

Test of APEX0100, APEX0101 802.11a/b/g/n/ac

To: FCC 47 CFR Part 15.407 & IC RSS-210

Test Report Serial No.: ARUB169-U3 Rev A



TEST REPORT

FROM



Test of APEX0100, APEX0101 802.11a/b/g/n/ac

to

To FCC 47 CFR Part 15.407 & IC RSS-210

Test Report Serial No.: ARUB169-U3 Rev A

Note: this report contains data with regard to the 5,250 - 5,350 MHz and 5,470 – 5,725 MHz (DFS) bands for Aruba Networks, APEX0100 and APEX0101 Wireless Access Point. DFS testing is reported in MiCOM Labs report ARUB173-U2.

This report supersedes None

Applicant: Aruba Networks
1344 Crossman Avenue
Sunnyvale, California 94089
USA

Product Function: Wireless Access Point

Copy No: pdf Issue Date: 29th September 2014

This Test Report is Issued Under the Authority of:

MiCOM Labs, Inc.

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



TESTING CERT # 2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory



Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 3 of 287

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TABLE OF CONTENTS

ACCREDITATION, LISTINGS & RECOGNITION.....	5
TESTING ACCREDITATION.....	5
RECOGNITION.....	6
PRODUCT CERTIFICATION.....	7
1. TEST RESULT CERTIFICATE.....	9
2. REFERENCES AND MEASUREMENT UNCERTAINTY.....	10
2.1. Normative References.....	10
2.2. Test and Uncertainty Procedures.....	11
3. PRODUCT DETAILS AND TEST CONFIGURATIONS.....	12
3.1. Technical Details.....	12
3.2. Scope of Test Program.....	13
3.3. Equipment Model(s) and Serial Number(s).....	16
3.4. Cabling and I/O Ports.....	16
3.5. Antenna Details.....	17
3.6. Cabling and I/O Ports.....	18
3.7. Test Configurations.....	19
3.8. Equipment Modifications.....	20
3.9. Deviations from the Test Standard.....	20
4. TESTING EQUIPMENT CONFIGURATION(S).....	21
4.1. Conducted RF Emission Test Set-up.....	21
4.2. Radiated Spurious Emission Test Set-up > 1 GHz.....	23
4.3. Digital Emissions Test Set-up (0.03 – 1 GHz).....	24
4.4. ac Wireline Emission Test Set-up.....	25
5. TEST SUMMARY.....	26
6. TEST RESULTS.....	28
6.1. Device Characteristics.....	28
6.1.1. <i>Conducted Testing</i>	28
6.1.2. <i>Radiated Emission Testing</i>	72
6.1.3. <i>AC Wireline Conducted Emissions (150 kHz – 30 MHz)</i>	122
7. PHOTOGRAPHS.....	125
7.1. Conducted Test Setup.....	125
7.2. Test Setup - Radiated Emissions < 1 GHz.....	126
7.3. Test Setup - Radiated Emissions > 1 GHz.....	127
8. TEST EQUIPMENT DETAILS.....	128
APPENDIX.....	130
A. SUPPORTING INFORMATION.....	130
A.1. CONDUCTED TEST PLOTS.....	130
A.1.1. <i>26 dB & 99% Bandwidth</i>	131
A.1.2. <i>Peak Power Spectral Density</i>	191
A.1.3. <i>Peak Excursion Ratio</i>	271

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 5 of 287

ACCREDITATION, LISTINGS & RECOGNITION

TESTING ACCREDITATION

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per 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>



American Association for Laboratory Accreditation

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 28th day of February 2014.

President & CEO
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2015



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

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RECOGNITION

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

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

**APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement.
Is a recognition agreement under which test lab is accredited to regulatory standards of the APEC member countries.

Phase I - recognition for product testing

Phase II – recognition for both product testing and certification

N/A – Not Applicable

**EU MRA – European Union Mutual Recognition Agreement.

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

**NB – Notified Body

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 7 of 287

PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard EN 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>



American Association for Laboratory Accreditation

Accredited Product Certification Body

A2LA has accredited

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for technical competence as a

Product Certification Body

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 quality management system.

Presented this 28th day of February 2014.



Pete Rhyne

President & CEO
For the Accreditation Council
Certificate Number 2381.02
Valid to November 30, 2015

For the product certification schemes to which this accreditation applies, please refer to the organization's Product Certification Scope of Accreditation

USA Telecommunication Certification Body (TCB) - TCB Identifier – US0159

Industry Canada Certification Body - CAB Identifier – US0159

European Notified Body - Notified Body Identifier - 2280

Japan – Recognized Certification Body (RCB) - RCB Identifier – 210

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 8 of 287

DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft		
Rev A	29 th September 2014	Initial release

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 9 of 287

1. TEST RESULT CERTIFICATE

Applicant:	Aruba Networks 1344 Crossman Avenue Sunnyvale, California 94089,USA	Tested By:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California, 94566, USA
EUT:	Wireless LAN Access point	Tel:	+1 925 462 0304
Model:	APEX0100 & APEX0101	Fax:	+1 925 462 0306
S/N:	APEX0100: CL0000089, APEX0101: CL0000090		
Test Date(s):	17th Feb - 24th June 2014	Website:	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC 47 CFR Part 15.407 & IC RSS-210	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:

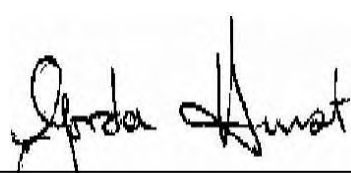
1. This document reports conditions under which testing was conducted and the results of testing performed.
2. Details of test methods used have been recorded and kept on file by the laboratory.
3. Test results apply only to the item(s) tested.

Approved & Released for MiCOM Labs, Inc. by:





Graeme Grieve
Quality Manager MiCOM Labs,



Gordon Hurst
President & CEO MiCOM Labs, Inc.

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2. REFERENCES AND MEASUREMENT UNCERTAINTY

2.1. Normative References

Ref.	Publication	Year	Title
(i)	FCC 47 CFR Part 15.407	2012	Code of Federal Regulations
(ii)	FCC 06-96	June 2006	Memorandum Opinion and Order
(iii)	FCC OET KDB 662911	31 st October 2013	Emissions Testing of Transmitters with Multiple Outputs in the Same Band
(iv)	Industry Canada RSS-210 Annex 9	2010	Low Power License-Exempt Radiocommunication Devices (All Frequency Bands): Category 1 Equipment
(v)	ICES-003	31 st August 2013	Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard Digital Apparatus; Issue 5
(vi)	Industry Canada RSS-Gen	2010	General Requirements and Information for the Certification of Radiocommunication Equipment
(vii)	ANSI C63.4	2009	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
(viii)	CISPR 22/ EN 55022	2010	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
(ix)	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
(x)	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
(xi)	ETSI TR 100 028	2001	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
(xii)	A2LA	April 2014	Reference to A2LA Accreditation Status – A2LA Advertising Policy
(xiii)	FCC Public Notice – DA 02-2138	2002	Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices



Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 11 of 287

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.

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 12 of 287

3. PRODUCT DETAILS AND TEST CONFIGURATIONS

3.1. Technical Details

Details	Description
Purpose:	Test of the APEX0100, APEX0101 802.11a/b/g/n/ac in the frequency range and 5,470 – 5,725 MHz to FCC Part 15.407 and Industry Canada RSS-210 regulations.
Applicant:	Aruba Networks 1344 Crossman Avenue Sunnyvale, California 94089, USA
Manufacturer:	As applicant
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court, Pleasanton, California 94566 USA
Test report reference number:	ARUB169-U3 Rev A
Date EUT received:	12 th February 2014
Standard(s) applied:	FCC 47 CFR Part 15.407 & IC RSS-210
Dates of test (from - to):	17th Feb - 24th June 2014
No of Units Tested:	Two: APEX0100 and APEX0101
Type of Equipment:	802.11a/b/g/n Wireless Access Point 3x3 Spatial Multiplexing MIMO configuration
Applicants Trade Name:	Wireless Access Point
Model(s):	APEX0100 & APEX0101
Location for use:	Outdoor only
Declared Frequency Range(s):	5250 – 5350 MHz, 5470 – 5725 MHz
Hardware Rev	A
Software Rev	AOS 6.4.2.0
Type of Modulation:	Per 802.11 – OFDM
EUT Modes of Operation:	802.11a/n/ac
Declared Nominal Output Power: (Average Power)	802.11a/n/ac: +19 dBm
Transmit/Receive Operation:	Time Division Duplex
System Beam Forming:	APEX0100 & APEX0101 has antenna beam forming
Rated Input Voltage and Current:	POE 48 Vdc 1.25 A AC 100 – 240VAC 50 – 60 Hz
Operating Temperature Range:	Declared range 0° to +40°C
ITU Emission Designator:	802.11a 16M7D1D 802.11n HT-20 17M8D1D 802.11n HT-40 36M3D1D 802.11ac-80 75M8D1D
Equipment Dimensions:	APEX0100; 5.5 X 9 X 9.4 inches APEX0101; 10.6 X 9 X 9.4 inches.
Weight:	APEX0100; 5.3 lbs APEX0101; 5.3 lbs
Primary function of equipment:	Wireless Access Point for transmitting data and voice.

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 13 of 287

3.2. Scope of Test Program

Aruba Networks APEX0100, APEX0101 Access Point RF Testing

The scope of the test program was to test the Aruba Networks APEX0100, APEX0101 Wireless LAN Access Point, 3x3 Spatial Multiplexing MIMO configurations in the frequency range 5,250 - 5,350 and 5,470 – 5,725 MHz for compliance against FCC 47 CFR Part 15.407 and Industry Canada RSS-210 specifications.

Model Identification

APEX0101: External Antenna (N-Type connectors)

APEX0100: Integral Antenna

APEX0100 and APEX0101 Operational Modes

Client did not provide software capability for the following operational modes and claimed these were covered under 802.11n HT-20 and 802.11n HT-40.

- i).. VHT-20
- ii)..VHT-40

FCC OET KDB Implementation

This test program implements the following FCC KDB – 662911 31st October 2013;
Emissions Testing of Transmitters with Multiple Outputs in the Same Band

The KDB document provides guidance for measurements of conducted output emissions of devices that employ a single transmitter with multiple outputs in the same band, with the outputs occupying the same or overlapping frequency ranges. It applies to EMC compliance measurements on devices that transmit on multiple antennas simultaneously in the same or overlapping frequency ranges through a coordinated process. Examples include, but are not limited to, devices employing beam forming or multiple-input and multiple-output (MIMO.) This guidance applies to both licensed and unlicensed devices wherever the FCC rules call for conducted output measurements. Guidance is provided for in-band, out-of-band and spurious emission measurements.

This guidance does not apply to the multiple transmitters included in a composite device, such as a device that combines an 802.11 modem with a cell phone in one enclosure with each driving its own antenna.

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Aruba Networks Inc
APEX0101 External Antenna 802.11 a/b/g/n/ac Wireless Access Point



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Aruba Networks Inc
APEX0100 Integral Antenna 802.11 a/b/g/n/ac Wireless Access Point



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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 16 of 287

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

Type (EUT/Support)	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
EUT	Wireless LAN Access Point.	Aruba Networks	APEX0100	CL0000089
EUT	Wireless LAN Access Point (Integral Antenna)	Aruba Networks	APEX0101 (Radiated only)	CL0000090
Support	Laptop PC	IBM	Thinkpad	None

3.4. Cabling and I/O Ports

Number and type of I/O ports

- 1 E0: 10/100/1000 Ethernet (POE).
2. E1: 10/100/1000 Ethernet
3. Micro USB connector. Console - Serial maintenance terminal.
4. 100 – 240 Vac connector.
5. RF Antenna Connectors (x6) – N-Type (APEX0101 Only).

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3.5. Antenna Details

APEX0100 Integral Antennas

Model	Type	Gain (dBi)	Freq. Band (MHz)	Antenna Tested
Integral	Directional	4.0	2400 - 2500	Yes
Integral	Directional	5.0	4900 - 5850	Yes

APEX0101 External Antennas

Model	Type	Gain (dBi)	Freq. Band (MHz)	Antenna Tested
ANT-2X2-D607	Directional	7.0	4900-5875	Yes
ANT-3X3-D608	Directional	8.0	2400 - 2500	
		8.0	4900-5875	
ANT-2X2-D805	Directional	5.0	2400 - 2500	Yes
		5.0	4900-5875	Yes
ANT-3X3-D905	Directional	5.0	2400 - 2500	
		5.0	4900-5875	
ANT-3X3-5005	Omni	5.0	4900-5875	
ANT-3X3-5010	Omni	10.0	4900-5875	Yes
ANT-2X2-5314	Directional	14.0	4900-6000	Yes
ANT-3X3-5712	Directional	11.5	4900-6000	Yes

The antennas tested represent the highest gain per type of construction.



Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 18 of 287

3.6. Cabling and I/O Ports

Number and type of I/O ports

1. E0: 10/100/1000 Ethernet (POE).
2. E1: 10/100/1000 Ethernet
3. Micro USB connector. Console - Serial maintenance terminal.
4. 100 – 240 Vac connector.
5. RF Antenna Connectors (x6) – N-Type (APEX0101 Only).

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3.7. Test Configurations

Testing was performed to determine the highest power level versus bit rate. The variant with the highest power was used to exercise the product.

Matrix of test configurations

Bands (MHz)	Operational Mode(s) (802.11)	Data Rates with Highest Power	Frequencies (MHz)
5250 - 5350 5470 - 5725	Legacy	6 MBit/s	5260, 5300, 5320
	HT-20, ac-20	6.5 MBit/s	5500, 5580, 5700
	HT-40, ac-40	13.5 MBit/s	5270, 5310 5510, 5550, 5670
	ac-80	29.3 MBit/s	5290, 5530, 5690

Spurious Emission and Band-Edge Test Strategy, Band 5,250 – 5250

11a	11n HT-20	11n HT-40	11n ac-80
SE 5260			
SE 5300			
SE 5320			
BE 5350	BE 5350	BE 5350	BE 5350

Band 5,470 – 5725

11a	11n HT-20	11n HT-40	11n ac-80
SE 5500			
SE 5580			
SE 5700			
BE 5470	BE 5470	BE 5470	BE 5470

KEY:-

SE – Spurious Emissions

BE – Band-Edge



Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 20 of 287

3.8. Equipment Modifications

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

1. NONE

3.9. Deviations from the Test Standard

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

1. NONE

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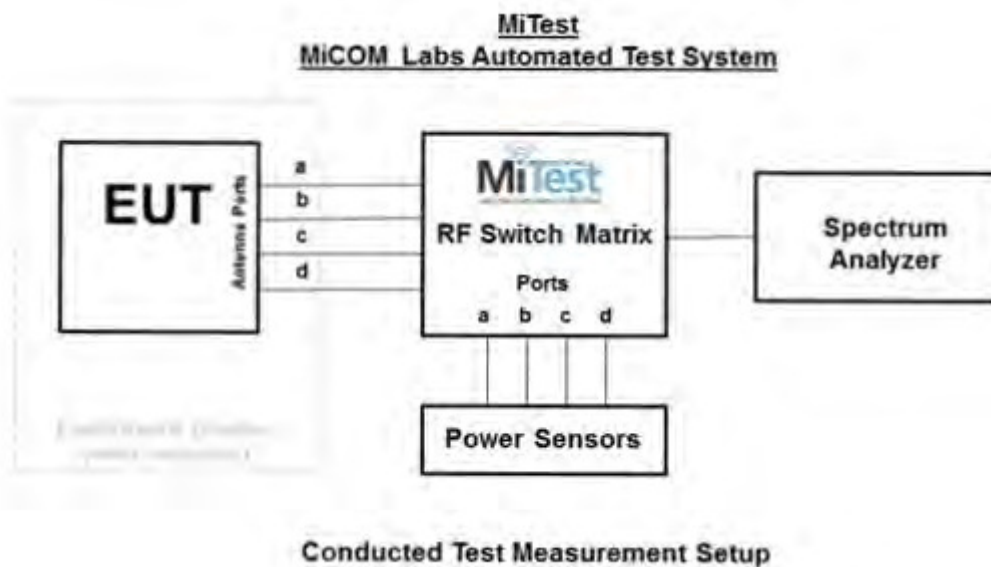
4. TESTING EQUIPMENT CONFIGURATION(S)

4.1. Conducted RF Emission Test Set-up

The following tests were performed using the conducted test set-up shown in the diagram below.

1. Section 6.1.1.1. Maximum Conducted Output Power
2. Section 6.1.1.2. Peak Power Spectral Density
3. Section 6.1.1.3. 26 dB and 99% Bandwidth
4. Section 6.1.1.4. Peak Excursion Ratio

Conducted Test Set-Up Pictorial Representation



Traceability

Test Equipment Utilized for Conducted Testing

075, 117, 158, 223, 376, 378, 380, 390, 398, 405, RF#1 SMA#SA, RF#1 SMA#1, RF#1 SMA#2, RF#1 SMA#3, RF#1 SMA#4

Measurement and Presentation of Test Data

The measurement and graphical data presented in this test report was generated automatically using state-of-the-art technology creating an easy to read report structure. Numerical measurement data is separated from supporting graphical data (plots) through hyperlinks. Numerical measurement data can be reviewed without scrolling through numerous graphical pages to arrive at the next data matrix.

Plots have been relegated into the Appendix 'Graphical Data'.

Test and report automation was performed by [MiTest](#). [MiTest](#) is an automated test system developed by MiCOM Labs. [MiTest](#) is the first cloud based modular test system enabling end-to-end automation of regulatory compliance testing for conducted RF testing.



The MiCOM Labs "[MiTest](#)" Automated Test System" (Patent Pending)

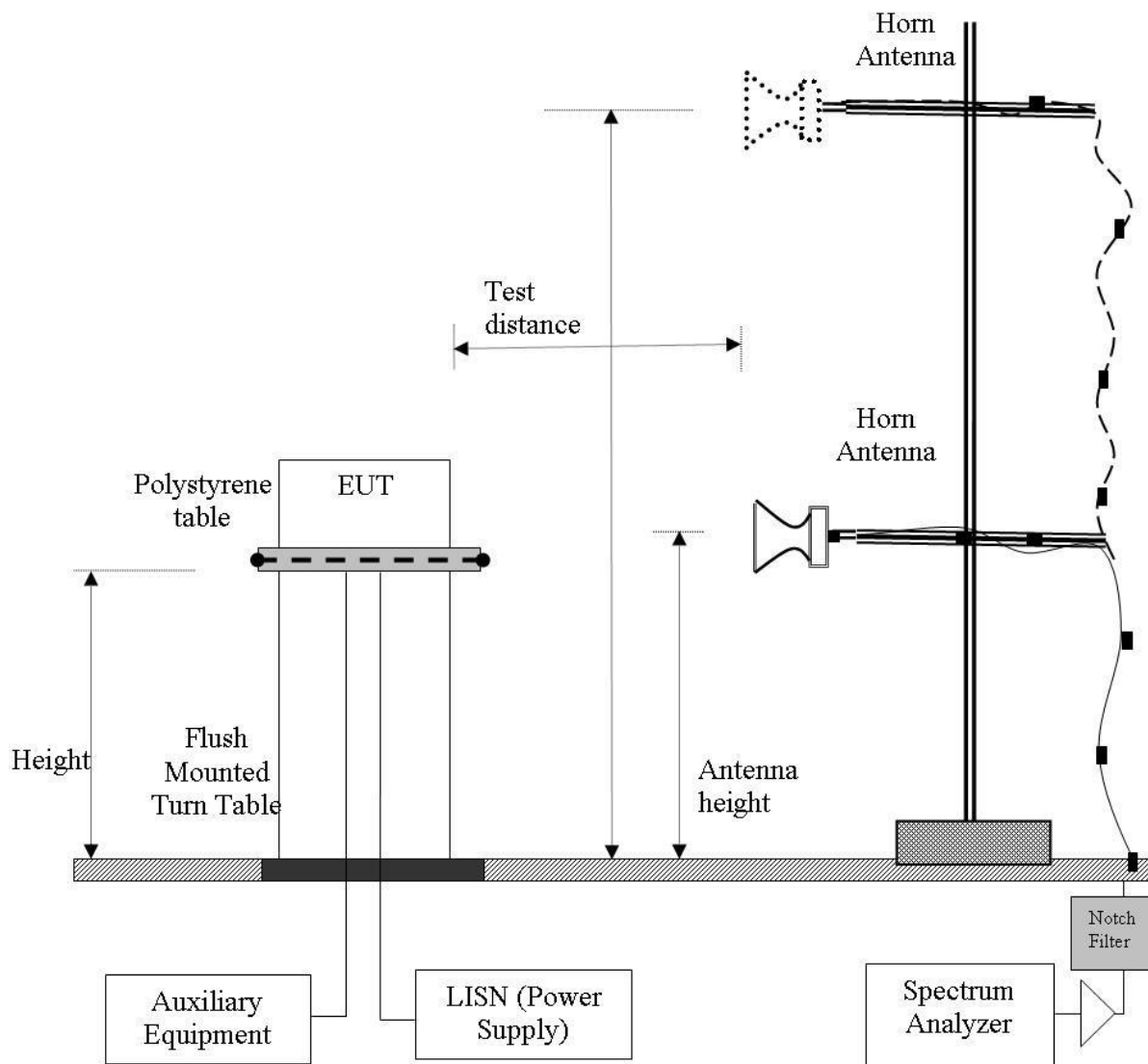
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4.2. Radiated Spurious Emission Test Set-up > 1 GHz

The following tests were performed using the conducted test set-up shown in the diagram below.

1. Section 6.1.2.

Radiated Emission Measurement Setup – Above 1 GHz



Traceability

Test Equipment Utilized for Radiated Emission Testing > 1GHz

158, 252, 310, 312, 377, 393, 396, 399, 406, 411, 413, 415, 416, 502, 503

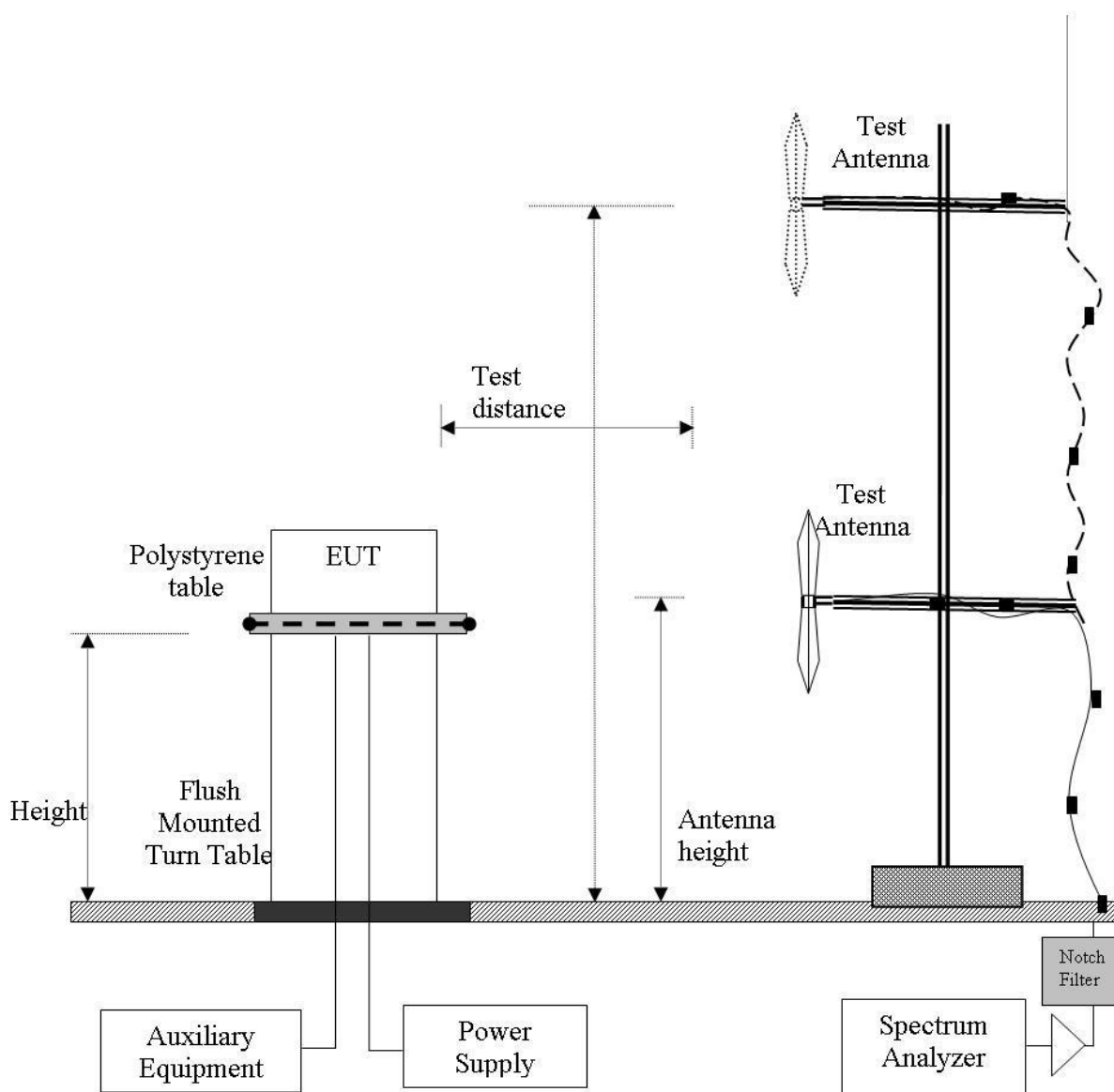
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4.3. Digital Emissions Test Set-up (0.03 – 1 GHz)

The following tests were performed using the conducted test set-up shown in the diagram below.

2. Section 6.1.2.7

Digital Emission Measurement Setup – Below 1 GHz



Traceability

Test Equipment Utilized for Radiated Emission Testing 0.03 - 1GHz

158, 252, 310, 312, 338, 377, 393, 396, 397, 411, 413, 415, 416, 502, 503

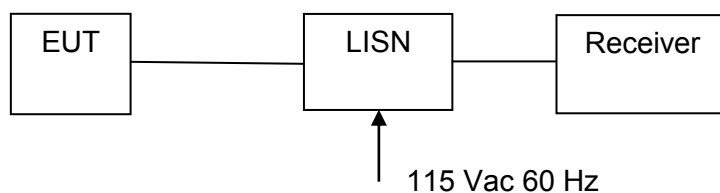
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4.4. ac Wireline Emission Test Set-up

The following tests were performed using the conducted test set-up shown in the diagram below.

1. Section 6.1.3 ac Wireline Conducted Emissions

Conducted Test Set-Up Pictorial Representation



Measurement set up for ac Wireline Conducted Emissions Test

Traceability

Test Equipment Utilized for Radiated Emission Testing 0.03 - 1GHz

158, 190, 378



5. TEST SUMMARY

List of Measurements

The following table represents the list of measurements required under the **FCC CFR47 Part 15.407** and **Industry Canada RSS-210** and **Industry Canada RSS-Gen**.

Section(s)	Test Items	Description	Condition	Result	Test Report Section
15.407(a) A9.2(2) 4.6	Maximum Conducted Output Power	Power Measurement	Conducted	Complies	6.1.1.1
15.407(a) A9.2(2)	Peak Power Spectral Density	PPSD	Conducted	Complies	6.1.1.2 A.1.2
15.407(a) A9.2(2) 4.4	26dB and 99% Emission BW	Emission bandwidth measurement	Conducted	Complies	6.1.1.3 A.1.1
15.407(a)(6)	Peak Excursion Ratio	<13dB in any 1MHz bandwidth	Conducted	Complies	6.1.1.4 A.1.3
15.407(g) 15.31 2.1 4.5	Frequency Stability	Limits: contained within band of operation at all times.	Applicant declaration	Complies	6.1.1.5
15.407(f) 5.5	Radio Frequency Radiation Exposure	Exposure to radio frequency energy levels, Maximum Permissible Exposure (MPE)	Conducted	See included MPE exhibit	--

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List of Measurements (continued)

The following table represents the list of measurements required under the **FCC CFR47 Part 15.407** and **Industry Canada RSS-210** and **Industry Canada RSS-Gen**.

Section(s)	Test Items	Description	Condition	Result	Test Report Section
15.407(b)(2) 15.205(a) 15.209(a) 2.2 2.6 A9.3(2) 4.7	Radiated Emissions		Radiated		6.1.2
	Transmitter Radiated Spurious Emissions	Emissions above 1 GHz		Complies	
	Radiated Band Edge	Band edge results		Complies	
15.407(b)(6) 15.205(a) 15.209(a) 2.2	Radiated Emissions	Emissions <1 GHz (30M-1 GHz)		Complies	6.1.2.7
15.407(b)(6) 15.207 7.2.2	AC Wireline Conducted Emissions 150 kHz–30 MHz	Conducted Emissions	Conducted	Complies	6.1.3

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 3.8 Equipment Modifications highlights the equipment modifications that were required to bring the product into compliance with the above test matrix



Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 28 of 287

6. TEST RESULTS

6.1. Device Characteristics

6.1.1. Conducted Testing

6.1.1.1. Maximum Conducted Output Power

Conducted Test Conditions for Maximum Conducted Output Power			
Standard:	FCC CFR 47:15.407	Ambient Temp. (°C):	24.0 - 27.5
Test Heading:	Maximum Conducted Output Power	Rel. Humidity (%):	32 - 45
Standard Section(s):	15.407 (a)	Pressure (mBars):	999 - 1001
Reference Document(s):	KDB 789033 - D01 DTS General UNII Test Procedures v01		

Test Procedure for Maximum Conducted Output Power Measurement

Method PM (Measurement using an RF average power meter). Section C) 4) of KDB 789033 defines a methodology using an average wideband power meter. Measurements were made while the EUT was operating in a continuous transmission mode (100% duty cycle) at the appropriate center frequency. All cable losses and offsets were taken into consideration in the measured result. All operational modes and frequency bands were measured independently and the resultant \square calculated. For multiple outputs, the measurements were made simultaneously on each output port and summed in a linear fashion. This technique was used in order to prove compliance.

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Antenna Beam and Non-Beam Forming Power Levels

15. 407 (a)(1), (a) (2) Operation with directional antenna gains greater than 6 dBi.

If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Further FCC KDB 662911 D01 Multiple Transmitter Output v01 requires that the gain of antennas transmitting the same data (legacy 802.11a mode) must be increased by $10 * \log(N)$ when N is the number of antenna elements.

The EUT was tested for worst case condition (highest power).

Maximum Transmit (Conducted) Power, FCC Limits and Industry Canada Limits

FCC Limits

Bands 5250 – 5350 and 5470 – 5725 MHz

Limit lesser of: 250 mW or 11 dBm + 10 log (B) dBm

Mode	Frequency Range (MHz)	Minimum 26 dB Bandwidth (MHz)	11 + 10 Log (B) (dBm)	Limit (dBm)
a	5250 – 5350 5470 – 5725	20.040	+24.02	+24.0
HT-20		20.541	+24.13	+24.0
HT-40		39.078	+26.92	+24.0
ac-80		80.561	+30.06	+24.0

Industry Canada Limits

Bands 5250 – 5350 and 5470 – 5725 MHz

Limit lesser of: 250 mW or 11 dBm + 10 log (B) dBm

Mode	Frequency Range (MHz)	Minimum 99% Bandwidth (MHz)	11 + 10 Log (B) (dBm)	Limit (dBm)
a	5250 – 5350 5470 – 5725	16.633	+23.21	+24.0
HT-20		17.735	+23.49	+24.0
HT-40		36.273	+26.60	+24.0
ac-80		75.752	+29.79	+24.0

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 30 of 287

Equipment Configuration for Peak Transmit Power

Variant:	802.11a	Duty Cycle (%):	95
Data Rate:	6 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	N/A
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes: DUT W1 Version: 6.37.14.18			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power Σ Port(s) dBm	Minimum 26 dB Bandwidth MHz	Limit dBm	Margin dBm	EUT Power Setting
	a	b	c	d					
5260.0	13.74	14.76	14.57		19.15	20.040	24.00	-4.85	56.00
5300.0	13.92	14.83	14.26		19.13	20.040	24.00	-4.87	56.00
5320.0	14.36	15.00	14.40		19.37	20.140	24.00	-4.63	56.00

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 31 of 287

Equipment Configuration for Peak Transmit Power

Variant:	802.11ac-80	Duty Cycle (%):	96
Data Rate:	29.3 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	N/A
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:	DUT W1 Version: 6.37.14.18		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power Σ Port(s) dBm	Minimum 26 dB Bandwidth MHz	Limit dBm	Margin dBm	EUT Power Setting
	a	b	c	d					
5290.0	16.51	17.83	17.44		22.06	80.561	24.00	-1.94	69.00

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 32 of 287

Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-20	Duty Cycle (%):	96
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	N/A
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:	DUT W1 Version: 6.37.14.18		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power Σ Port(s) dBm	Minimum 26 dB Bandwidth MHz	Limit dBm	Margin dBm	EUT Power Setting
	a	b	c	d					
5260.0	12.12	13.38	12.75		17.55	20.541	24.00	-6.45	50.00
5300.0	12.25	13.53	12.51		17.57	20.541	24.00	-6.43	50.00
5320.0	12.44	13.44	12.67		17.64	20.541	24.00	-6.36	50.00

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 33 of 287

Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-40	Duty Cycle (%):	92
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	N/A
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:	DUT W1 Version: 6.37.14.18		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power Σ Port(s) dBm	Minimum 26 dB Bandwidth MHz	Limit dBm	Margin dBm	EUT Power Setting
	Port(s)								
MHz	a	b	c	d					
5270.0	16.80	17.95	17.65		22.27	39.078	24.00	-1.73	70.00
5310.0	17.16	18.18	17.38		22.37	39.479	24.00	-1.63	70.00

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 34 of 287

Equipment Configuration for Peak Transmit Power

Variant:	802.11a	Duty Cycle (%):	95
Data Rate:	6 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	N/A
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:	DUT W1 Version: 6.37.14.18		

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power Σ Port(s) dBm	Minimum 26 dB Bandwidth MHz	Limit dBm	Margin dBm	EUT Power Setting
	a	b	c	d					
5500.0	14.49	14.60	13.80		19.08	20.040	24.00	-4.92	56.00
5580.0	13.89	14.36	13.33		18.65	20.040	24.00	-5.35	56.00
5720.0	11.30	12.46	11.30		16.50	20.140	24.00	-7.50	49.00

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 35 of 287

Equipment Configuration for Peak Transmit Power

Variant:	802.11ac-80	Duty Cycle (%):	95
Data Rate:	29.3 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	N/A
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5530.0	16.42	17.43	16.21		21.49	80.561	24.00	-2.51	66.00
5690.0	15.65	16.72	16.05		20.94	80.561	24.00	-3.06	66.00

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 36 of 287

Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-20	Duty Cycle (%):	96
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	N/A
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5500.0	12.78	13.12	11.85		17.38	20.541	24.00	-6.62	49.00
5580.0	12.43	13.01	11.72		17.19	20.641	24.00	-6.81	49.00
5720.0	11.73	12.62	11.35		16.70	20.541	24.00	-7.30	49.00

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 37 of 287

Equipment Configuration for Peak Transmit Power

Variant:	802.11n HT-40	Duty Cycle (%):	92
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	N/A
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm)				Calculated Total Power	Minimum 26 dB Bandwidth	Limit	Margin	EUT Power Setting
	Port(s)								
MHz	a	b	c	d	Σ Port(s) dBm	MHz	dBm	dBm	
5510.0	15.81	16.42	15.01		20.56	39.078	24.00	-3.44	62.00
5550.0	15.80	16.25	14.93		20.47	39.078	24.00	-3.53	62.00
5710.0	14.71	15.76	14.78		19.88	39.279	24.00	-4.12	62.00

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Antenna Type V's Power Setting

The following **Antenna Types V's Power Setting** tables consolidates the results of all tests performed on the APEX0100 and APEX0101 to finalize the power setting for each antenna's tested;

Integral Antenna (APEX0100)

Channel	5.25-5.35 GHz				5.47-5.725 GHz			
	a	HT-20	HT-40	ac-80	a	HT-20	HT-40	ac-80
Low	56.0	50.0	70.0	--	56.0	49.0	62.0	66.0
Mid	56.0	50.0	--	54.0	56.0	49.0	62.0	--
High	56.0	50.0	61.0	--	49.0	49.0	62.0	66.0

Antenna AP-ANT-5010 (APEX0101)

Channel	5.25-5.35 GHz				5.47-5.725 GHz			
	a	HT-20	HT-40	ac-80	a	HT-20	HT-40	ac-80
Low	56.0	50.0	70.0	--	24.0	24.0	36.0	42.0
Mid	56.0	50.0	--	40.0	56.0	49.0	62.0	--
High	26.0	28.0	40.0	--	49.0	49.0	62.0	66.0

Antenna AP-ANT-5314 (APEX0101)

Channel	5.25-5.35 GHz				5.47-5.725 GHz			
	a	HT-20	HT-40	ac-80	a	HT-20	HT-40	ac-80
Low	56.0	50.0	70.0	--	26.0	26.0	33.0	40.0
Mid	56.0	50.0	--	34.0	56.0	49.0	62.0	--
High	26.0	26.0	36.0	--	49.0	49.0	62.0	66.0

Antenna AP-ANT-5712 (APEX0101)

Channel	5.25-5.35 GHz				5.47-5.725 GHz			
	a	HT-20	HT-40	ac-80	a	HT-20	HT-40	ac-80
Low	56.0	50.0	70.0	--	33.0	32.0	54.0	50.0
Mid	56.0	50.0	--	53.0	56.0	49.0	62.0	--
High	40.0	40.0	54.0	--	49.0	49.0	62.0	66.0



Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 39 of 287

Antenna ANT-2X2-D607 (APEX0101)

Channel	5.25-5.35 GHz				5.47-5.725 GHz			
	a	HT-20	HT-40	ac-80	a	HT-20	HT-40	ac-80
Low	56.0	50.0	70.0	--	52.0	49.0	62.0	66.0
Mid	56.0	50.0	--	56.0	56.0	49.0	62.0	--
High	56.0	50.0	70.0	--	49.0	49.0	62.0	66.0

Antenna ANT-2X2-D805 (APEX0101)

Channel	5.25-5.35 GHz				5.47-5.725 GHz			
	a	HT-20	HT-40	ac-80	a	HT-20	HT-40	ac-80
Low	56.0	50.0	70.0	--	33.0	46.0	58.0	66.0
Mid	56.0	50.0	--	52.0	56.0	49.0	62.0	--
High	33.0	44.0	58.0	--	49.0	49.0	62.0	66.0

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 40 of 287

Specification Limits

FCC, Part 15 §15.407 (a)(1), (a)(2) and Industry Canada RSS-210 § A9.2(2)

(a)(1) For the band 5.15-5.25 GHz the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $+4 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed +4 dBm in any 1 megahertz band.

(a)(2) For the 5.25-5.35 and 5470-5725 MHz GHz band the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or $+11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed +11 dBm in any 1 megahertz band.

Industry Canada RSS-210 §A9.2(2)

For the band 5150-5250 MHz, the maximum equivalent isotropically radiated power (e.i.r.p.) shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

For the band 5250-5350 MHz and 5470-5725 MHz, the maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$, dBm, whichever power is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band. The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 41 of 287

6.1.1.2. Peak Power Spectral Density

Conducted Test Conditions for Power Spectral Density			
Standard:	FCC CFR 47:15.407	Ambient Temp. (°C):	24.0 - 27.5
Test Heading:	Power Spectral Density	Rel. Humidity (%):	32 - 45
Standard Section(s):	15.247 (a)	Pressure (mBars):	999 - 1001
Reference Document(s):	KDB 789033 - D01 DTS General UNII Test Procedures v01		

Test Procedure for Power Spectral Density

The In-Band power spectral density was measured using the measure and sum approach per FCC KDB 662911 (D01 Multiple Transmitter Output v01.)

Measure and sum the spectra across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The individual spectra are then summed mathematically in linear power units. Unlike in-band power measurements, in which the sum involves a single measured value (output power) from each output, measurements for compliance with PSD limits involve summing entire spectra across corresponding frequency bins on the various outputs. Consistency is maintained for any device with N transmitter outputs to be certain the individual outputs are all aligned with the same span and same number of points. In this instance, the linear power spectrum value within the first spectral bin of output 0 is summed with that in the first spectral bin of output 1, and the first spectral bin of output 2, and so on up to the Nth output to obtain the true value for the first frequency bin of the summed spectrum. The summed spectrum value for each frequency bin is computed in this fashion. These summed spectral values were calculated on a computer, and the results read back into the spectrum analyzer as a data file to produce a representative plot of total spectral power density.

NOTE:

It may be observed that spectrum in some plots break the limit line however this in itself does NOT constitute a failure. In this case a summation plot for all spectrum plots is provided to prove compliance. A failure occurs only after the summation of all spectrum plots have been summed and are found to be greater than the limit line.

Supporting Information

Calculated Power = $A + 10 \log (1/x)$ dBm

A = Total Power Spectral Density [10 Log10 (10a/10 + 10 b/10 + 10c/10 + 10d/10)]

x = Duty Cycle

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 42 of 287

Equipment Configuration for Peak Power Spectral Density

Variant:	802.11a	Duty Cycle (%):	95.0
Data Rate:	6 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Amplitude Summation	Limit	Margin
	Port(s) (dBm/MHz)						
	a	b	c	d			
5260.0	3.475	5.733	7.734		10.742	11.0	-0.3
5300.0	3.276	4.350	8.263		10.040	11.0	-1.0
5320.0	3.326	4.583	8.593		10.439	11.0	-0.6

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 43 of 287

Equipment Configuration for Peak Power Spectral Density

Variant:	802.11ac-80	Duty Cycle (%):	96.0
Data Rate:	29.3 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Amplitude Summation	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5290.0	6.214	5.370	4.507		9.831	11.0	-1.2

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 44 of 287

Equipment Configuration for Peak Power Spectral Density

Variant:	802.11n HT-20	Duty Cycle (%):	96.0
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Amplitude Summation	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5260.0	6.055	6.155	5.614		10.553	11.0	-0.4
5300.0	5.665	5.699	6.453		10.602	11.0	-0.4
5320.0	6.034	6.046	5.668		10.566	11.0	-0.4

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 45 of 287

Equipment Configuration for Peak Power Spectral Density

Variant:	802.11n HT-40	Duty Cycle (%):	92.0
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Amplitude Summation	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5270.0	2.870	5.392	6.388		9.765	11.0	-1.2
5310.0	6.066	5.978	5.510		10.545	11.0	-0.5

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 46 of 287

Equipment Configuration for Peak Power Spectral Density

Variant:	802.11a	Duty Cycle (%):	95.0
Data Rate:	6 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Amplitude Summation	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5500.0	3.529	3.922	7.445		9.818	11.0	-1.2
5580.0	3.033	4.021	7.336		9.495	11.0	-1.5
5720.0	6.106	5.645	5.460		10.336	11.0	-0.7

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 47 of 287

Equipment Configuration for Peak Power Spectral Density

Variant:	802.11ac-80	Duty Cycle (%):	95.0
Data Rate:	29.3 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Amplitude Summation	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5530.0	4.312	3.995	3.753		8.658	11.0	-2.3
5690.0	3.763	3.439	3.315		8.190	11.0	-2.8

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 48 of 287

Equipment Configuration for Peak Power Spectral Density

Variant:	802.11n HT-20	Duty Cycle (%):	96.0
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Amplitude Summation	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5500.0	6.057	5.842	6.015		10.546	11.0	-0.5
5580.0	5.754	5.541	5.552		10.134	11.0	-0.9
5720.0	5.192	4.668	4.897		9.515	11.0	-1.5

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 49 of 287

Equipment Configuration for Peak Power Spectral Density

Variant:	802.11n HT-40	Duty Cycle (%):	92.0
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	5.00
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density				Amplitude Summation	Limit	Margin
	Port(s) (dBm/MHz)						
MHz	a	b	c	d	dBm/MHz	dBm/MHz	dB
5510.0	4.192	4.770	4.476		9.257	11.0	-1.7
5550.0	4.456	4.192	3.918		8.760	11.0	-2.2
5710.0	3.897	3.864	4.297		8.379	11.0	-2.6

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 50 of 287

Specification

FCC, Part 15 §15.407 (a)(1), (a)(2)

5150 – 5250 MHz

(a)(1) The peak power spectral density shall not exceed +4 dBm in any 1 megahertz band.

5250 – 5350 MHz & 5470 – 5725 MHz

(a)(2) The peak power spectral density shall not exceed +11 dBm in any 1 megahertz band.

Industry Canada RSS-210 § A9.2(1), A9.2(2)

5150 – 5250 MHz

§ A9.2(1) The eirp spectral density shall not exceed +10 dBm in any 1 MHz band

5250 – 5350 MHz & 5470 – 5725 MHz

§ A9.2(2) The power spectral density shall not exceed +11 dBm in any 1 MHz band

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 51 of 287

6.1.1.3. 26 dB and 99 % Bandwidth

Conducted Test Conditions for 26 dB and 99% Bandwidth			
Standard:	FCC CFR 47:15.407	Ambient Temp. (°C):	24.0 - 27.5
Test Heading:	26 dB and 99 % Bandwidth	Rel. Humidity (%):	32 - 45
Standard Section(s):	15.407 (a)	Pressure (mBars):	999 - 1001
Reference Document(s):	KDB 789033 - D01 DTS General UNII Test Procedures v01		
Test Procedure for 26 dB and 99% Bandwidth Measurement			
The bandwidth at 26 dB and 99 % is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency. KDB 789033 Section 5.1 Emission Bandwidth was used in order to prove compliance. The Resolution Bandwidth was set to approximately 1% of the emission bandwidth.			

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 52 of 287

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11a	Duty Cycle (%):	95
Data Rate:	6 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes: DUT W1 Version: 6.37.14.18			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5260.0	20.140	20.040	20.341		20.341	20.040		
5300.0	20.140	20.040	20.341		20.341	20.040		
5320.0	20.140	20.140	20.341		20.341	20.140		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5260.0	16.633	16.633	16.733		16.733	16.633		
5300.0	16.633	16.633	16.733		16.733	16.633		
5320.0	16.633	16.633	16.733		16.733	16.633		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 53 of 287

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11ac-80	Duty Cycle (%):	96
Data Rate:	29.3 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:	DUT W1 Version: 6.37.14.18		

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5290.0	80.561	80.962	80.561		80.962	80.561		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5290.0	75.752	75.752	75.752		75.752	75.752		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 54 of 287

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-20	Duty Cycle (%):	96
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:	DUT W1 Version: 6.37.14.18		

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5260.0	20.641	20.641	20.541		20.641	20.541		
5300.0	20.641	20.541	20.541		20.641	20.541		
5320.0	20.541	20.541	20.541		20.541	20.541		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5260.0	17.735	17.735	17.735		17.735	17.735		
5300.0	17.735	17.735	17.735		17.735	17.735		
5320.0	17.735	17.735	17.735		17.735	17.735		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 55 of 287

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-40	Duty Cycle (%):	92
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:	DUT W1 Version: 6.37.14.18		

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5270.0	39.479	39.078	39.078		39.479	39.078		
5310.0	39.479	39.479	39.479		39.479	39.479		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5270.0	36.273	36.273	36.273		36.273	36.273		
5310.0	36.273	36.273	36.273		36.273	36.273		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 56 of 287

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11a	Duty Cycle (%):	95
Data Rate:	6 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:	DUT W1 Version: 6.37.14.18		

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5500.0	20.040	20.240	20.341		20.341	20.040		
5580.0	20.040	20.140	20.341		20.341	20.040		
5720.0	20.240	20.140	20.240		20.240	20.140		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5500.0	16.633	16.633	16.633		16.633	16.633		
5580.0	16.633	16.533	16.633		16.633	16.533		
5720.0	16.633	16.533	16.633		16.633	16.533		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 57 of 287

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11ac-80	Duty Cycle (%):	95
Data Rate:	29.3 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5530.0	81.363	80.561	80.561		81.363	80.561		
5690.0	80.962	80.561	80.561		80.962	80.561		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5530.0	75.752	75.752	75.752		75.752	75.752		
5690.0	75.752	75.752	75.752		75.752	75.752		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 58 of 287

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-20	Duty Cycle (%):	96
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5500.0	20.741	20.541	20.641		20.741	20.541		
5580.0	20.741	20.641	20.641		20.741	20.641		
5720.0	20.741	20.541	20.541		20.741	20.541		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5500.0	17.735	17.735	17.735		17.735	17.735		
5580.0	17.836	17.735	17.735		17.836	17.735		
5720.0	17.936	17.735	17.735		17.936	17.735		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 59 of 287

Equipment Configuration for 26 dB & 99% Occupied Bandwidth

Variant:	802.11n HT-40	Duty Cycle (%):	92
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured 26 dB Bandwidth (MHz)				26 dB Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5510.0	39.479	39.078	39.279		39.479	39.078		
5550.0	39.679	39.078	39.279		39.679	39.078		
5710.0	39.479	39.279	39.279		39.479	39.279		

Test Frequency	Measured 99% Bandwidth (MHz)				99% Bandwidth (MHz)			
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5510.0	36.273	36.273	36.273		36.273	36.273		
5550.0	36.273	36.273	36.273		36.273	36.273		
5710.0	36.273	36.273	36.273		36.273	36.273		

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 60 of 287

Specification

Limits

FCC, Part 15 §15.407 (a)(1), (a)(2) and Industry Canada RSS-210 § A9.2(2)

(a)(1) For the band 5.15-5.25 GHz the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or +4 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed +4 dBm in any 1 megahertz band.

(a)(2) For the 5.25-5.35 GHz band the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or +11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed +11 dBm in any 1 megahertz band.

Industry Canada RSS-Gen 4.4

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 61 of 287

6.1.1.4. Peak Excursion Ratio

Conducted Test Conditions for Peak Excursion Ratio			
Standard:	FCC CFR 47:15.407	Ambient Temp. (°C):	24.0 - 27.5
Test Heading:	Peak Excursion Ratio	Rel. Humidity (%):	32 - 45
Standard Section(s):	15.407 (a)(6)	Pressure (mBars):	999 - 1001
Reference Document(s):	KDB 789033 - D01 DTS General UNII Test Procedures v01		

Test Procedure for Peak Excursion Ratio

Compliance with the peak excursion requirement is demonstrated by confirming the ratio of the maximum of the peak-hold spectrum to the maximum of the average spectrum during continuous transmission. Section F) of KDB 789033 was used in order to prove compliance. This is a conducted measurement using a spectrum analyzer using dual traces. Peak Excursion Ratio is the difference in amplitude (dB) between both traces; The following identifies two spectrum traces on the same plot. Trace 1 is the max hold Peak detector, and Trace 2 is the recalled trace data from Peak Power Spectral Density measurements. Each frequency and operational mode is recalled in order to prove compliance.

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 62 of 287

Equipment Configuration for Peak Excursion Ratio

Variant:	802.11a	Duty Cycle (%):	95
Data Rate:	6 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:	DUT W1 Version: 6.37.14.18		

Test Measurement Results

Test Frequency MHz	Measured Peak Excursion (dB) Port(s)				Ratio (dB)		Limit	Lowest Margin
	a	b	c	d	Highest	Lowest	dB	MHz
5260.0	9.19				9.19	9.19	13.0	-3.81

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 63 of 287

Equipment Configuration for Peak Excursion Ratio

Variant:	802.11ac-80	Duty Cycle (%):	96
Data Rate:	29.3 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:	DUT W1 Version: 6.37.14.18		

Test Measurement Results

Test Frequency	Measured Peak Excursion (dB)				Ratio (dB)		Limit	Lowest Margin
	Port(s)				Highest	Lowest		
MHz	a	b	c	d	Highest	Lowest	dB	MHz
5290.0	9.63				9.63	9.63	13.0	-3.37

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 64 of 287

Equipment Configuration for Peak Excursion Ratio

Variant:	802.11n HT-20	Duty Cycle (%):	96
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:	DUT W1 Version: 6.37.14.18		

Test Measurement Results

Test Frequency MHz	Measured Peak Excursion (dB)				Ratio (dB)		Limit dB	Lowest Margin MHz
	Port(s)				Highest	Lowest		
	a	b	c	d				
5260.0	9.98				9.98	9.98	13.0	-3.02

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 65 of 287

Equipment Configuration for Peak Excursion Ratio

Variant:	802.11n HT-40	Duty Cycle (%):	92
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:	DUT W1 Version: 6.37.14.18		

Test Measurement Results

Test Frequency MHz	Measured Peak Excursion (dB)				Ratio (dB)		Limit dB	Lowest Margin MHz
	Port(s)				Highest	Lowest		
	a	b	c	d				
5270.0	12.49				12.49	12.49	13.0	-0.51

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 66 of 287

Equipment Configuration for Peak Excursion Ratio

Variant:	802.11a	Duty Cycle (%):	95
Data Rate:	6 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:	DUT W1 Version: 6.37.14.18		

Test Measurement Results

Test Frequency MHz	Measured Peak Excursion (dB)				Ratio (dB)		Limit dB	Lowest Margin MHz
	Port(s)				Highest	Lowest		
	a	b	c	d				
5500.0	9.60	9.68	9.82		9.82	9.60	13.0	-3.18

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 67 of 287

Equipment Configuration for Peak Excursion Ratio

Variant:	802.11ac-80	Duty Cycle (%):	95
Data Rate:	29.3 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results

Test Frequency MHz	Measured Peak Excursion (dB)				Ratio (dB)		Limit dB	Lowest Margin MHz
	Port(s)				Highest	Lowest		
	a	b	c	d				
5530.0	9.90	10.30	10.20		10.30	9.90	13.0	-2.70

Traceability to Industry Recognized Test Methodologies

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 68 of 287

Equipment Configuration for Peak Excursion Ratio

Variant:	802.11n HT-20	Duty Cycle (%):	96
Data Rate:	6.5 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results								
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Test Frequency	Measured Peak Excursion (dB)				Ratio (dB)		Limit	Lowest Margin
	Port(s)				Highest	Lowest		
MHz	a	b	c	d				
5500.0	9.90	10.29	11.18		11.18	9.90	13.0	-1.82

Traceability to Industry Recognized Test Methodologies	
---	--

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 69 of 287

Equipment Configuration for Peak Excursion Ratio

Variant:	802.11n HT-40	Duty Cycle (%):	92
Data Rate:	13.5 MBit/s	Antenna Gain (dBi):	Not Applicable
Modulation:	OFDM	Beam Forming Gain (Y):	Not Applicable
TPC:	Not Applicable	Tested By:	SB
Engineering Test Notes:			

Test Measurement Results								
---------------------------------	--	--	--	--	--	--	--	--

Test Frequency	Measured Peak Excursion (dB)				Ratio (dB)		Limit	Lowest Margin
	Port(s)				Highest	Lowest		
MHz	a	b	c	d	Highest	Lowest	dB	MHz
5510.0	10.74	11.64	12.43		12.43	10.74	13.0	-0.57

Traceability to Industry Recognized Test Methodologies	
---	--

Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 70 of 287

Specification

Limits

§15.407 (a)(6) The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified in this paragraph) shall not exceed 13dB across any 1MHz bandwidth or the emission bandwidth whichever is less

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 71 of 287

6.1.1.5. Frequency Stability

FCC, Part 15 Subpart C §15.407(g)
Industry Canada RSS-210 §2.1

Test Procedure

The manufacturer of the equipment is responsible for ensuring that the frequency stability is such that emissions are always maintained within the band of operation under all conditions.

Manufacturer Declaration

The frequency stability of the reference oscillator sets the frequency stability of the RF transceiver signals. Therefore all of the RF signals should have ± 20 ppm stability.

This stability accounts for room temp tolerance of the crystal oscillator circuit, frequency variation across temperature, and crystal ageing.

± 20 ppm at 5.250 GHz translates to a maximum frequency shift of ± 105 KHz. As the edge of the channels is at least one MHz from either of the band edges, ± 105 KHz is more than sufficient to guarantee that the intentional emission will remain in the band over the entire operating range of the EUT.

Specification

Limits

§15.407 (g) Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

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6.1.2. Radiated Emission Testing

FCC, Part 15 Subpart C §15.407(b)(2), §15.205(a)/15.209(a)
Industry Canada RSS-210 §A9.3(2); §2.2; §2.6; RSS-Gen §4.7

Test Procedure

Testing was performed in a 3-meter anechoic chamber. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. Preliminary emissions were recorded with in Spectrum Analyzer mode, using a maximum peak detector while in peak hold mode. Depending on the frequency band spanned a notch filter and/or waveguide filter was used to remove the fundamental frequency.

Emissions nearest the limits were chosen for maximization and formal measurement using a CISPR compliant receiver. Emissions above 1000 MHz are measured utilizing a CISPR compliant average detector with a tuned receiver, using a bandwidth of 1 MHz. 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. Only the highest emissions relative to the limit are listed.

Field Strength Calculation

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

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

FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor

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

CL = Cable Loss
AG = Amplifier Gain
FO = Distance Falloff Factor
NFL = Notch Filter Loss or Waveguide Loss

Field Strength Calculation Example:

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

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

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

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

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

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

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 73 of 287

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength (dB μ V/m);

$$E = 1000000 \times \sqrt{30P} / 3 \mu\text{V/m}$$

where P is the EIRP in Watts

Therefore: -27 dBm/MHz = 68.23 dB μ V/m

Note: The data in this Section identifies that the EUT is in compliance with the -27dBm/MHz EIRP limit (68.23 dB μ V/m) for out of band emissions. All out of band emissions are less than 68.23 dB μ V/m.

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 74 of 287

Specification

Radiated Spurious Emissions

15.407 (b)(2). All emissions outside of the 5,150-5,350MHz band shall not exceed an EIRP of -27dBm/MHz.

FCC §15.205 (a) Except as shown in paragraph (d) of 15.205 (a), only spurious emissions are permitted in any of the frequency bands listed.

FCC §15.205 (a) Except as shown in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

FCC §15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

RSS-210 §A9.3(2) For transmitters operating in the 5250-5350 MHz band, all emissions outside the 5150-5350 MHz band shall not exceed -27 dBm/MHz e.i.r.p. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band shall not exceed out of band emission limit of 27 dBm/MHz e.i.r.p. in the 5150-5250 MHz band in order to operate indoor/outdoor, or alternatively shall comply with the spectral power density for operation within the 5150-5250 MHz band and shall be labeled "for indoor use only".

RSS-Gen §4.7 The search for unwanted emissions shall be from the lowest frequency internally generated or used in the device (local oscillator, intermediate of carrier frequency), or from 30 MHz, whichever is the lowest frequency, to the 5th harmonic of the highest frequency generated without exceeding 40 GHz.

RSS-Gen §6 Receiver Spurious Emission Standard

If a radiated measurement is made, all spurious emissions shall comply with the limits of the following Table. The resolution bandwidth of the spectrum analyzer shall be 100 kHz for spurious emission measurements below 1.0 GHz and 1.0 MHz for measurements above 1.0 GHz

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 75 of 287

Table 1: FCC 15.209 Spurious Emissions Limits

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Field Strength ($\text{dB}\mu\text{V/m}$)	Measurement Distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

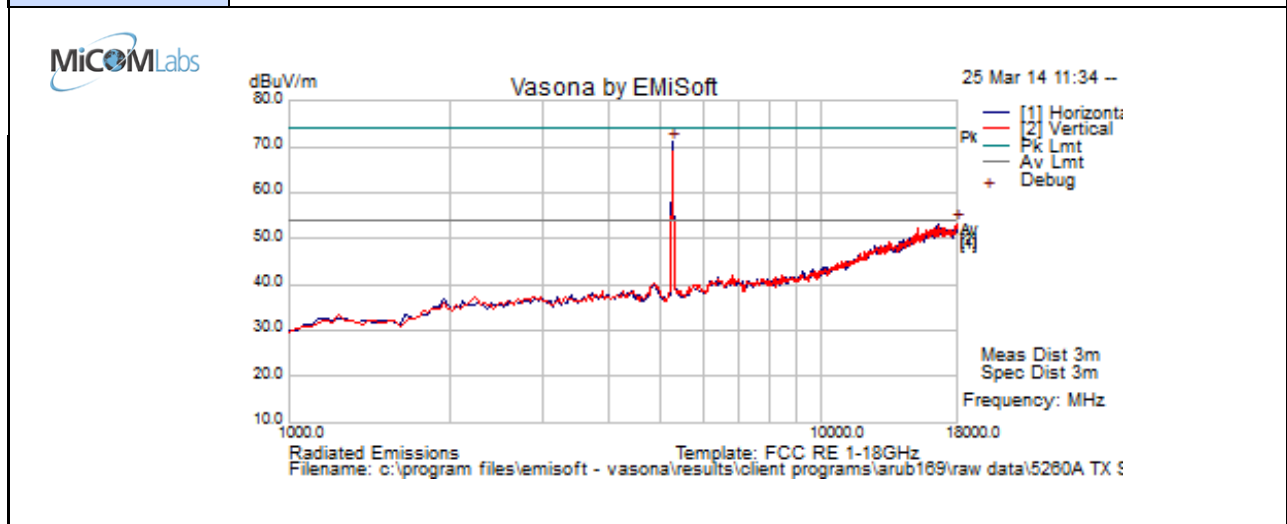
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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 76 of 287

6.1.2.1. Integral Antenna – Spurious Emissions and Radiated Band Edge

Test Freq.	5260 MHz ch 52	Engineer	STP
Variation	802.11a; 6 Mbit/s	Temp (°C)	18
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	36
Power Setting	56	Press. (mBars)	1003
Antenna	INTEGRAL	Duty Cycle (%)	100
Test Notes 1	APEX0100, SN# CL0000089		
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5258.517	67.3	5.9	-2.2	71.0	Peak [Scan]	H						FUND
17931.864	29.4	13.0	10.8	53.2	Peak [Scan]	V						NOISE

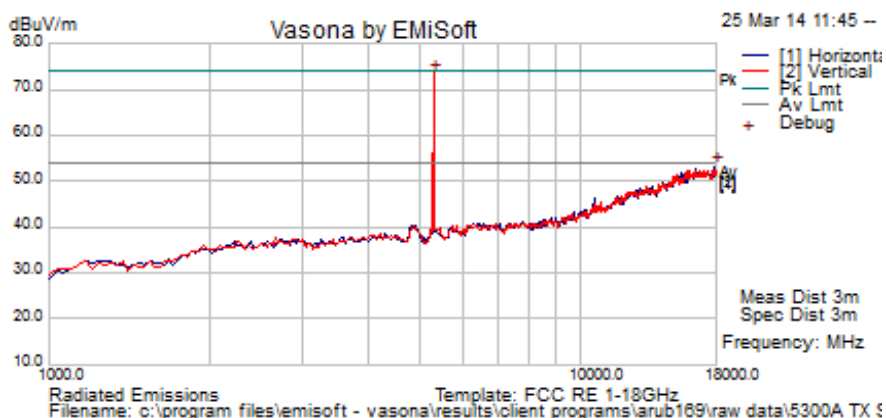
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 77 of 287

Test Freq.	5300 MHz ch 60	Engineer	STP
Variant	802.11a; 6 Mbit/s	Temp (°C)	18
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	36
Power Setting	56	Press. (mBars)	1003
Antenna	INTEGRAL	Duty Cycle (%)	100
Test Notes 1	APEX0100, SN# CL0000089		
Test Notes 2			



Formally measured emission peaks

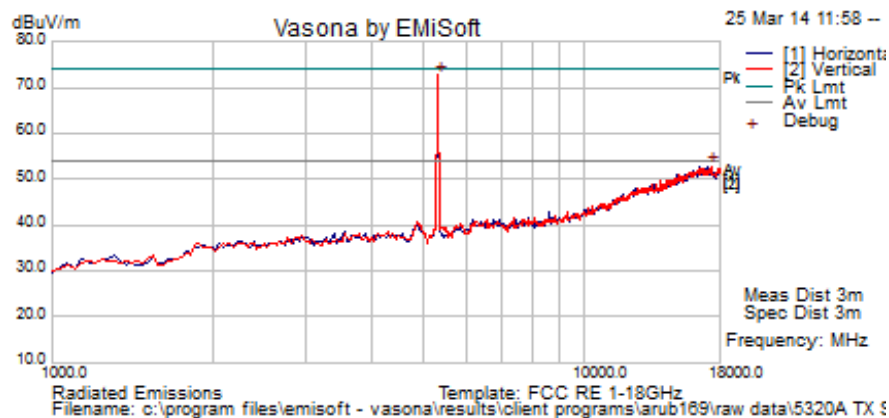
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5292.585	69.6	6.0	-2.1	73.5	Peak [Scan]	V						FUND
17897.796	29.4	13.0	10.8	53.2	Peak [Scan]	H						NOISE
Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission											
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205											

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 78 of 287

Test Freq.	5320 MHz (ch64)	Engineer	STP
Variant	802.11a; 6 Mbit/s	Temp (°C)	18
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	36
Power Setting	56	Press. (mBars)	1003
Antenna	Integral	Duty Cycle (%)	100
Test Notes 1	APEX0100, SN# CL0000089		
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5326.653	68.6	6.0	-1.9	72.6	Peak [Scan]	V						FUND
17318.637	30.1	12.4	10.4	52.9	Peak [Scan]	V						NOISE

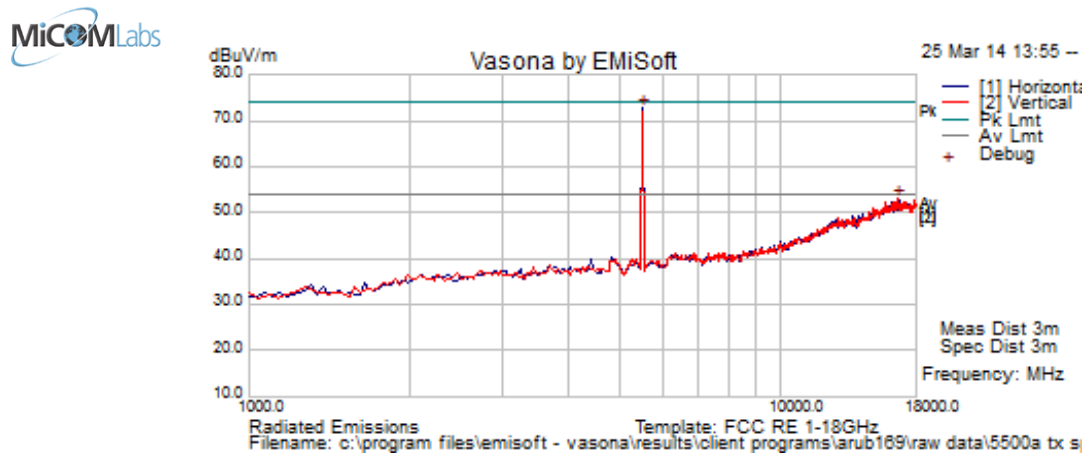
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 79 of 287

Test Freq.	5500 MHz ch 100	Engineer	STP
Variant	802.11a; 6 Mbit/s	Temp (°C)	18
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	36
Power Setting	56	Press. (mBars)	1003
Antenna	INTEGRAL	Duty Cycle (%)	100
Test Notes 1	APEX0100, SN# CL0000089		
Test Notes 2			



Formally measured emission peaks

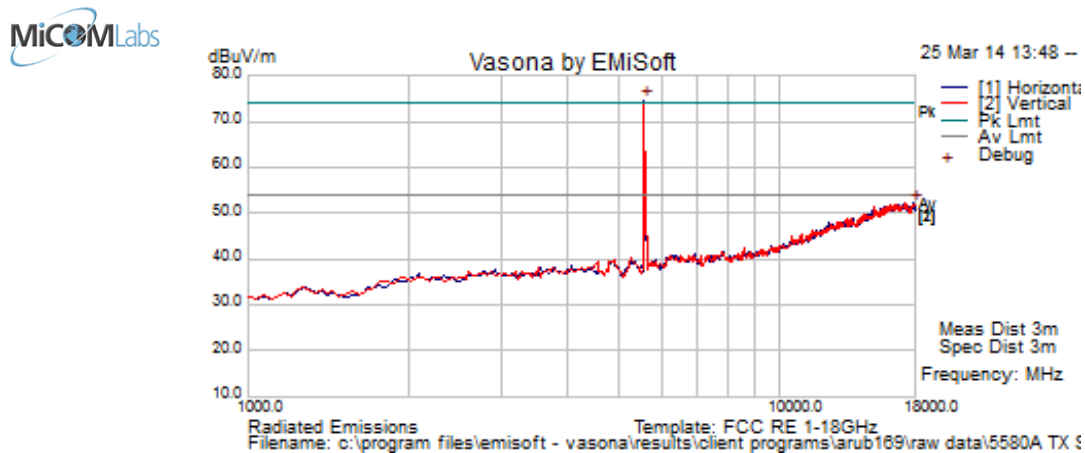
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5496.994	68.8	6.1	-2.0	72.9	Peak [Scan]	H						FUND
16569.138	31.3	11.9	10.0	53.2	Peak [Scan]	V						NOISE
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 80 of 287

Test Freq.	5580 MHz (ch116)	Engineer	STP
Variant	802.11a; 6 Mbit/s	Temp (°C)	18
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	36
Power Setting	56	Press. (mBars)	1003
Antenna	INTEGRAL	Duty Cycle (%)	100
Test Notes 1	APEX0100, SN# CL0000089		
Test Notes 2			



Formally measured emission peaks

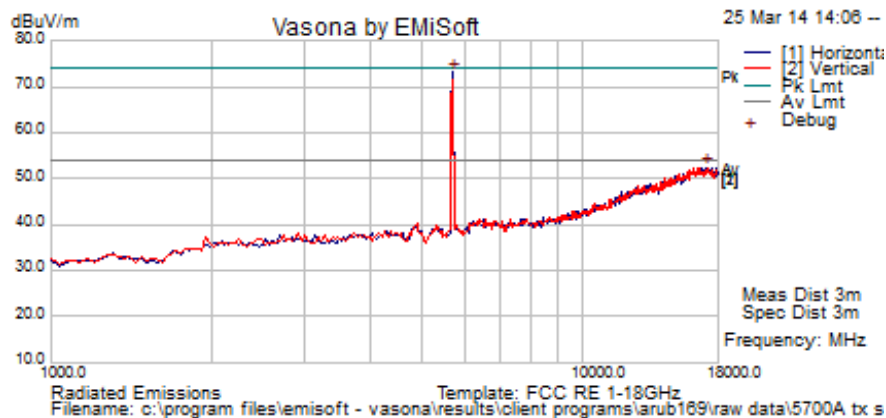
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5565.130	70.7	6.1	-2.1	74.7	Peak [Scan]	H						FUND
17897.796	28.4	13.0	10.8	52.2	Peak [Scan]	H						NOISE
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 81 of 287

Test Freq.	5700 MHz ch140	Engineer	STP
Variant	802.11a; 6 Mbit/s	Temp (°C)	18
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	36
Power Setting	49	Press. (mBars)	1003
Antenna	Integral	Duty Cycle (%)	100
Test Notes 1	APEX0100, SN# CL0000089		
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5701.403	68.9	6.2	-2.0	73.1	Peak [Scan]	H						FUND
17046.092	29.9	12.4	10.2	52.4	Peak [Scan]	H						NOISE
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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Integral Antenna - Radiated Band-Edge

Peak Limit 74.0 dB μ V, Peak Limit 54.0 dB μ V

		5350 MHz		
		dB μ V		Power Setting
Operational Mode	Operating Frequency (MHz)	Peak	Average	
a	5320.0	60.10	50.15	56
n HT-20	5320.0	58.10	48.78	50
n HT-40	5310.0	73.52	53.06	61
ac-80	5290.0	72.23	53.25	54

		5470 MHz		
		dB μ V		Power Setting
Operational Mode	Operating Frequency	Peak	Average	
a	5320.0	62.94	52.83	56
n HT-20	5320.0	61.29	50.10	49
n HT-40	5310.0	61.70	53.06	62
ac-80	5290.0	70.27	52.93	66

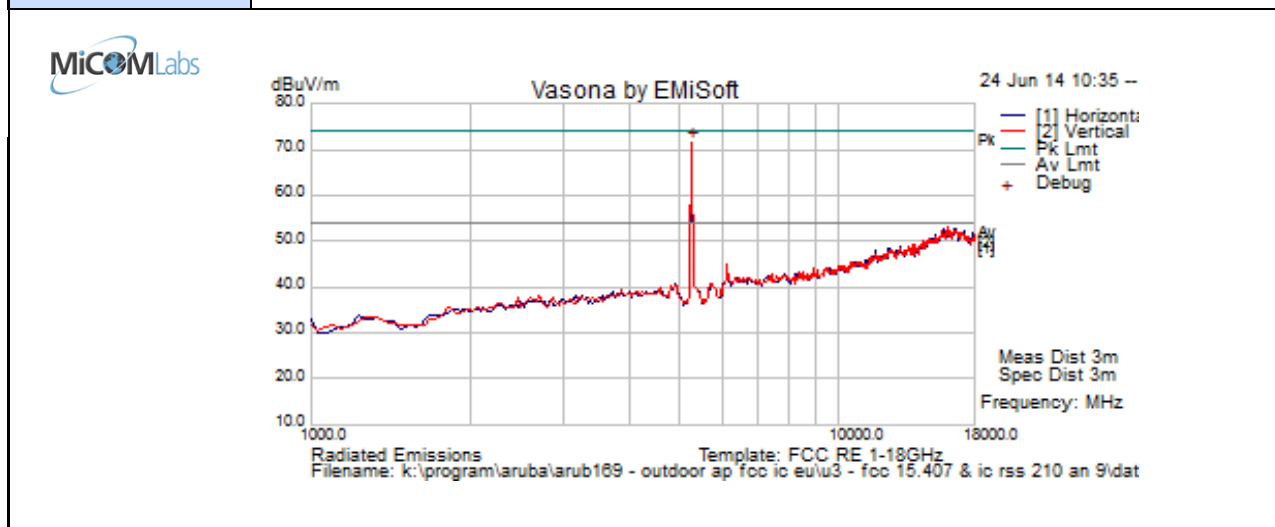
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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 83 of 287

6.1.2.2. AP-ANT-5010 – Spurious and Band-Edge Emissions

Test Freq.	5260 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5010	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5258.517	77.1	5.9	-11.3	71.7	Peak [Scan]	V	100					FUND

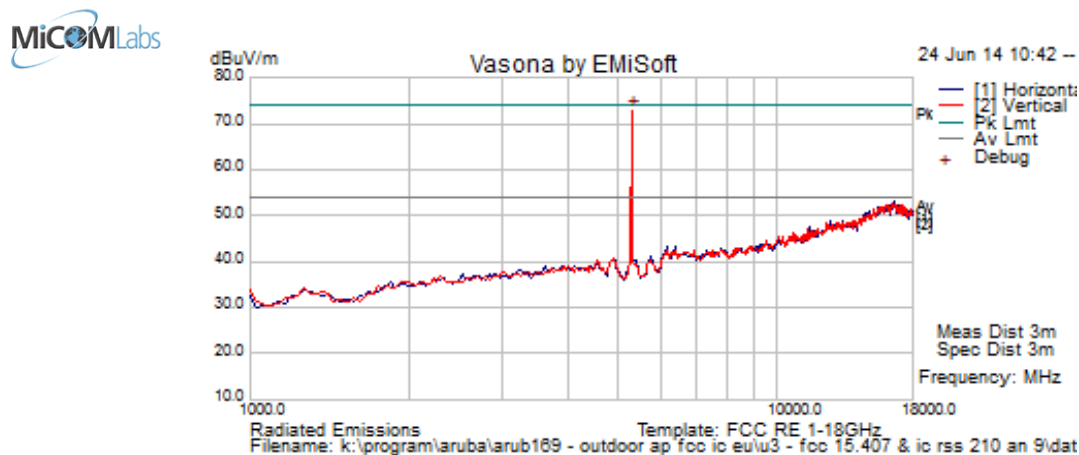
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 84 of 287

Test Freq.	5300 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5010	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

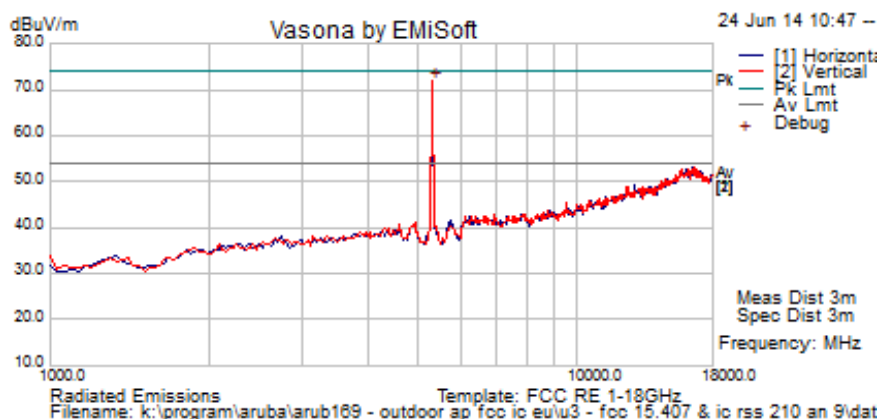
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5292.585	78.2	6.0	-11.1	73.0	Peak [Scan]	V	100					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 85 of 287

Test Freq.	5320 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5010	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

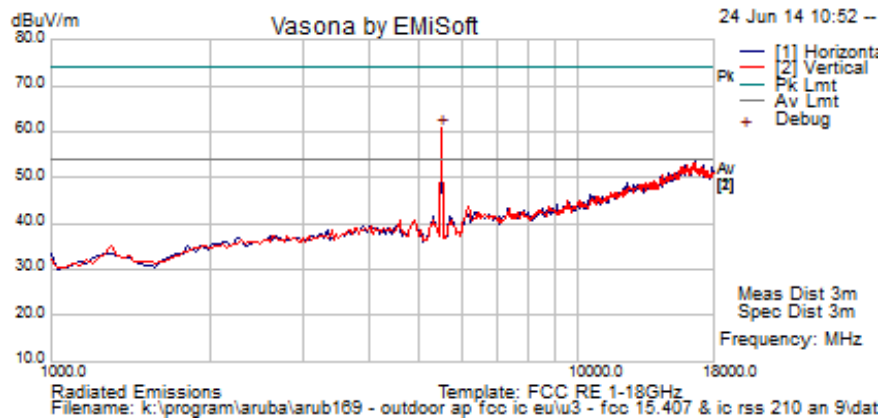
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5326.653	77.0	6.0	-11.1	71.9	Peak [Scan]	V	100					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 86 of 287

Test Freq.	5500 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5010	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

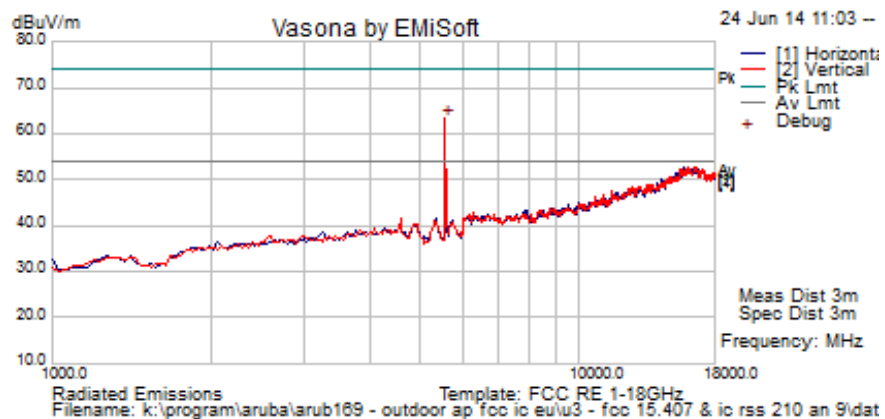
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5496.994	65.8	6.1	-11.2	60.7	Peak [Scan]	V	100					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 87 of 287

Test Freq.	5580 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5010	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

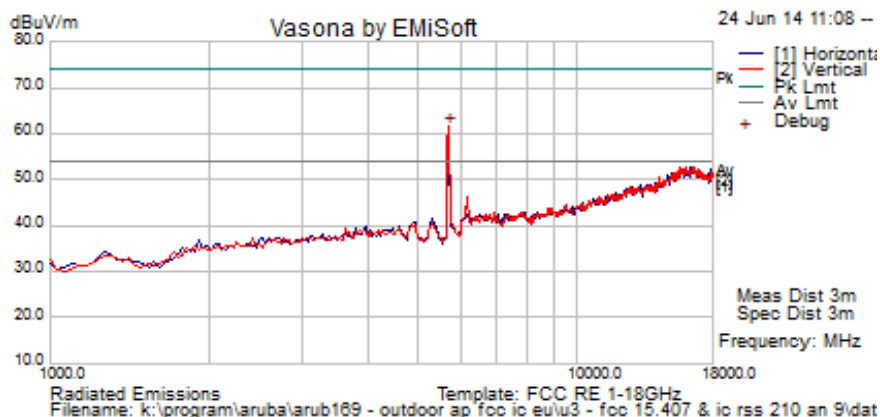
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5565.130	68.3	6.1	-11.2	63.2	Peak [Scan]	V	100					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 88 of 287

Test Freq.	5700 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5010	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5701.403	61.4	6.2	-2.0	65.7	Peak [Scan]	V	200					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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AP-ANT-5010 - Radiated Band-Edge

Peak Limit 74.0 dB μ V, Peak Limit 54.0 dB μ V

		5350 MHz		
		dB μ V		Power Setting
Operational Mode	Operating Frequency (MHz)	Peak	Average	
a	5320.0	63.48	53.29	26
n HT-20	5320.0	63.14	53.12	28
n HT-40	5310.0	64.76	53.93	40
ac-80	5290.0	72.06	53.93	40

		5470 MHz		
		dB μ V		Power Setting
Operational Mode	Operating Frequency	Peak	Average	
a	5320.0	63.43	53.12	24
n HT-20	5320.0	63.43	52.96	24
n HT-40	5310.0	64.24	53.57	36
ac-80	5290.0	69.92	53.79	42

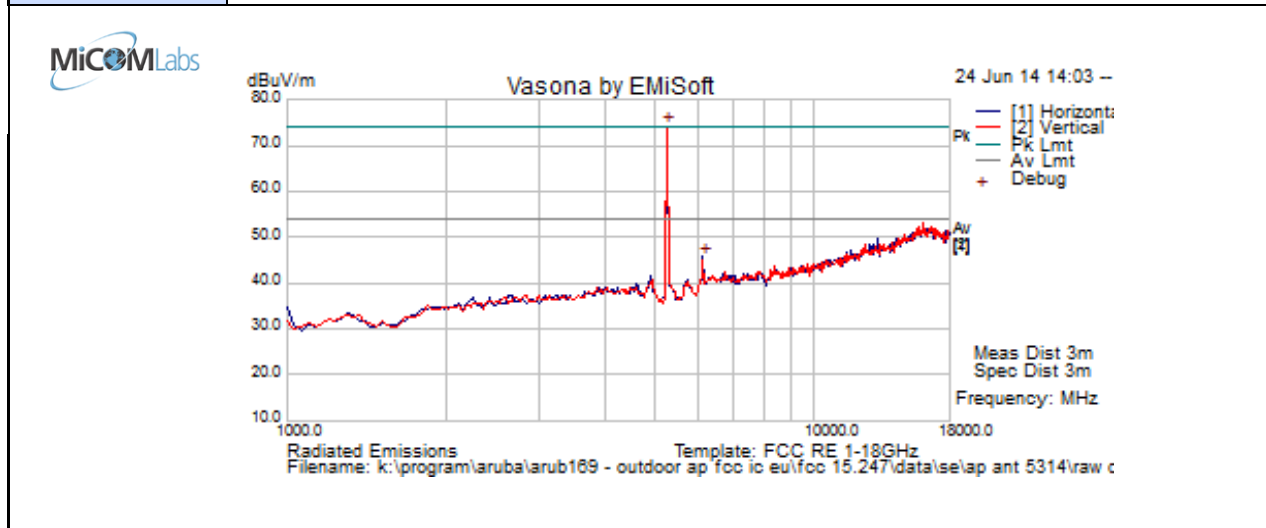
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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 90 of 287

6.1.2.3. AP-ANT-5314 – Spurious and Band-Edge Emissions

Test Freq.	5260 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5314	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5258.517	79.6	5.9	-11.3	74.2	Peak [Scan]	V	100					FUND
6145.915	48.2	6.5	-9.2	45.5	Peak [Scan]	V	98					NRB

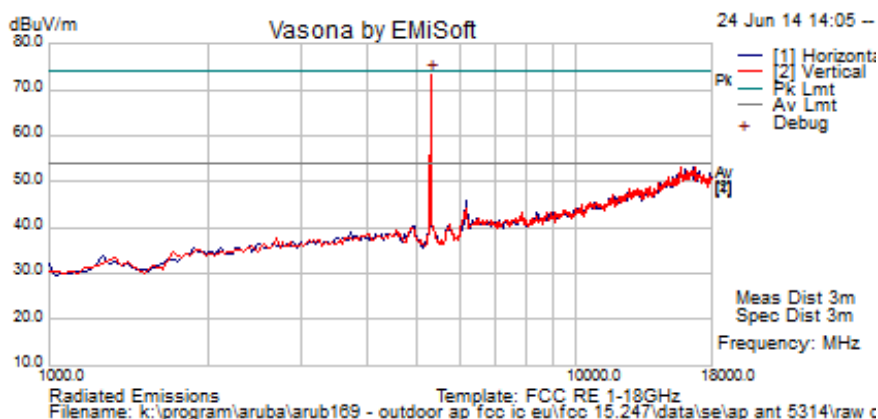
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 91 of 287

Test Freq.	5300 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5314	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

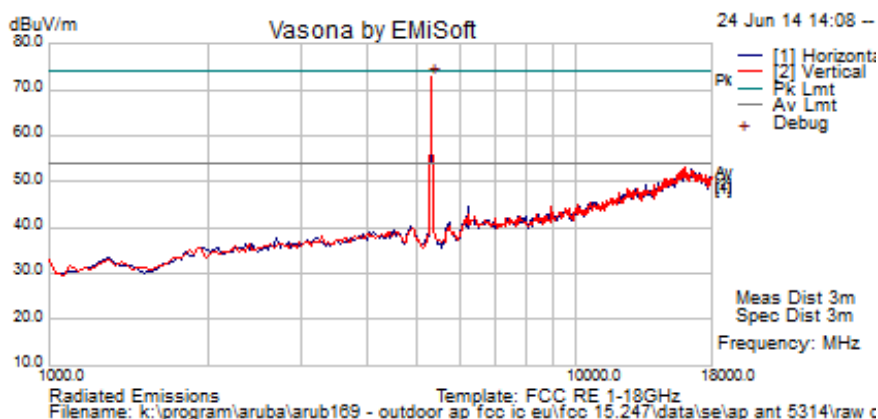
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5292.585	78.2	6.0	-11.1	73.0	Peak [Scan]	V	100					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 92 of 287

Test Freq.	5320 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5314	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

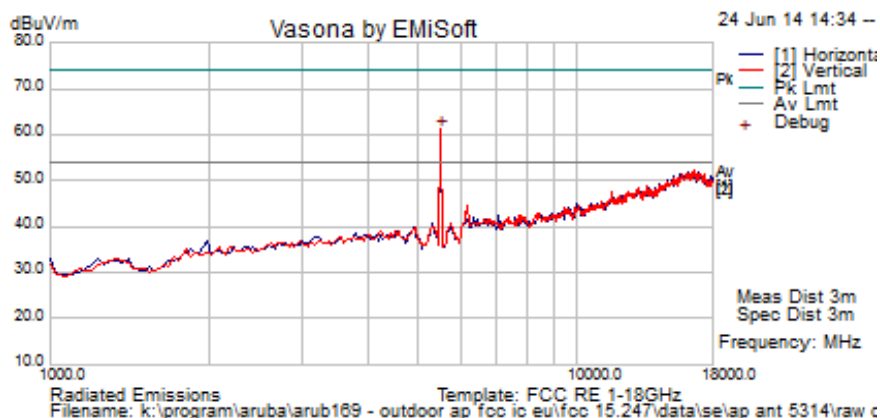
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5326.653	77.0	6.0	-11.1	71.9	Peak [Scan]	V	100					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 93 of 287

Test Freq.	5500 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5314	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

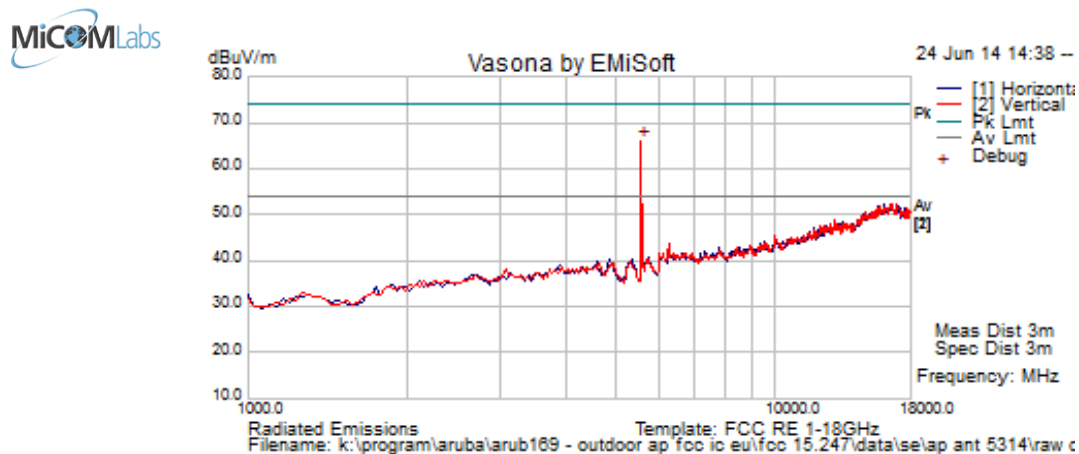
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5496.994	66.3	6.1	-11.2	61.2	Peak [Scan]	V	100					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 94 of 287

Test Freq.	5580 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5314	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

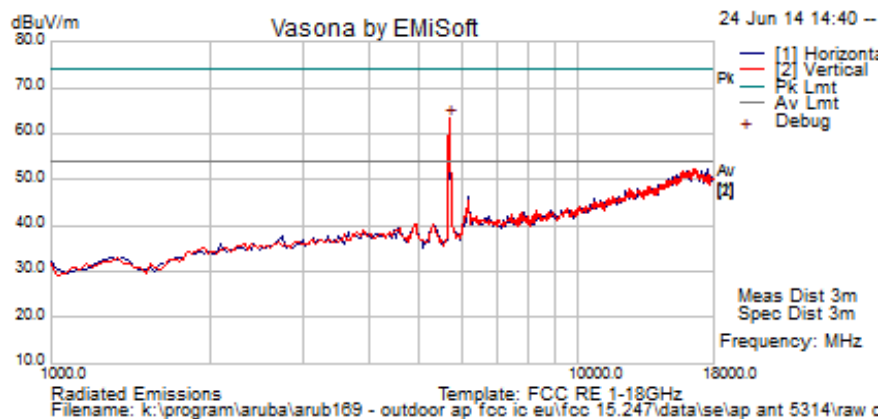
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5565.130	71.3	6.1	-11.2	66.2	Peak [Scan]	V	100					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 95 of 287

Test Freq.	5700 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5314	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5701.403	67.8	6.2	-10.8	63.2	Peak [Scan]	V	100					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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AP-ANT-5314 - Radiated Band-Edge

Peak Limit 74.0 dB μ V, Peak Limit 54.0 dB μ V

		5350 MHz		
		dB μ V		Power Setting
Operational Mode	Operating Frequency (MHz)	Peak	Average	
a	5320.0	63.93	53.50	26
n HT-20	5320.0	63.68	53.27	26
n HT-40	5310.0	64.88	53.86	36
ac-80	5290.0	72.02	52.80	34

		5470 MHz		
		dB μ V		Power Setting
Operational Mode	Operating Frequency	Peak	Average	
a	5320.0	64.31	53.86	26
n HT-20	5320.0	63.43	53.50	26
n HT-40	5310.0	64.18	53.86	33
ac-80	5290.0	68.35	53.93	40

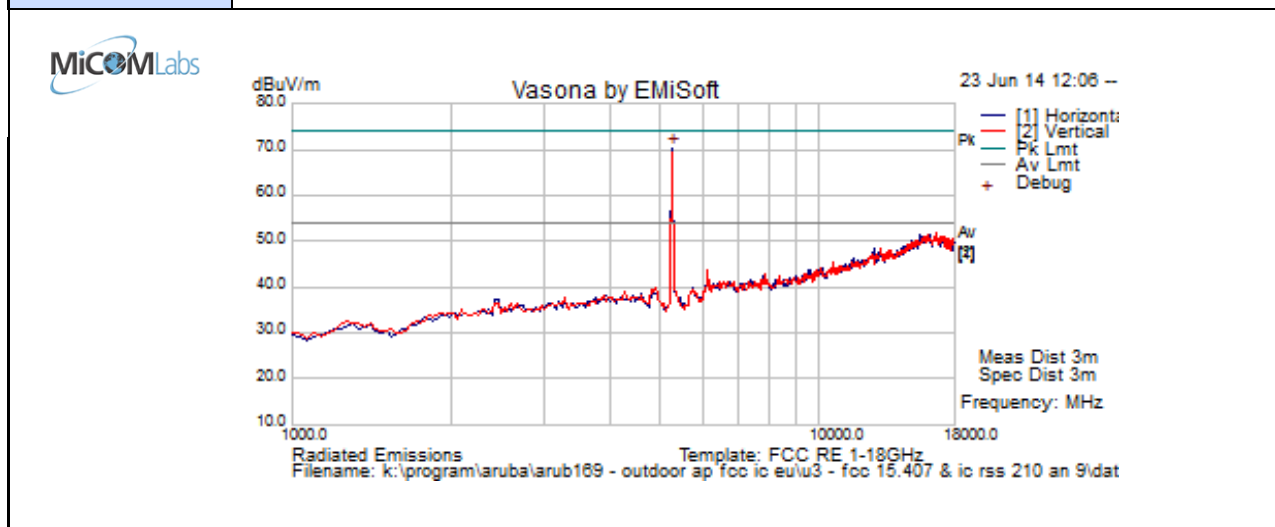
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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 97 of 287

6.1.2.4. AP-ANT-5712 – Spurious and Band-Edge Emissions

Test Freq.	5260 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5712	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5258.517	74.7	5.9	-11.3	69.4	Peak [Scan]	H	100					FUND

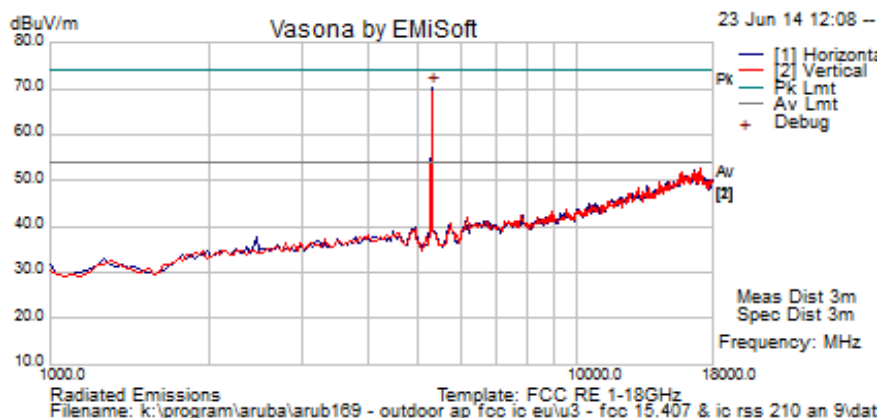
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 98 of 287

Test Freq.	5300 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5712	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

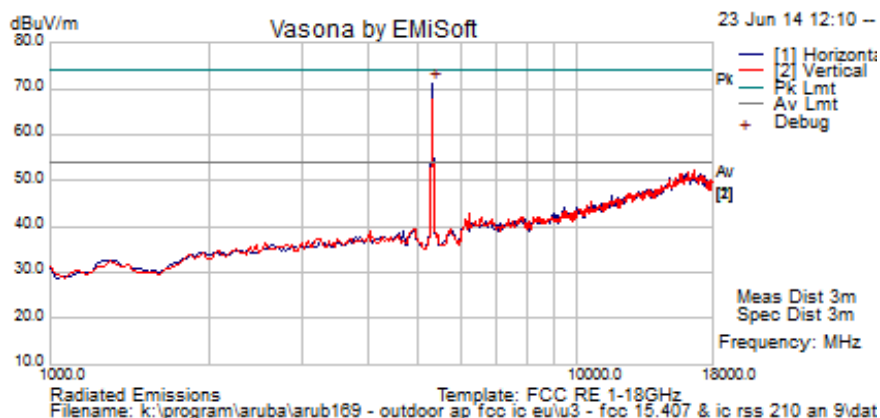
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5292.585	74.9	6.0	-11.1	69.8	Peak [Scan]	H	100					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 99 of 287

Test Freq.	5320 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5712	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

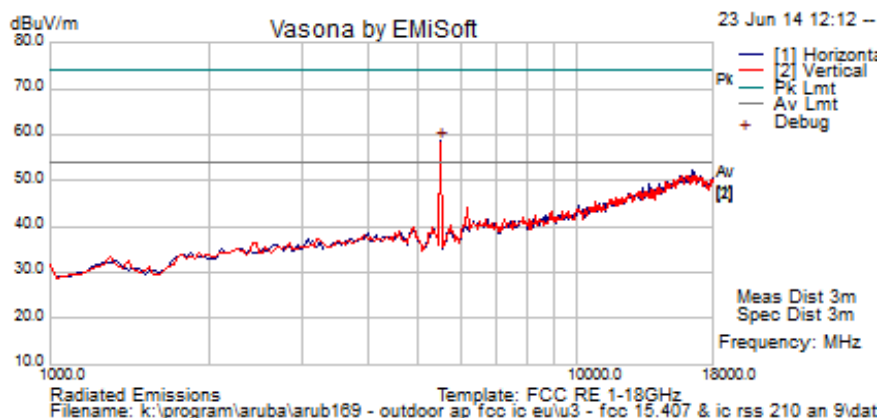
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5326.653	73.6	6.0	-11.1	68.6	Peak [Scan]	H	100					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 100 of 287

Test Freq.	5500 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5712	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

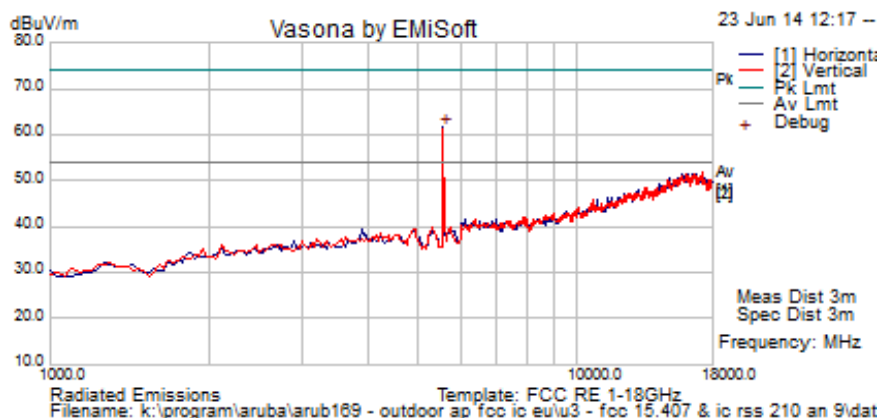
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5496.994	62.1	6.1	-2.0	66.2	Peak [Scan]	V	200					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 101 of 287

Test Freq.	5580 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5712	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

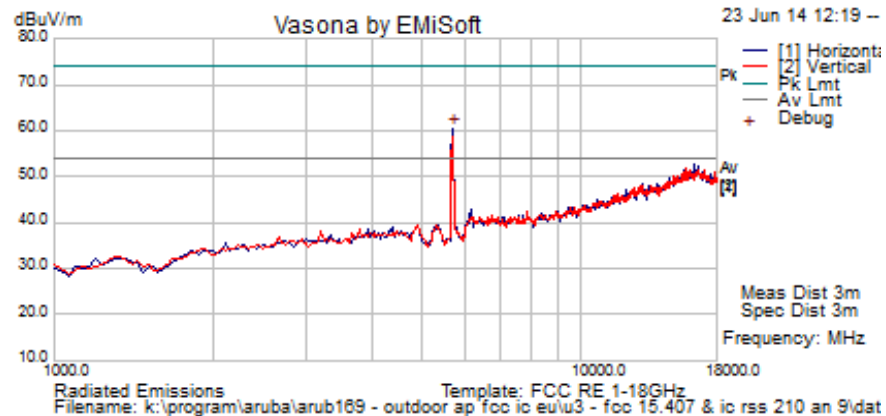
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5565.130	62.9	6.1	-2.1	66.9	Peak [Scan]	H	200					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 102 of 287

Test Freq.	5700 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	5712	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5701.403	61.4	6.2	-2.0	65.7	Peak [Scan]	V	200					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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AP-ANT-5712 - Radiated Band-Edge

Peak Limit 74.0 dB μ V, Peak Limit 54.0 dB μ V

		5350 MHz		
		dB μ V		Power Setting
Operational Mode	Operating Frequency (MHz)	Peak	Average	
a	5320.0	63.40	53.86	40
n HT-20	5320.0	61.53	51.30	40
n HT-40	5310.0	66.64	53.59	54
ac-80	5290.0	72.94	53.68	53

		5470 MHz		
		dB μ V		Power Setting
Operational Mode	Operating Frequency	Peak	Average	
a	5320.0	63.95	53.86	33
n HT-20	5320.0	63.97	53.77	32
n HT-40	5310.0	63.83	53.40	54
ac-80	5290.0	68.25	53.40	50

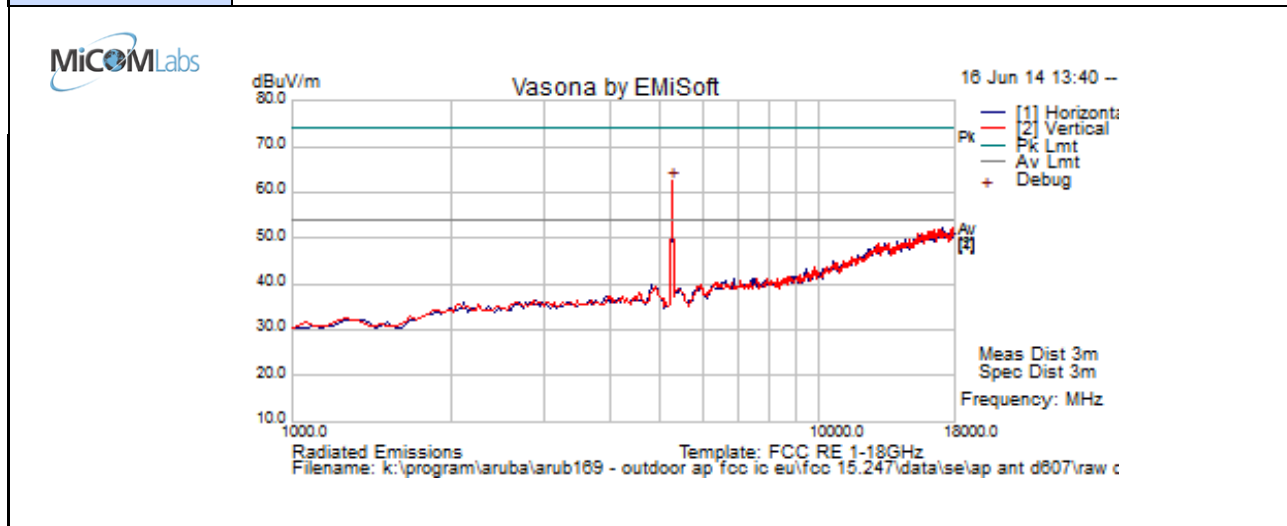
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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 104 of 287

6.1.2.5. AP-ANT-D607 – Spurious and Band-Edge Emissions

Test Freq.	5260 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	D607	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5258.517	58.8	5.9	-2.2	62.5	Peak [Scan]	V	100					FUND

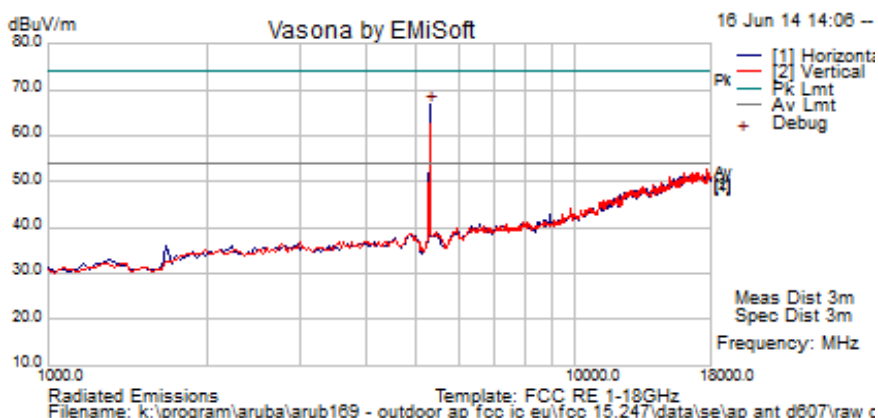
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 105 of 287

Test Freq.	5300 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	D607	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

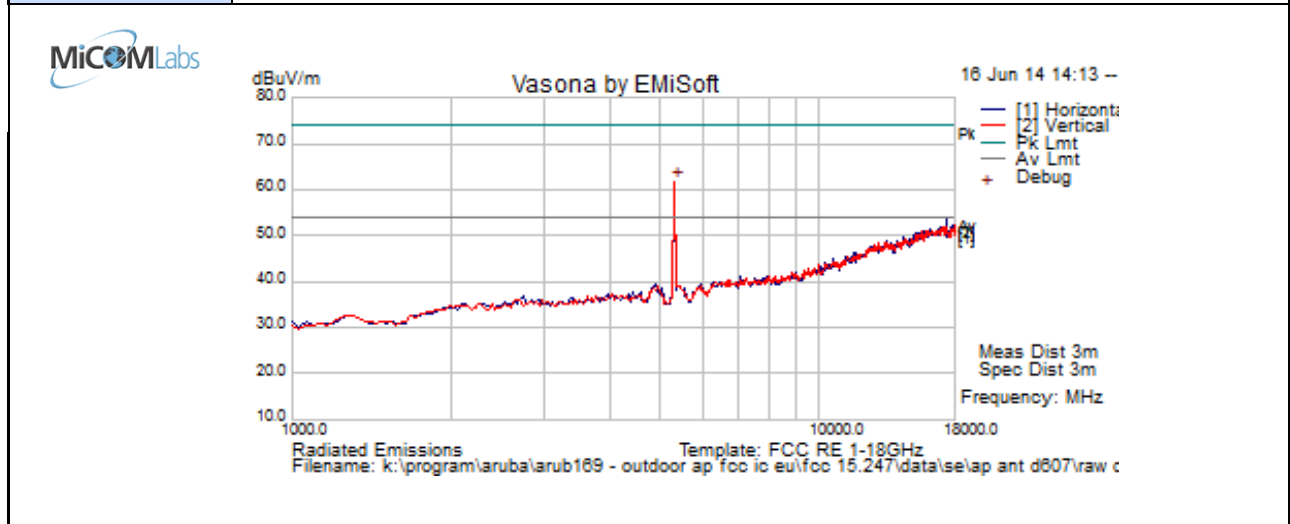
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5292.585	62.8	6.0	-2.1	66.7	Peak [Scan]	H	100					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 106 of 287

Test Freq.	5320 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	D607	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded ethernet cable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5326.653	57.9	6.0	-1.9	61.9	Peak [Scan]	V	150					FUND

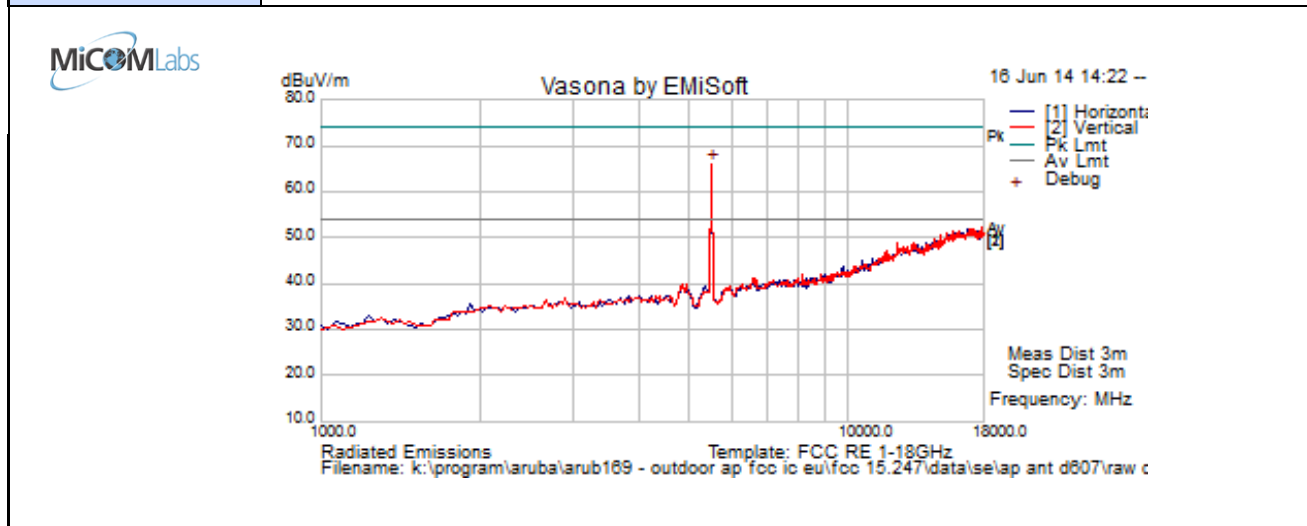
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 107 of 287

Test Freq.	5500 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	D607	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

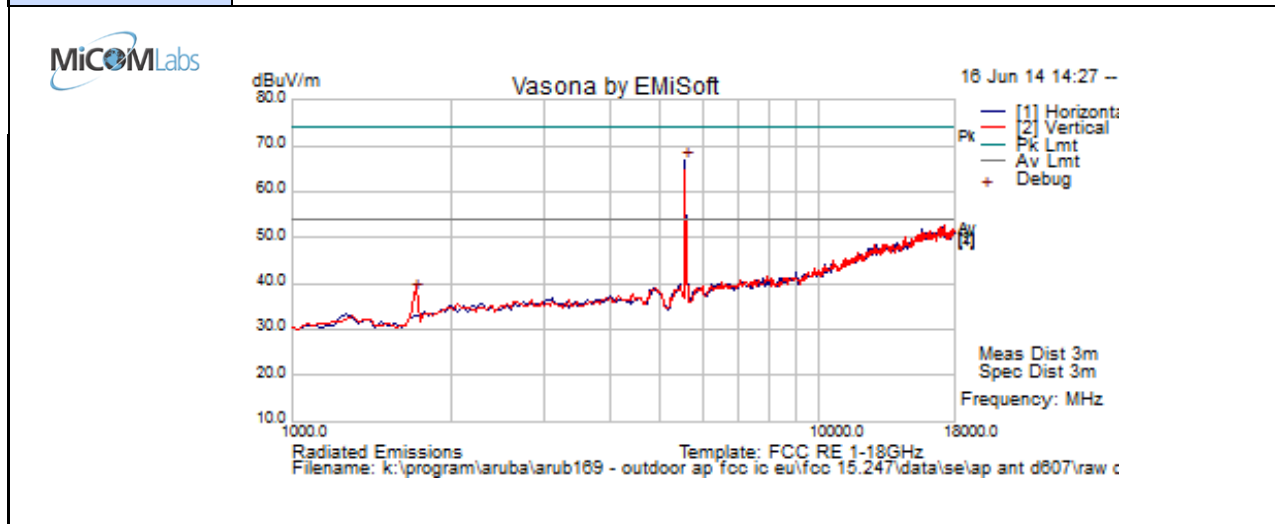
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5496.994	62.1	6.1	-2.0	66.2	Peak [Scan]	V	200					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 108 of 287

Test Freq.	5580 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	D607	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded ethernet cable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5565.130	62.9	6.1	-2.1	66.9	Peak [Scan]	H	200					FUND

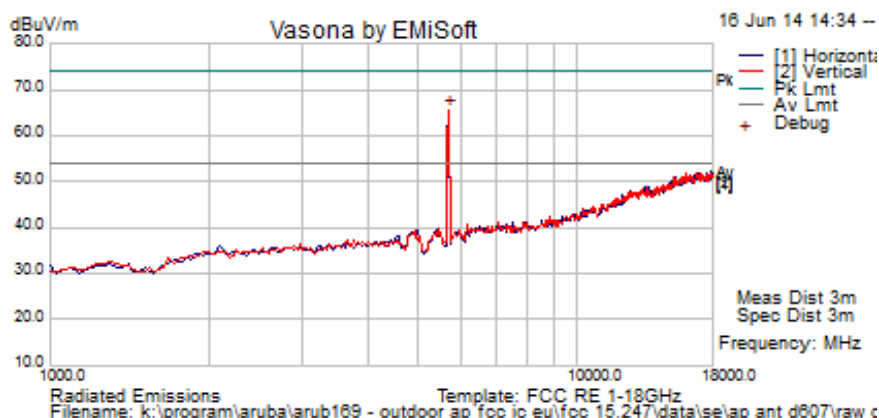
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 109 of 287

Test Freq.	5700 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	D607	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5701.403	61.4	6.2	-2.0	65.7	Peak [Scan]	V	200					FUND
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205												

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AP-ANT-D607 - Radiated Band-Edge

Peak Limit 74.0 dB μ V, Peak Limit 54.0 dB μ V

		5350 MHz		
		dB μ V		Power Setting
Operational Mode	Operating Frequency (MHz)	Peak	Average	
a	5320.0	63.73	53.22	56
n HT-20	5320.0	62.16	51.75	50
n HT-40	5310.0	68.89	53.22	70
ac-80	5290.0	69.49	53.32	56

		5470 MHz		
		dB μ V		Power Setting
Operational Mode	Operating Frequency	Peak	Average	
a	5320.0	64.56	53.96	52
n HT-20	5320.0	64.21	52.83	49
n HT-40	5310.0	64.61	53.87	62
ac-80	5290.0	67.74	51.98	66

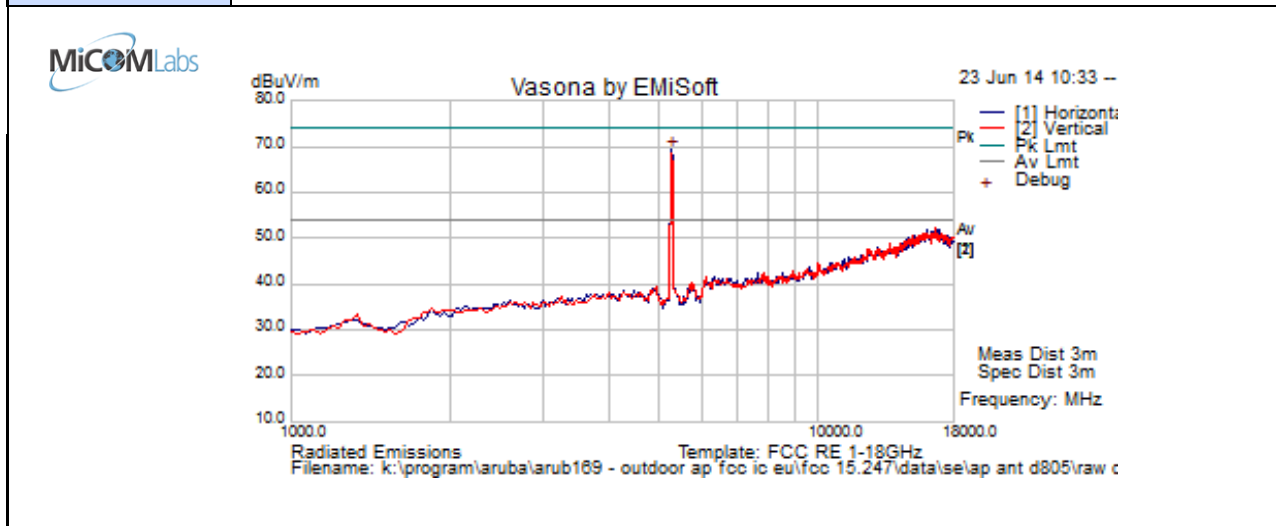
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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 111 of 287

6.1.2.6. AP-ANT-D805 – Spurious and Band-Edge Emissions

Test Freq.	5260 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	D805	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5258.517	74.7	5.9	-11.3	69.4	Peak [Scan]	H	100					FUND

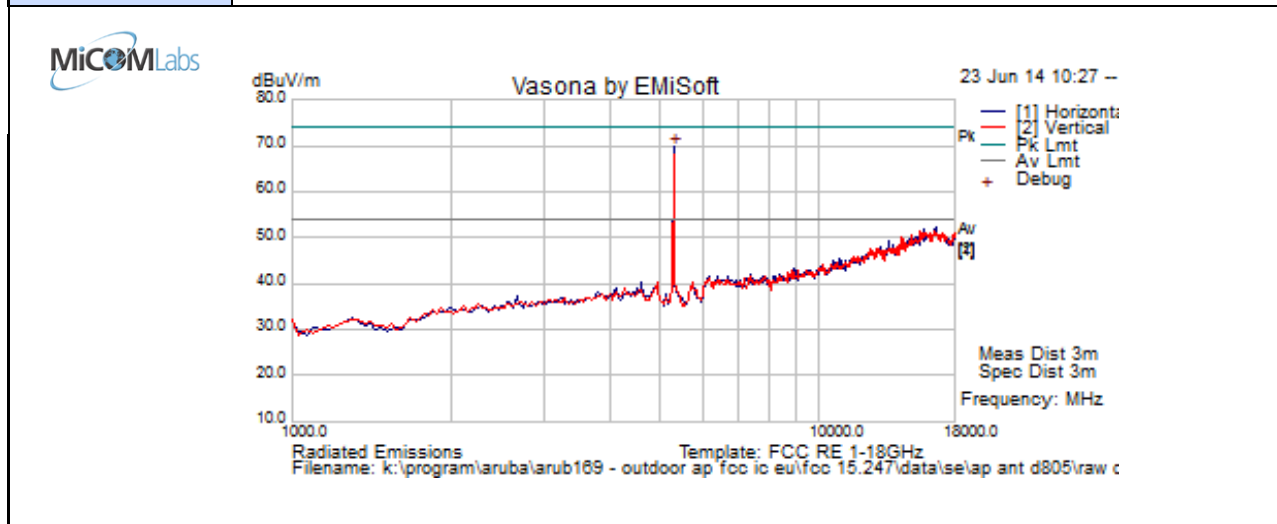
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 112 of 287

Test Freq.	5300 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	D805	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded ethernet cable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5292.585	74.9	6.0	-11.1	69.8	Peak [Scan]	H	100					FUND

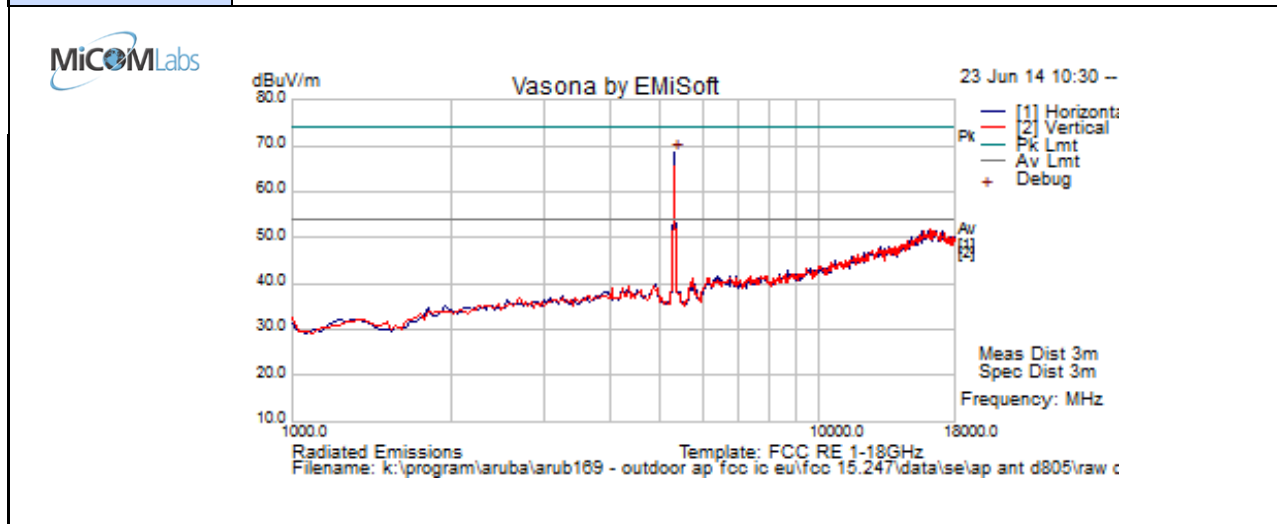
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 113 of 287

Test Freq.	5320 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	D805	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5326.653	73.6	6.0	-11.1	68.6	Peak [Scan]	H	100					FUND

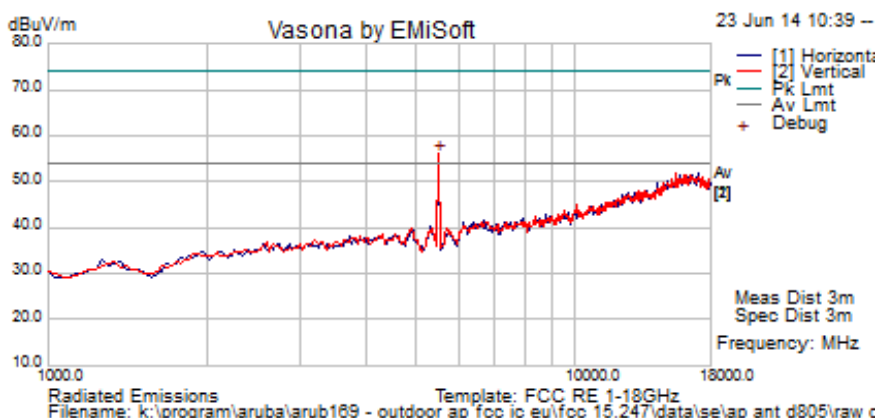
Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 114 of 287

Test Freq.	5500 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	D805	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded ethernet cable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5496.994	62.1	6.1	-2.0	66.2	Peak [Scan]	V	200					FUND

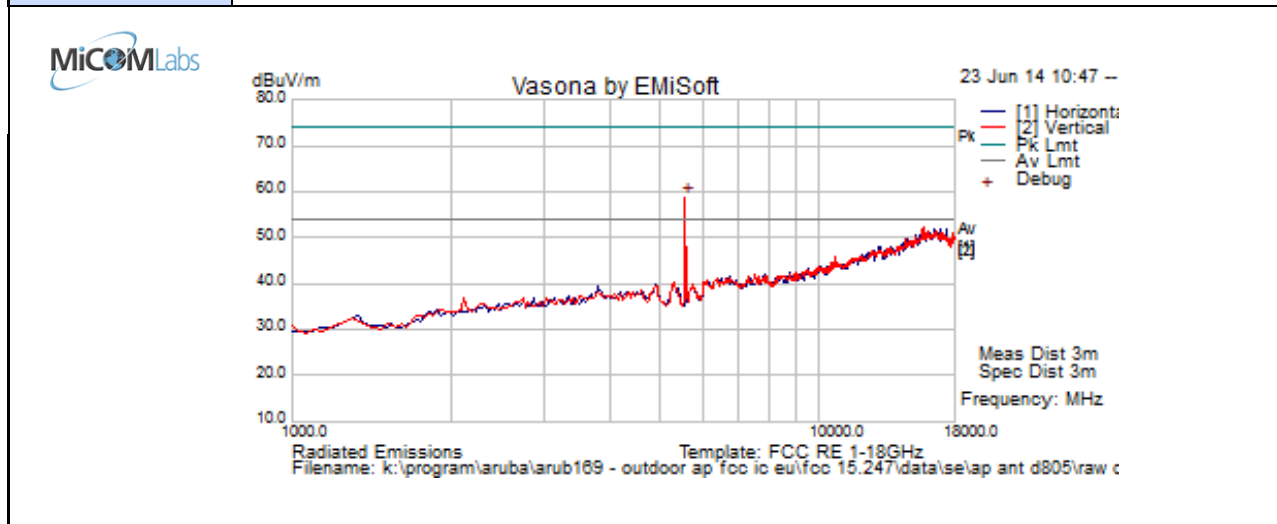
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 115 of 287

Test Freq.	5580 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	D805	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded etherncable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5565.130	62.9	6.1	-2.1	66.9	Peak [Scan]	H	200					FUND

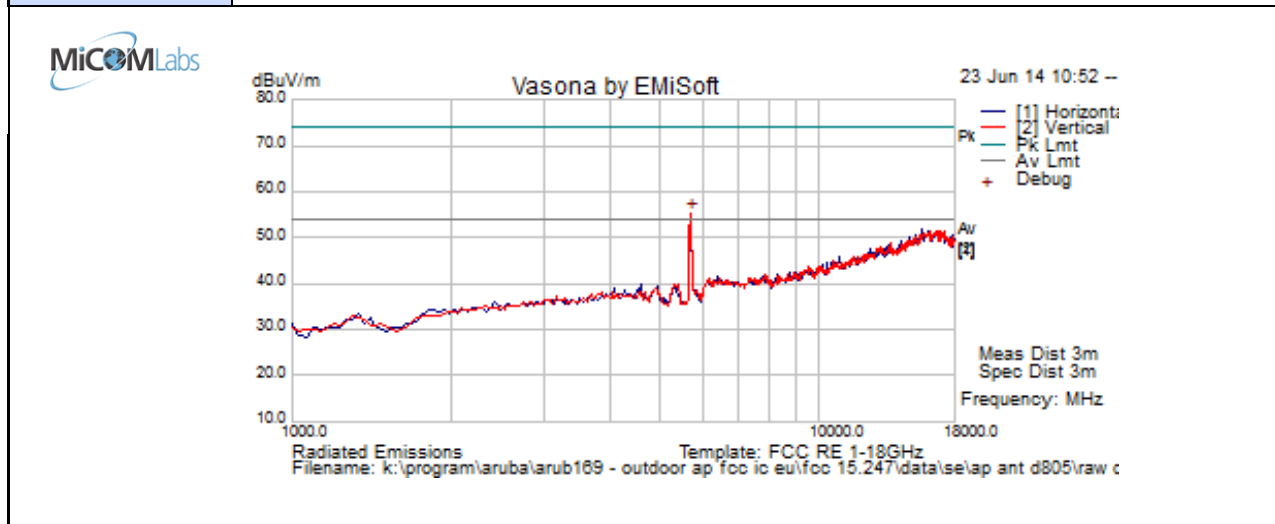
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 116 of 287

Test Freq.	5700 MHz	Engineer	SB
Variant	802.11a; 6 Mbs	Temp (°C)	18.5
Freq. Range	1000 MHz - 18000 MHz	Rel. Hum.(%)	34
Power Setting	56	Press. (mBars)	1004
Antenna	D805	Duty Cycle (%)	99
Test Notes 1	APEX0101 External, P2A 5#; non shielded ethernet cable		
Test Notes 2	POE: Power Dsine 3501G 48VDC;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5701.403	61.4	6.2	-2.0	65.7	Peak [Scan]	V	200					FUND

Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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AP-ANT-D805 - Radiated Band-Edge

Peak Limit 74.0 dB μ V, Peak Limit 54.0 dB μ V

		5350 MHz		
		dB μ V		Power Setting
Operational Mode	Operating Frequency (MHz)	Peak	Average	
a	5320.0	63.33	53.50	33
n HT-20	5320.0	64.11	53.20	44
n HT-40	5310.0	68.60	53.79	58
ac-80	5290.0	72.83	53.27	52

		5470 MHz		
		dB μ V		Power Setting
Operational Mode	Operating Frequency	Peak	Average	
a	5320.0	63.55	53.35	33
n HT-20	5320.0	64.52	53.42	46
n HT-40	5310.0	65.80	53.27	58
ac-80	5290.0	69.02	52.64	66

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6.1.2.7. Digital Emissions (30M-1 GHz)

FCC, Part 15 Subpart C §15.205/ §15.209
Industry Canada RSS-210 §2.2

Test Procedure

Testing 30M-1 GHz was performed in a 3-meter 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 closest to the limits are measured in the quasi-peak mode with the tuned receiver using a bandwidth of 120 kHz. Only the highest emissions relative to the limit are listed. The anechoic chamber test set-up is identified in Section 6 Test Set-Up Photographs.

The EUT had two methods of powering on ac/dc converter and Power over Ethernet (POE). Both modes were tested for emissions below 1GHz.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. In this test facility, the Antenna Factor, Cable Loss, and Amplifier Gains are loaded into the Rohde & Schwarz Receiver and the corrected field strength can be read directly on the receiver.

$$FS = R + AF + CORR$$

where:

FS = Field Strength
R = Measured Receiver Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain

For example:

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

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

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

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

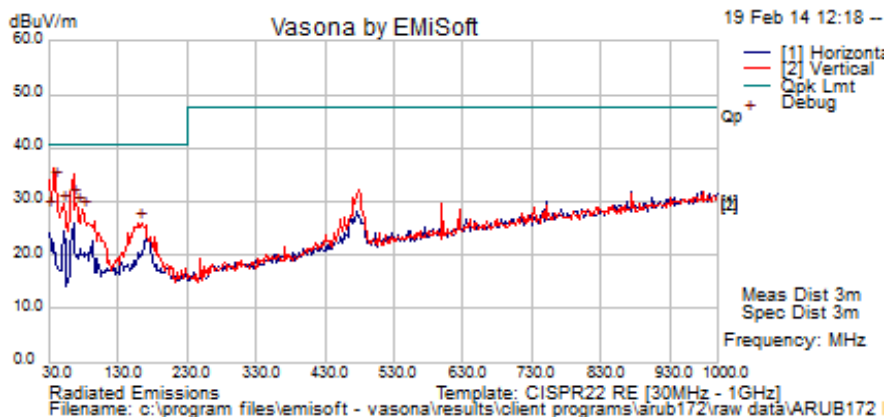
$$40 \text{ dB}\mu\text{V/m} = 100\mu\text{V/m}$$
$$48 \text{ dB}\mu\text{V/m} = 250\mu\text{V/m}$$

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 119 of 287

Test Freq.	NA	Engineer	JMH
Variant	Digital Emissions	Temp (°C)	18
Freq. Range	30 - 1000 MHz	Rel. Hum.(%)	37
Power Setting	NA	Press. (mBars)	1007
Antenna	NA		
Test Notes 1	POE Powered		
Test Notes 2	POE:PowerDSine 9001GR 55VDC / 350mA;		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
39.073	46.6	3.6	-16.4	33.8	Quasi Max	V	155	17	40.5	-6.7	Pass	
65.807	49.8	3.8	-23.2	30.4	Quasi Max	V	174	267	40.5	-10.1	Pass	
30.291	34.6	3.5	-9.7	28.4	Quasi Max	V	99	361	40.5	-12.1	Pass	
51.607	48.9	3.7	-23.1	29.5	Peak [Scan]	V	98	-1	40.5	-11.0	Pass	
70.100	47.9	3.9	-22.9	28.9	Peak [Scan]	V	98	-1	40.5	-11.6	Pass	
78.959	47.7	3.9	-23.1	28.5	Peak [Scan]	V	98	-1	40.5	-12.0	Pass	
160.241	40.0	4.4	-18.3	26.0	Peak [Scan]	V	98	-1	40.5	-14.5	Pass	

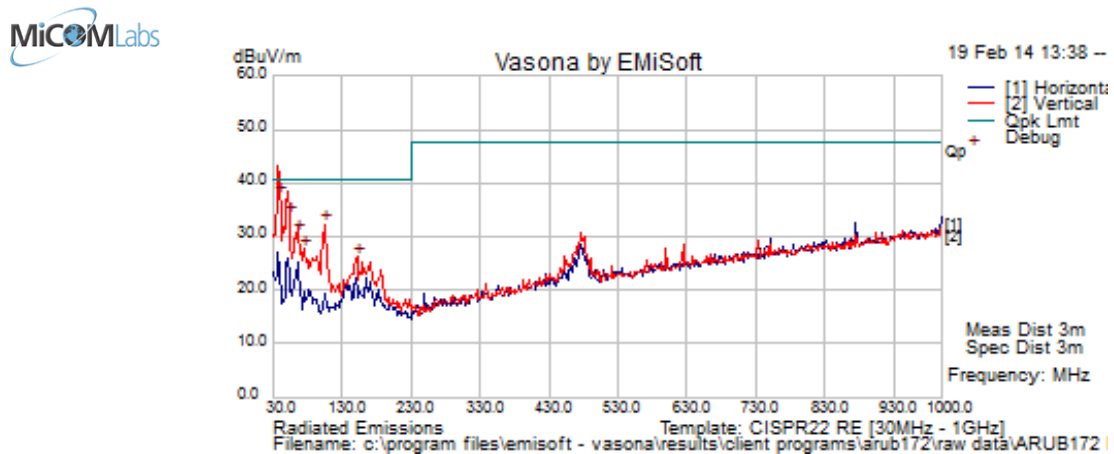
Legend: DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
 NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 120 of 287

Test Freq.	NA	Engineer	JMH
Variant	Digital Emissions	Temp (°C)	18
Freq. Range	30 - 1000 MHz	Rel. Hum.(%)	37
Power Setting	NA	Press. (mBars)	1007
Antenna	NA		
Test Notes 1	ac Powered		
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
39.093	50.5	3.6	-16.4	37.69	Quasi Max	V	127	271	40.5	-2.8	Pass	
51.899	53.2	3.7	-23.1	33.7	Quasi Max	V	145	55	40.5	-6.8	Pass	
104.727	47.8	4.1	-19.6	32.3	Peak [Scan]	V	98	361	40.5	-8.2	Pass	
66.356	49.8	3.8	-23.1	30.5	Peak [Scan]	V	98	361	40.5	-10.1	Pass	
75.196	46.5	3.9	-22.9	27.5	Peak [Scan]	V	98	361	40.5	-13.0	Pass	
152.498	40.4	4.4	-18.5	26.3	Peak [Scan]	V	98	361	40.5	-14.2	Pass	

Legend: DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
 NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

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Specification

Limits

§15.205 (a) Except as shown in paragraph (d) of 15.205 (a), only spurious emissions are permitted in any of the frequency bands listed.

§15.205 (a) Except as shown in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

§15.209 (a) and RSS-Gen §2.2 Limit Matrix

Frequency(MHz)	Field Strength ($\mu\text{V/m}$)	Field Strength ($\text{dB}\mu\text{V/m}$)	Measurement Distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Laboratory Measurement Uncertainty for Radiated Emissions

Measurement uncertainty	+5.6/ -4.5 dB
-------------------------	---------------

Traceability

Method
Measurements were made per work instruction WI-03 'Measurement of Radiated Emissions'

6.1.3. AC Wireline Conducted Emissions (150 kHz – 30 MHz)

FCC, Part 15 Subpart C §15.207
Industry Canada RSS-Gen §7.2.2

Test Procedure

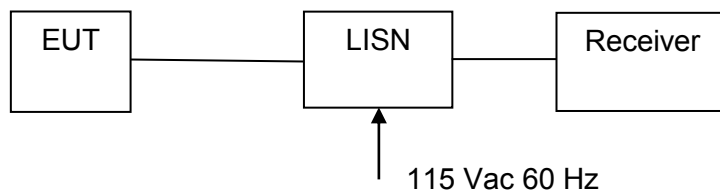
The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

Measurement Results for AC Wireline Conducted Emissions (150 kHz – 30 MHz)

Ambient conditions.

Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

Test Measurement Set up



Measurement set up for AC Wireline Conducted Emissions Test

Measurement Results for AC Wireline Conducted Emissions (150 kHz – 30 MHz)

Ambient conditions.

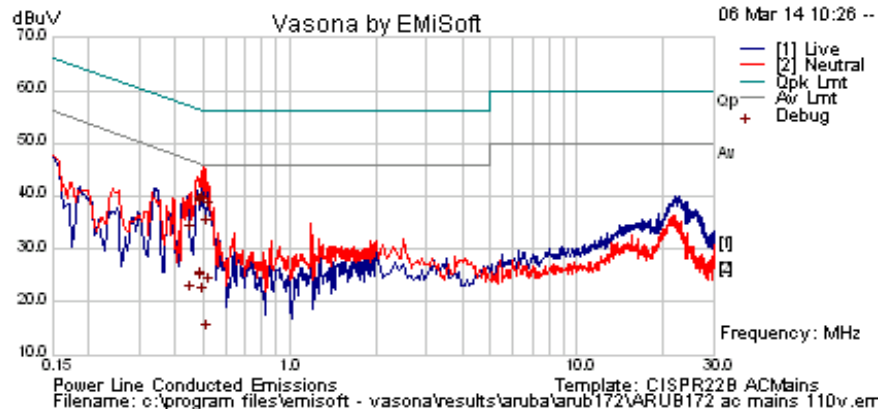
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar



Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 123 of 287

ac/dc Adaptor Wireline Emissions

Test Freq.	N/A	Engineer	JMH
Variant	AC Line Emissions	Temp (°C)	18
Freq. Range	0.150 MHz - 30 MHz	Rel. Hum.(%)	35
Power Setting	NA	Press. (mBars)	1004
Antenna	N/A		
Test Notes 1	115VAC 60Hz		
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
0.447	11.6	9.9	0.1	21.6	Average	Neutral	46.93	-25.4	Pass	
0.447	22.8	9.9	0.1	32.8	Quasi Peak	Neutral	56.93	-24.2	Pass	
0.481	27.8	9.9	0.1	37.8	Quasi Peak	Neutral	56.32	-18.5	Pass	
0.481	14.0	9.9	0.1	24.0	Average	Neutral	46.32	-22.4	Pass	
0.485	13.5	9.9	0.1	23.5	Average	Neutral	46.25	-22.8	Pass	
0.485	28.0	9.9	0.1	38.0	Quasi Peak	Neutral	56.25	-18.2	Pass	
0.491	11.1	9.9	0.1	21.1	Average	Neutral	46.15	-25.1	Pass	
0.491	28.3	9.9	0.1	38.3	Quasi Peak	Neutral	56.15	-17.9	Pass	
0.505	24.1	9.9	0.1	34.1	Quasi Peak	Neutral	56	-21.9	Pass	
0.505	4.0	9.9	0.1	14.0	Average	Neutral	46	-32.0	Pass	
0.519	27.3	9.9	0.1	37.3	Quasi Peak	Neutral	56	-18.7	Pass	
0.519	12.8	9.9	0.1	22.8	Average	Neutral	46	-23.2	Pass	

Legend: DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
 NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

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Specification

Limit

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 $\mu\Omega$ line impedance stabilization network (LISN), see §15.207 (a) matrix below. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

RSS-Gen §7.2.2

The radio frequency voltage that is conducted back into the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table below. The tighter limit applies at the frequency range boundaries.

§15.207 (a) and RSS-Gen §7.2.2 Limit Matrix

The lower limit applies at the boundary between frequency ranges

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	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

Laboratory Measurement Uncertainty for Conducted Emissions

Measurement uncertainty	± 2.64 dB
-------------------------	---------------

Traceability

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

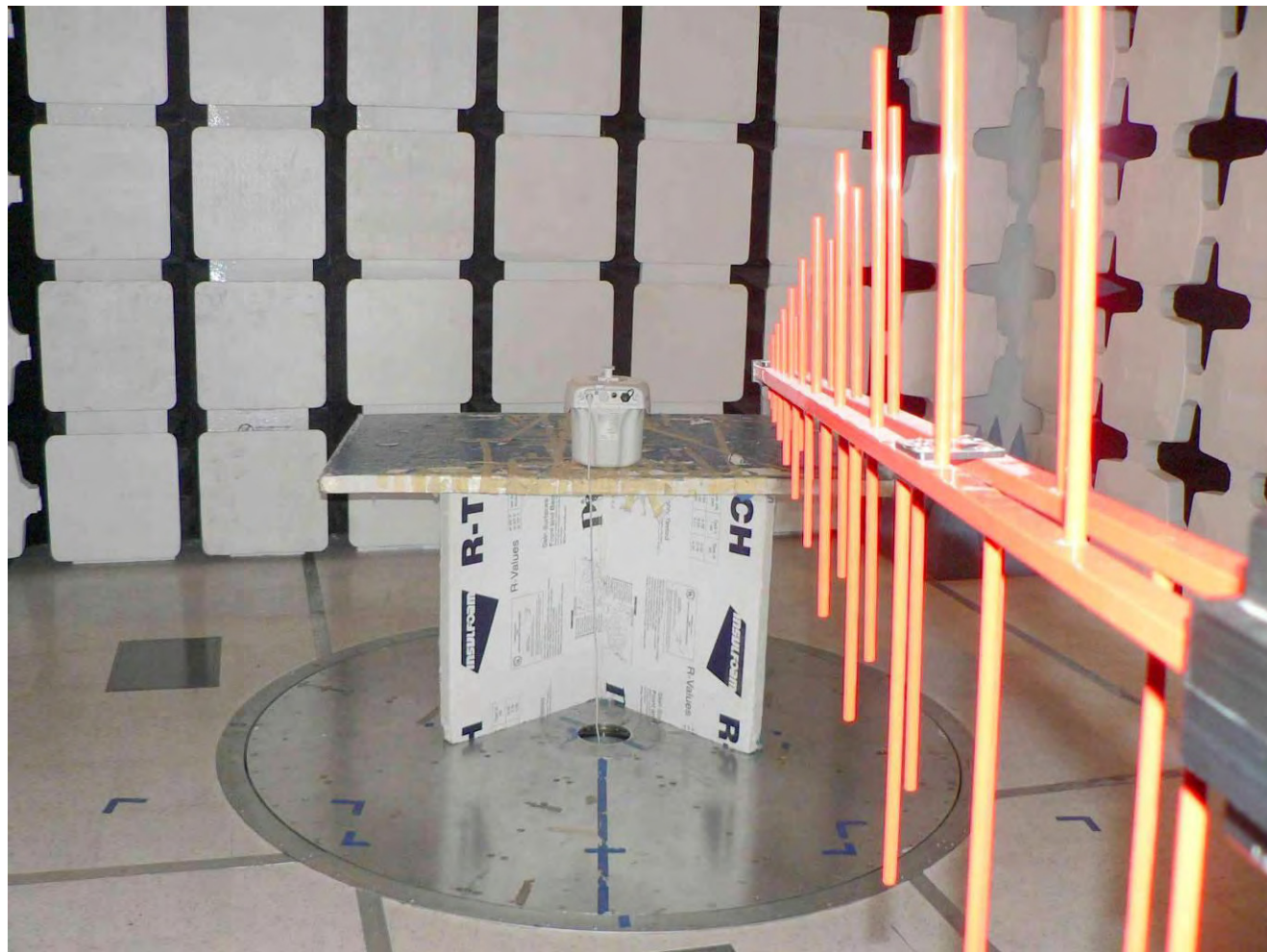
7. PHOTOGRAPHS

7.1. Conducted Test Setup



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7.2. Test Setup - Radiated Emissions < 1 GHz



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7.3. Test Setup - Radiated Emissions > 1 GHz



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8. TEST EQUIPMENT DETAILS

Asset #	Instrument	Manufacturer	Part #	Serial #	Calibration Due Date
075	Environmental Chamber	Thermatron	SE-300-2-2	27946	28 th Nov 14
117	Power Sensor	Hewlett Packard	8487D	3318A00371	18 th Oct 14
158	Barometer /Thermometer	Control Co.	4196	E2846	6 th Dec 14
190	Line Impedance Stabilization Network	Rhode & Schwartz	ESH3Z5	836679/006	12 Sep 15
223	Power Meter	Hewlett Packard	EPM-442A	US37480256	18 th Oct 14
252	SMA Cable	Megaphase	Sucoflex 104	None	2 nd Nov 14
310	2m SMA Cable	Micro-Coax	UFA210A-0-0787-3G03G0	209089-001	2 nd Nov 14
312	3m SMA Cable	Micro-Coax	UFA210A-1-1181-3G0300	209092-001	2 nd Nov 14
338	30 - 3000 MHz Antenna	Sunol	JB3	A052907	14 th Aug 15
376	Power Sensor	Agilent	U2000A	MY51440005	28 th Oct 14
377	Notch Filter 5G	Microtronics	BRM50716	034	22 nd Oct 14
378	EMI Receiver	Rhode & Schwartz	ESIB40	100107/040	17 th Jul 15
380	RF Switch	MiCOM Labs	MIC001	MIC001	20 th Dec 14
390	Power Sensor	Agilent	U2002A	MY50000103	17 th Oct 14
393	Low Pass Filter 1050MHz	Minicircuits	VLFX-1050	--	22 nd Oct 14
396	Notch Filter 2.4G	Microtronics	BRM50701	--	22 nd Oct 14
397	Preamp 10-2500 MHz	MiCOM Labs	--	0397	23 Oct 14
398	RF Conducted Test Software	MiCOM Labs ATS	--	Version 1.8	N/A
399	Horn Antenna 1-18G	ETS	3117	00154575	10 Oct 14
405	Power Supply 0 -60 Vdc	Agilent	6654A	MY4001826	Cal when used

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 129 of 287

Asset #	Instrument	Manufacturer	Part #	Serial #	Calibration Due Date
406	Preamp 1-18 GHz	MiCOM Labs		0406	30 May 15
411	Mast/Turntable Control	Sunol Sciences	SC98V	060199-1D	N/A
413	Mast Controller	Sunol Sciences	TWR95-4	030801-3	N/A
415	Turntable Controller	Sunol Sciences		0415	N/A
416	Gigabit Ethernet Filter	ETS	260366	0416	N/A
502	EMC Test Software	EMISoft	Vasona	5.0051	N/A
503	RF Conducted Test Software	National Instruments	Labview	Version 8.2	N/A
RF#1SMA #SA	SMA Cable	Flexco	--	--	20 th Dec 14
RF#1SMA #1	SMA Cable	Flexco	--	--	20 th Dec 14
RF#1SMA #2	SMA Cable	Flexco	--	--	20 th Dec 14
RF#1SMA #3	SMA Cable	Flexco	--	--	20 th Dec 14
RF#1SMA #4	SMA Cable	Flexco	--	--	20 th Dec 14

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Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 130 of 287

APPENDIX

A. SUPPORTING INFORMATION

A.1. CONDUCTED TEST PLOTS

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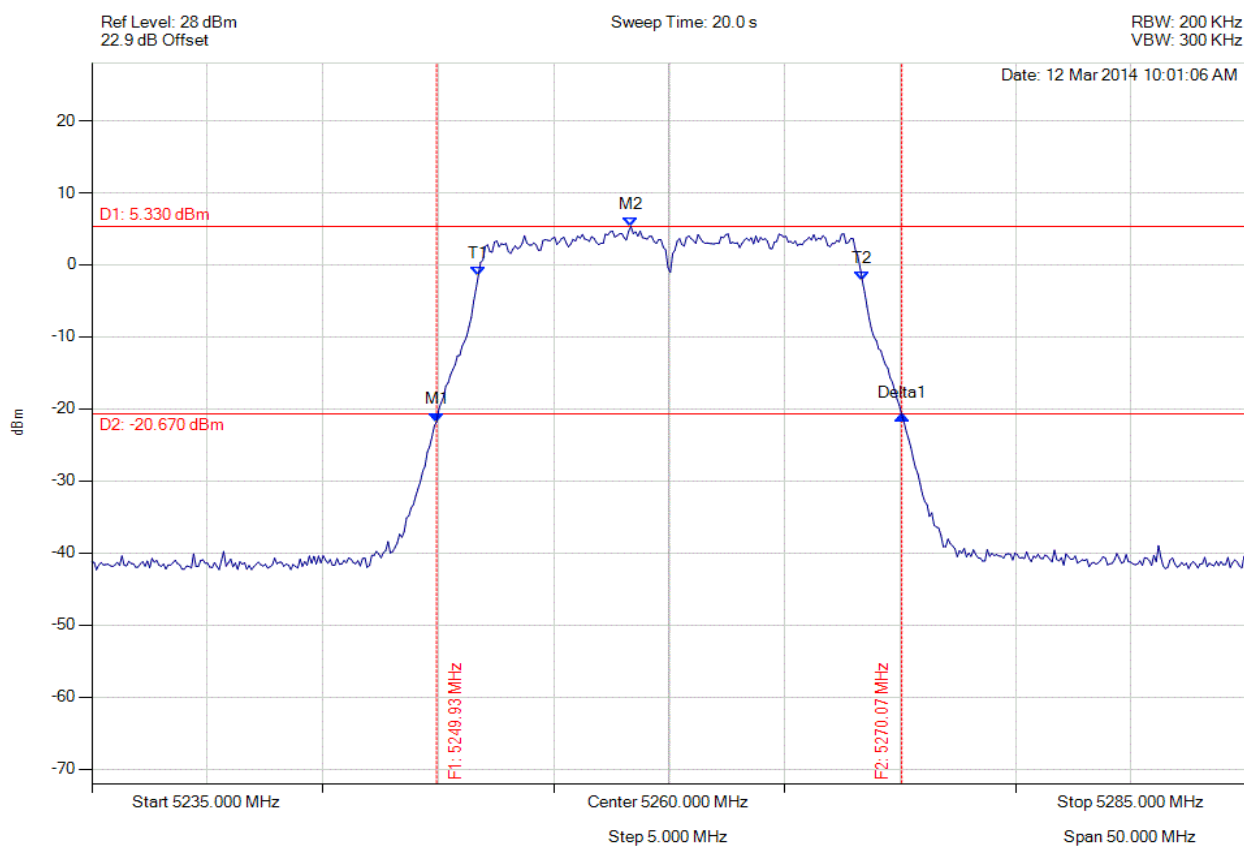


A.1.1. 26 dB & 99% Bandwidth



26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5260.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5249.930 MHz : -21.802 dBm M2 : 5258.347 MHz : 5.330 dBm Delta1 : 20.140 MHz : 0.950 dB T1 : 5251.733 MHz : -1.613 dBm T2 : 5268.367 MHz : -2.250 dBm OBW : 16.633 MHz	Channel Frequency: 5260.00 MHz

[Back to the Matrix](#)

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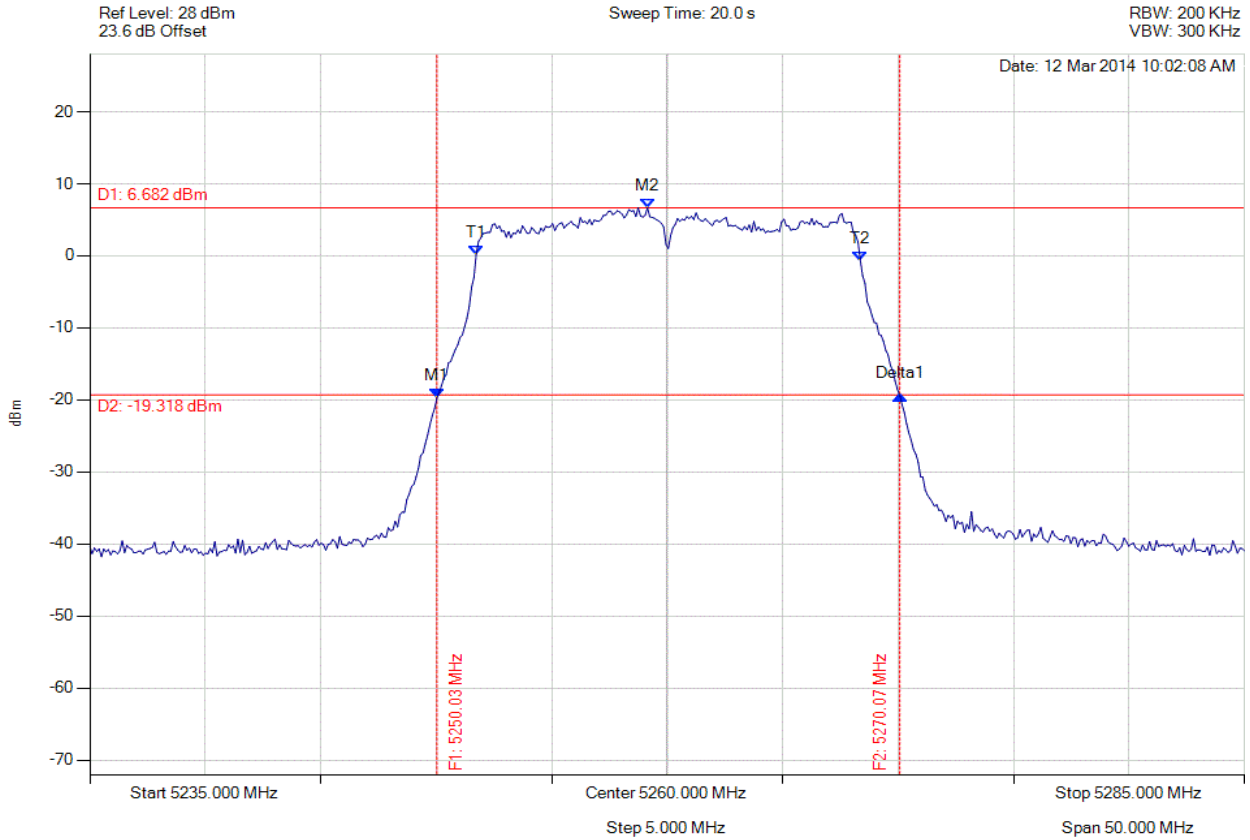


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 132 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5260.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5250.030 MHz : -19.746 dBm M2 : 5259.148 MHz : 6.682 dBm Delta1 : 20.040 MHz : 0.395 dB T1 : 5251.733 MHz : 0.199 dBm T2 : 5268.367 MHz : -0.672 dBm OBW : 16.633 MHz	Channel Frequency: 5260.00 MHz

[Back to the Matrix](#)

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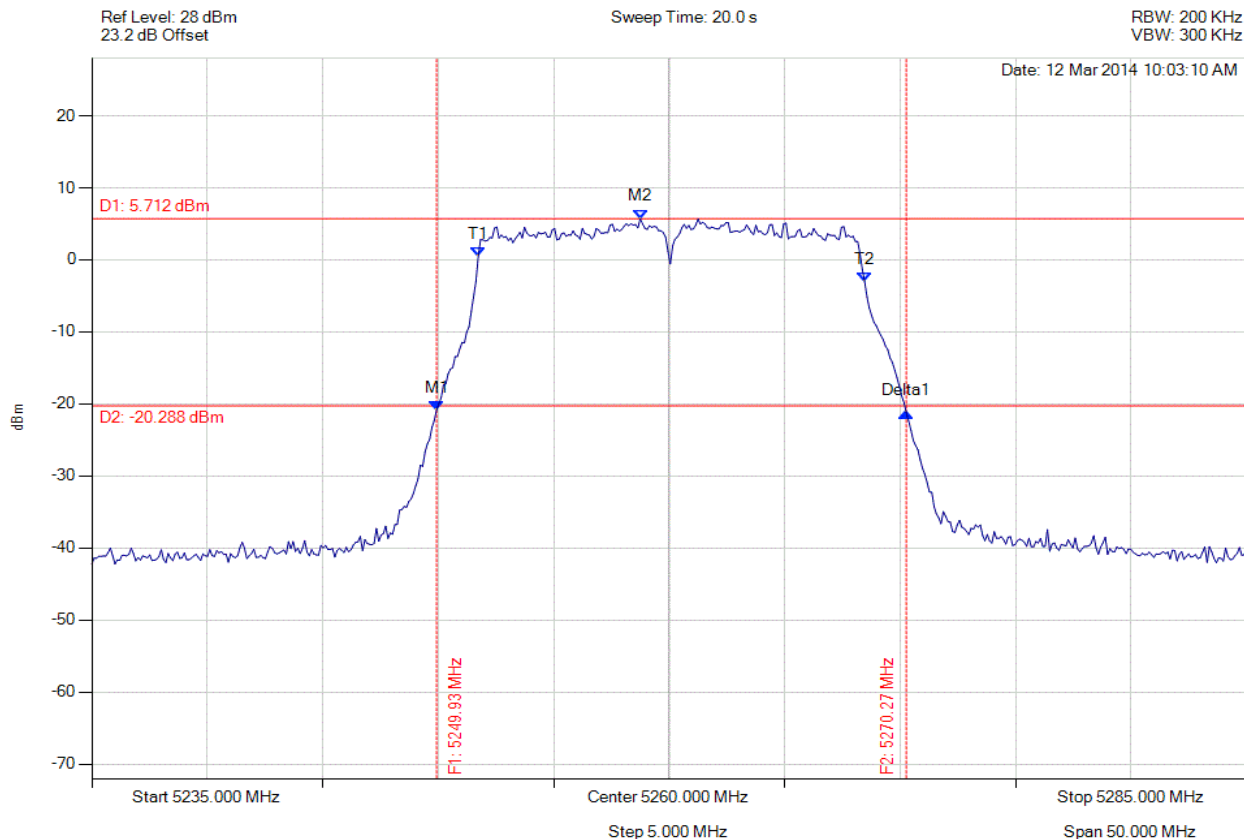


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 133 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5260.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5249.930 MHz : -20.834 dBm M2 : 5258.747 MHz : 5.712 dBm Delta1 : 20.341 MHz : -0.401 dB T1 : 5251.733 MHz : 0.435 dBm T2 : 5268.467 MHz : -3.039 dBm OBW : 16.733 MHz	Channel Frequency: 5260.00 MHz

[Back to the Matrix](#)

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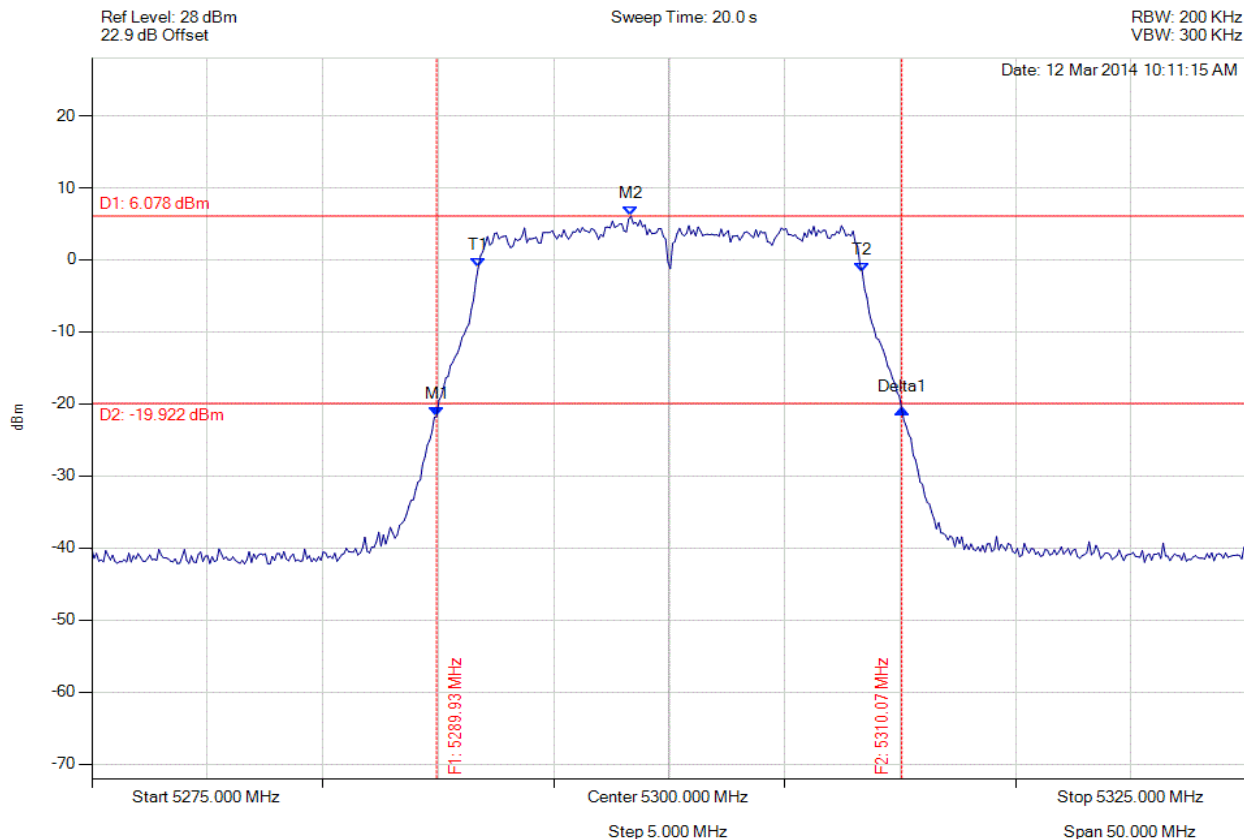


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 134 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5300.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5289.930 MHz : -21.776 dBm M2 : 5298.347 MHz : 6.078 dBm Delta1 : 20.140 MHz : 1.031 dB T1 : 5291.733 MHz : -1.111 dBm T2 : 5308.367 MHz : -1.770 dBm OBW : 16.633 MHz	Channel Frequency: 5300.00 MHz

[Back to the Matrix](#)

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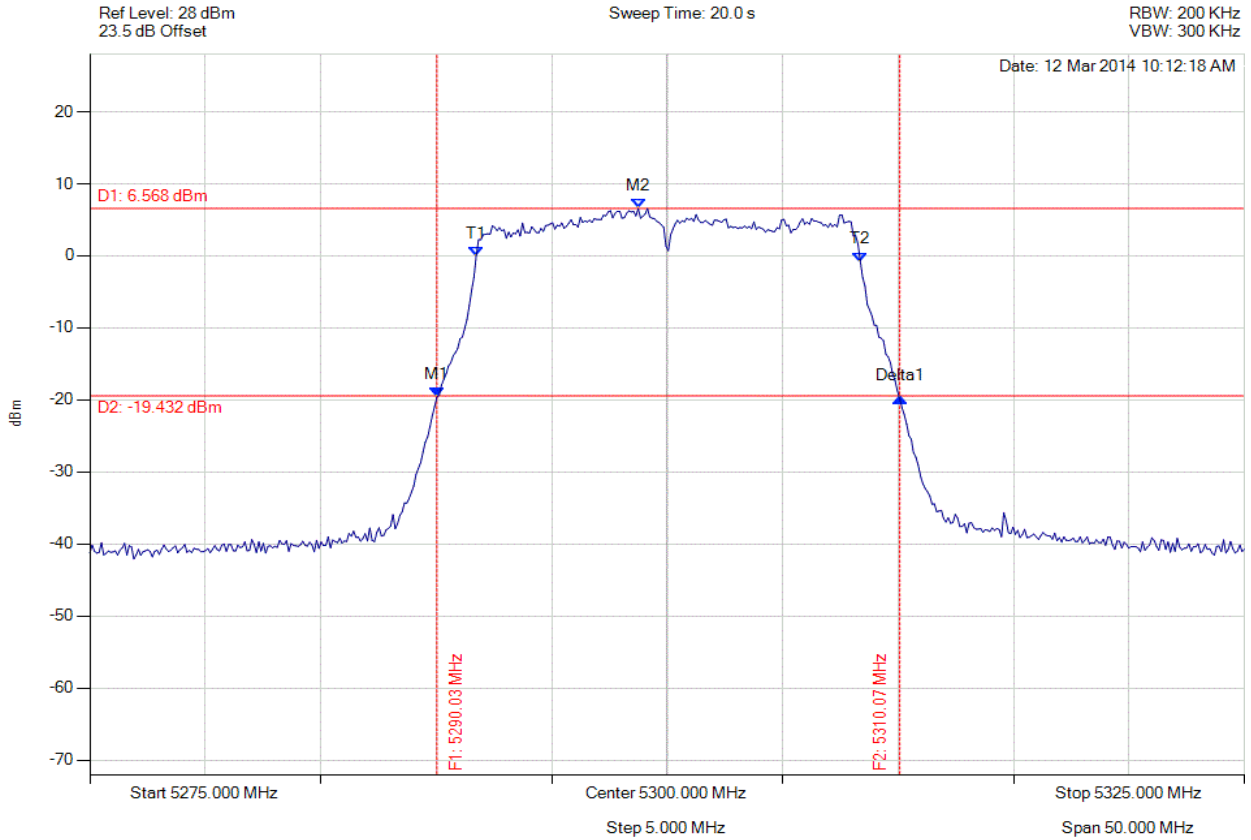


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Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 135 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5300.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5290.030 MHz : -19.614 dBm M2 : 5298.747 MHz : 6.568 dBm Delta1 : 20.040 MHz : -0.175 dB T1 : 5291.733 MHz : 0.010 dBm T2 : 5308.367 MHz : -0.784 dBm OBW : 16.633 MHz	Channel Frequency: 5300.00 MHz

[Back to the Matrix](#)

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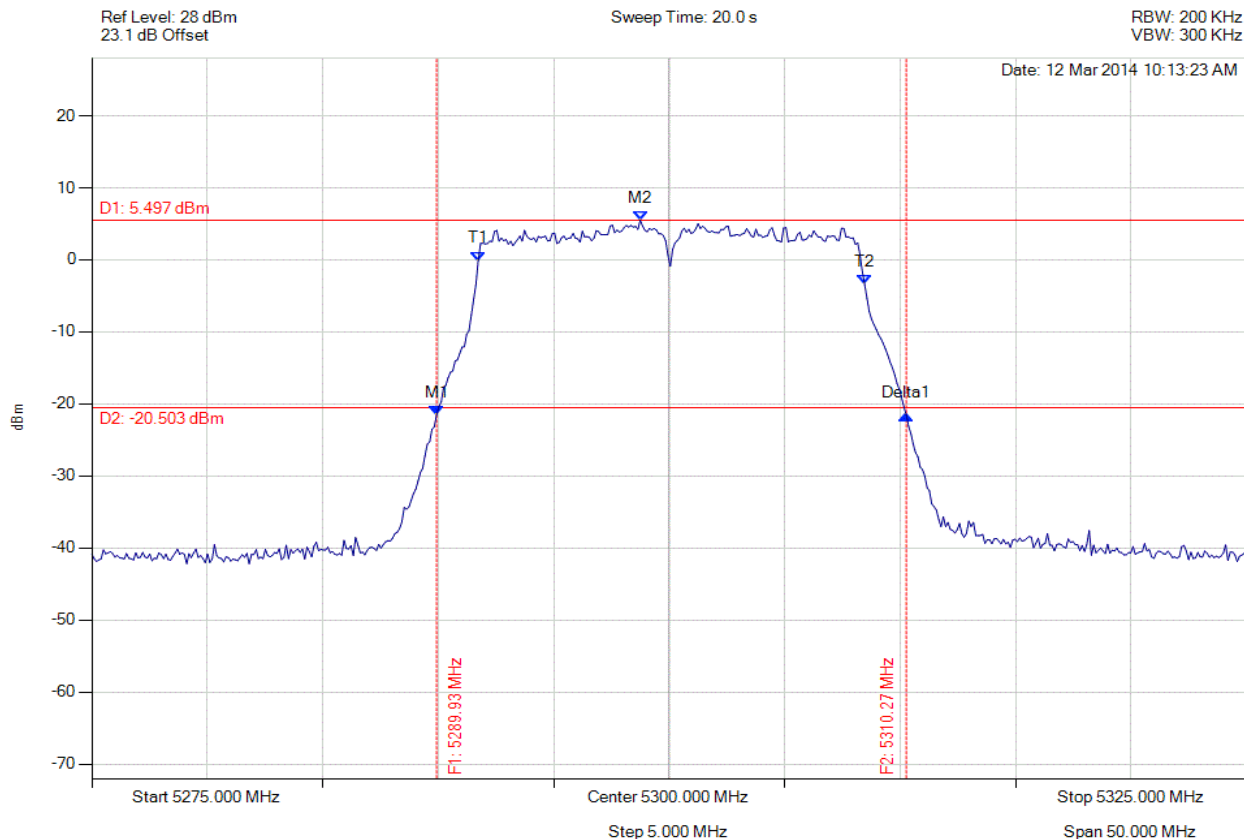


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 136 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5300.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5289.930 MHz : -21.514 dBm M2 : 5298.747 MHz : 5.497 dBm Delta1 : 20.341 MHz : -0.033 dB T1 : 5291.733 MHz : -0.115 dBm T2 : 5308.467 MHz : -3.411 dBm OBW : 16.733 MHz	Channel Frequency: 5300.00 MHz

[Back to the Matrix](#)

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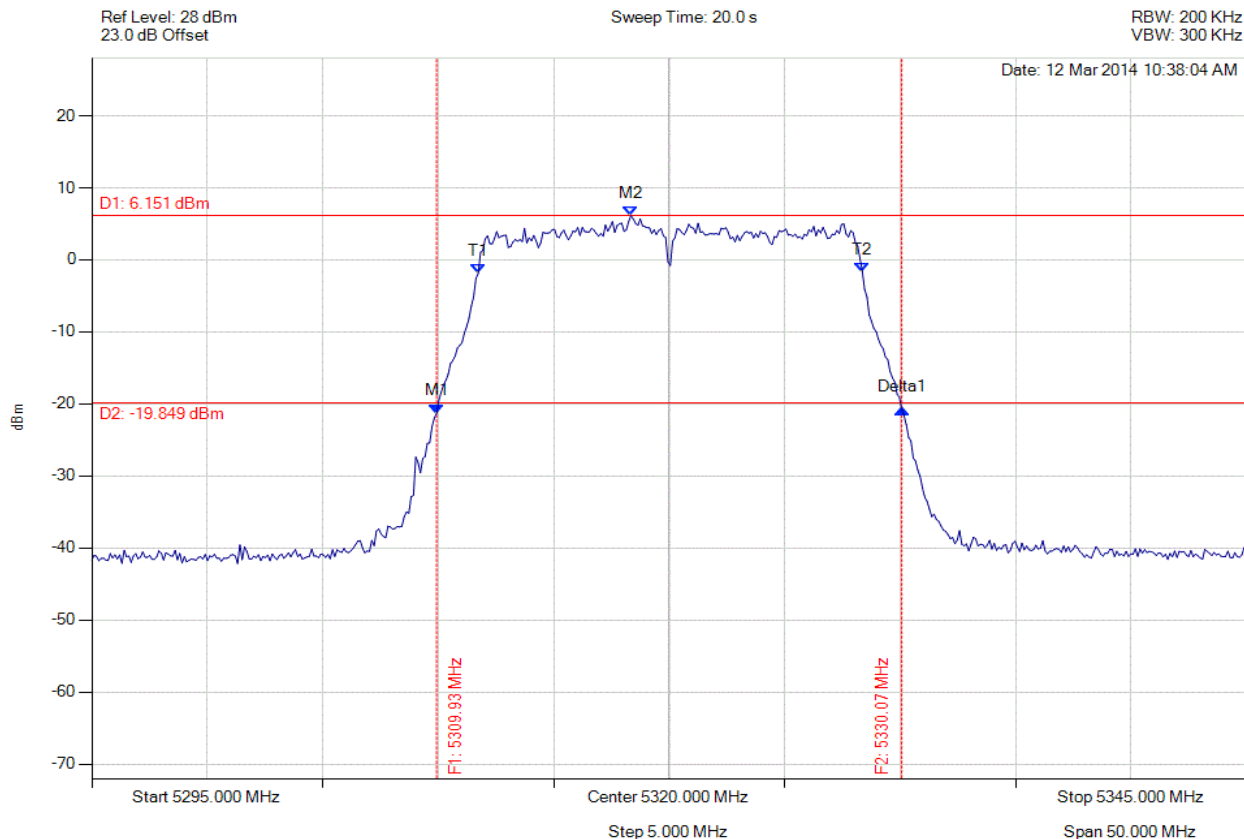


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 137 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5320.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5309.930 MHz : -21.306 dBm M2 : 5318.347 MHz : 6.151 dBm Delta1 : 20.140 MHz : 0.521 dB T1 : 5311.733 MHz : -1.878 dBm T2 : 5328.367 MHz : -1.670 dBm OBW : 16.633 MHz	Channel Frequency: 5320.00 MHz

[Back to the Matrix](#)

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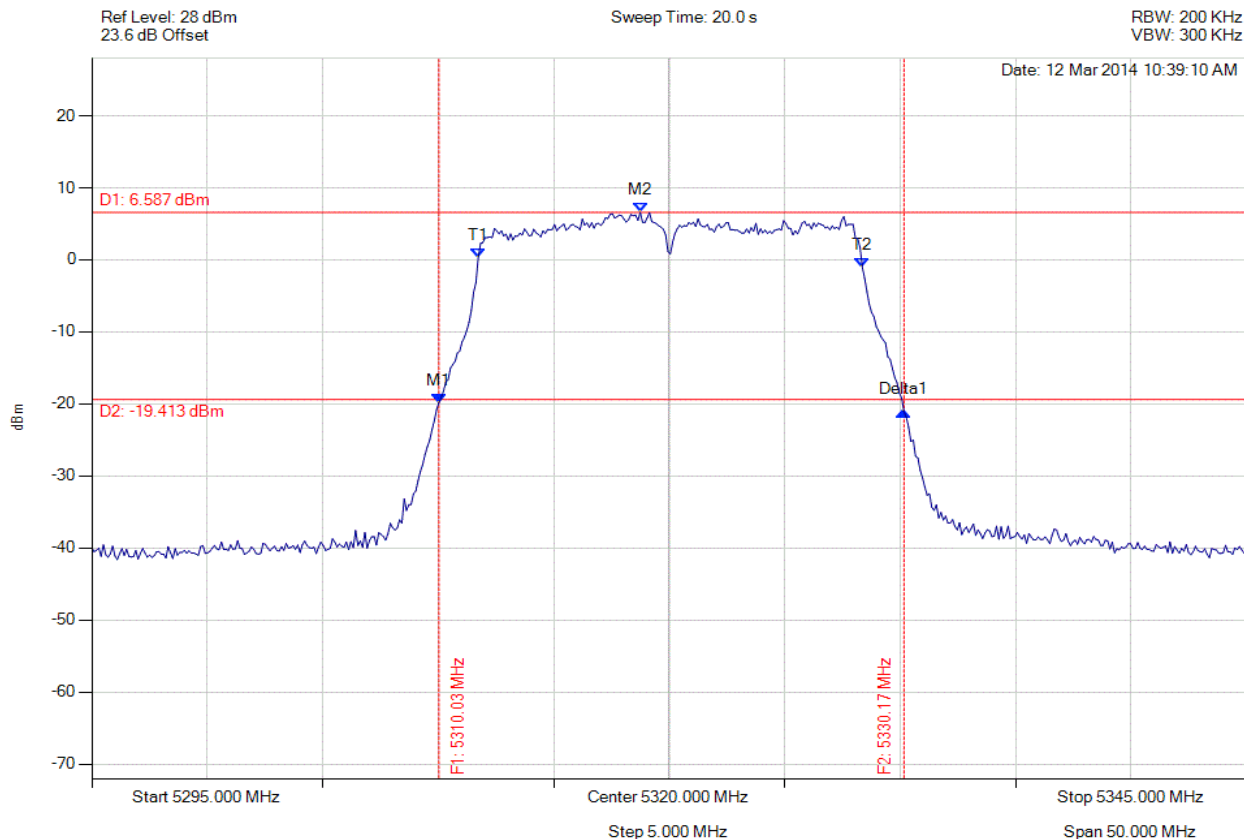


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 138 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5320.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5310.030 MHz : -19.813 dBm M2 : 5318.747 MHz : 6.587 dBm Delta1 : 20.140 MHz : -1.269 dB T1 : 5311.733 MHz : 0.286 dBm T2 : 5328.367 MHz : -1.040 dBm OBW : 16.633 MHz	Channel Frequency: 5320.00 MHz

[Back to the Matrix](#)

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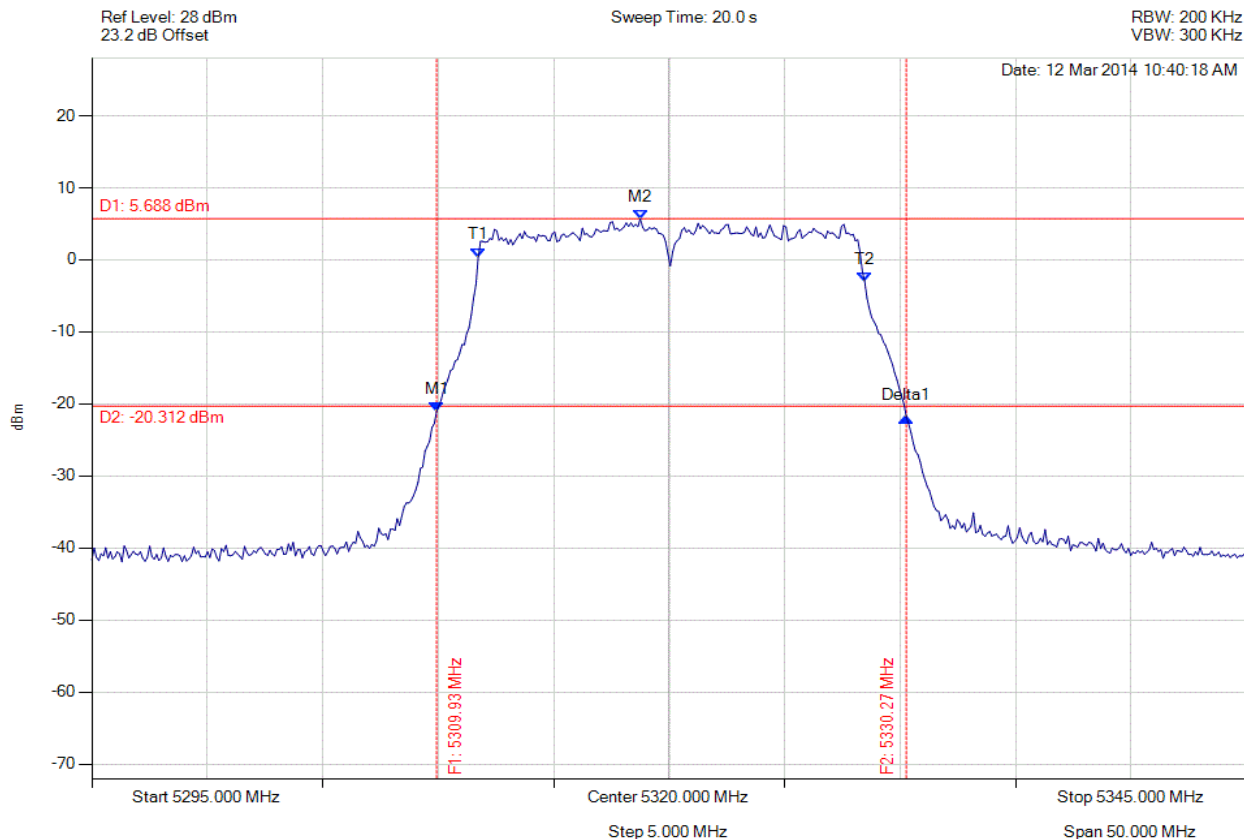


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 139 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11a, Channel: 5320.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5309.930 MHz : -21.068 dBm M2 : 5318.747 MHz : 5.688 dBm Delta1 : 20.341 MHz : -0.746 dB T1 : 5311.733 MHz : 0.382 dBm T2 : 5328.467 MHz : -2.996 dBm OBW : 16.733 MHz	Channel Frequency: 5320.00 MHz

[Back to the Matrix](#)

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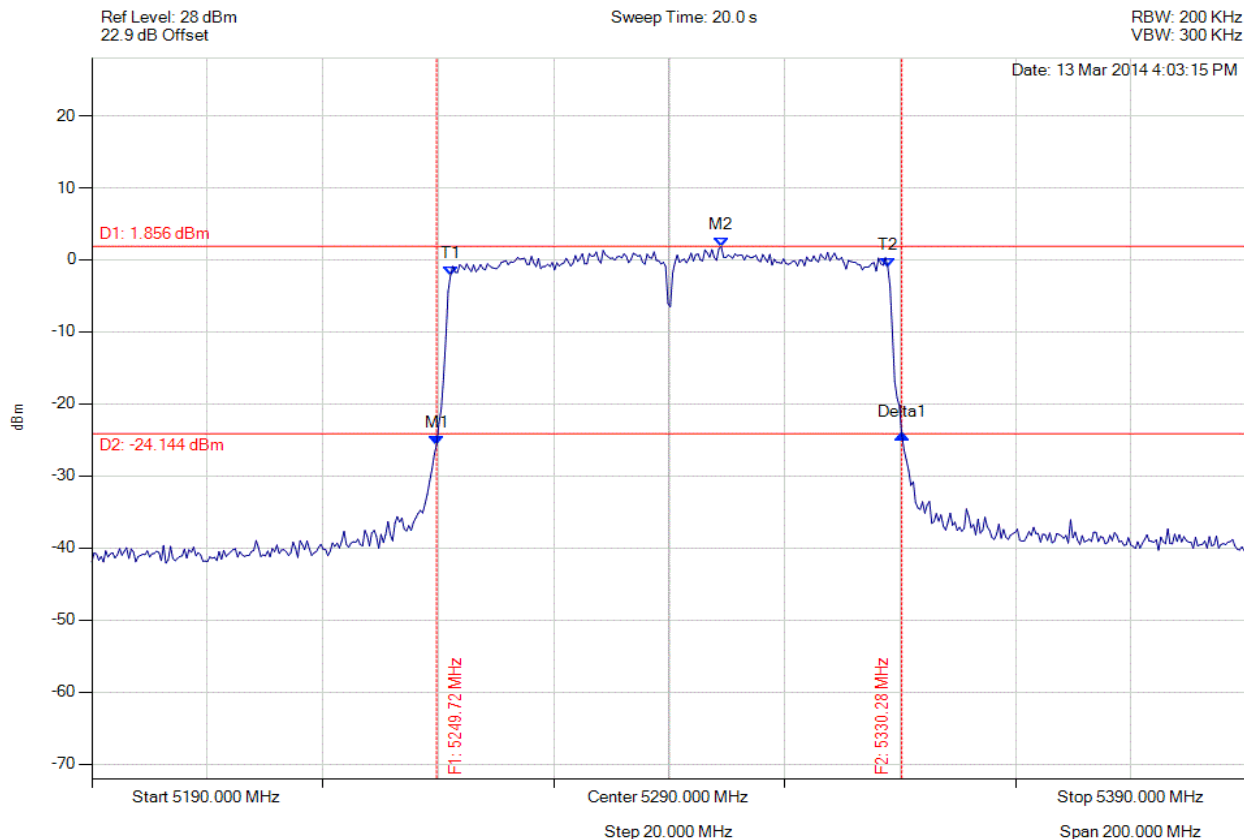


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 140 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11ac-80, Channel: 5290.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5249.719 MHz : -25.646 dBm M2 : 5299.018 MHz : 1.856 dBm Delta1 : 80.561 MHz : 1.481 dB T1 : 5252.124 MHz : -2.171 dBm T2 : 5327.876 MHz : -1.028 dBm OBW : 75.752 MHz	Channel Frequency: 5290.00 MHz

[Back to the Matrix](#)

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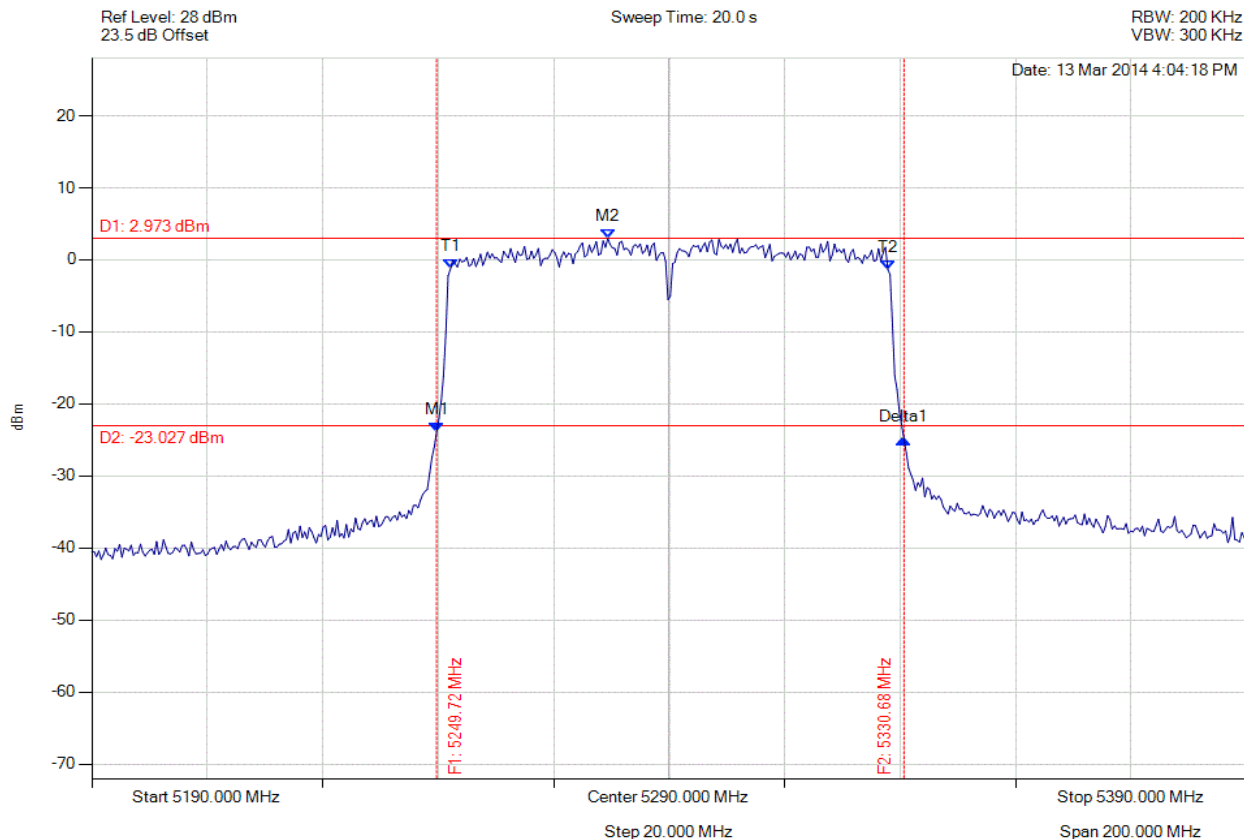


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 141 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11ac-80, Channel: 5290.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5249.719 MHz : -23.938 dBm M2 : 5279.379 MHz : 2.973 dBm Delta1 : 80.962 MHz : -0.992 dB T1 : 5252.124 MHz : -1.249 dBm T2 : 5327.876 MHz : -1.312 dBm OBW : 75.752 MHz	Channel Frequency: 5290.00 MHz

[Back to the Matrix](#)

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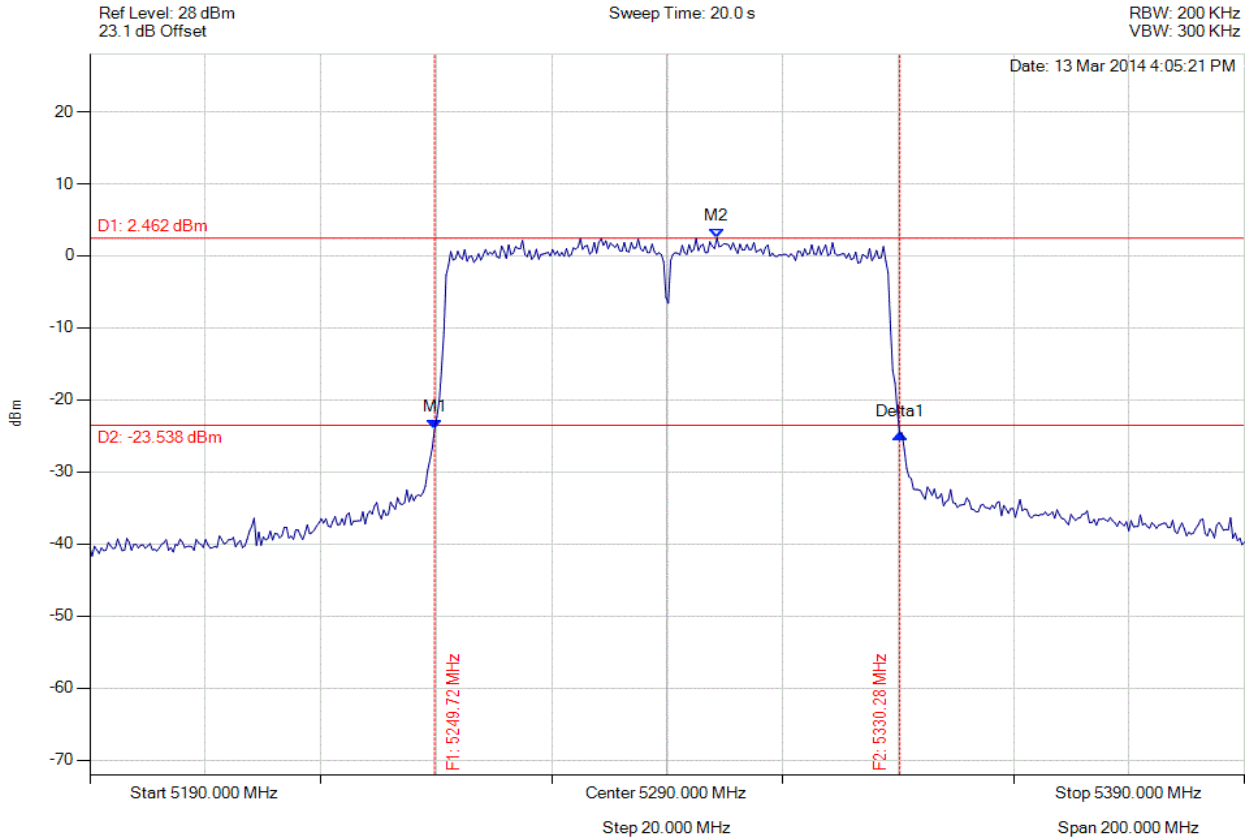


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 142 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11ac-80, Channel: 5290.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5249.719 MHz : -24.105 dBm M2 : 5298.617 MHz : 2.462 dBm Delta1 : 80.561 MHz : -0.612 dB T1 : 0 Hz : 500.000 dBm T2 : 0 Hz : 500.000 dBm OBW : 75.752 MHz	Channel Frequency: 5290.00 MHz

[Back to the Matrix](#)

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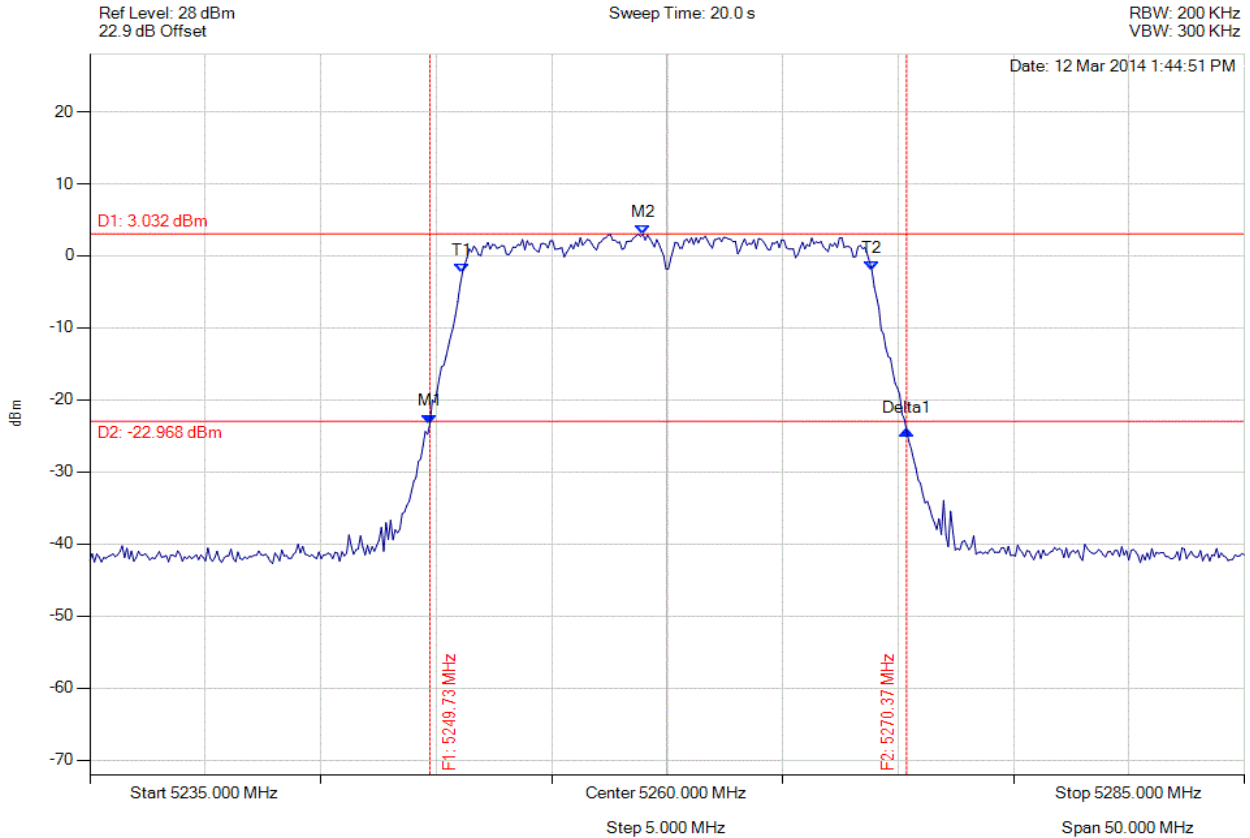


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 143 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5260.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5249.729 MHz : -23.305 dBm M2 : 5258.948 MHz : 3.032 dBm Delta1 : 20.641 MHz : -0.970 dB T1 : 5251.132 MHz : -2.378 dBm T2 : 5268.868 MHz : -2.042 dBm OBW : 17.735 MHz	Channel Frequency: 5260.00 MHz

[Back to the Matrix](#)

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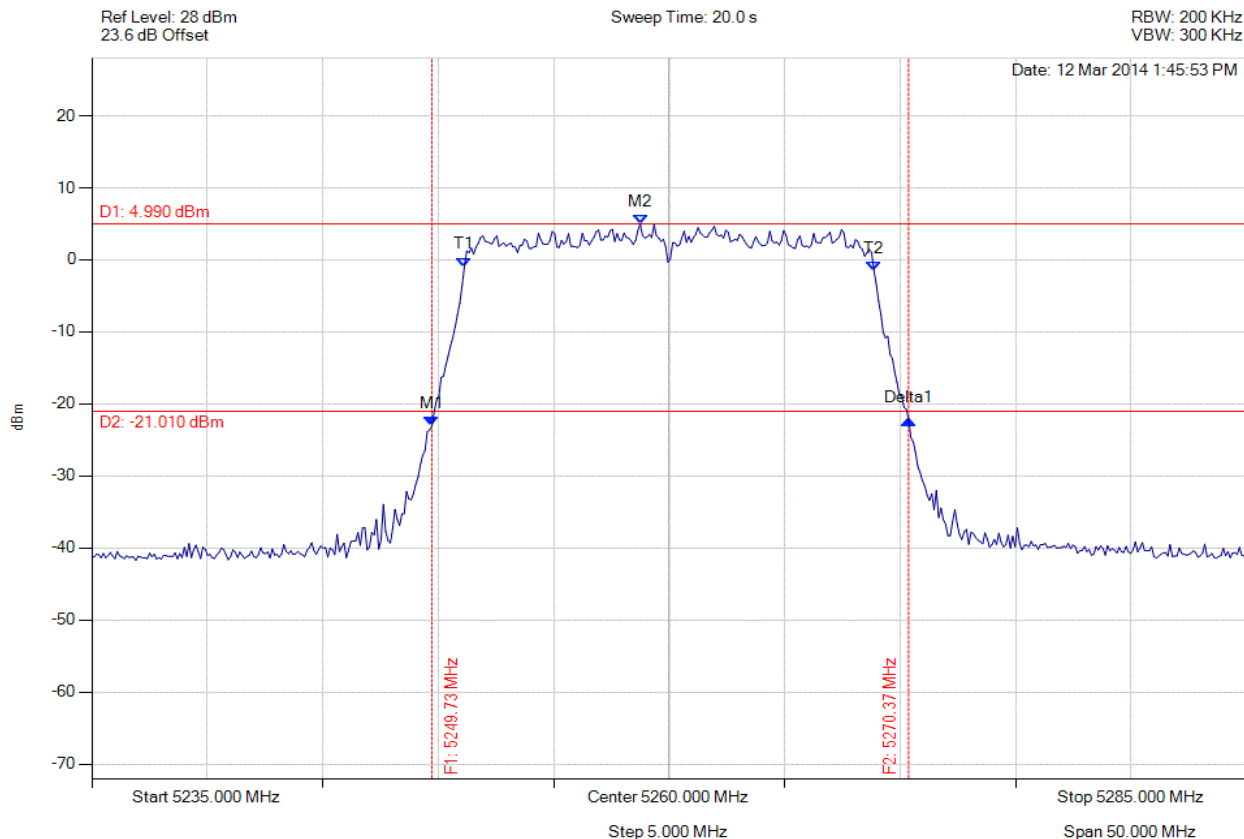


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 144 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5260.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5249.729 MHz : -23.063 dBm M2 : 5258.747 MHz : 4.990 dBm Delta1 : 20.641 MHz : 0.911 dB T1 : 5251.132 MHz : -0.952 dBm T2 : 5268.868 MHz : -1.467 dBm OBW : 17.735 MHz	Channel Frequency: 5260.00 MHz

[Back to the Matrix](#)

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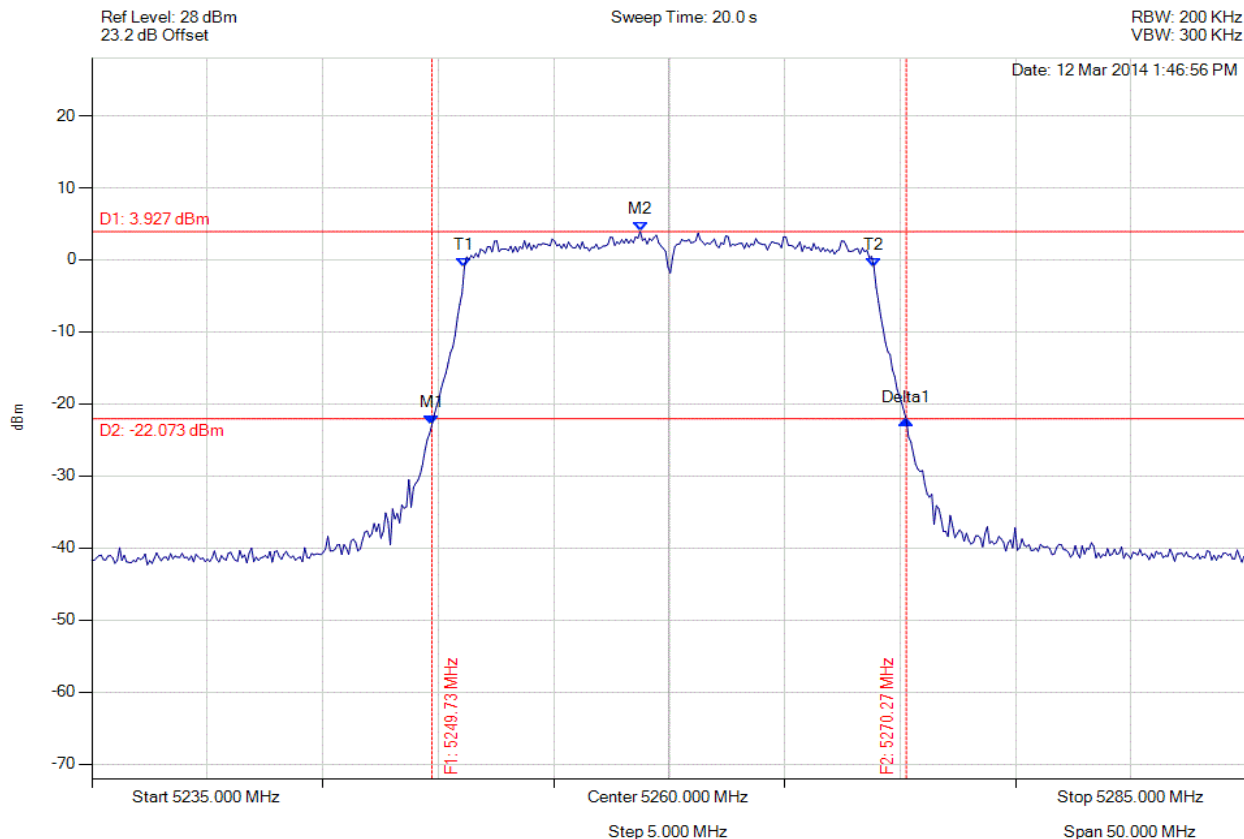


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 145 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5260.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5249.729 MHz : -22.860 dBm M2 : 5258.747 MHz : 3.927 dBm Delta1 : 20.541 MHz : 0.606 dB T1 : 5251.132 MHz : -0.983 dBm T2 : 5268.868 MHz : -1.007 dBm OBW : 17.735 MHz	Channel Frequency: 5260.00 MHz

[Back to the Matrix](#)

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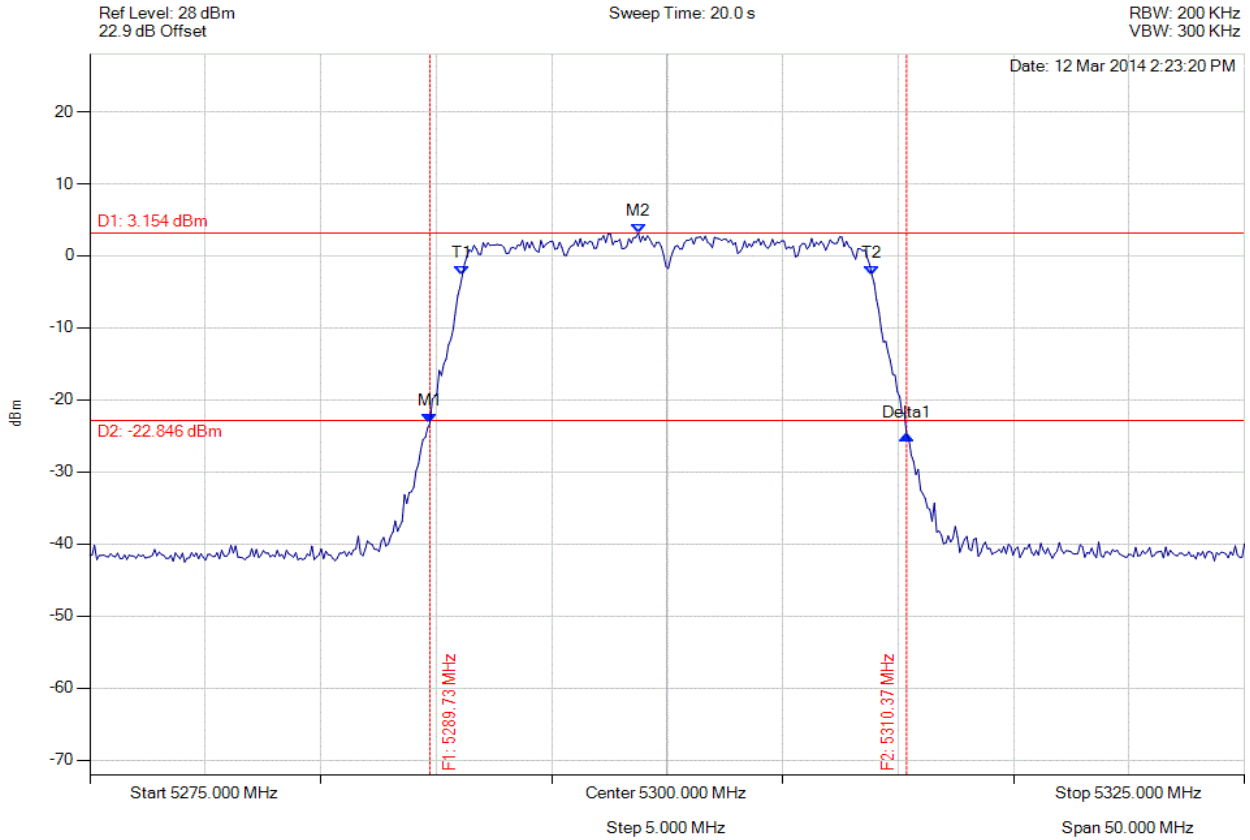


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 146 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5300.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5289.729 MHz : -23.252 dBm M2 : 5298.747 MHz : 3.154 dBm Delta1 : 20.641 MHz : -1.629 dB T1 : 5291.132 MHz : -2.653 dBm T2 : 5308.868 MHz : -2.665 dBm OBW : 17.735 MHz	Channel Frequency: 5300.00 MHz

[Back to the Matrix](#)

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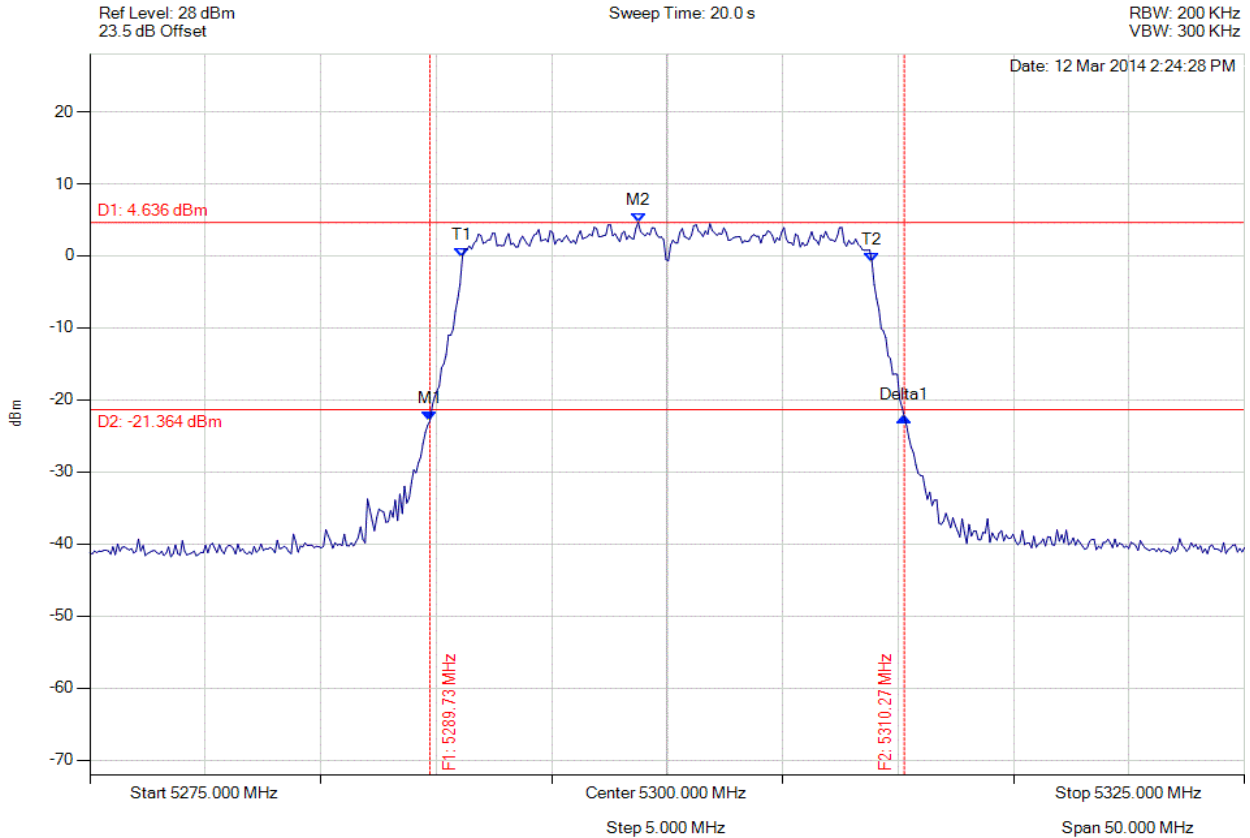


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 147 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5300.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5289.729 MHz : -22.931 dBm M2 : 5298.747 MHz : 4.636 dBm Delta1 : 20.541 MHz : 0.513 dB T1 : 5291.132 MHz : -0.159 dBm T2 : 5308.868 MHz : -0.806 dBm OBW : 17.735 MHz	Channel Frequency: 5300.00 MHz

[Back to the Matrix](#)

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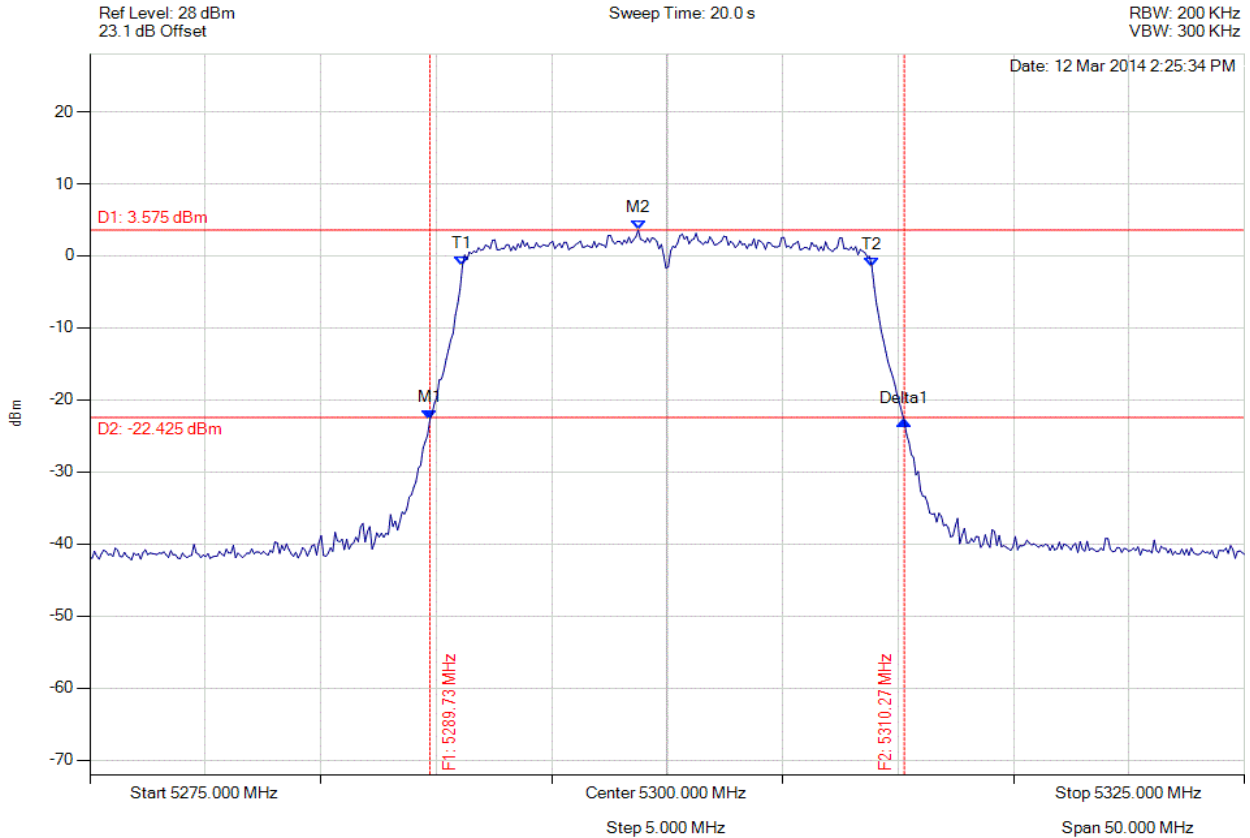


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 148 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5300.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5289.729 MHz : -22.726 dBm M2 : 5298.747 MHz : 3.575 dBm Delta1 : 20.541 MHz : -0.187 dB T1 : 5291.132 MHz : -1.420 dBm T2 : 5308.868 MHz : -1.552 dBm OBW : 17.735 MHz	Channel Frequency: 5300.00 MHz

[Back to the Matrix](#)

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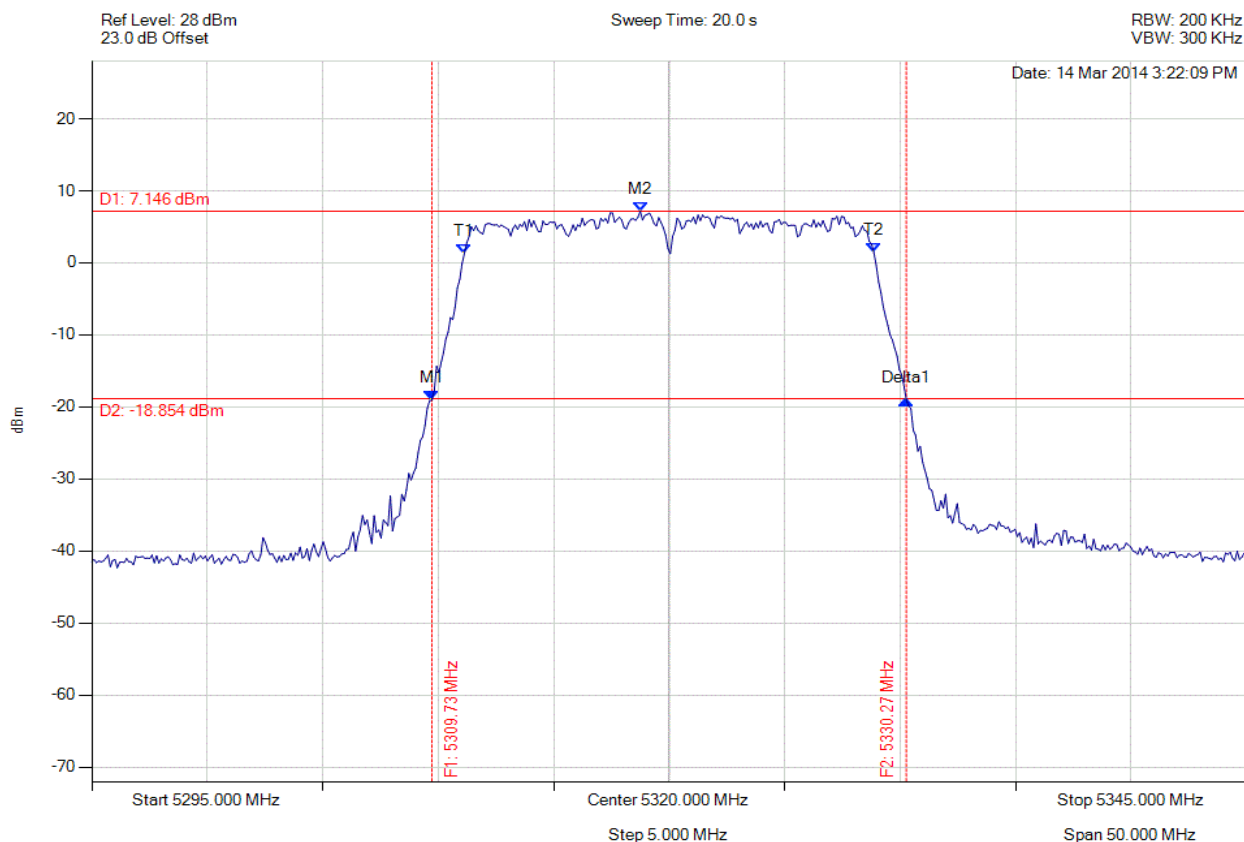


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 149 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5320.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5309.729 MHz : -19.059 dBm M2 : 5318.747 MHz : 7.146 dBm Delta1 : 20.541 MHz : 0.016 dB T1 : 5311.132 MHz : 1.293 dBm T2 : 5328.868 MHz : 1.409 dBm OBW : 17.735 MHz	Channel Frequency: 5320.00 MHz

[Back to the Matrix](#)

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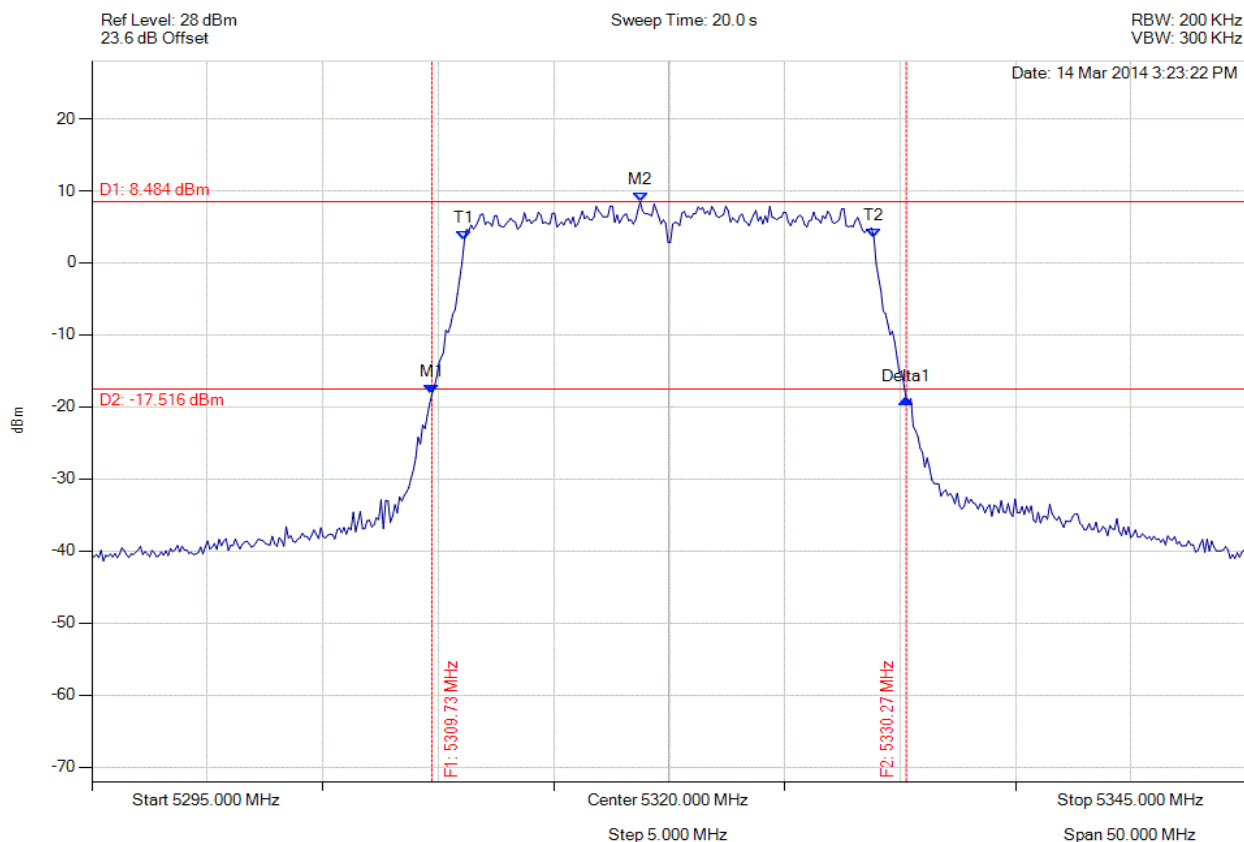


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 150 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5320.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5309.729 MHz : -18.209 dBm M2 : 5318.747 MHz : 8.484 dBm Delta1 : 20.541 MHz : -0.710 dB T1 : 5311.132 MHz : 3.182 dBm T2 : 5328.868 MHz : 3.447 dBm OBW : 17.735 MHz	Channel Frequency: 5320.00 MHz

[Back to the Matrix](#)

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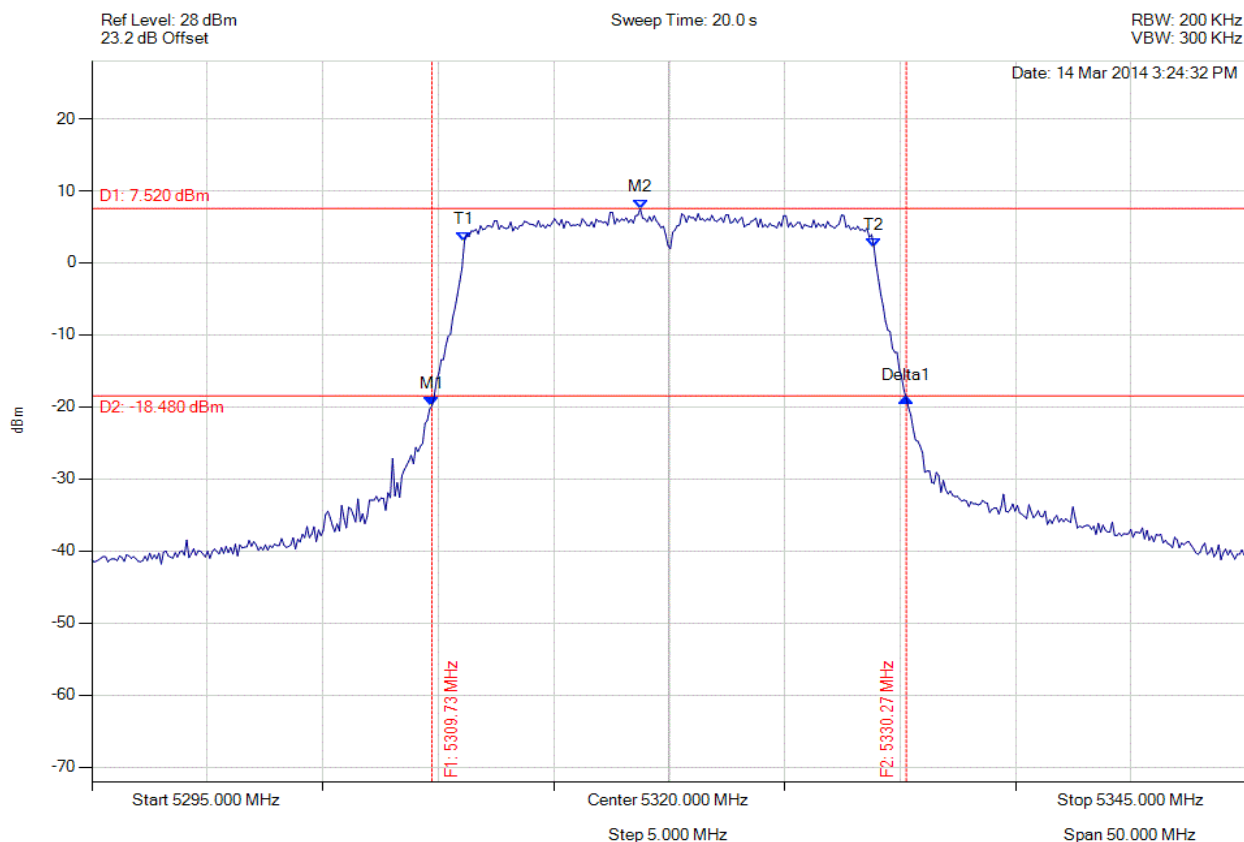


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 151 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11n HT-20, Channel: 5320.00 MHz, Chain c, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5309.729 MHz : -19.866 dBm M2 : 5318.747 MHz : 7.520 dBm Delta1 : 20.541 MHz : 1.098 dB T1 : 5311.132 MHz : 2.979 dBm T2 : 5328.868 MHz : 2.171 dBm OBW : 17.735 MHz	Channel Frequency: 5320.00 MHz

[Back to the Matrix](#)

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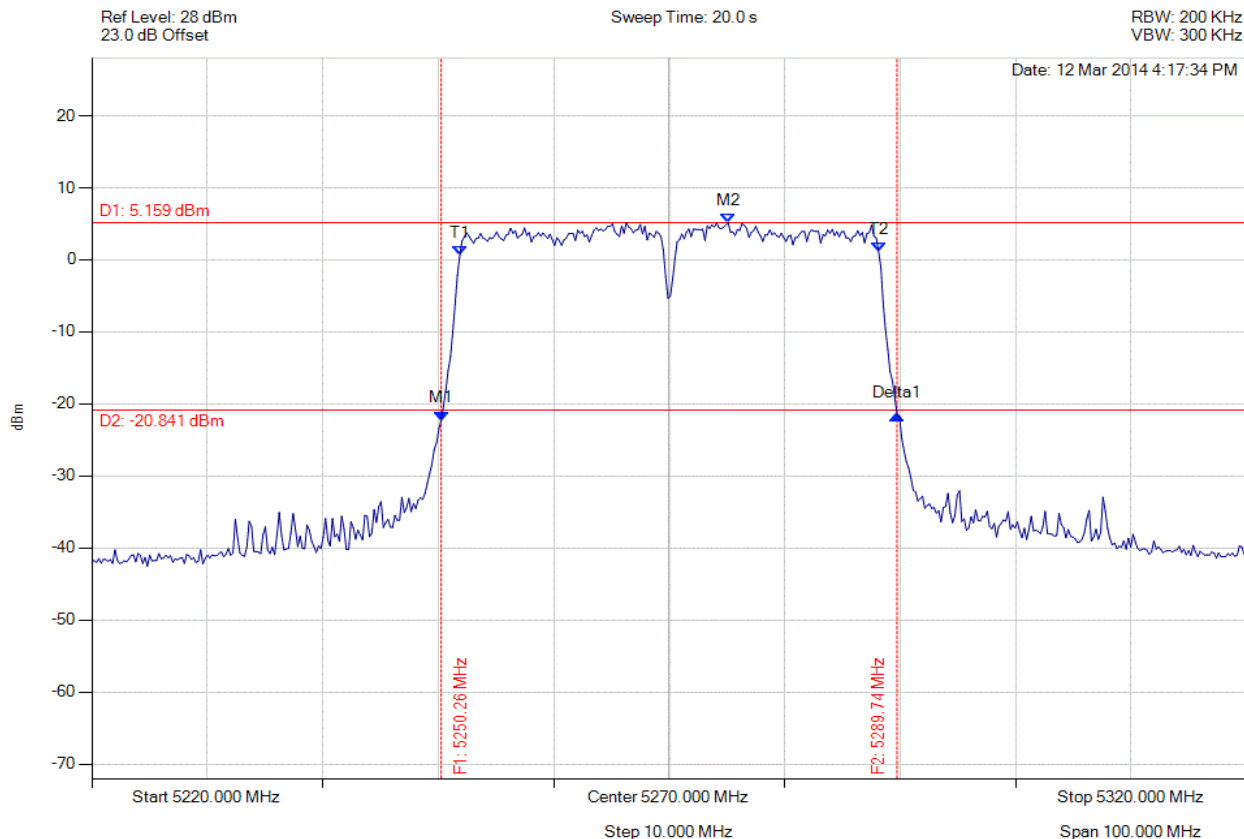


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 152 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5270.00 MHz, Chain a, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5250.261 MHz : -22.297 dBm M2 : 5275.110 MHz : 5.159 dBm Delta1 : 39.479 MHz : 0.744 dB T1 : 5251.864 MHz : 0.593 dBm T2 : 5288.136 MHz : 1.195 dBm OBW : 36.273 MHz	Channel Frequency: 5270.00 MHz

[Back to the Matrix](#)

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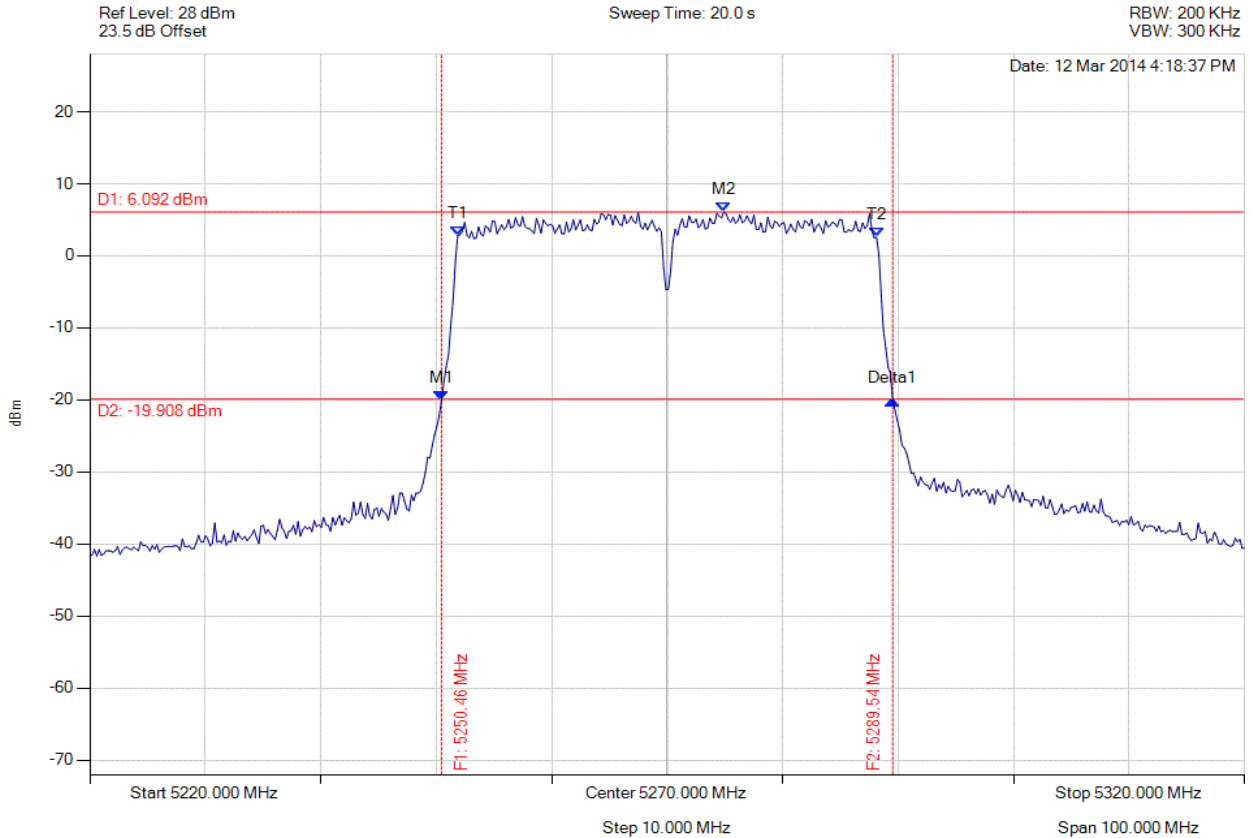


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
To: FCC 47 CFR Part 15.407 & IC RSS-210
Serial #: ARUB169-U3 Rev A
Issue Date: 29th September 2014
Page: 153 of 287



26 dB & 99% BANDWIDTH

Variant: 802.11n HT-40, Channel: 5270.00 MHz, Chain b, Temp: Ambient, Voltage: 48 Vdc



Analyser Setup	Marker : Frequency : Amplitude	Test Results
Detector = MAX PEAK Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = VIEW	M1 : 5250.461 MHz : -19.992 dBm M2 : 5274.910 MHz : 6.092 dBm Delta1 : 39.078 MHz : -0.022 dB T1 : 5251.864 MHz : 2.855 dBm T2 : 5288.136 MHz : 2.582 dBm OBW : 36.273 MHz	Channel Frequency: 5270.00 MHz

[Back to the Matrix](#)

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