41039 Boyce Road
Fremont, CA. 94538

510-578-3500 Phone
510-440-9525 Fax

EMC Test Report

Application for FCC Grant of Equipment Authorization
Canada Certification

Innovation, Science and Economic Development Canada
RSS-Gen Issue 5 / RSS-247 Issue 2
FCC Part 15, Subpart E

Model: APIN0555

IC CERTIFICATION #:	4675A-APIN0555
FCC ID:	Q9DAPIN0555
APPLICANT:	Aruba, a Hewlett Packard Enterprise company 3333 Scott Blvd Santa Clara, CA 95054
TEST SITE(S):	National Technical Systems 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-3, 2845B-4, 2845B-5 and 2845B-7
PROJECT NUMBER:	PR075848
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A2LA ACCREDITED
Testing Cert #0214.26

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VALIDATING SIGNATORIES

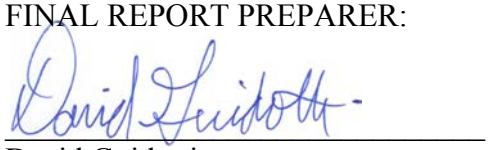
PROGRAM MGR

David W. Bare
Chief Engineer

TECHNICAL REVIEWER:

David W. Bare
Chief Engineer

FINAL REPORT PREPARER:



David Guidotti
Senior Technical Writer

QUALITY ASSURANCE DELEGATE

Gary Izard
Quality Assurance Representative

REVISION HISTORY

Rev#	Date	Comments	Modified By
-	March 14, 2019	First release	
1	April 8, 2019	Revised to correct 11ax20 bandwidth values, removed statement about use of 15.209 limits in lieu of 15.407 limits	dwb
2	April 18, 2019	Updated 6dB bandwidth results for 5.8 GHz band	dwb
3	May 3, 2019	Revised peak antenna gain values listed on page 12	dwb

TABLE OF CONTENTS

VALIDATING SIGNATORIES **2**
REVISION HISTORY **3**
TABLE OF CONTENTS **4**
SCOPE **5**
OBJECTIVE **5**
STATEMENT OF COMPLIANCE **6**
DEVIATIONS FROM THE STANDARDS **6**
TEST RESULTS SUMMARY **7**
UNII / LELAN DEVICES 7
MEASUREMENT UNCERTAINTIES 11
EQUIPMENT UNDER TEST (EUT) DETAILS **12**
GENERAL 12
OTHER EUT DETAILS 12
ENCLOSURE 12
MODIFICATIONS 12
SUPPORT EQUIPMENT 13
EUT INTERFACE PORTS 13
EUT OPERATION 13
TEST SITE **14**
GENERAL INFORMATION 14
CONDUCTED EMISSIONS CONSIDERATIONS 14
RADIATED EMISSIONS CONSIDERATIONS 14
MEASUREMENT INSTRUMENTATION **15**
RECEIVER SYSTEM 15
INSTRUMENT CONTROL COMPUTER 15
LINE IMPEDANCE STABILIZATION NETWORK (LISN) 15
FILTERS/ATTENUATORS 16
ANTENNAS 16
ANTENNA MAST AND EQUIPMENT TURNTABLE 16
INSTRUMENT CALIBRATION 16
TEST PROCEDURES **17**
EUT AND CABLE PLACEMENT 17
CONDUCTED EMISSIONS 17
RADIATED EMISSIONS 17
CONDUCTED EMISSIONS FROM ANTENNA PORT 21
BANDWIDTH MEASUREMENTS 21
SPECIFICATION LIMITS AND SAMPLE CALCULATIONS 22
CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(A), RSS GEN 22
GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS 23
RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS 23
FCC 15.407 (A) OUTPUT POWER LIMITS 24
OUTPUT POWER LIMITS –LELAN DEVICES 24
SPURIOUS EMISSIONS LIMITS –UNII AND LELAN DEVICES 24
SAMPLE CALCULATIONS - CONDUCTED EMISSIONS 25
SAMPLE CALCULATIONS - RADIATED EMISSIONS 25
SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION 26
APPENDIX A TEST EQUIPMENT CALIBRATION DATA **27**
APPENDIX B TEST DATA **32**
END OF REPORT **150**

SCOPE

An electromagnetic emissions test has been performed on the Aruba, a Hewlett Packard Enterprise company model APIN0555, pursuant to the following rules:

RSS-Gen Issue 5 " General Requirements for Compliance of Radio Apparatus"
RSS 247 Issue 2 "Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSS) and Licence-Exempt Local Area Network (LE-LAN) Devices"
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 test procedures:

ANSI C63.10-2013
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.

National Technical Systems is accredited by the A2LA, certificate number 0214.26, to perform the test(s) listed in this report, except where noted otherwise.

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.

Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification. Class II devices are required to meet the appropriate technical requirements but are exempt from certification 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 samples of Aruba, a Hewlett Packard Enterprise company model APIN0555 complied with the requirements of the following regulations:

RSS 247 Issue 2 "Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSS) and Licence-Exempt Local Area Network (LE-LAN) Devices"
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, a Hewlett Packard Enterprise company model APIN0555 and therefore apply only to the tested samples. The samples were selected and prepared by Mark Hill of Aruba, a Hewlett Packard Enterprise company.

DEVIATIONS FROM THE STANDARDS

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

TEST RESULTS SUMMARY

UNII / LELAN DEVICES

OPERATION IN THE 5.15 – 5.25 GHZ BAND – ACCESS POINTS

FCC Rule Part		Description	Measured Value / Comments	Limit / Requirement	Result
15.407 (a) (1) (i) or (ii)		Output Power	a: 143.1 mW ax20: 139.4 mW ax40: 284.4 mW ax80: 127.3 mW (Max eirp: 0.955 W)	30 dBm EIRP <= 4W	Complies
15.407 (a) (1) (i), (ii) or (iii)		Power Spectral Density	a: 11.2 mW/MHz ax20: 13.0 mW/MHz ax40: 11.6 mW/MHz ax80: 2.4 mW/MHz	17 dBm/MHz	Complies
15.407(b) (1) / 15.209		Spurious Emissions above 1GHz	54.0 dBµV/m @ 5149.5 MHz (0.0 dB)	Refer to the limits section (p23) for restricted bands, all others -27 dBm/MHz EIRP	Complies

OPERATION IN THE 5.15 – 5.25 GHZ BAND

	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
	RSS-247 6.2.1	Indoor operation only	Refer to user's manual	N/A	Complies
	RSS-247 6.2.1 (1)	99% Bandwidth	a: 16.94 MHz ax20: 19.78 MHz ax40: 38.48 MHz ax80: 78.08 MHz	N/A – limits output power if < 20MHz	N/A
	RSS-247 6.2.1 (1)	EIRP Output Power	a: 7.2 mW ax20: 7.4 mW ax40: 14.6 mW ax80: 27.8 mW (Max eirp: 0.093 W)	23 dBm (200 mW)	Complies
	RSS-247 6.2.1 (1)	Power Spectral Density	a: 0.6 mW/MHz ax20: 0.6 mW/MHz ax40: 0.6 mW/MHz ax80: 0.6 mW/MHz	10 dBm/MHz	Complies
	RSS-247 6.2.1 (2)	Spurious Emissions above 1GHz	54.0 dBµV/m @ 5149.5 MHz (0.0 dB)	Refer to the limits section (p23) for restricted bands, all others -27 dBm/MHz EIRP 26 dBc in 5.25-5.35 GHz band	Complies

OPERATION IN THE 5.725 – 5.85 GHZ BAND

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(e)	RSS-247 6.2.4 (1)	6dB Bandwidth	a: 16.16 MHz ax20: 19.04 MHz ax40: 37.76 MHz ax80: 77.76 MHz	<= 500 kHz	Complies
15.407(a) (3)	RSS-210 A9.2(2)	Output Power (multipoint systems)	a: 619.1 mW ax20: 671.1 mW ax40: 631.7 mW ax80: 548.3 mW (Max eirp: 1.625 W)	30 dBm (1 W) EIRP <= 4W	Complies
15.407(a) (3)	RSS-247 6.2.3 (1)	Power Spectral Density	a: 48.1 mW/MHz ax20: 47 mW/MHz ax40: 21.3 mW/MHz ax80: 9.3 mW/MHz	30 dBm / 500 kHz	Complies
15.407(b) (4) / 15.209	RSS-247 6.2.4 (2)	Spurious Emissions above 1GHz	70.9 dBµV/m @ 5911.7 MHz (-0.9 dB)	Refer to the limits section (p23) for restricted bands, all others -17 dBm/MHz EIRP bandedge and -27 dBm/MHz EIRP	Complies

REQUIREMENTS FOR ALL U-NII/LELAN BANDS

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407	RSS-247 6.1	Modulation	System uses OFDM techniques	Digital modulation is required	Complies
15.407(b) (6) / 15.209	RSS-247 6.2.1 (2)	Spurious Emissions below 1GHz	36.8 dBµV/m @ 45.29 MHz (-3.2 dB)	Refer to page 24	Complies
15.31 (m)	RSS-247 6.4 (1) RSS-Gen 6.9	Channel Selection	Emissions tested at outermost and middle channels in each band	Device was tested on the top, bottom and center channels in each band	N/A
15.407 (c)	RSS-247 6.4 (2)	Operation in the absence of information to transmit	Operation is discontinued in the absence of information (Operational Description page 8)	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)		Frequency Stability	Frequency stability is such that the emissions stay in band. (Operational description page 5)	Signal shall remain within the allocated band	Complies
15.407 (h1)	RSS-247 6.2.2 (1) 6.2.3 (1)	Transmit Power Control	TPC is not required as the device does not operate in either the 5470 – 5725 or 5250 – 5350 MHz bands	The U-NII device shall have the capability to operate with a mean EIRP value lower than 24dBm (250mW)	N/A
15.407 (h2)	RSS-247 6.3	Dynamic frequency Selection (device with radar detection)	Device does not operate in either 5470 – 5725 or 5250 – 5350 MHz bands.		N/A
	RSS-247 6.4 c	User manual information	Refer to manual for details	Warning regarding Indoor use for 5150-5250 MHz 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	Integral antenna	Unique or integral antenna required	Complies
15.407 (b) (6)	RSS-Gen Table 4	AC Conducted Emissions (AC Power)	38.5 dBµV @ 0.46 MHz (-8.3 dB)	Refer to page 22	Complies
		AC Conducted Emissions (POE)	34.6 dBµV @ 0.45 MHz (-12.2 dB)		
15.247 (i) 15.407 (f)	RSS 102	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
-	RSS-Gen 6.8	User Manual	Integral antenna	Statement for products with detachable antenna	N/A
-	RSS-Gen 8.4	User Manual	Refer to manual	Statement for all products	Complies

MEASUREMENT UNCERTAINTIES

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

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

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Aruba, a Hewlett Packard Enterprise company model APIN0555 is an enterprise grade Wi-Fi Access Point with two radios (one for 5 GHz bands and a second for 2.4 GHz bands). In addition, it incorporates a Bluetooth Low Energy (BLE) and ZigBee radio. Since the EUT could be placed in any position during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 56VDC, 0.6A.

The samples were received on October 12, 2018 and tested on October 12, 15, 16, 17, 22, 25, 26, 29 and 31, November 1 and 2, December 2, 3, 4, 5, 6 and 27, 2018, January 14 and 15, February 14, 15 and 19, 2019. The following samples were used:

Company	Model	Description	Serial Number	FCC ID
Aruba	APIN0555	Wi-Fi Access Point	CNGFK9Y02N	Q9DAPIN0555
Aruba	APIN0555	Wi-Fi Access Point	CNGFK9Y005	Q9DAPIN0555
Aruba	APIN0555	Wi-Fi Access Point	CNGXK9Y07P	Q9DAPIN0555

OTHER EUT DETAILS

The following EUT details should be noted:
Maximum antenna gains for internal antennas (details in test results):
2.4GHz: 4.3dBi max
5GHz: 5.8dBi max
BLE/ZigBee: 4.5dBi
The Aruba APIN0555 802.11ax mode does not support partial RU configurations.

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 26 cm wide by 26 cm deep by 5.5 cm high.

MODIFICATIONS

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

SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
		AC Adapter		

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

Company	Model	Description	Serial Number	FCC ID
Dell	LatitudeE5440	Laptop	TS-0000342	-
Microsemi	PD-9001GR/AT/AC	POE adapter	None	-

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
AC Adapter	Mains	Two wire	Unshileded	1.3
POE adapter	Laptop	Cat 6	Unshileded	4
POE adapter	Mains	Three wire	Unshileded	1.3

EUT OPERATION

During emissions testing the EUT was set to transmit continuously in the 2.4 GHz and 5 GHz bands on the selected channel at the stated power level. Both Wi-Fi and BLE or ZigBee were transmitting.

TEST SITE

GENERAL INFORMATION

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

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

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. Results from testing performed in this chamber have been correlated with results from an open area test site. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4.

CONDUCTED EMISSIONS CONSIDERATIONS

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

RADIATED EMISSIONS CONSIDERATIONS

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

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

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

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

INSTRUMENT CONTROL COMPUTER

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

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

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

FILTERS/ATTENUATORS

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

ANTENNAS

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

ANTENNA MAST AND EQUIPMENT TURNTABLE

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

ANSI C63.10 specifies that the test height above ground for table mounted devices shall be 80 centimeters for testing below 1 GHz and 1.5m for testing above 1 GHz. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor as specified in ANSI C63.4. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

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

TEST PROCEDURES

EUT AND CABLE PLACEMENT

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

CONDUCTED EMISSIONS

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

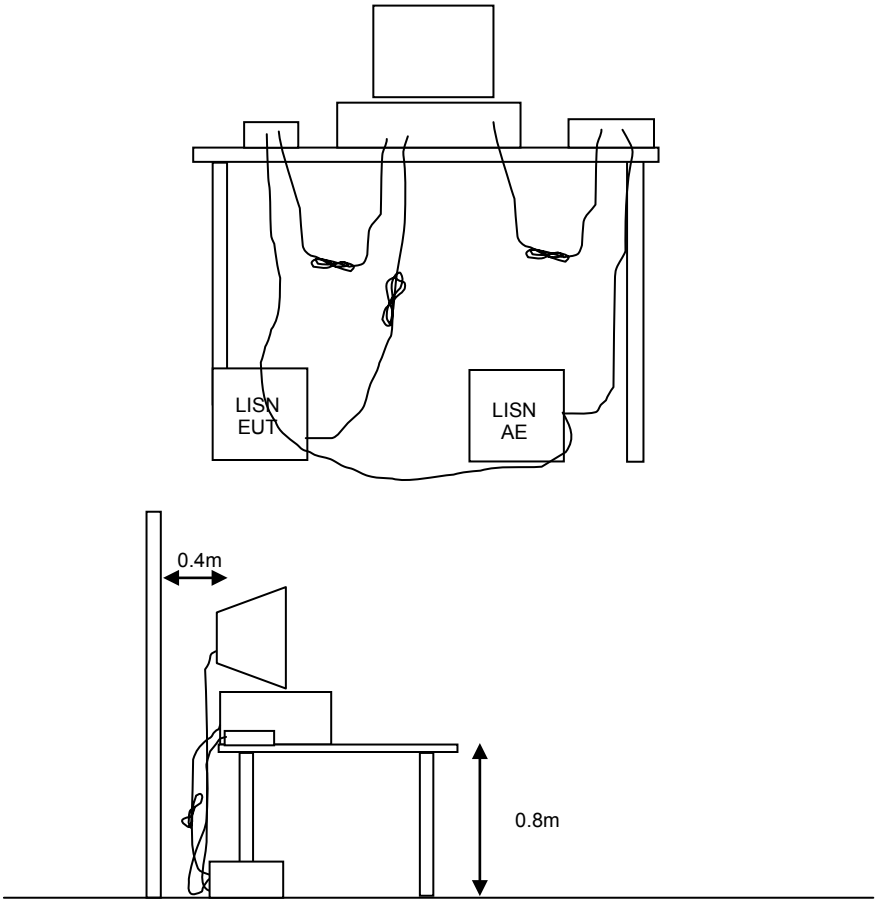


Figure 1 Typical Conducted Emissions Test Configuration

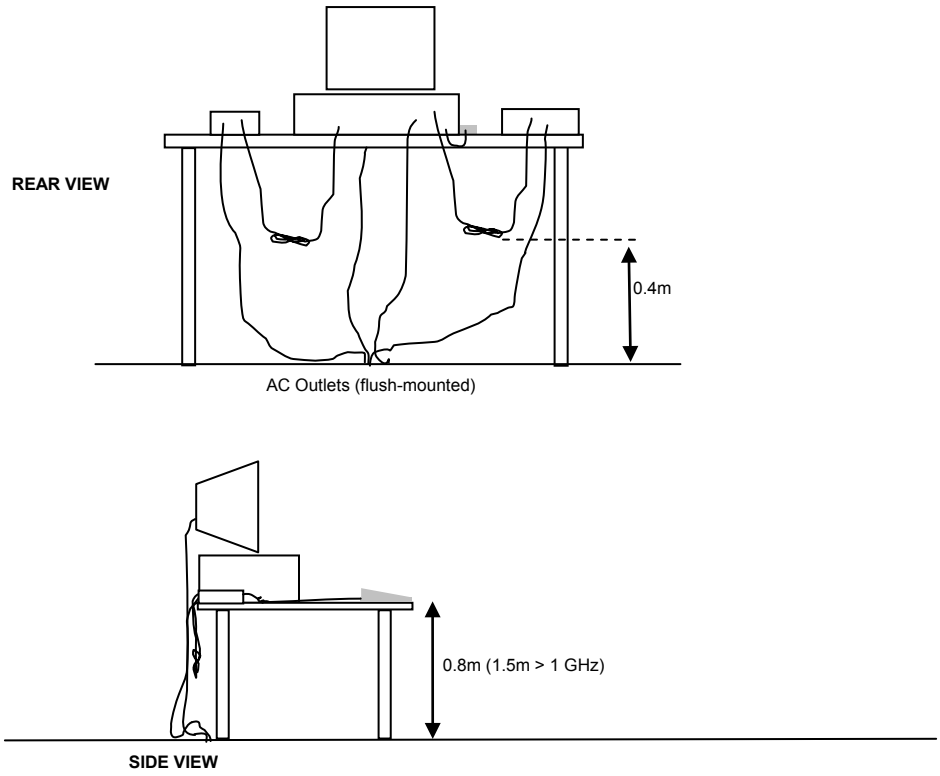
RADIATED EMISSIONS

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

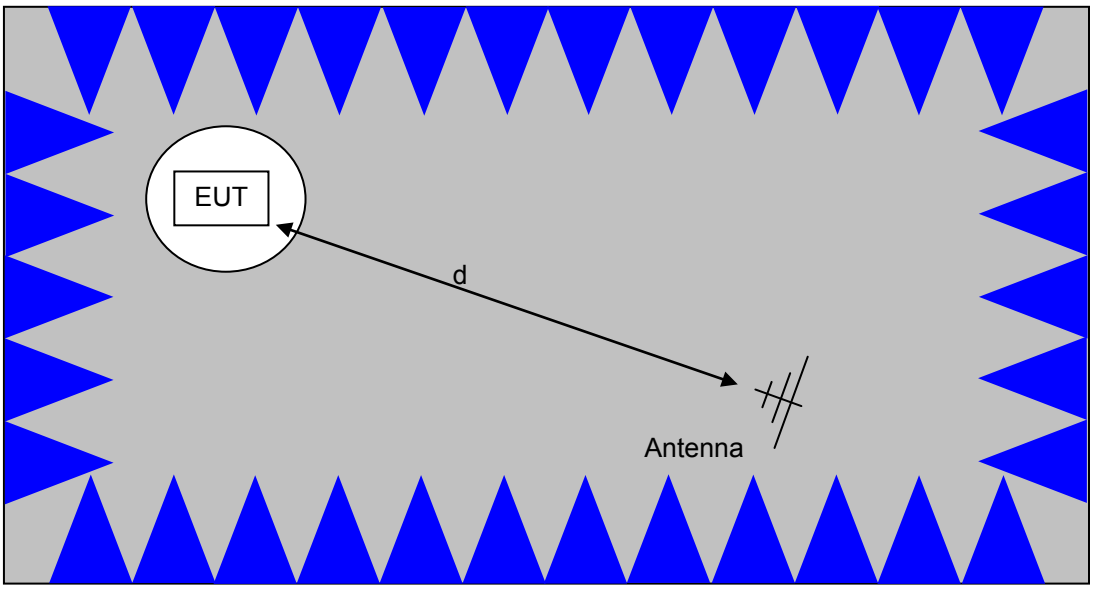
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

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

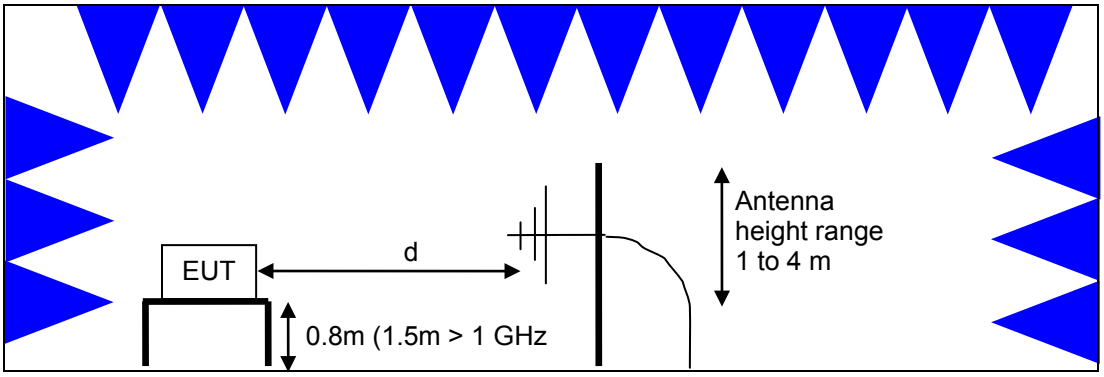


Typical Test Configuration for Radiated Field Strength Measurements



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

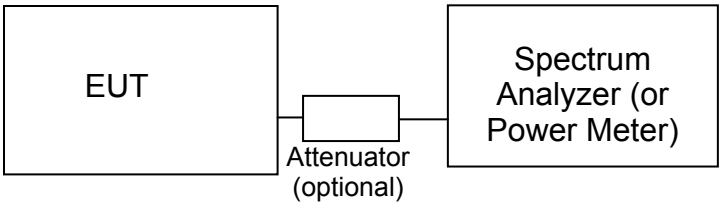
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

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



Test Configuration for Antenna Port Measurements

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

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

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

BANDWIDTH MEASUREMENTS

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

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

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

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

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

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

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from receivers as detailed in FCC Part 15.109 and RSS GEN Table 3. Note that receivers operating outside of the frequency range 30 MHz – 960 MHz are exempt from the requirements of FCC Part 15.109 and receivers that are not stand-alone are exempt from the ISED Canada requirements per RSS-GEN and instead are subject to the requirements of ICES-003.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

[1] The restricted bands are detailed in FCC 15.205 and RSS-Gen Table 7

FCC 15.407 (a) OUTPUT POWER LIMITS

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

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

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

OUTPUT POWER LIMITS –LELAN DEVICES

The table below shows the limits for output power and output power density defined by RSS 247. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 – 5250	200mW (23 dBm) eirp	10 dBm/MHz eirp
5250 – 5350 and 5470 - 5725	250 mW (24 dBm)[2] 1W (30dBm) eirp	11 dBm/MHz
5725 – 5825	1 Watt (30 dBm) 4W eirp	30 dBm/500kHz

Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

SPURIOUS EMISSIONS LIMITS –UNII and LELAN DEVICES

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

[2] If EIRP exceeds 500mW the device must employ TPC

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - S = M$$

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

SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

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

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

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

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

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

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

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

where P is the eirp (Watts)

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

Appendix A Test Equipment Calibration Data

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Radiated Spurious Emissions, 1000 - 6,500 MHz, 15-Oct-18					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	1538	2/10/2018	2/10/2019
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/24/2017	8/24/2019
Radiated Emissions - Band Edge, 16-Oct-18					
EMCO	Antenna, Horn, 1-18GHz	3115	868	7/9/2018	7/9/2020
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESI 40	2493	3/22/2018	3/22/2019
Radiated Emissions - Band Edge, 17-Oct-18					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
National Technical Systems	NTS Capture Analyzer Software (rev 3.8)	N/A	0		N/A
EMCO	Antenna, Horn, 1-18GHz	3115	868	7/9/2018	7/9/2020
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESI 40	2493	3/22/2018	3/22/2019
Radiated Spurious Emissions, 1000 - 18,000 MHz, 25-Oct-18					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	9/18/2018	9/18/2020
Hewlett Packard	Spectrum Analyzer (SA40) Blue 9 kHz - 40 GHz	8564E (84125C)	1393	12/8/2017	12/8/2018
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	4/18/2018	4/18/2019
Micro-Tronics	Band Reject Filter, 5150-5350 MHz 12GHz	BRC50703-02	1729	4/18/2018	4/18/2019
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	1756	7/7/2018	7/7/2019
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	8/30/2018	8/30/2019
Radiated Spurious Emissions, 1-18 GHz, 29-Oct-18					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
Hewlett Packard	EMC Spectrum Analyzer, 9 KHz-26.5 GHz	8593EM	1141	1/25/2018	1/25/2019
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	9/18/2018	9/18/2020
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	10/8/2018	10/8/2020
Hewlett Packard	Spectrum Analyzer (SA40) Blue 9 kHz - 40 GHz	8564E (84125C)	1393	12/8/2017	12/8/2018
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	4/18/2018	4/18/2019
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	6/20/2018	6/20/2019

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	8/30/2018	8/30/2019
Micro-Tronics	Band Reject Filter, 2400-2500 MHz 18GHz	BRM50702-02	2238	5/1/2018	5/1/2019
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	8/17/2018	8/17/2019
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-01	2738	8/18/2018	8/18/2019
Radiated Emissions, 1,000 - 12,000 MHz, 29-Oct-18					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	10/8/2018	10/8/2020
Hewlett Packard	Spectrum Analyzer (SA40) Blue 9 kHz - 40 GHz	8564E (84125C)	1393	12/8/2017	12/8/2018
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	8/30/2018	8/30/2019
Micro-Tronics	Band Reject Filter, 2400-2500 MHz 18GHz	BRM50702-02	2238	5/1/2018	5/1/2019
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-01	2738	8/18/2018	8/18/2019
Radiated Spurious Emissions, 1 - 40 GHz, 01-Nov-18					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	9/18/2018	9/18/2020
Hewlett Packard	Spectrum Analyzer (SA40) Blue 9 kHz - 40 GHz	8564E (84125C)	1393	12/8/2017	12/8/2018
HP / Miteq	SA40 B Head HF preAmplifier, 18-40 GHz (w/1393)	TTA1840-45-5P-HG-S	1620	1/9/2018	1/9/2019
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	8/30/2018	8/30/2019
A. H. Systems	Blue System Horn, 18-40GHz	SAS-574, p/n: 2581	2159	9/5/2017	8/8/2020
Micro-Tronics	Band Reject Filter, 2400-2500 MHz 18GHz	BRM50702-02	2238	5/1/2018	5/1/2019
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	8/17/2018	8/17/2019
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	8/17/2018	8/17/2019
Radiated Spurious Emissions, 1 - 18 GHz, 02-Nov-18					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	9/18/2018	9/18/2020
Hewlett Packard	Spectrum Analyzer (SA40) Blue 9 kHz - 40 GHz	8564E (84125C)	1393	12/8/2017	12/8/2018
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	8/30/2018	8/30/2019
Micro-Tronics	Band Reject Filter, 2400-2500 MHz 18GHz	BRM50702-02	2238	5/1/2018	5/1/2019
EMCO	Antenna, Horn, 1-18GHz	3115	868	7/9/2018	7/9/2020

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	8/30/2018	8/30/2019
Hewlett Packard	Spectrum Analyzer (SA40) Purple 9 kHz - 40 GHz,	8564E (84125C)	2415	2/16/2018	2/16/2019
Rx Radiated spurious Emissions, 05-Nov-18					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
EMCO	Antenna, Horn, 1-18GHz	3115	868	7/9/2018	7/9/2020
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1549	5/30/2017	5/30/2019
HP / Miteq	SA40 P Head HF preAmplifier, 18-40 GHz (w/2415)	TTA1840-45-5P-HG-S	1772	9/12/2018	N/A
A. H. Systems	System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	7/21/2017	7/21/2019
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	8/30/2018	8/30/2019
Hewlett Packard	Spectrum Analyzer (SA40) Purple 9 kHz - 40 GHz,	8564E (84125C)	2415	2/16/2018	2/16/2019
Hewlett Packard	9KHz-1300MHz pre-amp	8447F	2777	12/27/2017	12/27/2018
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	9482	10/13/2018	10/13/2019
Conducted Emissions - AC Power and Telecommunications Ports, 05-Nov-18					
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1401	1/8/2018	1/8/2019
Fischer Custom Comm	LISN, 25A, 150kHz to 30MHz, 25 Amp,	FCC-LISN-50-25-2-09	2001	8/15/2018	8/15/2019
Com-Power	ISN, T8 unscreened	ISN-T8	3260	2/20/2018	2/20/2019
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	9482	10/13/2018	10/13/2019
Radiated Spurious Emissions, 30 - 1,000 MHz, 06-Nov-18					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1549	5/30/2017	5/30/2019
Micro-Tronics	Band Reject Filter, 2400-2500 MHz 18GHz	BRM50702-02	2238	5/1/2018	5/1/2019
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2251	8/17/2018	8/17/2019
Hewlett Packard	9KHz-1300MHz pre-amp	8447F	2777	12/27/2017	12/27/2018
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	9482	10/13/2018	10/13/2019
Radiated Emissions, Band-edge, 03-Dec-18					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	10/8/2018	10/8/2020
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESI 40	2493	3/22/2018	3/22/2019
Radio Antenna Port (Power and Spurious Emissions), 03-Dec-18					
Rohde & Schwarz	Signal Analyzer 20 Hz - 26.5 GHz	FSQ26	2327	6/25/2018	6/25/2019
Radio Antenna Port (Power and Spurious Emissions), 06-Dec-18					

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Rohde & Schwarz	Signal Analyzer 20 Hz - 26.5 GHz	FSQ26	2327	6/25/2018	6/25/2019
Rohde & Schwarz	Open Switch and Control Unit with integrated power meter	OSP120 with OSP-B157 module	3000	5/1/2018	5/1/2019
Radiated Emissions, 27-Dec-18					
EMCO	Antenna, Horn, 1-18 GHz	3115	1242	4/11/2017	4/19/2019
Hewlett Packard	High Pass filter, 8.2 GHz (Blu System)	P/N 84300-80039 (84125C)	1392	5/1/2018	5/1/2019
Hewlett Packard	Spectrum Analyzer (SA40) Blue 9 kHz - 40 GHz	8564E (84125C)	1393	12/8/2018	12/8/2019
Micro-Tronics	Band Reject Filter, 5470-5725 MHz 12GHz	BRC50704-02	1681	3/23/2018	3/23/2019
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	8/30/2018	8/30/2019
Micro-Tronics	Band Reject Filter, 2400-2500 MHz 18GHz	BRM50702-02	2238	5/1/2018	5/1/2019
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	8/17/2018	8/17/2019
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	9482	10/13/2018	10/13/2019
HP / Miteq	SA40 B Head HF preAmplifier, 18-40 GHz (w/1393)	TTA1840-45-5P-HG-S	1620	1/9/2018	1/9/2019
A. H. Systems	Blue System Horn, 18-40GHz	SAS-574, p/n: 2581	2159	9/5/2017	8/8/2020
Radiated Emissions, 1,000 - 12,000 MHz, 15-Jan-19					
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	9/5/2018	9/5/2019
Hewlett Packard	Spectrum Analyzer (SA40) Red 30 Hz -40 GHz	8564E (84125C)	1148	9/27/2018	9/27/2019
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	10/8/2018	10/8/2020
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	4/18/2018	4/18/2019
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	6/20/2018	6/20/2019
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESI 40	2493	3/22/2018	3/22/2019
Radiated Emissions, 1,000 - 6,000 MHz, 14-Feb-19					
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	9/18/2018	9/18/2020
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESI 40	2493	3/22/2018	3/22/2019
Radiated Emissions, 1,000 - 18,000 MHz, 19-Feb-19					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	9/5/2018	9/5/2019
Hewlett Packard	Spectrum Analyzer (SA40) Red 30 Hz -40 GHz	8564E (84125C)	1148	9/27/2018	9/27/2019

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	10/8/2018	10/8/2020
Hewlett Packard	High Pass filter, 8.2 GHz (Blu System)	P/N 84300-80039 (84125C)	1392	5/1/2018	5/1/2019
Micro-Tronics	Band Reject Filter, 5150-5350 MHz 12GHz	BRC50703-02	1729	4/18/2018	4/18/2019
Micro-Tronics	Band Reject Filter, 2400-2500 MHz 18GHz	BRM50702-02	2238	5/1/2018	5/1/2019
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	8/17/2018	8/17/2019
Radio Antenna Port (6dB Bandwidth), 18-Apr-19					
Agilent	PSA Spectrum Analyzer	E4446A	2796	5/31/2018	5/31/2019

Appendix B Test Data

TL075848-RA-FCC Pages 33 – 149

Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Product	APIN0555	T-Log Number:	TL075848-RA-FCC
System Configuration:	-	Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Emissions Standard(s):	FCC §15.247 & §15.407	Class:	
Immunity Standard(s):	-	Environment:	Radio

EMC Test Data

For The

Aruba, a Hewlett Packard Enterprise company

Product

APIN0555

Date of Last Test: 2/27/2019

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Test Specific Details

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

General Test Configuration

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

Ambient Conditions:

Temperature: 22-24 °C
Rel. Humidity: 38-41 %

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.

Sample Notes

Sample S/N: CNGFK9Y02N (BLE) & CNGFK9Y005 (Zigbee)
Driver: P4 V0.4.5
Antenna: Internal 8 antennas for 5 GHz radio and 4 antennas for 2.4 GHz radio (5GHz radio may also use 4 antennas but with 3 dB higher power and can operate in both lower and upper 5 GHz bands simutaneously). Tests performed with 8 antennas at the 4 antenna power levels. Tests performed with 4 antennas at the target power.

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2), (3) RSS-247 6.2	Pass	a: 143.1 mW 20: 139.4 mW 40: 284.4 mW 80: 127.3 mW
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2), (3) RSS-247 6.2	Pass	a: 11.9 mW/MHz 20: 13.0 mW/MHz 40: 11.8 mW/MHz 80: 2.4 mW/MHz
1	99% Bandwidth	RSS-247 (Information only)	Pass	a: 16.94 MHz 20: 20.544 MHz 40: 38.48 MHz 80: 78.08 MHz

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 D01

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)	
11a	6 MB/s	0.923	Yes	1.437	0.35	0.69	696	5 GHz only
11ax20	MCS0	0.962	Yes	5.448	0.17	0.34	184	
11n20	MCS0	0.962	Yes	5.432	0.17	0.34	184	
11ax40	MCS0	0.955	Yes	5.414	0.20	0.40	185	
11n40	MCS0	0.956	Yes	4.779	0.20	0.39	209	
ax80	MCS0	0.959	Yes	5.401	0.18	0.37	185	5 GHz only
ac80	MCS0	0.951	Yes	4.753	0.22	0.44	210	
11ax80+80	MCS0	0.950	Yes	5.401	0.22	0.45	185	5 GHz only
ac80+80	MCS0	0.953	Yes	4.766	0.21	0.42	210	

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Date of Test: 12/3/2018 0:00 Config. Used: 1 (Zigbee EUT setup)
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Lab #4a EUT Voltage: PoE

Note 1:	Constant Duty Cycle < 98%. Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, Span > OBW, # of points in sweep ≥ 2*span/RBW, RMS detector, trace average 100 traces (at least 100 traces, increase the number to get true average), power averaging on and power integration over the OBW. Tthe measurements were adjusted by adding the Pwr Cor Factor in dB. This is based on 10log(1/x), where x is the duty cycle. (method SA-2 of ANSI C63.10)
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-247 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with C63.10 - RB between 1-5 % of OBW and VB ≥ 3*RB, Span between 1.5 and 5 times OBW.
Note 5:	For MIMO systems the total output power and total PSD are calculated from the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain								Dir G (PWR)	Dir G (PSD)
	1	2	3	4	5	6	7	8		
5150-5250	5.5	3.7	5.3	2.9	4.3	4.5	5.8	3.9	5.3	11.3

8x8 mode uses 4 V and 4 H polarized antennas, directional gain used is the highest of the two.
4x4 mode uses 2 V and 2 H polarized antennas, directional gain used is the highest of the two.
Legacy modes operate on all chains
Power for BF mode is reduced by 3 dB so effective antenna gain does not change
CDD active for single stream modes

For devices that support CDD modes

Min # of spatial streams: 1
Max # of spatial streams: 8

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

FCC UNII-1 Limits

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

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Standard:	FCC §15.247 & §15.407	Class:	N/A

MIMO Device - 5150-5250 MHz Band - FCC

Mode: 11a — Max EIRP (mW): 480.5

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power[1] dBm	Total Power mW	Total Power dBm	FCC Limit dBm	Max Power (W)	Result
5180	1	14.0		92.3	11.3	138.7	21.4	30.0	0.143	Pass
	2				12.7					
	3				11.3					
	4				12.6					
	5				11.2					
	6				12.7					
	7				11.4					
	8				12.7					
5200	1	15.0		92.3	12.6	143.1	21.6	30.0		Pass
	2				12.3					
	3				11.9					
	4				12.7					
	5				12.4					
	6				11.8					
	7				11.6					
	8				12.0					
5240	1	15.0		92.3	12.7	132.7	21.2	30.0		Pass
	2				12.3					
	3				12.8					
	4				11.8					
	5				12.1					
	6				11.0					
	7				10.3					
	8				11.2					

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

MIMO Device - 5150-5250 MHz Band - ISEDC

Mode: 11a Max EIRP (mW): 24.2

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power[1] dBm	Total Power mW	Total Power dBm (eirp)	IC limit dBm (eirp)	Max Power (W)	Result
5180	0	0	16.99	92.3	-0.6	7.2	13.8	22.3	0.007	Pass
	1				-0.6					
	2				0.1					
	3				-1.1					
	4				-1.1					
	5				-1.2					
	6				-1.2					
	7				-0.9					
5200	0	0	16.94	92.3	-0.7	6.2	13.2	22.3		Pass
	1				-1.2					
	2				-1.4					
	3				-1.5					
	4				-1.0					
	5				-2.0					
	6				-2.1					
	7				-1.9					
5240	0	0	16.94	92.3	-0.4	6.6	13.5	22.3		Pass
	1				-0.8					
	2				-0.6					
	3				-1.9					
	4				-0.9					
	5				-1.9					
	6				-2.1					
	7				-1.3					

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

5150-5250 PSD - FCC
Mode: 11a

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	Result
5180	0	14.0		92.3	0.0	11.2	10.5	11.7	Pass
	1				1.7				
	2				0.1				
	3				1.5				
	4				0.5				
	5				2.1				
	6				0.5				
	7				2.0				
5200	0	15.0		92.3	1.4	11.9	10.8	11.7	Pass
	1				1.3				
	2				0.7				
	3				1.4				
	4				2.1				
	5				1.7				
	6				0.8				
	7				1.4				
5240	0	15.0		92.3	1.4	10.8	10.3	11.7	Pass
	1				1.4				
	2				1.6				
	3				0.6				
	4				1.5				
	5				0.7				
	6				-0.4				
	7				0.4				

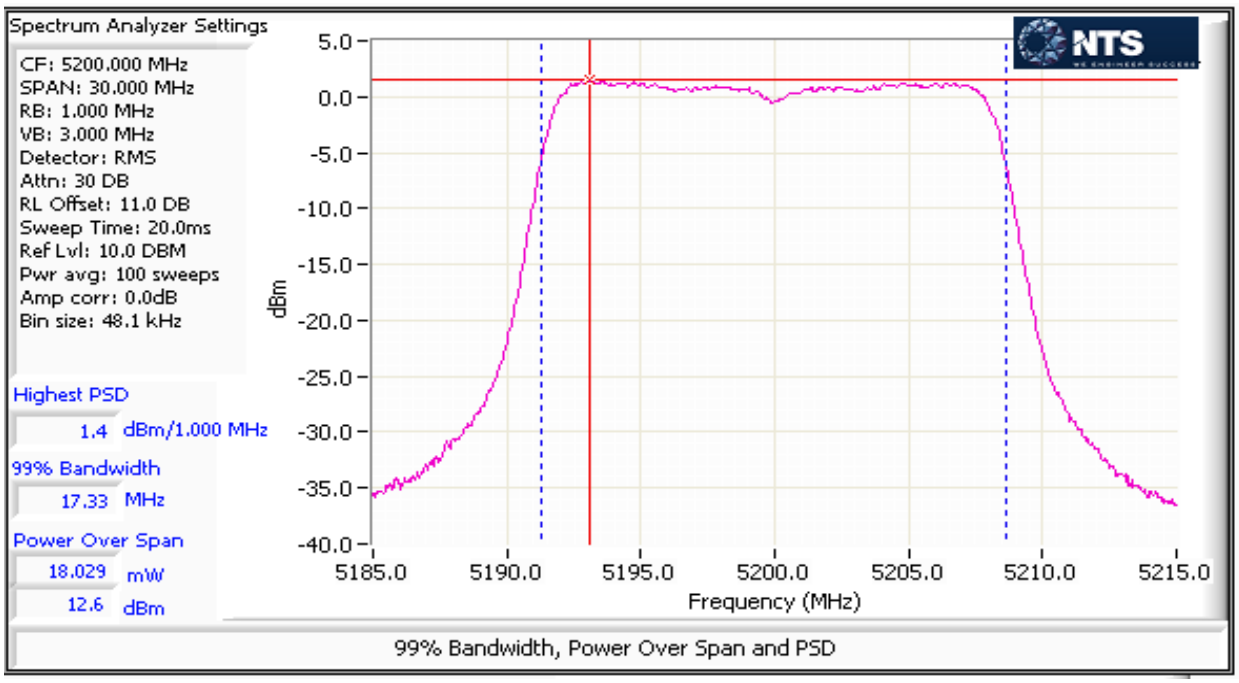
Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

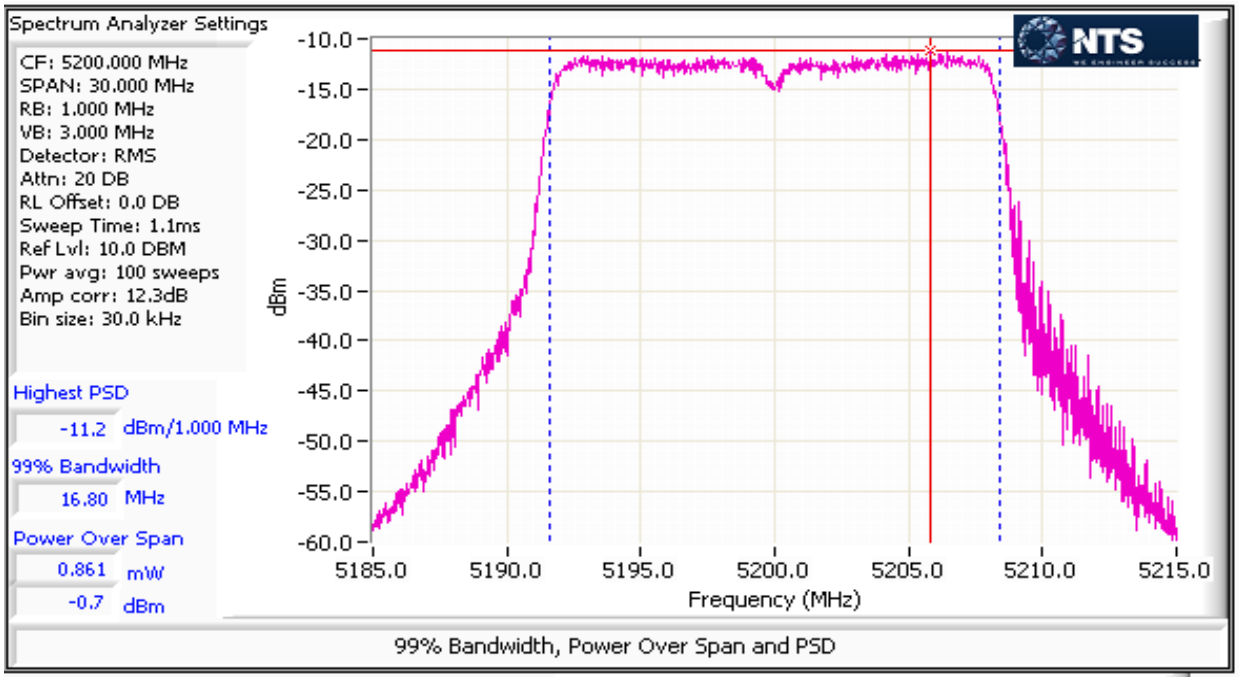
5150-5250 PSD - ISEDC

Mode: 11a

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	IC Limit dBm/MHz	Result
5180	0	0		92.3	-11.4	0.6	-2.2	-1.3	Pass
	1				-11.2				
	2				-10.7				
	3				-11.8				
	4				-11.2				
	5				-11.2				
	6				-11.6				
	7				-11.0				
5200	0	0		92.3	-11.2	0.6	-2.2	-1.3	Pass
	1				-11.4				
	2				-11.9				
	3				-12.0				
	4				-10.6				
	5				-11.3				
	6				-12.3				
	7				-11.6				
5240	0	0		92.3	-11.4	0.6	-2.2	-1.3	Pass
	1				-11.4				
	2				-11.7				
	3				-12.8				
	4				-11.3				
	5				-12.1				
	6				-12.5				
	7				-11.5				

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A





Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

MIMO Device - 5150-5250 MHz Band - FCC

Mode: 11ax20 Max EIRP (mW): 468.0

Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power[1] dBm	Total Power mW	Total Power dBm	FCC Limit dBm	Max Power (W)	Result
5180	1	12.0		96	12.2	123.8	20.9	30.0	0.139	Pass
	2				11.8					
	3				11.4					
	4				11.7					
	5				12.0					
	6				12.0					
	7				11.0					
	8				11.6					
5200	1	12.5		96	12.5	139.4	21.4	30.0		Pass
	2				12.4					
	3				12.2					
	4				12.3					
	5				12.5					
	6				12.3					
	7				11.7					
	8				12.0					
5240	1	12.5		96	12.6	127.3	21.0	30.0		Pass
	2				12.3					
	3				11.8					
	4				11.8					
	5				12.4					
	6				11.8					
	7				10.4					
	8				11.3					

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

MIMO Device - 5150-5250 MHz Band - ISEDC

Mode: 11ax20 Max EIRP (mW): 24.8

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power[1] dBm	Total Power mW	Total Power dBm (eirp)	IC limit dBm (eirp)	Max Power (W)	Result
5180	1	0.5	19.78	96.2	-0.2	7.4	14.0	23.0	0.007	Pass
	2				-0.4					
	3				-1.2					
	4				-0.3					
	5				-0.1					
	6				-0.4					
	7				-0.3					
	8				-1.1					
5200	1	0.5	19.78	96.2	-0.2	7.1	13.8	23.0		Pass
	2				-0.7					
	3				-0.4					
	4				-0.8					
	5				-0.6					
	6				-0.7					
	7				-1.3					
	8				-0.7					
5240	1	0.5	19.78	96.2	-0.5	6.3	13.3	23.0		Pass
	2				-0.8					
	3				-1.4					
	4				-1.1					
	5				-0.6					
	6				-1.2					
	7				-2.6					
	8				-1.6					

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

5150-5250 PSD - FCC
Mode: 11ax20

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	Result
5180	1	12.0		96.2	1.5	11.7	10.7	11.7	Pass
	2				1.3				
	3				0.9				
	4				1.1				
	5				2.1				
	6				2.3				
	7				0.8				
	8				1.7				
5200	1	12.5		96.2	1.6	12.4	10.9	11.7	Pass
	2				1.6				
	3				1.5				
	4				1.5				
	5				2.4				
	6				2.4				
	7				1.0				
	8				1.7				
5240	1	12.5		96.2	2.2	13.0	11.1	11.7	Pass
	2				2.2				
	3				1.5				
	4				1.6				
	5				2.7				
	6				2.6				
	7				0.8				
	8				1.6				

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

5150-5250 PSD - ISEDC
Mode: 11ax20

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	IC Limit dBm/MHz	Result
5180	1	0.5		96.2	-10.9	0.6	-2.2	-1.3	Pass
	3				-11.0				
	4				-12.4				
	3				-11.1				
	4				-11.7				
	3				-11.9				
	4				-11.7				
	2				-12.7				
5200	1	0.5		96.2	-11.2	0.6	-2.2	-1.3	Pass
	3				-11.7				
	4				-11.3				
	3				-11.9				
	4				-10.6				
	3				-10.7				
	4				-12.1				
	2				-11.1				
5240	1	0.5		96.2	-11.3	0.6	-2.2	-1.3	Pass
	3				-11.2				
	4				-12.1				
	3				-11.7				
	4				-10.6				
	3				-10.7				
	4				-12.6				
	2				-11.7				

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

5150-5250 PSD - FCC n20 mode tested to demonstrate PSD is almost the same as for ax20 mode

Mode: 11n20

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	Result
5180	1	12.0		96.2	1.5	11.6	10.6	11.7	Pass
	2				1.7				
	3				0.9				
	4				1.2				
	5				2.0				
	6				2.4				
	7				1.5				
	8				0.1				
5200	1	12.5		96.2	2.3	12.8	11.1	11.7	Pass
	2				1.5				
	3				1.9				
	4				1.3				
	5				2.6				
	6				1.9				
	7				1.5				
	8				1.9				
5240	1	12.5		96.2	2.5	12.9	11.1	11.7	Pass
	2				1.8				
	3				2.0				
	4				1.4				
	5				2.9				
	6				1.8				
	7				1.0				
	8				1.6				

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

5150-5250 PSD - ISEDC
Mode: 11n20

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	IC Limit dBm/MHz	Result
5180	1	0.5		96.2	-10.8	0.6	-2.2	-1.3	Pass
	3				-11.6				
	4				-11.0				
	3				-11.7				
	4				-10.5				
	3				-11.2				
	4				-12.1				
	2				-10.7				
5200	1	0.5		96.2	-10.7	0.6	-2.2	-1.3	Pass
	3				-11.8				
	4				-11.2				
	3				-11.9				
	4				-10.3				
	3				-11.3				
	4				-11.8				
	2				-11.2				
5240	1	0.5		96.2	-10.8	0.6	-2.2	-1.3	Pass
	3				-11.6				
	4				-11.4				
	3				-12.1				
	4				-10.6				
	3				-11.7				
	4				-11.8				
	2				-11.8				

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

MIMO Device - 5150-5250 MHz Band - FCC

Mode: ax40 Max EIRP (mW): 954.9

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	Power dBm	Total Power[1] mW	Total Power[1] dBm	FCC Limit dBm	Max Power (W)	Result
5190	1	12.5		95.5	12.6	131.3	21.2	30.0	0.284	Pass
	2				12.4					
	3				11.7					
	4				12.1					
	5				12.0					
	6				11.9					
	7				11.9					
	8				10.8					
5230	1	16.5		95.5	16.0	284.4	24.5	30.0		Pass
	2				15.7					
	3				15.2					
	4				15.0					
	5				15.4					
	6				15.5					
	7				14.7					
	8				14.8					

MIMO Device - 5150-5250 MHz Band - ISEDC

Mode: ax40 Max EIRP (mW): 49.0

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power[1] dBm	Total Power mW	Total Power dBm (eirp)	IC limit dBm (eirp)	Max Power (W)	Result
5190	1	3.0	38.72	95.5	2.3	14.6	16.9	23.0	0.015	Pass
	2				2.2					
	3				1.6					
	4				3.5					
	5				2.5					
	6				2.4					
	7				0.3					
	8				3.7					
5230	1	3.0	38.48	95.5	2.2	13.4	16.5	23.0		Pass
	2				2.2					
	3				1.2					
	4				3.0					
	5				2.2					
	6				1.7					
	7				0.4					
	8				2.9					

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

5150-5250 PSD - FCC
Mode: ax40

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	Result
5190	1	12.5		95.5	-2.0	5.1	7.1	11.7	Pass
	2				-1.9				
	3				-2.7				
	4				-2.4				
	5				-1.7				
	6				-1.9				
	7				-1.9				
	8				-3.3				
5230	1	16.5		95.5	1.8	11.6	10.6	11.7	Pass
	2				1.8				
	3				1.0				
	4				0.8				
	5				1.8				
	6				2.0				
	7				1.1				
	8				0.8				

5150-5250 PSD - ISEDC
Mode: ax40

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	IC Limit dBm/MHz	Result
5190	1	3.0		95.5	-11.7	0.6	-2.2	-1.3	Pass
	2				-11.5				
	3				-12.3				
	4				-10.4				
	5				-10.9				
	6				-10.8				
	7				-13.2				
	8				-9.5				
5230	1	3.0		95.5	-11.6	0.6	-2.2	-1.3	Pass
	2				-11.3				
	3				-12.4				
	4				-10.8				
	5				-10.9				
	6				-11.4				
	7				-12.9				
	8				-10.2				

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

5150-5250 PSD - FCC n40 mode tested to demonstrate PSD is same as for ax40 mode

Mode: n40

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	Result
5190	1	12.5		95.6	-1.4	5.6	7.5	11.7	Pass
	2				-1.4				
	3				-2.3				
	4				-2.0				
	5				-1.3				
	6				-1.3				
	7				-1.3				
	8				-3.2				
5230	1	16.5		95.6	1.9	11.8	10.7	11.7	Pass
	2				1.9				
	3				1.0				
	4				1.0				
	5				1.8				
	6				2.2				
	7				1.2				
	8				0.8				

5150-5250 PSD - ISEDC

Mode: n40

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	IC Limit dBm/MHz	Result
5190	1	3.0		95.6	-11.4	0.6	-2.2	-1.3	Pass
	2				-12.5				
	3				-11.6				
	4				-12.2				
	5				-10.9				
	6				-11.8				
	7				-13.1				
	8				-11.4				
5230	1	3.0		95.6	-11.6	0.5	-3.0	-1.3	Pass
	2				-12.2				
	3				-12.3				
	4				-12.5				
	5				-11.3				
	6				-12.6				
	7				-12.1				
	8				-11.7				

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

MIMO Device - 5150-5250 MHz Band - FCC

Mode: ax80 Max EIRP (mW): 427.4

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	Power dBm	Total Power[1] mW	Total Power[1] dBm	FCC Limit dBm	Max Power (W)	Result
5210	1	12.0		95.9	12.1	127.3	21.0	30.0	0.127	Pass
	2				12.0					
	3				11.7					
	4				12.1					
	5				11.7					
	6				12.2					
	7				11.5					
	8				11.3					

MIMO Device - 5150-5250 MHz Band - ISEDC

Mode: ax80 Max EIRP (mW): 93.3

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power[1] dBm	Total Power mW	Total Power dBm (eirp)	IC limit dBm (eirp)	Max Power (W)	Result
5210	1	6.0	78.08	95.9	5.6	27.8	19.7	23.0	0.028	Pass
	2				5.2					
	3				5.9					
	4				5.9					
	5				5.0					
	6				4.5					
	7				4.5					
	8				5.0					

5150-5250 PSD - FCC

Mode: ax80

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	Result
5210	1	12.0		95.9	-5.7	2.4	3.8	11.7	Pass
	2				-5.6				
	3				-6.0				
	4				-5.3				
	5				-5.6				
	6				-4.5				
	7				-5.4				
	8				-6.1				

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

5150-5250 PSD - ISEDC
Mode: ax80

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	IC Limit dBm/MHz	Result
5210	1	6.0		95.9	-11.4	0.6	-2.2	-1.3	Pass
	2				-11.4				
	3				-11.3				
	4				-11.2				
	5				-11.3				
	6				-11.5				
	7				-11.5				
	8				-11.2				

5150-5250 PSD - FCC
Mode: ac80

ac80 mode tested to demonstrate PSD is same as for ax80 mode

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	Result
5210	1	12.0		95.1	-5.7	2.4	3.8	11.7	Pass
	2				-5.6				
	3				-6.0				
	4				-5.3				
	5				-5.6				
	6				-4.5				
	7				-5.4				
	8				-6.1				

5150-5250 PSD - ISEDC
Mode: ac80

Frequency (MHz)	Chain	Software Setting		Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	IC Limit dBm/MHz	Result
5210	1	6.0		95.1	-11.2	0.6	-2.2	-1.3	Pass
	2				-11.7				
	3				-11.7				
	4				-12.0				
	5				-10.8				
	6				-11.9				
	7				-12.7				
	8				-11.2				

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Test Specific Details

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

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5725 - 5850MHz	15.407(a) (1), (2), (3) RSS-247 6.2	Pass	a: 619.1 mW 20: 671.1 mW 40: 631.7 mW 80: 548.3 mW
1	PSD, 5725 - 5850MHz	15.407(a) (1), (2), (3) RSS-247 6.2	Pass	a: 48.1 mW/MHz 20: 47 mW/MHz 40: 21.3 mW/MHz 80: 9.3 mW/MHz
1	99% Bandwidth	RSS-GEN (Information only)	N/A	a: 17.52 MHz 20: 19.68 MHz 40: 38.272 MHz 80: 79.583 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: 21.7 °C
Rel. Humidity: 38.6 %

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 D01

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)	
11a	6 MB/s	0.923	Yes	1.437	0.3	0.7	696	5 GHz only
11ax20	MCS0	0.962	Yes	5.448	0.2	0.3	184	
11ax40	MCS0	0.955	Yes	5.414	0.2	0.4	185	
ax80	MCS0	0.959	Yes	5.401	0.2	0.4	185	5 GHz only
11ax80+80	MCS0	0.950	Yes	5.401	0.2	0.4	185	5 GHz only

Sample Notes

Sample S/N: CNGFK9Y02N (BLE) & CNGFK9Y005 (Zigbee)

Driver: P4 V0.4.5

Antenna: Internal 8 antennas for 5 GHz radio and 4 antennas for 2.4 GHz radio (5GHz radio may also use 4 antennas but with 3 dB higher power and can operate in both lower and upper 5 GHz bands simutaneously). Tests performed with 8 antennas at the 4 antenna power levels. Tests performed with 4 antennas at the target power.

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Date of Test: 12/6/2018 8:00 Config. Used: 1 (Zigbee EUT setup)
Test Engineer: Roy Zheng / R. Varelas Config Change: None
Test Location: FT Lab #4a EUT Voltage: PoE

Note 1:	Constant Duty Cycle < 98%. Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, Span > OBW, # of points in sweep ≥ 2*span/RBW, RMS sample detector, trace average 100 traces (at least 100 traces, increase the number to get true average), power averaging on and power integration over the OBW. Tthe measurements were adjusted by adding YY dB. This is based on 10log(1/x), where x is the duty cycle. (method SA-2 of ANSI C63.10)
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	99% Bandwidth measured in accordance with C63.10 - RB between 1-5 % of OBW and VB ≥ 3*RB, Span between 1.5 and 5 times OBW.
Note 4:	For MIMO systems the total output power and total PSD are calculated from the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain								Dir G (PWR)	Dir G (PSD)
	1	2	3	4	5	6	7	8		
5725-5825	2.6	4.9	3.0	2.4	3.5	4.1	5.6	2.8	3.8	9.8

8x8 mode uses 4 V and 4 H polarized antennas, directional gain used is the highest of the two.
4x4 mode uses 2 V and 2 H polarized antennas, directional gain used is the highest of the two.
Legacy modes operate on all chains
Power for BF mode is reduced by 3 dB so effective antenna gain does not change
CDD active for single stream modes

For devices that support CDD modes

Min # of spatial streams: 1
Max # of spatial streams: 8

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Mode: 11a — Max EIRP (mW): 1498.9

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power dBm	Total Power[1] mW	Total Power[1] dBm	Limit dBm	Max Power (W)	Result
5745	0	20	17.52	92.3	19.0	619.1	27.9	30.0	0.619	Pass
	1				19.2					
	2				18.9					
	3				17.5					
	4				17.8					
	5				19.3					
	6				18.8					
	7				17.3					
5785	0	20	17.36	92.3	18.5	565.1	27.5	30.0		Pass
	1				18.6					
	2				18.7					
	3				16.9					
	4				17.7					
	5				18.4					
	6				18.8					
	7				17.1					
5825	0	20	17.36	92.3	18.6	605.9	27.8	30.0		Pass
	1				18.9					
	2				19.2					
	3				17.2					
	4				17.8					
	5				19.0					
	6				18.9					
	7				17.5					

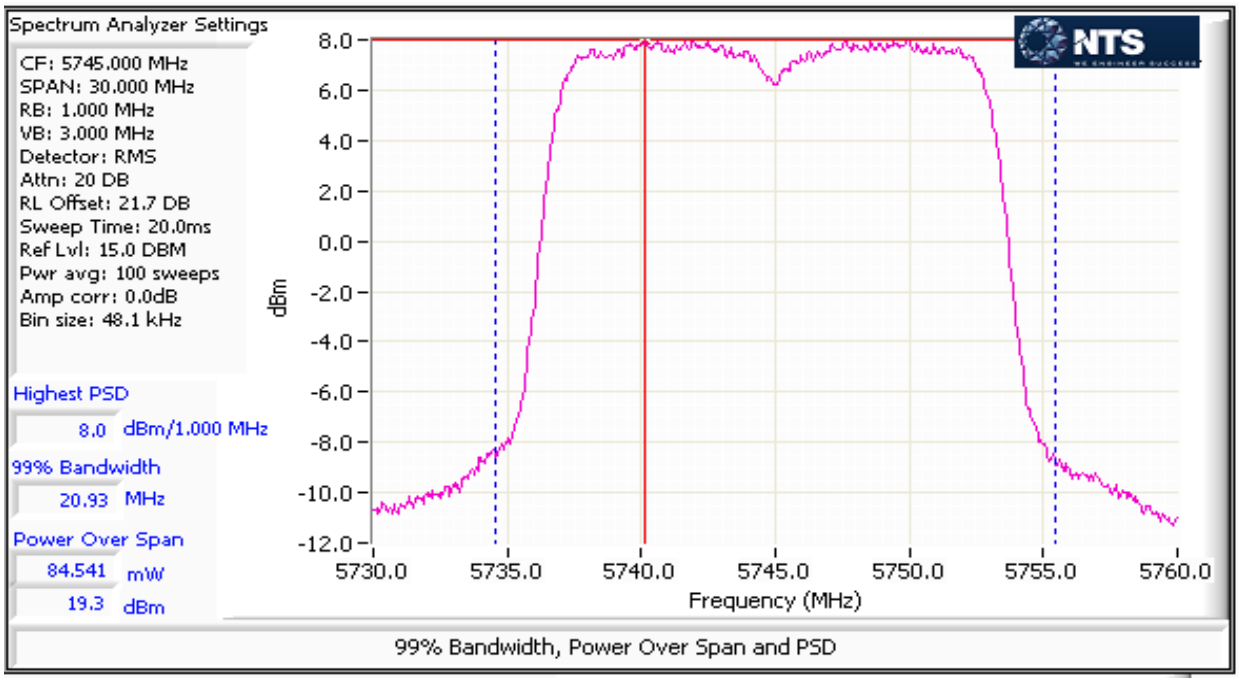
Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

MIMO Device 5725-5850 PSD - FCC/ISEDC

Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/500kHz	IC Limit dBm/500kHz	Result
5745	0	20		92.3	8.0	48.0	16.8	26.2	26.2	Pass
	1				7.9					
	2				7.6					
	3				6.3					
	4				6.8					
	5				8.0					
	6				8.3					
	7				6.0					
5785	0	20		92.3	7.4	43.9	16.4	26.2	26.2	Pass
	1				7.5					
	2				7.4					
	3				5.6					
	4				6.5					
	5				7.3					
	6				8.1					
	7				6.0					
5825	0	20		92.3	7.7	48.1	16.8	26.2	26.2	Pass
	1				7.7					
	2				7.9					
	3				6.1					
	4				6.7					
	5				8.2					
	6				8.3					
	7				6.4					

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Mode: ax20 Max EIRP (mW): 1624.8

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power dBm	Total Power[1] mW	Total Power[1] dBm	FCC Limit dBm	Max Power (W)	Result
5745	0	20	19.52	96.2	19.5	671.1	28.3	30.0	0.671	Pass
	1				19.1					
	2				19.3					
	3				17.6					
	4				19.3					
	5				20.0					
	6				19.6					
	7				17.5					
5785	0	20	19.68	96.2	18.8	587.3	27.7	30.0		Pass
	1				18.8					
	2				19.1					
	3				17.1					
	4				18.7					
	5				19.0					
	6				18.8					
	7				17.1					
5825	0	20	19.44	96.2	19.0	627.4	28.0	30.0		Pass
	1				19.0					
	2				19.4					
	3				17.3					
	4				18.7					
	5				19.4					
	6				19.3					
	7				17.6					

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

MIMO Device 5725-5850 PSD - FCC/ISEDC
Mode: ax20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5745	0	20		96.2	7.8	47.0	16.7	26.2	26.2	Pass
	1				7.5					
	2				7.7					
	3				6.1					
	4				7.9					
	5				8.4					
	6				8.3					
	7				5.8					
5785	0	20		96.2	7.3	41.1	16.1	26.2	26.2	Pass
	1				6.9					
	2				7.5					
	3				5.4					
	4				7.0					
	5				7.6					
	6				7.6					
	7				5.6					
5825	0	20		96.2	7.2	44.0	16.4	26.2	26.2	Pass
	1				7.4					
	2				7.8					
	3				5.7					
	4				7.0					
	5				8.1					
	6				8.0					
	7				6.1					

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Mode: ax40 Max EIRP (mW): 1529.4

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power dBm	Total Power[1] mW	Total Power[1] dBm	FCC Limit dBm	Max Power (W)	Result
5755	0	19	38.272	95.5	19.5	631.7	28.0	30.0	0.632	Pass
	1				19.5					
	2				19.4					
	3				17.5					
	4				17.8					
	5				19.4					
	6				19.0					
	7				17.4					
5795	0	20	38.4	95.5	18.6	554.7	27.4	30.0		Pass
	1				18.5					
	2				19.1					
	3				16.9					
	4				17.7					
	5				18.5					
	6				18.9					
	7				16.9					

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

MIMO Device 5725-5850 PSD - FCC/ISEDC

Mode: ax40

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5755	0	19		95.5	4.7	21.3	13.3	26.2	26.2	Pass
	1				4.3					
	2				4.6					
	3				2.7					
	4				3.2					
	5				4.7					
	6				4.9					
	7				2.6					
5795	0	20		95.5	3.8	19.1	12.8	26.2	26.2	Pass
	1				3.7					
	2				4.3					
	3				2.2					
	4				2.9					
	5				4.2					
	6				4.6					
	7				2.2					

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Mode: ax80 Max EIRP (mW): 1327.5

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power dBm	Total Power[1] mW	Total Power[1] dBm	FCC Limit dBm	Max Power (W)	Result
5775	0	15.5	79.583	95.9	18.7	548.3	27.4	30.0	0.548	Pass
	1				18.4					
	2				19.0					
	3				16.7					
	4				17.7					
	5				18.5					
	6				18.9					
	7				16.9					

MIMO Device 5725-5850 PSD - FCC/ISEDC

Mode: ax80

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5775	0	15.5		95.9	0.9	9.3	9.7	26.2	26.2	Pass
	1				0.5					
	2				0.9					
	3				-1.1					
	4				-0.1					
	5				1.0					
	6				1.8					
	7				-0.9					

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

RSS-247 and FCC 15.407 Antenna Port Measurements
6 dB Bandwidth

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: 4/18/2019
Test Engineer: David Bare
Test Location: Fremont EMC Lab #4B
Config. Used: 1
Config Change: None
EUT Voltage: POE

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 20 °C
Rel. Humidity: 41 %

Summary of Results

Run #	Pwr setting		Test Performed	Limit	Pass / Fail	Result / Margin
3	See below		Minimum 6dB Bandwidth	15.247(a)	Pass	> 500 kHz

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.

Sample Notes

Sample S/N: CNGFK9Y005
Driver: P4 V0.4.5

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #3: Signal Bandwidth

Mode: 11a

Power Setting	Frequency (MHz)	Bandwidth (MHz) 6dB		RBW Setting (MHz) 6dB	
20	5785	16.16		0.2	

Mode: 11ax20

Power Setting	Frequency (MHz)	Bandwidth (MHz) 6dB		RBW Setting (MHz) 6dB	
20	5785	19.04		0.2	

Mode: 11ax40

Power Setting	Frequency (MHz)	Bandwidth (MHz) 6dB	99%	RBW Setting (MHz) 6dB	99%
20	5795	37.76		0.51	

Mode: 11ax80

Power Setting	Frequency (MHz)	Bandwidth (MHz) 6dB	99%	RBW Setting (MHz) 6dB	99%
15.5	5775	77.76		1	

Note 1:	6dB BW: RBW=1-5% of 6dBBW, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time. Span 2-5 times OBW.

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Test Specific Details

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

General Test Configuration

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

Ambient Conditions:

Temperature: 24.8 °C
Rel. Humidity: 39 %

Summary of Results

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
20MHz Bandwith Modes							
1	a, BLE	36 5180 MHz	15.0	14.0	Restricted Band Edge at 5150 MHz	15.209	54.0 dBµV/m @ 5149.5 MHz (0.0 dB)
4		149 - 5745MHz	20.0	20.0	Band Edge 5725 MHz	15E	61.0 dBµV/m @ 5942.0 MHz (-7.3 dB)
		165 - 5825MHz	20.0	20.0	Band Edge 5850MHz		62.0 dBµV/m @ 5928.8 MHz (-6.3 dB)
5	ac, ax20, BLE	ac20 36 - 5180MHz	20.0	14.5	Restricted Band Edge at 5150 MHz	15.209	51.6 dBµV/m @ 5149.6 MHz (-2.4 dB)
		ax20 36 - 5180MHz	20.0	14.5	Restricted Band Edge at 5150 MHz		53.2 dBµV/m @ 5150.0 MHz (-0.8 dB)
		ax20 40 - 5200MHz	20.0	20.0	Restricted Band Edge at 5150 MHz		53.7 dBµV/m @ 5150.0 MHz (-0.3 dB)
8		149 - 5745MHz	20.0	20.0	Band Edge 5725 MHz	15E	61.8 dBµV/m @ 5647.9 MHz (-6.5 dB)
		165 - 5825MHz	20.0	20.0	Band Edge 5850MHz		59.3 dBµV/m @ 5948.5 MHz (-9.0 dB)

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
40MHz Bandwith Modes							
9	ax40, BLE	38 - 5190MHz	20.0	15.0	Restricted Band Edge at 5150 MHz	15.209	52.7 dBµV/m @ 5149.9 MHz (-1.3 dB)
		46 - 5230MHz	20.0	18.0	Restricted Band Edge at 5150 MHz		50.6 dBµV/m @ 5147.3 MHz (-3.4 dB)
12		151 - 5755MHz	20.0	19.0	Band Edge 5725 MHz	15.E	68.0 dBµV/m @ 5654.9 MHz (-3.9 dB)
		159 - 5795MHz	20.0	20.0	Band Edge 5850MHz		70.9 dBµV/m @ 5911.7 MHz (-0.9 dB)
80MHz Bandwith Modes							
13	ax80, BLE	42 - 5210MHz	20.0	14.0	Restricted Band Edge at 5150 MHz	15.209	53.4 dBµV/m @ 5134.2 MHz (-0.6 dB)
16		155 - 5775MHz	20.0	15.5	Band Edge 5725 MHz	15.E	65.3 dBµV/m @ 5646.4 MHz (-3.0 dB)
		155 - 5775MHz	20.0	15.5	Band Edge 5850MHz		59.9 dBµV/m @ 5928.3 MHz (-8.4 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.

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Procedure Comments:

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

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)	
BLE	1 Mb/s	0.65	Yes	0.424	1.9	3.8	2358	
ZigBee	-	0.43	Yes	0.858	3.7	7.4	1166	2 kHz
11a	6 MB/s	0.92	Yes	1.437	0.3	0.7	696	1 kHz
ac20	MCS0	0.95	Yes	5.474	0.2	0.5	183	200 Hz
ax20	MCS0	0.96	Yes	5.452	0.2	0.4	183	200 Hz
ax40	MCS0	0.96	Yes	5.297	0.2	0.4	189	200 Hz
ax80	MCS0	0.96	Yes	5.401	0.2	0.4	185	200 Hz
ax80+80	MCS0	0.95	Yes	5.401	0.2	0.4	185	200 Hz

Sample Notes

Sample S/N: CNGFK9Y02N (BLE)
Driver: P4 V0.4.5
Antenna: Internal 8 antennas for 5 GHz radio and 4 antennas for 2.4 GHz radio (5GHz radio may also use 4 antennas but with 3 dB higher power and can operate in both lower and upper 5 GHz bands simutaneously). Tests performed with 8 antennas at the 4 antenna power levels. Tests performed with 4 antennas at the target power.

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 3:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep, max hold 50*1/DC traces (method VB of KDB 789033)
Note 4:	Emission has a duty cycle < 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100*1/DC traces, measurement corrected by Pwr correction factor (method AD of KDB 789033)
Note 5:	Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements.

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

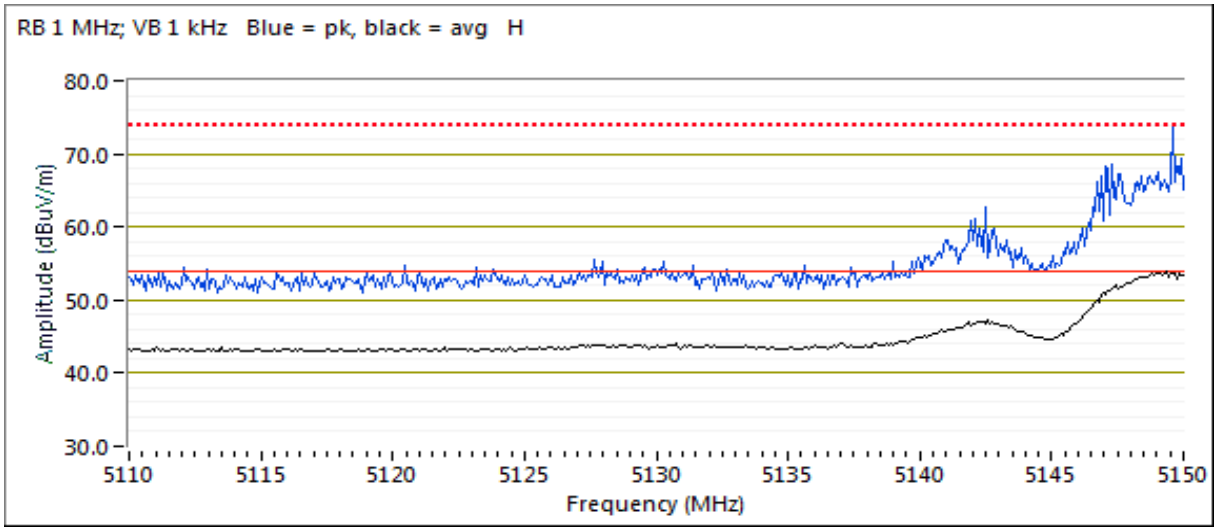
Date of Test: 10/15/2018
Test Engineer: John Caizzi
Test Location: Fremont Chamber #3

Config. Used: 1
Config Change: none
EUT Voltage: PoE & 120V/60Hz

Channel: 36 - 5180 MHz at setting 15, BLE at 2440 MHz, 8 dBm, V primary antenna.
Tx Chain: 8
Mode: a

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.520	54.0	H	54.0	0.0	Avg	309	2.17	RB 1 MHz, VB 1 kHz, note 3
5148.880	72.9	H	74.0	-1.1	PK	309	2.17	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

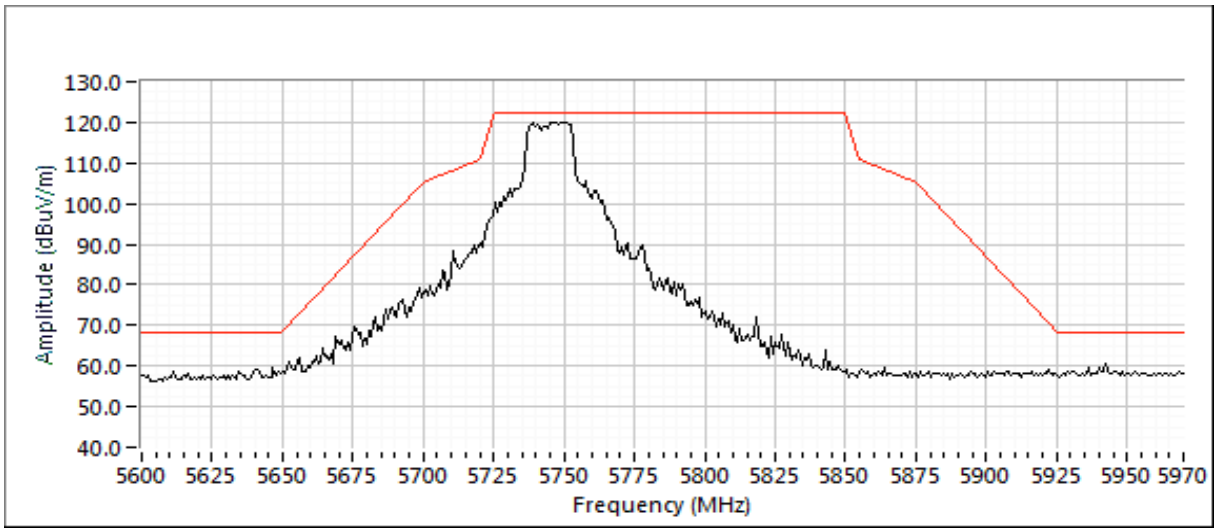
Run #4: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 10/16/2018 Config. Used: 1
Test Engineer: David W. Bare Config Change: none
Test Location: Fremont Chamber #3 EUT Voltage: PoE & 120V/60Hz

Channel: 149 - 5745MHz at setting 20, BLE at 2440 MHz, 8 dBm, V primary antenna.
Tx Chain: 8
Mode: a

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5941.970	61.0	H	68.3	-7.3	PK	36	1.5	POS; RB 1 MHz; VB: 3 MHz

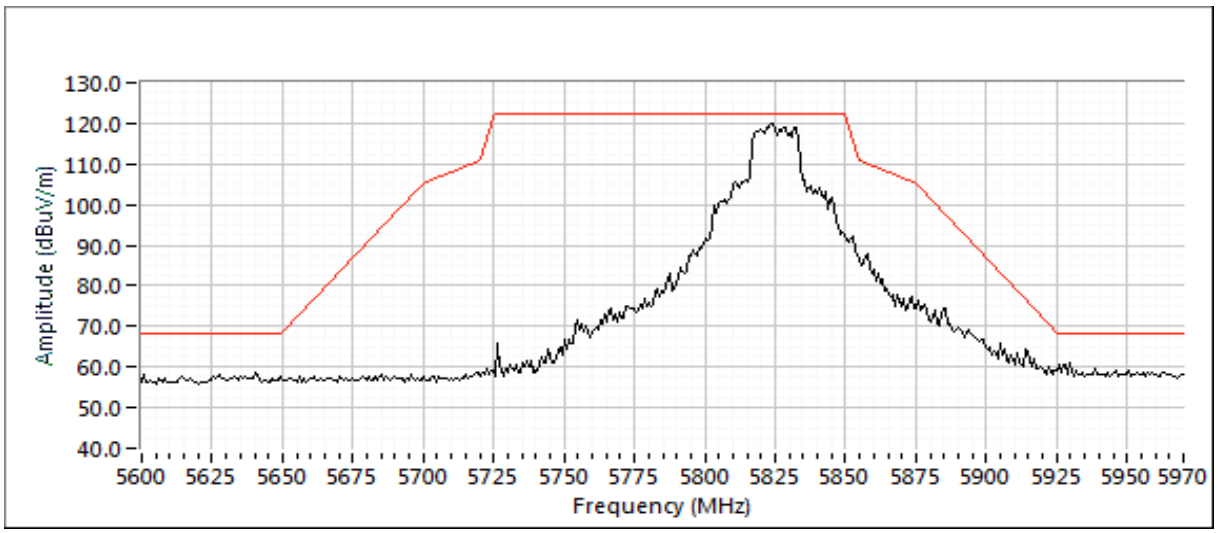


Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Channel: 165 - 5825MHz at setting 20, BLE at 2440 MHz, 8 dBm, V primary antenna.
Tx Chain: 8
Mode: a

5850 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5928.810	62.0	H	68.3	-6.3	PK	297	2.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

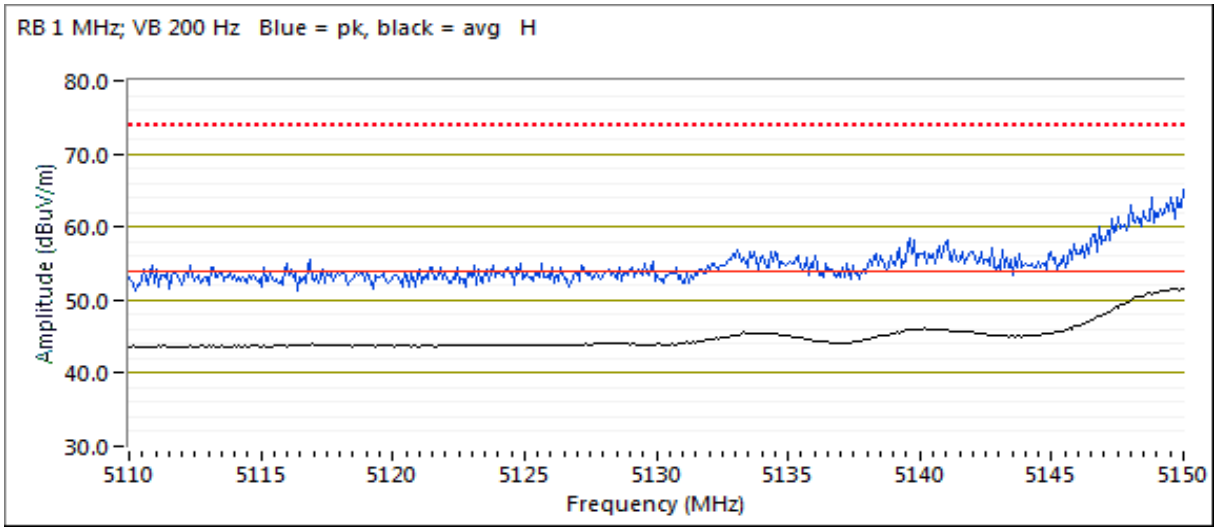
Run #5: Radiated Bandedge Measurements, 5150-5250 MHz

Date of Test: 10/17/2018 Config. Used: 1
Test Engineer: John Caizzi Config Change: none
Test Location: Fremont Chamber #7 EUT Voltage: PoE & 120V/60Hz

Channel: 36 - 5180 MHz Pwr setting 14.5
Tx Chain: 8x8
Mode: ac20, BLE

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.600	51.6	H	54.0	-2.4	Avg	304	2.15	VB 200 Hz, note 3
5149.280	65.5	H	74.0	-8.5	PK	304	2.15	



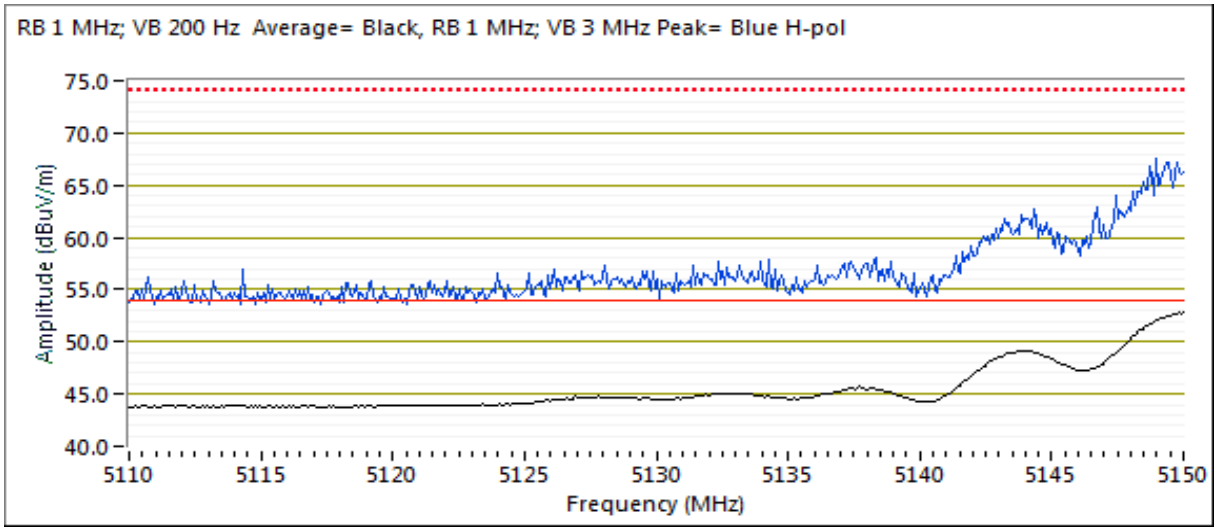
Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Date of Test: 10/16/2018 Config. Used: 1
Test Engineer: Deniz Demirci Config Change: None
Test Location: Fremont Chamber #7 EUT Voltage: POE & 120 V, 60 Hz

Channel: 36 - 5180 MHz
Tx Chain: 8x8
Mode: ax20, BLE

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5150.000	53.2	H	54.0	-0.8	Avg	278	1.0	Note 3; RB 1 MHz; VB: 200 Hz
5149.900	67.6	H	74.0	-6.4	PK	278	1.0	POS; RB 1 MHz; VB: 3 MHz
5149.890	49.9	V	54.0	-4.1	Avg	276	1.7	Note 3; RB 1 MHz; VB: 200 Hz
5149.990	63.9	V	74.0	-10.1	PK	276	1.7	POS; RB 1 MHz; VB: 3 MHz



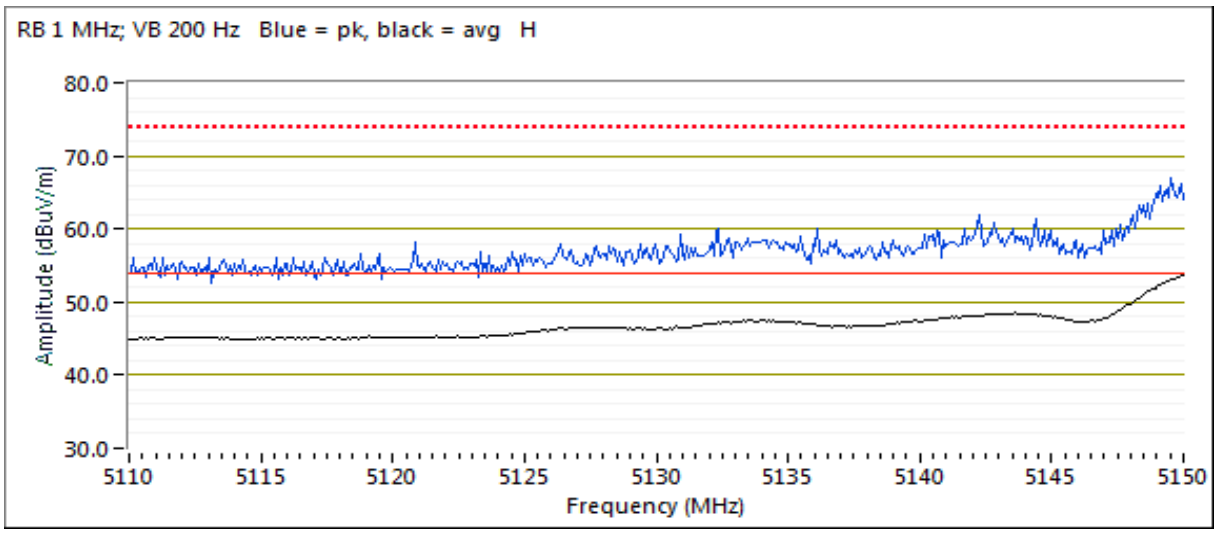
Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Date of Test: 10/17/2018 Config. Used: 1
Test Engineer: John Caizzi Config Change: none
Test Location: Fremont Chamber #7 EUT Voltage: PoE & 120V/60Hz

Channel: 40 - 5200 MHz Pwr setting 20
Tx Chain: 8x8
Mode: ax20, BLE

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5150.000	53.7	H	54.0	-0.3	Avg	76	2.07	Note 3; RB 1 MHz; VB: 200 Hz
5149.750	71.1	H	74.0	-2.9	PK	76	2.07	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

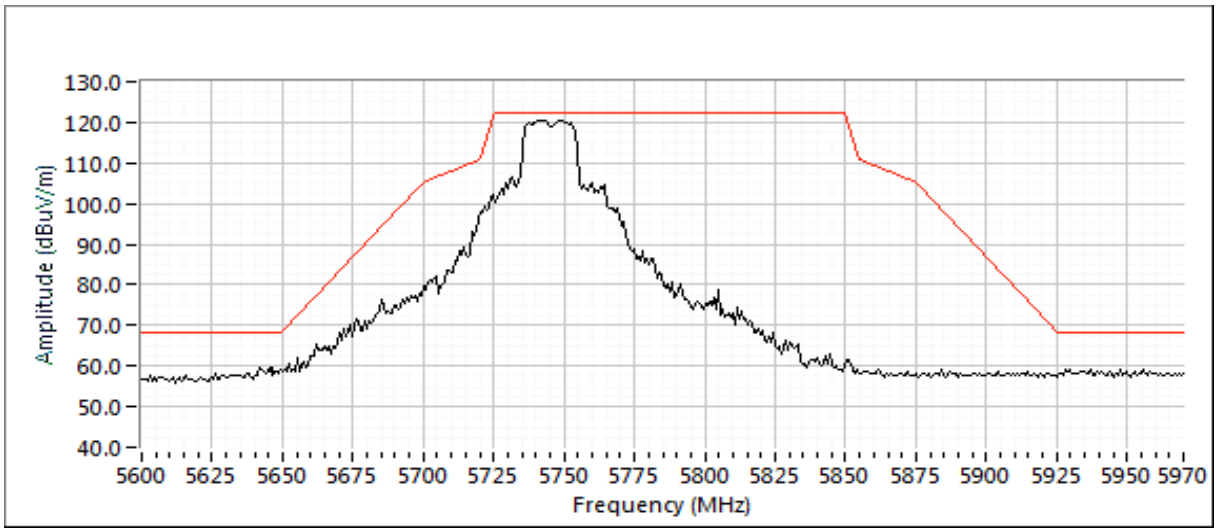
Run #8: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 10/16/2018 Config. Used: 1
Test Engineer: David W. Bare Config Change: none
Test Location: Fremont Chamber #7 EUT Voltage: PoE & 120V/60Hz

Channel: 149 - 5745MHz at setting 20, BLE at 2440 MHz, 8 dBm, V primary antenna.
Tx Chain: 8
Mode: ax20, BLE

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5647.890	61.8	H	68.3	-6.5	PK	288	2.0	POS; RB 1 MHz; VB: 3 MHz

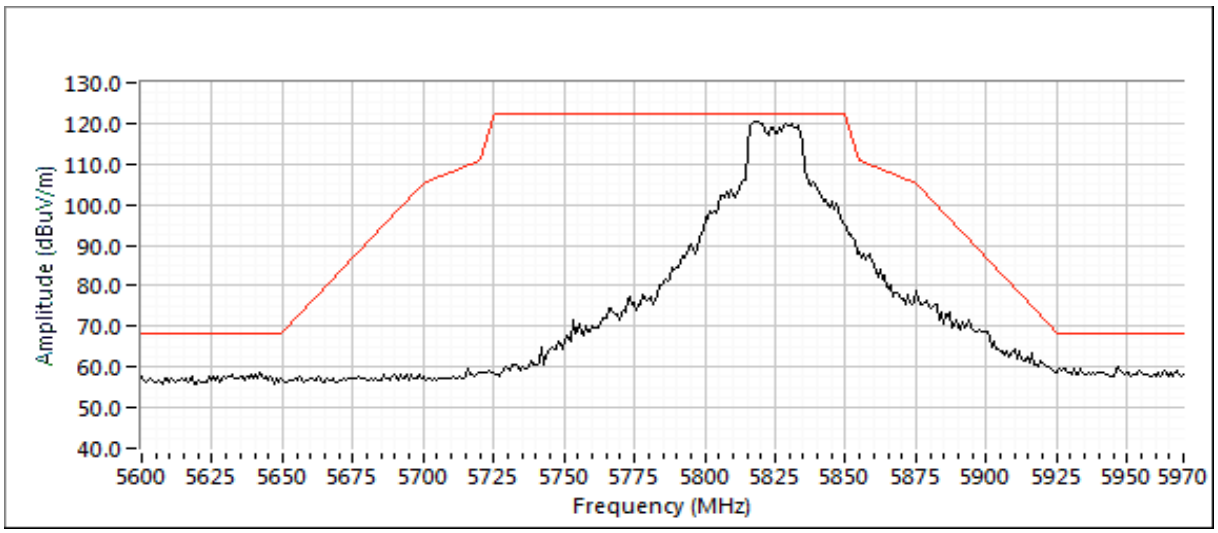


Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Channel: 165 - 5825MHz at setting 20, BLE at 2440 MHz, 8 dBm, V primary antenna.
Tx Chain: 8
Mode: ax20, BLE

5850 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5948.490	59.3	H	68.3	-9.0	PK	67	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

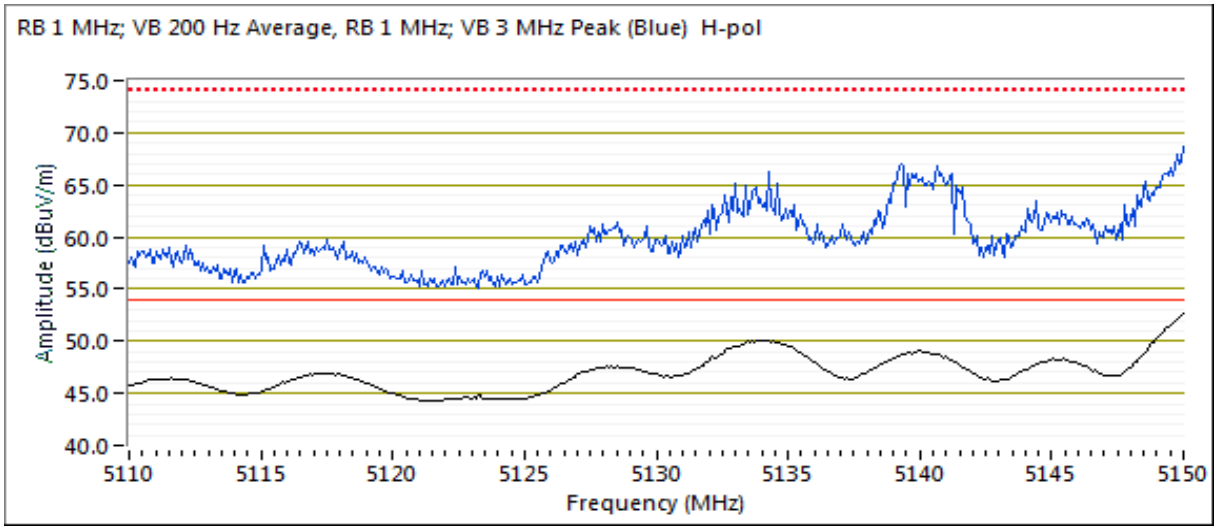
Date of Test: 10/16/2018
Test Engineer: Deniz Demirci
Test Location: Fremont Chamber #7

Config. Used: 1
Config Change: None
EUT Voltage: POE & 120 V, 60 Hz

Channel: 38 - 5190 MHz
Tx Chain: 8x8
Mode: ax40, BLE

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.930	52.7	H	54.0	-1.3	Avg	286	1.4	Note 3; RB 1 MHz; VB: 200 Hz
5149.890	71.0	H	74.0	-3.0	PK	286	1.4	POS; RB 1 MHz; VB: 3 MHz
5149.020	52.1	V	54.0	-1.9	Avg	278	1.7	Note 3; RB 1 MHz; VB: 200 Hz
5148.950	68.2	V	74.0	-5.8	PK	278	1.7	POS; RB 1 MHz; VB: 3 MHz



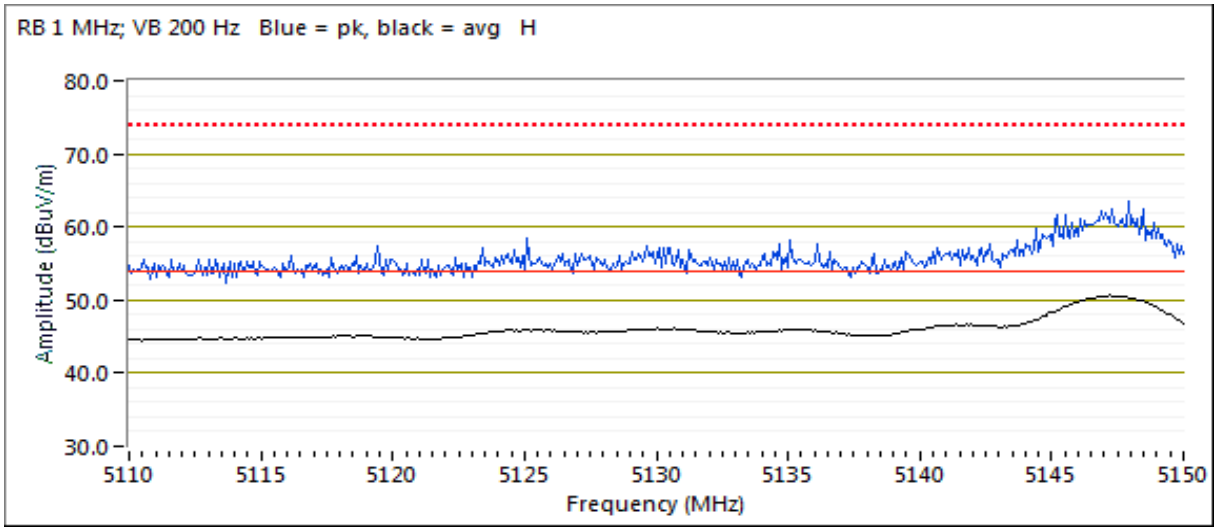
Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Date of Test: 10/17/2018 Config. Used: 1
Test Engineer: John Caizzi Config Change: none
Test Location: Fremont Chamber #7 EUT Voltage: PoE & 120V/60Hz

Channel: 46 - 5230 MHz Pwr setting 20
Tx Chain: 8x8
Mode: ax40, BLE

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5147.250	50.6	H	54.0	-3.4	Avg	310	2.13	Note 3; RB 1 MHz; VB: 200 Hz
5146.960	64.7	H	74.0	-9.3	PK	310	2.13	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

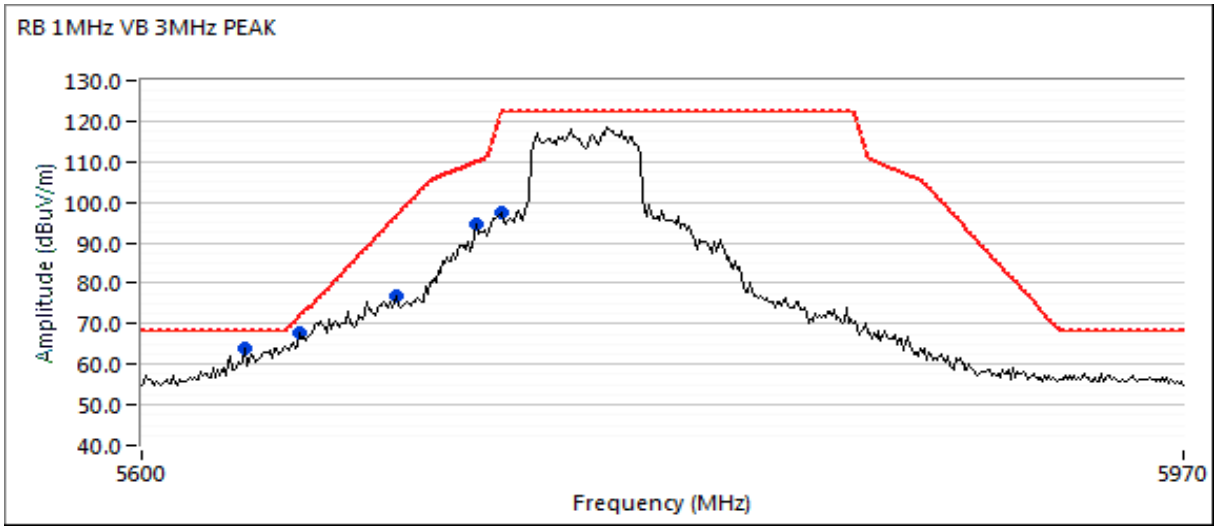
Run #12: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 10/12/2018 Config. Used: 1
Test Engineer: Roy Zheng Config Change: none
Test Location: Fremont Chamber #3 EUT Voltage: PoE & 120V/60Hz

Channel: 151 - 5755MHz at setting 19, BLE at 2440 MHz, 8 dBm, V primary antenna.
Tx Chain: 8
Mode: ax40

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5654.870	68.0	H	71.9	-3.9	PK	284	1.5	POS; RB 1 MHz; VB: 3 MHz
5635.590	63.9	H	68.3	-4.4	PK	47	2.0	POS; RB 1 MHz; VB: 3 MHz
5716.410	94.8	H	109.9	-15.1	Peak	285	1.5	POS; RB 1 MHz; VB: 3 MHz
5688.240	77.0	H	96.6	-19.6	Peak	307	1.5	POS; RB 1 MHz; VB: 3 MHz

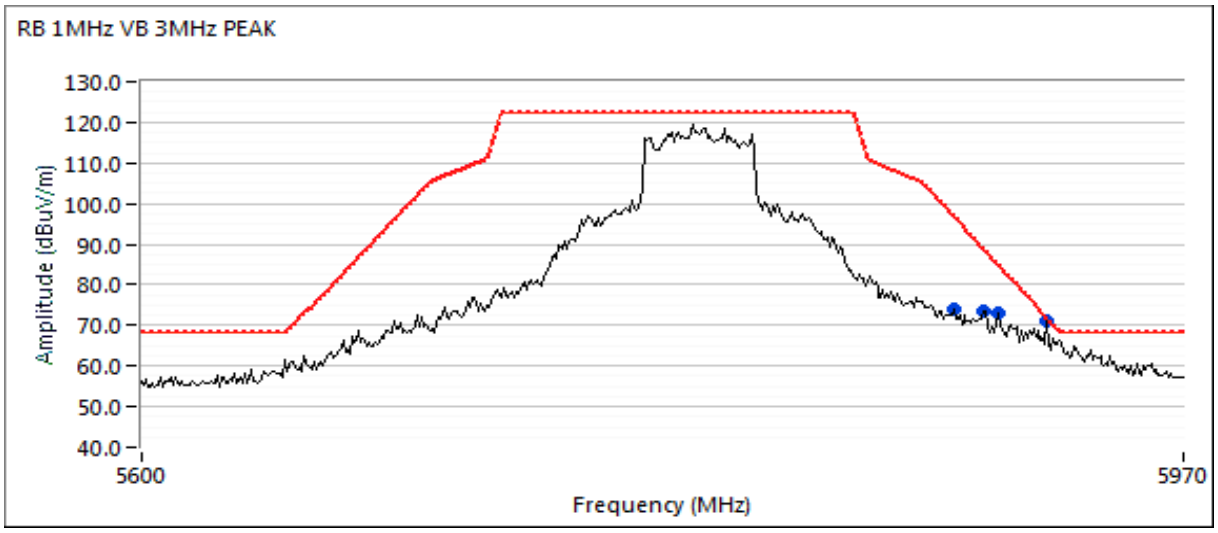


Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Channel: 159 - 5795MHz at setting 20
Tx Chain: 8
Mode: ax40

5850 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5911.720	70.9	H	71.8	-0.9	PK	310	2.0	POS; RB 1 MHz; VB: 3 MHz
5886.210	74.0	H	97.0	-23.0	Peak	308	2.0	POS; RB 1 MHz; VB: 3 MHz
5897.330	73.5	H	88.8	-15.3	Peak	65	2.0	POS; RB 1 MHz; VB: 3 MHz
5902.520	73.0	H	84.9	-11.9	Peak	311	1.0	POS; RB 1 MHz; VB: 3 MHz
5910.650	66.5	H	78.9	-12.4	PK	31	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

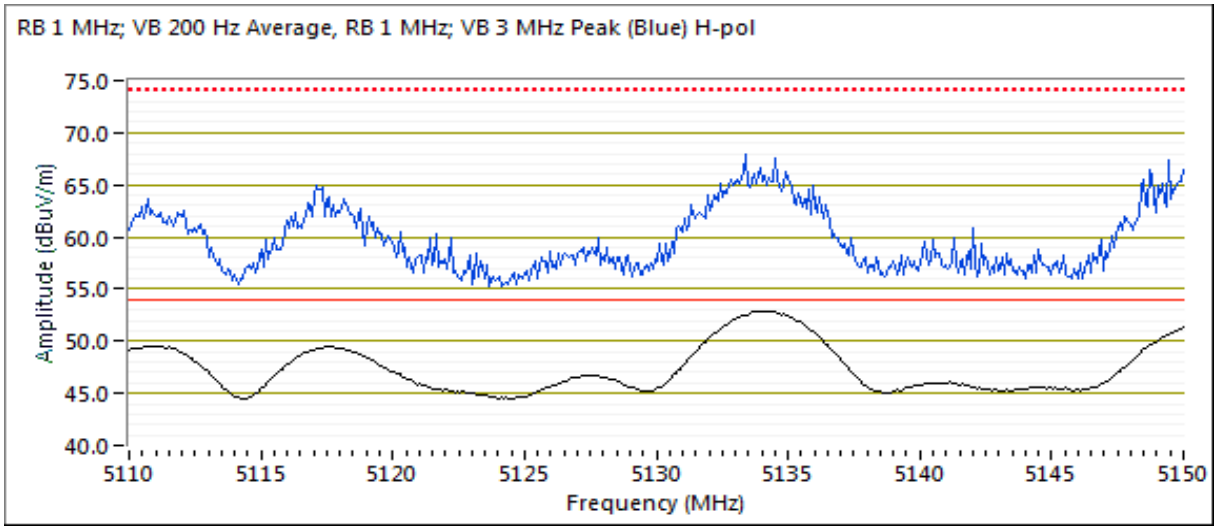
Date of Test: 10/16/2018
Test Engineer: Deniz Demirci
Test Location: Fremont Chamber #7

Config. Used: 1
Config Change: None
EUT Voltage: POE & 120 V, 60 Hz

Channel: 42 - 5210 MHz
Tx Chain: 8x8
Mode: ax80

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5134.220	53.4	H	54.0	-0.6	Avg	284	2.0	Note 3; RB 1 MHz; VB: 200 Hz
5133.420	67.1	H	74.0	-6.9	PK	284	2.0	POS; RB 1 MHz; VB: 3 MHz
5137.930	52.0	V	54.0	-2.0	Avg	286	1.5	Note 3; RB 1 MHz; VB: 200 Hz
5138.330	66.8	V	74.0	-7.2	PK	286	1.5	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Date of Test: 10/16/2018 0:00
Test Engineer: David W. Bare
Test Location: Fremont Chamber #7

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

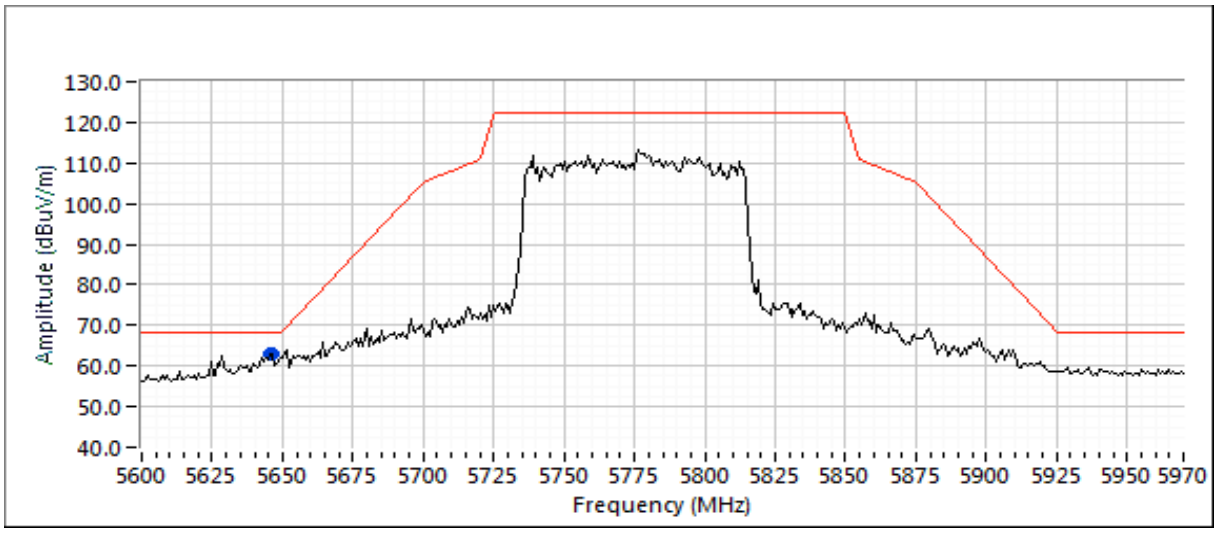
Channel: 155 - 5775MHz
Tx Chain: 8
Mode: ax80

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5643.820	64.5	H	68.3	-3.8	PK	280	2.5	POS; RB 1 MHz; VB: 3 MHz
5646.410	65.3	H	68.3	-3.0	PK	287	2.0	POS; RB 1 MHz; VB: 3 MHz

5850 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5928.270	59.9	H	68.3	-8.4	PK	73	1.2	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

RSS-247, FCC 15.247 and FCC 15.407 Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

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

Ambient Conditions:

Temperature: 20-24 °C
Rel. Humidity: 35-45 %

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.

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Summary of Results

Run #	Mode	Channel	Target Powers	Power Settings	Test Performed	Limit	Result / Margin
Scans on "center" channel in all five OFDM modes to determine the worst case mode (8x8 in 5 GHz bands and 4x4 in 2.4 GHz band).							
1	a / g	6 & 40	15 / 20	20 /20	Radiated Emissions, 1 - 40 GHz	FCC 15.209/ 15.247 / 15 E	45.9dBµV/m @ 20798.9MHz (-8.1dB)
	ax20	6 & 40	20 / 20	20 /20			43.9dBµV/m @ 20798.2MHz (-10.1dB)
	ax40	6 & 38	20 / 20	20 / 20			39.1 dBµV/m @ 20758.5MHz (-14.9dB)
	ax80 / b	6 & 42	20 / 20	20 / 20			48.0 dBµV/m @ 7216.2 MHz (-6.0 dB)
Scans on worst case mode above with BLE or ZigBee also active.							
2	a / b, ZigBee	6, 40 Wi-Fi 18 - ZB	15 / 20 / 8	15 / 20 / 8	Radiated Emissions, 1 - 40 GHz	FCC 15.209/ 15.247 / 15 E	44.8 dBµV/m @ 7311.6 MHz (-9.2 dB)
	a / b, BLE	6, 40 Wi-Fi 17 - BLE	15 / 20 / 8	15 / 20 / 8			50.9 dBµV/m @ 7205.2 MHz (-3.1 dB)
Measurements on low and high channels in worst-case OFDM mode.							
3	a / g	1 & 36	20 / 20	20 / 20	Radiated Emissions, 1 - 12 GHz	FCC 15.209/ 15.247 / 15 E	44.8 dBµV/m @ 20726.1 MHz (-9.2 dB)
	a / g	11 & 48	20 / 20	20 / 20			47.4 dBµV/m @ 20957.2 MHz (-6.6 dB)
Scans on "center" channel in all four OFDM modes to determine the worst case mode. (8x8 in 5 GHz bands and 4x4 in 2.4 GHz band).							
8	a / g	6 & 157	20 / 20	20 / 20	Radiated Emissions, 1 - 40 GHz	FCC 15.209/ 15.247 / 15 E	42.5dBµV/m @ 11571.5MHz (-11.5dB)
	ax20	6 & 157	20 / 20	20 / 20			40.7dBµV/m @ 4738.8MHz (-13.3dB)
	ax40	6 & 159	20 / 20	20 / 20			51.1dBµV/m @ 23181.9MHz (-17.2dB)
	ax80 / b	6 & 155	20 / 20	20 / 20			37.7dBµV/m @ 23101.2MHz (-16.3dB)
9	a / g	1 & 149	20 / 20	20 /20	Radiated Emissions, 1 - 12 GHz	FCC 15.209/ 15.247 / 15 E	43.6dBµV/m @ 22979.7MHz (-10.4dB)
		11 & 165		20 / 20			43.9dBµV/m @ 11649.9MHz (-10.1dB)

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #	Mode	Channel	Target Powers	Power Settings	Test Performed	Limit	Result / Margin
Measurements on low and high channels in worst-case OFDM mode.							
10	BLE	37	8	8	Radiated Emissions, 1 - 25 GHz	FCC 15.209/ 15.247	53.3 dBµV/m @ 4803.9 MHz (-0.7 dB)
		17					48.9 dBµV/m @ 7319.3 MHz (-5.1 dB)
		39					50.8 dBµV/m @ 7439.3 MHz (-3.2 dB)
11	ZigBee	11					36.2dBµV/m @ 11020.0MHz (-17.8dB)
		18					53.6dBµV/m @ 7321.5MHz (-20.4dB)
		26					54.5 dBµV/m @ 7438.3 MHz (-19.5 dB)

Procedure Comments:

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

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)	
BLE	1 Mb/s	0.65	Yes	0.424	1.9	3.8	2358	3 kHz
ZigBee	-	0.43	Yes	0.858	3.7	7.4	1166	2 kHz
11b	1 Mb/s	0.78	Yes	0.667	1.1	2.2	1499	2 kHz
11g	6 Mb/s	0.92	Yes	1.437	0.4	0.7	696	1 kHz
11a	6 Mb/s	0.92	Yes	1.437	0.3	0.7	696	1 kHz
ax20	MCS0	0.96	Yes	5.485	0.2	0.3	182	200 Hz
ax40	MCS0	0.96	Yes	5.401	0.2	0.4	185	200 Hz
ax80	MCS0	0.96	Yes	5.401	0.2	0.4	185	200 Hz
ax80+80	MCS0	0.95	Yes	5.401	0.2	0.4	185	200 Hz

Sample Notes

Sample S/N: CNGFK9Y02N (BLE) & CNGFK9Y005 (Zigbee)

Driver: P4 V0.4.5

Antenna: Internal 8 antennas for 5 GHz radio and 4 antennas for 2.4 GHz radio (5GHz radio may also use 4 antennas but with 3 dB higher power and can operate in both lower and upper 5 GHz bands simutaneously). Tests performed with 8 antennas at the 4 antenna power levels.

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m) for emissions related to UNII operation. The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).
Note 2	Emission in non-restricted band, but limit of 15.209 used.
Note 3:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep,max hold 50*1/DC traces (method VB of KDB 789033)
Note 4:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep, trace average 100 traces, measurement corrected by linear voltage correction factor
Note 5:	-20 dB correction factor was used for ZigBee as 10% operational duty cycle
Note 6:	Digital device emission, class A limit extrapolated to 3m applied, peak reading vs peak or average limit.

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Date of Test: 10/25/2018 Config. Used: 1

Test Engineer: M. Birgani Config Change: None

Test Location: Fremont Chamber #4 EUT Voltage: POE & 120 V, 60 Hz

Run #1a: Center Channel

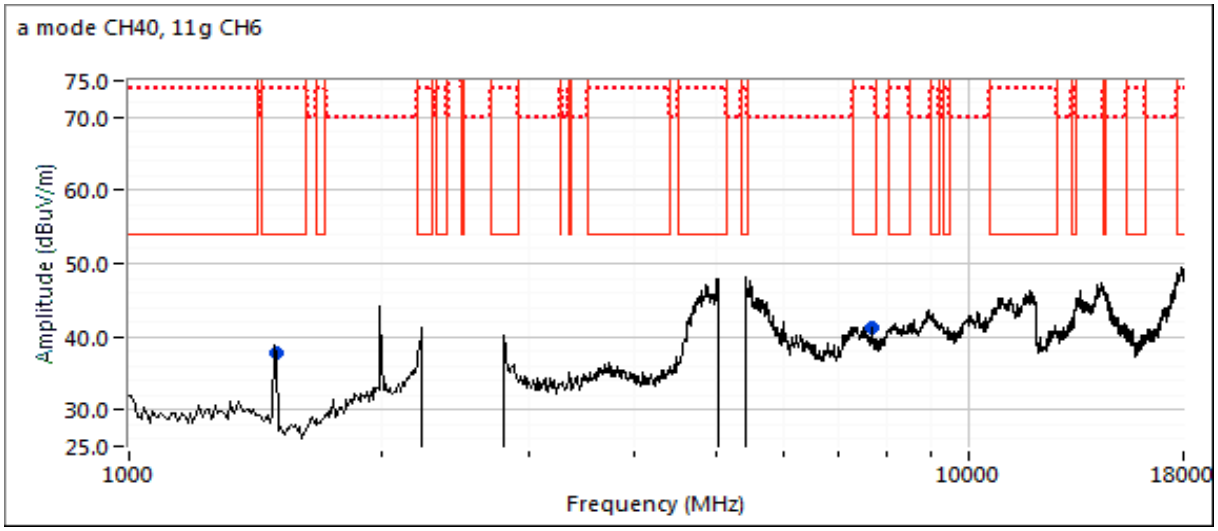
Channel, Mode, Chain, Level: 6, g, 4, 20

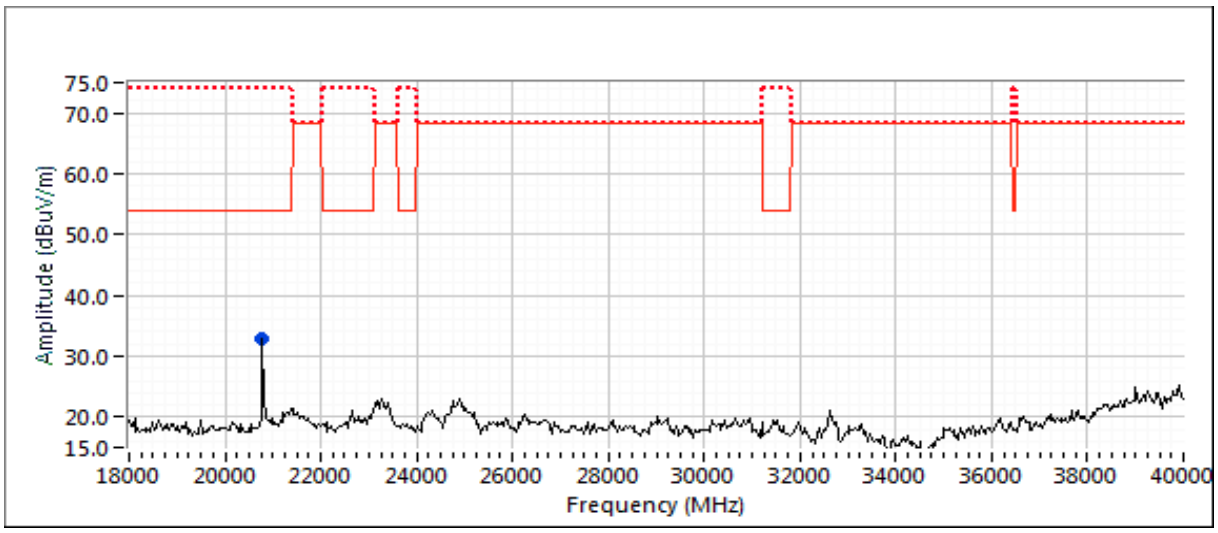
Channel, Mode, Chain, Level: 40, a, 8, 20

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
20798.900	45.9	V	54.0	-8.1	AVG	338	1.1	RB 1 MHz;VB 1 kHz, note 3
20798.550	57.8	V	74.0	-16.2	PK	338	1.1	RB 1 MHz;VB 3 MHz;Peak
20799.660	41.9	H	54.0	-12.1	AVG	32	1.2	RB 1 MHz;VB 1 kHz, note 3
20800.320	54.5	H	74.0	-19.5	PK	32	1.2	RB 1 MHz;VB 3 MHz;Peak
7644.350	36.8	V	54.0	-17.2	AVG	224	1.0	RB 1 MHz;VB 10 Hz;Peak
7644.850	49.5	V	74.0	-24.5	PK	224	1.0	RB 1 MHz;VB 3 MHz;Peak
1500.010	36.1	V	60.0	-23.9	AVG	180	1.0	RB 1 MHz;VB 10 Hz;Peak
1499.950	40.5	V	80.0	-39.5	PK	180	1.0	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT 30 from the device indicated there were no significant emissions in this frequency range other than the 4th harmonic of the 5GHz fundamental.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m) for emissions related to UNII operation. The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A





Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #1b: Center Channel

Date of Test: 10/25/2018 Config. Used: 1

Test Engineer: M. Birgani Config Change: None

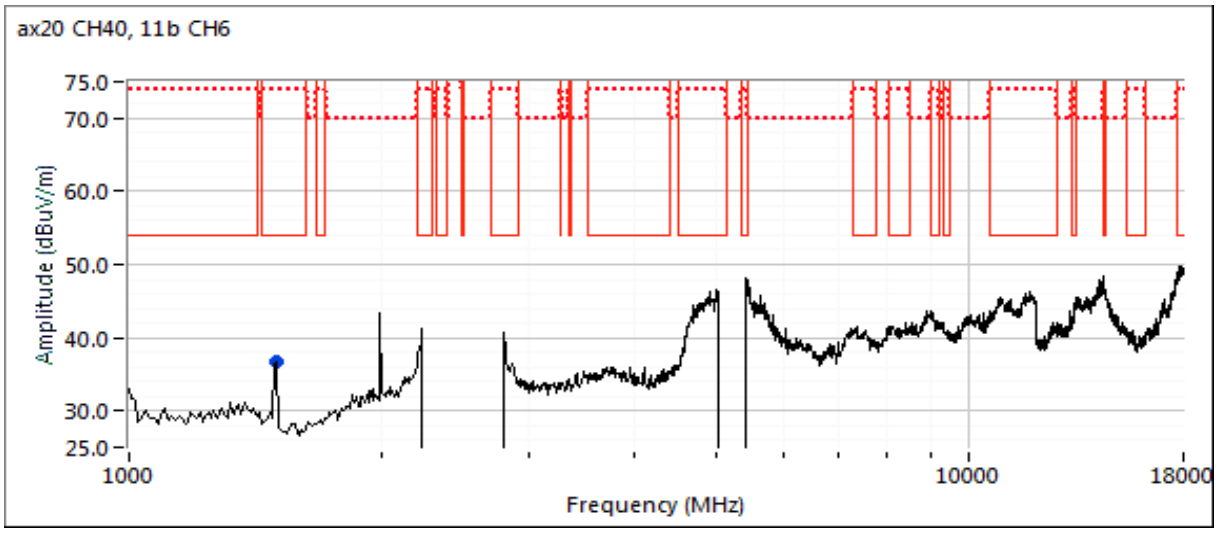
Test Location: Fremont Chamber #4 EUT Voltage: POE & 120 V, 60 Hz

Channel, Mode, Chain, Level: 6, b, 4, 20

Channel, Mode, Chain, Level: 40, ax20, 8, 20

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
20798.180	43.9	V	54.0	-10.1	AVG	336	1.2	Note 3; RB 1 MHz;VB 300 Hz
20798.780	58.7	V	74.0	-15.3	PK	336	1.2	RB 1 MHz;VB 3 MHz;Peak
1500.010	40.4	V	54.0	-13.6	PK	206	1.0	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT 30 from the device indicated there were no significant emissions in this frequency range other than the 4th harmonic of the 5GHz fundamental.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m) for emissions related to UNII operation. The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

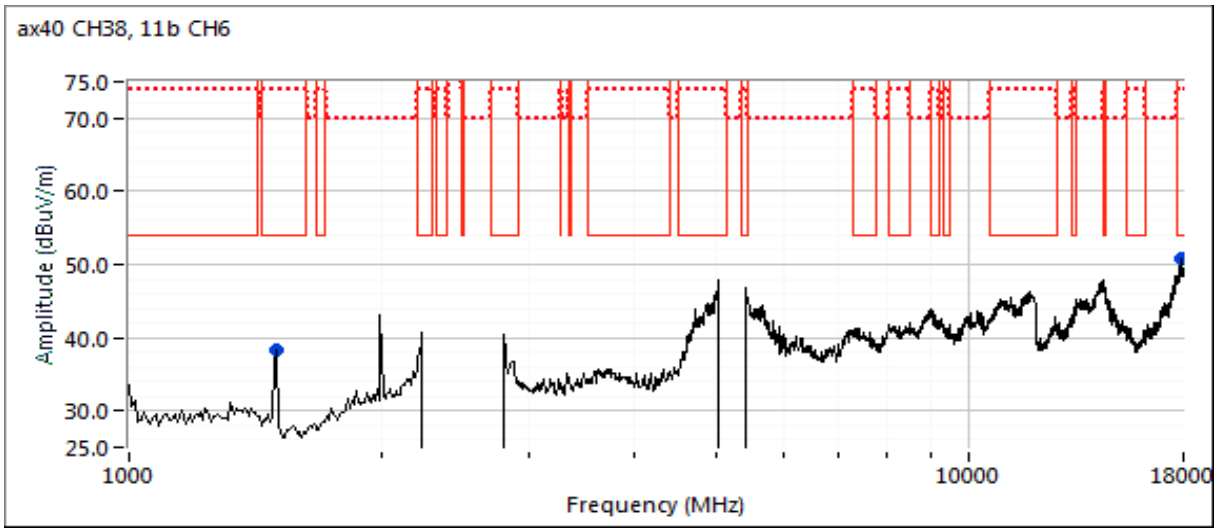
Run #1c: Center Channel

Date of Test: 10/25/2018 Config. Used: 1
Test Engineer: M. Birgani Config Change: None
Test Location: Fremont Chamber #4 EUT Voltage: POE & 120 V, 60 Hz

Channel, Mode, Chain, Level: 6, b, 4, 20
Channel, Mode, Chain, Level: 38, ax40, 8, 20

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
20758.480	39.1	V	54.0	-14.9	AVG	338	1.2	RB 1 MHz;VB 300 Hz; note 3
20759.830	53.6	V	74.0	-20.4	PK	338	1.2	RB 1 MHz;VB 3 MHz;Peak
1500.010	40.4	V	54.0	-13.6	PK	206	1.0	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT 30 from the device indicated there were no significant emissions in this frequency range other than the 4th harmonic of the 5GHz fundamental.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m) for emissions related to UNII operation. The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).

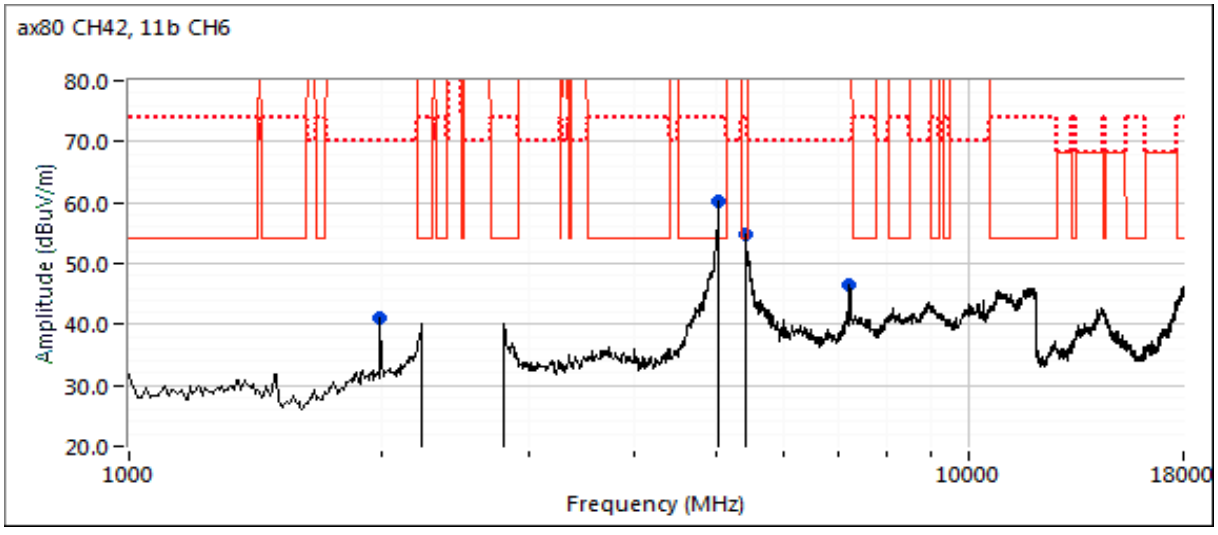


Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #1d: Center Channel
Channel, Mode, Chain, Level: 6, b, 4, 20
Channel, Mode, Chain, Level: 42, ax80, 8, 20

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7216.200	48.0	H	54.0	-6.0	Avg	53	2.0	Note 2, 3; RB 1 MHz; VB 3 kHz
7216.550	53.0	H	74.0	-21.0	PK	53	2.0	RB 1 MHz;VB 3 MHz;Peak
20839.770	38.4	V	54.0	-15.6	AVG	338	1.2	Note 3; RB 1 MHz;VB 300 Hz
20838.560	52.4	V	74.0	-21.6	PK	338	1.2	RB 1 MHz;VB 3 MHz;Peak
2000.000	41.2	V	60.0	-18.8	Peak	196	1.5	Note 6
5041.670	60.3	H			Peak	300	2.0	See bandedge measurements.
5416.670	54.8	H			Peak	46	1.5	See bandedge measurements.

Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT 30 from the device indicated there were no significant emissions in this frequency range other than the 4th harmonic of the 5GHz fundamental.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m) for emissions related to UNII operation. The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Date of Test: 12/27/2018 0:00 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: Ft Chamber #5 EUT Voltage: PoE

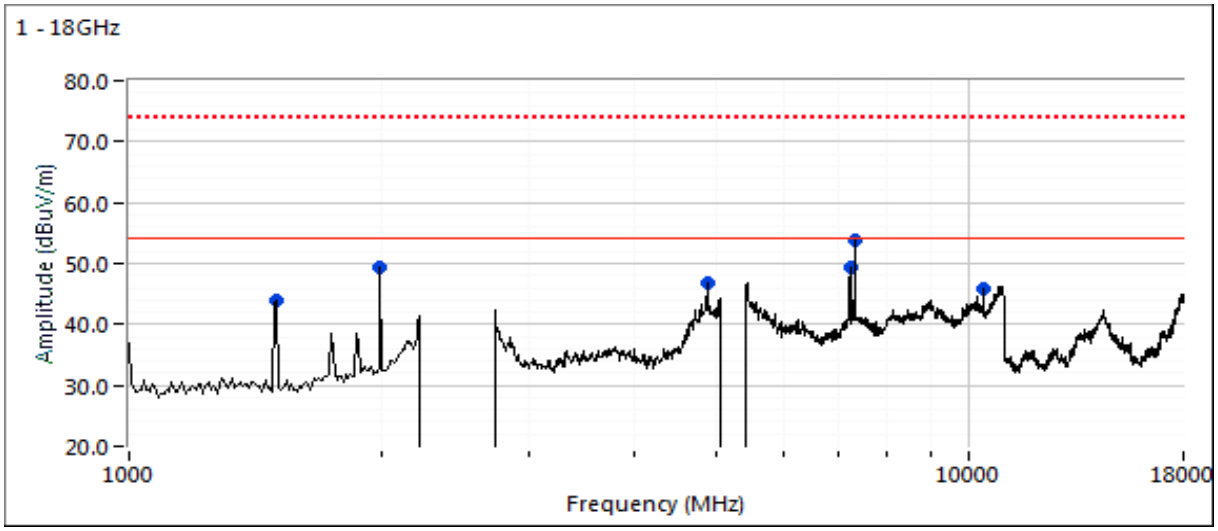
Run #2a: Center Channel

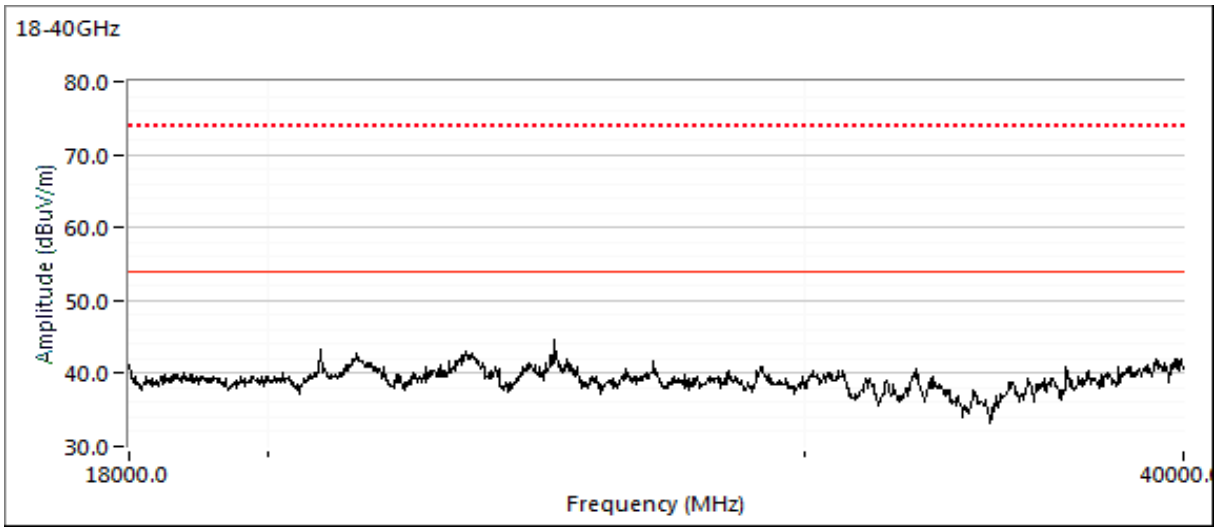
Channel: 6, 40 Wi-Fi, 18 - ZigBee Mode: a, b
Tx Chain: 8 (5GHz), 4 (2.4 GHz) Data Rate: 6Mbps, 1

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.000	43.9	H	54.0	-10.1	Peak	133	1.0	
2000.000	49.4	H	60.0	-10.6	Peak	139	2.5	Note 6
4874.520	41.7	H	54.0	-12.3	Vavg	125	1.5	Note 3; RB 1 MHz;VB 300 Hz
4875.370	51.1	H	74.0	-22.9	PK	125	1.5	RB 1 MHz;VB 3 MHz;Peak
7213.390	34.8	V	54.0	-19.2	Avg	206	1.1	Note 5
7213.390	54.8	V	74.0	-19.2	PK	206	1.1	RB 1 MHz;VB 3 MHz;Peak
7311.630	44.8	V	54.0	-9.2	Vavg	178	1.0	Note 3; RB 1 MHz; VB 2 kHz
7311.610	44.7	V	74.0	-29.3	PK	178	1.0	RB 1 MHz;VB 3 MHz;Peak
10375.250	51.7	V	68.3	-16.6	PK	186	2.5	RB 1 MHz;VB 3 MHz;Peak

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

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A





Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

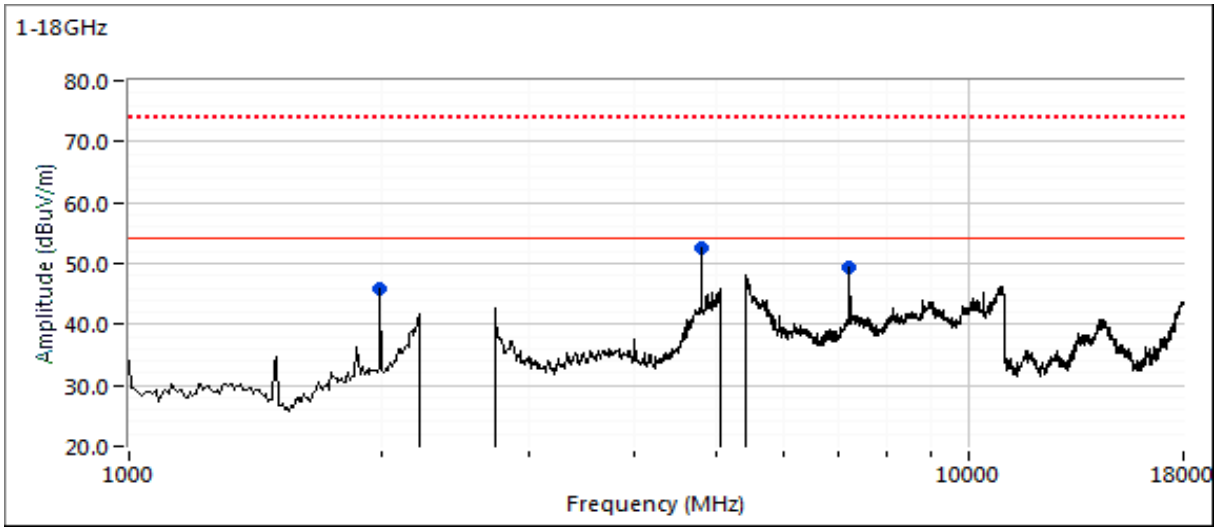
Run #2d: Center Channel

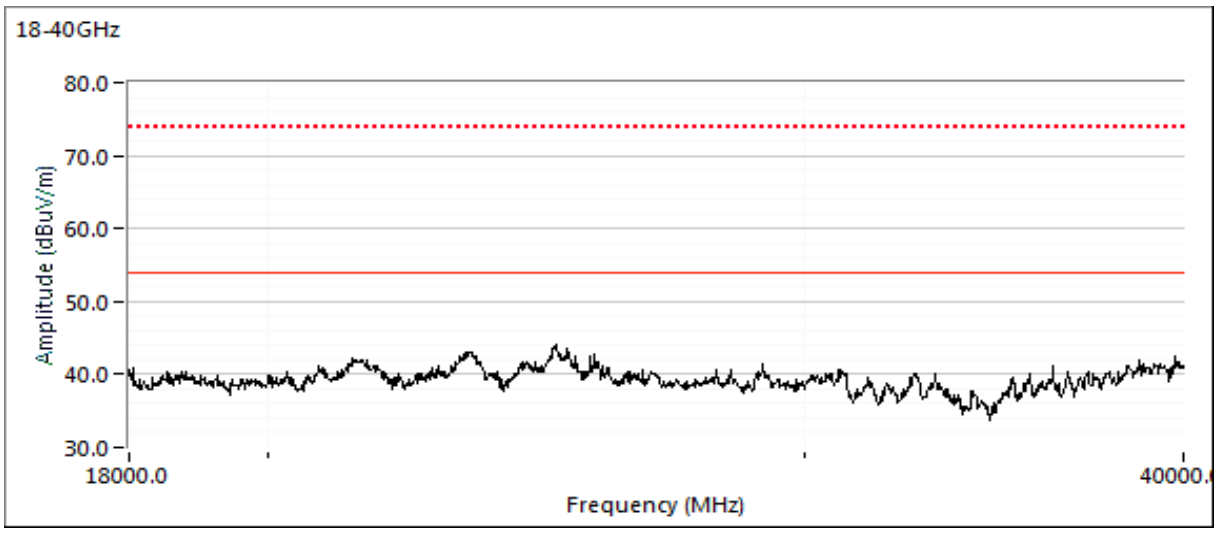
Channel: 6, 40 Wi-Fi, 17 - BLE
Mode: a, b
Tx Chain: 8 (5GHz), 4 (2.4 GHz)
Data Rate: 6Mbps, 1

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2000.000	45.7	H	60.0	-14.3	Peak	93	1.3	Note 6
7205.190	50.9	V	54.0	-3.1	Vavg	217	1.2	Note 3; RB 1 MHz; VB 3 kHz
7206.740	55.2	V	74.0	-18.8	PK	217	1.2	RB 1 MHz;VB 3 MHz;Peak
4803.680	50.7	H	54.0	-3.3	Vavg	233	1.1	Note 3; RB 1 MHz; VB 3 kHz
4804.350	55.4	H	74.0	-18.6	PK	233	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 (68.3dBuV/m) for emissions related to UNII operation. The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A





Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #3: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: Worse case from Runs #1 and 2

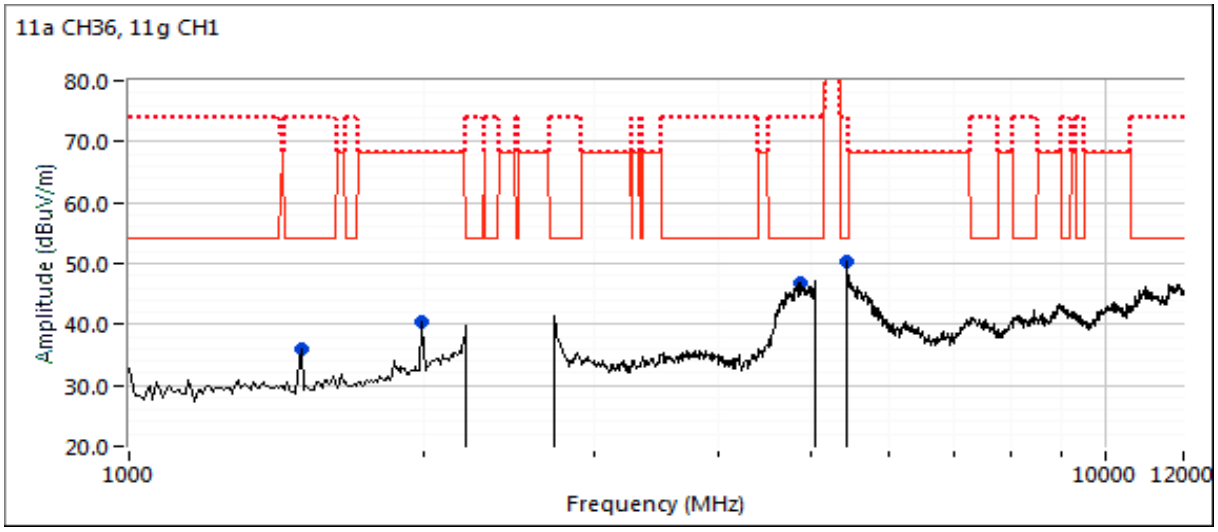
Date of Test: 11/1/2018 0:00 Config. Used: 1
Test Engineer: John Caizzi Config Change: none
Test Location: Chamber 7 EUT Voltage: PoE & 120V / 60Hz

Run #3a: Low Channel

Channel: 1 & 36 Mode: a / g
Tx Chain: 8 Data Rate: 6Mbps

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.000	35.8	V	60.0	-18.2	Peak	221	1.0	Note 6
2000.000	40.4	V	60.0	-27.9	Peak	336	1.0	Note 6
4889.500	43.7	H	54.0	-10.3	PK	298	1.7	Note 3; RB 1 MHz; VB 1 kHz
4886.650	55.3	H	74.0	-18.7	PK	298	1.7	RB 1 MHz;VB 3 MHz;Peak
5425.000	50.3	H			Peak	66	2.0	See bandedge measurements.
20726.100	44.8	V	54.0	-9.2	Avg	342	1.90	Note 3; RB 1 MHz; VB 1 kHz
20727.200	57.0	V	74.0	-17.0	PK	342	1.90	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 12 - 40 GHz with the measurement antenna moved around the EUT 30 from the device indicated there were no significant emissions in this frequency range other than the 4th harmonic of the 5GHz fundamental.



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

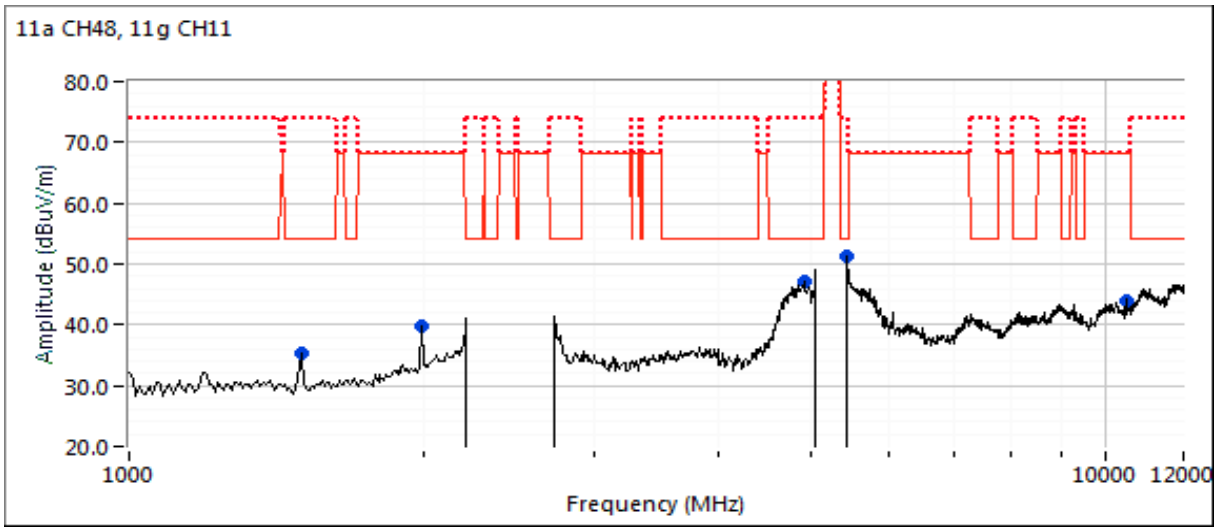
Run #3b: High Channel

Channel: 11 & 48 Mode: a / g

Tx Chain: 8 Data Rate:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.000	35.3	V	60.0	-18.7	Peak	8	1.0	Note 6
2000.000	39.8	V	60.0	-28.5	Peak	308	1.5	Note 6
4881.180	43.6	H	54.0	-10.4	Avg	298	1.74	Note 3; RB 1 MHz; VB 1 kHz
4873.750	56.1	H	74.0	-17.9	PK	298	1.74	RB 1 MHz;VB 3 MHz;Peak
5425.000	*51.4*	*V*			*Peak*	*76*	*1.5*	*See bandedge measurements.*
10480.000	51.1	V	68.3	-17.2	PK	30	1.99	RB 1 MHz;VB 3 MHz;Peak
20957.200	47.4	V	54.0	-6.6	Avg	32	1.88	Note 3; RB 1 MHz; VB 1 kHz
20957.620	59.7	V	74.0	-14.3	PK	32	1.88	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 12 - 40 GHz with the measurement antenna moved around the EUT 30 from the device indicated there were no significant emissions in this frequency range other than the 4th harmonic of the 5GHz fundamental.



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #8, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5725-5850 MHz Band

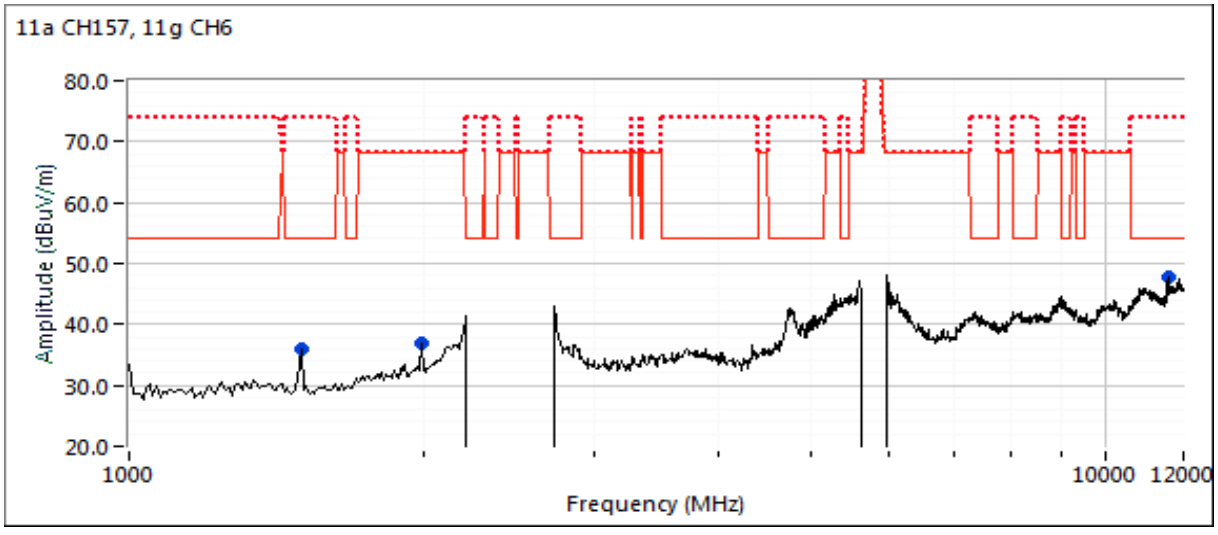
Date of Test: 10/29/2018 0:00 Config. Used: 1
Test Engineer: John Caizzi Config Change: none
Test Location: Chamber 7 EUT Voltage: PoE & 120V / 60Hz

Run #8a: Center Channel

Channel: 6 & 157 Wi-Fi Mode: a, g
Tx Chain: 8 (5GHz), 4 (2.4 GHz) Data Rate: 6 Mb/s / 1 Mb/s

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.000	36.1	V	60.0	-23.9	Peak	123	1.0	Note 6
2000.000	36.9	H	60.0	-23.1	Peak	83	2.0	Note 6
11571.470	42.5	V	54.0	-11.5	Avg	342	1.00	VB 300 Hz, note 3
11571.470	54.8	V	74.0	-19.2	PK	342	1.00	RB 1 MHz;VB 3 MHz;Peak
23143.470	54.6	V	68.3	-13.7	PK	356	1.00	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 12 - 40 GHz with the measurement antenna moved around the EUT 30 from the device indicated there were no significant emissions in this frequency range other than the 4th harmonic of the 5GHz fundamental.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m) for emissions related to UNII operation. The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).

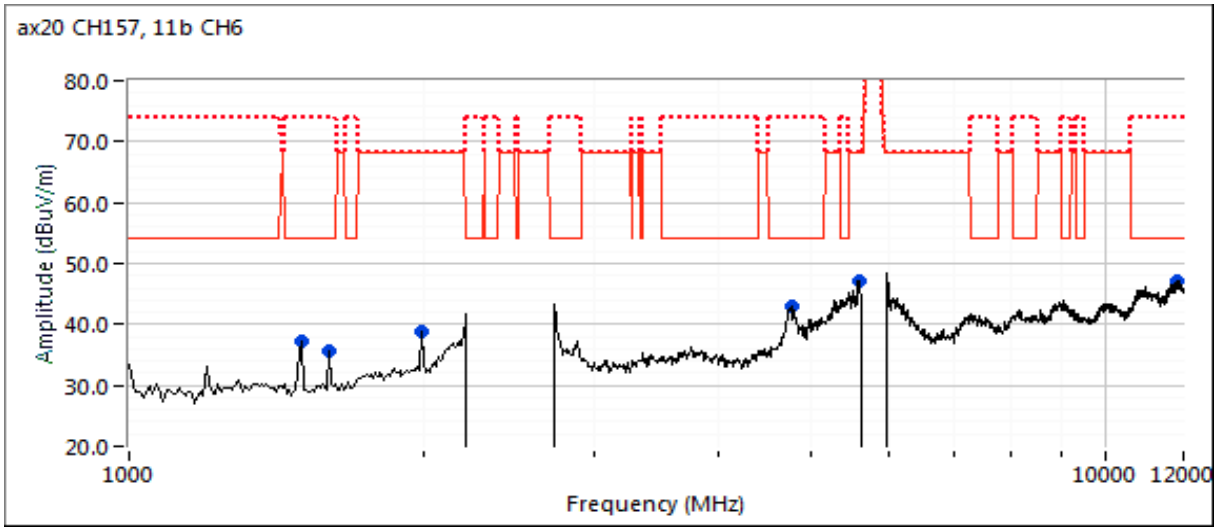


Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #8b: Center Channel
Channel: 6 & 157 Wi-Fi Mode: ax20
Tx Chain: 8 (5GHz), 4 (2.4 GHz) Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.000	37.1	H	60.0	-22.9	Peak	52	2.5	Note 6
2000.000	38.9	V	60.0	-21.1	Peak	227	1.0	Note 6
4738.800	40.7	H	54.0	-13.3	Avg	298	1.6	VB 3 kHz, note 3
4742.400	52.1	H	74.0	-21.9	PK	298	1.6	RB 1 MHz;VB 3 MHz;Peak
5583.330	47.2	H			Peak	67	1.0	See bandedge measurements.
11850.130	40.3	H	54.0	-13.7	Avg	286	2.5	VB 300 Hz, note 3
11854.100	52.9	H	74.0	-21.1	PK	286	2.5	RB 1 MHz;VB 3 MHz;Peak
23138.000	54.3	V	68.3	-14.0	PK	356	1.0	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 12 - 40 GHz with the measurement antenna moved around the EUT 30 from the device indicated there were no significant emissions in this frequency range other than the 4th harmonic of the 5GHz fundamental.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m) for emissions related to UNII operation. The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Date of Test: 10/29/2018
Test Engineer: Deniz Demirci
Test Location: Chamber 7

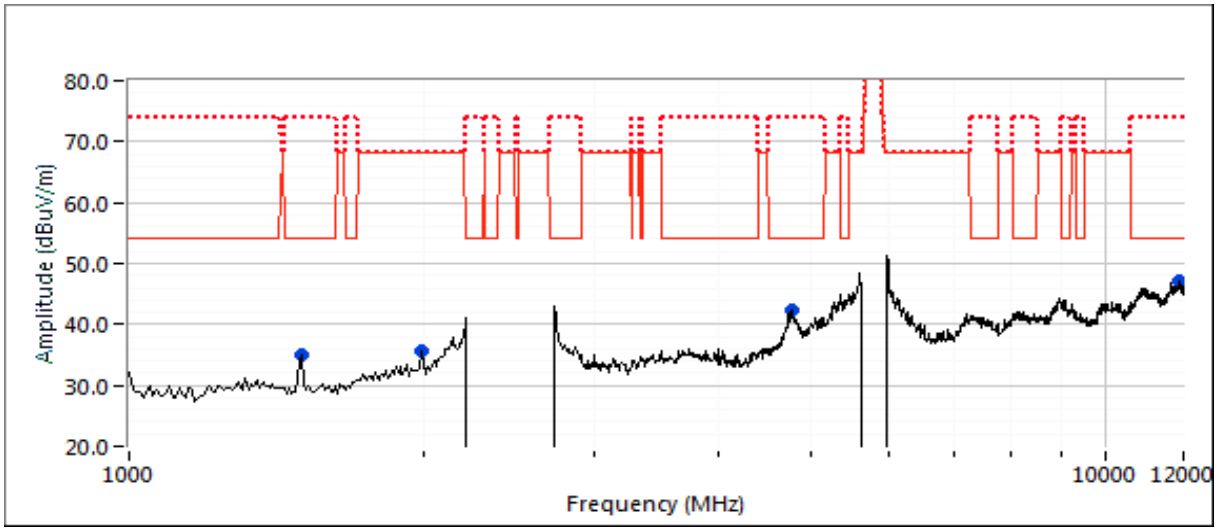
Config. Used: 1
Config Change: none
EUT Voltage: PoE & 120V / 60Hz

Run #8c: Center Channel
Channel: 6 & 159 Wi-Fi
Tx Chain: 8 (5GHz), 4 (2.4 GHz)

Mode: 11ax40
Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.000	34.9	H	60.0	-25.1	Peak	60	2.5	Note 6
2000.000	35.6	V	60.0	-24.4	Peak	356	1.0	Note 6
4759.250	36.6	H	54.0	-17.4	Avg	75	2.1	RB 1 MHz;VB 300 Hz; note 3
4731.750	50.0	H	74.0	-24.0	PK	75	2.1	RB 1 MHz;VB 3 MHz;Peak
23181.930	51.1	V	68.3	-17.2	PK	21	1.0	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 12 - 40 GHz with the measurement antenna moved around the EUT 30 from the device indicated there were no significant emissions in this frequency range other than the 4th harmonic of the 5GHz fundamental.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m) for emissions related to UNII operation. The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Date of Test: 10/29/2018
Test Engineer: Deniz Demirci
Test Location: Chamber 7

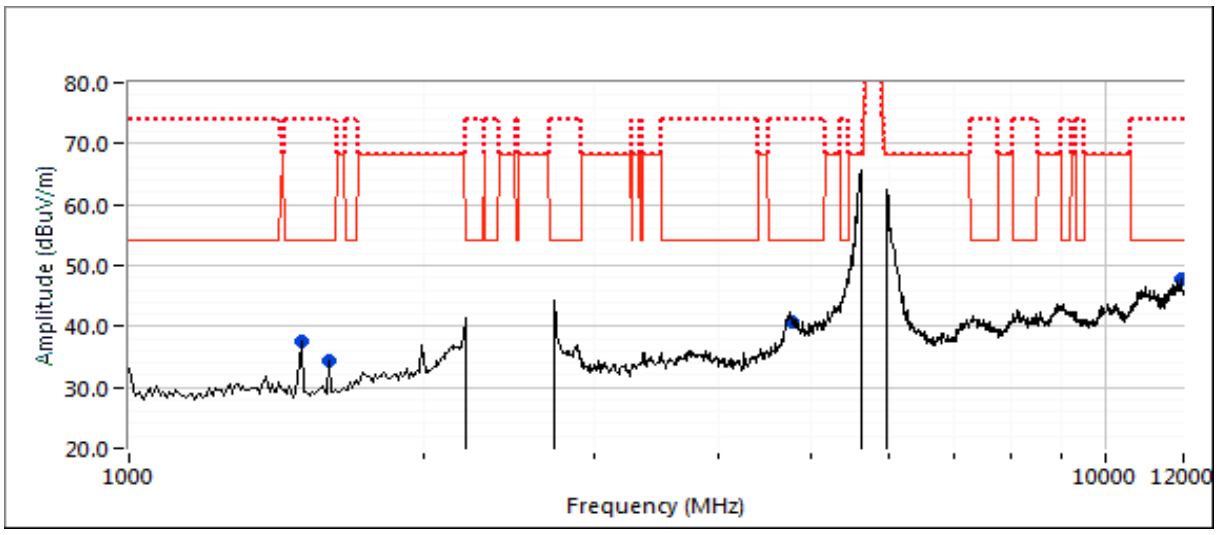
Config. Used: 1
Config Change: none
EUT Voltage: PoE & 120V / 60Hz

Run #8d: Center Channel
Channel: 6 & 155
Tx Chain: 8 (5GHz), 4 (2.4 GHz)

Mode: ax80 / b
Data Rate: MCS0 / 1 Mb/s

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.000	37.6	H	60.0	-22.4	Peak	79	1.5	Note 6
1600.000	34.5	H	60.0	-25.5	Peak	29	2.5	Note 6
4759.540	36.8	H	54.0	-17.2	Avg	288	1.9	RB 1 MHz;VB 300 Hz; note 3
4760.820	50.4	H	74.0	-23.6	PK	288	1.9	RB 1 MHz;VB 3 MHz;Peak
23101.180	37.7	V	54.0	-16.3	Avg	21	1.0	RB 1 MHz;VB 300 Hz; note 3
23099.530	49.6	V	74.0	-24.4	PK	21	1.0	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 12 - 40 GHz with the measurement antenna moved around the EUT 30 from the device indicated there were no significant emissions in this frequency range other than the 4th harmonic of the 5GHz fundamental.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m) for emissions related to UNII operation. The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #9: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: Worse case from Run #8

Date of Test: 11/01/18 Config. Used: 1

Test Engineer: John Caizzi Config Change: none

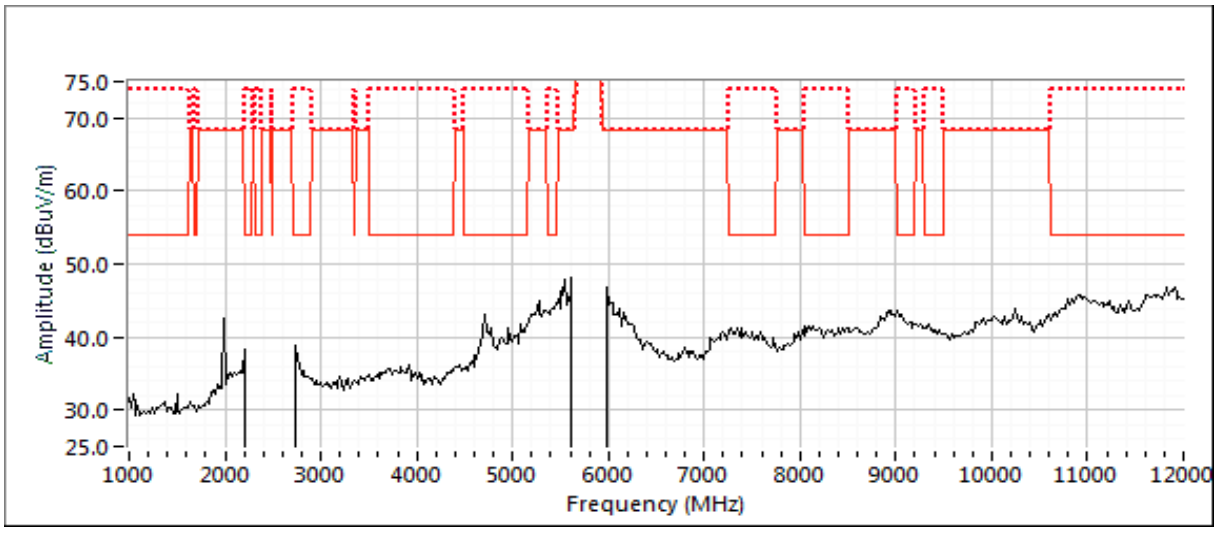
Test Location: Chamber 7 EUT Voltage: PoE & 120V / 60Hz

Run #9a: Low Channel

Channel/Mode/Rate/Chains/Power: 1/g/6Mbps/4/20 Channel/Mode/Rate/Chains/Power: 149/a/6Mbps/8/20

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
22979.670	43.6	V	54.0	-10.4	Avg	37	1.82	VB 1 kHz, note 3
22979.800	54.3	V	74.0	-19.7	PK	37	1.82	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 12 - 40 GHz with the measurement antenna moved around the EUT 30 from the device indicated there were no significant emissions in this frequency range other than the 4th harmonic of the 5GHz fundamental.



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Date of Test: 11/01/18
Test Engineer: M. Birgani
Test Location: Chamber 7

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

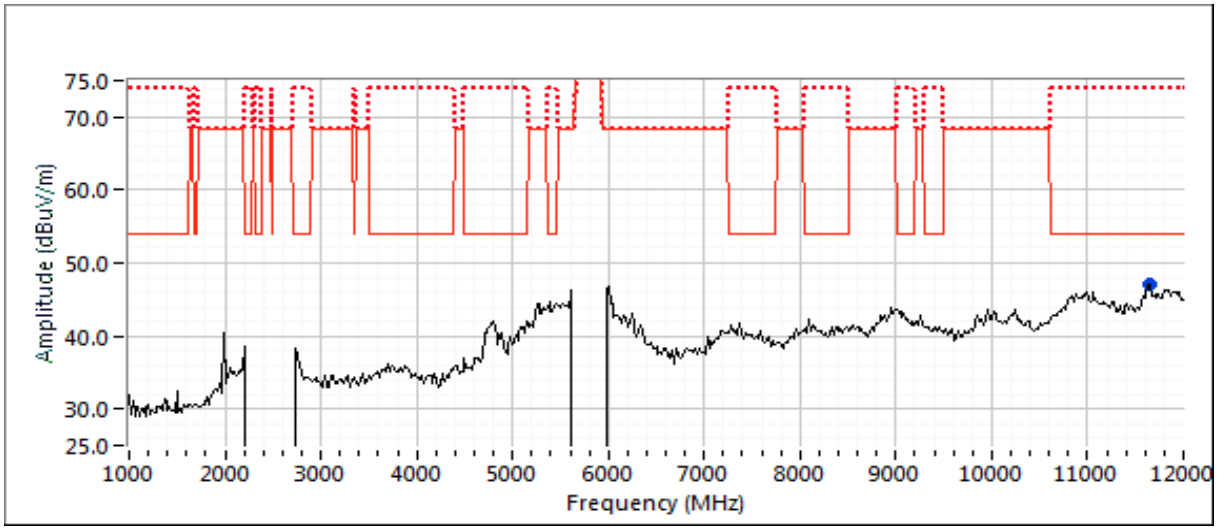
Run #9b: High Channel

Channel/Mode/Rate/Chains/Power: 11/g/6Mbps/4/20

Channel/Mode/Rate/Chains/Power: 165/a/6Mbps/8/20

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11649.880	43.9	V	54.0	-10.1	VAVG	342	1.03	RB 1 MHz;VB 1 kHz
23301.600	56.2	V	68.3	-12.1	PK	344	1.72	RB 1 MHz;VB 3 MHz;Peak
11649.790	54.7	V	74.0	-19.3	PK	342	1.03	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 12 - 40 GHz with the measurement antenna moved around the EUT 30 from the device indicated there were no significant emissions in this frequency range other than the 4th harmonic of the 5GHz fundamental.



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #10, Radiated Spurious Emissions, 1,000 - 25,000 MHz

Date of Test: 11/2/2018 0:00 Config. Used: 1

Test Engineer: John Caizzi Config Change: none

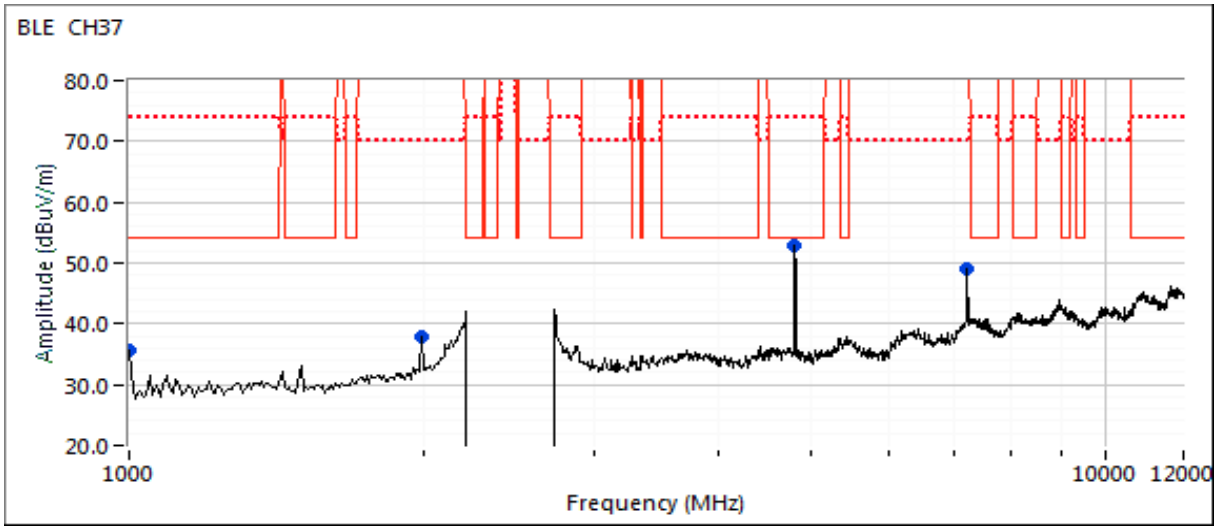
Test Location: Chamber 7 EUT Voltage: PoE & 120V / 60Hz

Run #10a: Low Channel

Channel: 37 Mode: BLE Tx Chain: Primary

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1000.000	35.5	V	60.0	-24.5	Peak	294	1.0	Note 6
2000.000	38.0	V	60.0	-22.0	Peak	291	1.5	Note 6
4803.890	53.3	H	54.0	-0.7	Avg	296	1.87	RB 1 MHz; VB 3 kHz, Note 4
4803.490	56.2	H	74.0	-17.8	PK	296	1.87	RB 1 MHz;VB 3 MHz;Peak
7205.430	47.4	V	54.0	-6.6	Avg	28	1.00	RB 1 MHz; VB 3 kHz, Notes 2 & 4
7206.880	53.1	V	74.0	-20.9	PK	28	1.00	RB 1 MHz;VB 3 MHz;Peak, Note 2

Note:	Scans made between 12 - 25 GHz with the measurement antenna moved around the EUT 30cm from the device indicated there were no significant emissions in this frequency range.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

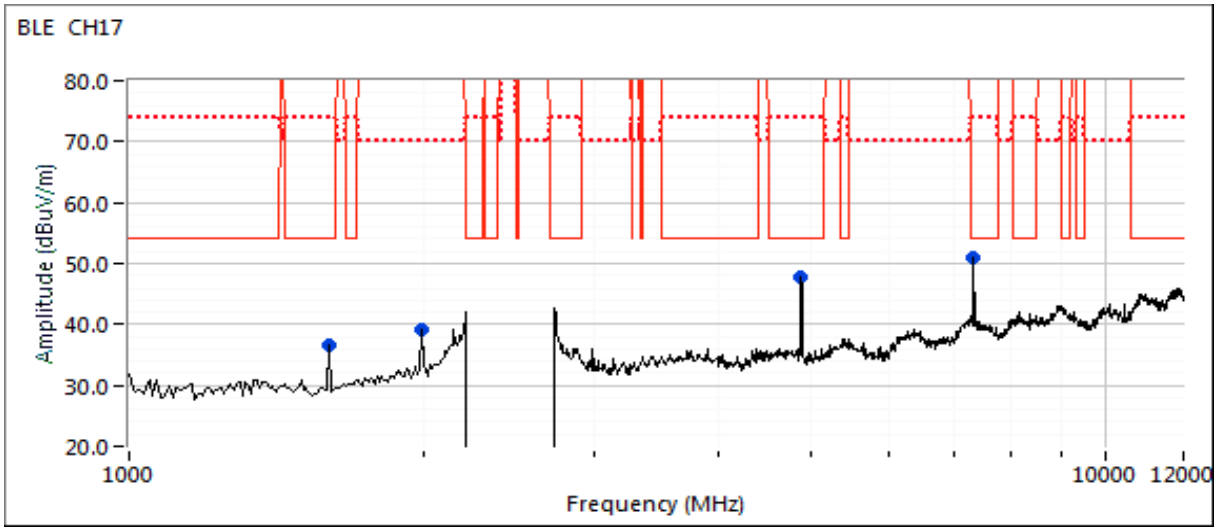
Run #10b: Center Channel

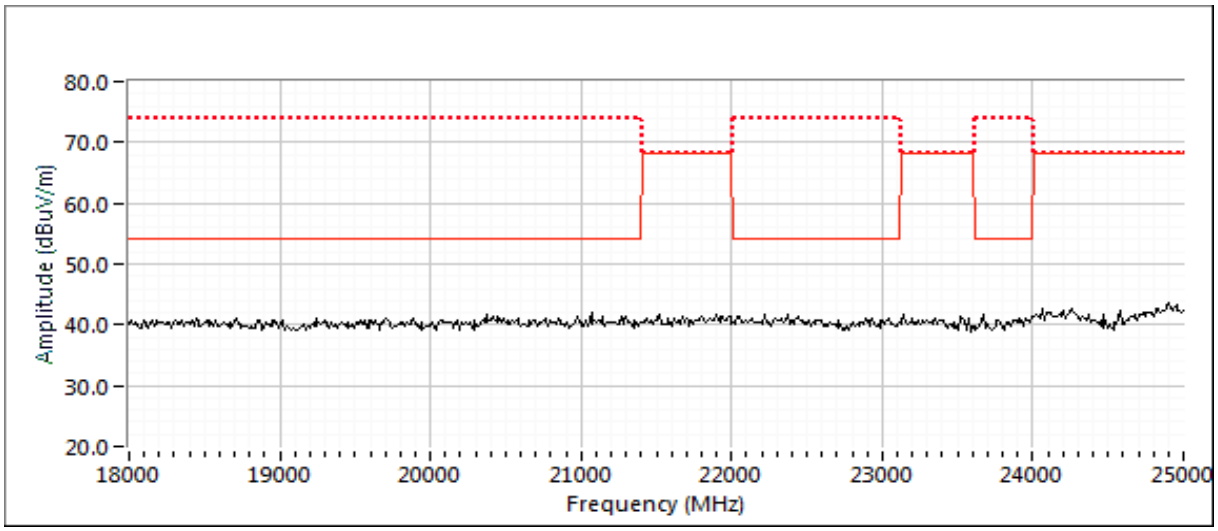
Channel: 17 Mode: BLE Tx Chain: Primary

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1600.000	36.6	V	60.0	-23.4	Peak	325	2.0	Note 6
2000.000	39.2	V	60.0	-20.8	Peak	201	1.5	Note 6
4879.810	47.4	H	54.0	-6.6	Avg	300	2.18	RB 1 MHz; VB 3 kHz, Note 4
4880.440	51.0	H	74.0	-23.0	PK	300	2.18	RB 1 MHz;VB 3 MHz;Peak
7319.250	48.9	V	54.0	-5.1	Avg	318	1.00	RB 1 MHz; VB 3 kHz, Note 4
7320.700	53.9	V	74.0	-20.1	PK	318	1.00	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:	Scans made between 12 - 25 GHz with the measurement antenna moved around the EUT 30cm from the device indicated there were no significant emissions in this frequency range.

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A





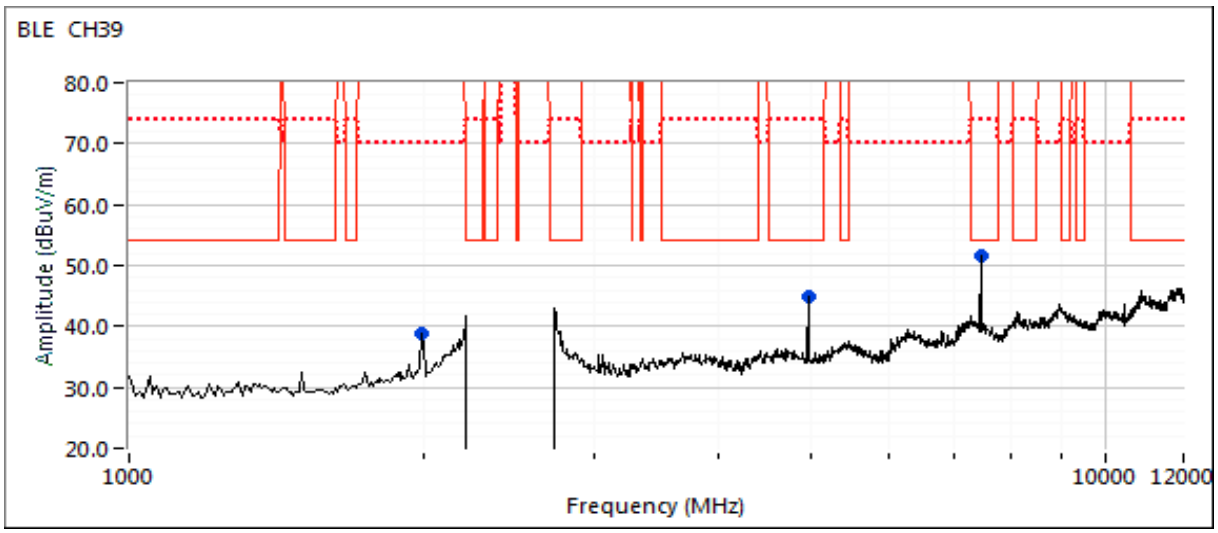
Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #10c: High Channel

Channel: 39 Mode: BLE Tx Chain: Primary

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2000.000	38.7	V	60.0	-21.3	Peak	74	1.5	Note 6
4959.910	45.5	V	54.0	-8.5	Avg	1	1.70	RB 1 MHz; VB 3 kHz, Note 4
4960.430	49.4	V	74.0	-24.6	PK	1	1.70	RB 1 MHz;VB 3 MHz;Peak
7439.330	50.8	V	54.0	-3.2	Avg	306	1.00	RB 1 MHz; VB 3 kHz, Note 4
7439.350	55.9	V	74.0	-18.1	PK	306	1.00	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 12 - 25 GHz with the measurement antenna moved around the EUT 30cm from the device indicated there were no significant emissions in this frequency range.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #11, Radiated Spurious Emissions, 1,000 - 25,000 MHz. Operation in the 2400-2483.5 MHz Band

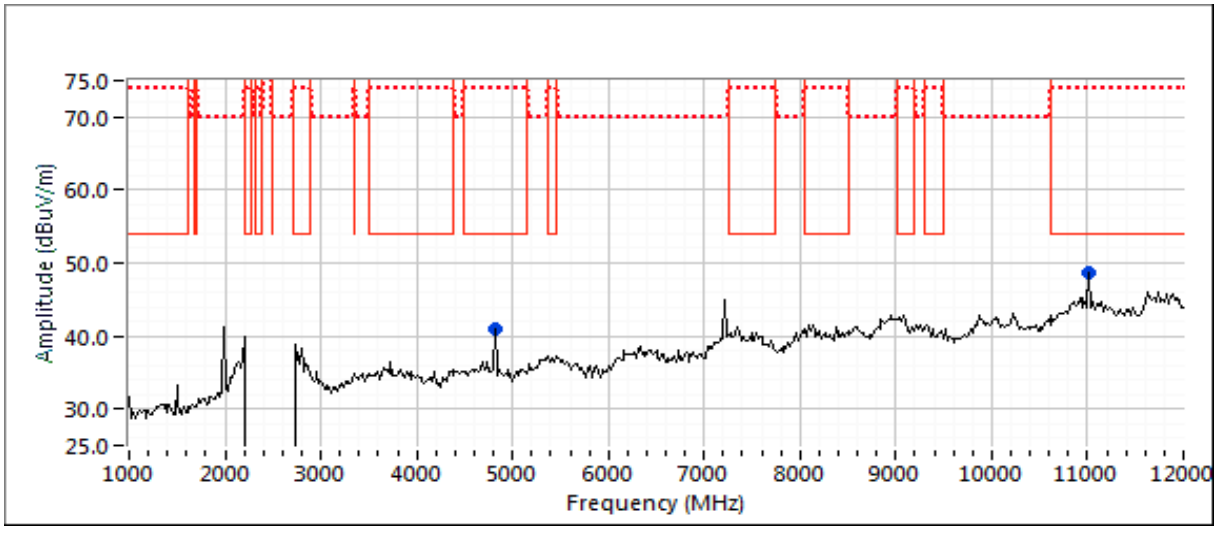
Date of Test: 11/01/18 Config. Used: 1
Test Engineer: M. Birgani Config Change: None
Test Location: Chamber 7 EUT Voltage: PoE & 120V / 60Hz

Run #11a: Low Channel

Channel: 11 Mode: Zigbee Tx Chain: Primary

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11019.960	36.2	V	54.0	-17.8	VAVG	26	1.0	RB 1 MHz;VB 3 kHz, Note 4, 5
11019.990	54.8	V	74.0	-19.2	PK	26	1.0	RB 1 MHz;VB 3 MHz;Peak
4809.000	47.2	H	74.0	-26.8	PK	294	2.3	RB 1 MHz;VB 3 MHz;Peak
4811.010	22.6	H	54.0	-31.4	VAVG	294	2.3	RB 1 MHz;VB 3 kHz, Note 4, 5

Note:	Scans made between 12 - 25 GHz with the measurement antenna moved around the EUT 30cm from the device indicated there were no significant emissions in this frequency range.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

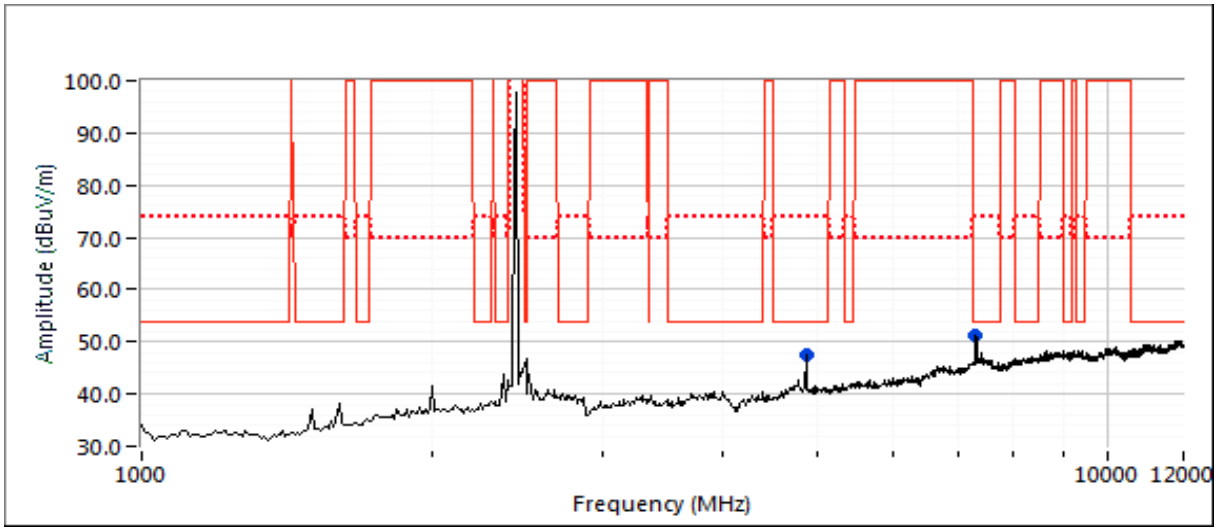
Date of Test: 11/01/18 Config. Used: 1
Test Engineer: M. Birgani Config Change: None
Test Location: Chamber 7 EUT Voltage: PoE & 120V / 60Hz

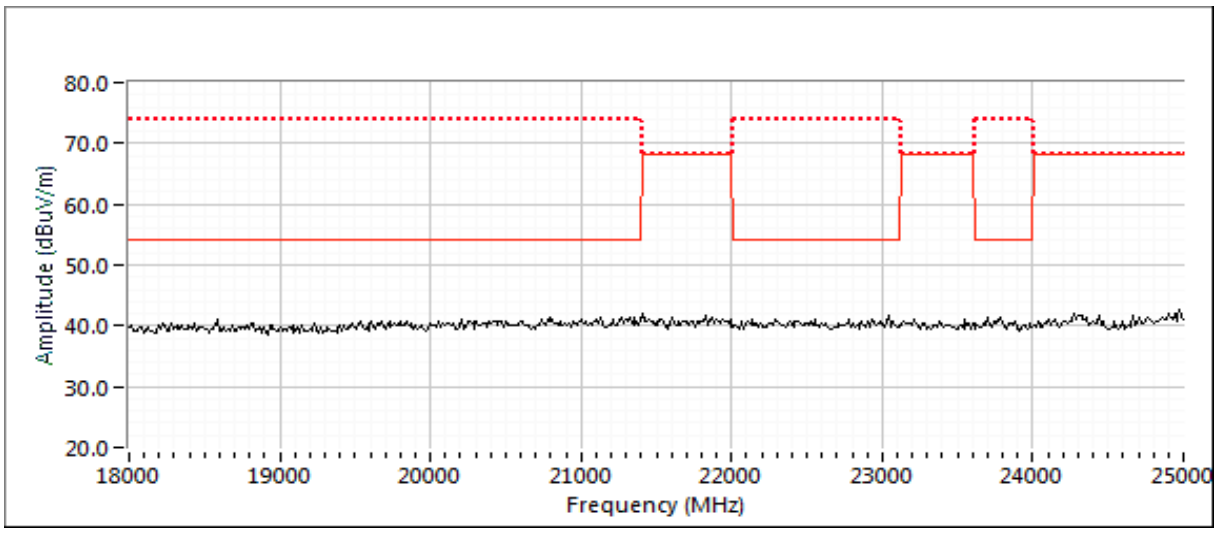
Run #11b: Center Channel
Channel: 18 Mode: Zigbee Tx Chain: Primary

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7321.530	53.6	H	74.0	-20.4	PK	290	2.0	RB 1 MHz;VB 3 MHz;Peak
7321.150	30.0	H	54.0	-24.0	VAVG	290	2.0	RB 1 MHz;VB 3 kHz, Note 4, 5
4879.050	47.0	V	74.0	-27.0	PK	322	1.9	RB 1 MHz;VB 3 MHz;Peak
4880.910	22.7	V	54.0	-31.3	VAVG	322	1.9	RB 1 MHz;VB 3 kHz, Note 4, 5

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note:	Scans made between 12 - 25 GHz with the measurement antenna moved around the EUT 30cm from the device indicated there were no significant emissions in this frequency range.

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A





Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

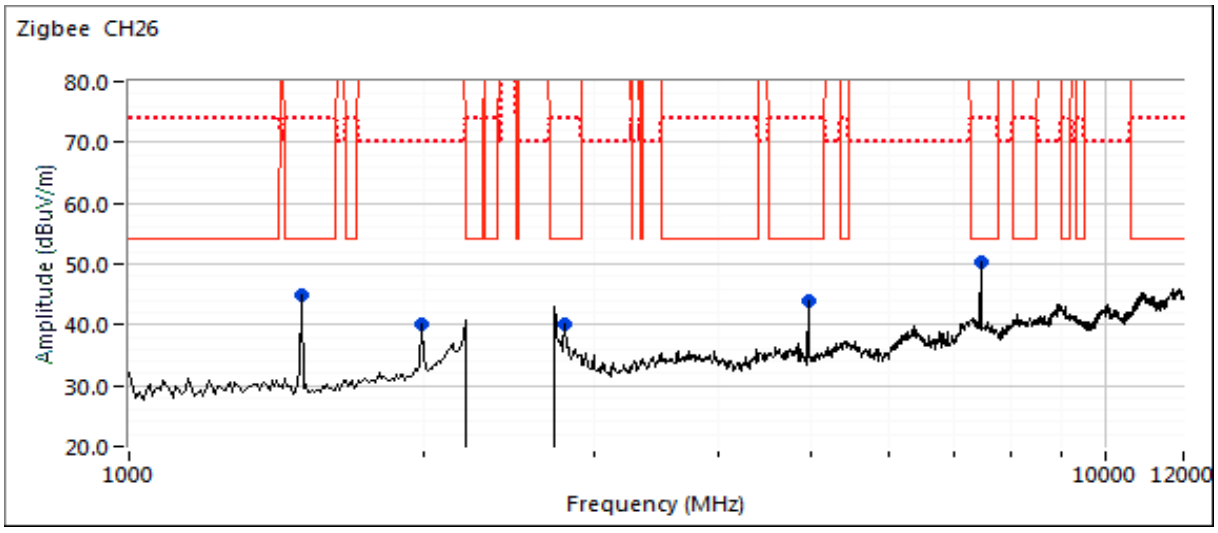
Run #11c: High Channel

Date of Test: 11/2/2018 0:00 — Config. Used: 1
Test Engineer: John Caizzi — Config Change: none
Test Location: Chamber 7 — EUT Voltage: PoE & 120V / 60Hz

Channel: 26 — Mode: ZigBee
Tx Chain: Primary — Data Rate:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2800.110	24.8	V	54.0	-29.2	Avg	50	1.86	RB 1 MHz;VB 3 kHz, Note 4
2799.980	48.2	V	74.0	-25.8	PK	50	1.86	RB 1 MHz;VB 3 MHz;Peak
4961.180	25.0	V	54.0	-29.0	Avg	29	1.17	RB 1 MHz;VB 3 kHz, Note 4
4960.910	48.6	V	74.0	-25.4	PK	29	1.17	RB 1 MHz;VB 3 MHz;Peak
7441.220	31.2	H	54.0	-22.8	Avg	69	2.50	RB 1 MHz;VB 3 kHz, Note 4
7438.300	54.5	H	74.0	-19.5	PK	69	2.50	RB 1 MHz;VB 3 MHz;Peak
1500.000	45.0	H	60.0	-15.0	Peak	246	1.5	Note 6
2000.000	40.2	V	60.0	-19.8	Peak	91	1.0	Note 6

Note:	Scans made between 12 - 25 GHz with the measurement antenna moved around the EUT 30cm from the device indicated there were no significant emissions in this frequency range.
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Test Specific Details

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

General Test Configuration

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

Ambient Conditions:

Temperature: 17-21 °C
Rel. Humidity: 38-45 %

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.

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Summary of Results

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
20MHz Bandwith Modes							
4	a	1, 36 & 149 Wi-Fi 37 - BLE	20 / 14 / 20 / 8	20 / 14 / 20 / 8	Band Edge 5725 MHz	15E	58.0 dBµV/m @ 5937.0 MHz (-10.3 dB)
	a	1, 48 & 165 Wi-Fi 37 - BLE	20 / 14 / 20 / 8	20 / 14 / 20 / 8	Band Edge 5850MHz	15E	57.4 dBµV/m @ 5933.1 MHz (-10.9 dB)
8	ax20	1, 36 & 149 Wi-Fi 37 - BLE	20 / 14.5 / 20 / 8	20 / 14.5 / 20 / 8	Band Edge 5725 MHz	15E	57.4 dBµV/m @ 5628.9 MHz (-10.9 dB)
	ax20	1, 48 & 165 Wi-Fi 37 - BLE	20 / 14 / 20 / 8	20 / 14 / 20 / 8	Band Edge 5850MHz	15E	58.1 dBµV/m @ 5933.1 MHz (-10.2 dB)
40MHz Bandwith Modes							
12	ax40	1, 38 & 151 Wi-Fi 37 - BLE	20 / 15 / 19 / 8	20 / 15 / 19 / 8	Band Edge 5725 MHz	15E	64.0 dBµV/m @ 5636.7 MHz (-4.3 dB)
	ax40	1, 46 & 159 Wi-Fi 37 - BLE	20 / 15 / 20 / 8	20 / 15 / 20 / 8	Band Edge 5850MHz	15E	63.9 dBµV/m @ 5931.8 MHz (-4.4 dB)
80MHz Bandwith Modes							
16	ax80	1, 42, 155 Wi-Fi 37 - BLE	20 / 14 / 15.5 / 8	20 / 14 / 15.5 / 8	Band Edge 5725 MHz	15E	63.1 dBµV/m @ 5645.8 MHz (-5.2 dB)

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Procedure Comments:

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

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)	
BLE	1 Mb/s	0.65	Yes	0.424	1.9	3.8	2358	
11b	1 Mb/s	0.78	Yes	0.667	1.1	2.2	1499	2 kHz
11a	6 MB/s	0.92	Yes	1.437	0.3	0.7	696	1 kHz
ax20	MCS0	0.96	Yes	5.452	0.2	0.4	183	200 Hz
ax40	MCS0	0.96	Yes	5.297	0.2	0.4	189	200 Hz
ax80	MCS0	0.96	Yes	5.401	0.2	0.4	185	200 Hz

Sample Notes

Sample S/N: CNGXK9Y07
Driver: P5
Antenna: Integral

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 2:	Emission has a duty cycle ≥ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces (method AD of KDB 789033)
Note 3:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep,max hold 50*1/DC traces (method VB of KDB 789033)
Note 4:	Emission has a duty cycle < 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100*1/DC traces, measurement corrected by Pwr correction factor (method AD of KDB 789033)
Note 5:	Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements.

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

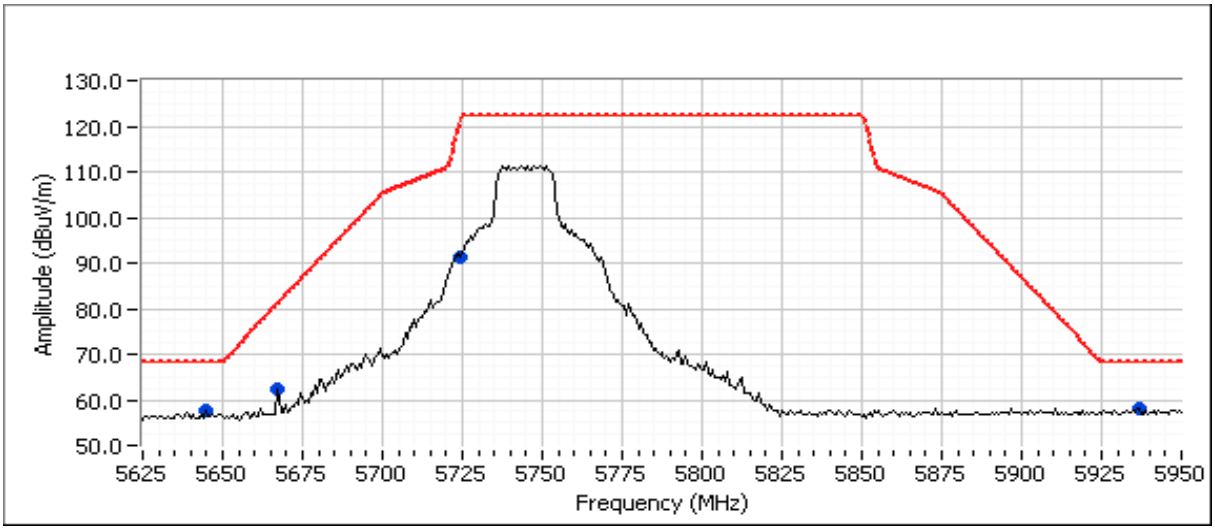
Run #4: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 02/14/19 Config. Used: 1
Test Engineer: Deniz Demirci Config Change: None
Test Location: Frement Chamber #7 EUT Voltage: PoE & 120V/ 60Hz

Mode,Channel, Chains, Data Rate,Power: b,1,4x4,1Mbps,20
Mode,Channel, Chains, Data Rate,Power: a,36,4x4,6Mbps,14.0
Mode,Channel, Chains, Data Rate,Power: a,149,4x4,6Mbps,20.0
Mode,Channel, Chains, Data Rate,Power: BLE,37,1x1,1Mbps,8

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5936.970	58.0	H	68.3	-10.3	PK	316	1.5	POS; RB 1 MHz; VB: 3 MHz
5644.540	57.8	V	68.3	-10.5	PK	277	1.0	POS; RB 1 MHz; VB: 3 MHz
5667.330	62.3	H	81.1	-18.8	PK	249	2.8	POS; RB 1 MHz; VB: 3 MHz
5724.650	91.4	V	121.5	-30.1	PK	285	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

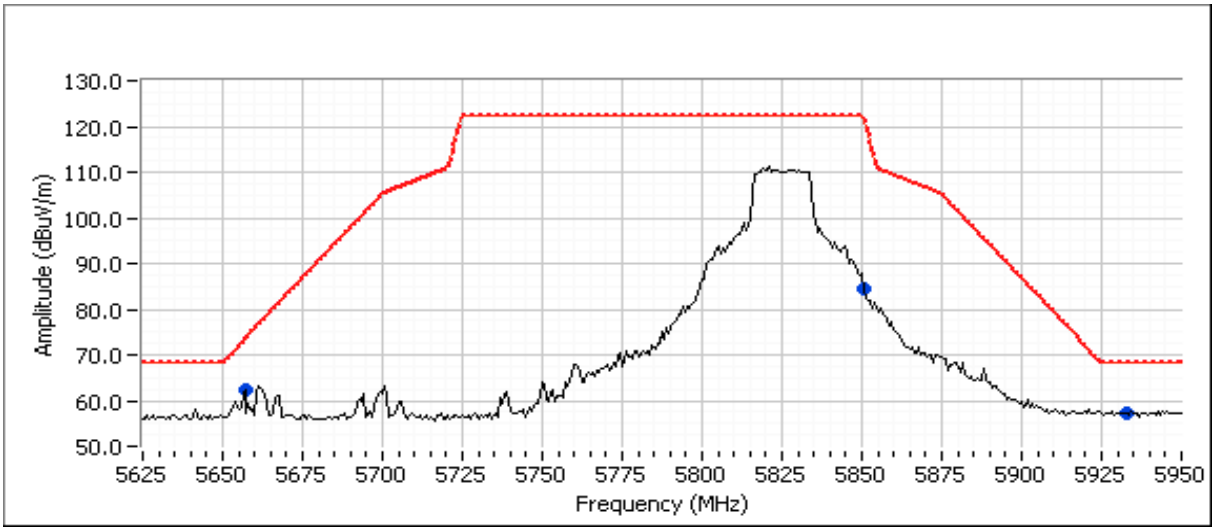
Date of Test: 02/14/19
Test Engineer: Deniz Demirci
Test Location: Frement Chamber #7

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

Mode,Channel, Chains, Data Rate,Power: b,1,4x4,1Mbps,20
Mode,Channel, Chains, Data Rate,Power: a,48,4x4,6Mbps,14.0
Mode,Channel, Chains, Data Rate,Power: a,165,4x4,6Mbps,20.0
Mode,Channel, Chains, Data Rate,Power: BLE,37,1x1,1Mbps,8

5850 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5933.070	57.4	H	68.3	-10.9	PK	172	2.0	POS; RB 1 MHz; VB: 3 MHz
5656.910	62.5	V	73.4	-10.9	PK	79	2.3	POS; RB 1 MHz; VB: 3 MHz
5850.350	84.4	V	121.5	-37.1	PK	38	1.5	POS; RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

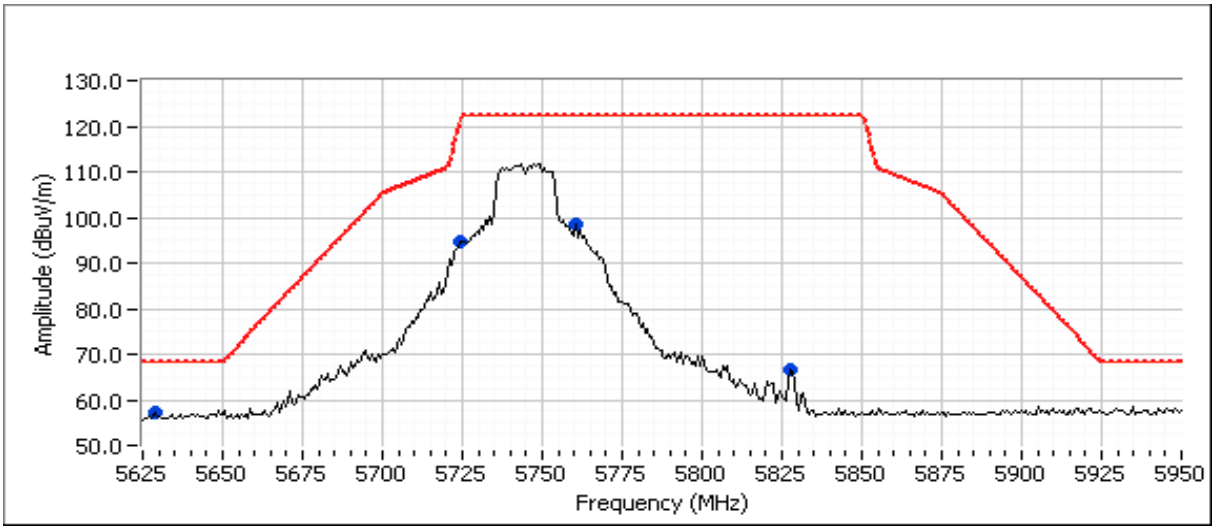
Run #8: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 01/15/19 Config. Used: 1
Test Engineer: Mehran Birgani Config Change: -
Test Location: Chamber #7 EUT Voltage: PoE and 120V/60Hz

Mode,Channel, Chains, Data Rate,Power: b,1,4x4,1Mbps,20
Mode,Channel, Chains, Data Rate,Power: ax20,36,4x4,MCS0,14.5
Mode,Channel, Chains, Data Rate,Power: ax20,149,4x4,MCS0,20
Mode,Channel, Chains, Data Rate,Power: BLE,37,1x1,1Mbps,8

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5628.910	57.4	V	68.3	-10.9	Pk	254	1.0	RB 1 MHz; VB: 3 MHz
5760.470	98.6	V	122.3	-23.7	Pk	292	1.5	RB 1 MHz; VB: 3 MHz
5724.650	94.7	V	121.5	-26.8	Pk	275	2.5	RB 1 MHz; VB: 3 MHz
5827.560	66.6	V	122.3	-55.7	Pk	213	2.0	RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

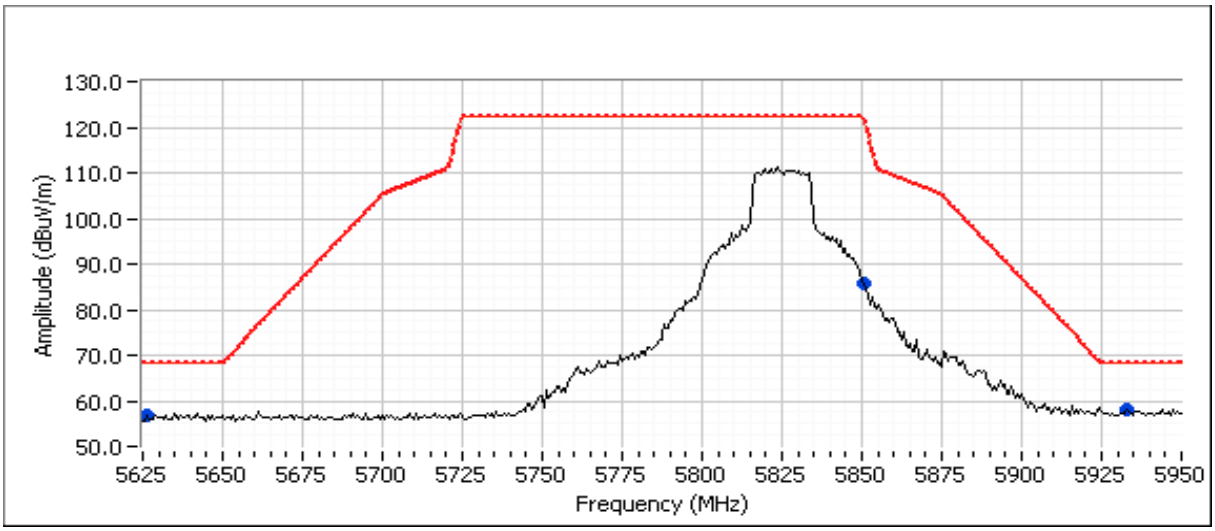
Date of Test: 01/15/19
Test Engineer: Mehran Birgani
Test Location: Chamber #7

Config. Used: 1
Config Change: -
EUT Voltage: PoE and 120V/60Hz

Mode,Channel, Chains, Data Rate,Power: b,1,4x4,1Mbps,20
Mode,Channel, Chains, Data Rate,Power: ax20,48,4x4,MCS0,14
Mode,Channel, Chains, Data Rate,Power: ax20,165,4x4,MCS0,20
Mode,Channel, Chains, Data Rate,Power: BLE,37,1x1,1Mbps,8

5850 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5933.070	58.1	V	68.3	-10.2	Pk	263	1.0	RB 1 MHz; VB: 3 MHz
5626.300	57.0	H	68.3	-11.3	Pk	273	3.0	RB 1 MHz; VB: 3 MHz
5850.350	85.8	V	121.5	-35.7	Pk	275	2.0	RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Date of Test: 01/15/19 Config. Used: 1

Test Engineer: Mehran Birgani Config Change: -

Test Location: Chamber #7 EUT Voltage: PoE and 120V/60Hz

Mode,Channel, Chains, Data Rate,Power: b,1,4x4,1Mbps,20

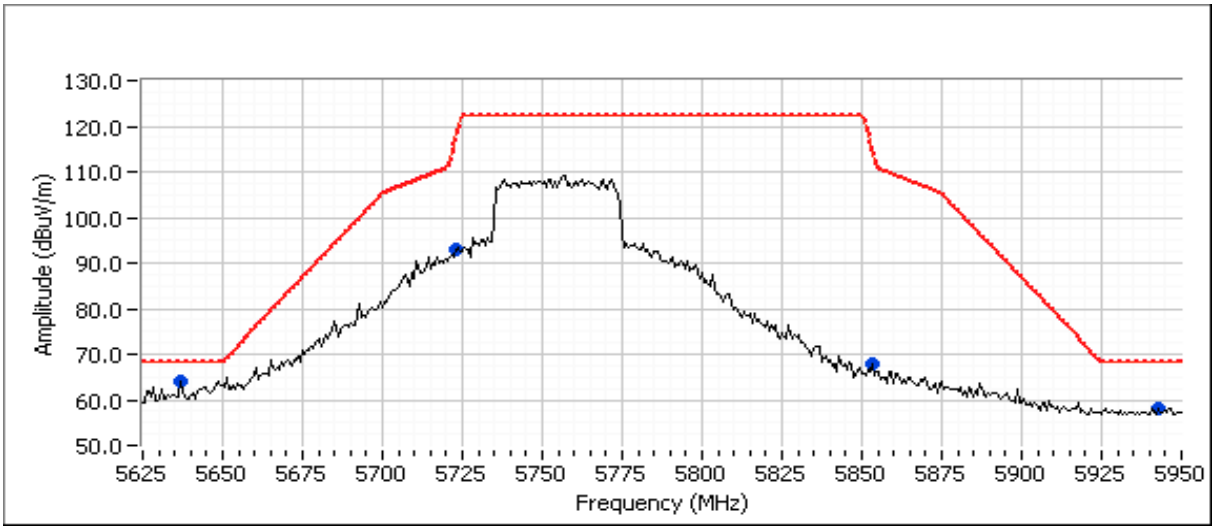
Mode,Channel, Chains, Data Rate,Power: ax40,38,4x4,MCS0,15

Mode,Channel, Chains, Data Rate,Power: ax40,151,4x4,MCS0,19

Mode,Channel, Chains, Data Rate,Power: BLE,37,1x1,1Mbps,8

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5636.720	64.0	V	68.3	-4.3	Pk	59	2.5	RB 1 MHz; VB: 3 MHz
5942.840	58.0	H	68.3	-10.3	Pk	220	2.5	RB 1 MHz; VB: 3 MHz
5723.350	92.8	V	118.5	-25.7	Pk	284	2.5	RB 1 MHz; VB: 3 MHz
5853.610	68.0	V	114.1	-46.1	Pk	290	2.5	RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

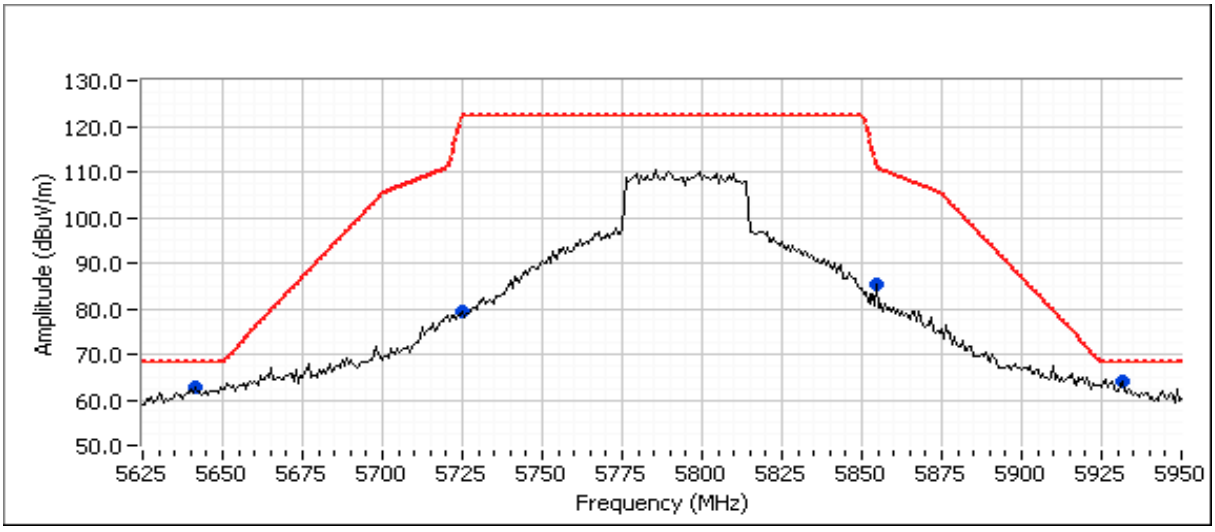
Date of Test: 01/15/19
Test Engineer: Mehran Birgani
Test Location: Chamber #7

Config. Used: 1
Config Change: -
EUT Voltage: PoE and 120V/60Hz

Mode,Channel, Chains, Data Rate,Power: b,1,4x4,1Mbps,20
Mode,Channel, Chains, Data Rate,Power: ax40,46,4x4,MCS0,15
Mode,Channel, Chains, Data Rate,Power: ax40,159,4x4,MCS0,20
Mode,Channel, Chains, Data Rate,Power: BLE,37,1x1,1Mbps,8

5850 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5931.760	63.9	V	68.3	-4.4	Pk	276	1.8	RB 1 MHz; VB: 3 MHz
5641.280	62.7	V	68.3	-5.6	Pk	288	1.8	RB 1 MHz; VB: 3 MHz
5854.910	85.2	V	111.1	-25.9	Pk	280	2.5	RB 1 MHz; VB: 3 MHz
5725.300	79.5	V	122.3	-42.8	Pk	273	2.3	RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Date of Test: 01/15/19 Config. Used: 1

Test Engineer: Mehran Birgani Config Change: -

Test Location: Chamber #7 EUT Voltage: PoE and 120V/60Hz

Mode,Channel, Chains, Data Rate,Power: b,1,4x4,1Mbps,20

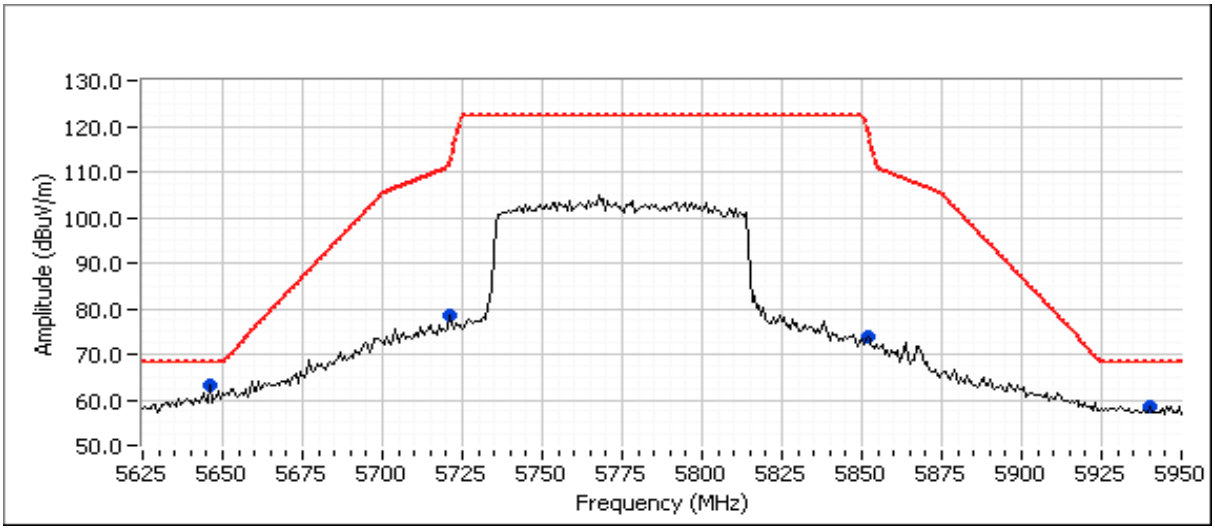
Mode,Channel, Chains, Data Rate,Power: ax80,42,4x4,MCS0,14.0

Mode,Channel, Chains, Data Rate,Power: ax80,155,4x4,MCS0,15.5

Mode,Channel, Chains, Data Rate,Power: BLE,37,1x1,1Mbps,8

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5645.840	63.1	V	68.3	-5.2	PK	293	1.8	RB 1 MHz; VB: 3 MHz
5940.230	58.5	H	68.3	-9.8	PK	106	1.8	RB 1 MHz; VB: 3 MHz
5720.740	78.3	V	112.6	-34.3	PK	300	1.8	RB 1 MHz; VB: 3 MHz
5851.650	73.8	V	118.5	-44.7	PK	284	2.5	RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

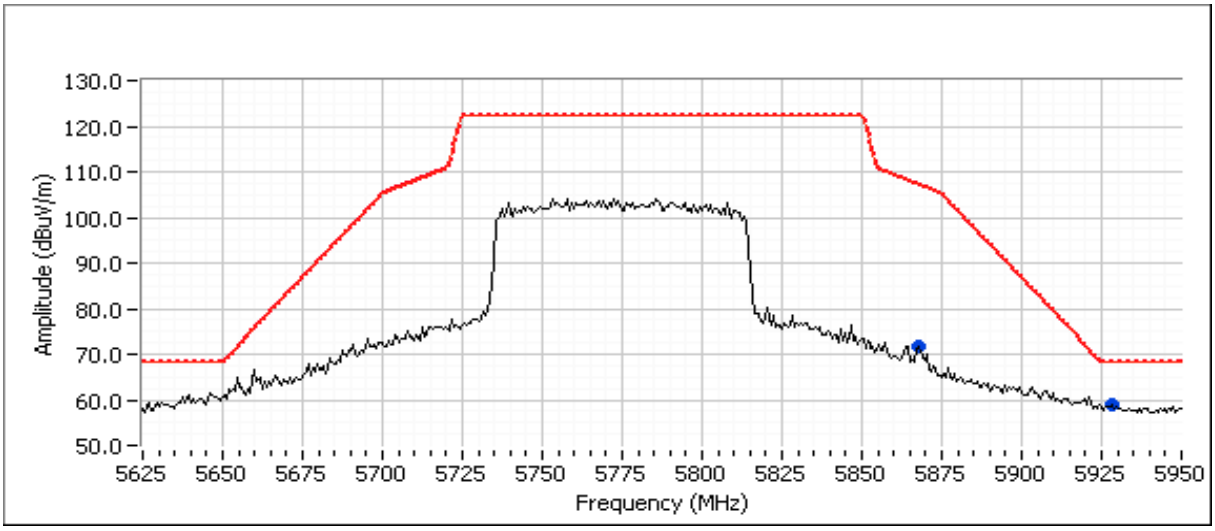
Date of Test: 01/15/19
Test Engineer: Mehran Birgani
Test Location: Chamber #7

Config. Used: 1
Config Change: -
EUT Voltage: PoE and 120V/60Hz

Mode,Channel, Chains, Data Rate,Power: b,1,4x4,1Mbps,20
Mode,Channel, Chains, Data Rate,Power: ax80,42,4x4,MCS0,14.5
Mode,Channel, Chains, Data Rate,Power: ax80,155,4x4,MCS0,15.5
Mode,Channel, Chains, Data Rate,Power: BLE,37,1x1,1Mbps,8

5850 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5928.510	*58.8*	*V*	*68.3*	-9.5	PK	*278*	*2.5*	RB 1 MHz; VB: 3 MHz
5867.940	*71.5*	*V*	*107.3*	-35.8	PK	*292*	*2.5*	RB 1 MHz; VB: 3 MHz



Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

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

Test Specific Details

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

General Test Configuration

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

Ambient Conditions:

Temperature: 18-22 °C
Rel. Humidity: 38-43 %

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.

Summary of Results

Run #	Mode	Channel	Power Setting		Test Performed	Limit	Result / Margin
Scans on closest 5 GHz channels in all four OFDM modes to determine the worst case mode (4x4 in lower 5 GHz bands, 4x4 in upper 5GHz bands and 4x4 in 2.4 GHz band)							
3	b , a BLE	1, 48 & 149 Wi-Fi 37 - BLE	20, 20, 8		Radiated Emissions, 1 - 40 GHz	FCC 15.209/ 15.247 / 15 E	42.1 dBµV/m @ 4803.9 MHz (-11.9 dB)
	b, ax20, BLE	1, 48 & 149 Wi-Fi 37 - BLE	20, 20, 8		Radiated Emissions, 1 - 40 GHz	FCC 15.209/ 15.247 / 15 E	38.9 dBµV/m @ 4804.0 MHz (-15.1 dB)
	b, ax40, BLE	1, 46 & 151 Wi-Fi 37 - BLE	20, 20, 8		Radiated Emissions, 1 - 40 GHz	FCC 15.209/ 15.247 / 15 E	42.3 dBµV/m @ 4804.0 MHz (-11.7 dB)
	b, ax80, BLE	1, 42 & 155 Wi-Fi 37 - BLE	20, 20, 8		Radiated Emissions, 1 - 40 GHz	FCC 15.209/ 15.247 / 15 E	42.1 dBµV/m @ 4804.0 MHz (-11.9 dB)

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #	Mode	Channel	Power Setting		Test Performed	Limit	Result / Margin
40MHz - Worse case from Run #3							
4	b, ax40, BLE	1, 38 & 159 Wi-Fi 37 - BLE	20, 20, 8		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	44.3 dBµV/m @ 7205.4 MHz (-9.7 dB)
	b, ax40, BLE	1, 40 & 157 Wi-Fi 37 - BLE	20, 20, 8				42.6 dBµV/m @ 7205.7 MHz (-11.4 dB)

Procedure Comments:

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

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)	
BLE	1 Mb/s	0.65	Yes	0.424	1.9	3.8	2358	
11b	1 Mb/s	0.78	Yes	0.667	1.1	2.2	1499	2 kHz
11a	6 MB/s	0.92	Yes	1.437	0.3	0.7	696	1 kHz
ax20	MCS0	0.96	Yes	5.452	0.2	0.4	183	200 Hz
ax40	MCS0	0.96	Yes	5.297	0.2	0.4	189	200 Hz
ax80	MCS0	0.96	Yes	5.401	0.2	0.4	185	200 Hz

Sample Notes

Sample S/N: CNGXK9Y07
Driver: P5
Antenna: Integral

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 2) c) (i), compliance can be demonstrated by meeting the average and peak limits of 15.209, as an alternative.
Note 3:	Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep,max hold 50*1/DC traces (method VB of KDB 789033)
Note 5:	Digital device emission, class A limit extrapolated to 3m applied, peak reading vs peak or average limit.

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

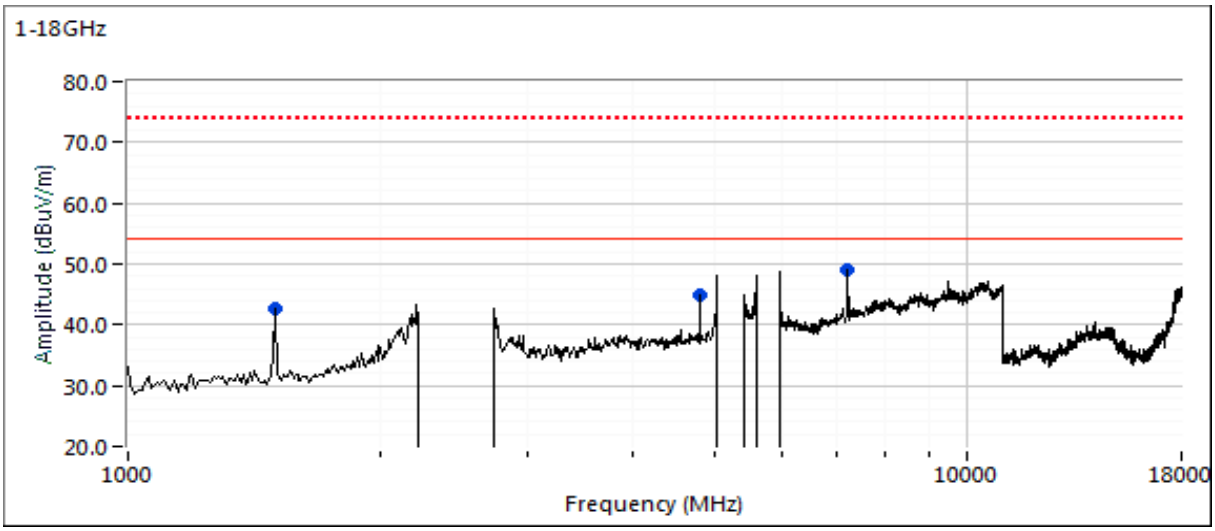
Run #3, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5470-5850 MHz Bands

Date of Test: 2/19/2019 Config. Used: 1
Test Engineer: Deniz Demirci Config Change: None
Test Location: Fremont Chamber #5 EUT Voltage: POE & 120 V, 60 Hz

Run #3a: Low and High Channels

Mode,Channel, Chains, Data Rate,Power: b,1,4x4,1Mbps,20
Mode,Channel, Chains, Data Rate,Power: a,48,4x4,6Mbps,20
Mode,Channel, Chains, Data Rate,Power: a,149,4x4,6Mbps,20
Mode,Channel, Chains, Data Rate,Power: BLE,37,1x1,1Mbps,8

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4803.880	42.1	H	54.0	-11.9	AVG	224	1.0	RB 1 MHz;VB 1 kHz; Note 3
7206.470	41.1	H	54.0	-12.9	AVG	224	1.0	RB 1 MHz;VB 1 kHz; Note 3
1500.000	42.7	V	60.0	-17.3	Peak	103	1.6	Note 6
7206.460	52.2	H	74.0	-21.8	PK	224	1.0	RB 1 MHz;VB 3 MHz;Peak
4804.260	50.0	H	74.0	-24.0	PK	224	1.0	RB 1 MHz;VB 3 MHz;Peak



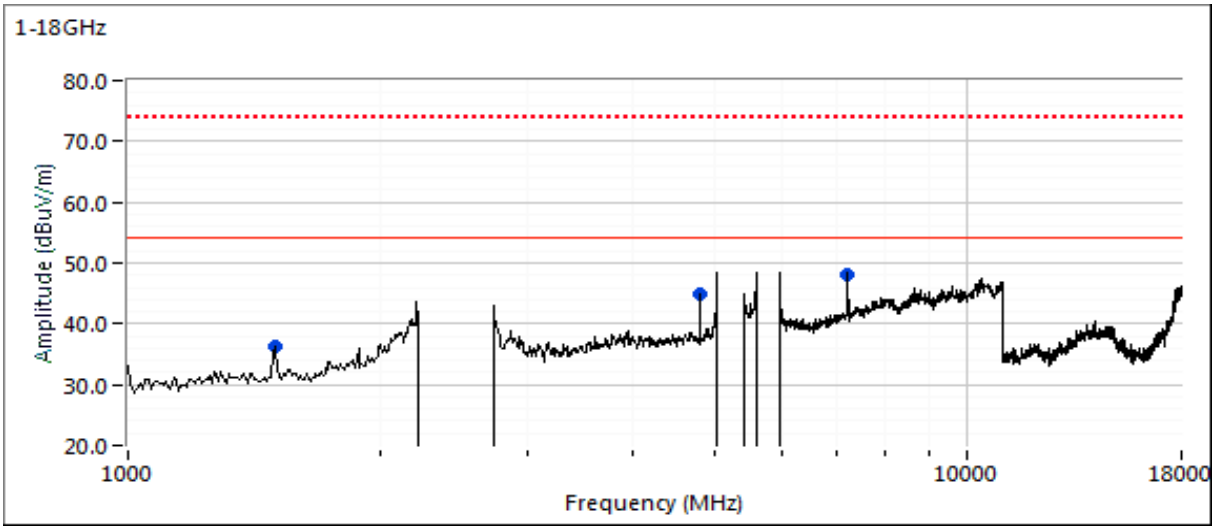
Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #3b: Low and High Channels

Mode,Channel, Chains, Data Rate,Power: b,1,4x4,1Mbps,20
Mode,Channel, Chains, Data Rate,Power: ax20,48,4x4,MCS0,20
Mode,Channel, Chains, Data Rate,Power: ax20,149,4x4,MCS0,20
Mode,Channel, Chains, Data Rate,Power: BLE,37,1x1,1Mbps,8

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4803.970	38.9	H	54.0	-15.1	AVG	230	1.0	RB 1 MHz;VB 1 kHz; Note 3
7206.320	38.8	V	54.0	-15.2	AVG	230	1.0	RB 1 MHz;VB 1 kHz; Note 3
7205.180	51.7	V	74.0	-22.3	PK	230	1.0	RB 1 MHz;VB 3 MHz;Peak
1500.000	36.2	V	60.0	-23.8	Peak	240	1.0	note 6
4804.310	49.4	H	74.0	-24.6	PK	230	1.0	RB 1 MHz;VB 3 MHz;Peak



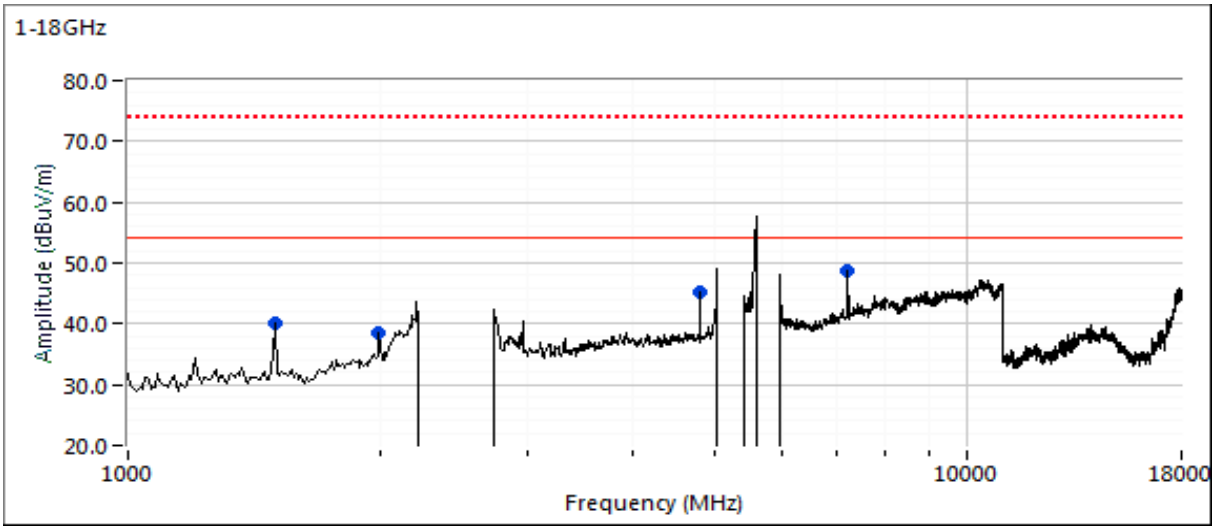
Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #3c: Low and High Channels

Mode,Channel, Chains, Data Rate,Power: b,1,4x4,1Mbps,20
Mode,Channel, Chains, Data Rate,Power: ax40,46,4x4,MCS0,20
Mode,Channel, Chains, Data Rate,Power: ax40,151,4x4,MCS0,20
Mode,Channel, Chains, Data Rate,Power: BLE,37,1x1,1Mbps,8

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4804.010	42.3	H	54.0	-11.7	AVG	225	2.1	RB 1 MHz;VB 1 kHz; Note 3
7205.720	41.6	V	54.0	-12.4	AVG	153	2.1	RB 1 MHz;VB 1 kHz; Note 3
1500.000	40.2	V	60.0	-19.8	Peak	273	1.0	note 6
7205.430	53.9	V	74.0	-20.1	PK	153	2.1	RB 1 MHz;VB 3 MHz;Peak
2000.000	38.6	H	60.0	-21.4	Peak	85	1.9	note 6
4803.550	51.7	H	74.0	-22.3	PK	225	2.1	RB 1 MHz;VB 3 MHz;Peak



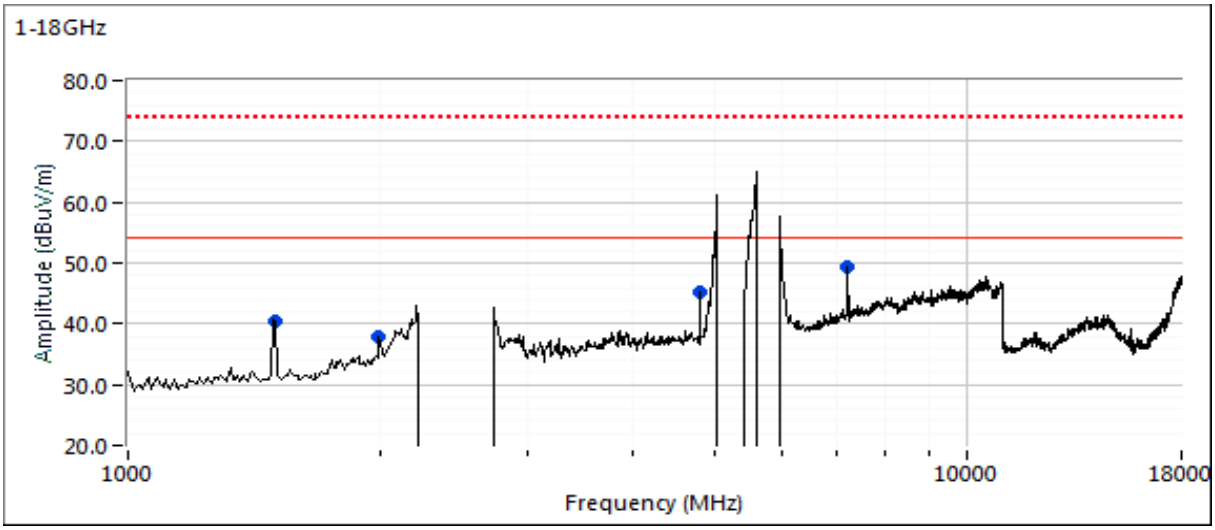
Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #3d: Low and High Channels

Mode,Channel, Chains, Data Rate,Power: b,1,4x4,1Mbps,20
Mode,Channel, Chains, Data Rate,Power: ax80,42,4x4,MCS0,20
Mode,Channel, Chains, Data Rate,Power: ax80,155,4x4,MCS0,20
Mode,Channel, Chains, Data Rate,Power: BLE,37,1x1,1Mbps,8

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4804.040	42.1	H	54.0	-11.9	AVG	224	2.2	RB 1 MHz;VB 1 kHz; Note 3
7205.570	41.6	H	54.0	-12.4	AVG	243	2.2	RB 1 MHz;VB 1 kHz; Note 3
1500.000	40.5	V	60.0	-19.5	Peak	273	1.0	note 6
7204.810	53.7	H	74.0	-20.3	PK	243	2.2	RB 1 MHz;VB 3 MHz;Peak
2000.000	37.8	V	60.0	-22.2	Peak	15	1.9	note 6
4804.520	51.4	H	74.0	-22.6	PK	224	2.2	RB 1 MHz;VB 3 MHz;Peak



Note:	Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

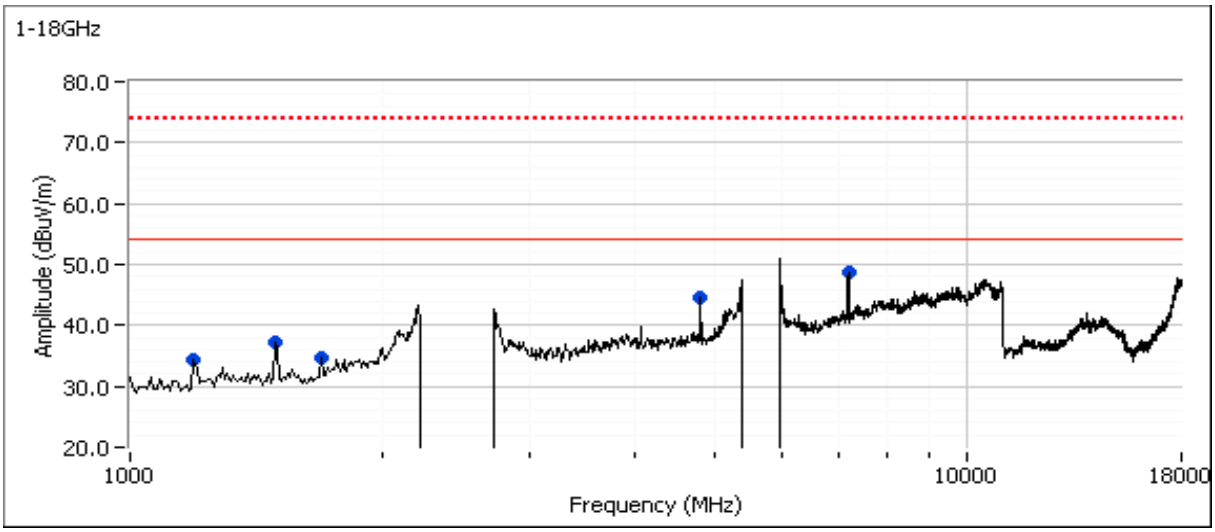
Run #4: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: Worse case from Run #3

Date of Test: 2/19/2019 Config. Used: 1
Test Engineer: Deniz Demirci Config Change: None
Test Location: Fremont Chamber #5 EUT Voltage: POE & 120 V, 60 Hz

Run #4a: High and Low Channels

Mode,Channel, Chains, Data Rate,Power: b,1,4x4,1Mbps,20
Mode,Channel, Chains, Data Rate,Power: ax40,38,4x4,MCS0,20
Mode,Channel, Chains, Data Rate,Power: ax40,159,4x4,MCS0,20
Mode,Channel, Chains, Data Rate,Power: BLE,37,1x1,1Mbps,8

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7205.440	44.3	V	54.0	-9.7	AVG	352	1.4	RB 1 MHz;VB 300 Hz; Note 3
4803.990	42.8	H	54.0	-11.2	AVG	38	2.1	RB 1 MHz;VB 300 Hz; Note 3
7205.440	53.7	V	74.0	-20.3	PK	352	1.4	RB 1 MHz;VB 3 MHz;Peak
4804.640	50.4	H	74.0	-23.6	PK	38	2.1	RB 1 MHz;VB 3 MHz;Peak
22851.920	32.6	H	54.0	-21.4	AVG	47	1.7	RB 1 MHz;VB 300 Hz; Note 3
22852.310	44.6	H	74.0	-29.4	PK	47	1.7	RB 1 MHz;VB 3 MHz;Peak

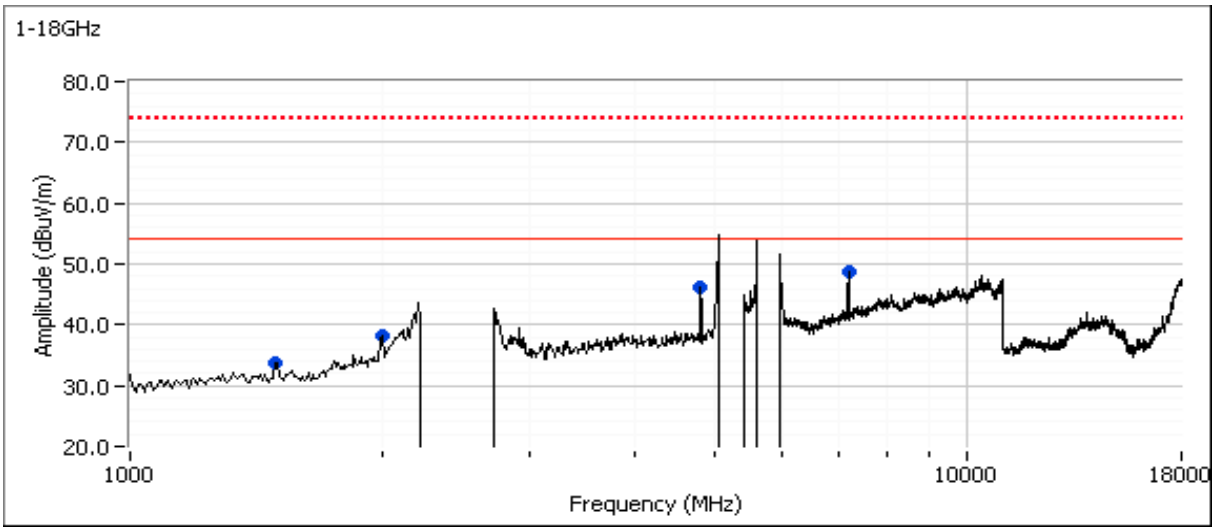


Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

Run #4b: Center Channels

Mode,Channel, Chains, Data Rate,Power: b,1,4x4,1Mbps,20
Mode,Channel, Chains, Data Rate,Power: ax20,40,4x4,MCS0,20
Mode,Channel, Chains, Data Rate,Power: ax20,157,4x4,MCS0,20
Mode,Channel, Chains, Data Rate,Power: BLE,37,1x1,1Mbps,8

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7205.690	42.6	V	54.0	-11.4	AVG	343	2.0	RB 1 MHz;VB 300 Hz; Note 3
4803.890	42.0	H	54.0	-12.0	AVG	38	2.0	RB 1 MHz;VB 300 Hz; Note 3
2000.000	*38.2*	*V*	*54.0*	*-15.8*	*Peak*	*316*	*1.0*	*Note 6*
22855.220	37.6	H	54.0	-16.4	AVG	0	1.6	RB 1 MHz;VB 300 Hz;Peak
7205.260	53.4	V	74.0	-20.6	PK	343	2.0	RB 1 MHz;VB 3 MHz;Peak
4803.970	51.1	H	74.0	-22.9	PK	38	2.0	RB 1 MHz;VB 3 MHz;Peak
22854.650	49.6	H	74.0	-24.4	PK	0	1.6	RB 1 MHz;VB 3 MHz;Peak



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

Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

Radiated 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: 11/6/2018
Test Engineer: John Caizzi
Test Location: Chamber #5

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

General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing. Any remote support equipment was located outside 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: 24 °C
Rel. Humidity: 40 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1a	Radiated Spurious Emissions 30 - 1000 MHz, WiFi	15.247 15E 15.209	Pass	36.8 dBµV/m @ 45.29 MHz (-3.2 dB)
1b			Pass	36.0 dBµV/m @ 43.61 MHz (-4.0 dB)
2a	Radiated Spurious Emissions 30 - 1000 MHz, BLE	15.247 15.209	Pass	36.6 dBµV/m @ 45.26 MHz (-3.4 dB)
2b			Pass	36.3 dBµV/m @ 43.61 MHz (-3.7 dB)
3a	Radiated Spurious Emissions 30 - 1000 MHz, Zigbee		Pass	36.2 dBµV/m @ 43.79 MHz (-3.8 dB)
3b			Pass	36.2 dBµV/m @ 43.65 MHz (-3.8 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

Sample Notes

Sample S/N: CNGFK9Y02N (BLE) & CNGFK9Y005 (Zigbee)

Run #1a, Radiated Spurious Emissions, 30 - 1000 MHz, Wi-Fi

Channel, Mode, Chain, Level: 6, g, 4, 20

Channel, Mode, Chain, Level: 40, a, 8, 20

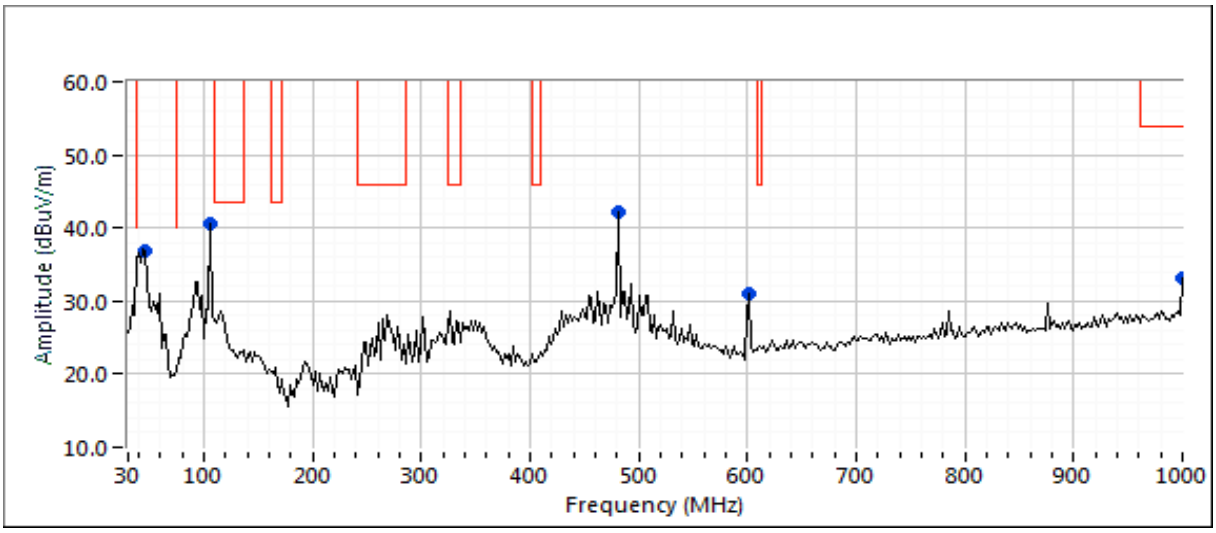
Preliminary peak readings captured during pre-scan (peak readings vs. QP limit)

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
45.286	36.9	V	40.0	-3.1	Peak	320	1.0	Note 1
105.731	40.7	V	43.5	-2.8	Peak	0	1.5	Note 1
480.057	42.2	V	46.0	-3.8	Peak	324	1.0	Note 1
600.019	30.9	V	46.0	-15.1	Peak	200	1.0	Note 1
1000.000	*33.1*	*H*	*54.0*	*-20.9*	*Peak*	*72*	*4.0*	

Final QP readings

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
45.286	36.8	V	40.0	-3.2	QP	325	1.00	Note 1
105.731	37.2	V	43.5	-6.3	QP	320	1.00	Note 1
480.057	37.5	V	46.0	-8.5	QP	301	1.16	Note 1
600.019	25.2	V	46.0	-20.8	QP	216	1.00	Note 1

Note 1	Emission in non-restricted band, but limit of 15.209 used.



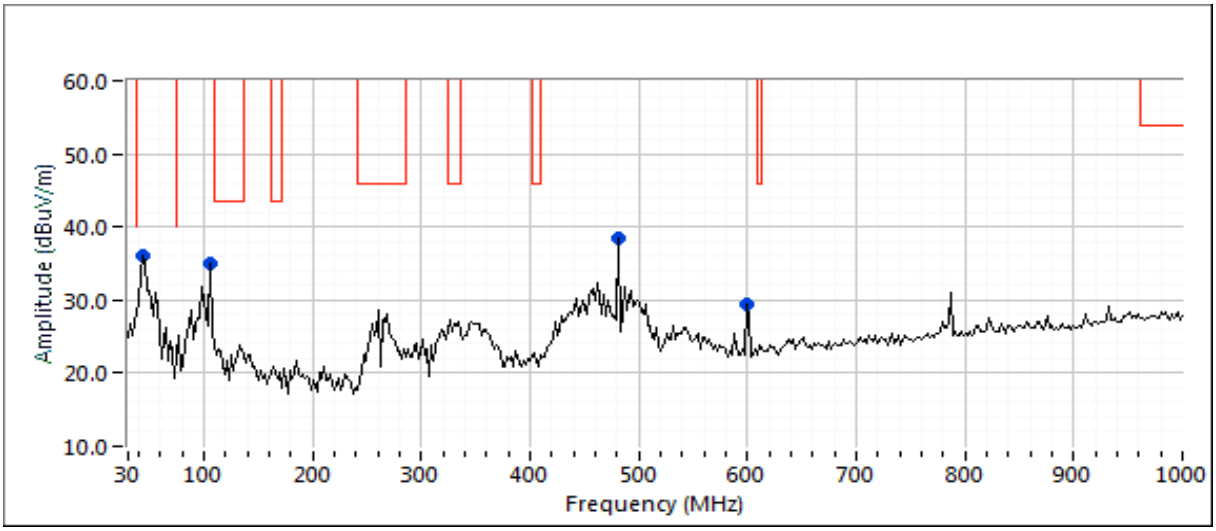
Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

Run #1b, Radiated Spurious Emissions, 30 - 1000 MHz, Wi-Fi
Channel, Mode, Chain, Level: 11, b, 4, 20
Channel, Mode, Chain, Level: 165, ax20, 8, 20

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

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
43.607	*36.0*	*V*	*40.0*	*-4.0*	*Peak*	*315*	*1.0*	*Note 1*
105.812	*35.0*	*V*	*43.5*	*-8.5*	*Peak*	*107*	*1.0*	*Note 1*
480.982	*38.5*	*H*	*46.0*	*-7.5*	*Peak*	*66*	*1.5*	*Note 1*
599.559	*29.5*	*H*	*46.0*	*-16.5*	*Peak*	*253*	*1.5*	*Note 1*

Note 1	Emission in non-restricted band, but limit of 15.209 used.
Note 2	Emissions were the same as run 1a, though the channels and modes were different. Therefore, it is likely that none of these emissions are radio signals. Testing on other channels in other modes was not done, since the emissions would not change.



Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

Run #2a, Radiated Spurious Emissions, 30 - 1000 MHz, BLE
Channel, Chain, Level: 37, 1, 8

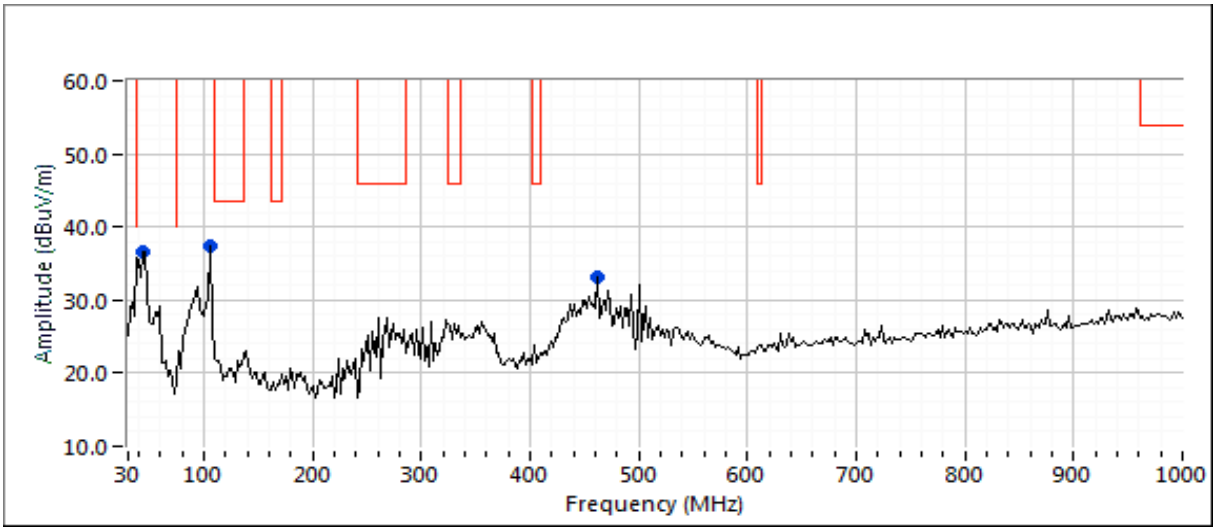
Preliminary peak readings captured during pre-scan (peak readings vs. QP limit)

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
45.263	36.7	V	40.0	-3.3	Peak	360	1.0	Note 1
105.750	37.4	V	43.5	-6.1	Peak	269	1.0	Note 1
460.832	33.1	V	46.0	-12.9	Peak	311	1.5	Note 1

Final QP readings

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
45.263	36.6	V	40.0	-3.4	QP	360	1.00	Note 1
105.750	37.6	V	43.5	-5.9	QP	322	1.04	Note 1
460.832	32.6	V	46.0	-13.4	QP	319	1.23	Note 1

Note 1	Emission in non-restricted band, but limit of 15.209 used.



Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

Run #2b, Radiated Spurious Emissions, 30 - 1000 MHz, BLE
Channel, Chain, Level: 39, 1, 8

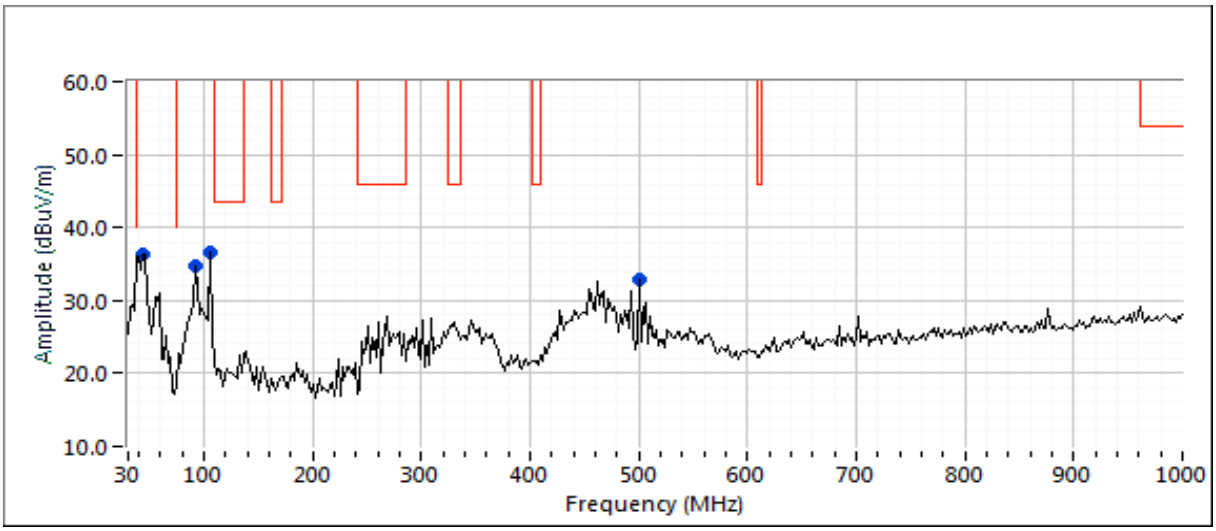
Preliminary peak readings captured during pre-scan (peak readings vs. QP limit)

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
43.607	*36.3*	*V*	*40.0*	*-3.7*	*Peak*	*274*	*1.0*	*Note 1*
92.357	34.8	V	43.5	-8.7	Peak	118	1.0	Note 1
105.812	*36.7*	*V*	*43.5*	*-6.8*	*Peak*	*291*	*1.0*	*Note 1*
499.196	33.0	V	46.0	-13.0	Peak	235	1.0	Note 1

Final QP readings

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
92.357	32.7	V	43.5	-10.8	QP	106	1.10	Note 1
499.196	33.6	V	46.0	-12.4	QP	227	1.00	Note 1

Note 1	Emission in non-restricted band, but limit of 15.209 used.
Note 2	Emissions were the same as run 2a, though the channel was different. Therefore, it is likely that none of these emissions are radio signals. Testing on the middle channel was not done, since the emissions would not change.



Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

Run #3a, Radiated Spurious Emissions, 30 - 1000 MHz, Zigbee
Channel, Chain, Level: 11, 1, 8

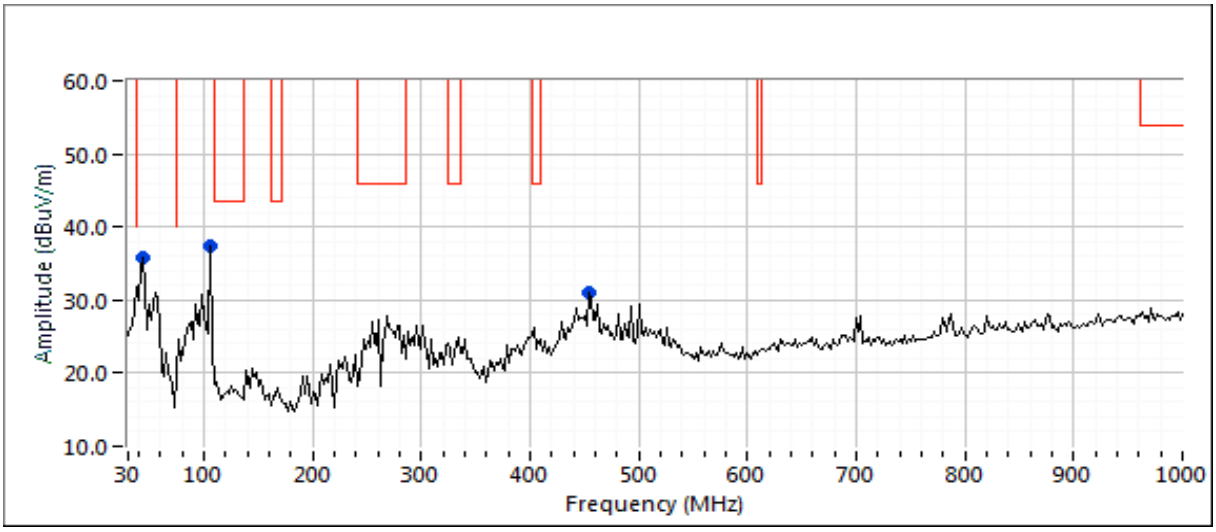
Preliminary peak readings captured during pre-scan (peak readings vs. QP limit)

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
43.791	35.8	V	40.0	-4.2	Peak	312	1.0	Note 1
105.724	37.5	V	43.5	-6.0	Peak	124	1.0	Note 1
454.415	30.9	V	46.0	-15.1	Peak	321	1.5	Note 1

Final QP readings

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
43.791	36.2	V	40.0	-3.8	QP	4	1.01	Note 1
105.724	37.5	V	43.5	-6.0	QP	79	1.01	Note 1
454.415	28.7	V	46.0	-17.3	QP	321	1.50	Note 1

Note 1	Emission in non-restricted band, but limit of 15.209 used.



Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

Run #3b, Radiated Spurious Emissions, 30 - 1000 MHz, Zigbee
Channel, Chain, Level: 26, 1, 8

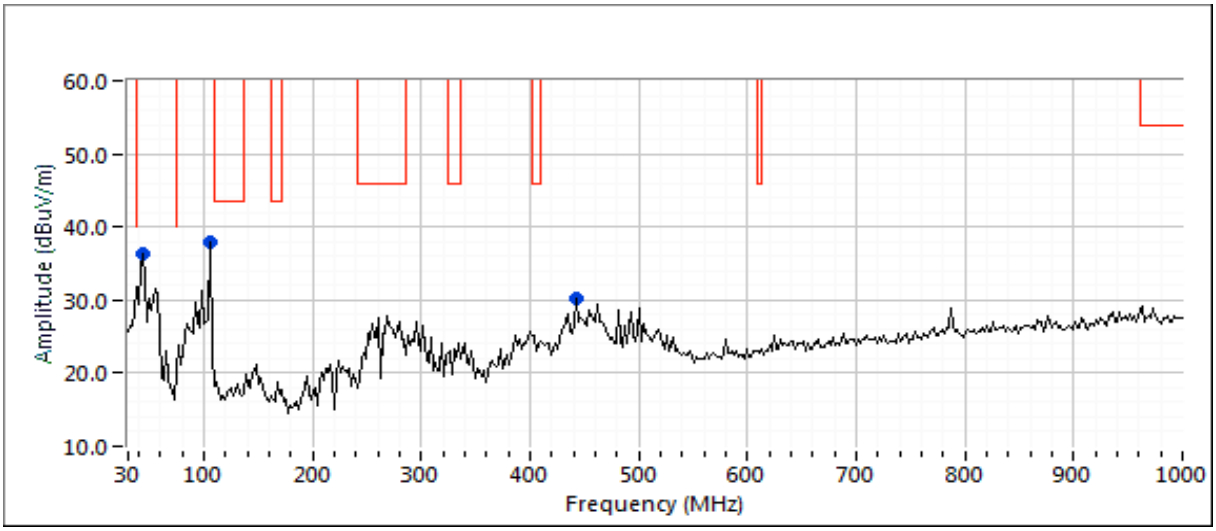
Preliminary peak readings captured during pre-scan (peak readings vs. QP limit)

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
43.607	*36.4*	*V*	*40.0*	*-3.6*	*Peak*	*329*	*1.0*	
105.812	*38.0*	*V*	*43.5*	*-5.5*	*Peak*	*89*	*1.0*	
442.104	*30.3*	*V*	*46.0*	*-15.7*	*Peak*	*305*	*1.0*	

Final QP readings

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
43.649	36.2	V	40.0	-3.8	QP	4	1.01	Note 1

Note 1	Emission in non-restricted band, but limit of 15.209 used.
Note 2	Emissions were the same as run 3a, though the channel was different. Therefore, it is likely that none of these emissions are radio signals. Testing on the middle channel was not done, since the emissions would not change.



Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

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: 11/5/2018
Test Engineer: John Caizzi
Test Location: Chamber 5

Config. Used: 1
Config Change: none
EUT Voltage: PoE & 110V / 60Hz, 220V / 60Hz, 230V / 50Hz

General Test Configuration

For tabletop equipment, the EUT and POE adapter were located on a wooden table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment. 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: 23-24 °C
Rel. Humidity: 35-38 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 110V/60Hz	EN 55032 Class B	Pass	38.5 dBµV @ 0.46 MHz (-8.3 dB)
2	CE, AC Power, 230V/50Hz	EN 55032 Class B	Pass	42.2 dBµV @ 0.50 MHz (-3.8 dB)
3	CE, AC Power, 220V/60Hz	EN 55032 Class B	Pass	41.5 dBµV @ 0.50 MHz (-4.5 dB)
4	CE, AC Power, PoE, 220V/60Hz	EN 55032 Class B	Pass	34.6 dBµV @ 0.45 MHz (-12.2 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

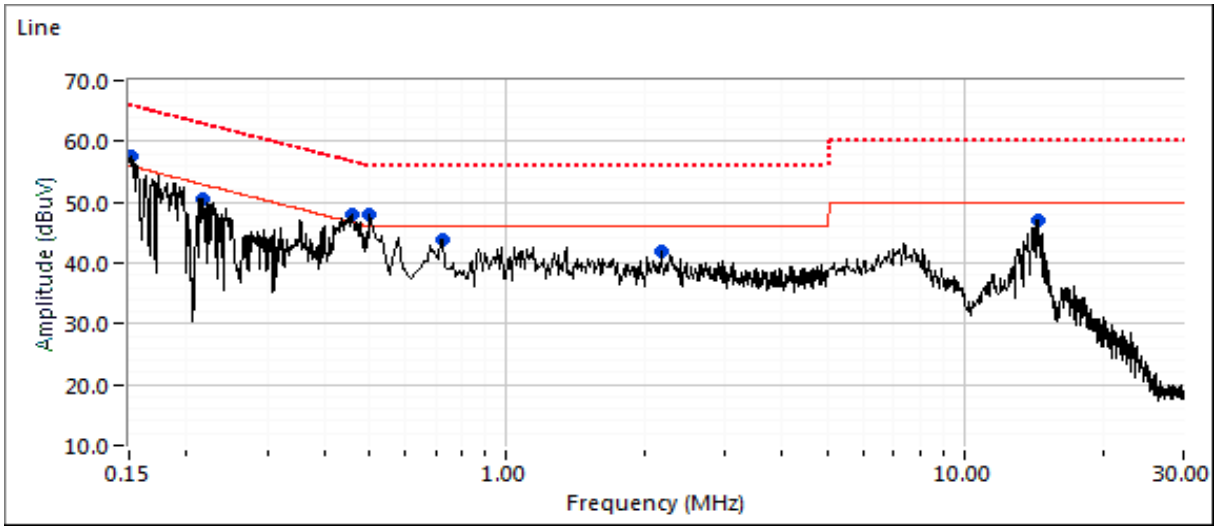
Deviations From The Standard

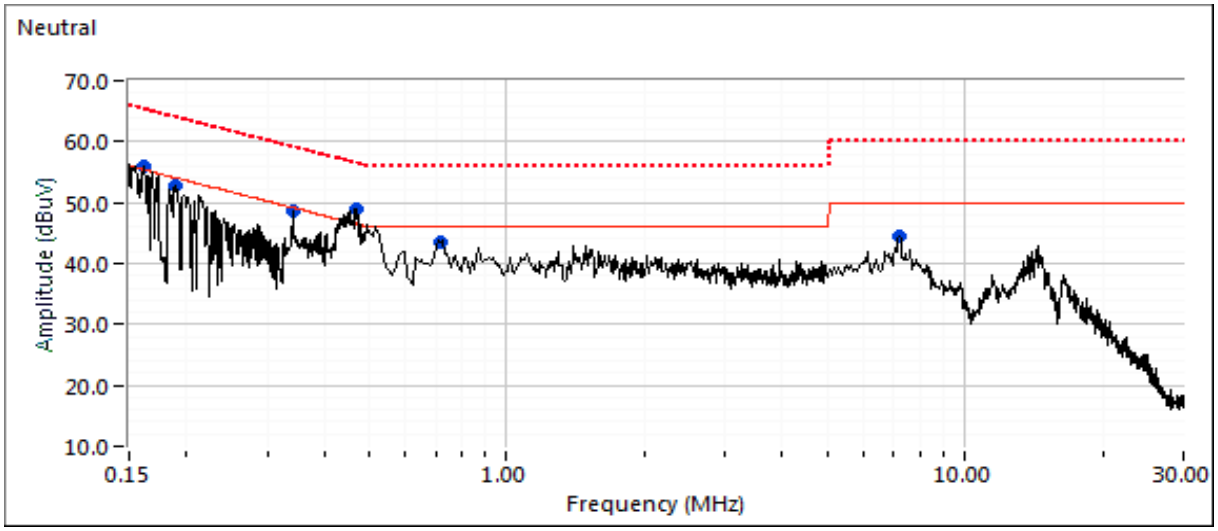
No deviations were made from the requirements of the standard.

Note: The unit was transmitting at 2412MHz in 802.11b mode and 5180MHz in 802.11a mode.

Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 110V/60Hz





Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

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

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.154	57.4	Line	55.9	1.5	Peak	
0.214	50.4	Line	52.9	-2.5	Peak	
0.455	47.9	Line	46.7	1.2	Peak	
0.499	48.0	Line	46.0	2.0	Peak	
0.721	43.7	Line	46.0	-2.3	Peak	
2.121	42.0	Line	46.0	-4.0	Peak	
14.502	46.9	Line	50.0	-3.1	Peak	
0.155	55.9	Neutral	55.4	0.5	Peak	
0.186	52.8	Neutral	54.1	-1.3	Peak	
0.348	48.6	Neutral	49.2	-0.6	Peak	
0.463	49.0	Neutral	46.5	2.5	Peak	
0.722	43.5	Neutral	46.0	-2.5	Peak	
7.115	44.5	Neutral	50.0	-5.5	Peak	

Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

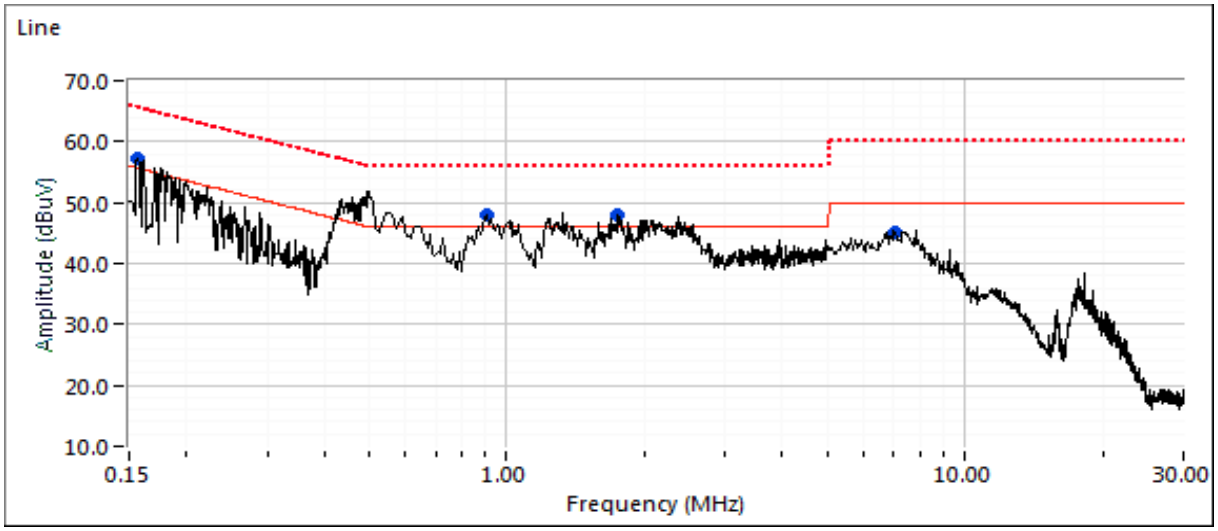
Final quasi-peak and average readings

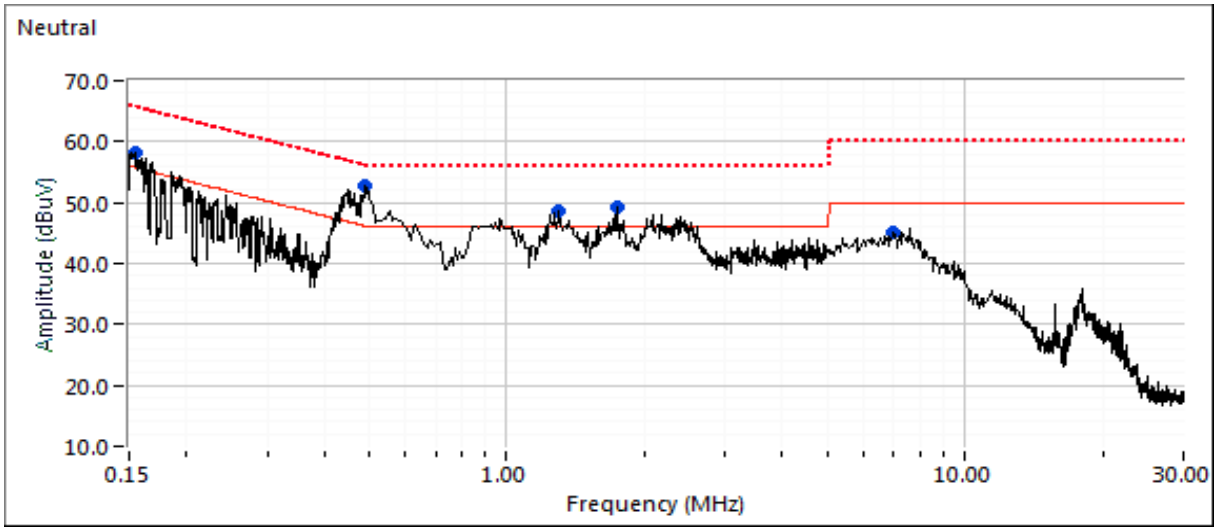
Frequency	Level	AC	Class B		Detector	Comments
MHz	dBμV	Line	Limit	Margin	QP/Ave	
0.455	38.5	Line	46.8	-8.3	AVG	
0.154	33.5	Line	55.8	-22.3	AVG	
0.154	49.7	Line	65.8	-16.1	QP	
0.214	20.8	Line	53.1	-32.3	AVG	
0.214	43.2	Line	63.1	-19.9	QP	
0.455	38.5	Line	46.8	-8.3	AVG	
0.455	45.4	Line	56.8	-11.4	QP	
0.499	35.6	Line	46.0	-10.4	AVG	
0.499	43.2	Line	56.0	-12.8	QP	
0.721	34.6	Line	46.0	-11.4	AVG	
0.721	41.2	Line	56.0	-14.8	QP	
2.121	29.9	Line	46.0	-16.1	AVG	
2.121	36.2	Line	56.0	-19.8	QP	
14.502	31.5	Line	50.0	-18.5	AVG	
14.502	39.3	Line	60.0	-20.7	QP	
0.155	32.8	Neutral	55.7	-22.9	AVG	
0.155	49.5	Neutral	65.7	-16.2	QP	
0.186	27.0	Neutral	54.2	-27.2	AVG	
0.186	46.0	Neutral	64.2	-18.2	QP	
0.348	34.4	Neutral	49.0	-14.6	AVG	
0.348	41.7	Neutral	59.0	-17.3	QP	
0.463	37.4	Neutral	46.6	-9.2	AVG	
0.463	44.8	Neutral	56.6	-11.8	QP	
0.722	35.6	Neutral	46.0	-10.4	AVG	
0.722	41.7	Neutral	56.0	-14.3	QP	
7.115	31.4	Neutral	50.0	-18.6	AVG	
7.115	37.1	Neutral	60.0	-22.9	QP	

Note 1:	
Note 2:	

Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz





Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

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

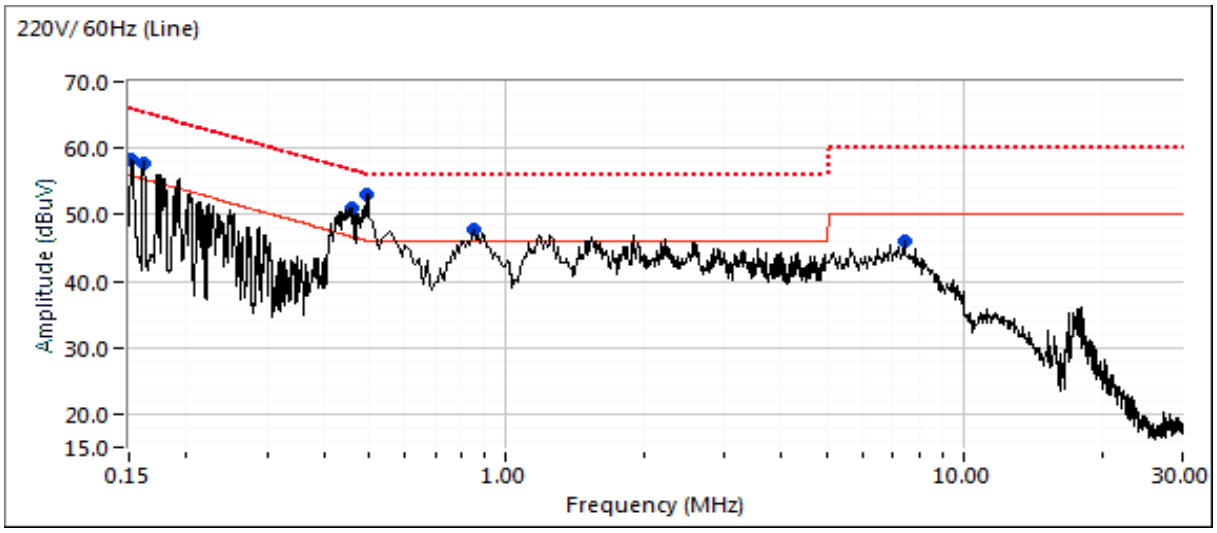
Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.150	57.3	Line	55.6	1.7	Peak	
0.497	51.9	Line	46.0	5.9	Peak	
0.904	48.0	Line	46.0	2.0	Peak	
1.680	47.9	Line	46.0	1.9	Peak	
7.310	45.0	Line	50.0	-5.0	Peak	
0.152	58.1	Neutral	55.8	2.3	Peak	
0.492	52.7	Neutral	46.2	6.5	Peak	
1.359	48.7	Neutral	46.0	2.7	Peak	
1.747	49.1	Neutral	46.0	3.1	Peak	
7.071	45.2	Neutral	50.0	-4.8	Peak	

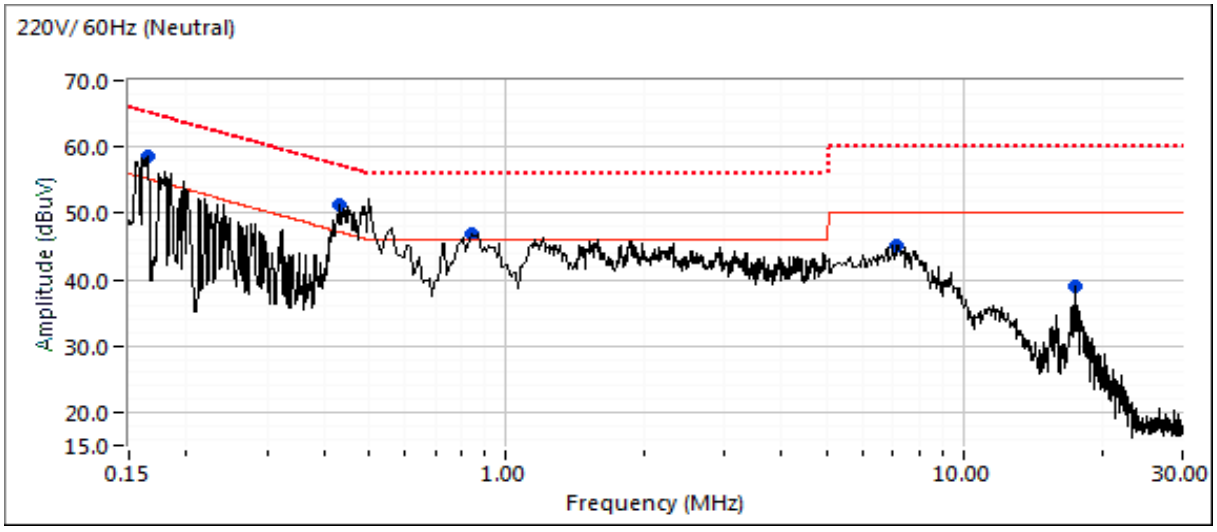
Final quasi-peak and average readings

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.150	36.9	Line	56.0	-19.1	AVG	
0.150	51.4	Line	66.0	-14.6	QP	
0.497	42.2	Line	46.0	-3.8	AVG	
0.497	49.5	Line	56.0	-6.5	QP	
0.904	37.0	Line	46.0	-9.0	AVG	
0.904	43.6	Line	56.0	-12.4	QP	
1.680	37.5	Line	46.0	-8.5	AVG	
1.680	44.0	Line	56.0	-12.0	QP	
7.310	34.8	Line	50.0	-15.2	AVG	
7.310	40.9	Line	60.0	-19.1	QP	
0.152	35.4	Neutral	55.9	-20.5	AVG	
0.152	51.0	Neutral	65.9	-14.9	QP	
0.492	42.3	Neutral	46.1	-3.8	AVG	
0.492	50.0	Neutral	56.1	-6.1	QP	
1.359	38.0	Neutral	46.0	-8.0	AVG	
1.359	43.8	Neutral	56.0	-12.2	QP	
1.747	37.7	Neutral	46.0	-8.3	AVG	
1.747	43.6	Neutral	56.0	-12.4	QP	
7.071	34.7	Neutral	50.0	-15.3	AVG	
7.071	40.6	Neutral	60.0	-19.4	QP	

Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

Run #3: AC Power Port Conducted Emissions, 0.15 - 30MHz, 220V/60Hz





Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

Run #3: AC Power Port Conducted Emissions, 0.15 - 30MHz, 220V/60Hz

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

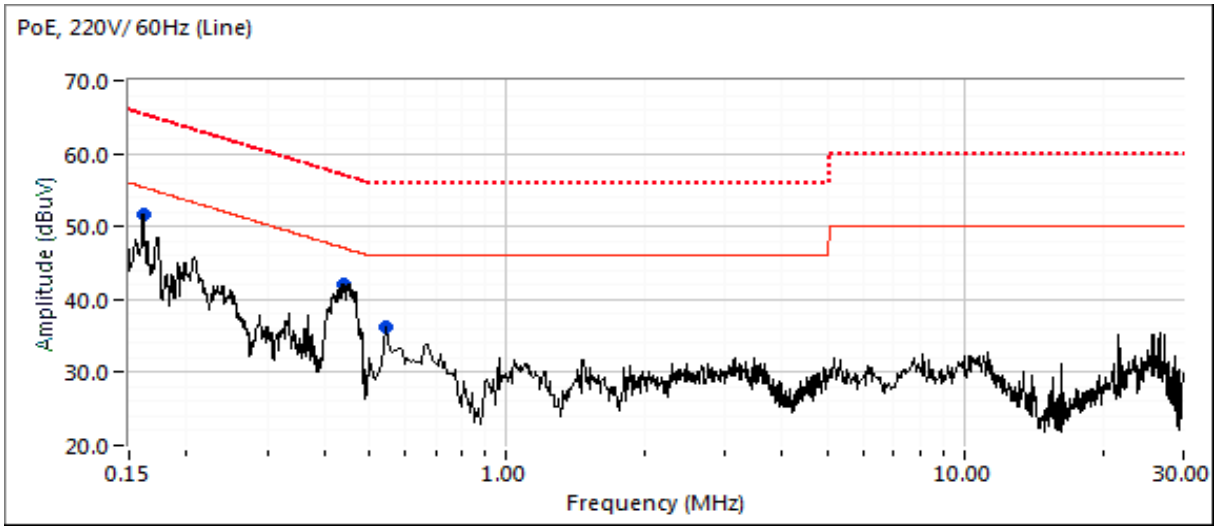
Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.498	53.1	Line	46.0	7.1	Peak	
0.500	51.6	Neutral	46.0	5.6	Peak	
0.457	51.0	Line	46.7	4.3	Peak	
0.432	51.4	Neutral	47.2	4.2	Peak	
0.500	49.5	Line	46.0	3.5	Peak	
0.163	58.5	Neutral	55.2	3.3	Peak	
0.152	58.4	Line	55.9	2.5	Peak	
0.160	57.8	Line	55.4	2.4	Peak	
0.866	46.8	Neutral	46.0	0.8	Peak	
7.400	45.9	Line	50.0	-4.1	Peak	
7.245	45.2	Neutral	50.0	-4.8	Peak	
17.510	39.1	Neutral	50.0	-10.9	Peak	

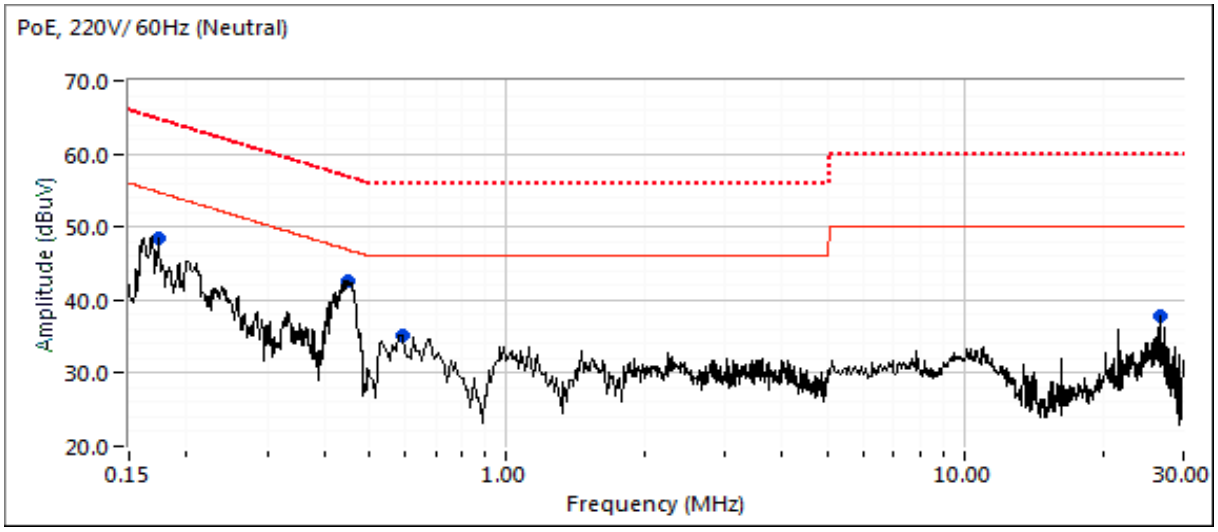
Final quasi-peak and average readings

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.498	41.5	Line	46.0	-4.5	AVG	AVG (0.10s)
0.500	41.5	Line	46.0	-4.5	AVG	AVG (0.10s)
0.500	41.4	Neutral	46.0	-4.6	AVG	AVG (0.10s)
0.498	50.1	Line	56.0	-5.9	QP	QP (1.00s)
0.500	49.8	Neutral	56.0	-6.2	QP	QP (1.00s)
0.500	49.6	Line	56.0	-6.4	QP	QP (1.00s)
0.432	40.7	Neutral	47.2	-6.5	AVG	AVG (0.10s)
0.457	39.7	Line	46.8	-7.1	AVG	AVG (0.10s)
0.866	37.2	Neutral	46.0	-8.8	AVG	AVG (0.10s)
0.457	47.7	Line	56.8	-9.1	QP	QP (1.00s)
0.432	48.1	Neutral	57.2	-9.1	QP	QP (1.00s)
0.866	44.3	Neutral	56.0	-11.7	QP	QP (1.00s)
0.152	52.6	Line	65.9	-13.3	QP	QP (1.00s)
0.160	51.5	Line	65.4	-13.9	QP	QP (1.00s)
0.163	51.2	Neutral	65.3	-14.1	QP	QP (1.00s)
7.245	34.0	Neutral	50.0	-16.0	AVG	AVG (0.10s)
7.245	40.5	Neutral	60.0	-19.5	QP	QP (1.00s)
0.152	35.0	Line	55.9	-20.9	AVG	AVG (0.10s)
0.160	30.6	Line	55.4	-24.8	AVG	AVG (0.10s)
0.163	30.4	Neutral	55.3	-24.9	AVG	AVG (0.10s)

Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

Run #4: PoE AC Power Port Conducted Emissions, 0.15 - 30MHz, 220V/60Hz





Client:	Aruba, a Hewlett Packard Enterprise company	PR Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
		Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Engineer:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	Enter on cover sheet

Run #3: AC Power Port Conducted Emissions, 0.15 - 30MHz, 220V/60Hz

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

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.160	51.6	Line	55.4	-3.8	Peak	
0.453	42.7	Neutral	46.8	-4.1	Peak	
0.444	42.1	Line	47.0	-4.9	Peak	
0.174	48.5	Neutral	54.8	-6.3	Peak	
0.549	36.3	Line	46.0	-9.7	Peak	
0.583	35.2	Neutral	46.0	-10.8	Peak	
26.611	37.7	Neutral	50.0	-12.3	Peak	

Final quasi-peak and average readings

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.453	34.6	Neutral	46.8	-12.2	AVG	AVG (0.10s)
0.444	34.6	Line	47.0	-12.4	AVG	AVG (0.10s)
0.453	41.2	Neutral	56.8	-15.6	QP	QP (1.00s)
0.444	41.4	Line	57.0	-15.6	QP	QP (1.00s)
26.611	31.0	Neutral	50.0	-19.0	AVG	AVG (0.10s)
0.160	36.4	Line	55.5	-19.1	AVG	AVG (0.10s)
0.160	45.3	Line	65.5	-20.2	QP	QP (1.00s)
0.174	34.0	Neutral	54.8	-20.8	AVG	AVG (0.10s)
0.583	25.0	Neutral	46.0	-21.0	AVG	AVG (0.10s)
0.549	33.9	Line	56.0	-22.1	QP	QP (1.00s)
0.174	41.4	Neutral	64.8	-23.4	QP	QP (1.00s)
0.583	32.6	Neutral	56.0	-23.4	QP	QP (1.00s)
0.549	20.9	Line	46.0	-25.1	AVG	AVG (0.10s)
26.611	34.9	Neutral	60.0	-25.1	QP	QP (1.00s)

End of Report

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