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EMC Test Report

Application for FCC Grant of Equipment Authorization
FCC Part 15, Subpart E

Model: RAP-155 (APINR155)

FCC ID:	Q9DAPINR15515P
APPLICANT:	Aruba Networks 1344 Crossman Ave Sunnyvale, CA 94089
TEST SITE(S):	National Technical Systems - Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-4, 2845B-5
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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	May 9, 2016	First release	
1	July 18, 2016	Revised report to clarify duty cycle and remove erroneous plots	David Guidotti Mark Hill
2.0	July 21, 2016	Removed IC standard references. Corrected spurious emissions margin calculation.	David Guidotti Mark Hill

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SCOPE

An electromagnetic emissions test has been performed on the Aruba Networks model RAP-155 (APINR155), pursuant to the following rules:

FCC Part 15, Subpart E requirements for UNII Devices

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in National Technical Systems - Silicon Valley test procedures:

FCC General UNII Test Procedures KDB789033

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer's declaration of conformity, with all other receive-only devices exempt from the technical requirements.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

STATEMENT OF COMPLIANCE

The tested sample of Aruba Networks model RAP-155 (APINR155) complied with the requirements of the following regulations:

FCC Part 15, Subpart E requirements for UNII Devices

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

The test results recorded herein are based on a single type test of Aruba Networks model RAP-155 (APINR155) and therefore apply only to the tested sample. The sample was selected and prepared by Rob Hastings of Aruba Networks.

DEVIATIONS FROM THE STANDARDS

No deviations were made from the published requirements listed in the scope of this report.

TEST RESULTS SUMMARY

UNII / LELAN DEVICES

OPERATION IN THE 5.15 – 5.25 GHZ BAND – ACCESS POINTS

FCC Rule Part		Description	Measured Value / Comments	Limit / Requirement	Result
15.407 (a) (1) (ii)		Output Power	a: 24.3 dBm (267.8 mW) n20: 24.3 dBm (266.4 mW) n40: 22.6 dBm (183.9 mW) (Max eirp: 0.534 W)	30 dBm EIRP <= 4W	Complies
15.407 (a) (1) (i), (ii) or (iii)		Power Spectral Density	a: 13.2 dBm/MHz n20: 13.0 dBm/MHz n40: 8.5 dBm/MHz	17 dBm/MHz	Complies
15.407 (a) (1) (i)		EIRP 30° Above Horizon	N/A – not designed for outdoor use		
15.407(b) (1) / 15.209		Spurious Emissions	73.9 dBµV/m @ 5149.3 MHz (-0.1 dB)	Refer to the limits section (p20) for restricted bands, all others -27 dBm/MHz EIRP	Complies

OPERATION IN THE 5.725 – 5.85 GHZ BAND

FCC Rule Part		Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(e)		6dB Bandwidth	16.3MHz min	<= 500 kHz	Complies
15.407(a) (3)		Output Power (multipoint systems)	a: 22.6 dBm (183.7 mW) n20: 22.3 dBm (170.0 mW) n40: 20.9 dBm (122.7 mW) (Max eirp: 0.367 W)	30 dBm (1 W) EIRP <= 4W	Complies
15.407(a) (3)		Power Spectral Density	a: 11.6 dBm/MHz n20: 11.1 dBm/MHz n40: 6.7 dBm/MHz	30 dBm / 500 kHz	Complies
15.407(b) (4) / 15.209		Spurious Emissions	78.2 dBµV/m @ 5724.1 MHz (-0.1 dB)	Refer to the limits section (p20) for restricted bands, all others -17 dBm/MHz EIRP bandedge and -27 dBm/MHz EIRP	Complies

REQUIREMENTS FOR ALL U-NII/LELAN BANDS

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407		Modulation	Unchanged from original filing		
15.31 (m)		Channel Selection			
15.407 (c)		Operation in the absence of information to transmit			
15.407 (g)		Frequency Stability			
15.407 (h1)		Transmit Power Control			
15.407 (h2)		Dynamic frequency Selection (device with radar detection)	Refer to separate test report, reference R101405	Threshold -62dBm (-64dBm if eirp > 200mW) Channel Availability Check > 60s Channel closing transmission time < 260ms Channel move time < 10s Non occupancy period > 30minutes	Complies

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203		RF Connector	Unchanged from original filing		
15.407 (b) (6)		AC Conducted Emissions	36.9 dBµV @ 0.632 MHz (-9.1 dB)	Refer to page 19	Complies
15.247 (i) 15.407 (f)		RF Exposure Requirements	Refer to MPE calculations in separate exhibit	Refer to OET 65, FCC Part 1 and RSS 102	Complies

MEASUREMENT UNCERTAINTIES

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with UKAS document LAB 34.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF power, conducted (power meter)	dBm	25 to 7000 MHz	± 0.52 dB
RF power, conducted (Spectrum analyzer)	dBm	25 to 7000 MHz	± 0.7 dB
Conducted emission of transmitter	dBm	25 to 26500 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 26500 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 26500 MHz	± 2.5 dB
Radiated emission (field strength)	dBµV/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dBµV	0.15 to 30 MHz	± 2.4 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Aruba Networks model RAP-155 (APINR155) is a dual 802.11abgn radio access point. Since the EUT would be placed on a tabletop during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 100-240 Volts, 50-60 Hz, 1.0 Amps.

The sample was received on March 8, 2016 and tested on March 8, 9, 25, 28, 29 and 30, 2016. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Aruba Networks	APINR155	Access Point	CC0001614	Q9DAPINR155155P
Sunnt	SYS1357-2412	AC Adapter	None	-

OTHER EUT DETAILS

The following EUT details should be noted:
5GHz radio - 3x3
2.4GHz - 2x2
Simultaneous transmission supported (not assessed in the original application)

ANTENNA SYSTEM

Integral, Omni Directional, 3dBi gain.

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 18.5 cm wide by 3.0 cm deep by 23 cm high.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at NTS Silicon Valley.

SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
Dell	Latitude E5440	Laptop	8ZQNP12	-
Netgear	-	Ethernet Switch	-	-

EUT INTERFACE PORTS

The I/O cabling configuration during testing was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Ethernet Port 0	Laptop	CAT5	Unshielded	10
Ethernet Ports 1-4	Remote Switch	CAT5 (x4)	Unshielded	10
DC power in	AC/DC Adapter	2wire	Unshielded	1.5
Serial/USB	Laptop	multiwire	Unshielded	1.5

EUT OPERATION

During testing, the EUT was configured for continuous transmission on the noted channel. Power was set to the maximum target power at the worse case data rate for the mode.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission and with industry Canada.

Site	Designation / Registration Numbers		Location
	FCC	Canada	
Chamber 3	US0027	2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 4	US0027	2845B-4	

ANSI C63.4 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.10. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

INSTRUMENT CONTROL COMPUTER

Software is used to view and convert receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers. The software used for radiated and conducted emissions measurements is NTS EMI Test Software (rev 2.10)

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.10 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor as specified in ANSI C63.4. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.10, and the worst-case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

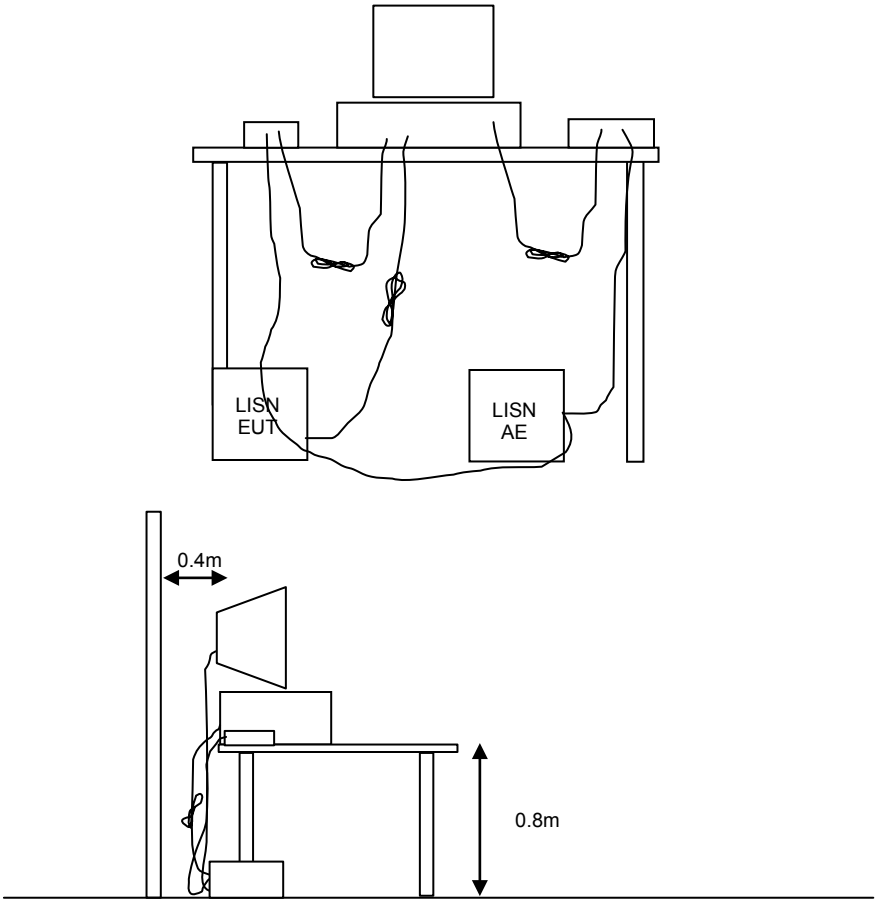


Figure 1 Typical Conducted Emissions Test Configuration

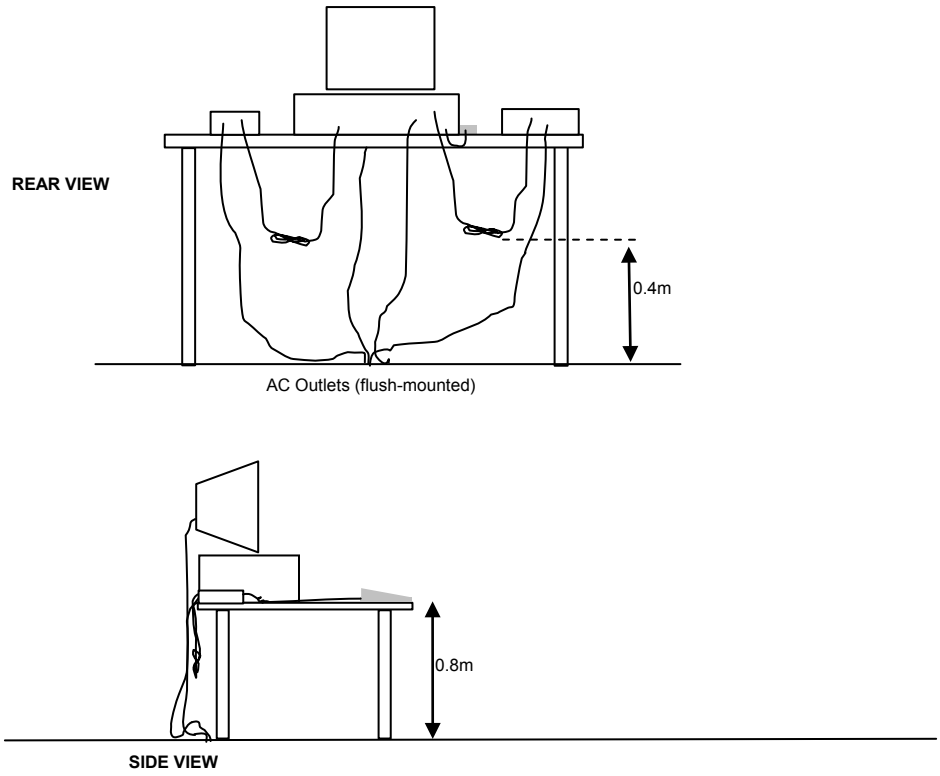
RADIATED EMISSIONS

A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). During the preliminary scans, the EUT is rotated through 360˚, the antenna height is varied (for measurements above 30 MHz) and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

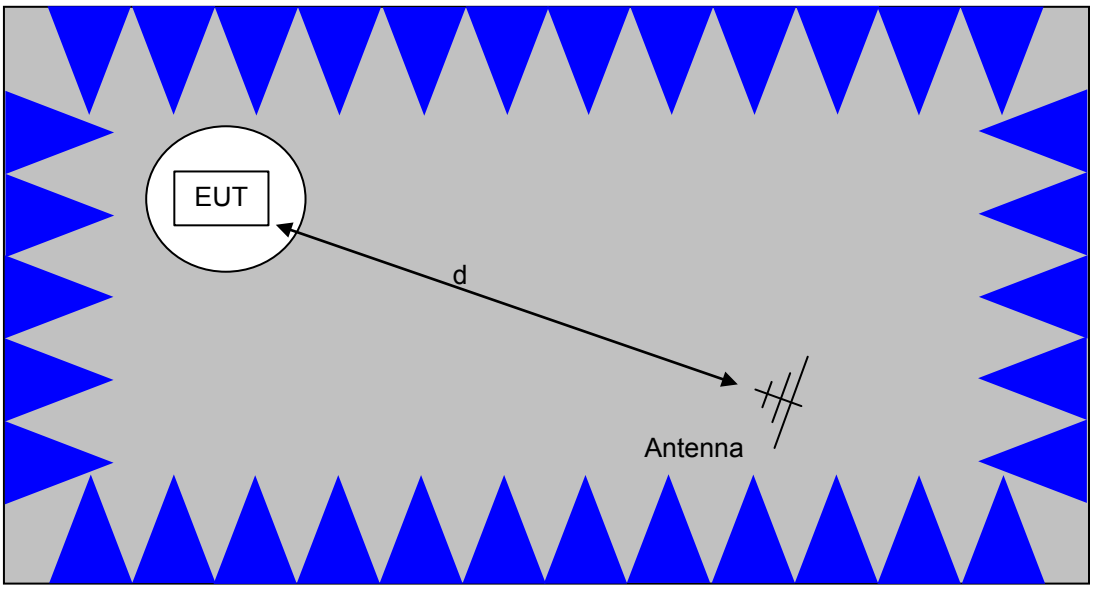
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1m). The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain.

When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.

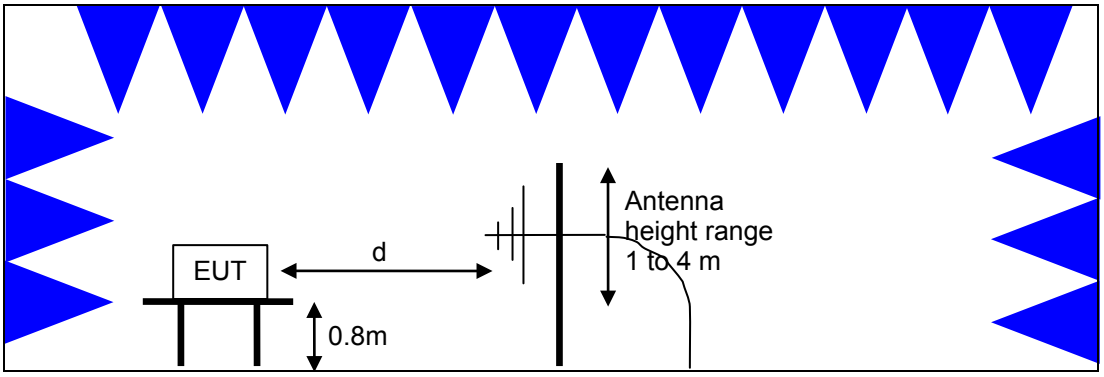


Typical Test Configuration for Radiated Field Strength Measurements



The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of CISPR 16 / CISPR 22 / ANSI C63.4 for an alternate test site at the measurement distances used.

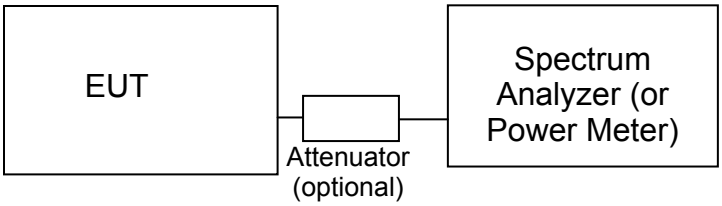
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



Test Configuration for Radiated Field Strength Measurements
Semi-Anechoic Chamber, Plan and Side Views

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements of power, bandwidth and power spectral density are performed, where possible, with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.



Test Configuration for Antenna Port Measurements

Measurement bandwidths (video and resolution) are set in accordance with the relevant standards and NTS Silicon Valley's test procedures for the type of radio being tested. When power measurements are made using a resolution bandwidth less than the signal bandwidth the power is calculated by summing the power across the signal bandwidth using either the analyzer channel power function or by capturing the trace data and calculating the power using software. In both cases the summed power is corrected to account for the equivalent noise bandwidth (ENBW) of the resolution bandwidth used.

If power averaging is used (typically for certain digital modulation techniques), the EUT is configured to transmit continuously. Power averaging is performed using either the built-in function of the analyzer or, if the analyzer does not feature power averaging, using external software. In both cases the average power is calculated over a number of sweeps (typically 100). When the EUT cannot be configured to continuously transmit then either the analyzer is configured to perform a gated sweep to ensure that the power is averaged over periods that the device is transmitting or power averaging is disabled and a max-hold feature is used.

If a power meter is used to make output power measurements the sensor head type (peak or average) is stated in the test data table.

BANDWIDTH MEASUREMENTS

The 6dB, 20dB, 26dB and/or 99% signal bandwidth are measured using the bandwidths recommended by ANSI C63.10 and RSS GEN.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(a), RSS GEN

The table below shows the limits for the emissions on the AC power line from an intentional radiator and a receiver.

Frequency (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands[1].

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{KHz}$ @ 300m	$67.6-20*\log_{10}(F_{KHz})$ @ 300m
0.490-1.705	$24000/F_{KHz}$ @ 30m	$87.6-20*\log_{10}(F_{KHz})$ @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

[1] The restricted bands are detailed in FCC 15.205 and RSS-Gen Table 6

FCC 15.407 (a) OUTPUT POWER LIMITS

The table below shows the limits for output power and output power density. For the 5250-5350 and 5470-5725 MHz bands, where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 – 5250	1Watt (30 dBm)	17 dBm/MHz
5250 – 5350 and 5470-5725	250 mW (24 dBm)	11 dBm/MHz
5725 – 5825	1 Watt (30 dBm)	30 dBm/500kHz

For system using antennas with gains exceeding 6dBi, the output power and power spectral density limits are reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

SPURIOUS EMISSIONS LIMITS –UNII and LELAN DEVICES

The spurious emissions limits for signals below 1GHz are the FCC/RSS-Gen general limits. For emissions above 1GHz, signals in restricted bands are subject to the FCC/RSS-Gen general limits. All other signals have a limit of –27dBm/MHz, which is field strength of 68.3dBuV/m/MHz at a distance of 3m. For devices operating in the 5725-5850 MHz bands under the LELAN/UNII rules, the limit within 10MHz of the allocated band is increased to –17dBm/MHz.

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_r - S = M$$

where:
R_r = Receiver Reading in dBuV
S = Specification Limit in dBuV
M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor, when used for electric field measurements above 30MHz, is calculated by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:
F_d = Distance Factor in dB
D_m = Measurement Distance in meters
D_s = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40*LOG_{10} (D_m/D_s)$$

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:
R_r = Receiver Reading in dBuV/m
F_d = Distance Factor in dB
R_c = Corrected Reading in dBuV/m
L_s = Specification Limit in dBuV/m
M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of d (meters) from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{d} \quad \text{microvolts per meter}$$

where P is the eirp (Watts)

For a measurement at 3m the conversion from a logarithmic value for field strength (dBuV/m) to an eirp power (dBm) is -95.3dB.

Appendix A Test Equipment Calibration Data

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Radiated Emissions, 1000 - 40,000 MHz, 08-Mar-16					
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	10/12/2015	10/12/2016
Hewlett Packard	High Pass filter, 8.2 GHz	P/N 84300-80039	1156	6/2/2015	6/2/2016
HP / Miteq	SA40 Head (Blue)	TTA1840-45-5P-HG-S	1620	10/21/2015	10/21/2016
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1681	7/13/2015	7/13/2016
A. H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	7/16/2015	7/16/2017
EMCO	Antenna, Horn, 1-18 GHz	3115	2733	11/18/2014	11/18/2016
Hewlett Packard	Spectrum Analyzer (SA40) Blue 9 kHz - 40 GHz	8564E (84125C)	3810	3/1/2016	3/1/2017
Radio Antenna Port (Power and Spurious Emissions), 09-Mar-16					
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	3/31/2015	3/31/2016
Radiated Emissions, Band Edge, 25-Mar-16					
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/27/2014	6/27/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	2/20/2016	2/20/2017
Radiated Emissions, 1000 - 40,000 MHz, 25-Mar-16					
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	1/21/2016	1/21/2017
HP / Miteq	SA40 Head (Red)	TTA1840-45-5P-HG-S	1145	7/17/2015	7/17/2016
Hewlett Packard	Spectrum Analyzer (SA40) Red 30 Hz -40 GHz	8564E (84125C)	1148	10/17/2015	10/17/2016
Hewlett Packard	High Pass filter, 8.2 GHz	P/N 84300-80039	1156	6/2/2015	6/2/2016
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/27/2014	6/27/2016
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	8/28/2014	8/28/2017
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	9/16/2015	9/16/2016
Radiated Emissions, 1,000 - 40,000 MHz, 28-Mar-16					
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	1/21/2016	1/21/2017
HP / Miteq	SA40 Head (Red)	TTA1840-45-5P-HG-S	1145	7/17/2015	7/17/2016
Hewlett Packard	Spectrum Analyzer (SA40) Red 30 Hz -40 GHz	8564E (84125C)	1148	10/17/2015	10/17/2016
Hewlett Packard	High Pass filter, 8.2 GHz	P/N 84300-80039	1156	6/2/2015	6/2/2016
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/27/2014	6/27/2016
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	8/28/2014	8/28/2017
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	9/16/2015	9/16/2016

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	9/16/2015	9/16/2016
Radiated Emissions, 1,000 - 40,000 MHz, 28-Mar-16					
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/13/2015	7/13/2016
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	1/21/2016	1/21/2017
HP / Miteq	SA40 Head (Red)	TTA1840-45-5P-HG-S	1145	7/17/2015	7/17/2016
Hewlett Packard	Spectrum Analyzer (SA40) Red 30 Hz -40 GHz	8564E (84125C)	1148	10/17/2015	10/17/2016
Hewlett Packard	High Pass filter, 8.2 GHz	P/N 84300-80039	1156	6/2/2015	6/2/2016
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/27/2014	6/27/2016
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	8/28/2014	8/28/2017
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	9/16/2015	9/16/2016
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	9/16/2015	9/16/2016
Radiated Emissions, 1000 - 18,000 MHz, 29-Mar-16					
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/26/2014	6/26/2016
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	1/21/2016	1/21/2017
Hewlett Packard	Spectrum Analyzer (SA40) Red 30 Hz -40 GHz	8564E (84125C)	1148	10/17/2015	10/17/2016
Hewlett Packard	High Pass filter, 8.2 GHz	P/N 84300-80039	1156	6/2/2015	6/2/2016
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/13/2015	7/13/2016
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	9/16/2015	9/16/2016
Conducted Emissions - AC Power Ports, 29-Mar-16					
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1398	1/25/2016	1/25/2017
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/20/2015	6/20/2016
Com-Power	9KHz-30MHz, 50uH, 15Aac, 10Adc, max CISPR 15	LI-215A	2671	6/26/2015	6/26/2016
Radio Antenna Port (Power and Spurious Emissions), 29-Mar-16					
Agilent Technologies	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	6/22/2015	6/22/2016
Radiated Emissions, 1000 - 6,000 MHz, 30-Mar-16					
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/27/2014	6/27/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/20/2015	6/20/2016

Appendix B Test Data

T101294 Pages 27 – 111

Client:	Aruba Networks	Job Number:	JD101099
Product	RAP-155	T-Log Number:	T101294
System Configuration:	-	Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Emissions Standard(s):	FCC 15.407	Class:	B
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Aruba Networks

Product

RAP-155

Date of Last Test: 5/4/2016

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Duty Cycle

Date of Test: 3/24/2016
Test Engineer: Mark Hill
Test Location: FT Lab #4

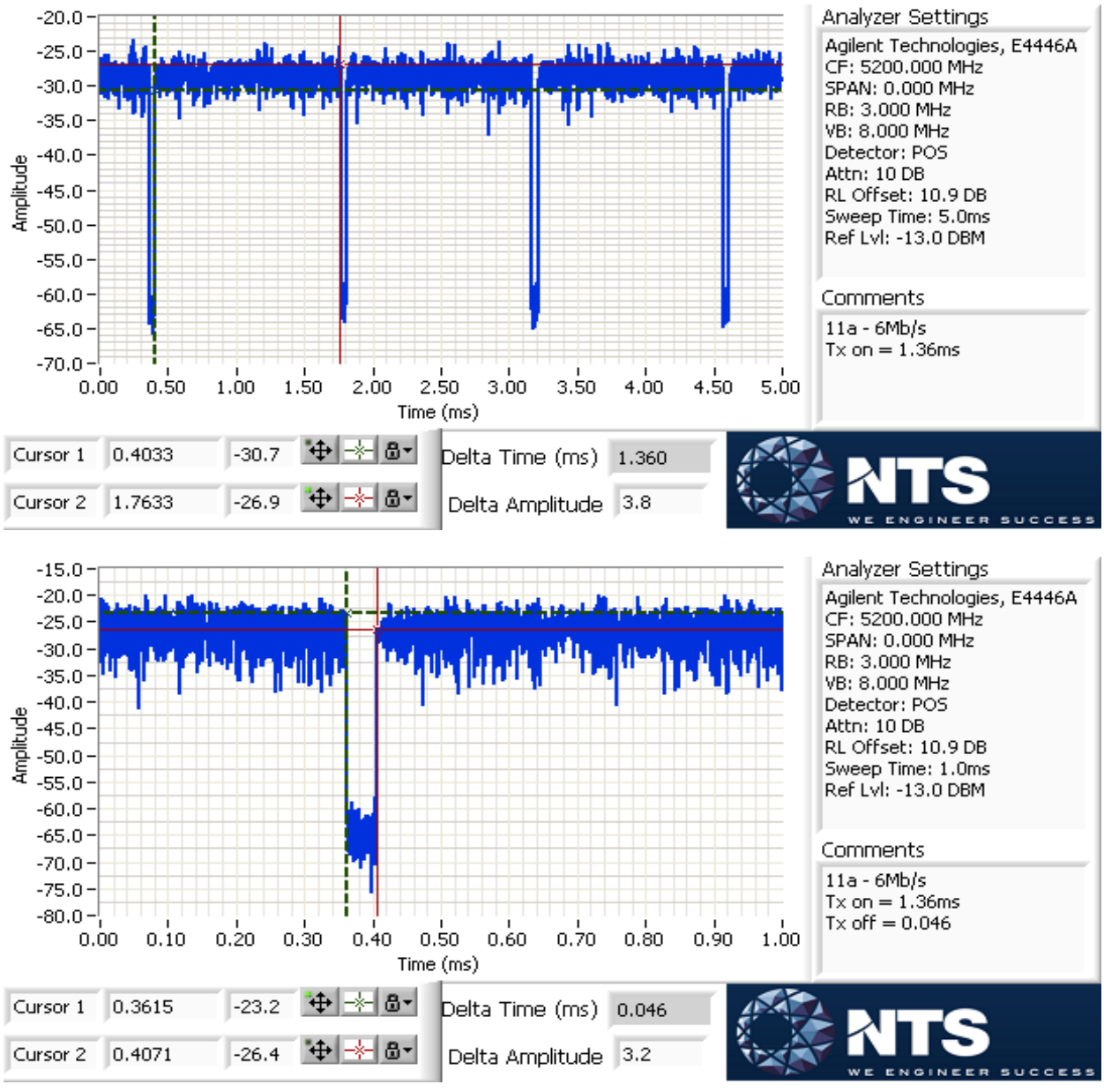
Duty cycle measurements performed on the worse case data rate for power. Worse case data rate taken from original test reports.

Notes: Measurements taken with maximum RBW/VBW settings allowed.

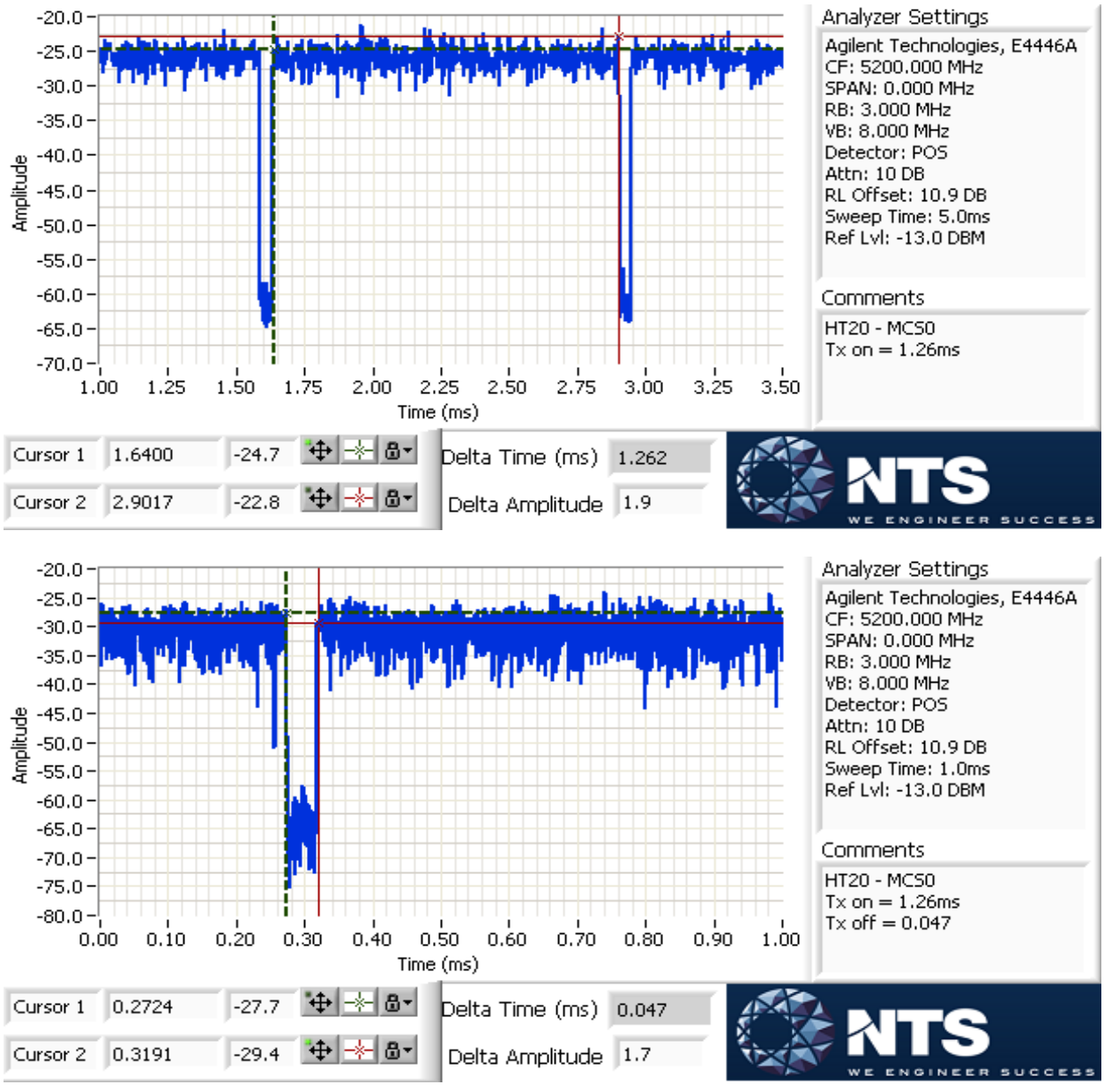
Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbs	0.97	Y	1.36	0.15	0.29	735
HT20	MCS0	0.96	Y	1.26	0.16	0.32	794
HT40	MCS0	0.93	Y	0.624	0.32	0.63	1603

* Correction factor when using RMS/Power averaging - 10*log(1/x)
** Correction factor when using linear voltage average - 20*log(1/x)
T = Minimum transmission duration

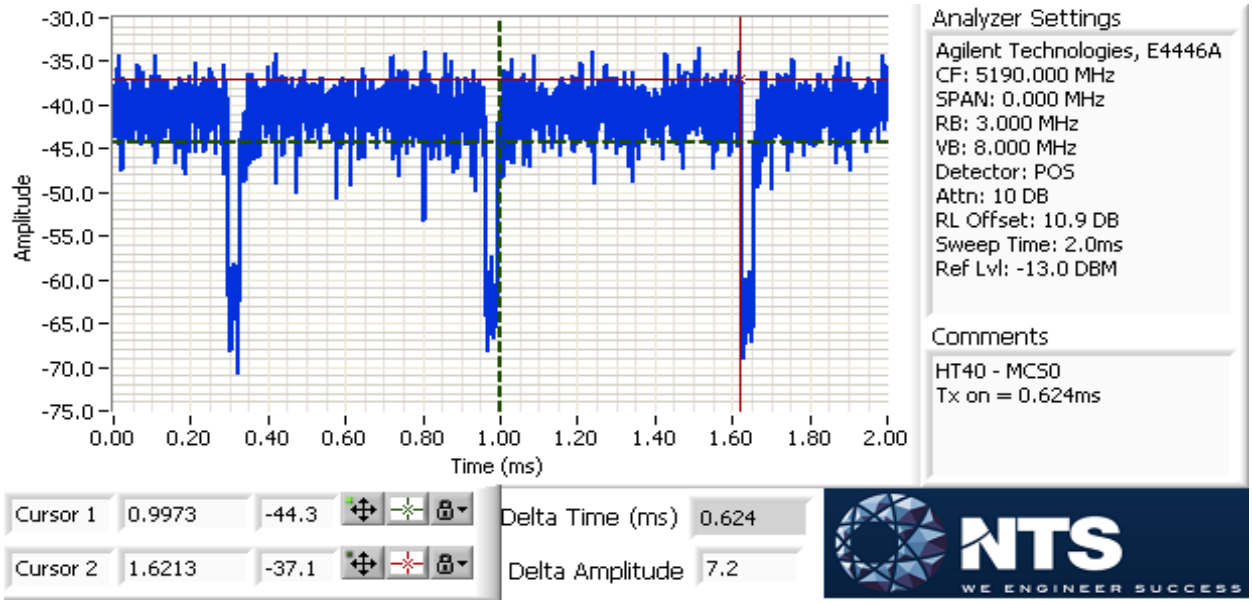
Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

RSS-247 and FCC 15.407 (UNII) Radiated Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 3/25/2016
Test Engineer: Deniz Demirci
Test Location: FT Ch #4

Config. Used: 1
Config Change: None
EUT Voltage: 120 VAC

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 20-22 °C
Rel. Humidity: 32-35 %

Summary of Results

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
20MHz Bandwith Modes							
1-a	a	36 - 5180MHz	18.0	14.0	Restricted Band Edge at 5150 MHz	15.209	73.9 dBµV/m @ 5149.3 MHz (-0.1 dB)
1-b	a	40 - 5200MHz	18.0	18.0	Restricted Band Edge at 5150 MHz	15.209	53.0 dBµV/m @ 5149.1 MHz (-1.0 dB)
4-a	n20	36 - 5180MHz	18.0	14.0	Restricted Band Edge at 5150 MHz	15.209	53.7 dBµV/m @ 5149.4 MHz (-0.3 dB)
4-b	n20	40 - 5200MHz	18.0	18.0	Restricted Band Edge at 5150 MHz	15.209	53.8 dBµV/m @ 5149.1 MHz (-0.2 dB)
40MHz Bandwith Modes							
7-a	n40	38 - 5190MHz	18.0	12.0	Restricted Band Edge at 5150 MHz	15.209	73.6 dBµV/m @ 5149.5 MHz (-0.4 dB)
7-b	n40	46 - 5230MHz	18.0	16.0	Restricted Band Edge at 5150 MHz	15.209	53.2 dBµV/m @ 5147.5 MHz (-0.8 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbs	0.97	Y	1.36	0.15	0.29	735
HT20	MCS0	0.96	Y	1.26	0.16	0.32	794
HT40	MCS0	0.93	Y	0.624	0.32	0.63	1603

Sample Notes

Sample S/N: CC0001614 MAC:000B868F4553
Driver: N/A
Antenna: Integral 3x3

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 2:	Emission has a duty cycle ≥ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces (method AD of KDB 789033)
Note 3:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep,max hold 50*1/DC traces (method VB of KDB 789033)
Note 5:	Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements.

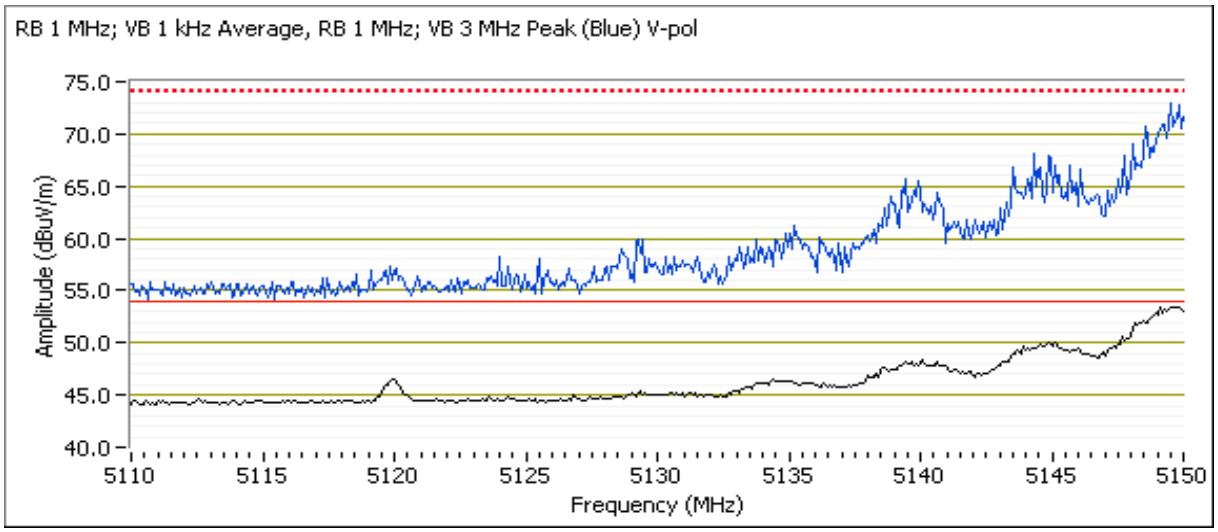
Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #1: Radiated Bandedge Measurements, 5150-5250MHz

Channel: 36 - 5180 MHz
Tx Chain: 3Tx
Mode: a
Data Rate: 6 Mbps

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.330	53.8	V	54.0	-0.2	AVG	46	2.0	Note 3. POS; RB 1 MHz; VB: 1 kHz
5149.340	73.9	V	74.0	-0.1	PK	46	2.0	POS; RB 1 MHz; VB: 3 MHz
5149.500	48.9	H	54.0	-5.1	AVG	197	1.9	Note 3. POS; RB 1 MHz; VB: 1 kHz
5149.640	70.5	H	74.0	-3.5	PK	197	1.9	POS; RB 1 MHz; VB: 3 MHz

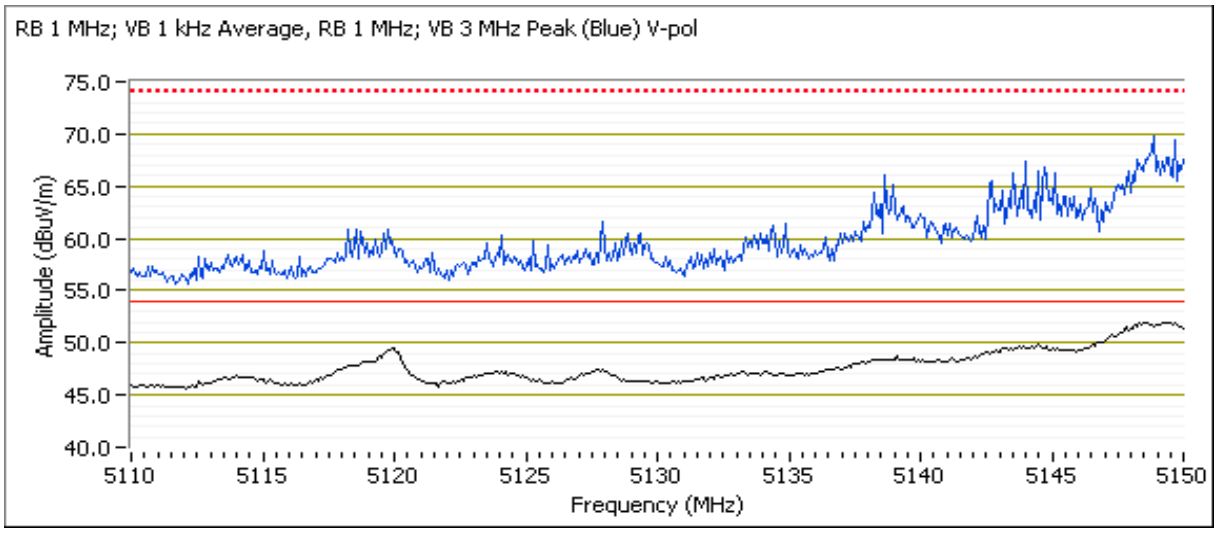


Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Channel: 40 - 5200 MHz
Tx Chain: 3Tx
Mode: a
Data Rate: 6 Mbps

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.120	**53.0**	V	54.0	**-1.0**	AVG	49	2.0	Note 3. POS; RB 1 MHz; VB: 1 kHz
5149.160	70.1	V	74.0	-3.9	PK	49	2.0	POS; RB 1 MHz; VB: 3 MHz
5149.450	52.2	H	54.0	-1.8	AVG	198	1.9	Note 3. POS; RB 1 MHz; VB: 1 kHz
5149.210	67.9	H	74.0	-6.1	PK	198	1.9	POS; RB 1 MHz; VB: 3 MHz



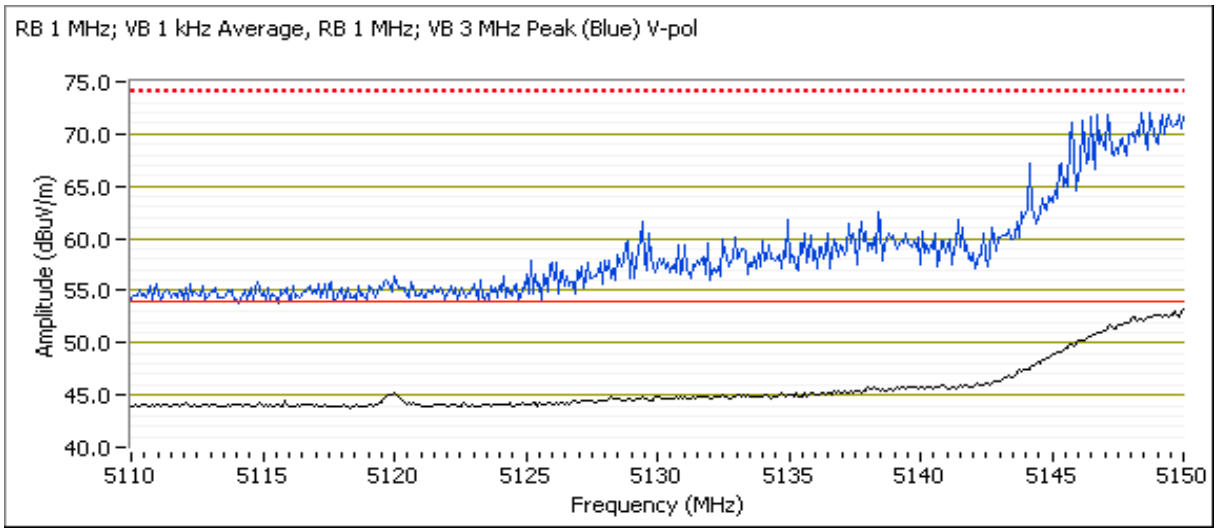
Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #4: Radiated Bandedge Measurements, 5150-5250MHz

Channel: 36 - 5180 MHz
Tx Chain: 3Tx
Mode: n20
Data Rate: MCS0

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.420	53.7	V	54.0	-0.3	AVG	80	1.5	POS; RB 1 MHz; VB: 1 kHz
5149.970	72.5	V	74.0	-1.5	PK	80	1.5	POS; RB 1 MHz; VB: 3 MHz
5149.400	50.1	H	54.0	-3.9	AVG	208	1.6	Note 3. POS; RB 1 MHz; VB: 1 kHz
5149.060	68.7	H	74.0	-5.3	PK	208	1.6	POS; RB 1 MHz; VB: 3 MHz

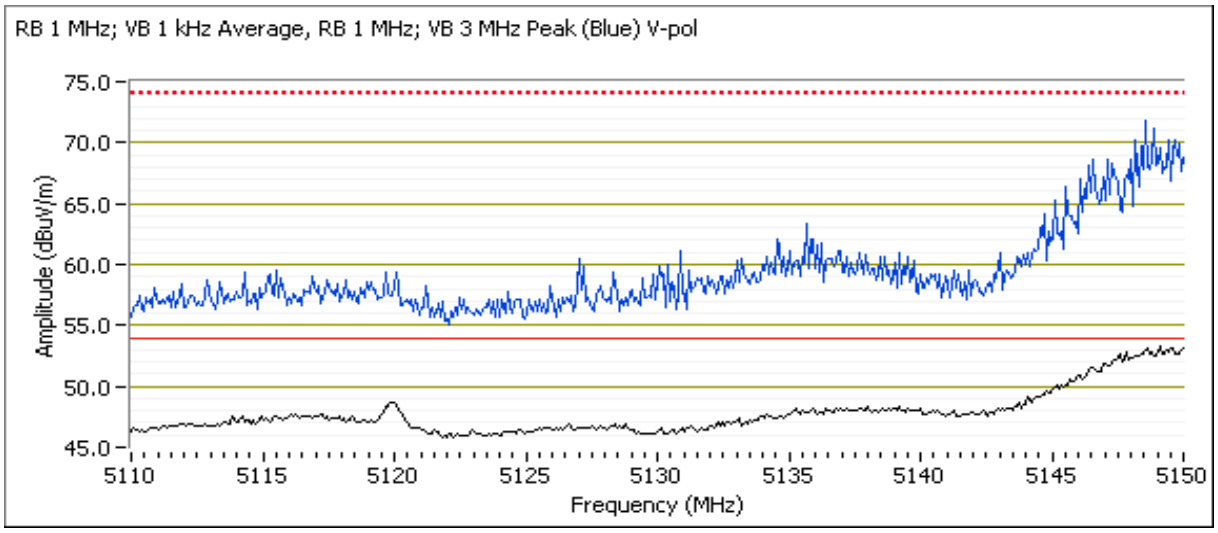


Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Channel: 40 - 5200MHz
Tx Chain: 3Tx
Mode: n20
Data Rate: MCS0

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.090	**53.8**	V	54.0	**-0.2**	AVG	77	2.0	Note 3. POS; RB 1 MHz; VB: 1 kHz
5149.340	72.9	V	74.0	-1.1	PK	77	2.0	POS; RB 1 MHz; VB: 3 MHz
5148.850	51.8	H	54.0	-2.2	AVG	153	1.5	POS; RB 1 MHz; VB: 1 kHz
5148.450	71.0	H	74.0	-3.0	PK	153	1.5	POS; RB 1 MHz; VB: 3 MHz



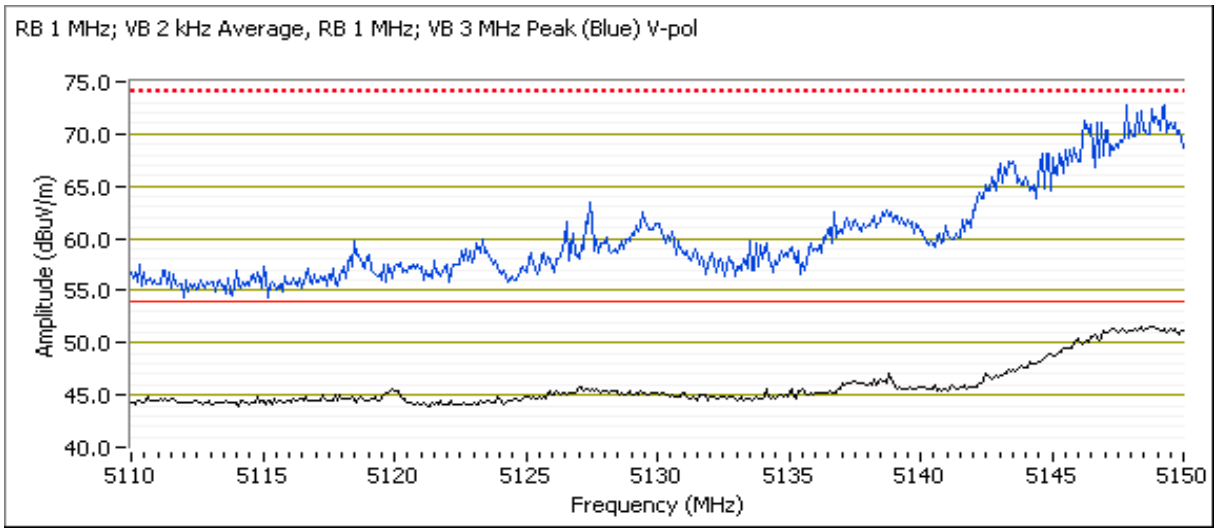
Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #7: Radiated Bandedge Measurements, 5150-5250MHz

Channel: 38 - 5190 MHz
Tx Chain: 3Tx
Mode: n40
Data Rate: MCS0

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.540	**73.6**	V	74.0	**-0.4**	PK	82	1.9	POS; RB 1 MHz; VB: 3 MHz
5148.620	52.4	V	54.0	-1.6	AVG	82	1.9	Note 3. POS; RB 1 MHz; VB: 2 kHz
5149.670	50.6	H	54.0	-3.4	AVG	191	1.8	Note 3. POS; RB 1 MHz; VB: 2 kHz
5148.740	69.6	H	74.0	-4.4	PK	191	1.8	POS; RB 1 MHz; VB: 3 MHz

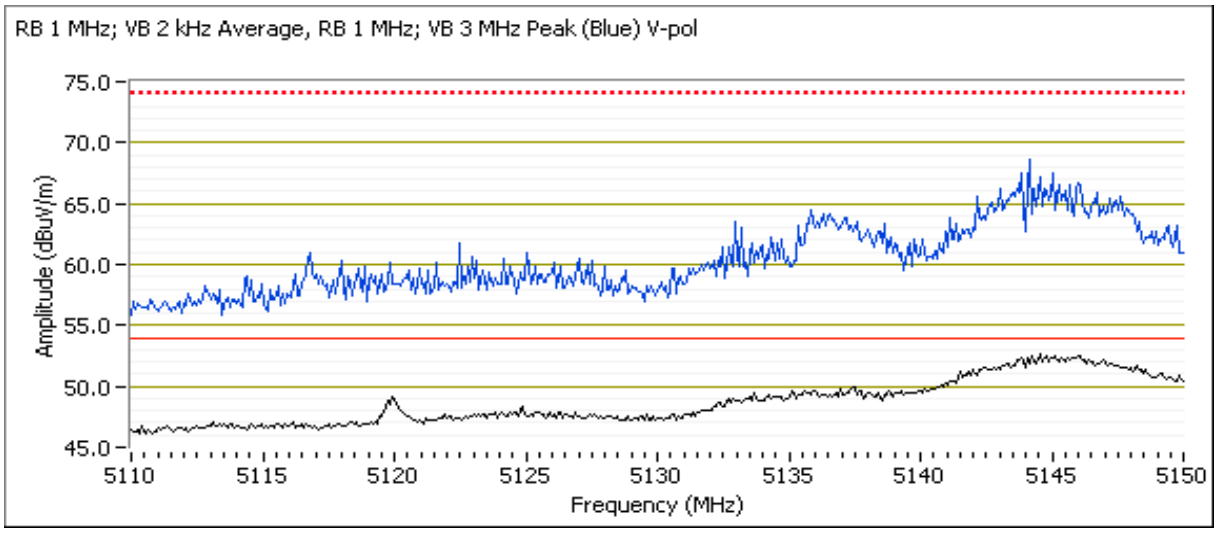


Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Channel: 46 - 5230MHz
Tx Chain: 3Tx
Mode: n40
Data Rate: MCS0

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5147.480	**53.2**	V	54.0	**-0.8**	AVG	44	1.9	POS; RB 1 MHz; VB: 2 kHz
5145.850	68.1	V	74.0	-5.9	PK	44	1.9	POS; RB 1 MHz; VB: 3 MHz
5149.020	51.6	H	54.0	-2.4	AVG	154	1.9	POS; RB 1 MHz; VB: 2 kHz
5149.440	68.3	H	74.0	-5.7	PK	154	1.9	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

RSS-247 and FCC 15.407 (UNII) Radiated Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 20-22 °C
Rel. Humidity: 32-35 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Scans on "center" channel in all OFDM modes to determine the worst case mode.							
1	a	40 - 5200MHz	18	18	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.7 dBµV/m @ 5434.9 MHz (-3.3 dB)
	n20	40 - 5200MHz	18	18	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.6 dBµV/m @ 5440.0 MHz (-1.4 dB)
	n40	38 - 5190MHz	18	18	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.7 dBµV/m @ 5431.1 MHz (-3.3 dB)
Measurements on low and high channels in worst-case OFDM mode.							
2	n20	36 - 5180MHz	18.0	17.5	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.7 dBµV/m @ 5440.0 MHz (-0.3 dB)
	n20	48 - 5240MHz	18.0	16.0	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.6 dBµV/m @ 5439.9 MHz (-0.1 dB)

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold 50 traces. (method VB of KDB 789033)

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbs	0.97	Y	1.36	0.15	0.29	735
HT20	MCS0	0.96	Y	1.26	0.16	0.32	794
HT40	MCS0	0.93	Y	0.624	0.32	0.63	1603

Sample Notes

Sample S/N: CC0001614 MAC:000B868F4553
Driver: N/A
Antenna: Integral 3x3

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 2:	Emission has a duty cycle ≥ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces (method AD of KDB 789033)
Note 3:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep,max hold 50*1/DC traces (method VB of KDB 789033)

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #1, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5150-5250 MHz Band

Date of Test: 3/25/2016 Config. Used: 1

Test Engineer: Rafael Varelas Config Change: None

Test Location: FT Ch #4 EUT Voltage: 120 VAC

Run #1a: Center Channel

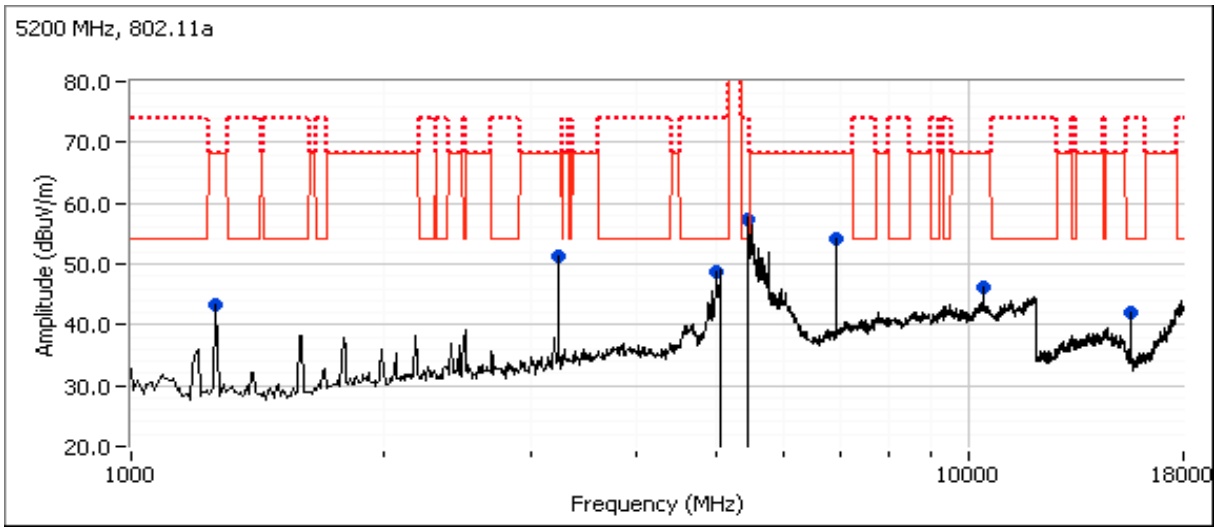
Channel: 40 Mode: a

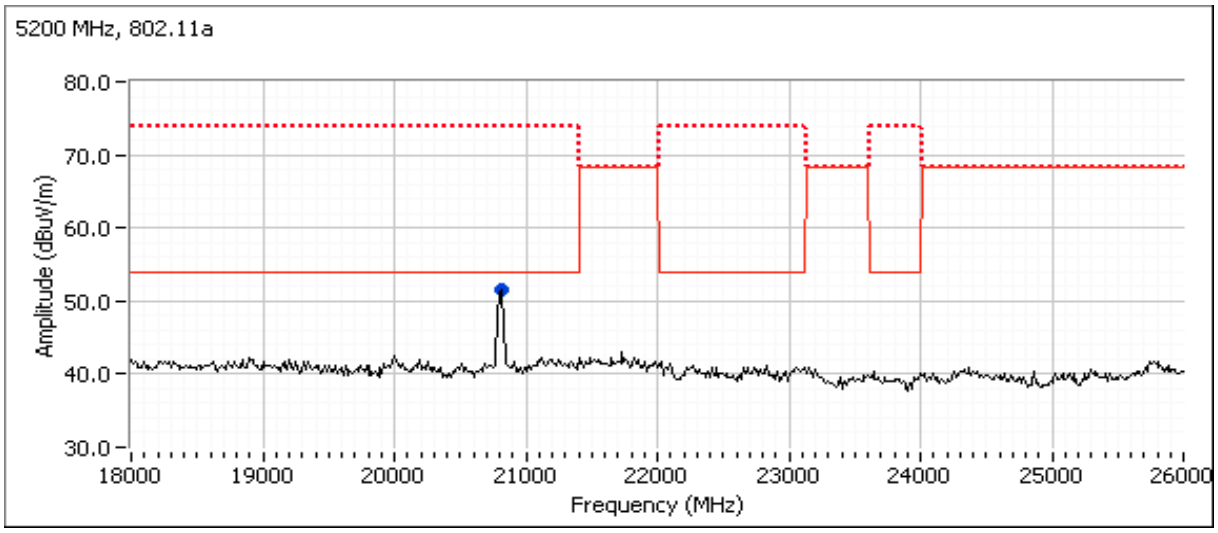
Tx Chain: 3Tx Data Rate: 6Mbs

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5434.890	50.7	V	54.0	**-3.3**	Avg	41	1.9	Note 3. POS; RB 1 MHz; VB: 1 kHz
5435.460	69.0	V	74.0	-5.0	PK	41	1.9	POS; RB 1 MHz; VB: 3 MHz
6933.080	56.2	V	68.3	-12.1	PK	40	1.3	RB 1 MHz;VB 3 MHz;Peak
4999.930	44.3	V	54.0	-9.7	Avg	59	1.9	Note 3. POS; RB 1 MHz; VB: 1 kHz
4996.540	57.3	V	74.0	-16.7	PK	59	1.9	RB 1 MHz;VB 3 MHz;Peak
1262.870	50.1	V	68.3	-18.2	PK	102	1.0	RB 1 MHz;VB 3 MHz;Peak
3233.840	42.4	V	68.3	-25.9	PK	206	1.8	RB 1 MHz;VB 3 MHz;Peak
10396.690	53.8	V	68.3	-14.5	PK	344	1.0	RB 1 MHz;VB 3 MHz;Peak
15590.000	42.1	V	54.0	-11.9	Peak	332	2.0	
20800.680	47.7	V	54.0	-6.3	Avg	356	2.2	Note 3. POS; RB 1 MHz; VB: 1 kHz
20801.580	61.8	V	74.0	-12.2	PK	356	2.2	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 26 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A





Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

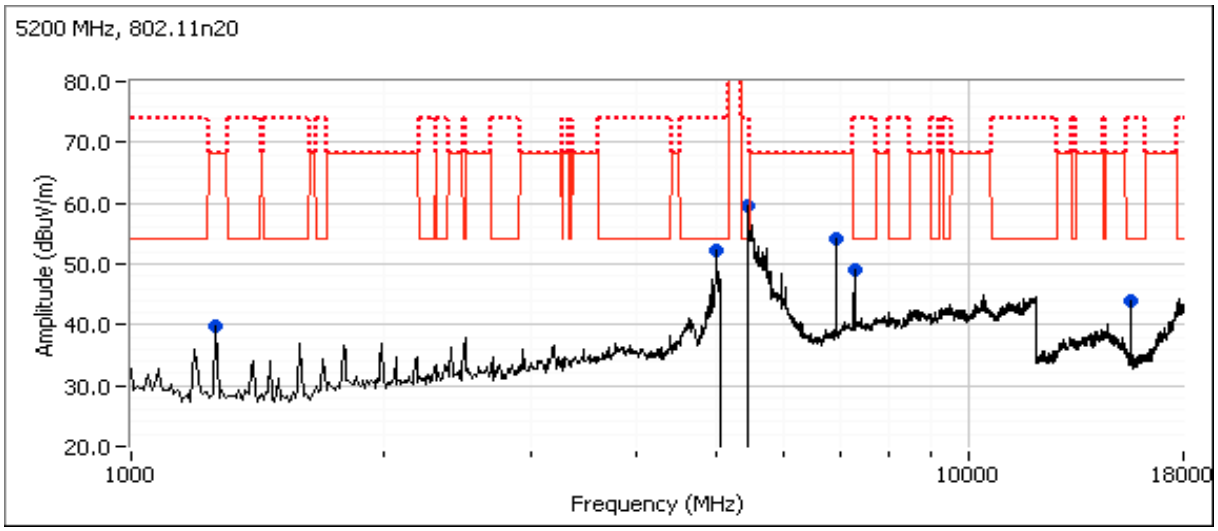
Run #1b: Center Channel

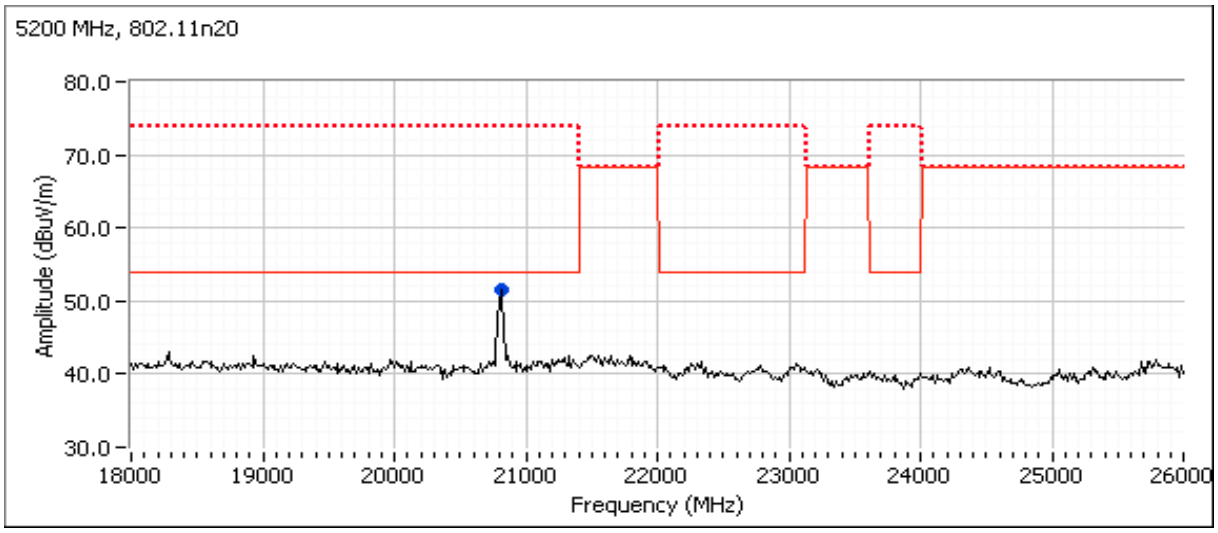
Channel: 40 Mode: 11n20
Tx Chain: 3Tx Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5440.020	52.6	V	54.0	**-1.4**	Avg	77	1.5	Note 3. POS; RB 1 MHz; VB: 1 kHz
5442.080	69.4	V	74.0	-4.6	PK	77	1.5	POS; RB 1 MHz; VB: 3 MHz
7331.370	36.9	V	54.0	-17.1	Avg	213	1.0	Note 3. POS; RB 1 MHz; VB: 1 kHz
7329.060	49.0	V	74.0	-25.0	PK	213	1.0	RB 1 MHz;VB 3 MHz;Peak
1263.610	47.6	V	68.3	-20.7	PK	202	1.0	RB 1 MHz;VB 3 MHz;Peak
5004.610	43.3	V	54.0	-10.7	Avg	72	2.0	Note 3. POS; RB 1 MHz; VB: 1 kHz
5004.150	55.4	V	74.0	-18.6	PK	72	2.0	RB 1 MHz;VB 3 MHz;Peak
6933.430	56.8	V	68.3	-11.5	PK	39	1.9	RB 1 MHz;VB 3 MHz;Peak
15590.000	43.8	V	54.0	-10.2	Peak	340	2.0	
20803.470	48.2	V	54.0	-5.8	Avg	354	2.1	Note 3. POS; RB 1 MHz; VB: 1 kHz
20803.920	63.3	V	74.0	-10.7	PK	354	2.1	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 26 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A





Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

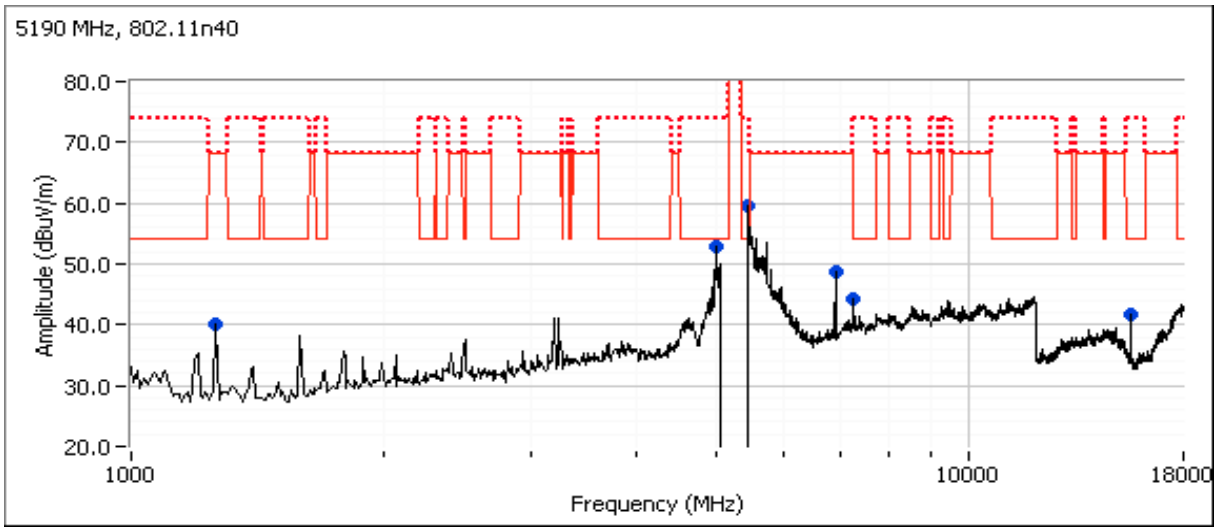
Run #1c: Center Channel

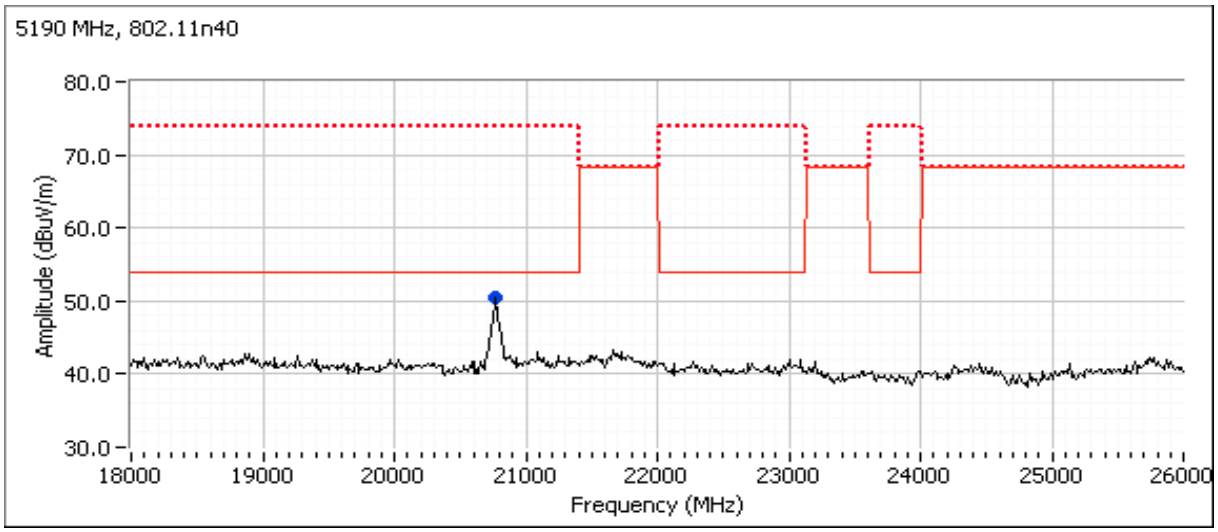
Channel: 38 Mode: 11n40
Tx Chain: 3Tx Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5431.130	50.7	V	54.0	**-3.3**	Avg	41	1.9	Note 3. POS; RB 1 MHz; VB: 1 kHz
5431.350	62.2	V	74.0	-11.8	PK	41	1.9	POS; RB 1 MHz; VB: 3 MHz
4997.000	43.6	V	54.0	-10.4	Avg	83	1.7	Note 3. POS; RB 1 MHz; VB: 1 kHz
4997.370	58.8	V	74.0	-15.2	PK	83	1.7	RB 1 MHz;VB 3 MHz;Peak
6919.960	55.7	V	68.3	-12.6	PK	55	1.1	RB 1 MHz;VB 3 MHz;Peak
7270.670	37.4	V	54.0	-16.6	Avg	130	2.0	Note 3. POS; RB 1 MHz; VB: 1 kHz
7280.040	49.1	V	74.0	-24.9	PK	130	2.0	RB 1 MHz;VB 3 MHz;Peak
1265.110	47.1	V	68.3	-21.2	PK	132	1.9	RB 1 MHz;VB 3 MHz;Peak
15570.000	41.6	V	54.0	-12.4	Peak	342	2.0	
20762.610	47.5	V	54.0	-6.5	Avg	348	1.1	Note 3. POS; RB 1 MHz; VB: 1 kHz
20763.290	62.1	V	74.0	-11.9	PK	348	1.1	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 26 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A





Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #2: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: Worse case from Run #1

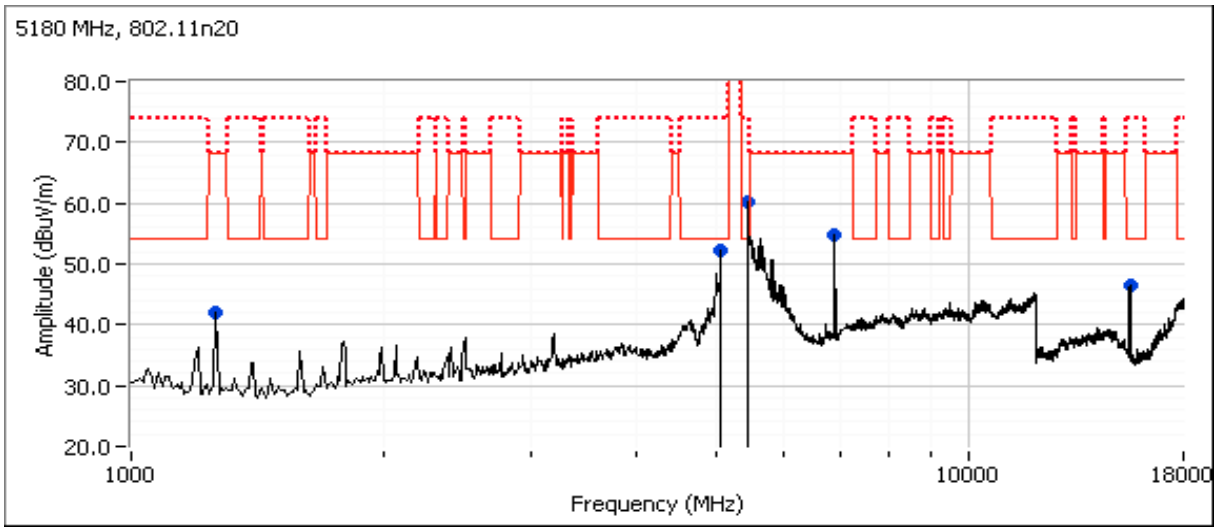
Date of Test: 3/28/2016 Config. Used: 1
Test Engineer: Deniz Demirci Config Change: None
Test Location: FT Ch #5 EUT Voltage: 120 VAC

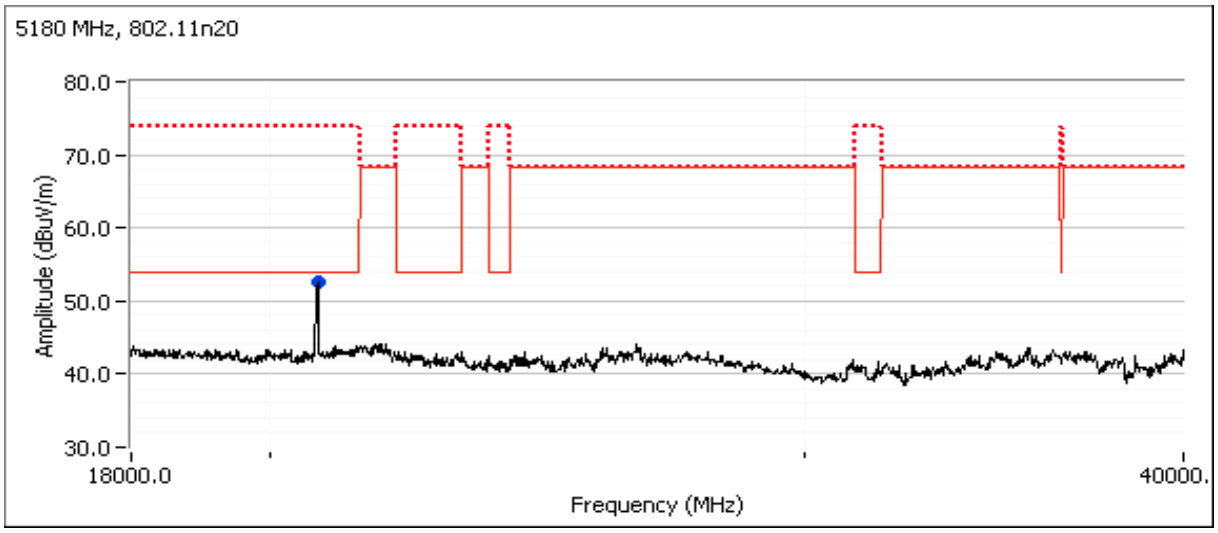
Run #2a: Low Channel

Channel: 36 Mode: 11n20
Tx Chain: 3Tx Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1261.320	34.8	V	54.0	-19.2	AVG	104	2.5	Note 3. RB 1 MHz;VB 1 kHz;Peak
1263.670	50.3	V	68.3	-18.0	PK	104	2.5	RB 1 MHz;VB 3 MHz;Peak
5040.010	46.7	V	54.0	-7.3	AVG	75	1.7	Note 3. RB 1 MHz;VB 1 kHz;Peak
5040.320	58.5	V	74.0	-15.5	PK	75	1.7	RB 1 MHz;VB 3 MHz;Peak
5440.030	53.7	V	54.0	**-0.3**	AVG	220	1.7	Note 3. POS; RB 1 MHz; VB: 1 kHz
5440.140	64.4	V	74.0	-9.6	PK	220	1.7	POS; RB 1 MHz; VB: 3 MHz
6906.620	58.5	V	68.3	-9.8	PK	37	1.2	RB 1 MHz;VB 3 MHz;Peak
15537.100	50.2	V	54.0	-3.8	AVG	25	1.9	Note 3. RB 1 MHz;VB 1 kHz;Peak
15537.900	66.2	V	74.0	-7.8	PK	25	1.9	RB 1 MHz;VB 3 MHz;Peak
20723.820	49.0	V	54.0	-5.0	AVG	12	1.7	Note 3. RB 1 MHz;VB 1 kHz;Peak
20722.830	63.5	V	74.0	-10.5	PK	12	1.7	RB 1 MHz;VB 3 MHz;Peak

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A





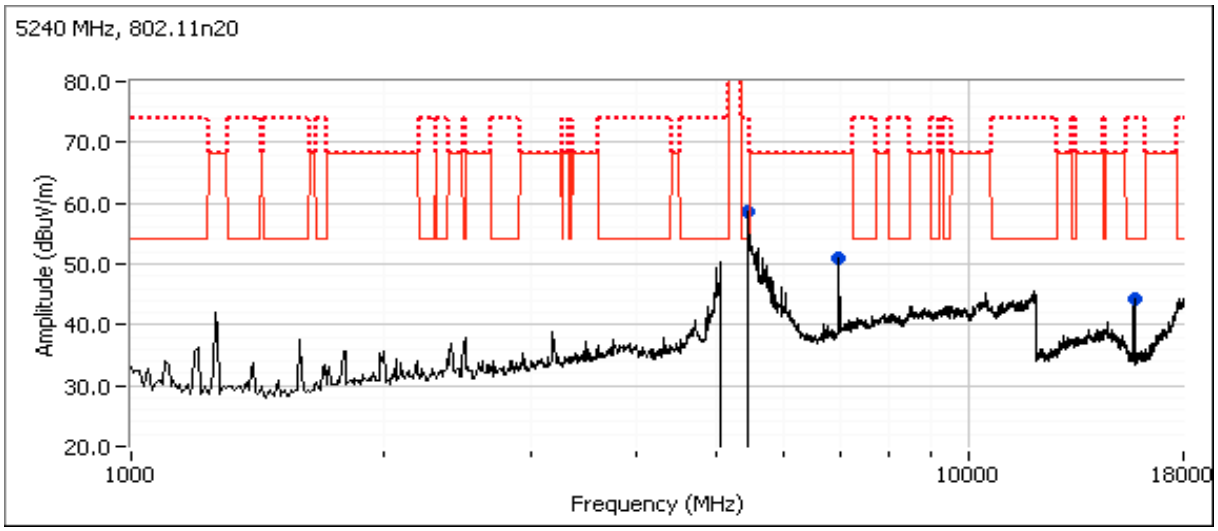
Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

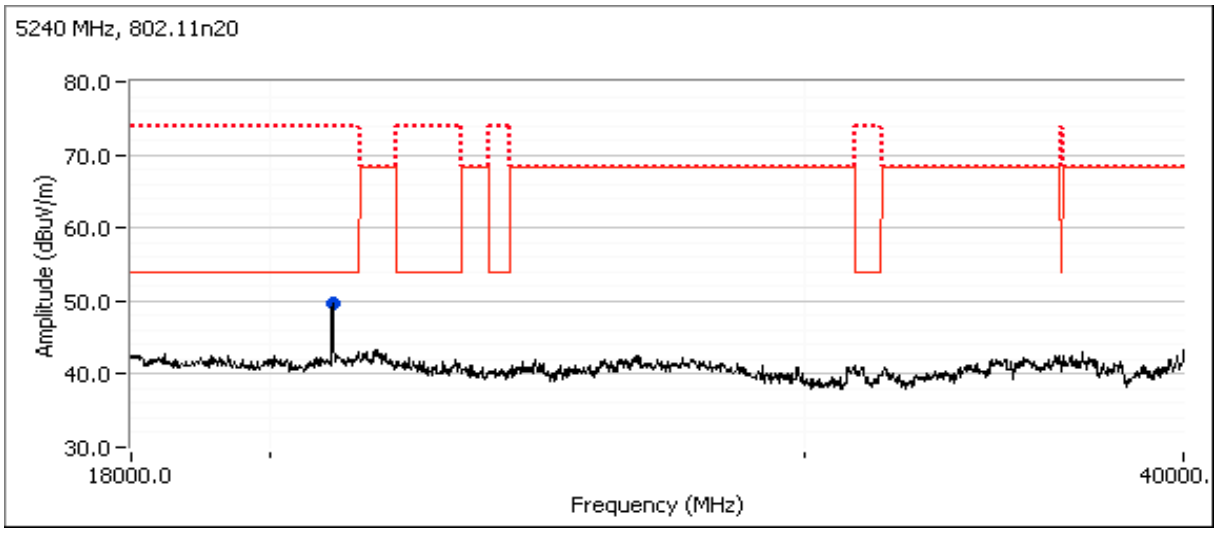
Run #2b: High Channel

Channel: 48 Mode: 11n20
Tx Chain: 3Tx Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5439.910	62.2	H	74.0	-11.8	PK	150	1.8	POS; RB 1 MHz; VB: 3 MHz
5439.870	53.9	H	54.0	**-0.1**	AVG	150	1.8	Note 3. POS; RB 1 MHz; VB: 1 kHz
6986.380	55.2	V	68.3	-13.1	PK	28	2.0	RB 1 MHz;VB 3 MHz;Peak
15721.470	49.4	V	54.0	-4.6	AVG	23	2.0	Note 3. RB 1 MHz;VB 1 kHz;Peak
15720.580	65.5	V	74.0	-8.5	PK	23	2.0	RB 1 MHz;VB 3 MHz;Peak
20966.170	48.0	V	54.0	-6.0	AVG	303	1.5	Note 3. RB 1 MHz;VB 1 kHz;Peak
20966.810	65.7	V	74.0	-8.3	PK	303	1.5	RB 1 MHz;VB 3 MHz;Peak

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A





Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

RSS-247 and FCC 15.407 (UNII) Radiated Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 3/25/2016
Test Engineer: Deniz Demirci / R. Varelas
Test Location: FT Ch #4

Config. Used: 1
Config Change: None
EUT Voltage: 120 VAC

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 20-22 °C
Rel. Humidity: 32-35 %

Summary of Results

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
20MHz Bandwith Modes							
1	a	149 - 5745MHz	18.0	13.5	Band Edge 5715 MHz	15E	71.2 dBµV/m @ 5713.3 MHz (-2.8 dB)
	a				Band Edge 5715 - 5725 MHz		77.6 dBµV/m @ 5724.2 MHz (-0.7 dB)
	a	153 - 5765MHz	18.0	18.0	Band Edge 5715 MHz		64.4 dBµV/m @ 5714.8 MHz (-3.9 dB)
	a				Band Edge 5715 - 5725 MHz		71.8 dBµV/m @ 5724.4 MHz (-6.5 dB)
	a	165 - 5825MHz	18.0	15.5	Band Edge 5850 - 5860 MHz		77.7 dBµV/m @ 5852.5 MHz (-0.6 dB)
	a				Band Edge 5860 MHz		69.5 dBµV/m @ 5861.1 MHz (-4.5 dB)
	a	161 - 5805MHz	18.0	18.0	Band Edge 5850 - 5860 MHz		68.7 dBµV/m @ 5855.5 MHz (-9.6 dB)
	a				Band Edge 5860 MHz		66.8 dBµV/m @ 5860.1 MHz (-1.5 dB)

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Summary of Results

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
2	HT20	149 - 5745MHz	18.0	13.5	Band Edge 5715 MHz	15E	70.0 dBµV/m @ 5714.7 MHz (-4.0 dB)
	HT20				Band Edge 5715 - 5725 MHz		78.2 dBµV/m @ 5724.1 MHz (-0.1 dB)
	HT20	153 - 5765MHz	18.0	18.0	Band Edge 5715 MHz		68.0 dBµV/m @ 5713.4 MHz (-0.3 dB)
	HT20				Band Edge 5715 - 5725 MHz		73.2 dBµV/m @ 5724.5 MHz (-5.1 dB)
	HT20	165 - 5825MHz	18.0	14.5	Band Edge 5850 - 5860 MHz		77.8 dBµV/m @ 5850.5 MHz (-0.5 dB)
	HT20				Band Edge 5860 MHz		70.0 dBµV/m @ 5862.4 MHz (-4.0 dB)
	HT20	161 - 5805MHz	18.0	18.0	Band Edge 5850 - 5860 MHz		71.4 dBµV/m @ 5850.2 MHz (-6.9 dB)
	HT20				Band Edge 5860 MHz		65.7 dBµV/m @ 5867.0 MHz (-2.6 dB)
40MHz Bandwith Mode							
3	HT40	151 - 5755MHz	18.0	12.5	Band Edge 5715 MHz	15E	73.6 dBµV/m @ 5714.6 MHz (-0.4 dB)
	HT40				Band Edge 5715 - 5725 MHz	15E	78.2 dBµV/m @ 5724.9 MHz (-0.1 dB)
	HT40	159- 5795MHz	18.0	16.0	Band Edge 5850 - 5860 MHz	15E	71.9 dBµV/m @ 5850.4 MHz (-6.4 dB)
	HT40				Band Edge 5860 MHz	15E	53.0 dBµV/m @ 5860.1 MHz (-1.0 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbs	0.97	Y	1.36	0.15	0.29	735
HT20	MCS0	0.96	Y	1.26	0.16	0.32	794
HT40	MCS0	0.93	Y	0.624	0.32	0.63	1603

Sample Notes

Sample S/N: CC0001614 MAC:000B868F4553
Driver: N/A
Antenna: Integral 3x3

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 3:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep,max hold 50*1/DC traces (method VB of KDB 789033)
Note 5:	Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements.

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #1: Radiated Bandedge Measurements, 5725-5850 MHz

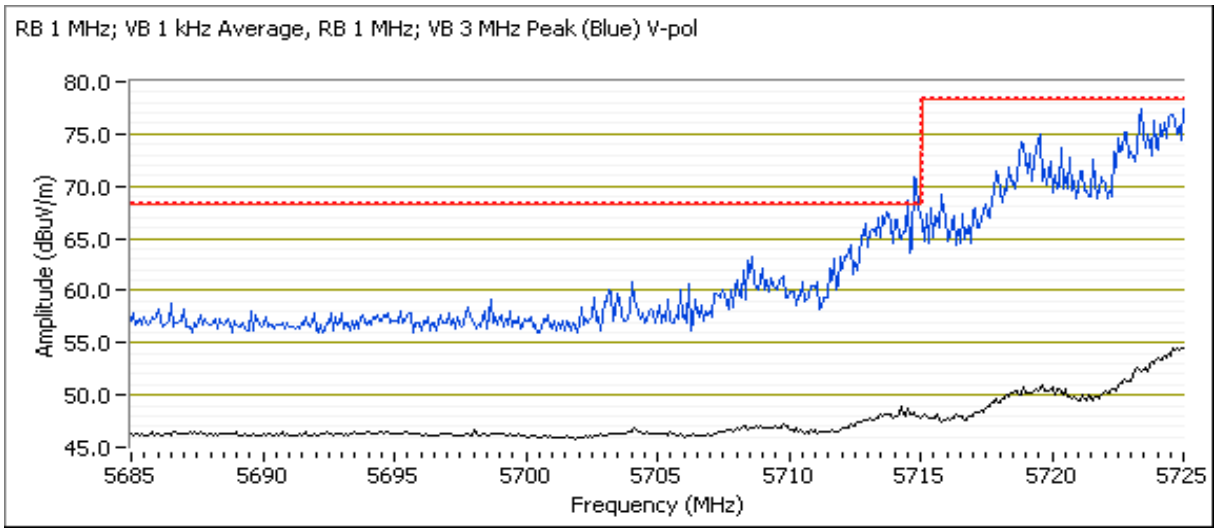
Channel: 149 - 5745MHz
Tx Chain: 3Tx
Mode: a
Data Rate: 6 Mbps

5715 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5714.110	48.7	V	54.0	-5.3	AVG	51	2.0	Note 1,3.POS; RB 1 MHz; VB: 1 kHz
5713.310	71.2	V	74.0	-2.8	PK	51	2.0	POS; RB 1 MHz; VB: 3 MHz
5714.800	48.2	H	54.0	-5.8	AVG	162	2.0	POS; RB 1 MHz; VB: 1 kHz
5714.160	70.5	H	74.0	-3.5	PK	162	2.0	POS; RB 1 MHz; VB: 3 MHz

5715-5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5724.240	77.6	V	78.3	-0.7	PK	51	2.0	POS; RB 1 MHz; VB: 3 MHz
5724.710	76.0	H	78.3	-2.3	PK	162	2.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

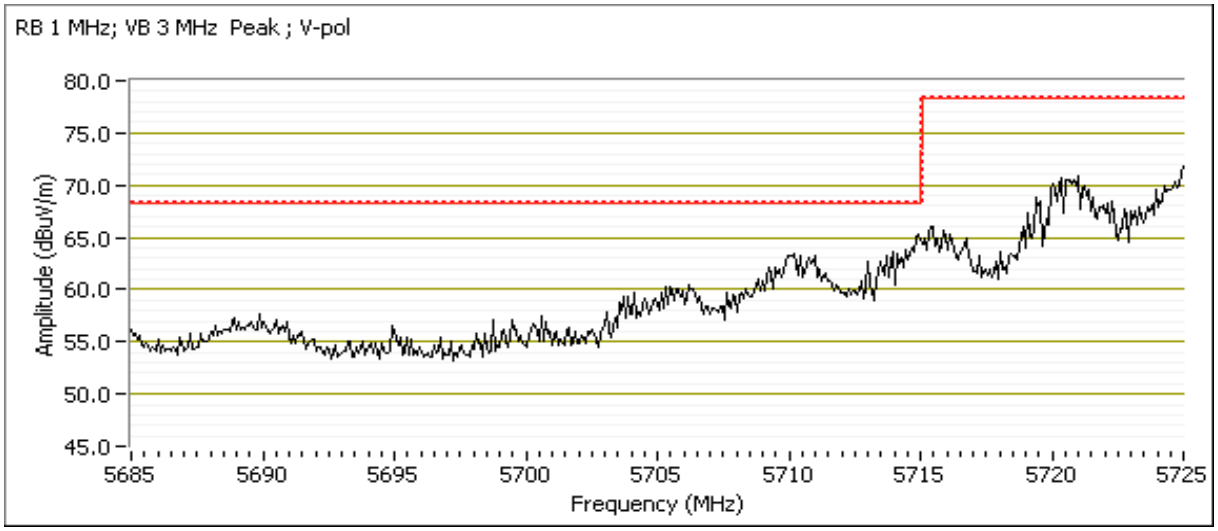
Channel: 153 - 5765MHz
Tx Chain: 3Tx
Mode: a
Data Rate: 6 Mbps

5715 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5714.820	64.4	V	68.3	-3.9	PK	258	1.0	POS; RB 1 MHz; VB: 3 MHz
5714.520	59.8	H	68.3	-8.5	PK	158	1.7	POS; RB 1 MHz; VB: 3 MHz

5715-5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5724.440	71.8	V	78.3	-6.5	PK	258	1.0	POS; RB 1 MHz; VB: 3 MHz
5722.640	67.6	H	78.3	-10.7	PK	158	1.7	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

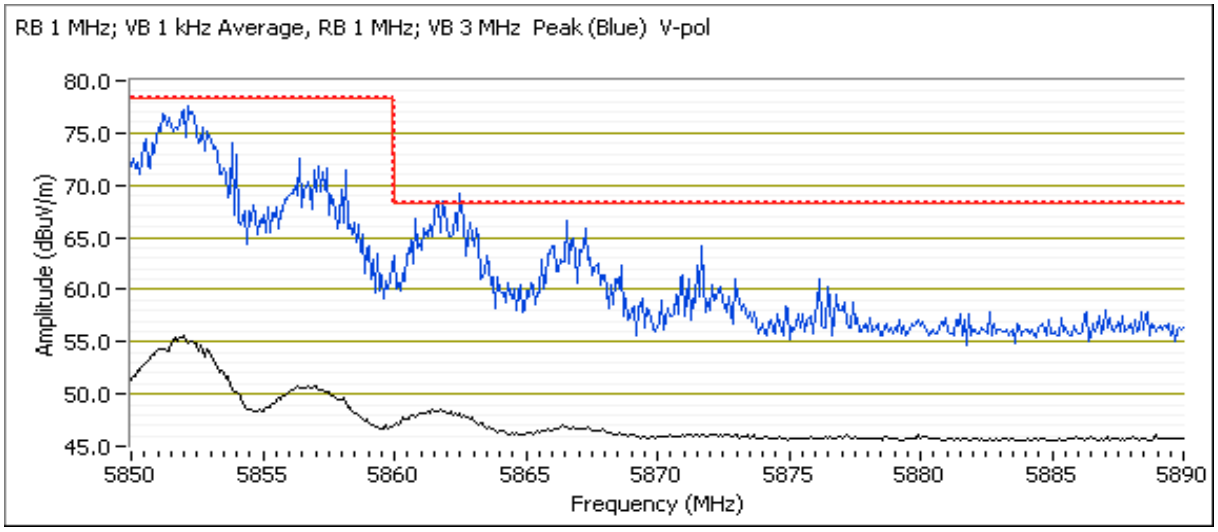
Channel: 165 - 5825MHz
Tx Chain: 3Tx
Mode: a
Data Rate: MCS0

5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5861.560	49.2	V	54.0	-4.8	AVG	45	1.8	Note 1,3. POS; RB 1 MHz; VB: 1 kHz
5861.090	69.5	V	74.0	-4.5	PK	45	1.8	POS; RB 1 MHz; VB: 3 MHz
5860.240	48.4	H	54.0	-5.6	AVG	167	1.8	Note 1,3. POS; RB 1 MHz; VB: 1 kHz
5863.900	66.2	H	74.0	-7.8	PK	167	1.8	POS; RB 1 MHz; VB: 3 MHz

5850-5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5852.520	77.7	V	78.3	-0.6	PK	45	1.8	POS; RB 1 MHz; VB: 3 MHz
5850.210	76.6	H	78.3	-1.7	PK	167	1.8	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

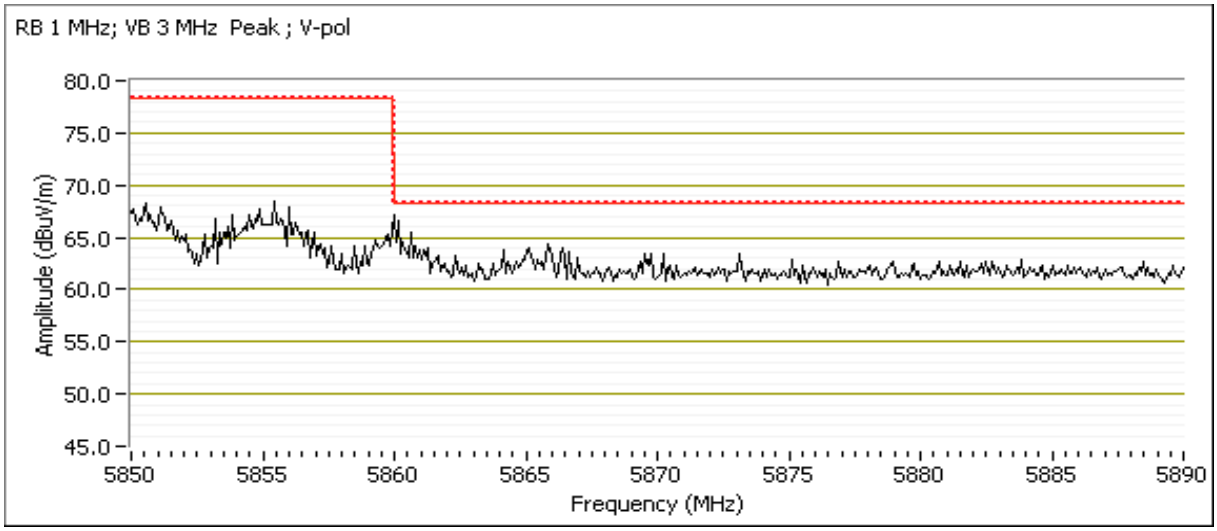
Channel: 161 - 5805MHz
Tx Chain: 3Tx
Mode: a
Data Rate: MCS0

5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5860.060	66.8	V	68.3	-1.5	PK	264	1.3	POS; RB 1 MHz; VB: 3 MHz
5860.840	60.5	H	68.3	-7.8	PK	153	1.0	POS; RB 1 MHz; VB: 3 MHz

5850-5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5855.490	68.7	V	78.3	-9.6	PK	264	1.3	POS; RB 1 MHz; VB: 3 MHz
5850.740	65.1	H	78.3	-13.2	PK	153	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #2: Radiated Bandedge Measurements, 5725-5850 MHz

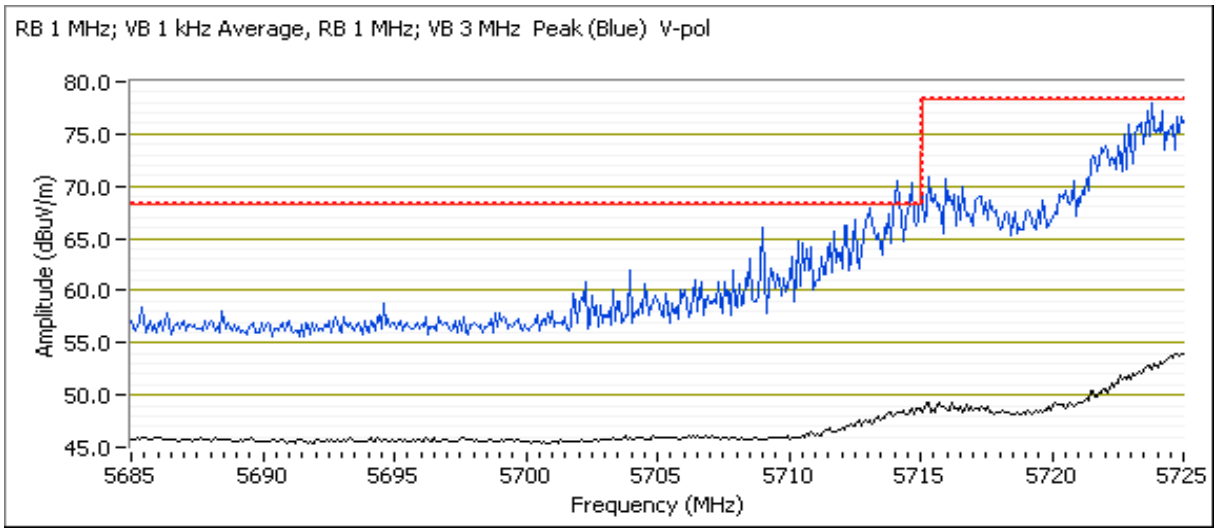
Channel: 149 - 5745MHz
Tx Chain: 3Tx
Mode: HT20
Data Rate: MCS0

5715 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5714.840	48.8	V	54.0	-5.2	AVG	157	2.1	Note 1,3. POS; RB 1 MHz; VB: 1 kHz
5714.720	70.0	V	74.0	-4.0	PK	157	2.1	POS; RB 1 MHz; VB: 3 MHz
5715.000	46.1	H	54.0	-7.9	AVG	166	2.0	Note 1,3. POS; RB 1 MHz; VB: 1 kHz
5713.670	68.5	H	74.0	-5.5	PK	166	2.0	POS; RB 1 MHz; VB: 3 MHz

5715-5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5724.060	78.2	V	78.3	-0.1	PK	157	2.1	POS; RB 1 MHz; VB: 3 MHz
5724.200	78.0	H	78.3	-0.3	PK	166	2.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

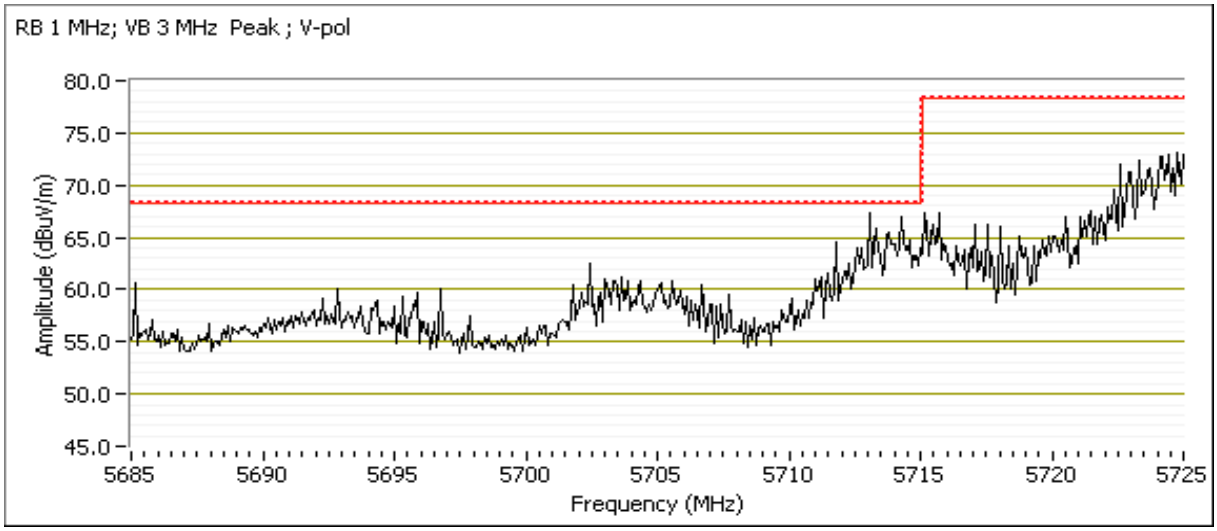
Channel: 153 - 5765MHz
Tx Chain: 3Tx
Mode: HT20
Data Rate: MCS0

5715 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5713.380	68.0	V	68.3	-0.3	PK	261	1.5	POS; RB 1 MHz; VB: 3 MHz
5714.340	64.9	H	68.3	-3.4	PK	147	1.0	POS; RB 1 MHz; VB: 3 MHz

5715-5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5724.480	73.2	V	78.3	-5.1	PK	261	1.5	POS; RB 1 MHz; VB: 3 MHz
5723.840	72.1	H	78.3	-6.2	PK	147	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

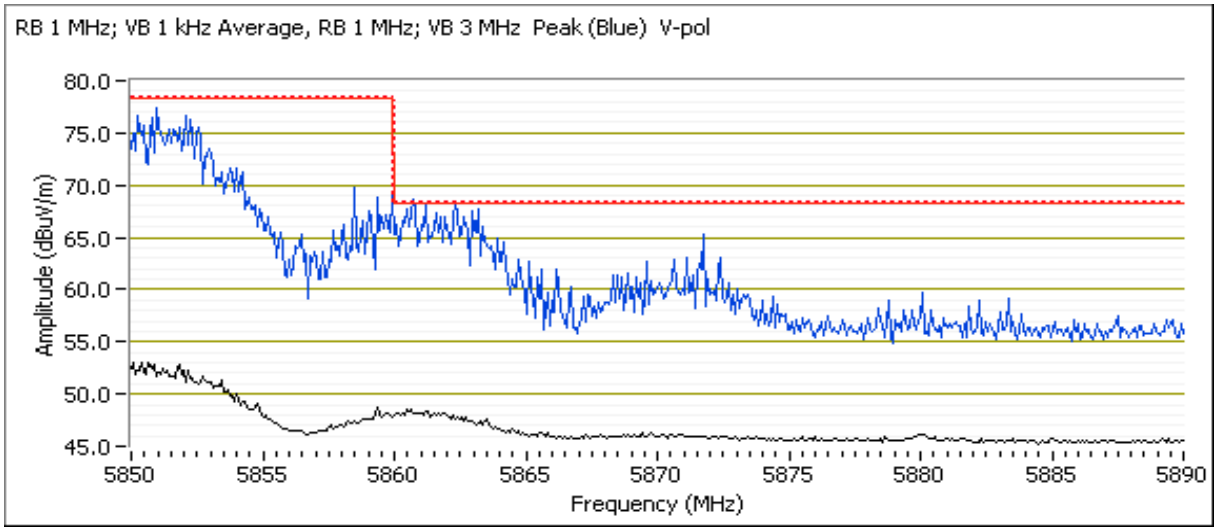
Channel: 165 - 5825MHz
Tx Chain: 3Tx
Mode: HT20
Data Rate: MCS0

5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5861.300	48.9	V	54.0	-5.1	AVG	56	2.0	Note 1,3. POS; RB 1 MHz; VB: 1 kHz
5862.420	70.0	V	74.0	-4.0	PK	56	2.0	POS; RB 1 MHz; VB: 3 MHz
5863.600	47.7	H	54.0	-6.3	AVG	210	1.8	Note 1,3. POS; RB 1 MHz; VB: 1 kHz
5860.710	67.2	H	74.0	-6.8	PK	210	1.8	POS; RB 1 MHz; VB: 3 MHz

5850-5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5850.460	77.8	V	78.3	-0.5	PK	56	2.0	POS; RB 1 MHz; VB: 3 MHz
5850.570	74.0	H	78.3	-4.3	PK	211	1.9	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

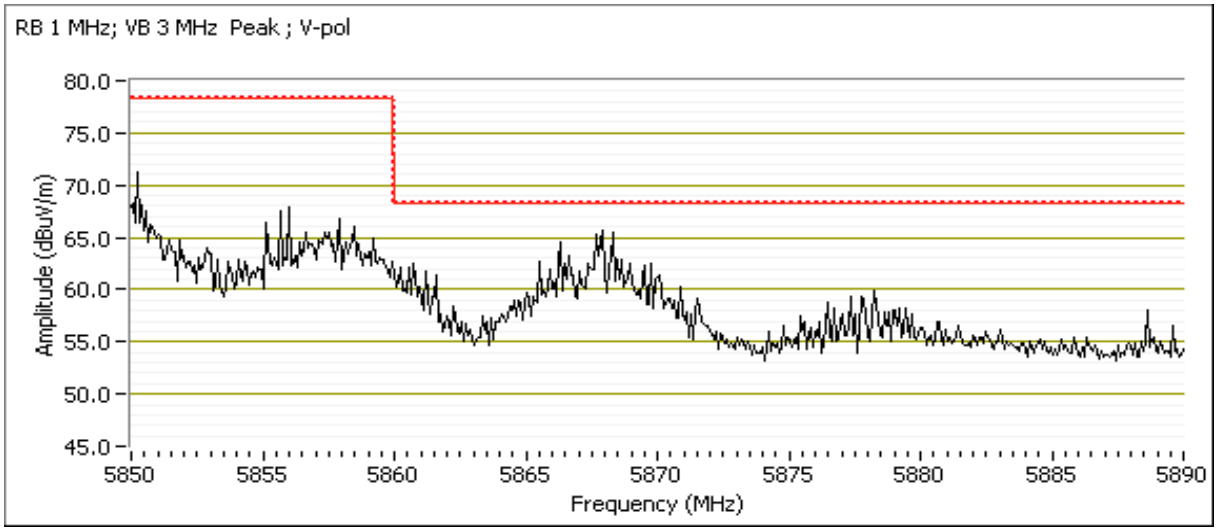
Channel: 161 - 5805MHz
Tx Chain: 3Tx
Mode: HT20
Data Rate: MCS0

5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5867.030	65.7	V	68.3	-2.6	PK	238	1.5	POS; RB 1 MHz; VB: 3 MHz
5860.180	62.2	H	68.3	-6.1	PK	151	2.0	POS; RB 1 MHz; VB: 3 MHz

5850-5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5850.180	71.4	V	78.3	-6.9	PK	238	1.5	POS; RB 1 MHz; VB: 3 MHz
5853.910	65.9	H	78.3	-12.4	PK	151	2.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #3: Radiated Bandedge Measurements, 5725-5850 MHz

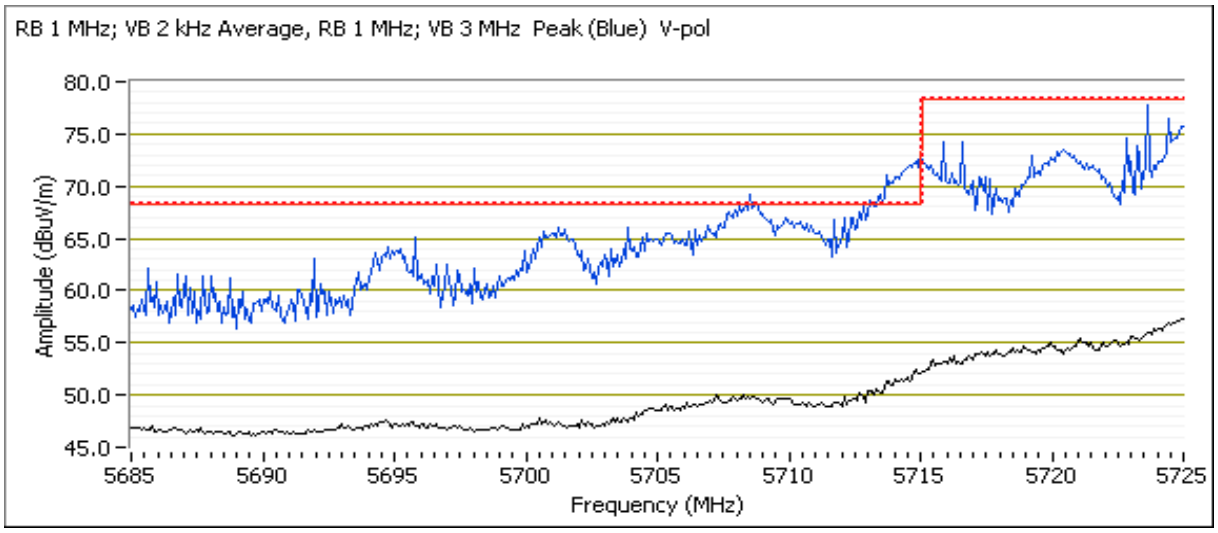
Channel: 151 - 5755MHz
Tx Chain: 3Tx
Mode: HT40
Data Rate: MCS0

5715 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5714.930	53.3	V	54.0	-0.7	AVG	88	2.1	Note 1,3. POS; RB 1 MHz; VB: 2 kHz
5714.590	73.6	V	74.0	-0.4	PK	88	2.1	POS; RB 1 MHz; VB: 3 MHz
5714.680	51.5	H	54.0	-2.5	AVG	157	1.5	Note 1,3. POS; RB 1 MHz; VB: 2 kHz
5714.510	70.3	H	74.0	-3.7	PK	157	1.5	POS; RB 1 MHz; VB: 3 MHz

5715-5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5724.870	78.2	V	78.3	-0.1	PK	88	2.1	POS; RB 1 MHz; VB: 3 MHz
5724.970	75.9	H	78.3	-2.4	PK	157	1.5	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

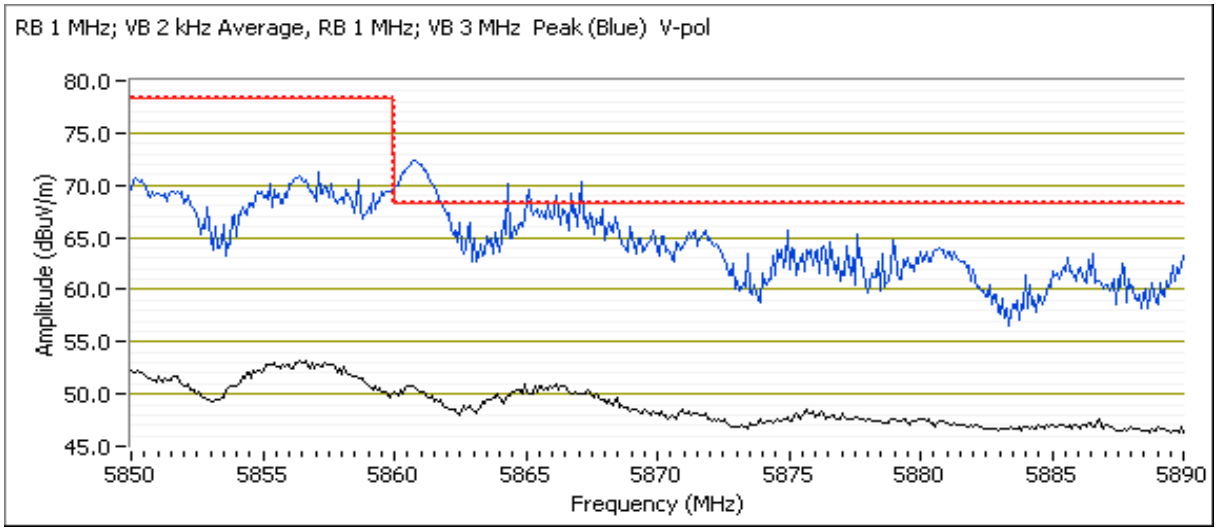
Channel: 159 - 5795MHz
Tx Chain: 3Tx
Mode: HT40
Data Rate: MCS0

5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5860.100	53.0	V	54.0	-1.0	AVG	43	1.8	Note 1,3. POS; RB 1 MHz; VB: 2 kHz
5861.340	70.8	V	74.0	-3.2	PK	43	1.8	POS; RB 1 MHz; VB: 3 MHz
5860.780	51.3	H	54.0	-2.7	AVG	139	2.1	Note 1,3. POS; RB 1 MHz; VB: 2 kHz
5863.070	70.1	H	74.0	-3.9	PK	139	2.1	POS; RB 1 MHz; VB: 3 MHz

5850-5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5850.380	**71.9**	V	78.3	**-6.4**	PK	52	2.0	POS; RB 1 MHz; VB: 3 MHz
5852.490	72.1	H	78.3	-6.2	PK	139	2.1	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

RSS-247 and FCC 15.407 (UNII) Radiated Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 20-22 °C
Rel. Humidity: 32-35 %

Summary of Results

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
Scans on "center" channel in all OFDM modes to determine the worst case mode.							
1	a	157 - 5785MHz	18	18	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.5 dBµV/m @ 5360.1 MHz (-2.5 dB)
	n20	157 - 5785MHz	18	18	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.2 dBµV/m @ 5439.9 MHz (-2.8 dB)
	n40	151 - 5755MHz	18	18	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.4 dBµV/m @ 5439.9 MHz (-2.6 dB)
Measurements on low and high channels in worst-case OFDM mode.							
2	a	149 - 5745MHz	18	18	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.4 dBµV/m @ 5440.0 MHz (-1.6 dB)
	a	165 - 5825MHz	18	18	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.9 dBµV/m @ 5360.0 MHz (-0.1 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold 50 traces. (method VB of KDB 789033)

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbs	0.97	Y	1.36	0.15	0.29	735
HT20	MCS0	0.96	Y	1.26	0.16	0.32	794
HT40	MCS0	0.93	Y	0.624	0.32	0.63	1603

Sample Notes

Sample S/N: CC0001614 MAC:000B868F4553
Driver: N/A
Antenna: Integral 3x3

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 3:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep,max hold 50*1/DC traces (method VB of KDB 789033)

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #1, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5725-5850MHz Band

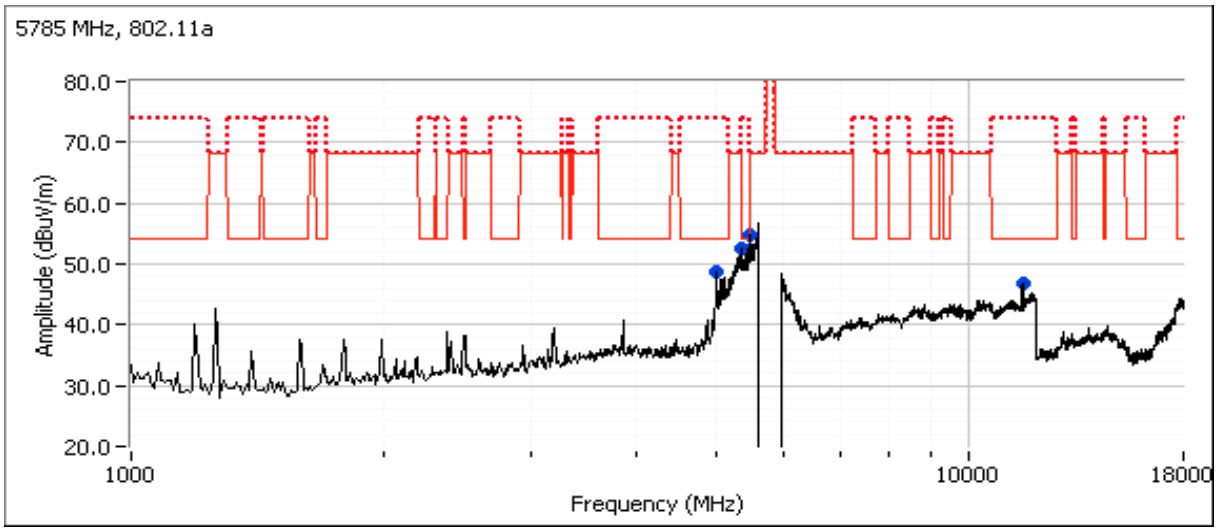
Date of Test: 3/28/2016 Config. Used: 1
Test Engineer: Deniz Demirci / R. Varelas Config Change: None
Test Location: FT Ch #5 EUT Voltage: 120 VAC

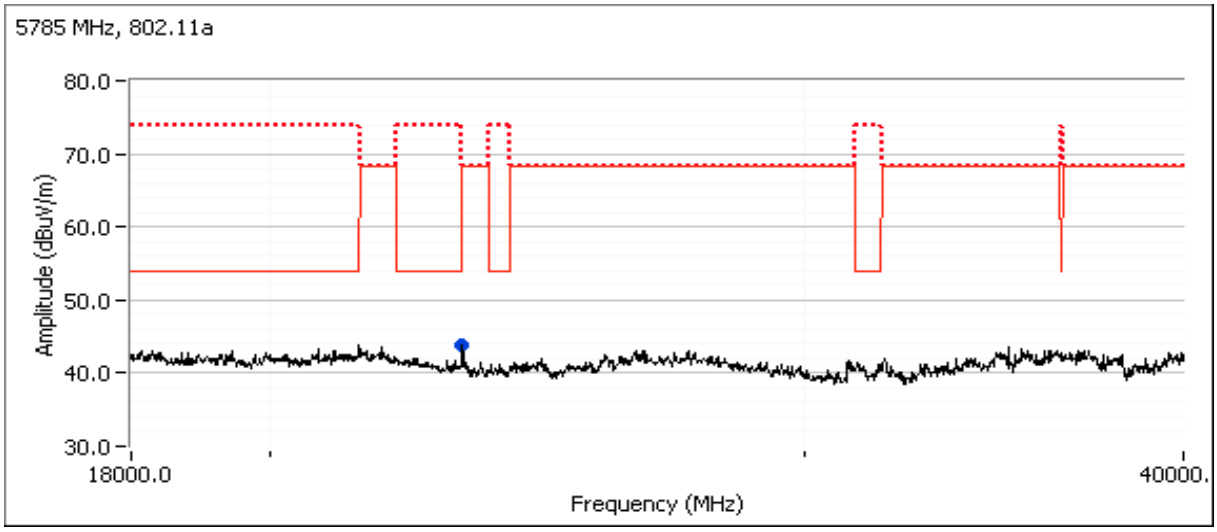
Run #1a: Center Channel

Channel: 157 Mode: a
Tx Chain: 3Tx Data Rate: 6Mbs

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4986.770	40.0	V	54.0	-14.0	AVG	41	1.9	Note 3. RB 1 MHz;VB 1 kHz;Peak
4992.810	58.2	V	74.0	-15.8	PK	41	1.9	RB 1 MHz;VB 3 MHz;Peak
5360.130	51.5	V	54.0	-2.5	AVG	42	2.0	Note 3. RB 1 MHz;VB 1 kHz;Peak
5360.170	62.3	V	74.0	-11.7	PK	42	2.0	RB 1 MHz;VB 3 MHz;Peak
5440.050	51.1	H	54.0	-2.9	AVG	148	1.4	Note 3. RB 1 MHz;VB 1 kHz;Peak
5440.160	59.9	H	74.0	-14.1	PK	148	1.4	RB 1 MHz;VB 3 MHz;Peak
5480.480	61.0	V	68.3	-7.3	PK	84	1.9	RB 1 MHz;VB 3 MHz;Peak
11570.820	44.5	H	54.0	-9.5	AVG	65	2.0	Note 3. RB 1 MHz;VB 1 kHz;Peak
11570.860	57.8	H	74.0	-16.2	PK	65	2.0	RB 1 MHz;VB 3 MHz;Peak
23136.170	57.8	V	68.3	-10.5	PK	19	1.8	RB 1 MHz;VB 3 MHz;Peak

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



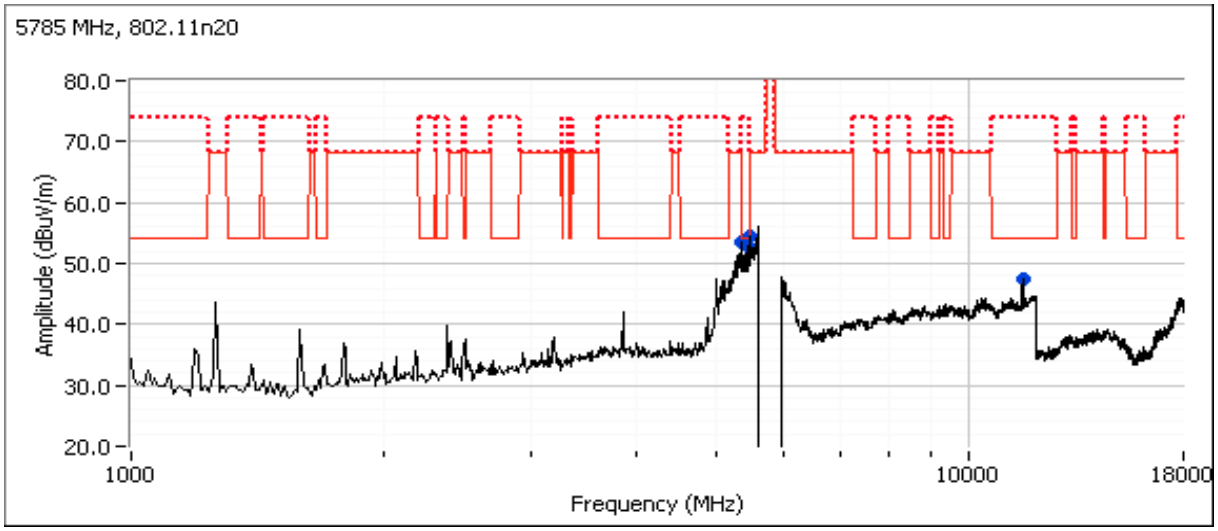


Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

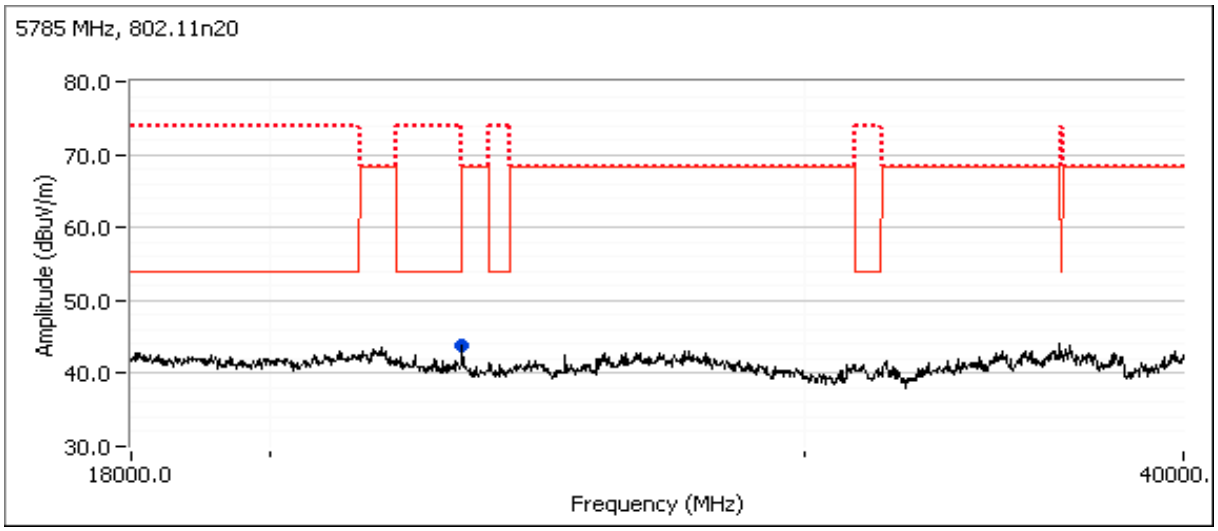
Run #1b: Center Channel

Channel: 157 Mode: 11n20
Tx Chain: 3Tx Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5359.940	50.9	V	54.0	-3.1	AVG	53	1.5	Note 3. RB 1 MHz;VB 1 kHz;Peak
5359.940	61.2	V	74.0	-12.8	PK	53	1.5	RB 1 MHz;VB 3 MHz;Peak
5439.920	51.2	H	54.0	-2.8	AVG	146	1.4	Note 3. RB 1 MHz;VB 1 kHz;Peak
5440.000	59.5	H	74.0	-14.5	PK	146	1.4	RB 1 MHz;VB 3 MHz;Peak
5480.370	63.0	V	68.3	-5.3	PK	45	2.1	RB 1 MHz;VB 3 MHz;Peak
11572.750	43.7	H	54.0	-10.3	AVG	68	1.9	Note 3. RB 1 MHz;VB 1 kHz;Peak
11572.340	56.7	H	74.0	-17.3	PK	68	1.9	RB 1 MHz;VB 3 MHz;Peak
23132.650	57.4	V	68.3	-10.9	PK	11	1.8	RB 1 MHz;VB 3 MHz;Peak



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

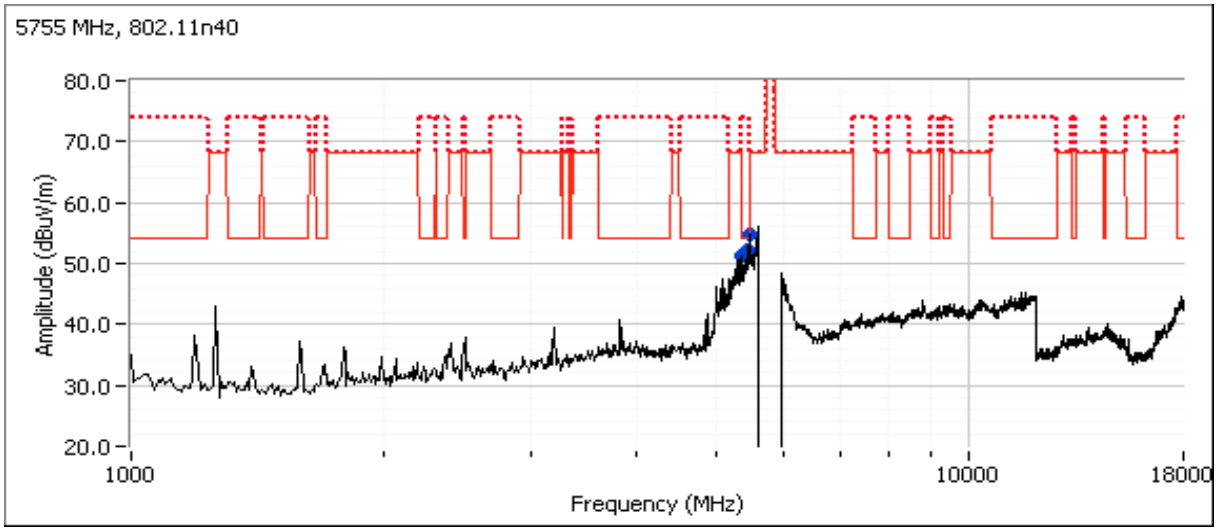


Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

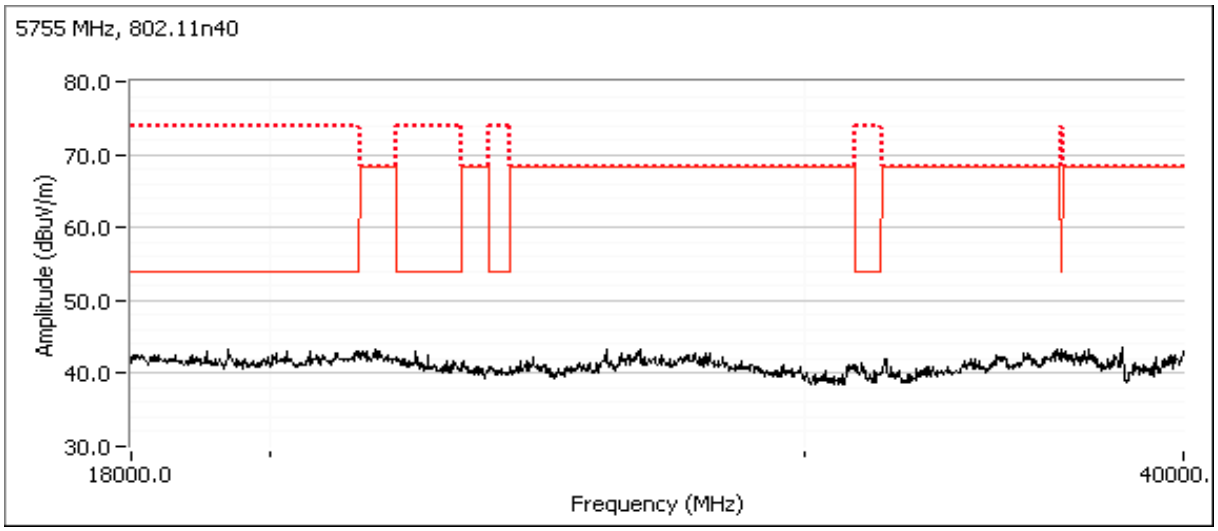
Run #1c: Center Channel

Channel: 151 Mode: 11n40
Tx Chain: 3Tx Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5359.990	50.2	H	54.0	-3.8	AVG	141	1.4	Note 3. RB 1 MHz;VB 3 kHz;Peak
5359.870	58.6	H	74.0	-15.4	PK	141	1.4	RB 1 MHz;VB 3 MHz;Peak
5439.930	51.4	H	54.0	-2.6	AVG	150	1.6	Note 3. RB 1 MHz;VB 1 kHz;Peak
5440.050	60.2	H	74.0	-13.8	PK	150	1.6	RB 1 MHz;VB 3 MHz;Peak
5479.600	62.0	V	68.3	-6.3	PK	67	2.2	RB 1 MHz;VB 3 MHz;Peak



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



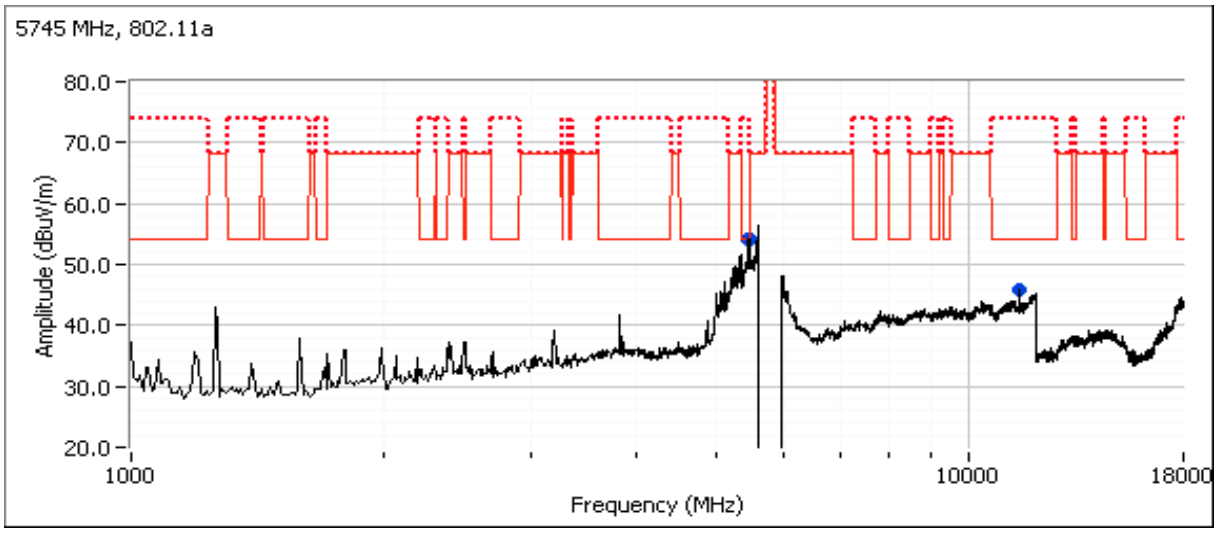
Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #2: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: Worse case from Run #1

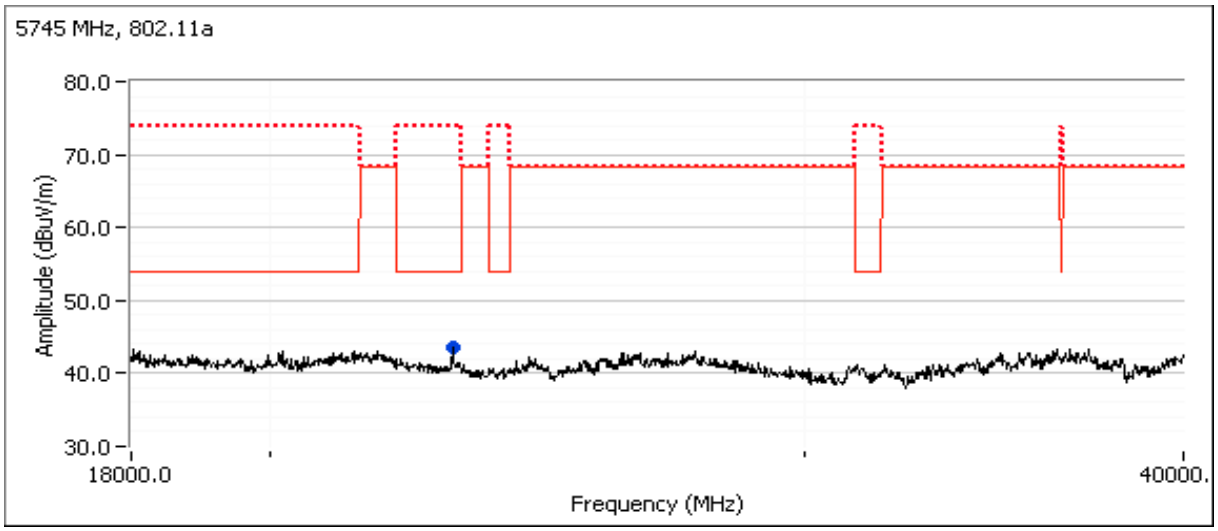
Run #2a: Low Channel

Channel: 149 Mode: a
Tx Chain: 3Tx Data Rate: 6Mbs

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5440.040	52.4	H	54.0	-1.6	AVG	198	2.0	Note 3. RB 1 MHz;VB 1 kHz;Peak
5440.310	61.3	H	74.0	-12.7	PK	198	2.0	RB 1 MHz;VB 3 MHz;Peak
5479.900	61.7	V	68.3	-6.6	PK	42	2.1	RB 1 MHz;VB 3 MHz;Peak
11491.250	44.3	H	54.0	-9.7	AVG	52	1.9	Note 3. RB 1 MHz;VB 1 kHz;Peak
11490.110	57.5	H	74.0	-16.5	PK	52	1.9	RB 1 MHz;VB 3 MHz;Peak
22977.400	38.1	V	54.0	-15.9	Avg	6	1.0	Note 3. RB 1 MHz;VB 1 kHz;Peak
22968.070	53.7	V	74.0	-20.3	PK	6	1.0	RB 1 MHz;VB 3 MHz;Peak



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

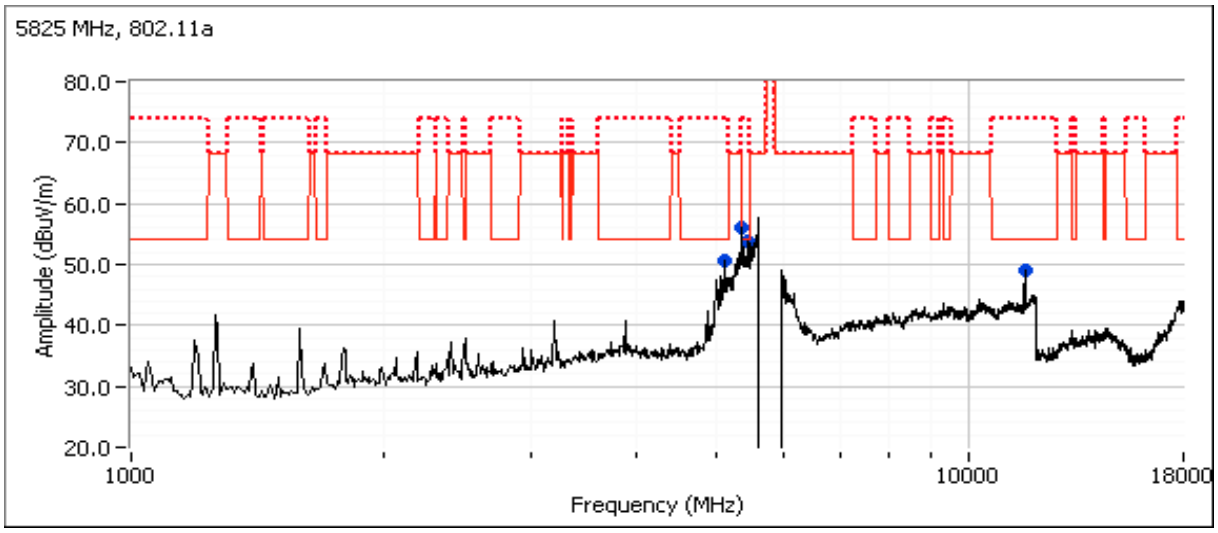


Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

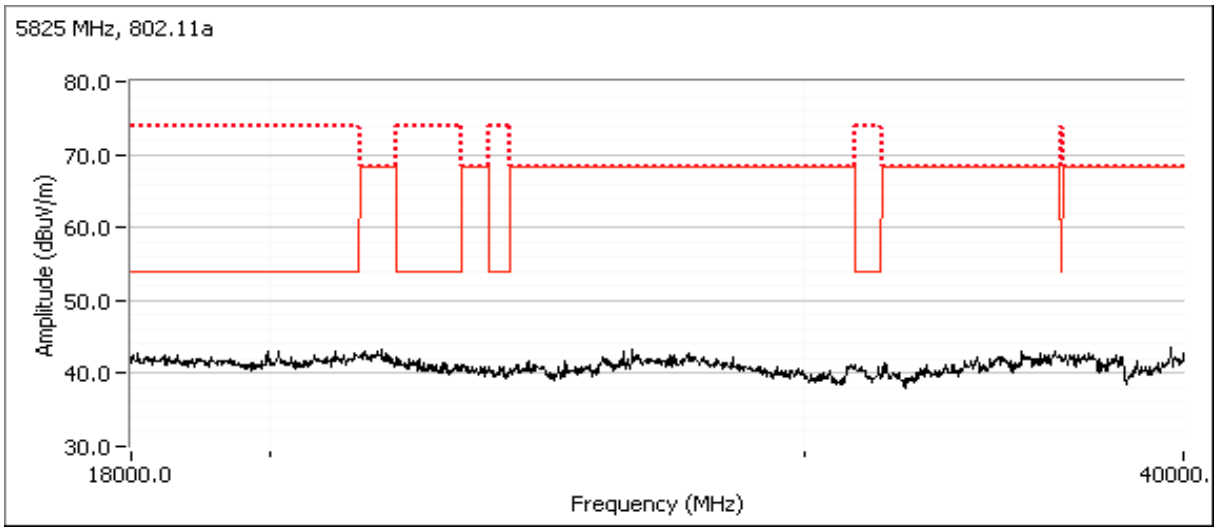
Run #2b: High Channel

Channel: 165 Mode: a
Tx Chain: 3Tx Data Rate: 6Mbs

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5119.970	49.6	V	54.0	-4.4	AVG	39	1.9	Note 3. RB 1 MHz;VB 1 kHz;Peak
5120.000	58.5	V	74.0	-15.5	PK	39	1.9	RB 1 MHz;VB 3 MHz;Peak
5359.950	53.9	V	54.0	-0.1	AVG	39	1.9	Note 3. RB 1 MHz;VB 1 kHz;Peak
5359.740	63.6	V	74.0	-10.4	PK	39	1.9	RB 1 MHz;VB 3 MHz;Peak
5439.960	52.3	V	54.0	-1.7	AVG	224	1.6	Note 3. RB 1 MHz;VB 1 kHz;Peak
5439.920	60.8	V	74.0	-13.2	PK	224	1.6	RB 1 MHz;VB 3 MHz;Peak
5480.040	61.2	V	68.3	-7.1	PK	156	1.9	RB 1 MHz;VB 3 MHz;Peak
11651.540	46.2	V	54.0	-7.8	AVG	348	1.6	Note 3. RB 1 MHz;VB 1 kHz;Peak
11651.190	59.3	V	74.0	-14.7	PK	348	1.6	RB 1 MHz;VB 3 MHz;Peak



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

RSS-247 (LELAN) and FCC 15.407(UNII)
Antenna Port Measurements
Power, PSD, Bandwidth and Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1) (ii)	Pass	a: 24.3 dBm (267.8 mW) n20: 24.3 dBm (266.4 mW) n40: 22.6 dBm (183.9 mW)
1	PSD, 5150 - 5250MHz	15.407(a) (1) (ii)	Pass	a: 13.2 dBm/MHz n20: 13.0 dBm/MHz n40: 8.5 dBm/MHz
1	99% Bandwidth	RSS-247 (Information only)	N/A	a: 16.9 MHz n20: 18.0 MHz n40: 36.3 MHz
2	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	performed radiated	All emissions below the -27dBm/MHz limit

General Test Configuration

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators and cables used.

Ambient Conditions:

Temperature: 22.3 °C
Rel. Humidity: 36 %

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 D01

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbs	0.97	Y	1.36	0.15	0.29	735
HT20	MCS0	0.96	Y	1.26	0.16	0.32	794
HT40	MCS0	0.93	Y	0.624	0.32	0.63	1603

Sample Notes

Sample S/N: CC0001614 MAC:000B868F4553
Driver: N/A
Antenna: Integral 3x3

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #1: Bandwidth, Output Power and Power Spectral Density - MIMO Systems

Date of Test: 3/29/2016 0:00 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Lab #4B EUT Voltage: 120V/60Hz

Note 1:	Duty Cycle < 98%. Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, Span > OBW, # of points in sweep ≥ 2*span/RBW, auto sweep, **RMS** detector, power averaging on,and power integration over the OBW. The measurements were adjusted by adding (see table above) dB. This is based on 10log(1/x), where x is the duty cycle. (method SA-2 of ANSI C63.10)
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-247 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with C63.10 - RB between 1-5 % of OBW and VB ≥ 3*RB, Span between 1.5 and 5 times OBW.
Note 5:	For MIMO systems the total output power and total PSD are calculated from the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.
Note 6:	Plots are not corrected for duty cycle. Any duty cycle correction is applied in the calculation of total power.

Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
5150-5250	3	3	3		No	Yes	Yes	No	3.00	7.80
5250-5350					No	Yes	Yes	No		
5470-5725					No	Yes	Yes	No		
5725-5825	3	3	3		No	Yes	Yes	No	3.00	7.80

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

For devices that support CDD modes

Min # of spatial streams: 1

Max # of spatial streams: 3

Notes:	BF = beamforming mode supported, Multichain Legacy = 802.11 legacy data rates supported for multichain transmissions, CDD = Cyclic Delay Diversity (or Cyclic Shift Diversity) modes supported, Sectorized / Xpol = antennas are sectorized or cross polarized.
Notes:	Dir G (PWR) = total gain (Gant + Array Gain) for power calculations; GA (PSD) = total gain for PSD calculations based on FCC KDB 662911. Depending on the modes supported, the Array Gain value for power could be different from the PSD value.
Notes:	Array gain for power/psd calculated per KDB 662911 D01.
Notes:	For systems with Beamforming and CDD, choose one the following options: Option 1: Delays are optimized for beamforming, rather than being selected from cyclic delay table of 802.11; Array gains calculated based on beamforming criteria. Option 2: Antennas are paired for beamforming, and the pairs are configured to use the cyclic delay diversity of 802.11; the array gain associated with beamforming with 2 antennas (3dB), and the array gain associated with CDD with two antennas (3dB for PSD and 0 dB for power)

FCC UNII-1 Limits		Pwr	PSD
	Outdoor AP	30	17
X	Indoor AP	30	17
	Station (e.g. Client)	24	11
	Outdoor AP (>30° Elv.)	21	-

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

MIMO Device - 5150-5250 MHz Band - FCC

Mode: 11a Max EIRP (mW): 534.33125

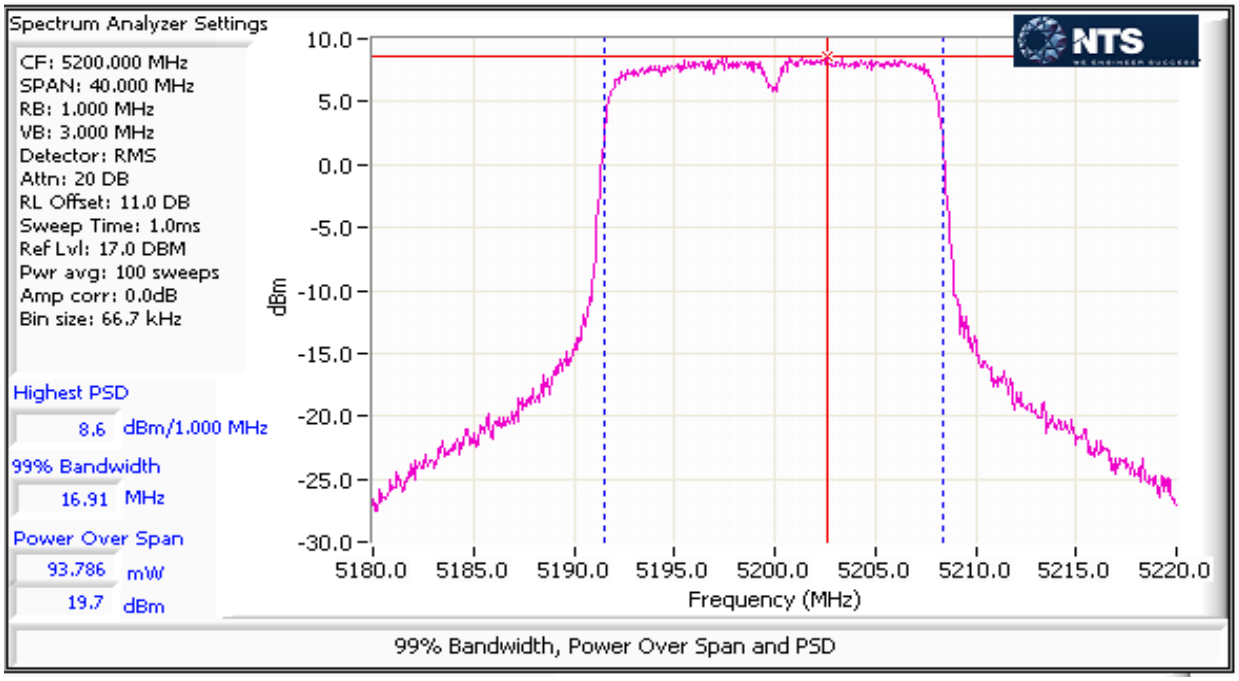
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power[1] dBm	Total Power mW	Total Power dBm	FCC Limit dBm	Max Power (W)	Result
5180	1	14		97	15.6	99.8	20.0	30.0	0.268	Pass
	3				15.0					
	4									
	2				14.6					
5200	1	18		97	19.7	267.8	24.3	30.0		Pass
	3				19.3					
	4									
	2				19.1					
5240	1	16		97	16.6	143.5	21.6	30.0		Pass
	3				17.3					
	4									
	2				16.0					

5150-5250 PSD - FCC

Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	Result
5180	1	14		97	4.6	7.9	9.0	15.2	Pass
	3				4.1				
	4								
	2				3.5				
5200	1	18		97	8.6	21.1	13.2	15.2	Pass
	3				8.5				
	4								
	2				7.9				
5240	1	16		97	5.5	11.6	10.6	15.2	Pass
	3				6.6				
	4								
	2				5.0				

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

MIMO Device - 5150-5250 MHz Band - FCC

Mode: n20 Max EIRP (mW): 531.53788

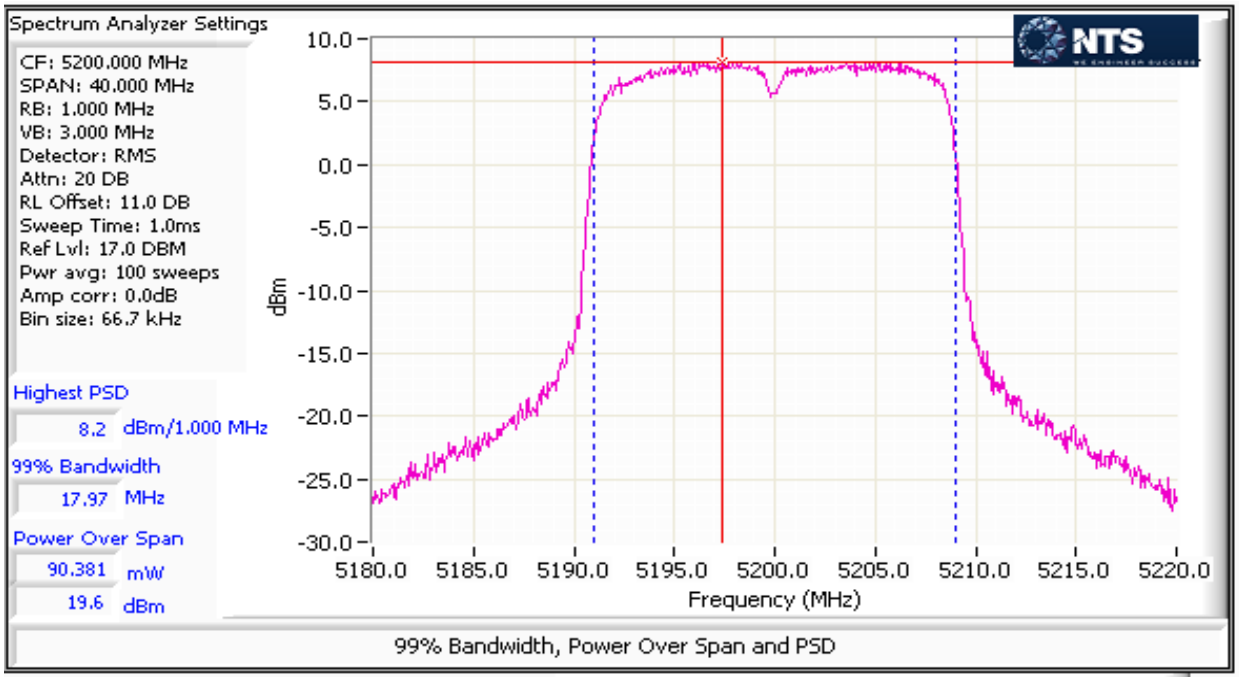
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power[1] dBm	Total Power mW	Total Power dBm	FCC Limit dBm	Max Power (W)	Result
5180	1	14		96	15.2	95.3	19.8	30.0	0.266	Pass
	3				14.8					
	4									
	2				14.5					
5200	1	18		96	19.6	266.4	24.3	30.0		Pass
	3				19.3					
	4									
	2				19.0					
5240	1	16		96	16.6	149.6	21.7	30.0		Pass
	3				17.5					
	4									
	2				16.2					

5150-5250 PSD - FCC

Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	Result
5180	1	14		96	3.8	7.0	8.5	15.2	Pass
	3				3.5				
	4								
	2				3.1				
5200	1	18		96	8.2	20.1	13.0	15.2	Pass
	3				8.3				
	4								
	2				7.7				
5240	1	16		96	5.3	11.5	10.6	15.2	Pass
	3				6.2				
	4								
	2				5.4				

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

MIMO Device - 5150-5250 MHz Band - FCC

Mode: n40 Max EIRP (mW): 366.92874

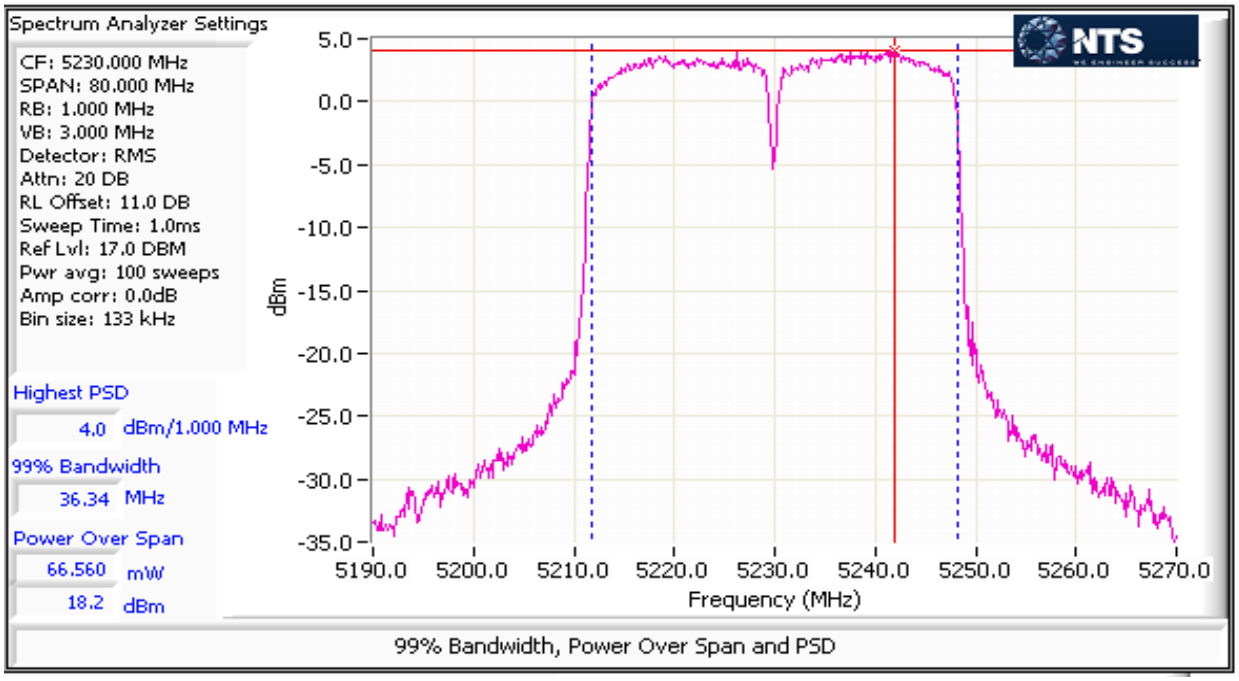
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power[1] mW	Total Power[1] dBm	FCC Limit dBm	Max Power (W)	Result
5190	1	12		93	13.6	64.8	18.1	30.0	0.184	Pass
	3				12.4					
	4									
	2				13.0					
5230	1	16		93	18.2	183.9	22.6	30.0		Pass
	3				17.8					
	4									
	2				16.5					

5150-5250 PSD - FCC

Mode: n40

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	Result
5190	1	12		93	-0.7	2.5	4.0	15.2	Pass
	3				-1.3				
	4								
	2				-1.2				
5230	1	16		93	4.0	7.0	8.5	15.2	Pass
	3				3.8				
	4								
	2				2.1				

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

RSS-247 (LELAN) and FCC 15.407(UNII)
Antenna Port Measurements
Power, PSD, Bandwidth and Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5725 - 5850MHz	15.407(a) (1), (2), (3) RSS-247 6.2	Pass	a: 22.6 dBm (183.7 mW) n20: 22.3 dBm (170.0 mW) n40: 20.9 dBm (122.7 mW)
1	PSD, 5725 - 5850MHz	15.407(a) (1), (2), (3) RSS-247 6.2	Pass	a: 11.6 dBm/MHz n20: 11.1 dBm/MHz n40: 6.7 dBm/MHz
1	99% Bandwidth	RSS-GEN (Information only)	N/A	a: 17.2 MHz n20: 18.1 MHz n40: 36.7 MHz
2	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	performed radiated	All emissions below the -27dBm/MHz limit

General Test Configuration

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators and cables used.

Ambient Conditions:

Temperature:	22.3 °C
Rel. Humidity:	36 %

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 D01

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbs	0.97	Y	1.36	0.15	0.29	735
HT20	MCS0	0.96	Y	1.26	0.16	0.32	794
HT40	MCS0	0.93	Y	0.624	0.32	0.63	1603

Sample Notes

Sample S/N: CC0001614 MAC:000B868F4553
Driver: N/A
Antenna: Integral 3x3

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #1: Bandwidth, Output Power and Power Spectral Density - MIMO Systems

Date of Test: 3/29 & 3/30/2016 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Lab #4B EUT Voltage: 120V/60Hz

Note 1:	Duty Cycle < 98%. Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, Span > OBW, # of points in sweep ≥ 2*span/RBW, auto sweep, **RMS** detector, power averaging on,and power integration over the OBW. The measurements were adjusted by adding (see table above) dB. This is based on 10log(1/x), where x is the duty cycle. (method SA-2 of ANSI C63.10)
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	99% Bandwidth measured in accordance with C63.10 - RB between 1-5 % of OBW and VB ≥ 3*RB, Span between 1.5 and 5 times OBW.
Note 4:	For MIMO systems the total output power and total PSD are calculated from the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.
Note 6:	Plots are not corrected for duty cycle. Any duty cycle correction is applied in the calculation of total power.

Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
5150-5250	3	3	3		No	Yes	Yes	No	3.00	7.8
5250-5350					No	Yes	Yes	No		
5470-5725					No	Yes	Yes	No		
5725-5825	3	3	3		No	Yes	Yes	No	3.00	7.8

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

For devices that support CDD modes

Min # of spatial streams: 1

Max # of spatial streams: 3

Notes:	BF = beamforming mode supported, Multichain Legacy = 802.11 legacy data rates supported for multichain transmissions, CDD = Cyclic Delay Diversity (or Cyclic Shift Diversity) modes supported, Sectorized / Xpol = antennas are sectorized or cross polarized.
Notes:	Dir G (PWR) = total gain (Gant + Array Gain) for power calculations; GA (PSD) = total gain for PSD calculations based on FCC KDB 662911. Depending on the modes supported, the Array Gain value for power could be different from the PSD value.
Notes:	Array gain for power/psd calculated per KDB 662911 D01.
Notes:	For systems with Beamforming and CDD, choose one the following options: Option 1: Delays are optimized for beamforming, rather than being selected from cyclic delay table of 802.11; Array gains calculated based on beamforming criteria. Option 2: Antennas are paired for beamforming, and the pairs are configured to use the cyclic delay diversity of 802.11; the array gain associated with beamforming with 2 antennas (3dB), and the array gain associated with CDD with two antennas (3dB for PSD and 0 dB for power)

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

MIMO Device - 5725-5850 MHz Band - FCC/IC

Mode: **11a** Max EIRP (mW): 366.5

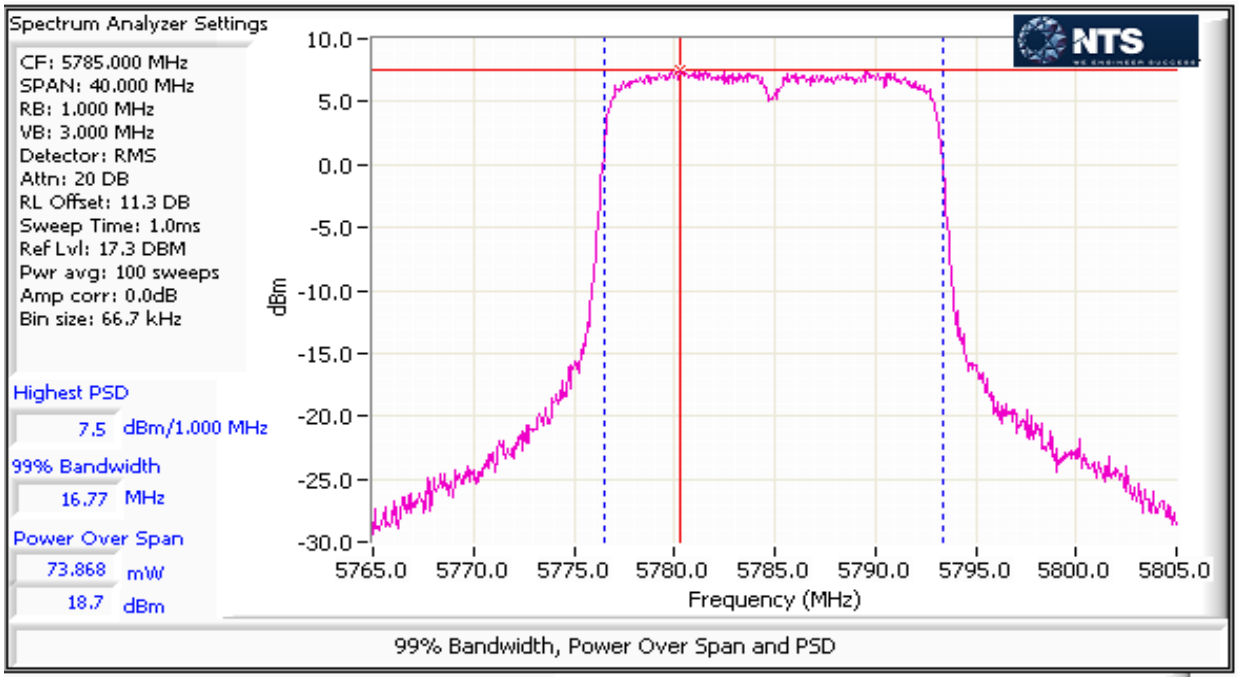
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power dBm	Total Power[1] mW	Total Power[1] dBm	Limit dBm	Max Power (W)	Result
5745	1	13.5	16.8	97	13.0	63.4	18.0	30.0	0.184	Pass
	3				14.1					
	4									
	2				12.0					
5785	1	18.0	16.8	97	17.5	183.7	22.6	30.0		Pass
	3				18.7					
	4									
	2				16.8					
5825	1	15.5	16.8	97	14.4	88.9	19.5	30.0		Pass
	3				15.6					
	4									
	2				13.5					

5725-5850 PSD - FCC/IC

Mode: **11a**

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/500kHz	IC Limit dBm/500kHz	Result
5745	1	13.5		97	2.2	5.2	7.2	28.2	28.2	Pass
	3				3.0					
	4									
	2				1.3					
5785	1	18.0		97	6.5	14.4	11.6	28.2	28.2	Pass
	3				7.5					
	4									
	2				5.9					
5825	1	15.5		97	3.7	7.2	8.6	28.2	28.2	Pass
	3				4.5					
	4									
	2				2.7					

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

MIMO Device - 5725-5850 MHz Band - FCC/IC

Mode: **n20** Max EIRP (mW): 339.2

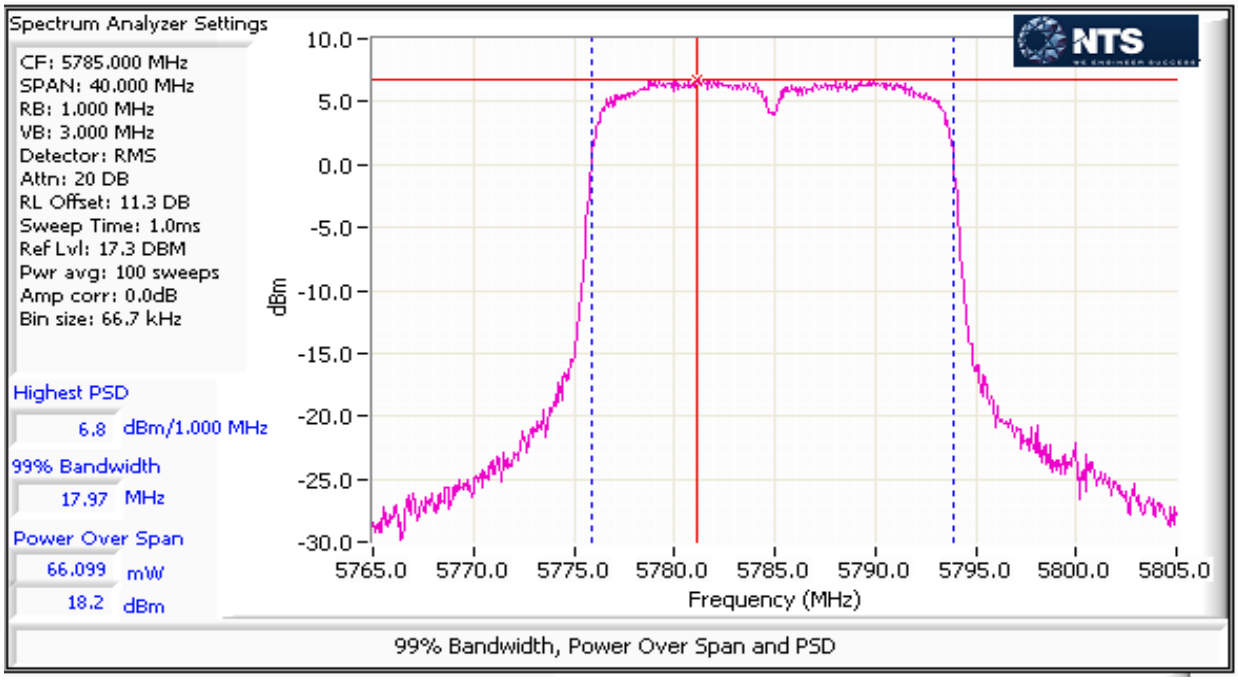
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power dBm	Total Power[1] mW	Total Power[1] dBm	FCC Limit dBm	Max Power (W)	Result
5745	1	13.5	18.0	96	12.6	59.0	17.7	30.0	0.170	Pass
	3				13.6					
	4									
	2				11.9					
5785	1	18.0	18.0	96	17.2	170.0	22.3	30.0		Pass
	3				18.2					
	4									
	2				16.5					
5825	1	14.5	17.9	96	13.3	68.2	18.3	30.0		Pass
	3				14.4					
	4									
	2				12.2					

5725-5850 MHz PSD - FCC/IC

Mode: **n20**

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5745	1	13.5		96	1.7	4.5	6.5	28.2	28.2	Pass
	3				2.3					
	4									
	2				0.7					
5785	1	18.0		96	6.1	12.8	11.1	28.2	28.2	Pass
	3				6.8					
	4									
	2				5.4					
5825	1	14.5		96	2.3	5.4	7.3	28.2	28.2	Pass
	3				3.2					
	4									
	2				1.3					

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

MIMO Device - 5725-5850 MHz Band - FCC/IC

Mode: **n40** Max EIRP (mW): 244.8

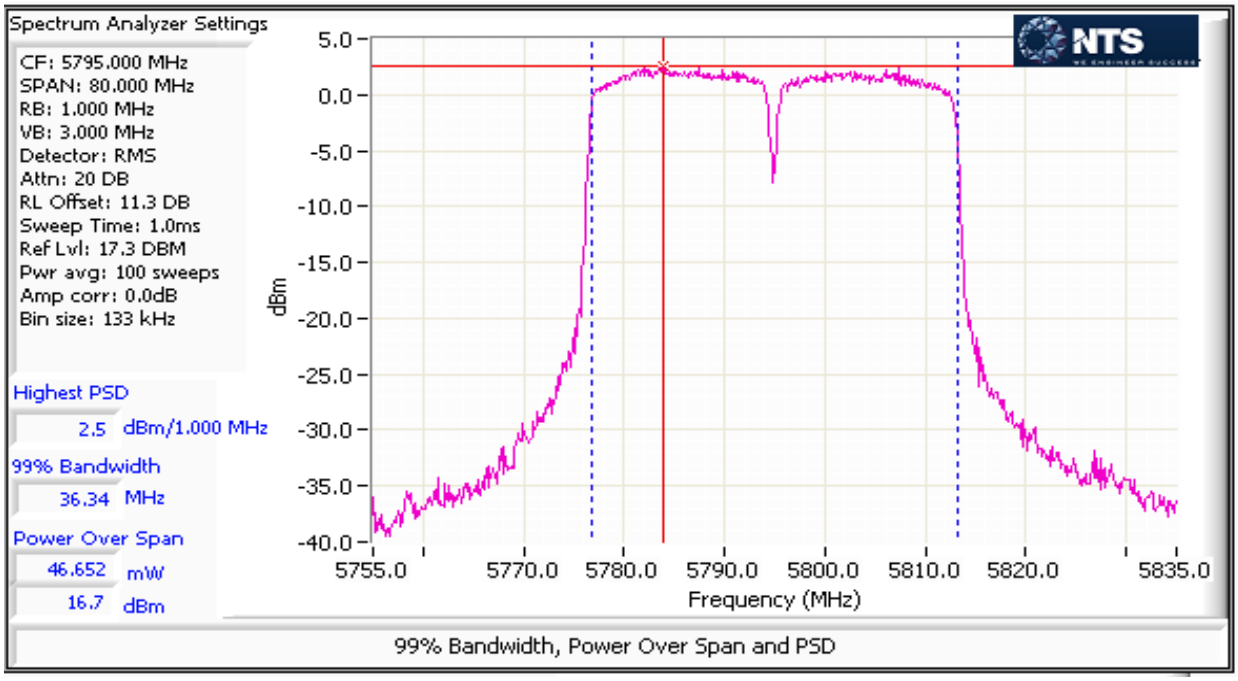
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power dBm	Total Power[1] mW	Total Power[1] dBm	FCC Limit dBm	Max Power (W)	Result
5755	1	12.5	36.3	93	11.9	51.8	17.1	30.0	0.123	Pass
	3				12.9					
	4									
	2				11.2					
5795	1	16.0	36.3	93	15.7	122.7	20.9	30.0		Pass
	3				16.7					
	4									
	2				14.8					

MIMO Device 5725-5850 MHz PSD - FCC/IC

Mode: **n40**

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5755	1	12.5		93	-2.1	2.0	3.0	28.2	28.2	Pass
	3				-1.2					
	4									
	2				-3.0					
5795	1	16.0		93	1.5	4.7	6.7	28.2	28.2	Pass
	3				2.5					
	4									
	2				0.7					

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #2: Bandwidth Measurements

Date of Test: 3/30/2016 0:00
Test Engineer: Rafael Varelas
Test Location: FT Lab #4B

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

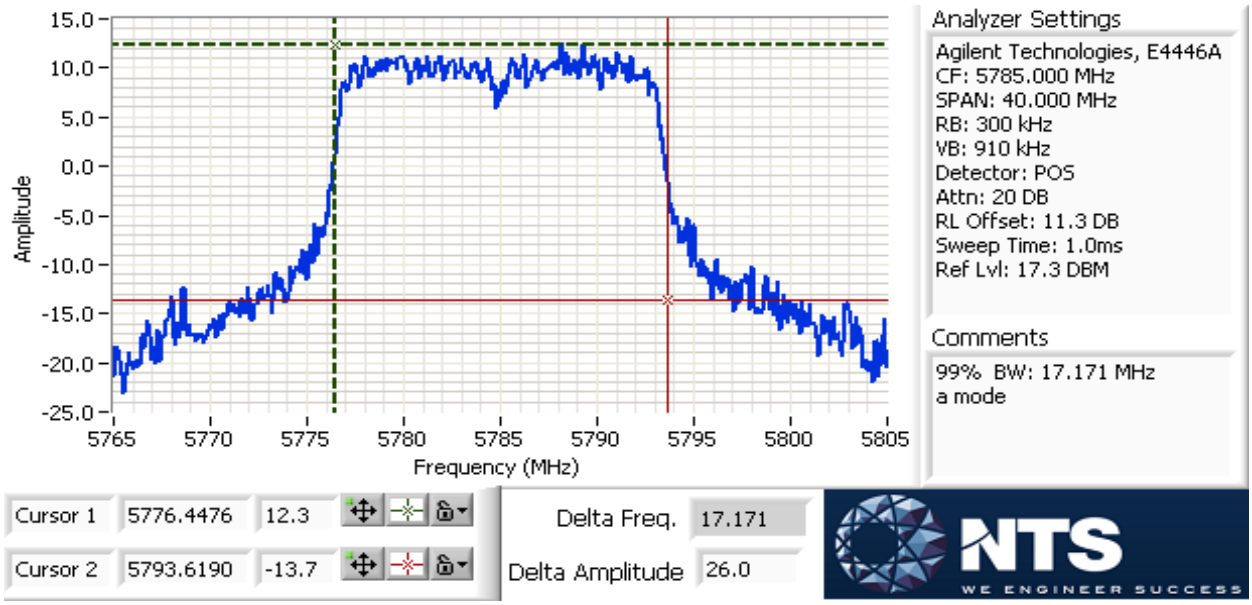
Mode: **11a**

5725-5850MHz band (UNII3)

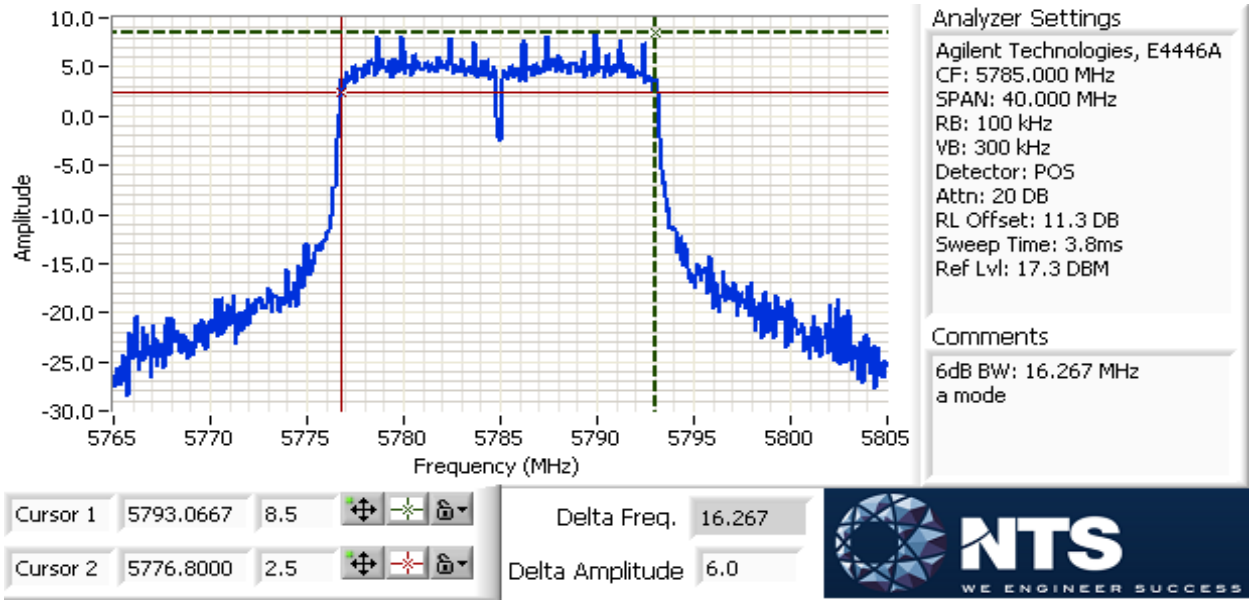
Testing performed on port: 3

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (MHz)	
		6dB	99%	6dB	99%
13.5	5745	16.4	16.7	100	300
18.0	5785	16.3	17.2	100	300
15.5	5825	16.4	16.8	100	300

Note 1:	6dB BW: RBW=100kHz, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time. 99% BW: RBW=1-5% of of 99%BW, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time.



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

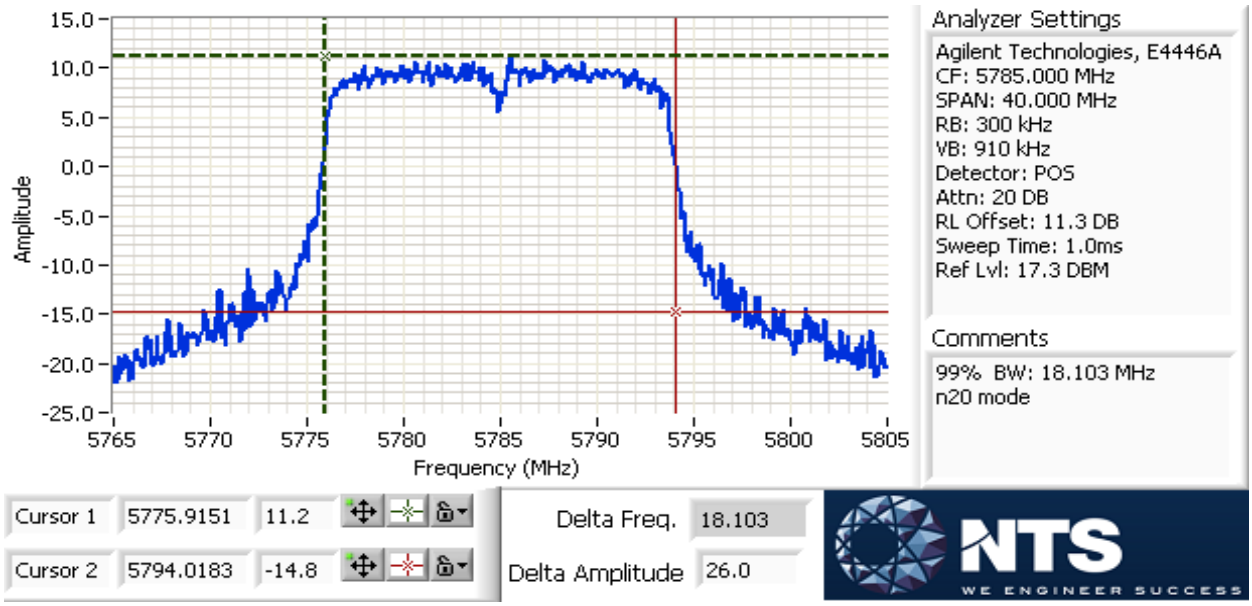
Mode: **n20**

5725-5850MHz band (UNII3)

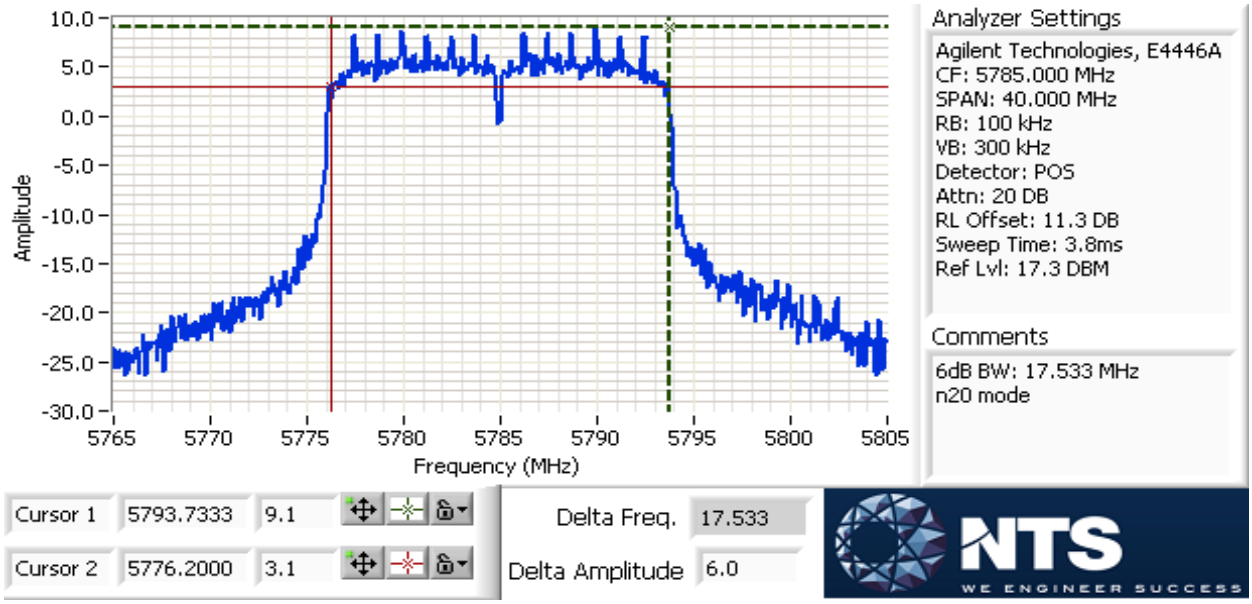
Testing performed on port: 3

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (kHz)	
		6dB	99%	6dB	99%
13.5	5745	17.6	17.9	100	300
18.0	5785	17.5	18.1	100	300
14.5	5825	17.6	17.9	100	300

Note 1:	6dB BW: RBW=100kHz, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time. 99% BW: RBW=1-5% of of 99%BW, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time.



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

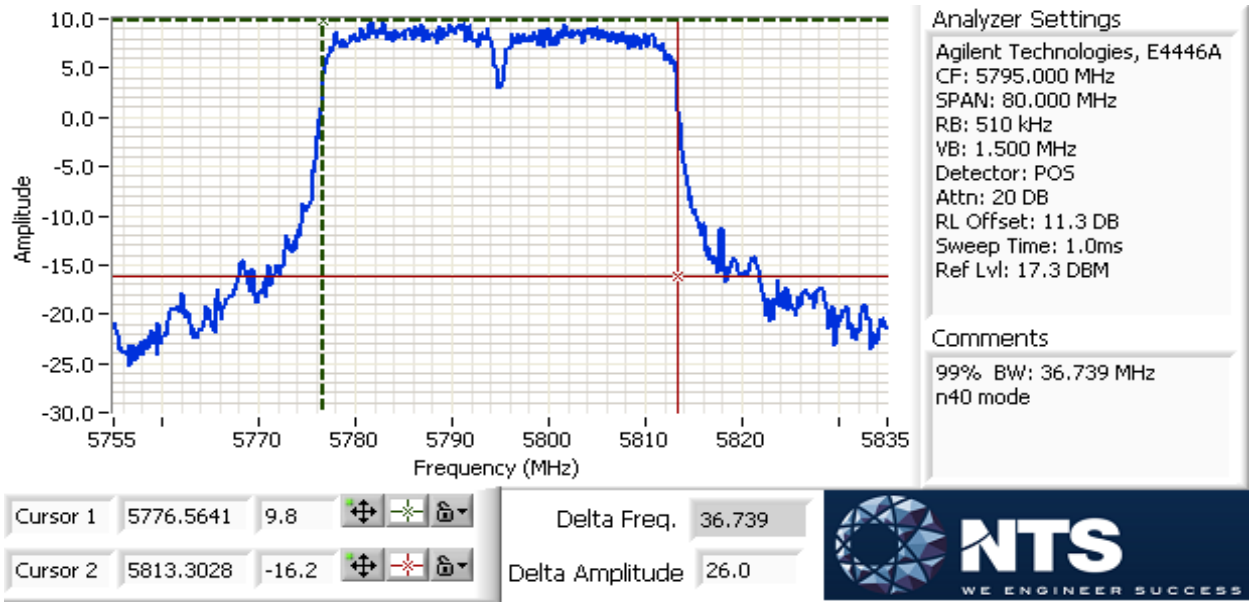
Mode: **n40**

5725-5850MHz band (UNII3)

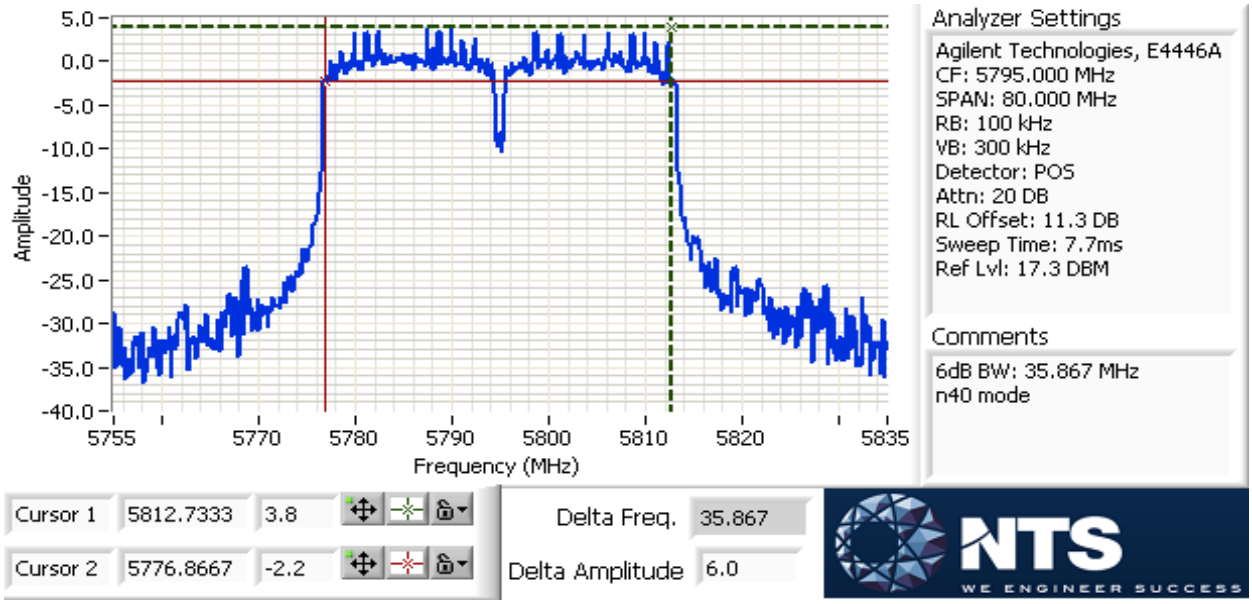
Testing performed on port: 3

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (kHz)	
		6dB	99%	6dB	99%
12.5	5755	36.4	36.6	100	500
16.0	5795	35.9	36.7	100	500

Note 1:	6dB BW: RBW=100kHz, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time. 99% BW: RBW=1-5% of of 99%BW, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time.



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A



Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

RSS-247 and FCC 15.407 (UNII) Radiated Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 20-22 °C
Rel. Humidity: 32-35 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	worse case of the UNII1 + 11b	5G: 36 2G: 1	5G: 18 2G: 18	5G: 18 2G: 18	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.8 dBµV/m @ 5440.0 MHz (-0.2 dB)
2	worse case of the UNII1 + 11b	5G: 48 2G: 11	5G: 18 2G: 18	5G: 16 2G: 18	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.5 dBµV/m @ 5439.9 MHz (-0.5 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold 50 traces. (method VB of KDB 789033)

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbs	0.97	Y	1.36	0.15	0.29	735
HT20	MCS0	0.96	Y	1.26	0.16	0.32	794
HT40	MCS0	0.93	Y	0.624	0.32	0.63	1603

Sample Notes

Sample S/N: CC0001614 MAC:000B868F4553
Driver: N/A
Antenna: Integral 3x3

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 2:	Emission has a duty cycle ≥ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces (method AD of KDB 789033)
Note 3:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep,max hold 50*1/DC traces (method VB of KDB 789033)
Note 4:	Emission has a duty cycle < 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100*1/DC traces, measurement corrected by Pwr correction factor (method AD of KDB 789033)

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #1, Radiated Spurious Emissions, 1,000 - 40,000 MHz.

Date of Test: 3/28/2016 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Ch #5 EUT Voltage: 120 VAC

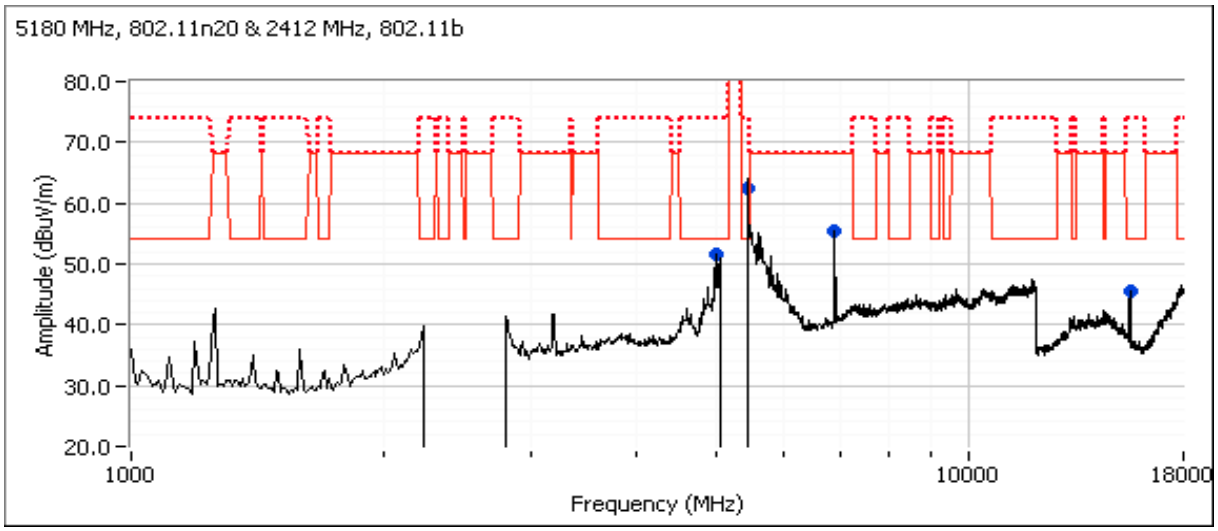
Channel: 36 Mode: HT20
Tx Chain: 3Tx Data Rate: MCS0

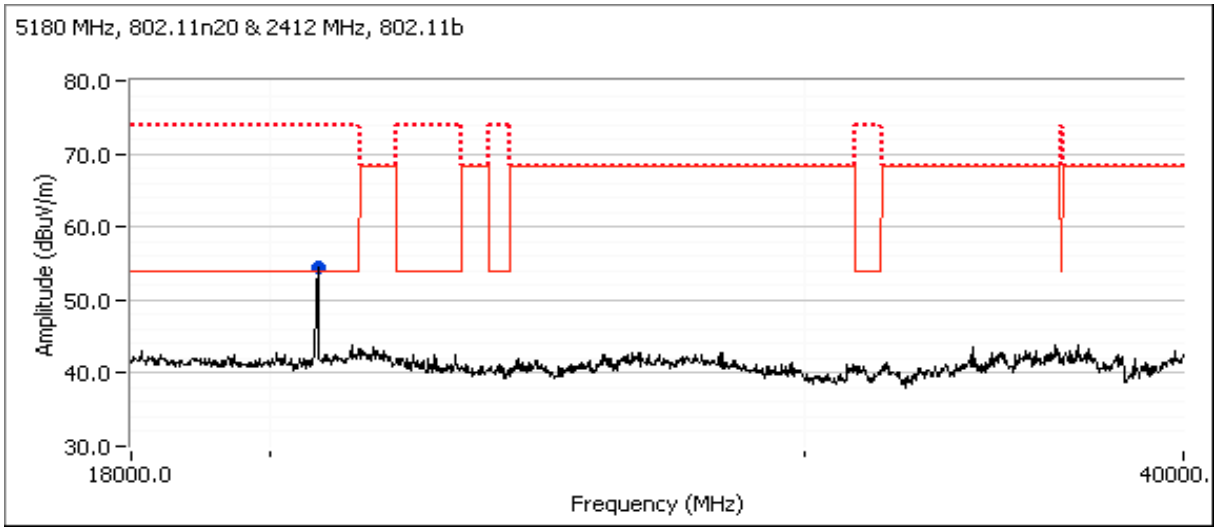
Channel: 1 Mode: 11b
Tx Chain: 2Tx Data Rate: 1Mb/s

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5440.000	53.8	H	54.0	-0.2	Avg	204	1.9	Note 3,RB 1 MHz;VB 1 kHz;Peak
5441.340	66.2	H	74.0	-7.8	PK	204	1.9	RB 1 MHz;VB 3 MHz;Peak
4997.100	43.3	V	54.0	-10.7	Avg	81	1.9	Note 3,RB 1 MHz;VB 1 kHz;Peak
4999.480	59.7	V	74.0	-14.3	PK	81	1.9	RB 1 MHz;VB 3 MHz;Peak
6906.670	57.6	V	68.3	-10.7	PK	21	1.1	RB 1 MHz;VB 3 MHz;Peak
15544.720	47.1	V	54.0	-6.9	Avg	297	1.8	Note 3,RB 1 MHz;VB 1 kHz;Peak
15542.720	60.6	V	74.0	-13.4	PK	297	1.8	RB 1 MHz;VB 3 MHz;Peak
20721.830	50.6	V	54.0	-3.4	Avg	345	1.2	Note 3,RB 1 MHz;VB 1 kHz;Peak
20721.300	63.3	V	74.0	-10.7	PK	345	1.2	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A





Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A

Run #2, Radiated Spurious Emissions, 1,000 - 40,000 MHz.

Date of Test: 3/28/2016 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Ch #5 EUT Voltage: 120 VAC

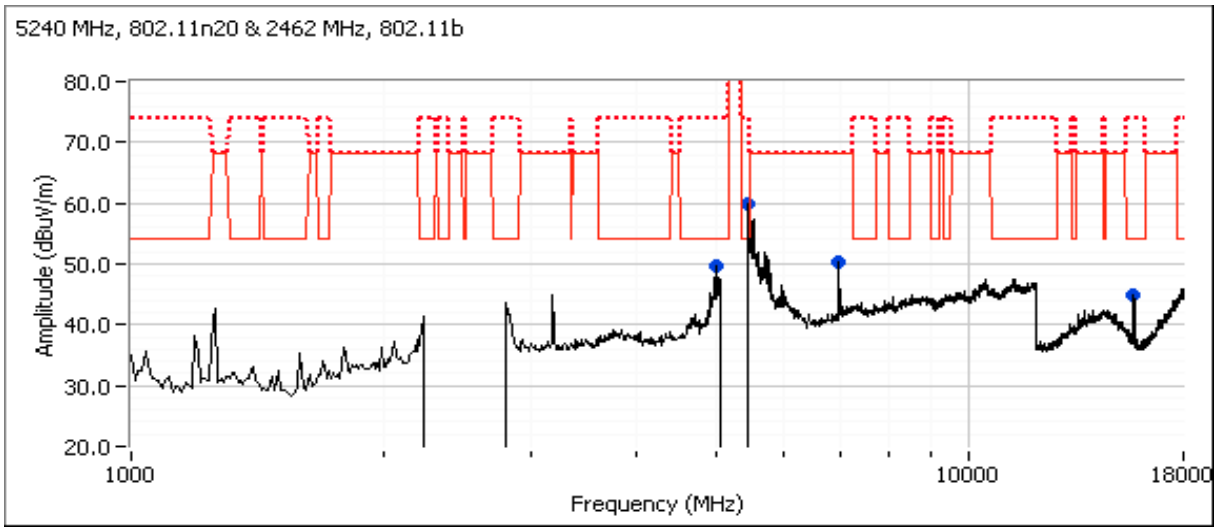
Channel: 48 Mode: HT20
Tx Chain: 3Tx Data Rate: MCS0

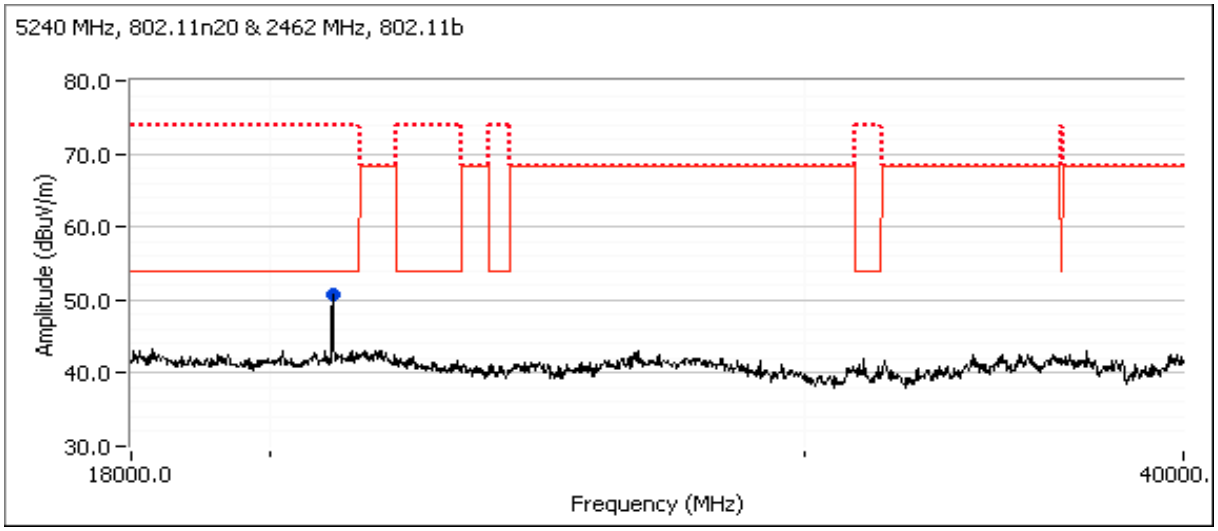
Channel: 11 Mode: 11b
Tx Chain: 2Tx Data Rate: 1Mb/s

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5439.920	53.5	V	54.0	-0.5	Avg	189	1.6	Note 3,RB 1 MHz;VB 1 kHz;Peak
5440.260	63.7	V	74.0	-10.3	PK	189	1.6	RB 1 MHz;VB 3 MHz;Peak
4981.990	42.3	V	54.0	-11.7	Avg	19	1.7	Note 3,RB 1 MHz;VB 1 kHz;Peak
4985.540	59.4	V	74.0	-14.6	PK	19	1.7	RB 1 MHz;VB 3 MHz;Peak
6986.640	54.4	V	68.3	-13.9	PK	14	1.8	RB 1 MHz;VB 3 MHz;Peak
15713.130	45.7	V	54.0	-8.3	Avg	284	1.8	Note 3,RB 1 MHz;VB 1 kHz;Peak
15713.800	59.9	V	74.0	-14.1	PK	284	1.8	RB 1 MHz;VB 3 MHz;Peak
20966.740	48.6	V	54.0	-5.4	Acg	300	1.5	Note 3,RB 1 MHz;VB 1 kHz;Peak
20969.070	63.3	V	74.0	-10.7	PK	300	1.5	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).

Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	N/A





Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	B

Conducted Emissions

(NTS Silicon Valley, Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 3/29/2016
Test Engineer: Rafael Varelas
Test Location: Fremont Chamber #5

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

For tabletop equipment, the EUT was located on a wooden table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80cm from the LISN. Remote support equipment was located outside of the semi-anechoic chamber. Any cables running to remote support equipment where routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

Ambient Conditions:

Temperature: 22.3 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	Class B	Pass	36.9 dBµV @ 0.632 MHz (-9.1 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

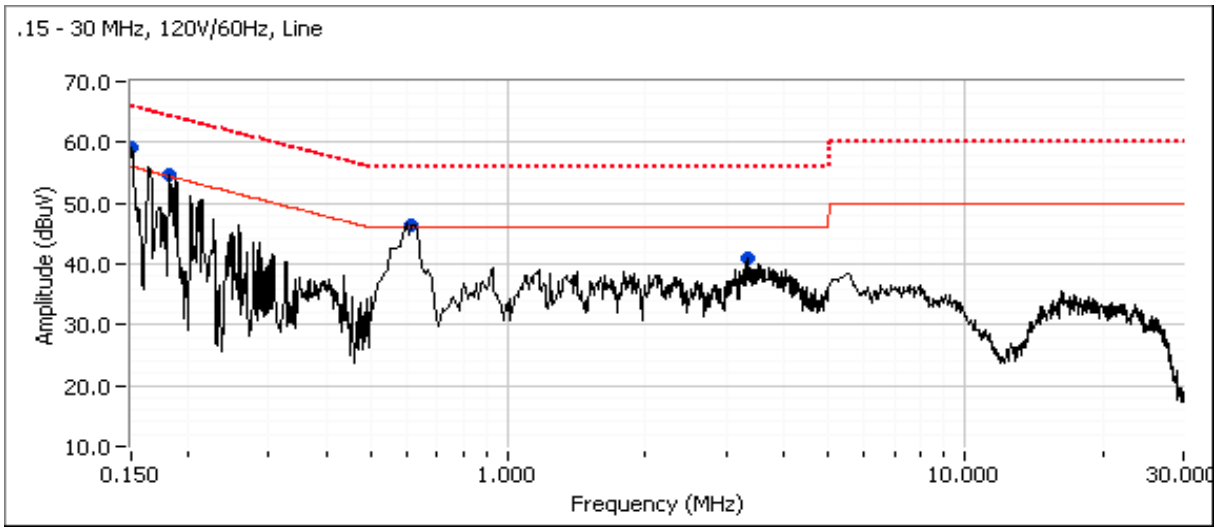
No deviations were made from the requirements of the standard.

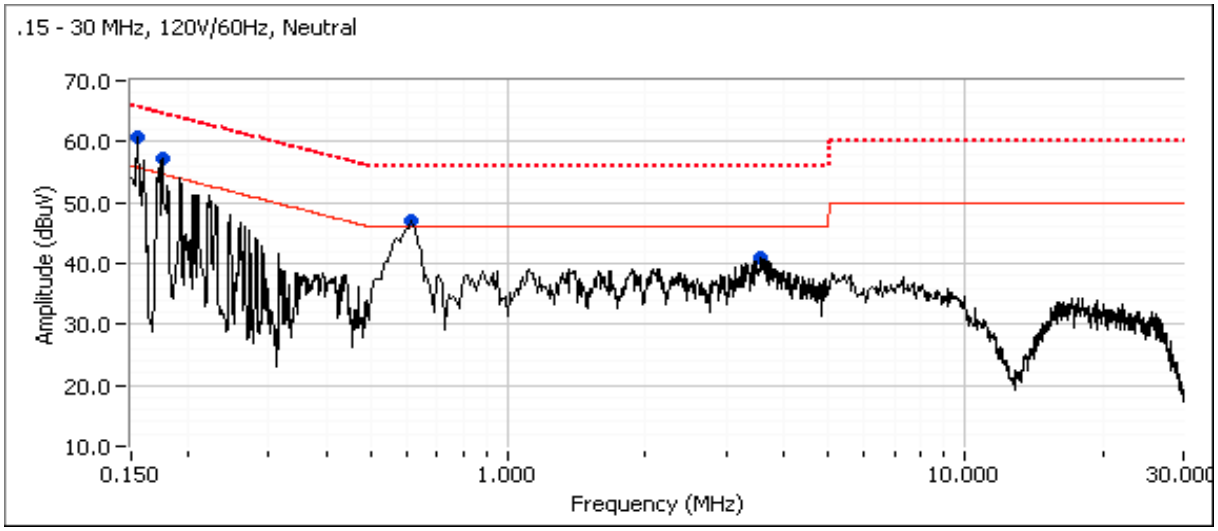
Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

Channel: 36 Mode: HT20
Tx Chain: 3Tx Data Rate: MCS0

Channel: 1 Mode: 11b
Tx Chain: 2Tx Data Rate: 1Mb/s





Client:	Aruba Networks	Job Number:	JD101099
Model:	RAP-155	T-Log Number:	T101294
		Project Manager:	Christine Krebill
Contact:	Rob Hastings	Project Coordinator:	-
Standard:	FCC 15.407	Class:	B

Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.150	59.1	Line 1	56.0	3.1	Peak	
0.181	54.6	Line 1	54.4	0.2	Peak	
0.632	46.5	Line 1	46.0	0.5	Peak	
3.324	40.8	Line 1	46.0	-5.2	Peak	
0.153	60.8	Neutral	55.7	5.1	Peak	
0.175	57.2	Neutral	54.7	2.5	Peak	
0.609	47.1	Neutral	46.0	1.1	Peak	
3.556	41.1	Neutral	46.0	-4.9	Peak	

Final quasi-peak and average readings

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.632	**36.9**	Line 1	46.0	**-9.1**	AVG	AVG (0.10s)
0.609	36.8	Neutral	46.0	-9.2	AVG	AVG (0.10s)
0.609	46.2	Neutral	56.0	-9.8	QP	QP (1.00s)
0.632	45.6	Line 1	56.0	-10.4	QP	QP (1.00s)
0.150	54.2	Line 1	66.0	-11.8	QP	QP (1.00s)
0.153	53.9	Neutral	65.8	-11.9	QP	QP (1.00s)
0.175	50.6	Neutral	64.7	-14.1	QP	QP (1.00s)
0.181	49.3	Line 1	64.4	-15.1	QP	QP (1.00s)
3.324	29.2	Line 1	46.0	-16.8	AVG	AVG (0.10s)
3.324	37.4	Line 1	56.0	-18.6	QP	QP (1.00s)
3.556	26.1	Neutral	46.0	-19.9	AVG	AVG (0.10s)
3.556	34.8	Neutral	56.0	-21.2	QP	QP (1.00s)
0.150	34.1	Line 1	56.0	-21.9	AVG	AVG (0.10s)
0.153	33.3	Neutral	55.8	-22.5	AVG	AVG (0.10s)
0.181	31.8	Line 1	54.4	-22.6	AVG	AVG (0.10s)
0.175	30.1	Neutral	54.7	-24.6	AVG	AVG (0.10s)

End of Report

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