Test of: Actiontec Electronics Inc T3200BV, C2300A

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

Test Report Serial No.: ATEC23-U2 Rev A

MiCOM Labs

opening wireless markets

Report
from

Test of: Actiontec Electronics Inc. T3200BV, C2300A

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

Test Report Serial No.: ATEC23-U2 Rev A

This report supersedes NONE

Manufacturer: Actiontec Electronic Inc
760 N Mary Avenue
Sunnyvale California 94085
USA

Product Function: Wireless 11ac Bonded VDSL2 Modem Gateway

Copy No: pdf **Issue Date:** 21st March 2017

This Test Report is Issued Under the Authority of;

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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. 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

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Pleasanton, CA

for technical competence in the field of

Electrical Testing

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

Presented this 4th day of February 2016.

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

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

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.
model	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	31st January 2017	
Rev A	21st March 2017	Initial Release

3. TEST RESULT CERTIFICATE

Manufacturer:	Actiontec Electronic Inc 760 N Mary Avenue Sunnyvale California 94085 USA	Tested By:	MiCOM Labs, Inc. 575 Boulder Court, Pleasanton California 94566 USA
EUT:	Wireless 11ac Bonded VDSL2 Modem Gateway	Tel:	+1 925 462 0304
Model:	T3200BV, C2300A	Fax:	+1 925 462 0306
S/N:	GATT6280300009		
Test Date(s):	12th January 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:

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:

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 47 CFR Part 15, Subpart B	2016	Unintentional Radiators
II	ICES-003	Issue 6 January 2016	Information Technology Equipment (Including Digital Apparatus) — Limits and Methods of Measurement
III	A2LA	June 2015	R105 - Requirement's When Making Reference to A2LA Accreditation Status
IV	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
V	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
VI	M 3003	Edition 3 Nov. 2012	Expression of Uncertainty and Confidence in Measurements

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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 / SETUP

List of Measurements

The following table represent the list of measurements required under the FCC CFR 47 part 15 standards;

TABLE OF REQUIRED TESTS – Emissions

Test Standard	Phenomenon/ Description	Limits	Compliance
FCC Part 15B	Radiated Emissions	Class B	Complies
FCC Part 15B	Conducted Emissions - ac power	Class B	Complies

Note 1: Test results reported in this document relate only to the items tested
Note 2: The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria
Note 3: Section 6.6 Equipment Modifications highlights the equipment modifications that were required to bring the product into compliance with the above test matrix

6. PRODUCT DETAILS AND TEST CONFIGURATIONS

6.1. Test Program Scope

The scope of the test program was to test the Actiontec Electronics Inc T3200BV, C2300A for verification to FCC CFR 47, part 15, Subpart B and Industry Canada ICES-003 radiated emissions 30 – 6000 MHz and AC wireline emissions;-

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

EUT is labelled C2150A, however that is customer assigned model number. ActionTec Electronics Inc. declares Model Number is T3200BV.

Actiontec Electronics Inc T3200BV, C2300A

Actiontec Electronics Inc T3200BV, C2300A

Actiontec Electronics Inc T3200BV, C2300A

Actiontec Electronics Inc T3200BV, C2300A

Actiontec AC/DC Power Adaptor

CDS036-W120U output 12Vdc 3A

6.2. Technical Details

Details	Description
Purpose:	Verification test of the Actiontec Electronics T3200BV, C2300A to FCC CFR 47, Part 15, Subpart B and Industry Canada ICES-003
Applicant:	As Manufacturer
Manufacturer:	Actiontec Electronic Inc. 760 N Mary Avenue, Sunnyvale California 94085 USA
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton, California 94566 USA
Test report reference number:	ATEC23-U2 Rev A
Date EUT received:	12th January 2017
Test Date:	12th January 2017
Standard(s) applied:	FCC CFR 47 Part 15B & IC ICES-003
No of Units Tested:	One
Type of Equipment:	Wireless 11ac Bonded VDSL2 Modem Gateway
Product Family Name:	Bonded VDSL2/G.fast Wireless AC Gateway Router
Models:	T3200BV, C2300A Note: The T3200BV was tested in this program
Serial Number	GATT6280300009
Internal Clocks	Not Provided
Construction/Location for Use:	Indoor Use Only
Operating Temperature Range:	Declared Range 0°C to 40°C
Rated Input Voltage and Current:	AC/ DC adaptor (adaptor sold with unit) Actiontec CDS036-W120U 100 - 240Vac 50/60Hz 0.8A 12 Vdc 3 A
Equipment Dimensions:	9.5” (H) x 7.25” (D) x 2.25” (W)
Weight:	0.95 lb
Hardware Rev:	AM1
Software Rev:	31.164L.00c-mfg1

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

Type (EUT/ Support)	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
EUT	Wireless 11ac Bonded VDSL2 Modem Gateway	Actiontec	T3200BV	GATT6280300009
EUT	Power Adapter 100 - 240Vac 50/60Hz 0.8A 12 Vdc 3 A	Actiontec	CDS036-W120U	55206605
Support	Laptop PC	IBM	Thinkpad	None

6.4. Antenna Details

Details provided for information only

Type	Manufacturer	Model	Family	Gain (dBi)	BF Gain	Dir BW	X-Pol	Frequency Band (MHz)
integral	Galtronics	Custom Cabled u.Fl	Dipole	3.0	-	360	-	2400 - 2483.5
integral	Galtronics	Custom Cabled u.Fl	Dipole	3.4	2.7	360	-	5150 - 5250
integral	Galtronics	Custom Cabled u.Fl	Dipole	4.46	1.16	360	-	5250 - 5350
integral	Galtronics	Custom Cabled u.Fl	Dipole	4.4	1.4	360	-	5470 - 5725
integral	Galtronics	Custom Cabled u.Fl	Dipole	4.43	1.57	360	-	5725 - 5850

BF Gain - Beamforming Gain
Dir BW - Directional BeamWidth
X-Pol - Cross Polarization

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	Max Cable Length	# Of Ports	Screened	Conn Type	Data Type
Ethernet LAN	100m	4	N	RJ-45	Packet Data
Ethernet WLAN	100m	1	N	RJ-45	Packet Data
USB 3.0	15m	2	Y	USB	Data
RJ14		1	N	RJ14	
RJ11		2	N	RJ11	Analog
SFP		1	N	SFP	Fiber

6.6. Equipment Modifications

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

1. NONE

6.7. Deviations from the Test Standard

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

1. NONE

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 – 18,000 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.

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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

Limits

The ancillary equipment shall meet the class B limits given in CISPR 22, and the limits above 1 GHz shown below.

FCC 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	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
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 2017
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	15 Aug 2017
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	4 Aug 2017
393	DC - 1050 MHz Low Pass Filter	Microcircuits	VLFX-1050	N/A	16 Aug 2017
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	9 Jun 2017
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	10 Apr 2017
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	9 Jun 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	Rad Emissions Test Software	MiCOM	Rad Emissions Test Software Version 1.0.109	447	Not Required
462	Schwarzbeck cable from Antenna to Amplifier.	Schwarzbeck	AK 9513	462	31 May 2017
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	31 May 2017
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	31 May 2017
465	Low Pass Filter DC-1000 MHz	Mini-Circuits	NLP-1200+	VUU01901402	2 Jun 2017
480	Cable - Bulkhead to Amp	SRC Haverhill	157-157-3050360	480	2 Jun 2017
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-151-3050787	481	2 Jun 2017
482	Cable - Amp to Antenna	SRC Haverhill	157-157-3051574	482	2 Jun 2017

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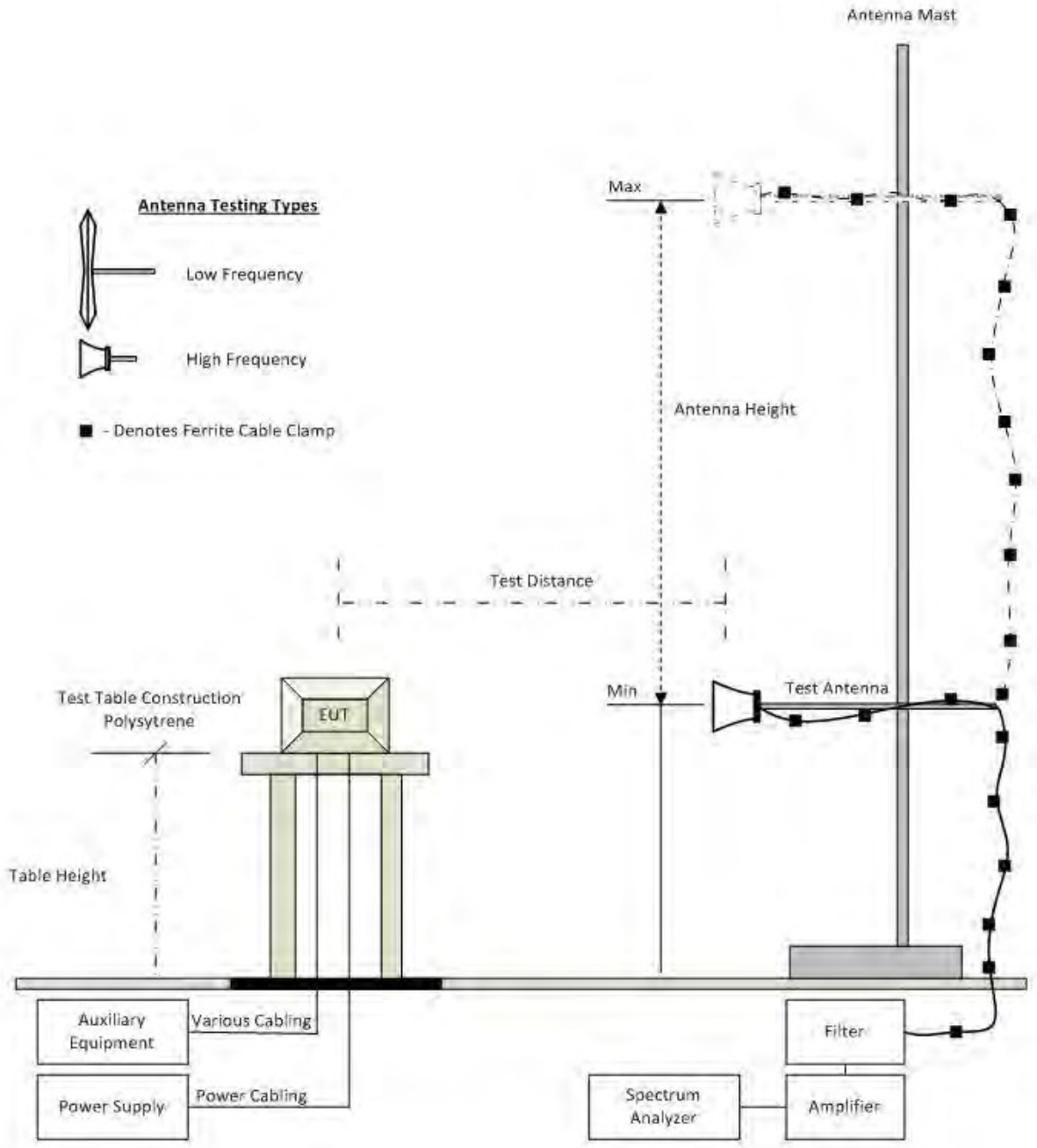
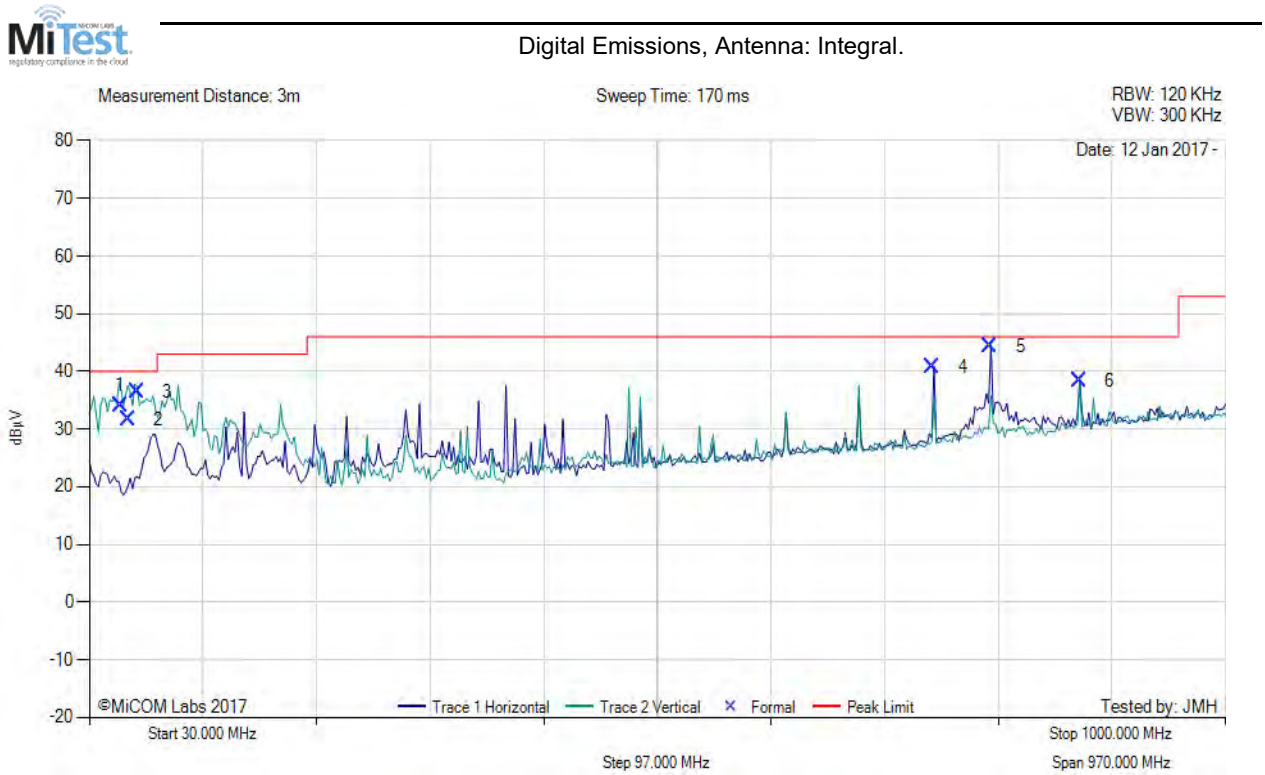
Test Setup for Radiated Emissions for above and below 1 GHz



Radiated Emission Test Setup

Measurement Results: 30-1000MHz

Actiontec AC/DC Power Adaptor CDS036-W120U

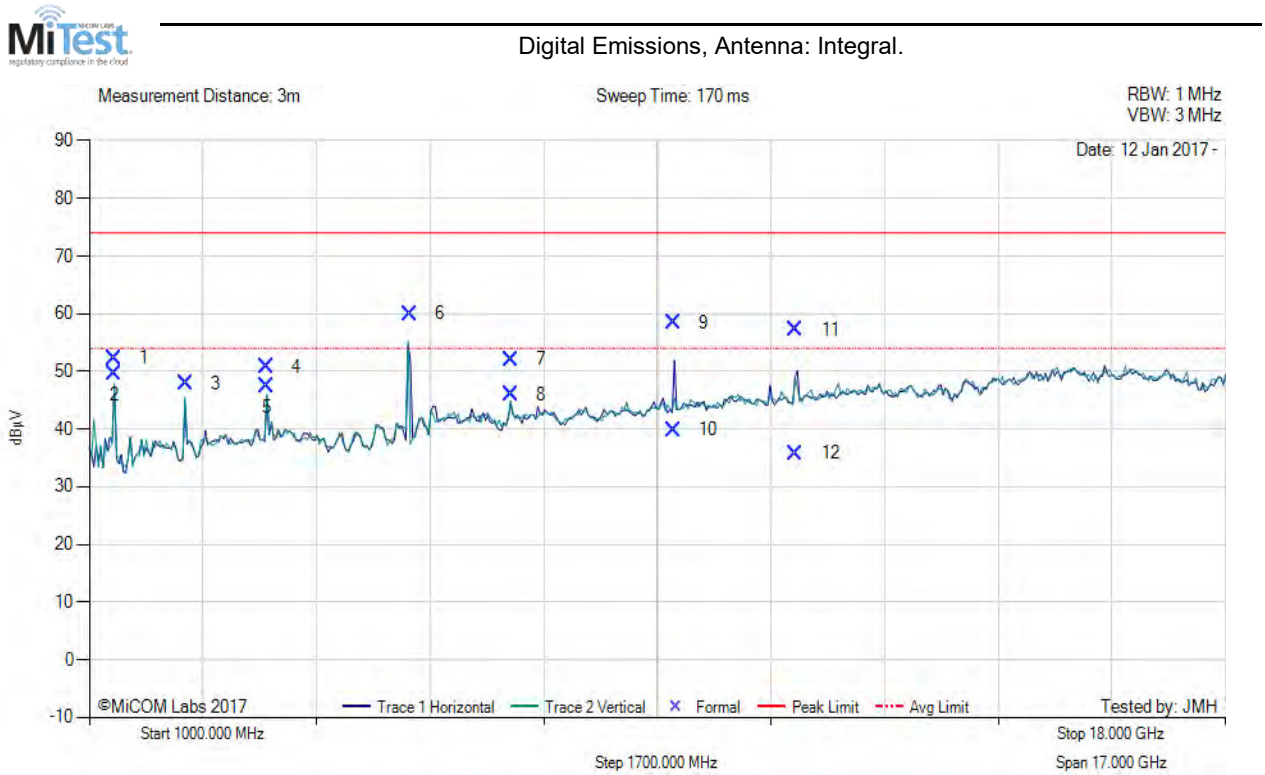


30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	56.19	54.63	3.61	-24.13	34.11	MaxQP	Vertical	100	98	40.0	-5.9	Pass
2	63.00	51.75	3.66	-23.71	31.70	MaxQP	Vertical	100	62	40.0	-8.3	Pass
3	70.67	55.87	3.71	-23.19	36.39	MaxQP	Vertical	104	97	40.0	-3.6	Pass
4	750.02	44.19	5.99	-9.42	40.76	MaxQP	Horizontal	204	232	46.0	-5.2	Pass
5	799.22	47.23	6.08	-8.91	44.40	MaxQP	Horizontal	341	138	46.0	-1.6	Pass
6	875.01	40.17	6.27	-8.09	38.35	MaxQP	Horizontal	100	351	46.0	-7.7	Pass

Test Notes: EUT powered by AC/DC adapter. Connected via fiber to fiber/lan interface and laptop outside chamber. DSL connected to DLS box. EUT 2.4G and 5G connected to Laptops pinging inside chamber. Added ferrite to DSL line underground plane. Different DSL Emulator Broadcom BCM96438V6

Actiontec AC/DC Power Adaptor CDS036-W120U

Measurement Results: 1000-18000 MHz



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	1375.00	65.45	2.27	-15.38	52.34	Max Peak	Vertical	103	270	74.0	-21.7	Pass
2	1375.00	62.67	2.27	-15.38	49.56	Max Avg	Vertical	103	270	54.0	-4.4	Pass
3	2437.21	56.87	2.72	-11.73	47.86	Fundamental	Vertical	101	1	--	--	Pass
4	3655.53	58.68	3.16	-11.05	50.79	Max Peak	Vertical	100	87	74.0	-23.2	Pass
5	3655.53	55.25	3.16	-11.05	47.36	Max Avg	Vertical	100	87	54.0	-6.6	Pass
6	5789.82	66.65	3.79	-10.42	60.02	Fundamental	Vertical	101	1	--	--	Pass
7	7310.92	55.12	4.24	-7.29	52.07	Max Peak	Vertical	105	85	74.0	-21.9	Pass
8	7310.92	49.08	4.24	-7.29	46.03	Max Avg	Vertical	105	85	54.0	-8.0	Pass
9	9747.71	59.36	5.29	-6.23	58.42	Max Peak	Horizontal	100	81	74.0	-15.6	Pass
10	9747.71	40.77	5.29	-6.23	39.83	Max Avg	Horizontal	100	81	54.0	-14.2	Pass
11	11570.02	56.46	5.46	-4.64	57.28	Max Peak	Horizontal	100	28	74.0	-16.7	Pass
12	11570.02	35.01	5.46	-4.64	35.83	Max Avg	Horizontal	100	28	54.0	-18.2	Pass

Test Notes: EUT powered by AC/DC adapter. Connected via fiber to fiber/lan interface and laptop outside chamber. DSL connected to DLS box. EUT 2.4G and 5G connected to Laptops pinging inside chamber. removed heat sink from Quantenna chip

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 CISPR 22 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.

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Limits

The equipment shall meet the class B limits given in CISPR 22. Alternatively, for equipment intended to be used in telecommunication centres only, the class A limits given in CISPR 22 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

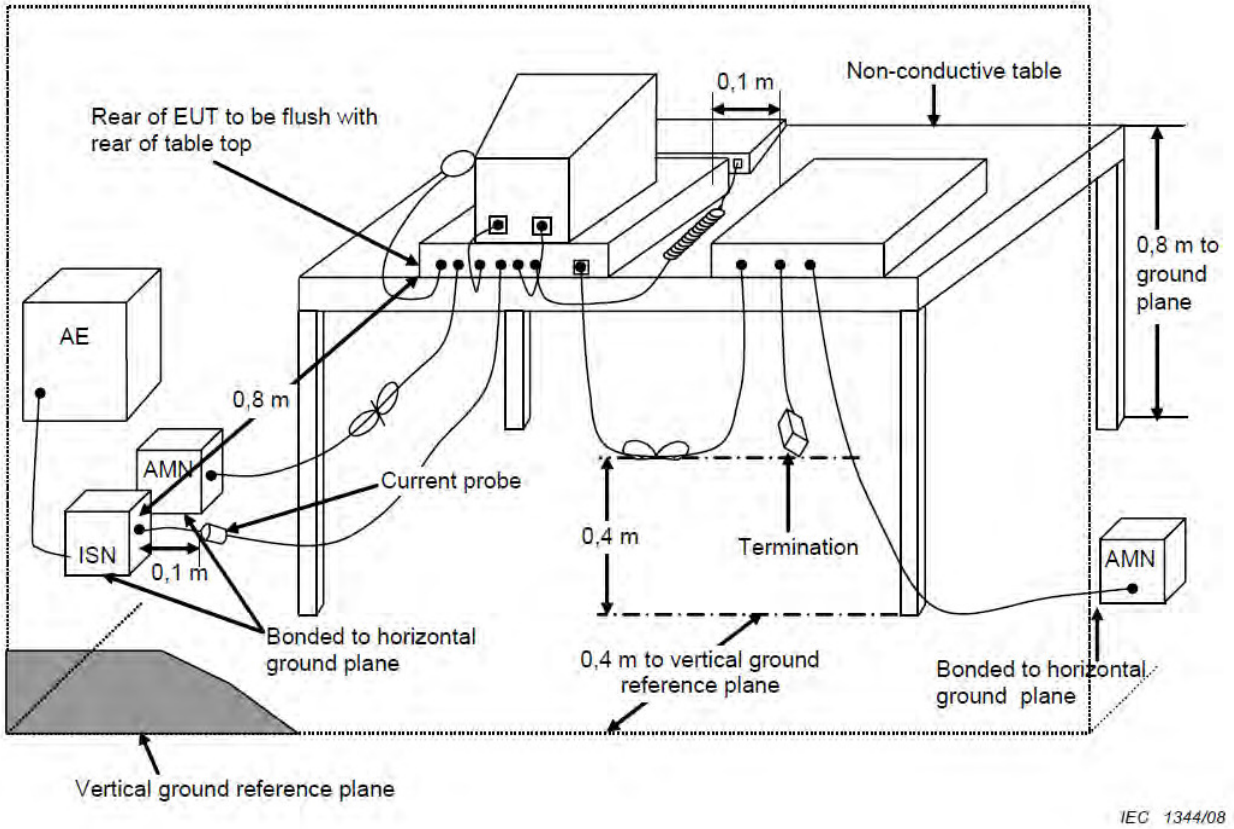
Method
Measurements were made per work instruction WI-EMC-01 'Measurement of Conducted Emissions'

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	7 Apr 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 Apr 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	Conducted Emissions Test Software Version 1.0.87	496	Not Required
ADAPT SMA#1	SMA Cable	Megaphase	SMA Cable #1	None	6 Apr 2017

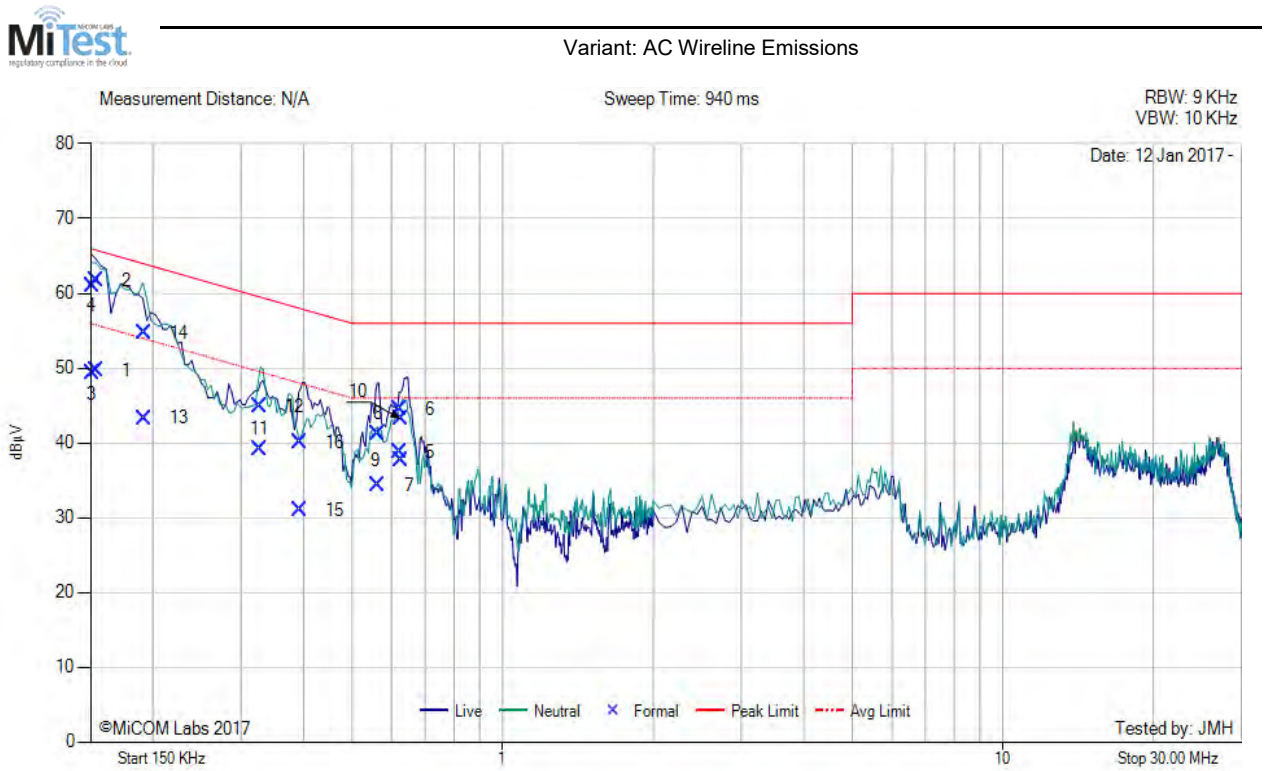
This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel and any changes noted in the Document History section of the report.

Test Setup – Power Input / Output Port



Measurement Results

Actiontec AC/DC Power Adaptor CDS036-W120U/120V 60 Hz

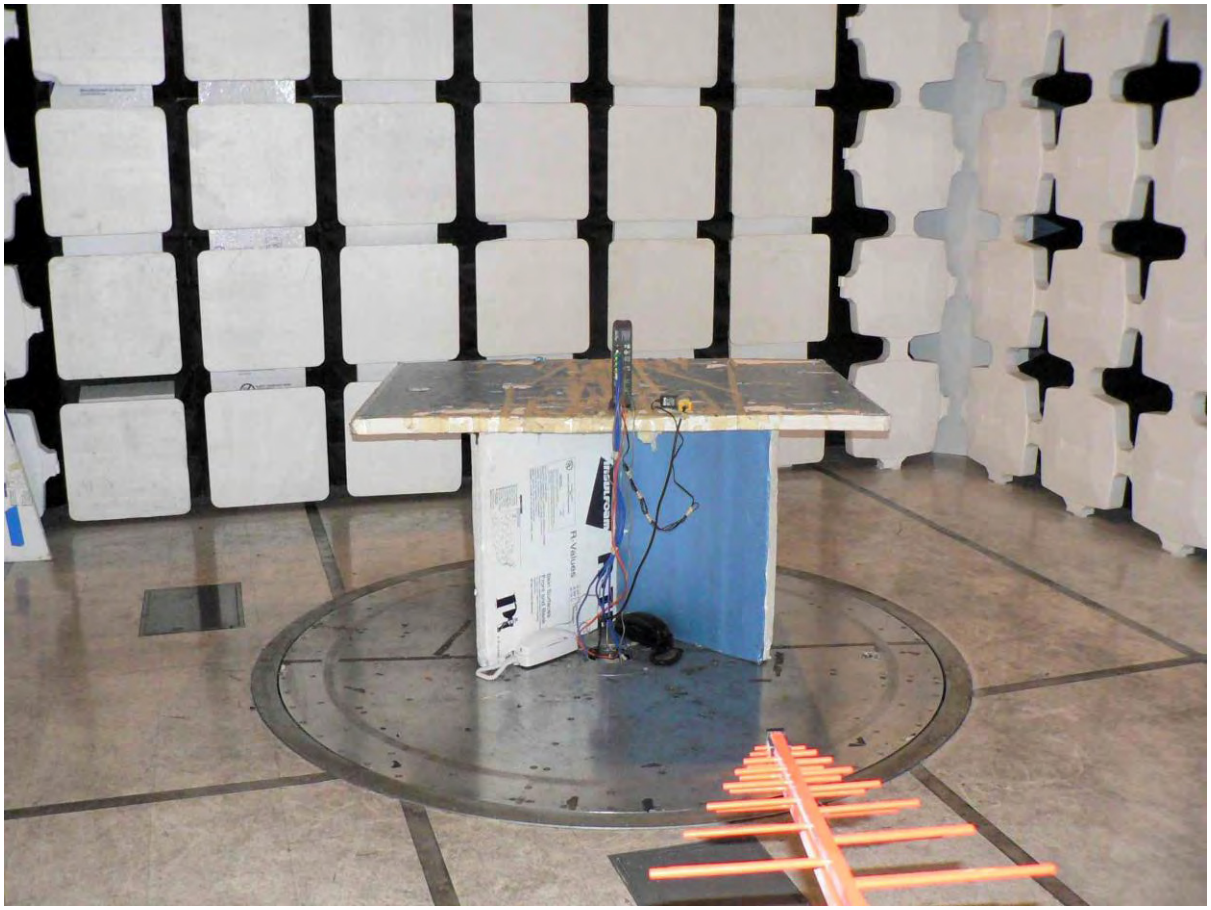


Num	Frequency MHz	Raw dBµV	Cable Loss dB	Factor dB	Total Correction dBµV	Corrected Value dBµV	Measurement Type	Line	Limit dBµV/m	Margin dB	Pass /Fail
1	0.154	39.78	0.05	9.92	9.97	49.75	Max Avg	Live	55.9	-6.1	Pass
2	0.154	51.71	0.05	9.92	9.97	61.68	Max Qp	Live	65.9	-4.2	Pass
3	0.151	39.31	0.05	9.92	9.97	49.28	Max Avg	Neutral	55.9	-6.6	Pass
4	0.151	51.09	0.05	9.92	9.97	61.06	Max Qp	Neutral	65.9	-4.8	Pass
5	0.623	28.80	0.10	9.93	10.03	38.83	Max Avg	Live	46.0	-7.2	Pass
6	0.623	34.46	0.10	9.93	10.03	44.49	Max Qp	Live	56.0	-11.5	Pass
7	0.564	24.31	0.10	9.92	10.02	34.33	Max Avg	Live	46.0	-11.7	Pass
8	0.564	31.18	0.10	9.92	10.02	41.20	Max Qp	Live	56.0	-14.8	Pass
9	0.626	27.63	0.11	9.93	10.04	37.67	Max Avg	Neutral	46.0	-8.3	Pass
10	0.626	33.19	0.11	9.93	10.04	43.23	Max Qp	Neutral	56.0	-12.8	Pass
11	0.327	29.24	0.04	9.92	9.96	39.20	Max Avg	Neutral	50.9	-11.7	Pass
12	0.327	34.96	0.04	9.92	9.96	44.92	Max Qp	Neutral	60.9	-16.0	Pass
13	0.192	33.34	0.06	9.92	9.98	43.32	Max Avg	Neutral	54.8	-11.5	Pass
14	0.192	44.67	0.06	9.92	9.98	54.65	Max Qp	Neutral	64.8	-10.2	Pass
15	0.393	21.04	0.03	9.92	9.95	30.99	Max Avg	Live	49.1	-18.1	Pass
16	0.393	30.18	0.03	9.92	9.95	40.13	Max Qp	Live	59.1	-18.9	Pass

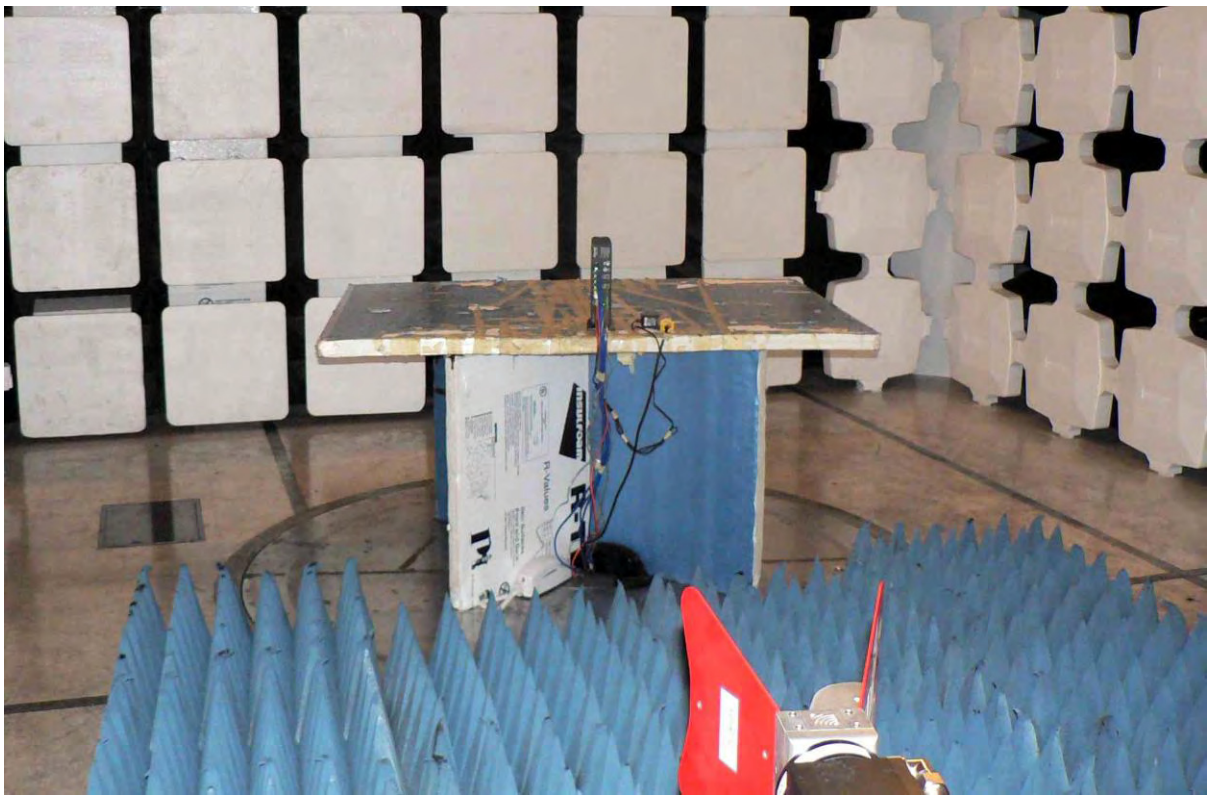
Test Notes: EUT powered by ATEC AC/DC PS. 120V 60 Hz, Fiber, DSL, ENET ports active. 2.4 and 5G WiFi active and connected to Laptops

8. PHOTOGRAPHS

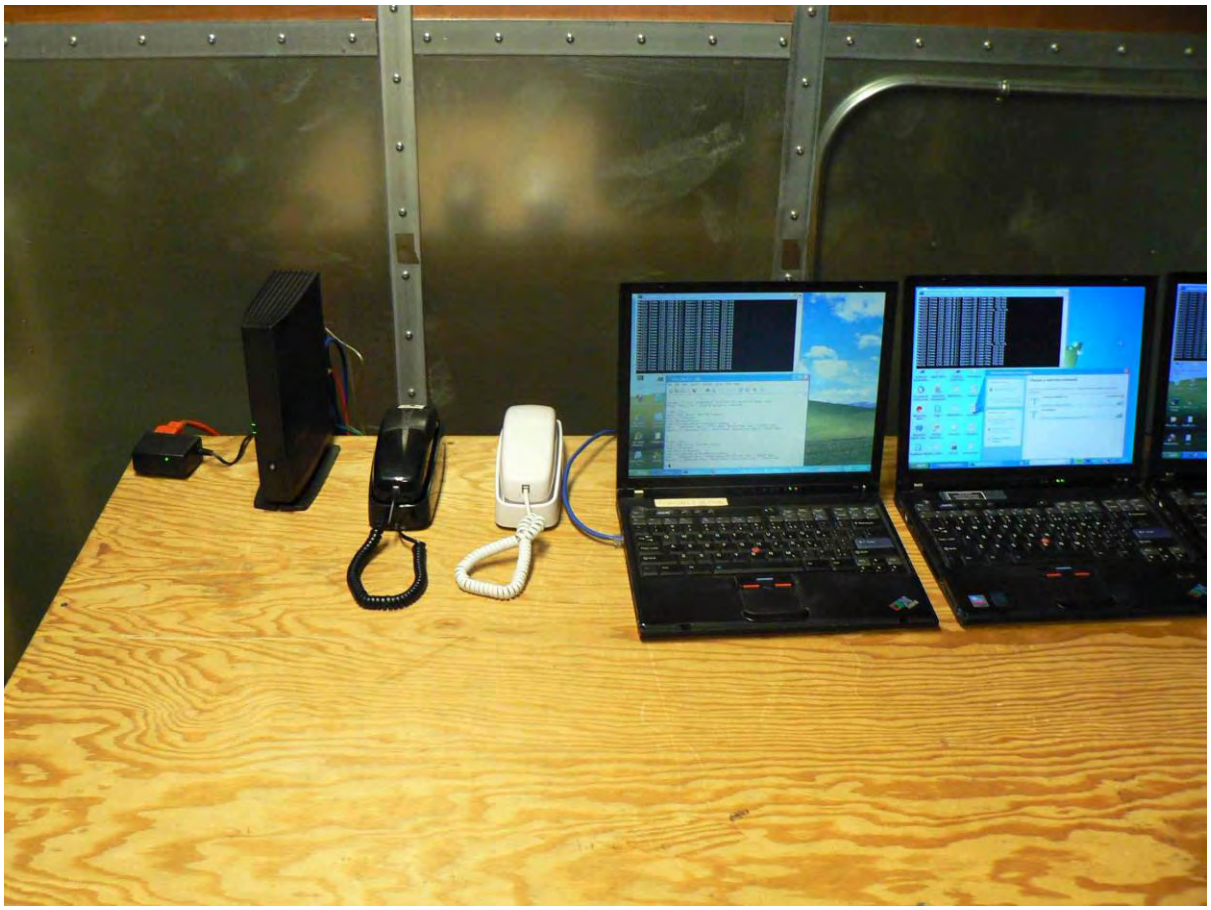
8.1. Radio Emissions < 1 GHz



8.2. Radiated Emissions 1 - 18 GHz



8.3. AC Wireline Emissions



AC Wireline Test Setup - Side

9. ADDENDUM – DECLARATION OF SIMILARITIES (DoS)

Actiontec Electronics, Inc.
760 North Mary Avenue • Sunnyvale • CA • 94085 • USA
Phone (408) 752-7700 • Fax (408) 541-9003 • www.actiontec.com

Declaration of Similarity

Date: February 1, 2017

To Whom It May Concern,

We, Actiontec Electronics, Inc., hereby to declare that product: Bonded VDSL2/G.fast Wireless AC Gateway Router, Model: C2300A is electrically identical with the same electromagnetic emissions and electromagnetic compatibility characteristics as Model: T3200BV which has been tested at MiCOM Labs. for FCC CFR47 Part 15B/IC ICES-003 under Test Report No.: ATEC23-U2.

The purpose is to clarify specifically for one large customer versus generic consumer products due to marketing reason.

Please contact me should there be need for any additional clarification or information.

Best Regards,

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