

***EMC Test Report******Application for FCC Grant of Equipment Authorization  
Canada Certification******Innovation, Science and Economic Development Canada  
RSS-Gen Issue 5 / RSS-247 Issue 2  
FCC Part 15 Subpart C******Model: ARCN9004LTE***

IC CERTIFICATION #: 4675A-ARC9004LTE  
FCC ID: Q9DARC9004LTE

APPLICANT: Aruba, a Hewlett Packard Enterprise Company  
3333 Scott Blvd.  
Santa Clara, CA 95054

TEST SITE(S): National Technical Systems  
41039 Boyce Road.  
Fremont, CA. 94538-2435

IC SITE REGISTRATION #: 2845B-3; 2845B-4, 2845B-5, 2845B-7

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**VALIDATING SIGNATORIES**

PROGRAM MGR

A handwritten signature in black ink that reads "David W. Bare".

David W. Bare  
Chief Engineer

TECHNICAL REVIEWER:

A handwritten signature in black ink that reads "David W. Bare".

David W. Bare  
Chief Engineer

FINAL REPORT PREPARER:

A handwritten signature in blue ink that reads "David Guidotti".

David Guidotti  
Senior Technical Writer

QUALITY ASSURANCE DELEGATE

A handwritten signature in black ink that reads "Jesse Reel".

Jesse Reel  
Technical Writer



## REVISION HISTORY

| Rev# | Date              | Comments                                          | Modified By    |
|------|-------------------|---------------------------------------------------|----------------|
| -    | December 6, 2019  | First release                                     |                |
| 1    | December 26, 2019 | Revised report to update Conducted Emissions data | David Guidotti |

**TABLE OF CONTENTS**

|                                                                              |           |
|------------------------------------------------------------------------------|-----------|
| <b>COVER PAGE.....</b>                                                       | <b>1</b>  |
| <b>VALIDATING SIGNATORIES .....</b>                                          | <b>2</b>  |
| <b>REVISION HISTORY .....</b>                                                | <b>3</b>  |
| <b>TABLE OF CONTENTS .....</b>                                               | <b>4</b>  |
| <b>SCOPE.....</b>                                                            | <b>5</b>  |
| <b>OBJECTIVE .....</b>                                                       | <b>5</b>  |
| <b>STATEMENT OF COMPLIANCE.....</b>                                          | <b>6</b>  |
| <b>DEVIATIONS FROM THE STANDARDS.....</b>                                    | <b>6</b>  |
| <b>TEST RESULTS SUMMARY .....</b>                                            | <b>7</b>  |
| DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHZ) .....                        | 7         |
| MEASUREMENT UNCERTAINTIES.....                                               | 8         |
| <b>EQUIPMENT UNDER TEST (EUT) DETAILS.....</b>                               | <b>9</b>  |
| GENERAL.....                                                                 | 9         |
| ANTENNA SYSTEM .....                                                         | 9         |
| OTHER EUT DETAILS.....                                                       | 9         |
| ENCLOSURE.....                                                               | 9         |
| MODIFICATIONS .....                                                          | 9         |
| SUPPORT EQUIPMENT.....                                                       | 9         |
| EUT INTERFACE PORTS .....                                                    | 10        |
| EUT OPERATION .....                                                          | 10        |
| <b>TEST SITE.....</b>                                                        | <b>11</b> |
| GENERAL INFORMATION .....                                                    | 11        |
| CONDUCTED EMISSIONS CONSIDERATIONS .....                                     | 11        |
| RADIATED EMISSIONS CONSIDERATIONS .....                                      | 11        |
| <b>MEASUREMENT INSTRUMENTATION .....</b>                                     | <b>12</b> |
| RECEIVER SYSTEM .....                                                        | 12        |
| INSTRUMENT CONTROL COMPUTER .....                                            | 12        |
| LINE IMPEDANCE STABILIZATION NETWORK (LISN).....                             | 12        |
| FILTERS/ATTENUATORS .....                                                    | 13        |
| ANTENNAS.....                                                                | 13        |
| ANTENNA MAST AND EQUIPMENT TURNTABLE .....                                   | 13        |
| INSTRUMENT CALIBRATION.....                                                  | 13        |
| <b>TEST PROCEDURES .....</b>                                                 | <b>14</b> |
| EUT AND CABLE PLACEMENT .....                                                | 14        |
| CONDUCTED EMISSIONS.....                                                     | 14        |
| RADIATED EMISSIONS .....                                                     | 14        |
| CONDUCTED EMISSIONS FROM ANTENNA PORT .....                                  | 18        |
| BANDWIDTH MEASUREMENTS .....                                                 | 18        |
| SPECIFICATION LIMITS AND SAMPLE CALCULATIONS.....                            | 19        |
| CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; RSS GEN.....           | 19        |
| GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS .....            | 19        |
| OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS .....                     | 20        |
| TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS AND DTS SYSTEMS..... | 20        |
| SAMPLE CALCULATIONS - CONDUCTED EMISSIONS .....                              | 21        |
| SAMPLE CALCULATIONS - RADIATED EMISSIONS.....                                | 21        |
| SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION.....                 | 22        |
| <b>APPENDIX A TEST EQUIPMENT CALIBRATION DATA .....</b>                      | <b>23</b> |
| <b>APPENDIX B TEST DATA .....</b>                                            | <b>24</b> |
| <b>END OF REPORT .....</b>                                                   | <b>65</b> |

**SCOPE**

An electromagnetic emissions test has been performed on the Aruba, a Hewlett Packard Enterprise Company model ARCN9004LTE, 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 C

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

ANSI C63.10-2013

FCC DTS Measurement Guidance KDB558074

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 ARCN9004LTE complied with the requirements of the following regulations:

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 C

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 ARCN9004LTE and therefore apply only to the tested sample. The sample was selected and prepared by Mark Hill of Aruba, a Hewlett Packard Enterprise Company.

### **DEVIATIONS FROM THE STANDARDS**

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

## TEST RESULTS SUMMARY

### DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)

| FCC Rule Part      | RSS Rule Part   | Description                                    | Measured Value / Comments                                     | Limit / Requirement                                                         | Result   |
|--------------------|-----------------|------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------|----------|
| 15.247(a)          | RSS 247 5.2     | Digital Modulation                             | Systems uses GFSK modulation                                  | System must utilize a digital transmission technology                       | Complies |
| 15.247 (a) (2)     | RSS 247 5.2 (1) | Min 6dB Bandwidth                              | 701 kHz                                                       | >500kHz                                                                     | Complies |
| 15.247 (b) (3)     | RSS 247 5.4 (4) | Output Power (multipoint systems)              | 7.1 dBm (0.005 Watts)<br>EIRP = 0.002 W <small>Note 1</small> | 1Watt, EIRP limited to 4 Watts.                                             | Complies |
| 15.247(e)          | RSS 247 5.2 (2) | Power Spectral Density                         | Total power is less than 8 dBm                                | 8dBm/3kHz                                                                   | Complies |
| 15.247(d)          | RSS 247 5.5     | Antenna Port Spurious Emissions 30MHz – 25 GHz | All < -20 dBc                                                 | < -20dBc                                                                    | Complies |
| 15.247(d) / 15.209 | RSS 247 5.5     | Radiated Spurious Emissions 30MHz – 25 GHz     | 52.3 dBμV/m @ 12011.0 MHz (-1.7 dB)                           | Refer to the limits section (p19) for restricted bands, all others < -20dBc | Complies |

Note 1: EIRP calculated using antenna gains of -4.0 dBi for the highest EIRP system.

### GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

| FCC Rule Part           | RSS Rule part          | Description              | Measured Value / Comments                                                                      | Limit / Requirement                            | Result (margin) |
|-------------------------|------------------------|--------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------|-----------------|
| 15.203                  | -                      | RF Connector             | Integral antenna                                                                               | Unique or integral antenna required            | Complies        |
| 15.407 (b) (6)          | RSS-Gen Table 4        | AC Conducted Emissions   | 52.3 dBμV @ 0.152 MHz<br>(margin: -13.6 dB)                                                    | Refer to page 19                               | 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              | Detachable antennas are only used for the Licensed cellular radio module                       | Statement for products with detachable antenna | Complies        |
| -                       | RSS-Gen 8.4            | User Manual              | In Installaion Guide                                                                           | Statement for all products                     | Complies        |
| -                       | RSP-100<br>RSS-Gen 6.7 | Occupied Bandwidth       | 1.07 MHz                                                                                       | Information only                               | N/A             |

**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    | $\pm 0.52$ dB        |
| RF power, conducted (Spectrum analyzer) | dBm              | 25 to 7000 MHz    | $\pm 0.7$ dB         |
| Conducted emission of transmitter       | dBm              | 25 to 26500 MHz   | $\pm 0.7$ dB         |
| Conducted emission of receiver          | dBm              | 25 to 26500 MHz   | $\pm 0.7$ dB         |
| Radiated emission (substitution method) | dBm              | 25 to 26500 MHz   | $\pm 2.5$ dB         |
| Radiated emission (field strength)      | dB $\mu$ V/m     | 25 to 1000 MHz    | $\pm 3.6$ dB         |
|                                         |                  | 1000 to 40000 MHz | $\pm 6.0$ dB         |
| Conducted Emissions (AC Power)          | dB $\mu$ V       | 0.15 to 30 MHz    | $\pm 2.4$ dB         |



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

The Aruba, a Hewlett Packard Enterprise Company model ARCN9004LTE is a gateway that supports both SD-WAN and wireless LAN capabilities that is designed to control access points. It incorporates a BLE radio and a passive NFC tag feature. 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 12 Volts DC, 2.5 Amps. It is supplied with an AC adapter rated 100-240V, 50-60 Hz, 1.5 Amp.

The sample was received on November 12, 2019 and tested on November 12, 13, 14, 18 and December 26, 2019. The EUT consisted of the following component(s):

| Company | Model       | Description  | Serial Number | FCC ID         |
|---------|-------------|--------------|---------------|----------------|
| Aruba   | ARCN9004LTE | Gateway      | TWJ9KSP00D    | Q9DARCN9004LTE |
| Aruba   | DB-48A12    | Power Supply | -             | -              |

**ANTENNA SYSTEM**

The BLE antenna system consists of an integral PCB antenna.

**OTHER EUT DETAILS**

The EUT incorporates a Cellular transceiver module, Quectel EG25-G that uses three antennas connected to ports on the EUT.

**ENCLOSURE**

The EUT enclosure is primarily constructed of metal. It measures approximately 20 cm wide by 15 cm deep by 4 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 during testing:

| Company | Model            | Description      | Serial Number | FCC ID |
|---------|------------------|------------------|---------------|--------|
| Unknown | Unknown          | USB Memory Stick | -             | -      |
| HP      | Elitebook 745 G4 | Laptop           | 5CG7296JK5    | -      |
| EMCO    | 3115             | Horn Antenna     | 9504-4486     | -      |

The following was used as remote support equipment during testing.

| Company | Model   | Description | Serial Number | FCC ID |
|---------|---------|-------------|---------------|--------|
| Anritsu | MT8820C | Call Box    | 6201341856    | -      |

**EUT INTERFACE PORTS**

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

**EUT**

| Port             | Connected To  | Cable(s)                   |                         |           |
|------------------|---------------|----------------------------|-------------------------|-----------|
|                  |               | Description                | Shielded or Unshielded  | Length(m) |
| DC power         | AC Adapter    | Two wire                   | Unshielded              | 1.0       |
| RJ45 Console     | Laptop        | Multiwire with USB adapter | Shielded and Unshielded | 2.5       |
| Eth0             | Eth1          | Cat 5                      | Unshielded              | 1.5       |
| Eth2             | Eth3          | Cat 5                      | Unshielded              | 1.0       |
| USB              | Memory Stick  | Multiwire                  | Shielded                | 1.0       |
| μUSB console     | Not connected | -                          | -                       | -         |
| AC Adapter Power | Mains         | Three wire                 | Unshielded              | 1.6       |

**EUT OPERATION**

During emissions testing the EUT was set to transmit a continuous modulated signal at the selected power and frequency. The LTE module was communicating with the call box at maximum RF power. LAN ports were passing traffic using internal diagnostics.

**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 / Registration Numbers |                                         | Location                                      |
|-----------|--------------------------------|-----------------------------------------|-----------------------------------------------|
|           | FCC                            | Canada                                  |                                               |
| Chamber 3 | US1031                         | 2845B<br>(Wireless Test<br>Lab #US0027) | 41039 Boyce Road<br>Fremont,<br>CA 94538-2435 |
| Chamber 4 |                                |                                         |                                               |
| Chamber 5 |                                |                                         |                                               |
| Chamber 7 |                                |                                         |                                               |

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

**CONDUCTED EMISSIONS CONSIDERATIONS**

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

**RADIATED EMISSIONS CONSIDERATIONS**

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

## **MEASUREMENT INSTRUMENTATION**

### **RECEIVER SYSTEM**

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

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

### **INSTRUMENT CONTROL COMPUTER**

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

### **LINE IMPEDANCE STABILIZATION NETWORK (LISN)**

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

**FILTERS/ATTENUATORS**

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

**ANTENNAS**

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

**ANTENNA MAST AND EQUIPMENT TURNTABLE**

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

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

**INSTRUMENT CALIBRATION**

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

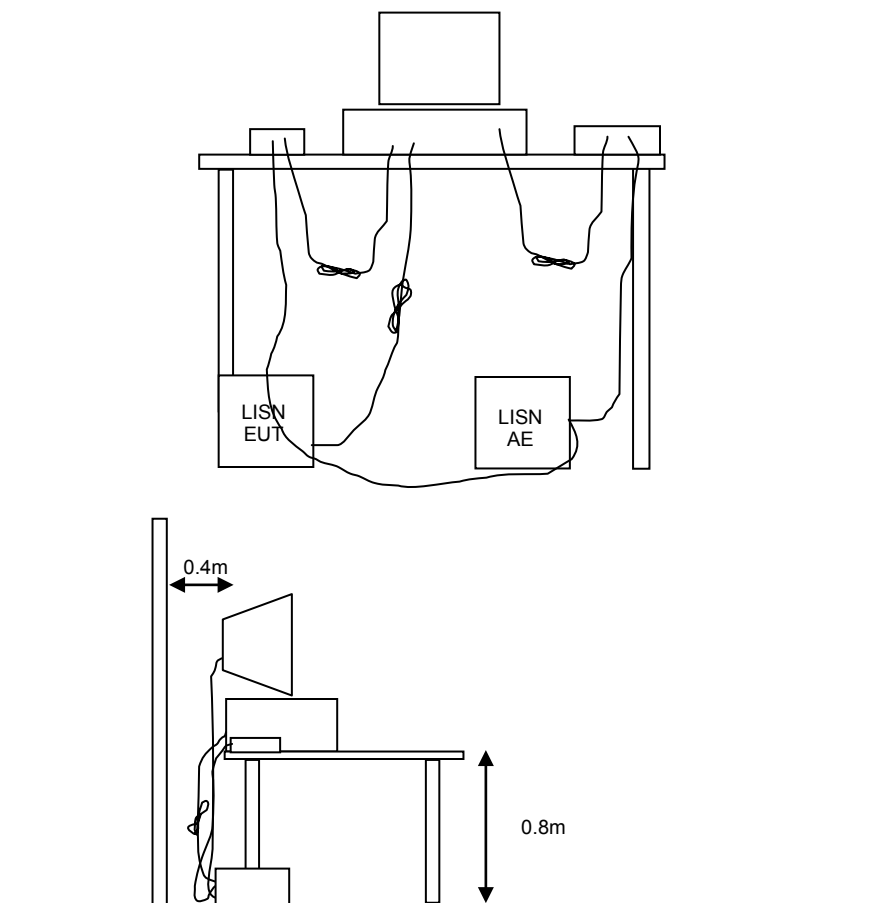
## TEST PROCEDURES

### EUT AND CABLE PLACEMENT

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

### CONDUCTED EMISSIONS

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



**Figure 1 Typical Conducted Emissions Test Configuration**

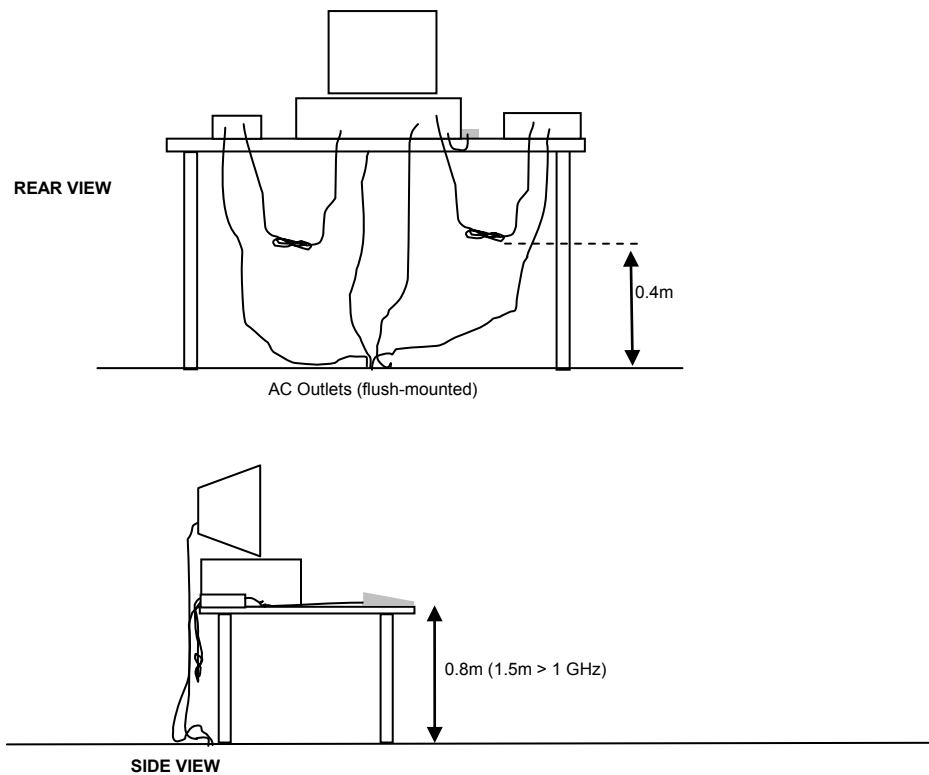
**RADIATED EMISSIONS**

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

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

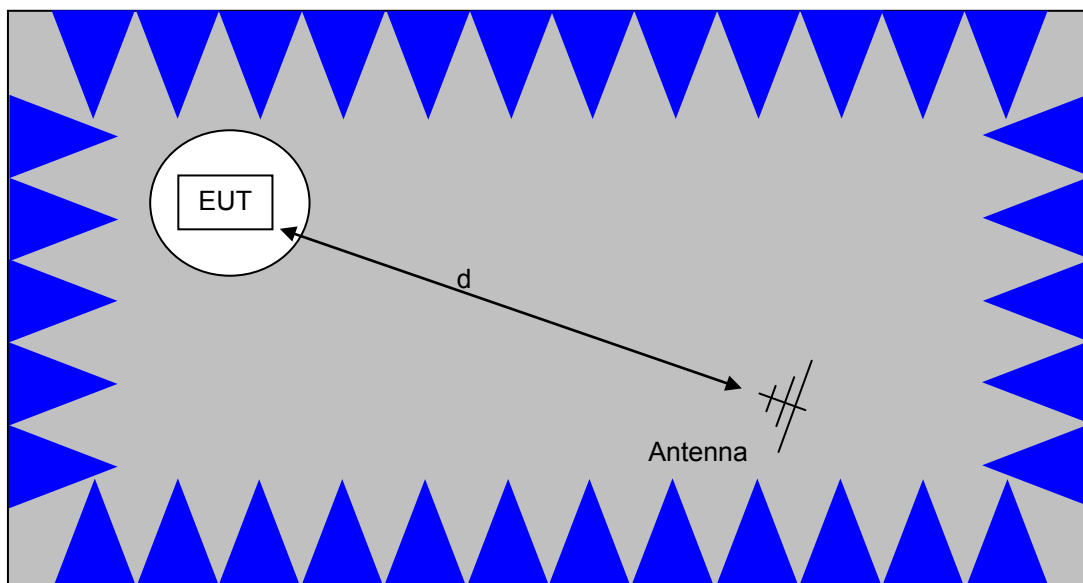
Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna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

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



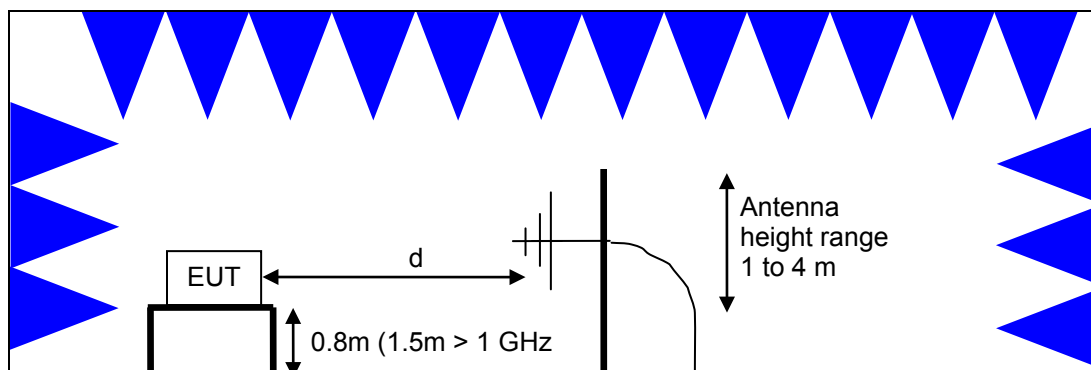
Typical Test Configuration for Radiated Field Strength Measurements





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

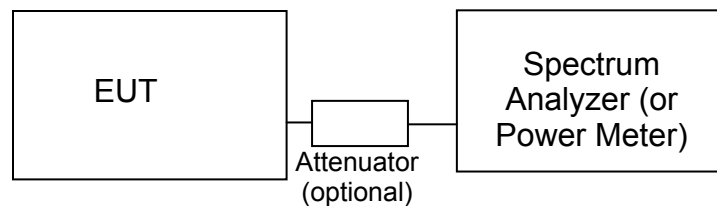
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

**CONDUCTED EMISSIONS FROM ANTENNA PORT**

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

Test Configuration for Antenna Port Measurements

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

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

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

**BANDWIDTH MEASUREMENTS**

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

## SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

### CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; 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           | $2400/F_{\text{KHz}} @ 300\text{m}$ | $67.6-20*\log_{10}(F_{\text{KHz}}) @ 300\text{m}$ |
| 0.490-1.705           | $24000/F_{\text{KHz}} @ 30\text{m}$ | $87.6-20*\log_{10}(F_{\text{KHz}}) @ 30\text{m}$  |
| 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>1</sup> The restricted bands are detailed in FCC 15.205 and RSS-Gen Table 7

**OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS**

The table below shows the limits for output power and output power density. 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 |
|---------------------------|-----------------|------------------------|
| 902 – 928                 | 1 Watt (30 dBm) | 8 dBm/3kHz             |
| 2400 – 2483.5             | 1 Watt (30 dBm) | 8 dBm/3kHz             |
| 5725 – 5850               | 1 Watt (30 dBm) | 8 dBm/3kHz             |

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. For FCC, fixed point to point applications using the 2400-2483.5 MHz band may use antennas with more than 6 dBi gain but output power is reduced by 1 dB for every 3dB that the antenna gain exceeds 6 dBi. For Canada, fixed point-to-point applications using the 2400-2483.5 MHz band are not subject to this restriction. Fixed point-to-point applications using the 5725 – 5850 MHz band are also not subject to this restriction. Certification of DTS systems operating in the 5725-5850 MHz band is no longer allowed under FCC Rules per §15.37(h).

**TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS**

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS GEN. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

**SAMPLE CALCULATIONS - CONDUCTED EMISSIONS**

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

$$R_r - S = M$$

where:

$R_r$  = Receiver Reading in dBuV

$S$  = Specification Limit in dBuV

$M$  = Margin to Specification in +/- dB

**SAMPLE CALCULATIONS - RADIATED EMISSIONS**

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

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

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

where:

$F_d$  = Distance Factor in dB

$D_m$  = Measurement Distance in meters

$D_s$  = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

$R_r$  = Receiver Reading in dBuV/m

$F_d$  = Distance Factor in dB

$R_c$  = Corrected Reading in dBuV/m

$L_s$  = Specification Limit in dBuV/m

$M$  = Margin in dB Relative to Spec

**SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION**

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

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

where P is the eirp (Watts)

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

## Appendix A Test Equipment Calibration Data

### Radiated Emissions, - 30 - 25,000 MHz, 12,13, and 14-Nov-19

| <u>Manufacturer</u> | <u>Description</u>                               | <u>Model</u>            | <u>Asset #</u> | <u>Calibrated</u> | <u>Cal Due</u> |
|---------------------|--------------------------------------------------|-------------------------|----------------|-------------------|----------------|
| Hewlett Packard     | Spectrum Analyzer (Blue)                         | 8564E<br>(84125C)       | WC055592       | 12/8/2018         | 12/8/2019      |
| Hewlett Packard     | Microwave Preamplifier<br>Head, 18-40 GHz (Blue) | 84125C EMI<br>Test Head | WC055663       | 1/9/2019          | 1/9/2020       |
| EMCO                | Antenna, Horn, 1-18 GHz<br>(SA40-Blu)            | 3115                    | WC064442       | 10/8/2018         | 10/8/2020      |
| Hewlett Packard     | High Pass filter, 3.5 GHz                        | 84300-80038             | WC064495       | 7/25/2019         | 7/25/2020      |
| Hewlett Packard     | Microwave Preamplifier, 1-<br>26.5GHz            | 8449B                   | WC064498       | 7/18/2019         | 7/18/2020      |
| A. H. Systems       | Antenna, Horn, 18-40GHz                          | SAS-574                 | WC064553       | 9/5/2017          | 8/8/2020       |
| Rohde & Schwarz     | EMI test receiver                                | ESI 40                  | WC068000       | 3/15/2019         | 3/15/2020      |
| Sunol Sciences      | Biconilog, 30-3000 MHz                           | JB3                     | WC064454       | 3/11/2019         | 3/11/2021      |

### Radio Antenna Port (Power and Spurious Emissions), 18-Nov-19

|                 |                   |       |          |          |          |
|-----------------|-------------------|-------|----------|----------|----------|
| Rohde & Schwarz | Spectrum Analyzer | FSQ26 | WC055662 | 7/4/2019 | 7/4/2020 |
|-----------------|-------------------|-------|----------|----------|----------|

### Conducted Emissions - Telecom and AC Power Ports, 18-Nov-19

|                               |                                |             |          |           |           |
|-------------------------------|--------------------------------|-------------|----------|-----------|-----------|
| National Technical<br>Systems | NTS EMI Software (rev<br>2.10) | N/A         | WC022452 | N/A       |           |
| EMCO                          | LISN, 10 kHz-100 MHz           | 3825/2      | WC064399 | 7/24/2019 | 7/24/2020 |
| Rohde & Schwarz               | EMI test receiver              | ESI 40      | WC068000 | 3/15/2019 | 3/15/2020 |
| Teseq                         | ISN T8                         | ISN T8-Cat6 | WC068004 | 4/23/2019 | 4/23/2020 |
| Rohde & Schwarz               | Pulse Limiter                  | ESH3-Z2     | WC072357 | 6/24/2019 | 6/24/2020 |

### Conducted Emissions - AC Power Ports, 26-Dec-19

|                               |                                                    |         |          |           |           |
|-------------------------------|----------------------------------------------------|---------|----------|-----------|-----------|
| National Technical<br>Systems | NTS EMI Software (rev<br>2.10)                     | N/A     | WC022452 | N/A       |           |
| Anritsu Wiltron               | LTE radio communications<br>analyzer generator OTA | MT8820C | WC062407 | 9/10/2019 | 9/10/2020 |
| EMCO                          | LISN, 10 kHz-100 MHz                               | 3825/2  | WC064407 | 6/13/2019 | 6/13/2020 |
| EMCO                          | Antenna, Horn, 1-18 GHz<br>(SA40-Red)              | 3115    | WC064432 | 9/18/2018 | 9/18/2020 |
| Rohde & Schwarz               | Pulse Limiter                                      | ESH3 Z2 | WC064445 | 12/2/2019 | 12/2/2020 |
| Rohde & Schwarz               | EMI Test Receiver, 20 Hz-<br>7 GHz                 | ESIB 7  | WC064989 | 11/4/2019 | 11/4/2020 |

## **Appendix B Test Data**

TL107760-RA NA Pages 25 – 64





## EMC Test Data

|                        |                                             |                   |                   |
|------------------------|---------------------------------------------|-------------------|-------------------|
| Client:                | Aruba, a Hewlett Packard Enterprise company | PR Number:        | PR107760          |
| Product                | ARCN9004LTE                                 | T-Log Number:     | TL107760-RA       |
| System Configuration:  |                                             | Project Manager:  | Christine Krebill |
| Contact:               | Mark Hill                                   | Project Engineer: | David Bare        |
| Emissions Standard(s): | FCC 15.247, RSS-247                         | Class:            | -                 |
| Immunity Standard(s):  | -                                           | Environment:      | Radio             |

## EMC Test Data

For The

**Aruba, a Hewlett Packard Enterprise company**

Product

ARCN9004LTE

Date of Last Test: 11/18/2019



## EMC Test Data

|           |                                             |                   |                   |
|-----------|---------------------------------------------|-------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | PR Number:        | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:     | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:  | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Engineer: | David Bare        |
|           |                                             | Class:            | -                 |

### Conducted Emissions

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

#### Test Specific Details

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

Date of Test: 12/26/2019  
Test Engineer: Mehran Birgani  
Test Location: Fremont Chamber #5

Config. Used: 1  
Config Change: Communication test set was local  
EUT Voltage: 120V/ 60Hz

#### General Test Configuration

For tabletop equipment, the EUT was located on a table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80 cm from the LISN. Remote support equipment was located in the semi-anechoic chamber.

Ambient Conditions:                      Temperature:        20-22 °C  
                                                         Rel. Humidity:        36-40 %

#### Summary of Results

| Run # | Test Performed                        | Limit   | Result | Margin                                      |
|-------|---------------------------------------|---------|--------|---------------------------------------------|
| 1     | CE, AC Power, 120V/60Hz<br>(LTE LINK) | Class B | Pass   | 52.3 dBμV @ 0.152 MHz<br>(margin: -13.6 dB) |

#### Modifications Made During Testing

No modifications were made to the EUT during testing

#### Deviations From The Standard

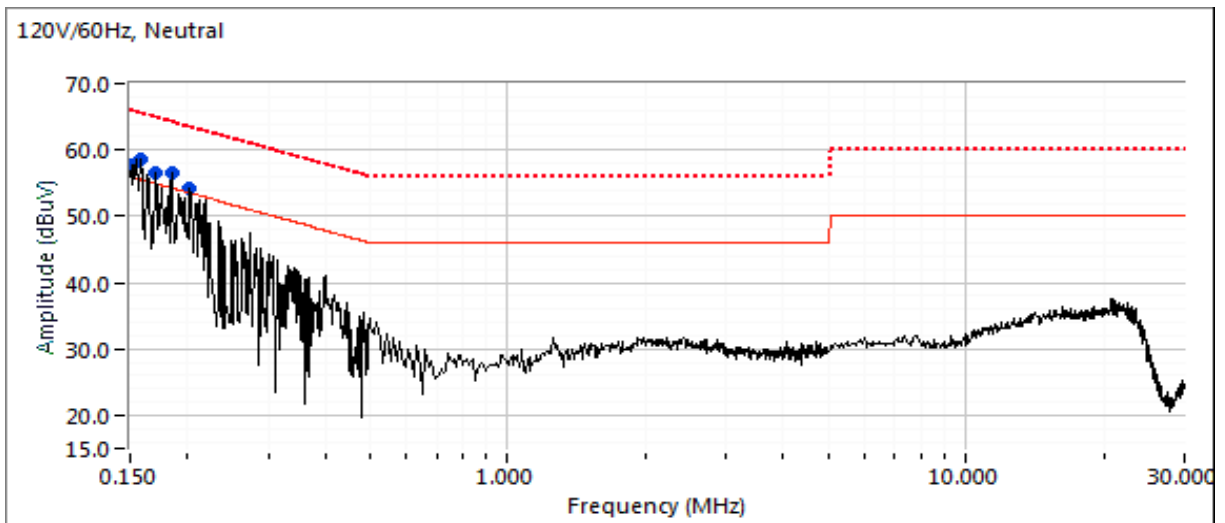
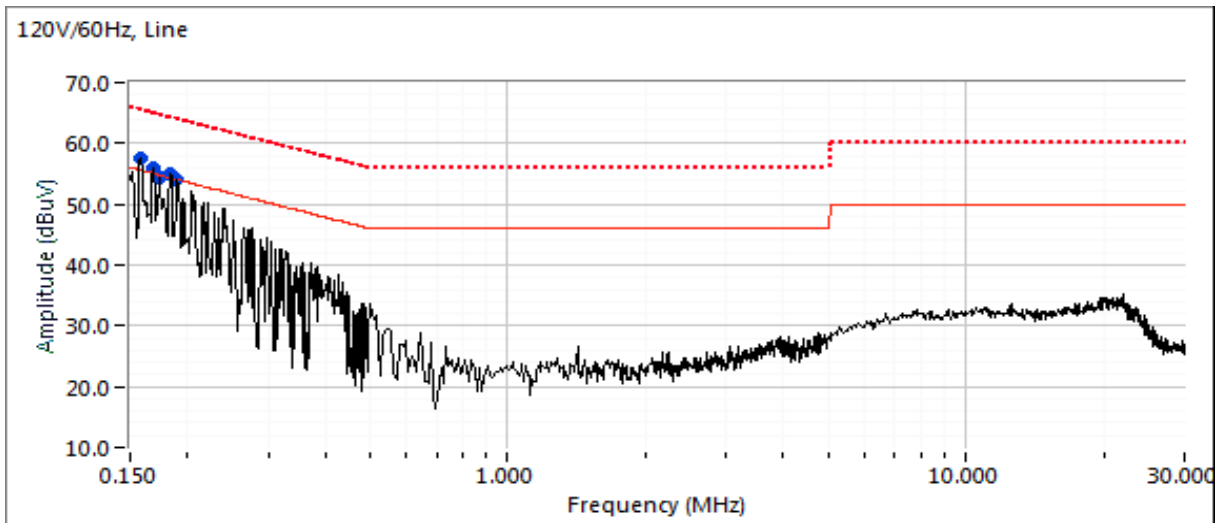
No deviations were made from the requirements of the standard.



# EMC Test Data

|           |                                             |                   |                   |
|-----------|---------------------------------------------|-------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | PR Number:        | PR107760          |
| Model:    | ARC9004LTE                                  | T-Log Number:     | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:  | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Engineer: | David Bare        |
|           |                                             | Class:            | -                 |

Run #1: AC Power Port Conducted Emissions, 0.15 - 30 MHz, 120V/60Hz (LTE LINK, Bluetooth, GNSS and LAN Active)





# EMC Test Data

|           |                                             |                   |                   |
|-----------|---------------------------------------------|-------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | PR Number:        | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:     | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:  | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Engineer: | David Bare        |
|           |                                             | Class:            | -                 |

Run #1: AC Power Port Conducted Emissions, 0.15 - 30 MHz, 120 V/60 Hz (LTE LINK, Bluetooth, GNSS and LAN Active)

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

| Frequency<br>MHz | Level<br>dBμV | AC<br>Line | Class B |        | Detector<br>QP/Ave | Comments |
|------------------|---------------|------------|---------|--------|--------------------|----------|
|                  |               |            | Limit   | Margin |                    |          |
| 0.158            | 57.7          | Line       | 55.6    | 2.1    | Peak               |          |
| 0.168            | 56.1          | Line       | 55.0    | 1.1    | Peak               |          |
| 0.184            | 55.0          | Line       | 54.3    | 0.7    | Peak               |          |
| 0.174            | 54.3          | Line       | 54.8    | -0.5   | Peak               |          |
| 0.190            | 53.9          | Line       | 54.0    | -0.1   | Peak               |          |
| 0.152            | 57.7          | Neutral    | 55.9    | 1.8    | Peak               |          |
| 0.158            | 58.5          | Neutral    | 55.5    | 3.0    | Peak               |          |
| 0.170            | 56.6          | Neutral    | 54.9    | 1.7    | Peak               |          |
| 0.184            | 56.4          | Neutral    | 54.3    | 2.1    | Peak               |          |
| 0.203            | 54.1          | Neutral    | 53.5    | 0.6    | Peak               |          |

## Final quasi-peak and average readings

| Frequency<br>MHz | Level<br>dBμV | AC<br>Line | Class B |        | Detector<br>QP/Ave | Comments    |
|------------------|---------------|------------|---------|--------|--------------------|-------------|
|                  |               |            | Limit   | Margin |                    |             |
| 0.152            | 52.3          | Neutral    | 65.9    | -13.6  | QP                 | QP (1.00s)  |
| 0.159            | 51.6          | Neutral    | 65.5    | -13.9  | QP                 | QP (1.00s)  |
| 0.157            | 51.5          | Line       | 65.6    | -14.1  | QP                 | QP (1.00s)  |
| 0.170            | 50.3          | Neutral    | 65.0    | -14.7  | QP                 | QP (1.00s)  |
| 0.174            | 49.9          | Line       | 64.8    | -14.9  | QP                 | QP (1.00s)  |
| 0.168            | 50.0          | Line       | 65.1    | -15.1  | QP                 | QP (1.00s)  |
| 0.185            | 48.0          | Line       | 64.3    | -16.3  | QP                 | QP (1.00s)  |
| 0.185            | 48.0          | Neutral    | 64.3    | -16.3  | QP                 | QP (1.00s)  |
| 0.190            | 47.3          | Line       | 64.0    | -16.7  | QP                 | QP (1.00s)  |
| 0.203            | 46.2          | Neutral    | 63.5    | -17.3  | QP                 | QP (1.00s)  |
| 0.152            | 33.4          | Neutral    | 55.9    | -22.5  | AVG                | AVG (0.10s) |
| 0.159            | 32.4          | Neutral    | 55.5    | -23.1  | AVG                | AVG (0.10s) |
| 0.157            | 31.7          | Line       | 55.6    | -23.9  | AVG                | AVG (0.10s) |
| 0.170            | 31.1          | Neutral    | 55.0    | -23.9  | AVG                | AVG (0.10s) |
| 0.168            | 30.1          | Line       | 55.1    | -25.0  | AVG                | AVG (0.10s) |
| 0.174            | 29.8          | Line       | 54.8    | -25.0  | AVG                | AVG (0.10s) |
| 0.185            | 27.4          | Neutral    | 54.3    | -26.9  | AVG                | AVG (0.10s) |
| 0.185            | 26.9          | Line       | 54.3    | -27.4  | AVG                | AVG (0.10s) |
| 0.190            | 25.9          | Line       | 54.0    | -28.1  | AVG                | AVG (0.10s) |
| 0.203            | 25.3          | Neutral    | 53.5    | -28.2  | AVG                | AVG (0.10s) |



## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

### RSS-247 and FCC 15.247 (DTS) Antenna Port Measurements Power, PSD, Bandwidth and Spurious Emissions

#### Test Specific Details

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

Date of Test: 11/18/2019  
Test Engineer: Rafael Varelas  
Test Location: FT Lab #3

Config. Used: 1  
Config Change: None  
EUT Voltage: 110V/60Hz

#### General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator.  
All measurements have been corrected to allow for the external attenuators used.

#### Ambient Conditions:

Temperature: 23.8 °C  
Rel. Humidity: 42 %

#### Summary of Results

| Run # | Pwr setting |  | Test Performed               | Limit     | Pass / Fail | Result / Margin |
|-------|-------------|--|------------------------------|-----------|-------------|-----------------|
| 1     | 8           |  | Output Power                 | 15.247(b) | Pass        | 7.1 dBm         |
| 2     | 8           |  | Power spectral Density (PSD) | 15.247(d) | Pass        | > 8 dBm         |
| 3     | 8           |  | Minimum 6dB Bandwidth        | 15.247(a) | Pass        | 701 kHz         |
| 3     | 8           |  | 99% Bandwidth                | RSS GEN   | -           | 1.07 MHz        |
| 4     | 8           |  | Spurious emissions           | 15.247(b) | Pass        | All < -20 dBc   |

#### Modifications Made During Testing

No modifications were made to the EUT during testing

#### Deviations From The Standard

No deviations were made from the requirements of the standard.

#### Procedure Comments:

Measurements performed in accordance with ANSI C63.10 and FCC KDB 558074

#### Sample Notes

Sample S/N: TWJ9KSP00D  
EUT Software Build: ArubaOS\_90xx\_8.7.0.0-mm-dev.new\_mm-dev\_9004lte\_compliance and radio\_test\_pca10056-Aruba  
Antenna: Maglayer



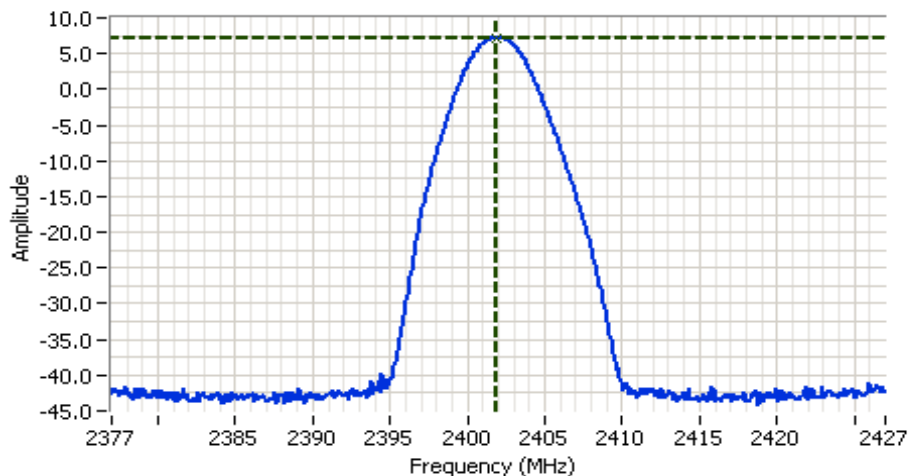
## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

### Run #1: Output Power

| Power Setting <sup>2</sup> | Frequency (MHz) | Output Power (dBm) <sup>1</sup> | mW  | Antenna Gain (dBi) | Result | EIRP dBm | W       | Output Power (dBm) <sup>3</sup> | mW |
|----------------------------|-----------------|---------------------------------|-----|--------------------|--------|----------|---------|---------------------------------|----|
| 8                          | 2402            | 7.1                             | 5.1 | -6.2               | Pass   | 0.9      | 0.00123 |                                 |    |
| 8                          | 2450            | 7.1                             | 5.1 | -4.0               | Pass   | 3.1      | 0.00204 |                                 |    |
| 8                          | 2480            | 6.9                             | 4.9 | -4.4               | Pass   | 2.5      | 0.00178 |                                 |    |

|         |                                                                                                                                                                                             |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Note 1: | Duty Cycle $\geq 98\%$ . Output power measured using a spectrum analyzer (see plots below) with RBW > OBW, VBW $\geq 3 \times$ RBW, Span $\geq 1.5$ of OBW, auto sweep time, Peak detector. |
| Note 2: | Power setting - the software power setting used during testing, included for reference only.                                                                                                |
| Note 3: | Power measured using average power meter (non-gated), if requested and is included for reference only.                                                                                      |



#### Analyzer Settings

Rohde&Schwarz,FSQ  
 CF: 2402.000 MHz  
 SPAN: 50.000 MHz  
 RB: 3.000 MHz  
 VB: 10.000 MHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 10.5 DB  
 Sweep Time: 2.5ms  
 Ref Lvl: 14.5 DBM

#### Comments

2402 MHz  
 BLE mode

|          |             |     |  |
|----------|-------------|-----|--|
| Cursor 1 | 2401.839744 | 7.1 |  |
|          | 0.000000    | 0.0 |  |



### Run #2: Power spectral Density

Power less than 8 dBm, no separate PSD test required



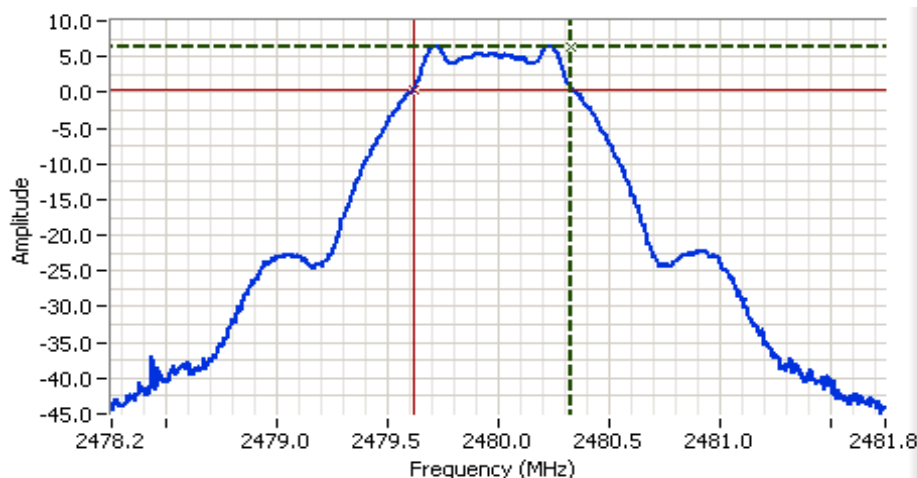
## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARC9004LTE                                  | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

### Run #3: Signal Bandwidth

| Power Setting | Frequency (MHz) | Bandwidth (MHz) |      | RBW Setting (MHz) |      |
|---------------|-----------------|-----------------|------|-------------------|------|
|               |                 | 6dB             | 99%  | 6dB               | 99%  |
| 8             | 2402            | 0.707           | 1.06 | 0.1               | 0.05 |
| 8             | 2440            | 0.712           | 1.06 | 0.1               | 0.05 |
| 8             | 2480            | 0.701           | 1.07 | 0.1               | 0.05 |

Note 1: DTS BW: RBW=100kHz, VBW  $\geq 3 \times$  RBW, peak detector, max hold, auto sweep time, Span 2-5 times measured BW.  
 99% BW: RBW=1-5% of 99%BW, VBW  $\geq 3 \times$  RBW, peak detector, max hold, auto sweep time. Span 1.5-5 times OBW.



**Analyzer Settings**  
 Rohde&Schwarz,FSQ  
 CF: 2480.000 MHz  
 SPAN: 3.500 MHz  
 RB: 100 kHz  
 VB: 300 kHz  
 Detector: POS  
 Attn: 20 DB  
 RL Offset: 10.5 DB  
 Sweep Time: 2.5ms  
 Ref Lvl: 14.5 DBM

**Comments**  
 6dB BW: 707 kHz

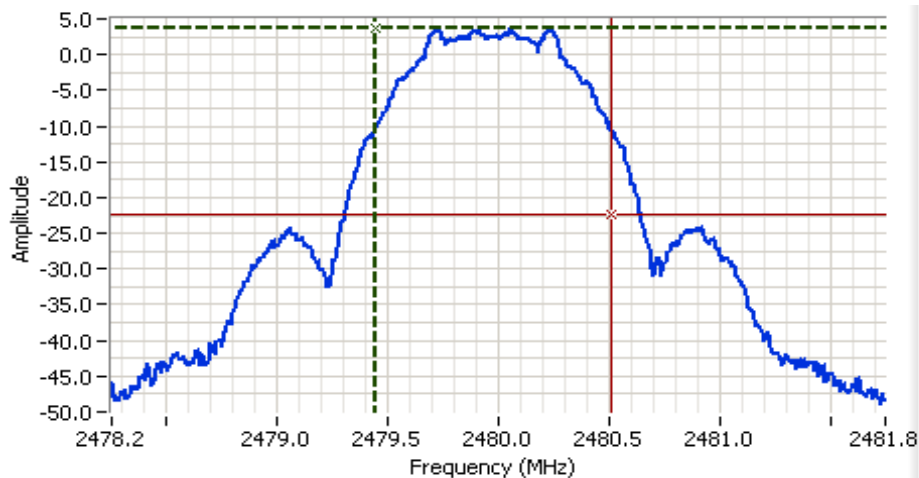
Cursor 1 2480.325321 6.5  
 Cursor 2 2479.618590 0.5  
 Delta Freq. 707 kHz  
 Delta Amplitude 6.0





## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |



### Analyzer Settings

Rohde&Schwarz,FSQ  
CF: 2480.000 MHz  
SPAN: 3.500 MHz  
RB: 50.0 kHz  
VB: 200 kHz  
Detector: POS  
Attn: 20 DB  
RL Offset: 10.5 DB  
Sweep Time: 2.5ms  
Ref Lvl: 14.5 DBM

### Comments

99% BW: 1.070 MHz

Cursor 1 2479.442800 3.7

Cursor 2 2480.512400 -22.3

Delta Freq. 1.070

Delta Amplitude 26.0







## EMC Test Data

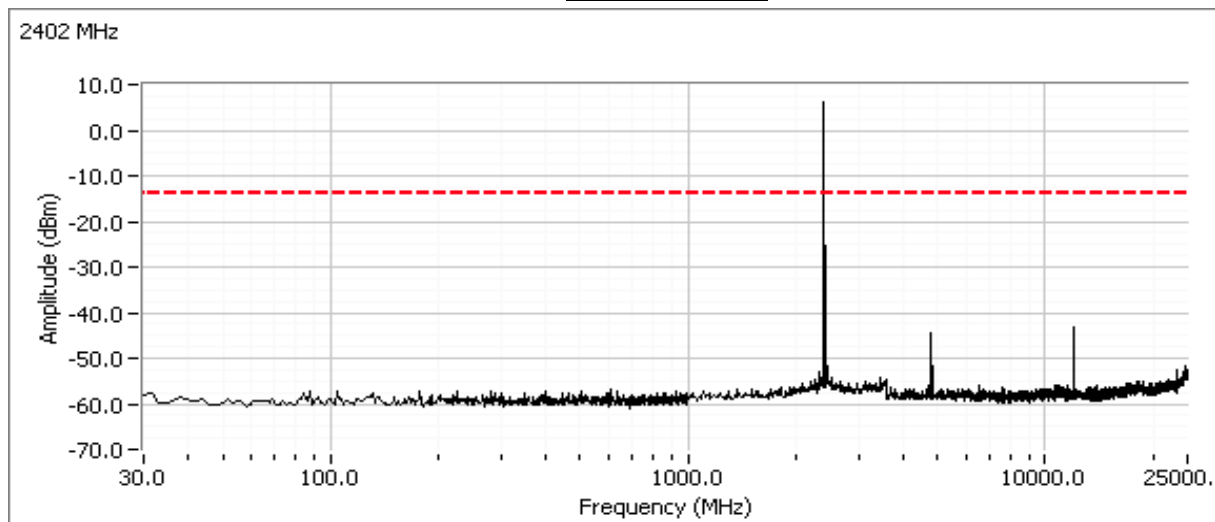
|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

### Run #4: Out of Band Spurious Emissions

| Frequency (MHz) | Power Setting |  | Limit  | Result |
|-----------------|---------------|--|--------|--------|
| 2402            | 8             |  | -20dBc | Pass   |
| 2450            | 8             |  | -20dBc | Pass   |
| 2480            | 8             |  | -20dBc | Pass   |

RBW = 100 kHz and VBW = 300 kHz for all plots.

#### Plots for low channel

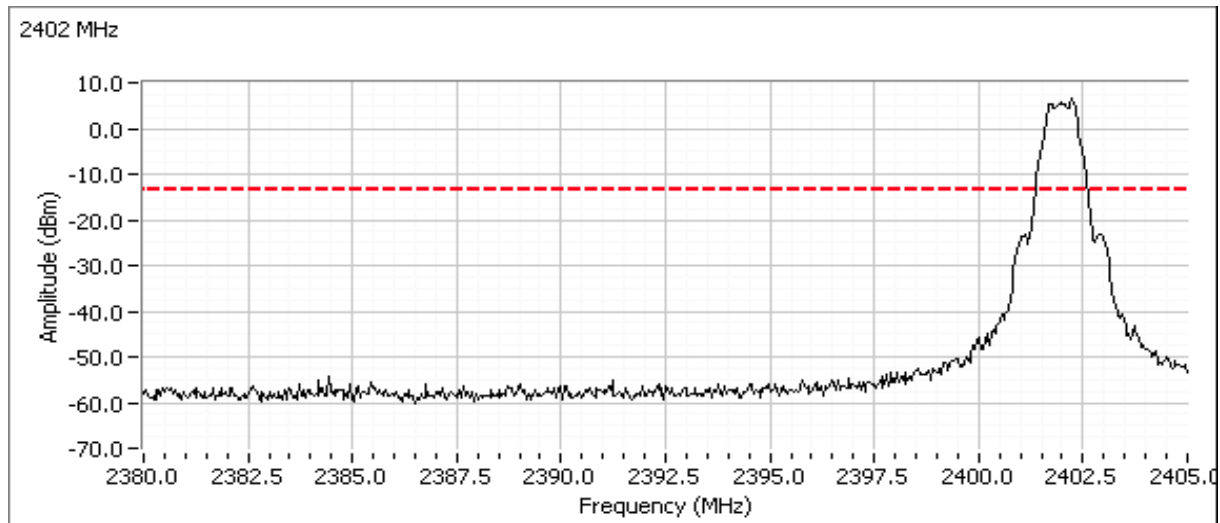




## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

Additional plot showing compliance with -20dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

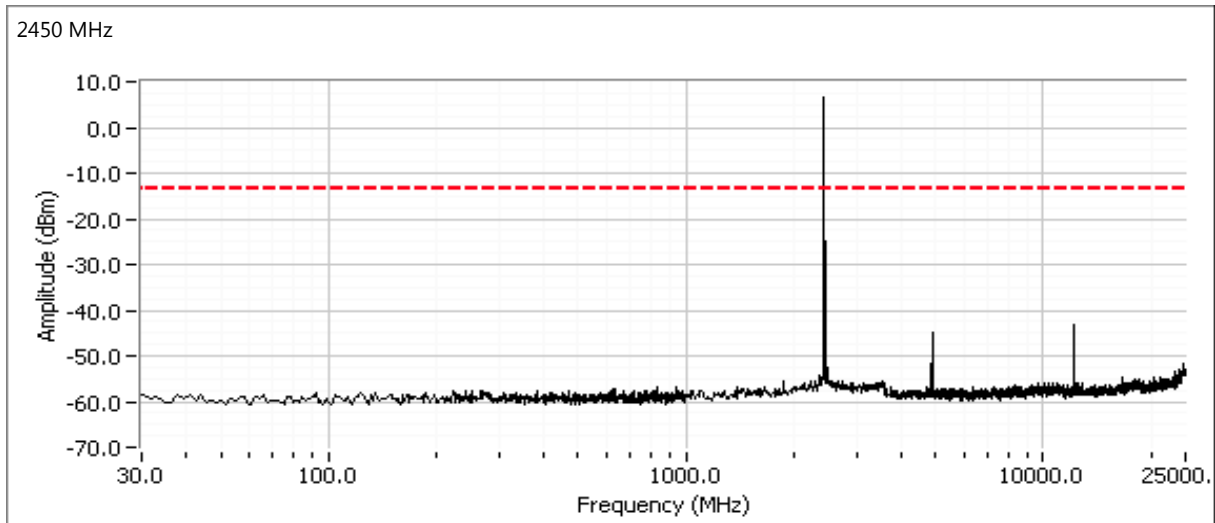




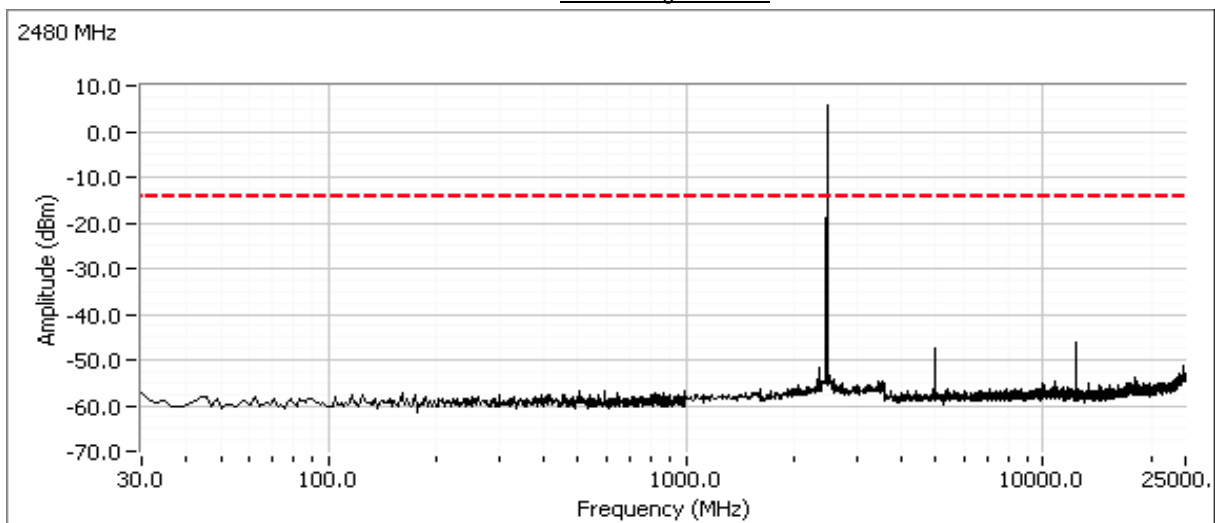
## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

Plots for center channel



Plots for high channel





## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

### RSS-247 and FCC 15.247 (DTS) 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: 22.3 °C  
Rel. Humidity: 38 %

#### Summary of Results - Device Operating in the 2400-2483.5 MHz Band

| Run # | Mode | Channel      |  | Power Setting | Test Performed                    | Limit                        | Result / Margin                     |
|-------|------|--------------|--|---------------|-----------------------------------|------------------------------|-------------------------------------|
| 1     | BLE  | 37 - 2402MHz |  | 8             | Restricted Band Edge (2390 MHz)   | FCC Part 15.209 / 15.247( c) | 40.0 dBµV/m @ 2388.7 MHz (-14.0 dB) |
|       | BLE  | 39 - 2480MHz |  | 8             | Restricted Band Edge (2483.5 MHz) | FCC Part 15.209 / 15.247( c) | 40.8 dBµV/m @ 2500.0 MHz (-13.2 dB) |

#### Modifications Made During Testing

No modifications were made to the EUT during testing

#### Deviations From The Standard

No deviations were made from the requirements of the standard.

#### Sample Notes

Sample S/N: TWJ9KSP00D

EUT Software Build: ArubaOS\_90xx\_8.7.0.0-mm-dev.new\_mm-dev\_9004lte\_compliance and radio\_test\_pca10056-Aruba

Antenna: Maglayer

#### Test Notes

BLE and LTE Band 30



## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

### Procedure Comments:

Measurements performed in accordance with FCC KDB 558074

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Unless otherwise stated/noted, emission has a duty cycle  $\geq 98\%$  and average was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

| Mode | Data Rate | Duty Cycle (x) | Constant DC? | T (ms) | Pwr Cor Factor* | Lin Volt Cor Factor** | Min VBW for FS (Hz) |
|------|-----------|----------------|--------------|--------|-----------------|-----------------------|---------------------|
| BLE  | 1 Mb/s    | 1.00           | Yes          | 0      | 0               | 0                     | 10                  |



## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

### Run #1: Radiated Bandedge Measurements

Date of Test: 11/14/2019

Test Engineer: Rafael Varelas

Test Location: Fremont Chamber #7

Config. Used: 1

Config Change: None

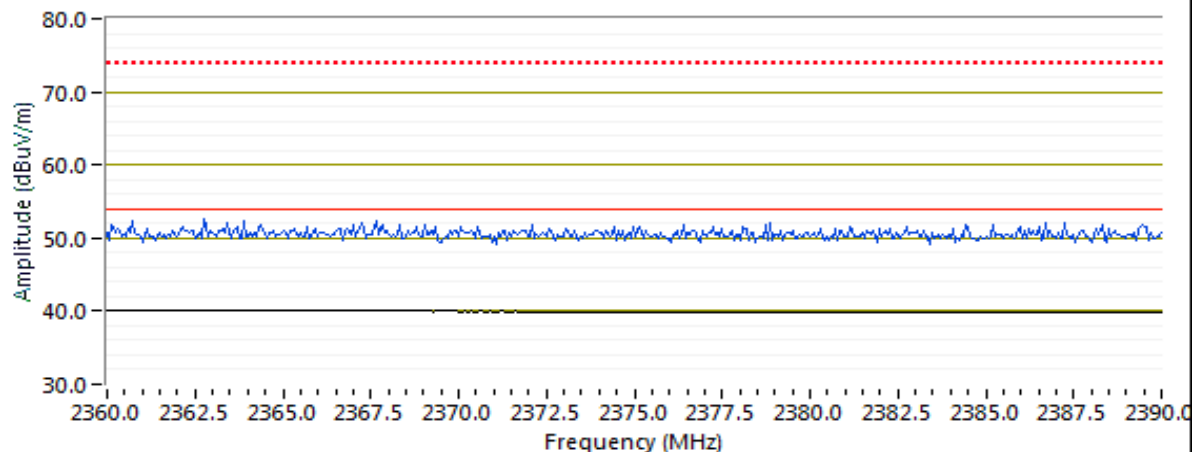
EUT Voltage: 110V/60Hz

Channel: 37 Mode: BLE  
Channel: 27735 (Uplink) Mode: LTE (Band 30)

### Band Edge Signal Field Strength - Direct measurement of field strength

| Frequency | Level        | Pol | 15.209 / 15.247 |        | Detector  | Azimuth | Height | Comments                 |
|-----------|--------------|-----|-----------------|--------|-----------|---------|--------|--------------------------|
| MHz       | dB $\mu$ V/m | v/h | Limit           | Margin | Pk/QP/Avg | degrees | meters |                          |
| 2388.660  | 40.0         | V   | 54.0            | -14.0  | AVG       | 336     | 1.0    | POS; RB 1 MHz; VB: 10 Hz |
| 2389.900  | 53.5         | V   | 74.0            | -20.5  | PK        | 336     | 1.0    | POS; RB 1 MHz; VB: 3 MHz |

RB 1 MHz; VB 10 Hz Avg (black trace); RB 1MHz, VB 3MHz PK (blue trace); V





## EMC Test Data

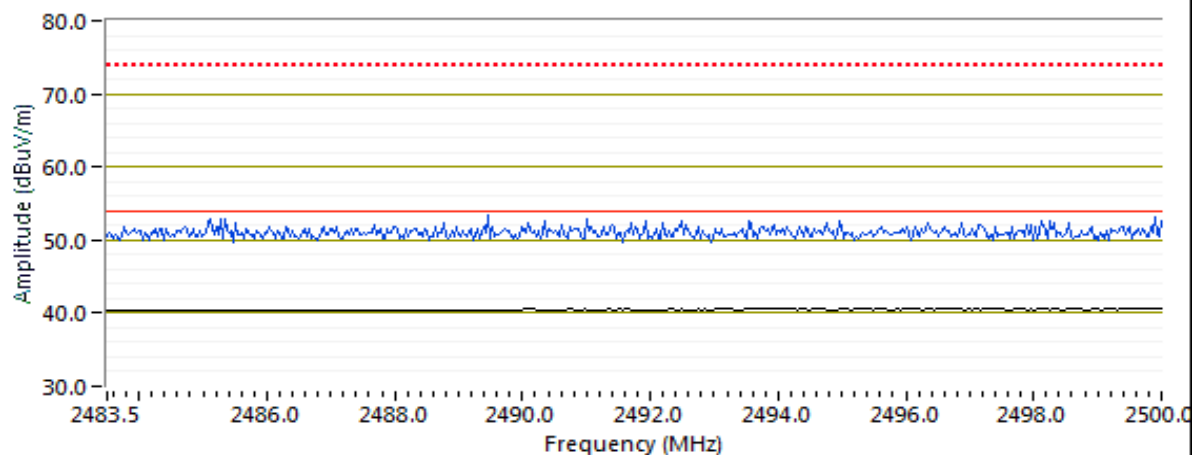
|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

Channel: 39 Mode: BLE  
Channel: 27735 (Uplink) Mode: LTE (Band 30)

### Band Edge Signal Field Strength - Direct measurement of field strength

| Frequency | Level        | Pol | 15.209 / 15.247 |        | Detector  | Azimuth | Height | Comments                 |
|-----------|--------------|-----|-----------------|--------|-----------|---------|--------|--------------------------|
| MHz       | dB $\mu$ V/m | v/h | Limit           | Margin | Pk/QP/Avg | degrees | meters |                          |
| 2500.000  | 40.8         | V   | 54.0            | -13.2  | AVG       | 27      | 1.0    | POS; RB 1 MHz; VB: 10 Hz |
| 2497.490  | 53.2         | V   | 74.0            | -20.8  | PK        | 27      | 1.0    | POS; RB 1 MHz; VB: 3 MHz |

RB 1 MHz; VB 10 Hz Avg (black trace); RB 1MHz, VB 3MHz PK (blue trace); V





## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

### RSS-247 and FCC 15.247 (DTS) 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: 23.4 °C  
Rel. Humidity: 41 %

#### Summary of Results - Device Operating in the 2400-2483.5 MHz Band

| Run # | Mode | Channel      |  | Power Setting | Test Performed                    | Limit                        | Result / Margin                     |
|-------|------|--------------|--|---------------|-----------------------------------|------------------------------|-------------------------------------|
| 1     | BLE  | 37 - 2402MHz |  | 8             | Restricted Band Edge (2390 MHz)   | FCC Part 15.209 / 15.247( c) | 34.0 dBµV/m @ 2389.7 MHz (-20.0 dB) |
|       | BLE  | 39 - 2480MHz |  | 8             | Restricted Band Edge (2483.5 MHz) | FCC Part 15.209 / 15.247( c) | 35.6 dBµV/m @ 2500.0 MHz (-18.4 dB) |

#### Modifications Made During Testing

No modifications were made to the EUT during testing

#### Deviations From The Standard

No deviations were made from the requirements of the standard.

#### Sample Notes

Sample S/N: TWJ9KSP00D

EUT Software Build: ArubaOS\_90xx\_8.7.0.0-mm-dev.new\_mm-dev\_9004lte\_compliance and radio\_test\_pca10056-Aruba

Antenna: Maglayer

#### Test Notes

BLE and LTE Band 4





## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

### Procedure Comments:

Measurements performed in accordance with FCC KDB 558074

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Unless otherwise stated/noted, emission has a duty cycle  $\geq 98\%$  and average was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

| Mode | Data Rate | Duty Cycle (x) | Constant DC? | T (ms) | Pwr Cor Factor* | Lin Volt Cor Factor** | Min VBW for FS (Hz) |
|------|-----------|----------------|--------------|--------|-----------------|-----------------------|---------------------|
| BLE  | 1 Mb/s    | 1.00           | Yes          | 0      | 0               | 0                     | 10                  |



## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

### Run #1: Radiated Bandedge Measurements

Date of Test: 11/12/2019

Test Engineer: Rafael Varelas

Test Location: Fremont Chamber #7

Config. Used: 1

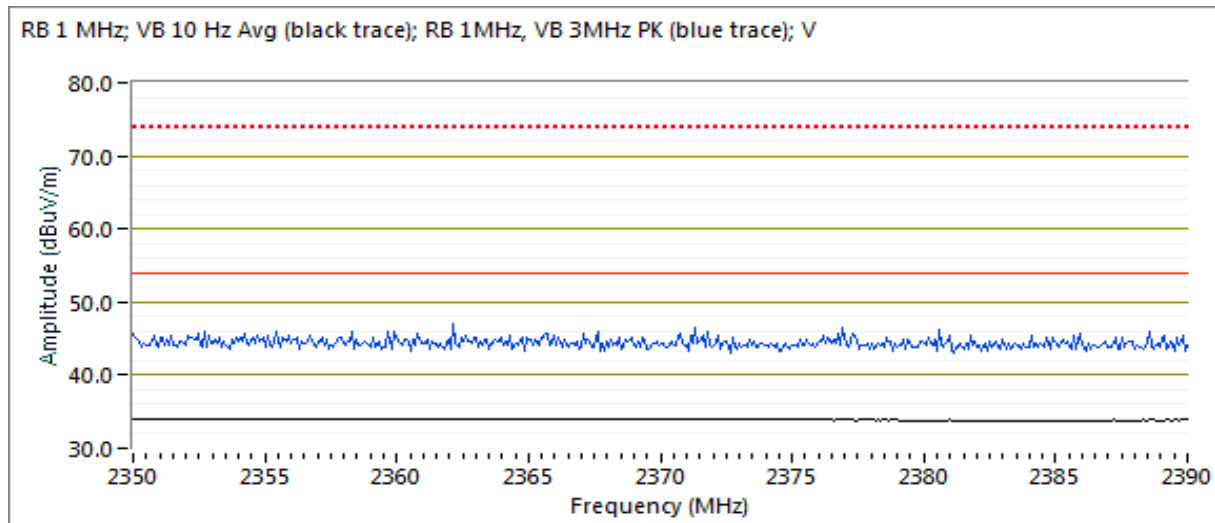
Config Change: None

EUT Voltage: 110V/60Hz

Channel: 37 Mode: BLE  
Channel: 20175 (Uplink) Mode: LTE (Band 4)

### Band Edge Signal Field Strength - Direct measurement of field strength

| Frequency | Level        | Pol | 15.209 / 15.247 |        | Detector  | Azimuth | Height | Comments                 |
|-----------|--------------|-----|-----------------|--------|-----------|---------|--------|--------------------------|
| MHz       | dB $\mu$ V/m | v/h | Limit           | Margin | Pk/QP/Avg | degrees | meters |                          |
| 2389.720  | 34.0         | V   | 54.0            | -20.0  | AVG       | 129     | 1.9    | POS; RB 1 MHz; VB: 10 Hz |
| 2389.380  | 34.0         | H   | 54.0            | -20.0  | AVG       | 326     | 1.0    | POS; RB 1 MHz; VB: 10 Hz |
| 2388.380  | 47.5         | V   | 74.0            | -26.5  | PK        | 129     | 1.9    | POS; RB 1 MHz; VB: 3 MHz |
| 2389.380  | 47.1         | H   | 74.0            | -26.9  | PK        | 326     | 1.0    | POS; RB 1 MHz; VB: 3 MHz |





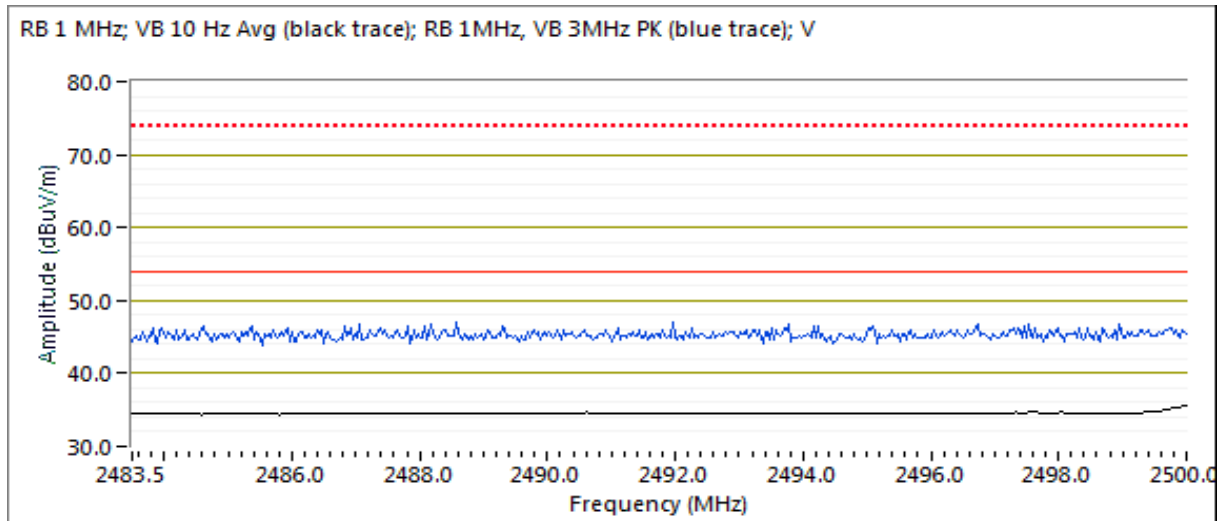
## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

Channel: 39 Mode: BLE  
Channel: 20175 (Uplink) Mode: LTE (Band 4)

### Band Edge Signal Field Strength - Direct measurement of field strength

| Frequency | Level        | Pol | 15.209 / 15.247 |        | Detector  | Azimuth | Height | Comments                 |
|-----------|--------------|-----|-----------------|--------|-----------|---------|--------|--------------------------|
| MHz       | dB $\mu$ V/m | v/h | Limit           | Margin | PK/QP/Avg | degrees | meters |                          |
| 2500.000  | 35.6         | V   | 54.0            | -18.4  | AVG       | 15      | 1.0    | POS; RB 1 MHz; VB: 10 Hz |
| 2483.500  | 35.1         | H   | 54.0            | -18.9  | AVG       | 347     | 1.0    | POS; RB 1 MHz; VB: 10 Hz |
| 2490.340  | 48.4         | H   | 74.0            | -25.6  | PK        | 347     | 1.0    | POS; RB 1 MHz; VB: 3 MHz |
| 2499.980  | 48.2         | V   | 74.0            | -25.8  | PK        | 15      | 1.0    | POS; RB 1 MHz; VB: 3 MHz |





## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

### RSS-247 and FCC 15.247 (DTS) 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:            23.4 °C  
                                                         Rel. Humidity:            41 %

#### Modifications Made During Testing

No modifications were made to the EUT during testing

#### Deviations From The Standard

No deviations were made from the requirements of the standard.



## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

### Summary of Results - Device Operating in the 2400-2483.5 MHz Band

| Run # | Mode | Channel       | LTE Band Uplink | Power Setting | Test Performed                         | Limit                           | Result / Margin                        |
|-------|------|---------------|-----------------|---------------|----------------------------------------|---------------------------------|----------------------------------------|
| 1     | BLE  | 37<br>2402MHz | 4<br>20175      | 8             | Radiated Emissions,<br>30 MHz - 25 GHz | FCC Part 15.209 /<br>15.247( c) | 52.3 dBµV/m @<br>12011.0 MHz (-1.7 dB) |
|       | BLE  | 17<br>2440MHz | 5<br>20525      | 8             | Radiated Emissions,<br>30 MHz - 25 GHz | FCC Part 15.209 /<br>15.247( c) | 50.0 dBµV/m @ 4879.8<br>MHz (-4.0 dB)  |
|       | BLE  | 39<br>2480MHz | 4<br>20175      | 8             | Radiated Emissions,<br>30 MHz - 25 GHz | FCC Part 15.209 /<br>15.247( c) | 44.4 dBµV/m @<br>12398.7 MHz (-9.6 dB) |
|       | BLE  | 37<br>2402MHz | 30<br>27710     | 8             | Radiated Emissions,<br>30 MHz - 25 GHz | FCC Part 15.209 /<br>15.247( c) | 43.6 dBµV/m @ 960.13<br>MHz (-10.4 dB) |
|       | BLE  | 37<br>2402MHz | 30<br>27735     | 8             | Radiated Emissions,<br>30 MHz - 25 GHz | FCC Part 15.209 /<br>15.247( c) | 36.0 dBµV/m @ 247.72<br>MHz (-10.0 dB) |

### Sample Notes

Sample S/N: TWJ9KSP00D

EUT Software Build: ArubaOS\_90xx\_8.7.0.0-mm-dev.new\_mm-dev\_9004lte\_compliance and radio\_test\_pca10056-Aruba

Antenna: Maglayer



## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

### Procedure Comments:

Measurements performed in accordance with FCC KDB 558074

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Unless otherwise stated/noted, emission has duty cycle  $\geq 98\%$  and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

| Mode | Data Rate | Duty Cycle (x) | Constant DC? | T (ms) | Pwr Cor Factor* | Lin Volt Cor Factor** | Min VBW for FS (Hz) |
|------|-----------|----------------|--------------|--------|-----------------|-----------------------|---------------------|
| BLE  | 1 Mb/s    | 1.00           | Yes          | 0      | 0               | 0                     | 10                  |

### Measurement Specific Notes:

|         |                                                                                                                                                                                                                                                           |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Note 1: | Emission in non-restricted band, but limit of 15.209 used.                                                                                                                                                                                                |
| Note 2: | Emission in non-restricted band, the limit was set 30dB below the level of the fundamental and measured in 100kHz.                                                                                                                                        |
| Note 3: | Emission has a duty cycle $\geq 98\%$ , average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces                                                                                                     |
| Note 4: | Emission has constant duty cycle $< 98\%$ , average measurement performed: RBW=1MHz, VBW $> 1/T$ but not less than 10Hz, peak detector, linear averaging, auto sweep, trace average 100 traces, measurement corrected by Linear voltage correction factor |
| Note 5: | Emission has constant duty cycle $< 98\%$ , average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces, measurement corrected by Pwr correction factor                                                 |
| Note 6: | Emission has non constant duty cycle $< 98\%$ , average measurement performed: RBW=1MHz, VBW $> 1/T$ , peak detector, linear average mode, sweep time auto, max hold. Max hold for $50 \cdot (1/DC)$ traces                                               |
| Note 7: | Emission has non constant duty cycle $< 98\%$ , average measurement performed: RBW=1MHz, VBW $> 1/T$ , RMS detector, sweep time auto, max hold. Max hold for $50 \cdot (1/DC)$ traces                                                                     |



# EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARC9004LTE                                  | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

Run #1: Radiated Spurious Emissions, 30 - 25,000 MHz.

Date of Test: 11/12-14/2019

Test Engineer: Rafael Varelas; M. Birgani

Test Location: Fremont Chamber #7

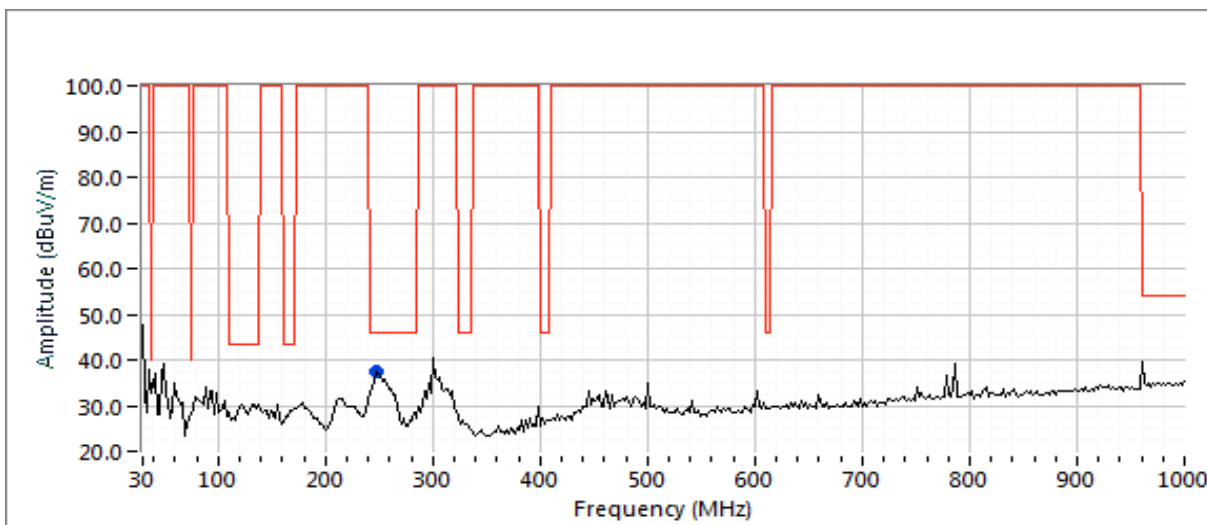
Config. Used: 1

Config Change: -

EUT Voltage: 110V/60Hz

Run #1a: Channel: 37 Mode: BLE  
Channel: 20175 (Uplink) Mode: LTE (Band 4)

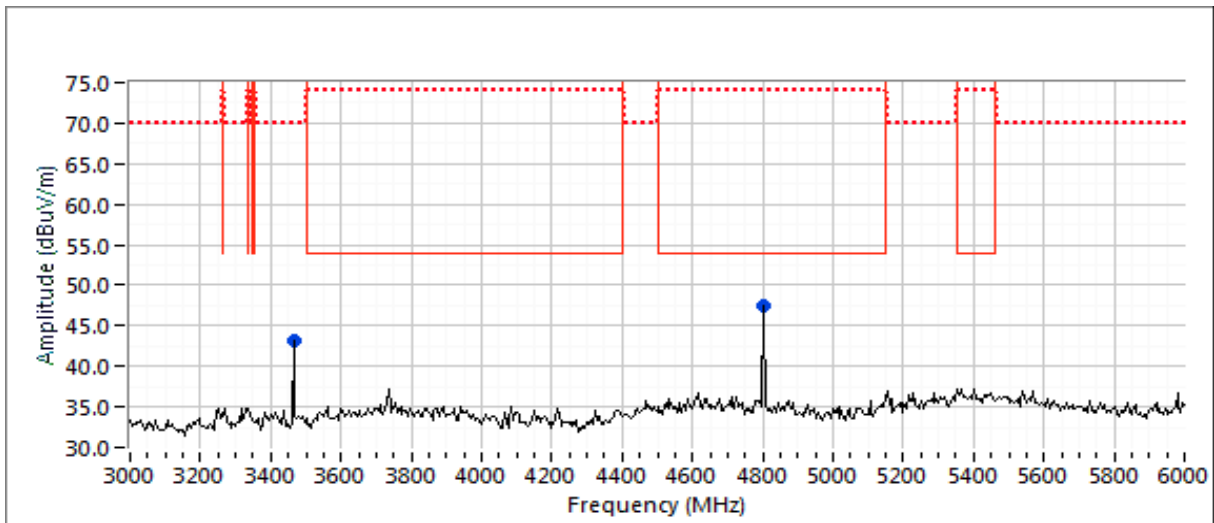
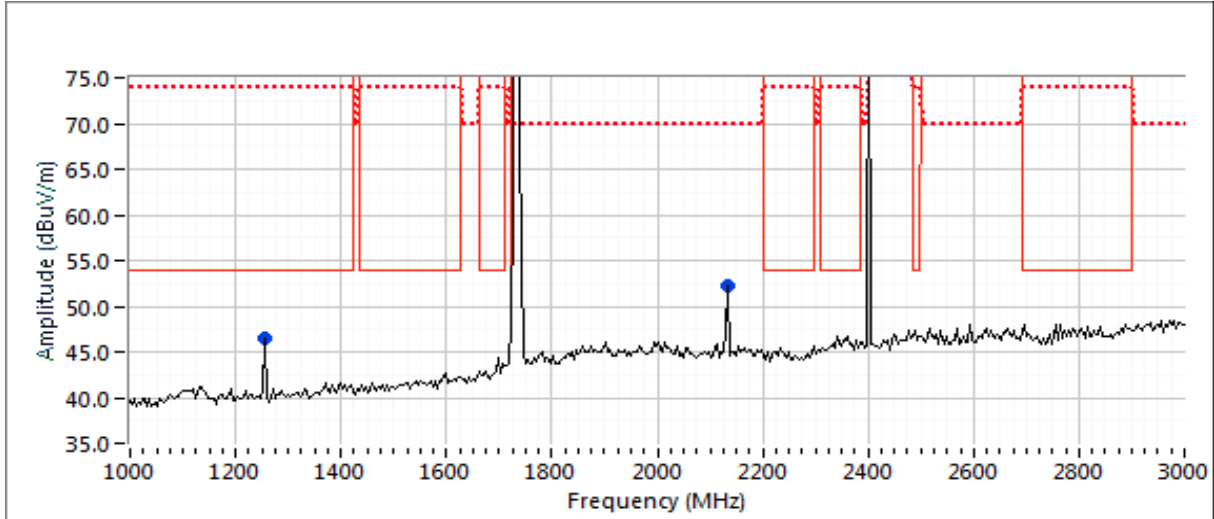
| Frequency | Level  | Pol | 15.209 / 15.247 |        | Detector  | Azimuth | Height | Comments                 |
|-----------|--------|-----|-----------------|--------|-----------|---------|--------|--------------------------|
| MHz       | dBuV/m | v/h | Limit           | Margin | Pk/QP/Avg | degrees | meters |                          |
| 248.448   | 34.3   | H   | 46.0            | -11.7  | QP        | 3       | 1.0    | QP (1.00s)               |
| 1256.950  | 64.2   | V   | 74.0            | -9.8   | PK        | 319     | 1.0    | POS; RB 1 MHz; VB: 3 MHz |
| 1257.160  | 33.5   | V   | 54.0            | -20.5  | AVG       | 319     | 1.0    | POS; RB 1 MHz; VB: 10 Hz |
| 1732.500  | 115.5  | V   | -               | -      | Peak      | 170     | 1.0    | LTE Uplink (Band 4)      |
| 2132.500  | 52.3   | V   | -               | -      | Peak      | 73      | 1.5    | LTE Downlink (Band 4)    |
| 2402.000  | 86.7   | H   | -               | -      | Peak      | 13      | 1.0    | BLE Fundamental          |
| 3464.800  | 41.2   | V   | 54.0            | -12.8  | AVG       | 17      | 1.0    | RB 1 MHz;VB 10 Hz;Peak   |
| 3464.810  | 50.1   | V   | 74.0            | -23.9  | PK        | 17      | 1.0    | RB 1 MHz;VB 3 MHz;Peak   |
| 4803.450  | 50.4   | V   | 74.0            | -23.6  | PK        | 336     | 1.7    | RB 1 MHz;VB 3 MHz;Peak   |
| 4804.000  | 44.0   | V   | 54.0            | -10.0  | AVG       | 336     | 1.7    | RB 1 MHz;VB 10 Hz;Peak   |
| 12008.650 | 46.3   | V   | 54.0            | -7.7   | AVG       | 339     | 1.0    | RB 1 MHz;VB 10 Hz;Peak   |
| 12009.320 | 57.5   | V   | 74.0            | -16.5  | PK        | 339     | 1.0    | RB 1 MHz;VB 3 MHz;Peak   |
| 12011.010 | 52.3   | H   | 54.0            | -1.7   | AVG       | 355     | 1.0    | RB 1 MHz;VB 10 Hz;Peak   |
| 12011.060 | 61.2   | H   | 74.0            | -12.8  | PK        | 355     | 1.0    | RB 1 MHz;VB 3 MHz;Peak   |





## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

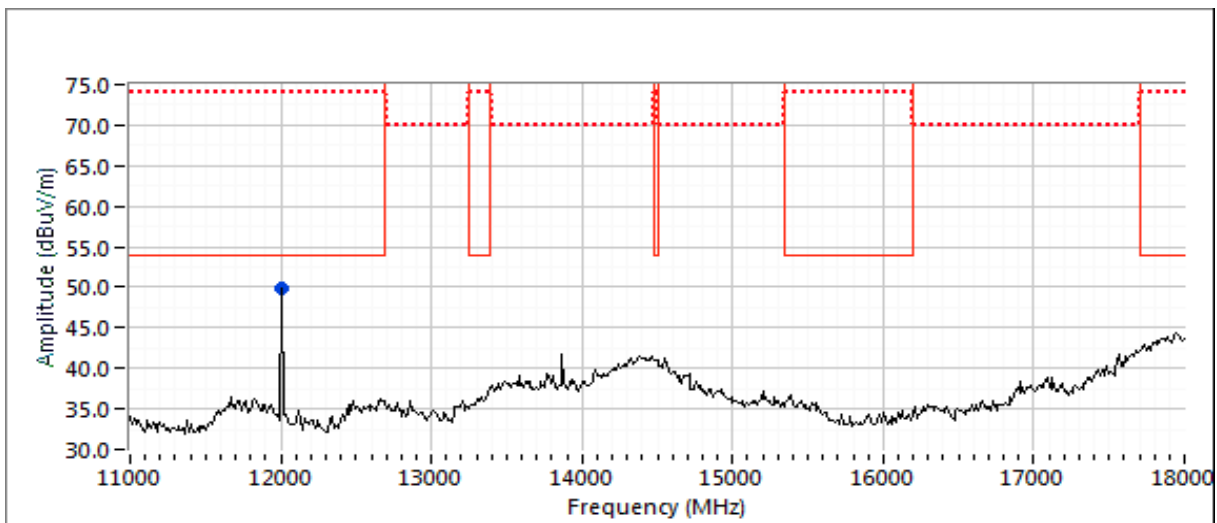
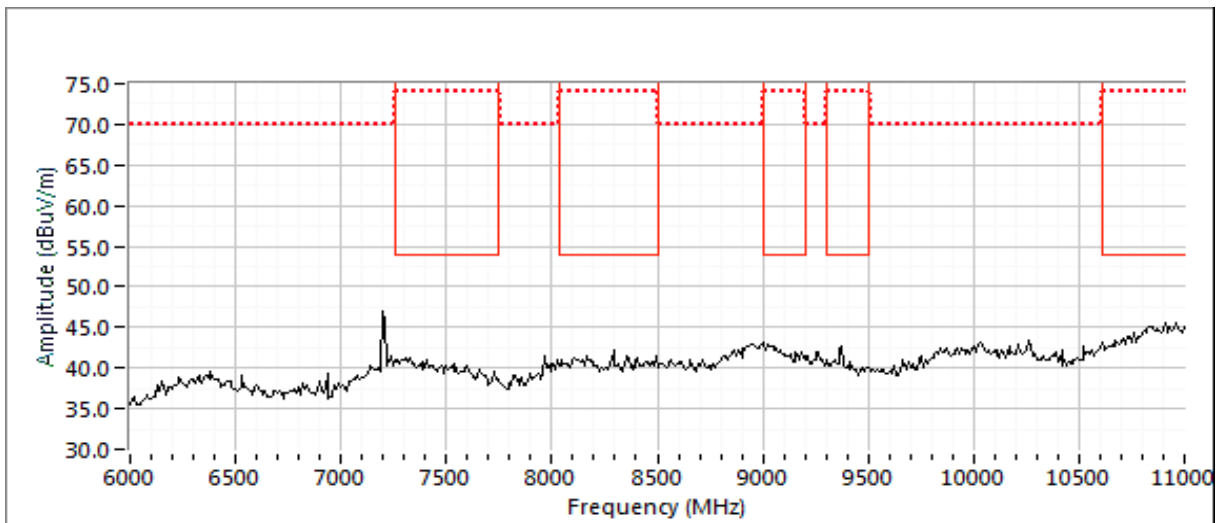






## EMC Test Data

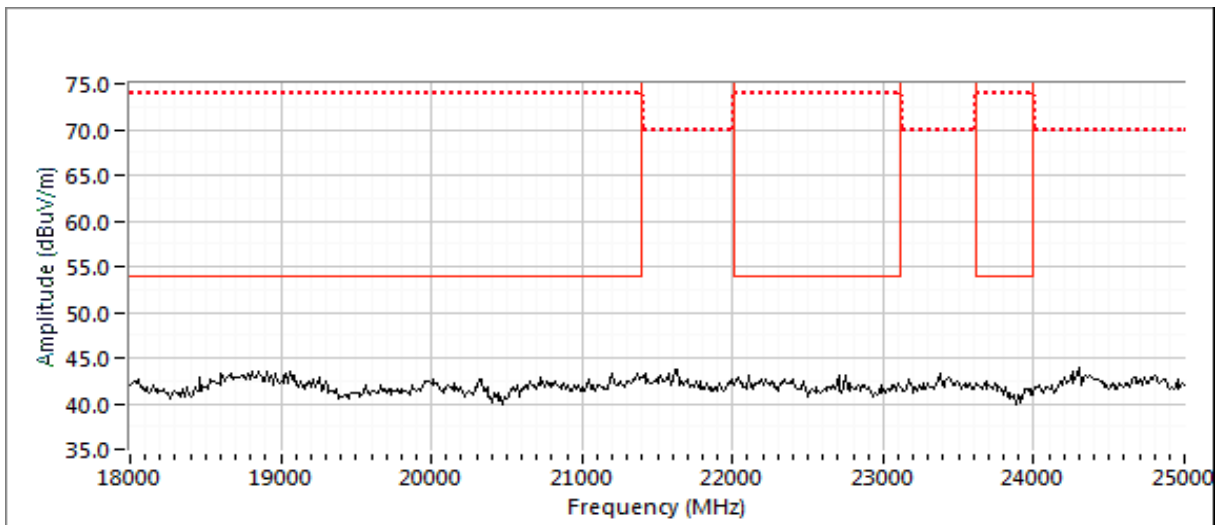
|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |





## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |



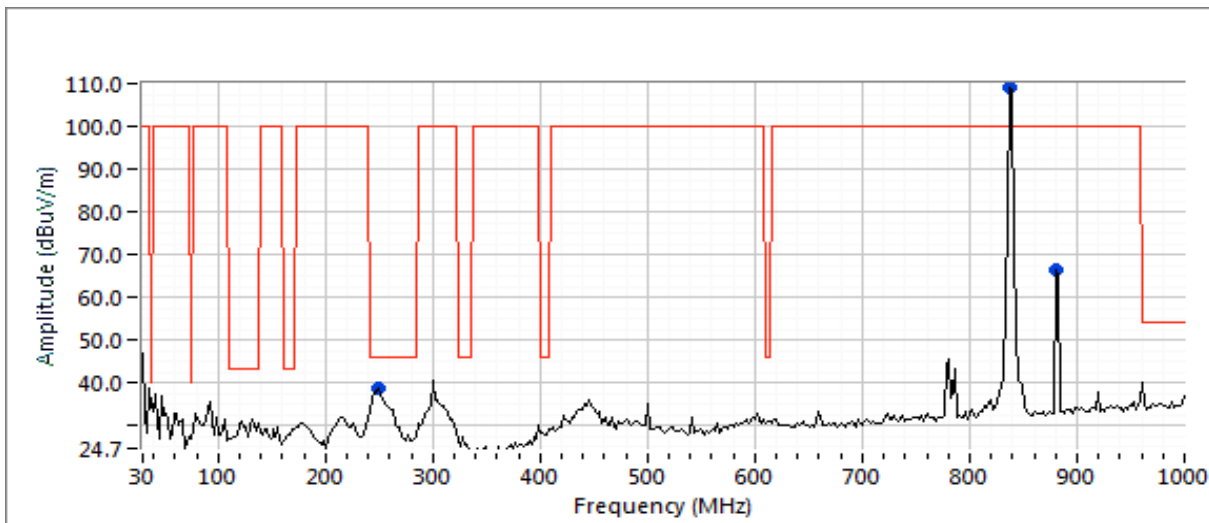


## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARC9004LTE                                  | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

Run #1b: Channel: 17 Mode: BLE  
Channel: 20525 (Uplink) Mode: LTE (Band 5)

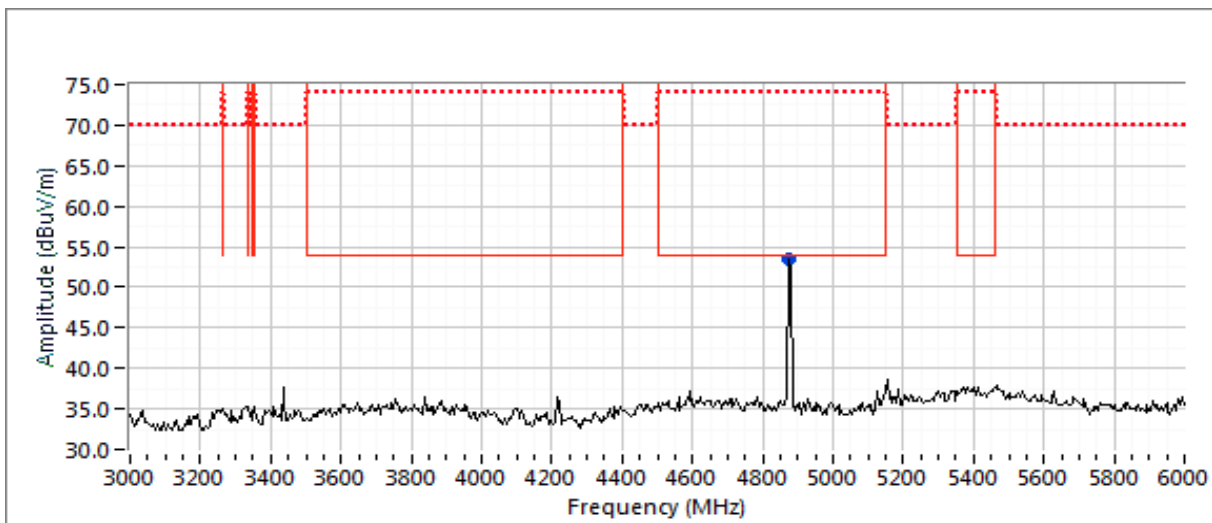
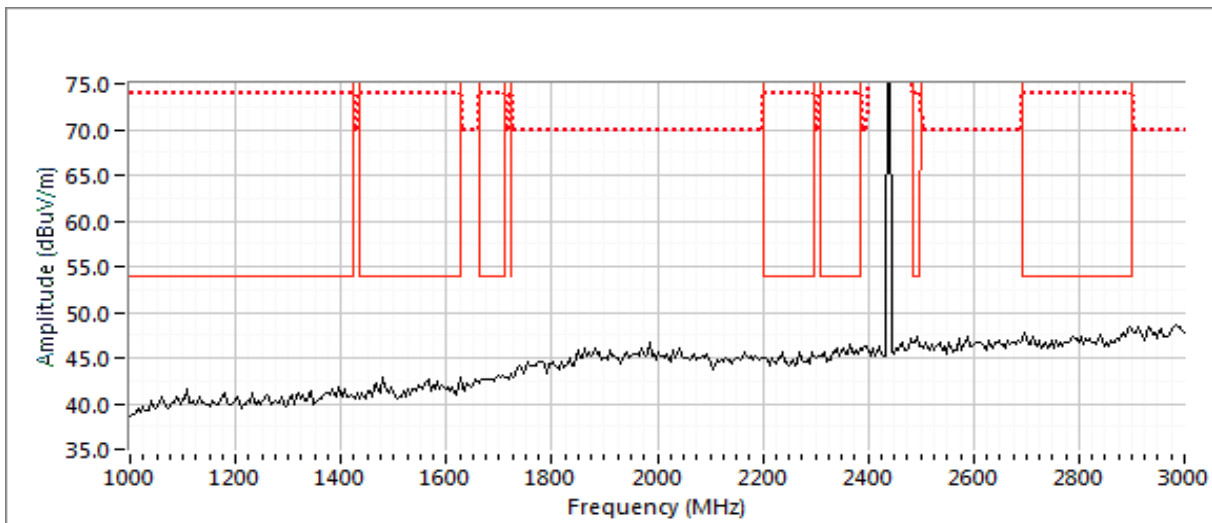
| Frequency | Level        | Pol | 15.209 / 15.247 |        | Detector  | Azimuth | Height | Comments               |
|-----------|--------------|-----|-----------------|--------|-----------|---------|--------|------------------------|
| MHz       | dB $\mu$ V/m | v/h | Limit           | Margin | Pk/QP/Avg | degrees | meters |                        |
| 248.290   | 36.0         | H   | 46.0            | -10.0  | QP        | 177     | 1.0    | QP (1.00s)             |
| 836.613   | 109.0        | H   | -               | -      | Peak      | 122     | 3.0    | LTE Uplink (Band 5)    |
| 881.423   | 66.3         | V   | -               | -      | Peak      | 79      | 1.0    | LTE Downlink (Band 5)  |
| 2440.020  | 84.7         | H   | -               | -      | Peak      | 19      | 1.0    | BLE Fundamental        |
| 4879.390  | 55.7         | V   | 74.0            | -18.3  | PK        | 333     | 1.7    | RB 1 MHz;VB 3 MHz;Peak |
| 4879.770  | 50.0         | V   | 54.0            | -4.0   | AVG       | 333     | 1.7    | RB 1 MHz;VB 10 Hz;Peak |
| 7319.020  | 54.5         | V   | 74.0            | -19.5  | PK        | 184     | 1.9    | RB 1 MHz;VB 3 MHz;Peak |
| 7319.320  | 44.8         | V   | 54.0            | -9.2   | AVG       | 184     | 1.9    | RB 1 MHz;VB 10 Hz;Peak |
| 12188.620 | 46.4         | V   | 54.0            | -7.6   | AVG       | 340     | 1.0    | RB 1 MHz;VB 10 Hz;Peak |
| 12188.880 | 56.1         | V   | 74.0            | -17.9  | PK        | 340     | 1.0    | RB 1 MHz;VB 3 MHz;Peak |





## EMC Test Data

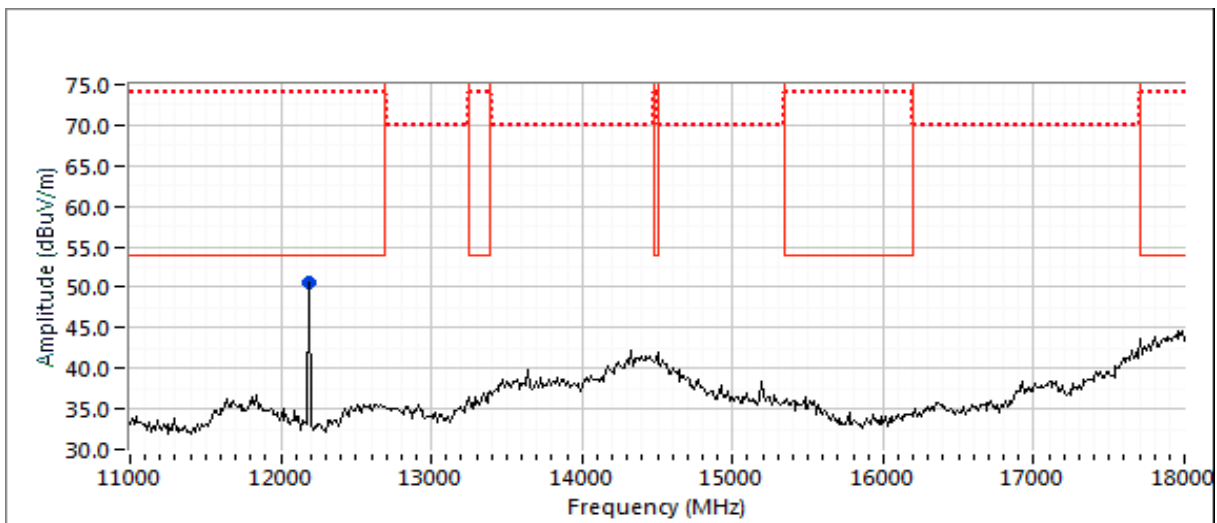
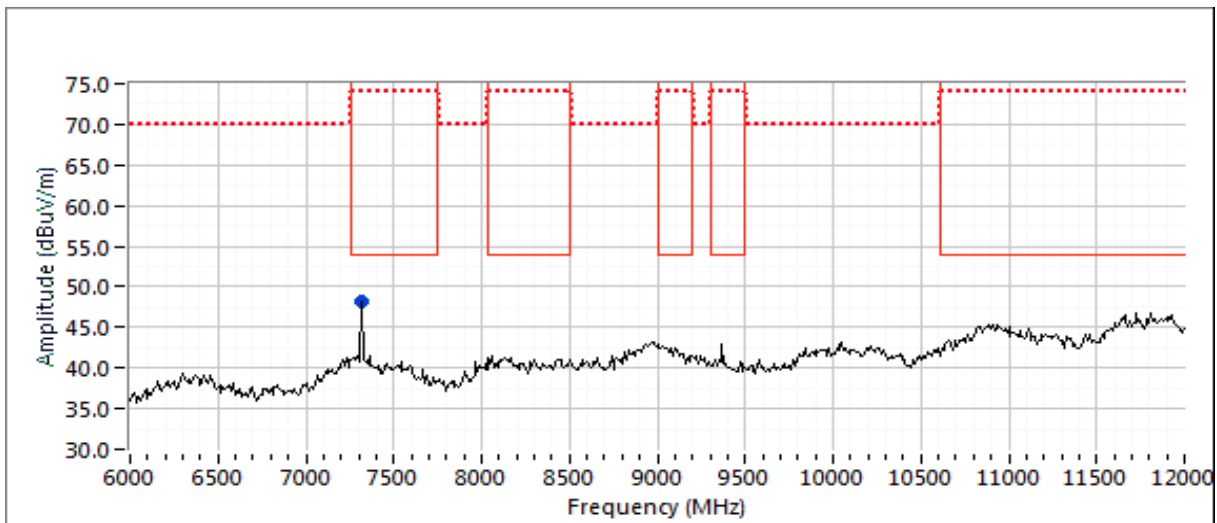
|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |





## EMC Test Data

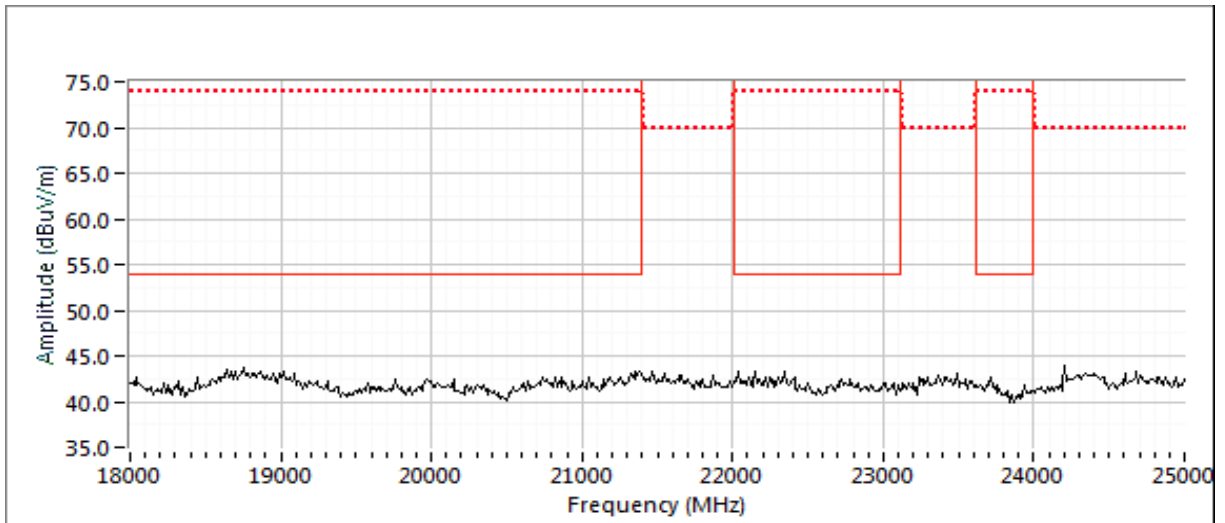
|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |





## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |



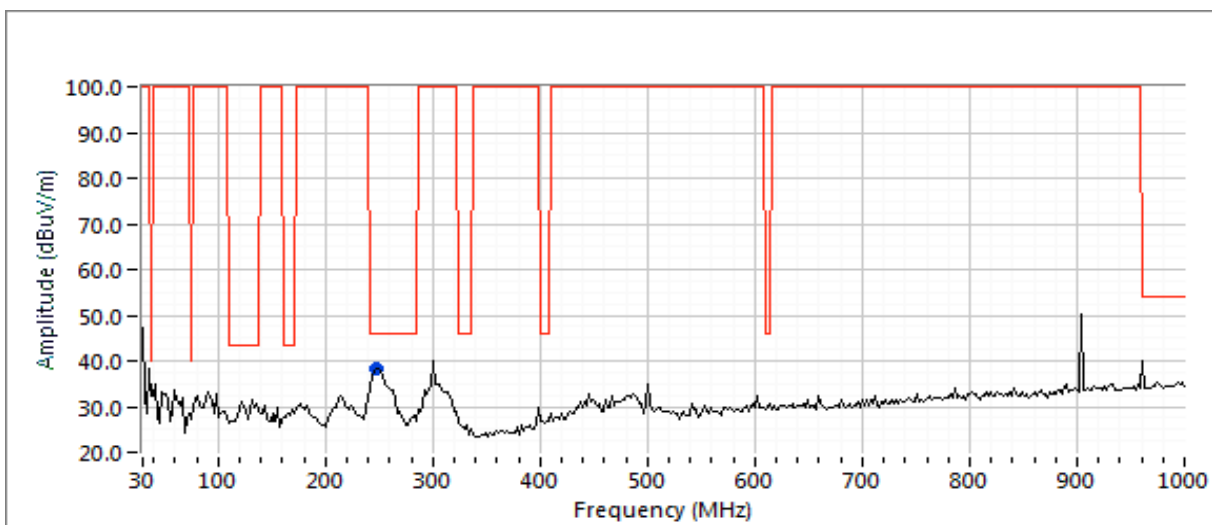


## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARC9004LTE                                  | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

Run #1c: Channel: 39 Mode: BLE  
Channel: 20175 (Uplink) Mode: LTE (Band 4)

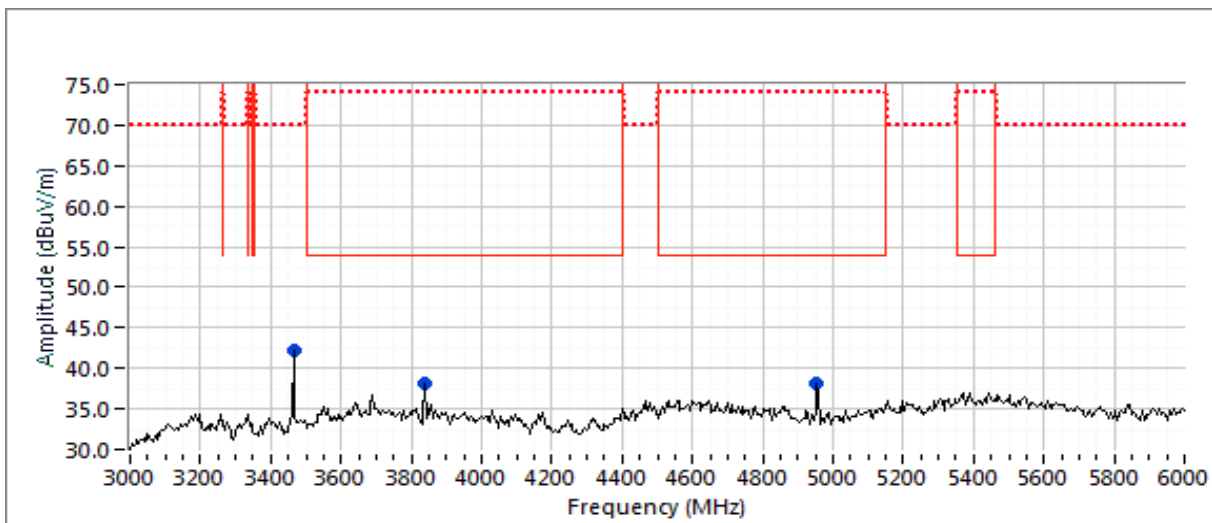
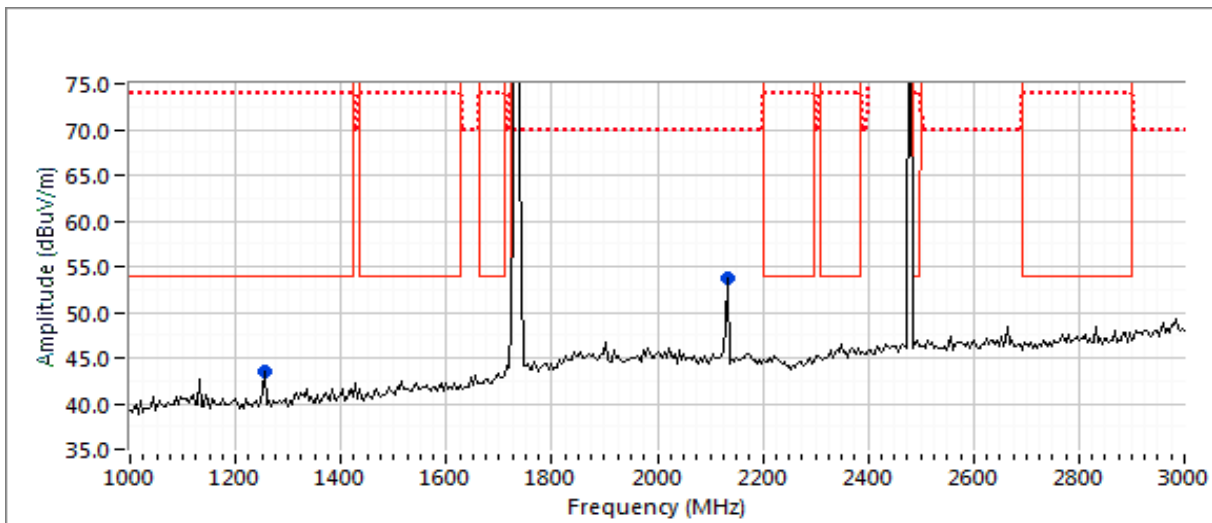
| Frequency | Level        | Pol | 15.209 / 15.247 |        | Detector  | Azimuth | Height | Comments                 |
|-----------|--------------|-----|-----------------|--------|-----------|---------|--------|--------------------------|
| MHz       | dB $\mu$ V/m | v/h | Limit           | Margin | Pk/QP/Avg | degrees | meters |                          |
| 248.290   | 36.0         | H   | 46.0            | -10.0  | QP        | 177     | 1.0    | Same as run 1B           |
| 1255.070  | 54.5         | V   | 74.0            | -19.5  | PK        | 330     | 2.5    | POS; RB 1 MHz; VB: 3 MHz |
| 1255.350  | 33.5         | V   | 54.0            | -20.5  | AVG       | 330     | 2.5    | POS; RB 1 MHz; VB: 10 Hz |
| 1732.500  | 115.7        | V   | -               | -      | Peak      | 162     | 1.0    | LTE Uplink (Band 4)      |
| 2132.500  | 53.8         | V   | -               | -      | Peak      | 92      | 2.0    | LTE Downlink (Band 4)    |
| 2480.000  | 88.1         | H   | -               | -      | Peak      | 340     | 1.0    | BLE Fundamental          |
| 3465.050  | 42.3         | V   | 74.0            | -31.7  | PK        | 72      | 1.3    | 2nd Harmonic of Cell     |
| 3840.450  | 36.4         | H   | 54.0            | -17.6  | AVG       | 258     | 1.7    | RB 1 MHz;VB 10 Hz;Peak   |
| 3840.720  | 45.0         | H   | 74.0            | -29.0  | PK        | 258     | 1.7    | RB 1 MHz;VB 3 MHz;Peak   |
| 4959.690  | 45.6         | V   | 74.0            | -28.4  | PK        | 331     | 1.6    | RB 1 MHz;VB 3 MHz;Peak   |
| 4959.820  | 37.6         | V   | 54.0            | -16.4  | AVG       | 331     | 1.6    | RB 1 MHz;VB 10 Hz;Peak   |
| 7439.230  | 51.6         | V   | 74.0            | -22.4  | PK        | 351     | 2.4    | RB 1 MHz;VB 3 MHz;Peak   |
| 7439.290  | 43.3         | V   | 54.0            | -10.7  | AVG       | 351     | 2.4    | RB 1 MHz;VB 10 Hz;Peak   |
| 12398.610 | 54.4         | V   | 74.0            | -19.6  | PK        | 345     | 1.0    | RB 1 MHz;VB 3 MHz;Peak   |
| 12398.710 | 44.4         | V   | 54.0            | -9.6   | AVG       | 345     | 1.0    | RB 1 MHz;VB 10 Hz;Peak   |





## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

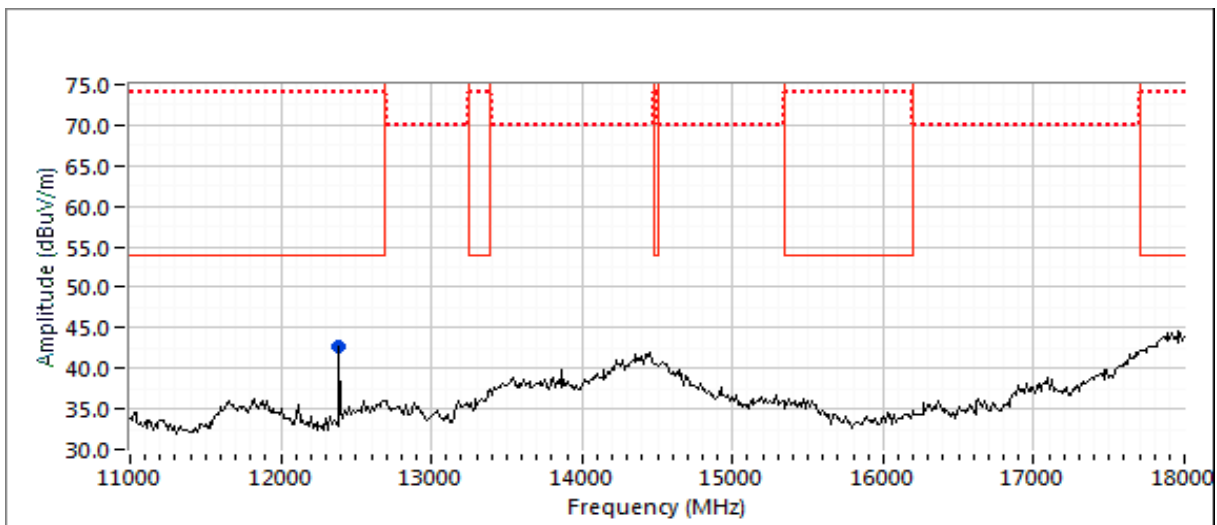
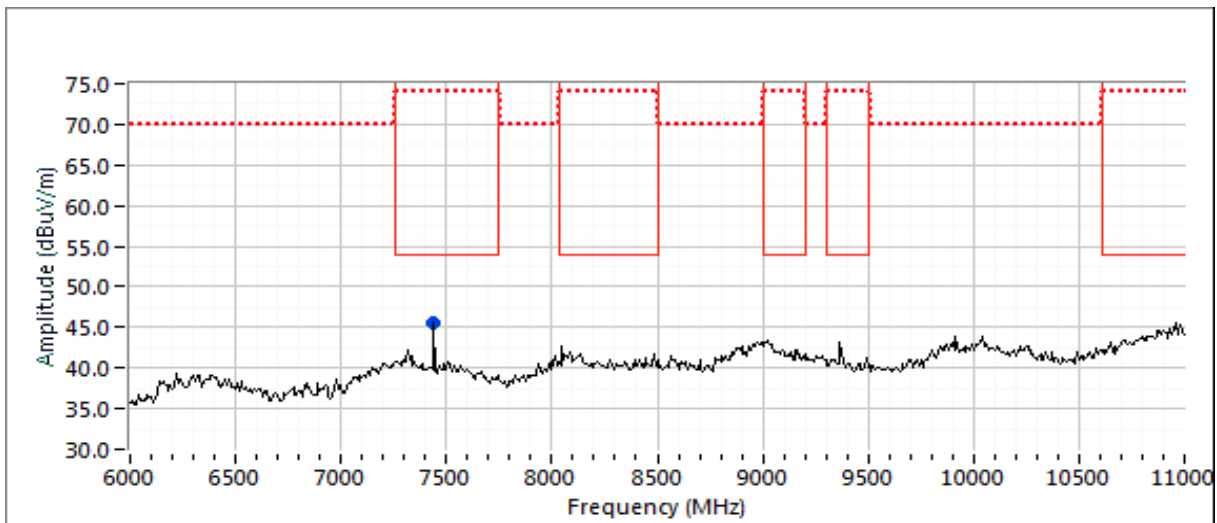






## EMC Test Data

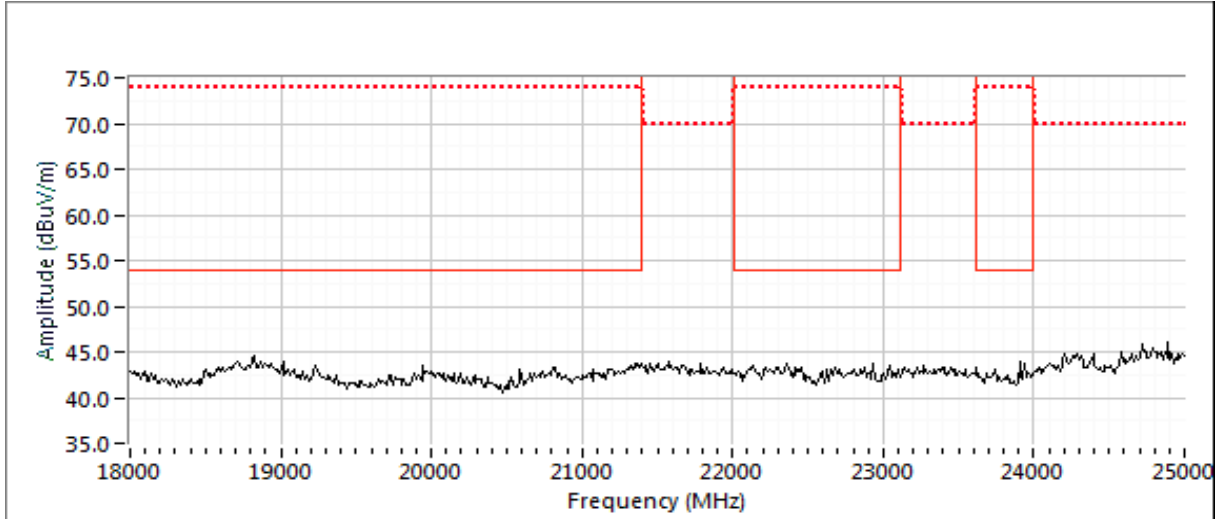
|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |





## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |



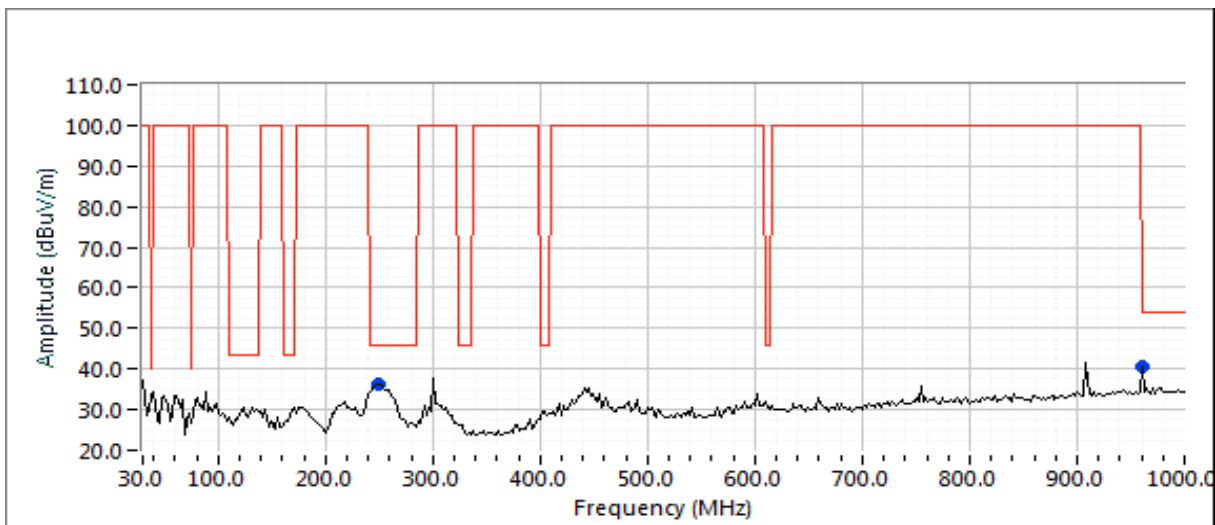


## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARC9004LTE                                  | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

Run #1d: Channel: 37 Mode: BLE  
Channel: 27710 (Uplink) Mode: LTE (Band 30)

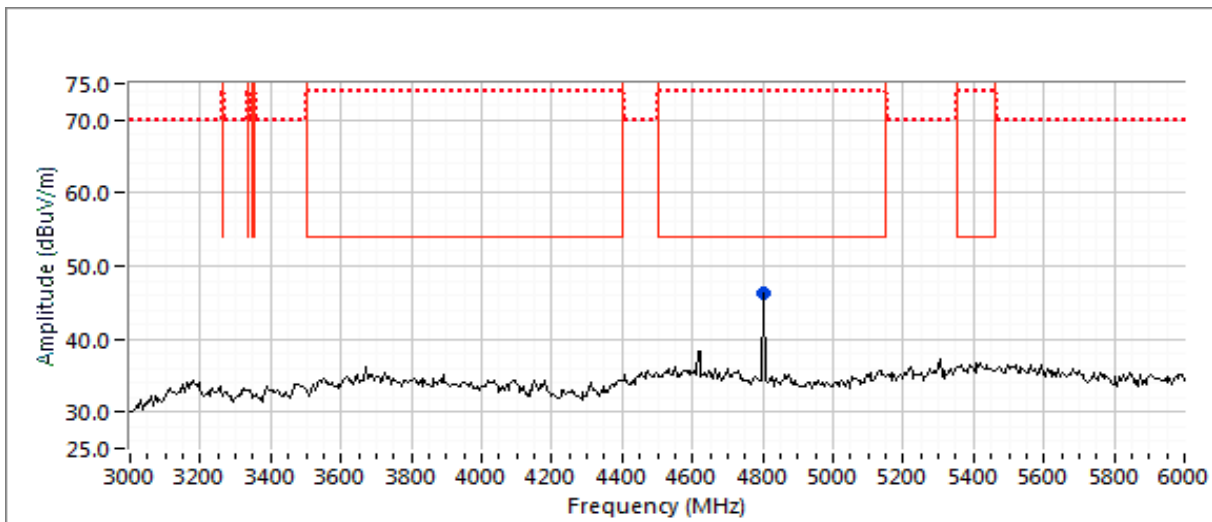
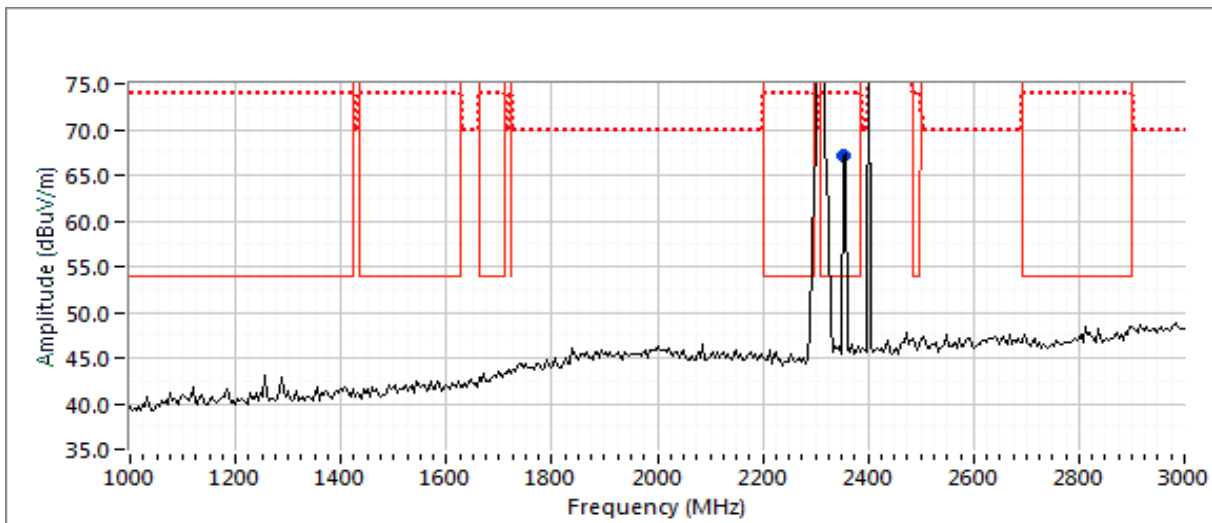
| Frequency | Level        | Pol | 15.209 / 15.247 |        | Detector  | Azimuth | Height | Comments               |
|-----------|--------------|-----|-----------------|--------|-----------|---------|--------|------------------------|
| MHz       | dB $\mu$ V/m | v/h | Limit           | Margin | Pk/QP/Avg | degrees | meters |                        |
| 249.286   | 34.8         | H   | 46.0            | -11.2  | QP        | 172     | 1.0    | QP (1.00s)             |
| 960.126   | 43.6         | V   | 54.0            | -10.4  | QP        | 206     | 1.0    | QP (1.00s)             |
| 2310.000  | 111.6        | V   | -               | -      | Peak      | 236     | 1.0    | LTE Uplink (Band 30)   |
| 2355.000  | 67.1         | V   | -               | -      | Peak      | 61      | 1.9    | LTE Downlink (Band 30) |
| 2402.000  | 86.6         | V   | -               | -      | Peak      | 7       | 1.6    | BLE Fundamental        |
| 4803.400  | 49.3         | V   | 74.0            | -24.7  | PK        | 327     | 1.0    | RB 1 MHz;VB 3 MHz;Peak |
| 4803.970  | 42.9         | V   | 54.0            | -11.1  | AVG       | 327     | 1.0    | RB 1 MHz;VB 10 Hz;Peak |
| 12008.500 | 48.9         | V   | 74.0            | -25.1  | PK        | 355     | 1.3    | RB 1 MHz;VB 3 MHz;Peak |
| 12010.930 | 38.4         | V   | 54.0            | -15.6  | AVG       | 355     | 1.3    | RB 1 MHz;VB 10 Hz;Peak |





## EMC Test Data

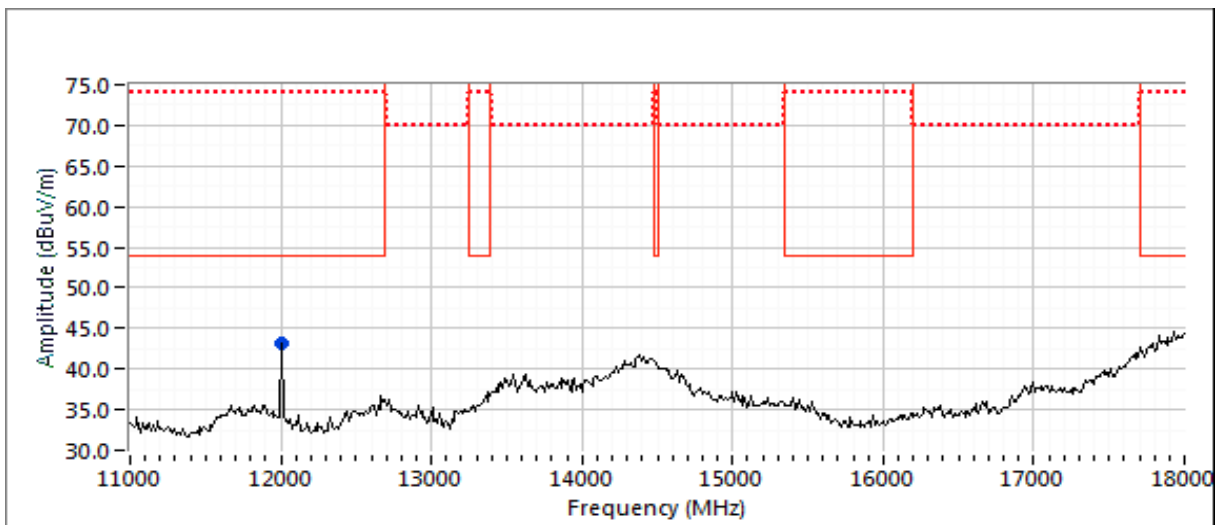
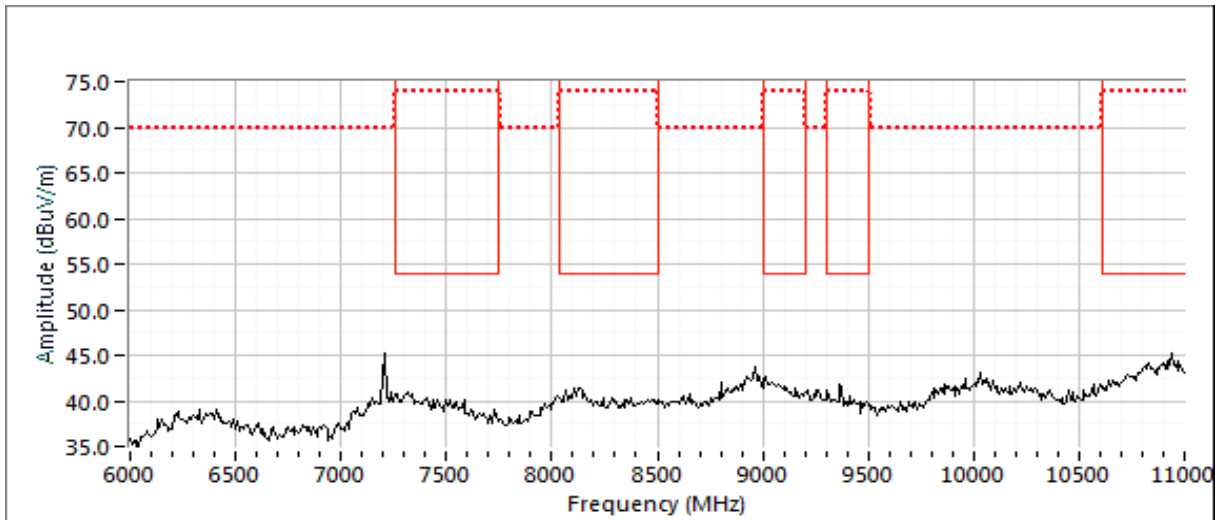
|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |





## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |



Note: Scans made between 18 - 25 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range

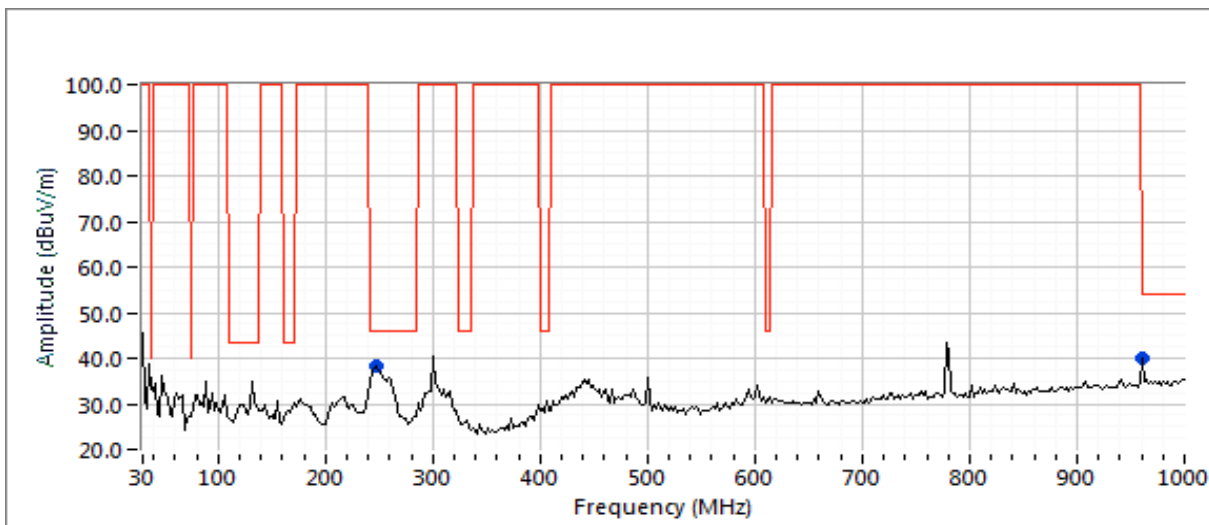


# EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARC9004LTE                                  | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |

Run #1e: Channel: 37 Mode: BLE  
Channel: 27735 (Uplink) Mode: LTE (Band 30)

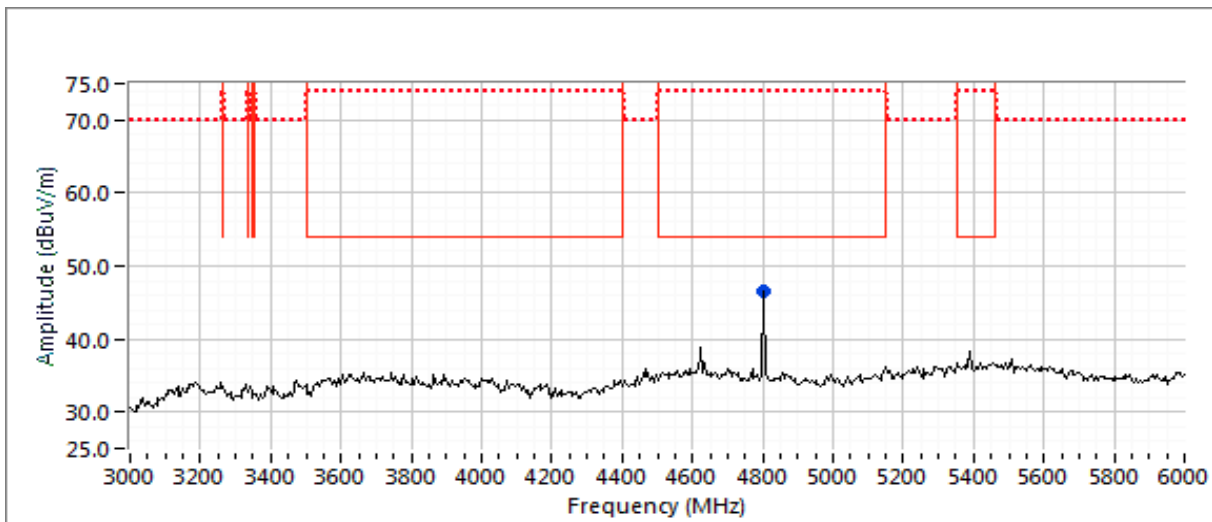
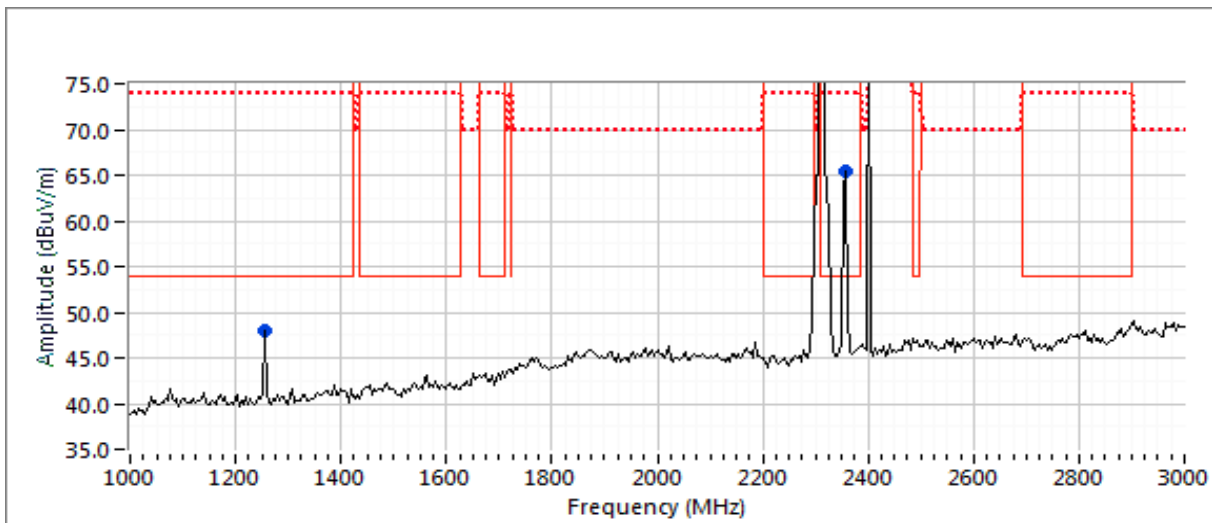
| Frequency | Level        | Pol | 15.209 / 15.247 |        | Detector  | Azimuth | Height | Comments                 |
|-----------|--------------|-----|-----------------|--------|-----------|---------|--------|--------------------------|
| MHz       | dB $\mu$ V/m | v/h | Limit           | Margin | Pk/QP/Avg | degrees | meters |                          |
| 247.715   | 36.0         | H   | 46.0            | -10.0  | QP        | 177     | 1.0    | QP (1.00s)               |
| 960.126   | 43.4         | V   | 54.0            | -10.6  | QP        | 208     | 1.0    | QP (1.00s)               |
| 1256.450  | 62.5         | V   | 74.0            | -11.5  | PK        | 116     | 1.3    | POS; RB 1 MHz; VB: 3 MHz |
| 1256.920  | 33.5         | V   | 54.0            | -20.5  | AVG       | 116     | 1.3    | POS; RB 1 MHz; VB: 10 Hz |
| 2312.500  | 109.4        | V   | -               | -      | Peak      | 240     | 1.0    | LTE Uplink (Band 30)     |
| 2357.500  | 65.4         | V   | -               | -      | Peak      | 66      | 1.3    | LTE Downlink (Band 30)   |
| 2402.000  | 86.2         | H   | -               | -      | Peak      | 338     | 1.0    | BLE Fundamental          |
| 4803.810  | 43.8         | V   | 54.0            | -10.2  | AVG       | 332     | 1.3    | RB 1 MHz;VB 10 Hz;Peak   |
| 4804.400  | 49.7         | V   | 74.0            | -24.3  | PK        | 332     | 1.3    | RB 1 MHz;VB 3 MHz;Peak   |
| 12008.570 | 49.0         | V   | 74.0            | -25.0  | PK        | 346     | 1.1    | RB 1 MHz;VB 3 MHz;Peak   |
| 12010.970 | 39.1         | V   | 54.0            | -14.9  | AVG       | 346     | 1.1    | RB 1 MHz;VB 10 Hz;Peak   |





## EMC Test Data

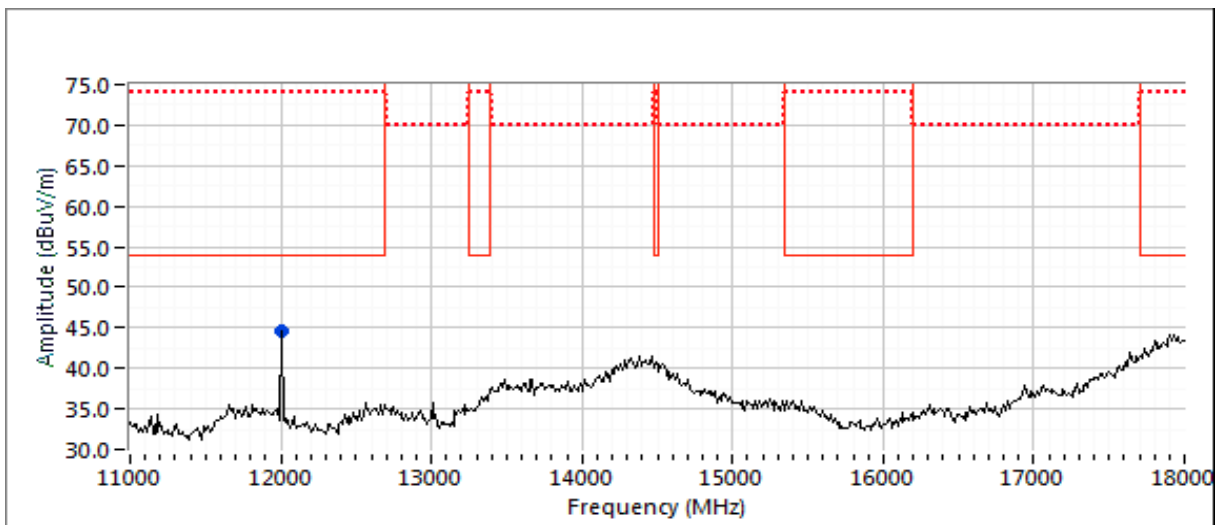
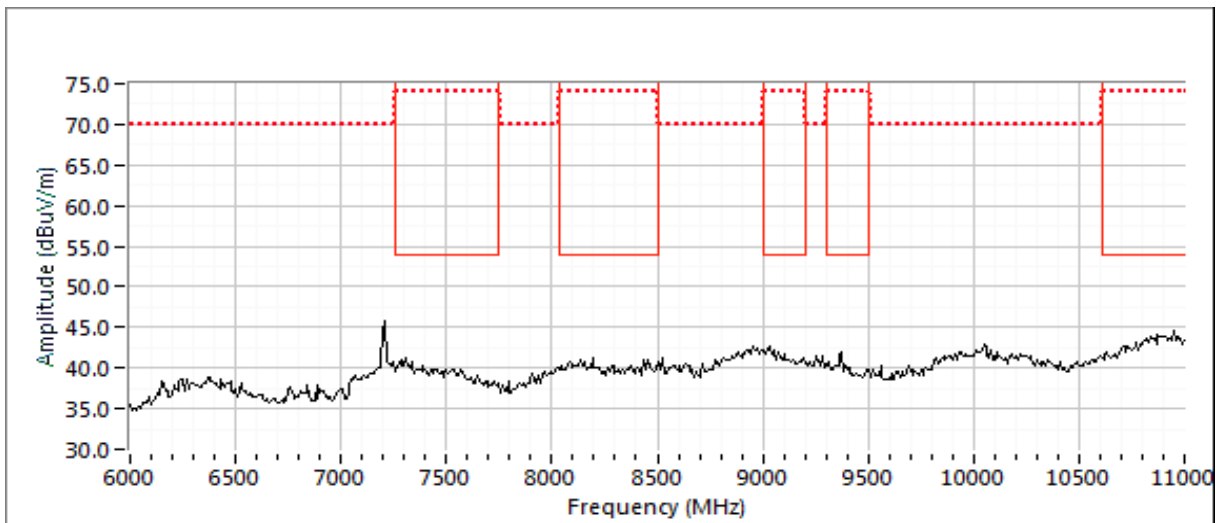
|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |





## EMC Test Data

|           |                                             |                      |                   |
|-----------|---------------------------------------------|----------------------|-------------------|
| Client:   | Aruba, a Hewlett Packard Enterprise company | Job Number:          | PR107760          |
| Model:    | ARCN9004LTE                                 | T-Log Number:        | TL107760-RA       |
| Contact:  | Mark Hill                                   | Project Manager:     | Christine Krebill |
| Standard: | FCC 15.247, RSS-247                         | Project Coordinator: | David Bare        |
|           |                                             | Class:               | N/A               |



Note: Scans made between 18 - 25 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



***End of Report***

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