

EMC Test Report

Application for Grant of Equipment Authorization

FCC Part 15, Subpart E

Model: APINH205 2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points

FCC ID: Q9DAPINH205

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REVISION HISTORY

Rev#	Date	Comments	Modified By
	January 26, 2015	First release	
1	February 10, 2015	Revised to correct model name	David Guidotti

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SCOPE

An electromagnetic emissions test has been performed on the Aruba Networks model APINH205 2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points, 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:

ANSI C63.10-2009
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 APINH205 2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points 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 APINH205 2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points and therefore apply only to the tested sample. The samples were selected and prepared by Tian Mendez 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 (FCC)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407(a)(1) (ii)	-	Output Power	a: 20.2 dBm (105 mW) n20: 20.2 dBm (106 mW) n40: 20.0 dBm (100 mW) ac80: 17.6 dBm (57 mW) (Max eirp: 0.421W)	30dBm	Complies
15.407(a)(1) (ii)	-	Power Spectral Density	a: 9.2 dBm/MHz n20: 9.0 dBm/MHz n40: 5.8 dBm/MHz ac80: 0.2 dBm/MHz	17 dBm/MHz	Complies

Operation in the 5.725 – 5.850 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(e)	-	6dB Bandwidth	a: 16.3 MHz n20: 17.6 MHz n40: 36 MHz ac80: 75.7MHz	<500kHz	Complies
15.407(a) (3)	-	Output Power	a: 20.7 dBm (117 mW) n20: 20.5 dBm (113 mW) n40: 20.2 dBm (106 mW) ac80: 19.3 dBm (85 mW) (Max eirp: 0.467 W)	30 dBm / 1@ (eirp < 36dBm)	Complies
15.407(a) (3)	-	Power Spectral Density	a: 8.5 dBm/MHz n20: 7.7 dBm/MHz n40: 4.6 dBm/MHz ac80: 0.4dBm/MHz	30 dBm/500kHz	Complies

Requirements for all U-NII/LELAN bands

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407	-	Modulation	Digital Modulation is used	Digital modulation is required	Complies
15.407(b) / 15.209		Spurious Emissions	78.2 dB μ V/m @ 5724.9 MHz (-0.1 dB)	Refer to page 21	Complies
15.407 (c)	-	Operation in the absence of information to transmit	Operation is discontinued in the absence of information	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	-	Frequency Stability	Frequency stability is +/- 20ppm	Signal shall remain within the allocated band	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	Antennas are internal and integral to the device	Unique or integral antenna required	Complies
15.207	-	AC Conducted Emissions	40.0 dB μ V @ 0.455 MHz (-6.8 dB)		Complies
15.247 (b) (5) 15.407 (f)	-	RF Exposure Requirements	Refer to MPE calculations in separate exhibit, RSS 102 declaration and User Manual statements.	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)	dB μ V/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dB μ V	0.15 to 30 MHz	± 2.4 dB

EQUIPMENT UNDER TEST (EUT) DETAILS**GENERAL**

The Aruba Networks model APINH205 2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points is a high-performance dual radio wireless and wired access point for hospitality and branch deployments.

The samples were received on December 10, 2014 and tested on December 16, 17, 18, 19, 22 and 23, 2014 and January 5, 2015. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Aruba	APINH202	2.4GHz/5GHz AP	L.AYM4A30030 (NTS Sample: 2014-2977)	Q9DAPINH205
Aruba	APINH202	2.4GHz/5GHz AP	L.AYM4A30017 (NTS Sample: 2014-2981)	Q9DAPINH205
Aruba	APINH202	2.4GHz/5GHz AP	Prototype (NTS Sample: 2014-2278)	Q9DAPINH205
Aruba	APINH202	2.4GHz/5GHz AP	Prototype (NTS Sample: 2273)	Q9DAPINH205

OTHER EUT DETAILS

802.11AC 2x2 dual radio access point

One radio fixed 2.4GHz, second radio fixed 5GHz

Radios can transmit simultaneous

Each radio is 2x2, does not support 1Tx modes

2.4GHz radio supports 11b/11g/n20/n40 data rates

5GHz radio supports 11a/n20/n40/VHT20/VHT40/VHT80 data rates

Indoor Use only

Internal antennas

ANTENNA SYSTEM

The antenna system consists of: Metal Sheet with 4dBi Gain Antennas for 2.4GHz Band and 6dBi Antenna for 5GHz Band

ENCLOSURE

The EUT enclosure measures approximately 15.5 by 9 by 4.3 centimeters. It is primarily constructed of uncoated plastic.

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
LTE LI TONE Electronics	LTE36E-S5-1	AC/DC Power Supply	-	-
IBM	Thinkpad T43	Laptop Computer	2669UYP	
-	-	USB/Serial Adapter		

The following equipment was used as remote support equipment for emissions testing:

Company	Model	Description	Serial Number	FCC ID
IBM	Thinkpad T43	Laptop Computer*	2669UYP	

* - Laptop was located remotely during the AC conducted emissions test.

EUT INTERFACE PORTS

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

Port	Connected To	Description	Cable(s)	
			Shielded or Unshielded	Length(m)
DC Power In	AC/DC Adapter	2Wire	Unshielded	1.9
Serial	USB/Serial Adapter / Remote Laptop	Multiconductor	Shielded	5.0
USB	Not connected	-	-	-
Ethernet (x4) Bottom	Not connected	-	-	-
ENET0 (back)	Not connected	-	-	-
Pass Through (back)	Not connected	-	-	-

AC Conducted Emissions

Port	Connected To	Description	Cable(s)	
			Shielded or Unshielded	Length(m)
DC Power In	AC/DC Adapter	2Wire	Unshielded	1.9
Serial	USB/Serial Adapter	Multiconductor	Shielded	5.0
USB	Not connected	-	-	-
Ethernet (x3) Bottom	Not connected	-	-	-
Ethernet Bottom	Remote laptop	CAT5	Unshielded	5.0
ENET0 (back)	Not connected	-	-	-
Pass Through (back)	Not connected	-	-	-

Note – preliminary testing showed that the addition of cables did not affect the radio related emissions.



Serial cable would not be used in normal operation. It was connected to allow for control of the radio for testing purposes.

EUT OPERATION

The laptop computer was used to configure the system for continuous transmission via the serial connection. The EUT was configured to transmit continuously at the channel noted at the worse case data rate for the mode under test. Power was set to the maximum. In some cases, the test was performed at a higher output level than the final regulatory power. The results for output power are the final regulatory powers.

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 FCC	Designation / Registration Numbers Canada	Location
Chamber 3	US0027	2845B-3	
Chamber 4	US0027	2845B-4	
Chamber 5	US0027	2845B-5	
Chamber 7	US0027	2845B-7	41039 Boyce Road Fremont, CA 94538-2435

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

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the 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 Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

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.

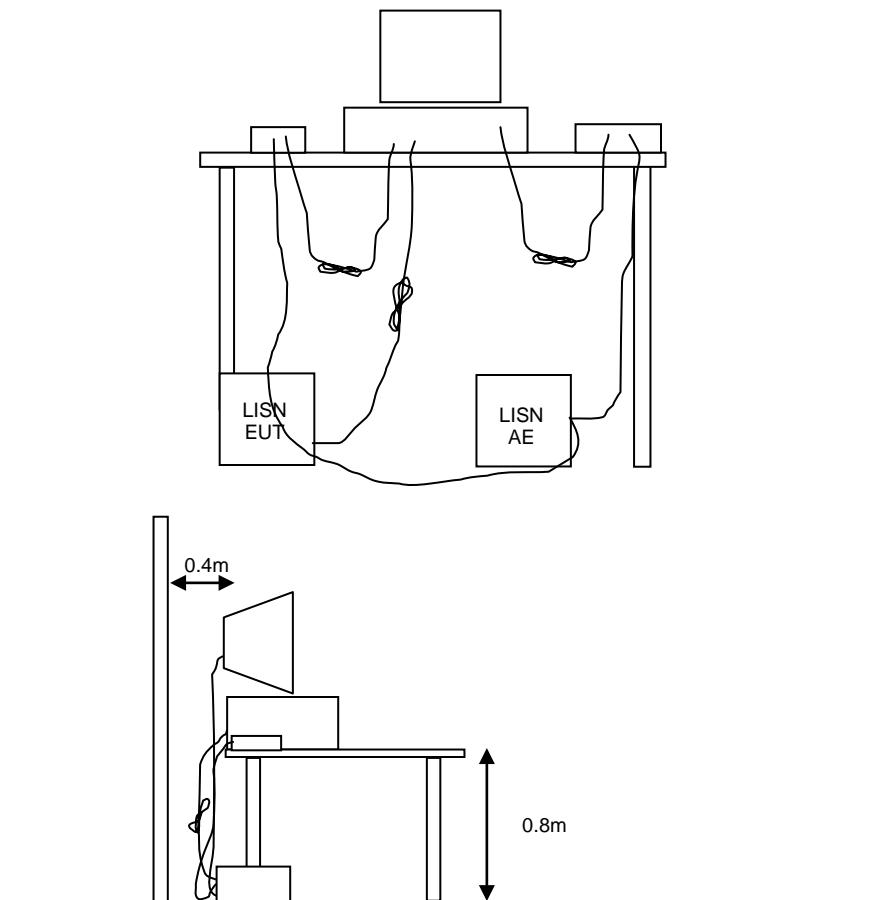


Figure 1 Typical Conducted Emissions Test Configuration

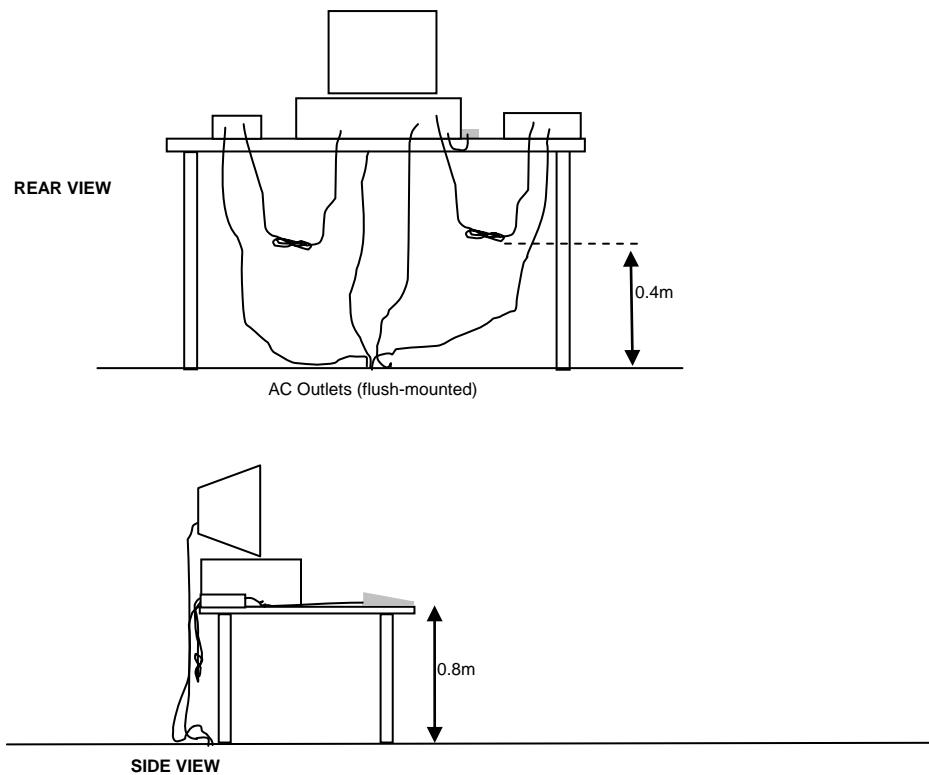
RADIATED EMISSIONS

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.

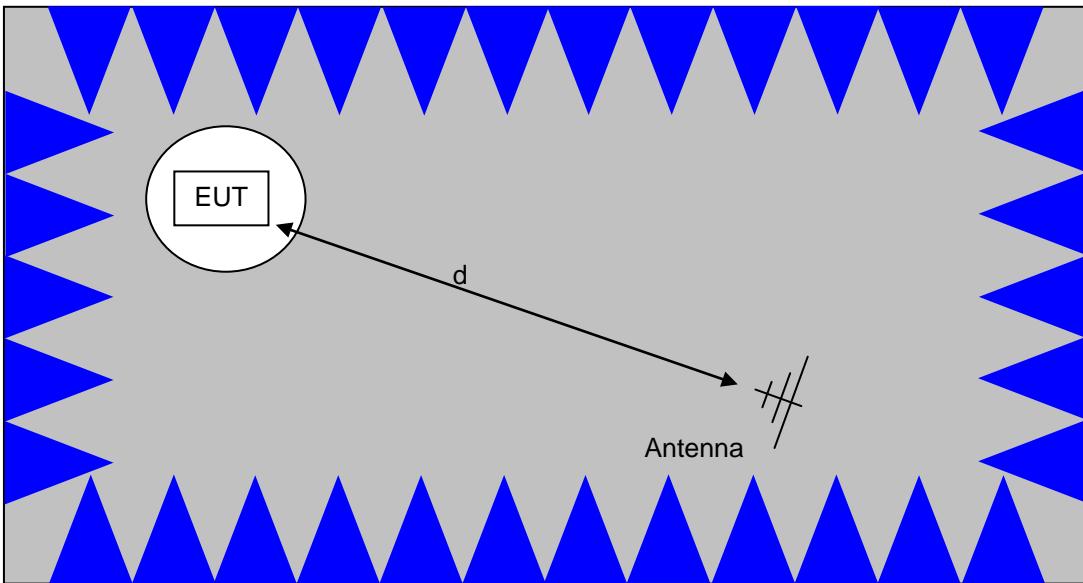
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

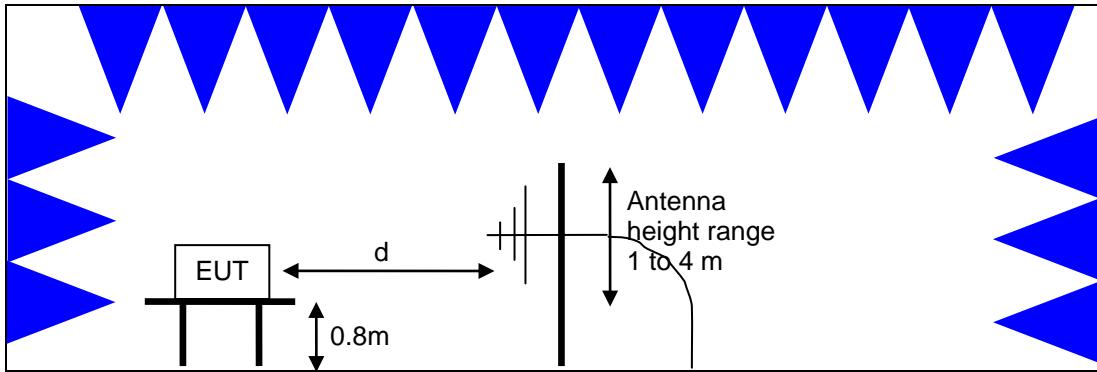


Typical Test Configuration for Radiated Field Strength Measurements



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.

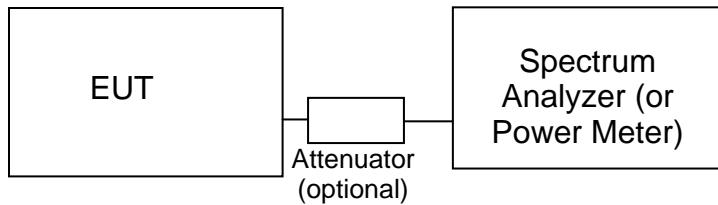
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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:

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands¹ (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

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

FCC 15.407 (a) OUTPUT POWER LIMITS

The table below shows the limits for output power and output power density.

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 – 5250 (indoor AP)	1000 mW (30 dBm)	17dBm/MHz
5725 – 5850	1 Watts (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.

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 a field strength of 68.3dBuV/m/MHz at a distance of 3m. For devices operating in the 5725-5850MHz bands under the LELAN/UNII rules, the limit within 10MHz of the allocated band is increased to -17dBm/MHz.

¹ The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

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:

$$F_d = 20 * \text{LOG10} (D_m / D_s)$$

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:

$$F_d = 40 * \text{LOG10} (D_m / D_s)$$

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:

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

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

T96923

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Calibrated</u>	<u>Cal Due</u>
Radiated Emissions, 1,000 - 6,500 MHz, 17-Dec-14					
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/29/2014	7/29/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/14/2014	6/14/2015
Radiated Emissions, 1 - 18 GHz, 19-Dec-14					
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/20/2013	12/20/2015
Hewlett Packard	High Pass filter, 8.2 GHz (Red System)	P/N 84300-80039 (84125C)	1152	8/1/2014	8/1/2015
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/20/2014	2/20/2015
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	9/16/2014	9/16/2015
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	9/16/2014	9/16/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	2/27/2014	2/27/2015
Radiated Emissions, 1000 - 12,000 MHz, 19-Dec-14					
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/20/2013	12/20/2015
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/20/2014	2/20/2015
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	9/16/2014	9/16/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	2/27/2014	2/27/2015
Radiated Emissions, 1 - 40 GHz and Band Edge, 23-Dec-14					
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/20/2013	12/20/2015
Hewlett Packard	High Pass filter, 8.2 GHz (Red System)	P/N 84300-80039 (84125C)	1152	8/1/2014	8/1/2015
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	6/21/2014	6/21/2015
Hewlett Packard	Head (Inc W1-W4, 1946 , 1947) Purple	84125C	1772	4/25/2014	4/25/2015
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	8/11/2014	8/11/2015
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/20/2014	2/20/2015
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	9/16/2014	9/16/2015
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	9/16/2014	9/16/2015
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	9/16/2014	9/16/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	2/27/2014	2/27/2015
Radiated Emissions, 18 - 40 GHz, 23-Dec-14					
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/6/2014	5/6/2015

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Calibrated</u>	<u>Cal Due</u>
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	5/6/2014	5/6/2015
A. H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	7/24/2014	7/24/2015
Radiated Emissions, 1,000 - 40,000 MHz, 05-Jan-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/20/2013	12/20/2015
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	7/15/2014	7/15/2015
Hewlett Packard	Head (Inc W1-W4, 1946 , 1947) Purple	84125C	1772	4/25/2014	4/25/2015
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	8/11/2014	8/11/2015
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/20/2014	2/20/2015
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/3/2014	10/3/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	2/27/2014	2/27/2015

T96924

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Calibrated</u>	<u>Cal Due</u>
Radio Antenna Port (Power and Spurious Emissions), 11-Dec-14 to 12-Dec-14					
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	2/6/2014	2/6/2015
Radio Antenna Port (Power and Spurious Emissions), 26-Dec-14					
Rohde & Schwarz	Signal Analyzer 20 Hz - 26.5 GHz	FSQ26	2327	4/28/2014	4/28/2015
Radio Antenna Port (Power and Spurious Emissions), 29-Dec-14					
Agilent Technologies	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	4/8/2014	4/8/2015
Radio Antenna Port (Power and Spurious Emissions), 30-Dec-14					
Agilent Technologies	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	4/8/2014	4/8/2015
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	2/6/2014	2/6/2015

T96924

Conducted Emissions - AC Power Ports, 06-Jan-15

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Calibrated</u>	<u>Cal Due</u>
EMCO	LISN, 10 kHz-100 MHz	3825/2	1293	2/13/2014	2/13/2015
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1401	5/15/2014	5/15/2015
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/14/2014	6/14/2015



Appendix B Test Data

T96924 Pages 27 – 64
(5G Conducted)

T96923 Pages 65 – 112
(5G Radiated)

T96924 Pages 113 – 117
AC conducted



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Product	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Emissions Standard(s):	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	
Immunity Standard(s):	-	Class:	-
		Environment:	-

EMC Test Data

For The

Aruba Networks

Product

APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points

Date of Last Test: 12/30/2014

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Power vs. Data Rate

In normal operating modes the card uses power settings stored on EEPROM to set the output power. For a given nominal output power the actual transmit power normally is reduced as the data rate increases, therefore testing was performed at the data rate in the mode with highest power to determine compliance with the requirements.

The following power measurements were made using a GATED average power meter and with the device configured in a continuous transmit mode on Chain 1 at the various data rates in each mode to verify the highest power mode:

Sample Notes

Sample S/N: L.AYM4A30017 (970AYM0KP00N016)
 Driver: 6.37 RC14.54, Version 6.37.14.54e (r425351 WLTEST)

Date of Test: 12/10/2014

Test Engineer: Mark Hill

Test Location: Lab#4

Mode	Data Rate	Power (dBm)	Power setting
802.11b	1	20.4	-q 78
	2	20.8	
	5.5	21.1	
	11	20.9	
802.11g	6	17.1	-q 72
	9	17.1	
	12	17.0	
	18	17.1	
	24	16.9	
	36	16.9	
	48	16.9	
	54	16.8	

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Mode	Data Rate	Power (dBm)	Power setting
802.11n 20MHz	6.5	17.1	-q 72
	13	17.0	
	19.5	16.9	
	26	16.9	
	39	16.9	
	52	16.7	
	58.5	16.6	
	65	16.7	
	78	17.1	
802.11n/ac 40MHz	13.5	16.5	-q 72
	27	16.4	
	40.5	16.1	
	54	16.1	
	81	15.9	
	108	15.7	
	121.5	15.8	
	135	15.8	
	162	16.3	
	180	16.3	
802.11ac 80MHz	29.3	16.3	-q 72
	58.5	16.2	
	87.8	16.1	
	117	16.0	
	175.5	15.8	
	234	15.8	
	266.3	15.6	
	292.5	15.6	
	351	15.5	
	390	15.5	

Note : Power setting - the software power setting used during testing, included for reference only.

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Duty Cycle

Date of Test: 12/10/2014

Test Engineer: Mark Hill

Test Location: Lab#4

Duty cycle measurements performed on the worse case data rate for power.

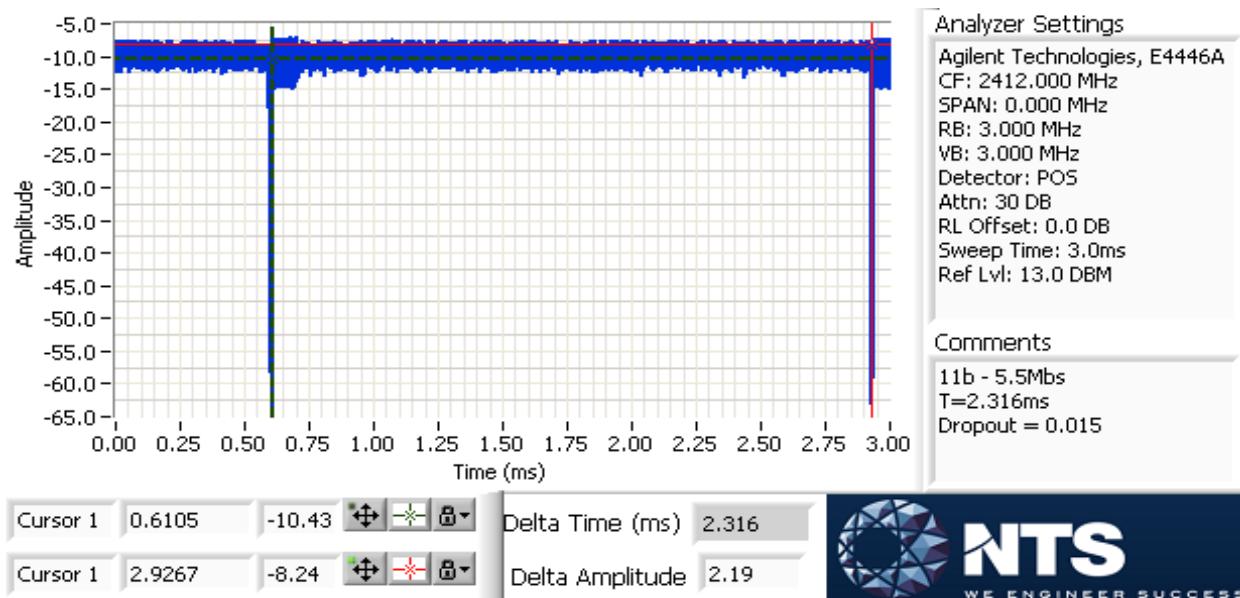
Notes: Measurements taken with maximum RBW/VBW settings allowed.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11b	5.5Mbs	0.99	Yes	2.316	0	0	432
11g	6Mbs	0.99	Yes	2.063	0.0	0.0	485
n20	MCS8	0.99	Yes	1.942	0.0	0.0	515
n40	MCS0	0.82	Yes	0.938	0.9	1.8	1066
ac80	VHT0	0.59	Yes	0.256	2.3	4.6	3906

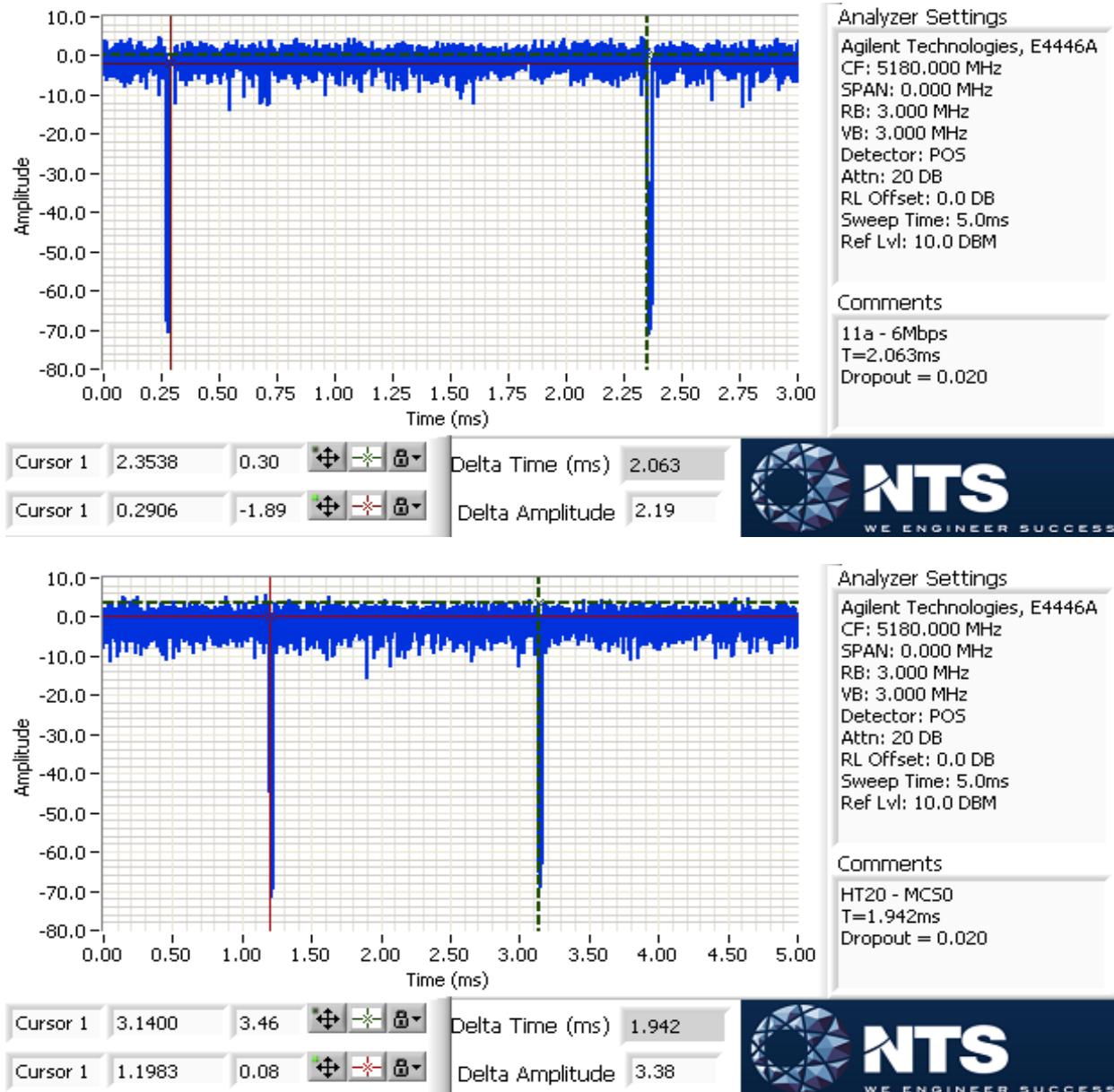
* Correction factor when using RMS/Power averaging - $10 \cdot \log(1/x)$

** Correction factor when using linear voltage average - $20 \cdot \log(1/x)$

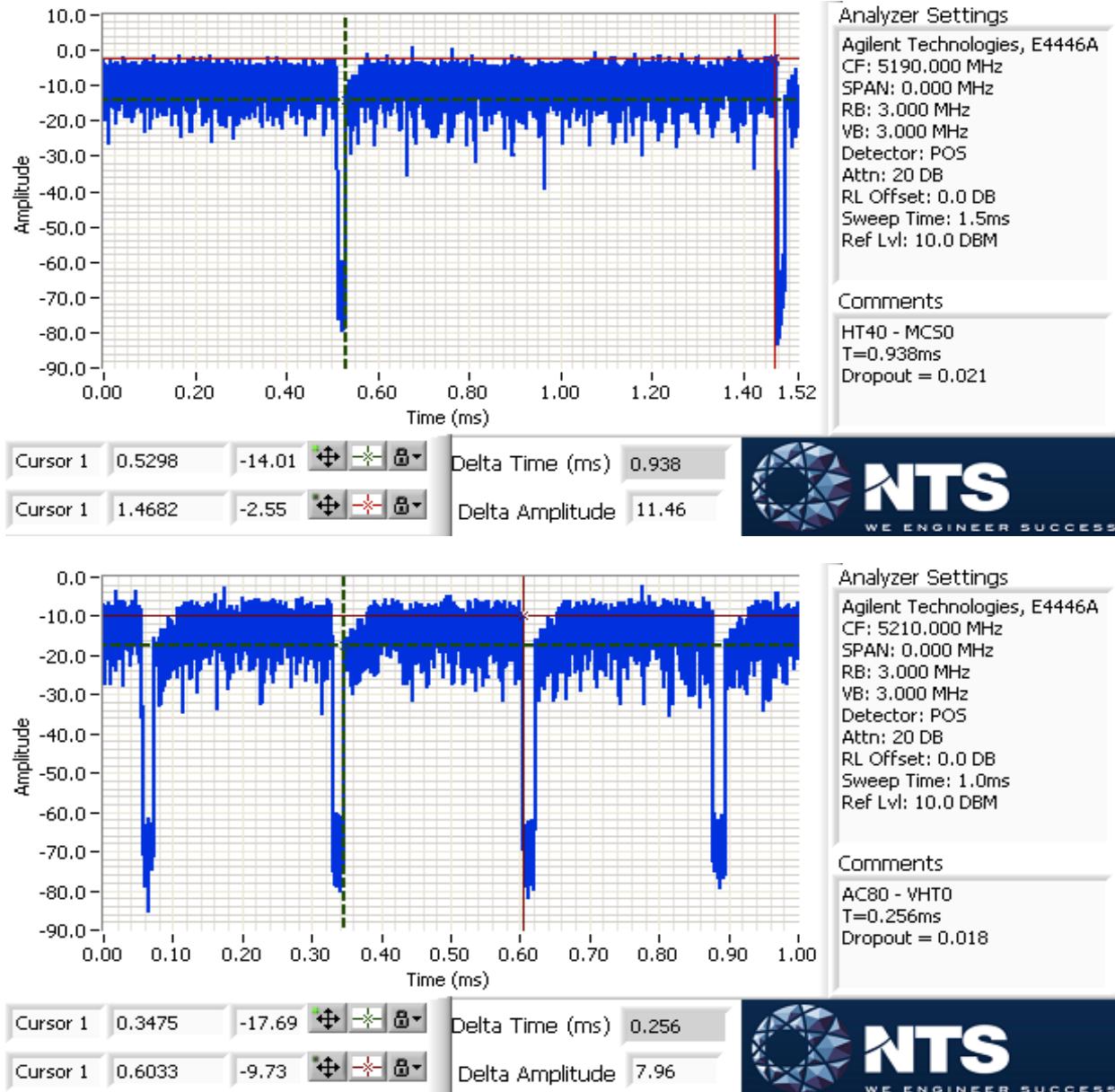
T = Minimum transmission duration



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

RSS-210 (LELAN) and FCC 15.407(UNII)

Antenna Port Measurements

Power, PSD, Peak Excursion, 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
FCC Only				
1	Power, 5150 - 5250MHz	15.407(a)(1)(ii)	Pass	a: 20.2 dBm (105 mW) n20: 20.2 dBm (106 mW) n40: 20.0 dBm (100 mW) ac80: 17.6 dBm (57 mW)
1	PSD, 5150 - 5250MHz	15.407(a)(1)(ii)	Pass	a: 9.2 dBm/MHz n20: 9.0 dBm/MHz n40: 5.8 dBm/MHz ac80: 0.2 dBm/MHz
IC Only				
1	Power, 5150 - 5250MHz	A9.2(1)	Pass	a: 11.9 dBm (16 mW) n20: 12.0 dBm (16 mW) n40: 15.0 dBm (32 mW) ac80: 17.0 (50 mW)
1	PSD, 5150 - 5250MHz	A9.2(1)		a: 0.9 dBm/MHz n20: 0.6 dBm/MHz n40: 0.8 dBm/MHz ac80: -0.4 dBm/MHz



EMC Test Data

Client:	Aruba Networks		Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points		T-Log Number:	T96924
Contact:	Tian Mendez		Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002		Project Coordinator:	-
Run #	Test Performed	Limit	Pass / Fail	Result / Margin
FCC Only				
1	Power, 5725 - 5850MHz	15.407(a)(3)	Pass	a: 20.7 dBm (117 mW) n20: 20.5 dBm (113 mW) n40: 20.2 dBm (106 mW) ac80: 19.3 dBm (85 mW)
1	PSD, 5725 - 5850MHz	15.407(a)(3)	Pass	a: 8.5 dBm/MHz n20: 7.7 dBm/MHz n40: 4.6 dBm/MHz ac80: 0.4 dBm/MHz
2	6dB Bandwidth - UNII3	15.407(e)	Pass	a: 16.3 MHz n20: 17.6 MHz n40: 36 MHz ac80: 75.7MHz
1	99% Bandwidth - UNII1	RSS 210 (Information only)	N/A	a: 17.2 MHz n20: 18.4 MHz n40: 36.7 MHz ac80: 75.8 MHz

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: 18-21 °C
Rel. Humidity: 30-45 %

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.



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC 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	0.99	Yes	2.063	0.0	0.0	485
n20	MCS8	0.99	Yes	1.942	0.0	0.0	515
n40	MCS0	0.82	Yes	0.938	0.9	1.8	1066
ac80	VHT0	0.59	Yes	0.256	2.3	4.6	3906

Sample Notes (For UNII 1 & 2)

Sample S/N: LAYM4A30030

Driver: 6.37 RC14.54

Tab6- Ant 1 (txchain 1)

Tab5- Ant 2 (txchain 2)

Pkteng tx 20 1500 0

Sample Notes (For UNII3)

Sample S/N: LAYM4A30017

Driver: 6.37 RC14.54

Tab6- Ant 1 (txchain 1)

Tab5- Ant 2 (txchain 2)

Pkteng tx 20 1500 0



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

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

Note 1:	Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, # of points in sweep \geq 2*span/RBW, RMS detector, power averaging on (transmitted signal was continuous) and power integration over 30, 60, 100 MHz (method SA-1 of KDB 789033).
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 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 RSS GEN - RB > 1% of span and VB \geq 3xRB
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.

Antenna Gain Information

Legacy Modes (11a)

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
5150-5250	6.0	6.0			No	Yes	Yes	No	6.0	9.0
5250-5350	6.0	6.0			No	Yes	Yes	No	6.0	9.0
5470-5725	6.0	6.0			No	Yes	Yes	No	6.0	9.0
5725-5825	6.0	6.0			No	Yes	Yes	No	6.0	9.0



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

11n/ac modes (n20/n40/ac80)

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
5150-5250	6.0	6.0			No	N/A	Yes	No	6.0	9.0
5250-5350	6.0	6.0			No	N/A	Yes	No	6.0	9.0
5470-5725	6.0	6.0			No	N/A	Yes	No	6.0	9.0
5725-5825	6.0	6.0			No	N/A	Yes	No	6.0	9.0

For devices that support CDD modes

Min # of spatial streams: 1
 Max # of spatial streams: 2

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. Spatial Multiplexing with Nant=4, NSS=2, for worse case condition. Array gain = $10 \log(4/2) = 3\text{dB}$.
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)



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

MIMO Device - 5150-5250 MHz Band - FCC

Date of Test: 12/26/2014

Config. Used: 1

Test Engineer: Deniz Demirci

Config Change: None

Test Location: FT Lab #4B

EUT Voltage: 120 VAC/ 60 Hz

Limits - Indoor Access Point (15.407(a)(1)(ii))

Mode: 11a						Max EIRP (mW): 419.50755			
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power ¹ dBm	Total Power mW	FCC Limit dBm	Max Power (W)	Result
5180	1	q72		99	17.1	105.4	20.2	30.0	
	2				17.4				
5200	1	q72		99	17.1	104.3	20.2	30.0	0.105
	2				17.3				
5240	1	q72		99	17.0	103.8	20.2	30.0	
	2				17.3				

5150-5250 PSD - FCC

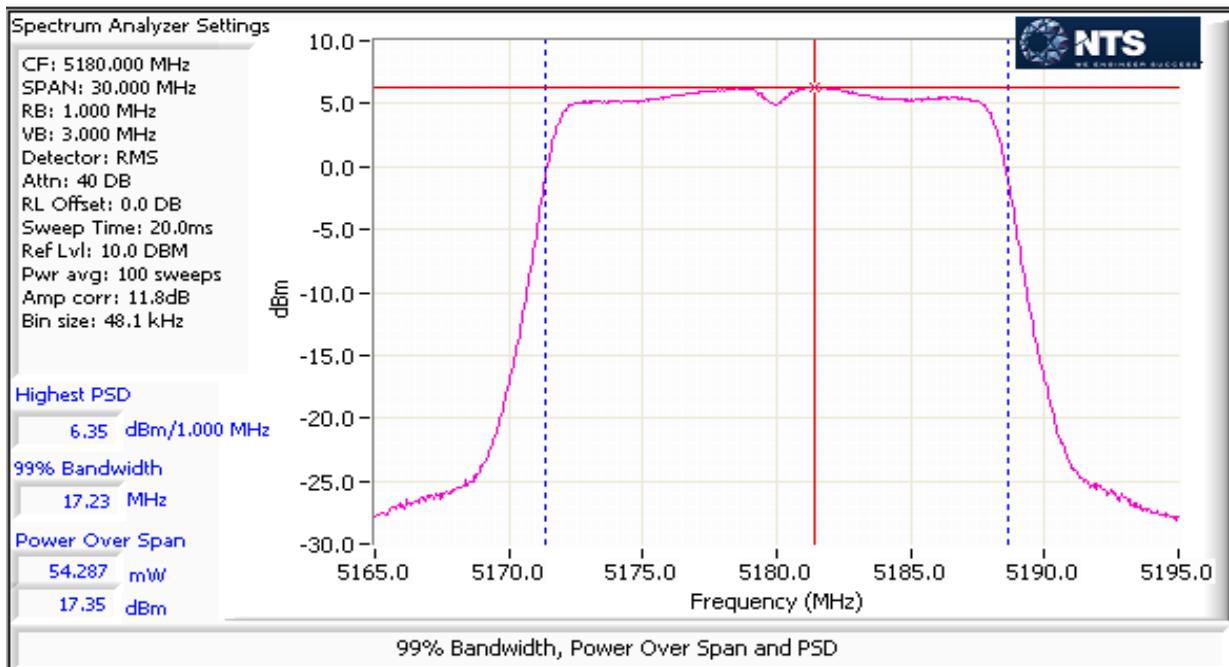
Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹ mW/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5180	1	q72		99	6.0	8.3	9.2	14.0	
	2				6.4				
5200	1	q72		99	6.0	8.2	9.2	14.0	
	2				6.3				
5240	1	q72		99	6.0	8.2	9.2	14.0	
	2				6.3				



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

MIMO Device - 5150-5250 MHz Band - FCC

Mode: n20 Max EIRP (mW): 420.9442

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power ¹ dBm	Total Power mW	FCC Limit dBm	Max Power (W)	Result
5180	1	q72		99	17.1	105.7	20.2	30.0	Pass
	2				17.4				
5200	1	q72		99	17.0	103.5	20.1	30.0	0.106 Pass
	2				17.3				
5240	1	q72		99	17.1	104.3	20.2	30.0	Pass
	2				17.3				

5150-5250 PSD - FCC

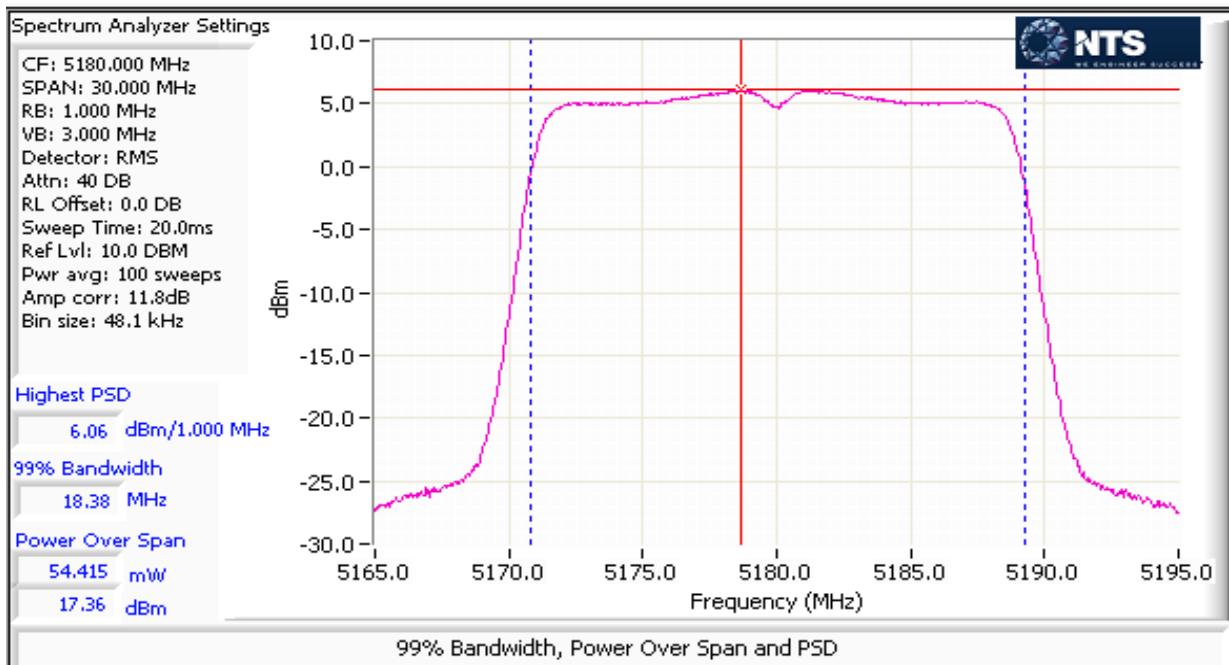
Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹ mW/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5180	1	q72		99	5.8	7.9	9.0	14.0	Pass
	2				6.1				
5200	1	q72		99	5.6	7.6	8.8	14.0	Pass
	2				6.0				
5240	1	q72		99	5.8	7.8	8.9	14.0	Pass
	2				6.1				



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

MIMO Device - 5150-5250 MHz Band - FCC

Mode: n40

Max EIRP (mW): 399.93801

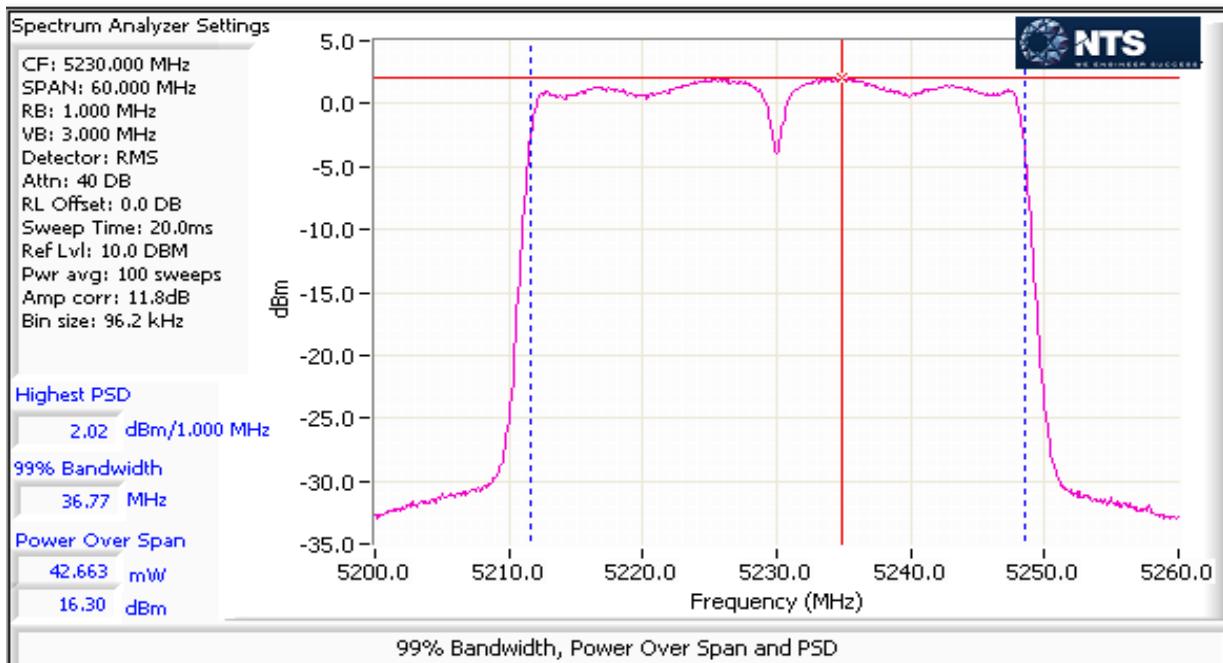
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power ¹		FCC Limit dBm	Max Power (W)	Result				
						mW	dBm							
5190	1	q65		82	14.8	70.4	18.5	30.0	0.100	Pass				
					14.4									
	2				14.4									
	1	q72			16.3	100.5	20.0	30.0						
	2				16.0									

5150-5250 PSD - FCC

Mode: n40

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹		FCC Limit dBm/MHz	IC Limit dBm/MHz	Result				
						mW/MHz	dBm/MHz							
5190	1	q65		82	0.5	2.7	4.2	14.0	0.100	Pass				
					0.2									
	2				0.2									
	1	q72			2.0	3.8	5.8	14.0						
	2				1.9									

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

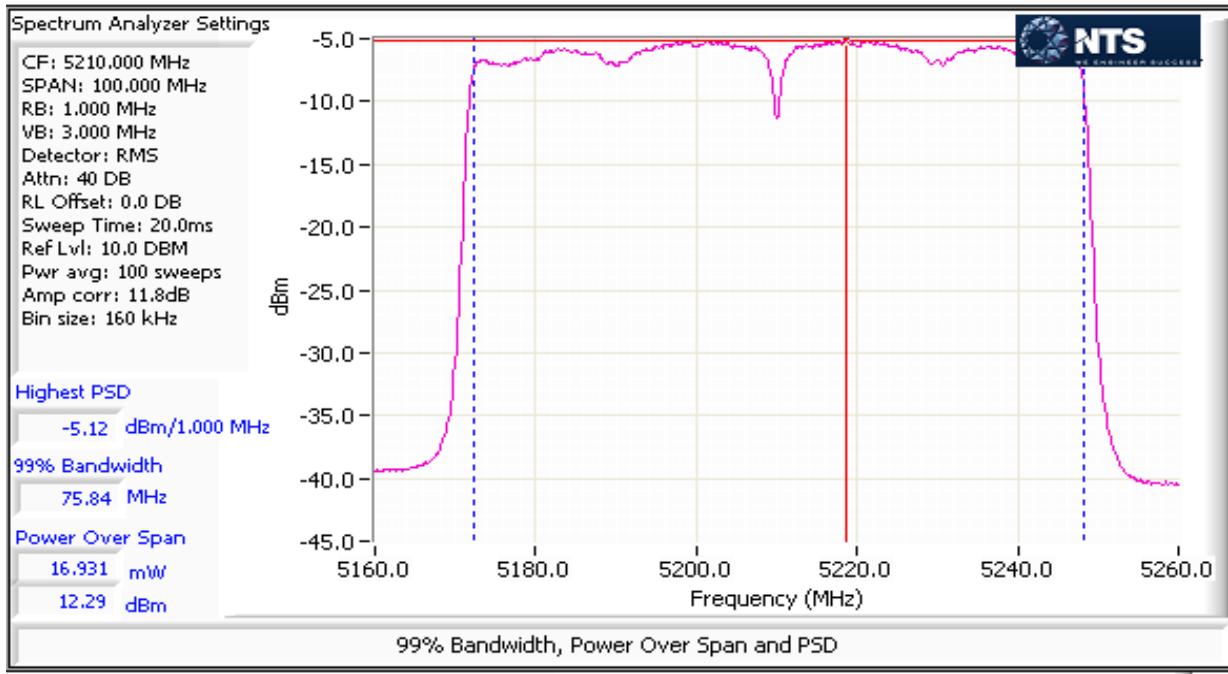
MIMO Device - 5150-5250 MHz Band - FCC
Mode: ac80

Max EIRP (mW): 228.12828

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power ¹ mW	FCC Limit dBm	Max Power (W)	Result
5210	1	q53		59	12.3	57.3	17.6	30.0	0.057
	2				12.3				

5150-5250 PSD - FCC
Mode: ac80

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹ mW/MHz	FCC Limit dBm	IC Limit dBm/MHz	Result
5210	1	q53		59	-5.1	1.0	0.2	14.0	Pass
	2				-5.1				





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

MIMO Device - 5150-5250 MHz Band - Industry Canada

Mode: 11a Max EIRP (mW): 62.3

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power ¹ dBm	Total Power dBm	Total Power dBm (eirp)	IC limit dBm (eirp)	Max Power (W)	Result
5180	1	q36	17.2	99	8.9	11.9	17.9	22.4	0.016	Pass
	2				9.0					
5200	1	q36	17.2	99	8.6	11.7	17.7	22.4	0.016	Pass
	2				8.8					
5240	1	q36	17.2	99	8.6	11.8	17.8	22.4	0.016	Pass
	2				8.9					

5150-5250 PSD - Industry Canada

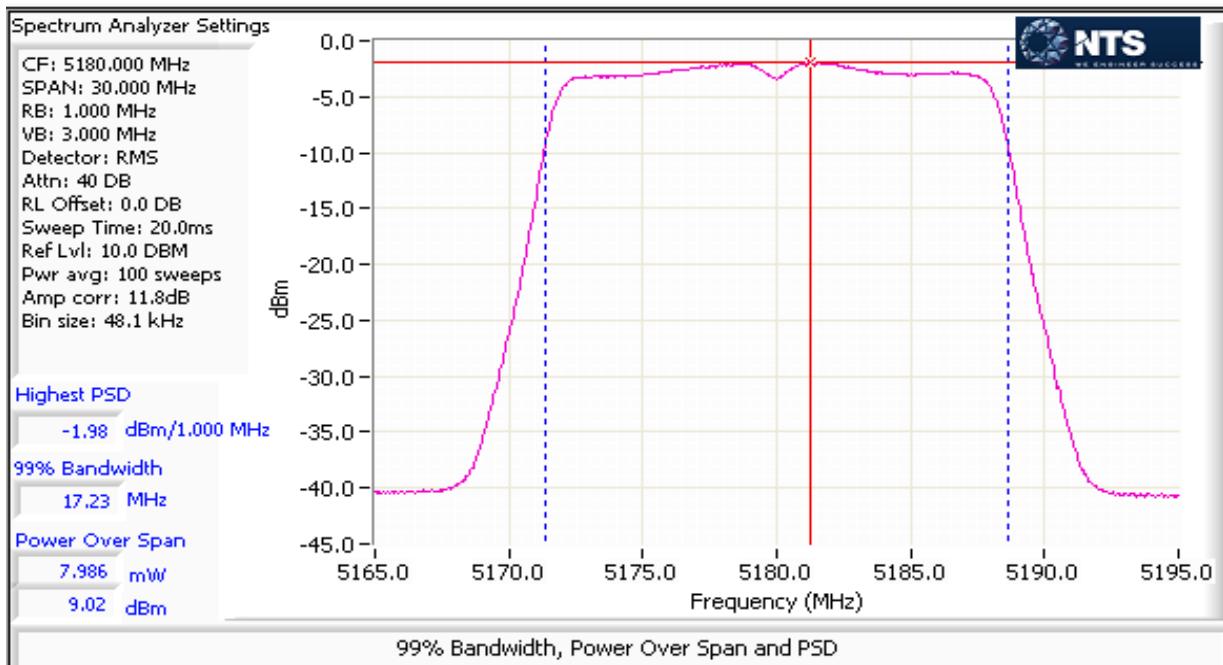
Mode: 11a

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	IC Limit ³ dBm/MHz	Result
5180	1	q36	17.2	99	-2.2	1.2	0.9	1.0	1.0	Pass
	2				-2.0					
5200	1	q36	17.2	99	-2.4	1.2	0.7	1.0	1.0	Pass
	2				-2.2					
5240	1	q36	17.2	99	-2.4	1.2	0.7	1.0	1.0	Pass
	2				-2.2					



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-

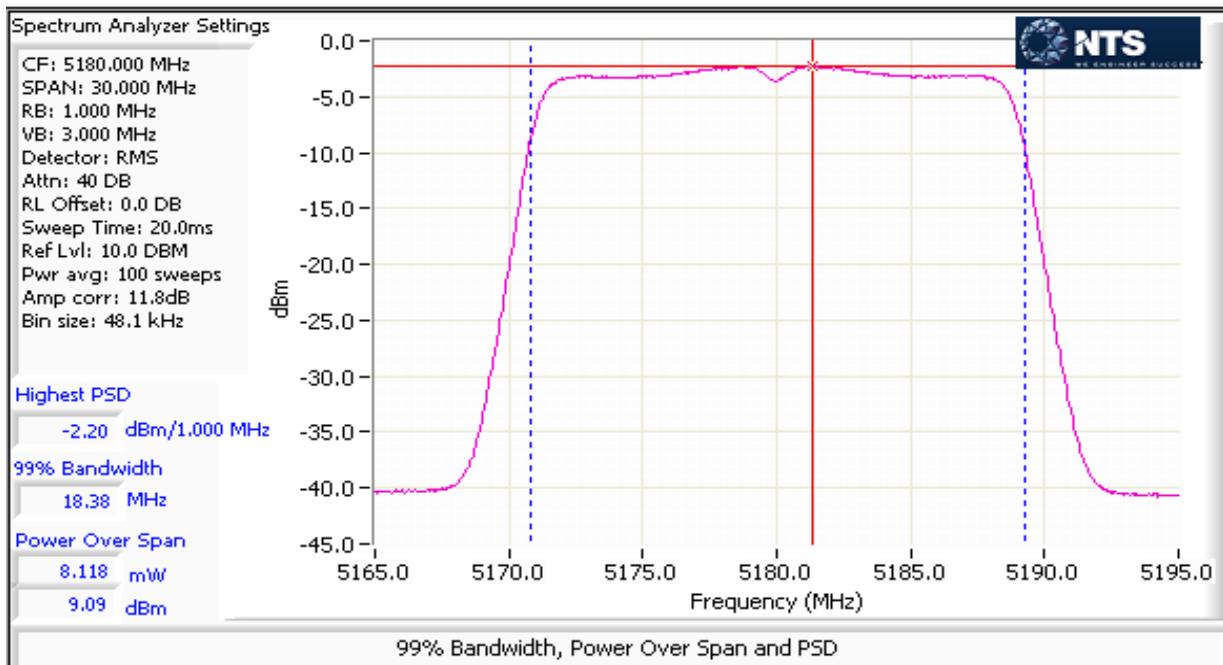
MIMO Device - 5150-5250 MHz Band - Industry Canada

Mode: n20							Max EIRP (mW):	62.6		
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power ¹ dBm	Total Power dBm	Power dBm (eirp)	IC limit dBm (eirp)	Max Power (W)	Result
5180	1	q37	18.4	99	8.8	12.0	18.0	22.6	0.016	Pass
	2				9.1					
5200	1	q37	18.4	99	8.8	11.9	17.9	22.6	0.016	Pass
	2				9.0					
5240	1	q37	18.4	99	8.7	11.9	17.9	22.6	0.016	Pass
	2				9.0					

5150-5250 PSD - Industry Canada

Mode: n20							FCC Limit	IC Limit	Result
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹ mW/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	
5180	1	q37	18.4	99	-2.6	1.2	0.6	1.0	Pass
	2				-2.2				
5200	1	q37	18.4	99	-2.5	1.1	0.6	1.0	Pass
	2				-2.3				
5240	1	q37	18.4	99	-2.6	1.1	0.6	1.0	Pass
	2				-2.3				

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

MIMO Device - 5150-5250 MHz Band - Industry Canada

Mode: n40							Max EIRP (mW):	126.6		
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power ¹ dBm	Total Power dBm	Power dBm (eirp)	IC limit dBm (eirp)	Max Power (W)	Result
5190	1	q48	36.7	82	11.4	15.0	21.0	23.0	0.032	Pass
	3									
	4									
	2				10.9					
5230	1	q48	36.7	82	11.3	14.9	20.9	23.0	0.032	Pass
	3									
	4									
	2				10.7					

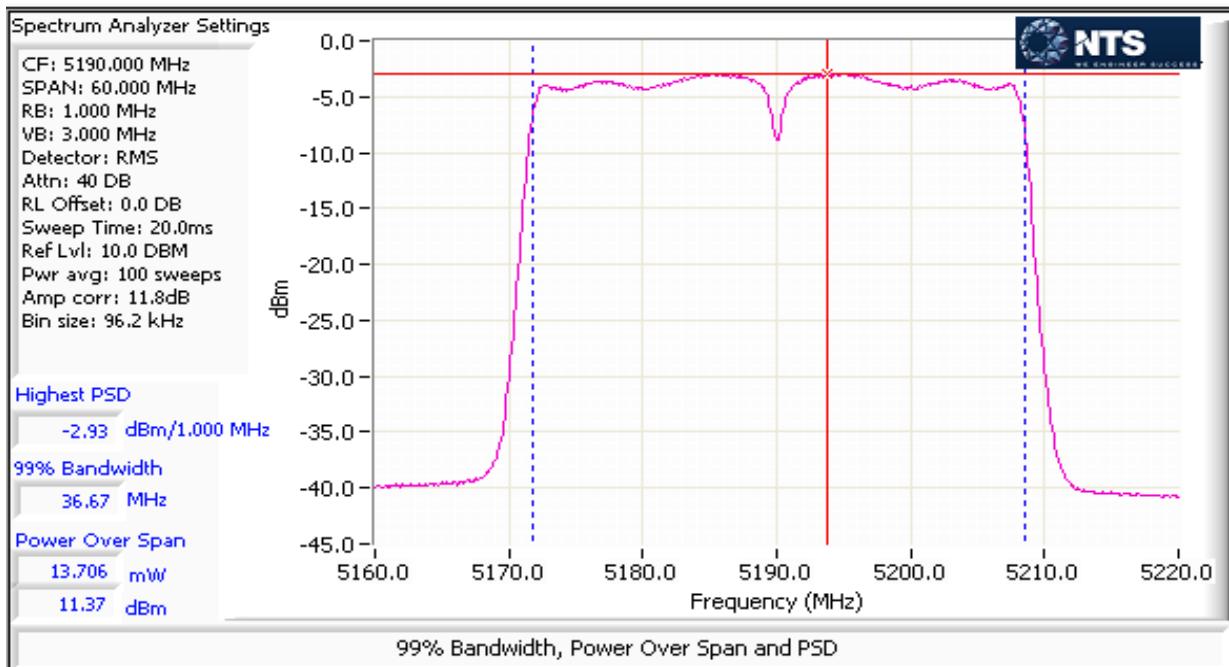
5150-5250 PSD - Industry Canada

Mode: n40							FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹ mW/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5190	1	q48	36.7	82	-2.9	1.2	0.8	1.0	Pass
	3								
	4								
	2				-3.3				
5230	1	q48	36.7	82	-3.0	1.2	0.6	1.0	Pass
	3								
	4								
	2				-3.6				



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A





EMC Test Data

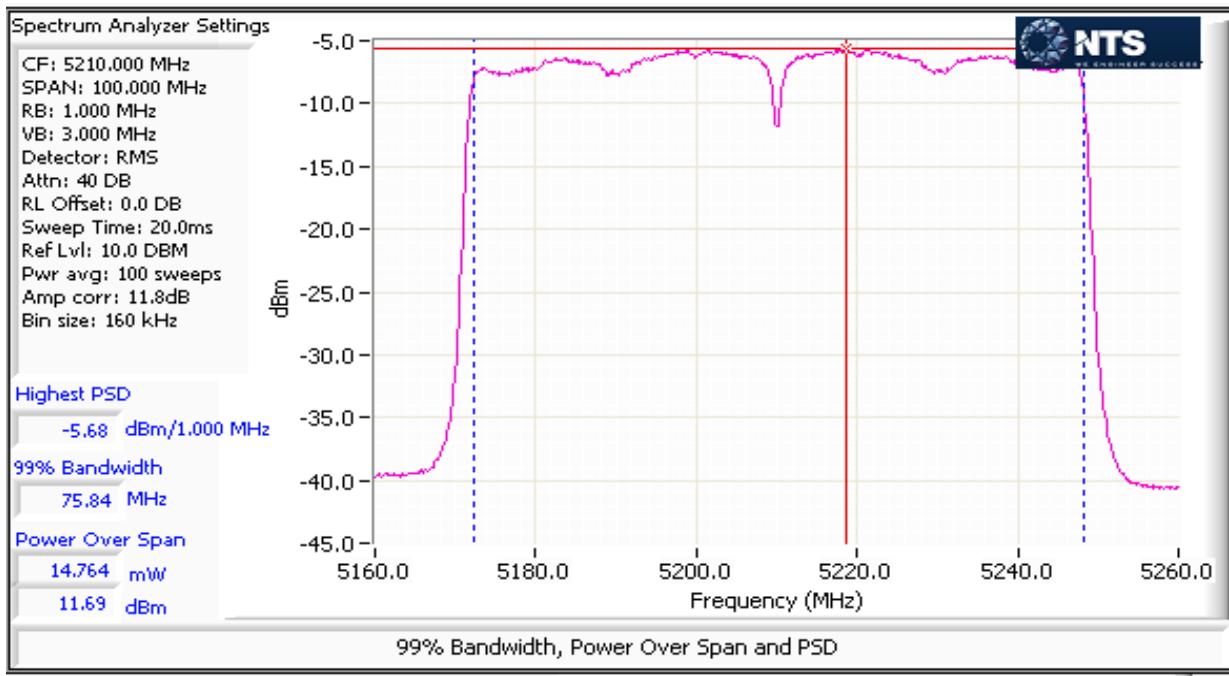
Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

MIMO Device - 5150-5250 MHz Band - Industry Canada

Mode: ac80						Max EIRP (mW): 198.5				
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power ¹ dBm	Total Power dBm	Power dBm (eirp)	IC limit dBm (eirp)	Max Power (W)	Result
5210	1	q50	75.8	59	11.7	17.0	22.98	23.00	0.050	Pass
	2				11.7					

5150-5250 PSD - Industry Canada

Mode: ac80						FCC Limit				IC Limit	Result
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹ mW/MHz	PSD dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result	
5210	1	q50	75.8	59	-5.7	0.9	-0.4	1.0	1.0	Pass	
	2				-5.7						





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

MIMO Device - 5725-5850 MHz Band - FCC

Date of Test: 12/11/14, 12/29/14

Config. Used: 1

Test Engineer: Jack Liu

Config Change: None

Test Location: FT Lab #4B, 4A

EUT Voltage: 120V/60Hz

Mode: 11a

Max EIRP (mW): 467.4

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power ¹ mW	FCC Limit dBm	Max Power (W)	Result
5745	1	-q65		99.0	16.2	88.0	19.4	30.0	Pass
	2				16.7				
	1				16.8				
	2				17.5				
5785	1	-q70		99.0	17.4	104.3	20.2	30.0	0.117
	2				17.5				
	1				17.4				
	2				18.0				
5825	1	-q72		99.0	17.4	117.4	20.7	30.0	Pass
	2				18.0				

MIMO Device 5725-5850 PSD - FCC

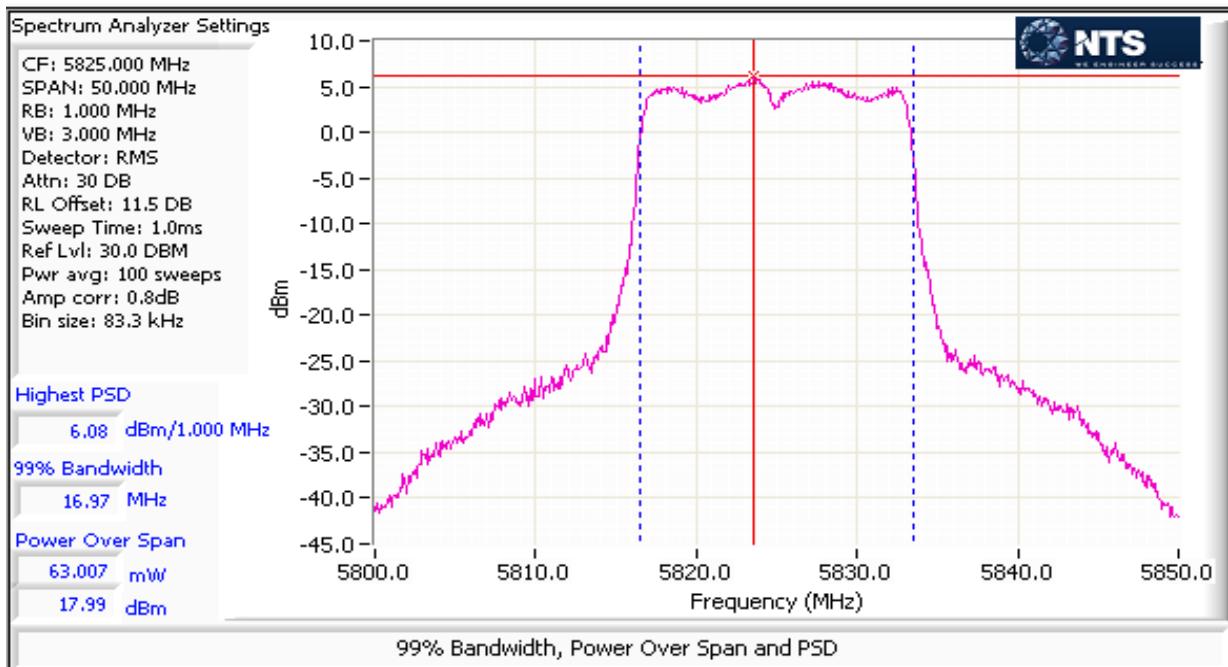
Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹ mW/MHz	FCC Limit dBm/500kHz	IC Limit dBm/500kHz	Result
5745	1	-q65		99.0	3.6	5.2	7.1	27.0	- Pass
	2				4.6				
	1				4.4				
	2				5.5				
5785	1	-q70		99.0	4.4	6.2	8.0	27.0	- Pass
	2				5.5				
	1				4.9				
	2				6.1				
5825	1	-q72		99.0	4.9	7.1	8.5	27.0	- Pass
	2				6.1				



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

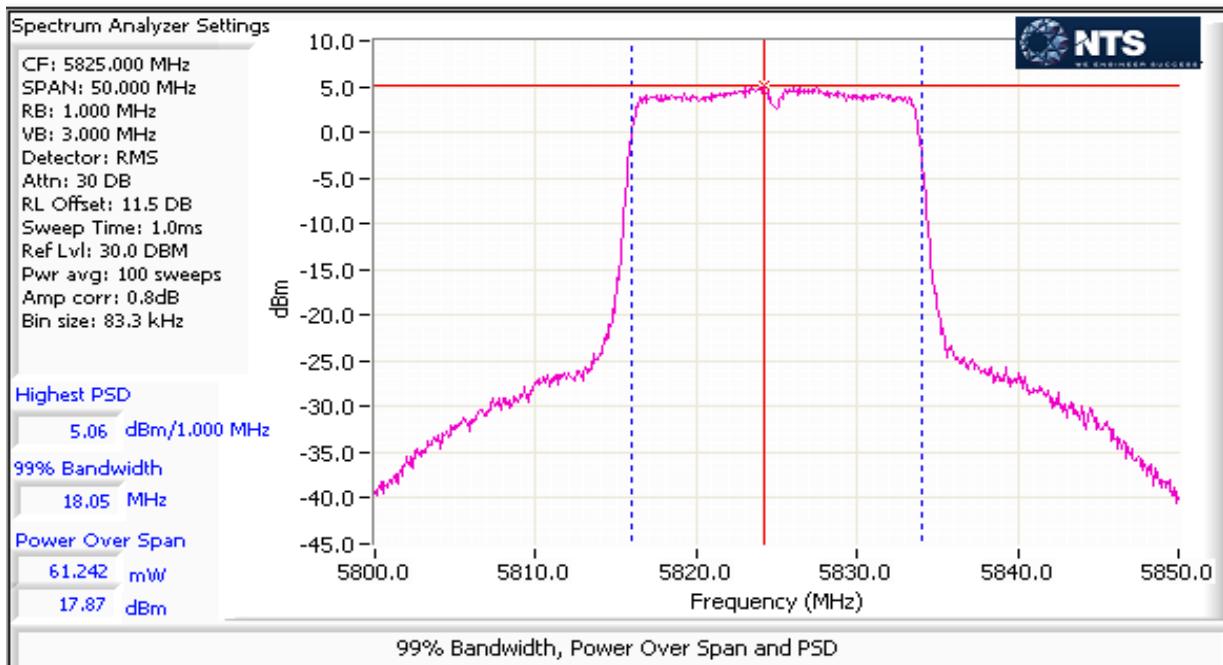
MIMO Device - 5725-5850 MHz Band - FCC

Mode: n20							Max EIRP (mW):	448.4	
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power ¹ mW	FCC Limit dBm	Max Power (W)	Result
5745	1	-q65		99.0	16.1	88.0	19.4	30.0	Pass
	2				16.8				
5785	1	-q72		99.0	17.1	108.7	20.4	30.0	0.113 Pass
	2				17.6				
5825	1	-q72		99.0	17.1	112.6	20.5	30.0	Pass
	2				17.9				

MIMO Device 5725-5850 PSD - FCC

Mode: n20							FCC Limit dBm/500kHz	IC Limit	Result
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹ mW/MHz	FCC Limit dBm/MHz		
5745	1	-q65		99.0	3.1	4.5	6.5	27.0	- Pass
	2				3.9				
5785	1	-q72		99.0	4.3	5.9	7.7	27.0	- Pass
	2				5.0				
5825	1	-q72		99.0	4.3	5.9	7.7	27.0	- Pass
	2				5.1				

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

MIMO Device - 5725-580 MHz Band - FCC

Mode: n40						Max EIRP (mW): 421.4				
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power ¹ mW	FCC Limit dBm	Max Power (W)	Result	
5755	1	-q65		82.0	15.2	82.0	19.1	30.0	0.106	Pass
	2				15.3					
5795	1	-q72		82.0	16.3	105.9	20.2	30.0	0.106	Pass
	2				16.4					

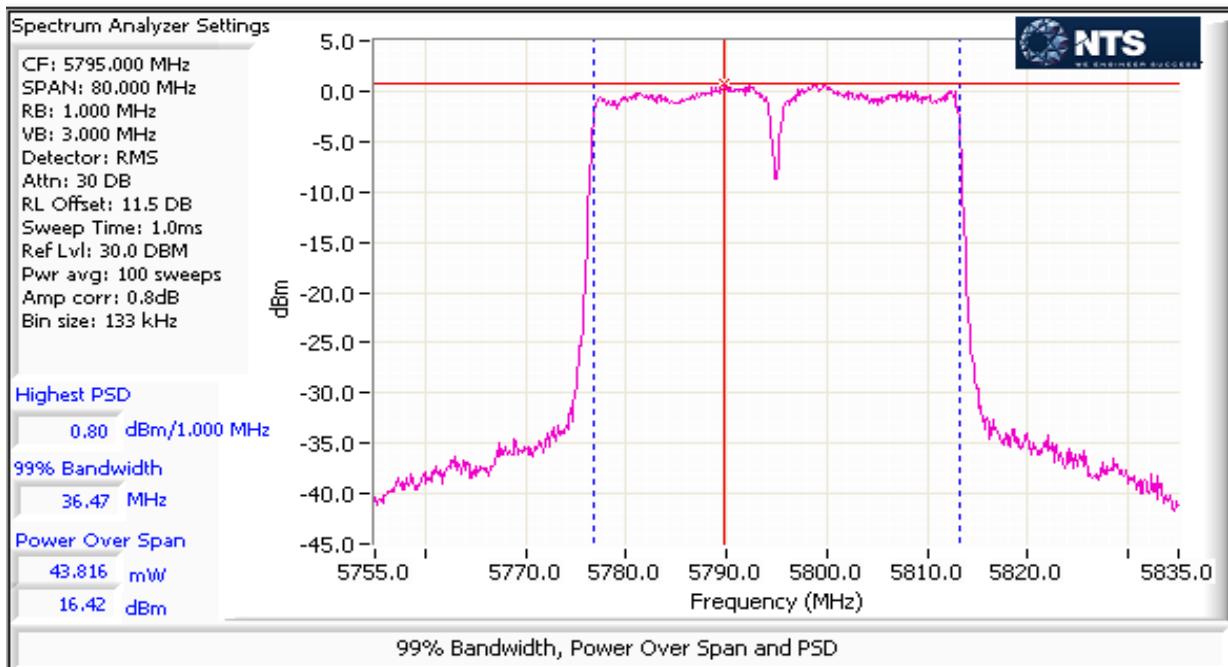
MIMO Device 5725-5850 PSD - FCC

Mode: n40						Total PSD ¹ mW/MHz dBm/MHz				
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹ mW/MHz	FCC Limit dBm/500kHz	IC Limit	Result	
5755	1	-q65		82.0	-0.5	2.2	3.3	27.0	-	Pass
	2				-0.6					
5795	1	-q72		82.0	0.7	2.9	4.6	27.0	-	Pass
	2				0.8					



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A





EMC Test Data

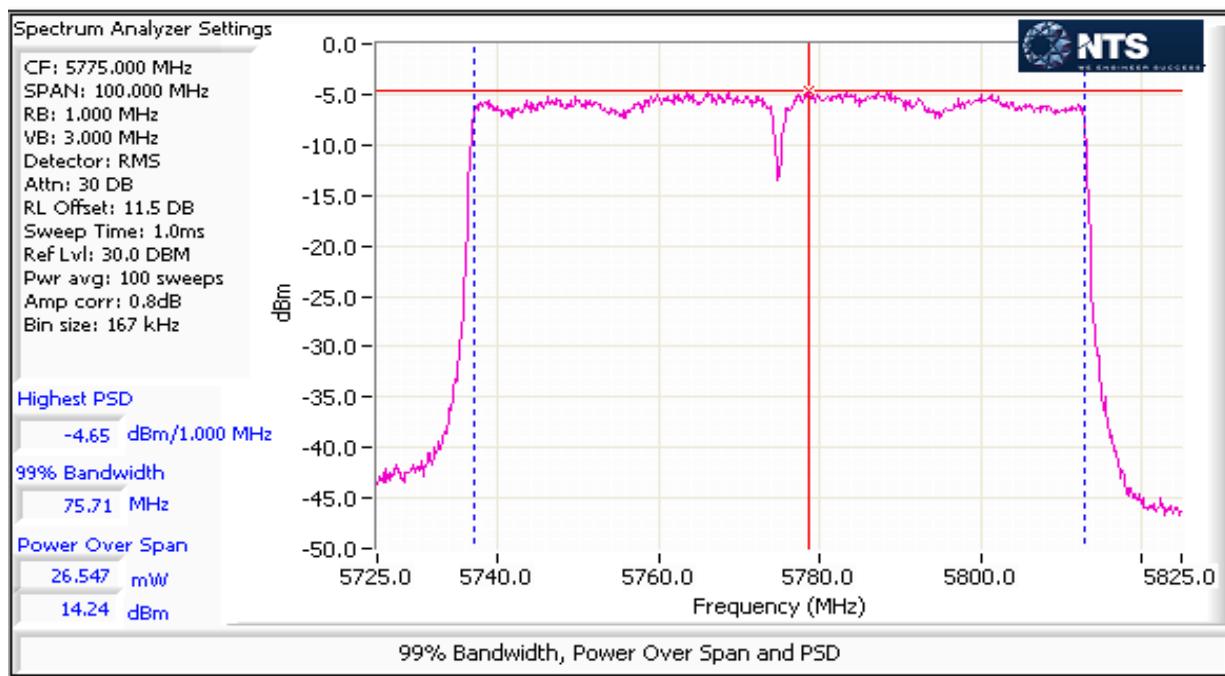
Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

MIMO Device - 5725-5800 MHz Band - FCC

Mode: ac80						Max EIRP (mW):	338.0		
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power ¹ mW	FCC Limit dBm	Max Power (W)	Result
5775	1	-q58		59.0	13.7	84.9	19.3	30.0	0.085
	2				14.2				

MIMO Device 5725-5850 PSD - FCC

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD ¹ mW/MHz	FCC Limit dBm	IC Limit dBm/500kHz	Result
5775	1	-q58		59.0	-5.2	1.1	0.4	27.0	-
	2				-4.7				



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-

Run #2: Bandwidth Measurements

Date of Test: 12/11/2014 0:00

Config. Used: 1

Test Engineer: Jack Liu

Config Change: None

Test Location: FT Lab #4B

EUT Voltage: 120V/60Hz

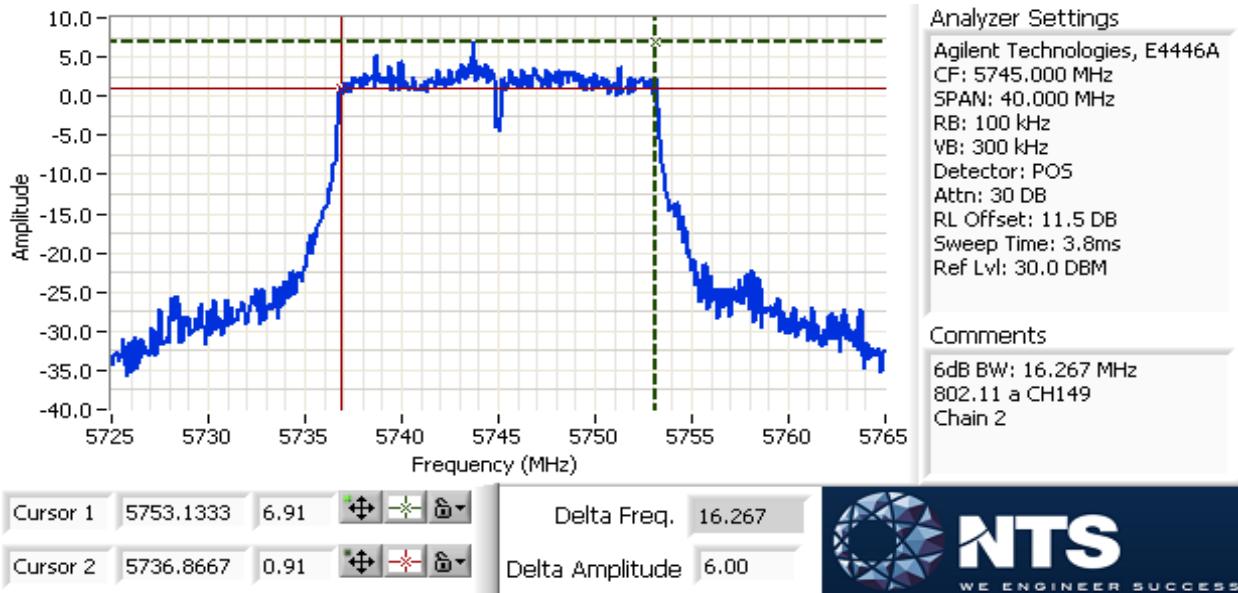
Mode: 11a

5725-5850MHz band (UNII3)

Testing performed on port: 2

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (MHz)	
		6dB	99%	6dB	99%
-q72	5745	16.3	17.0	0.1	0.3
-q72	5785	16.4	17.0	0.1	0.3
-q72	5825	16.4	17.0	0.1	0.3

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





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-

Mode: n20

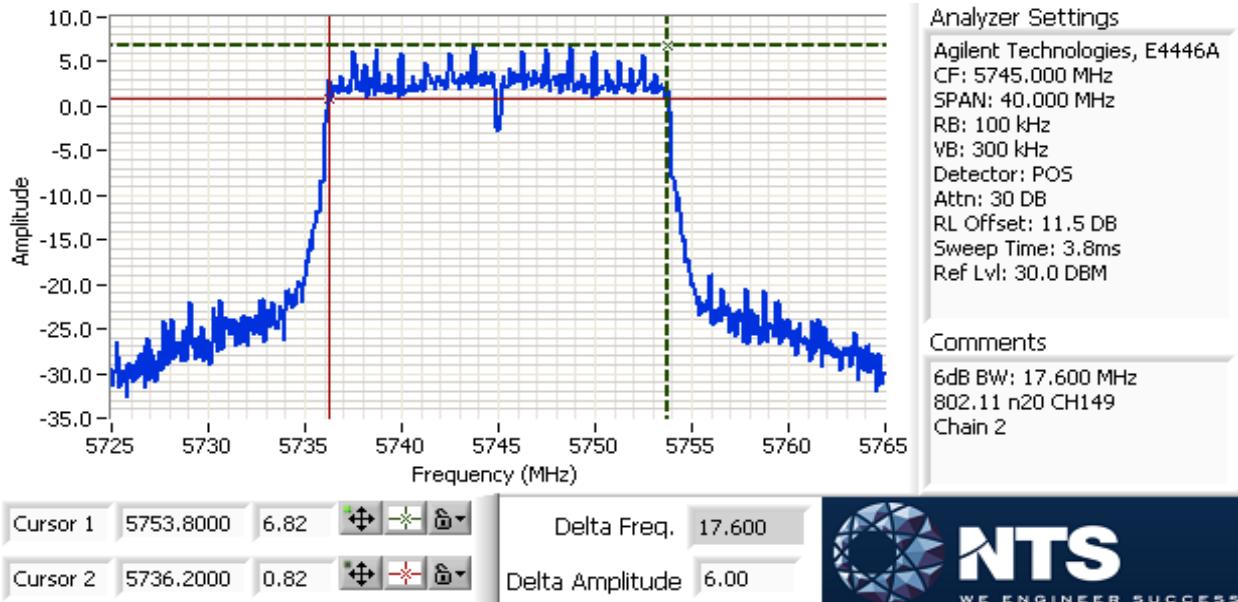
5725-5850MHz band (UNII3)

Testing performed on port:

2

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (MHz)	
		6dB	99%	6dB	99%
-q72	5745	17.6	17.9	0.1	0.3
-q72	5785	17.6	18.0	0.1	0.3
-q72	5825	17.6	18.0	0.1	0.3

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

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Mode: n40

5725-5850MHz band (UNII3)

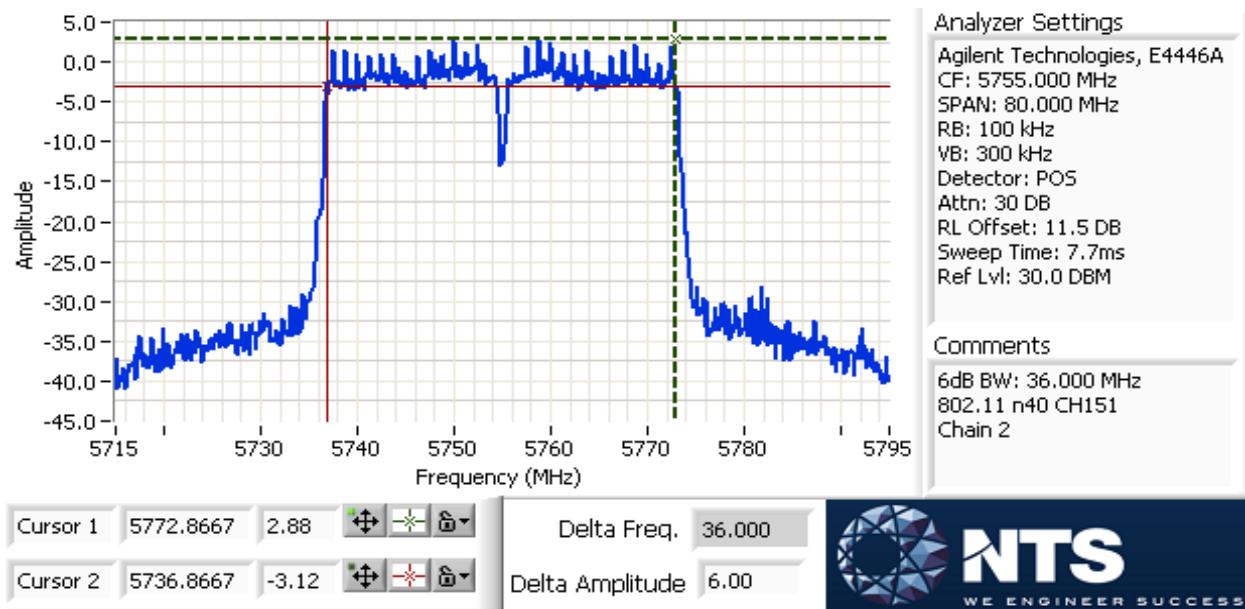
Testing performed on port:

2

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (MHz)	
		6dB	99%	6dB	99%
-q72	5755	36.0	36.3	0.1	0.51
-q72	5795	36.3	36.3	0.1	0.51

Note 1: 6dB BW: RBW=100kHz, VBW \geq 3*RBW, peak detector, max hold, auto sweep time.

99% BW: RBW=1-5% of 99%BW, VBW \geq 3*RBW, peak detector, max hold, auto sweep time.





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
			Class: N/A

Mode: ac80

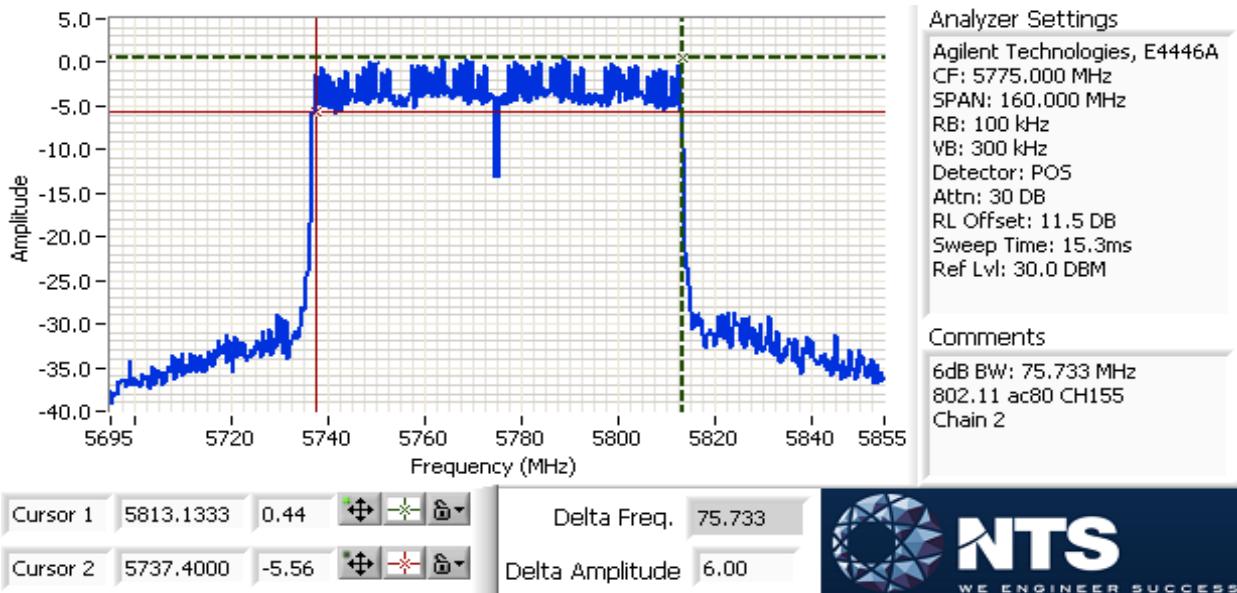
5725-5850MHz band (UNII3)

Testing performed on port:

2

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (MHz)	
		6dB	99%	6dB	99%
-q72	5775	75.7	76.4	0.1	1

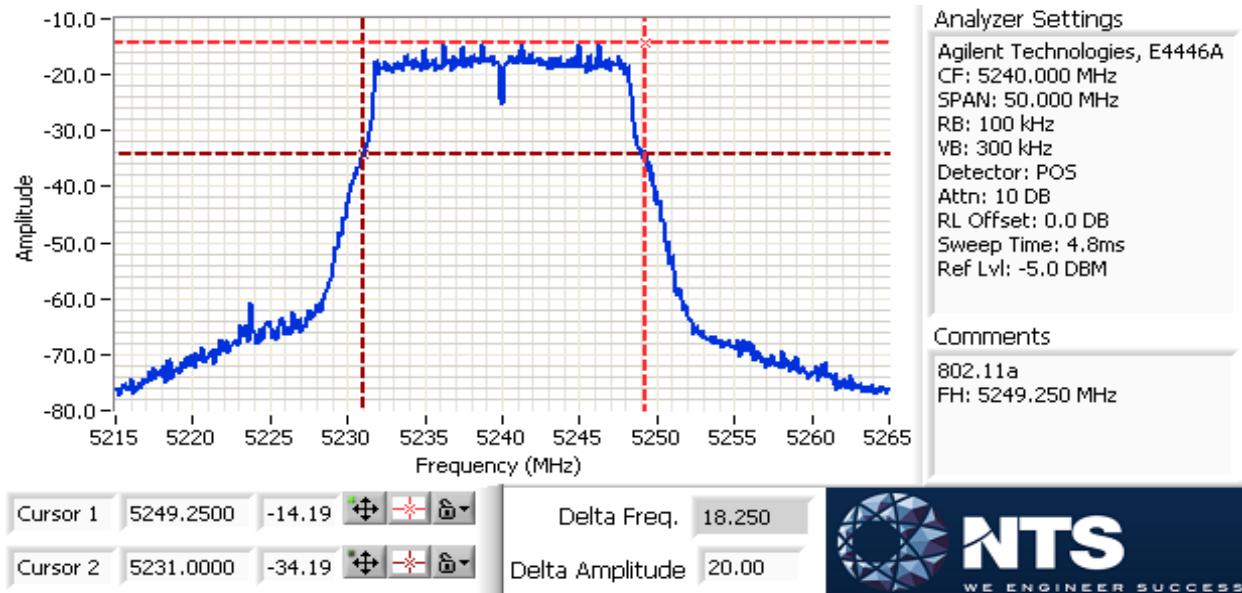
Note 1:	6dB BW: RBW=100kHz, VBW \geq 3*RBW, peak detector, max hold, auto sweep time. 99% BW: RBW=1-5% of 99%BW, VBW \geq 3*RBW, peak detector, max hold, auto sweep time.
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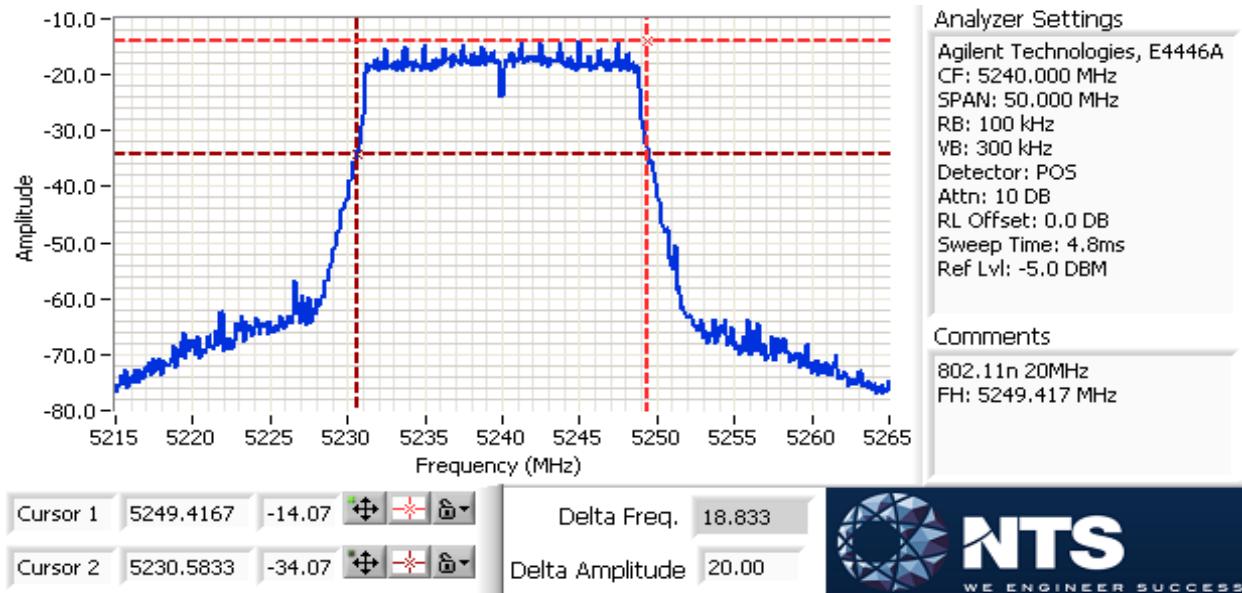
Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

20dBc plots at the highest channel in the 5150-5250MH band

11a



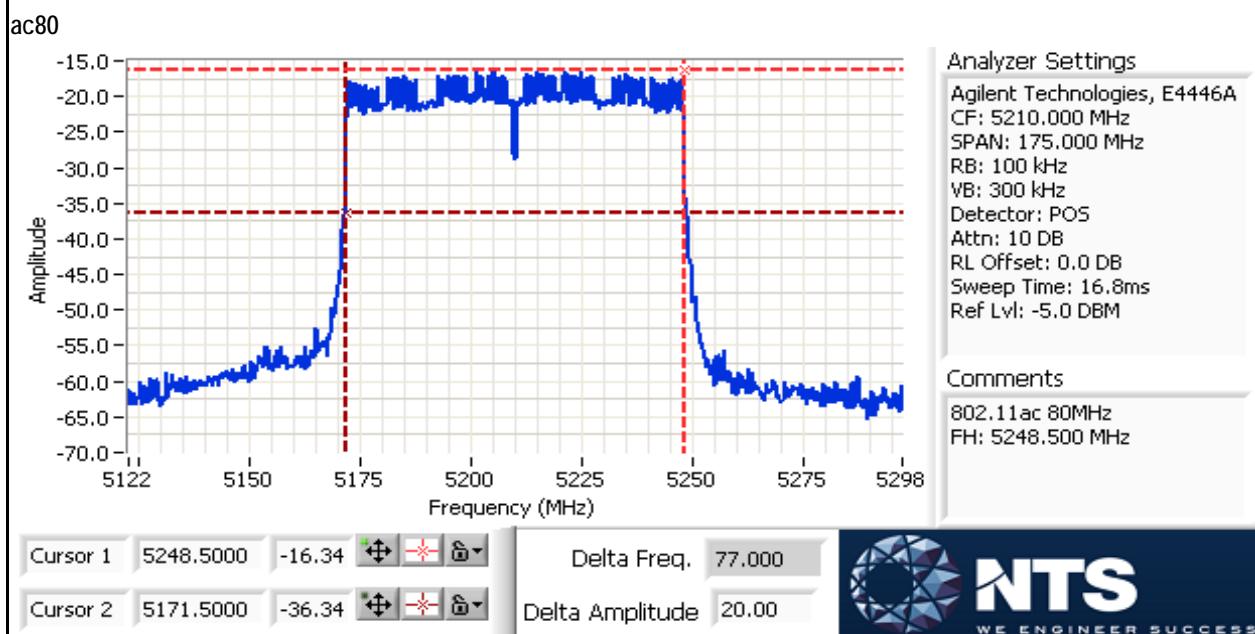
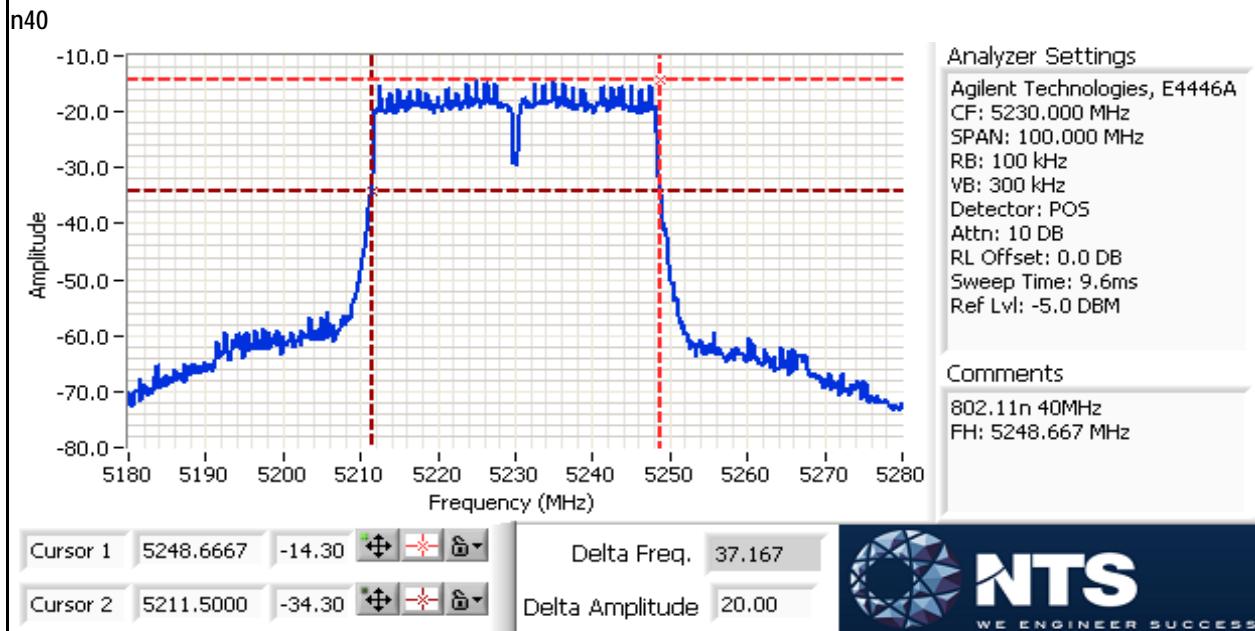
n20





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Product	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Emissions Standard(s):	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	
Immunity Standard(s):	-	Class:	-
		Environment:	-

EMC Test Data

For The

Aruba Networks

Product

APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points

Date of Last Test: 1/5/2015



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

RSS 210 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: 18-20 °C

Rel. Humidity: 35-45 %

Summary of Results

Run #	Mode	Channel	Target Power	Passing Power Setting	Test Performed	Limit	Result / Margin
20MHz Bandwidth Modes							
1	a	36 - 5180MHz	q72	q72	Restricted Band Edge at 5150 MHz	15.209	50.3 dB μ V/m @ 5098.5 MHz (-3.7 dB)
4	a	149 - 5745MHz	q72	q65	Band Edge 5715 MHz	15E	66.3 dB μ V/m @ 5713.5 MHz (-2.0 dB)
	a	149 - 5745MHz	q72	q65	Band Edge 5715 - 5725 MHz	15E	78.1 dB μ V/m @ 5723.6 MHz (-0.2 dB)
	a	165 - 5825MHz	q72	q72	Band Edge 5850 MHz	15E	71.8 dB μ V/m @ 5850.3 MHz (-6.5 dB)
	a	165 - 5825MHz	q72	q72	Band Edge 5860 MHz	15E	67.9 dB μ V/m @ 5909.0 MHz (-0.4 dB)



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Summary of Results (continued)

20MHz Bandwidth Modes (continued)							
Run #	Mode	Channel	Target Power	Passing Power Setting	Test Performed	Limit	Result / Margin
5	n20	36 - 5180MHz	q72	q72	Restricted Band Edge at 5150 MHz	15.209	48.7 dB μ V/m @ 5098.7 MHz (-5.3 dB)
8	n20	149 - 5745MHz	q72	q65	Band Edge 5715 MHz	15E	66.4 dB μ V/m @ 5715.0 MHz (-1.9 dB)
	n20	149 - 5745MHz	q72	q65	Band Edge 5715 - 5725 MHz	15E	78.2 dB μ V/m @ 5724.9 MHz (-0.1 dB)
	n20	165 - 5825MHz	q72	q72	Band Edge 5850 MHz	15E	73.5 dB μ V/m @ 5850.1 MHz (-4.8 dB)
	n20	165 - 5825MHz	q72	q72	Band Edge 5860 MHz	15E	68.2 dB μ V/m @ 5860.9 MHz (-0.1 dB)



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Summary of Results (continued)

40MHz Bandwidth Modes							
Run #	Mode	Channel	Target Power	Passing Power Setting	Test Performed	Limit	Result / Margin
9	n40	38 - 5190MHz	q72	q65	Restricted Band Edge at 5150 MHz	15.209	53.8 dB μ V/m @ 5150.0 MHz (-0.3 dB)
12	n40	151 - 5755MHz	q72	q65	Band Edge 5715 MHz	15E	53.8 dB μ V/m @ 5715.0 MHz (-0.3 dB)
	n40	151 - 5755MHz	q72	q65	Band Edge 5715 - 5725 MHz	15E	73.3 dB μ V/m @ 5719.8 MHz (-5.0 dB)
	n40	159 - 5795MHz	q72	q72	Band Edge 5850 MHz	15E	67.1 dB μ V/m @ 5853.1 MHz (-11.2 dB)
	n40	159 - 5795MHz	q72	q72	Band Edge 5860 MHz	15E	63.8 dB μ V/m @ 5863.8 MHz (-4.5 dB)



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Summary of Results (continued)

80MHz Bandwidth Modes							
Run #	Mode	Channel	Target Power	Passing Power Setting	Test Performed	Limit	Result / Margin
13	ac80	42 - 5210MHz	q72	q53	Restricted Band Edge at 5150 MHz	15.209	53.2 dB μ V/m @ 5148.5 MHz (-0.8 dB)
16	ac80	155 - 5785MHz	q72	q58	Band Edge 5715 MHz	15E	67.6 dB μ V/m @ 5697.6 MHz (-0.7 dB)
	ac80	155 - 5785MHz	q72	q58	Band Edge 5715 - 5725 MHz	15E	71.2 dB μ V/m @ 5717.7 MHz (-7.1 dB)
	ac80	155 - 5785MHz	q72	q58	Band Edge 5850 MHz	15E	67.3 dB μ V/m @ 5858.7 MHz (-11.0 dB)
	ac80	155 - 5785MHz	q72	q58	Band Edge 5860 MHz	15E	64.4 dB μ V/m @ 5862.4 MHz (-3.9 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.



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		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 \geq 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbs	0.99	Yes	2.063	0.0	0.0	485
n20	MCS8	0.99	Yes	1.942	0.0	0.0	515
n40	MCS8	0.82	Yes	0.938	0.9	1.75	1066
ac80	VHT0	0.59	Yes	0.256	2.3	4.62	3906

Sample Notes

Sample S/N: Prototype (NTS Sample: 2014-2278)

Driver: 6.37 RC 14.54

Pkteng tx 20 1500 0

Antenna: Internal

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 \geq 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 duty cycle \geq 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces
Note 3:	Emission has duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=10Hz, peak detector, linear averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Linear Voltage correction factor
Note 4:	Emission has duty cycle < 98% and is NOT constant, average measurement performed: RBW=1MHz, VBW> 1/T, peak detector, linear average mode, sweep time auto, max hold. Max hold for 50*(1/DC) traces
Note 5:	Emission has duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Pwr correction factor
Note 6:	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:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

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

Date of Test: 12/16/14

Test Location: Chamber #3

Test Engineer: Mehran Birgani

EUT Voltage: 120V/ 60Hz

Channel: 36 - 5180 MHz

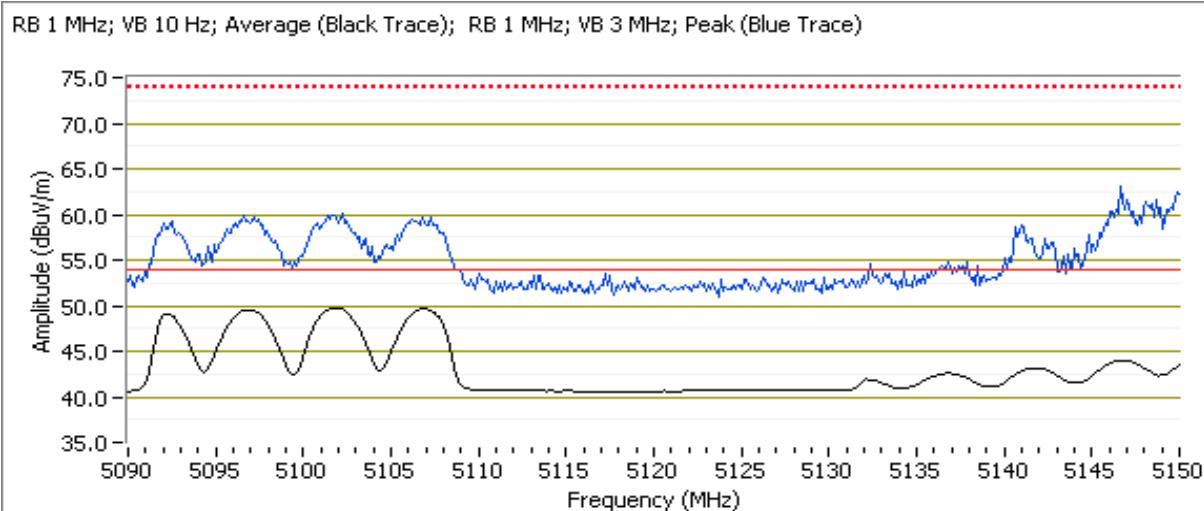
Mode: a

Tx Chain: 2Tx

Data Rate: 6Mbps

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5098.540	50.3	H	54.0	-3.7	AVG	51	1.2	POS; RB 1 MHz; VB: 10 Hz
5101.900	49.7	V	54.0	-4.3	AVG	13	2.4	POS; RB 1 MHz; VB: 10 Hz
5098.060	62.4	H	74.0	-11.6	PK	51	1.2	POS; RB 1 MHz; VB: 3 MHz
5148.080	61.6	V	74.0	-12.4	PK	13	2.4	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Run #4: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 12/22/14

Test Location: Chamber #4

Test Engineer: Deniz Demirci

EUT Voltage: 120 VAC / 60 Hz

Channel: 149 - 5745MHz

Mode: a

Tx Chain: 2Tx

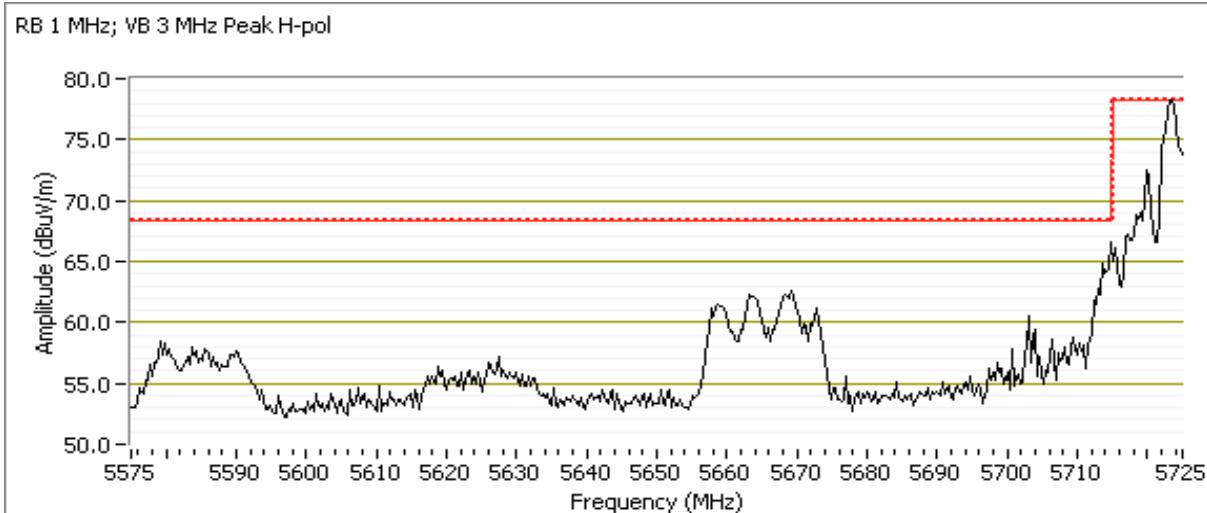
Data Rate: 6Mbps

5715-5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5723.550	78.1	H	78.3	-0.2	PK	47	1.2	POS; RB 1 MHz; VB: 3 MHz
5723.450	75.9	V	78.3	-2.4	PK	334	2.2	POS; RB 1 MHz; VB: 3 MHz

5715 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5713.510	66.3	H	68.3	-2.0	PK	47	1.2	POS; RB 1 MHz; VB: 3 MHz
5714.650	65.6	V	68.3	-2.7	PK	334	2.2	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Channel: 165 - 5825MHz

Mode: a

Tx Chain: 2Tx

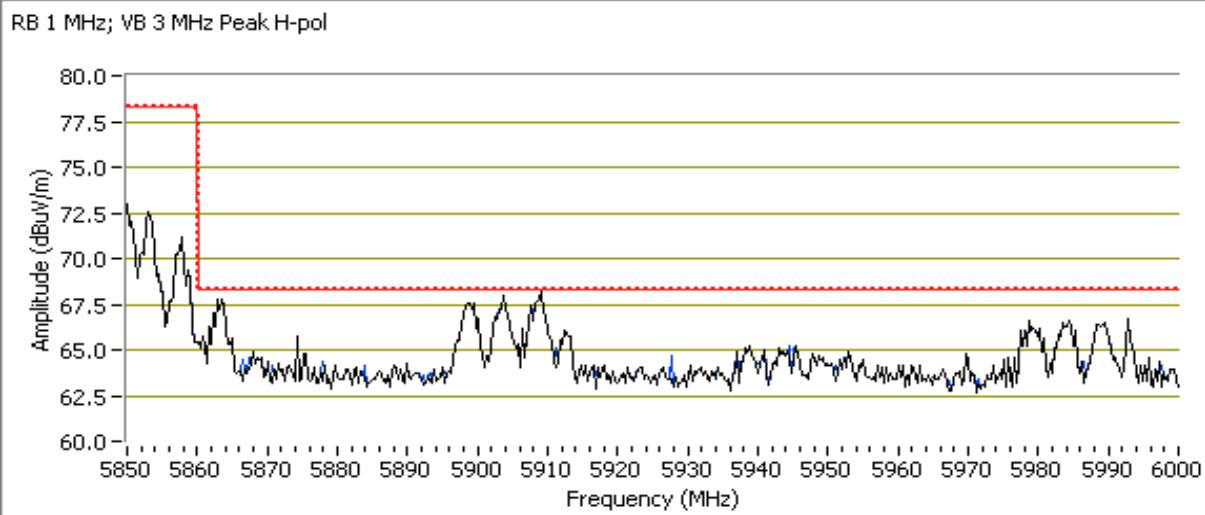
Data Rate: 6Mbps

5850 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5850.340	71.8	H	78.3	-6.5	PK	46	1.3	POS; RB 1 MHz; VB: 3 MHz
5852.300	71.7	V	78.3	-6.6	PK	17	2.3	POS; RB 1 MHz; VB: 3 MHz

5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5908.980	67.9	H	68.3	-0.4	PK	46	1.3	POS; RB 1 MHz; VB: 3 MHz
5907.180	64.1	V	68.3	-4.2	PK	17	2.3	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Run #5: Radiated Bandedge Measurements, 5150-5250MHz

Date of Test: 12/17/14

Test Location: Chamber #3

Test Engineer: Jack Liu

EUT Voltage: 120V/ 60Hz

Channel: 36 - 5180 MHz

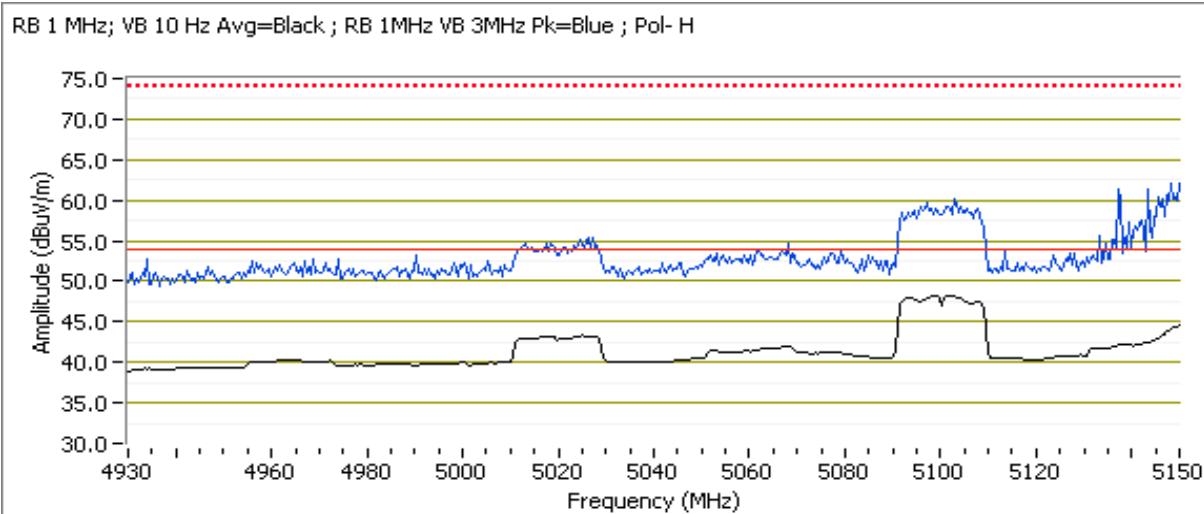
Mode: n20

Tx Chain: 2Tx

Data Rate: MCS8

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
5098.660	48.7	H	54.0	-5.3	AVG	51	1.3
5148.880	66.2	H	74.0	-7.8	PK	51	1.3
5092.830	47.4	V	54.0	-6.6	AVG	21	1.8
5149.820	63.3	V	74.0	-10.7	PK	21	1.8



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Run #8: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 12/22/14

Test Location: Chamber #4

Test Engineer: Deniz Demirci

EUT Voltage: 120 VAC / 60 Hz

Channel: 149 - 5745MHz

Mode: n20

Tx Chain: 2Tx

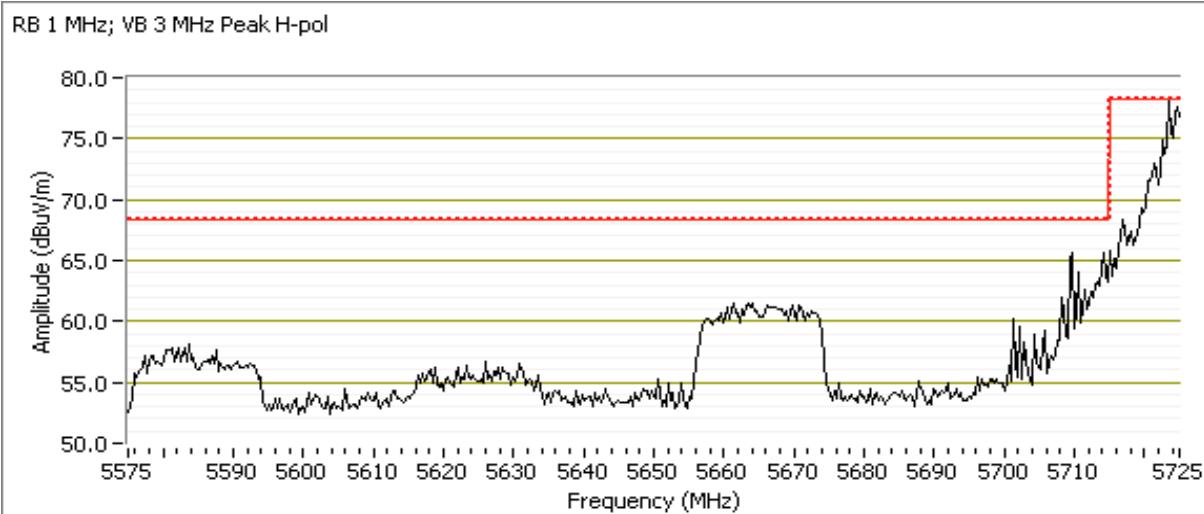
Data Rate: MCS8

5715 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5714.980	66.4	H	68.3	-1.9	PK	41	1.0	POS; RB 1 MHz; VB: 3 MHz
5714.830	64.4	V	68.3	-3.9	PK	0	1.9	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	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5724.870	78.2	H	78.3	-0.1	PK	41	1.0	POS; RB 1 MHz; VB: 3 MHz
5724.590	76.9	V	78.3	-1.4	PK	0	1.9	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Channel: 165 - 5825MHz

Mode: n20

Tx Chain: 2Tx

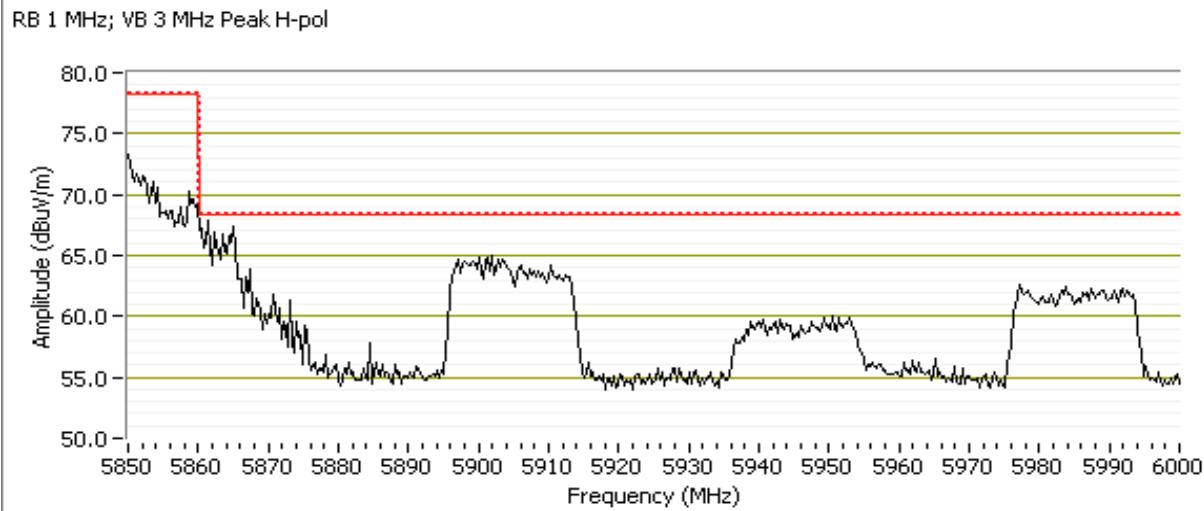
Data Rate: MCS8

5850 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5850.060	73.5	H	78.3	-4.8	PK	35	1.1	POS; RB 1 MHz; VB: 3 MHz
5850.040	69.2	V	78.3	-9.1	PK	20	2.2	POS; RB 1 MHz; VB: 3 MHz

5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5860.910	68.2	H	68.3	-0.1	PK	35	1.1	POS; RB 1 MHz; VB: 3 MHz
5861.540	64.6	V	68.3	-3.7	PK	20	2.2	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Run #9: Radiated Bandedge Measurements, 5150-5250MHz

Date of Test: 12/17/14

Test Location: Chamber #3

Test Engineer: Jack Liu

EUT Voltage: 120V/ 60Hz

Channel: 38 - 5190 MHz

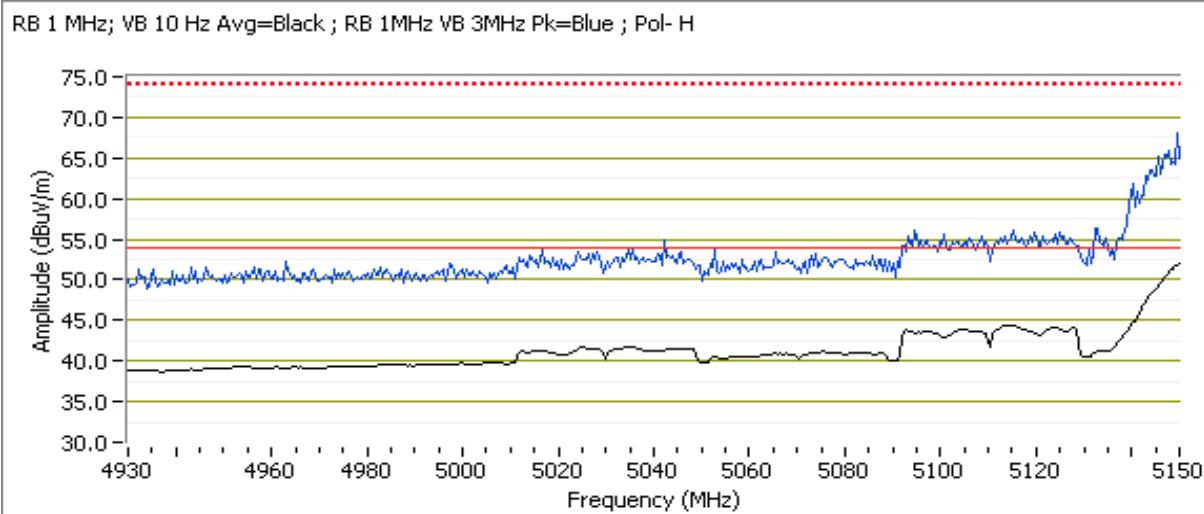
Mode: n40

Tx Chain: 2Tx

Data Rate: MCS8

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5150.000	53.8	H	54.0	-0.3	AVG	53	1.0	Note3;POS; RB 1 MHz; VB: 10 Hz
5149.400	68.4	H	74.0	-5.6	PK	53	1.0	POS; RB 1 MHz; VB: 3 MHz
5150.000	52.7	V	54.0	-1.4	AVG	22	2.5	Note3;POS; RB 1 MHz; VB: 10 Hz
5148.460	66.1	V	74.0	-7.9	PK	22	2.5	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Run #12: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 12/22/14

Test Location: Chamber #4

Test Engineer: Deniz Demirci

EUT Voltage: 120 VAC / 60 Hz

Channel: 151 - 5755MHz

Mode: n40

Tx Chain: 2Tx

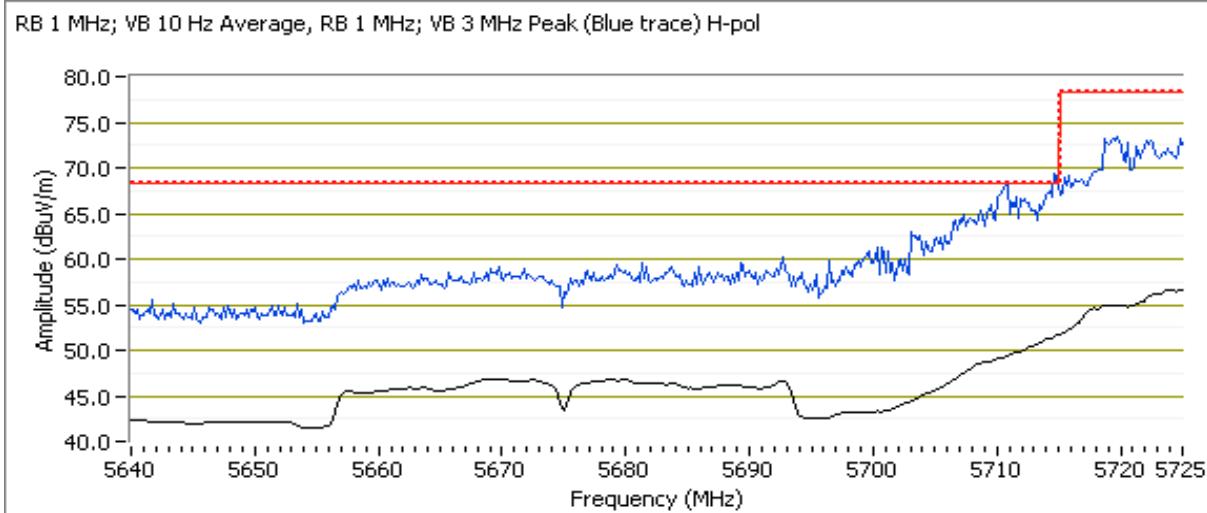
Data Rate: MCS8

5715 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5715.000	53.8	H	54.0	-0.3	AVG	40	1.4	POS; RB 1 MHz; VB: 10 Hz
5713.970	70.1	H	74.0	-3.9	PK	40	1.4	POS; RB 1 MHz; VB: 3 MHz
5714.990	51.7	V	54.0	-2.3	AVG	15	2.3	POS; RB 1 MHz; VB: 10 Hz
5713.990	69.2	V	74.0	-4.8	PK	15	2.3	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	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5719.750	73.3	H	78.3	-5.0	PK	40	1.4	POS; RB 1 MHz; VB: 3 MHz
5721.950	72.4	V	78.3	-5.9	PK	15	2.3	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

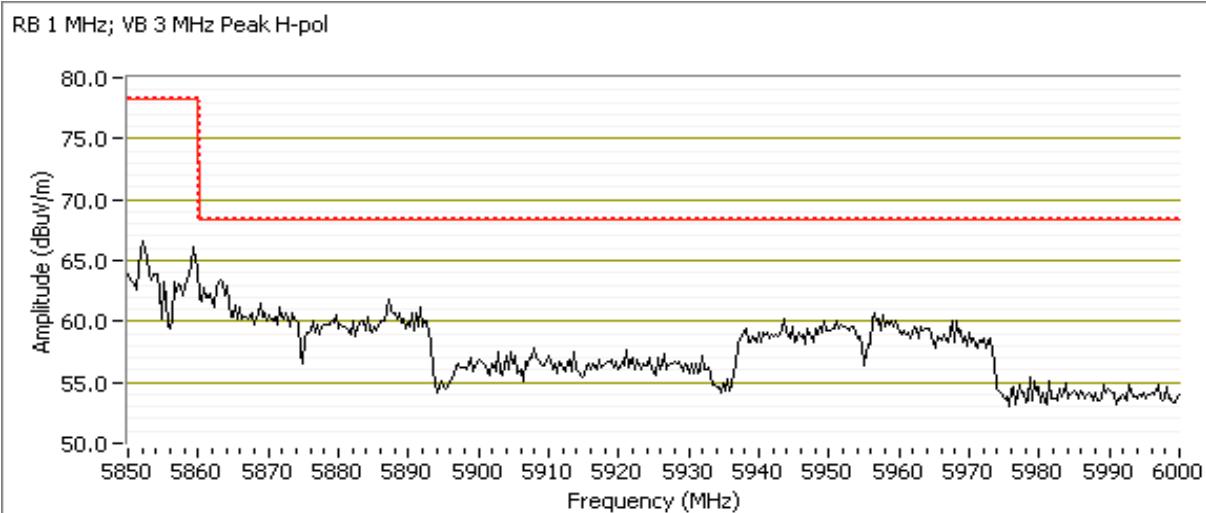
Channel: 159 - 5795MHz Mode: n40
Tx Chain: 2Tx Data Rate: MCS8

5850 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5853.130	67.1	H	78.3	-11.2	PK	35	1.1	POS; RB 1 MHz; VB: 3 MHz
5852.140	66.3	V	78.3	-12.0	PK	7	2.2	POS; RB 1 MHz; VB: 3 MHz

5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5863.790	63.8	H	68.3	-4.5	PK	35	1.1	POS; RB 1 MHz; VB: 3 MHz
5861.530	63.2	V	68.3	-5.1	PK	7	2.2	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Run #13: Radiated Bandedge Measurements, 5150-5250MHz

Date of Test: 12/17/14

Test Location: Chamber #3

Test Engineer: Jack Liu; M. Birgani

EUT Voltage: 120V/ 60Hz

Channel: 42 - 5210MHz

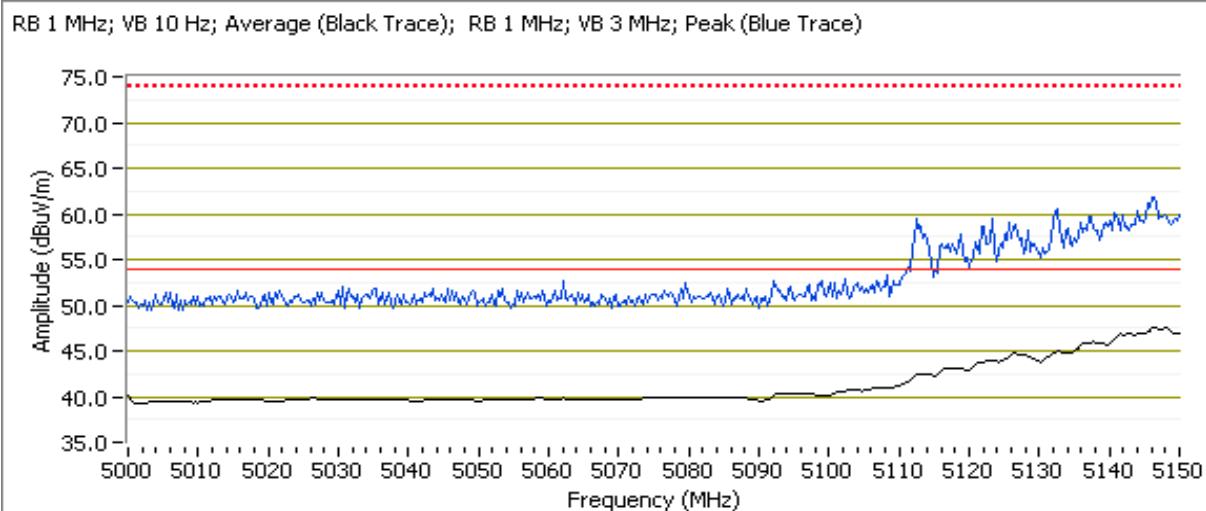
Mode: ac80

Tx Chain: 2Tx

Data Rate: VHT0

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
5148.460	53.2	H	54.0	-0.8	AVG	48	1.2
5146.390	52.3	V	54.0	-1.7	AVG	14	2.5
5144.530	63.7	H	74.0	-10.3	PK	48	1.2
5149.400	61.7	V	74.0	-12.3	PK	14	2.5



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Run #16: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 12/22/14

Test Location: Chamber #4

Test Engineer: Deniz Demirci

EUT Voltage: 120 VAC / 60 Hz

Channel: 155 - 5785MHz

Mode: ac80

Tx Chain: 2Tx

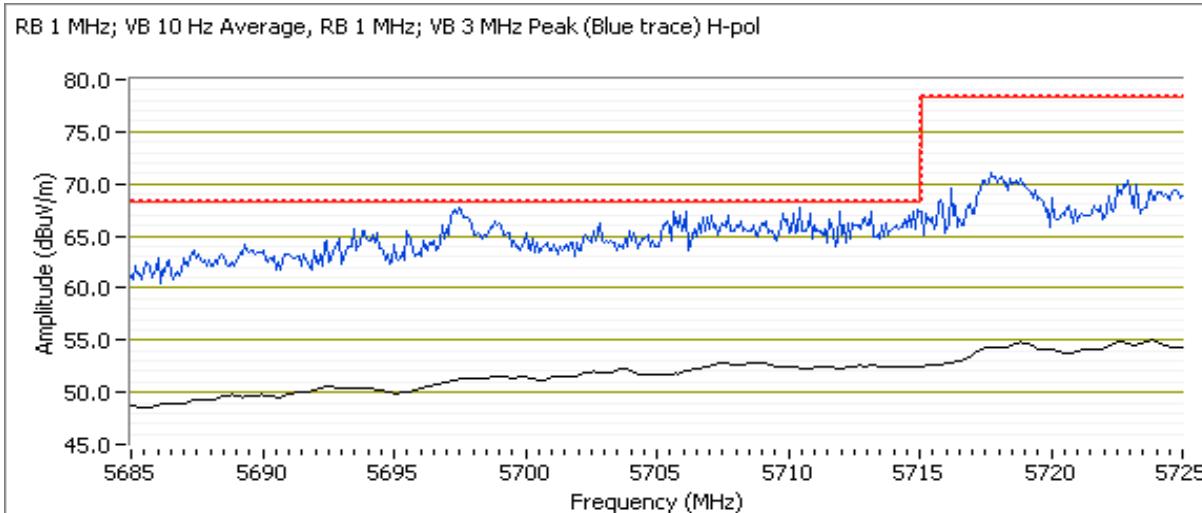
Data Rate: VHT8

5715 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5697.560	67.6	H	68.3	-0.7	PK	39	1.0	POS; RB 1 MHz; VB: 3 MHz
5697.380	66.2	V	68.3	-2.1	PK	12	2.4	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	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5717.730	71.2	H	78.3	-7.1	PK	39	1.0	POS; RB 1 MHz; VB: 3 MHz
5717.830	69.5	V	78.3	-8.8	PK	12	2.4	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

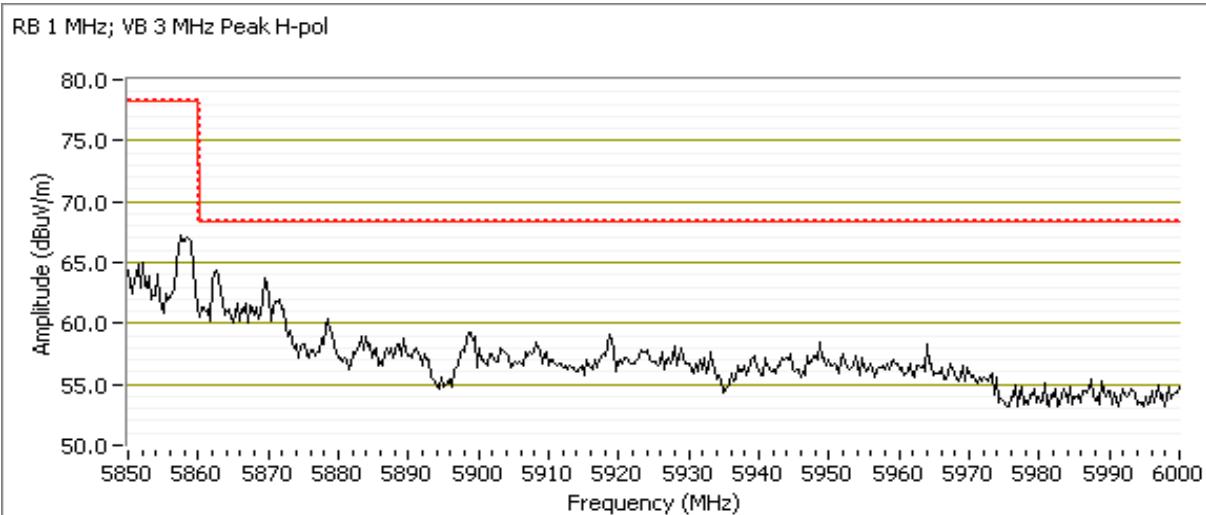
Channel: 155 - 5785MHz Mode: ac80
Tx Chain: 2Tx Data Rate: VHT8

5850 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5858.720	67.3	H	78.3	-11.0	PK	40	1.1	POS; RB 1 MHz; VB: 3 MHz
5851.260	65.1	V	78.3	-13.2	PK	9	2.2	POS; RB 1 MHz; VB: 3 MHz

5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5862.400	64.4	H	68.3	-3.9	PK	40	1.1	POS; RB 1 MHz; VB: 3 MHz
5871.300	62.6	V	68.3	-5.7	PK	9	2.2	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

RSS 210 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: 18-22 °C
Rel. Humidity: 30-40 %

Summary of Results

Run #	Mode	Channel	Target Power	Passing Power	Test Performed	Limit	Result / Margin
Scans on "center" channel in all four OFDM modes to determine the worst case mode.							
1	a	40 - 5200MHz	q72	q72	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.9 dB μ V/m @ 6940.0 MHz (-15.4 dB)
	n20	40 - 5200MHz	q72	q72	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.4 dB μ V/m @ 6940.0 MHz (-15.9 dB)
	n40	38 - 5190MHz	q72	q72	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	54.7 dB μ V/m @ 6930.0 MHz (-13.6 dB)
	ac80	42 - 5210MHz	q72	q72	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.6 dB μ V/m @ 5791.7 MHz (-14.7 dB)
Measurements on low and high channels in worst-case OFDM mode.							
2	n40	46 - 5230MHz	q72	q72	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	57.9 dB μ V/m @ 6973.3 MHz (-10.4 dB)



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Summary of Results (continued)

Scans on "center" channel in all four OFDM modes to determine the worst case mode.							
Run #	Mode	Channel	Target Power	Passing Power	Test Performed	Limit	Result / Margin
Scans on "center" channel in all four OFDM modes to determine the worst case mode.							
7	a	157 - 5785MHz	q72	q70	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.8 dB μ V/m @ 11572.1 MHz (-0.2 dB)
	n20	157 - 5785MHz	q72	q72	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.5 dB μ V/m @ 11569.7 MHz (-0.5 dB)
	n40	151 - 5755MHz	q72	q72	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.3 dB μ V/m @ 11508.9 MHz (-3.7 dB)
	ac80	155 - 5775MHz	q72	q72	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.5 dB μ V/m @ 11563.6 MHz (-1.5 dB)
Measurements on low and high channels in worst-case OFDM mode.							
8	a	149 - 5745MHz	q72	q72	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.9 dB μ V/m @ 11492.2 MHz (-2.1 dB)
	a	165 - 5825MHz	q72	q72	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.6 dB μ V/m @ 11652.7 MHz (-0.4 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.



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		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 $\geq 98\%$ and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbps	0.99	Yes	2.063	0.0	0.0	485
n20	MCS8	0.99	Yes	1.942	0.0	0.0	515
n40	MCS8	0.82	Yes	0.938	0.9	1.8	1066
ac80	VHT0	0.59	Yes	0.256	2.3	4.6	3906

Sample Notes

Sample S/N: 2014-2278

Driver: 6.37 RC 14.54

Pkteng tx 20 1500 0

Antenna: Internal

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 \geq 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 duty cycle $\geq 98\%$, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces
Note 3:	Emission has duty cycle $< 98\%$, but constant, average measurement performed: RBW=1MHz, VBW=10Hz, peak detector, linear averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Linear Voltage correction factor
Note 4:	Emission has duty cycle $< 98\%$ and is NOT constant, average measurement performed: RBW=1MHz, VBW> 1/T, peak detector, linear average mode, sweep time auto, max hold. Max hold for 50*(1/DC) traces
Note 5:	Emission has duty cycle $< 98\%$, but constant, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Pwr correction factor
Note 6:	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:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

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

Run #1a: Center Channel

Date of Test: 12/18/14

Test Engineer: Mehran Birgani

Test Location: Chamber #4

EUT Voltage: 120V/ 60Hz

Channel: 40

Mode: a

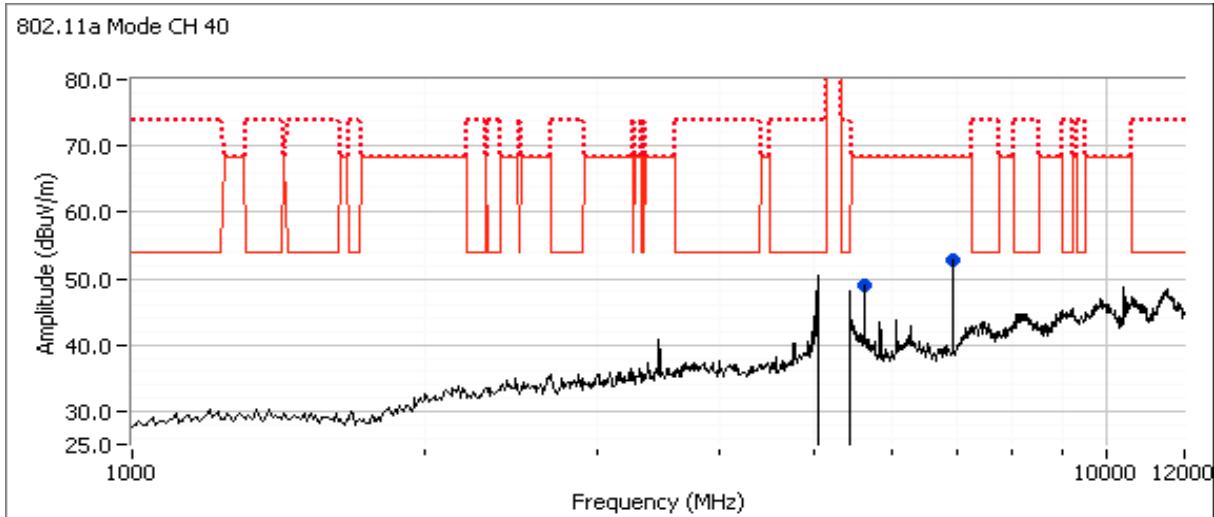
Tx Chain: 2Tx

Data Rate: 6Mbps

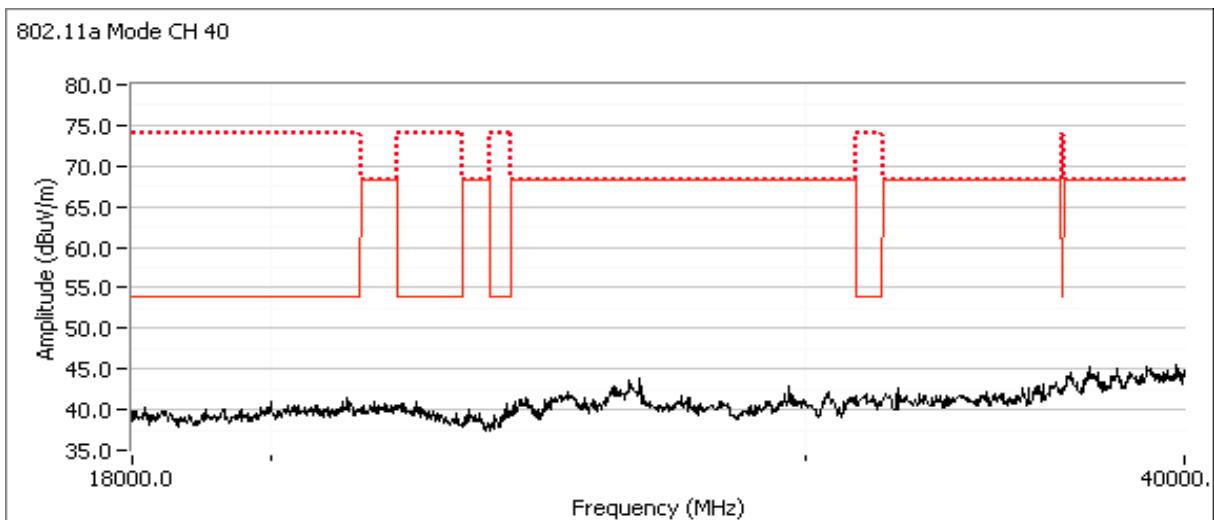
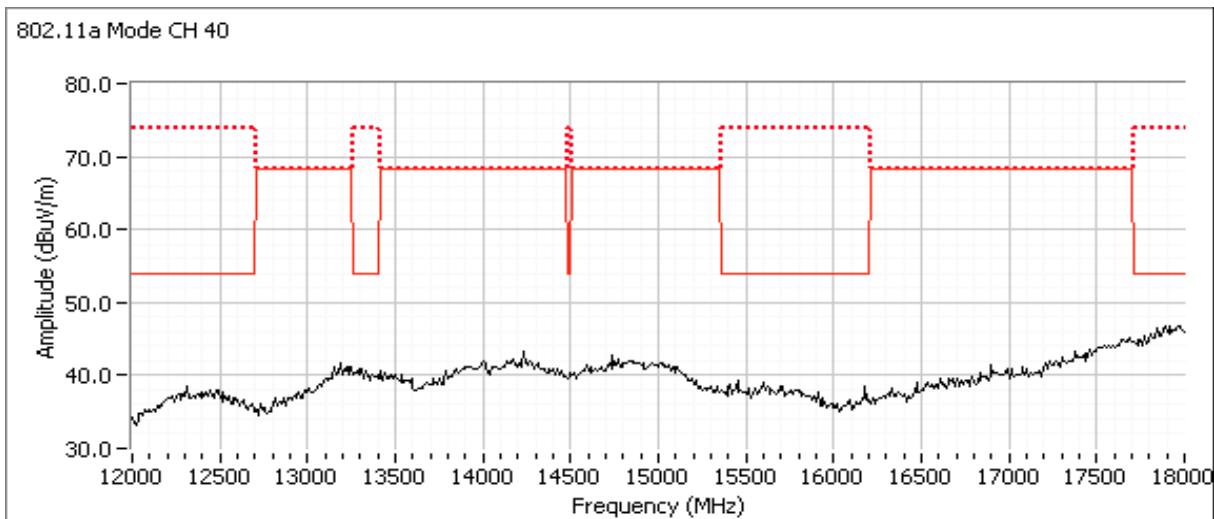
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
6940.000	52.9	H	68.3	-15.4	PK	58	1.0	
5641.670	48.9	H	68.3	-19.4	PK	38	1.0	

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 (68.3dB μ V/m). The measurement method required is a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Run #1b: Center Channel

Date of Test: 12/18/14

Test Location: Chamber #4

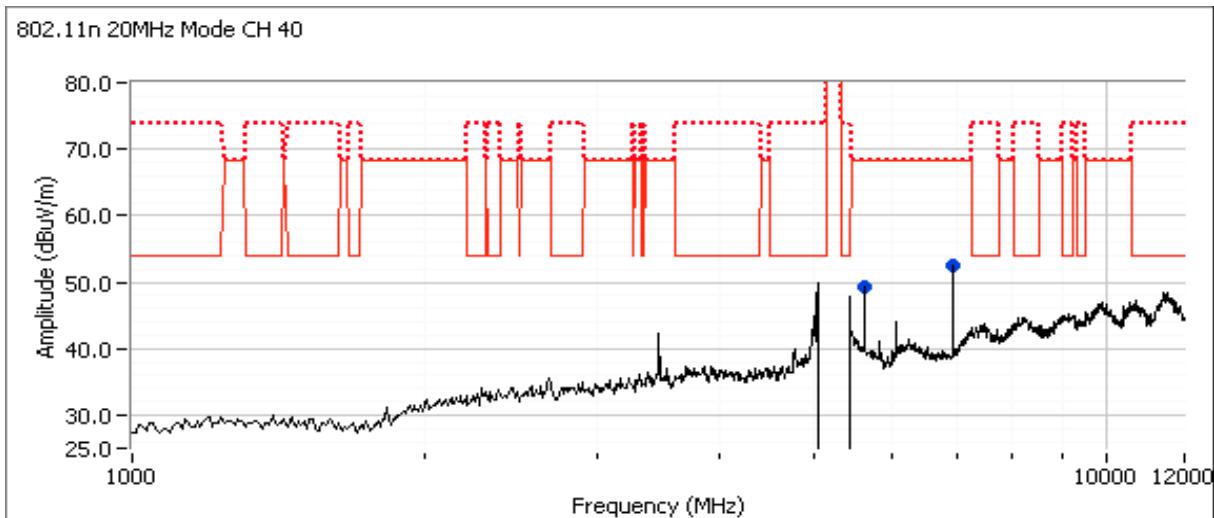
Test Engineer: Mehran Birgani

EUT Voltage: 120V/ 60Hz

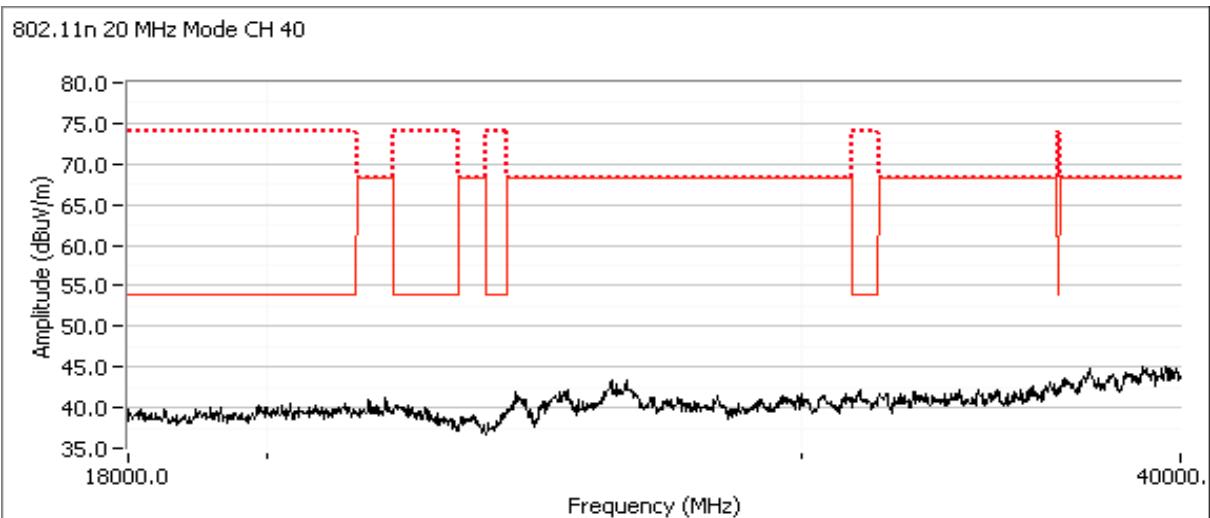
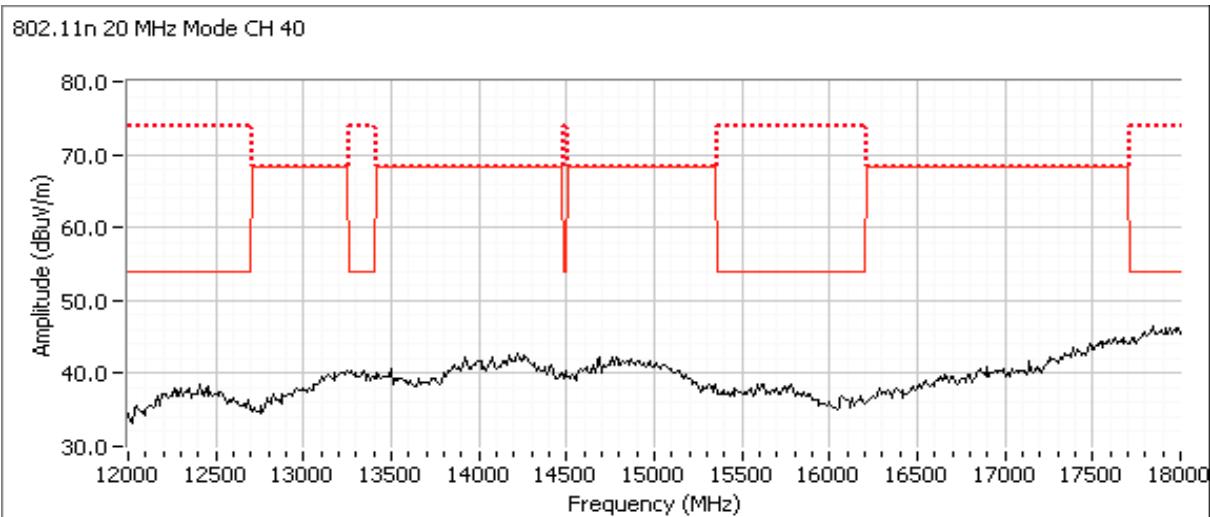
 Channel: 40 Mode: 11n20
 Tx Chain: 2Tx Data Rate: MCS8

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
6940.000	52.4	H	68.3	-15.9	PK	65	1.1	
5641.670	49.2	H	68.3	-19.1	PK	36	1.0	

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 (68.3dB μ V/m). The measurement method required is a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).


Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Run #1c: Center Channel

Date of Test: 12/18/14

Test Location: Chamber #4

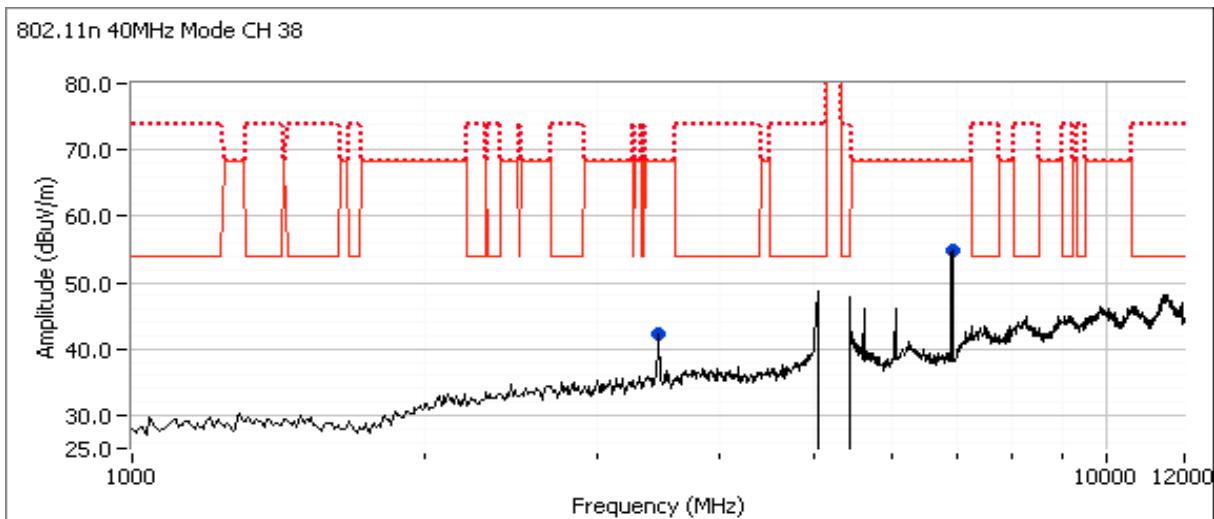
Test Engineer: Mehran Birgani

EUT Voltage: 120V/ 60Hz

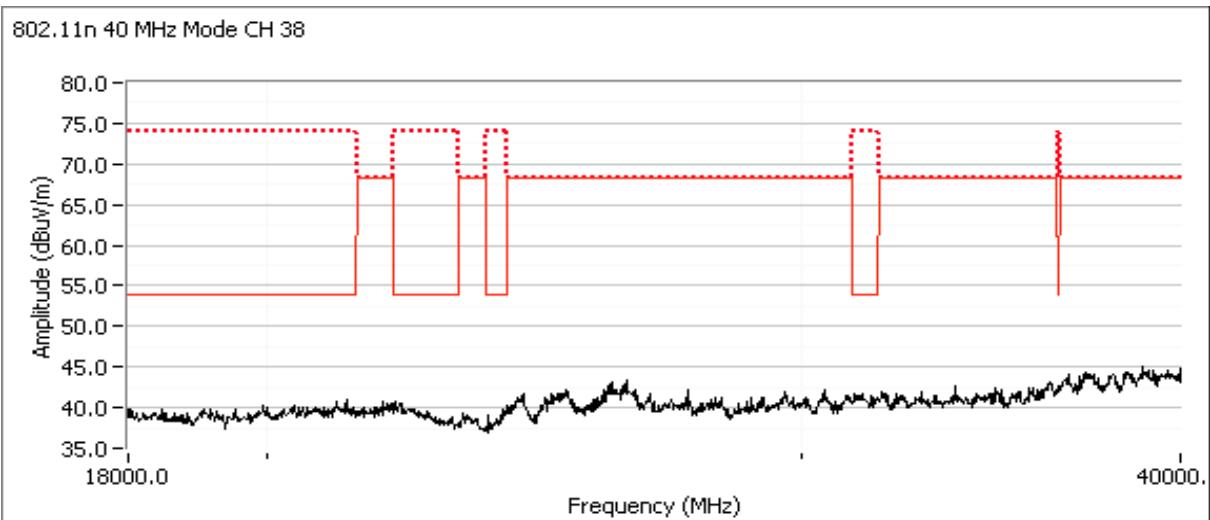
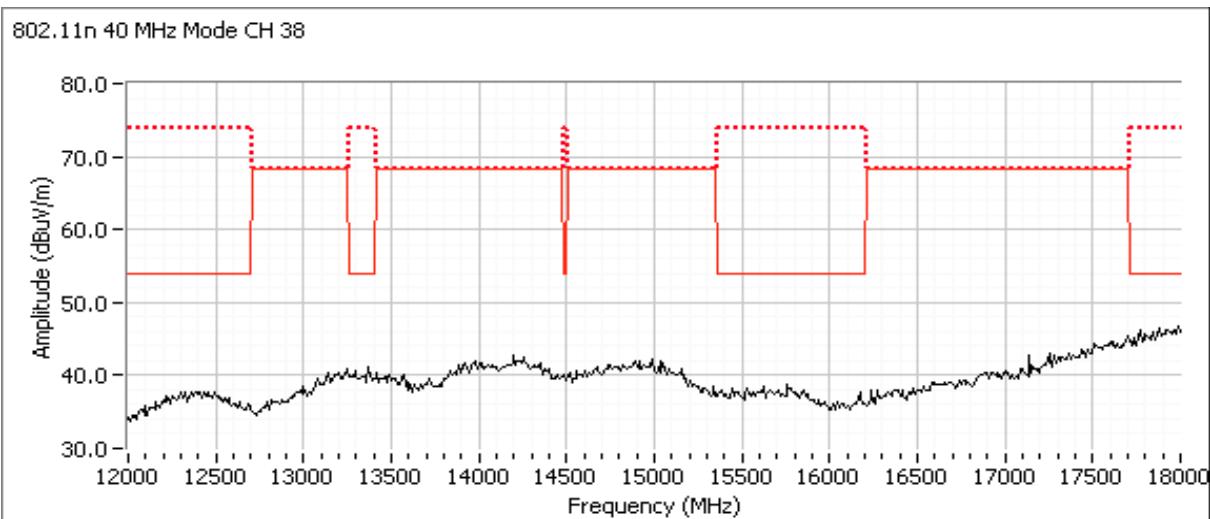
 Channel: 38 Mode: 11n40
 Tx Chain: 2Tx Data Rate: MCS8

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
6930.000	54.7	H	68.3	-13.6	PK	54	1.0	
3466.670	42.2	V	68.3	-26.1	PK	19	1.3	

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 (68.3dB μ V/m). The measurement method required is a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).


Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Run #1d: Center Channel

Date of Test: 12/18/14

Test Location: Chamber #4

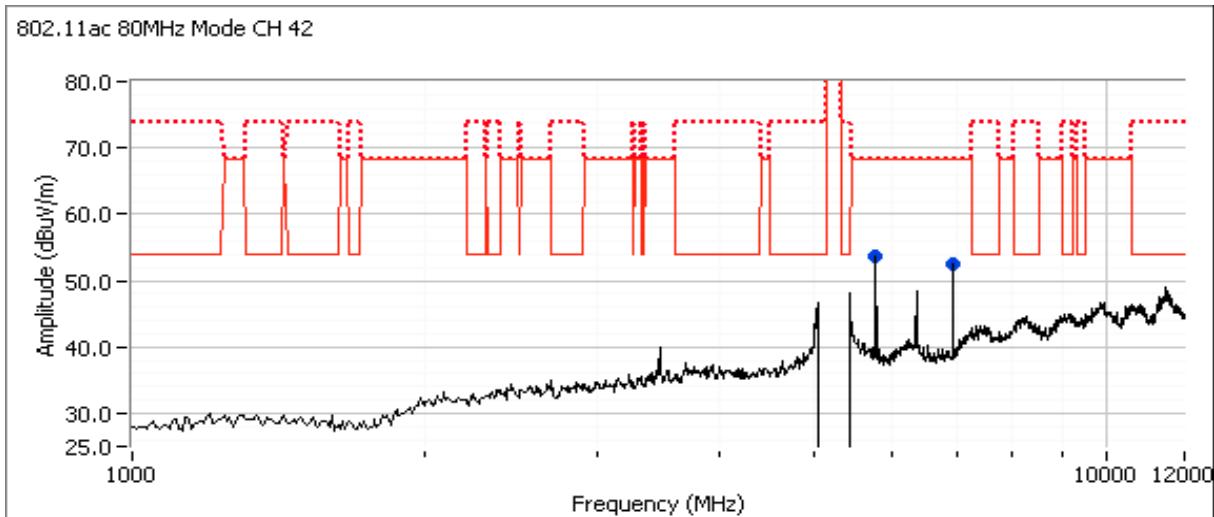
Test Engineer: Mehran Birgani

EUT Voltage: 120V/ 60Hz

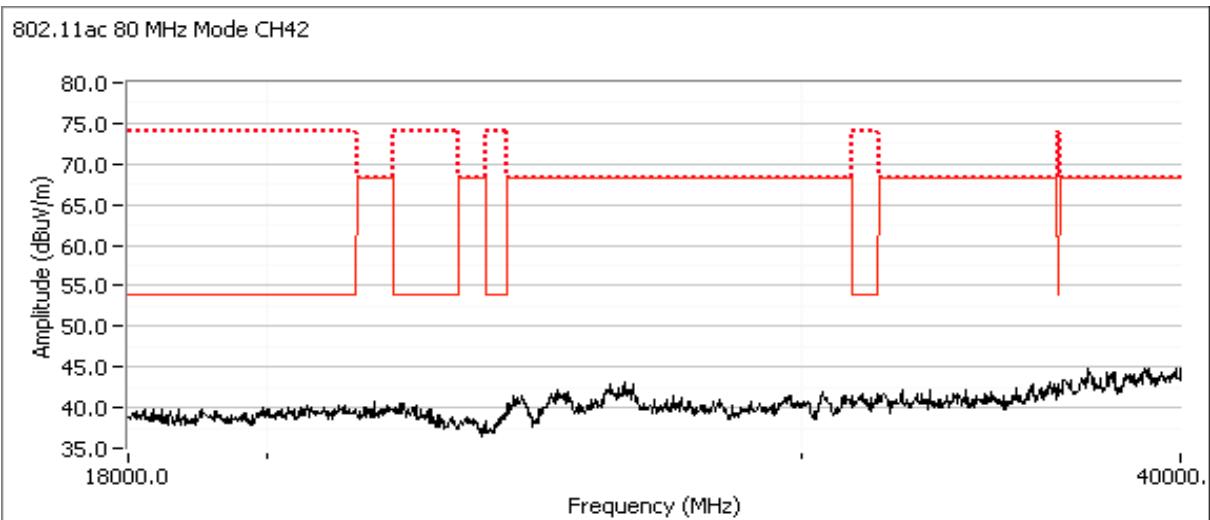
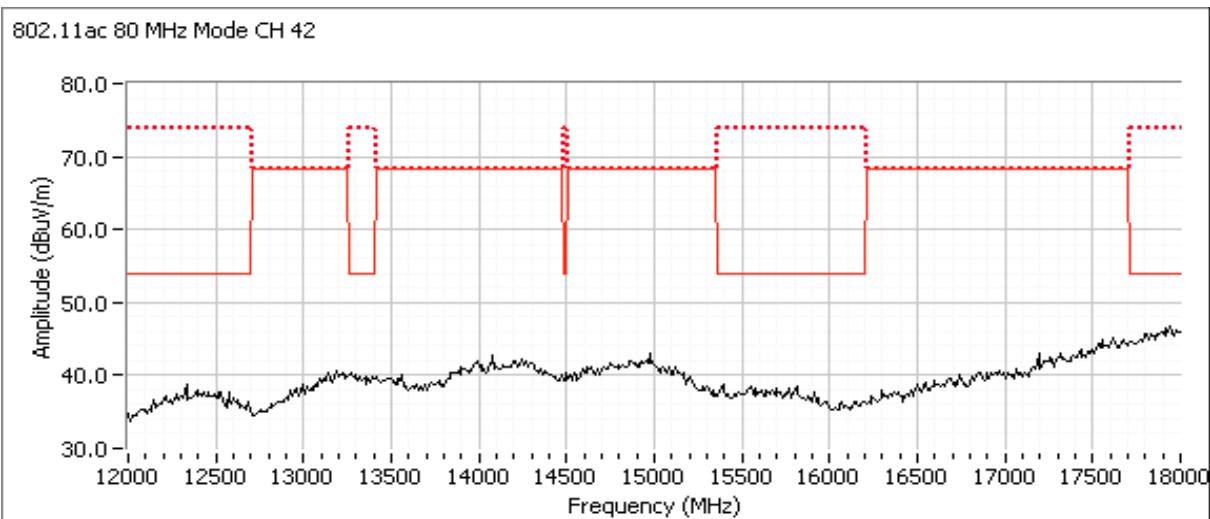
 Channel: 42 Mode: ac80
 Tx Chain: 2Tx Data Rate: VHT0

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5791.670	53.6	H	68.3	-14.7	PK	36	1.0	
6950.000	52.5	H	68.3	-15.8	PK	70	1.0	

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 (68.3dB μ V/m). The measurement method required is a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).


Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

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

Date of Test: 12/19/2014

Test Engineer: Deniz Demirci

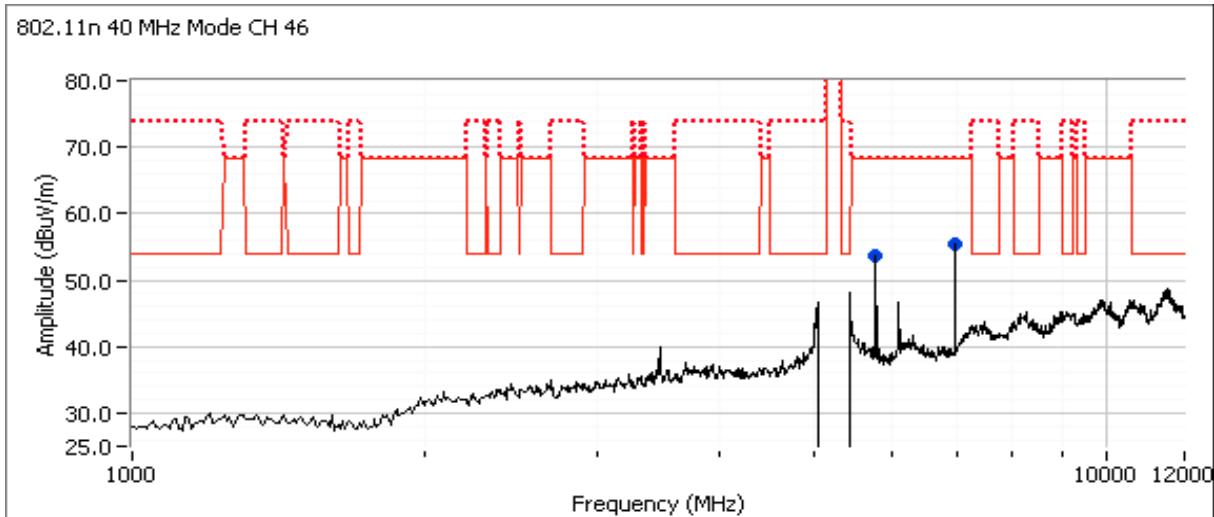
Test Location: FT Ch #4

EUT Voltage: 120 VAC/ 60 Hz

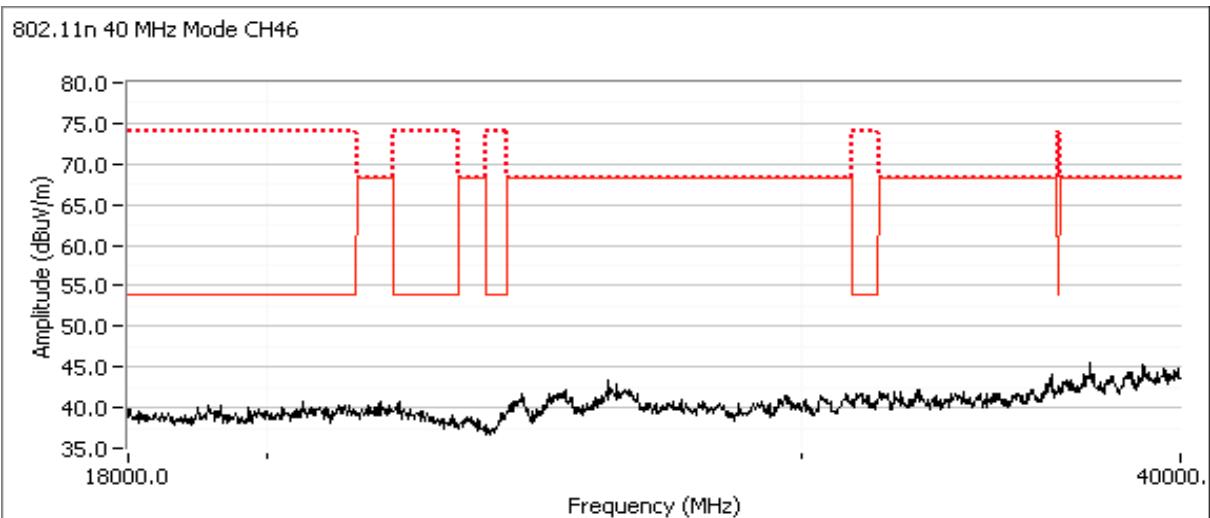
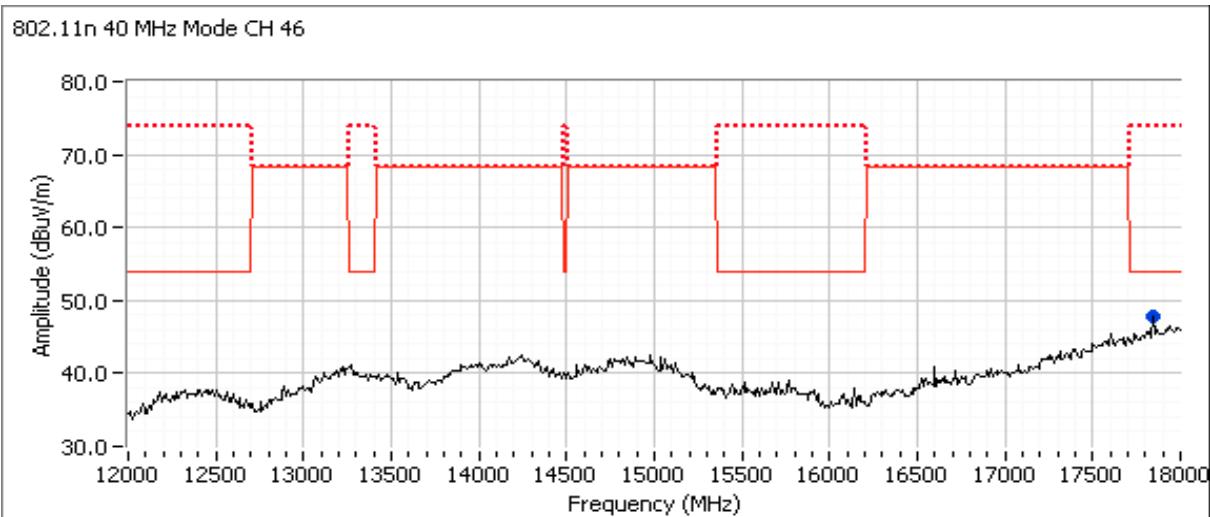
Run #2a: High Channel

Channel: 46 Mode: 11n40
Tx Chain: 2Tx Data Rate: MCS8

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
6973.310	57.9	H	68.3	-10.4	PK	53	1.0
5665.860	51.3	H	68.3	-17.0	PK	52	1.2
17840.000	47.8	H	-	-	PK	330	1.5
							Highest noise floor



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Run #7, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5725-5850 MHz Band

Note - for IC and LP0002, any emissions within a restricted band were assessed via antenna port conducted measurements. Refer to the antenna conducted sheets.

Date of Test: 12/19/2014

Test Engineer: Rafael Varelas

Test Location: FT Ch #4

Config. Used: 1

Config Change: None

EUT Voltage: 120V/60Hz

Run #7a: Center Channel

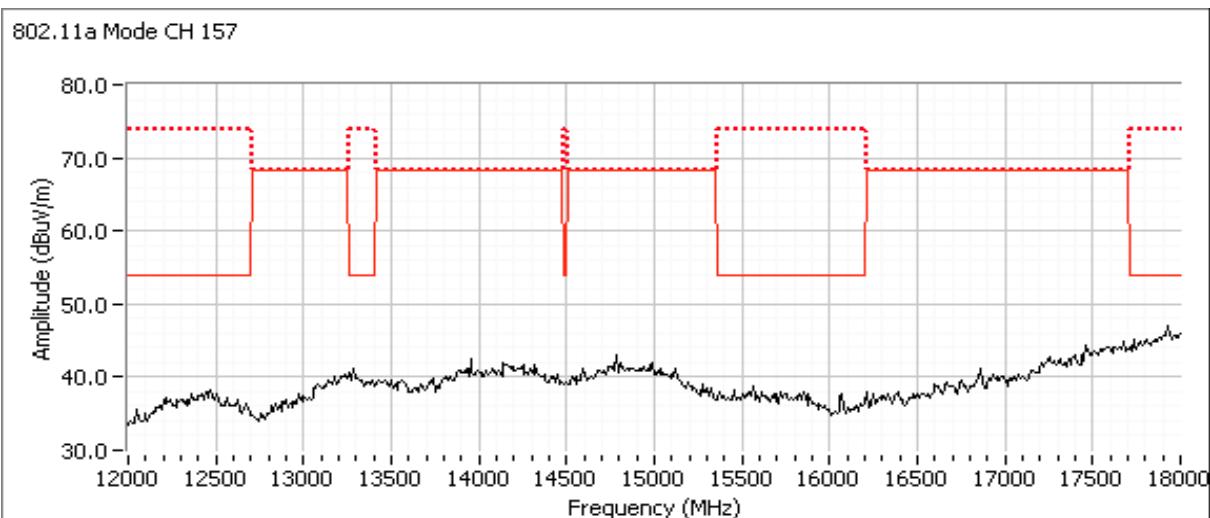
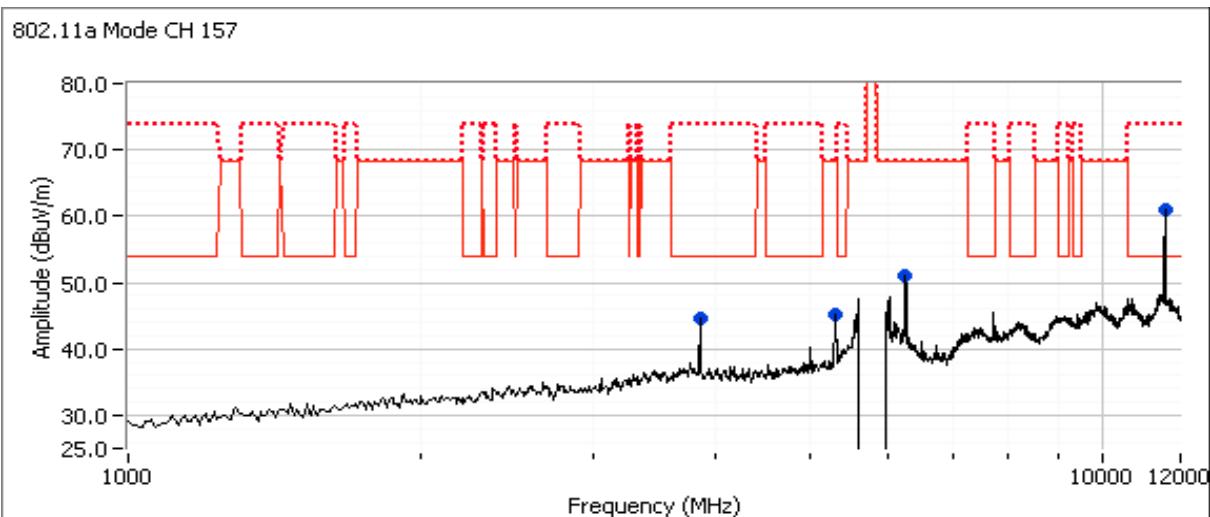
Channel: 157 Mode: a
Tx Chain: 2Tx Data Rate: 6Mbps

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
6264.830	57.3	H	68.3	-11.0	PK	35	1.1	RB 1 MHz;VB 3 MHz;Peak
5310.320	52.3	H	68.3	-16.0	PK	39	1.0	RB 1 MHz;VB 3 MHz;Peak
11572.070	53.8	H	54.0	-0.2	AVG	61	1.9	RB 1 MHz;VB 10 Hz;Peak
11572.700	64.7	H	74.0	-9.3	PK	61	1.9	RB 1 MHz;VB 3 MHz;Peak
3856.690	44.5	H	54.0	-9.5	AVG	332	1.2	RB 1 MHz;VB 10 Hz;Peak
3856.650	49.1	H	74.0	-24.9	PK	332	1.2	RB 1 MHz;VB 3 MHz;Peak

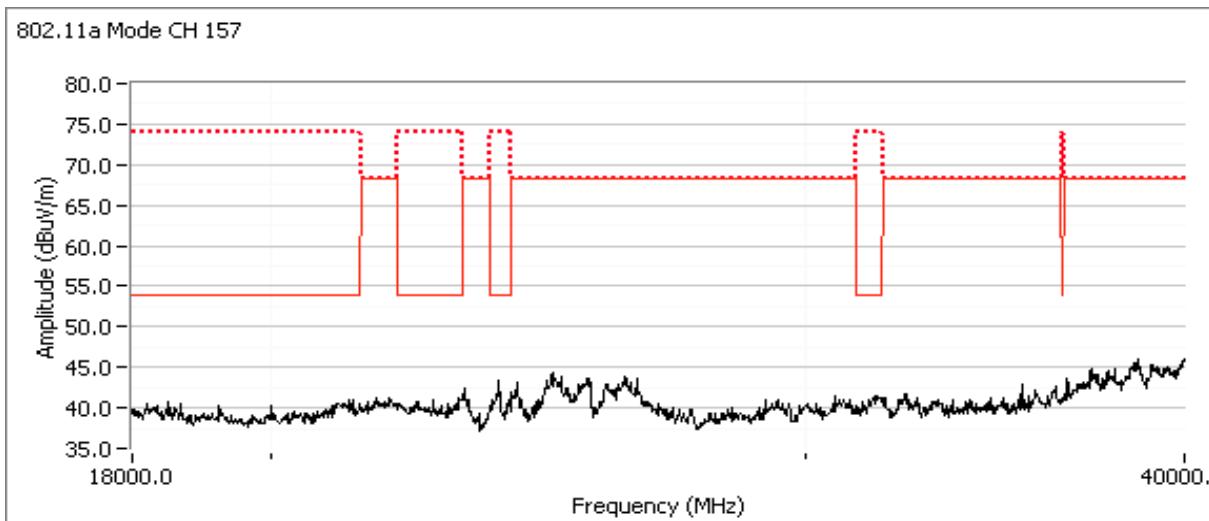
Note 1: For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.

Note 2: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dB μ V/m). The measurement method required is a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

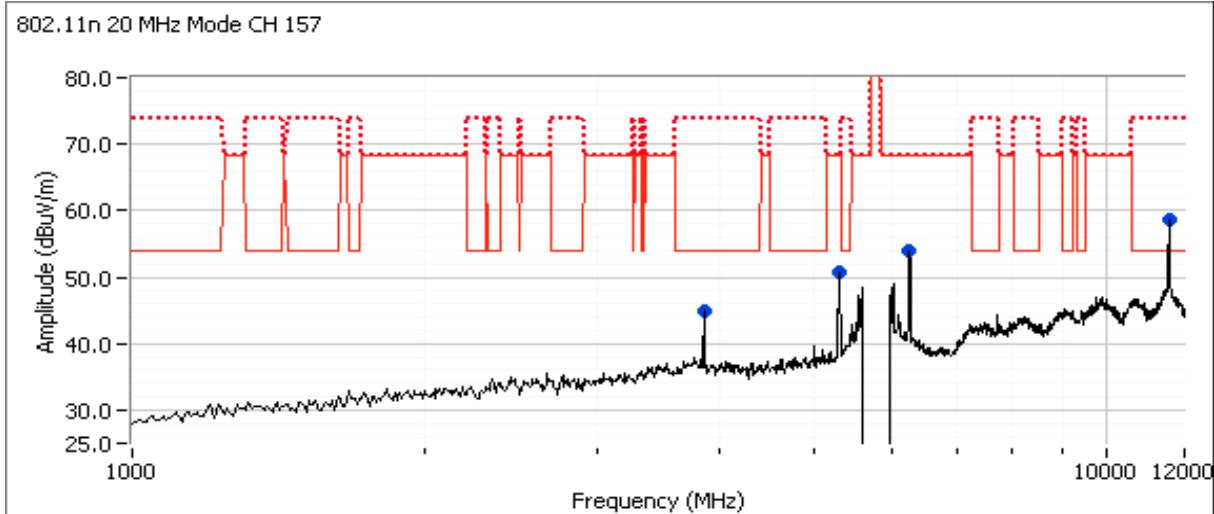
Run #7b: Center Channel

Channel: 157 Mode: 11n20
Tx Chain: 2Tx Data Rate: MCS8

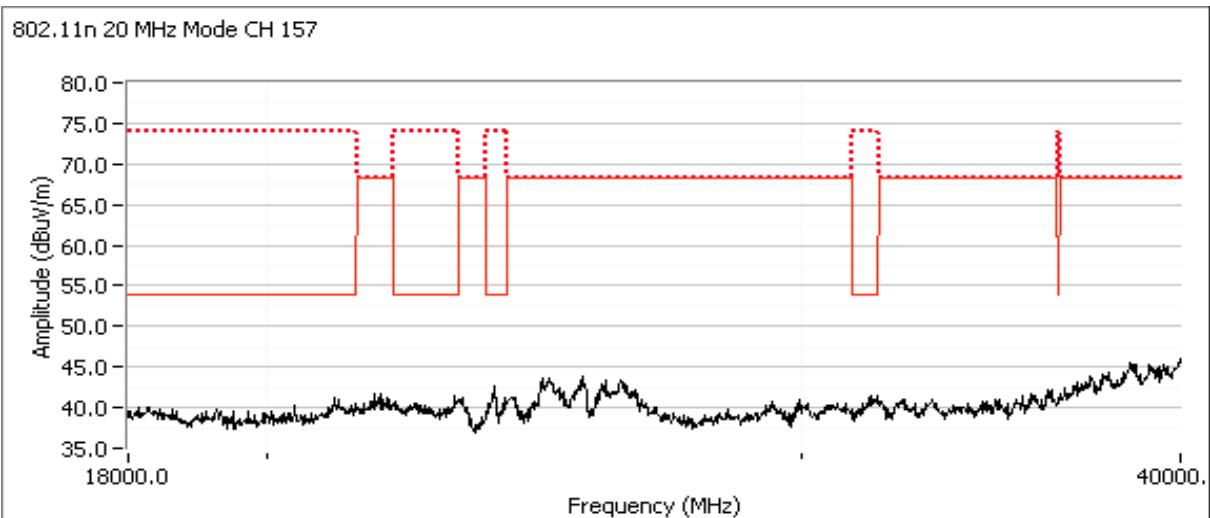
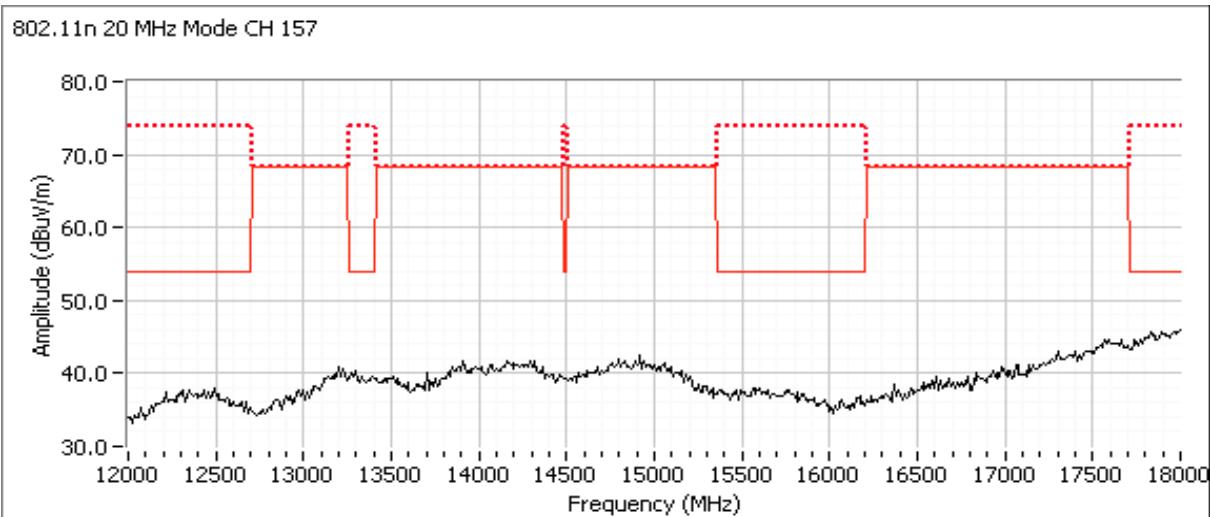
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11569.650	53.5	H	54.0	-0.5	AVG	304	1.7	RB 1 MHz;VB 10 Hz;Peak
6267.780	60.2	H	68.3	-8.1	PK	314	1.1	RB 1 MHz;VB 3 MHz;Peak
11567.020	65.1	H	74.0	-8.9	PK	304	1.7	RB 1 MHz;VB 3 MHz;Peak
3856.700	44.6	H	54.0	-9.4	AVG	338	1.1	RB 1 MHz;VB 10 Hz;Peak
5307.630	57.0	H	68.3	-11.3	PK	39	1.1	RB 1 MHz;VB 3 MHz;Peak
3856.620	49.1	H	74.0	-24.9	PK	338	1.1	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 (68.3dB μ V/m). The measurement method required is a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

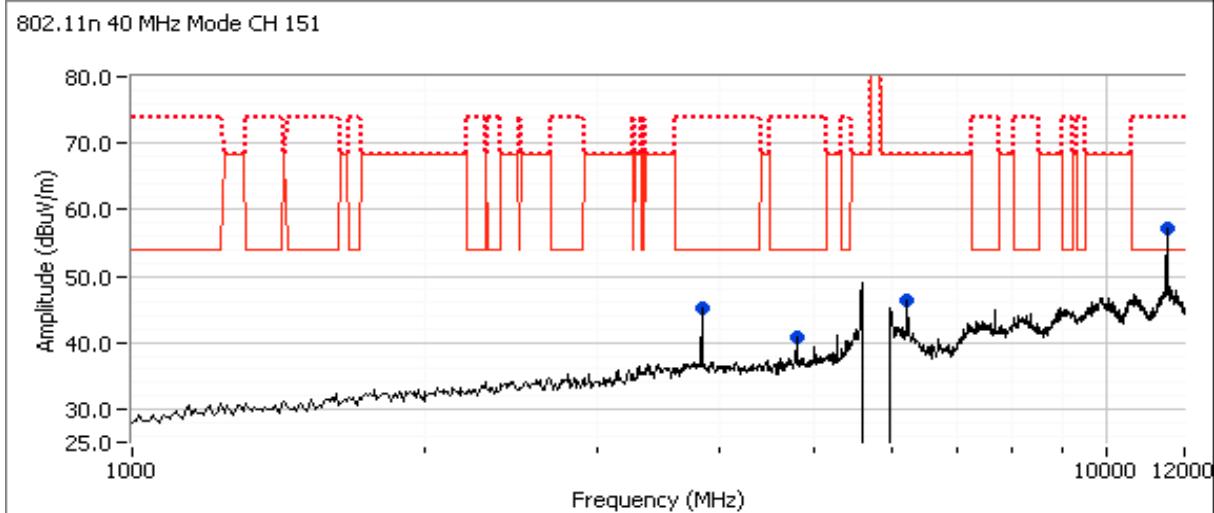
Run #7c: Center Channel

Channel: 151 Mode: 11n40
Tx Chain: 2Tx Data Rate: MCS8

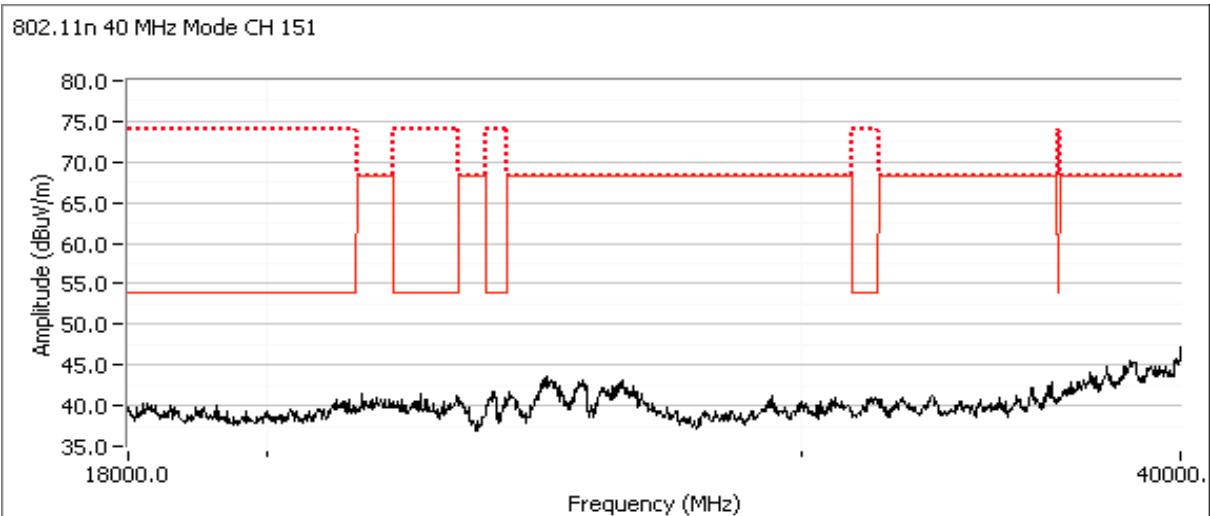
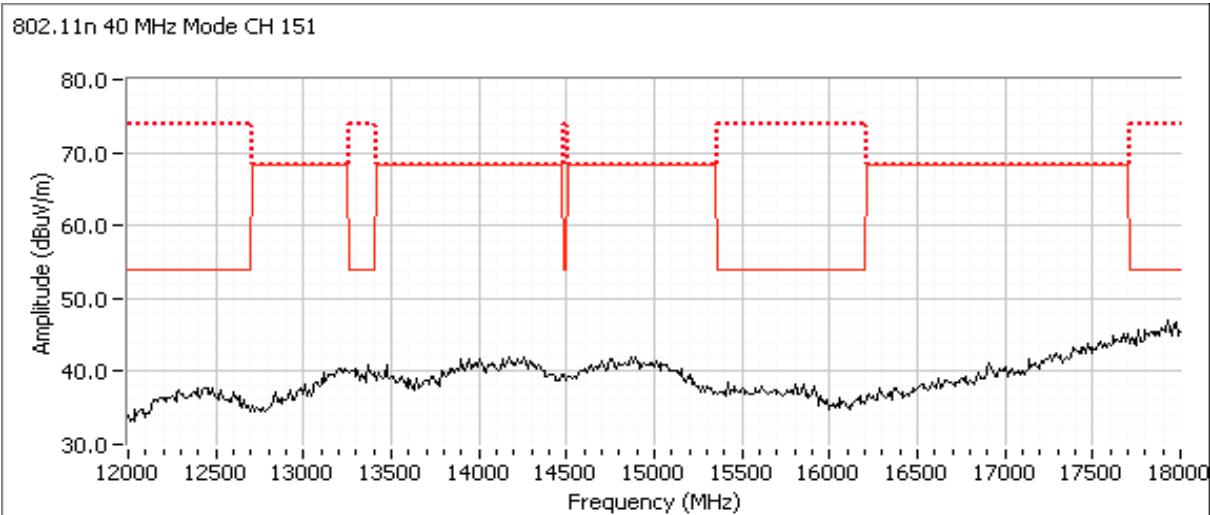
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11508.880	50.3	H	54.0	-3.7	AVG	59	1.4	Note3, RB 1 MHz;VB 10 Hz;Peak
3836.690	46.2	H	54.0	-7.8	AVG	330	1.4	Note3, RB 1 MHz;VB 10 Hz;Peak
11506.410	61.0	H	74.0	-13.0	PK	59	1.4	RB 1 MHz;VB 3 MHz;Peak
4795.900	38.3	H	54.0	-15.7	AVG	337	1.0	RB 1 MHz;VB 10 Hz;Peak
6234.460	51.7	H	68.3	-16.6	PK	302	1.1	RB 1 MHz;VB 3 MHz;Peak
3836.570	48.8	H	74.0	-25.2	PK	330	1.4	RB 1 MHz;VB 3 MHz;Peak
4795.840	46.0	H	74.0	-28.0	PK	337	1.0	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 (68.3dB μ V/m). The measurement method required is a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

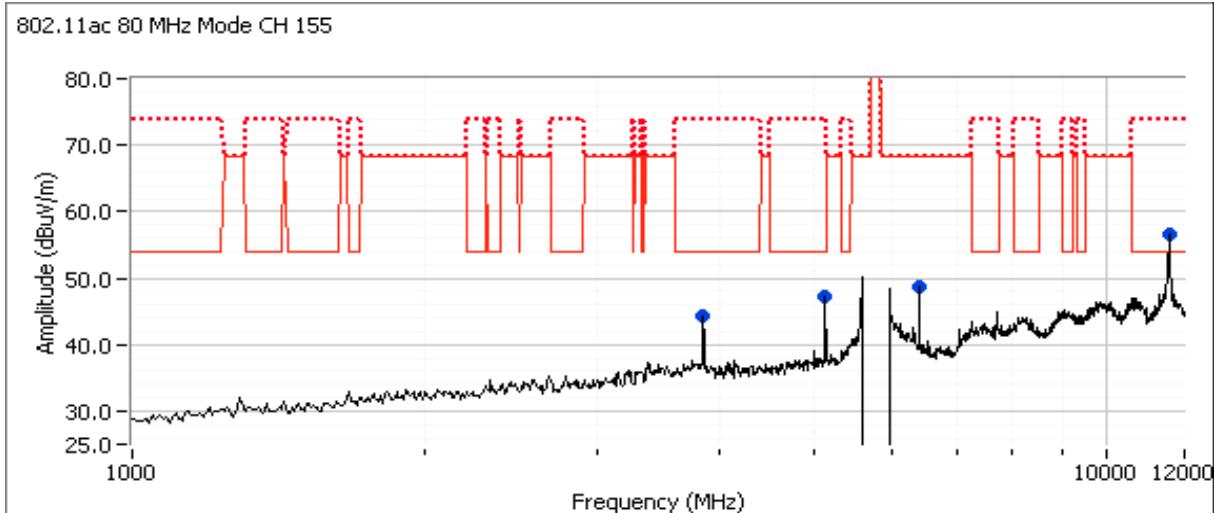
Run #7d: Center Channel

Channel: 155 Mode: ac80
Tx Chain: 2Tx Data Rate: VHT0

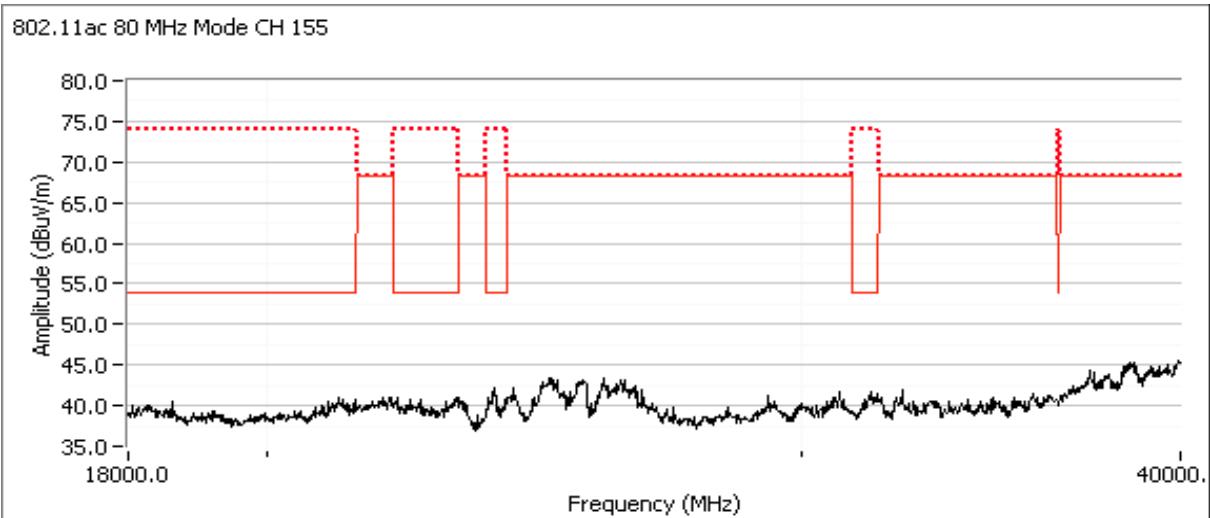
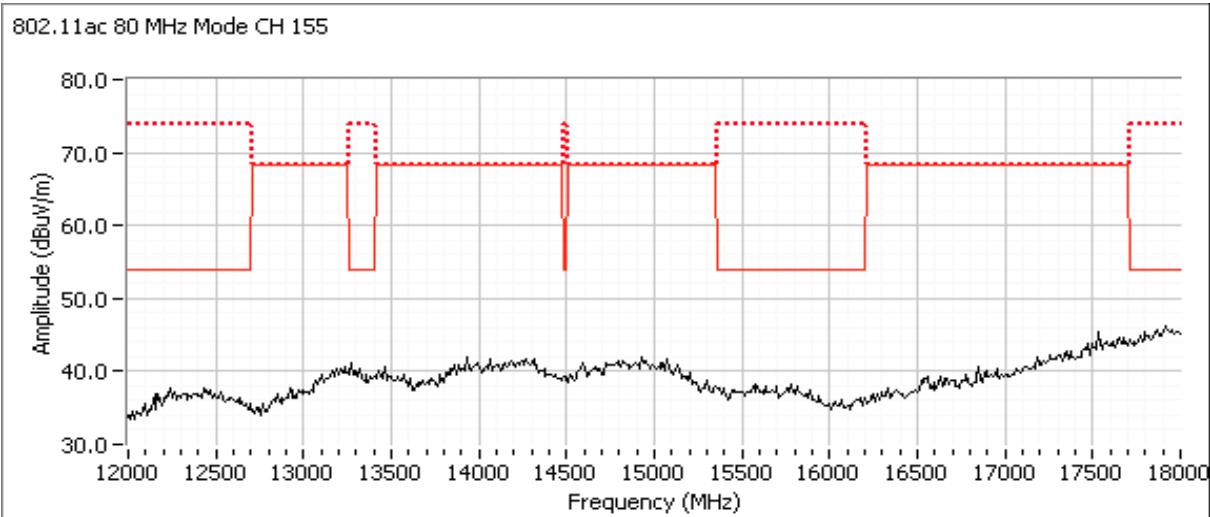
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11563.590	52.5	H	54.0	-1.5	AVG	63	1.4	Note3, RB 1 MHz;VB 10 Hz;Peak
11566.450	61.7	H	74.0	-12.3	PK	63	1.4	RB 1 MHz;VB 3 MHz;Peak
5133.320	51.1	H	54.0	-2.9	AVG	313	1.4	Note3, RB 1 MHz;VB 10 Hz;Peak
5133.340	50.9	H	74.0	-23.1	PK	313	1.4	RB 1 MHz;VB 3 MHz;Peak
6416.750	52.8	H	68.3	-15.5	PK	303	1.2	RB 1 MHz;VB 3 MHz;Peak
3850.030	43.5	H	54.0	-10.5	AVG	333	1.2	RB 1 MHz;VB 10 Hz;Peak
3849.940	48.2	H	74.0	-25.8	PK	333	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 (68.3dB μ V/m). The measurement method required is a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Run #8: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: Worse case from Run #7

Date of Test: 12/19/2014

Config. Used: 1

Test Engineer: Rafael Varelas

Config Change: None

Test Location: FT Ch #4

EUT Voltage: 120V/60Hz

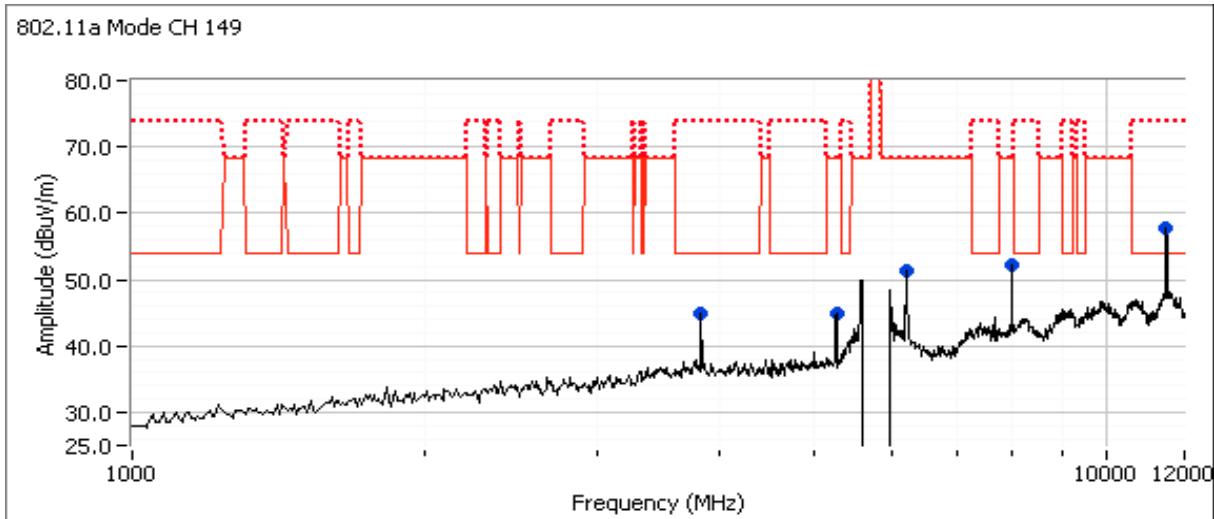
Run #8a: Low Channel

Channel: 149 Mode: a
Tx Chain: 2Tx Data Rate: 6Mbps

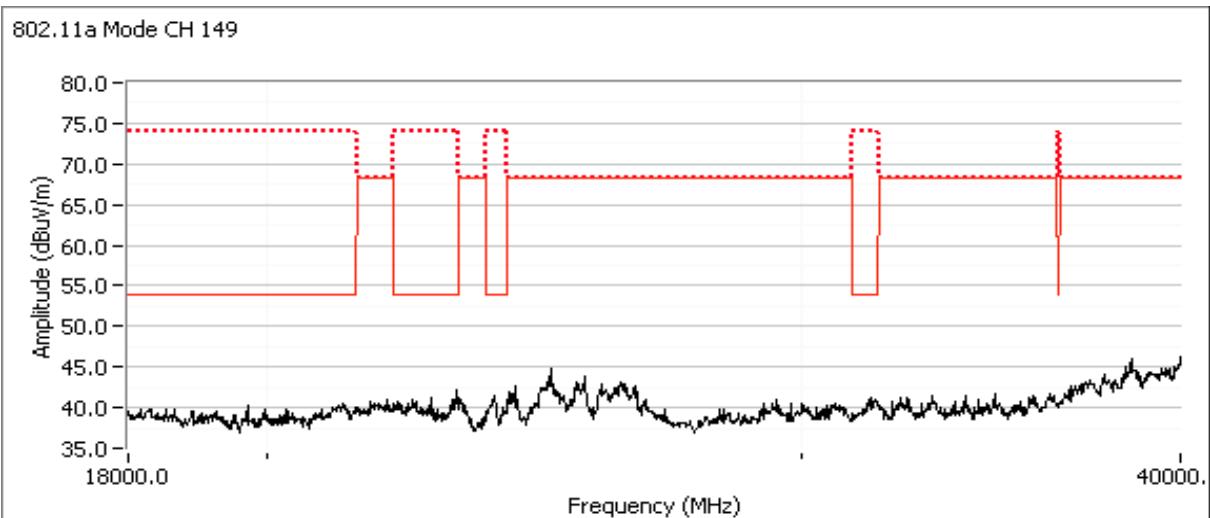
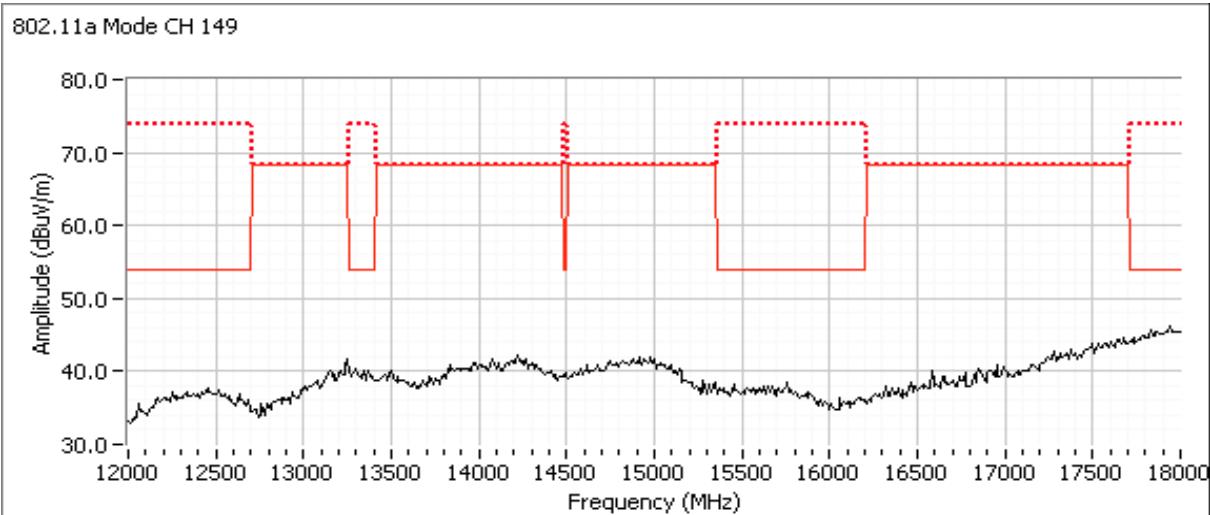
Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
11492.200	51.9	H	54.0	-2.1	AVG	61	1.7
3830.030	44.5	H	54.0	-9.5	AVG	330	1.1
11492.670	63.8	H	74.0	-10.2	PK	61	1.7
6220.940	56.6	H	68.3	-11.7	PK	310	1.0
5264.230	52.8	H	68.3	-15.5	PK	39	1.2
8004.620	50.3	H	68.3	-18.0	PK	6	1.0
3830.140	48.9	H	74.0	-25.1	PK	330	1.1

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 (68.3dB μ V/m). The measurement method required is a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

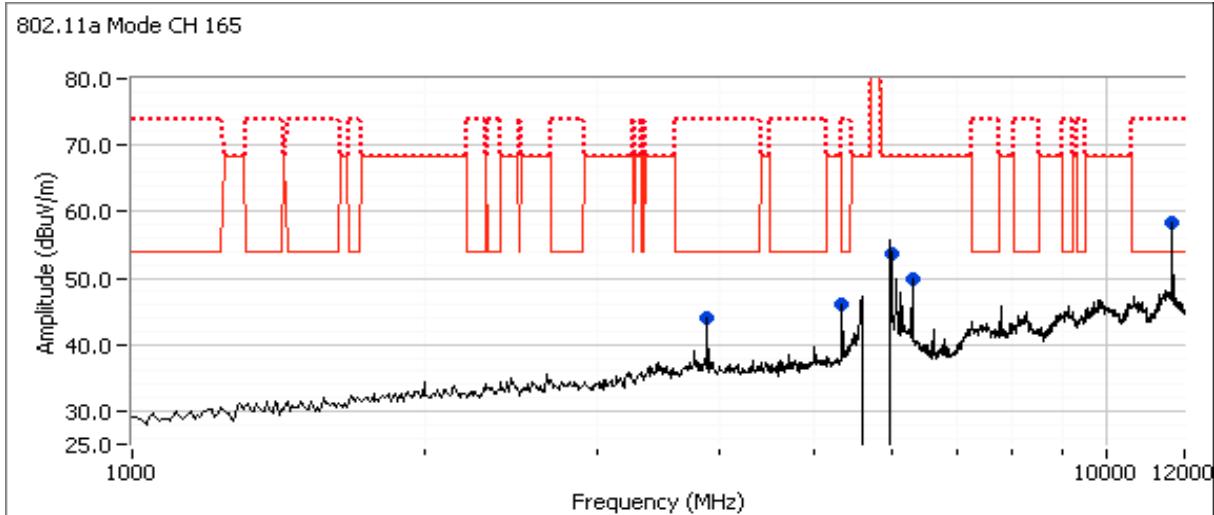


Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-

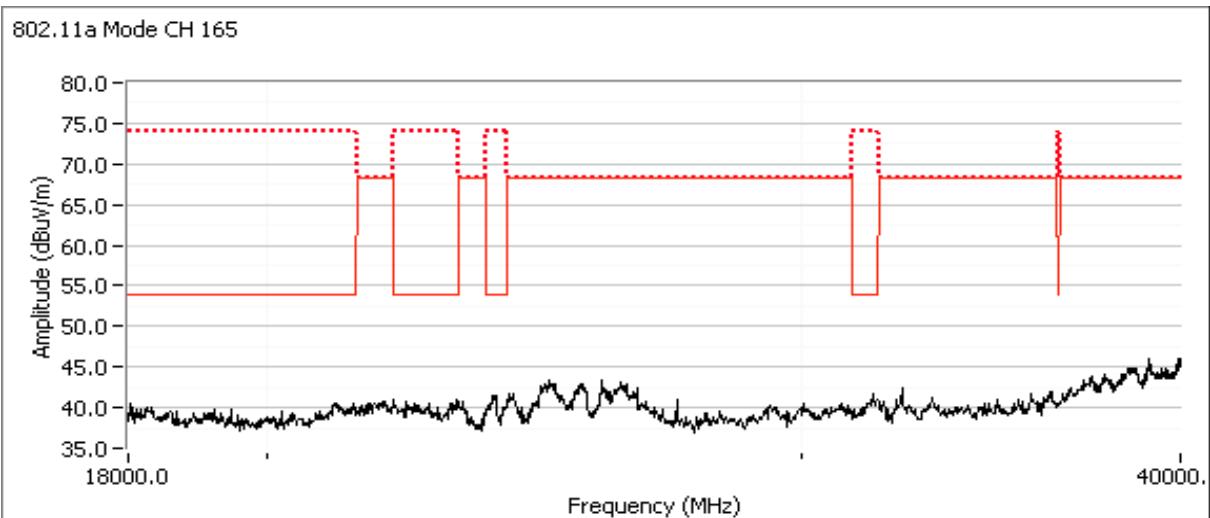
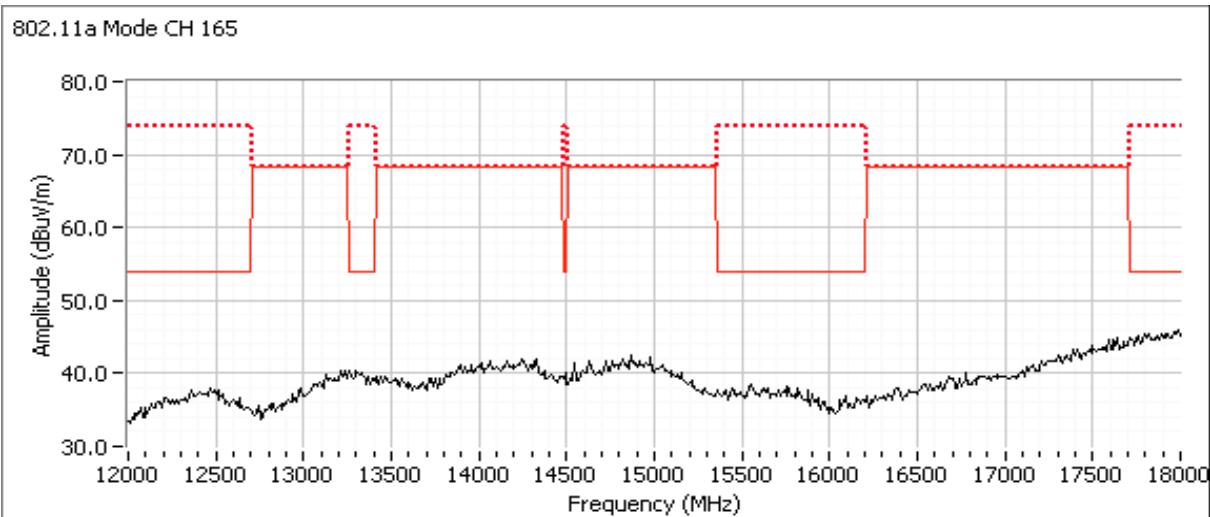
Run #8b: High Channel

Channel: 165 Mode: a
Tx Chain: 2Tx Data Rate: 6Mbps

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11652.680	53.6	H	54.0	-0.4	AVG	59	1.3	RB 1 MHz;VB 10 Hz;Peak
5992.730	64.0	H	68.3	-4.3	PK	310	1.0	RB 1 MHz;VB 3 MHz;Peak
3883.380	45.8	H	54.0	-8.2	AVG	335	1.4	RB 1 MHz;VB 10 Hz;Peak
11653.240	64.6	H	74.0	-9.4	PK	59	1.3	RB 1 MHz;VB 3 MHz;Peak
6312.040	57.9	H	68.3	-10.4	PK	312	1.2	RB 1 MHz;VB 3 MHz;Peak
5337.020	51.6	H	68.3	-16.7	PK	37	1.4	RB 1 MHz;VB 3 MHz;Peak
3883.270	50.0	H	74.0	-24.0	PK	335	1.4	RB 1 MHz;VB 3 MHz;Peak
5337.370	42.3	H	68.3	-26.0	AVG	37	1.4	RB 1 MHz;VB 10 Hz;Peak



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions (Intermodulations)

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: 23 °C
Rel. Humidity: 40 %

Summary of Results

Run #	Mode	Channel	Target Power	Passing Power	Test Performed	Limit	Result / Margin
Test for intermodulation products when 2.4GHz and 5GHz radio are both transmitting							
1	a	157 - 5785MHz	q72	q70	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	No change from single radio transmission
	n20	6 - 2437MHz	q78	q78			

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 $\geq 98\%$ and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	6Mbps	0.99	Yes	2.063	0.0	0.0	485
n20	MCS8	0.99	Yes	1.942	0.0	0.0	515



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A

Sample Notes

Sample S/N: 2014-2278

Driver: 6.37 RC 14.54

Pkteng tx 20 1500 0

Antenna: Internal

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 \geq 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 duty cycle \geq 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces
Note 3:	Emission has duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=10Hz, peak detector, linear averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Linear Voltage correction factor
Note 4:	Emission has duty cycle < 98% and is NOT constant, average measurement performed: RBW=1MHz, VBW > 1/T, peak detector, linear average mode, sweep time auto, max hold. Max hold for 50*(1/DC) traces
Note 5:	Emission has duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Pwr correction factor
Note 6:	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:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-

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

Date of Test: 1/5/2015 0:00

Config. Used: 1

Test Engineer: Jack Liu

Config Change: None

Test Location: FT Chamber# 4

EUT Voltage: 120V/60Hz

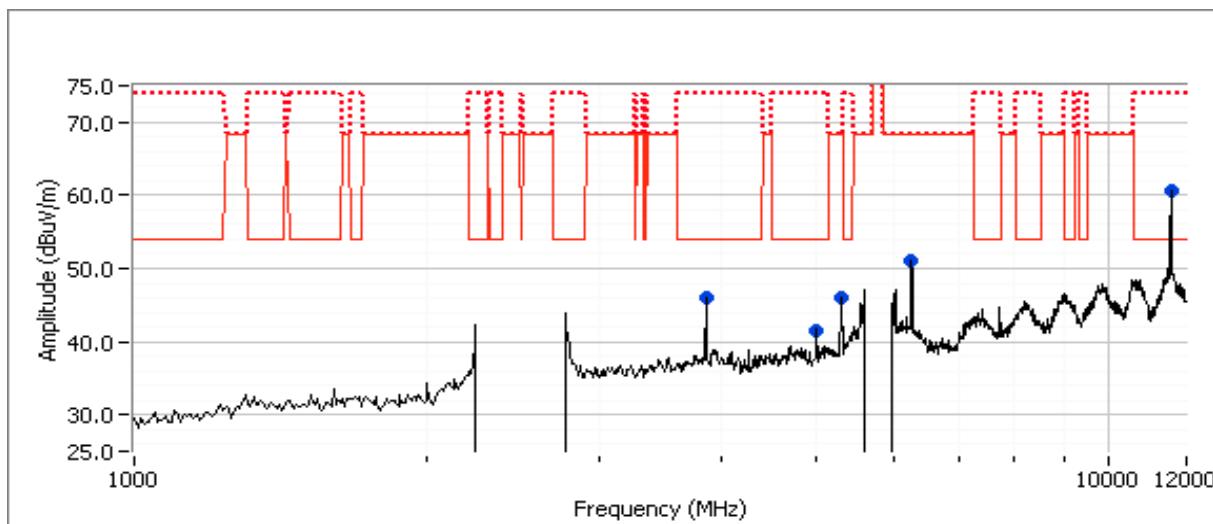
Run #1a:

 Channel: 157 Mode: a
 Tx Chain: 2Tx Data Rate: 6Mbps

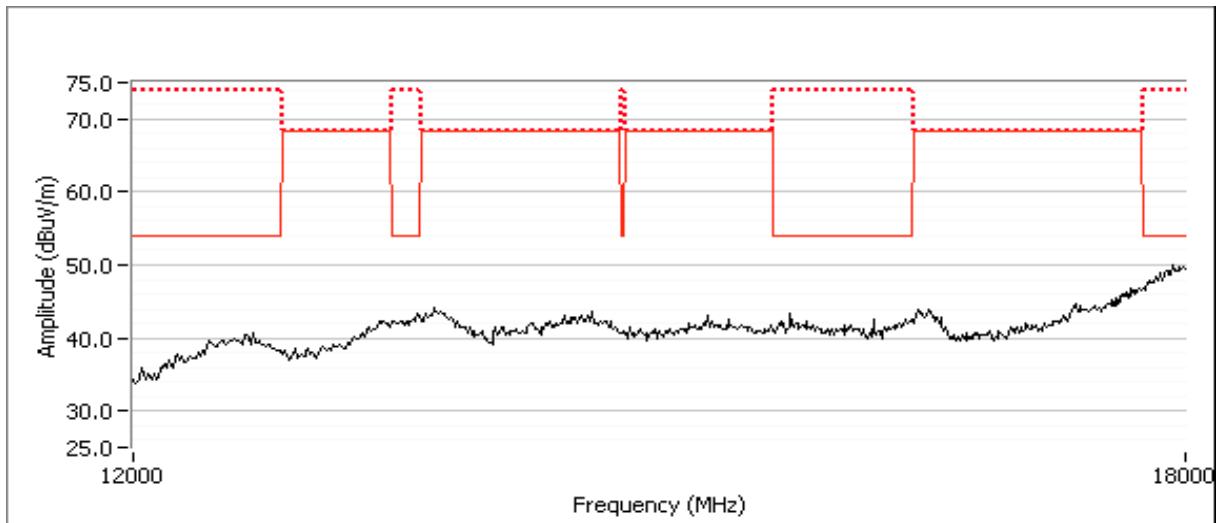
 Channel: 6 Mode: n20
 Tx Chain: 2Tx Data Rate: MCS8

Refer to T96923, UNII Tx Spurious, Run #7a and T96888, 2.4GHz Wifi Tx Spurious, Run #2b for comparison.

Result: No emissons from intermodulations observed.



Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96923
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Product	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
Contact:	Tian Mendez	Project Manager:	Christine Krebill
Emissions Standard(s):	FCC 15.247/FCC 15.407/RSS-210/LP0002	Project Coordinator:	
Immunity Standard(s):	-	Class:	-
		Environment:	-

EMC Test Data

For The

Aruba Networks

Product

APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points

Date of Last Test: 12/30/2014



EMC Test Data

Client:	Aruba Networks	Job Number:	J96879
Model:	APINH205-2x2:2 MIMO 802.11a/b/g/n/ac Wireless Access Points	T-Log Number:	T96924
		Project Manager:	Christine Krebill
Contact:	Tian Mendez	Project Coordinator:	-
Standard:	FCC 15.247/FCC 15.407/RSS-210/LP0002	Class:	-

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: 1/6/2015

Config. Used: 1

Test Engineer: John Caizzi

Config Change: none

Test Location: Fremont Chamber #3

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 were routed through metal conduit and passed through a ferrite clamp upon exiting the chamber.

Ambient Conditions:

Temperature: 19 °C

Rel. Humidity: 32 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
2	CE, AC Power, 120V/60Hz	Class B	Pass	40.0 dB μ V @ 0.455 MHz (-6.8 dB)

Modifications Made During Testing

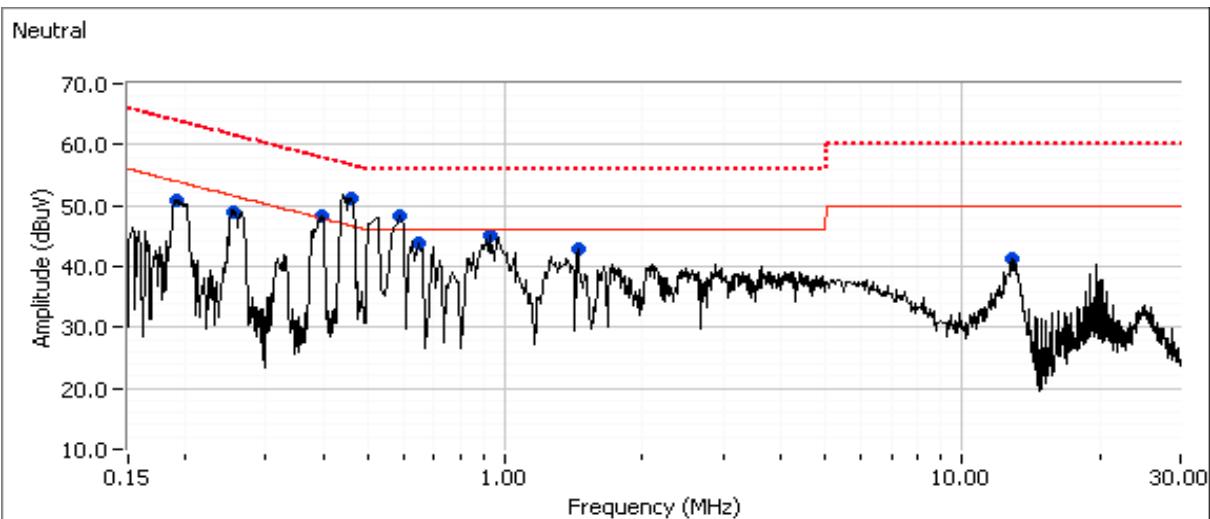
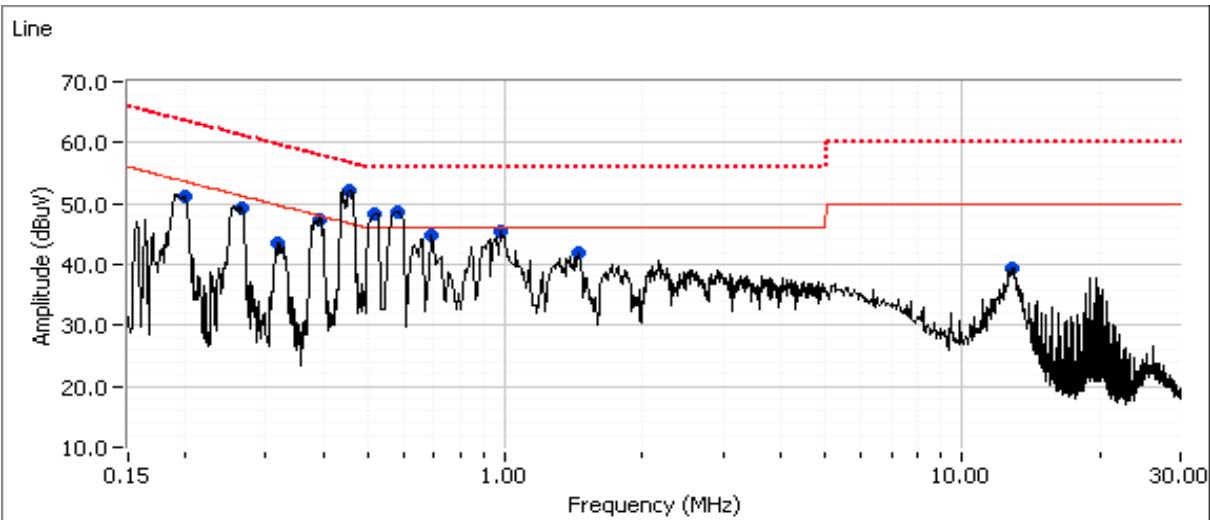
No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

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Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz





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Class:	-	Comments	

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

Frequency MHz	Level dB μ V	AC Line	Class B		Detector QP/Ave	Comments
			Limit	Margin		
0.455	52.0	Line	46.8	5.2	Peak	
0.584	48.5	Line	46.0	2.5	Peak	
0.522	48.4	Line	46.0	2.4	Peak	
0.921	45.3	Line	46.0	-0.7	Peak	
0.390	47.2	Line	48.0	-0.8	Peak	
0.660	44.9	Line	46.0	-1.1	Peak	
0.266	49.4	Line	51.3	-1.9	Peak	
0.196	51.2	Line	53.6	-2.4	Peak	
1.450	41.9	Line	46.0	-4.1	Peak	
0.320	43.4	Line	49.7	-6.3	Peak	
12.947	39.3	Line	50.0	-10.7	Peak	
0.456	51.2	Neutral	46.7	4.5	Peak	
0.583	48.3	Neutral	46.0	2.3	Peak	
0.395	48.4	Neutral	47.9	0.5	Peak	
0.920	45.2	Neutral	46.0	-0.8	Peak	
0.659	43.8	Neutral	46.0	-2.2	Peak	
0.260	49.0	Neutral	51.6	-2.6	Peak	
1.449	42.8	Neutral	46.0	-3.2	Peak	
0.194	50.8	Neutral	54.0	-3.2	Peak	
13.007	41.4	Neutral	50.0	-8.6	Peak	



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Final quasi-peak and average readings

Frequency MHz	Level dB μ V	AC Line	Class B Limit	Margin	Detector QP/Ave	Comments
0.455	40.0	Line	46.8	-6.8	AVG	
0.455	50.0	Line	56.8	-6.8	QP	
0.584	35.1	Line	46.0	-10.9	AVG	
0.584	46.3	Line	56.0	-9.7	QP	
0.522	35.8	Line	46.0	-10.2	AVG	
0.522	47.1	Line	56.0	-8.9	QP	
0.921	29.2	Line	46.0	-16.8	AVG	
0.921	42.8	Line	56.0	-13.2	QP	
0.390	35.9	Line	48.1	-12.2	AVG	
0.390	45.3	Line	58.1	-12.8	QP	
0.660	28.2	Line	46.0	-17.8	AVG	
0.660	42.1	Line	56.0	-13.9	QP	
0.266	31.8	Line	51.2	-19.4	AVG	
0.266	44.1	Line	61.2	-17.1	QP	
0.196	35.9	Line	53.8	-17.9	AVG	
0.196	48.4	Line	63.8	-15.4	QP	
1.450	32.0	Line	46.0	-14.0	AVG	
1.450	39.5	Line	56.0	-16.5	QP	
0.320	30.5	Line	49.7	-19.2	AVG	
0.320	39.3	Line	59.7	-20.4	QP	
12.947	29.5	Line	50.0	-20.5	AVG	
12.947	35.6	Line	60.0	-24.4	QP	
0.456	39.2	Neutral	46.8	-7.6	AVG	
0.456	49.4	Neutral	56.8	-7.4	QP	
0.583	34.4	Neutral	46.0	-11.6	AVG	
0.583	45.9	Neutral	56.0	-10.1	QP	
0.395	34.1	Neutral	48.0	-13.9	AVG	
0.395	45.6	Neutral	58.0	-12.4	QP	
0.920	29.2	Neutral	46.0	-16.8	AVG	
0.920	42.6	Neutral	56.0	-13.4	QP	
0.659	28.6	Neutral	46.0	-17.4	AVG	
0.659	42.0	Neutral	56.0	-14.0	QP	
0.260	38.2	Neutral	51.4	-13.2	AVG	
0.260	46.3	Neutral	61.4	-15.1	QP	
1.449	32.1	Neutral	46.0	-13.9	AVG	
1.449	39.4	Neutral	56.0	-16.6	QP	
0.194	36.9	Neutral	53.9	-17.0	AVG	
0.194	48.1	Neutral	63.9	-15.8	QP	
13.007	30.7	Neutral	50.0	-19.3	AVG	
13.007	36.7	Neutral	60.0	-23.3	QP	



End of Report

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