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Electromagnetic Emissions Test Report
Application for Grant of Equipment Authorization
pursuant to
Industry Canada RSS-Gen Issue 2 / RSS 210 Issue 7
FCC Part 15 Subpart C
on the
Broadcom Corporation
Transmitter
Model: BCM943224HMS

UPN:	4324A-BRCM1041
FCC ID:	QDS-BRCM1041
GRANTEE:	Broadcom Corporation 190 Mathilda Ave. Sunnyvale, CA 94086
TEST SITE(S):	Elliott Laboratories 41039 Boyce Road. Fremont, CA. 94538-2435 IC Site Registration #: IC 2845B-3, IC 2845B-4, IC 2845B-5
REPORT DATE:	March 25, 2009
FINAL TEST DATE:	December 17, December 18, December 22, and December 23, 2008, Janauary 26, January 27, January 29, February 5, February 6, February 10, February 12, February 15, February 23, February 24 and March 24, 2009
AUTHORIZED SIGNATORY:	Mark E. Hill Staff Engineer

Testing Cert #2016-01

REVISION HISTORY

Rev #	Date	Comments	Modified By
1			

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SCOPE

An electromagnetic emissions test has been performed on the Broadcom Corporation model BCM943224HMS 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 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.

The test results recorded herein are based on a single type test of the Broadcom Corporation model BCM943224HMS and therefore apply only to the tested sample. The sample was selected and prepared by Anne Liang of Broadcom Corporation.

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 Broadcom Corporation model BCM943224HMS complied with the requirements of the following regulations:

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 C

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.).

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	Systems uses OFDM / DSSS techniques	-	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	802.11b: 7.1 MHz 802.11g: 14.8 MHz 802.11n40: 35.3 MHz	>500kHz	Complies
	RSP100	99% Bandwidth	802.11b: 10.8 MHz 802.11g: 17.1 MHz 802.11n40:36.4 MHz	Information only	Complies

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	802.11b: 17.7 dBm (0.059 Watts) EIRP = 0.145 W Note 1 802.11g: 24.4 dBm (0.275 Watts) EIRP = 0.676 W Note 1 802.11 CDD 20MHz 20.7 dBm (0.117 Watts) EIRP = 0.573 W Note 1 802.11 CDD 40MHz 21.4 dBm (0.137 Watts) EIRP = 0.672 W Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	802.11b: -2.2 dBm/3kHz 802.11g: -3.5 dBm/3kHz 802.11n20: 0.8 dBm/3kHz 802.11n40: -2.3 dBm/3kHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	All spurious emissions < -20dBc	< -20dBc Note 2	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.9dBµV/m @ 2483.8MHz (-0.1dB)	15.207 in restricted bands, all others < -20dBc Note 2	Complies

Note 1: EIRP calculated using antenna gain of 3.9 dBi for the highest EIRP multi-point system.

Note 2: Limit of -20dBc was used for those cases where the power was measured using a peak power meter. Limit of -30dBc in the cases where the power was measured 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).

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	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	802.11a: 15.0 MHz 802.11n20: 16.2 MHz 802.11n40: 35.7 MHz	>500kHz	Complies
	RSP100	99% Bandwidth	802.11a: 18.6 MHz 802.11n20: 18.7 MHz 802.11n40: 39.2 MHz	Information only	Complies
15.247 (b)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	802.11a 22.5 dBm (0.178 Watts) EIRP = 0.676 W Note 1 802.11n20 25.5 dBm (0.352 Watts) EIRP = 2.678 W Note 1 802.11n40 24.7 dBm (0.325 Watts) EIRP = 2.236 W Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	802.11a -4.8 dBm/3kHz 802.11n20 -2.1 dBm/3kHz 802.11n40 -4.1 dBm/3kHz	Maximum permitted is 8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions – 30MHz – 40 GHz	All spurious emissions < -20dBc	< -20dBc	Complies
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 40 GHz	64.7dBµV/m @ 17388.2MHz (-9.3dB)	15.207 in restricted bands, all others < -20dBc Note 2	Complies

Note 1: EIRP calculated using antenna gain of 5.8 dBi for the highest EIRP multi-point system. Note, effective antenna gain is 8.8 dBi for the n20 and n40 modes.

Note 2: Limit of -20dBc was used for those cases where the power was measured using a peak power meter. Limit of -30dBc in the cases where the power was measured 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).

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Device uses a unique connector type	-	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	45.4dBµV/m @ 2495.6MHz (-8.6dB)	Refer to standard	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	34.8dBµV @ 3.622MHz (-11.2dB)	Refer to standard	Complies
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 7.1.5	User Manual		Statement required regarding detachable antenna	Complies

MEASUREMENT UNCERTAINTIES

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

Measurement Type	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 Broadcom Corporation model BCM943224HMS is a WLAN card designed to be installed in laptop computers. Since the EUT would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 3.3 VDC.

The sample was received on December 17, 2008 and tested on December 17, December 18, December 22, and December 23, 2008, Janauary 26, January 27, January 29, February 5, February 6, February 10, February 12, February 15, February 23, February 24 and March 24, 2009. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Broadcom	BCM943224 HMS	WLAN card	106 & 108	QDS-BRCM1041

ANTENNA SYSTEM

The EUT antenna is an 802.11a/b/g/n WLAN antenna, with peak gains for 3.9dBi/2.4GHz and 5.8dBi/5GHz.

The antenna connects to the EUT via a U.FL antenna connector, thereby meeting the requirements of FCC 15.203.

ENCLOSURE

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer or system.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with emissions specifications.

SUPPORT EQUIPMENT

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

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	Inspiron 630m	Laptop	-	-
Dell	-	External power supply	-	-
Canon	iP2600	Printer	-	-

The following remote support equipment was used during emissions testing.

Manufacturer	Model	Description	Serial Number	FCC ID
Netgear	GS605	Hub	-	-

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
USB/Laptop	Printer	USB cable	Shielded	1.5
Ethernet/Laptop	Hub	Cat-5	Unshielded	10.0
Adapter card	-	-	-	-
AC Power	AC Mains	3 wire	Unshielded	2.0

EUT OPERATION

During emissions testing the EUT was continuously transmitting on the desired channel.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on December 17, December 18, December 22, and December 23, 2008, Janauary 26, January 27, January 29, February 5, February 6, February 10, February 12, February 15, February 23, February 24 and March 24, 2009 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 3	769238	IC 2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 4	211948	IC 2845B-4	
Chamber 5	211948	IC 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. 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 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.

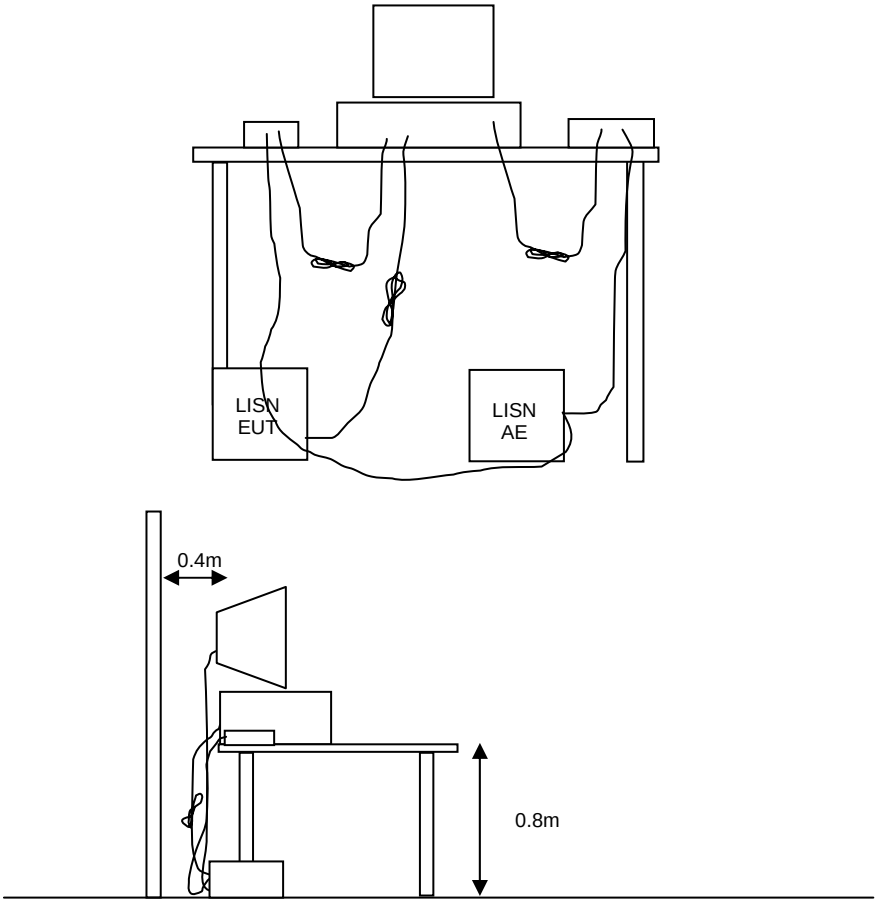
TEST PROCEDURES

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.

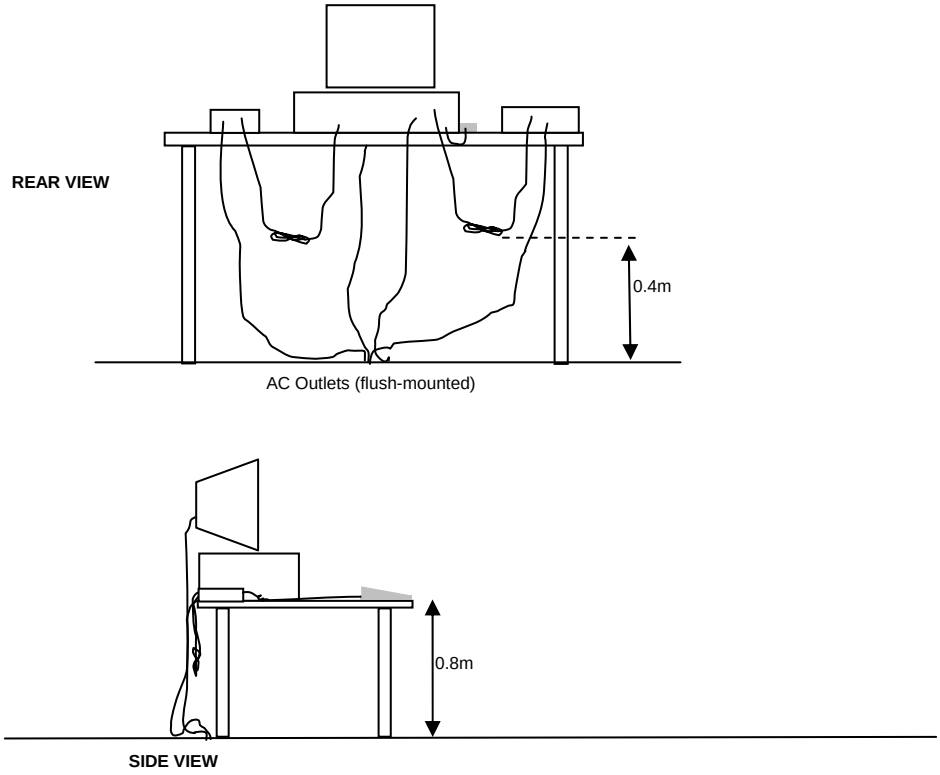


A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT).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

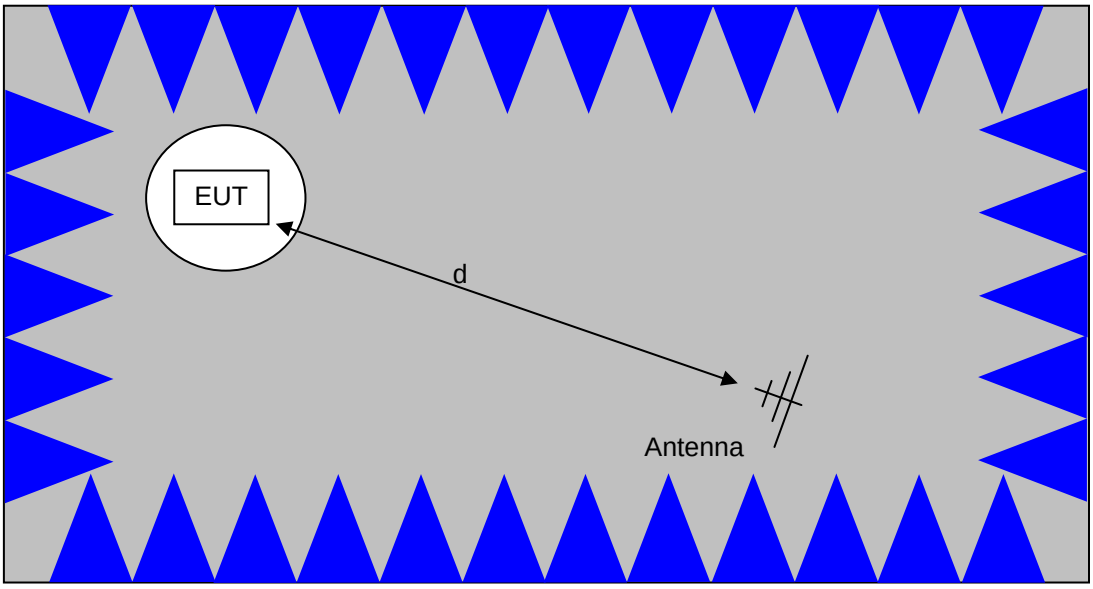
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

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

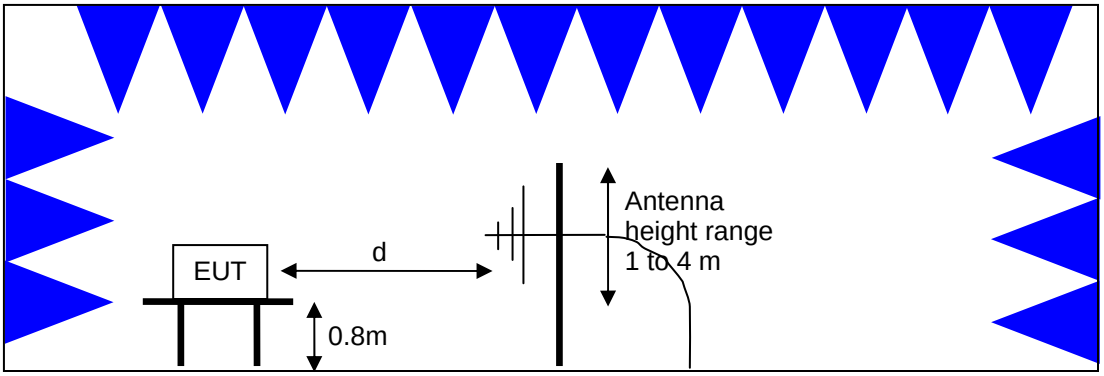


Typical Test Configuration for Radiated Field Strength Measurements



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

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



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

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 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

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

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

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 3m from the equipment under test:

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

where P is the eirp (Watts)

EXHIBIT 1: Test Equipment Calibration Data

3 Pages

Radiated Emissions, 1000 - 18,000 MHz, 17-Dec-08
Engineer: jcaizzi

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpecAn 9 KHz-26.5 GHz, Non-Program	8563E	284	24-Dec-08
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	02-Sep-10
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	02-Dec-09
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	13-Nov-09

Radiated Emissions, 18-Dec-08
Engineer: skhushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	24-Dec-08
EMCO	Antenna, Horn, 1-18 GHz (SA40-Purple)	3115	1779	19-Mar-10

Radiated Emissions, 1000 - 18,000 MHz, 23-Dec-08
Engineer: rvarelas

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	786	07-Dec-09
Hewlett Packard	SpectAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	15-Jan-09
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	02-Dec-09
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	13-Nov-09

Radio Antenna Port (Power and Spurious Emissions), 26-Jan-09
Engineer: skhushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	09-Oct-09
EMCO	Antenna, Horn, 1-18 GHz	3115	786	07-Dec-09
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	02-Dec-09
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	20-Oct-09

Bandedge 2.4 GHz, 27-Jan-09
Engineer: jcaizzi

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	02-Sep-10
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	22-Feb-09

Radiated Emissions, 1000 - 40,000 MHz, 29-Jan-09
Engineer: Joseph Cadigal

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	09-Oct-09
EMCO	Antenna, Horn, 1-18GHz	3115	868	10-Jun-10
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	20-Oct-09

Radiated Emissions, 1000 - 18,000 MHz, 30-Jan-09
Engineer: rvarelas

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	09-Oct-09
EMCO	Antenna, Horn, 1-18 GHz	3115	786	06-Dec-09
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1728	07-Oct-09
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	20-Oct-09

Conducted Emissions - AC Power Ports, 30-Jan-09
Engineer: rvarelas

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	LISN, 10 kHz-100 MHz	3825/2	1292	22-Feb-09
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	19-Sep-09
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	1594	06-Jun-09
Fischer Custom Comm	LISN, 25A, 150kHz to 30MHz, 25 Amp,	FCC-LISN-50-25-2-09	2001	15-Oct-09

Radiated Emissions, 30 - 1,000 MHz, 06-Feb-09
Engineer: vnarayan

Manufacturer	Description	Model #	Asset #	Cal Due
Com-Power Corp.	Preamplifier, 30-1000 MHz	PA-103	1543	14-Nov-09
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	22-Feb-09

Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1657	23-May-10

Radiated Emissions, 30 - 1,000 MHz, 06-Feb-09
Engineer: skhushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Com-Power Corp.	Preamplifier, 30-1000 MHz	PA-103	1543	14-Nov-09
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	22-Feb-09
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1657	23-May-10

Radio Antenna Port (Power and Spurious Emissions), 06-Feb-09
Engineer: skhushzad

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	02-Sep-10
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	22-Feb-09

Radiated Emissions, DTS Bandedge, 23-Feb-09
Engineer: jcaizzi

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	786	06-Dec-09
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	10-Feb-10

Radiated Emissions, 30 - 2,500 MHz, 24-Feb-09
Engineer: jcaizzi

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	02-Sep-10
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	19-Sep-09

Radio Spurious Emissions, 17-Mar-09
Engineer: skhushzad

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18GHz	3115	868	10-Jun-10
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	26-Feb-10

Radiated Emissions, 1000 - 18,000 MHz, 17-Dec-08
Engineer: jcaizzi

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpecAn 9 KHz-26.5 GHz, Non-Program	8563E	284	24-Dec-08
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	02-Sep-10
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	02-Dec-09
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	13-Nov-09

Radio Antenna Port (Power and Spurious Emissions), 18-Dec-08
Engineer: skhushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	24-Dec-08
EMCO	Antenna, Horn, 1-18 GHz (SA40-Purple)	3115	1779	19-Mar-10

Radio Antenna Port (Power and Spurious Emissions), 07-Feb-09
Engineer: rvarelas

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	22-Feb-09

Radio Antenna Port (Power and Spurious Emissions), 09-Feb-09
Engineer: skhushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpectAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	15-Feb-09

Radio Antenna Port (Power and Spurious Emissions), 11-Feb-09
Engineer: rvarelas

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	19-Sep-09
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	20-Oct-09

Radio Antenna Port (Power and Spurious Emissions), 13-Feb-09
Engineer: Mehran Birgani

Manufacturer	Description	Model #	Asset #	Cal Due
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1534	05-Mar-09
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts (w/ 20 dB pad, SN BJ5155)	NRV-Z32	1536	12-Sep-09
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40)	8564E	CH5273	20-Feb-09

Radio Antenna Port (Power and Spurious Emissions), 16-Feb-09
Engineer: rvarelas

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	20-Oct-09

Radio Antenna Port (Power and Spurious Emissions), 17-Mar-09
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	SpectAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	15-Apr-09
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts	NRV-Z32	1423	07-Nov-09
Rohde & Schwarz	Power Meter, Single Channel, +1795+1796	NRVS	1534	05-Apr-09

EXHIBIT 2: Test Measurement Data

140 Pages

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Emissions Standard(s):	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Broadcom

Model

BCM943224HMS

Date of Last Test: 3/24/2009

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manger:	Eriksen / Washington
Contact:	Anne Liang		
Emissions Standard(s):	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII
Immunity Standard(s):	-	Environment:	-

EUT INFORMATION

The following information was collected during the test session(s).

General Description

The EUT is an 802.11ag/Draft 802.11n WLAN PCI-E minicard that is designed to enable wireless data transmissions in PCs. Since the EUT would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 3.3Vdc from the host.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Broadcom	BCM943224HMS	802.11ag/Draft 802.11n WLAN PCI-E Minicard	-	QDS-BRCM1041

EUT Antenna (Intentional Radiators Only)

The EUT antenna is an 802.11a/b/g/n WLAN antenna, with peak gains for 3.9dBi/2.4GHz and 5.8dBi/5GHz.

The antenna connects to the EUT via a U.FL antenna connector, thereby meeting the requirements of FCC 15.203.

EUT Enclosure

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer or system.

Modification History

Mod. #	Test	Date	Modification
1			No modifications were made to the EUT during testing.
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manger:	Eriksen / Washington
Contact:	Anne Liang		
Emissions Standard(s):	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII
Immunity Standard(s):	-	Environment:	-

Test Configuration #1

The following information was collected during the test session(s).

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	Inspiron	Laptop	-	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
-	-	-	-	-

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Adapter card	-	-	-	-
AC Power	AC Mains	3 wire	Unshielded	2.0

EUT Operation During Emissions Tests

During emissions testing the EUT was continuously transmitting on the desired channel.

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manger:	Eriksen / Washington
Contact:	Anne Liang		
Emissions Standard(s):	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII
Immunity Standard(s):	-	Environment:	-

Test Configuration #2

The following information was collected during the test session(s).

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	Inspiron	Laptop	-	-
Canon	iP2600	Printer	-	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Netgear	GS605	Hub	-	-

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
USB/Laptop	Printer	USB cable	Shielded	1.5
Ethernet/Laptop	Hub	Cat-5	Unshielded	10.0
Adapter card	-	-	-	-
AC Power	AC Mains	3 wire	Unshielded	2.0

EUT Operation During Emissions Tests

During emissions testing the EUT was continuously transmitting on the desired channel.

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

RSS 210 and FCC 15.247 (2.4GHz DTS)
802.11bg Band Edge Field Strength

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: Refer to individual run
Test Engineer: Refer to individual run
Test Location: Refer to individual run

Config. Used: #1
Config Change: None
Host Unit Voltage 120V/60Hz

General Test Configuration

The EUT was located on the turntable for radiated spurious emissions testing. Any remote support equipment was located approximately 30 meters from the EUT with all I/O connections running beneath the groundplane.

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

Ambient Conditions:

Temperature: 15 - 25 °C
Rel. Humidity: 35 - 65 %

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

Run #	Mode	Channel	Chain/ Antenna	Power Setting	Test Performed	Limit	Result / Margin
1a	802.11b	#1 2412 MHz	Main	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	42.5dBµV/m @ 2390.1MHz (-11.5dB)
1c		#11 2462 MHz		-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	52.5dBµV/m @ 2483.6MHz (-1.5dB)
2a	802.11g	#1 2412 MHz	Main	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.7dBµV/m @ 2390.1MHz (-0.3dB)
2b		#10 2457MHz	Aux	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	72.6dBµV/m @ 2483.8MHz (-1.4dB)
2d		#11 2462 MHz	Aux	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	49.5dBµV/m @ 2483.6MHz (-4.5dB)

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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #1: Band Edge Radiated Field Strength. Operating Mode: 802.11b

Date of Test: 3/5/2009 Config. Used: 1

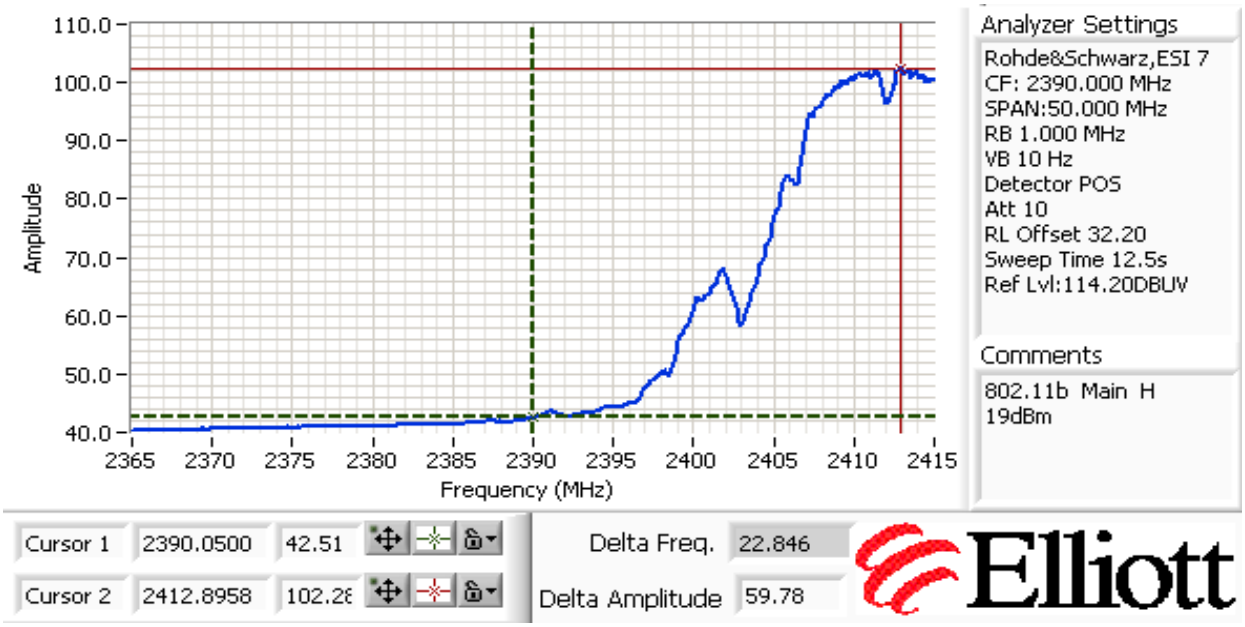
Test Engineer: John Caizzi Config Change: none

Test Location: Fremont Chamber #4 Host Unit Voltage 120V/60Hz

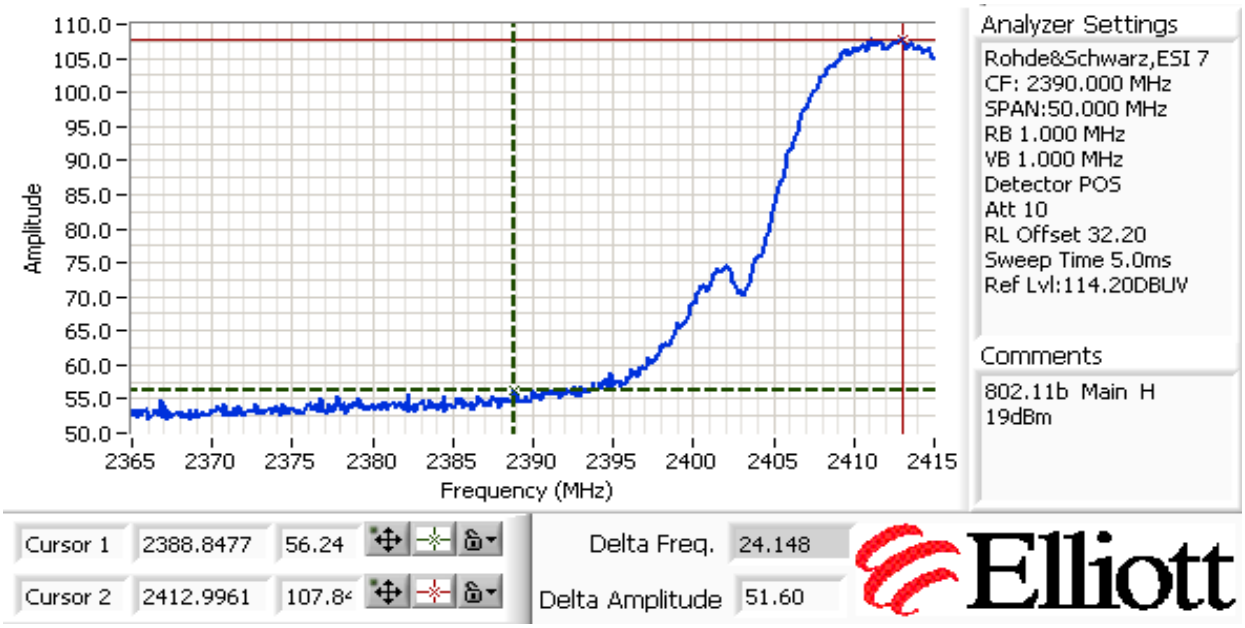
Run #1a: 802.11b, Channel 1 (2412 MHz)

Band Edge 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	
2390.050	42.5	H	54.0	-11.5	Avg	311	1.0	
2388.848	56.2	H	74.0	-17.8	Pk	311	1.0	



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

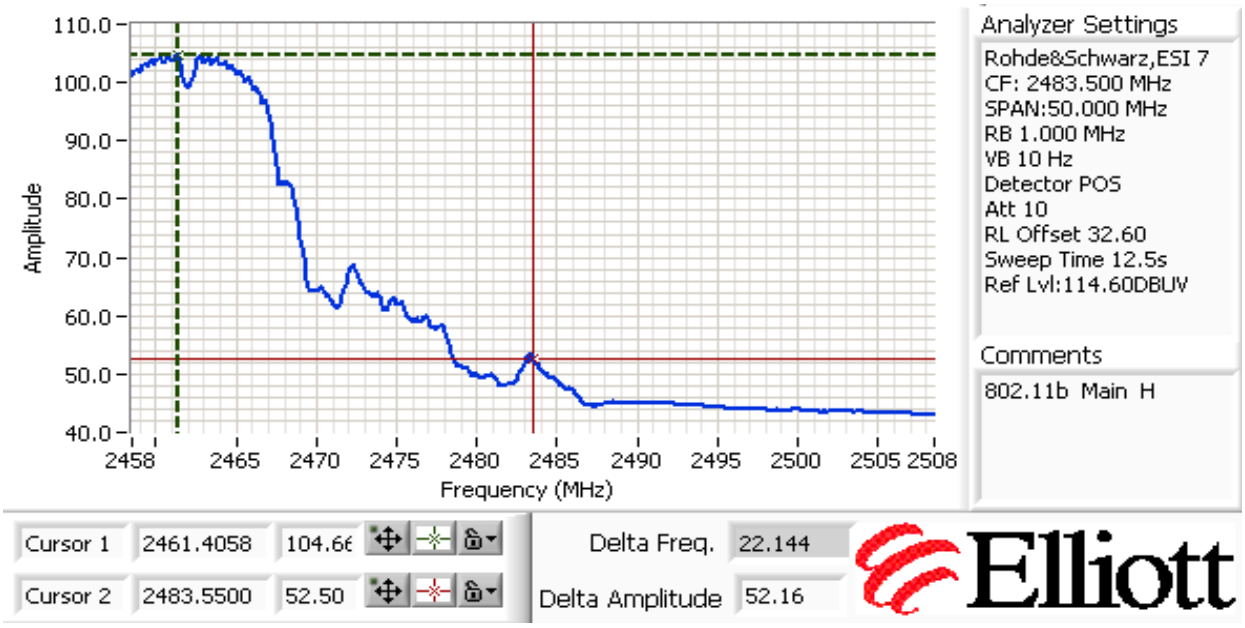


Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

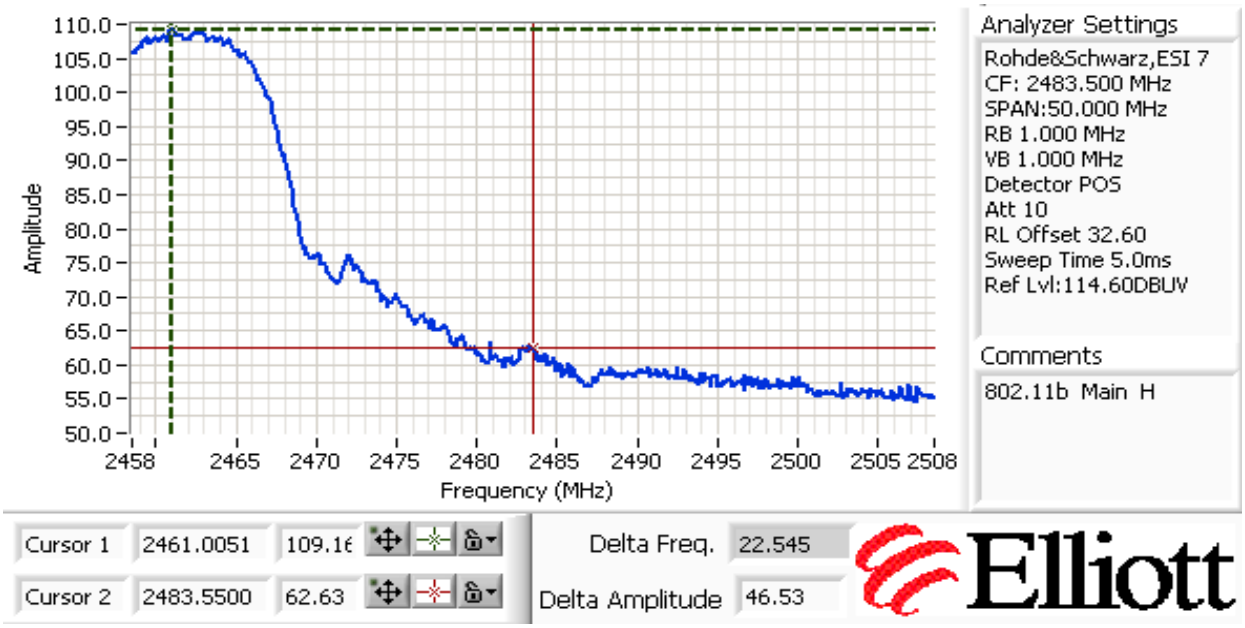
Run #1b: 802.11b, Channel 11 (2462 MHz)

Band Edge 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	
2483.550	52.5	H	54.0	-1.5	Avg	314	1.0	
2483.550	62.6	H	74.0	-11.4	Pk	314	1.0	



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

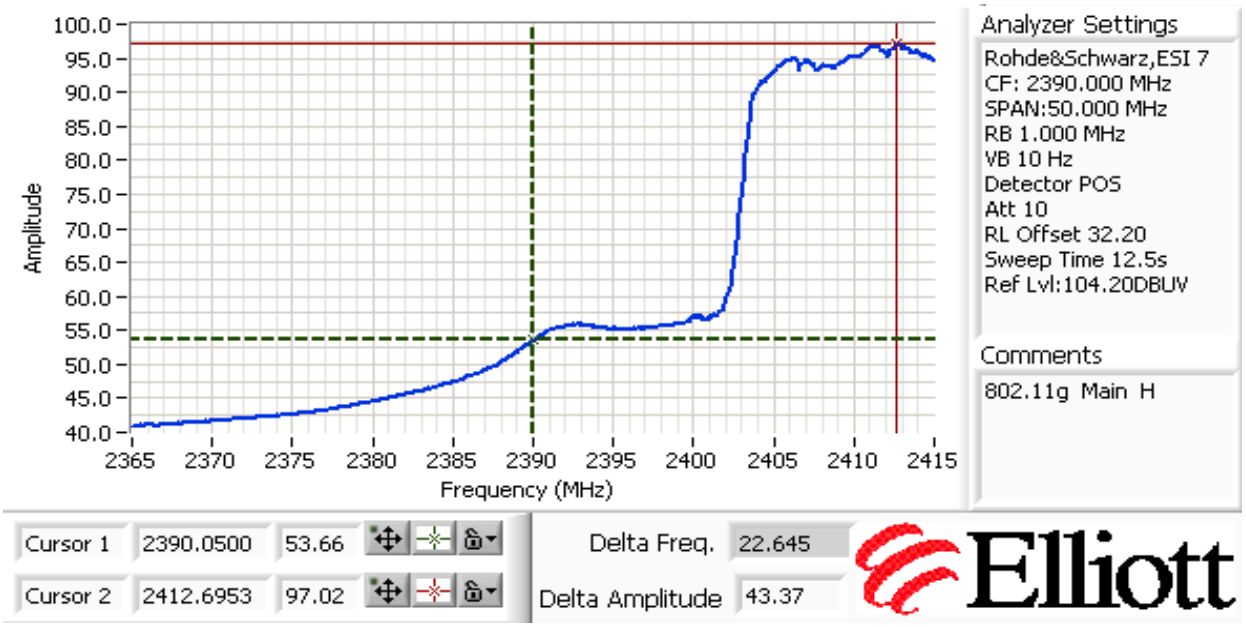
Run #2: Band Edge Radiated Field Strength. Operating Mode: 802.11g
Run #2a: 802.11g, Channel 1 (2412 MHz)

Date of Test: 3/5/2009
Test Engineer: John Caizzi
Test Location: Fremont Chamber #4

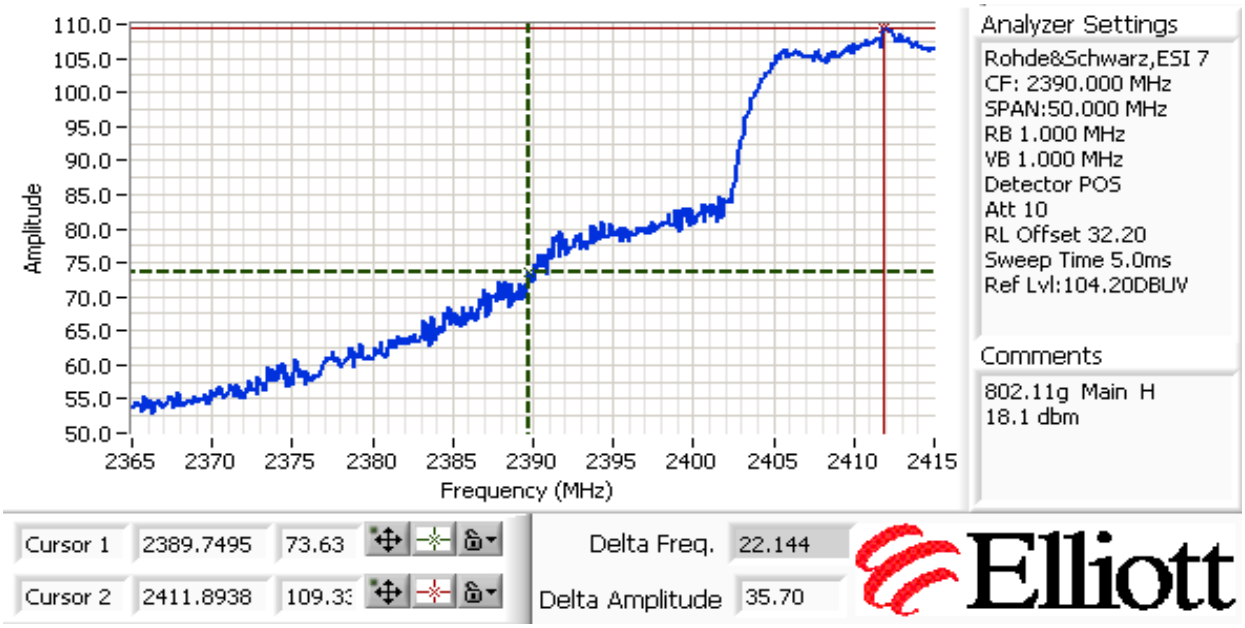
Config. Used: 1
Config Change: none
Host Unit Voltage 120V/60Hz

Band Edge 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	
2390.050	53.7	H	54.0	-0.3	Pk	320	1.0	
2389.750	73.6	H	74.0	-0.4	Pk	320	1.0	



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #2b: 802.11g, Channel 10 (2457 MHz)

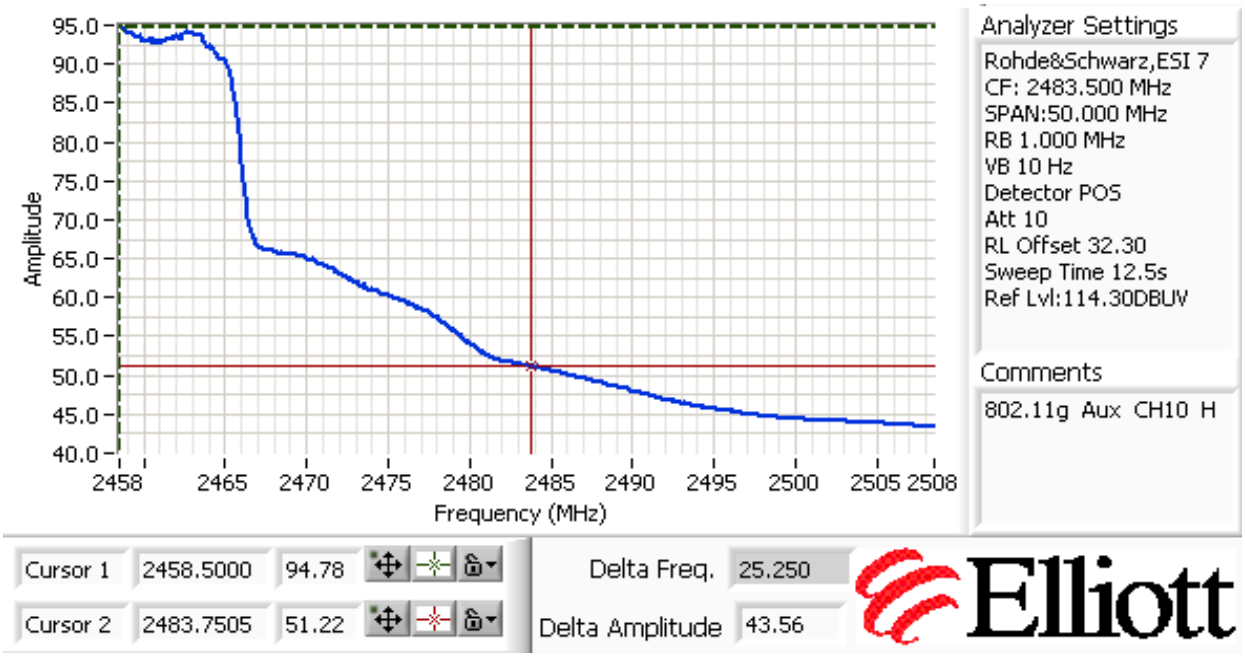
Date of Test: 2/23/2009
Test Engineer: John Caizzi
Test Location: Fremont Chamber #5

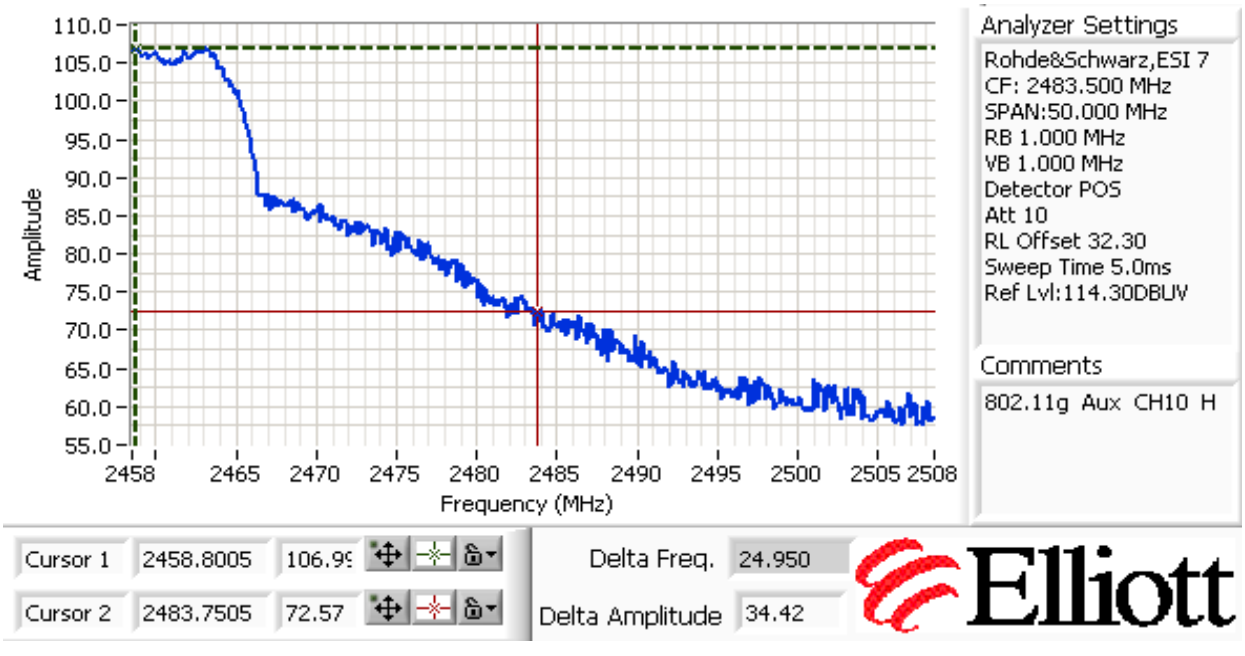
Config. Used: 1
Config Change: none
EUT Voltage: 120V/60Hz

Band Edge 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	
2483.751	72.6	H	74.0	-1.4	Pk	126	2.0	Aux
2483.751	51.2	H	54.0	-2.8	Avg	126	2.0	Aux
2484.552	71.1	V	74.0	-2.9	Pk	351	1.0	Main
2484.853	70.2	H	74.0	-3.8	Pk	231	1.0	Main
2483.550	50.0	H	54.0	-4.0	Avg	231	1.0	Main
2483.550	48.8	V	54.0	-5.2	Avg	351	1.0	Main
2486.456	68.6	V	74.0	-5.4	Pk	196	1.7	Aux
2487.057	48.2	V	54.0	-5.8	Avg	196	1.7	Aux

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A





Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

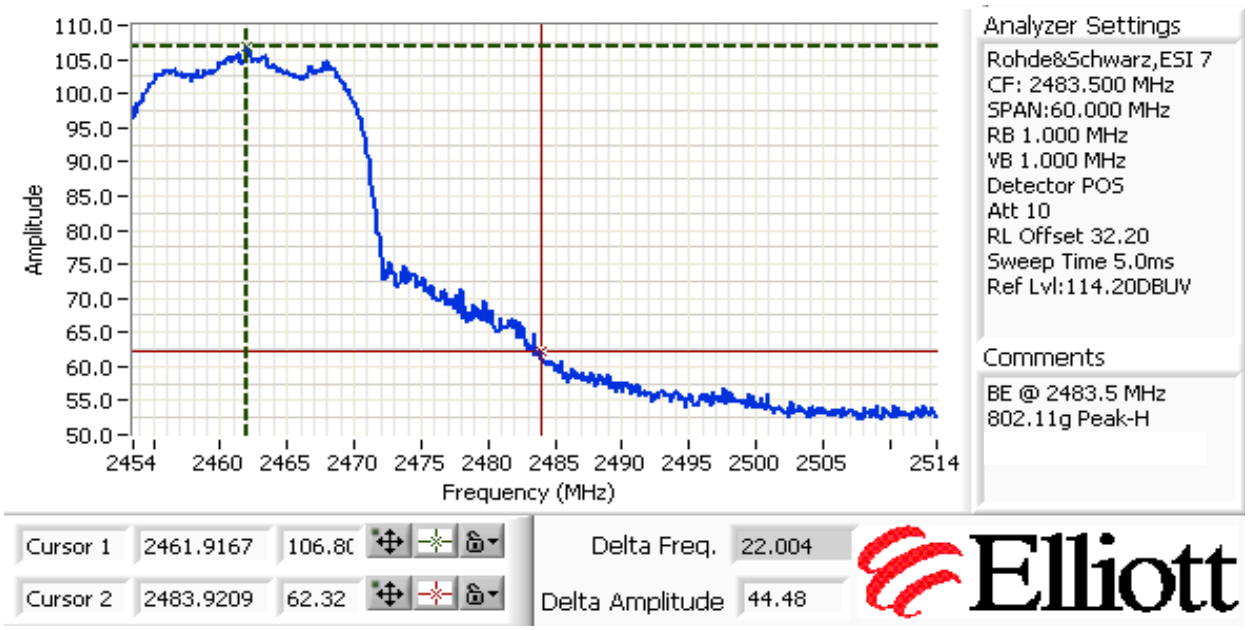
Run #2d: 802.11g, Channel 11 (2462 MHz)

Date of Test: 3/24/2009
Test Engineer: Suhaila Khushzad
Test Location: Fremont Chamber #5

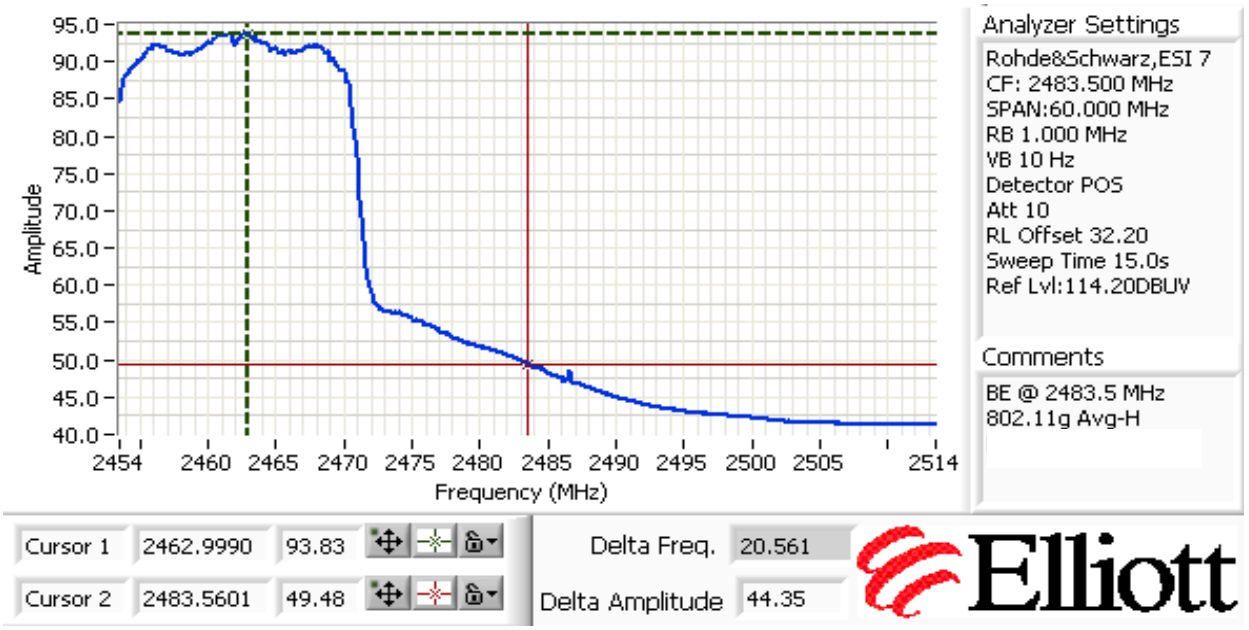
Config. Used: 1
Config Change: None
Host Unit Voltage 120V/60Hz

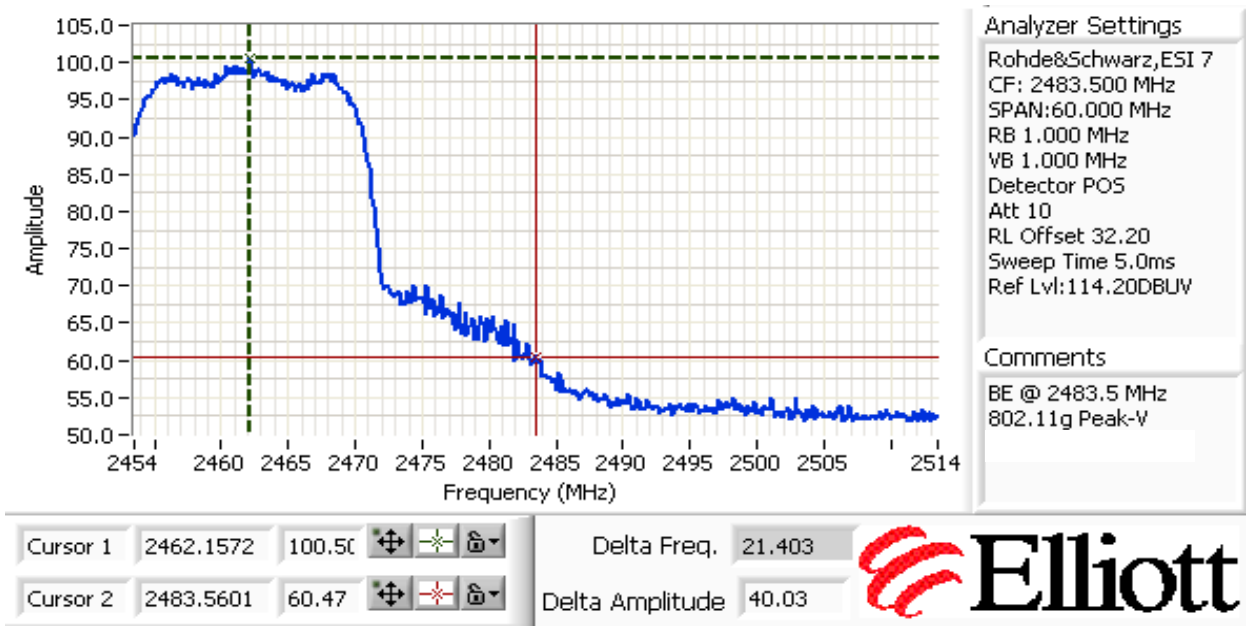
Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.560	49.5	H	54.0	-4.5	Avg	218	1.0	
2483.560	45.6	V	54.0	-8.4	Avg	182	1.0	
2483.920	62.3	H	74.0	-11.7	PK	218	1.0	
2483.560	60.5	V	74.0	-13.5	PK	182	1.0	

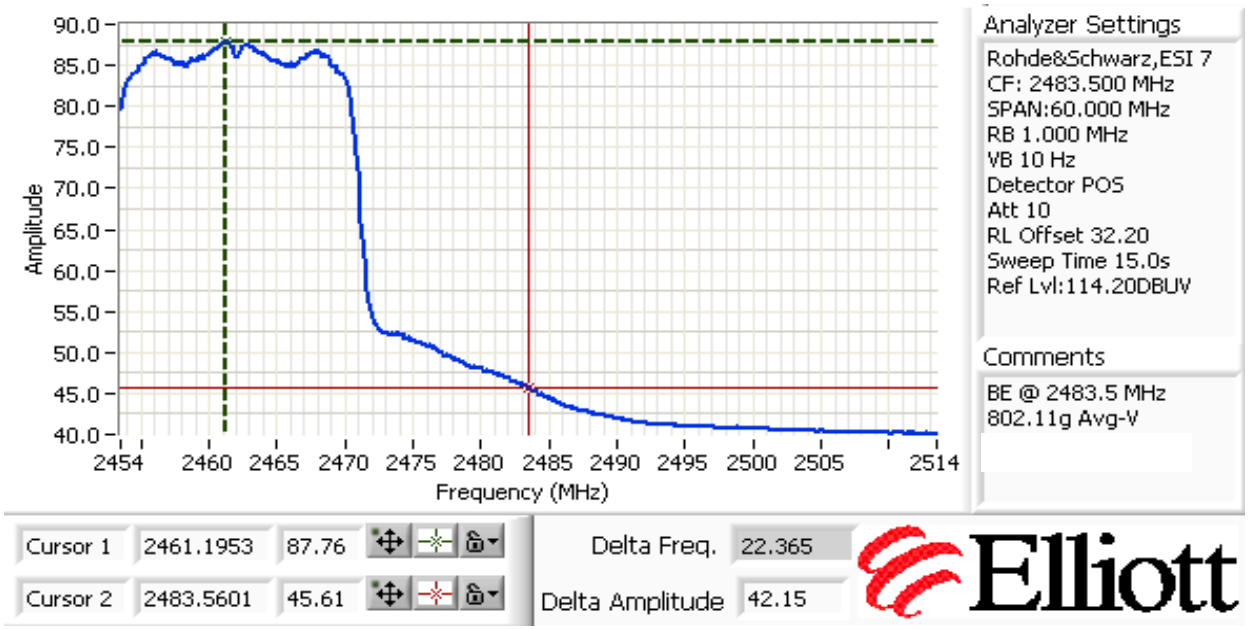


Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A





Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

RSS 210 and FCC 15.247 (2.4GHz DTS)
MIMO Band Edge Field Strength

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: Refer to individual run
Test Engineer: Refer to individual run
Test Location: Refer to individual run

Config. Used: #1
Config Change: None
Host Unit Voltage 120V/60Hz

General Test Configuration

The EUT was located on the turntable for radiated spurious emissions testing. Any remote support equipment was located approximately 30 meters from the EUT with all I/O connections running beneath the groundplane.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 15 - 25 °C
Rel. Humidity: 35 - 65 %

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

Run #	Mode	Channel	Chain/ Antenna	Power Setting	Test Performed	Limit	Result / Margin
1a	CDD 20MHz	#1 2412 MHz	Main + Aux (Chain A+B)	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	46.0dBµV/m @ 2390.1MHz (-8.0dB)
1b		#2 2417MHz		-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	71.1dBµV/m @ 2389.7MHz (-2.9dB)
1c		#3 2422MHz		-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	73.0dBµV/m @ 2388.0MHz (-1.0dB)
1d		#9 2452MHz		-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	73.2dBµV/m @ 2484.3MHz (-0.8dB)
1e		#10 2457MHz		-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	71.6dBµV/m @ 2483.6MHz (-2.4dB)
1f		#11 2462 MHz		-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.9dBµV/m @ 2483.8MHz (-0.1dB)
2a	CDD 40MHz	#3 2422 MHz	Main + Aux	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	49.7dBµV/m @ 2388.9MHz (-4.3dB)
2b		#4 2427MHz		-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	73.8dBµV/m @ 2388.3MHz (-0.2dB)
2c		#8 2447MHz		-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.5dBµV/m @ 2483.8MHz (-0.5dB)
2d		#9 2452MHz		-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.4dBµV/m @ 2483.8MHz (-0.6dB)

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

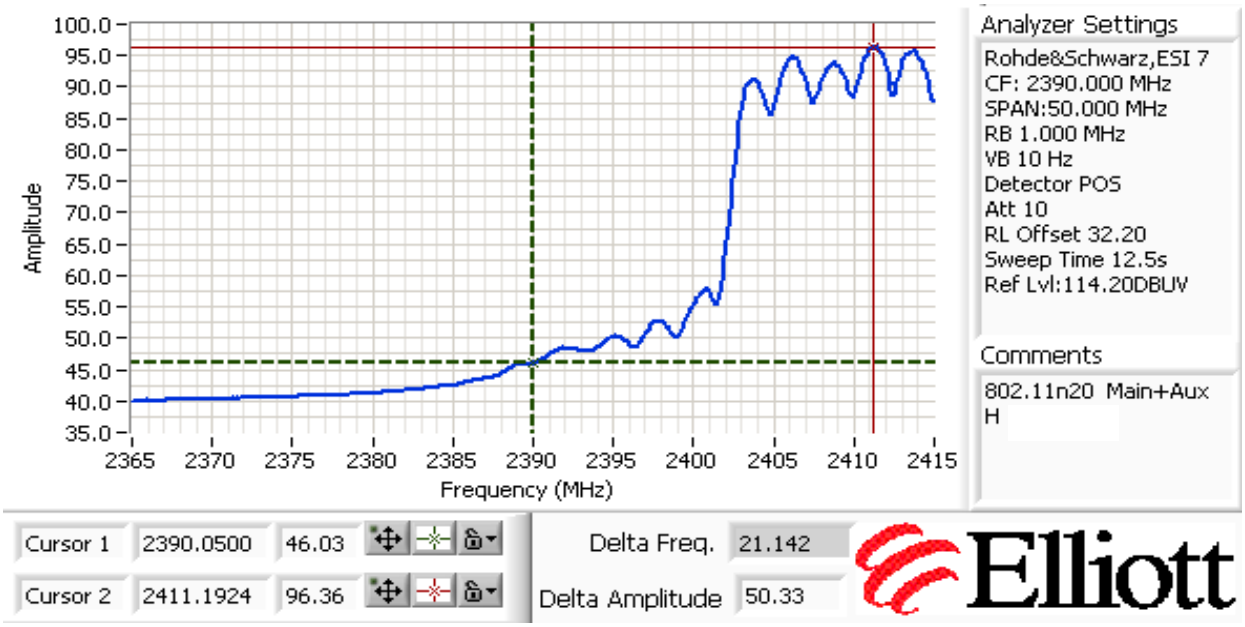
No deviations were made from the requirements of the standard.

Run #1: Band Edge Radiated Field Strength. Operating Mode: CDD 20MHz
Run #1a: CDD 20MHz, Channel 1 (2412 MHz)

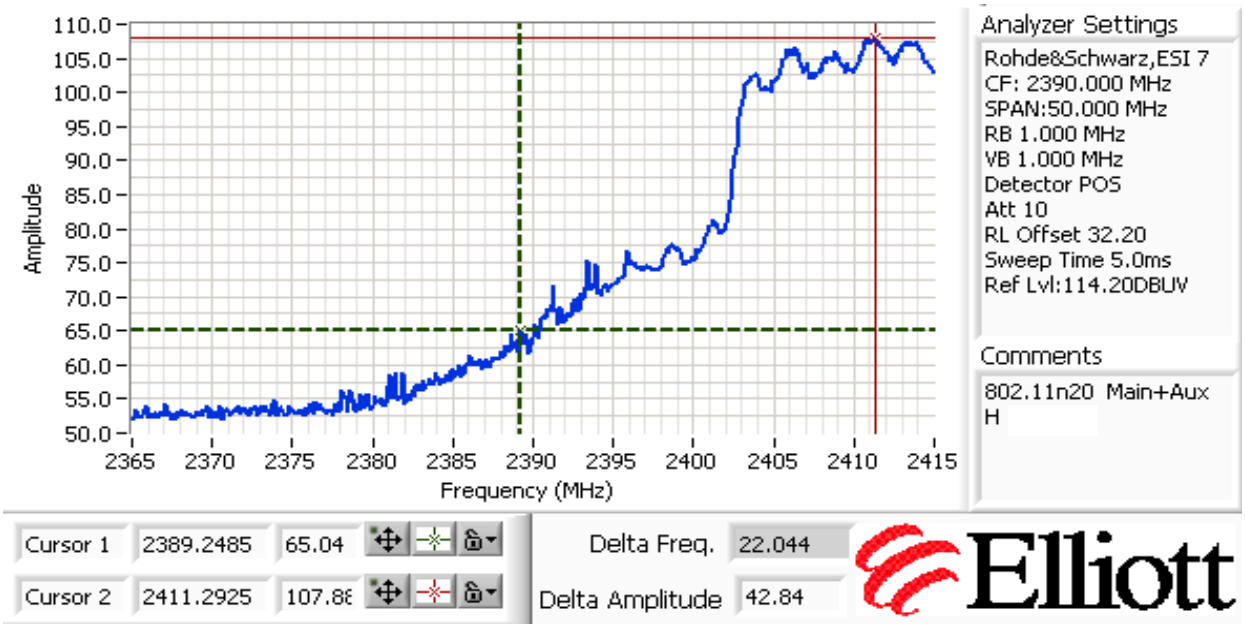
Date of Test:	3/5/2009	Config. Used:	1
Test Engineer:	John Caizzi	Config Change:	none
Test Location:	Fremont Chamber #4	Host Unit Voltage	120V/60Hz

Band Edge 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	
2390.050	46.0	H	54.0	-8.0	Avg	48	1.0	
2389.249	65.0	H	74.0	-9.0	Pk	48	1.0	



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A



Run #1b: CDD 20MHz, Channel 2 (2417 MHz)

Date of Test: 1/26/2009 Test Engineer: Suhaila Khushzad

Test Location: Chamber # 3 Comments: None

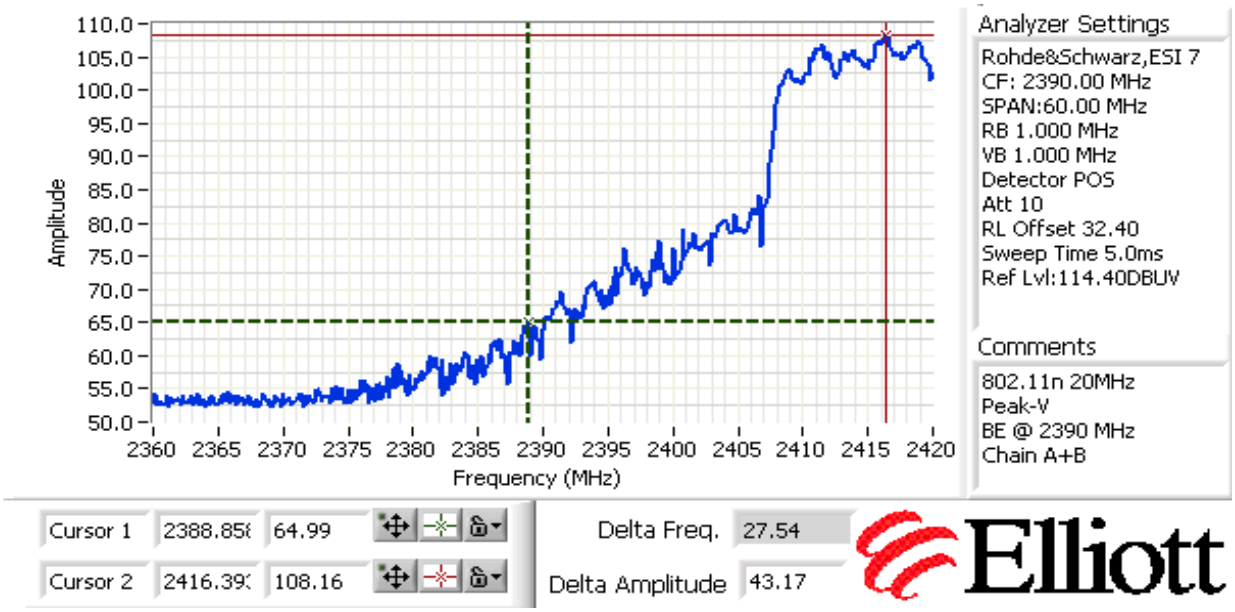
Band-edge Field Strength

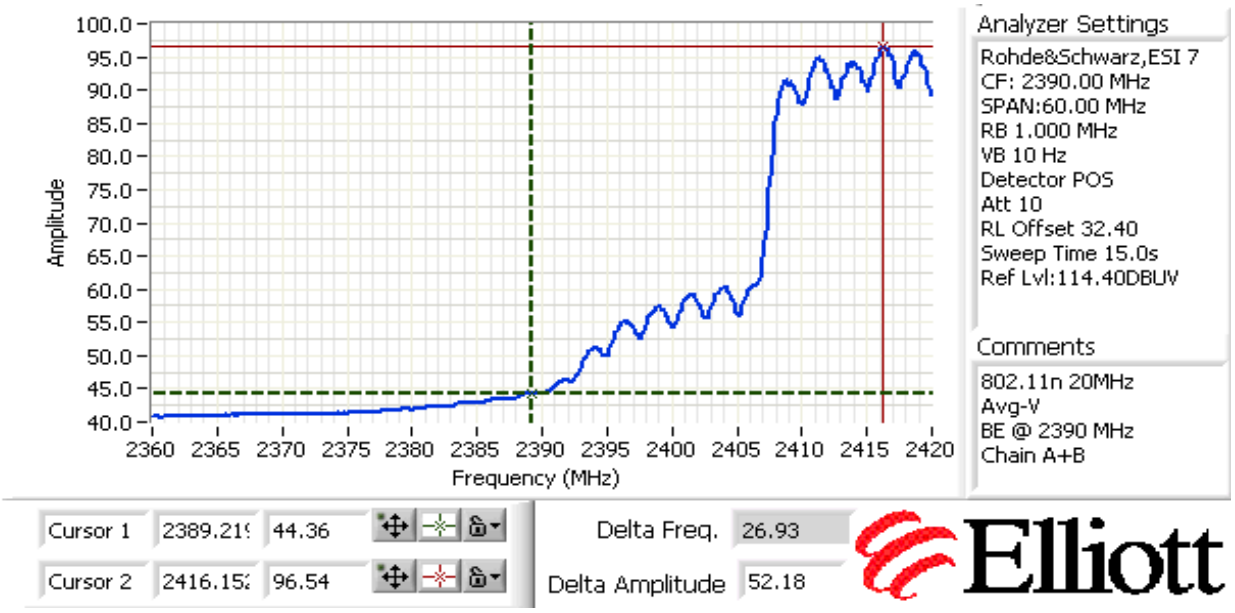
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.690	71.1	H	74.0	-2.9	PK	43	1.6	
2388.850	65.0	V	74.0	-9.0	PK	0	1.6	
2390.060	44.8	H	54.0	-9.2	Avg	43	1.6	
2389.210	44.4	V	54.0	-9.6	Avg	0	1.6	

Note 1:	Measured as a field strength at 3m.

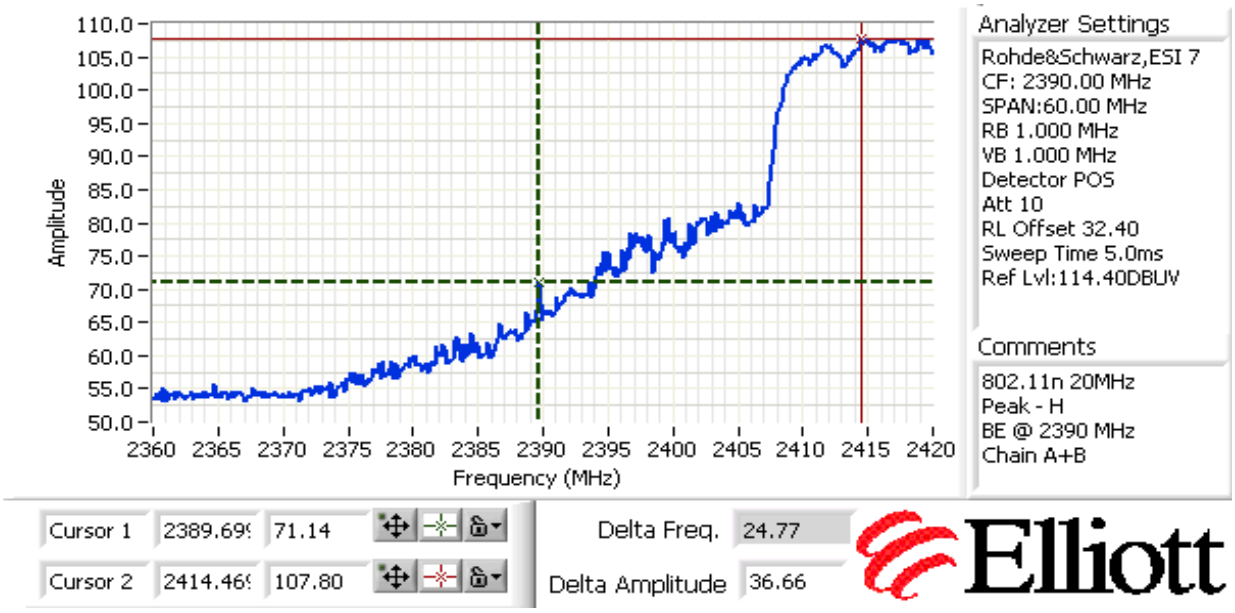
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

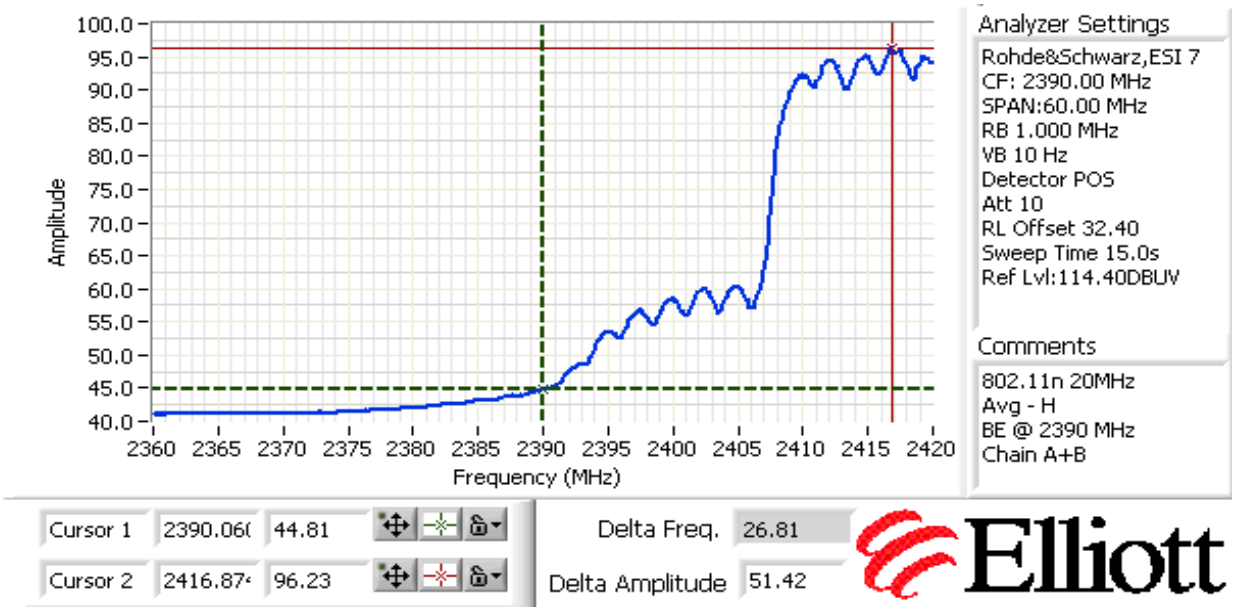
Run #1b: CDD 20MHz, Channel 2 (2417 MHz)





Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A





Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #1c: CDD 20MHz, Channel 3 (2422 MHz)

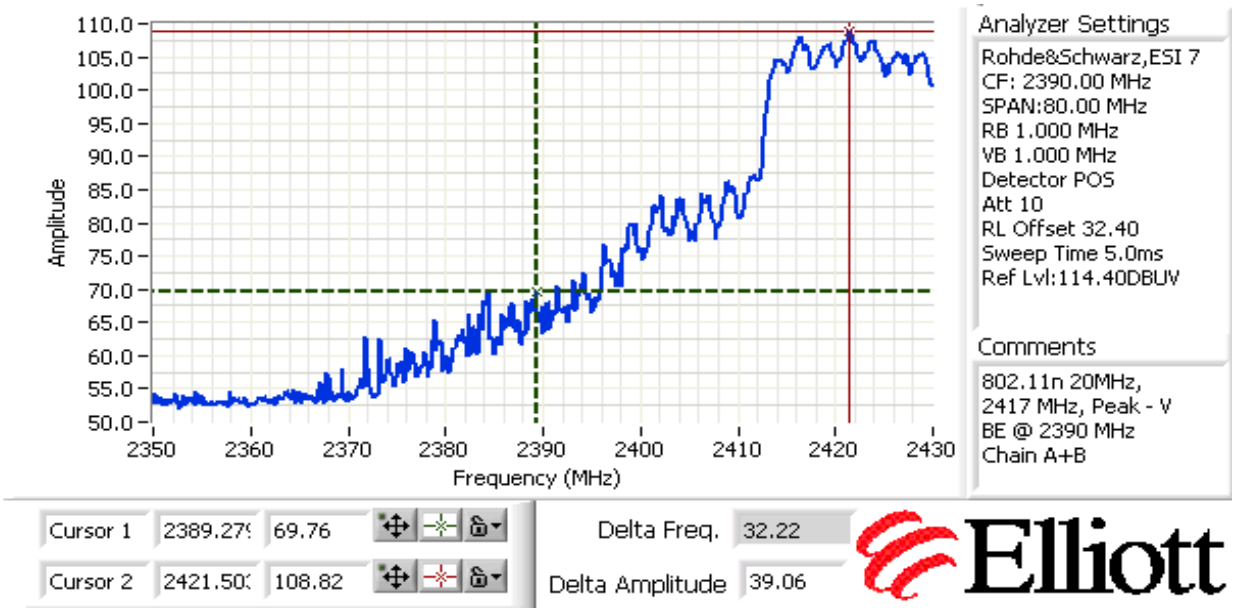
Date of Test: 1/26/2009 Test Engineer: Suhaila Khushzad

Test Location: Chamber # 3 Comments: None

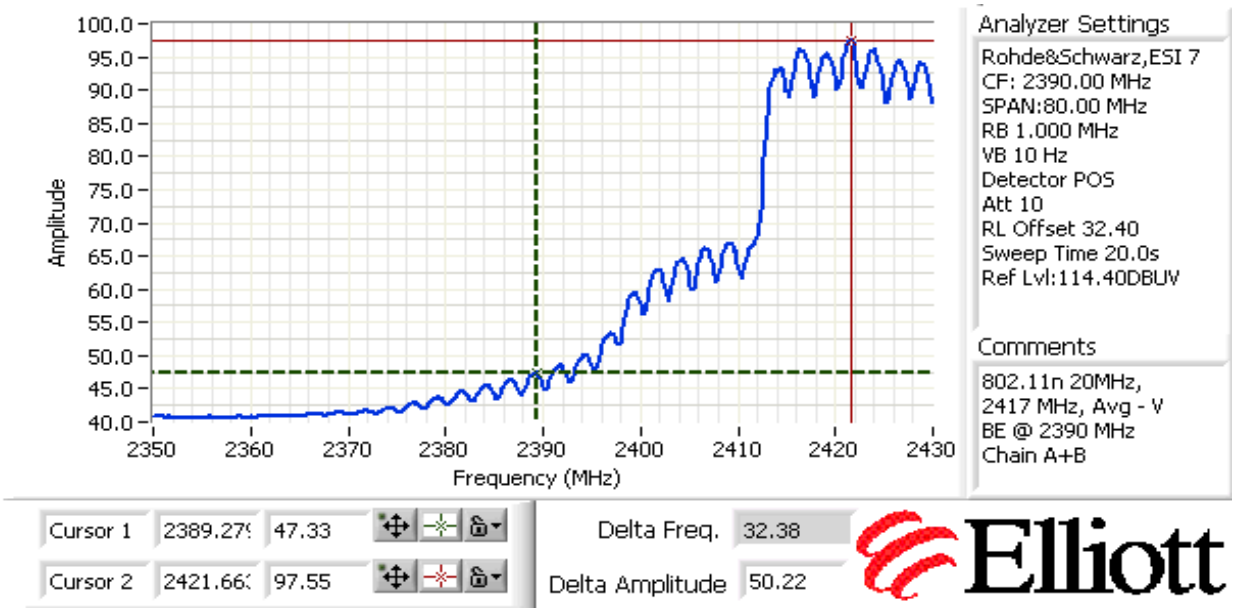
Band-edge Field Strength

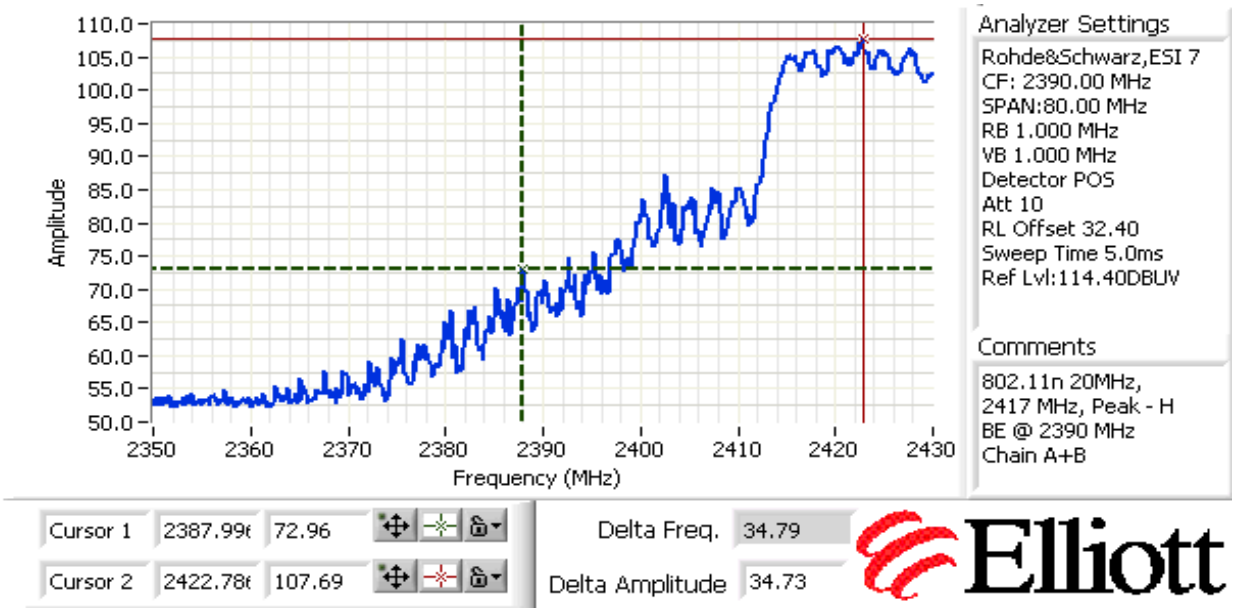
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2387.990	73.0	H	74.0	-1.0	PK	139	1.0	
2389.270	69.8	V	74.0	-4.2	PK	360	1.3	
2390.080	49.3	H	54.0	-4.7	Avg	139	1.0	
2389.270	47.3	V	54.0	-6.7	Avg	360	1.3	

Note 1:	Measured as a field strength at 3m.

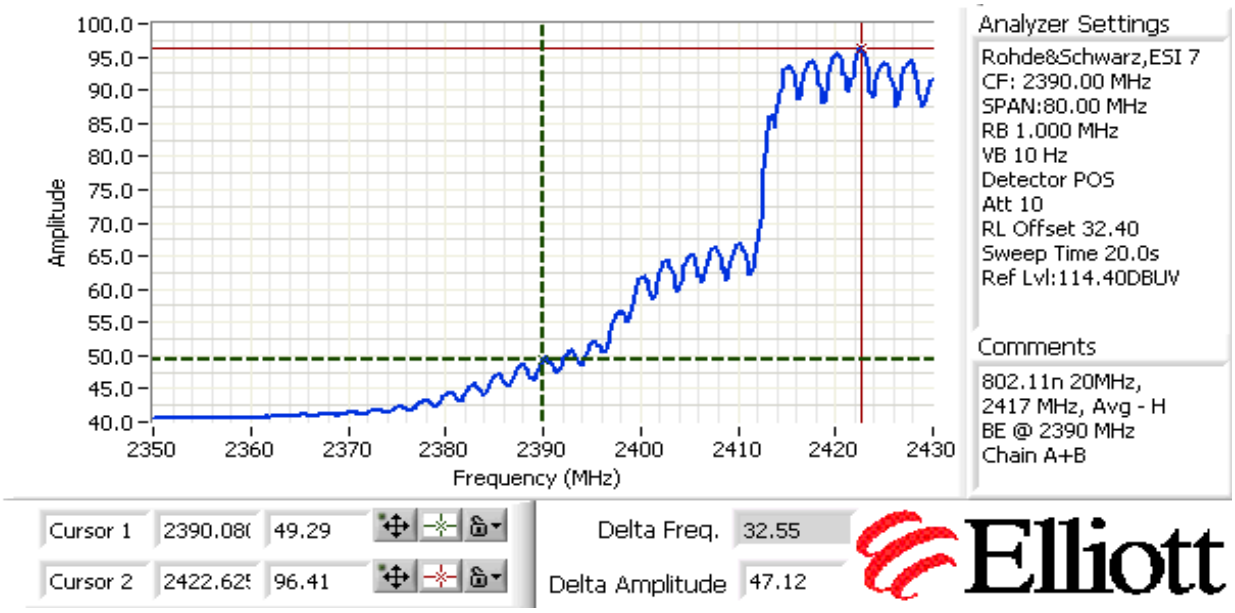


Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A





Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #1d: CDD 20MHz, Channel 9 (2452 MHz)

Date of Test: 2/23/2009 Config. Used: 1
Test Engineer: John Caizzi Config Change: none
Test Location: Fremont Chamber #5 EUT Voltage: 120V/60Hz

Ambient Conditions: Temperature: 19 °C
Rel. Humidity: 45 %

Band Edge 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	
2484.252	73.2	H	74.0	-0.8	Pk	261	1.4	
2484.051	72.9	V	74.0	-1.1	Pk	191	1.4	
2485.253	51.5	H	54.0	-2.6	Avg	261	1.4	
2483.550	50.2	V	54.0	-3.8	Avg	191	1.4	

Run #1e: CDD 20MHz, Channel 10 (2457 MHz)

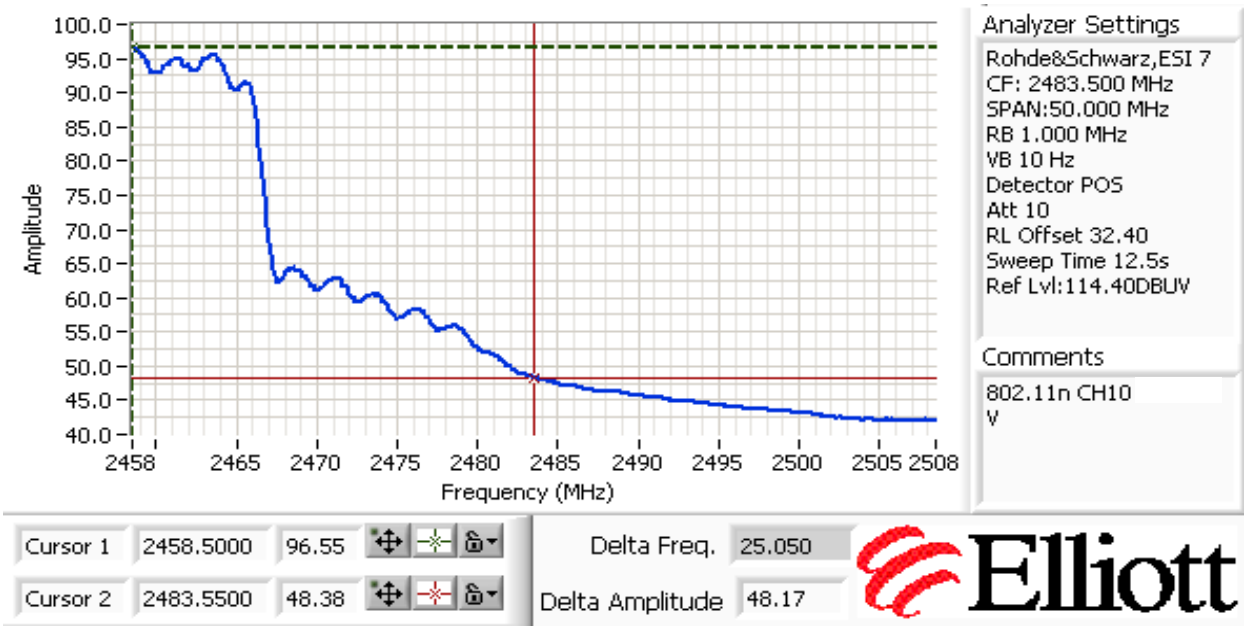
Date of Test: 1/27/2009 Test Engineer: John Caizzi
Test Location: CH #5 Comments: None

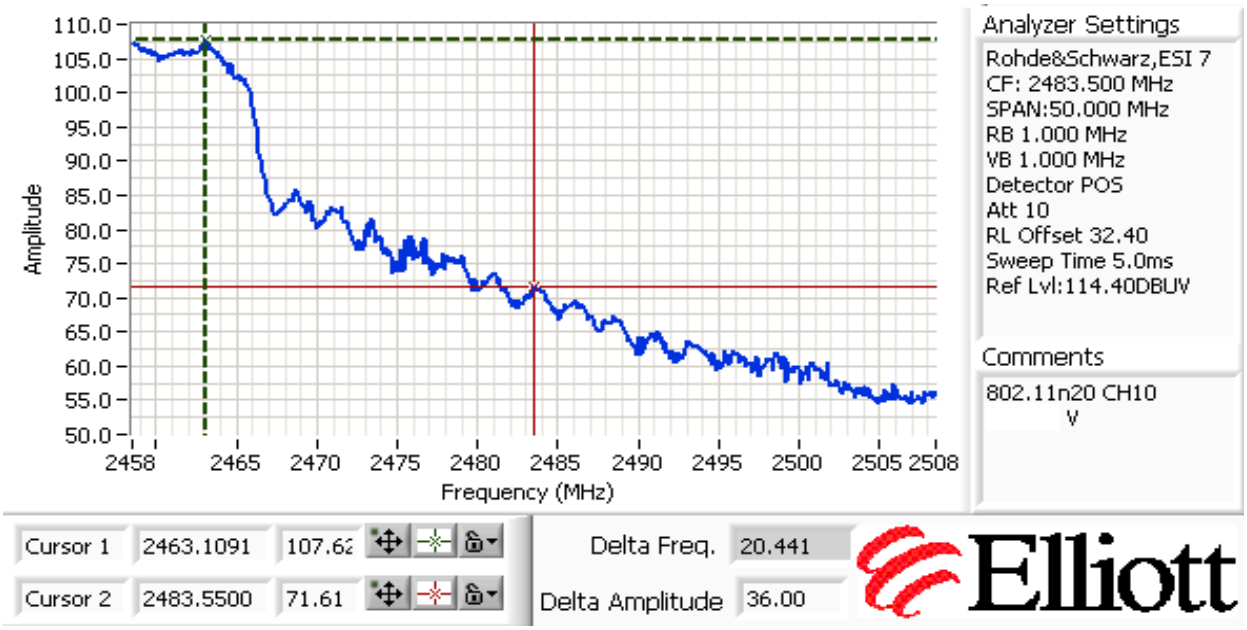
Band-edge Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.550	71.6	V	74.0	-2.4	Pk	321	1.4	
2485.253	69.9	H	74.0	-4.1	Pk	273	1.5	
2483.550	48.4	V	54.0	-5.6	Avg	321	1.4	
2483.550	47.2	H	54.0	-6.8	Avg	273	1.5	

Note 1: Measured as a field strength at 3m.

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A





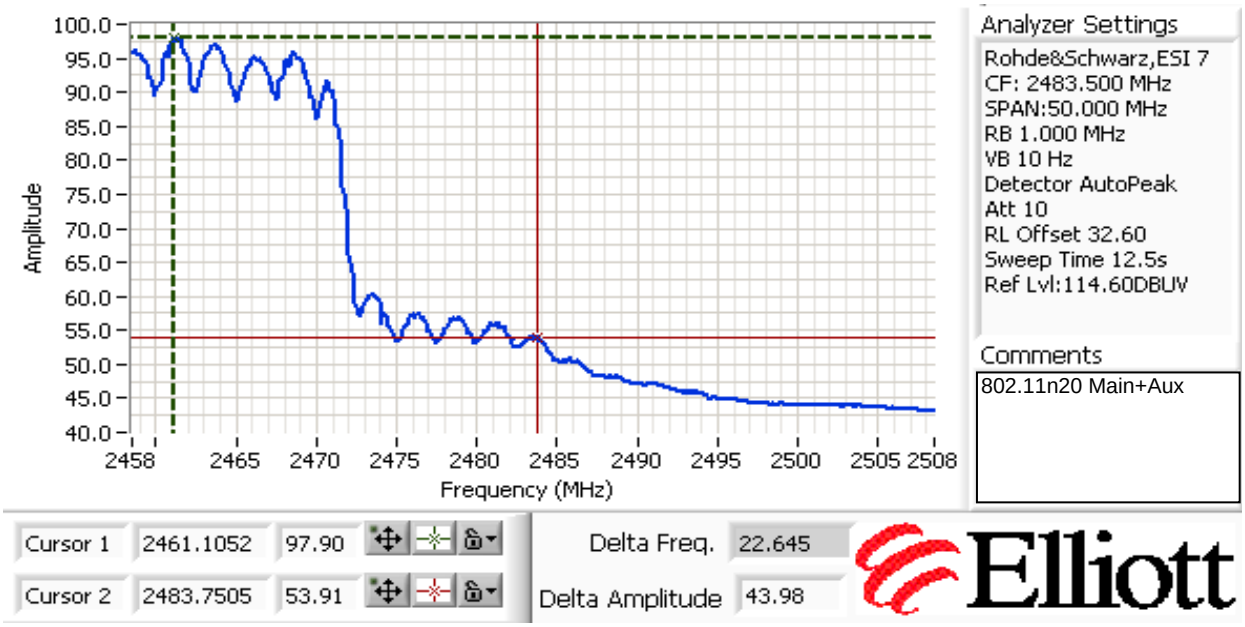
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #1f: CDD 20MHz, Channel 11 (2462 MHz)

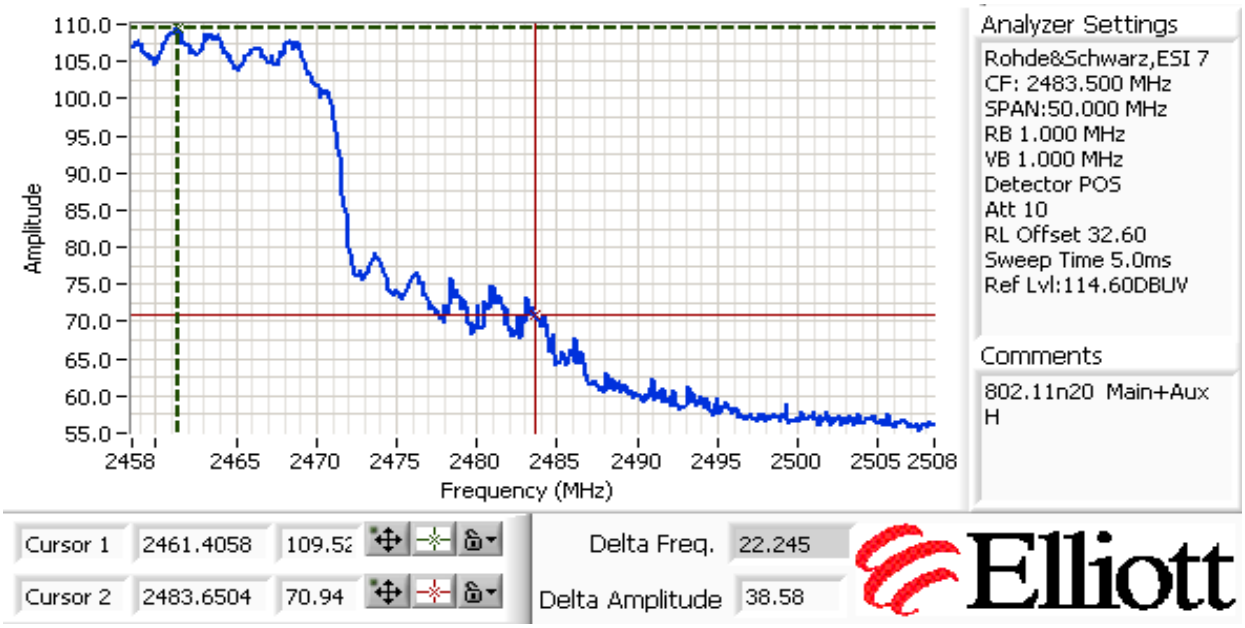
Date of Test:	3/5/2009	Config. Used:	1
Test Engineer:	John Caizzi	Config Change:	none
Test Location:	Fremont Chamber #4	Host Unit Voltage	120V/60Hz

Band Edge 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	
2483.751	53.9	H	54.0	-0.1	Avg	51	1.0	
2483.650	70.9	H	74.0	-3.1	Pk	51	1.0	



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A



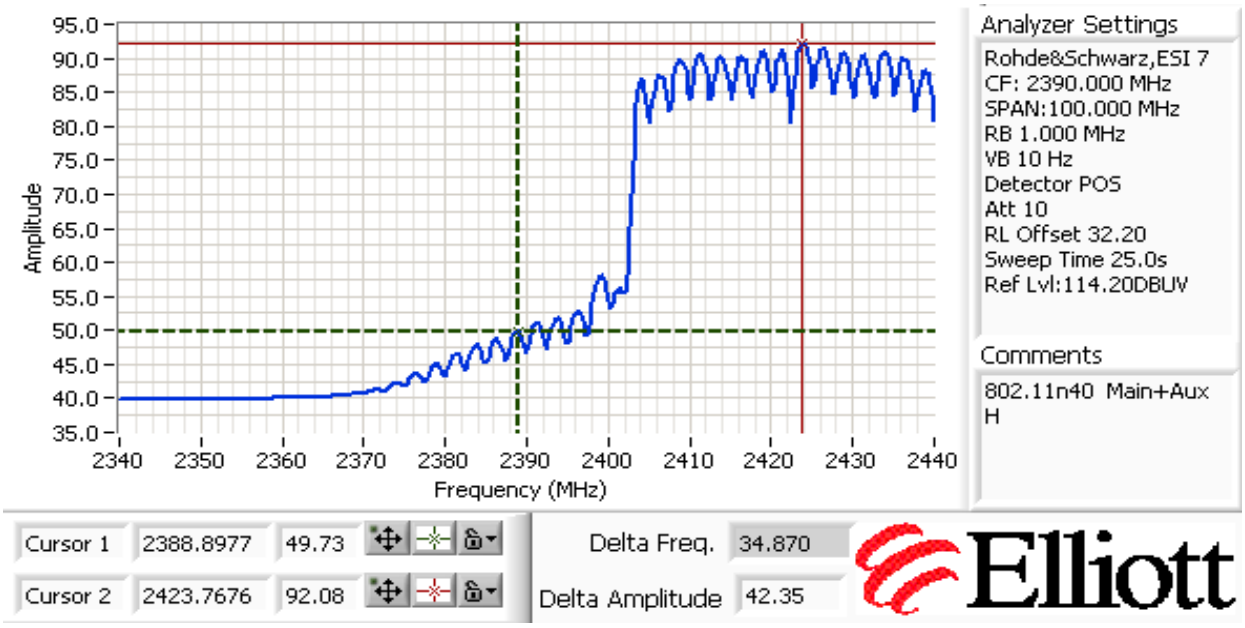
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #2: Band Edge Radiated Field Strength. Operating Mode: CDD 40MHz
Run #2a: CDD 40MHz, Channel 3 (2422 MHz)

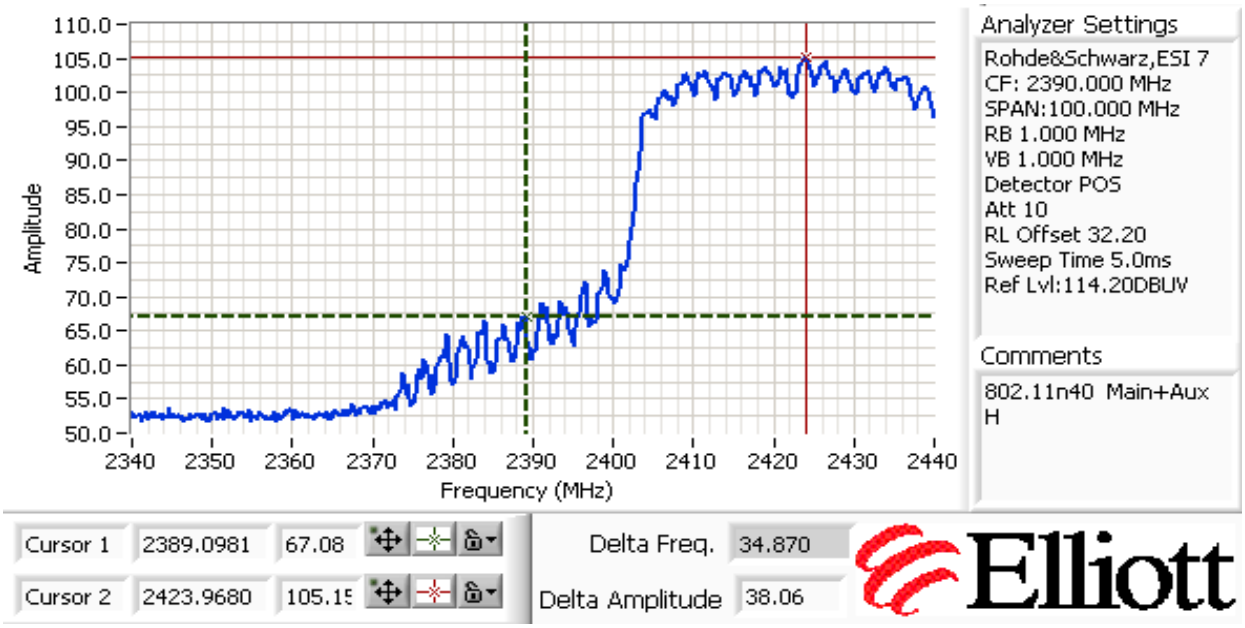
Date of Test:	3/5/2009	Config. Used:	1
Test Engineer:	John Caizzi	Config Change:	none
Test Location:	Fremont Chamber #4	Host Unit Voltage	120V/60Hz

Band Edge 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	
2388.898	49.7	H	54.0	-4.3	Avg	49	1.0	
2389.098	67.1	H	74.0	-6.9	Pk	49	1.0	



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #2b: CDD 40MHz, Channel 4 (2427 MHz)

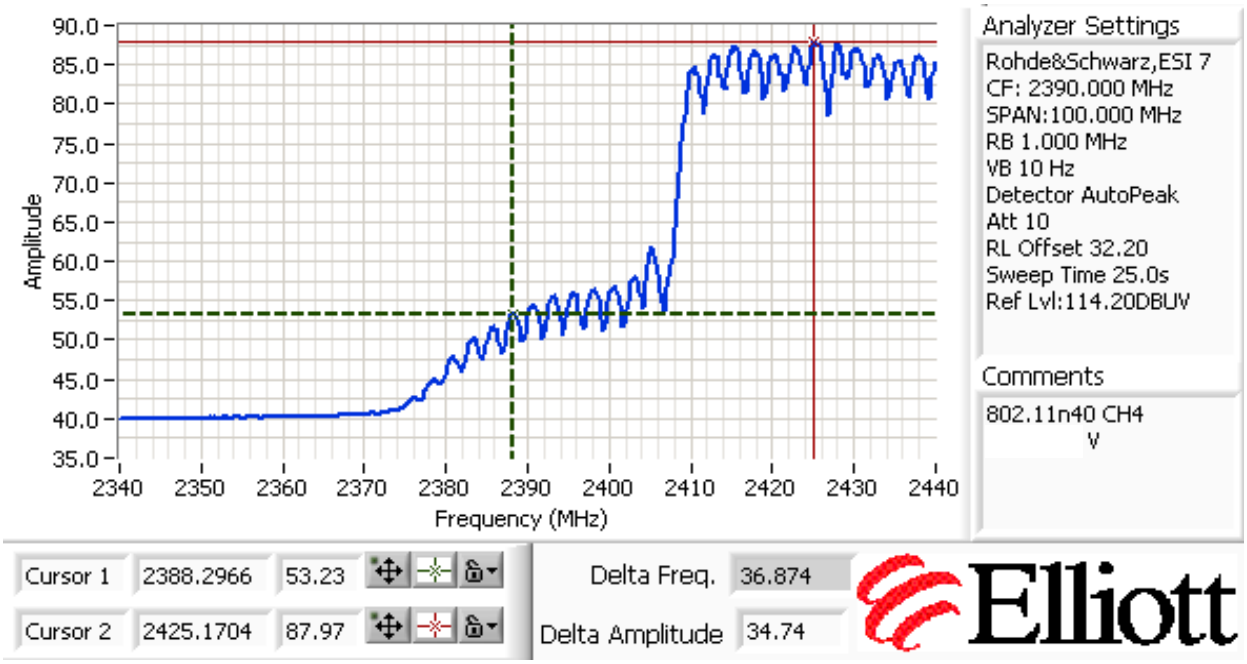
Date of Test: 1/27/2009 Test Engineer: John Caizzi

Test Location: CH #5 Comments: None

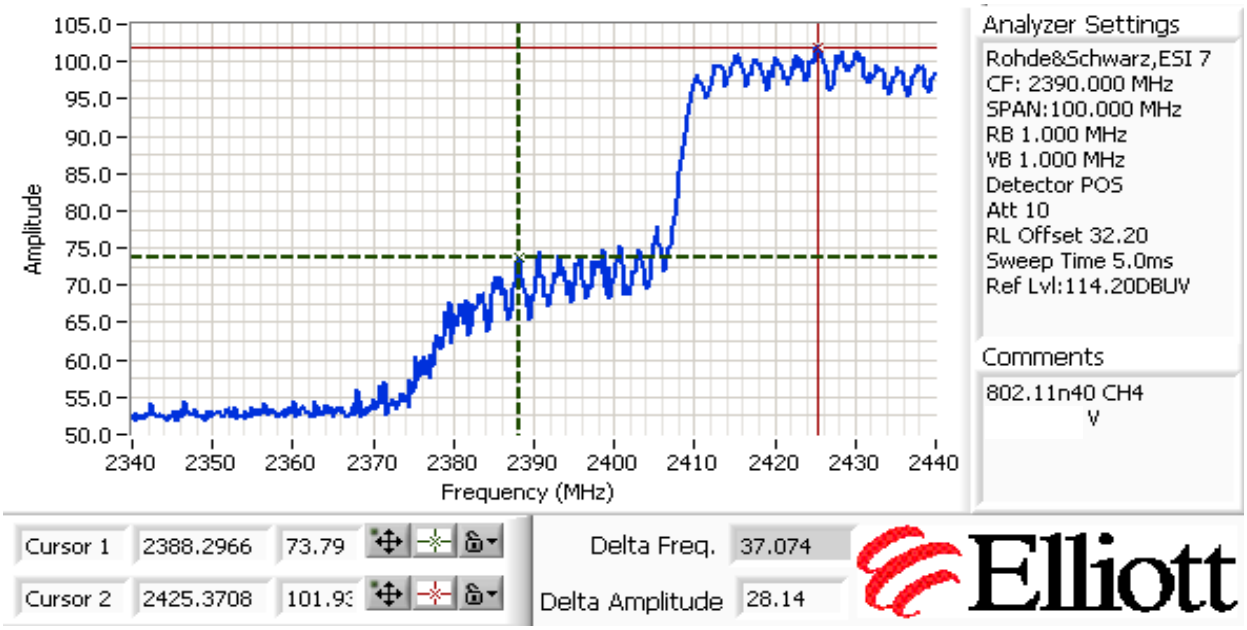
Band-edge Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2388.297	73.8	V	74.0	-0.2	Pk	36	1.4	
2388.297	53.2	V	54.0	-0.8	Avg	36	1.4	
2388.297	50.9	H	54.0	-3.1	Avg	110	1.6	
2388.297	69.5	H	74.0	-4.5	Pk	110	1.6	

Note 1:	Measured as a field strength at 3m.



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #2c: CDD 40MHz, Channel 8 (2447 MHz)

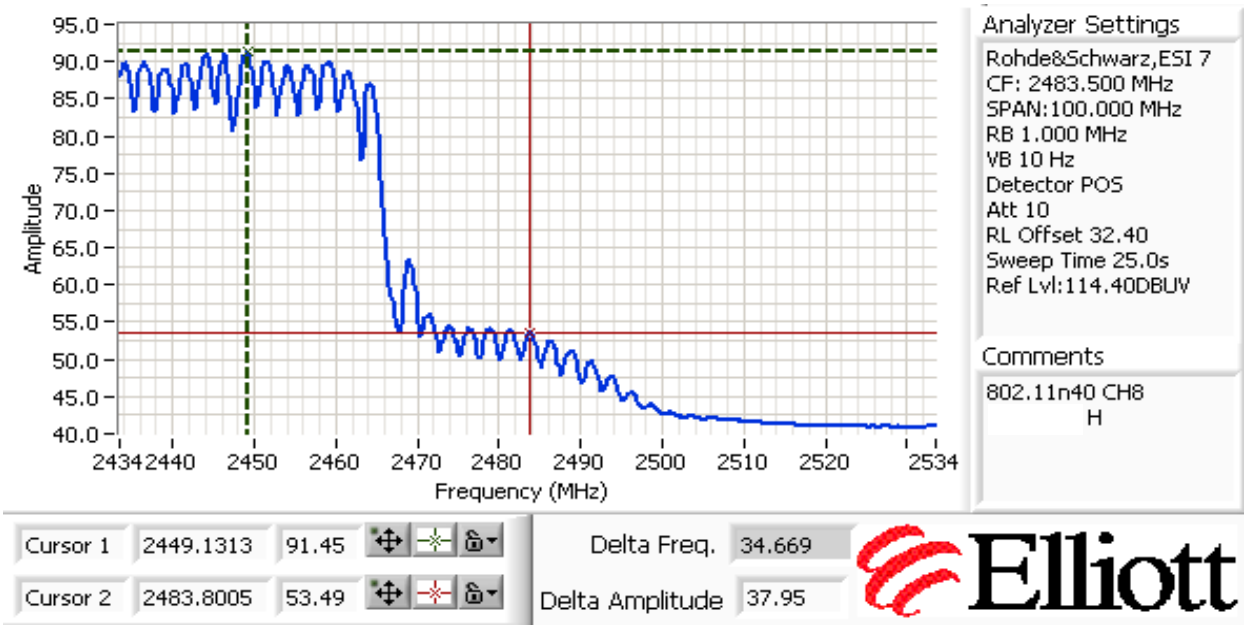
Date of Test: 1/27/2009 Test Engineer: John Caizzi

Test Location: CH #5 Comments: None

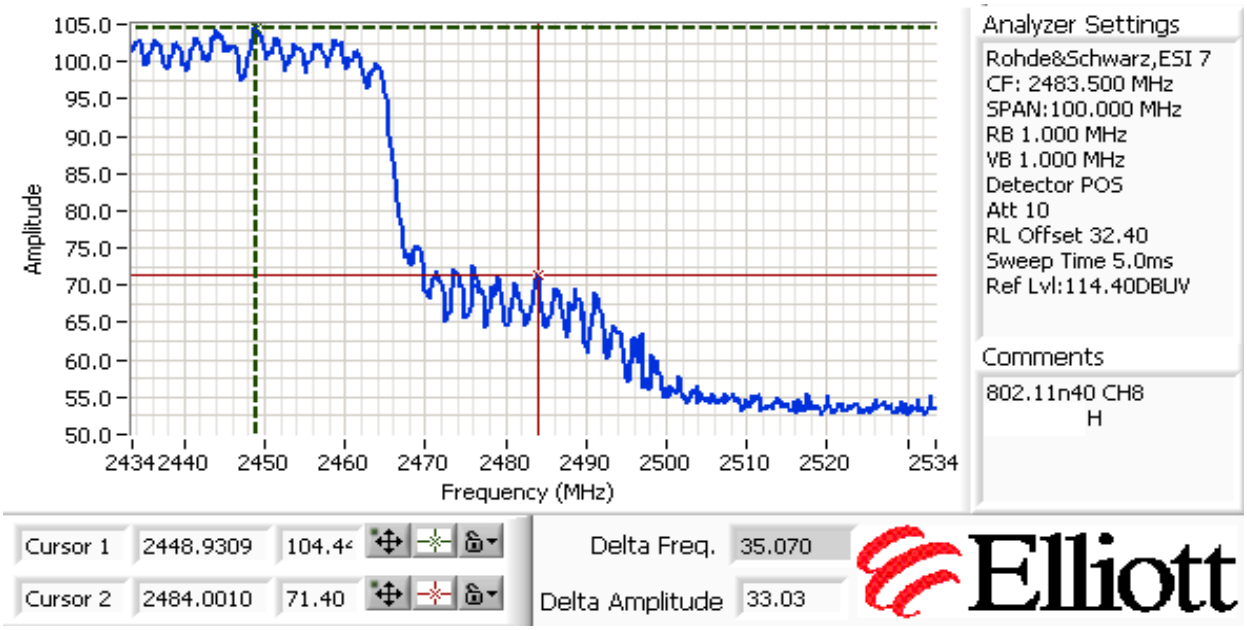
Band-edge Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.801	53.5	H	54.0	-0.5	Avg	110	1.9	
2484.201	52.2	V	54.0	-1.8	Avg	270	1.6	
2484.001	71.4	H	74.0	-2.6	Pk	110	1.9	
2484.201	69.7	V	74.0	-4.3	Pk	270	1.6	

Note 1:	Measured as a field strength at 3m.



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

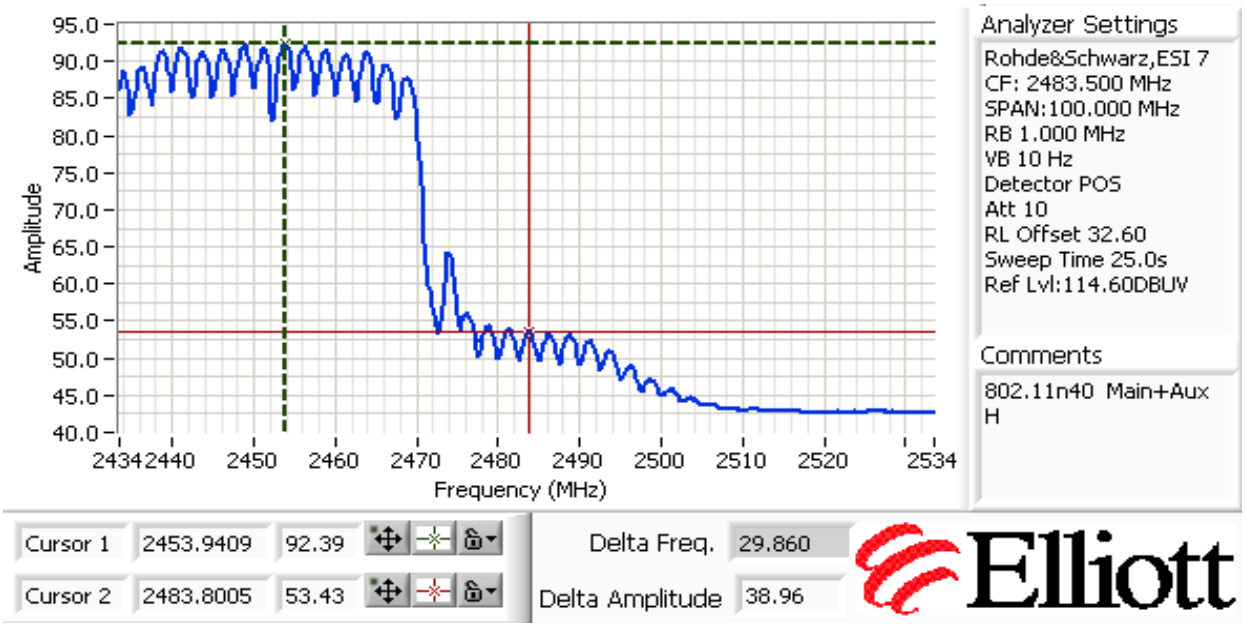
Run #2d: CDD 40MHz, Channel 9 (2452 MHz)

Date of Test: 3/5/2009
Test Engineer: John Caizzi
Test Location: Fremont Chamber #4

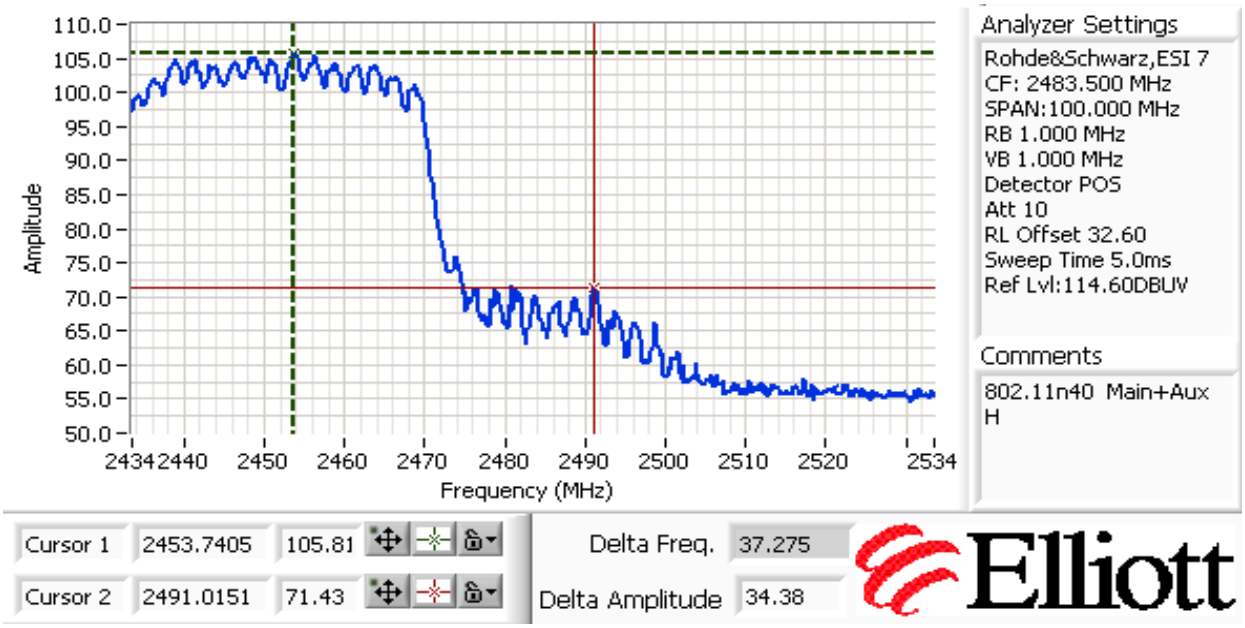
Config. Used: 1
Config Change: none
Host Unit Voltage 120V/60Hz

Band Edge 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	
2483.801	53.4	H	54.0	-0.6	Avg	51	1.0	
2491.015	71.4	H	74.0	-2.6	Pk	51	1.0	



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

RSS 210 and FCC 15.247 (2.4GHz DTS) Radiated 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: 15-25 °C
Rel. Humidity: 25-55 %

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

Run #	Mode	Channel	Chain/ Antenna	Test Performed	Limit	Result / Margin
1a	802.11b	#1 2412 MHz	Main	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	53.6dBµV/m @ 4824.0MHz (-0.4dB)
1b		#6 2437 MHz				51.9dBµV/m @ 4874.0MHz (-2.1dB)
1c		#11 2462 MHz				51.7dBµV/m @ 4924.0MHz (-2.3dB)
2a	802.11g	#1 2412 MHz	Aux	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	42.8dBµV/m @ 4823.9MHz (-11.2dB)
2b		#6 2437 MHz				44.4dBµV/m @ 4874.1MHz (-9.6dB)
2c		#11 2462 MHz				46.8dBµV/m @ 4924.0MHz (-7.2dB)
3a	CDD 20MHz	#1 2412 MHz	Main + Aux	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	39.7dBµV/m @ 4826.5MHz (-14.3dB)
3b		#6 2437 MHz				46.4dBµV/m @ 4874.0MHz (-7.6dB)
3c		#11 2462 MHz				49.6dBµV/m @ 4924.0MHz (-4.4dB)
4a	CDD 40MHz	#3 2422 MHz	Main + Aux	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	Covered by CDD n20 measurements.
4b		#6 2437 MHz				
4c		#9 2452 MHz				

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	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 emissions above 18GHz.

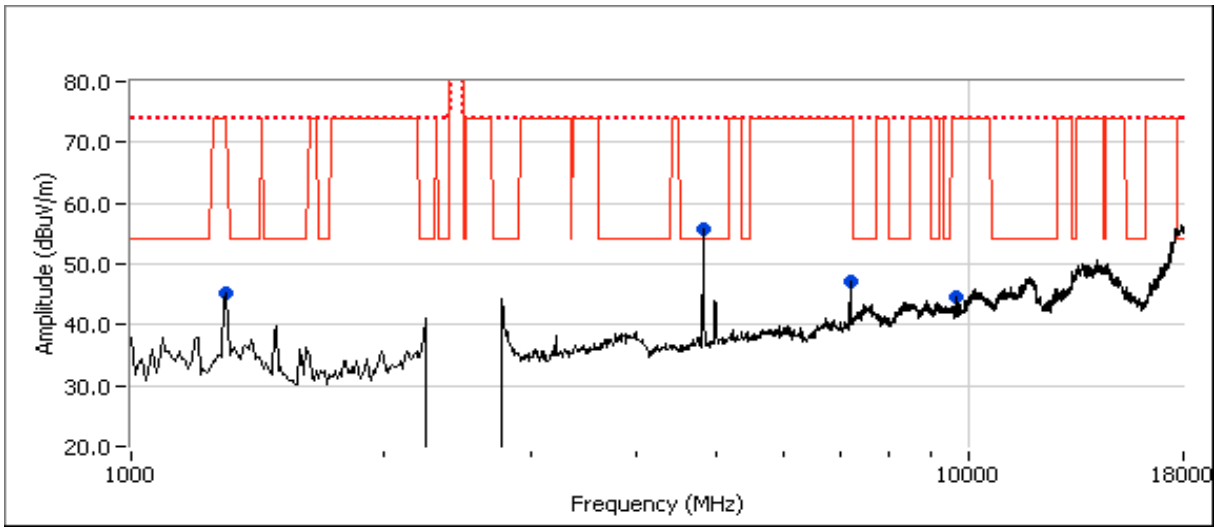
Run #1: Radiated Spurious Emissions, 30 - 25,000 MHz. Operating Mode: 802.11b Main Port

Date of Test: 12/17/2008 Config. Used: 1, Sample s/n 108

Test Engineer: John Caizzi Config Change: none

Test Location: Fremont Chamber #3 Host Unit Voltage 120V/60Hz

Run #1a: 802.11b, Channel 1 (2412 MHz)



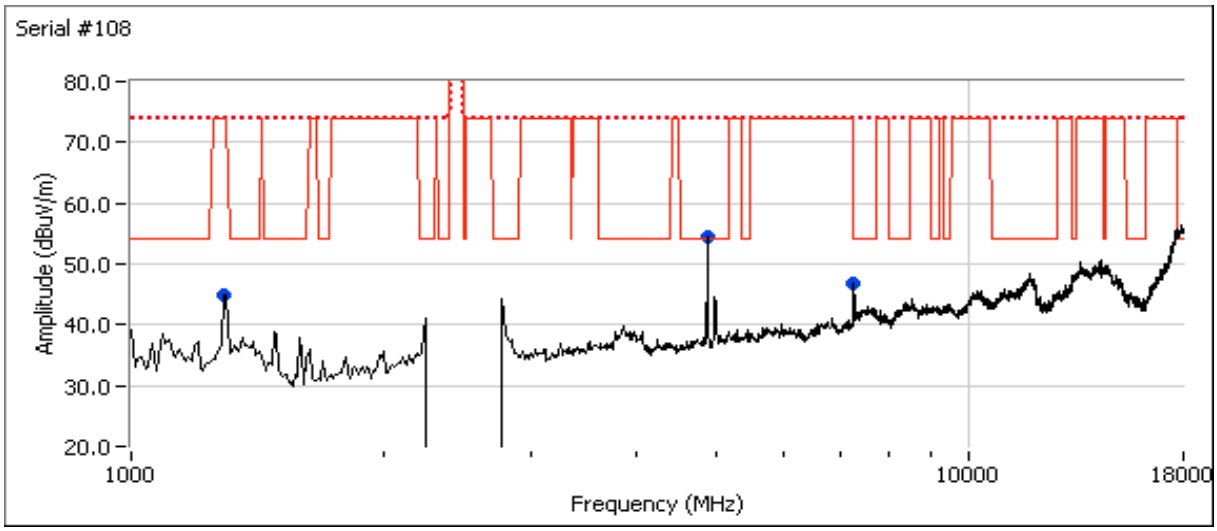
Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.000	53.6	H	54.0	-0.4	AVG	59	1.4	
4823.970	56.2	H	74.0	-17.8	PK	59	1.4	

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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

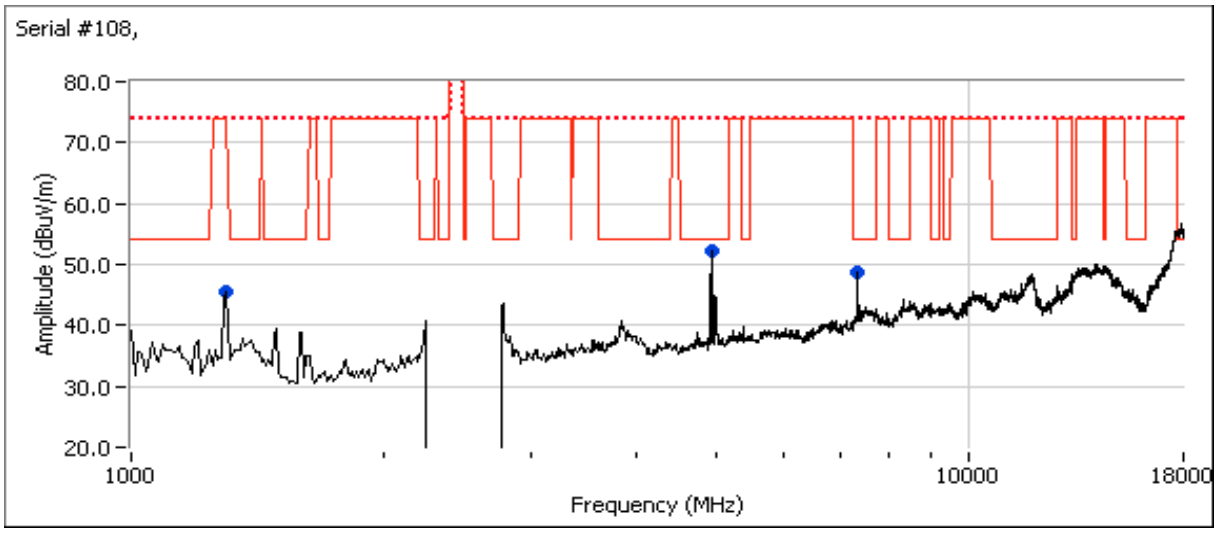
Run #1b: 802.11b, Channel 6 (2437 MHz)



Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.000	51.9	H	54.0	-2.1	AVG	62	1.2	
4874.130	54.5	H	74.0	-19.5	PK	62	1.2	

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #1c: 802.11b, Channel 11 (2462 MHz)



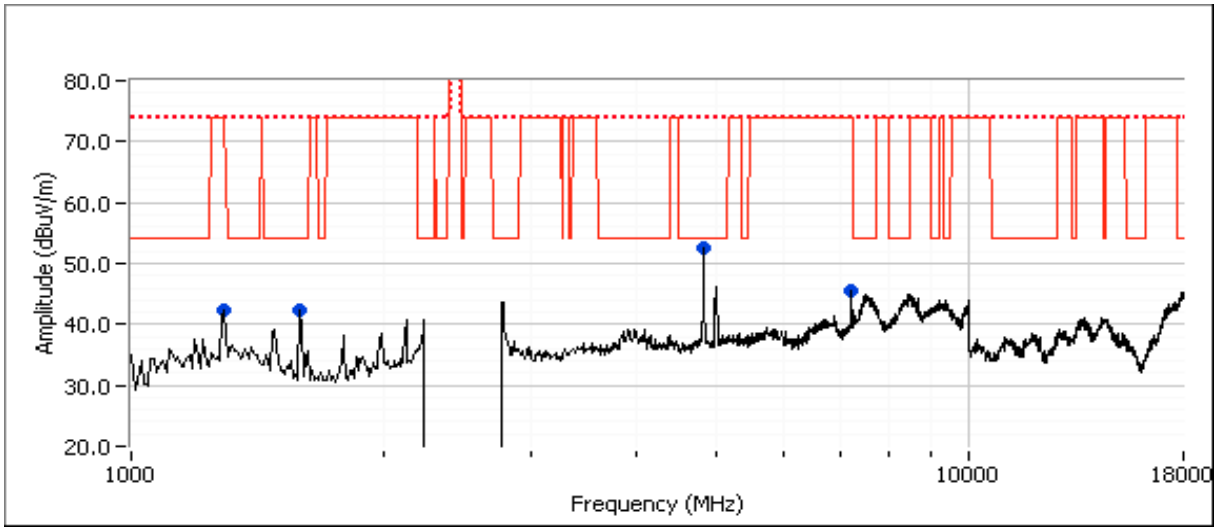
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.030	51.7	H	54.0	-2.3	AVG	70	1.2	
4924.000	55.1	H	74.0	-18.9	PK	70	1.2	

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #2: Radiated Spurious Emissions, 30 - 25,000 MHz. Operating Mode: 802.11g

Date of Test:	12/22/2008	Config. Used:	1, Sample s/n 108
Test Engineer:	Rafael Varelas	Config Change:	None
Test Location:	FT Chamber #5	Host Unit Voltage	120V/60Hz

Run #2a: 802.11g, Channel 1 (2412 MHz)

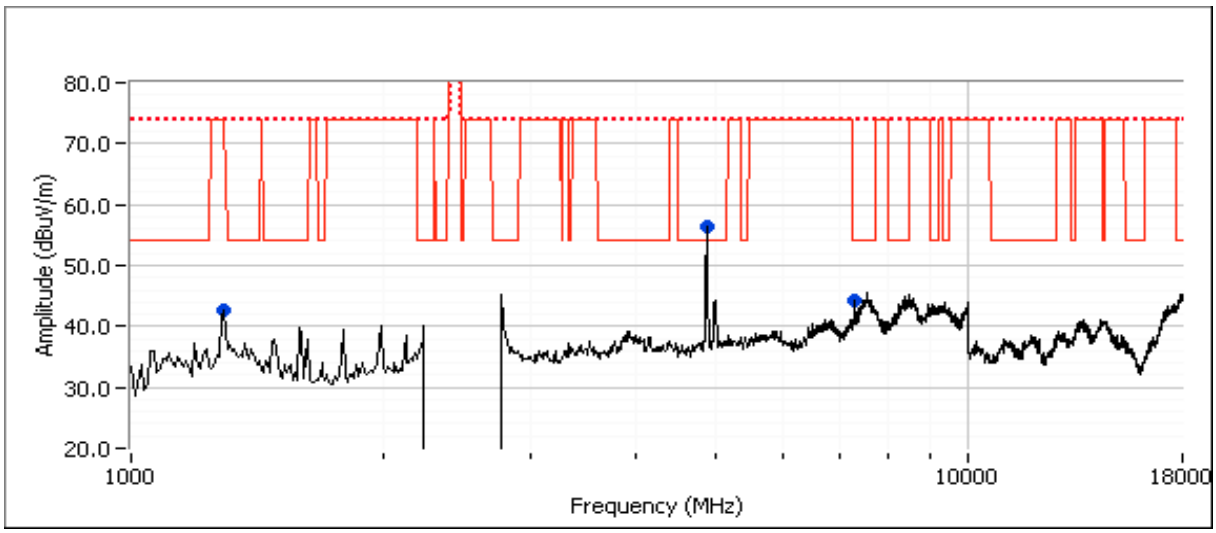


Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.900	42.8	H	54.0	-11.2	AVG	52	1.0	RB 1 MHz; VB: 10 Hz
1586.670	42.3	V	54.0	-11.7	Peak	282	1.0	RB 1 MHz; VB: 1 MHz
4824.440	52.8	H	74.0	-21.2	PK	52	1.0	RB 1 MHz; VB: 1 MHz
7235.000	45.5	V	74.0	-28.5	Peak	90	1.6	RB 1 MHz; VB: 1 MHz
1293.330	42.4	V	74.0	-31.6	Peak	297	1.6	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 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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #2b: 802.11g, Channel 6 (2437 MHz)

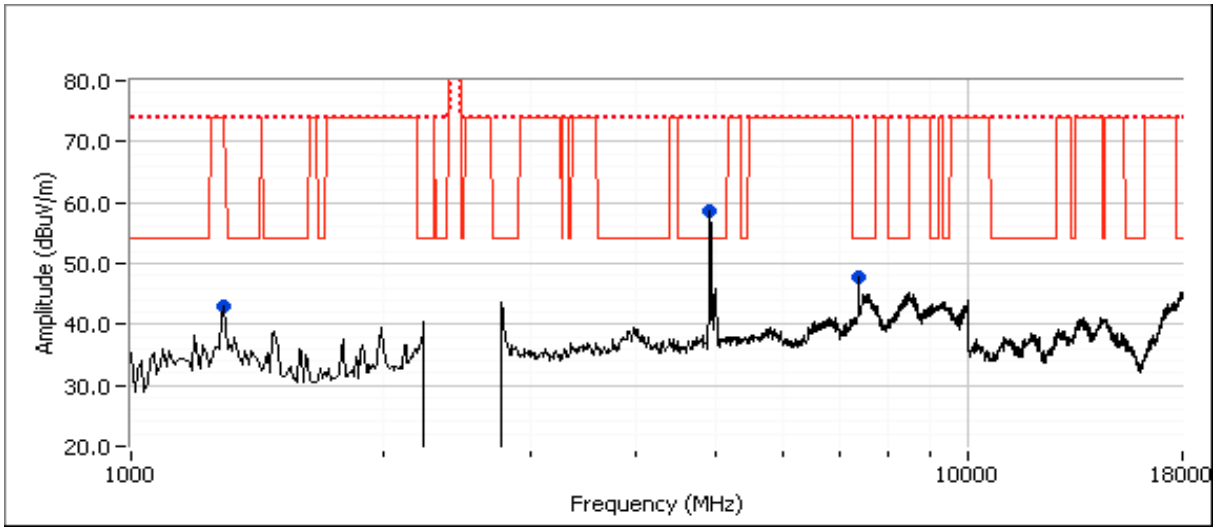


Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.080	44.4	H	54.0	-9.6	AVG	47	1.0	RB 1 MHz; VB: 10 Hz
7309.870	37.5	V	54.0	-16.5	AVG	342	1.0	RB 1 MHz; VB: 10 Hz
4874.310	53.5	H	74.0	-20.5	PK	47	1.0	RB 1 MHz; VB: 1 MHz
7309.060	49.8	V	74.0	-24.2	PK	342	1.0	RB 1 MHz; VB: 1 MHz
1293.330	42.7	V	74.0	-31.3	Peak	278	1.6	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 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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #2c: 802.11g, Channel 11 (2462 MHz)



Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.000	46.8	H	54.0	-7.2	AVG	229	1.3	RB 1 MHz; VB: 10 Hz
7386.380	41.6	V	54.0	-12.4	AVG	279	1.6	RB 1 MHz; VB: 10 Hz
4924.120	58.4	H	74.0	-15.6	PK	229	1.3	RB 1 MHz; VB: 1 MHz
7384.720	53.9	V	74.0	-20.1	PK	279	1.6	RB 1 MHz; VB: 1 MHz
1293.330	43.1	H	74.0	-30.9	Peak	262	1.3	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 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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

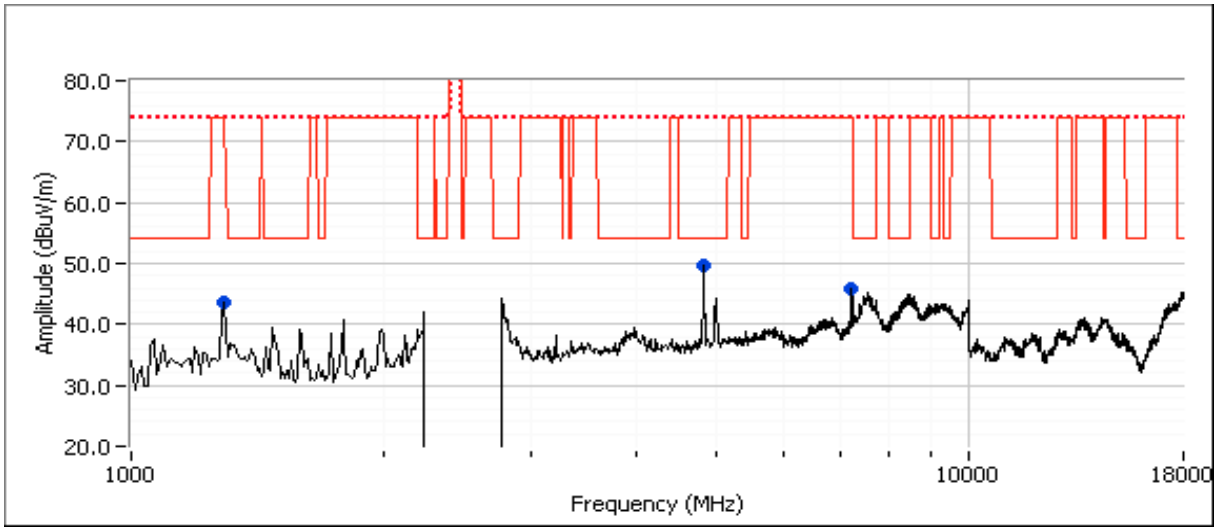
Run #3: Radiated Spurious Emissions, 30 - 25,000 MHz. Operating Mode: CDD 20MHz

Date of Test: 12/22/2008 Config. Used: 1, Sample s/n 108

Test Engineer: Rafael Varelas Config Change: None

Test Location: FT Chamber #5 Host Unit Voltage 120V/60Hz

Run #3a: CDD 20MHz, Channel 1 (2412 MHz)

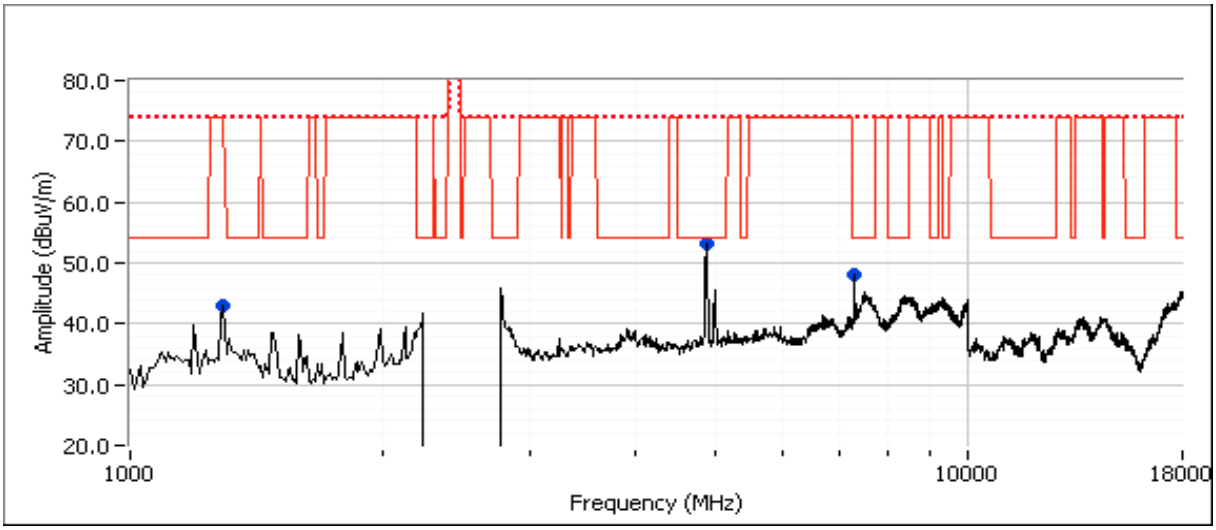


Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4826.480	39.7	H	54.0	-14.3	AVG	313	1.9	RB 1 MHz; VB: 10 Hz
4826.210	50.9	H	74.0	-23.1	PK	313	1.9	RB 1 MHz; VB: 1 MHz
7235.000	46.0	H	74.0	-28.0	Peak	315	1.6	RB 1 MHz; VB: 1 MHz
1293.330	43.6	H	74.0	-30.4	Peak	265	1.3	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 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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #3b: CDD 20MHz, Channel 6 (2437 MHz)

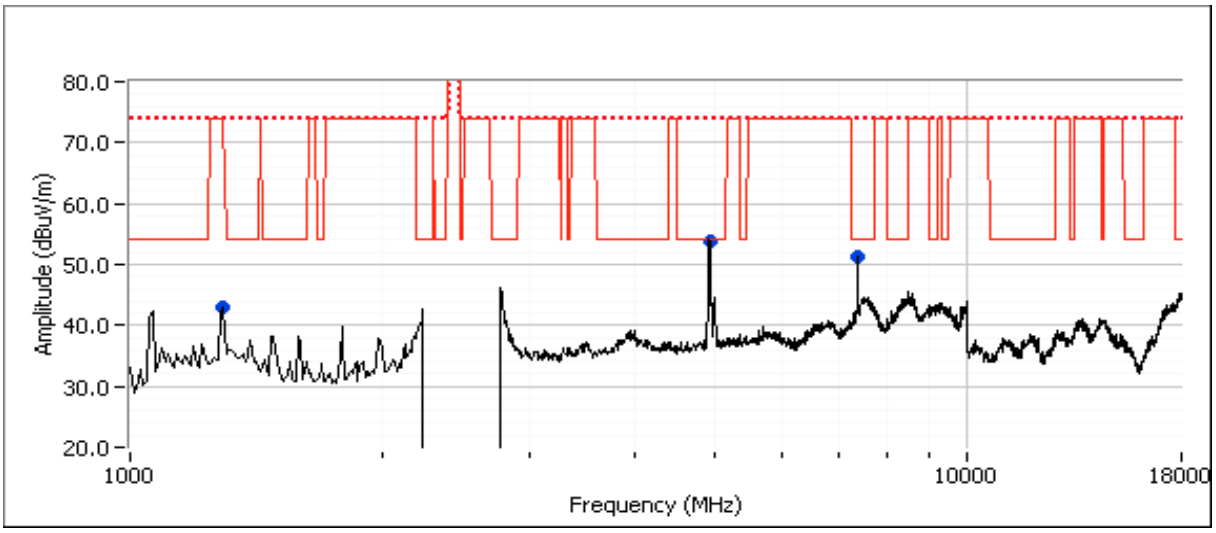


Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.960	46.4	H	54.0	-7.6	AVG	224	1.4	RB 1 MHz; VB: 10 Hz
7311.060	43.3	V	54.0	-10.7	AVG	46	1.3	RB 1 MHz; VB: 10 Hz
4874.170	57.0	H	74.0	-17.0	PK	224	1.4	RB 1 MHz; VB: 1 MHz
7311.430	56.4	V	74.0	-17.6	PK	46	1.3	RB 1 MHz; VB: 1 MHz
1293.330	42.9	V	74.0	-31.1	Peak	288	1.6	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 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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #3c: CDD 20MHz, Channel 11 (2462 MHz)



Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.030	49.6	H	54.0	-4.4	AVG	130	1.2	RB 1 MHz; VB: 10 Hz
4923.870	60.5	H	74.0	-13.5	PK	130	1.2	RB 1 MHz; VB: 1 MHz
7391.310	44.0	V	54.0	-10.0	AVG	75	1.3	RB 1 MHz; VB: 10 Hz
7391.420	56.8	V	74.0	-17.2	PK	75	1.3	RB 1 MHz; VB: 1 MHz
1293.330	42.9	V	74.0	-31.1	Peak	271	1.0	

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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

RSS 210 and FCC 15.247 (5GHz 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 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: 15 - 25 °C
Rel. Humidity: 35 - 65 %

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

Run #	Mode	Channel	Chain/ Antenna	Power Setting	Test Performed	Limit	Result / Margin
1a	802.11a	149 5745MHz	Main	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	41.8dBµV/m @ 2490.9MHz (-12.2dB)
1b		157 5785MHz	Main	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	62.8dBµV/m @ 17355.8MHz (-11.2dB)
			Aux	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	62.0dBµV/m @ 17355.5MHz (-12.0dB)
1c		165 5825MHz	Main	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	40.0dBµV/m @ 2490.3MHz (-14.0dB)
2a	20 MHz CDD	149 5745MHz	Main + Aux	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	52.8dBµV/m @ 17234.2MHz (-21.2dB)
2b		157 5785MHz		-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	63.5dBµV/m @ 17355.5MHz (-10.5dB)
2c		165 5825MHz		-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	63.8dBµV/m @ 17475.7MHz (-10.2dB)
3a	40 MHz CDD	151 5755MHz	Main + Aux	-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	39.7dBµV/m @ 11510.2MHz (-14.3dB)
3b		159 5795MHz		-	Radiated Emissions, 1 - 40GHz	FCC Part 15.209 / 15.247(c)	64.7dBµV/m @ 17388.2MHz (-9.3dB)

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	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 emissions above 18GHz.

Run #1: Radiated Spurious Emissions, 30 - 40000 MHz. Operating Mode: 802.11a Legacy A (Single Chain)

Date of Test: 1/29/2009 Test Engineer: Rafael Varelas

Test Location: FT Chamber #4 Comments: None

Run #1a: 802.11a Legacy Channel 149 @ 5745 MHz

Fundamental Signal Field Strength: Peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5746.400	97.1	V	-	-	PK	180	1.0	RB 100 kHz; VB: 100 kHz
5746.470	100.8	H	-	-	PK	211	1.5	RB 100 kHz; VB: 100 kHz

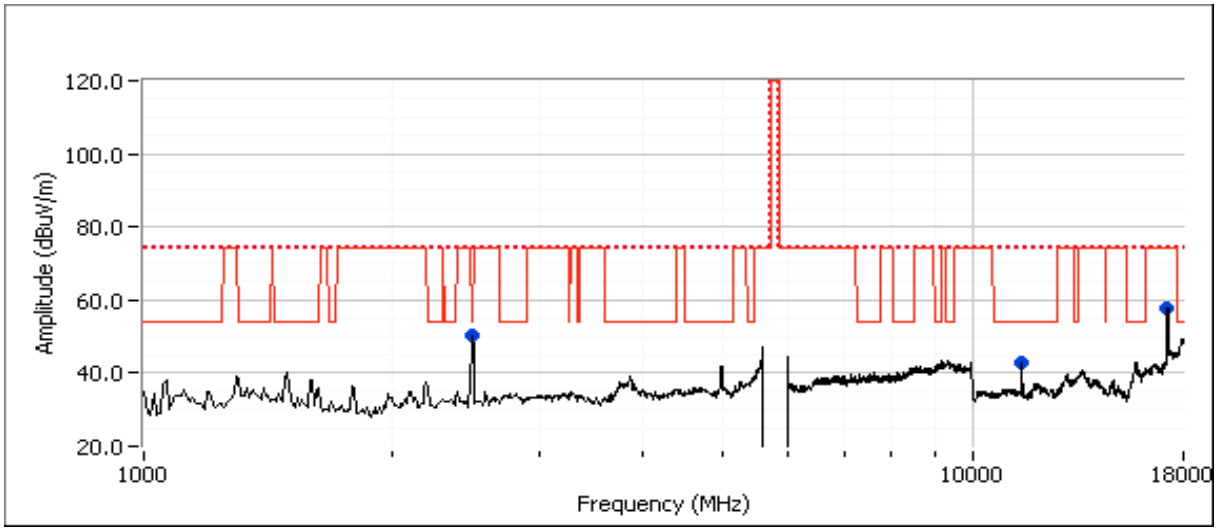
Fundamental emission level @ 3m in 100kHz RBW:	100.8	dBµV/m	
Limit for emissions outside of restricted bands:	70.8	dBµV/m	Limit is -30dBc (UNII power measurement)

Spurious Emissions (Antenna based on center channel measurements)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2490.930	41.8	V	54.0	-12.2	AVG	194	1.0	RB 1 MHz; VB: 10 Hz
2489.140	58.8	V	74.0	-15.2	PK	194	1.0	RB 1 MHz; VB: 1 MHz
11490.610	37.0	H	54.0	-17.0	AVG	34	1.0	RB 1 MHz; VB: 10 Hz
17236.870	52.4	H	70.8	-18.4	PK	193	1.0	RB 100 kHz; VB: 100 kHz
11493.430	50.7	H	74.0	-23.3	PK	34	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 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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A



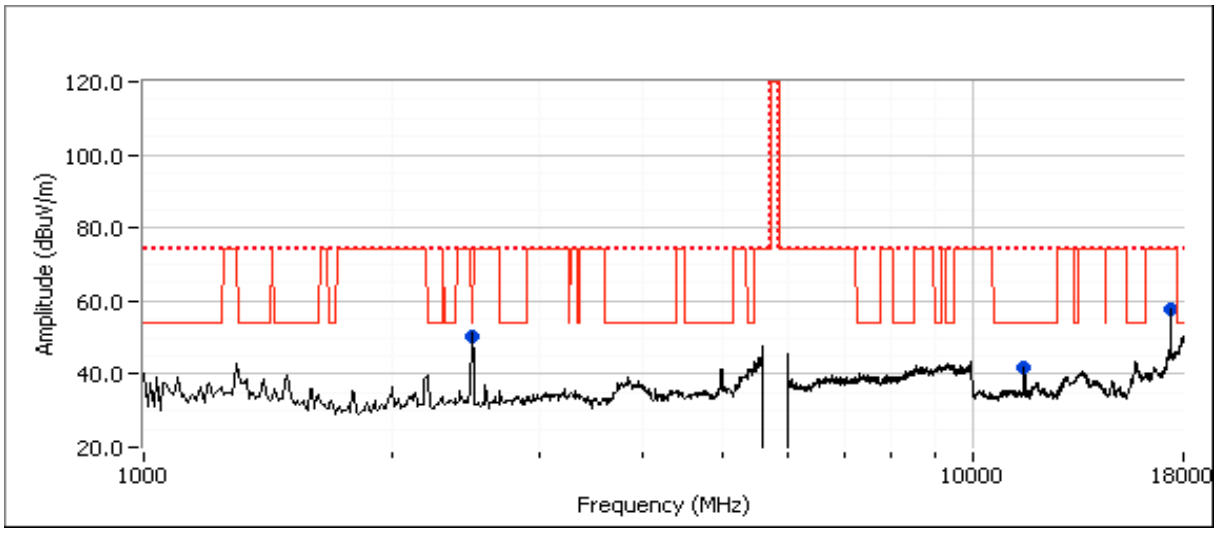
Run #1b: 802.11a Legacy, Channel 157 @ 5785 MHz

Fundamental Signal Field Strength: Peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5785.700	102.4	V	-	-	Pk	28	1.2	RB 100 kHz; VB: 100 kHz
5784.440	105.4	H	-	-	Pk	42	1.5	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	105.4	dBµV/m
Limit for emissions outside of restricted bands:	75.4	dBµV/m

Limit is -30dBc (UNII power measurement)

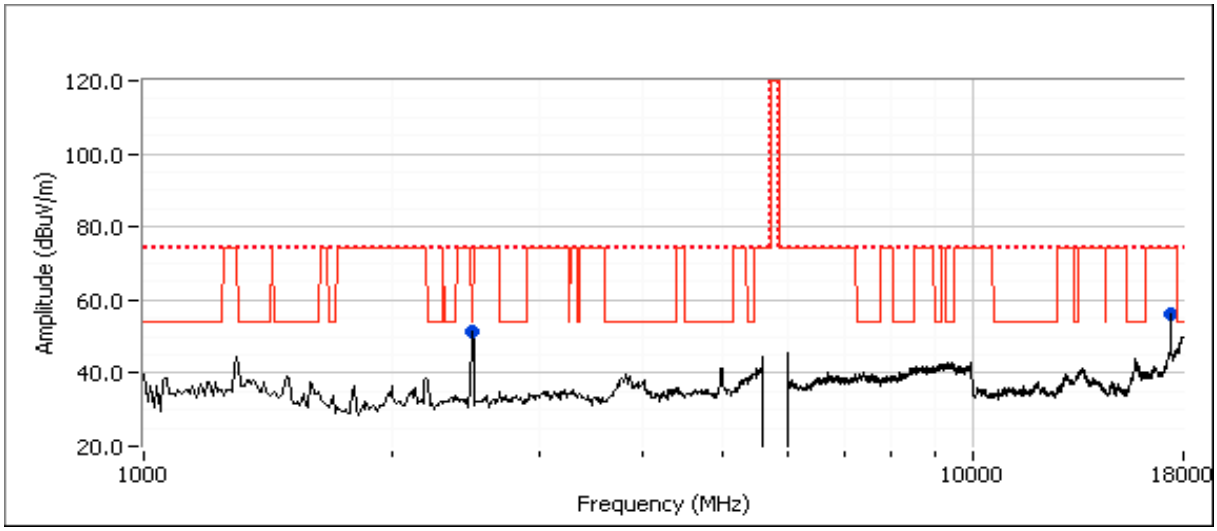


Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Spurious Emissions - Main antenna

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
17355.830	62.8	H	74.0	-11.2	PK	229	1.0	RB 1 MHz; VB: 1 MHz
11569.640	33.8	H	54.0	-20.2	AVG	208	1.0	RB 1 MHz; VB: 10 Hz
17355.510	50.2	H	74.0	-23.8	AVG	229	1.0	RB 1 MHz; VB: 10 Hz
2494.580	27.4	V	54.0	-26.6	AVG	85	1.0	RB 1 MHz; VB: 10 Hz
11569.790	47.1	H	74.0	-26.9	PK	208	1.0	RB 1 MHz; VB: 1 MHz
2496.440	44.0	V	74.0	-30.0	PK	85	1.0	RB 1 MHz; VB: 1 MHz

Run #1b: 802.11a Legacy, Channel 157 @ 5785 MHz



Spurious Emissions - Aux antenna

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
17355.510	62.0	H	74.0	-12.0	PK	228	1.3	RB 1 MHz; VB: 1 MHz
17357.300	47.9	H	74.0	-26.1	AVG	228	1.3	RB 1 MHz; VB: 10 Hz
2489.220	24.6	V	54.0	-29.4	AVG	85	1.0	RB 1 MHz; VB: 10 Hz
2488.840	41.1	V	74.0	-32.9	PK	85	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 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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #1c: 802.11a Legacy Channel 165 @ 5825 MHz

Fundamental Signal Field Strength: Peak value measured in 100kHz

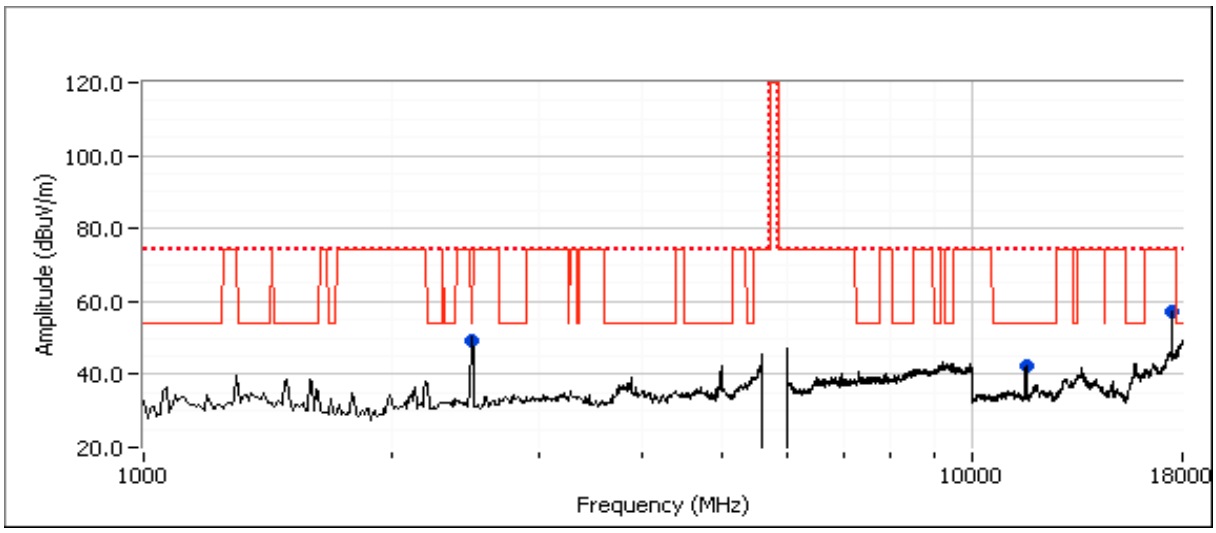
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5823.830	97.8	V	-	-	PK	193	1.0	RB 100 kHz; VB: 100 kHz
5818.770	103.3	H	-	-	PK	223	1.7	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	103.3	dBµV/m	
Limit for emissions outside of restricted bands:	73.3	dBµV/m	Limit is -30dBc (UNII power measurement)

Spurious Emissions (Antenna based on center channel measurements)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2490.280	40.0	V	54.0	-14.0	AVG	187	1.1	RB 1 MHz; VB: 10 Hz
17475.480	58.6	H	73.3	-14.7	PK	214	1.0	RB = VB = 100kHz
2488.900	56.8	V	74.0	-17.2	PK	187	1.1	RB 1 MHz; VB: 1 MHz
11649.970	36.3	H	54.0	-17.7	AVG	43	1.0	RB 1 MHz; VB: 10 Hz
11649.350	50.5	H	74.0	-23.5	PK	43	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 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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #2: Radiated Spurious Emissions, 30 - 40000 MHz. Operating Mode: 802.11a CDD 20MHz

Date of Test: 1/28/2009 Test Engineer: Joseph Cadigal

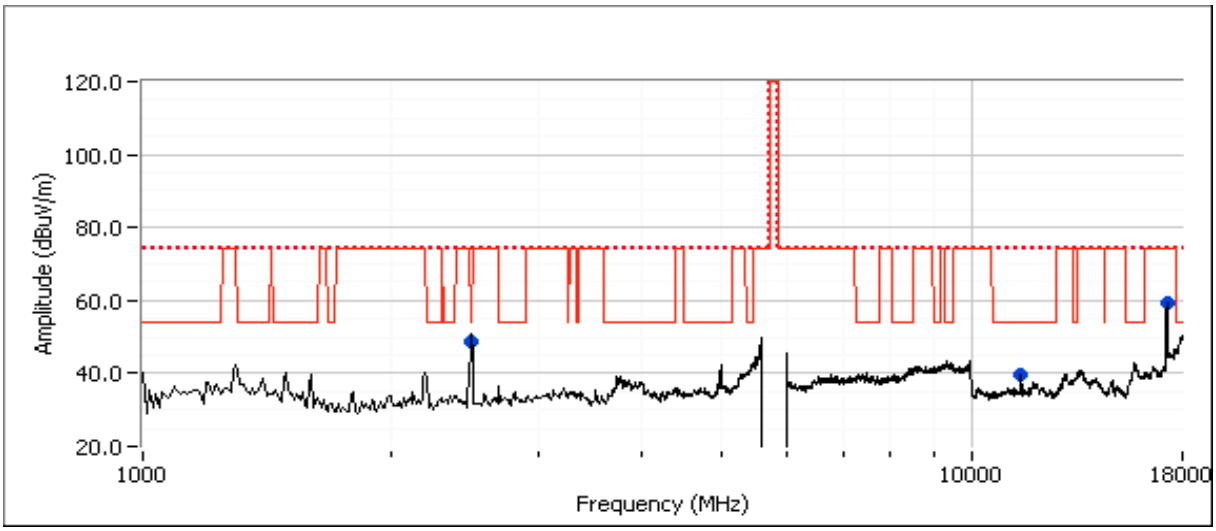
Test Location: FT Chamber #4 Comments: None

Run #2a: CDD 20MHz, Channel 149 @ 5745 MHz

Fundamental Signal Field Strength: Peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5743.790	102.7	V	-	-	Pk	358	1.1	RB 100 kHz; VB: 100 kHz
5745.310	106.0	H	-	-	Pk	32	1.6	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	106	dBµV/m	
Limit for emissions outside of restricted bands:	76	dBµV/m	Limit is -30dBc (UNII power measurement)



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	
17234.230	52.8	V	74.0	-21.2	PK	97	1.3	MHz; VB: 1 MHz
11490.140	32.3	H	54.0	-21.7	AVG	242	1.0	MHz; VB: 10 Hz
2499.060	26.4	V	54.0	-27.6	AVG	7	1.0	MHz; VB: 10 Hz
11490.390	44.4	H	74.0	-29.6	PK	242	1.0	MHz; VB: 1 MHz
2499.660	43.8	V	74.0	-30.2	PK	7	1.0	MHz; VB: 1 MHz
17234.200	39.3	V	74.0	-34.7	AVG	97	1.3	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 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.

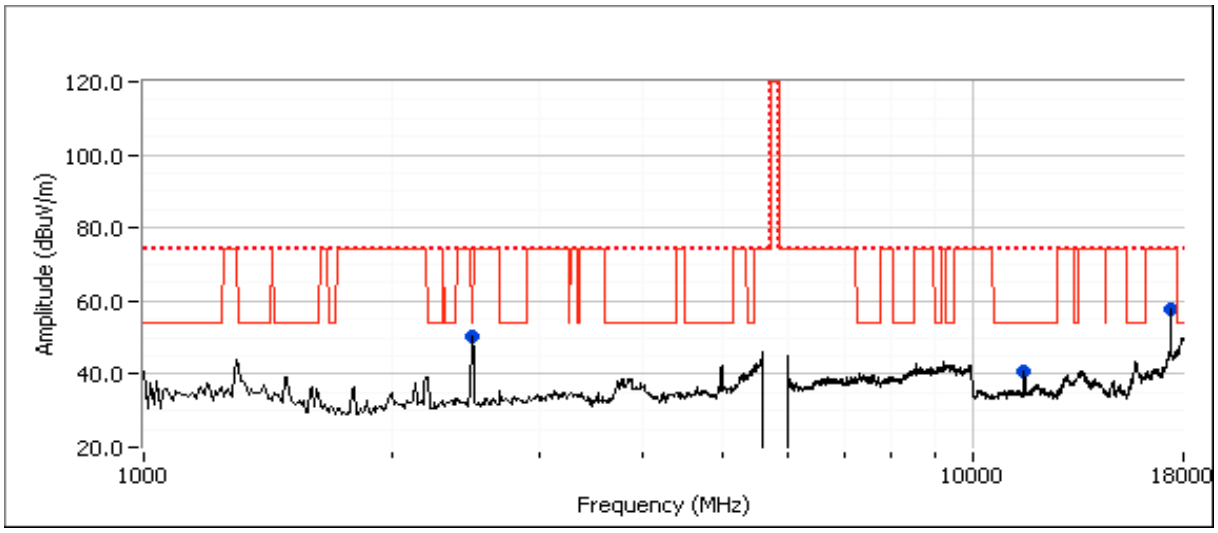
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #2b: CDD 20MHz, Channel 157 @ 5785 MHz

Fundamental Signal Field Strength: Peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5783.780	104.9	V	-	-	Pk	3	1.3	RB 100 kHz; VB: 100 kHz
5786.360	108.4	H	-	-	Pk	45	1.5	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	108.4	dBµV/m	
Limit for emissions outside of restricted bands:	78.4	dBµV/m	Limit is -30dBc (UNII power measurement)



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	
17355.520	63.5	H	74.0	-10.5	PK	233	1.0	RB 1 MHz; VB: 1 MHz
11569.850	34.7	H	54.0	-19.3	AVG	230	1.0	RB 1 MHz; VB: 10 Hz
17355.410	50.0	H	74.0	-24.0	AVG	233	1.0	RB 1 MHz; VB: 10 Hz
11569.490	47.6	H	74.0	-26.4	PK	230	1.0	RB 1 MHz; VB: 1 MHz
2492.780	26.8	V	54.0	-27.2	AVG	85	1.0	RB 1 MHz; VB: 10 Hz
2492.710	43.1	V	74.0	-30.9	PK	85	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 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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

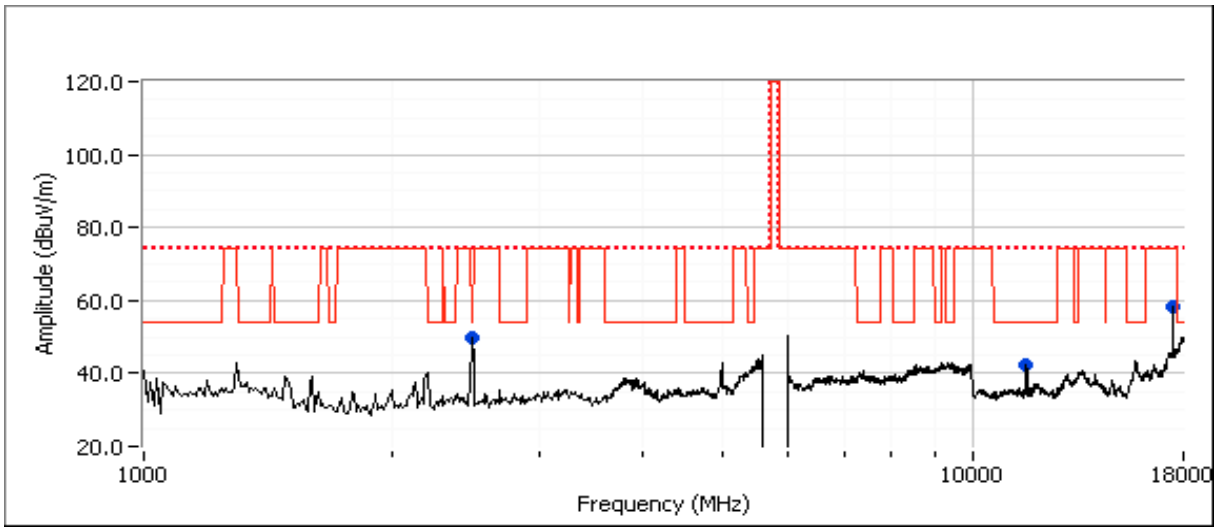
Run #2c: CDD 20MHz, Channel 165 @ 5825 MHz

Fundamental Signal Field Strength: Peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5823.770	104.8	V	-	-	Pk	18	1.2	RB 100 kHz; VB: 100 kHz
5824.420	106.8	H	-	-	Pk	42	1.7	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	106.8	dBµV/m
Limit for emissions outside of restricted bands:	76.8	dBµV/m

Limit is -30dBc (UNII power measurement)



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	
17475.670	63.8	H	74.0	-10.2	PK	221	1.0	RB 1 MHz; VB: 1 MHz
11649.950	35.7	H	54.0	-18.3	AVG	236	1.0	RB 1 MHz; VB: 10 Hz
17475.650	51.0	H	74.0	-23.0	AVG	221	1.0	RB 1 MHz; VB: 10 Hz
11649.800	48.6	H	74.0	-25.4	PK	236	1.0	RB 1 MHz; VB: 1 MHz
2498.860	24.8	V	54.0	-29.2	AVG	77	1.0	RB 1 MHz; VB: 10 Hz
2498.500	42.3	V	74.0	-31.7	PK	77	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 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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

Run #3: Radiated Spurious Emissions, 30 - 40000 MHz. Operating Mode: 802.11a CDD 40MHz

Date of Test: 1/29/2009 Test Engineer: Rafael Varelas

Test Location: FT Chamber 34 Comments: none

Run #3a: CDD 40MHz, Channel 151 @ 5755 MHz

Fundamental Signal Field Strength: Peak value measured in 100kHz

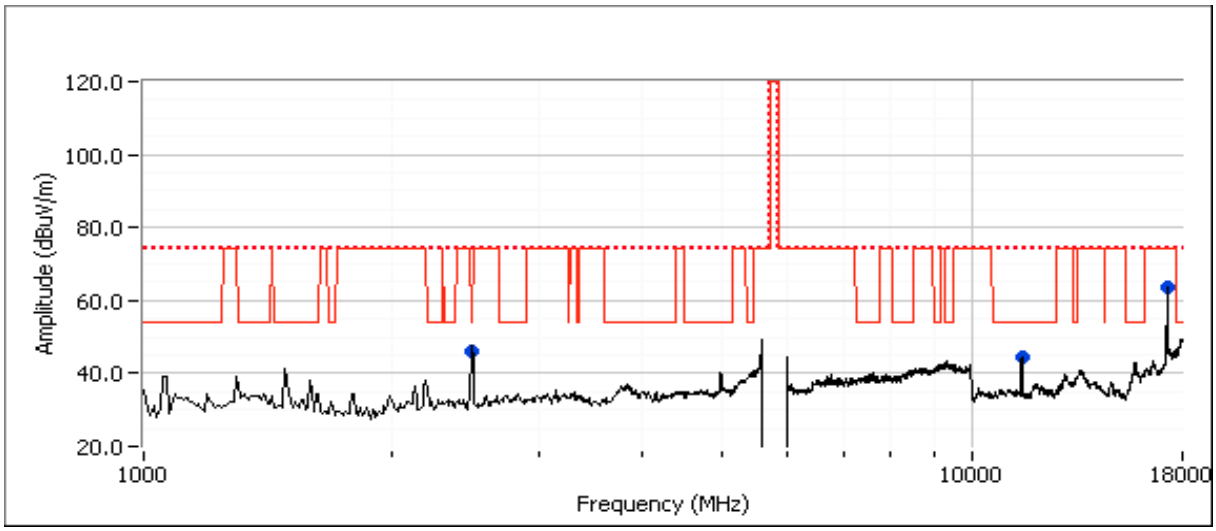
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5751.530	100.9	V	-	-	PK	178	1.5	RB 100 kHz; VB: 100 kHz
5753.400	102.3	H	-	-	PK	211	1.5	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	102.3	dBµV/m	
Limit for emissions outside of restricted bands:	72.3	dBµV/m	Limit is -30dBc (UNII power measurement)

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	
11510.180	39.7	H	54.0	-14.3	AVG	34	1.0	RB 1 MHz; VB: 10 Hz
2496.910	36.3	H	54.0	-17.7	AVG	261	1.5	RB 1 MHz; VB: 10 Hz
17263.600	55.6	H	74.0	-18.4	PK	39	1.0	RB 100 kHz; VB: 100 kHz
11510.370	54.1	H	74.0	-19.9	PK	34	1.0	RB 1 MHz; VB: 1 MHz
2498.350	53.8	H	74.0	-20.2	PK	261	1.5	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 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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	N/A

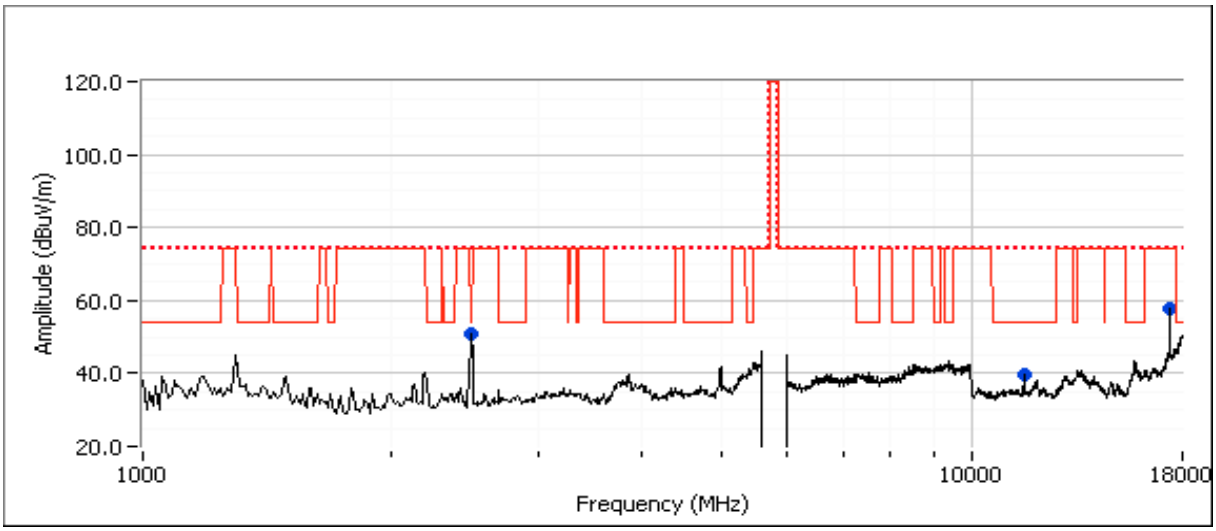
Run #3b: CDD 40MHz, Channel 159 @ 5795 MHz

Fundamental Signal Field Strength: Peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5795.700	100.6	V	-	-	Pk	22	1.2	RB 100 kHz; VB: 100 kHz
5795.700	102.1	H	-	-	Pk	34	1.5	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	102.1	dBµV/m
Limit for emissions outside of restricted bands:	72.1	dBµV/m

Limit is -30dBc (UNII power measurement)



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	
17388.210	64.7	H	74.0	-9.3	PK	222	1.3	MHz; VB: 1 MHz
17388.020	51.6	H	74.0	-22.4	AVG	222	1.3	MHz; VB: 10 Hz
11579.670	28.1	H	54.0	-25.9	AVG	237	1.6	MHz; VB: 10 Hz
2488.270	22.9	V	54.0	-31.1	AVG	84	1.0	MHz; VB: 10 Hz
2488.430	39.6	V	74.0	-34.4	PK	84	1.0	MHz; VB: 1 MHz
11579.450	39.4	H	74.0	-34.6	PK	237	1.6	MHz; VB: 1 MHz

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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII

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: 1/29/2009 & 2/12/09
Test Engineer: Rafael Varelas
Test Location: FT Chamber #4

Config. Used: 1
Config Change: None
Host Unit Voltage 120V/60Hz

General Test Configuration

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

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: 20.3 °C
Rel. Humidity: 35 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1a Rx at 2437MHz, Aux only, 802.11b	RE, 1000 - 7500 MHz, Maximized Emissions	RSS 210, LP0002	Pass	40.7dBµV/m @ 2497.8MHz (-13.3dB)
1b Rx at 2437MHz, Aux and Main, 802.11b	RE, 1000 - 7500 MHz, Maximized Emissions	RSS 210, LP0002	Pass	40.5dBµV/m @ 2498.2MHz (-13.5dB)
2a Rx at 2437MHz, Aux only, 802.11g	RE, 1000 - 7500 MHz, Maximized Emissions	RSS 210, LP0002	Pass	43.5dBµV/m @ 2496.5MHz (-10.5dB)
2b Rx at 2437MHz, Aux and Main, 802.11g	RE, 1000 - 7500 MHz, Maximized Emissions	RSS 210, LP0002	Pass	45.4dBµV/m @ 2495.6MHz (-8.6dB)
3a Rx at 5785MHz, Aux only	RE, 1000 - 18,000 MHz, Maximized Emissions	RSS 210, LP0002	Pass	41.4dBµV/m @ 2497.8MHz (-12.6dB)
3b Rx at 5785MHz, Aux and Main	RE, 1000 - 18,000 MHz, Maximized Emissions	RSS 210, LP0002	Pass	41.0dBµV/m @ 2497.2MHz (-13.0dB)
4 Rx at 5755MHz, Aux and Main, 11n 40MHz	RE, 1000 - 18,000 MHz, Maximized Emissions	RSS 210, LP0002	Pass	42.0dBµV/m @ 2490.7MHz (-12.0dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

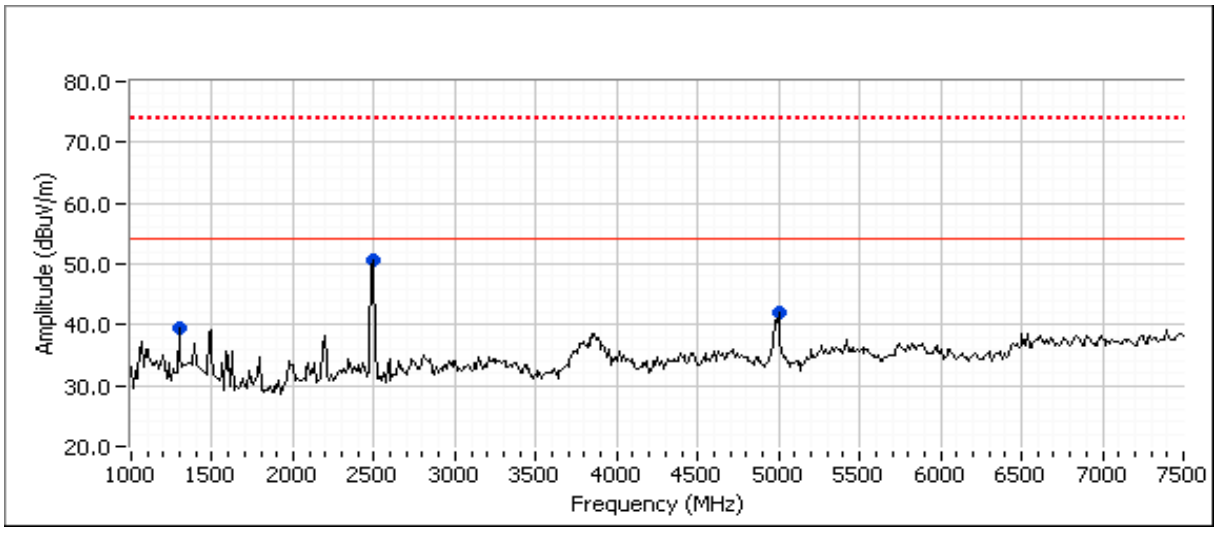
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII

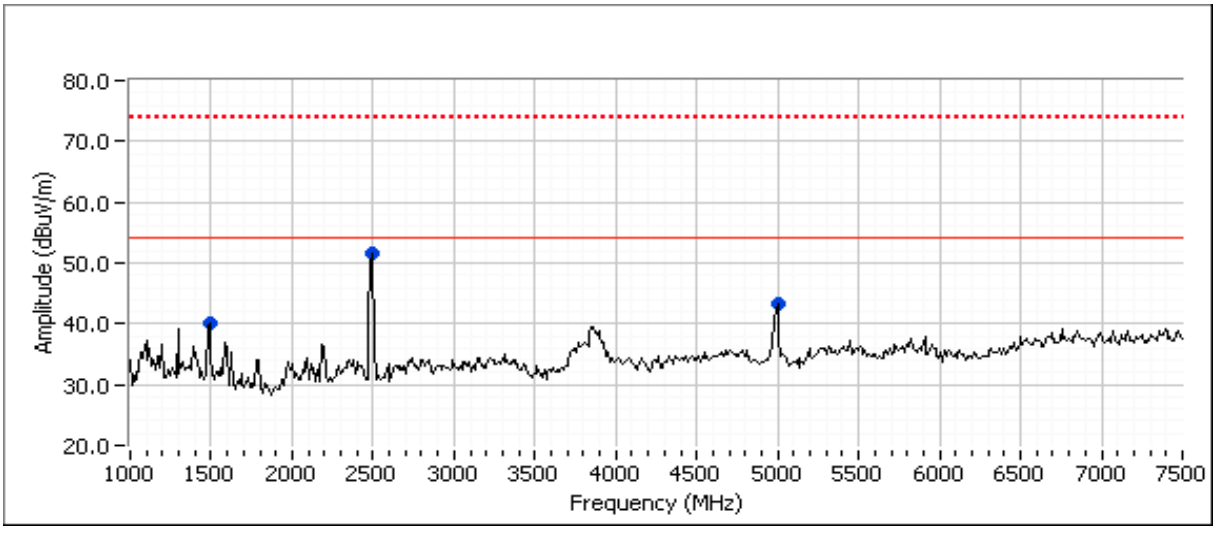
Run #1: Preliminary Radiated Emissions, 1000 - 7500 MHz (Receive mode, 2437 MHz)

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000-7500	3	3	0.0



Preliminary peak readings captured during pre-scan - Aux antenna

Frequency	Level	Pol	RSS GEN \ LP0002		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1294.140	39.6	V	54.0	-14.4	Peak	98	1.0	
2499.290	50.7	V	54.0	-3.3	Peak	214	1.9	
5000.020	41.9	H	54.0	-12.1	Peak	357	1.3	



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII

Run #1: Continued

Preliminary peak readings captured during pre-scan - Aux and Main antenna

Frequency	Level	Pol	RSS GEN \ LP0002		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.240	40.0	V	54.0	-14.0	Peak	121	1.3	
2499.670	51.6	V	54.0	-2.4	Peak	228	1.3	
4999.140	43.4	V	54.0	-10.6	Peak	207	1.3	

Maximized average and peak readings - worst-case antenna combination

Frequency	Level	Pol	RSS GEN \ LP0002		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Aux antenna								
2497.790	40.7	V	54.0	-13.3	AVG	221	1.5	RB 1 MHz; VB: 10 Hz
2498.230	58.8	V	74.0	-15.2	PK	221	1.5	RB 1 MHz; VB: 1 MHz
1295.480	32.6	V	54.0	-21.4	AVG	92	1.1	RB 1 MHz; VB: 10 Hz
4998.520	31.3	H	54.0	-22.7	AVG	355	1.3	RB 1 MHz; VB: 10 Hz
5000.710	47.7	H	74.0	-26.3	PK	355	1.3	RB 1 MHz; VB: 1 MHz
1295.530	46.3	V	74.0	-27.7	PK	92	1.1	RB 1 MHz; VB: 1 MHz
Aux and Main antenna								
2498.170	40.5	V	54.0	-13.5	AVG	219	1.2	RB 1 MHz; VB: 10 Hz
2498.230	58.7	V	74.0	-15.3	PK	219	1.2	RB 1 MHz; VB: 1 MHz
4998.060	33.5	V	54.0	-20.5	AVG	202	1.3	RB 1 MHz; VB: 10 Hz
5000.310	52.1	V	74.0	-21.9	PK	202	1.3	RB 1 MHz; VB: 1 MHz
1499.730	27.4	V	54.0	-26.6	AVG	112	1.3	RB 1 MHz; VB: 10 Hz
1499.900	40.1	V	74.0	-33.9	PK	112	1.3	RB 1 MHz; VB: 1 MHz

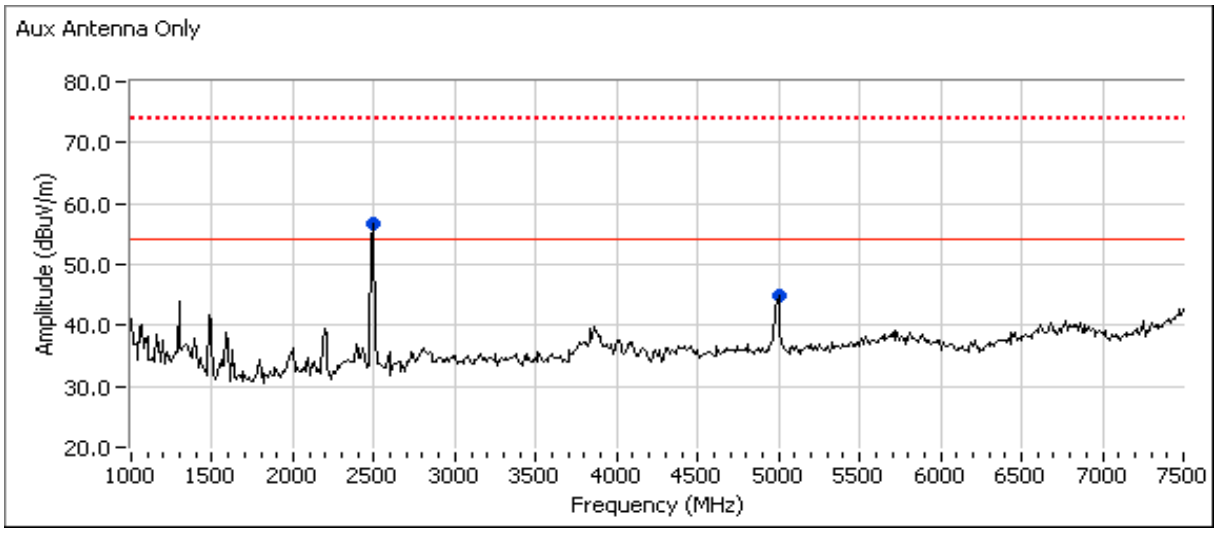
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII

Run #2: Preliminary Radiated Emissions, 1000 - 7500 MHz (Receive mode, 2437 MHz)

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000-7500	3	3	0.0

Preliminary peak readings captured during pre-scan - Aux antenna

Frequency	Level	Pol	RSS GEN \ LP0002		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2498.030	56.6	V	54.0	2.6	Peak	233	1.0	
4999.550	44.8	H	54.0	-9.2	Peak	294	1.3	

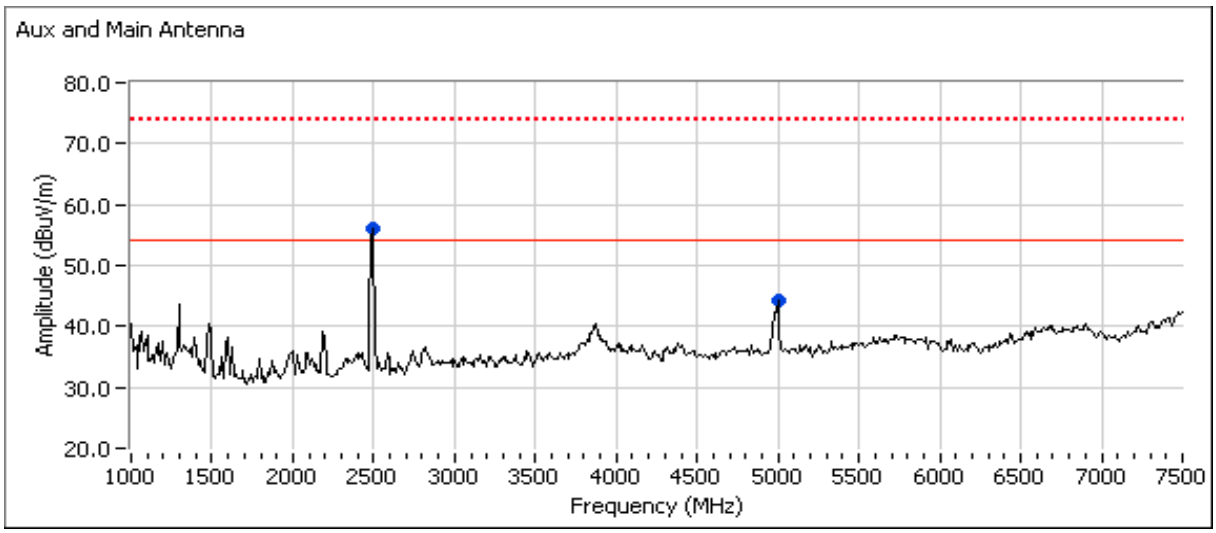


Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII

Run #2: Continued

Preliminary peak readings captured during pre-scan - Aux and Main antenna

Frequency	Level	Pol	RSS GEN \ LP0002		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2496.620	56.2	V	54.0	2.2	Peak	257	1.3	
5010.150	44.3	H	54.0	-9.7	Peak	136	1.6	



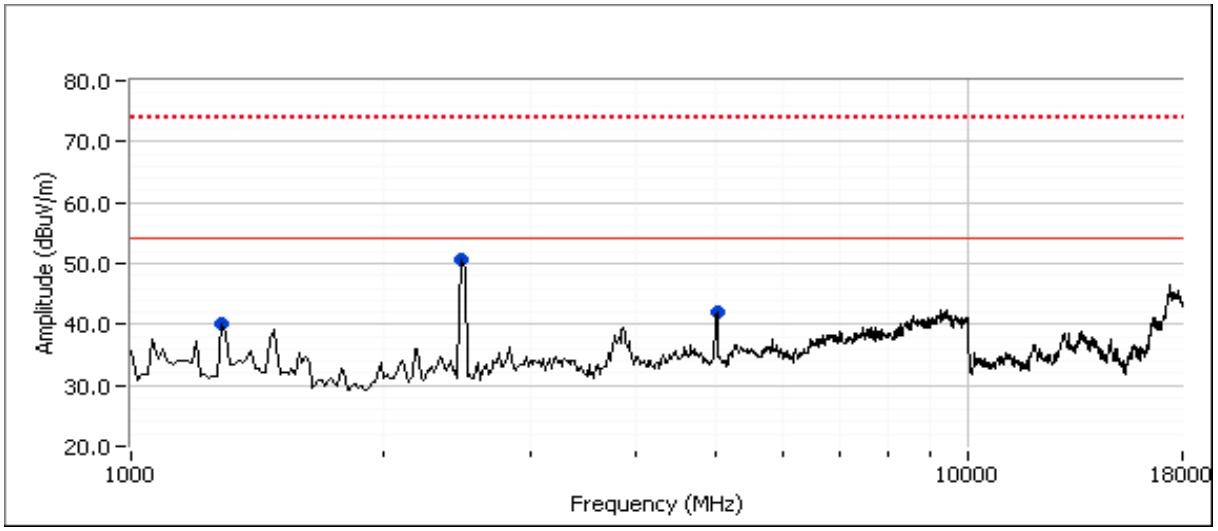
Maximized average and peak readings - worst-case antenna combination

Frequency	Level	Pol	RSS GEN \ LP0002		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Aux antenna								
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2496.530	43.5	V	54.0	-10.5	AVG	234	1.0	RB 1 MHz; VB: 10 Hz
2499.520	61.4	V	74.0	-12.6	PK	234	1.0	RB 1 MHz; VB: 1 MHz
4998.080	34.5	H	54.0	-19.5	AVG	290	1.3	RB 1 MHz; VB: 10 Hz
4999.420	52.3	H	74.0	-21.7	PK	290	1.3	RB 1 MHz; VB: 1 MHz
Aux and Main antenna								
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2495.620	45.4	V	54.0	-8.6	AVG	250	1.3	RB 1 MHz; VB: 10 Hz
2497.920	62.6	V	74.0	-11.4	PK	250	1.3	RB 1 MHz; VB: 1 MHz
5010.680	30.3	H	54.0	-23.7	AVG	131	1.6	RB 1 MHz; VB: 10 Hz
5010.430	41.7	H	74.0	-32.3	PK	131	1.6	RB 1 MHz; VB: 1 MHz

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII

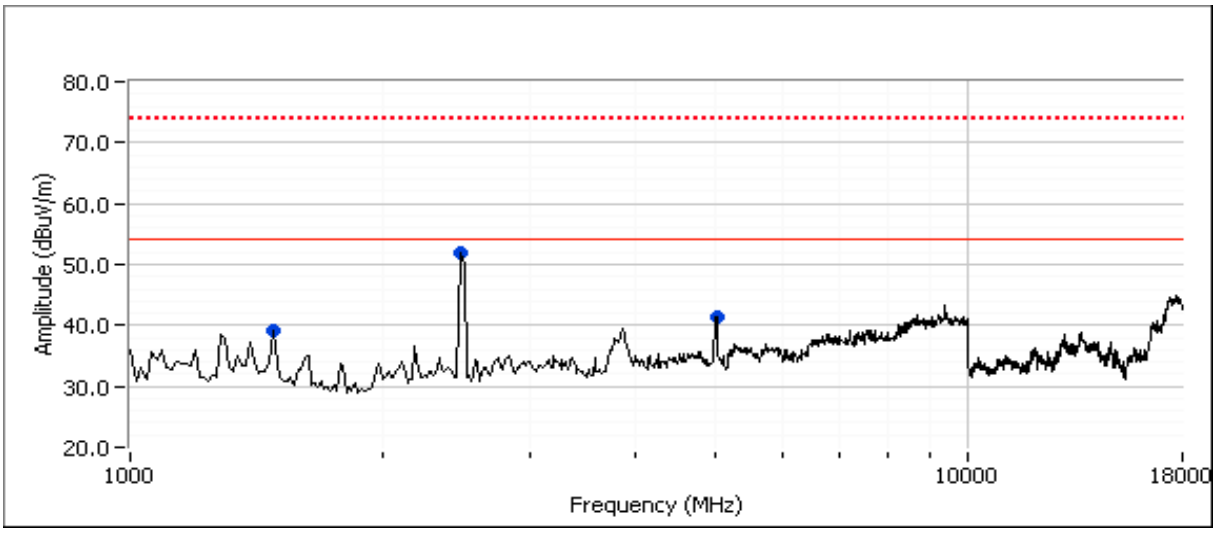
Run #3: Preliminary Radiated Emissions, 1000 - 18000 MHz (Receive mode, 5785 MHz)

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



Preliminary peak readings captured during pre-scan - Aux antenna

Frequency	Level	Pol	RSS GEN \ LP0002		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1294.080	40.1	V	54.0	-13.9	Peak	8	1.0	
2499.330	50.7	V	54.0	-3.3	Peak	207	1.9	
4986.830	41.9	H	54.0	-12.1	Peak	284	1.3	



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII

Run #3: Continued

Preliminary peak readings captured during pre-scan - Aux and Main antenna

Frequency	Level	Pol	RSS GEN \ LP0002		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1493.800	39.3	V	54.0	-14.7	Peak	40	1.9	
2498.630	52.0	V	54.0	-2.0	Peak	215	1.3	
4999.930	41.4	V	54.0	-12.6	Peak	192	1.3	

Maximized average and peak readings - worst-case antenna combination

Frequency	Level	Pol	RSS GEN \ LP0002		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Aux antenna								
2497.830	41.4	V	54.0	-12.6	AVG	226	1.5	RB 1 MHz; VB: 10 Hz
2498.040	59.6	V	74.0	-14.4	PK	226	1.5	RB 1 MHz; VB: 1 MHz
4987.680	33.6	H	54.0	-20.4	AVG	277	1.4	RB 1 MHz; VB: 10 Hz
1295.520	32.3	V	54.0	-21.7	AVG	0	1.0	RB 1 MHz; VB: 10 Hz
4986.350	49.7	H	74.0	-24.3	PK	277	1.4	RB 1 MHz; VB: 1 MHz
1295.560	45.7	V	74.0	-28.3	PK	0	1.0	RB 1 MHz; VB: 1 MHz
Aux and Main antenna								
2497.150	41.0	V	54.0	-13.0	AVG	219	1.2	RB 1 MHz; VB: 10 Hz
2498.080	58.8	V	74.0	-15.2	PK	219	1.2	RB 1 MHz; VB: 1 MHz
4998.430	30.3	V	54.0	-23.7	AVG	192	1.5	RB 1 MHz; VB: 10 Hz
5000.030	45.5	V	74.0	-28.5	PK	192	1.5	RB 1 MHz; VB: 1 MHz
1494.940	25.0	V	54.0	-29.0	AVG	59	1.9	RB 1 MHz; VB: 10 Hz
1492.500	37.1	V	74.0	-36.9	PK	59	1.9	RB 1 MHz; VB: 1 MHz

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII

Run #4: Preliminary Radiated Emissions, 1000 - 18000 MHz (Receive mode, 5755 MHz)
11n 40MHz Mode

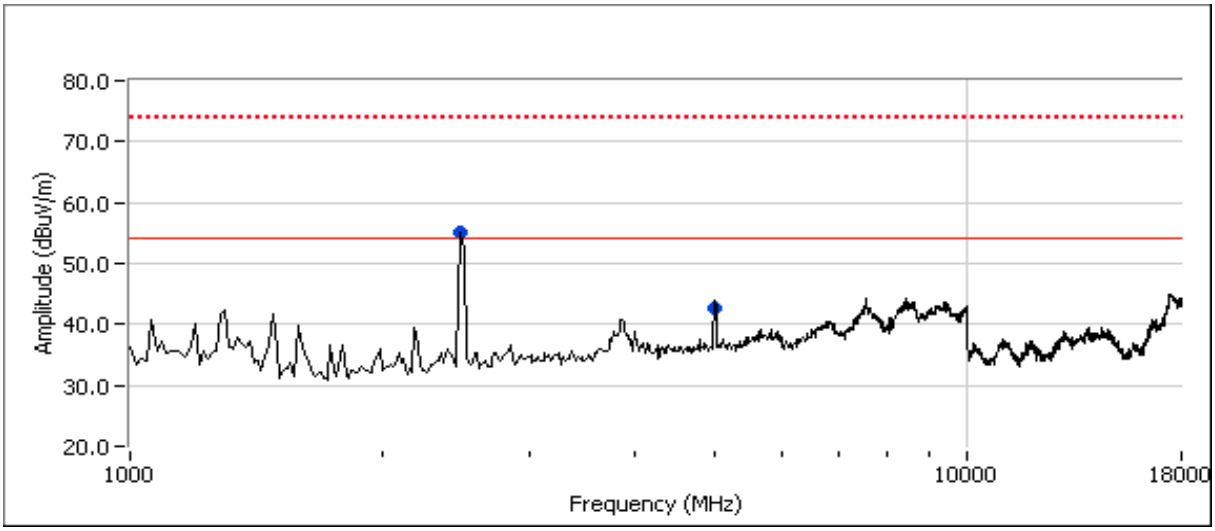
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000-18000	3	3	0.0

Preliminary peak readings captured during pre-scan - Aux antenna

Frequency	Level	Pol	RSS GEN \ LP0002		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2489.340	55.2	V	54.0	1.2	Peak	219	1.6	
4990.900	42.8	V	54.0	-11.2	Peak	174	1.6	

Maximized average and peak readings - worst-case antenna combination

Frequency	Level	Pol	RSS GEN \ LP0002		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2490.740	42.0	V	54.0	-12.0	AVG	218	1.6	RB 1 MHz; VB: 10 Hz
2488.910	59.1	V	74.0	-14.9	PK	218	1.6	RB 1 MHz; VB: 1 MHz
4989.770	33.2	V	54.0	-20.8	AVG	173	1.6	RB 1 MHz; VB: 10 Hz
4991.240	48.5	V	74.0	-25.5	PK	173	1.6	RB 1 MHz; VB: 1 MHz



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII

Conducted 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: 1/29/2009
Test Engineer: Rafael Varelas
Test Location: FT Chamber #4

Config. Used: 2
Config Change: None
Host Unit Voltage 110V/60Hz

General Test Configuration

For tabletop equipment, the EUT was located on a wooden table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment. Remote support equipment was located outside of the semi-anechoic chamber. Any cables running to remote support equipment where routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

Ambient Conditions:

Temperature: 20.3 °C
Rel. Humidity: 35 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,110V/60Hz	FCC 15.207, RSS 210, LP0002	Pass	34.8dBµV @ 3.622MHz (-11.2dB)

Modifications Made During Testing

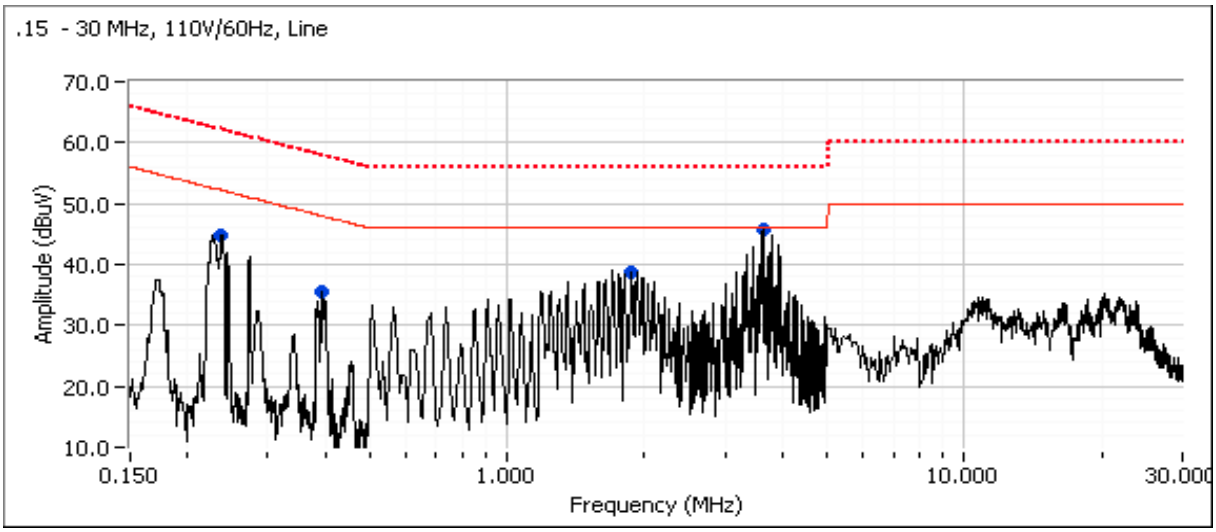
No modifications were made to the EUT during testing

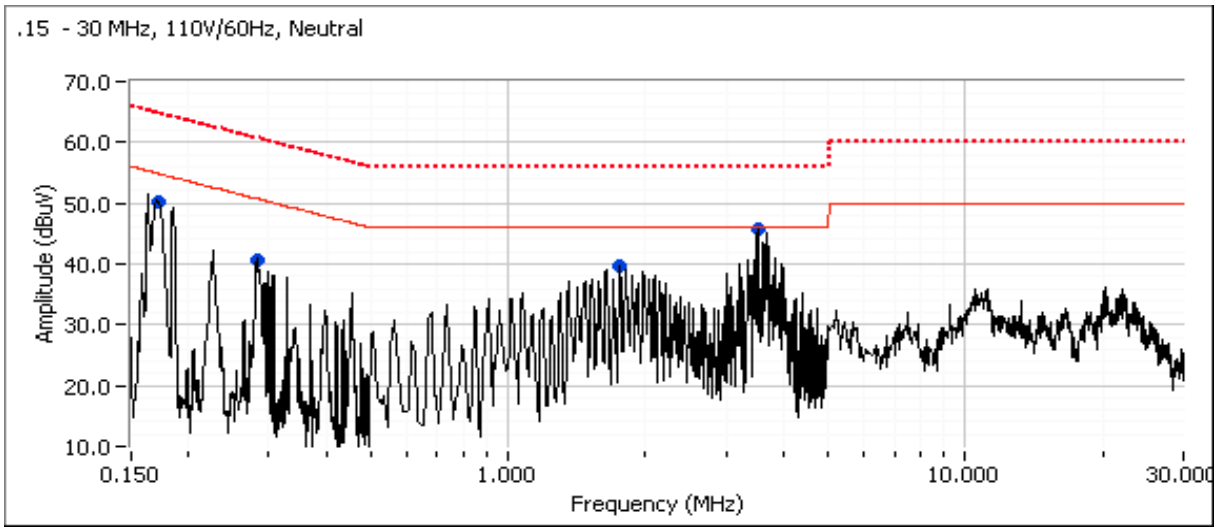
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII

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





Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74145
		Account Manager:	Eriksen / Washington
Contact:	Anne Liang		
Standard:	FCC 15.247, FCC 15E, RSS 210, LP0002	Class:	DTS/NII

Run #1: Continued

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

Frequency	Level	AC	FCC/RSS 210/LP0002		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.237	44.9	Line 1	52.2	-7.3	Peak	
0.395	35.5	Line 1	48.0	-12.5	Peak	
3.622	45.8	Line 1	46.0	-0.2	Peak	
1.868	38.8	Line 1	46.0	-7.2	Peak	
0.170	50.3	Neutral	54.9	-4.6	Peak	
0.283	40.7	Neutral	50.7	-10.0	Peak	
3.499	45.9	Neutral	46.0	-0.1	Peak	
1.754	39.8	Neutral	46.0	-6.2	Peak	

Final quasi-peak and average readings

Frequency	Level	AC	FCC/RSS 210/LP0002		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
3.622	34.8	Line 1	46.0	-11.2	AVG	AVG (0.10s)
1.754	34.6	Neutral	46.0	-11.4	AVG	AVG (0.10s)
3.622	44.5	Line 1	56.0	-11.5	QP	QP (1.00s)
1.868	33.7	Line 1	46.0	-12.3	AVG	AVG (0.10s)
0.170	50.2	Neutral	65.0	-14.8	QP	QP (1.00s)
0.170	39.5	Neutral	55.0	-15.5	AVG	AVG (0.10s)
1.754	38.0	Neutral	56.0	-18.0	QP	QP (1.00s)
1.868	37.3	Line 1	56.0	-18.7	QP	QP (1.00s)
3.499	37.0	Neutral	56.0	-19.0	QP	QP (1.00s)
3.499	25.2	Neutral	46.0	-20.8	AVG	AVG (0.10s)
0.237	37.7	Line 1	62.2	-24.5	QP	QP (1.00s)
0.237	16.9	Line 1	52.2	-35.3	AVG	AVG (0.10s)

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		-
Emissions Standard(s):	FCC 15.247 & 15.205	Class:	B
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Broadcom

Model

BCM943224HMS

Date of Last Test: 3/17/2009

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	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: 2/5/2009
Test Engineer: rvarelas
Test Location: Fremont Chamber #4

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 20.7 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Pwr setting	Power	Test Performed	Limit	Pass / Fail	Result / Margin
1	-	-	Output Power (Peak)	15.247(b)	Pass	28.3 dBm EIRP
2	-	-	Power spectral Density (PSD)	15.247(d)	Pass	-3.5 dBm/3kHz
3	-	-	Minimum 6dB Bandwidth	15.247(a)	Pass	14.8 MHz
3	-	-	99% Bandwidth	RSS GEN	-	17.1 MHz
4	-	-	Spurious emissions	15.247(b)	Pass	> 20dBc

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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #1: Output Power (Peak)

Power Setting	Frequency (MHz)	Output Power (dBm) [1]	Output Power mW	Antenna Gain (dBi)	Result	EIRP dBm	EIRP W	Output Power (dBm)	Output Power mW
Main Chain									
-	2412	22.4	173.8	3.9	Pass	26.3	0.427		
-	2417	24.4	275.4	3.9	Pass	28.3	0.676		
-	2437	24.4	275.4	3.9	Pass	28.3	0.676		
-	2457	23.3	213.8	3.9	Pass	27.2	0.525		
-	2462	21.4	138.0	3.9	Pass	25.3	0.339		
Aux Chain									
-	2412	23.3	213.8	3.9	Pass	27.2	0.525		
-	2417	24.4	275.4	3.9	Pass	28.3	0.676		
-	2437	24.4	275.4	3.9	Pass	28.3	0.676		
-	2457	23.4	218.8	3.9	Pass	27.3	0.537		
-	2462	21.8	151.4	3.9	Pass	25.7	0.372		

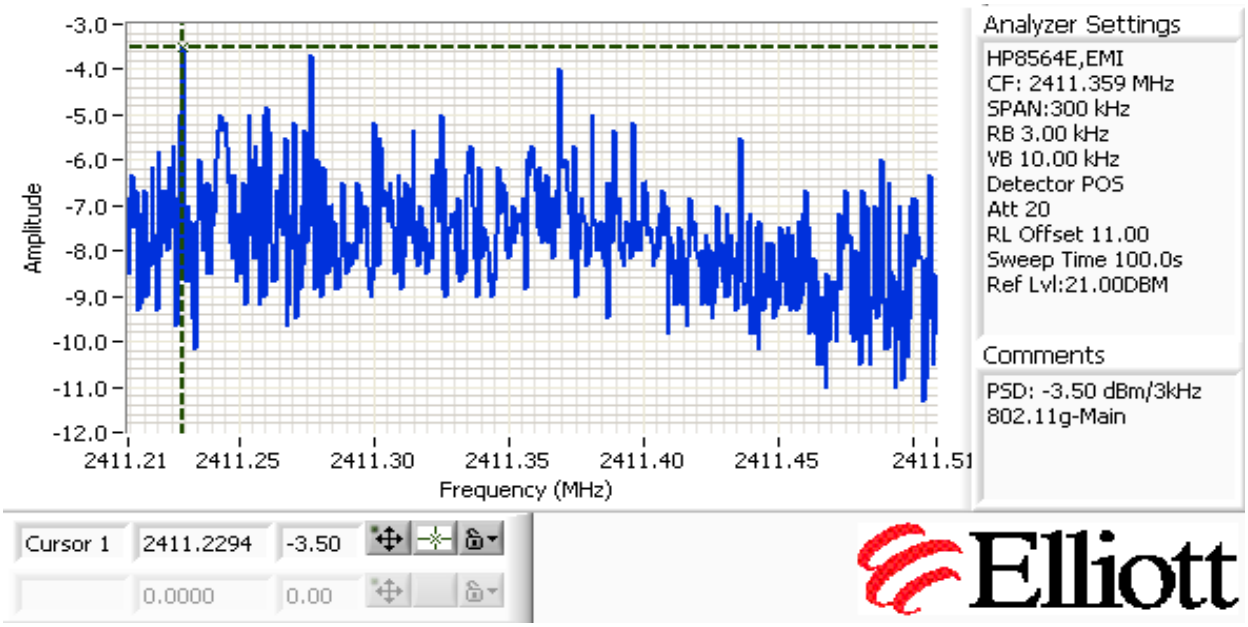
Note 1:	Power measured using Peak Power Sonsor. Spurious limit is -20dBc because this method was used.
Note 2:	
Note 3:	

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

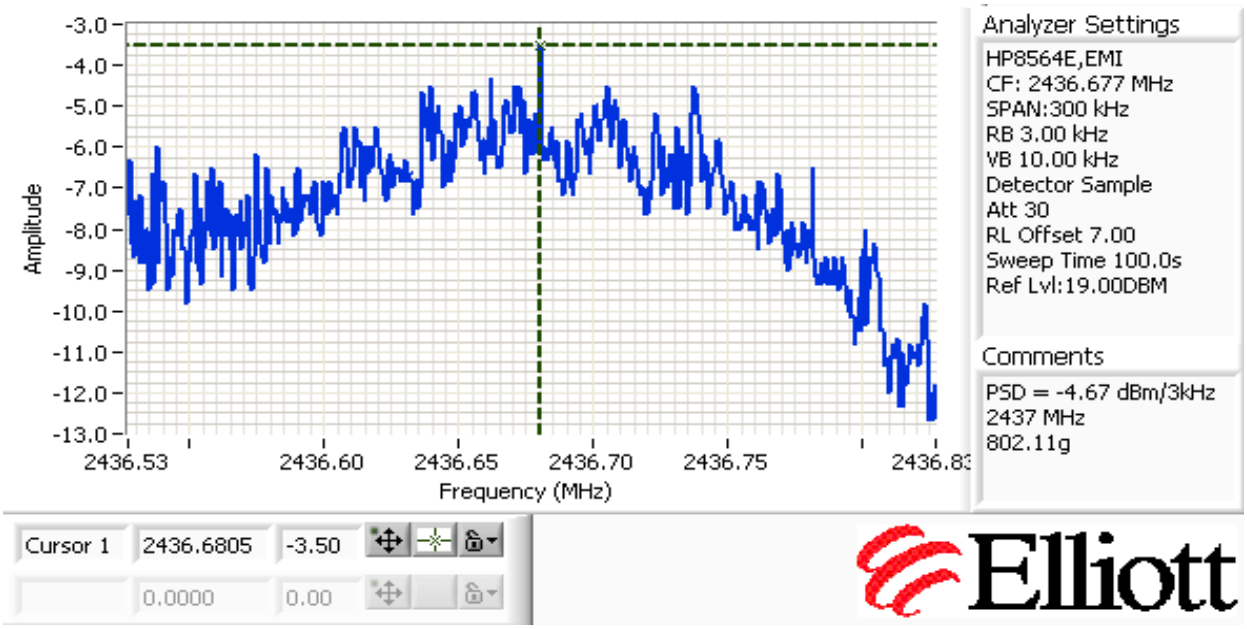
Run #2: Power spectral Density

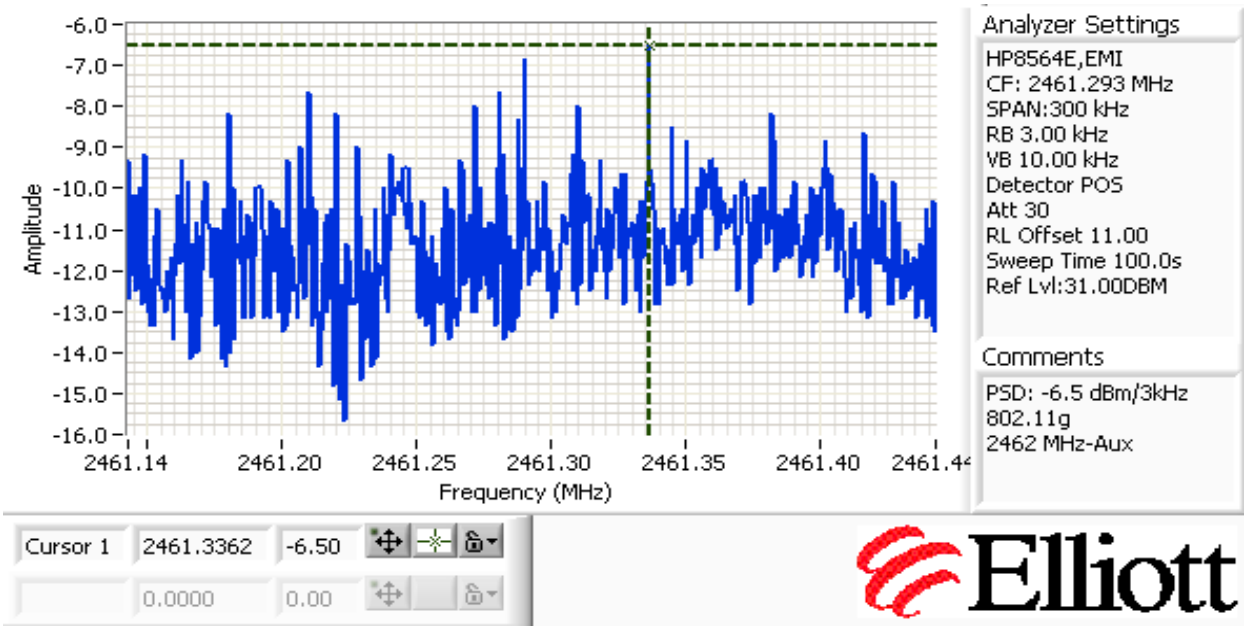
Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
	2412	-3.5	8.0	Pass
	2437	-3.5	8.0	Pass
	2462	-6.5	8.0	Pass

Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A



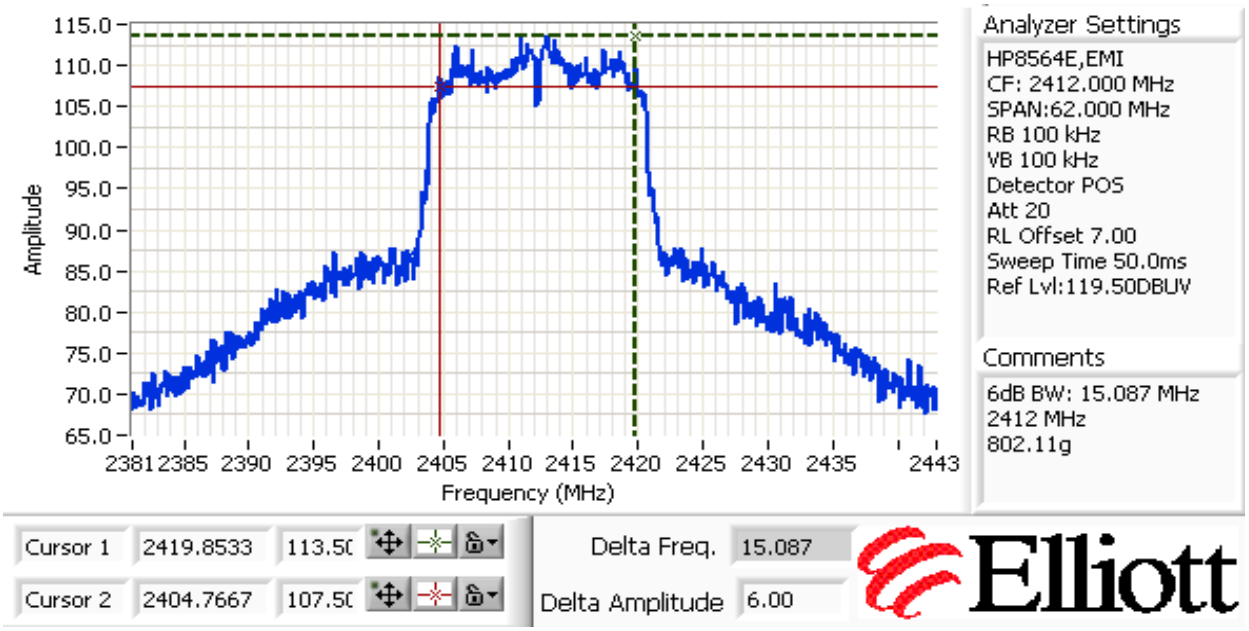


Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

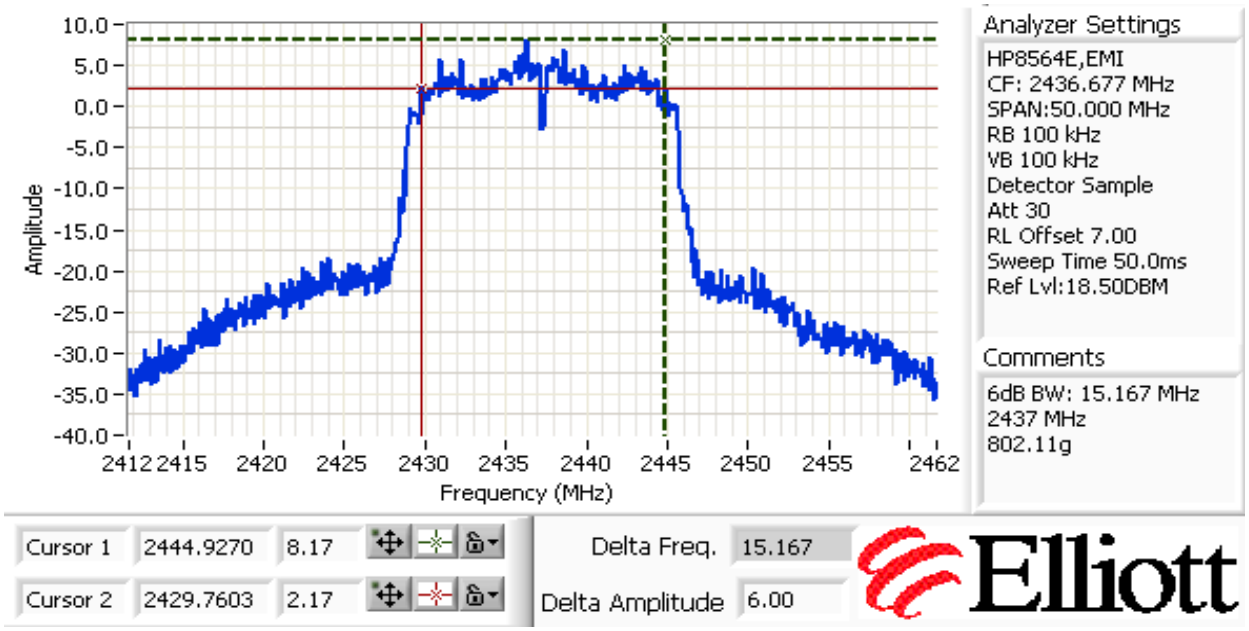
Run #3: Signal Bandwidth

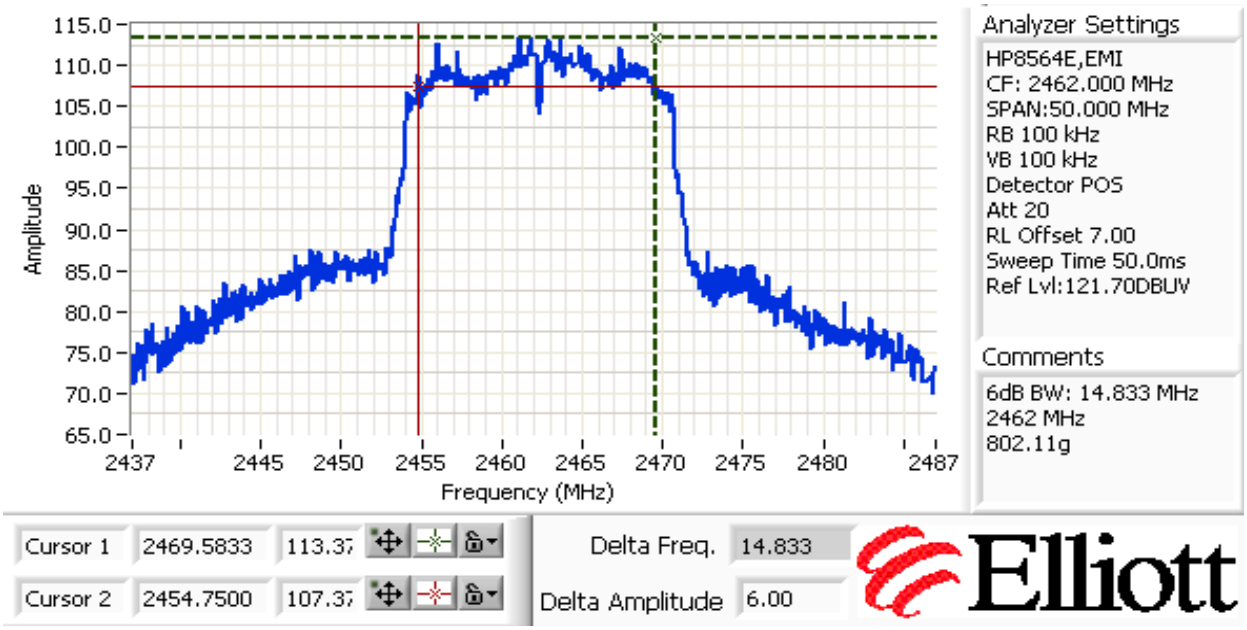
Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
	2412	100kHz	15.1	17.0
	2437	100kHz	15.2	17.1
	2462	100kHz	14.8	17.0

Note 1:	99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB

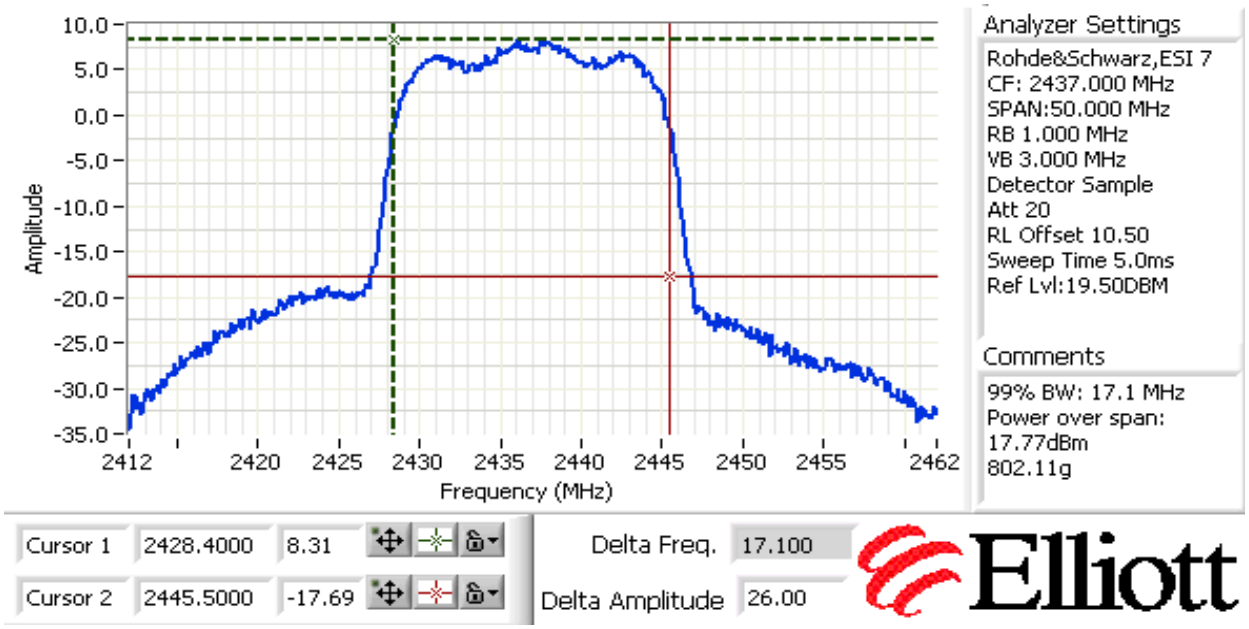


Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A





Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

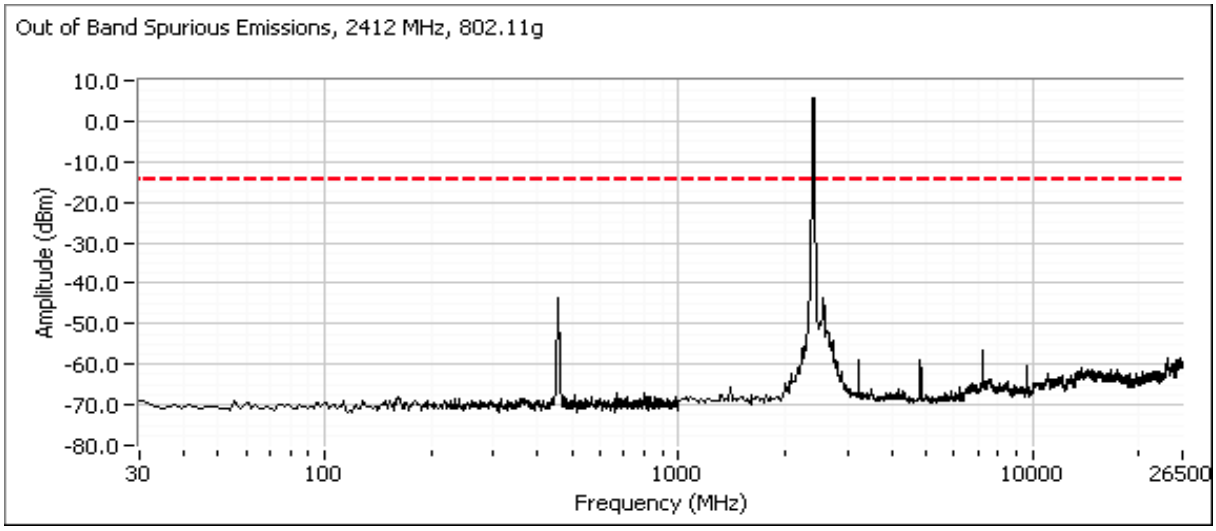


Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

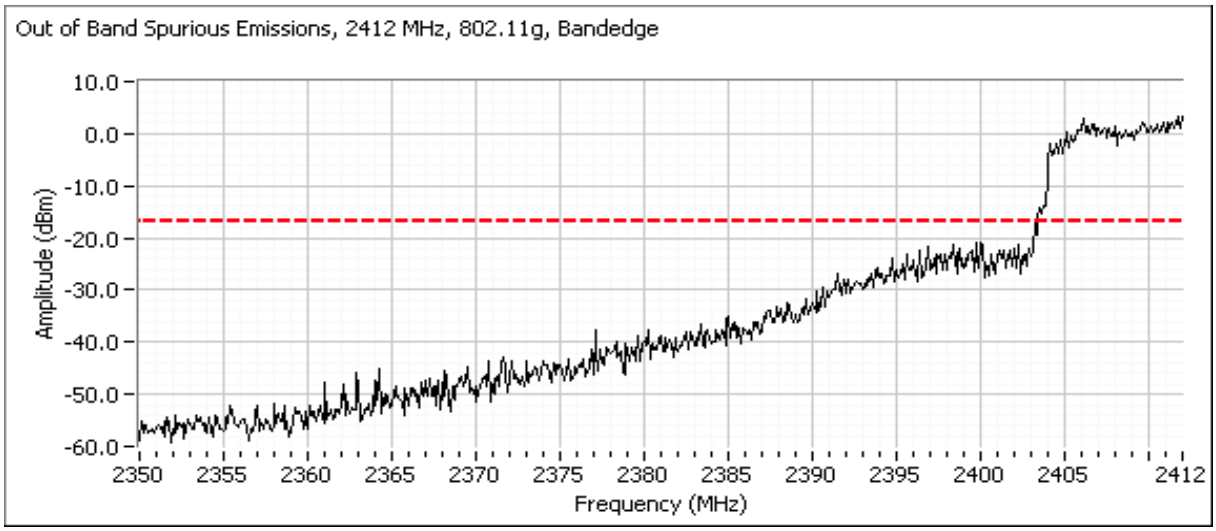
Run #4: Out of Band Spurious Emissions

Frequency (MHz)	Limit	Result
2412	-20dBc	Pass
2437	-20dBc	Pass
2462	-20dBc	Pass

Plots for low channel 2412 MHz



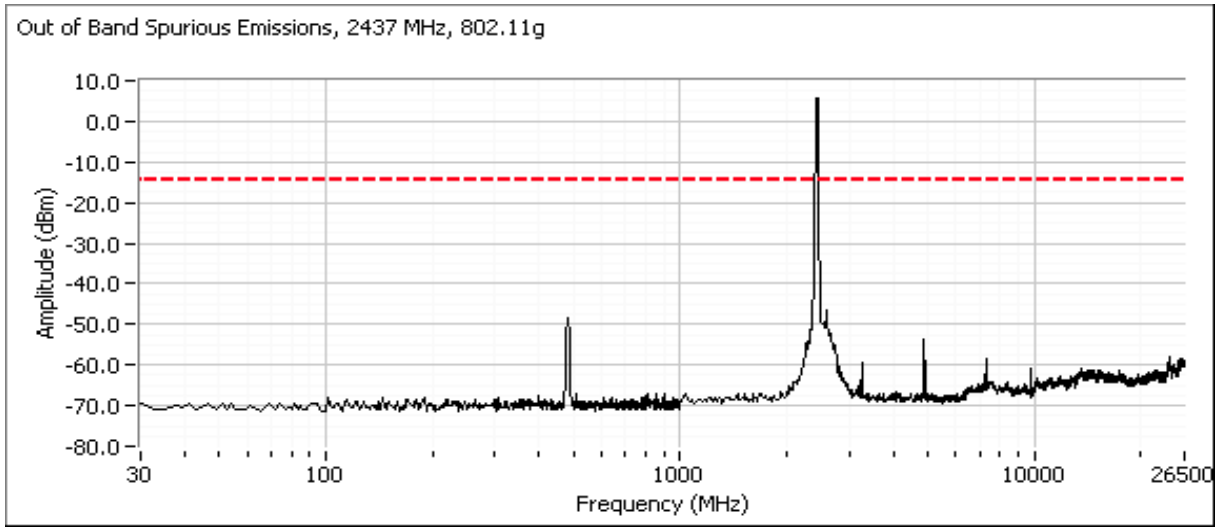
Additional plot showing compliance with -20dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



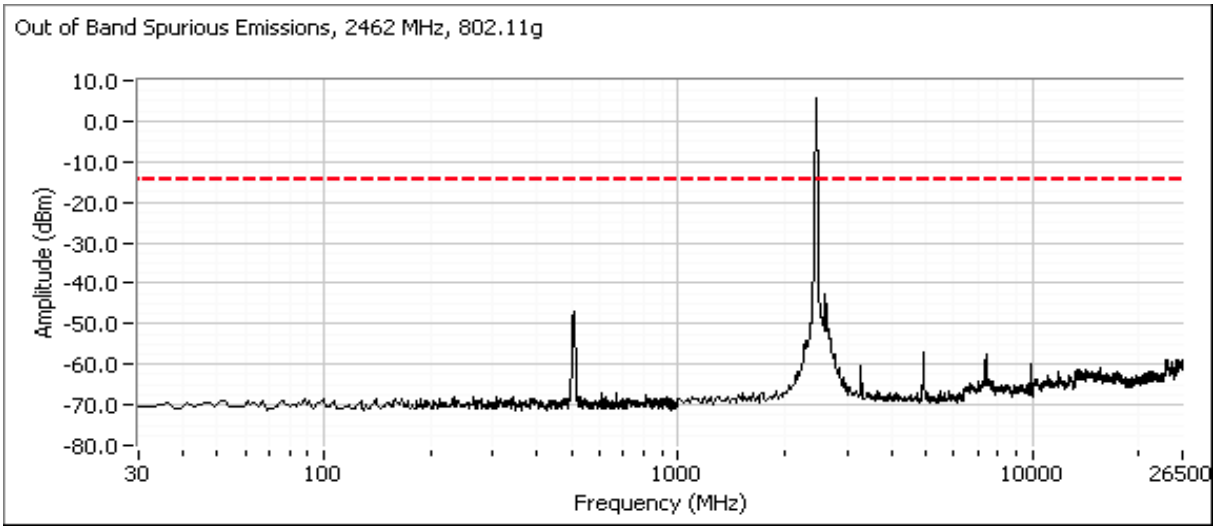
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #4: Continued

Plots for center channel 2437 MHz



Plots for high channel



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	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: 2/5/2009
Test Engineer: rvarelas
Test Location: Fremont Chamber #4

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 20.7 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	-	-	Output Power	15.247(b)	Pass	23.3 dBm EIRP
2	-	-	Power spectral Density (PSD)	15.247(d)	Pass	-2.2 dBm/3kHz
3	-	-	Minimum 6dB Bandwidth	15.247(a)	Pass	7.1 MHz
3	-	-	99% Bandwidth	RSS GEN	-	10.8 MHz
4	-	-	Spurious emissions	15.247(b)	Pass	>30dBc below the limit

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

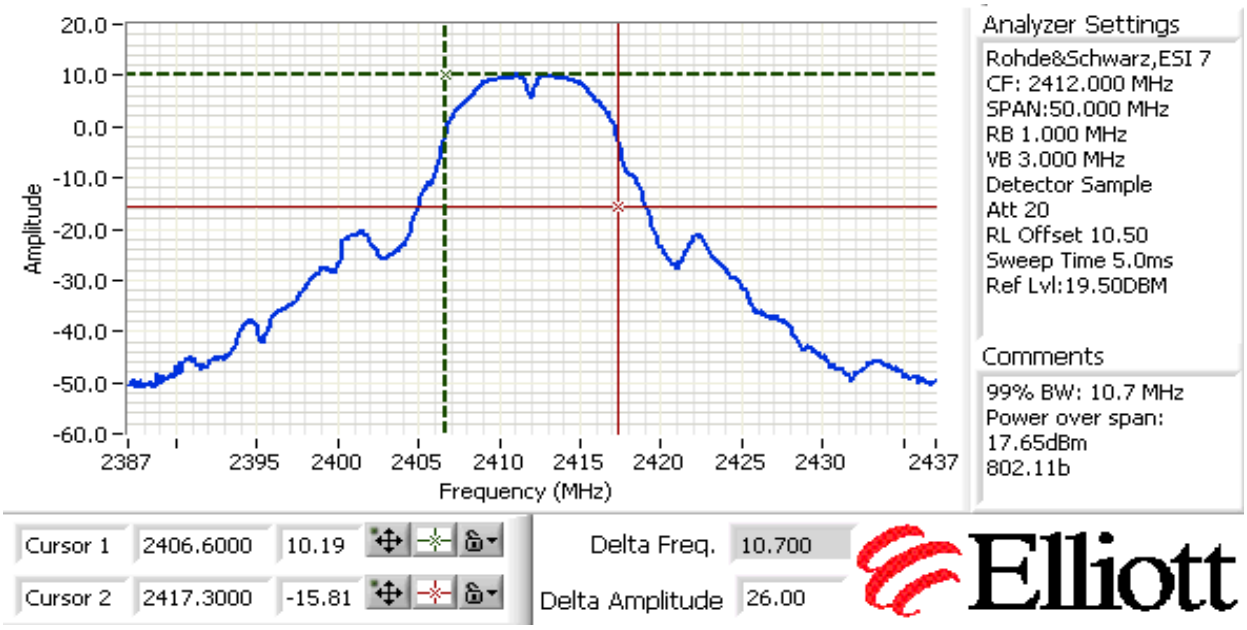
No deviations were made from the requirements of the standard.

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #1: Output Power

Power Setting	Frequency (MHz)	Output Power (dBm) [1]	Output Power mW	Antenna Gain (dBi)	Result	EIRP dBm	EIRP W		
-	2412	17.7	58.9	3.9	Pass	21.6	0.145		
-	2437	17.6	57.5	3.9	Pass	21.5	0.141		
-	2462	16.8	47.5	3.9	Pass	20.7	0.117		

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:	
Note 3:	

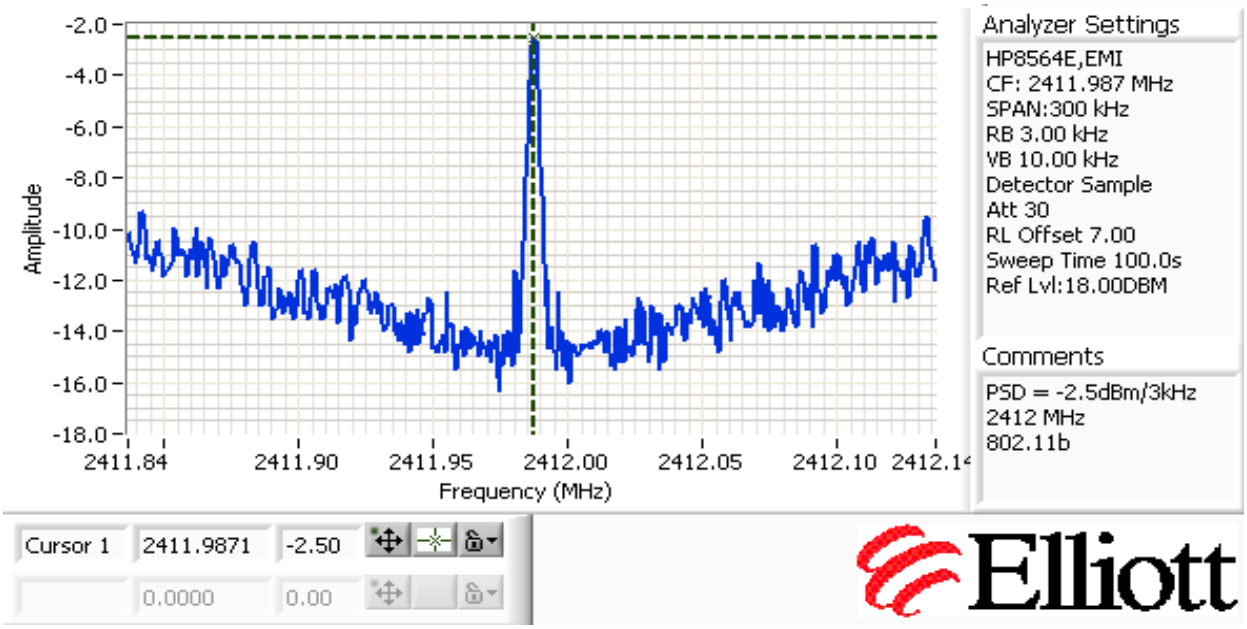


Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #2: Power spectral Density

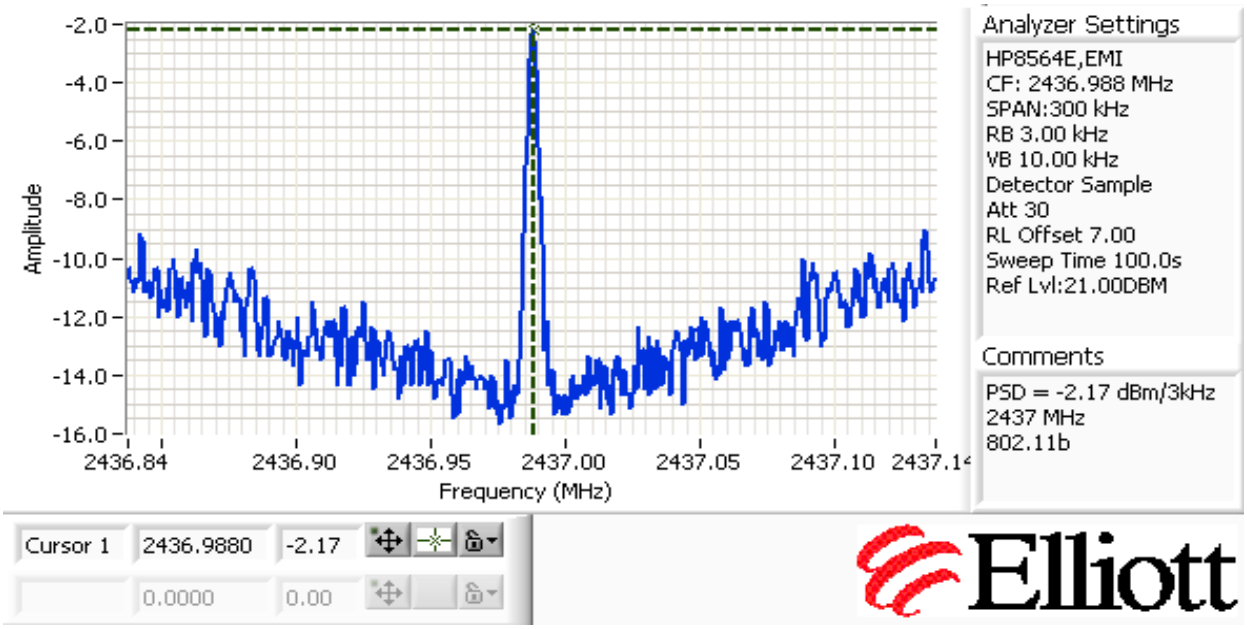
Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
-	2412	-2.5	8.0	Pass
-	2437	-2.2	8.0	Pass
-	2462	-2.8	8.0	Pass

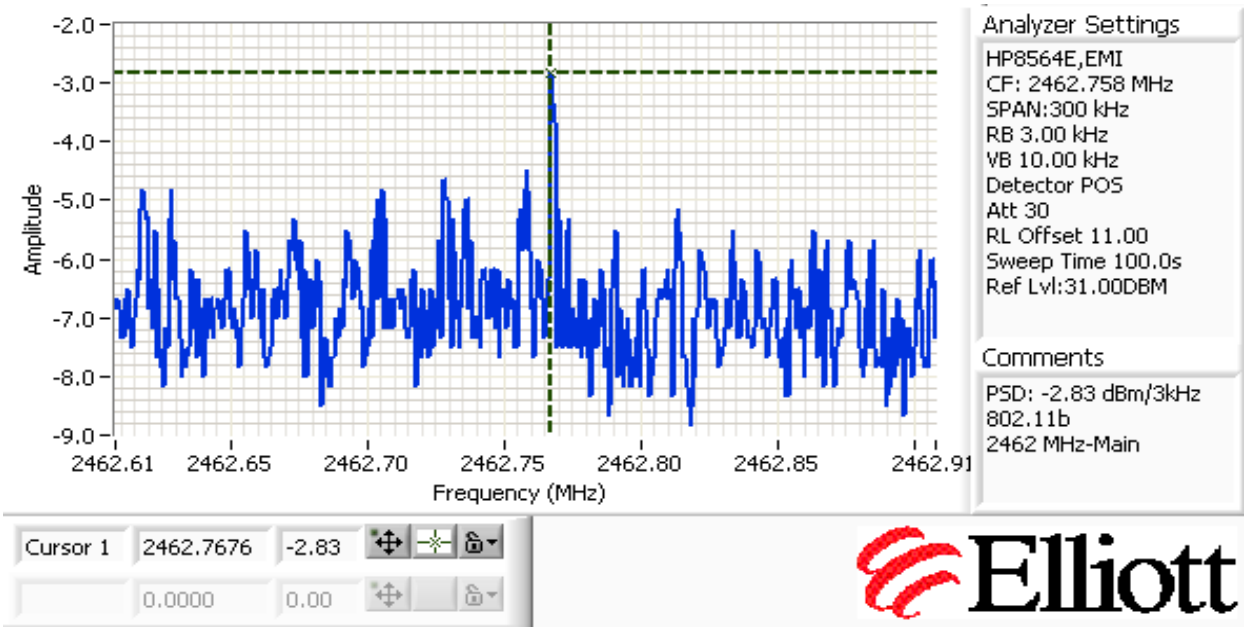
Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #2: Continued



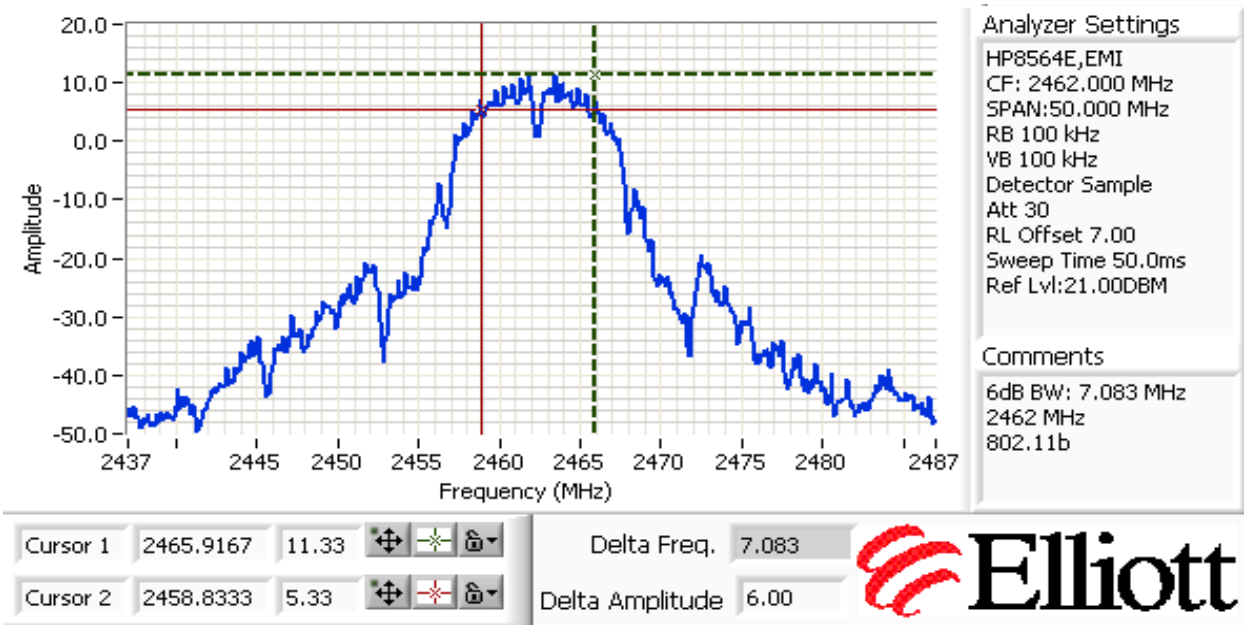


Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #3: Signal Bandwidth

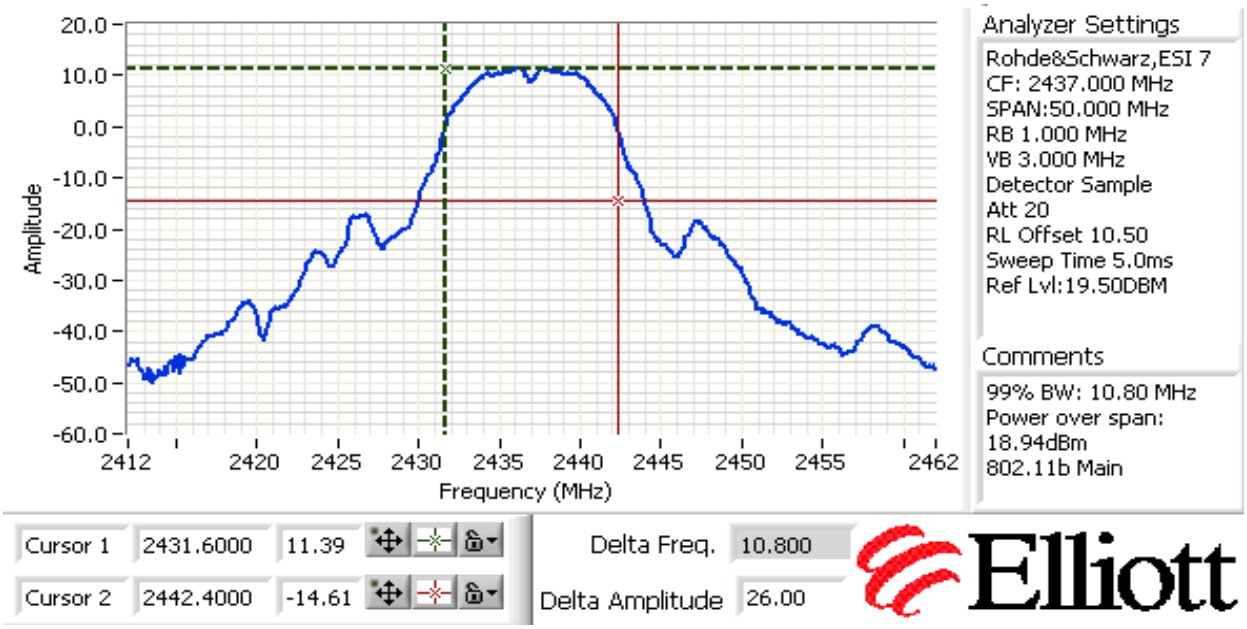
Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
-	2412	100kHz	7.6	10.8
-	2437	100kHz	7.6	10.8
-	2462	100kHz	7.1	10.7

Note 1:	99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #3: Continued

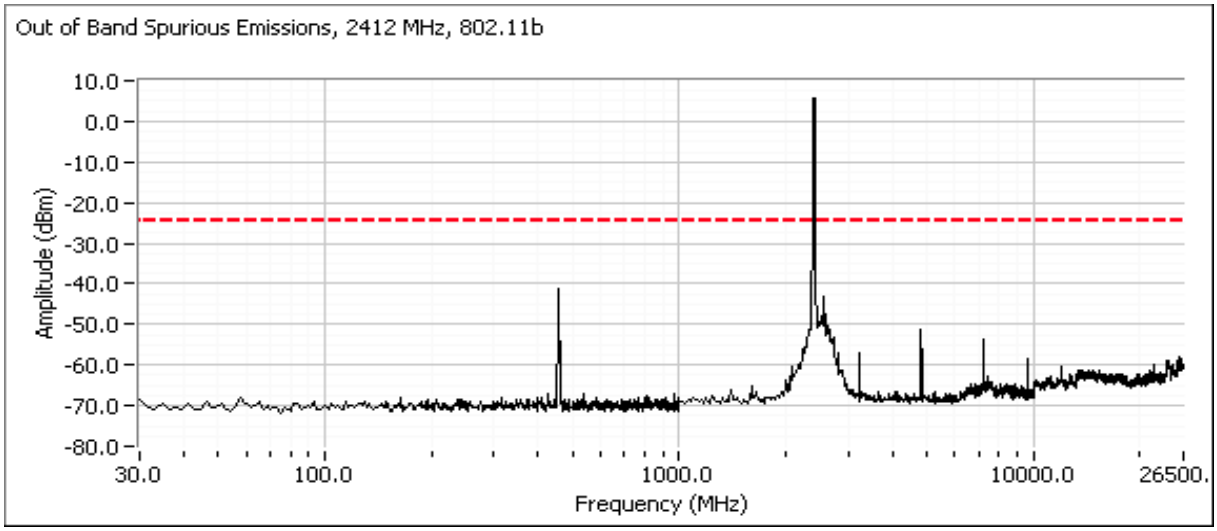


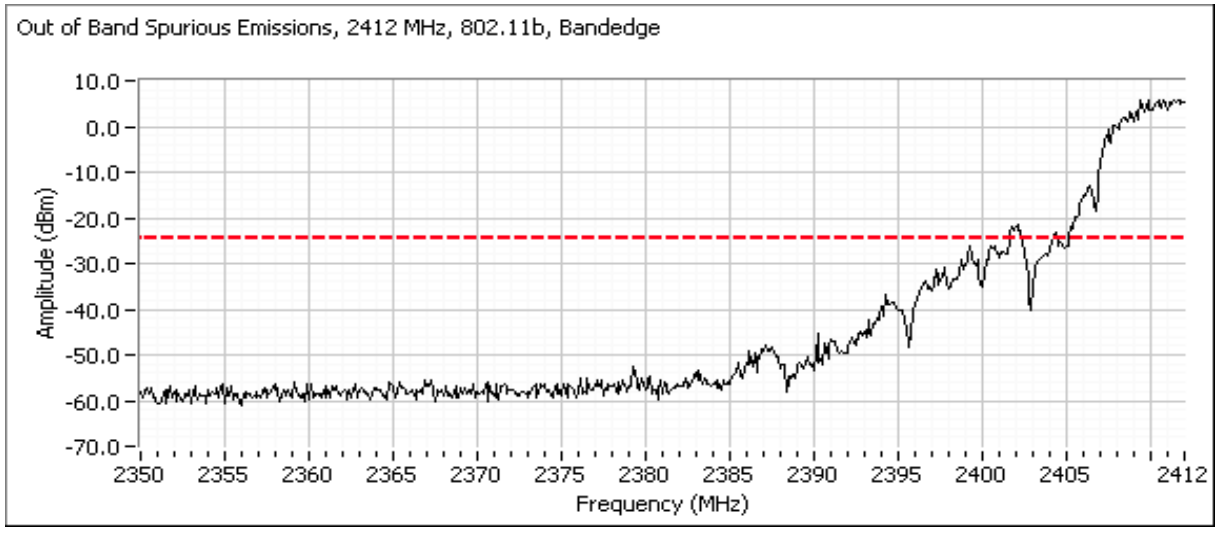
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #4: Out of Band Spurious Emissions

Frequency (MHz)	Limit	Result
2412	-30dBc	Pass
2437	-30dBc	Pass
2462	-30dBc	Pass

Plots for low channel

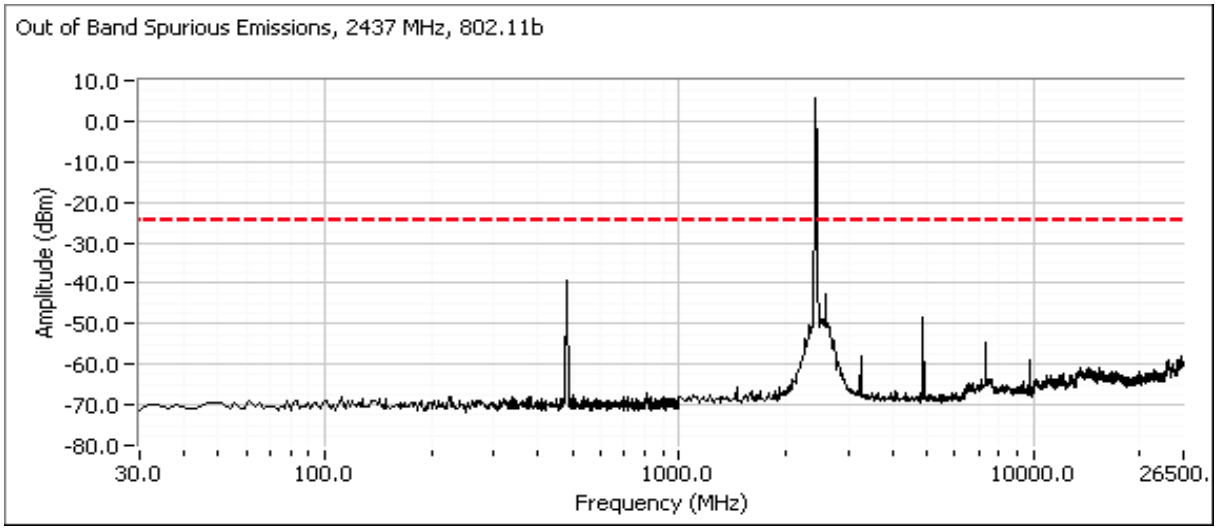




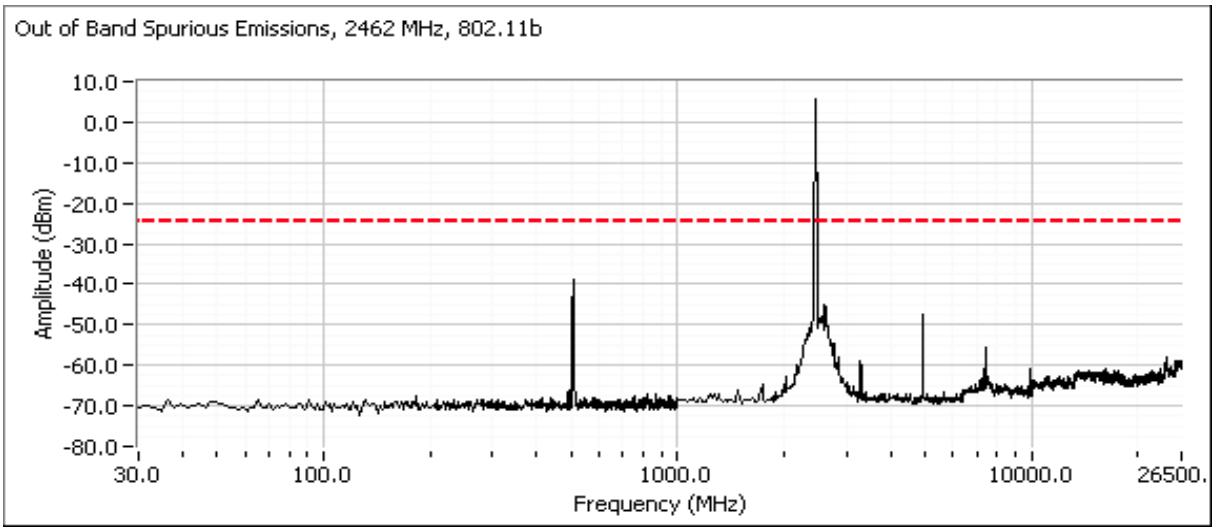
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #4: Continued

Plots for center channel



Plots for high channel



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
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: 2/6/2009
Test Engineer: Rafael Varelas
Test Location: Fremont Chamber #3

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

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: 19.2 °C
Rel. Humidity: 35 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Output Power Chain A + B	15.247(b)	Pass	27.6 dBm EIRP
2	Power spectral Density (PSD) Chain A + B	15.247(d)	Pass	0.8dBm/3kHz
-	6dB Bandwidth	15.247(a)		Covered by single-chain measurements for 802.11g
-	99% Bandwidth	RSS GEN	-	
-	Spurious emissions	15.247(b)		

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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #1: Output Power - Chain A + B

Operating Mode: 802.11n 20MHz

Transmitted signal on chain is coherent ? yes

Ref. 99% BW	18.1	18.1						
2412 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	13.5	12.97			16.3 dBm	0.042 W	29.1 dBm	0.811 W
Antenna Gain (dBi) Note 2	3.9	3.9			6.9 dBi		Pass	
eirp (dBm) Note 2	17.4	16.87			23.2 dBm	0.207 W		

Ref. 99% BW	18.1	18.1						
2417 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	15.3	14.9			18.1 dBm	0.065 W	29.1 dBm	0.811 W
Antenna Gain (dBi) Note 2	3.9	3.9			6.9 dBi		Pass	
eirp (dBm) Note 2	19.2	18.8			25.0 dBm	0.318 W		

Ref. 99% BW	18.4	18.3						
2422 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	17.9	17.1			20.5 dBm	0.113 W	29.1 dBm	0.811 W
Antenna Gain (dBi) Note 2	3.9	3.9			6.9 dBi		Pass	
eirp (dBm) Note 2	21.8	21			27.4 dBm	0.554 W		

Ref. 99% BW	18.3	18.3						
2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	17.56	17.76			20.7 dBm	0.117 W	29.1 dBm	0.811 W
Antenna Gain (dBi) Note 2	3.9	3.9			6.9 dBi		Pass	
eirp (dBm) Note 2	21.46	21.66			27.6 dBm	0.573 W		

Ref. 99% BW	18.1	18.1						
2452 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	15.01	14.96			18.0 dBm	0.063 W	29.1 dBm	0.811 W
Antenna Gain (dBi) Note 2	3.9	3.9			6.9 dBi		Pass	
eirp (dBm) Note 2	18.91	18.86			24.9 dBm	0.309 W		

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Ref. 99% BW	18.1	18.1						
2457 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	15.68	15.33			18.5 dBm	0.071 W	29.1 dBm	0.811 W
Antenna Gain (dBi) Note 2	3.9	3.9			6.9 dBi		Pass	
eirp (dBm) Note 2	19.58	19.23			25.4 dBm	0.349 W		

Ref. 99% BW	18.1	18.1						
2462 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	8.63	8.72			11.7 dBm	0.015 W	29.1 dBm	0.811 W
Antenna Gain (dBi) Note 2	3.9	3.9			6.9 dBi		Pass	
eirp (dBm) Note 2	12.53	12.62			18.6 dBm	0.072 W		

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:	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
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

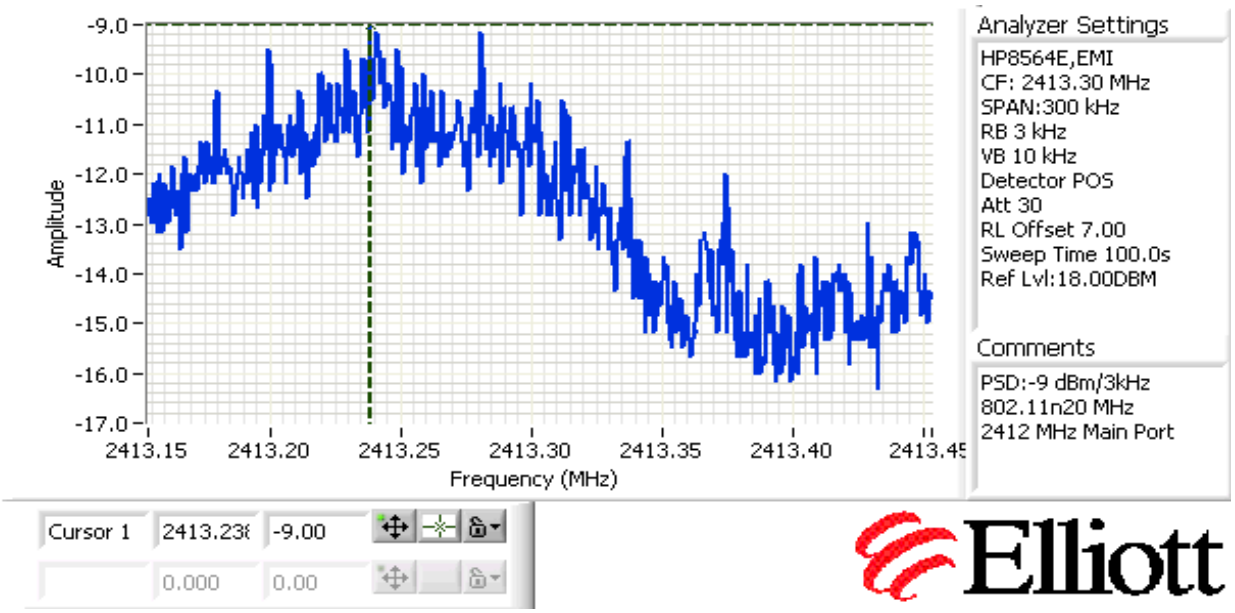
Run #2: Power spectral Density

Date of Test: 2/9/2009
Test Engineer: Suhaila Khushzad
Test Location: Fremont Chamber #3

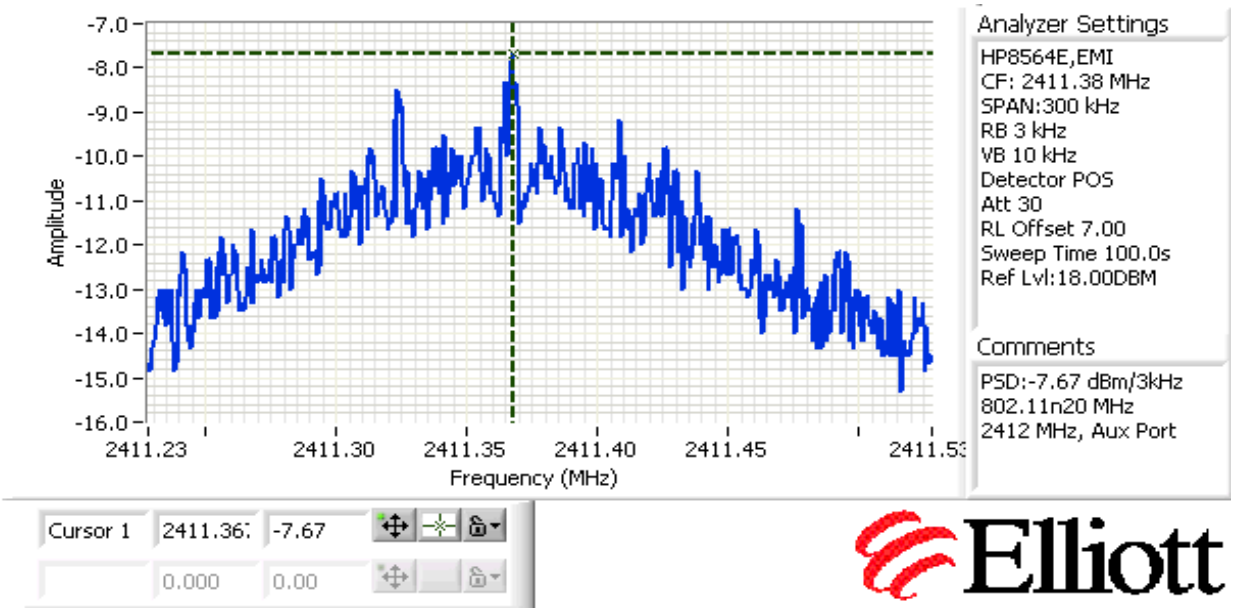
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

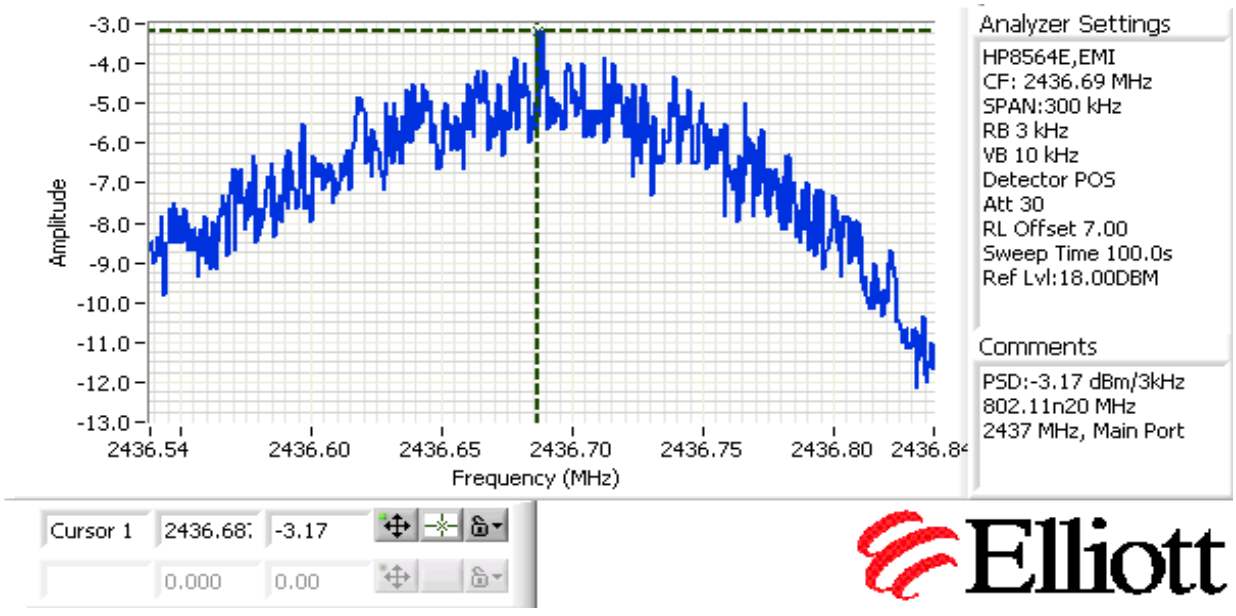
Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1 Chain 1	Chain 2	Chain 3	Chain 4	Total	Limit dBm/3kHz	Result
-	2412	-9.0	-7.7			-5.3	8.0	Pass
-	2437	-3.2	-1.5			0.8	8.0	Pass
-	2462	-12.0	-2.3			-1.9	8.0	Pass

Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.

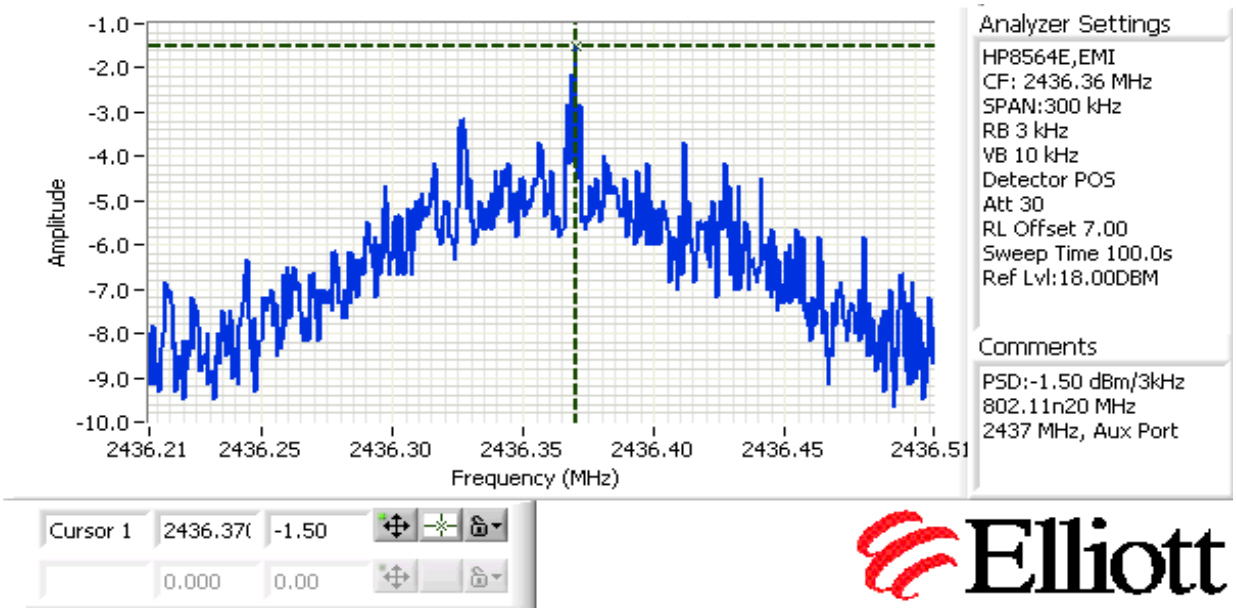


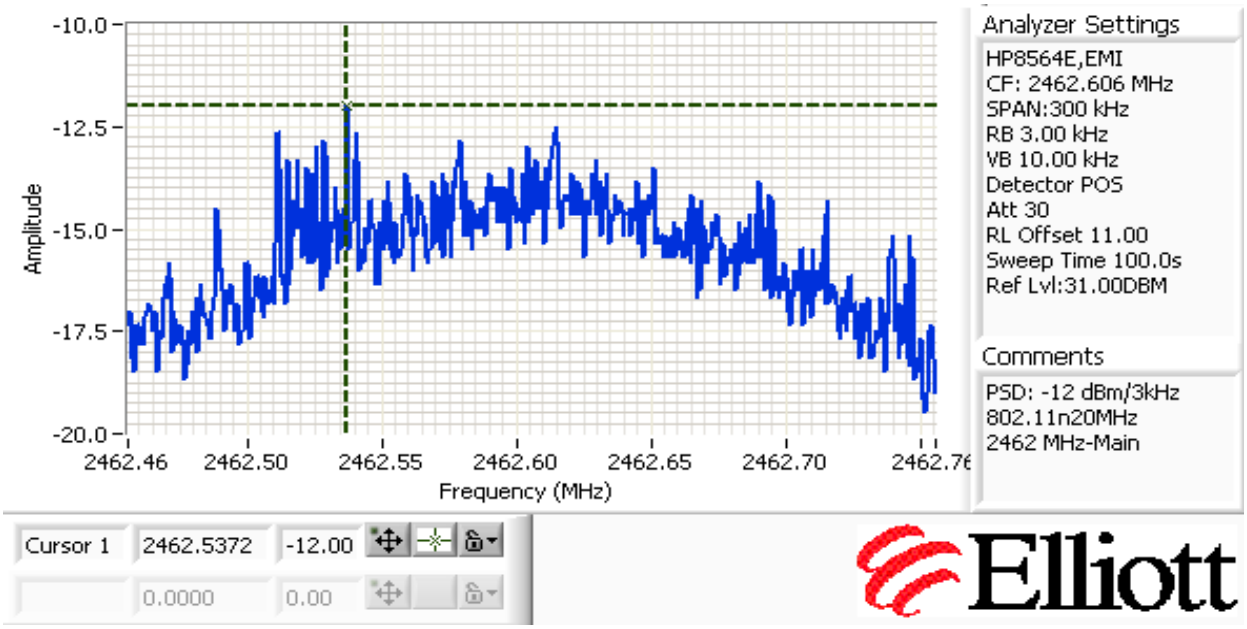
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A



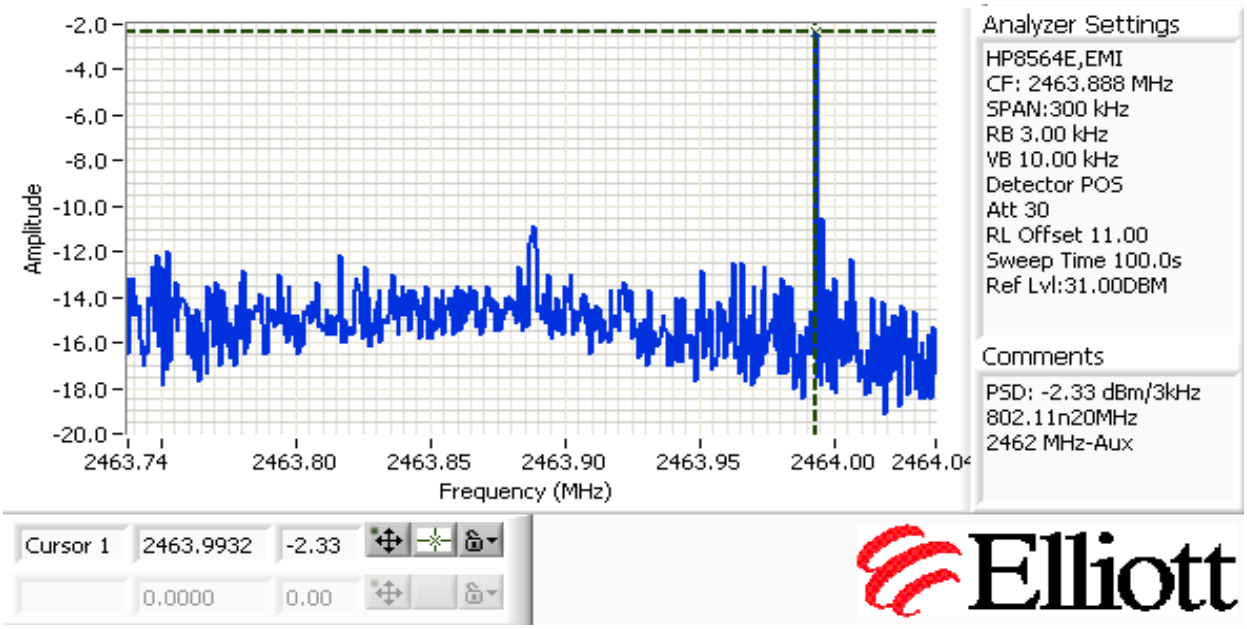


Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A





Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
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: 2/6/2009
Test Engineer: Rafael Varelas
Test Location: Fremont Chamber #3

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

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: 19.2 °C
Rel. Humidity: 35 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Output Power Chain A + B	15.247(b)	Pass	28.3 dBm EIRP
2	Power spectral Density (PSD) Chain A + B	15.247(d)	Pass	-2.3dBm/3kHz
3	6dB Bandwidth	15.247(a)	Pass	35.3 MHz
3	99% Bandwidth	RSS GEN	-	36.4 MHz
4	Spurious emissions	15.247(b)	Pass	All emissions at least <-20dBc

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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #1b: Output Power - Chain A + B (Peak Power)

Operating Mode: 802.11n 40MHz

Transmitted signal on chain is coherent ? yes

Ref. 99% BW	36.2	36.2						
2422 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	18	18.1			21.1 dBm	0.128 W	29.1 dBm	0.811 W
Antenna Gain (dBi) Note 2	3.9	3.9			6.9 dBi	6.9 dBi	Pass	
eirp (dBm) Note 2	21.9	22			28.0 dBm	0.627 W		

Ref. 99% BW	36.2	36.3						
2427 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	18.1	18.3			21.2 dBm	0.132 W	29.1 dBm	0.811 W
Antenna Gain (dBi) Note 2	3.9	3.9			6.9 dBi	6.9 dBi	Pass	
eirp (dBm) Note 2	22	22.2			28.1 dBm	0.649 W		

Ref. 99% BW	36.4	36.4						
2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	17	17.2			20.1 dBm	0.103 W	29.1 dBm	0.811 W
Antenna Gain (dBi) Note 2	3.9	3.9			6.9 dBi	6.9 dBi	Pass	
eirp (dBm) Note 2	20.9	21.1			27.0 dBm	0.504 W		

Ref. 99% BW	36.4	36.4						
2447 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	18.2	18.5			21.4 dBm	0.137 W	29.1 dBm	0.811 W
Antenna Gain (dBi) Note 2	3.9	3.9			6.9 dBi	6.9 dBi	Pass	
eirp (dBm) Note 2	22.1	22.4			28.3 dBm	0.672 W		

Ref. 99% BW	36.2	36.2						
2452 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	16.4	17			19.7 dBm	0.094 W	29.1 dBm	0.811 W
Antenna Gain (dBi) Note 2	3.9	3.9			6.9 dBi	6.9 dBi	Pass	
eirp (dBm) Note 2	20.3	20.9			26.6 dBm	0.460 W		

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Note 1:	Power measured via peak power meter.
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
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

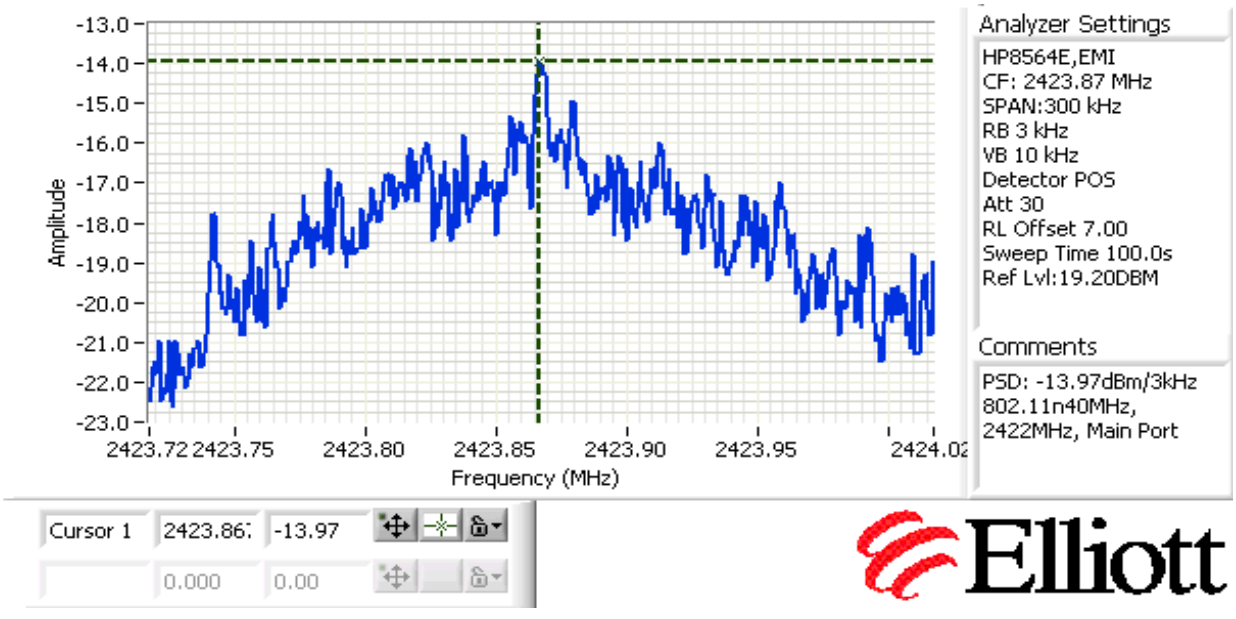
Date of Test: 2/8/2009
Test Engineer: Suhaila Khushzad
Test Location: Fremont Chamber #3

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

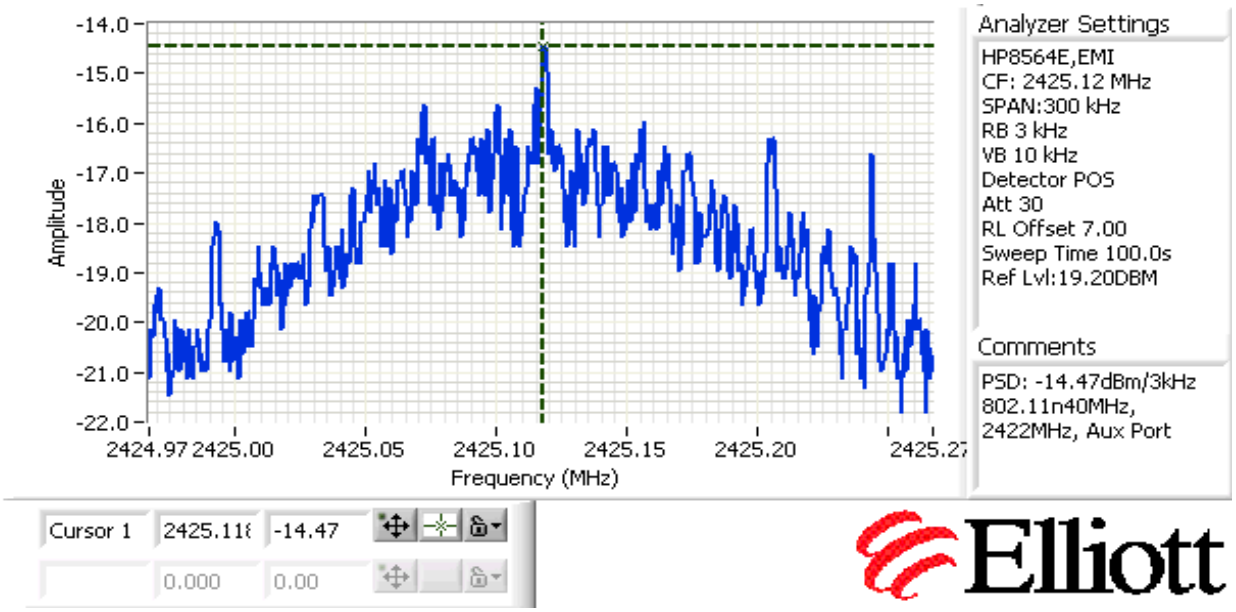
Run #2: Power spectral Density

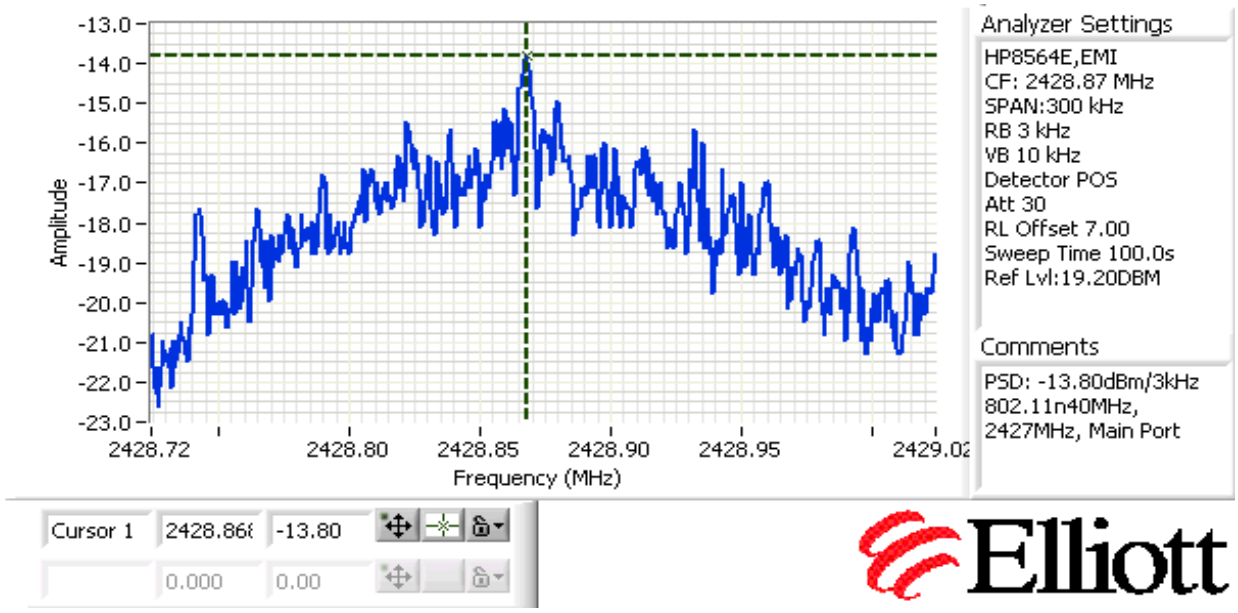
Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1 Chain 1	Chain 2	Chain 3	Chain 4	Total	Limit dBm/3kHz	Result
-	2422	-14.0	-14.5			-11.2	8.0	Pass
-	2427	-13.8	-15.3			-11.5	8.0	Pass
-	2437	-11.8	-10.3			-8.0	8.0	Pass
-	2447	-12.1	-12.5			-9.3	8.0	Pass
-	2452	-15.7	-2.5			-2.3	8.0	Pass

Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.



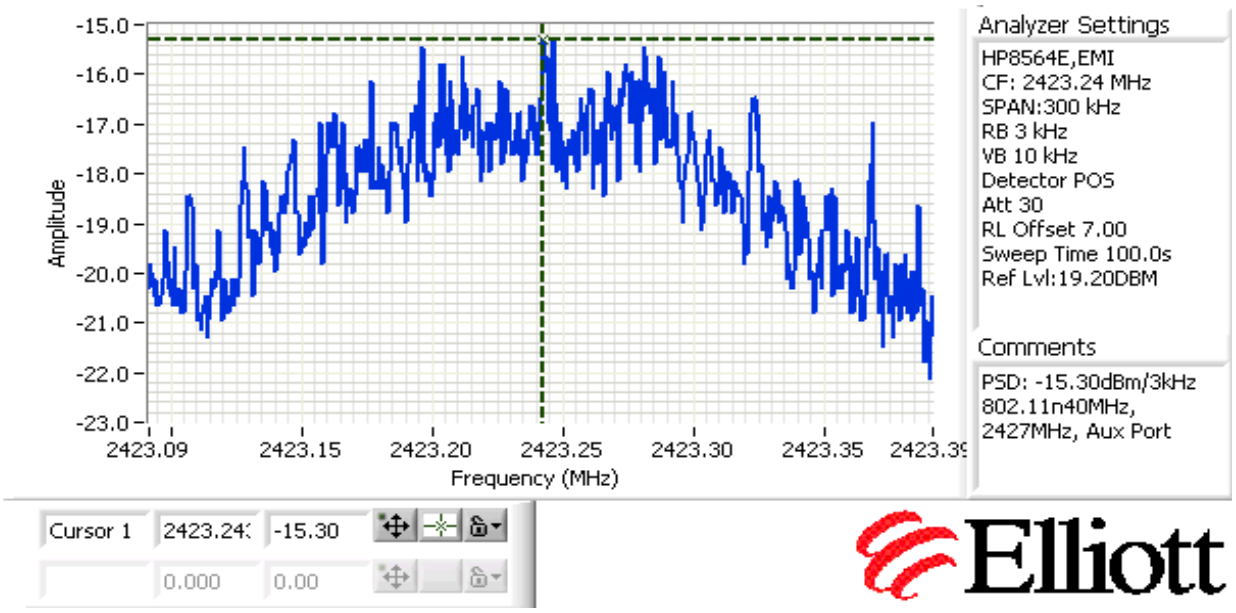
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

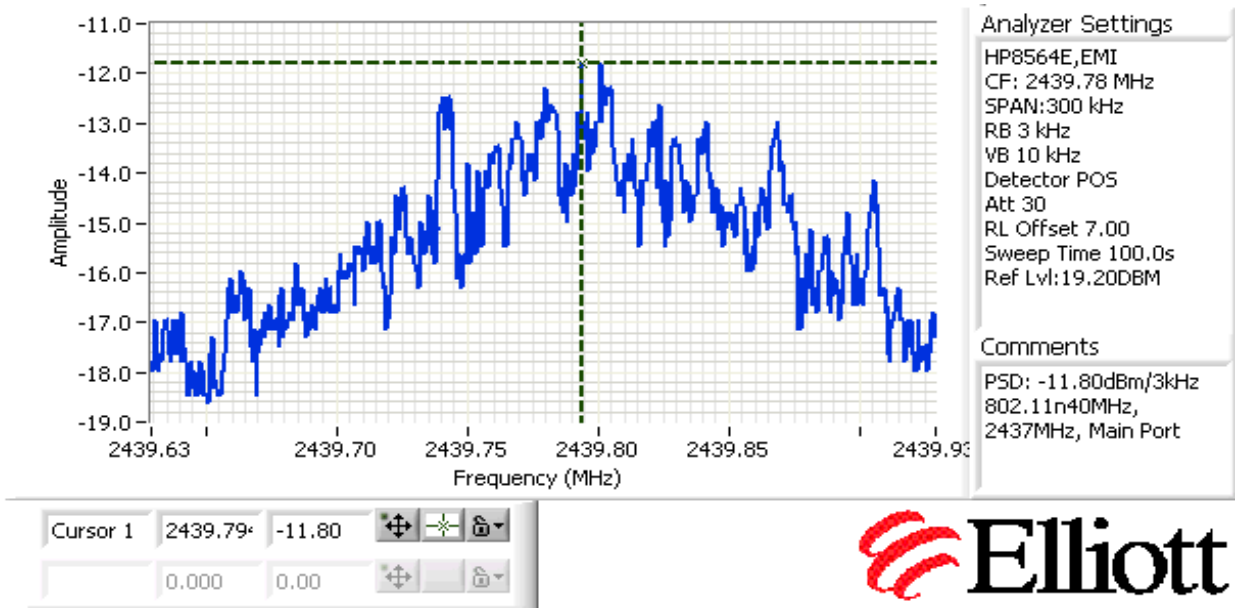




Run #2: Con't

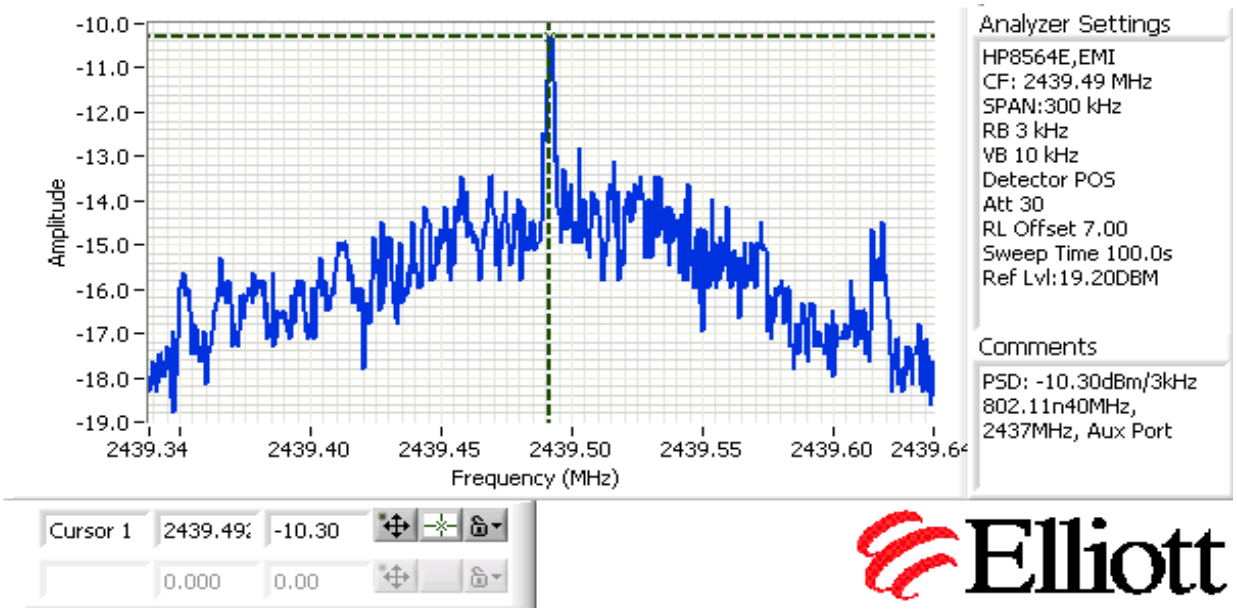
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

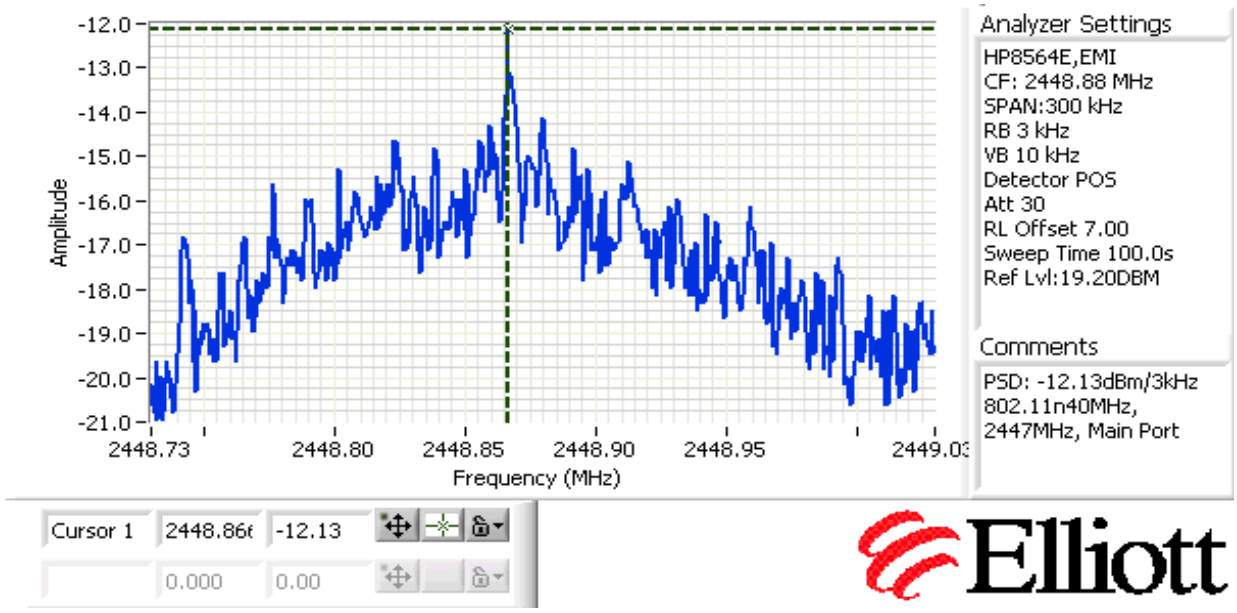




Run #2: Con't

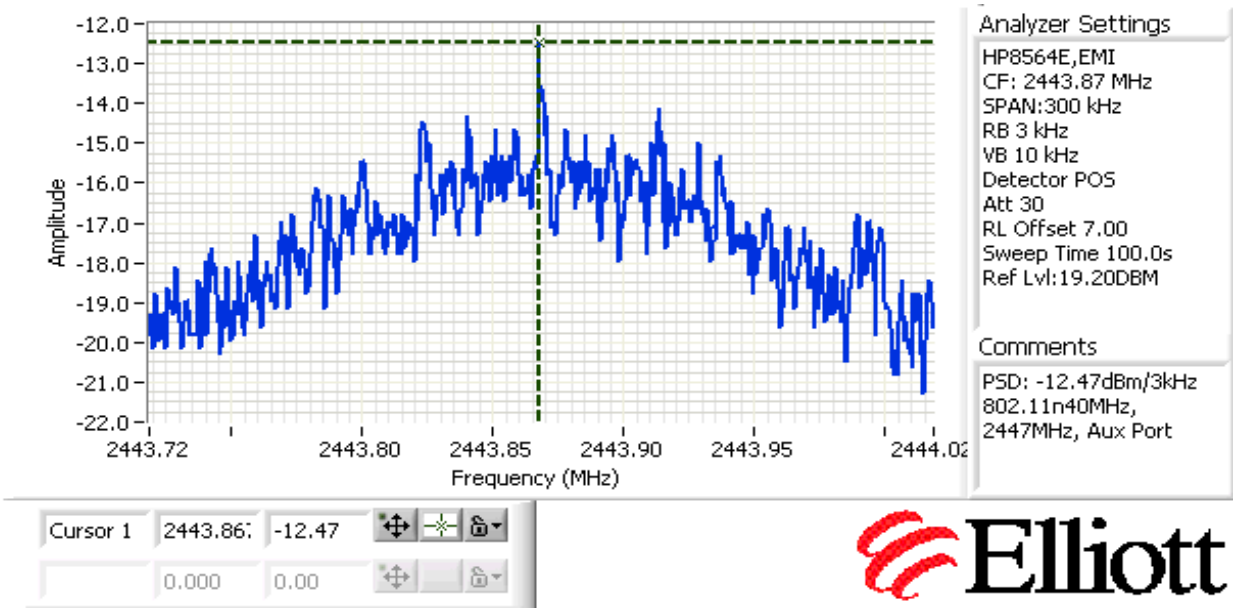
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

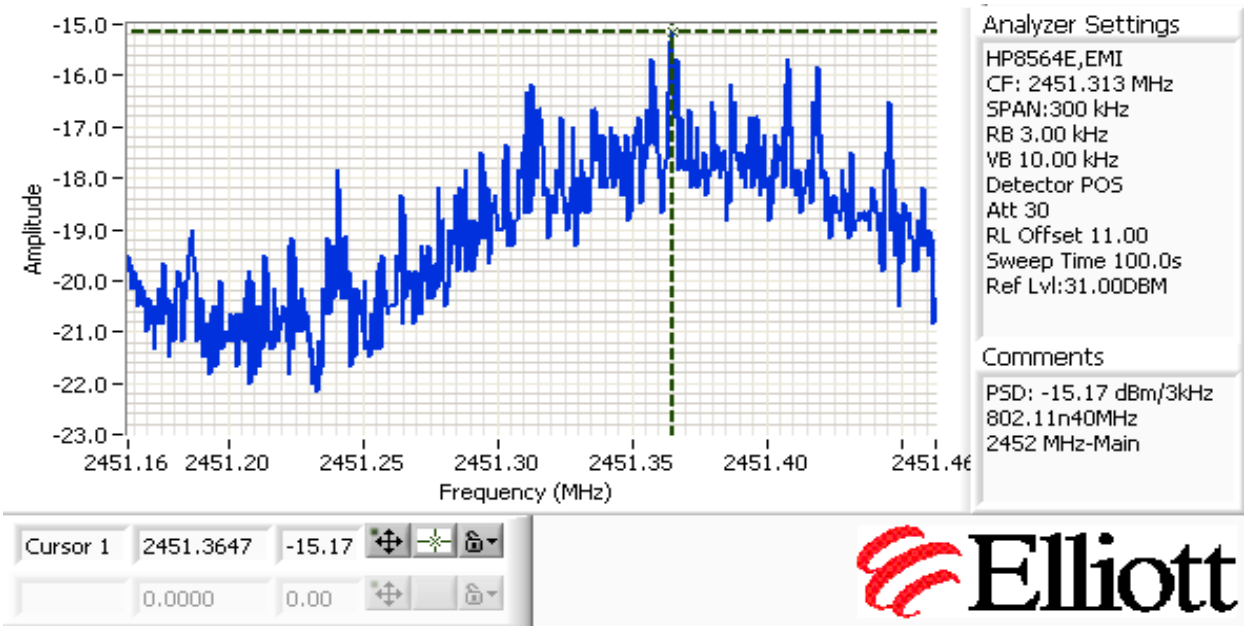




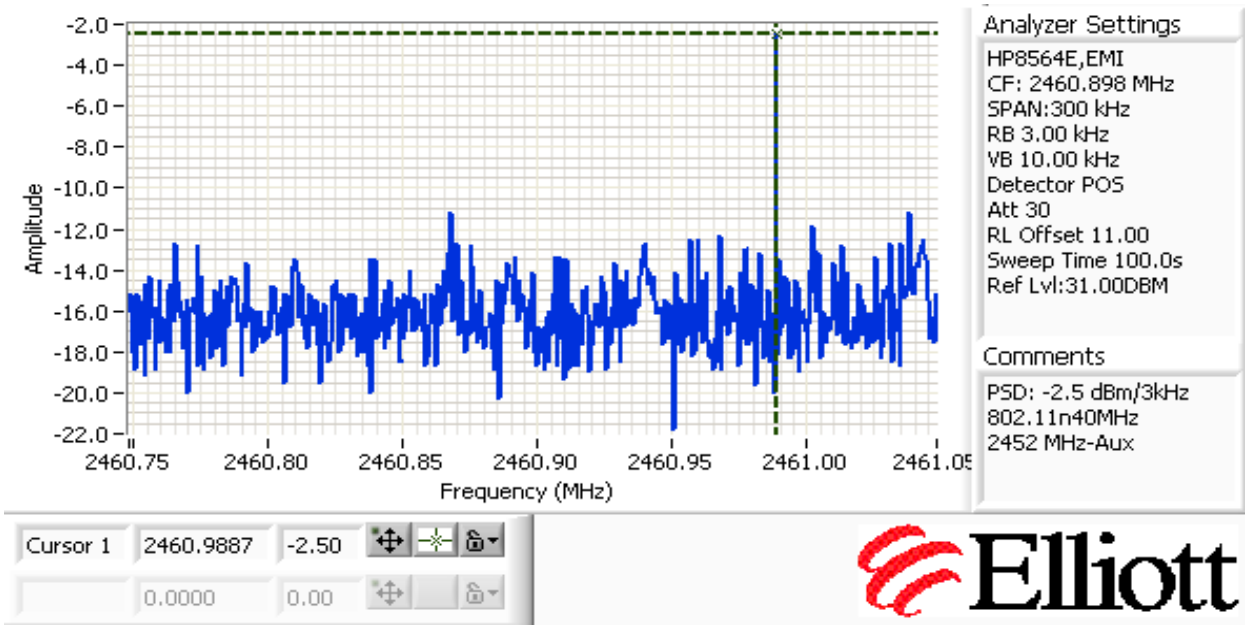
Run #2: Con't

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A





Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

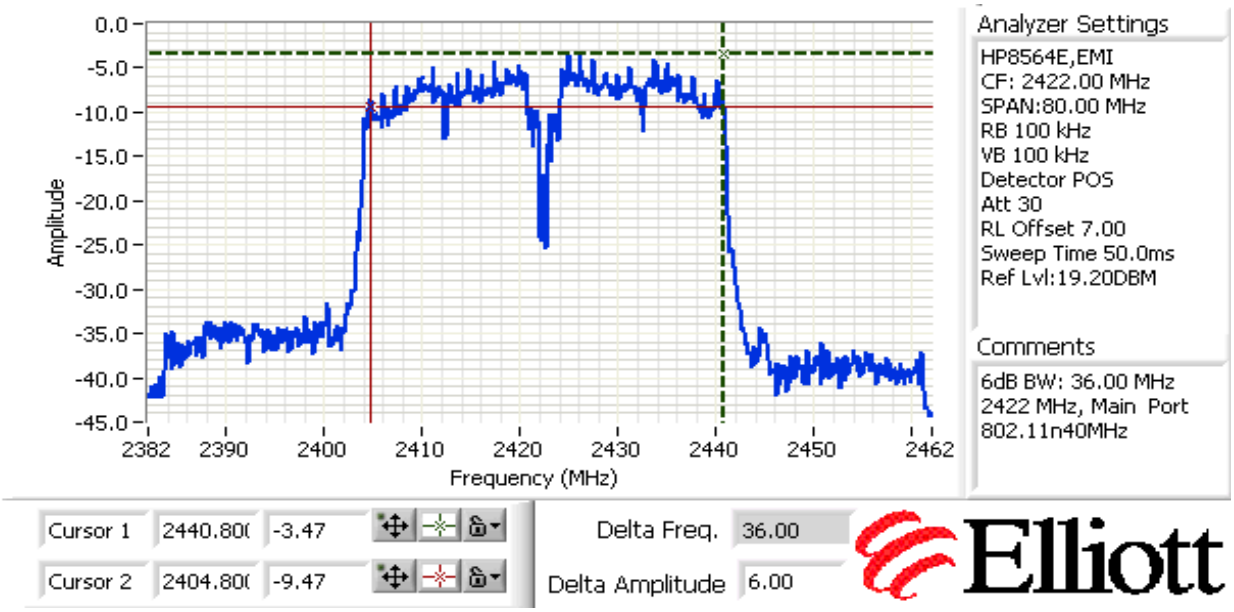


Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #3: Signal Bandwidth

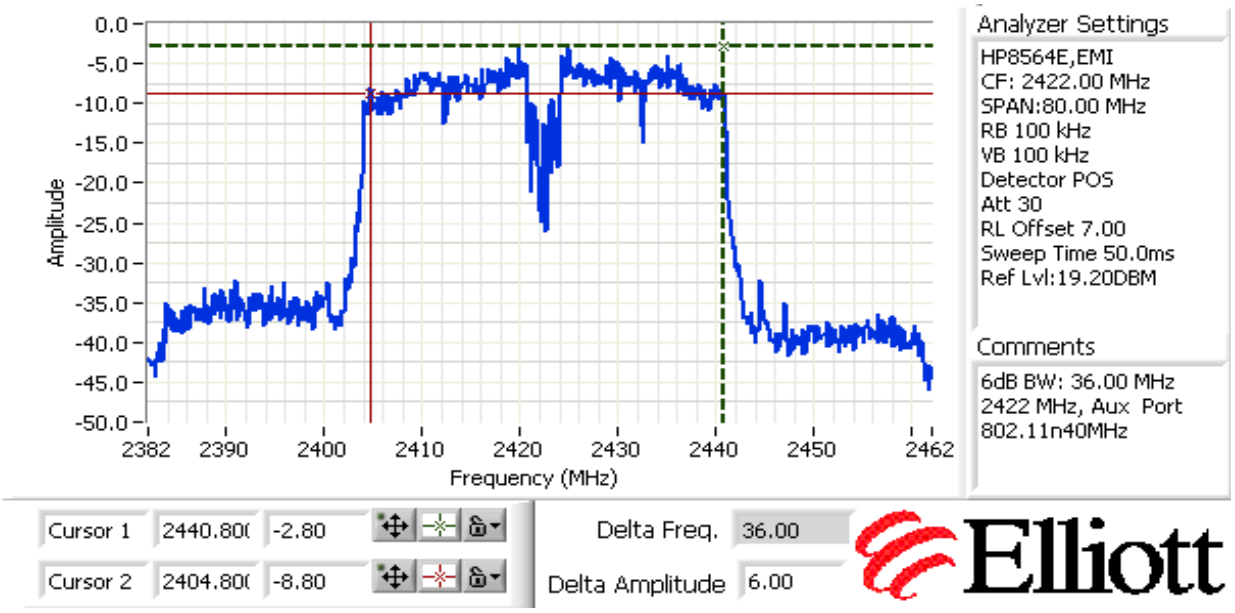
Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
-	2422	100kHz	36.0	36.2
-	2427	100kHz	36.1	36.3
-	2437	100kHz	35.3	36.4
-	2447	100kHz	36.0	36.4
-	2452	100kHz	36.1	36.2

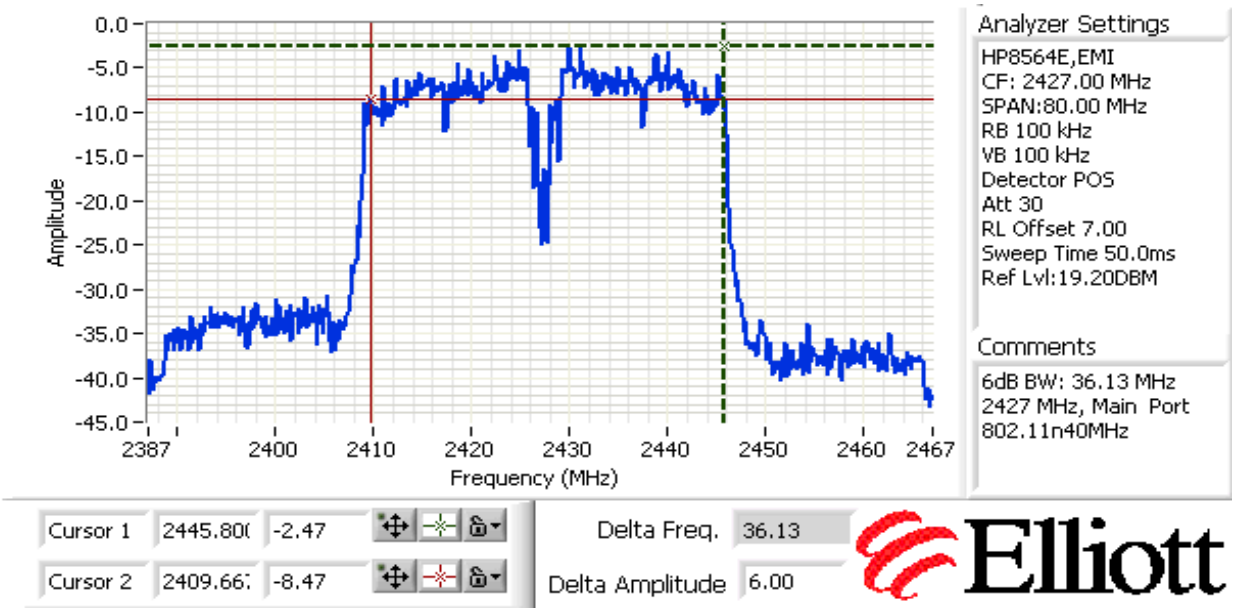
Note 1:	Measured on a single chain
Note 2:	99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB



Run #3: Con't

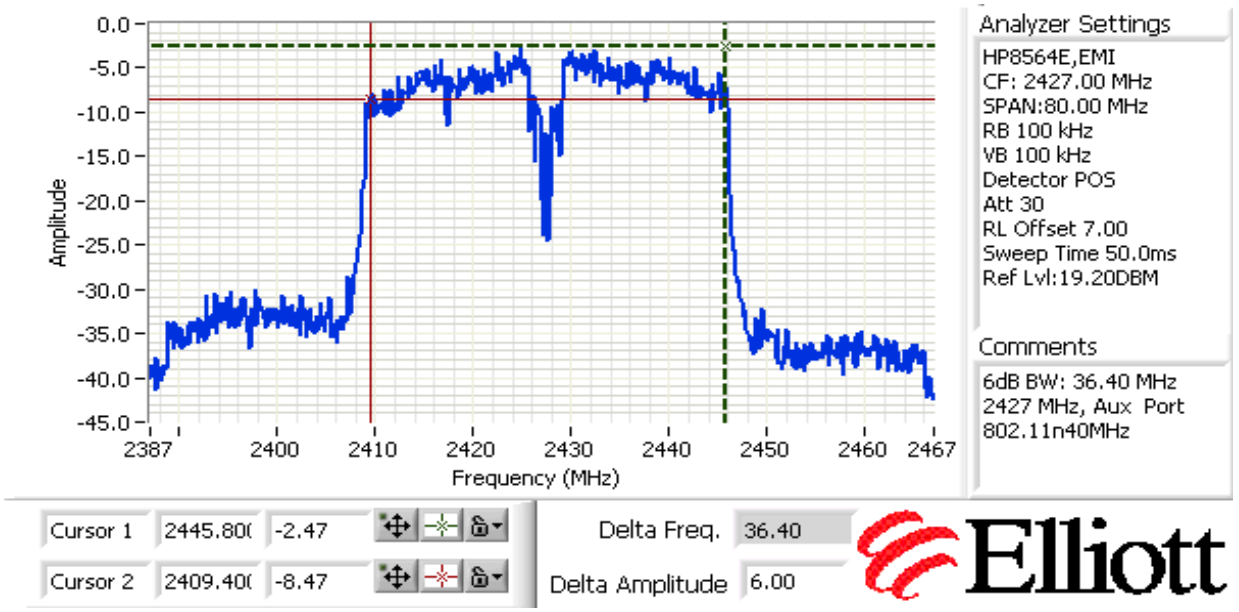
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

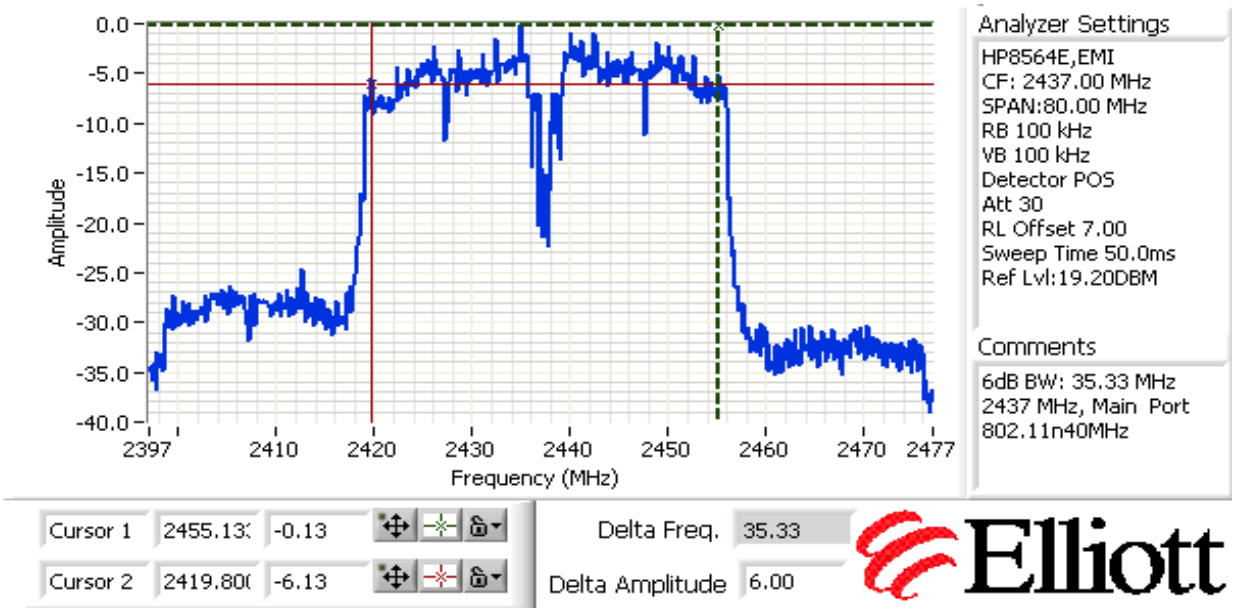




Run #3: Con't

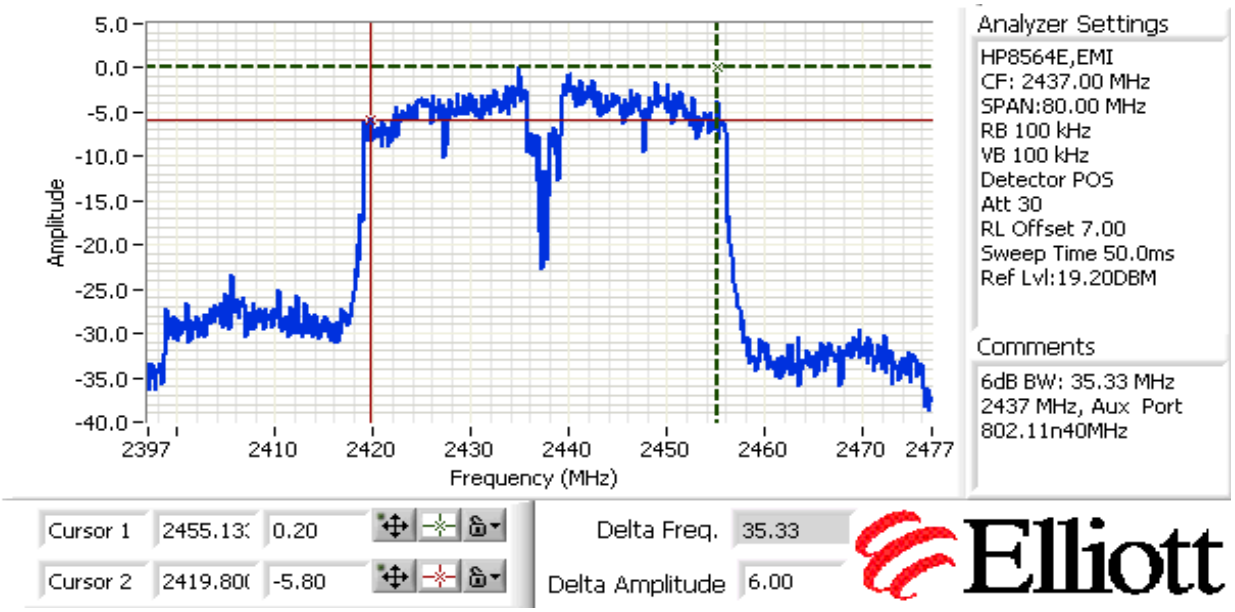
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

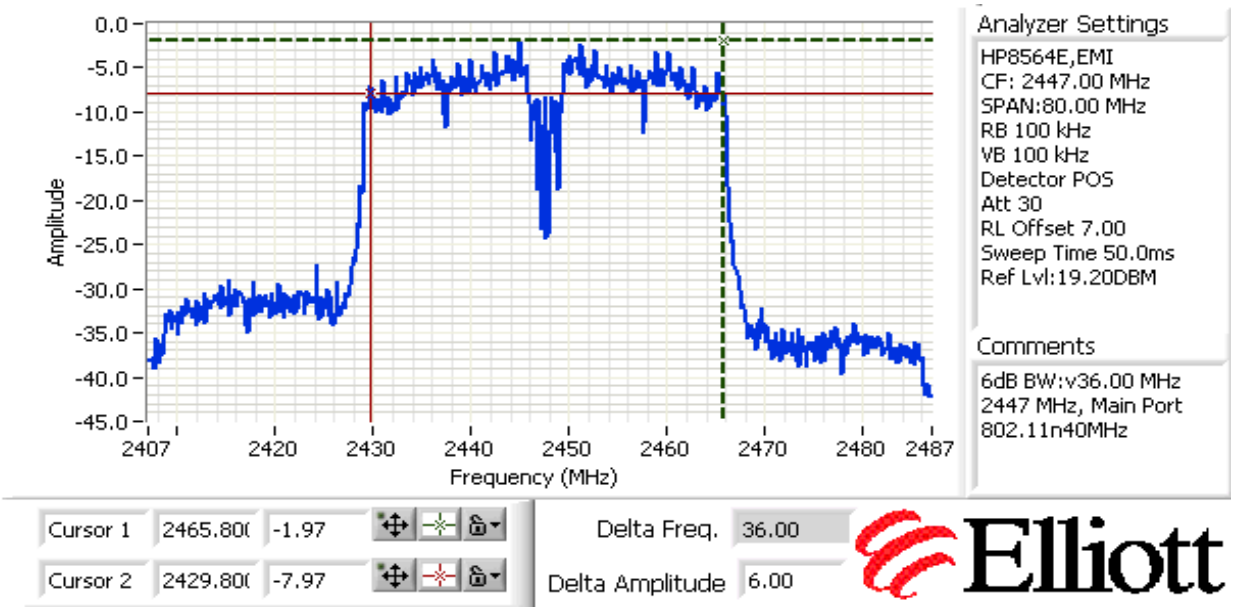




Run #3: Con't

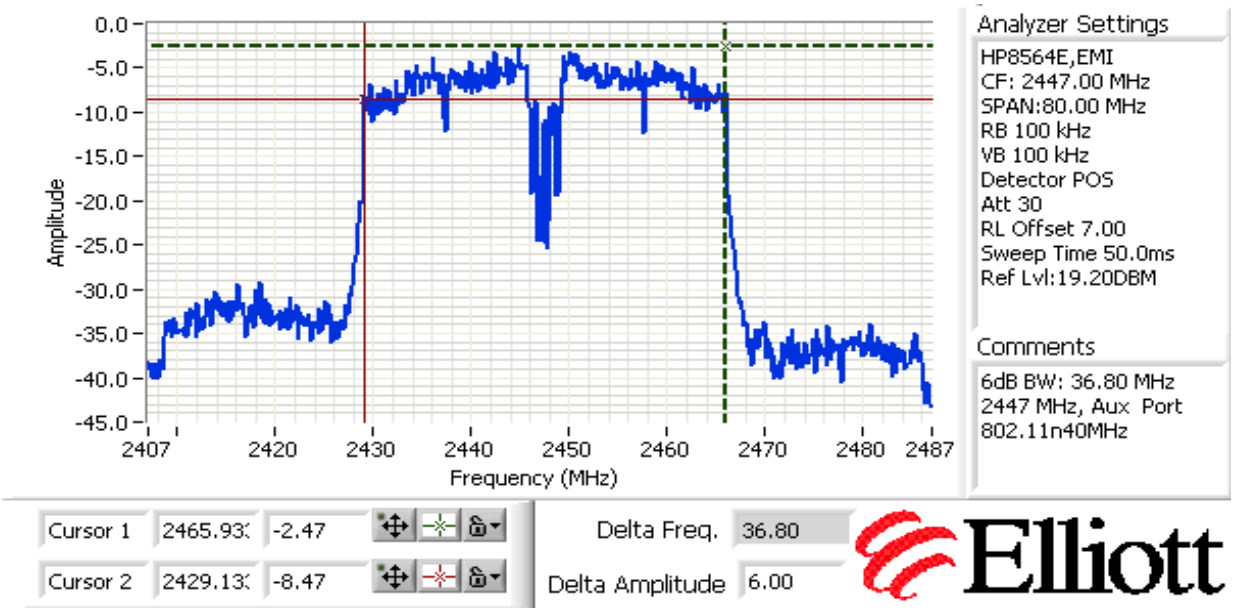
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

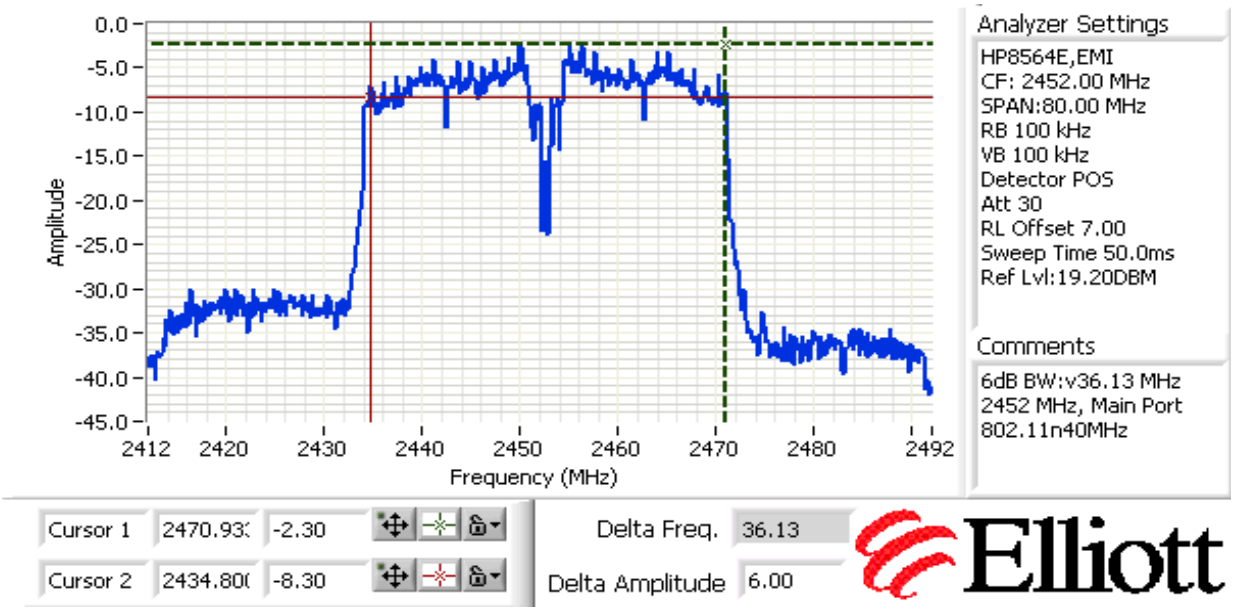




Run #3: Con't

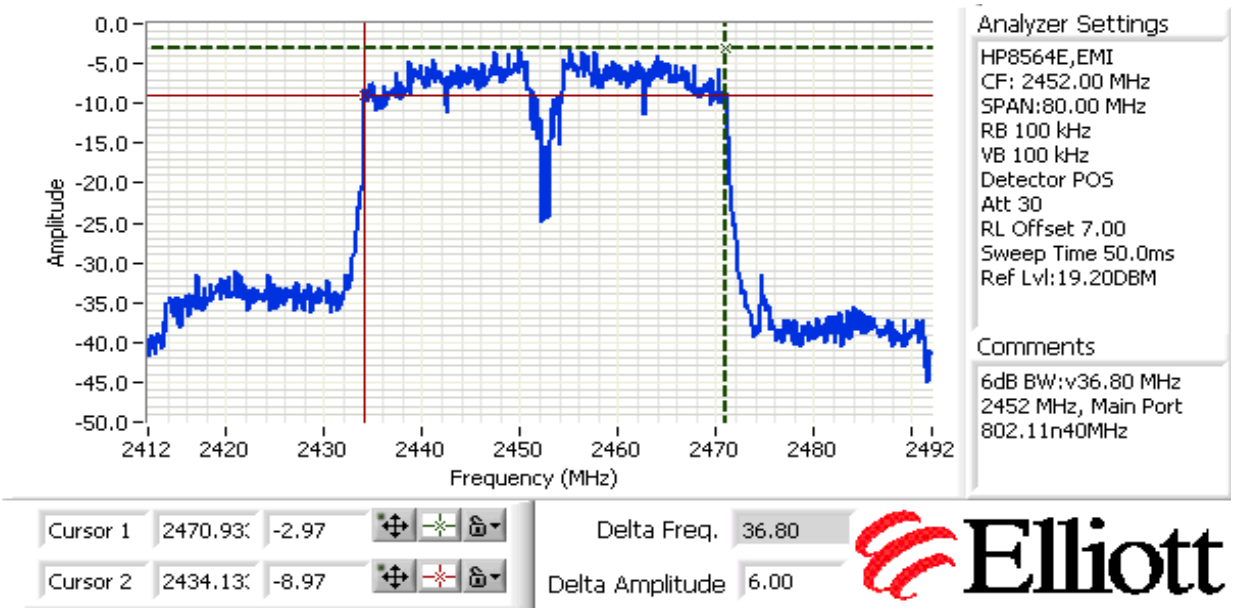
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A





Run #3: Con't

Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A



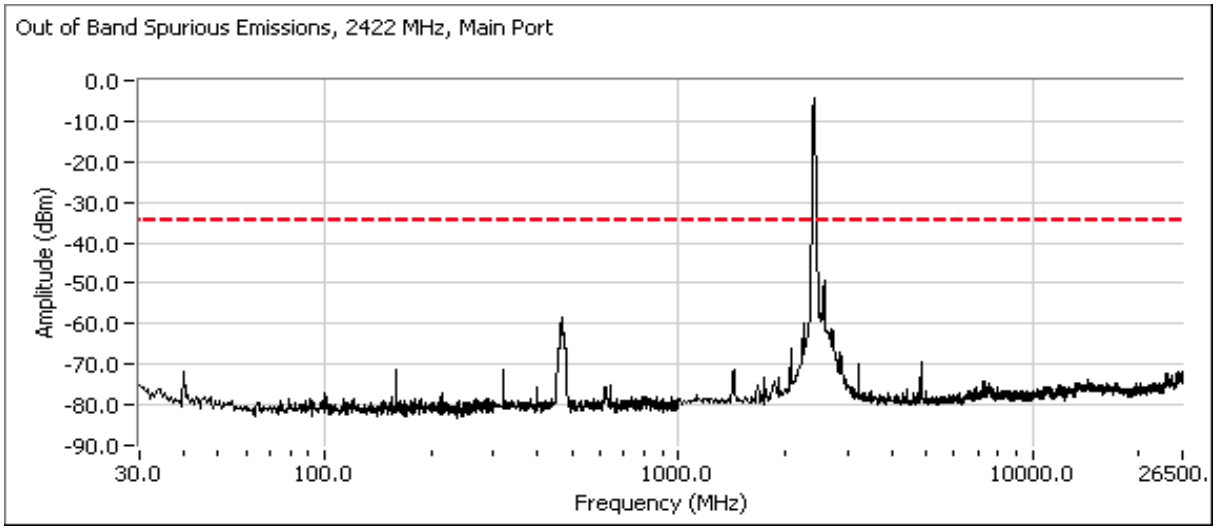
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

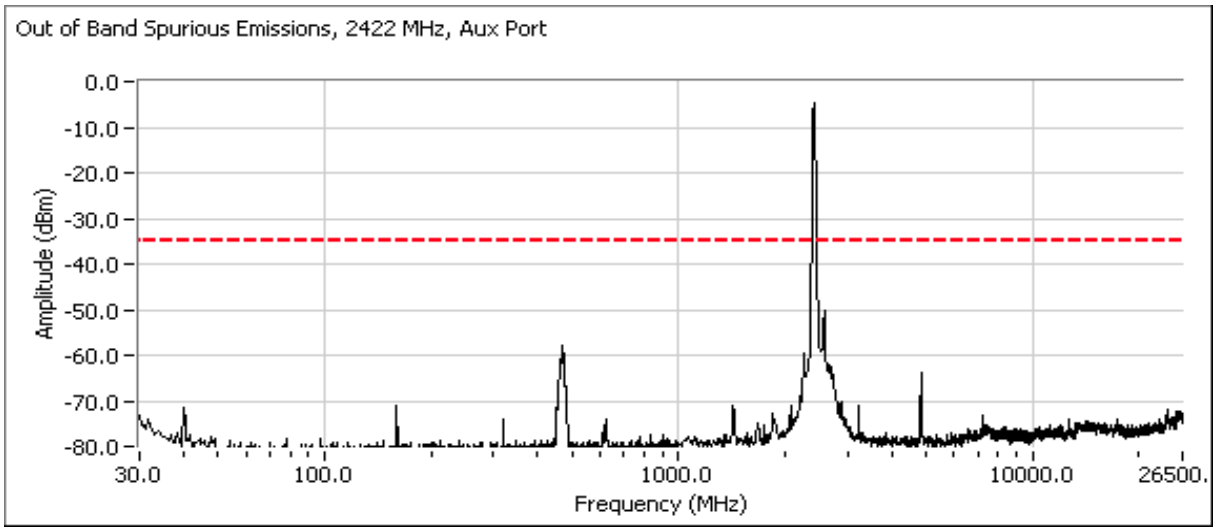
Run #4: Out of Band Spurious Emissions

Power Setting Per Chain				Frequency (MHz)	Limit	Result
#1	#2	#3	#4			
-	-			2422	-20dBc	Pass
-	-			2437	-20dBc	Pass
-	-			2452	-20dBc	Pass

Note 1:	Measured on each chain individually
Note 2:	Out of Band Spurious Emissions complaince with the -20dBc limit since power is measure as peak power. Note, all plots use the -30dBc limit.

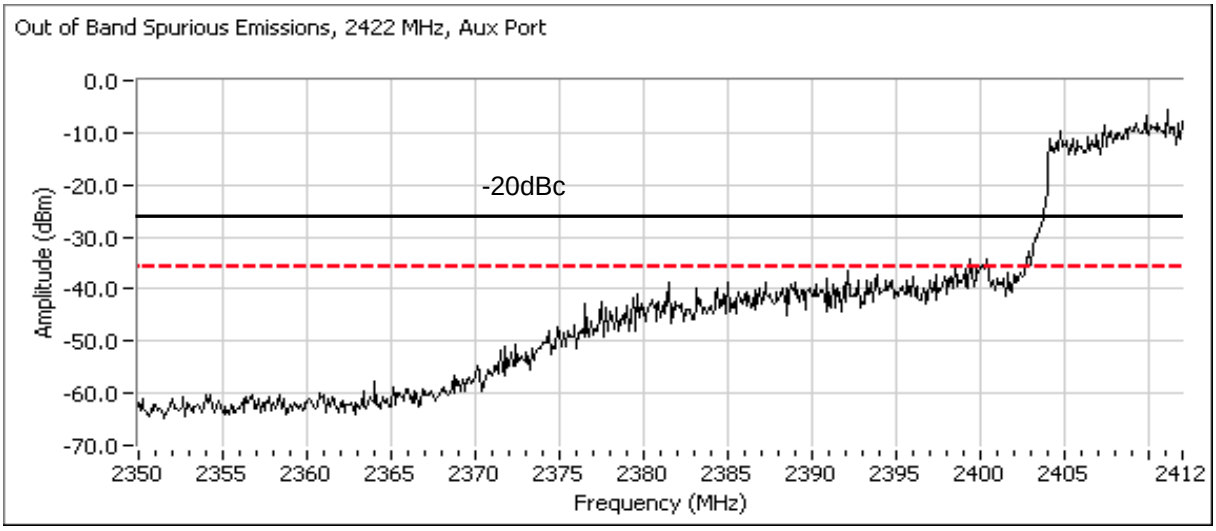
Plots for low channel

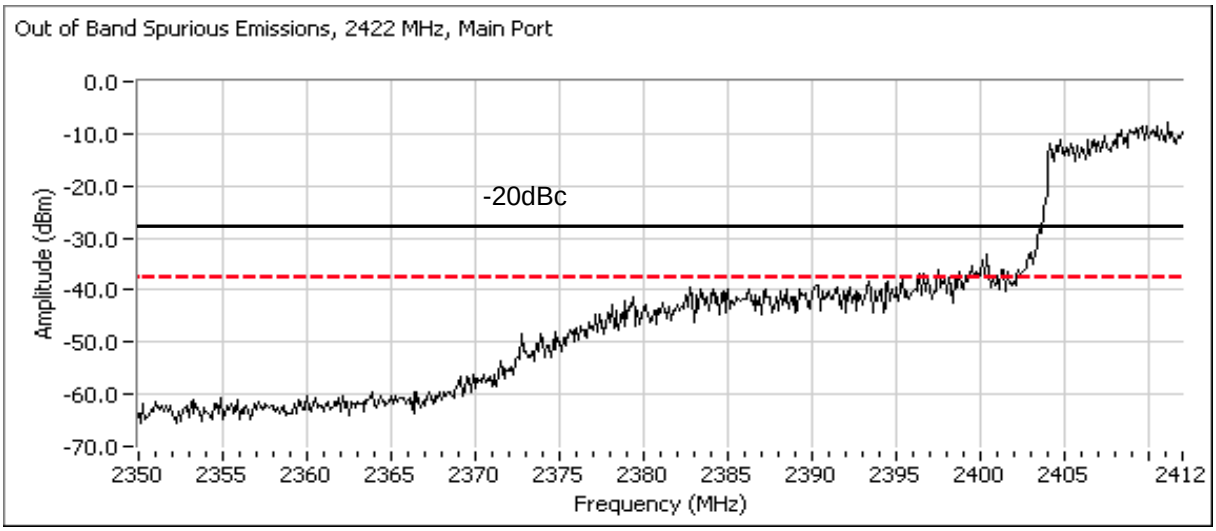




Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

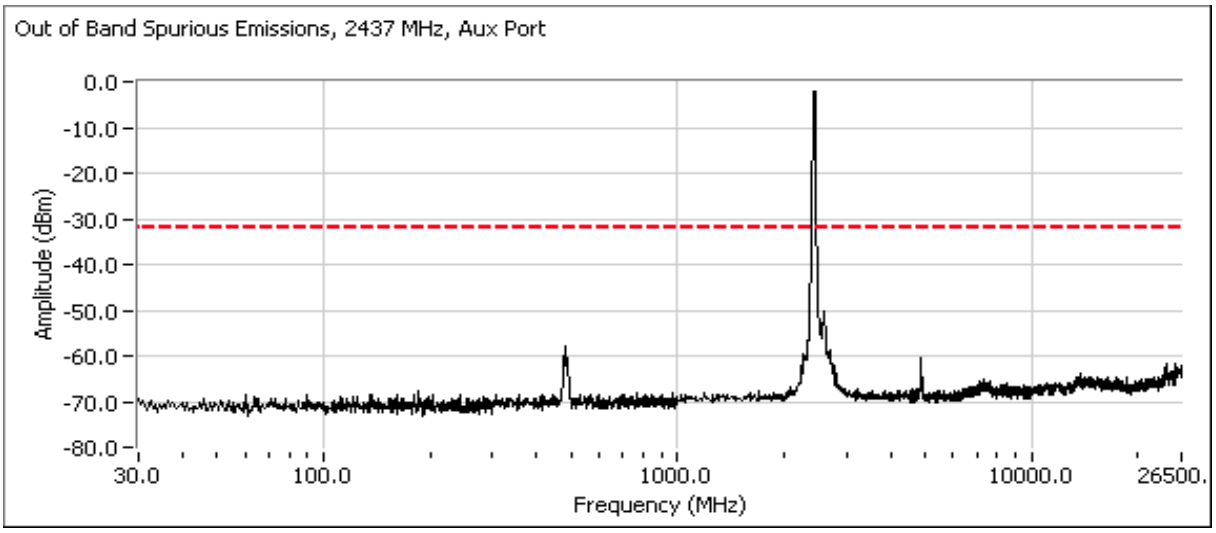
Additional plot showing compliance with -20dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

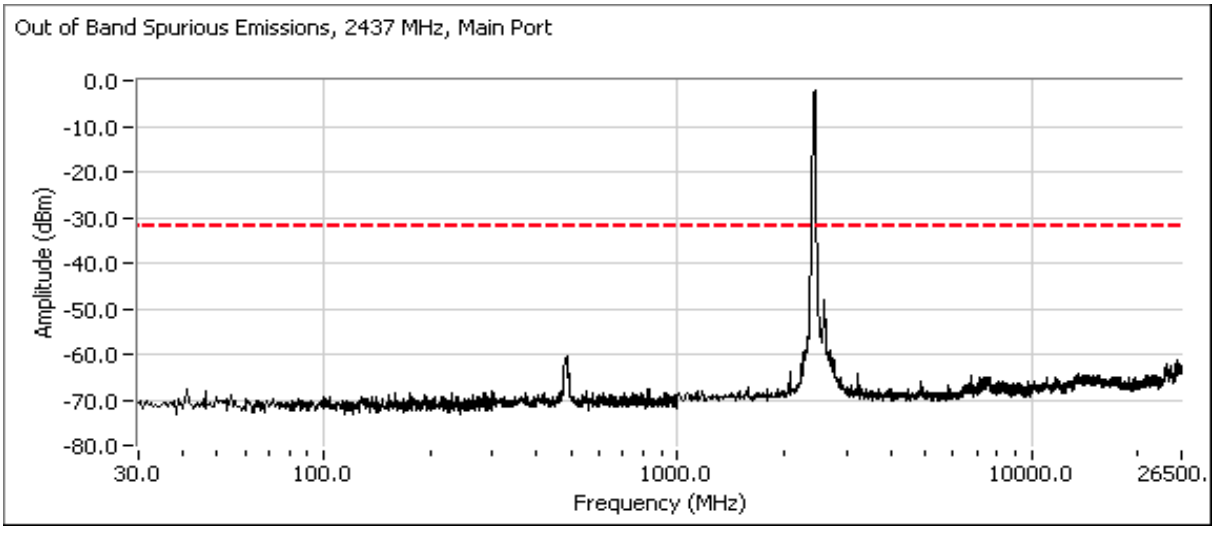




Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

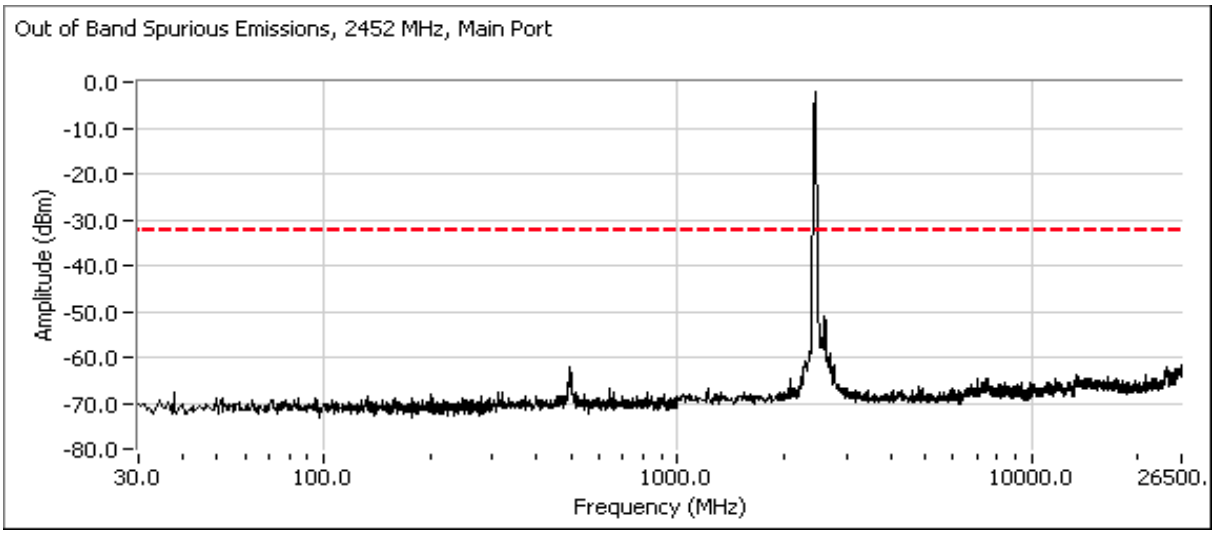
Plots for center channel

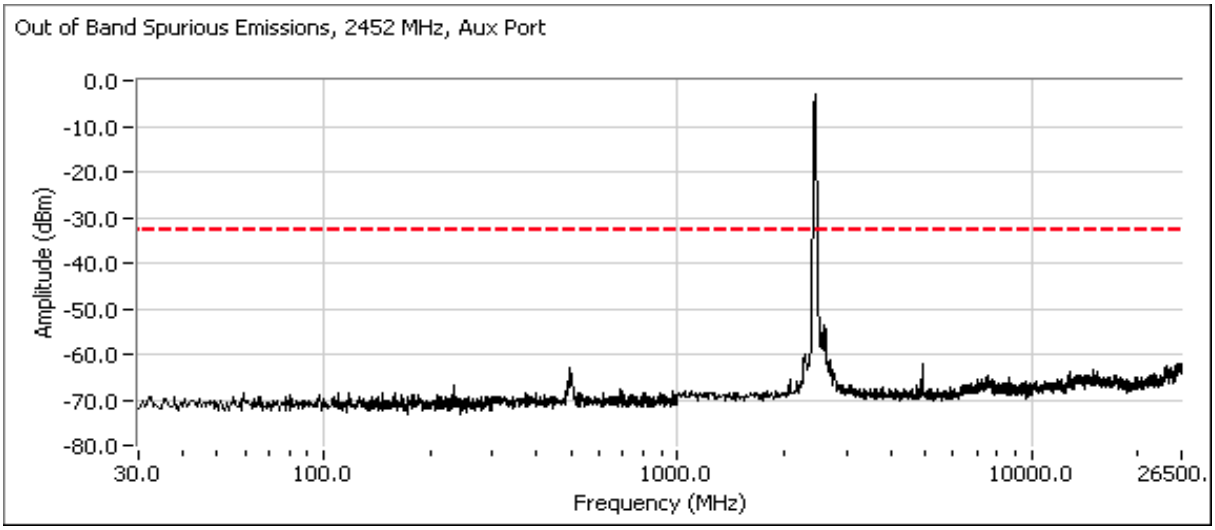




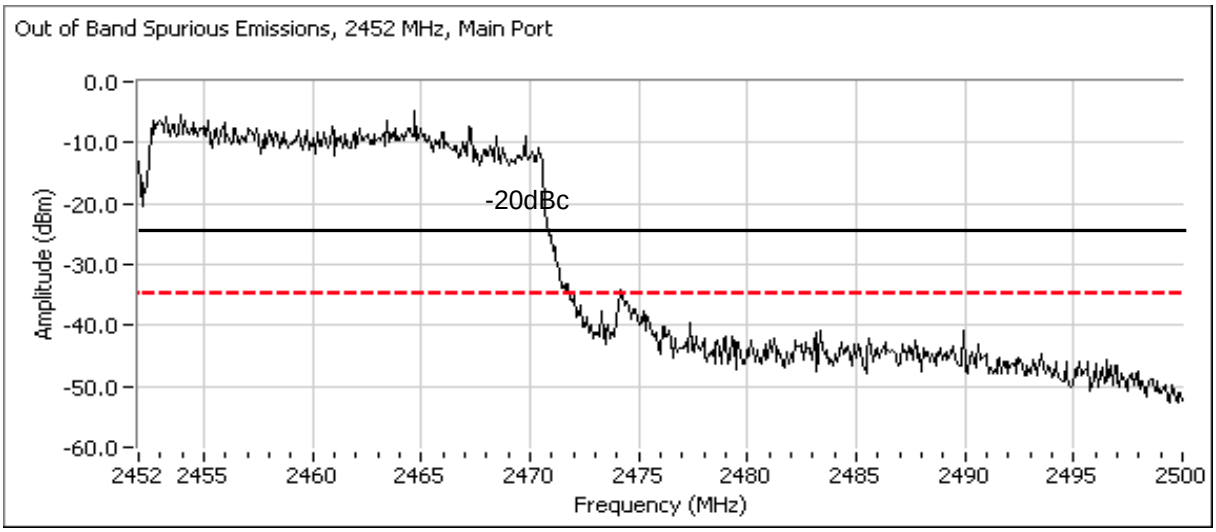
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

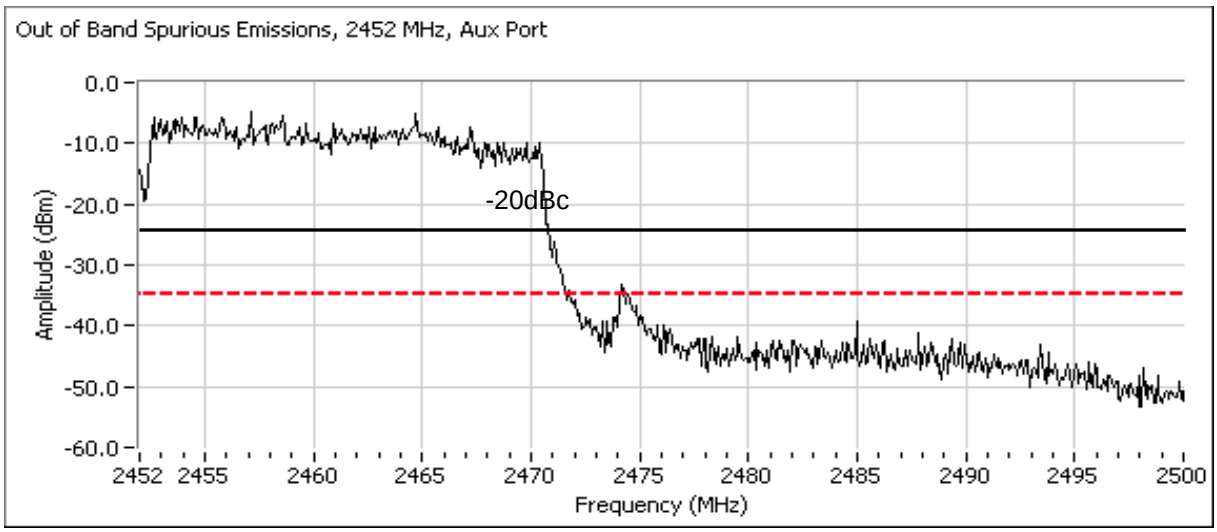
Plots for high channel





Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A





Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	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: 2/10/2009
Test Engineer: rvarelas
Test Location: Fremont Chamber #5

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

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: 19.3 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Pwr setting	Power	Test Performed	Limit	Pass / Fail	Result / Margin
1	-	-	Output Power (Peak)	15.247(b)	Pass	28.3 dBm EIRP
1	-	-	Output Power (Average)	15.247(b)	Pass	22.2 dBm EIRP
2	-	-	Power spectral Density (PSD)	15.247(d)	Pass	-4.8 dBm/3kHz
3	-	-	Minimum 6dB Bandwidth	15.247(a)	Pass	15.0 MHz
3	-	-	99% Bandwidth	RSS GEN	-	18.6 MHz
4	-	-	Spurious emissions	15.247(b)	Pass	> 20dBc margin

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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #1: Output Power

Power Setting	Frequency (MHz)	Output Power (dBm) [1]	Output Power mW	Antenna Gain (dBi)	Result	EIRP dBm	EIRP W	Output Power (dBm)	Output Power mW
-	5745	22.1	162.2	5.8	Pass	27.9	0.617		
-	5785	22.1	162.2	5.8	Pass	27.9	0.617		
-	5825	22.5	177.8	5.8	Pass	28.3	0.676		

Note 1:	Output power measured using Peak Power Sensor. Spurious limit becomes -20dBc.
Note 2:	
Note 3:	

Client:	Broadcom	Job Number:	J74037
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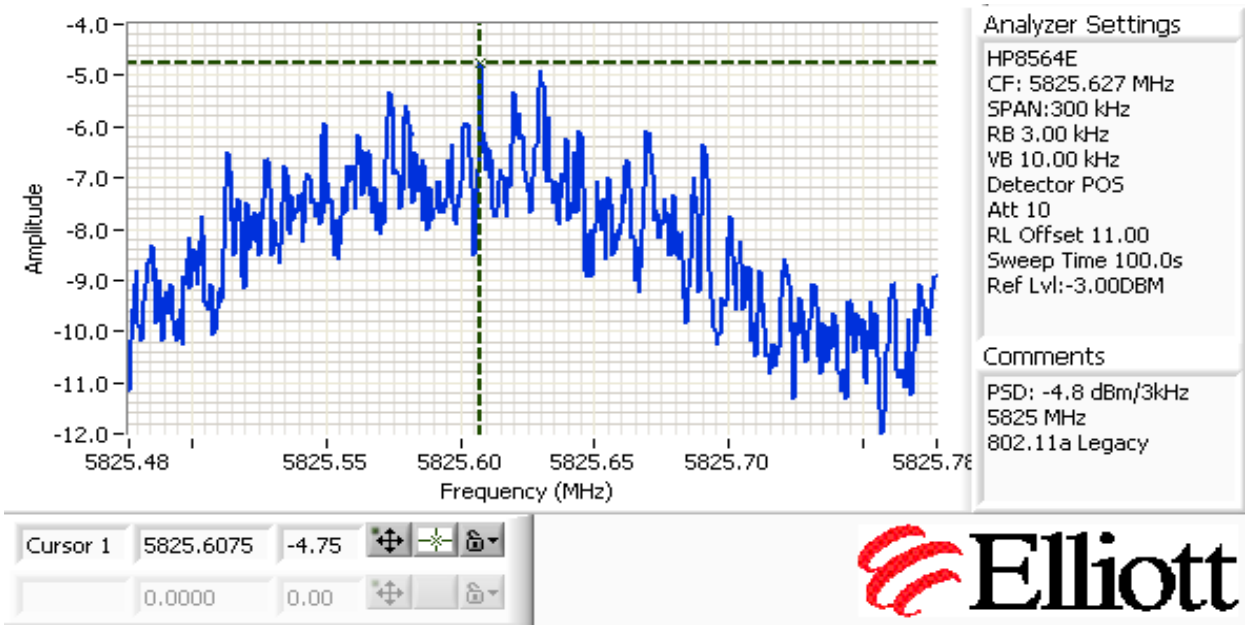
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
	5745.228	-5.3	8.0	Pass
	5784.325	-5.3	8.0	Pass
	5825.608	-4.8	8.0	Pass

Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.



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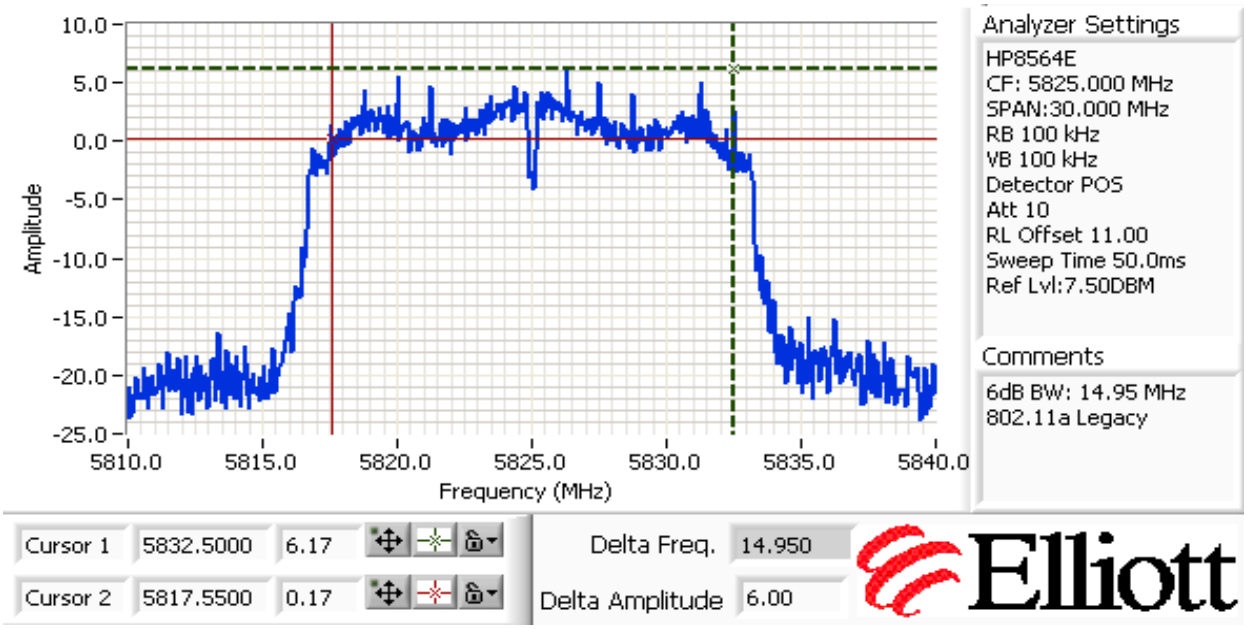
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

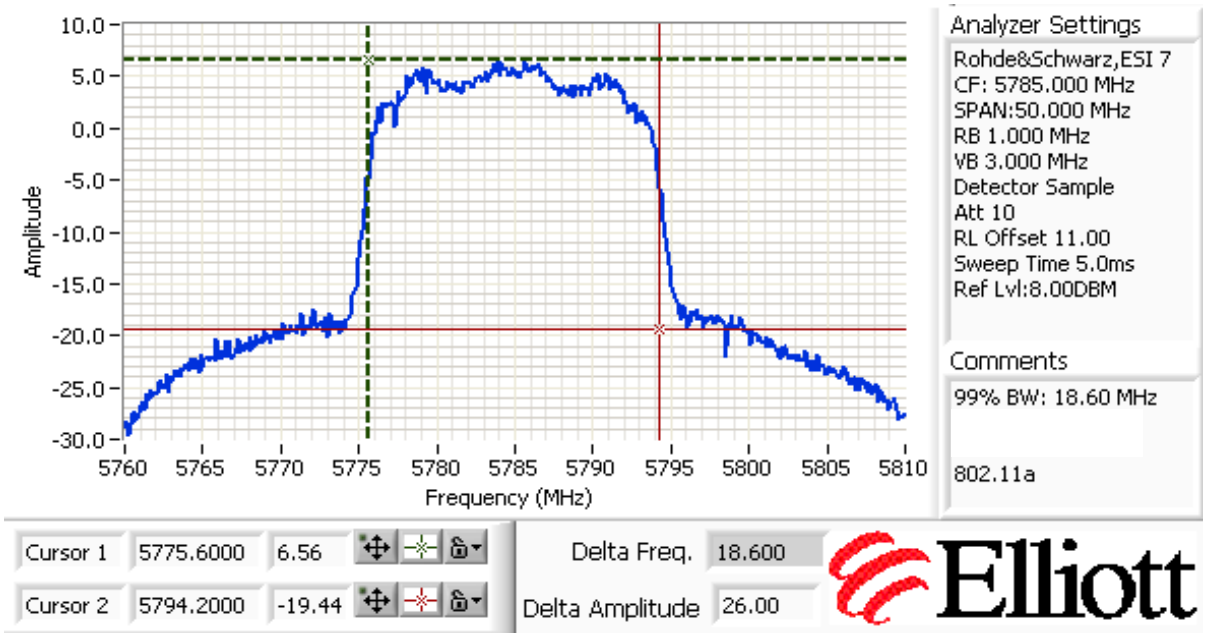
Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
	5745	100 kHz	15.1	17.3
	5785	100 kHz	16.4	18.6
	5825	100 kHz	15.0	17.3

Note 1:	99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB



Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

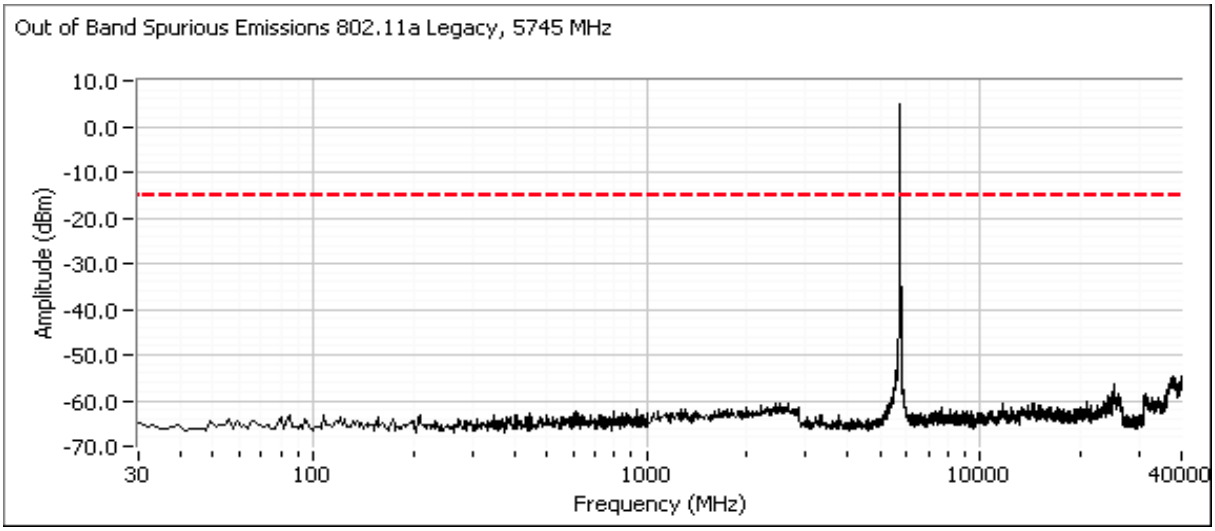


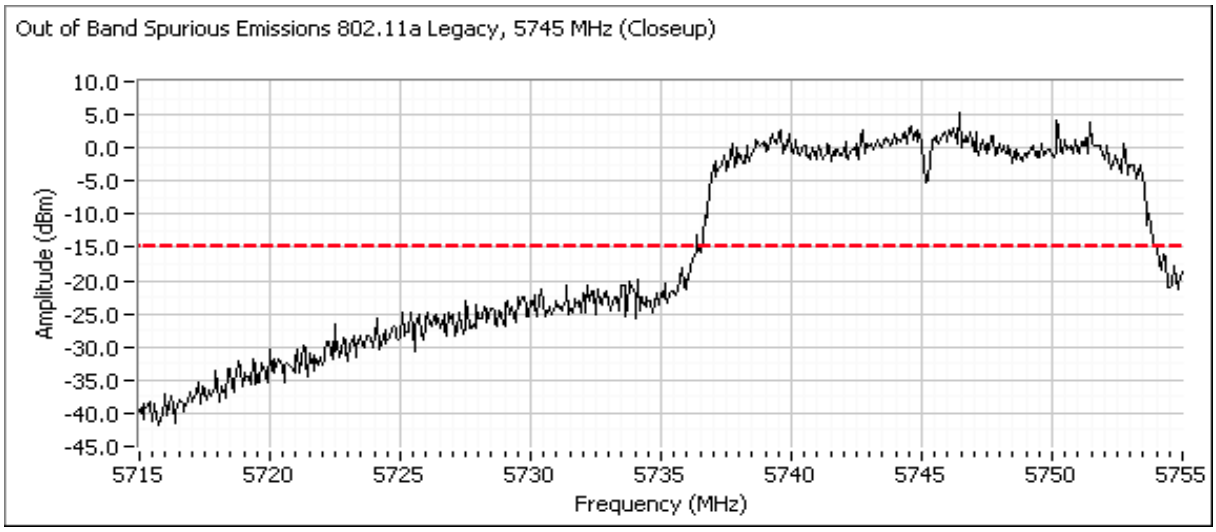
Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #4: Out of Band Spurious Emissions

Frequency (MHz)	Limit	Result
5745	-20dBc	Pass
5785	-20dBc	Pass
5825	-20dBc	Pass

Plots for low channel





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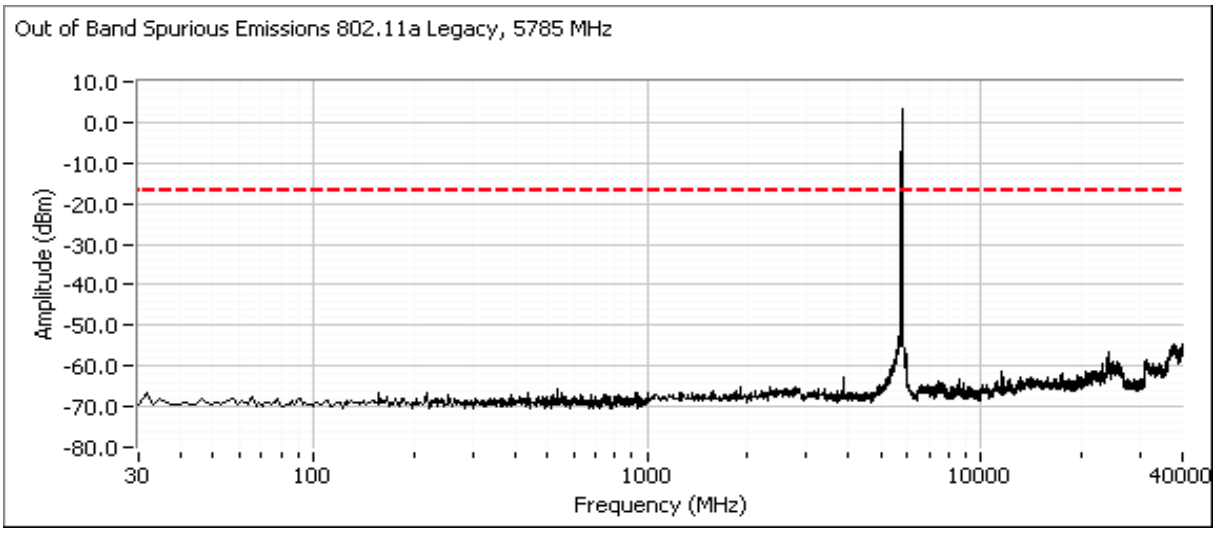
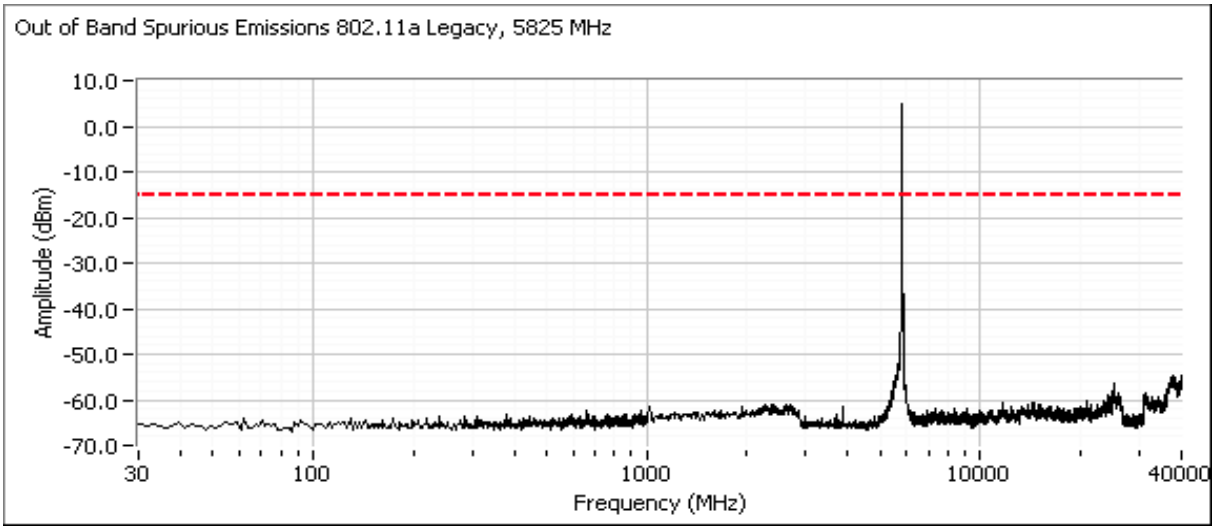
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Plots for center channel



Plots for high channel



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Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
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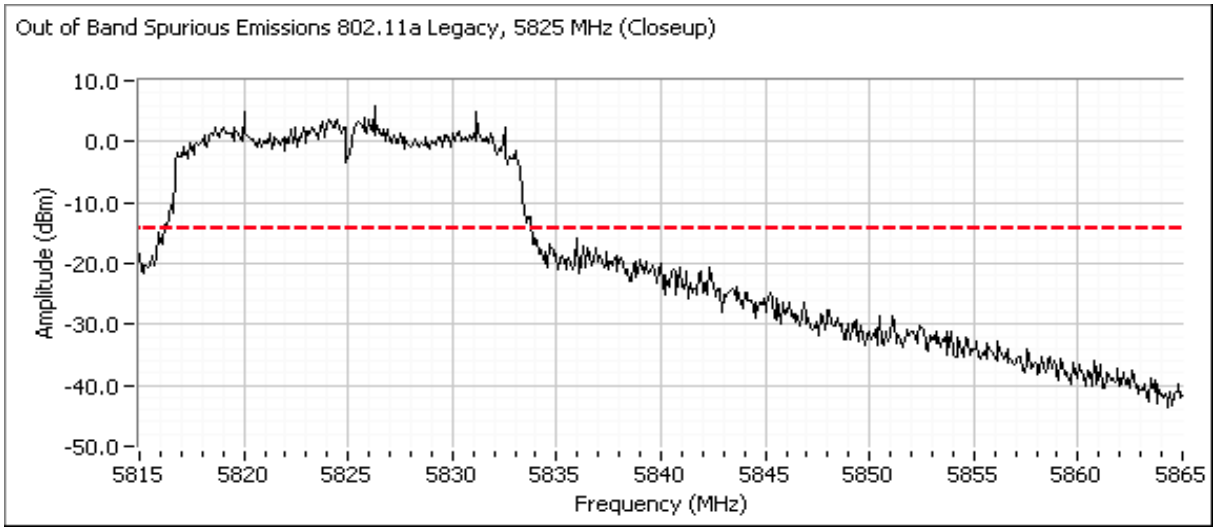
Standard:	FCC 15.247 & 15.205	Class:	N/A



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Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
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: 2/10/2009 & 2/15/2009
Test Engineer: rvarelas
Test Location: Fremont Chamber #5

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

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: 19.3 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Output Power Chain A + B (Peak Measurment)	15.247(b)	Pass	25.5dBm (0.352W) 34.3dBm (2.678W)
1	Output Power Chain A + B (Average Measurment)	15.247(b)	Pass	19.9dBm (0.1W) 25.9dBm (0.39W) EIRP
2	Power spectral Density (PSD) Chain A + B	15.247(d)	Pass	-2.1 dBm/3kHz
3	6dB Bandwidth	15.247(a)	Pass	16.2 MHz
3	99% Bandwidth	RSS GEN	-	18.7 MHz
4	Spurious emissions	15.247(b)	Pass	>20 dBc Margin

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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #1: Output Power - Chain A + B (Peak Power Measurment)

Operating Mode: 802.11n 20MHz

Transmitted signal on chain is coherent ? yes

Ref. 99% BW	18.3	18.3						
5745 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	21.6	22.1			24.9 dBm	0.307 W	27.2 dBm	0.524 W
Antenna Gain (dBi) Note 2	5.8	5.8			8.8 dBi	8.8 dBi	Pass	
eirp (dBm) Note 2	27.4	27.9			33.7 dBm	2.332 W		

Ref. 99% BW	18.6	18.7						
5785 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	22.2	22.7			25.5 dBm	0.352 W	27.2 dBm	0.524 W
Antenna Gain (dBi) Note 2	5.8	5.8			8.8 dBi	8.8 dBi	Pass	
eirp (dBm) Note 2	28	28.5			34.3 dBm	2.678 W		

Ref. 99% BW	18.7	18.7						
5825 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	-	-						
Output Power (dBm) Note 1	22.2	22.6			25.4 dBm	0.348 W	27.2 dBm	0.524 W
Antenna Gain (dBi) Note 2	5.8	5.8			8.8 dBi	8.8 dBi	Pass	
eirp (dBm) Note 2	28	28.4			34.2 dBm	2.646 W		

Note 1:	Output power measured using Peak Power Sensor. Spurious limit becomes -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
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

Client:	Broadcom	Job Number:	J74037
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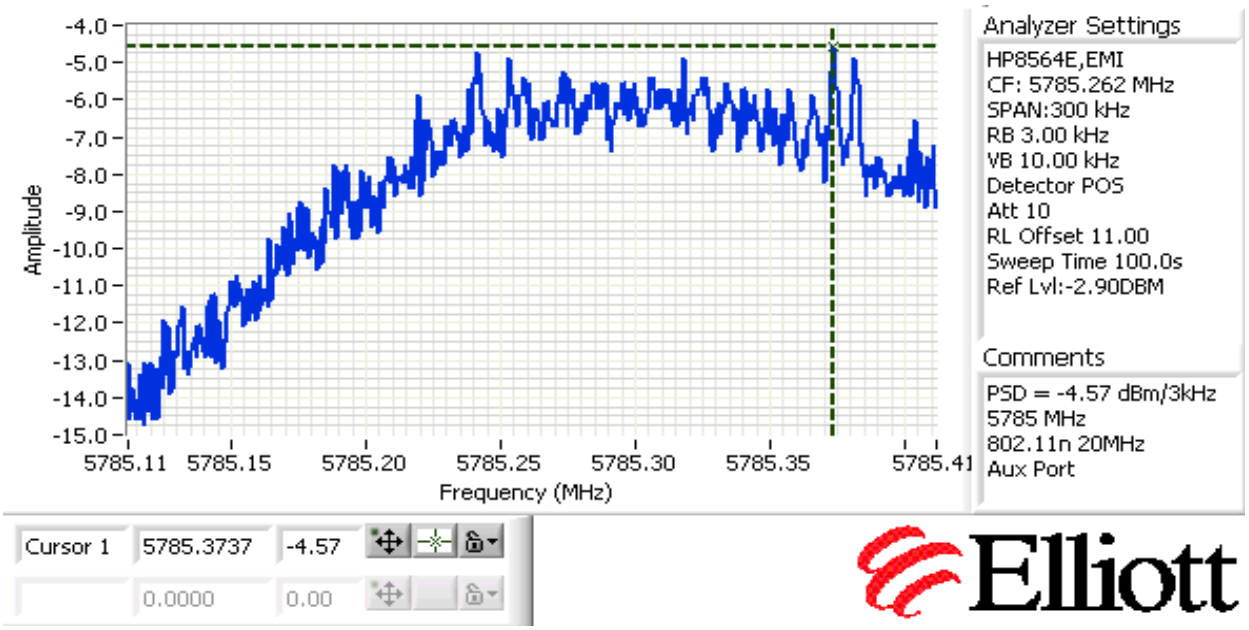
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1					Limit dBm/3kHz	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
-	5745	-6.1	-5.6			-2.8	8.0	Pass
-	5785	-5.7	-4.6			-2.1	8.0	Pass
-	5825	-5.6	-4.7			-2.1	8.0	Pass

Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.



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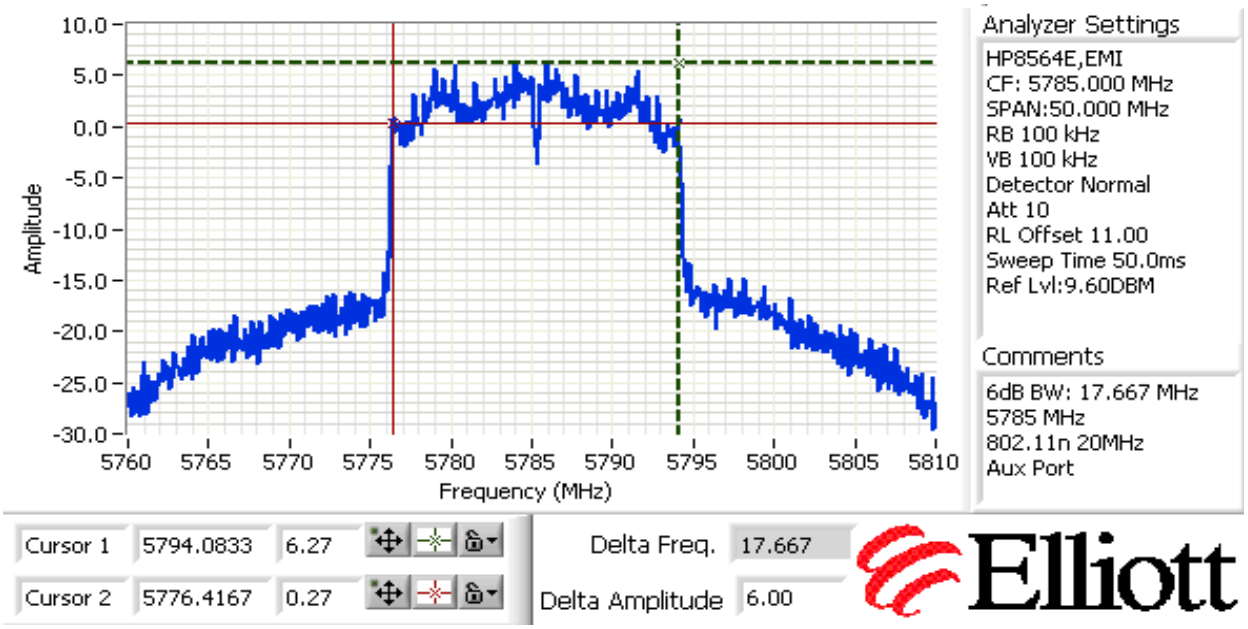
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
-	5745	100 kHz	16.2	18.3
-	5785	100 kHz	17.7	18.7
-	5825	100 kHz	17.0	18.7

Note 1:	Measured on a single chain
Note 2:	99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB



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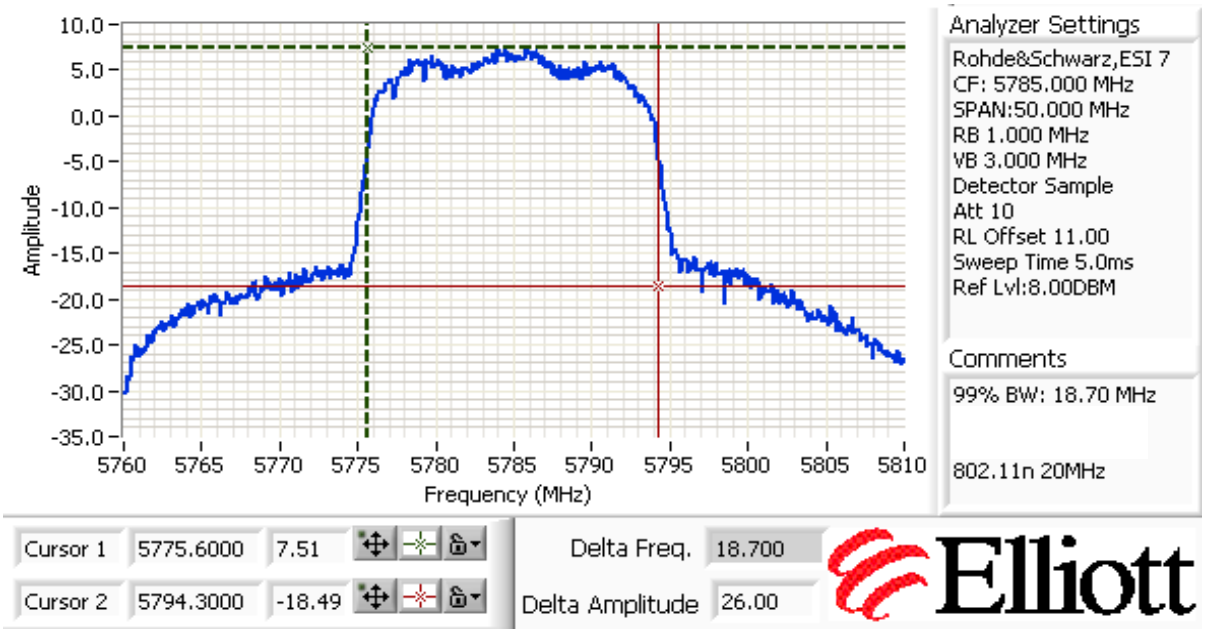
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A



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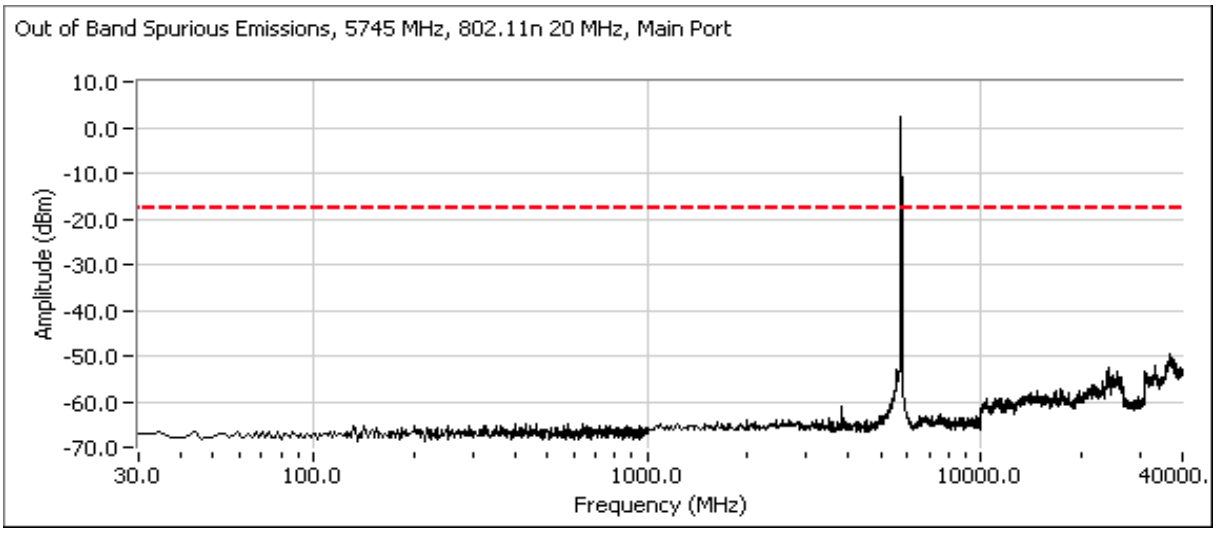
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

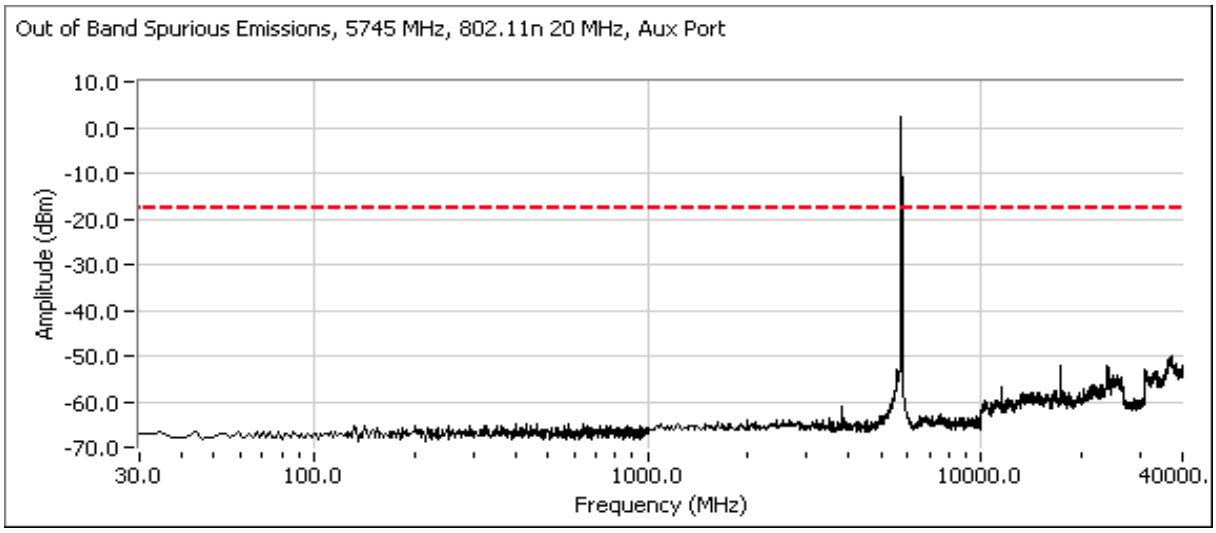
Run #4: Out of Band Spurious Emissions

Power Setting Per Chain				Frequency (MHz)	Limit	Result
#1	#2	#3	#4			
-	-			5745	-20dBc	Pass
-	-			5785	-20dBc	Pass
-	-			5825	-20dBc	Pass

Note 1:	Measured on each chain individually

Plots for low channel

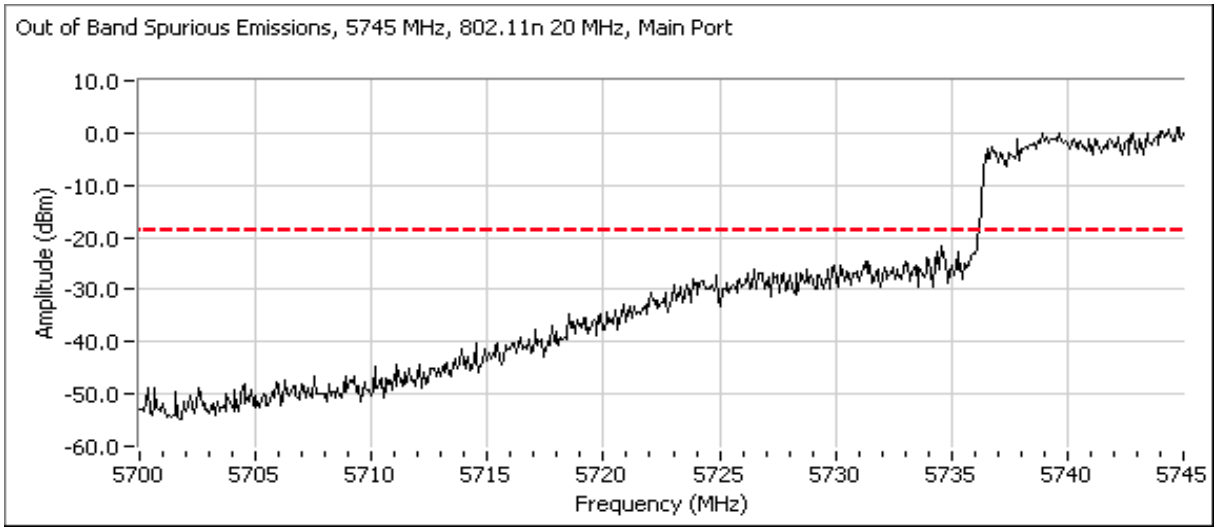


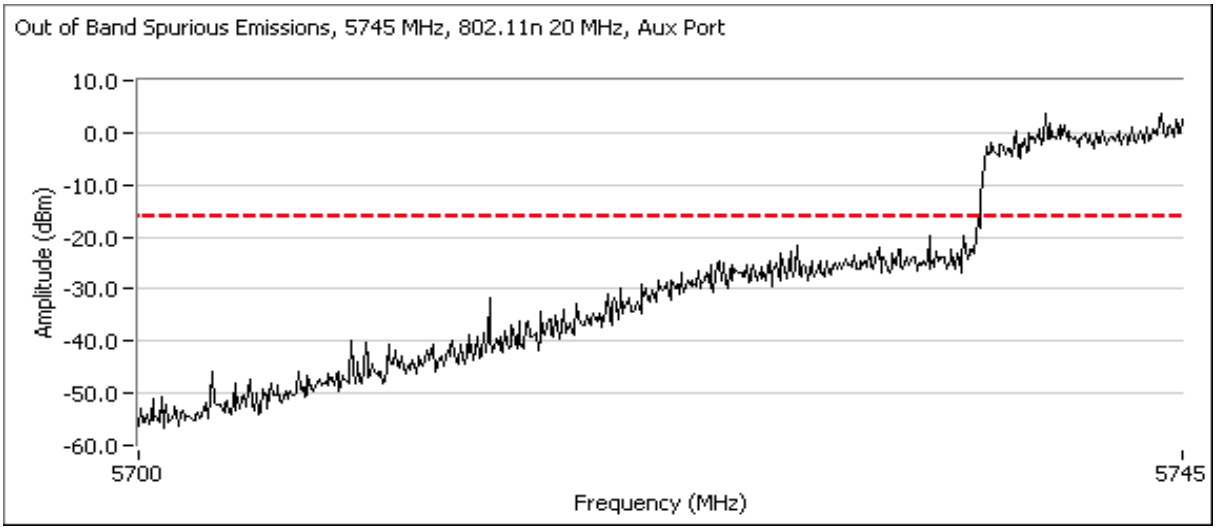


Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #4: Continued

Additional plot from 5715 - 5755 MHz showing compliance with -20dBc at the band edge.





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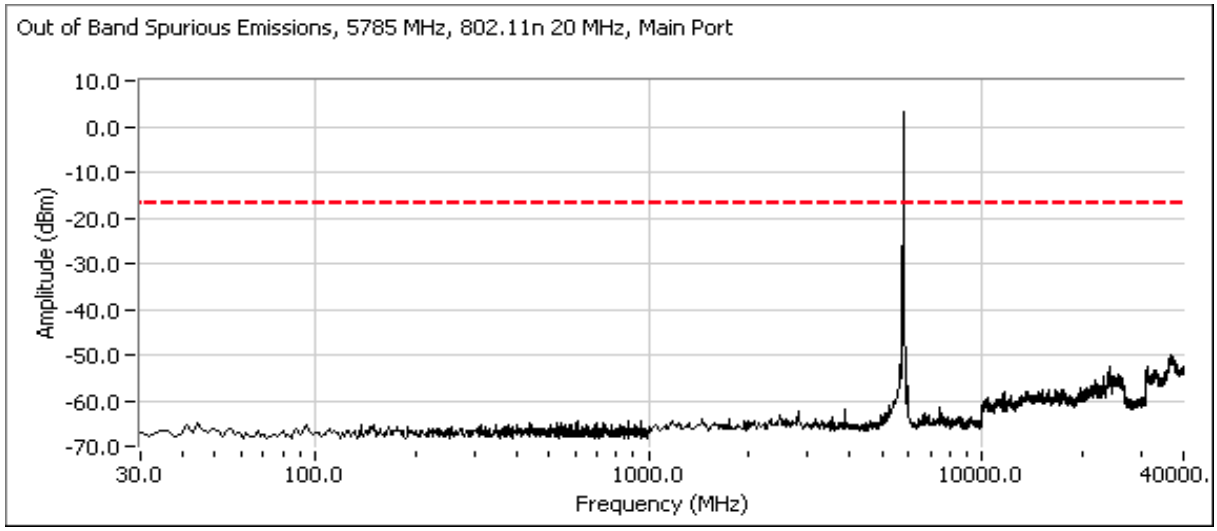
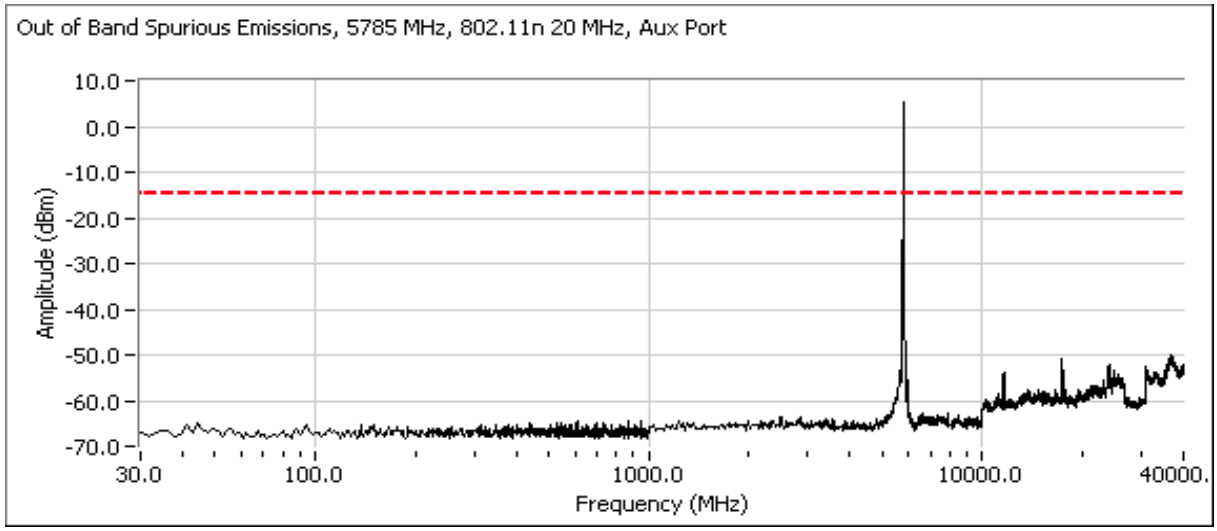
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #4: Continued

Plots for center channel





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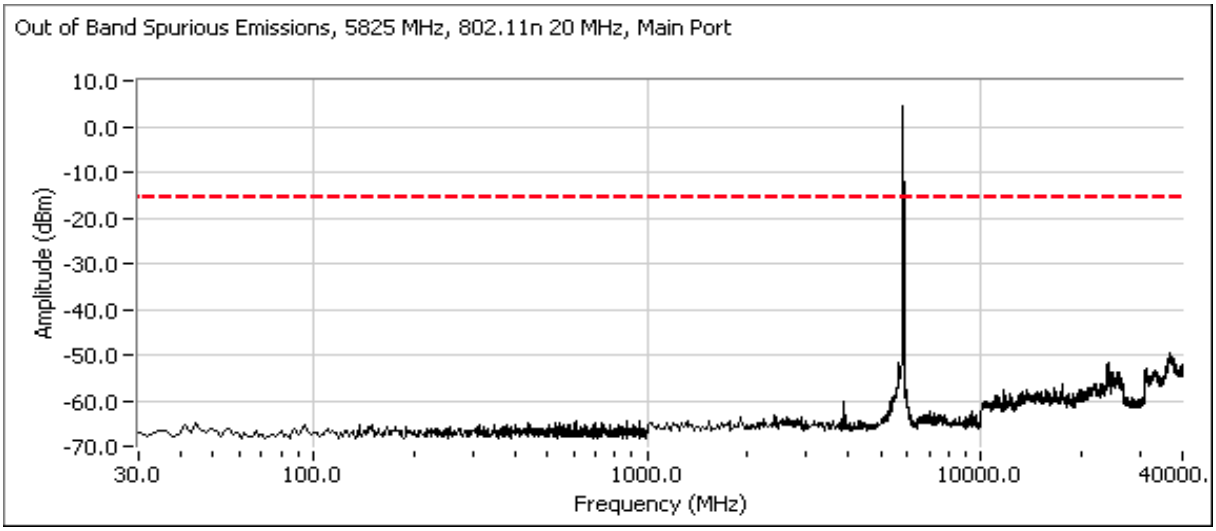
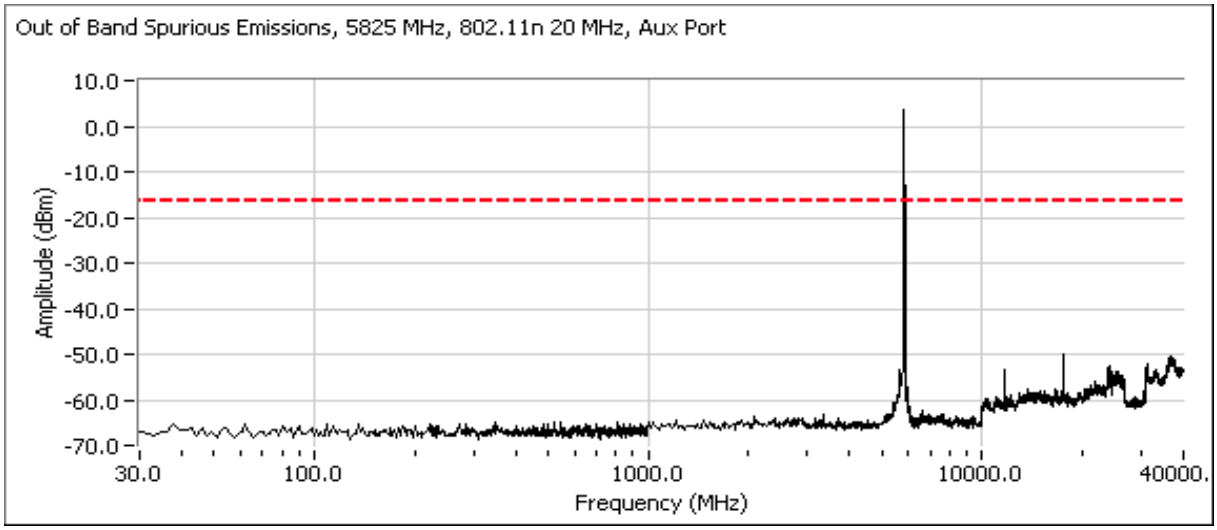
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #4: Continued

Plots for high channel





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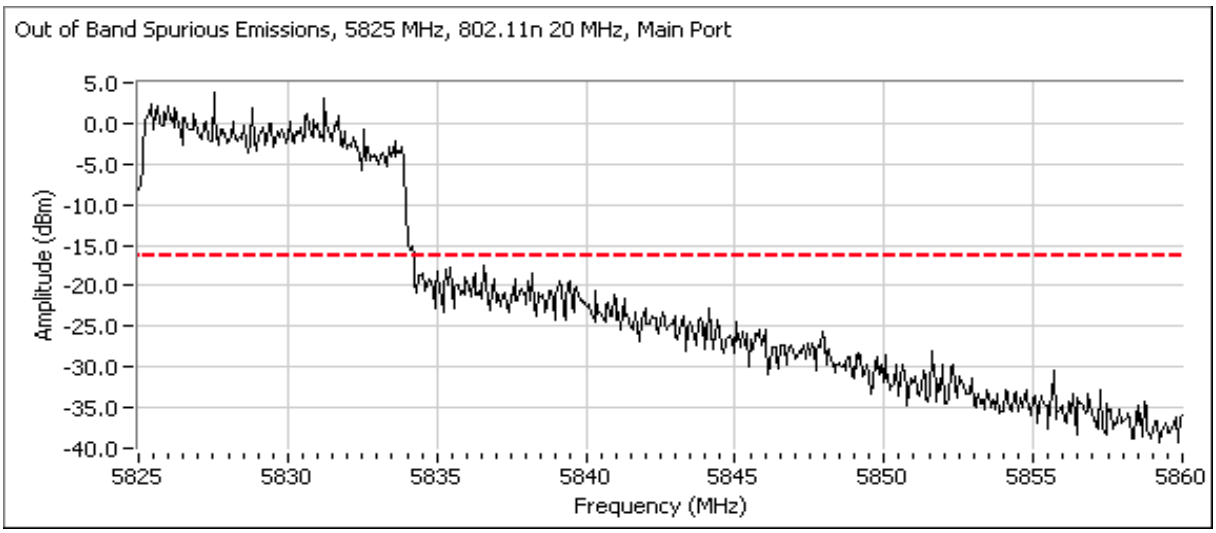
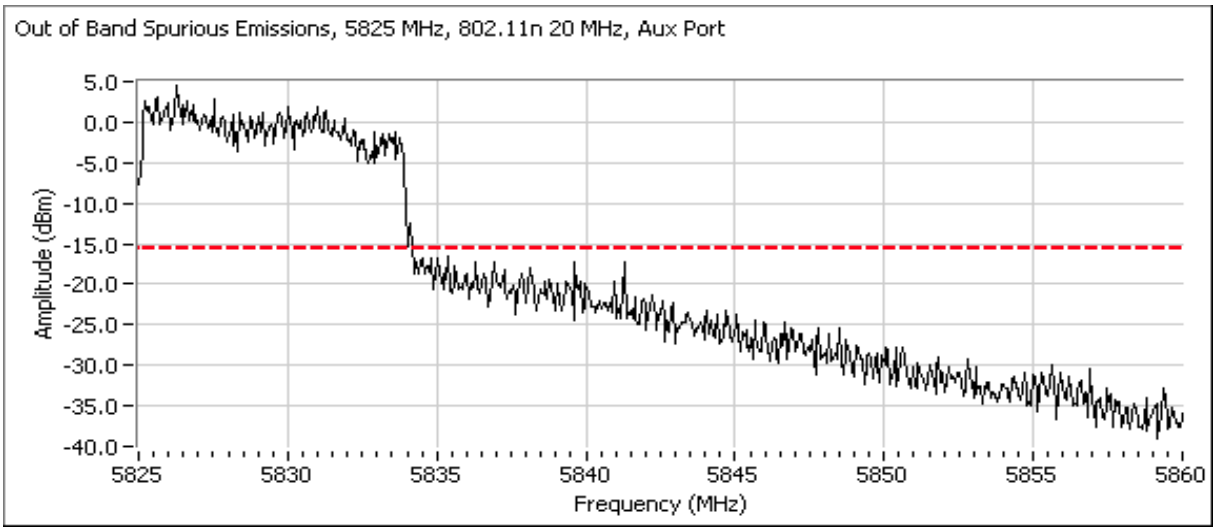
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #4: Continued

Additional plot from 5820 - 5860 MHz showing compliance with -20dBc at the band edge.





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Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
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: 2/10/2009
Test Engineer: rvarelas
Test Location: Fremont Chamber #5

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

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: 19.3 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Output Power Chain A + B (Peak Measurment)	15.247(b)	Pass	25.1dBm (0.325W) 33.9dBm (2.472W)
1	Output Power Chain A + B (Average Measurment)	15.247(b)	Pass	20.3dBm (0.09W) 26.3dBm (0.43W) EIRP
2	Power spectral Density (PSD) Chain A + B	15.247(d)	Pass	-4.1 dBm/3kHz
3	6dB Bandwidth	15.247(a)	Pass	35.7 MHz
3	99% Bandwidth	RSS GEN	-	39.2 MHz
4	Spurious emissions	15.247(b)	Pass	NA

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:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #1: Output Power - Chain A + B(Peak Power)

Operating Mode: 802.11n 40MHz

Transmitted signal on chain is coherent ? yes

Ref. 99% BW		37.2	37.6						
5755 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting[Note 3]								
Output Power (dBm)[Note 1]	21.2	22.1			24.7 dBm	0.294 W	27.2 dBm	0.524 W
Antenna Gain (dBi)[Note 2]	5.8	5.8			8.8 dBi	8.8 dBi	Pass	
eirp (dBm)[Note 2]	27	27.9			33.5 dBm	2.236 W		

Ref. 99% BW		39.2	38.8						
5795 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting[Note 3]								
Output Power (dBm)[Note 1]	21.8	22.4			25.1 dBm	0.325 W	27.2 dBm	0.524 W
Antenna Gain (dBi)[Note 2]	5.8	5.8			8.8 dBi	8.8 dBi	Pass	
eirp (dBm)[Note 2]	27.6	28.2			33.9 dBm	2.472 W		

Note 1:	Power measured via peak power meter.
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
Note 3:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.

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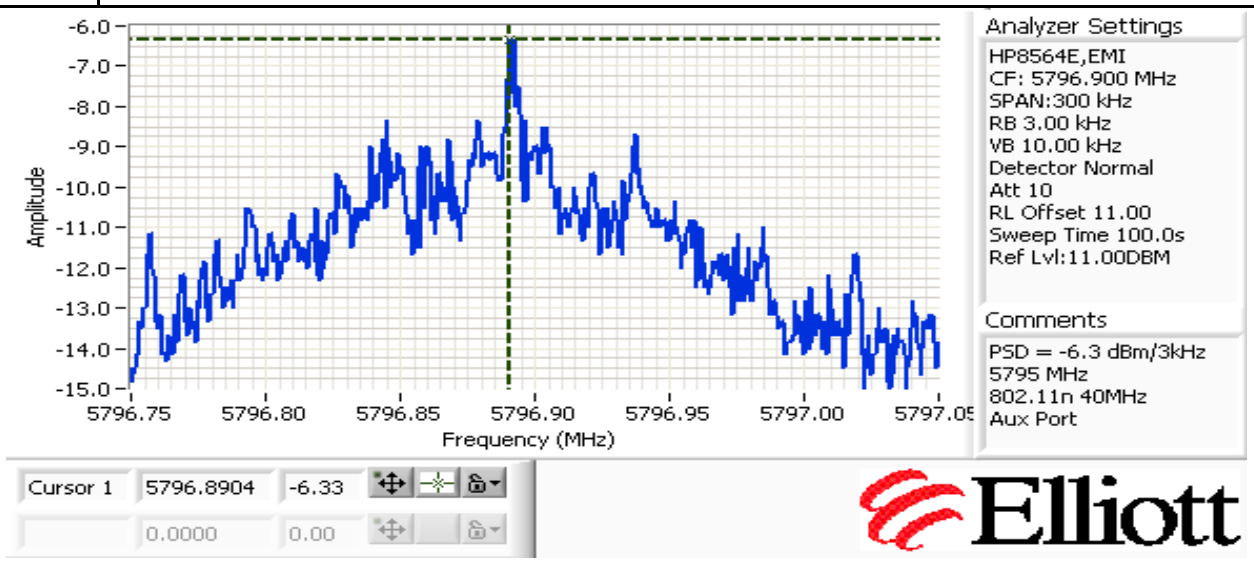
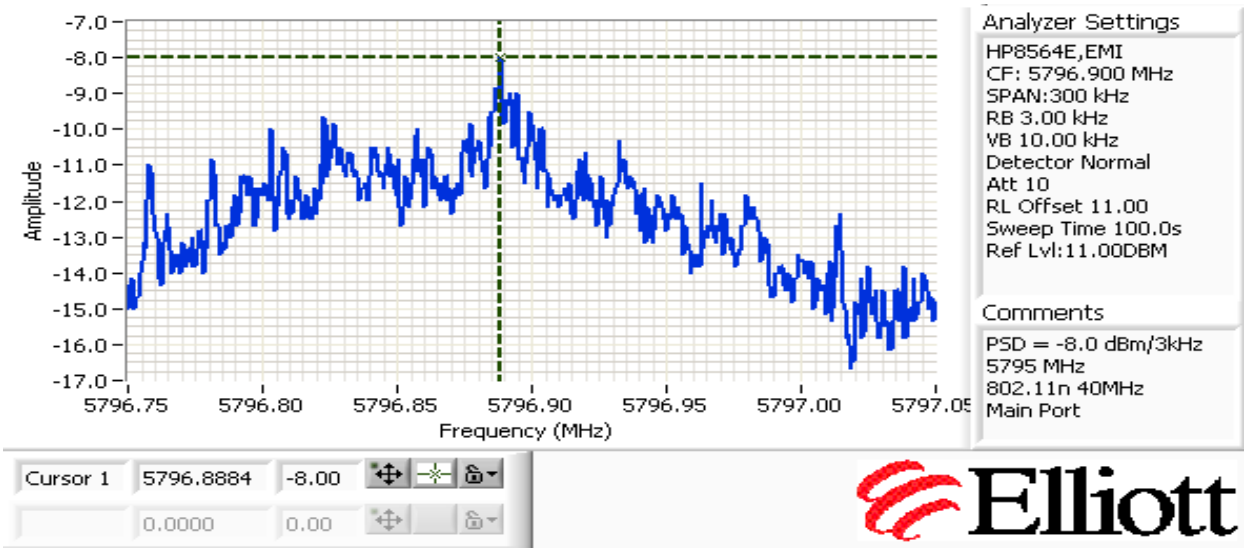
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1 Chain 1	Chain 2	Chain 3	Chain 4	Total	Limit dBm/3kHz	Result
-	5755	-7.9	-7.5			-4.7	8.0	Pass
-	5795	-8.0	-6.3			-4.1	8.0	Pass

Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.





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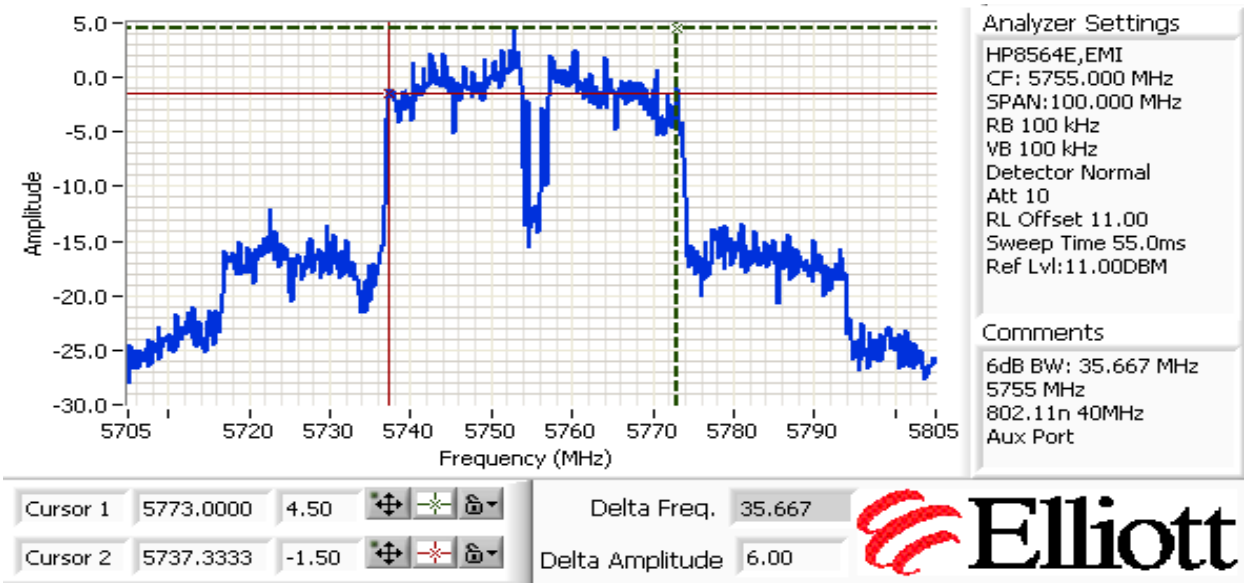
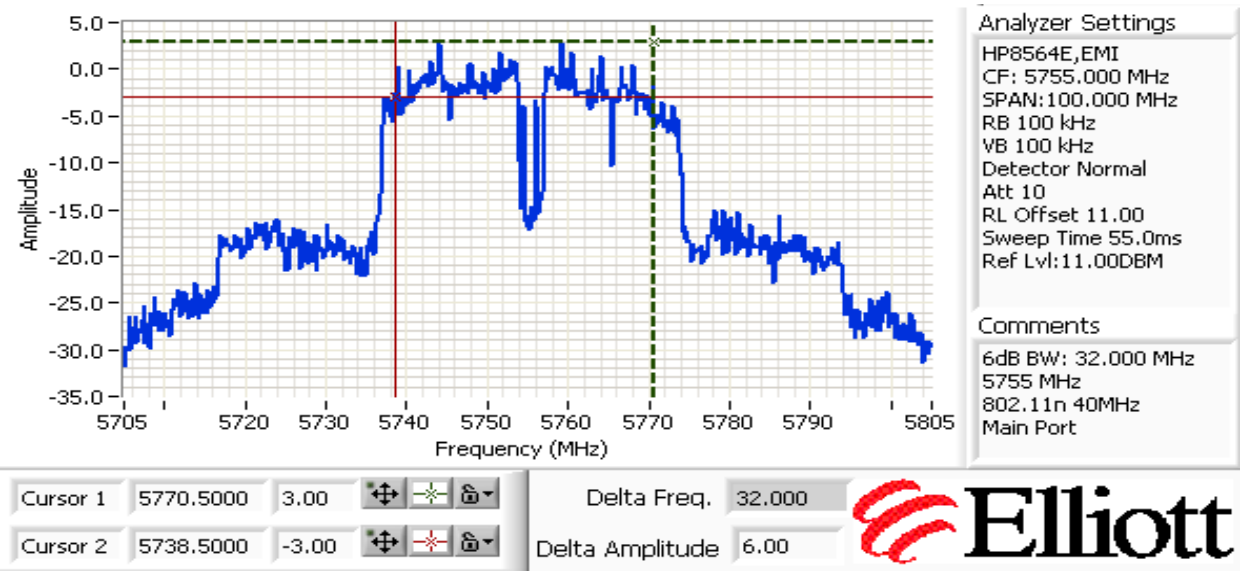
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
	5755	100kHz	35.7	37.6
	5795	100kHz	36.0	39.2

Note 1:	Measured on a single chain
Note 2:	99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB





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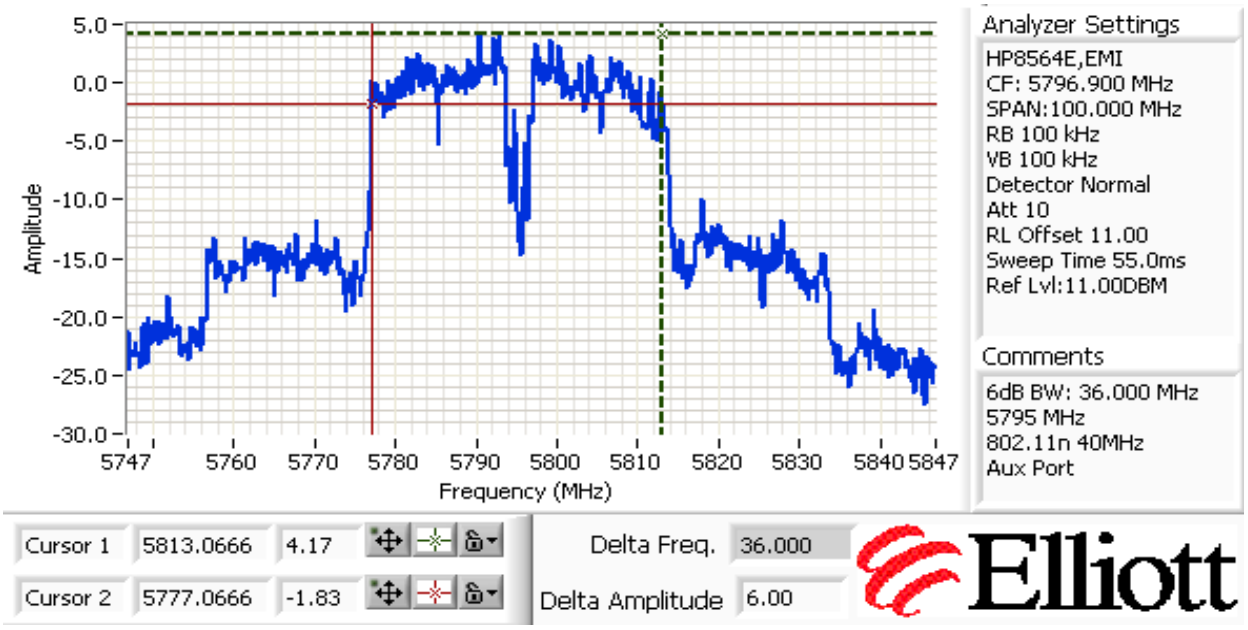
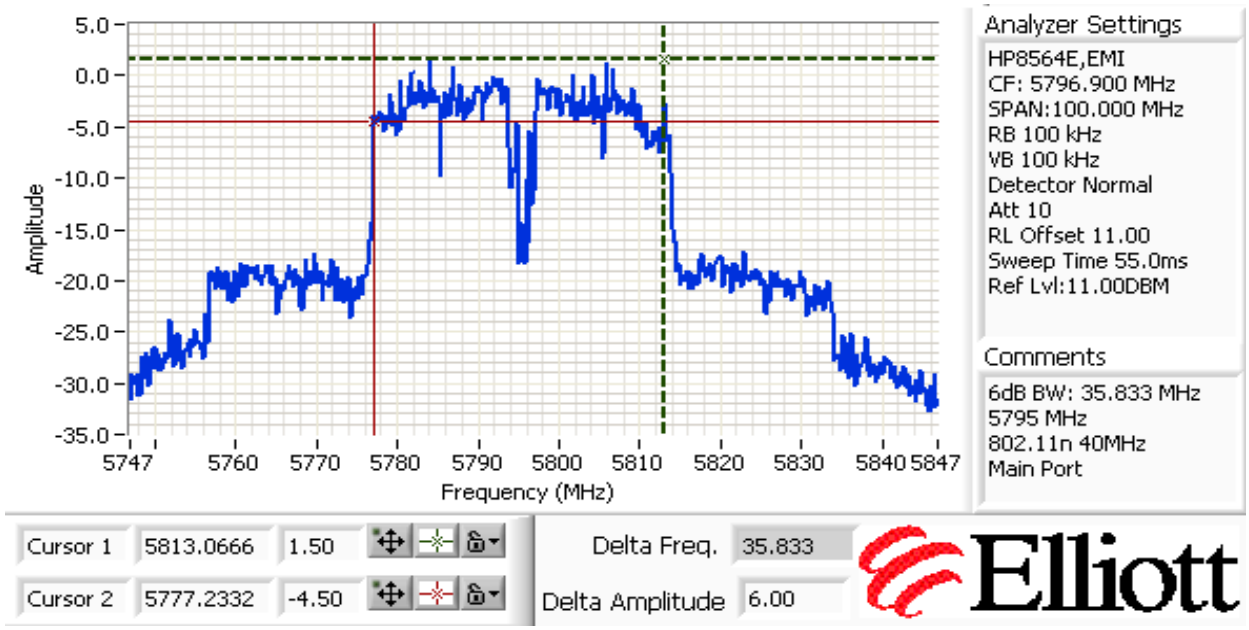
Standard:	FCC 15.247 & 15.205	Class:	N/A





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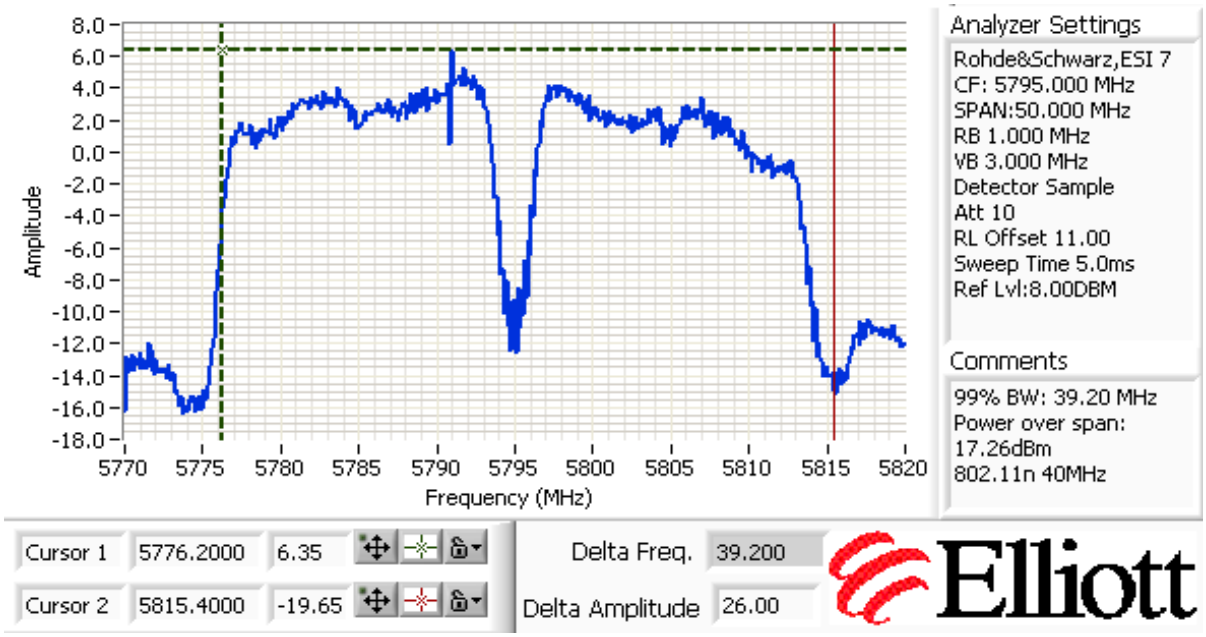
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A



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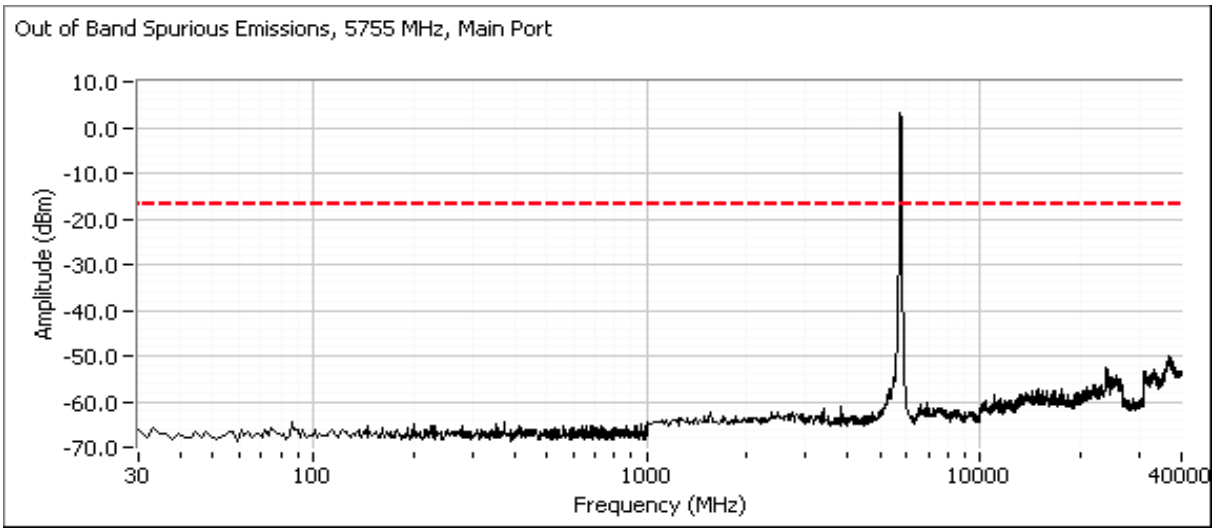
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

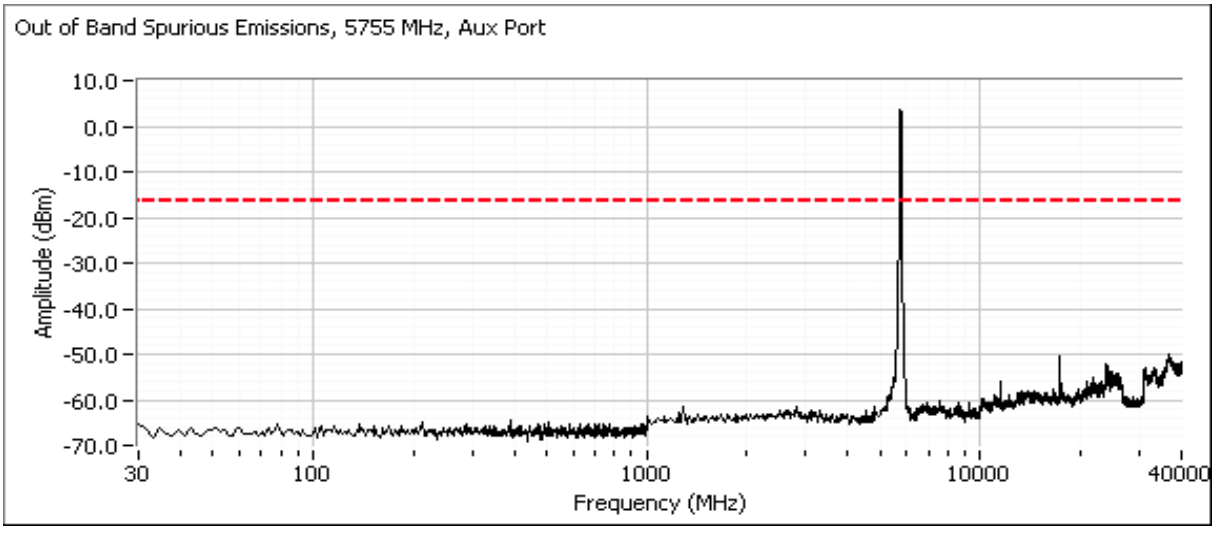
Run #4: Out of Band Spurious Emissions

Power Setting Per Chain				Frequency (MHz)	Limit	Result
#1	#2	#3	#4			
-	-			5755	-20dBc	Pass
-	-			5795	-20dBc	Pass

Note 1:	Measured on each chain individually

Plots for low channel





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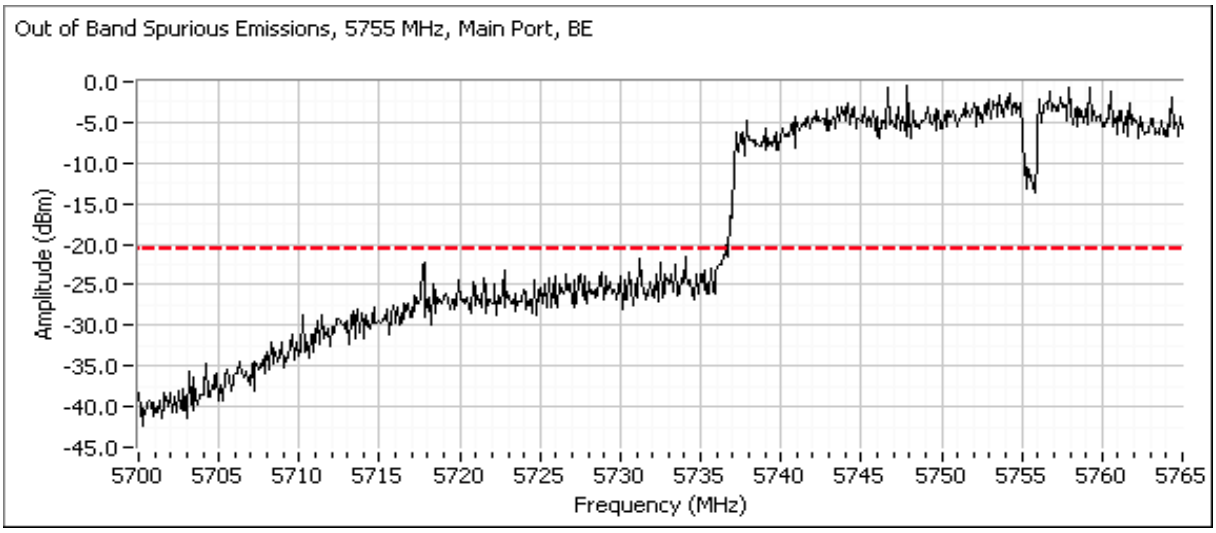
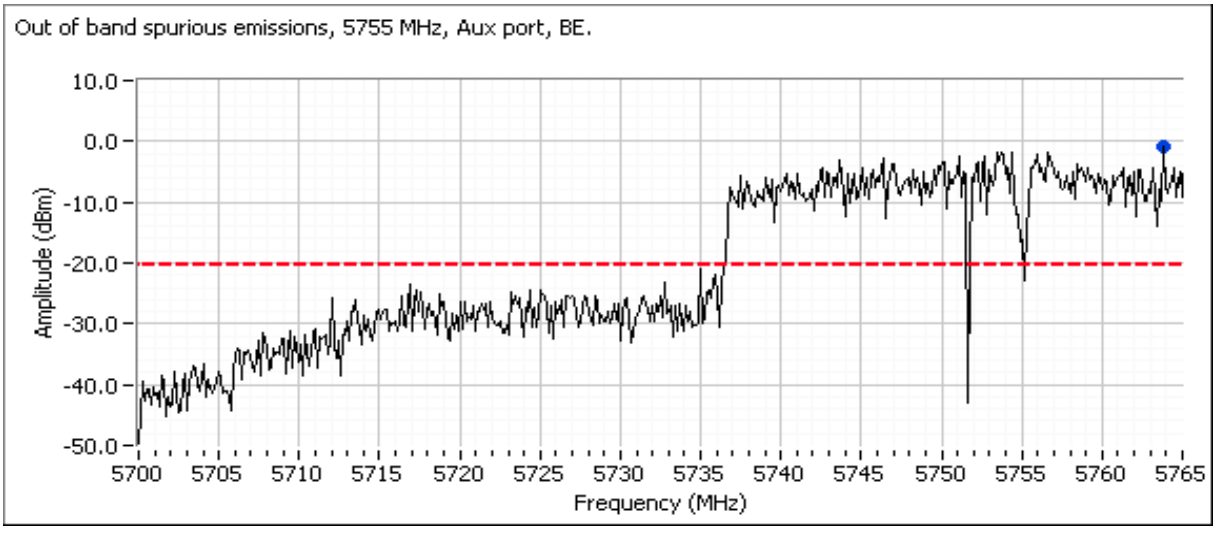
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

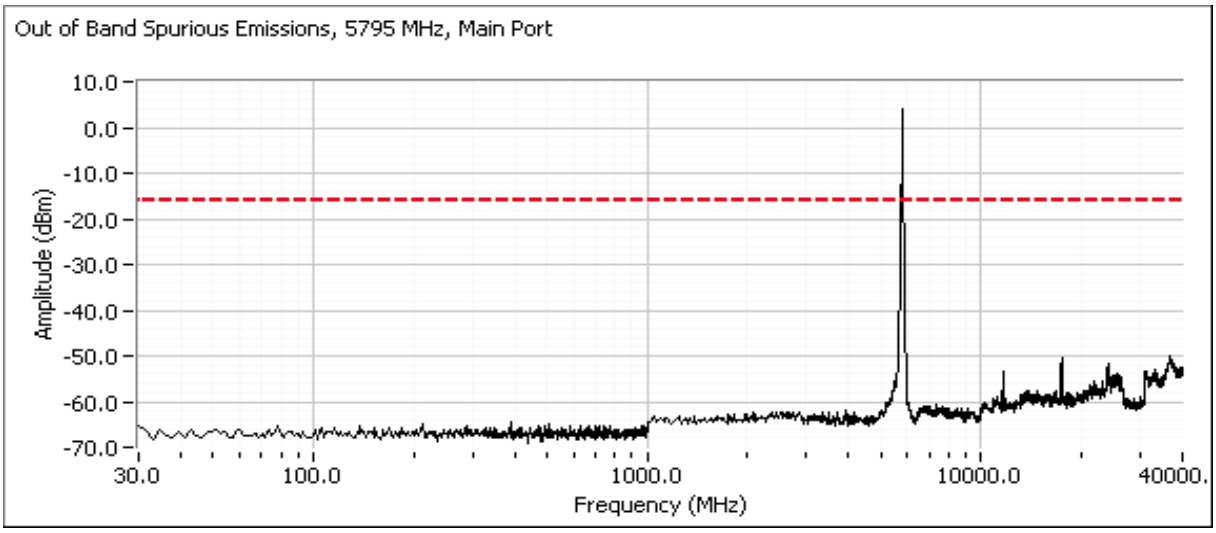
Additional plot from 5715 - 5755 MHz showing compliance with -20dBc at the band edge with lower power setting.

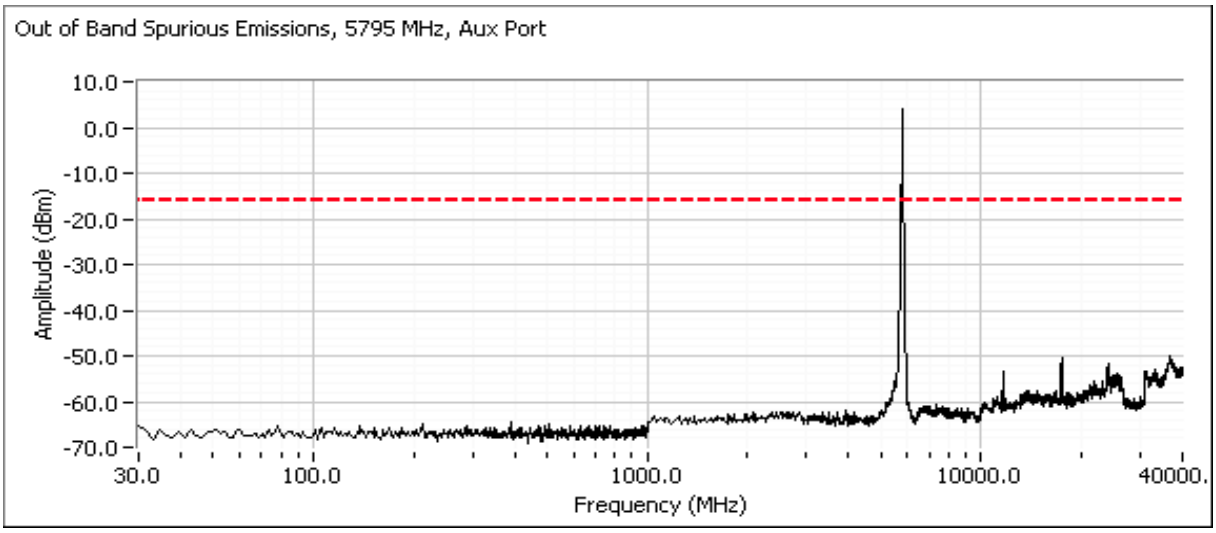




Client:	Broadcom	Job Number:	J74037
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Plots for high channel





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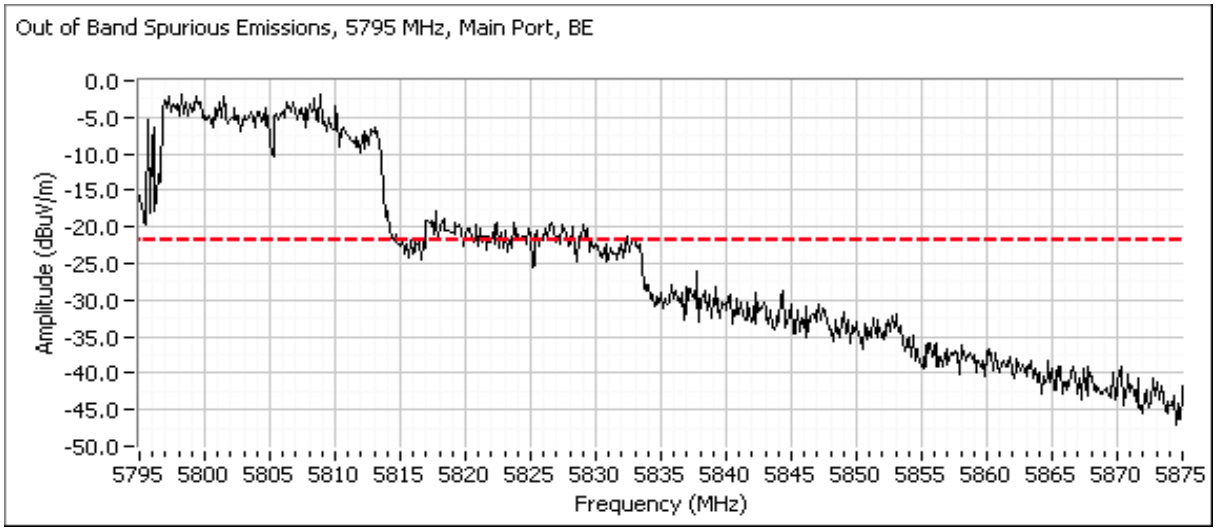
Model:	BCM943224HMS	T-Log Number:	T74077
		Account Manager:	Dean Eriksen
Contact:	Anne Liang		
Standard:	FCC 15.247 & 15.205	Class:	N/A

Additional plots from 5795 - 5885 MHz showing compliance with -20dBc at the band edge.



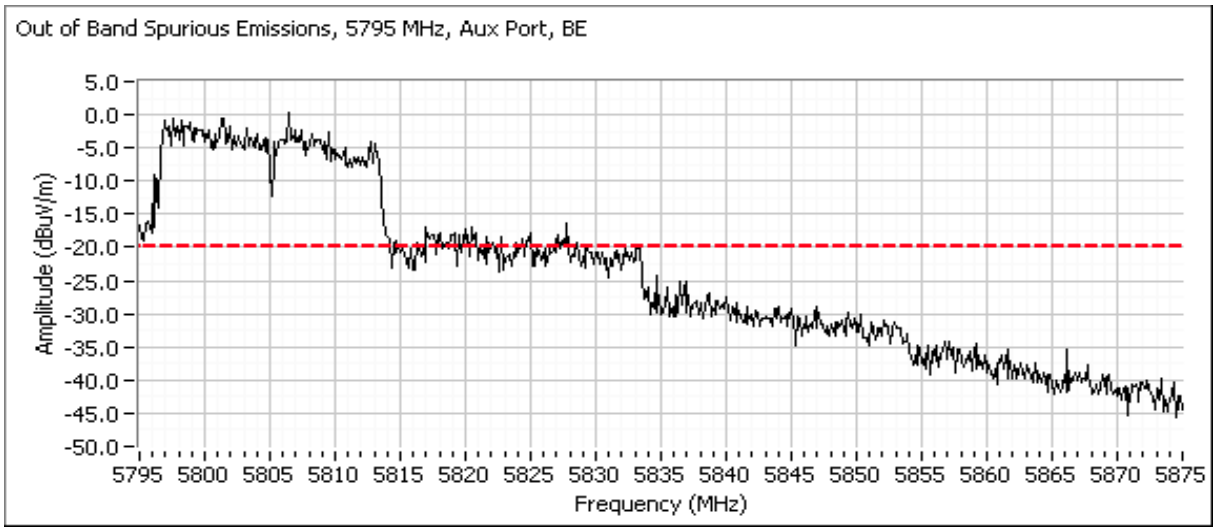


EXHIBIT 3: Photographs of Test Configurations

EXHIBIT 4: Proposed FCC ID Label & Label Location

EXHIBIT 5: Detailed Photographs of Broadcom Corporation Model BCM943224HMSConstruction

EXHIBIT 6: Operator's Manual for Broadcom Corporation Model BCM943224HMS

EXHIBIT 7: Block Diagram of Broadcom Corporation Model BCM943224HMS

EXHIBIT 8: Schematic Diagrams for Broadcom Corporation Model BCM943224HMS

EXHIBIT 9: Theory of Operation for Broadcom Corporation Model BCM943224HMS

EXHIBIT 10: RF Exposure Information