EMC Test Report
Application for Grant of Equipment Authorization
pursuant to
Industry Canada RSS-Gen Issue 2 / RSS 210 Issue 7
FCC Part 15, Subpart E
Model: WLAN AP 8120

IC CERTIFICATION #:	3794G-AP8120
FCC ID:	X7CAP8120
APPLICANT:	Avaya 4655 Great America Parkway Santa Clara, CA 95054
TEST SITE(S):	Elliott Laboratories 684 W. Maude Avenue Sunnyvale, CA 94085
and	41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845A-1; 2845A-2; 2845B-3; 2845B-4, 2845B-5
REPORT DATE:	March 5, 2010
FINAL TEST DATES:	January 28, 29, 31, February 3, 4, 9 and 11, 2010

AUTHORIZED SIGNATORY:

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ACCREDITED

Testing Cert #2016-01

REVISION HISTORY

Rev#	Date	Comments	Modified By
-	March 5, 2010	First release	

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SCOPE

An electromagnetic emissions test has been performed on the Avaya model WLAN AP 8120, pursuant to the following rules:

Industry Canada RSS-Gen Issue 2
RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15, Subpart E requirements for UNII Devices (using FCC DA 02-2138, August 30, 2002)

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 UNII test procedure 2002-08 DA-02-2138, August 2002

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 AP 8120 complied with the requirements of the following regulations:

RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15, Subpart E requirements for UNII Devices

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

The test results recorded herein are based on a single type test of Avaya model WLAN AP 8120 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

UNII / LELAN DEVICES

Operation in the 5.15 – 5.25 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407(e)		Indoor operation only	Refer to user's manual	N/A	Complies
15.407(a) (1)		26dB Bandwidth	Limits output power if < 20MHz		N/A
15.407 (a) (1)	A9.2(1)	Output Power	802.11a: 13.0 dBm n20: 11.6 dBm n40: 13.5 dBm	17dBm	Complies
15.407 (a) (1)	-	Power Spectral Density	a: 2.4dBm/MHz n20: 1.0 dBm/MHz n40: 0.8 dBm/MHz	4 dBm/MHz	Complies
-	A9.5 (2)			5 dBm/MHz	Complies
15.407(b) (5) / 15.209	A9.3	Spurious Emissions below 1GHz	No emissions detected	Refer to Standard	Complies
15.407(b) (2)	A9.3	Spurious Emissions above 1GHz	53.7dBµV/m @ 5149.6MHz (-0.3dB)	Refer to Standard	Complies
15.407(a)(6)	-	Peak Excursion Ratio	12.98 dB	< 13dB	Complies

Requirements for all U-NII/LELAN bands

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407	A9.5a	Modulation	Digital Modulation is used	Digital modulation is required	Complies
	A9.5 (3)	Channel Selection	Spurious emissions tested at outermost channels in each band	Device was tested on the top, bottom and center channels in each band	N/A
15			Measurements on three channels in each band		Complies
15.407 (c)	A9.5(4)	Operation in the absence of information to transmit	Operation is discontinued in the absence of information	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	A9.5 (5)	Frequency Stability	Frequency stability is better than 10ppm	Refer to standard	Complies
15.407 (h1)	A9.4	Transmit Power Control	Device does not operate in either 5470 – 5725 or 5250 – 5350 MHz bands.		N/A
15.407 (h2)	A9.4	Dynamic frequency Selection (device with radar detection)	Device does not operate in either 5470 – 5725 or 5250 – 5350 MHz bands.		N/A
	A9.9g	User Manual information	Refer to Exhibit 6 for details	Refer to standard	Complies

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	The antennas are attached via internal u.FL connectors.	Refer to standard	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	42.4dBµV/m @ 3076.4MHz (-11.6dB)	Refer to standard	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	38.2dBµV @ 2.442MHz (-7.8dB)	Refer to standard	Complies (- ?.? dB)
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, 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		Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	a: 17.4 MHz n20: 18.5 MHz n40: 37.0 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	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	0.015 to 30	± 3.0
Radiated Emissions	30 to 1000	± 3.6
Radiated Emissions	1000 to 40000	± 6.0

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Avaya model WLAN AP 8120 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 January 25, 2010 and tested on January 28, 29, 31, February 3, 4, 9 and 11, 2010. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Avaya	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.

ANTENNA SYSTEM

The antenna system consists of 6 custom antennas mounted on one assembly. The antenna is integral to the device.

ENCLOSURE

The EUT outer enclosure is primarily constructed of plastic. It measures approximately 23.5 cm wide by 15 cm deep by 5.5 cm high. The plastic outer enclosure covers a full metalized inner enclosure.

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	D094565000005 8BA00	-

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
POE	POE Injector	CAT-5	Unshielded	5.0
Serial Port	USB-to-Serial Adapter to Laptop	CAT-5 to Serial	Unshielded	6.0

EUT OPERATION

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

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on January 28, 29, 31, February 3, 4, 9 and 11, 2010 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	
SVOATS #2	90593	2845A-2	684 West Maude Ave, Sunnyvale CA 94085-3518
Chamber 3	769238	2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 4	211948	2845B-4	
Chamber 5	211948	2845B-5	

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 with the exception, on OATS sites, of predictable local TV, radio, and mobile communications traffic. 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.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4:2003. 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 C63.4:2003 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.

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 C63.4:2003 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.

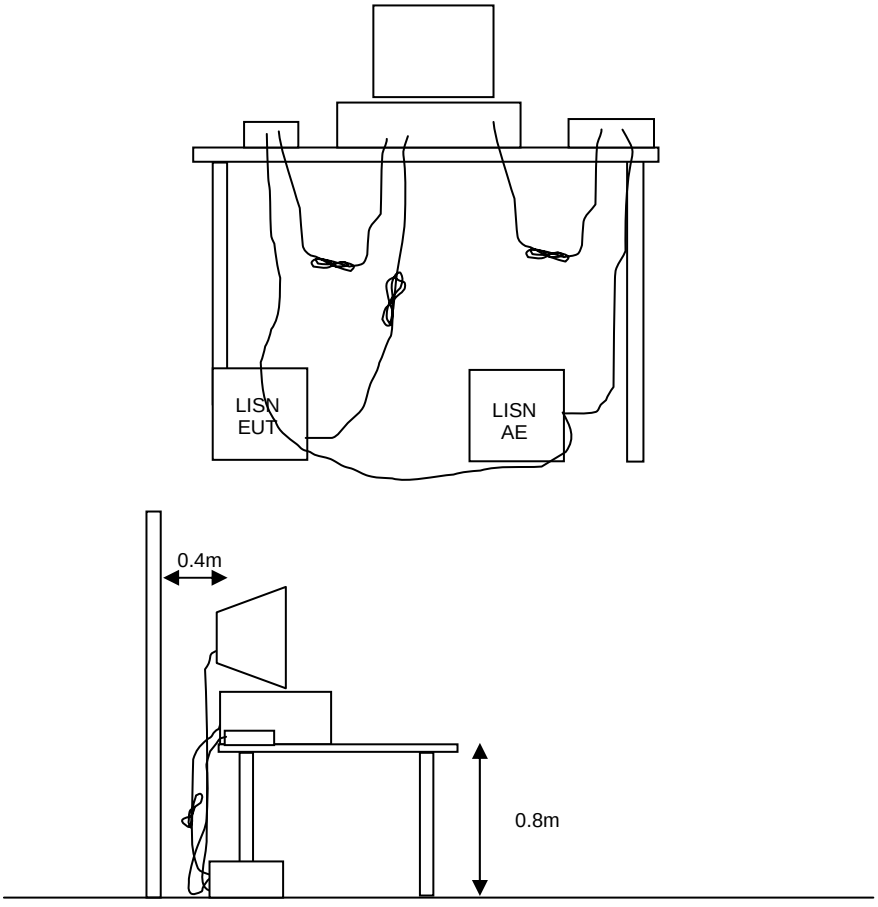
TEST PROCEDURES

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.

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.



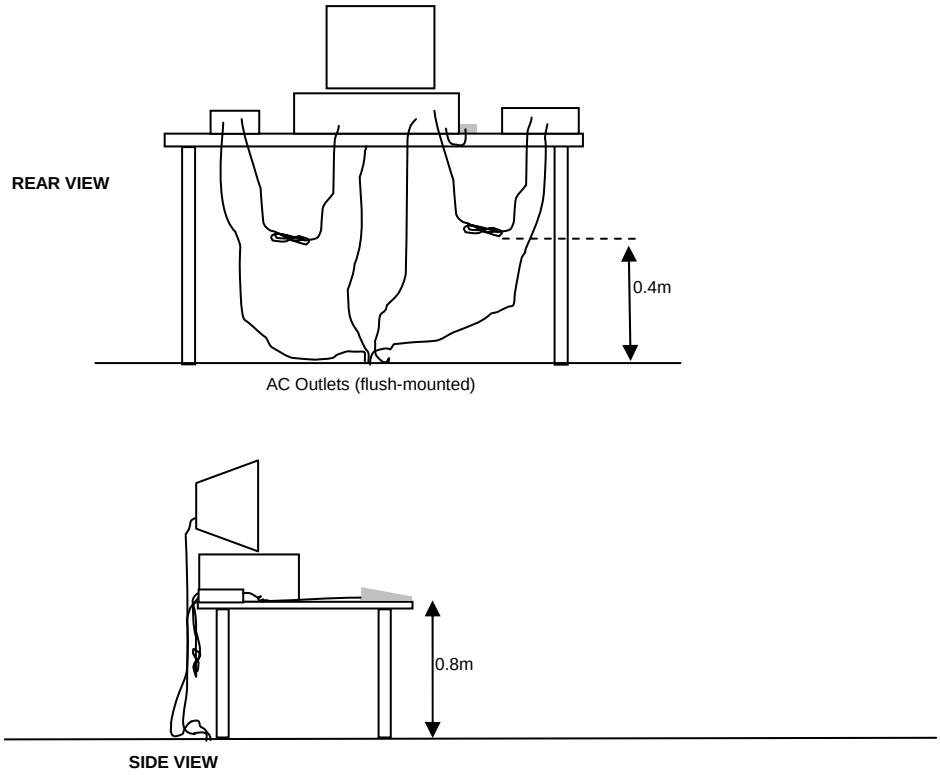
RADIATED EMISSIONS

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.

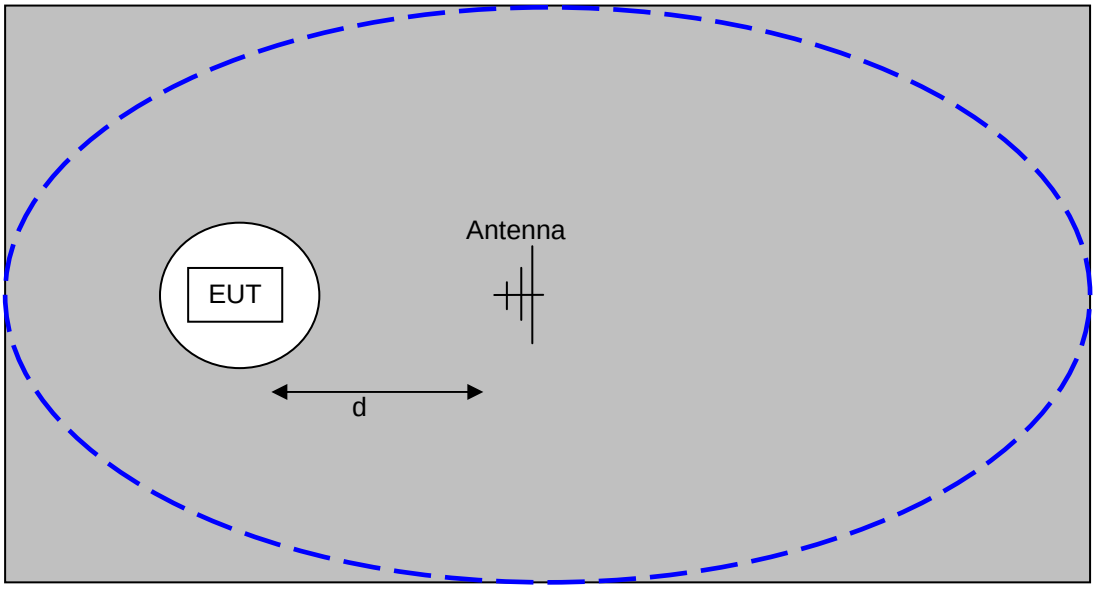
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

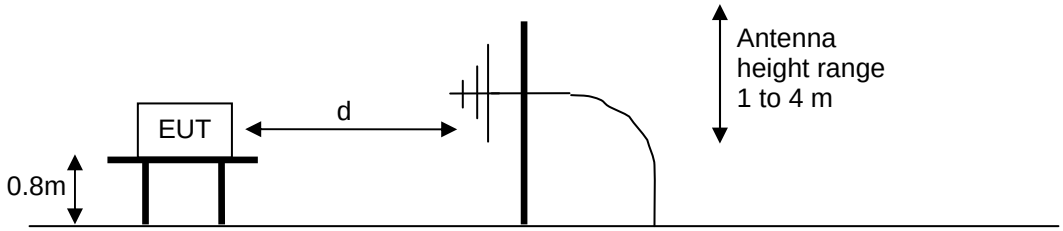
When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.



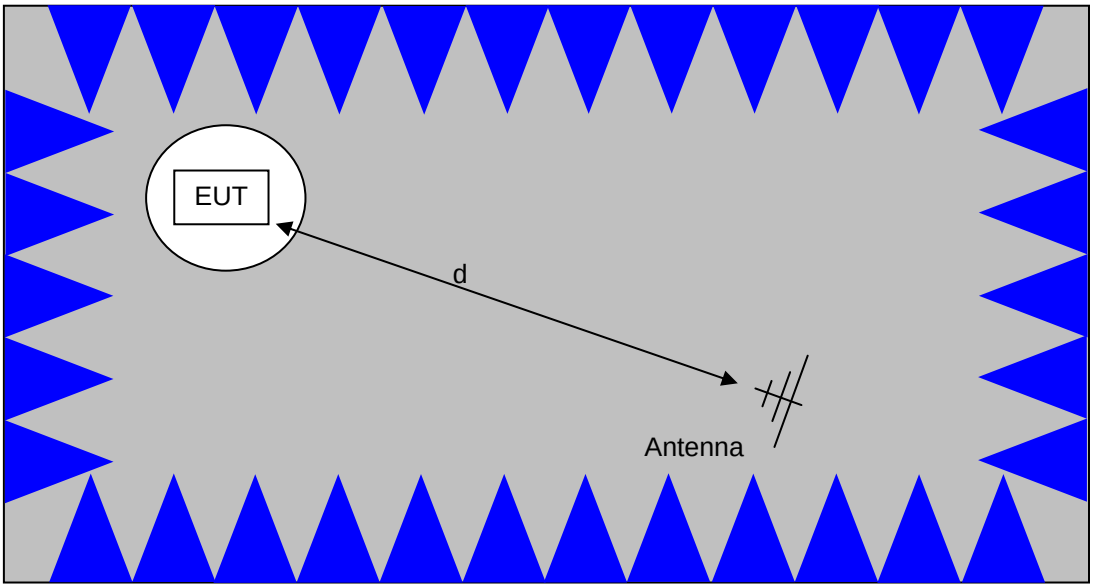
Typical Test Configuration for Radiated Field Strength Measurements



The ground plane extends beyond the ellipse defined in CISPR 16 / CISPR 22 / ANSI C63.4 and is large enough to accommodate test distances (d) of 3m and 10m. Refer to the test data tables for the actual measurement distance.

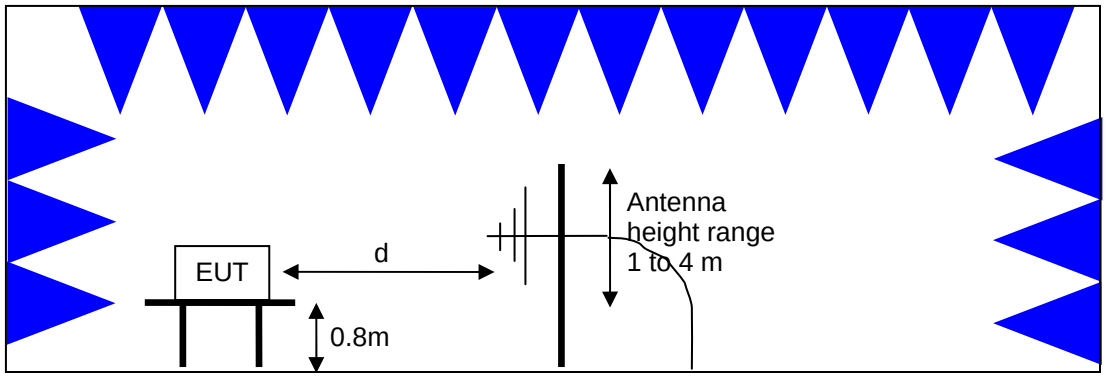


Test Configuration for Radiated Field Strength Measurements
OATS- Plan and Side Views



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.

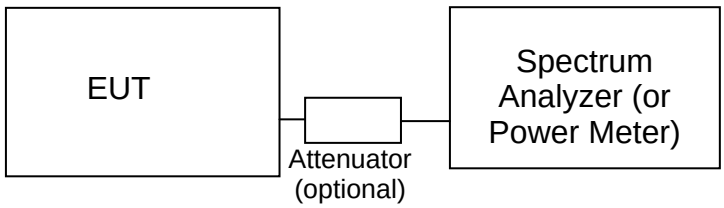
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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:

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

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands[1] (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

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

FCC 15.407 (a) OUTPUT POWER LIMITS

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

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 - 5250	50mW (17 dBm)	4 dBm/MHz
5250 - 5350	250 mW (24 dBm)	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm)	17 dBm/MHz

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

The peak excursion envelope is limited to 13dB.

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

OUTPUT POWER LIMITS –LELAN DEVICES

The table below shows the limits for output power and output power density defined by RSS 210. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 - 5250	200mW (23 dBm) eirp	10 dBm/MHz eirp
5250 - 5350	250 mW (24 dBm)[2] 1W (30dBm) eirp	11 dBm/MHz
5470 - 5725	250 mW (24 dBm)[3] 1W (30dBm) eirp	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm) 4W eirp	17 dBm/MHz

In addition, the power spectral density limit shall be reduced by 1dB for every dB the highest power spectral density exceeds the "average" power spectral density) by more than 3dB. The "average" power spectral density is determined by dividing the output power by 10log(EBW) where EBW is the 99% power bandwidth.

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

OUTPUT POWER AND SPURIOUS LIMITS –UNII and LELAN DEVICES

The spurious emissions limits for signals below 1GHz are the FCC/RSS-GEN general limits. For emissions above 1GHz, signals in restricted bands are subject to the FCC/RSS GEN general limits. All other signals have a limit of –27dBm/MHz, which is a field strength of 68.3dBuV/m/MHz at a distance of 3m. This is an average limit so the peak value of the emission may not exceed –7dBm/MHz (68.3dBuV/m/MHz at a distance of 3m). For devices operating in the 5725-5850Mhz bands under the LELAN/UNII rules, the limit within 10Mhz of the allocated band is increased to –17dBm/MHz.

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

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of 3m from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{3} \text{ microvolts per meter}$$

where P is the eirp (Watts)

Appendix A Test Equipment Calibration Data

Radio (Spurious Emissions), 29-Jan-10

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	6/3/2010
Hewlett Packard	High Pass filter, 8.2 GHz (Blu System)	P/N 84300-80039 (84125C)	1392	6/22/2010
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/10/2010
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	9/25/2010
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	2/10/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	9/30/2010

TX Spurious Emissions, 29-Jan-10

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	6/3/2010
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/10/2010
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	2/26/2010
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	9/25/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	9/30/2010

Tx/Rx Spurious Emissions, 31-Jan-10

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	8/19/2010
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/10/2010
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	9/25/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	9/30/2010

Radio Antenna Port (Power and Spurious Emissions), 03-Feb-10

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/10/2010
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	2/10/2010

Appendix B Test Data

T78131 19 Pages
T78132 24 Pages
T78249 8 Pages

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		-
Emissions Standard(s):	FCC 15.E	Class:	B
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Avaya

Model

AP 8120

Date of Last Test: 2/10/2010

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT with all I/O connections running on top of the groundplane or routed in overhead in the GR-1089 test configuration.

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

Ambient Conditions:

Temperature: 18.9 °C

Rel. Humidity: 37 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	802.11a Chain A	36	-	-	Restricted Band Edge at 5150 MHz	15.209	51.2dBµV/m @ 5147.4MHz (-2.8dB)
	802.11a Chain A	36	-	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.9dBµV/m @ 5013.6MHz (-3.1dB)
	802.11a Chain A	40	-	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	47.1dBµV/m @ 5033.5MHz (-6.9dB)
	802.11a Chain A	48	-	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	47.5dBµV/m @ 5415.5MHz (-6.5dB)
2	802.11 n20	36	-	-	Restricted Band Edge at 5150 MHz	15.209	49.7dBµV/m @ 5147.7MHz (-4.4dB)
	802.11 n20	36	-	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	42.5dBµV/m @ 1115.5MHz (-11.5dB)
	802.11 n20	40	-	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	40.7dBµV/m @ 1110.0MHz (-13.3dB)
	802.11 n20	48	-	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	41.5dBµV/m @ 1119.2MHz (-12.5dB)
3	802.11a n40	38	-	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	60.8dBµV/m @ 10383.7MHz (-7.5dB)
	802.11a n40	46	-	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	61.3dBµV/m @ 10460.3MHz (-7.0dB)
4	802.11a n40	38	-	-	Restricted Band Edge at 5150 MHz	15.209	53.7dBµV/m @ 5149.6MHz (-0.3dB)

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Note: Preliminary testing showed no radio related emissions below 1 GHz and above 18 GHz.

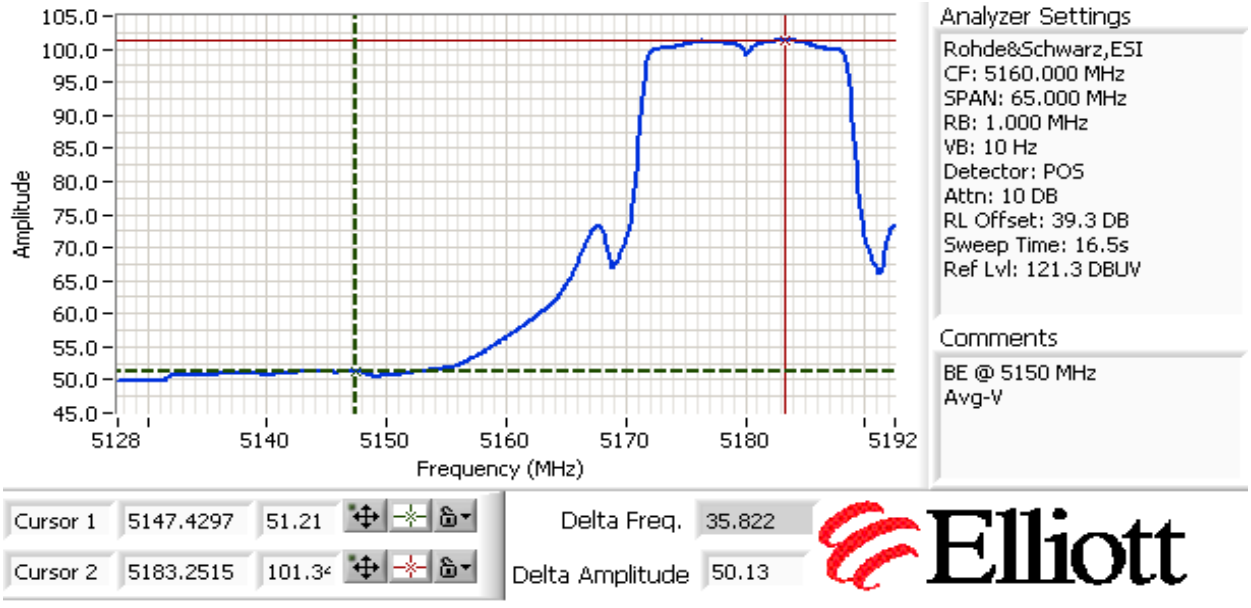
Run #1, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5150-5250 MHz Band, Legacy A Mode

Date of Test: 1/28/2010
Test Engineer: Suhaila Khushzad
Test Location: Chamber #5

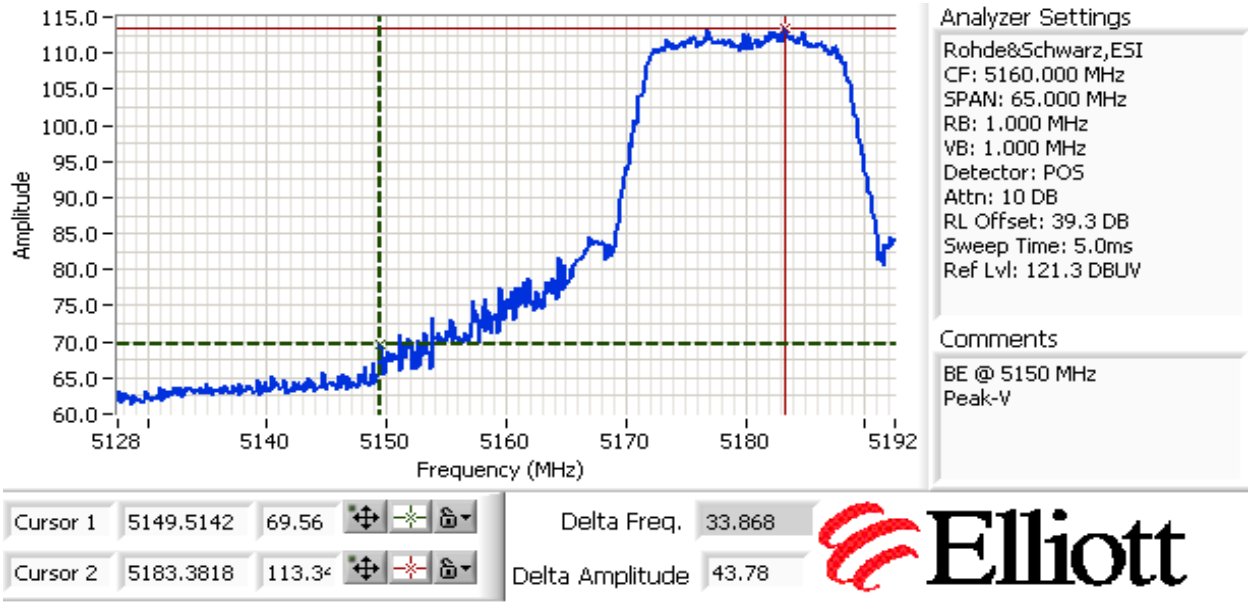
Run #1a: Low Channel
Port: Main
Orientation: Up Right(Main Antenna)

5150 MHz Band Edge Signal Radiated Field Strength

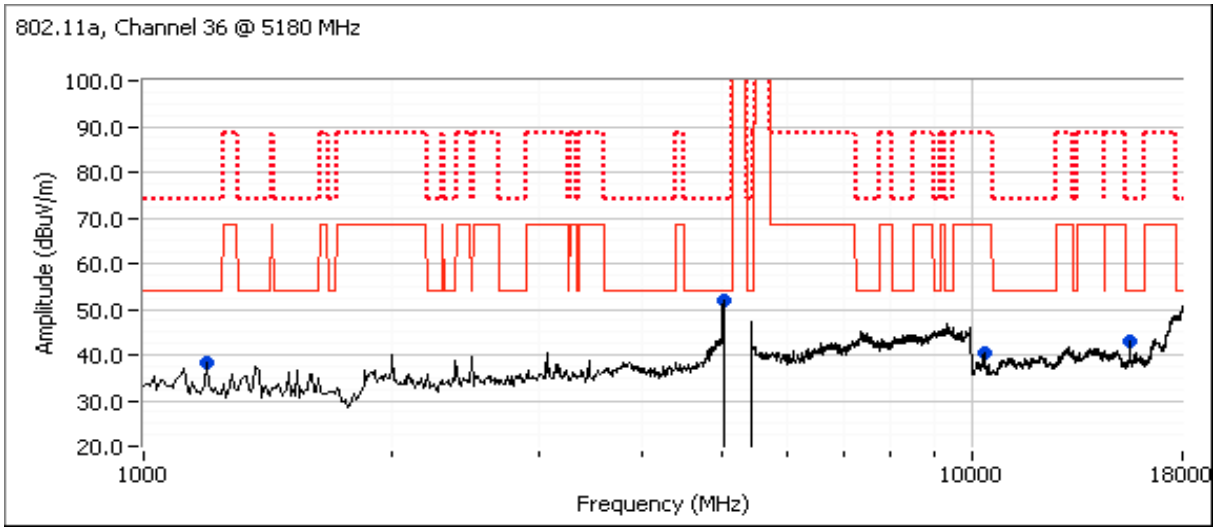
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5147.430	51.2	V	54.0	-2.8	Avg	211	1.2	
5149.510	69.6	V	74.0	-4.4	Pk	211	1.2	
5144.040	50.6	H	54.0	-3.4	Avg	216	1.2	
5146.510	65.7	H	74.0	-8.3	Pk	216	1.2	



Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A



Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A



Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5013.570	50.9	V	54.0	-3.1	AVG	207	1.2	RB 1 MHz; VB: 10 Hz
5014.240	60.1	V	74.0	-13.9	PK	207	1.2	RB 1 MHz; VB: 1 MHz
15541.150	32.1	V	54.0	-21.9	AVG	192	1.0	RB 1 MHz; VB: 10 Hz
15533.020	44.2	V	74.0	-29.8	PK	192	1.0	RB 1 MHz; VB: 1 MHz
1200.000	38.5	V	54.0	-15.5	Peak	134	1.0	Peak vs Avg Limit
10359.070	40.5	V	68.3	-27.8	Peak	190	1.3	Peak vs Avg Limit

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).

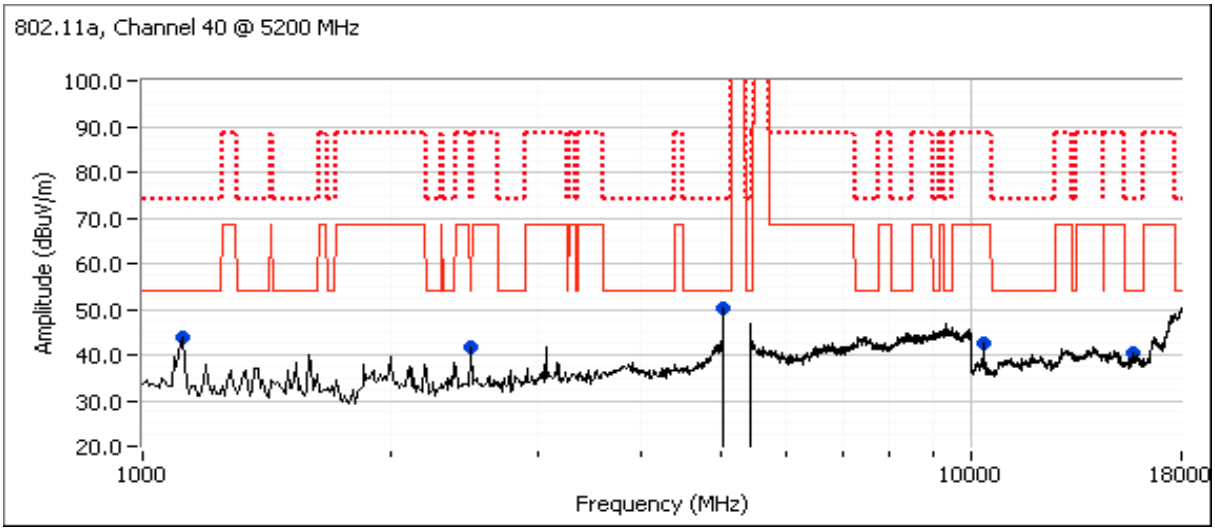
Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A

Run #1b: Center Channel 40 @ 5200 MHz

Fundamental Signal 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	
EUT Upright - Aux antenna								
5196.270	101.9	V	-	-	AVG	165	1.3	RB 1 MHz; VB: 10 Hz
5197.900	110.6	V	-	-	PK	165	1.3	RB 1 MHz; VB: 1 MHz
5203.500	98.5	H	-	-	AVG	172	1.0	RB 1 MHz; VB: 10 Hz
5198.030	107.1	H	-	-	PK	172	1.0	RB 1 MHz; VB: 1 MHz
EUT Upright - Main antenna								
5196.200	102.5	V	-	-	AVG	178	1.4	RB 1 MHz; VB: 10 Hz
5197.100	111.2	V	-	-	PK	178	1.4	RB 1 MHz; VB: 1 MHz
EUT Flat - Main Antenna								
5196.170	96.6	V	-	-	AVG	125	1.4	RB 1 MHz; VB: 10 Hz
5194.670	105.3	V	-	-	PK	125	1.4	RB 1 MHz; VB: 1 MHz
5203.800	92.3	H	-	-	AVG	314	1.5	RB 1 MHz; VB: 10 Hz
5203.930	101.0	H	-	-	PK	314	1.5	RB 1 MHz; VB: 1 MHz
EUT on Edge - Main Antenna								
5196.200	96.6	V	-	-	AVG	204	1.0	RB 1 MHz; VB: 10 Hz
5198.130	105.1	V	-	-	PK	204	1.0	RB 1 MHz; VB: 1 MHz
5196.330	101.5	H	-	-	AVG	179	1.2	RB 1 MHz; VB: 10 Hz
5194.670	109.7	H	-	-	PK	179	1.2	RB 1 MHz; VB: 1 MHz

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A



Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5033.530	47.1	V	54.0	-6.9	AVG	218	1.3	RB 1 MHz; VB: 10 Hz
5035.930	57.2	V	74.0	-16.8	PK	218	1.3	RB 1 MHz; VB: 1 MHz
10402.880	42.4	V	68.3	-25.9	Peak	175	1.0	Peak vs Avg Limit
15784.870	40.4	H	54.0	-13.6	Peak	11	2.2	Peak vs Avg Limit
2526.500	41.8	V	54.0	-12.2	Peak	144	1.0	Peak vs Avg Limit
1117.580	43.7	V	54.0	-10.3	Peak	93	1.0	Peak vs Avg Limit
1125.180	29.6	V	54.0	-24.4	AVG	63	1.0	RB 1 MHz; VB: 10 Hz
1118.380	41.6	V	74.0	-32.4	PK	63	1.0	RB 1 MHz; VB: 1 MHz

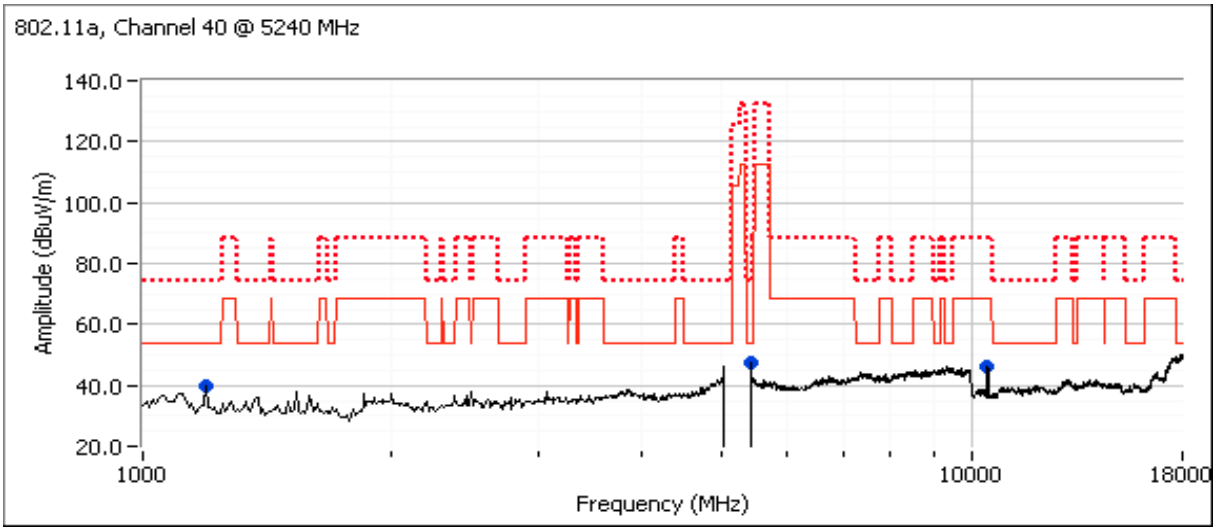
Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A

Run #1c: High Channel
Port: Main
Orientation: Upright
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1198.840	39.5	H	54.0	-14.5	Peak	138	1.6	Peak vs Avg Limit
5415.520	47.5	H	54.0	-6.5	Peak	226	1.0	Peak vs Avg Limit
5432.250	44.5	H	54.0	-9.5	AVG	194	1.1	. MHz; VB: 10 Hz
5432.120	56.8	H	74.0	-17.2	PK	194	1.1	MHz; VB: 1 MHz
10466.670	46.1	H	68.3	-22.2	Peak	236	1.0	Peak vs Avg Limit

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).



Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A

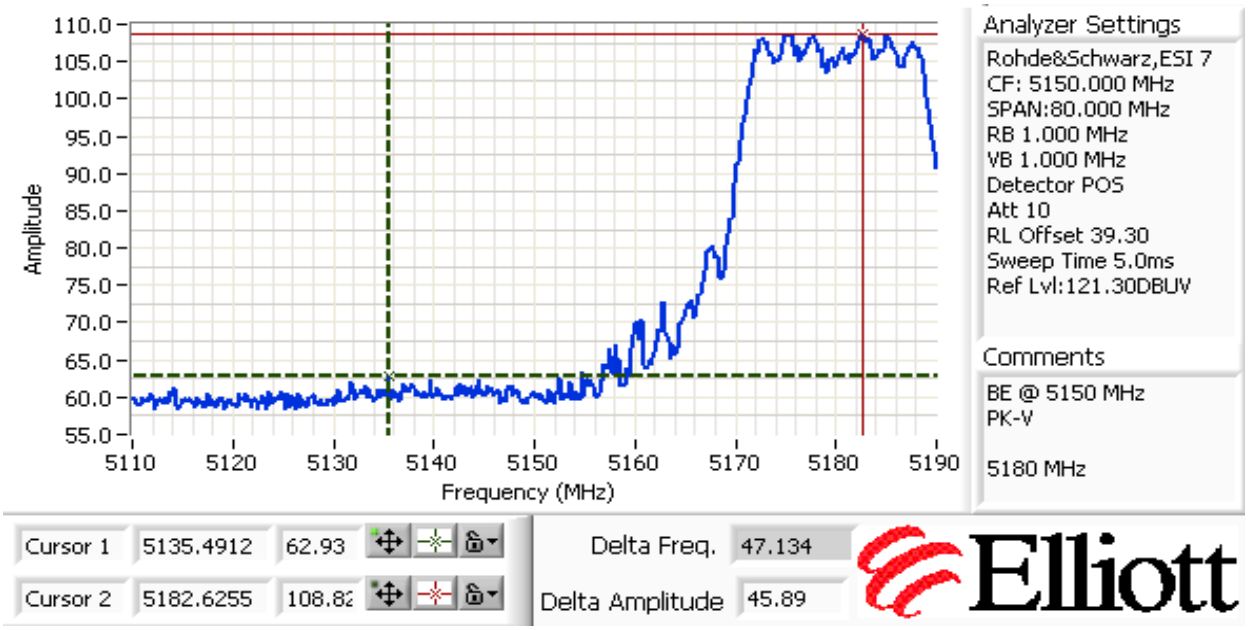
Run #2, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5150-5250 MHz Band, HT20 Mode

Date of Test: 1/28/2010
Test Engineer: Rafael Varelas
Test Location: Chamber #4

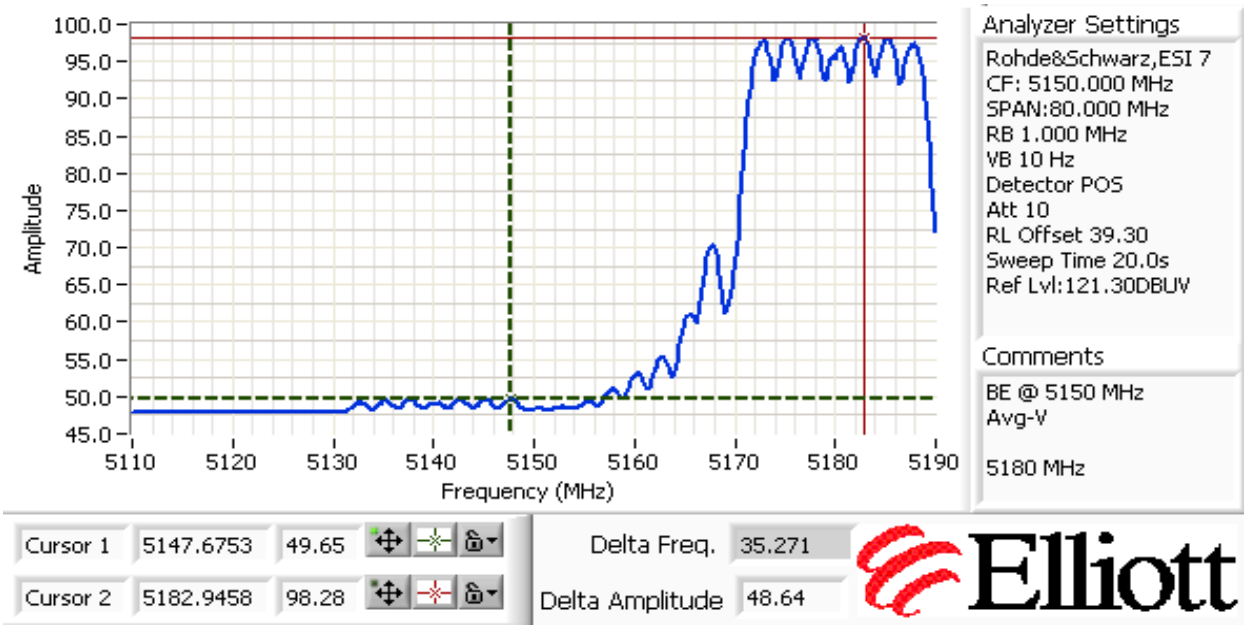
Run #2a: Low Channel
Port: Main/Aux
Orientation: Upright

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5147.675	49.7	V	54.0	-4.4	Avg	200	1.2	
5135.491	62.9	V	74.0	-11.1	Pk	200	1.2	
5137.575	48.6	H	54.0	-5.5	Avg	195	1.0	
5146.874	61.6	H	74.0	-12.4	Pk	195	1.0	



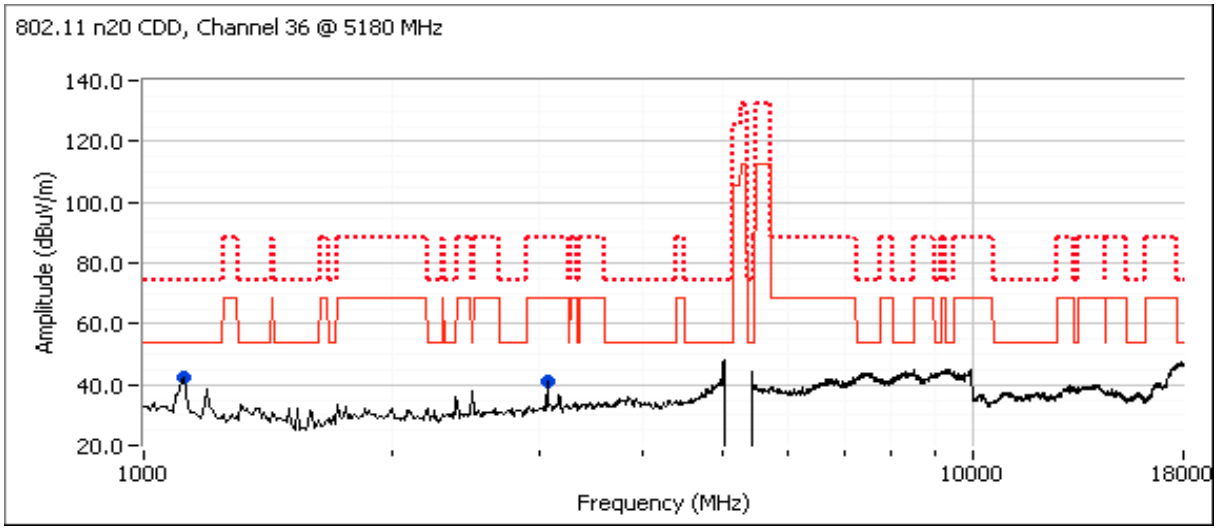
Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A



Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1115.510	42.5	V	54.0	-11.5	Peak	75	1.0	Peak vs Avg Limit
3071.670	41.1	V	68.3	-27.2	Peak	36	1.0	Peak vs Avg Limit

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).



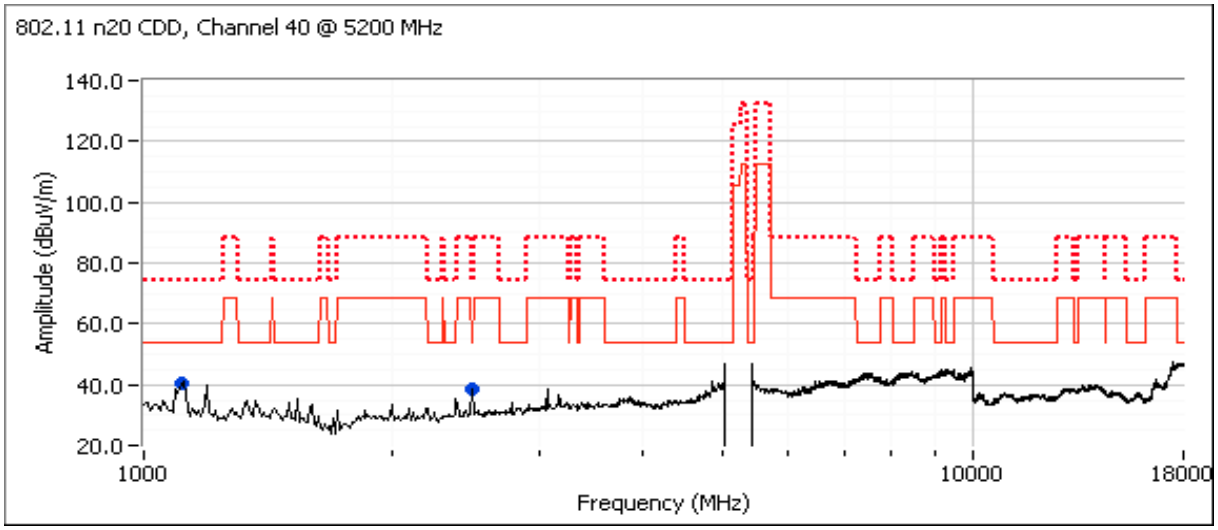
Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A

Run #2b: Center Channel
Port: Main/Aux
Orientation: Upright

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1110.000	40.7	V	54.0	-13.3	Peak	75	1.0	Peak vs Avg Limit
2494.170	38.8	V	54.0	-15.2	Peak	128	1.0	Peak vs Avg Limit

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).



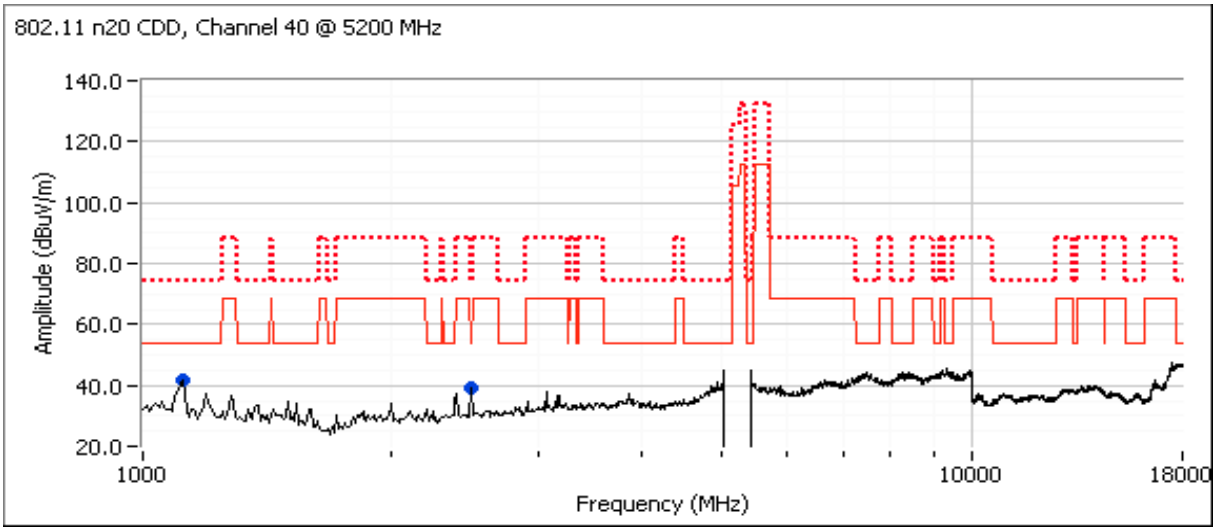
Run #2c: High Channel
Port: Main/Aux
Orientation: Upright

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1119.170	41.5	V	54.0	-12.5	Peak	87	1.0	
2494.170	38.9	V	54.0	-15.1	Peak	127	1.0	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A



Run #3, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5150-5250 MHz Band, HT40 Mode

Date of Test: 1/29/2009
Test Engineer: Mark Hill
Test Location: FT #3

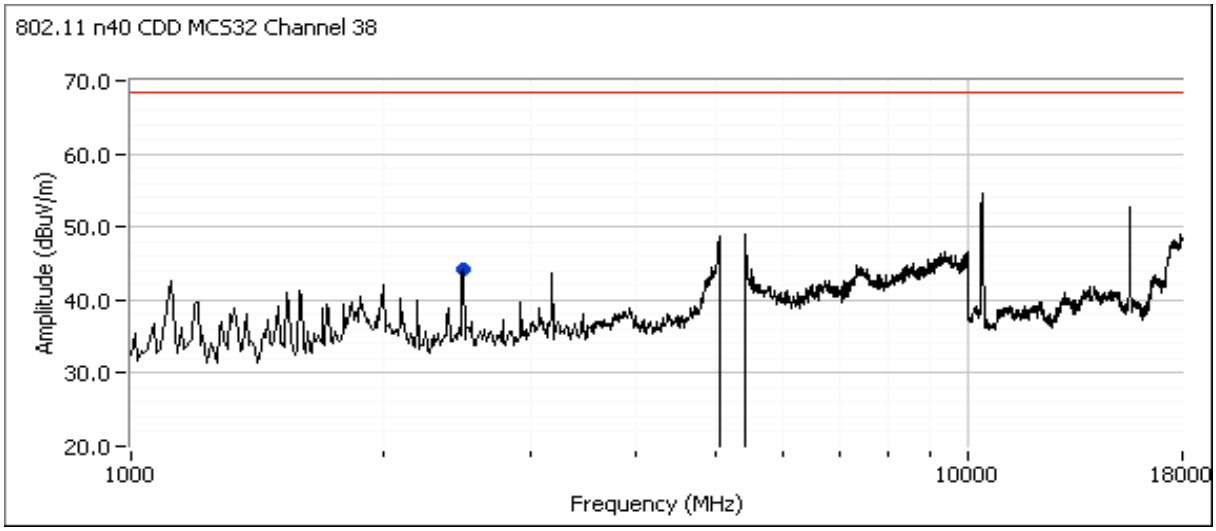
Run #3a: Low Channel
Port: Main/Aux
Orientation: Upright

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2496.840	36.7	V	54.0	-17.3	AVG	169	1.0	RB 1 MHz; VB: 10 Hz
10379.050	48.8	H	68.3	-19.5	AVG	137	1.0	RB 1 MHz; VB: 10 Hz
15575.470	46.1	V	54.0	-7.9	AVG	184	1.0	RB 1 MHz; VB: 10 Hz
2498.980	53.1	V	74.0	-20.9	PK	169	1.0	RB 1 MHz; VB: 1 MHz
10383.650	60.8	H	68.3	-7.5	PK	137	1.0	RB 1 MHz; VB: 1 MHz
15570.400	57.5	V	74.0	-16.5	PK	184	1.0	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A



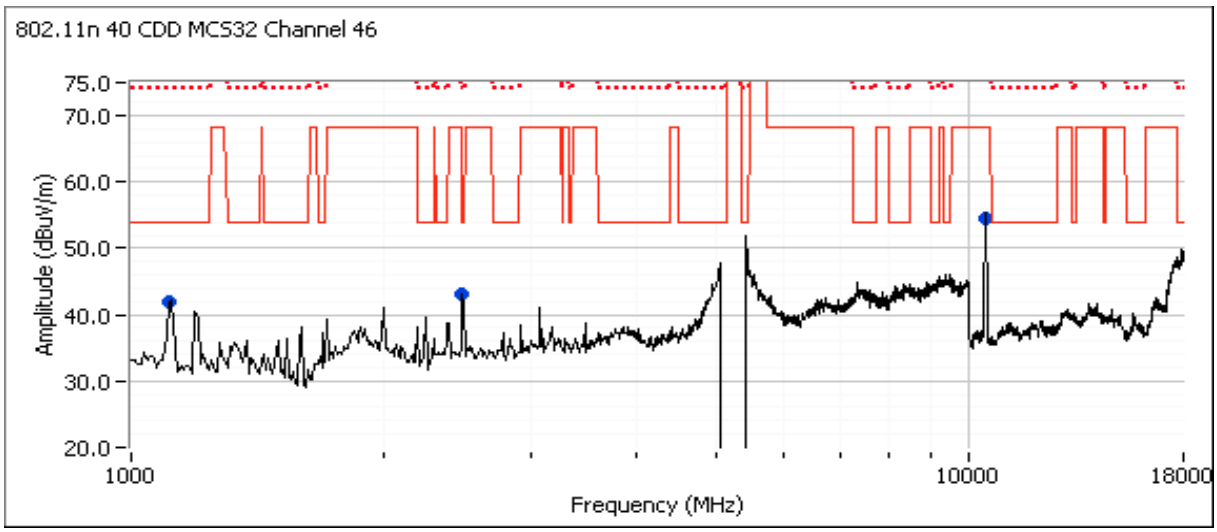
Run #3b: High Channel
Port: Main/Aux
Orientation: Upright

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
10460.340	61.3	V	68.3	-7.0	PK	170	1.0	RB 1 MHz; VB: 1 MHz
1117.790	41.9	V	54.0	-12.1	Peak	64	1.6	Peak vs Avg Limit
2497.010	34.7	V	54.0	-19.3	AVG	119	1.0	RB 1 MHz; VB: 10 Hz
2498.470	50.8	V	74.0	-23.2	PK	119	1.0	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the average limit was set to -27dBm/MHz (~68dBuV/m).

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A



Run #4, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5150-5250 MHz Band, HT40 Mode, MCS0

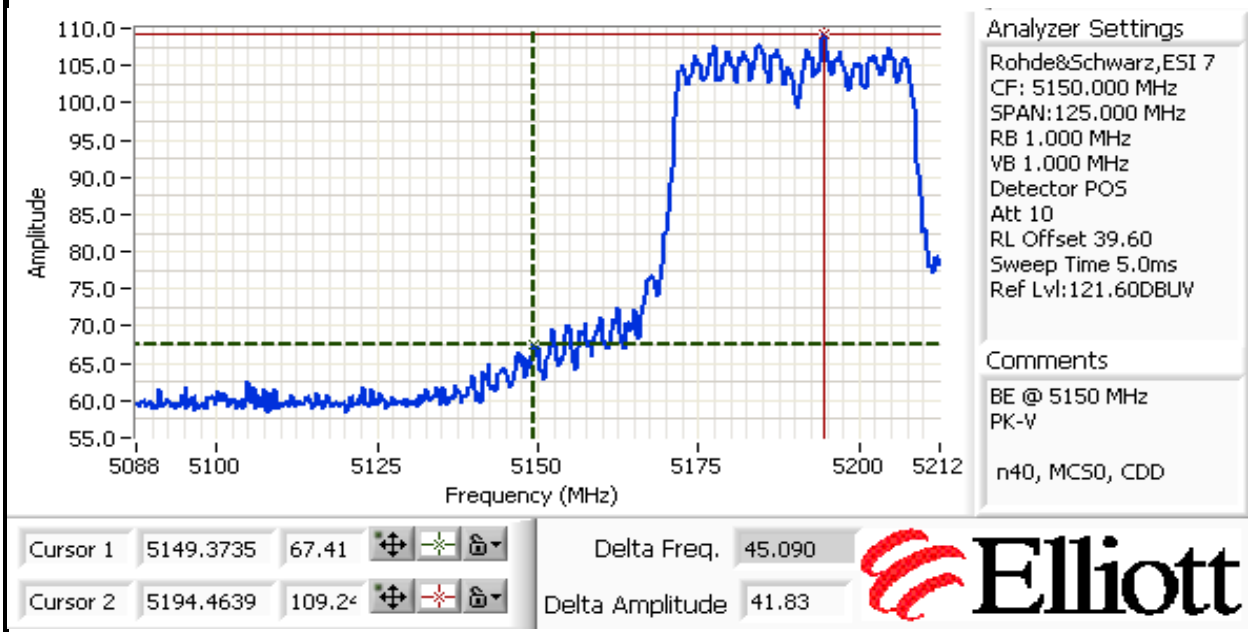
Date of Test: 2/9/2010
Test Engineer: Rafael Varelas
Test Location: FT Chamber #4

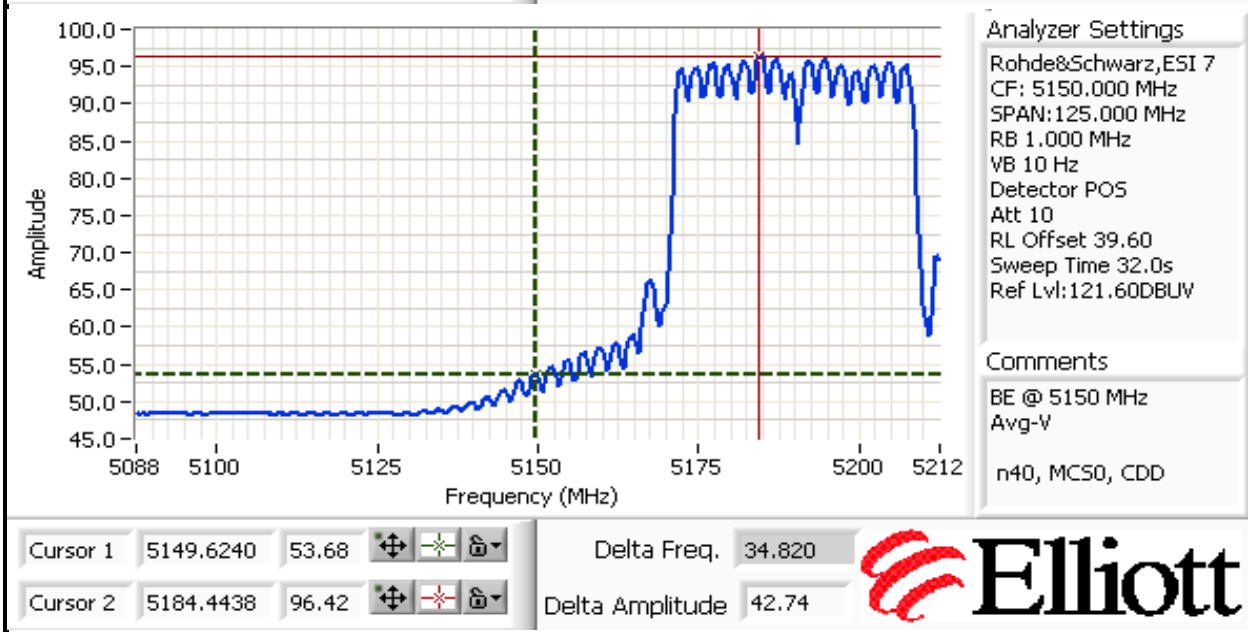
Run #4a: Low Channel
Port: Main/Aux
Orientation: Upright

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.620	53.7	V	54.0	-0.3	AVG	147	1.1	
5149.374	67.4	V	74.0	-6.6	PK	147	1.1	
5148.873	52.3	H	54.0	-1.8	AVG	161	1.1	
5148.372	65.9	H	74.0	-8.1	PK	161	1.1	

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A





Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

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

Ambient Conditions:

Temperature: 19.3 °C

Rel. Humidity: 39 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	802.11a Chain A	40	Rx	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	39.5dBµV/m @ 3076.5MHz (-14.5dB)
2	802.11 n20	40	Rx	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	40.4dBµV/m @ 3076.5MHz (-13.6dB)
3	802.11a n40 MCS0	46	Rx	-	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	42.4dBµV/m @ 3076.4MHz (-11.6dB)

Note: Preliminary testing showed no radio related emissions below 1 GHz.

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:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A

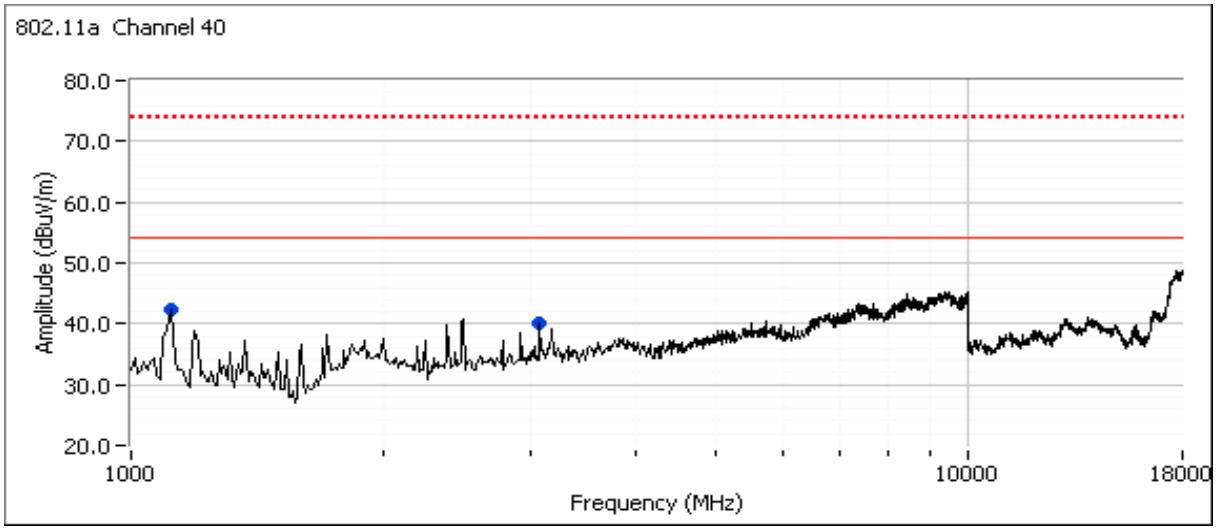
Run #1, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5150-5250 MHz Band, Legacy A Mode

Date of Test: 1/31/2010
Test Engineer: Rafael Varelas
Test Location: Chamber #4

Run #1: Center Channel 40 @ 5200 MHz
Orientation: Upright

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3076.510	39.5	V	54.0	-14.5	AVG	76	1.4	RB 1 MHz; VB: 10 Hz
3076.460	44.9	V	74.0	-29.1	PK	76	1.4	RB 1 MHz; VB: 1 MHz
1125.010	31.5	V	54.0	-22.5	AVG	89	1.0	RB 1 MHz; VB: 10 Hz
1125.170	42.0	V	74.0	-32.0	PK	89	1.0	RB 1 MHz; VB: 1 MHz



Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A

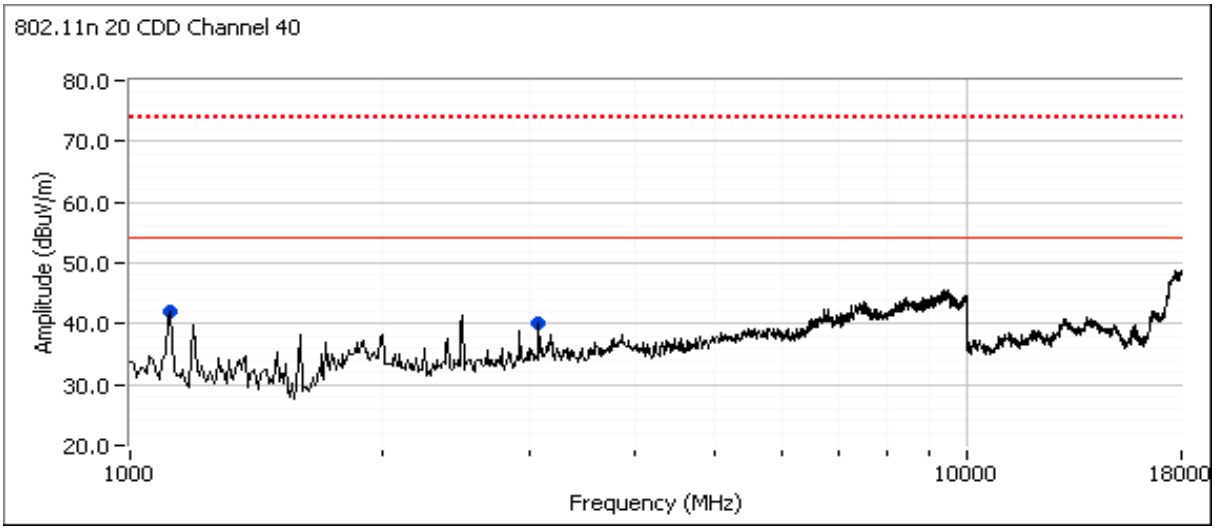
Run #2, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5150-5250 MHz Band, HT20 Mode

Date of Test: 1/31/2010
Test Engineer: Rafael Varelas
Test Location: Chamber #4

Run #2: Center Channel 40 @ 5200 MHz
Orientation: Upright

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3076.470	40.4	V	54.0	-13.6	AVG	50	1.0	. MHz; VB: 10 Hz
3076.650	46.2	V	74.0	-27.8	PK	50	1.0	MHz; VB: 1 MHz
1117.810	36.4	V	54.0	-17.6	AVG	101	1.0	. MHz; VB: 10 Hz
1119.370	49.5	V	74.0	-24.5	PK	101	1.0	MHz; VB: 1 MHz



Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.E	Class:	N/A

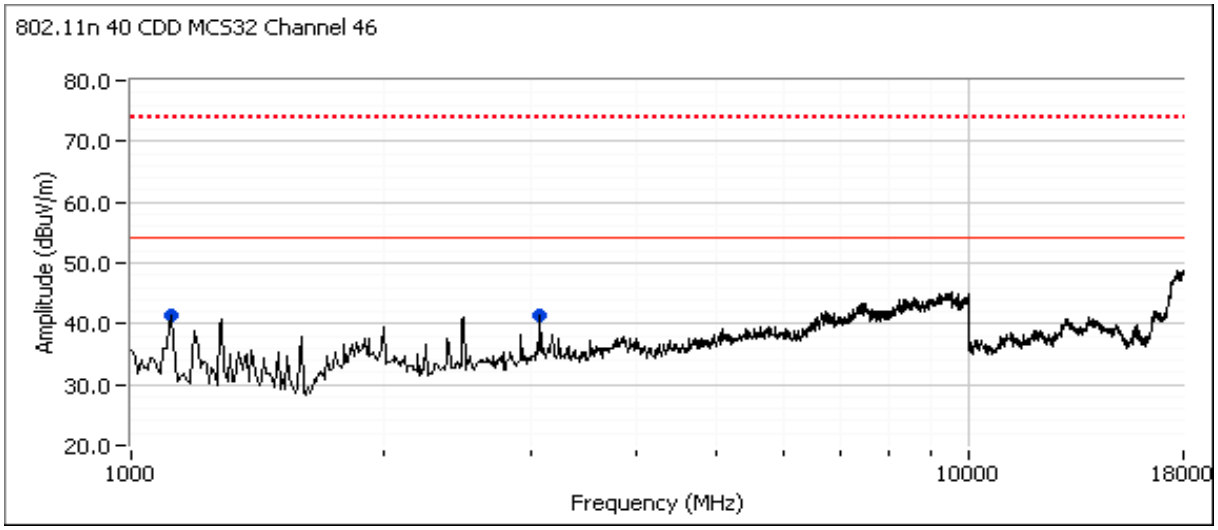
Run #3, Radiated Spurious Emissions, 30 - 40,000 MH. Operation in the 5150-5250 MHz Band, HT40 Mode

Date of Test: 1/31/2010
Test Engineer: Rafael Varelas
Test Location: Chamber #4

Run #3: High Channel 46 @ 5230 MHz
Orientation: Upright

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3076.440	42.4	V	54.0	-11.6	AVG	50	1.0	MHz; VB: 10 Hz
3076.520	47.2	V	74.0	-26.8	PK	50	1.0	MHz; VB: 1 MHz
1117.870	35.4	V	54.0	-18.6	AVG	62	1.0	MHz; VB: 10 Hz
1118.250	48.2	V	74.0	-25.8	PK	62	1.0	MHz; VB: 1 MHz



Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		-
Emissions Standard(s):	FCC 15.247	Class:	B
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Avaya

Model

AP 8120

Date of Last Test: 2/12/2010

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A

RSS-210 (LELAN) and FCC 15.407(UNII)
Antenna Port Measurements
Power, PSD, Peak Excursion, Bandwidth and Spurious Emissions

Test Specific Details

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

Date of Test: 2/3/2010 0:46
Test Engineer: Rafael Varelas
Test Location: Fremont Chamber #4
Config. Used: 1
Config Change: None
EUT Voltage: POE

General Test Configuration

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

Ambient Conditions:

Temperature: 19.1 °C
Rel. Humidity: 40 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	13.0 dBm
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	2.4 dBm/MHz
1	26dB Bandwidth	15.407	-	20.0 MHz
1	99% Bandwidth	RSS 210	-	17.4 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	11.9 dB
3	Antenna Conducted - Out of Band Spurious	15.407(b)	Pass	All emissions below the -27dBm/MHz limit

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.

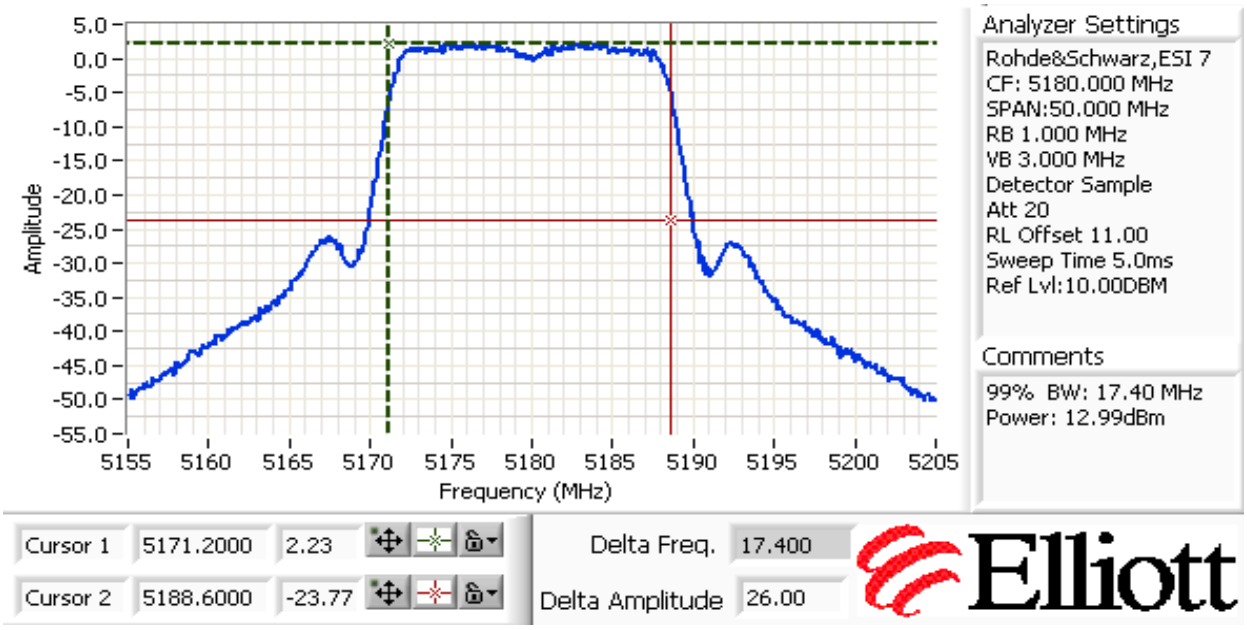
Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A

Run #1: Bandwidth, Output Power and Power spectral Density
Port: Main

Antenna Gain (dBi): 5.91

Frequency (MHz)	Software Setting	Bandwidth		Output Power[1] dBm		Power (Watts)	PSD[2] dBm/MHz			Result
		26dB	99%[4]	Measured	Limit		Measured	FCC Limit	RSS Limit[3]	
5180	-	20.0	17.4	13.0	17.0	0.020	2.2	4.0	4.1	Pass
5200	-	21.7	17.4	12.8	17.0	0.019	2.4	4.0	4.1	Pass
5240	-	21.1	17.4	12.8	17.0	0.019	2.4	4.0	4.1	Pass

Note 1:	RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the 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
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB



Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A

Run #2: Peak Excursion Measurement

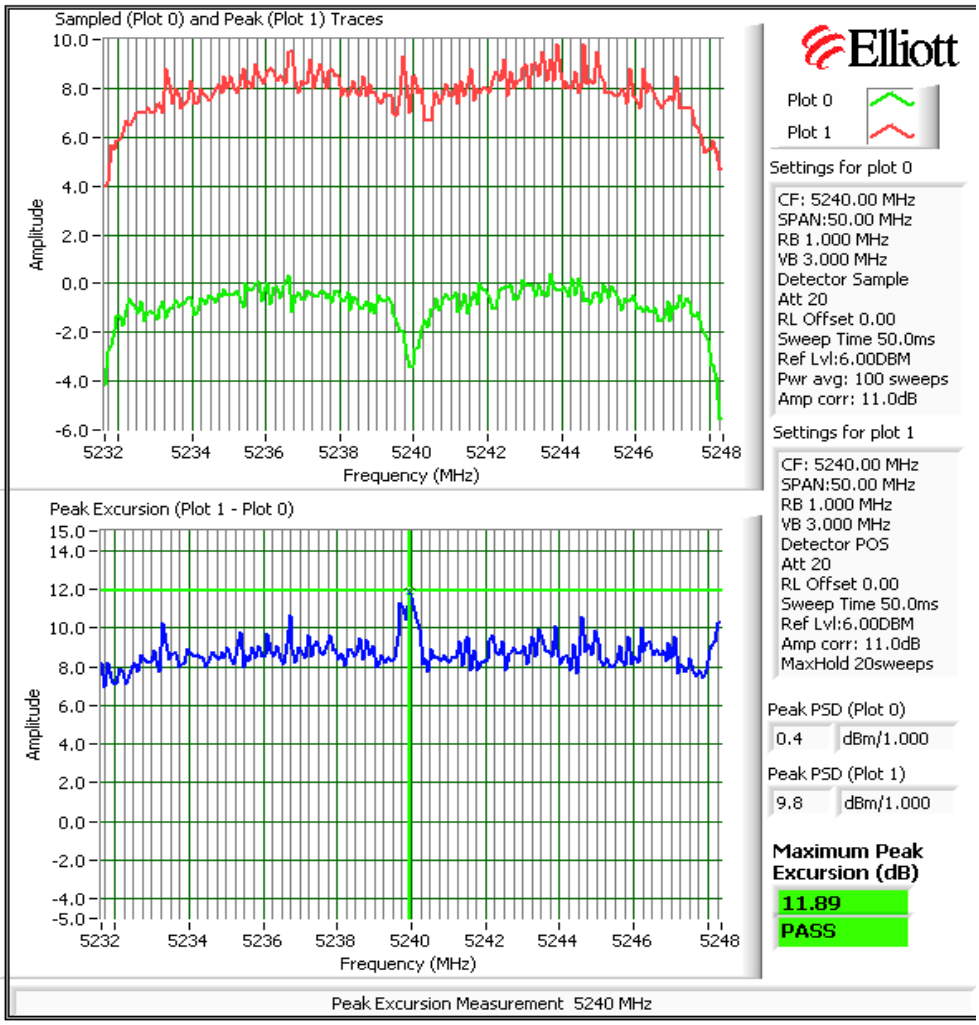
Device meets the requirement for the peak excursion

Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180	11.6	13.0	5260		13.0	5500		13.0
5200	11.8	13.0	5300		13.0	5580		13.0
5240	11.9	13.0	5320		13.0	5700		13.0

Plots Showing Peak Excursion

Trace A: RBW = 1MHz, VBW = 3MHz, Peak hold

Trace B: Same settings as used for power/PSD measurements (RBW = 1 MHz, VBW = 3MHz, Integrated average power)



Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A

Run #3: Out Of Band Spurious Emissions - Antenna Conducted

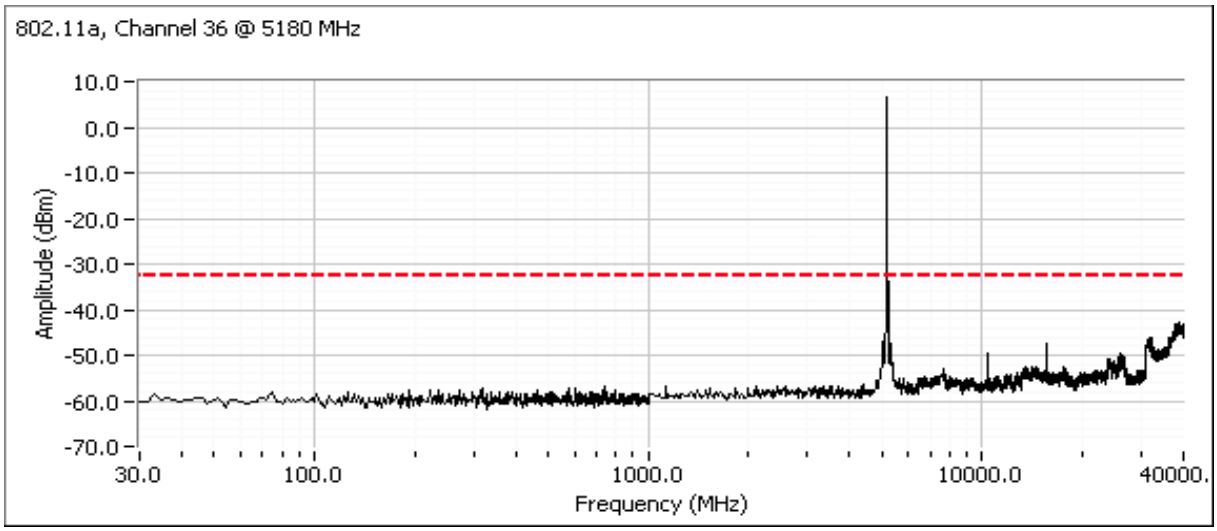
Maximum Antenna Gain:	5.9 dBi	
Spurious Limit:	-27.0 dBm/MHz eirp	
Limit Used On Plots [Note 1]:	-32.9 dBm/MHz	Average Limit (RB=1MHz, VB=10Hz)
	-12.9 dBm/MHz	Peak Limit (RB=VB=1MHz)

Note 1:	The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit are made to determine compliance as the antenna gain is not known at these frequencies.
Note 2:	All spurious signals below 1GHz are measured during digital device radiated emissions test.
Note 3:	Signals within 10MHz of the 5.725 or 5.825 Band edge are subject to a limit of -17dBm EIRP
Note 4:	If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.
Note 5:	Signals that fall in the restricted bands of 15.205 are subject to the limit of 15.209.

Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz)

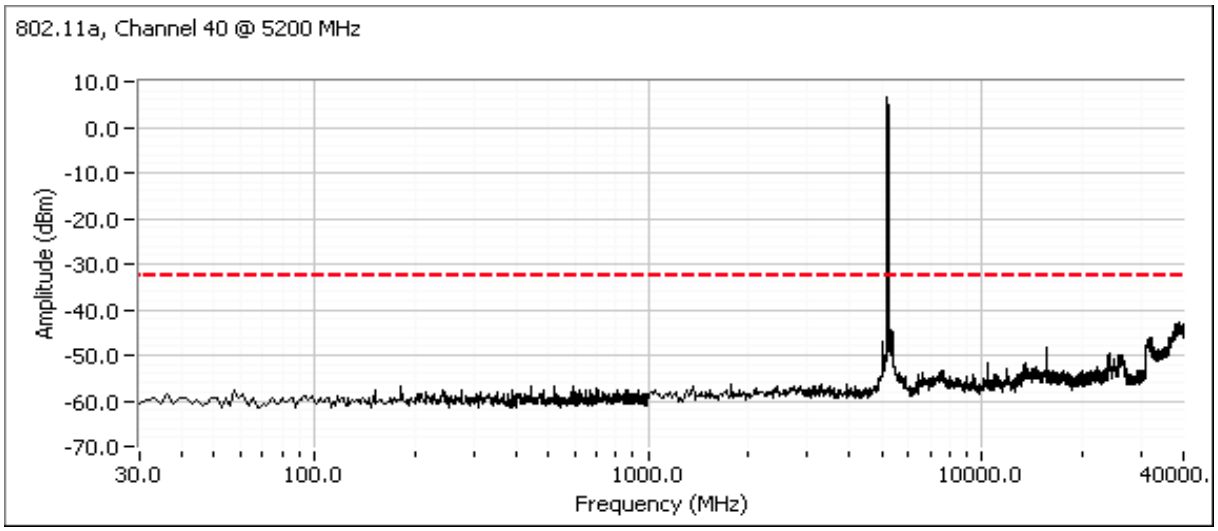
Low channel, 5150 - 5250 MHz Band

Compliance with the radiated limits for the restricted band immediately below 5150MHz is demonstrated through the radiated emissions tests.



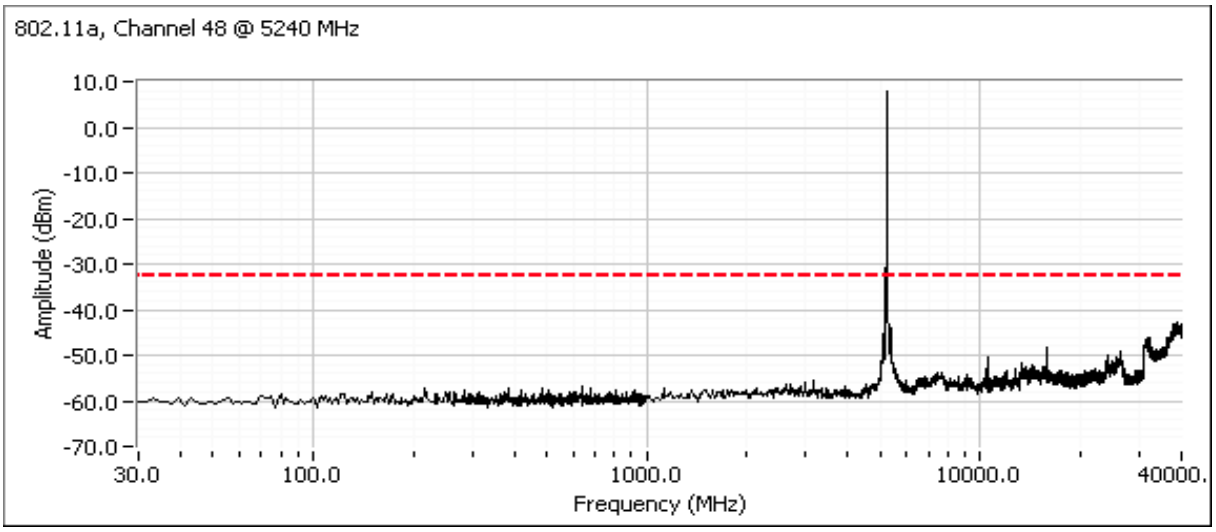
Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A

Center channel, 5150 - 5250 MHz Band

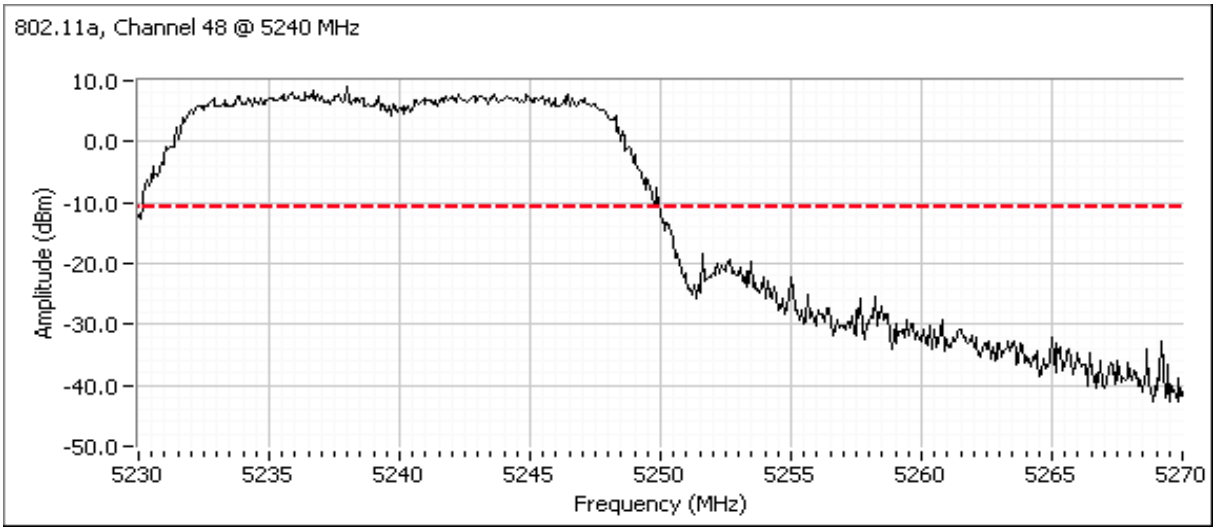


High channel, 5150 - 5250 MHz Band

Note; If device does not operate in the 5250 - 5350 Mhz band include a plot showing -20dBc at 5250 MHz



Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A



Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A

RSS-210 (LELAN) and FCC 15.407(UNII)
Antenna Port Measurements
Power, PSD, Peak Excursion, Bandwidth and Spurious Emissions

Test Specific Details

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

Date of Test: 2/4/2010 1:45
Test Engineer: Rafael Varelas
Test Location: Fremont Chamber #4
Config. Used: 1
Config Change: None
EUT Voltage: POE

General Test Configuration

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

Ambient Conditions:

Temperature: 20 °C
Rel. Humidity: 40 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	11.6 dBm
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	1.0 dBm/MHz
1	26dB Bandwidth	15.407	-	21.5 MHz
1	99% Bandwidth	RSS 210	-	18.5 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	12.5 dB
3	Antenna Conducted - Out of Band Spurious	15.407(b)	Pass	All emissions below the -27dBm/MHz limit

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:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A

Run #1: Bandwidth, Output Power and Power spectral Density
MIMO Device

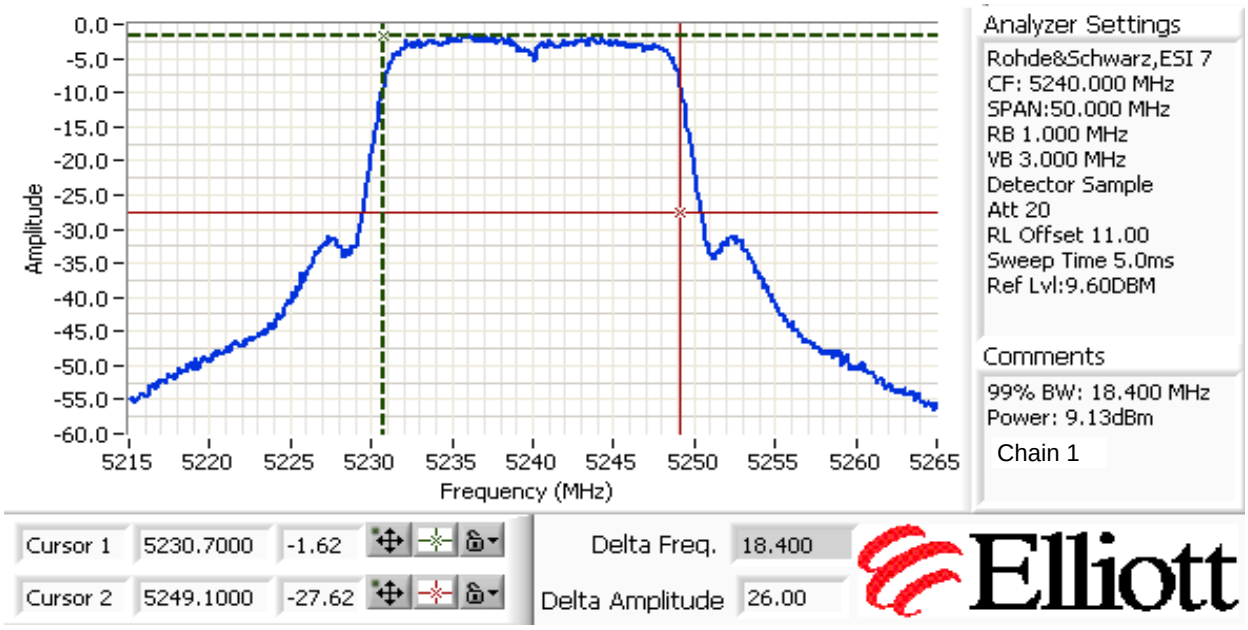
	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]
Antenna Gain (dBi):	5.91	5.91		Yes	8.9

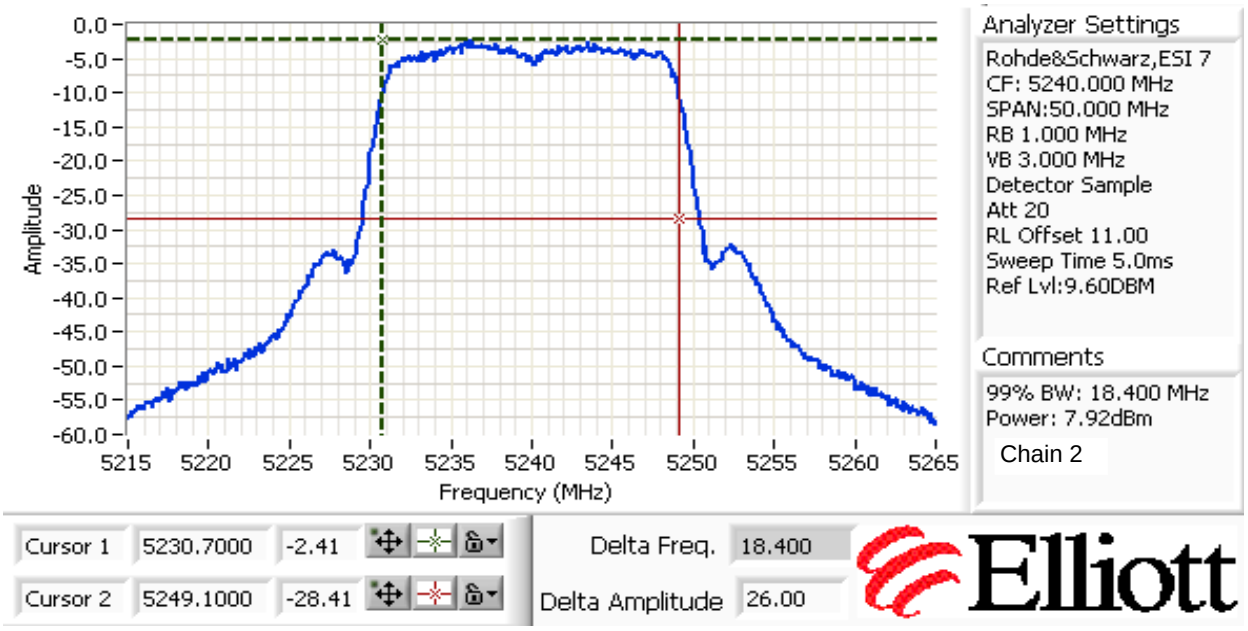
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
5180	43.0	21.8	8.9	8.1		14.2	11.5	14.1	0.014	PASS
5200	42.0	21.8	8.7	8.0		13.7	11.4	14.1		PASS
5240	42.0	21.5	9.1	7.9		14.4	11.6	14.1		PASS

Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
5180	18.3	11.5	-1.9	-2.4		1.2	0.9	1.1	1.1	PASS
5200	18.4	11.4	-1.9	-2.7		1.2	0.7	1.1	1.1	PASS
5240	18.5	11.6	-1.6	-2.4		1.3	1.0	1.1	1.1	PASS

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the 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
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A





Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A

Run #2: Peak Excursion Measurement

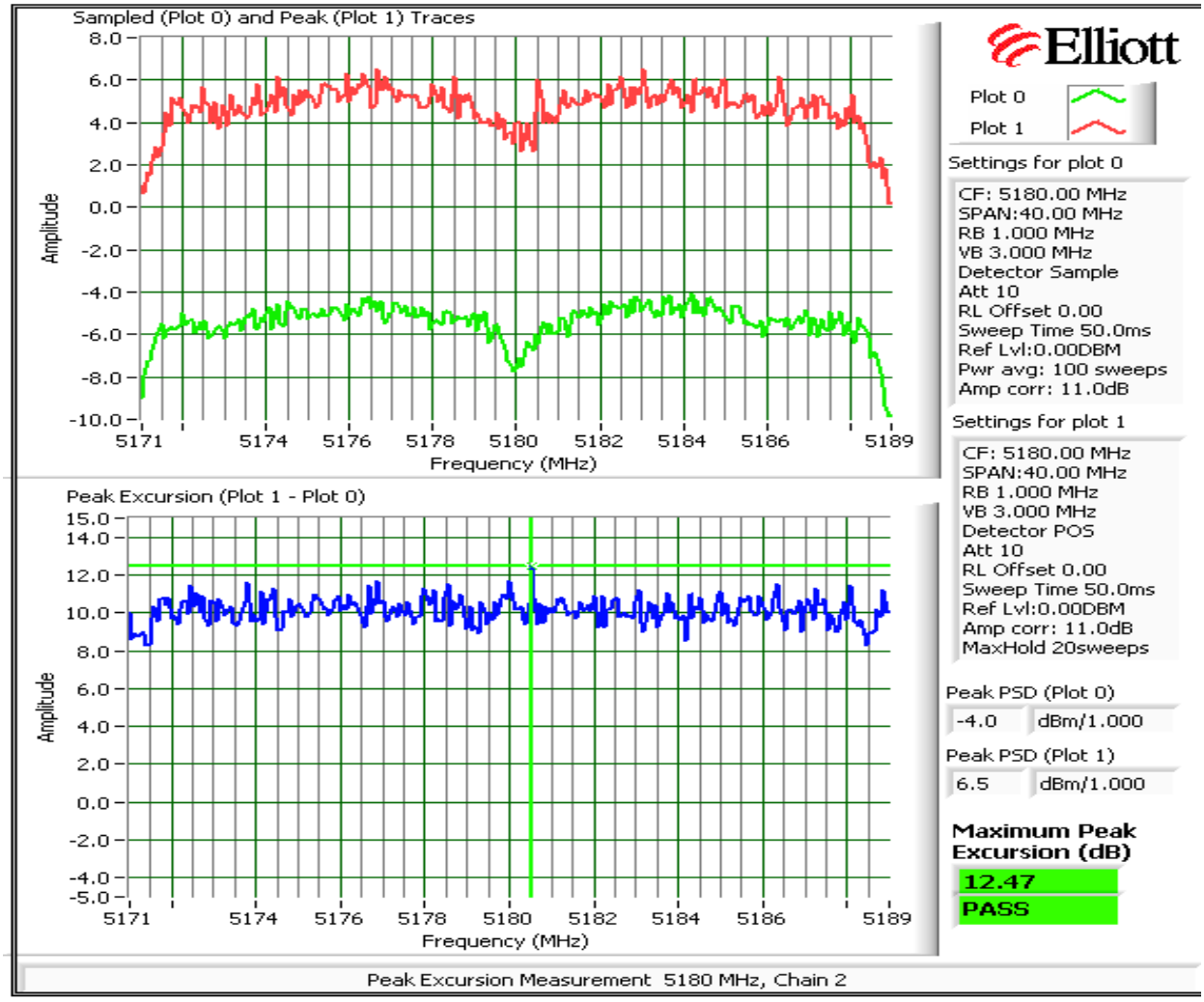
Device meets the requirement for the peak excursion

Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180	12.5	13.0	5260		13.0	5500		13.0
5200	11.9	13.0	5300		13.0	5580		13.0
5240	11.9	13.0	5320		13.0	5700		13.0

Plots Showing Peak Excursion

Trace A: RBW = 1MHz, VBW = 3MHz, Peak hold

Trace B: Same settings as used for power/PSD measurements (RBW = 1 MHz, VBW = 3MHz, Integrated average power)



Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A

Run #3: Out Of Band Spurious Emissions - Antenna Conducted

MIMO Devices: Antenna gain used is the effective gain calculated in the power section of this data sheet. The plots were obtained for each chain individually and the limit was adjusted to account for all chains transmitting simultaneously

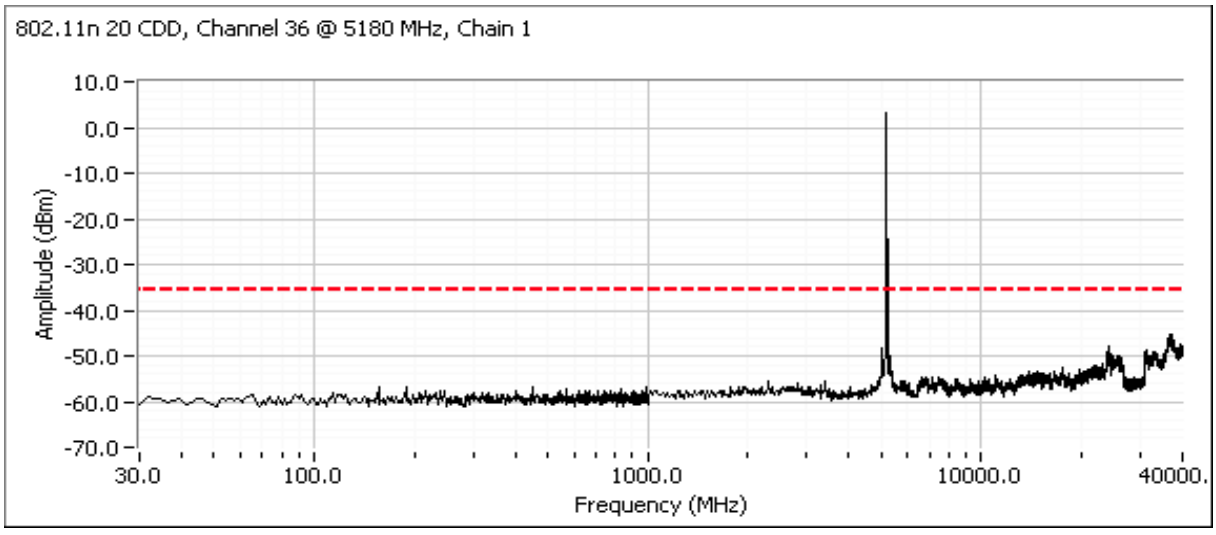
Number of transmit chains:	2		
Maximum Antenna Gain:	5.9	dBi	
Spurious Limit:	-27.0	dBm/MHz eirp	
Adjustment for 2 chains:	-3.0	dB adjustment for multiple chains.	
Limit Used On Plots Note 1:	-35.9	dBm/MHz	Average Limit (RB=1MHz, VB=10Hz)
	-15.9	dBm/MHz	Peak Limit (RB=VB=1MHz)

Note 1:	The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit are made to determine compliance as the antenna gain is not known at these frequencies.
Note 2:	All spurious signals below 1GHz are measured during digital device radiated emissions test.
Note 3:	Signals within 10MHz of the 5.725 or 5.825 Band edge are subject to a limit of -17dBm EIRP
Note 4:	If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.
Note 5:	Signals that fall in the restricted bands of 15.205 are subject to the limit of 15.209.

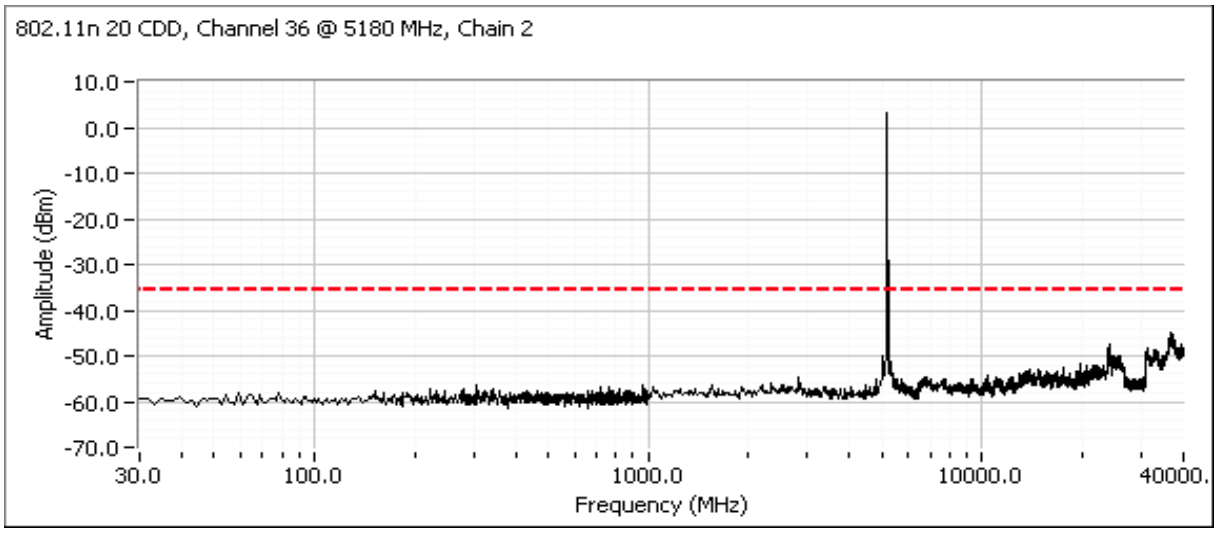
Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz)

Low channel, 5150 - 5250 MHz Band

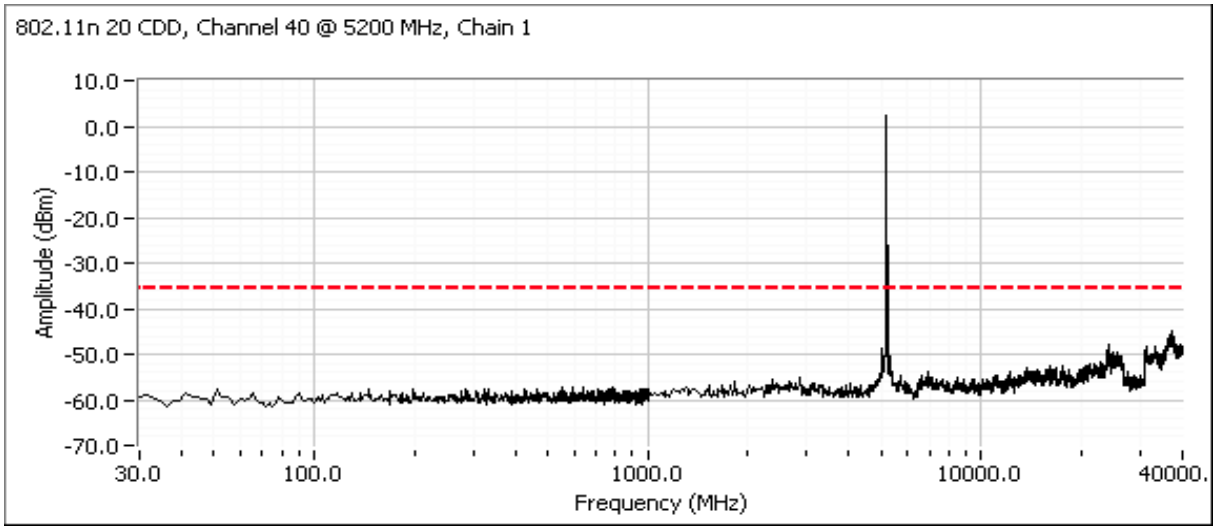
Compliance with the radiated limits for the restricted band immediately below 5150MHz is demonstrated through the radiated emissions tests.



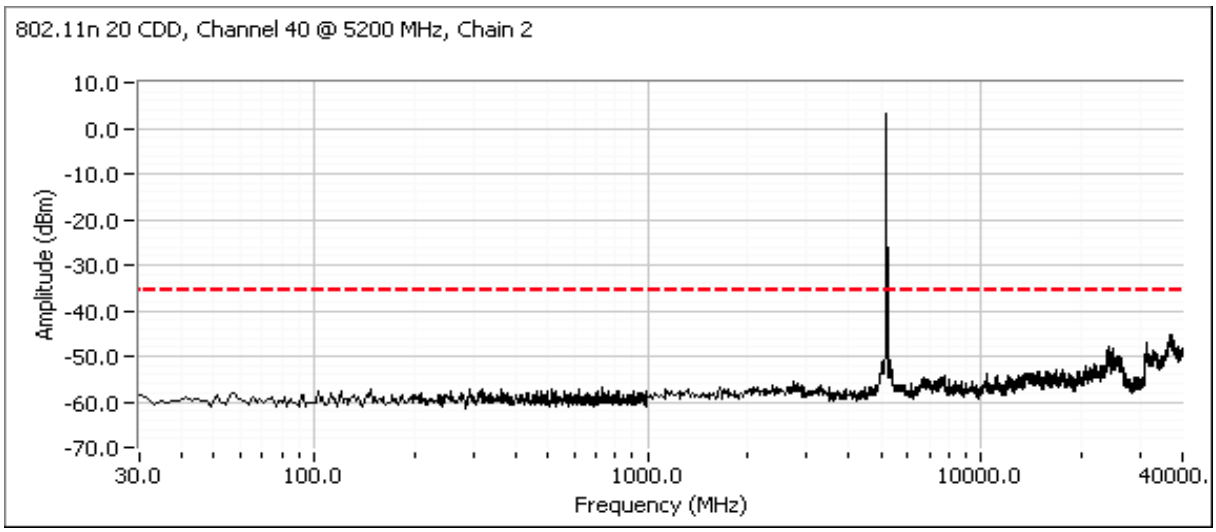
Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A



Center channel, 5150 - 5250 MHz Band

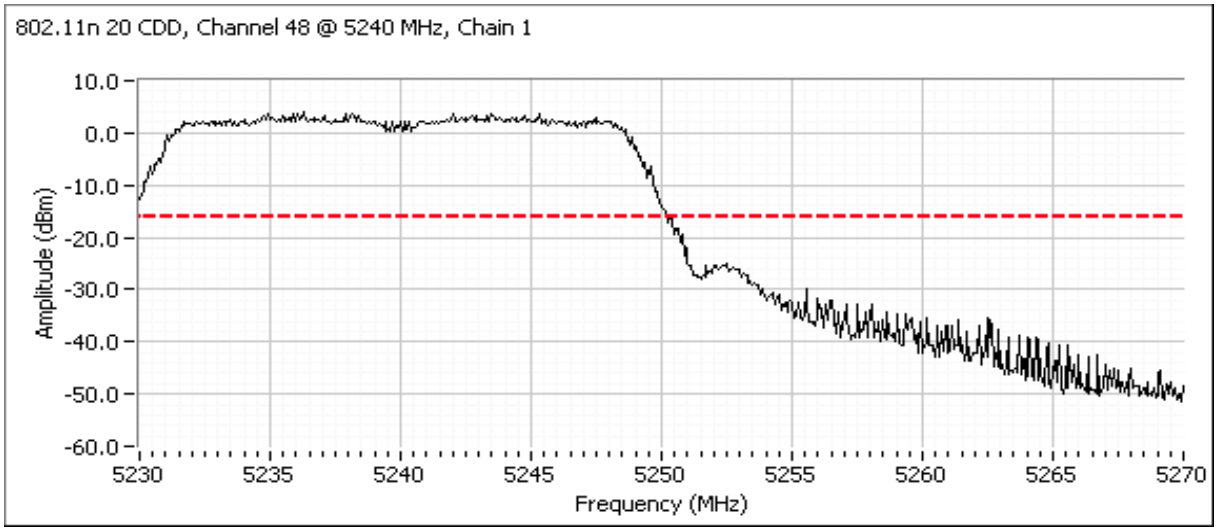


Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A

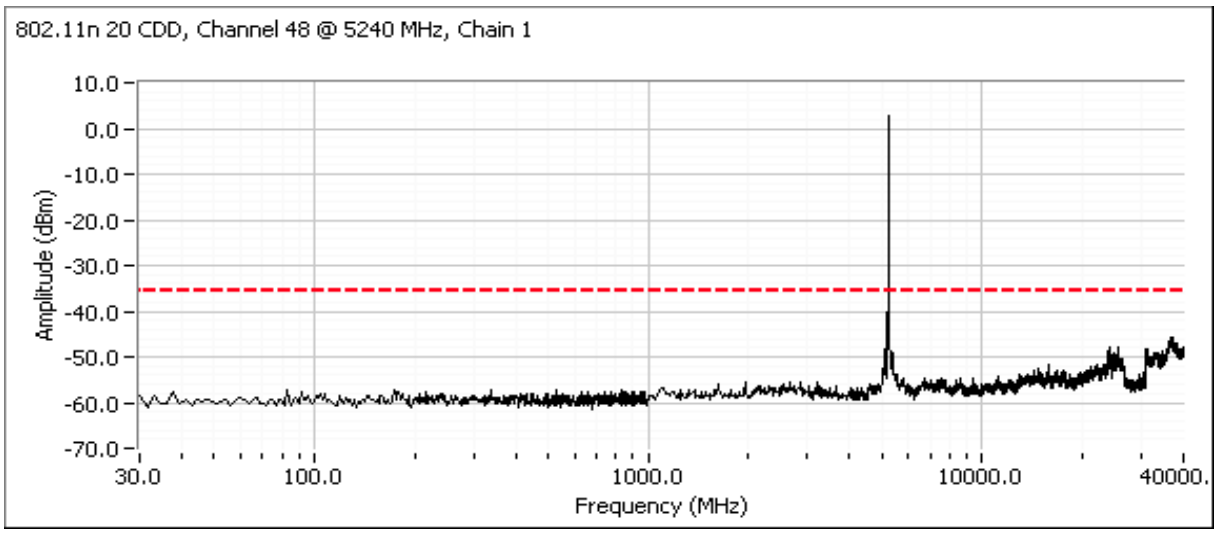


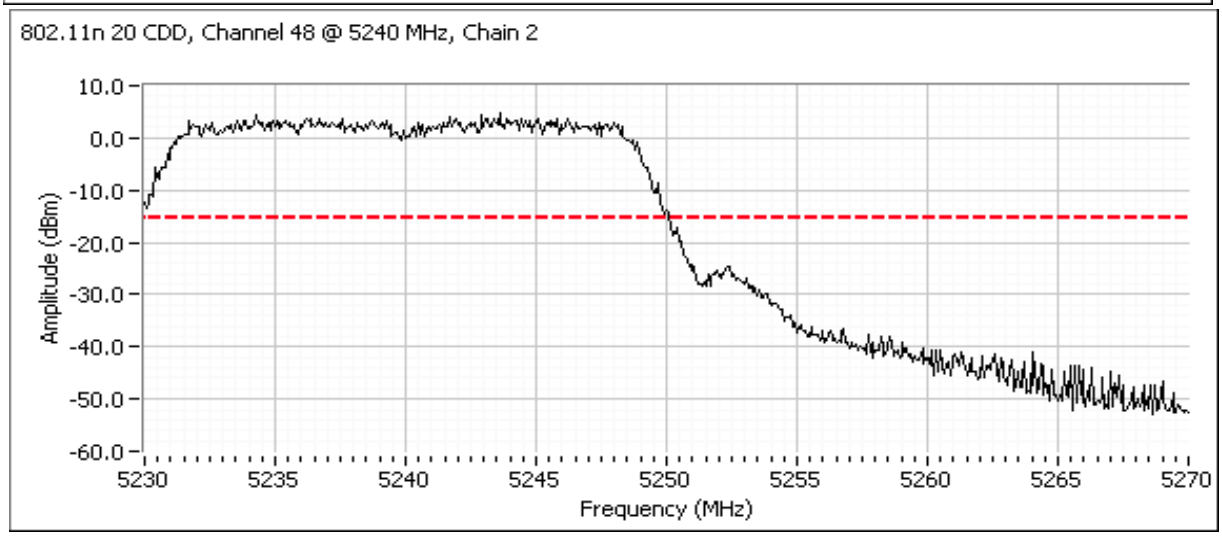
High channel, 5150 - 5250 MHz Band

Note; If device does not operate in the 5250 - 5350 Mhz band include a plot showing -20dBc at 5250 MHz

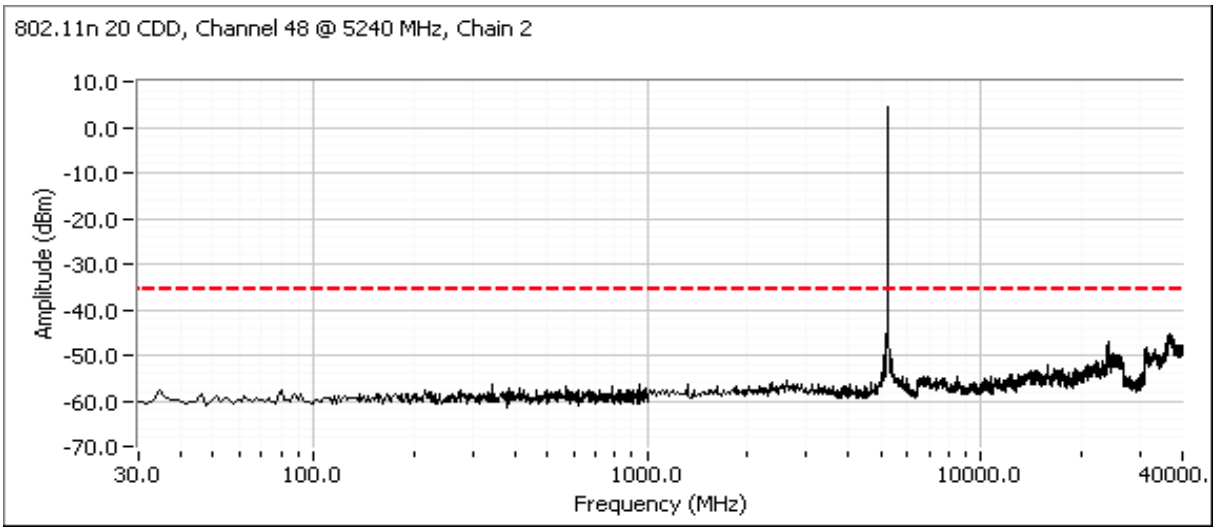


Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A





Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A



Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A

RSS-210 (LELAN) and FCC 15.407(UNII)
Antenna Port Measurements
Power, PSD, Peak Excursion, Bandwidth and Spurious Emissions

Test Specific Details

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

Date of Test: 2/11/2010 1:45
Test Engineer: Rafael Varelas
Test Location: Fremont Chamber #5
Config. Used: 1
Config Change: None
EUT Voltage: POE

General Test Configuration

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

Ambient Conditions:

Temperature: 18.9 °C
Rel. Humidity: 38 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	13.5 dBm(22.4mW)
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	0.8 dBm/MHz
1	26dB Bandwidth	15.407	-	39.5 MHz
1	99% Bandwidth	RSS 210	-	37.0 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	12.98 dB
3	Antenna Conducted - Out of Band Spurious	15.407(b)	Pass	All emissions below the -27dBm/MHz limit

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:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A

Run #1: Bandwidth, Output Power and Power spectral Density
MIMO Device

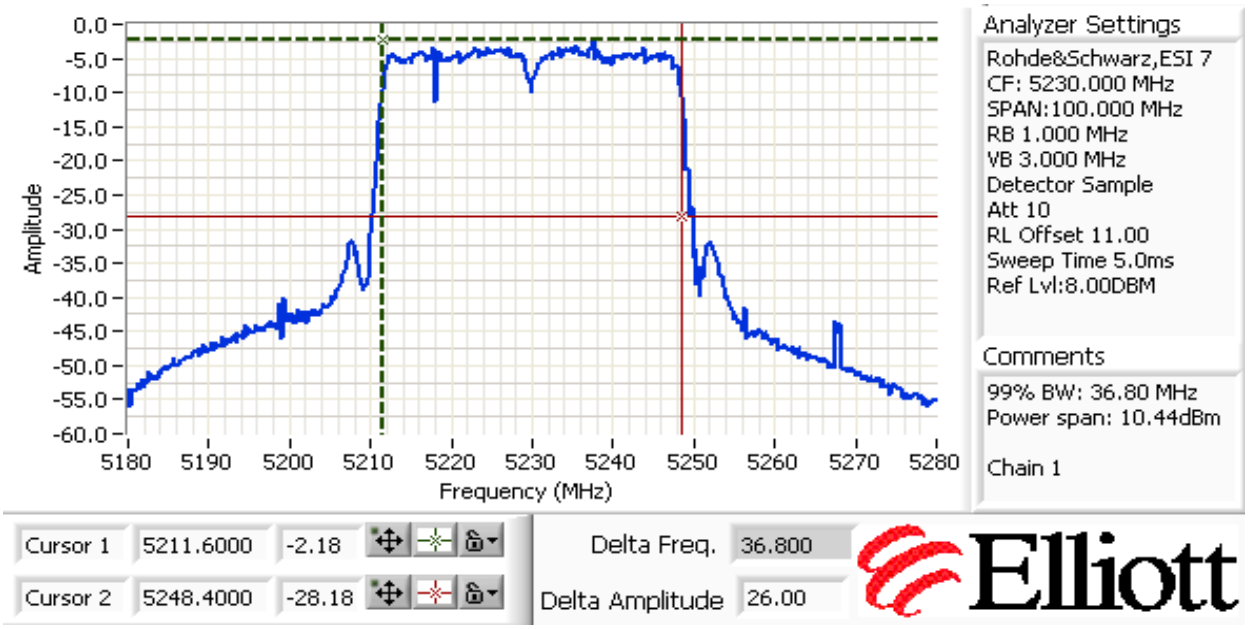
	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]
Antenna Gain (dBi):	5.91	5.91		Yes	8.9

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
5190	50.0	39.5	9.9	10.0		19.8	13.0	14.1	0.022	PASS
5230	53.0	41.2	10.4	10.6		22.4	13.5	14.1		PASS

Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
5190	36.6	13.0	-3.0	-3.6		0.9	-0.2	1.1	1.1	PASS
5230	37.0	13.5	-2.2	-2.3		1.2	0.8	1.1	1.1	PASS

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the 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
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A



Run #2: Peak Excursion Measurement

Device meets the requirement for the peak excursion

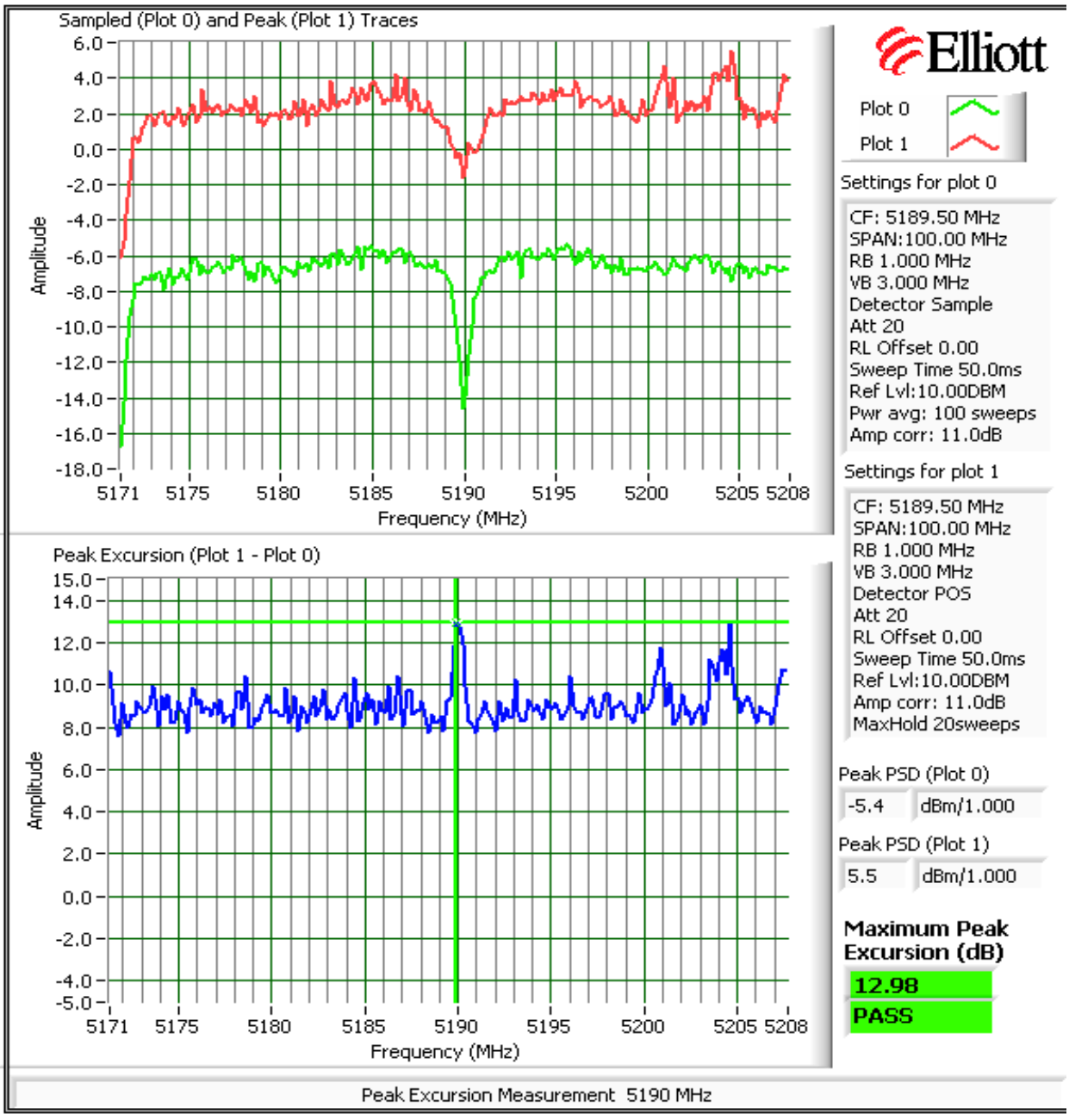
Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5190	12.98	13.0	5260		13.0	5500		13.0
			5300		13.0	5580		13.0
5230	12.9	13.0	5320		13.0	5700		13.0

Plots Showing Peak Excursion

Trace A: RBW = 1MHz, VBW = 3MHz, Peak hold

Trace B: Same settings as used for power/PSD measurements (RBW = 1 MHz, VBW = 3MHz, Integrated average power)

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A



Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A

Run #3: Out Of Band Spurious Emissions - Antenna Conducted

MIMO Devices: Antenna gain used is the effective gain calculated in the power section of this data sheet. The plots were obtained for each chain individually and the limit was adjusted to account for all chains transmitting simultaneously

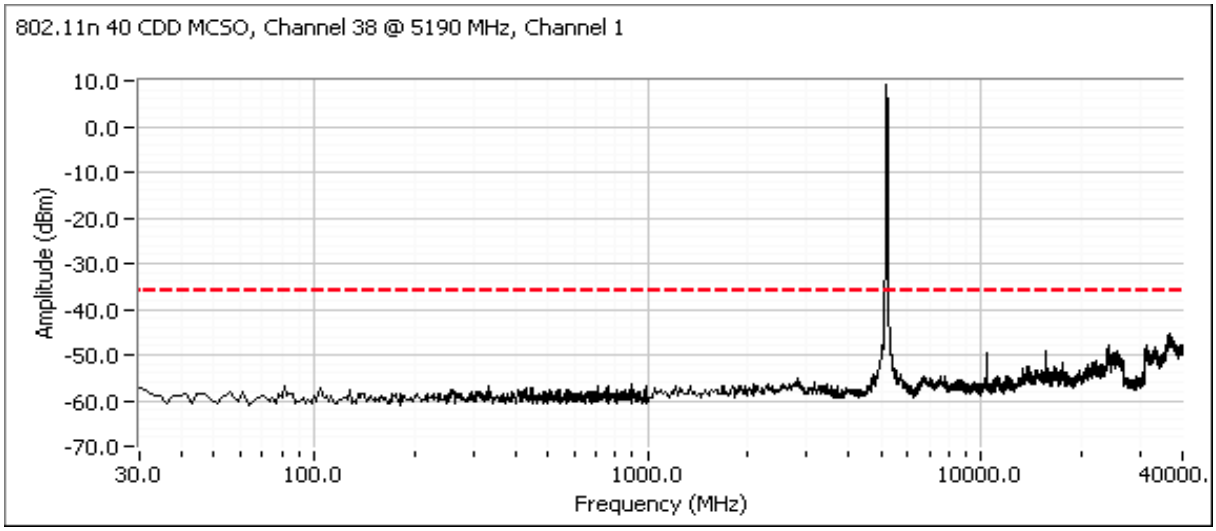
Number of transmit chains:	2		
Maximum Antenna Gain:	5.9	dBi	
Spurious Limit:	-27.0	dBm/MHz eirp	
Adjustment for 2 chains:	-3.0	dB adjustment for multiple chains.	
Limit Used On Plots Note 1:	-35.9	dBm/MHz	Average Limit (RB=1MHz, VB=10Hz)
	-15.9	dBm/MHz	Peak Limit (RB=VB=1MHz)

Note 1:	The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit are made to determine compliance as the antenna gain is not known at these frequencies.
Note 2:	All spurious signals below 1GHz are measured during digital device radiated emissions test.
Note 3:	Signals within 10MHz of the 5.725 or 5.825 Band edge are subject to a limit of -17dBm EIRP
Note 4:	If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.
Note 5:	Signals that fall in the restricted bands of 15.205 are subject to the limit of 15.209.

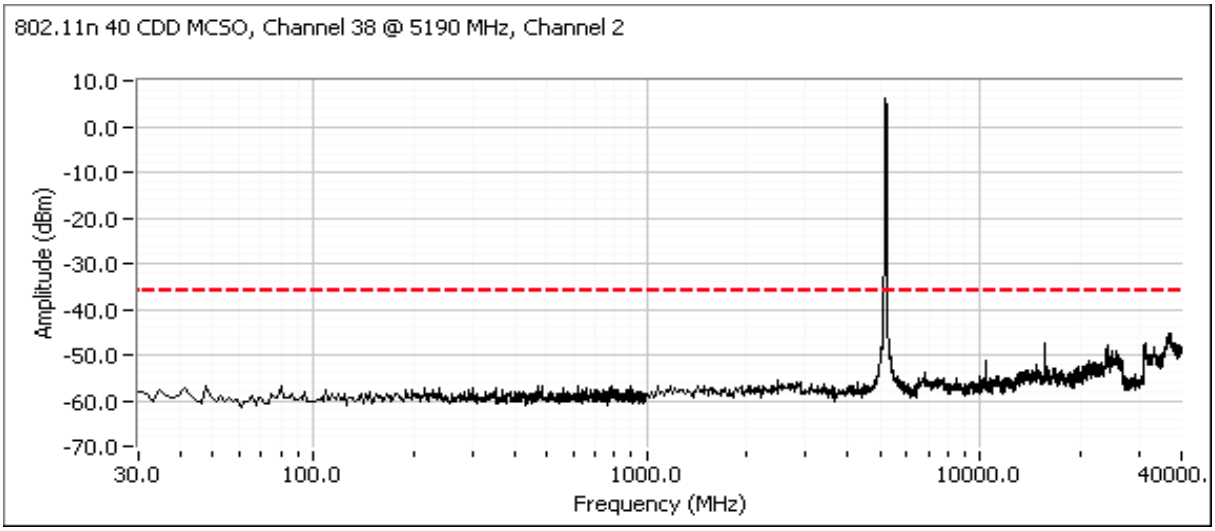
Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz)

Low channel, 5150 - 5250 MHz Band

Compliance with the radiated limits for the restricted band immediately below 5150MHz is demonstrated through the radiated emissions tests.

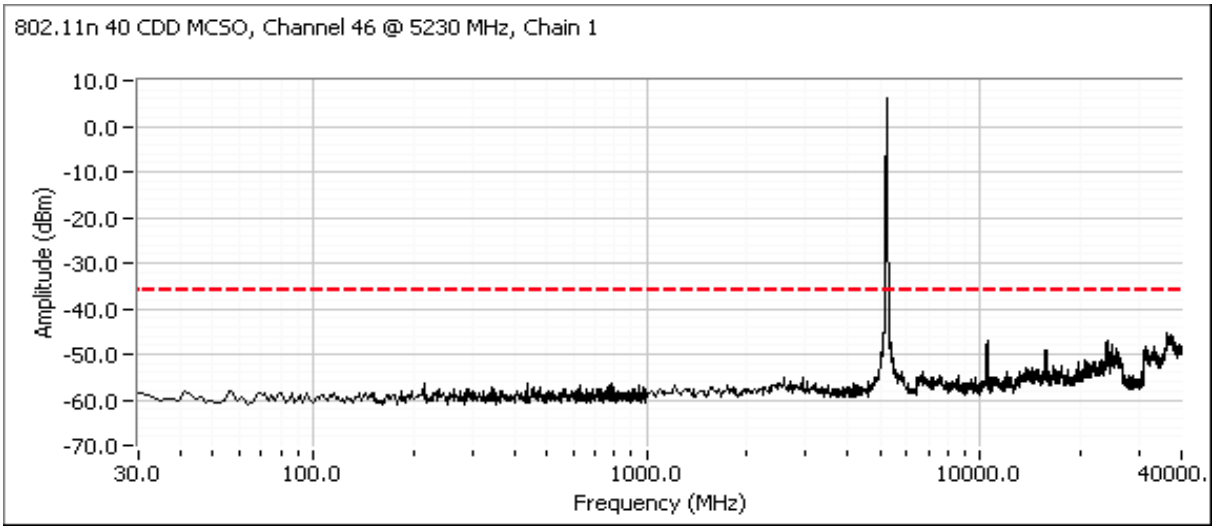


Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A

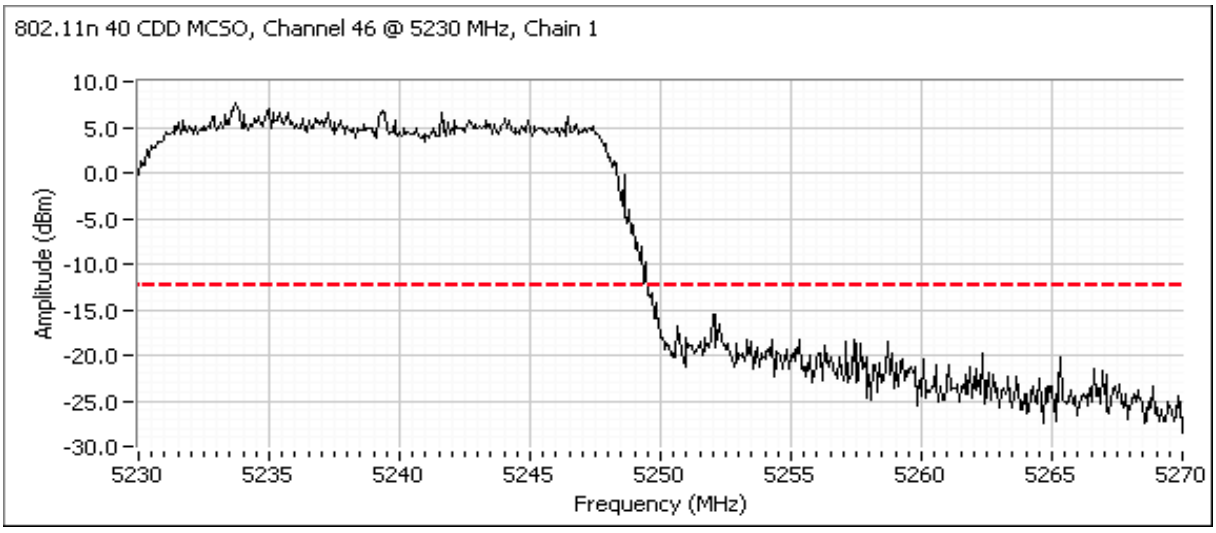


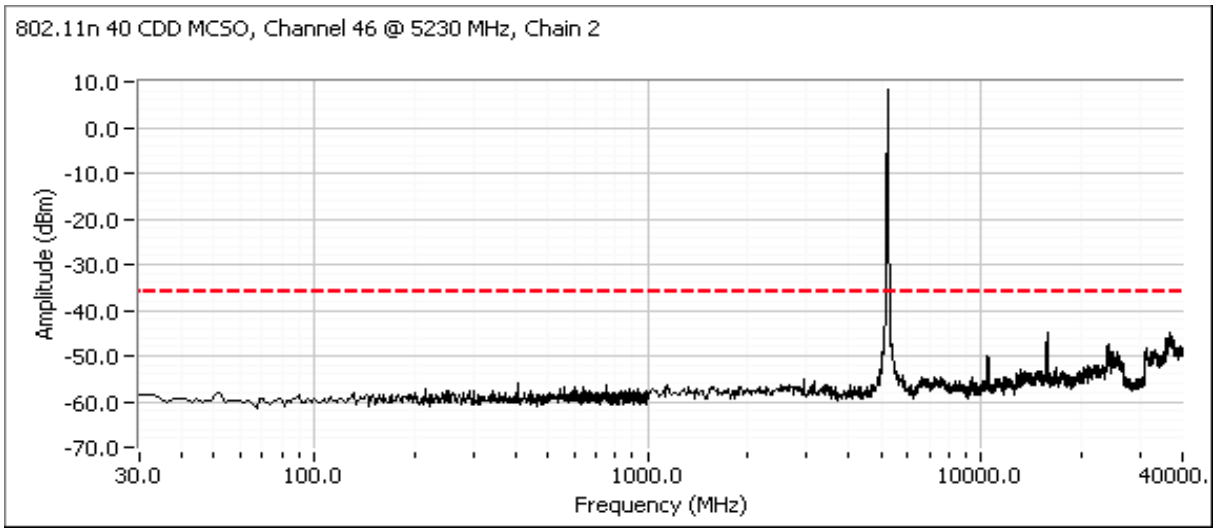
High channel, 5150 - 5250 MHz Band

Note; If device does not operate in the 5250 - 5350 Mhz band include a plot showing -20dBc at 5250 MHz

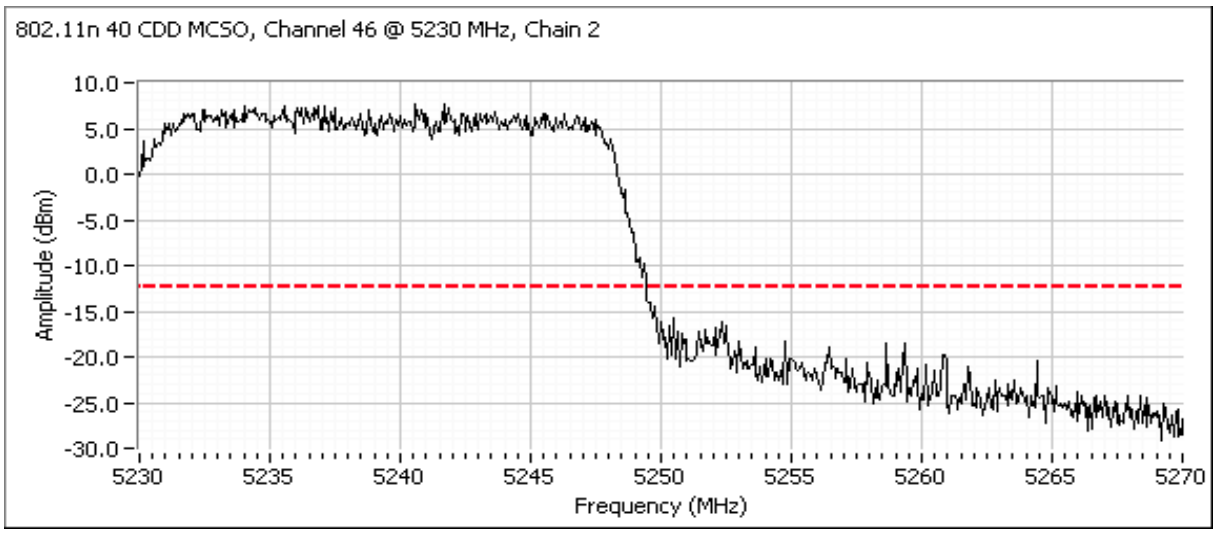


Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A





Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78071
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	N/A



Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78249
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		-
Emissions Standard(s):	FCC 15.247	Class:	B
Immunity Standard(s):	EN301 489-17	Environment:	-

EMC Test Data

For The

Avaya

Model

AP 8120

Date of Last Test: 3/2/2010

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78249
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	B

Conducted Emissions - Power Ports

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: 2/10/2010 12:37
Test Engineer: John Caizzi
Test Location: SVOATS #2

Config. Used: 1
Config Change: none
EUT Voltage: 230V / 50Hz & 120V / 60Hz

General Test Configuration

The EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment.

Ambient Conditions:

Temperature: 20 °C
Rel. Humidity: 39 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
3	CE, AC Power, 230V/50Hz	EN 55022 Class B	Pass	38.2dBµV @ 2.442MHz (-7.8dB)
4	CE, AC Power, 120V/60Hz	EN 55022 Class B	Pass	42.9dBµV @ 2.657MHz (-13.1dB)

Modifications Made During Testing

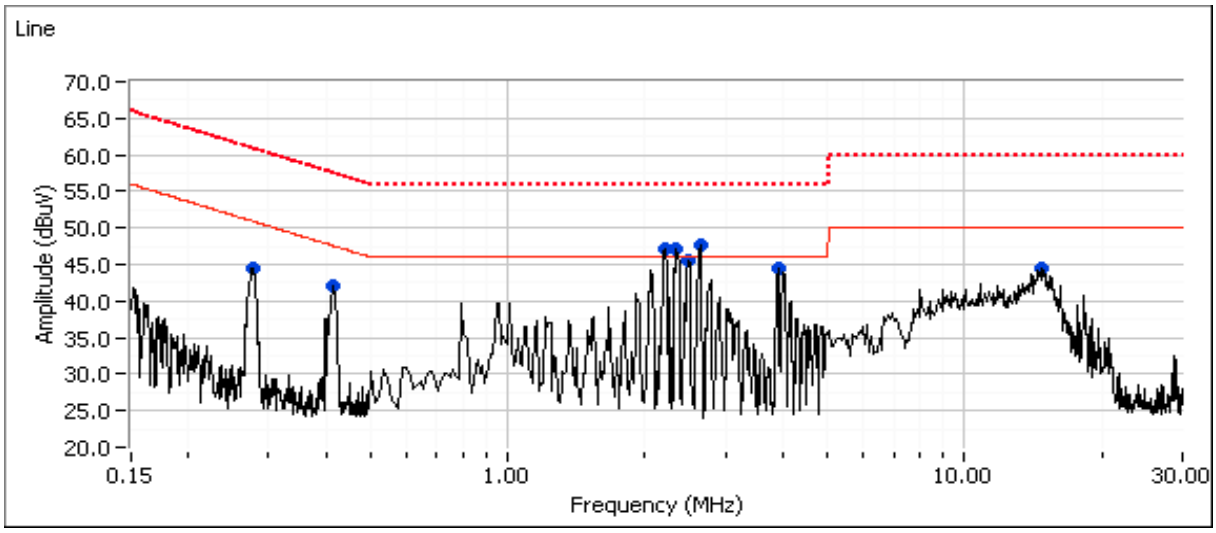
No modifications were made to the EUT during testing

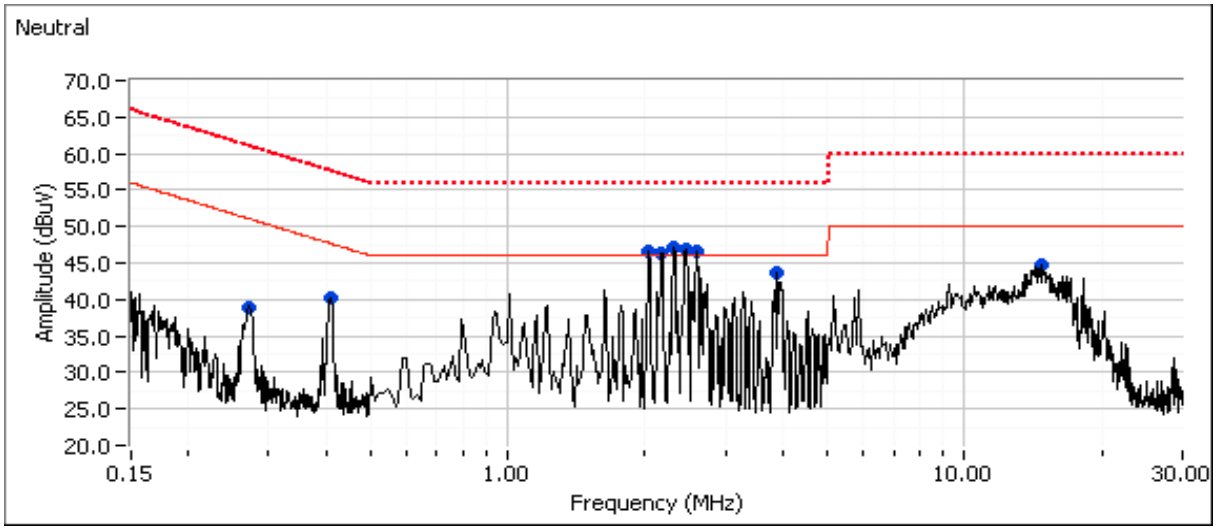
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78249
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	B

Run #3: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz. PoE injector #D0945650000058DA00





Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78249
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	B

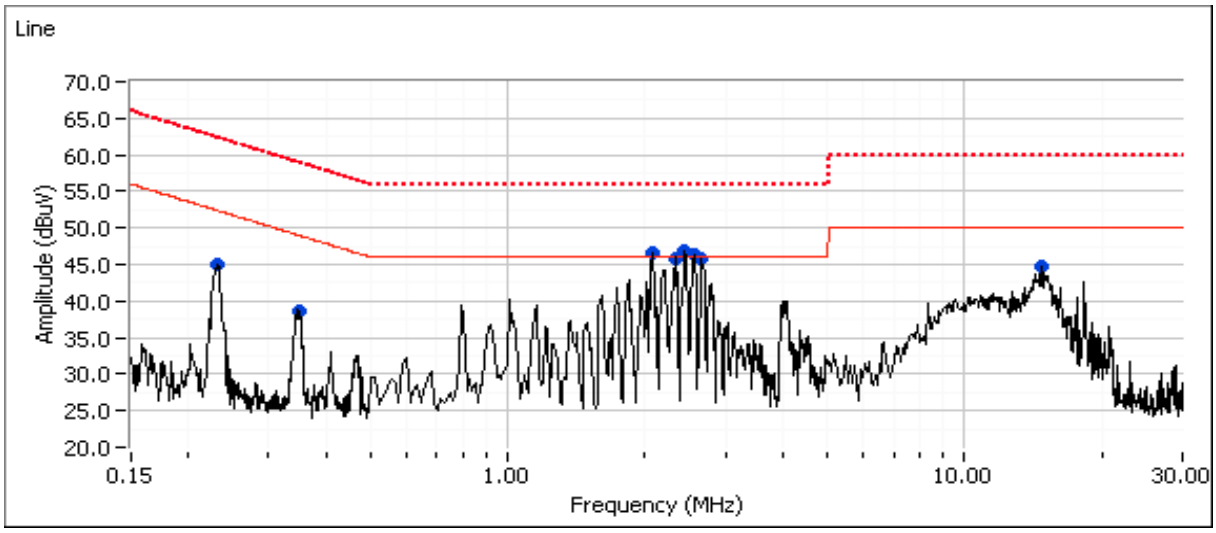
Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
2.616	47.7	Line	46.0	1.7	Peak	
2.206	47.0	Line	46.0	1.0	Peak	
2.343	47.0	Line	46.0	1.0	Peak	
2.467	45.5	Line	46.0	-0.5	Peak	
3.949	44.6	Line	46.0	-1.4	Peak	
14.675	44.6	Line	50.0	-5.4	Peak	
0.410	42.1	Line	47.5	-5.4	Peak	
0.275	44.5	Line	50.9	-6.4	Peak	
2.308	47.1	Neutral	46.0	1.1	Peak	
2.442	46.9	Neutral	46.0	0.9	Peak	
2.582	46.6	Neutral	46.0	0.6	Peak	
2.039	46.5	Neutral	46.0	0.5	Peak	
2.174	46.4	Neutral	46.0	0.4	Peak	
3.932	43.6	Neutral	46.0	-2.4	Peak	
14.765	44.7	Neutral	50.0	-5.3	Peak	
0.407	40.3	Neutral	47.6	-7.3	Peak	
0.272	39.0	Neutral	51.0	-12.0	Peak	
0.410	38.5	Line	47.7	-9.2	AVG	
2.457	36.1	Line	46.0	-9.9	AVG	
3.953	36.1	Line	46.0	-9.9	AVG	
2.321	35.9	Line	46.0	-10.1	AVG	
2.189	35.3	Line	46.0	-10.7	AVG	
2.600	34.6	Line	46.0	-11.4	AVG	
2.600	44.1	Line	56.0	-11.9	QP	
2.457	44.0	Line	56.0	-12.0	QP	
2.189	43.9	Line	56.0	-12.1	QP	
2.321	43.9	Line	56.0	-12.1	QP	
3.953	43.3	Line	56.0	-12.7	QP	
0.274	38.2	Line	51.0	-12.8	AVG	
0.410	41.4	Line	57.7	-16.3	QP	
14.675	33.5	Line	50.0	-16.5	AVG	
0.274	42.9	Line	61.0	-18.1	QP	
14.675	40.0	Line	60.0	-20.0	QP	
2.442	38.2	Neutral	46.0	-7.8	AVG	
2.308	36.5	Neutral	46.0	-9.5	AVG	
2.582	35.6	Neutral	46.0	-10.4	AVG	
2.174	35.5	Neutral	46.0	-10.5	AVG	
2.442	45.3	Neutral	56.0	-10.7	QP	
2.308	44.6	Neutral	56.0	-11.4	QP	
3.932	34.4	Neutral	46.0	-11.6	AVG	
0.407	35.9	Neutral	47.7	-11.8	AVG	
2.174	43.9	Neutral	56.0	-12.1	QP	

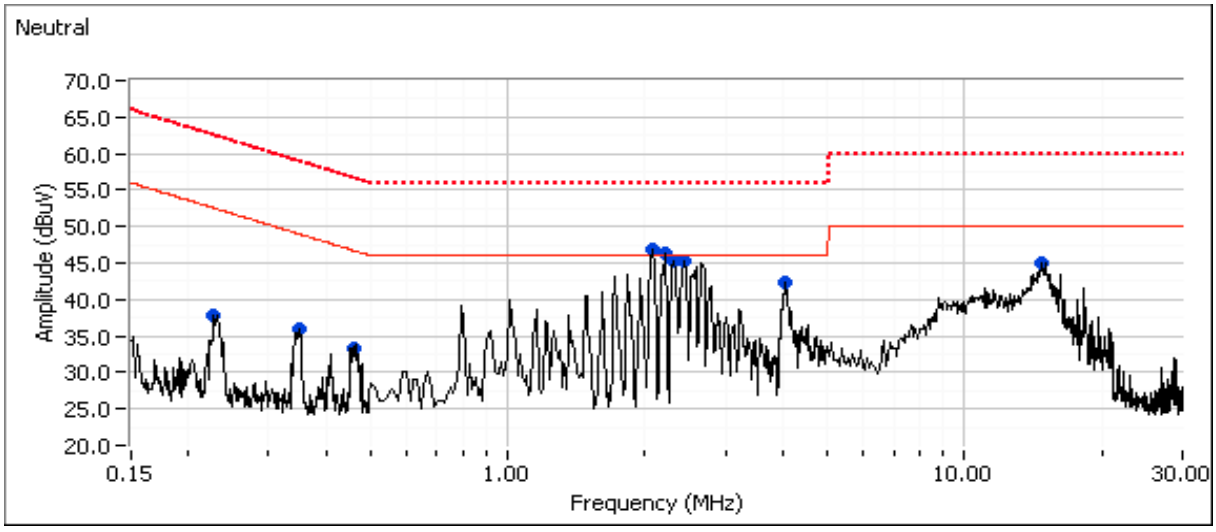
Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78249
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	B

2.038	33.5	Neutral	46.0	-12.5	AVG	
2.582	42.9	Neutral	56.0	-13.1	QP	
2.038	41.9	Neutral	56.0	-14.1	QP	
3.932	41.2	Neutral	56.0	-14.8	QP	
0.272	36.3	Neutral	51.1	-14.8	AVG	
14.765	34.2	Neutral	50.0	-15.8	AVG	
0.407	39.2	Neutral	57.7	-18.5	QP	
14.765	40.6	Neutral	60.0	-19.4	QP	
0.272	37.5	Neutral	61.1	-23.6	QP	

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78249
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	B

Run #4: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz. PoE injector #D0945650000058DA00.





Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78249
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	B

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
2.425	46.9	Line	46.0	0.9	Peak	
2.073	46.6	Line	46.0	0.6	Peak	
2.554	46.2	Line	46.0	0.2	Peak	
2.322	45.9	Line	46.0	-0.1	Peak	
2.657	45.7	Line	46.0	-0.3	Peak	
14.696	44.8	Line	50.0	-5.2	Peak	
0.231	44.9	Line	52.4	-7.5	Peak	
0.349	38.5	Line	49.0	-10.5	Peak	
2.078	46.8	Neutral	46.0	0.8	Peak	
2.196	46.2	Neutral	46.0	0.2	Peak	
2.428	45.3	Neutral	46.0	-0.7	Peak	
2.313	45.3	Neutral	46.0	-0.7	Peak	
4.036	42.3	Neutral	46.0	-3.7	Peak	
14.659	45.0	Neutral	50.0	-5.0	Peak	
0.346	36.0	Neutral	49.0	-13.0	Peak	
0.462	33.4	Neutral	46.6	-13.2	Peak	
0.228	37.8	Neutral	52.5	-14.7	Peak	
2.657	42.9	Line	56.0	-13.1	QP	
2.539	42.1	Line	56.0	-13.9	QP	
2.425	31.9	Line	46.0	-14.1	AVG	
2.425	41.9	Line	56.0	-14.1	QP	
2.310	31.8	Line	46.0	-14.2	AVG	
0.231	38.1	Line	52.4	-14.3	AVG	
2.073	41.4	Line	56.0	-14.6	QP	
2.539	31.4	Line	46.0	-14.6	AVG	
2.073	31.2	Line	46.0	-14.8	AVG	
2.310	41.1	Line	56.0	-14.9	QP	
2.657	30.8	Line	46.0	-15.2	AVG	
14.696	33.7	Line	50.0	-16.3	AVG	
0.231	44.3	Line	62.4	-18.1	QP	
14.696	40.0	Line	60.0	-20.0	QP	
2.196	32.8	Neutral	46.0	-13.2	AVG	
2.313	32.8	Neutral	46.0	-13.2	AVG	
2.428	32.4	Neutral	46.0	-13.6	AVG	
2.078	41.6	Neutral	56.0	-14.4	QP	
2.196	41.4	Neutral	56.0	-14.6	QP	
2.313	41.3	Neutral	56.0	-14.7	QP	
2.078	31.2	Neutral	46.0	-14.8	AVG	
2.428	40.9	Neutral	56.0	-15.1	QP	
4.036	29.2	Neutral	46.0	-16.8	AVG	
14.659	32.9	Neutral	50.0	-17.1	AVG	
4.036	37.4	Neutral	56.0	-18.6	QP	

Client:	Avaya	Job Number:	J78065
Model:	AP 8120	T-Log Number:	T78249
		Account Manager:	Dean Eriksen
Contact:	Vipin Naik		
Standard:	FCC 15.247	Class:	B

0.346	28.9	Neutral	49.1	-20.2	AVG	
14.659	39.4	Neutral	60.0	-20.6	QP	
0.346	32.9	Neutral	59.1	-26.2	QP	