

Test of: Rockwell Collins SSR-7610

To: FCC Part 15 Subpart B, ICES-003

Test Report Serial No.: ROCK25-U2 Rev A



Test Report

from



Test of: Rockwell Collins SSR-7610

To: FCC Part 15 Subpart B, ICES-003

Test Report Serial No.: ROCK25-U2 Rev A

This report supersedes: NONE

Manufacturer: Rockwell Collins
400 Collins Road NE
Cedar Rapids, IA 52498
USA

Product Function: Secure Server Router

Copy No: pdf **Issue Date:** 13th March, 2018

This Test Report is Issued Under the Authority of:

MiCOM Labs, Inc.

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



TESTING CERT #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory



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To: FCC Part 15 Subpart B, ICES-003
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ACCREDITATION, LISTINGS & RECOGNITION

Test Accreditation

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



Accredited Laboratory

A2LA has accredited

MICOM LABS

Pleasanton, CA

for technical competence in the field of

Electrical Testing

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



Presented this 4th day of February 2016.



President and CEO
For the Accreditation Council
Certificate Number 2381.01
Valid to March 31, 2018
Revised February 28, 2018

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



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Recognition

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

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

**APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement.

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

Phase I - recognition for product testing

Phase II – recognition for both product testing and certification

N/A – Not Applicable

**EU MRA – European Union Mutual Recognition Agreement.

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

**NB – Notified Body

Product Certification

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



Accredited Product Certification Body

A2LA has accredited

MICOM LABS

Pleasanton, CA

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC 17065:2012 Requirements for bodies certifying products, processes and services. This product certification body also meets the A2LA R322 – Specific Requirements – Notified Body Accreditation Requirements and A2LA R308 - Specific Requirements - ISO-IEC 17065 - Telecommunication Certification Body Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a management system.



Presented this 4th day of February 2016.



President and CEO
For the Accreditation Council
Certificate Number 2381.02
Valid to March 31, 2018
Revised February 28, 2018

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)

TCB Identifier – US0159

Industry Canada – Certification Body

CAB Identifier – US0159

Europe – Notified Body

Notified Body Identifier - 2280

Japan – Recognized Certification Body (RCB)

RCB Identifier – 210

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Document History

Document History		
Revision	Date	Comments
Draft	7th March 2018	Draft report for client review.
Rev A	13 th March 2018	Initial release.

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1. TEST RESULT CERTIFICATE

Applicant:	Rockwell Collins 400 Collins Road NE Cedar Rapids, IA 52498 USA	Tested By:	MiCOM Labs, Inc. 575 Boulder Court, Pleasanton California, 94566, USA
EUT	Secure Server Router	Tel:	+1 925 462 0304
Model:	SSR-7610	Fax:	+1 925 462 0306
S/N	4CY592		
Test Date(s):	13th-15th February, 2018	Website:	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC Part 15 Subpart B, ICES-003.	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.

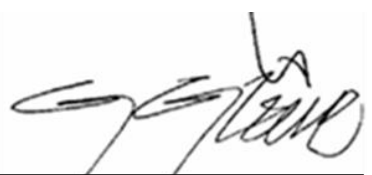
Notes:

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.

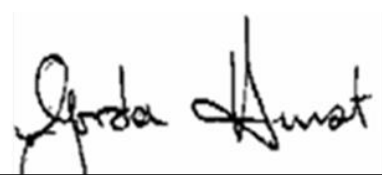
Approved & Released for MiCOM Labs, Inc. by:



TESTING CERT #2381.01



Graeme Grieve
Quality Manager MiCOM Labs, Inc.



Gordon Hurst
President & CEO MiCOM Labs, Inc.

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2. REFERENCES AND MEASUREMENT UNCERTAINTY

2.1. Normative References

Ref.	Publication	Year	Title
i.	FCC 47 CFR Part 15, Subpart B	2016	Title 47 CFR Part 15, Subpart B; Unintentional Radiators
ii.	ICES-003, Issue 6	2017	Information Technology Equipment (ITE) – Limits and methods of measurement.
iii.	ANSI C63.4	2014	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
iv.	M 3003	Edition 3 Nov Dec. 2012	Expression of Uncertainty and Confidence in Measurements
v.	LAB34	Edition 1 August 2002	The expression of uncertainty in EMC Testing
vi.	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
vii.	A2LA	August 2017	Reference to A2LA Accreditation Status – A2LA Advertising Policy

2.2. Test and Uncertainty Procedures

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

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

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



3. PRODUCT DETAILS AND TEST CONFIGURATIONS

3.1. Technical Details

Details	Description
Purpose:	Testing of the Rockwell Collins SSR-7610 to FCC CFR 47, Part 15, Subpart B and Industry Canada ICES-003 regulations.
Applicant:	Rockwell Collins 400 Collins Road NE Cedar Rapids, IA 52498, USA
Manufacturer:	Rockwell Collins 400 Collins Road NE Cedar Rapids, IA 52498, USA
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton, California 94566 USA
Test report reference number:	ROCK25-U2 Rev A
Date EUT received:	5 th February, 2018
Dates of test (from - to):	13th-15th February, 2018
Standard(s) applied:	FCC Part 15 Subpart B, ICES-003
No of Units Tested:	One
Type of Equipment:	Secure Server Router, Cellular and WiFi
Model:	SSR-7610
Serial Number	4CY592
Software Revision	072-2836-002B (Bootloader) 072-2838-001 (Factory ETS)
Hardware revision	822-3543-001/100
Internal Clocks:	Refer to Table in Section 3.5 of this report.
Installation type:	Fixed installation
Construction/Location for Use:	Aircraft EE bay
Operating Temperature Range °C:	Nominal: 20 °C Max: 70 °C Min: -40 °C
Rated Supply Voltage and Current	115V _{AC} , 400Hz
Equipment Dimensions:	Length 15.22 inch X Width 2.43 inch X Height 7.64 inch
Weight:	7.8 lbs
Primary Function:	Secure Server Router

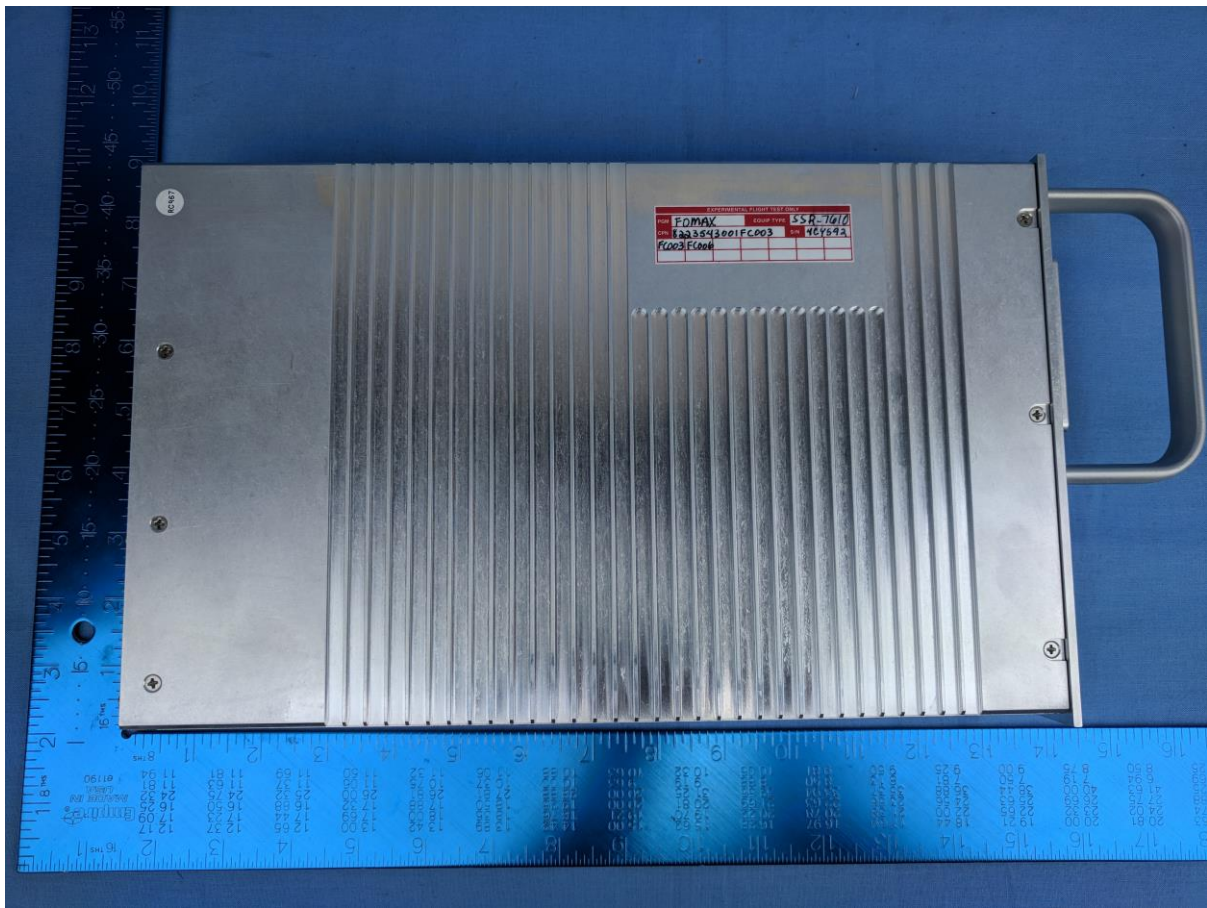
Note; The following description of the hardware revision and Rockwell Collins product release numbering system was supplied by the manufacturer.

The test article used during this testing was built under the developmental number 8223543001FC012 Revision - . The final production version of the SSR-7610 is built under RCPN: 822-3543-100. There are no design changes between these part numbers and the change is made to have configuration control over engineering units and production ready units. The 8223543-100 performs identically to the tested article in the environmental conditions of this report. The SSR-7610 RCPN 822-3543-100 can therefore be qualified by similarity for the standards presented in section 1 of this report.

3.2. Scope of Test Program

The scope of the test program was to test the Rockwell Collins SSR-7610 to verify compliance with the emissions requirements of FCC CFR 47 Part15B and Industry Canada ICES-003.

Rockwell Collins
SSR-7610, Secure Server Router Top



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Rockwell Collins
SSR-7610, Secure Server Router Bottom



Rockwell Collins
SSR-7610, Secure Server Router Front 1



Rockwell Collins
SSR-7610, Secure Server Router Front 2



Rockwell Collins
SSR-7610, Secure Server Router Rear





3.3. External AC/DC Power Adaptor

The SSR-7610 can only be powered by AC 115V 400 Hz, not the public mains network.

3.4. Cabling and I/O Ports

The following is a description of the cable and input, output ports available on the EUT;
Number and type of I/O ports;

Port Type	Port Description	Qty.	Screened (Yes/ No)	Length
Ethernet	Ethernet	9	Yes	> 3m
Gatelink Wi-Fi	RF	1	Yes	> 3m
Gatelink 1 Cellular	RF	1	Yes	> 3m
Gatelink 2 Cellular	RF	1	Yes	> 3m
Discrete I/O	I/O	19	Yes	> 3m
ARINC 717 Receivers	I/O	8	Yes	> 3m
ARINC 429 Receivers	I/O	16	Yes	> 3m
ARINC 429 Transmitters	I/O	1	Yes	> 3m
RS422	I/O	2	Yes	> 3m
SIM cards	SIM	8	Yes	N/A
RS232	RS232	2	No	N/A



3.5. Clock Frequencies

The EUT has the following clock frequencies;

SSR-7610 Fundamental Frequencies

Source	Frequency
SSR	
SSR I2C Buses	100 KHz
Ethernet Data (100Base-TX/1000 Case T)	31.25MHz
Ethernet Data (10BASE T)	10MHz
General Clock (for PCIe) & RGMII data	25MHz
PCIe & SGMII Data	1.25GHz
System & PCIe Clock	100MHz
DDR3 Bus	500MHz
Control Clock	32.768kHz
PMAT Microcontroller	16MHz
A429 Interface	48MHz
A429 Data	100kHz
RS422 Data	1MHz
A717 Data	8.196kbps
RS232	115kHz
Module POLARs	
SSR +1.35V & +1.8VDC	480kHz
SSR P3 3VDC_HK & P2 55VDC	600kHz
SSR +1VDC	400kHz
SSR +1.8VDC	400kHz



3.6. Equipment Details

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

Type (EUT/Support)	Equipment Description (Including Brand Name)	Manufacturer	Model Number
EUT	Secure Server Router	Rockwell Collins	SSR-7610
Support	Test PC	Various	Various
Support	Laptop Test PC	Various	Various
Support	USB to A717 Convertor	Ballard	UA1401
Support	Ethernet Qualification Test Load Card	Rockwell Collins	828-9890-001
Support	Aric 429/A717/RS422/ Discrete Qualification Test Card	Rockwell Collins	828-2248-003
Support	Valid 8 LTE4G Core Network Emulator plus eNodeB SISO M3 PKG 1.	Valid8	Core-network emulator-enodeb-siso-m3-1-pkg
Support	Ethernet Switch 8 port	PTP-Link	TL-SG1008D
Support	USB 3.0 to Gigabit Ethernet Adapter	Startech	USB2100S
Support	RF Splitter		PD2120
Support	Radio Communication Analyzer	Anritsu	Model MT8820C
Support	Cable Assembly, ENV	Rockwell Collins	983-9994-101
Support	Cable Assembly, SSR PMAT	Rockwell Collins	983-9994-103
Support	Cable Assembly, Ethernet Loopback 1	Rockwell Collins	983-8100-107
Support	Cable Assembly, Ethernet Loopback 2	Rockwell Collins	983-8100-108
Support	Cable Assembly, A717 429 Discrete Ext	Rockwell Collins	983-8100-109
Support	Cable Assembly, RF Coax	Rockwell Collins	983-8100-111
Support	Cable Assembly, RF Coax	Rockwell Collins	983-8100-112
Support	Cable Assembly, RF Coax	Rockwell Collins	983-8100-113
Support	Cable Assembly, RF Coax	Rockwell Collins	983-8100-114

3.7. Antenna Details

No antennas were included in this test program.



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3.8. Equipment Modifications

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

1. None.

3.9. 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 SUMMARY / SETUP

List of Measurements

The following table represent the list of measurements required under the FCC CFR 47 part 15 B and Industry Canada ICES-003 standards;

TABLE OF REQUIRED TESTS – Emissions

Test Standard	Description	Limits	Compliance
FCC Part 15B	Radiated Emissions	Class A	Complies
FCC Part 15B	Conducted Emissions - AC power	-	Not Required ⁽³⁾

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

Note 2: *Section 3.7 Equipment Modifications highlights the equipment modifications that were required to bring the product into compliance with the above test matrix.*

Note 3: EUT not connected to public utility (AC) power line.

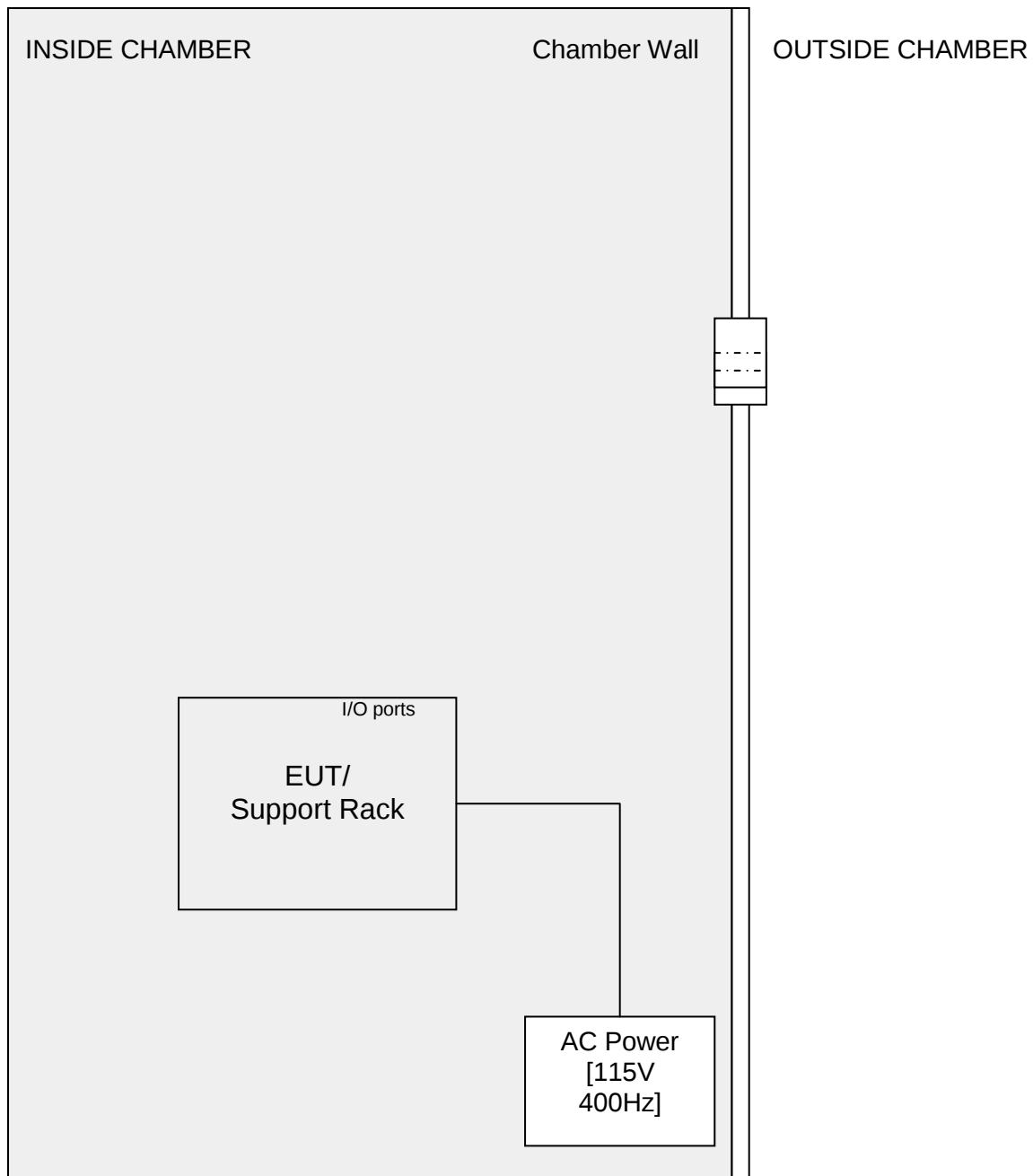
EUT Configurations

The EUT setup consist of 1 configuration: AC powered.

A Qualification Test Station (QTS) is used to stress test the EUT during testing and to verify correct operation of EUT. The QTS computer with the software GUI is set to a continuous data loopback communication between the WLAN and WLAN gatelink antenna. The GUI also sets all other subsystems including CPU, DDR memory, and I/O loopback to be stressed tested to simulate the worst case scenario. Cellular is exercised using a Anritsu radio communication analyser.

Ethernet and I/O cables were connected to the Ethernet port for Software Utility control and in the case of radiated emissions, routed under the ground plane into an attached shielded “control” room.

Diagram of EUT Configuration for Emissions Measurements



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5. TEST RESULTS

5.1. Radiated Spurious Emissions – Digital Apparatus

Standard Reference

FCC, Part 15 Subpart B §15.109
Industry Canada ICES-003 Section 6.2

Test Procedure

Testing 30 – 6,000 MHz was performed in an 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 nearest the limits were chosen for maximization and formal measurement using a CISPR Compliant receiver. Emissions from 30 MHz – 1000 MHz are measured utilizing a CISPR compliant quasi-peak detector with a tuned receiver, using a bandwidth of 120 kHz. Emissions above 1000 MHz are measured utilizing a CISPR compliant average detector with a tuned receiver, using a bandwidth of 1 MHz. Only the highest emissions relative to the limit are listed.



Field Strength Calculation

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

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

FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

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

CL = Cable Loss

AG = Amplifier Gain

FO = Distance Falloff Factor

NFL = Notch Filter Loss or Waveguide Loss

Field Strength Calculation Example:

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

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

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

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

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

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



FCC and IC Spurious Emissions Limits

FCC, Part 15 Subpart B §15.109 Spurious Emissions Limits

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

Limits below 1 GHz:

Class A limits

Frequency(MHz)	Quasi-peak Limit (dB μ V/m)	Measurement Distance (meters)	Quasi-peak Limit (dB μ V/m)	Measurement Distance (meters)
30 to 88	40	10	49.5	3
88-216	43.5	10	54	3
216-960	46.4	10	56.5	3
960-1000	49.5	10	60	3

Class B limits

Frequency(MHz)	Quasi-peak Limit (dB μ V/m)	Measurement Distance (meters)	Quasi-peak Limit (dB μ V/m)	Measurement Distance (meters)
30 to 88	29.5	10	40	3
88-216	33	10	43.5	3
216-960	35.6	10	46	3
960-1000	43.5	10	54	3

Limits above 1GHz:

Frequency(MHz)	Average Limit (dB μ V/m)	Peak Limit (dB μ V/m)	Measurement Distance (meters)	Class (A/B)
1 000 to 6000	54	74	3	Class B

Frequency(MHz)	Average Limit (dB μ V/m)	Peak Limit (dB μ V/m)	Measurement Distance (meters)	Class (A/B)
1 000 to 6000	60	80	3	Class A

Laboratory Measurement Uncertainty for Spectrum Measurement

Measurement Uncertainty	+5.6/ -4.5 dB
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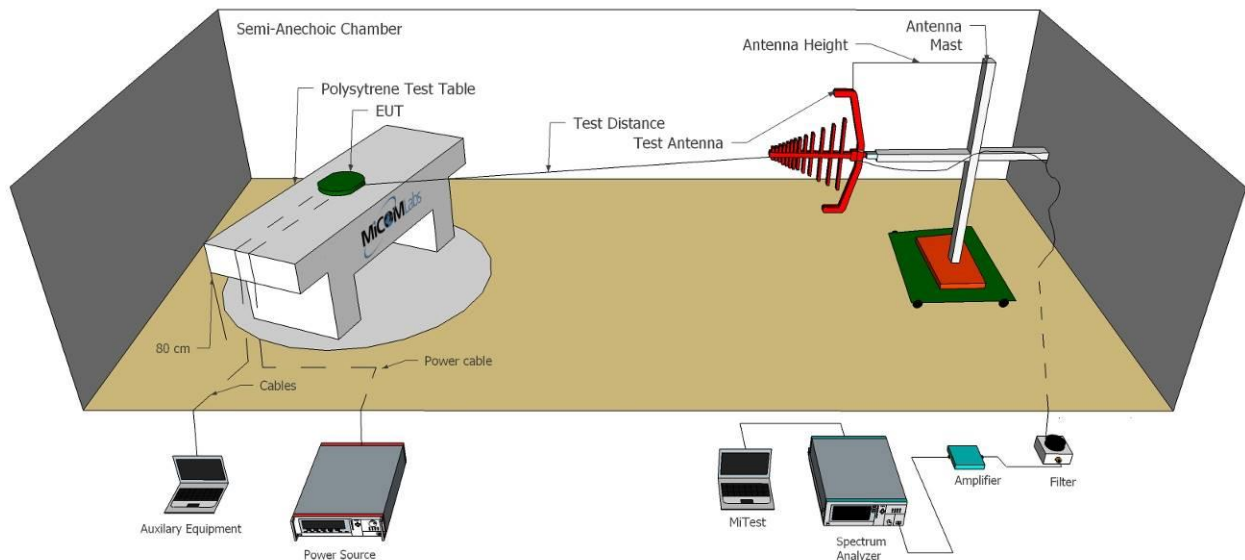
Traceability

Method
Work instruction WI-EMC-07: Radiated Emissions Test

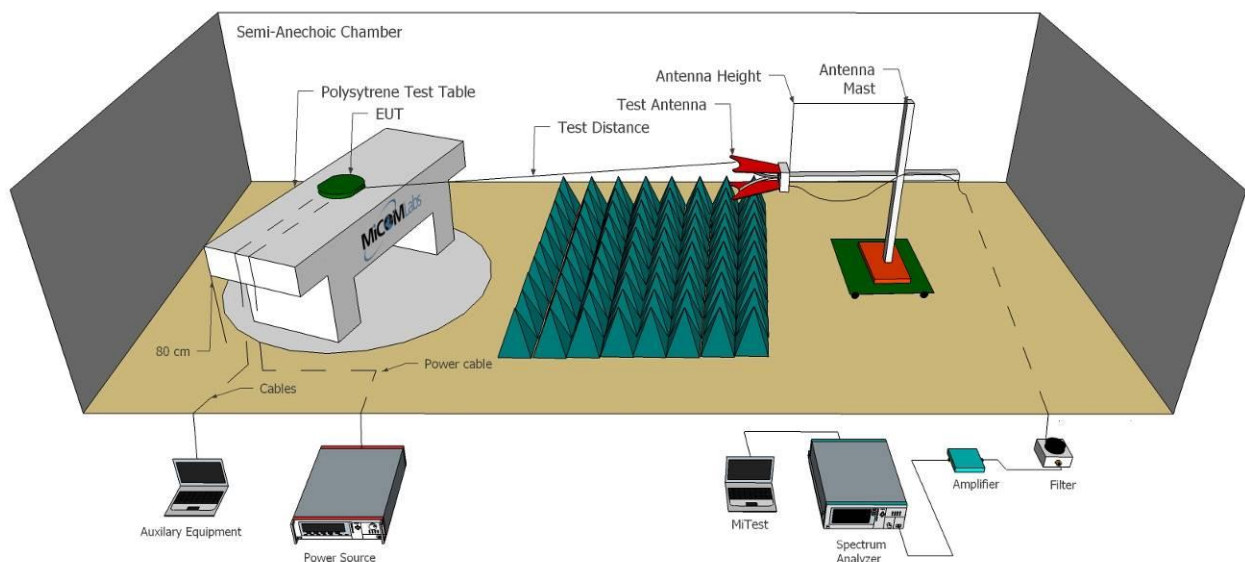
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Radiated Emission Measurement Setup

Radiated Emissions Below 1GHz Test Setup



Radiated Emissions Above 1GHz 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.

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Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
170	Video System Controller for Semi Anechoic Chamber	Panasonic	WV-CU101	04R08507	Not Required
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	2 May 2018
298	3M Radiated Emissions Chamber Maintenance Check	MiCOM	3M Chamber	298	28 Mar 2018
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	5 Oct 2018
342	2.4 GHz Notch Filter	EWT	EWT-14-0203	H1	6 Oct 2018
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	12 Oct 2018
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	12 Oct 2018
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	12 Oct 2018
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	MiTest Rad Emissions Test Software	MiCOM	Rad Emissions Test Software Version 1.0	447	Not Required
462	Schwarzbeck cable from Antenna to Amplifier.	Schwarzbeck	AK 9513	462	4 Oct 2018
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	4 Oct 2018
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	4 Oct 2018
465	Low Pass Filter DC-1000 MHz	Mini-Circuits	NLP-1200+	VUU01901402	6 Oct 2018
466	Low Pass Filter DC-1500 MHz	Mini-Circuits	NLP-1750+	VUU10401438	6 Oct 2018
480	Cable - Bulkhead to Amp	SRC Haverhill	157-3050360	480	6 Oct 2018
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-3050787	481	6 Oct 2018
482	Cable - Amp to Antenna	SRC Haverhill	157-3051574	482	6 Oct 2018
510	Barometer/Thermometer	Control Company	68000-49	170871375	11 Dec 2018
CC05	Confidence Check	MiCOM	CC05	None	19 Jul 2018
VLF-1700	Low pass filter DC-1700 MHz	Mini Circuits	VLF-1700	None	6 Oct 2018

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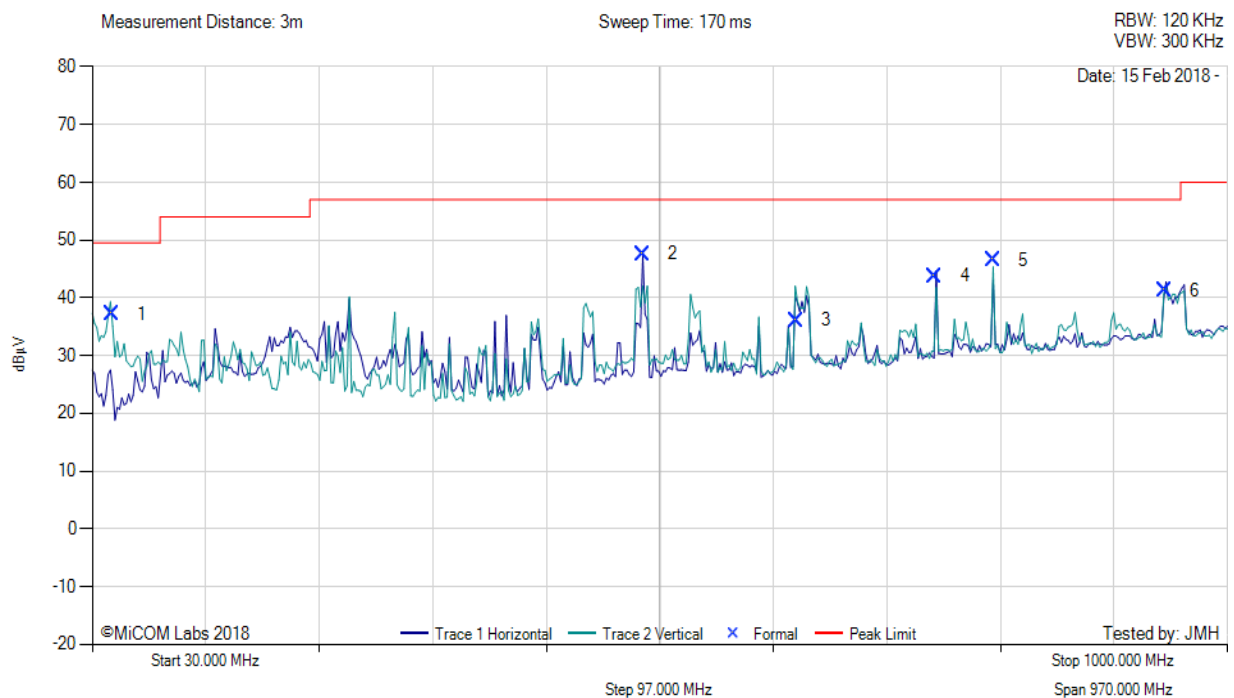


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Model Number	SSR-7610	Engineer	JMH
Variant	Digital Emissions 115VAC, 400Hz	Temp (°C)	10
Freq. Range	30 – 1000 MHz	Rel. Hum.(%)	48
Power Setting	Max	Press. (mBars)	1024
Antenna	N/A		
Test Notes 1	AC powered 115V 400 Hz		
Test Notes 2	Class A Limits		



Variant: , Test Freq: 0.00 MHz, Power Setting: MAX



30.00 - 1000.00 MHz												
Num	Frequency MHz	Raw dBμV	Cable Loss dB	AF dB	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
1	46.54	55.28	3.52	-21.61	37.19	MaxQP	Vertical	98	257	49.5	-11.3	Pass
2	500.02	55.67	5.18	-13.27	47.58	MaxQP	Horizontal	98	3	57.0	-10.4	Pass
3	631.12	41.83	5.55	-11.27	36.11	MaxQP	Horizontal	102	216	57.0	-20.9	Pass
4	750.04	47.70	5.85	-9.83	43.72	MaxQP	Horizontal	118	326	57.0	-13.3	Pass
5	799.80	49.48	5.98	-9.02	46.44	MaxQP	Vertical	98	191	57.0	-10.6	Pass
6	946.47	42.08	6.35	-7.18	41.25	MaxQP	Horizontal	101	221	57.0	-15.8	Pass

Test Notes: EUT powered by 115V 400 Hz. Cell active on LTE Band 7, WiFi 2.4GHz active.

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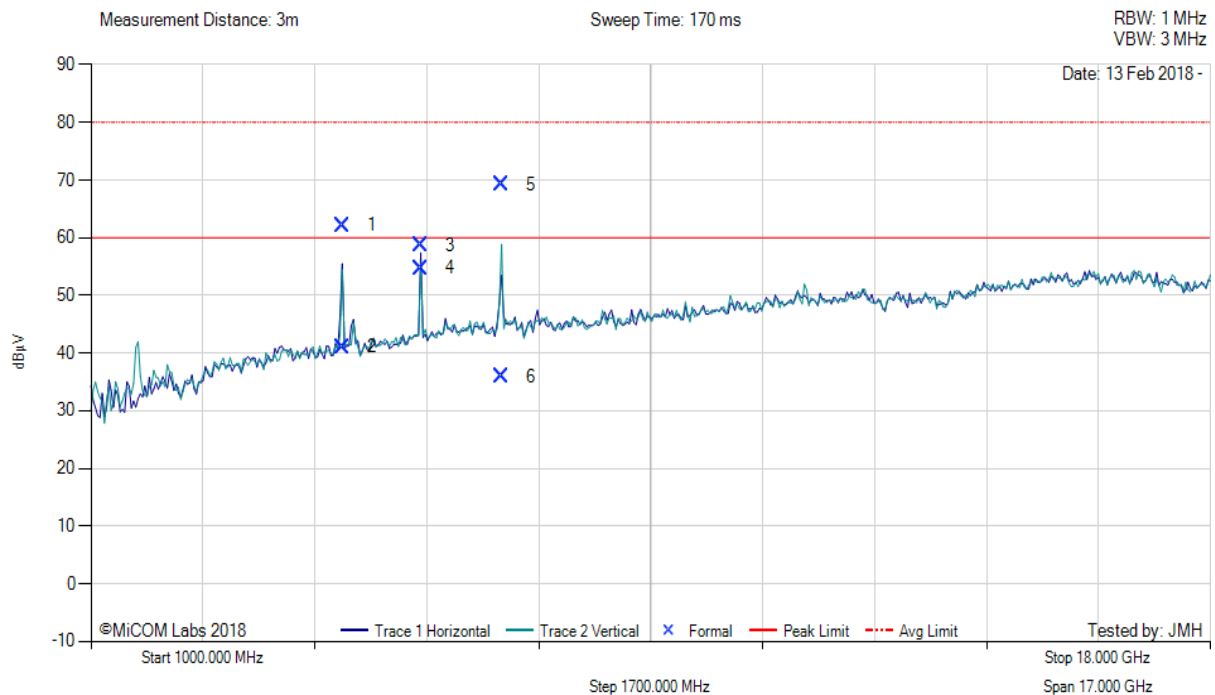
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Measurement Results: 1000-18000 MHz

Model Number	SSR-7610	Engineer	JMH
Variant	Digital Emissions 115VAC, 400Hz	Temp (°C)	10
Freq. Range	1000 – 18000 MHz	Rel. Hum.(%)	48
Power Setting	Max	Press. (mBars)	1024
Antenna	N/A		
Test Notes 1	AC powered 115V 400 Hz		
Test Notes 2	Class A Limits		



Variant: , Test Freq: 0.00 MHz, Power Setting: Max



1000.00 - 18000.00 MHz												
Num	Frequency MHz	Raw dBμV	Cable Loss dB	AF dB	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
1	4823.95	71.59	2.97	-12.43	62.13	Max Peak	Horizontal	110	356	80.0	-17.9	Pass
2	4823.95	50.55	2.97	-12.43	41.09	Max Avg	Horizontal	110	356	60.0	-18.9	Pass
3	5999.74	65.57	3.26	-10.12	58.71	Max Peak	Horizontal	105	56	80.0	-21.3	Pass
4	5999.74	61.55	3.26	-10.12	54.69	Max Avg	Horizontal	105	56	60.0	-5.3	Pass
5	7235.03	73.35	3.44	-7.60	69.19	Max Peak	Vertical	100	19	80.0	-10.8	Pass
6	7235.03	40.09	3.44	-7.60	35.93	Max Avg	Vertical	100	19	60.0	-24.1	Pass

Test Notes: EUT powered by 115V 400 Hz, Comm & Ethernet ports routed, Both cells tx tone, WiFi active. No 1.6 Filter

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5.2. AC Mains Conducted Emissions

Test not applicable, EUT not connected to the public utility (AC) power line.

Standard Reference

FCC, Part 15 Subpart C §15.107

Scope

This test assesses the ability of the EUT to limit its internal noise from being present on the AC mains power input/output ports.

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.

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Limits

The equipment shall meet the class A limits given in FCC Part 15: 107. Alternatively, for equipment intended to be used in non-residential environments, the class A limits given in FCC Part 15: 107 may be used.

Limits for conducted disturbance at the mains ports of class B ITE

Frequency of emission (MHz)	Quasi-peak dBuV	Average dBuV
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50
Note 1	* Decreases with the logarithm of the frequency	
Note 2	* The lower limit applies at the boundary between frequency ranges	

Limits for conducted disturbance at the mains ports of class A ITE

Frequency of emission (MHz)	Quasi-peak dBuV	Average dBuV
0.15–0.5	79	66
0.5–30	73	60
Note 1	* The lower limit shall apply at the transition frequency.	

Traceability

All conducted emission measurements are traceable to national standards. The uncertainty of measurement at a confidence level of not less than 95 %, with a coverage factor of k=2, in the range 9 kHz – 30 MHz (Average & Quasi-peak) is ± 2.64 dB.

Laboratory Measurement Uncertainty	
Measurement uncertainty	± 2.64 dB

Method
Measurements were made per work instruction WI-EMC-01 'Measurement of Conducted Emissions'

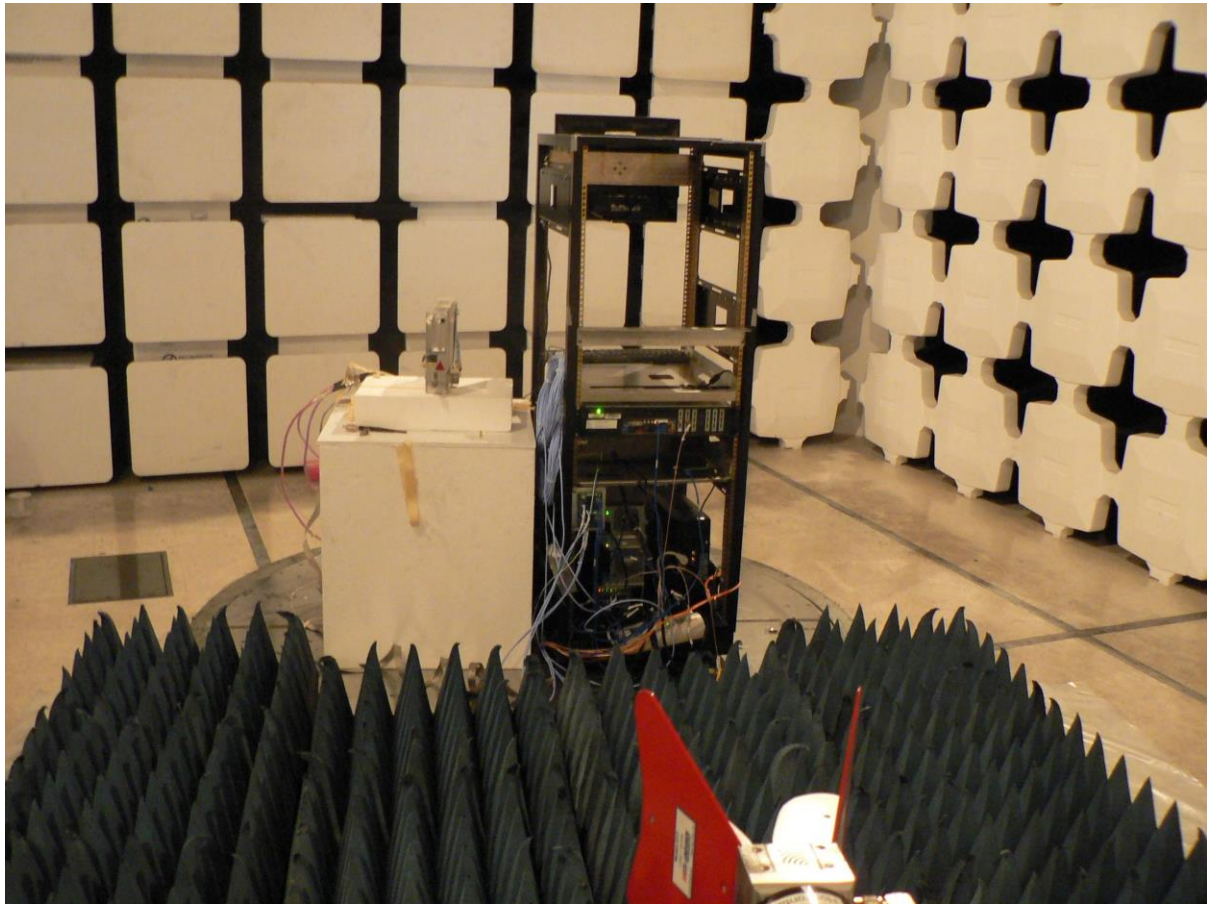
6. PHOTOGRAPHS

Radiated Emissions Setup – 30-1000 MHz Front



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Radiated Emissions Setup – 1-18 GHz Front





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