary Option (2) Measure and add 10 log (N) dB was implemented

5.1.2.1. Spurious Emissions - Integral antenna

Test Freq.	2412 MHz	**Engineer**	SB
Variant	802.11b; 1 Mbit/s	**Temp (ºC)**	17.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	33
Power Setting	24	**Press. (mBars)**	1009
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT w/ POE no external Antenna; 2x2 configuration setup;		
Test Notes 2			

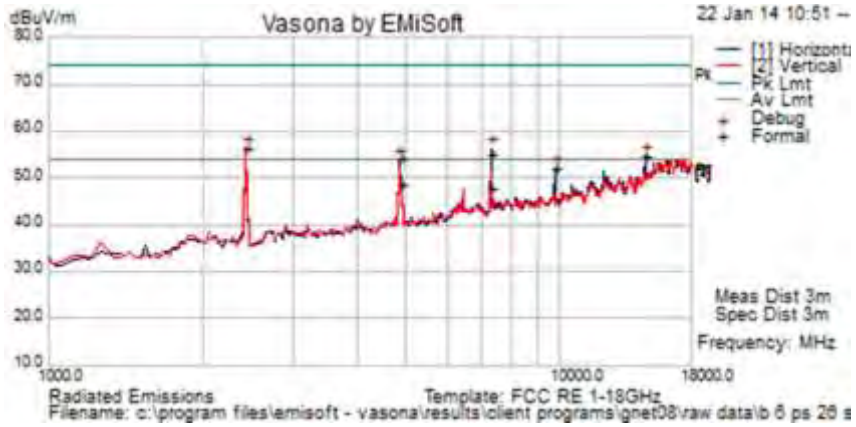


Formally measured emission peaks

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
4823.998	61.6	5.7	-9.7	57.6	Peak Max	H	121	83	74	-16.39	Pass	RB
12057.865	47.8	9.5	-2.5	54.8	Peak Max	H	103	42	74	-19.16	Pass	RB
4823.998	57.1	5.7	-9.7	53.1	Average Max	H	121	83	54	-0.93	Pass	RB
12057.865	38.4	9.5	-2.5	45.4	Average Max	H	103	42	54	-8.64	Pass	RB
17182.365	41.0	12.4	0.7	54.1	Peak [Scan]	V						Noise Floor
7234.469	51.2	7.2	-5.8	52.5	Peak [Scan]	H						NRB
2396.794	58.7	3.9	-11.7	51.0	Peak [Scan]	H						FUND

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

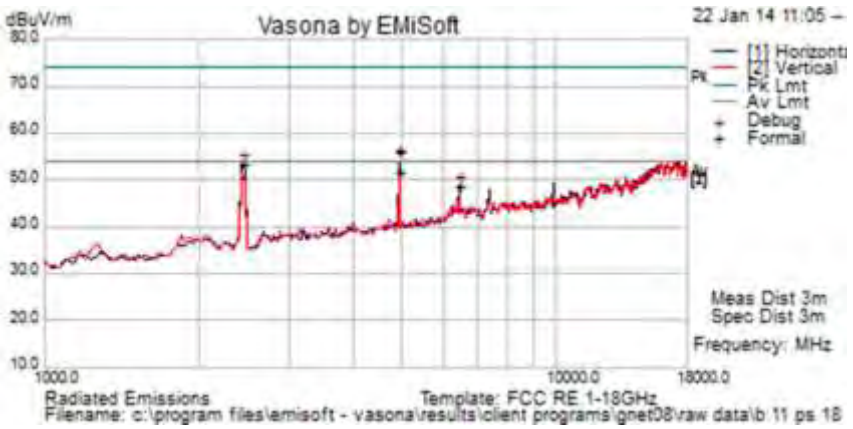
Test Freq.	2437 MHz	**Engineer**	SB
Variant	802.11b; 1 Mbit/s	**Temp (ºC)**	25
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	32
Power Setting	26	**Press. (mBars)**	1002
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT w/ POE no external Antenna; 2x2 configuration setup;		
Test Notes 2			



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
7313.226	53.6	7.2	-5.7	55.1	Peak Max	H	101	293	74	-18.86	Pass	RB
4873.948	58.0	5.7	-9.7	54.0	Peak Max	H	148	28	74	-19.99	Pass	RB
7313.226	46.3	7.2	-5.7	47.8	Average Max	H	101	293	54	-6.2	Pass	RB
4873.948	52.9	5.7	-9.7	48.8	Average Max	H	148	28	54	-5.17	Pass	RB
2430.862	64.0	3.9	-11.6	56.4	Peak [Scan]	V						FUND
14627.255	46.6	10.9	-2.7	54.8	Peak [Scan]	H						NRB
9755.511	47.1	8.6	-3.7	51.9	Peak [Scan]	H						NRB
Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission											
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205											

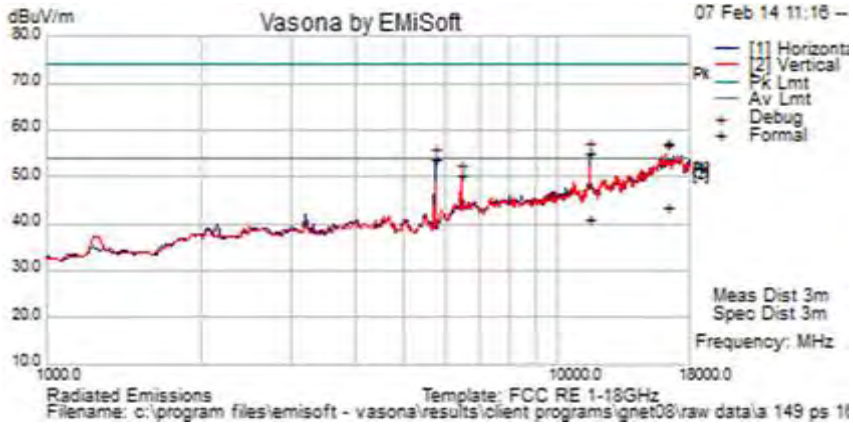
Test Freq.	2462 MHz	**Engineer**	SB
Variant	802.11b; 1 Mbit/s	**Temp (ºC)**	22
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	23
Power Setting	18	**Press. (mBars)**	1002
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT w/ POE no external Antenna; 2x2 configuration setup;		
Test Notes 2			



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
4923.998	60.6	5.7	-9.8	56.5	Peak Max	H	134	81	74	-17.52	Pass	RB
4923.998	55.7	5.7	-9.8	51.7	Average Max	H	134	81	54	-2.33	Pass	RB
2430.862	61.1	3.9	-11.6	53.5	Peak [Scan]	H						FUND
6450.9018	49.2	6.7	-7.1	48.7	Peak [Scan]	H						NRB
Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission											
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205											

Test Freq.	5745 MHz	**Engineer**	SB
Variant	802.11b; 1 Mbit/s	**Temp (ºC)**	17.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	33
Power Setting	20	**Press. (mBars)**	1009
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT w/ POE no external Antenna; 2x2 configuration setup;		
Test Notes 2			

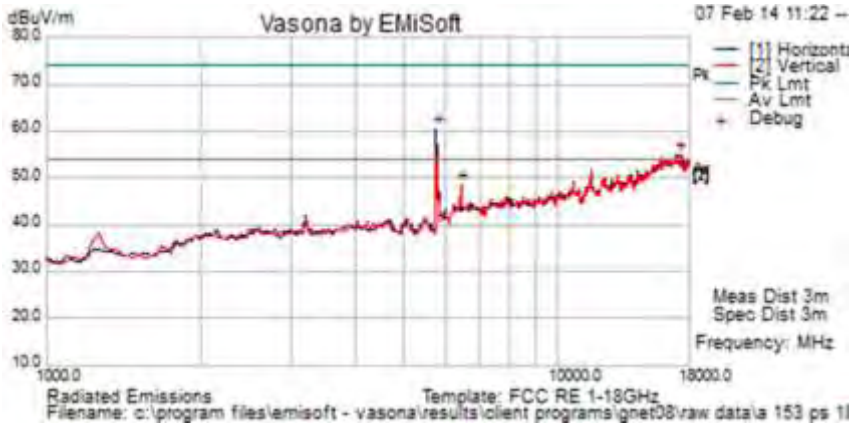


Formally measured emission peaks

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
11487.725	47.7	9.4	-2.0	55.2	Peak Max	H	143	-1	74	-18.85	Pass	RB
16262.525	44.9	12.0	0.1	57.0	Peak Max	V	152	157	74	-17.01	Pass	Noise Floor
11487.725	33.6	9.4	-2.0	41.0	Average Max	H	143	-1	54	-13.02	Pass	RB
16262.525	31.4	12.0	0.1	43.5	Average Max	V	152	157	54	-10.51	Pass	Noise Floor
5735.471	57.0	6.2	-9.5	53.7	Peak [Scan]	H	150					FUND
6450.902	50.6	6.7	-7.1	50.2	Peak [Scan]	V	100					NRB

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

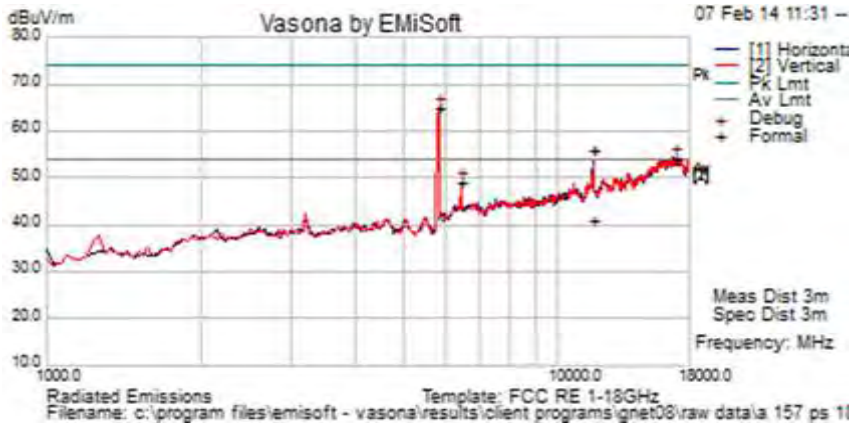
Test Freq.	5785 MHz	**Engineer**	SB
Variant	802.11b; 1 Mbit/s	**Temp (ºC)**	25
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	32
Power Setting	20	**Press. (mBars)**	1009
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT w/ POE no external Antenna; 2x2 configuration setup;		
Test Notes 2			



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
17148.297	44.9	12.0	0.1	57.0	Peak Max	V	152	157	74	-17.01	Pass	Noise Floor
17148.297	31.4	12.0	0.1	43.5	Average Max	V	152	157	54	-10.51	Pass	Noise Floor
6450.902	49.0	6.7	-7.1	48.6	Peak [Scan]	V	100					NRB
5769.53908	63.8	6.3	-9.5	60.6	Peak [Scan]	H	100					FUND
Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission											
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205											

Test Freq.	5825 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbit/s	**Temp (ºC)**	22
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	23
Power Setting	20	**Press. (mBars)**	1009
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1	EUT w/ POE no external Antenna; 2x2 configuration setup;		
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
11652.054	48.7	9.4	-2.3	55.9	Peak Max	H	98	347	74	-18.12	Pass	RB
11652.054	33.8	9.4	-2.3	41.0	Average Max	H	98	347	54	-13.01	Pass	RB
16841.683	44.9	12.0	0.1	57.0	Peak Max	V	152	157	74	-17.01	Pass	Noise Floor
16841.683	31.4	12.0	0.1	43.5	Average Max	V	152	157	54	-10.51	Pass	Noise Floor
5837.675	68.0	6.3	-9.3	65.0	Peak [Scan]	V	100					FUND
6450.902	49.5	6.7	-7.1	49.0	Peak [Scan]	V	100					NRB

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

5.1.2.2. Band-Edge - Internal Antenna Ports

2.4 GHz Frequency Band

Peak Limit 74.0 dBµV, Peak Limit 54.0 dBµV

Integral Antenna

	Band-Edge 2390 MHz			Band-Edge 2483.5 MHz		
	dBµV		Power Setting	dBµV		Power Setting
Operational Mode	Peak	Average		Peak	Average	
b	44.97	32.98	20	47.27	38.42	18
g	65.87	44.88	20	61.09	39.56	18
n HT-20	66.65	46.50	19	64.18	42.72	18
n HT-40	68.28	52.79	19	67.00	50.16	18.5

5.8 GHz Frequency Band – Restricted Band-edge @ 5460 MHz

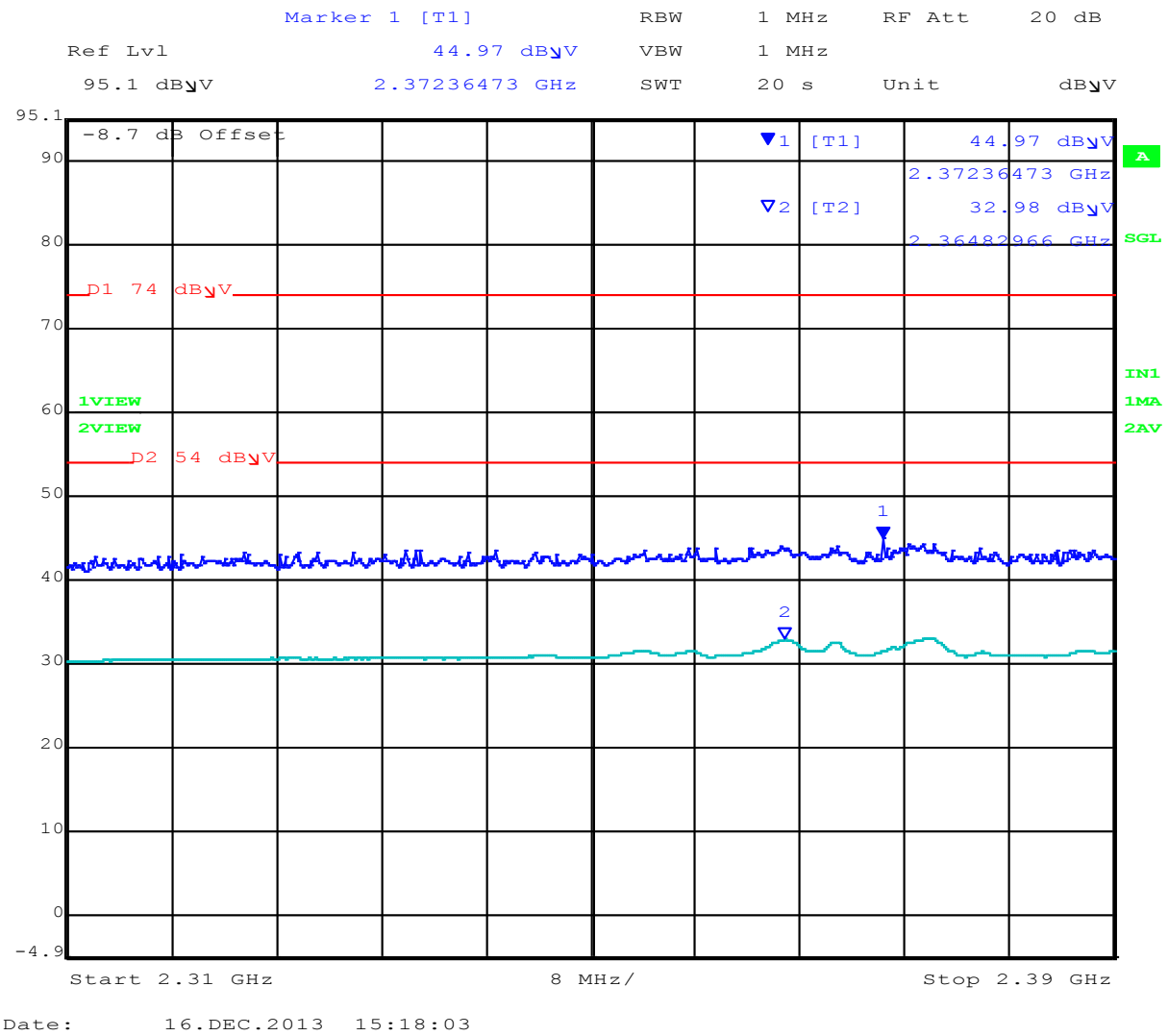
Peak Limit 74.0 dBµV, Peak Limit 54.0 dBµV

Integral Antenna

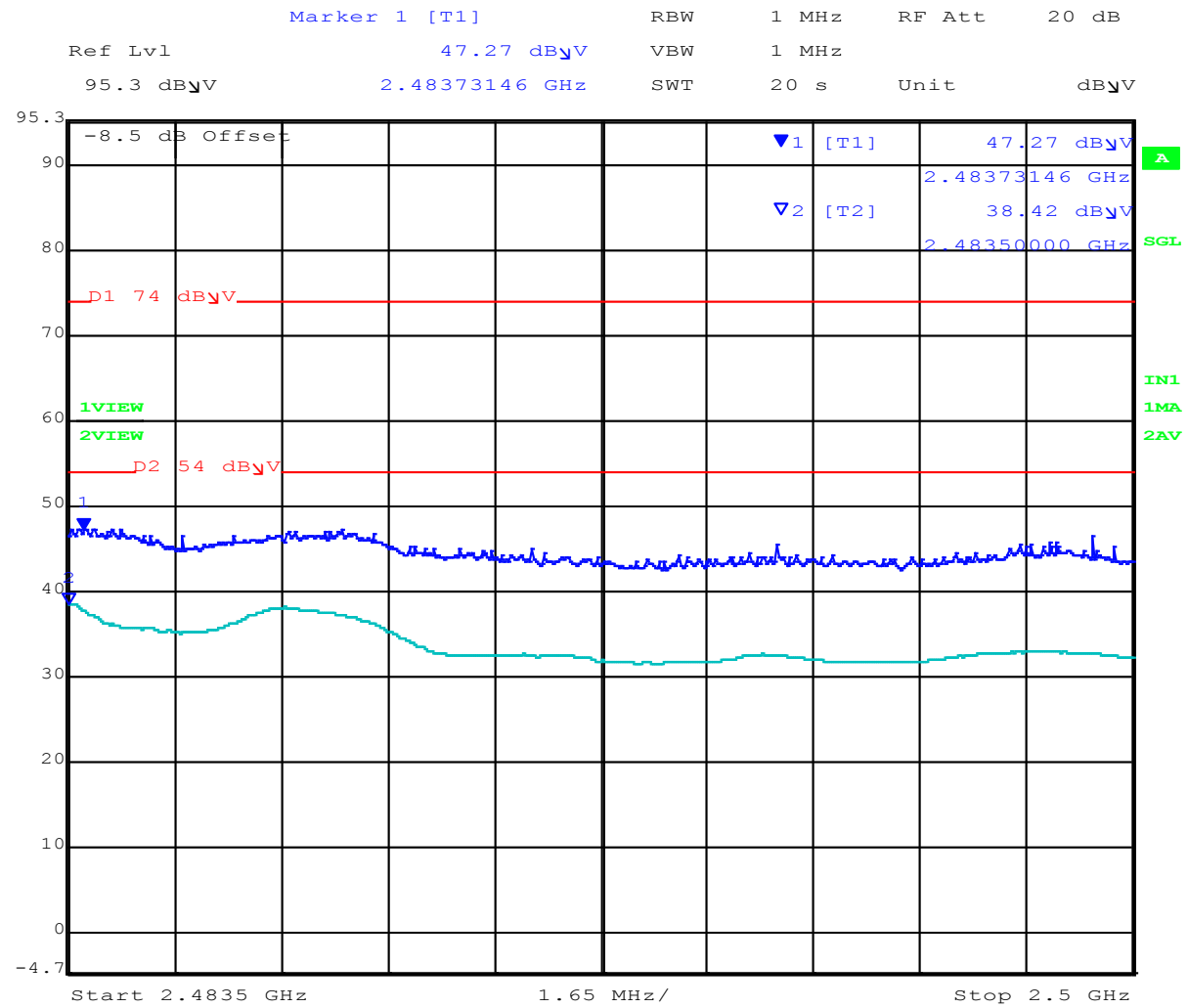
	5460 MHz		
	dBµV		Power Setting
Operational Mode	Peak	Average	
a	48.48	36.10	24
n HT-20	48.67	36.10	24
n HT-40	48.62	35.90	24

2.4 GHz Band-Edge

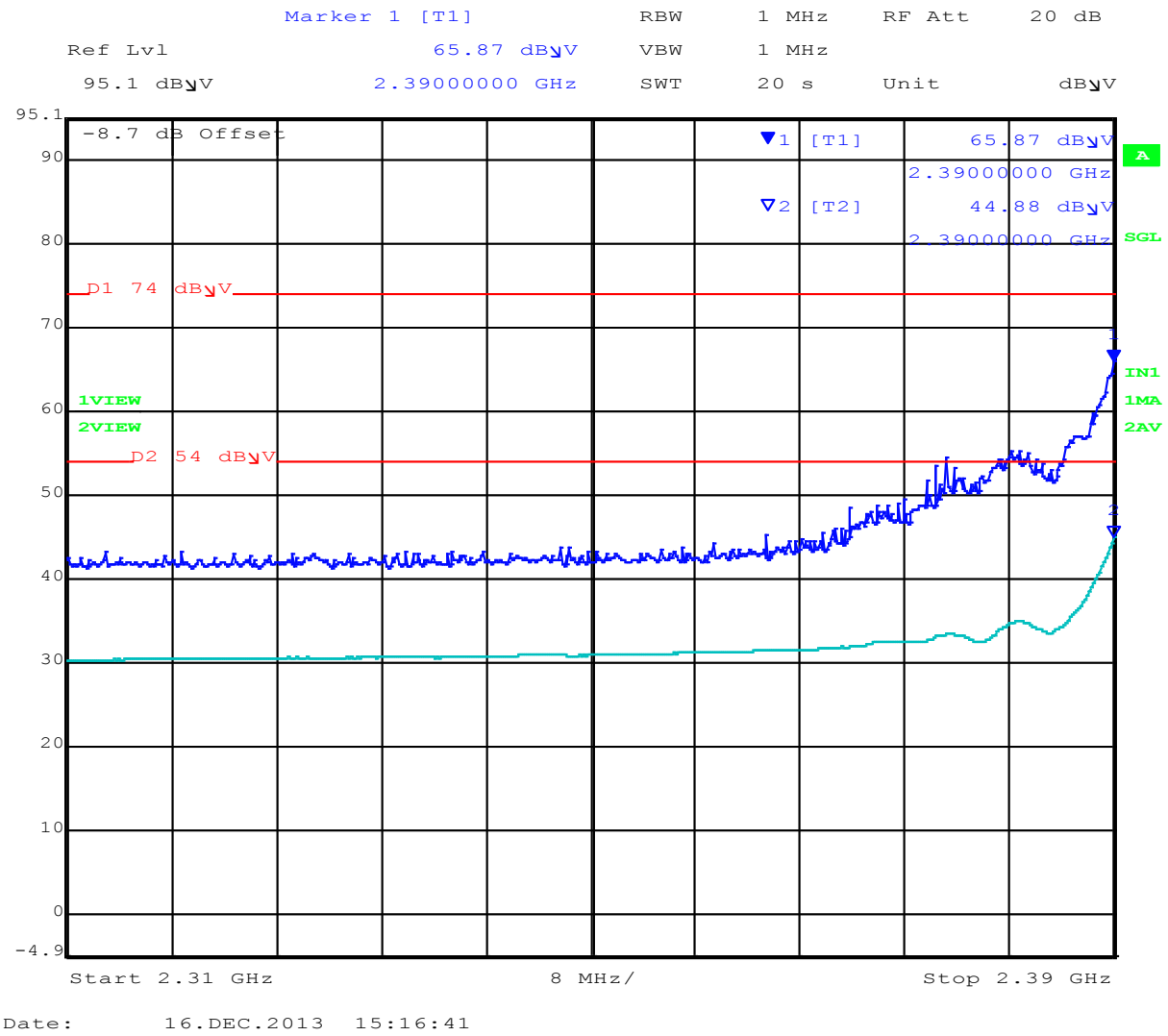
802.11b 2390 MHz Band-Edge



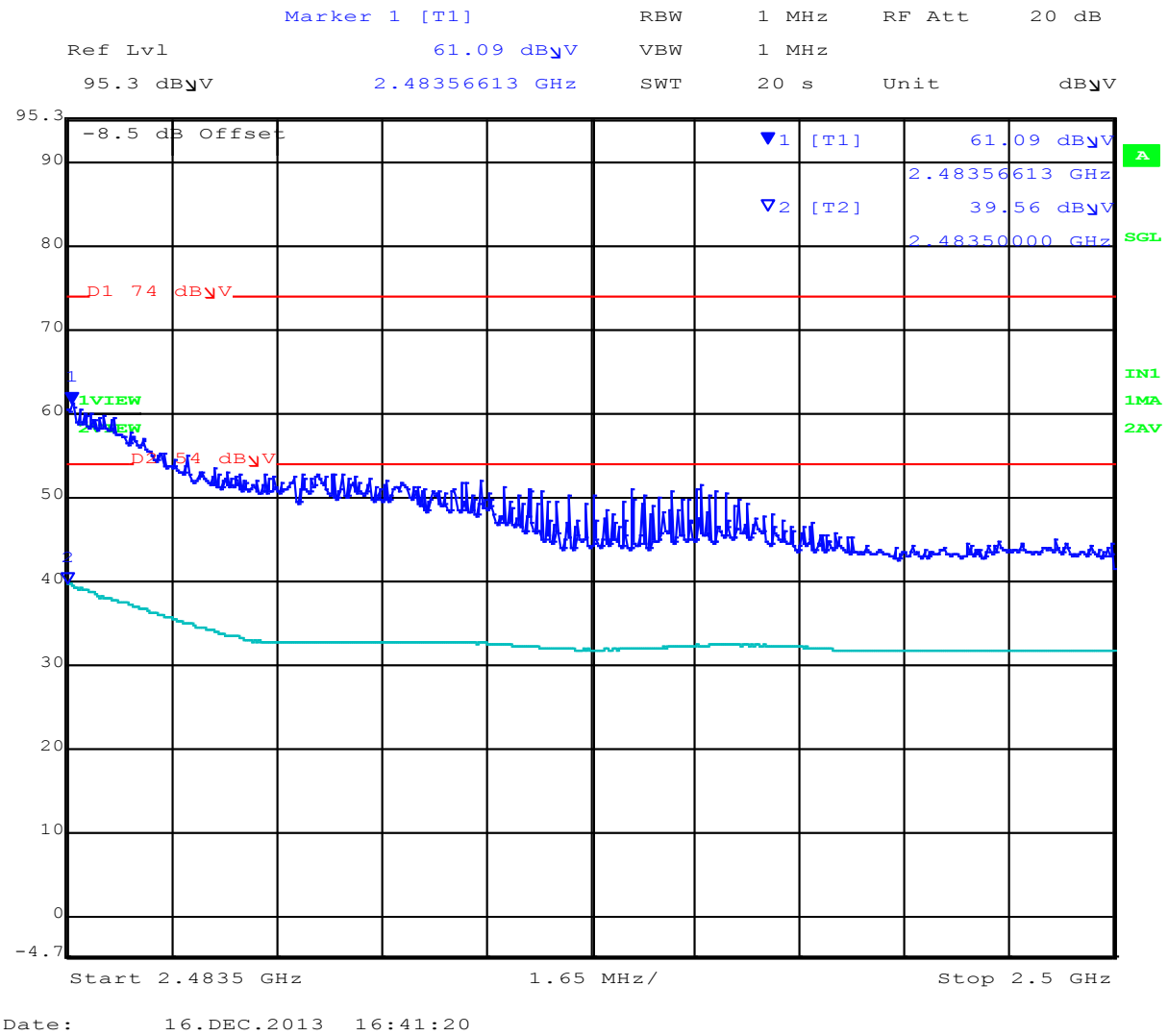
802.11b 2483.5 MHz Band-Edge



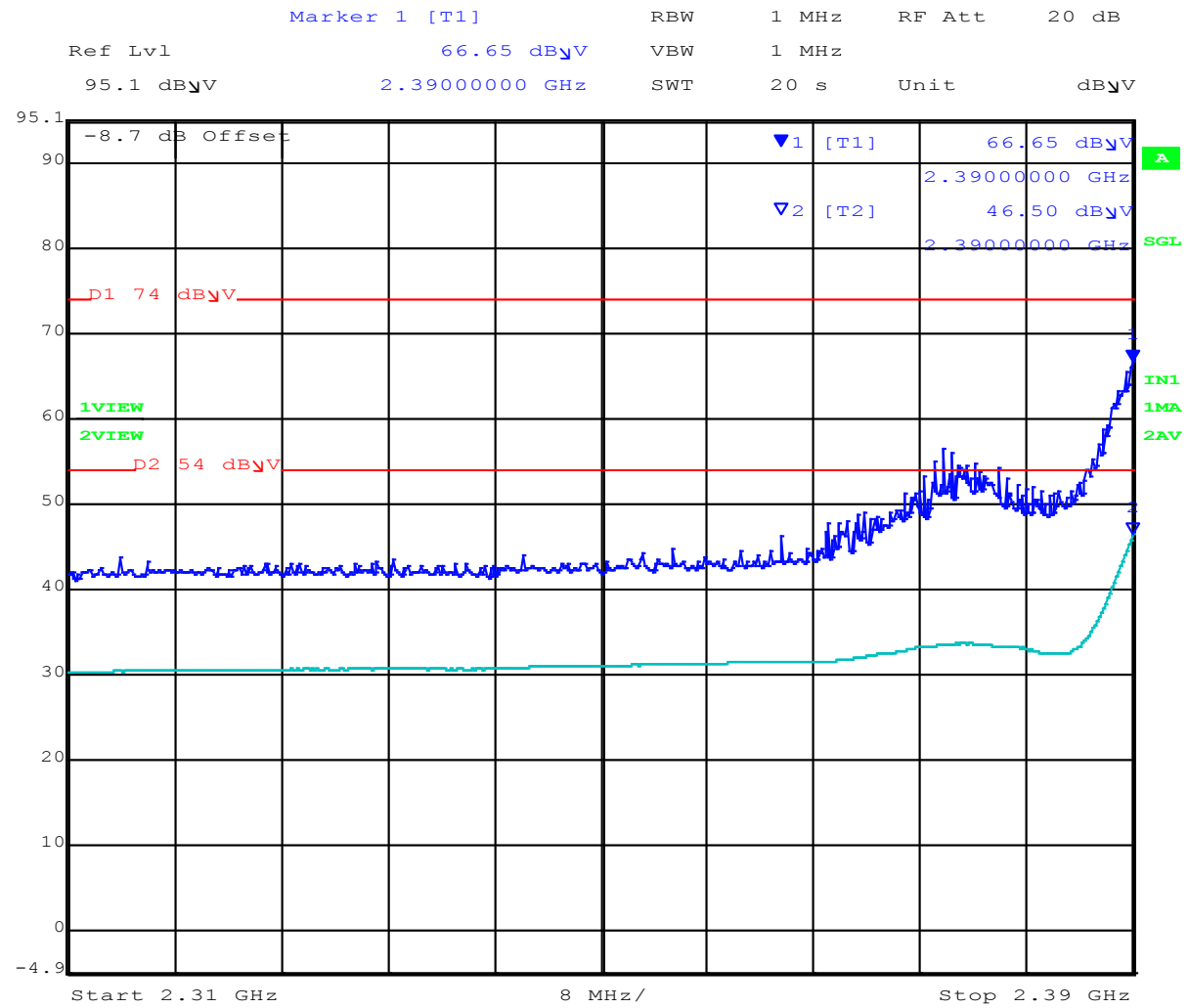
802.11g 2390 MHz Band-Edge



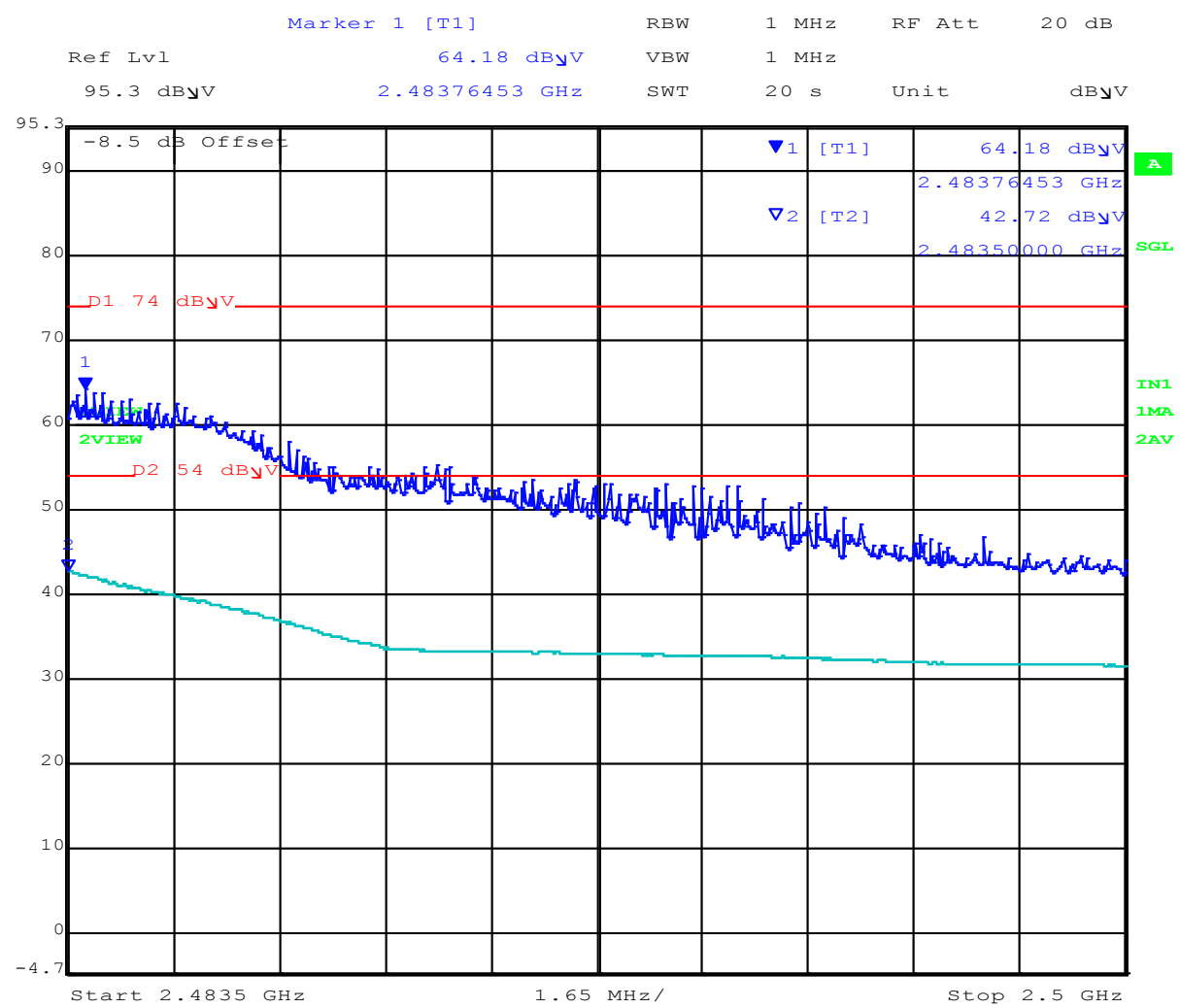
802.11g 2483.5 MHz Band-Edge



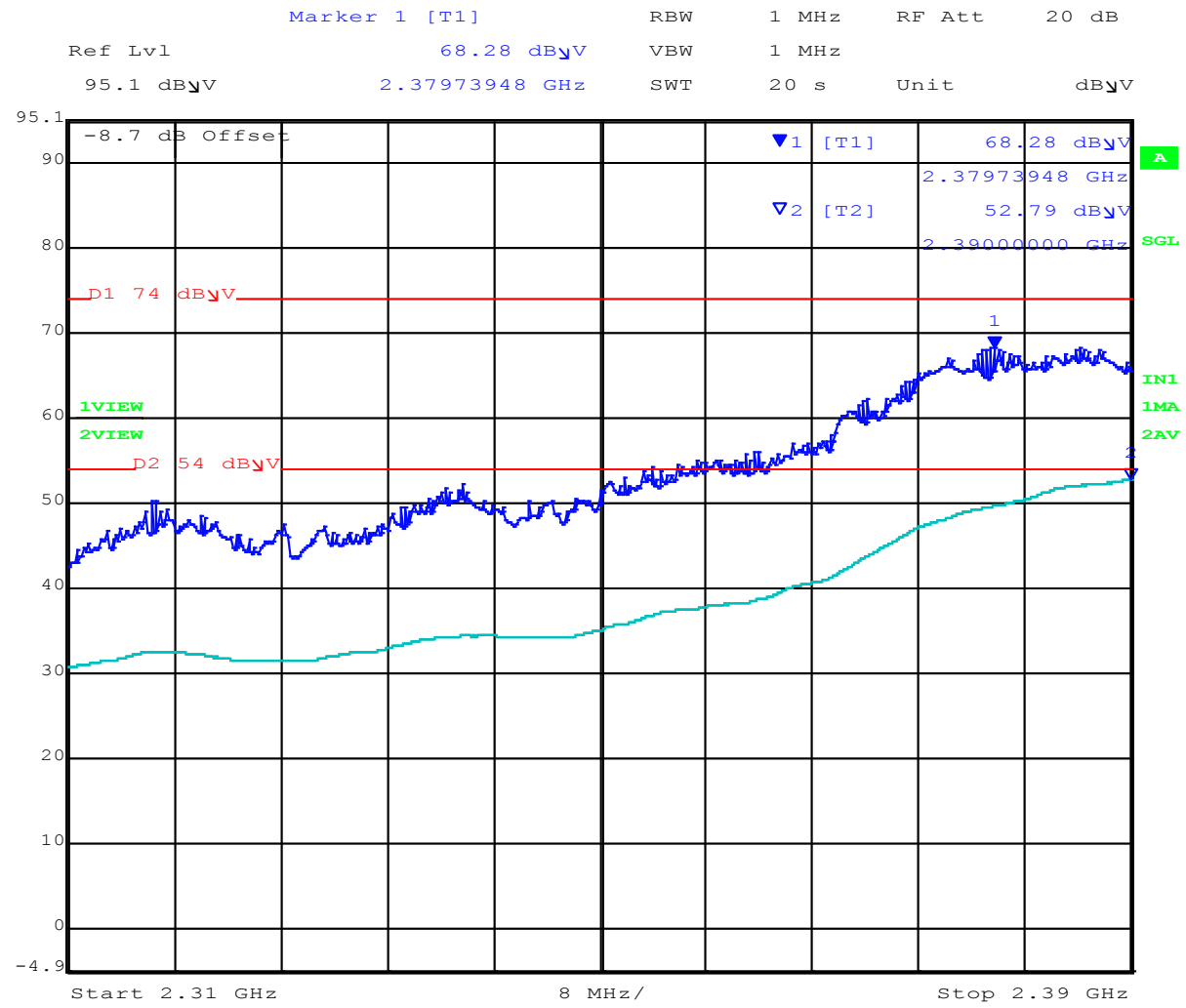
802.11n HT-20 2390 MHz Band-Edge



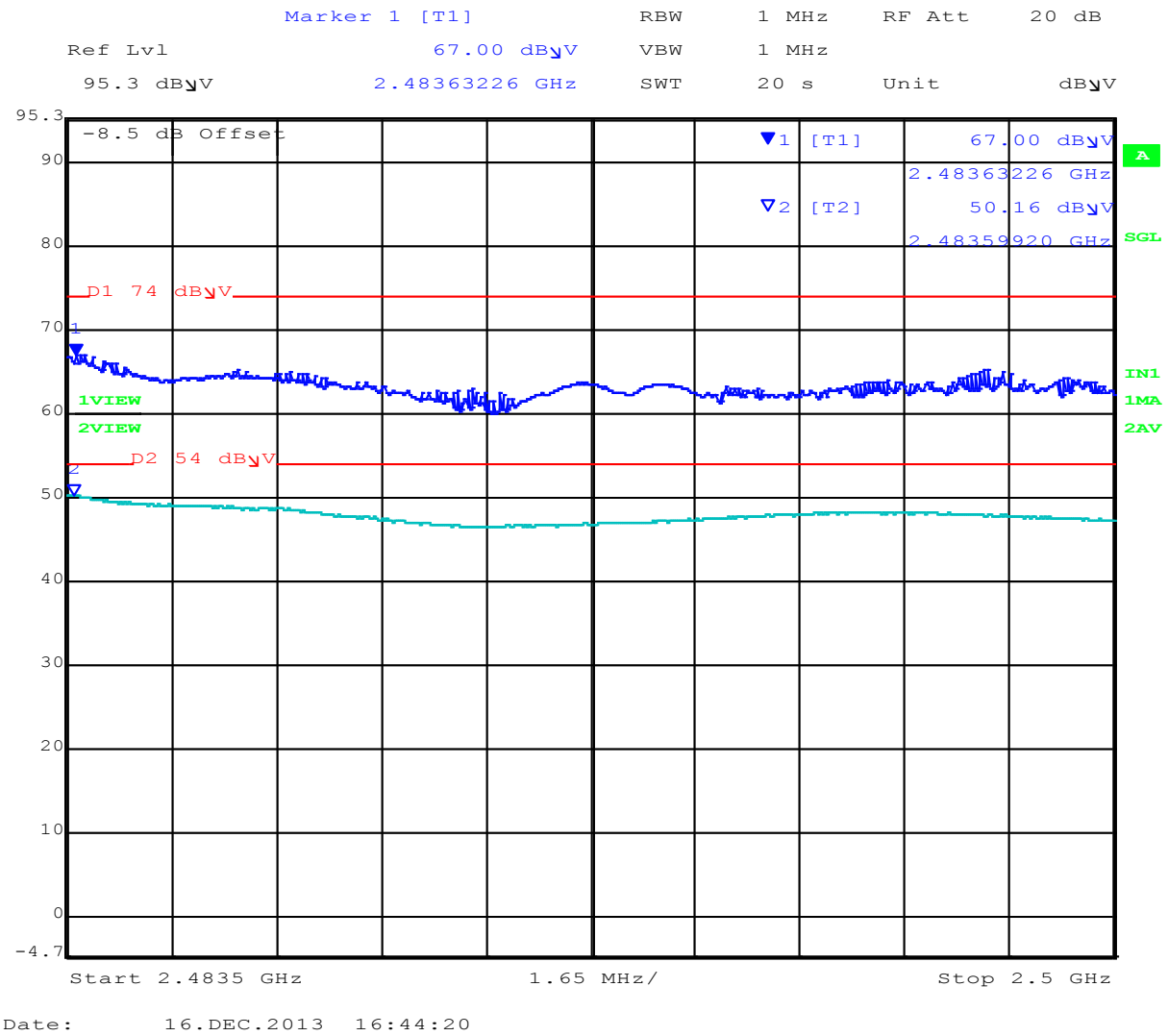
802.11n HT-20 2483.5 MHz Band-Edge



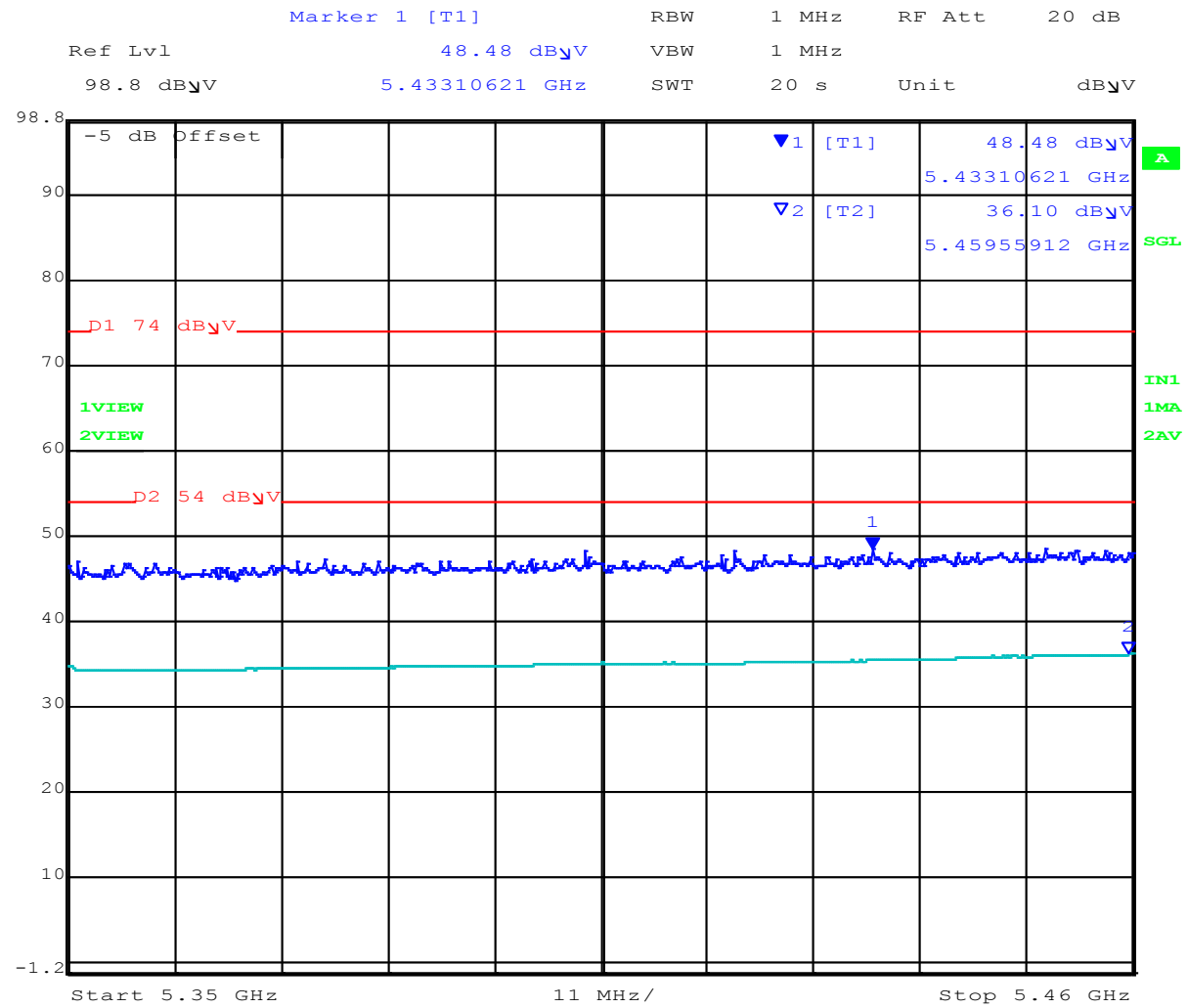
802.11n HT-40 2390 MHz Band-Edge



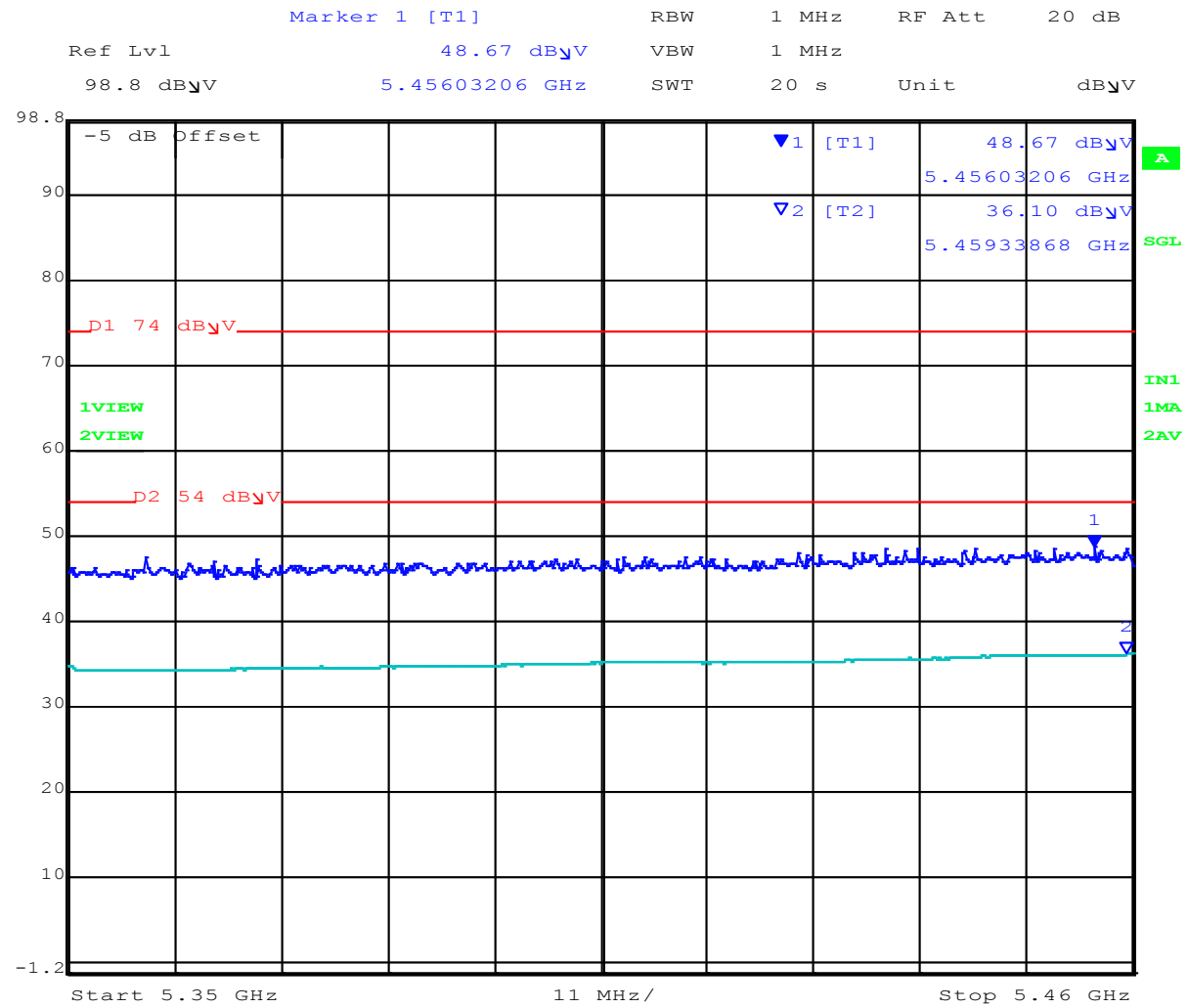
802.11n HT-40 2483.5 MHz Band-Edge



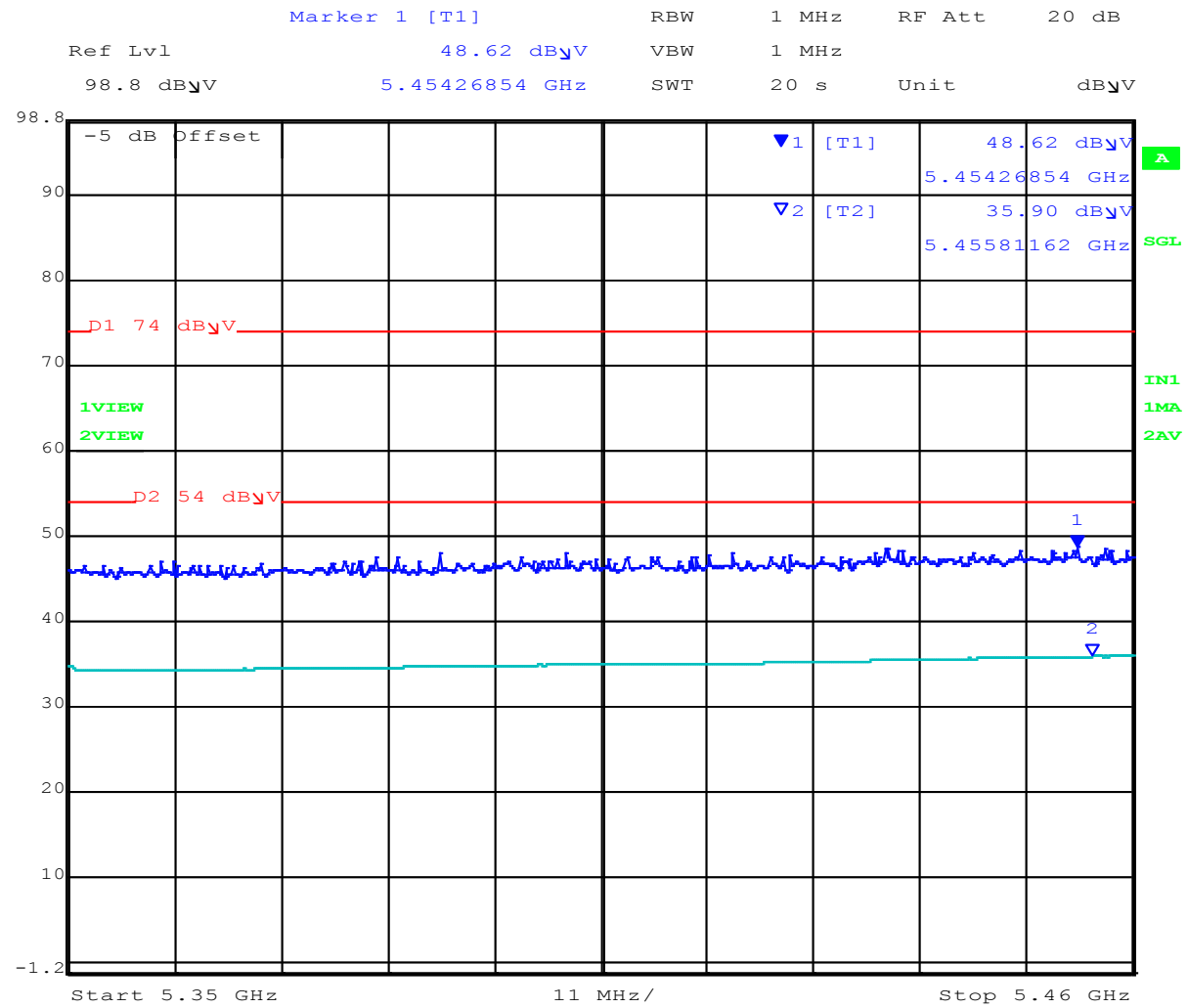
802.11a 5460 MHz Band-Edge (Tranmission Channel 5745 MHz)



802.11n HT-20 5460 MHz Band-Edge (Tranmission Channel 5745 MHz)

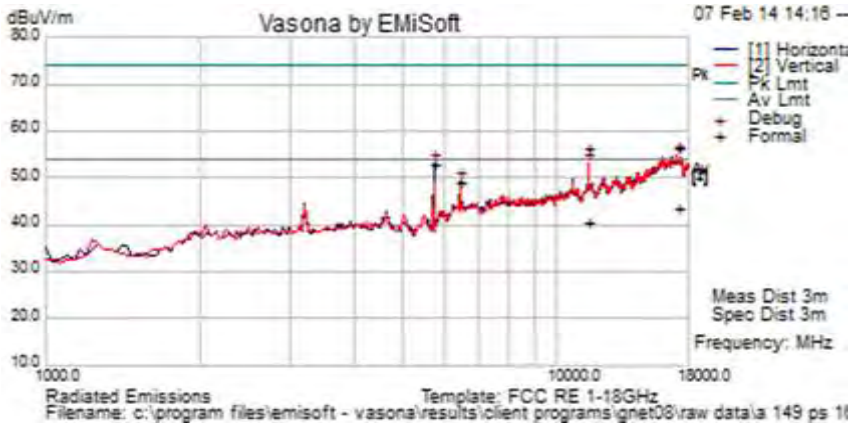


802.11n HT-40 5460 MHz Band-Edge (Tranmission Channel 5755 MHz)



5.1.2.3. Spurious Emissions - External Antenna Ports

Test Freq.	5745 MHz	**Engineer**	SB
Variant	802.11b; 1 Mbit/s	**Temp (ºC)**	17.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	33
Power Setting	16	**Press. (mBars)**	1009
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1	EUT w/ POE & external Antenna; 2x2 configuration setup;		
Test Notes 2			

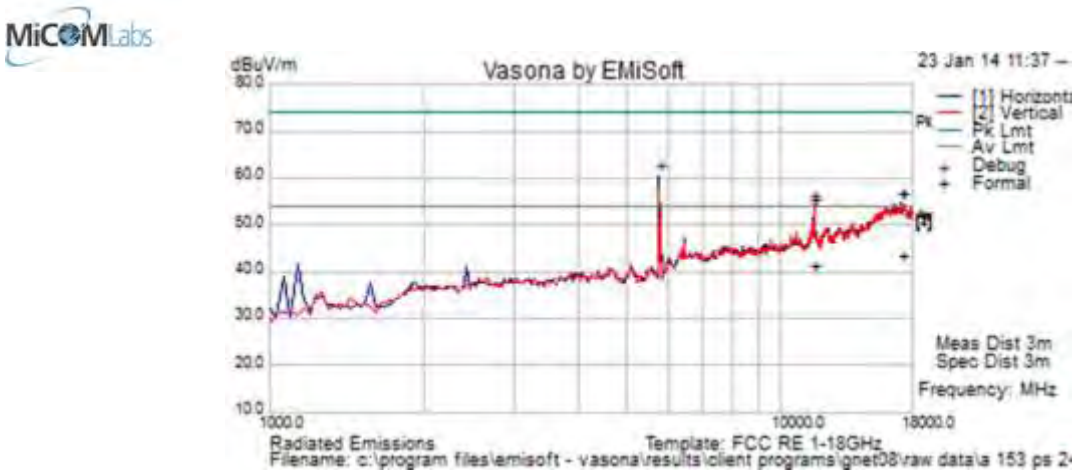


Formally measured emission peaks

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
17114.228	43.4	12.5	0.5	56.3	Peak Max	V	125	272	74	-17.71	Pass	Noise Floor
11483.467	48.8	9.4	-2.0	56.2	Peak Max	V	153	218	74	-17.76	Pass	RB
17114.228	30.5	12.5	0.5	43.5	Average Max	V	125	272	54	-10.5	Pass	Noise Floor
11483.467	33.1	9.4	-2.0	40.5	Average Max	V	153	218	54	-13.52	Pass	RB
5735.471	56.2	6.2	-9.5	52.9	Peak [Scan]	H	100					FUND
6450.902	49.6	6.7	-7.1	49.2	Peak [Scan]	H	100					NRB

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

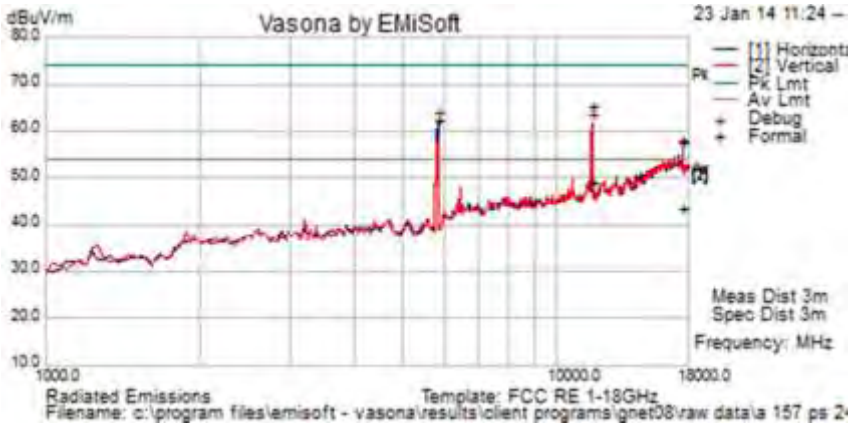
Test Freq.	5785 MHz	**Engineer**	SB
Variant	802.11b; 1 Mbit/s	**Temp (ºC)**	25
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	32
Power Setting	16	**Press. (mBars)**	1009
Antenna	external	**Duty Cycle (%)**	100
Test Notes 1	EUT w/ POE & external Antenna; 2x2 configuration setup;		
Test Notes 2			



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
17148.297	43.7	12.5	0.5	56.7	Peak Max	H	124	-1	74	-17.31	Pass	Noise Floor
11573.397	47.9	9.4	-2.0	55.3	Peak Max	H	120	93	74	-18.72	Pass	RB
17148.297	30.3	12.5	0.5	43.3	Average Max	H	124	-1	54	-10.73	Pass	Noise Floor
11573.397	33.9	9.4	-2.0	41.3	Average Max	H	120	93	54	-12.74	Pass	RB
5769.539	63.7	6.3	-9.5	60.5	Peak [Scan]	H						Fund
Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission											
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205											

Test Freq.	5825 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbit/s	**Temp (ºC)**	22
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	23
Power Setting	16	**Press. (mBars)**	1009
Antenna	external	**Duty Cycle (%)**	100
Test Notes 1	EUT w/ POE & external Antenna; 2x2 configuration setup;		
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
11651.144	58.3	9.4	-2.3	65.5	Peak Max	H	122	50	74	-8.54	Pass	RB
17487.515	44.3	12.4	1.0	57.7	Peak Max	V	184	361	74	-16.29	Pass	Noise Floor
11651.144	41.9	9.4	-2.3	49.1	Average Max	H	122	50	54	-4.91	Pass	RB
17487.515	30.0	12.4	1.0	43.4	Average Max	V	184	361	54	-10.6	Pass	Noise Floor
5837.675	65.1	6.3	-9.3	62.1	Peak [Scan]	H						FUND
Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission											
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205											

5.1.2.4. Band-Edge External Antenna Ports

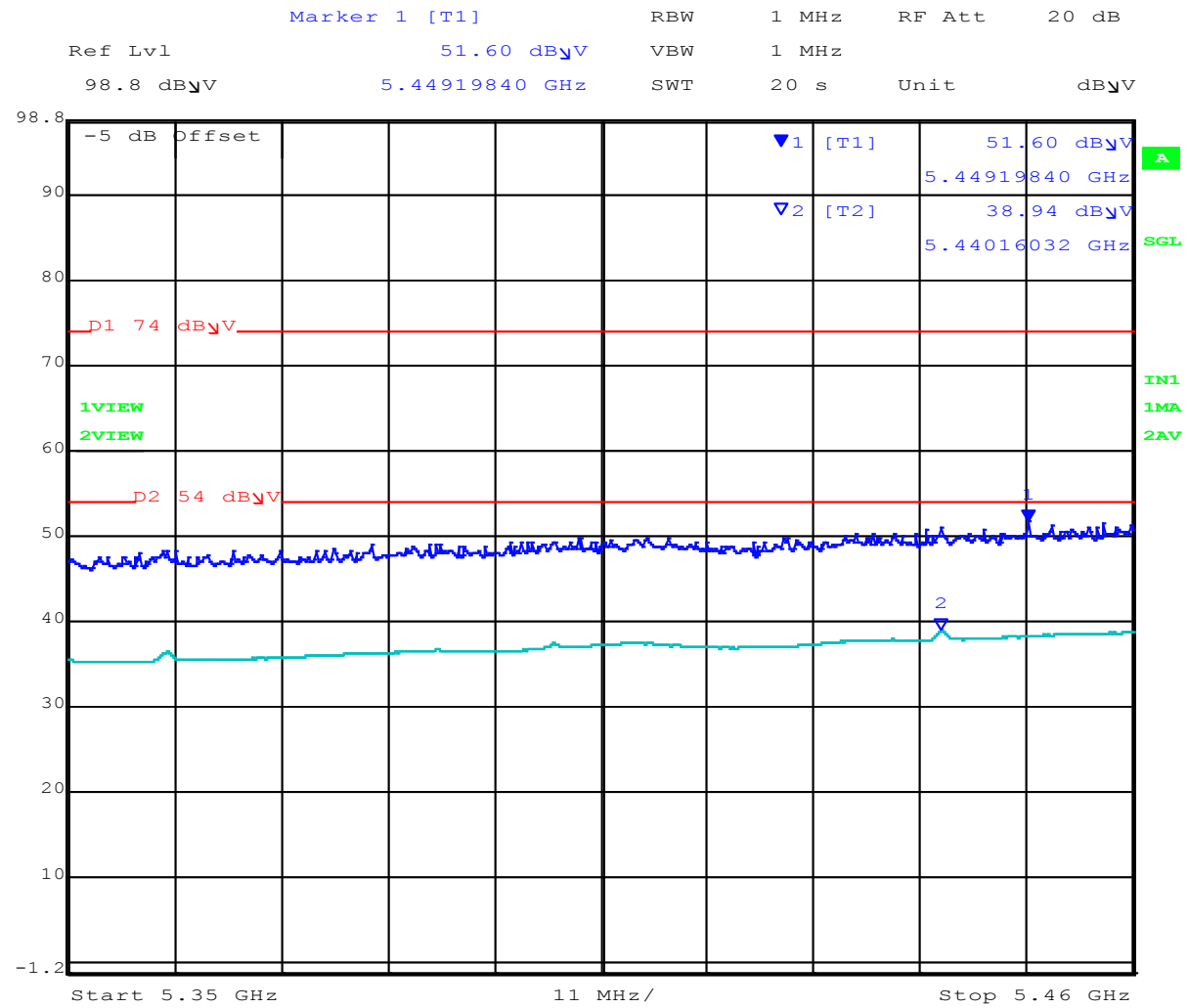
5.8 GHz Frequency Band – Restricted Band-edge @ 5460 MHz

Peak Limit 74.0 dBµV, Peak Limit 54.0 dBµV

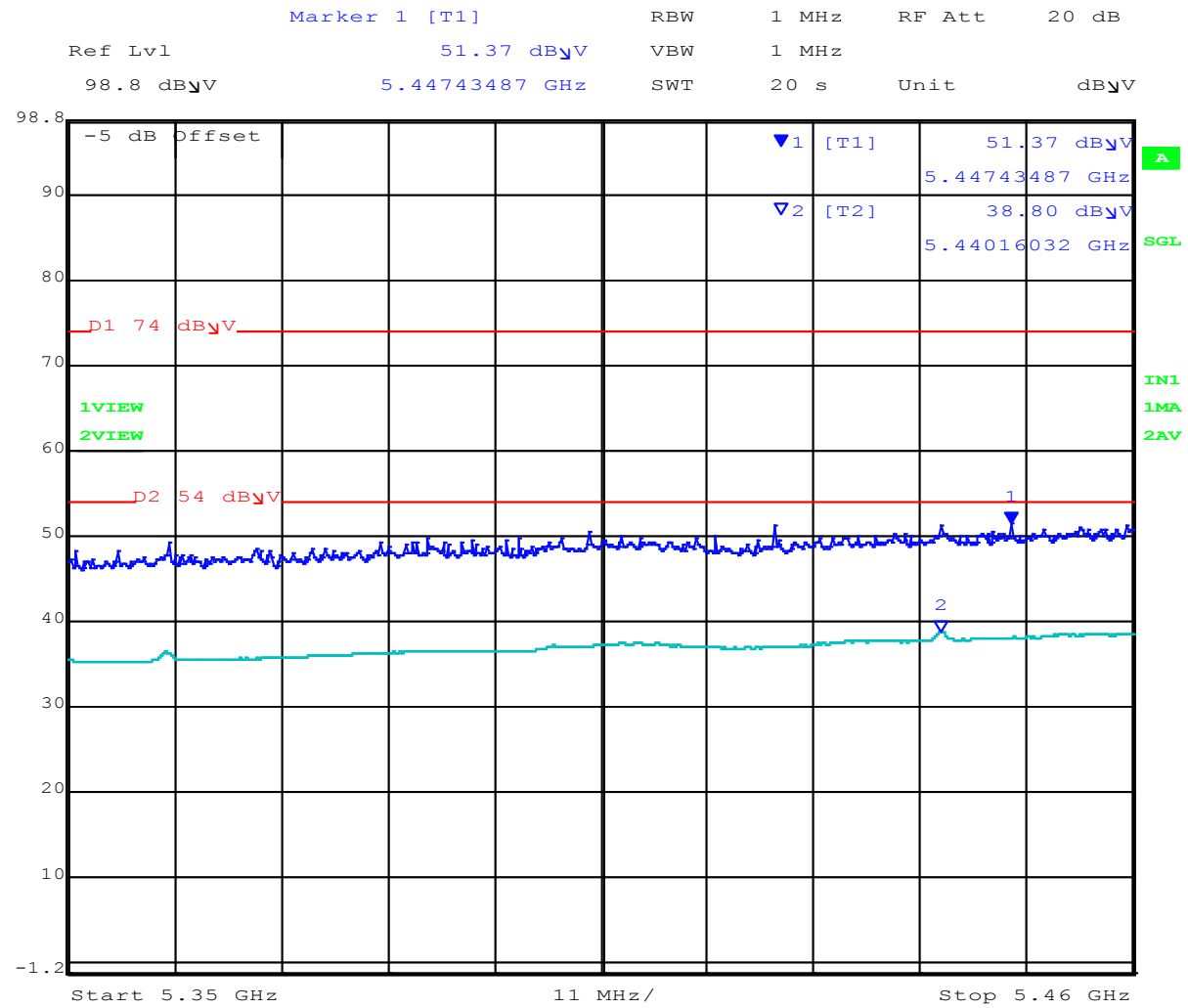
Integral Antenna

	5460 MHz		
	dBµV		Power Setting
Operational Mode	Peak	Average	
a	51.60	38.94	24
n HT-20	51.37	38.80	24
n HT-40	51.05	38.65	24

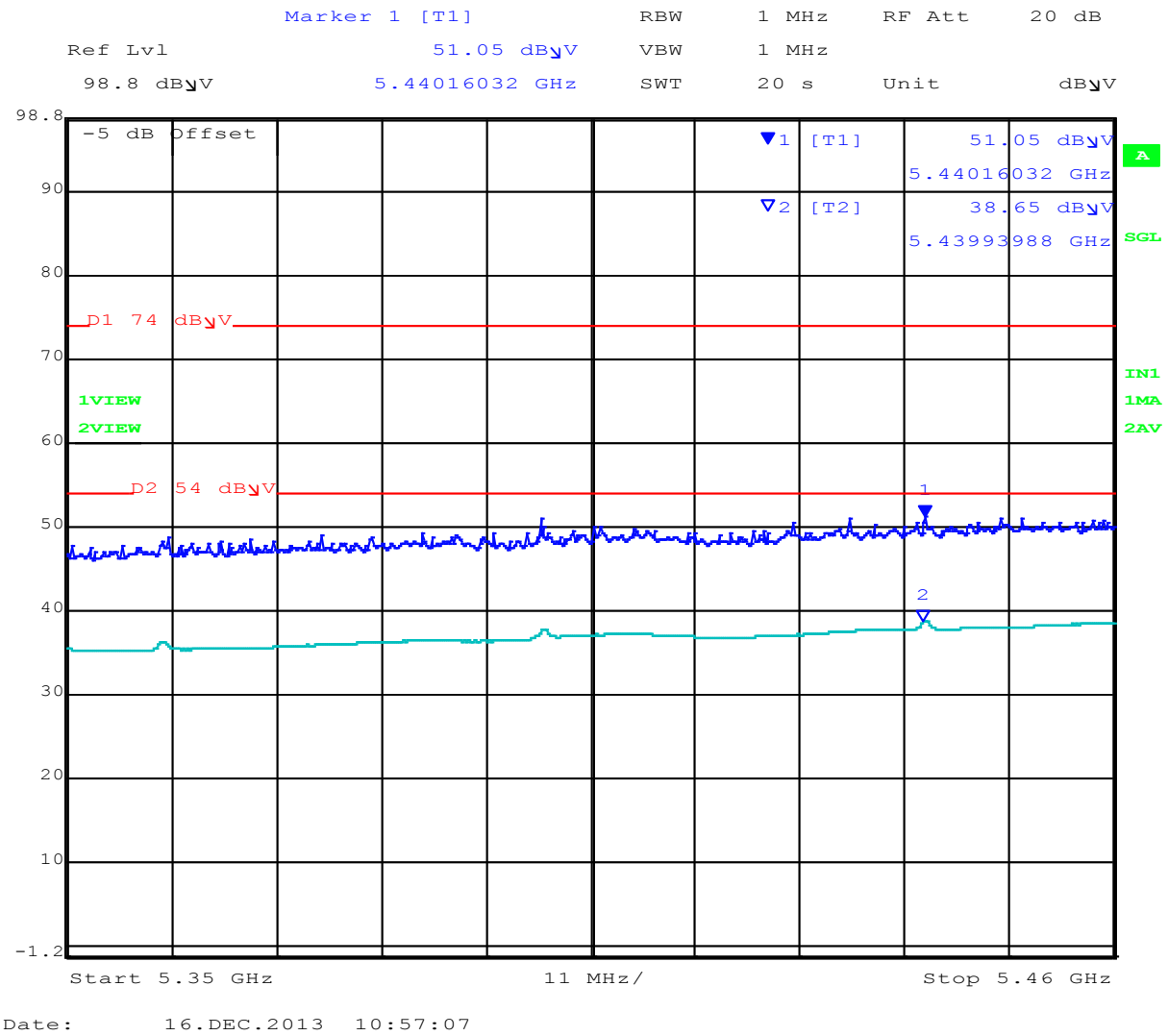
802.11a 5460 MHz Band-Edge (Tranmission Channel 5745 MHz)



802.11n HT-20 5460 MHz Band-Edge (Tranmission Channel 5745 MHz)



802.11n HT-40 5460 MHz Band-Edge (Tranmission Channel 5755 MHz)



Specification Limits

FCC §15.247(d) and RSS-210 §A8.5 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.

FCC §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)).

IC RSS-210 §A8.5 If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

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

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.

§15.209 (a) Limit Matrix

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

Laboratory Measurement Uncertainty for Radiated Emissions

Measurement uncertainty	+5.6/ -4.5 dB

Traceability

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

5.1.2.5. Digital Emissions (0.03-1 GHz)

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

Test Procedure

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

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

Field Strength Calculation

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

$$FS = R + AF + CORR$$

where:

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

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

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

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

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

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

Test Freq.	5745 MHz	**Engineer**	SB
Variant	Digital Emissions	**Temp (ºC)**	17.5
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum.(%)**	33
Power Setting	18	**Press. (mBars)**	1011
Antenna	Integral		
Test Notes 1	Integral antenna used however, external antenna with cables setup for worse case.		
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
46.785	57.8	3.7	-21.8	39.8	Quasi Max	V	114	218	40	-0.2	Pass	
30.123	46.3	3.5	-9.8	39.9	Quasi Max	V	98	164	40	-0.1	Pass	
106.919	57.9	4.1	-19.4	42.6	Quasi Max	V	106	-1	43.5	-0.9	Pass	
147.074	53.9	4.4	-18.8	39.5	Quasi Max	H	148	4	43.5	-4.0	Pass	
625.009	45.6	6.3	-11.0	41.0	Quasi Max	V	102	361	46	-5.1	Pass	

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

Specification

Limits

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

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

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

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

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

Laboratory Measurement Uncertainty for Radiated Emissions

Measurement uncertainty	+5.6/ -4.5 dB

Traceability

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

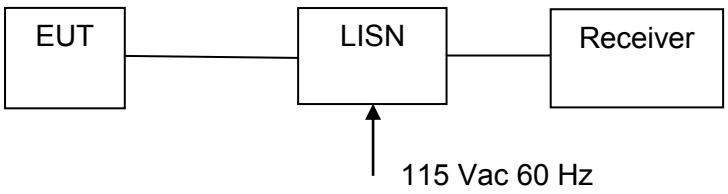
5.1.3. AC Wireline Conducted Emissions (150 kHz – 30 MHz)

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

Test Procedure

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

Test Measurement Set up

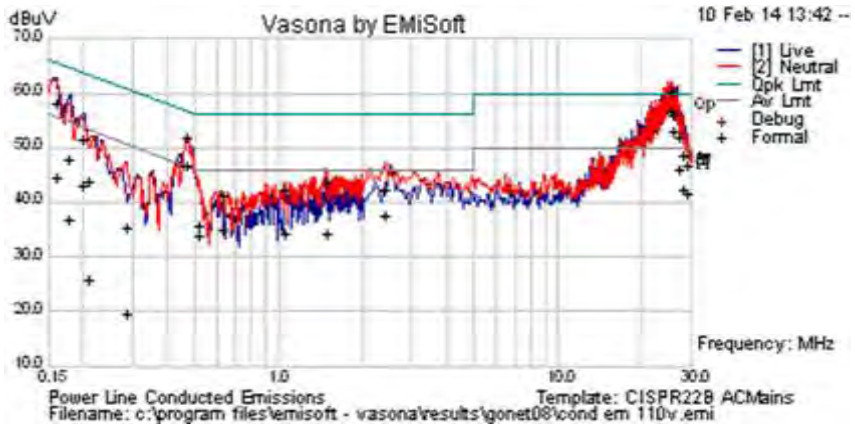


Measurement set up for AC Wireline Conducted Emissions Test

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

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

Test Freq.	N/A	**Engineer**	JMH
Variant	AC Line Emissions	**Temp (ºC)**	18
Freq. Range	0.150 MHz - 30 MHz	**Rel. Hum.(%)**	54
Power Setting	Not Applicable	**Press. (mBars)**	1011
Antenna	Not Applicable		
Test Notes 1	110V 60 Hz		
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
0.158	40.9	9.9	0.1	50.9	Peak [Scan]	Live	55.57	-4.7	Pass	
0.471	30.9	9.9	0.1	40.9	Quasi Peak	Live	56.5	-15.6	Pass	
0.471	29.0	9.9	0.1	39.0	Average	Live	46.5	-7.5	Pass	
21.867	34.9	10.6	0.8	46.3	Quasi Peak	Live	60	-13.8	Pass	
21.867	31.9	10.6	0.8	43.3	Average	Live	50	-6.8	Pass	
24.332	38.8	10.6	0.9	50.3	Quasi Peak	Live	60	-9.7	Pass	
24.332	37.1	10.6	0.9	48.6	Average	Live	50	-1.4	Pass	
24.945	35.5	10.6	0.9	47.0	Average	Live	50	-3.0	Pass	
24.945	37.5	10.6	0.9	49.0	Quasi Peak	Live	60	-11.0	Pass	
25.564	37.3	10.6	0.9	48.8	Quasi Peak	Neutral	60	-11.2	Pass	
25.564	33.1	10.6	0.9	44.6	Average	Neutral	50	-5.4	Pass	
26.177	34.9	10.7	0.9	46.5	Quasi Peak	Live	60	-13.5	Pass	
26.177	32.4	10.7	0.9	44.0	Average	Live	50	-6.1	Pass	
27.104	34.3	10.7	0.9	45.9	Quasi Peak	Live	60	-14.1	Pass	
27.104	31.6	10.7	0.9	43.2	Average	Live	50	-6.8	Pass	
26.796	33.4	10.7	0.9	45.0	Peak [Scan]	Live	50	-5.0	Pass	

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

Specification

Limit

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

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

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

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

* Decreases with the logarithm of the frequency

Laboratory Measurement Uncertainty for Conducted Emissions

Measurement uncertainty	±2.64 dB

Traceability

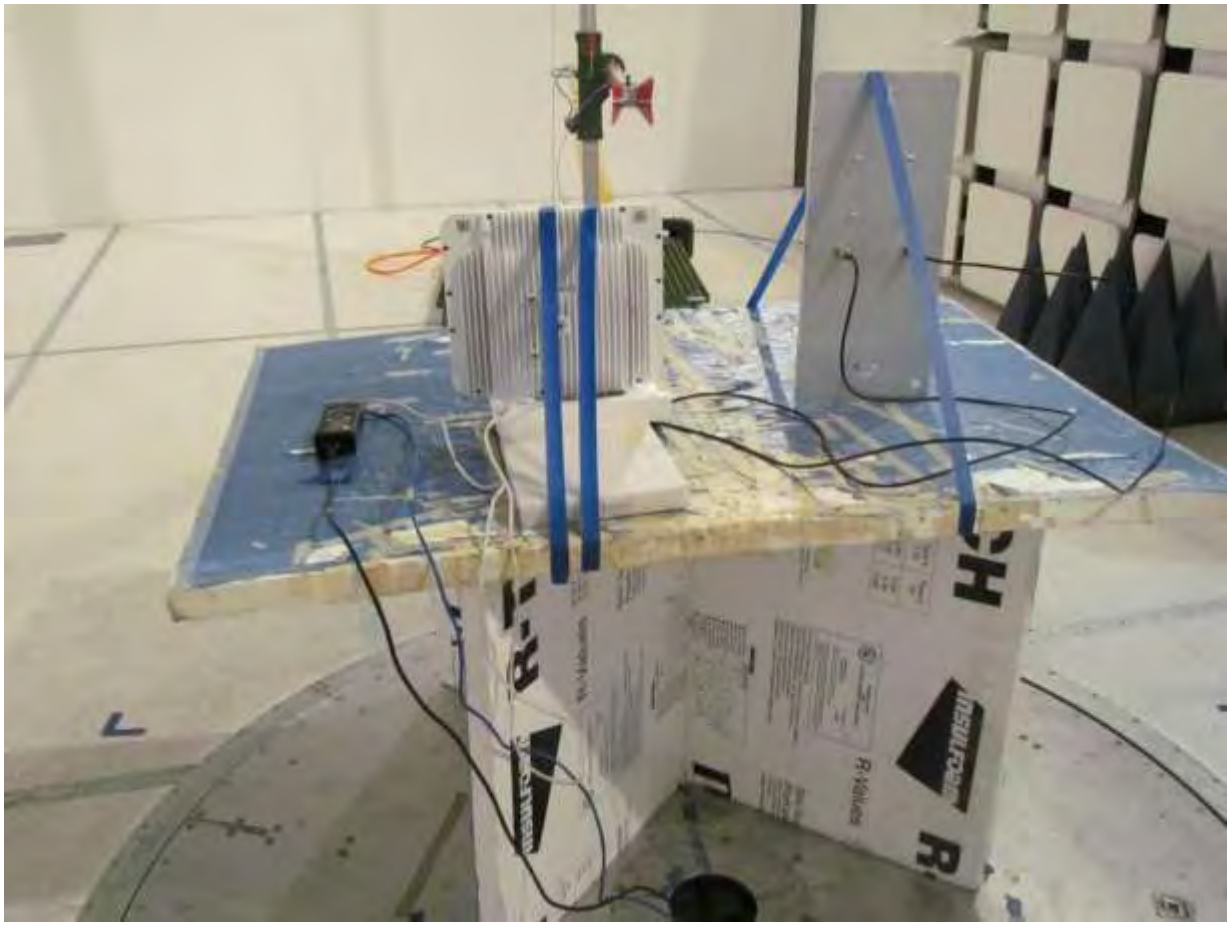
Method	Test Equipment Used
Measurements were made per work instruction WI-EMC-01 'Measurement of Conducted Emissions'	0158, 0184, 0287, 0190, 0293, 0307

6. PHOTOGRAPHS

6.1. Conducted Test Setup

6.2. Test Setup - Digital Emissions <1 GHz

6.3. Test Setup - Digital Emissions >1 GHz



6.4. ac Wireline Test Setup

7. TEST EQUIPMENT

Asset #	Instrument	Manufacturer	Part #	Serial #	Calibration Due Date
0117	Power Sensor	Hewlett Packard	8487D	3318A00371	18th Oct 14
0223	Power Meter	Hewlett Packard	EPM-442A	US37480256	18th Oct 14
0376	Power Sensor	Agilent	U2000A	MY51440005	28th Oct 14
0390	Power Sensor	Agilent	U2002A	MY50000103	17th Oct 14
0158	Barometer /Thermometer	Control Co.	4196	E2846	6th Dec 14
0193	EMI Receiver	Rhode & Schwartz	ESI 7	838496/007	2nd Dec 13
0287	EMI Receiver	Rhode & Schwartz	ESIB40	100201	31st Jul 14
0378	EMI Receiver	Rhode & Schwartz	ESIB40	100107/040	17th Jul 14
0338	30 - 3000 MHz Antenna	Sunol	JB3	A052907	14th Aug 14
0399	1-18 GHz Horn Antenna	EMCO	3117	00154575	10th Oct 14
0252	SMA Cable	Megaphase	Sucoflex 104	None	N/A
0310	2m SMA Cable	Micro-Coax	UFA210A-0-0787-3G03G0	209089-001	N/A
0312	3m SMA Cable	Micro-Coax	UFA210A-1-1181-3G0300	209092-001	N/A
0314	30dB N-Type Attenuator	ARRA	N9444-30	1623	N/A
0359	DFS Test System	Aeroflex	PXI-1042	300001/004	21st Oct 14
0299	DFS Test Software	Aeroflex	PXIModule	Version 7.1.0	N/A
0502	EMC Test Software	EMISoft	Vasona	5.0051	N/A
0503	RF Conducted Test Software	National Instruments	Labview	Version 8.2	N/A
0398	RF Conducted Test Software	MiCOM Labs ATS	--	Version 1.8	N/A
0380	RF Switch	MiCOM Labs	MIC001	MIC001	20th March 14

APPENDIX

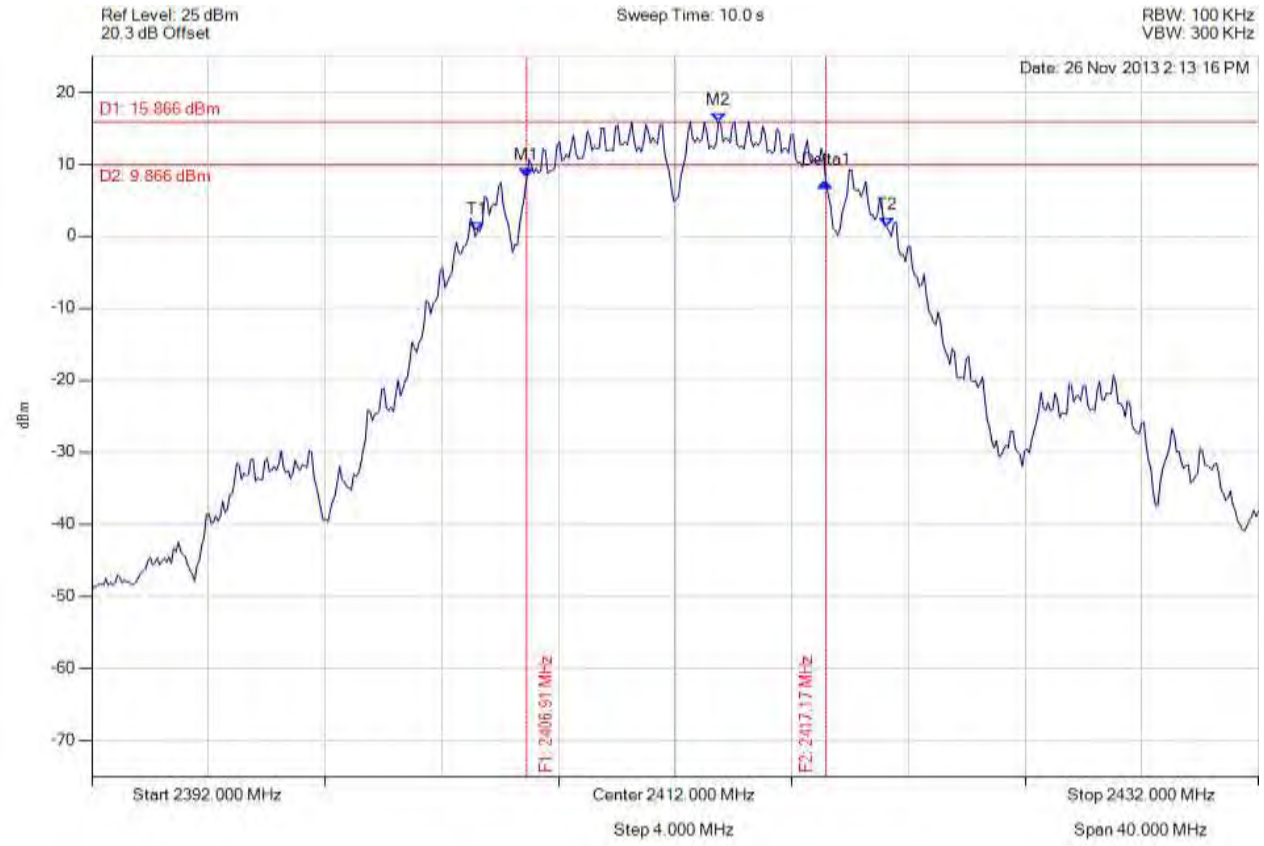
A. SUPPORTING INFORMATION

A.1. CONDUCTED TEST PLOTS

A.1.1. 6 dB & 99% Bandwidth

6 dB & 99% BANDWIDTH

Variant: 802.11b, Channel: 2412.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc

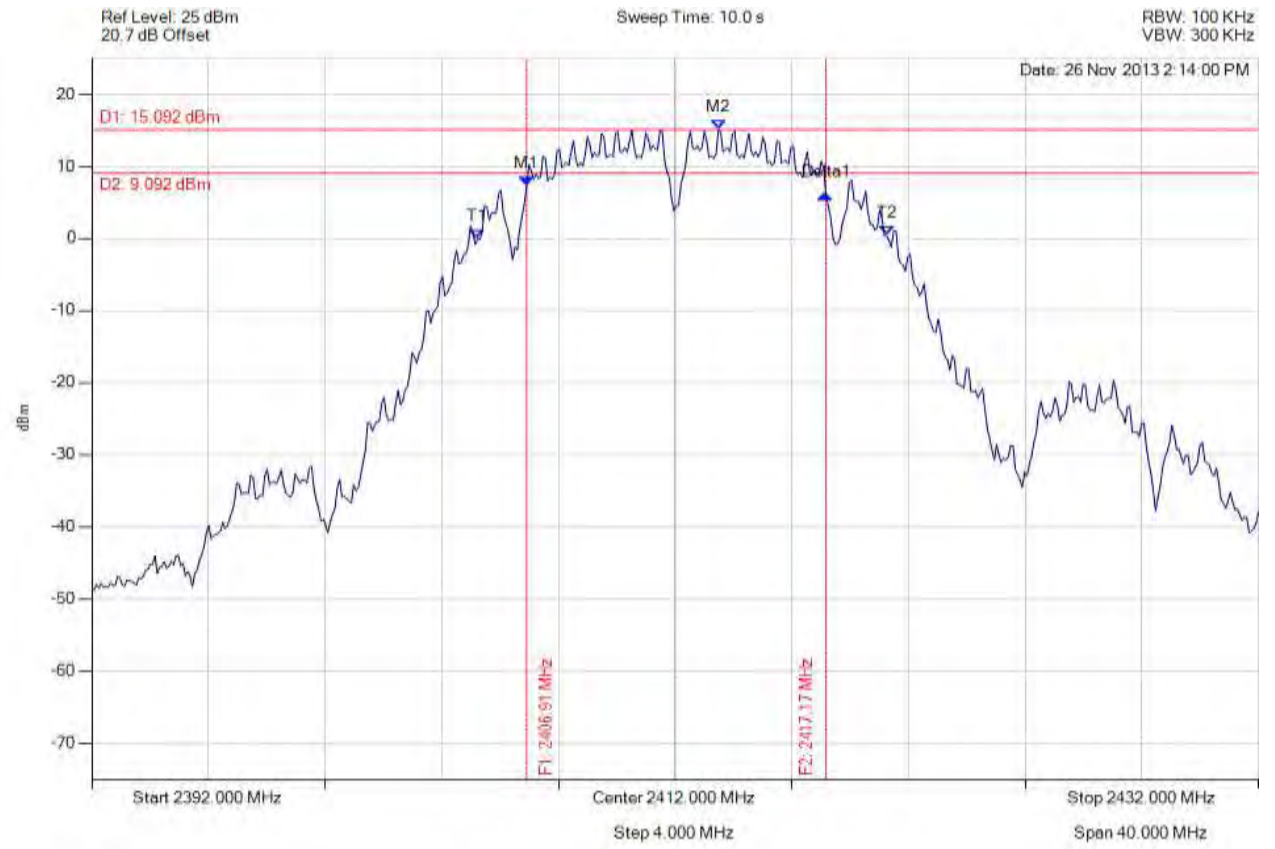


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2406.910 MHz : 8.195 dBm M2 : 2413.483 MHz : 15.866 dBm Delta1 : 10.261 MHz : -0.791 dB T1 : 2405.226 MHz : 0.646 dBm T2 : 2419.255 MHz : 1.274 dBm OBW : 14.028 MHz	Measured 6 dB Bandwidth: 10.261 MHz Limit: ≥500.0 kHz Margin: -9.76 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11b, Channel: 2412.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc

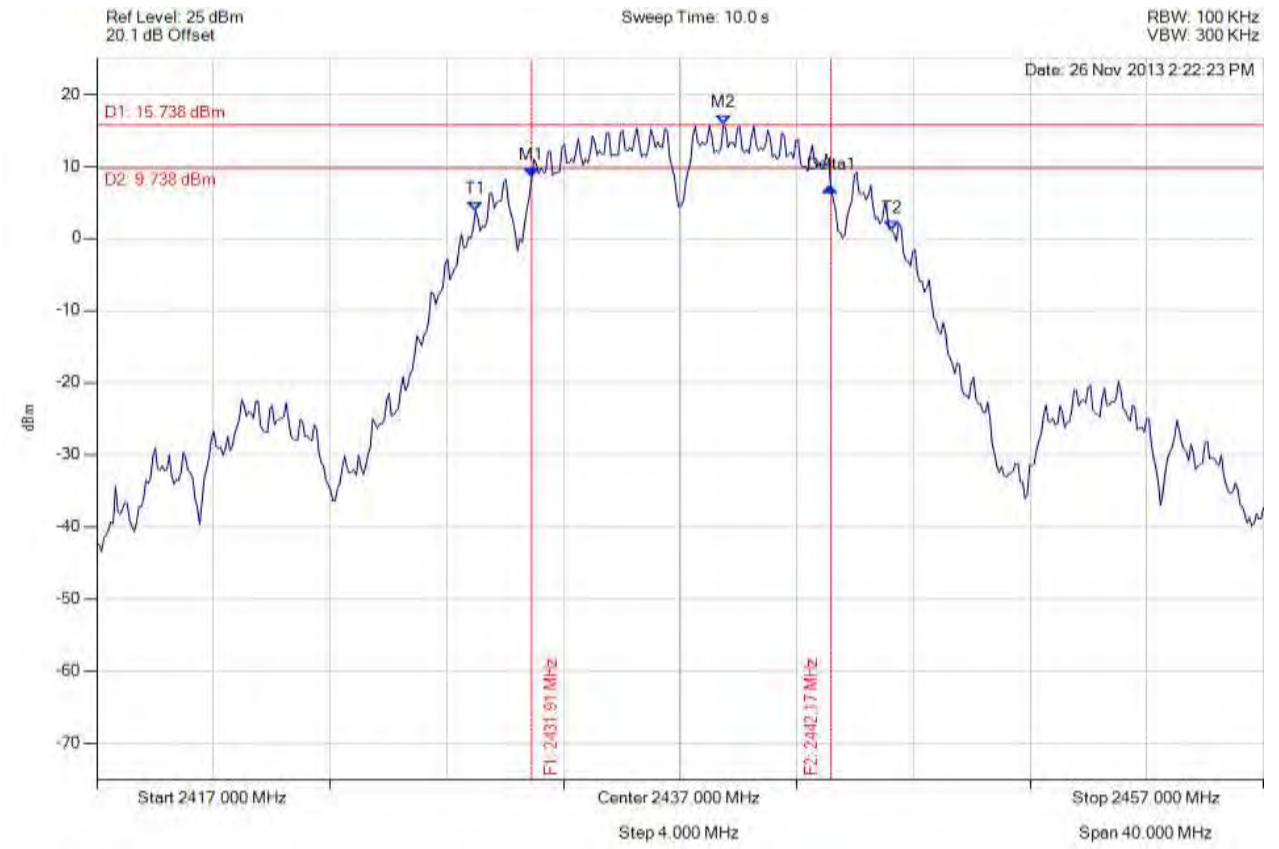


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2406.910 MHz : 7.361 dBm M2 : 2413.483 MHz : 15.092 dBm Delta1 : 10.261 MHz : -1.220 dB T1 : 2405.226 MHz : -0.088 dBm T2 : 2419.255 MHz : 0.406 dBm OBW : 14.028 MHz	Measured 6 dB Bandwidth: 10.261 MHz Limit: ≥500.0 kHz Margin: -9.76 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11b, Channel: 2437.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc

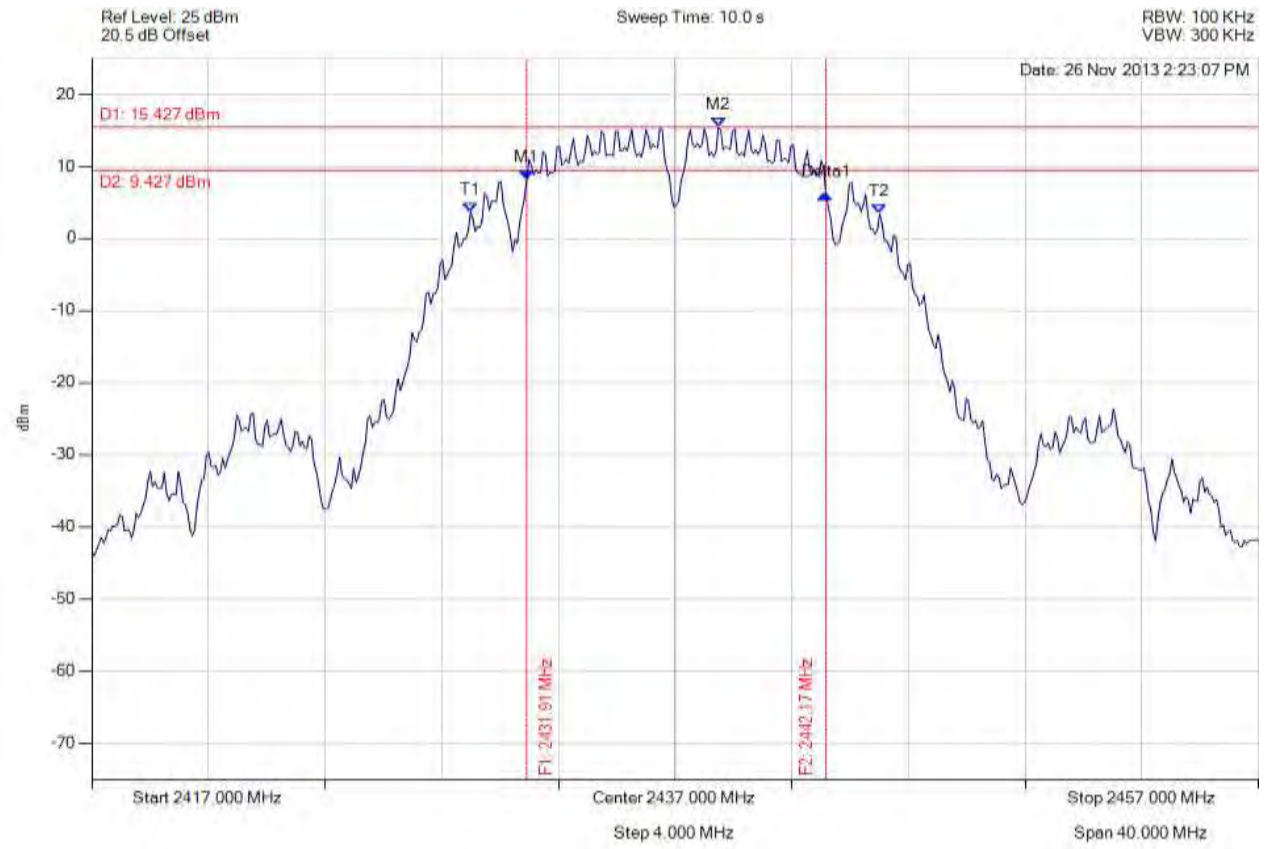


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2431.910 MHz : 8.494 dBm M2 : 2438.483 MHz : 15.738 dBm Delta1 : 10.261 MHz : -1.413 dB T1 : 2429.986 MHz : 3.863 dBm T2 : 2444.255 MHz : 1.154 dBm OBW : 14.269 MHz	Measured 6 dB Bandwidth: 10.261 MHz Limit: ≥500.0 kHz Margin: -9.76 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11b, Channel: 2437.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc

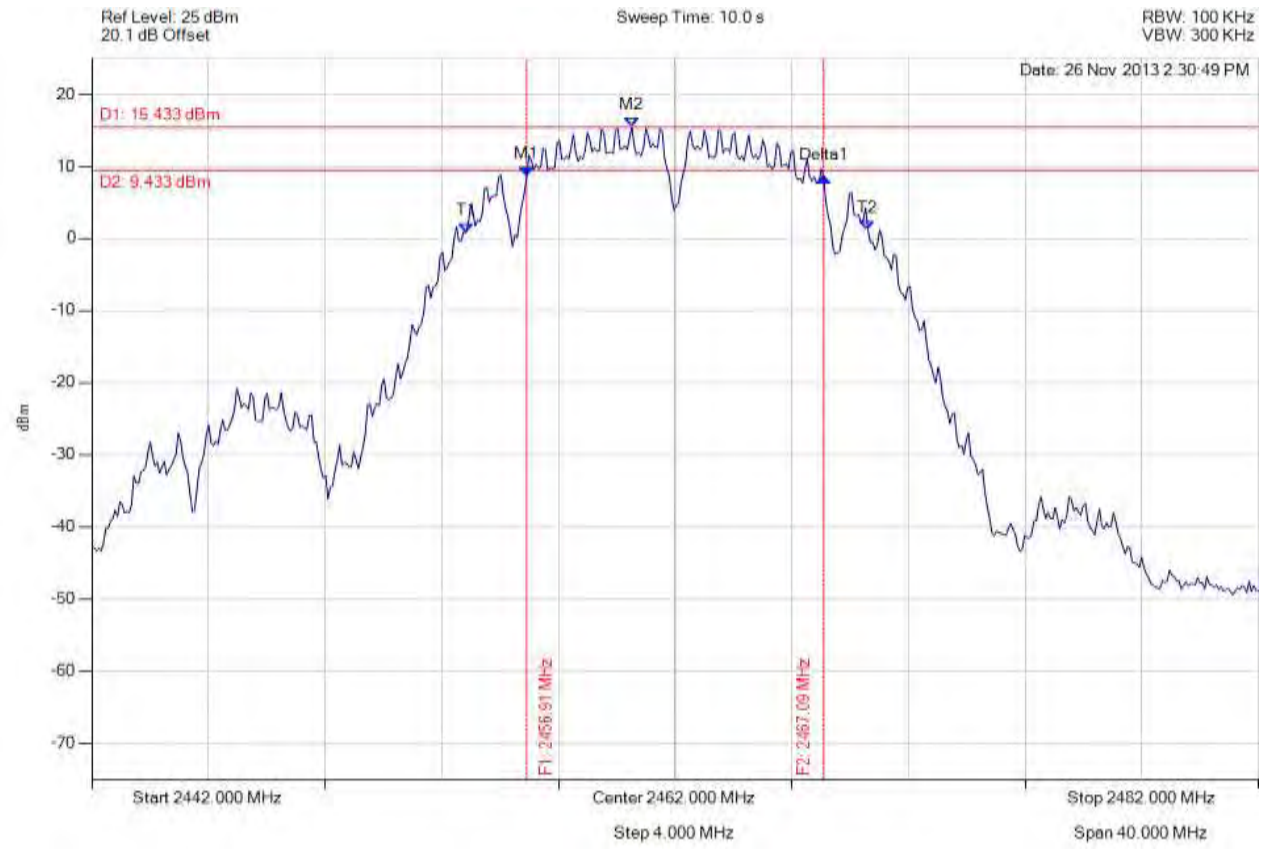


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2431.910 MHz : 8.089 dBm M2 : 2438.483 MHz : 15.427 dBm Delta1 : 10.261 MHz : -1.930 dB T1 : 2429.986 MHz : 3.654 dBm T2 : 2444.014 MHz : 3.412 dBm OBW : 14.028 MHz	Measured 6 dB Bandwidth: 10.261 MHz Limit: ≥500.0 kHz Margin: -9.76 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11b, Channel: 2462.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc

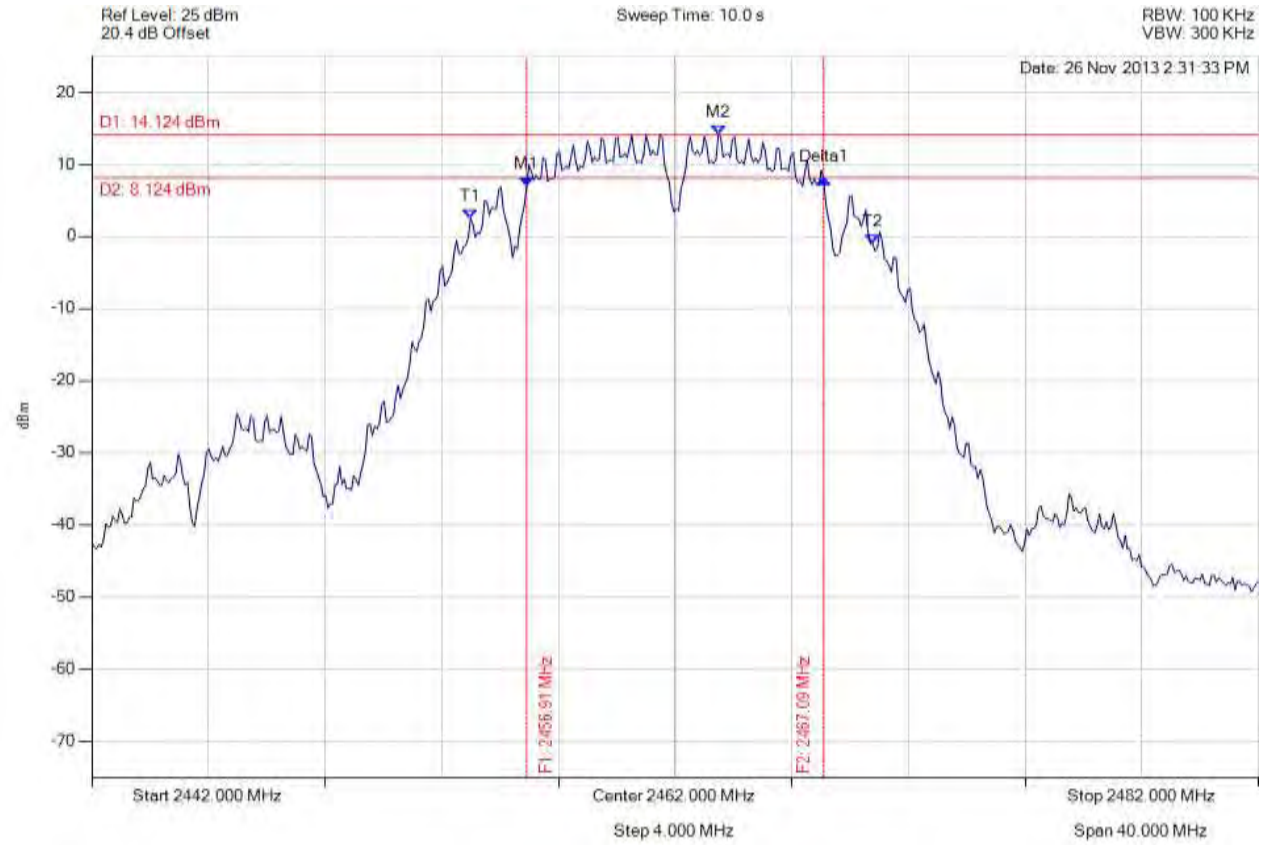


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2456.910 MHz : 8.671 dBm M2 : 2460.517 MHz : 15.433 dBm Delta1 : 10.180 MHz : -0.226 dB T1 : 2454.826 MHz : 0.796 dBm T2 : 2468.613 MHz : 1.193 dBm OBW : 13.788 MHz	Measured 6 dB Bandwidth: 10.180 MHz Limit: ≥500.0 kHz Margin: -9.68 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11b, Channel: 2462.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc

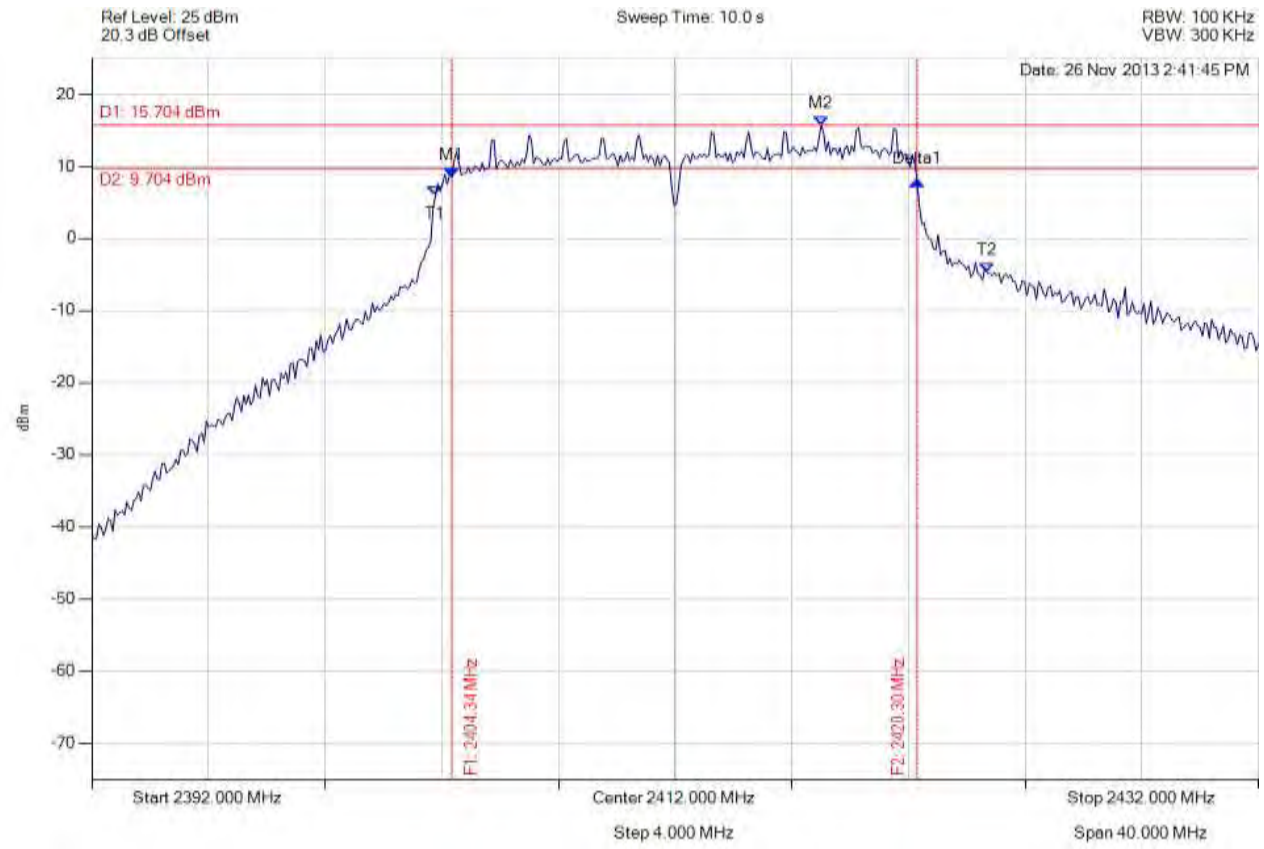


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2456.910 MHz : 6.918 dBm M2 : 2463.483 MHz : 14.124 dBm Delta1 : 10.180 MHz : 1.092 dB T1 : 2454.986 MHz : 2.521 dBm T2 : 2468.774 MHz : -1.014 dBm OBW : 13.788 MHz	Measured 6 dB Bandwidth: 10.180 MHz Limit: ≥500.0 kHz Margin: -9.68 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11g, Channel: 2412.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc

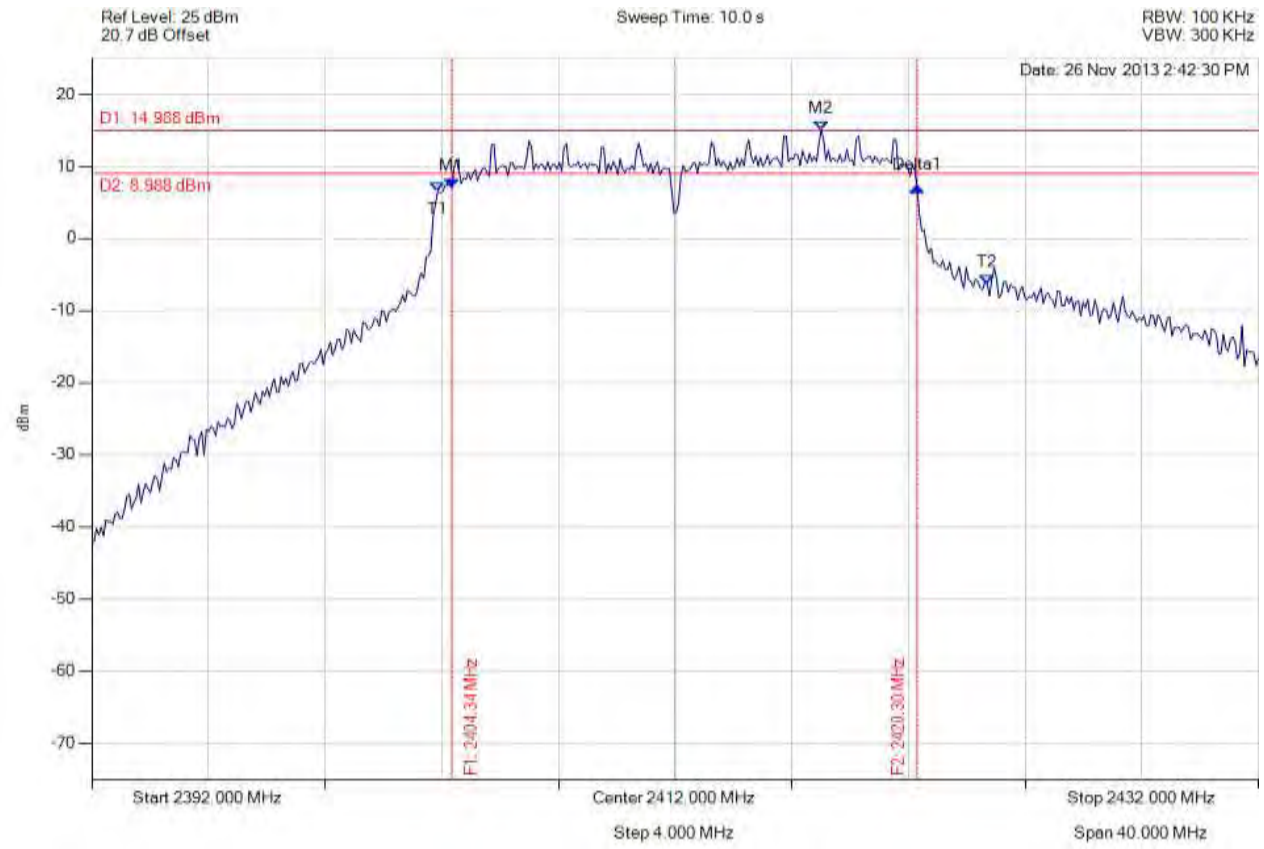


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2404.345 MHz : 8.468 dBm M2 : 2417.010 MHz : 15.704 dBm Delta1 : 15.952 MHz : -0.523 dB T1 : 2403.784 MHz : 5.923 dBm T2 : 2422.701 MHz : -4.758 dBm OBW : 18.918 MHz	Measured 6 dB Bandwidth: 15.952 MHz Limit: ≥500.0 kHz Margin: -15.45 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11g, Channel: 2412.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc

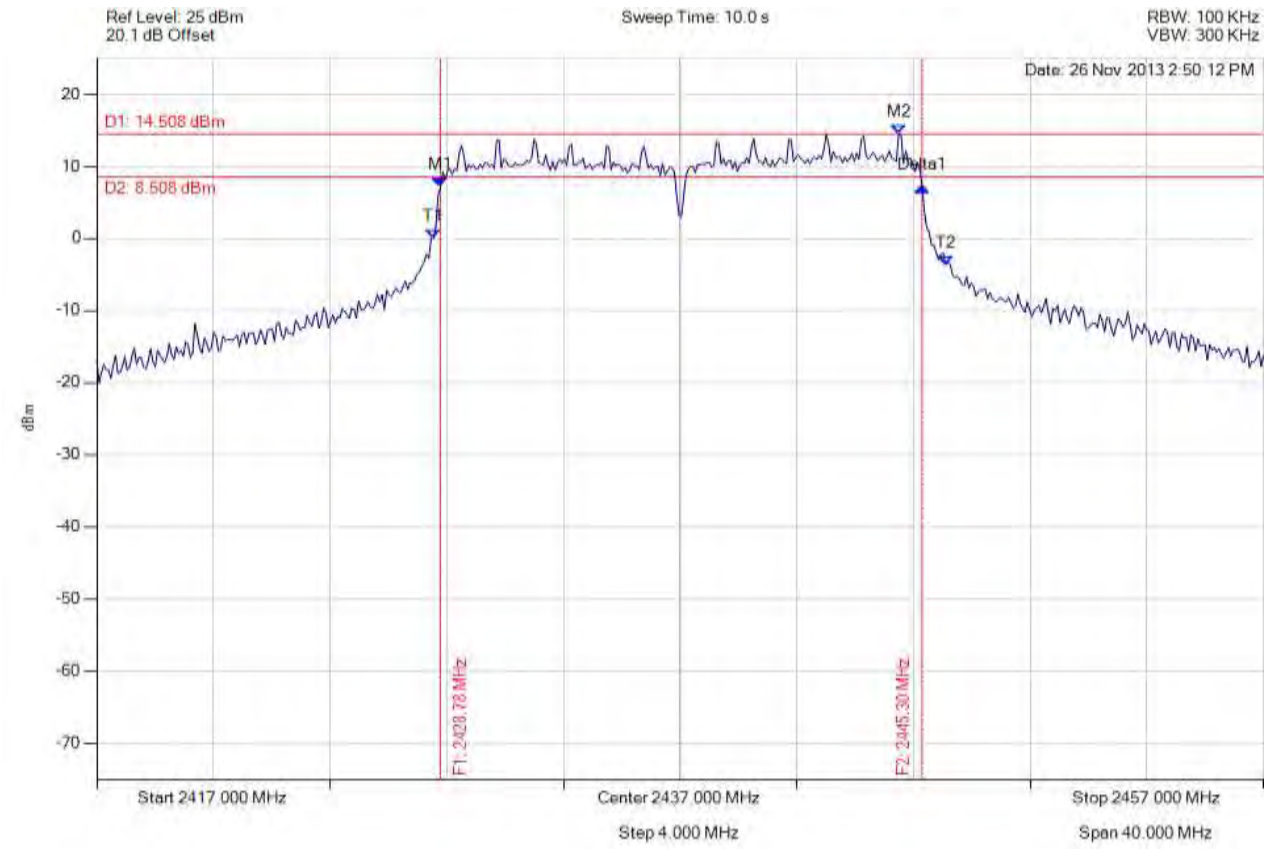


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2404.345 MHz : 7.018 dBm M2 : 2417.010 MHz : 14.988 dBm Delta1 : 15.952 MHz : 0.100 dB T1 : 2403.864 MHz : 6.525 dBm T2 : 2422.701 MHz : -6.326 dBm OBW : 18.838 MHz	Measured 6 dB Bandwidth: 15.952 MHz Limit: ≥500.0 kHz Margin: -15.45 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11g, Channel: 2437.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc

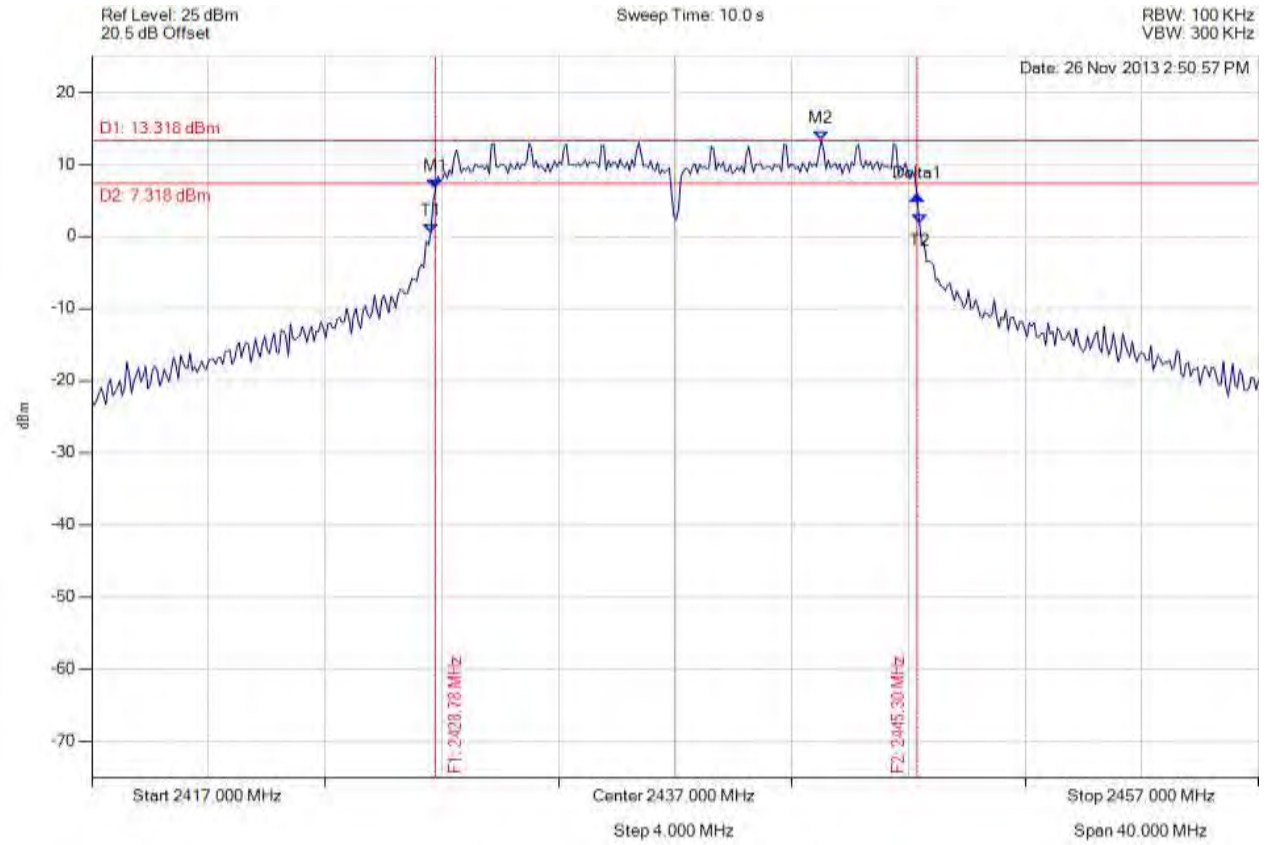


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2428.784 MHz : 7.144 dBm M2 : 2444.495 MHz : 14.508 dBm Delta1 : 16.513 MHz : 0.026 dB T1 : 2428.543 MHz : 0.011 dBm T2 : 2446.098 MHz : -3.639 dBm OBW : 17.555 MHz	Measured 6 dB Bandwidth: 16.513 MHz Limit: ≥500.0 kHz Margin: -16.01 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11g, Channel: 2437.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc

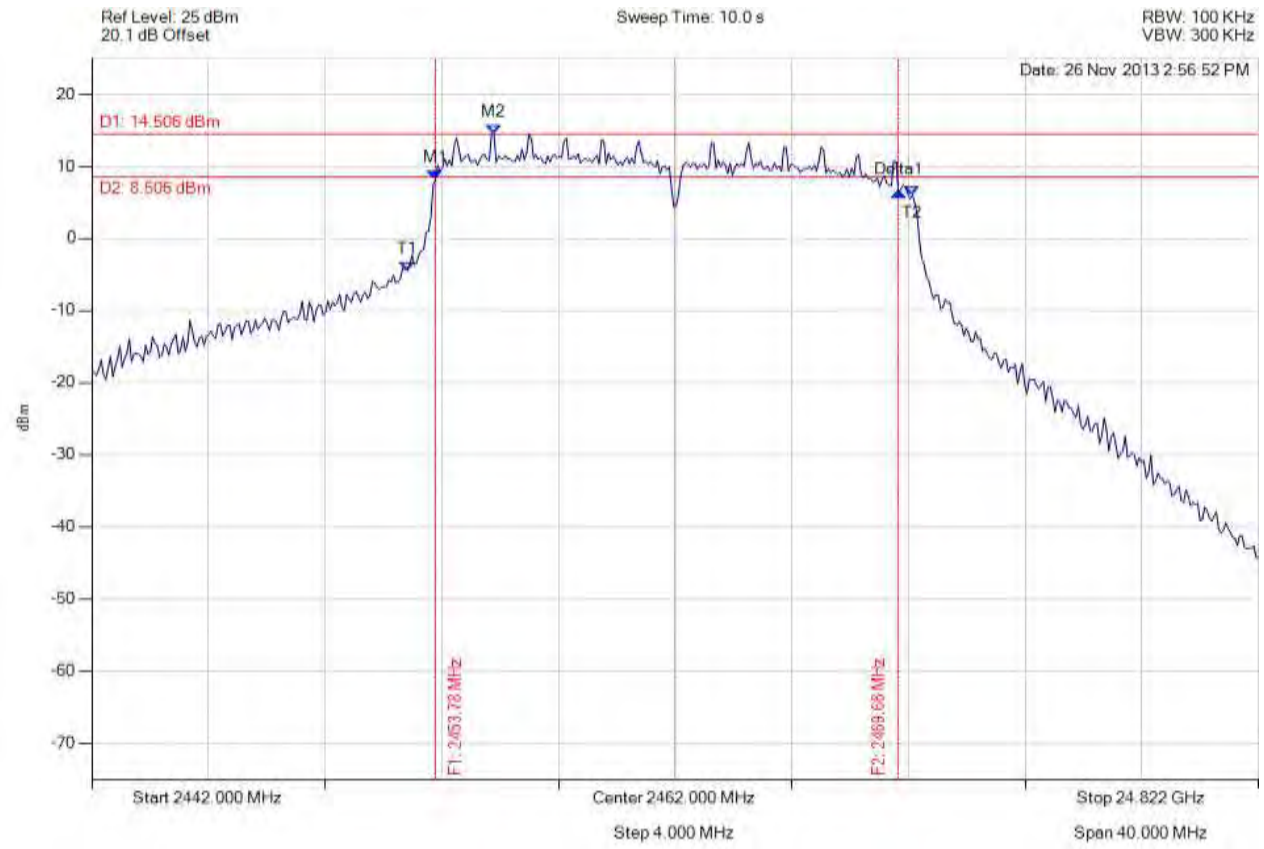


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2428.784 MHz : 6.584 dBm M2 : 2442.010 MHz : 13.318 dBm Delta1 : 16.513 MHz : -0.966 dB T1 : 2428.623 MHz : 0.493 dBm T2 : 2445.377 MHz : 1.889 dBm OBW : 16.754 MHz	Measured 6 dB Bandwidth: 16.513 MHz Limit: ≥500.0 kHz Margin: -16.01 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11g, Channel: 2462.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc

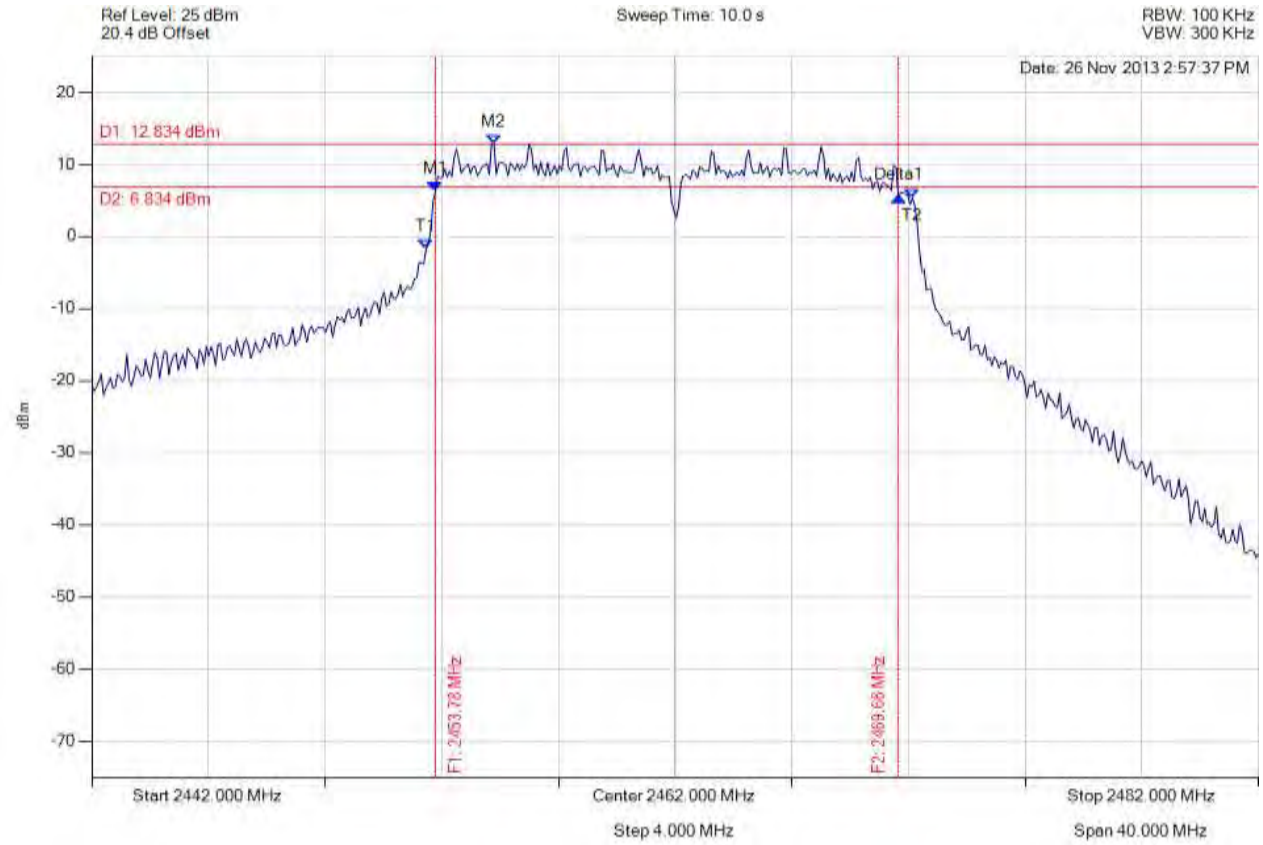


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2453.784 MHz : 8.187 dBm M2 : 2455.788 MHz : 14.506 dBm Delta1 : 15.872 MHz : -1.765 dB T1 : 2452.822 MHz : -4.475 dBm T2 : 2470.136 MHz : 6.011 dBm OBW : 17.315 MHz	Measured 6 dB Bandwidth: 15.872 MHz Limit: ≥500.0 kHz Margin: -15.37 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11g, Channel: 2462.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc

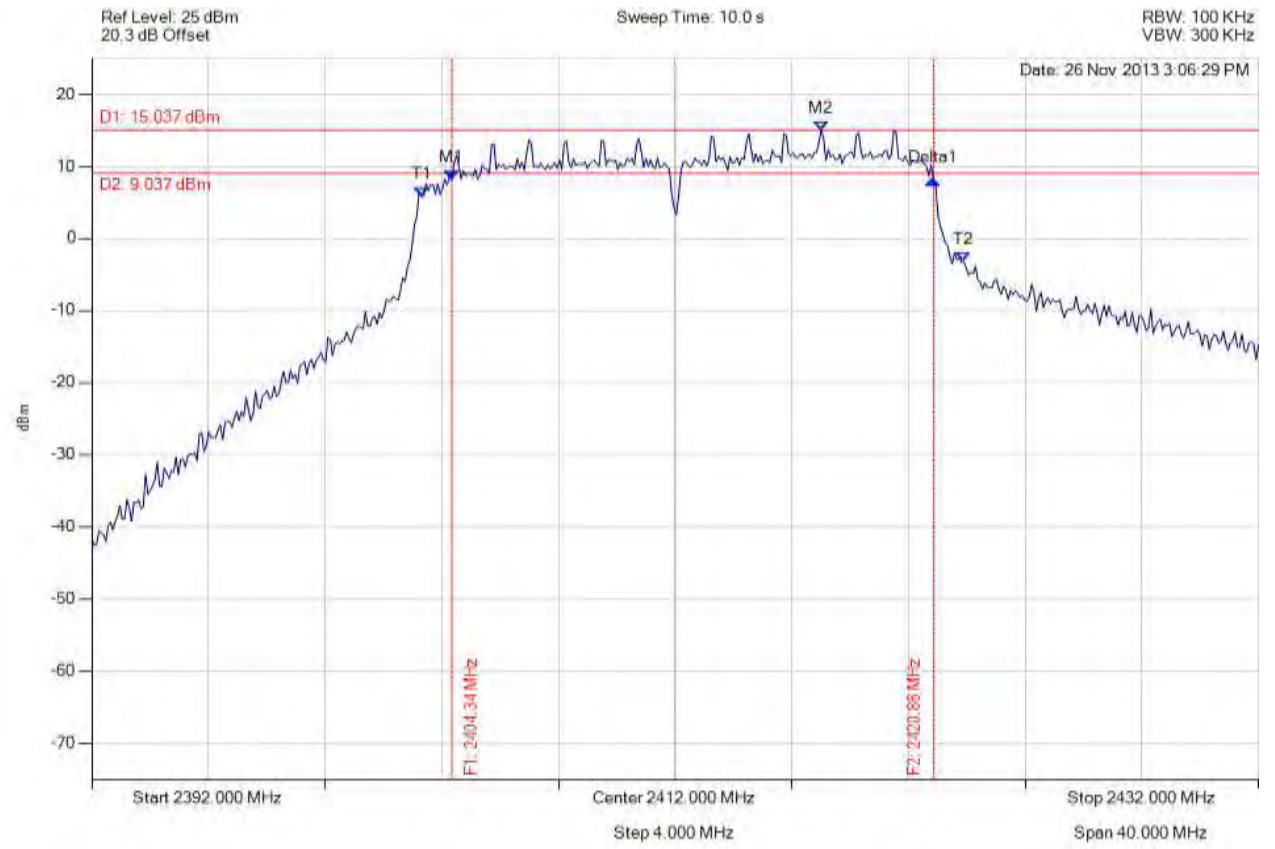


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2453.784 MHz : 6.373 dBm M2 : 2455.788 MHz : 12.834 dBm Delta1 : 15.872 MHz : -0.968 dB T1 : 2453.463 MHz : -1.719 dBm T2 : 2470.136 MHz : 5.346 dBm OBW : 16.673 MHz	Measured 6 dB Bandwidth: 15.872 MHz Limit: ≥500.0 kHz Margin: -15.37 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 2412.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc

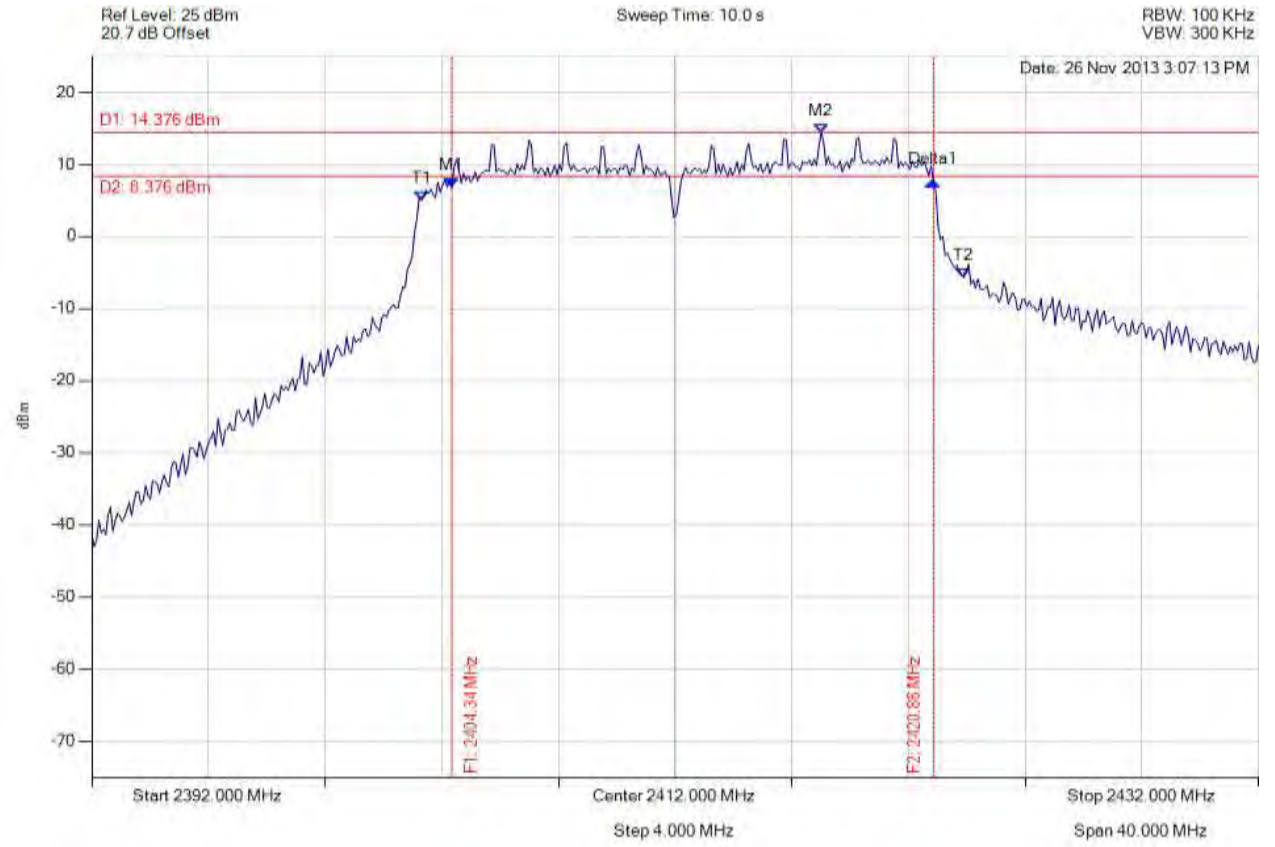


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2404.345 MHz : 8.134 dBm M2 : 2417.010 MHz : 15.037 dBm Delta1 : 16.513 MHz : -0.022 dB T1 : 2403.303 MHz : 5.828 dBm T2 : 2421.900 MHz : -3.226 dBm OBW : 18.597 MHz	Measured 6 dB Bandwidth: 16.513 MHz Limit: ≥500.0 kHz Margin: -16.01 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 2412.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc

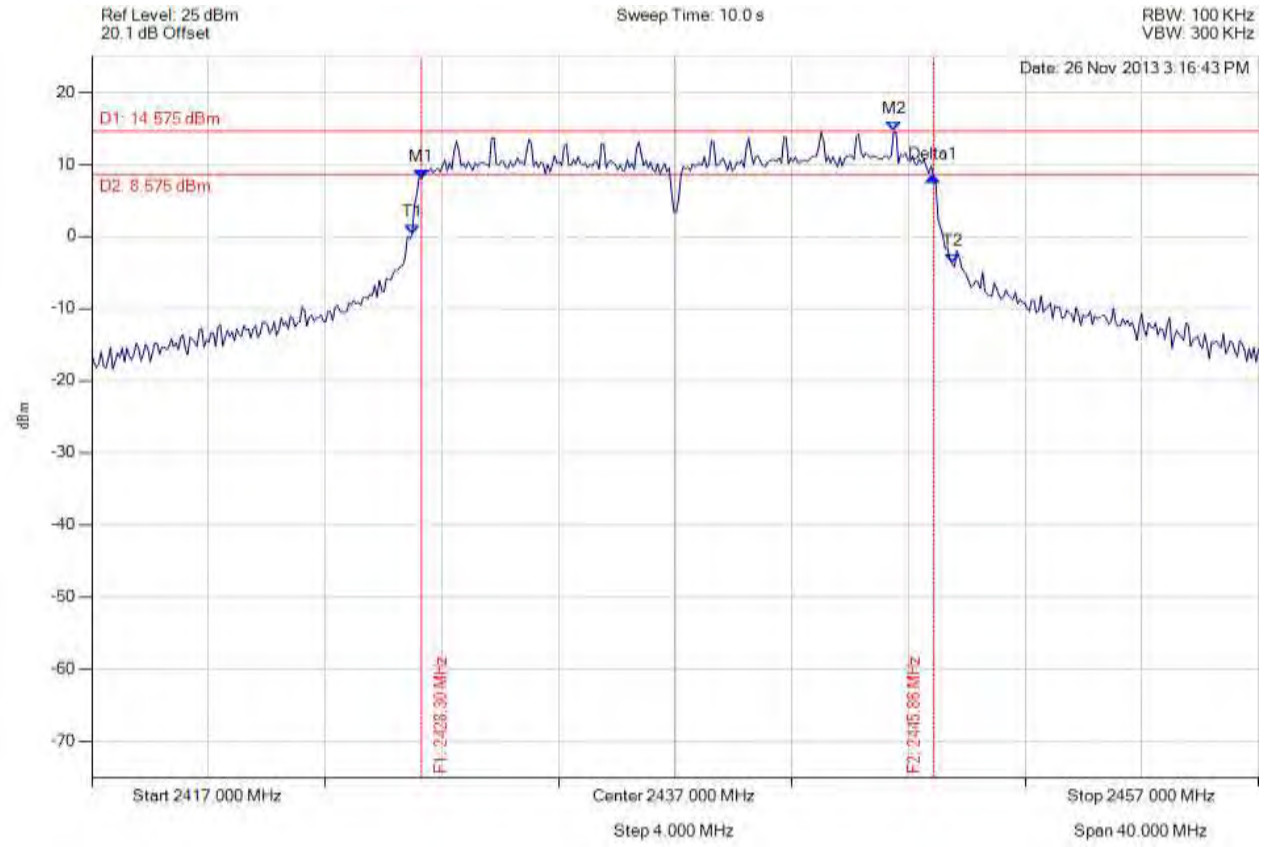


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2404.345 MHz : 6.851 dBm M2 : 2417.010 MHz : 14.376 dBm Delta1 : 16.513 MHz : 0.746 dB T1 : 2403.303 MHz : 5.039 dBm T2 : 2421.900 MHz : -5.640 dBm OBW : 18.597 MHz	Measured 6 dB Bandwidth: 16.513 MHz Limit: ≥500.0 kHz Margin: -16.01 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 2437.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc

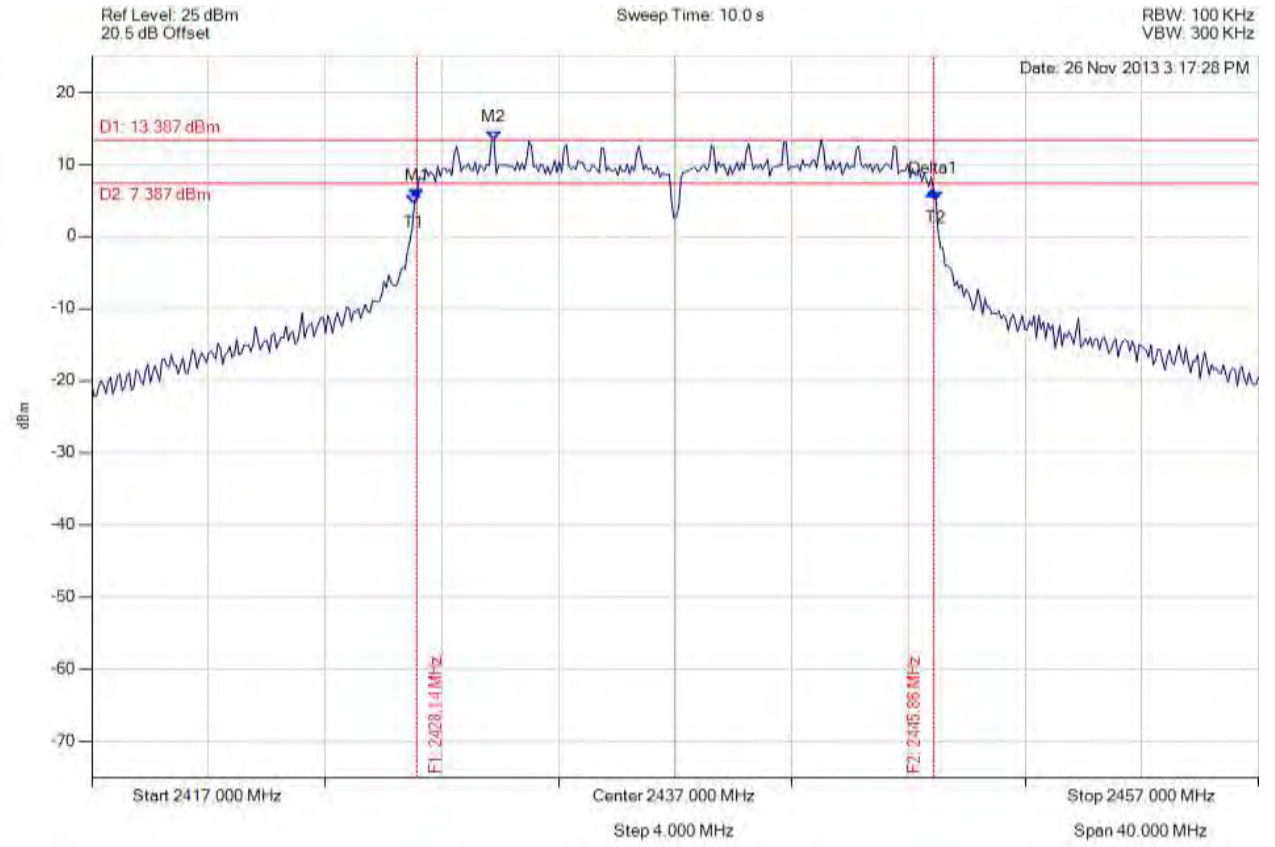


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2428.303 MHz : 7.961 dBm M2 : 2444.495 MHz : 14.575 dBm Delta1 : 17.555 MHz : 0.336 dB T1 : 2427.982 MHz : 0.237 dBm T2 : 2446.499 MHz : -3.765 dBm OBW : 18.517 MHz	Measured 6 dB Bandwidth: 17.555 MHz Limit: ≥500.0 kHz Margin: -17.06 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 2437.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc

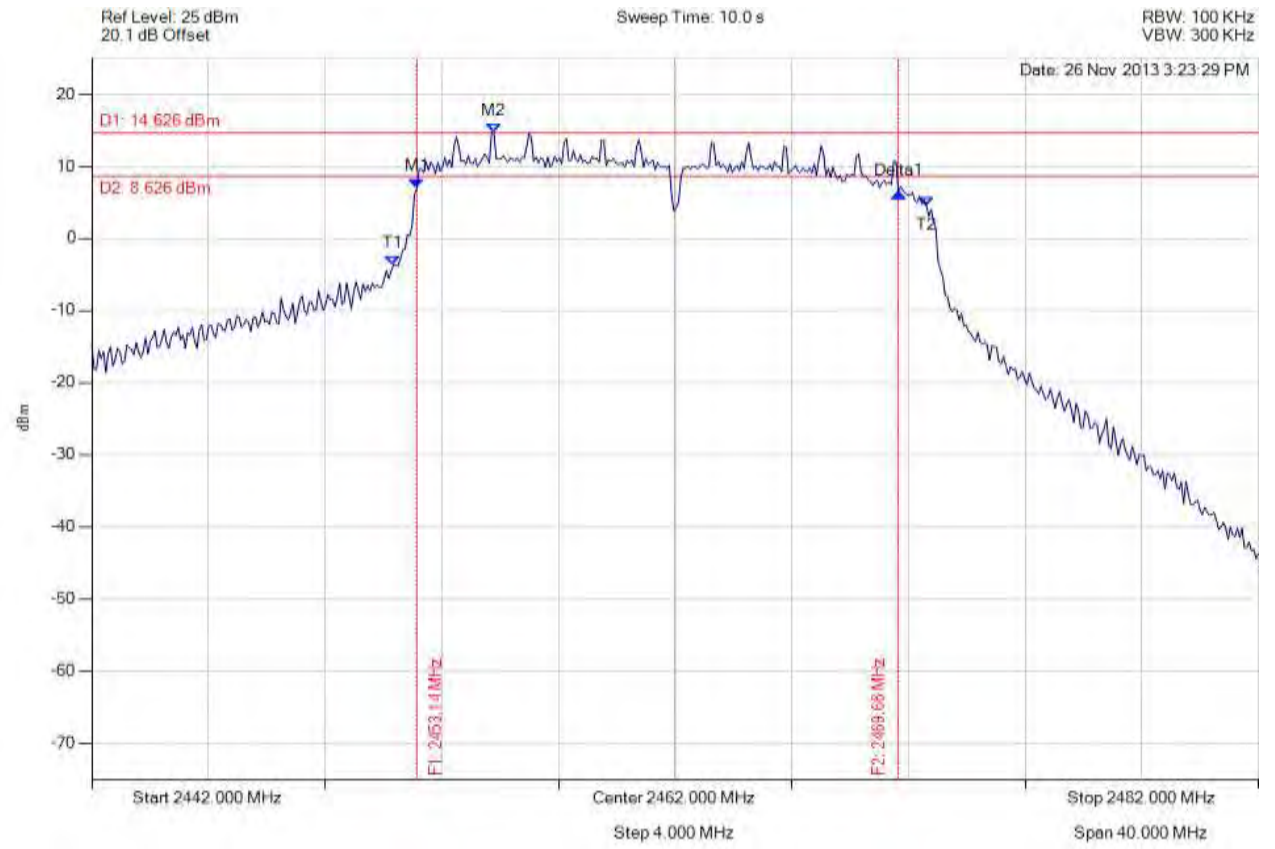


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2428.142 MHz : 5.252 dBm M2 : 2430.788 MHz : 13.387 dBm Delta1 : 17.715 MHz : 1.088 dB T1 : 2428.062 MHz : 4.482 dBm T2 : 2445.938 MHz : 5.035 dBm OBW : 17.876 MHz	Measured 6 dB Bandwidth: 17.715 MHz Limit: ≥500.0 kHz Margin: -17.22 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 2462.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc

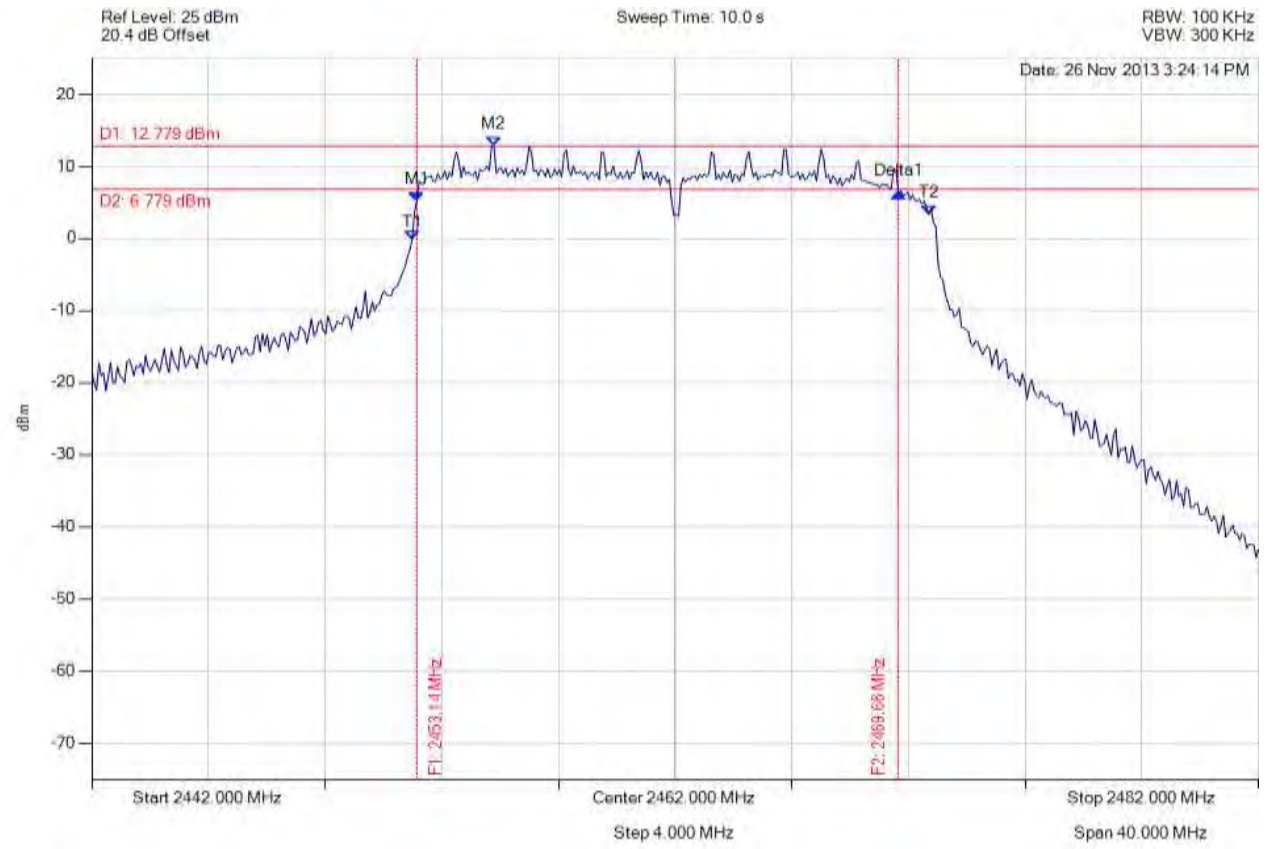


Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2453.142 MHz : 7.022 dBm M2 : 2455.788 MHz : 14.626 dBm Delta1 : 16.513 MHz : -0.655 dB T1 : 2452.341 MHz : -3.658 dBm T2 : 2470.617 MHz : 4.492 dBm OBW : 18.277 MHz	Measured 6 dB Bandwidth: 16.513 MHz Limit: ≥500.0 kHz Margin: -16.01 MHz

Back to the Matrix

6 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 2462.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 2453.142 MHz : 5.094 dBm M2 : 2455.788 MHz : 12.779 dBm Delta1 : 16.513 MHz : 1.277 dB T1 : 2452.982 MHz : -0.200 dBm T2 : 2470.697 MHz : 3.332 dBm OBW : 17.715 MHz	Measured 6 dB Bandwidth: 16.513 MHz Limit: ≥500.0 kHz Margin: -16.01 MHz

Back to the Matrix