

*EMC Test Report
Application for Grant of Equipment Authorization
Class II Permissive Change/Reassessment
Industry Canada RSS-Gen Issue 3 / RSS 210 Issue 8
FCC Part 15 Subpart C*

Model: WLAN AP8120

IC CERTIFICATION #: 3794G-AP8120
FCC ID: X7CAP8120

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Santa Clara, CA 95054

TEST SITE(S): Elliott Laboratories
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Fremont, CA. 94538-2435

IC SITE REGISTRATION #: 2845B-4 & 2845B-7

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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	03-22-2011	First release	
1.0	06-21-2011	Updated with revised data from additional testing	MEH
2.0	07-29-2011	Updated antenna gain, revised calculations, no additional testing	MEH

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SCOPE

An electromagnetic emissions test has been performed on the Avaya model WLAN AP8120, pursuant to the following rules:

Industry Canada RSS-Gen Issue 3
RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
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 Elliott Laboratories test procedures:

ANSI C63.4:2003
FCC DTS Measurement Procedure KDB558074, March 2005

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

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

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

OBJECTIVE

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

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

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 Avaya model WLAN AP8120 complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 3
RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
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 Avaya model WLAN AP8120 and therefore apply only to the tested sample. The sample was selected and prepared by Vipin Naik of Avaya.

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 210 A8.2	Digital Modulation	Change would not affect previous results		
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	Change would not affect previous results		
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	802.11b 18.8 dBm (0.076 Watts) EIRP = 0.392 W 802.11g 22.9 dBm (0.195 Watts) EIRP = 1.007 W 802.11n20 CDD 25.6 dBm (0.364 Watts) EIRP = 3.601 W 802.11n40 CDD 21.0 dBm (0.126 Watts) EIRP = 1.244 W 802.11n40 SISO 19.1 dBm (0.081 Watts) EIRP = 0.420 W	1 Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	Change would not affect previous results		
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	Change would not affect previous results		
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.9dBμV/m @ 2389.97MHz (-0.1dB)	15.207 in restricted bands, all others < -20dBc <-30dBc ^{Note 2}	Complies
<p>Note 1: EIRP calculated using antenna gain of 7.13 dBi for the highest EIRP system multi-point system.</p> <p>Note 2: For those modes that were tested using a peak power meter, a limit of -20dBc was used. For those modes that were tested using the UNII test procedure (maximum power averaged over a transmission burst) / RMS averaging over a time interval, as permitted under RSS 210 section A8.4(4), a limit of -30dBc was used. Refer to the test data in the appendix for details.</p>					

DIGITAL TRANSMISSION SYSTEMS (5725 –5850 MHz)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Change would not affect previous results		
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	Change would not affect previous results		
15.247 (b)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	802.11a 16.6 dBm (0.046 Watts) EIRP = 0.393 W 802.11n20 CDD 19.6 dBm (0.091 Watts) EIRP = 1.376 W 802.11n40CDD 22.3 dBm (0.164 Watts) EIRP = 2.583 W	1 Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	Change would not affect previous results		
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions – 30MHz – 40 GHz	All spurious emissions < -20dBc	< -20dBc or < -30dBc ^{Note 2}	Complies
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 40 GHz	49.2dBμV/m @ 11589.7MHz (-4.8dB)	15.207 in restricted bands, all others < -20dBc < -30dBc ^{Note 2}	Complies
Note 1: EIRP calculated using antenna gain of 8.8 dBi for the highest EIRP system multi-point system. Note 2: For those modes that were tested using a peak power meter, a limit of -20dBc was used. For those modes that were tested using the UNII test procedure (maximum power averaged over a transmission burst) / RMS averaging over a time interval, as permitted under RSS 210 section A8.4(4), a limit of -30dBc was used. Refer to the test data in the appendix for details.					

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	System uses reverse SMA connectors	Unique or integral antenna required	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	Change would not affect previous results		
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	37.1dB μ V/m @ 1062.4MHz (-16.9dB)	Refer to page 19	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in RF Exposure Exhibit, RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	Change would not affect previous results		
-	RSP 100 RSS GEN 7.1.5	User Manual	Refer to User's Manual Exhibit	Statement for products with detachable antenna	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	Change would not affect previous results		

MEASUREMENT UNCERTAINTIES

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

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

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

The Avaya model WLAN AP8120 is a 802.11abgn wireless router/access point that is designed to wireless connectivity for enterprise network systems. The EUT can be table-top or wall mounted in normal operation. During testing, the EUT was treated as table-top, and rotated thru different orientation to simulate wall mounting, as noted. The EUT is powered via a POE connection.

The sample was received on February 4, 2011 and tested on February 9, and May 31, 2011. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Avaya	WLAN AP8120	802.11abgn AP	Prototype	X7CAP8120

OTHER EUT DETAILS

The following EUT details should be noted: The EUT contains 2 abgn radio modules. One module is used for 2.4GHz operation and one module is used for 5GHz operation. Simultaneous transmission is possible, but never in the same band at the same time. The device supports 2x3 MIMO operation.

The WLAN AP8120 is a modified version of the WLAN AP 8120, approved under the same FCC ID. The internal antenna was removed and 6 reverse SMA connectors were mounted on the enclosure to allow for connection of external antennas.

ANTENNA SYSTEM

There are two external antennas to be included in this permissive change.

1) Laird, S24517PT, 3x3 Dual-Band Panel Antenna:

Peak Gain (dBi)	P1 (V-Pol)	P2 (H-Pol)	P3 (V-Pol)
2.4 - 2.5 GHz	6.65	6.75	7.13
5.15 - 5.35 GHz	8.66	7.68	8.66
5.5 GHz	8.76	7.54	8.76
5.9 GHz	8.84	7.65	8.76

2) Tyco, 1513461-1, 6 Element Mimo Antenna, 5.41dBi @ 2.4GHz, 5.91dBi @ 5.15GHz, 4.53dBi @ 5.35GHz, 5.55dBi @ 5.5GHz, 5.09dBi @ 5.725GHz.

The Tyco antenna is the same antenna that was originally mounted in the WLAN AP 8120. It has been repacked as an external antenna. Only DFS testing was performed using the Tyco antenna. All RF testing was performed using the Laird antenna, as it is higher gain and a different type of antenna from the Tyco.

ENCLOSURE

The EUT outer enclosure is primarily constructed of metal. It measures approximately 23.5 cm wide by 15 cm deep by 5.5 cm high.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at Elliott.

SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
Dell	Inspiron 1501	Laptop	-	-
-	-	USB to Serial Adapter	-	-

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

Company	Model	Description	Serial Number	FCC ID
PowerDsine	PowerDsine 9001G	POE Injector	D0945650000058BA00	-

EUT INTERFACE PORTS

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

Port	Connected To	Description	Cable(s)	
			Shielded or Unshielded	Length(m)
POE	POE Injector	CAT-5	Unshielded	5
Serial Port	USB-to-Serial Adatpter to Laptop	CAT-5 to Serial	Unshielded	6

EUT OPERATION

During testing, the EUT was configured to transmit continuously on the noted channel. Data rate was set to 1Mbps for 802.11b mode and 6Mbps for 802.11g. For MIMO mode testing, please refer to the actual data for the MCS setting.

TEST SITE**GENERAL INFORMATION**

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

Site	Registration Numbers		Location
	FCC	Canada	
Chamber 4	211948	2845B-4	41039 Boyce Road Fremont, CA 94538-2435
Chamber 7	A2LA accreditation	2845B-7	

ANSI C63.4:2003 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4:2003.

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 C63.4:2003 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4:2003.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

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

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

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

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 C63.4:2003 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. 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 C63.4:2003, and the worst-case orientation is used for final measurements.

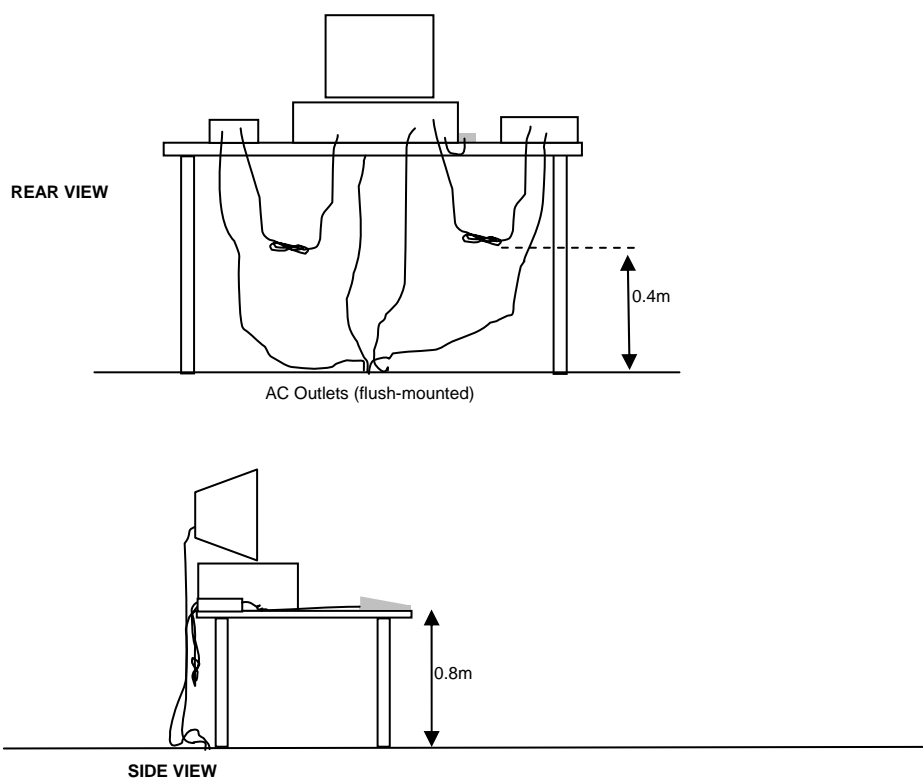
RADIATED EMISSIONS

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

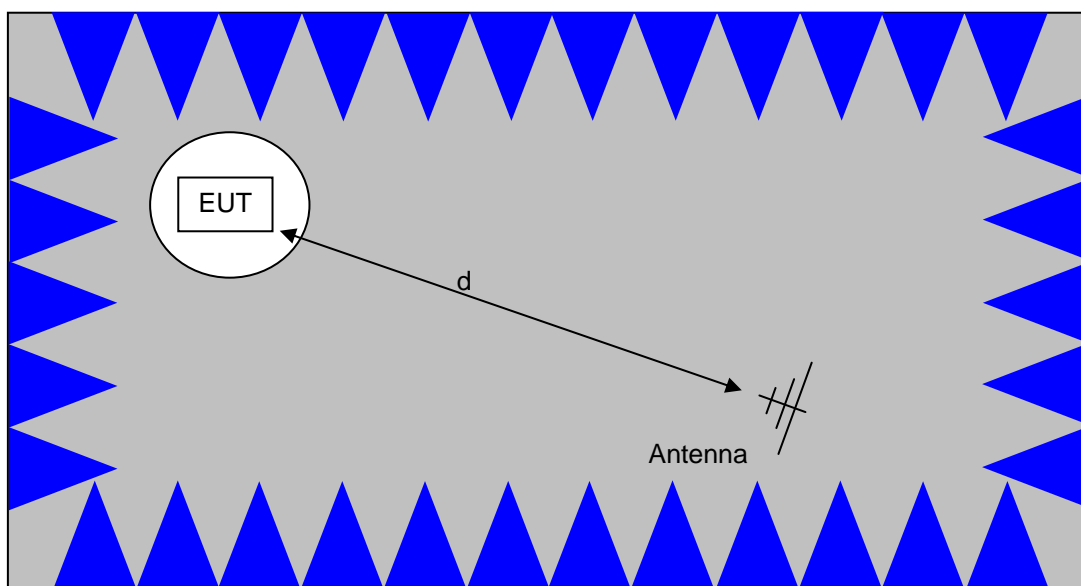
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

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

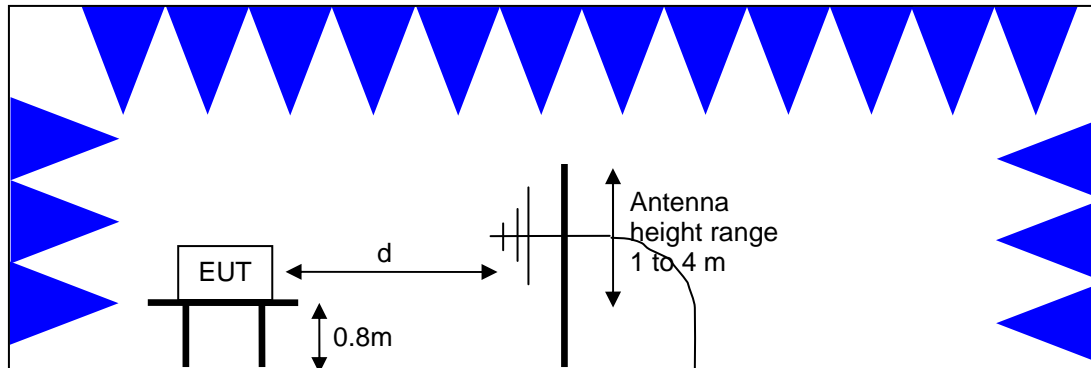


Typical Test Configuration for Radiated Field Strength Measurements



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

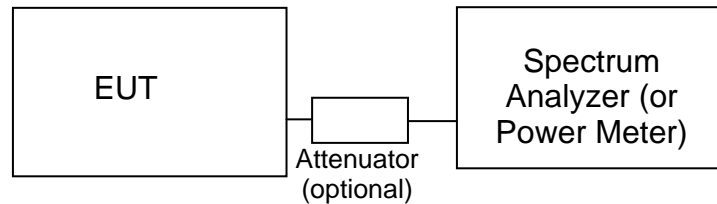
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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 Elliott'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 and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4. When required, the 99% bandwidth is measured using the methods detailed in RSS GEN.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

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

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

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from receivers as detailed in FCC Part 15.109, RSS 210 Table 2, RSS GEN Table 1 and RSS 310 Table 3. Note that receivers operating outside of the frequency range 30 MHz – 960 MHz are exempt from the requirements of 15.109.

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

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

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. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

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 210. 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, 1000 - 18,000 MHz, 09-Feb-11**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/8/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/14/2011
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	11/2/2011

Radiated Emissions, 1000-18,000 MHz, 09-Feb-11

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/11/2011
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/14/2011

Radiated Emissions, 1000 - 18,000 MHz, 9-Feb-11

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	High Pass filter, 8.2 GHz (Red System)	P/N 84300-80039 (84125C)	1152	9/3/2011
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	9/21/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	11/2/2011
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1681	5/25/2011
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	9/3/2011
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	8/26/2011
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/11/2011

Radiated Emissions, 2000 - 6,000 MHz, 31-May-11

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	11/2/2011
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012

Radio Antenna Port (Power and Spurious Emissions), 31-May-11

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	1/26/2012

Appendix B Test Data

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EMC Test Data

Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Emissions Standard(s):	FCC 15.247	Class:	B
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Avaya

Model

AP 8120 with 2 external Antenna (Class II Permissive change)

Date of Last Test: 7/29/2011

Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

RSS 210 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. All remote support equipment was located outside the test chamber.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature:	14-20 °C
Rel. Humidity:	35-50 %

NOTE - testing performed with antenna cables connected directly to radio

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

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1a	b	1	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	52.0dBµV/m @ 2374.86MHz (-2.0dB)
			-	-	Radiated Emissions, 1 - 18 GHz	FCC Part 15.209 / 15.247(c)	48.0dBµV/m @ 4824.0MHz (-6.0dB)
1b	b	6	-	-	Radiated Emissions, 1 - 18 GHz	FCC Part 15.209 / 15.247(c)	45.2dBµV/m @ 4874.0MHz (-8.8dB)
1c	b	11	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.7dBµV/m @ 2483.53MHz (-0.3dB)
			-	-	Radiated Emissions, 1 - 18 GHz	FCC Part 15.209 / 15.247(c)	47.0dBµV/m @ 4924.0MHz (-7.0dB)
2a	g	1	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.9dBµV/m @ 2389.97MHz (-0.1dB)
2b	g	11	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.6dBµV/m @ 2483.5MHz (-0.4dB)

Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

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

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
3a	n20 CDD	1	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	52.8dBμV/m @ 2389.47MHz (-1.2dB)
		1	-	-	Radiated Emissions, 1 - 18 GHz	FCC Part 15.209 / 15.247(c)	40.2dBμV/m @ 3219.9MHz (-29.8dB)
3b	n20 CDD	6	-	-	Radiated Emissions, 1 - 18 GHz	FCC Part 15.209 / 15.247(c)	42.4dBμV/m @ 4871.8MHz (-11.6dB)
3c	n20 CDD	11	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	52.3dBμV/m @ 2484.37MHz (-1.7dB)
		11	-	-	Radiated Emissions, 1 - 18 GHz	FCC Part 15.209 / 15.247(c)	41.9dBμV/m @ 3282.5MHz (-28.1dB)
4a	n40 SISO	3	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	52.8dBμV/m @ 2389.63MHz (-1.2dB)
4b	n40 SISO	9	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	52.8dBμV/m @ 2483.63MHz (-1.2dB)
5a	n40 CDD	3	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.4dBμV/m @ 2389.22MHz (-0.6dB)
5b	n40 CDD	9	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.7dBμV/m @ 2484.59MHz (-0.3dB)

Summary of Results - Device Operating in the 5725 - 5850 MHz Band

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
6a	n40 CDD	151	-	-	Radiated Emissions, 1 - 18 GHz	FCC Part 15.209 / 15.247(c)	48.5dBμV/m @ 11509.2MHz (-5.5dB)
6b	n40 CDD	159	-	-	Radiated Emissions, 1 - 18 GHz	FCC Part 15.209 / 15.247(c)	49.2dBμV/m @ 11589.7MHz (-4.8dB)

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.

Based on previous testing of this radio with other antennas, there were no significant emissions observed < 1GHz or > 18GHz. Thus all emissions tests for this new antenna were restricted to the 1-18GHz range.

Antenna connections: Chain 1 - Vert, Chain 2 (receive only), Vert, Chain 3 - Horiz

Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #1: Radiated Spurious Emissions, 1,000 - 18,000 MHz. Operating Mode: 802.11b

Date of Test: 5/31/2011

Test Location: FT Chasmbler #4

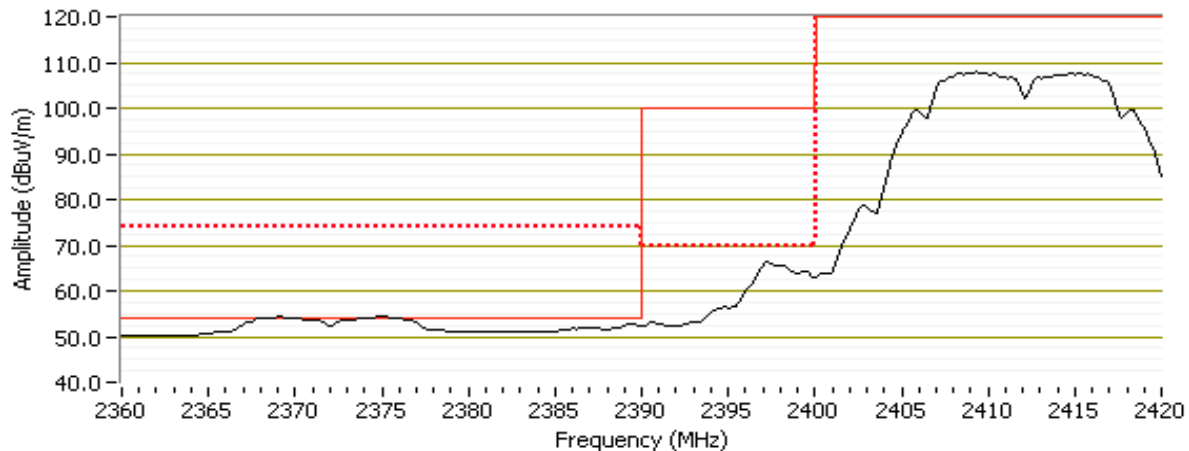
Test Engineer: D. Bare, M. Birgani

Run #1a: Low Channel @ 2412 MHz

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2374.860	52.0	V	54.0	-2.0	AVG	7	1.2	POS; RB 1 MHz; VB: 10 Hz
2372.970	59.5	V	74.0	-14.5	PK	7	1.2	POS; RB 1 MHz; VB: 10 MHz
2350.400	40.4	H	54.0	-13.6	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2351.120	53.5	H	74.0	-20.5	PK	0	1.0	POS; RB 1 MHz; VB: 10 MHz

RB 1 MHz; VB 10 Hz

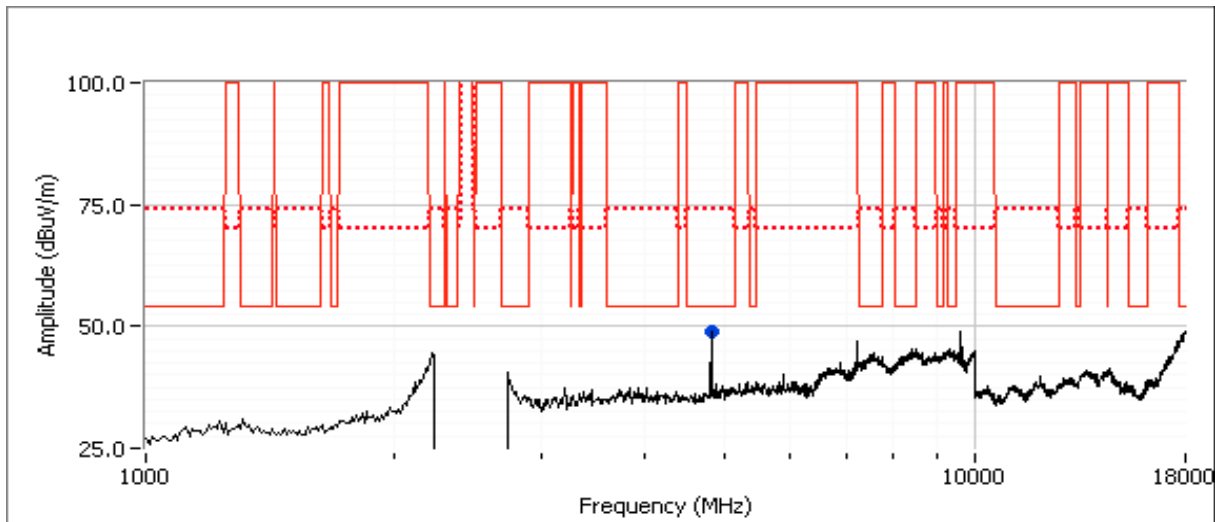


Client: Avaya	Job Number: J81820
Model: AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number: T82013
Contact: Vipin Naik	Account Manager: Christine
Standard: FCC 15.247	Class: N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.970	48.0	V	54.0	-6.0	AVG	0	1.1	RB 1 MHz;VB 10 Hz;Pk
4824.020	51.1	V	74.0	-22.9	PK	0	1.1	RB 1 MHz;VB 3 MHz;Pk

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.



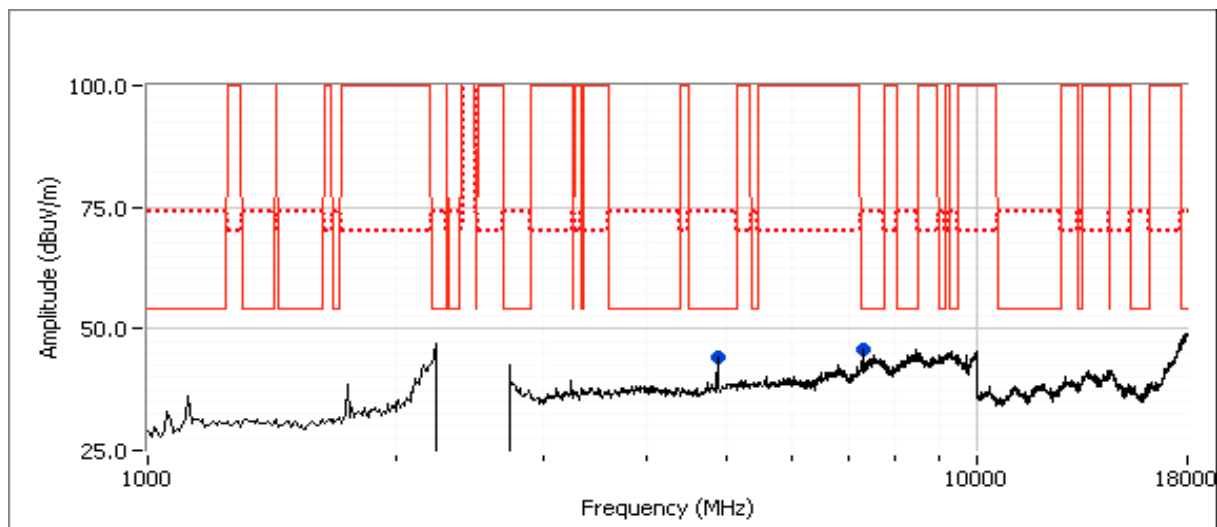
Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #1b: Center Channel @ 2437 MHz

Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.000	45.2	V	54.0	-8.8	AVG	360	1.1	RB 1 MHz;VB 10 Hz;Pk
7314.260	43.0	V	54.0	-11.0	AVG	22	1.2	RB 1 MHz;VB 10 Hz;Pk
7313.420	51.4	V	74.0	-22.6	PK	22	1.2	RB 1 MHz;VB 3 MHz;Pk
4873.950	49.6	V	74.0	-24.4	PK	360	1.1	RB 1 MHz;VB 3 MHz;Pk

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.



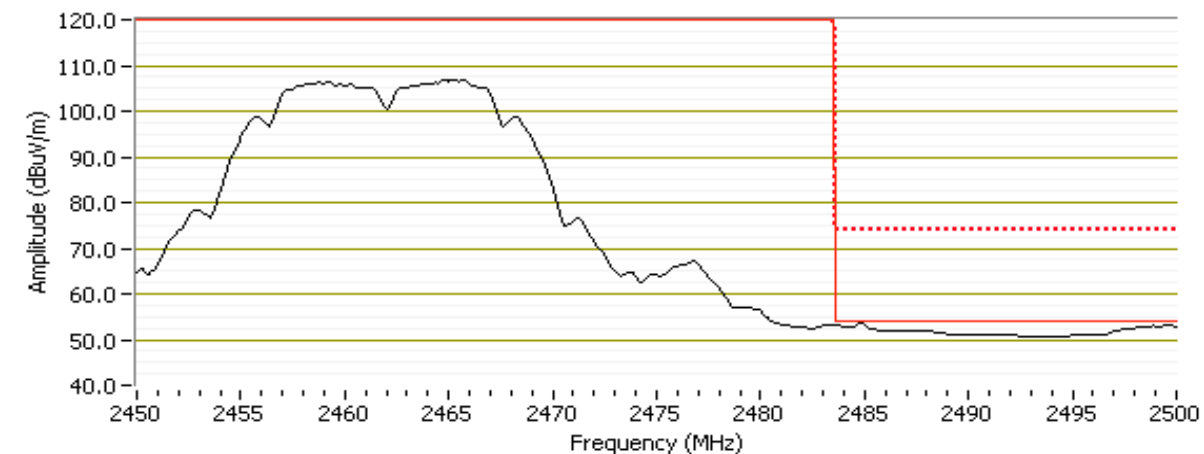
Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #1c: High Channel @ 2462 MHz

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2463.840	108.3	V	-	-	-	356	1.2	RB 100 kHz; VB 100 kHz; Pk
2483.530	53.7	V	54.0	-0.3	AVG	356	1.2	POS; RB 1 MHz; VB: 10 Hz
2484.830	64.0	V	74.0	-10.0	PK	356	1.2	POS; RB 1 MHz; VB: 10 MHz
2483.990	39.8	H	54.0	-14.2	AVG	360	1.3	POS; RB 1 MHz; VB: 10 Hz
2486.330	53.4	H	74.0	-20.6	PK	360	1.3	POS; RB 1 MHz; VB: 10 MHz

RB 1 MHz; VB 10 Hz



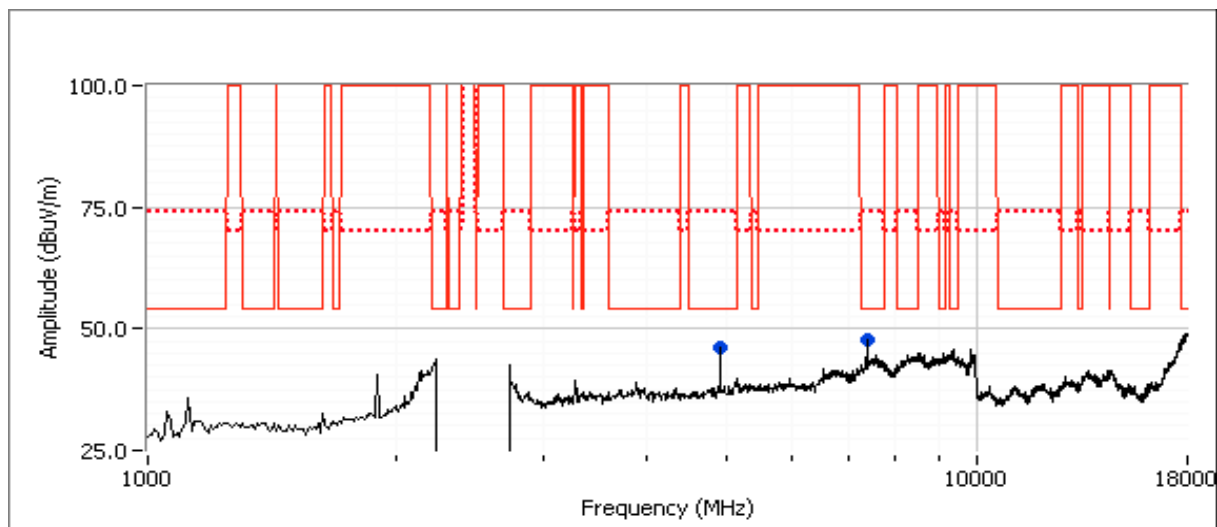
Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.000	47.0	V	54.0	-7.0	AVG	341	1.4	RB 1 MHz;VB 10 Hz;Pk
7382.890	45.9	V	54.0	-8.1	AVG	8	1.0	RB 1 MHz;VB 10 Hz;Pk
7382.300	53.4	V	74.0	-20.6	PK	8	1.0	RB 1 MHz;VB 3 MHz;Pk
4923.970	50.2	V	74.0	-23.8	PK	341	1.4	RB 1 MHz;VB 3 MHz;Pk

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.



Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #2: Radiated Spurious Emissions, 1,000 - 18,000 MHz. Operating Mode: 802.11g

Date of Test: 5/31/2011

Test Location: FT Chasmbler #4

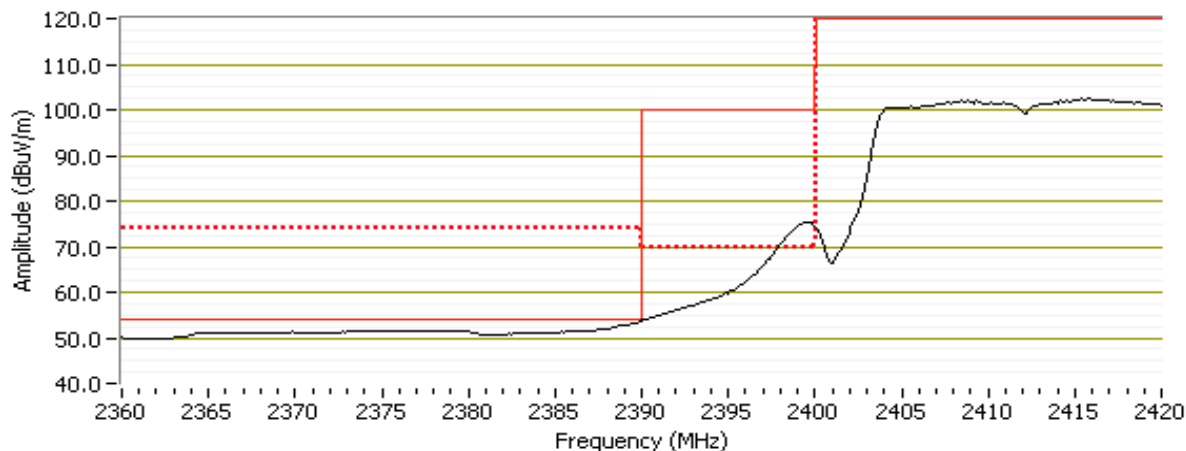
Test Engineer: D. Bare, M. Birgani

Run #2a: Low Channel @ 2412 MHz

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2389.970	53.9	V	54.0	-0.1	AVG	7	1.2	POS; RB 1 MHz; VB: 10 Hz
2390.000	66.6	V	74.0	-7.4	PK	7	1.2	POS; RB 1 MHz; VB: 10 MHz
2389.990	38.8	H	54.0	-15.2	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2387.380	51.6	H	74.0	-22.4	PK	0	1.0	POS; RB 1 MHz; VB: 10 MHz
2417.660	102.2	V	-	-	PK	8	1.2	POS; RB 100 kHz; VB: 100 kHz
2399.510	76.0	V	82.2	-6.2	PK	8	1.2	POS; RB 100 kHz; VB: 100 kHz

RB 1 MHz; VB 10 Hz



Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.

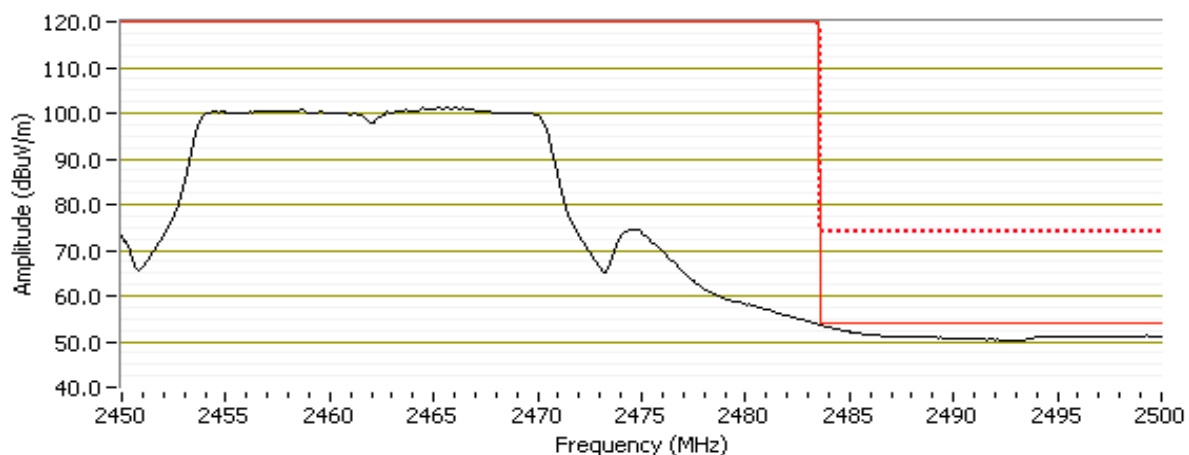
Client: Avaya	Job Number: J81820
Model: AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number: T82013
Contact: Vipin Naik	Account Manager: Christine
Standard: FCC 15.247	Class: N/A

Run #2b: High Channel @ 2462 MHz

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	53.6	V	54.0	-0.4	AVG	13	1.2	POS; RB 1 MHz; VB: 10 Hz
2484.020	66.9	V	74.0	-7.1	PK	13	1.2	POS; RB 1 MHz; VB: 10 MHz
2483.570	38.4	H	54.0	-15.6	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2498.840	51.2	H	74.0	-22.8	PK	0	1.2	POS; RB 1 MHz; VB: 10 MHz

RB 1 MHz; VB 10 Hz



Note 1:

For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.

Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #3: Radiated Spurious Emissions, 1,000 - 18,000 MHz. Operating Mode: 802.11n20 CDD (MCS 0)

Date of Test: 5/31/2011

Test Location: FT Chasmbler #4

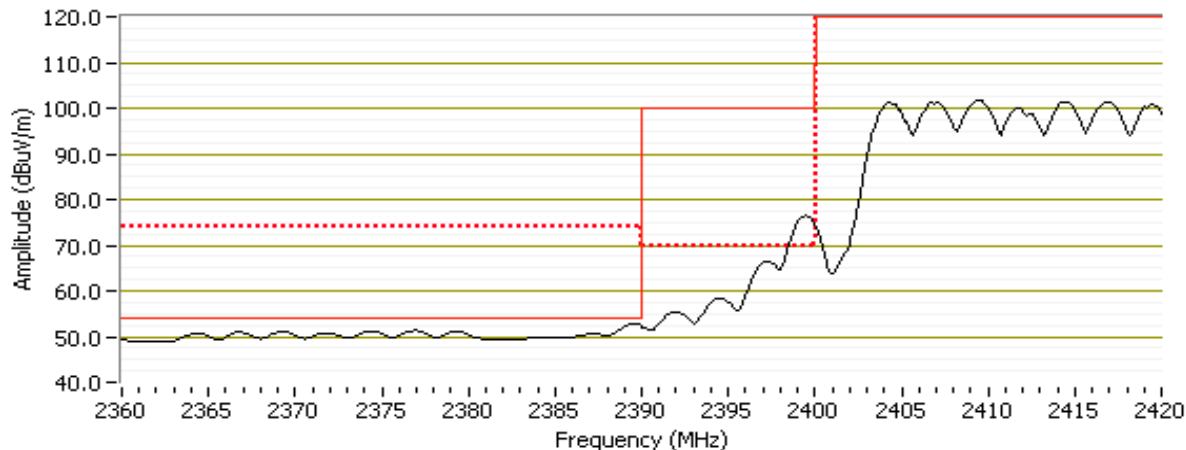
Test Engineer: D. Bare, M. Birgani

Run #3a: Low Channel @ 2412 MHz

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2389.470	52.8	V	54.0	-1.2	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.270	67.2	V	74.0	-6.8	PK	0	1.0	POS; RB 1 MHz; VB: 10 MHz
2409.540	103.2	V	-	-	PK	0	1.0	POS; RB 100 kHz; VB: 100 kHz
2399.450	79.2	V	83.2	-4.0	PK	0	1.0	POS; RB 100 kHz; VB: 100 kHz

RB 1 MHz; VB 10 Hz

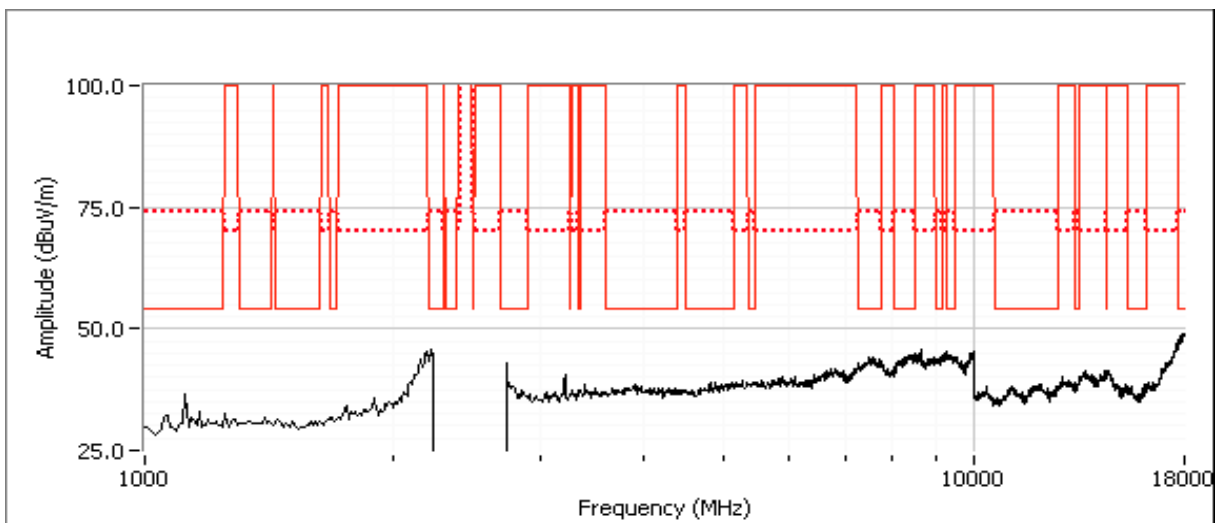


Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Other Spurious Emissions with power setting of 57

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3219.900	40.2	V	70.0	-29.8	PK	300	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.



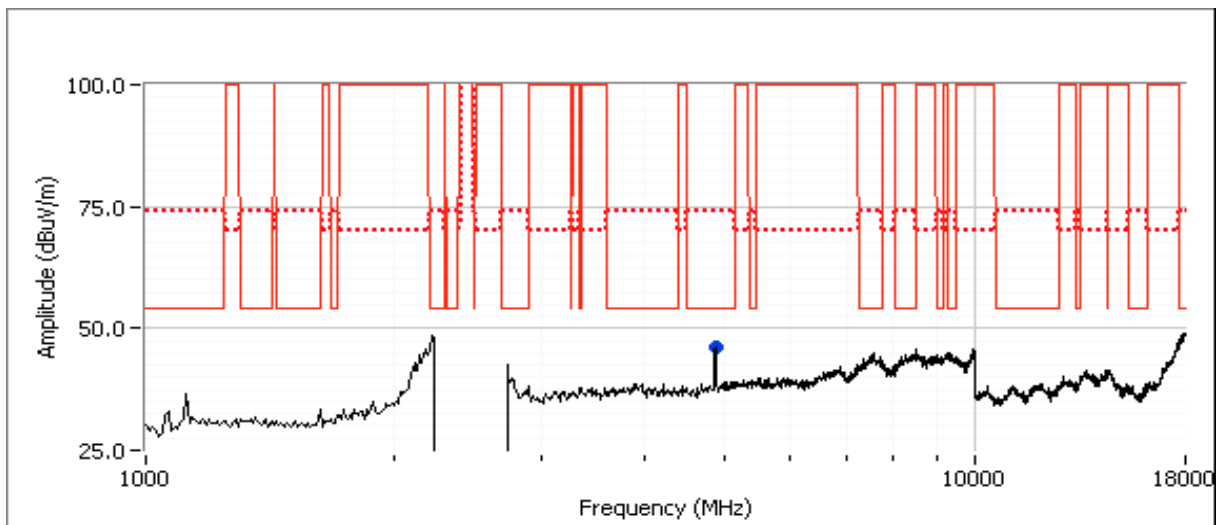
Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #3b: Center Channel @ 2437 MHz

Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4871.820	42.4	V	54.0	-11.6	AVG	0	1.0	RB 1 MHz;VB 10 Hz;Pk
4869.750	56.8	V	74.0	-17.2	PK	0	1.0	RB 1 MHz;VB 3 MHz;Pk

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.



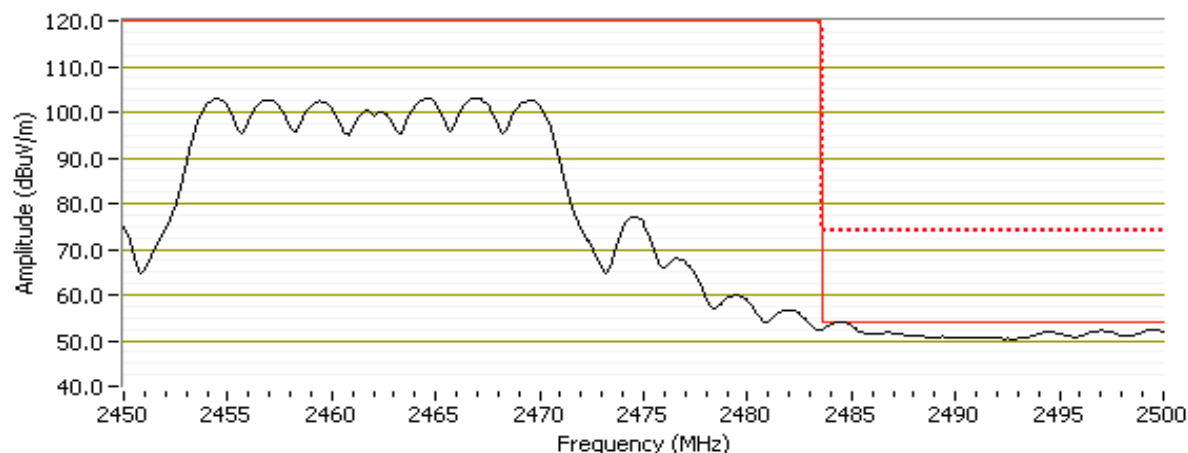
Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #3c: High Channel @ 2462 MHz

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2484.370	52.3	V	54.0	-1.7	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2484.410	69.1	V	74.0	-4.9	PK	0	1.2	POS; RB 1 MHz; VB: 10 MHz
2484.150	39.8	H	54.0	-14.2	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2484.620	52.0	H	74.0	-22.0	PK	0	1.0	POS; RB 1 MHz; VB: 10 MHz

RB 1 MHz; VB 10 Hz



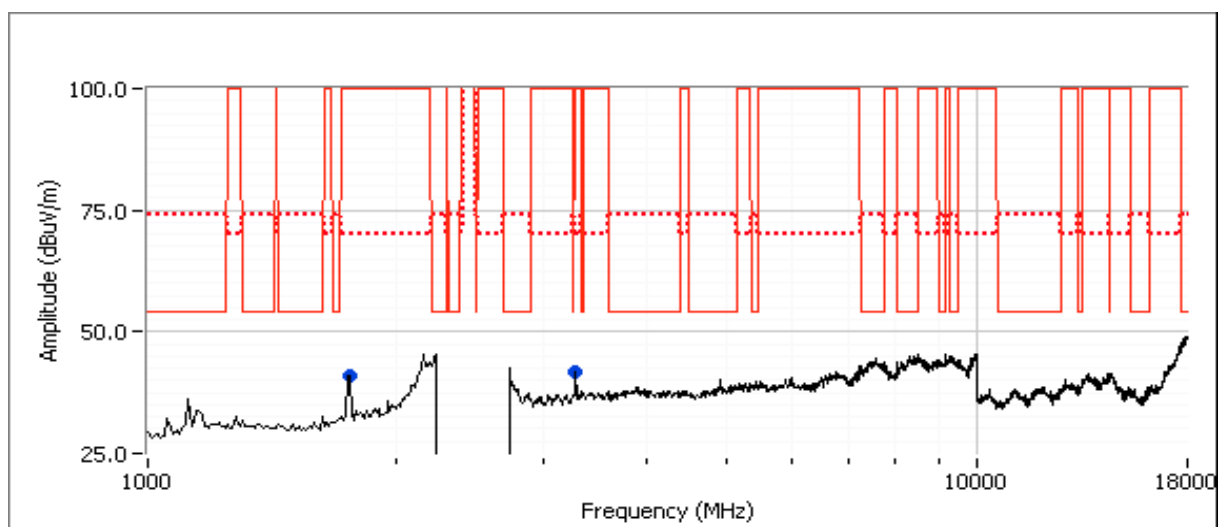
Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3282.500	41.9	V	70.0	-28.1	Peak	4	1.0	
1751.670	41.1	V	70.0	-28.9	Peak	223	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.



Client: Avaya	Job Number: J81820
Model: AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number: T82013
Contact: Vipin Naik	Account Manager: Christine
Standard: FCC 15.247	Class: N/A

Run #4: Radiated Spurious Emissions, 1,000 - 18,000 MHz. Operating Mode: 802.11n40 SISO (MCS 0)

Date of Test: 5/31/2011

Test Engineer: David Bare

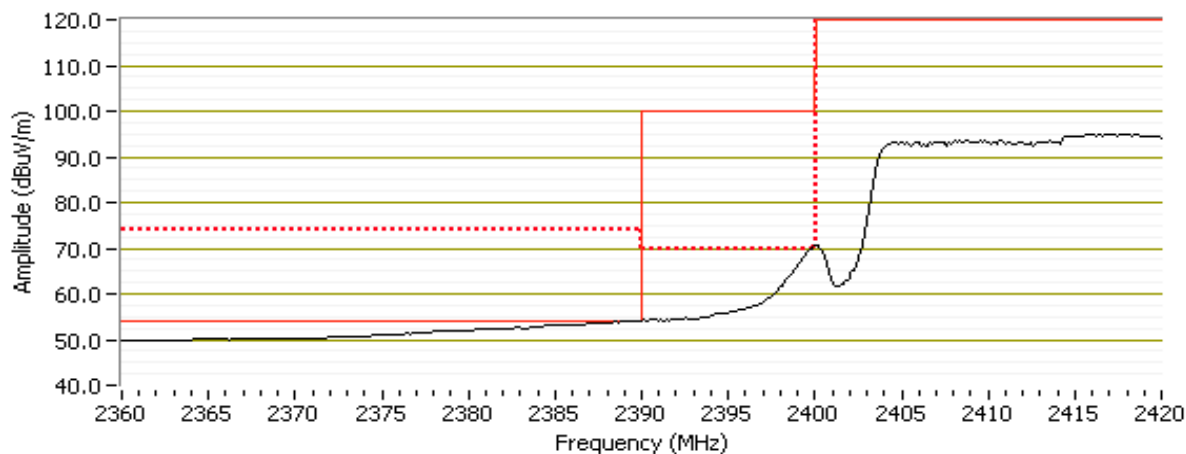
Test Location: FT Chamber #4

Run #4a: Low Channel @ 2422 MHz

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.630	52.8	V	54.0	-1.2	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2387.500	67.3	V	74.0	-6.7	PK	0	1.0	POS; RB 1 MHz; VB: 10 MHz
2387.900	38.5	H	54.0	-15.5	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2388.470	51.3	H	74.0	-22.7	PK	0	1.0	POS; RB 1 MHz; VB: 10 MHz
2407.010	95.6	V	-	-	PK	0	1.0	POS; RB 100 kHz; VB: 100 kHz
2399.840	70.0	V	75.6	-5.6	PK	0	1.0	POS; RB 100 kHz; VB: 100 kHz

RB 1 MHz; VB 10 Hz



Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.

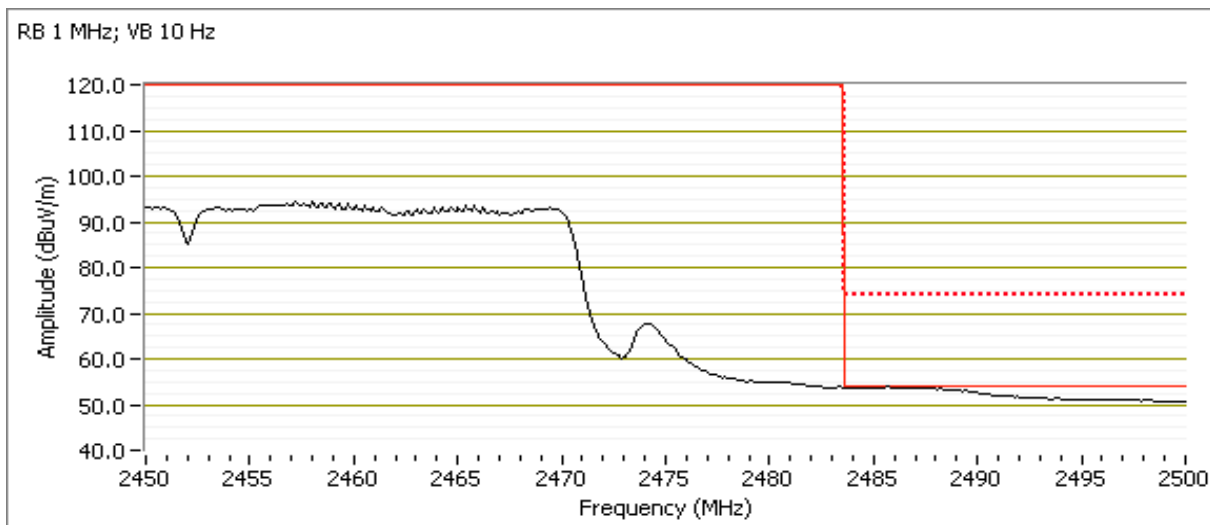
Client: Avaya	Job Number: J81820
Model: AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number: T82013
Contact: Vipin Naik	Account Manager: Christine
Standard: FCC 15.247	Class: N/A

Run #4b: High Channel @ 2452 MHz

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.630	52.8	V	54.0	-1.2	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2485.080	66.3	V	74.0	-7.7	PK	0	1.2	POS; RB 1 MHz; VB: 10 MHz
2483.850	39.7	H	54.0	-14.3	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2485.990	52.8	H	74.0	-21.2	PK	0	1.0	POS; RB 1 MHz; VB: 10 MHz

RB 1 MHz; VB 10 Hz



Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Client: Avaya	Job Number: J81820
Model: AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number: T82013
Contact: Vipin Naik	Account Manager: Christine
Standard: FCC 15.247	Class: N/A

Run #5: Radiated Spurious Emissions, 1,000 - 18,000 MHz. Operating Mode: 802.11n40 CDD (MCS 0)

Date of Test: 5/31/2011

Test Engineer: David Bare

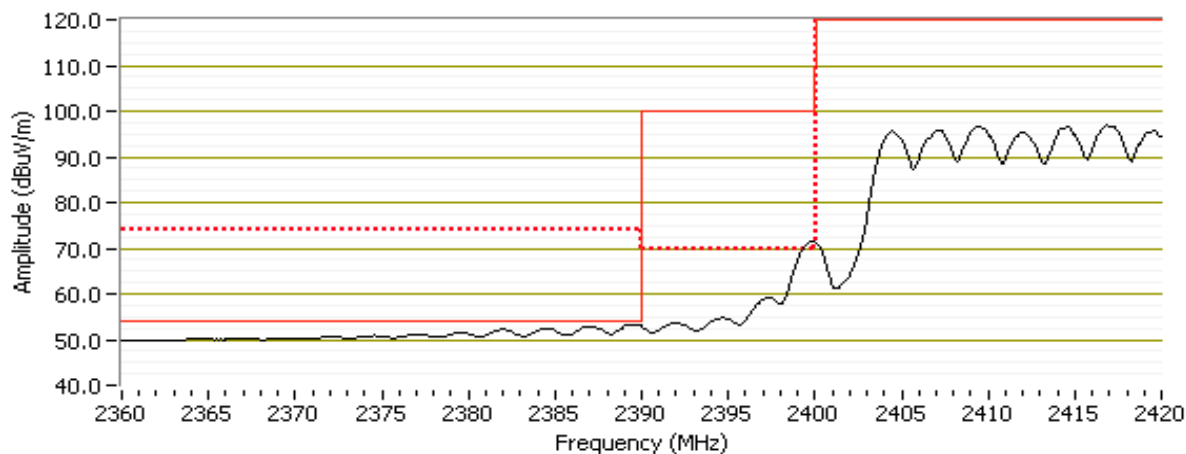
Test Location: FT Chamber #4

Run #5a: Low Channel @ 2422 MHz

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.220	53.4	V	54.0	-0.6	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.830	66.9	V	74.0	-7.1	PK	0	1.0	POS; RB 1 MHz; VB: 10 MHz
2389.480	38.6	H	54.0	-15.4	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2387.310	52.0	H	74.0	-22.0	PK	0	1.0	POS; RB 1 MHz; VB: 10 MHz
2417.660	73.7	H	-	-	PK	0	1.0	POS; RB 100 kHz; VB: 100 kHz
2399.480	50.6	H	53.7	-3.1	PK	0	1.0	POS; RB 100 kHz; VB: 100 kHz

RB 1 MHz; VB 10 Hz



Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.

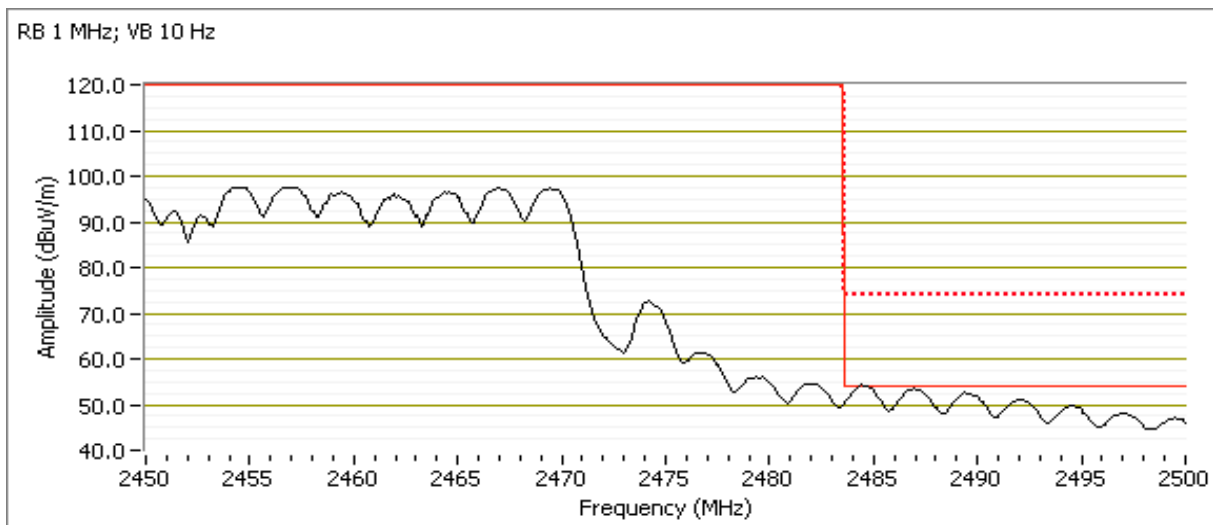
Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #5b: High Channel @ 2452 MHz

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2484.590	53.7	V	54.0	-0.3	AVG	0	1.2	POS; RB 1 MHz; VB: 10 Hz
2484.170	67.3	V	74.0	-6.7	PK	0	1.2	POS; RB 1 MHz; VB: 10 MHz
2484.490	38.5	H	54.0	-15.5	AVG	0	1.0	POS; RB 1 MHz; VB: 10 Hz
2485.370	50.7	H	74.0	-23.3	PK	0	1.0	POS; RB 1 MHz; VB: 10 MHz

RB 1 MHz; VB 10 Hz



Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #6: Radiated Spurious Emissions, 1,000 - 18,000 MHz. Operating Mode: 802.11n40 CDD (MCS 0)

Date of Test: 6/1/2011

Test Engineer: David Bare

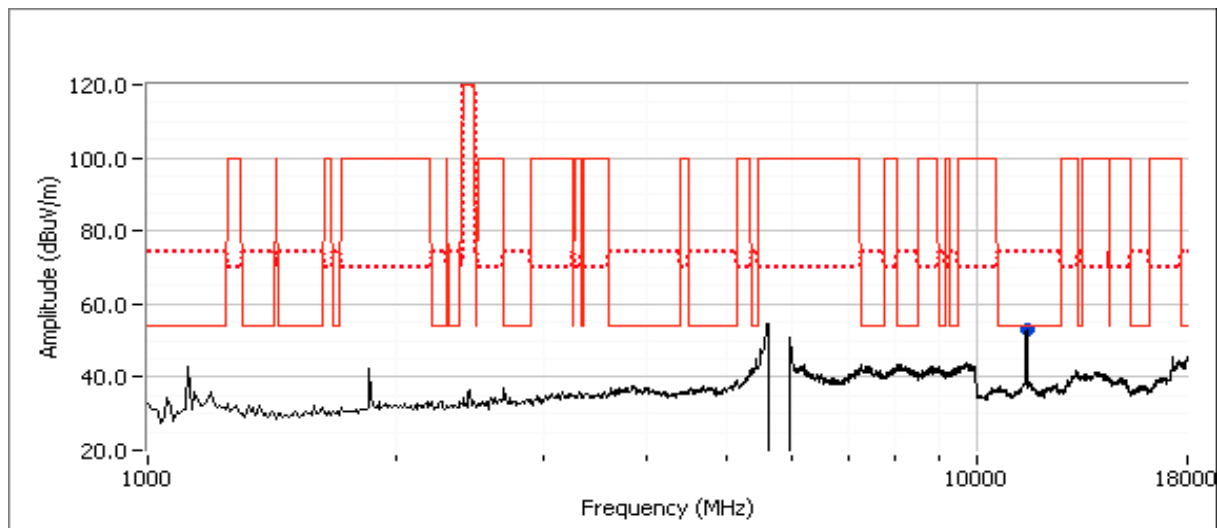
Test Location: FT Chamber #5

Run #6a: Low Channel @ 5755 MHz

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11509.200	48.5	H	54.0	-5.5	AVG	28	1.3	RB 1 MHz;VB 10 Hz;Pk
11509.220	60.5	H	74.0	-13.5	PK	28	1.3	RB 1 MHz;VB 3 MHz;Pk

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.



Client: Avaya	Job Number: J81820
Model: AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number: T82013
Contact: Vipin Naik	Account Manager: Christine
Standard: FCC 15.247	Class: N/A

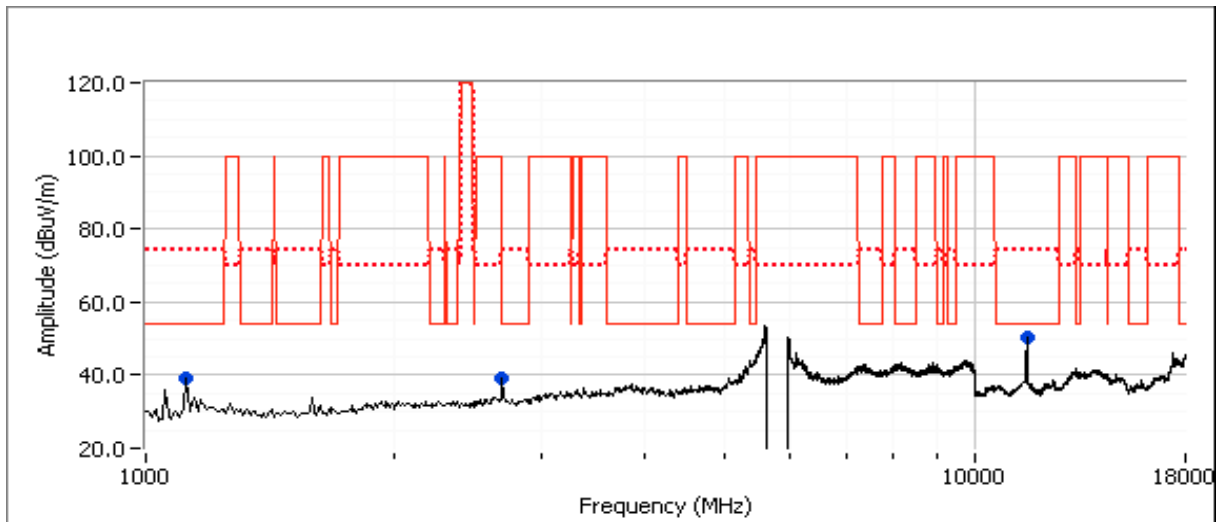
Run #6b: High Channel @ 5795 MHz

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11589.650	49.2	V	54.0	-4.8	AVG	34	1.7	RB 1 MHz;VB 10 Hz;Pk
11586.960	60.9	V	74.0	-13.1	PK	34	1.7	RB 1 MHz;VB 3 MHz;Pk
2696.990	39.3	V	54.0	-14.7	PK	193	2.5	RB 1 MHz;VB 3 MHz;Pk
1125.090	39.0	V	54.0	-15.0	PK	91	1.0	RB 1 MHz;VB 3 MHz;Pk

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.



Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

RSS 210 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: 5/31/2011
Test Engineer: Mehran B.
Test Location: Fremont Chamber #4

Config. Used: 1
Config Change: -
EUT Voltage: POE

General Test Configuration

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

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

Ambient Conditions:

Temperature: 12-17 °C
Rel. Humidity: 30-50 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	-	-	Output Power - 802.11b	15.247(b)	Pass	18.8dBm (0.076W)
2	-	-	Output Power - 802.11g	15.247(b)	Pass	22.9dBm (0.195W)
3	-	-	Output Power - 802.11n20 CDD	15.247(b)	Pass	25.6dBm (0.364W)
4	-	-	Output Power - 802.11n40 CDD	15.247(b)	Pass	21.0dBm (0.126W)
5	-	-	Output Power - 802.11n40 SISO	15.247(b)	Pass	19.1dBm (0.081W)
6	-	-	Output Power - 802.11a	15.247(b)	Pass	16.6dBm (0.046W)
7	-	-	Output Power - 802.11n20 CDD (5.7GHz)	15.247(b)	Pass	19.6dBm (0.091W)
8	-	-	Output Power - 802.11n40 CDD (5.7GHz)	15.247(b)	Pass	22.2dBm (0.164W)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client: Avaya	Job Number: J81820
Model: AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number: T82013
Contact: Vipin Naik	Account Manager: Christine
Standard: FCC 15.247	Class: N/A

Notes

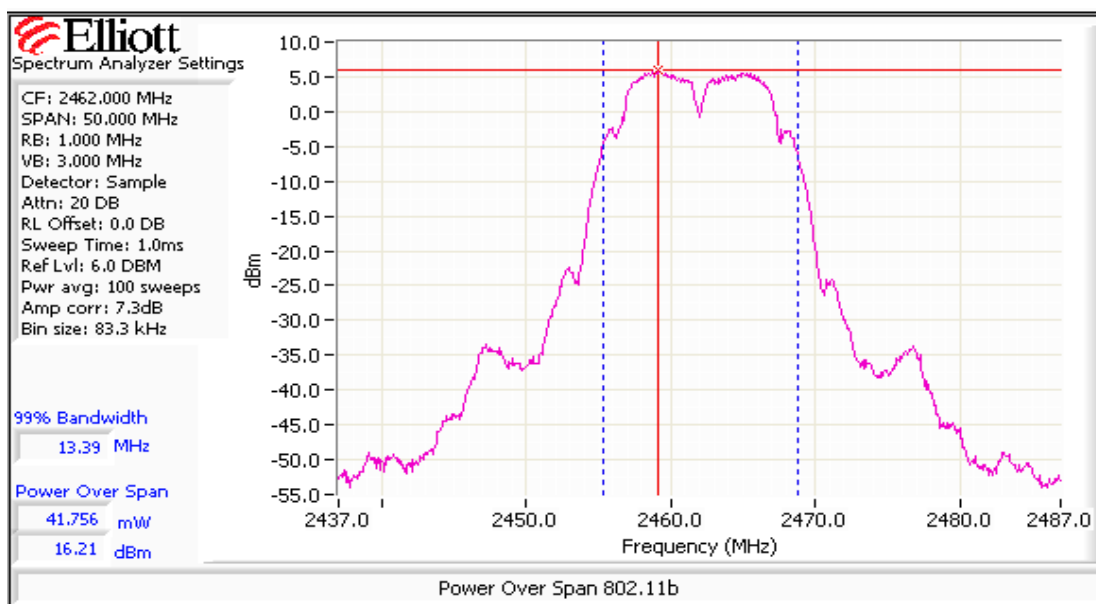
Highlighted line items indicate power was reduced from the original filing. Non-highlighted items represent data from the original filing with the EIRP calculated using the new antenna gain.

Power measurements were performed using the same method as the original filing.

Run #1: Output Power - 802.11b

Power Setting ²	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP		
		(dBm) ¹	mW			dBm	W	
-	2412	15.9	39.3	7.1	Pass	23.1	0.203	
-	2437	18.8	75.9	7.1	Pass	25.9	0.392	
-	2462	16.2	41.7	7.1	Pass	23.3	0.215	

Note:	Highlighted items indicate power was reduced from the integral antenna configuration for use with the new antennas. Non highlighted measurements were taken from original testing (J78065).
Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting) and power integration over 50 MHz (option #2, method 1 in KDB 558074, equivalent to method 1 of DA-02-2138A1 for U-NII devices). Spurious limit becomes -30dBc.
Note 2:	Power setting - the software power setting used during testing, included for reference only.



Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #2: Output Power - 802.11g

Power Setting ²	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP		
		(dBm) ¹	mW			dBm	W	
-	2412	20.4	109.6	7.1	Pass	27.5	0.566	
-	2437	22.9	195.0	7.1	Pass	30.0	1.007	
-	2462	19.1	81.3	7.1	Pass	26.2	0.420	

Note:	Highlighted items indicate power was reduced from the integral antenna configuration for use with the new antennas. Non highlighted measurements were taken from original testing (J78065).
Note 1:	Output power measured using a peak power meter. The output power limit is 20dBm
Note 2:	Power setting - the software power setting used during testing, included for reference only.

Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #3: Output Power - Chain A + B (802.11n20 CDD)

Operating Mode: 802.11n 20 CDD

Transmitted signal on chain is coherent ? yes

2412 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting	-	-						
Output Power (dBm) ^{Note 1}	17.3	17.6			20.5 dBm	0.111 W	26.0 dBm	0.402 W
Antenna Gain (dBi) ^{Note 2}	6.8	7.1			10.0 dBi	10.0 dBi	Pass	
eirp (dBm) ^{Note 2}	24.05	24.73			30.4 dBm	1.101 W		
2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting	-	-						
Output Power (dBm) ^{Note 1}	22.6	22.6			25.6 dBm	0.364 W	26.0 dBm	0.402 W
Antenna Gain (dBi) ^{Note 2}	7.1	6.8			10.0 dBi	10.0 dBi	Pass	
eirp (dBm) ^{Note 2}	29.73	29.35			35.6 dBm	3.601 W		
2462 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting	-	-						
Output Power (dBm) ^{Note 1}	16.9	16.9			19.9 dBm	0.098 W	26.0 dBm	0.402 W
Antenna Gain (dBi) ^{Note 2}	6.8	7.1			10.0 dBi	10.0 dBi	Pass	
eirp (dBm) ^{Note 2}	23.65	24.03			29.9 dBm	0.969 W		

Note 1: Output power measured using a peak power meter, spurious limit is -20dBc.

Note: Highlighted items indicate power was reduced from the integral antenna configuration for use with the new antennas. Non highlighted measurements were taken from original testing (J78065).

Note 2: As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain.

Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #4: Output Power - Chain A + B (802.11n40 CDD)

Operating Mode: 802.11 n40 MHz CDD - MCS12

Transmitted signal on chain is coherent ? yes

2422 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting	-	-						
Output Power (dBm) ^{Note 1}	11.2	12.9			15.1 dBm	0.033 W	26.0 dBm	0.402 W
Antenna Gain (dBi) ^{Note 2}	6.8	7.1			10.0 dBi	10.0 dBi	Pass	
eirp (dBm) ^{Note 2}	17.95	20.03			25.1 dBm	0.323 W		
2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting	-	-						
Output Power (dBm) ^{Note 1}	17.4	18.5			21.0 dBm	0.126 W	26.0 dBm	0.402 W
Antenna Gain (dBi) ^{Note 2}	6.8	7.1			10.0 dBi	10.0 dBi	Pass	
eirp (dBm) ^{Note 2}	24.15	25.63			30.9 dBm	1.244 W		
2452 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting	-	-						
Output Power (dBm) ^{Note 1}	12.8	14.0			16.5 dBm	0.044 W	26.0 dBm	0.402 W
Antenna Gain (dBi) ^{Note 2}	6.8	7.1			10.0 dBi	10.0 dBi	Pass	
eirp (dBm) ^{Note 2}	19.55	21.13			26.4 dBm	0.437 W		

Note 1: Output power measured using a peak power meter, spurious limit is -20dBc.

Note: Highlighted items indicate power was reduced from the integral antenna configuration for use with the new antennas. Non highlighted measurements were taken from original testing (J78065).

Note 2: As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain.

Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #5: Output Power (802.11n40 SISO)

Power Setting ²	Frequency (MHz)	Output Power		Antenna Gain ⁴ (dBi)	Result	EIRP		
		(dBm) ¹	mW			dBm	W	
-	2422	16.5	44.7	7.1	Pass	23.6	0.231	
-	2437	19.1	81.3	7.1	Pass	26.2	0.420	
-	2452	15.3	33.9	7.1	Pass	22.4	0.175	

Note:	Highlighted items indicate power was reduced from the integral antenna configuration for use with the new antennas. Non highlighted measurements were taken from original testing (J78065).
Note 1:	Output power measured using a peak power meter.
Note 2:	Power setting - the software power setting used during testing, included for reference only.

Run #6: Output Power (802.11a Legacy)

Power Setting ²	Frequency (MHz)	Output Power		Antenna Gain ⁴ (dBi)	Result	EIRP		
		(dBm) ¹	mW			dBm	W	
-	5745	16.4	43.7	8.8	Pass	25.2	0.334	
-	5785	16.6	45.7	8.8	Pass	25.4	0.350	
-	5825	17.1	51.3	8.8	Pass	25.9	0.393	

Note:	Highlighted items indicate power was reduced from the integral antenna configuration for use with the new antennas. Non highlighted measurements were taken from original testing (J78065).
Note 1:	RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting) and power integration over 50 MHz. Spurious limit is -30dBc because this method was used.
Note 2:	Power setting - the software power setting used during testing, included for reference only.

Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #7: Output Power - Chain A + B (802.11n20 CDD)

Operating Mode: 802.11n20 CDD

Transmitted signal on chain is coherent ? yes

5745 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting	-	-						
Output Power (dBm) ^{Note 1}	16.3	15.8			19.1 dBm	0.081 W	24.2 dBm	0.262 W
Antenna Gain (dBi) ^{Note 2}	8.8	8.8			11.8 dBi	11.8 dBi	Pass	
eirp (dBm) ^{Note 2}	25.14	24.56			30.9 dBm	1.224 W		
5785 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting	-	-						
Output Power (dBm) ^{Note 1}	16.9	16.2			19.6 dBm	0.091 W	24.2 dBm	0.262 W
Antenna Gain (dBi) ^{Note 2}	8.8	8.8			11.8 dBi	11.8 dBi	Pass	
eirp (dBm) ^{Note 2}	25.74	24.96			31.4 dBm	1.376 W		
5825 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting	-	-						
Output Power (dBm) ^{Note 1}	16.8	16.1			19.5 dBm	0.089 W	24.2 dBm	0.262 W
Antenna Gain (dBi) ^{Note 2}	8.8	8.8			11.8 dBi	11.8 dBi	Pass	
eirp (dBm) ^{Note 2}	25.64	24.86			31.3 dBm	1.344 W		

Note: Highlighted items indicate power was reduced from the integral antenna configuration for use with the new antennas. Non highlighted measurements were taken from original testing (J78065).

Note 1: Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting) and power integration over **50 MHz** (reference method 1 of FCC DA 02-2138 for U-NII devices, August 30, 2002). Spurious limit becomes **-30dBc**.

Note 2: As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain.

Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	N/A

Run #8: Output Power - Chain A + B (802.11n40 CDD - 5.7GHz)
 Operating Mode: 802.11n 40 MHz MCS0
 Transmitted signal on chain is coherent ? yes

5755 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting	-	-						
Output Power (dBm) ^{Note 1}	19.3	19.3			22.3 dBm	0.170 W	24.2 dBm	0.262 W
Antenna Gain (dBi) ^{Note 2}	8.8	8.8			11.8 dBi	11.8 dBi	Pass	
eirp (dBm) ^{Note 2}	28.06	28.14			34.1 dBm	2.583 W		

5795 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting	-	-						
Output Power (dBm) ^{Note 1}	19.2	19.4			22.3 dBm	0.170 W	24.2 dBm	0.262 W
Antenna Gain (dBi) ^{Note 2}	8.8	8.8			11.8 dBi	11.8 dBi	Pass	
eirp (dBm) ^{Note 2}	27.96	28.24			34.1 dBm	2.583 W		

Note:	Highlighted items indicate power was reduced from the integral antenna configuration for use with the new antennas. Non highlighted measurements were taken from original testing (J78065).
Note 1:	Output power measured using a peak power meter, spurious limit is -20dBc.
Note 2:	As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain.

Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	B

Radiated Emissions

(Elliott Laboratories 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: 2/9/2011
 Test Engineer: Rafael Varelas
 Test Location: Fremont Chamber #4

Config. Used: 1
 Config Change: none
 EUT Voltage: POE

General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing. Any remote support equipment was located outside the semi-anechoic chamber. Any cables running to remote support equipment were routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

The test distance and extrapolation factor (if applicable) are detailed under each run description.

Note, preliminary testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. Maximized testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 21.6 °C
 Rel. Humidity: 35 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1 (2437 MHz)	Radiated Emissions 1 GHz - 8 GHz Maximized	RSS-210	Pass	37.1dBμV/m @ 1062.4MHz (-16.9dB)
2 (5785 MHz)	Radiated Emissions 1 GHz - 18 GHz Maximized	RSS-210	Pass	35.3dBμV/m @ 1062.4MHz (-18.7dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Avaya	Job Number:	J81820
Model:	AP 8120 with 2 external Antenna (Class II Permissive change)	T-Log Number:	T82013
Contact:	Vipin Naik	Account Manager:	Christine
Standard:	FCC 15.247	Class:	B

Run #1: Maximized Readings, 1000 - 8000 MHz
 RX mode @ 2437MHz

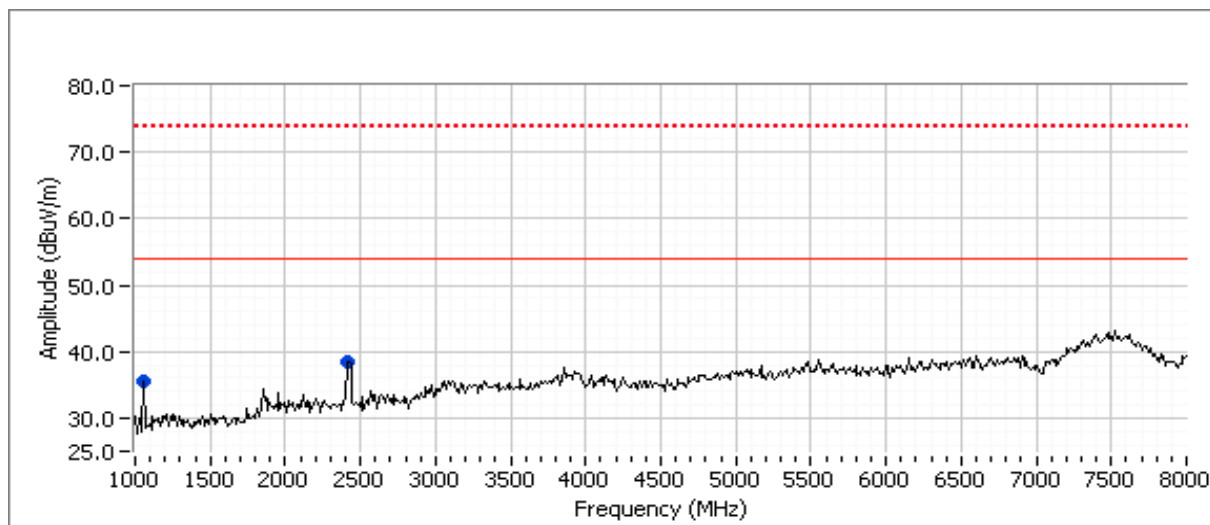
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 18000 MHz	3	3	0.0

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

Frequency	Level	Pol	RSS-210		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1062.830	35.6	V	54.0	-18.4	Peak	185	1.0	
2437.450	38.4	V	54.0	-15.6	Peak	198	1.0	

Final peak and average readings

Frequency	Level	Pol	RSS-210		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1062.390	37.1	V	54.0	-16.9	AVG	196	1.0	RB 1 MHz;VB 10 Hz;Pk
1062.590	41.6	V	74.0	-32.4	PK	196	1.0	RB 1 MHz;VB 3 MHz;Pk
2420.520	30.3	V	54.0	-23.7	AVG	199	1.2	RB 1 MHz;VB 10 Hz;Pk
2422.250	39.2	V	74.0	-34.8	PK	199	1.2	RB 1 MHz;VB 3 MHz;Pk



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Standard:	FCC 15.247	Class:	B

Run #2: Maximized Readings, 1000 - 18000 MHz
RX mode @ 5785MHz

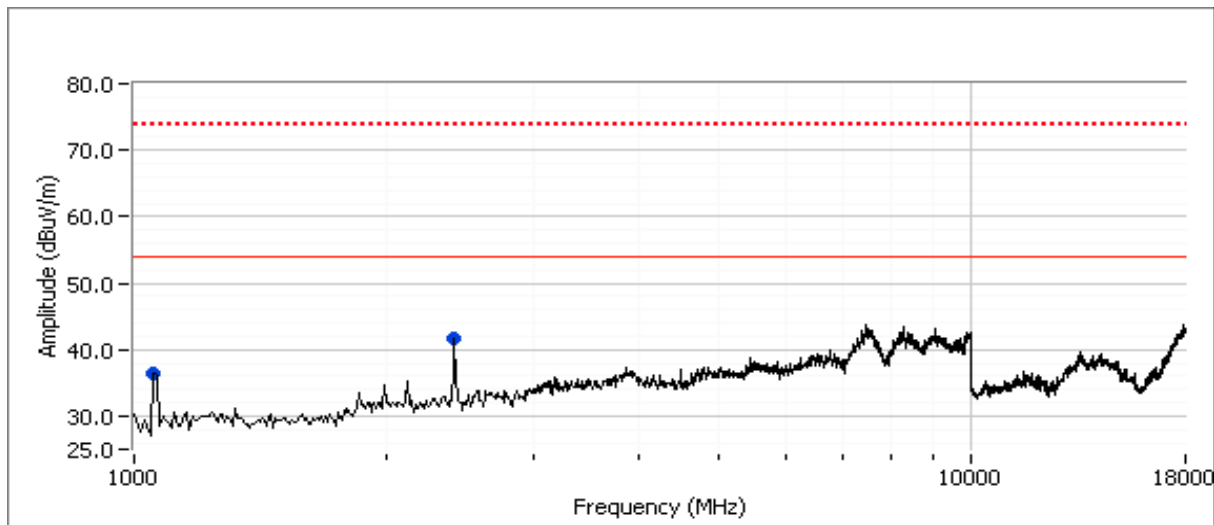
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 18000 MHz	3	3	0.0

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

Frequency	Level	Pol	RSS-210		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1062.440	36.5	H	54.0	-17.5	Peak	225	1.3	
2412.890	41.6	V	54.0	-12.4	Peak	77	1.9	

Final peak and average readings

Frequency	Level	Pol	RSS-210		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1062.370	35.3	H	54.0	-18.7	AVG	227	1.3	RB 1 MHz;VB 10 Hz;Pk
1062.500	40.2	H	74.0	-33.8	PK	227	1.3	RB 1 MHz;VB 3 MHz;Pk
2422.520	28.2	V	54.0	-25.8	AVG	76	1.0	RB 1 MHz;VB 10 Hz;Pk
2420.520	38.4	V	74.0	-35.6	PK	76	1.0	RB 1 MHz;VB 3 MHz;Pk



End of Report

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