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EMC Test Report

Application for Grant of Equipment Authorization

Industry Canada RSS-Gen Issue 3 / RSS 210 Issue 8
FCC Part 15 Subpart C

Model: WS-AP3710i

FCC ID:	QQD10I
IC CERTIFICATION #:	5248S-10I
APPLICANT:	Flextronics 21 Richardson Side Road Kanata, ON K2K 2C1, Canada
TEST SITE(S):	NTS Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-4, 2845B-5, 2845B-7
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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	02-04-2013	Initial release	
1	02-13-2013	Added KDB 662911 to list of measurement procedures, corrected summary of occupied bandwidth values	dwb

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SCOPE

An electromagnetic emissions test has been performed on the Flextronics model WS-AP3710i, pursuant to the following rules:

Industry Canada RSS-Gen Issue 3
RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15 Subpart C

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

ANSI C63.4:2003
FCC DTS Measurement Procedure, KDB 558074
FCC KDB 662911 "Emissions Testing of Transmitters with Multiple Outputs in the Same Band"

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

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

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

OBJECTIVE

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

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

Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification. Class II devices are required to meet the appropriate technical requirements but are exempt from certification requirements.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

STATEMENT OF COMPLIANCE

The tested sample of Flextronics model WS-AP3710i complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 3
RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15 Subpart C

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

The test results recorded herein are based on a single type test of Flextronics model WS-AP3710i and therefore apply only to the tested sample. The sample was selected and prepared by Georges Fares of Flextronics.

DEVIATIONS FROM THE STANDARDS

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

TEST RESULTS SUMMARY

DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	System uses 802.11b/g/n techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (a)	6dB Bandwidth	b: 10.1 MHz g: 16.3 MHz n20: 17.0 MHz n40: 36.3 MHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.4 (4)	Output Power (multipoint systems)	b: 23.1 dBm g: 22.6 dBm n20: 21.5 dBm n40: 21.1 dBm EIRP = 0.982 W Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (b)	Power Spectral Density	b: 2.2 dBm/3kHz g: --1.8 dBm/3kHz n20: -2.3 dBm/3kHz n40: -10.5 dBm/3kHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	All emissions < -30dBc for 802.11b/g/n20 All emissions < -20dBc for 802.11n40	< -20dBc or < -30dBc Note 2	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.9 dBµV/m @ 5440.1 MHz (-0.1 dB)	15.207 in restricted bands, all others > 30dBc Note 2	Complies

Note 1: EIRP calculated using antenna gain of 6.8 dBi (three 2 dBi antennas) for the highest EIRP system.
Note 2: A limit of -30dBc was used when the maximum conducted output power was measured and a limit of -20dBc was used when maximum peak conducted output power was measured.

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	System uses 802.11a/n techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (a)	6dB Bandwidth	a: 15.9 MHz n20: 17.1 MHz n40: 35.7 MHz	>500kHz	Complies
15.247 (b)	RSS 210 A8.4 (4)	Output Power (multipoint systems)	a: 21.9 dBm n20: 25.7 dBm n40: 23.1 dBm EIRP = 0.733 W Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (b)	Power Spectral Density	a: -6.9 dBm/3kHz n20: -4.8 dBm/3kHz n40: -9.0 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 < -30dBc for 802.11a and < -20dBc for 802.11 n20 and n40	< -20dBc or < -30dBc Note 2	Complies
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 40 GHz	53.9 dBµV/m @ 5440.1 MHz (-0.1 dB)	15.207 in restricted bands, all others > 30dBc Note 2	Complies

Note 1: EIRP calculated using antenna gain of 6.8 dBi (three 2 dBi antennas) for the highest EIRP system.
Note 2: A limit of -30dBc was used when the maximum conducted output power was measured and a limit of -20dBc was used when maximum peak conducted output power was measured.

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Integral antenna	Unique or integral antenna required	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	48.3 dBµV @ 1.188 MHz (-7.7 dB)	Refer to page 18	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations, 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	Refer to User Manual for details	Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	No detachable antenna	Statement for products with detachable antenna	N/A
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	2.4 GHz b: 17.1 MHz g: 17.7 MHz n20: 18.5 MHz n40: 36.6 MHz 5.8 GHz a: 17.9 MHz n20: 23.4 MHz n40: 37.0 MHz	Information only	N/A

MEASUREMENT UNCERTAINTIES

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

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

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Flextronics model WS-AP3710i is a multiple radio access point, each radio operating in 3x3 MIMO and legacy modes. It incorporates both a 2.4 GHz band 802.11b/g/n and a 5.2 GHz band and 5.8 GHz band 802.11a/n radio in a single enclosure. Since the EUT could be placed in any position 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 48 Volts DC, 0.8 Amps.

The sample was received on November 29, 2012 and tested on November 29, December 3, 4, 12, 17, 19, 20, 21, 26, 27 and 28, 2012. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Flextronics	WS-AP3710i	Access Point	None	QQD10I

ANTENNA SYSTEM

The antenna system consists of three integral antennas for both radios.

ENCLOSURE

The EUT enclosure measures approximately 20 by 18.5 by 3 centimeters. It is constructed of uncoated plastic and cast metal.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at NTS Silicon Valley.

SUPPORT EQUIPMENT

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

Company	Model	Description	Serial Number	FCC ID
PowerDsine	9001G-40/SP	POE adapter	N114565190018 46A01	-
Dell	Latitude D610	Laptop Computer	26895386773	-

A remote Ethernet/POE switch (Enterasys model C5G124-24P2, serial # 1111824225H) was used for testing from 30-1000 MHz instead of the POE adapter.

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Ethernet/POE	Remote POE adapter or switch	Cat 5	Unshielded	10
Remote POE Data or switch	Laptop	Cat 5	Unshielded	2

The console port was not connected during testing as this is used only during configuration of the radio.

EUT OPERATION

During testing, the EUT was configured to transmit a continuous modulated signal at the selected frequency and power level on all three chains of both radios.

TEST SITE

GENERAL INFORMATION

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

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

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 16-1-1 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.

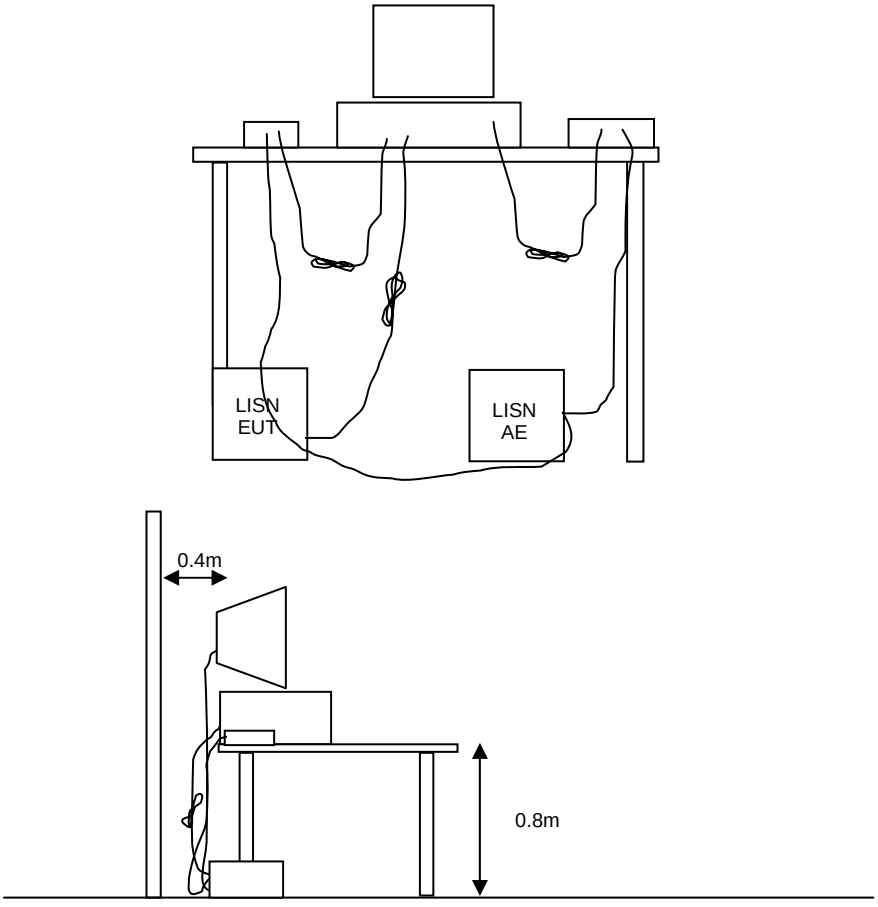


Figure 1 Typical Conducted Emissions Test Configuration

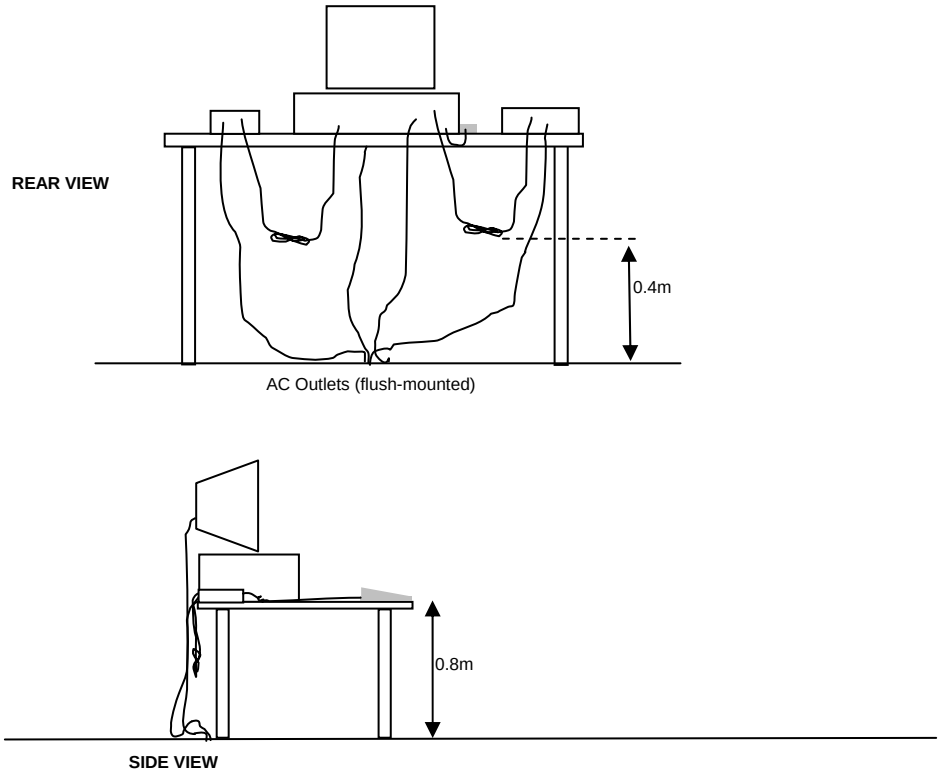
RADIATED EMISSIONS

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

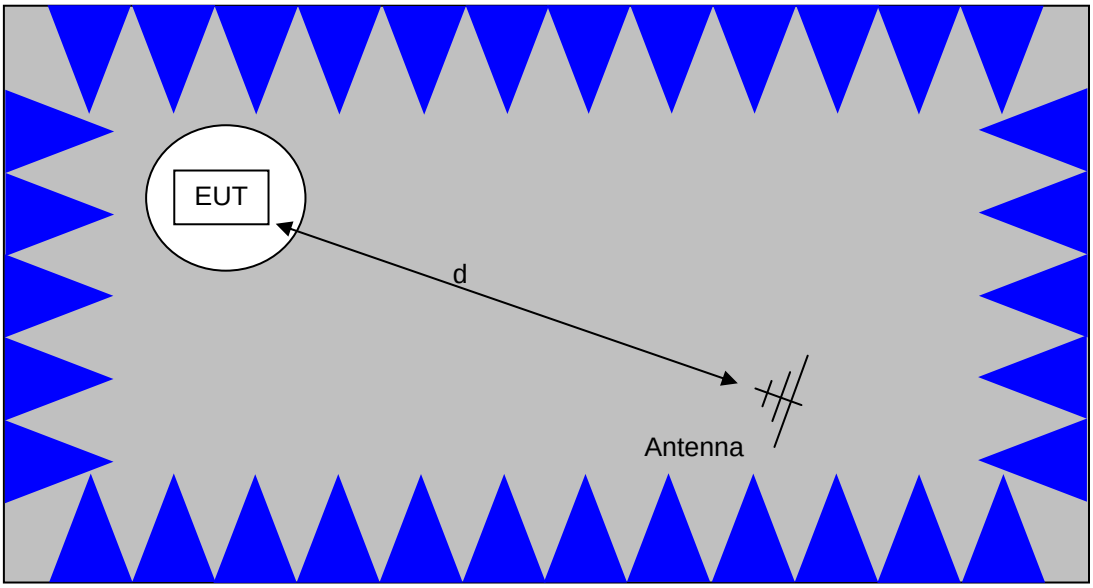
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

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

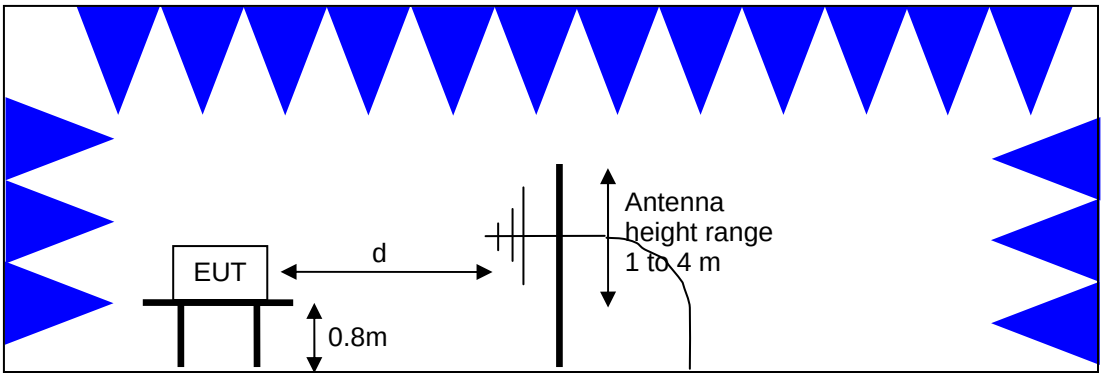


Typical Test Configuration for Radiated Field Strength Measurements



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

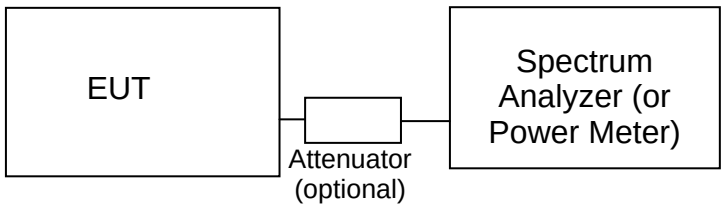
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

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



Test Configuration for Antenna Port Measurements

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

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

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

BANDWIDTH MEASUREMENTS

The 6dB, 20dB and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4. When required, the 99% bandwidth is measured using the methods detailed in RSS GEN.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

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

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

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

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

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

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

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

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

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

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

Operating Frequency (MHz)	Output Power	Power Spectral Density
902 – 928	1 Watt (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watt (30 dBm)	8 dBm/3kHz
5725 – 5850	1 Watt (30 dBm)	8 dBm/3kHz

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS 210. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_S = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_S$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_S = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

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

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

where P is the eirp (Watts)

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

Appendix A Test Equipment Calibration Data

Radio Antenna Port (Power and Spurious Emissions), 29-Nov-12 to 28-Dec-12

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/1/2013
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts use with 20dB attenuator sn:100059 only	NRV-Z32	1423	9/18/2013
Rohde & Schwarz	Power Meter, Single Channel, +1795+1796	NRVS	1534	6/28/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/21/2013
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	2/23/2013

Radiated Emissions, 1,000 - 40,000 MHz, 3-Dec-12 to 20-Dec-12

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	3/29/2013
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/19/2014
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/1/2013
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/12/2014
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	5/17/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/21/2013
Hewlett Packard	Head (Inc W1-W4, 1946 , 1947) Purple	84125C	1772	5/1/2013
A.H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	4/17/2013
A.H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	5/8/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/23/2013
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	8/10/2013
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	11/9/2013
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/19/2014
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	9/14/2013

Radiated Emissions, 30 - 1,000 MHz, 19-Dec-12

Manufacturer	Description	Model	Asset #	Cal Due
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1657	6/4/2014
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/21/2013
Com-Power Corp.	Preamplifier, 30-1000 MHz	PAM-103	2380	11/9/2013

Conducted Emissions - AC Power Ports, 20-Dec-12

Manufacturer	Description	Model	Asset #	Cal Due
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1594	5/22/2013
Com-Power	9KHz-30MHz, 50uH, 15Aac, 10Adc, max	LI-215A	2672	5/25/2013

Appendix B Test Data

T89870 Pages 24 – 155

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Emissions Standard(s):	15.247, 15.407, RSS-210	Class:	-
Immunity Standard(s):		Environment:	Radio

EMC Test Data

For The

Flextronics

Model

WS-AP3710i

Date of Last Test: 1/3/2013

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
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: 12/27/2012
Test Engineer: Rafael Varelas
Test Location: FT 7

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

General Test Configuration

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

Ambient Conditions:

Temperature: 20.8 °C
Rel. Humidity: 39 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1	-	-	Power spectral Density (PSD)	15.247(d)	Pass	b: 2.2 dBm/3kHz g: -1.8 dBm/3kHz n20: -2.3 dBm/3kHz n40: -10.5 dBm/3kHz
2	-	-	Minimum 6dB Bandwidth	15.247(a)	Pass	b: 10.07 MHz g: 16.31 MHz n20: 17.02 MHz n40: 36.33 MHz
2	-	-	99% Bandwidth	RSS GEN	-	b: 14.1 MHz g: 16.9 MHz n20: 18.1 MHz n40: 36.6 MHz
3	-	-	Spurious emissions 802.11b,802.11g, and 802.11n20	15.247(b)	Pass	All emissions below the -30dBc limit
3	-	-	Spurious emissions 802.11n40	15.247(b)	Pass	All emissions below the -20dBc limit

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	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.

Notes

Testing performed at the highest output power setting across all antennas
Antenna spurious emissions must show compliance for any emission in a restricted band against the radiated limit.
All measurements performed at the antenna port of the module inside the chassis
Pigtail loss 0.2dB

Run #1: 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
802.11b								
16.5	2412	-5.3	-5.6	-5.9		-0.8	8.0	Pass
21	2437	-3.4	-1.8	-2.6		2.2	8.0	Pass
16.5	2462	-5.8	-4.9	-5.4		-0.6	8.0	Pass
802.11g								
12.5	2412	-12.8	-12.4	-12.8		-7.9	8.0	Pass
19	2437	-6.3	-6.9	-6.6		-1.8	8.0	Pass
13.5	2462	-10.9	-9.8	-10.8		-5.7	8.0	Pass
802.11n20								
12	2412	-12.4	-13.1	-12.9		-8.0	8.0	Pass
18	2437	-7.4	-6.9	-6.8		-2.3	8.0	Pass
12.5	2462	-12.8	-11.8	-12.4		-7.5	8.0	Pass
802.11n40								
10	2422	-17.6	-18.4	-16.6		-12.7	8.0	Pass
13	2437	-15.3	-15.1	-15.3		-10.5	8.0	Pass
10.5	2452	-16.1	-16.3	-17.9		-11.9	8.0	Pass

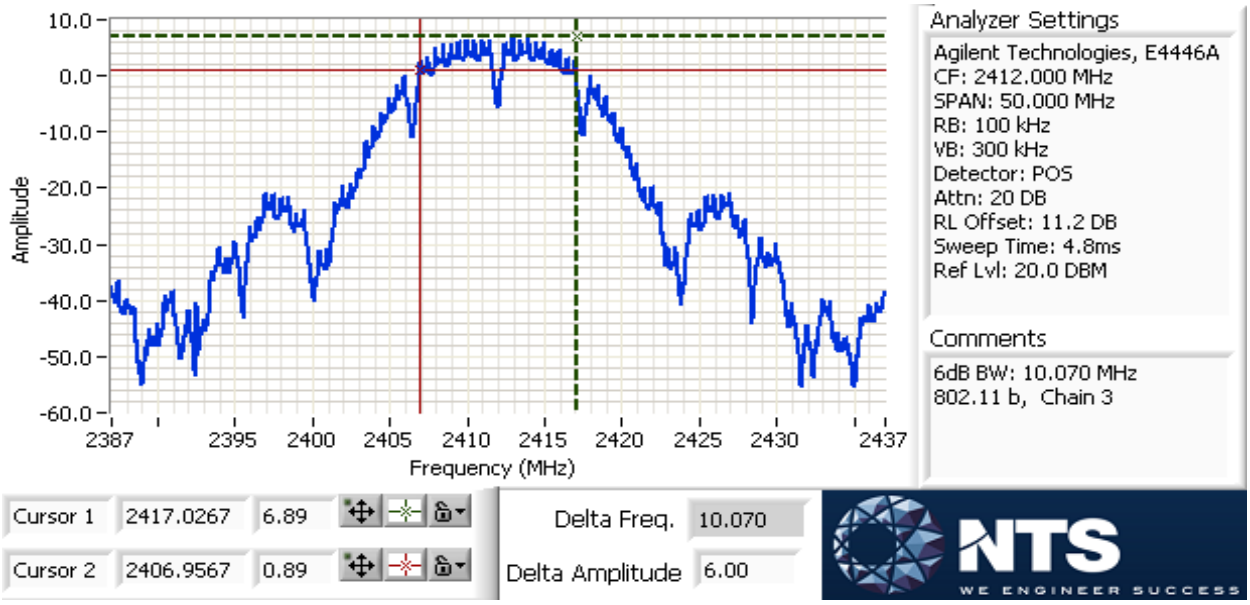
Note 1:	Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

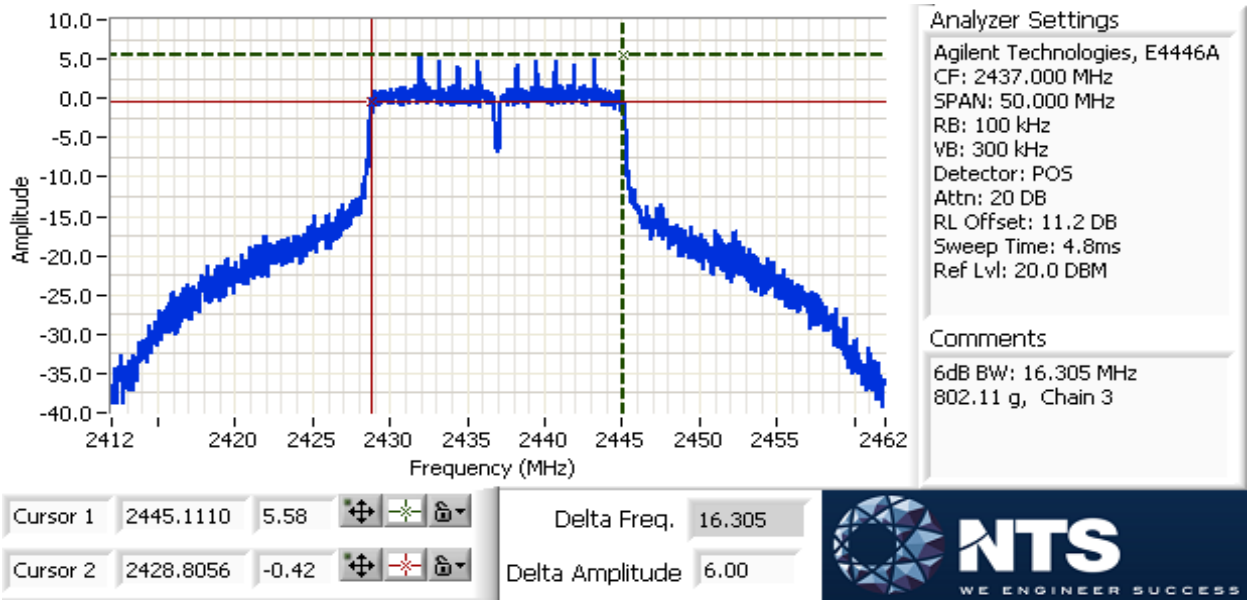
Run #2: Signal Bandwidth

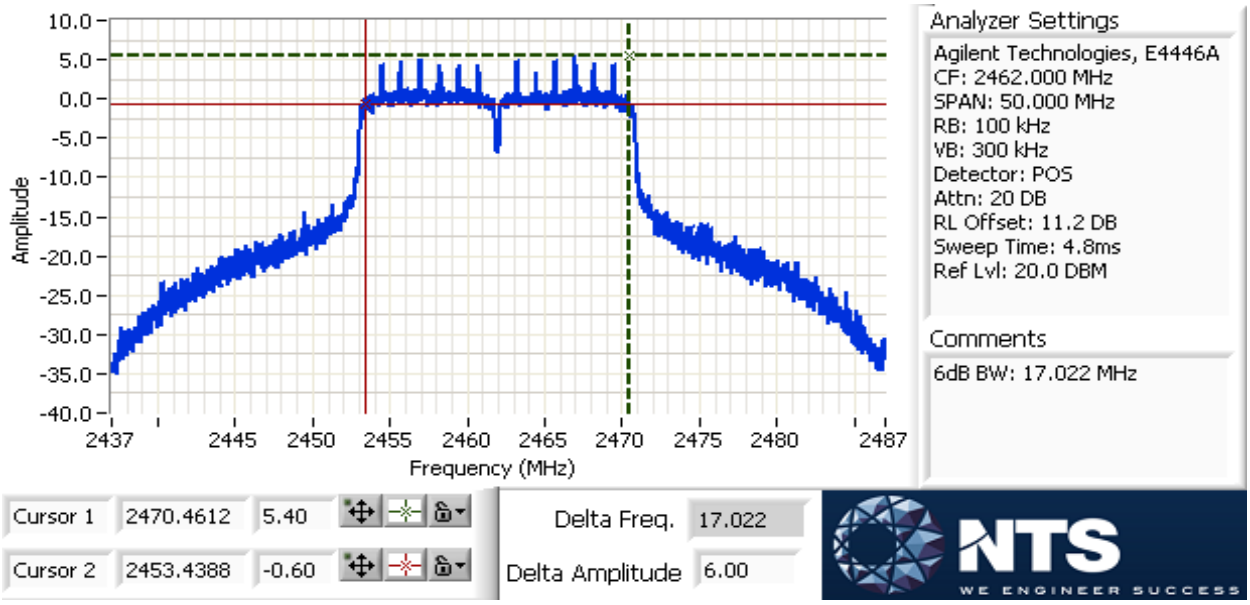
Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	Resolution Bandwidth	Bandwidth (MHz) 99%
802.11b					
16.5	2412	100kHz	10.07	1MHz	17.1
21	2437	100kHz	10.09	1MHz	15.6
16.5	2462	100kHz	10.09	1MHz	14.1
802.11g					
12.5	2412	100kHz	16.31	1MHz	16.9
19	2437	100kHz	16.31	1MHz	17.7
13.5	2462	100kHz	16.31	1MHz	16.9
802.11n20					
12	2412	100kHz	17.29	1MHz	18.1
18	2437	100kHz	17.27	1MHz	18.5
12.5	2462	100kHz	17.02	1MHz	18.1
802.11n40					
10	2422	100kHz	36.36	1MHz	36.6
13	2437	100kHz	36.36	1MHz	36.6
10.5	2452	100kHz	36.33	1MHz	36.6

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

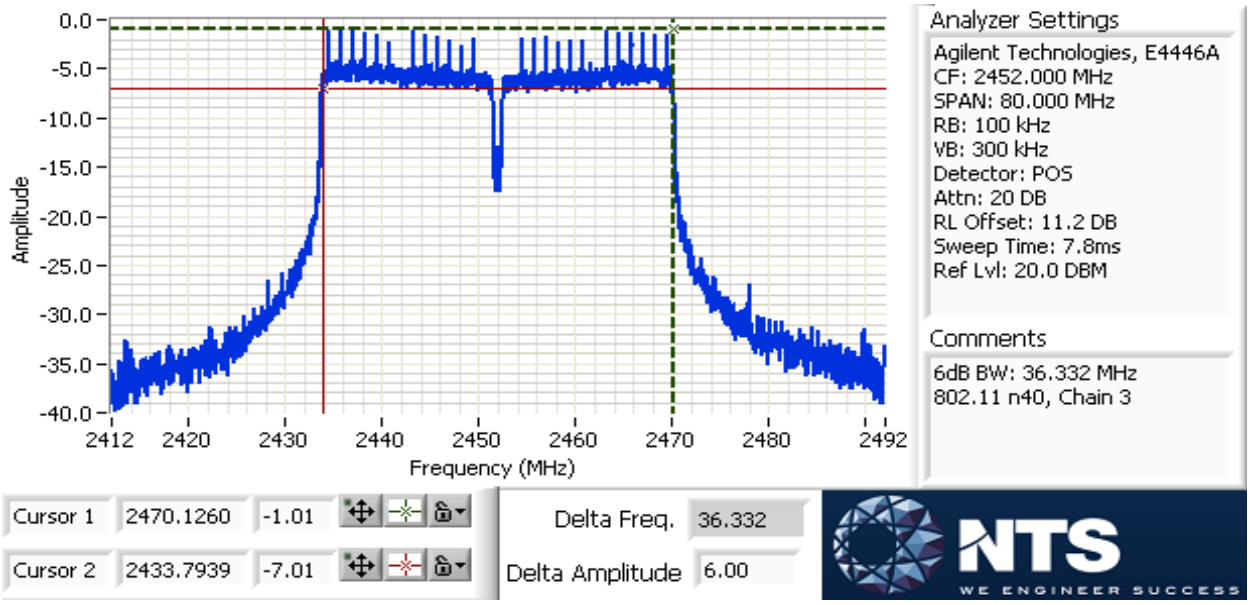


Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A





Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

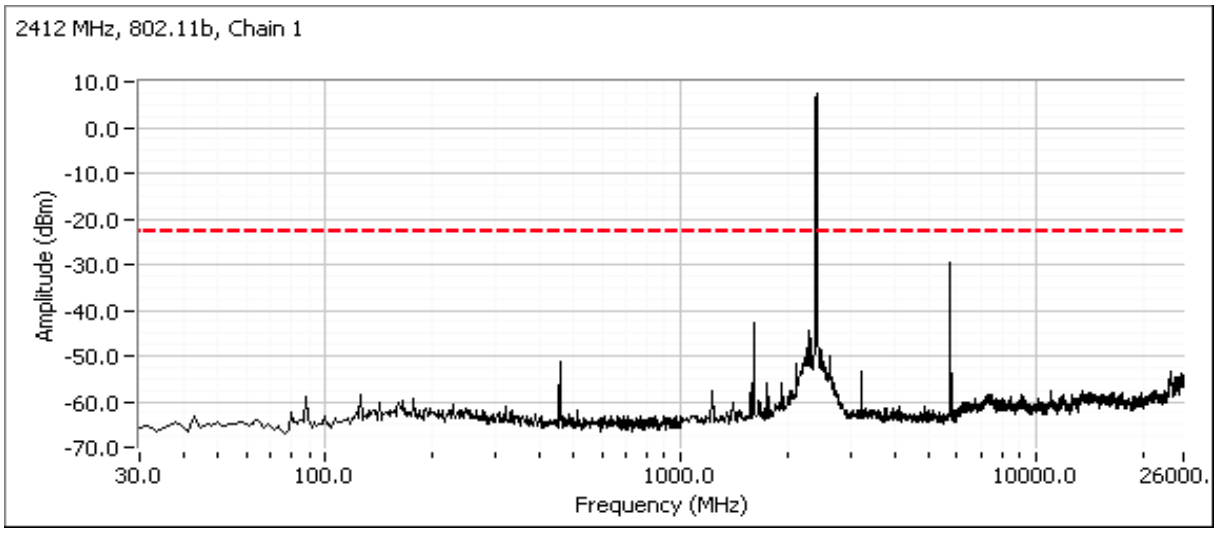
Run #3: Out of Band Spurious Emissions

Power Setting #1	#2	#3	#4	Frequency (MHz)	Limit	Result
802.11b						
16.5				2412	-30dBc	Pass
21.0				2437	-30dBc	Pass
16.5				2462	-30dBc	Pass
802.11g						
12.5				2412	-30dBc	Pass
19				2437	-30dBc	Pass
13.5				2462	-30dBc	Pass
802.11n20						
12.0				2412	-30dBc	Pass
18.0				2437	-30dBc	Pass
12.5				2462	-30dBc	Pass
802.11n40						
10.0				2422	-20dBc	Pass
13.0				2437	-20dBc	Pass
10.5				2452	-20dBc	Pass

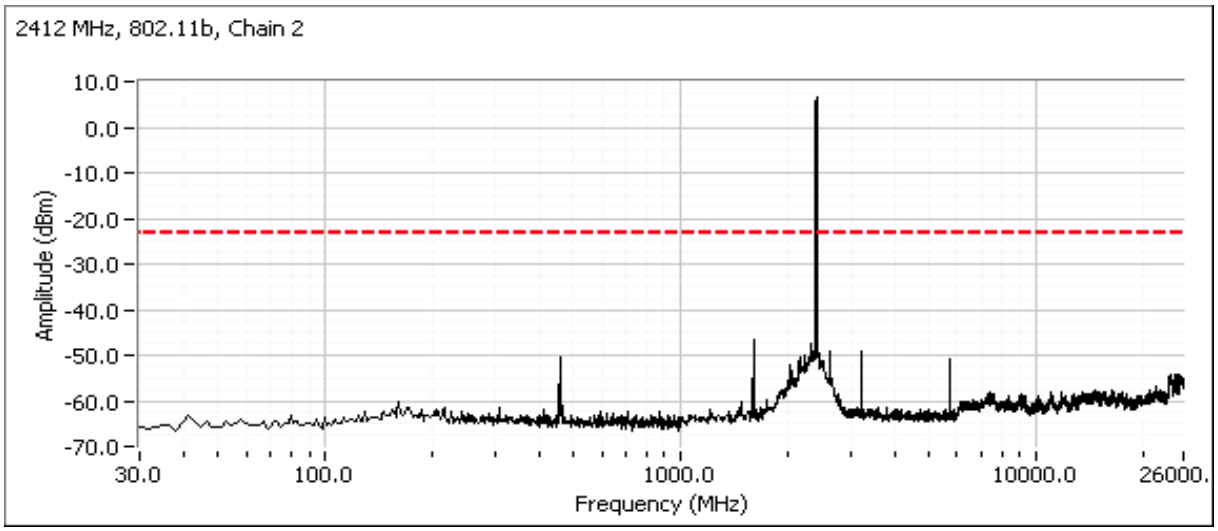
Note 1:	Measured on each chain individually

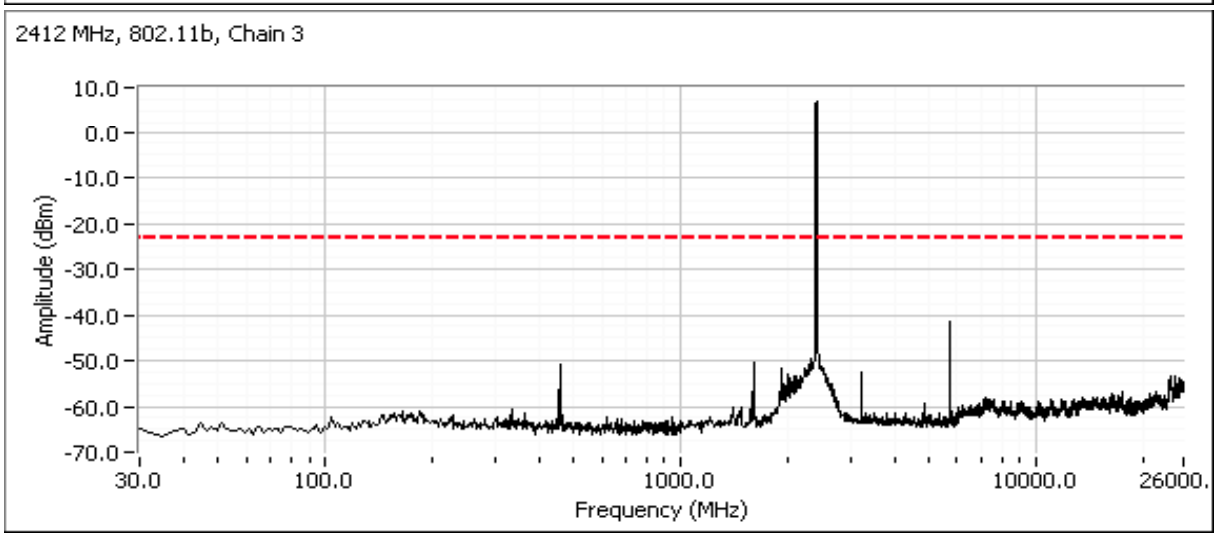
802.11b

Plots for low channel



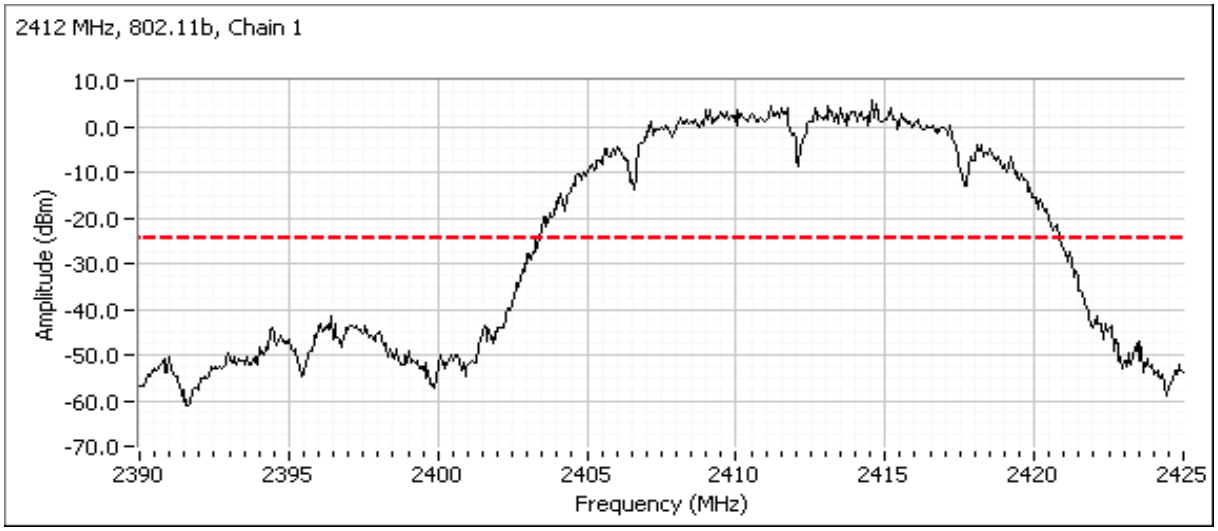
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

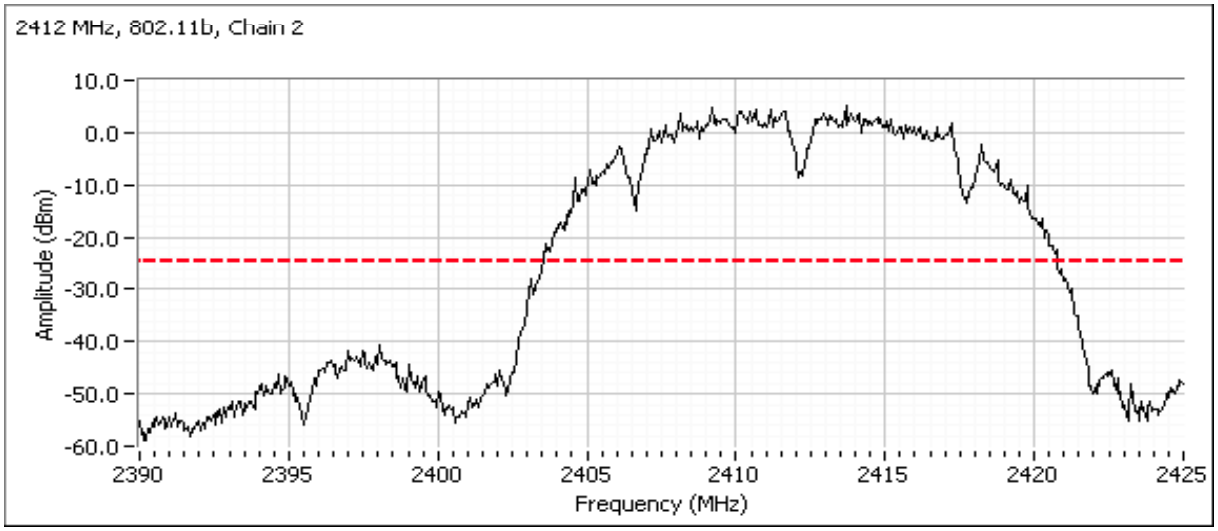




Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.





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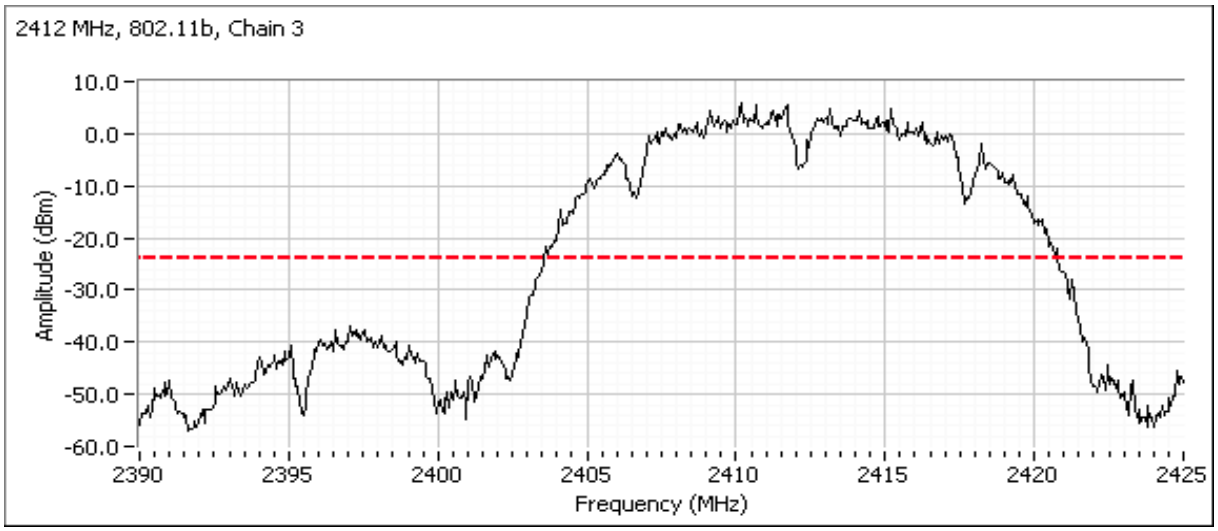
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A



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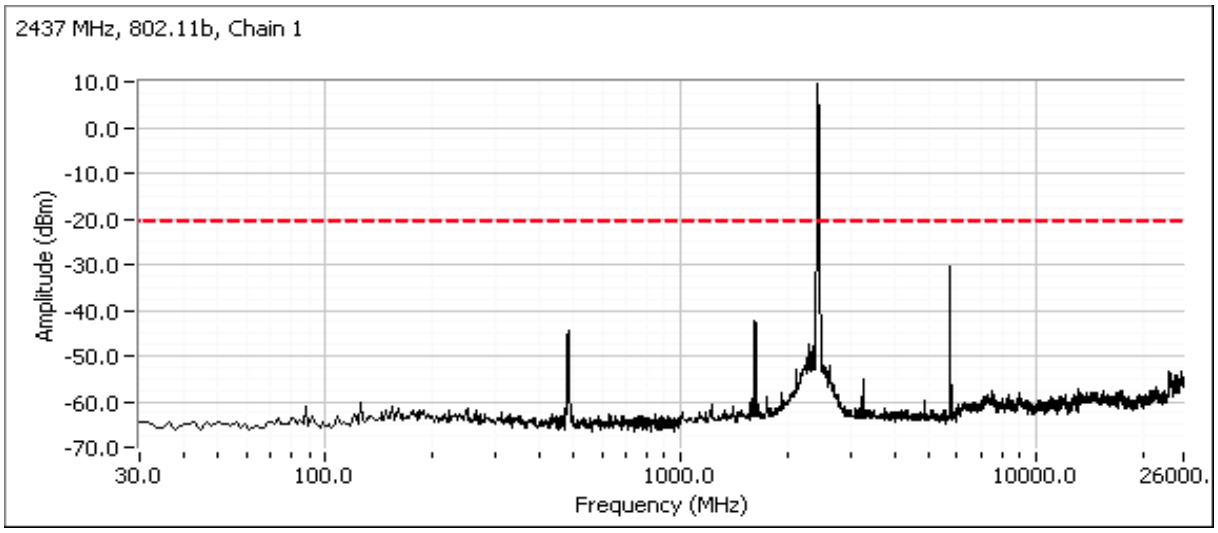
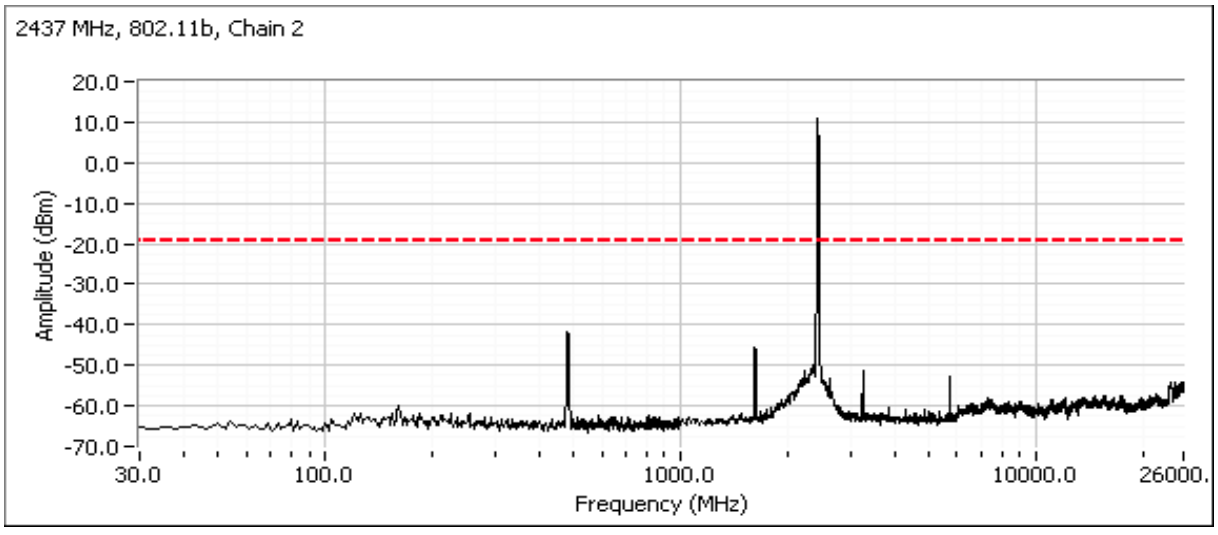
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Plots for center channel





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Model:	WS-AP3710i	T-Log Number:	T89870
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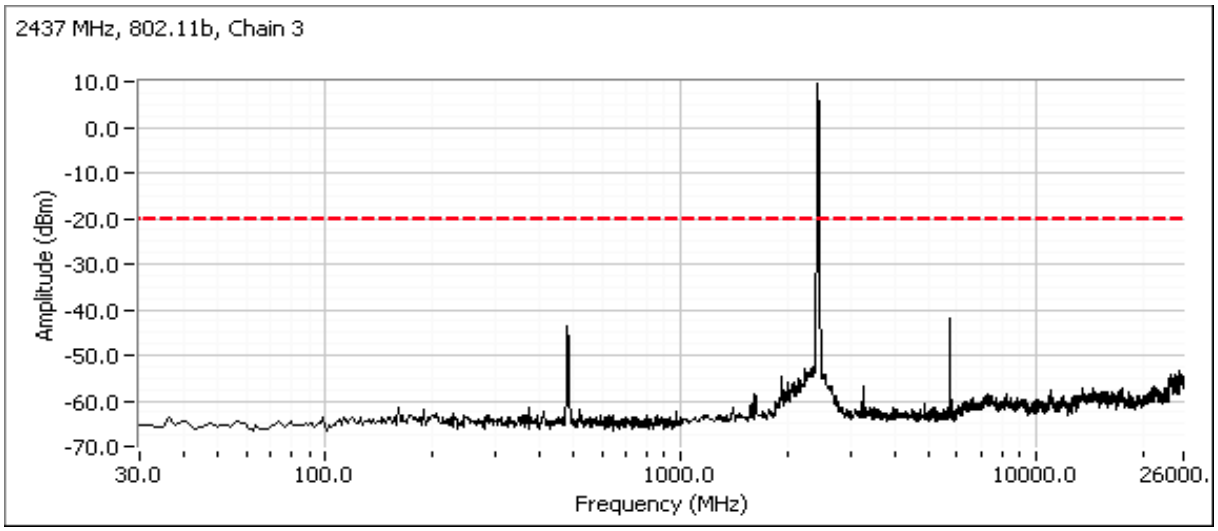
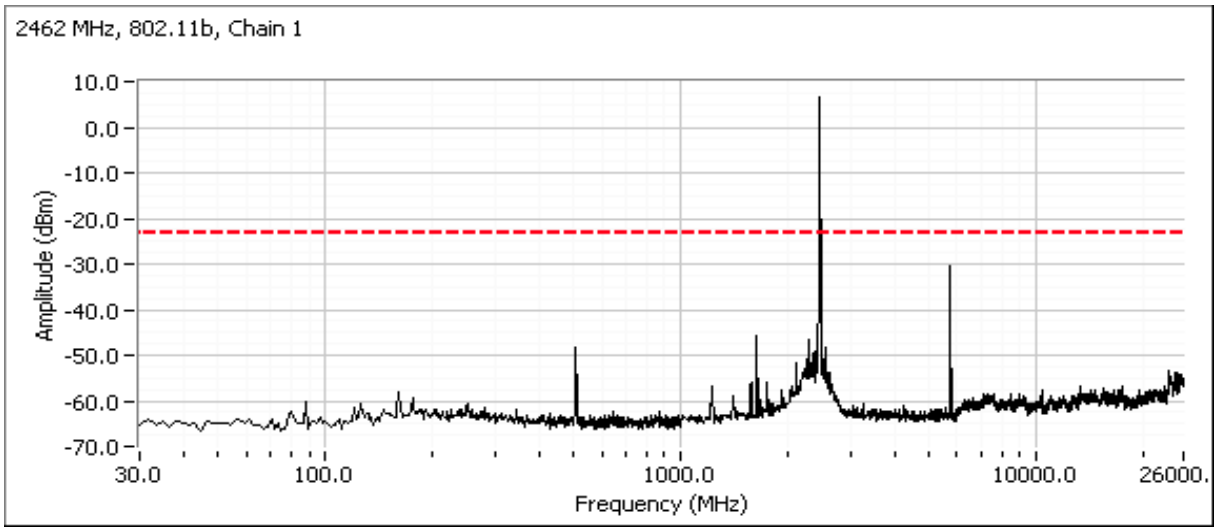
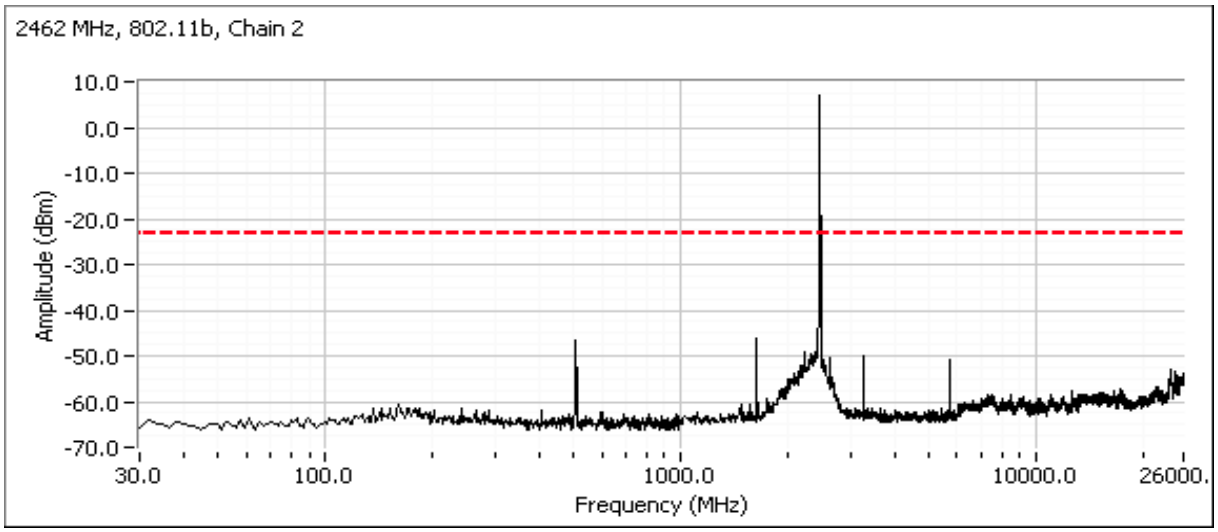
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A



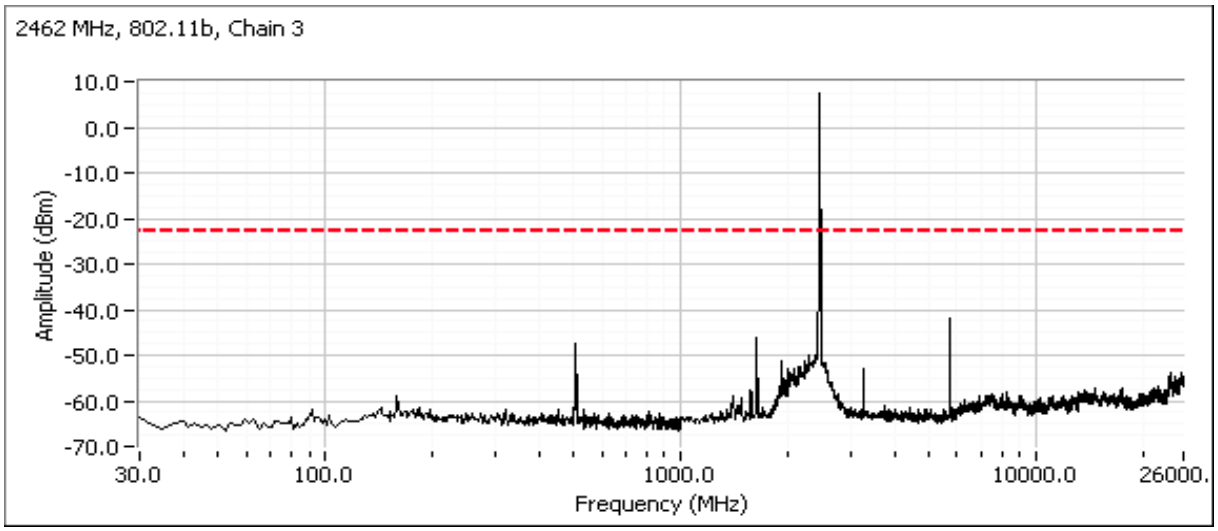
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Plots for high channel

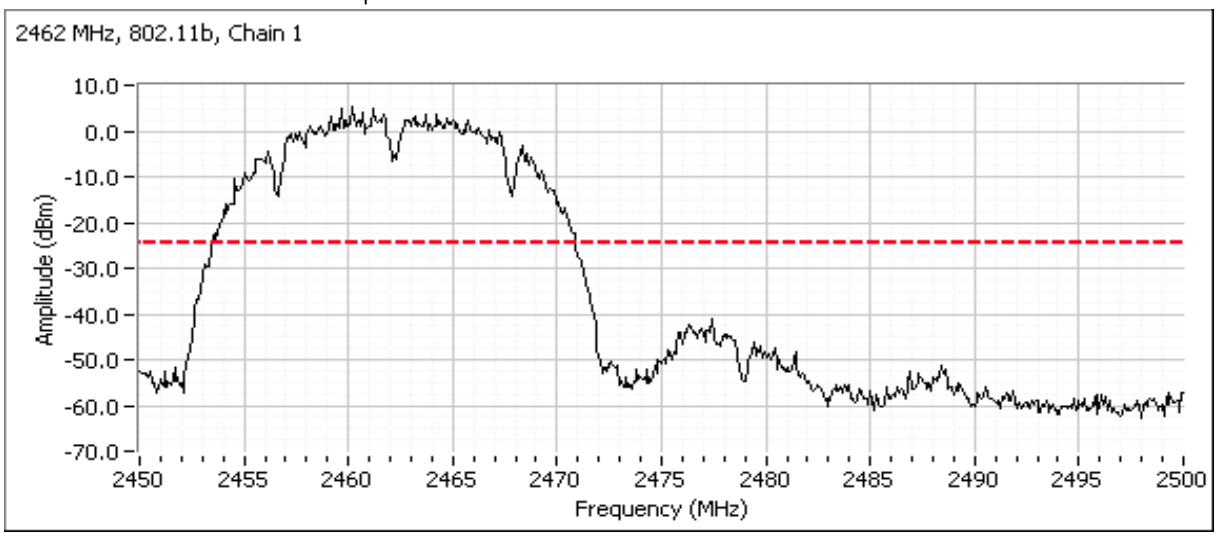




Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A



Radiated measurements used to show compliance with the limits in the restricted band above 2483.5 MHz.



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
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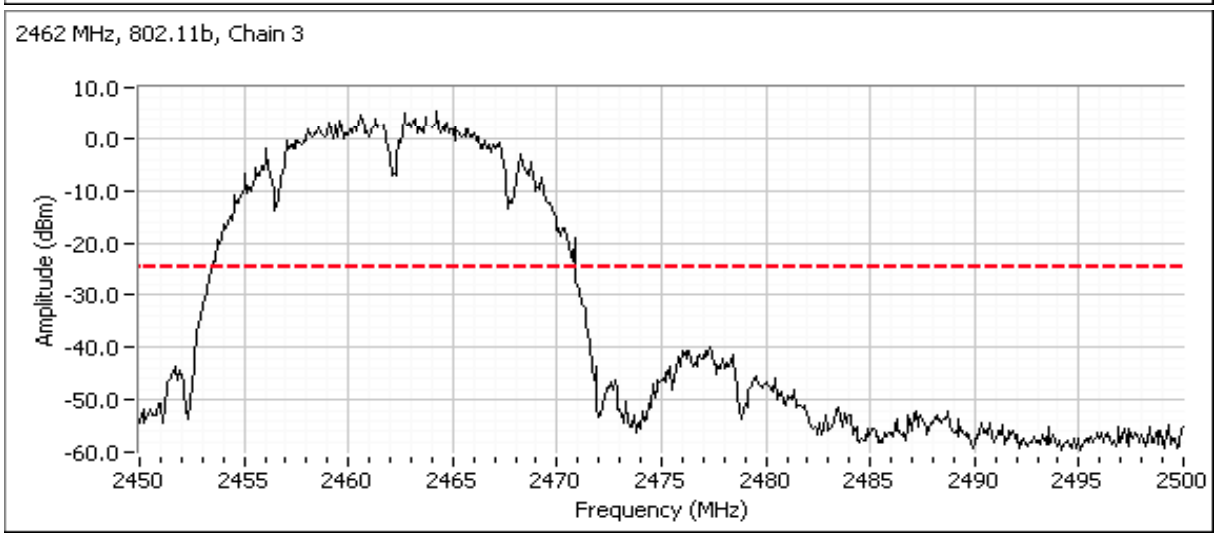
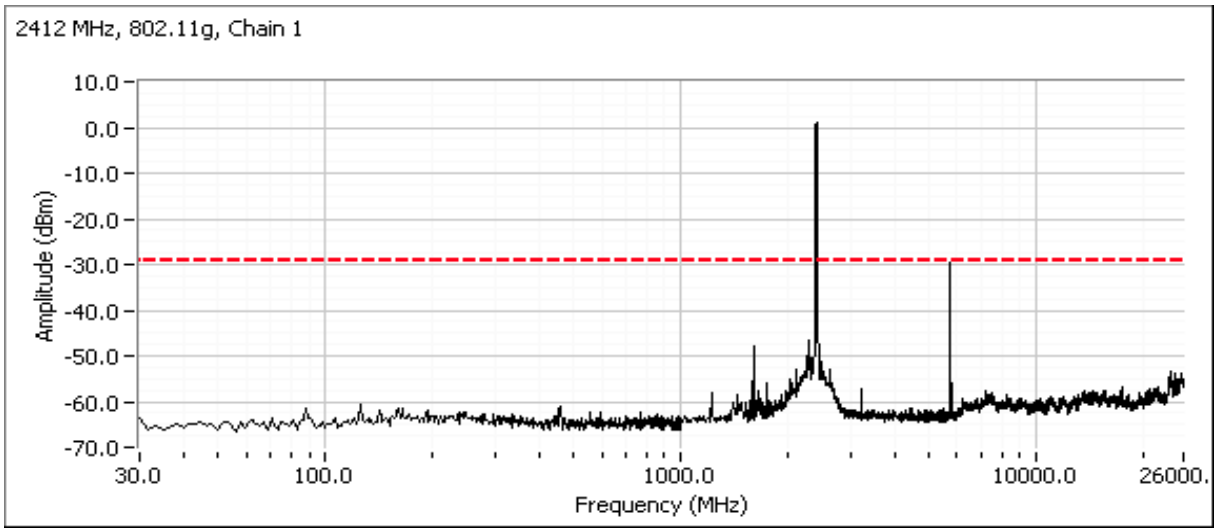
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

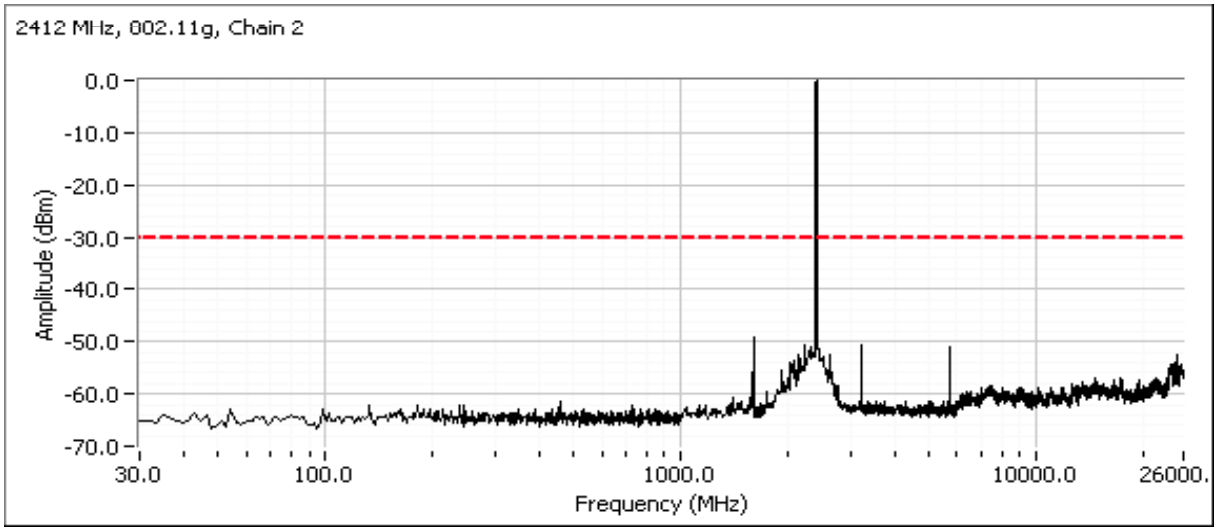


Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

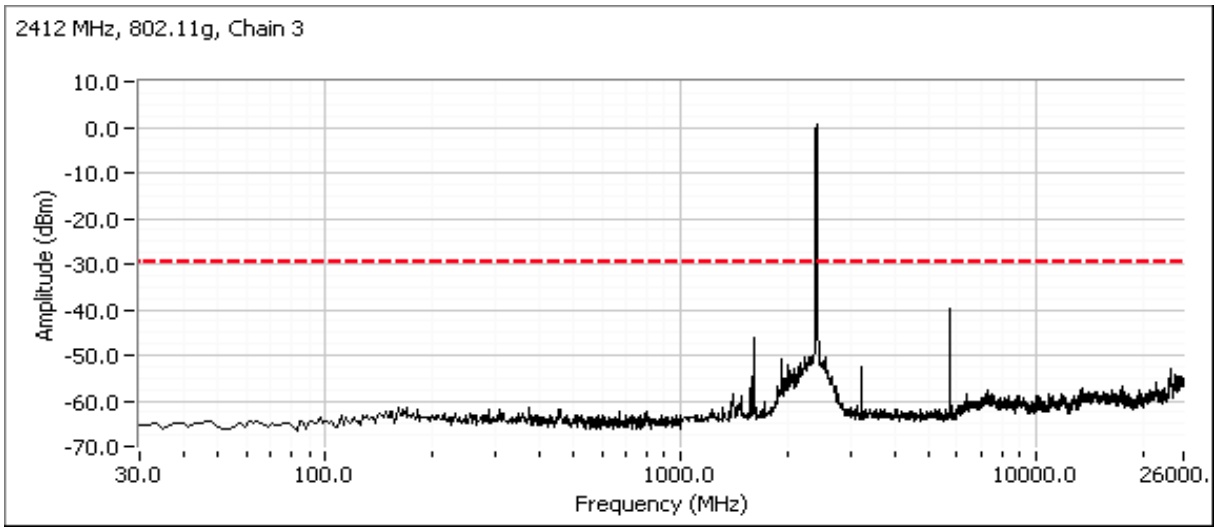
802.11g

Plots for low channel

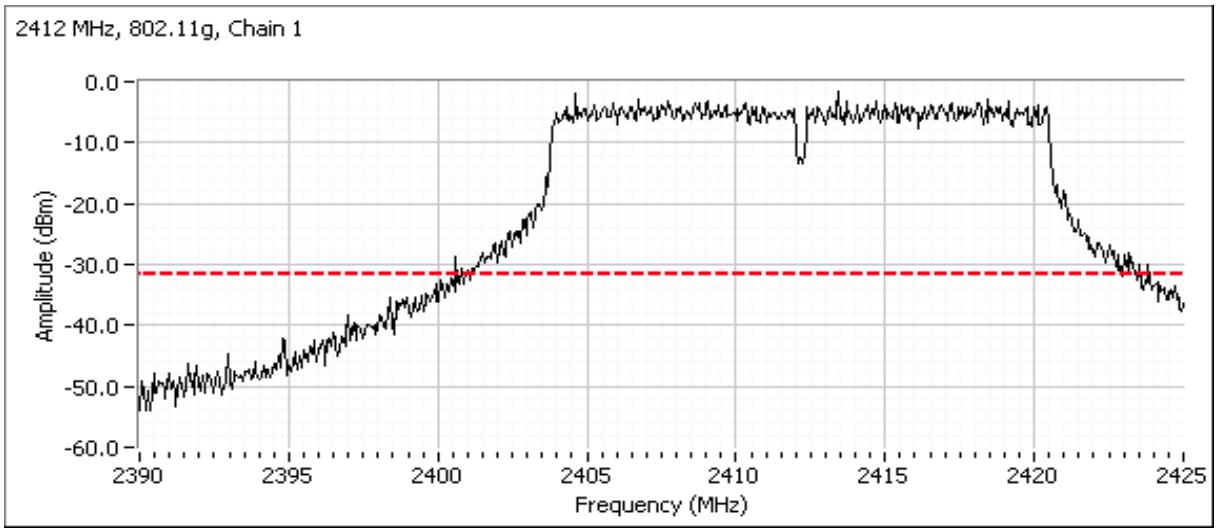




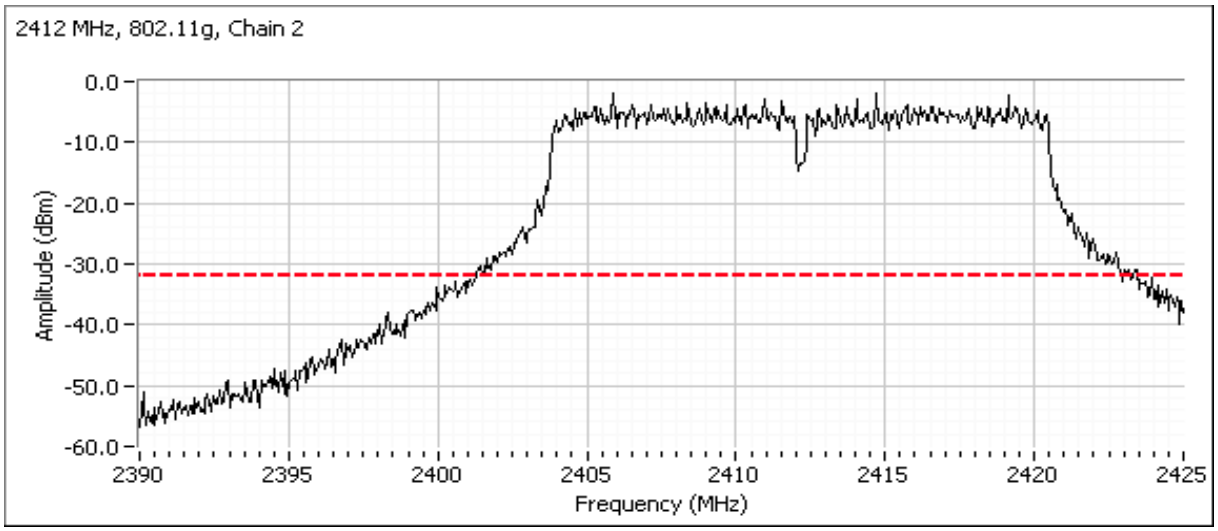
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

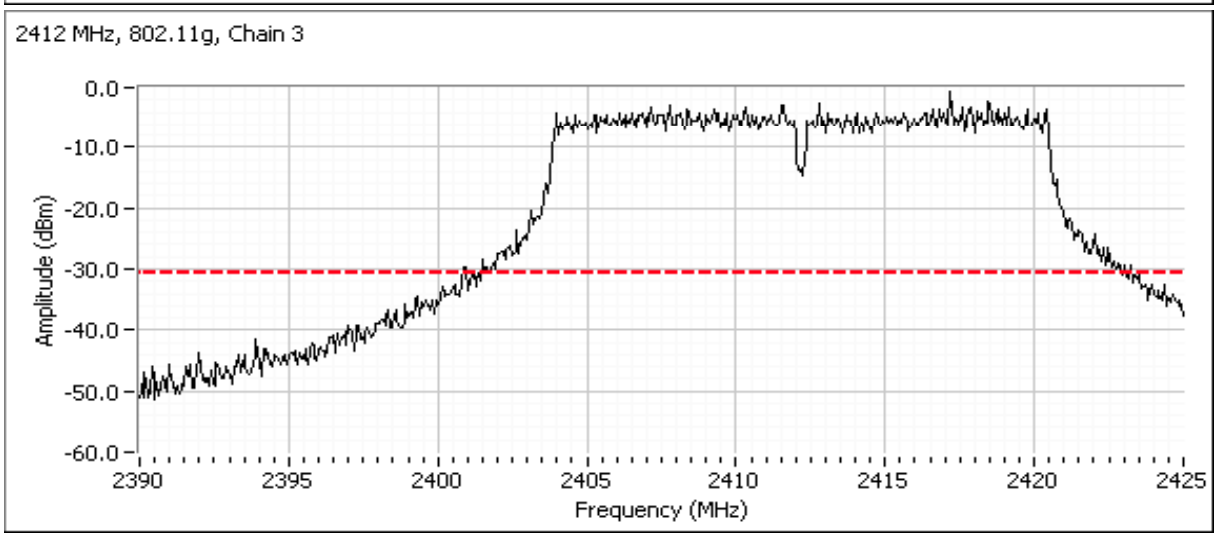


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



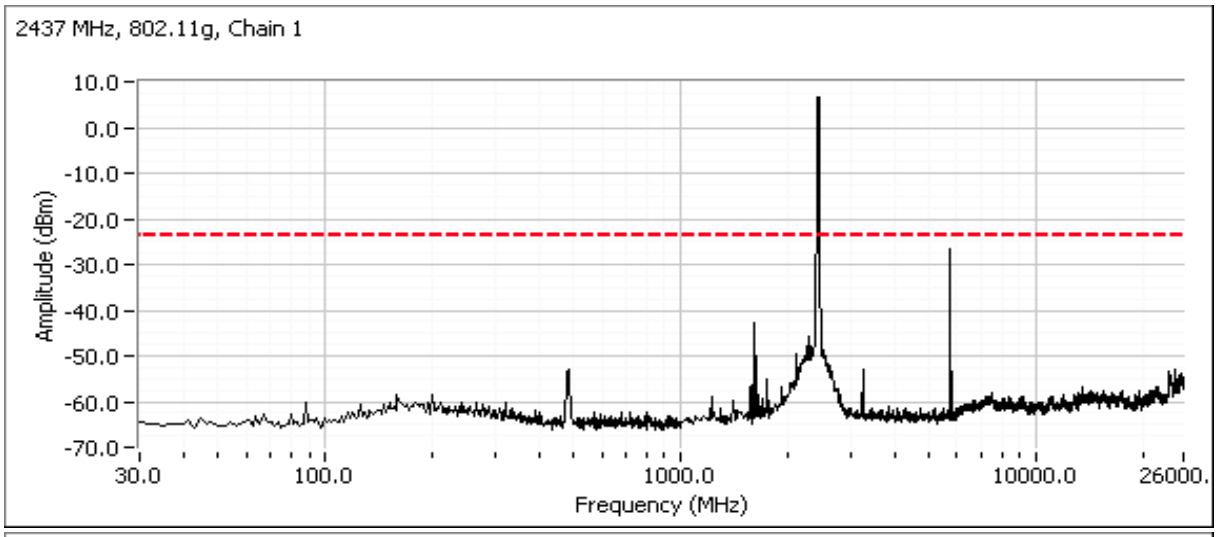
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

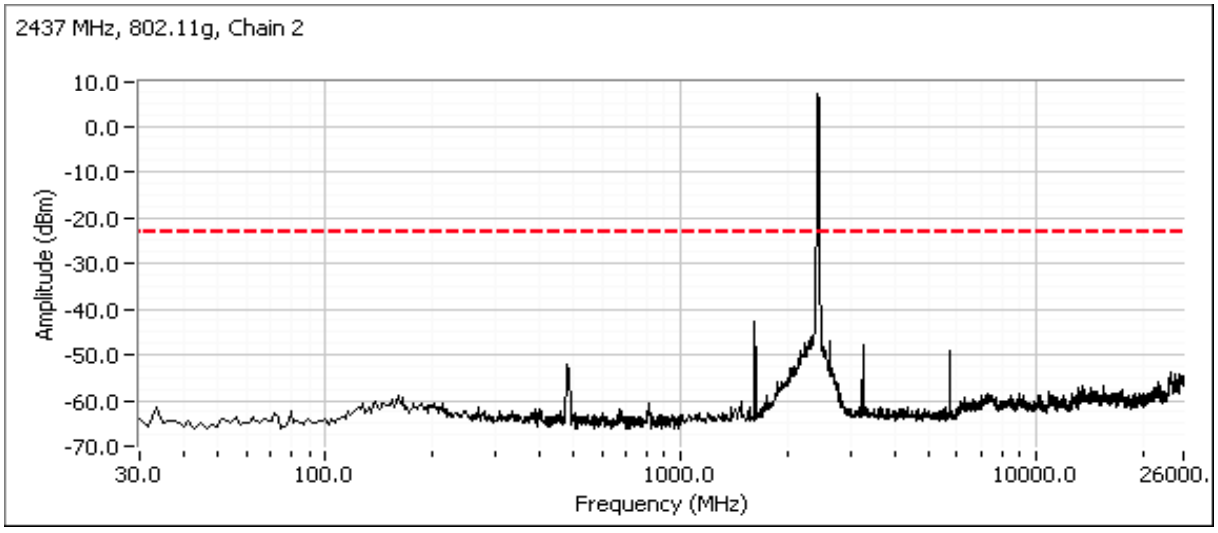




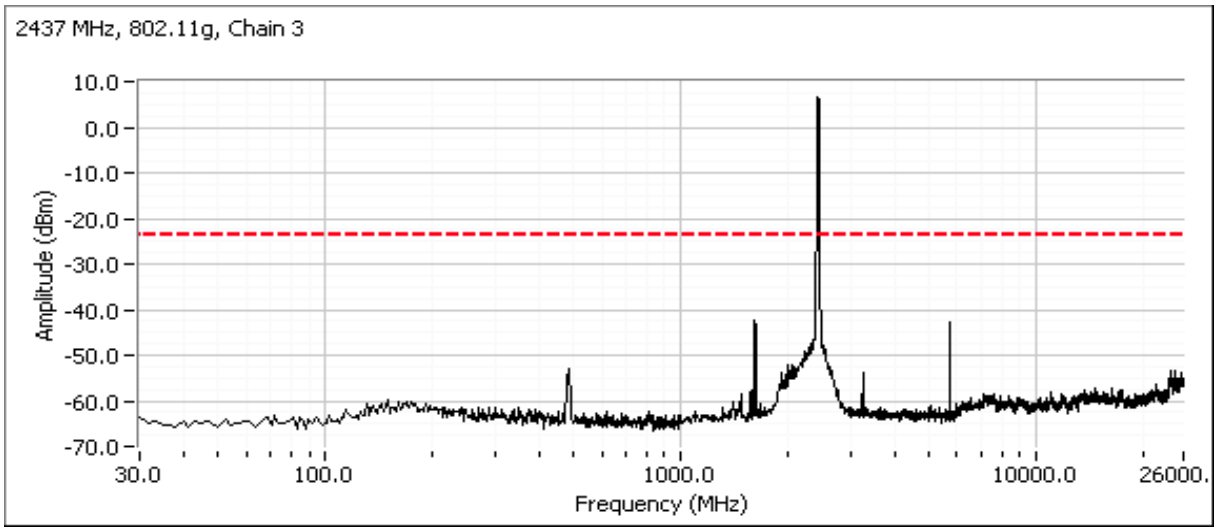
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Plots for center channel

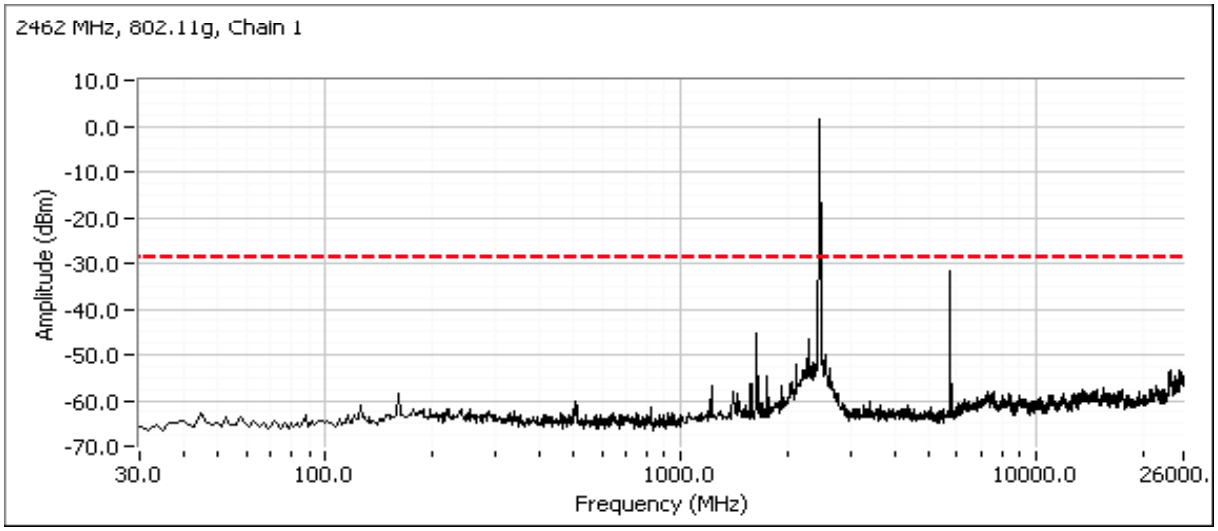




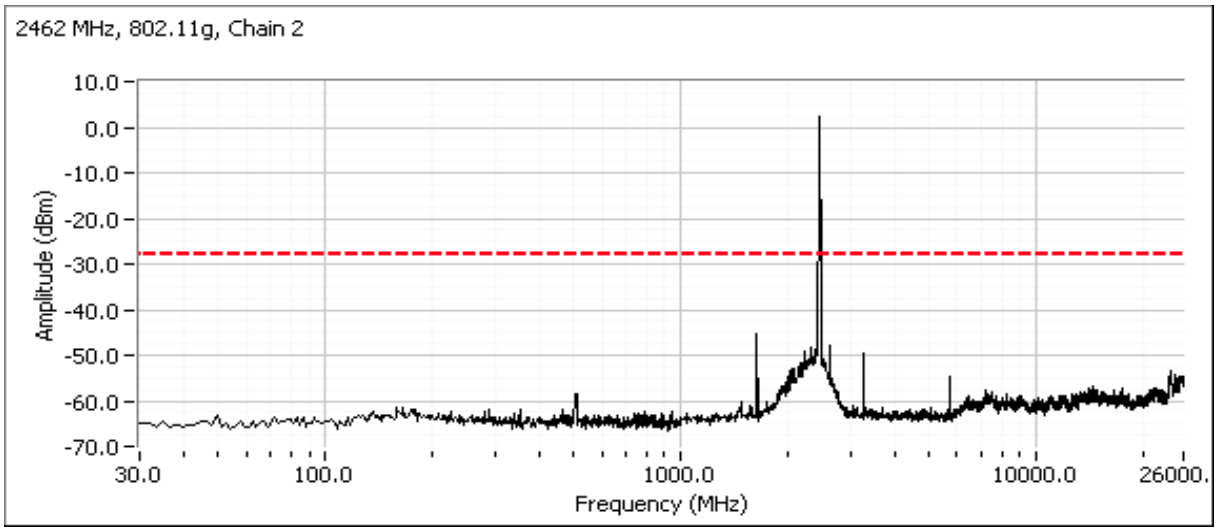
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

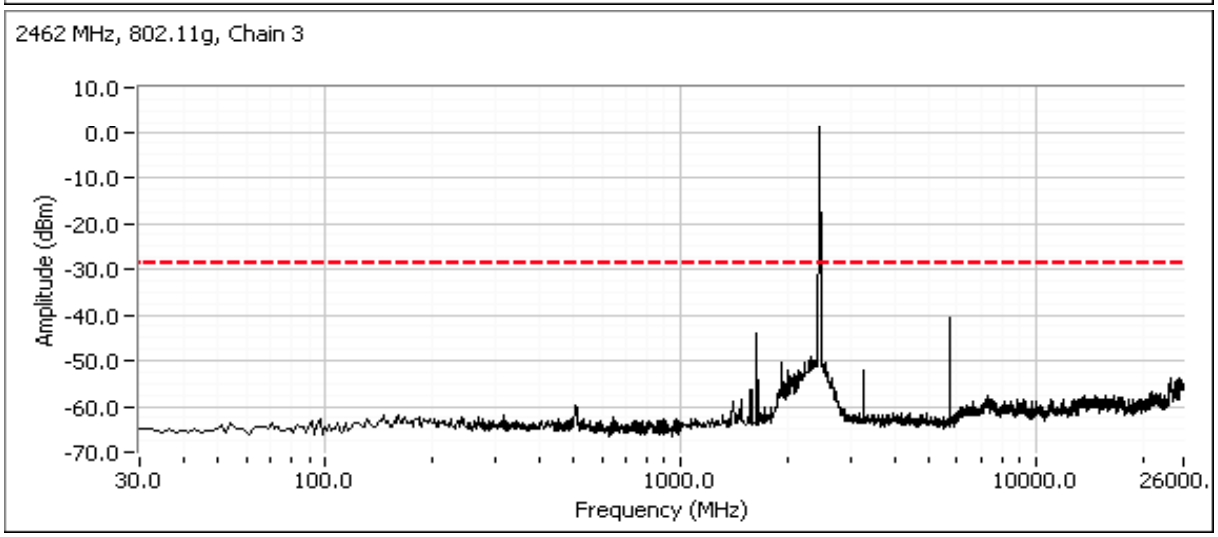


Plots for high channel



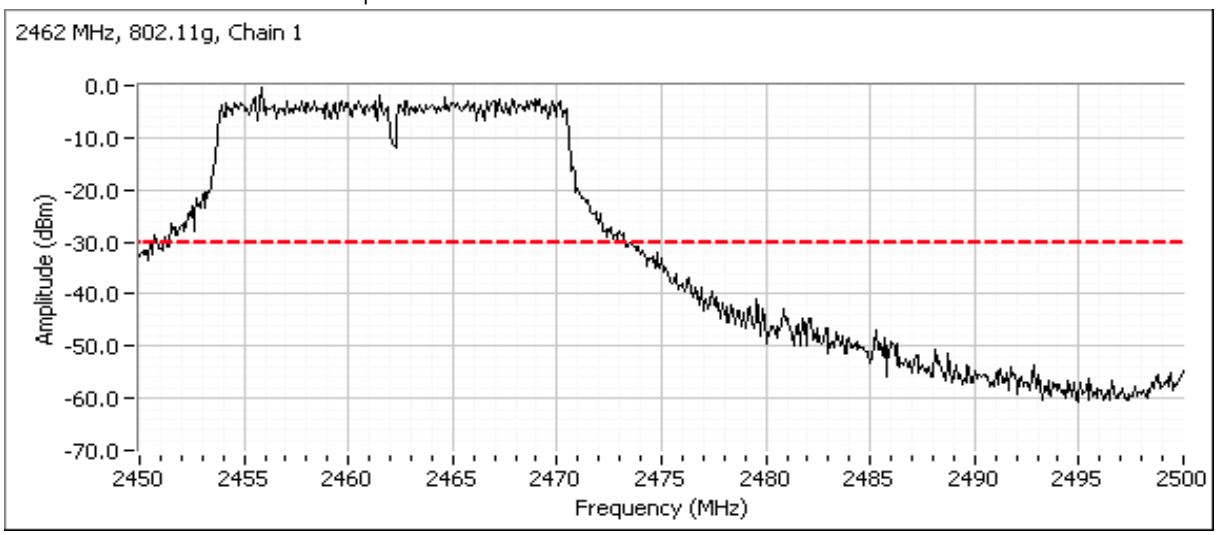
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

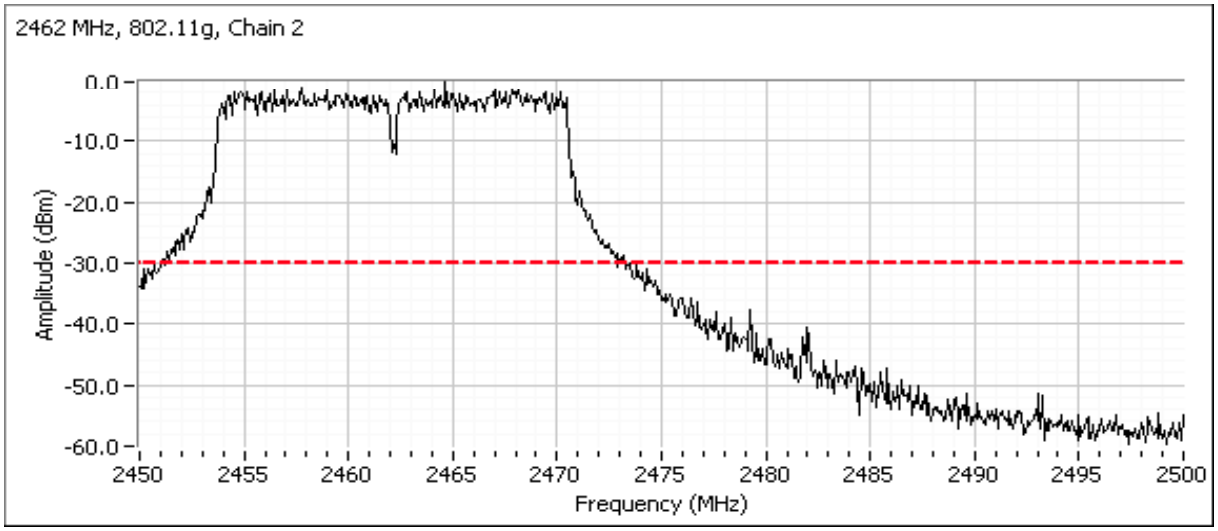




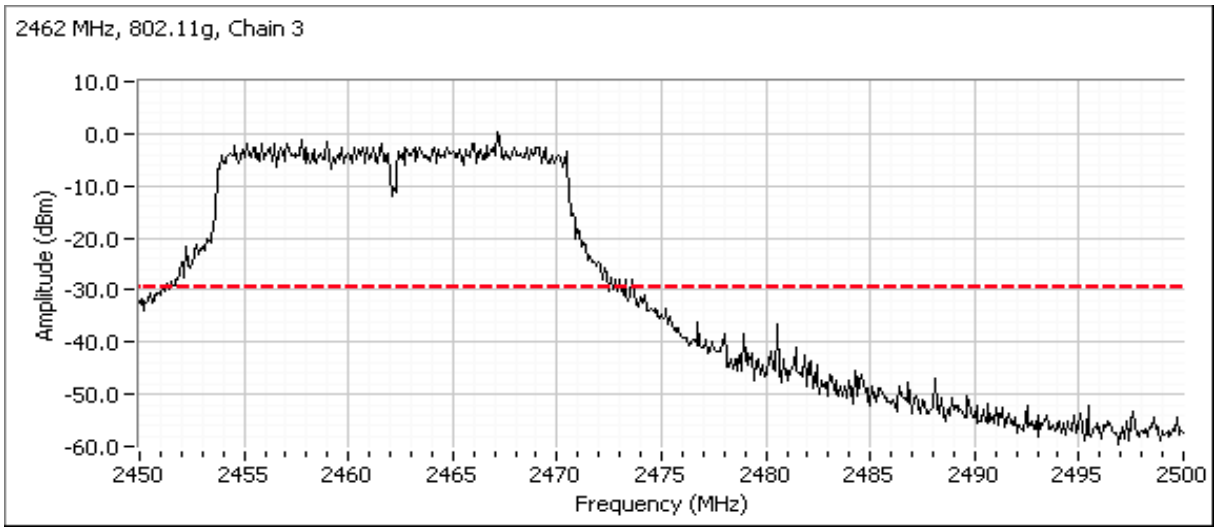
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Radiated measurements used to show compliance with the limits in the restricted band above 2483.5 MHz.





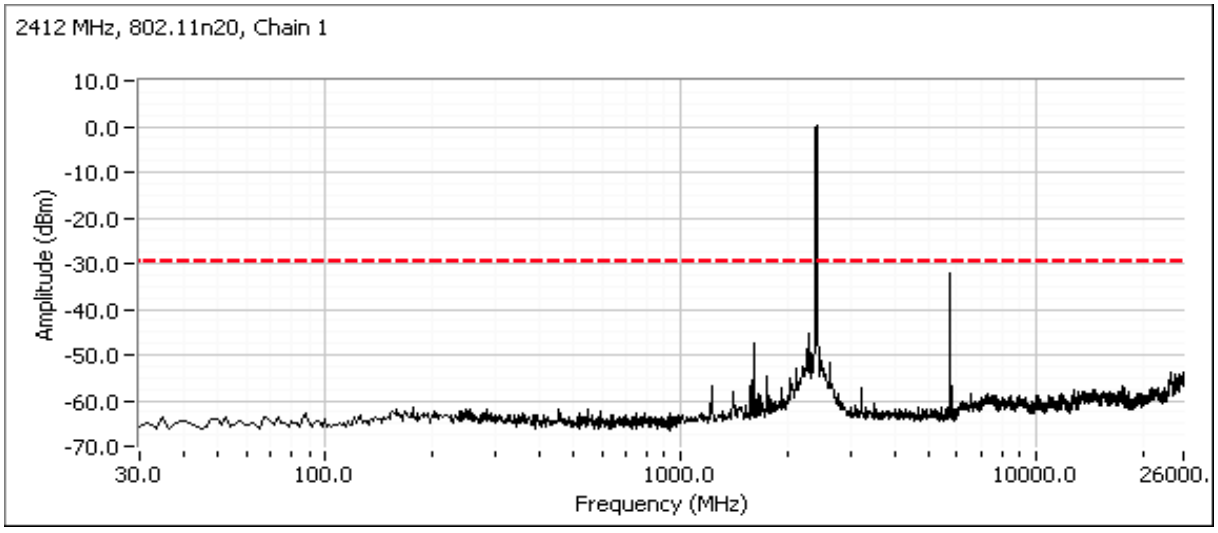
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

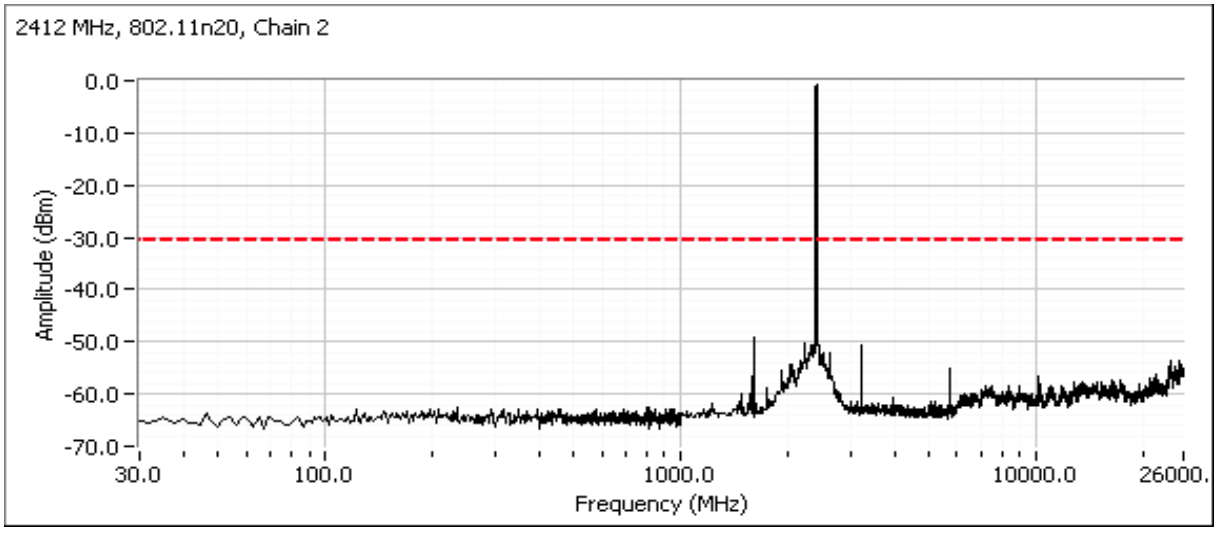


Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

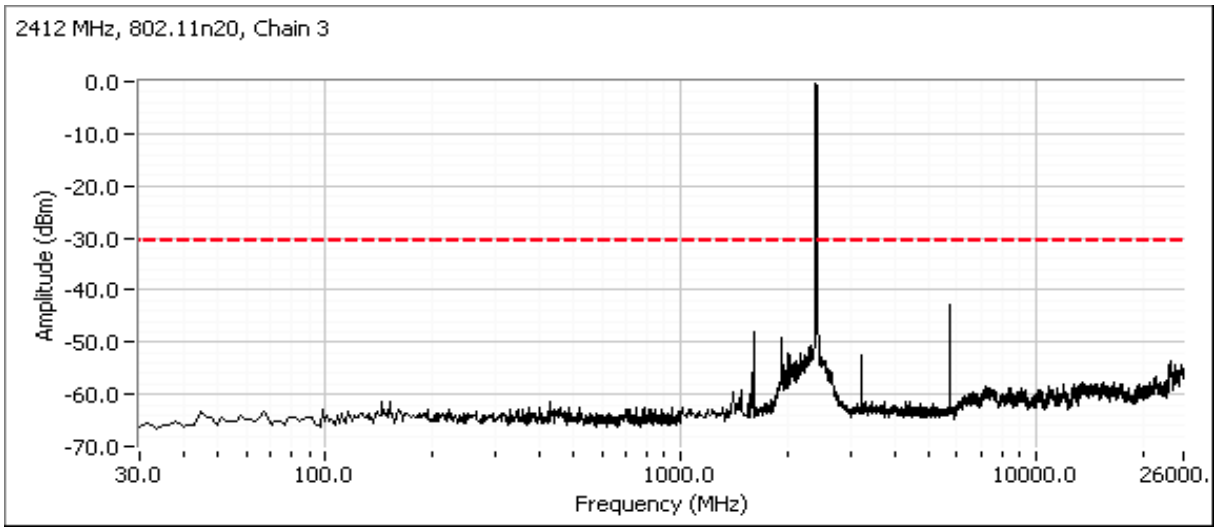
802.11n20

Plots for low channel

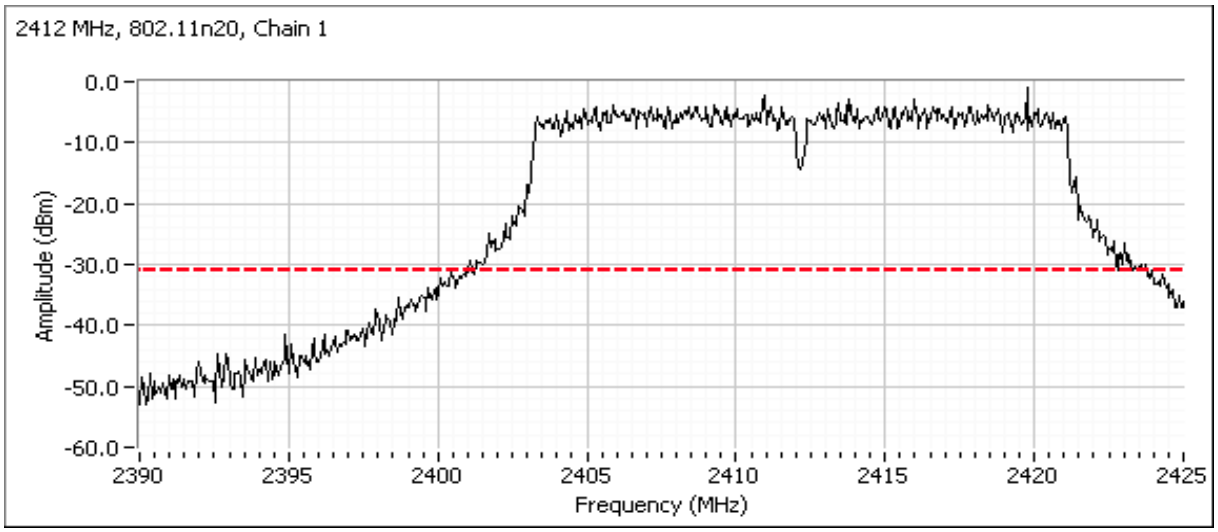




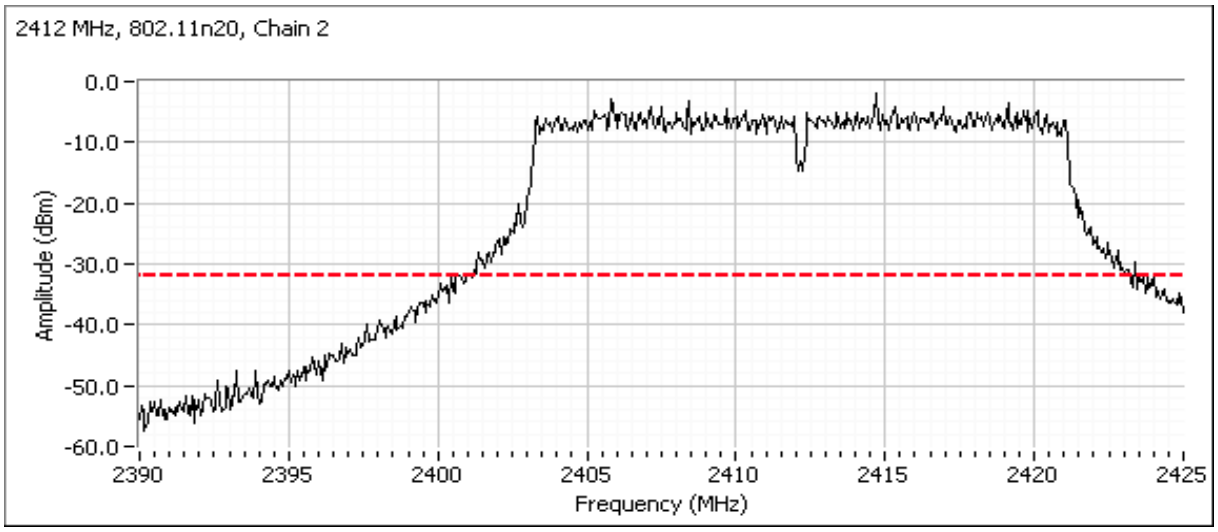
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

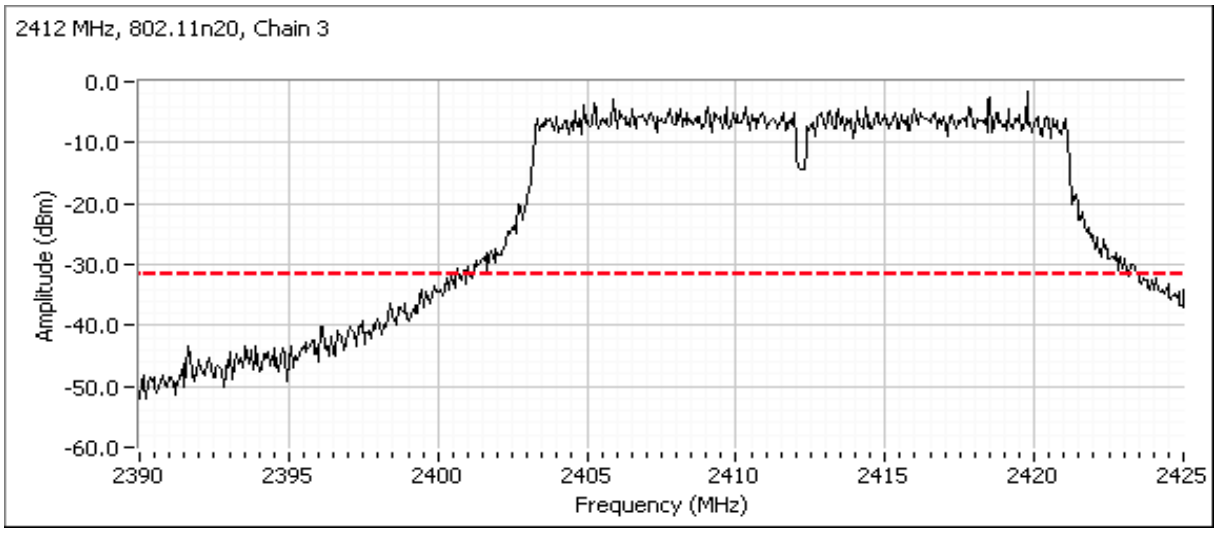


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



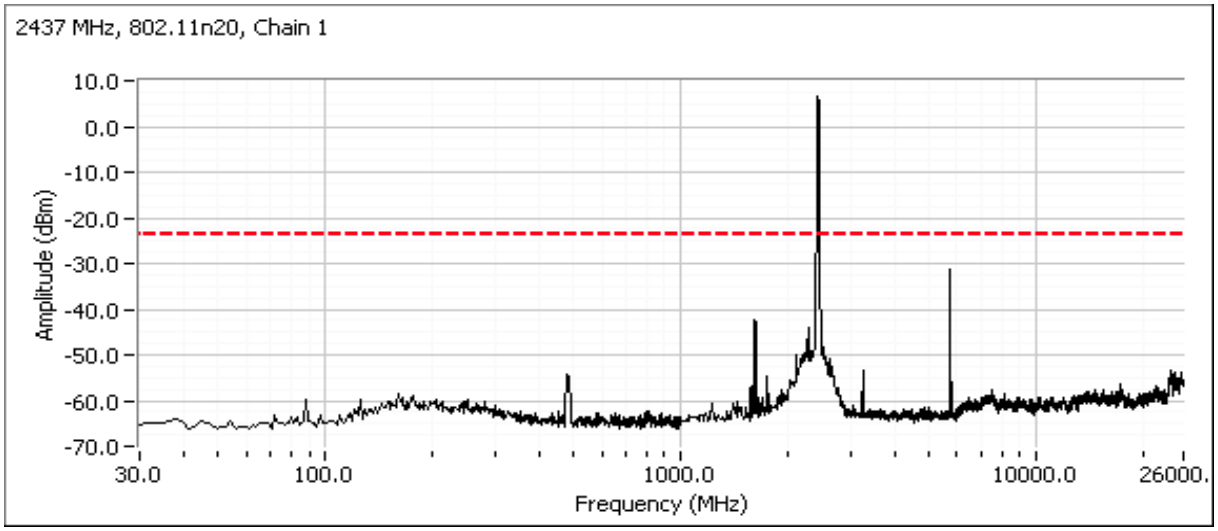
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

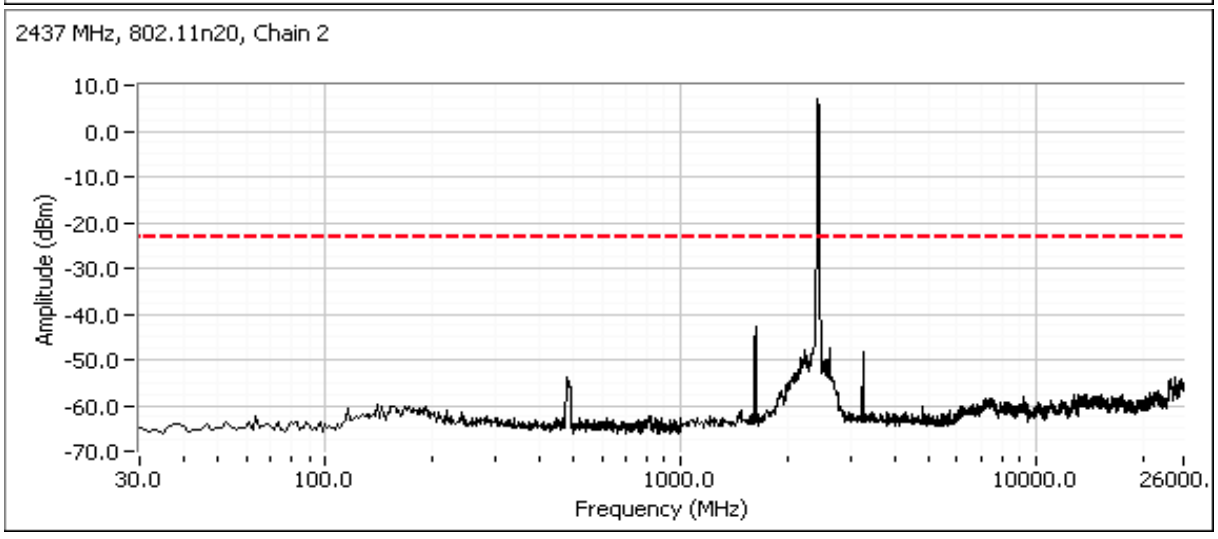




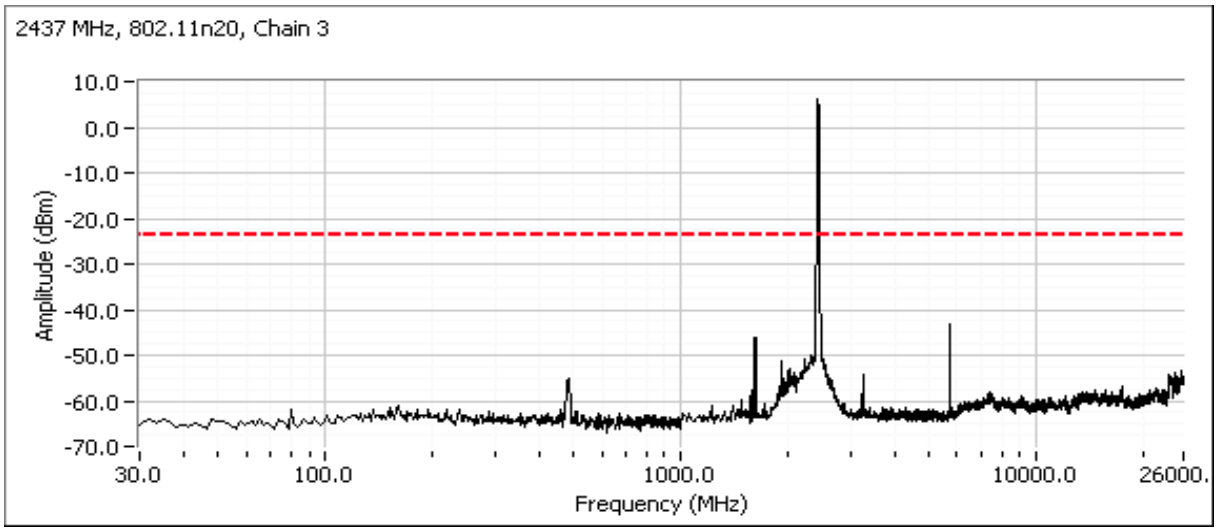
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Plots for center channel



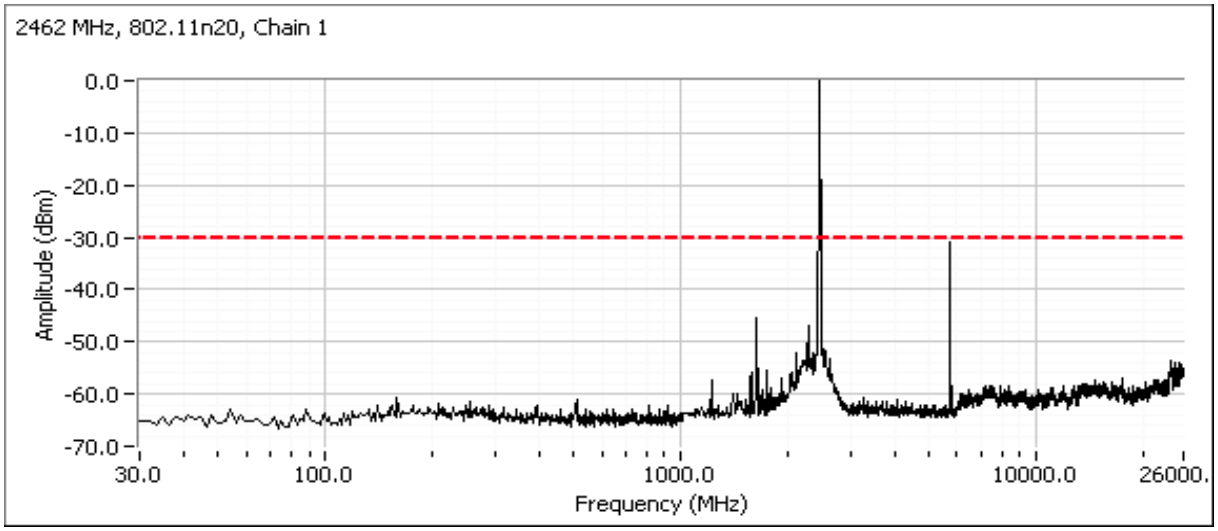


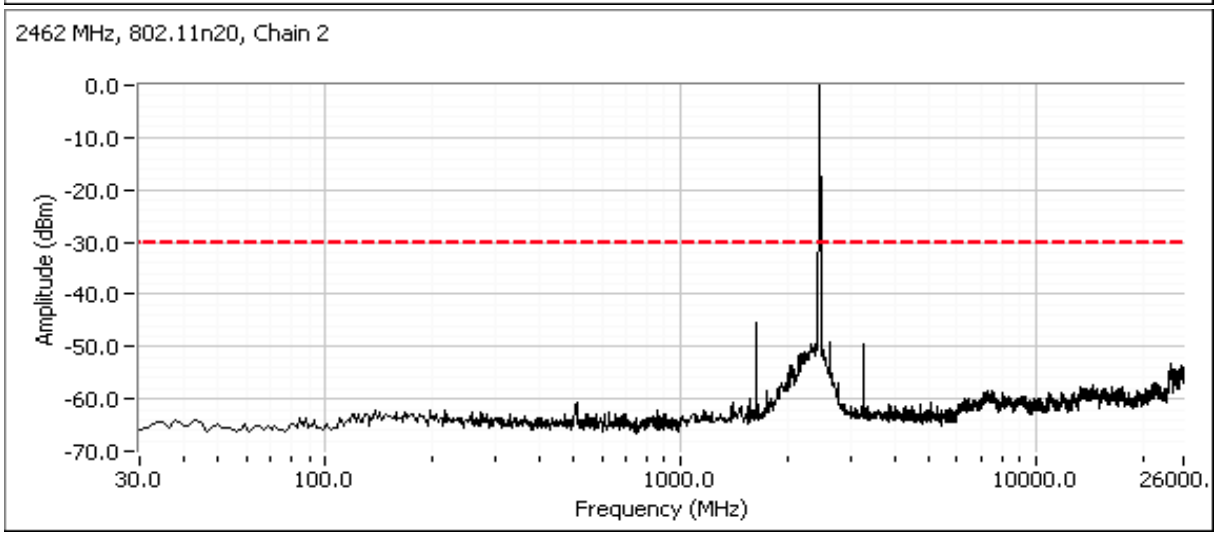
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A



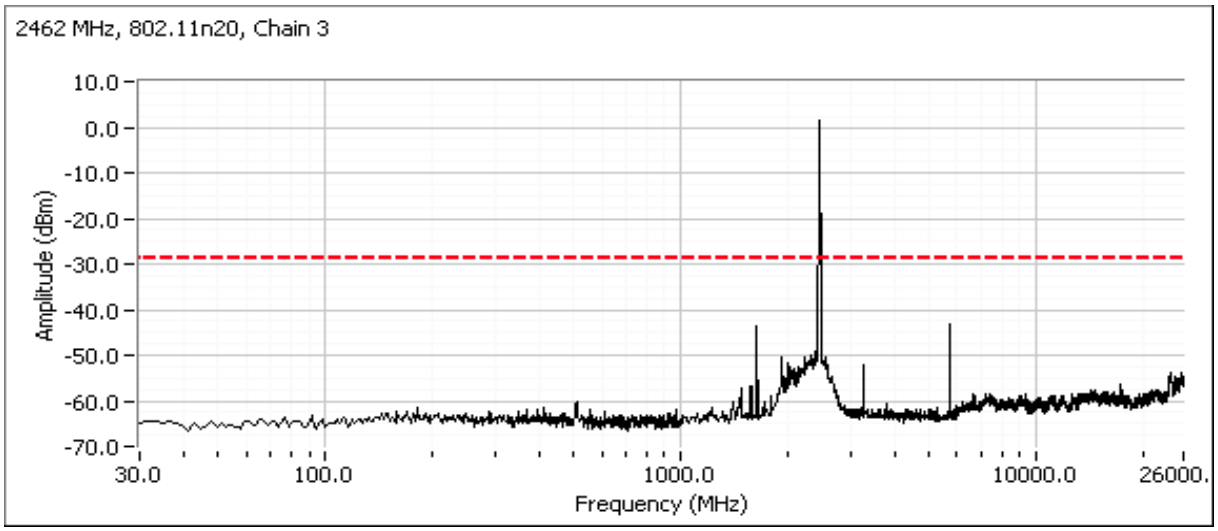
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Plots for high channel

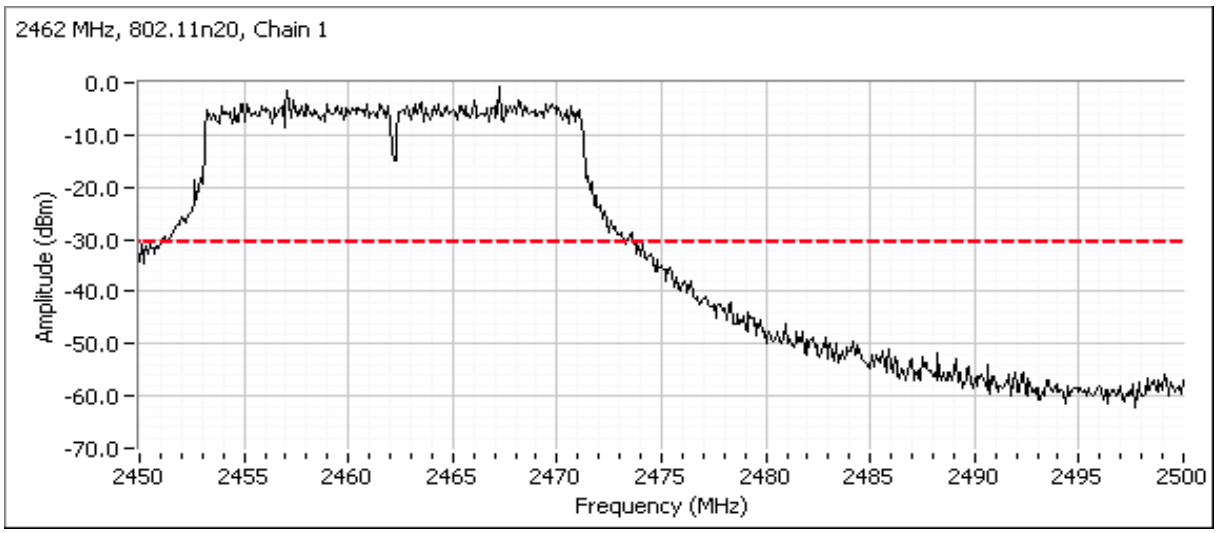




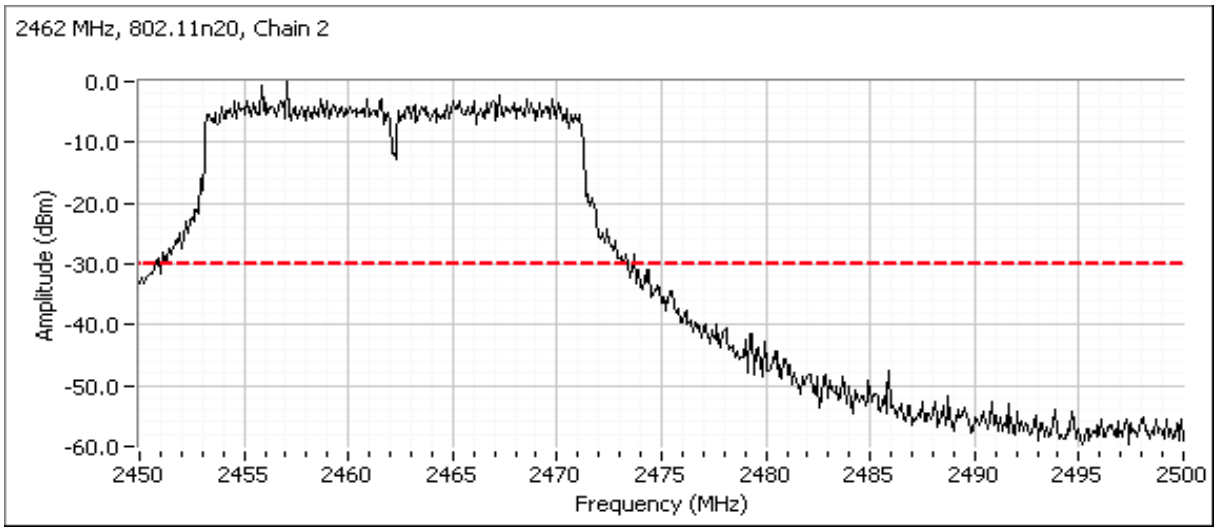
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

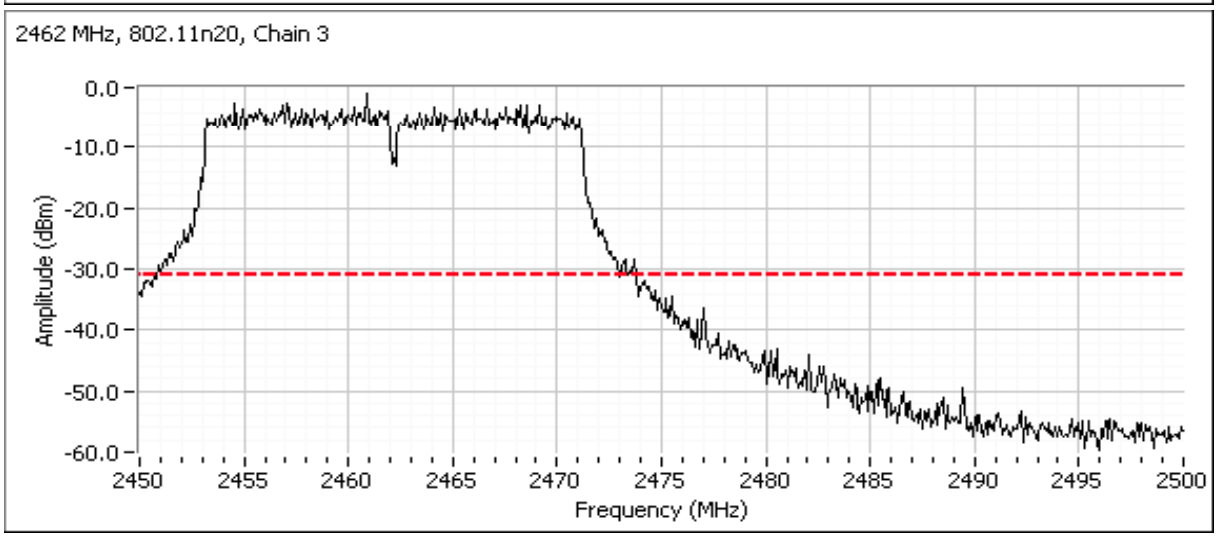


Radiated measurements used to show compliance with the limits in the restricted band above 2483.5 MHz.



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

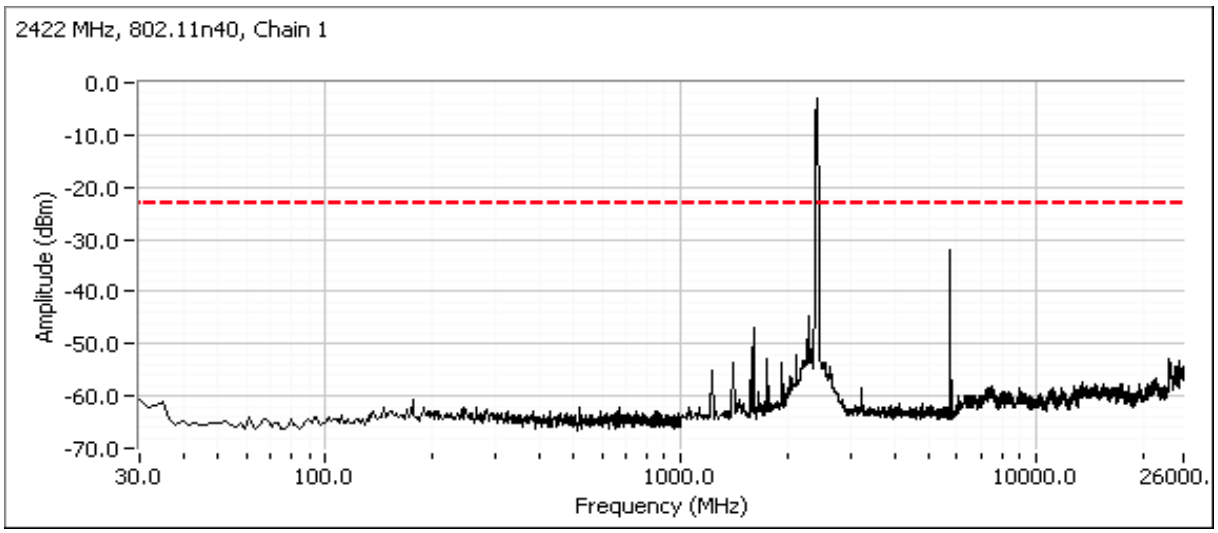


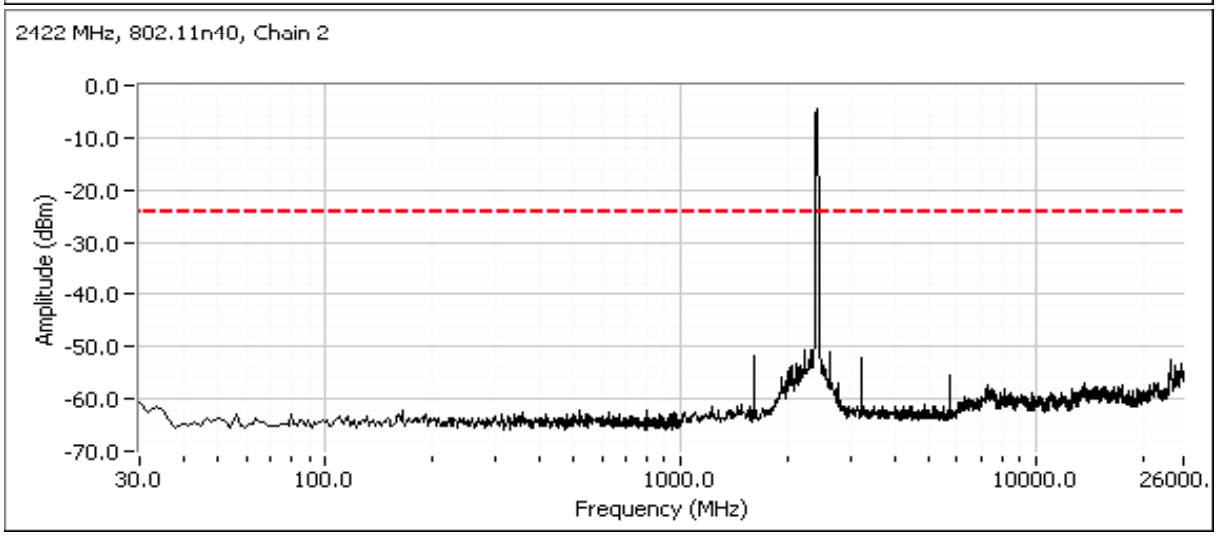


Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

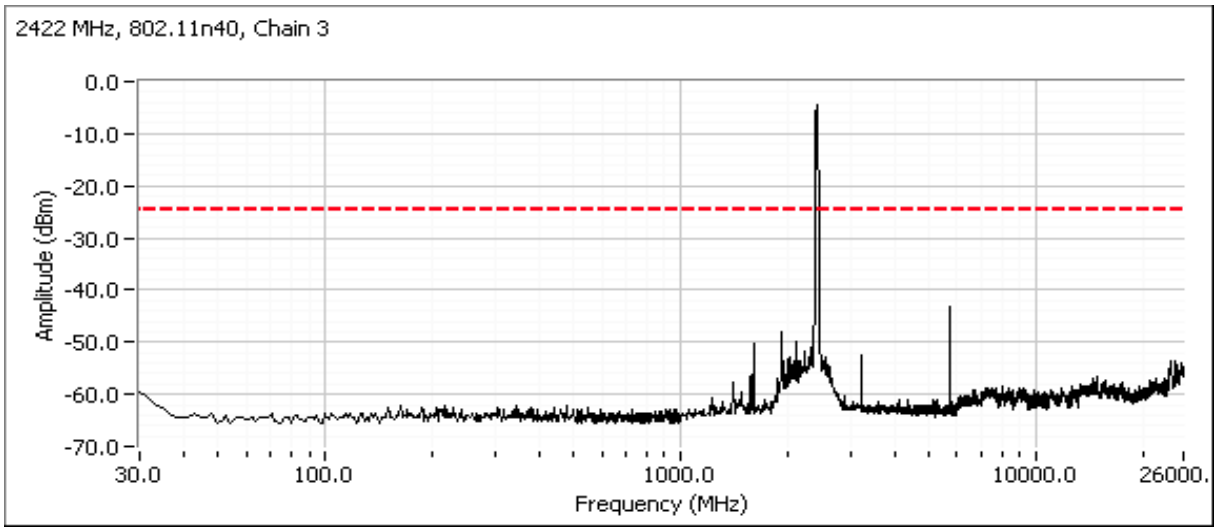
802.11n40

Plots for low channel

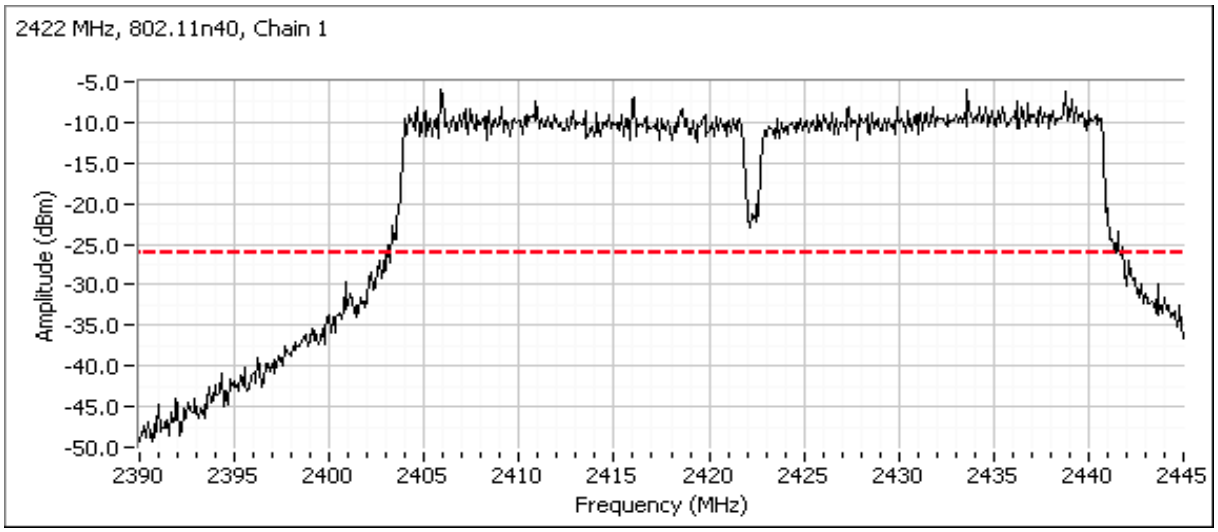




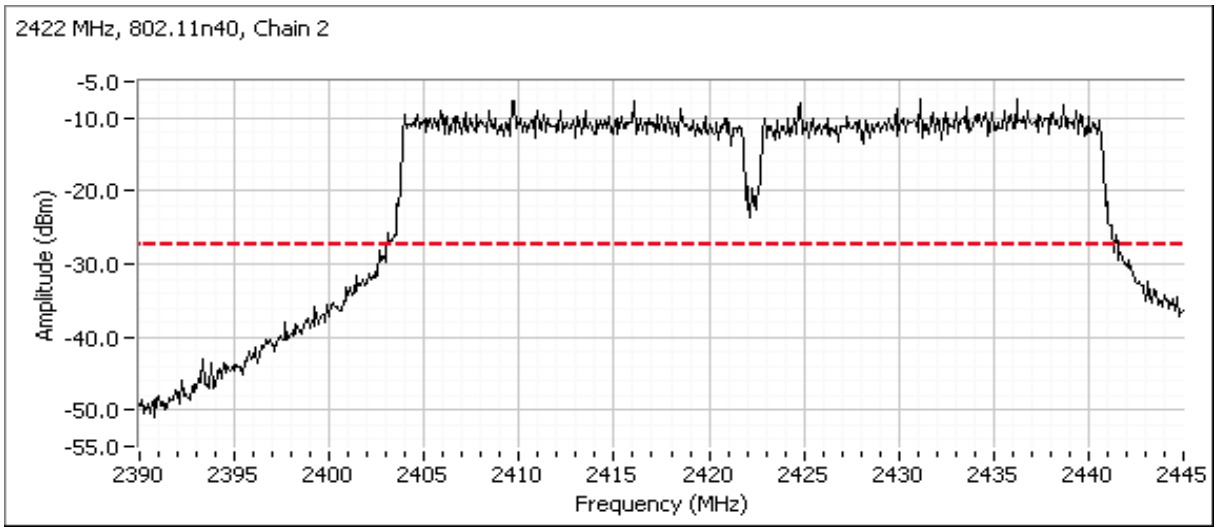
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

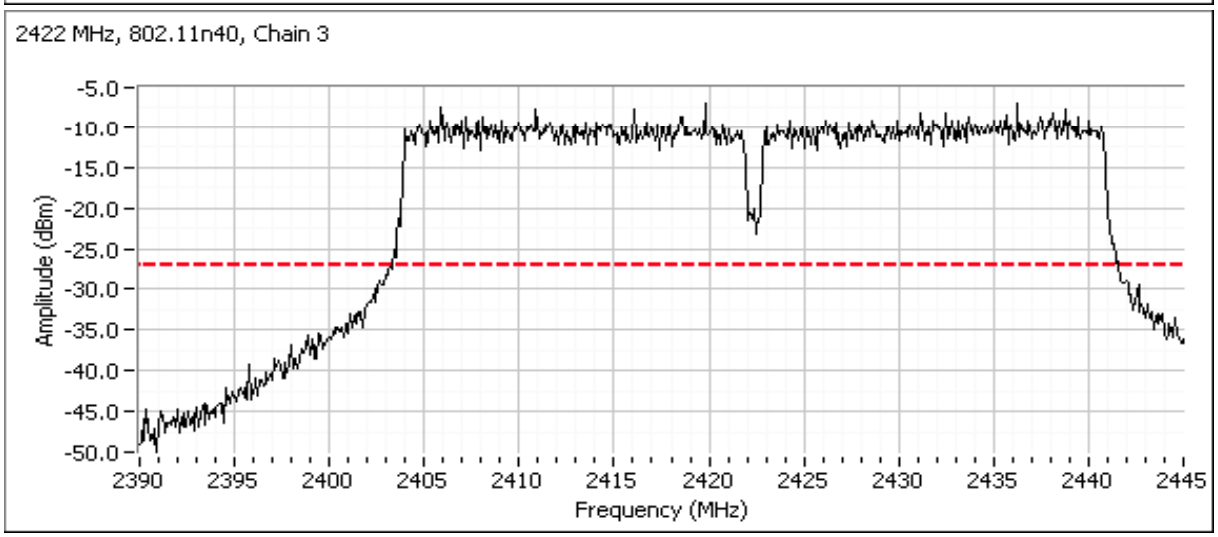


Additional plot showing compliance with -20dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



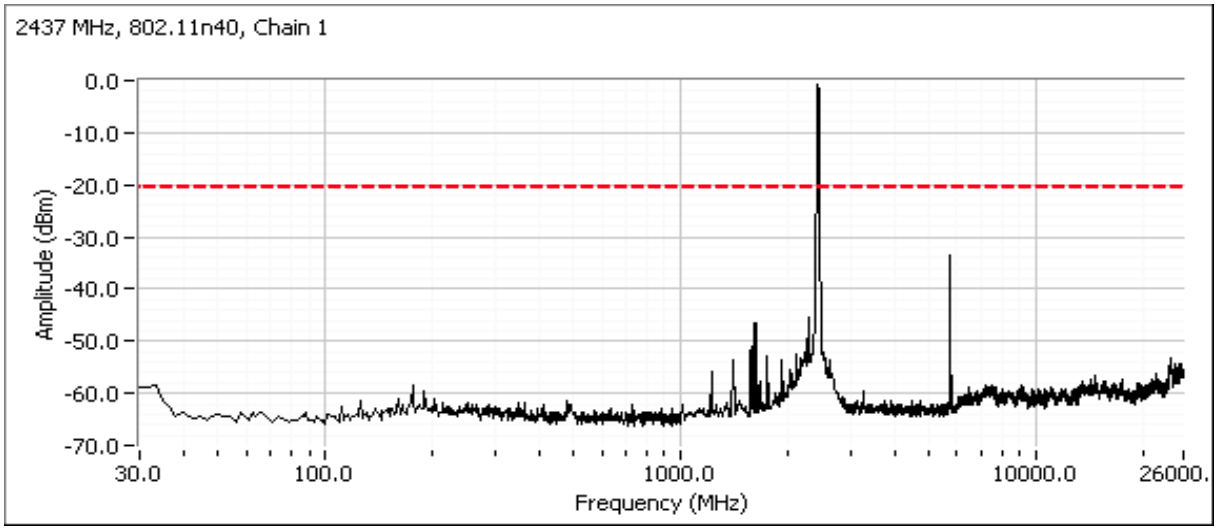
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

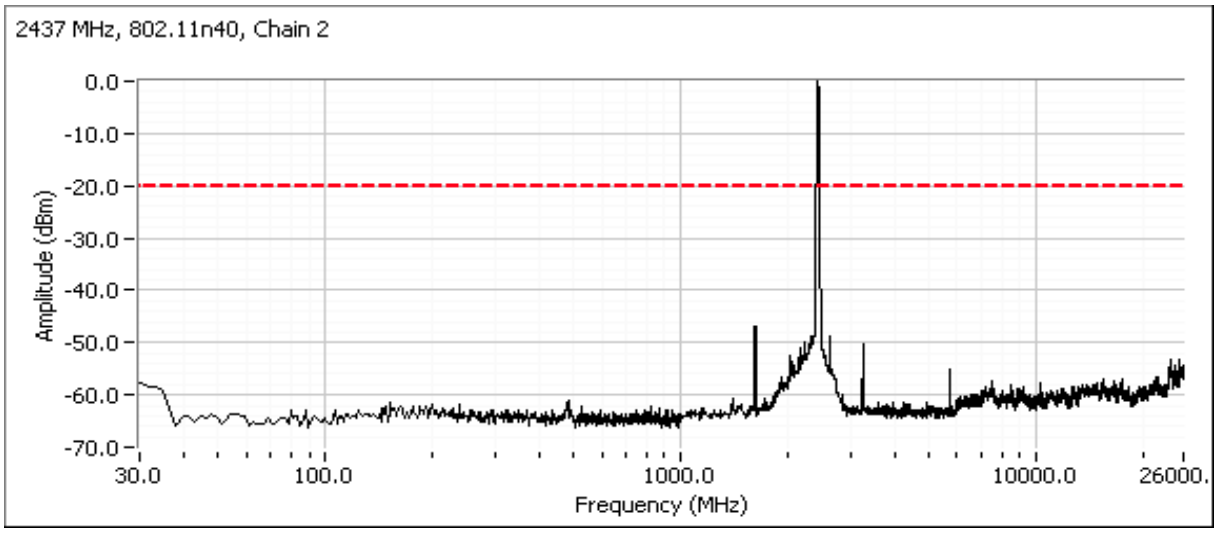




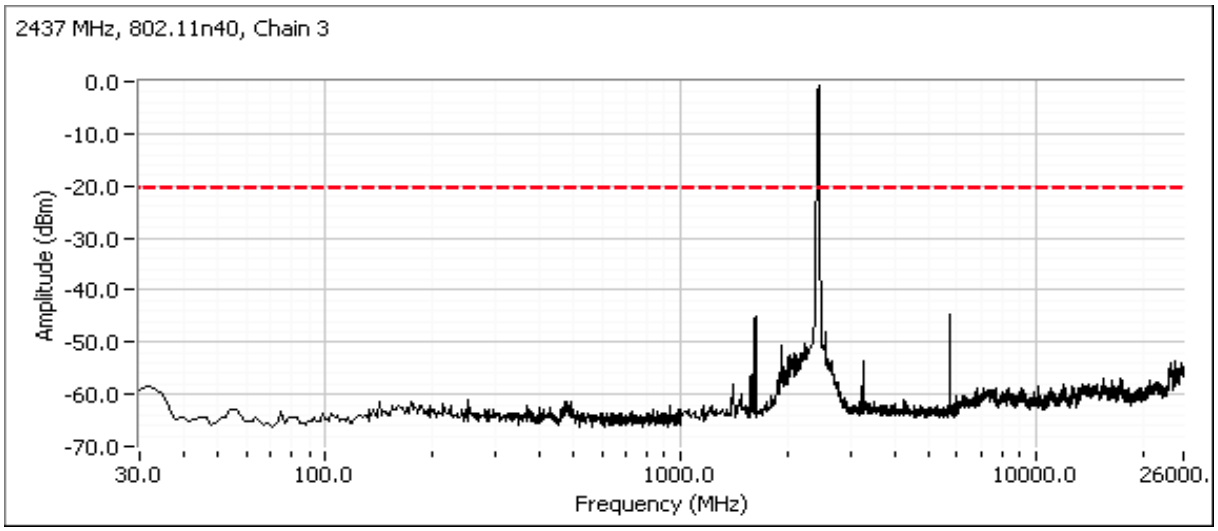
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Plots for center channel



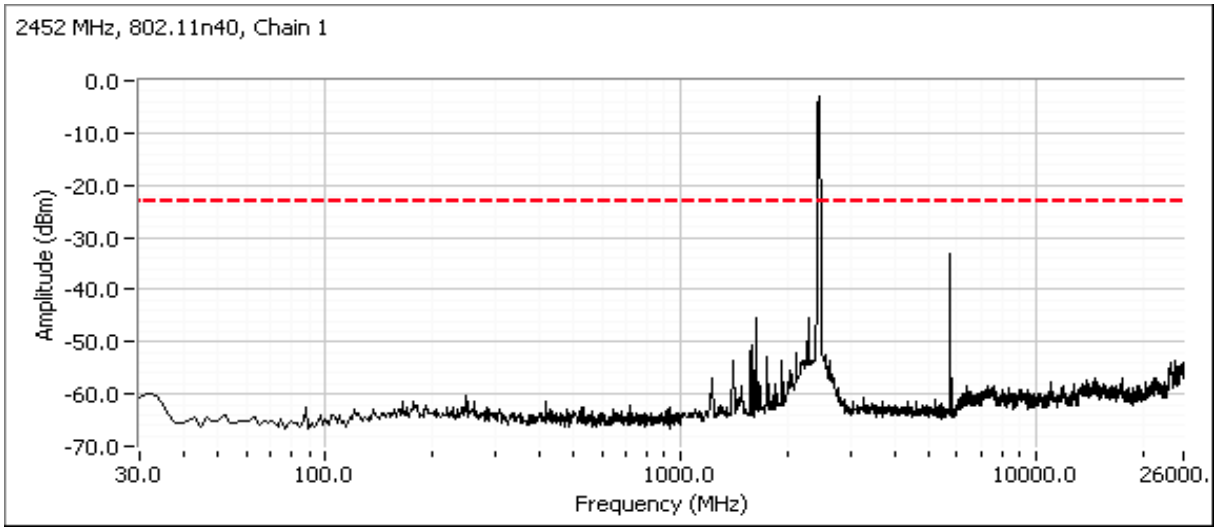


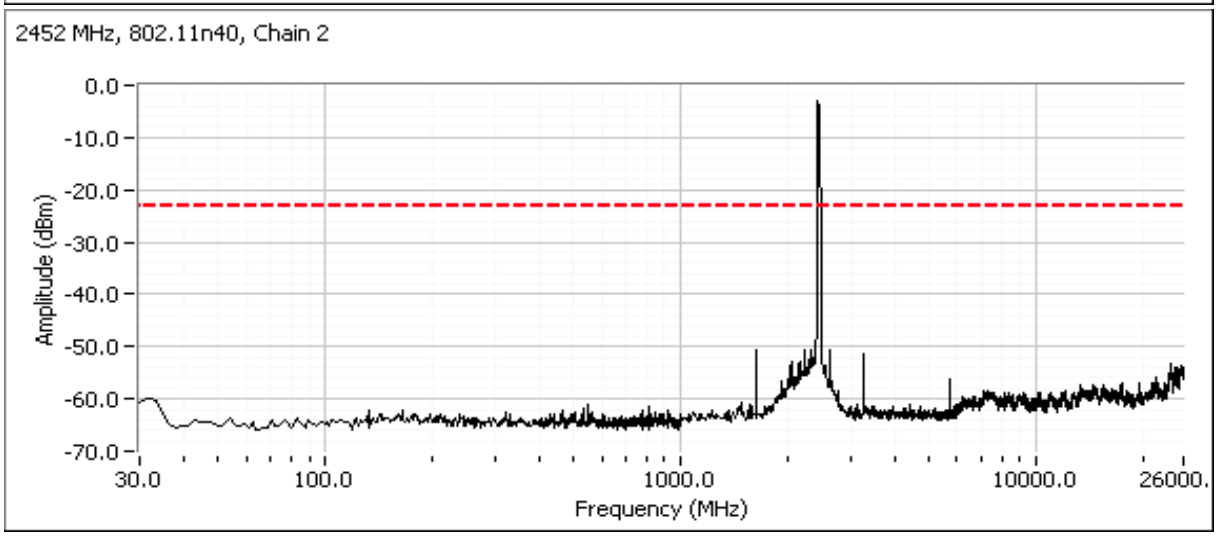
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A



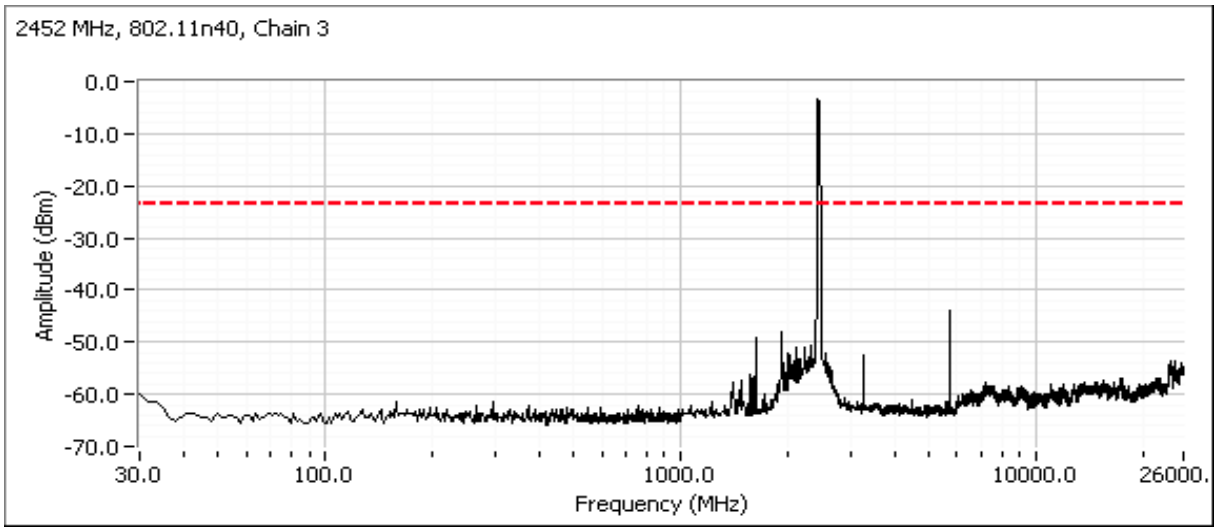
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Plots for high channel

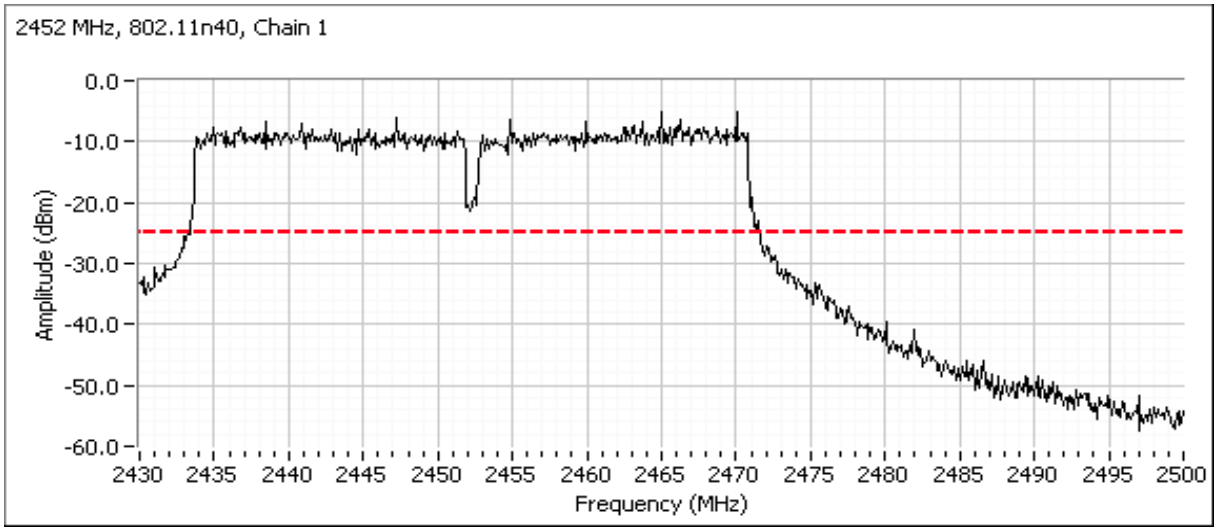




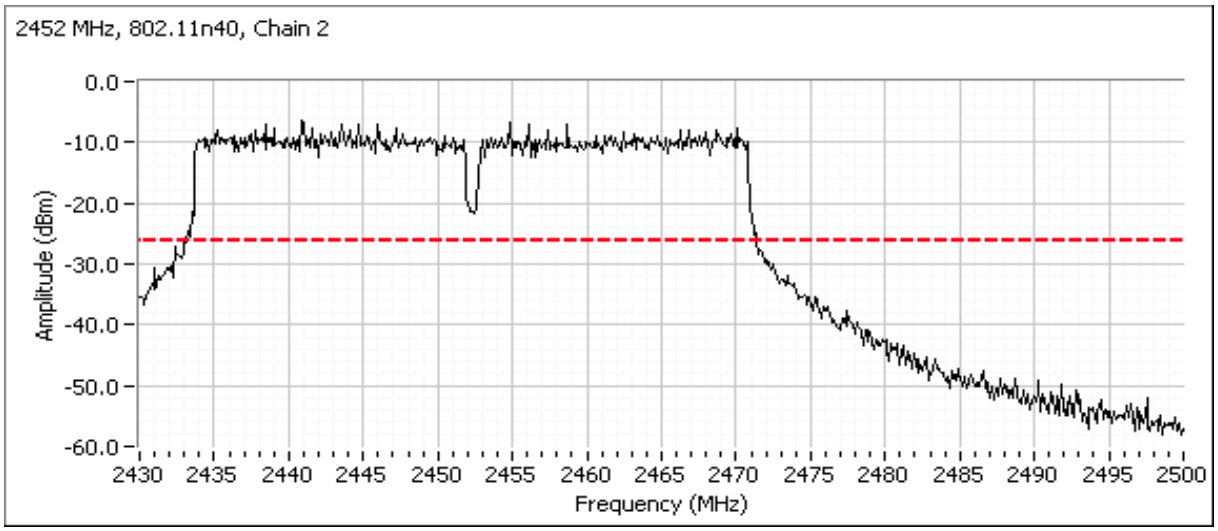
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

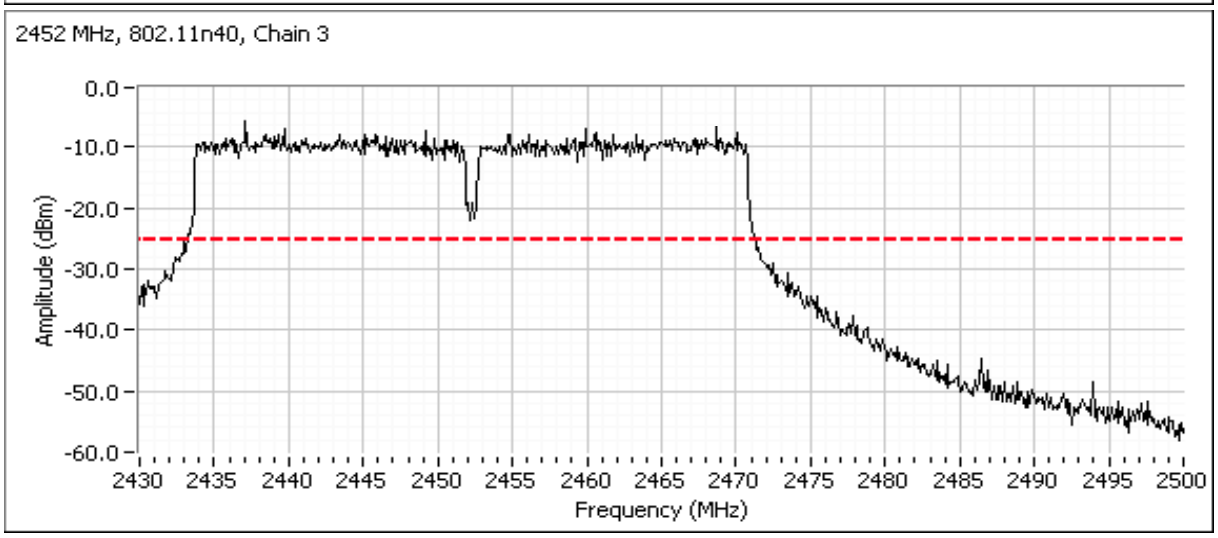


Radiated measurements used to show compliance with the limits in the restricted band above 2483.5 MHz.



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A





Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
Power - 802.11b mode

Test Specific Details

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

Date of Test: 11/29/2012
Test Engineer: Rafael Varelas
Test Location: FT7

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 20.4 °C
Rel. Humidity: 35 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1	-	-	Output Power (802.11b)	15.247(b)	Pass	23.1 dBm

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.

Notes

All measurements performed at the antenna port of the module inside the chassis
Pigtail loss 0.2dB

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B + C - 802.11b

Run #1a:
Antenna: 2dBi Internal

Operating Mode: 802.11b
Transmitted signal on chain is coherent ? yes

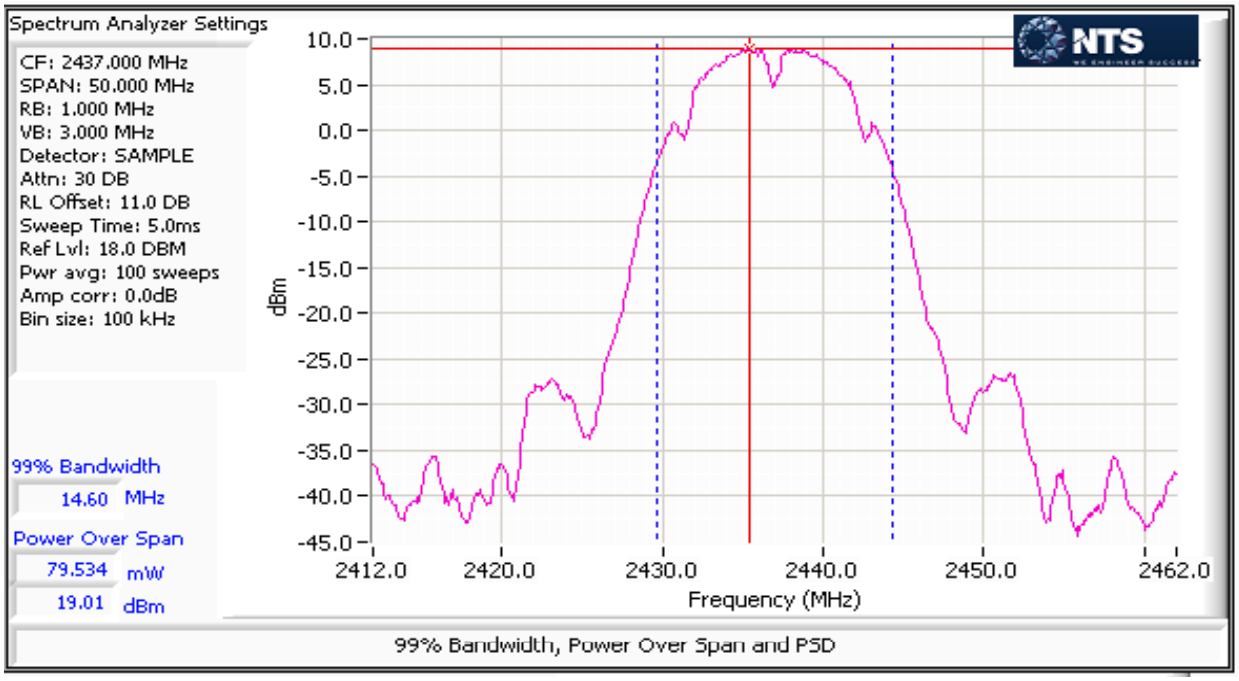
2412 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	16.5							
Output Power (dBm) Note 1	16.0	15.2	15.4		20.3 dBm	0.107 W	29.2 dBm	0.837 W
Antenna Gain (dBi) Note 2	2	2	2		6.8 dBi		Pass	
eirp (dBm) Note 2	18	17.18	17.37		27.1 dBm	0.510 W		

2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	21.0							
Output Power (dBm) Note 1	17.8	19	18.25		23.1 dBm	0.207 W	29.2 dBm	0.837 W
Antenna Gain (dBi) Note 2	2	2	2		6.8 dBi		Pass	
eirp (dBm) Note 2	19.8	21	20.25		29.9 dBm	0.982 W		

2462 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	16.5							
Output Power (dBm) Note 1	15.3	16.1	15.6		20.5 dBm	0.111 W	29.2 dBm	0.837 W
Antenna Gain (dBi) Note 2	2	2	2		6.8 dBi		Pass	
eirp (dBm) Note 2	17.3	18.1	17.6		27.2 dBm	0.527 W		

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz (option #1 in KDB 558074). Spurious limit becomes -30dBc.
Note 2:	As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain
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:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
Power - 802.11g mode

Test Specific Details

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

Date of Test: 12/21/2012
Test Engineer: Jack Liu
Test Location: FT 7

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 21 °C
Rel. Humidity: 38 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1	-	-	Output Power (802.11g)	15.247(b)	Pass	22.6dBm

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.

Notes

All measurements performed at the antenna port of the module inside the chassis
Pigtail loss 0.2dB

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B + C - 802.11g

Run #1a:
Antenna: 2dBi Internal

Operating Mode: 802.11g
Transmitted signal on chain is coherent ? yes

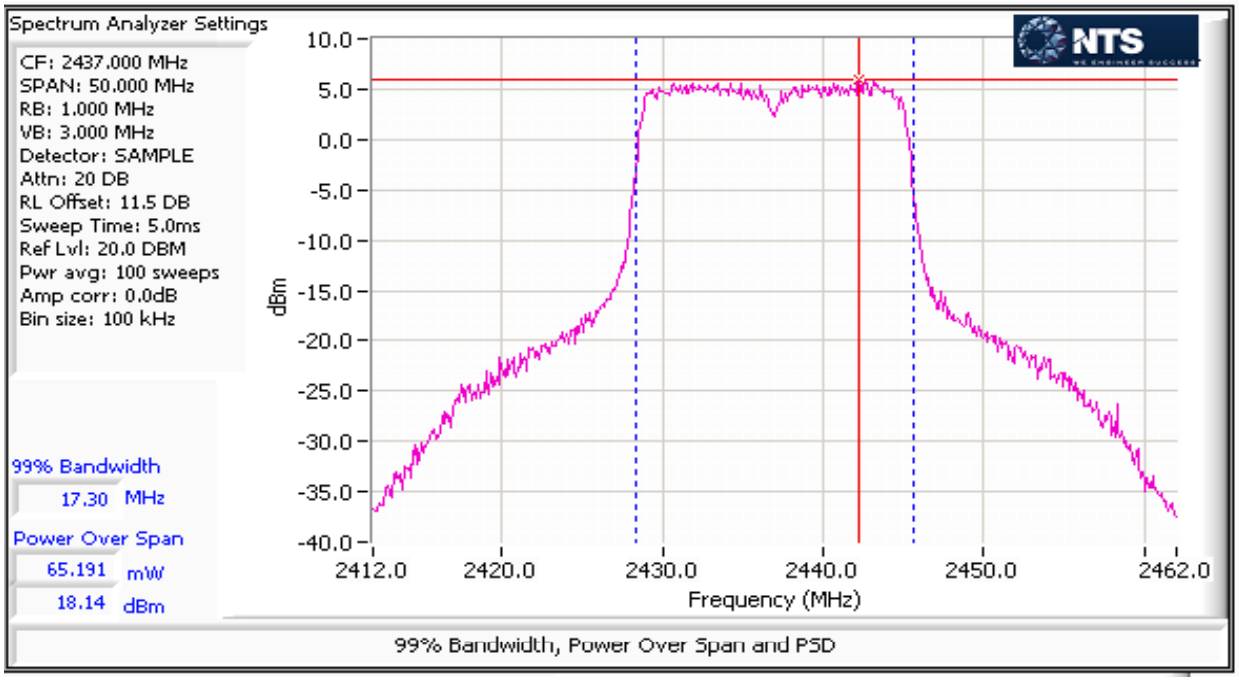
2412 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	12.5							
Output Power (dBm) Note 1	12.52	12.18	12.37		17.1 dBm	0.052 W	29.2 dBm	0.837 W
Antenna Gain (dBi) Note 2	2	2	2		6.8 dBi		Pass	
eirp (dBm) Note 2	14.52	14.18	14.37		23.9 dBm	0.246 W		

2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	19.0							
Output Power (dBm) Note 1	17.65	18.14	17.78		22.6 dBm	0.183 W	29.2 dBm	0.837 W
Antenna Gain (dBi) Note 2	2	2	2		6.8 dBi		Pass	
eirp (dBm) Note 2	19.65	20.14	19.78		29.4 dBm	0.872 W		

2462 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	13.5							
Output Power (dBm) Note 1	13.24	13.61	13.6		18.3 dBm	0.067 W	29.2 dBm	0.837 W
Antenna Gain (dBi) Note 2	2	2	2		6.8 dBi		Pass	
eirp (dBm) Note 2	15.24	15.61	15.6		25.0 dBm	0.318 W		

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz (option #1 in KDB 558074). Spurious limit becomes -30dBc.
Note 2:	As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain
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:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
Power - 802.11n20 mode

Test Specific Details

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

Date of Test: 11/29/2012
Test Engineer: Rafael Varelas
Test Location: FT7

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 20.4 °C
Rel. Humidity: 35 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1	-	-	Output Power (802.11n20)	15.247(b)	Pass	21.5 dBm

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.

Notes

All measurements performed at the antenna port of the module inside the chassis
Pigtail loss 0.2dB

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B + C - 802.11n20

Run #1a:
Antenna: 2dBi Internal

Operating Mode: 802.11n20
Transmitted signal on chain is coherent ? no

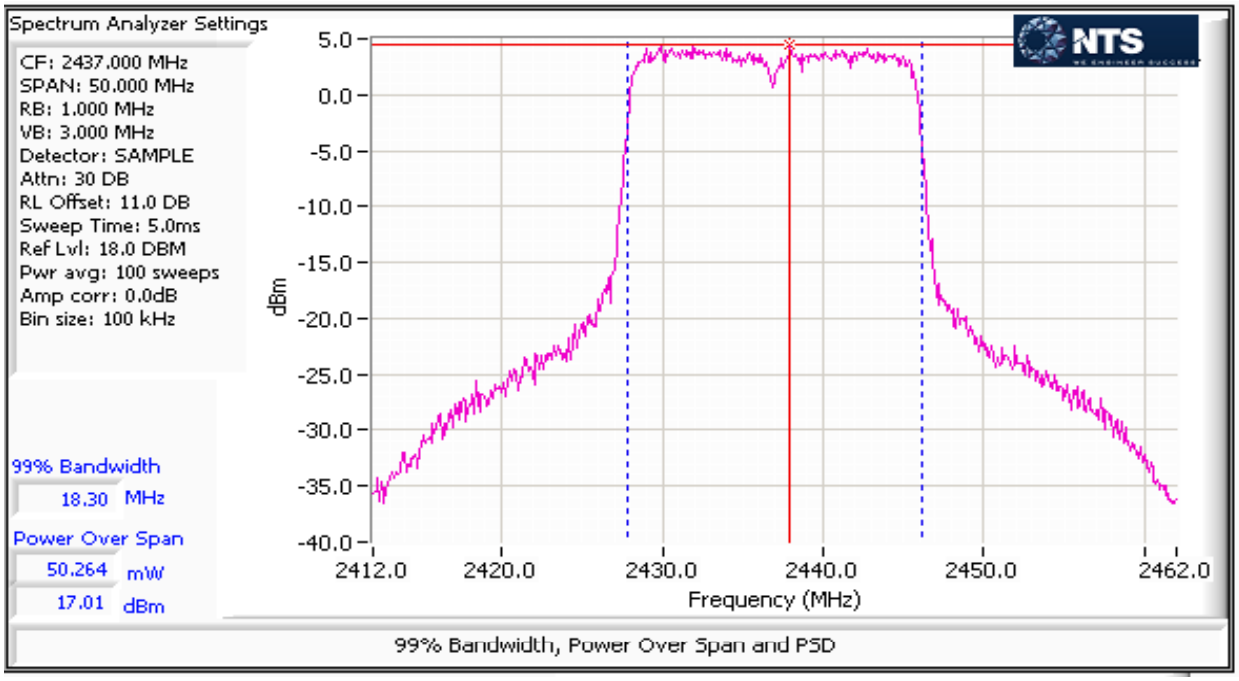
2412 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting[Note 3]	12.0							
Output Power (dBm) [Note 1]	11.5	11.1	10.9		15.9 dBm	0.039 W	30.0 dBm	1.000 W
Antenna Gain (dBi) [Note 2]	2	2	2			2.0 dBi	Pass	
eirp (dBm) [Note 2]	13.45	13.13	12.87		17.9 dBm	0.062 W		

2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting[Note 3]	18.0							
Output Power (dBm) [Note 1]	16.7	17	16.6		21.5 dBm	0.143 W	30.0 dBm	1.000 W
Antenna Gain (dBi) [Note 2]	2	2	2			2.0 dBi	Pass	
eirp (dBm) [Note 2]	18.7	19	18.6		23.5 dBm	0.226 W		

2462 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting[Note 3]	12.5							
Output Power (dBm) [Note 1]	11.6	12.4	12.1		16.8 dBm	0.048 W	30.0 dBm	1.000 W
Antenna Gain (dBi) [Note 2]	2	2	2			2.0 dBi	Pass	
eirp (dBm) [Note 2]	13.6	14.4	14.1		18.8 dBm	0.076 W		

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz (option #1 in KDB 558074). Spurious limit becomes -30dBc.
Note 2:	As there is no coherency between chains the total EIRP is the sum of the individual EIRPs and effective antenna gain equals the eirp divide by the sum of the power on each chain.
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:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
Power - 802.11n40 mode

Test Specific Details

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

Date of Test: 12/28/2012
Test Engineer: Rafael Varelas
Test Location: FT 7

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 21 °C
Rel. Humidity: 38 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1	-	-	Output Power (802.11n40)	15.247(b)	Pass	21.1 dBm

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.

Notes

All measurements performed at the antenna port of the module inside the chassis
Pigtail loss 0.2dB

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B + C - 802.11n40

Run #1a:
Antenna: 2dBi Internal

Operating Mode: 802.11n40
Transmitted signal on chain is coherent ? no

2422 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	10.0							
Output Power (dBm) Note 1	13.2	12.9	12.6		17.7 dBm	0.059 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	2	2	2			2.0 dBi	Pass	
eirp (dBm) Note 2	15.2	14.9	14.6		19.7 dBm	0.093 W		

2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	13.0							
Output Power (dBm) Note 1	16.1	16.3	16.5		21.1 dBm	0.128 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	2	2	2			2.0 dBi	Pass	
eirp (dBm) Note 2	18.1	18.3	18.5		23.1 dBm	0.203 W		

2452 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	10.5							
Output Power (dBm) Note 1	13.8	13.1	13.3		18.2 dBm	0.066 W	30.0 dBm	1.000 W
Antenna Gain (dBi) Note 2	2	2	2			2.0 dBi	Pass	
eirp (dBm) Note 2	15.8	15.1	15.3		20.2 dBm	0.104 W		

Note 1:	Output power measured using a peak power meter, spurious limit is -20dBc.
Note 2:	As there is no coherency between chains the total EIRP is the sum of the individual EIRPs and effective antenna gain equals the eirp divide by the sum of the power on each chain.
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:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT.

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

Ambient Conditions:

Temperature: 24.2 °C
Rel. Humidity: 38 %

Summary of Results - Device Operating in the DTS Bands

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 1	802.11b Chain A+B+C	#1 2412MHz	16.5		Restricted Band Edge at 2390 MHz	15.209	53.3 dBµV/m @ 2386.3 MHz (-0.7 dB)
		#11 2462MHz	16.5		Restricted Band Edge at 2483.5 MHz	15.209	53.0 dBµV/m @ 2487.8 MHz (-1.0 dB)

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 2	802.11n20 Chain A+B+C	#1 2412MHz	12.0		Restricted Band Edge at 2390 MHz	15.209	53.4 dBµV/m @ 2390.0 MHz (-0.6 dB)
		#2 2417MHz	14.0		Restricted Band Edge at 2390 MHz	15.209	51.9 dBµV/m @ 2389.9 MHz (-2.1 dB)
		#3 2422MHz	16.5		Restricted Band Edge at 2390 MHz	15.209	53.9 dBµV/m @ 2390.0 MHz (-0.1 dB)
		#9 2452MHz	16.5		Restricted Band Edge at 2483.5 MHz	15.209	53.2 dBµV/m @ 2483.5 MHz (-0.8 dB)
		#10 2457MHz	14.5		Restricted Band Edge at 2483.5 MHz	15.209	51.2 dBµV/m @ 2484.2 MHz (-2.8 dB)
		#11 2462MHz	12.5		Restricted Band Edge at 2483.5 MHz	15.209	51.4 dBµV/m @ 2483.6 MHz (-2.6 dB)

Antenna:

#	Model	Type	Freq. Band (GHz)	Gain (dBi)	Ind/Out	Xpol?	Pt to Pt?
1	(Antenna A)	IFA	2.4	2	Indoor	No	No

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.

Notes

Antenna: antenna(s) connected
Duty Cycle: 99.0%

ART GUI (Singleradio test) Or Command Line Script (multiple radio test)
ART GUI Used: No
ART GUI Boot File: -
-
ART GUI Calibration file: -
-
Command Line Script: 3710i Pilot_935942 boot and initialize all 3 radios to NART Command Line Interface

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 1, Band Edge Field Strength - 802.11b, Chain A+B+C

Date of Test: 12/3/2012 Test Location: FT7

Test Engineer: Rafael Varelas Config Change: none

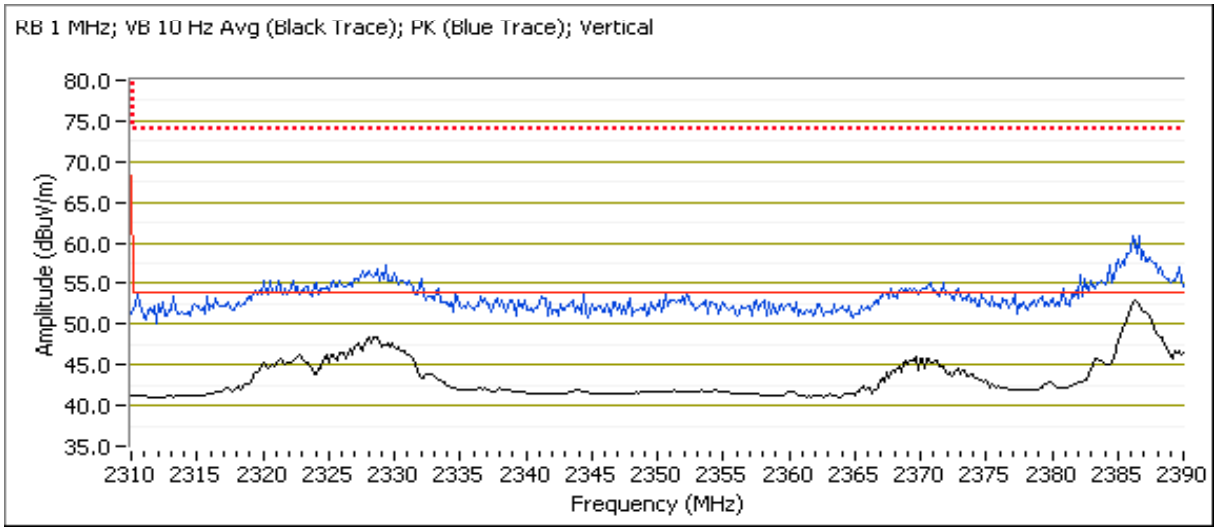
Run # 1a, EUT on Channel #1 2412MHz - 802.11b, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	20.0
2	2412 MHz	16.5

2390 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	
2386.320	53.3	V	54.0	-0.7	AVG	132	1.0	POS; RB 1 MHz; VB: 10 Hz
2385.960	60.2	V	74.0	-13.8	PK	132	1.0	POS; RB 1 MHz; VB: 3 MHz
2386.250	51.9	H	54.0	-2.1	AVG	122	1.2	POS; RB 1 MHz; VB: 10 Hz
2385.890	59.2	H	74.0	-14.8	PK	122	1.2	POS; RB 1 MHz; VB: 3 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



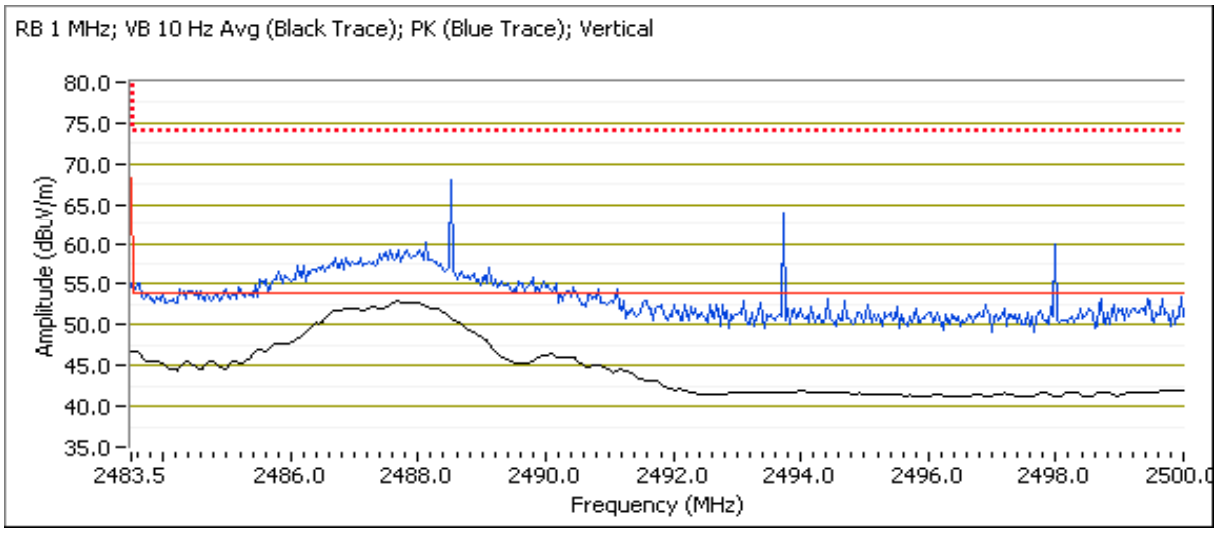
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 1b, EUT on Channel #11 2462MHz - 802.11b, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	20.0
2	2462 MHz	16.5

2483.5 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	
2487.830	53.0	V	54.0	-1.0	AVG	156	1.5	POS; RB 1 MHz; VB: 10 Hz
2486.420	70.9	V	74.0	-3.1	PK	156	1.5	POS; RB 1 MHz; VB: 3 MHz
2487.730	51.9	H	54.0	-2.1	AVG	322	1.1	POS; RB 1 MHz; VB: 10 Hz
2485.080	69.0	H	74.0	-5.0	PK	322	1.1	POS; RB 1 MHz; VB: 3 MHz



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 2, Band Edge Field Strength - 802.11n20, Chain A+B+C

Date of Test: 12/4/2012 Test Location: FT Chamber7

Test Engineer: Jack Liu Config Change: none

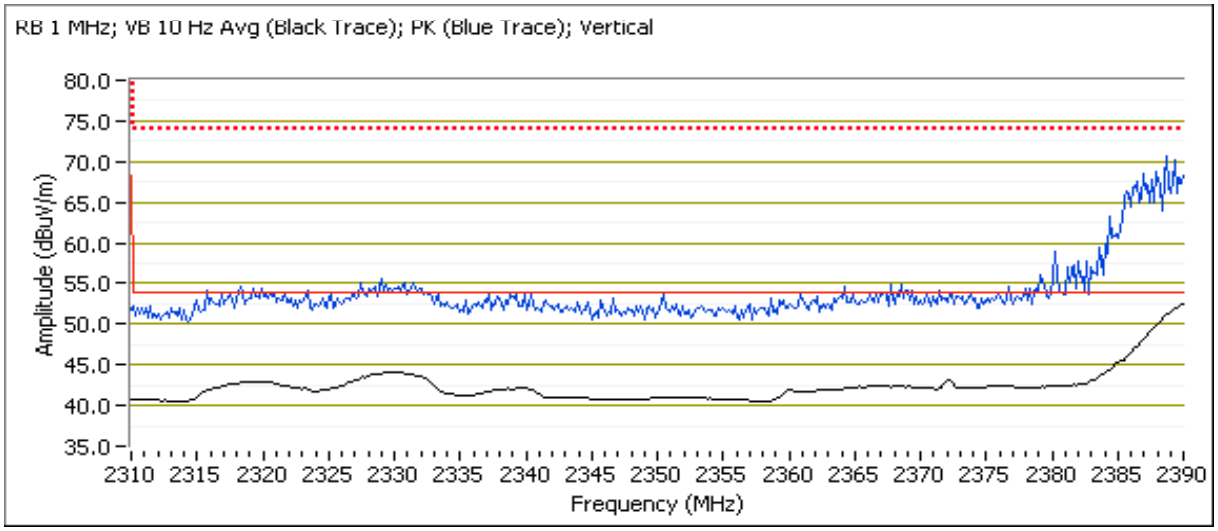
Run # 2a, EUT on Channel #1 2412MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	20.0
2	2412 MHz	12.0

2390 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	
2390.000	53.4	V	54.0	-0.6	AVG	124	1.0	Radio2 power setting 12
2389.120	70.9	V	74.0	-3.1	PK	124	1.0	Radio2 power setting 12
2390.000	48.9	H	54.0	-5.1	AVG	189	1.5	Radio2 power setting 12
2389.600	61.8	H	74.0	-12.2	PK	189	1.5	Radio2 power setting 12

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



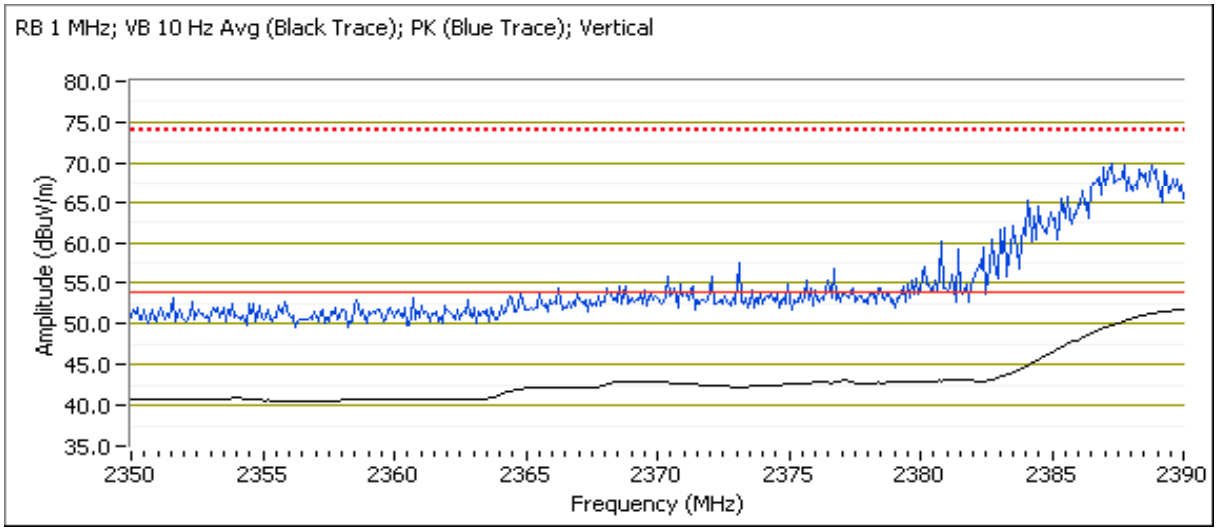
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 2b, EUT on Channel #2 2417MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	20.0
2	2417 MHz	14.0

2390 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	
2389.920	51.9	V	54.0	-2.1	AVG	203	1.0	Radio2 power setting 14
2388.080	68.5	V	74.0	-5.5	PK	203	1.0	Radio2 power setting 14
2390.000	49.4	H	54.0	-4.6	AVG	219	1.2	Radio2 power setting 14
2389.360	67.6	H	74.0	-6.4	PK	219	1.2	Radio2 power setting 14



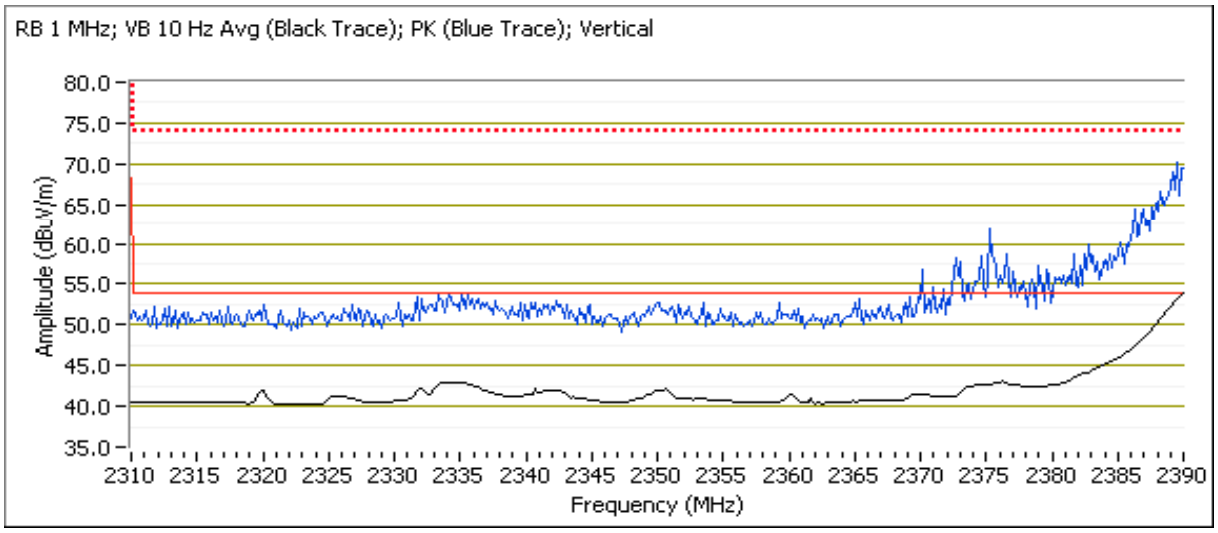
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 2c, EUT on Channel #3 2422MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	20.0
2	2422 MHz	16.5

2390 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	
2390.000	53.9	V	54.0	-0.1	AVG	335	1.5	POS; RB 1 MHz; VB: 10 Hz
2389.760	68.6	V	74.0	-5.4	PK	335	1.5	POS; RB 1 MHz; VB: 3 MHz
2390.000	50.5	H	54.0	-3.5	AVG	173	1.2	POS; RB 1 MHz; VB: 10 Hz
2385.430	67.8	H	74.0	-6.2	PK	173	1.2	POS; RB 1 MHz; VB: 3 MHz



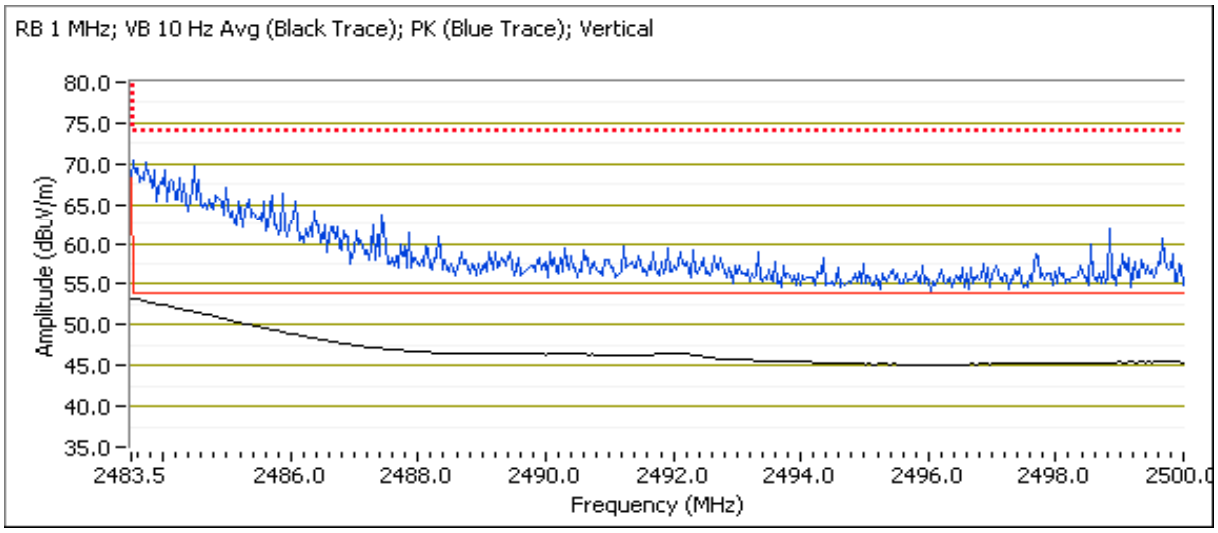
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 2d, EUT on Channel #9 2452MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	20.0
2	2452 MHz	16.5

2483.5 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	
2483.500	53.2	V	54.0	-0.8	AVG	166	1.0	Radio2 power setting 16.5
2483.500	66.6	V	74.0	-7.4	PK	166	1.0	Radio2 power setting 16.5
2485.580	51.5	H	54.0	-2.5	AVG	18	1.4	Radio2 power setting 16.5
2484.660	68.3	H	74.0	-5.7	PK	18	1.4	Radio2 power setting 16.5



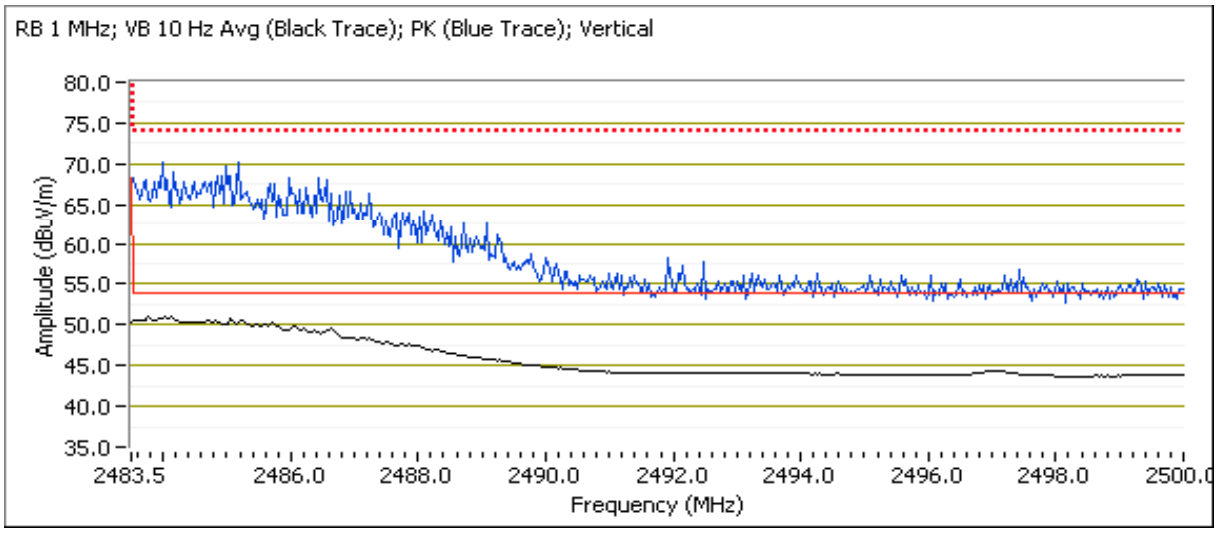
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 2e, EUT on Channel #10 2457MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	20.0
2	2457 MHz	14.5

2483.5 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	
2484.160	51.2	V	54.0	-2.8	AVG	302	1.0	Radio2 power setting 14.5
2484.720	68.5	V	74.0	-5.5	PK	302	1.0	Radio2 power setting 14.5
2483.500	50.3	H	54.0	-3.7	AVG	316	1.1	Radio2 power setting 14.5
2484.160	67.7	H	74.0	-6.3	PK	316	1.1	Radio2 power setting 14.5



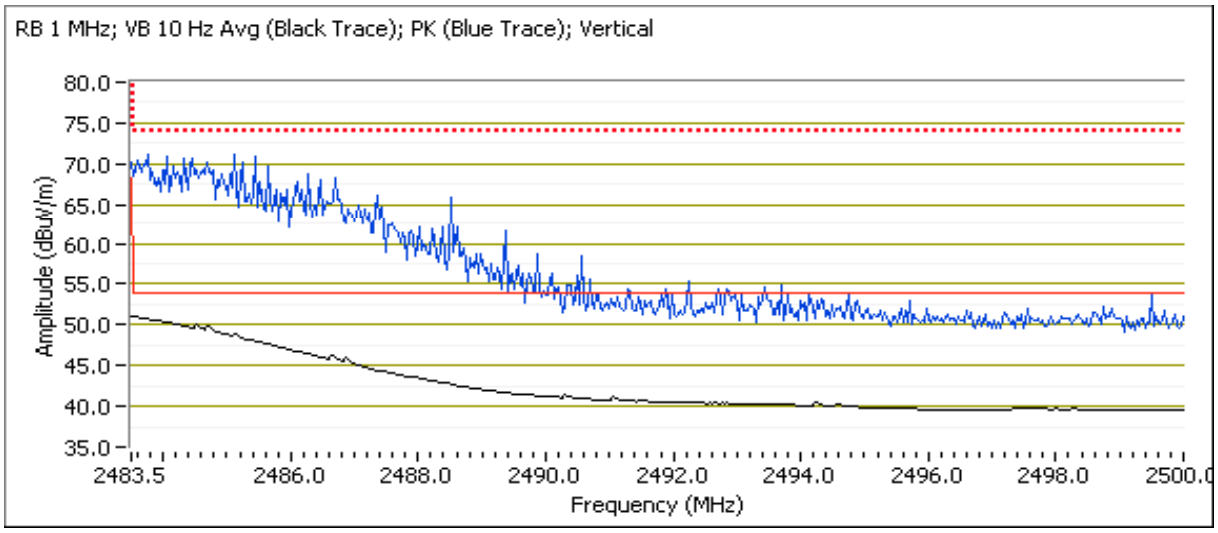
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 2f, EUT on Channel #11 2462MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5745 MHz	20.0
2	2462 MHz	12.5

2483.5 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	
2483.570	51.4	V	54.0	-2.6	AVG	139	1.0	Radio2 power setting 12.5
2484.790	68.6	V	74.0	-5.4	PK	139	1.0	Radio2 power setting 12.5
2483.730	51.2	H	54.0	-2.8	AVG	328	1.1	Radio2 power setting 12.5
2486.340	69.6	H	74.0	-4.4	PK	328	1.1	Radio2 power setting 12.5



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT.

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

Ambient Conditions:

Temperature: 24 °C
Rel. Humidity: 38 %

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

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 1	802.11g Chain A+B+C	#1 2412MHz	12.5		Restricted Band Edge at 2390 MHz	15.209	53.0 dBµV/m @ 2390.0 MHz (-1.0 dB)
		#2 2417MHz	14.5		Restricted Band Edge at 2390 MHz	15.209	53.4 dBµV/m @ 2390.0 MHz (-0.6 dB)
		#3 2422MHz	16.5		Restricted Band Edge at 2390 MHz	15.209	73.5 dBµV/m @ 2389.3 MHz (-0.5 dB)
		#9 2452MHz	17.0		Restricted Band Edge at 2483.5 MHz	15.209	52.7 dBµV/m @ 2483.5 MHz (-1.3 dB)
		#10 2457MHz	15.0		Restricted Band Edge at 2483.5 MHz	15.209	73.4 dBµV/m @ 2483.9 MHz (-0.6 dB)
		#11 2462MHz	13.5		Restricted Band Edge at 2483.5 MHz	15.209	53.8 dBµV/m @ 2483.5 MHz (-0.2 dB)

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 2	802.11n40 Chain A+B+C	#3 2422MHz	10.0		Restricted Band Edge at 2390 MHz	15.209	53.7 dBµV/m @ 2389.9 MHz (-0.3 dB)
		#4 2427MHz	11.0		Restricted Band Edge at 2390 MHz	15.209	53.0 dBµV/m @ 2389.6 MHz (-1.0 dB)
		#5 2432MHz	12.5		Restricted Band Edge at 2390 MHz	15.209	52.8 dBµV/m @ 2390.0 MHz (-1.2 dB)
		#6 2437MHz	13.0		Restricted Band Edge at 2390 MHz	15.209	53.5 dBµV/m @ 2390.0 MHz (-0.5 dB)
		#6 2437MHz	13.0		Restricted Band Edge at 2483.5 MHz	15.209	52.9 dBµV/m @ 2483.5 MHz (-1.1 dB)
		#7 2442MHz	12.5		Restricted Band Edge at 2483.5 MHz	15.209	73.1 dBµV/m @ 2486.4 MHz (-0.9 dB)
		#8 2447MHz	11.5		Restricted Band Edge at 2483.5 MHz	15.209	52.7 dBµV/m @ 2484.5 MHz (-1.3 dB)
		#9 2452MHz	10.5		Restricted Band Edge at 2483.5 MHz	15.209	52.9 dBµV/m @ 2484.1 MHz (-1.1 dB)

Antenna:

#	Model	Type	Freq. Band (GHz)	Gain (dBi)	Ind/Out	Xpol?	Pt to Pt?
1	(Antenna A)	IFA	2.4	2	Indoor	No	No

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.

Notes

Software Used:

ART GUI (Singleradio test) Or Command Line Script (multiple radio test)

ART GUI Used: No

ART GUI Boot File: -
-

ART GUI Calibration file: -
-

Command Line Script: 3710i Pilot_935942 boot and initialize all 3 radios to NART Command Line Interface - High Power

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 1, Band Edge Field Strength - 802.11g, Chain A+B+C

Date of Test: 12/20/2012 Test Location: FT7

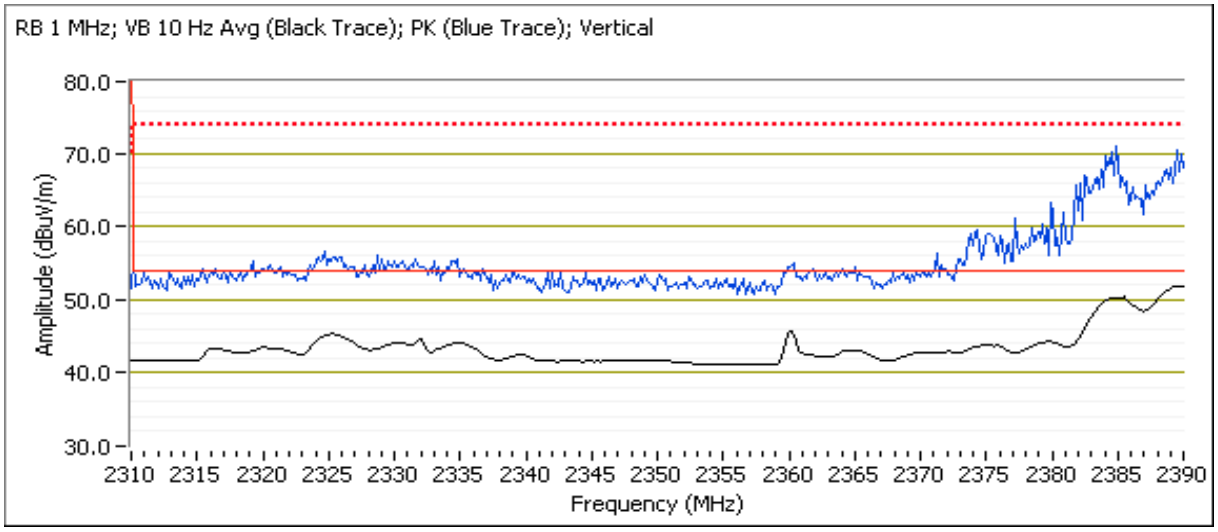
Test Engineer: Rafael Varelas Config Change: None

Run # 1a, EUT on Channel #1 2412MHz - 802.11g, Chain A+B+C

Radio	Freq	Power Setting
2	2412 MHz	12.5
1	5745 MHz	20.0

2390 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	
2390.000	53.0	V	54.0	-1.0	AVG	350	1.2	setting 12.5
2388.740	73.0	V	74.0	-1.0	PK	350	1.2	setting 12.5
2389.960	51.0	H	54.0	-3.0	AVG	162	1.2	setting 12.5
2389.540	70.0	H	74.0	-4.0	PK	162	1.2	setting 12.5



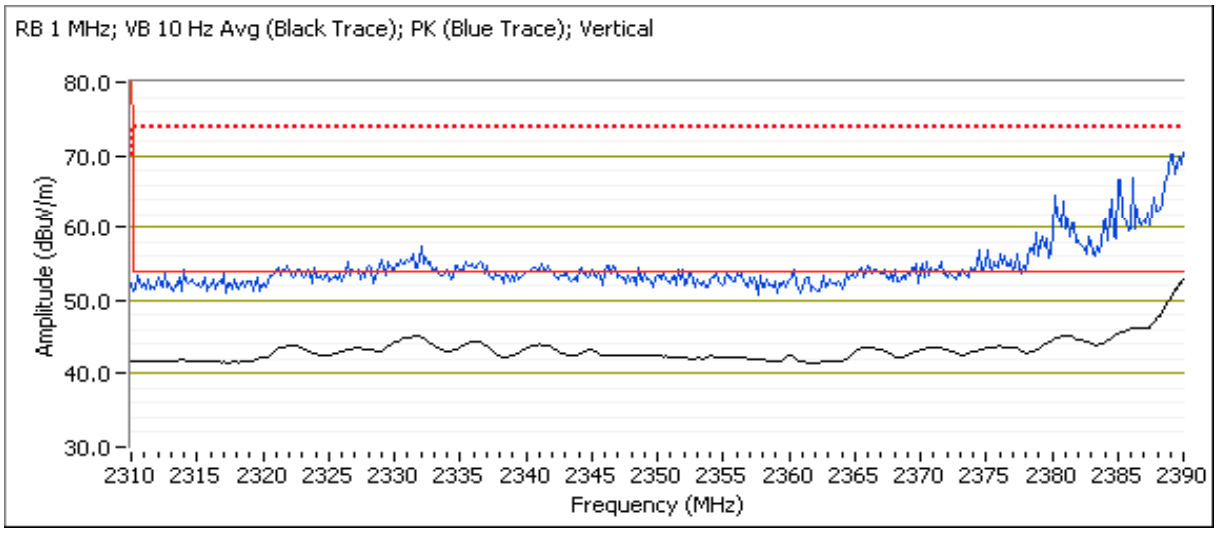
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 1b, EUT on Channel #2 2417MHz - 802.11g, Chain A+B+C

Radio	Freq	Power Setting
2	2417 MHz	14.5
1	5745 MHz	20.0

2390 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	
2389.990	53.4	V	54.0	-0.6	AVG	128	1.0	setting 14.5
2389.300	70.9	V	74.0	-3.1	PK	128	1.0	setting 14.5
2389.990	49.7	H	54.0	-4.3	AVG	190	1.2	setting 14.5
2389.130	65.8	H	74.0	-8.2	PK	190	1.2	setting 14.5



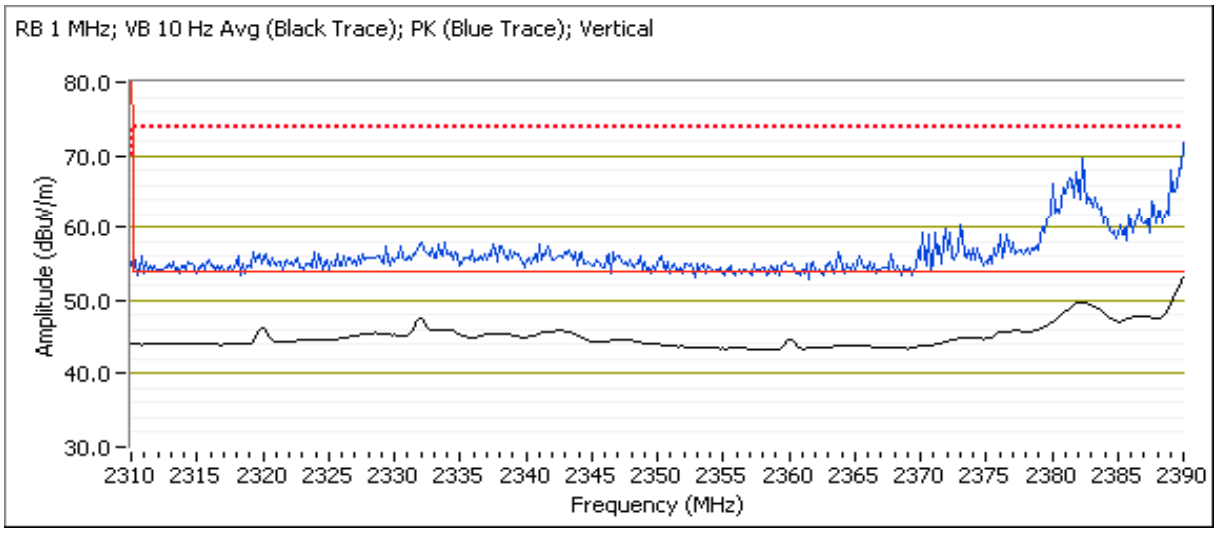
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 1c, EUT on Channel #3 2422MHz - 802.11g, Chain A+B+C

Radio	Freq	Power Setting
2	2422 MHz	16.5
1	5745 MHz	20.0

2390 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	
2389.250	73.5	V	74.0	-0.5	PK	239	1.6	setting 16.5
2389.970	53.0	V	54.0	-1.0	AVG	239	1.6	setting 16.5
2390.000	47.5	H	54.0	-6.5	AVG	250	1.2	setting 16.5
2389.790	66.1	H	74.0	-7.9	PK	250	1.2	setting 16.5



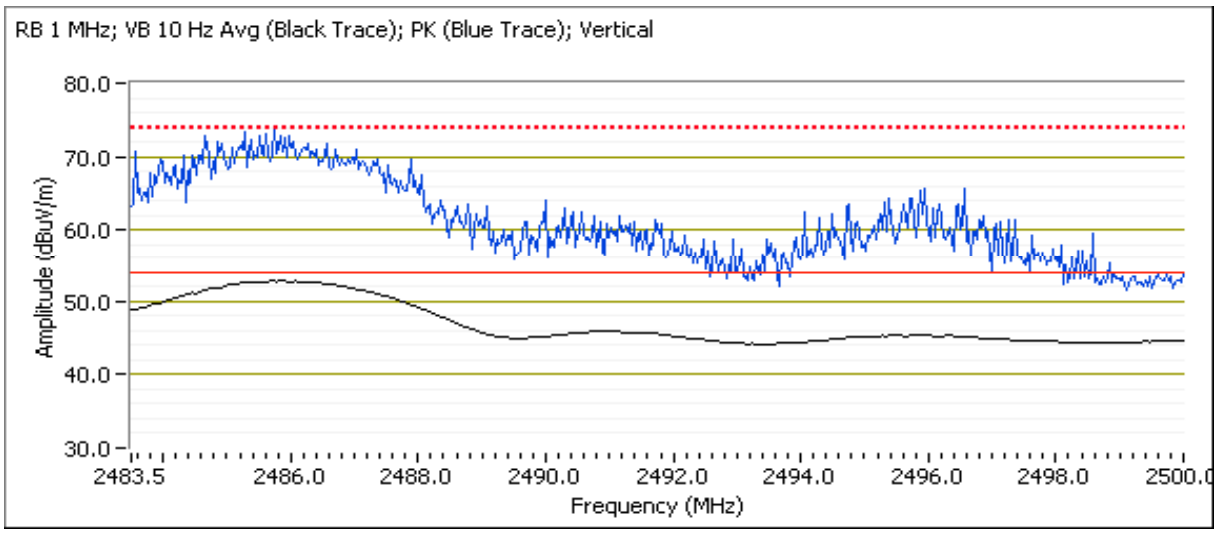
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 1d, EUT on Channel #11 2462MHz - 802.11g, Chain A+B+C

Radio	Freq	Power Setting
2	2462 MHz	13.5
1	5745 MHz	20.0

2483.5 MHz Band Edge Signal Radiated 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	
2483.510	53.8	V	54.0	-0.2	AVG	137	1.0	setting 13.5
2483.900	73.4	V	74.0	-0.6	PK	137	1.0	setting 13.5
2483.500	52.8	H	54.0	-1.2	AVG	0	1.1	setting 13.5
2484.160	72.7	H	74.0	-1.3	PK	0	1.1	setting 13.5



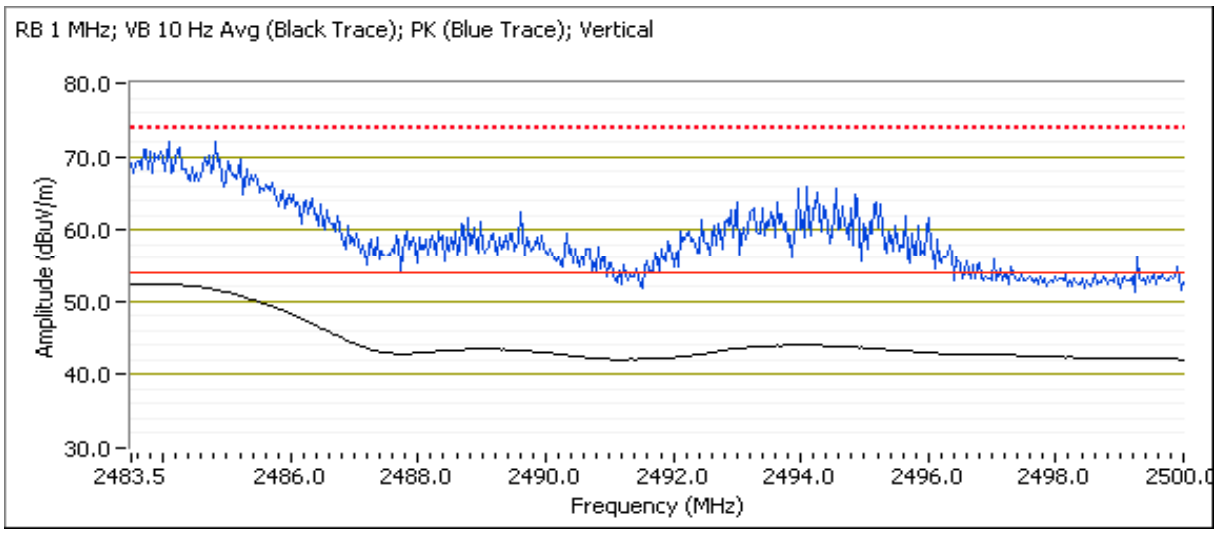
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 1e, EUT on Channel #10 2457MHz - 802.11g, Chain A+B+C

Radio	Freq	Power Setting
2	2457 MHz	15.0
1	5745 MHz	20.0

2483.5 MHz Band Edge Signal Radiated 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	
2483.910	73.4	V	74.0	-0.6	PK	344	1.5	setting 15
2483.870	52.5	V	54.0	-1.5	AVG	344	1.5	setting 15
2485.340	51.8	H	54.0	-2.2	AVG	35	1.1	setting 15
2486.280	70.8	H	74.0	-3.2	PK	35	1.1	setting 15



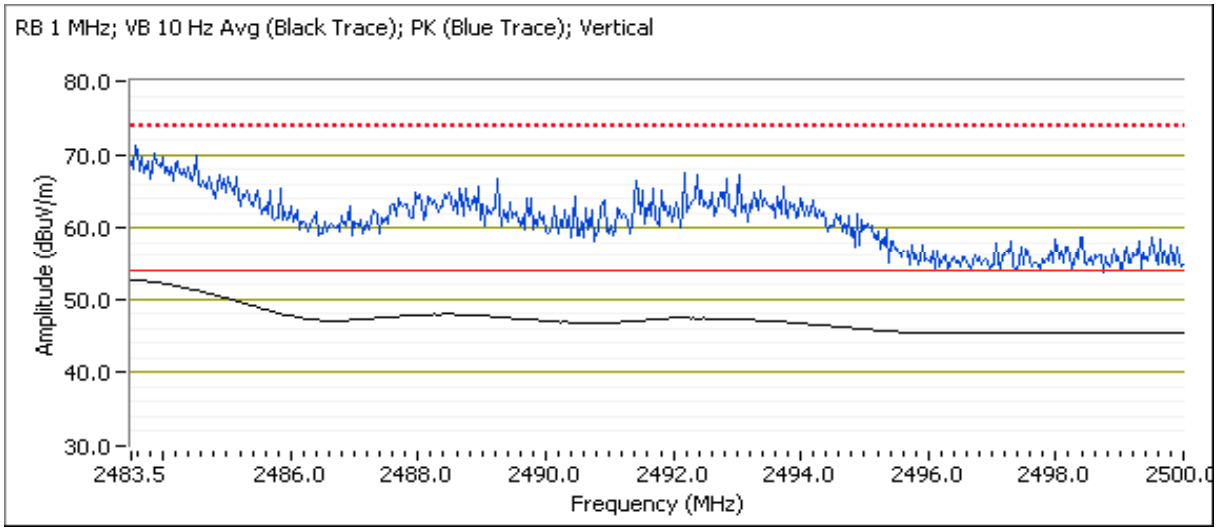
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 1f, EUT on Channel #9 2452MHz - 802.11g, Chain A+B+C

Radio	Freq	Power Setting
2	2452 MHz	17.0
1	5745 MHz	20.0

2483.5 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	52.7	V	54.0	-1.3	AVG	50	1.5	setting 17
2483.550	69.5	V	74.0	-4.5	PK	50	1.5	setting 17
2484.360	52.3	H	54.0	-1.7	AVG	20	1.1	setting 17
2483.700	68.7	H	74.0	-5.3	PK	20	1.1	setting 17



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 2, Band Edge Field Strength - 802.11n40, Chain A+B+C

Date of Test: 12/20/2012 Test Location: FT7

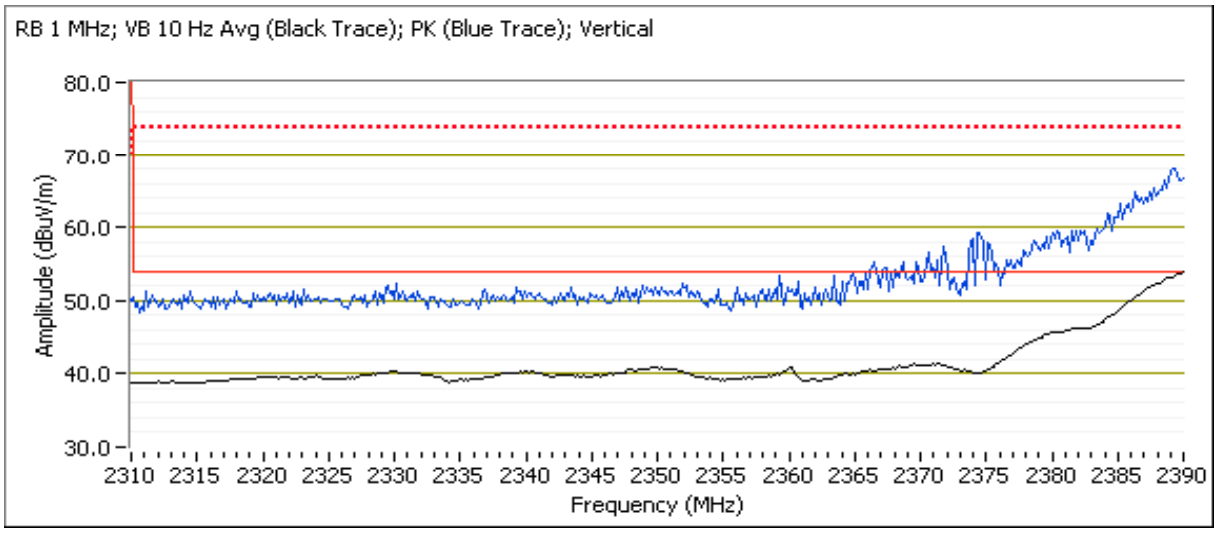
Test Engineer: Rafael Varelas Config Change: None

Run # 2a, EUT on Channel #3 2422MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
2	2422 MHz	10.0
1	5745 MHz	20.0

2390 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	
2389.920	53.7	V	54.0	-0.3	AVG	127	1.0	setting 10
2389.240	69.2	V	74.0	-4.8	PK	127	1.0	setting 10
2390.000	49.5	H	54.0	-4.5	AVG	183	1.2	setting 10
2389.730	63.1	H	74.0	-10.9	PK	183	1.2	setting 10



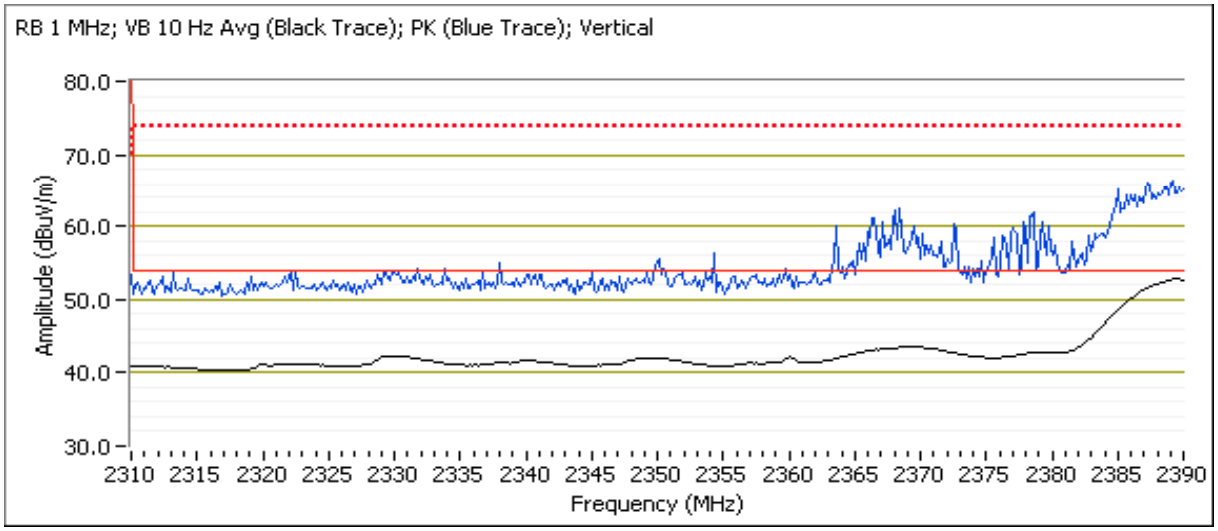
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 2b, EUT on Channel #4 2427MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
2	2427 MHz	11.0
1	5745 MHz	20.0

2390 MHz Band Edge Signal Radiated 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	
2389.600	53.0	V	54.0	-1.0	AVG	360	1.0	setting 11
2387.110	67.2	V	74.0	-6.8	PK	360	1.0	setting 11
2387.520	49.7	H	54.0	-4.3	AVG	150	1.2	setting 11
2386.310	62.4	H	74.0	-11.6	PK	150	1.2	setting 11



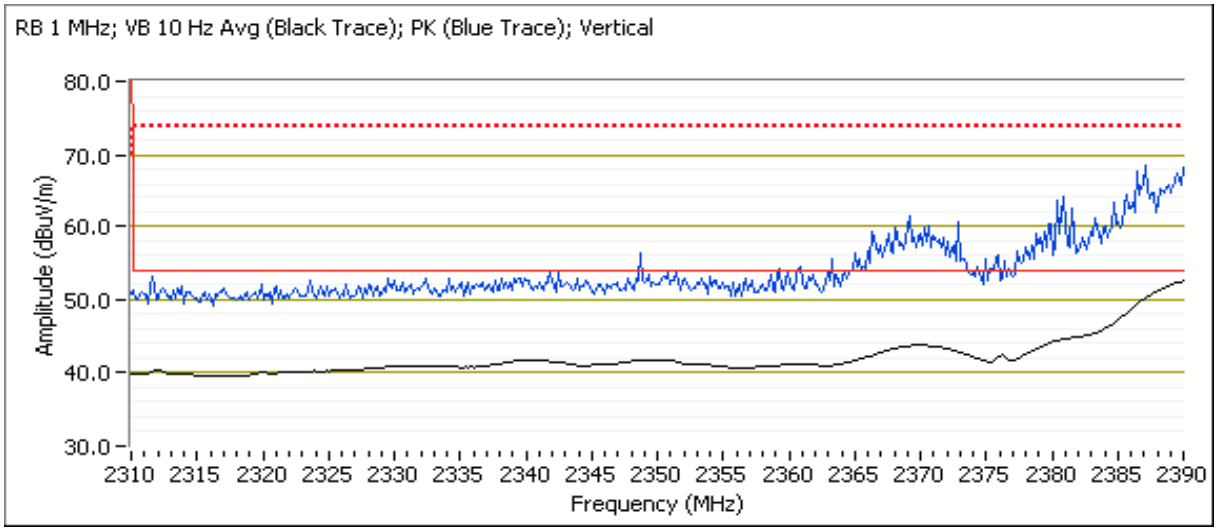
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 2c, EUT on Channel #5 2432MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
2	2432 MHz	12.5
1	5745 MHz	20.0

2390 MHz Band Edge Signal Radiated 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	
2389.960	52.8	V	54.0	-1.2	AVG	197	1.0	setting 12.5
2389.830	68.2	V	74.0	-5.8	PK	197	1.0	setting 12.5
2387.030	47.4	H	54.0	-6.6	AVG	180	1.5	setting 12.5
2385.430	60.9	H	74.0	-13.1	PK	180	1.5	setting 12.5



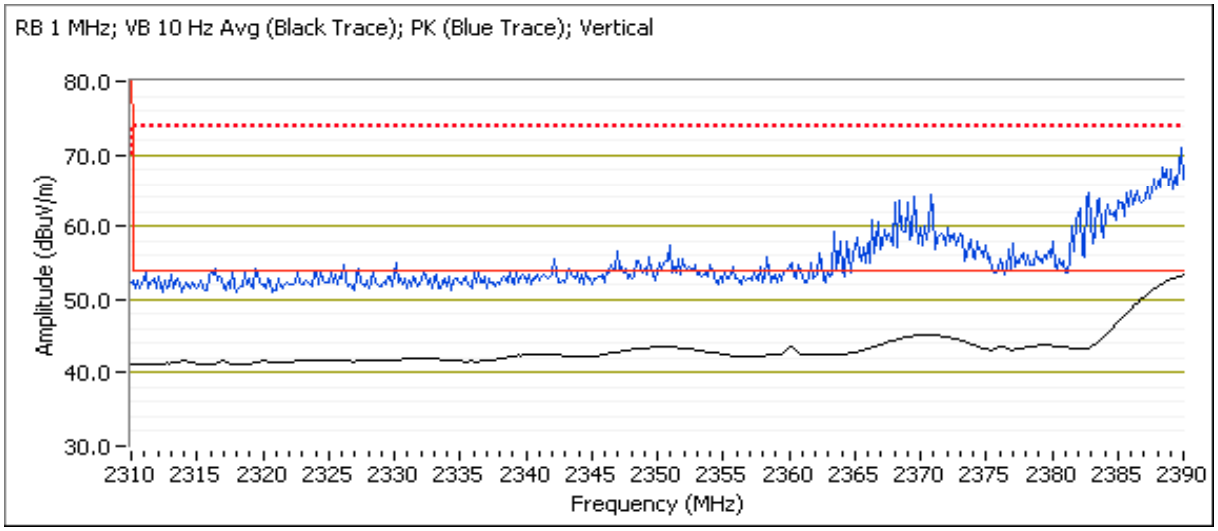
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 2d, EUT on Channel #6 2437MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
2	2437 MHz	13.0
1	5745 MHz	20.0

2390 MHz Band Edge Signal Radiated 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	
2389.960	53.5	V	54.0	-0.5	AVG	131	1.0	setting 13
2387.540	73.0	V	74.0	-1.0	PK	131	1.0	setting 13
2390.000	52.2	H	54.0	-1.8	AVG	124	1.5	setting 13
2388.800	68.7	H	74.0	-5.3	PK	124	1.5	setting 13

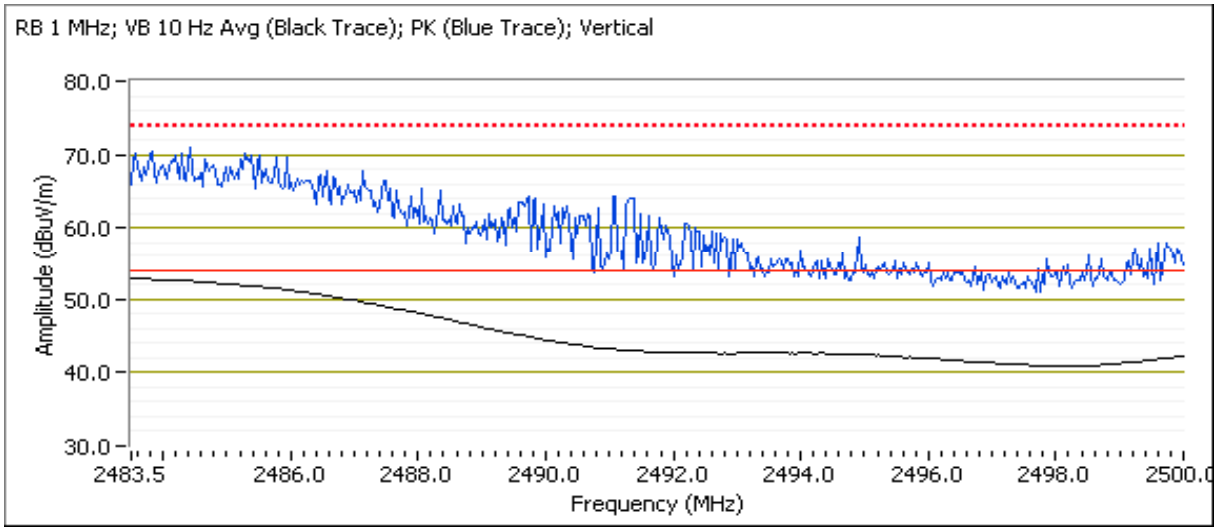


Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Radio	Freq	Power Setting
2	2437 MHz	13.0
1	5745 MHz	20.0

2483.5 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	52.9	V	54.0	-1.1	AVG	192	1.0	setting 13
2484.460	70.4	V	74.0	-3.6	PK	192	1.0	setting 13
2483.630	52.8	H	54.0	-1.2	AVG	16	1.1	setting 13
2483.730	67.7	H	74.0	-6.3	PK	16	1.1	setting 13



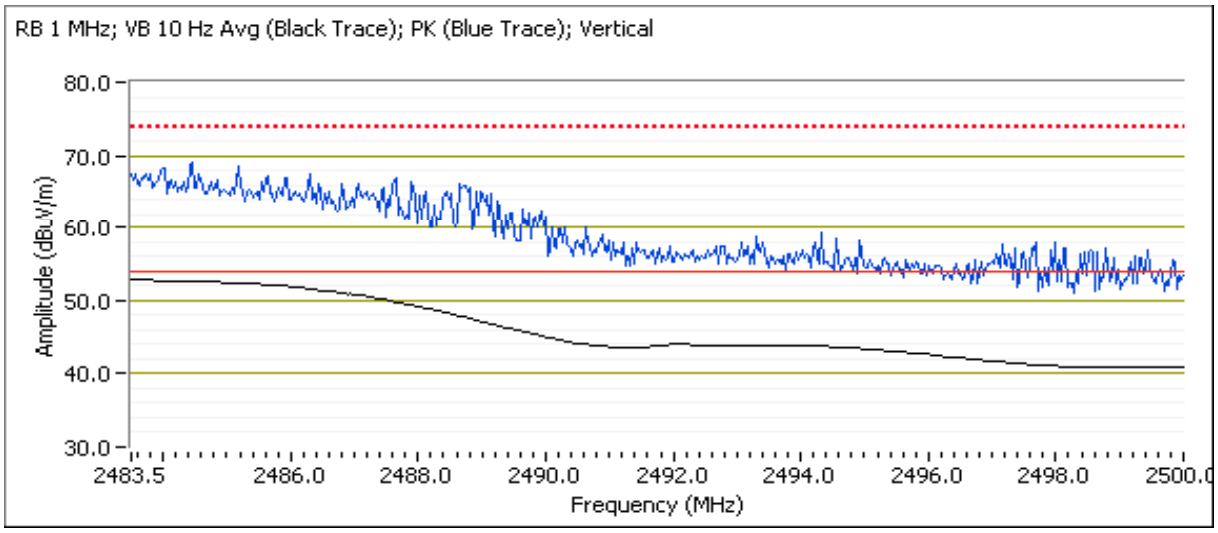
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 2e, EUT on Channel #9 2452MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
2	2452 MHz	10.5
1	5745 MHz	20.0

2483.5MHz 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	
2484.070	52.9	V	54.0	-1.1	AVG	46	1.2	setting 10.5
2485.750	68.7	V	74.0	-5.3	PK	46	1.2	setting 10.5
2486.740	52.9	H	54.0	-1.1	AVG	20	1.1	setting 10.5
2483.730	70.3	H	74.0	-3.7	PK	20	1.1	setting 10.5



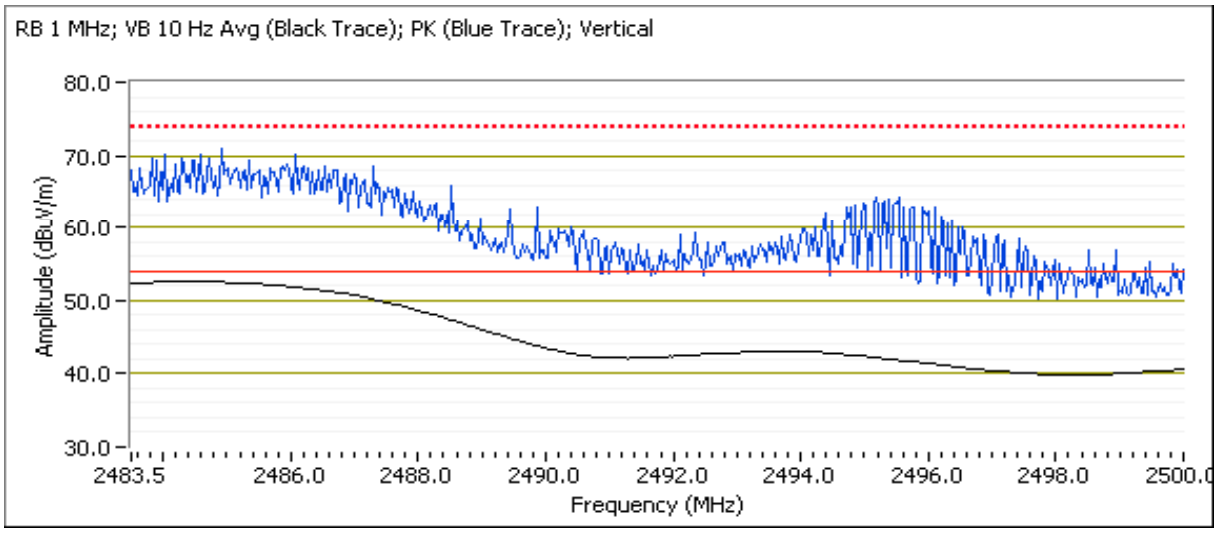
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 2f, EUT on Channel #8 2447MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
2	2447 MHz	11.5
1	5745 MHz	20.0

2483.5MHz 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	
2484.530	52.7	V	54.0	-1.3	AVG	302	1.0	setting 11.5
2485.550	68.9	V	74.0	-5.1	PK	302	1.0	setting 11.5
2485.450	52.5	H	54.0	-1.5	AVG	6	1.1	setting 11.5
2486.870	68.5	H	74.0	-5.5	PK	6	1.1	setting 11.5



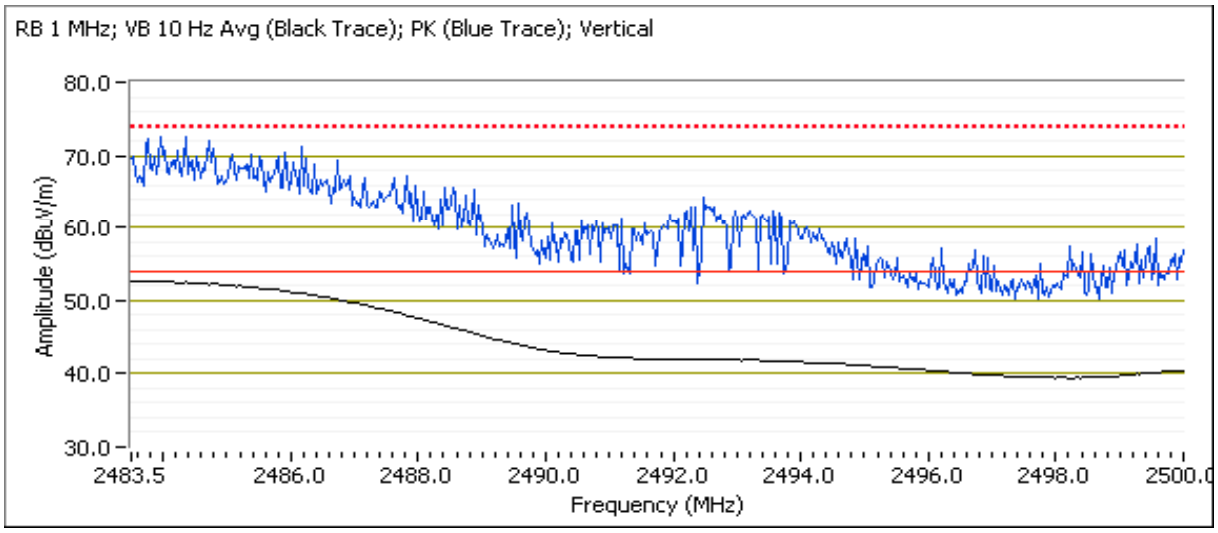
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run # 2g, EUT on Channel #7 2442MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
2	2442 MHz	12.5
1	5745 MHz	20.0

2483.5MHz 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	
2486.430	73.1	V	74.0	-0.9	PK	41	1.0	setting 12.5
2483.530	52.8	V	54.0	-1.2	AVG	41	1.0	setting 12.5
2486.670	53.1	H	54.0	-0.9	AVG	18	1.1	setting 12.5
2486.280	70.5	H	74.0	-3.5	PK	18	1.1	setting 12.5



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
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: 12/26/2012 & 12/27/12
Test Engineer: Jack Liu
Test Location: FT7

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 20.6 °C
Rel. Humidity: 37 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1	-	-	Power spectral Density (PSD)	15.247(d)	Pass	a: -6.9 dBm/3kHz n20: -4.8 dBm/3kHz n40: -9 dBm/3kHz
2	-	-	Minimum 6dB Bandwidth	15.247(a)	Pass	a: 15.9 MHz n20: 17.1 MHz n40: 35.7 MHz
2	-	-	99% Bandwidth	RSS GEN	-	a: 17.2 MHz n20: 21.3 MHz n40: 36.8 MHz
3	-	-	Spurious emissions (802.11 a)	15.247(b)	Pass	All emissions below the -30dBc limit
3	-	-	Spurious emissions (802.11 n20 and n40)	15.247(b)	Pass	All emissions below the -20dBc limit

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	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.

Notes

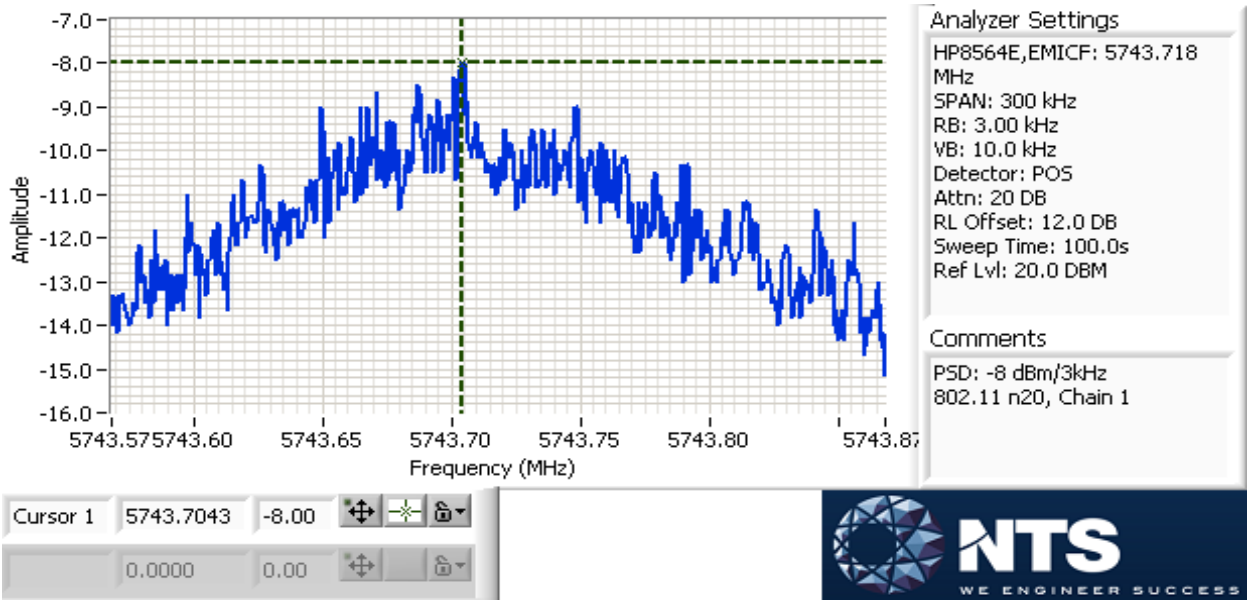
Testing performed at the highest output power setting across all antennas
Antenna spurious emissions must show compliance for any emission in a restricted band against the radiated limit.
All measurements performed at the antenna port of the module inside the chassis
Pigtail loss 0.5dB

Run #1: 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
802.11a								
16	5745	-11.3	-12.7	-12.7		-7.4	8.0	Pass
17	5785	-11.0	-12.5	-11.5		-6.9	8.0	Pass
16	5825	-12.0	-11.8	-12.7		-7.4	8.0	Pass
802.11n20								
20	5745	-8.0	-11.0	-10.3		-4.8	8.0	Pass
20	5785	-9.5	-9.8	-9.8		-4.9	8.0	Pass
19	5825	-12.0	-10.5	-13.0		-6.9	8.0	Pass
802.11n40								
16	5755	-13.7	-13.2	-14.5		-9.0	8.0	Pass
16	5795	-14.8	-16.2	-15.5		-10.7	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

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

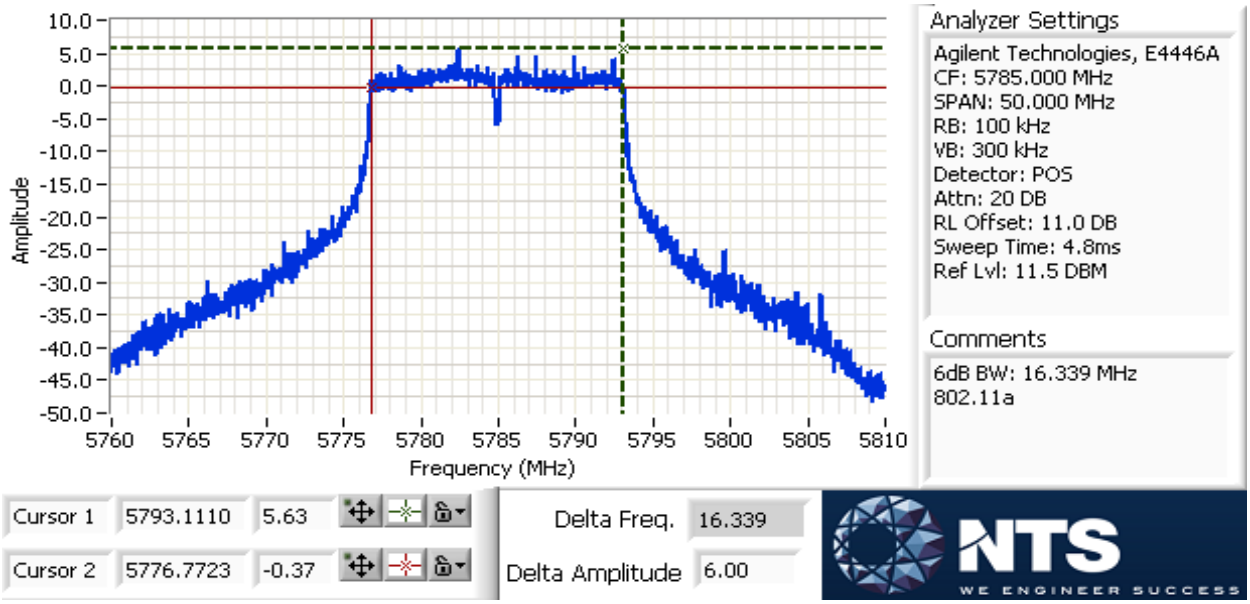


Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

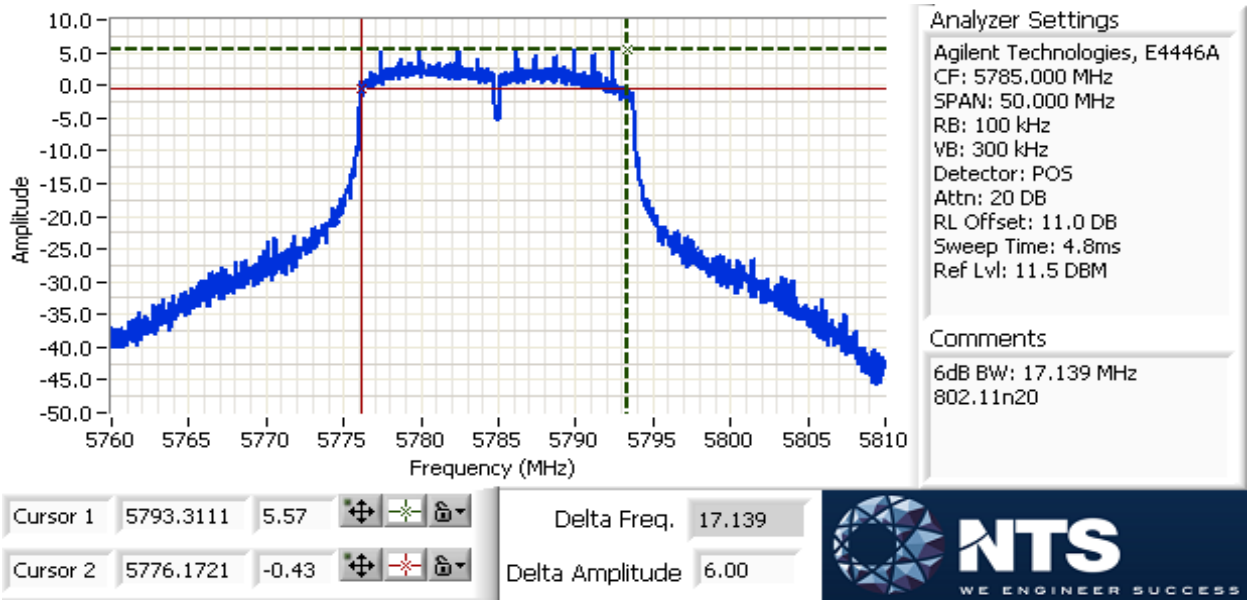
Run #2: Signal Bandwidth

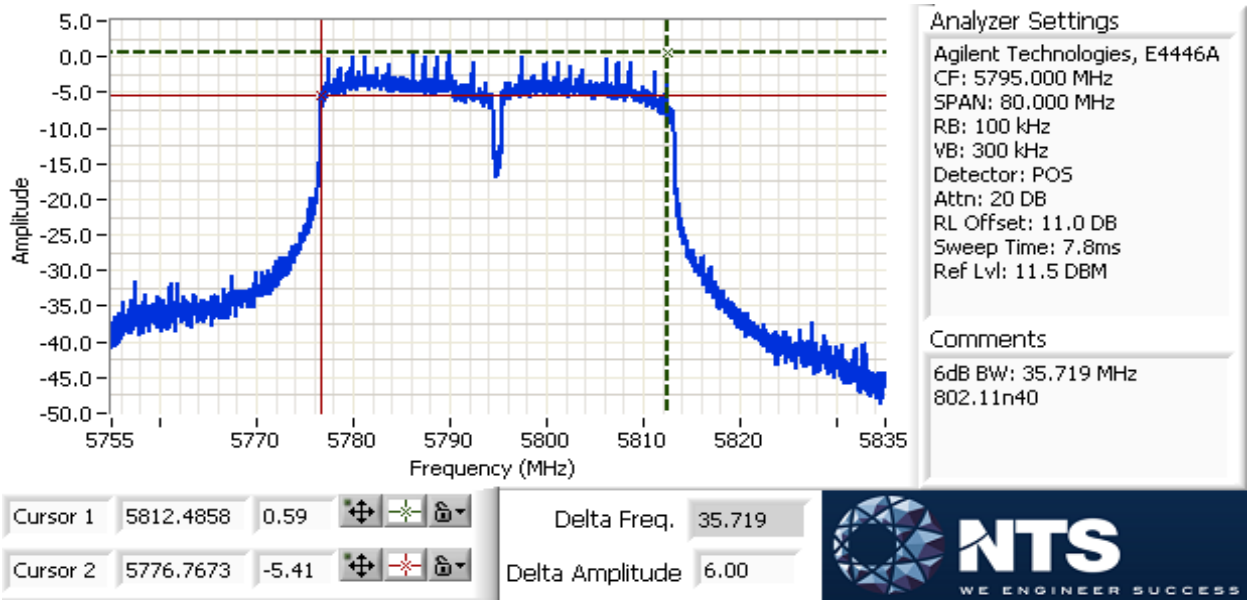
Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	Resolution Bandwidth	Bandwidth (MHz) 99%
802.11a					
16	5745	100kHz	15.9	1MHz	17.2
17	5785	100kHz	16.3	1MHz	17.9
16	5825	100kHz	16.3	1MHz	17.5
802.11n20					
20	5745	100kHz	17.3	1MHz	21.3
20	5785	100kHz	17.1	1MHz	23.4
19	5825	100kHz	17.6	1MHz	22.1
802.11n40					
16	5755	100kHz	35.7	1MHz	36.8
16	5795	100kHz	35.7	1MHz	37.0

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



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A





Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

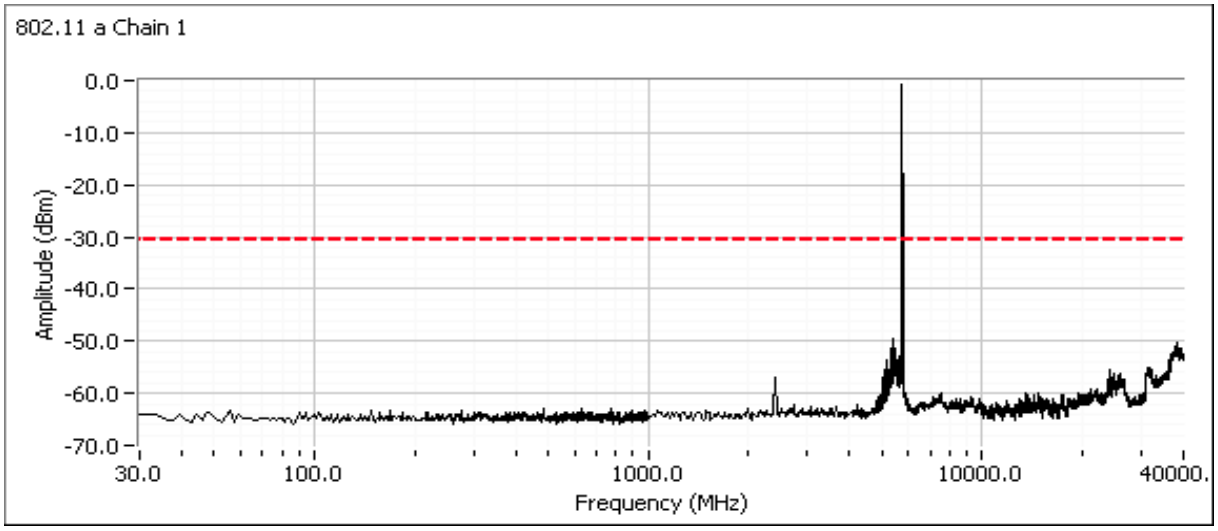
Run #3: Out of Band Spurious Emissions

Power Setting Per Chain #1	#2	#3	#4	Frequency (MHz)	Limit	Result
802.11a						
16				5745	-30dBc	Pass
17				5785	-30dBc	Pass
16				5825	-30dBc	Pass
802.11n20						
20				5745	-20dBc	Pass
20				5785	-20dBc	Pass
19				5825	-20dBc	Pass
802.11n40						
16				5755	-20dBc	Pass
16				5795	-20dBc	Pass

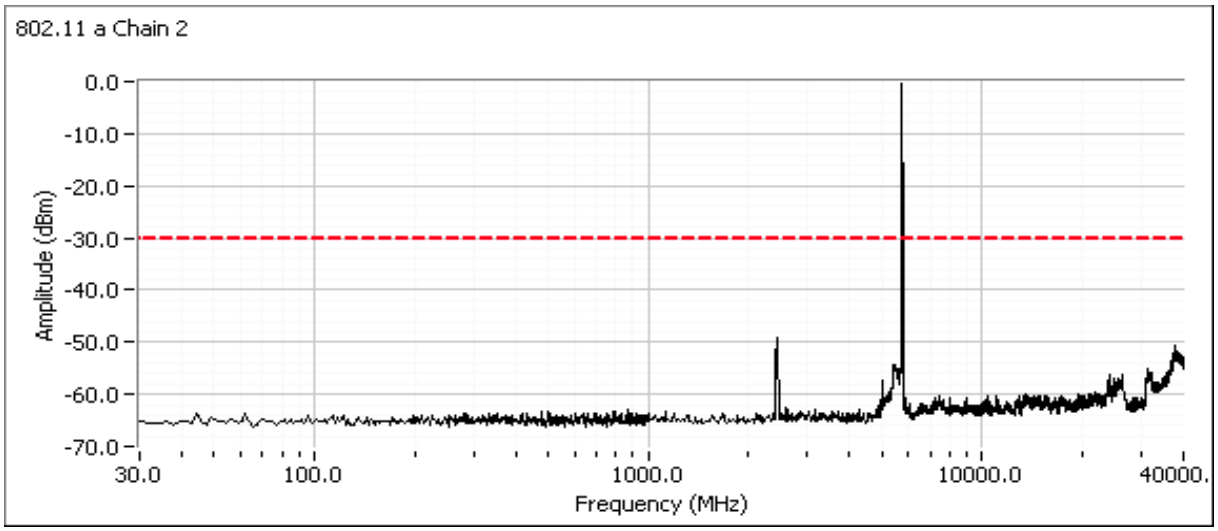
Note 1:	Measured on each chain individually

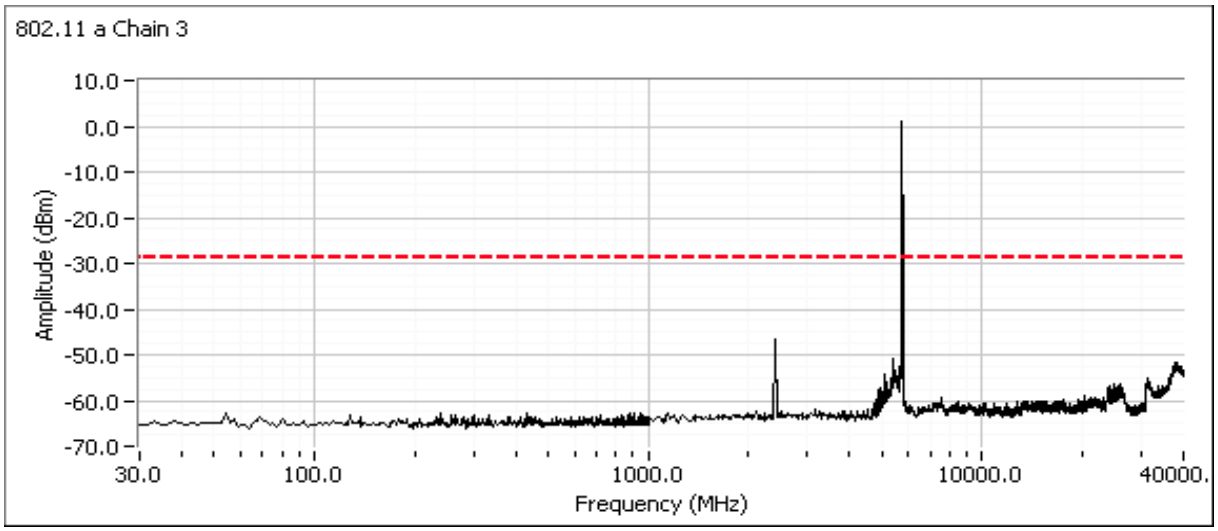
Plots for low channel

a Mode



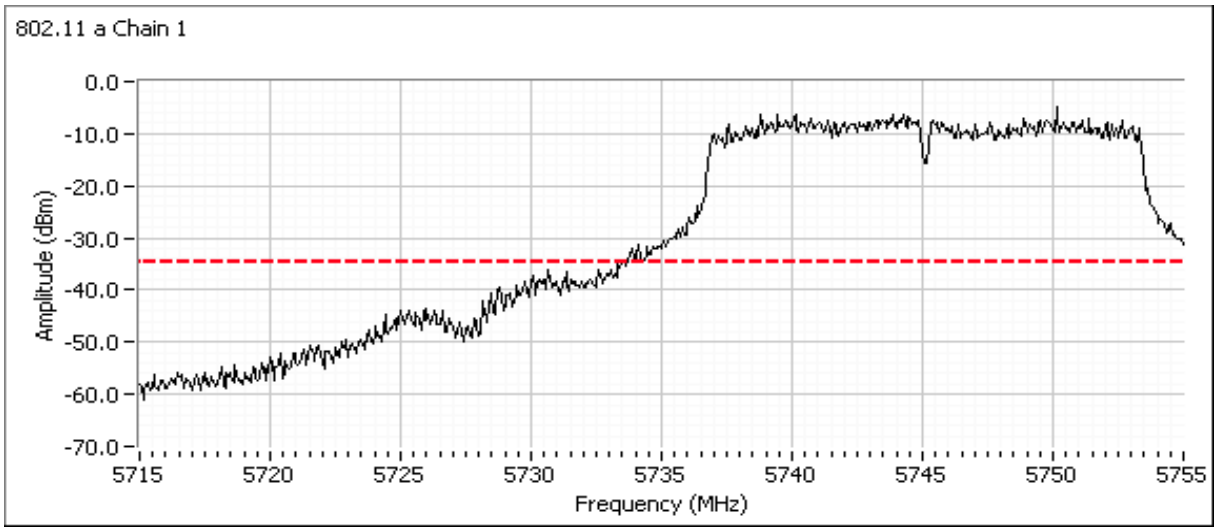
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

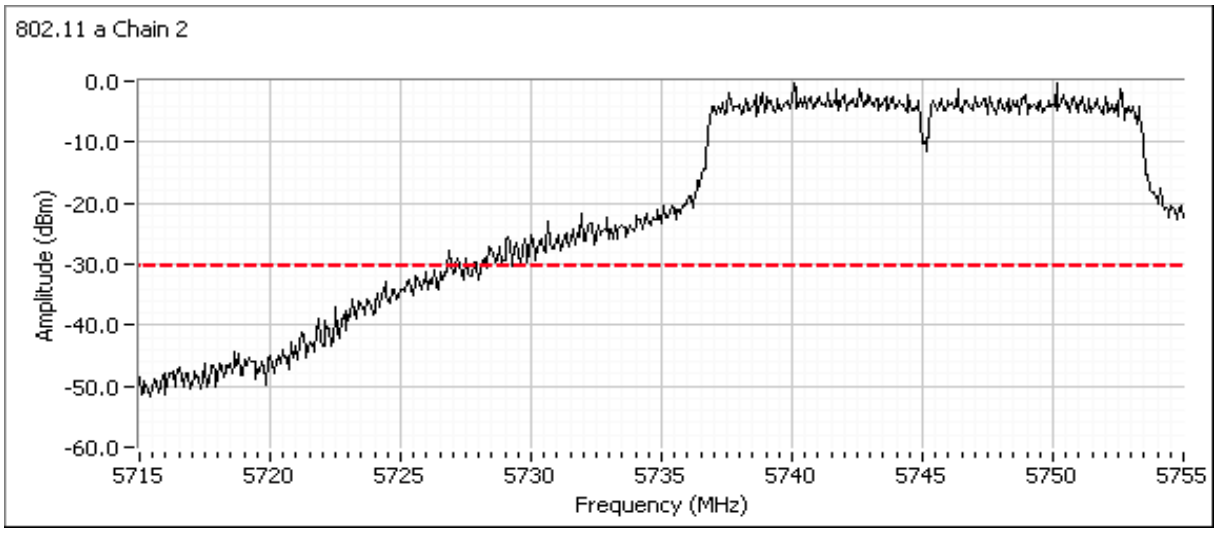




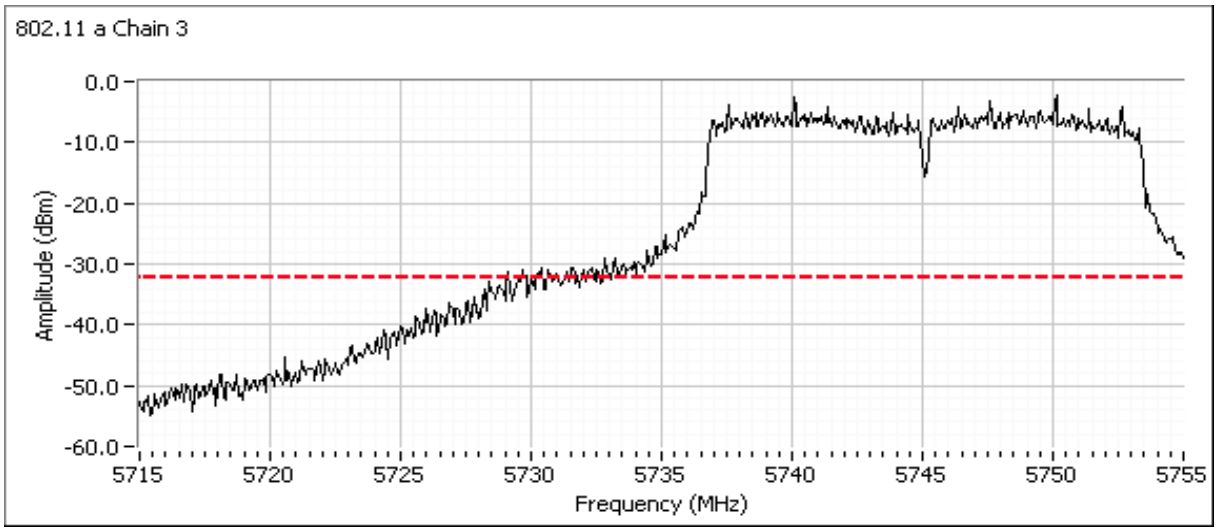
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Additional plot from 5715 - 5755 MHz showing compliance with -30dBc at the band edge.

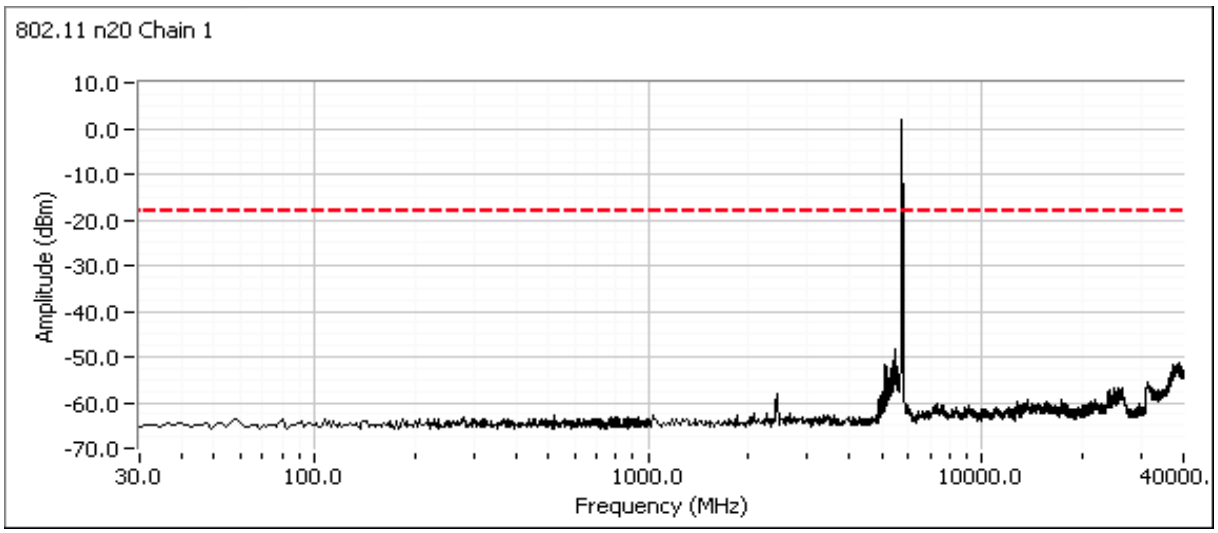




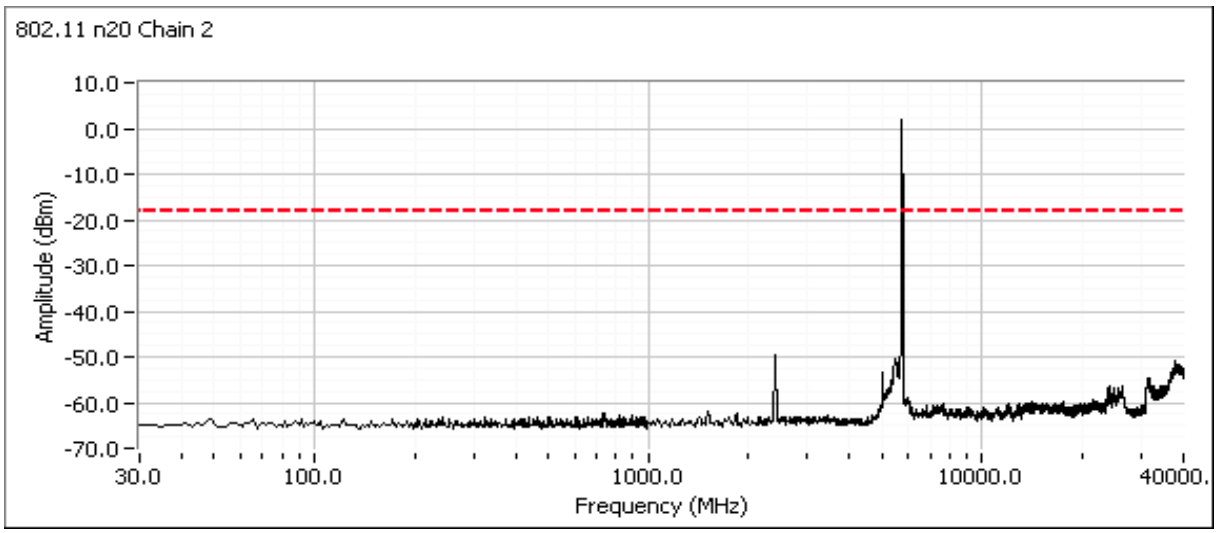
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

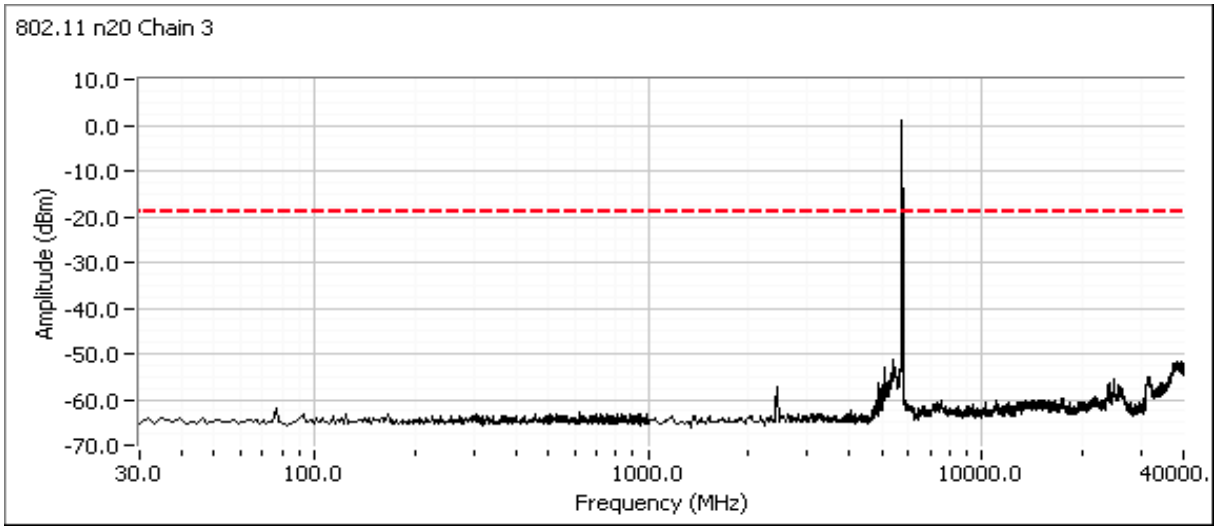


n20 Mode



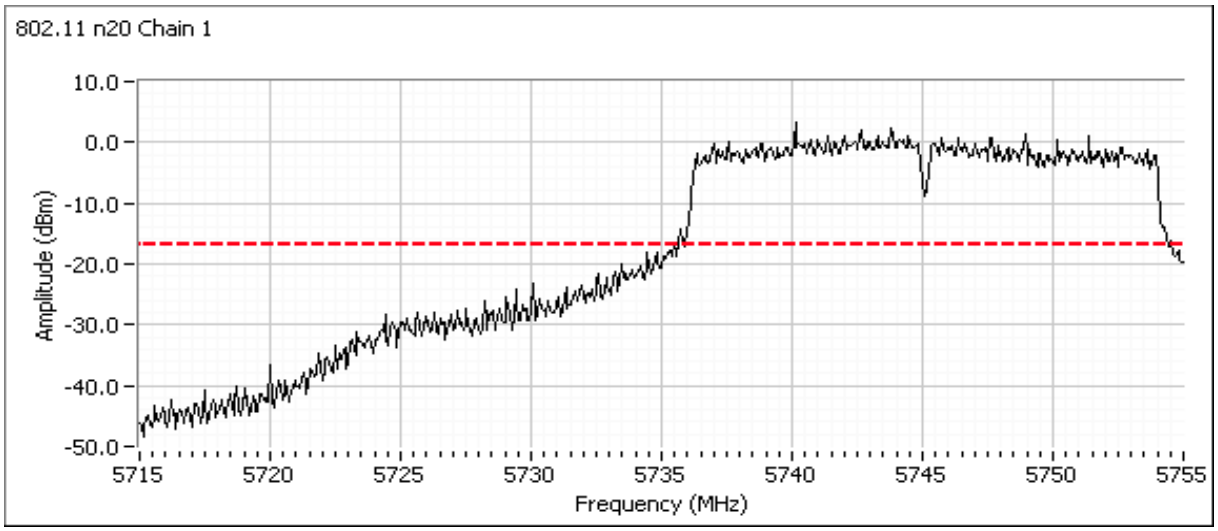
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

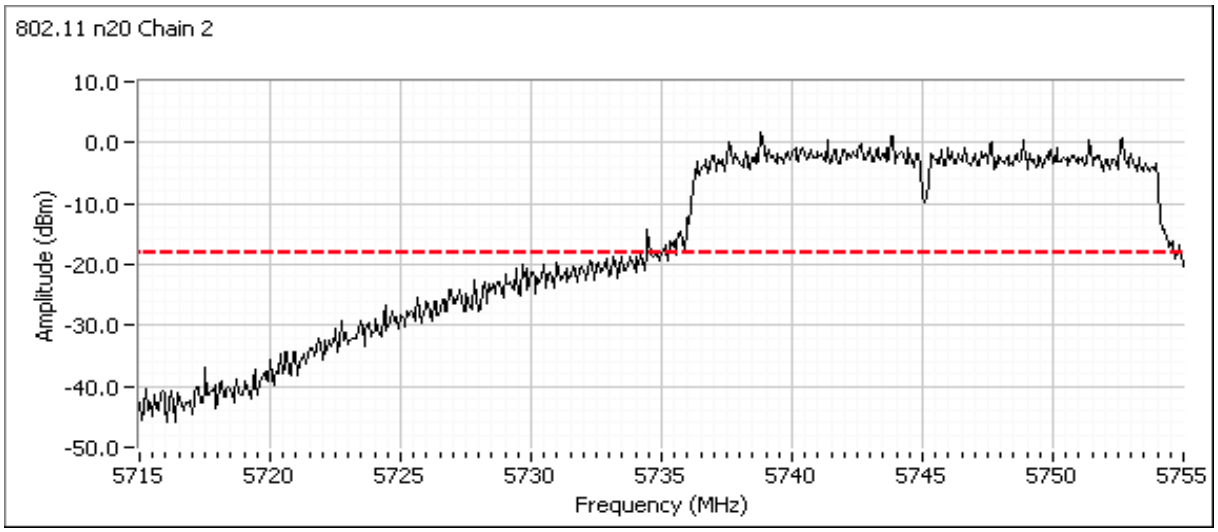




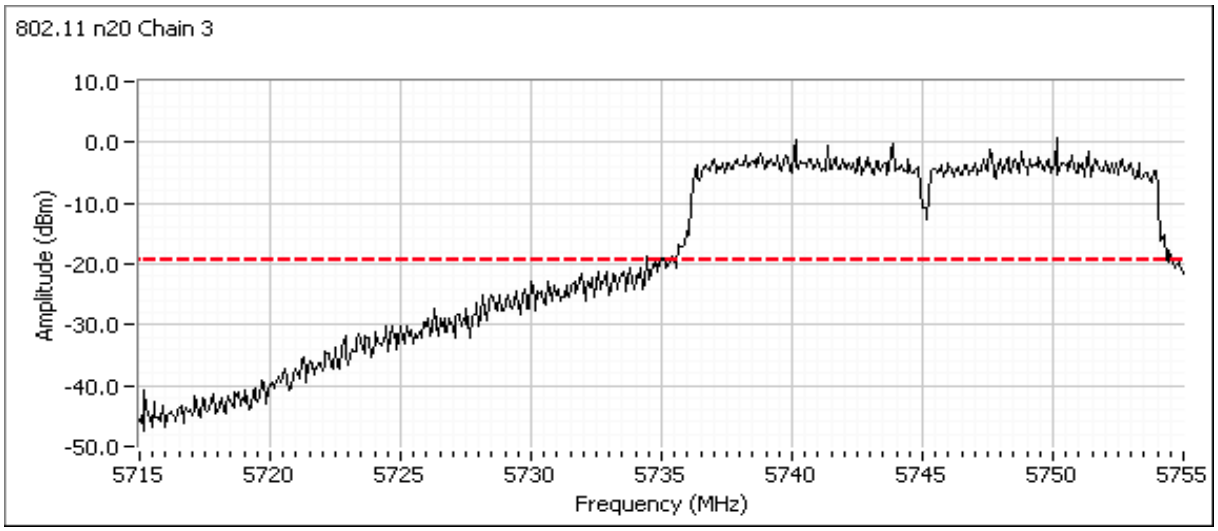
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

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

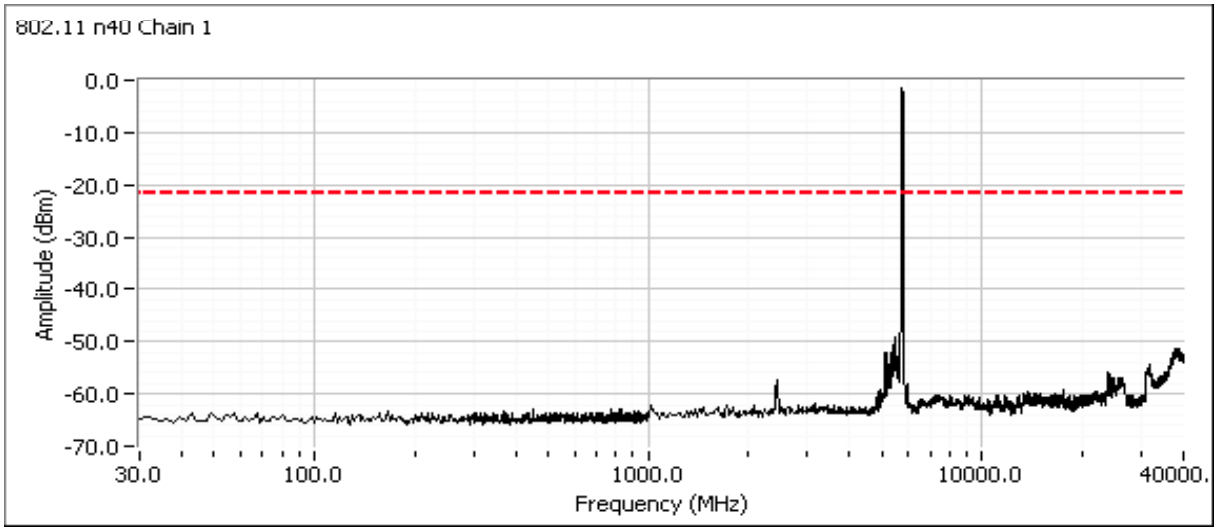




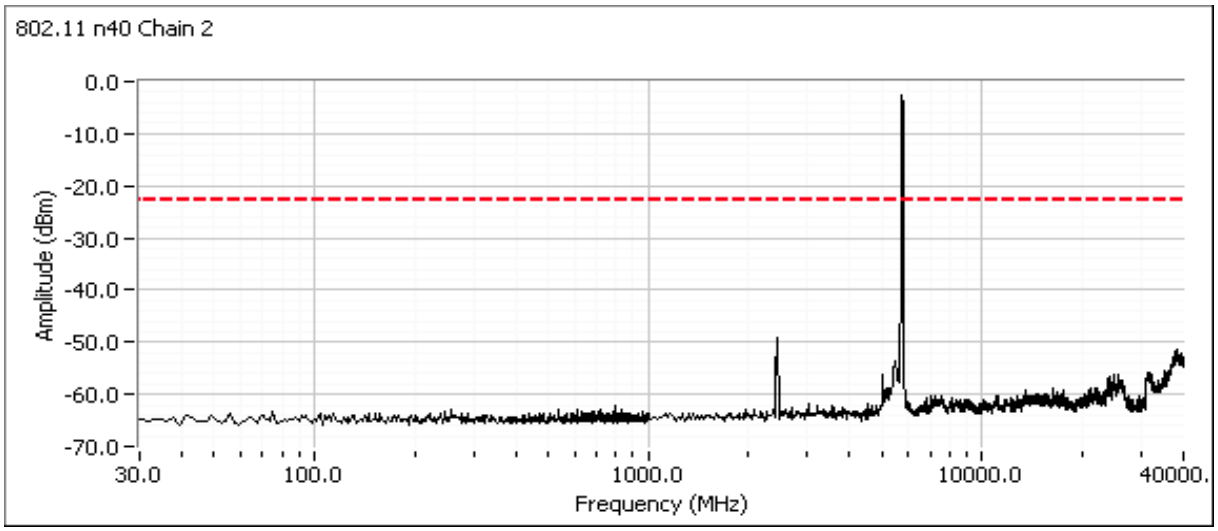
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

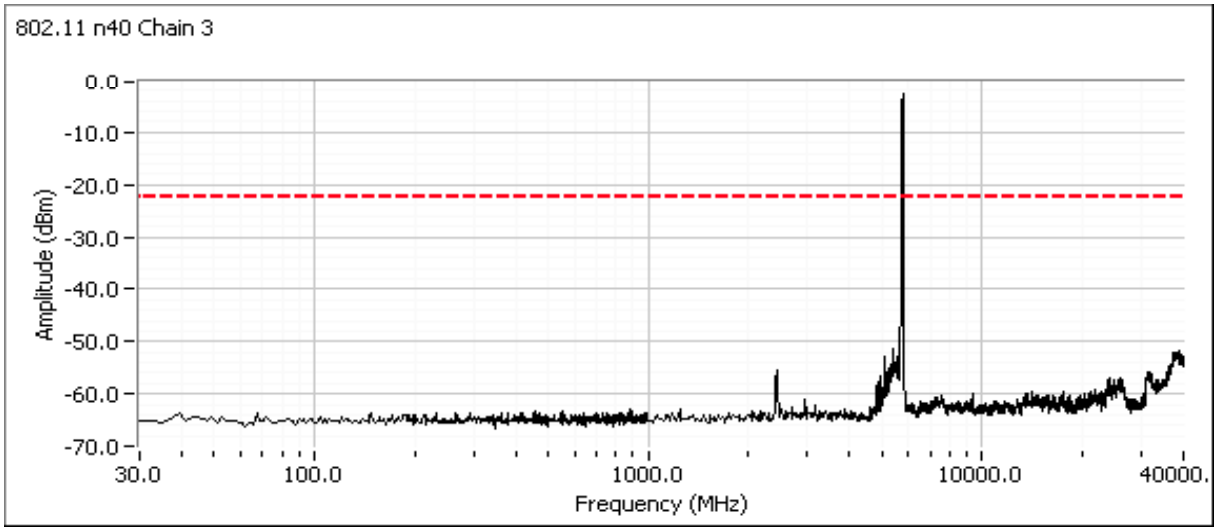


n40 Mode



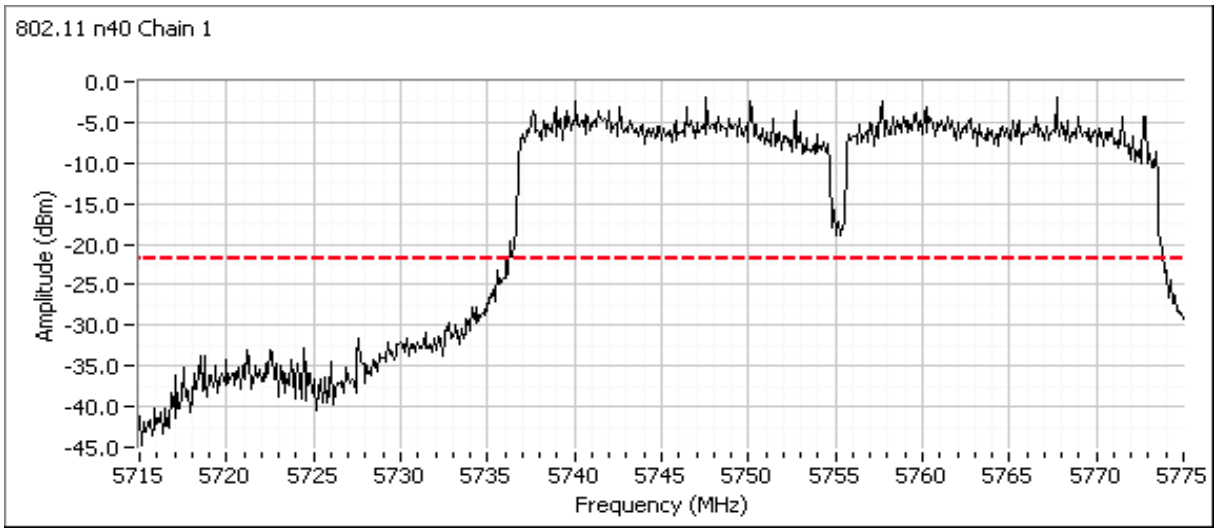
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

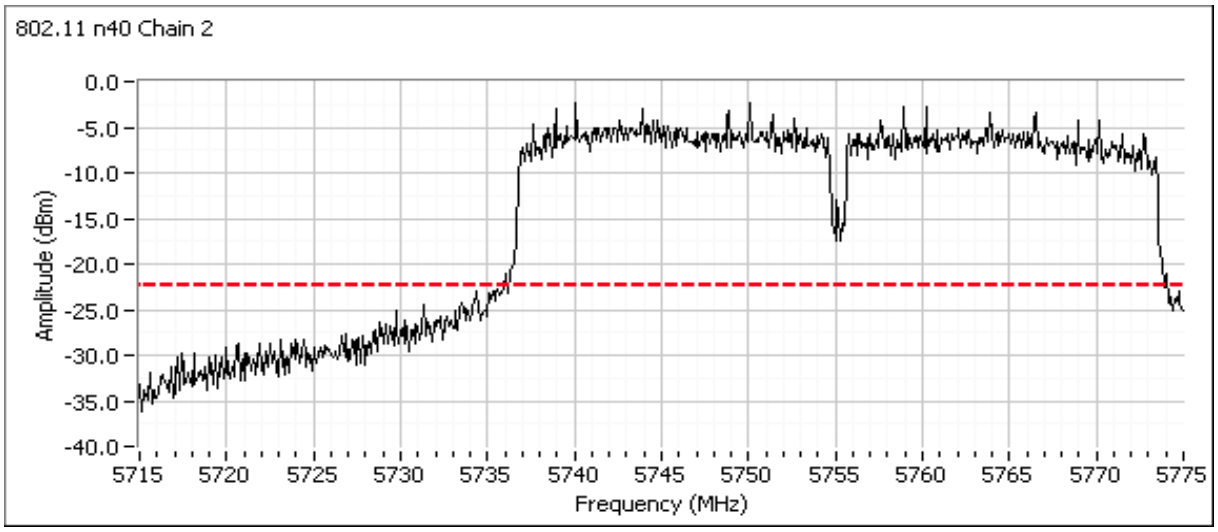




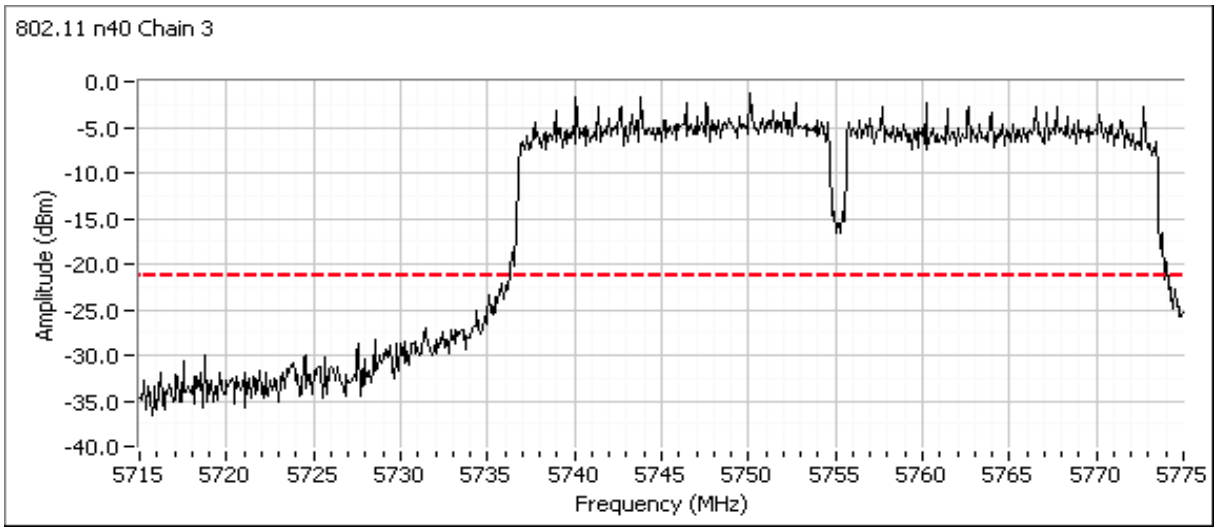
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Additional plot from 5715 - 5775 MHz showing compliance with -20dBc at the band edge.



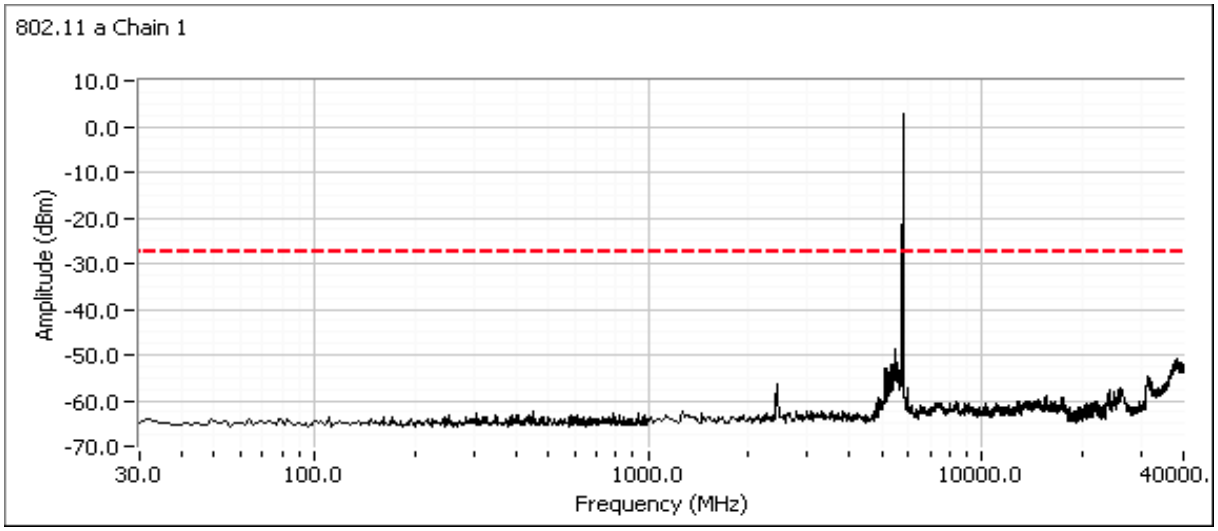


Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

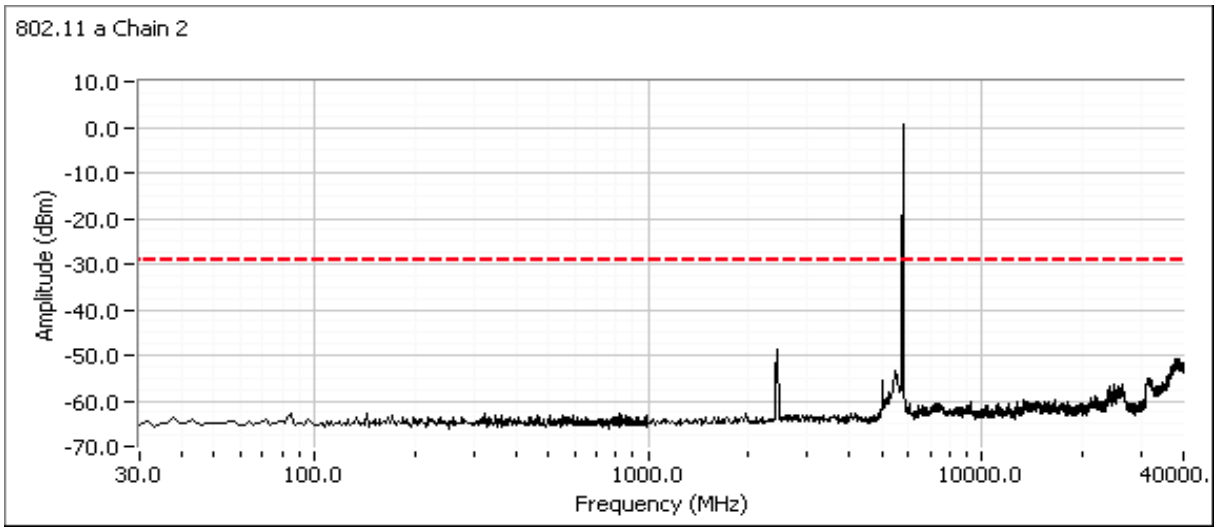


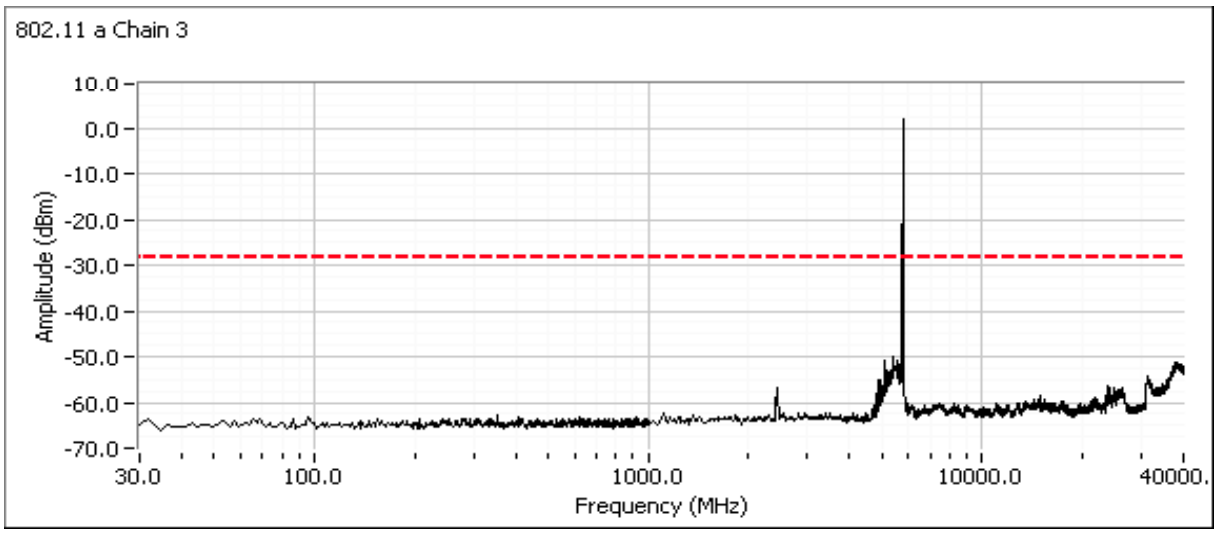
Plots for center channel

a Mode



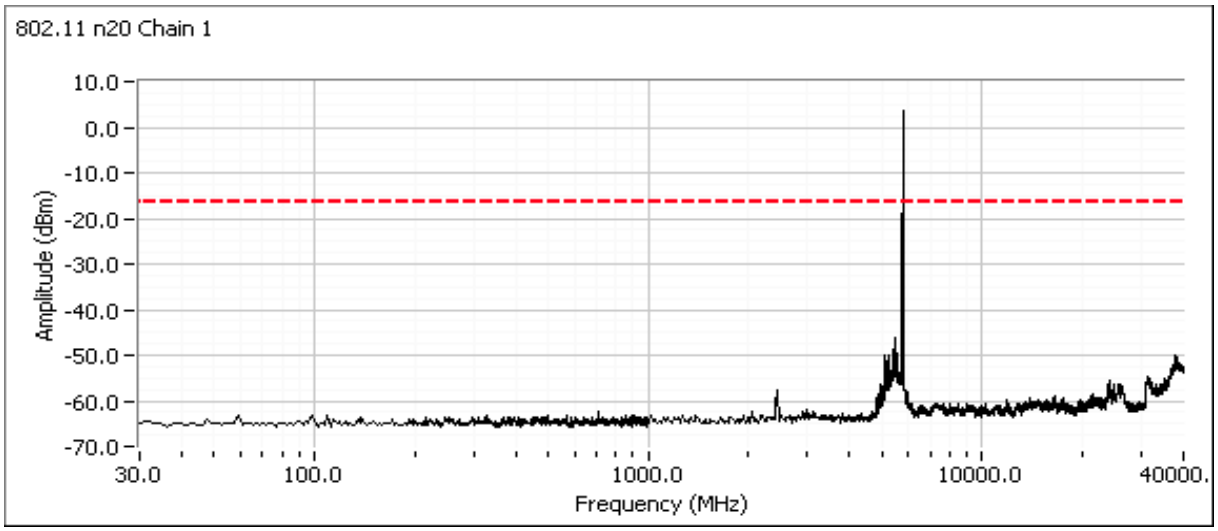
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

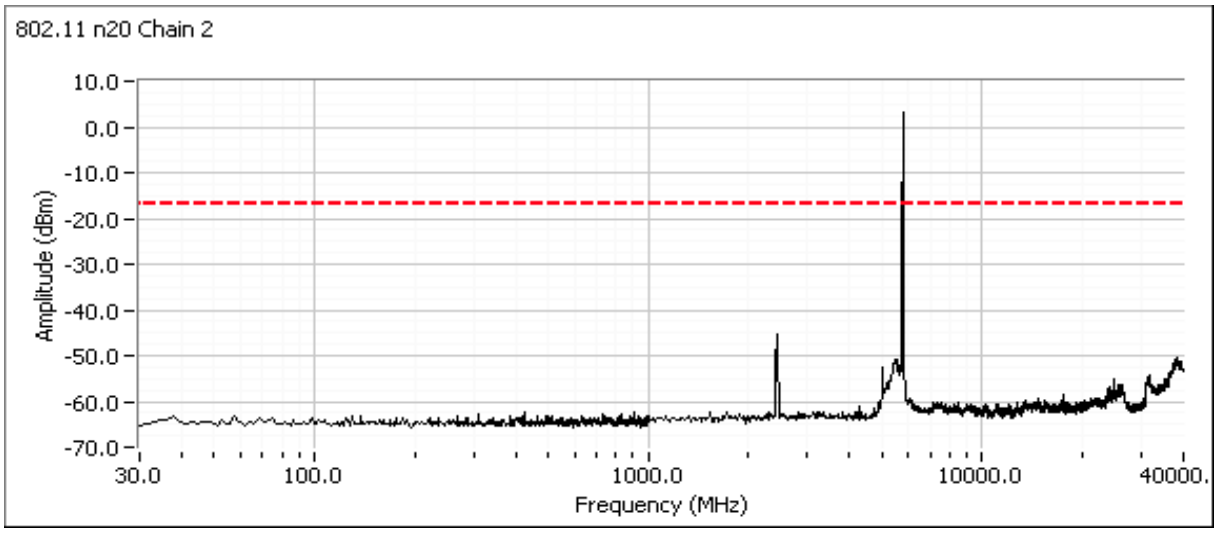




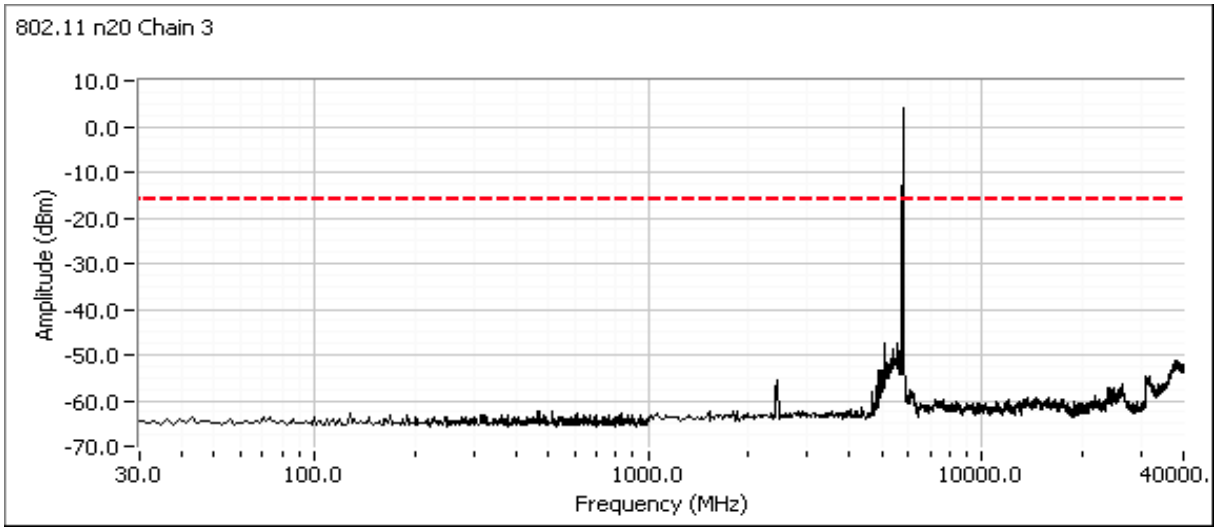
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

n20 Mode



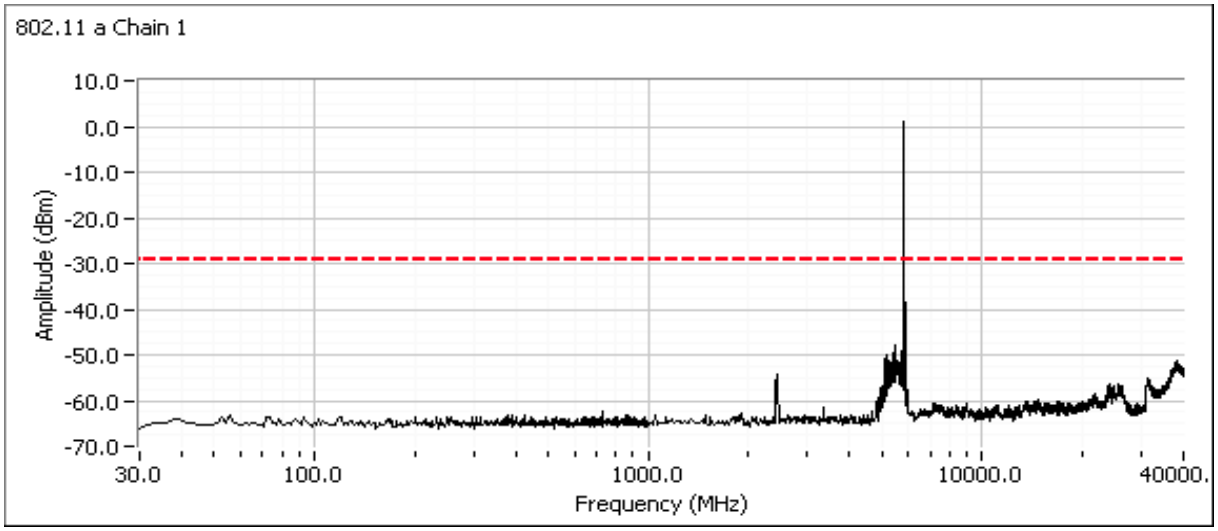


Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

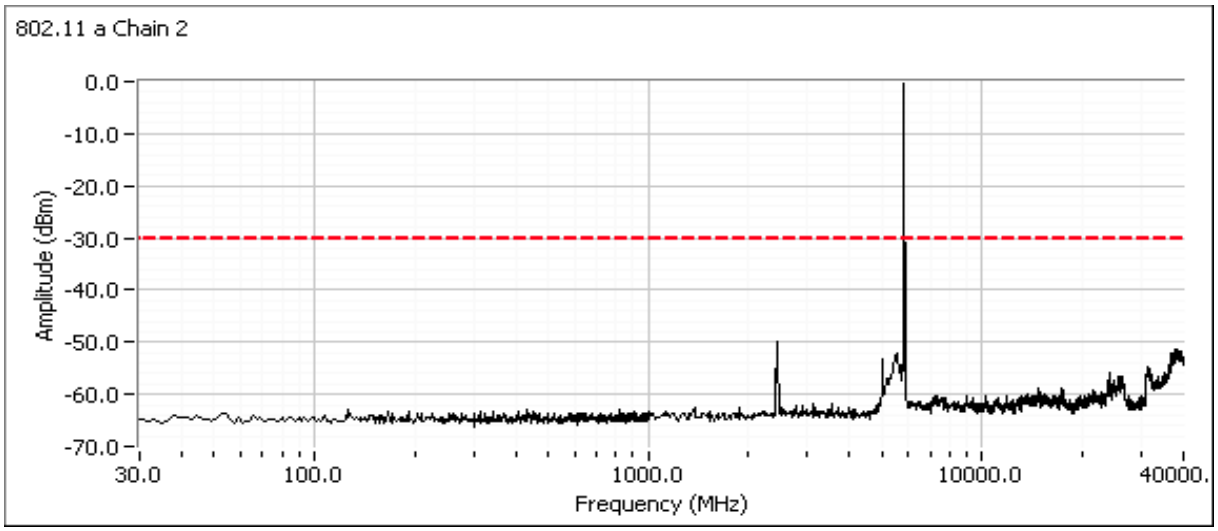


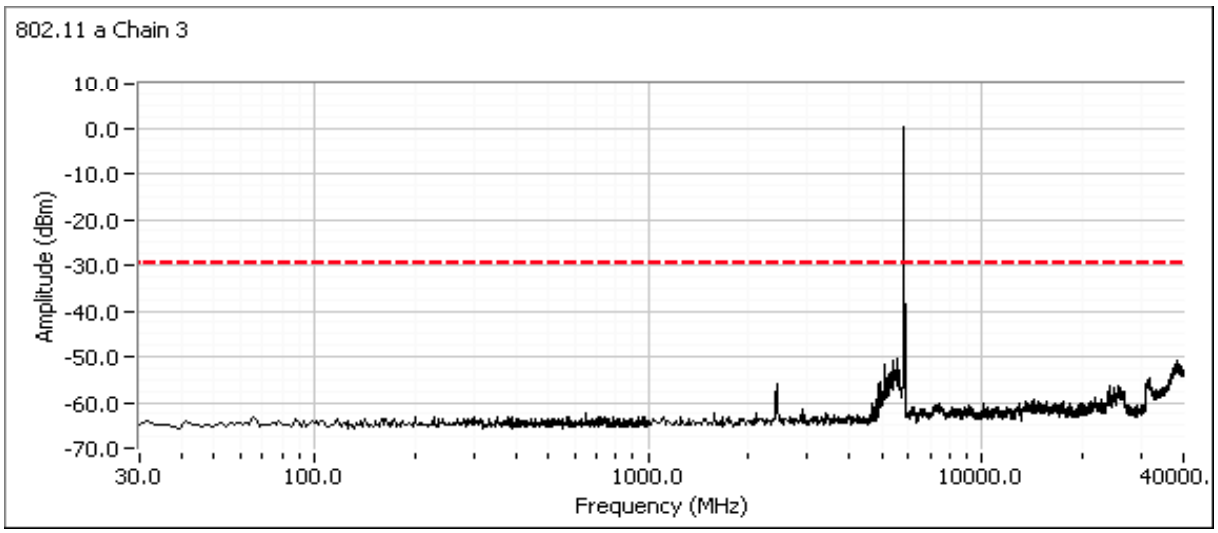
Plots for high channel

a Mode



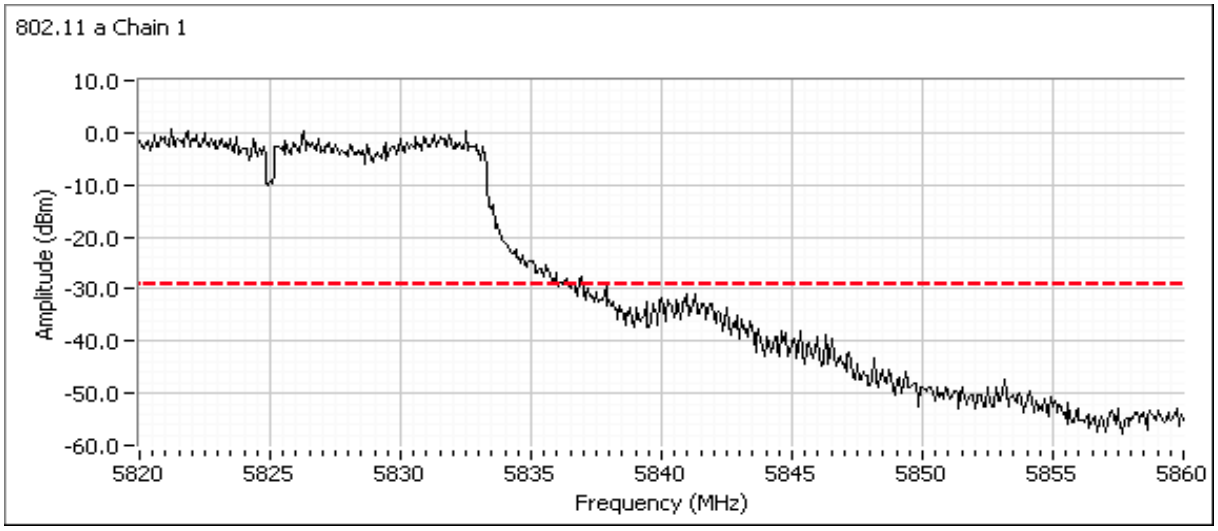
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

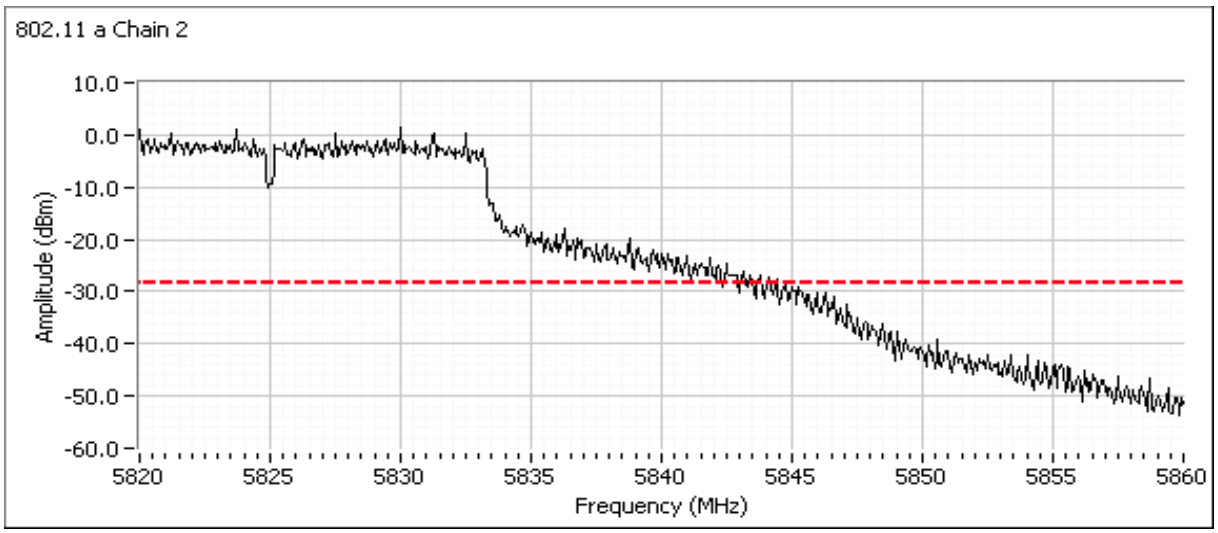




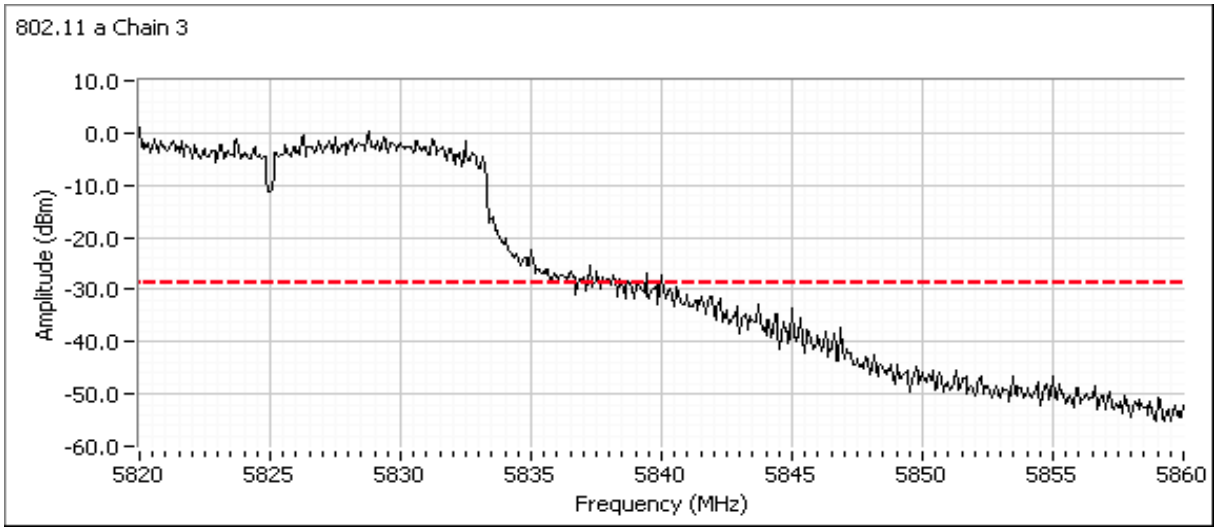
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Additional plot from 5820 - 5860 MHz showing compliance with -30dBc at the band edge.

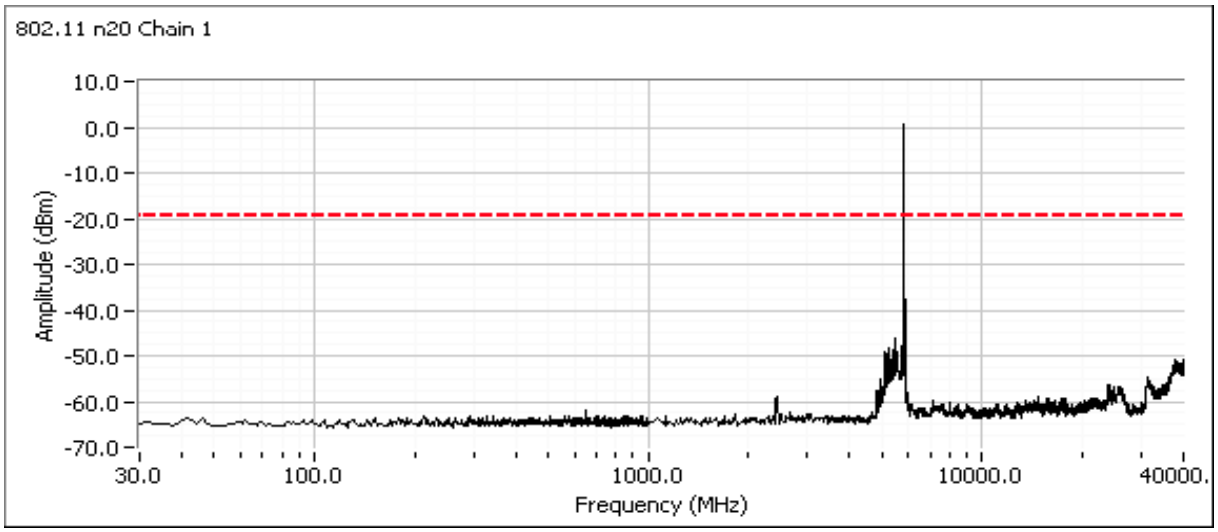




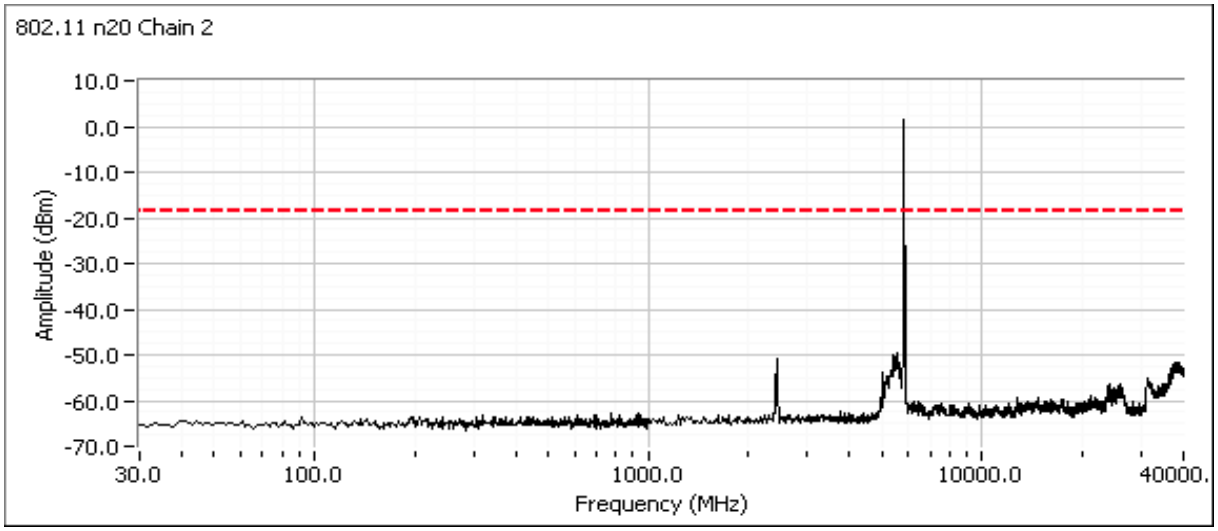
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

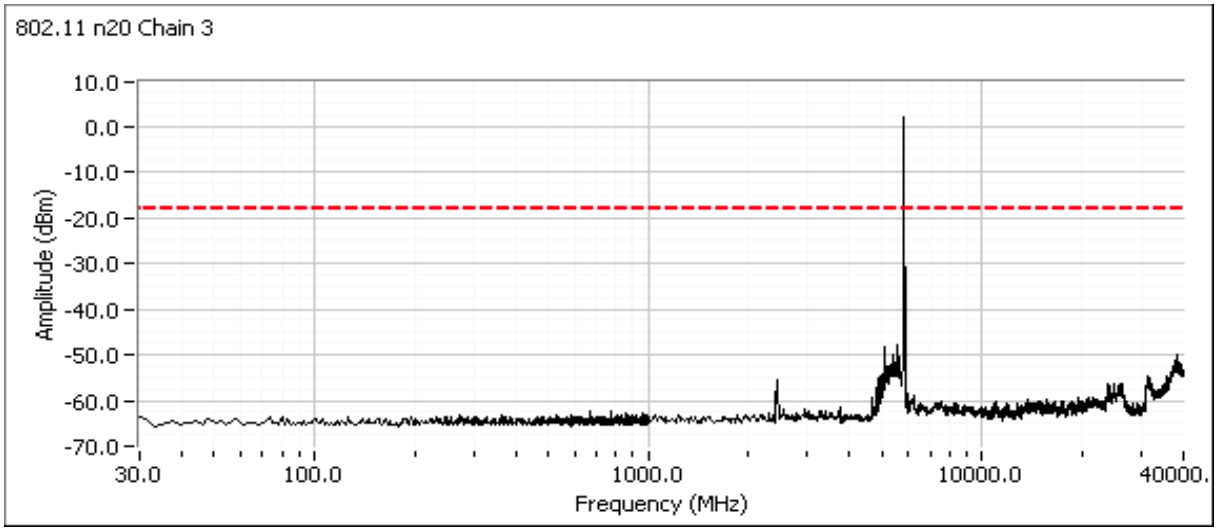


n20 Mode



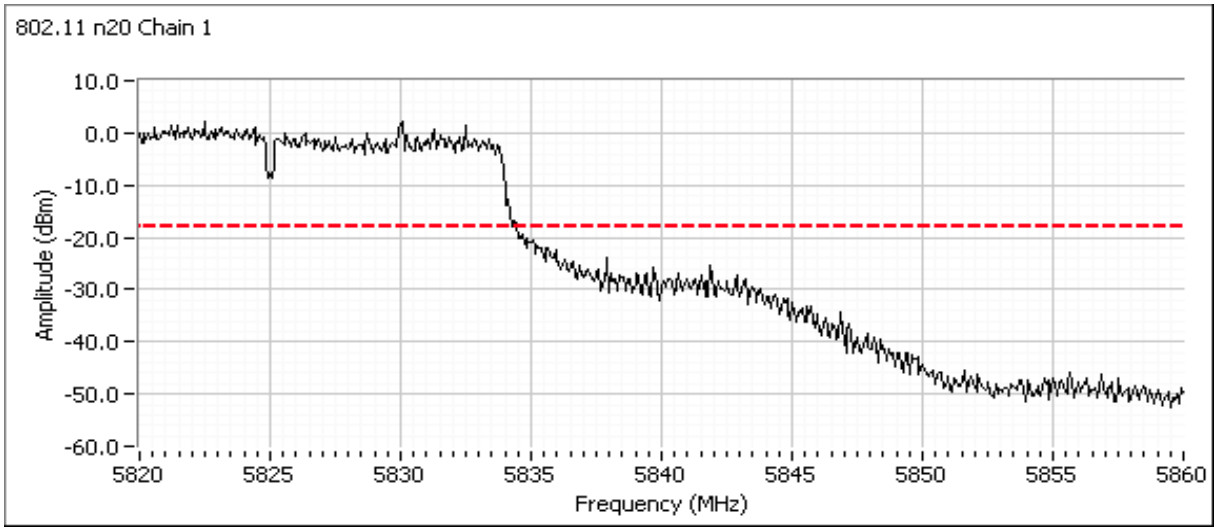
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

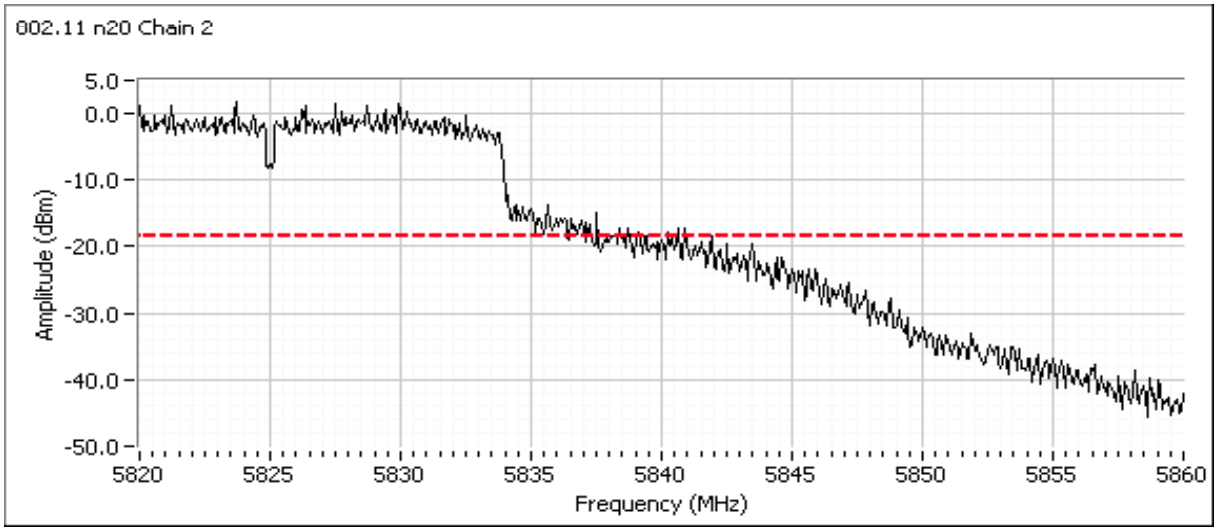




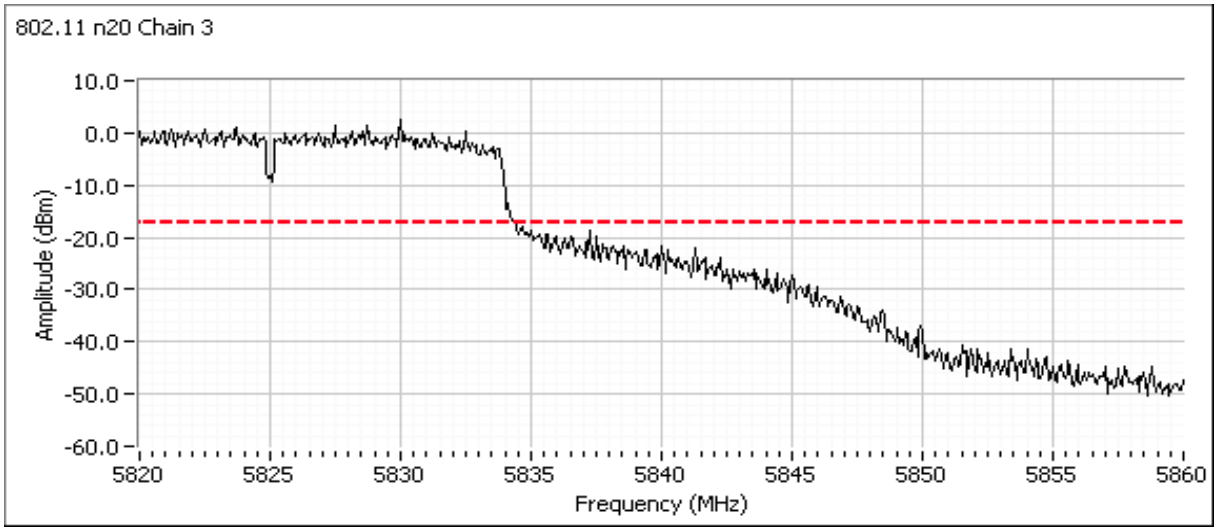
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

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

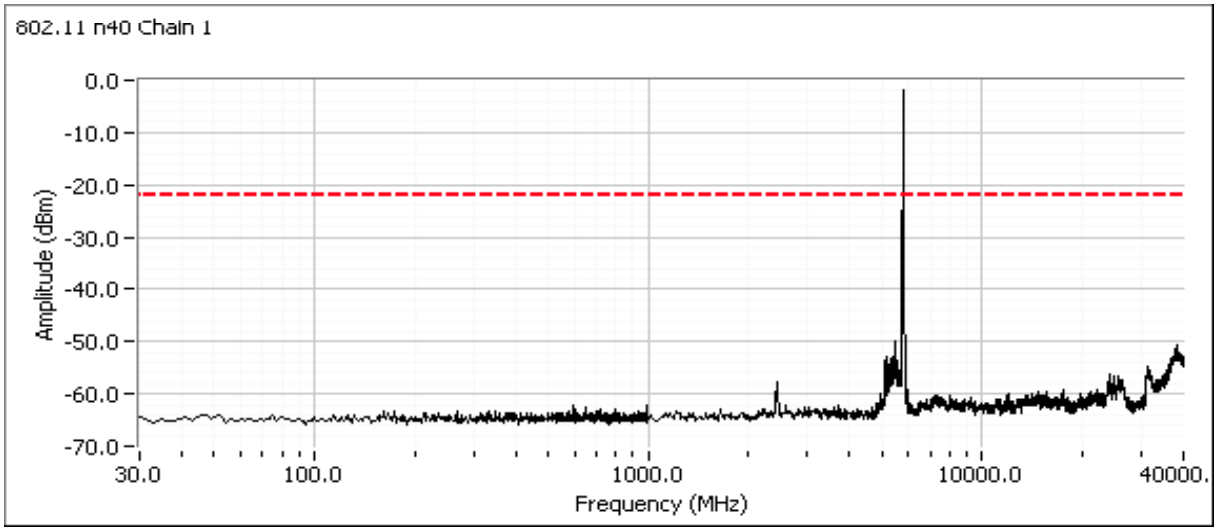




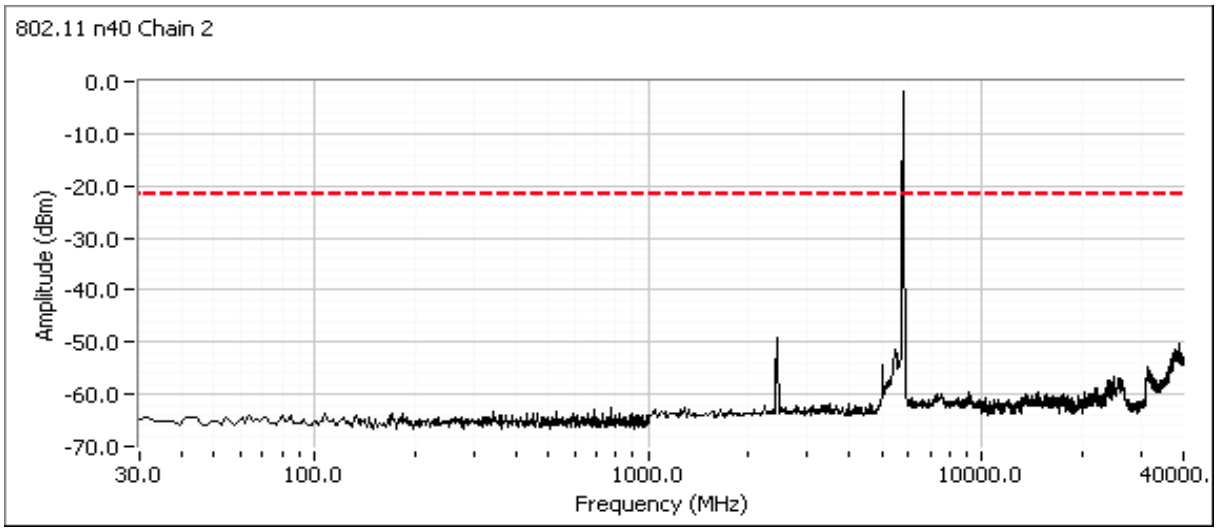
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

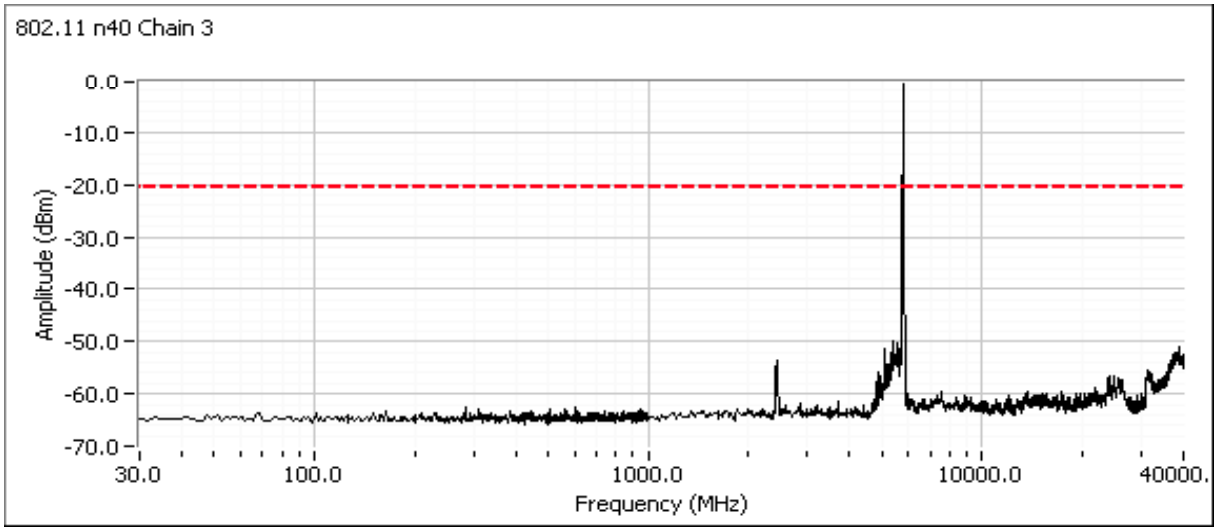


n40 Mode



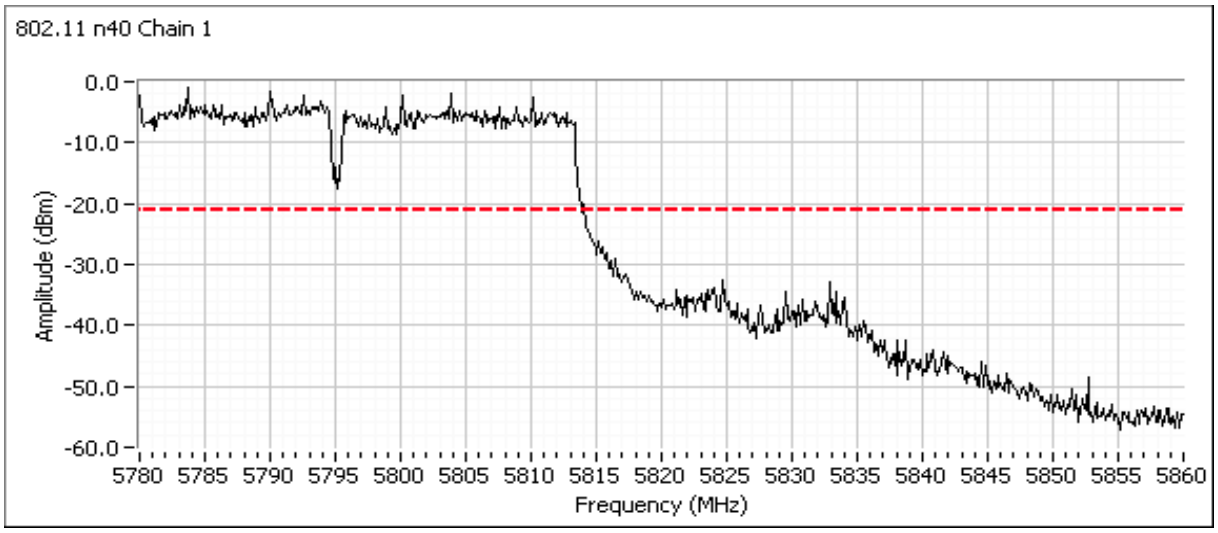
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

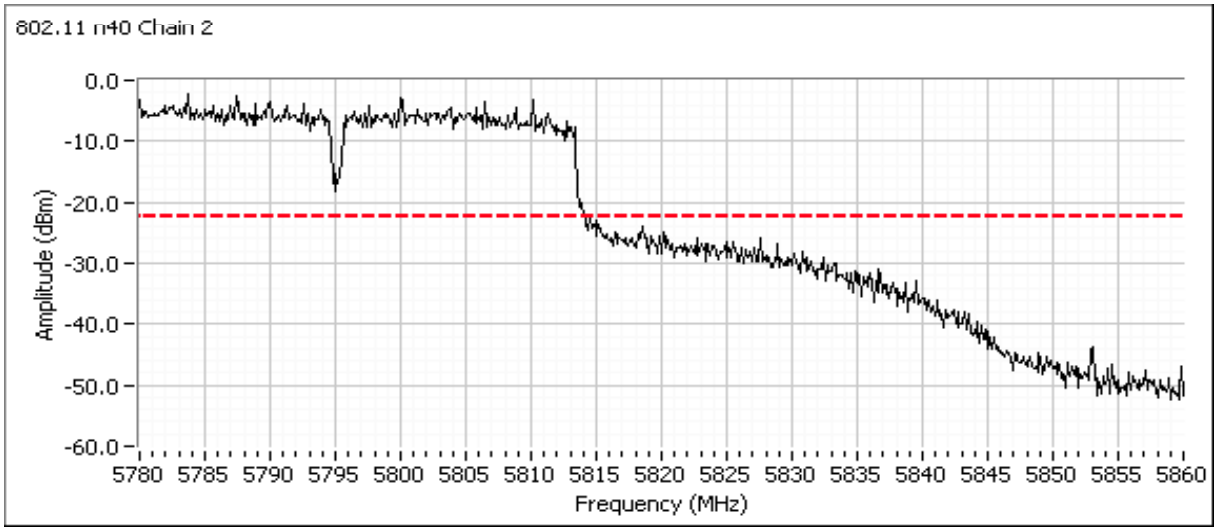




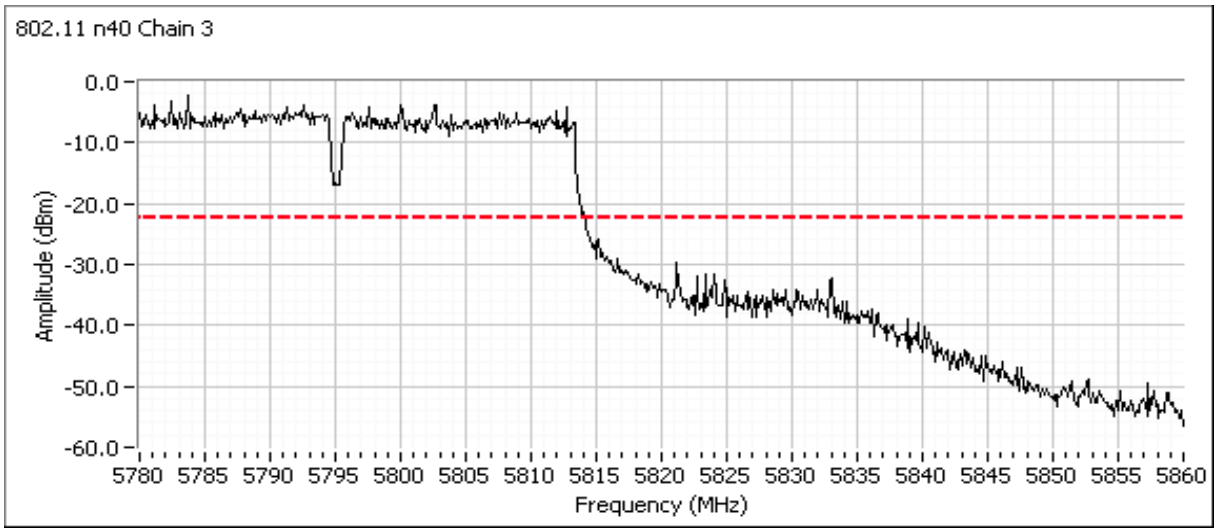
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Additional plot from 5780 - 5860 MHz showing compliance with -20dBc at the band edge.





Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
Power - 802.11a mode

Test Specific Details

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

Date of Test: 12/12/2012
Test Engineer: Jack Liu
Test Location: FT7

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 21 °C
Rel. Humidity: 40 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1	-	-	Output Power (802.11a)	15.247(b)	Pass	23.1dBm

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.

Notes

All measurements performed at the antenna port of the module inside the chassis
Pigtail loss 0.5dB

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B + C - 802.11a

Run #1a:
Antenna: 2dBi Internal

Operating Mode: 802.11a
Transmitted signal on chain is coherent ? yes

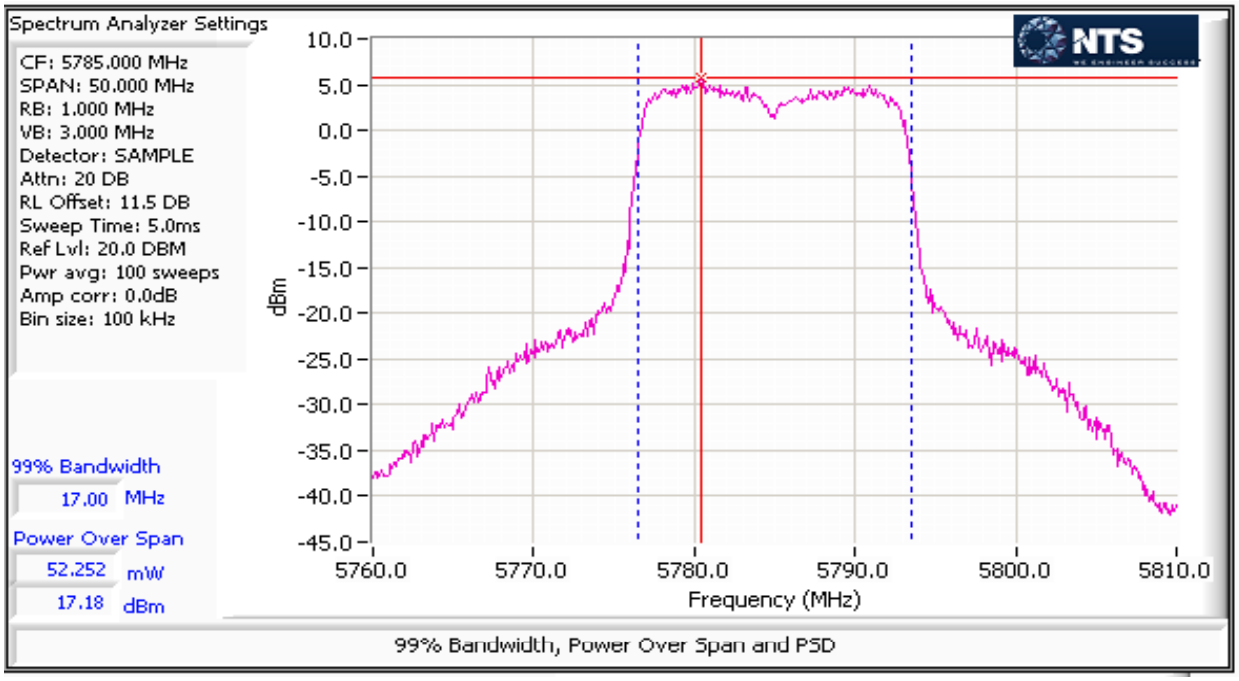
5745 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	16.0							
Output Power (dBm) Note 1	16.44	16.21	16.71		21.2 dBm	0.133 W	29.2 dBm	0.837 W
Antenna Gain (dBi) Note 2	2	2	2		6.8 dBi		Pass	
eirp (dBm) Note 2	18.44	18.21	18.71		28.0 dBm	0.631 W		

5785 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	17.0							
Output Power (dBm) Note 1	17.03	17.12	17.18		21.9 dBm	0.154 W	29.2 dBm	0.837 W
Antenna Gain (dBi) Note 2	2	2	2		6.8 dBi		Pass	
eirp (dBm) Note 2	19.03	19.12	19.18		28.7 dBm	0.733 W		

5825 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	16.0							
Output Power (dBm) Note 1	16.11	16.58	16.03		21.0 dBm	0.126 W	29.2 dBm	0.837 W
Antenna Gain (dBi) Note 2	2	2	2		6.8 dBi		Pass	
eirp (dBm) Note 2	18.11	18.58	18.03		27.8 dBm	0.601 W		

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz (option #1 in KDB 558074). Spurious limit becomes -30dBc.
Note 2:	As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain
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:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
Power - 802.11n20 mode

Test Specific Details

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

Date of Test: 12/27/2012
Test Engineer: Rafael Varelas
Test Location: FT7

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 20.9 °C
Rel. Humidity: 38 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1	-	-	Output Power (802.11n20)	15.247(b)	Pass	25.7 dBm

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.

Notes

All measurements performed at the antenna port of the module inside the chassis
Pigtail loss 0.5dB

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B + C - 802.11n20

Run #1a:
Antenna: 2dBi Internal

Operating Mode: 802.11n20
Transmitted signal on chain is coherent ? no

5745 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3		20.0						
Output Power (dBm) Note 1	21.9	19.6	20.9		25.7 dBm	0.369 W	29.2 dBm	0.837 W
Antenna Gain (dBi) Note 2	2	2	2			2.0 dBi	Pass	
eirp (dBm) Note 2	23.9	21.6	22.9		27.7 dBm	0.585 W		

5785 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3		20.0						
Output Power (dBm) Note 1	21.9	19.5	20.6		25.5 dBm	0.359 W	29.2 dBm	0.837 W
Antenna Gain (dBi) Note 2	2	2	2			2.0 dBi	Pass	
eirp (dBm) Note 2	23.9	21.5	22.6		27.5 dBm	0.569 W		

5825 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3		19.0						
Output Power (dBm) Note 1	21.2	19.1	20.1		25.0 dBm	0.315 W	29.2 dBm	0.837 W
Antenna Gain (dBi) Note 2	2	2	2			2.0 dBi	Pass	
eirp (dBm) Note 2	23.2	21.1	22.1		27.0 dBm	0.500 W		

Note 1:	Output power measured using a peak power meter, spurious limit is -20dBc.
Note 2:	As there is no coherency between chains the total EIRP is the sum of the individual EIRPs and effective antenna gain equals the eirp divide by the sum of the power on each chain.
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:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
Power - 802.11n40 mode

Test Specific Details

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

Date of Test: 12/27/2012
Test Engineer: Rafael Varelas
Test Location: FT7

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 20.9 °C
Rel. Humidity: 38 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
Chain A + B + C						
1			Output Power (802.11n40)	15.247(b)	Pass	23.1 dBm

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.

Notes

All measurements performed at the antenna port of the module inside the chassis

Pigtail loss 0.5dB

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B + C - 802.11n40

Antenna: 2dBi Internal

Operating Mode: 802.11n40

Transmitted signal on chain is coherent ? no

5755 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	16.0							
Output Power (dBm) Note 1	18.9	17.7	18.3		23.1 dBm	0.204 W	29.2 dBm	0.837 W
Antenna Gain (dBi) Note 2	2	2	2			2.0 dBi	Pass	
eirp (dBm) Note 2	20.9	19.7	20.3		25.1 dBm	0.324 W		

5795 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	16.0							
Output Power (dBm) Note 1	18.8	17.5	18.3		23.0 dBm	0.200 W	29.2 dBm	0.837 W
Antenna Gain (dBi) Note 2	2	2	2			2.0 dBi	Pass	
eirp (dBm) Note 2	20.8	19.5	20.3		25.0 dBm	0.317 W		

Note 1:	Output power measured using a peak power meter, spurious limit is -20dBc.
Note 2:	As there is no coherency between chains the total EIRP is the sum of the individual EIRPs and effective antenna gain equals the eirp divide by the sum of the power on each chain.
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:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 30 meters from the EUT.

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

Ambient Conditions:

Temperature: 20.4 °C
Rel. Humidity: 36 %

Summary of Results - Device Operating in the DTS Bands

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run #1	802.11b	2412 MHz	16.5		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247	53.6 dBµV/m @ 5399.9 MHz (-0.4 dB)
		5745 MHz	16.0				
	802.11a	2437 MHz	21				53.3 dBµV/m @ 5440.0 MHz (-0.7 dB)
		5785 MHz	19				
	Chain A+B+C	2462 MHz	16.5				53.9 dBµV/m @ 5440.1 MHz (-0.1 dB)
		5825 MHz	18				
Run # 2	802.11g	2412 MHz	19		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247	51.0 dBµV/m @ 5400.0 MHz (-3.0 dB)
		5745 MHz	19				
	802.11a	2437 MHz	19				53.2 dBµV/m @ 5440.0 MHz (-0.8 dB)
		5785 MHz	17				
	Chain A+B+C	2462 MHz	19				53.5 dBµV/m @ 5440.0 MHz (-0.5 dB)
		5825 MHz	16				
Run #3	802.11n20	2412 MHz	12		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247	52.8 dBµV/m @ 5440.1 MHz (-1.2 dB)
		5745 MHz	20				
	802.11n20	2437 MHz	18				50.4 dBµV/m @ 5120.1 MHz (-3.6 dB)
		5785 MHz	20				
	Chain A+B+C	2462 MHz	12.5				53.6 dBµV/m @ 5440.0 MHz (-0.4 dB)
		5825 MHz	19				

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Run # 4	802.11n40	2422MHz	16		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15.247	49.8 dBµV/m @ 5439.9 MHz (-4.2 dB)
		5755MHz	16				
	802.11n40	2437MHz	16				46.7 dBµV/m @ 5440.1 MHz (-7.3 dB)
		5795MHz	16				
	Chain A+B+C	2452MHz	16				50.4 dBµV/m @ 5400.0 MHz (-3.6 dB)
		5795MHz	16				

Antenna:

#	Model	Type	Freq. Band (GHz)	Gain (dBi)	Ind/Out	Xpol?	Pt to Pt?
1	(Antenna A)	IFA	2.4	2	Indoor	No	No
1	(Antenna B & C)	IFA	2.4 & 5.8	2	Indoor	No	No

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.

Notes

Antenna: antenna(s) connected
Duty Cycle: 99.0%

ART GUI (Singleradio test) Or Command Line Script (multiple radio test)

ART GUI Used: No
ART GUI Boot File: -
-
ART GUI Calibration file: -
-
Command Line Script: 3710i Pilot_935942 boot and initialize all 3 radios to NART Command Line Interface - High Power

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1, Radiated Spurious Emissions, 1-40GHz, 802.11b/802.11a, Chain A+B+C

Run #1a, EUT on Channel #1 2412MHz - 802.11b and Channel #149 5745MHz - 802.11a - Chain A+B+C

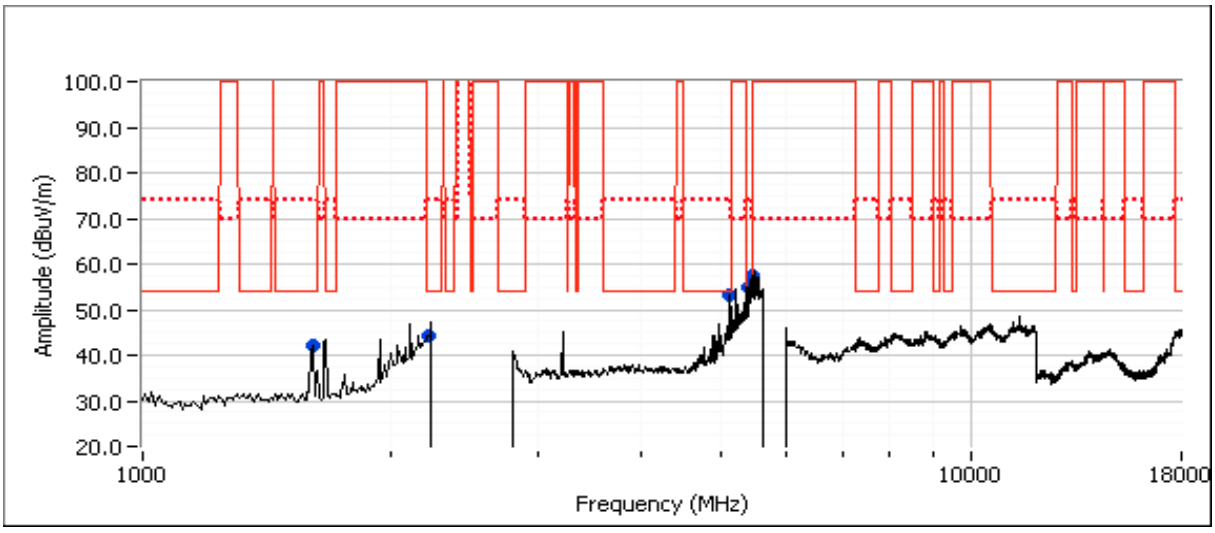
Date of Test: 12/17/2012 Test Location: FT7
Test Engineer: Rafael Varelas Config Change: None

Radio	Freq	Power Setting
1	5745 MHz	16.0
2	2412 MHz	16.5

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Radio 1 @ 16.0, Radio 2 @ 16.5								
5399.900	53.6	V	54.0	-0.4	AVG	355	1.0	RB 1 MHz;VB 10 Hz;Peak
5400.070	60.9	V	74.0	-13.1	PK	355	1.0	RB 1 MHz;VB 3 MHz;Peak
Radio 1 @ 19.0, Radio 2 @ 16.5								
1608.040	42.0	H	54.0	-12.0	Peak	248	1.0	RB 1 MHz;VB 3 MHz;Peak
2215.860	42.8	H	54.0	-11.2	AVG	214	1.0	RB 1 MHz;VB 10 Hz;Peak
2217.690	53.9	H	74.0	-20.1	PK	214	1.0	RB 1 MHz;VB 3 MHz;Peak
5117.720	43.1	V	54.0	-10.9	AVG	192	1.5	RB 1 MHz;VB 10 Hz;Peak
5121.870	55.0	V	74.0	-19.0	PK	192	1.5	RB 1 MHz;VB 3 MHz;Peak

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

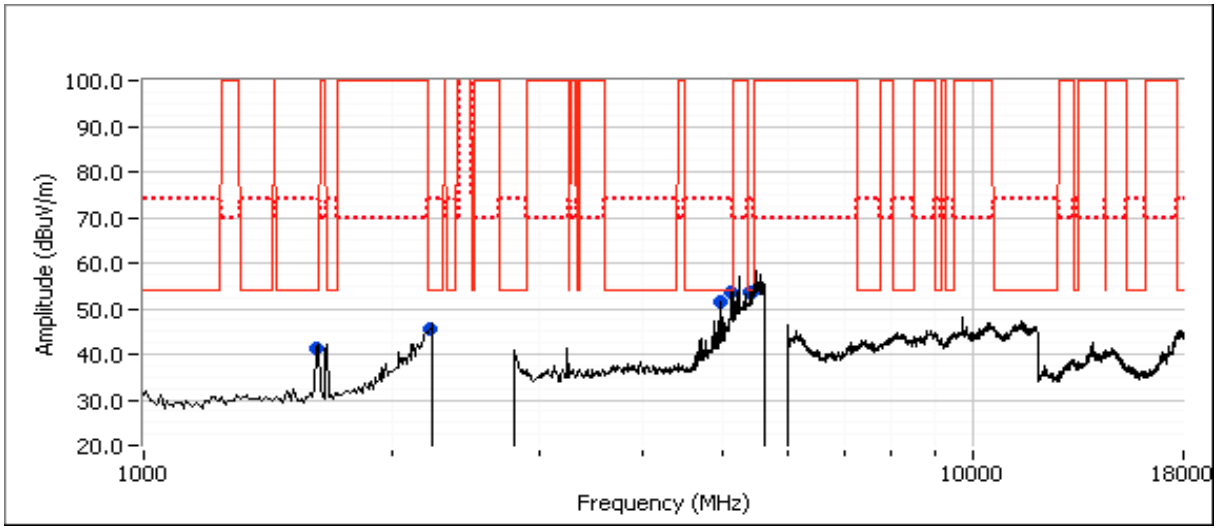
Run #1b, EUT on Channel #6 2437MHz - 802.11b and Channel #157 5785MHz - 802.11a, Chain A+B+C

Radio	Freq	Power Setting
1	5785 MHz	19.0
2	2437 MHz	21.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5439.990	53.3	H	54.0	-0.7	AVG	164	1.0	RB 1 MHz;VB 10 Hz;Peak
5439.890	61.4	H	74.0	-12.6	PK	164	1.0	RB 1 MHz;VB 3 MHz;Peak
4960.040	50.0	V	54.0	-4.0	AVG	360	1.4	RB 1 MHz;VB 10 Hz;Peak
4959.960	55.7	V	74.0	-18.3	PK	360	1.4	RB 1 MHz;VB 3 MHz;Peak
5120.040	51.1	V	54.0	-2.9	AVG	339	1.5	RB 1 MHz;VB 10 Hz;Peak
5120.540	58.8	V	74.0	-15.2	PK	339	1.5	RB 1 MHz;VB 3 MHz;Peak
2234.140	45.8	V	54.0	-8.2	AVG	230	1.3	RB 1 MHz;VB 10 Hz;Peak
2236.310	57.2	V	74.0	-16.8	PK	230	1.3	RB 1 MHz;VB 3 MHz;Peak
5400.000	50.5	V	54.0	-3.5	AVG	7	1.7	RB 1 MHz;VB 10 Hz;Peak
5398.980	60.7	V	74.0	-13.3	PK	7	1.7	RB 1 MHz;VB 3 MHz;Peak
1624.630	41.4	H	54.0	-12.6	Peak	324	1.3	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Scans made between 18 - 26GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

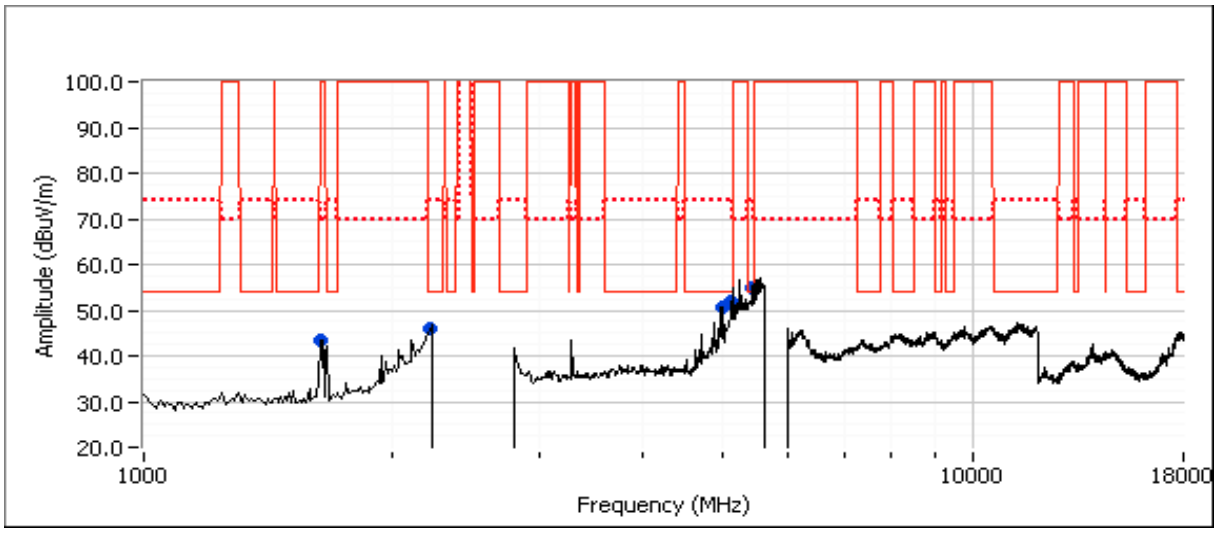
Run #1c, EUT on Channel #11 2462MHz - 802.11b and Channel #165 5825MHz - 802.11a, Chain A+B+C

Radio	Freq	Power Setting
1	5825 MHz	18.0
2	2462 MHz	16.5

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Radio 1 @ 18.0, Radio 2 @ 16.5								
5440.050	53.9	V	54.0	-0.1	AVG	334	1.0	RB 1 MHz;VB 10 Hz;Peak
5440.270	62.8	V	74.0	-11.2	PK	334	1.0	RB 1 MHz;VB 3 MHz;Peak
Radio 1 @ 19.0, Radio 2 @ 16.5								
5120.010	52.1	V	54.0	-1.9	AVG	339	1.2	RB 1 MHz;VB 10 Hz;Peak
5120.330	59.7	V	74.0	-14.3	PK	339	1.2	RB 1 MHz;VB 3 MHz;Peak
2230.170	44.5	V	54.0	-9.5	AVG	232	1.0	RB 1 MHz;VB 10 Hz;Peak
2230.090	55.4	V	74.0	-18.6	PK	232	1.0	RB 1 MHz;VB 3 MHz;Peak
4999.850	50.9	V	54.0	-3.1	AVG	232	1.5	RB 1 MHz;VB 10 Hz;Peak
5000.010	60.4	V	74.0	-13.6	PK	232	1.5	RB 1 MHz;VB 3 MHz;Peak
1641.290	43.2	H	-	-	Peak	324	1.0	Note1

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #2, Radiated Spurious Emissions, 1-40GHz, 802.11g/802.11a, Chain A+B+C

Run #2a, EUT on Channel #1 2412MHz - 802.11g and Channel #149 5745MHz - 802.11a - Chain A+B+C

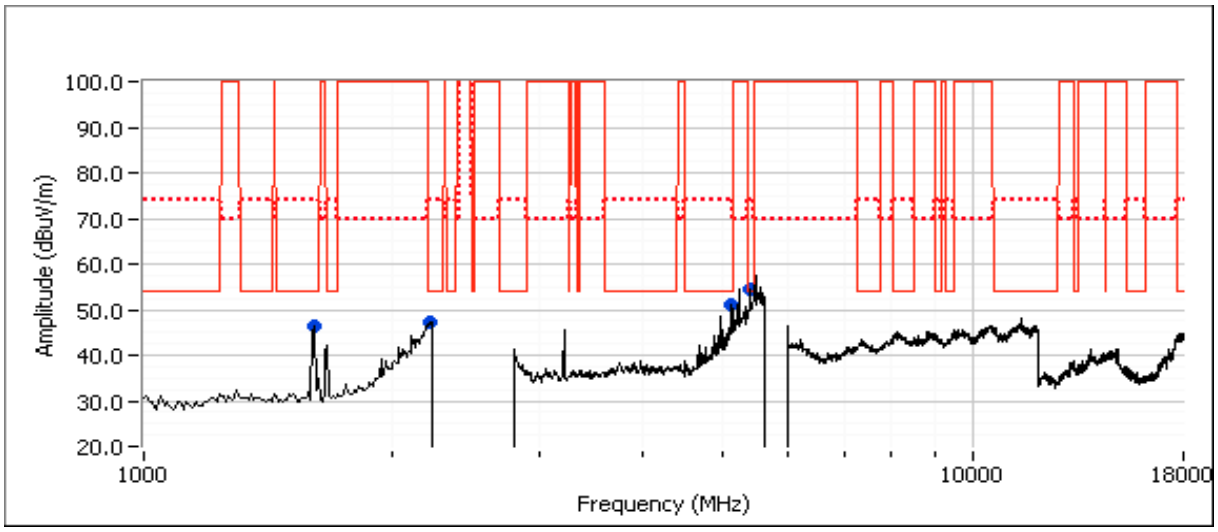
Date of Test: 12/17/2012 Test Location: FT7
Test Engineer: Rafael Varelas Config Change: None

Radio	Freq	Power Setting
1	5745 MHz	19.0
2	2412 MHz	19.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5400.040	51.0	V	54.0	-3.0	AVG	354	1.0	RB 1 MHz;VB 10 Hz;Peak
5399.940	60.2	V	74.0	-13.8	PK	354	1.0	RB 1 MHz;VB 3 MHz;Peak
1608.070	46.1	H	54.0	-7.9	AVG	234	1.0	RB 1 MHz;VB 10 Hz;Peak
1608.120	49.3	H	74.0	-24.7	PK	234	1.0	RB 1 MHz;VB 3 MHz;Peak
2230.190	46.3	H	54.0	-7.7	AVG	214	1.0	RB 1 MHz;VB 10 Hz;Peak
2231.260	57.4	H	74.0	-16.6	PK	214	1.0	RB 1 MHz;VB 3 MHz;Peak
5120.020	48.6	V	54.0	-5.4	AVG	167	1.5	RB 1 MHz;VB 10 Hz;Peak
5120.100	56.2	V	74.0	-17.8	PK	167	1.5	RB 1 MHz;VB 3 MHz;Peak

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

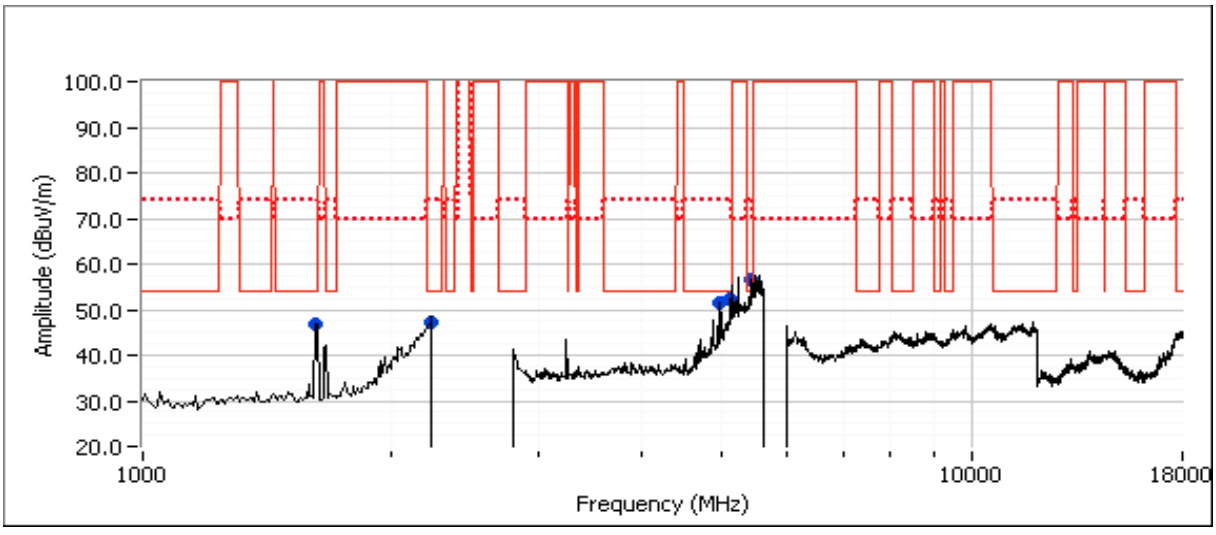
Run #2b, EUT on Channel #6 2437MHz - 802.11g and Channel #157 5785MHz - 802.11a, Chain A+B+C

Radio	Freq	Power Setting
1	5785 MHz	17.0
2	2437 MHz	19.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Radio 1 @ 17.0, Radio 2 @ 19.0								
5440.020	53.2	V	54.0	-0.8	AVG	353	1.0	RB 1 MHz;VB 10 Hz;Peak
5440.300	60.7	V	74.0	-13.3	PK	353	1.0	RB 1 MHz;VB 3 MHz;Peak
Radio 1 @ 19.0, Radio 2 @ 19.0								
4959.960	50.8	V	54.0	-3.2	AVG	344	1.5	RB 1 MHz;VB 10 Hz;Peak
4960.170	56.3	V	74.0	-17.7	PK	344	1.5	RB 1 MHz;VB 3 MHz;Peak
2229.660	46.3	H	54.0	-7.7	AVG	306	1.0	RB 1 MHz;VB 10 Hz;Peak
2231.460	57.9	H	74.0	-16.1	PK	306	1.0	RB 1 MHz;VB 3 MHz;Peak
1624.740	47.1	H	54.0	-6.9	AVG	247	1.4	RB 1 MHz;VB 10 Hz;Peak
1624.590	50.1	H	74.0	-23.9	PK	247	1.4	RB 1 MHz;VB 3 MHz;Peak
5120.000	50.2	V	54.0	-3.8	AVG	148	1.5	RB 1 MHz;VB 10 Hz;Peak
5119.940	57.8	V	74.0	-16.2	PK	148	1.5	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Scans made between 18 - 26GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

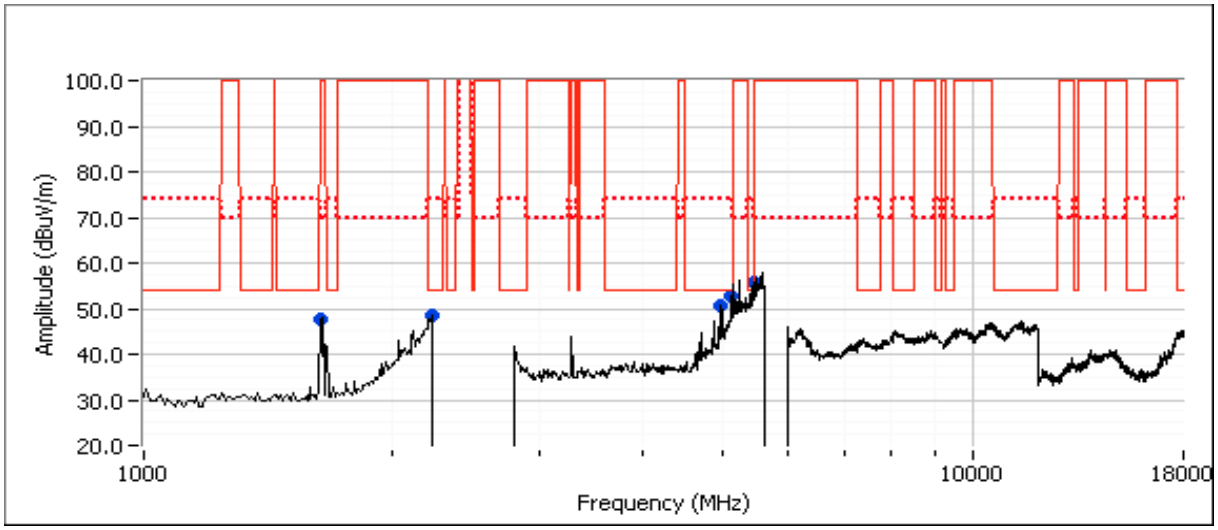
Run #2c, EUT on Channel #11 2462MHz - 802.11g and Channel #165 5825MHz - 802.11a, Chain A+B+C

Radio	Freq	Power Setting
1	5825 MHz	16.0
2	2462 MHz	19.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Radio 1 @ 16.0, Radio 2 @ 19.0								
5440.040	53.5	V	54.0	-0.5	AVG	354	1.0	RB 1 MHz;VB 10 Hz;Peak
5439.830	62.7	V	74.0	-11.3	PK	354	1.0	RB 1 MHz;VB 3 MHz;Peak
Radio 1 @ 19.0, Radio 2 @ 19.0								
4960.000	47.3	V	54.0	-6.7	AVG	162	1.2	RB 1 MHz;VB 10 Hz;Peak
4959.920	54.2	V	74.0	-19.8	PK	162	1.2	RB 1 MHz;VB 3 MHz;Peak
2227.490	46.5	V	54.0	-7.5	AVG	227	1.1	RB 1 MHz;VB 10 Hz;Peak
2229.460	57.2	V	74.0	-16.8	PK	227	1.1	RB 1 MHz;VB 3 MHz;Peak
5120.040	47.8	V	54.0	-6.2	AVG	340	1.4	RB 1 MHz;VB 10 Hz;Peak
5119.750	58.2	V	74.0	-15.8	PK	340	1.4	RB 1 MHz;VB 3 MHz;Peak
1641.190	47.5	V	-	-	Peak	216	1.0	Note1

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #3, Radiated Spurious Emissions, 1-40GHz, 802.11n20/802.11n20, Chain A+B+C

Run #3a, EUT on Channel #1 2412MHz - 802.11n20 and Channel #149 5745MHz - 802.11n20 - Chain A+B+C

Date of Test: 12/17/2012 Test Location: FT7

Test Engineer: Rafael Varelas Config Change: None

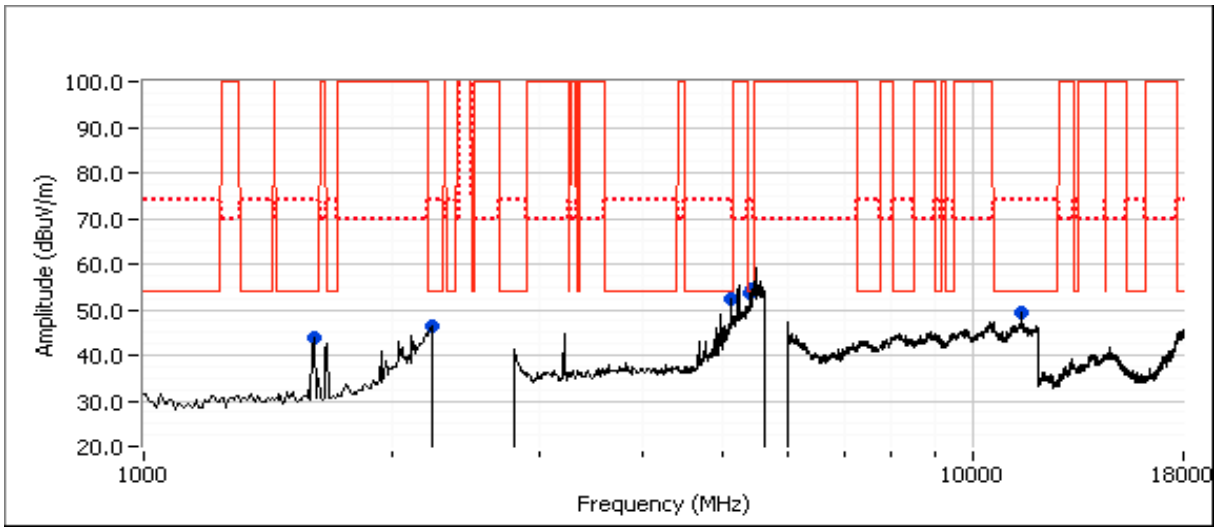
Radio	Freq	Power Setting
1	5745 MHz	20.0
2	2412 MHz	12.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5440.050	52.8	V	54.0	-1.2	AVG	360	1.0	RB 1 MHz;VB 10 Hz;Peak
5440.360	63.4	V	74.0	-10.6	PK	360	1.0	RB 1 MHz;VB 3 MHz;Peak
2229.820	45.2	V	54.0	-8.8	AVG	234	1.3	RB 1 MHz;VB 10 Hz;Peak
2232.370	56.2	V	74.0	-17.8	PK	234	1.3	RB 1 MHz;VB 3 MHz;Peak
1608.080	43.4	H	54.0	-10.6	AVG	241	1.0	RB 1 MHz;VB 10 Hz;Peak
1608.060	46.5	H	74.0	-27.5	PK	241	1.0	RB 1 MHz;VB 3 MHz;Peak
5400.000	52.0	H	54.0	-2.0	AVG	163	1.0	RB 1 MHz;VB 10 Hz;Peak
5399.790	59.9	H	74.0	-14.1	PK	163	1.0	RB 1 MHz;VB 3 MHz;Peak
11484.270	48.6	V	54.0	-5.4	AVG	38	1.2	RB 1 MHz;VB 10 Hz;Peak
11484.590	60.4	V	74.0	-13.6	PK	38	1.2	RB 1 MHz;VB 3 MHz;Peak
5119.940	50.4	V	54.0	-3.6	AVG	14	1.8	RB 1 MHz;VB 10 Hz;Peak
5119.940	58.0	V	74.0	-16.0	PK	14	1.8	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

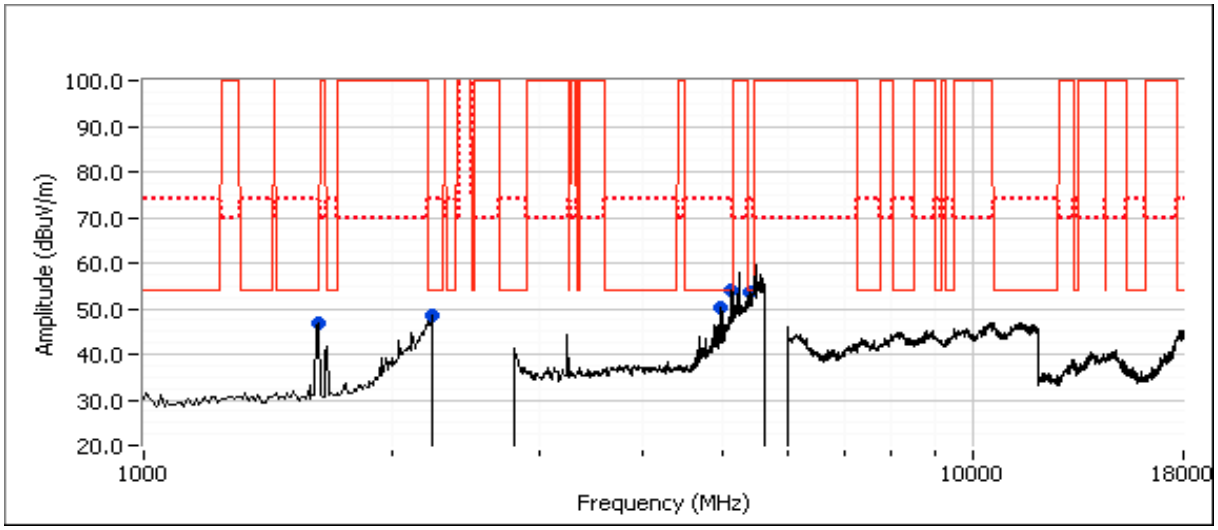
Run #3b, EUT on Channel #6 2437MHz - 802.11n20 and Channel #157 5785MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5785 MHz	20.0
2	2437 MHz	18.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5120.080	50.4	V	54.0	-3.6	AVG	166	1.5	RB 1 MHz;VB 10 Hz;Peak
5119.460	58.2	V	74.0	-15.8	PK	166	1.5	RB 1 MHz;VB 3 MHz;Peak
4959.980	49.9	V	54.0	-4.1	AVG	163	1.4	RB 1 MHz;VB 10 Hz;Peak
4959.940	56.0	V	74.0	-18.0	PK	163	1.4	RB 1 MHz;VB 3 MHz;Peak
1624.740	46.9	H	54.0	-7.1	AVG	241	1.0	RB 1 MHz;VB 10 Hz;Peak
1624.770	49.6	H	74.0	-24.4	PK	241	1.0	RB 1 MHz;VB 3 MHz;Peak
5412.810	47.7	V	54.0	-6.3	AVG	238	1.3	RB 1 MHz;VB 10 Hz;Peak
5411.460	59.5	V	74.0	-14.5	PK	238	1.3	RB 1 MHz;VB 3 MHz;Peak
2230.130	46.7	H	54.0	-7.3	AVG	316	1.0	RB 1 MHz;VB 10 Hz;Peak
2230.460	58.6	H	74.0	-15.4	PK	316	1.0	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Scans made between 18 - 26GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

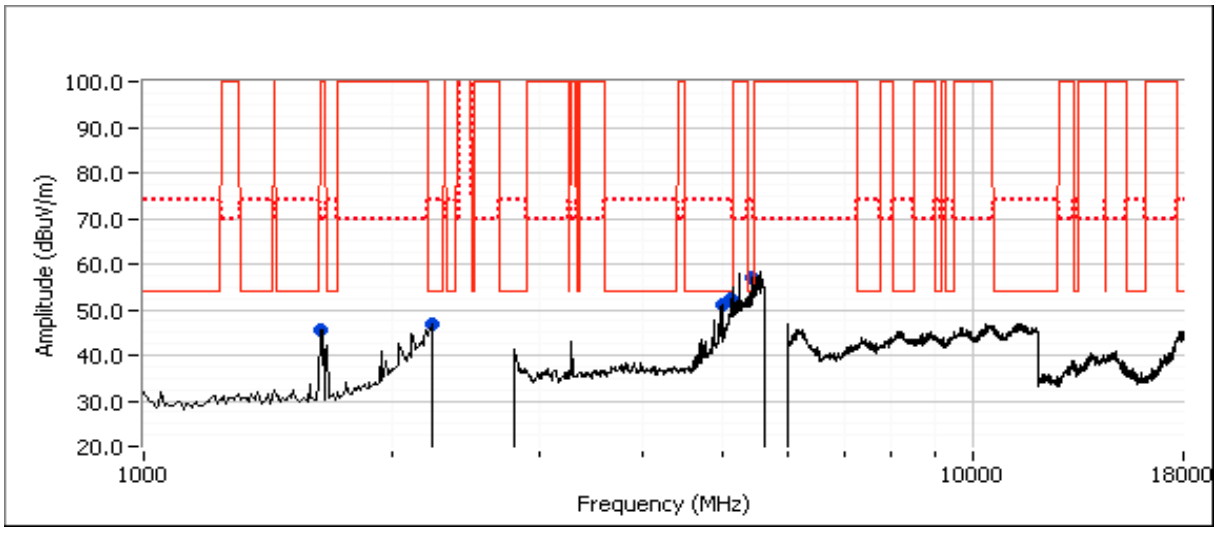
Run #3c, EUT on Channel #11 2462MHz - 802.11n20 and Channel #165 5825MHz - 802.11n20, Chain A+B+C

Radio	Freq	Power Setting
1	5825 MHz	19.0
2	2462 MHz	12.5

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Radio 1 @ 19.0, Radio 2 @ 12.5								
5440.020	53.6	V	54.0	-0.4	AVG	357	1.0	RB 1 MHz;VB 10 Hz;Peak
5440.440	62.6	V	74.0	-11.4	PK	357	1.0	RB 1 MHz;VB 3 MHz;Peak
Radio 1 @ 20.0, Radio 2 @ 12.5								
5120.000	49.8	V	54.0	-4.2	AVG	164	1.0	RB 1 MHz;VB 10 Hz;Peak
5119.670	57.5	V	74.0	-16.5	PK	164	1.0	RB 1 MHz;VB 3 MHz;Peak
4999.970	50.1	V	54.0	-3.9	AVG	182	1.8	RB 1 MHz;VB 10 Hz;Peak
4999.880	58.5	V	74.0	-15.5	PK	182	1.8	RB 1 MHz;VB 3 MHz;Peak
2229.300	45.3	V	54.0	-8.7	AVG	228	1.3	RB 1 MHz;VB 10 Hz;Peak
2235.630	57.2	V	74.0	-16.8	PK	228	1.3	RB 1 MHz;VB 3 MHz;Peak
1641.390	45.1	H	100.0	-54.9	AVG	238	1.0	RB 1 MHz;VB 10 Hz;Peak
1641.240	47.6	H	70.0	-22.4	PK	238	1.0	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #4, Radiated Spurious Emissions, 1-40GHz, 802.11n40/802.11n40, Chain A+B+C

Run #4a, EUT on Channel #1 2422MHz - 802.11n40 and Channel #151 5755MHz - 802.11n40 - Chain A+B+C

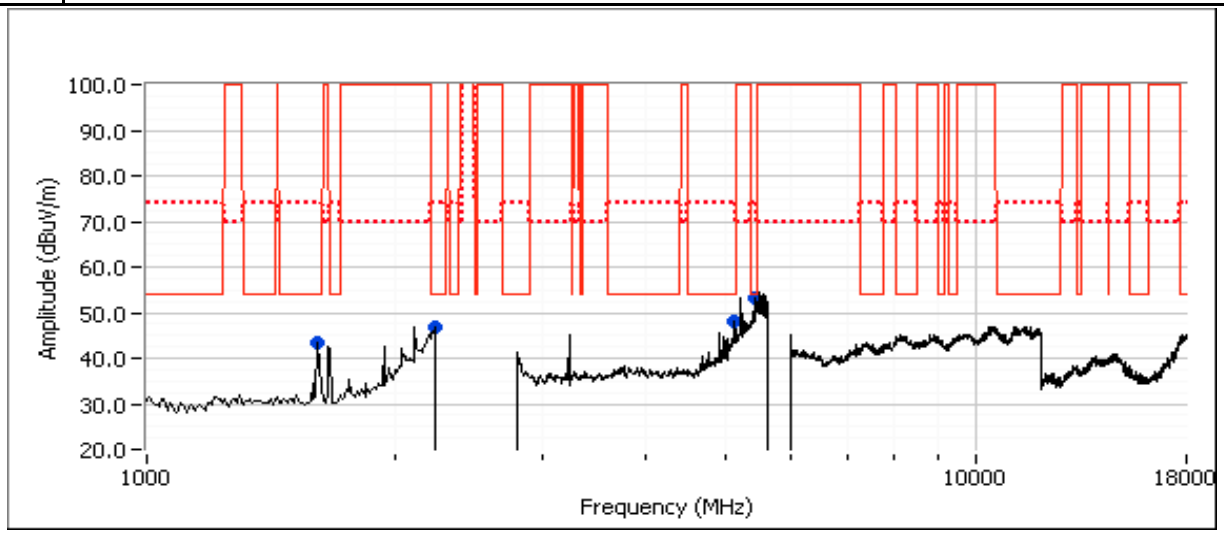
Date of Test: 12/17/2012 Test Location: FT7
Test Engineer: Rafael Varelas Config Change: None

Radio	Freq	Power Setting
1	5755 MHz	16.0
2	2422 MHz	16.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5439.940	49.8	V	54.0	-4.2	AVG	360	1.0	RB 1 MHz;VB 10 Hz;Peak
5440.050	60.8	V	74.0	-13.2	PK	360	1.0	RB 1 MHz;VB 3 MHz;Peak
5120.150	49.4	V	54.0	-4.6	AVG	342	1.2	RB 1 MHz;VB 10 Hz;Peak
5120.010	55.8	V	74.0	-18.2	PK	342	1.2	RB 1 MHz;VB 3 MHz;Peak
1614.750	43.4	H	54.0	-10.6	AVG	242	1.0	RB 1 MHz;VB 10 Hz;Peak
1614.730	46.6	H	74.0	-27.4	PK	242	1.0	RB 1 MHz;VB 3 MHz;Peak
2229.350	45.5	V	54.0	-8.5	AVG	231	1.0	RB 1 MHz;VB 10 Hz;Peak
2230.040	56.6	V	74.0	-17.4	PK	231	1.0	RB 1 MHz;VB 3 MHz;Peak

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

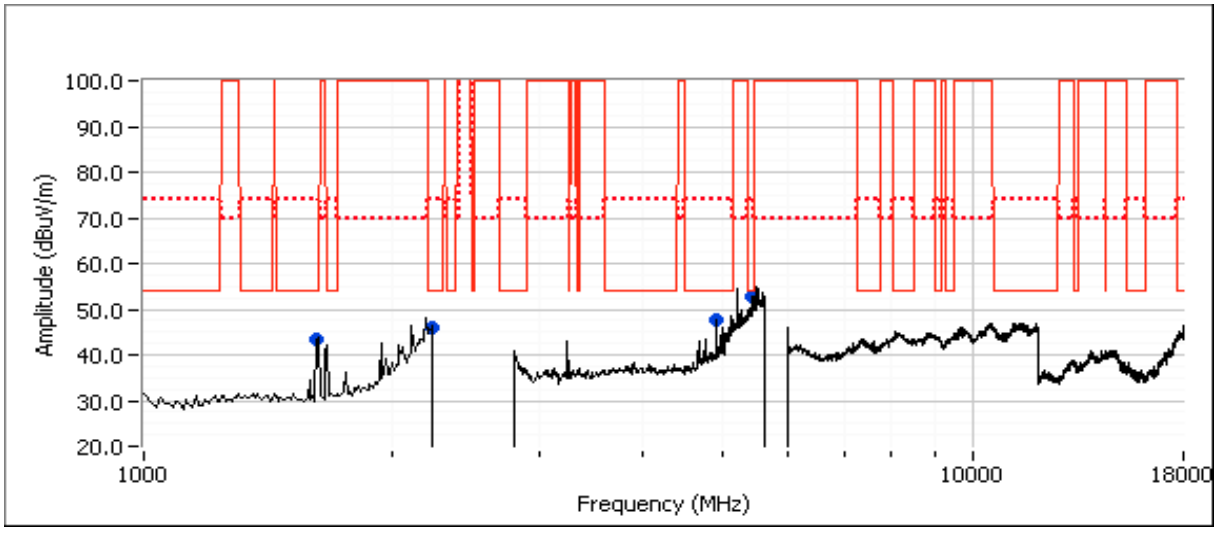
Run #4b, EUT on Channel #6 2437MHz - 802.11n40 and Channel #159 5795MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
1	5795 MHz	16.0
2	2437 MHz	16.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5440.090	46.7	V	54.0	-7.3	AVG	263	1.6	RB 1 MHz;VB 10 Hz;Peak
5443.040	57.4	V	74.0	-16.6	PK	263	1.6	RB 1 MHz;VB 3 MHz;Peak
1624.720	43.7	H	54.0	-10.3	AVG	334	1.4	RB 1 MHz;VB 10 Hz;Peak
1624.770	47.0	H	74.0	-27.0	PK	334	1.4	RB 1 MHz;VB 3 MHz;Peak
4920.020	43.5	V	54.0	-10.5	AVG	146	1.0	RB 1 MHz;VB 10 Hz;Peak
4919.830	51.2	V	74.0	-22.8	PK	146	1.0	RB 1 MHz;VB 3 MHz;Peak
2229.520	45.9	H	54.0	-8.1	AVG	118	1.0	RB 1 MHz;VB 10 Hz;Peak
2231.390	56.5	H	74.0	-17.5	PK	118	1.0	RB 1 MHz;VB 3 MHz;Peak

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Scans made between 18 - 26GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no signifcant emissions in this frequency range



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

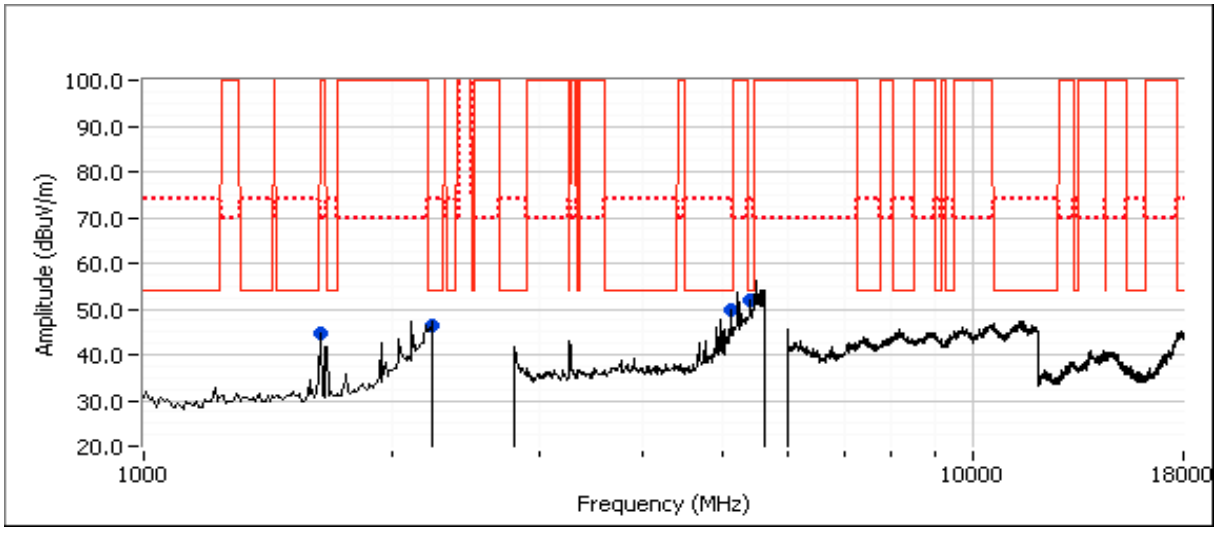
Run #4c, EUT on Channel #9 2452MHz - 802.11n40 and Channel #159 5795MHz - 802.11n40, Chain A+B+C

Radio	Freq	Power Setting
1	5795 MHz	16.0
2	2452 MHz	16.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5399.980	50.4	V	54.0	-3.6	AVG	358	1.3	RB 1 MHz;VB 10 Hz;Peak
5399.750	59.1	V	74.0	-14.9	PK	358	1.3	RB 1 MHz;VB 3 MHz;Peak
5120.050	47.8	V	54.0	-6.2	AVG	164	1.6	RB 1 MHz;VB 10 Hz;Peak
5119.990	55.8	V	74.0	-18.2	PK	164	1.6	RB 1 MHz;VB 3 MHz;Peak
2230.460	45.4	H	54.0	-8.6	AVG	322	1.3	RB 1 MHz;VB 10 Hz;Peak
2236.010	56.7	H	74.0	-17.3	PK	322	1.3	RB 1 MHz;VB 3 MHz;Peak
1634.590	44.7	H	-	-	Peak	326	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -27dBm/MHz for peak measurements in a measurement bandwidth of 1MHz.



Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Radiated Emissions 30-1000 MHz, (FCC 15.247/RSS 210)

(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: 12/19/2012
Test Engineer: Jack Liu
Test Location: FT Chamber #7

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

General Test Configuration

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

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: 23 °C
Rel. Humidity: 36 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	Radiated Emissions 30 - 1000 MHz Radio1 5785MHz (TX) Radio2 2412MHz (TX)	FCC 15.209 / RSS 210	Pass	29.3 dBµV/m @ 37.75 MHz (-10.7 dB)
2	Radiated Emissions 30 - 1000 MHz Radio1 5825MHz (TX) Radio2 2462MHz (TX)	FCC 15.209 / RSS 210	Pass	26.5 dBµV/m @ 37.81 MHz (-13.5 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

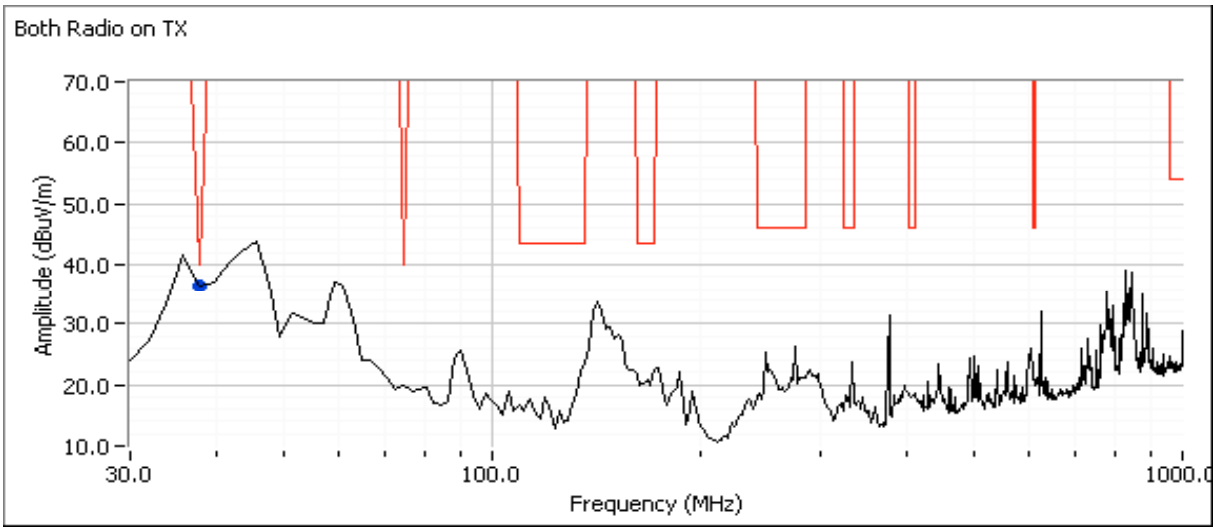
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #1: Preliminary Radiated Emissions, 30 - 1000 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0

Configured Radio 1 to Tx , 802.11n20 19dBm on each chain (settings 19) on channel 157, Radio 2 to Tx, 802.11n20 19dBm on each chain (settings 19) on channel 1

#	Model	Type	Freq. Band (GHz)	Gain (dBi)	Ind/Out	Xpol?	Pt to Pt?
1	(Antenna A)	IFA	2.4	2	Indoor	No	No
1	(Antenna B & C)	IFA	5.2	2	Indoor	No	No



Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	FCC 15.209 / RSS 210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
37.750	36.5	V	40.0	-3.5	Peak	15	1.0	

Maximized quasi-peak readings (includes manipulation of EUT interface cables)

Frequency	Level	Pol	FCC 15.209 / RSS 210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
37.750	29.3	V	40.0	-10.7	QP	183	1.0	

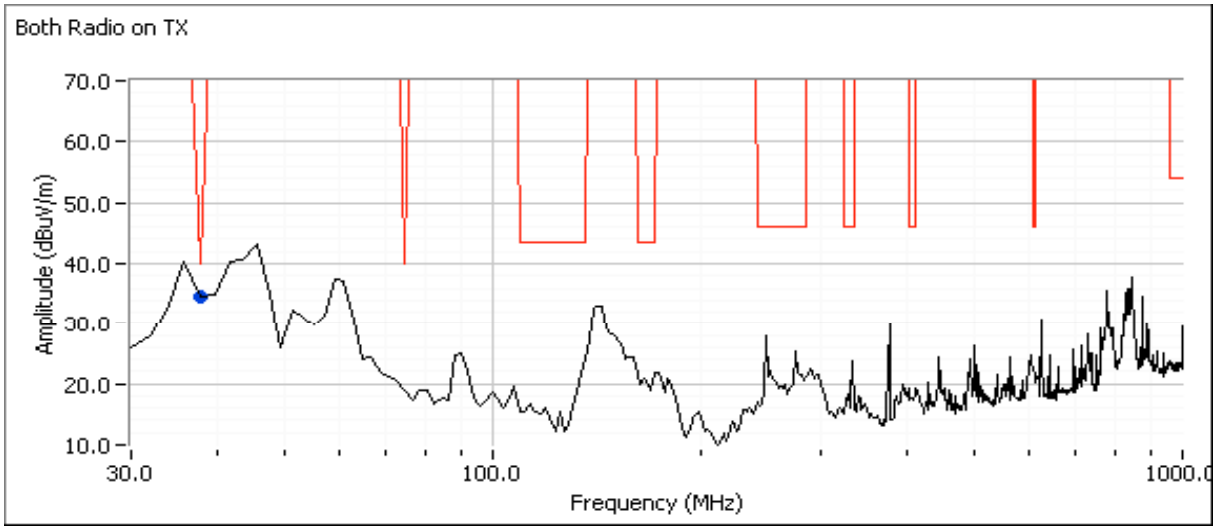
Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	N/A

Run #2: Preliminary Radiated Emissions, 30 - 1000 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0

Configured Radio 1 to Tx , 802.11n20 19dBm on each chain (settings 19) on channel 165, Radio 2 to Tx, 802.11n20 19dBm on each chain (settings 19) on channel 11

#	Model	Type	Freq. Band (GHz)	Gain (dBi)	Ind/Out	Xpol?	Pt to Pt?
1	(Antenna A)	IFA	2.4	2	Indoor	No	No
1	(Antenna B & C)	IFA	5.2	2	Indoor	No	No



Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	FCC 15.209 / RSS 210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
37.806	34.5	V	40.0	-5.5	Peak	315	1.0	

Maximized quasi-peak readings (includes manipulation of EUT interface cables)

Frequency	Level	Pol	FCC 15.209 / RSS 210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
37.806	26.5	V	40.0	-13.5	QP	315	1.0	QP (1.00s)

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	-

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: 12/20/2012
Test Engineer: Jack Liu
Test Location: FT Chamber #7

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

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. 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: 22 °C
Rel. Humidity: 40 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	15.207	Pass	48.3 dBµV @ 1.188 MHz (-7.7 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	-

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

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

Frequency	Level	AC	FCC 15.207		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
1.191	48.7	Neutral	46.0	2.7	Peak	
1.280	48.3	Neutral	46.0	2.3	Peak	
1.362	45.0	Neutral	46.0	-1.0	Peak	
1.377	43.7	Neutral	46.0	-2.3	Peak	
0.173	51.7	Neutral	54.7	-3.0	Peak	
0.258	46.6	Neutral	51.4	-4.8	Peak	
0.257	45.7	Line 1	51.4	-5.7	Peak	
0.171	50.0	Line 1	54.8	-4.8	Peak	
1.106	47.7	Line 1	46.0	1.7	Peak	
1.188	49.3	Line 1	46.0	3.3	Peak	
1.271	45.0	Line 1	46.0	-1.0	Peak	
8.124	40.5	Line 1	50.0	-9.5	Peak	

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
		Account Manager:	Christine Krebill
Contact:	George Fares		
Standard:	15.247, 15.407, RSS-210	Class:	-

Final quasi-peak and average readings

Frequency	Level	AC	FCC 15.207		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
1.188	48.3	Line 1	56.0	-7.7	QP	QP (1.00s)
0.257	42.9	Neutral	51.5	-8.6	AVG	AVG (0.10s)
1.280	37.2	Neutral	46.0	-8.8	AVG	AVG (0.10s)
1.191	47.2	Neutral	56.0	-8.8	QP	QP (1.00s)
1.280	46.9	Neutral	56.0	-9.1	QP	QP (1.00s)
1.106	46.0	Line 1	56.0	-10.0	QP	QP (1.00s)
0.173	44.5	Neutral	54.8	-10.3	AVG	AVG (0.10s)
1.191	35.4	Neutral	46.0	-10.6	AVG	AVG (0.10s)
0.257	40.6	Line 1	51.5	-10.9	AVG	AVG (0.10s)
1.106	35.0	Line 1	46.0	-11.0	AVG	AVG (0.10s)
1.362	44.2	Neutral	56.0	-11.8	QP	QP (1.00s)
0.170	43.1	Line 1	55.0	-11.9	AVG	AVG (0.10s)
1.362	33.9	Neutral	46.0	-12.1	AVG	AVG (0.10s)
1.271	33.7	Line 1	46.0	-12.3	AVG	AVG (0.10s)
1.271	43.7	Line 1	56.0	-12.3	QP	QP (1.00s)
1.377	43.4	Neutral	56.0	-12.6	QP	QP (1.00s)
1.377	31.7	Neutral	46.0	-14.3	AVG	AVG (0.10s)
1.188	31.5	Line 1	46.0	-14.5	AVG	AVG (0.10s)
0.173	50.3	Neutral	64.8	-14.5	QP	QP (1.00s)
0.257	45.5	Neutral	61.5	-16.0	QP	QP (1.00s)
0.170	48.9	Line 1	65.0	-16.1	QP	QP (1.00s)
0.257	44.3	Line 1	61.5	-17.2	QP	QP (1.00s)
8.124	37.4	Line 1	60.0	-22.6	QP	QP (1.00s)
8.124	23.0	Line 1	50.0	-27.0	AVG	AVG (0.10s)

Client:	Flextronics	Job Number:	J89849
Model:	WS-AP3710i	T-Log Number:	T89870
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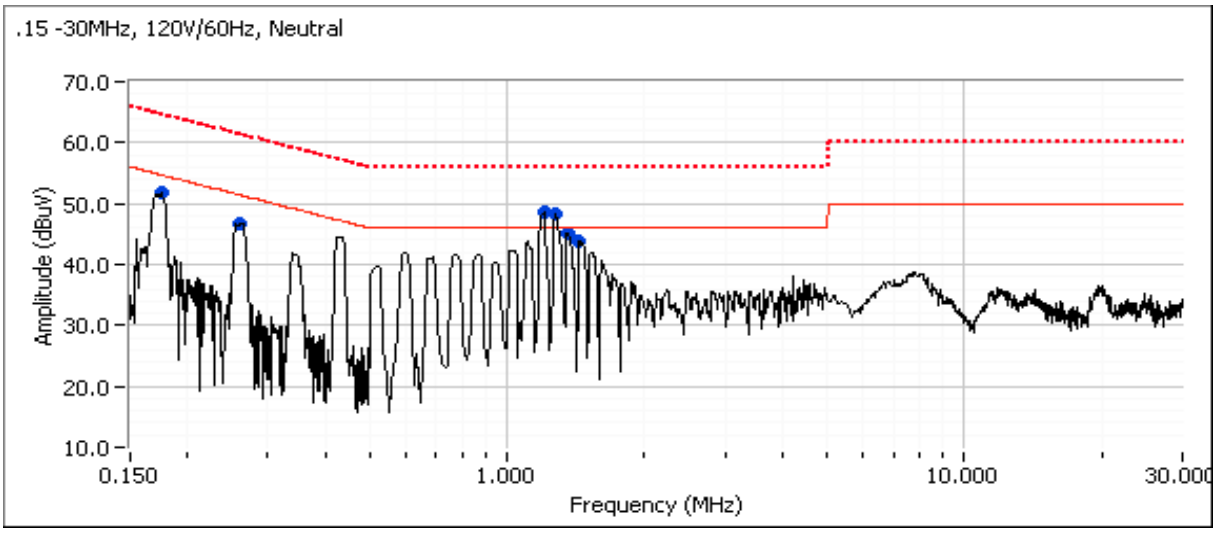
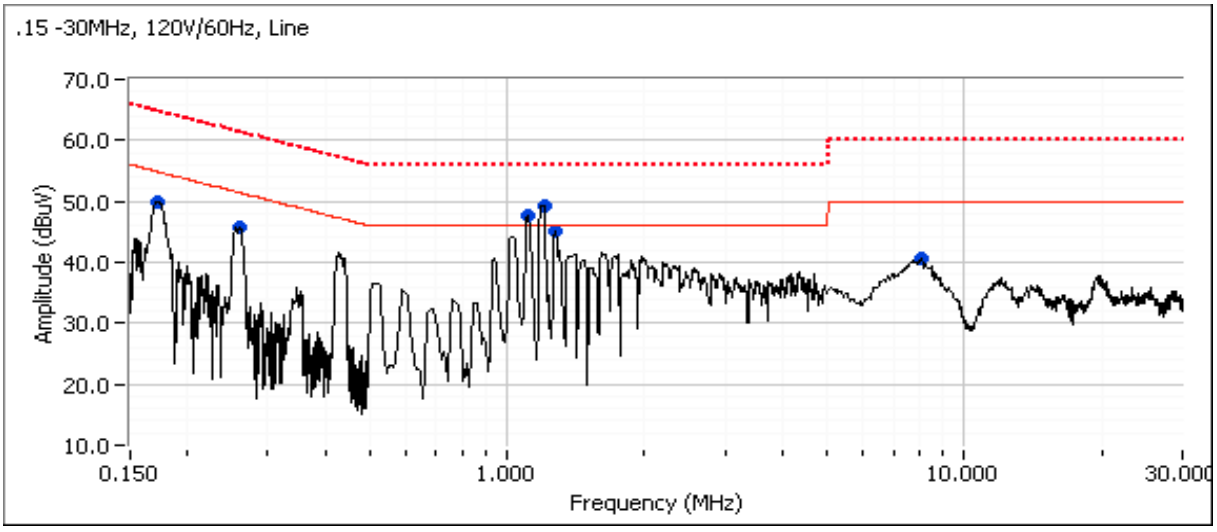
Standard:	15.247, 15.407, RSS-210	Class:	-





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