

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
Fax: +1 (925) 462-0306
www.micomlabs.com



TESTING CERT #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory



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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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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

MICOM LABS

Pleasanton, CA

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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DOCUMENT HISTORY

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

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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.

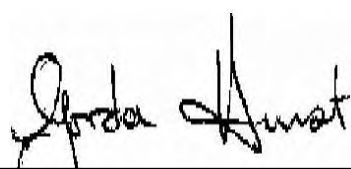
Approved & Released for MiCOM Labs, Inc. by:



TESTING CERT #2381.01



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 |



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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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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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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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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. 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.



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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



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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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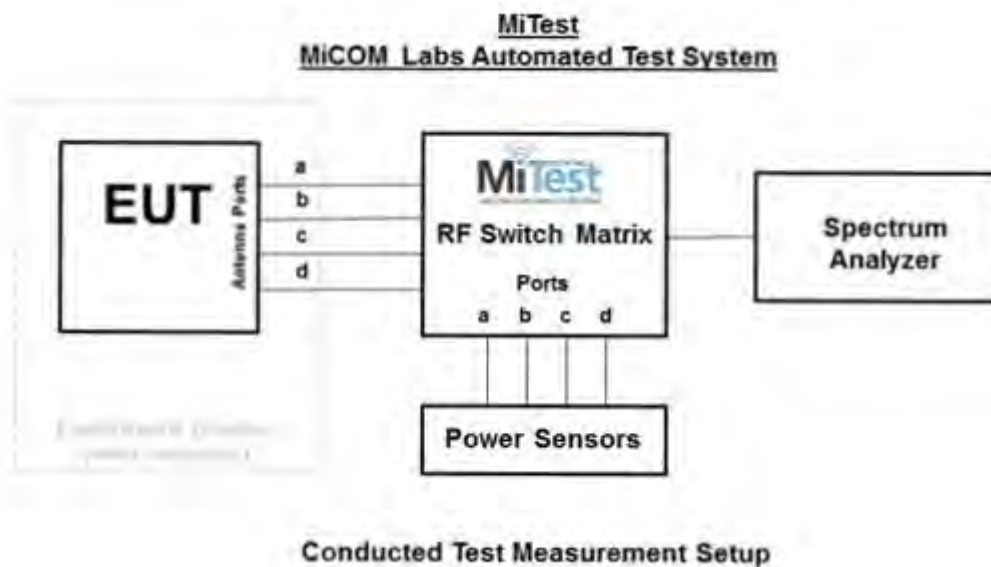
4. TESTING EQUIPMENT CONFIGURATION(S)

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)

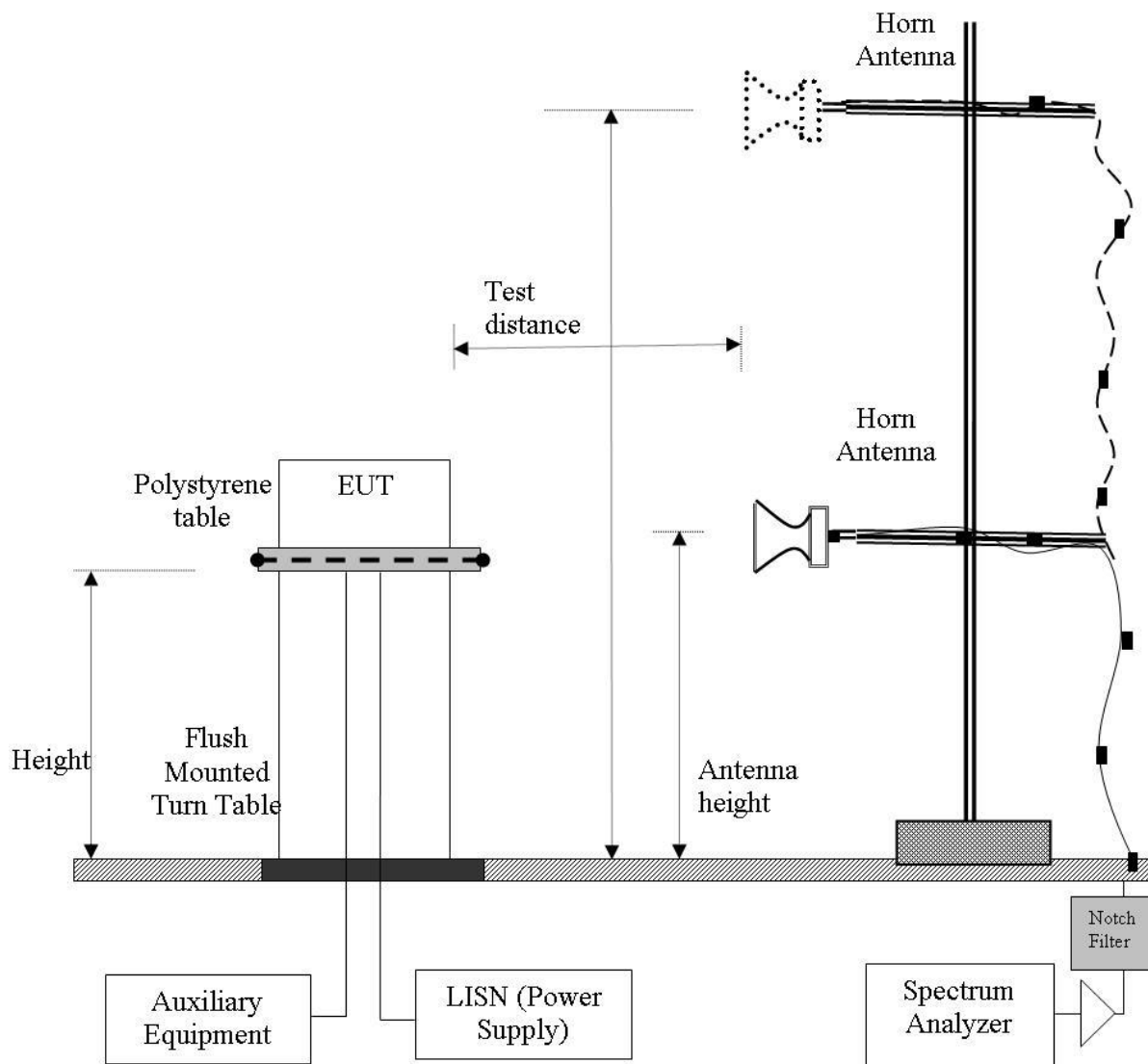
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4.2. Radiated Spurious Emission Test Set-up > 1 GHz

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

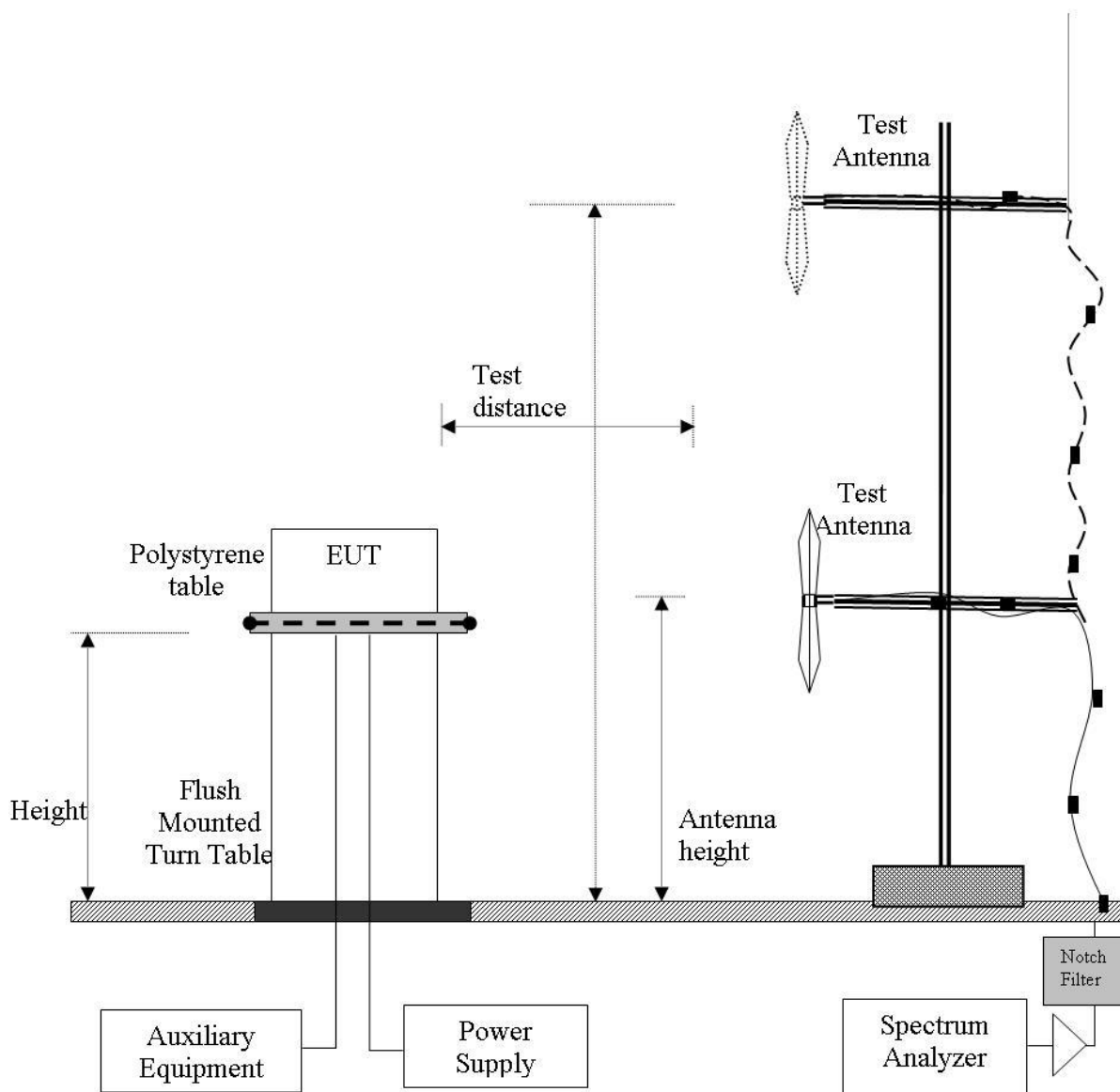
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4.3. Digital Emissions Test Set-up (0.03 – 1 GHz)

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

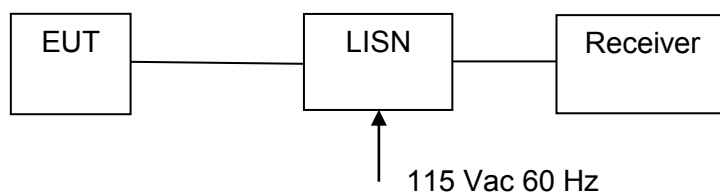
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4.4. ac Wireline Emission Test Set-up

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



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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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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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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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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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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 |
|----------------|---------------------------------------|-------|-------|---|---|--------------------------------|--------------|---------------|-------------------|
| | 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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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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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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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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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 |



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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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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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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 [$10 \log_{10} (10a/10 + 10 b/10 + 10c/10 + 10d/10)$]

x = Duty Cycle

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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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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 |

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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 |

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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 |

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

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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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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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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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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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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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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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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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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 |

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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 |

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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 |

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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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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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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 |

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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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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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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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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 | | | | |
| 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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| |
|---|
| 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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| |
|---|
| 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 | Measured Peak Excursion (dB) | | | | Ratio (dB) | | Limit | Lowest Margin |
|----------------|------------------------------|---|---|---|------------|--------|-------|---------------|
| | Port(s) | | | | Highest | Lowest | | |
| MHz | a | b | c | d | Highest | Lowest | dB | MHz |
| 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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| |
|---|
| 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 | Measured Peak Excursion (dB) | | | | Ratio (dB) | | Limit | Lowest Margin |
|----------------|------------------------------|---|---|---|------------|--------|-------|---------------|
| | Port(s) | | | | Highest | Lowest | | |
| MHz | a | b | c | d | | | dB | MHz |
| 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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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 |
| 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 |

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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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| |
|---|
| 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 |
|---------------------------------|

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

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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 MHz | Measured Peak Excursion (dB) | | | | Ratio (dB) | | Limit dB | Lowest Margin MHz |
|-----------------------|------------------------------|-----------------------|-----------------------|---|------------|--------|-------------|----------------------|
| | Port(s) | | | | Highest | Lowest | | |
| | a | b | c | d | | | | |
| 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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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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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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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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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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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 |

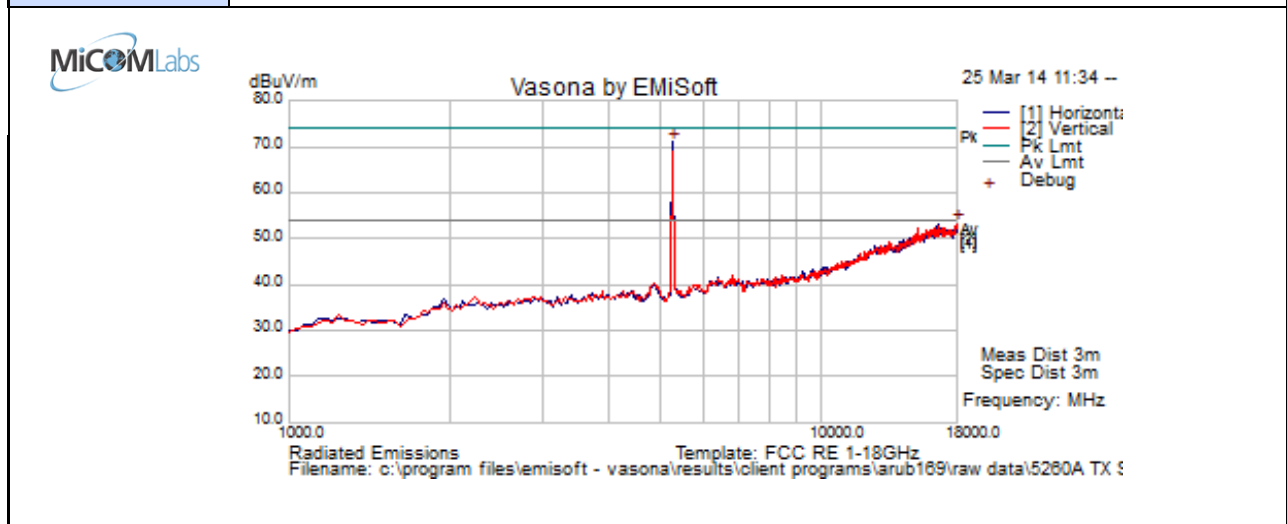
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6.1.2.1. Integral Antenna – Spurious Emissions and Radiated Band Edge

| | | | |
|----------------------|-------------------------|-----------------------|------|
| 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 |

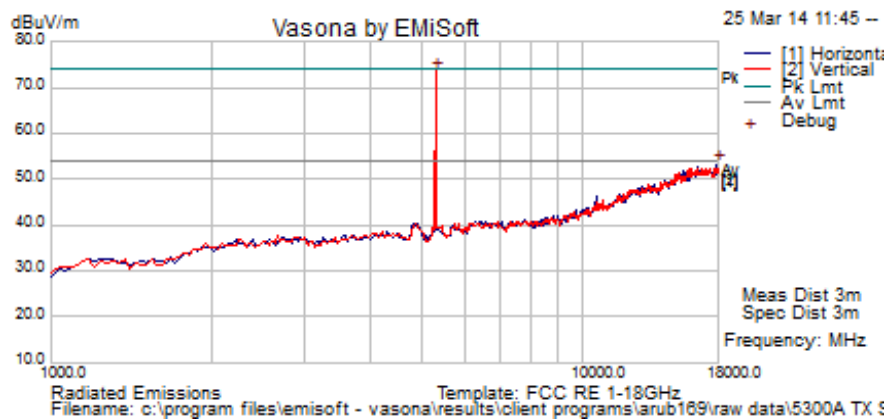
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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| | | | |
|----------------------|-------------------------|-----------------------|------|
| 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

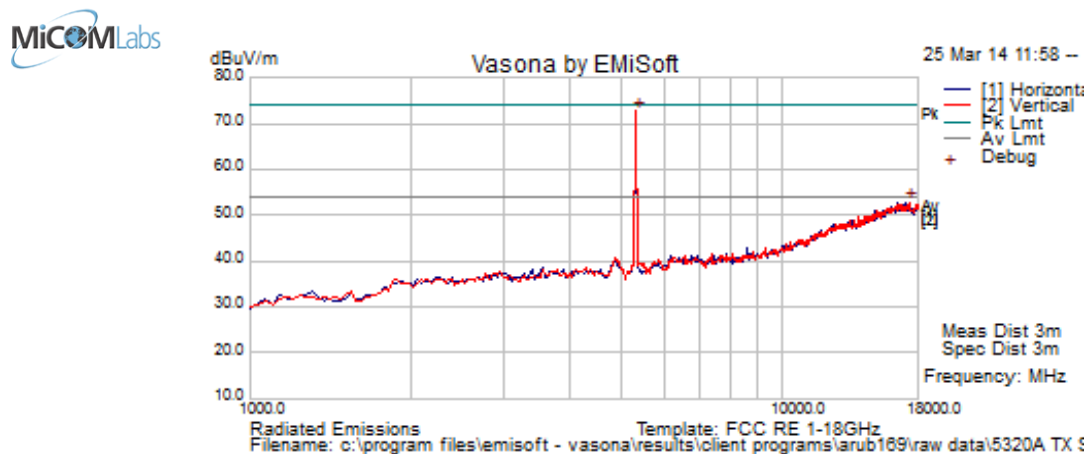
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---------------|---|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|-------------------------|-----------------------|------|
| 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 |

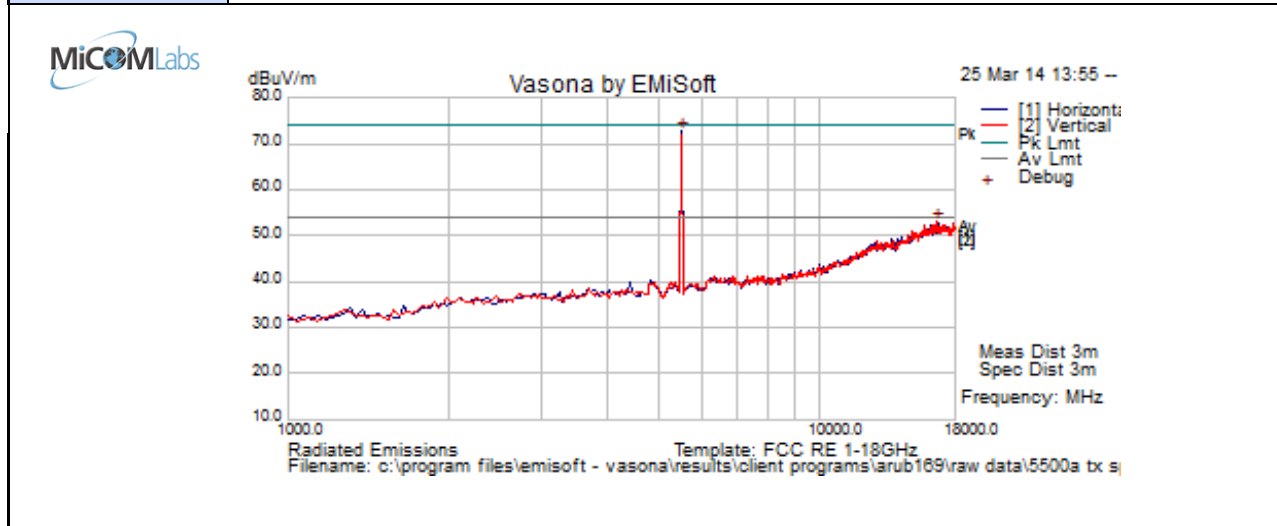
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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| | | | |
|----------------------|-------------------------|-----------------------|------|
| 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

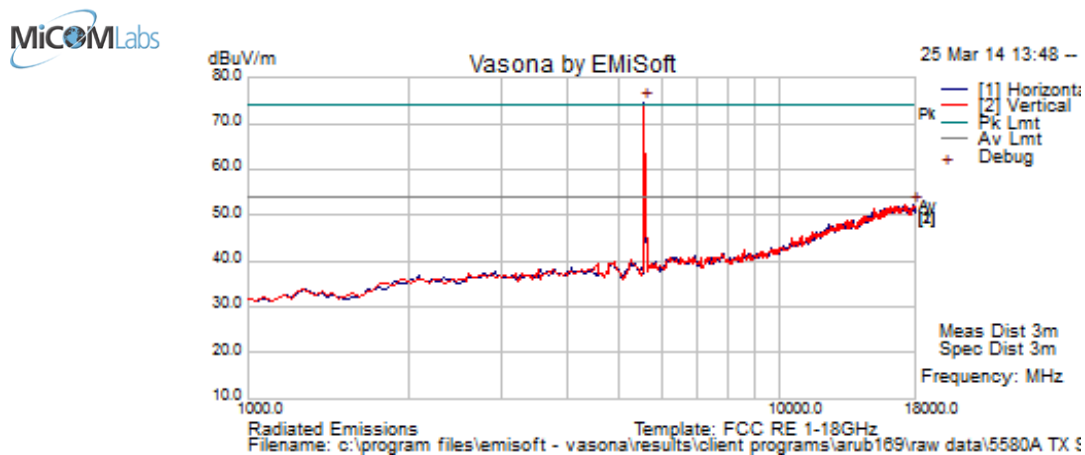
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|-------------------------|-----------------------|------|
| 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

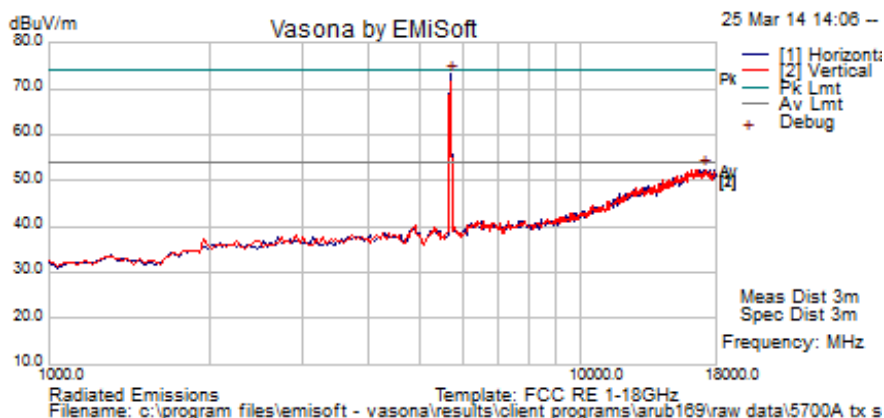
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|-------------------------|-----------------------|------|
| 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 |

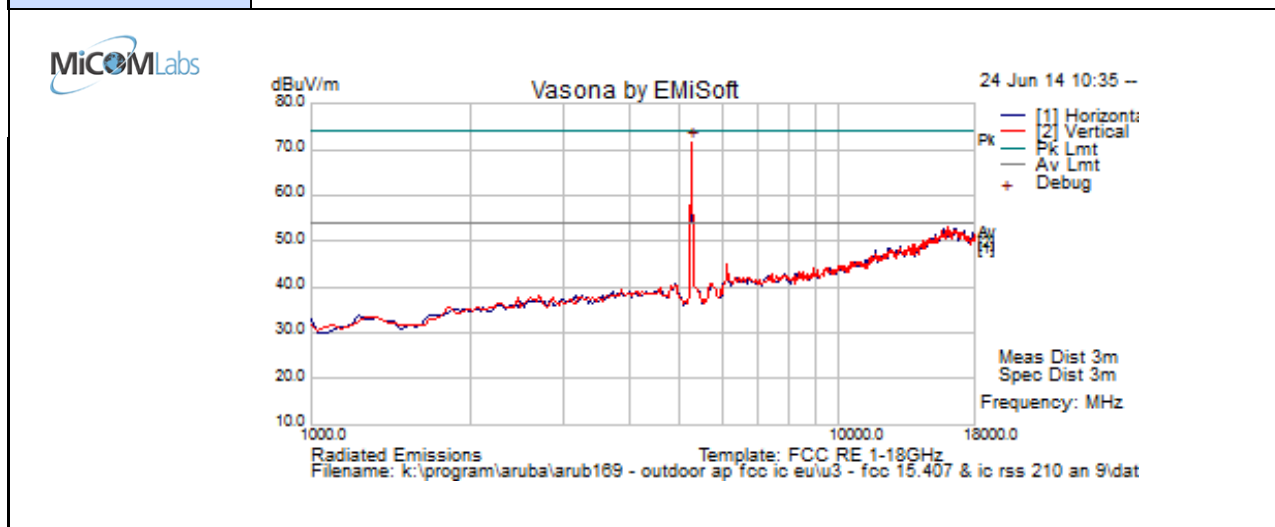
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6.1.2.2. AP-ANT-5010 – Spurious and Band-Edge Emissions

| | | | |
|----------------------|---|-----------------------|------|
| 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 |

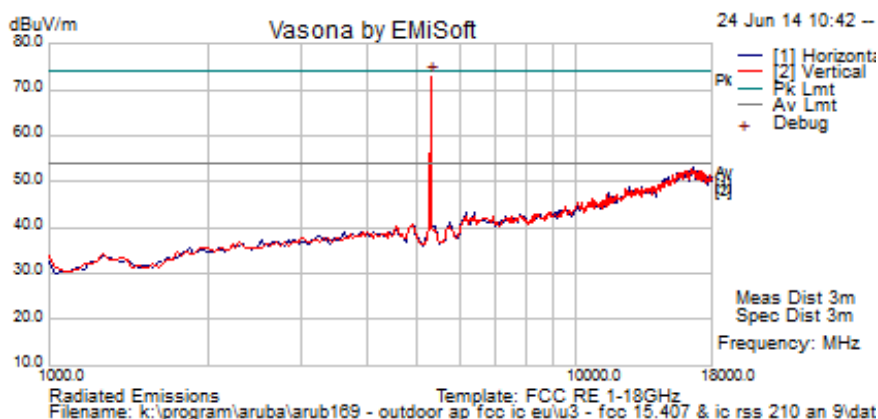
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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| | | | |
|----------------------|---|-----------------------|------|
| 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

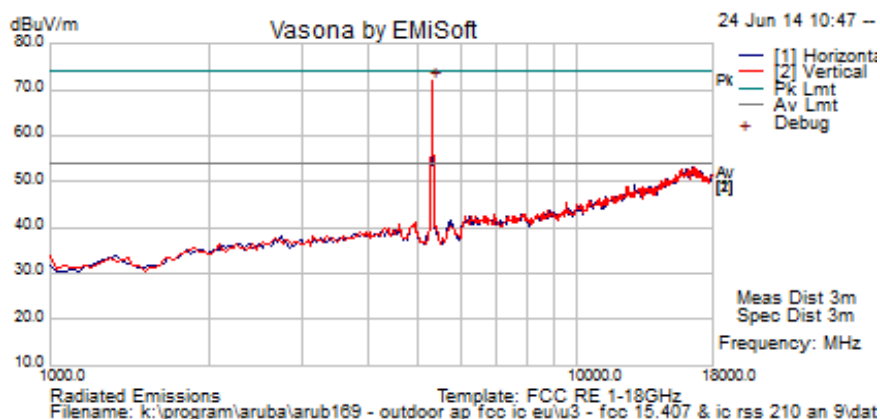
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|---|-----------------------|------|
| 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

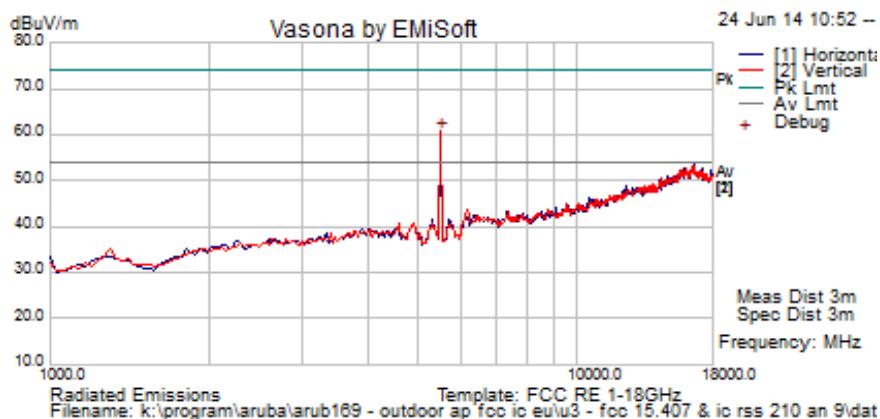
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|---|-----------------------|------|
| 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

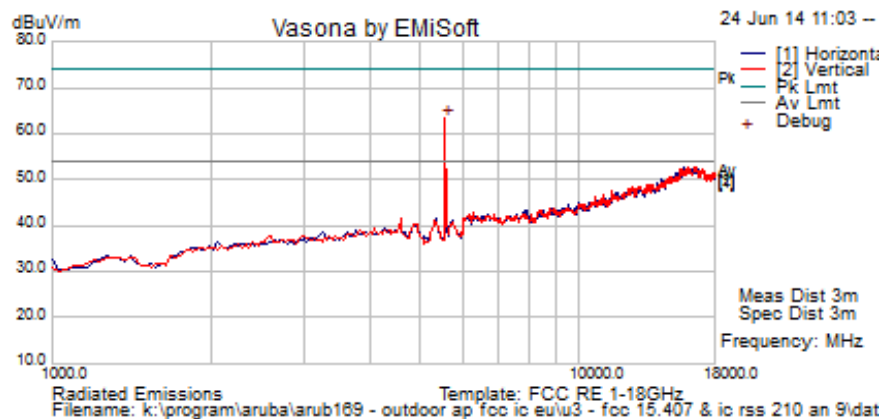
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|---|-----------------------|------|
| 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

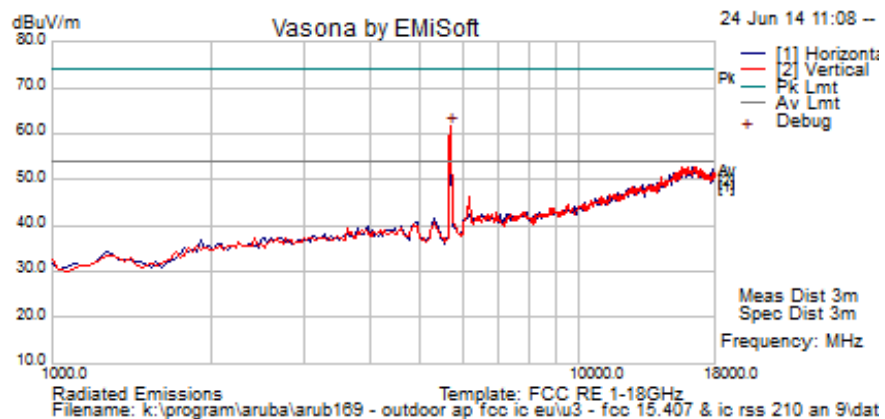
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|---|-----------------------|------|
| 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 |

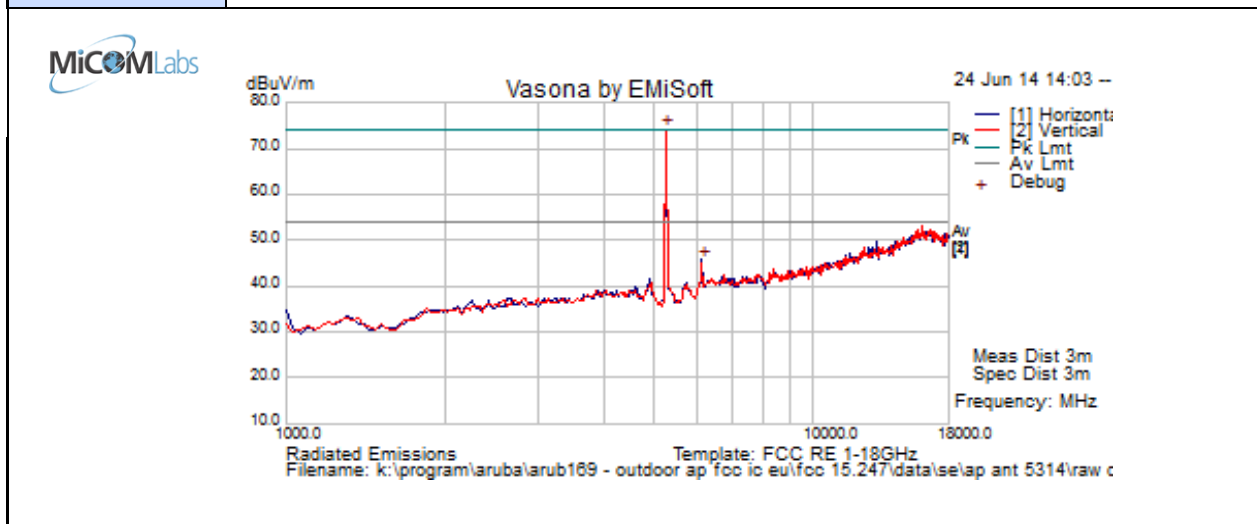
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6.1.2.3. AP-ANT-5314 – Spurious and Band-Edge Emissions

| | | | |
|----------------------|---|-----------------------|------|
| 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 |

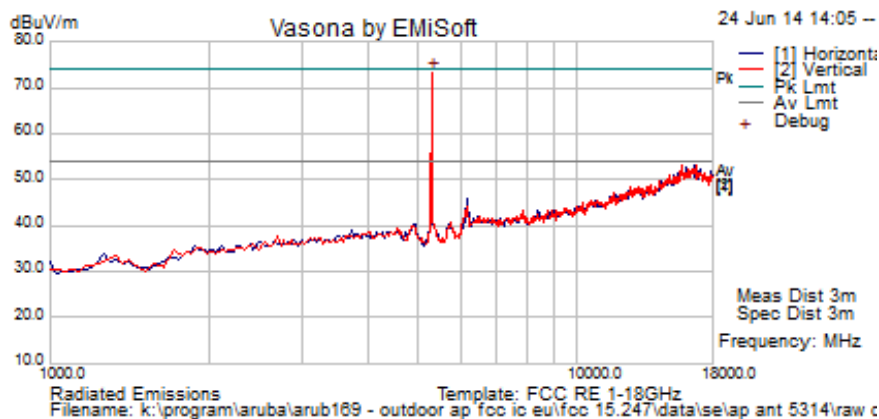
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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| | | | |
|----------------------|---|-----------------------|------|
| 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

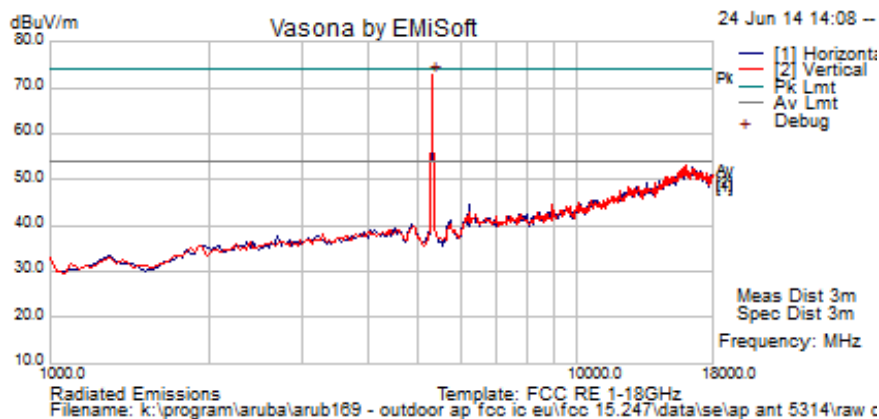
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|---|-----------------------|------|
| 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

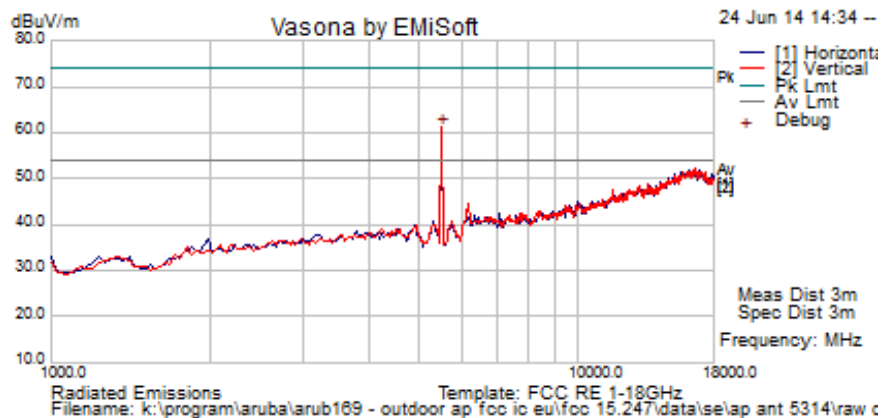
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|---|-----------------------|------|
| 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

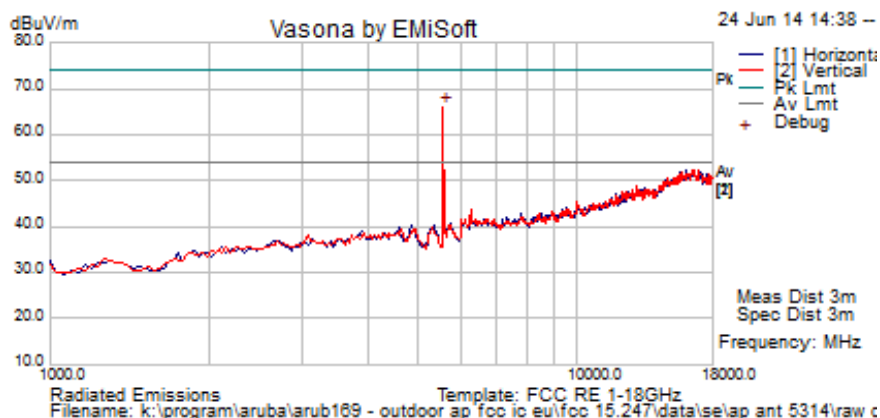
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|---|-----------------------|------|
| 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

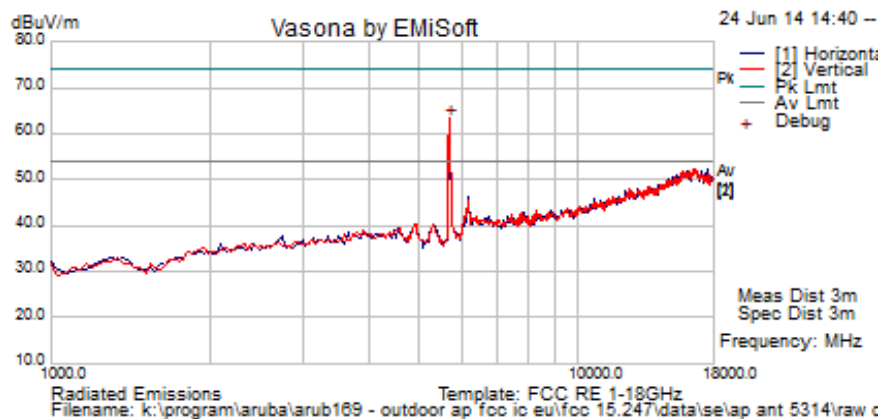
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|---|-----------------------|------|
| 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 |

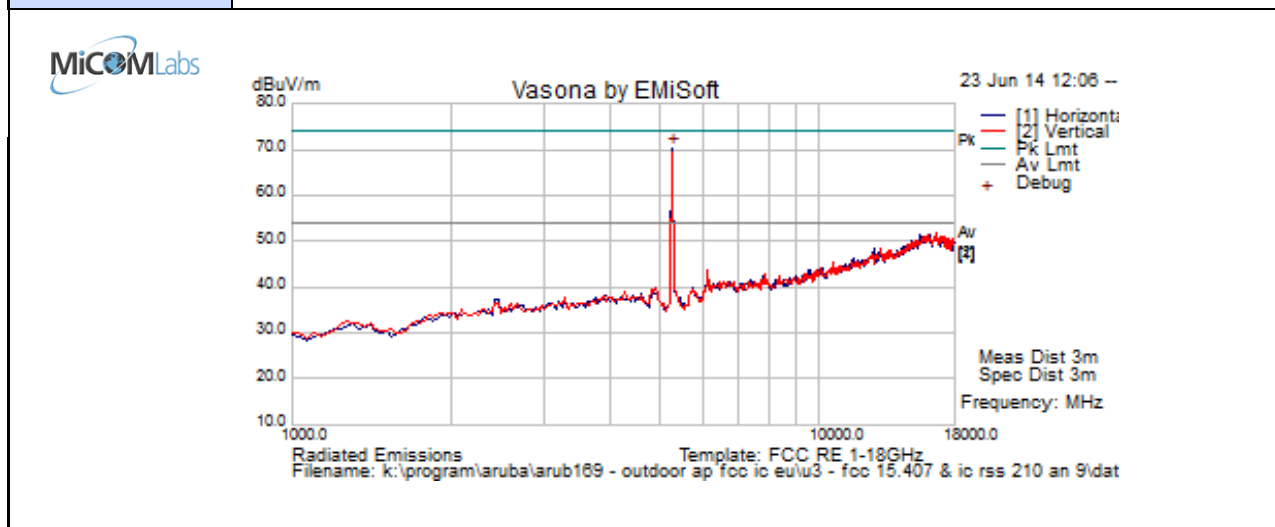
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6.1.2.4. AP-ANT-5712 – Spurious and Band-Edge Emissions

| | | | |
|---------------|---|----------------|------|
| 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 |

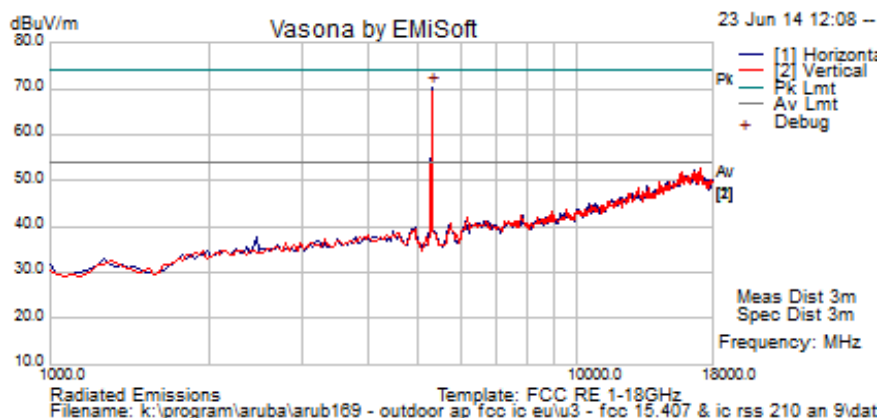
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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| | | | |
|----------------------|---|-----------------------|------|
| 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

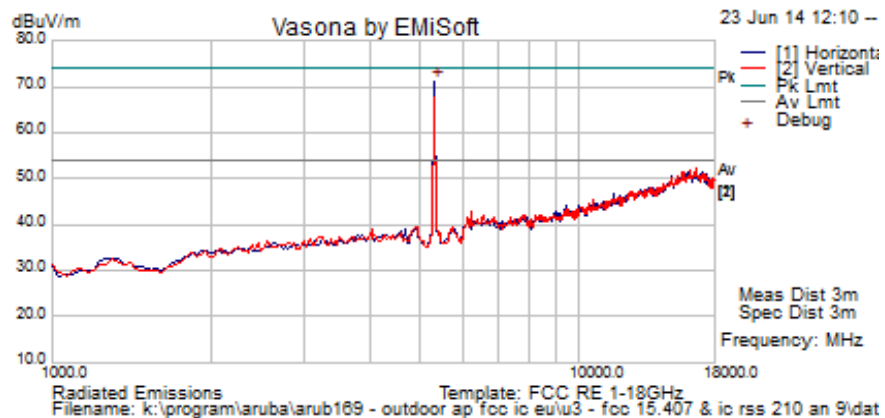
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|---|-----------------------|------|
| 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

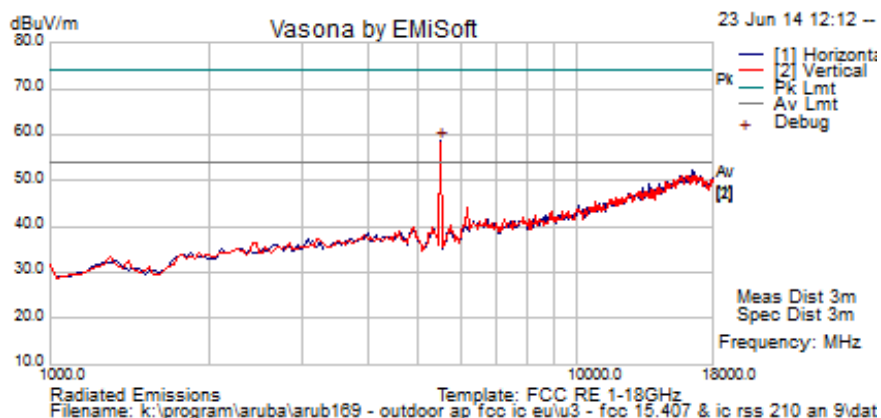
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|---|-----------------------|------|
| 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

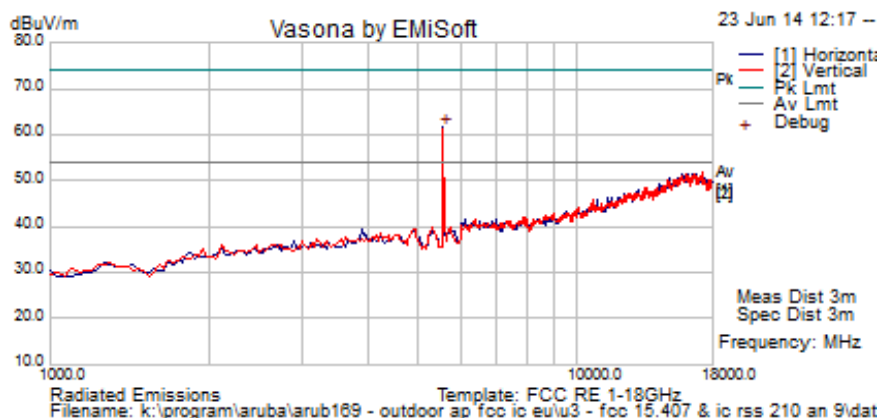
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|---|-----------------------|------|
| 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

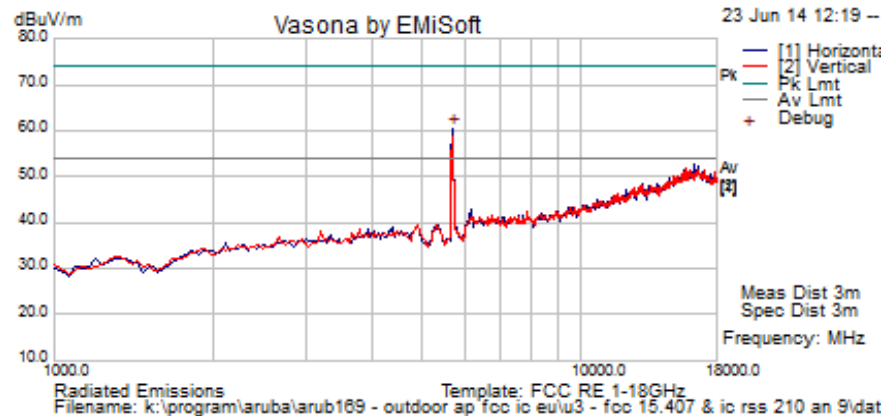
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|---|-----------------------|------|
| 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 |

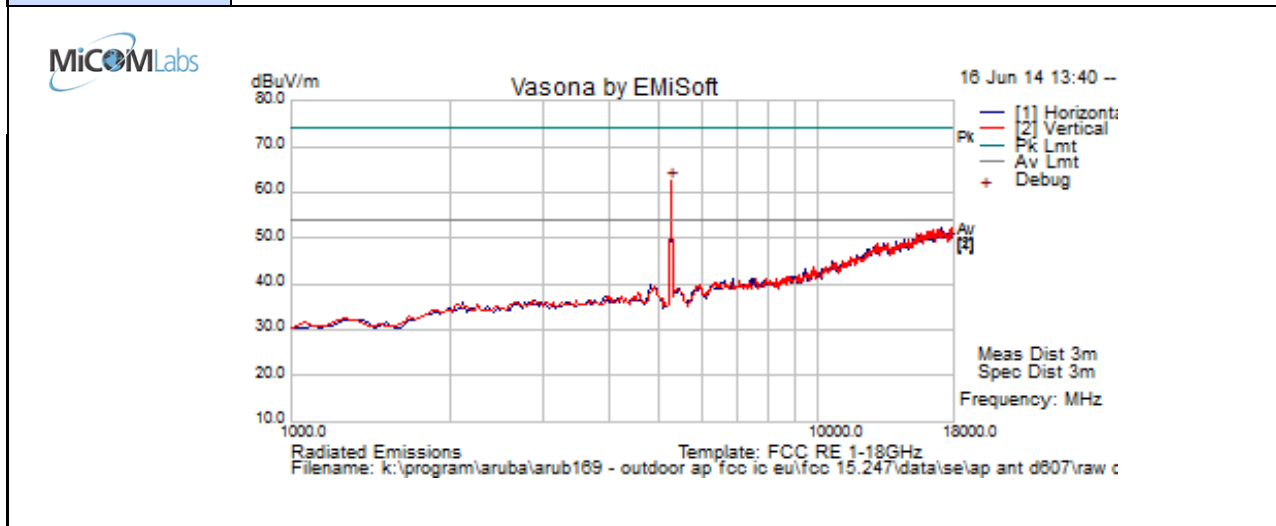
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6.1.2.5. AP-ANT-D607 – Spurious and Band-Edge Emissions

| | | | |
|---------------|---|----------------|------|
| 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 |

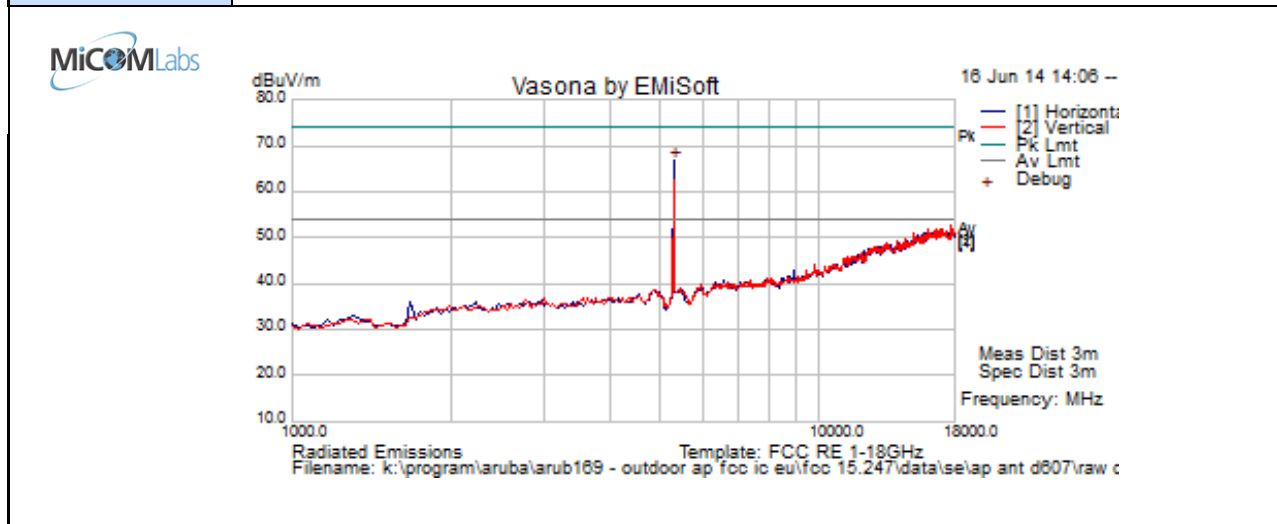
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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| | | | |
|----------------------|---|-----------------------|------|
| 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 |

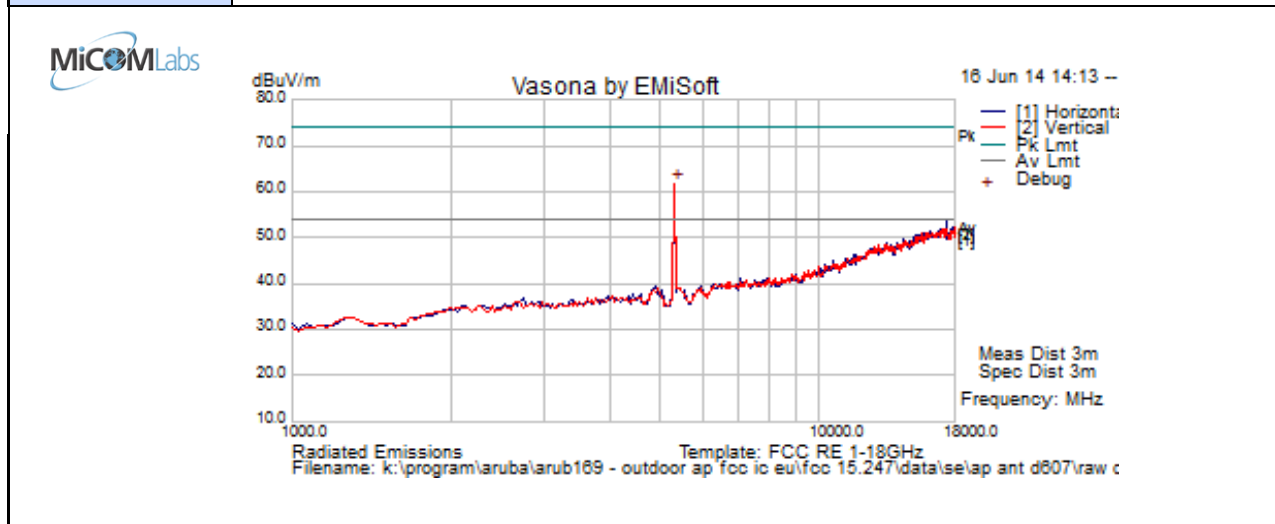
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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| | | | |
|----------------------|--|-----------------------|------|
| 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 |

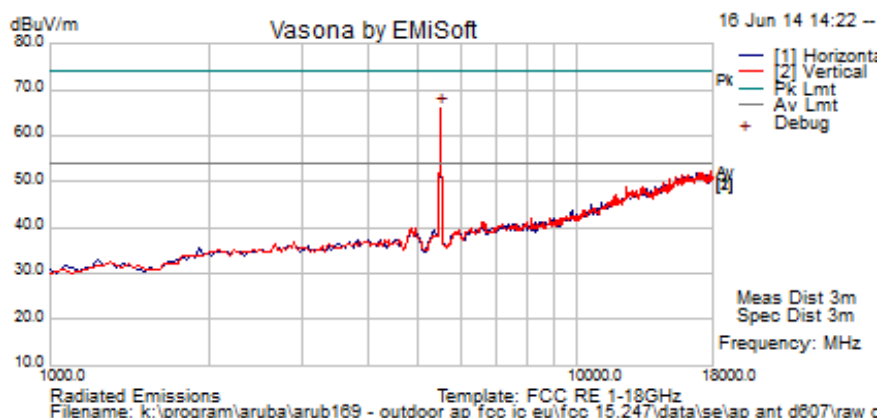
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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| | | | |
|----------------------|---|-----------------------|------|
| 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

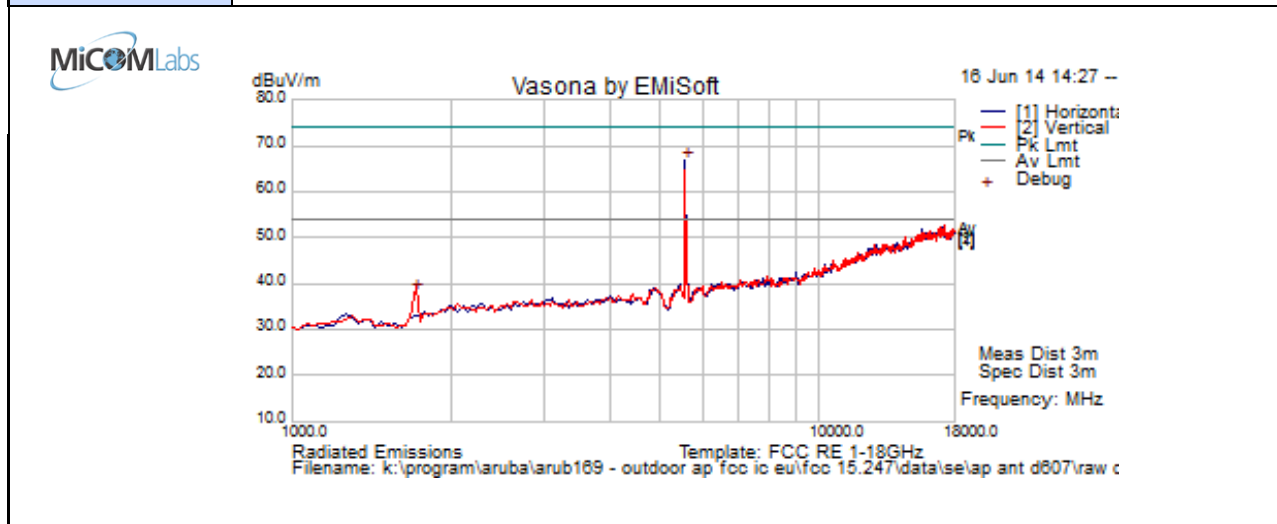
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|---|-----------------------|------|
| 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 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 |

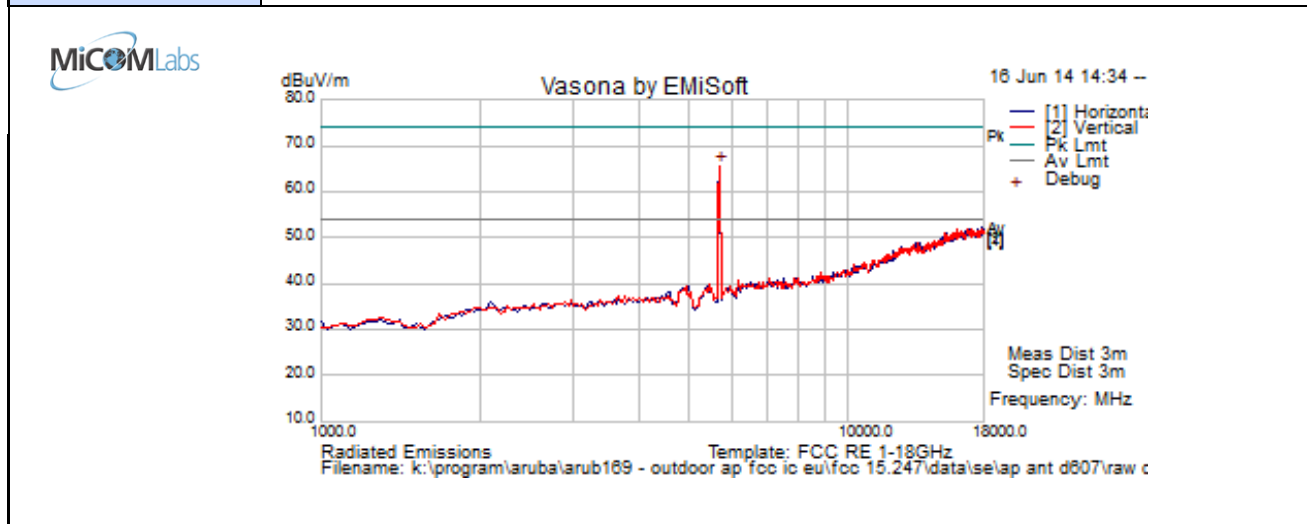
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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| | | | |
|----------------------|---|-----------------------|------|
| 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 |

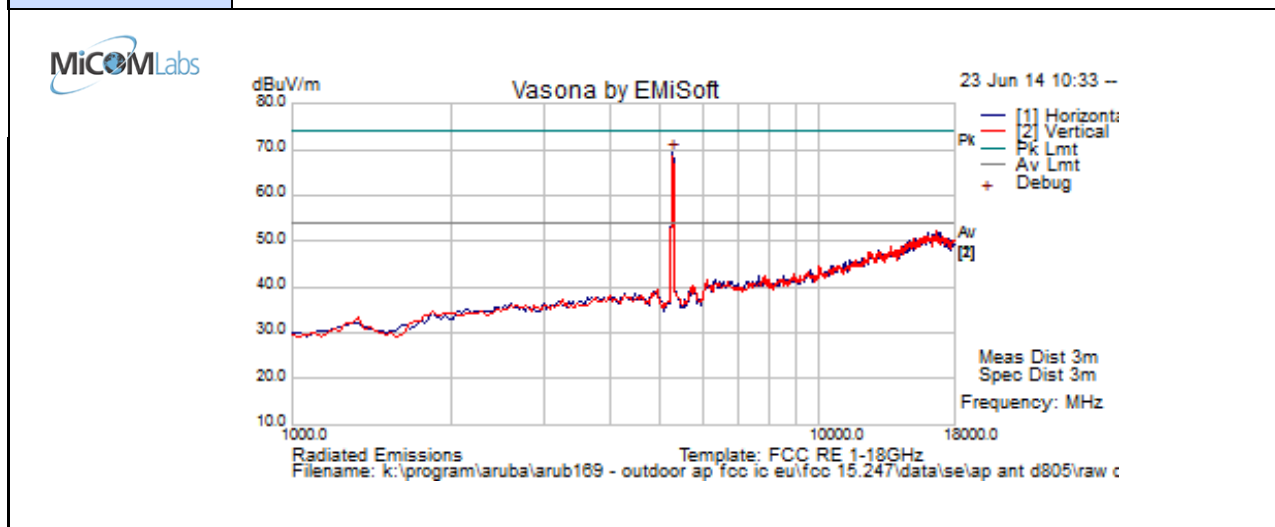
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6.1.2.6. AP-ANT-D805 – Spurious and Band-Edge Emissions

| | | | |
|----------------------|---|-----------------------|------|
| 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 |

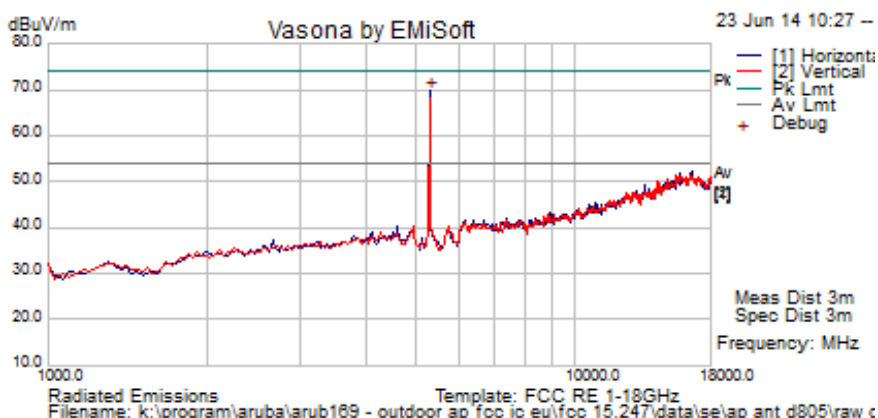
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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| | | | |
|----------------------|---|-----------------------|------|
| 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 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 |

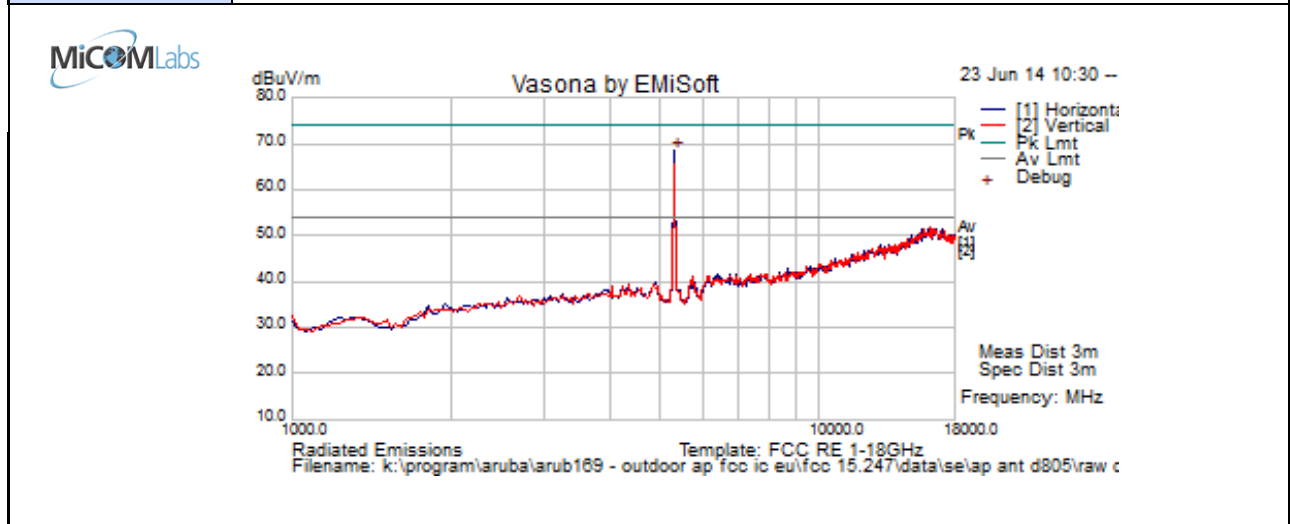
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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| | | | |
|----------------------|--|-----------------------|------|
| 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 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 | 73.6 | 6.0 | -11.1 | 68.6 | Peak [Scan] | H | 100 | | | | | FUND |

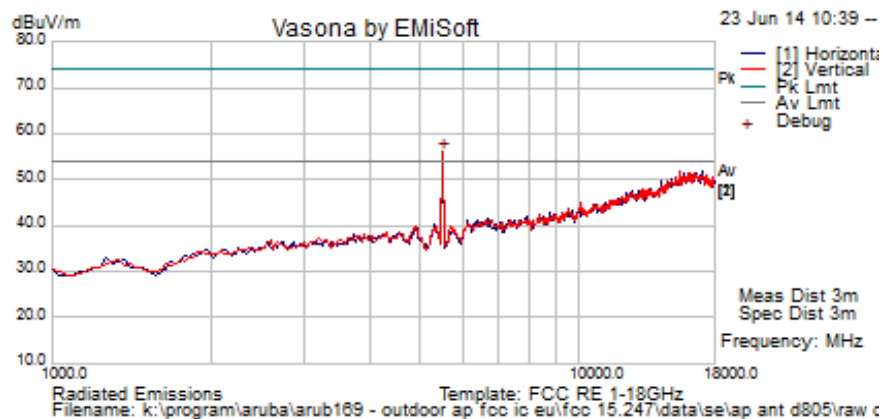
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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| | | | |
|----------------------|--|-----------------------|------|
| 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

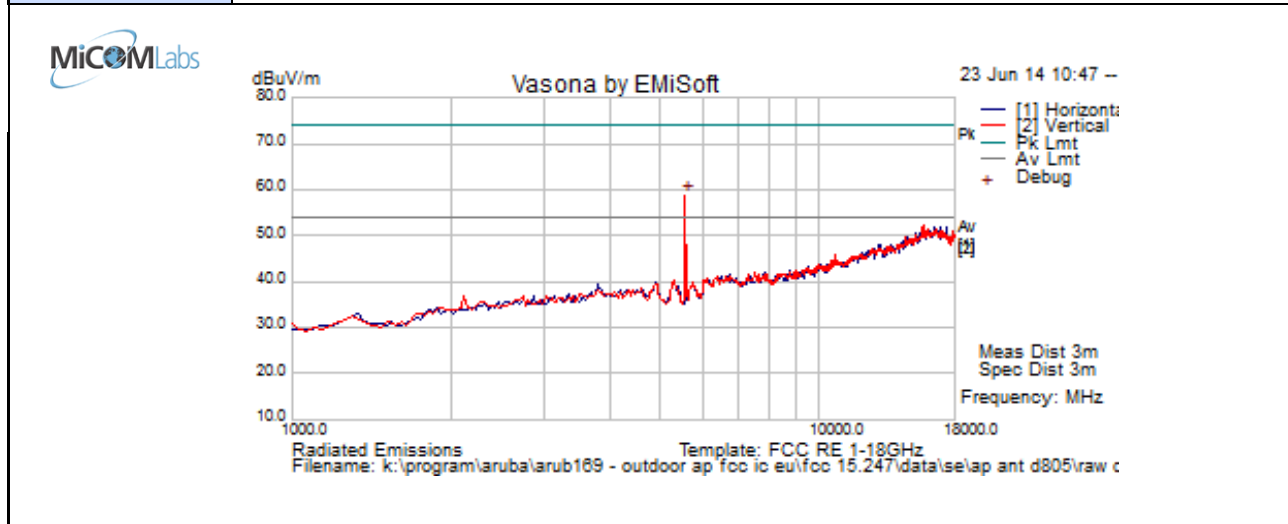
| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 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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| | | | |
|----------------------|--|-----------------------|------|
| 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 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 |

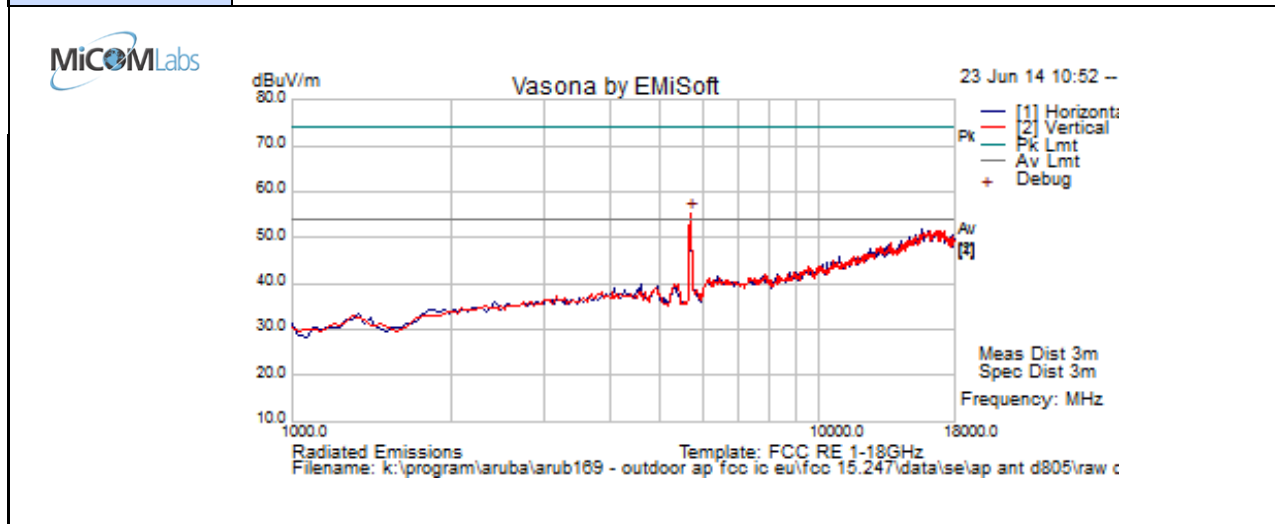
Legend: TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
 NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

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| | | | |
|----------------------|--|-----------------------|------|
| 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:

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

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

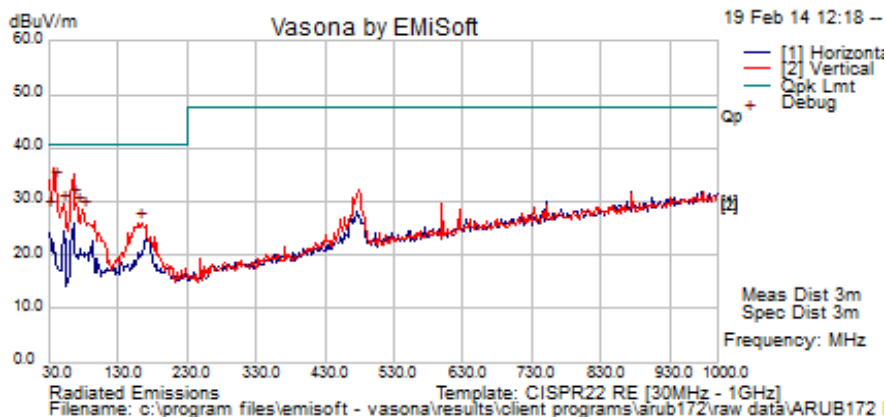
$$48 \text{ dB}\mu\text{V/m} = 250\mu\text{V/m}$$

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| | | | |
|----------------------|--------------------------------------|-----------------------|------|
| 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 | |

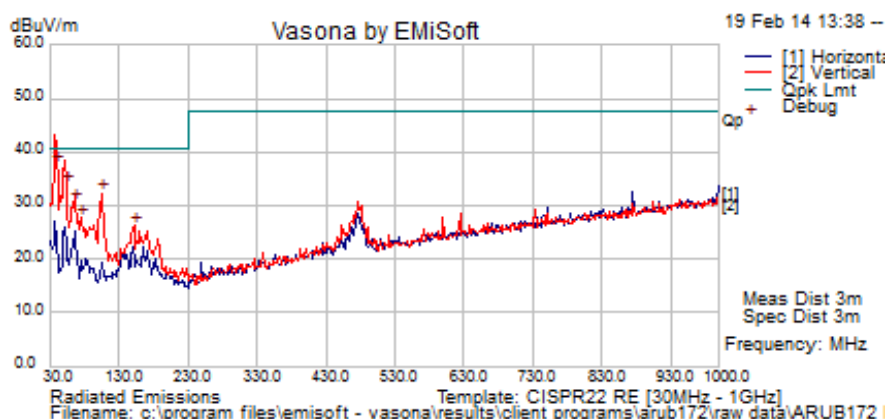
Legend: DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
 NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

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| | | | |
|----------------------|-------------------|-----------------------|------|
| 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

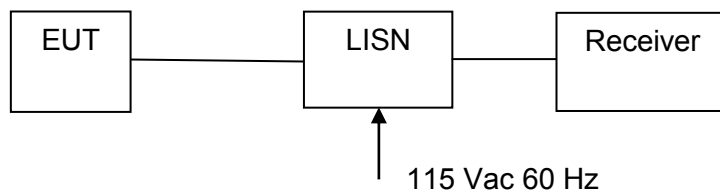
The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions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

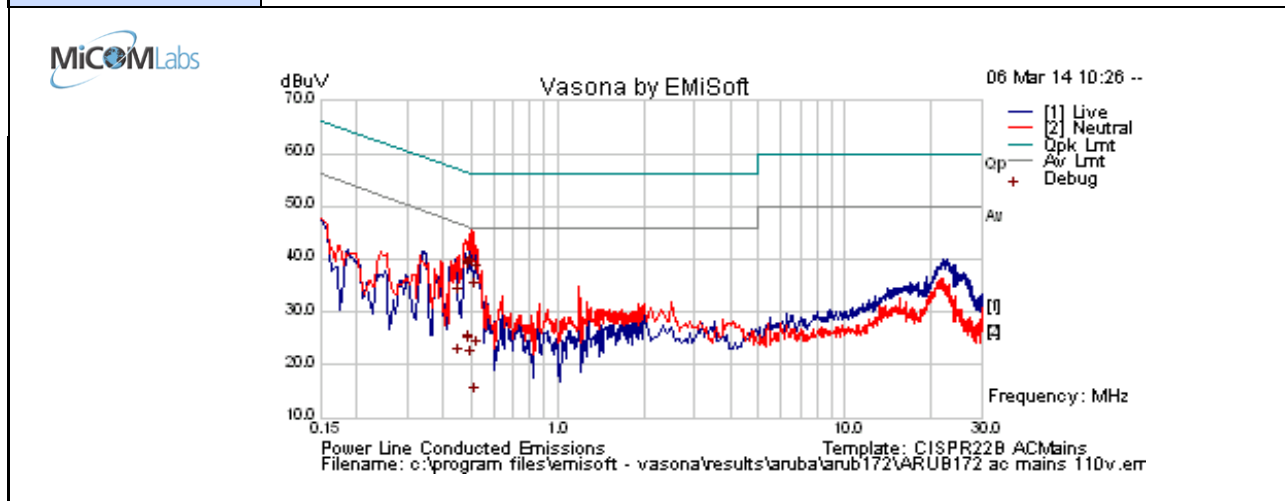
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar



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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' |

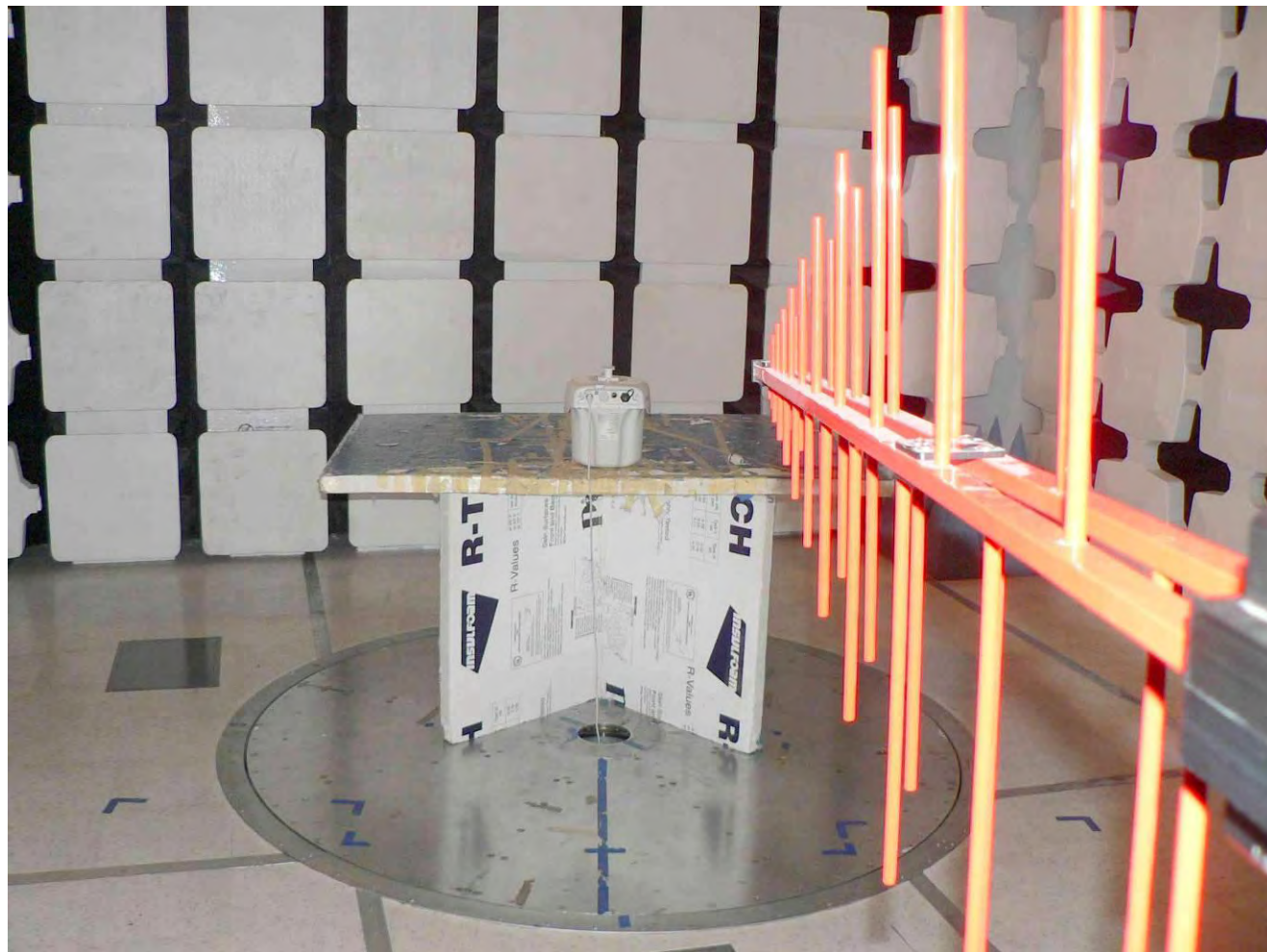
7. PHOTOGRAPHS

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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| 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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APPENDIX

A. SUPPORTING INFORMATION

A.1. CONDUCTED TEST PLOTS

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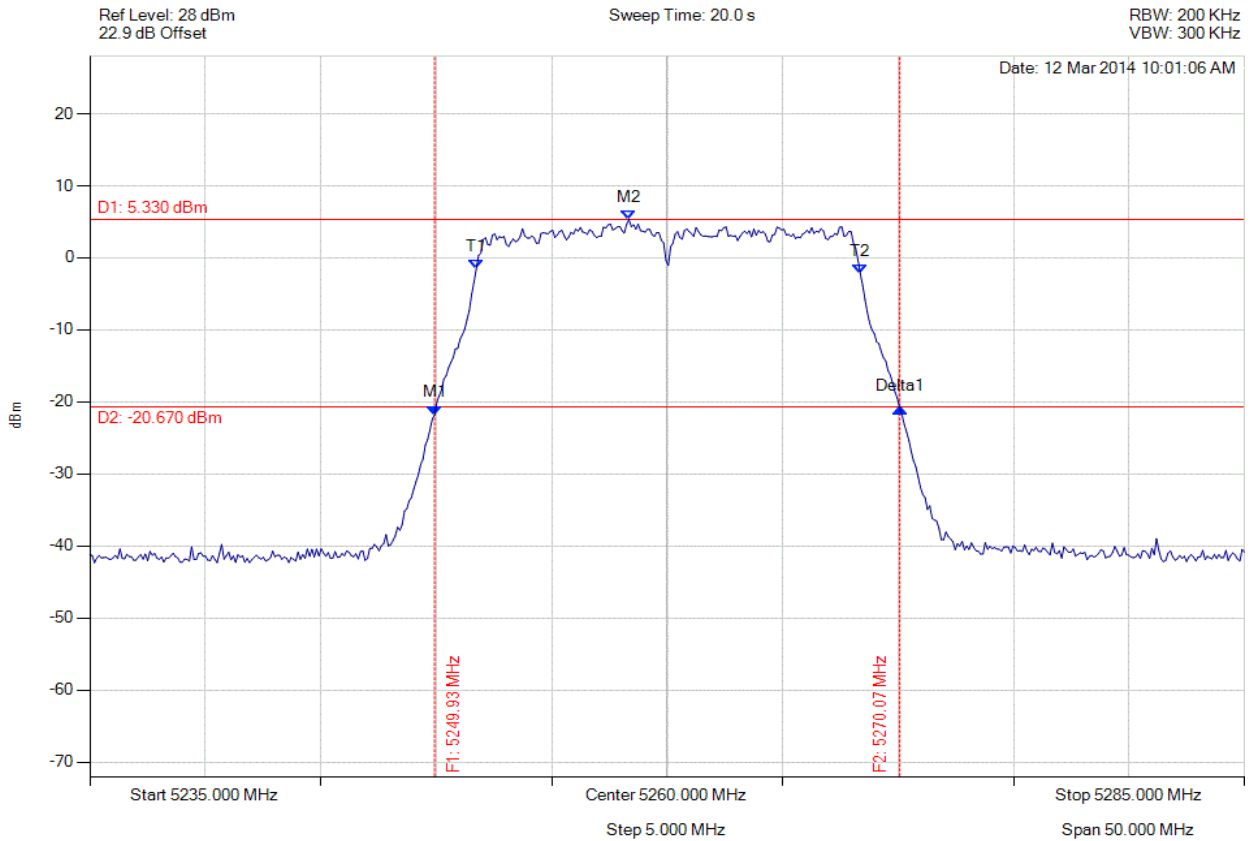


A.1.1. 26 dB & 99% Bandwidth



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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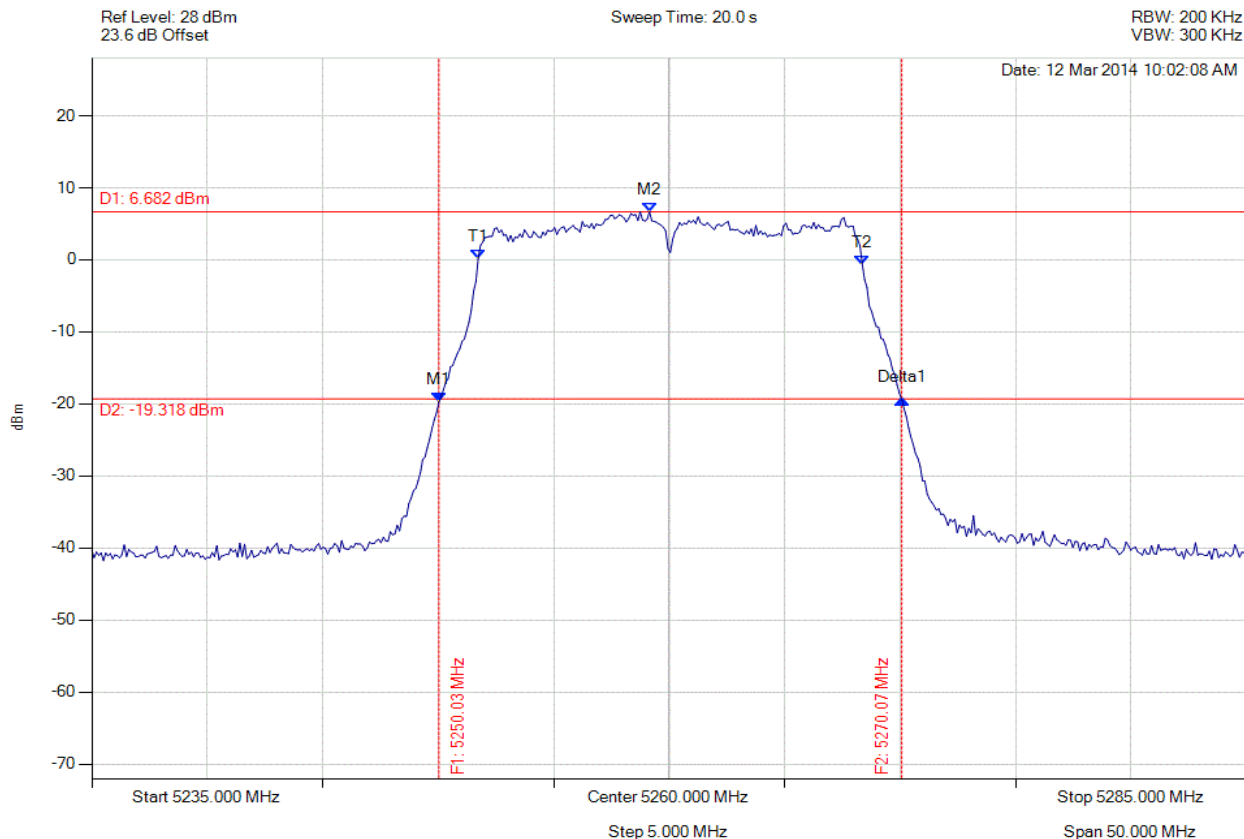


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26 dB & 99% BANDWIDTH

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 |

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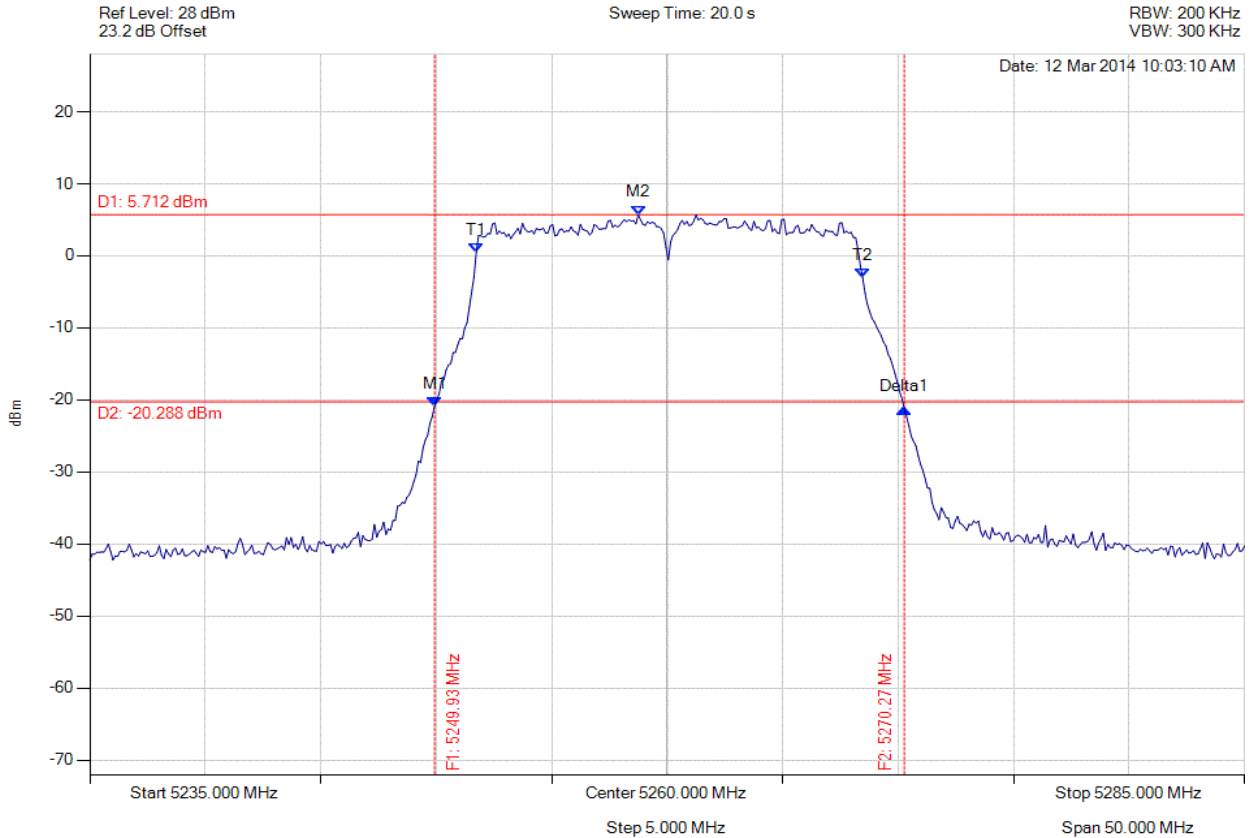


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26 dB & 99% BANDWIDTH

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 |

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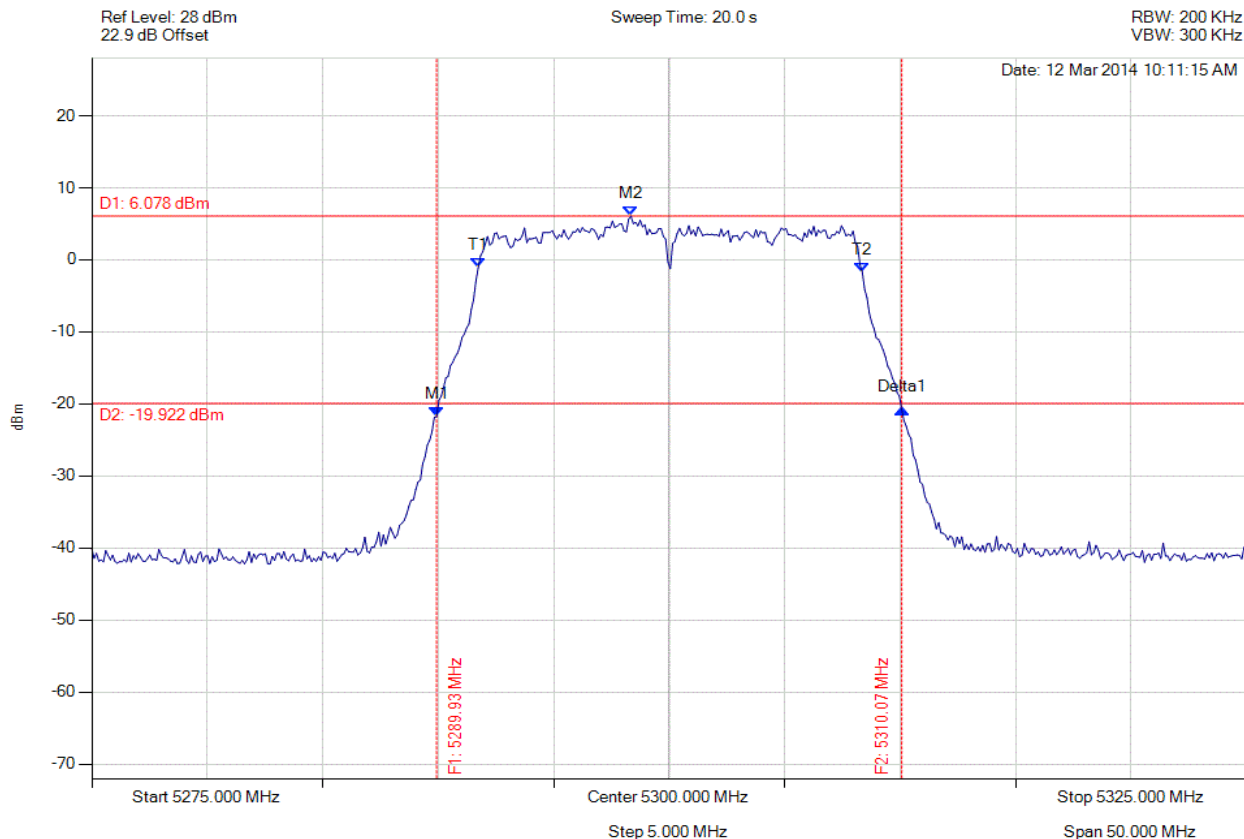


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26 dB & 99% BANDWIDTH

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 |

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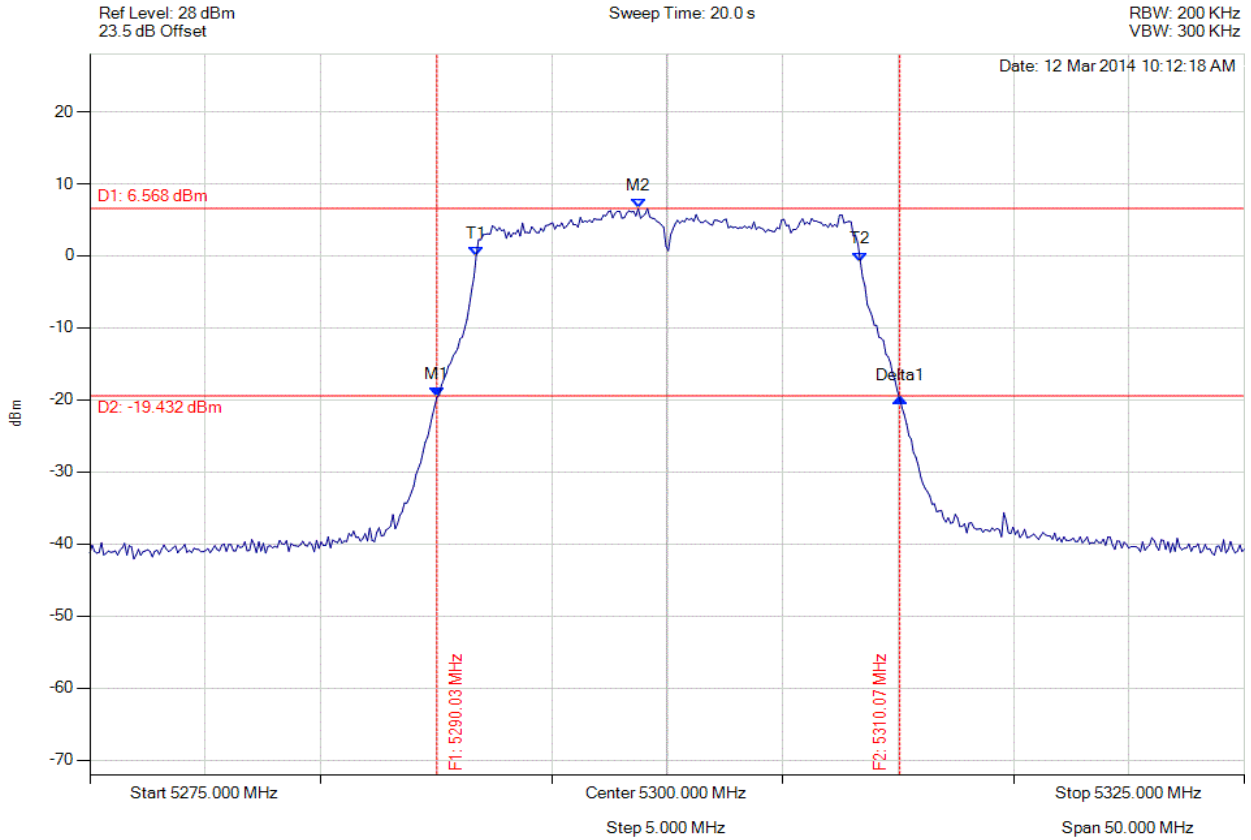


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26 dB & 99% BANDWIDTH

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 |

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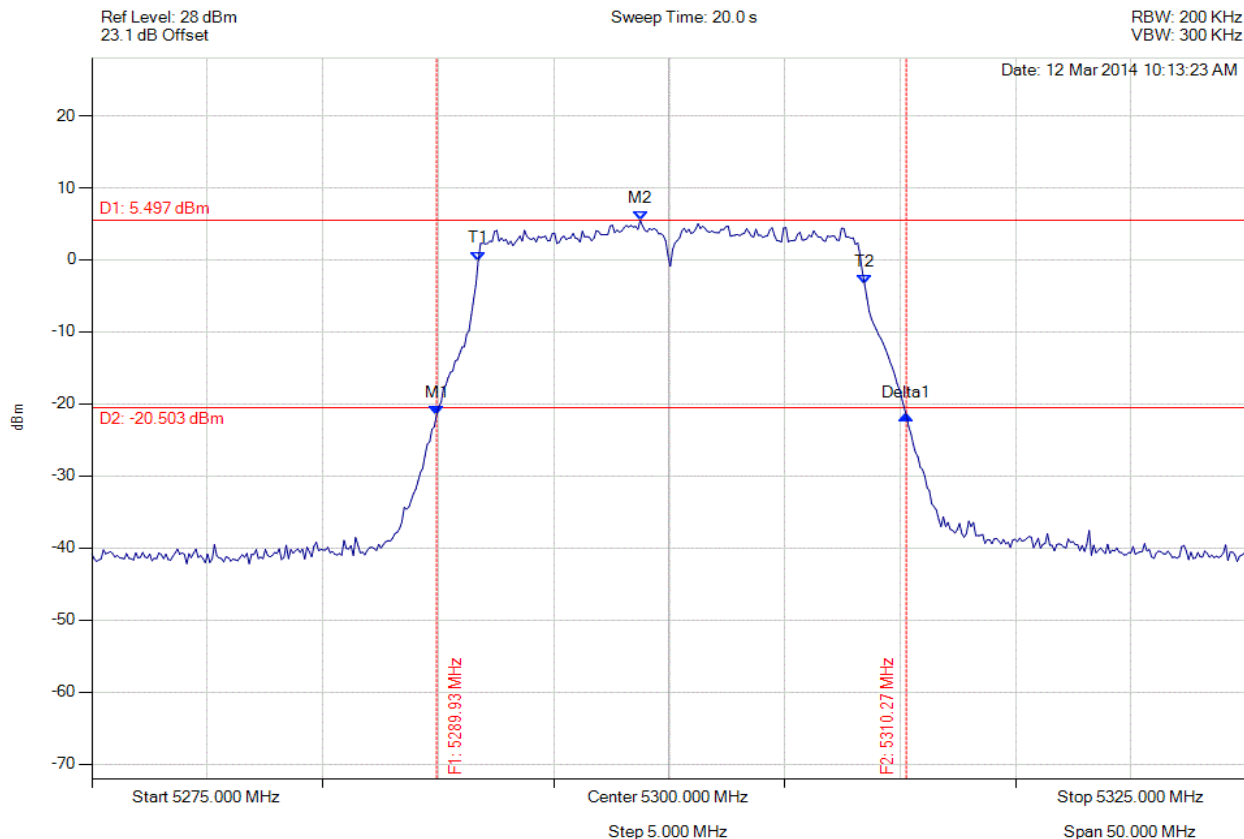


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26 dB & 99% BANDWIDTH

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 |

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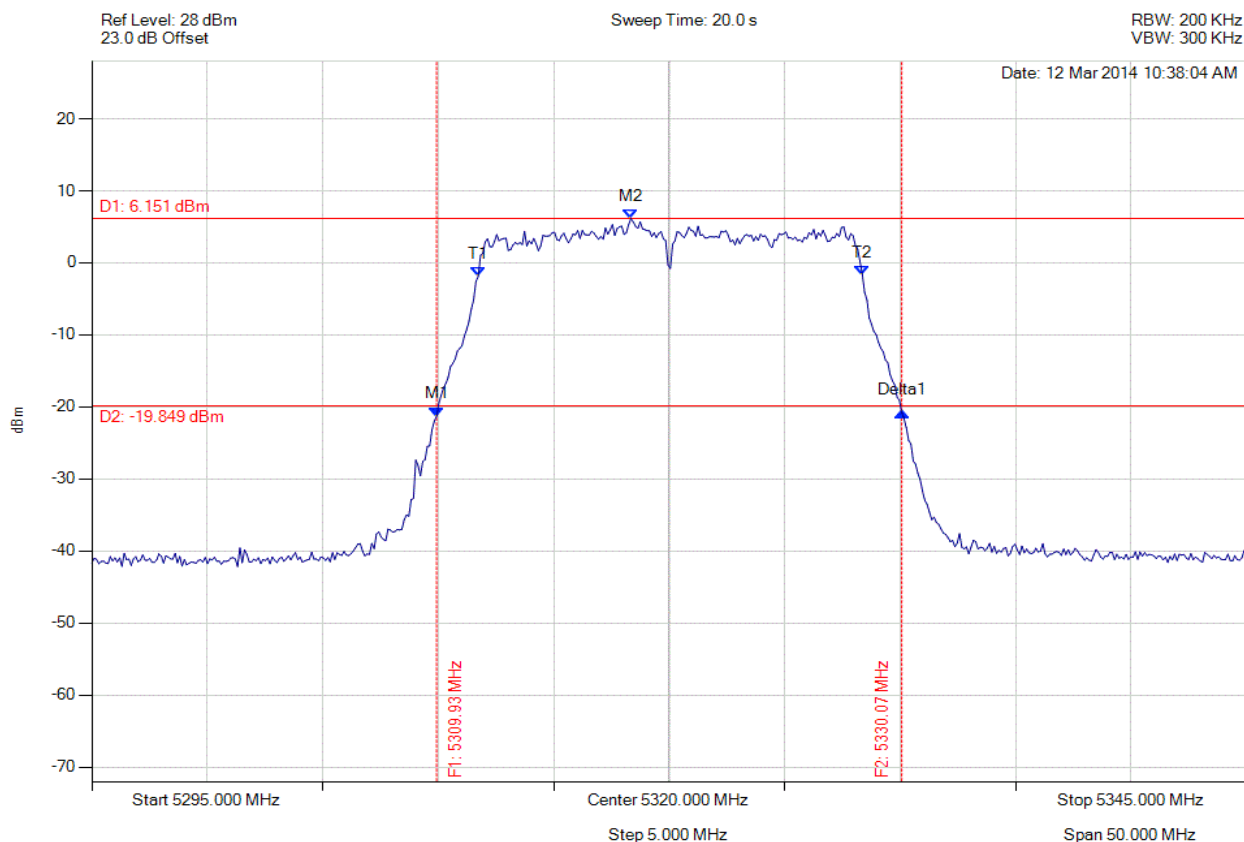


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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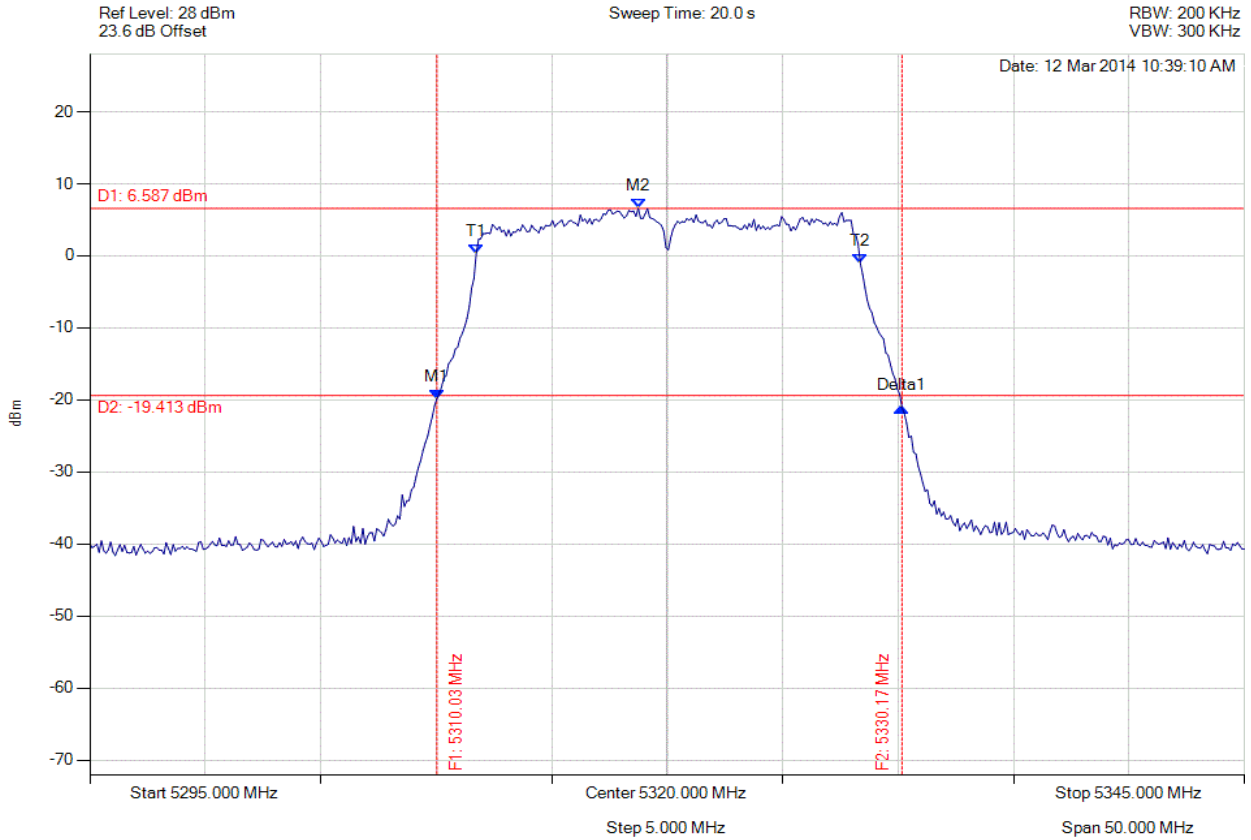


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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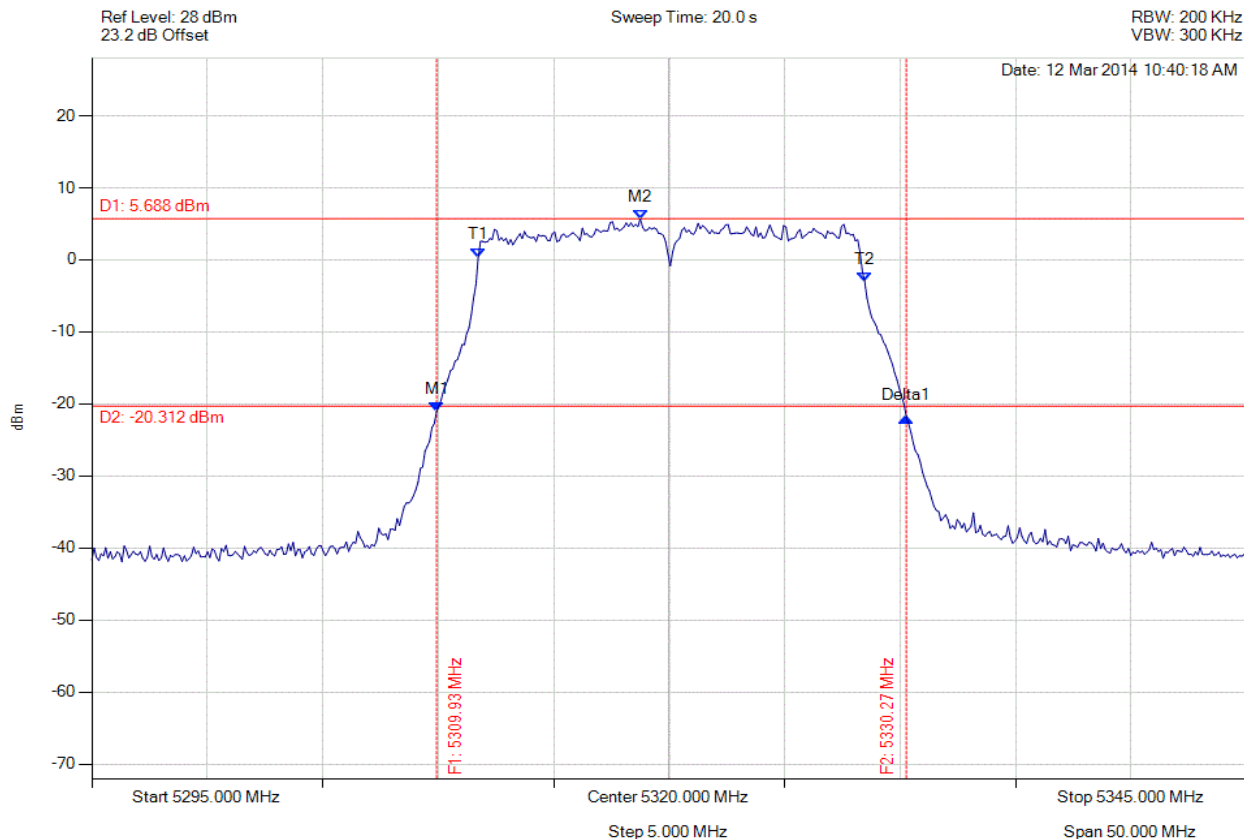


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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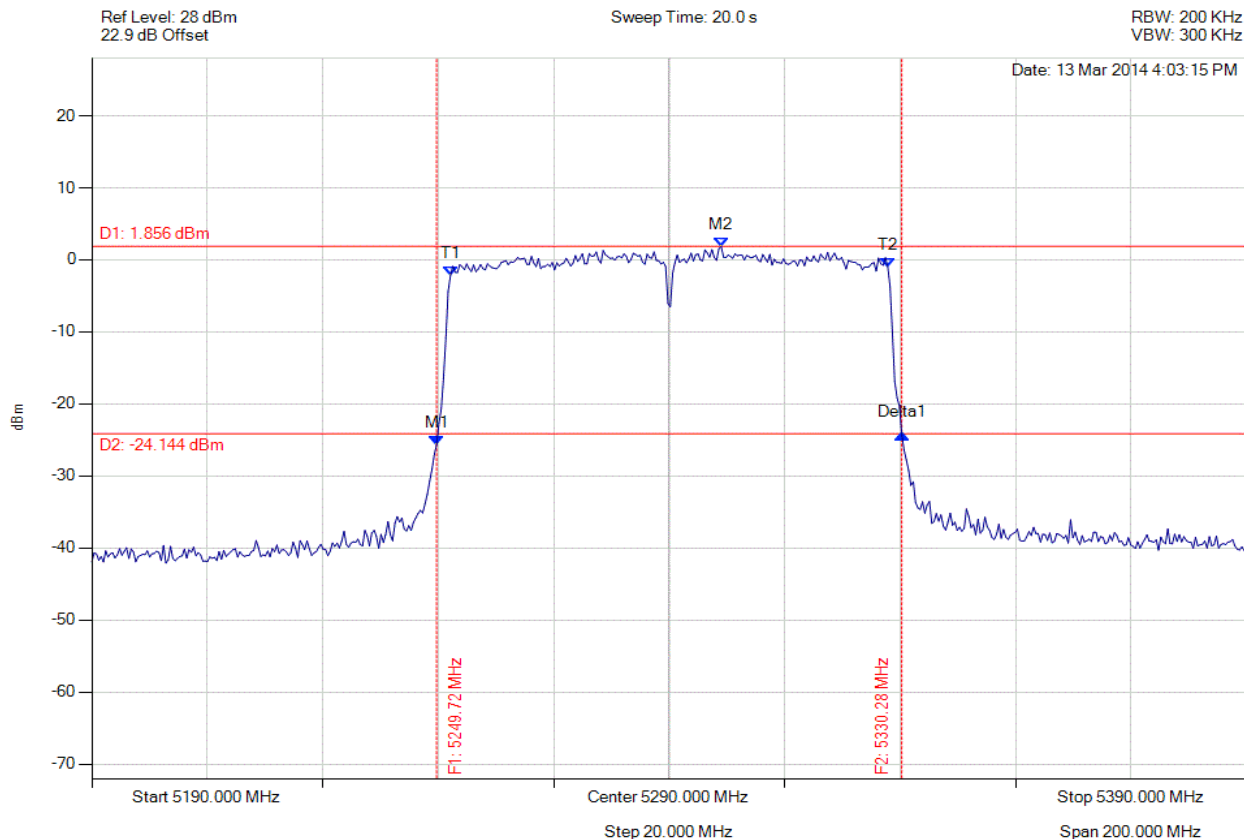


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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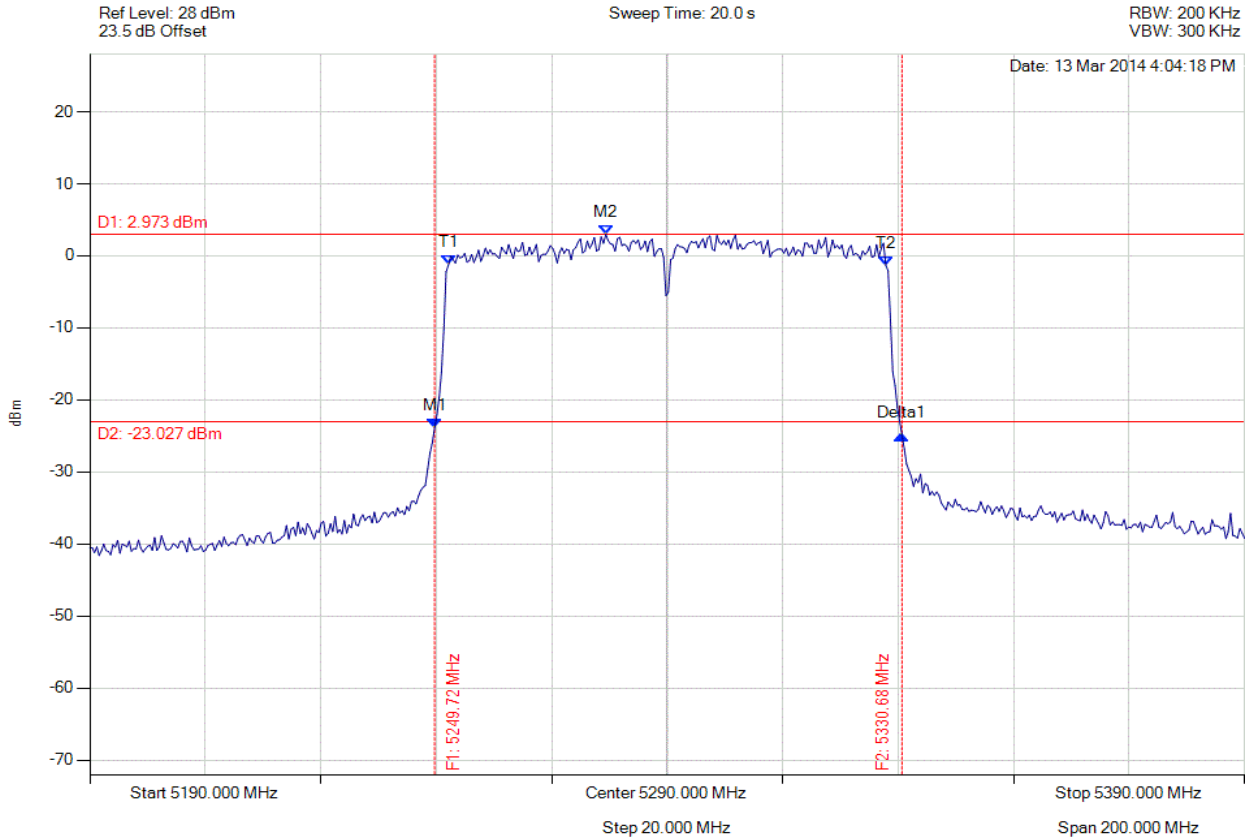


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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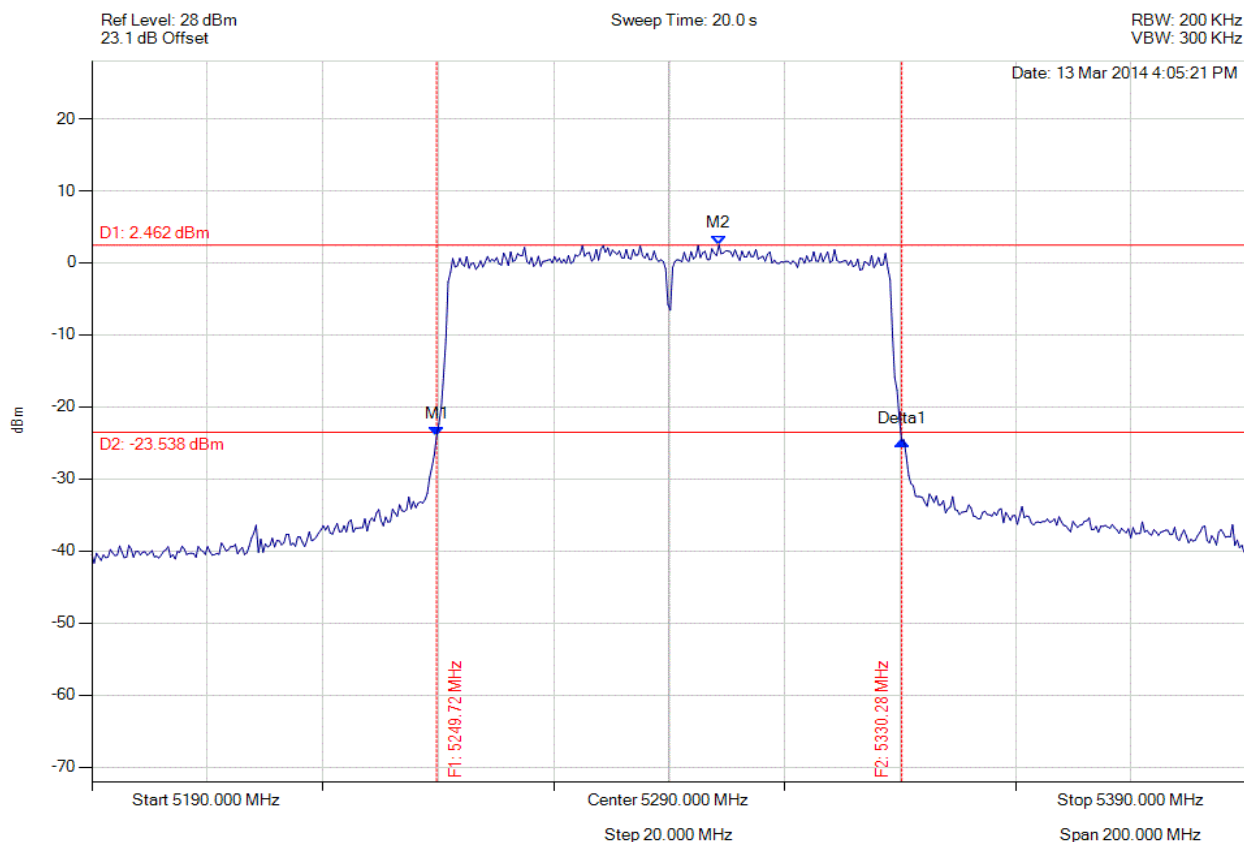


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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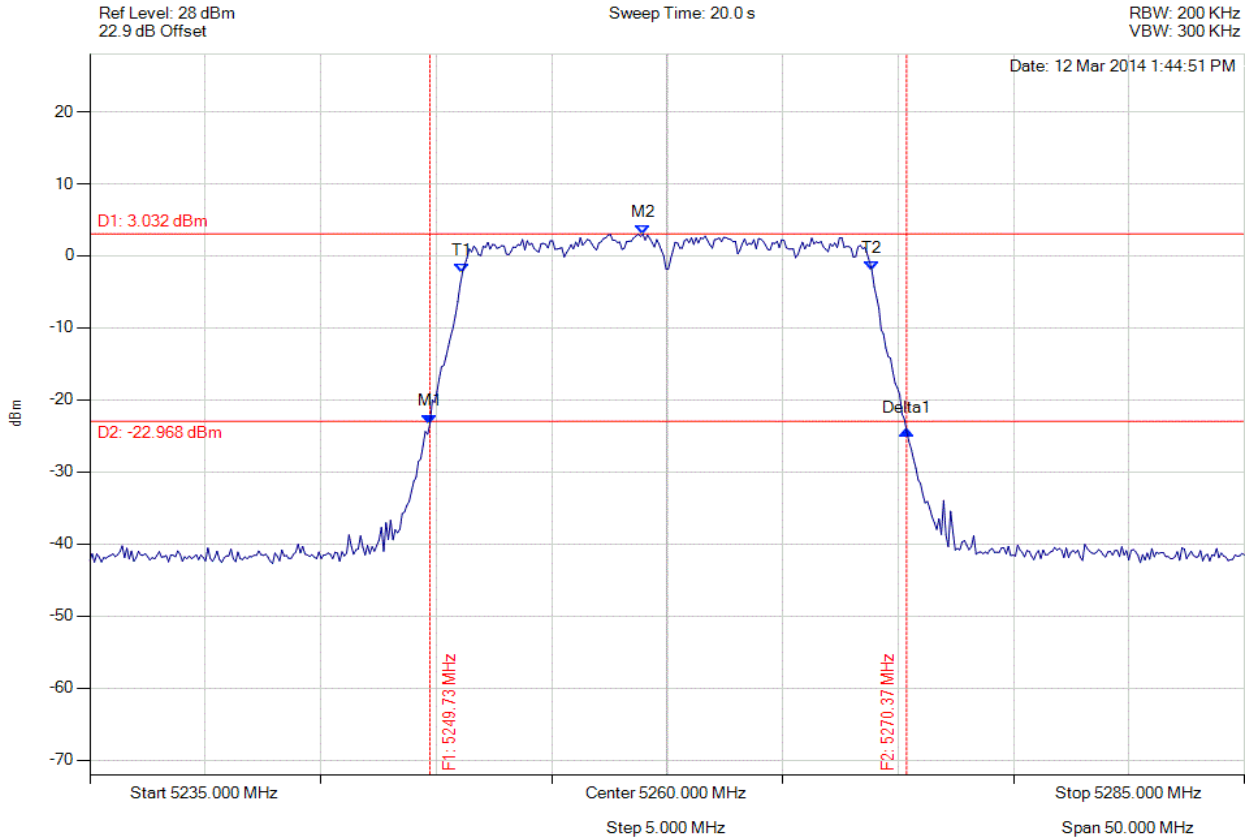


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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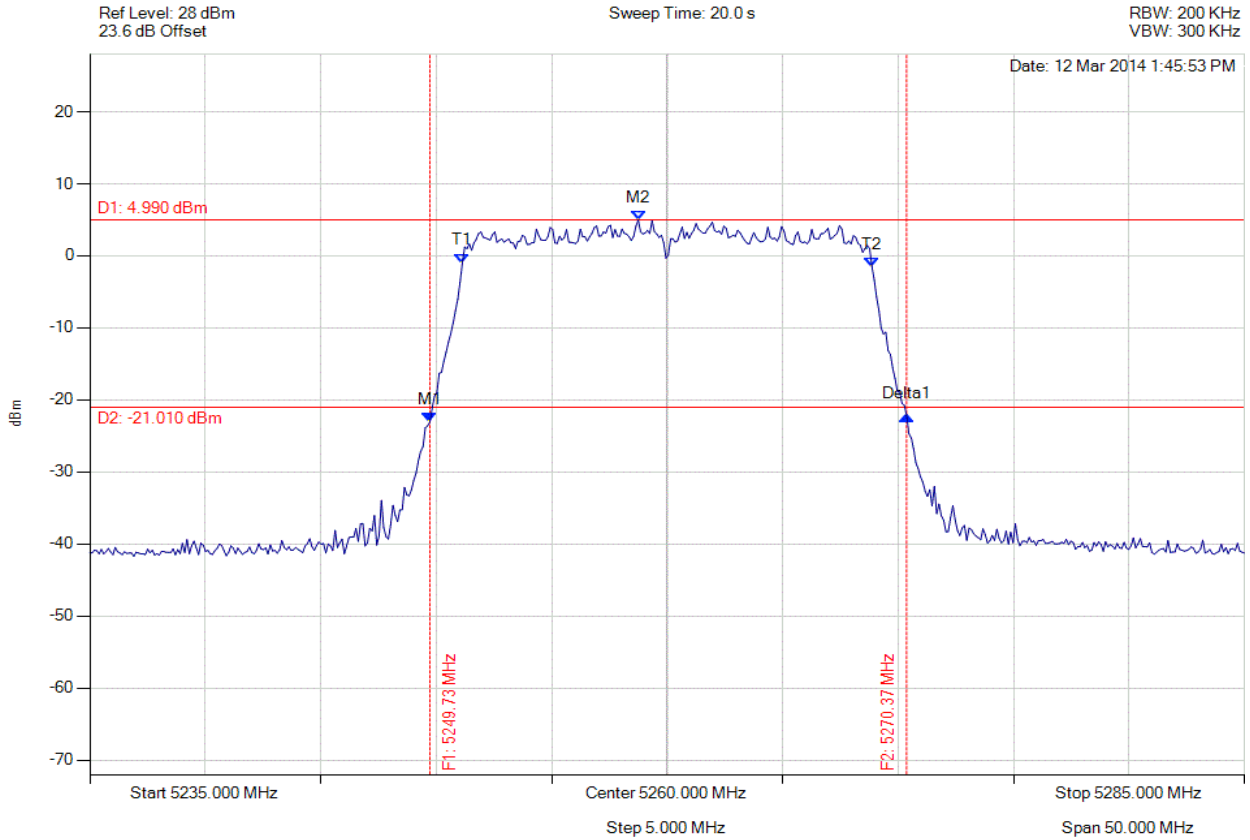


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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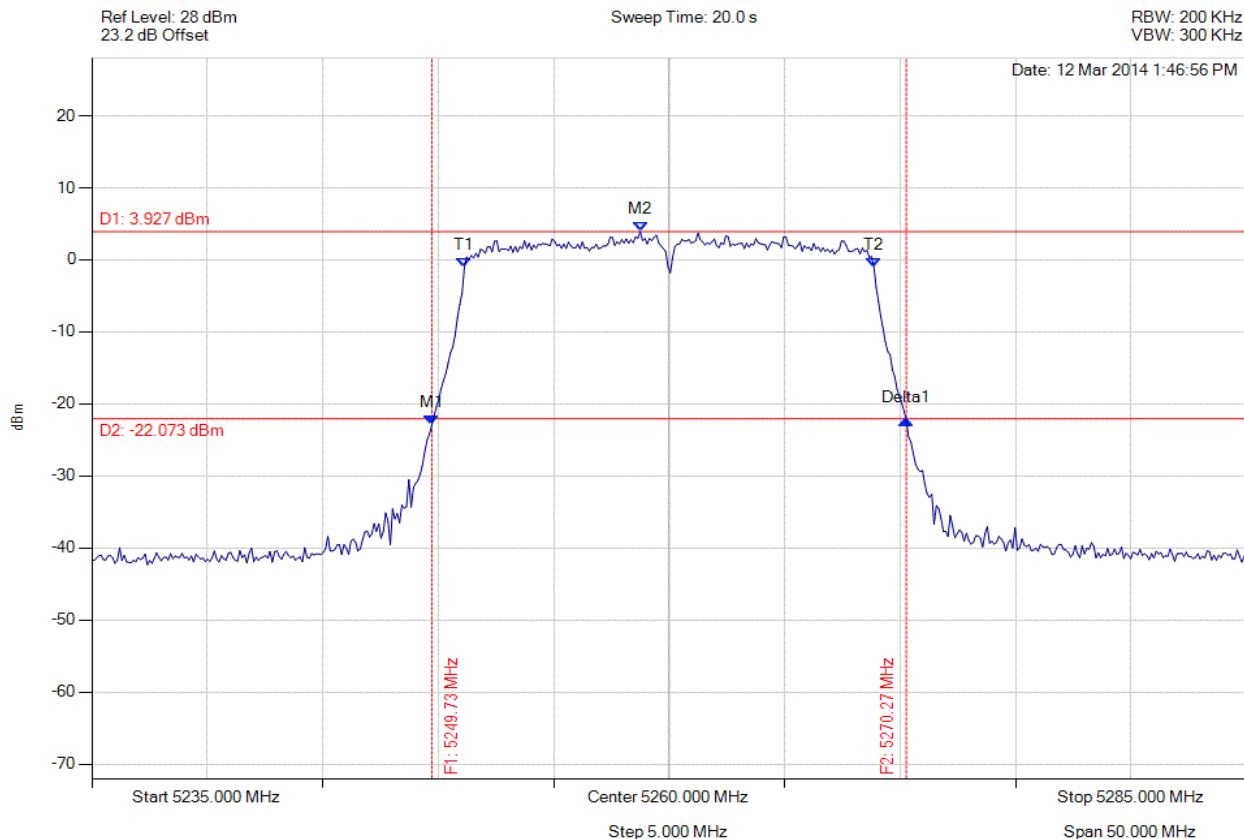


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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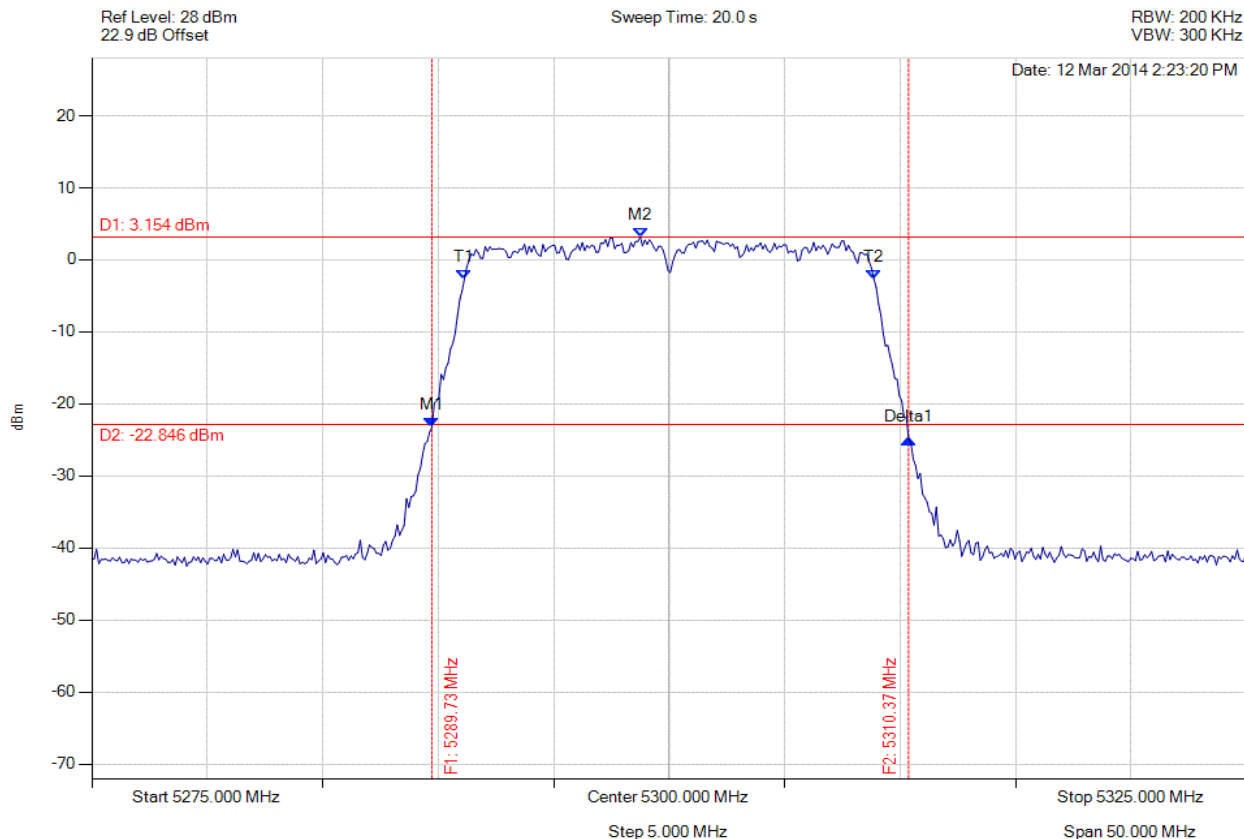


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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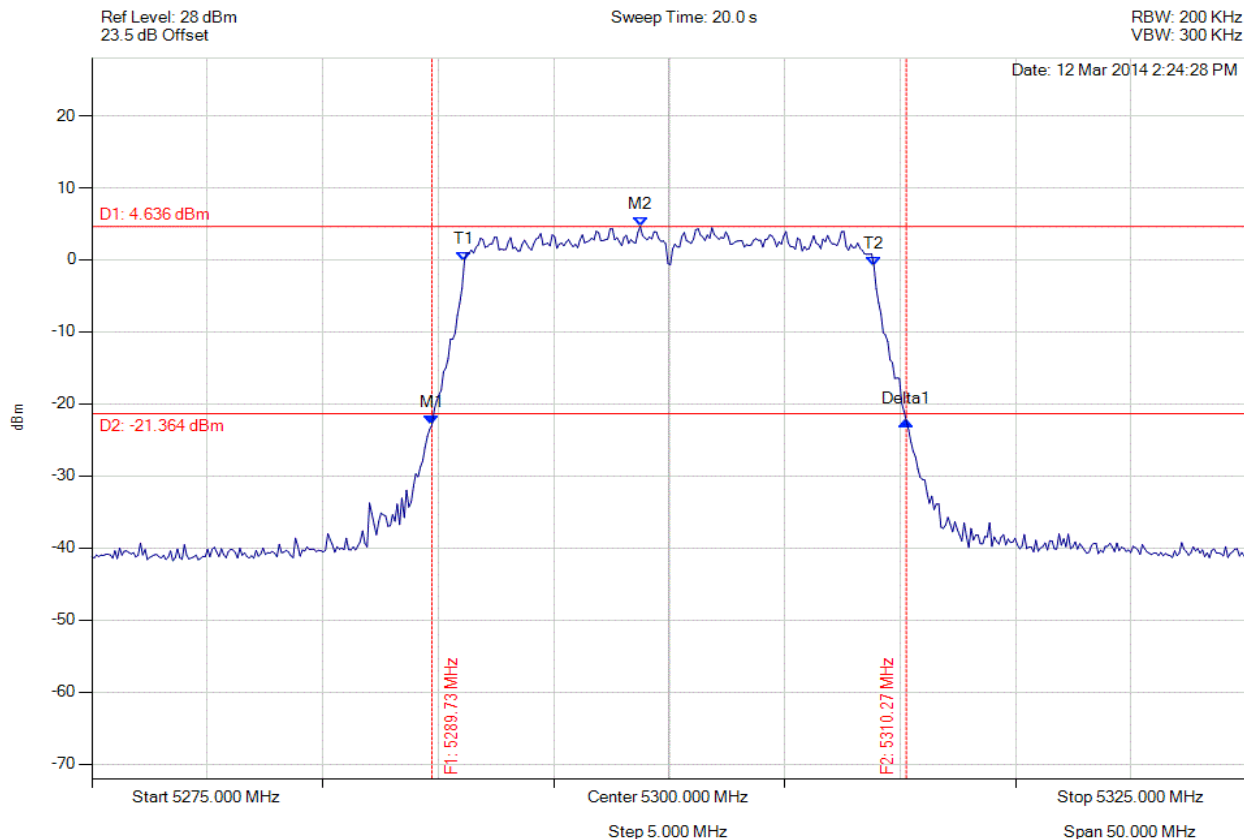


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

Variants: 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 |

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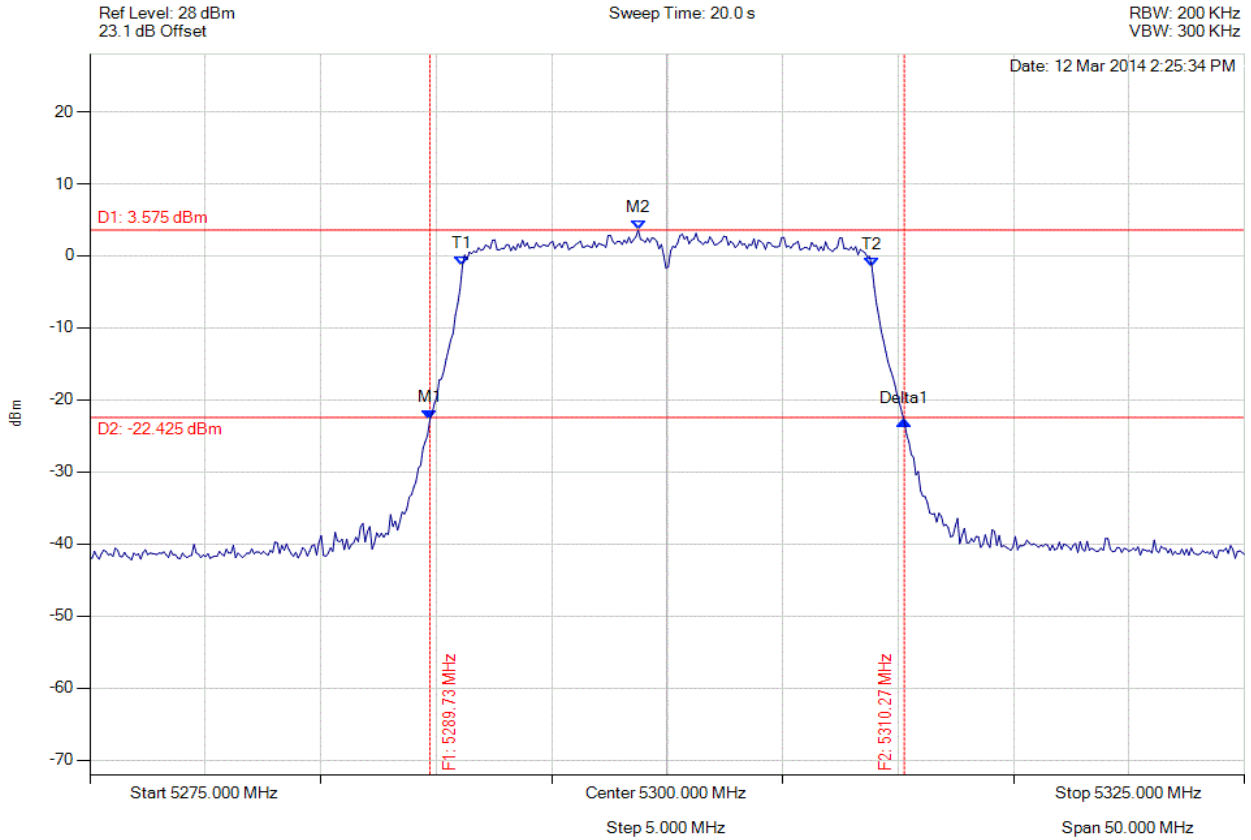


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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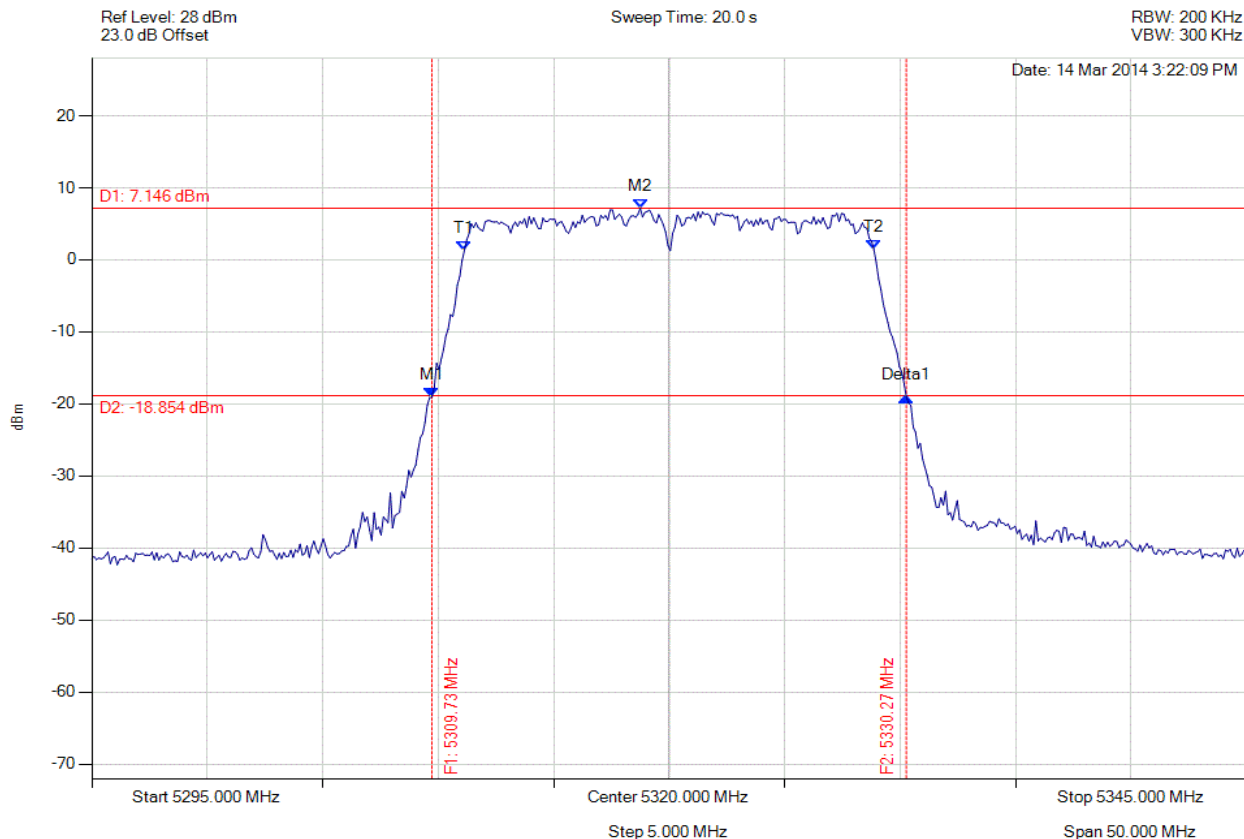


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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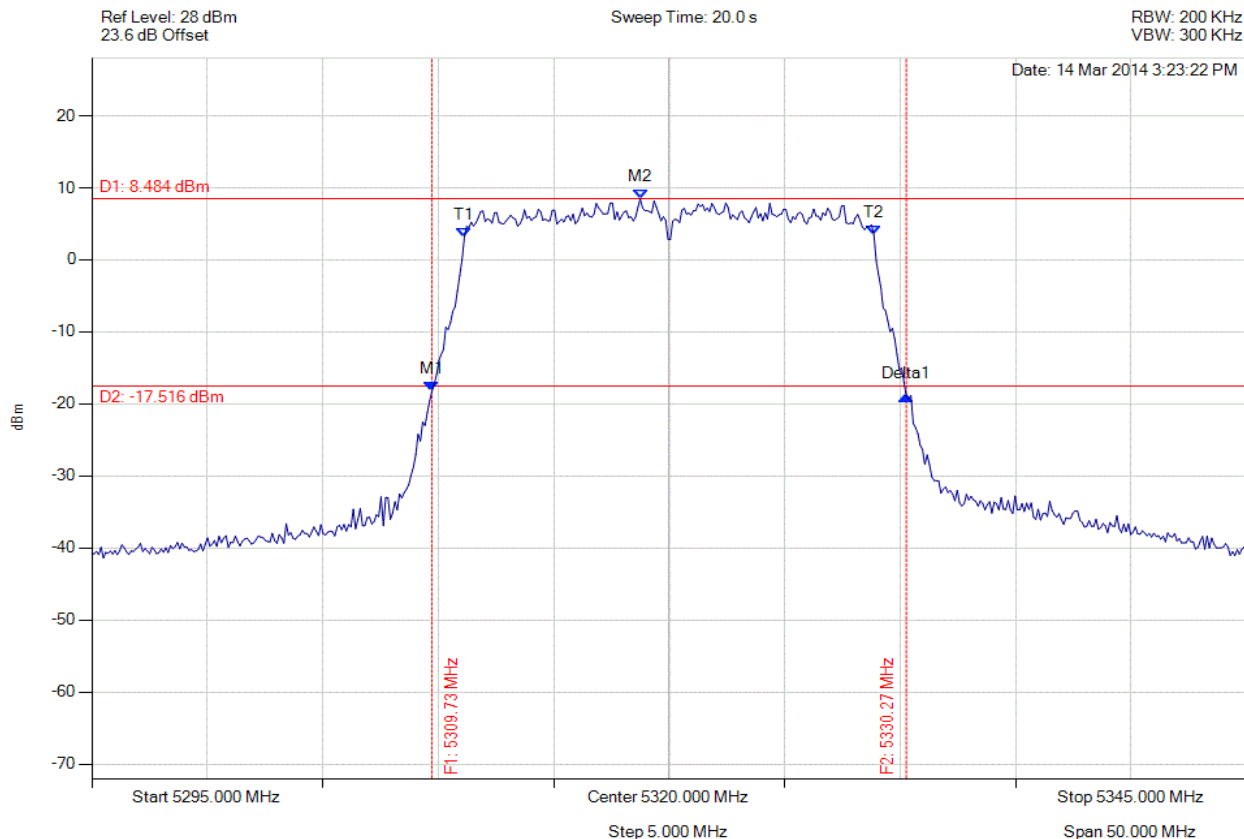


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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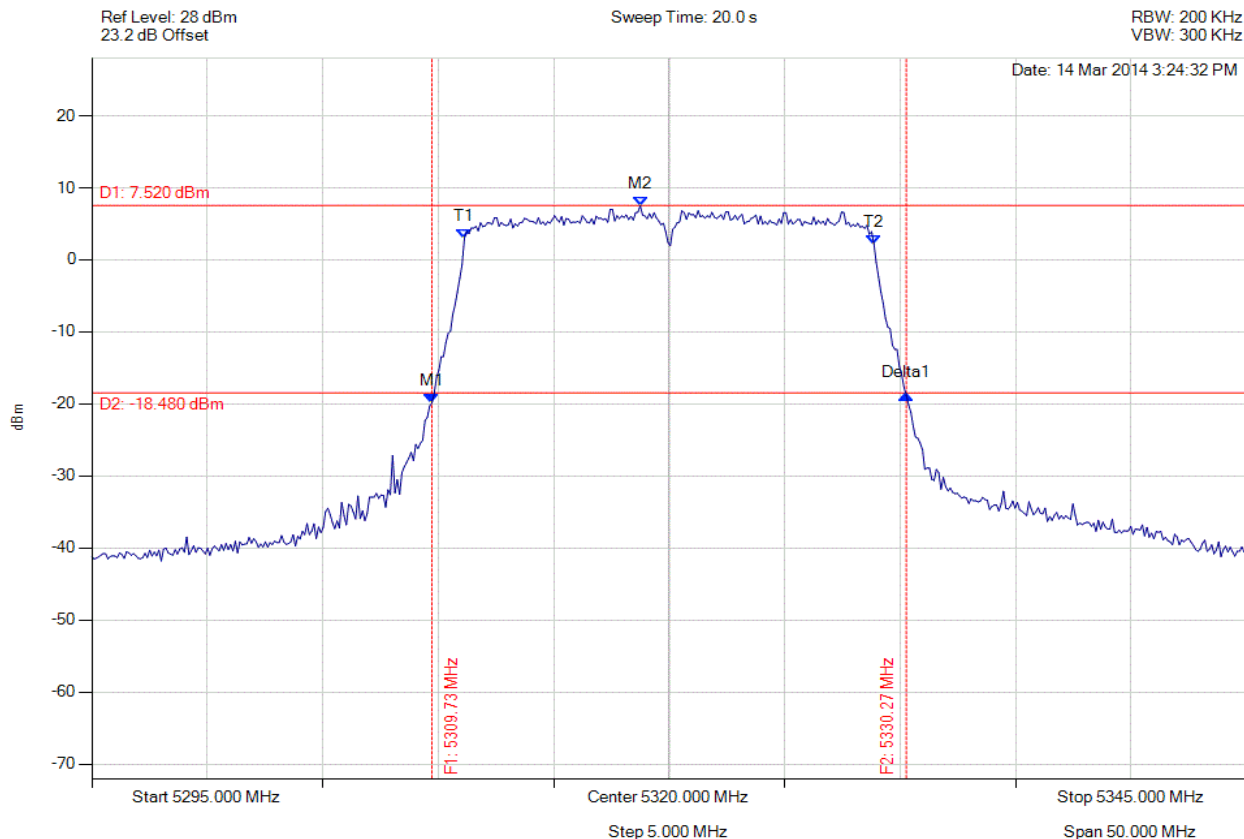


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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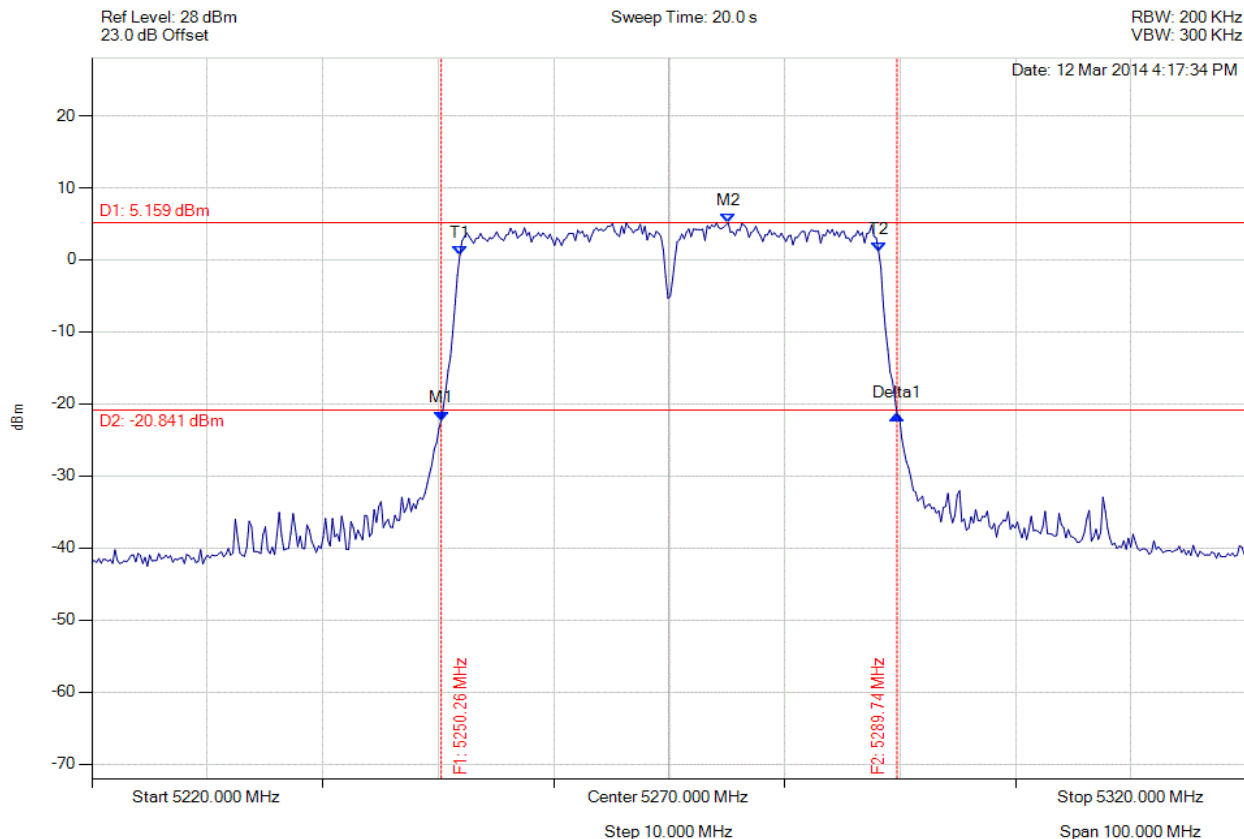


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

Variation: 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 |

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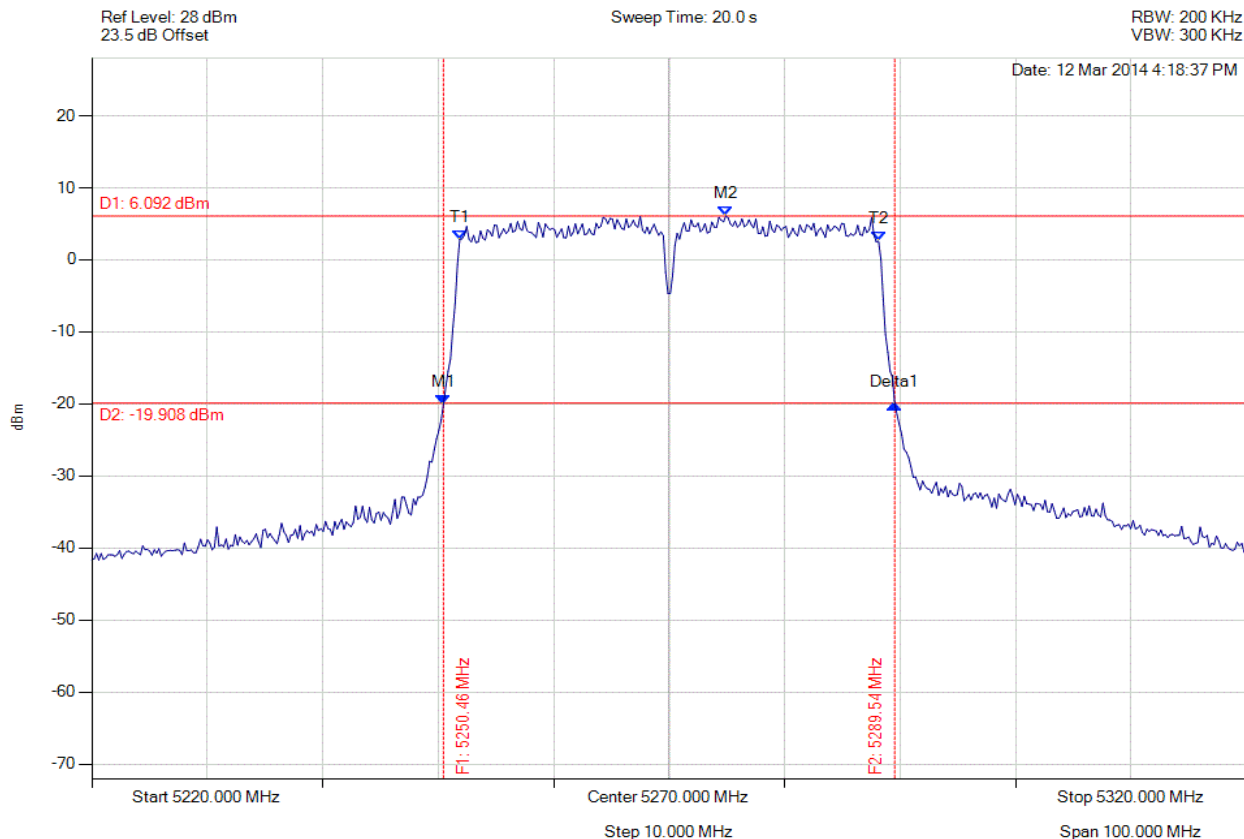


Title: APEX0100, APEX0101 802.11a/b/g/n/ac
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26 dB & 99% BANDWIDTH

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 |

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