Test of: Wireless Access Point

To: FCC Part 15 Subpart B, ICES-003

Test Report Serial No.: MIMO09-U3 Rev A



# Report

from



Test of: Wireless Access Point

To: FCC Part 15 Subpart B, ICES-003

Test Report Serial No.: MIMO09-U3 Rev A

This report supersedes: NONE

Manufacturer: Mimosa Networks, Inc.

469 El Camino Real, Suite 100 Santa Clara, California 95050

USA

Product Function: Wireless Access Point

Copy No: pdf Issue Date: 26th July 2016

## 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



MiCOM Labs is an ISO 17025 Accredited Testing Laboratory



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016

**Page:** 3 of 36

This page has been left intentionally blank



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016

**Page:** 4 of 36

# **TABLE OF CONTENTS**

AC	CREDIT	'ATION, LISTINGS & RECOGNITION	5
		creditation	
		t Certification	
1.		RESULT CERTIFICATE	
2.	REFER	ENCES AND MEASUREMENT UNCERTAINTY	10
	2.1. N	Iormative References	10
	2.2. T	est and Uncertainty Procedures	11
3.		JCT DETAILS AND TEST CONFIGURATIONS	
	3.1. T	echnical Details	12
	3.2. S	Scope of Test Program	13
		equipment Model(s) and Serial Number(s)	
		Cabling and I/O Ports	
	3.5. E	quipment Modifications	19
	3.6. D	Deviations from the Test Standard	19
4.	TEST S	SUMMARY / SETUP	20
5.	TEST R	RESULTS	21
	5.1. R	Radiated Spurious Emissions – Digital Apparatus	21
	5.2. A	AC Mains Conducted Emissions	28
6.	<b>PHOTO</b>	OGRAPHS	32



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016

Page: 5 of 36

## **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) <a href="https://www.a2la.org">www.a2la.org</a> test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; <a href="http://www.a2la.org/scopepdf/2381-01.pdf">http://www.a2la.org/scopepdf/2381-01.pdf</a>





# **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.



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016

**Page:** 6 of 36

### 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)	ТСВ	-	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	
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	US0159
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	

<sup>\*\*</sup>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

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

\*\*NB - Notified Body

<sup>\*\*</sup>EU MRA – European Union Mutual Recognition Agreement.



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016

Page: 7 of 36

### **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) <a href="https://www.a2la.org">www.a2la.org</a> test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; <a href="http://www.a2la.org/scopepdf/2381-02.pdf">http://www.a2la.org/scopepdf/2381-02.pdf</a>



# **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  $4^{th}$  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.

<u>United States of America – Telecommunication Certification Body (TCB)</u>

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



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016

**Page:** 8 of 36

# **Document History**

	Document History			
Revision	Date	Comments		
Draft	5 <sup>th</sup> July 2016			
Draft #2	19 <sup>th</sup> July 2016			
Rev A	26 <sup>th</sup> July 2016	Initial release.		



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016

Page: 9 of 36

# 1. TEST RESULT CERTIFICATE

Applicant: Tested By: MiCOM Labs, Inc. Mimosa Networks, Inc.

> 469 El Camino Real. Suite 100 575 Boulder Court,

Santa Clara, California 95050 Pleasanton

USA

California, 94566, USA

**EUT** Wireless Access Point Tel: +1 925 462 0304

Model: A5-14, A5-18 Fax: +1 925 462 0306

S/N 2112696984, 2119591877

Website: www.micomlabs.com Test Date(s): 13th June 2016

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:

ACCREDITE TESTING CERT #2381.01

Graeme Grieve

Quality Manager MiCOM Labs, Inc.

Gordon Hurst

President & CEO MiCOM Labs, Inc.



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016
Page: 10 of 36

# 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	2016	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	Feb 2016	Reference to A2LA Accreditation Status – A2LA Advertising Policy	



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016

**Page:** 11 of 36

## 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.



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A lssue Date: 26th July 2016

**Page:** 12 of 36

# 3. PRODUCT DETAILS AND TEST CONFIGURATIONS

### 3.1. Technical Details

Details	Description		
Purpose:	Testing of the Wireless Access Point to FCC CFR 47, Part 15,		
r dipose.	Subpart B and Industry Canada ICES-003 regulations.		
	Mimosa Networks, Inc.		
Applicant:	469 El Camino Real, Suite 100		
	Santa Clara, California 95050, USA		
	Mimosa Networks, Inc.		
Manufacturer:	469 El Camino Real, Suite 100		
	Santa Clara, California 95050, USA		
Laboratory performing the tests:	MiCOM Labs, Inc.		
Laboratory porterning the tester	575 Boulder Court		
	Pleasanton, California 94566 USA		
Test report reference number:	MIMO09-U3 Rev A		
Date EUT received:	1 <sup>st</sup> June 2016		
Dates of test (from - to):	13th June 2016		
Standard(s) applied:	FCC Part 15 Subpart B, ICES-003		
No of Units Tested: Two			
Type of Equipment:	Wireless Access Point		
Model:	A5-14, A5-18		
Conicl Number	A5-14: 2112696984		
Serial Number	A5-18: 2119591877		
Software Revision	2.0		
Hardware revision	D		
Internal Clocks 25MHz, 40MHz, 100MHz, 125Mhz, 400MHz			
Installation type:	Fixed installation		
Construction/Location for Use:	Indoor only		
Operating Temperature Range °C:	-40 to +55 °C		
Dated Cumply Voltage and Comment	PoE Adapter AC 100-240V 50/60 Hz 1.5A		
Rated Supply Voltage and Current	Output: DC 56V 0.93A		
	A5-14: 142.2mm diameter x 320.0mm / 5.6"diameter x 12.6"		
Equipment Dimensions:	(Diameter x H)		
Equipment Dimensions.	A5-18: 142.2mm diameter x 642.6mm / 5.6" diameter x 25.3"		
	(Diameter x H)		
Weight:	A5-14: 4 lbs		
vveignt.	A5-18: 8 lbs		
Primary Function:	Wireless Access Point		

**Note:** The models A5-14, A5-18 are identical, the difference is in gain of antenna, only the worst case model, A5-14, is presented.



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016
Page: 13 of 36

# 3.2. Scope of Test Program

The scope of the test program was to test the A5-14, A5-18 to verify compliance with the emissions requirements of FCC CFR 47 Part15B and Industry Canada ICES-003.

**A5-14 Front View** 





To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016 Page: 14 of 36

### A5-14 Rear View





To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016 Page: 15 of 36







To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016 Page: 16 of 36

### **A5-14 Bottom View**





To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016 Page: 17 of 36

A5-14 Left View





To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016 Page: 18 of 36

A5-14 Right View





To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A lssue Date: 26th July 2016

**Page:** 19 of 36

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

Type (EUT/ Support)	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
FUT	NA/Section Access Delet	Mimosa	A5-14	2112696984
EUT	Wireless Access Point	Networks, Inc.	A5-18	2119591877
Support	PoE Injector IP: 100-240 V <sub>AC</sub> 50/60 Hz OP: 56V 0.93A	Mimosa Networks, Inc.	502-00002	P42900690A1
Support	Laptop	Dell	Latitude D620	N/A

### 3.4. Cabling and I/O Ports

Port Type	Port Description	Qty	Screened (Yes/ No)	Length
Ethernet	Ethernet PoE Port	1	NO	> 3m

## 3.5. Equipment Modifications

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

1. NONE

### 3.6. Deviations from the Test Standard

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

1. NONE.



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016

Page: 20 of 36

# 4. TEST SUMMARY / SETUP

### **List of Measurements**

The following table represent the list of measurements required under the FCC CFR 47 part 15 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	Class A	Complies

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

**Note 2:** Section 3.5 Equipment Modifications highlights the equipment modifications that were required to bring the product into compliance with the above test matrix.



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016

**Page:** 21 of 36

# 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.



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016
Page: 22 of 36

### **Field Strength Calculation**

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

FS = R + AF + CORR - FO

FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

#### CORR = Correction Factor = CL - AG + NFL

CL = Cable Loss

AG = Amplifier Gain

FO = Distance Falloff Factor

NFL = Notch Filter Loss or Waveguide Loss

### Field Strength Calculation Example:

Given receiver input reading of 51.5 dB $_{\mu}$ 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:

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

Conversion between  $dB\mu V/m$  (or  $dB\mu V$ ) and  $\mu V/m$  (or  $\mu V$ ) are done as:

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

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

 $48~dB\mu V/m = 250~\mu V/m$ 



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016

**Page:** 23 of 36

### **FCC 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.

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

Field Strength of radiated emissions for a Class A digital device are as follows.

Frequency (MHz)	Field Strength @ 10m (µV/m)	Measurement Distance (meters)	Field Strength (dBµV/m) @ 3m
30-88	90	3	49.5
88-216	150	3	54.0
216-960	210	3	57.0
Above 960	300	3	60.0

### **Laboratory Measurement Uncertainty for Spectrum Measurement**

Measurement Uncertainty	+5.6/ -4.5 dB
-------------------------	---------------

### **Traceability**

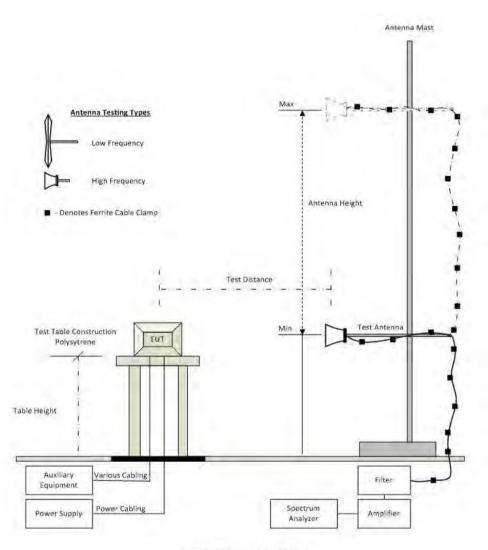
Method
Work instruction WI-EMC-07: Radiated Emissions Test



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016
Page: 24 of 36

### **Radiated Emission Measurement Setup**



**Radiated Emission Test Setup** 

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



**To:** FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016

**Page:** 25 of 36

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Co	4196	E2846	01 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	15 Aug 2016
338	Sunol 30 to 3000 MHz Ant	Sunol	JB3	A052907	15 Aug 2016
341	900MHz Notch Filter	EWT	EWT-14-0199	H1	18 Aug 2016
342	2.4 GHz Notch Filter	EWT	EWT-14-0203	H1	18 Aug 2016
377	Band Rejection Filter 5150 to 5880MHz	Microtronics	BRM50716	034	18 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	10 Oct 2016
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	10 Oct 2016
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	Not Required
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	Cal when used
414	DC Power Supply 0-60V	HP	6274	1029A01285	Not Required



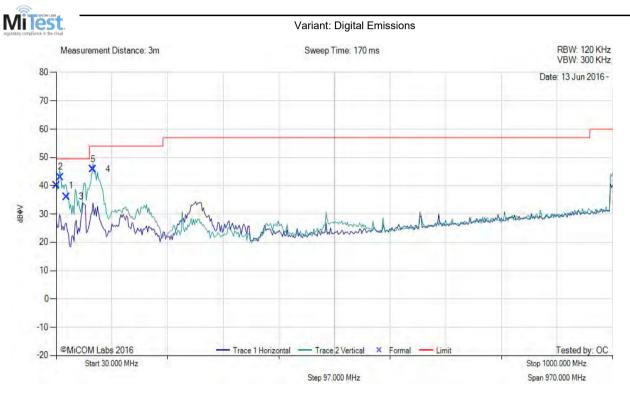
To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016

Page: 26 of 36

### Measurement Results: Radiated Emissions; 0.03 - 1 GHz

Model Number	A5-14, S/N: 2112696984	Engineer	OC				
Variant	Digital Emissions 120VAC, 60Hz	Temp (°C)	22				
Freq. Range	30 – 1000 MHz	Rel. Hum.(%)	45				
Power Setting	NA	Press. (mBars)	1003				
Antenna	N/A						
Test Notes 1	PoE powered: Manu.: Mimosa Networks, Mode	PoE powered: Manu.: Mimosa Networks, Model: P42900690A1					
Test Notes 2	Class A Limits						



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	30.57	47.23	3.43	-10.61	40.05	MaxQP	Vertical	100	117	49.5	<b>-</b> 9.5	Pass
2	37.51	55.59	3.48	-16.06	43.01	MaxQP	Vertical	100	184	49.5	-6.5	Pass
3	47.75	54.88	3.56	-22.34	36.10	MaxQP	Vertical	102	26	49.5	-13.4	Pass
4	94.33	65.00	3.84	-23.03	45.81	MaxQP	Vertical	100	197	54.0	<b>-</b> 8.2	Pass
5	94.34	65.04	3.84	-23.03	45.85	MaxQP	Vertical	105	215	54.0	<b>-</b> 8.2	Pass

Test Notes: 120V 60Hz. Model: A5-14, S/N: 2112696984. PoE configuration, S/N: P42900690A1. EUT set to ping laptop continuously.

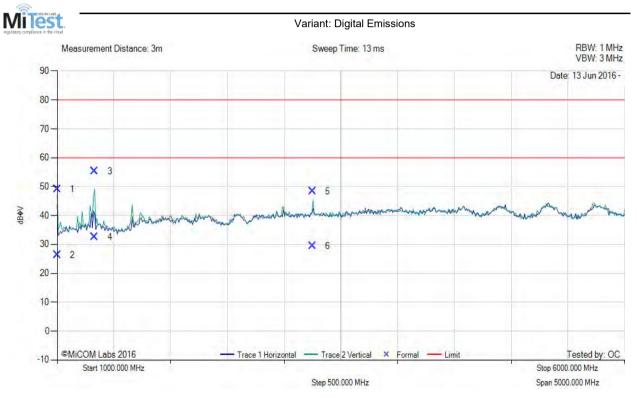


To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016
Page: 27 of 36

Measurement Results: Radiated Emissions; 1-6 GHz

Model Number	A5-14, S/N: 2112696984	Engineer	OC				
Variant	Digital Emissions 120VAC, 60Hz	Temp (°C)	22				
Freq. Range	1000 – 6000 MHz	Rel. Hum.(%)	45				
Power Setting	NA	Press. (mBars)	1003				
Antenna	N/A						
Test Notes 1	PoE powered: Manu.: Mimosa Networks, Mode	PoE powered: Manu.: Mimosa Networks, Model: P42900690A1					
Test Notes 2	Class A Limits	_					



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	1000.00	63.97	2.03	-16.95	49.05	Max Peak	Vertical	100	141	60.0	-11.0	Pass
2	1000.00	41.21	2.03	-16.95	26.29	Max Avg	Vertical	100	141	80.0	-53.7	Pass
3	1331.21	68.14	2.24	-15.02	55.36	Max Peak	Vertical	100	162	60.0	-4.6	Pass
4	1331.21	45.29	2.24	-15.02	32.51	Max Avg	Vertical	100	162	80.0	-47.5	Pass
5	3249.35	56.63	3.03	-11.26	48.40	Max Peak	Vertical	184	251	60.0	-11.6	Pass
6	3249.35	37.67	3.03	-11.26	29.44	Max Avg	Vertical	184	251	80.0	-50.6	Pass

Test Notes: 120V 60Hz. Model: A5-14, S/N: 2112696984. PoE configuration, S/N: P42900690A1. EUT set to ping laptop continuously.



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016
Page: 28 of 36

# 5.2. AC Mains Conducted Emissions

#### **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.



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016

**Page:** 29 of 36

#### Limits

The equipment shall meet the class B 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 bound	ary 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  $9 \, \text{kHz} - 30 \, \text{MHz}$  (Average & Quasi-peak) is  $\pm 2.64 \, \text{dB}$ .

Laboratory Measurement Uncertainty	
Measurement uncertainty	±2.64 dB

#### Method

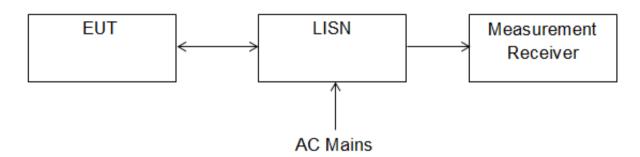
Measurements were made per work instruction WI-EMC-01 'Measurement of Conducted Emissions'



To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016
Page: 30 of 36

# **AC Mains Conducted Emissions 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	01 Dec 2016
184	Pulse Limiter	Rhode & Schwarz	ESH3Z2	357.8810.52	27 Oct 2016
190	LISN (two-line V-network)	Rhode & Schwarz	ESH3Z5	836679/006	29 Oct 2016
193	Receiver 20 Hz to 7 GHz	Rhode & Schwarz	ESI 7	838496/007	17 Jun 2016
307	BNC-CABLE	Megaphase	1689 1GVT4	15F50B002	27 Oct 2016
316	Dell desktop computer workstation with Vasona	Dell	Desktop	WS04	Not Required
351	Data Impedance Stabilization Network	Teseq	ISN T800	24809	30 Nov 2016
372	AC Variable PS	California Instruments	1251P	L06951	Cal when used
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	04 Aug 2016
388	LISN (3 Phase) 9kHz - 30MHz	Rohde & Schwarz	ESH2-Z5	892107/022	30 Oct 2016
ADAPT SMA#1	SMA Cable	Megaphase	SMA Cable #1	None	Cal when used

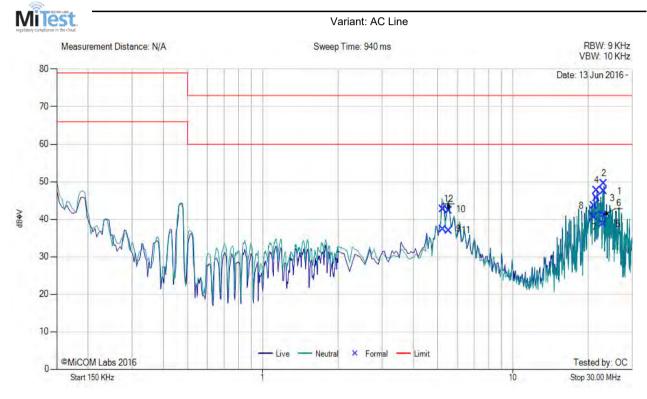


To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016
Page: 31 of 36

#### **Measurement Results**

Model Number	A5-14, S/N: 2112696984	Engineer	OC				
Variant	AC Wireline 120VAC, 60Hz	Temp (°C)	22				
Freq. Range	30 – 1000 MHz	Rel. Hum.(%)	45				
Power Setting	NA	Press. (mBars)	1003				
Antenna	N/A						
Test Notes 1	PoE powered: Manu.: Mimosa Networks, Model	PoE powered: Manu.: Mimosa Networks, Model: P42900690A1					
Test Notes 2	Class A Limits						



Num	Frequency MHz	Raw dBµV	Cable Loss	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV	Margin dB	Pass /Fail
1	23.129	35.99	0.64	10.85	11.49	47.48	Max Avg	Live	60.0	-12.5	Pass
2	23.129	37.99	0.64	10.85	11.49	49.48	Max Qp	Live	73.0	-23.5	Pass
3	21.663	34.28	0.65	10.72	11.37	45.65	Max Avg	Live	60.0	-14.4	Pass
4	21.663	36.25	0.65	10.72	11.37	47.62	Max Qp	Live	73.0	-25.4	Pass
5	22.945	27.34	0.64	10.85	11.49	38.83	Max Avg	Neutral	60.0	-21.2	Pass
6	22.945	29.55	0.64	10.85	11.49	41.04	Max Qp	Neutral	73.0	-32.0	Pass
7	21.112	29.29	0.65	10.68	11.33	40.62	Max Avg	Live	60.0	-19.4	Pass
8	21.112	32.27	0.65	10.68	11.33	43.60	Max Qp	Live	73.0	-29.4	Pass
9	5.260	27.00	0.29	10.11	10.40	37.40	Max Avg	Neutral	60.0	-22.6	Pass
10	5.260	32.26	0.29	10.11	10.40	42.66	Max Qp	Neutral	73.0	-30.3	Pass
11	5.532	26.57	0.31	10.11	10.42	36.99	Max Avg	Live	60.0	-23.0	Pass
12	5.532	31.88	0.31	10.11	10.42	42.30	Max Qp	Live	73.0	-30.7	Pass

Test Notes: 120V 60Hz. Model: A5-14, S/N: 2112696984. PoE configuration, S/N: P42900690A1. EUT set to ping laptop continuously.

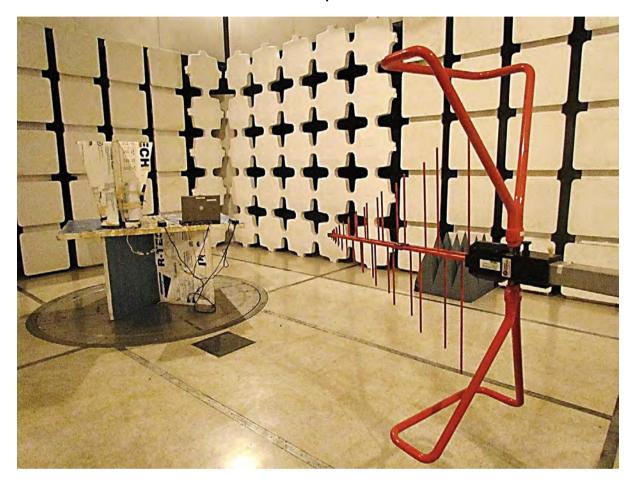


To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016 Page: 32 of 36

# 6. PHOTOGRAPHS

### Radiated Emissions Setup - 30-1000 MHz Front

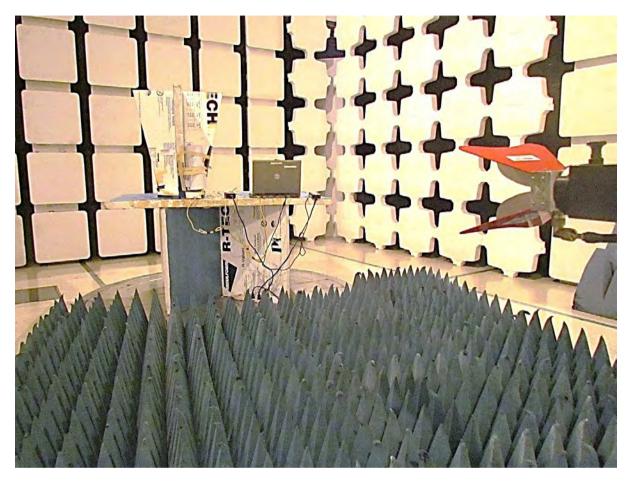




To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016 Page: 33 of 36

## Radiated Emissions Setup - 1-6 GHz Front

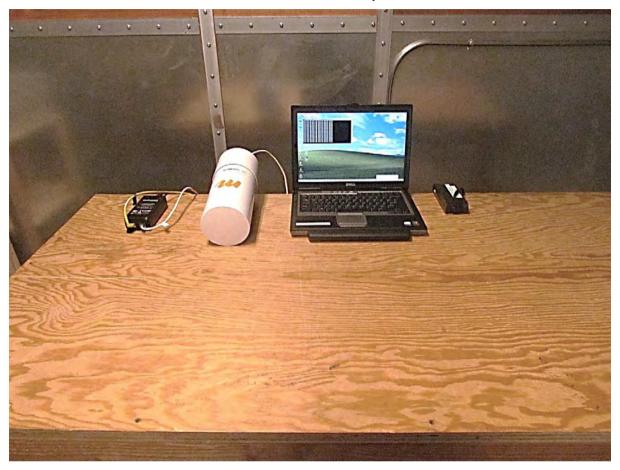




To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A Issue Date: 26th July 2016
Page: 34 of 36

### **AC Wireline Emissions Setup - Front**





To: FCC Part 15 Subpart B, ICES-003

Report Serial #: MIMO09-U3 Rev A lssue Date: 26th July 2016 Page: 35 of 36

### **AC Wireline Emissions Setup - Side**





575 Boulder Court
Pleasanton, California 94566, USA
Tel: 1.925.462.0304
Fax: 1.925.462.0306
www.micomlabs.com