REGULATORY COMPLIANCE TEST REPORT

FCC CFR 47 Part 15 SubPart B & ISED ICES-003

Report No.: HWPD91-U2 Rev A

Company: HP Inc.

Model Name: VCVRA-1712; Part No 0960-4745

REGULATORY COMPLIANCE TEST REPORT

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Model Name: VCVRA-1712; Part No 0960-4745

To: FCC CFR 47 Part 15B & ISED ICES-003

Test Report Serial No.: HWPD91-U2 Rev A

This report supersedes: NONE

Applicant:	HP Inc. 1115 SE 164th Avenue, Suite 210 Vancouver, Washington 98683 USA
Product Function	802.11 a/b/g/n SDIO dual band 2.4G/5GHz WLAN with BT/BLE
Issue Date:	20th August 2019

This Test Report is Issued Under the Authority of:

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A2LA ACCREDITED
TESTING CERT #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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1. ACCREDITATION, LISTINGS & RECOGNITION

1.1. TESTING ACCREDITATION

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

Accredited Laboratory

A2LA has accredited

MiCOM LABS

Pleasanton, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 14th day of May 2018.

President and CEO
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2019

For the 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 wireless testing capabilities. Our international recognition includes Conformity Assessment Body designation by APEC MRA countries. MiCOM Labs test reports are accepted globally.

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

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

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

1.3. PRODUCT CERTIFICATION

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

Accredited Product Certification Body

A2LA has accredited

MiCOM LABS

Pleasanton, CA

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC 17065:2012 *Requirements for bodies certifying products, processes and services*. This 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 14th day of May 2018

President and CEO
For the Accreditation Council
Certificate Number 2381.02
Valid to November 30, 2019

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

2. DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft	16th August 2019	Initial Draft
Rev A	20th August 2019	Initial Release
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In the above table the latest report revision will replace all earlier versions.

3. TEST RESULT CERTIFICATE

Manufacturer:	HP Inc. 1115 SE 164th Avenue, Suite 210 Vancouver, Washington 98683 USA	**Tested By:**	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
EUT:	802.11 a/b/g/n SDIO dual band 2.4G/5GHz WLAN with BT/BLE	**Telephone:**	+1 925 462 0304
Model: **Equipment:**	VCVRA-1712; Part No 0960-4745	**Fax:**	+1 925 462 0306
S/N's:	COB5D7DBE18C		
Test Date(s):	August 6-8th 2019	**Website:**	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC CFR 47 Part 15B & ISED 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.

ACCREDITED
TESTING CERT #2381.01

Approved & Released for MiCOM Labs, Inc. by:

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	2018	Title 47 CFR Part 15, Sub Part B; Unintentional Radiators
(ii)	ICES-003, Issue 6	Jan 2016; Updated April 2019	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	August 2018	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.

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

5. TEST SUMMARY

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

TABLE OF REQUIRED TESTS – Emissions

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

6. PRODUCT DETAILS AND TEST CONFIGURATIONS

6.1. Test Program Scope

The scope of the test program was to test the HP Inc. VCVRA-1712; Part No 0960-4745 for compliance against the following standards:

- FCC CFR 47 Part 15, Subpart B - Title 47 CFR Part 15, SubPart B; Unintentional Radiators.
- ICES-003, Issue 6 Jan 2016; Updated April 2019 - Information Technology Equipment (ITE) – Limits and methods of measurement.

6.2. EUT Details

Detail	Description
Purpose:	Test of the VCVRA-1712; Part No 0960-4745 for compliance to FCC Part 15 B and Canada ISED ICES-003.
Applicant:	HP Inc. 1115 SE 164th Avenue, Suite 210 Vancouver, Washington 98683 USA
Manufacturer:	HP Inc. 1115 SE 164th Avenue, Suite 210 Vancouver, Washington 98683 USA
Test Laboratory:	MiCOM Labs, Inc. 575 Boulder Court, Pleasanton, California 94566, USA
Test report reference number:	HWPD91-U2 Rev A
Date EUT received:	1 August 2019
Dates of test (from - to):	6th – 8th August 2019
No of Units Tested:	One
Type of Equipment:	WLAN BT Radio Module
Product Name:	VCVRA-1712
Model No.:	VCVRA-1712; Part No 0960-4745
Serial No.:	COB5D7DBE18C
Equipment Secondary Function(s):	None
Type of Technology:	Transceiver
Installation type:	Fixed installation
Construction/Location for Use:	Indoor
Software/Firmware Release:	P130
Hardware Release:	V5
Rated Input Voltage and Current:	DC 3.3V
Equipment Dimensions:	1.75L x 1.75W 0.2D in
Temperature:	Nominal: 20 ºC Max: 55 ºC Min: -33 ºC
Weight:	2 oz
Primary Function:	802.11 a/b/g/n SDIO dual band 2.4G/5GHz WLAN with BT/BLE

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

The Hewlett Packard Inc. VCVRA-1712; Part No 0960-4745 is a module rated at 3.3 V DC powered by a host device in normal operation.

6.4. Antenna Details

No antennas were tested as part of this test program.

6.5. Cabling and I/O Ports

The following is a description of the input, output ports available on the EUT;

Port Type	Port Description	Qty	Screened (Yes/ No)	Length
SDIO	Data/DC	1	N	<1m

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	Styx, 802.11 a/b/g/n Module	Marvell	VCVRA-1712; Part No 0960-4745	COB5D7DBE18C
Support	Host	HP	FE-HPQ-23111	--
Support	AC/DC PS	V-Infinity	3A-621DN24	-

6.7. Equipment Modifications

1).. NONE

6.8. Deviations from the Test Standard

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

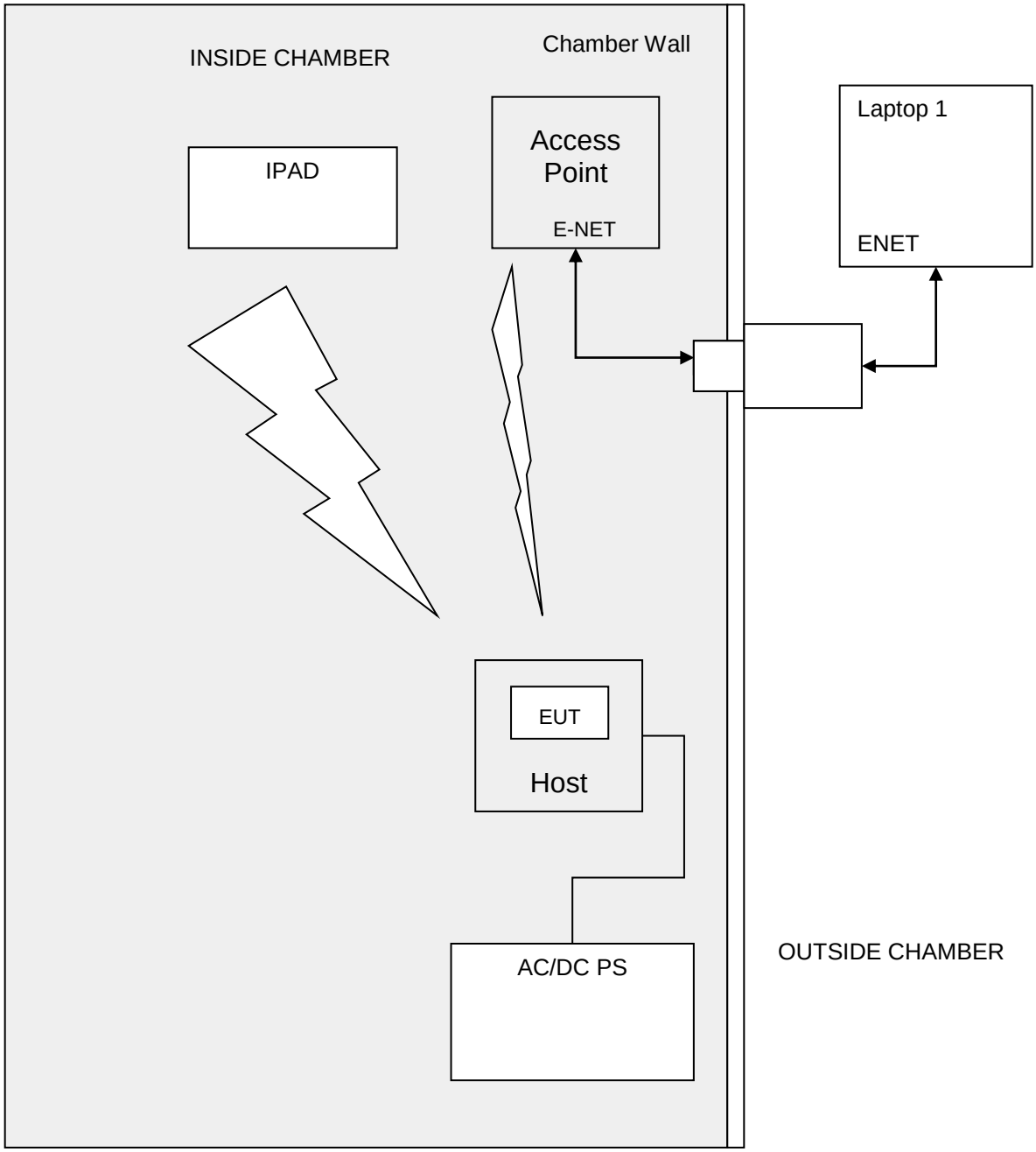
6.9. EUT Configurations

The EUT was tested for radiated emissions in a 3-meter chamber. One (1) laptop computer was set to continuously communicate with the EUT via WiFi connected via an Access Point inside chamber. BLE transmissions were exercised by pinging an IPAD tablet also located in the chamber.

Results for the following configurations are provided in this report:

- Radiated Emissions powered by Host
- AC Wireline Emissions powered by Host

Diagram of EUT Configuration for Emissions Testing



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 – 1,000 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

FCC and IC Spurious Emissions Limits

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

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 (dBµV/m)	Measurement Distance (meters)	Quasi-peak Limit (dBµV/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 (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

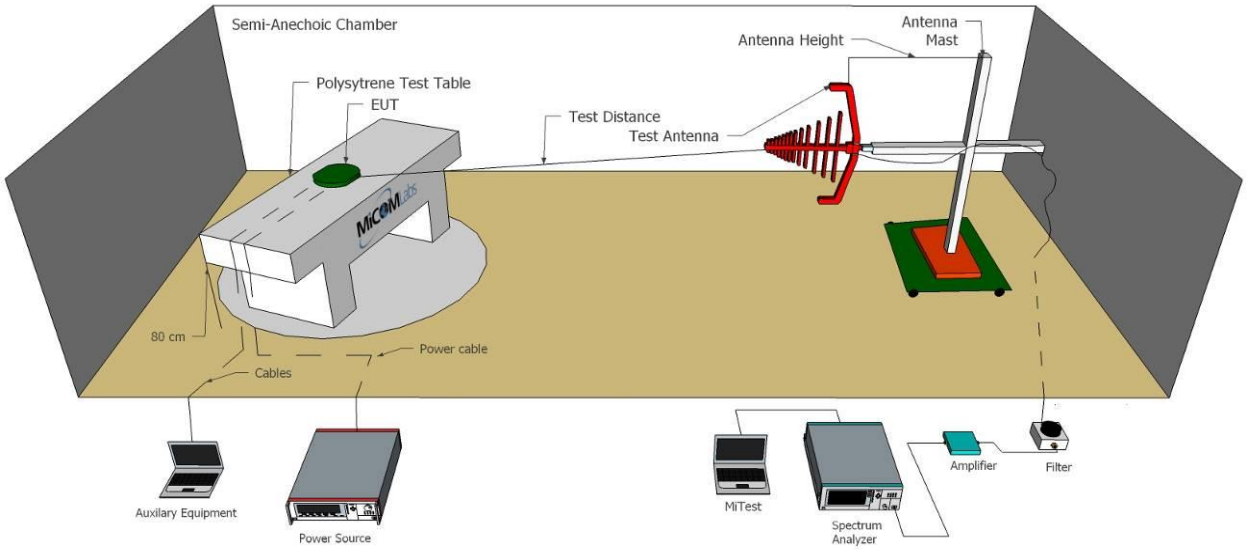
Method
Work instruction WI-EMC-07: Radiated Emissions Test

Test Equipment Utilized

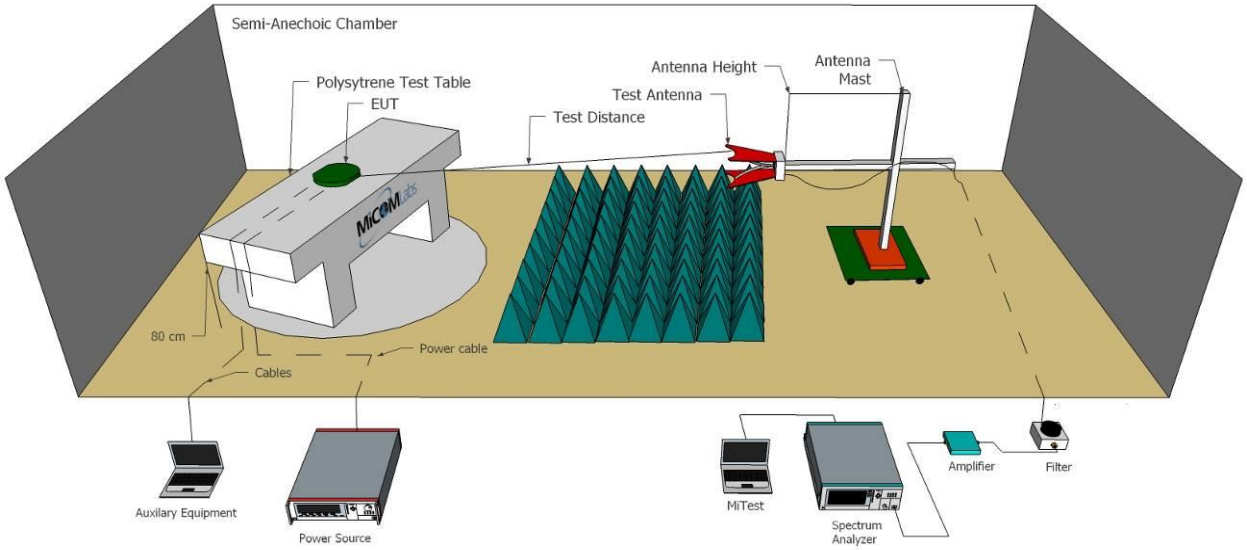
Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
170	Video System Controller for Semi Anechoic Chamber	Panasonic	WV-CU101	04R08507	Not Required
298	3M Radiated Emissions Chamber Maintenance Check	MiCOM	3M Chamber	298	21 Sep 2019
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	4 Apr 2020
373	26III RMS Multimeter	Fluke	Fluke 26 series III	76080720	21 Sep 2019
377	Band Rejection Filter 5150 to 5880MHz	Microtronics	BRM50716	034	9 Oct 2019
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	12 Oct 2019
396	2.4 GHz Notch Filter	Microtronics	BRM50701	001	8 Oct 2019
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	12 Sep 2019
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	12 Oct 2019
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	12 Sep 2019
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	9 Oct 2019
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	9 Oct 2019
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	9 Oct 2019
465	Low Pass Filter DC-1000 MHz	Mini-Circuits	NLP-1200+	VUU01901402	9 Oct 2019
480	Cable - Bulkhead to Amp	SRC Haverhill	157-3050360	480	24 Sep 2019
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-3050787	481	24 Sep 2019
510	Barometer/Thermometer	Control Company	68000-49	170871375	11 Dec 2019
518	Cable - Amp to Antenna	SRC Haverhill	157-3051574	518	21 Sep 2019
CC05	Confidence Check	MiCOM	CC05	None	21 Sep 2019
VLF-1700	Low pass filter DC-1700 MHz	Mini Circuits	VLF-1700	None	8 Oct 2019

Test Setup for Radiated Emissions for above and below 1 GHz

Radiated Emissions Below 1GHz Test Setup

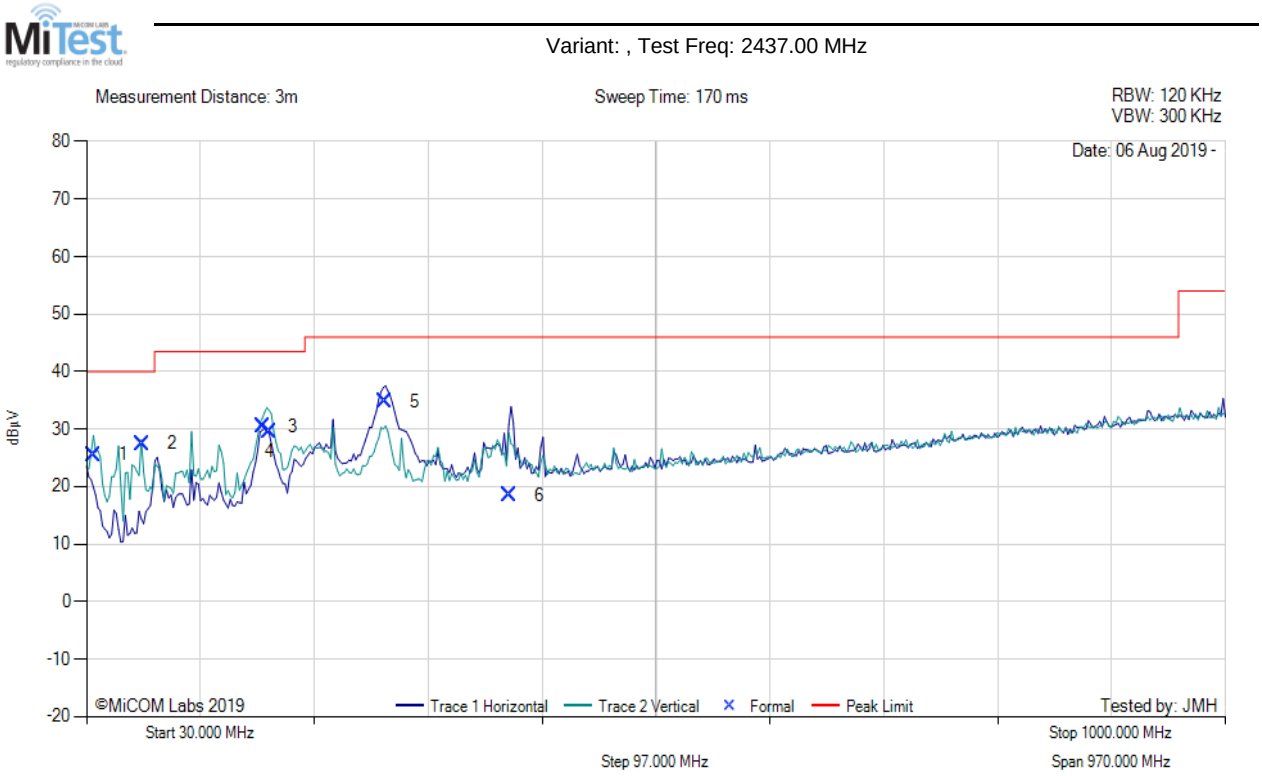


Radiated Emissions Above 1GHz Test Setup



30-1000 MHz

Model:	VCVRA-1712; Part No 0960-4745	Configuration tested:	Host Powered
Input power:	120 Vac	Standard:	FCC Part 15

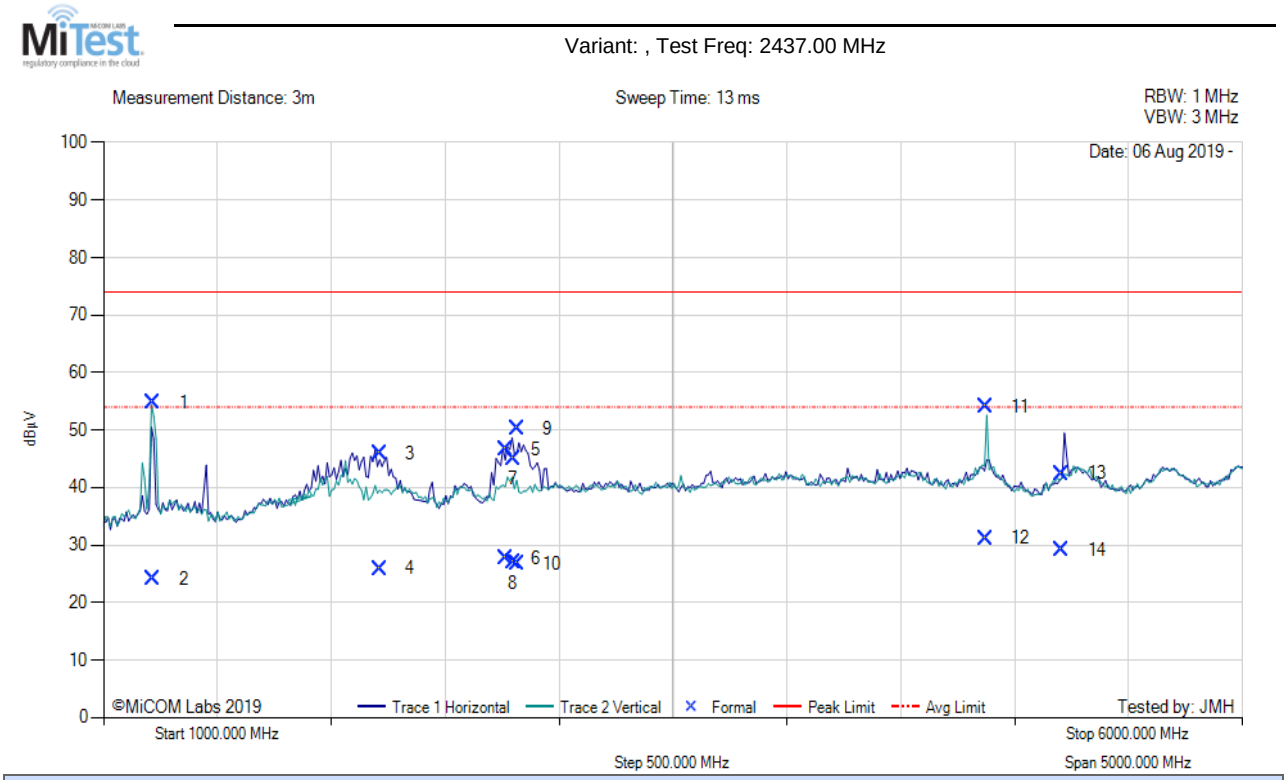


30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB/m**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	36.15	34.45	3.57	-12.50	25.52	MaxQP	Vertical	116	107	40.0	-14.5	Pass
2	77.21	44.34	3.89	-20.80	27.43	MaxQP	Vertical	105	209	40.0	-12.6	Pass
3	180.07	43.18	4.37	-17.10	30.45	MaxQP	Vertical	100	40	43.5	-13.1	Pass
4	186.18	42.32	4.40	-17.10	29.62	MaxQP	Vertical	101	22	43.5	-13.9	Pass
5	283.70	44.86	4.78	-14.80	34.84	MaxQP	Horizontal	103	118	46.0	-11.2	Pass
6	390.36	25.77	5.15	-12.40	18.52	MaxQP	Horizontal	101	326	46.0	-27.5	Pass

Test Notes: EUT in host powered up and connected to wifi network

1-6 GHz

Model:	VCVRA-1712; Part No 0960-4745	Configuration tested:	Host Powered
Input power:	120 Vac	Standard:	FCC Part 15 B



1000.00 - 6000.00 MHz												
Num	Frequency MHz	Raw dBµV	Cable Loss dB	AF dB/m	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	1218.56	72.54	-1.25	-16.57	54.72	Max Peak	Vertical	154	27	74.0	-19.3	Pass
2	1218.56	41.91	-1.25	-16.57	24.09	Max Avg	Vertical	154	27	54.0	-29.9	Pass
3	2214.81	60.27	-1.71	-12.60	45.96	Max Peak	Horizontal	140	289	74.0	-28.0	Pass
4	2214.81	40.26	-1.71	-12.60	25.95	Max Avg	Horizontal	140	289	54.0	-28.1	Pass
5	2767.41	60.55	-1.94	-12.04	46.57	Max Peak	Horizontal	168	347	74.0	-27.4	Pass
6	2767.41	41.61	-1.94	-12.04	27.63	Max Avg	Horizontal	168	347	54.0	-26.4	Pass
7	2798.38	58.85	-1.87	-11.90	45.08	Max Peak	Horizontal	174	61	74.0	-28.9	Pass
8	2798.38	40.72	-1.87	-11.90	26.95	Max Avg	Horizontal	174	61	54.0	-27.1	Pass
9	2814.69	64.04	-1.88	-11.93	50.23	Max Peak	Horizontal	186	304	74.0	-23.8	Pass
10	2814.69	40.61	-1.88	-11.93	26.80	Max Avg	Horizontal	186	304	54.0	-27.2	Pass
11	4874.05	69.19	-2.51	-12.60	54.08	Max Peak	Vertical	100	157	74.0	-19.9	Pass
12	4874.05	46.27	-2.51	-12.60	31.16	Max Avg	Vertical	100	157	54.0	-22.8	Pass
13	5207.36	57.09	-2.64	-12.00	42.45	Max Peak	Horizontal	101	66	74.0	-31.6	Pass
14	5207.36	43.80	-2.64	-12.00	29.16	Max Avg	Horizontal	101	66	54.0	-24.8	Pass

Test Notes: EUT in host powered up and connected to wifi network ch 6. 2.4 and 5 G notch in front of amp to prevent overload. 5G WiFi pinging and cannot turn off

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 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.

Limits

The equipment shall meet the class B limits given in FCC 15.207 & ICES-003. Alternatively, for equipment intended to be used in telecommunication centres only, the class A limits given in FCC 15B, ICES-003 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.

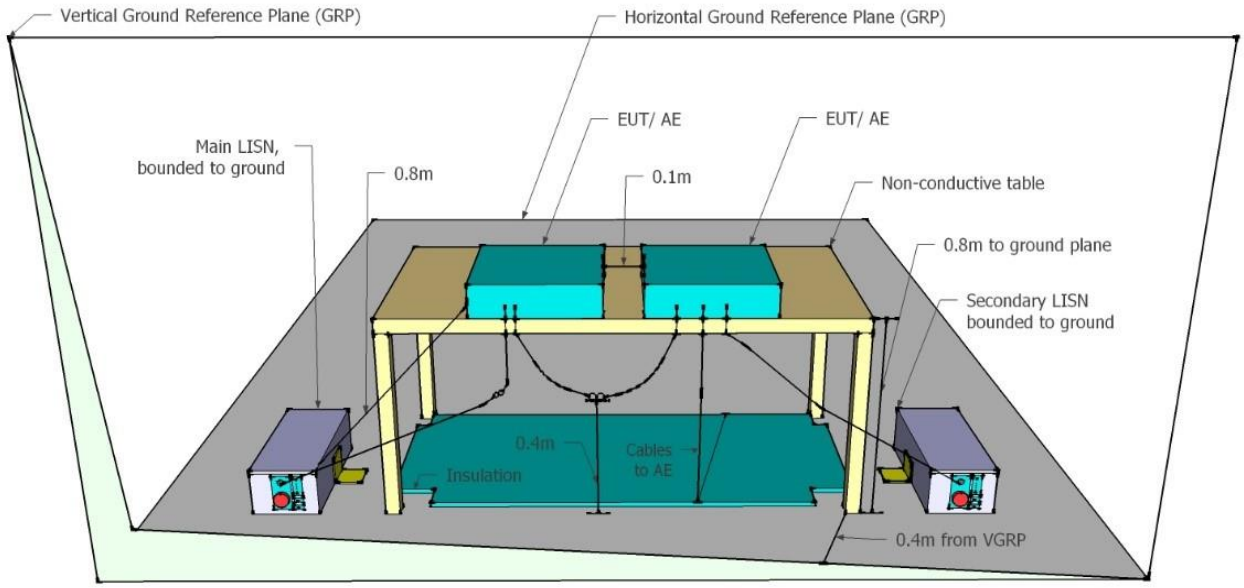
Laboratory Measurement Uncertainty	
Measurement uncertainty	±2.64 dB

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

Test Equipment Utilized

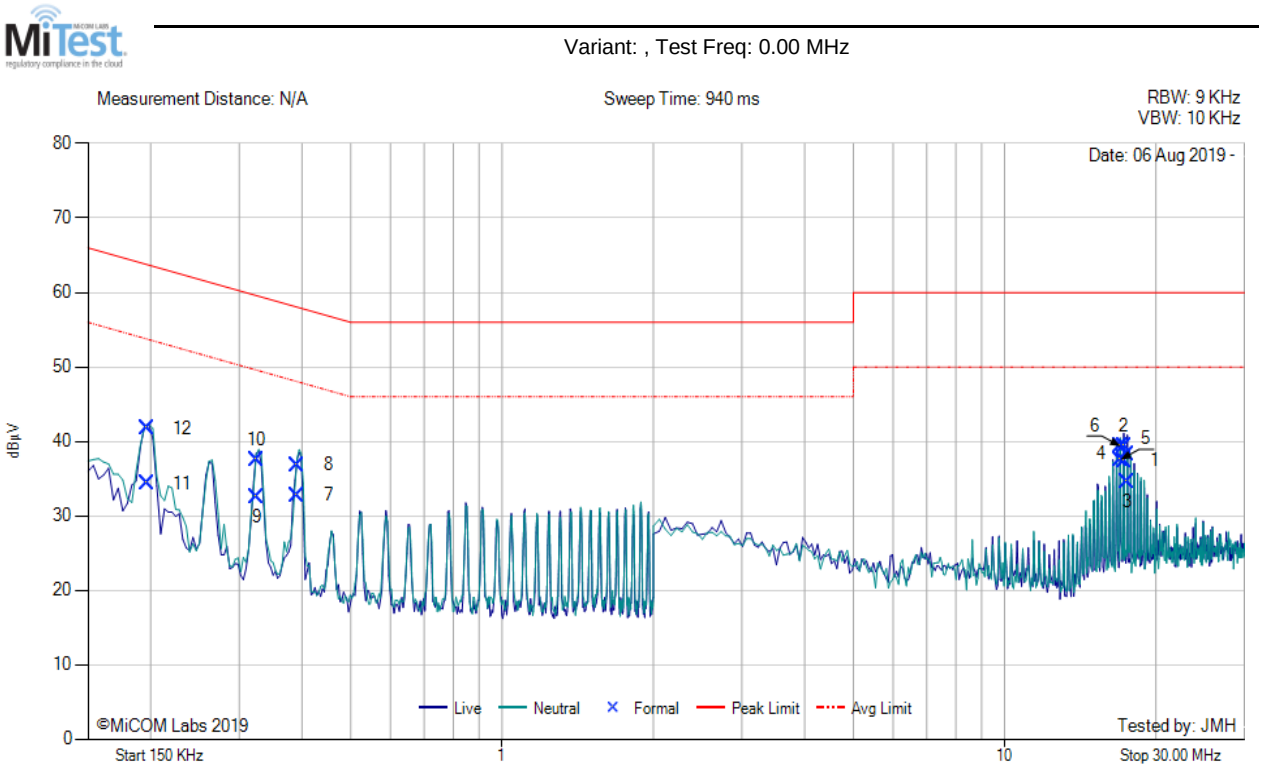
Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
184	Pulse Limiter	Rhode & Schwarz	ESH3Z2	357.8810.52	6 Oct 2019
190	LISN (two-line V-network)	Rhode & Schwarz	ESH3Z5	836679/006	18 Oct 2019
193	Receiver 20 Hz to 7 GHz	Rhode & Schwarz	ESI 7	838496/007	10 Oct 2019
295	Conducted Emissions Chamber Maintenance Check	MiCOM	Conducted Emissions Chamber	295	18 Sep 2019
307	BNC-CABLE	Megaphase	1689 1GVT4	15F50B002	11 Sep 2019
316	Dell desktop computer workstation	Dell	Desktop	WS04	Not Required
372	AC Variable PS	California Instruments	1251P	L06951	Cal when used
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	12 Oct 2019
388	LISN (3 Phase) 9kHz - 30MHz	Rohde & Schwarz	ESH2-Z5	892107/022	20 Oct 2019
496	MiTest Conducted Emissions test software.	MiCOM	Conducted Emissions Test Software Version 1.0	496	Not Required
510	Barometer/Thermometer	Control Company	68000-49	170871375	11 Dec 2019
CCEMC01	Confidence Check.	MiCOM	CCEMC01	None	11 Sep 2019

Test Setup – Power Input / Output Port



7.1.2.1. Measurement Results

Model:	VCVRA-1712; Part No 0960-4745	Configuration tested:	Host Powered
Input power:	120V_{AC}/60Hz	Standard:	FCC 15B

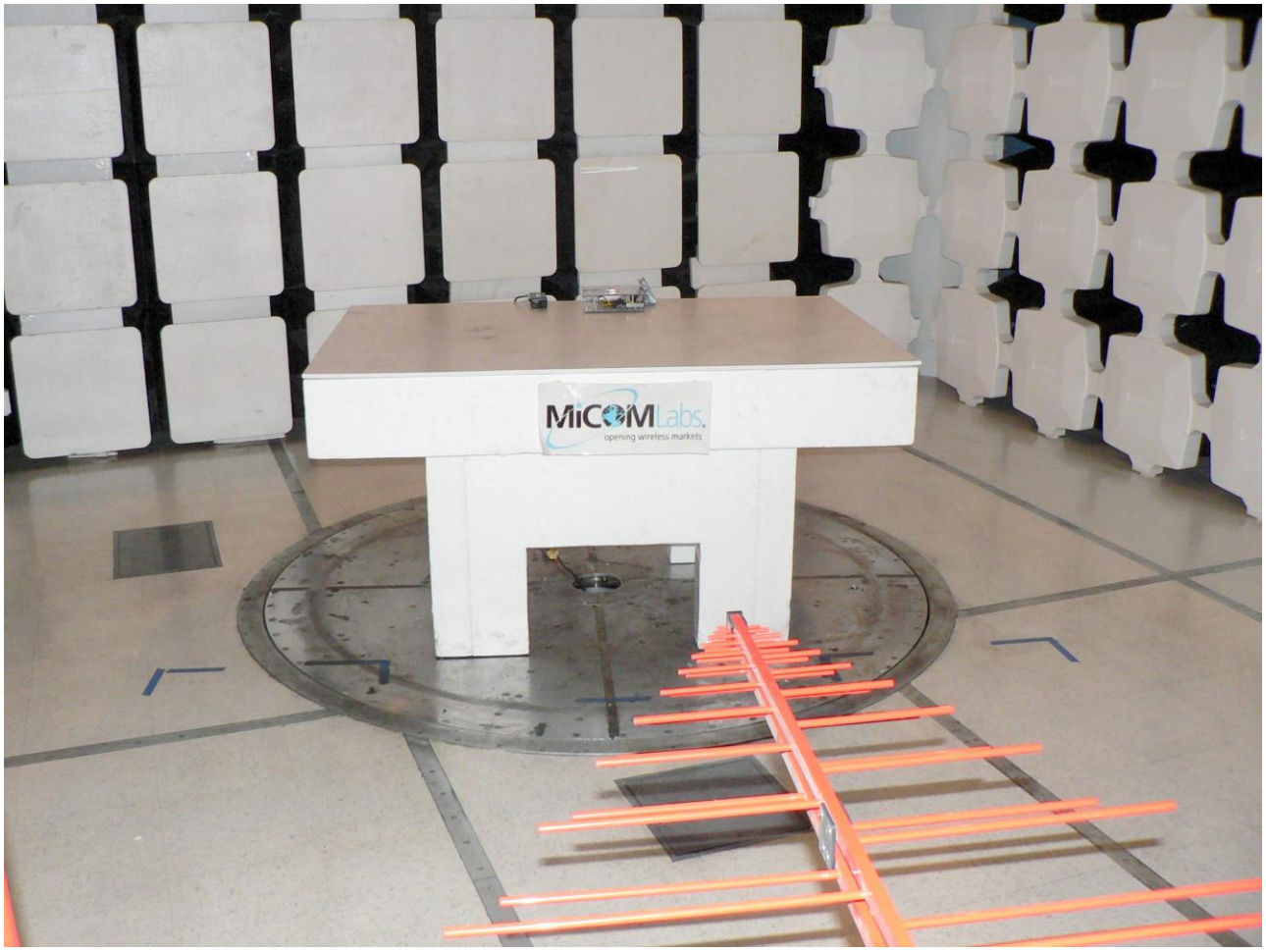


Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	17.276	26.28	0.56	10.57	11.13	37.41	Max Avg	Live	50.0	-12.6	Pass
2	17.276	28.26	0.56	10.57	11.13	39.39	Max Qp	Live	60.0	-20.6	Pass
3	17.557	23.51	0.55	10.58	11.13	34.64	Max Avg	Live	50.0	-15.4	Pass
4	17.557	27.22	0.55	10.58	11.13	38.35	Max Qp	Live	60.0	-21.7	Pass
5	17.001	26.45	0.56	10.56	11.12	37.57	Max Avg	Neutral	50.0	-12.4	Pass
6	17.001	28.24	0.56	10.56	11.12	39.36	Max Qp	Neutral	60.0	-20.6	Pass
7	0.392	22.84	0.03	9.92	9.95	32.79	Max Avg	Neutral	49.1	-16.3	Pass
8	0.392	26.92	0.03	9.92	9.95	36.87	Max Qp	Neutral	59.1	-22.2	Pass
9	0.325	22.62	0.04	9.92	9.96	32.58	Max Avg	Neutral	51.0	-18.4	Pass
10	0.325	27.50	0.04	9.92	9.96	37.46	Max Qp	Neutral	61.0	-23.5	Pass
11	0.197	24.34	0.06	9.93	9.99	34.33	Max Avg	Live	54.7	-20.3	Pass
12	0.197	31.74	0.06	9.93	9.99	41.73	Max Qp	Live	64.7	-22.9	Pass

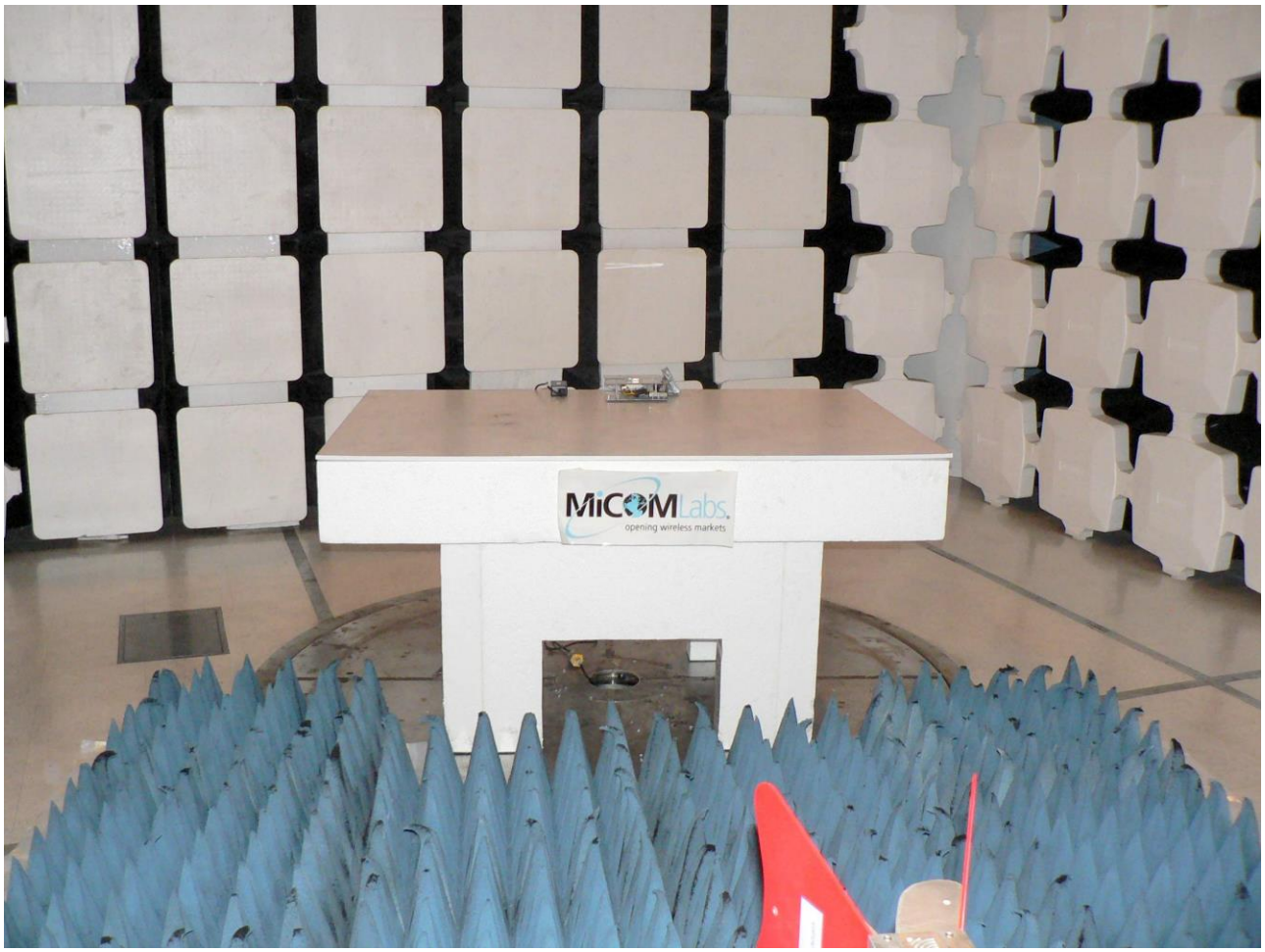
Test Notes: EUT powered by host and AC/DC PS. Connected to laptop via AP on ch 6.
AC Mains 120V 60 Hz

8 PHOTOGRAPHS

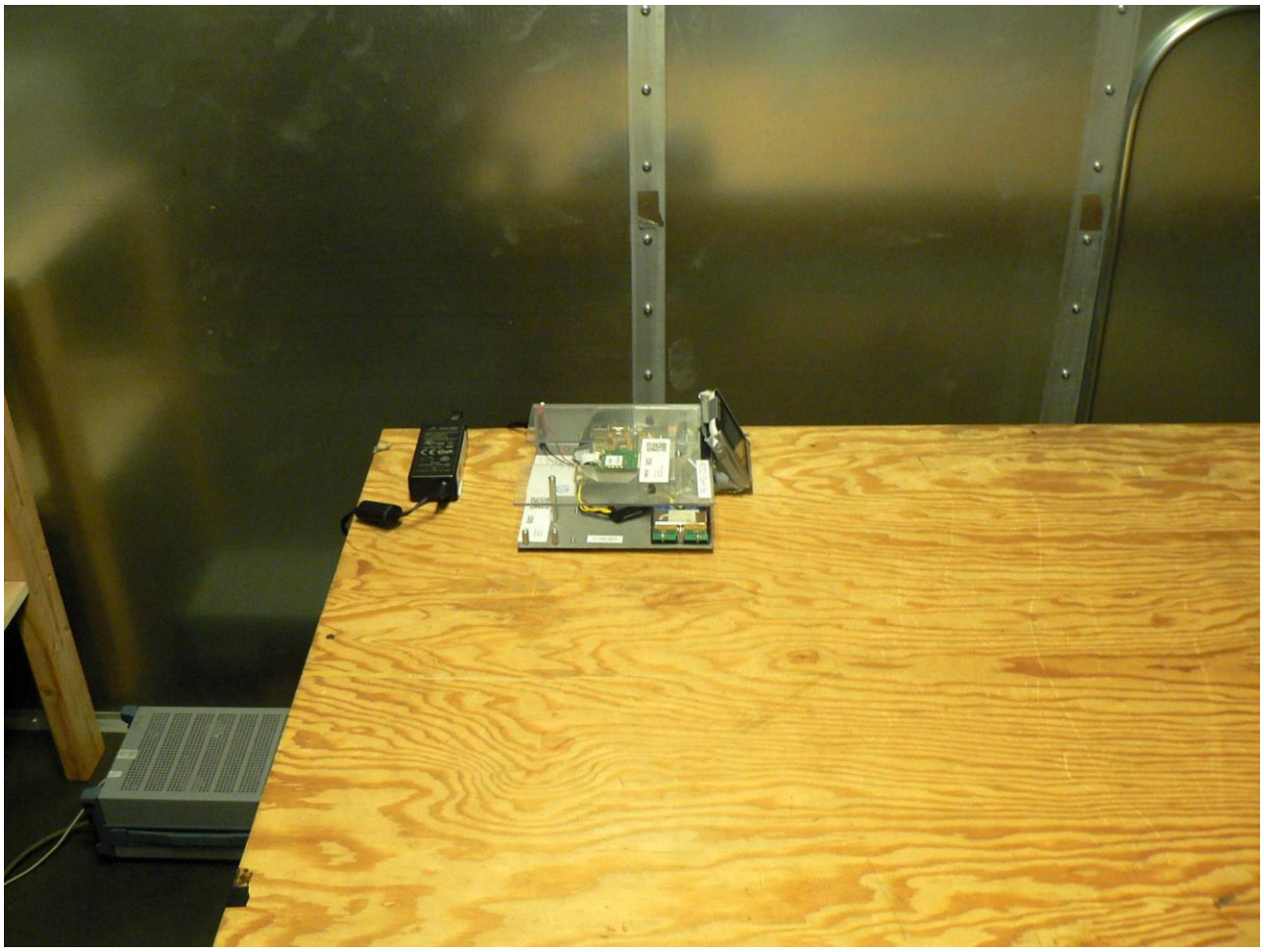
8.1 Radio Emissions < 1 GHz



8.2 Radiated Emissions 1 - 6 GHz



8.3 AC Mains Conducted



Side View

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