Test of: Kumu Networks KU5B01LTE02-US

To:
FCC CFR 47 Part 15B; ICES-003 Issue 6: 2016

Test Report Serial No.: KUMU03-U2 Rev A

TEST REPORT

FROM

Test of Kumu Networks KU5B01LTE02-US

To FCC CFR 47 Part 15B & IC ICES-003

Test Report Serial No.: KUMU03-U2 Rev A

This report supersedes NONE

Manufacturer:	Kumu Networks 960 Hamlin Ct Sunnyvale, CA 94089 USA
Product Function:	LTE Network Relay

Copy No: pdf Issue Date: 18th August 2017

This Test Report is Issued Under the Authority of;

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

ACCREDITED
TESTING CERT #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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1. ACCREDITATION, LISTINGS & RECOGNITION

1.1. Test Accreditation

MiCOM Labs, Inc. an accredited laboratory complies with 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

ilac-MRA A2LA

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.

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.

1.2. 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

1.3. 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 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)
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

2. DOCUMENT HISTORY

Document History		
Revision	**Date**	**Comments**
Draft	1st August 2017	Draft report for client review.
Rev A	18th August 2017	Initial release

3. TEST RESULT CERTIFICATE

Applicant:	Kumu Networks 960 Hamlin Ct Sunnyvale, CA 94089 USA	Tested By:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton, California 94566 USA
EUT	LTE Network Relay	Tel:	+1 925 462 0304
Model:	KU5B01LTE02-US	Fax:	+1 925 462 0306
S/N:	RG5-R009-D015-U013-B22B10		
Test Dates:	14th March 2017	Website:	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC CFR 47 Part 15B & IC 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:

- This document reports conditions under which testing was conducted and the results of testing performed.
- Details of the test methods used have been recorded and are kept on file by the laboratory.
- 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, Inc.

Gordon Hurst
President & CEO MiCOM Labs, Inc.

4. REFERENCES AND MEASUREMENT UNCERTAINTY

4.1. Normative References

Ref.	Publication	Year	Title
(i)	FCC CFR 47 Part 15, Subpart B	2016	Title 47 CFR Part 15, Sub Part B; Unintentional Radiators
(ii)	ICES-003	Issue 6 January 2016	Information Technology Equipment (Including Digital Apparatus) - 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 2 Dec. 2007	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	June 2015	R105 - Requirement's When Making Reference to A2LA Accreditation Status

4.2. 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.

5. TEST SUMMARY

List of Measurements

The following table represents the list of emission measurements required under the standards.

TABLE OF REQUIRED TESTS – Emissions

Test Standard	Description	Limits	Compliance
FCC Part 15B ICES-003	Radiated Emissions	Class A	Complies
FCC Part 15B ICES-003	Conducted Emissions - ac power I/O port	Class A	Complies

6. PRODUCT DETAILS AND TEST CONFIGURATIONS

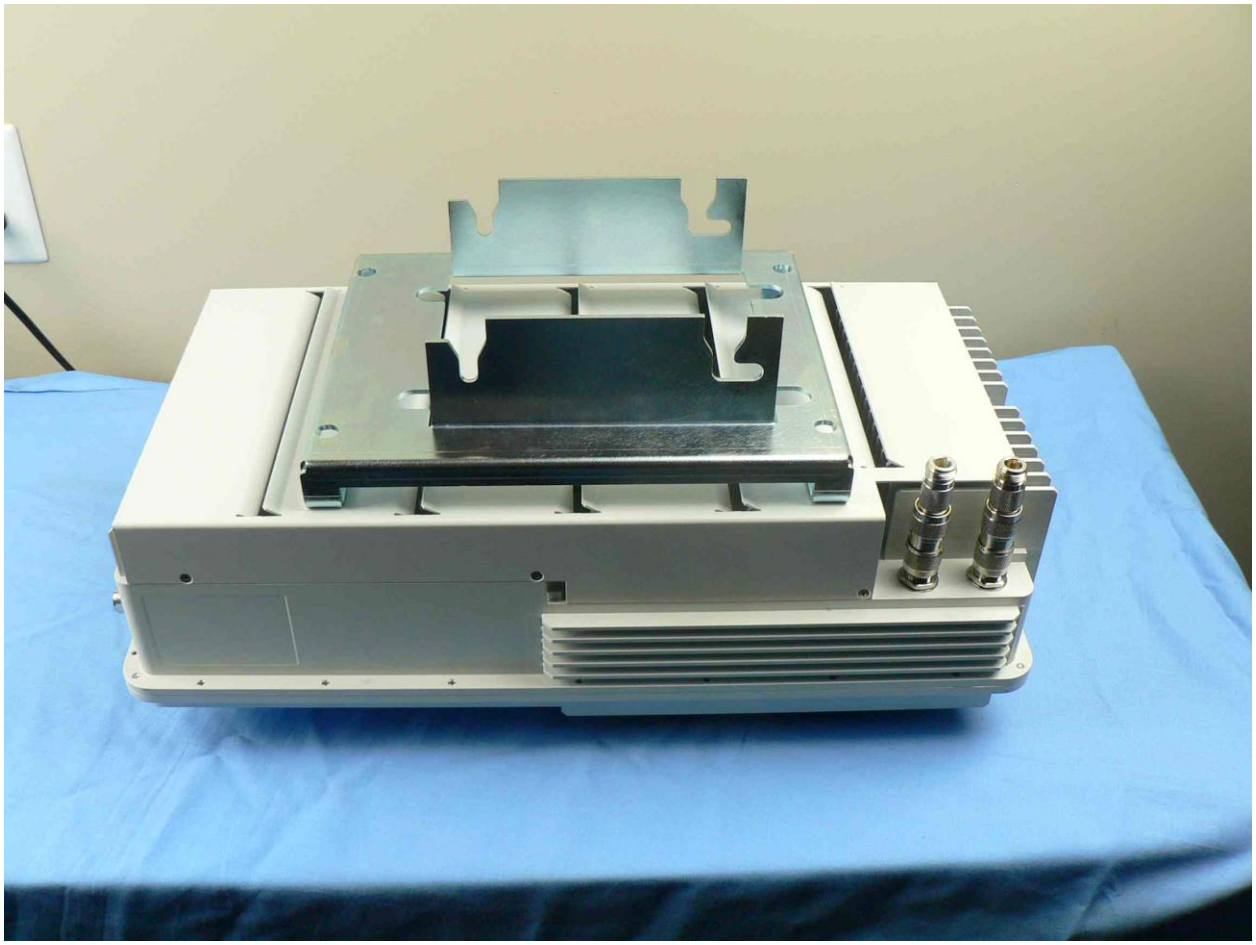
6.1. Test Program Scope

The scope of the test program was to test the Kumu Networks KU5B01LTE02-US for compliance against the appropriate emission standards listed within this report in order to satisfy the following standards.

- FCC CFR 47 Part 15, Subpart B - Title 47 CFR Part 15, SubPart B; Unintentional Radiators
- ICES-003 Issue 6 - Information Technology Equipment (Including Digital Apparatus) - Limits and methods of measurement

Kumu Networks KU5B01LTE02-US
Front

Kumu Networks KU5B01LTE02-US
Rear View



Kumu Networks KU5B01LTE02-US
Bottom View

6.2. EUT Details

Detail	Description
Purpose:	Test of the Kumu Networks KU5B01LTE02-US for compliance to; FCC specification FCC Part 15B; ICES-003 Issue 6.
Applicant:	Kumu Networks 960 Hamlin Ct, Sunnyvale, CA 94089 USA
Manufacturer:	Same as Applicant
Test Laboratory:	MiCOM Labs, Inc. 575 Boulder Court, Pleasanton, California 94566, USA
Test report reference number:	KUMU03-U2 Rev A
Date EUT received:	13th March 2017
Dates of test (from - to):	14th March 2017
No of Units Tested:	One
Type of Equipment:	LTE Transceiver
Product Name:	Kumu Networks KU5B01LTE02-US
Model No.:	KU5B01LTE02-US
Serial No.:	RG5-R009-D015-U013-B22B10
Equipment Secondary Function(s):	None
Type of Technology:	LTE Network Relay
Installation type:	Fixed
Construction/Location for Use:	Outdoor
Transmit/Receive Operation:	Transceiver - Full Duplex
Rated Input Voltage and Current:	AC Nominal 230Vac, 1.25 A Maximum: 264 Vac Minimum: 90 Vac
Operating Frequency:	Rated: 50-60 Hz
Operating Temperature Range ºC:	Nominal: 20 ºC Max: 40 ºC Min: 0 ºC
Equipment Dimensions:	(HxWxD) 10 in x 20 in x 3 in
Weight:	30 lbs
Hardware PN/Rev:	810-000005-1
Software Version:	Release 5
Firmware Version:	Release 6
Primary Function:	LTE Network Relay

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

None, the KU5B01LTE02-US is AC powered only.

6.4. Antenna Details

No antennas were tested as part of this test program.

Type	Manufacturer	Gain (dBi)	Dir Beamwidth	Cross-Polarized
Integral Panel	Kumu Networks	0	Not Provided	Not Provided

6.5. 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
ENET	Data Port	2	No	> 3m
Antenna Port N	N	5	Yes	< 3m

6.6. Equipment Details

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

Type (EUT/ Support)	Equipment Description (Including Brand Name)	Mfr.	Model No.	Serial No.
EUT	LTE Network Relay	Kumu Networks	KU5B01LTE02-US	RG5-R009-D015-U013-B22B10
Support	Radio Communications Analyzer	Anritsu	MT8820C	6201465533
Support	Laptop PC	Lenovo	ThinkPad W520	--

6.7. Equipment Modifications

No modifications were required to bring the equipment into compliance:

6.8. Deviations from the Test Standard

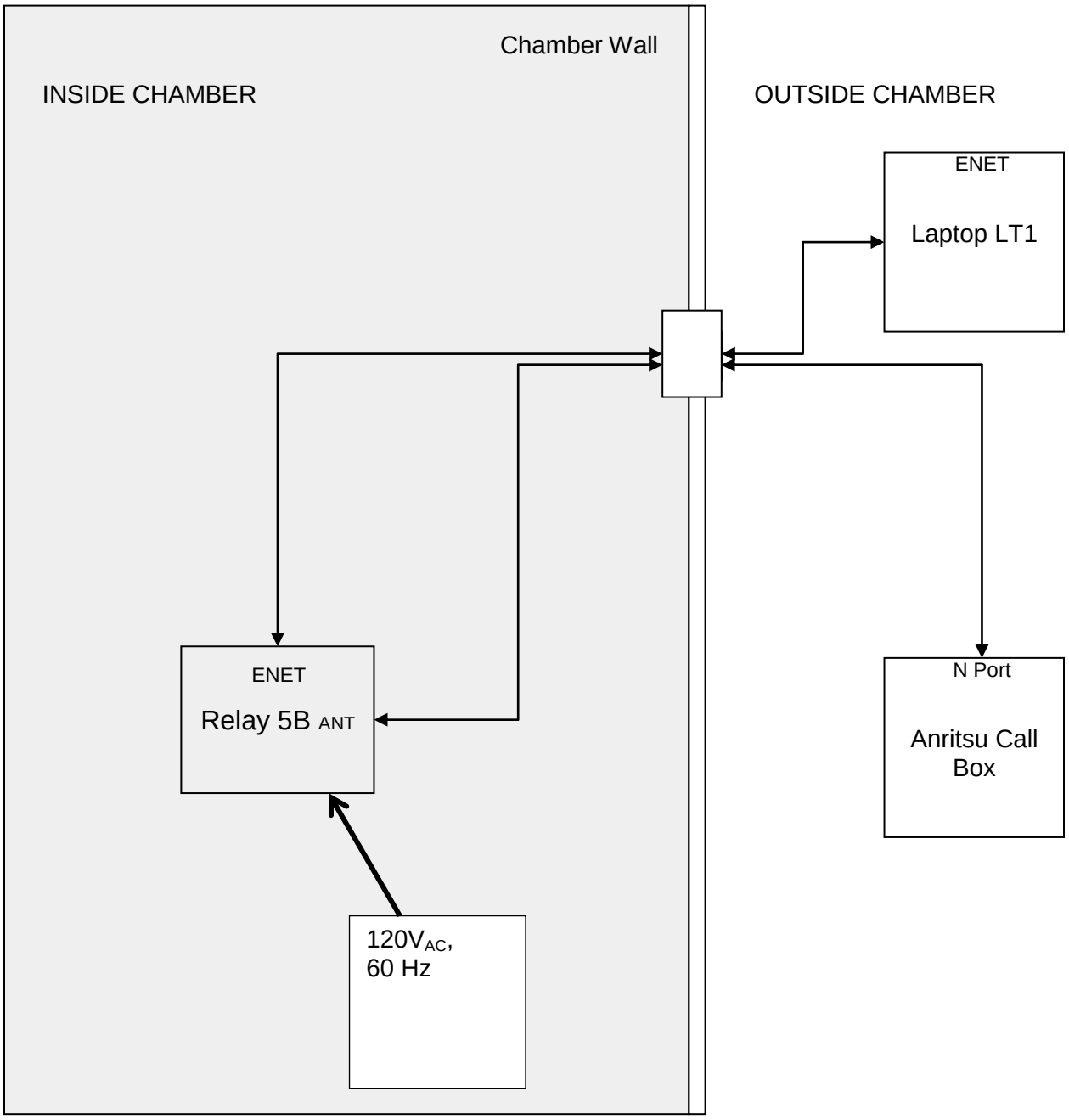
No deviations from the test standard were required in order to complete the test program:

6.9. EUT Configurations

6.9.1. EUT Configuration - Radiated Emissions:

One (1) laptop computer [LT1] was connected to the ENET data port to exercise the EUT and monitor status within the product maintenance webpage, a LTE call box was used to process calls while connected to one of the antenna ports.

Diagram of EUT Configuration for Emissions Measurements



7. TEST RESULTS

7.1. EMC EMISSIONS TEST RESULTS

7.1.1. Radiated Emissions

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

Test Procedure
Testing 30 – 6,000 MHz was performed in a 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
FO = Distance Falloff Factor

CORR = Correction Factor = CL – AG + NFL

CL = Cable Loss
AG = Amplifier Gain
NFL = Notch Filter Loss or Waveguide Loss

Field Strength Calculation Example:

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

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

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

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

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

Radiated Spurious Emissions Limits

Limits below 1 GHz:

Class A limits

Frequency(MHz)	Quasi-peak Limit (dBµV/m)	Measurement Distance (meters)	Quasi-peak Limit (dBµV/m)	Measurement Distance (meters)
30 to 88	39.0	10	49.5	3
88-216	43.5	10	54	3
216-960	46.4	10	56.9	3
960-1000	49.5	10	60	3

Class B limits

Frequency(MHz)	Quasi-peak Limit (dBµV/m)	Measurement Distance (meters)	Quasi-peak Limit (dBµV/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 (dBµV/m)	Peak Limit (dBµV/m)	Measurement Distance (meters)	Class (A/B)
1 000 to 6000	54	74	3	Class B

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

Traceability

Laboratory Measurement Uncertainty	
Measurement uncertainty	+5.6/ -4.5 dB

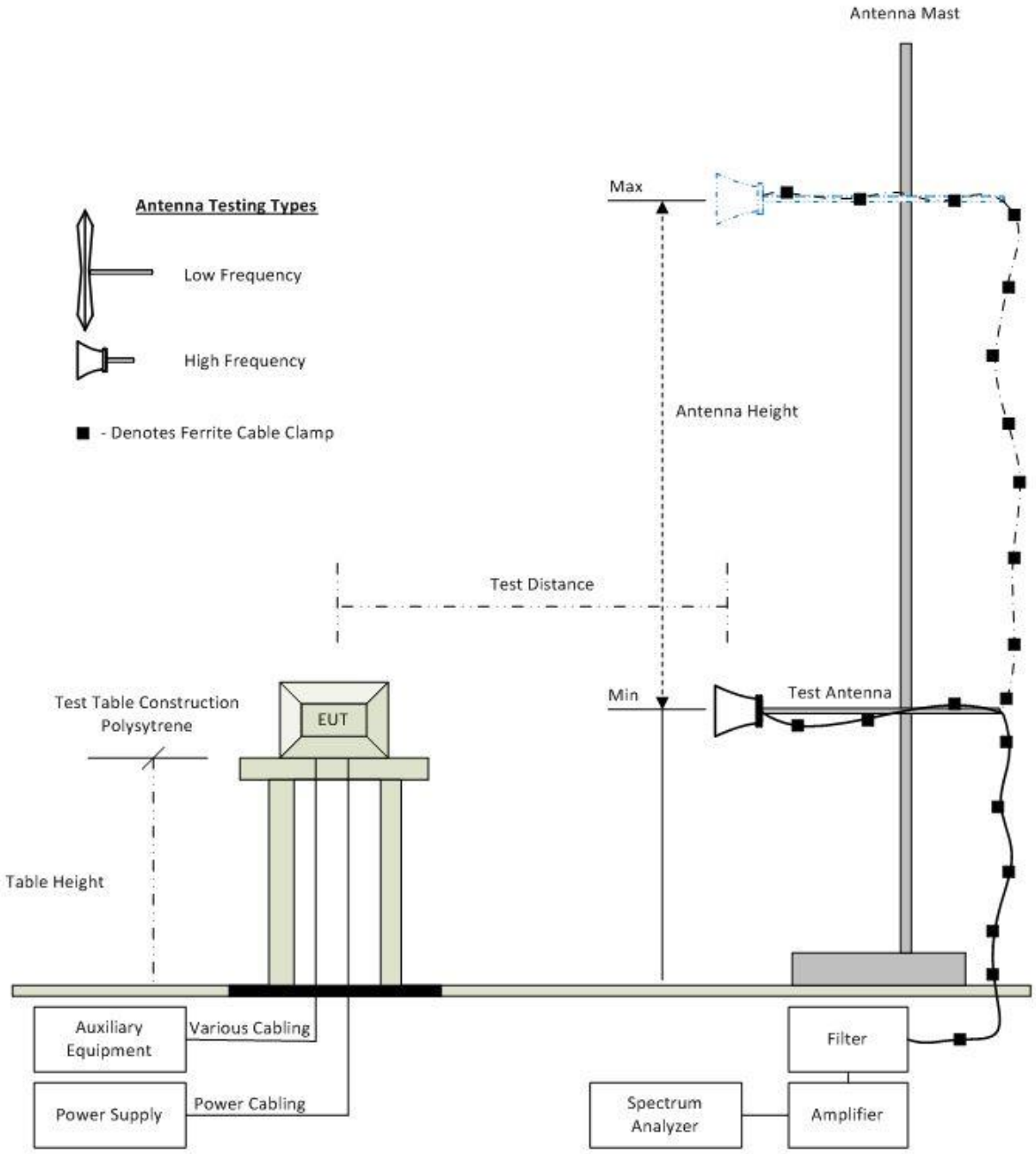
Method
Measurements were made per work instruction Work instruction WI-07 Radiated Emissions Test

Test Equipment Utilized

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	30 Nov 2017
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
301	5470 to 5725 MHz Notch Filter	Microtronics	RBC50704	001	30 Oct 2017
302	5150 to 5350 MHz Notch Filter	Microtronics	BRC50703	002	30 Oct 2017
303	5725 to 5875 MHz Notch filter	Microtronics	BRC50705	003	30 Oct 2017
330	Variac 0-280 Vac	Staco Energy Co	3PN1020B	0546	Cal when used
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	30 Oct 2017
341	900MHz Notch Filter	EWT	EWT-14-0199	H1	30 Oct 2017
342	2.4 GHz Notch Filter	EWT	EWT-14-0203	H1	30 Oct 2017
343	5.15 GHz Notch Filter	EWT	EWT-14-0200	H1	30 Oct 2017
344	5.35 GHz Notch Filter	EWT	EWT-14-0201	H1	30 Oct 2017
345	5.46 GHz Notch Filter	EWT	EWT-14-0202	H1	30 Oct 2017
373	26III RMS Multimeter	Fluke	Fluke 26 series III	76080720	26 Oct 2017
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	4 Nov 2017
393	DC - 1050 MHz Low Pass Filter	Microcircuits	VLFX-1050	N/A	30 Oct 2017
396	2.4 GHz Notch Filter	Microtronics	BRM50701	001	30 Oct 2017
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	9 Oct 2017
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	10 Oct 2017
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	9 Oct 2017
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
414	DC Power Supply 0-60V	HP	6274	1029A01285	Cal when used
415	Turntable Controller	Sunol Sciences	Turntable Controller	None	Not Required

416	Gigabit ethernet filter	ETS-Lingren	Gigafoil 260366	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	30 Oct 2017
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	30 Oct 2017
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	30 Oct 2017
480	Cable - Bulkhead to Amp	SRC Haverhill	157-3050360	480	30 Oct 2017
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-3050787	481	30 Oct 2017
482	Cable - Amp to Antenna	SRC Haverhill	157-3051574	482	30 Oct 2017
87	Uninterruptible Power Supply	Falcon Electric	ED2000-1/2LC	F3471 02/01	Cal when used
VLF-1700	Low pass filter DC-1700 MHz	Mini Circuits	VLF-1700	None	30 Oct 2017

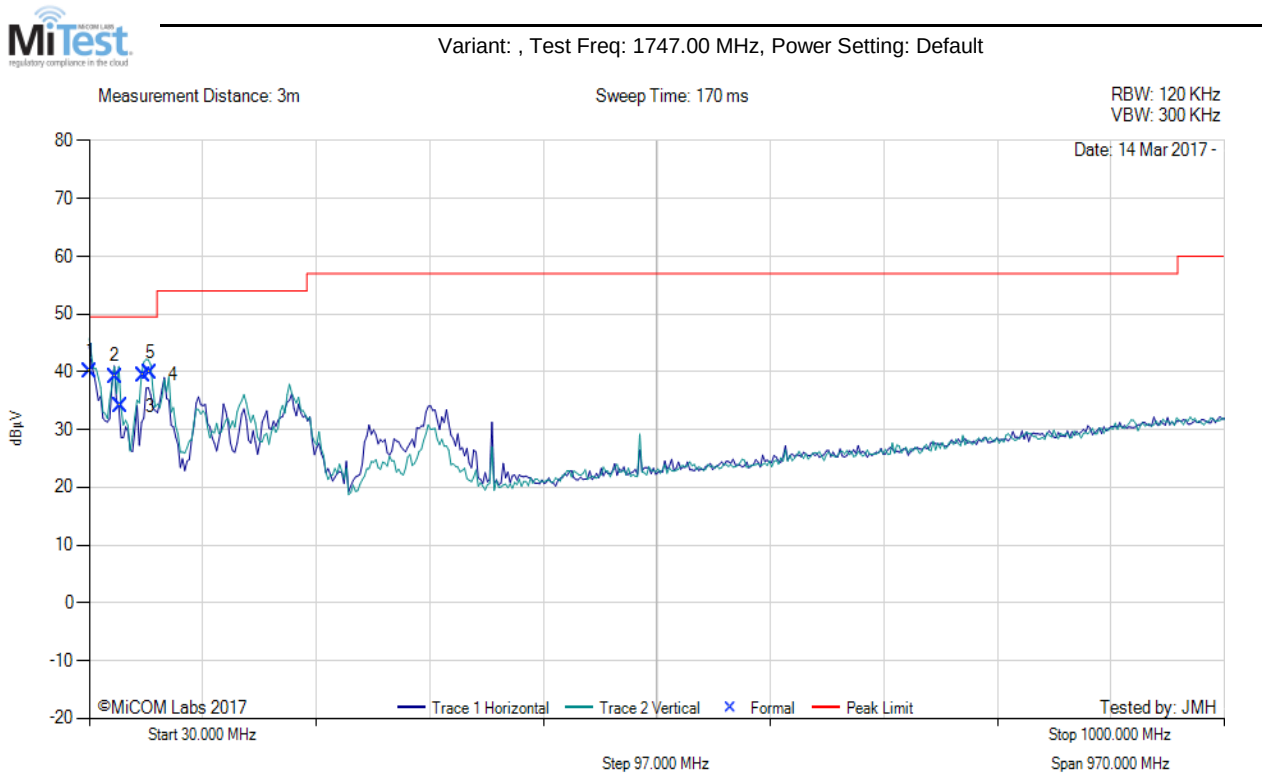
Test Setup for Radiated Emissions for above and below 1 GHz



Radiated Emission Test Setup

7.1.1.1. Measurement Results: 30-1000MHz

Model:	Relay Gen 5B	Configuration tested:	AC
Input power:	120V/60Hz	Standard:	FCC 15B Class A

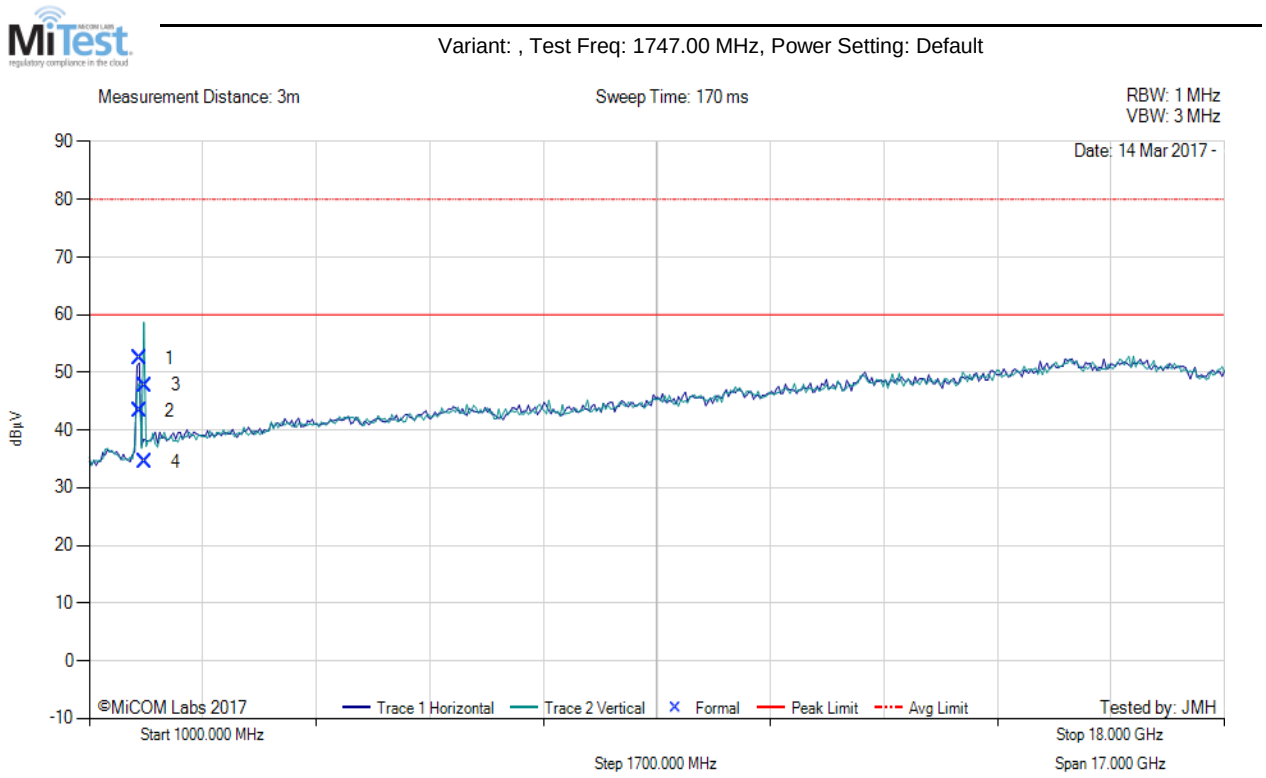


30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	30.54	47.28	3.43	-10.61	40.10	MaxQP	Vertical	98	253	49.5	-9.4	Pass
2	52.05	59.52	3.59	-23.92	39.19	MaxQP	Vertical	101	67	49.5	-10.3	Pass
3	56.30	54.62	3.62	-24.22	34.02	MaxQP	Vertical	150	79	49.5	-15.5	Pass
4	76.51	58.97	3.76	-23.26	39.47	MaxQP	Vertical	101	211	49.5	-10.0	Pass
5	81.98	59.63	3.79	-23.66	39.76	MaxQP	Vertical	104	209	49.5	-9.7	Pass

Test Notes: Gen 5 on table powered by 120V AC. Connected to call box outside chamber with call originated.

7.1.1.2. Measurement Results: 1000-6000 MHz

Model:	Relay Gen 5B	Configuration tested:	AC
Input power:	120V/60Hz	Standard:	FCC 15B Class A



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	1747.00	64.62	2.43	-14.62	52.43	Max Peak	Horizontal	149	72	60.0	-7.6	Pass
2	1747.00	55.49	2.43	-14.62	43.30	Max Avg	Horizontal	149	72	80.0	-36.7	Pass
3	1841.44	58.77	2.45	-13.48	47.74	Max Peak	Vertical	117	312	60.0	-12.3	Pass
4	1841.44	45.48	2.45	-13.48	34.45	Max Avg	Vertical	117	312	80.0	-45.6	Pass

Test Notes: Gen 5 on table powered by 120V AC. Connected to call box outside chamber with call originated.

7.1.2. AC Mains Power Input/Output Ports

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 Method

The test method shall be in accordance with §15.107 and the Artificial Mains Networks (AMNs) shall be connected to the AC mains power source.

The measurement frequency range extends from 150 kHz to 30 MHz. When the EUT is a transmitter operating at frequencies below 30 MHz, then the exclusion band for transmitters applies for measurements in the transmit mode of operation.

Test Procedure

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.

Limits

The equipment shall meet the class B limits given in §15.107. Alternatively, for equipment intended to be used in telecommunication centres only, the class A limits given in §15.107 may be used.

Class B Emissions

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

Class A Emissions

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	79	66
0.5-30	73	60

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.

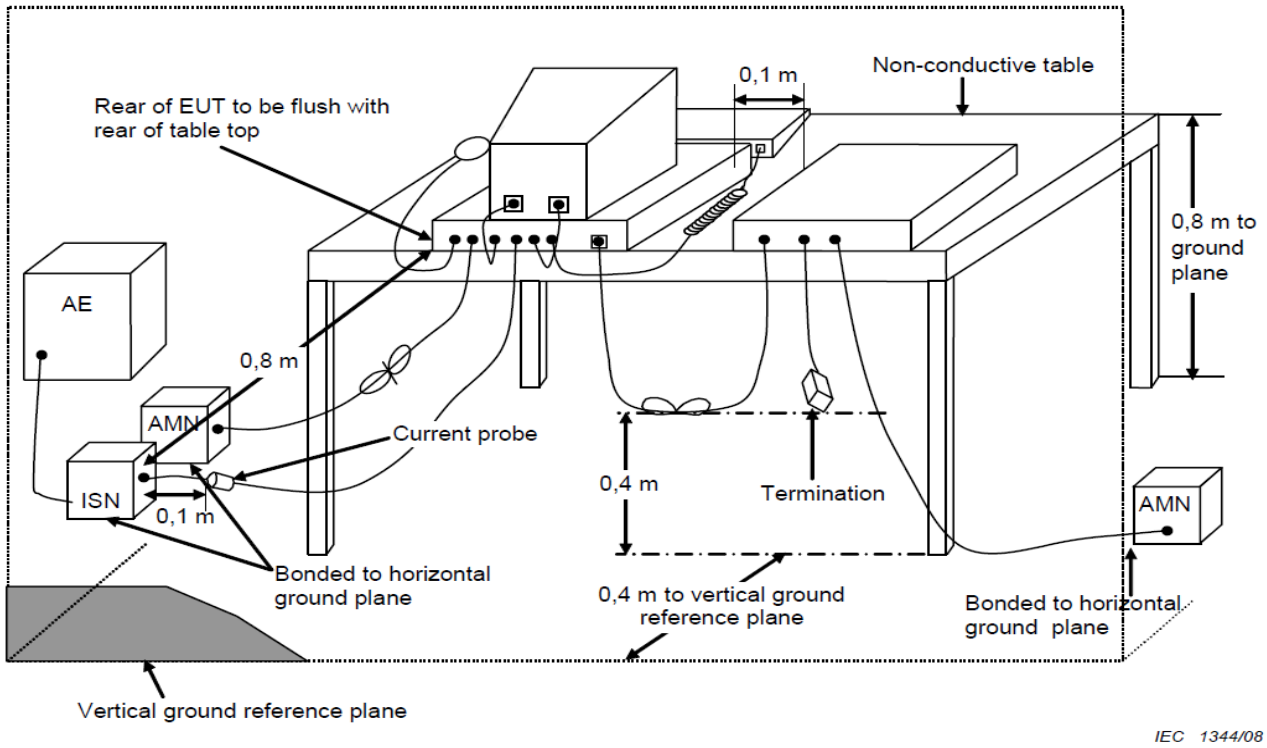
Laboratory Measurement Uncertainty	
Measurement uncertainty	±2.64 dB

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

Test Equipment Utilized

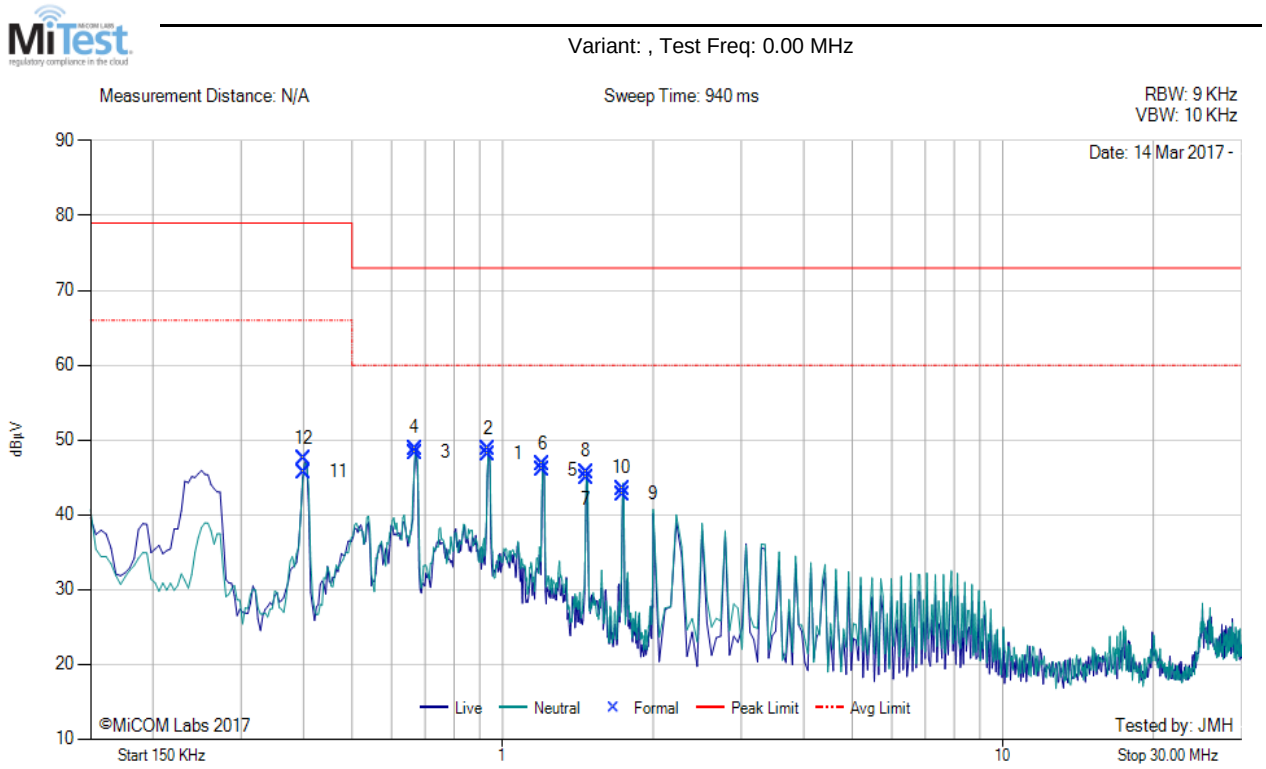
Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	30 Nov 2017
184	Pulse Limiter	Rhode & Schwarz	ESH3Z2	357.8810.52	6 Oct 2017
190	LISN (two-line V-network)	Rhode & Schwarz	ESH3Z5	836679/006	29 Oct 2017
193	Receiver 20 Hz to 7 GHz	Rhode & Schwarz	ESI 7	838496/007	10 Oct 2017
307	BNC-CABLE	Megaphase	1689 1GVT4	15F50B002	6 Oct 2017
316	Dell desktop computer workstation with Vasona	Dell	Desktop	WS04	Not Required
351	Data Impedance Stabilization Network	Teseq	ISN T800	24809	30 Nov 2017
372	AC Variable PS	California Instruments	1251P	L06951	Cal when used
388	LISN (3 Phase) 9kHz - 30MHz	Rohde & Schwarz	ESH2-Z5	892107/022	30 Oct 2017
496	MiTest Conducted Emissions Test Software	MiCOM	CE Test Software Version 1.0.87	496	Not Required
ADAPT SMA#1	SMA Cable	Megaphase	SMA Cable #1	None	6 Oct 2017

Test Setup – Power Input / Output Port



Measurement Results

Model:	Relay Gen 5B	Configuration tested:	AC
Input power:	120V/60Hz	Standard:	FCC 15B Class A

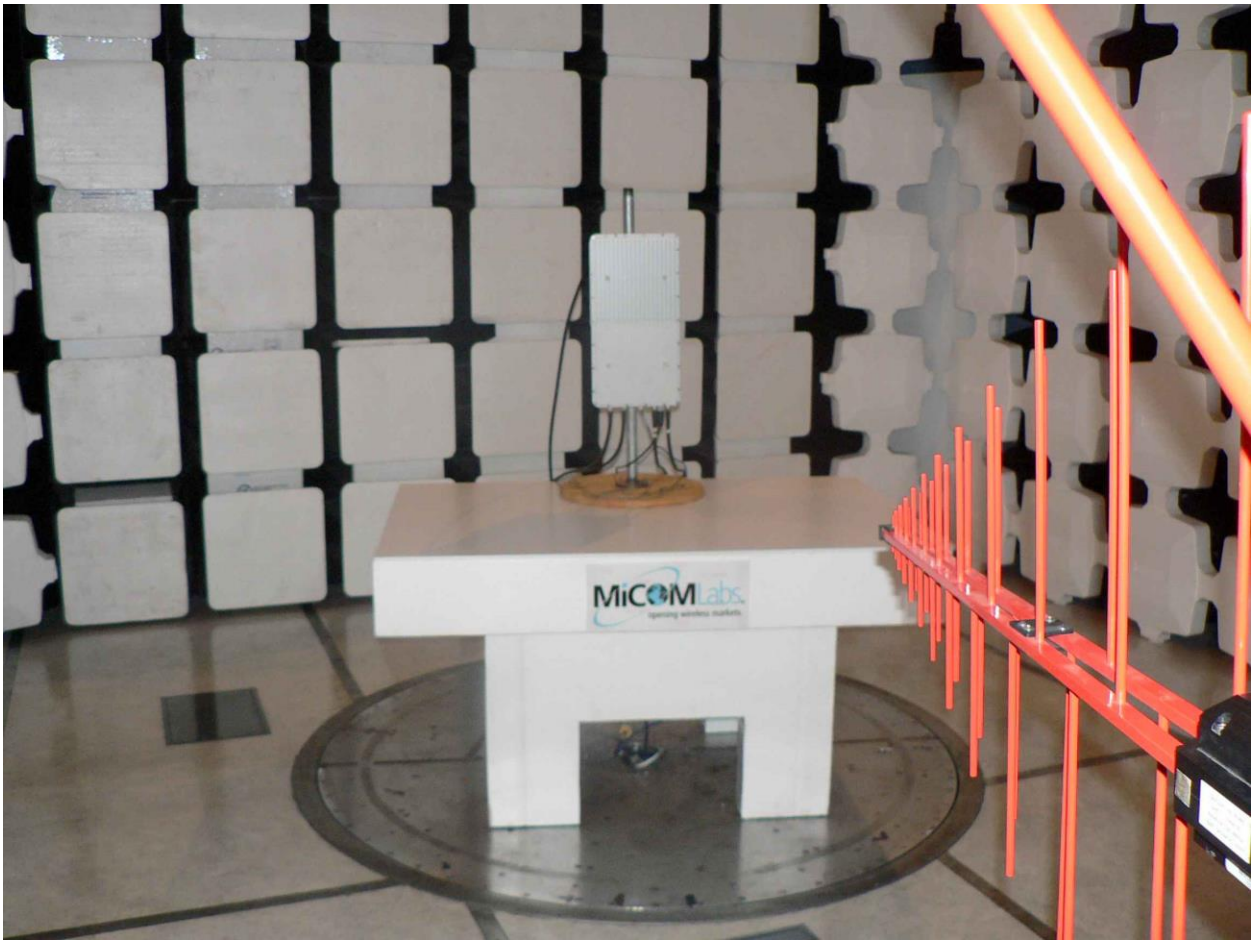


Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	0.935	38.11	0.08	9.93	10.01	48.12	Max Avg	Neutral	60.0	-11.9	Pass
2	0.935	38.75	0.08	9.93	10.01	48.76	Max Qp	Neutral	73.0	-24.2	Pass
3	0.668	38.26	0.11	9.93	10.04	48.30	Max Avg	Neutral	60.0	-11.7	Pass
4	0.668	38.82	0.11	9.93	10.04	48.86	Max Qp	Neutral	73.0	-24.1	Pass
5	1.203	35.98	0.09	9.94	10.03	46.01	Max Avg	Neutral	60.0	-14.0	Pass
6	1.203	36.71	0.09	9.94	10.03	46.74	Max Qp	Neutral	73.0	-26.3	Pass
7	1.468	34.79	0.13	9.95	10.08	44.87	Max Avg	Neutral	60.0	-15.1	Pass
8	1.468	35.63	0.13	9.95	10.08	45.71	Max Qp	Neutral	73.0	-27.3	Pass
9	1.735	32.64	0.16	9.96	10.12	42.76	Max Avg	Neutral	60.0	-17.2	Pass
10	1.735	33.38	0.16	9.96	10.12	43.50	Max Qp	Neutral	73.0	-29.5	Pass
11	0.401	35.81	0.03	9.92	9.95	45.76	Max Avg	Live	66.0	-20.2	Pass
12	0.401	37.54	0.03	9.92	9.95	47.49	Max Qp	Live	79.0	-31.5	Pass

Test Notes: GEN 5B connected to call box with call in process. AC Mains 120V

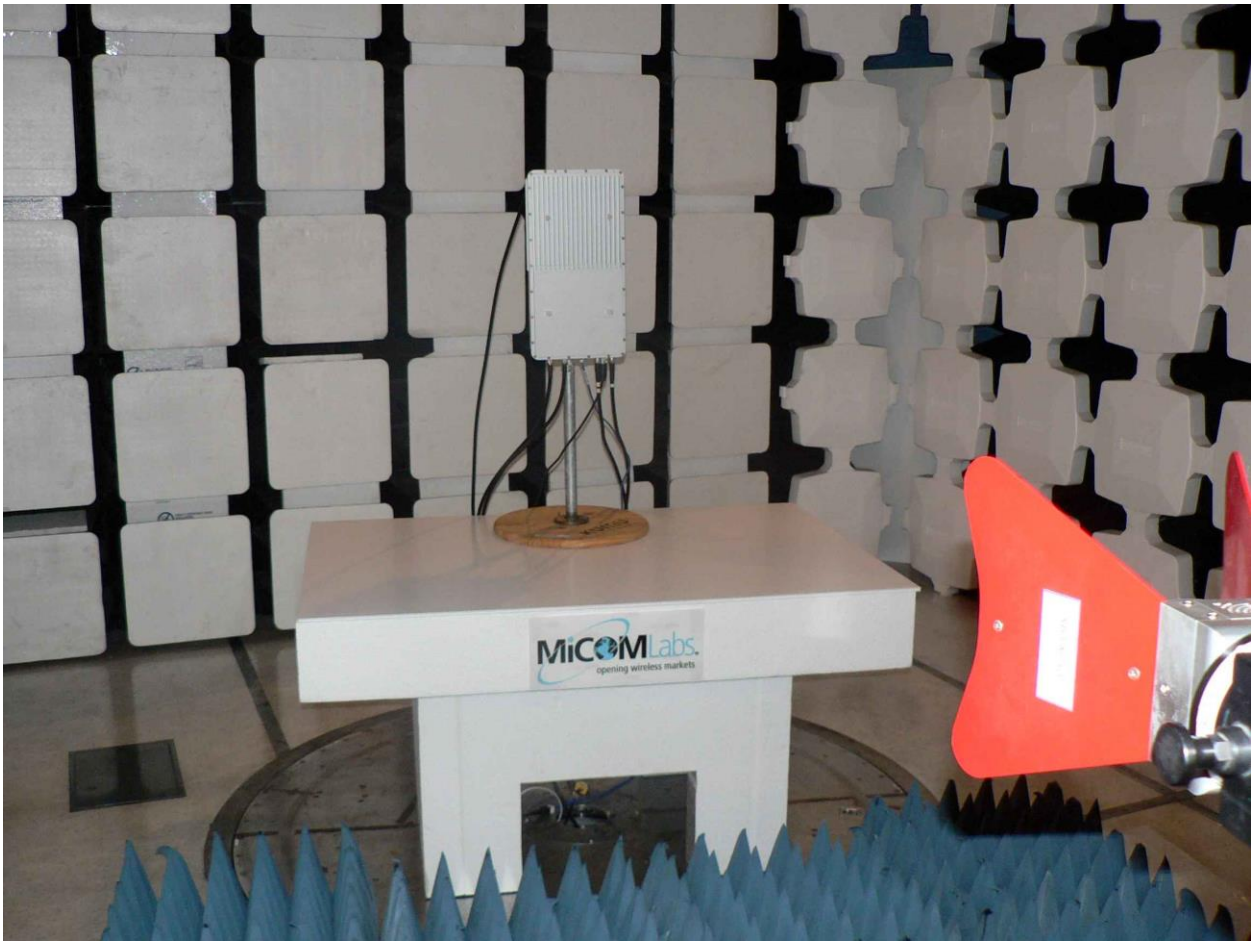
8. PHOTOGRAPHS

8.1. Radio Emissions < 1 GHz



Note: Callbox located outside chamber.

8.2. Radiated Emissions 1 - 18 GHz



Note: Callbox located outside chamber.

8.3. AC Wireline Emissions

8.4. AC Wireline Emissions – Side View

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