Test of: RADWIN Ltd. AP0158770 Wireless Module

To: FCC 47 CFR Part 15.247

Test Report Serial No.: RDWN40-U3 Rev A

TEST REPORT

FROM

Test of: RADWIN Ltd. AP0158770 Wireless Module

to

To FCC 47 CFR Part 15.247

Test Report Serial No.: RDWN40-U3 Rev A

Note: this report contains data with regard to the 5725-5850 MHz operational modes of the RADWIN Ltd AP0158770 Wireless Module. Test data for the non-DFS Bands 5,150 - 5,250 is reported in MiCOM Labs RDWN34-U6

This report supersedes: RDWN40-U3 Rev A

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

Product Function: 5 GHz Wireless Module

Copy No: pdf Issue Date: 23rd March 2016

This Test Report is Issued Under the Authority of;

MiCOM Labs, Inc.
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Pleasanton, CA 94566 USA
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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

Test Accreditation

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

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Accredited Laboratory

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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 4th day of February 2016.

Senior Director of Quality & Communications
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2017

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

Recognition

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

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

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

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Is a recognition agreement under which test lab is accredited to regulatory standards of the EU member countries.

**NB – Notified Body

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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 4th day of February 2016.

Senior Director of Quality & Communications
For the Accreditation Council
Certificate Number 2381.02
Valid to November 30, 2017

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	18th March 2016	
Draft #2	23rd March 2016	
Rev A		Addition of a single integral antenna (gain 20.5 dBi) in the 5.8 GHz band. As a complete suite of conducted testing was performed in the original test program (RDWN34) only radiated spurious emissions above 1 GHz was required
This report was originally issued under RDWN34		
Rev B	11th February 2015	Fixed typographical error in report release date
Rev A	7th January 2015	Initial release

TEST RESULT CERTIFICATE

Manufacturer:	RADWIN Ltd 27 Habarzel Street Tel Aviv, 6971039 Israel	Tested By:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California, 94566, USA
EUT:	5, 10, 20, 40, 80 MHz Bandwidth(s) Wireless Module	Telephone:	+1 925 462 0304
Model(s):	AP0158770	Fax:	+1 925 462 0306
S/N's:	Prototype		
Test Date(s):	2nd - 12th December 2014 7th March 2016	Website:	www.micomlabs.com

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

A2LA ACCREDITED
TESTING CERT #2381.01

Graeme Grieve
Quality Manager MiCOM Labs,

Gordon Hurst
President & CEO MiCOM Labs, Inc.

1. REFERENCES AND MEASUREMENT UNCERTAINTY

1.1. Normative References

2. REF.	PUBLICATION	YEAR	TITLE
I	KDB 662911	Oct 31 2013	Guidance for measurement of output emission of devices that employ single transmitter with multiple outputs or systems with multiple transmitters operating simultaneously in the same frequency band
II	KDB 558074 D01 v03r03	9th June 2015	Guidance for performing compliance measurements on Digital Transmission Systems (DTS) operating under section 15.247.
III	A2LA	June 2015	R105 - Requirement's When Making Reference to A2LA Accreditation Status
IV	ANSI C63.10	2013	American National Standard for Testing Unlicensed Wireless Devices
V	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
VI	CISPR 22	2008	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
VII	ETSI TR 100 028	2001-12	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
VIII	FCC 47 CFR Part 15.247	2014	Radio Frequency Devices; Subpart C – Intentional Radiators
IX	ICES-003	Issue 5 2012	Spectrum Management and Telecommunications; Interference-Causing Equipment Standard. Information Technology Equipment (ITE) – Limits and methods of measurement.
X	M 3003	Edition 3 Nov. 2012	Expression of Uncertainty and Confidence in Measurements
XI	RSS-247 Issue 1	May 2015	Digital Transmission Systems (DTSs), Frequency Hopping System (FHSs) and Licence-Exempt Local Area Network (LE-LEN) Devices
XII	RSS-Gen Issue 4	November 2014	General Requirements and Information for the Certification of Radiocommunication Equipment
XIII	KDB 644545 D03 v01	August 14th 2014	Guidance for IEEE 802.11ac New Rules
XIV	FCC 47 CFR Part 2.1033	2014	FCC requirements and rules regarding photographs and test setup diagrams.

2.1. Test and Uncertainty Procedures

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

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

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

3. PRODUCT DETAILS AND TEST CONFIGURATIONS

3.1. Technical Details

Details	Description
Purpose:	Test of the RADWIN Ltd. AP0158770 Wireless Module to FCC Part 15.247 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:	RDWN40-U3 Rev A
Date EUT received:	1st December 2014 + 7th March 2016
Standard(s) applied:	FCC 47 CFR Part 15.247
Dates of test (from - to):	2nd - 12th December 2014 7th March 2016
No of Units Tested:	One
Type of Equipment:	5 GHz Wireless Module 2x2 Spatial Multiplexing MIMO configuration
Manufacturers Trade Name:	Wireless Module
Model(s):	AP0158770
Location for use:	Outdoor
Declared Frequency Range(s):	5725 - 5850 MHz
Hardware Rev:	Prototype
Software Rev:	Radwin Art GUI
Type of Modulation:	Per 802.11ac/n – BPSK, QPSK, 16QAM, 64QAM, 256QAM, OFDM
EUT Modes of Operation:	802.11n 5, 10, 20, 40 MHz 802.11ac 5, 10, 20, 40, 80 MHz
Declared Nominal Average Output Power:	5 GHz Operation 802.11n/ac: +30 dBm
System Beam Forming:	AP0158770 has no capability for antenna beam forming
Transmit/Receive Operation:	Time Division Duplex
Rated Input Voltage and Current:	POE 48 - 55 Vdc 1 A
Operating Temperature Range:	Declared range -35ºC to +60ºC
ITU Emission Designator:	5 MHz 4M73W7W 10 MHz 9M02W7W 20 MHz 17M8W7W 40 MHz 36M4W7W 80 MHz 76M0W7W
Equipment Dimensions:	1.9” x 2.0” x 0.3”
Weight:	0.42 lb (19 g)
Primary function of equipment:	RF module for transmitting data and voice.

3.2. Scope of Test Program

RADWIN Ltd AP0158770 Wireless Access Point

The scope of the test program was to test the RADWIN Ltd. AP0158770 Wireless Module, 2x2 Spatial Multiplexing MIMO configurations in the frequency range 5725 – 5850 MHz for compliance against FCC 47 CFR Part 15.247 and Industry Canada RSS-210 specifications.

Operational Bandwidths

802.11n/802.11ac 5 MHz
802.11n/802.11ac 10 MHz
802.11n/802.11ac 20 MHz
802.11n/802.11ac 40 MHz
802.11ac 80 MHz

FCC OET KDB Implementation
This test program implements the following FCC KDB – 662911 31st October 2013; ***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.

RADWIN Ltd
AP0158770 Wireless Module (Front)

RADWIN Ltd
AP0158770 Wireless Module (Rear)

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

Type (EUT/ Support)	Equipment Description (Including Brand Name)	Manufacturer	Model No.	Serial No.
EUT	Wireless LAN Access Point	RADWIN Ltd	AP0158770	Prototype
Support	POE 55 Vdc	RADWIN Ltd	CPU55A-270-1	--
Support	Laptop PC	IBM	Thinkpad	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)
				5725-5850 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	16.5
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	Integrated Smart Flat panel	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. 10/100/1000 Ethernet (POE) – RJ45
2. RF Antenna Connectors (x2) – u.Fl

3.6. Test Configurations

Results for the following configurations are provided in this report.

5,725 – 5,850 MHz			
Operating Bandwidth V's Channel Frequencies (MHz)			
5 MHz	Con/SE/BE: 5730	40 MHz	Con/BE: 5745
	Con/SE: 5800		Con: 5800
	Con/SE: 5845		Con: 5830
10 MHz	Con/BE: 5731	80 MHz	Con/BE: 5765
	Con: 5800		Con: 5810
	Con: 5844	KEY:	Con - Conducted Radiated SE – Spurious Emissions BE – Band-Edge
20 MHz	Con/BE: 5735		
	Con: 5800		
	Con: 5840		

The above matrix identifies testing performed for each antenna identified for testing under Section 2.4 Antenna Details

3.7. Equipment Modifications

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

1. NONE

3.8. Deviations from the Test Standard

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

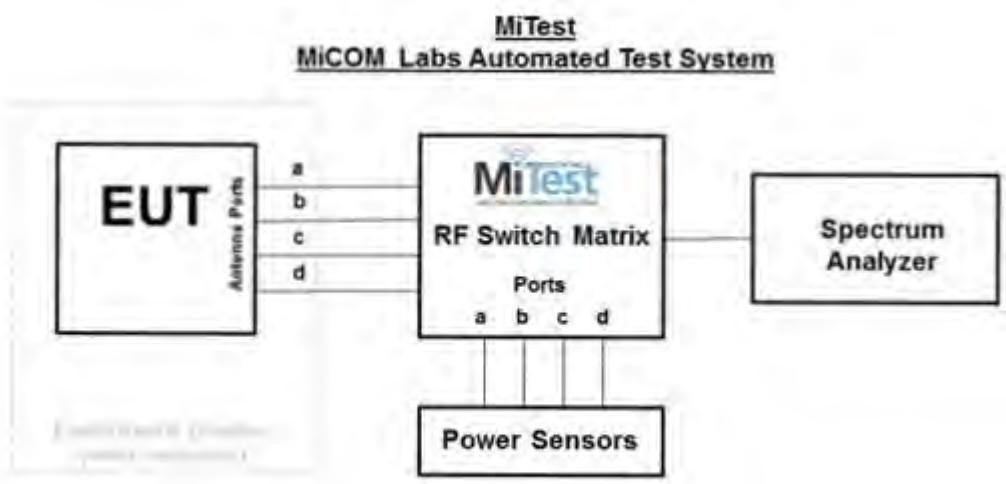
1. NONE

4. TEST EQUIPMENT CONFIGURATION(S)

4.1. Conducted RF Emission Test Set-up

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

1. Section 6.1.1.1. 6 dB and 99% Bandwidth
2. Section 6.1.1.2. Peak Output Power
3. Section 6.1.1.3. Power Spectral Density
4. Section 6.1.1.4. Conducted Spurious Emissions



Conducted Test Measurement Setup

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

Traceability of Test Equipment Utilized for Conducted Testing

Asset#	Description	Manufacturer	Model #	Serial #	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	04 Dec 2015
193	Receiver 20 Hz to 7 GHz	Rhode & Schwarz	ESI 7	838496/007	14 Jan 2015
249	Resistance Thermometer	Thermotronics	GR2105-02	9340 #2	30 Oct 2015
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	31 Jul 2015
361	Desktop for RF#1, Labview Software installed	Dell	Vostro 220	WS RF#1	Not Required
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	17 Jul 2015
380	4x4 RF Switch Box	MiCOM Labs	MiTest RF Switch Box	MIC001	20 Jan 2015
390	USB Power Head 50MHz - 24GHz -60 to +20dBm	Agilent	U2002A	MY50000103	17 Oct 2015
398	Test Software	MiCOM	MiTest ATS	Version 1.9	Not Required
405	DC Power Supply 0-60V	Agilent	6654A	MY4001826	Cal when used
408	USB to GPIB interface	National Instruments	GPIB-USB HS	14C0DE9	Not Required
440	USB Wideband Power Sensor	Boonton	55006	9178	25 Sep 2015
441	USB Wideband Power Sensor	Boonton	55006	9179	25 Sep 2015
442	USB Wideband Power Sensor	Boonton	55006	9181	25 Sep 2015
445	PoE Injector	D-Link	DPE-101GL	QTAH1E2000625	Not Required
75	Environmental Chamber	Thermatron	SE-300-2-2	27946	28 Nov 2015
RF#1 GPIB#1	GPIB cable to Power Supply	HP	GPIB	None	Not Required
RF#1 SMA#1	EUT to Mitest box port 1	Flexco	SMA Cable port1	None	20 Jan 2015
RF#1 SMA#2	EUT to Mitest box port 2	Flexco	SMA Cable port2	None	20 Jan 2015
RF#1 SMA#3	EUT to Mitest box port 3	Flexco	SMA Cable port3	None	20 Jan 2015
RF#1 SMA#4	EUT to Mitest box port 4	Flexco	SMA Cable port4	None	20 Jan 2015
RF#1 SMA#SA	Mitest box to SA	Flexco	SMA Cable SA	None	20 Jan 2015
RF#1 USB#1	USB Cable to Mitest Box	Dynex	USB Cable	None	Not Required

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.

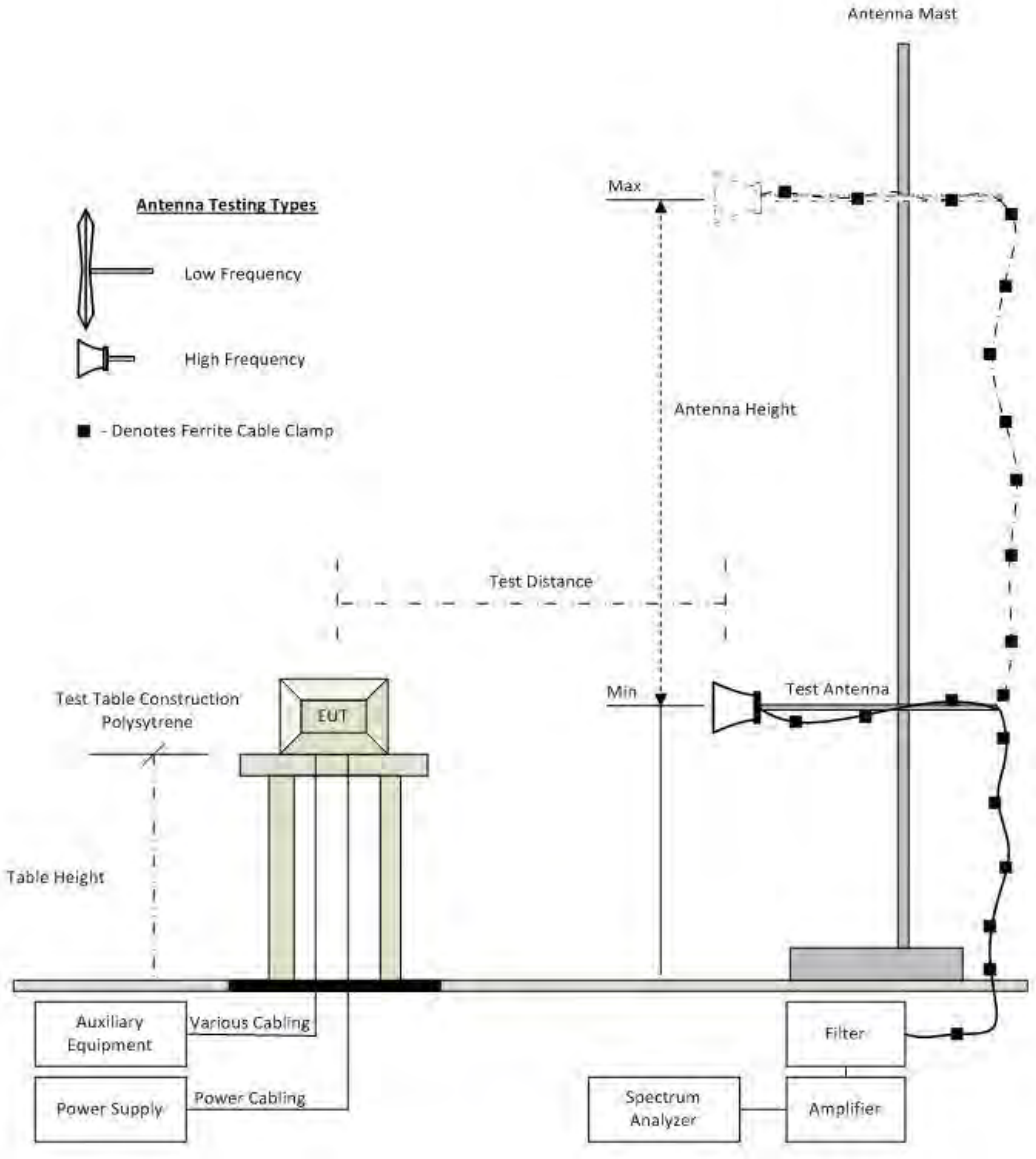
The MiCOM Labs "***MiTest***" Automated Test System" (Patent Pending)

4.2. Radiated Spurious Emission Test Set-up

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

1. Radiated Spurious and Band-Edge Emissions

Radiated Emission Measurement Setup Pictorial Representation



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.

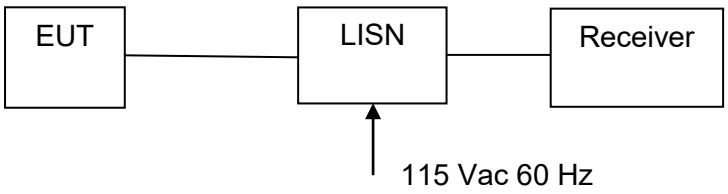
Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	04 Dec 2016
170	Video System Controller for Semi Anechoic Chamber	Panasonic	WV-CY101	04R08507	Not Required
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	27 Aug 2016
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	15 Aug 2016
396	2.4 GHz Notch Filter	Microtronics	BRM50701	001	18 Aug 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	18th Oct 2016
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
447	Rad Emissions Test Software	MiCOM	Rad Emissions Test Software 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
465	Low Pass Filter DC-1000 MHz	Mini-Circuits	NLP-1200+	VUU01901402	18 Aug 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

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 5.1.3 ac Wireline Conducted Emissions

Test Measurement Set up



Measurement set up for AC Wireline Conducted Emissions Test

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 ac Wireline Emission Testing

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	04 Dec 2015
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 2015
193	Receiver 20 Hz to 7 GHz	Rhode & Schwarz	ESI 7	838496/007	14 Jan 2015
307	BNC-CABLE	Megaphase	1689 1GVT4	15F50B002	Cal when used
316	Dell desktop computer workstation with Vasona	Dell	Desktop	WS04	Not Required

5. TEST SUMMARY

List of Measurements

The following table represents the list of measurements required under the **FCC CFR47 Part 15.247**.

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

List of Measurements (continued)

The following table represents the list of measurements required under the **FCC CFR47 Part 15.247.**

Section(s)	Test Items	Description	Condition	Result	Test Report Section
15.247(d) **15.205 /** **15.209**	Radiated Emissions	Restricted Bands	Radiated	Complies	5.1.2
	Transmitter Radiated Spurious Emissions	Emissions above 1 GHz		Complies	
	Radiated Band Edge	Band-edge results Peak Emissions		Complies	
15.205 / **15.209**	Radiated Spurious Emissions	Emissions <1 GHz (30M-1 GHz)	Radiated	Complies	*5.1.2.4*
15.207	AC Wireline Conducted Emissions 150 kHz–30 MHz	Conducted Emissions	Conducted	Complies EUT is POE powered - not shipped with equipment	*5.1.3*

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

6. TEST RESULTS

6.1. Device Characteristics

6.1.1. Conducted Testing

6.1.1.1. 6 dB and 99 % Bandwidth

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

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

Equipment Configuration for 6 dB & 99% Bandwidth			
Variant:	5 MHz	**Duty Cycle (%):**	96
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 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
5730.0	4.509	4.529	--	--	4.529	4.509	≥500.0	-4.01
5800.0	4.489	4.469	--	--	4.489	4.469	≥500.0	-3.97
5845.0	4.509	4.489	--	--	4.509	4.489	≥500.0	-3.99

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
5730.0	4.669	4.729	--	--	4.729		
5800.0	4.689	4.709	--	--	4.709		
5845.0	4.689	4.709	--	--	4.709		

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

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

Equipment Configuration for 6 dB & 99% Bandwidth			
Variant:	10 MHz	**Duty Cycle (%):**	94
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 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
5731.0	8.898	8.938	--	--	8.938	8.898	≥500.0	-8.40
5800.0	8.898	8.938	--	--	8.938	8.898	≥500.0	-8.40
5844.0	8.938	8.938	--	--	8.938	8.938	≥500.0	-8.44

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
5731.0	9.018	9.018	--	--	9.018		
5800.0	9.018	9.018	--	--	9.018		
5844.0	9.018	9.018	--	--	9.018		

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

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

Equipment Configuration for 6 dB & 99% Bandwidth			
Variant:	20 MHz	**Duty Cycle (%):**	92
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 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
5735.0	17.715	17.796	--	--	17.796	17.715	≥500.0	-17.22
5800.0	17.715	17.715	--	--	17.715	17.715	≥500.0	-17.22
5840.0	17.715	17.715	--	--	17.715	17.715	≥500.0	-17.22

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
5735.0	17.715	17.796	--	--	17.796		
5800.0	17.715	17.715	--	--	17.715		
5840.0	17.715	17.715	--	--	17.715		

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

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

Equipment Configuration for 6 dB & 99% Bandwidth			
Variant:	40 MHz	**Duty Cycle (%):**	87
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 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
5745.0	36.553	36.393	--	--	36.553	36.393	≥500.0	-35.89
5800.0	36.553	36.393	--	--	36.553	36.393	≥500.0	-35.89
5830.0	36.393	36.393	--	--	36.393	36.393	≥500.0	-35.89

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
5745.0	36.393	36.393	--	--	36.393		
5800.0	36.393	36.393	--	--	36.393		
5830.0	36.393	36.393	--	--	36.393		

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

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

Equipment Configuration for 6 dB & 99% Bandwidth			
Variant:	80 MHz	**Duty Cycle (%):**	77
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 6 dB Bandwidth (MHz) Port(s)				6 dB Bandwidth (MHz)		Limit	Lowest Margin
MHz	a	b	c	d	Highest	Lowest	KHz	MHz
5765.0	76.633	76.633	--	--	76.633	76.633	≥500.0	-76.13
5810.0	76.633	76.633	--	--	76.633	76.633	≥500.0	-76.13

Test Frequency	Measured 99% Bandwidth (MHz) Port(s)				Maximum 99% Bandwidth (MHz)		
MHz	a	b	c	d			
5765.0	75.992	75.992	--	--	75.992		
5810.0	75.992	75.992	--	--	75.992		

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

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

Specification

Limits

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

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

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

6.1.1.2. Peak Output Power

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

Test Procedure for Fundamental Emission Output Power Measurement
The transmitter terminal of EUT was connected to the input of the spectrum analyzer set to measure peak power. The resolution filter bandwidth was set to 6 dB, peak detector selected and the analyzer built-in power function was used to integrate peak power over the 20 dB bandwidth.

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

15.247 (b)(4) If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

15.247 (c)(1)(ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power

Maximum Limit: +30 dBm Conducted Power

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
RW-9732-4958	Point - Point	31.0*	61.0	30.0
RW-9721-5158	Point - Point	28.0*	58.0	30.0
RW-9622-5001	Point - Point	28.0*	58.0	30.0
RW-9612-5001	Point - Point	22.0*	52.0	30.0
MT0070760	Point - Point	24.0	54.0	30.0
AM0111760	Point - Point	16.5	46.5	30.0
AM0156430	Point - Point	20.5	50.5	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.

The following conducted measurements were made on the equipment to determine the maximum power setting for +30 dBm. Each bandwidth was tested and the power setting logged within the measurement matrix.

Equipment Configuration for Peak Output Power			
Variant:	5 MHz	**Duty Cycle (%):**	96
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5730.0	27.22	25.34	--	--	29.39	30.00	-0.61	14.00
5800.0	24.86	27.23	--		29.22	30.00	-0.78	15.00
5845.0	27.26	25.43	--	--	29.45	30.00	-0.55	15.00

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

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

Equipment Configuration for Peak Output Power			
Variant:	10 MHz	**Duty Cycle (%):**	94
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5731.0	26.79	25.68	--	--	29.28	30.00	-0.72	14.00
5800.0	24.94	27.88	--	--	29.66	30.00	-0.34	14.00
5844.0	27.85	24.72	--	--	29.57	30.00	-0.43	14.00

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

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

Equipment Configuration for Peak Output Power			
Variant:	20 MHz	**Duty Cycle (%):**	92
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5735.0	27.05	24.88	--	--	29.11	30.00	-0.89	15.00
5800.0	25.28	27.26	--	--	29.39	30.00	-0.61	15.00
5840.0	25.35	27.22	--	--	29.40	30.00	-0.60	15.00

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

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

Equipment Configuration for Peak Output Power			
Variant:	40 MHz	**Duty Cycle (%):**	87
Data Rate:	Rate 9	**Antenna Gain (dBi):**	11
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5745.0	26.98	25.85	--	--	29.46	30.00	-0.54	15.00
5800.0	24.18	27.54	--	--	29.19	30.00	-0.81	15.00
5830.0	27.01	25.31	--	--	29.25	30.00	-0.75	15.00

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

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

Equipment Configuration for Peak Output Power			
Variant:	80 MHz	**Duty Cycle (%):**	77
Data Rate:	Rate 9	**Antenna Gain (dBi):**	11
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5765.0	27.24	24.83	--	--	29.21	30.00	-0.79	15.00
5810.0	23.76	27.99	--	--	29.38	30.00	-0.62	15.00

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

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

The following matrix were calculated based on the previous measurement results. Results are only provided for Non Point-to-Point antenna types (see Antenna Type Table at the start of this section). Point-to-Point antennas are permitted maximum power without any reduction due to antenna gain.

Antenna MT125250 + RW-9061-5001

Equipment Configuration for Peak Output Power			
Variant:	5 MHz	**Duty Cycle (%):**	96
Data Rate:	Rate 8	**Antenna Gain (dBi):**	13.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna MT125250 + RW-9061-5001		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5730.0	20.22	18.34	--	--	22.39	23	-0.61	
5800.0	17.86	20.23	--	--	22.22	23	-0.78	
5845.0	20.26	18.43	--	--	22.45	23	-0.55	

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

Equipment Configuration for Peak Output Power			
Variant:	10 MHz	**Duty Cycle (%):**	94
Data Rate:	Rate 8	**Antenna Gain (dBi):**	13.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna MT125250 + RW-9061-5001		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5731.0	19.79	18.68	--	--	22.28	23	-0.72	
5800.0	17.94	20.88	--	--	22.66	23	-0.34	
5844.0	20.85	17.72	--	--	22.57	23	-0.43	

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

Equipment Configuration for Peak Output Power			
Variant:	20 MHz	**Duty Cycle (%):**	92
Data Rate:	Rate 8	**Antenna Gain (dBi):**	13.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna MT125250 + RW-9061-5001		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5735.0	20.05	17.88	--	--	22.11	23	-0.89	
5800.0	18.28	20.26	--	--	22.39	23	-0.61	
5840.0	18.35	20.22	--	--	22.40	23	-0.60	

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

Equipment Configuration for Peak Output Power			
Variant:	40 MHz	**Duty Cycle (%):**	87
Data Rate:	Rate 9	**Antenna Gain (dBi):**	13.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna MT125250 + RW-9061-5001		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5745.0	19.98	18.85	--	--	22.46	23	-0.54	
5800.0	17.18	20.54	--	--	22.19	23	-0.81	
5830.0	20.01	18.31	--	--	22.25	23	-0.75	

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

Equipment Configuration for Peak Output Power

Variant:	80 MHz	**Duty Cycle (%):**	77
Data Rate:	Rate 9	**Antenna Gain (dBi):**	13.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna MT125250 + RW-9061-5001		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5765.0	20.24	17.83	--	--	22.21	23	-0.79	
5810.0	16.76	20.99	--	--	22.38	23	-0.62	

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

Antenna RW-9061-5002

Equipment Configuration for Peak Output Power

Variant:	5 MHz	**Duty Cycle (%):**	96
Data Rate:	Rate 8	**Antenna Gain (dBi):**	14.5
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9061-5002		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5730.0	18.72	16.84	--	--	20.89	21.5	-0.61	
5800.0	16.36	18.73	--	--	20.72	21.5	-0.78	
5845.0	18.76	16.93	--	--	20.95	21.5	-0.55	

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

Equipment Configuration for Peak Output Power

Variant:	10 MHz	**Duty Cycle (%):**	94
Data Rate:	Rate 8	**Antenna Gain (dBi):**	14.5
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9061-5002		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5731.0	18.29	17.18	--	--	20.78	21.5	-0.72	
5800.0	16.44	19.38	--	--	21.16	21.5	-0.34	
5844.0	19.35	16.22	--	--	21.07	21.5	-0.43	

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

Equipment Configuration for Peak Output Power			
Variant:	20 MHz	**Duty Cycle (%):**	92
Data Rate:	Rate 8	**Antenna Gain (dBi):**	14.5
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9061-5002		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5735.0	18.55	16.38	--	--	20.61	21.5	-0.89	
5800.0	16.78	18.76	--	--	20.89	21.5	-0.61	
5840.0	16.85	18.72	--	--	20.90	21.5	-0.60	

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

Equipment Configuration for Peak Output Power			
Variant:	40 MHz	**Duty Cycle (%):**	87
Data Rate:	Rate 9	**Antenna Gain (dBi):**	14.5
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9061-5002		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5745.0	18.48	17.35	--	--	20.96	21.5	-0.54	
5800.0	15.68	19.04	--	--	20.69	21.5	-0.81	
5830.0	18.51	16.81	--	--	20.75	21.5	-0.75	

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

Equipment Configuration for Peak Output Power

Variant:	80 MHz	**Duty Cycle (%):**	77
Data Rate:	Rate 9	**Antenna Gain (dBi):**	14.5
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9061-5002		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5765.0	18.74	16.33	--	--	20.71	21.5	-0.79	
5810.0	15.26	19.49	--	--	20.88	21.5	-0.62	

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

Antenna RW-9061-5004

Equipment Configuration for Peak Output Power			
Variant:	5 MHz	**Duty Cycle (%):**	96
Data Rate:	Rate 8	**Antenna Gain (dBi):**	10.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9061-5004		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5730.0	23.22	21.34	--	--	25.39	26	-0.61	
5800.0	20.86	23.23	--	--	25.22	26	-0.78	
5845.0	23.26	21.43	--	--	25.45	26	-0.55	

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

Equipment Configuration for Peak Output Power			
Variant:	10 MHz	**Duty Cycle (%):**	94
Data Rate:	Rate 8	**Antenna Gain (dBi):**	10.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9061-5004		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5731.0	22.79	21.68	--	--	25.28	26	-0.72	
5800.0	20.94	23.88	--	--	25.66	26	-0.34	
5844.0	23.85	20.72	--	--	25.57	26	-0.43	

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

Equipment Configuration for Peak Output Power			
Variant:	20 MHz	**Duty Cycle (%):**	92
Data Rate:	Rate 8	**Antenna Gain (dBi):**	10.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9061-5004		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5735.0	23.05	20.88	--	--	25.11	26	-0.89	
5800.0	21.28	23.26	--	--	25.39	26	-0.61	
5840.0	21.35	23.22	--	--	25.40	26	-0.60	

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

Equipment Configuration for Peak Output Power			
Variant:	40 MHz	**Duty Cycle (%):**	87
Data Rate:	Rate 9	**Antenna Gain (dBi):**	10.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9061-5004		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5745.0	22.98	21.85	--	--	25.46	26	-0.54	
5800.0	20.18	23.54	--	--	25.19	26	-0.81	
5830.0	23.01	21.31	--	--	25.25	26	-0.75	

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

Equipment Configuration for Peak Output Power			
Variant:	80 MHz	**Duty Cycle (%):**	77
Data Rate:	Rate 9	**Antenna Gain (dBi):**	10.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9061-5004		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5765.0	23.24	20.83	--	--	25.21	26	-0.79	
5810.0	19.76	23.99	--	--	25.38	26	-0.62	

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

Antenna MT0128930

Equipment Configuration for Peak Output Power

Variant:	5 MHz	**Duty Cycle (%):**	96
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna MT0128930		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5730.0	22.22	20.34	--	--	24.39	25	-0.61	
5800.0	19.86	22.23	--	--	24.22	25	-0.78	
5845.0	22.26	20.43	--	--	24.45	25	-0.55	

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

Equipment Configuration for Peak Output Power

Variant:	10 MHz	**Duty Cycle (%):**	94
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna MT0128930		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5731.0	21.79	20.68	--	--	24.28	25	-0.72	
5800.0	19.94	22.88	--	--	24.66	25	-0.34	
5844.0	22.85	19.72	--	--	24.57	25	-0.43	

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

Equipment Configuration for Peak Output Power			
Variant:	20 MHz	**Duty Cycle (%):**	92
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna MT0128930		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5735.0	22.05	19.88	--	--	24.11	25	-0.89	
5800.0	20.28	22.26	--	--	24.39	25	-0.61	
5840.0	20.35	22.22	--	--	24.40	25	-0.60	

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

Equipment Configuration for Peak Output Power			
Variant:	40 MHz	**Duty Cycle (%):**	87
Data Rate:	Rate 9	**Antenna Gain (dBi):**	11.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna MT0128930		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5745.0	21.98	20.85	--	--	24.46	25	-0.54	
5800.0	19.18	22.54	--	--	24.19	25	-0.81	
5830.0	22.01	20.31	--	--	24.25	25	-0.75	

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

Equipment Configuration for Peak Output Power

Variant:	80 MHz	**Duty Cycle (%):**	77
Data Rate:	Rate 9	**Antenna Gain (dBi):**	11.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna MT0128930		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5765.0	22.24	19.83	--	--	24.21	25	-0.79	
5810.0	18.76	22.99	--	--	24.38	25	-0.62	

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

Antenna AM0135060

Equipment Configuration for Peak Output Power

Variant:	5 MHz	**Duty Cycle (%):**	96
Data Rate:	Rate 8	**Antenna Gain (dBi):**	12.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna AM0135060		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5730.0	21.22	19.34	--	--	23.39	24	-0.61	
5800.0	18.86	21.23	--	--	23.22	24	-0.78	
5845.0	21.26	19.43	--	--	23.45	24	-0.55	

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

Equipment Configuration for Peak Output Power

Variant:	10 MHz	**Duty Cycle (%):**	94
Data Rate:	Rate 8	**Antenna Gain (dBi):**	12.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna AM0135060		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5731.0	20.79	19.68	--	--	23.28	24	-0.72	
5800.0	18.94	21.88	--	--	23.66	24	-0.34	
5844.0	21.85	18.72	--	--	23.57	24	-0.43	

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

Equipment Configuration for Peak Output Power

Variant:	20 MHz	**Duty Cycle (%):**	92
Data Rate:	Rate 8	**Antenna Gain (dBi):**	12.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna AM0135060		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5735.0	21.05	18.88	--	--	23.11	24	-0.89	
5800.0	19.28	21.26	--	--	23.39	24	-0.61	
5840.0	19.35	21.22	--	--	23.40	24	-0.60	

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

Equipment Configuration for Peak Output Power

Variant:	40 MHz	**Duty Cycle (%):**	87
Data Rate:	Rate 9	**Antenna Gain (dBi):**	12.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna AM0135060		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5745.0	20.98	19.85	--	--	23.46	24	-0.54	
5800.0	18.18	21.54	--	--	23.19	24	-0.81	
5830.0	21.01	19.31	--	--	23.25	24	-0.75	

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

Equipment Configuration for Peak Output Power			
Variant:	80 MHz	**Duty Cycle (%):**	77
Data Rate:	Rate 9	**Antenna Gain (dBi):**	12.0
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna AM0135060		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5765.0	21.24	18.83	--	--	23.21	24	-0.79	
5810.0	17.76	21.99	--	--	23.38	24	-0.62	

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

Antenna RW-9401-5002

Equipment Configuration for Peak Output Power			
Variant:	5 MHz	**Duty Cycle (%):**	96
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.5
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9401-5002		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5730.0	21.72	19.84	--	--	23.89	24.5	-0.61	
5800.0	19.36	21.73	--	--	23.72	24.5	-0.78	
5845.0	21.76	19.93	--	--	23.95	24.5	-0.55	

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

Equipment Configuration for Peak Output Power			
Variant:	10 MHz	**Duty Cycle (%):**	94
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.5
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9401-5002		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5731.0	21.29	20.18	--	--	23.78	24.5	-0.72	
5800.0	19.44	22.38	--	--	24.16	24.5	-0.34	
5844.0	22.35	19.22	--	--	24.07	24.5	-0.43	

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

Equipment Configuration for Peak Output Power			
Variant:	20 MHz	**Duty Cycle (%):**	92
Data Rate:	Rate 8	**Antenna Gain (dBi):**	11.5
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9401-5002		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5735.0	21.55	19.38	--	--	23.61	24.5	-0.89	
5800.0	19.78	21.76	--	--	23.89	24.5	-0.61	
5840.0	19.85	21.72	--	--	23.90	24.5	-0.60	

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

Equipment Configuration for Peak Output Power			
Variant:	40 MHz	**Duty Cycle (%):**	87
Data Rate:	Rate 9	**Antenna Gain (dBi):**	11.5
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9401-5002		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5745.0	21.48	20.35	--	--	23.96	24.5	-0.54	
5800.0	18.68	22.04	--	--	23.69	24.5	-0.81	
5830.0	21.51	19.81	--	--	23.75	24.5	-0.75	

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

Equipment Configuration for Peak Output Power			
Variant:	80 MHz	**Duty Cycle (%):**	77
Data Rate:	Rate 9	**Antenna Gain (dBi):**	11.5
Modulation:	OFDM	**Beam Forming Gain (Y):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:	Antenna RW-9401-5002		

Test Measurement Results

Test Frequency	Measured Output Power (dBm) Port(s)				Calculated Total Power Σ Port(s)	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	dBm	dBm	dBm	
5765.0	21.74	19.33	--	--	23.71	24.5	-0.79	
5810.0	18.26	22.49	--	--	23.88	24.5	-0.62	

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

Specification

Limits

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

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

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

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

(1) Fixed point-to-point operation:

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

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

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

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

6.1.1.3. Power Spectral Density

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

Test Procedure for Power Spectral Density

The transmitter output was connected to a spectrum analyzer and the maximum level in a 3 kHz bandwidth was measured. A peak value was found over the full emission bandwidth and the frequency span reduced to obtain enhanced resolution. Sweep time ≥ span / 3 kHz with video averaging turned off. The Peak Power Spectral Density is the highest level found across the emission in a 3 kHz resolution bandwidth.

Supporting Information

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

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

x = Duty Cycle

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

Equipment Configuration for Power Spectral Density			
Variant:	5 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/3KHz)				Amplitude Summation + DCCF +0.18 dB	Limit	Margin
MHz	a	b	c	d	dBm/3KHz:	dBm/3KHz	dB
5730.0	-4.428	-6.667	--	--	-2.881	8.0	-10.9
5800.0	-7.249	-3.719	--	--	-2.812	8.0	-10.8
5845.0	-4.741	-6.063	--	--	-2.634	8.0	-10.6

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).

Equipment Configuration for Power Spectral Density			
Variant:	10 MHz	**Duty Cycle (%):**	94.0
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/3KHz)				Amplitude Summation + DCCF: +0.27 dB	Limit	Margin
MHz	a	b	c	d	dBm/3KHz	dBm/3KHz	dB
5731.0	-5.970	-8.480	--	--	-3.839	8.0	-11.8
5800.0	-8.750	-6.425	--	--	-4.845	8.0	-12.9
5844.0	-5.177	-7.292	--	--	-3.238	8.0	-11.2

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).

Equipment Configuration for Power Spectral Density			
Variant:	20 MHz	**Duty Cycle (%):**	92.0
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/3KHz)				Amplitude Summation + DCCF: +0.36 dB	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/3KHz**	**dBm/3KHz**	**dB**
5735.0	-7.560	-9.625	--	--	-5.365	8.0	-13.4
5800.0	-10.574	-6.700	--	--	-4.955	8.0	-13.0
5840.0	-6.855	-9.545	--	--	-4.946	8.0	-13.0

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).

Equipment Configuration for Power Spectral Density			
Variant:	40 MHz	**Duty Cycle (%):**	86.9
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/3KHz)				Amplitude Summation + DCCF : +0.61 dB	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/3KHz**	**dBm/3KHz**	**dB**
5745.0	-9.622	-11.786	--	--	-7.654	8.0	-15.7
5800.0	-12.510	-10.131	--	--	-8.140	8.0	-16.2
5830.0	-10.157	-11.831	--	--	-7.934	8.0	-15.9

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

DCCF Duty Cycle Correction Factor
Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for Power Spectral Density			
Variant:	80 MHz	**Duty Cycle (%):**	76.6
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/3KHz)				Amplitude Summation + DCCF: +1.16 dB	Limit	Margin
MHz	**a**	**b**	**c**	**d**	**dBm/3KHz**	**dBm/3KHz**	**dB**
5765.0	-11.988	-13.932	--	--	-9.569	8.0	-17.6
5810.0	-15.671	-12.826	--	--	-10.223	8.0	-18.2

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
Peak Power Spectral Density Limits

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

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

6.1.1.4. Conducted Spurious Emissions

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

Test Procedure for Transmitter Conducted Spurious and Band-Edge Emissions Measurement
Transmitter Conducted Spurious and Band-Edge emissions were measured at a limit of 20 dB below the highest in-band spectral density measured with a spectrum analyzer connected to the antenna terminal. Measurements were made while EUT was operating in transmit mode of operation at the appropriate centre frequency closest to the band-edge. Emissions were maximized during the measurement and limits derived from the peak spectral power and drawn on each plot.

Equipment Configuration for Conducted Low Band-Edge Emissions			
Variant:	5 MHz	**Duty Cycle (%):**	96
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

Channel Frequency:	5730.0 MHz					
Band-Edge Frequency:	5725.0 MHz					
Test Frequency Range:	5683.0 - 5735.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-29.29	-10.29	5727.10	--	--	**-2.100**
b	-27.75	-12.32	5727.10	--	--	**-2.100**

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

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

Equipment Configuration for Conducted High Band-Edge Emissions			
Variant:	5 MHz	**Duty Cycle (%):**	96
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

Channel Frequency:	5845.0 MHz					
Band-Edge Frequency:	5850.0 MHz					
Test Frequency Range:	5840.0 - 5887.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-24.82	-9.79	5847.70	--	--	**-2.300**
b	-29.89	-11.18	5847.90	--	--	**-2.100**

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

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

Equipment Configuration for Transmitter Conducted Spurious Emissions

Variant:	5 MHz	**Duty Cycle (%):**	96
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	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
5730.0	30.0 - 26000.0	-49.023	-11.80	-47.362	-12.30	--	--	--	--
5800.0	30.0 - 26000.0	-26.851	-14.65	-26.359	-11.33	--	--	--	--
5845.0	30.0 - 26000.0	-48.958	-11.30	-48.684	-12.71	--	--	--	--

Traceability to Industry Recognized Test Methodologies

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

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

Equipment Configuration for Conducted Low Band-Edge Emissions			
Variant:	10 MHz	**Duty Cycle (%):**	94
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

Channel Frequency:	5731.0 MHz					
Band-Edge Frequency:	5725.0 MHz					
Test Frequency Range:	5683.0 - 5736.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-18.91	-12.52	5725.80	--	--	**-0.800**
b	-20.00	-14.32	5725.80	--	--	**-0.800**

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

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

Equipment Configuration for Conducted High Band-Edge Emissions			
Variant:	10 MHz	**Duty Cycle (%):**	94
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

Channel Frequency:	5844.0 MHz					
Band-Edge Frequency:	5850.0 MHz					
Test Frequency Range:	5838.0 - 5887.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-16.89	-11.28	5849.20	--	--	**-0.800**
b	-17.84	-13.13	5849.30	--	--	**-0.700**

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

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

Equipment Configuration for Transmitter Conducted Spurious Emissions

Variant:	10 MHz	**Duty Cycle (%):**	94
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	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
5731.0	30.0 - 26000.0	-46.129	-14.06	-45.861	-16.21	--	--	--	--
5800.0	30.0 - 26000.0	-47.234	-17.54	-45.767	-12.31	--	--	--	--
5844.0	30.0 - 26000.0	-46.719	-12.85	-45.485	-14.72	--	--	--	--

Traceability to Industry Recognized Test Methodologies

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

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

Equipment Configuration for Conducted Low Band-Edge Emissions			
Variant:	20 MHz	**Duty Cycle (%):**	92
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

Channel Frequency:	5735.0 MHz					
Band-Edge Frequency:	5725.0 MHz					
Test Frequency Range:	5683.0 - 5745.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-15.52	-13.44	5725.20	--	--	**-0.200**
b	-16.85	-15.19	5725.00	--	--	**0.000**

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

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

Equipment Configuration for Conducted High Band-Edge Emissions			
Variant:	20 MHz	**Duty Cycle (%):**	92
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

Channel Frequency:	5840.0 MHz					
Band-Edge Frequency:	5850.0 MHz					
Test Frequency Range:	5830.0 - 5887.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-16.50	-13.37	5849.50	--	--	**-0.500**
b	-17.28	-14.62	5849.50	--	--	**-0.500**

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

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

Equipment Configuration for Transmitter Conducted Spurious Emissions

Variant:	20 MHz	**Duty Cycle (%):**	92
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	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
5735.0	30.0 - 26000.0	-47.498	-15.13	-46.540	-17.91	--	--	--	--
5800.0	30.0 - 26000.0	-47.378	-17.73	-45.802	-14.14	--	--	--	--
5840.0	30.0 - 26000.0	-45.863	-13.57	-45.501	-15.68	--	--	--	--

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

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

Equipment Configuration for Conducted Low Band-Edge Emissions			
Variant:	40 MHz	**Duty Cycle (%):**	87
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

Channel Frequency:	5745.0 MHz					
Band-Edge Frequency:	5725.0 MHz					
Test Frequency Range:	5625.0 - 5755.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-21.08	-16.43	5725.80	--	--	**-0.800**
b	-23.05	-18.07	5725.80	--	--	**-0.800**

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

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

Equipment Configuration for Conducted High Band-Edge Emissions			
Variant:	40 MHz	**Duty Cycle (%):**	87
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

Channel Frequency:	5830.0 MHz					
Band-Edge Frequency:	5850.0 MHz					
Test Frequency Range:	5820.0 - 5925.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-21.90	-16.34	5849.20	--	--	**-0.800**
b	-23.01	-17.82	5849.00	--	--	**-1.000**

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

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

Equipment Configuration for Transmitter Conducted Spurious Emissions

Variant:	40 MHz	**Duty Cycle (%):**	87
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	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
5745.0	30.0 - 26000.0	-49.129	-16.88	-48.259	-18.68	--	--	--	--
5800.0	30.0 - 26000.0	-47.059	-20.03	-46.011	-16.83	--	--	--	--
5830.0	30.0 - 26000.0	-46.975	-16.79	-44.502	-18.29	--	--	--	--

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

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

Equipment Configuration for Conducted Low Band-Edge Emissions			
Variant:	80 MHz	**Duty Cycle (%):**	77
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

Channel Frequency:	5765.0 MHz					
Band-Edge Frequency:	5725.0 MHz					
Test Frequency Range:	5653.0 - 5805.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M1 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-21.62	-18.89	5725.50	--	--	**-0.500**
b	-24.32	-20.18	5725.80	--	--	**-0.800**

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

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

Equipment Configuration for Conducted High Band-Edge Emissions			
Variant:	80 MHz	**Duty Cycle (%):**	77
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

Channel Frequency:	5810.0 MHz					
Band-Edge Frequency:	5850.0 MHz					
Test Frequency Range:	5770.0 - 5925.0 MHz					
Port(s)	**Band-Edge Markers and Limit**			**Amended Limit**		**Margin**
	M3 Amplitude (dBm)	**Plot Limit (dBm)**	**M2 Frequency (MHz)**	**Amplitude (dBm)**	**M2A Frequency (MHz)**	**(MHz)**
a	-26.24	-22.48	5849.50	--	--	**-0.500**
b	-23.67	-18.72	5848.90	--	--	**-1.100**

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

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

Equipment Configuration for Transmitter Conducted Spurious Emissions			
Variant:	80 MHz	**Duty Cycle (%):**	77
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	Frequency Range	Transmitter Conducted Spurious Emissions (dBm)							
		Port a		Port b		Port c		Port d	
MHz	MHz	SE	Limit	SE	Limit	SE	Limit	SE	Limit
5765.0	30.0 - 26000.0	-49.046	-19.23	-48.983	-20.96	--	--	--	--
5810.0	30.0 - 26000.0	-49.349	-22.87	-48.338	-19.27	--	--	--	--

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

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

Specification

Limits Band-Edge

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

§15.247(d) and RSS-210 §A8.5 In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

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

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

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

Laboratory Measurement Uncertainty for Conducted Spurious Emissions

Measurement uncertainty	±2.37 dB

6.1.2. Radiated Emission Testing

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

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

Test Procedure

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

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

Operational Modes

Operational mode(s) tested for spurious emissions were the modes which delivered maximum spectral density.

Field Strength Calculation

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

FS = R + AF + CORR - FO

where: FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain
FO = Distance Falloff Factor
NFL = Notch Filter Loss or Waveguide Loss

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

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

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

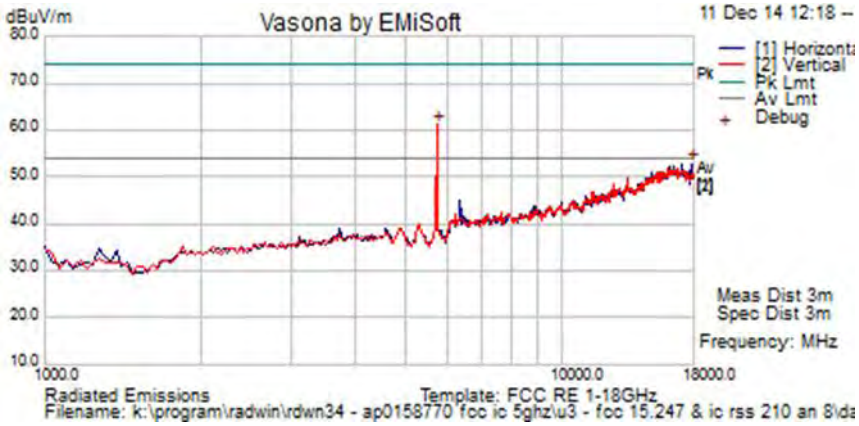
Level (dBμV/m) = 20 * Log (level (μV/m))

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

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

6.1.2.1. 11 dBi MT0128930 – Spurious and Band-Edge Emissions

Test Freq.	5730 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	14	**Press. (mBars)**	800
Antenna	11 dBi		
Test Notes 1	EUT AP0158770, SN# EUT has no serial number		
Test Notes 2	11dBi Sector, MT0128930		

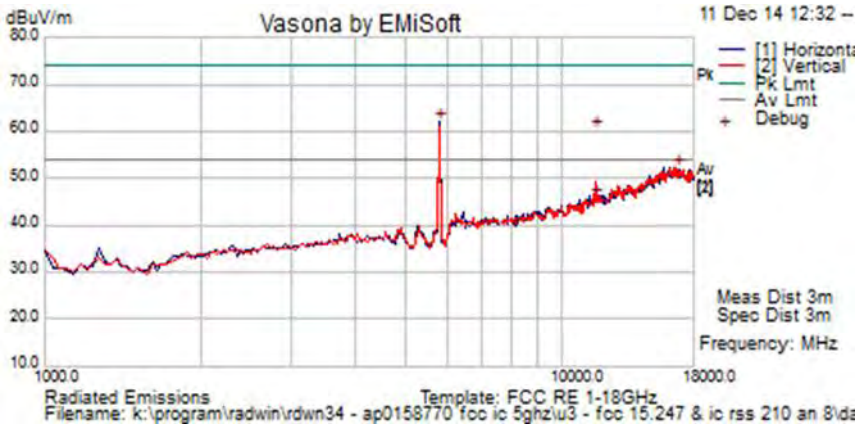


Formally measured emission peaks

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
5735.47094	65.7	6.2	-10.7	61.2	Peak [Scan]							FUND
17795.591	40.6	12.9	-0.7	52.7	Peak [Scan]	H	150	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.	5800 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	15	**Press. (mBars)**	800
Antenna	11 dBi		
Test Notes 1	EUT AP0158770, SN# EUT has no serial number		
Test Notes 2	11dBi Sector, MT0128930		

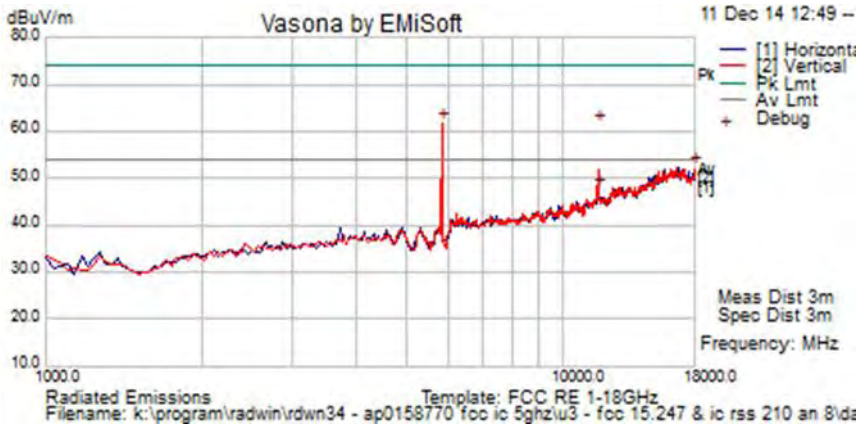


Formally measured emission peaks

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
5803.607	66.1	6.3	-10.4	62.0	Peak [Scan]							FUND
16637.275	38.7	12.0	1.6	52.3	Peak [Scan]	H	200	0	54.0	-1.7	Pass	Noise
11600.820	55.3	9.4	-4.5	60.2	Peak	H	125	128	74	-13.8	Pass	RB
11600.820	40.7	9.4	-4.5	45.6	Average.	H	125	128	54	-8.5	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

Test Freq.	5845 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	15	**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
5837.67535	65.6	6.3	-10.2	61.8	Peak [Scan]							FUND
18000.000	39.7	12.9	-0.3	52.3	Peak [Scan]	V	100	0	54	-1.7	Pass	Noise
11689.687	56.6	9.4	-4.4	61.6	Peak	V	123	124	74	-12.4	Pass	RB
11690.010	42.7	9.4	-4.4	47.7	Average	V	123	124	54	-6.3	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

Band-Edge - Antenna 11 dBi MT0128930

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

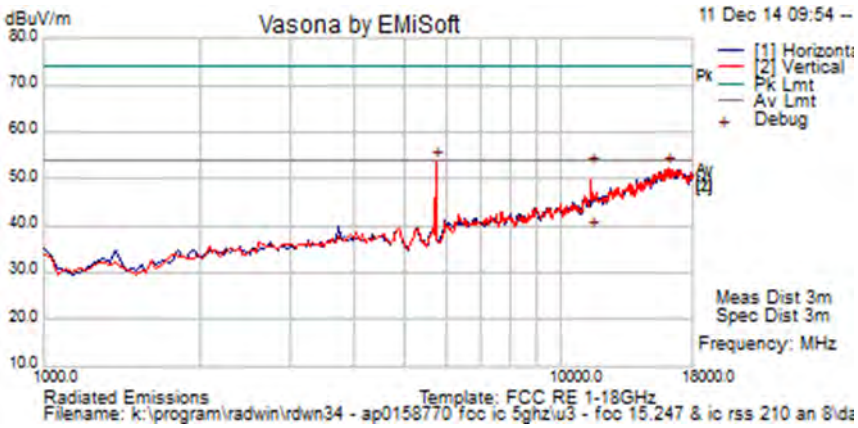
5.8 GHz Frequency Band

	Restricted Band 5460 MHz		
Operational Mode	**Peak**	**Average**	**Power Setting**
5 MHz	52.96	41.71	14
10 MHz	53.37	41.71	14
20 MHz	53.46	41.96	15
40 MHz	53.66	41.71	15
80 MHz	53.53	41.46	15

All band-edge plots are kept on file by the laboratory

6.1.2.2. 12 dBi Antenna AM0135060 – Spurious and Band-Edge Emissions

Test Freq.	5730 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	80
Power Setting	14	**Press. (mBars)**	800
Antenna	12 dBi		
Test Notes 1	EUT AP0158770, SN# EUT has no serial number		
Test Notes 2	12dBi Sector, AM0135060		

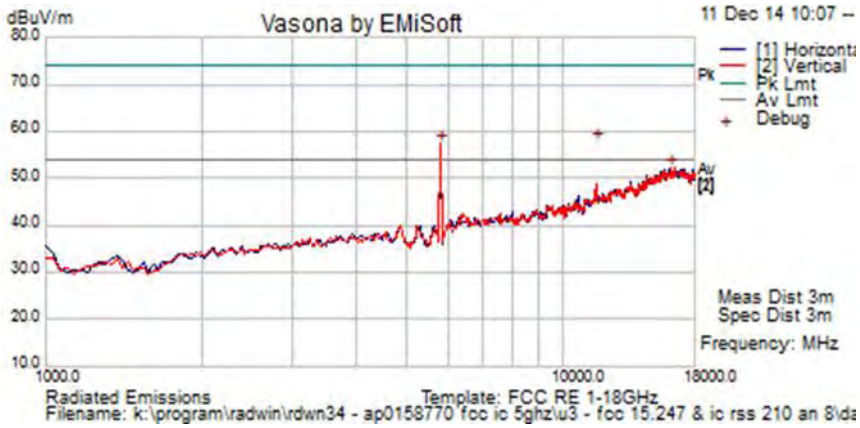


Formally measured emission peaks

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
5735.47094	58.3	6.2	-10.7	53.8	Peak [Scan]							FUND
16160.321	39.3	12.0	1.1	52.3	Peak [Scan]	H	100	0	54	-1.7	Pass	Noise
11459.922	48.2	9.4	-4.9	52.7	Peak Max	V	177	298	74	-21.4	Pass	RB
11459.922	34.5	9.4	-4.9	39.0	Average Max	V	177	298	54	-15.0	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

Test Freq.	5800 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	80
Power Setting	15	**Press. (mBars)**	800
Antenna	12 dBi		
Test Notes 1	EUT AP0158770, SN# EUT has no serial number		
Test Notes 2	12dBi Sector, AM0135060		

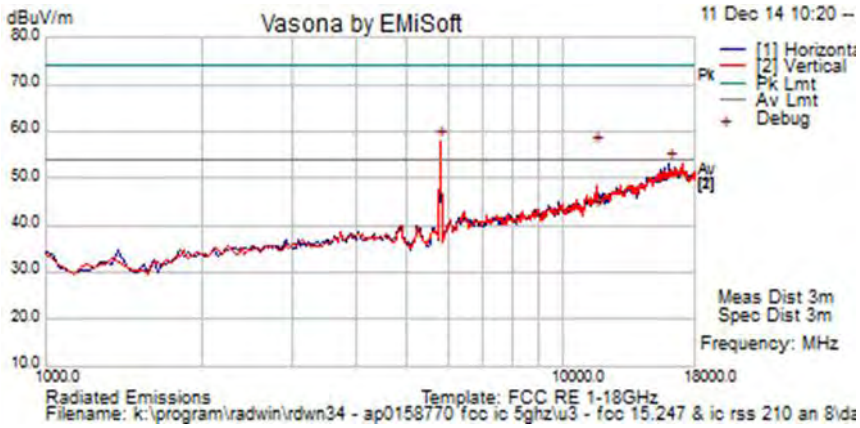


Formally measured emission peaks

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
5803.607	61.5	6.3	-10.4	57.4	Peak [Scan]							FUND
11600.372	52.6	9.4	-4.5	57.5	Peak Max	V	151	194	74.0	-16.5	Pass	RB
11600.372	38.7	9.4	-4.5	43.6	Average Max	V	151	194	54	-10.4	Pass	RB
16160.321	39.2	12.0	1.1	52.2	Peak [Scan]	V	100	0	54	-1.8	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.	5845 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	80
Power Setting	15	**Press. (mBars)**	800
Antenna	12 dBi		
Test Notes 1	EUT AP0158770, SN# EUT has no serial number		
Test Notes 2	12dBi 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
5803.60721	62.0	6.3	-10.4	57.9	Peak [Scan]							FUND
11600.333	52.1	9.4	-4.5	57.0	Peak Max	V	149	253	74	-17.0	Pass	RB
11600.333	38.1	9.4	-4.5	43.0	Average Max	V	149	253	54	-11.0	Pass	RB
16092.184	40.4	12.0	1.0	53.3	Peak [Scan]	H	150	0	54	-0.7	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

Band-Edge - Antenna 12 dBi Antenna AM0135060

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

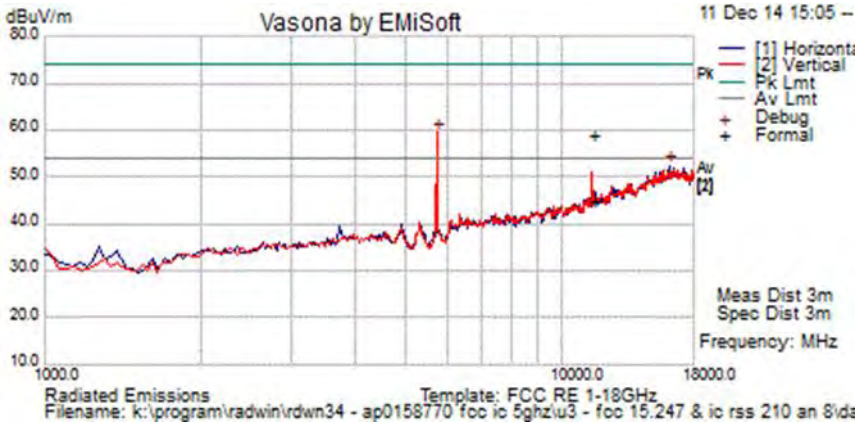
5.8 GHz Frequency Band

	Restricted Band 5460 MHz		
Operational Mode	**Peak**	**Average**	**Power Setting**
5 MHz	52.17	40.64	14
10 MHz	52.02	40.78	14
20 MHz	51.98	40.64	15
40 MHz	52.21	40.35	15
80 MHz	52.43	39.90	15

All band-edge plots are kept on file by the laboratory

6.1.2.3. 12.5 dBi Antenna RW-9401-5002 – Spurious and Band-Edge Emissions

Test Freq.	5730 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	14	**Press. (mBars)**	800
Antenna	12.5 dBi		
Test Notes 1	EUT AP0158770, SN# EUT has no serial number		
Test Notes 2	12.5 dBi Mobile Antenna, RW-9401-5002		

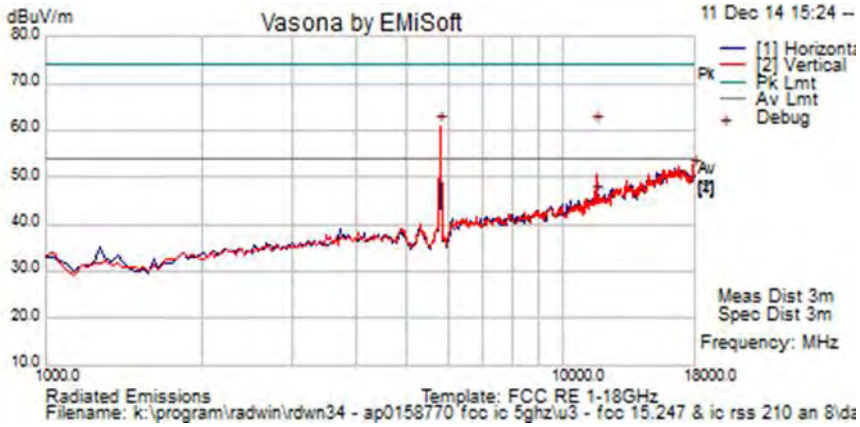


Formally measured emission peaks

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
5735.471	63.9	6.2	-10.7	59.5	Peak [Scan]							FUND
11460.564	54.6	9.4	-4.9	59.1	Peak Max	V	100	109	74	-14.9	Pass	RB
11460.564	40.2	9.4	-4.9	44.7	Average Max	V	100	109	54	-9.3	Pass	RB
16126.253	39.4	12	1	52.4	Peak [Scan]	H	100	0	54	-1.6	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.	5800 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	15	**Press. (mBars)**	800
Antenna	12.5 dBi		
Test Notes 1	EUT AP0158770, SN# EUT has no serial number		
Test Notes 2	12.5 dBi Mobile Antenna, RW-9401-5002		

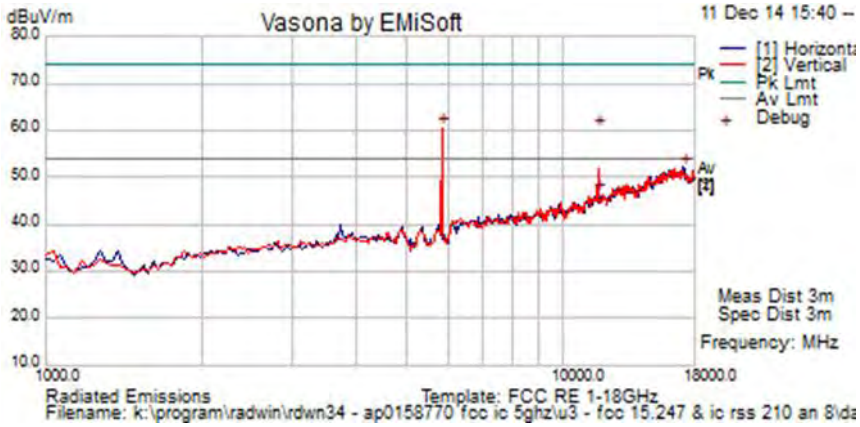


Formally measured emission peaks

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
5803.607	65.0	6.3	-10.4	61.0	Peak [Scan]							FUND
11600.823	56.1	9.4	-4.5	61.0	Peak	V	124	125	74.0	-13.0	Pass	RB
11600.823	41.4	9.4	-4.5	46.3	Average	V	124	125	54	-7.7	Pass	RB
17863.727	39.0	13.0	-0.5	51.5	Peak [Scan]	V	100	0	54	-2.5	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.	5845 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	15	**Press. (mBars)**	800
Antenna	12.5 dBi		
Test Notes 1	EUT AP0158770, SN# EUT has no serial number		
Test Notes 2	12.5 dBi 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
5837.67535	64.3	6.3	-10.2	60.5	Peak [Scan]							
17114.228	39.3	12.5	0.5	52.2	Peak [Scan]	H	100	0	54	-1.8	Pass	
11689.560	55.2	9.4	-4.4	60.2	Peak	V	126	125	74	-13.8	Pass	
11689.845	41.6	9.4	-4.4	46.6	Average	V	126	125	54	-7.4	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

Band-Edge - Antenna 12.5 dBi Antenna RW-9401-5002 (Shark Fin)

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

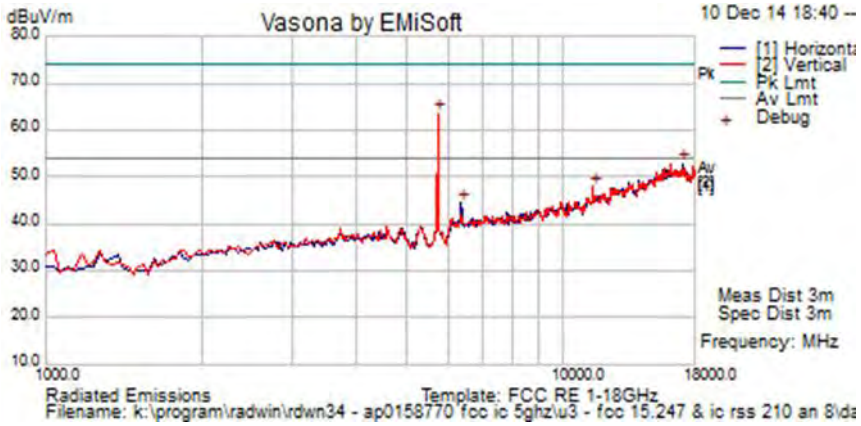
5.8 GHz Frequency Band

	Restricted Band 5460 MHz		
Operational Mode	**Peak**	**Average**	**Power Setting**
5 MHz	52.68	41.06	14
10 MHz	53.46	40.92	14
20 MHz	52.28	40.92	15
40 MHz	52.89	40.92	15
80 MHz	52.82	41.06	15

All band-edge plots are kept on file by the laboratory

6.1.2.4. 15.5 dBi Antenna RW-9061-5002 – Spurious and Band-Edge Emissions

Test Freq.	5730	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	14	**Press. (mBars)**	800
Antenna	15.5 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			

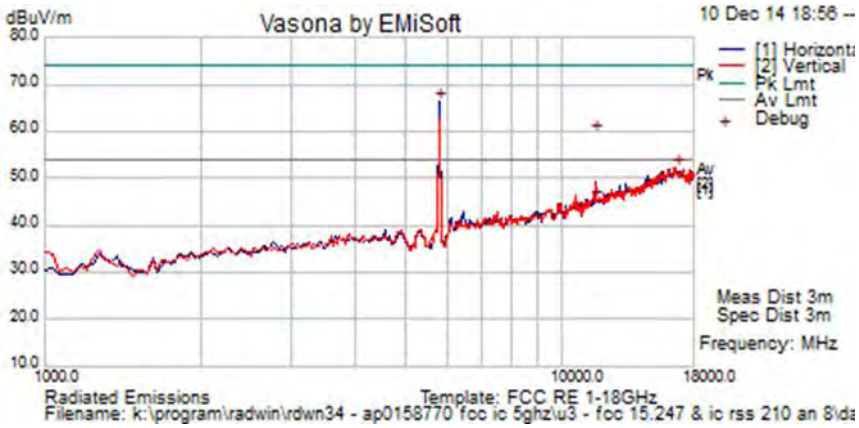


Formally measured emission peaks

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
5735.47094	67.9	6.2	-10.7	63.5	Peak [Scan]							FUND
17080.160	39.7	12.5	0.6	52.8	Peak [Scan]	H	200	0	54	-1.2	Pass	Noise
6354.491	45.8	6.6	-8.2	44.2	Peak [Scan]	V						NRB
11461.795	43.15	9.39	-4.9	47.65	Peak [Scan]	V	100	361	54	-6.35	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

Test Freq.	5800 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	15	**Press. (mBars)**	800
Antenna	15.5 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			

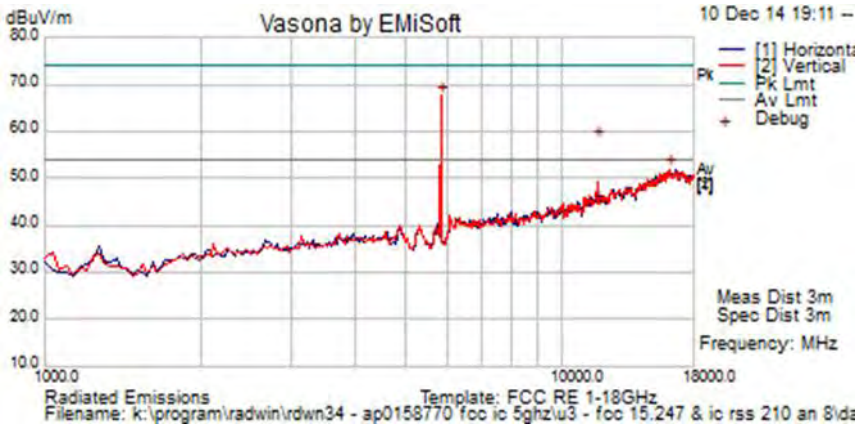


Formally measured emission peaks

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
5803.607	70.3	6.3	-10.4	66.2	Peak [Scan]							FUND
16637.275	38.6	12.0	1.6	52.2	Peak [Scan]	V	100	0	54.0	-1.8	Pass	Noise
11600.422	54.3	9.4	-4.5	59.2	Peak Max	V	131	128	74	-14.8	Pass	RB
11600.422	40.3	9.4	-4.5	45.2	Average Max	V	131	128	54	-8.8	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

Test Freq.	5845 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	15	**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
5837.67535	71.49	6.33	-10.2	67.62	Peak [Scan]							FUND
11690.252	53.01	9.43	-4.44	58.01	Peak Max	V	142	114	74	-15.99	Pass	RB
11690.252	39.26	9.43	-4.44	44.25	Average Max	V	142	114	54	-9.75	Pass	RB
16126.253	38.9	12.0	1.0	51.9	Peak [Scan]	V	100	0	54	-2.1	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

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

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

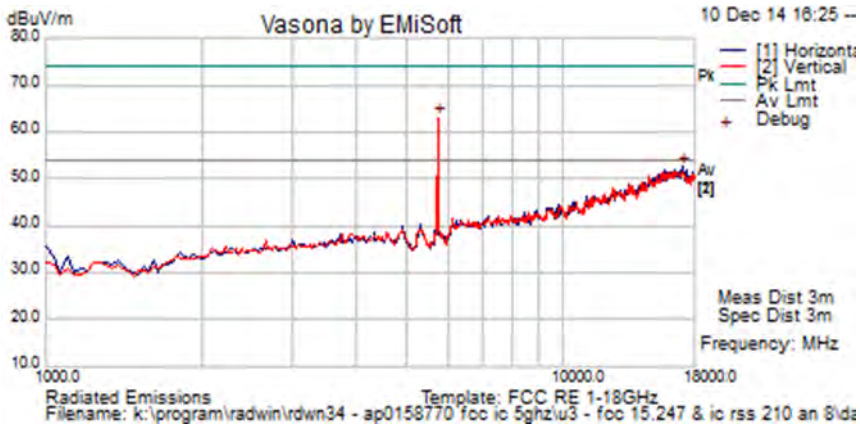
5.8 GHz Frequency Band

	Restricted Band 5460 MHz		
Operational Mode	**Peak**	**Average**	**Power Setting**
5 MHz	55.06	43.92	14
10 MHz	55.79	44.02	14
20 MHz	55.89	44.12	15
40 MHz	55.94	43.92	15
80 MHz	56.01	43.52	15

All band-edge plots are kept on file by the laboratory

6.1.2.5. 16.5 dBi Antenna AM111760 – Spurious and Band-Edge Emissions

Test Freq.	5730 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	14	**Press. (mBars)**	800
Antenna	16.5 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			

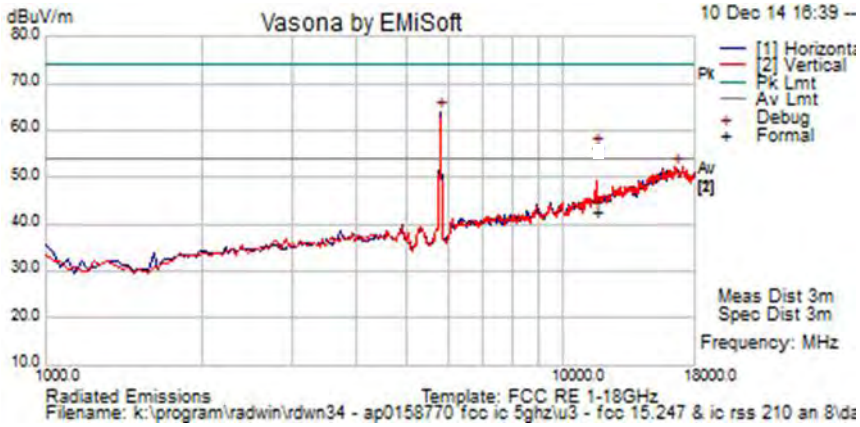


Formally measured emission peaks

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
5735.47094	67.5	6.2	-10.7	63.1	Peak [Scan]							FUND
17012.024	39.4	12.4	0.8	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.	5800 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	15	**Press. (mBars)**	800
Antenna	16.5 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			

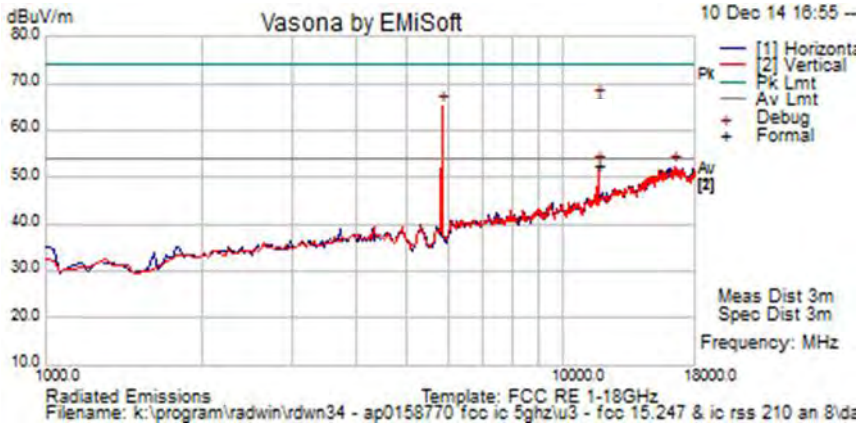


Formally measured emission peaks

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
5803.607	68.1	6.3	-10.4	64.0	Peak [Scan]							FUND
11600.489	51.3	9.4	-4.5	56.2	Peak Max	V	120	204	74.0	-17.8	Pass	RB
11600.489	37.7	9.4	-4.5	42.5	Average Max	V	120	204	54.0	-11.4	Pass	RB
16535.070	38.8	11.9	1.6	52.3	Peak [Scan]	V	200	0	54	-1.7	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.	5845 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17.5
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	15	**Press. (mBars)**	800
Antenna	16.5 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
5837.67535	69.2	6.3	-10.2	65.3	Peak [Scan]							FUND
11690.328	61.8	9.4	-4.4	66.8	Peak Max	V	121	180	74	-7.2	Pass	RB
11690.328	47.6	9.4	-4.4	52.5	Average Max	V	121	180	54	-1.5	Pass	RB
16398.798	38.9	12.0	1.6	52.4	Peak [Scan]	V	150	0	54	-1.6	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

Band-Edge – 16.5 dBi Antenna AM111760

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

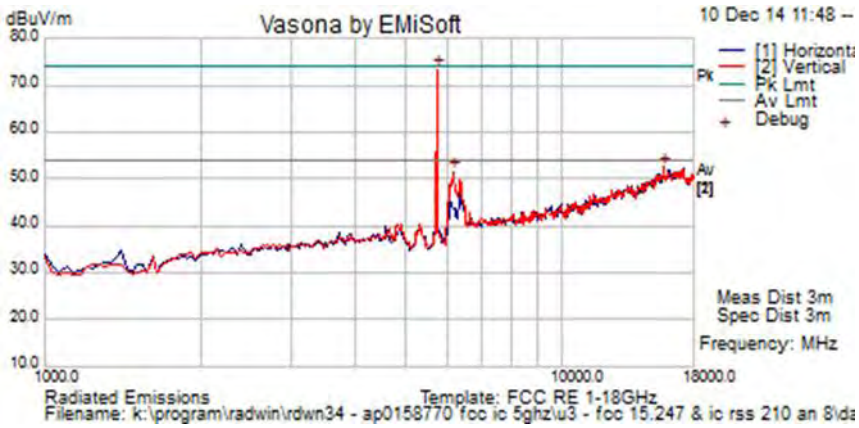
5.8 GHz Frequency Band

	Restricted Band 5460 MHz		
Operational Mode	**Peak**	**Average**	**Power Setting**
5 MHz	54.45	42.55	14
10 MHz	53.82	42.44	14
20 MHz	54.68	42.78	15
40 MHz	55.09	44.02	15
80 MHz	54.76	42.32	15

All band-edge plots are kept on file by the laboratory

6.1.2.6. 24 dBi Antenna MT0070760 – Spurious and Band-Edge Emissions

Test Freq.	5730 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	14	**Press. (mBars)**	800
Antenna	24 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			

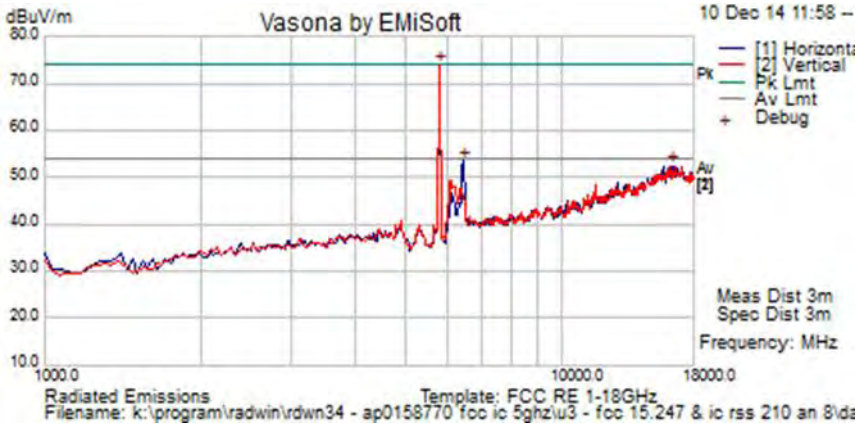


Formally measured emission peaks

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
5735.47094	77.9	6.2	-10.7	73.5	Peak [Scan]							FUND
15717.435	40.8	11.6	0.2	52.6	Peak [Scan]	V	200	0	54	-1.4	Pass	Noise
6178.357	54.0	6.5	-9.0	51.5	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

Test Freq.	5845 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	15	**Press. (mBars)**	800
Antenna	24 dBi		
Test Notes 1	EUT AP0158770, SN# No Serial number on unit		
Test Notes 2			

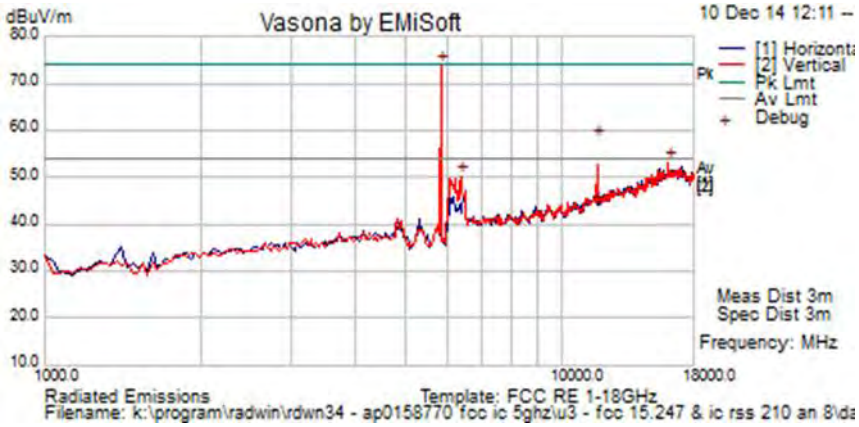


Formally measured emission peaks

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
5803.607	78.0	6.3	-10.4	73.9	Peak [Scan]							FUND
6450.9018	54.6	6.7	-8.0	53.4	Peak [Scan]	H						NRB
16296.593	39.3	11.9	1.2	52.5	Peak [Scan]	H	100	0	54	-1.6	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.	5845 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	17
Freq. Range	1-18 G	**Rel. Hum.(%)**	67
Power Setting	15	**Press. (mBars)**	800
Antenna	24 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
5837.67535	78.0	6.3	-10.2	74.1	Peak [Scan]							FUND
11690.306	53.1	9.4	-4.4	58.1	Peak Max	V	129	201	74	-15.9	Pass	RB
11690.306	38.9	9.4	-4.4	43.9	Average Max	V	129	201	54	-10.1	Pass	RB
16092.184	40.3	12.0	1.0	53.2	Peak [Scan]	V	100	0	54	-0.8	Pass	Noise
6382.766	51.8	6.7	-8.1	50.3	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

Band-Edge - 24 dBi Antenna MT0070760

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

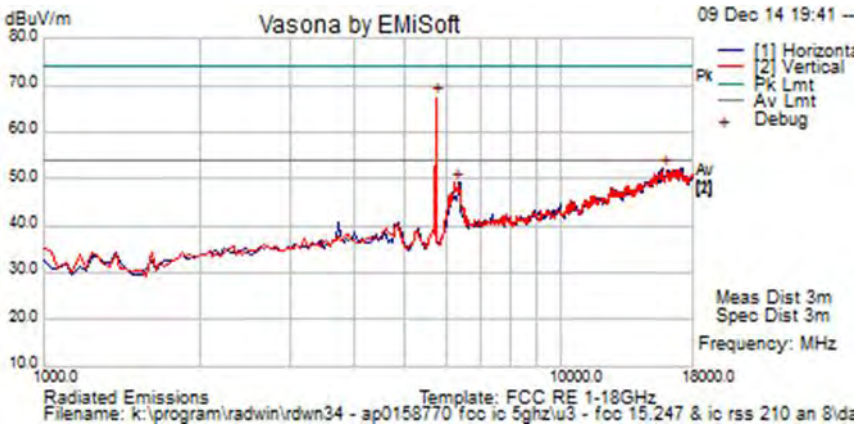
5.8 GHz Frequency Band

	Restricted Band 5460 MHz		
Operational Mode	**Peak**	**Average**	**Power Setting**
5 MHz	60.70	49.02	14
10 MHz	61.82	49.23	14
20 MHz	61.46	49.18	15
40 MHz	61.81	48.96	15
80 MHz	61.55	48.40	15

All band-edge plots are kept on file by the laboratory

6.1.2.7. 29 dBi Antenna RW-9622-5001 – Spurious and Band-Edge Emissions

Test Freq.	5730 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	59
Power Setting	14	**Press. (mBars)**	848
Antenna	29 dBi		
Test Notes 1	EUT AP0158770 SN# No Serial number on unit		
Test Notes 2			

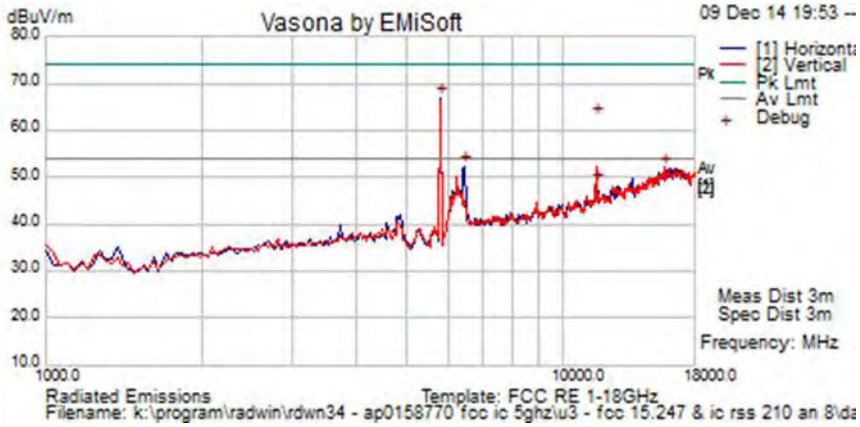


Formally measured emission peaks

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
5735.47094	71.8	6.2	-10.7	67.3	Peak [Scan]							FUND
15785.571	40.4	11.7	0.1	52.2	Peak [Scan]	H	200	0	54	-1.8	Pass	Noise
6246.493	51.2	6.6	-8.6	49.2	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.	5800 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	59
Power Setting	15	**Press. (mBars)**	848
Antenna	29 dBi		
Test Notes 1	EUT AP0158770 SN# No Serial number on unit		
Test Notes 2			

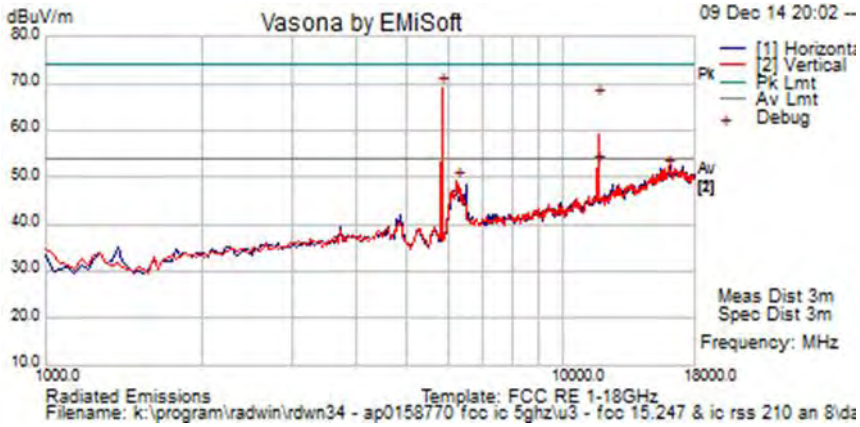


Formally measured emission peaks

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
5803.607	71.1	6.3	-10.4	67.1	Peak [Scan]							FUND
11600.435	57.9	9.4	-4.5	62.8	Peak Max	V	99	125	74.0	-11.2	Pass	RB
11600.435	43.8	9.4	-4.5	48.7	Average Max	V	99	125	54	-5.3	Pass	RB
6450.902	53.6	6.7	-8.0	52.4	Peak [Scan]	H						NRB
15717.435	40.4	11.6	0.2	52.2	Peak [Scan]	V	150	0	54	-1.8	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.	5845 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	59
Power Setting	15	**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
5837.67535	73.1	6.3	-10.2	69.2	Peak [Scan]							FUND
11690.654	47.6	9.4	-4.4	52.6	Average	V	105	126	54	-1.4	Pass	RB
11690.654	61.8	9.4	-4.4	66.8	Peak	V	105	126	74	-7.2	Pass	RB
6246.493	51.2	6.6	-8.6	49.2	Peak [Scan]	V						NRB
16040.249	39.0	11.9	0.8	51.7	Peak [Scan]	V	105	126	54	-2.3	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

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

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

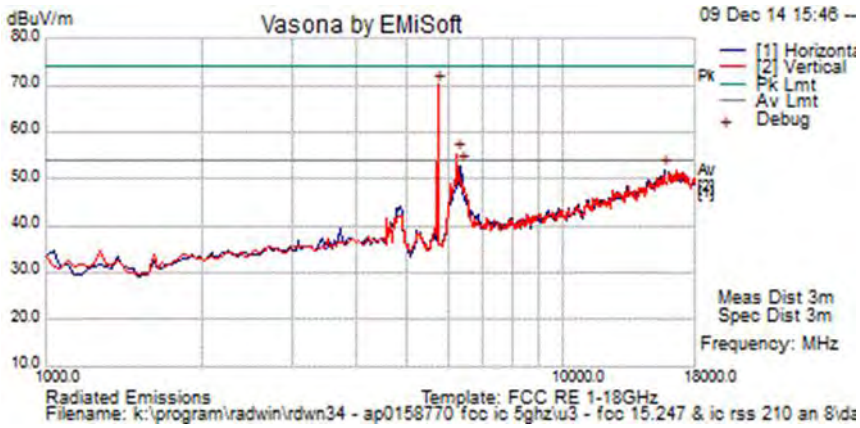
5.8 GHz Frequency Band

	Restricted Band 5460 MHz		
Operational Mode	**Peak**	**Average**	**Power Setting**
5 MHz	63.78	51.78	14
10 MHz	63.85	51.59	14
20 MHz	64.85	51.86	15
40 MHz	64.81	51.52	15
80 MHz	64.02	51.74	15

All band-edge plots are kept on file by the laboratory

6.1.2.8. 32 dBi Antenna RW-9732-4958 – Spurious and Band-Edge Emissions

Test Freq.	5730 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	59
Power Setting	14	**Press. (mBars)**	848
Antenna	32 dBi		
Test Notes 1	AP0158770 SN# No Serial number on unit		
Test Notes 2			

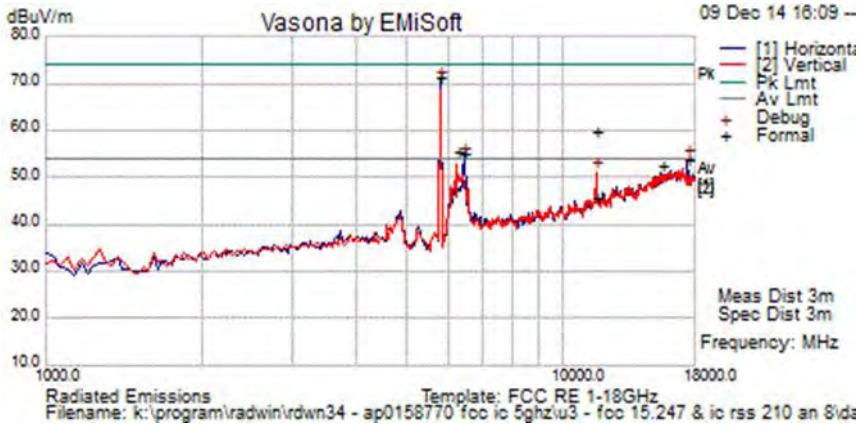


Formally measured emission peaks

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
5735.471	74.7	6.2	-10.7	70.3	Peak [Scan]							FUND
6246.493	57.5	6.6	-8.6	55.5	Peak [Scan]	V						NRB
6348.697	54.3	6.6	-8.2	52.8	Peak [Scan]	H						NRB
15683.367	40.2	11.6	0.2	52	Peak [Scan]	H	100	0	54	-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

Test Freq.	5800 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	59
Power Setting	15	**Press. (mBars)**	848
Antenna	32 dBi		
Test Notes 1	AP0158770 SN# No Serial number on unit		
Test Notes 2			

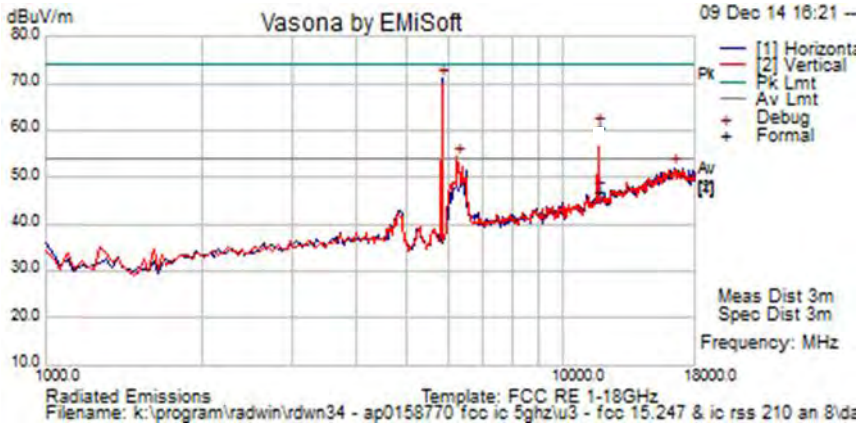


Formally measured emission peaks

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
5803.607	75.6	6.3	-10.4	71.5	Peak [Scan]							FUND
6246.49299	57.3	6.6	-8.6	55.3	Peak [Scan]	V						NRB
6450.902	56.4	6.7	-8.0	55.2	Peak [Scan]	H						NRB
11600.126	54.7	9.4	-4.5	59.6	Peak Max	V	124	171	74	-14.4	Pass	RB
11600.126	40.8	9.4	-4.5	45.7	Average Max	V	124	171	54	-8.3	Pass	RB
17420.842	41.9	12.4	-0.3	53.9	Peak [Scan]	H	100	0	54	-0.1	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.	5845 MHz	**Engineer**	JMH
Variant	802.11; 5 MHz	**Temp (ºC)**	18
Freq. Range	1-18 G	**Rel. Hum.(%)**	59
Power Setting	15	**Press. (mBars)**	848
Antenna	32 dBi		
Test Notes 1	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
5837.67535	74.9	6.3	-10.2	71.1	Peak [Scan]							FUND
11690.130	55.7	9.4	-4.4	60.7	Peak Max	V	126	229	74	-13.3	Pass	RB
11690.130	41.9	9.4	-4.4	46.9	Average Max	V	126	229	54	-7.1	Pass	RB
6246.493	56.2	6.6	-8.6	54.2	Peak [Scan]	V						NRB
16466.934	38.3	12.0	1.7	52.0	Peak [Scan]	H	100	0	54	-2.0	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

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

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

5.8 GHz Frequency Band

	Restricted Band 5460 MHz		
Operational Mode	**Peak**	**Average**	**Power Setting**
5 MHz	65.49	53.50	14
10 MHz	65.61	53.23	14
20 MHz	67.01	53.40	15
40 MHz	65.90	53.03	15
80 MHz	65.62	52.43	15

All band-edge plots are kept on file by the laboratory

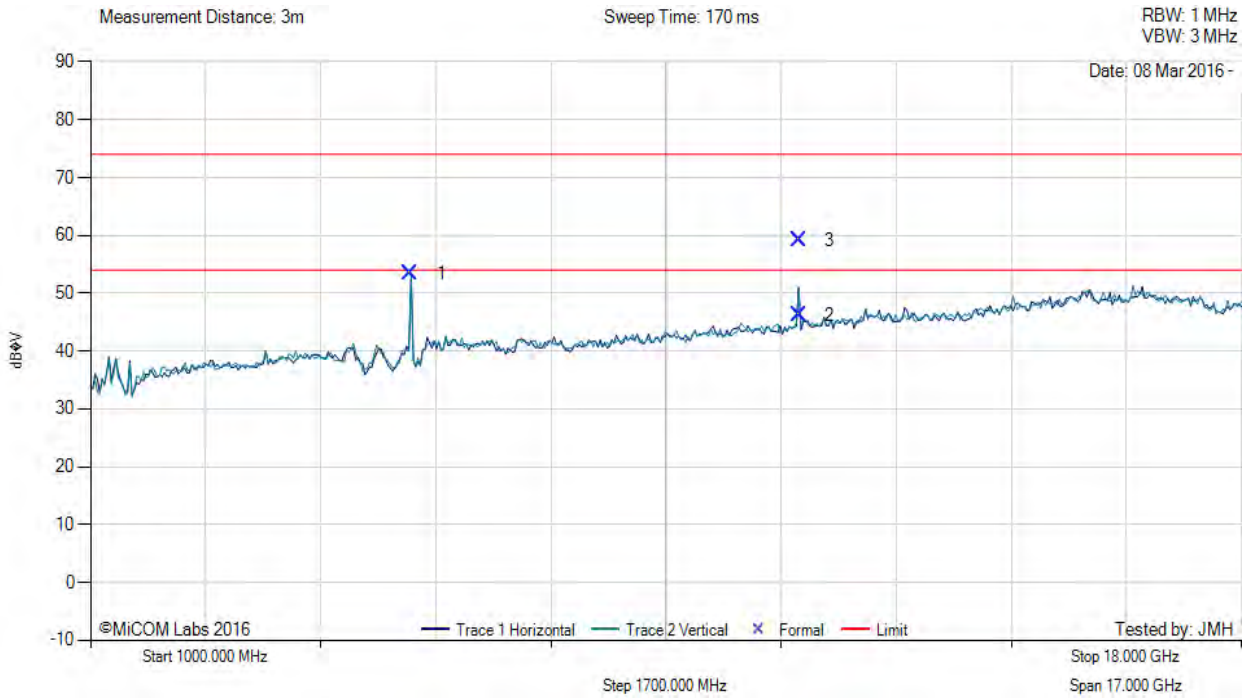
6.1.2.9. 20.5 dBi Antenna AM0156430 – Spurious and Band-Edge Emissions

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	AM0156430	**Variant:**	5 MHz
Antenna Gain (dBi):	20.5 dBi	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	100
Channel Frequency (MHz):	5730.00	**Data Rate:**	6.5 MBits/s
Power Setting:	12	**Tested By:**	JMH

Test Measurement Results

Variant: 5 MHz, Test Freq: 5730.00 MHz, Antenna: 20.5 dBi, Power Setting: 12, Duty Cycle (%): 100



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	5729.10	60.37	3.80	-10.71	53.46	Fundamental	Vertical	151	0	--	--	
2	11459.68	45.56	5.52	-4.90	46.18	Max Avg	Horizontal	171	24	54.0	-7.8	Pass
3	11459.68	58.50	5.52	-4.90	59.12	Max Peak	Horizontal	171	24	74.0	-14.9	Pass

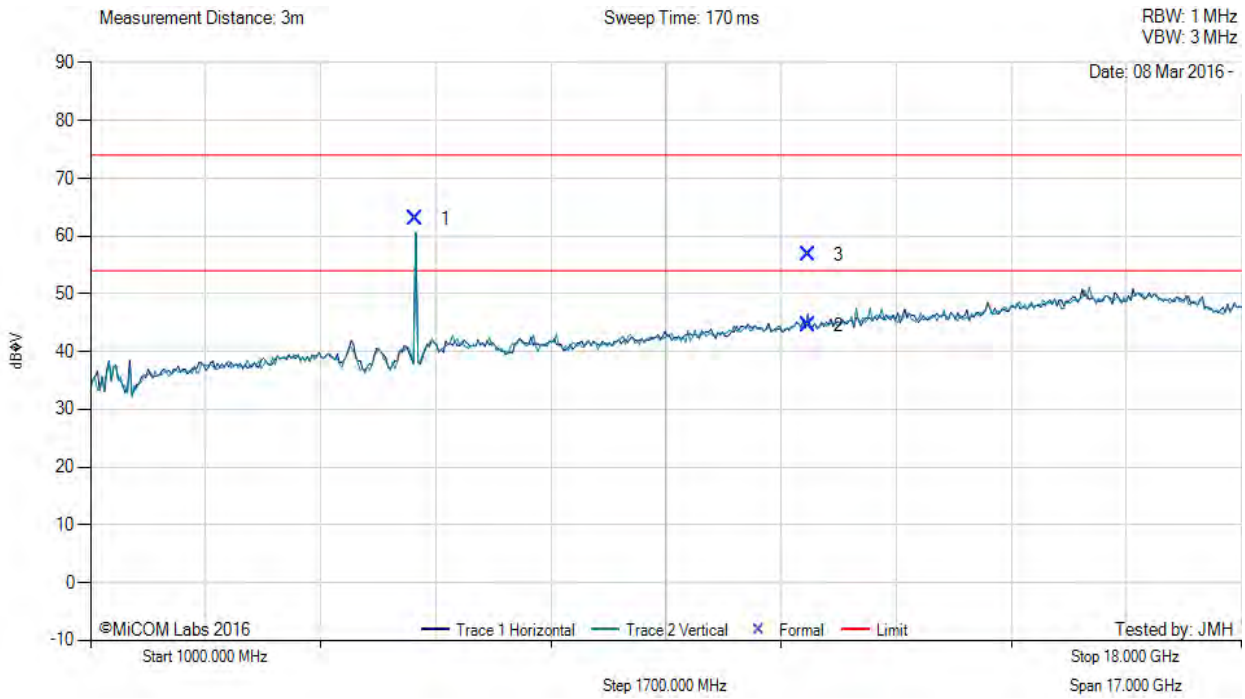
Test Notes: EUT on 150 cm table powered by POE. Connected to laptop outside chamber

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	AM0156430	**Variant:**	5 MHz
Antenna Gain (dBi):	20.5 dBi	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	100
Channel Frequency (MHz):	5800.00	**Data Rate:**	6.5 MBits/s
Power Setting:	14	**Tested By:**	JMH

Test Measurement Results

Variant: 5 MHz, Test Freq: 5800.00 MHz, Antenna: 20.5 dBi, Power Setting: 14, Duty Cycle (%): 100



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	5798.84	69.53	3.80	-10.37	62.96	Fundamental	Horizontal	151	1	--	--	
2	11600.94	43.58	5.47	-4.54	44.51	Max Avg	Horizontal	178	45	54.0	-9.5	Pass
3	11600.94	55.82	5.47	-4.54	56.75	Max Peak	Horizontal	178	45	74.0	-17.3	Pass

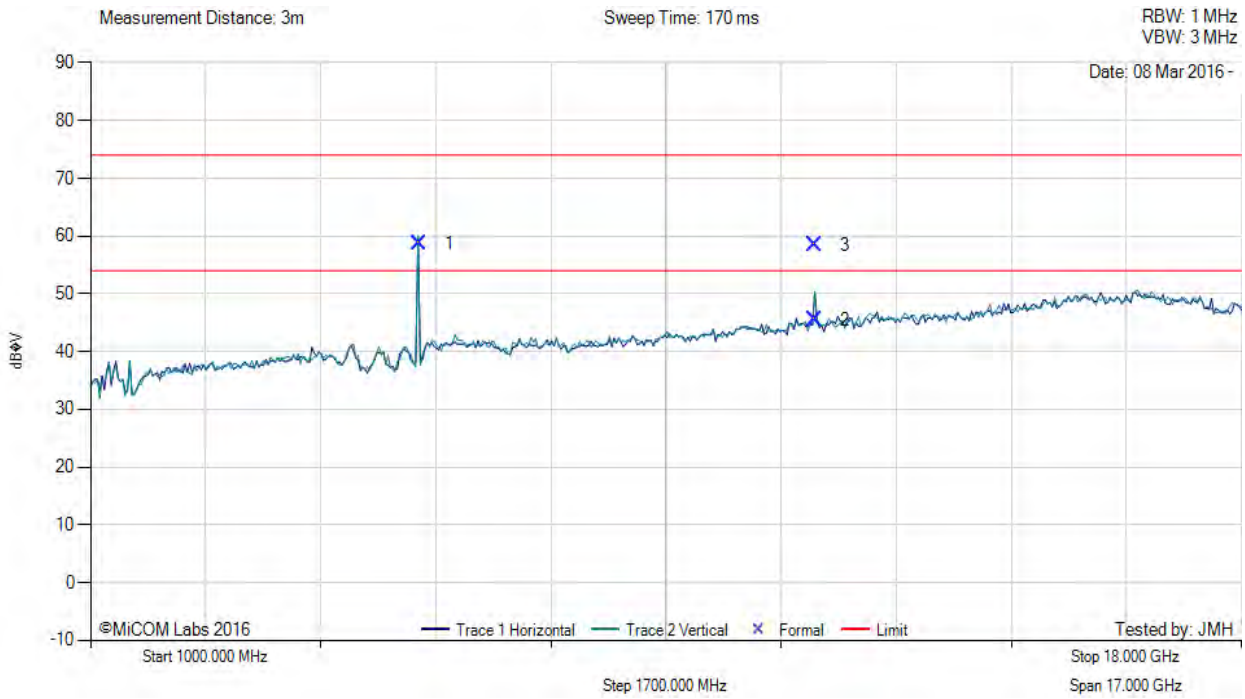
Test Notes: EUT on 150 cm table powered by POE. Connected to laptop outside chamber

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	AM0156430	**Variant:**	5 MHz
Antenna Gain (dBi):	20.5 dBi	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	100
Channel Frequency (MHz):	5845.00	**Data Rate:**	6.5 MBits/s
Power Setting:	14	**Tested By:**	JMH

Test Measurement Results

Variant: 5 MHz, Test Freq: 5845.00 MHz, Antenna: 20.5 dBi, Power Setting: 14, Duty Cycle (%): 100



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	5846.06	65.02	3.82	-10.16	58.68	Fundamental	Vertical	200	0	--	--	
2	11690.21	44.43	5.54	-4.44	45.53	Max Avg	Horizontal	187	50	54.0	-8.5	Pass
3	11690.21	57.33	5.54	-4.44	58.43	Max Peak	Horizontal	187	50	74.0	-15.6	Pass

Test Notes: EUT on 150 cm table powered by POE. Connected to laptop outside chamber

Band-Edge – 20.5 dBi Integral Antenna AM0156430

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

5.8 GHz Frequency Band

	Restricted Band 5460 MHz		
Operational Mode	**Peak**	**Average**	**Power Setting**
5 MHz	57.67	44.13	12
10 MHz	57.49	44.13	12
20 MHz	56.77	43.54	12
40 MHz	57.00	43.54	12
80 MHz	56.44	43.22	12

All band-edge plots are kept on file by the laboratory

Specification Limits

FCC §15.247(d) and RSS-210 §A8.5 In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

FCC §15.247(d)
If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section §15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(a)).

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

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

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

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

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

§15.209 (a) Limit Matrix

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

Laboratory Measurement Uncertainty for Radiated Emissions

Measurement uncertainty	+5.6/ -4.5 dB

Traceability

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

6.1.2.10.Digital Emissions (0.03-1 GHz)

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

Test Procedure

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

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

Field Strength Calculation

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

$$FS = R + AF + CORR$$

where:

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

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

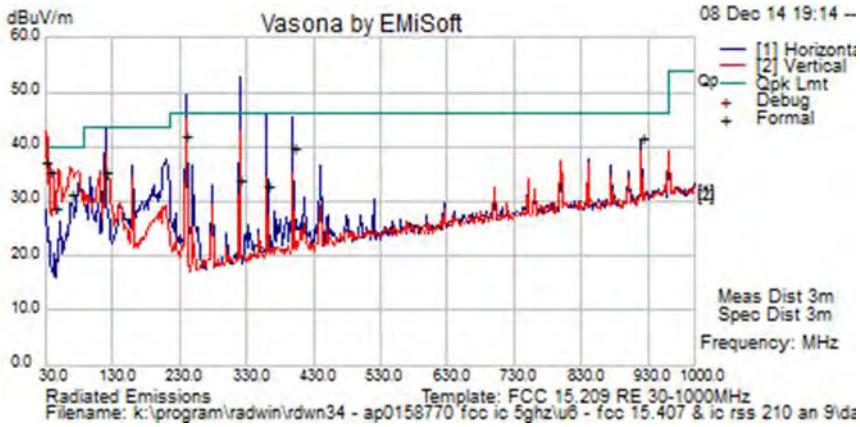
$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 dB\mu V/m$$

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

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

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

Test Freq.	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	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
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

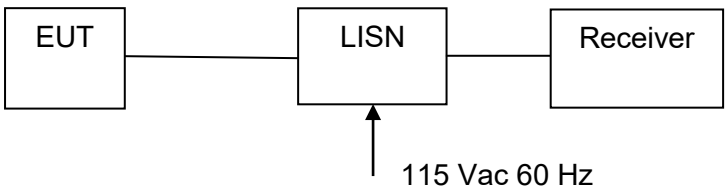
6.1.3. AC Wireline Conducted Emissions (150 kHz – 30 MHz)

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

Test Procedure

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

Test Measurement Set up



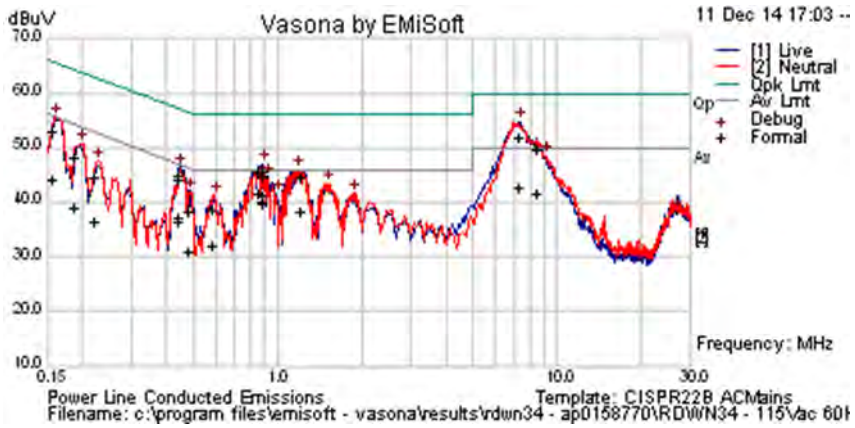
Measurement set up for AC Wireline Conducted Emissions Test

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

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

ac Wireline Emissions

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	
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

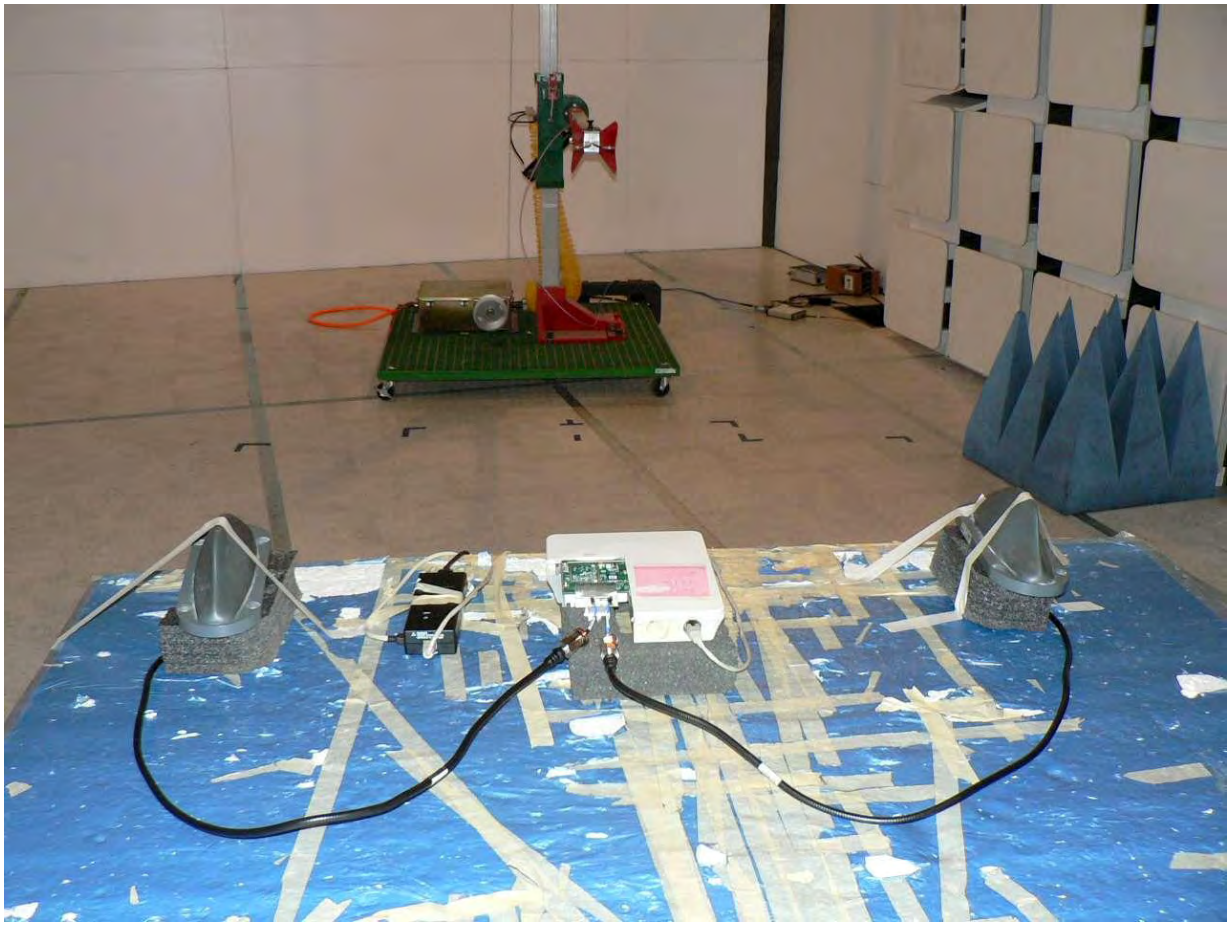
7. PHOTOGRAPHS

7.1. Conducted Test Setup

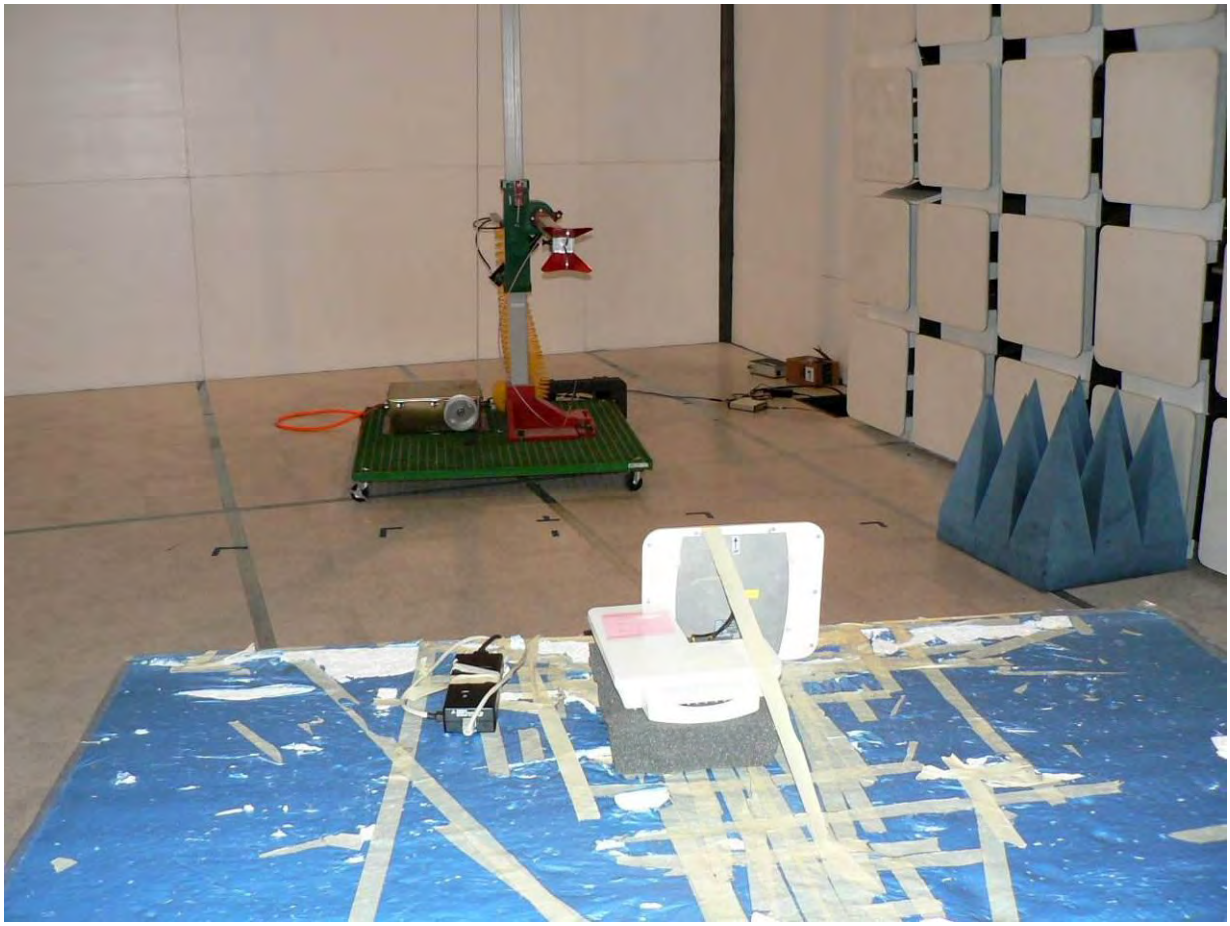
7.2. Test Setup - Digital Emissions > 1 GHz

11 dBi MT0128930

11.5 dBi RW-9401-5002 (Shark Fin)

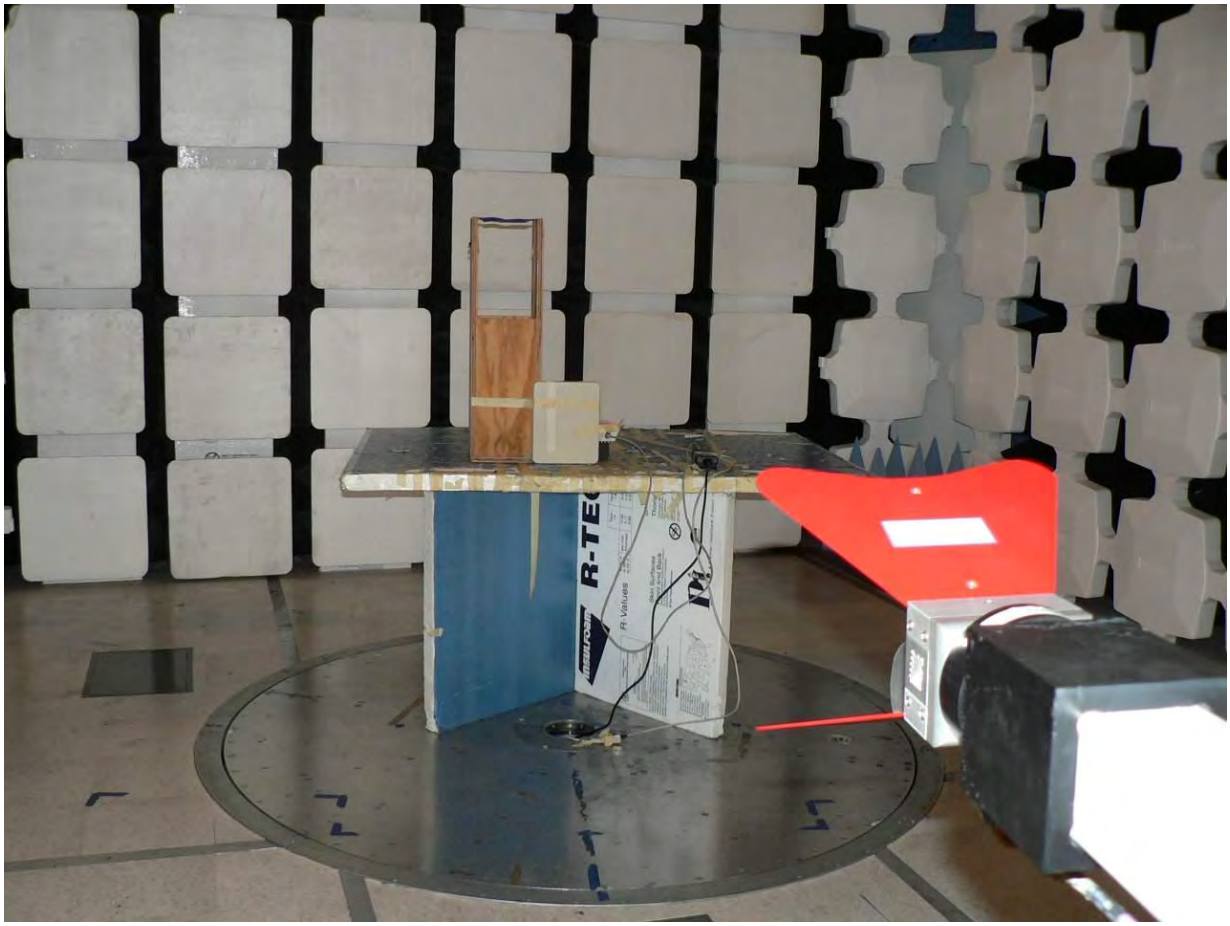


12 dBi AM0135060

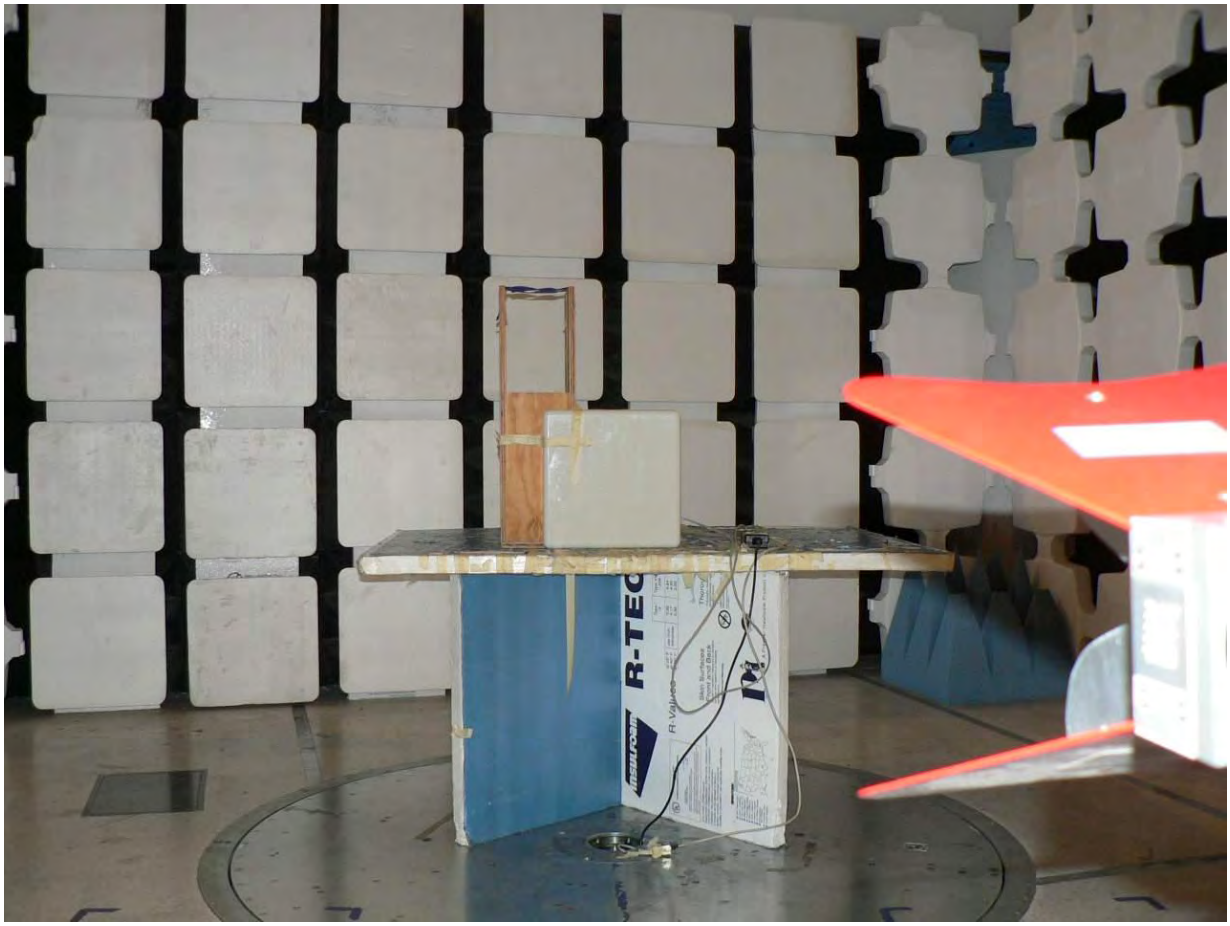


15.5 dBi Sector RW-9061-5002

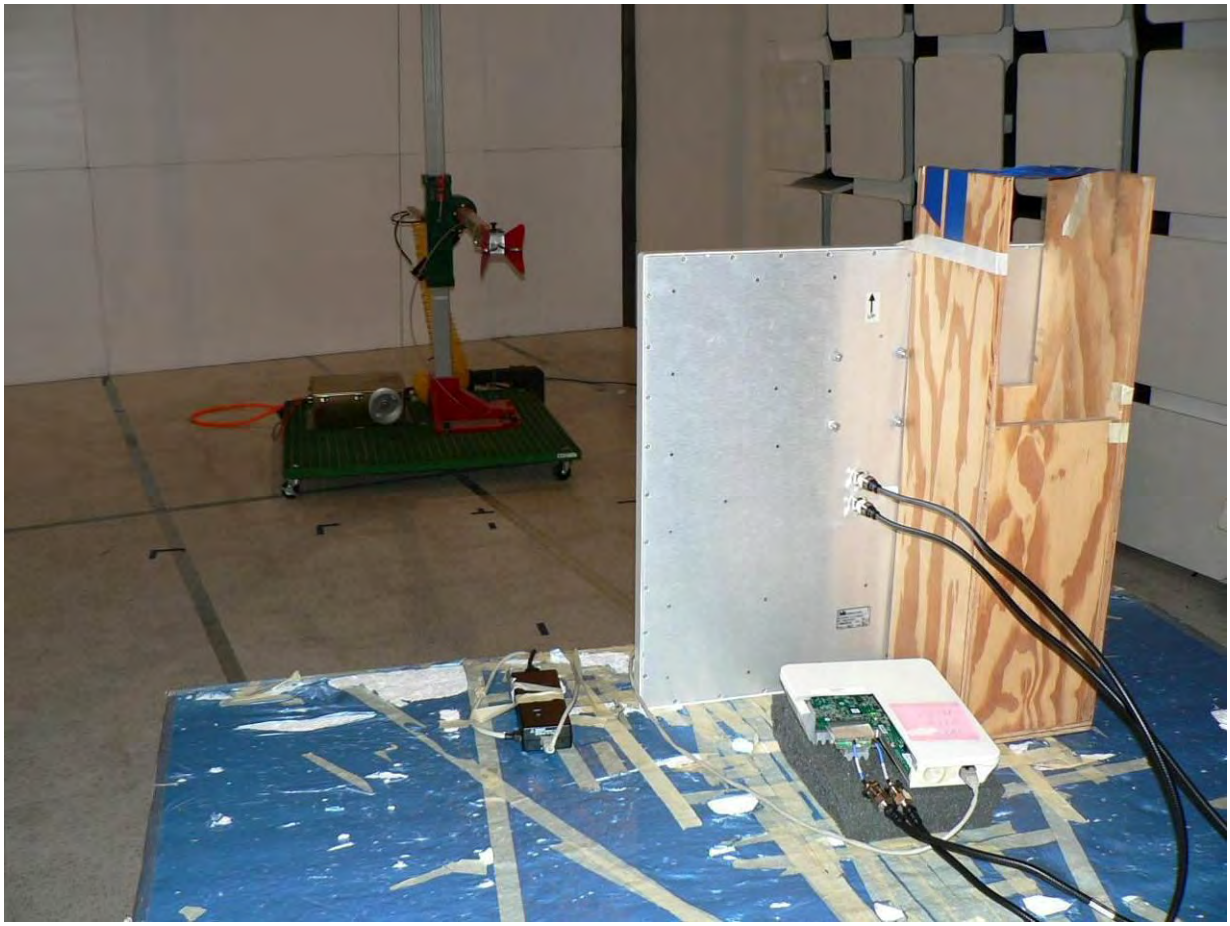
16 dBi AM0111760



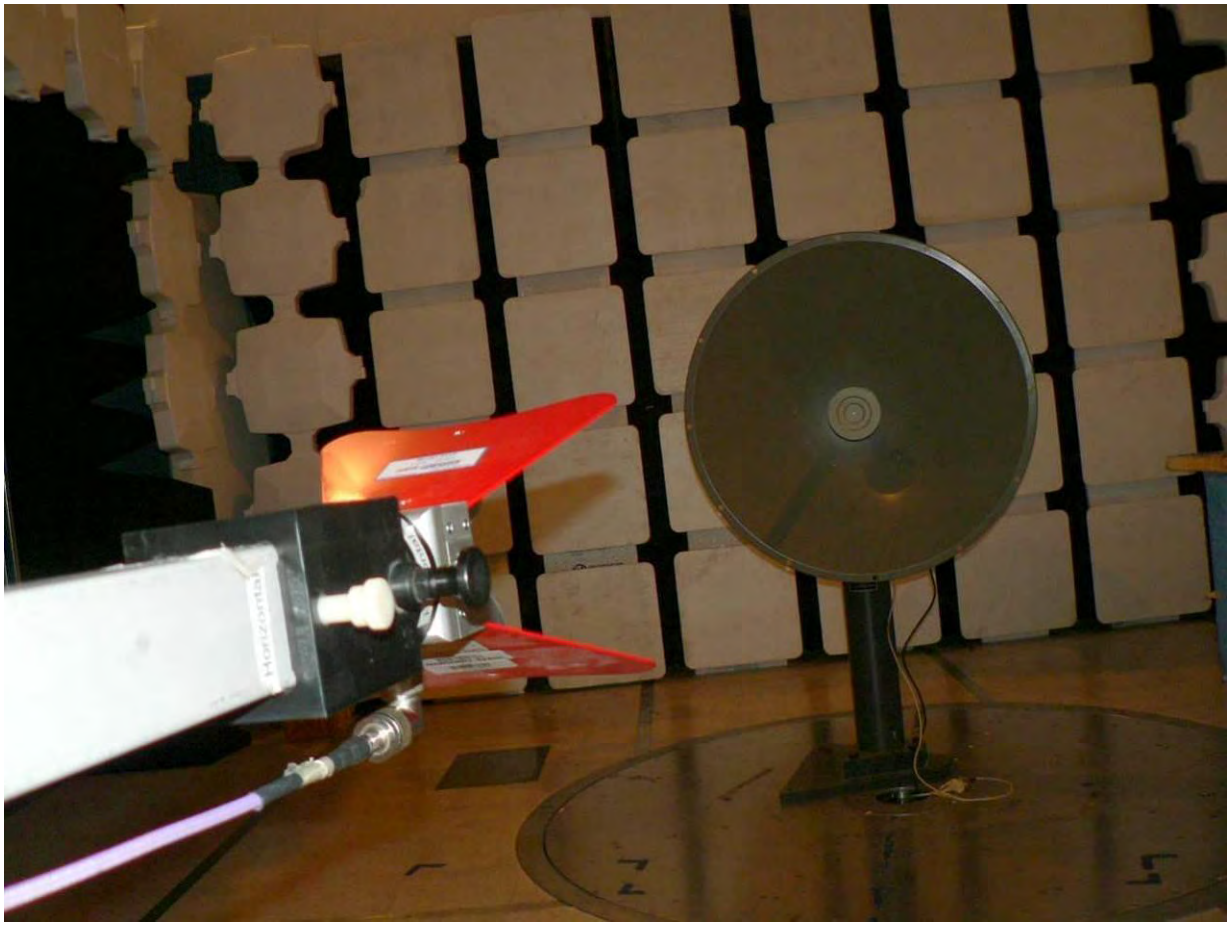
23 dBi ant MT0070760



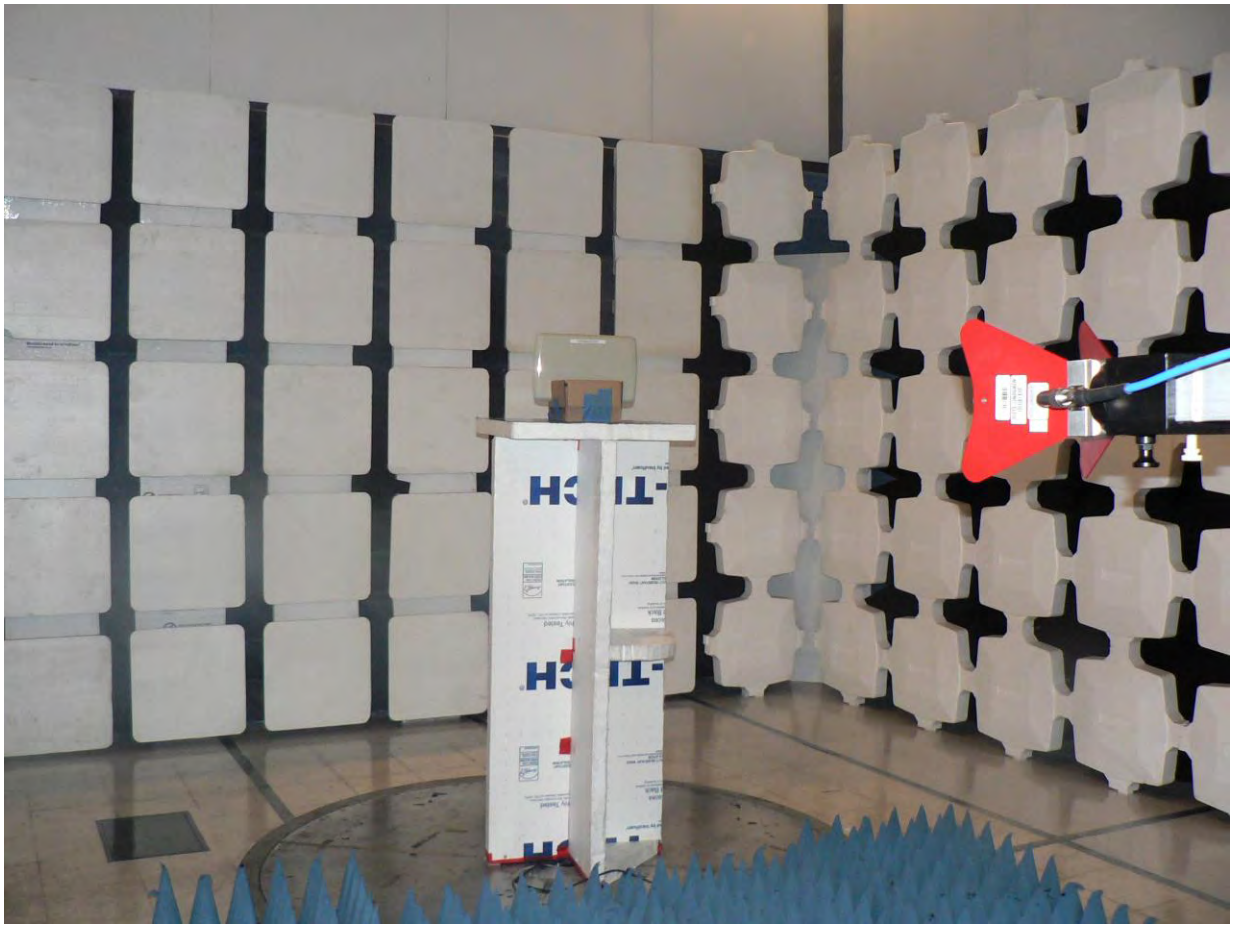
29 dBi Panel RW-9622-5001



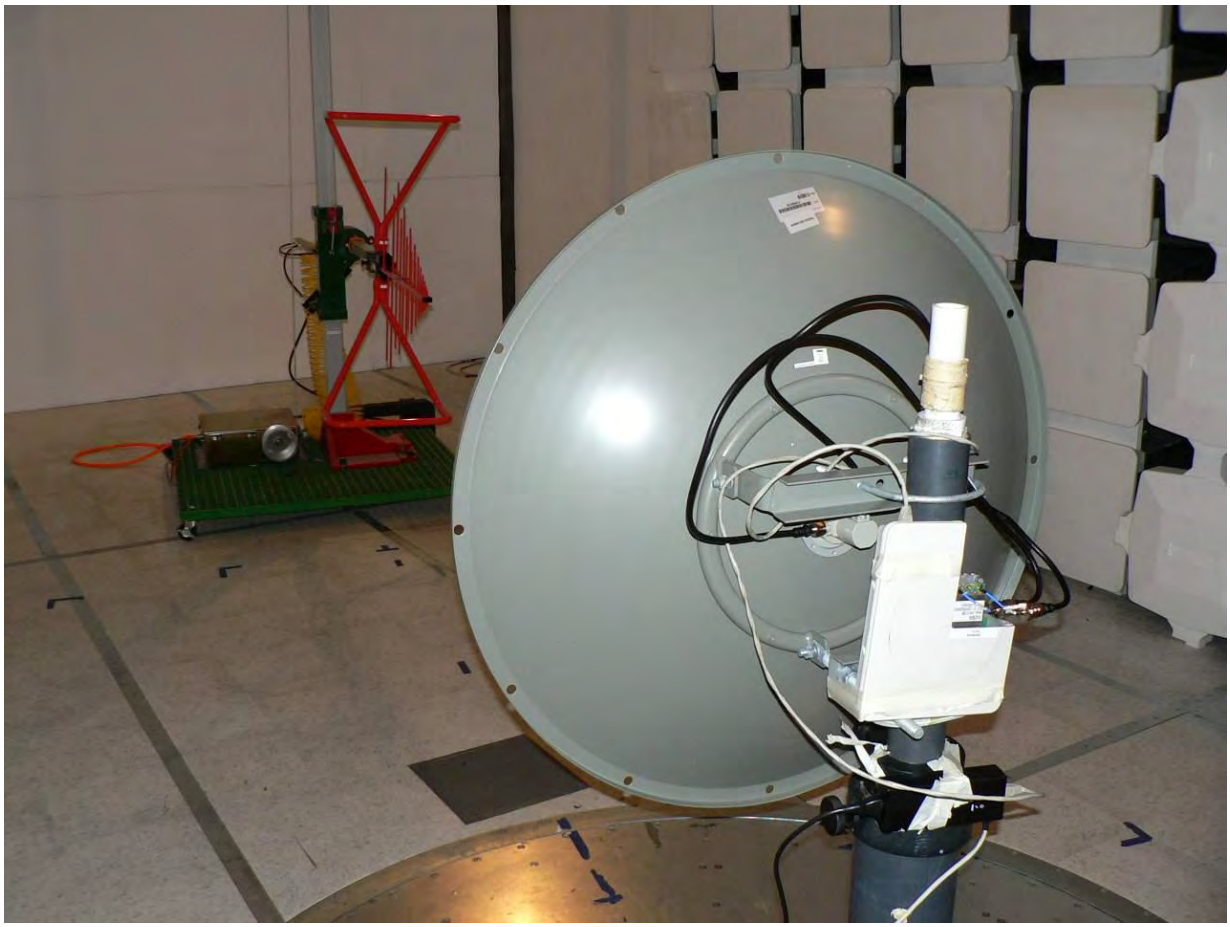
32 dBi Dish RW-9732-4958



20.5 dBi Integrated Smart Antenna AM0156430



7.3. Radiated Emissions Test Setup <1 GHz



7.4. ac Wireline Test Setup