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# EMC Test Report

# Application for FCC Grant of Equipment Authorization Canada Certification Class II Permissive Change/Reassessment

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

# Model: APIN0555

IC CERTIFICATION #: FCC ID:	4675A-APIN0555 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-4 and 2845B-7
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# **REVISION HISTORY**

Rev#	Date	Comments	Modified By
-	July 2, 2020	First release	
1	July 28, 2020	Added plots for power and bandwidth	dwb



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#### 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:

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ANSI C63.10-2013
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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 sample 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 sample. The sample was selected and prepared by Tian Wang-Mendez 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) (ii)	Output Power	ax80+80: 103.0 mW	30 dBm EIRP <= 4W	Complies
15.407 (a) (1) (i), (ii) or (iii)	Power Spectral Density	ax80+80: 1.9 mW/MHz	17 dBm/MHz	Complies
15.407(b) (1) / 15.209	Spurious Emissions above 1GHz	52.9 dBµV/m @ 5130.6 MHz (-1.1 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	ax80+80: 156.48 MHz	N/A – limits output power if < 20MHz	N/A
RSS-247 6.2.1 (1)	EIRP Output Power	ax80+80: 103.7 mW	23 dBm (200 mW)	Complies
RSS-247 6.2.1 (1)	Power Spectral Density	ax80+80: 2.2 mW/MHz	10 dBm/MHz	Complies
RSS-247 6.2.1 (2)	Spurious Emissions above 1GHz	52.9 dBµV/m @ 5130.6 MHz (-1.1 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 5.25 – 5.35 GHZ BAND

Note: The device is restricted to indoor use only, therefore the spectral density of spurious emissions in the 5.15 - 5.25 GHz band were limited to the power spectral limits for intentional signals detailed in FCC 15.407(b)(2) and RSS 247 6.2.2 (2) i) b

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)		26dB Bandwidth		N/A – limits output power if < 20MHz	N/A
	RSS-247 6.2.2 (1)	99% Bandwidth	ax80+80: 156.48 MHz	N/A – limits EIRP if < 20MHz	N/A
15.407(a) (2)	RSS-247 6.2.1 (2)	Output Power	ax80+80: 103.8 mW	24 dBm (250 mW) EIRP <= 1W	Complies
15.407(a) (2)	RSS-247 6.2.2 (1)	Power Spectral Density	ax80+80: 2.2 mW/MHz	11 dBm/MHz	Complies
15.407(b) (2) / 15.209	RSS-247 6.2.2 (2)	Spurious Emissions above 1GHz	52.9 dBµV/m @ 5130.6 MHz (-1.1 dB)	Refer to the limits section (p23) for restricted bands, all others -27 dBm/MHz EIRP	Complies

#### **OPERATION IN THE 5.47 – 5.725 GHZ BAND**

FCC Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)	26dB Bandwidth	> 20MHz for all modes	N/A – limits output power if < 20MHz	N/A
	99% Bandwidth	ax80+80: 156.6 MHz	N/A – limits EIRP if < 20MHz	N/A
15.407(a) (2)	Output Power	ax80+80: 185.2 mW	24 dBm (250 mW) EIRP <= 1W	Complies
15.407(a) (2)	Power Spectral Density	ax80+80: 3.7 mW/MHz	11 dBm/MHz	Complies
15.407(b) (3) / 15.209	Spurious Emissions above 1GHz	68.2 dBµV/m @ 5469.6 MHz (-0.1 dB)	Refer to the limits section (p23) for restricted bands, all others -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	No change from original filing	Refer to page 25	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	No change from original filing	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)		Frequency Stability	No change from original filing	Signal shall remain within the allocated band	Complies
15.407 (h1)	RSS-247 6.2.2 (1) 6.2.3 (1)	Transmit Power Control	No change from original filing	The U-NII device shall have the capability to operate with a mean EIRP value lower than 24dBm (250mW)	Complies
15.407 (h2)	RSS-247 6.3	Dynamic frequency Selection (device with radar detection)	Refer to separate test report, reference FR075848-24	Threshold -62dBm (- 64dBm if eirp > 200mW) Channel Availability Check > 60s Channel closing transmission time < 260ms Channel move time < 10s Non occupancy period > 30minutes	Complies
	RSS-247 6.4 (5)	User manual information	No change from original filing	Warning regarding Tilt angle for EIRP compliance, Indoor use for 5150-5250 MHz band and Radar are primary user of some bands	Complies



GENERAL REQU	ENERAL REQUIREMENTS APPLICABLE TO ALL BANDS						
FCC Rule Part	RSS Rule part	Description	Description Measured Value / Comments		Result (margin)		
15.203	-	RF Connector	No change from original filing	Unique or integral antenna required	Complies		
15.407 (b) (6)	RSS-Gen Table 4	AC Conducted Emissions	No change from original filing	Refer to page 23	Complies		
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	No change from original filing	Statement for products with detachable antenna	Complies		
-	RSS-Gen 8.4	User Manual	No change from original filing	Statement for all products	Complies		

#### GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

#### **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)	dDu\//m	25 to 1000 MHz	± 3.6 dB
	dBµV/m	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 16, 17, 25, 29, December 3 and 5, 2018. 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

#### 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)			
T OIL	Connected 10	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.



#### **PROPOSED MODIFICATION DETAILS**

#### GENERAL

This section details the modifications to the Aruba, a Hewlett Packard Enterprise company model APIN0555 being proposed. All performance and construction deviations from the characteristics originally reported to the FCC are addressed.

#### SOFTWARE

The operating software was modified to allow operation in 80+80 bandwidth mode and in Tri-Radio mode. RF testing for Tri-Radio mode was included in previous C3PC application (See NTS report FR-075848.05-C3PC Rev 1). However this mode was never enabled in previously released software.



## 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 6.2 of RSS-GEN, NTS has been recognized as an accredited test laboratory by the Commission and Innovation, Science and Economic Development Canada. A description of the facilities employed for testing is maintained by NTS.

Site	Company / Regis	stration Numbers	Leasting
Site	FCC	Canada	Location
Chamber 4		2845B	41039 Boyce Road
Chamber 7	US1031	(Wireless Test	Fremont,
Chamber 7		Lab #US0027)	CA 94538-2435

ANSI C63.4 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. 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 nonconductive 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.

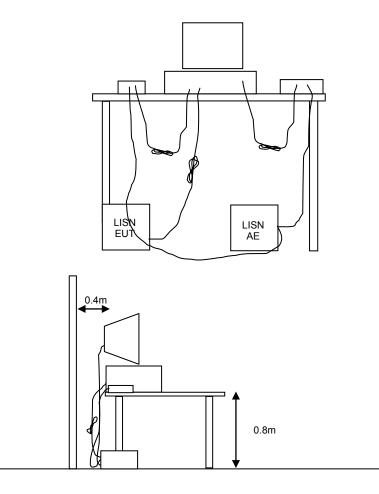


Figure 1 Typical Conducted Emissions Test Configuration



#### RADIATED EMISSIONS

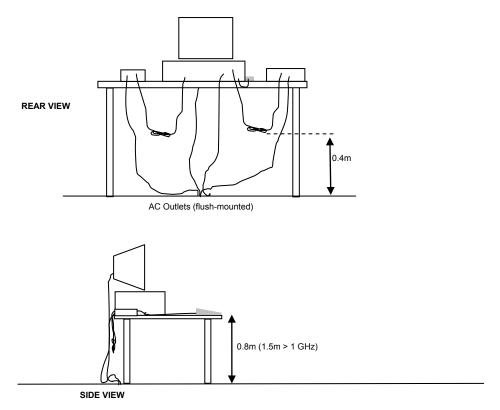
A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). 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.

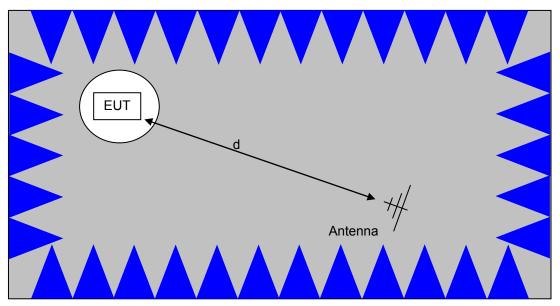
Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna 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 1 meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.



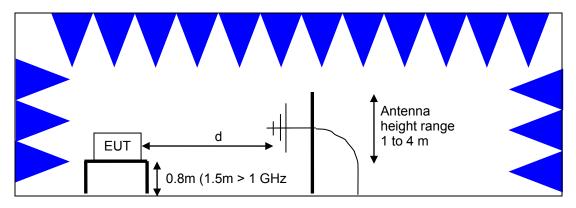


Typical Test Configuration for Radiated Field Strength Measurements



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.

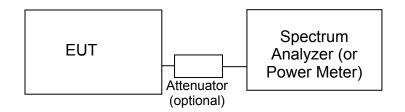


<u>Test Configuration for Radiated Field Strength Measurements</u> <u>Semi-Anechoic Chamber, Plan and Side Views</u>



#### 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; 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<sup>1</sup>.

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	2400/F <sub>KHz</sub> @ 300m	67.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 300m
0.490-1.705	24000/F <sub>KHz</sub> @ 30m	87.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 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

<sup>&</sup>lt;sup>1</sup> 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
5725–5850	1 Watt (30 dBm)	30 dBm/500kHz
5925-6425 and 6525-6875	1Watt (30 dBm)	17 dBm/MHz
6425-6525 and 6875-7125	250 mW (24 dBm)	11 dBm/MHz

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 – 5850 MHz band may use antennas of any gain without this limitation.

#### **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 – 5850	1 Watt (30 dBm) 4W eirp	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 - 5850 MHz band may use antennas with any gain without this limitation.

<sup>&</sup>lt;sup>2</sup> If EIRP exceeds 500mW the device must employ TPC



#### 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 band under the LELAN/UNII rules, the limit within 5 MHz of the allocated band slopes from 27 dBm/MHz to 15.6 dBm/MHz, from 5 MHz to 25 MHz from the allocated band slopes from 15.6 dBm/MHz to 10 dBm/MHz, from 25 MHz to 75 MHz from the allocated band slopes from 10 dBm/MHz to -27 dBm/MHz and for more than 75 MHz from the allocated band is –27dBm/MHz.

#### SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

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

#### SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

 $F_{d} = 20*LOG_{10} (D_{m}/D_{s})$ where:  $F_{d} = Distance Factor in dB$   $D_{m} = Measurement Distance in meters$   $D_{s} = Specification Distance in meters$ 

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

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

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

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

$$\begin{array}{rcl} R_c &=& R_r \,+\, F_d \\ & \text{and} \\ & M &=& R_c \,-\, L_s \\ & \text{where:} \\ & R_r &=& \text{Receiver Reading in dBuV/m} \\ & F_d &=& \text{Distance Factor in dB} \\ & R_c &=& \text{Corrected Reading in dBuV/m} \\ & L_s &=& \text{Specification Limit in dBuV/m} \end{array}$$

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:

 $E = \frac{1000000 \sqrt{30 P}}{d}$  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	<u>Description</u> - Band Edge, 16-Oct-18	Model	<u>Asset #</u>	<b>Calibrated</b>	<u>Cal Due</u>
EMCO Rohde & Schwarz	Antenna, Horn, 1-18GHz EMI Test Receiver, 20 Hz- 40 GHz	3115 ESI 40	868 2493	7/9/2018 3/22/2018	7/9/2020 3/22/2019
Radiated Emissions National Technical Systems	- Band Edge, 17-Oct-18 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 Rohde & Schwarz	Antenna, Horn, 1-18GHz EMI Test Receiver, 20 Hz- 40 GHz	3115 ESI 40	868 2493	7/9/2018 3/22/2018	7/9/2020 3/22/2019
Radiated Spurious E	Emissions, 1000 - 18,000 MH	Iz, 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 E	Emissions, 1-18 GHz, 29-Oc	t-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
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



		Report Duie. v	<i>uty 2, 2020, Re</i>	Issued Dute. out	<i>y</i> 20, 2020	
Manufacturer Micro-Tronics	<u>Description</u> Band Reject Filter, 5470- 5725 MHz	<u>Model</u> BRC50704-02	<u>Asset #</u> 2240	<u>Calibrated</u> 8/17/2018	<u>Cal Due</u> 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	t-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	
Padio Antonna Port	(Power and Spurious Emis	sions) 03-Doc-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), 05-Dec-18						
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	



# Appendix B Test Data

TL075848-RA-FCC Pages 31 – 70



# EMC Test Data

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: 6/15/2020

🎲 NTS			EMC Test Data
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) Antenna Por Power, PSD, Bandwidt	t Measuremer	nts
Test Specific Details			
	of this test session is to pe isted above.	rform final qualificati	on testing of the EUT with respect to the
	le attenuator to prevent over		a port of the EUT was connected to the spectrur rement system. All measurements are corrected
Ambient Conditions:	Temperature: Rel. Humidity:	22-24 °C 38-41 %	
Modifications Made During Ten No modifications were made to the E	•		
Deviations From The Standard No deviations were made from the re		ł.	
but with 3 dB	ennas for 5 GHz radio and higher power and can oper	4 antennas for 2.4 G ate in both lower and	Hz radio (5GHz radio may also use 4 antennas d upper 5 GHz bands simutaneously). Tests sts performed with 4 antennas at the target powe

# 🎲 NTS

# EMC Test Data

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

## Summary of Results

Summary of Result	S			
Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2), (3) RSS-247 6.2	Pass	ax80+80: 103.0 mW
1	Power, 5250 - 5350MHz	15.407(a) (1), (2), (3) RSS-247 6.2	Pass	ax80+80: 103.8 mW
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2), (3) RSS-247 6.2	Pass	ax80+80: 1.9 mW/MHz
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2), (3) RSS-247 6.2	Pass	ax80+80: 2.2 mW/MHz
1	99% Bandwidth	RSS-247 (Information only)	Pass	ax80+80: 156.48 MHz

## Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 D01

Мс	ode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)	
11ax8	80+80	MCS0	0.950	Yes	5.401	0.22	0.45	185	5 GHz only

	NTS							EM	C Test	t Data
Client:	Aruba, a He	wlett Packar	d Enterprise	company			J	ob Number:	PR075848	
							T-L	og Number:	TL075848-I	RA-FCC
Model:	APIN0555						Proje	ct Manager:	Christine Kr	ebill
Contact:	Mark Hill						Project	Coordinator:	David Bare	
Standard:	FCC §15.24	7 & §15.407						Class:	N/A	
C Te	ndwidth, Ou Date of Test: st Engineer: est Location:	12/3/2018 0 Rafael Vare	:00	Spectral Der	C Cor			JT setup)		
Note 1:	MHz, Span increase the were adjuste ANSI C63.1	> OBW, # of e number to g ed by adding 0)	points in sw get true aver the Pwr Co	power meas veep $\geq 2^*$ spar rage), power a r Factor in dE	n/RBW, RMS averaging on 3. This is bas	detector, tra and power i sed on 10log	ace average	100 traces (a ver the OBW	at least 100 t '.  Tthe meas	races, surements
Note 2:				settings used 5250 MHz ba			nna nain as t	he maximum	n eiro allowe	d is
Note 3:	PSD (calcula the measure 99% Bandw 5 times OBV	ated from the ed value exce idth measure V.	e measured eeds the ave ed in accord	ected for inst power divided erage by more ance with C6	d by the mea e than 3dB. 3.10 - RB be	sured 99% b tween 1-5 %	oandwidth) by	v more than VB ≥ 3*RB	3dB by the a	mount that een 1.5 and
		ms). The an	tenna gain ι	used to deterr	mine the FIR		for DCD/Out			
Note 5:	the limits is t chain. If the the EIRP is	the highest g signals are the product c	ain of the in coherent the	nals on the n dividual chair en the effectiv ve gain and t	on-coherent ns and the El ve antenna g	between the RP is the su	transmit cha m of the proc	ins then the lucts of gain	e gain used t and power	o determine on each
Note 5: Antenna Ga	the limits is t chain. If the	the highest g signals are the product c	ain of the in coherent the of the effecti	nals on the n dividual chair en the effectiv ve gain and t	on-coherent ns and the El ve antenna g otal power.	between the RP is the su ain is the su	transmit cha m of the proc	ins then the lucts of gain	e gain used t and power gains for eac	o determine on each ch chain and
Note 5:	the limits is t chain. If the the EIRP is	the highest g signals are the product c	ain of the in coherent the of the effecti	nals on the n dividual chair en the effectiv	on-coherent ns and the El ve antenna g otal power.	between the RP is the su ain is the su	transmit cha m of the proc	ins then the lucts of gain	e gain used t and power	o determine on each
Note 5: Antenna Ga	the limits is t chain. If the the EIRP is	the highest g signals are the product c	ain of the in coherent the of the effecti	nals on the n dividual chair en the effectiv ve gain and to Antenna Gair	on-coherent ns and the El ve antenna g otal power.	between the RP is the su ain is the su	transmit cha m of the proc	ins then the ducts of gain erms) of the	e gain used t and power gains for eac Dir G	o determine on each ch chain and Dir G

	NTS	EM	C Test Data
Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Madal	APIN0555	T-Log Number:	TL075848-RA-FCC
woder.	AFIN0555	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 da CDD = Cyclic Delay Diversity (or Cyclic Shift Diversity) modes supported, S cross polarized. Dir G (PWR) = total gain (Gant + Array Gain) for power calculations; GA (P FCC KDB 662911. Depending on the modes supported, the Array Gain va value.	Sectorized / Xpol = anteni (SD) = total gain for PSD	has are sectorized or calculations based on
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 calculated based on beamforming criteria. Option 2: Antennas are paired for beamforming, and the pairs are configured array gain associated with beamforming with 2 antennas (3dB), and the arr (3dB for PSD and 0 dB for power)	ed from cyclic delay table red to use the cyclic delay	y diversity of 802.11; the

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

Client:	Aruba, a He	wlett Packard Enterp	rise company				Job Number:	PR075848		
Madel							T-Log Number: TL075848-RA			
Model:	APIN0555						Project Manager: Christine Krel			
Contact:	Mark Hill					Project Coordinator: David Bare				
Standard:	FCC §15.24	7 & §15.407					Class:	N/A		
		50 MHz and 5250-53	350 MHz Bands ·	- FCC						
	ax80+80						<u>EIRP (mW):</u>	345.8		
	Chain	Software	Duty Cycle		Total F			Max Power	Resu	
(MHz)	1	Setting	%	dBm 14.4	mW	dBm	dBm	(W)		
5250	2 3 4 5 6 7 8	14.5	95	14.4 12.9 14.0 14.1 -23.1 -25.8 -26.6 -22.2	103.0	20.1	30.0	0.103	Pass	
		50 MHz band (UNII-2					EIRP (mW):	348.5		
5250	2 3 4 5 6 7 8	14.5	95	-24.4 -24.0 -24.3 14.6 13.3 12.6 14.8	103.8	20.2	24.0	0.104	Pass	
CF: 5200. SPAN: 10 RB: 1.000 VB: 3.000 Detector: Attn: 20 D RL Offset: Sweep Tir Ref Lvl: 19 Pwr avg: Amp corr Bin size: 1	0.000 MHz MHz MHz RMS bB 21.7 DB ne: 20.0ms 5.0 DBM 100 sweeps : 0.0dB 60 kHz	-5.0- -5.0- -10.0- -15.0- -20.0- 慶 -25.0- -30.0-				V		ITS		
Highest PS	×	-35.0-	1							
-3.5	dBm/1.000 f	<sup>MHz</sup> -40.0 - -45.0 -								
Power Ov 25.345 14.0	mW	-50.0 - 5150.0 51	.60.0 51	80.0 Fred	5200.0 juency (MH	5220,1 z)	0 52	40.0 5250.0		
(			Bandwidth, Pov		Lasa				1	

Client:	Aruba, a He	ewlett Packar	d Enterprise	company				Job Number:		
Model:	APIN0555							-	TL075848-R	
Contoct	Mark Hill						-	ect Manager: Coordinator:	Christine Kre	bill
		47 & §15.407					Project	Class:		
Stanuaru.	100 910.2-	+1 & 310.401						01033.		
		50 MHz Ban	d - Industry	Canada						
	ax80+80	Coffwara	99% BW	Duty Oyala	<b>D</b> 1	Total	Max Power	EIRP (mW):	103.7 Max Power	
Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	Power <sup>1</sup> dBm	mW	dBm (eirp)	IC limit dBm (eirp)	Wax Power (W)	Resul
()	1	oottiing	(	70	8.9	11100	dbiii (ciip)	dbiii (ciip)	()	
	2				8.2					
	3	-			8.7 8.8					_
5250	5	9.5	78.24	95	-27.9	30.9	20.2	23.0	0.0309	Pass
	6 7				-29.8 -30.3					
	8	1			-30.5					
)							Maria		40.7	
	nin 5250-53 1	50 MHz band	1 (UNII-ZA)		-29.3		IMax	EIRP (mW):	40.7	
	2				-29.3					
	3	4			-29.3					
5250	4 5	9.5	78.24	95	-29.4 8.5	25.7	16.1	24.0	0.0257	Pass
	6	1			7.2					
	7 8				6.5 8.8					
15.0 - 10.0 - 5.0 - 0.0 - -5.0 - -15.0 - -15.0 - -25.0 - -25.0 - -30.0 - 51	₩¢Å		5220 524	0 5260 5 ency (MHz)	280 5300		Columnation CF SP, RB VB De Att RL Sw Re 99 UN UN	alyzer Setti hde&Schwar : 5250.000 M AN: 200.000 : 2.000 MHz : 10.000 MHz : 10.000 MHz tector: POS n: 20 DB Offset: 21.7 eep Time: 20 f Lvl: 15.0 Dl mments % BW: 156. II-1: 78.24 M II-2A: 78.24 160 mode	z,FSQ 1Hz MHz 2 DB 1.0ms BM 480 MHz 1Hz	
	F171 7400	13.2	₽ 🔸 8-	Delt	a Freq. 15	5.480	1			
Cursor 1	5171.7600									

Client:	Aruba, a He	wlett Packard Enterp	orise company			Job	Number: PR075848	
Madal	APIN0555		· · ·			T-Log	Number: TL075848-F	RA-FCC
						-	Manager: Christine Kr	ebill
	Mark Hill					Project Co	ordinator: David Bare	
Standard:	FCC §15.24	7 & §15.407					Class: N/A	
	PSD - FCC ax80+80							
<sup>-</sup> requency (MHz)	Chain	Software Setting	Duty Cycle %	dBm/MHz	Total mW/MHz	PSD <sup>1</sup> dBm/MHz	FCC Limit dBm/MHz	Resu
5250	1 2 3 4 5 6 7 8	14.5	95	-3.3 -4.7 -3.5 -3.6 -18.9 -22.5 -23.5 -18.3	1.8	2.6	11.7	Pass
ortion wit 5250	1 2 3 4 5 6 7	50 MHz band (UNII-2	2 <b>A)</b> 95	-21.4 -22.0 -21.5 -21.7 -2.1 -3.6 -3.8	2.2	3.4	6.2	Pass
CF: 5200, SPAN: 10 RB: 1.000 VB: 3.000 Detector: Attn: 20 E RL Offset: Sweep Tii Ref Lvl: 1 Pwr avg: Amp corr Bin size: 1 Highest PS	0.000 MHz MHz MHz RMS DB 21.7 DB me: 20.0ms 5.0 DBM 100 sweeps : 0.0dB .60 kHz	0.0 - -5.0 - -10.0 - -15.0 - -20.0 - <u></u> -25.0 - -30.0 - -35.0 -		-2.1				
Power Ov 25.345		-45.0 - -50.0 - 1 5150.0 5:	160.0 51	180.0 Fre	5200.0	5220.0	5240.0 5250.0	)

🎲 NTS						EMC Tes	st Data
Client: Aruba, a H	lewlett Packard Enterp	rise company				Number: PR075848	
Model: APIN0555						Number: TL075848	
						Manager: Christine I	
Contact: Mark Hill					Project Co	ordinator: David Bar	e
Standard: FCC §15.2	247 & §15.407					Class: N/A	
150-5250 PSD - IC Mode: ax80+80							
requency Chain	Software	Duty Cycle	PSD	Total	PSD <sup>1</sup>	IC Limit	Result
(MHz)	Setting	%	dBm/MHz	mW/MHz	dBm/MHz	dBm/MHz	Resul
$ \begin{array}{r}     1 \\     2 \\     3 \\     5250 \\     5 \\     6 \\     7 \\     8 \\   \end{array} $	9.5	95	-8.7 -9.4 -9.0 -8.8 -24.5 -27.9 -28.9 -24.0	0.5	-3.0	-1.3	Pass
ortion within 5250-5	350 MHz band (UNII-2	A)	-27.3		r		
$5250 \qquad \begin{array}{r} 2 \\ 3 \\ 5250 \\ \hline 5 \\ 6 \\ \hline 7 \\ 8 \end{array}$	9.5	95	-27.2 -27.2 -27.3 -27.5 -8.0 -9.4 -9.9 -9.9 -8.0	0.6	-2.2	6.2	Pass
Spectrum Analyzer Sel	tings -5.0 -					() NTS	
CF: 5200.000 MHz SPAN: 100.000 MHz RB: 1.000 MHz	-10.0 -	r		*	V	12 - C - C - C - C - C - C - C - C - C -	
VB: 3.000 MHz Detector: RMS	-15.0-						
Attn: 20 DB RL Offset: 21.7 DB	-20.0 -			_			
Sweep Time: 20.0ms Ref Lvl: 15.0 DBM	-25.0 -						
Pwr avg: 100 sweeps Amp corr: 0.0dB Bin size: 160 kHz	ළ -30.0 -						
Surfaces avoid the							
Highest PSD	-35.0 -						
-8.7 dBm/1.000	MHz -40.0-						
	-45.0-						
Power Over Span	-50.0-			5000.0			
2202	5150.0 51	60.0 5	180.0 Fre	5200.0 quency (MH	5220.0 z)	5240.0 5250	.0
7.762 mW 8.9 dBm					-,		

Client: A	ruba, a Hewl	ett Packard Enterp	orise company				Number: PR075848	
Model: Al	PIN0555					-	Number: TL075848	
Contact: M	lork Hill						Manager: Christine k ordinator: David Bare	
Standard: F		& 815 407				FIUJECI CO	Class: N/A	5
Stanuaru. I	00 310.247	a 310.401					01035.	
150-5250 PS Mode: ad	c80+80		0 mode tested to	demonstrate				
Frequency	Chain	Software	Duty Cycle			PSD <sup>1</sup>	FCC Limit	Resul
(MHz)	1	Setting	%	dBm/MHz -3.5	mW/MHz	dBm/MHz	dBm/MHz	
5250	2 3 4 5 6 7 8	14.5	95.3	-3.3 -4.0 -3.3 -3.4 -28.7 -31.6 -32.6 -28.5	1.9	2.8	11.7	Pass
5250	n 5250-5350 1 2 3 4 5 6 7 8	MHz band (UNII-2	2A) 95.3	-30.3 -30.0 -30.1 -30.2 -2.7 -3.3 -3.7 -1.9	2.2	3.4	6.2	Pass
Spectrum An- CF: 5200.000 SPAN: 100.0 RB: 1.000 Mi Detector: RM Attn: 20 DB RL Offset: 21 Sweep Time Ref Lvl: 15.0 Pwr avg: 10 Amp corr: 0 Bin size: 160 Highest PSD -3.5 d	0 MHz 100 MHz Hz Hz MS 1.7 DB : 20.0ms 0 DBM 00 sweeps 0.0dB	0.0 - -5.0 - -10.0 - -15.0 - -20.0 - -25.0 - -30.0 - -35.0 -	160.0 51	80.0	5200.0 quency (MH	5220.0	5240.0 5250	0
-			6 Bandwidth, Pov			c)		

	NTS						EMC Tes	
Client:	Aruba, a He	wlett Packard Ente	erprise company				Number: PR075848	
Model:	APIN0555					-	Number: TL075848 Manager: Christine ł	
Contact	Mark Hill						ordinator: David Bar	
	FCC §15.24	7 & §15.407					Class: N/A	
4	-	•				l		
5150-5250 F Mode:	PSD - IC ac80+80							
Frequency	Chain	Software	Duty Cycle	PSD		PSD <sup>1</sup>	IC Limit	Resul
(MHz)		Setting	%	dBm/MHz	mW/MHz	dBm/MHz	dBm/MHz	T C S U
5250	1 2 3 4 5 6 7 8	9.5	95.3	-8.6 -9.0 -8.3 -8.4 -35.0 -36.6 -37.5 -33.8	0.6	-2.2	-1.3	Pass
Portion with	hin 5250-535 1 2 3 4 5 6 7 8	50 MHz band (UNI 9.5	I-2A) 95.3	-34.6 -34.3 -34.3 -34.5 -7.9 -7.8 -8.2 -6.4	0.7	-1.5	6.2	Pass
CF: 5200.0 SPAN: 100 RB: 1.000 VB: 3.000 Detector: 1 Attn: 20 D RL Offset: Sweep Tin Ref Lvl: 15	0.000 MHz MHz MHz RMS 21.7 DB ne: 20.0ms 5.0 DBM 100 sweeps : 0.0dB	ngs -5.0 - -10.0 - -15.0 - -20.0 - -25.0 - -25.0 - -35.0 -				V	NTS	
Highest PS	D	-40.0-	/					
-7.9	dBm/1.000 M	<sup>/IHz</sup> -45.0 - -50.0 -						
		-55.0 -¦ 5150.0	5160.0 51	80.0 Fre	5200.0 quency (MH	5220.0 z)	5240.0 5250	.0
1			% Bandwidth, Pov					

Client: Aruba, a Hewlett Model: APIN0555	Packard Enterprise company			C Test Data
Model: APIN0555			Job Number:	PR075848
			T-Log Number:	TL075848-RA-FCC
			Project Manager:	
Contact: Mark Hill			Project Coordinator:	
Standard: FCC §15.247 & §	§15.407		Class:	N/A
	RSS-247 (LELAN Antenna Po Power, PSD, Bandwig	ort Measuremer	nts	
Tast Spacific Datails				
	objective of this test session is to p ification listed above.	perform final qualificati	on testing of the EUT with	respect to the
General Test Configura	tion			
When measuring the condu	ucted emissions from the EUT's an a a suitable attenuator to prevent c			
Ambient Conditions:	Temperature: Rel. Humidity:	21-23 °C 38-42 %		
Modifications Made Du No modifications were mac	ring Testing le to the EUT during testing			
Deviations From The S No deviations were made f	tandard rom the requirements of the standa	ard.		
Sample Notes				
Driver: P4 \	GFK9Y02N (BLE) & CNGFK9Y005 /0.4.5 nal 8 antennas for 5 GHz radio an		Hz radio (5CHz radio ma)	also uso 4 antonnas
but	with 3 dB higher power and can op ormed with 8 antennas at the 4 ant	erate in both lower and	d upper 5 GHz bands simi	utaneously). Tests

# 🎊 NTS

### EMC Test Data

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

#### Summary of Posults

Summary of Result	S			
Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5470 - 5725MHz	15.407(a) (1), (2), (3) RSS-247 6.2	Pass	ax80+80: 185.2 mW
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2), (3) RSS-247 6.2	Pass	ax80+80: 3.7 mW/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold		EIRP = 23.2 dBm (207.8 mW)
1	26dB Bandwidth	15.407 (Information only)	-	> 20MHz for all modes
1	99% Bandwidth	RSS-247 (Information only)	N/A	ax80+80: 156.6 MHz

### Procedure Comments:

Measurements performed in accordance with FCC KDB 789033 D01

1

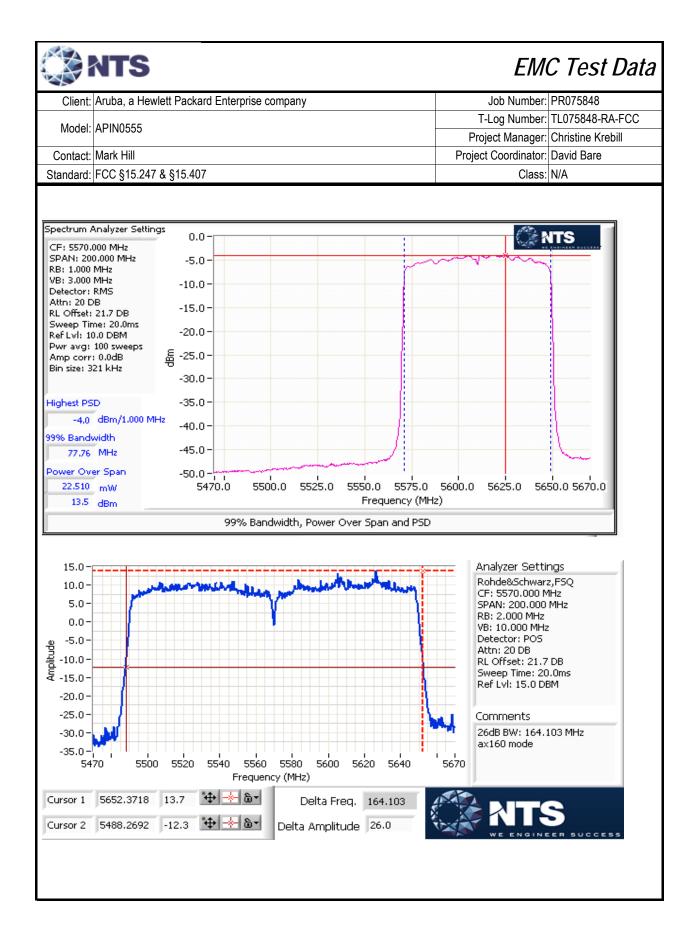
Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)	
11ax80+80	MCS0	0.950	Yes	5.401	0.2	0.4	185	5 GHz only

For devices that support CDD modes Min # of spatial streams:

Max # of spatial streams: 8

	NTS							EM	C Test	t Data
Client:	Aruba, a He	wlett Packard	I Enterprise	company				Job Number:	PR075848	
Madal				•			T-l	_og Number:	TL075848-F	RA-FCC
Wodel:	APIN0555						Proje	ect Manager:	Christine Kr	ebill
Contact:	Mark Hill						Project	Coordinator:	David Bare	
Standard:	FCC §15.24	7 & §15.407						Class:	N/A	
E Te Te Note 1: Note 2: Note 3:	MHz, Span traces, incre measureme ANSI C63.1 Measured u 99% Bandw 5 times OBV For MIMO s (in linear ter	12/5/2018 0: Roy Zheng FT Lab #4a ty Cycle < 98 > OBW, # of p ase the numbrist were adju 0) sing the same idth measure V. ystems the to ms). The ant MIMO device	00 w. Output points in swe per to get tru sted by add analyzer s d in accorda tal output pre enna gain u b. If the sigr	power meas eep ≥ 2*spa ue average), ling YY dB. ettings used ance with C6 ower and tot used to deter nals on the r	Co Esured using a in/RBW, RMS power avera This is based I for output p 33.10 - RB be tal PSD are co mine the EIF non-coherent	Config. Used: nfig Change: EUT Voltage: i spectrum an S sample dete aging on and d on 10log(1/s ower. wween 1-5 % calculated fror RP and limits to between the	None PoE alyzer (see j ector, trace a power integr (), where x i of OBW and n the sum o for PSD/Out transmit cha	plots below). average 100 ration over th s the duty cy d VB $\geq$ 3*RB f the powers put power de ains then the	traces (at lea e OBW. Tth cle. (method , Span betwe of the indivic epends on th e gain used to	ast 100 e J SA-2 of een 1.5 and lual chains e operating o determine
	chain. If the		oherent the	en the effecti	ve antenna g	gain is the sur		-		
	chain. If the the EIRP is	signals are of the product of	oherent the	en the effecti	ve antenna g			-		
Antenna Ga	chain. If the	signals are of the product of	coherent the f the effectiv	en the effecti ve gain and t	ve antenna g	gain is the sur		-		
	chain. If the the EIRP is	signals are of the product of	coherent the f the effectiv	en the effecti ve gain and t	ve antenna g total power.	gain is the sur		-	gains for eac	ch chain an
Antenna Ga Freq 5470-5725	chain. If the the EIRP is ain Informati	signals are of the product of on 2 3.4	coherent the f the effectiv 3 2.8	en the effecti ve gain and the second s	n (dBi) / Cha	in 6 3.3	n (in linear tr 7 5.4	erms) of the	gains for eac	ch chain ar
Antenna Ga Freq 5470-5725 8x8 mode 4x4 mode Legacy m Power for CDD activ	chain. If the the EIRP is is ain Information 1 3.2 e uses 4 V and e uses 2 V and bodes operated r BF mode is ve for single s BF = beamfr CDD = Cyclic cross polarize	signals are of the product of on 2 3.4 d 4 H polarize d 2 H polarize e on all chains reduced by 3 stream modes corming mode c Delay Diver red.	coherent the f the effective f the eff	en the effecti ve gain and the Antenna Gai 4 3.6 s, directional s, directional ctive antenna Multichain L lic Shift Dive	n (dBi) / Cha 5 4.5 I gain used is gain used is a gain does r egacy = 802 ersity) modes	in 6 3.3 the highest of the highest of not change .11 legacy da supported, S	7 5.4 of the two. of the two. ta rates sup ectorized / 3	8 3.6 ported for mic Kpol = anteni	Dir G (PWR) 0.5	bh chain an Dir G (PSD) 9.3 smissions, prized or
Antenna Ga Freq 5470-5725 8x8 mode 4x4 mode Legacy m Power for CDD activ Notes: Notes:	chain. If the the EIRP is ain Informati 1 3.2 e uses 4 V an e uses 2 V an odes operate r BF mode is ve for single s BF = beamfe CDD = Cycli cross polariz Dir G (PWR) FCC KDB 66 value.	signals are of the product of on 2 3.4 d 4 H polarized d 2 H polarized d 2 H polarized d 2 H polarized d 2 H polarized e on all chains reduced by 3 stream modes c Delay Diver red. = total gain ( 52911. Depe	coherent the f the effective f the eff	en the effecti ve gain and the Antenna Gai 4 3.6 s, directional s, directional stive antenna Multichain L lic Shift Dive ay Gain) for p e modes sup	n (dBi) / Cha 5 4.5 I gain used is gain used is gain does r egacy = 802 ersity) modes	in 6 3.3 the highest of the highest of the highest of the highest of the highest of the highest of	7 7 5.4 of the two. of the two. ta rates sup ectorized / 3 SD) = total	erms) of the 8 3.6 ported for mic Kpol = anteni gain for PSD	Dir G (PWR) 0.5 ultichain tran	b chain ar Dir G (PSD) 9.3 smissions, prized or based on
Antenna Ga Freq 5470-5725 8x8 mode 4x4 mode Legacy m Power for CDD activ Notes:	chain. If the the EIRP is ain Informati 1 3.2 uses 4 V an uses 2 V an odes operate r BF mode is ve for single s BF = beamfe CDD = Cycli cross polariz Dir G (PWR) FCC KDB 66 value.	signals are of the product of on 2 3.4 d 4 H polarized d 2 H polarized d 2 H polarized d 2 H polarized e on all chains reduced by 3 stream modes c Delay Diver red. = total gain ( 52911. Depe	coherent the f the effective f the eff	en the effecti ve gain and the Antenna Gai 4 3.6 s, directional s, di s, directional s, di s, directional s, di	n (dBi) / Cha n (dBi) / Cha 4.5 I gain used is gain used is a gain does r egacy = 802 ersity) modes power calcula ported, the A	ain is the sur in 6 3.3 the highest of the highest of not change .11 legacy da supported, S ations; GA (P	n (in linear to 7 5.4 of the two. of the two. ta rates sup ectorized / 3 SD) = total lue for powe	erms) of the 8 3.6 ported for mic Kpol = anteni gain for PSD	Dir G (PWR) 0.5 ultichain tran	b chain ar Dir G (PSD) 9.3 smissions, prized or based on

	NTS							EM	C Test	Data
Client:	Aruba, a Hev	wlett Packar	d Enterprise	company			J	ob Number:	PR075848	
Model.	APIN0555								TL075848-F	
								-	Christine Kre	ebill
	Mark Hill						Project	Coordinator:		
Standard:	FCC §15.24	7 & §15.407						Class:	N/A	
MIMO Devi Mode:	ce - 5470-572 ax80+80	25 MHz Ban	d - FCC Onl	у			Мах	EIRP (mW):	207.8	
Frequency		Software	26dB BW	Duty Cycle	Power <sup>1</sup>	Total I		· · · · ·	Max Power	Decult
(MHz)	Chain	Setting	(MHz)	%	dBm	mW	dBm	dBm	(W)	Result
5570	$     \begin{array}{r}       1 \\       2 \\       3 \\       4 \\       5 \\       6 \\       7 \\       8 \\       8       \end{array} $	14	164.1	95.0	13.4           12.3           13.2           13.7           13.6           13.9           13.5	185.2	22.7	24.0	0.185	Pass
5470-5725 Mode: Frequency (MHz)	1 1	only Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total mW/MHz	PSD <sup>1</sup> dBm/MHz	FCC Limit	/MHz	Result
5570	$     \begin{array}{r}       1 \\       2 \\       3 \\       4 \\       5 \\       6 \\       7 \\       8 \\       8       \end{array} $	14		95.0	-3.8 -4.8 -4.2 -3.5 -3.1 -2.9 -2.8 -4.0	3.7	5.7	7.7		Pass
CF: 5570. SPAN: 20	0.000 MHz	ngs 0.01 -5.01 -10.01	-		• <b>v</b>			<u></u>	ITS	
Ref Lvl: 11 Pwr avg: Amp corr Bin size: 3 Highest PS	MHz RMS 28 21.7 DB me: 20.0ms 0.0 DBM 100 sweeps : 0.0dB 20.0dB 221 kHz	-15.0 -20.0 -25.0 -30.0 -35.0 -40.0								
VB: 3.000 Detector: Attn: 20 C RL Offset: Sweep Tir Ref Lvl: 11 Pwr avg: Amp corr Bin size: 3 Highest PS -3.8 9996 Bandt 77.76 Power Ov 21.898	MHz RMS DB : 21.7 DB me: 20.0ms 0.0 DBM 100 sweeps : 0.0dB 221 kHz 5D dBm/1.000 M width MHz er Span	-15.0 -20.0 -25.0 -30.0 -35.0 -40.0 -45.0 -55.0		00.0 552s		) 5575.0 quency (MH:		i625.0 56	50.0 5670.0	





### EMC Test Data

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Madal	APIN0555	T-Log Number:	TL075848-RA-FCC
MOUEI.	AF IN0555	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

<b>,</b>										
Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin			
160MHz Bandwith Modes										
17		50 - 5250MHz	14.5	14.5	Restricted Band Edge at 5150 MHz		52.9 dBµV/m @ 5130.0 MHz (-1.1 dB)			
BLE		50 - 5250MHz	14.5	14.5	Restricted Band Edge at 5350 MHz	15.209	51.5 dBµV/m @ 5352.1 MHz (-2.5 dB)			
		114 - 5570MHz	14.5	14.0	Restricted Band Edge at 5460 MHz		52.7 dBµV/m @ 5450.0 MHz (-1.3 dB)			
10		114 - 5570MHz	14.5	14.0	Band Edge 5460 - 5470 MHz	15E	68.2 dBµV/m @ 5469.6 MHz (-0.1 dB)			

### Modifications Made During Testing

No modifications were made to the EUT during testing

#### Deviations From The Standard

No deviations were made from the requirements of the standard.



## EMC Test Data

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:		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)

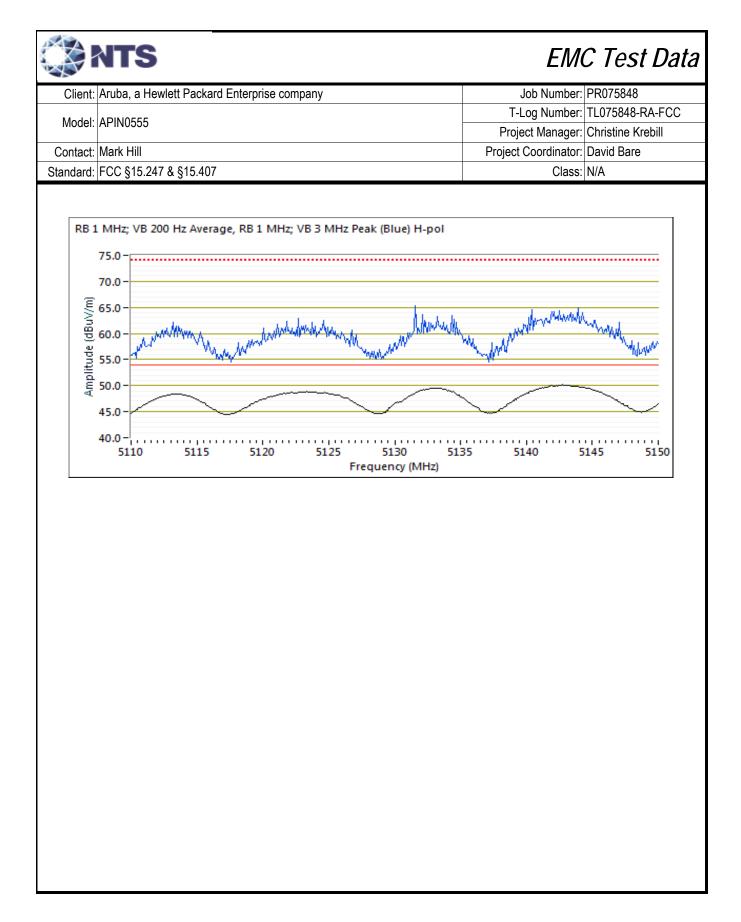
Driver: P4 V0.4.5

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:

	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method
Note 1:	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,
Note 5.	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
Note 4.	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
Note 5.	measurements.

Mode:       PProject       Manager:       Christine Kr         Contact:       Mark Hill       Project Coordinator:       David Bare         Standard:       FCC §15.247 & §15.407       Class:       N/A         Run #17:       Radiated Bandedge Measurements, 5150-5350 MHz       Config. Used: 1         Date of Test:       10/16/2018       Config. Used: 1         Test Engineer:       Denirci       Config Change: None         Test Location:       Fremont Chamber #7       EUT Voltage: POE & 110 V, 60 Hz         Channel:       50 - 5250 MHz       Tx Chain:       8x8         Vode:       ax160       Standard Field Strength         Frequency       Level       Pol       FCC 15.209       Detector       Azimuth         MHz       dBµV/m       v/h       Limit       Margin       Pk/QP/Avg       degrees       meters         5130.040       52.9       V       54.0       -1.1       Avg       296       1.6       Note 3 - POS; RB 1 MHz; VB 31         5142.630       50.2       H       54.0       -3.8       Avg       299       1.5       Note 3 - POS; RB 1 MHz; VB 31         5129.170       63.0       V       74.0       -7.5       PK       299       1.6       POS;		AL S	S						EMC Test Dat
Model:         APIN0555         T-Log Number:         TL075848-f           Project Manager:         Christine Kr           Contact:         Mark Hill         Project Coordinator:         David Bare           Standard:         FCC §15.247 & §15.407         Class:         N/A           Run #17:         Radiated Bandedge Measurements, 5150-5350 MHz         Class:         N/A           Run #17:         Radiated Bandedge Measurements, 5150-5350 MHz         Config. Used: 1         Image: Standard: Config. Used: 1           Test Engineer:         Deni/Coll         Config. Config. Used: 1         Image: Standard: Config. Used: 1         Image: Standard: Config. Used: 1           Test Location:         Frequency:         Deni/Coll         Config. Used: 1         Image: Standard: Config. Used: 1           Test Location:         Frequency         Eurit Oktage: POE & 110 V, 60 Hz         Channel:         50 - 5250 MHz           Standard:         Standard:         FCC 15.209         Detector         Azimuth         Height         Comments           MHz         dBµV/m         V/h         Limit         Margin         PK/QP/Avg         degrees         meters           5130.040         52.9         V         54.0         -1.1         Avg         296         1.6         Note 3 - POS; RB 1 MHz;	Client:	Aruba, a	Hewlett Packar	d Enterprise	company				Job Number: PR075848
Contact:       Mark Hill       Project Manager:       Christine Kr         Standard:       FCC §15.247 & §15.407       Class:       N/A         Run #17:       Radiated Bandedge Measurements, 5150-5350 MHz       Class:       N/A         Date of Test:       10/16/2018       Config. Used: 1       Test Engineer: Deniz Demirci       Config Change: None         Test Engineer:       Deniz Demirci       Config Change: None       Test Location: Fremont Chamber #7       EUT Voltage: POE & 110 V, 60 Hz         Stannel:       50 - 5250 MHz       X       X       X         x Chain:       8x8       Node:       ax160       X         X150 MHz       Ask       N/A       X       X         X150 MHz       Evel       Pol       FCC 15.209       Detector       Azimuth       Height       Comments         MHz       dBjLV/m       V/h       Limit       Margin       PV(QP/Avg       degrees       meters         5130.040       52.9       V       54.0       -1.1       Avg       296       1.6       Note 3 - POS; RB 1 MHz; VB: 31         5142.630       50.2       H       74.0       -7.5       PK       299       1.5       Note 3 - POS; RB 1 MHz; VB: 31         5129.170       63.0<	Madal		F		<u> </u>			T-	Log Number: TL075848-RA-FCC
Standard:         FCC §15.247 & §15.407         Class:         N/A           tun #17:         Radiated Bandedge Measurements, 5150-5350 MHz			5					Proj	ect Manager: Christine Krebill
tun #17:         Radiated Bandedge Measurements, 5150-5350 MHz           Date of Test:         10/16/2018         Config. Used: 1           Test Engineer:         Deniz Demirci         Config Change: None           Test Location:         Freemont Chamber #7         EUT Voltage: POE & 110 V, 60 Hz           ihannel:         50 - 5250 MHz         EUT Voltage: POE & 110 V, 60 Hz           x Chain:         8x8         Note:         ax160           150 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           5130.040         52.9         V         54.0         -1.1         Avg         296         1.6         Note 3 - POS; RB 1 MHz; V           5142.630         50.2         H         54.0         -3.8         Avg         299         1.5         Note 3 - POS; RB 1 MHz; VB: 31           5142.630         50.2         H         74.0         -7.5         PK         299         1.5         POS; RB 1 MHz; VB: 31           5129.170         63.0         V         74.0         -11								Project	
Date of Test: 10/16/2018       Config. Used: 1         Test Engineer: Deniz Demirci       Config Change: None         Test Location: Fremont Chamber #7       EUT Voltage: POE & 110 V, 60 Hz         hannel:       50 - 5250 MHz         x Chain:       8x8         lode:       ax160         Test Location: Fremont Chamber #7         Test Location: Fremont Chamber #7         Location: Fremont Chamber #7         Location: 8x8         Idoe         100 Hz Signal Radiated Field Strength         Trequency Level Pol FCC 15.209 Detector Azimuth Height Comments         MHz       dBµV/m       v/h       Limit       Margin       Pk/QP/Avg       degrees       meters       5130.040       52.9       V       54.0       -1.1       Avg       296       1.6       Note 3 - POS; RB 1 MHz; V         5130.040       52.9       V       54.0       -3.8       Avg       299       1.5       Note 3 - POS; RB 1 MHz; VB: 31         5142.630       50.2       H       74.0       -7.5       PK       299       1.5       POS; RB 1 MHz; VB: 31         5129.170       63.0       V       74.0       -11.0       PK	Standard:	FCC §15	.247 & §15.407						Class: N/A
Test Engineer: Deniz Demirci       Config Change: None         Test Location: Fremont Chamber #7       EUT Voltage: POE & 110 V, 60 Hz         Channel:       50 - 5250 MHz         x Chain:       8x8         Node:       ax160 <i>i150 MHz Band Edge Signal Radiated Field Strength</i> Frequency       Level         Pol       FCC 15.209         Detector       Azimuth         MHz       dBµV/m         V/h       Limit         Margin       Pk/QP/Avg         degrees       meters         5130.040       52.9         V       54.0       -1.1         Avg       296       1.6       Note 3 - POS; RB 1 MHz; V         5142.630       50.2       H       54.0       -3.8         Avg       299       1.5       Note 3 - POS; RB 1 MHz; V         5143.510       66.5       H       74.0       -7.5         5129.170       63.0       V       74.0       -11.0       PK       296       1.6       POS; RB 1 MHz; VB: 31         70.0	Run #17: R	Radiated E	Bandedge Mea	surements,	5150-5350 N	ЛНz			
Test Location: Fremont Chamber #7       EUT Voltage: POE & 110 V, 60 Hz         Channel:       50 - 5250 MHz         x Chain:       8x8         Node:       ax160         750 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         5130.040       52.9         V       54.0         5142.630       50.2         H       54.0         5143.510       66.5         H       74.0         5129.170       63.0         V       74.0         71.0       PK         296       1.6         POS; RB 1 MHz; VB 30 Hz         V       74.0         71.0       PK         75.0         70.0         70.0	Γ	Date of Te	st: 10/16/2018			С	onfig. Used:	1	
hannel: 50 - 5250 MHz x Chain: 8x8 lode: ax160 <u>150 MHz Band Edge Signal Radiated Field Strength</u> <u>Trequency Level Pol FCC 15.209 Detector Azimuth Height Comments</u> <u>MHz dBµV/m v/h Limit Margin Pk/QP/Avg degrees meters</u> <u>5130.040 52.9 V 54.0 -1.1 Avg 296 1.6 Note 3 - POS; RB 1 MHz; V5 5142.630 50.2 H 54.0 -3.8 Avg 299 1.5 Note 3 - POS; RB 1 MHz; V5 5143.510 66.5 H 74.0 -7.5 PK 299 1.5 POS; RB 1 MHz; VB 3 f 5129.170 63.0 V 74.0 -11.0 PK 296 1.6 POS; RB 1 MHz; VB 3 f RB 1 MHz; VB 200 Hz Average, RB 1 MHz; VB 3 MHz Peak (Blue) V-pol 75.0</u>		-							
x Chain: 8x8 lode: ax160	le	est Locatio	on: Fremont Ch	amber #7		E	UT Voltage:	POE & 110	V, 60 Hz
Mode:       ax160         S150 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         5130.040       52.9       V       54.0       -1.1       Avg       296       1.6       Note 3 - POS; RB 1 MHz; V         5142.630       50.2       H       54.0       -3.8       Avg       299       1.5       Note 3 - POS; RB 1 MHz; V         5143.510       66.5       H       74.0       -7.5       PK       299       1.5       POS; RB 1 MHz; VB: 3 f         5129.170       63.0       V       74.0       -11.0       PK       296       1.6       POS; RB 1 MHz; VB: 3 f         75.0         70.0       -	hannel:	50 - 5250	) MHz						
6150 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           5130.040         52.9         V         54.0         -1.1         Avg         296         1.6         Note 3 - POS; RB 1 MHz; V           5142.630         50.2         H         54.0         -3.8         Avg         299         1.5         Note 3 - POS; RB 1 MHz; V           5143.510         66.5         H         74.0         -7.5         PK         299         1.5         POS; RB 1 MHz; VB: 31           5129.170         63.0         V         74.0         -11.0         PK         296         1.6         POS; RB 1 MHz; VB: 31           75.0           70.0         -		8x8							
Frequency         Level         Pol         FCC 15.209         Detector         Azimuth         Height         Comments           MHz         dBµV/m         v/h         Limit         Margin         Pk/QP/Avg         degrees         meters         5130.040         52.9         V         54.0         -1.1         Avg         296         1.6         Note 3 - POS; RB 1 MHz; V         5142.630         50.2         H         54.0         -3.8         Avg         299         1.5         Note 3 - POS; RB 1 MHz; V         5143.510         66.5         H         74.0         -7.5         PK         299         1.5         POS; RB 1 MHz; VB: 3 I         5129.170         63.0         V         74.0         -11.0         PK         296         1.6         POS; RB 1 MHz; VB: 3 I           RB 1 MHz; VB 200 Hz Average, RB 1 MHz; VB 3 MHz Peak (Blue) V-pol           75.0	lode:	ax160							
Frequency         Level         Pol         FCC 15.209         Detector         Azimuth         Height         Comments           MHz         dBµV/m         v/h         Limit         Margin         Pk/QP/Avg         degrees         meters         5130.040         52.9         V         54.0         -1.1         Avg         296         1.6         Note 3 - POS; RB 1 MHz; V         5142.630         50.2         H         54.0         -3.8         Avg         299         1.5         Note 3 - POS; RB 1 MHz; V         5143.510         66.5         H         74.0         -7.5         PK         299         1.5         POS; RB 1 MHz; VB: 3 I           5129.170         63.0         V         74.0         -11.0         PK         296         1.6         POS; RB 1 MHz; VB: 3 I           75.0	5150 MHz F	Rand Eda	e Sianal Radia	ted Field St	renath				
MHz         dBμV/m         v/h         Limit         Margin         Pk/QP/Avg         degrees         meters           5130.040         52.9         V         54.0         -1.1         Avg         296         1.6         Note 3 - POS; RB 1 MHz; V           5142.630         50.2         H         54.0         -3.8         Avg         299         1.5         Note 3 - POS; RB 1 MHz; V           5143.510         66.5         H         74.0         -7.5         PK         299         1.5         POS; RB 1 MHz; VB: 3 I           5129.170         63.0         V         74.0         -11.0         PK         296         1.6         POS; RB 1 MHz; VB: 3 I           71.0         -11.0         PK         296         1.6         POS; RB 1 MHz; VB: 3 I           71.0         -11.0         PK         296         1.6         POS; RB 1 MHz; VB: 3 I           71.0         -11.0         PK         296         1.6         POS; RB 1 MHz; VB: 3 I           75.0						Detector	Azimuth	Height	Comments
5142.630         50.2         H         54.0         -3.8         Avg         299         1.5         Note 3 - POS; RB 1 MHz; V           5143.510         66.5         H         74.0         -7.5         PK         299         1.5         POS; RB 1 MHz; VB: 3 I           5129.170         63.0         V         74.0         -11.0         PK         296         1.6         POS; RB 1 MHz; VB: 3 I           5129.170         63.0         V         74.0         -11.0         PK         296         1.6         POS; RB 1 MHz; VB: 3 I           RB 1 MHz; VB 200 Hz Average, RB 1 MHz; VB 3 MHz Peak (Blue) V-pol           75.0			n v/h	Limit	Margin			-	
5143.510         66.5         H         74.0         -7.5         PK         299         1.5         POS; RB 1 MHz; VB: 3 1           5129.170         63.0         V         74.0         -11.0         PK         296         1.6         POS; RB 1 MHz; VB: 3 1           RB 1 MHz; VB 200 Hz Average, RB 1 MHz; VB 3 MHz Peak (Blue) V-pol           75.0 -           70.0 -						Avg			Note 3 - POS; RB 1 MHz; VB: 200 H
5129.170         63.0         V         74.0         -11.0         PK         296         1.6         POS; RB 1 MHz; VB: 3 I           RB 1 MHz; VB 200 Hz Average, RB 1 MHz; VB 3 MHz Peak (Blue) V-pol         75.0 -						-			Note 3 - POS; RB 1 MHz; VB: 200 H:
RB 1 MHz; VB 200 Hz Average, RB 1 MHz; VB 3 MHz Peak (Blue) V-pol 75.0 – 70.0 –									
75.0	5129.170	63.0	V	74.0	-11.0	۲ň	290	1.0	POS; RB T MHZ; VB: 3 MHZ
55.0 50.0 50.0 50.0 5110 5115 5120 5125 5130 5135 5140 5145 Frequency (MHz)	Amplitude (dBuV/m)	75.0 - 70.0 - 65.0 - 60.0 - 55.0 - 50.0 - 45.0 -	hunnan hull	WMmy May	nyhrup hyhr	AMANA A			



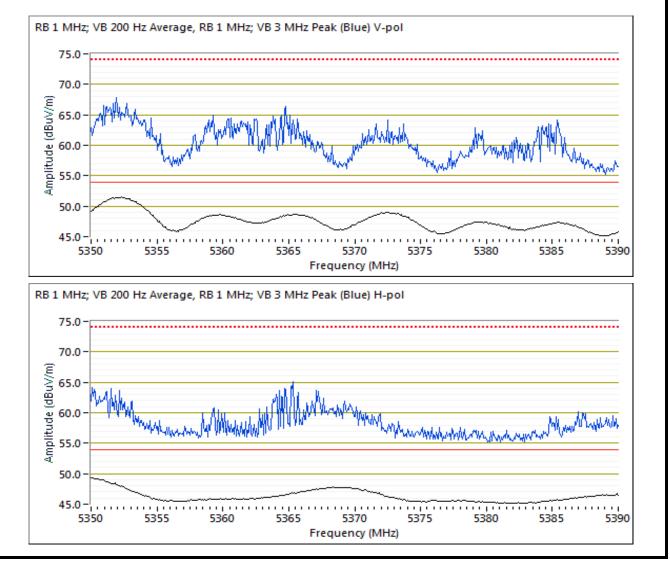
# 🎲 NTS

## EMC Test Data

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:		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

### 5350 MHz Band Edge Signal Radiated Field Strength

		gina						
Frequency	Level	Pol	FCC 1	15.209	Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5352.130	51.5	V	54.0	-2.5	Avg	286	1.6	Note 3 - POS; RB 1 MHz; VB: 200 Hz
5350.790	68.9	V	74.0	-5.1	PK	286	1.6	POS; RB 1 MHz; VB: 3 MHz
5350.240	49.3	Н	54.0	-4.7	Avg	295	1.5	Note 3 - POS; RB 1 MHz; VB: 200 Hz
5350.450	65.7	Н	74.0	-8.3	PK	295	1.5	POS; RB 1 MHz; VB: 3 MHz



	21	S							EMC Test Data	
Client	t: Aruba	, a He	wlett Packard	d Enterprise	company				Job Number: PR075848	
Mode	I: APIN(	)555		-				T-	Log Number: TL075848-RA-FCC	
								-	ect Manager: Christine Krebill	
	tact: Mark Hill Project Coordinator: David Bare									
Standard	I: FCC §	§15.24	7 & §15.407						Class: N/A	
Run #18:	Radiate	ed Ban	idedge Meas	surements,	5470-5725N	lHz				
	Date of	Test:	10/17/2018			C	onfig. Used:	1		
			Deniz Demir				fig Change:			
[	Test Loc	ation:	Fremont Cha	amber #7		E	UT Voltage:	POE & 110	V, 60 Hz	
Channel: Tx Chain: Mode: <i>5460 MHz</i>	Tx Chain: 8x8									
Frequency	/ Le	vel	Pol	FCC 1	5.209	Detector	Azimuth	Height	Comments	
MHz	dΒμ		v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5450.040			Н	54.0	-1.3	Avg	302	1.5	Note 3 - POS; RB 1 MHz; VB: 200 Hz	
5451.290	-		H	74.0	-8.3	PK	302	1.5	POS; RB 1 MHz; VB: 3 MHz	
5449.920 5449.680			V V	54.0 74.0	-1.9 -11.4	Avg PK	<u> </u>	1.8 1.8	Note 3 - POS; RB 1 MHz; VB: 200 Hz POS; RB 1 MHz; VB: 3 MHz	
(m//	75.0 - 70.0 - 65.0 - 55.0 - 50.0 - 45.0 -	4444444		utuallant	M.,	5 5440		www.coll	450 5455 5460	
						Frequency	/ (MHz)			

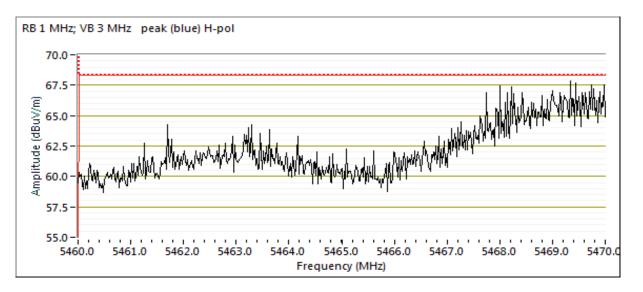
	NTS
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## EMC Test Data

Client:	Aruba, a Hewlett Packard Enterprise company	Job Number:	PR075848
Model:	APIN0555	T-Log Number:	TL075848-RA-FCC
	AF IN0555	Project Manager:	Christine Krebill
Contact:	Mark Hill	Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407	Class:	N/A

#### *5470 MHz Band Edge Signal Radiated Field Strength*

Frequency	Level	Pol	15	i.E	Detector	Azimuth	Height	Comments			
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters				
5469.640	68.2	Н	68.3	-0.1	PK	50	1.5	POS; RB 1 MHz; VB: 3 MHz			
5463.230	68.0	V	68.3	-0.3	PK	64	1.8	POS; RB 1 MHz; VB: 3 MHz			



	NTS			EMO	C Test Dai
Client:	Aruba, a Hewlett Packard Enterp	rise company		Job Number:	PR075848
Model	APIN0555			T-Log Number:	TL075848-RA-FCC
				Project Manager:	
Contact:	Mark Hill			Project Coordinator:	David Bare
Standard:	FCC §15.247 & §15.407			Class:	N/A
	RSS-247, FCC 15.2	47 and FCC 1	5.407 Radiate	ed Spurious Emiss	sions
est Spec	ific Details Objective: The objective of this specification listed a		form final qualificati	on testing of the EUT with r	espect to the
The EUT a	est Configuration and all local support equipment w ed emissions testing the measure				e noted.
Ambient (	Conditions:	Temperature: Rel. Humidity:	20-24 °C 35-45 %		
	ions Made During Testing cations were made to the EUT du	ring testing			
	s From The Standard ons were made from the requiren	nents of the standard.			

	NTS					EM	C Test Data	
Client:	: Aruba, a Hev	wlett Packar	d Enterprise	company		Job Number:	PR075848	
Madal	APIN0555					T-Log Number:	TL075848-RA-FCC	
	APINU000					Project Manager:		
	: Mark Hill					Project Coordinator: David Bare		
Standard:	: FCC §15.247	7 & §15.407				Class:	N/A	
Summary	y of Result	.S						
Run #	Mode	Channel	Target Powers	Power Settings	Test Performed	Limit	Result / Margin	
Scans on "c	enter" chann	el in all five (			the worst case mode (8)	x8 in 5 GHz bands and 4	x4 in 2.4 GHz band).	
	a / g	6 & 40	15 / 20	20 /20			45.9dBµV/m @ 20798.9MHz (-8.1dE	
	ax20	6 & 40	20 / 20	20 /20	-	FCC 15.209/ 15.247 / 15 E	43.9dBµV/m @ 20798.2MHz (-10.1d	
1	ax40	6 & 38	20 / 20	20 / 20	Radiated Emissions, 1 - 40 GHz		39.1 dBµV/m @ 20758.5MHz (-14.9d	
	ax80 / b	6 & 42	20 / 20	20 / 20			48.0 dBµV/m @ 7210 MHz (-6.0 dB)	
	ac160 (80+80) / b	6 & 50	14.5 / 20	14.5 / 20			34.3 dBµV/m @ 22675.2MHz (-19.7d	
	center" channe e performed ir		)FDM modes	s to determine	e the worst case mode (8)	x8 in 5 GHz bands and 4		
	g /a	6 & 116	20 / 12	20 / 20			44.1 dBµV/m @ 22320.7 MHz (-9.9 d	
	ax20	6 & 116	20 / 14.5	20 / 20			42.8dBµV/m @ 22321.4MHz (-11.2c	
6	ax40	6 & 110	20 / 14.5	20 / 20	Radiated Emissions, 1 - 40 GHz	FCC 15.209/ 15.247 / 15 E	50.1 dBµV/m @ 11100.0 MHz (-3.9 c	
	ax80 / b	6 & 122	20 / 14.5	20 / 20			44.4 dBµV/m @ 11220.0 MHz (-9.6 c	
	ax160 (80+80) / b	6 & 114	20 / 14.5	20 / 20			34.5 BµV/m @ 22440.0MHz (-19.5c	

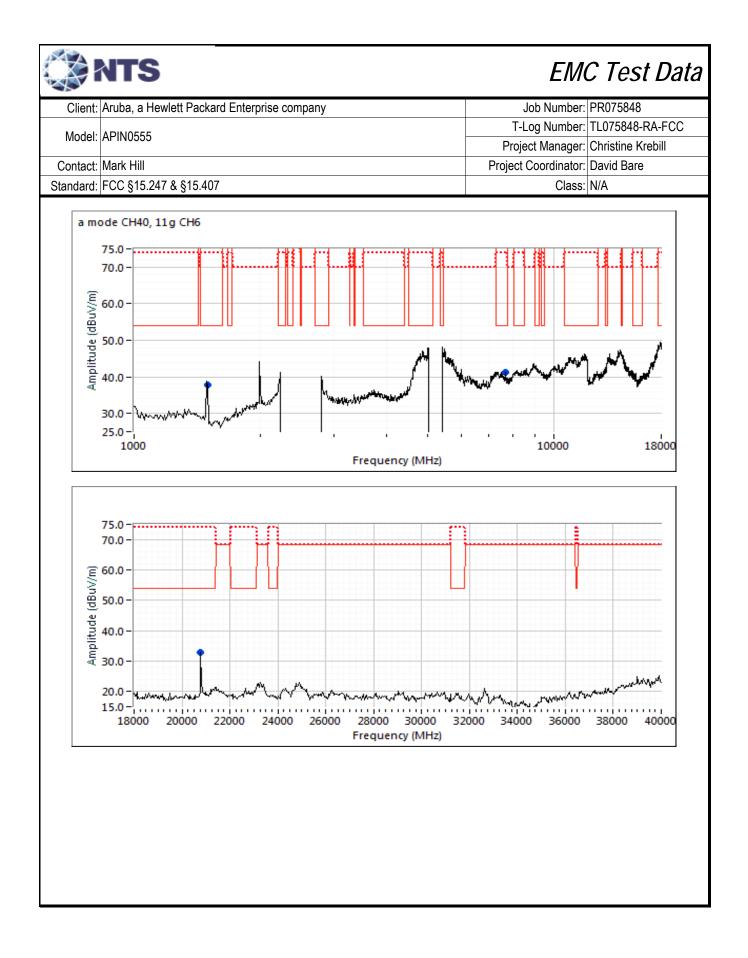
### Procedure Comments:

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)

		<b>_</b>							
	NTS							EM	C Test Data
Client:	Aruba, a He	wlett Packar	d Enterprise	company				Job Number:	PR075848
Madal	APIN0555						T-!	Log Number:	TL075848-RA-FCC
WOUEI.	APINU0000						Proje	ect Manager:	Christine Krebill
Contact:	Mark Hill						Project	Coordinator:	David Bare
Standard:	FCC §15.24	7 & §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		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
ļ	11g	6 Mb/s	0.92	Yes	1.437	0.4	0.7	696	1 kHz
	11a ax20	6 Mb/s MCS0	0.92 0.96	Yes Yes	1.437 5.485	0.3 0.2	0.7	696 182	1 kHz 200 Hz
	ax20 ax40	MCS0 MCS0	0.96	Yes	5.405	0.2	0.3	185	200 Hz 200 Hz
ļ	ax40 ax80	MCS0	0.90	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
	Driver: Antenna:	P4 V0.4.5 Internal 8 ar with 3 dB hig	gher power a nnas at the 4 a	GHz radio and can opera	ind 4 antenna ate in both lo	wer and uppe	er 5 GHz bar	•	also use 4 antennas but eously). Tests performed target power.
Note 1:							•	,	ns related to UNII
						urement (RB	3=1MHz, VB	≥3MHz, peak	c detector).
Note 2	Emission in	non-restricte	ed band, but li	mit of 15.20	J used.	-t norformod			but not loss than 10Uz
Note 3:			eraging, auto						but not less than 10Hz,
Note 4:	Emission ha	as constant d	luty cycle < 98	8%, average	measureme	nt performed	l: RBW=1MH	Hz, VBW>1/T	but not less than 10Hz, near voltage correction
Note 5:	-20 dB corr		was used for						
Note 6:	Digital devic	e emission, o	class A limit e	extrapolated	to 3m applier	d, peak readi	ing vs peak o	or average lin	nit.

Client:         Aruba, a Hewlett Packard Enterprise company         Job Number:         PR075848           Model:         APIN0555         T-Log Number:         TL075848-RA- Project Manager:         Christine Krebi           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 & 110 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           20798.900         45.9         V         54.0         -8.1         AVG         338         1.1         RB 1 MHz;VB 1 kHz, note 3           20799.660         41.9         H         54.0         -12.1         AVG         32         1.2         RB 1 MHz;VB 3 MHz;Peak           7644.850         36.8	
Model:         APIN0555         Project Manager:         Christine Krebi           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. Used:         1         Config. Used:         1           Test Location:         Fremont Chamber #4         EUT Voltage:         POE & 110 V, 60 Hz         X           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         dB <sub>µ</sub> V/m         v/h         Limit         Margin         Pk/QP/Avg         degrees         meters           20798.050         57.8         V         74.0         -16.2         PK         338         1.1         RB 1 MHz;VB 1 kHz, note 3           20800.320         54.5         H         74.0         -19.5         PK         3	
Project Manager:         Christine Krebi           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:         Config:         Used:         1           Run #1, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5150-5250 MHz Band Date of Test:         Config:         Used:         1           Test Engineer:         M. Birgani         Config:         Used:         1         Feature         None           Test Location:         Freemont Chamber #4         EUT Voltage:         POE & 110 V, 60 Hz         Hait         Kingani         Kingani           Run #1a:         Center Channel Channel, Mode, Chain, Level: 6, g, 4, 20         Detector         Azimuth         Height         Comments           MHz         dBµV/m         v/n         Limit         Margin         Pk/QP/Avg         degrees         meters           20798.000         45.9         V         54.0         -8.1         AVG         338         1.1         RB 1 MHz;VB 3 MHz;Peak           20798.650         57.8         V         74.0         -16.2         PK         338         1.1	
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 & 110 V, 60 Hz           Run #1a:         Center Channel         Channel, Mode, Chain, Level: 6, g, 4, 20           Channel, Mode, Chain, Level: 40, a, 8, 20         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           20798.900         45.9         V         54.0         -16.2         PK         338         1.1         RB 1 MHz;VB 3 MHz;Peak           20799.600         41.9         H         54.0         -12.1         AVG         32         1.2         RB 1 MHz;VB 3 MHz;Peak           20800.320         54.5         H         74.0         -19.5         PK         32         1.2         R	
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 & 110 V, 60 Hz           Run #1a:         Center Channel         Channel, Mode, Chain, Level: 6, g, 4, 20           Channel, Mode, Chain, Level: 40, a, 8, 20         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           20798.900         45.9         V         54.0         -16.2         PK         338         1.1         RB 1 MHz;VB 3 MHz;Peak           20799.600         41.9         H         54.0         -12.1         AVG         32         1.2         RB 1 MHz;VB 3 MHz;Peak           20800.320         54.5         H         74.0         -19.5         PK         32         1.2         R	
Date of Test:         10/25/2018         Config. Used:         1           Test Engineer:         M. Birgani         Config Change:         None           Test Location:         Fremont Chamber #4         EUT Voltage:         POE & 110 V, 60 Hz           Run #1a:         Center Channel         EUT Voltage:         POE & 110 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           20799.600         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         22	
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 3 MHz;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	
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	
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           20798.500         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	
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	
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 3 MHz;Peak           7644.850         49.5         V         74.0         -24.5         PK         224         1.0         RB 1 MHz;VB 3 MHz;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	
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	
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	
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	
500.010 36.1 V 60.0 -23.9 AVG 180 1.0 RB 1 MHz;VB 10 Hz;Peak	
1/00 050 / 0.5 V 80.0 30.5 PK 180 1.0 PB 1 MHz VB 3 MHz Poak	
Note:       Scans made between 18 - 40 GHz with the measurement antenna moved around the EUT 30 from the device indicate 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 UN operation. The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector).	



								EMO	C Test Data
	Aruba, a Hev	vlett Packard	I Enterprise	company				Job Number:	PR075848
Madalı	APIN0555						T-I	_og Number:	TL075848-RA-FCC
wodel:	APINU0000						Proje	ect Manager:	Christine Krebill
Contact:	Mark Hill						Project	Coordinator:	David Bare
Standard:	FCC §15.247	7 & §15.407						Class:	
Run #1b:  C [ Te	Center Chann Date of Test: est Engineer: I est Location: I	nel 10/25/2018 M. Birgani	amber #4		Cor	onfig. Used: ıfig Change: UT Voltage:	None		
Char	nnel, Mode, Cl	hain, Level:	6, b, 4, 20						
	nnel, Mode, Cl		40, ax20, 8,						
Frequency	Level	Pol	15.209		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	RB 1 MHz;V	
20798.780	58.7	V	74.0	-15.3	PK	336	1.2	,	B 3 MHz;Peak
1500.010	40.4	V	54.0	-13.6	PK	206	1.0	RB 1 MHz;V	B 3 MHz;Peak
Note 2:	operation. T	he measurer	ment method	required is	a peak meas	urement (RB	=1MHz, VB2	≥3MHz, peak	detector).
	75.0 70.0 -								
(m//m	75.0 - 70.0 - 60.0 -								
	75.0 - 70.0 - 60.0 - 50.0 - 40.0 -		l (		Yest Income				
(m//m	75.0 - 70.0 - 60.0 -		l (						

Client: A	vruba, a Hev	vlett Packard	d Enterprise	company				Job Number:	PR075848
Model: A			-				T-I	Log Number:	TL075848-RA-FCC
wodel. A	PINU0000						Proje	ect Manager:	Christine Krebill
Contact: M	/lark Hill						Project	Coordinator:	David Bare
Standard: F	CC §15.247	7 & §15.407						Class:	N/A
ın #1c: Cer	nter Chann	el							
	ate of Test:					onfig. Used:			
	t Engineer:	-	ombor #1			ifig Change:			
Test Location: Fremont Chamber #4 EUT Voltage:						FUE & IIU	V, UU HZ		
Channe	el, Mode, C	hain, Level:	6, b, 4, 20						
			38, ax40, 8,						
	Level	Pol	15.209 Limit		Detector	Azimuth	Height	Comments	
MHz 0758.480	dBµV/m 39.1	v/h V	Limit 54.0	Margin -14.9	Pk/QP/Avg AVG	degrees 338	meters 1.2		'B 300 Hz; note 3
					AVG	ააი	1.2		
759.830 500.010 Note: S w	53.6 40.4 Scans made vere no sign	V V between 18	74.0 54.0 - 40 GHz wi	-20.4 -13.6 th the meas requency ra	PK PK urement anter nge other that	338 206 nna moved a n the 4th har	1.2 1.0 around the E monic of the	RB 1 MHz;V RB 1 MHz;V UT 30 from the 5GHz fundar	B 3 MHz;Peak B 3 MHz;Peak ne device indicated t mental.
0759.830 500.010 Note: S w Note 1: Fo Note 2: Fo op ax40 C 7! 70 (∭ 60 pp 10 50	53.6 40.4 Scans made vere no sign for emission for emission peration. T CH38, 11b 5.0 –	V V between 18 ificant emiss s in restricte s outside of he measure	74.0 54.0 - 40 GHz wi ions in this fi d bands, the the restricted	-20.4 -13.6 th the meas requency rai limit of 15.2 d bands the	PK PK urement ante nge other thai 209 was used	338 206 nna moved a n the 4th har which requir m/MHz eirp (	1.2 1.0 around the E monic of the es average 68.3dBuV/m	RB 1 MHz;V RB 1 MHz;V UT 30 from the 5GHz fundar and peak mea 1) for emission	B 3 MHz;Peak B 3 MHz;Peak ne device indicated t mental. asurements. ns related to UNII

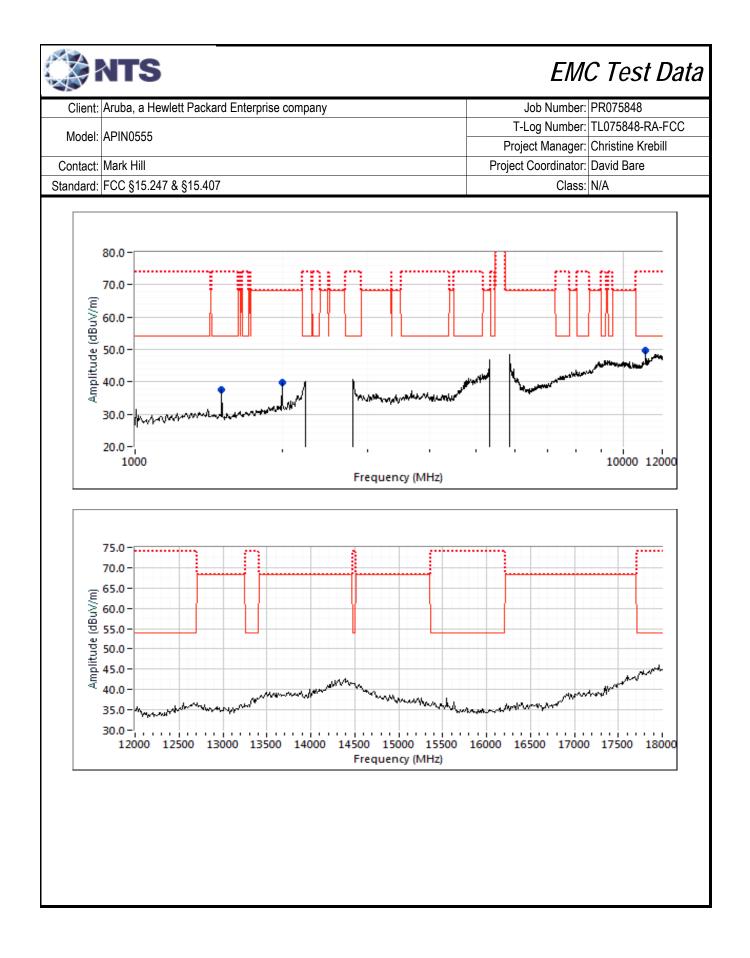
<u>~</u>									00075010
Client:	Aruba, a Hew	lett Packar	d Enterprise	company				Job Number:	
Model:	APIN0555					-		0	TL075848-RA-FCC
								-	Christine Krebill
	Mark Hill						Project	Coordinator:	
Standard:	FCC §15.247	& §15.407						Class:	N/A
Char	Center Chann nnel, Mode, Ch nnel, Mode, Ch	nain, Level:		20					
requency	cy Level Pol 15.209 / 15E Detector Azimuth							Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	Height meters	e e i i i i i i i i i i i i i i i i i i	
216.200	48.0	H	54.0	-6.0	Avg	53	2.0	VB 3 kHz, V	AVG 100, note 2, 3
216.550	53.0	H	74.0	-21.0	PK	53	2.0		/B 3 MHz;Peak
0839.770	38.4	V	54.0	-15.6	AVG	338	1.2		'B 300 Hz; note 3
0838.560	52.4	V	74.0	-21.6	PK	338	1.2		/B 3 MHz;Peak
2000.000	41.2	V	60.0	-18.8	Peak	196	1.5	Note 6	
5041.670	60.3	Н			Peak	300	2.0		ge measurements.
416.670	54.8	Н			Peak	46	1.5	See banded	ge measurements.
Note 2:	For emissions operation. The							,	ns related to UNII detector).

	NTS							EMO	C Test Data
Client:	Aruba, a Hev	wlett Packar	d Enterprise	company				Job Number:	PR075848
Model.	APIN0555						T-I	_og Number:	TL075848-RA-FCC
								2	Christine Krebill
	Mark Hill						Project	Coordinator:	
Standard:	FCC §15.24	7 & §15.407						Class:	N/A
Channel:	Center Chanr 6 & 50 Wi-Fi 8 (5GHz), 4				ac80+80 / b MCS0 / 1Mb	/s			
Frequency	Level	Pol		9 / 15E	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
22675.230 22689.930	34.3 47.0	V V	54.0 74.0	-19.7 -27.0	AVG PK	347 347	<u>1.1</u> 1.1		B 300 Hz; note 3 B 3 MHz;Peak
2000.000	47.0	V	60.0	-27.0	Peak	269	1.1	Note 6	
itude (dBu//m)	0+80 CH50, 1 80.0 - 70.0 - 60.0 - 50.0 - 40.0 - 30.0 - 20.0 - 1000	IIb CH6	- And and a second		Frequency			10000	

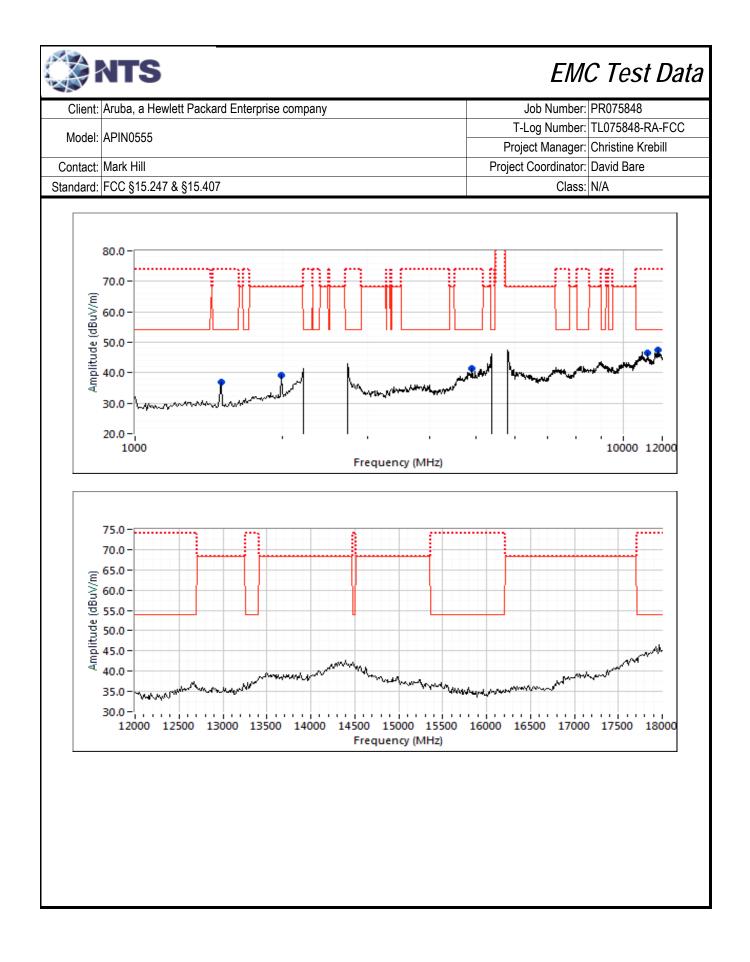
								EM	
Client:	Aruba, a Hev	wlett Packard	I Enterprise	company				Job Number:	
Model.	APIN0555							-	TL075848-RA-FCC
								-	Christine Krebill
Contact:	Mark Hill						Projec	t Coordinator:	David Bare
Standard:	FCC §15.24	7 & §15.407						Class:	N/A
un #6, Ra	diated Spurio	ous Emissio	ns, 1,000 -	40,000 MHz	. Operation in	n the 5470-5	725 MHz B	and	
I	Date of Test:	10/29/18			C	onfig. Used:	1		
	est Engineer:					fig Change:			
T	est Location:	Chamber 4			E	UT Voltage:	PoE & 120	V / 60Hz	
un #6a: C	enter Chann	el							
	6 & 116 Wi-F			Mode	: g, a		Power	: 20 / 12	
	8 (5GHz), 4			Data Rate	0,				
requency	Level	Pol		9 / 15E	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
1694.250		V	54.0	-11.7	Avg	88	2.5	VB 1 kHz, n	
1696.480 2320.720	53.3 44.1	V V	74.0	-20.7 -9.9	PK	88 28	2.5 1.0		B 3 MHz;Peak
2320.720	44.1 57.4	V	54.0 74.0	-9.9 -16.6	AVG PK	28 28	1.0		'B 1 kHz; note 3 'B 3 MHz;Peak
1500.000	36.9	V	60.0	-10.0	Peak	63	1.0	Note 6	
2000.000	39.4	V	60.0	-20.6	Peak	345	1.0	Note 6	
Note 1: Note 2:	were no sign For emission For emission	ificant emiss is in restricte is outside of he measurer	ions in this f d bands, the the restricte	requency ra limit of 15.2 d bands the	nge other thar 209 was used	n the 4th han which requir n/MHz eirp (	monic of the es average 68.3dBuV/r	e 5GHz funda and peak me n) for emission	asurements. ns related to UNII
	20.0-								

	Aruba, a Hev	vlett Packard	d Enterprise	company				Job Number:	PR075848	
			p						TL075848-RA-FCC	
Model:	APIN0555							•	Christine Krebill	
Contact:	Mark Hill						-	Coordinator:		
Standard:	FCC §15.24	7 & §15.407					,	Class:		
		- 0							-	
un #6b: 0	Center Chanr	nel								
Channel:	6 & 116 Wi-F	i		Mode:	ax20 / ax20		Power: 20 /20			
Tx Chain:	8 (5GHz), 4	(2.4 GHz)		Data Rate:	MCS0					
		Dal	15.00	0/155	Detector	A _:	11-1-1-1	0		
requency MHz	Level dBµV/m	Pol v/h	Limit	9 / 15E Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments		
1890.500	авµv/ш 41.9	H	54.0	-12.1	Avg	316	2.0	VB 300 Hz,	note 3	
1889.990	53.3	H	74.0	-12.1	PK	316	2.0		/B 3 MHz;Peak	
2321.440	42.8	V	54.0	-11.2	VAVG	28	1.2		B 300 Hz; note 3	
2021.110		V	74.0	-16.6	PK	28	1.2		/B 3 MHz;Peak	
2321,160	57.4	V		-10.0						
	57.4 37.8	V				165	1.0		,,	
500.000 2000.000 Note: Note 1:	37.8 40.3 Scans made were no sign For emission For emission	V V between 18 ificant emiss is in restricte is outside of	60.0 60.0 - 40 GHz w sions in this t ed bands, the the restricte	-22.2 -19.7 ith the measu frequency rau e limit of 15.2 d bands the	Peak Peak urement anter nge other that 09 was used	n the 4th har which requir m/MHz eirp (	monic of the es average 68.3dBuV/m	Note 6 Note 6 UT 30 from the 5GHz funda and peak me n) for emission	ne device indicated t mental. asurements. ns related to UNII	
1500.000 2000.000	37.8 40.3 Scans made were no sign For emission For emission	V V between 18 ificant emiss is in restricte is outside of	60.0 60.0 - 40 GHz w sions in this t ed bands, the the restricte	-22.2 -19.7 ith the measu frequency rau e limit of 15.2 d bands the	Peak Peak urement anter nge other that 09 was used limit is -27dBr	175 nna moved a n the 4th har which requir n/MHz eirp (	1.5 round the E monic of the es average 68.3dBuV/m	Note 6 Note 6 UT 30 from the 5GHz funda and peak me n) for emission	ne device indicated t mental. asurements. ns related to UNII	
1500.000 2000.000 Note: Note 1:	37.8 40.3 Scans made were no sign For emission operation. T 80.0 –	V V between 18 ificant emiss is in restricte is outside of	60.0 60.0 - 40 GHz w sions in this t ed bands, the the restricte	-22.2 -19.7 ith the measu frequency rau e limit of 15.2 d bands the	Peak Peak urement anter nge other that 09 was used limit is -27dBr	175 nna moved a n the 4th har which requir n/MHz eirp (	1.5 round the E monic of the es average 68.3dBuV/m	Note 6 Note 6 UT 30 from the 5GHz funda and peak me n) for emission	ne device indicated t mental. asurements. ns related to UNII	
1500.000 2000.000 Note: Note 1: Note 2:	37.8 40.3 Scans made were no sign For emission operation. T	V V between 18 ificant emiss is in restricte is outside of	60.0 60.0 - 40 GHz w sions in this t ed bands, the the restricte	-22.2 -19.7 ith the measu frequency rau e limit of 15.2 d bands the	Peak Peak urement anter nge other that 09 was used limit is -27dBr	175 nna moved a n the 4th har which requir n/MHz eirp (	1.5 round the E monic of the es average 68.3dBuV/m	Note 6 Note 6 UT 30 from th s 5GHz funda and peak me n) for emission ≥3MHz, peak	ne device indicated t mental. asurements. ns related to UNII	
1500.000 2000.000 Note: Note 1: Note 2:	37.8 40.3 Scans made were no sign For emission operation. T 80.0 –	V V between 18 ificant emiss is in restricte is outside of	60.0 60.0 - 40 GHz w sions in this t ed bands, the the restricte	-22.2 -19.7 ith the measu frequency rau e limit of 15.2 d bands the	Peak Peak urement anter nge other that 09 was used limit is -27dBr	175 nna moved a n the 4th har which requir n/MHz eirp (	1.5 round the E monic of the es average 68.3dBuV/m	Note 6 Note 6 UT 30 from th s 5GHz funda and peak me n) for emission ≥3MHz, peak	ne device indicated t mental. asurements. ns related to UNII	
1500.000           2000.000           Note:           Note 1:           Note 2:	37.8 40.3 Scans made were no sign For emission operation. T 80.0 – 70.0 – 60.0 –	V V between 18 ificant emiss is in restricte is outside of	60.0 60.0 - 40 GHz w sions in this t ed bands, the the restricte	-22.2 -19.7 ith the measu frequency rau e limit of 15.2 d bands the	Peak Peak urement anter nge other that 09 was used limit is -27dBr	175 nna moved a n the 4th har which requir n/MHz eirp (	1.5 round the E monic of the es average 68.3dBuV/m	Note 6 Note 6 UT 30 from th s 5GHz funda and peak me n) for emission ≥3MHz, peak	ne device indicated t mental. asurements. ns related to UNII	
1500.000           2000.000           Note:           Note 1:           Note 2:	37.8 40.3 Scans made were no sign For emission operation. T 80.0 – 70.0 –	V V between 18 ificant emiss is in restricte is outside of	60.0 60.0 - 40 GHz w sions in this t ed bands, the the restricte	-22.2 -19.7 ith the measu frequency rau e limit of 15.2 d bands the	Peak Peak urement anten nge other that 09 was used limit is -27dBr	175 nna moved a n the 4th har which requir n/MHz eirp (	1.5 iround the E monic of the es average 68.3dBuV/m =1MHz, VB	Note 6 Note 6 UT 30 from th s 5GHz funda and peak me n) for emission ≥3MHz, peak	ne device indicated t mental. asurements. ns related to UNII	
1500.000           2000.000           Note:           Note 1:           Note 2:	37.8 40.3 Scans made were no sign For emission operation. T 80.0 – 70.0 – 60.0 – 50.0 –	V V between 18 ificant emiss is in restricte is outside of	60.0 60.0 - 40 GHz w sions in this t ed bands, the the restricte	-22.2 -19.7 ith the measu frequency rau e limit of 15.2 d bands the	Peak Peak urement anten nge other that 09 was used limit is -27dBr	175 nna moved a n the 4th har which requir n/MHz eirp (	1.5 iround the E monic of the es average 68.3dBuV/m =1MHz, VB	Note 6 Note 6 UT 30 from th s 5GHz funda and peak me n) for emission ≥3MHz, peak	ne device indicated t mental. asurements. ns related to UNII	
Note 1: Note 2:	37.8 40.3 Scans made were no sign For emission operation. T 80.0 – 70.0 – 60.0 –	V V between 18 ificant emiss is in restricte is outside of	60.0 60.0 - 40 GHz w sions in this t ed bands, the the restricte	-22.2 -19.7 ith the measu frequency ran e limit of 15.2 d bands the d required is	Peak Peak urement anten nge other than 09 was used limit is -27dBr a peak meas	175 nna moved a n the 4th har which requir n/MHz eirp (	1.5 iround the E monic of the es average 68.3dBuV/m =1MHz, VB	Note 6 Note 6 UT 30 from th s 5GHz funda and peak me n) for emission ≥3MHz, peak	ne device indicated t mental. asurements. ns related to UNII	
1500.000 2000.000 Note: Note 1: Note 2:	37.8 40.3 Scans made were no sign For emission operation. T 80.0 – 70.0 – 60.0 – 50.0 –	V V between 18 ificant emiss is in restricte is outside of	60.0 60.0 - 40 GHz w sions in this t ed bands, the the restricte	-22.2 -19.7 ith the measu frequency ran e limit of 15.2 d bands the d required is	Peak Peak urement anten nge other that 09 was used limit is -27dBr	175 nna moved a n the 4th har which requir n/MHz eirp (	1.5 iround the E monic of the es average 68.3dBuV/m =1MHz, VB	Note 6 Note 6 UT 30 from th s 5GHz funda and peak me n) for emission ≥3MHz, peak	ne device indicated t mental. asurements. ns related to UNII	
1500.000 2000.000 Note: Note 1: Note 2:	37.8 40.3 Scans made were no sign For emission operation. T 80.0 - 70.0 - 60.0 - 50.0 - 40.0 - 30.0 -	V V between 18 ificant emiss is in restricte is outside of	60.0 60.0 - 40 GHz w sions in this t ed bands, the the restricte	-22.2 -19.7 ith the measu frequency ran e limit of 15.2 d bands the d required is	Peak Peak urement anten nge other than 09 was used limit is -27dBr a peak meas	175 nna moved a n the 4th har which requir n/MHz eirp (	1.5 iround the E monic of the es average 68.3dBuV/m =1MHz, VB	Note 6 Note 6 UT 30 from th s 5GHz funda and peak me n) for emission ≥3MHz, peak	ne device indicated t mental. asurements. ns related to UNII	
1500.000 2000.000 Note: Note 1: Note 2:	37.8 40.3 Scans made were no sign For emission operation. T 80.0 - 70.0 - 60.0 - 50.0 - 40.0 -	V V between 18 ificant emiss is in restricte is outside of	60.0 60.0 - 40 GHz w sions in this t ed bands, the the restricte	-22.2 -19.7 ith the measu frequency ran e limit of 15.2 d bands the d required is	Peak Peak urement anten nge other than 09 was used limit is -27dBr a peak meas	175 nna moved a n the 4th har which requir n/MHz eirp (	1.5 iround the E monic of the es average 68.3dBuV/m =1MHz, VB	Note 6 Note 6 UT 30 from th s 5GHz funda and peak me n) for emission ≥3MHz, peak	ne device indicated t mental. asurements. ns related to UNII	

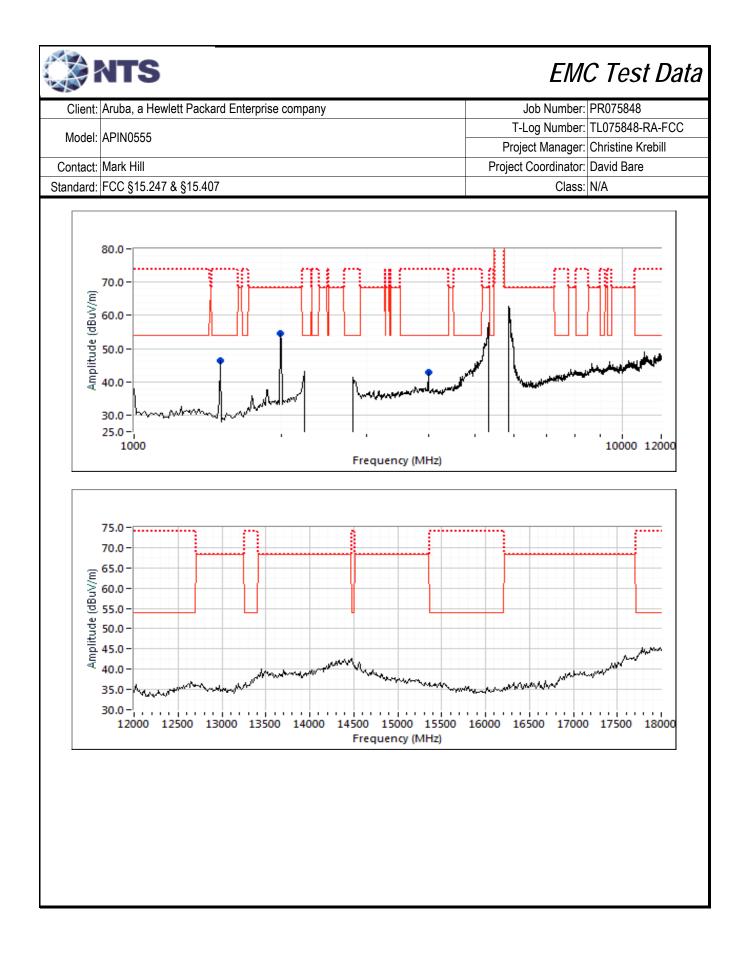
Client	Aruba, a Hew	lett Packard	d Enterprise	company				Job Number:	PR075848	
							T-	Log Number:	TL075848-RA-FCC	
Model	APIN0555						Proj	ect Manager:	Christine Krebill	
Contact	Mark Hill						Project	Coordinator:	David Bare	
Standard	FCC §15.247	' & §15.407					Class: N/A			
		-								
	Center Channe			Mada	1110 h					
	: 6 & 110 Wi-F : 8 (5GHz), 4 (;				11ax40, b 1 Mb/s & M(	000				
	0 (30112), 4 (	2.4 GHZ)		030						
equency	Level Pol 15.209 / 15E Detector Azimuth						Height	Comments		
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters			
099.950		V	54.0	-3.9	Avg	29	1.9	VB 300 Hz,		
099.780		V	74.0	-18.2	PK	29	1.9		/B 3 MHz;Peak	
192.400		V	54.0	-16.6	Avg	32	1.0	VB 300 Hz,		
193.500		V	74.0	-23.2	PK	32	1.0	RB 1 MHz;V	'B 3 MHz;Peak	
500.000	37.5	V	60.0	-22.5	Peak	78	1.0	Note 6		
000.000	39.9	V	60.0	-20.1	Peak	145	1.5	Note 6		



Client:	Aruba, a Hev	vlett Packard	d Enterprise	company				Job Number:		
Model	APIN0555						T-	Log Number:	TL075848-RA-FCC	
MOUEI.							Proje	ect Manager:	Christine Krebill	
Contact:	Mark Hill						Project	Coordinator:	David Bare	
Standard:	FCC §15.24	7 & §15.407					Class: N/A			
Channel:	enter Chanr 6 & 122 Wi-F 8 (5GHz), 4 (	i			ax80 / b 1 Mb/s & M0	CSO	Note: Chan	nel 122 not u	sed in Canada	
Frequency	Level	Pol	15.20	9 / 15E	Detector	Azimuth	Height	Comments		
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters			
1500.000	36.8	Н	60.0	-23.2	Peak	205	2.0	Note 6		
2000.000	39.1	V	60.0	-20.9	Peak	150	1.5	Note 6		
4895.950	37.4	Н	54.0	-16.6	Avg	30	2.0	VB 3 kHz, n		
4896.070	46.8	Н	74.0	-27.2	PK	30	2.0		'B 3 MHz;Peak	
11219.980	44.4	V	54.0	-9.6	Avg	146	1.5	VB 3 kHz, n		
11219.900	52.4	V	74.0	-21.6	PK	146	1.5		B 3 MHz;Peak	
22439.970	37.8	V	54.0	-16.2	Avg	3	1.0	VB 3 kHz, n		
22439.970	51.2	V	74.0	-22.8	PK	3	1.0	RB 1 MHZ;V	'B 3 MHz;Peak	
Note 1:	For emission For emission	is in restricte is outside of	d bands, the the restricte	e limit of 15.2 d bands the	nge other thar 209 was used limit is -27dBr a peak measu	which requi n/MHz eirp	res average (68.3dBuV/m	and peak mean) for emission	asurements. ns related to UNII	



	NTS							EM	C Test Data	
Client:	nt: Aruba, a Hewlett Packard Enterprise company							Job Number:	PR075848	
Madal						T-I	_og Number:	TL075848-RA-FCC		
wodel:	APIN0555	0000					Proje	ect Manager:	Christine Krebill	
Contact:	st: Mark Hill							Coordinator:		
Standard:	tandard: FCC §15.247 & §15.407							Class: N/A		
Channel:	Center Chanr 6 & 114 Wi-F 8 (5GHz), 4	=i			ax80+80 / b 1 Mb/s & M	CS0	Note: Chan	nel 114 not u	sed in Canada	
Frequency	Level	Pol	15.209	9 / 15E	Detector	Azimuth	Height	Comments		
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters			
22439.970	34.5	V	54.0	-19.5	Avg	3	1.0	VB 3 kHz, n	ote 3	
22298.000	47.5	V	74.0	-26.5	PK	3	1.0		B 3 MHz;Peak	
1500.000	46.3	V	60.0	-13.7	Peak	109	1.3	Note 6		
1991.670	54.6	Н	60.0	-5.4	Peak	90	1.0	Note 6		
4000.000	42.9	Н	60.0	-17.1	Peak	107	1.3	Note 6		
Note 1: Note 2:	were no sigr For emissior For emissior	nificant emiss ns in restricte ns outside of	ions in this f d bands, the the restricted	requency rar limit of 15.2 d bands the	nge other than 09 was used	n the 4th hai which requi m/MHz eirp	rmonic of the res average a (68.3dBuV/m	5GHz funda and peak me ) for emission	asurements. ns related to UNII	





### End of Report

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