Test of: RADWIN Ltd AP0158770 RF Module

To: FCC 47 CFR Part 15.407 &
Industry Canada RSS-247 Issue 1

Test Report Serial No.: RDWN39-U8 Rev A

MiCOM Labs

opening wireless markets

TEST REPORT

FROM

Test of: RADWIN Ltd AP0158770 RF Module

to

To FCC 47 CFR Part 15.407 &
Industry Canada RSS-247 Issue 1

Test Report Serial No.: RDWN39-U8 Rev A

This report supersedes None

Applicant: RADWIN Ltd
27 Habarzel Street
Tel Aviv, 6971039
Israel

Product Function: 5 GHz Wireless Module

Copy No: pdf Issue Date: 8th December 2015

This Test Report is Issued Under the Authority of;

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ACCREDITED
TESTING CERT # 2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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ACCREDITATION, LISTINGS & RECOGNITION

Testing Accreditation

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard ISO/IEC 17025:2005. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-01.pdf

Accredited Laboratory

A2LA has accredited

MICOM LABS

Pleasanton, CA

for technical competence in the field of

Electrical Testing

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

Presented this 28th day of February 2014.

President & CEO
For the Accreditation Council
Certificate Number 2381.01
Valid to December 31, 2015
Revised November 18, 2015

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

1.1. Recognition

MiCOM Labs, Inc has widely recognized wireless testing capabilities. Our international recognition includes Conformity Assessment Body designation by APEC MRA countries. MiCOM Labs test reports are accepted globally.

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

EU MRA – European Union Mutual Recognition Agreement.
NB – Notified Body
APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement. Recognition agreement under which test lab is accredited to regulatory standards of the APEC member countries.

Phase I - recognition for product testing
Phase II – recognition for both product testing and certification

1.2. Product Certification

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

Accredited Product Certification Body

A2LA has accredited

MICOM LABS

Pleasanton, CA

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC 17065:2012 *Requirements for bodies certifying products, processes and services*. This accreditation demonstrates technical competence for a defined scope and the operation of a management system.

Presented this 28th day of February 2014.

President & CEO
For the Accreditation Council
Certificate Number 2381.02
Valid to December 31, 2015
Revised November 18, 2015

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

United States of America – Telecommunication Certification Body (TCB)
Industry Canada – Certification Body, CAB Identifier – US0159
Europe – Notified Body (NB), NB Identifier - 2280
Japan – Recognized Certification Body (RCB), RCB Identifier - 210

DOCUMENT HISTORY

Document History		
Revision	**Date**	**Comments**
Draft	1st December 2015	Added additional antenna AM0156430
Draft #2	7th December 2015	
Rev A	8th December 2015	Second Document Release
Document initially released RDWN36-U6		
Rev A	31st January 2015	Initial release

1. TEST RESULT CERTIFICATE

Applicant:	RADWIN Ltd 27 Habarzel Street Tel Aviv, 6971039 Israel	Tested By:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California, 94566, USA
EUT:	5 GHz Wireless Module.	Tel:	+1 925 462 0304
Model:	AP0158770	Fax:	+1 925 462 0306
S/N:	Prototype		
Test Date(s):	2nd-12th Dec '14 & 11th Nov '15	Website:	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC 47 CFR Part 15.407 & IC RSS-247	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.

2. REFERENCES AND MEASUREMENT UNCERTAINTY

2.1. Normative References

Ref.	Publication	Year	Title
(i)	FCC 47 CFR Part 15.407	2015	Code of Federal Regulations
(ii)	FCC 06-96	June 2006	Memorandum Opinion and Order
(iii)	FCC OET KDB 662911	4th April 2011	Emissions Testing of Transmitters with Multiple Outputs in the Same Band
(iv)	ANSI C63.4	2009	American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
(v)	CISPR 22/ EN 55022	2008 2006+A1:2007	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
(vi)	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
(vii)	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
(viii)	ETSI TR 100 028	2001	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
(ix)	A2LA	July 2012	Reference to A2LA Accreditation Status – A2LA Advertising Policy
(x)	FCC Public Notice – DA 02-2138	2002	Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices
(xi)	ICES-003	Issue 5 2012	Spectrum Management and Telecommunications; Interference-Causing Equipment Standard. Information Technology Equipment (ITE) – Limits and methods of measurement.
(xii)	RSS-247, Issue 1	May 2015	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
(xiii)	RSS-Gen, Issue 4	Nov 2014	General Requirements and Information for the Certification of Radiocommunication Equipment

2.2. Test and Uncertainty Procedures

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

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

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

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3. PRODUCT DETAILS AND TEST CONFIGURATIONS

3.1. Technical Details

Details	Description
Purpose:	Test of RADWIN Ltd AP0158770 to FCC Part 15.407 and Industry Canada RSS-247 Issue 1 regulations.
Applicant:	RADWIN Ltd 27 Habarzel Street Tel Aviv, 6971039, Israel
Manufacturer:	As applicant
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton, California 94566 USA
Test report reference number:	RDWN39-U8 Rev A
Date EUT received:	1st December 2014
Standard(s) applied:	FCC 47 CFR Part 15.407
Dates of test (from - to):	2nd-12th Dec '14 & 11th Nov '15
No of Units Tested:	One
Type of Equipment:	5 GHz Wireless Module 2x2 Spatial Multiplexing MIMO configuration
Applicants Trade Name:	RADWIN
Model(s):	AP0158770
Location for use:	Outdoor
Declared Frequency Range(s):	5,150 – 5,250 MHz
Hardware Rev	Prototype
Software Rev	Radwin Art GUI
Type of Modulation:	Per 802.11n/ac BPSK, QPSK, 16QAM, 64QAM, 256 QAM, OFDM
Declared Nominal Output Power: (Average Power)	5 MHz: +25.0 dBm 10 MHz: +27.0 dBm 20 MHz: +27.0 dBm 40 MHz: +27.0 dBm 80 MHz: +30.0 dBm
EUT Modes of Operation:	5, 10, 20, 40, 80 MHz
Transmit/Receive Operation:	Time Division Duplex
System Beam Forming:	AP0158770 has no capability for beam-forming
Rated Input Voltage and Current:	POE 55 Vdc 1 A
Operating Temperature Range:	Declared range -35° to +60°C
ITU Emission Designator:	5 MHz 5M00W7W 10 MHz 10M0W7W 20 MHz 20M0W7W 40 MHz 40M0W7W 80 MHz 80M0W7W
Equipment Dimensions:	1.9” X 2.0” x 0.3”
Weight:	0.042 lb. (19g)
Primary function of equipment:	RF module for transmitting and receiving data

3.2. Scope of Test Program

AP0158770 5 GHz Wireless Module
The scope of the test program was to test the AP0158770 5 GHz 2x2 MIMO RF module configurations in the frequency range 5150 - 5250 MHz for compliance against FCC 47 CFR Part 15.407 and Industry Canada RSS-247 Issue 1

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.

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RADWIN Ltd
AP0158770 Wireless Module

RADWIN Ltd
AP0158770 Wireless Module (Rear)

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

Equipment Type	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
EUT	5 GHz Wireless Module	RADWIN Ltd	AP0158770	Prototype
Support	Laptop PC	DELL	LATITUDE D530	None

3.4. Antenna Details

Radiated emissions testing were performed in the mode with the highest spectral density to verify compliance. Radiated emissions were performed on the highest gain of each type of antenna as identified in the table below;-

Radiated Emission Results (Antenna #)	Antenna Type	Manufacturer	Model Number	Antenna Gain(dBi)
				5150-5250 MHz
1	Sector Dual Pole Integrated 120 Deg	RADWIN Ltd.	MT0128930	11
Not Tested	Sector Dual Pole 120 Deg	RADWIN Ltd.	RW-9061-5004	11
2	Shark Fin Monopole	RADWIN Ltd	RW-9401-5002	12.5
3	Sector Dual Pole Integrated 95 Deg	RADWIN Ltd.	AM0135060	12
Not Tested	Sector Dual Pole 90 Deg	RADWIN Ltd.	RW-9061-5001	14
4	Sector Dual Pole 60 Deg	RADWIN Ltd.	RW-9061-5002	15.5
Not Tested	Sector Dual Pole Integrated 90 Deg	RADWIN Ltd.	MT0125250	13
Not Tested	Flat Panel Dual Pole Integrated	RADWIN Ltd.	AM0119960	16
5	Flat Panel Dual Pole Integrated	RADWIN Ltd.	AM0111760	16
Not Tested	Flat Panel Dual Pole External	RADWIN Ltd.	RW-9612-5001	23
6	Flat Panel Dual Pole Integrated	RADWIN Ltd.	MT0070760	23.5
7	Flat Panel Dual Pole External	RADWIN Ltd.	RW-9622-5001	29
Not Tested	Dual Pole Dish	RADWIN Ltd.	RW-9721-5158	28
8	Dual Pole Dish	RADWIN Ltd.	RW-9732-4958	32
9	Integral Smart Dual Pole.	RADWIN Ltd.	AM0156430	20.5

The “Not Tested” antennas were covered by testing higher gain antennas of the same family

3.5. Cabling and I/O Ports

Number and type of I/O ports

1. 1 x 10/100/1000 Ethernet (includes POE +55 Vdc)

3.6. Test Configurations

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

Matrix of test configurations

Channel Bandwidth	Data Rates with Highest Power	Frequencies (MHz)
5 MHz	15 MCS	5157.5 / 5200 / 5245
10 MHz	15 MCS	5162 / 5200 / 5245
20 MHz	15 MCS	5165 / 5200 / 5240
40 MHz	15 MCS	5172 / 5200 / 5230
80 MHz	15 MCS	5190 / 5210

Antenna Test Configurations for Radiated Emissions and Band-Edge
The following measurements were performed on all antenna configurations identified in Section 3.4 Antenna Details. Results for the following configurations are provided in this report.

5,150 – 5,250 MHz			
Operating Bandwidth V's Channel Frequencies (MHz)			
5 MHz	Con/SE/BE: 5157.5	40 MHz	Con/BE: 5172
	Con/SE: 5200		Con: 5200
	Con/SE: 5245		Con: 5230
10 MHz	Con/BE: 5162	80 MHz	Con/BE: 5190
	Con: 5200		Con: 5210
	Con: 5245	KEY:	Con - Conducted Radiated SE – Spurious Emissions BE – Band-Edge
20 MHz	Con/BE: 5165		
	Con: 5200		
	Con: 5240		

3.7. Equipment Modifications

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

1. Band-Edge Power Reduction

   The power settings required for each antenna to comply with the requirements are detailed in Section 6.1.1.2 “Maximum Conducted Output Power”

3.8. Deviations from the Test Standard

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

1. NONE

3.9. Subcontracted Testing or Third Party Data

1. NONE

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4. TESTING EQUIPMENT CONFIGURATION(S)

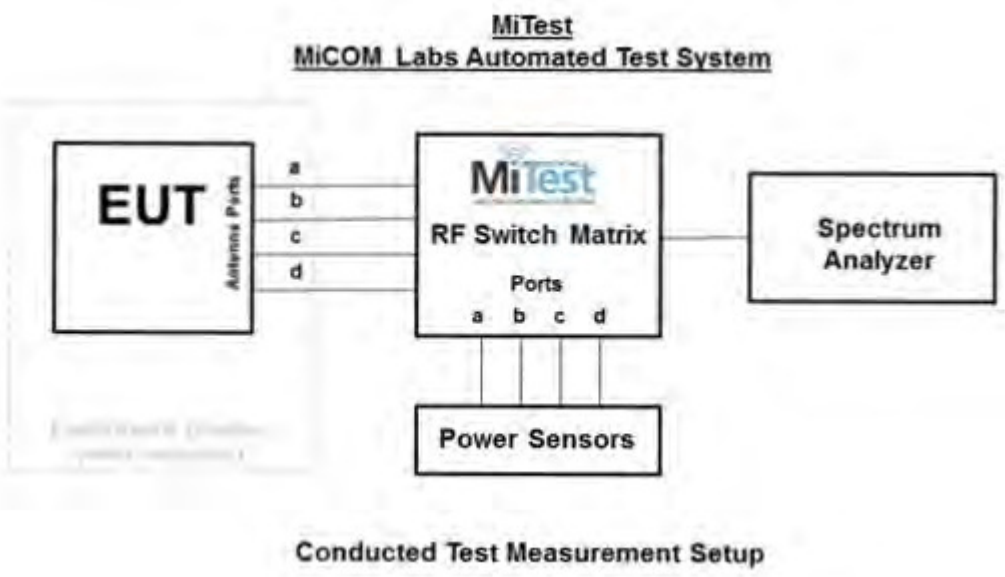
4.1. Conducted RF Emission Test Set-up

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

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

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

Conducted Test Set-Up Pictorial Representation



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

Traceability of Test Equipment Utilized for Conducted Testing

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	01 Dec 2016
193	Receiver 20 Hz to 7 GHz	Rhode & Schwarz	ESI 7	838496/007	14 Jan 2016
249	Resistance Thermometer	Thermotronics	GR2105-02	9340 #2	23 Oct 2016
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	27 Aug 2016
361	Desktop for RF#1, Labview Software installed	Dell	Vostro 220	WS RF#1	Not Required
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	04 Aug 2016
380	4x4 RF Switch Box	MiCOM Labs	MiTest RF Switch Box	MIC001	20 Dec 2015
390	USB Power Head 50MHz - 24GHz -60 to +20dBm	Agilent	U2002A	MY50000103	17 Oct 2016
398	Test Software	MiCOM	MiTest ATS	Version 3.0.0.16	Not Required
405	DC Power Supply 0-60V	Agilent	6654A	MY4001826	Cal when used
408	USB to GPIB interface	National Instruments	GPIB-USB HS	14C0DE9	Not Required
436	USB Wideband Power Sensor	Boonton	55006	8731	31 Jul 2016
437	USB Wideband Power Sensor	Boonton	55006	8759	31 Jul 2016
445	PoE Injector	D-Link	DPE-101GL	QTAH1E2000625	Not Required
75	Environmental Chamber	Thermatron	SE-300-2-2	27946	24 Nov 2016
RF#1 GPIB#1	GPIB cable to Power Supply	HP	GPIB	None	Not Required
RF#1 SMA SA #452	Precision SMA Male RG-402 Spectrun Analyzer	Fairview Microwave	Precision SMA Male RG 402 coax	None	20 Dec 2015
RF#1 SMA#1	EUT to Mitest box port 1	Flexco	SMA Cable port1	None	20 Dec 2015
RF#1 SMA#2	EUT to Mitest box port 2	Flexco	SMA Cable port2	None	20 Dec 2015
RF#1 SMA#3	EUT to Mitest box port 3	Flexco	SMA Cable port3	None	20 Dec 2015
RF#1 SMA#4	EUT to Mitest box port 4	Flexco	SMA Cable port4	None	20 Dec 2015
RF#1 USB#1	USB Cable to Mitest Box	Dynex	USB Cable	None	Not Required

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Measurement and Presentation of Test Data

The measurement and graphical data presented in this test report was generated automatically using state-of-the-art technology creating an easy to read report structure. Numerical measurement data is separated from supporting graphical data (plots) through hyperlinks. Numerical measurement data can be reviewed without scrolling through numerous graphical pages to arrive at the next data matrix.

Plots have been relegated into the Appendix 'Graphical Data'.

Test and report automation was performed by MiTest. MiTest is an automated test system developed by MiCOM Labs. MiTest is the first cloud based modular test system enabling end-to-end automation of regulatory compliance testing for conducted RF testing.

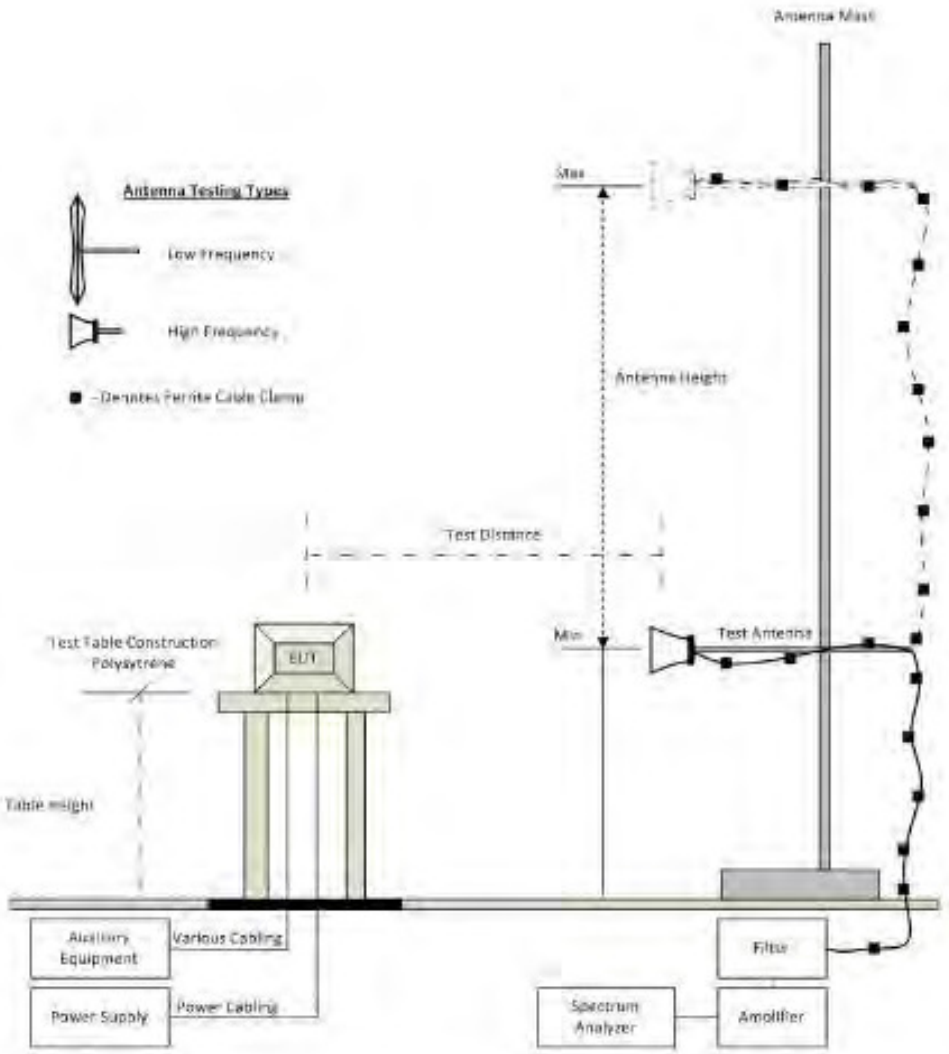
The MiCOM Labs "***MiTest***" Automated Test System" (Patent Pending)

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

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

1. Section 6.1.2 Radiated Emissions
2. Section 6.1.3 Digital Emissions

Radiated Emission Measurement Setup



Radiated Emission Test Setup

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

Traceability of Test Equipment Utilized for Radiated Emission Testing

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	01 Dec 2016
170	Video System Controller for Semi Anechoic Chamber	Panasonic	WV-CY101	04R08507	Not Required
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	15 Aug 2016
377	Band Rejection Filter 5150 to 5880MHz	Microtronics	BRM50716	034	18 Aug 2016
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	04 Aug 2016
393	DC - 1050 MHz Low Pass Filter	Microcircuits	VLFX-1050	N/A	08 Oct 2016
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	24 Feb 2016
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	10 Dec 2015
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	28 May 2016
410	Desktop Computer	Dell	Inspiron 620	WS38	Not Required
411	Mast/Turntable Controller	Sunol Sciences	SC98V	060199-1D	Not Required
412	USB to GPIB Interface	National Instruments	GPIB-USB HS	11B8DC2	Not Required
413	Mast Controller	Sunol Science	TWR95-4	030801-3	Not Required
415	Turntable Controller	Sunol Sciences	Turntable Controller	None	Not Required
416	Gigabit ethernet filter	ETS-Lingren	Gigafoil 260366	None	Not Required
447	Rad Emissions Test Software	MiCOM	Version 1.0.73	447	Not Required
462	Schwarzbeck cable from Antenna to Amplifier.	Schwarzbeck	AK 9513	462	25 Feb 2016
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	25 Feb 2016
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	25 Feb 2016
480	Cable - Bulkhead to Amp	SRC Haverhill	157-157-3050360	480	11 Aug 2016
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-151-3050787	481	11 Aug 2016
482	Cable - Amp to Antenna	SRC Haverhill	157-157-3051574	482	11 Aug 2016
502	Test Software for Radiated Emissions	EMISoft	Vasona	Version 5 Build 59	Not Required

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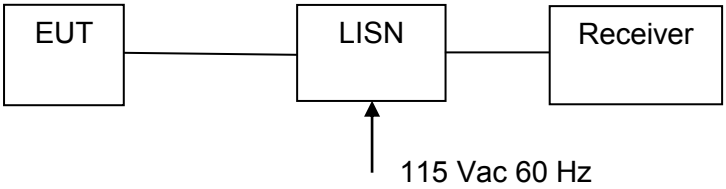
4.3. ac Wireline Emission Test Set-up

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

1. Section 6.1.3 ac Wireline Conducted Emissions

Conducted Test Set-Up Pictorial Representation



Measurement set up for ac Wireline Conducted Emissions Test

Traceability of Test Equipment Utilized for ac Wireline Emission Testing

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	04 Dec 2016
184	Pulse Limiter	Rhode & Schwarz	ESH3Z2	357.8810.52	Cal when used
190	LISN (two-line V-network)	Rhode & Schwarz	ESH3Z5	836679/006	12 Sep 2016
193	Receiver 20 Hz to 7 GHz	Rhode & Schwarz	ESI 7	838496/007	14 Jan 2016
307	BNC-CABLE	Megaphase	1689 1GVT4	15F50B002	7th Jan 2016
316	Dell desktop computer workstation with Vasona	Dell	Desktop	WS04	Not Required

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

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5. TEST SUMMARY

List of Measurements

The following table represents the list of measurements required under the **FCC CFR47 Part 15.407**.

Section(s)	Test Items	Description	Condition	Result	Test Report Section
15.407(a)	26dB and 99% Emission BW	Emission bandwidth measurement	Conducted	Complies	6.1.1.1 A.1.1
15.407(a)	Maximum Conducted Output Power	Power Measurement	Conducted	Complies	6.1.1.2
15.407(a)	Peak Power Spectral Density	PPSD	Conducted	Complies	6.1.1.3 A.1.2
15.407(g) **15.31**	Frequency Stability	Limits: contained within band of operation at all times.	Applicant declaration	Complies	6.1.1.5
15.407(f)	Radio Frequency Radiation Exposure	Exposure to radio frequency energy levels, Maximum Permissible Exposure (MPE)	Conducted	See separate MPE attachment	N/A

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List of Measurements (continued)

The following table represents the list of measurements required under the **FCC CFR47 Part 15.407**.

Section(s)	Test Items	Description	Condition	Result	Test Report Section
15.407(b)(2) **15.205(a)** **15.209(a)**	Radiated Emissions		Radiated		6.1.2
	Transmitter Radiated Spurious Emissions	Emissions above 1 GHz		Complies	6.1.2.1 6.1.2.2
	Radiated Band Edge	Band edge results		Complies	6.1.2.1 6.1.2.2
15.407(b)(6) **15.205(a)** **15.209(a)**	Digital Radiated Emissions	Emissions <1 GHz (30M-1 GHz)		Complies	6.1.3
15.407(b)(6) **15.207**	AC Wireline Conducted Emissions 150 kHz–30 MHz	Conducted Emissions	Conducted	Complies EUT is POE powered - not shipped with equipment	6.1.4

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

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

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

6. TEST RESULTS

6.1. Device Characteristics

6.1.1. Conducted Testing

6.1.1.1. 26 dB and 99 % Bandwidth

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

Test Procedure for 26 dB and 99% Bandwidth Measurement

The bandwidth at 26 dB and 99 % is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency. KDB 789033 Section 5.1 Emission Bandwidth was used in order to prove compliance. The Resolution Bandwidth was set to approximately 1% of the emission bandwidth.

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

Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	5 MHz	**Duty Cycle (%):**	97.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results								
Test Frequency	**Measured 26 dB Bandwidth (MHz)**				**26 dB Bandwidth (MHz)**			
	Port(s)							
MHz	**a**	**b**	**c**	**d**	**Highest**	**Lowest**		
5157.5	7.640	6.738	--	--	7.640	6.738		
5200.0	6.789	7.189	--	--	7.189	6.789		
5245.0	7.064	6.864	--	--	7.064	6.864		
Test Frequency	**Measured 99% Bandwidth (MHz)**				**99% Bandwidth (MHz)**			
	Port(s)							
MHz	**a**	**b**	**c**	**d**	**Highest**	**Lowest**		
5157.5	4.935	4.935	--	--	4.935	4.935		
5200.0	4.910	4.960	--	--	4.960	4.910		
5245.0	4.860	4.960	--	--	4.960	4.860		

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 26 dB & 99% Occupied Bandwidth			
Variant:	10 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5162.0	12.525	12.525	--	--	12.525	12.525		
5200.0	13.126	12.876	--	--	13.126	12.876		
5245.0	13.427	12.926	--	--	13.427	12.926		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5162.0	9.218	9.269	--	--	9.269	9.218		
5200.0	9.269	9.319	--	--	9.319	9.269		
5245.0	9.269	9.369	--	--	9.369	9.269		

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

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

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Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	20 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5165.0	22.345	22.645	--	--	22.645	22.345		
5200.0	22.445	23.447	--	--	23.447	22.445		
5240.0	24.148	23.246	--	--	24.148	23.246		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5165.0	17.836	17.936	--	--	17.936	17.836		
5200.0	17.836	17.936	--	--	17.936	17.836		
5240.0	17.936	17.936	--	--	17.936	17.936		

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

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

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Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	40 MHz	**Duty Cycle (%):**	94.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5172.0	41.884	42.285	--	--	42.285	41.884		
5200.0	56.112	42.285	--	--	56.112	42.285		
5230.0	42.886	41.884	--	--	42.886	41.884		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5172.0	36.473	36.473	--	--	36.473	36.473		
5200.0	36.473	36.473	--	--	36.473	36.473		
5230.0	36.473	36.273	--	--	36.473	36.273		

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

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

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Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	80 MHz	**Duty Cycle (%):**	76.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	Not Applicable
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5190.0	109.419	83.768	--	--	109.419	83.768		
5210.0	89.379	84.168	--	--	89.379	84.168		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)							
MHz	a	b	c	d	Highest	Lowest		
5190.0	76.152	76.152	--	--	76.152	76.152		
5210.0	76.553	76.152	--	--	76.553	76.152		

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

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

6.1.1.2. Maximum Conducted Output Power

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

Test Procedure for Maximum Conducted Output Power Measurement

Method PM (Measurement using an RF average power meter). Section C) 4) of KDB 789033 defines a methodology using an average wideband power meter. Measurements were made while the EUT was operating in a continuous transmission mode (100% duty cycle) at the appropriate centre frequency. All cable losses and offsets were taken into consideration in the measured result. All operational modes and frequency bands were measured independently and the resultant □ calculated. For multiple outputs, the measurements were made simultaneously on each output port and summed in a linear fashion. This technique was used in order to prove compliance.

Antenna Power Levels

(a) *Power limits:*

(1) For the band 5.15-5.25 GHz

Outdoor Access Point

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

Fixed Point-to-Point

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

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Operating Frequency Band 5150 - 5250 MHz

Limit: +30 dBm

Antenna		Gain	Maximum Power Calculation	
Model Number	**Type**	**(dBi)**	**dBm/EIRP**	**Conducted Power**
MT0125250	Outdoor	13.0	36.0	23.0
RW-9061-5002	Outdoor	14.5*	36.0	21.5
RW-9061-5001	Outdoor	13.0*	36.0	23.0
RW-9061-5004	Outdoor	10.0*	36.0	26.0
MT0128930	Outdoor	11.0	36.0	25.0
AM0135060	Outdoor	12.0	36.0	24.0
RW-9401-5002	Outdoor	11.5*	36.0	24.5
AM0156430	Point - Point	20.5	50.5	30.0
RW-9732-4958	Point - Point	31.0*	53.0	22.0
RW-9721-5158	Point - Point	27.0*	53.0	26.0
RW-9622-5001	Point - Point	28.0*	53.0	25.0
RW-9612-5001	Point - Point	22.0*	52.0	30.0
MT0070760	Point - Point	23.5	53.0	29.5
MT0119960	Point - Point	16.0	46.0	30.0
AM0111760	Point - Point	16.0	46.0	30.0

* The gain includes 1 dB feeder cable loss for external antennas

The AP0158770 has no beam-forming capability. The EUT operates in five different bandwidth modes;- 5 MHz; 10 MHz; 20 MHz; 40 MHz, 80 MHz. The +30 dBm limits are calculated for each mode along with the conducted power measurements for each antenna presented in this section of the test report.

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Consolidated Power Results

The EUT was tested for radiated spurious emissions and radiated band-edge emissions and the following tables define the worst case compliant results defined for each parameter

Antenna Type - Outdoor

Antenna	Gain	Operational Mode	Channel	Radiated Power Setting		
Model Number	**dBi**	**MHz**	**MHz**	**Spurious Emissions**	**Band-Edge**	**Final Setting**
MT0128930	11	5	5157.5	7.5	4.0	4.0
			5200	22.0		22.0
			5245	23.0		23.0
		10	5162		4.0	4.0
			5200			
			5245			
		20	5165		2.5	2.5
			5200			
			5240			
		40	5172		3.0	3.0
			5200			
			5230			
		80	5190		1.5	1.5
			5210			

Antenna	Gain	Operational Mode	Channel	Radiated Power Setting		
Model Number	**dBi**	**MHz**	**MHz**	**Spurious Emissions**	**Band-Edge**	**Final Setting**
RW-9401-5002	11.5	5	5157.5	4.5	4.5	4.5
			5200	22.0		22.0
			5245	22.0		22.0
		10	5162		5.5	5.5
			5200			
			5245			
		20	5165		5.0	5.0
			5200			
			5240			
		40	5172		7.0	7.0
			5200			
			5230			
		80	5190		5.5	5.5
			5210			

Antenna	Gain	Operational Mode	Channel	Radiated Power Setting		
Model Number	**dBi**	**MHz**	**MHz**	**Spurious Emissions**	**Band-Edge**	**Final Setting**
AM0135060	12	5	5157.5	4.5	4.5	4.5
			5200	18.0		18.0
			5245	22.0		22.0
		10	5162		6.0	6.0
			5200			
			5245			
		20	5165		4.0	4.0
			5200			
			5240			
		40	5172		2.5	2.5
			5200			
			5230			
		80	5190		3.0	3.0
			5210			

Antenna	Gain	Operational Mode	Channel	Radiated Power Setting		
Model Number	**dBi**	**MHz**	**MHz**	**Spurious Emissions**	**Band-Edge**	**Final Setting**
RW-9061-5002	14.5	5	5157.5	2.0	2.0	2.0
			5200	15.0		15.0
			5245	15.0		15.0
		10	5162		3.5	3.5
			5200			
			5245			
		20	5165		1.5	1.5
			5200			
			5240			
		40	5172		0.5	0.5
			5200			
			5230			
		80	5190		-1.5	-1.5
			5210			

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Antenna Type – Point - Point

Antenna	Gain	Operational Mode	Channel	Radiated Power Setting		
Model Number	dBi	MHz	MHz	Spurious Emissions	Band-Edge	Final Setting
AM0111760	16	5	5157.5	1.5	1.5	1.5
			5200	22.0		22.0
			5245	22.0		22.0
		10	5162		1.5	1.5
			5200			
			5245			
		20	5165		0.5	0.5
			5200		17.5	17.5
			5240			
		40	5172		-0.5	-0.5
			5200		10.5	10.5
			5230		18.0	18.0
		80	5190		-3.0	-3.0
			5210		8.0	8.0

Antenna	Gain	Operational Mode	Channel	Radiated Power Setting		
Model Number	dBi	MHz	MHz	Spurious Emissions	Band-Edge	Final Setting
MT0070760	23.5	5	5157.5	-4.5	-4.5	-4.5
			5200	22.0		22.0
			5245	23.0		23.0
		10	5162		-4.5	-4.5
			5200			
			5245			
		20	5165		-8.5	-8.5
			5200		9.5	9.5
			5240			
		40	5172		-8.5	-8.5
			5200		11.0	11.0
			5230		21.5	21.5
		80	5190		-9.0	-9.0
			5210		-0.5	-0.5

Antenna	Gain	Operational Mode	Channel	Radiated Power Setting		
Model Number	**dBi**	**MHz**	**MHz**	**Spurious Emissions**	**Band-Edge**	**Final Setting**
RW-9622-5001	28	5	5157.5	-6.5	-6.5	-6.5
			5200	21.0		21.0
			5245	21.0		21.0
		10	5162		-10.5	-10.5
			5200			
			5245			
		20	5165		-12.5	-12.5
			5200		4.5	4.5
			5240			
		40	5172		-12.5	-12.5
			5200		4.0	4.0
			5230		19.5	19.5
		80	5190		-14.5	-14.5
			5210		-4.5	-4.5

Antenna	Gain	Operational Mode	Channel	Radiated Power Setting		
Model Number	**dBi**	**MHz**	**MHz**	**Spurious Emissions**	**Band-Edge**	**Final Setting**
RW-9732-4958	31	5	5157.5	-6.5	-14.0	-14.0
			5200	21.0	13.5	13.5
			5245	21.0		21.0
		10	5162		-6.0	-6.0
			5200			
			5245			
		20	5165		-11.0	-11.0
			5200		5.0	5.0
			5240			
		40	5172		-14.0	-14.0
			5200		4.5	4.5
			5230		18.0	18.0
		80	5190		-0.5	-0.5
			5210		-5.5	-5.5

Antenna	Gain	Operational Mode	Channel	Radiated Power Setting		
Model Number	**dBi**	**MHz**	**MHz**	**Spurious Emissions**	**Band-Edge**	**Final Setting**
AM0156430	20.5	5	5157.5	10.0	4.0	4.0
			5200	22.0		22.0
			5245	22.0		22.0
		10	5162		6.0	6.0
			5200			
			5245			
		20	5165		2.5	2.5
			5200			
			5240			
		40	5172		-2.5	-2.5
			5200			
			5230			
		80	5190		-3.5	-3.5
			5210			

Measurement Results for Maximum Conducted Output Power

The following tables used the lowest gain antenna (11 dBi) to calculate the maximum conducted power from the EUT. The output power was corrected for duty cycle. The output power on the channel closest to the 5150 MHz restricted band was reduced in order to comply with the band-edge limits.

Equipment Configuration for Peak Transmit Power

Variant:	5 MHz	**Duty Cycle (%):**	97.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5157.5	6.04	2.88	--	--	7.88	N/A	30.00	-22.12	4.50
5200.0	21.42	19.81	--	--	23.83	N/A	30.00	-6.17	13.50
5245.0	22.23	20.85	--	--	24.74	N/A	30.00	-5.26	22.00

Traceability to Industry Recognized Test Methodologies

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

Equipment Configuration for Peak Transmit Power

Variant:	10 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5162.0	9.16	6.50	--	--	11.22	N/A	30.00	-18.78	6.00
5200.0	24.71	22.97	--	--	27.11	N/A	30.00	-2.89	22.00
5245.0	24.39	22.91	--	--	26.90	N/A	30.00	-3.10	23.00

Traceability to Industry Recognized Test Methodologies

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

DCCF - Duty Cycle Correction Factor

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Equipment Configuration for Peak Transmit Power			
Variant:	20 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5165.0	6.72	4.15	--	--	8.81	N/A	30.00	-21.19	4.00
5200.0	21.49	19.51	--	--	23.80	N/A	30.00	-6.20	19.00
5240.0	24.48	23.06	--	--	27.02	N/A	30.00	-2.98	23.00

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

Equipment Configuration for Peak Transmit Power			
Variant:	40 MHz	**Duty Cycle (%):**	94.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	11.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5172.0	11.47	8.86	--	--	13.64	N/A	30.00	-16.36	9.50
5200.0	25.04	23.50	--	--	27.62	N/A	30.00	-2.38	23.00
5230.0	20.16	18.45	--	--	22.67	N/A	30.00	-7.33	19.00

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

DCCF - Duty Cycle Correction Factor

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Equipment Configuration for Peak Transmit Power			
Variant:	80 MHz	**Duty Cycle (%):**	76.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	11.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5190.0	26.06	23.98	--	--	29.35	N/A	30.00	-0.65	24.00
5210.0	25.80	24.49	--	--	29.40	N/A	30.00	-0.60	25.00

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

DCCF - Duty Cycle Correction Factor

The following Output Power tables define the maximum permissible power (EIRP) that can be transmitted per antenna. The following sections are split into two FCC equipment categories "Outdoor Equipment" +36 dBm EIRP limits and "Point – Point Equipment" +53 dBm EIRP limits. The output power specified in the following tables takes into account the power setting obtained from testing Radiated Spurious Emissions and Radiated Band-Edge

11 dBi Antenna MT0128930 – Outdoor Equipment

Equipment Configuration for Peak Transmit Power			
Variant:	5 MHz	**Duty Cycle (%):**	99.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11 (MT0128930)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5157.5	5.54	2.38	--	--	7.25	N/A	36	18.25	-17.75
5200.0	21.42	19.81	--	--	23.70	N/A	36	34.70	-1.30
5245.0	22.23	20.85	--	--	24.60	N/A	36	35.60	-0.40

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

Equipment Configuration for Peak Transmit Power			
Variant:	10 MHz	**Duty Cycle (%):**	98.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11 (MT0128930)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5162.0	7.16	4.5	--	--	9.04	N/A	36	20.04	-15.96
5200.0	22.21	20.47	--	--	24.44	N/A	36	35.44	-0.56
5245.0	22.39	20.91	--	--	24.72	N/A	36	35.72	-0.28

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

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Equipment Configuration for Peak Transmit Power			
Variant:	20 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11 (MT0128930)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5165.0	5.22	2.65	--	--	7.13	N/A	36	18.13	-17.87
5200.0	21.49	19.51	--	--	23.62	N/A	36	34.62	-1.38
5240.0	22.48	21.06	--	--	24.84	N/A	36	35.84	-0.16

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

Equipment Configuration for Peak Transmit Power			
Variant:	40 MHz	**Duty Cycle (%):**	92.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	11 (MT0128930)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	dB	dBm	dBm	dB
5172.0	4.97	2.36	--	--	6.87	N/A	36	17.87	-18.13
5200.0	22.54	21.00	--	--	24.85	N/A	36	35.85	-0.15
5230.0	20.16	18.45	--	--	22.40	N/A	36	33.40	-2.60

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

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Equipment Configuration for Peak Transmit Power			
Variant:	80 MHz	**Duty Cycle (%):**	76.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	11 (MT0128930)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	dB	dBm	dBm	dB
5190.0	4.97	2.36	--	--	6.87	N/A	36	17.87	-18.13
5210.0	20.16	18.45	--	--	22.40	N/A	36	33.40	-2.60

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

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11.5 dBi Shark Fin Antenna RW-9401-5002 – Outdoor Equipment

Equipment Configuration for Peak Transmit Power

Variant:	5 MHz	**Duty Cycle (%):**	99.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.5 (Antenna RW-9401-5002)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5157.5	6.04	2.88	--	--	7.75	N/A	36	19.25	-16.75
5200.0	21.42	19.81	--	--	23.70	N/A	36	35.20	-0.80
5245.0	21.73	20.35	--	--	24.10	N/A	36	35.60	-0.40

Traceability to Industry Recognized Test Methodologies

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

Equipment Configuration for Peak Transmit Power

Variant:	10 MHz	**Duty Cycle (%):**	98.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.5 (Antenna RW-9401-5002)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5162.0	8.66	6.00	--	--	10.54	N/A	36	22.04	-13.96
5200.0	22.21	20.47	--	--	24.44	N/A	36	35.94	-0.06
5245.0	21.89	20.41	--	--	24.22	N/A	36	35.72	-0.28

Traceability to Industry Recognized Test Methodologies

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

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Equipment Configuration for Peak Transmit Power			
Variant:	20 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.5 (Antenna RW-9401-5002)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5165.0	6.72	4.15	--	--	8.63	N/A	36	20.13	-15.87
5200.0	21.49	19.51	--	--	23.62	N/A	36	35.12	-0.88
5240.0	21.98	20.56	--	--	24.34	N/A	36	35.84	-0.16

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

Equipment Configuration for Peak Transmit Power			
Variant:	40 MHz	**Duty Cycle (%):**	92.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	11.5 (Antenna RW-9401-5002)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	Margin
MHz	a	b	c	d	Σ Port(s) dBm	dB	dBm	dBm	dB
5172.0	8.97	6.36	--	--	10.87	N/A	36	22.37	-13.63
5200.0	22.04	20.50	--	--	24.35	N/A	36	35.85	-0.15
5230.0	20.16	18.45	--	--	22.40	N/A	36	33.9	-2.1

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

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Equipment Configuration for Peak Transmit Power			
Variant:	80 MHz	**Duty Cycle (%):**	76.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	11.5 (Antenna RW-9401-5002)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	**a**	**b**	**c**	**d**	**Σ Port(s) dBm**	**dB**	**dBm**	**dBm**	**dB**
5190.0	7.56	5.48	--	--	9.65	N/A	36	21.15	-14.85
5210.0	21.80	20.49	--	--	24.20	N/A	36	35.70	-0.30

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

12 dBi Antenna AM0135060 – Outdoor Equipment

Equipment Configuration for Peak Transmit Power

Variant:	5 MHz	**Duty Cycle (%):**	99.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	12 (Antenna AM0135060)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5157.5	6.04	2.88	--	--	7.75	N/A	36	19.75	-16.25
5200.0	21.42	19.81	--	--	23.70	N/A	36	35.70	-0.30
5245.0	21.23	19.85	--	--	23.60	N/A	36	35.60	-0.40

Traceability to Industry Recognized Test Methodologies

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

Equipment Configuration for Peak Transmit Power

Variant:	10 MHz	**Duty Cycle (%):**	98.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	12 (Antenna AM0135060)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5162.0	9.16	6.5	--	--	11.04	N/A	36	23.04	-12.96
5200.0	21.71	19.97	--	--	23.94	N/A	36	35.94	-0.06
5245.0	21.39	19.91	--	--	23.72	N/A	36	35.72	-0.28

Traceability to Industry Recognized Test Methodologies

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

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Equipment Configuration for Peak Transmit Power			
Variant:	20 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	12 (Antenna AM0135060)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5165.0	6.72	4.15	--	--	8.63	N/A	36	20.63	-15.37
5200.0	21.49	19.51	--	--	23.62	N/A	36	35.62	-0.38
5240.0	21.48	20.06	--	--	23.84	N/A	36	35.84	-0.16

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

Equipment Configuration for Peak Transmit Power			
Variant:	40 MHz	**Duty Cycle (%):**	92.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	12 (Antenna AM0135060)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	dB	dBm	dBm	dB
5172.0	4.47	1.86	--	--	6.37	N/A	36	18.37	-17.63
5200.0	21.54	20.00	--	--	23.85	N/A	36	35.85	-0.15
5230.0	20.16	18.45	--	--	22.40	N/A	36	34.40	-1.60

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

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Equipment Configuration for Peak Transmit Power			
Variant:	80 MHz	**Duty Cycle (%):**	76.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	12 (Antenna AM0135060)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	dB	dBm	dBm	dB
5190.0	5.06	2.98	--	--	7.15	N/A	36	19.15	-16.85
5210.0	21.30	19.99	--	--	23.70	N/A	36	35.70	-0.30

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

14.5 dBi Antenna RW-9061-5002 – Outdoor Equipment

Equipment Configuration for Peak Transmit Power			
Variant:	5 MHz	**Duty Cycle (%):**	99.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	14.5 (RW-9061-5002)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5157.5	4.54	1.38	--	--	6.25	N/A	36	20.75	-15.25
5200.0	18.92	17.31	--	--	21.20	N/A	36	35.7	-0.3
5245.0	15.23	13.85	--	--	17.60	N/A	36	33.1	-2.9

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

Equipment Configuration for Peak Transmit Power			
Variant:	10 MHz	**Duty Cycle (%):**	98.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	14.5 (RW-9061-5002)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5162.0	7.66	5.00	--	--	9.54	N/A	36	24.04	-11.96
5200.0	19.21	17.47	--	--	21.44	N/A	36	35.94	-0.06
5245.0	18.89	17.41	--	--	21.22	N/A	36	35.72	-0.28

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

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Equipment Configuration for Peak Transmit Power			
Variant:	20 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	14.5 (RW-9061-5002)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5165.0	5.22	2.65	--	--	7.13	N/A	36	21.63	-14.37
5200.0	18.99	17.01	--	--	21.12	N/A	36	35.62	-0.38
5240.0	18.98	17.56	--	--	21.34	N/A	36	35.84	-0.16

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

Equipment Configuration for Peak Transmit Power			
Variant:	40 MHz	**Duty Cycle (%):**	92.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	14.5 (RW-9061-5002)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	dB	dBm	dBm	dB
5172.0	3.47	0.86	--	--	5.37	N/A	36	19.87	-16.13
5200.0	19.04	17.50	--	--	21.35	N/A	36	35.85	-0.15
5230.0	19.16	17.45	--	--	21.40	N/A	36	35.90	-0.10

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

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Equipment Configuration for Peak Transmit Power			
Variant:	80 MHz	**Duty Cycle (%):**	76.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	14.5 (RW-9061-5002)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	**a**	**b**	**c**	**d**	**Σ Port(s) dBm**	**dB**	**dBm**	**dBm**	**dB**
5190.0	1.56	-0.52	--	--	3.65	N/A	36	18.15	-17.85
5210.0	18.80	17.49	--	--	21.20	N/A	36	35.7	-0.30

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

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The following Output Power tables define the maximum permissible power (EIRP) that can be transmitted. The equipment falls under the FCC category of "Point - Point Equipment" +53 dBm EIRP limit.

16 dBi Antenna AM0111760 – Point - Point Equipment

Equipment Configuration for Peak Transmit Power			
Variant:	5 MHz	**Duty Cycle (%):**	99.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	16 (AM0111760)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	**a**	**b**	**c**	**d**	**Σ Port(s) dBm**	**MHz**	**dBm**	**dBm**	**dB**
5157.5	3.04	-0.12	--	--	4.75	N/A	53	20.75	-32.25
5200.0	21.42	19.81	--	--	23.70	N/A	53	39.70	-13.30
5245.0	22.23	20.85	--	--	24.60	N/A	53	40.60	-12.40

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

Equipment Configuration for Peak Transmit Power			
Variant:	10 MHz	**Duty Cycle (%):**	98.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	16 (AM0111760)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	**a**	**b**	**c**	**d**	**Σ Port(s) dBm**	**MHz**	**dBm**	**dBm**	**dB**
5162.0	4.66	2.00	--	--	6.54	N/A	53	22.54	-30.46
5200.0	24.71	22.97	--	--	26.94	N/A	53	42.94	-10.06
5245.0	24.39	22.91	--	--	26.72	N/A	53	42.72	-10.28

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

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Equipment Configuration for Peak Transmit Power			
Variant:	20 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	16 (AM0111760)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5165.0	2.22	-0.35	--	--	4.13	N/A	53	20.13	-32.87
5200.0	19.99	18.01	--	--	22.12	N/A	53	38.12	-14.88
5240.0	24.48	23.06	--	--	26.84	N/A	53	42.84	-10.16

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

Equipment Configuration for Peak Transmit Power			
Variant:	40 MHz	**Duty Cycle (%):**	92.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	16 (AM0111760)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	dB	dBm	dBm	dB
5172.0	1.47	-1.14	--	--	3.37	N/A	53	19.37	-33.63
5200.0	12.54	11.00	--	--	14.85	N/A	53	30.85	-22.15
5230.0	19.16	17.45	--	--	21.40	N/A	53	37.40	-15.6

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

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Equipment Configuration for Peak Transmit Power			
Variant:	80 MHz	**Duty Cycle (%):**	76.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	16 (AM0111760)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	**a**	**b**	**c**	**d**	**Σ Port(s) dBm**	**dB**	**dBm**	**dBm**	**dB**
5190.0	-0.94	-3.02	--	--	1.15	N/A	53	17.15	-35.85
5210.0	8.8	7.49	--	--	11.20	N/A	53	27.20	-25.80

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

23.5 dBi Antenna MT0070760 – Point - Point Equipment

Equipment Configuration for Peak Transmit Power

Variant:	5 MHz	**Duty Cycle (%):**	99.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	23.5 (MT0070760)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5157.5	-2.96	-6.12	--	--	-1.25	N/A	53	22.25	-30.75
5200.0	21.42	19.81	--	--	23.70	N/A	53	47.20	-5.80
5245.0	22.23	20.85	--	--	24.60	N/A	53	48.10	-4.90

Traceability to Industry Recognized Test Methodologies

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

Equipment Configuration for Peak Transmit Power

Variant:	10 MHz	**Duty Cycle (%):**	98.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	23.5 (MT0070760)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5162.0	-1.34	-4.00	--	--	0.54	N/A	53	24.04	-28.96
5200.0	24.71	22.97	--	--	26.94	N/A	53	50.44	-2.56
5245.0	24.39	22.91	--	--	26.72	N/A	53	50.22	-2.78

Traceability to Industry Recognized Test Methodologies

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

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Equipment Configuration for Peak Transmit Power			
Variant:	20 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	23.5 (MT0070760)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5165.0	-5.78	-8.35	--	--	-3.87	N/A	53	19.63	-33.37
5200.0	11.99	10.01	--	--	14.12	N/A	53	37.62	-15.38
5240.0	24.48	23.06	--	--	26.84	N/A	53	50.34	-2.66

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

Equipment Configuration for Peak Transmit Power			
Variant:	40 MHz	**Duty Cycle (%):**	92.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	23.5 (MT0070760)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	dB	dBm	dBm	dB
5172.0	-6.53	-9.14	--	--	-4.63	N/A	53	18.87	-34.13
5200.0	13.04	11.5	--	--	15.35	N/A	53	38.85	-14.15
5230.0	20.16	18.45	--	--	22.40	N/A	53	45.90	-7.10

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

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Equipment Configuration for Peak Transmit Power			
Variant:	80 MHz	**Duty Cycle (%):**	76.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	23.5 (MT0070760)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	**a**	**b**	**c**	**d**	**Σ Port(s) dBm**	**dB**	**dBm**	**dBm**	**dB**
5190.0	-4.94	-7.02	--	--	-2.85	N/A	53	20.65	-32.35
5210.0	0.3	-1.01	--	--	2.70	N/A	53	26.20	-26.80

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

28 dBi Antenna RW-9622-5001 – Point - Point Equipment

Equipment Configuration for Peak Transmit Power

Variant:	5 MHz	**Duty Cycle (%):**	99.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	28 (RW-9622-5001)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5157.5	-3.96	-7.12	--	--	-2.25	N/A	53	25.75	-27.25
5200.0	22.42	20.81	--	--	24.70	N/A	53	52.70	-0.30
5245.0	22.23	20.85	--	--	24.60	N/A	53	52.60	-0.40

Traceability to Industry Recognized Test Methodologies

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

Equipment Configuration for Peak Transmit Power

Variant:	10 MHz	**Duty Cycle (%):**	98.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	28 (RW-9622-5001)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5162.0	-0.34	-3.00	--	--	1.54	N/A	53	29.54	-23.46
5200.0	22.71	20.97	--	--	24.94	N/A	53	52.94	-0.06
5245.0	22.39	20.91	--	--	24.72	N/A	53	52.72	-0.28

Traceability to Industry Recognized Test Methodologies

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

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Equipment Configuration for Peak Transmit Power			
Variant:	20 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	28 (RW-9622-5001)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5165.0	-4.78	-7.35	--	--	-2.87	N/A	53	25.13	-27.87
5200.0	12.99	11.01	--	--	15.12	N/A	53	43.12	-9.88
5240.0	22.48	21.06	--	--	24.84	N/A	53	52.84	-0.16

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

Equipment Configuration for Peak Transmit Power			
Variant:	40 MHz	**Duty Cycle (%):**	92.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	28 (RW-9622-5001)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	dB	dBm	dBm	dB
5172.0	-5.53	-8.14	--	--	-3.63	N/A	53	24.37	-28.63
5200.0	14.04	12.5	--	--	16.35	N/A	53	44.35	-8.65
5230.0	21.16	19.45	--	--	23.40	N/A	53	51.40	-1.60

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

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Equipment Configuration for Peak Transmit Power			
Variant:	80 MHz	**Duty Cycle (%):**	76.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	28 (RW-9622-5001)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	dB	dBm	dBm	dB
5190.0	-3.94	-6.02	--	--	-1.85	N/A	53	26.15	-26.85
5210.0	1.3	-0.01	--	--	3.70	N/A	53	31.70	-21.30

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

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31 dBi Antenna RW-9732-4958 – Point - Point Equipment

Equipment Configuration for Peak Transmit Power

Variant:	5 MHz	**Duty Cycle (%):**	99.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	31 (RW-9732-4958)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5157.5	-7.89	-11.12	--	--	-6.20	N/A	53	24.80	-28.20
5200.0	19.42	17.81	--	--	21.70	N/A	53	52.70	-0.30
5245.0	19.23	17.85	--	--	21.60	N/A	53	52.60	-0.40

Traceability to Industry Recognized Test Methodologies

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

Equipment Configuration for Peak Transmit Power

Variant:	10 MHz	**Duty Cycle (%):**	98.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	31 (RW-9732-4958)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5162.0	-1.84	-5.5	--	--	0.04	N/A	53	31.04	-21.96
5200.0	19.71	17.97	--	--	21.94	N/A	53	52.94	-0.06
5245.0	19.39	17.91	--	--	21.72	N/A	53	52.72	-0.28

Traceability to Industry Recognized Test Methodologies

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

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Equipment Configuration for Peak Transmit Power			
Variant:	20 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	31 (RW-9732-4958)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5165.0	-7.28	-9.85	--	--	-5.37	N/A	53	25.63	-27.37
5200.0	8.49	6.51	--	--	10.62	N/A	53	41.62	-11.38
5240.0	19.48	18.06	--	--	21.84	N/A	53	52.84	-0.16

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

Equipment Configuration for Peak Transmit Power			
Variant:	40 MHz	**Duty Cycle (%):**	92.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	31 (RW-9732-4958)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	dB	dBm	dBm	dB
5172.0	-11.03	-13.64	--	--	-9.13	N/A	53	21.87	-31.13
5200.0	7.54	6.00	--	--	9.85	N/A	53	40.85	-12.15
5230.0	19.66	17.95	--	--	21.90	N/A	53	52.90	-0.10

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

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Equipment Configuration for Peak Transmit Power			
Variant:	80 MHz	**Duty Cycle (%):**	76.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	31 (RW-9732-4958)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	dB	dBm	dBm	dB
5190.0	2.56	0.48	--	--	4.65	N/A	53	35.65	-17.35
5210.0	-3.7	-5.01	--	--	-1.30	N/A	53	29.70	-23.30

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

20.5 dBi Antenna AM0156430 – Point - Point Equipment

Equipment Configuration for Peak Transmit Power			
Variant:	5 MHz	**Duty Cycle (%):**	99.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	20.5 (AM0156430)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5157.5	5.54	2.38	--	--	7.25	N/A	53	27.75	-25.25
5200.0	21.42	19.81	--	--	23.70	N/A	53	44.20	-8.80
5245.0	22.23	20.85	--	--	24.60	N/A	53	45.10	-7.90

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

Equipment Configuration for Peak Transmit Power			
Variant:	10 MHz	**Duty Cycle (%):**	98.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	20.5 (AM0156430)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5162.0	9.16	6.50	--	--	11.04	N/A	53	31.54	-21.46
5200.0	24.71	22.97	--	--	26.94	N/A	53	47.44	-5.56
5245.0	24.39	22.91	--	--	26.72	N/A	53	47.22	-5.78

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

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Equipment Configuration for Peak Transmit Power			
Variant:	20 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	20.5 (AM0156430)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	dB
5165.0	5.22	2.65	--	--	7.13	N/A	53	27.63	-25.37
5200.0	21.49	19.51	--	--	23.62	N/A	53	44.12	-8.88
5240.0	24.48	23.06	--	--	26.84	N/A	53	47.34	-5.16

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

Equipment Configuration for Peak Transmit Power			
Variant:	40 MHz	**Duty Cycle (%):**	92.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	20.5 (AM0156430)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	a	b	c	d	Σ Port(s) dBm	dB	dBm	dBm	dB
5172.0	-0.53	-3.14	--	--	1.37	N/A	53	21.87	-31.13
5200.0	25.04	23.50	--	--	27.35	N/A	53	47.85	-5.15
5230.0	20.16	18.45	--	--	22.40	N/A	53	37.40	-10.10

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

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Equipment Configuration for Peak Transmit Power			
Variant:	80 MHz	**Duty Cycle (%):**	76.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	20.5 (AM0156430)
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	The data contained in this matrix were calculated values based on measured data		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	EIRP	Margin
MHz	**a**	**b**	**c**	**d**	**Σ Port(s) dBm**	**dB**	**dBm**	**dBm**	**dB**
5190.0	-1.44	-3.52	--	--	1.37	N/A	53	21.87	-31.13
5210.0	22.80	21.49	--	--	25.20	N/A	53	45.70	-7.30

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

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Specification Limits

FCC, Part 15 §15.407 (a)(1), (a)(2)

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

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

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

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6.1.1.3. Peak Power Spectral Density

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

Test Procedure for Power Spectral Density

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

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

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

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

x = Duty Cycle

Using the lowest gain antenna (11 dBi) the measured Power Spectral Density values were the highest values that the equipment can transmit. As can be observed in the Maximum Conducted Output Power as the antenna gain increases the power is reduced according to the regulations, as a result the Power Spectral Density follows and will comply with the regulations.

Equipment Configuration for Peak Power Spectral Density

Variant:	5 MHz	**Duty Cycle (%):**	97.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/MHz)				Amplitude Summation + DCCF (+0.13 dB)	Limit	Margin
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5157.5	-0.202	-3.360	--	--	1.293	17.0	-15.7
5200.0	14.148	13.138	--	--	16.561	17.0	-0.4
5245.0	14.027	12.999	--	--	16.041	17.0	-1.0

Traceability to Industry Recognized Test Methodologies

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

DCCF - Duty Cycle Correction Factor

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

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Equipment Configuration for Peak Power Spectral Density			
Variant:	10 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/MHz)				Amplitude Summation + DCCF (+0.18 dB)	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/MHz**	**dBm/MHz**	**dB**
5162.0	-1.083	-3.479	--	--	3.682	17.0	-13.3
5200.0	14.287	12.477	--	--	16.273	17.0	-0.7
5245.0	12.599	12.429	--	--	14.655	17.0	-2.4

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

DCCF - Duty Cycle Correction Factor

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

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Equipment Configuration for Peak Power Spectral Density			
Variant:	20 MHz	**Duty Cycle (%):**	96.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/MHz)				Amplitude Summation + DCCF (+0.18 dB)	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/MHz**	**dBm/MHz**	**dB**
5165.0	-6.604	-9.886	--	--	-5.135	17.0	-22.1
5200.0	7.372	5.264	--	--	9.166	17.0	-7.8
5240.0	9.749	8.597	--	--	11.448	17.0	-5.6

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

DCCF - Duty Cycle Correction Factor

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

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Equipment Configuration for Peak Power Spectral Density			
Variant:	40 MHz	**Duty Cycle (%):**	94.0
Data Rate:	Rate 9	**Antenna Gain (dBi):**	11.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/MHz)				Amplitude Summation + DCCF (+0.27 dB)	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/MHz**	**dBm/MHz**	**dB**
5172.0	-6.910	-10.062	--	--	-4.996	17.0	-22.0
5200.0	5.458	4.507	--	--	7.554	17.0	-9.5
5230.0	0.800	0.109	--	--	2.301	17.0	-14.7

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

DCCF - Duty Cycle Correction Factor

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

Equipment Configuration for Peak Power Spectral Density			
Variant:	80 MHz	**Duty Cycle (%):**	76.0
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.00
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density Port(s) (dBm/MHz)				Amplitude Summation + DCCF (+1.19 dB)	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/MHz**	**dBm/MHz**	**dB**
5190.0	-0.925	-3.407	--	--	1.106	17.0	-15.9
5210.0	-1.768	-4.020	--	--	0.825	17.0	-16.2

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

DCCF - Duty Cycle Correction Factor

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

Specification

FCC, Part 15 §15.407 (a)(1), (a)(2)

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

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

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

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6.1.1.4. Frequency Stability

FCC, Part 15 Subpart C §15.407(g)

Test Procedure

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

Manufacturer Declaration

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

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

Specification

Limits

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

6.1.2. Radiated Emission Testing

FCC, Part 15 Subpart C §15.407(b)(2), §15.205(a)/15.209(a)

Test Procedure

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

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

Field Strength Calculation

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

FS = R + AF + CORR – FO

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

CORR = Correction Factor = CL – AG + NFL

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

Field Strength Calculation Example:

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

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

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

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

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

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

$$E = 1000000 \times \sqrt{30P} / 3 \text{ µV/m}$$

where P is the EIRP in Watts

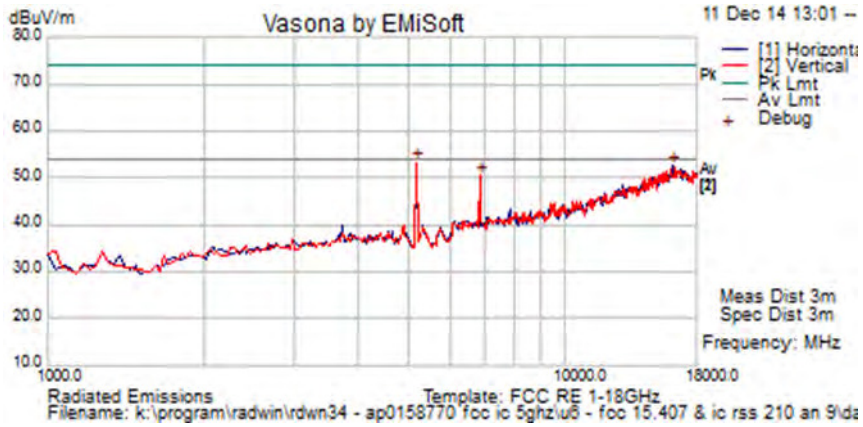
Therefore: -27 dBm/MHz = 68.23 dBuV/m

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

6.1.2.1. Outdoor Equipment Antenna

11 dBi Antenna MT0128930 Outdoor Equipment

Test Freq.	5157 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	7.5	**Press. (mBars)**	800
Antenna	11 dBi		
Test Notes 1	EUT AP0158770, SN# EUT has no serial number		
Test Notes 2	11dBi Sector, MT0128930		

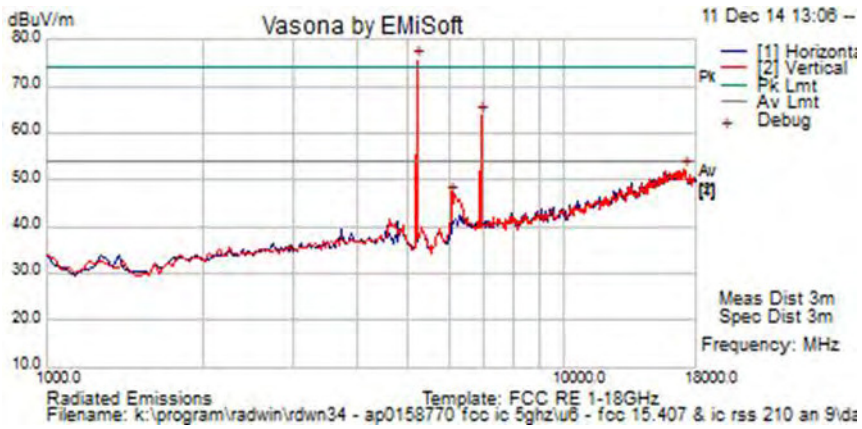


Formally measured emission peaks

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
5156.31263	58.9	5.9	-11.6	53.2	Peak [Scan]	V						FUND
16160.321	39.5	12.0	1.1	52.5	Peak [Scan]	H	100	0	54	-1.5	Pass	Noise
6859.719	51.1	6.9	-7.7	50.4	Peak [Scan]	V	100					NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5200 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	22	**Press. (mBars)**	800
Antenna	11 dBi		
Test Notes 1	EUT AP0158770, SN# EUT has no serial number		
Test Notes 2	11dBi Sector, MT0128930		

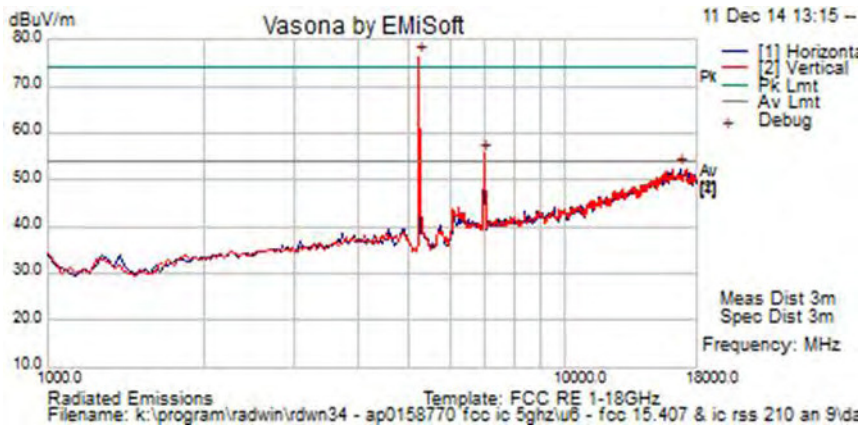


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	81.1	5.9	-11.5	75.5	Peak [Scan]							FUND
6927.85571	64.3	7.0	-7.5	63.8	Peak [Scan]	V						NRB
17114.228	39.1	12.5	0.5	52.1	Peak [Scan]	V	100	0	54	-1.9	Pass	Noise
6071.511	49.9	6.5	-9.6	46.7	Peak [Scan]	V						NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5245 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	23	**Press. (mBars)**	800
Antenna	11 dBi		
Test Notes 1	EUT AP0158770, SN# EUT has no serial number		
Test Notes 2	11dBi Sector, MT0128930		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5224.4489	82.0	5.9	-11.4	76.5	Peak [Scan]							FUND
6995.992	56.1	7.0	-7.5	55.7	Peak [Scan]	V						NRB
16705.411	38.8	12.1	1.6	52.5	Peak [Scan]	H	100	0	54	-1.5	Pass	Noise

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

11 dBi Antenna MT0128930 - Radiated Band-Edge

Peak Limit 74.0 dBµV/m, Average Limit 54.0 dBµV/m

	5150 MHz Restricted Band-Edge		
	dBµV/m		Power Setting
Operational Mode (MHz)	Peak	Average	
5	71.49	43.90	4.0
10	68.55	47.54	4.0
20	70.64	52.70	2.5
40	72.69	53.86	3.0
80	71.88	53.89	1.5

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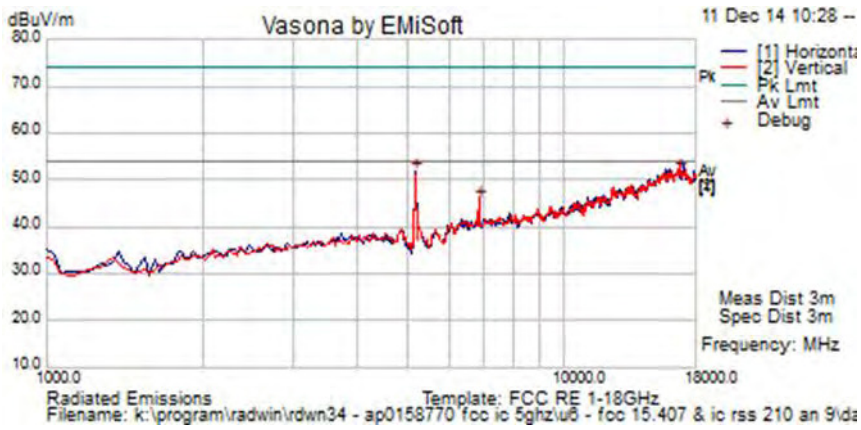
12 dBi Antenna - AM0135060 Outdoor Equipment

Test Freq.	5157 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	80
Power Setting	4.5	**Press. (mBars)**	800
Antenna	12 dBi		
Test Notes 1	EUT AP0158770, SN# EUT has no serial number		
Test Notes 2	12 dBi Sector, AM0135060		

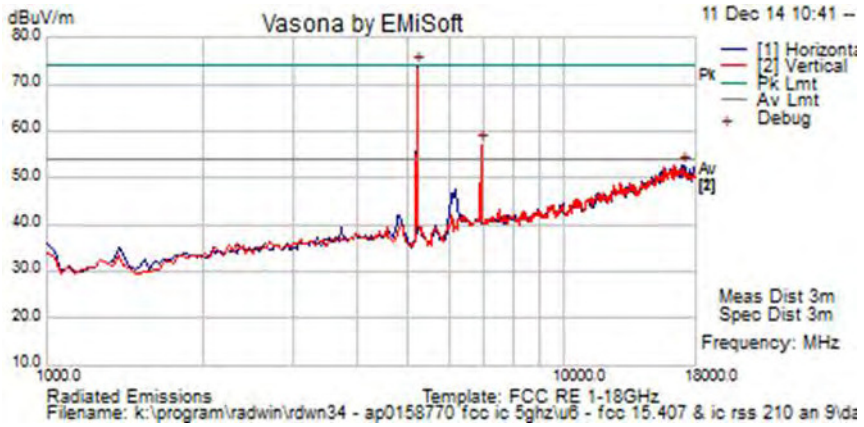


Formally measured emission peaks

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
5156.31263	57.5	5.9	-11.6	51.8	Peak [Scan]							FUND
16705.411	37.8	12.1	1.6	51.5	Peak [Scan]	V	100	0	54	-2.5	Pass	Noise
6856.354	46.4	6.9	-7.7	45.6	Peak [Scan]	V	98	361	54	-8.4	Pass	NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5200 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	80
Power Setting	18	**Press. (mBars)**	800
Antenna	12 dBi		
Test Notes 1	EUT AP0158770, SN# EUT has no serial number		
Test Notes 2	12 dBi Sector, AM0135060		

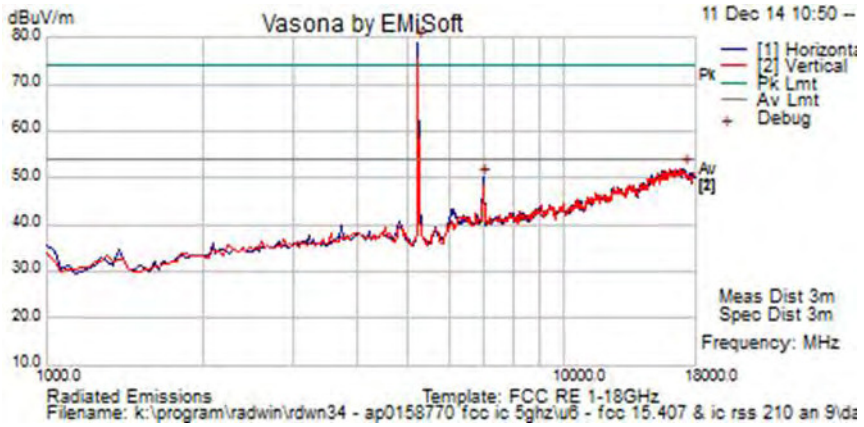


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	79.7	5.9	-11.5	74.1	Peak [Scan]							FUND
6927.85571	57.7	7.0	-7.5	57.1	Peak [Scan]	V						NRB
17080.160	39.5	12.5	0.6	52.6	Peak [Scan]	H	200	0	54	-1.4	Pass	Noise

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5245 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	80
Power Setting	22	**Press. (mBars)**	800
Antenna	12 dBi		
Test Notes 1	EUT AP0158770, SN# EUT has no serial number		
Test Notes 2	12 dBi Sector, AM0135060		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5224.4489	84.5	5.9	-11.4	79.0	Peak [Scan]							FUND
17114.228	39.0	12.5	0.5	52.0	Peak [Scan]	H	150	0	54	-2.0	Pass	Noise
6995.992	50.5	7.0	-7.5	50.1	Peak [Scan]	H	100	0	54	-3.9	Pass	NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

12 dBi Antenna - AM0135060 - Radiated Band-Edge

Peak Limit 74.0 dBµV/m, Average Limit 54.0 dBµV/m

	5150 MHz Restricted Band-Edge		
	dBµV/m		Power Setting
Operational Mode (MHz)	Peak	Average	
5	67.23	41.50	4.5
10	68.17	45.14	6.0
20	69.81	51.43	4.0
40	72.84	51.00	2.5
80	72.59	53.92	3.0

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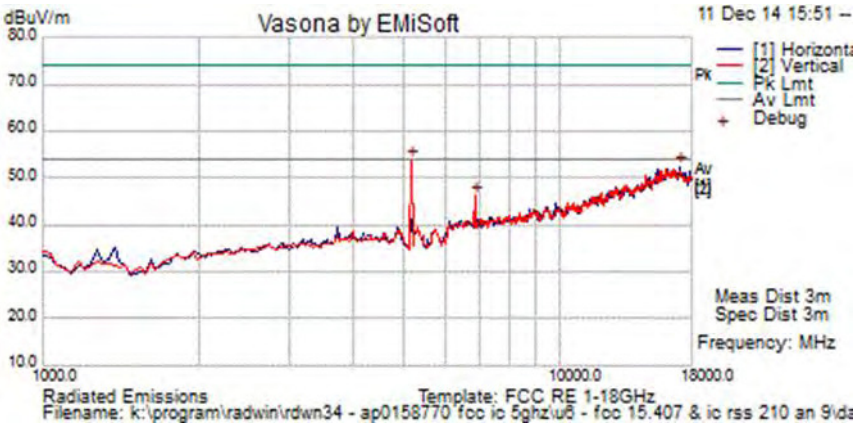
11.5 dBi Antenna - RW-9401-5002 Outdoor Equipment

Test Freq.	5157 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	4.5	**Press. (mBars)**	800
Antenna	12 dBi		
Test Notes 1	EUT AP015877, SN# EUT has no serial number		
Test Notes 2	11.5dBi Mobile Antenna, RW-9401-5002		

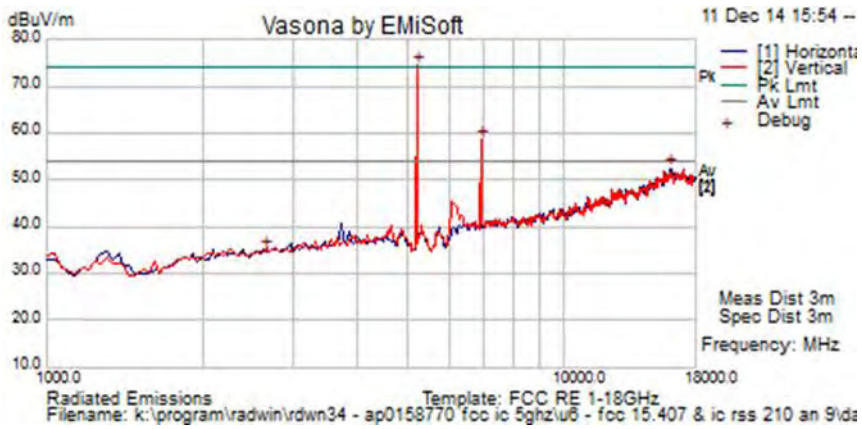


Formally measured emission peaks

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
5156.31263	59.5	5.9	-11.6	53.8	Peak [Scan]							FUND
17046.092	39.3	12.4	0.8	52.5	Peak [Scan]	H	100	0	54	-1.6	Pass	Noise
6860.789	46.9	6.9	-7.7	46.2	Peak [Scan]	V						NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5200 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	22	**Press. (mBars)**	800
Antenna	12 dBi		
Test Notes 1	EUT AP015877, SN# EUT has no serial number		
Test Notes 2	11.5dBi Mobile Antenna, RW-9401-5002		

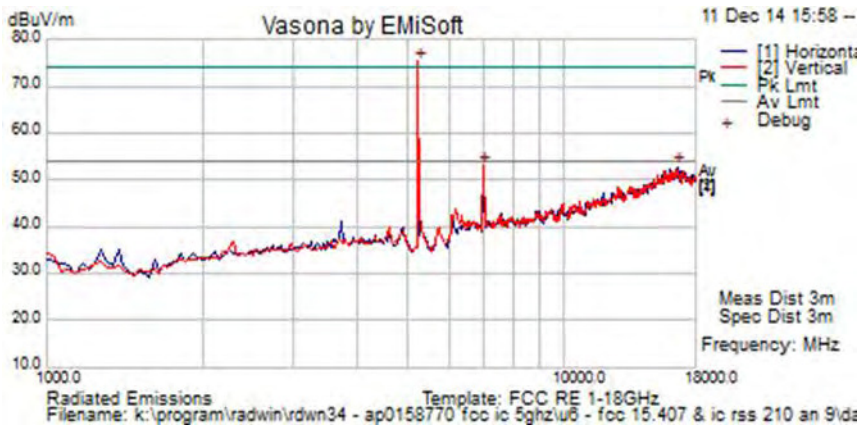


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	80.0	5.9	-11.5	74.4	Peak [Scan]							FUND
6927.85571	59.2	7.0	-7.5	58.7	Peak [Scan]	V						NRB
16024.048	39.8	12.0	0.7	52.5	Peak [Scan]	H	100	0	54	-1.5	Pass	Noise

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5245 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	22	**Press. (mBars)**	800
Antenna	12 dBi		
Test Notes 1	EUT AP015877, SN# EUT has no serial number		
Test Notes 2	11.5dBi Mobile Antenna, RW-9401-5002		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5224.4489	80.9	5.9	-11.4	75.4	Peak [Scan]							FUND
6995.992	53.5	7.0	-7.5	53.1	Peak [Scan]	V						NRB
16569.138	39.2	11.9	1.6	52.8	Peak [Scan]	H	150	0	54	-1.2	Pass	Noise

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

11.5 dBi Antenna - RW-9401-5002 - Radiated Band-Edge

Peak Limit 74.0 dBµV/m, Average Limit 54.0 dBµV/m

	5150 MHz Restricted Band-Edge		
	dBµV/m		Power Setting
Operational Mode (MHz)	Peak	Average	
5	70.11	42.19	4.5
10	73.32	48.37	5.5
20	69.14	53.39	5.0
40	72.65	53.69	7.0
80	72.87	53.05	5.5

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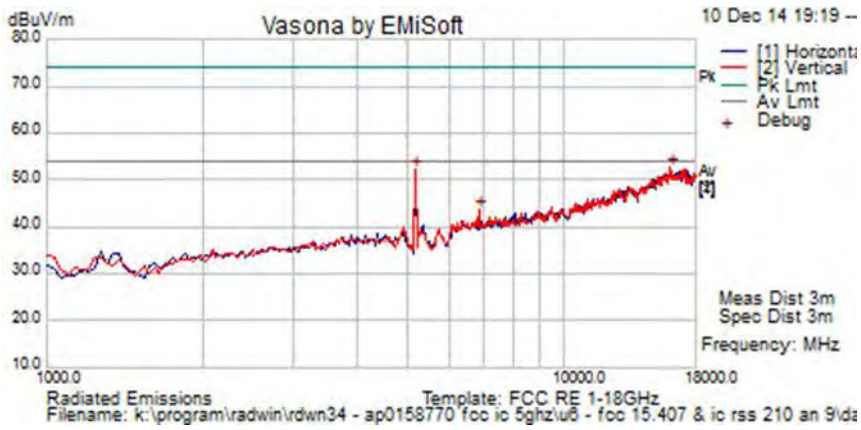
15.5 dBi Antenna - RW-9061-5002 Outdoor Equipment

Test Freq.	5157 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	2.0	**Press. (mBars)**	800
Antenna	15 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			

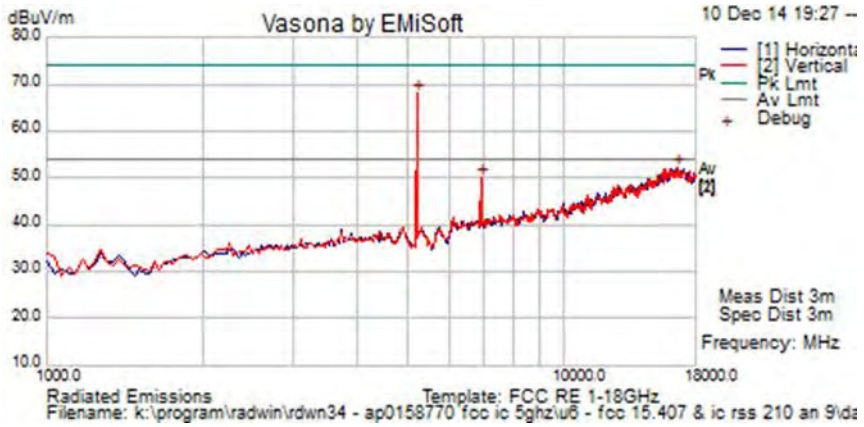


Formally measured emission peaks

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
16092.184	39.7	12.0	1.0	52.7	Peak [Scan]							FUND
5156.313	57.9	5.9	-11.6	52.2	Peak [Scan]	V	100	0	54	-1.8	Pass	Noise
6860.055	44.5	6.9	-7.7	43.7	Peak [Scan]	V						NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5200 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	15.0	**Press. (mBars)**	800
Antenna	15.5 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			

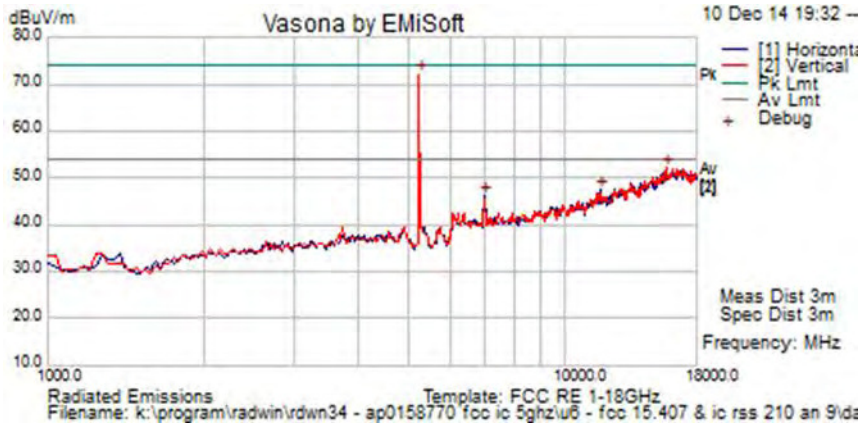


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	73.7	5.9	-11.5	68.1	Peak [Scan]							FUND
16603.206	38.6	12.0	1.6	52.2	Peak [Scan]	V	150	0	54.0	-1.8	Pass	Noise
6927.856	50.6	7.0	-7.5	50.1	Peak [Scan]	V						NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5245 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	15.0	**Press. (mBars)**	800
Antenna	15.5 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5224.4489	77.54	5.92	-11.4	72.06	Peak [Scan]							FUND
15683.367	40.27	11.64	0.16	52.07	Peak [Scan]	V	100	0	54	-1.93	Pass	Noise
6995.96	46.66	7.01	-7.45	46.22	Peak [Scan]	V						NRB
11702.353	42.2	9.4	-4.4	47.2	Peak [Scan]	H	98	-1	54	-6.8	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

15.5 dBi Antenna - RW-9061-5002 - Radiated Band-Edge

Peak Limit 74.0 dBµV/m, Average Limit 54.0 dBµV/m

	5150 MHz Restricted Band-Edge		
	dBµV/m		Power Setting
Operational Mode (MHz)	Peak	Average	
5	68.05	43.03	2.0
10	73.82	50.55	3.5
20	71.22	53.72	1.5
40	71.23	51.32	0.5
80	69.11	52.93	-1.5

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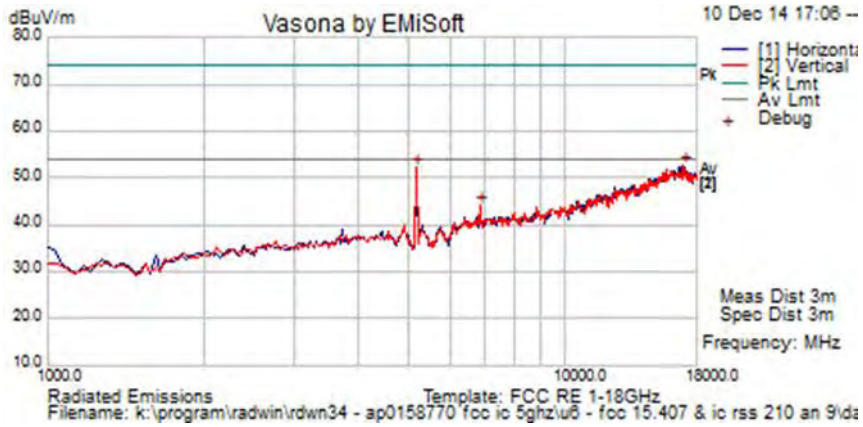
6.1.2.2. Point - Point Equipment Antenna

16 dBi Antenna - AM0111760 Point - Point

Test Freq.	5157 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	1.5	**Press. (mBars)**	800
Antenna	16 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			

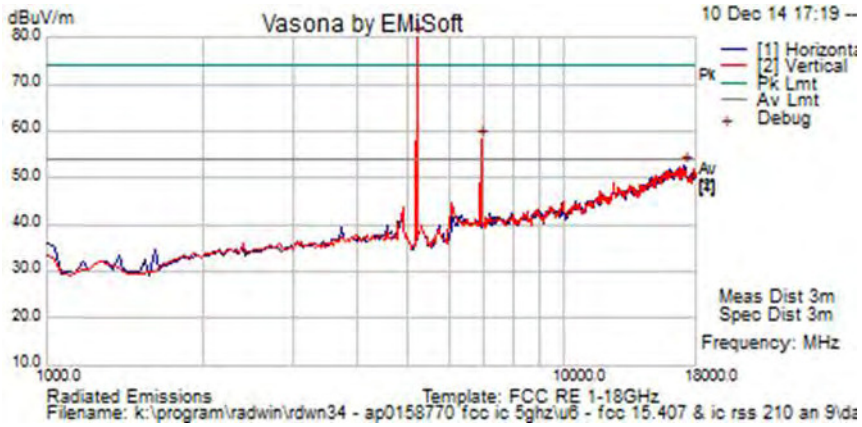


Formally measured emission peaks

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
16977.956	39.4	12.4	0.8	52.6	Peak [Scan]	V	100	0	54.0	-1.4	Pass	
5156.313	57.8	5.9	-11.6	52.1	Peak [Scan]							
6860.789	44.7	6.9	-7.7	43.9	Peak [Scan]	V						

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5200 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	22	**Press. (mBars)**	800
Antenna	16 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			

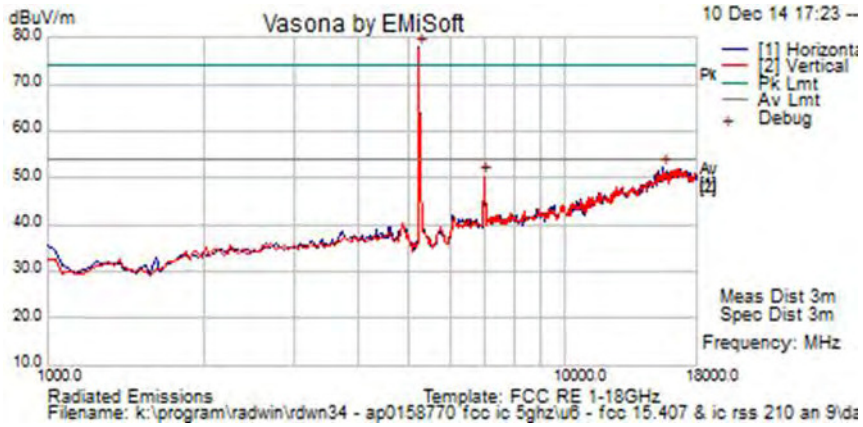


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	85.7	5.9	-11.5	80.1	Peak [Scan]							FUND
6927.85571	58.7	7.0	-7.5	58.2	Peak [Scan]	V						NRB
17114.228	39.7	12.5	0.5	52.7	Peak [Scan]	H	100	0	54	-1.3	Pass	Noise

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5245 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	22	**Press. (mBars)**	800
Antenna	16 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5224.4489	83.4	5.9	-11.4	77.9	Peak [Scan]							FUND
15513.026	41.6	11.4	-0.7	52.3	Peak [Scan]	H	150	0	54	-1.7	Pass	Noise
6995.992	50.8	7.0	-7.5	50.3	Peak [Scan]							NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

16 dBi Antenna - AM0111760 - Radiated Band-Edge

Peak Limit 74.0 dBµV/m, Average Limit 54.0 dBµV/m

	5150 MHz Restricted Band-Edge		
	dBµV/m		Power Setting
Operational Mode (MHz)	Peak	Average	
5 (5157 MHz)	70.81	43.60	1.5
10 (5162 MHz)	73.21	51.77	1.5
20 (5165 MHz)	68.82	52.47	0.5
20 (5200 MHz)	68.79	53.72	17.5
40 (5172 MHz)	73.69	53.86	-0.5
40 (5200 MHz)	69.59	53.86	10.5
40 (5230 MHz)	63.26	47.70	18.0
80 (5190 MHz)	73.20	51.77	-3.0
80 (5210 MHz)	69.73	53.98	8.0

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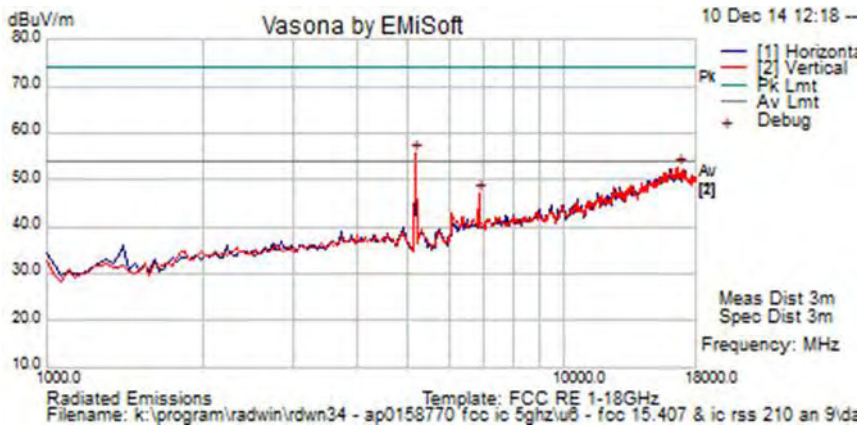
23.5 dBi Antenna - MT0070760 Point – Point

Test Freq.	5157 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	-4.5	**Press. (mBars)**	800
Antenna	23 dBi		
Test Notes 1	SN# No Serial number on unit		
Test Notes 2			

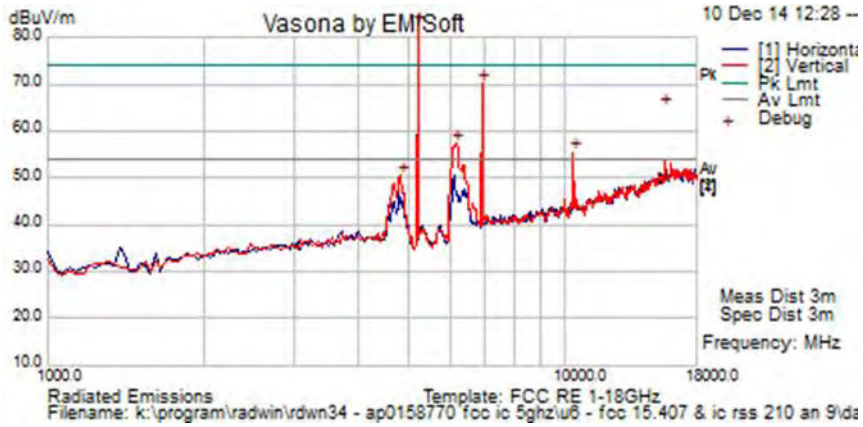


Formally measured emission peaks

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
5156.31263	61.3	5.9	-11.6	55.7	Peak [Scan]							FUND
16637.275	38.9	12.0	1.6	52.5	Peak [Scan]	V	150	0	54	-1.5	Pass	Noise
6860.176	47.7	6.9	-7.7	47.0	Peak [Scan]	V						NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5200 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	22	**Press. (mBars)**	800
Antenna	23 dBi		
Test Notes 1	SN# No Serial number on unit		
Test Notes 2			

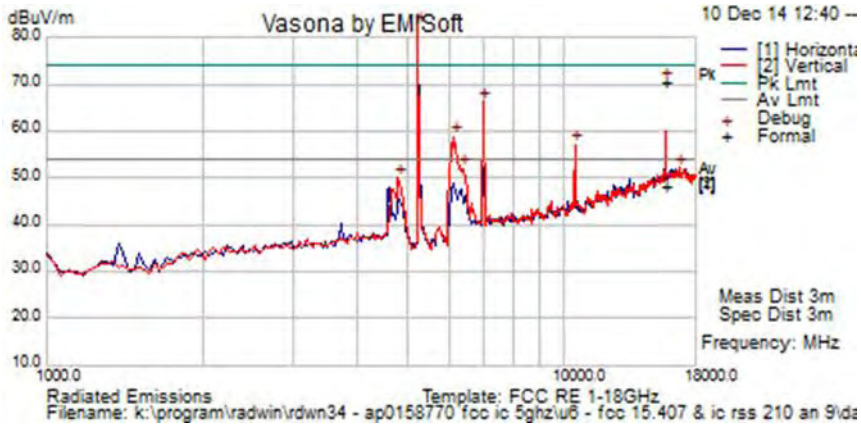


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	88.0	5.9	-11.5	82.4	Peak [Scan]							FUND
6927.85571	70.7	7.0	-7.5	70.2	Peak [Scan]	V						NRB
6178.357	59.8	6.5	-9.0	57.2	Peak [Scan]	V						NRB
15600.450	53.7	11.5	-0.2	65.0	Peak Max	V	100	360	74	-9.1	Pass	RB
15600.450	37.6	11.5	-0.2	48.9	Average Max	V	100	360	54	-5.1	Pass	RB
10402.806	51.4	9.0	-5.0	55.4	Peak [Scan]	V						NRB
4815.631	55.9	5.7	-11.2	50.4	Peak [Scan]	V	100	0	54	-3.6	Pass	BE

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5245 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	23	**Press. (mBars)**	800
Antenna	23 dBi		
Test Notes 1	SN# No Serial number on unit		
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5224.4489	88.0	5.9	-11.4	82.5	Peak [Scan]							FUND
6995.992	66.7	7.0	-7.5	66.3	Peak [Scan]	V						NRB
6144.289	61.6	6.5	-9.2	58.9	Peak [Scan]	V						NRB
15731.933	58.7	11.6	0.2	70.5	Peak Max	V	99	4	74	-3.5	Pass	RB
15731.933	36.4	11.6	0.2	48.2	Average Max	V	99	4	54	-5.8	Pass	RB
10505.010	52.5	9.0	-4.3	57.2	Peak [Scan]	V						NRB
16739.479	38.5	12.1	1.5	52.1	Peak [Scan]	V	150	0	54	-1.9	Pass	Noise
6382.766	53.4	6.7	-8.1	52.0	Peak [Scan]	V						NRB
4781.563	55.6	5.6	-11.1	50.1	Peak [Scan]	V	100	0	54	-3.9	Pass	BE

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

23.5 dBi Antenna - MT0070760 - Radiated Band-Edge

Peak Limit 74.0 dBµV/m, Average Limit 54.0 dBµV/m

	5150 MHz Restricted Band-Edge		
	dBµV/m		Power Setting
Operational Mode (MHz)	Peak	Average	
5 (5157 MHz)	72.12	46.17	-4.5
10 (5162 MHz)	73.24	52.43	-4.5
20 (5165 MHz)	69.00	52.12	-8.5
20 (5200 MHz)	68.55	53.48	9.5
40 (5172 MHz)	72.95	52.80	-8.5
40 (5200 MHz)	67.83	53.54	11.0
40 (5230 MHz)	69.38	53.42	21.5
80 (5190 MHz)	70.91	52.70	-9.0
80 (5210 MHz)	67.87	52.89	2.0

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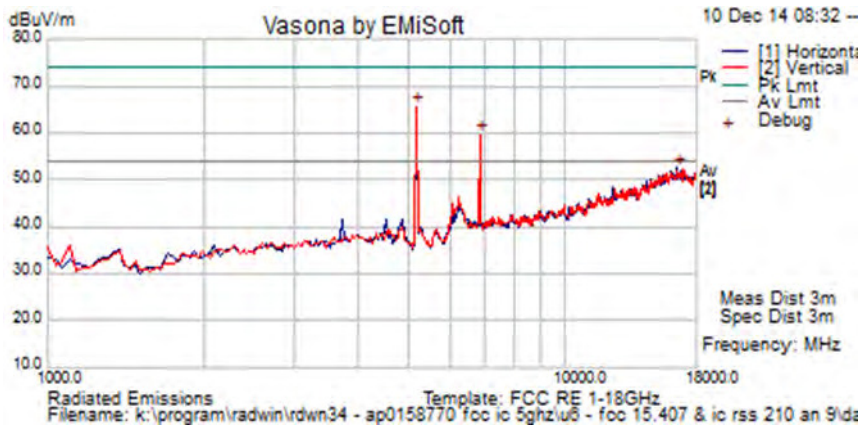
29dBi Antenna - RW-9622-5001 Point – Point

Test Freq.	5157 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	59
Power Setting	-6.5	**Press. (mBars)**	848
Antenna	29 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			

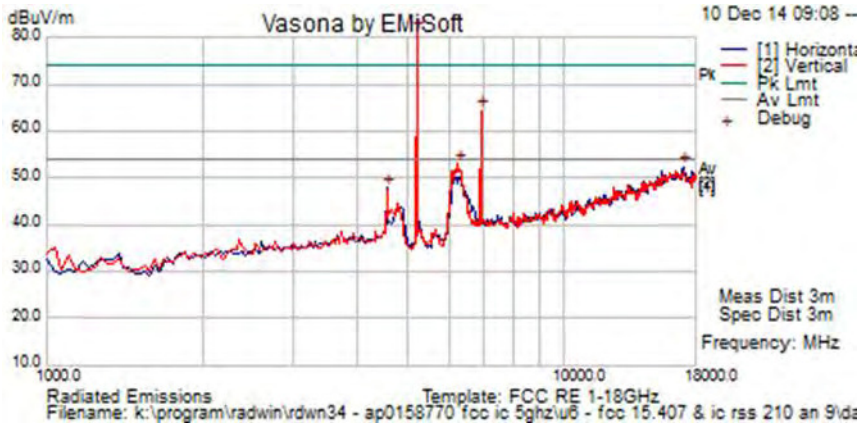


Formally measured emission peaks

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
5156.31263	71.5	5.9	-11.6	65.8	Peak [Scan]							FUND
6859.719	60.5	6.9	-7.7	59.7	Peak [Scan]	V						NRB
16535.070	39.2	11.9	1.6	52.7	Peak [Scan]	H	100	0	54	-1.3	Pass	Noise

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5200 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	59
Power Setting	21 (EIRP)	**Press. (mBars)**	848
Antenna	29 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			

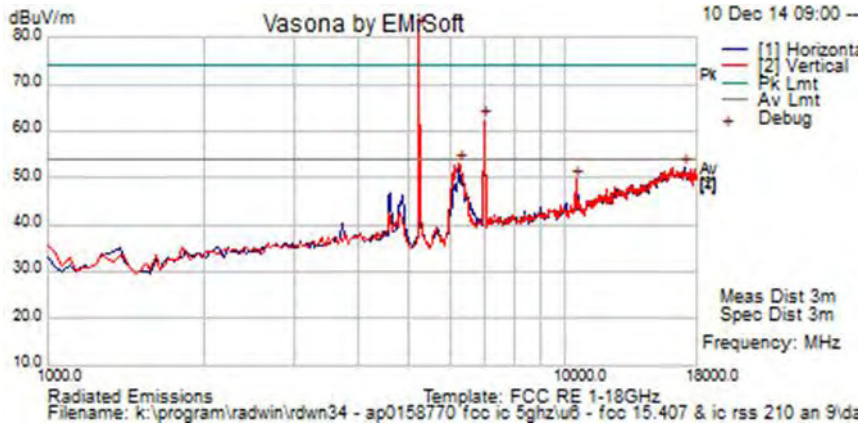


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	86.8	5.9	-11.5	81.2	Peak [Scan]							FUND
6927.85571	64.9	7.0	-7.5	64.4	Peak [Scan]	V						NRB
6246.493	55.1	6.6	-8.6	53.1	Peak [Scan]	V						NRB
17012.024	39.3	12.4	0.8	52.5	Peak [Scan]	H	100	0	54	-1.6	Pass	Noise
4542.659	53.8	5.5	-11.4	47.9	Peak [Scan]	H	98	-1	54	-6.1	Pass	BE

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5245 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	59
Power Setting	21 (EiRP)	**Press. (mBars)**	848
Antenna	29 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5224.4489	87.2	5.9	-11.4	81.8	Peak [Scan]							FUND
6995.992	62.8	7.0	-7.5	62.3	Peak [Scan]	V						NRB
6246.493	55.1	6.6	-8.6	53.0	Peak [Scan]	V						NRB
17046.092	39.0	12.4	0.8	52.2	Peak [Scan]	H	100	0	54	-1.8	Pass	Noise
10505.010	44.8	9.0	-4.3	49.5	Peak [Scan]	V						NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

29dBi Antenna - RW-9622-5001 - Radiated Band-Edge

Peak Limit 74.0 dBµV/m, Average Limit 54.0 dBµV/m

	5150 MHz Restricted Band-Edge		
	dBµV/m		Power Setting
Operational Mode (MHz)	Peak	Average	
5 (5157 MHz)	73.27	48.37	-6.5
10 (5162 MHz)	73.01	50.34	-10.5
20 (5165 MHz)	70.99	52.83	-12.5
20 (5200 MHz)	68.90	53.45	4.5
40 (5172 MHz)	73.00	53.12	-12.5
40 (5200 MHz)	69.12	53.42	4.0
40 (5230 MHz)	71.47	53.39	19.5
80 (5190 MHz)	72.96	52.26	-14.5

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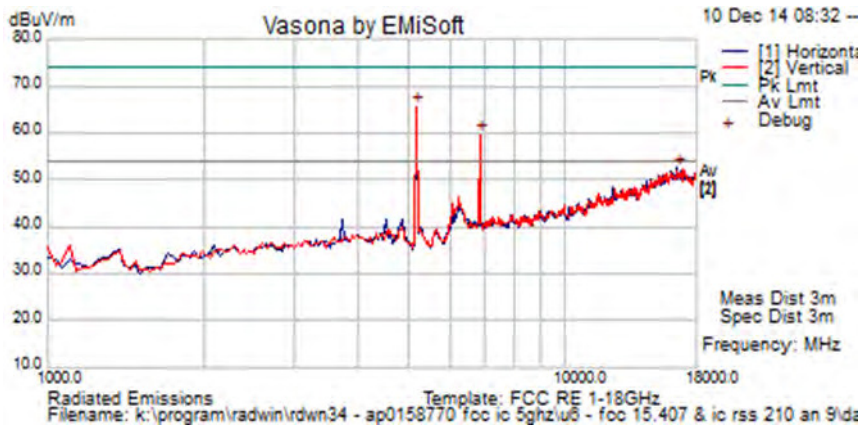
32dBi Antenna - RW-9732-4958 Point – Point

Test Freq.	5157 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	59
Power Setting	-6.5	**Press. (mBars)**	848
Antenna	29 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			

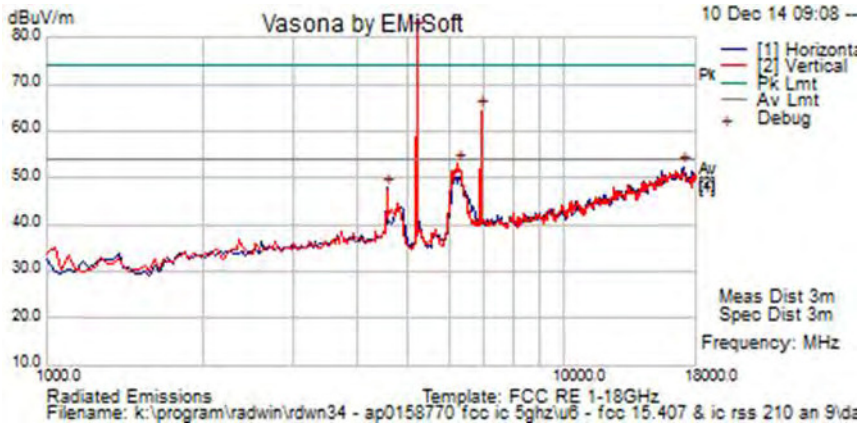


Formally measured emission peaks

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
5156.31263	71.5	5.9	-11.6	65.8	Peak [Scan]							FUND
6859.719	60.5	6.9	-7.7	59.7	Peak [Scan]	V						NRB
16535.070	39.2	11.9	1.6	52.7	Peak [Scan]	H	100	0	54	-1.3	Pass	Noise

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5200 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	59
Power Setting	21 (EIRP)	**Press. (mBars)**	848
Antenna	29 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			

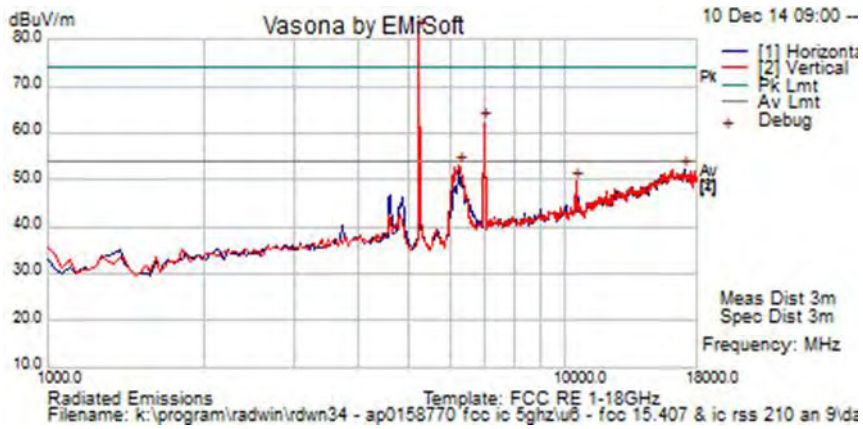


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	86.8	5.9	-11.5	81.2	Peak [Scan]							FUND
6927.85571	64.9	7.0	-7.5	64.4	Peak [Scan]	V						NRB
6246.493	55.1	6.6	-8.6	53.1	Peak [Scan]	V						NRB
17012.024	39.3	12.4	0.8	52.5	Peak [Scan]	H	100	0	54	-1.6	Pass	Noise
4542.659	53.8	5.5	-11.4	47.9	Peak [Scan]	H	98	-1	54	-6.1	Pass	BE

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

Test Freq.	5245 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	59
Power Setting	21 (EiRP)	**Press. (mBars)**	848
Antenna	29 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5224.4489	87.2	5.9	-11.4	81.8	Peak [Scan]							FUND
6995.992	62.8	7.0	-7.5	62.3	Peak [Scan]	V						NRB
6246.493	55.1	6.6	-8.6	53.0	Peak [Scan]	V						NRB
17046.092	39.0	12.4	0.8	52.2	Peak [Scan]	H	100	0	54	-1.8	Pass	Noise
10505.010	44.8	9.0	-4.3	49.5	Peak [Scan]	V						NRB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

32dBi Antenna - RW-9732-4958 - Radiated Band-Edge

Peak Limit 74.0 dBµV/m, Average Limit 54.0 dBµV/m

	5150 MHz Restricted Band-Edge		
	dBµV/m		Power Setting
Operational Mode (MHz)	Peak	Average	
5 (5157 MHz)	71.60	53.87	-14.0
5 (5200 MHz)	62.69	41.90	13.5
10 (5162 MHz)	60.29	47.87	-6.0
20 (5165 MHz)	73.36	51.74	-11.0
20 (5200 MHz)	68.60	53.96	5.0
40 (5172 MHz)	69.71	52.62	-14.0
40 (5200 MHz)	68.32	53.37	4.5
40 (5230 MHz)	68.51	52.01	18.0
80 (5190 MHz)	70.40	53.70	-0.5
80 (5210 MHz)	69.01	53.96	-5.5

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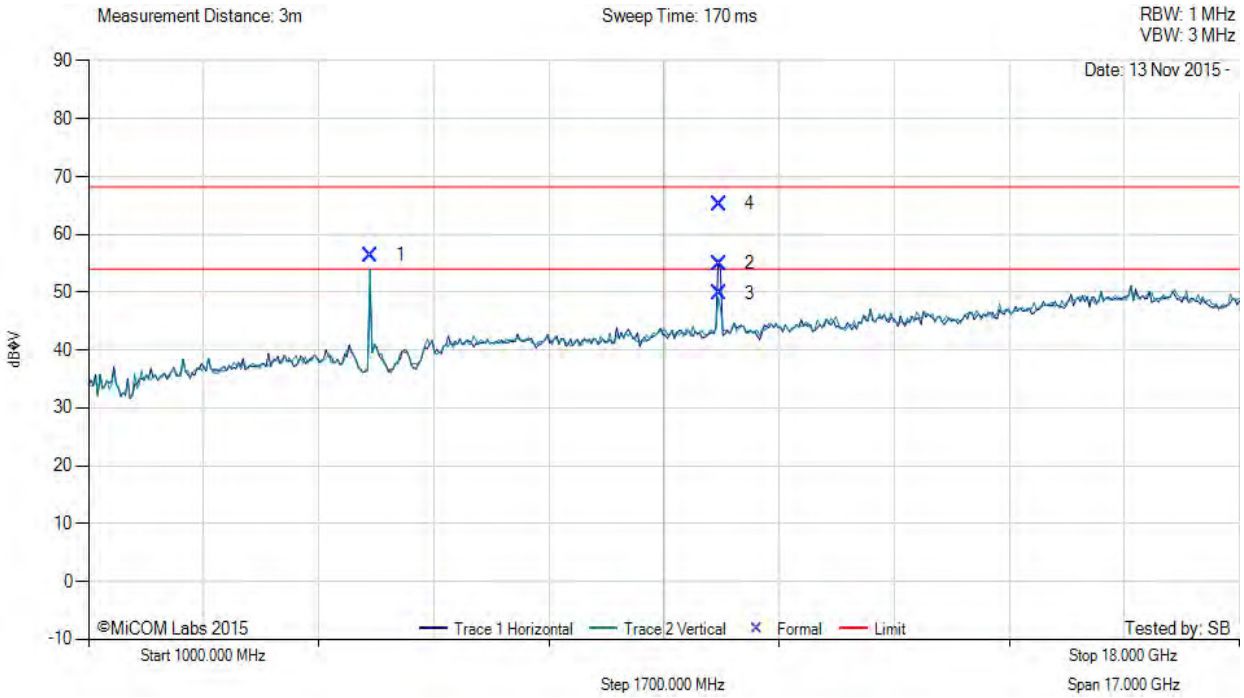
20.5 dBi Integral Antenna – AM0156430 Outdoor Equipment

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	AM0156430	**Variant:**	5MHz
Antenna Gain (dBi):	20.5	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5157.5	**Data Rate:**	6mbit/s
Power Setting:	max	**Tested By:**	SB

Test Measurement Results

Variant: 5MHz, Test Freq: 5157.5 MHz, Antenna: AM0156430, Power Setting: max, Duty Cycle (%): 99



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5158.67	64.30	3.67	-11.57	56.40	Peak (NRB)	Vertical					
2	10314.27	54.73	5.62	-5.39	54.96	Peak (NRB)	Horizontal					
3	10314.27	49.53	5.62	-5.39	49.76	Max Avg	Horizontal	151	29	54.00	-4.24	Pass
4	10314.27	64.99	5.62	-5.39	65.22	Max Peak	Horizontal	151	29	74.00	-18.78	Pass

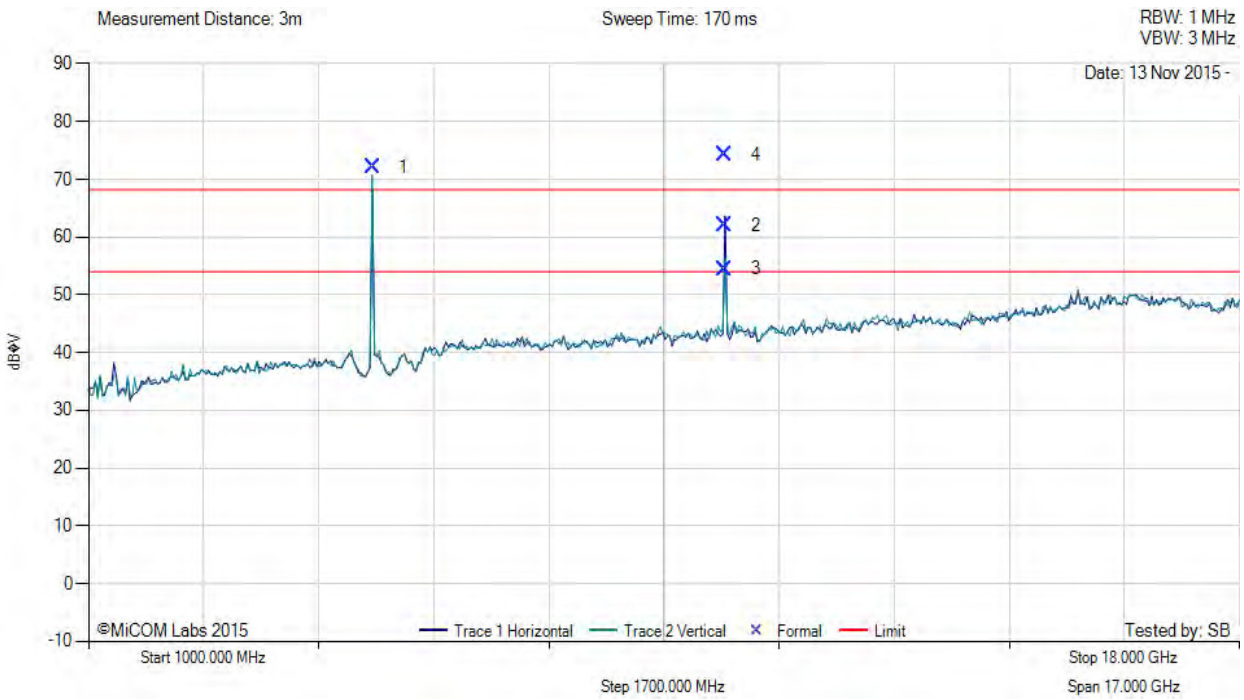
NRB – Non-Restricted Band

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	AM0156430	**Variant:**	5MHz
Antenna Gain (dBi):	20.5	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5200.00	**Data Rate:**	6mbit/s
Power Setting:	max	**Tested By:**	SB

Test Measurement Results

Variant: 5MHz, Test Freq: 5200.00 MHz, Antenna: AM0156430, Power Setting: max, Duty Cycle (%): 99



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5198.92	79.83	3.66	-11.47	72.02	Peak (NRB)	Vertical					
2	10402.61	61.60	5.42	-5.02	62.00	Peak (NRB)	Horizontal					
3	10402.61	53.10	5.42	-5.02	53.50	Max Avg	Horizontal	163	30	54.00	-0.50	Pass
4	10402.61	72.77	5.42	-5.02	73.17	Max Peak	Horizontal	163	30	74.00	-0.83	Pass

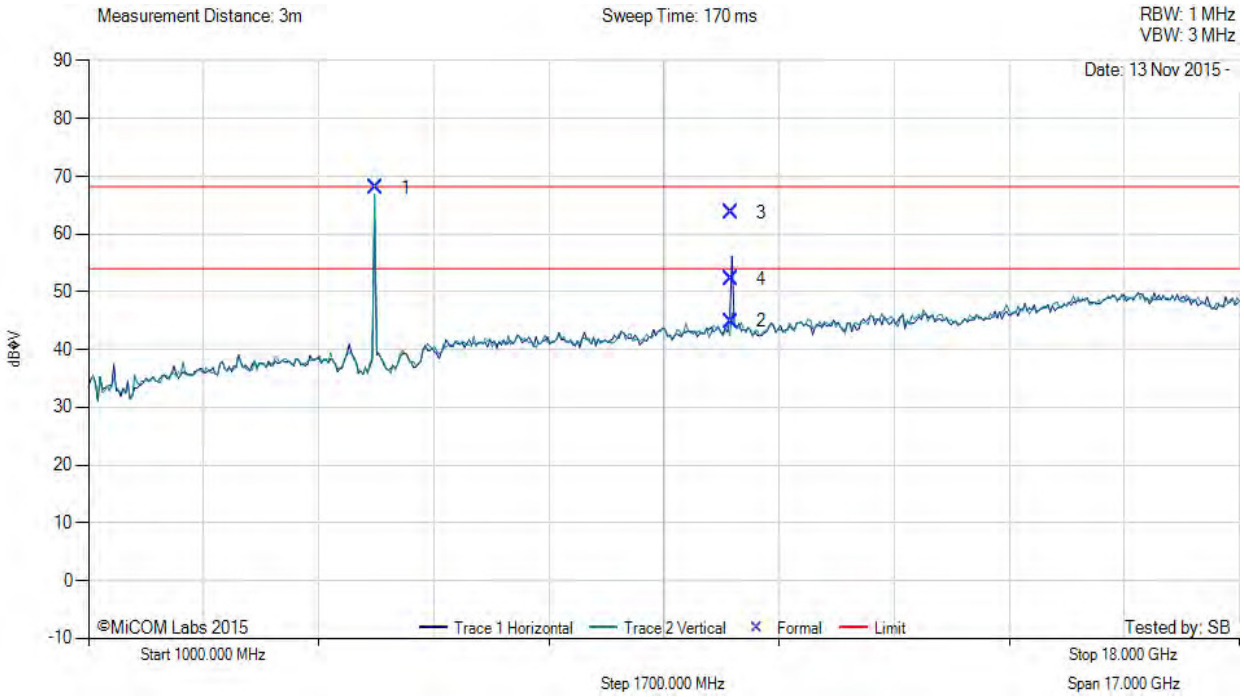
NRB – Non-Restricted Band

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	AM0156430	**Variant:**	5MHz
Antenna Gain (dBi):	20.5	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	5245.00	**Data Rate:**	6mbit/s
Power Setting:	max	**Tested By:**	SB

Test Measurement Results

Variant: 5MHz, Test Freq: 5245.00 MHz, Antenna: AM0156430, Power Setting: max, Duty Cycle (%): 99



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5243.65	75.70	3.63	-11.36	67.97	Peak (NRB)	Vertical					
2	10491.50	43.80	5.46	-4.37	44.89	Max Avg	Horizontal	157	15	54.00	-9.11	Pass
3	10491.50	62.68	5.46	-4.37	63.77	Max Peak	Horizontal	157	15	74.00	-10.23	Pass
4	10491.50	51.16	5.46	-4.37	52.25	Peak (NRB)	Horizontal					

NRB – Non-Restricted Band

20.5 dBi Integral Antenna - AM0156430 Outdoor Equipment - Radiated Band-Edge

Peak Limit 74.0 dBµV/m, Average Limit 54.0 dBµV/m

	5150 MHz Restricted Band-Edge		
	dBµV/m		Power Setting
Operational Mode (MHz)	Peak	Average	
5	72.74	46.14	4.0
10	73.08	48.16	6.0
20	71.16	49.62	2.5
40	73.37	50.33	-2.5
80	73.07	49.43	-3.5

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Specification

Radiated Spurious Emissions

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

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

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

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

Table 1: FCC 15.209 & RSS-Gen Spurious Emissions Limits

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

6.1.3. Digital Emissions (30M-1 GHz)

FCC, Part 15 Subpart C §15.205/ §15.209

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:

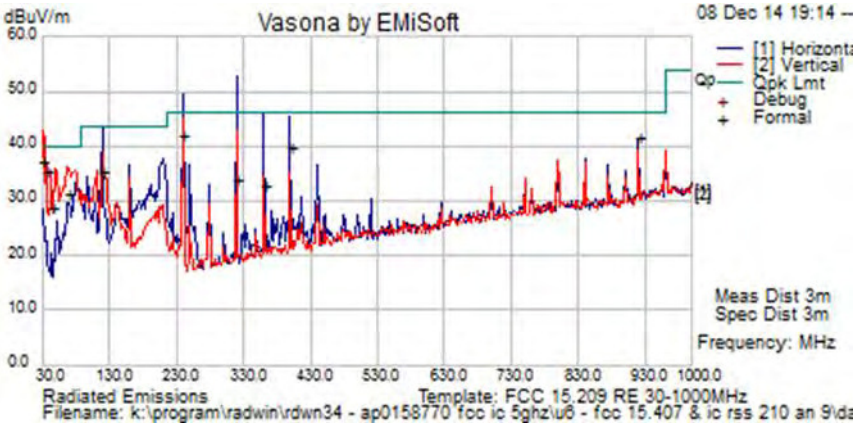
$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 dB\mu V/m$$

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.	NA	**Engineer**	JMH
Variant	Digital Emissions	**Temp (ºC)**	20
Freq. Range	30-1000 MHz	**Rel. Hum.(%)**	56
Power Setting	NA	**Press. (mBars)**	848
Antenna	32 dBi		
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
319.999	45.4	5.2	-16.7	33.9	Quasi Max	H	99	179	46.0	-12.1	Pass	
240.015	56.0	4.8	-19.0	41.9	Quasi Max	H	100	157	46	-4.2	Pass	
30.251	43.5	3.5	-9.9	37.1	Quasi Max	V	224	18	40	-2.9	Pass	
34.975	45.3	3.6	-13.6	35.3	Quasi Max	V	142	12	40	-4.7	Pass	
120.005	48.6	4.2	-17.5	35.3	Quasi Max	H	209	204	43.5	-8.2	Pass	
360.008	42.9	5.3	-15.4	32.8	Quasi Max	H	217	152	46	-13.2	Pass	
399.995	49.0	5.5	-14.8	39.7	Quasi Max	H	160	202	46	-6.3	Pass	
66.934	50.9	3.8	-23.3	31.4	Quasi Max	V	108	313	40	-8.6	Pass	
44.815	45.7	3.6	-20.7	28.7	Quasi Max	V	130	349	40	-11.4	Pass	
919.995	42.0	7.2	-7.7	41.4	Quasi Max	H	109	181	46	-4.6	Pass	

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental Frequency
	ETSI Vid Avg Type = 100 kHz RBW, 100 kHz VBW, Peak Detector, Video Average, 100 Sweeps

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

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

FCC, Part 15 Subpart C §15.207

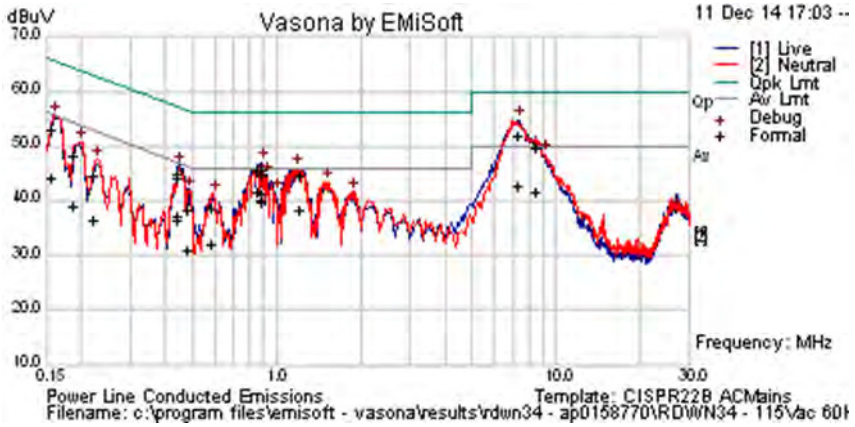
Test Procedure

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

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

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

Test Freq.	N/A	**Engineer**	GMH
Variant	DC Line Emissions	**Temp (ºC)**	20
Freq. Range	0.150 MHz - 30 MHz	**Rel. Hum.(%)**	75
Power Setting	NA	**Press. (mBars)**	999
Antenna	N/A		
Test Notes 1	POE: Sinpro 115Vac 60 Hz: 55 Vdc		
Test Notes 2	POE Model #: CPU55A-270-1		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
0.155	34.1	9.9	0.1	44.1	Average	Neutral	55.75	-11.7	Pass	
0.155	43.1	9.9	0.1	53.1	Quasi Peak	Neutral	65.75	-12.6	Pass	
0.187	38.1	9.9	0.1	48.1	Quasi Peak	Neutral	64.19	-16.1	Pass	
0.187	29.2	9.9	0.1	39.1	Average	Neutral	54.19	-15.1	Pass	
0.217	34.7	9.9	0.1	44.7	Quasi Peak	Neutral	62.92	-18.2	Pass	
0.217	26.4	9.9	0.1	36.3	Average	Neutral	52.92	-16.6	Pass	
0.440	34.8	9.9	0.1	44.8	Quasi Peak	Live	57.06	-12.3	Pass	
0.440	27.2	9.9	0.1	37.2	Average	Live	47.06	-9.8	Pass	
0.440	26.4	9.9	0.1	36.4	Average	Live	47.06	-10.7	Pass	
0.440	34.3	9.9	0.1	44.3	Quasi Peak	Live	57.06	-12.8	Pass	
0.472	28.4	9.9	0.1	38.4	Quasi Peak	Live	56.47	-18.1	Pass	
0.472	21.0	9.9	0.1	31.0	Average	Live	46.47	-15.5	Pass	
0.578	28.8	9.9	0.1	38.9	Quasi Peak	Neutral	56	-17.2	Pass	
0.578	21.9	9.9	0.1	31.9	Average	Neutral	46	-14.1	Pass	
0.843	31.6	9.9	0.1	41.6	Average	Live	46	-4.4	Pass	
0.843	35.8	9.9	0.1	45.9	Quasi Peak	Live	56	-10.2	Pass	

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0.873	29.9	9.9	0.1	39.9	Average	Neutral	46	-6.1	Pass	
0.873	35.0	9.9	0.1	45.1	Quasi Peak	Neutral	56	-10.9	Pass	
0.876	30.1	9.9	0.1	40.2	Average	Live	46	-5.9	Pass	
0.876	35.5	9.9	0.1	45.5	Quasi Peak	Live	56	-10.5	Pass	
0.877	35.8	9.9	0.1	45.8	Quasi Peak	Live	56	-10.2	Pass	
0.877	31.2	9.9	0.1	41.2	Average	Live	46	-4.8	Pass	
1.189	28.2	9.9	0.1	38.2	Average	Neutral	46	-7.8	Pass	
1.189	34.6	9.9	0.1	44.6	Quasi Peak	Neutral	56	-11.4	Pass	
7.294	41.2	10.3	0.3	51.8	Quasi Peak	Live	60	-8.2	Pass	
7.294	32.0	10.3	0.3	42.6	Average	Live	50	-7.4	Pass	
8.379	39.2	10.3	0.3	49.9	Quasi Peak	Neutral	60	-10.1	Pass	
8.379	30.9	10.3	0.3	41.5	Average	Neutral	50	-8.5	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

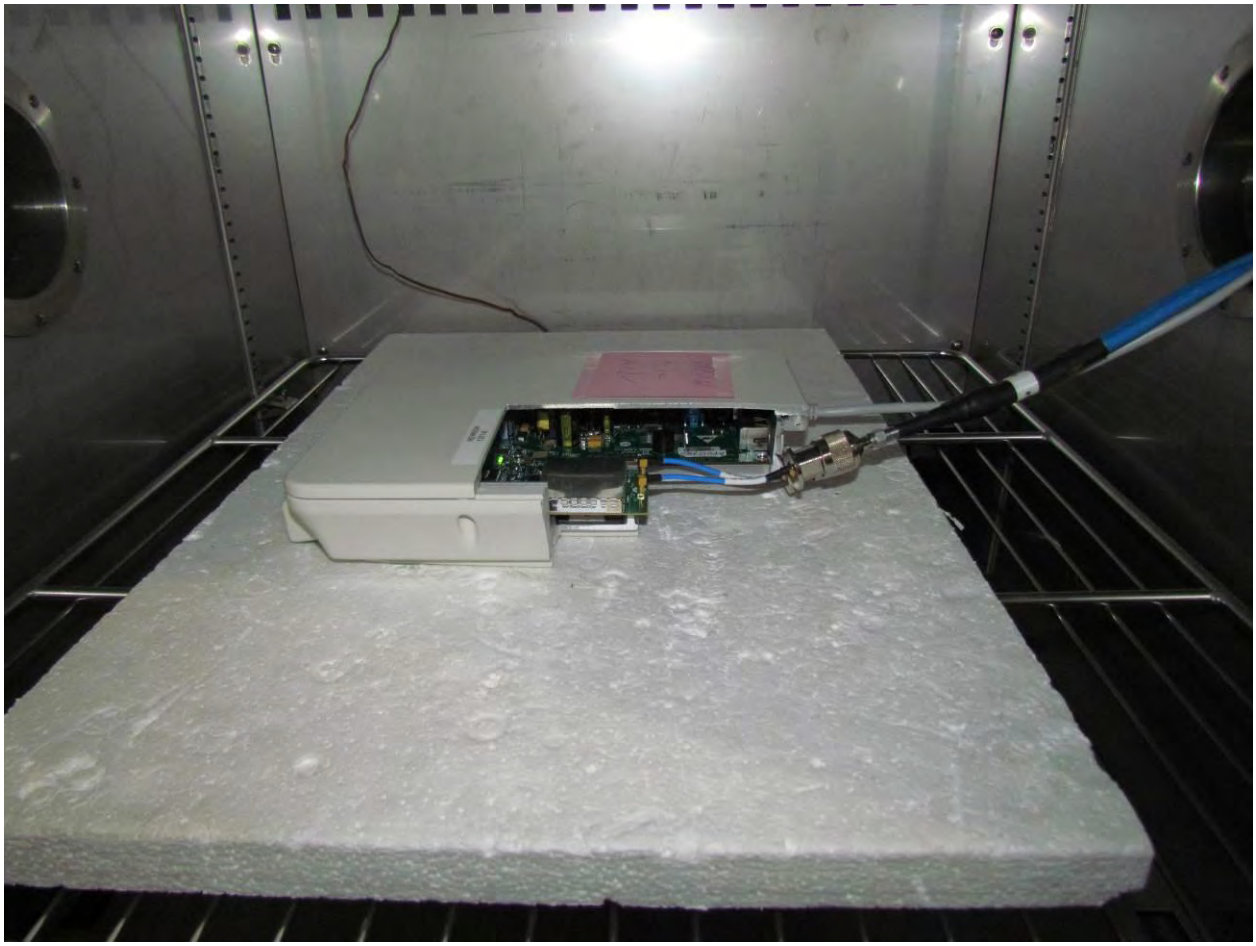
* Decreases with the logarithm of the frequency

Laboratory Measurement Uncertainty for Conducted Emissions

Measurement uncertainty	±2.64 dB

7. PHOTOGRAPHS

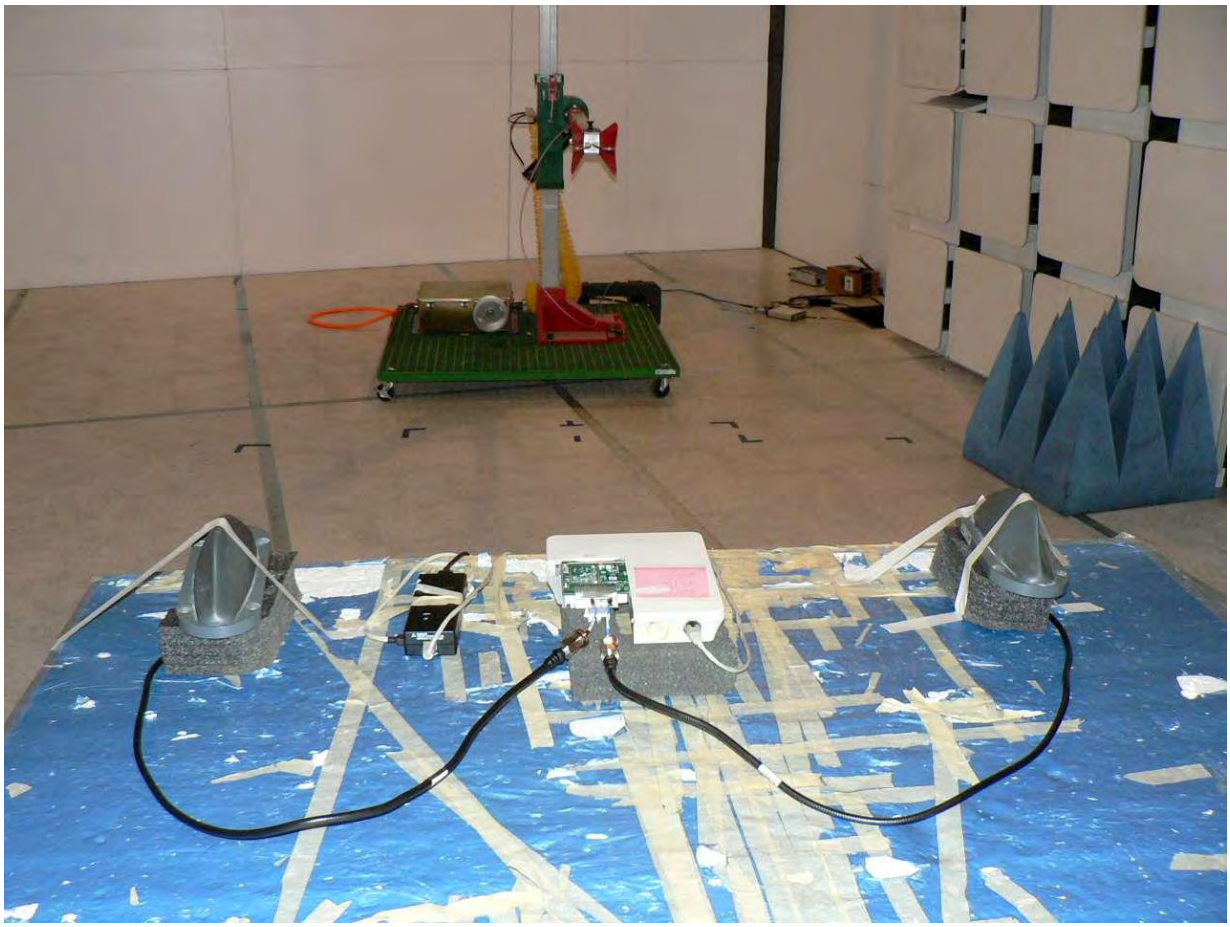
7.1. Conducted Test Setup



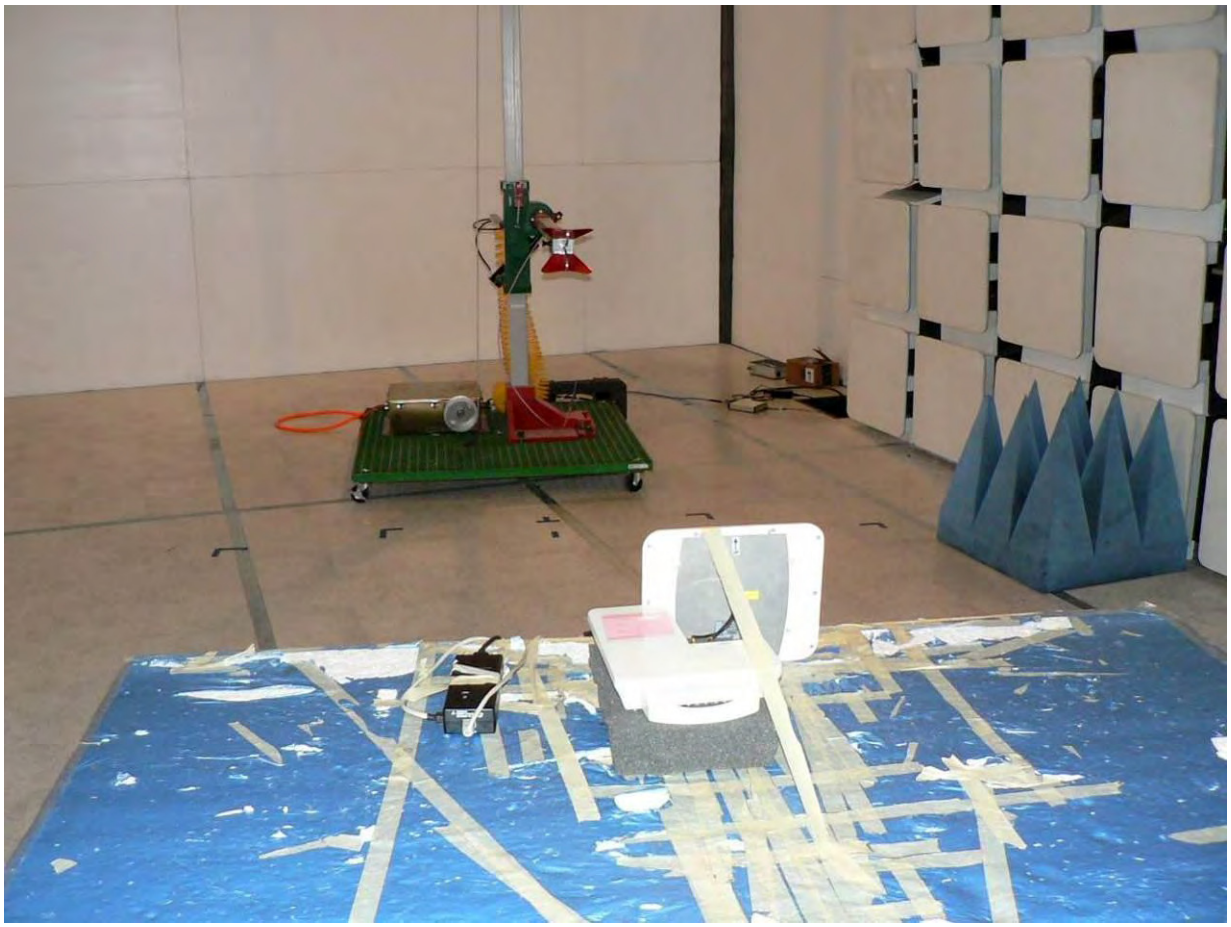
7.2. Test Setup - Digital Emissions above 1 GHz

11 dBi MT0128930

11.5 dBi RW-9401-5002 (Shark Fin)

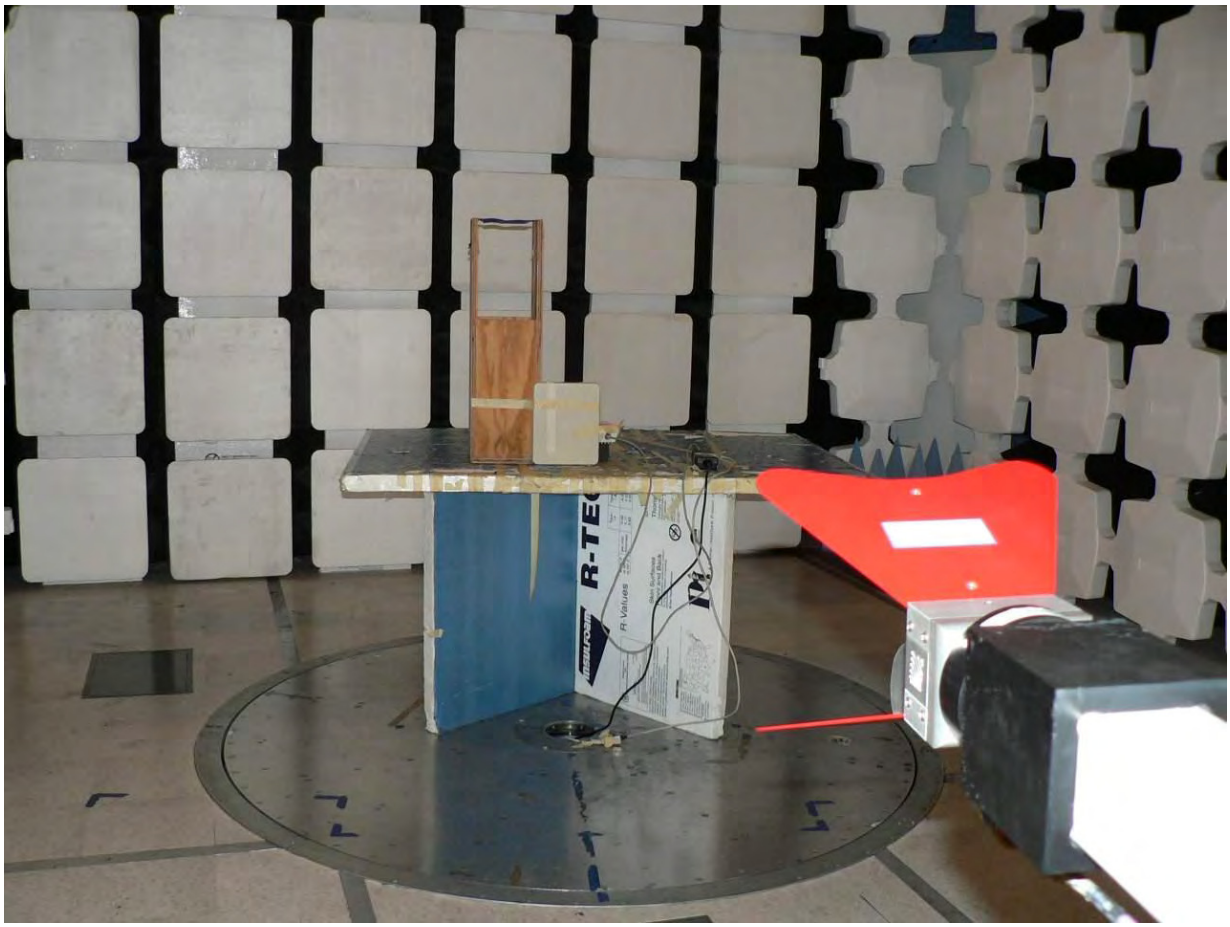


12 dBi AM0135060

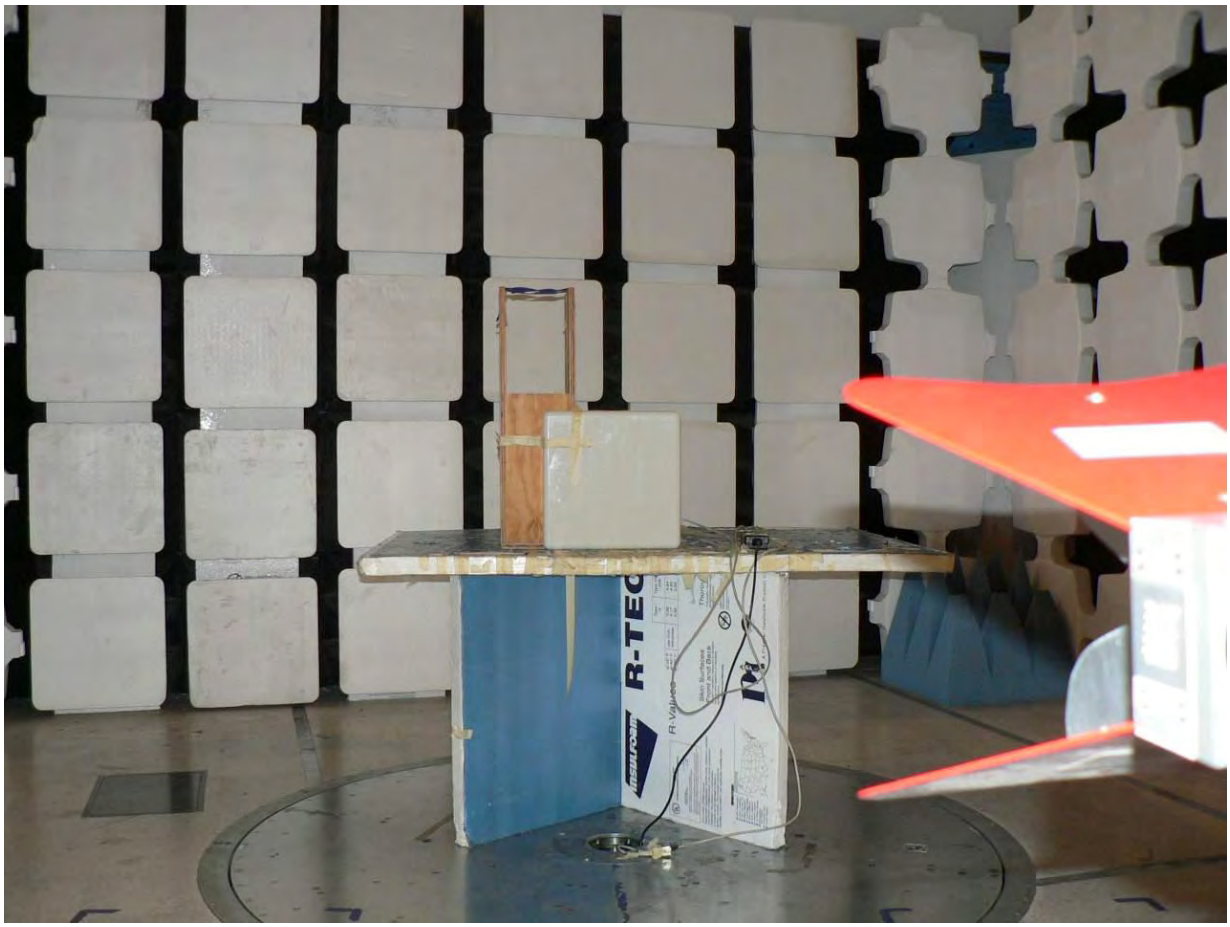


15.5 dBi Sector RW-9061-5002

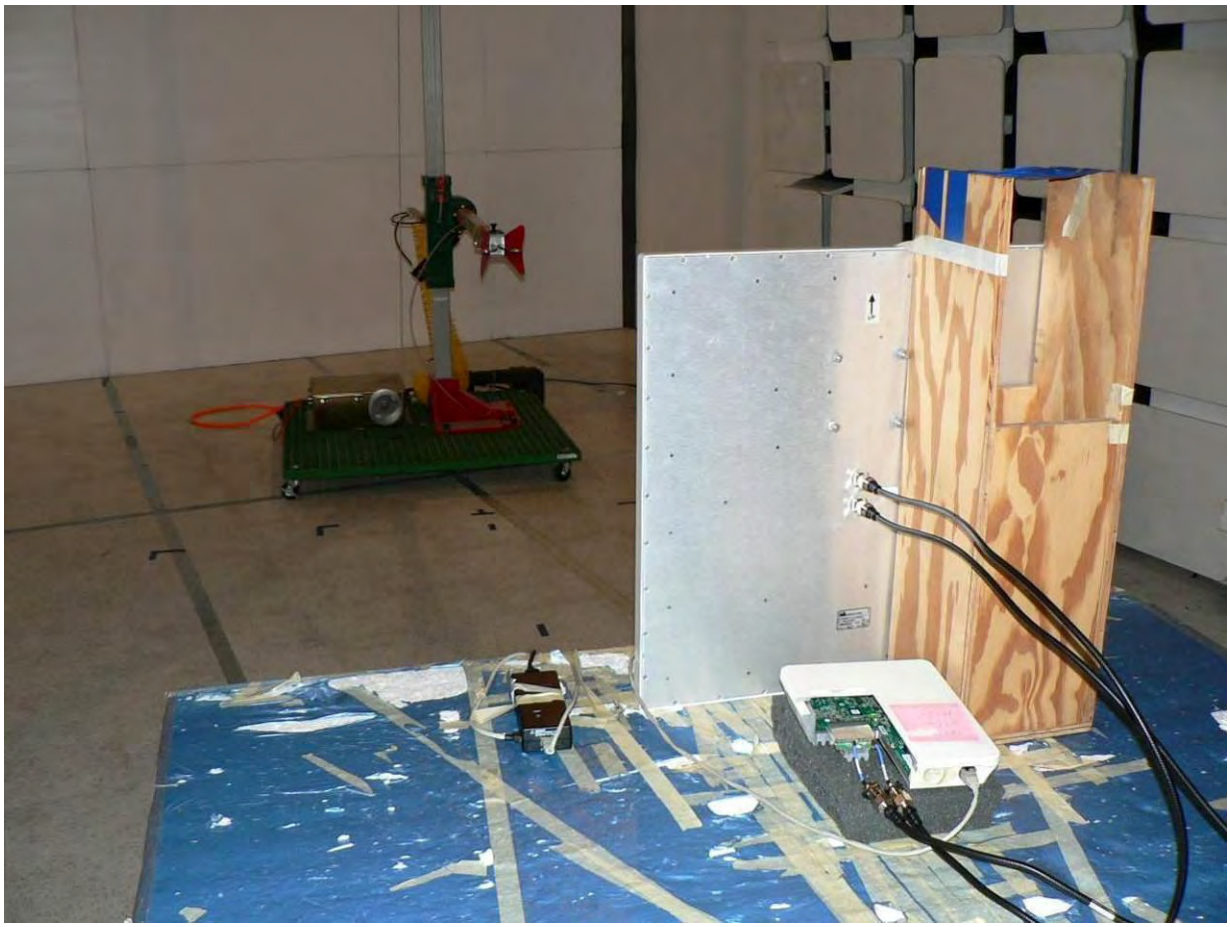
16 dBi AM0111760



23 dBi ant MT0070760



29 dBi Panel RW-9622-5001



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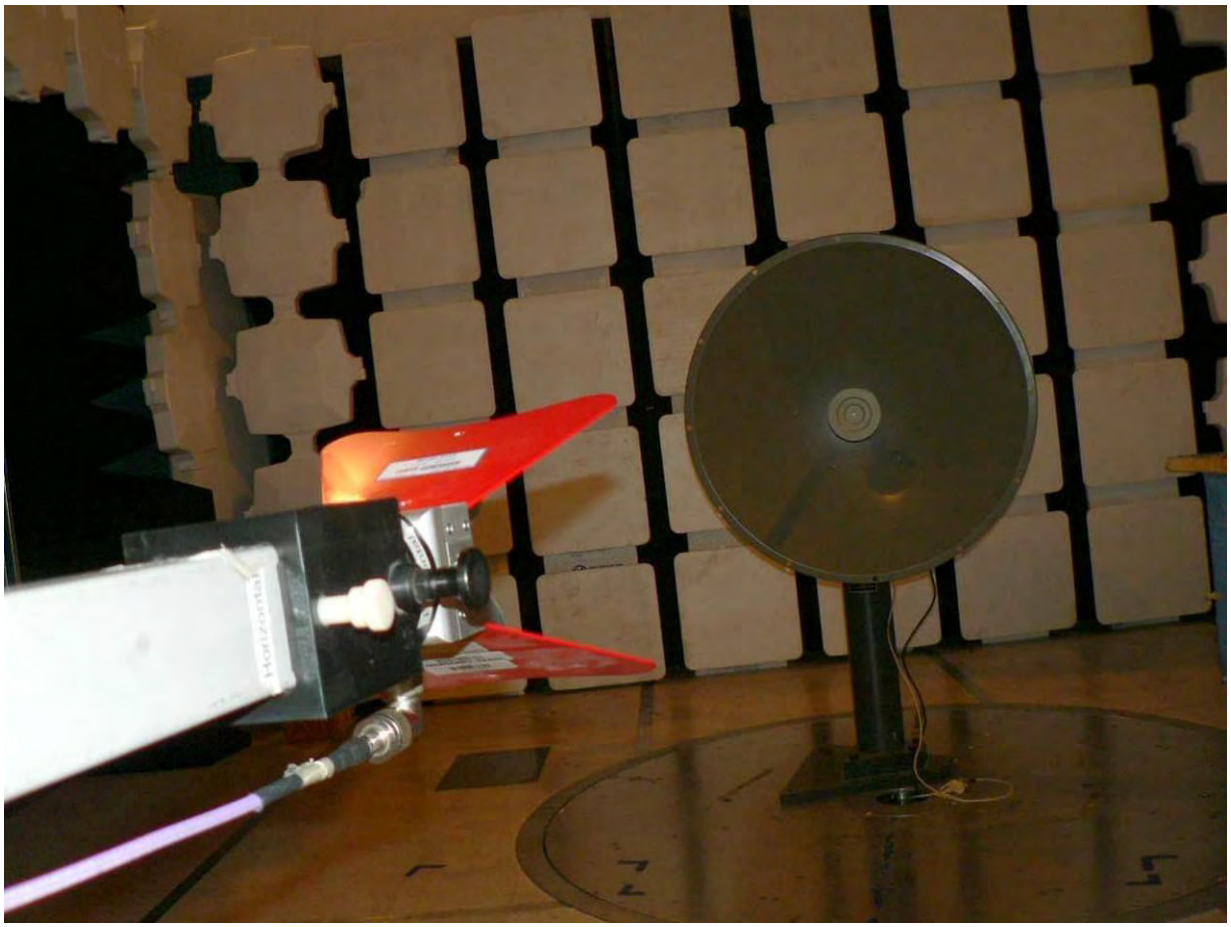
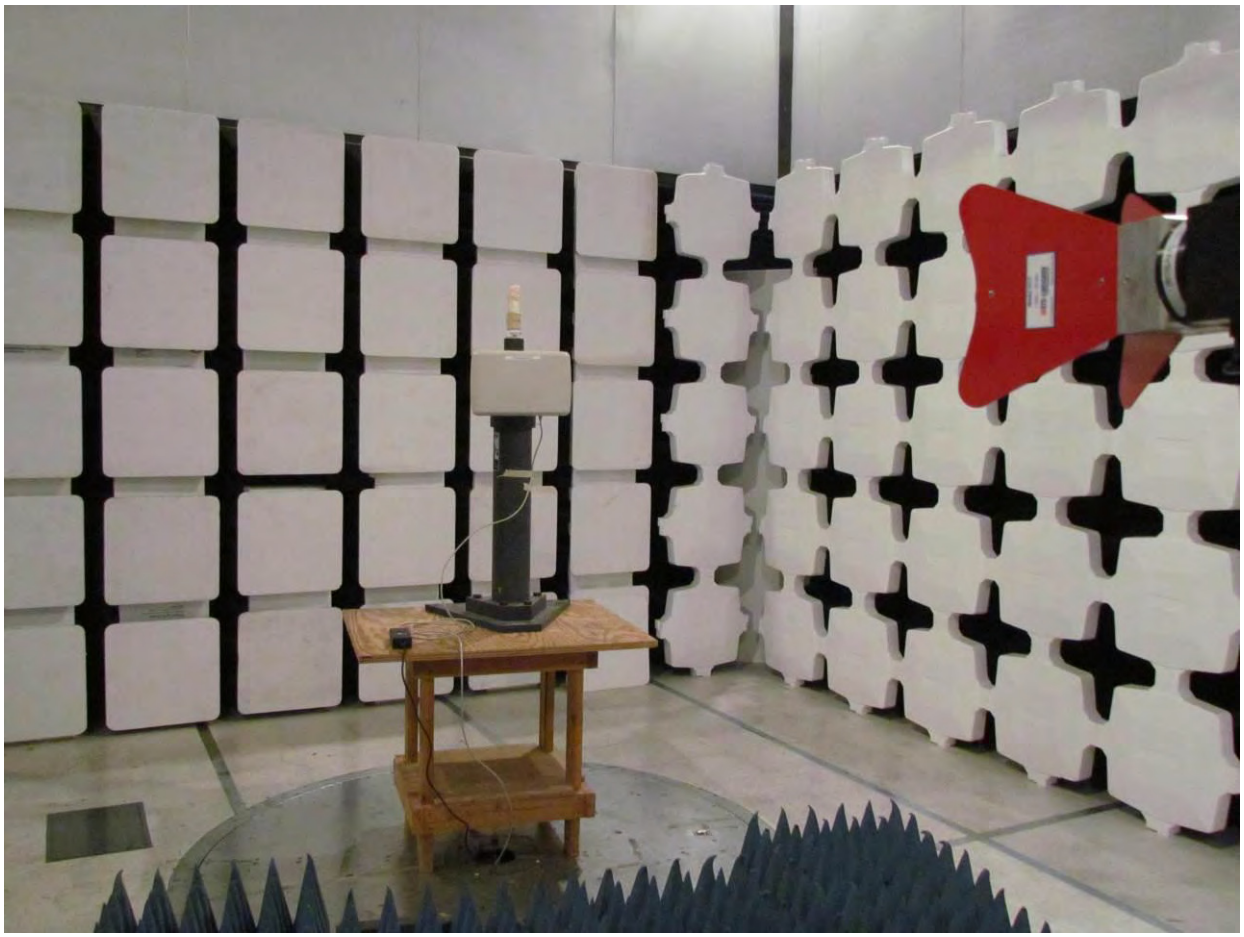
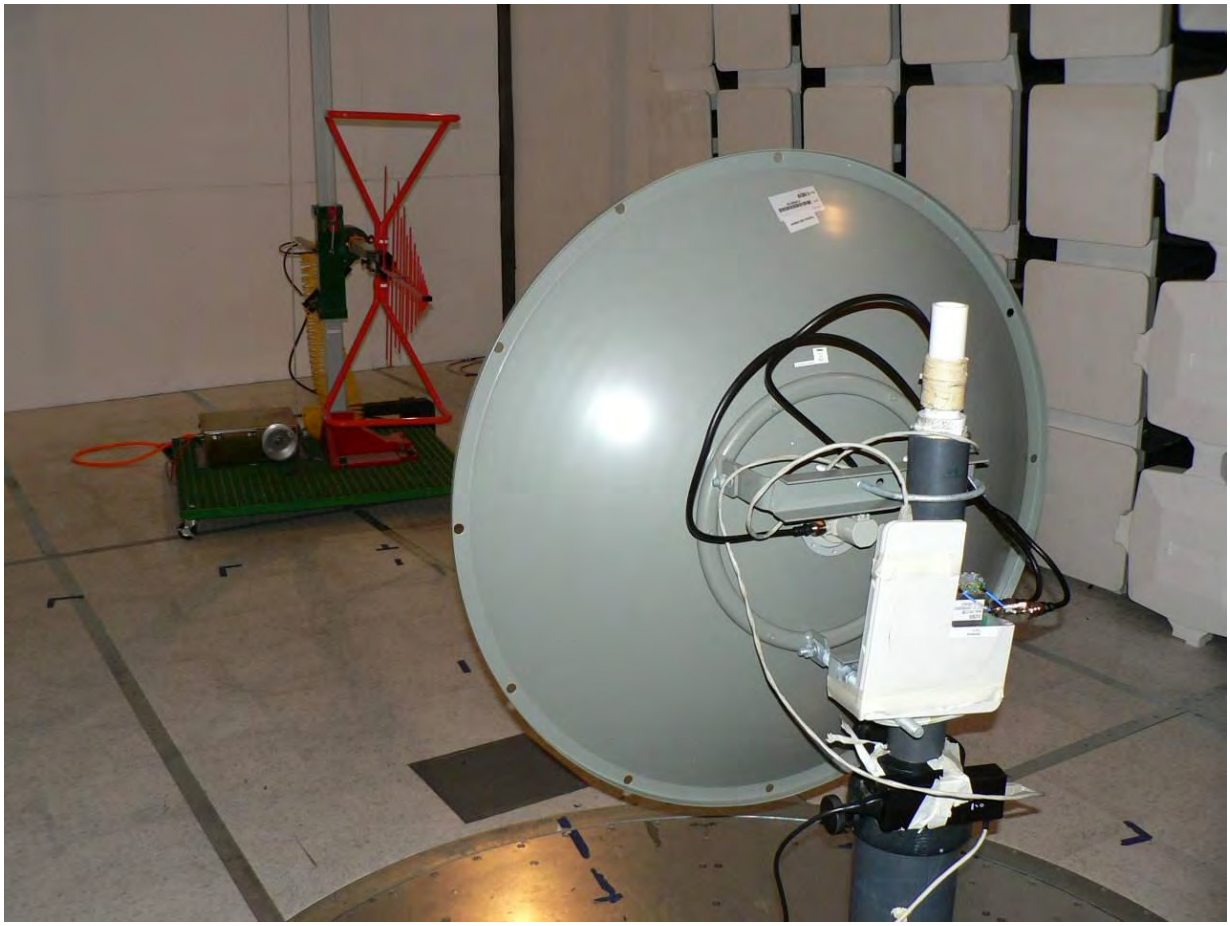
32 dBi Dish RW-9732-4958



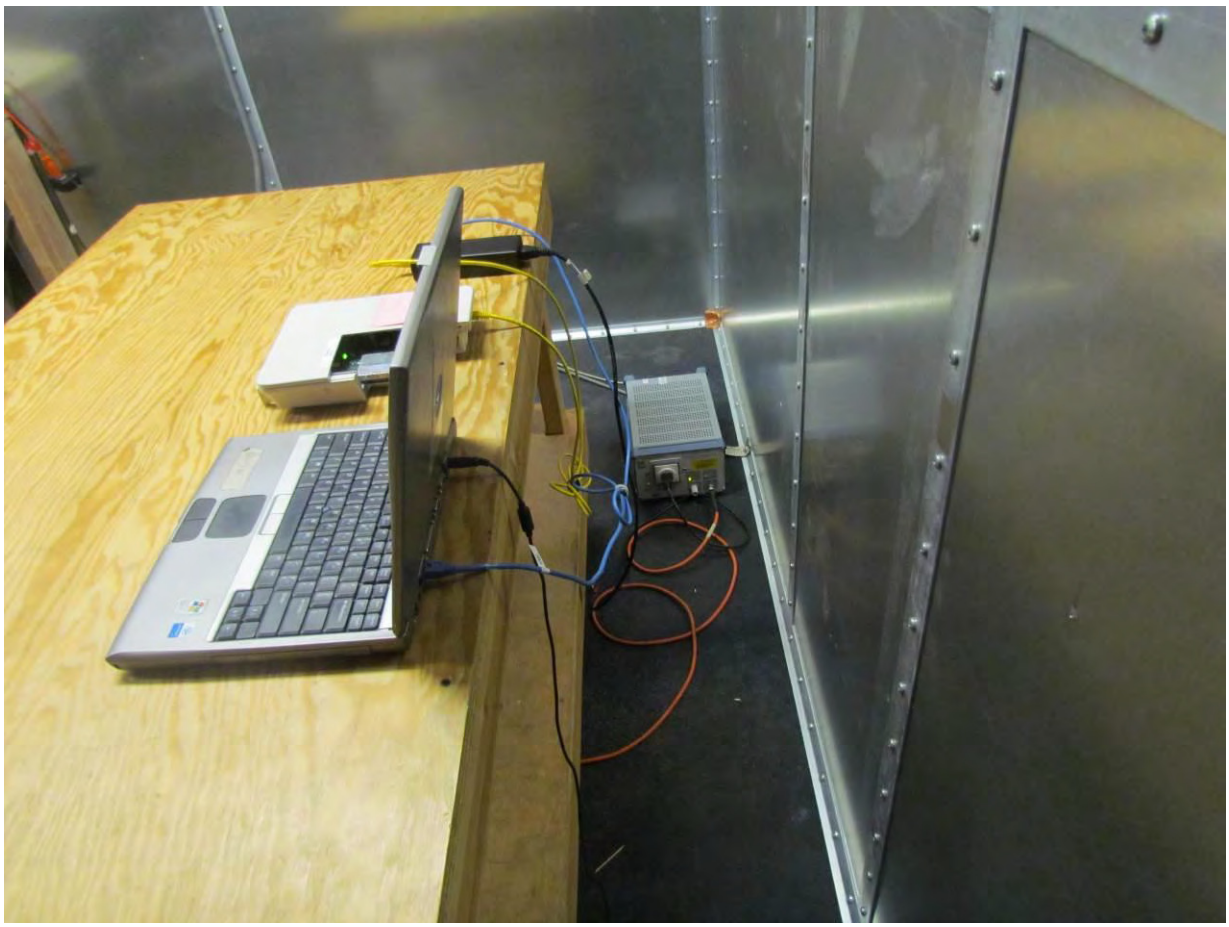
20.5 dBi Smart AM0156430



7.3. Radiated Emissions Test Setup <1 GHz



7.4. ac Wireline Test Setup



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