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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: XR1000 Outdoor Unit

IC CERTIFICATION #:	
FCC ID:	
APPLICANT:	Xirrus, Inc. 2101 Corporate Center Dr. Newbury Park, CA 91320
TEST SITE(S):	NTS Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-3; 2845B-4, 2845B-5, 2845B-7
REPORT DATE:	August 3, 2012
FINAL TEST DATES:	April 1, 9, 10, 11, 12, 13, 18, 19, 20 and 24, 2012
TOTAL NUMBER OF PAGES:	154

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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	08-03-2012	First release	

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SCOPE

An electromagnetic emissions test has been performed on the Xirrus, Inc. model XR1000 Outdoor Unit, 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 KDB558074, March 2005

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

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

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

OBJECTIVE

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

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

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

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

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

STATEMENT OF COMPLIANCE

The tested sample of Xirrus, Inc. model XR1000 Outdoor Unit 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 Xirrus, Inc. model XR1000 Outdoor Unit and therefore apply only to the tested sample. The sample was selected and prepared by Steve Smith of Xirrus, Inc..

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	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	b: 10.1 MHz g: 16.5 MHz n20: 17.1 MHz n40: 36.2 MHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	b: 19.1dBm g: 21.9dBm n20: 21.6dBm n40: 21.9dBm EIRP = 3.665 W Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	b: -4.4 dBm/3kHz g: -5.1 dBm/3kHz n20: -7.4 dBm/3kHz n40: -7.4 dBm/3kHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	All emissions below the -30dBc or -20dBc limit	< -20dBc or < -30dBc Note 2	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	54.0 dBµV/m @ 2390.0 MHz (0.0 dB)	15.207 in restricted bands, all others < -20dBc <-30dBc Note 2	Complies

Note 1: EIRP calculated using antenna gain of 9 dBi for the highest EIRP system.
Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst). For some modulations, a limit of -20dBc was used since power was measured peak.

DIGITAL TRANSMISSION SYSTEMS (5725 –5850 MHz)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	a: 16.5MHz n20: 17.6MHz n40: 35.8MHz	>500kHz	Complies
15.247 (b)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	802.11a: 15.9dBm n20: 16.0dBm n40: 24.0dBm EIRP = 3.01 W Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	a: -8.2dBm/3kHz n20: -8.4dBm/3kHz n40: -10.6dBm/3kHz	Maximum permitted is 8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions – 30MHz – 40 GHz	All emissions below the -30dBc or -20dBc limits	< -20dBc or < -30dBc Note 2	Complies
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 40 GHz	53.8 dBµV/m @ 11645.9 MHz (-0.2 dB)	15.207 in restricted bands, all others < -20dBc <-30dBc Note 2	Complies

Note 1: EIRP calculated using antenna gain of 6 dBi for the highest EIRP system.
Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst). For some modulations, a limit of -20dBc was used since power was measured peak.

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector		Unique or integral antenna required	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	51.6dBµV @ 5.674MHz	Refer to page 18	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	N/A	Refer to page 20	N/A
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual		Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual		Statement for products with detachable antenna	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	2.4GHz b: 14.5 MHz g: 19.6 MHz n20: 20.1 MHz n40: 39.8 MHz 5.8GHz 802.11a: 20.1MHz n20: 21.3MHz n40: 40.6MHz	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 Xirrus, Inc. model XR1000 Outdoor Unit is an 802.11agbn access point that is designed for outdoor usage. It uses two 3x3 radio module that can operate in either 2.4GHz or 5GHz bands. The EUT is powered via POE.

The sample was received on April 1, 2012 and tested on April 1, 9, 10, 11, 12, 13, 18, 19, 20 and 24, 2012. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Xirrus	XR1000 Outdoor	802.11abgn access point		

OTHER EUT DETAILS

The EUT is restricted such that only one radio will operate in the 2.4GHz band and the other radio in a 5GHz band. For testing purposes, this feature was disabled.

ANTENNA SYSTEM

There are two antenna options:
Terrawave, M6060060MO1D33607, three element, 2.4GHz - 4 dBi, 5GHz - 6dBi, Vertically polarized
L-Com, HG2458-14DP-3NF, three element (two vertical/one horizontal), 2.4GHz - 14dBi, 5GHz - 14dBi.

Note - the L-com antenna will be used with RF cabling. Minimum cable loss is 5dB for 2.4GHz, and 8dB for 5GHz.

As there is only one output power setting, the highest antenna gain values were used for any EIRP/ERP calculations; 9dBi (14-5)for 2.4GHz and 6dBi (14-8) for 5GHz.

ENCLOSURE

The EUT enclosure measures approximately 20.5cm in diameter. It is primarily constructed of steel.

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 local support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
Xirrus	POE60U-560(G)-SS-R	Single Port Midspan Injector	N/A	-

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

Company	Model	Description	Serial Number	FCC ID
IBM	R51	Laptop Computer	99-MZ551	-

EUT INTERFACE PORTS

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

Port		Cable(s)		
From	To	Description	Shielded/Unshielded	Length(m)
AC Power	AC Mains	Power to Single Port Midspan Injector	Unshielded	2 m
GigE POE	OUT port of Single Port Midspan Injector	CAT5 cable	Unshielded	5 m
10/100 BaseT	IN port of Single Port Midspan Injector	CAT5 cable	Unshielded	5 m

EUT OPERATION

During testing, the EUT was configured to continuously transmit at maximum power on the channel noted.

During AC conducted emissions testing the EUT was exercised by setting the EUT to continuously transmit 802.11b, channel 6.

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 3	769238	2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 4	211948	2845B-4	
Chamber 5	211948	2845B-5	
Chamber 7	A2LA accreditation	2845B-7	

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

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.

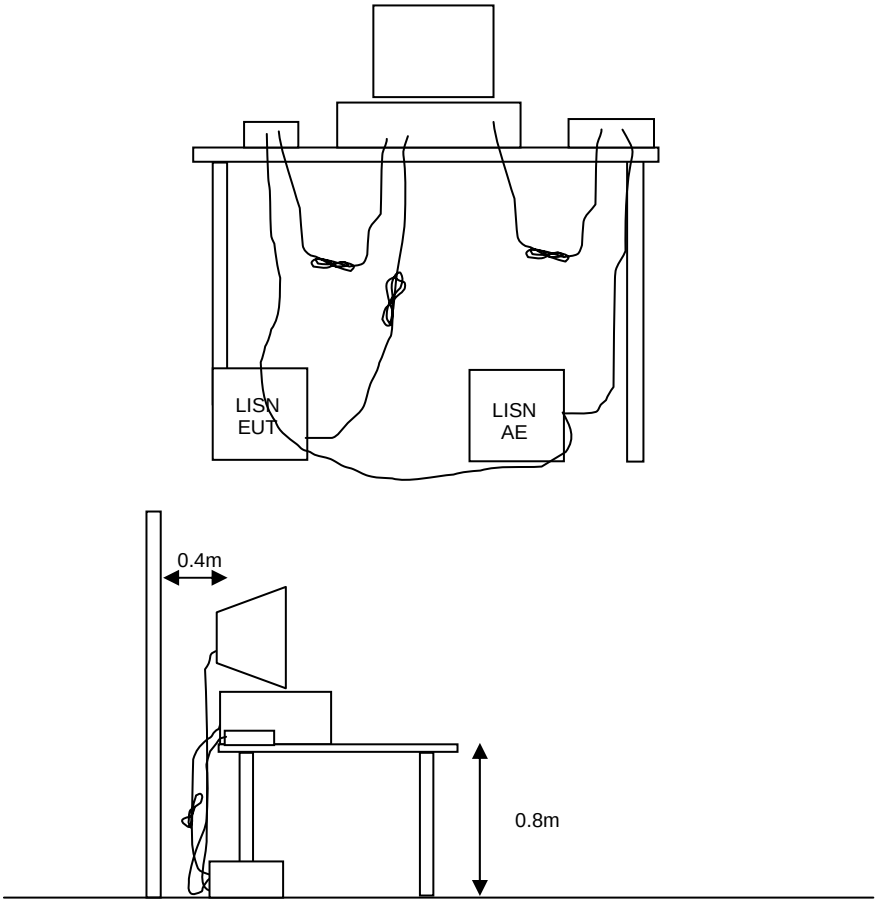


Figure 1 Typical Conducted Emissions Test Configuration

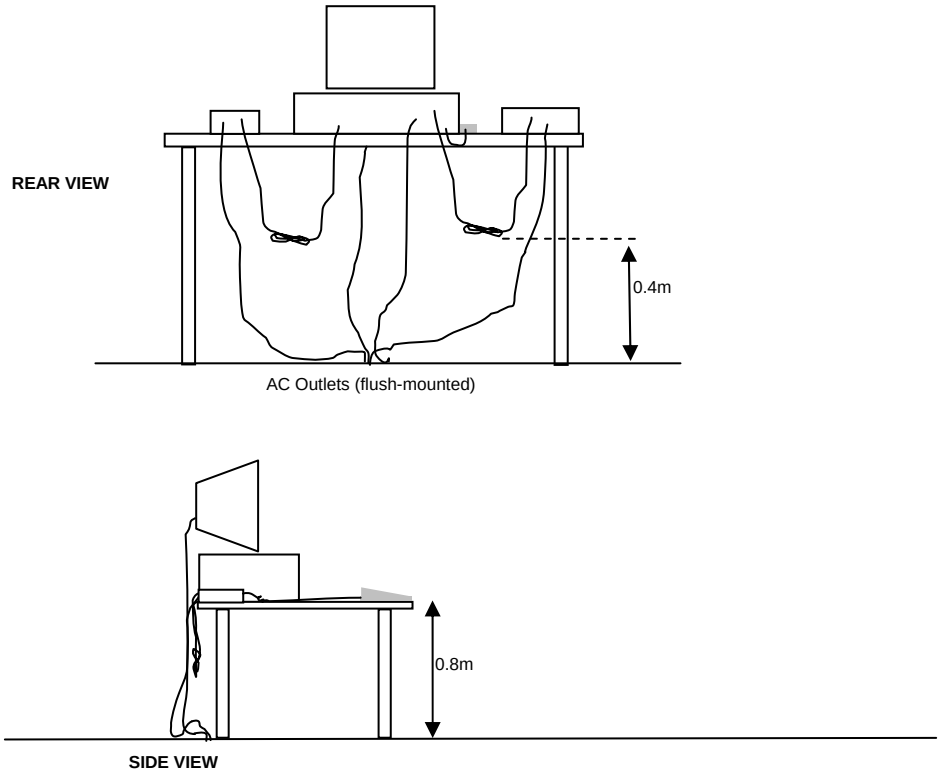
RADIATED EMISSIONS

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.

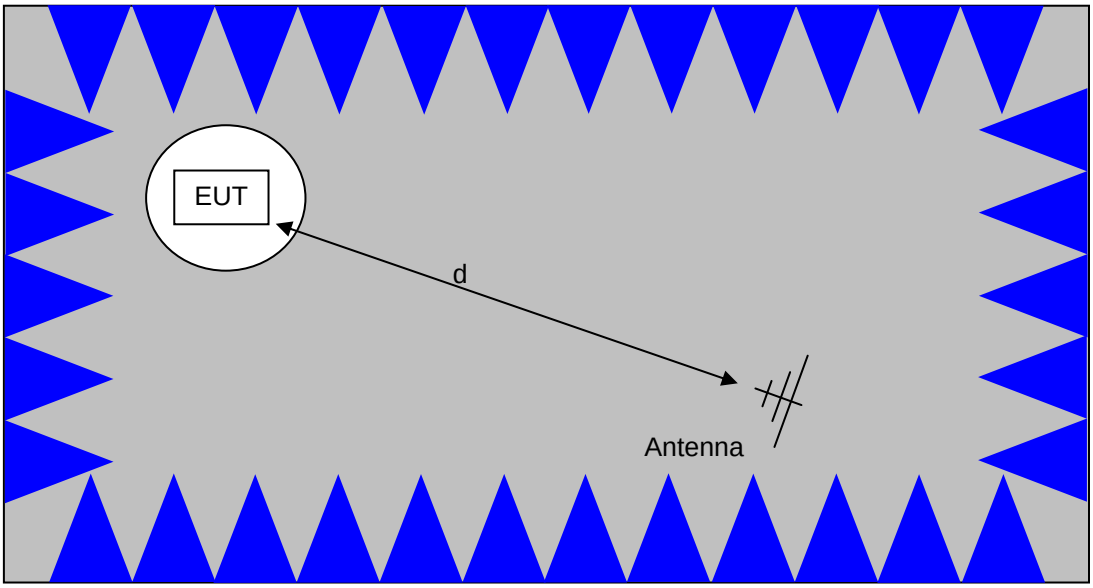
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

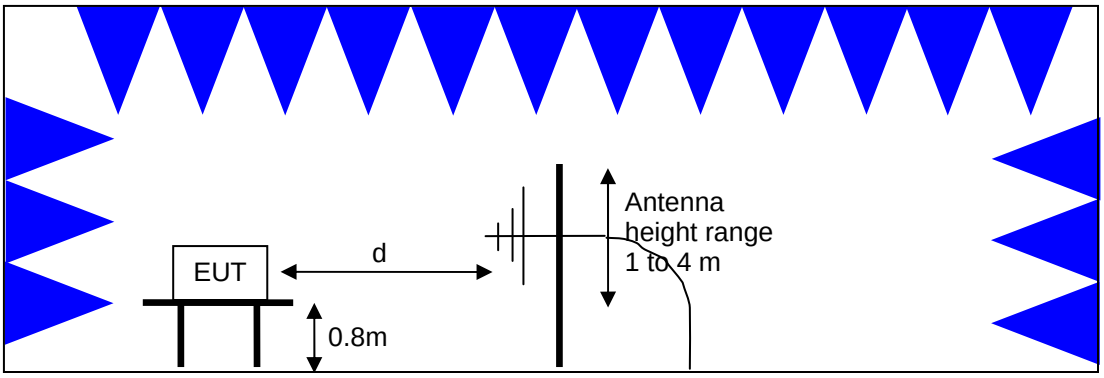


Typical Test Configuration for Radiated Field Strength Measurements



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.

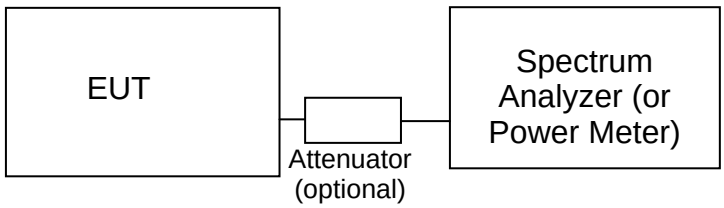
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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:

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:

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

where P is the eirp (Watts)

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

Appendix A Test Equipment Calibration Data

Radiated Emissions, 1,000 - 12,000 MHz, 03-Apr-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	7/6/2012
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1728	3/23/2013
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	10/4/2012

Radiated Emissions, 1,000 - 12,000 MHz, 04-Apr-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	7/6/2012
Hewlett Packard	High Pass filter, 8.2 GHz (Red System)	P/N 84300-80039 (84125C)	1152	8/5/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	4/30/2012

Radiated Spurious Emissions, 1000 - 18,000 MHz, 12-Apr-12

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/8/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/15/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	4/13/2012
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	11/22/2012
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2012

Radiated Spurious Emissions, 1000 - 18,000 MHz, 13-Apr-12

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/8/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/15/2012
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	11/22/2012
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2012

Radiated Emissions, 1000 - 2,500 MHz, Bandedges, 18-Apr-12

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/25/2012

Radiated Emissions, 1000 - 18,000 MHz, 19-Apr-12

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Purple	8564E (84125C)	2415	7/28/2012
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/25/2012
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/23/2013
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	10/4/2012

Radio Antenna Port (Power and Spurious Emissions), 23-Apr-12

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/15/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/6/2012

Radio Antenna Port (Power and Spurious Emissions), 24-Apr-12

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	8/15/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/25/2012

Radio Antenna Port (Power and Spurious Emissions), 25-Apr-12

Manufacturer	Description	Model	Asset #	Cal Due
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	5/25/2012

Radio Antenna Port , 04-May-12

Manufacturer	Description	Model	Asset #	Cal Due
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	12/6/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	7/28/2012

Conducted Emissions - AC Power and Telecommunications Ports, 11-Jun-12

Manufacturer	Description	Model	Asset #	Cal Due
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1398	1/26/2013
Fischer Custom Comm	LISN, 25A, 150kHz to 30MHz, 25 Amp,	FCC-LISN-50-25-2-09	2000	10/18/2012
Fischer Custom Comm.	FCC-TLISN-T8-02 (Includes 2374)	FCC-TLISN-T8-02-09	2373	1/7/2013
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	12/9/2012

Appendix B Test Data

T86967 Pages 27 – 148
T87799 Pages 149 - 153

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		-
Emissions Standard(s):	FCC 15.247, 15.E, RSS-210	Class:	A
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Xirrus

Model

XR1000 Outdoor (3x3 radio modules)

Date of Last Test: 7/3/2012

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
Power, PSD, Bandwidth and Spurious Emissions

Test Specific Details

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

Date of Test: 4/20 & 4/24/12
Test Engineer: Rafael Varelas / J. Caizzi
Test Location: FT3

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: 20.2 °C
Rel. Humidity: 35 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1			Output Power	15.247(b)	Pass	b: 19.1dBm g: 21.9dBm n20: 21.6dBm n40: 21.9dBm
2			Power spectral Density (PSD)	15.247(d)	Pass	b: -4.4 dBm/3kHz g: -5.1 dBm/3kHz n20: -7.4 dBm/3kHz n40: -7.4 dBm/3kHz
3			Minimum 6dB Bandwidth	15.247(a)	Pass	10.1 MHz
3			99% Bandwidth	RSS GEN	Pass	39.8 MHz
4			Spurious emissions	15.247(b)	Pass	All emissions below the -30dBc or -20dBc limit

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, 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.

Testing Notes

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

Operating Mode: 802.11b

Transmitted signal on chain is coherent ? y

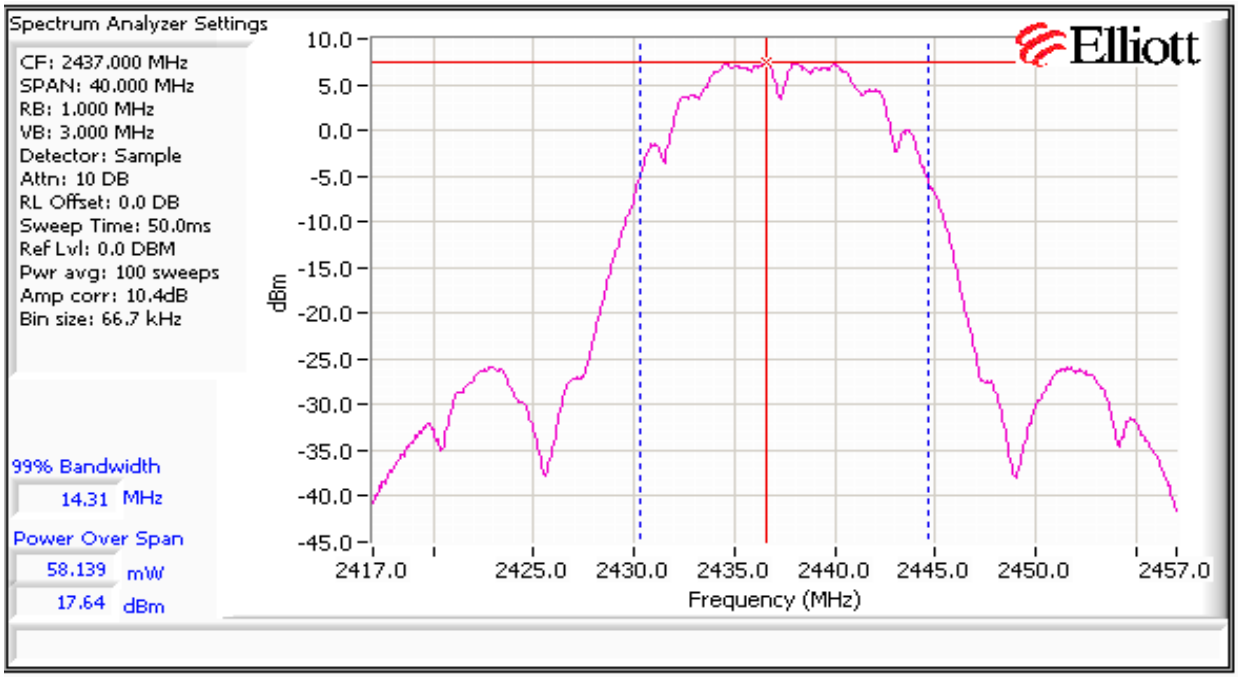
2412 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	30.0	30.0	30.0					
Output Power (dBm) Note 1	7.32	7.14	12.82		14.7 dBm	0.030 W	22.2 dBm	0.167 W
Antenna Gain (dBi) Note 2	9	9	9		13.8 dBi		Pass	
eirp (dBm) Note 2	16.32	16.14	21.82		28.5 dBm	0.708 W		

2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	36.0	36.0	36.0					
Output Power (dBm) Note 1	10.54	10.9	17.64		19.1 dBm	0.082 W	22.2 dBm	0.167 W
Antenna Gain (dBi) Note 2	9	9	9		13.8 dBi		Pass	
eirp (dBm) Note 2	19.54	19.9	26.64		32.9 dBm	1.947 W		

2462 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	34.0	34.0	34.0					
Output Power (dBm) Note 1	8.07	8.49	15.2		16.7 dBm	0.047 W	22.2 dBm	0.167 W
Antenna Gain (dBi) Note 2	9	9	9		13.8 dBi		Pass	
eirp (dBm) Note 2	17.07	17.49	24.2		30.5 dBm	1.110 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 40 MHz (option #2 7.2.2.2 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:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

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	27.0	27.0	27.0					
Output Power (dBm) Note 1	10.7	11.1	18.5		19.8 dBm	0.095 W	22.2 dBm	0.167 W
Antenna Gain (dBi) Note 2	9	9	9		13.8 dBi		Pass	
eirp (dBm) Note 2	19.7	20.1	27.5		33.6 dBm	2.274 W		

2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	28.0	28.0	28.0					
Output Power (dBm) Note 1	12.2	12.3	20.8		21.9 dBm	0.154 W	22.2 dBm	0.167 W
Antenna Gain (dBi) Note 2	9	9	9		13.8 dBi		Pass	
eirp (dBm) Note 2	21.2	21.3	29.8		35.6 dBm	3.665 W		

2462 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	25.0	25.0	25.0					
Output Power (dBm) Note 1	10.2	9.90	19		20.0 dBm	0.100 W	22.2 dBm	0.167 W
Antenna Gain (dBi) Note 2	9	9	9		13.8 dBi		Pass	
eirp (dBm) Note 2	19.2	18.9	28		33.8 dBm	2.375 W		

Note 1:	Output power measured using a peak power meter (Option 3 7.2.1.3 of KDB 558074), spurious limit is -20dBc.
Note 2:	As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain
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:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Operating Mode: 802.11n20
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	25.0	25.0	25.0					
Output Power (dBm) Note 1	9.8	10	16.7		18.2 dBm	0.066 W	22.2 dBm	0.167 W
Antenna Gain (dBi) Note 2	9	9	9		13.8 dBi		Pass	
eirp (dBm) Note 2	18.8	19	25.7		32.0 dBm	1.580 W		

2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	28.0	28.0	28.0					
Output Power (dBm) Note 1	11.9	12.1	20.5		21.6 dBm	0.144 W	22.2 dBm	0.167 W
Antenna Gain (dBi) Note 2	9	9	9		13.8 dBi		Pass	
eirp (dBm) Note 2	20.9	21.1	29.5		35.4 dBm	3.429 W		

2462 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	24.0	24.0	24.0					
Output Power (dBm) Note 1	8.7	8.9	18.7		19.5 dBm	0.089 W	22.2 dBm	0.167 W
Antenna Gain (dBi) Note 2	9	9	9		13.8 dBi		Pass	
eirp (dBm) Note 2	17.7	17.9	27.7		33.3 dBm	2.128 W		

Note 1:	Output power measured using a peak power meter (Option 3 7.2.1.3 of KDB 558074), spurious limit is -20dBc.
Note 2:	As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain
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:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Operating Mode: 802.11n40
Transmitted signal on chain is coherent ? yes

2422 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	18.0	18.0	18.0					
Output Power (dBm) Note 1	5.3	4.8	12.6		13.9 dBm	0.025 W	22.2 dBm	0.167 W
Antenna Gain (dBi) Note 2	9	9	9		13.8 dBi		Pass	
eirp (dBm) Note 2	14.3	13.8	21.6		27.7 dBm	0.586 W		

2437 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	29.0							
Output Power (dBm) Note 1	12.2	12.3	20.8		21.9 dBm	0.154 W	22.2 dBm	0.167 W
Antenna Gain (dBi) Note 2	9	9	9		13.8 dBi		Pass	
eirp (dBm) Note 2	21.2	21.3	29.8		35.6 dBm	3.665 W		

2452 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	18.0	18.0	18.0					
Output Power (dBm) Note 1	4.2	5.3	14.6		15.4 dBm	0.035 W	22.2 dBm	0.167 W
Antenna Gain (dBi) Note 2	9	9	9		13.8 dBi		Pass	
eirp (dBm) Note 2	13.2	14.3	23.6		29.2 dBm	0.831 W		

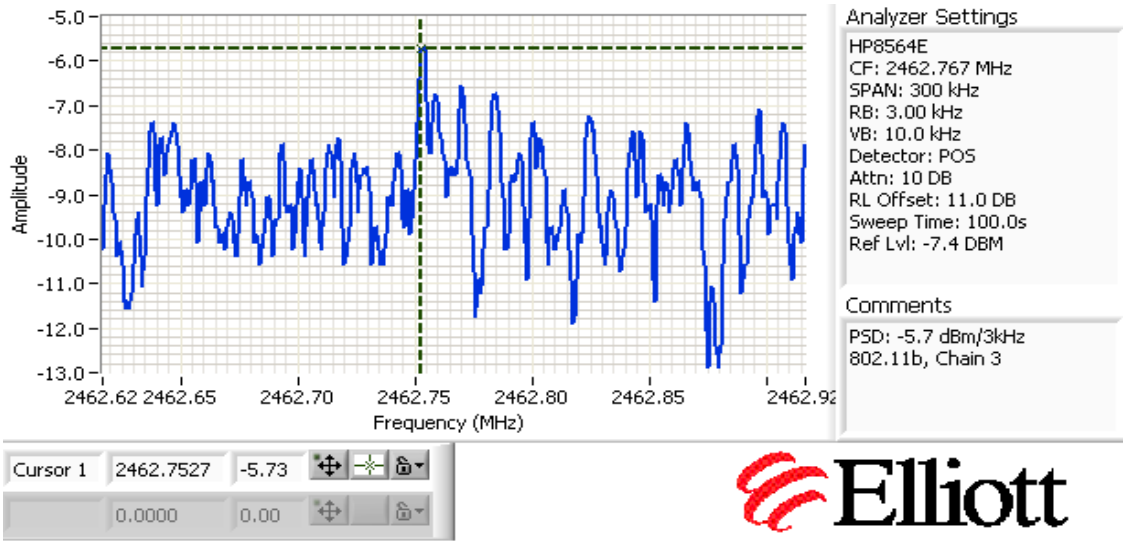
Note 1:	Output power measured using a peak power meter (Option 3 7.2.1.3 of KDB 558074), spurious limit is -20dBc.
Note 2:	As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain
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:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1 Chain 1	Chain 2	Chain 3	Chain 4	Total	Limit dBm/3kHz	Result
802.11b								
36	2412	-14.8	-12.6	-7.9		-6.0	8.0	Pass
36	2437	-13.8	-14.4	-7.8		-6.1	8.0	Pass
36	2462	-14.6	-12.4	-5.7		-4.4	8.0	Pass
802.11g								
38	2412	-14.1	-13.4	-7.6		-5.9	8.0	Pass
38	2437	-13.1	-13.9	-7.4		-5.7	8.0	Pass
38	2462	-13.4	-13.1	-6.7		-5.1	8.0	Pass
802.11n20								
34	2412	-16.4	-16.6	-10.9		-9.0	8.0	Pass
34	2437	-15.6	-15.4	-9.4		-7.7	8.0	Pass
34	2462	-15.1	-15.8	-9.1		-7.4	8.0	Pass
802.11n40								
39	2422	-15.0	-15.0	-9.2		-7.4	8.0	Pass
39	2437	-16.9	-17.2	-10.2		-8.7	8.0	Pass
39	2452	-14.9	-15.1	-9.2		-7.4	8.0	Pass

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

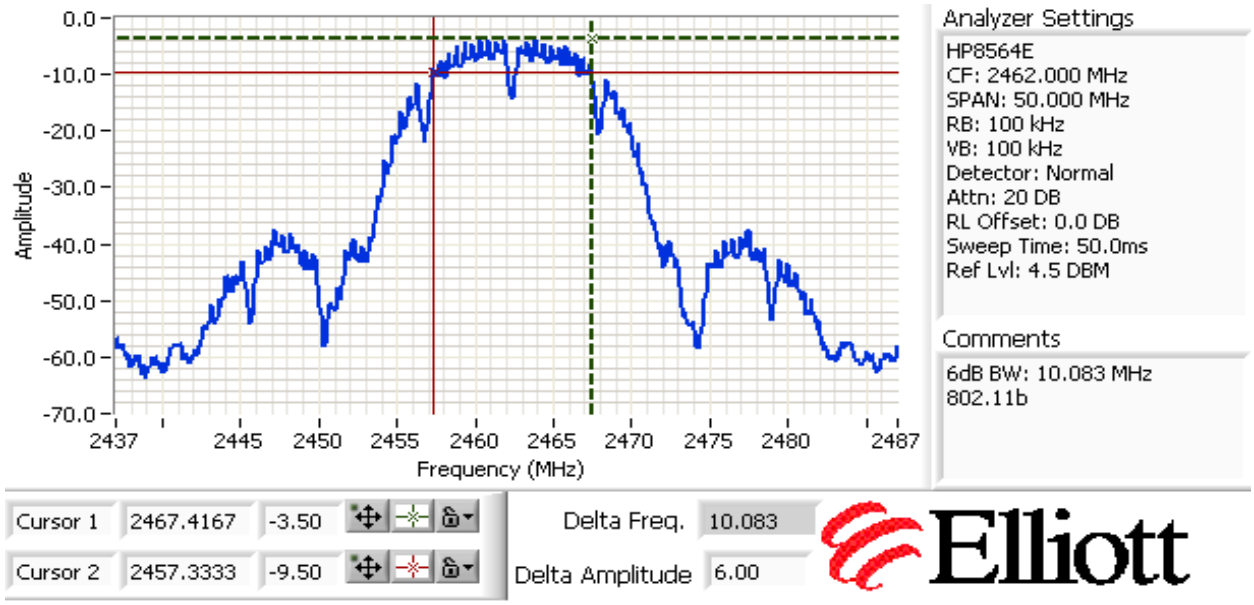


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

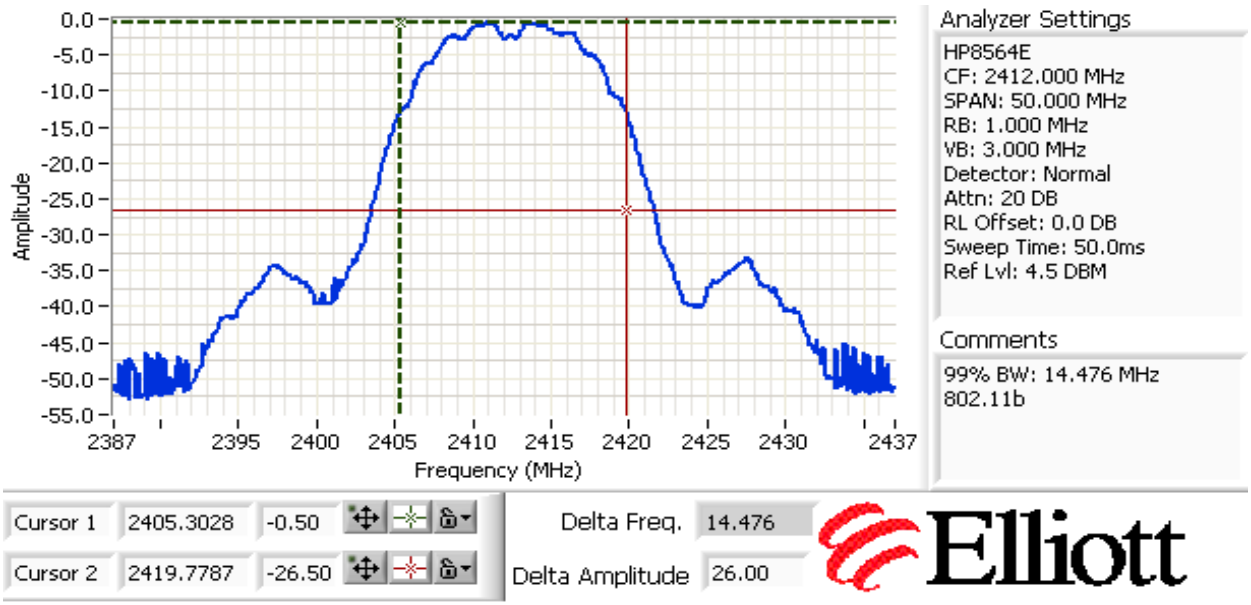
Run #3: Signal Bandwidth

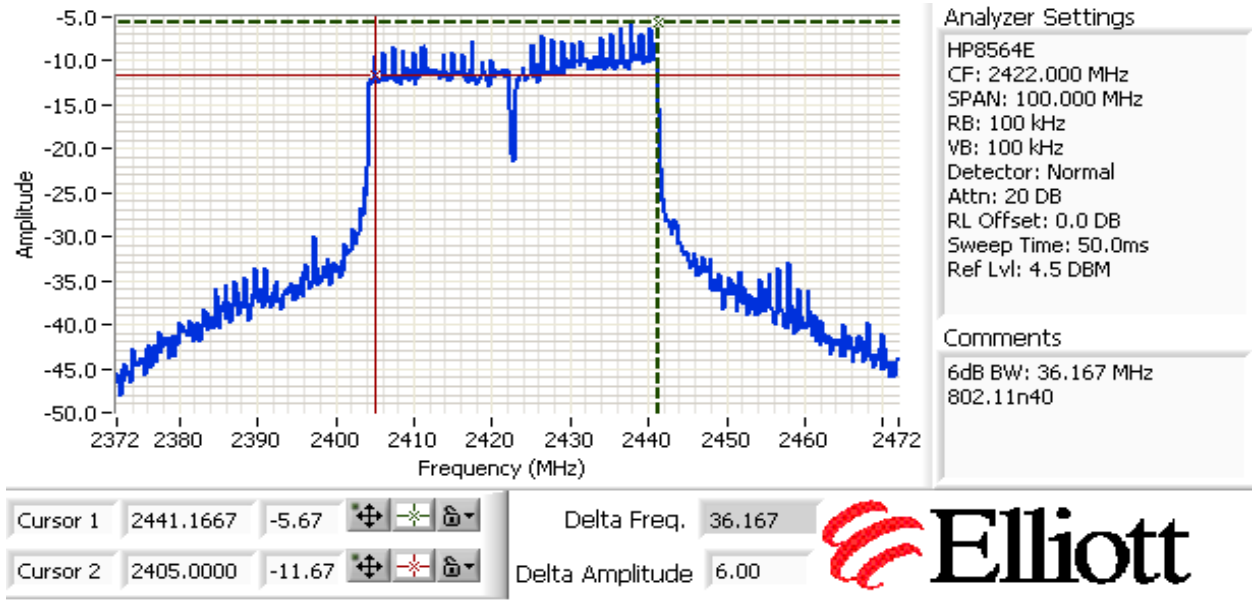
Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
802.11b				
36	2412	100kHz	10.3	14.5
36	2437	100kHz	10.2	14.4
36	2462	100kHz	10.1	14.2
802.11g				
38	2412	100kHz	16.6	19.6
38	2437	100kHz	16.5	19.3
38	2462	100kHz	16.5	19.2
802.11n20				
34	2412	100kHz	17.8	20.1
34	2437	100kHz	17.8	20.1
34	2462	100kHz	17.1	20.0
802.11n40				
39	2422	100kHz	36.2	39.4
39	2437	100kHz	36.8	39.6
39	2452	100kHz	36.5	39.8

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

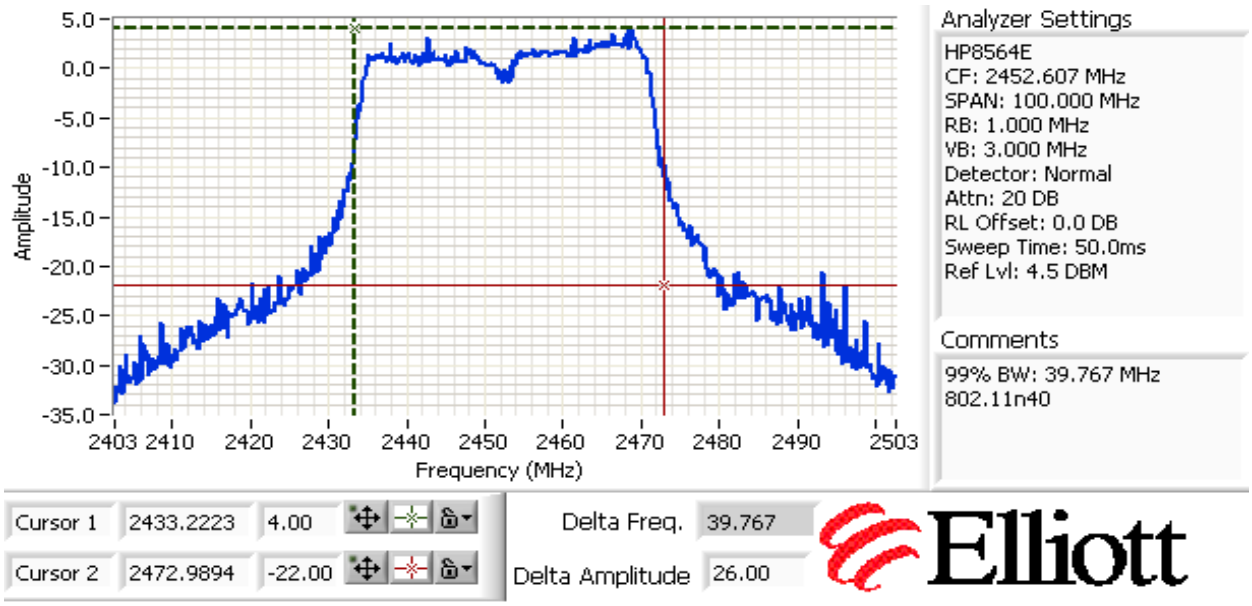


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A





Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

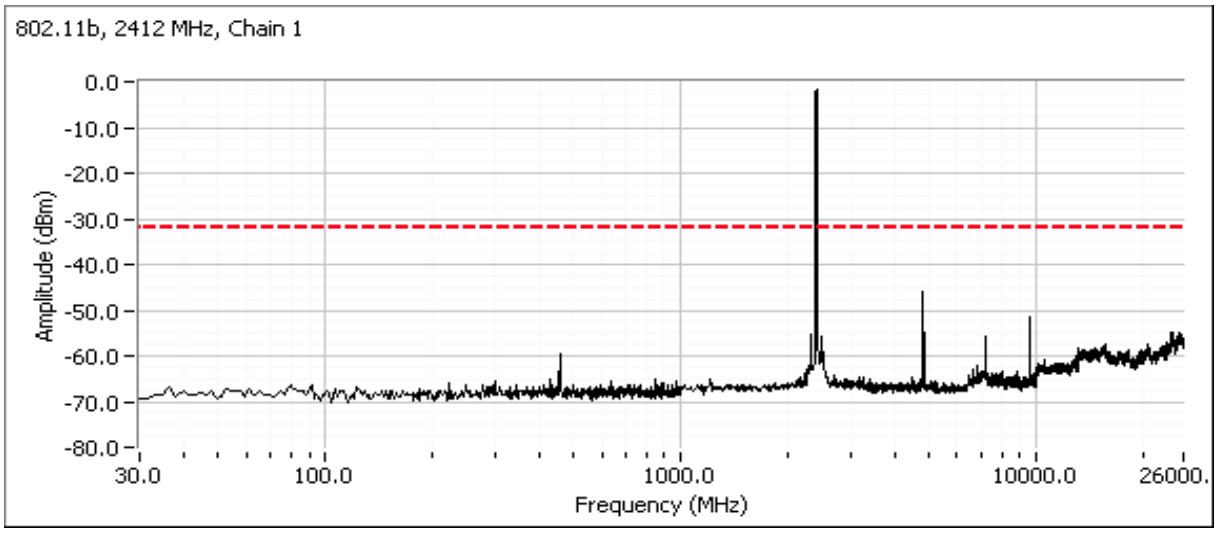
Run #4: Out of Band Spurious Emissions

Power Setting Per Chain #1	#2	#3	#4	Frequency (MHz)	Limit	Result
802.11b						
36	36	36		2412	-30dBC	Pass
36	36	36		2437	30dBc	Pass
36	36	36		2462	30dBc	Pass
802.11g						
38	38	38		2412	-20dBc	Pass
38	38	38		2437	-20dBc	Pass
38	38	38		2462	-20dBc	Pass
802.11n20						
34	34	34		2412	-20dBc	Pass
34	34	34		2437	-20dBc	Pass
34	34	34		2462	-20dBc	Pass
802.11n40						
39	39	39		2422	-20dBc	Pass
39	39	39		2437	-20dBc	Pass
39	39	39		2452	-20dBc	Pass

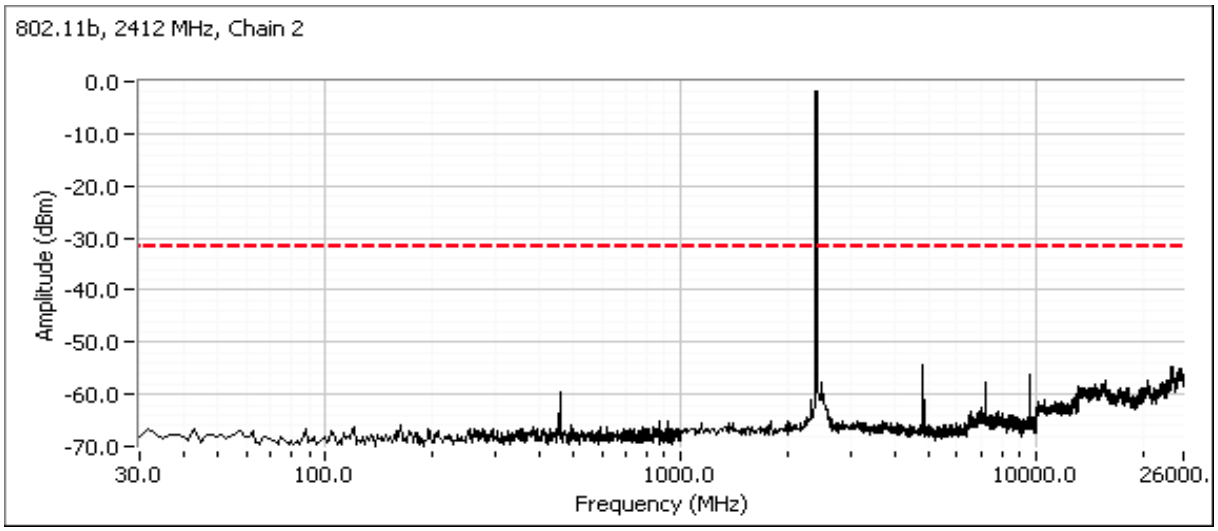
Note 1:	Measured on each chain individually

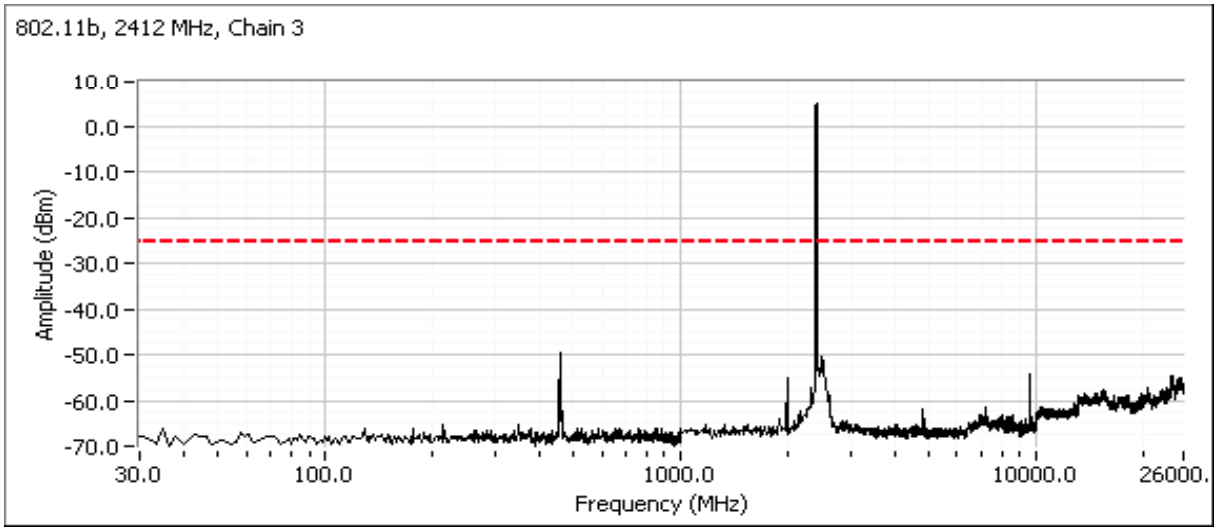
802.11b

Plots for low channel



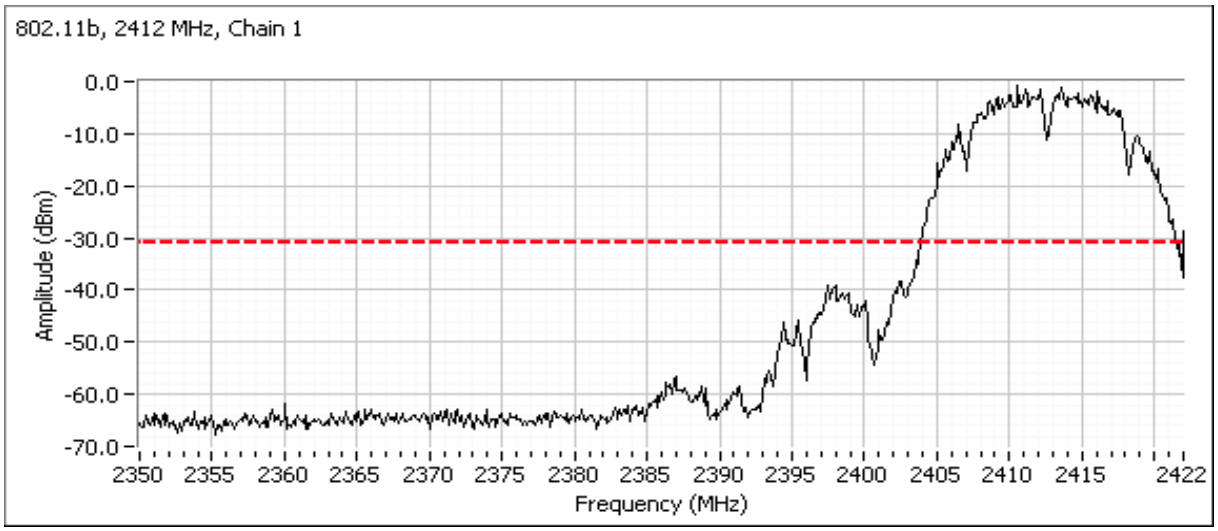
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

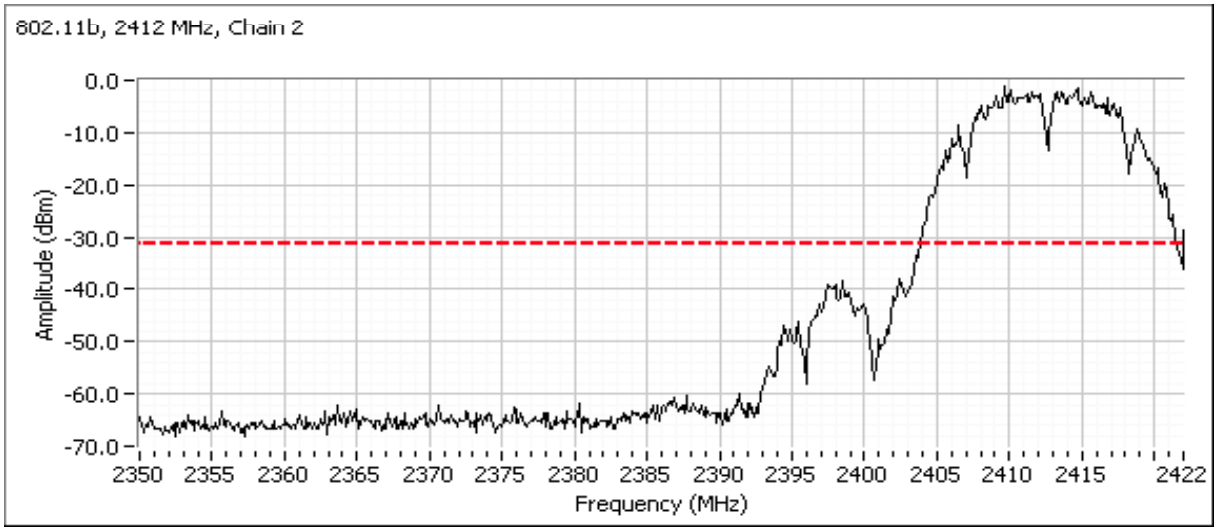




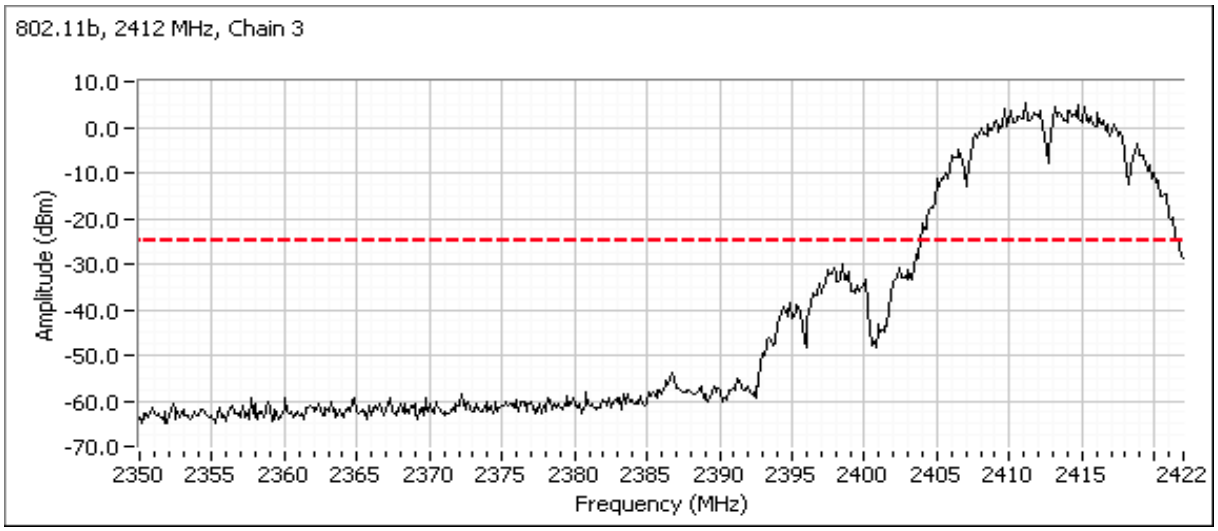
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

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.

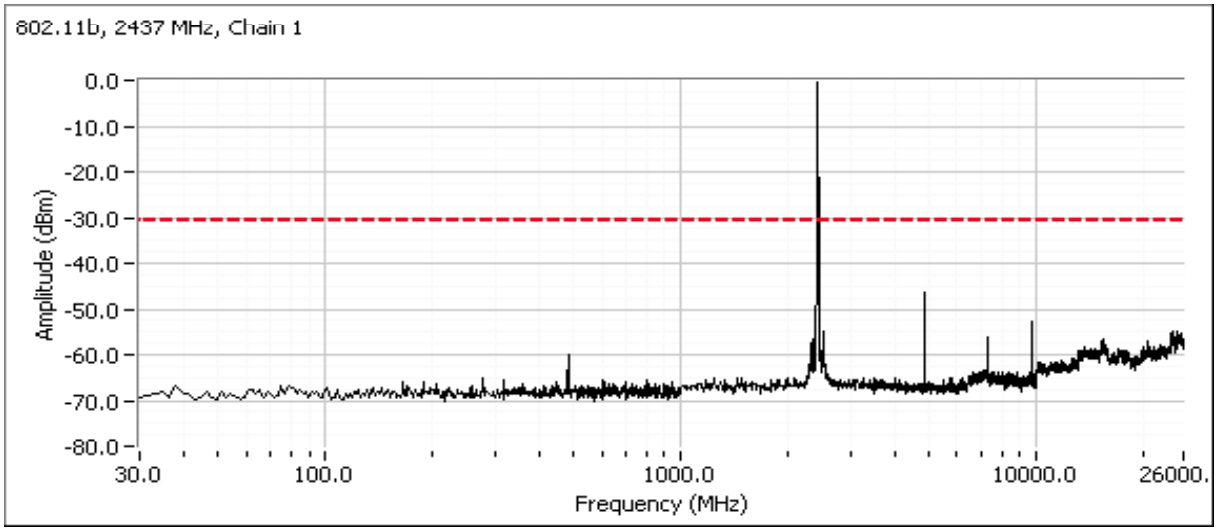




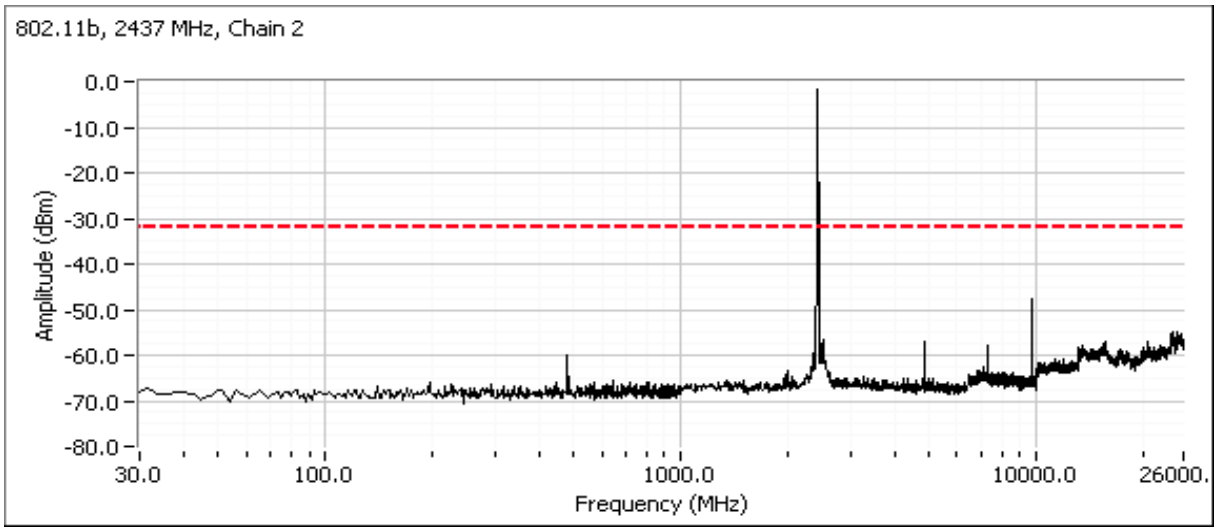
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

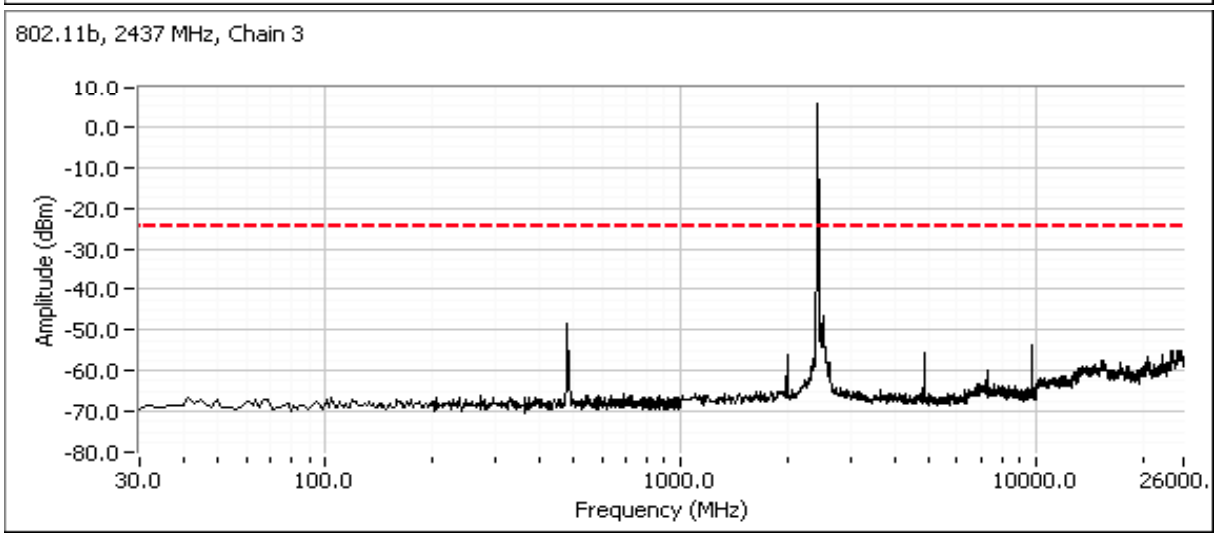


Plots for center channel



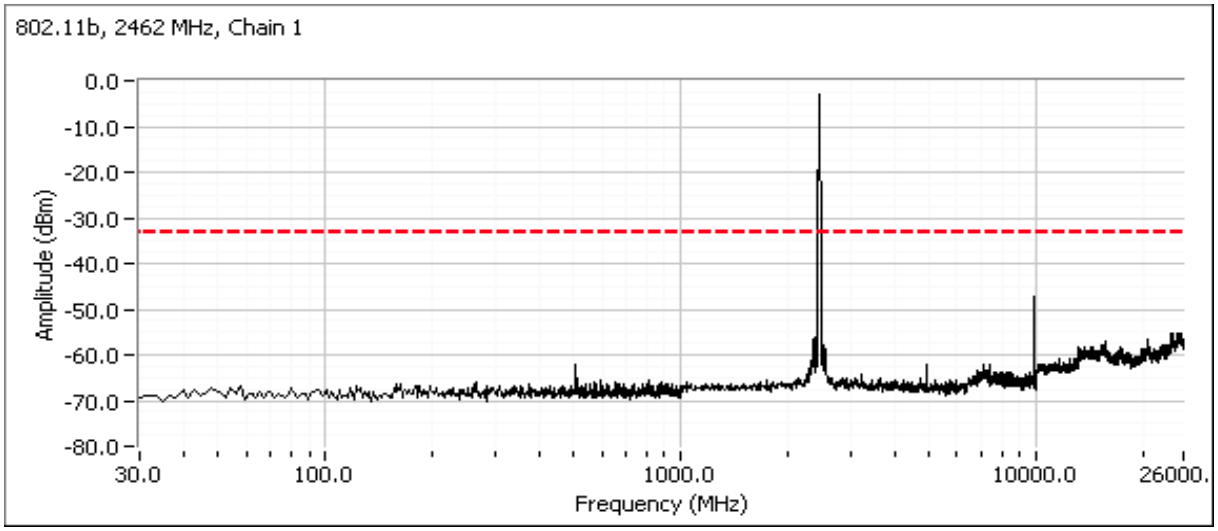
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

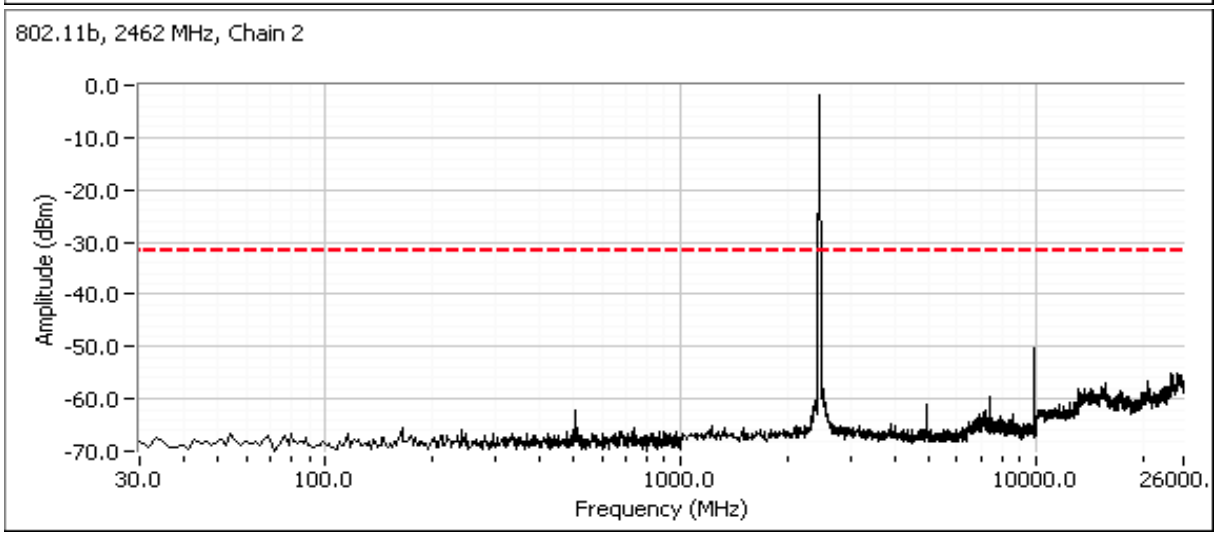




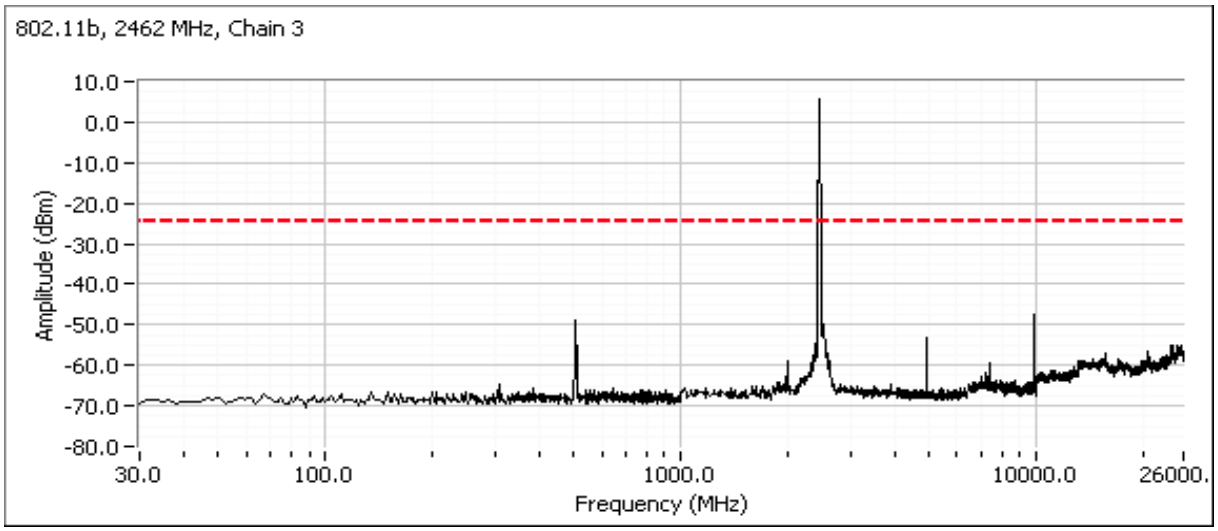
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Plots for high channel



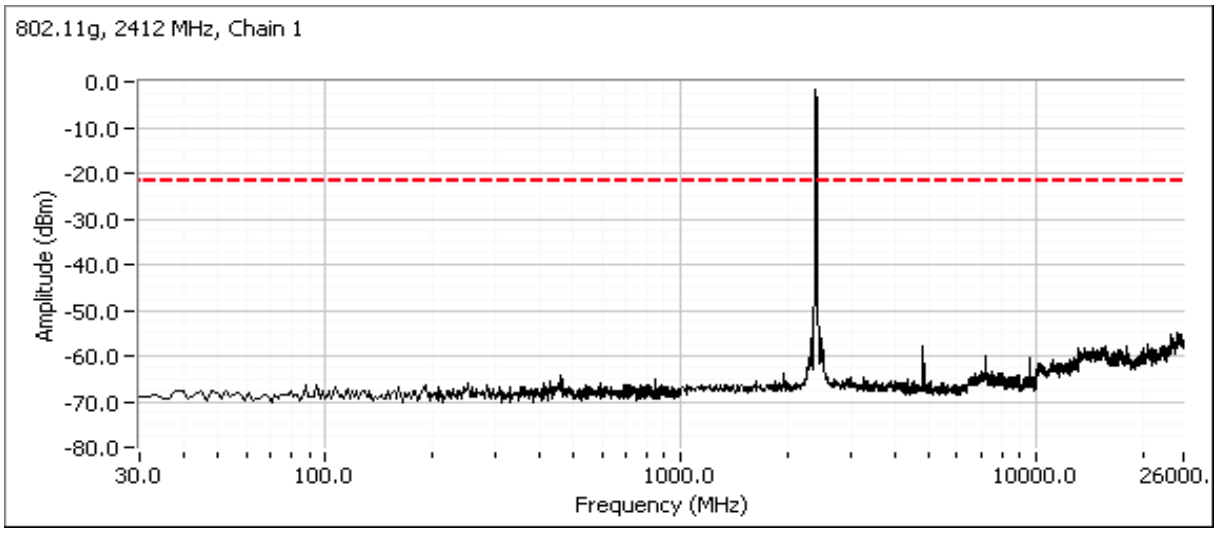


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

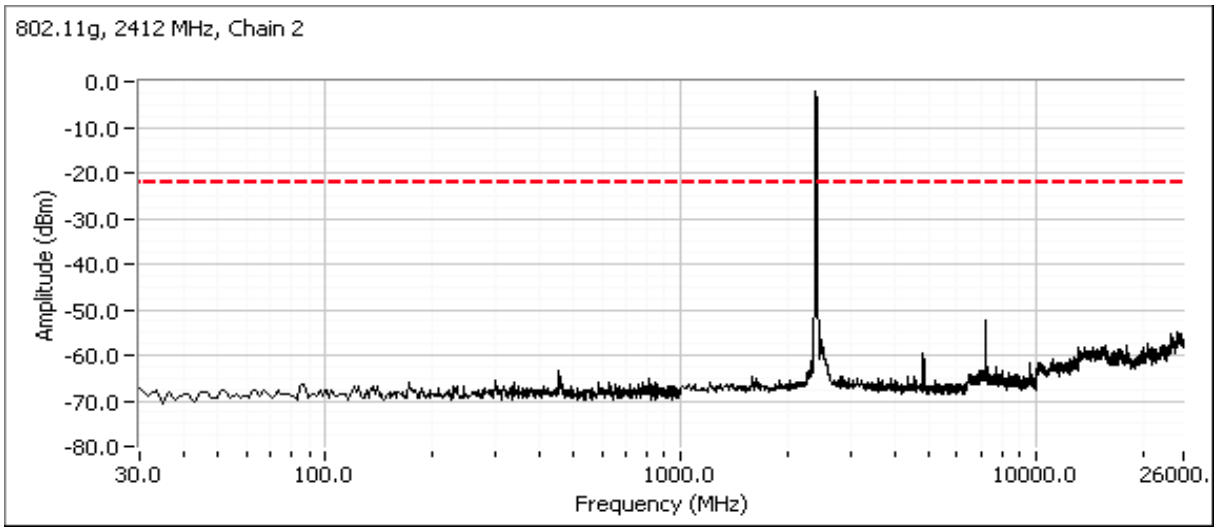


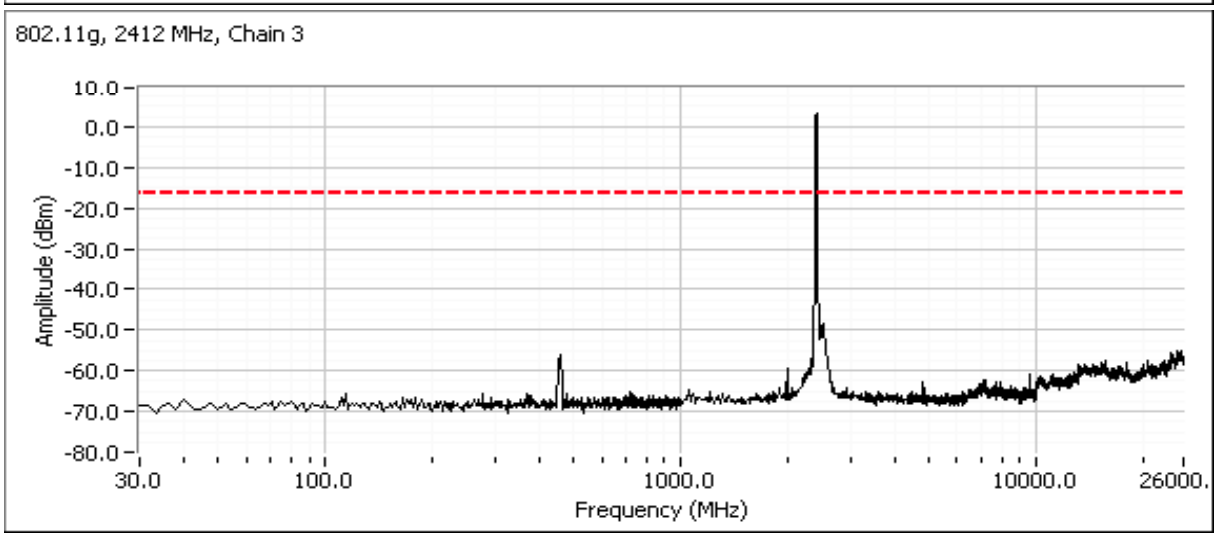
802.11g

Plots for low channel



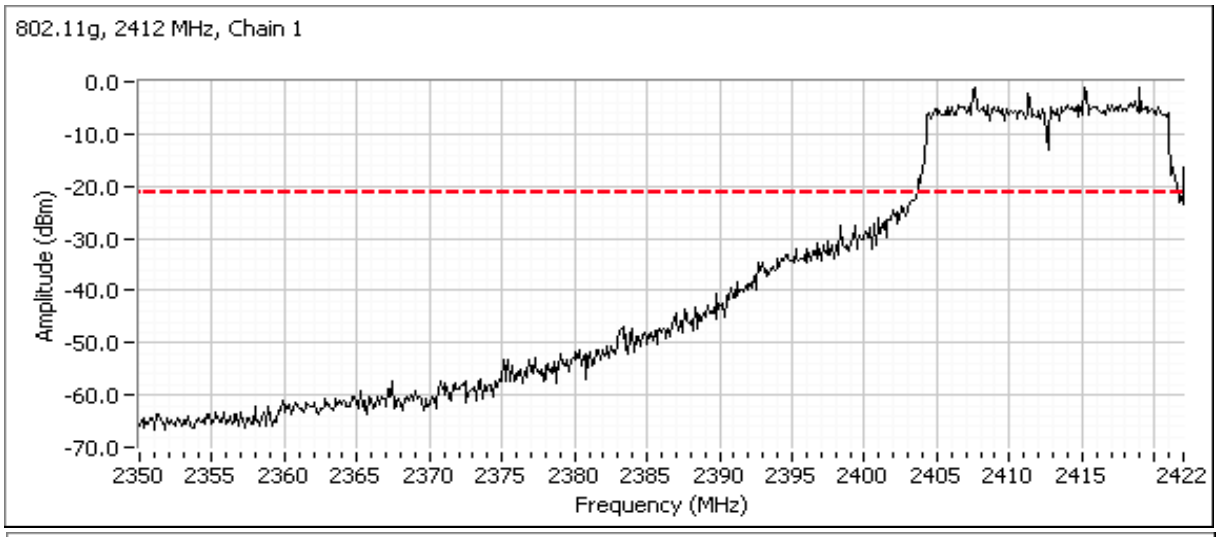
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

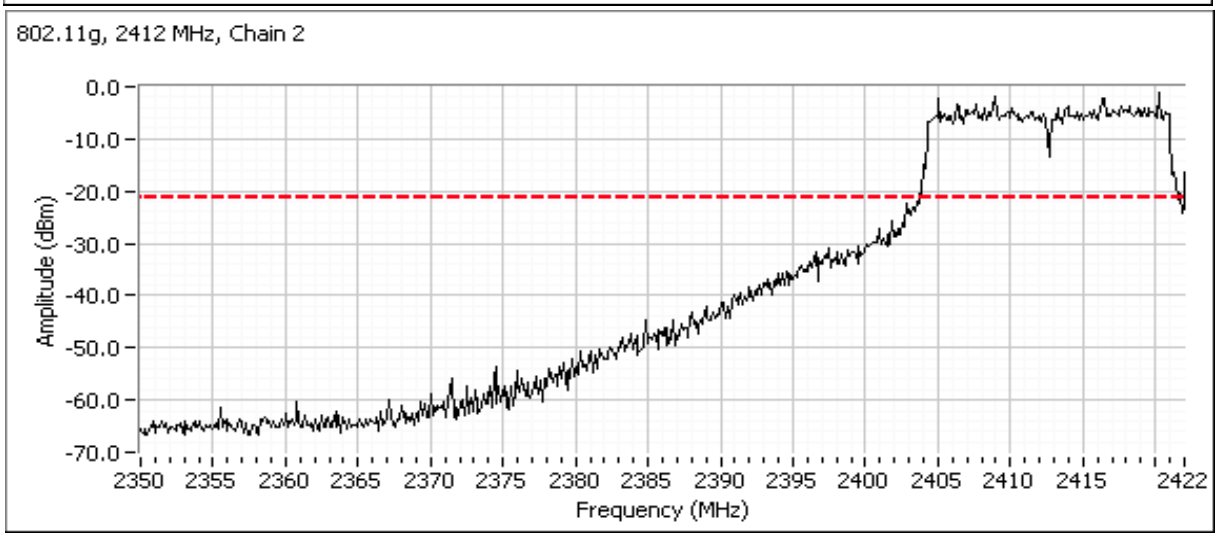




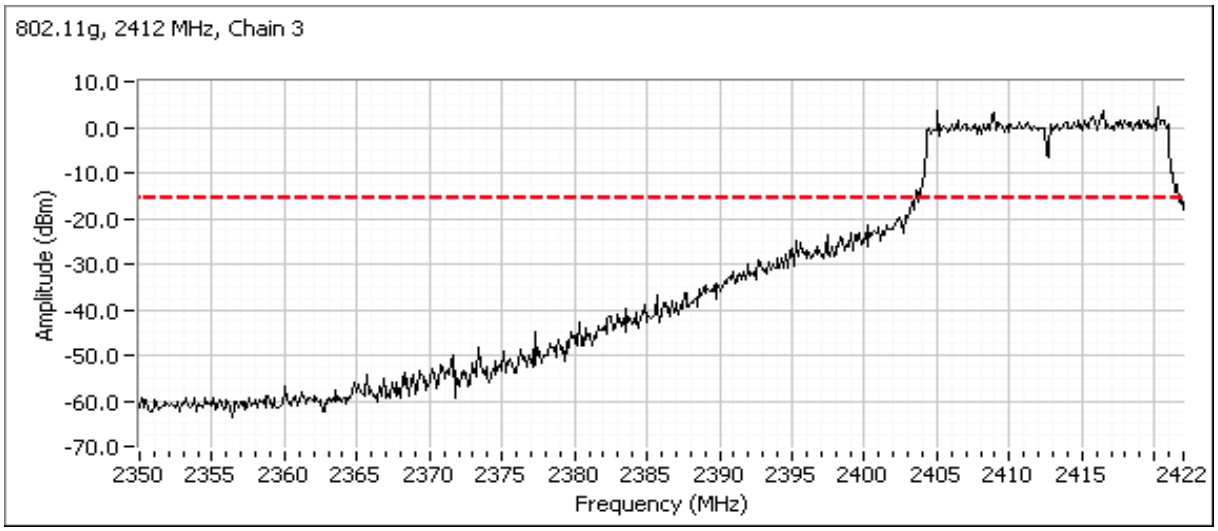
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

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.

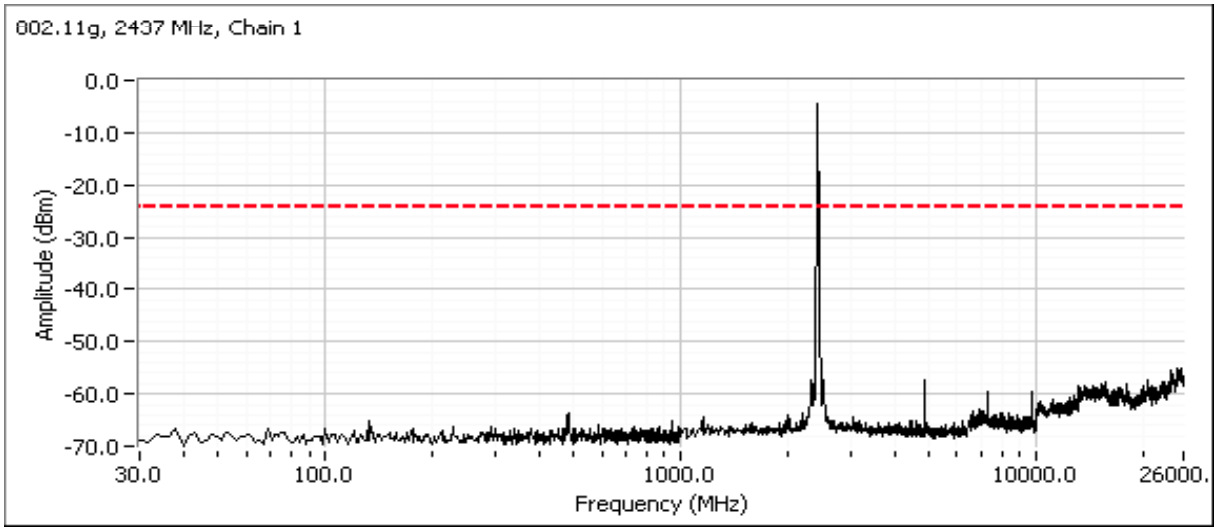




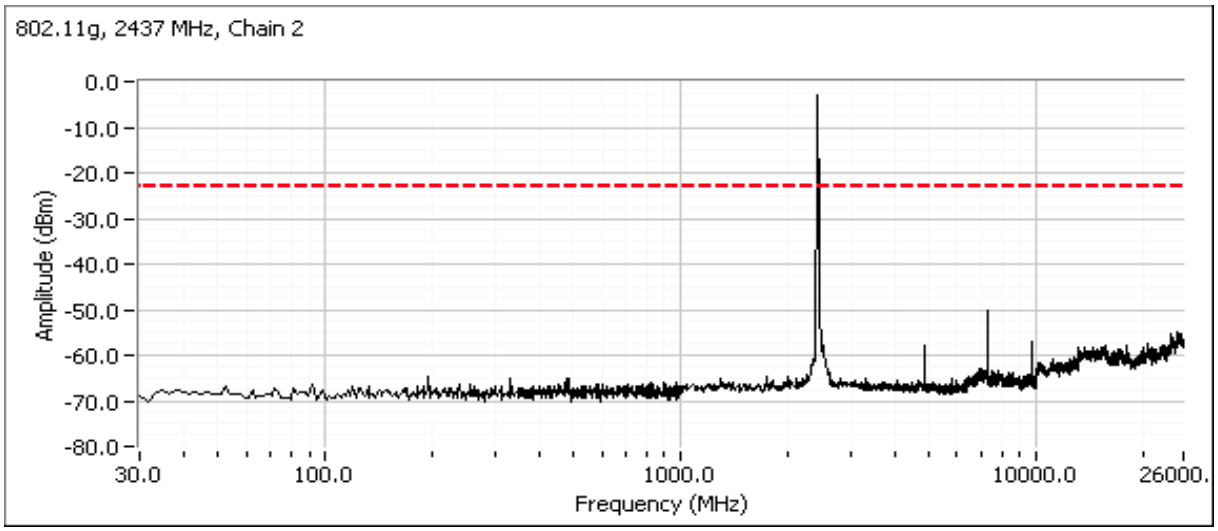
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

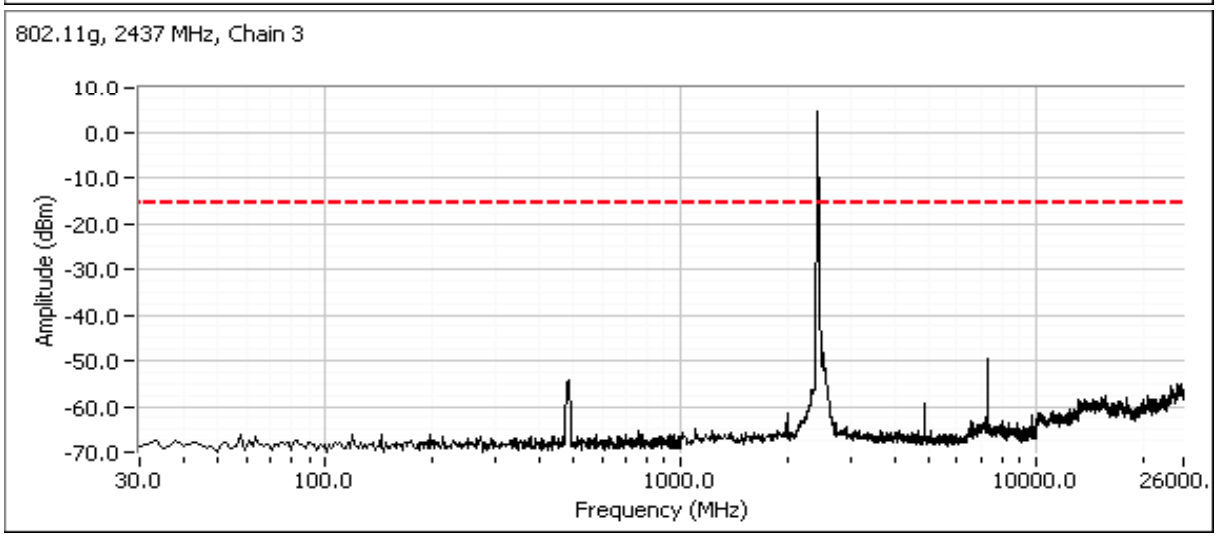


Plots for center channel



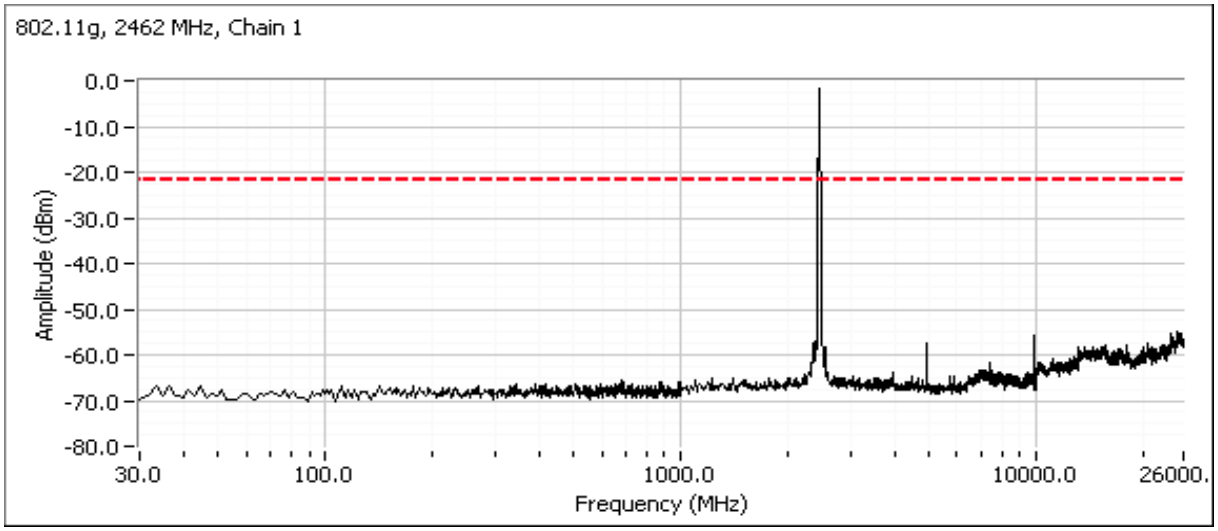
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

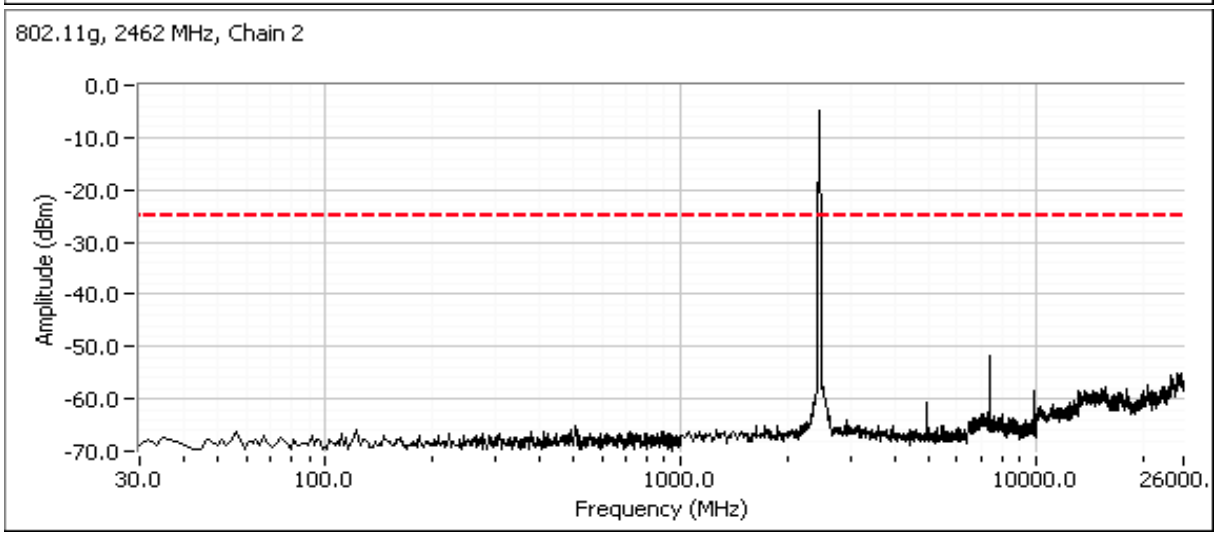




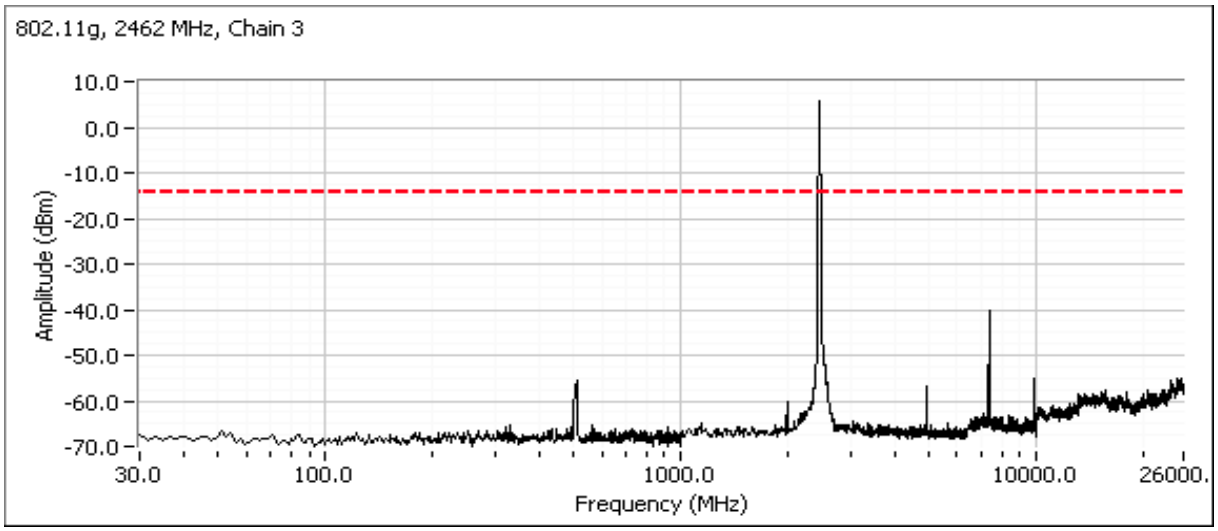
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Plots for high channel



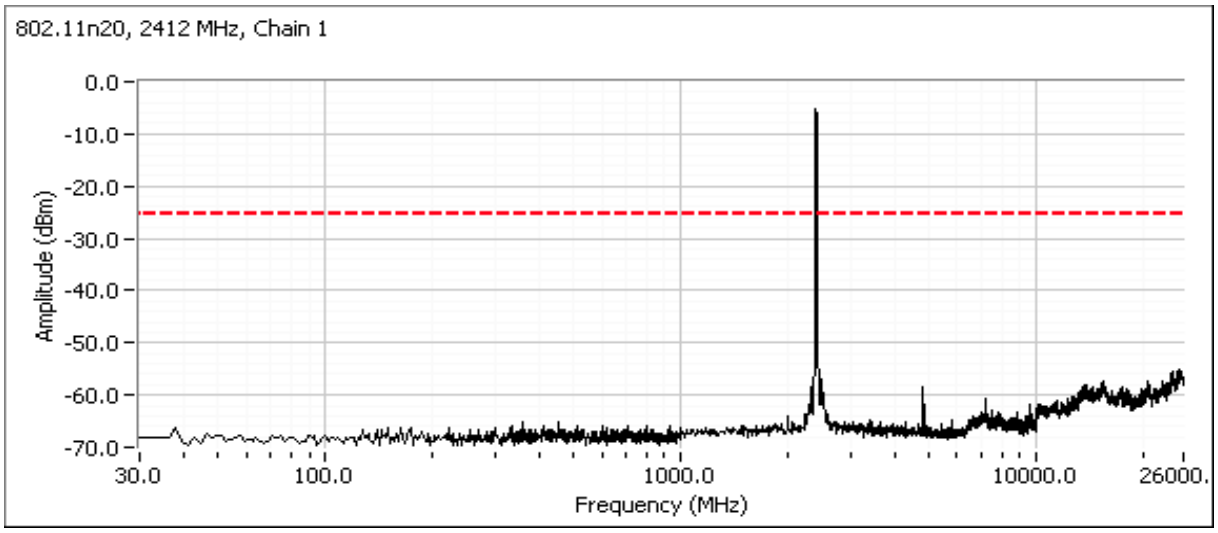


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

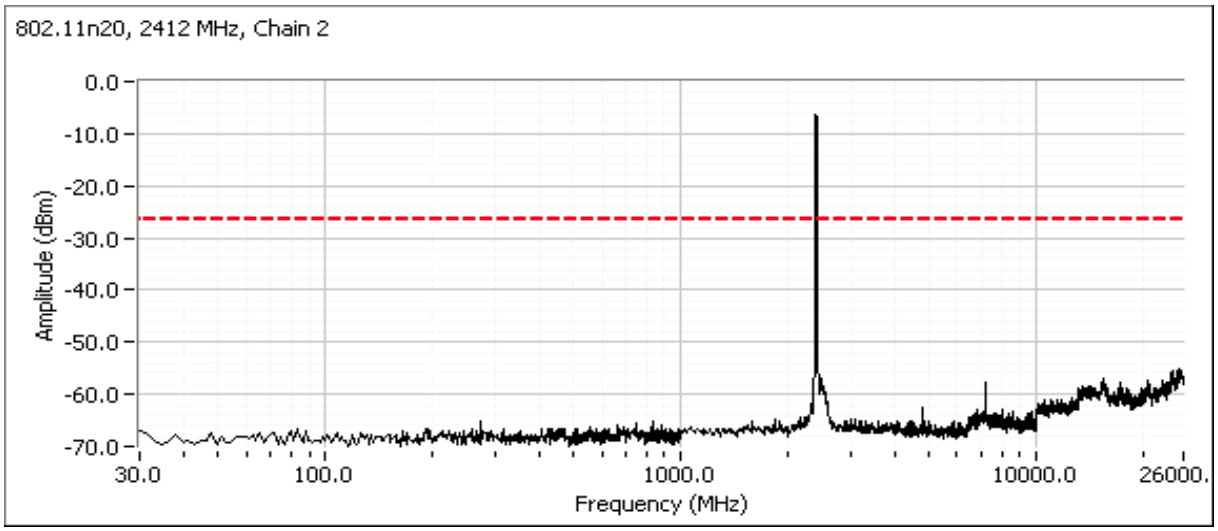


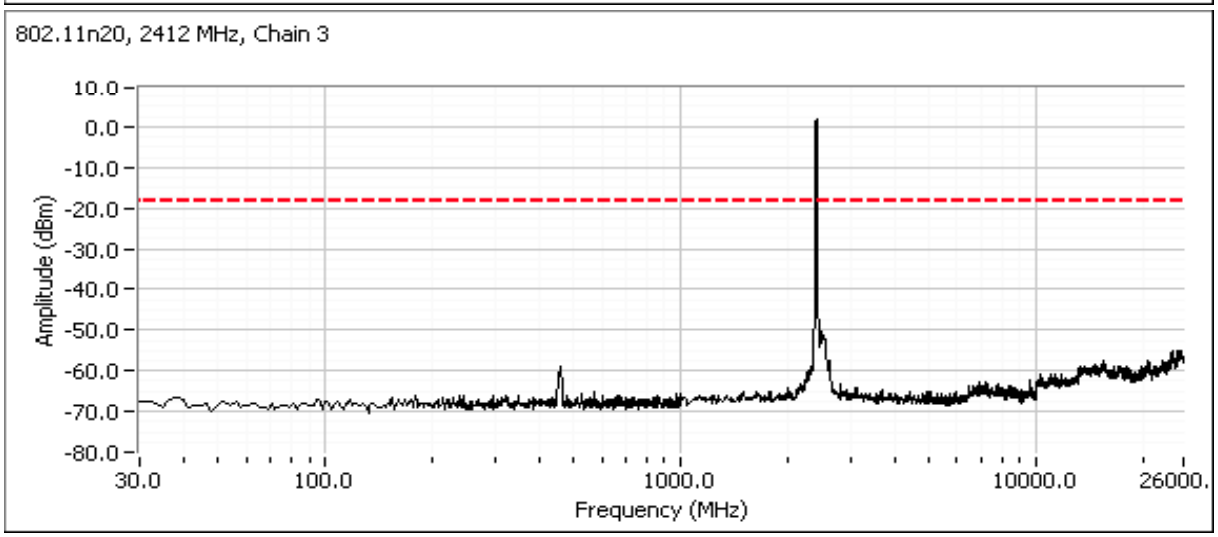
802.11n20

Plots for low channel



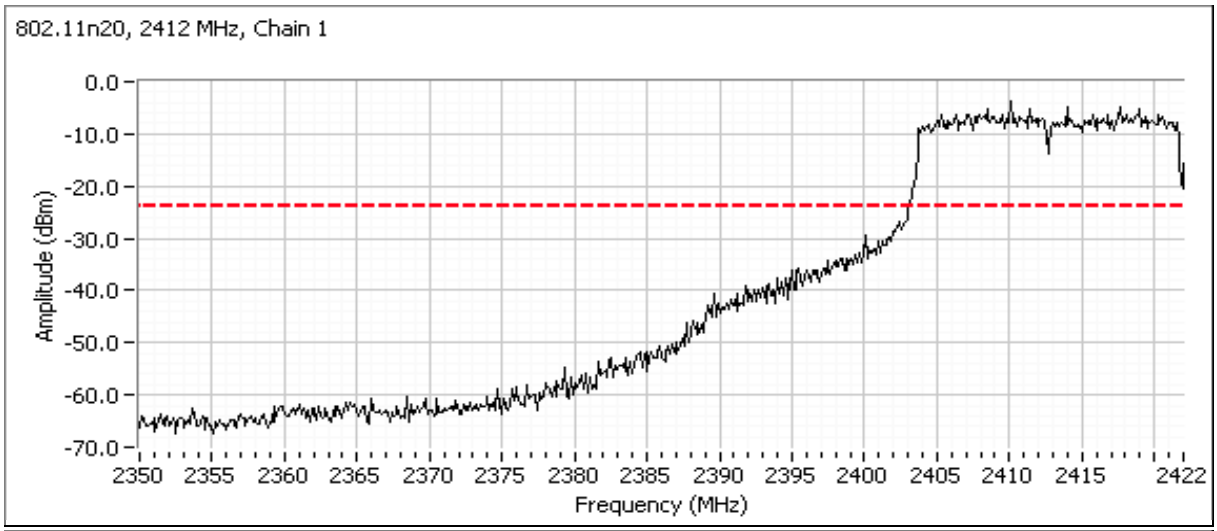
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

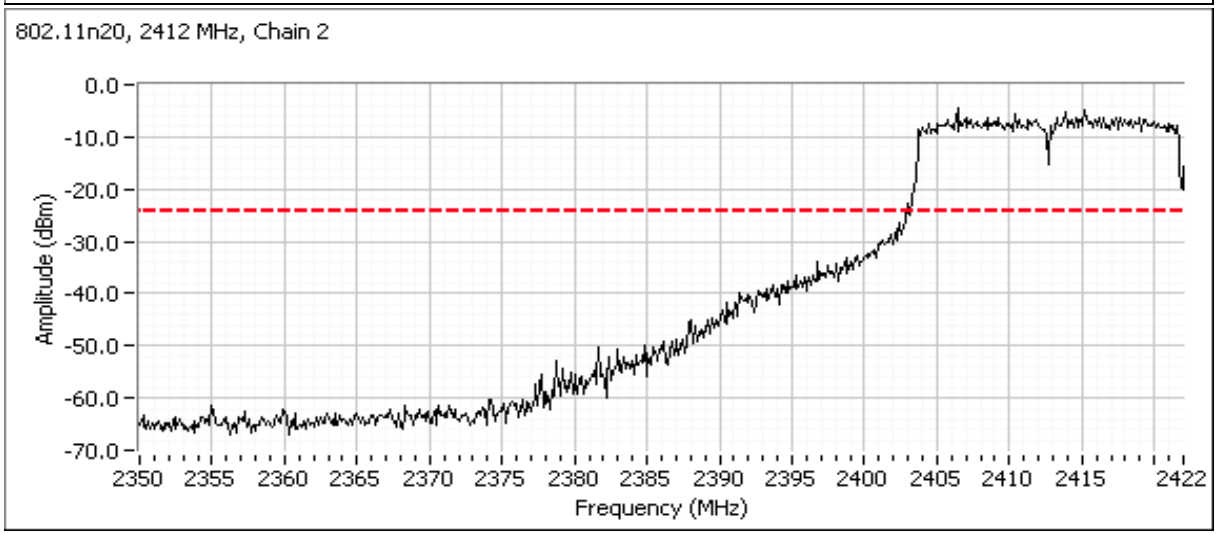




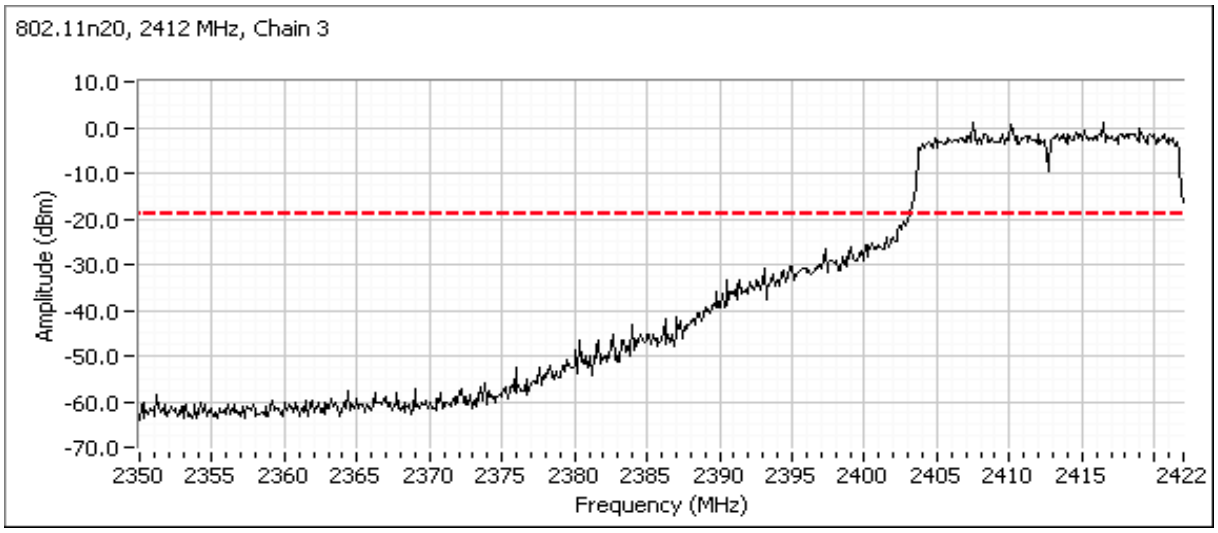
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

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.

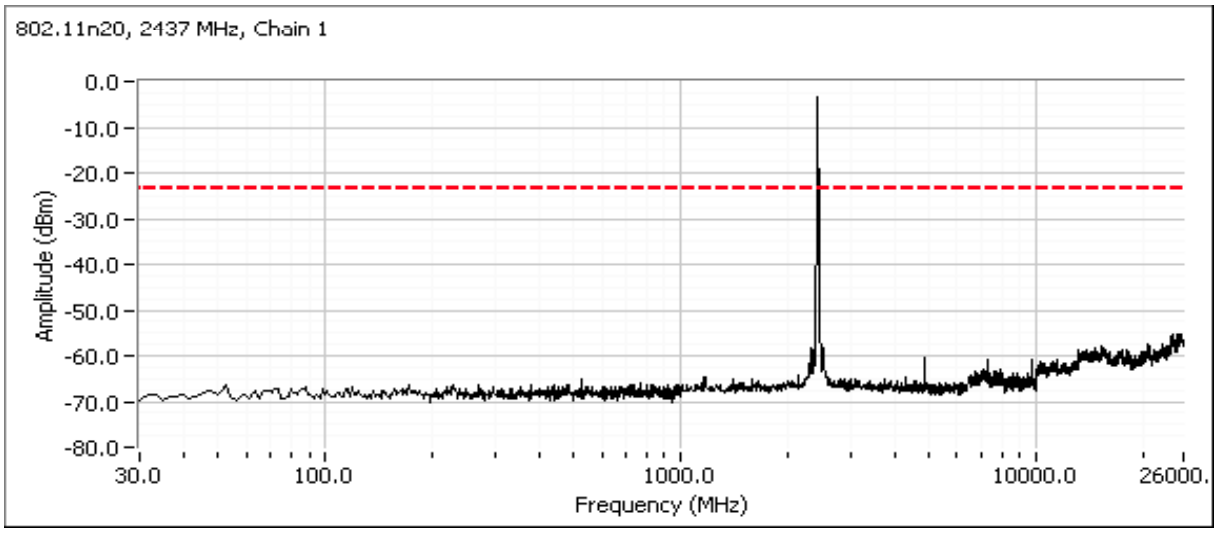




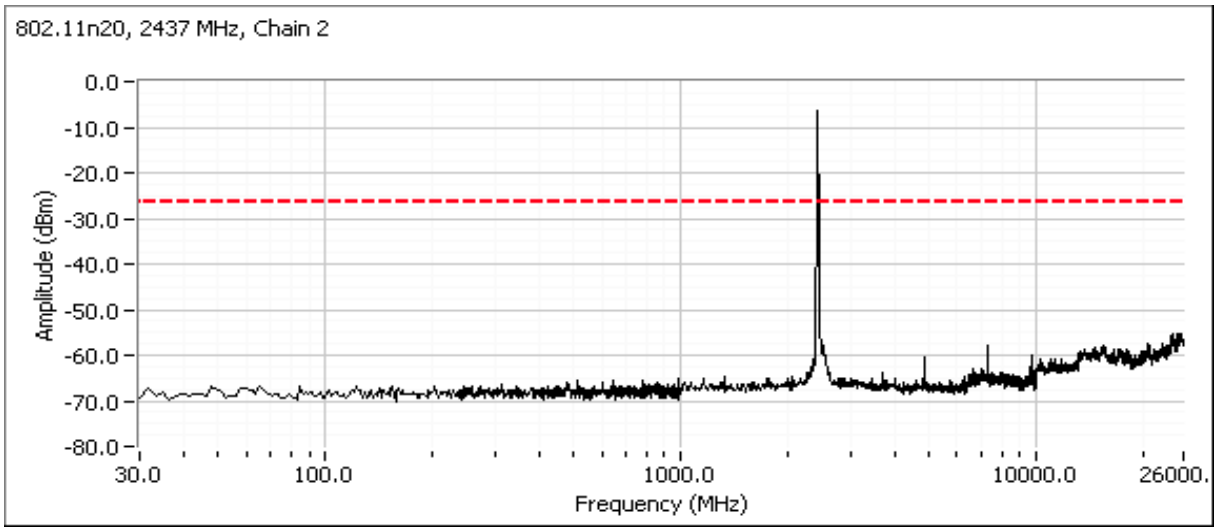
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

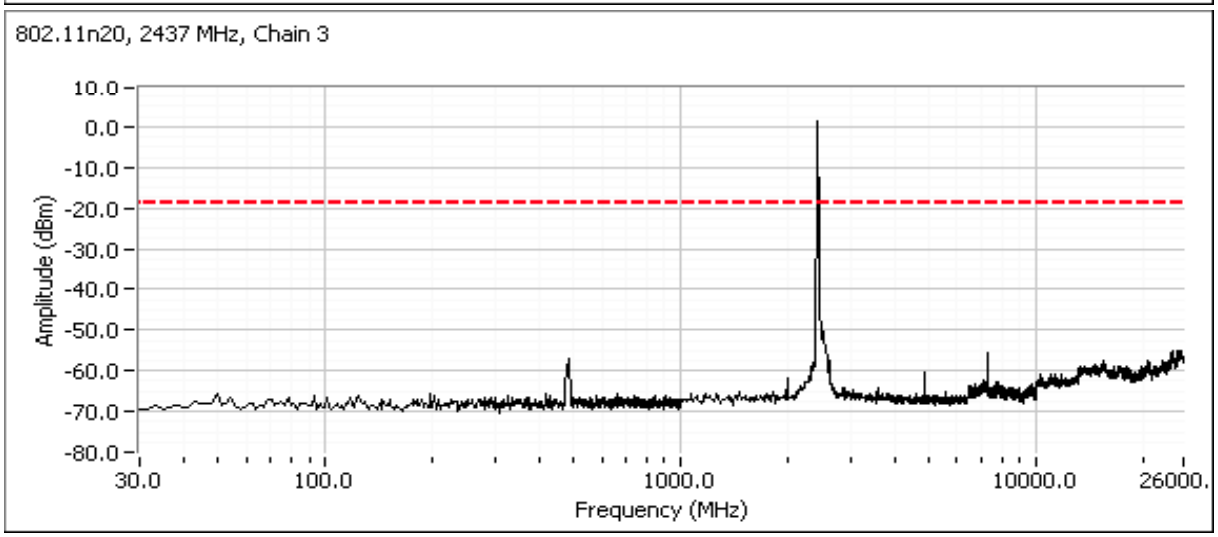


Plots for center channel



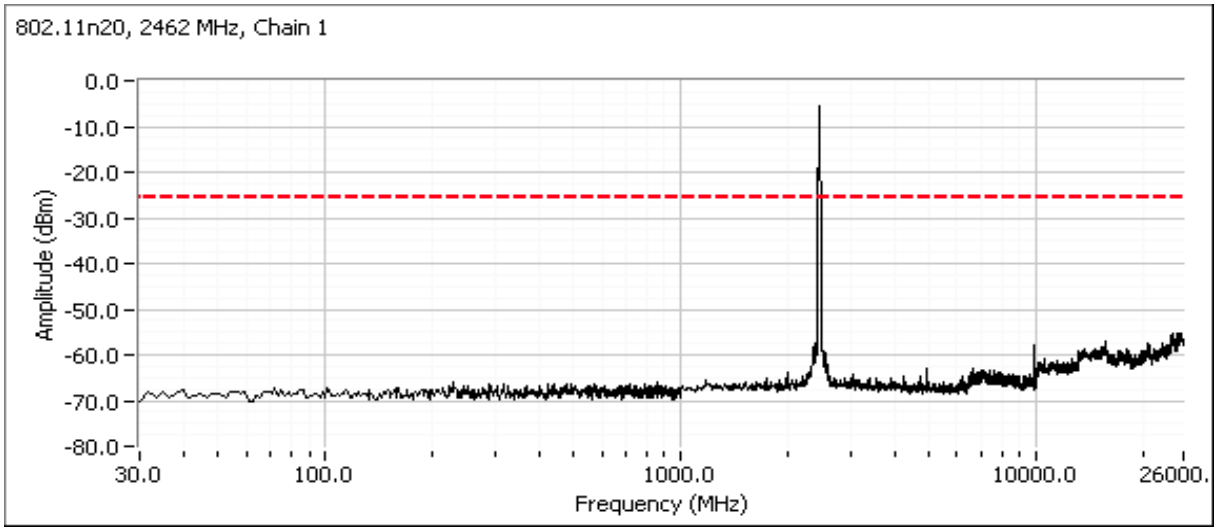
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

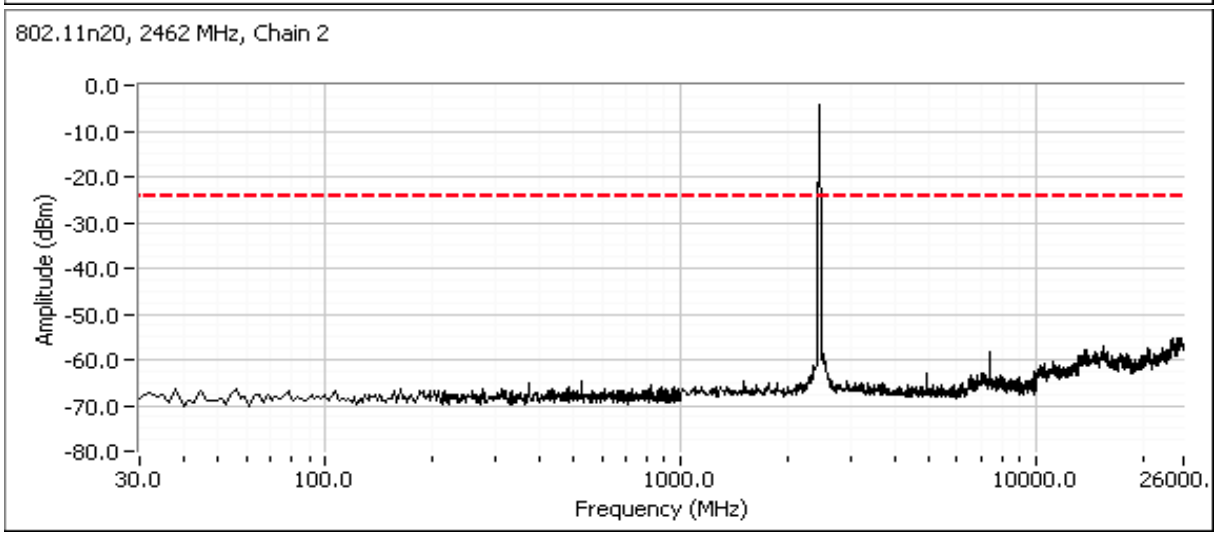




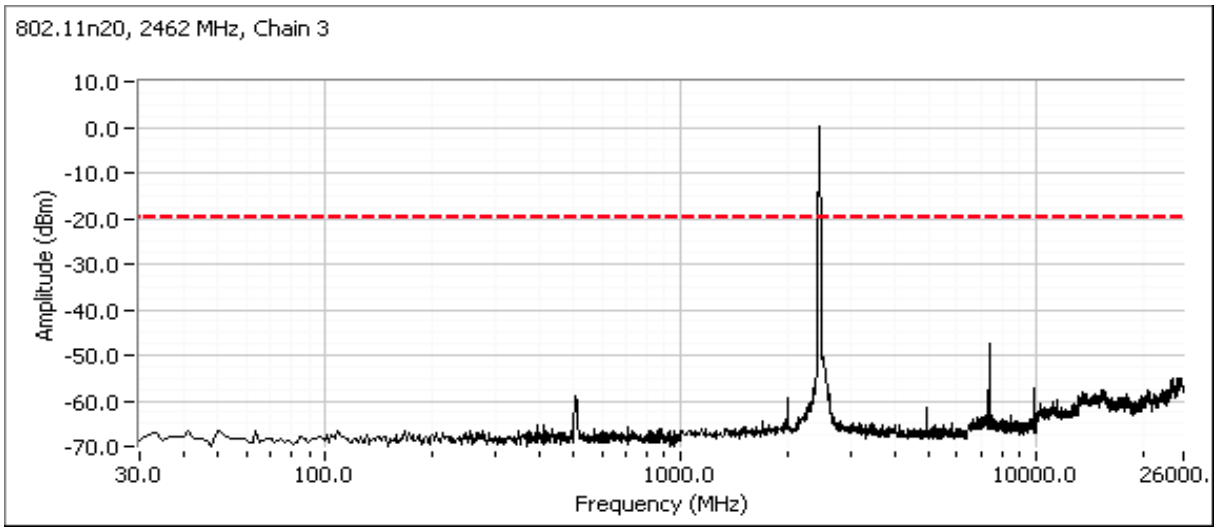
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Plots for high channel



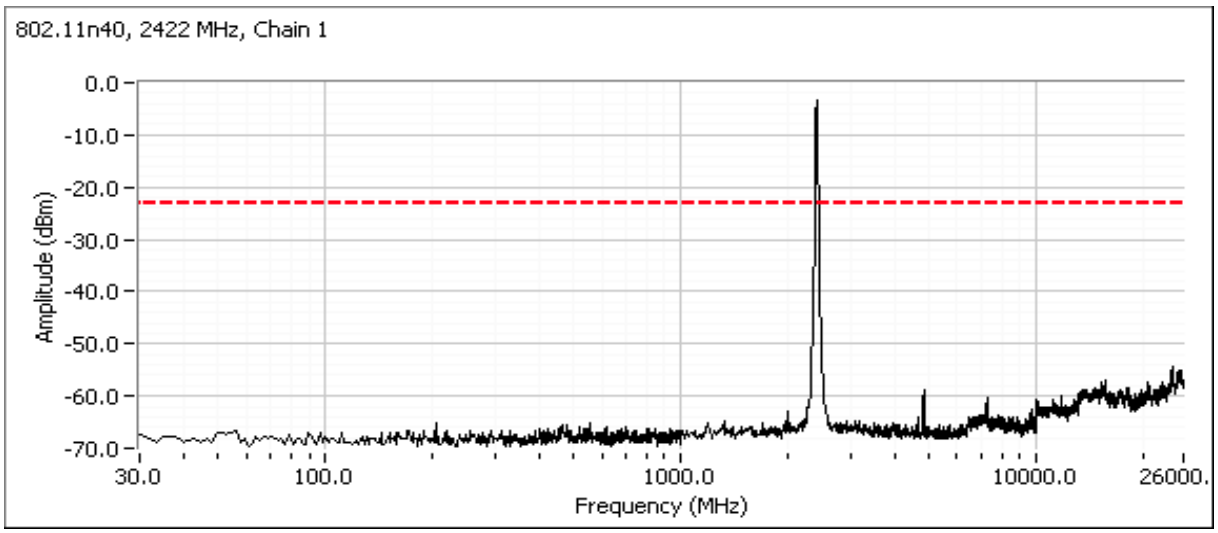


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

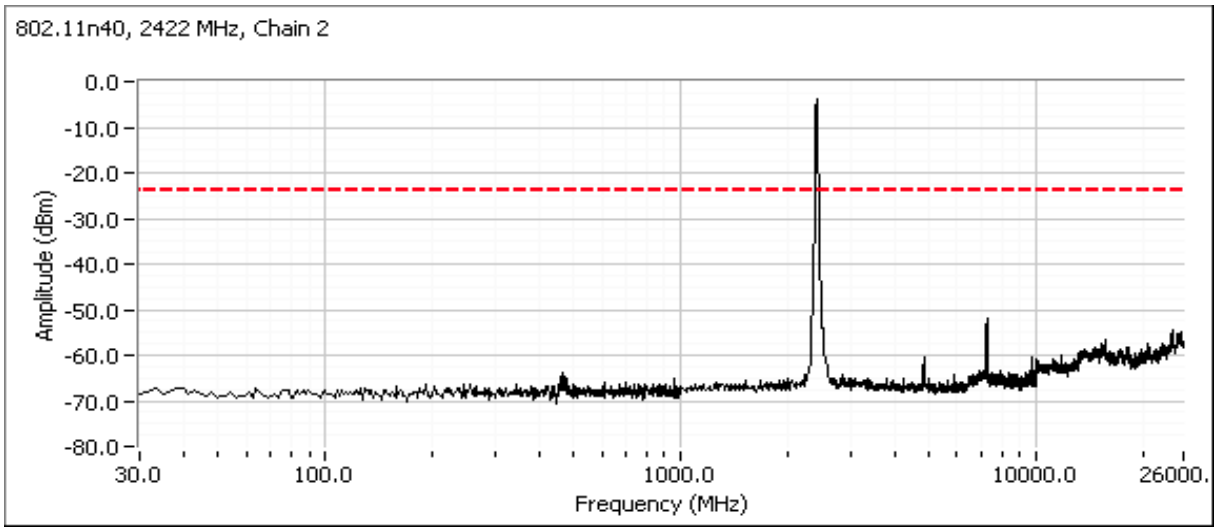


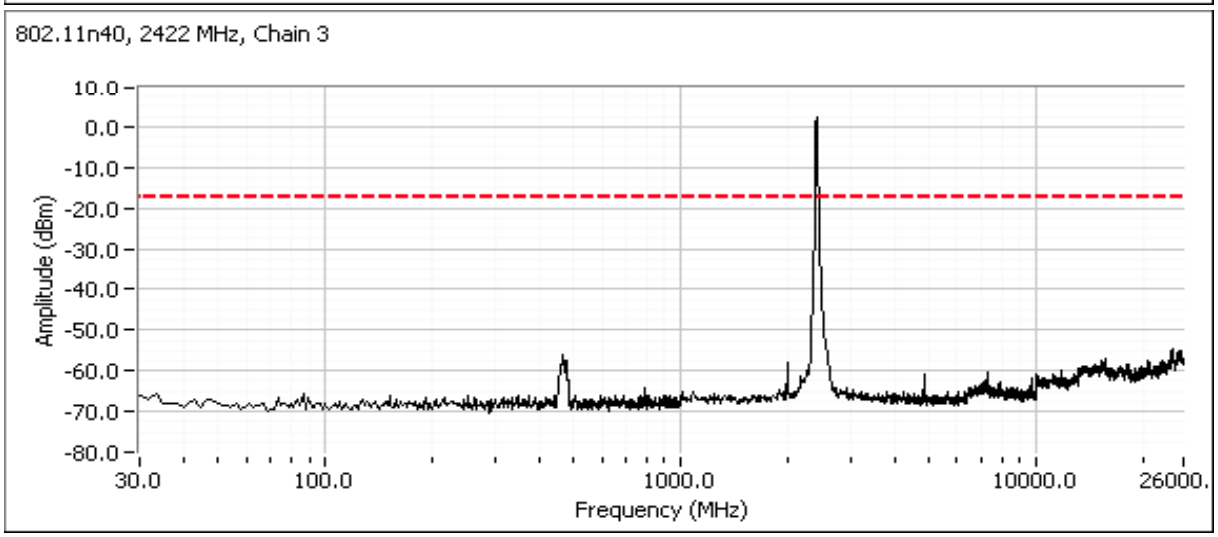
802.11n40

Plots for low channel



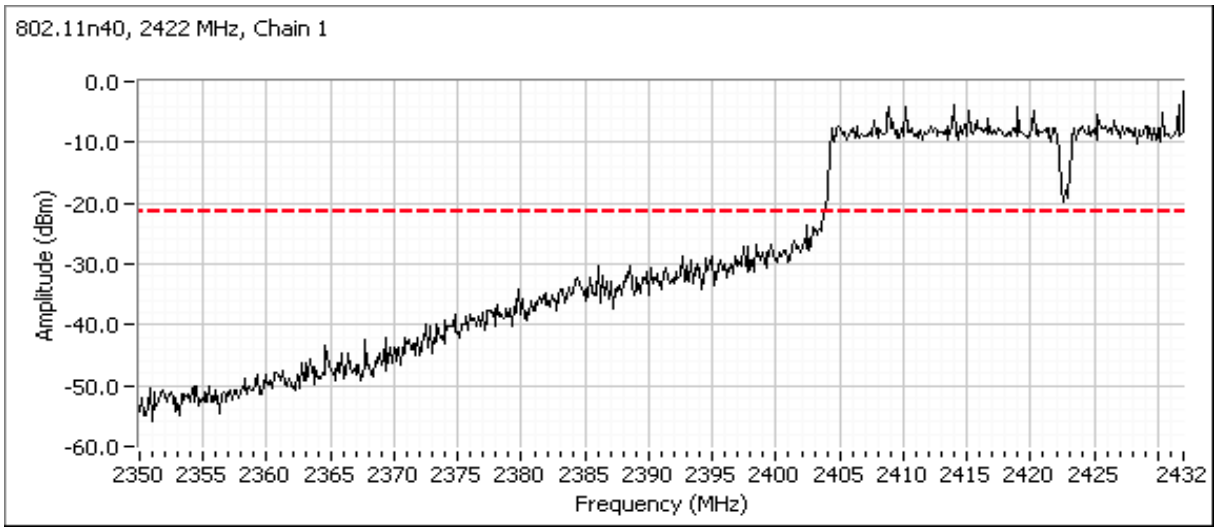
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

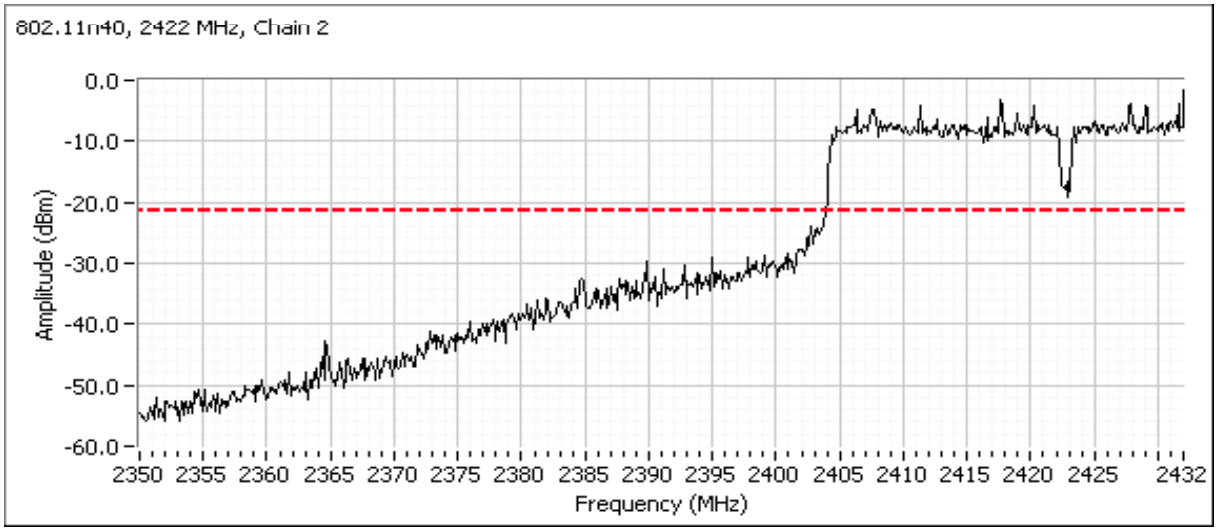




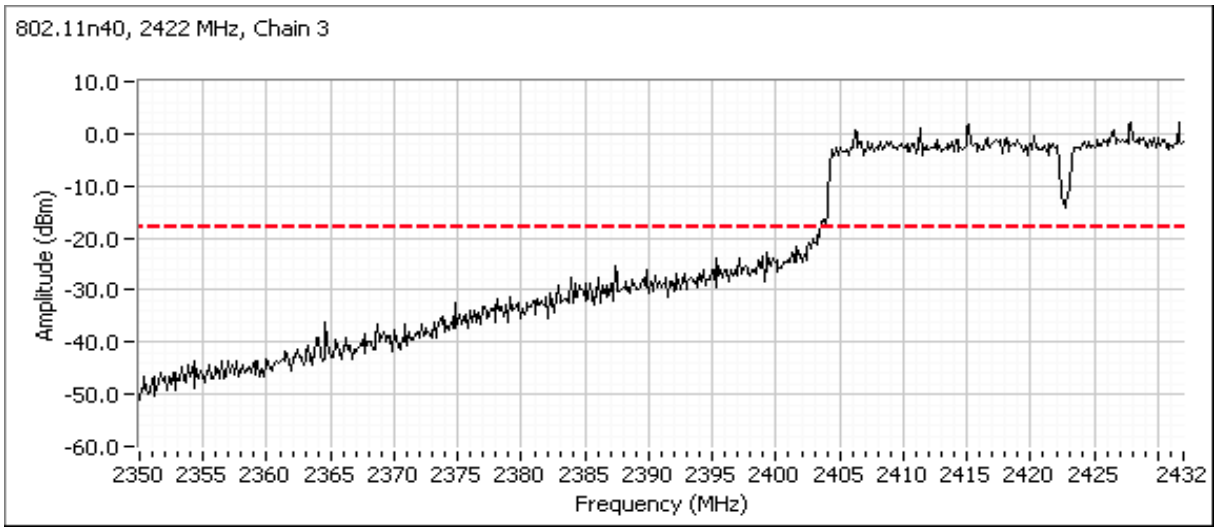
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

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.

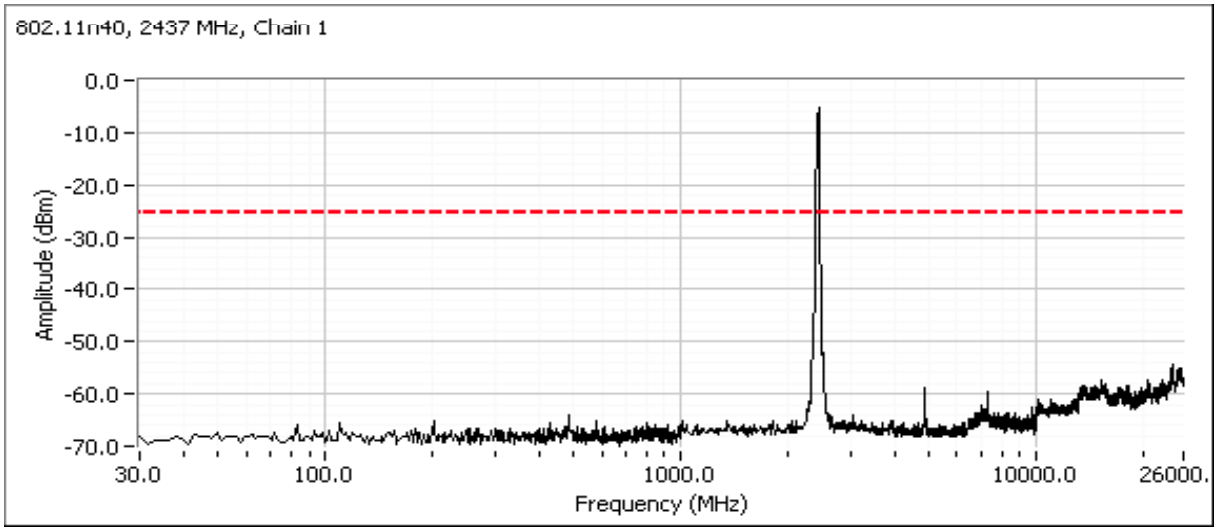




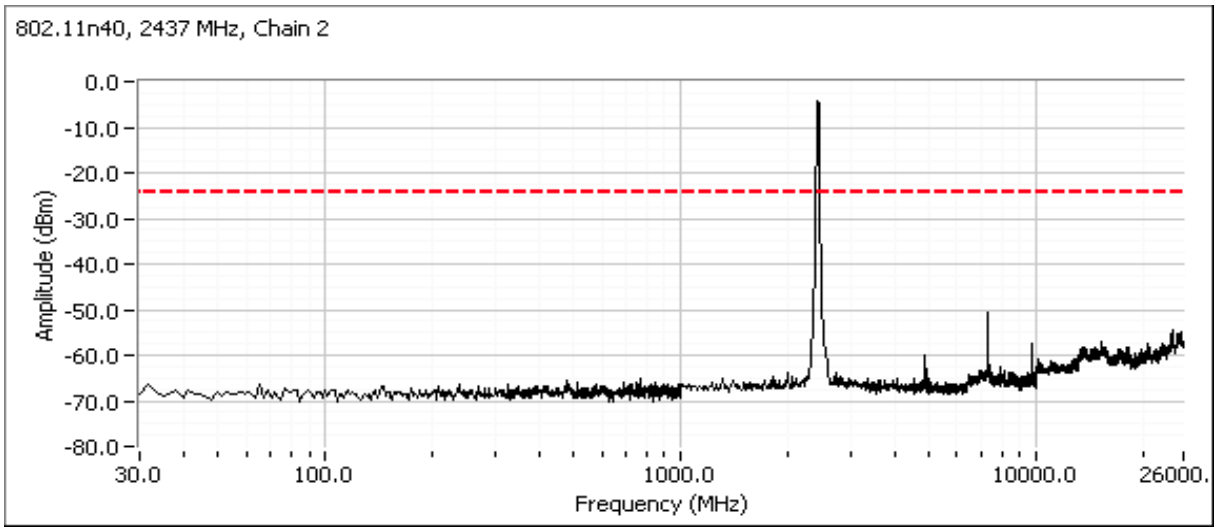
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

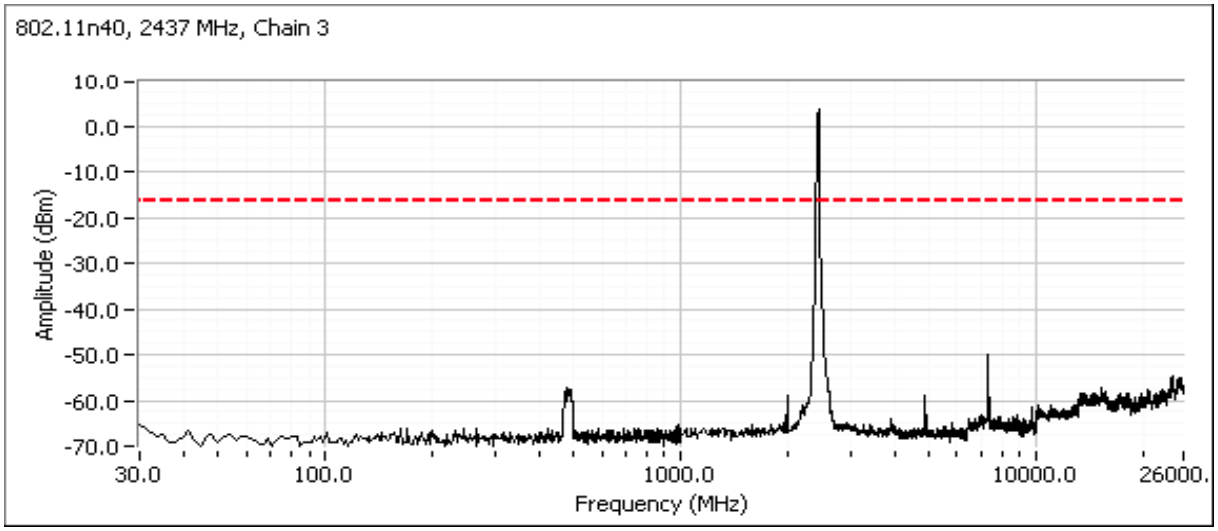


Plots for center channel



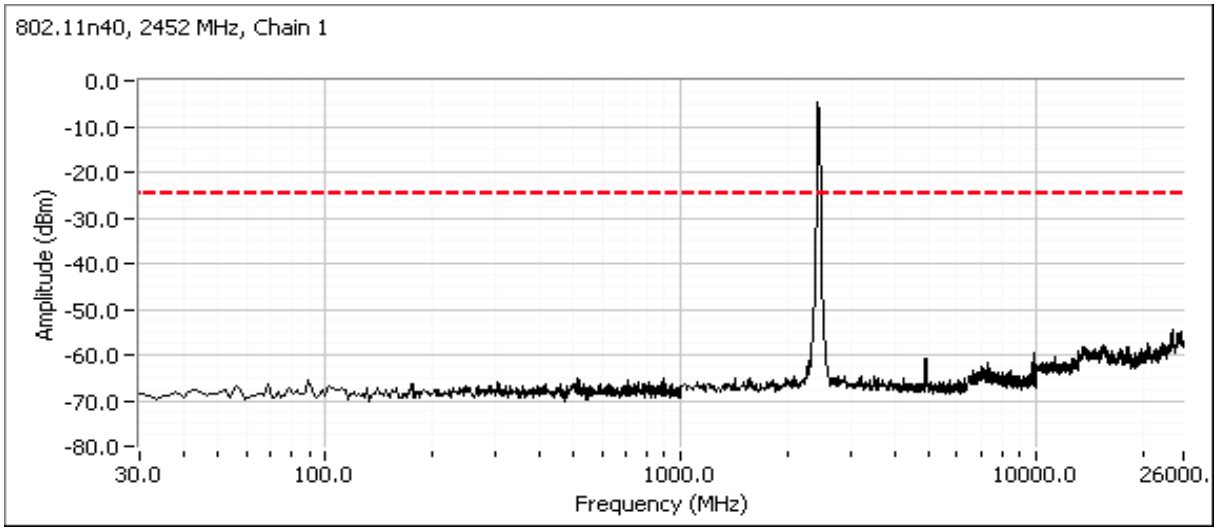
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

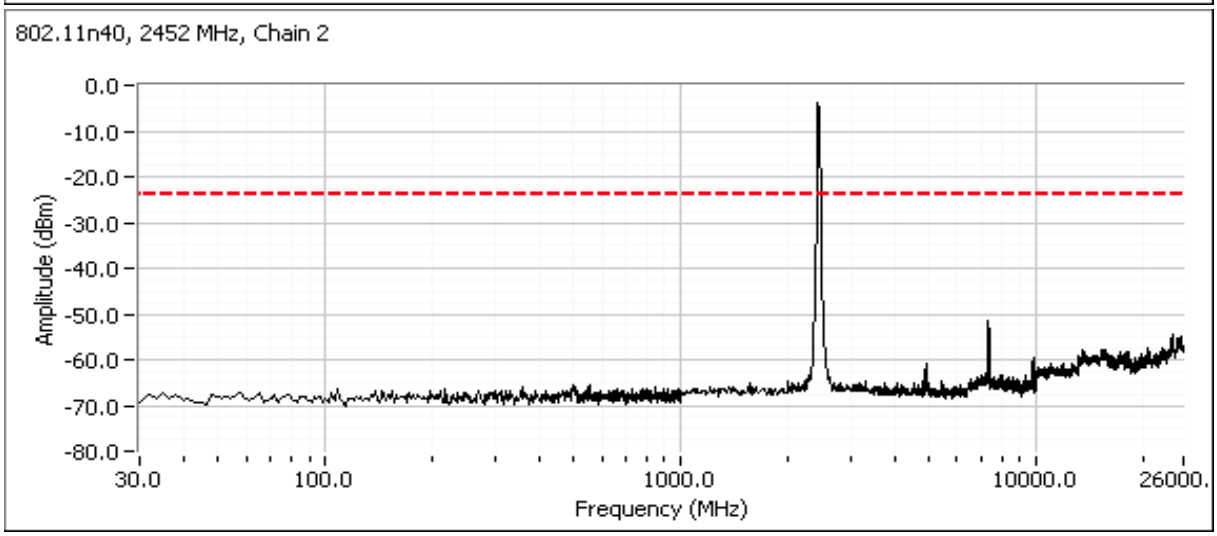




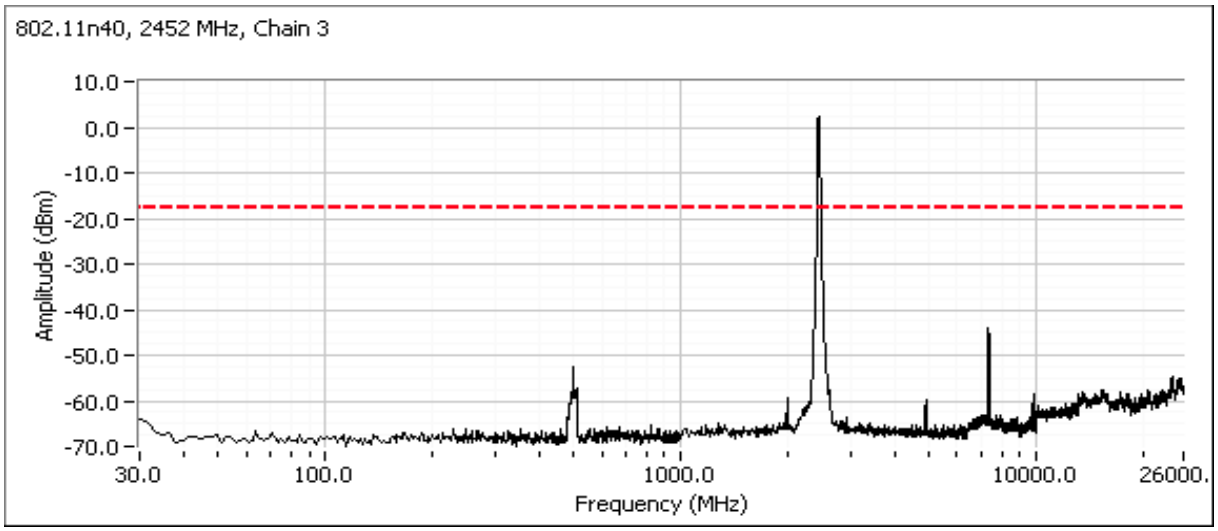
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Plots for high channel





Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
Power, PSD, Bandwidth and Spurious Emissions

Test Specific Details

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

Date of Test: 4/19 & 4/24/2012
Test Engineer: Rafael Varelas
Test Location: FT4

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: 20.2 °C
Rel. Humidity: 34 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Output Power	15.247(b)	Pass	802.11a: 15.9dBm n20: 16.0dBm n40: 24.0dBm
2	Power spectral Density (PSD)	15.247(d)	Pass	802.11a:-8.2dBm/3kHz n20: -8.4dBm/3kHz n40: -10.6dBm/3kHz
3	Minimum 6dB Bandwidth	15.247(a)	Pass	802.11a: 16.5MHz n20: 17.6MHz n40: 35.8MHz
3	99% Bandwidth	RSS GEN	Pass	802.11a: 16.5MHz
4	Spurious emissions	15.247(b)	Pass	All emissions below the -30dBc or -20dBc limits

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, 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.

Testing Notes

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #1: Output Power - Chain A + B

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	36.0	36.0	36.0					
Output Power (dBm) Note 1	8.5	5.0	14.6		15.9 dBm	0.039 W	25.2 dBm	0.333 W
Antenna Gain (dBi) Note 2	6	6	6		10.8 dBi	10.8 dBi	Pass	
eirp (dBm) Note 2	14.5	10.96	20.6		26.7 dBm	0.466 W		

5785 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	36.0	36.0	36.0					
Output Power (dBm) Note 1	7.3	5.4	14.2		15.5 dBm	0.035 W	25.2 dBm	0.333 W
Antenna Gain (dBi) Note 2	6	6	6		10.8 dBi	10.8 dBi	Pass	
eirp (dBm) Note 2	13.3	11.35	20.2		26.2 dBm	0.419 W		

5825 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	36.0	36.0	36.0					
Output Power (dBm) Note 1	5.7	6.1	12.8		14.3 dBm	0.027 W	25.2 dBm	0.333 W
Antenna Gain (dBi) Note 2	6	6	6		10.8 dBi	10.8 dBi	Pass	
eirp (dBm) Note 2	11.7	12.1	18.8		25.1 dBm	0.321 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 40 MHz (option #2 7.2.2.2 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:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Operating Mode: 802.11n20
Transmitted signal on chain is coherent ? yes

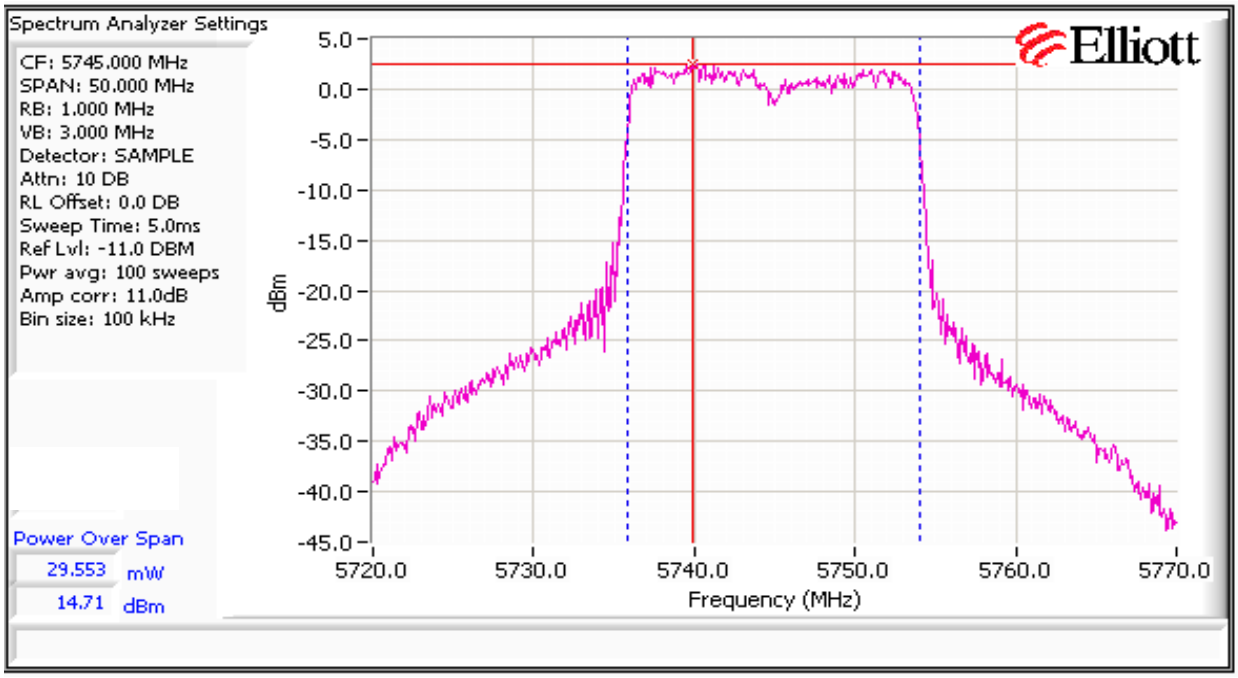
5745 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	36.0	36.0	36.0					
Output Power (dBm) Note 1	8.8	4.6	14.7		16.0 dBm	0.040 W	25.2 dBm	0.333 W
Antenna Gain (dBi) Note 2	6	6	6		10.8 dBi	10.8 dBi	Pass	
eirp (dBm) Note 2	14.8	10.6	20.7		26.8 dBm	0.478 W		

5785 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	36.0	36.0	36.0					
Output Power (dBm) Note 1	7.0	5.4	14.1		15.3 dBm	0.034 W	25.2 dBm	0.333 W
Antenna Gain (dBi) Note 2	6	6	6		10.8 dBi	10.8 dBi	Pass	
eirp (dBm) Note 2	13	11.4	20.1		26.1 dBm	0.408 W		

5825 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	36.0	36.0	36.0					
Output Power (dBm) Note 1	5.6	6.0	11.7		13.5 dBm	0.022 W	25.2 dBm	0.333 W
Antenna Gain (dBi) Note 2	6	6	6		10.8 dBi	10.8 dBi	Pass	
eirp (dBm) Note 2	11.6	12	17.7		24.3 dBm	0.268 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 40 MHz (option #2 7.2.2.2 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:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Operating Mode: 802.11n40

Transmitted signal on chain is coherent ? yes

5755 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	36.0	36.0	36.0					
Output Power (dBm) Note 1	15.9	12.6	22.9		24.0 dBm	0.252 W	25.2 dBm	0.333 W
Antenna Gain (dBi) Note 2	6	6	6		10.8 dBi	10.8 dBi	Pass	
eirp (dBm) Note 2	21.9	18.6	28.9		34.8 dBm	3.011 W		

5795 MHz	Chain 1	Chain 2	Chain 3	Chain 4	Total Across All Chains		Limit	
Power Setting Note 3	36.0	36.0	36.0					
Output Power (dBm) Note 1	14.9	14.4	22.3		23.6 dBm	0.228 W	25.2 dBm	0.333 W
Antenna Gain (dBi) Note 2	6	6	6		10.8 dBi	10.8 dBi	Pass	
eirp (dBm) Note 2	20.9	20.4	28.3		34.4 dBm	2.726 W		

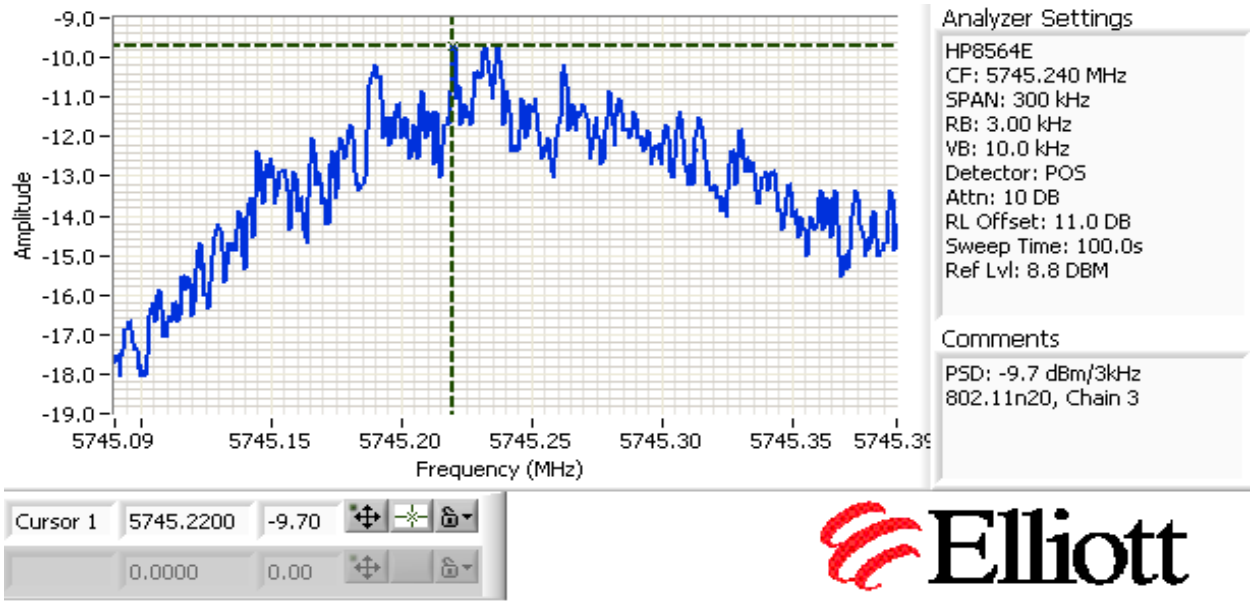
Note 1:	Output power measured using a peak power meter (Option 3 7.2.1.3 of KDB 558074), spurious limit is -20dBc.
Note 2:	As there is coherency between chains the effective antenna gain is the sum of the individual antenna gains and the eirp is the product of the total power and the effective antenna gain
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:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1 Chain 1	Chain 2	Chain 3	Chain 4	Total	Limit dBm/3kHz	Result
802.11a								
36	5745	-14.5	-18.3	-9.9		-8.2	8.0	Pass
36	5785	-17.2	-17.7	-10.9		-9.3	8.0	Pass
36	5825	-18.2	-16.5	-11.9		-9.9	8.0	Pass
802.11n20								
36	5745	-15.5	-20.7	-9.7		-8.4	8.0	Pass
36	5785	-17.9	-19.2	-11.4		-10.0	8.0	Pass
36	5825	-18.0	-17.5	-12.7		-10.6	8.0	Pass
802.11n40								
36	5755	-17.4	-21.4	-12.1		-10.6	8.0	Pass
36	5795	-21.3	-21.6	-15.4		-13.6	8.0	Pass

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

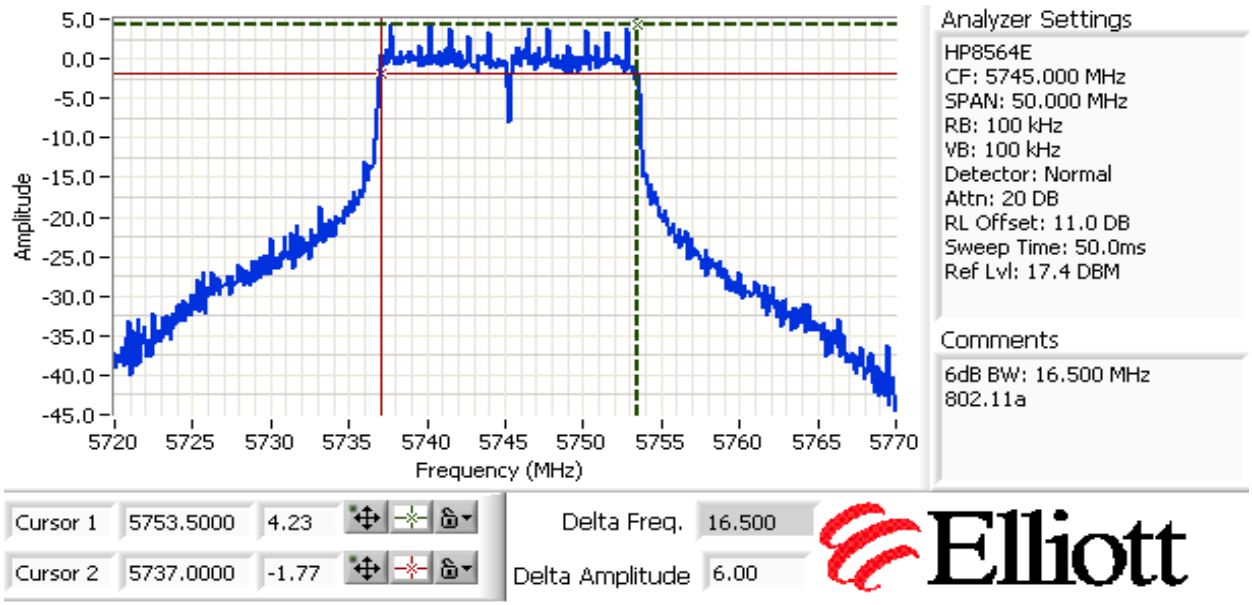


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

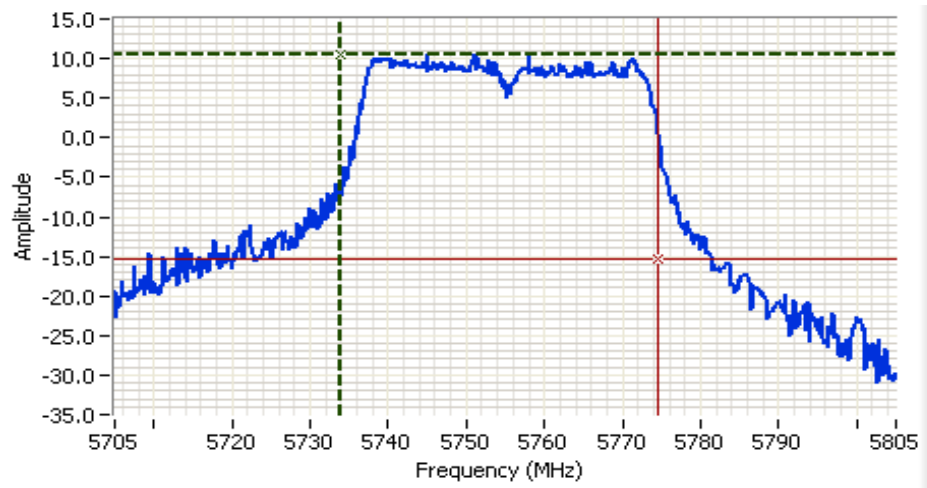
Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
802.11a				
36	5745	100kHz	16.5	19.9
36	5785	100kHz	16.5	20.1
36	5825	100kHz	17.0	20.0
802.11n20				
36	5745	100kHz	17.8	20.9
36	5785	100kHz	17.8	21.3
36	5825	100kHz	17.6	21.0
802.11n40				
36	5755	100kHz	36.5	40.6
36	5795	100kHz	35.8	40.4

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:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A



Analyzer Settings

HP8564E
CF: 5755.000 MHz
SPAN: 100.000 MHz
RB: 1.000 MHz
VB: 3.000 MHz
Detector: Normal
Attn: 20 DB
RL Offset: 11.0 DB
Sweep Time: 50.0ms
Ref Lvl: 12.1 DBM

Comments

99% BW: 40.599 MHz
802.11n40

Cursor 1	5733.9517	10.60	Delta Freq.	40.599	Elliott
Cursor 2	5774.5507	-15.40	Delta Amplitude	26.00	

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

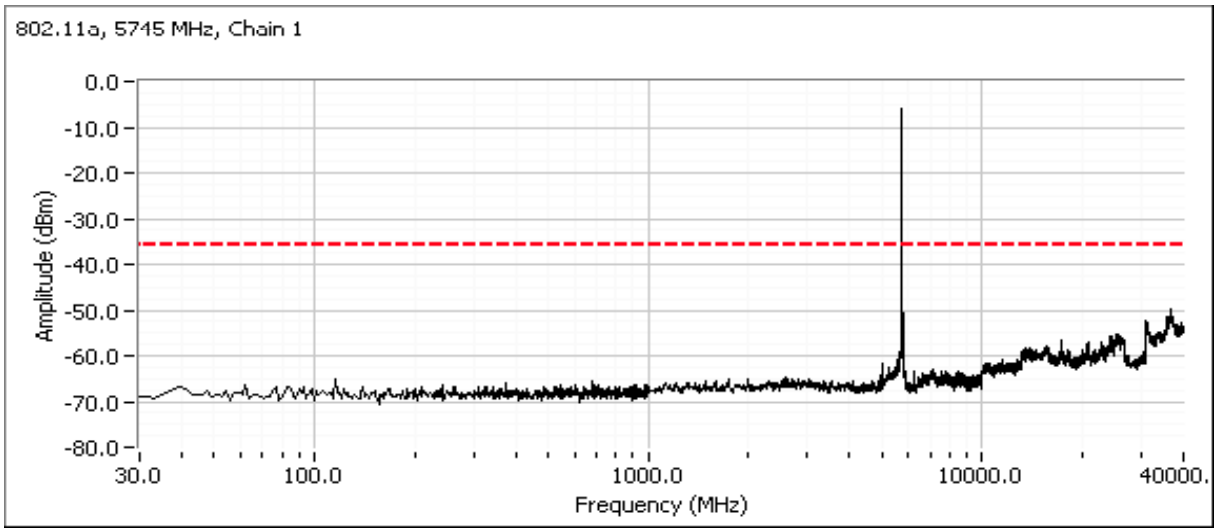
Run #4: Out of Band Spurious Emissions

Power Setting Per Chain				Frequency (MHz)	Limit	Result
#1	#2	#3	#4			
802.11a						
36	36	36		5745	-30dBc	Pass
36	36	36		5785	-30dBc	Pass
36	36	36		5825	-30dBc	Pass
802.11n20						
36	36	36		5745	-30dBc	Pass
36	36	36		5785	-30dBc	Pass
36	36	36		5825	-30dBc	Pass
802.11n40						
36	36	36		5755	-20dBc	Pass
36	36	36		5795	-20dBc	Pass

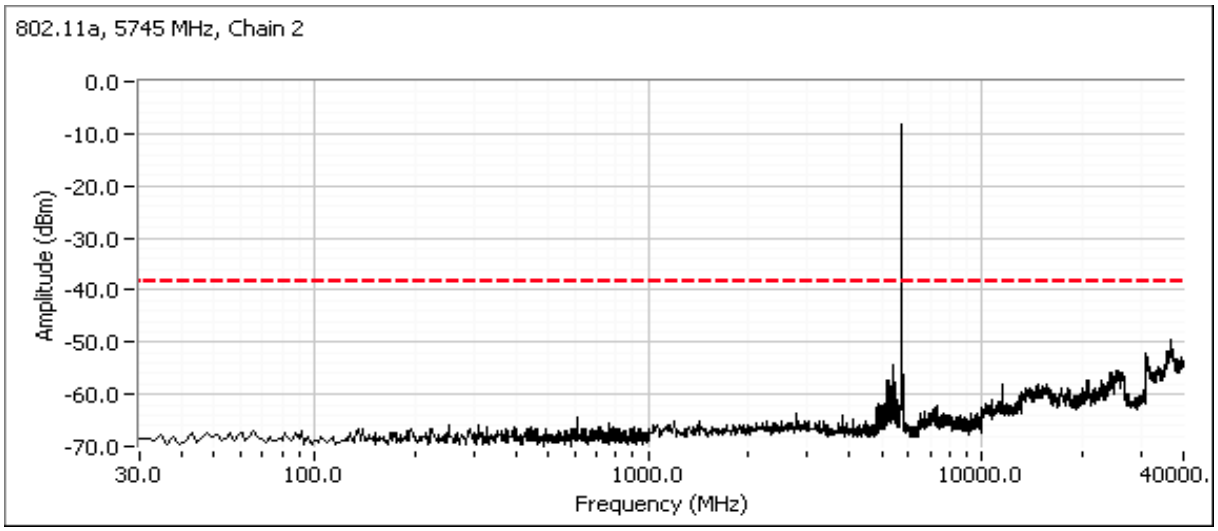
Note 1:	Measured on each chain individually

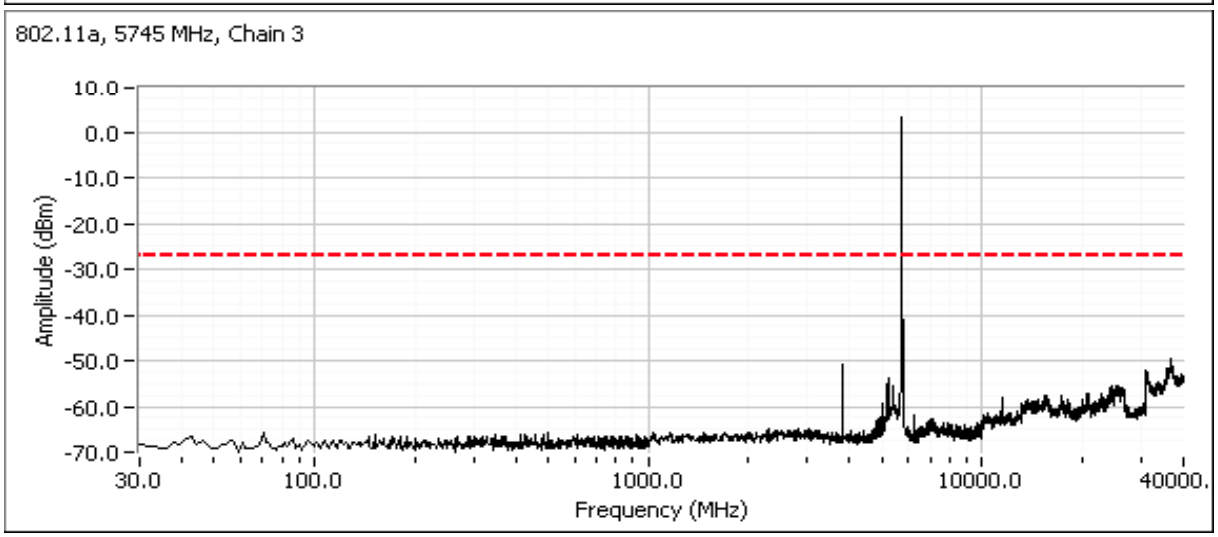
802.11a

Plots for low channel



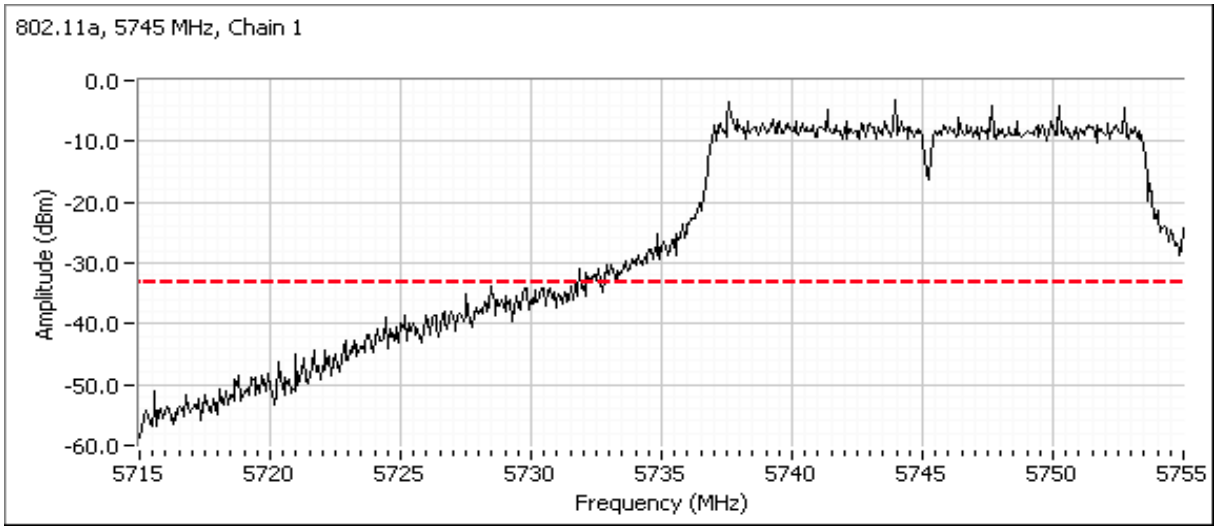
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

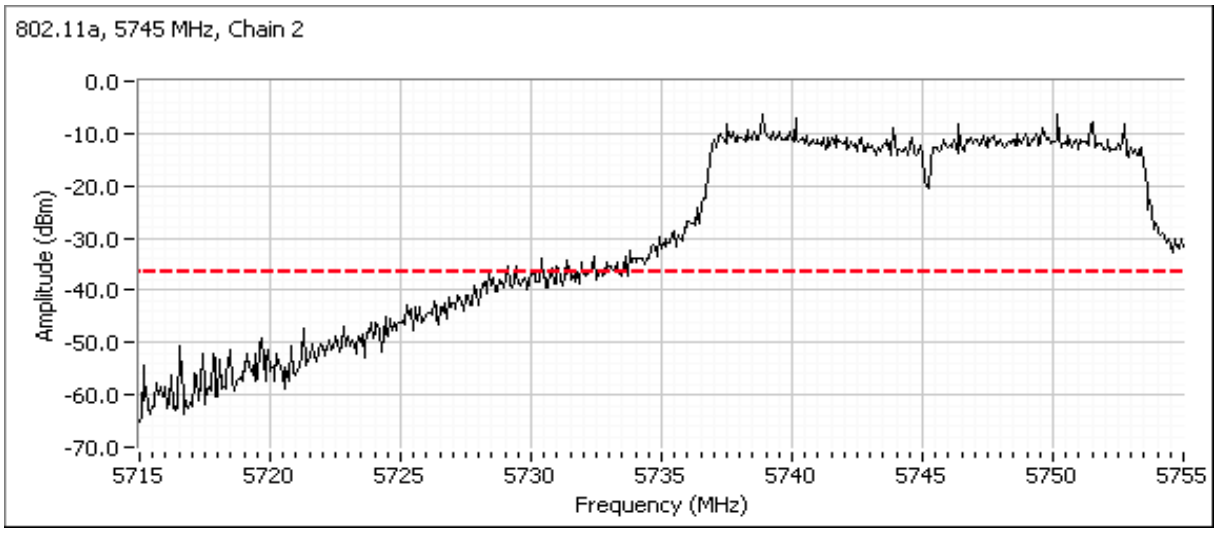




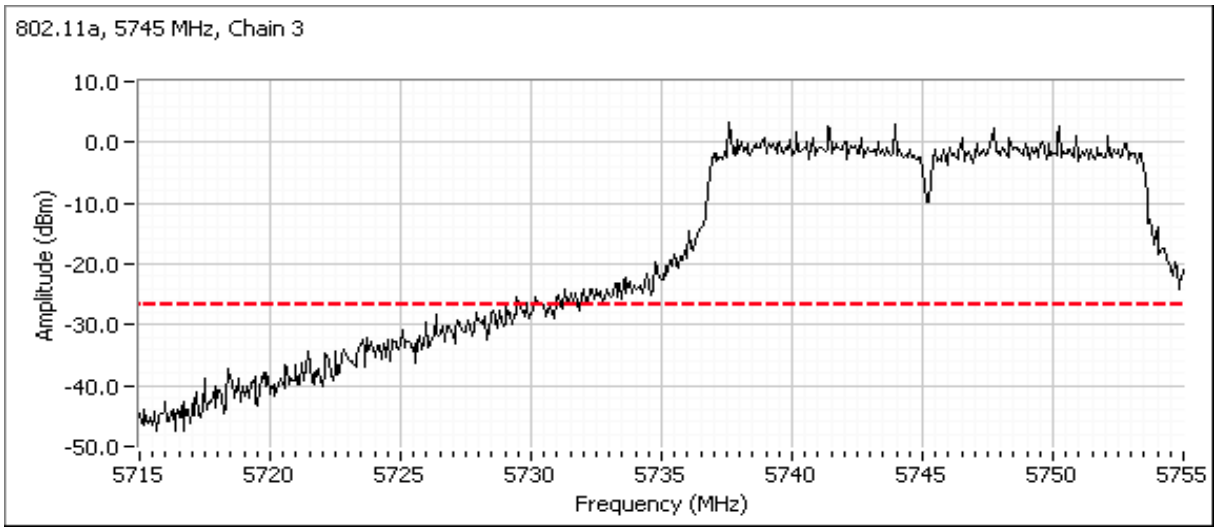
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

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

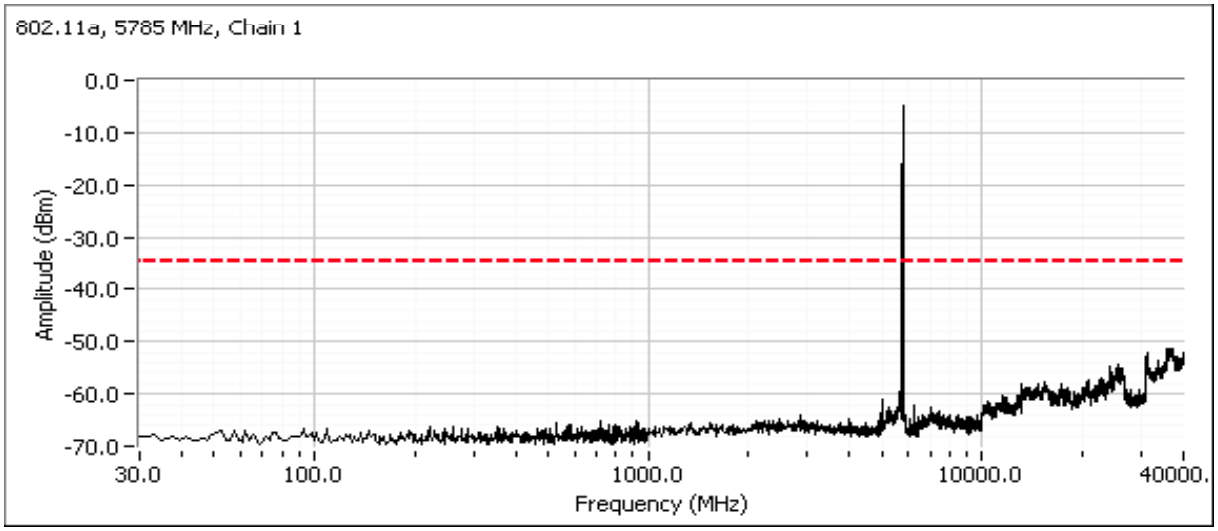




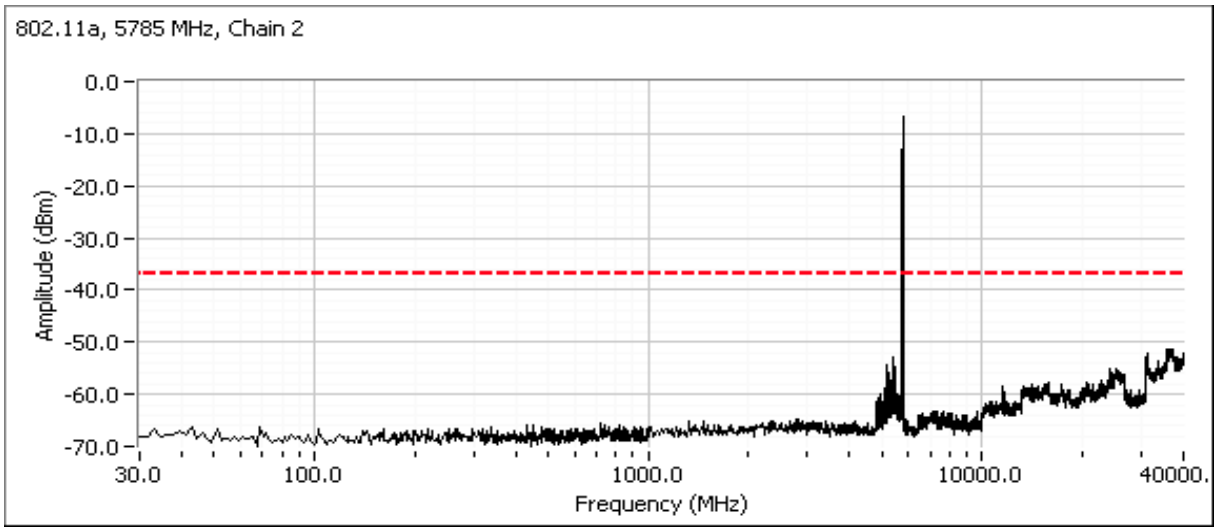
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

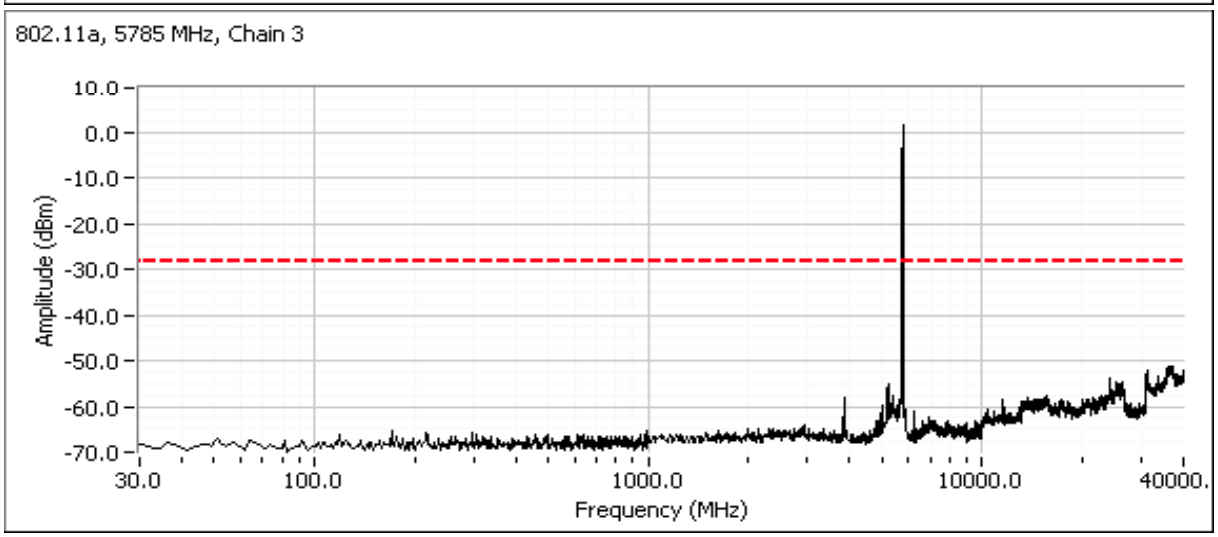


Plots for center channel



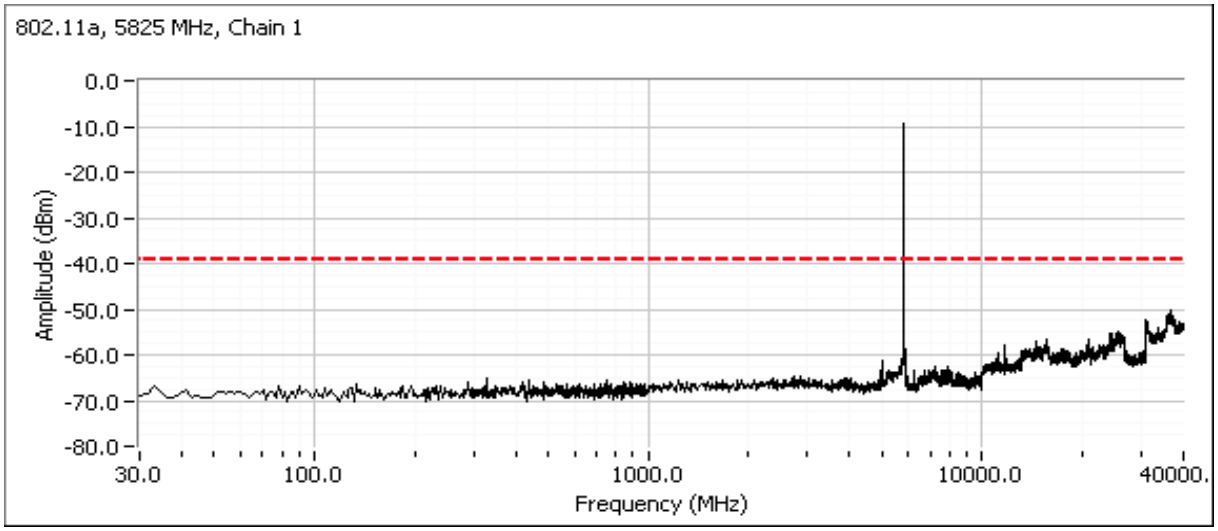
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

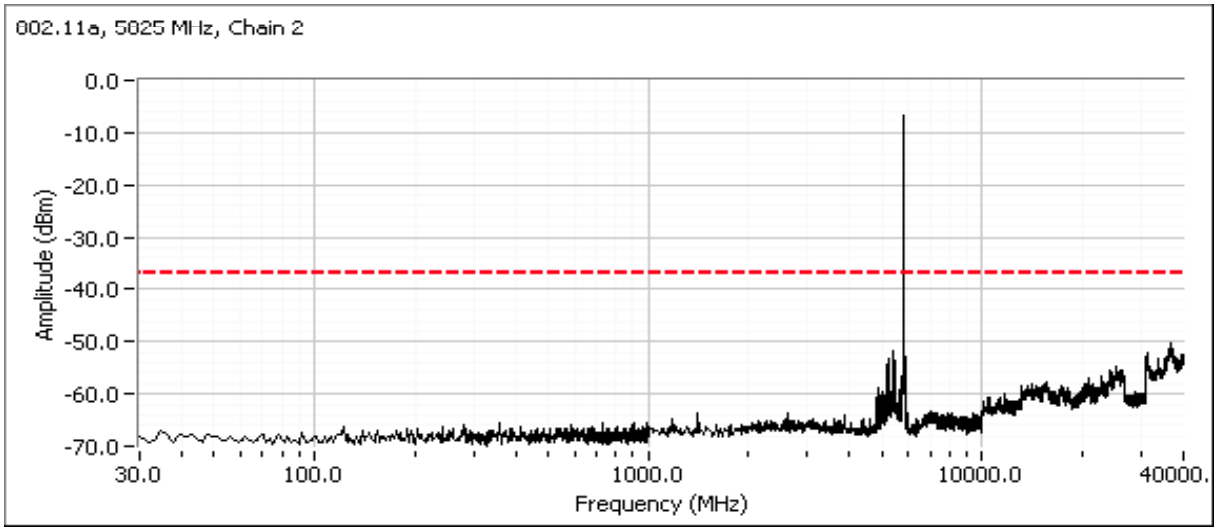




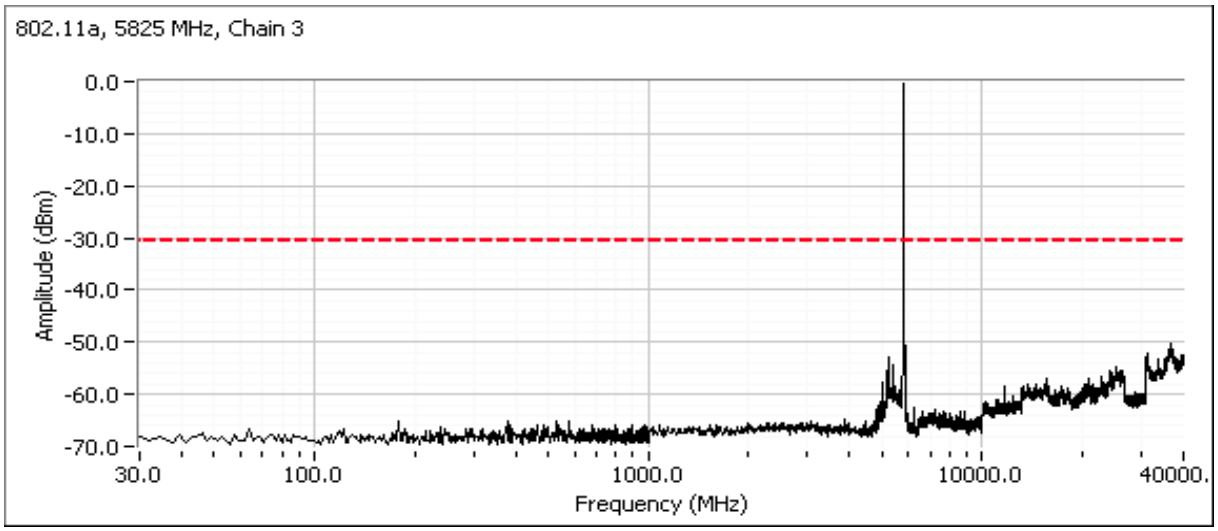
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Plots for high channel

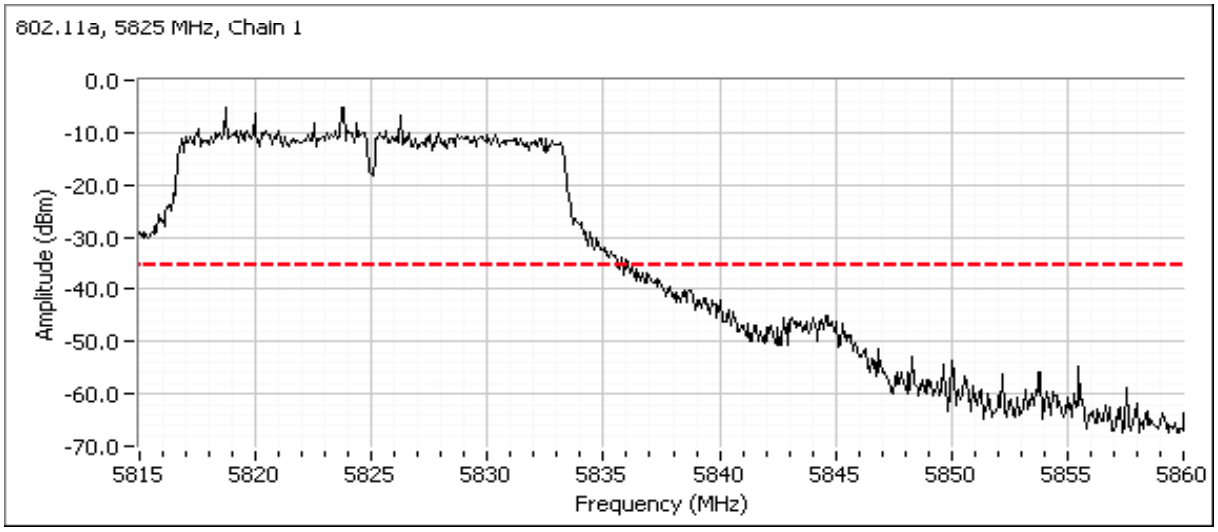




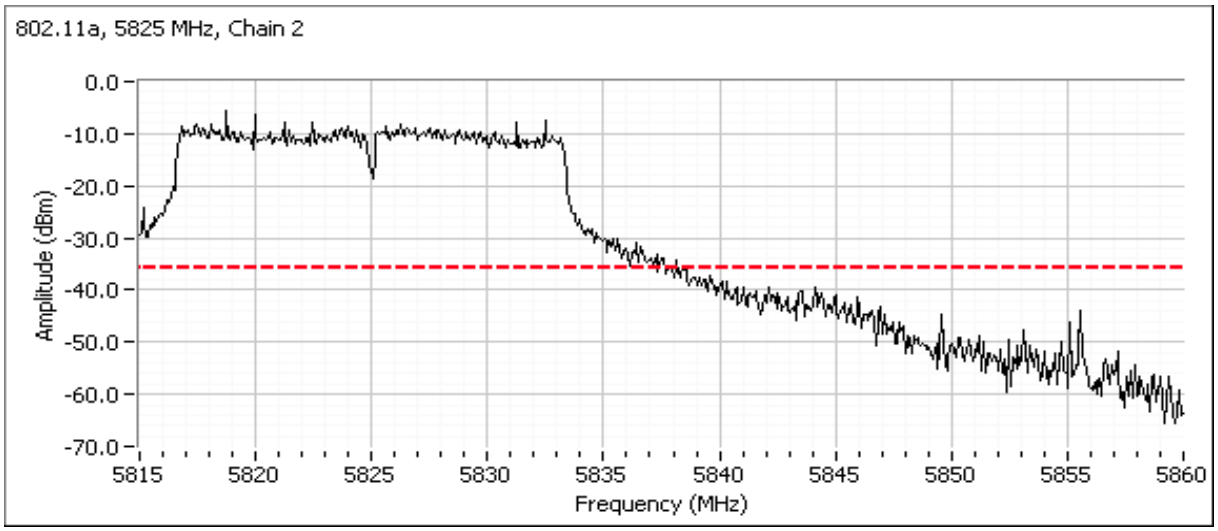
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

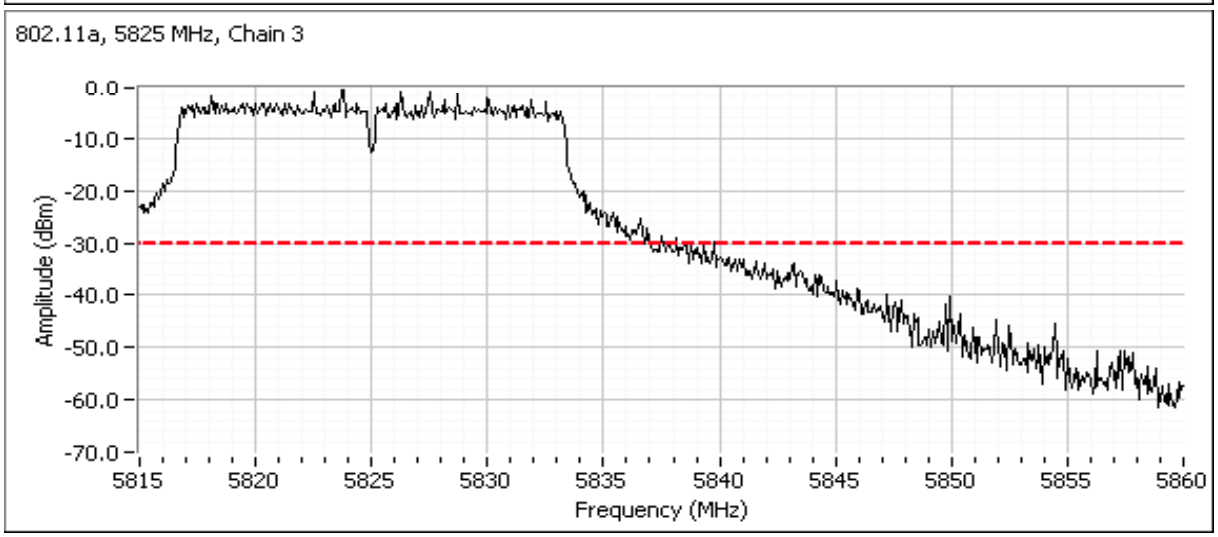


Additional plot from 5820 - 5860 MHz showing compliance with -30dBc at the band edge.



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

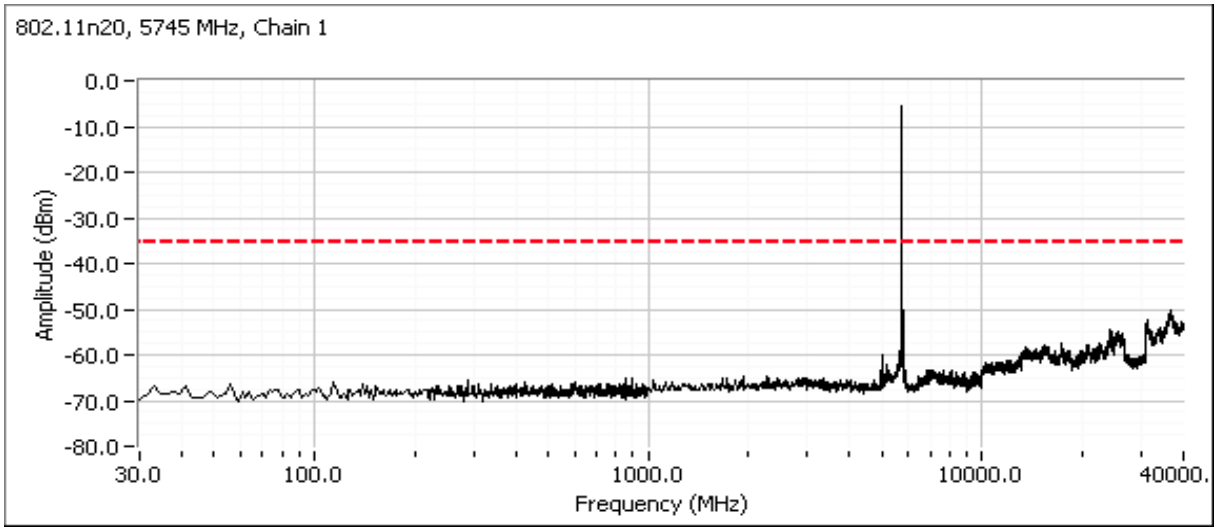


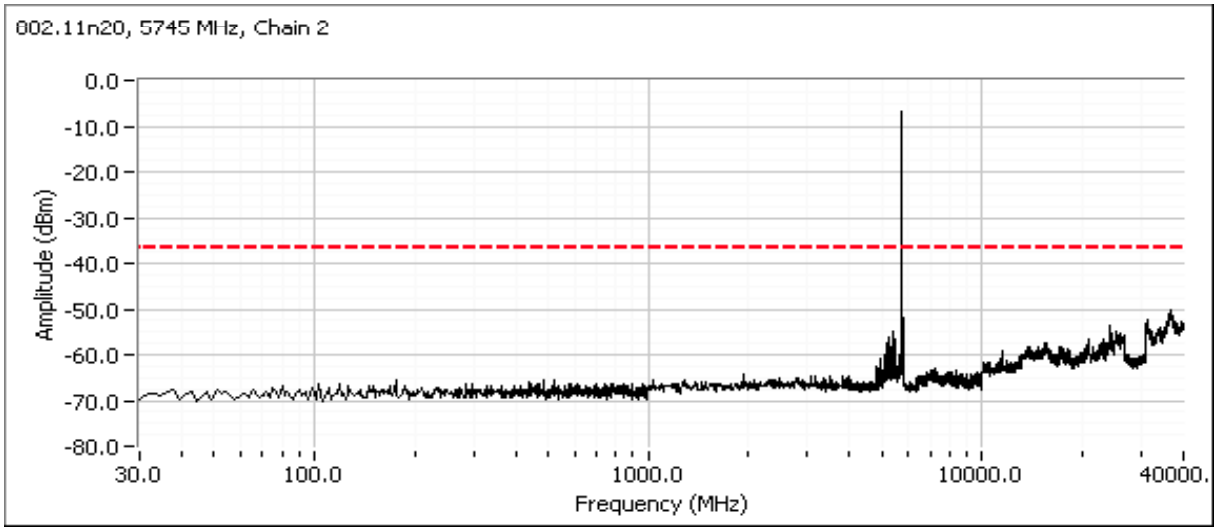


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

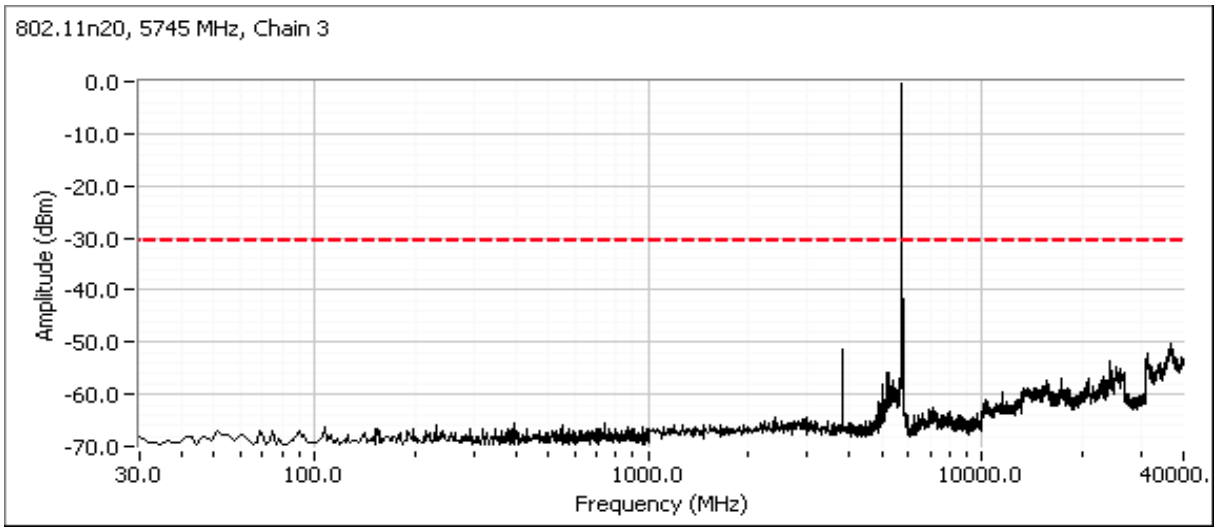
802.11n20

Plots for low channel

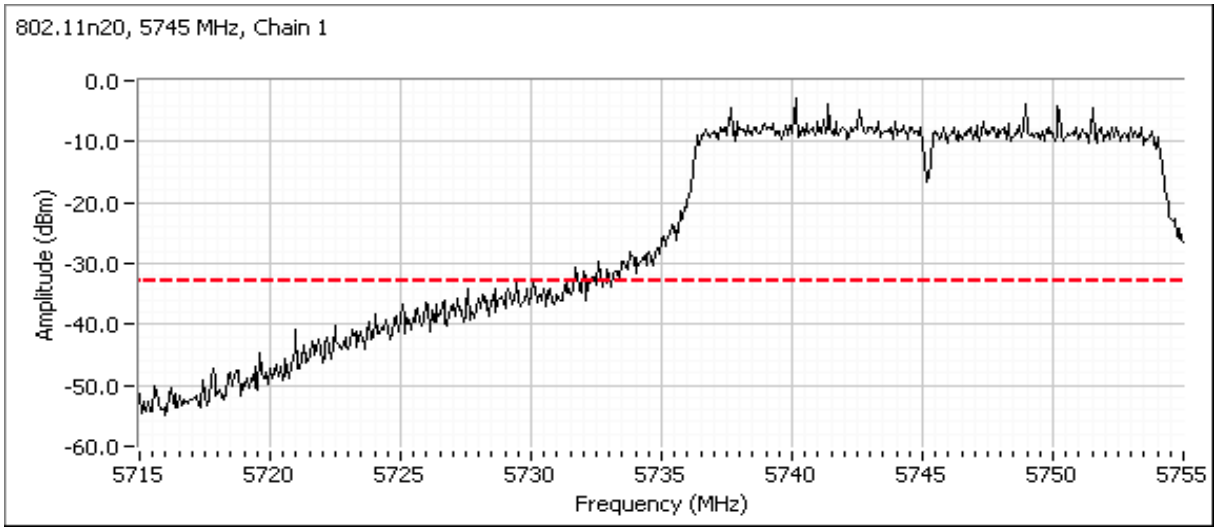




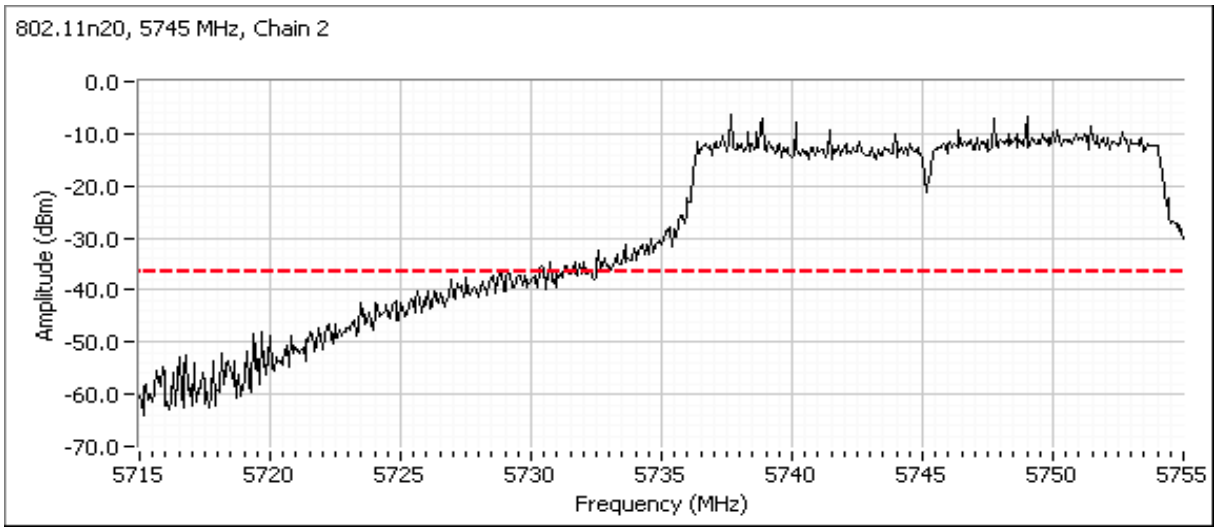
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

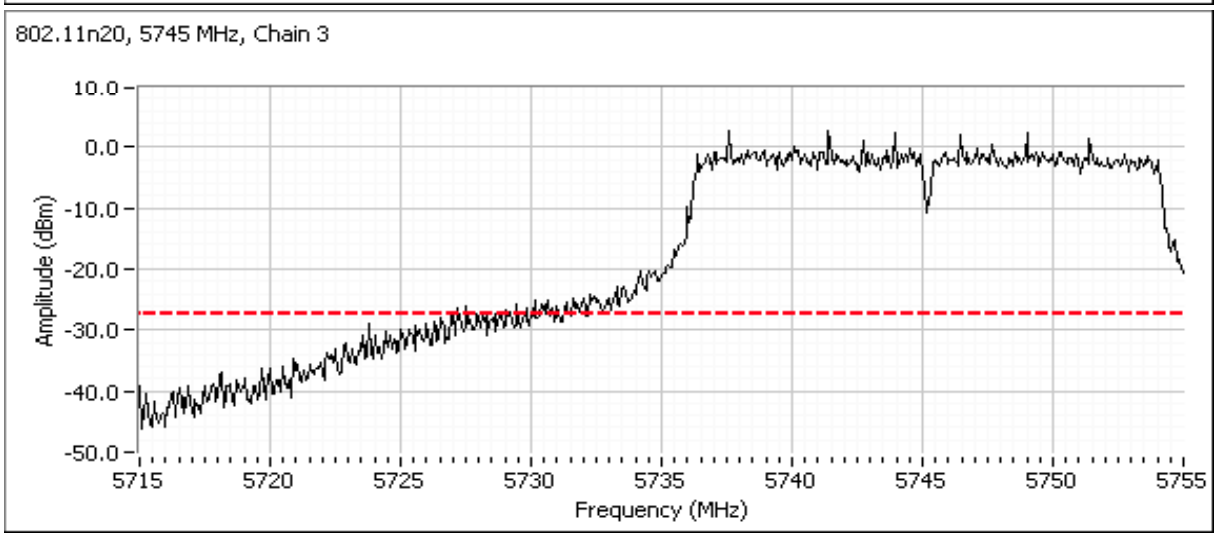


Additional plot from 5715 - 5755 MHz showing compliance with -30dBc at the band edge.



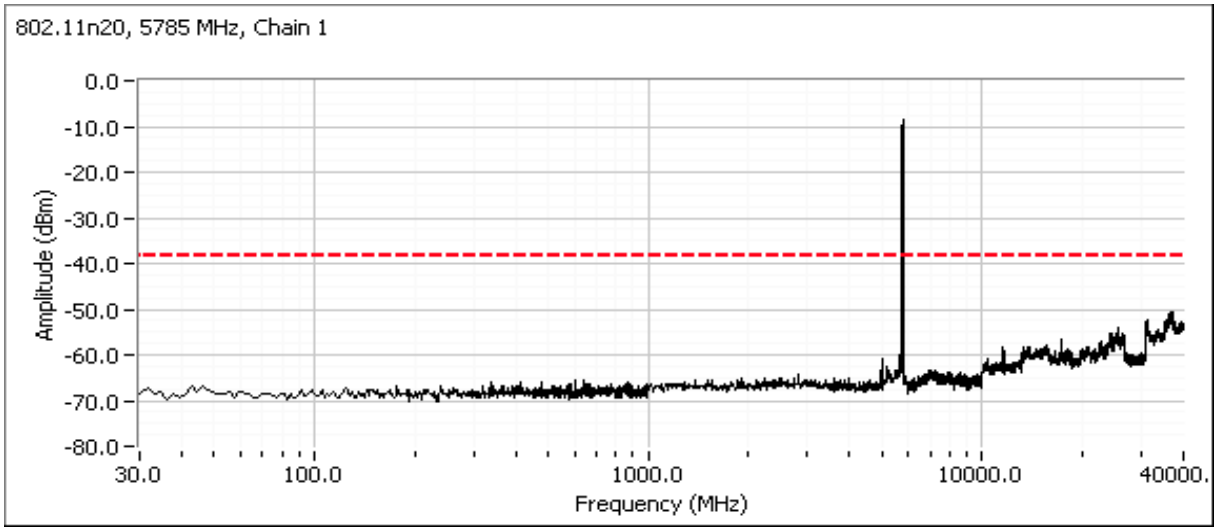
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

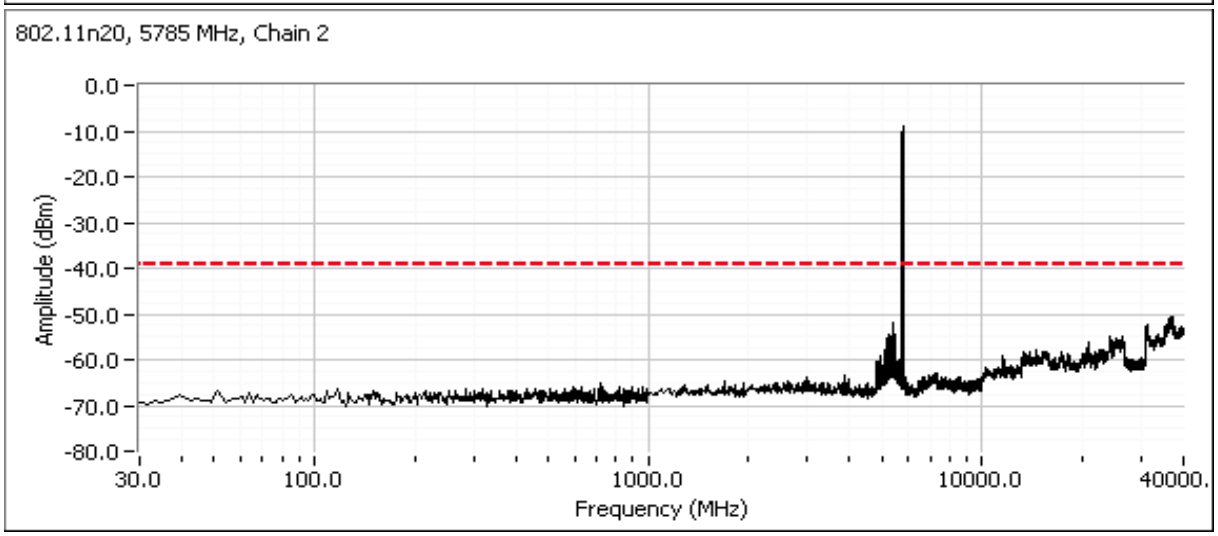




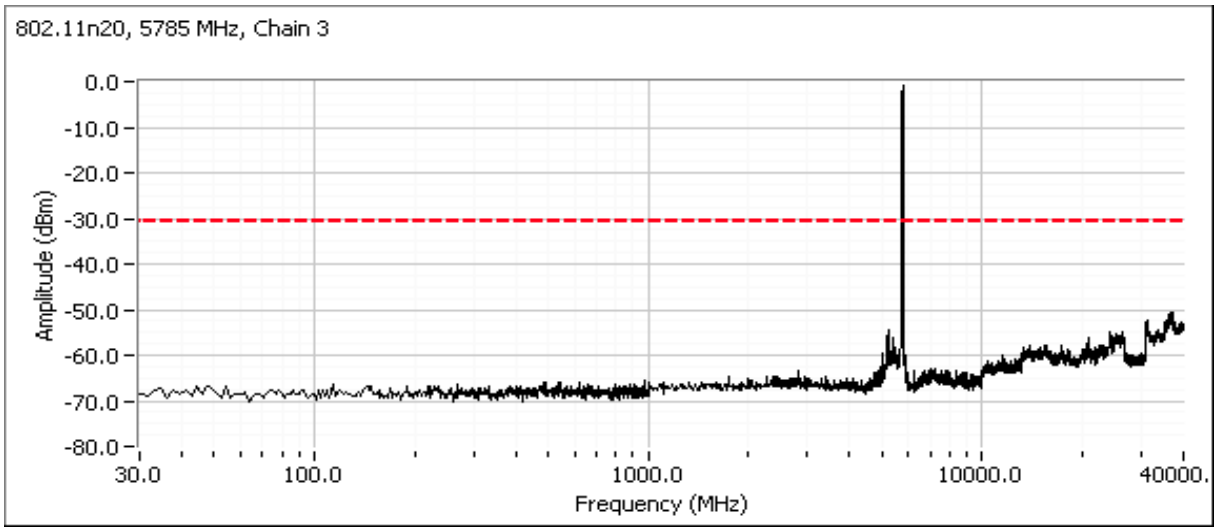
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Plots for center channel

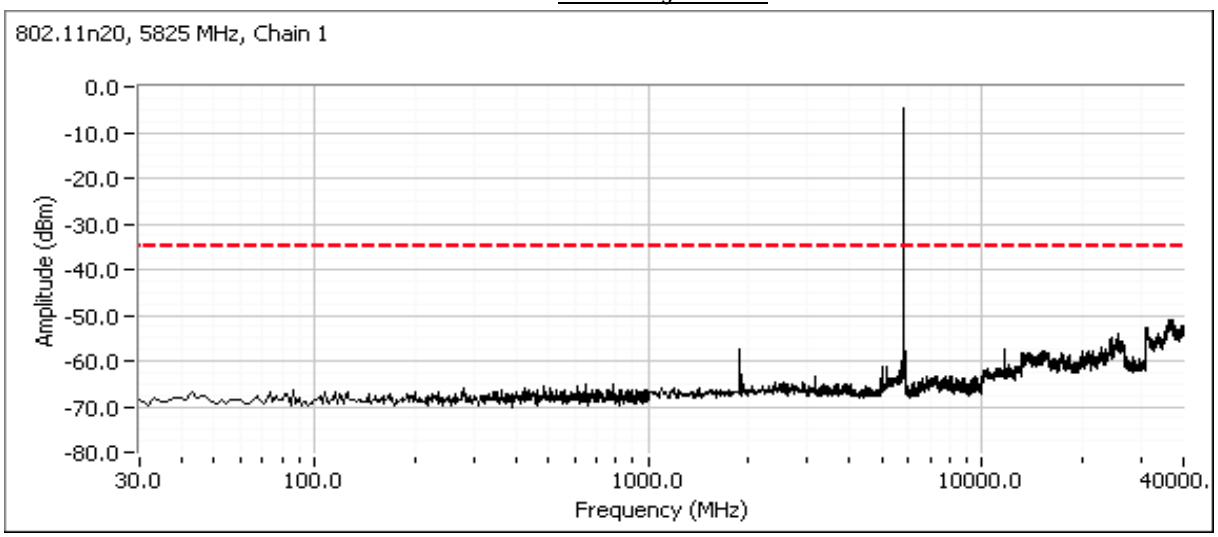




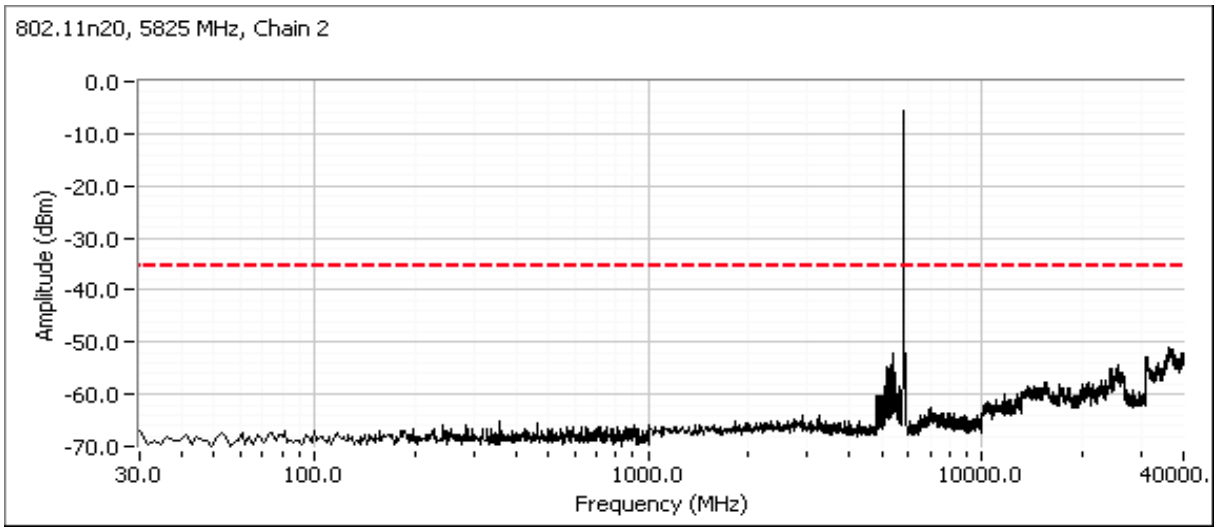
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

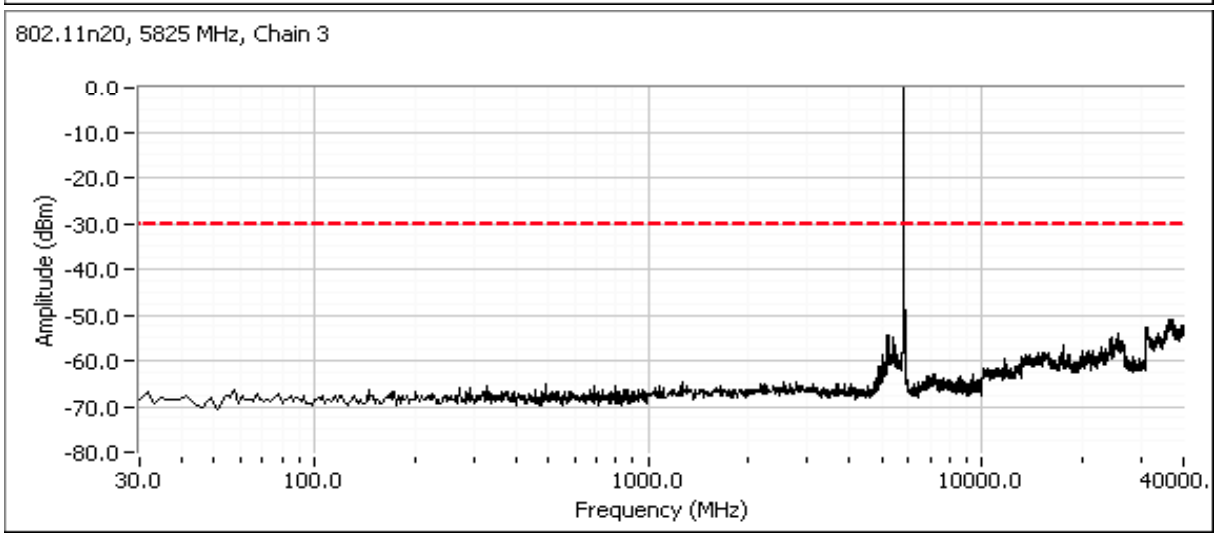


Plots for high channel



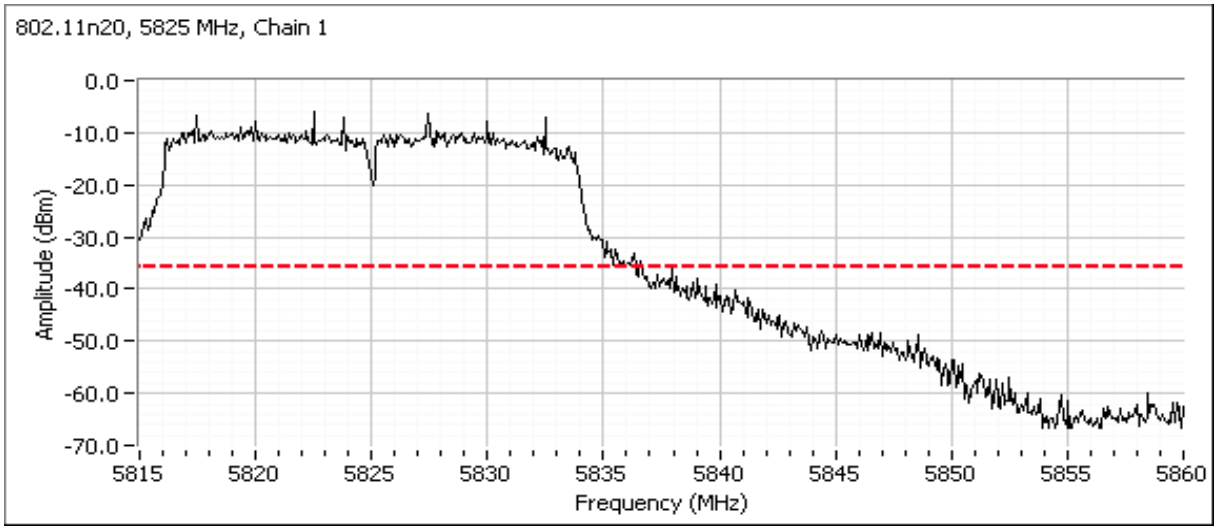
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

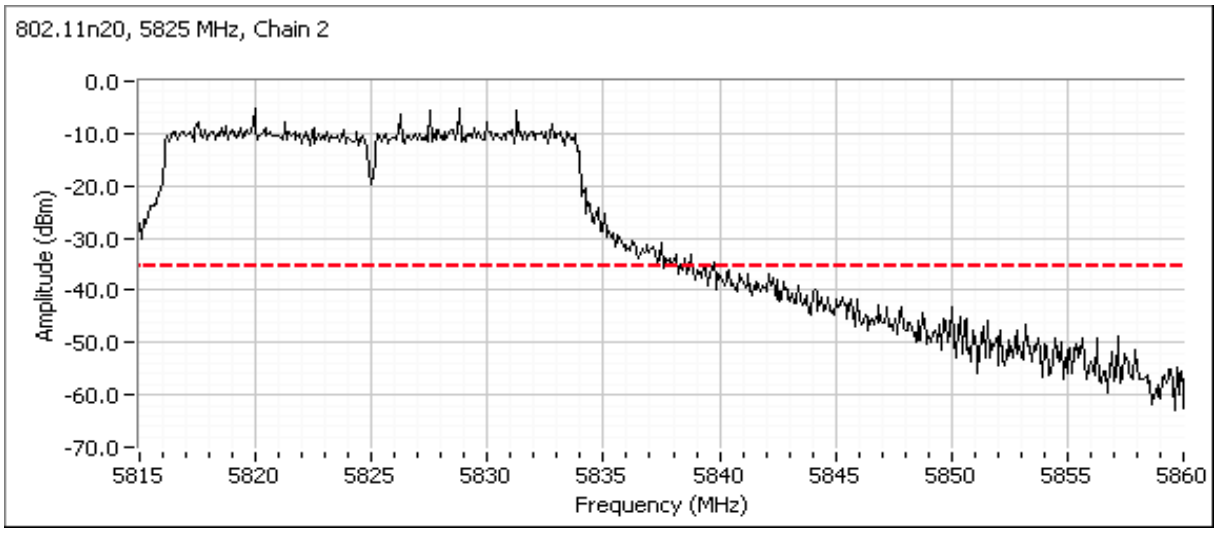




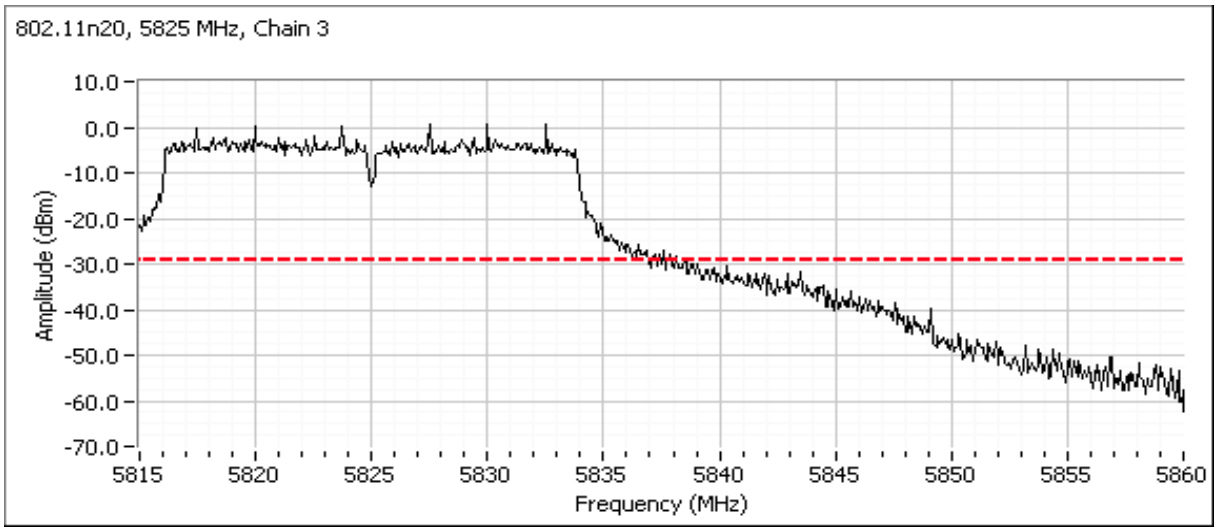
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

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



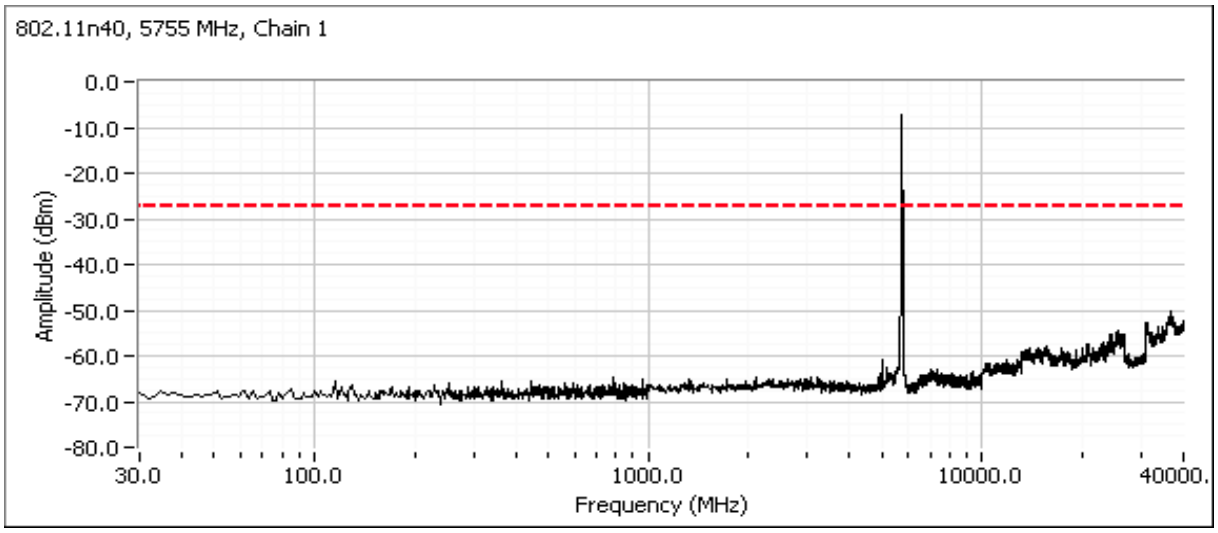


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

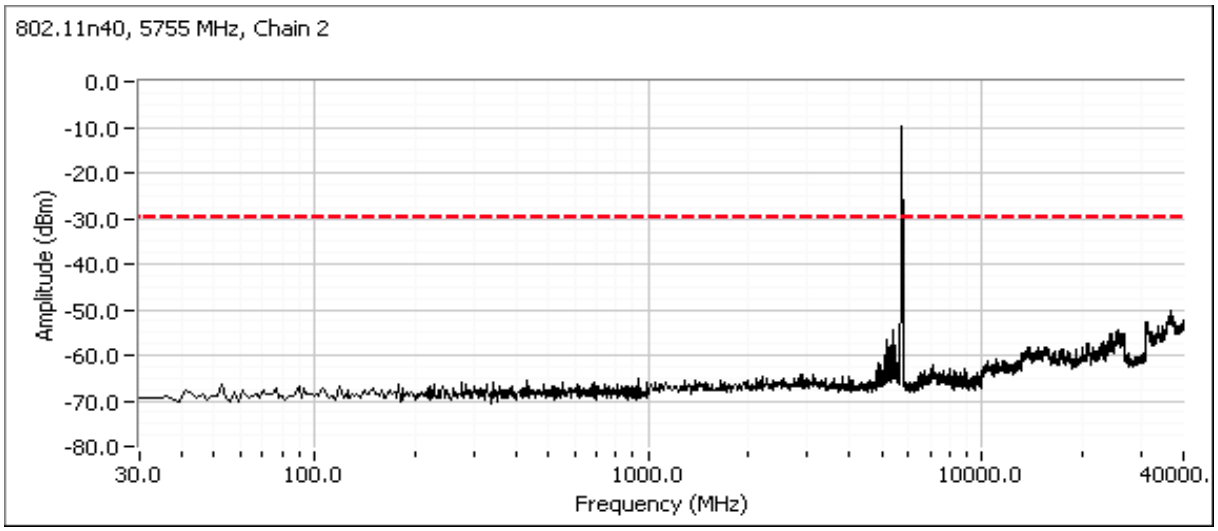


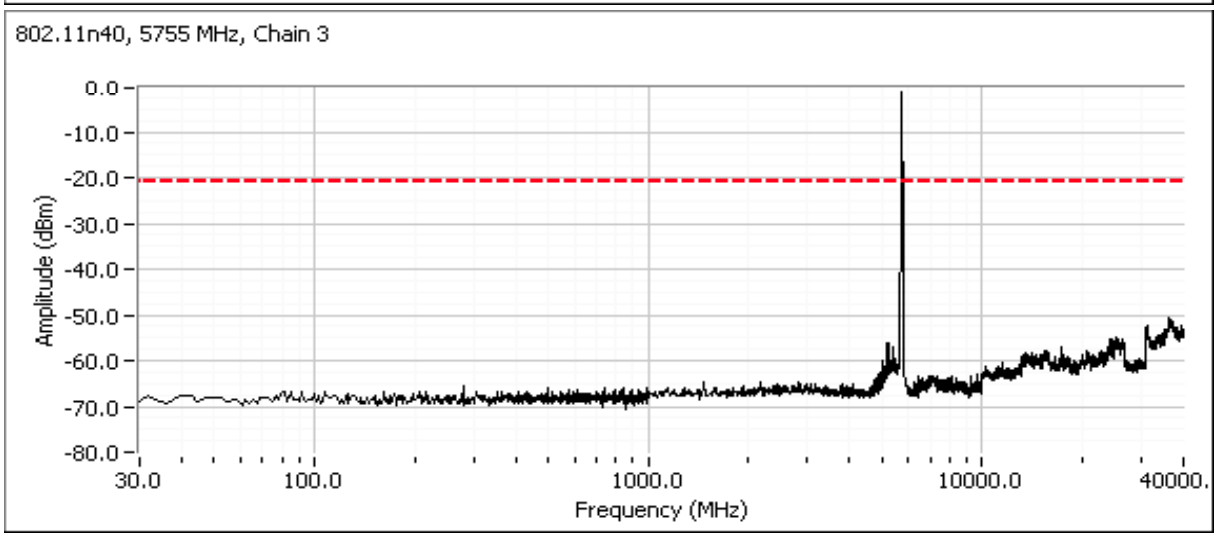
802.11n40

Plots for low channel



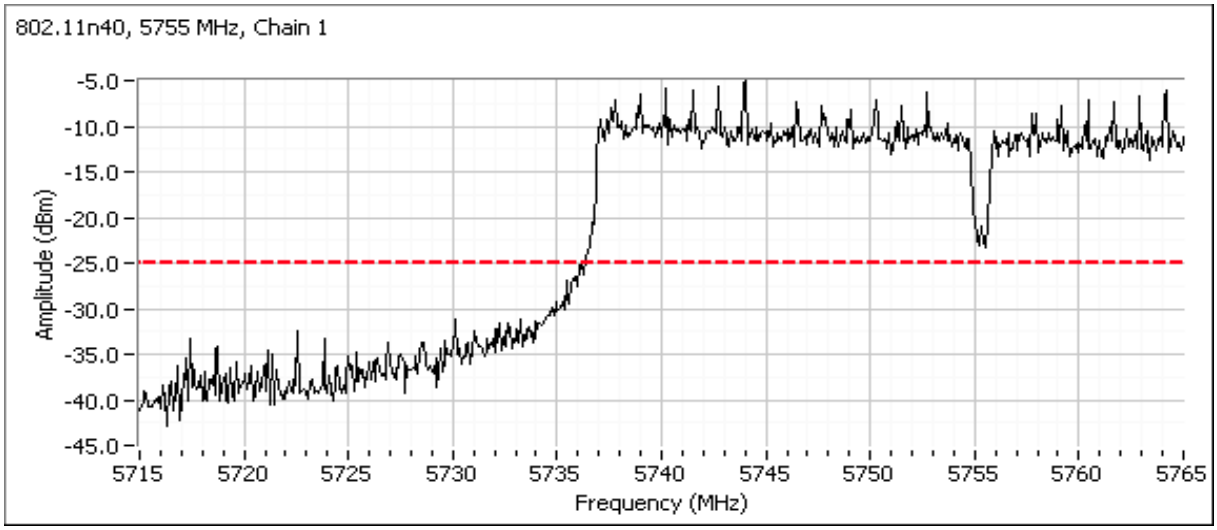
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

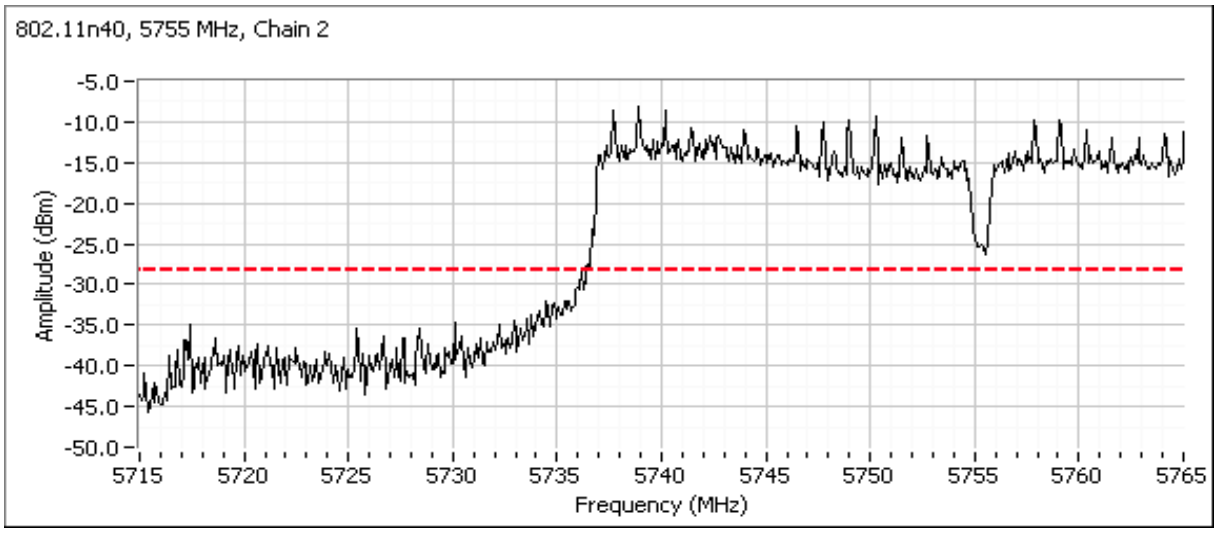




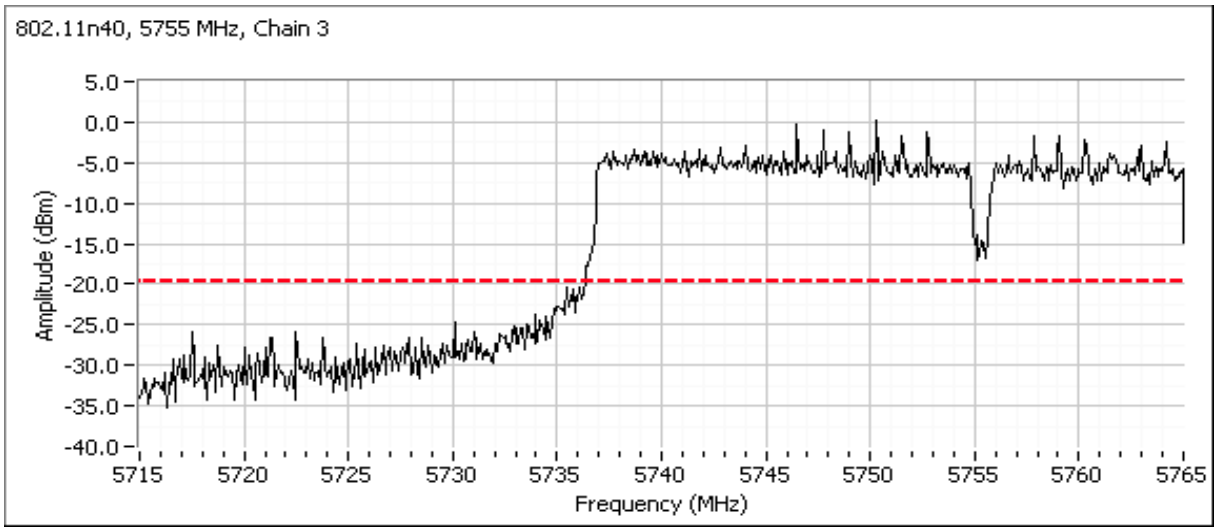
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

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

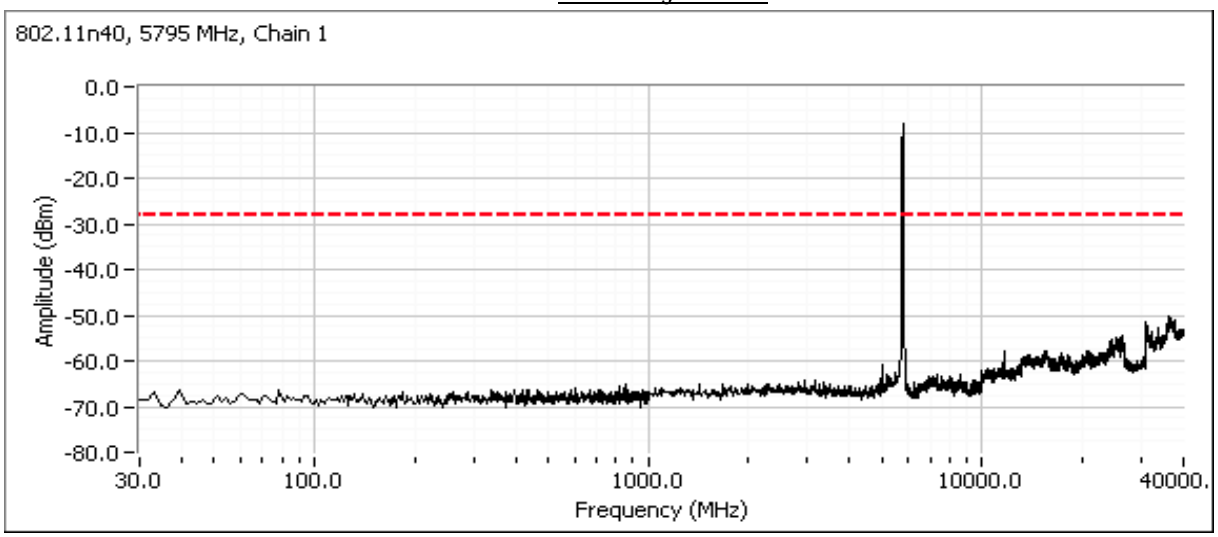




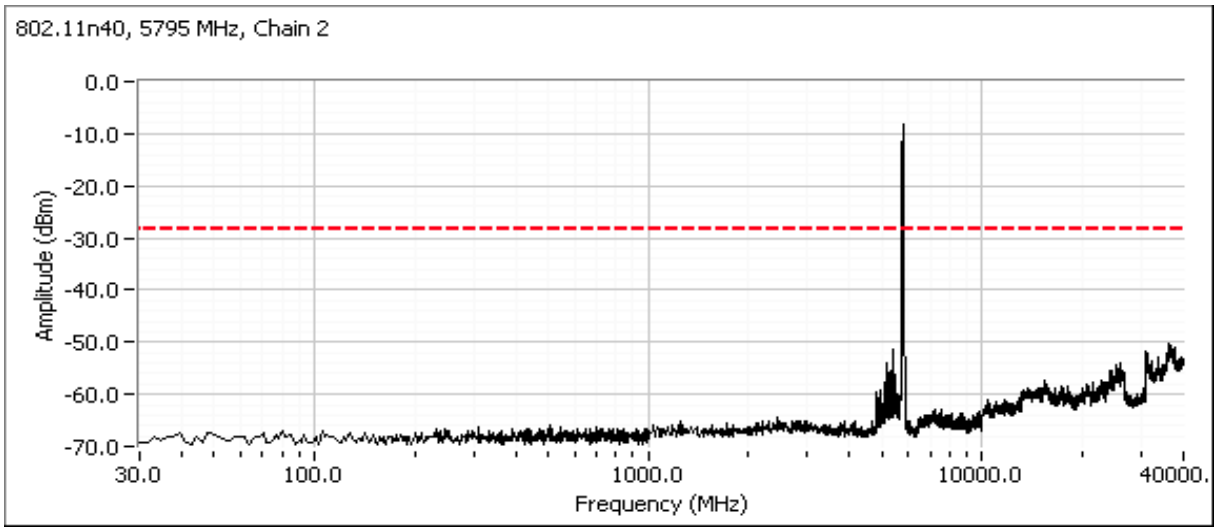
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

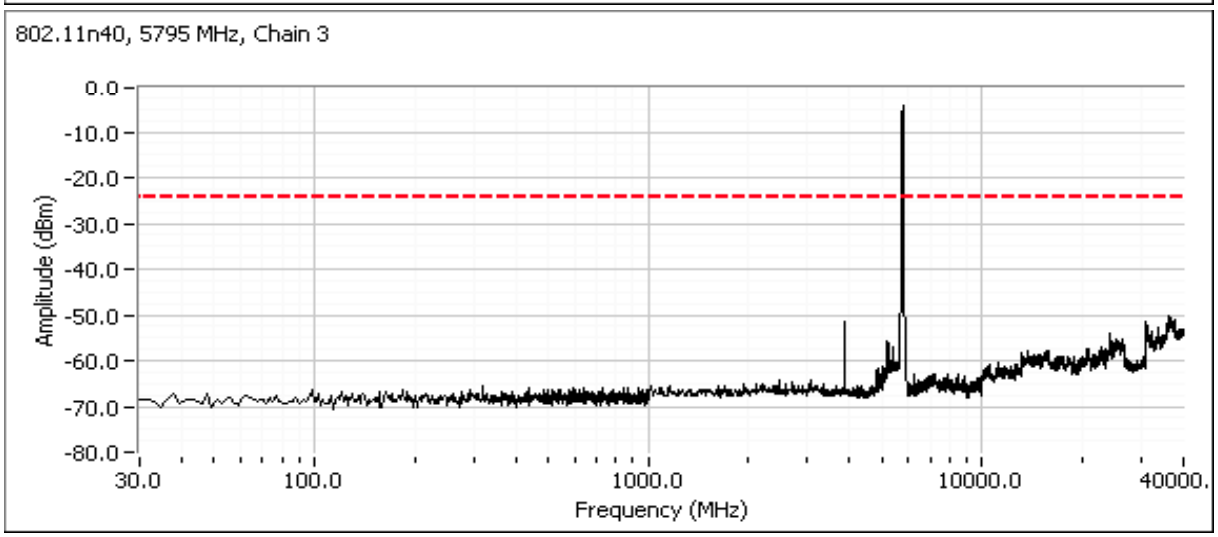


Plots for high channel



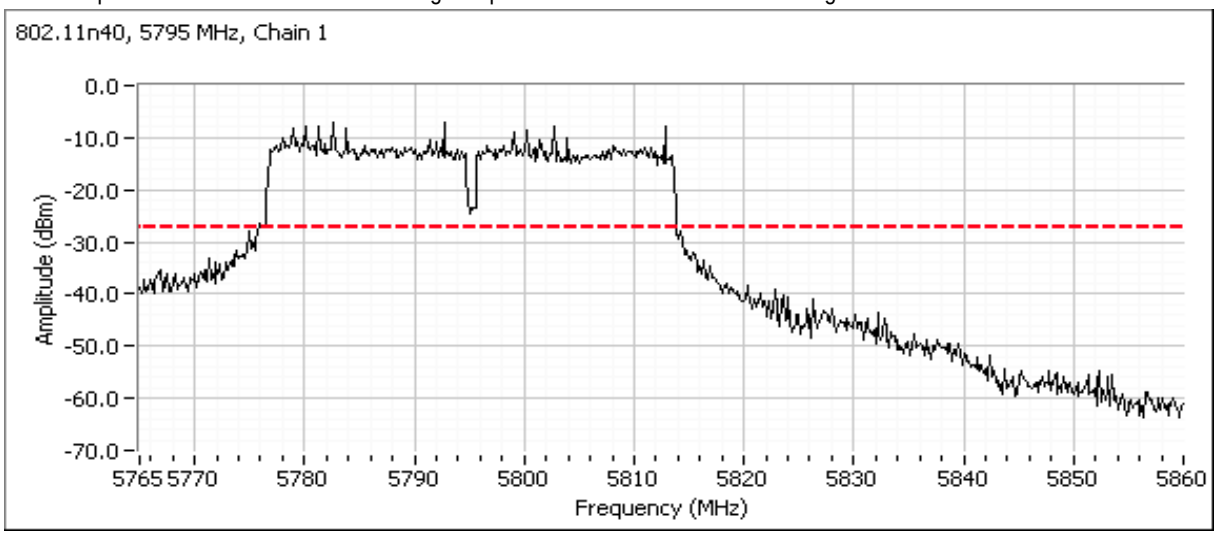
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

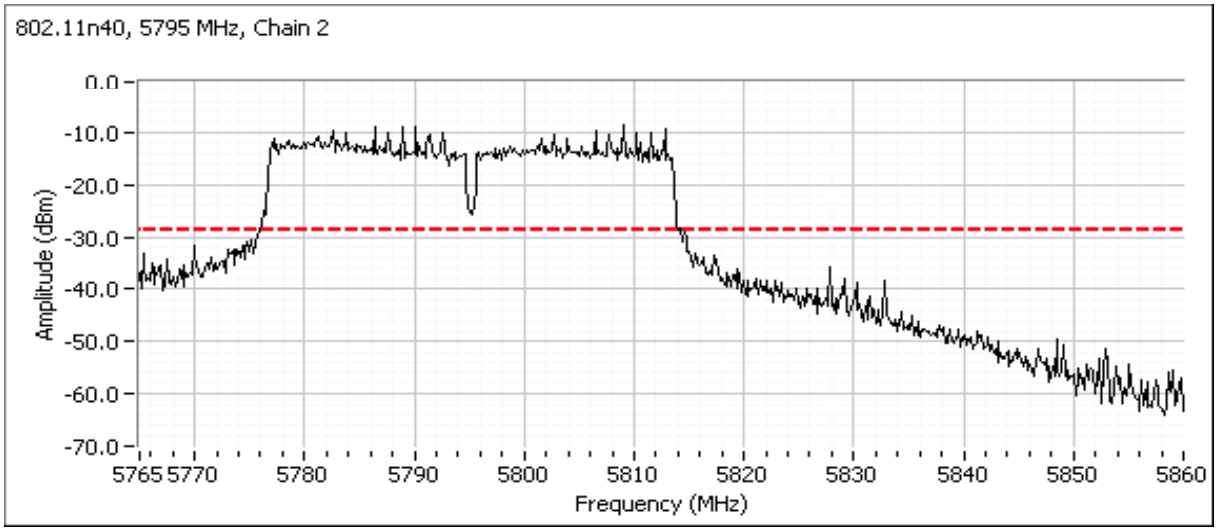




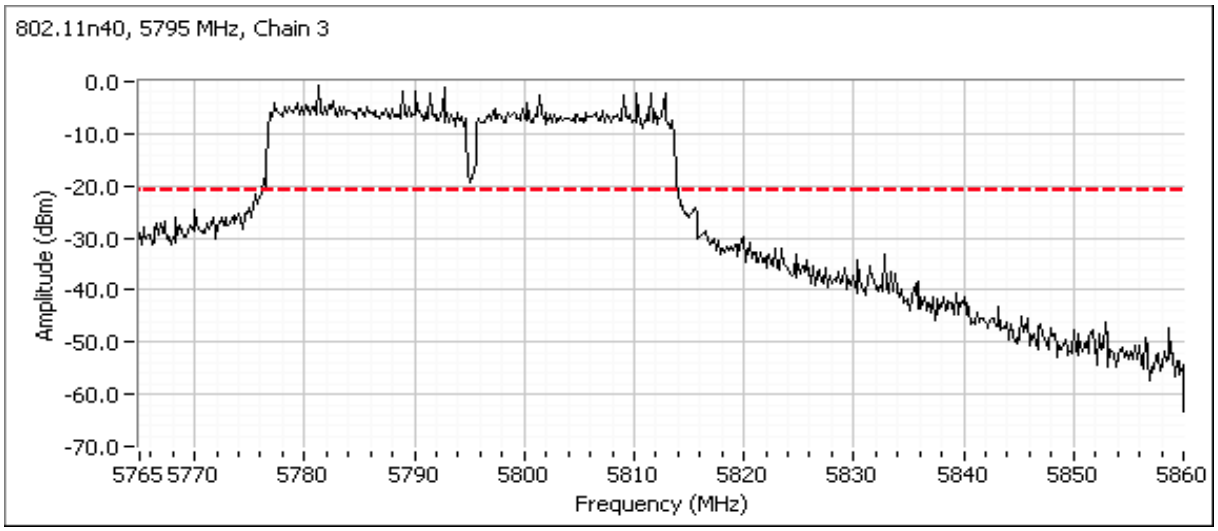
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

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





Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, 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 outside the chamber, with all I/O connections running under the groundplane through brass pipe.

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

Ambient Conditions:

Temperature: 20 °C

Rel. Humidity: 41 %

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

Run #	Mode	Channel	Power Setting	Antenna	Test Performed	Limit	Result / Margin
1a	b	low	34	Omni	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	43.8 dBµV/m @ 2386.4 MHz (-10.2 dB)
1b	b	high	34	Omni	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	46.5 dBµV/m @ 2487.8 MHz (-7.5 dB)
2a	g	low	32	Omni	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	52.8 dBµV/m @ 2390.0 MHz (-1.2 dB)
2b	g	high	26	Omni	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.7 dBµV/m @ 2483.5 MHz (-0.3 dB)
3a	n20	low	26	Omni	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	49.8 dBµV/m @ 2390.0 MHz (-4.2 dB)
3b	n20	high	24	Omni	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	52.9 dBµV/m @ 2483.5 MHz (-1.1 dB)
4a	n40	low	22	Omni	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.8 dBµV/m @ 2384.6 MHz (-0.2 dB)
4b	n40	high	20	Omni	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.1 dBµV/m @ 2483.5 MHz (-0.9 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.

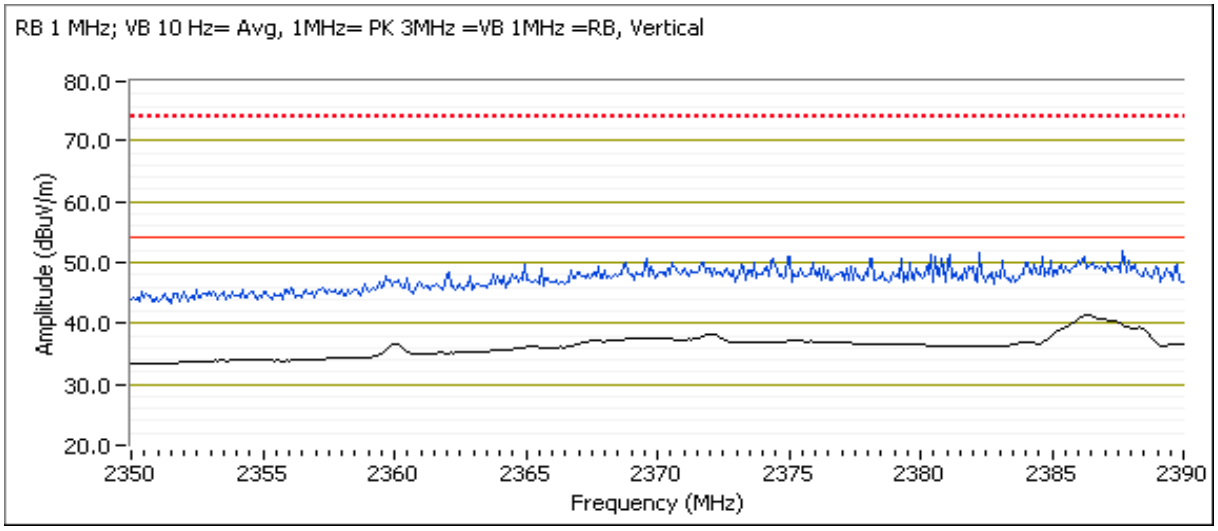
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #1: Operating Mode: 802.11b
Date of Test: 4/10/2012
Test Engineer: Vishal Narayan
Test Location: FT 4

Run #1a: Low Channel @ 2412 MHz
Power Setting = 34

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2386.230	34.8	H	54.0	-19.2	AVG	160	1.8	POS; RB 1 MHz; VB: 10 Hz
2384.150	43.5	H	74.0	-30.5	PK	160	1.8	POS; RB 1 MHz; VB: 3 MHz
2386.390	43.8	V	54.0	-10.2	AVG	50	1.0	POS; RB 1 MHz; VB: 10 Hz
2385.590	53.2	V	74.0	-20.8	PK	50	1.0	POS; RB 1 MHz; VB: 3 MHz

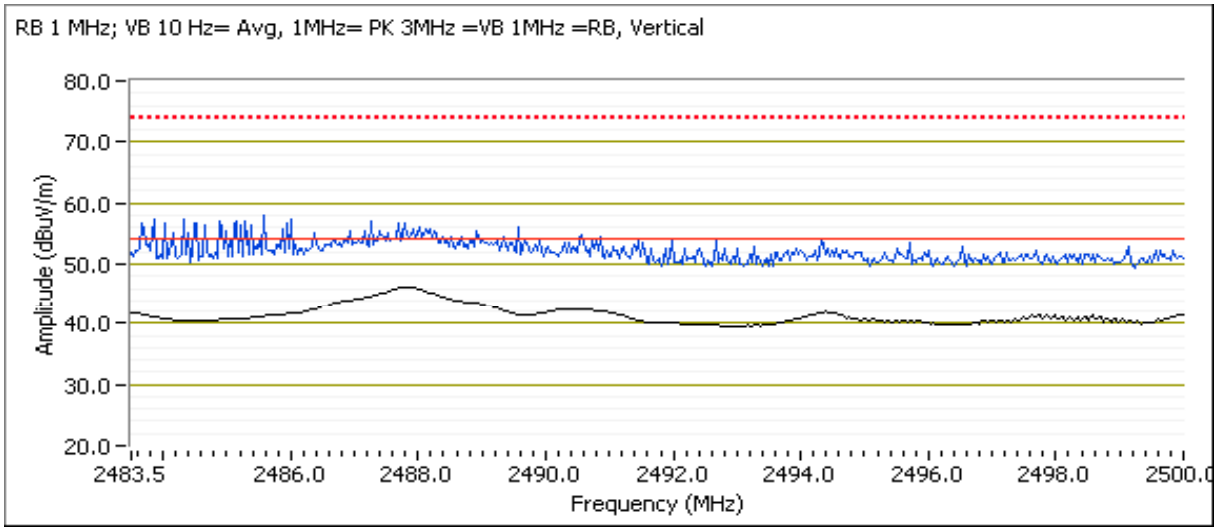


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #1b: High Channel @ 2462 MHz
Power Setting = 34

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2487.800	46.5	V	54.0	-7.5	AVG	326	1.1	POS; RB 1 MHz; VB: 10 Hz
2494.710	56.3	V	74.0	-17.7	PK	326	1.1	POS; RB 1 MHz; VB: 3 MHz
2487.960	41.4	H	54.0	-12.6	AVG	74	1.0	POS; RB 1 MHz; VB: 10 Hz
2490.910	53.2	H	74.0	-20.8	PK	74	1.0	POS; RB 1 MHz; VB: 3 MHz



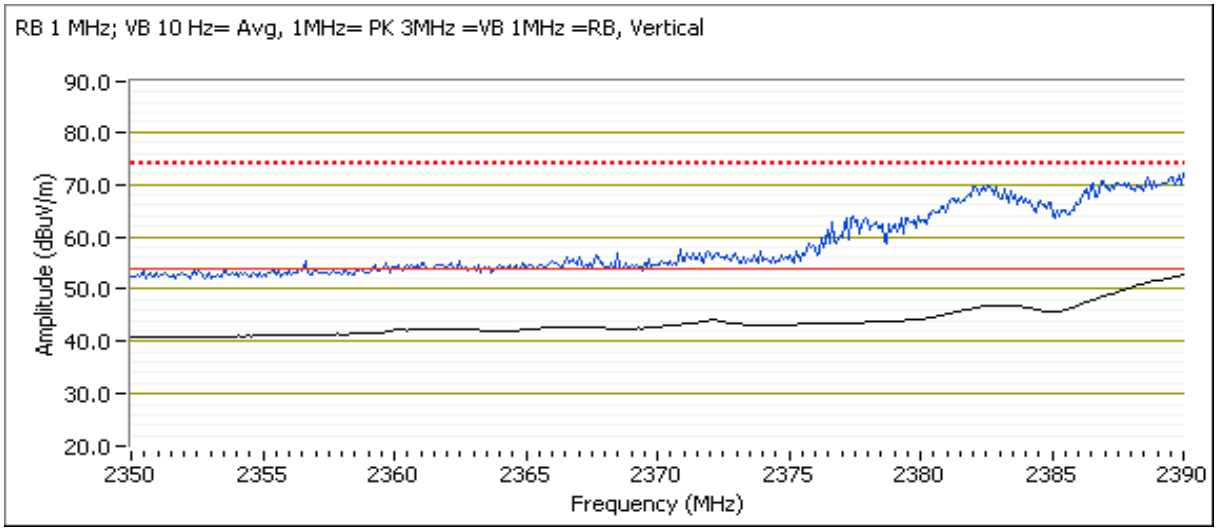
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #2: Operating Mode: 802.11g
Date of Test: 4/10/2012
Test Engineer: Vishal Narayan
Test Location: FT 4

Run #2a: Low Channel @ 2412 MHz
Power Setting = 32

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	52.8	V	54.0	-1.2	AVG	212	1.0	Power 32
2387.680	67.5	V	74.0	-6.5	PK	212	1.0	Power 32
2390.000	45.5	H	54.0	-8.5	AVG	22	0.9	POS; RB 1 MHz; VB: 10 Hz
2389.840	57.2	H	74.0	-16.8	PK	22	0.9	POS; RB 1 MHz; VB: 3 MHz

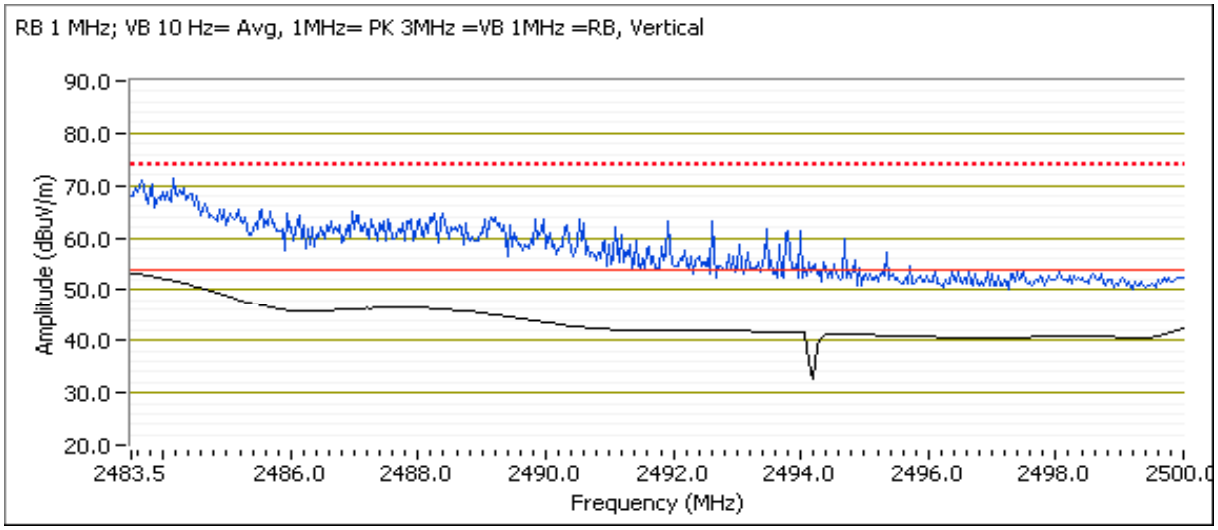


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #2b: High Channel @ 2462 MHz
Power Setting = 26

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	53.7	V	54.0	-0.3	AVG	154	1.0	Power 26
2484.690	67.1	V	74.0	-6.9	PK	154	1.0	Power 26
2483.530	43.4	H	54.0	-10.6	AVG	191	1.0	POS; RB 1 MHz; VB: 10 Hz
2483.760	54.4	H	74.0	-19.6	PK	191	1.0	POS; RB 1 MHz; VB: 3 MHz



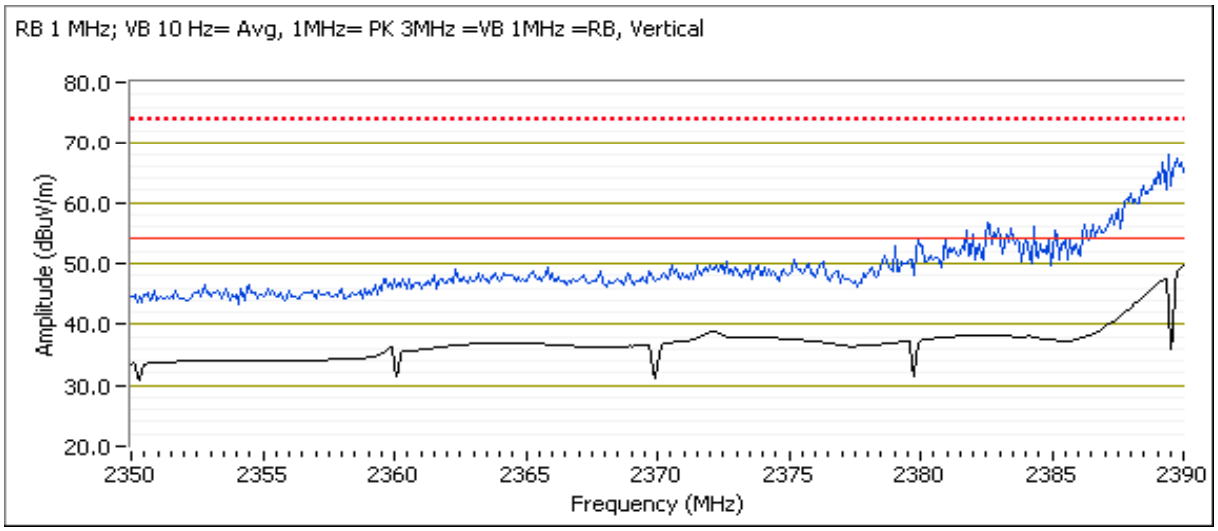
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #3: Operating Mode: 802.11 n20
Date of Test: 4/10/2012
Test Engineer: Vishal Narayan
Test Location: FT 4

Run #3a: Low Channel @ 2412 MHz
Power Setting = 26

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	49.8	V	54.0	-4.2	AVG	200	1.0	Power 26
2389.440	61.6	V	74.0	-12.4	PK	200	1.0	Power 26
2387.110	40.7	H	54.0	-13.3	AVG	244	1.0	POS; RB 1 MHz; VB: 10 Hz
2351.040	51.9	H	74.0	-22.1	PK	244	1.0	POS; RB 1 MHz; VB: 3 MHz

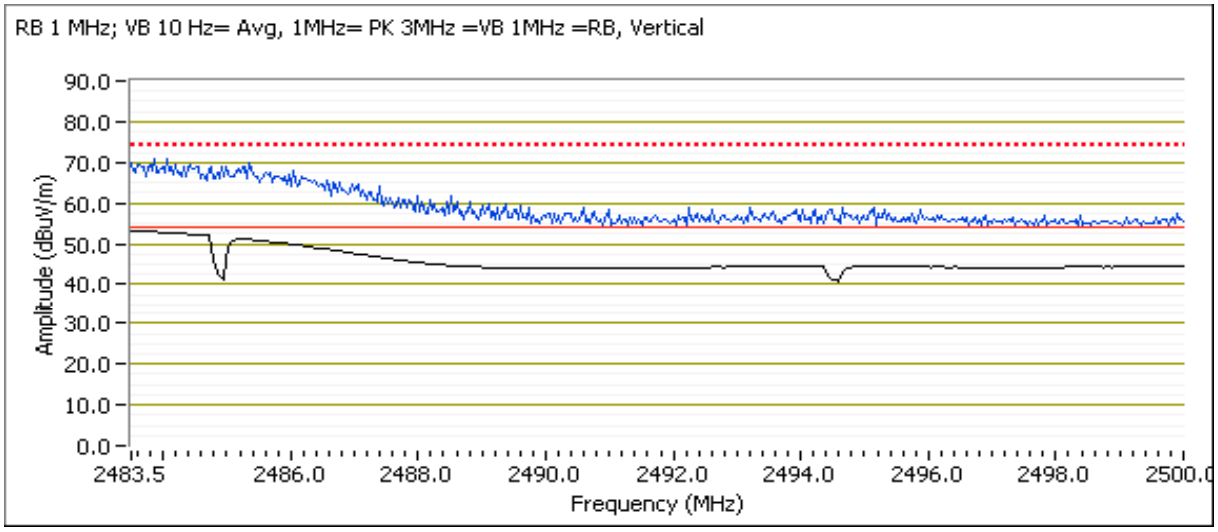


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #3b: High Channel @ 2462 MHz
Power Setting = 24

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	52.9	V	54.0	-1.1	AVG	221	1.0	Power 24
2484.560	69.5	V	74.0	-4.5	PK	221	1.0	Power 24
2483.600	44.8	H	54.0	-9.2	AVG	114	1.0	POS; RB 1 MHz; VB: 10 Hz
2484.590	58.5	H	74.0	-15.5	PK	114	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

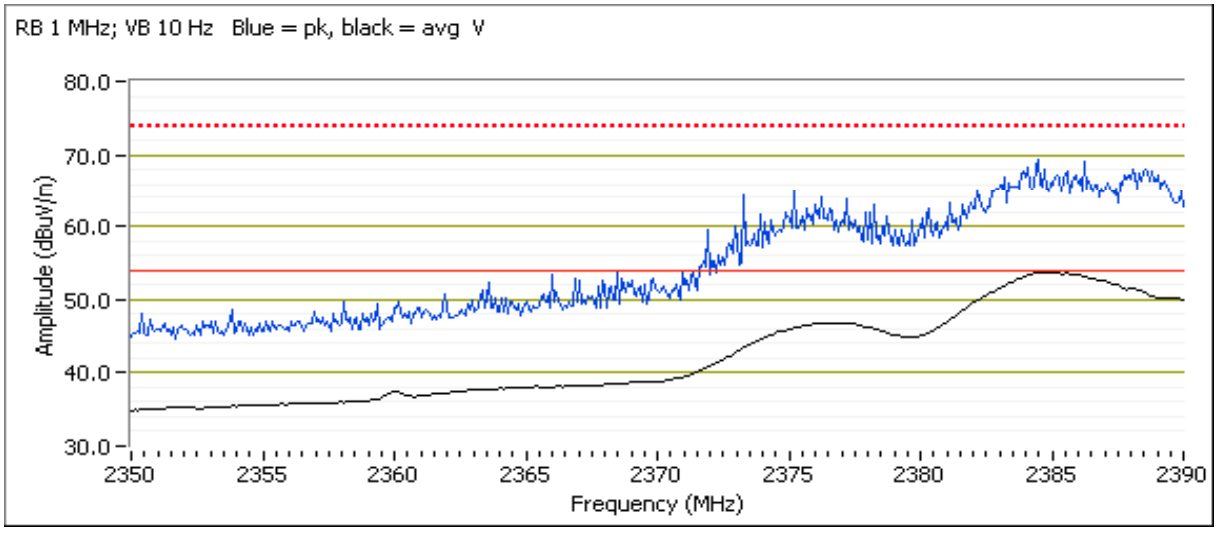
Run #4: Operating Mode: 802.11 n40

Date of Test: 4/18/2012
Test Engineer: John Caizzi
Test Location: Chamber 7

Run #4a: Low Channel @ 2422 MHz
Power Setting = 22

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2384.630	53.8	V	54.0	-0.2	AVG	14	1.00	Pwr setting = 22
2387.920	68.0	V	74.0	-6.0	PK	14	1.00	Pwr setting = 22

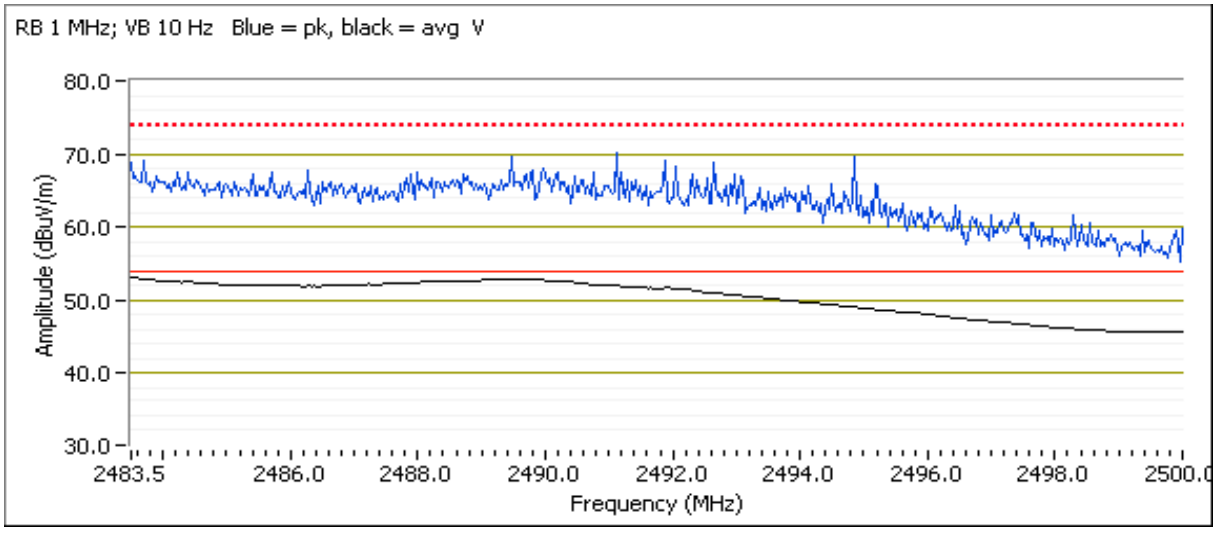


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #4b: High Channel @ 2452 MHz
Power Setting = 20

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	53.1	V	54.0	-0.9	AVG	274	1.19	Pwr setting = 20
2493.780	67.8	V	74.0	-6.2	PK	274	1.19	Pwr setting = 20



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, 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 outside the chamber, with all I/O connections running under the groundplane through brass pipe.

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

Ambient Conditions:

Temperature: 20 °C

Rel. Humidity: 41 %

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

Run #	Mode	Channel	Power Setting	Antenna	Test Performed	Limit	Result / Margin
1a	b	low	30	Patch	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.3 dBµV/m @ 2363.2 MHz (-0.7 dB)
1b		high	36		Restricted Band Edge (2483.5 MHz)		52.5 dBµV/m @ 2487.8 MHz (-1.5 dB)
2a	g	low	27		Restricted Band Edge (2390 MHz)		53.5 dBµV/m @ 2390.0 MHz (-0.5 dB)
2b		high	25		Restricted Band Edge (2483.5 MHz)		53.4 dBµV/m @ 2483.5 MHz (-0.6 dB)
3a	n20	low	25		Restricted Band Edge (2390 MHz)		54.0 dBµV/m @ 2390.0 MHz (0.0 dB)
3b		high	25		Restricted Band Edge (2483.5 MHz)		53.5 dBµV/m @ 2483.5 MHz (-0.5 dB)
4a	n40	low	18		Restricted Band Edge (2390 MHz)		53.3 dBµV/m @ 2388.3 MHz (-0.7 dB)
4b		high	18		Restricted Band Edge (2483.5 MHz)		53.2 dBµV/m @ 2483.5 MHz (-0.8 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:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

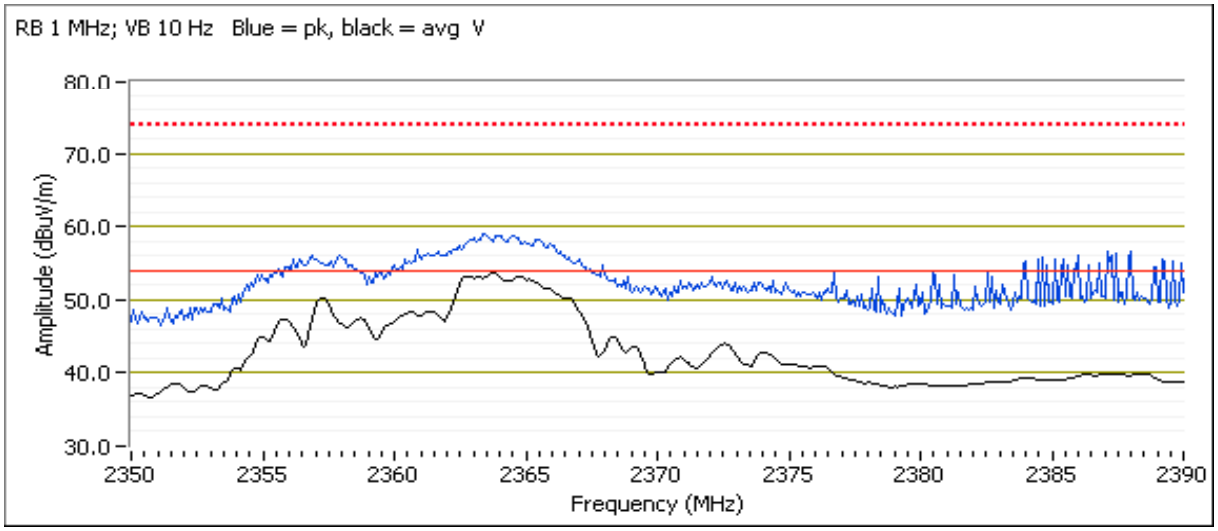
Run #1: Operating Mode: 802.11b

Date of Test: 4/18/2012
Test Engineer: John Caizzi
Test Location: Chamber 7

Run #1a: Low Channel @ 2412 MHz
Power Setting = 30

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2383.830	41.9	V	54.0	-12.1	AVG	274	1.14	
2381.020	50.3	V	74.0	-23.7	PK	274	1.14	
2363.230	53.3	V	54.0	-0.7	AVG	96	1.30	Pwr setting = 30
2364.670	58.5	V	74.0	-15.5	PK	96	1.30	Pwr setting = 30

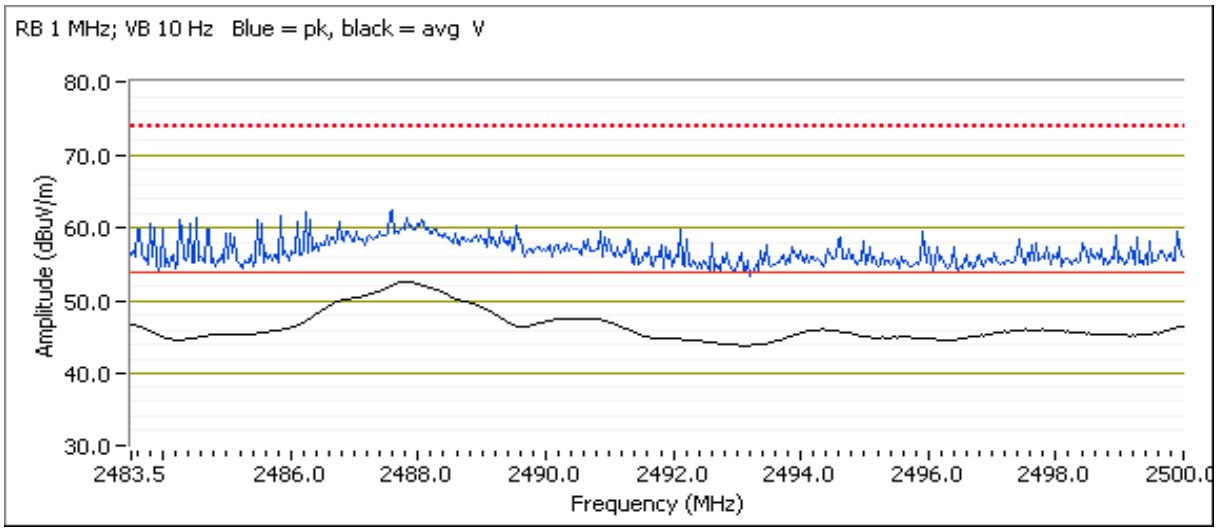


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #1b: High Channel @ 2462 MHz
Power Setting = 36

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2487.770	52.5	V	54.0	-1.5	AVG	283	1.00	Pwr setting = 36
2488.160	59.8	V	74.0	-14.2	PK	283	1.00	Pwr setting = 36



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

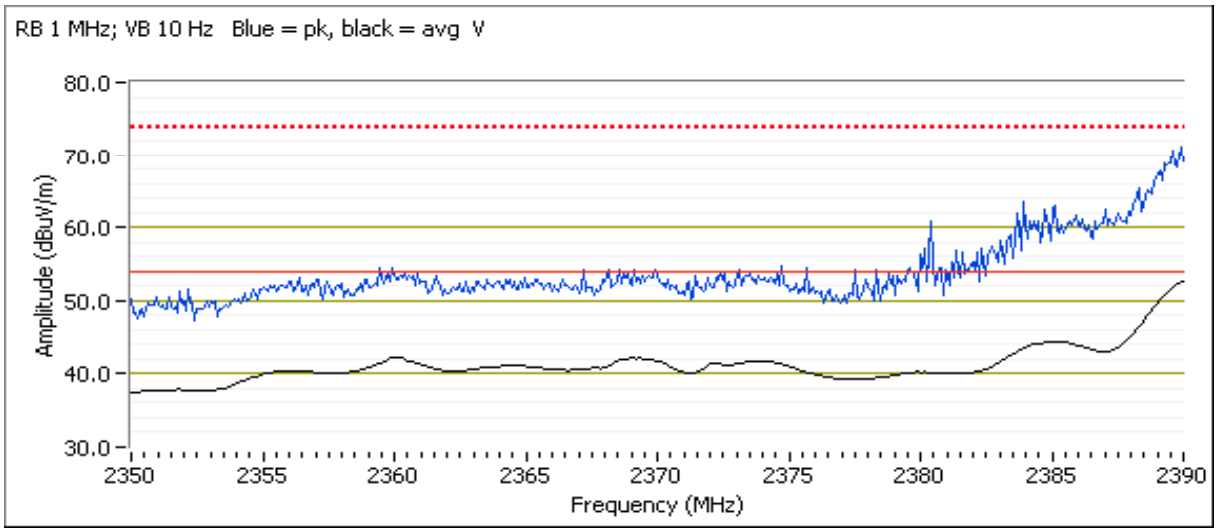
Run #2: Operating Mode: 802.11g

Date of Test: 4/18/2012
Test Engineer: John Caizzi
Test Location: Chamber 7

Run #2a: Low Channel @ 2412 MHz
Power Setting = 27

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.5	V	54.0	-0.5	AVG	97	1.04	Pwr setting = 27
2389.760	67.4	V	74.0	-6.6	PK	97	1.04	Pwr setting = 27

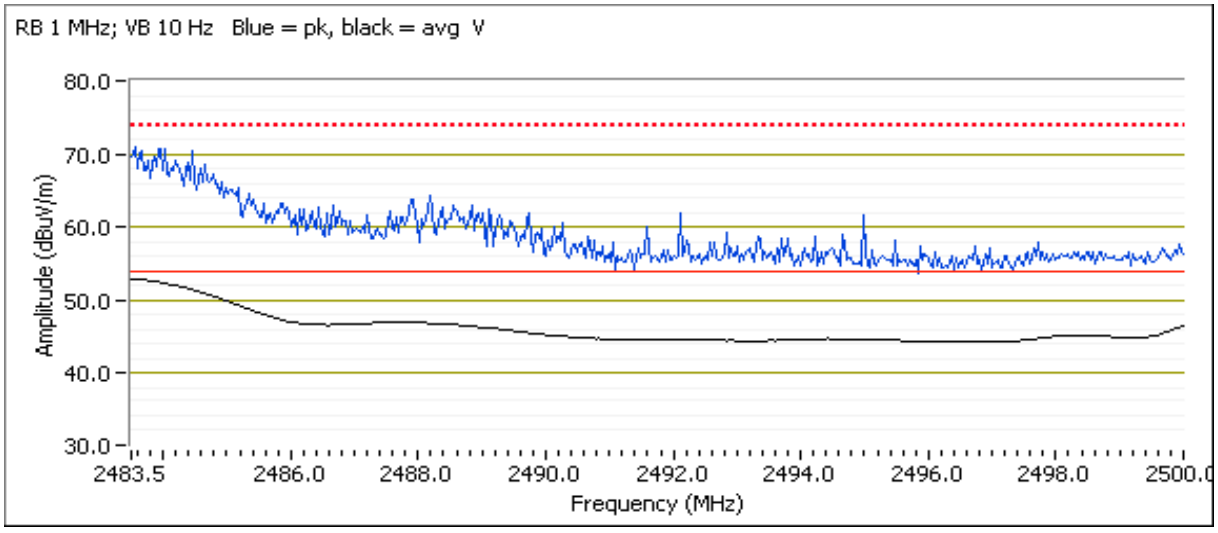


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #2b: High Channel @ 2462 MHz
Power Setting = 25

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.530	53.4	V	54.0	-0.6	AVG	269	1.00	Pwr setting = 25
2483.830	68.8	V	74.0	-5.2	PK	269	1.00	Pwr setting = 25



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

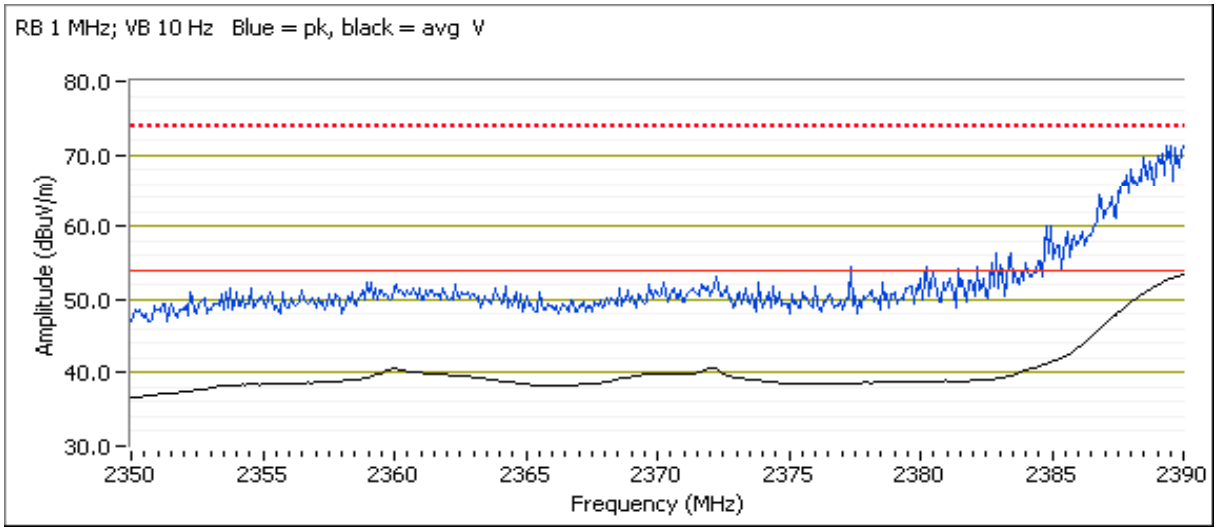
Run #3: Operating Mode: 802.11 n20

Date of Test: 4/18/2012
Test Engineer: John Caizzi
Test Location: Chamber 7

Run #3a: Low Channel @ 2412 MHz
Power Setting = 25

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	54.0	V	54.0	0.0	AVG	80	1.04	Pwr setting = 25
2388.320	71.4	V	74.0	-2.6	PK	80	1.04	Pwr setting = 25

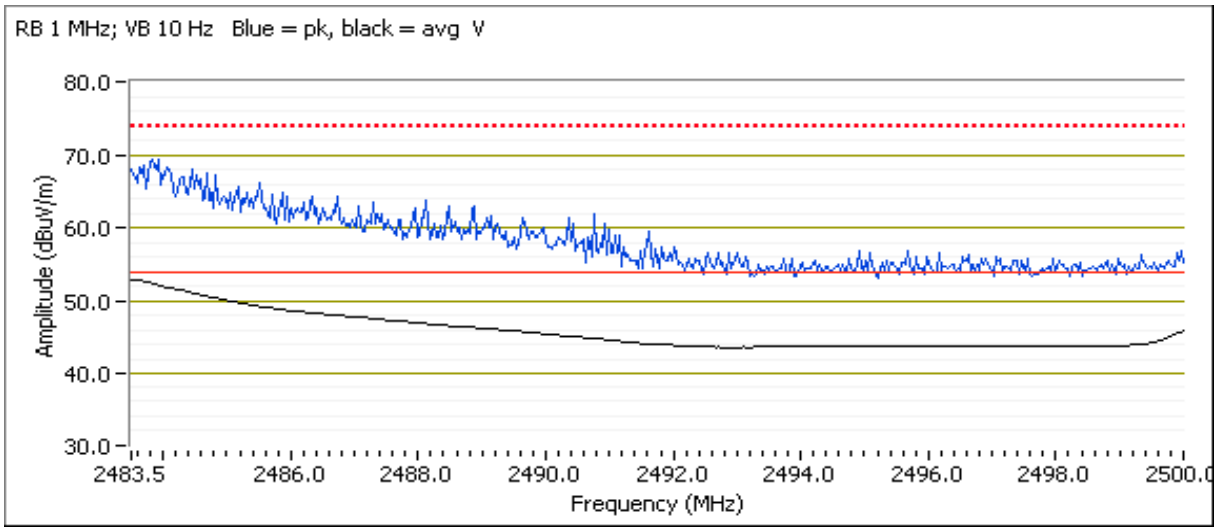


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #3b: High Channel @ 2462 MHz
Power Setting = 25

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	53.5	V	54.0	-0.5	AVG	264	1.00	Pwr setting = 25
2484.760	67.3	V	74.0	-6.7	PK	264	1.00	Pwr setting = 25



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

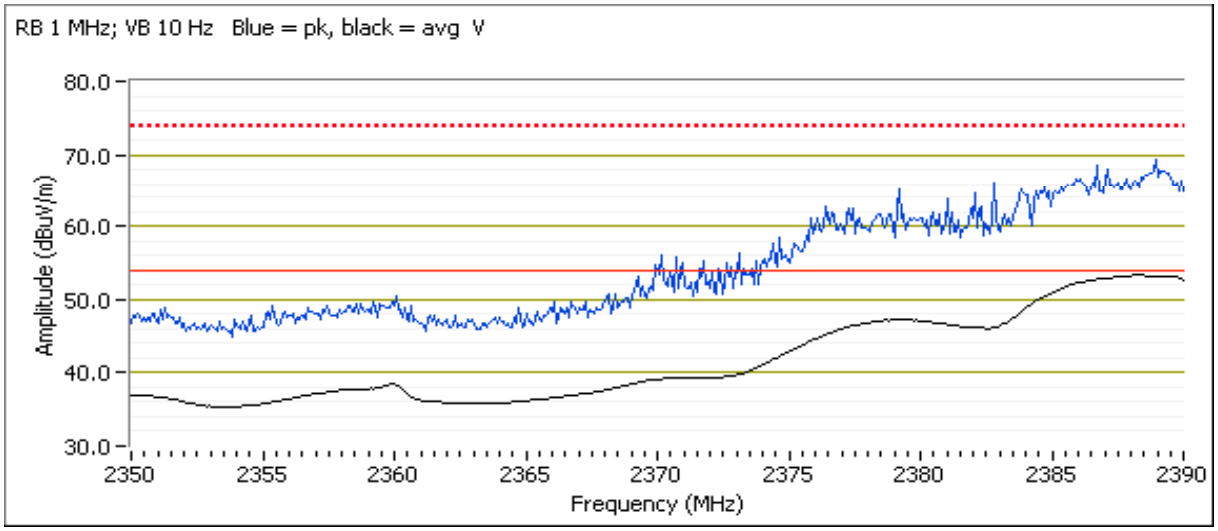
Run #4: Operating Mode: 802.11 n40

Date of Test: 4/18/2012
Test Engineer: John Caizzi
Test Location: Chamber 7

Run #4a: Low Channel @ 2422 MHz
Power Setting = 18

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2388.320	53.3	V	54.0	-0.7	AVG	100	1.01	Pwr setting = 18
2389.200	68.1	V	74.0	-5.9	PK	100	1.01	Pwr setting = 18

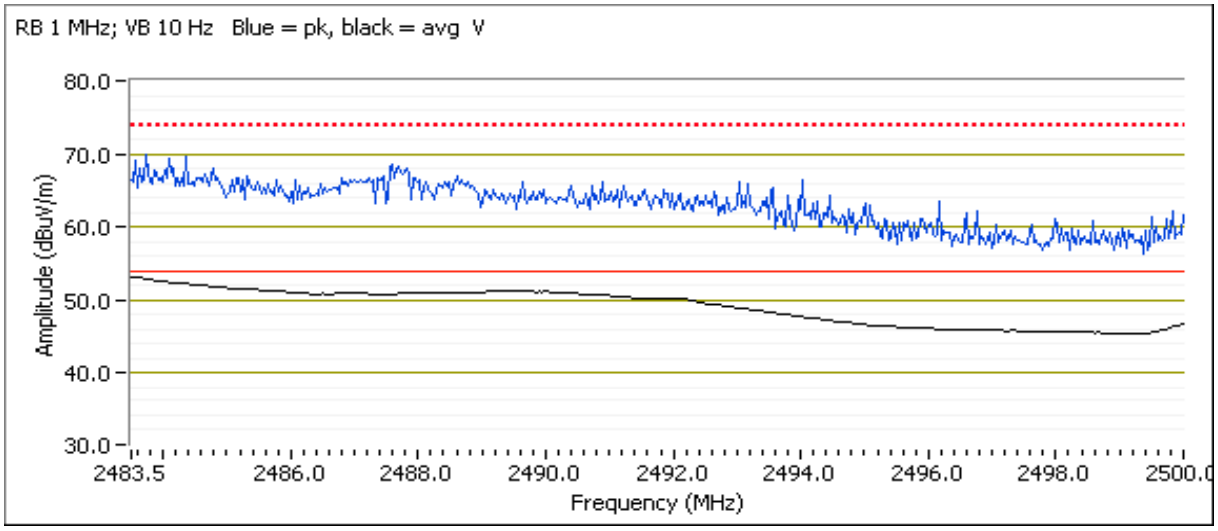


Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #4b: High Channel @ 2452 MHz
Power Setting = 18

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	53.2	V	54.0	-0.8	AVG	272	1.00	Pwr setting = 18
2487.960	66.8	V	74.0	-7.2	PK	272	1.00	Pwr setting = 18



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions
3x3 Module - 802.11b, 802.11g, HT20, HT40 Modes

Test Specific Details

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

General Test Configuration

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

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

Ambient Conditions:

Temperature:	20 °C
Rel. Humidity:	30 %

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

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

Run #	Mode	Channel	Power Setting	Antenna	Test Performed	Limit	Result / Margin
1	802.11b	3x3: 2412 MHz 3x3: 2462 MHz	34 35	Omni	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	52.8 dBµV/m @ 4824.0 MHz (-1.2 dB)
2	802.11b 802.11g	3x3: 2437 MHz 3x3: 2437 MHz	36 40	Omni	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	72.9 dBµV/m @ 7323.5 MHz (-1.1 dB)
3	802.11g	3x3: 2412 MHz 3x3: 2462 MHz	34 40	Omni	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	71.7 dBµV/m @ 7380.7 MHz (-2.3 dB)
4	802.11 HT20	3x3: 2412 MHz 3x3: 2462 MHz	38 34	Omni	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	71.9 dBµV/m @ 7393.5 MHz (-2.1 dB)
5	802.11 HT20 HT40	3x3: 2437 MHz 3x3: 2422 MHz	34 36	Omni	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	71.3 dBµV/m @ 7319.9 MHz (-2.7 dB)
6	802.11 HT40	3x3: 2437 MHz	38	Omni	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	53.2 dBµV/m @ 7337.6 MHz (-0.8 dB)
7	802.11 HT40	3x3: 2437 MHz 3x3:2452 MHz	39 40	Omni	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	53.7 dBµV/m @ 7330.8 MHz (-0.3 dB)

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, 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

Preliminary testing showed no radio related emissions below 1GHz or above 12GHz.

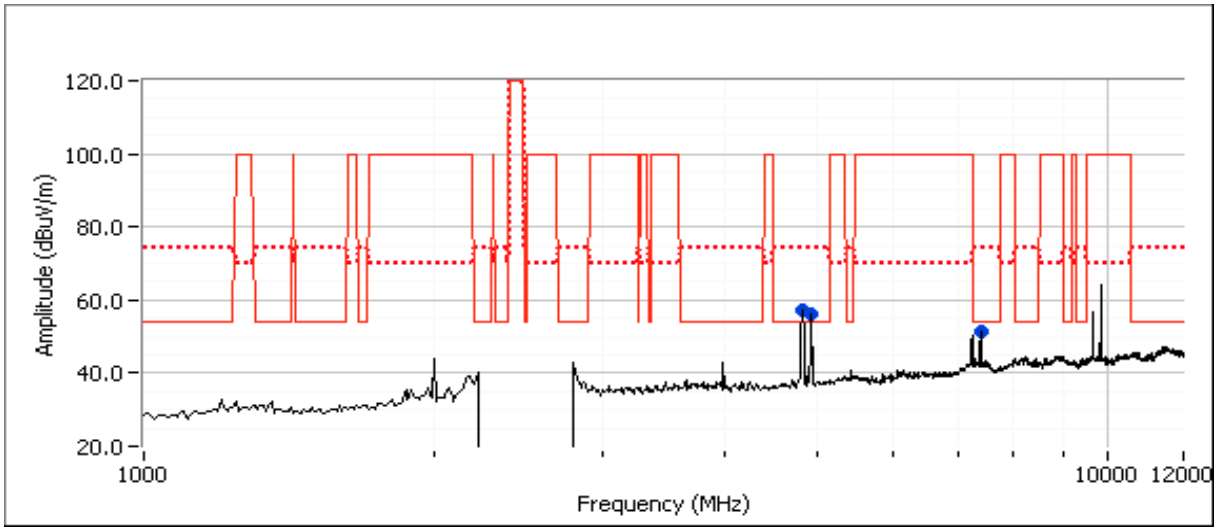
System Configuration:

Radio #	Frequency	Module	Mode	Radio #	Frequency	Module	Mode
Run: 1				Run: 2			
4	2412	3x3	802.11b	4	2437	3x3	802.11b
12	2462	3x3	802.11b	12	2437	3x3	802.11g
Run: 3							
4	2412	3x3	802.11g				
12	2462	3x3	802.11g				
Run: 4				Run: 5			
4	2412	3x3	802.11HT20	4	2437	3x3	802.11HT20
12	2462	3x3	802.11HT20	12	2422	3x3	802.11HT40
Run: 6							
4	2447	3x3	802.11HT40				
Run: 7							
4	2437	3x3	802.11HT40				
12	2452	3x3	802.11HT40				

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #1: Radiated Spurious Emissions, 1-26GHz. 802.11b - 3x3 module.

Date of Test: 4/9/2012
Test Engineer: Peter Sales
Test Location: FT5



Other Spurious Emissions

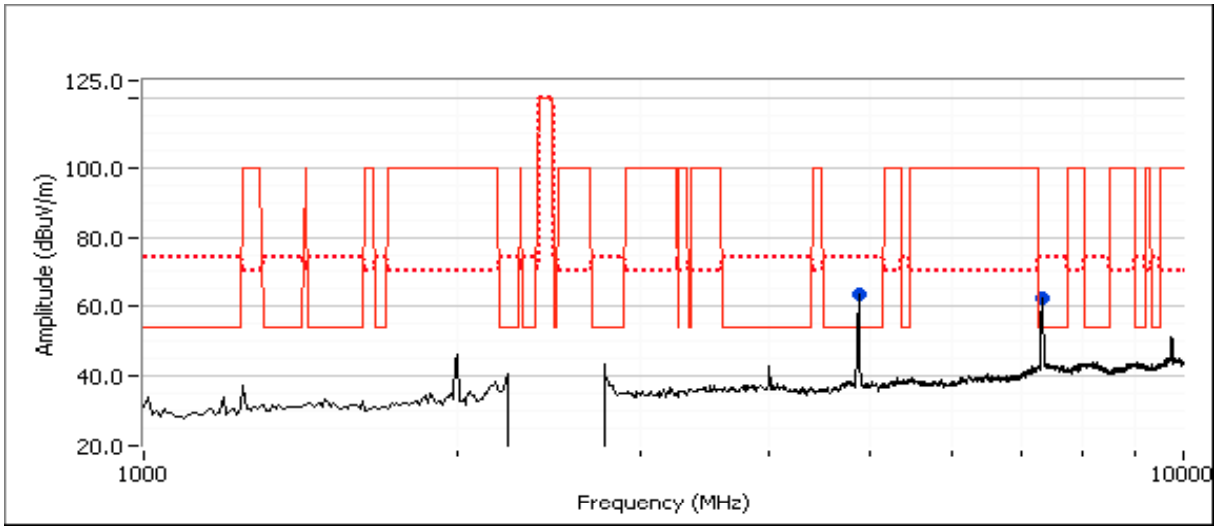
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.980	52.8	V	54.0	-1.2	AVG	52	1.0	Power 34 - radio 4
4823.940	55.0	V	74.0	-19.0	PK	52	1.0	Power 34 - radio 4
7385.190	50.4	V	54.0	-3.6	AVG	153	1.0	RB 1 MHz;VB 10 Hz;Pk
7385.760	55.6	V	74.0	-18.4	PK	153	1.0	RB 1 MHz;VB 3 MHz;Pk
4923.970	52.7	V	54.0	-1.3	AVG	303	1.0	Power 35 - radio 12
4924.040	55.5	V	74.0	-18.5	PK	303	1.0	Power 35 - radio 12

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 10-26GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #2: Radiated Spurious Emissions, 1-40GHz. 802.11b, 802.11g - 3x3 module.

Date of Test: 4/10/2012
Test Engineer: Vishal Narayan
Test Location: FT4



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.000	52.3	V	54.0	-1.7	AVG	144	1.2	Power 36 Radio 4
4874.000	56.7	V	74.0	-17.3	PK	144	1.2	Power 36 Radio 4
7312.220	48.6	V	54.0	-5.4	AVG	160	1.2	Power 36 Radio 4
7312.020	56.3	V	74.0	-17.7	PK	160	1.2	Power 36 Radio 4
4875.520	51.1	V	54.0	-2.9	AVG	296	1.2	Power 40 Radio 12
4875.950	62.4	V	74.0	-11.6	PK	296	1.2	Power 40 Radio 12
7315.110	49.5	V	54.0	-4.5	AVG	169	1.2	Power 40 Radio 12
7323.510	72.9	V	74.0	-1.1	PK	169	1.2	Power 40 Radio 12

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 10-26GHz

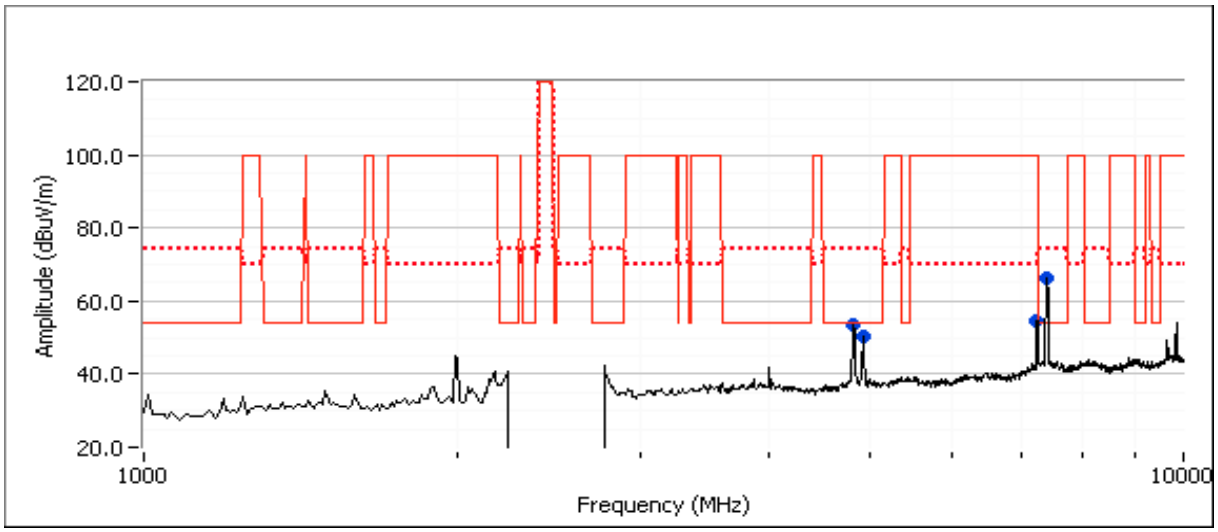
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #3: Radiated Spurious Emissions, 1-40GHz. 802.11g - 3x3 module.

Date of Test: 4/10/2012

Test Engineer: Vishal Narayan

Test Location: FT4



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Continuation of Run #3

Other Spurious Emissions

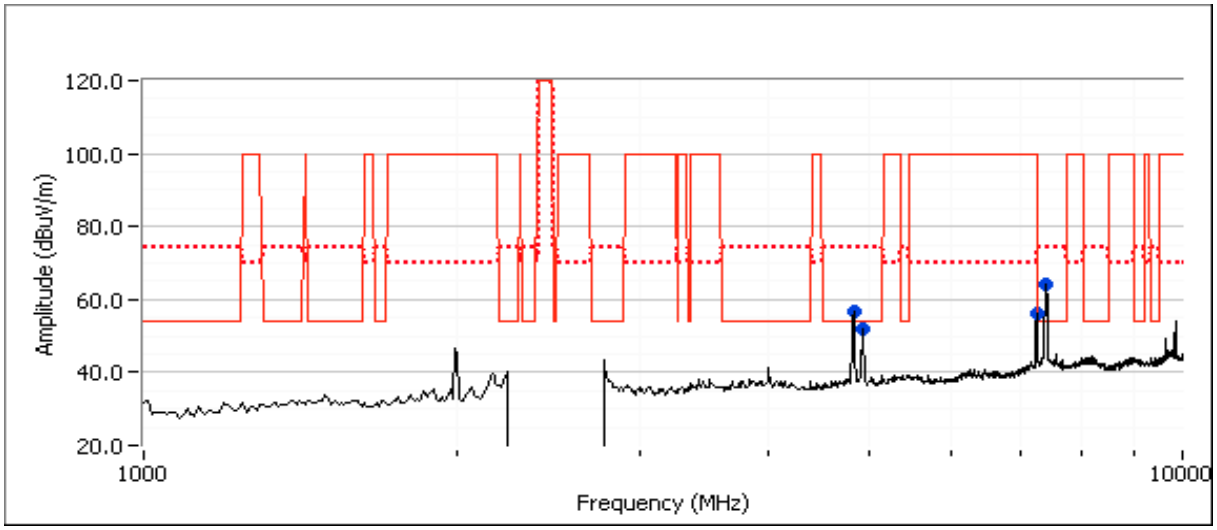
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4818.250	52.4	V	54.0	-1.6	AVG	104	1.0	RB 1 MHz;VB 10 Hz;Pk
4817.020	66.0	V	74.0	-8.0	PK	104	1.0	RB 1 MHz;VB 3 MHz;Pk
4925.830	50.8	V	54.0	-3.2	AVG	297	1.3	RB 1 MHz;VB 10 Hz;Pk
4926.790	62.6	V	74.0	-11.4	PK	297	1.3	RB 1 MHz;VB 3 MHz;Pk
7377.760	45.0	V	54.0	-9.0	AVG	305	1.0	Power 34 Radio 4
7380.680	71.7	V	74.0	-2.3	PK	305	1.0	Power 34 Radio 4
7238.060	50.8	V	-	-	AVG	61	1.3	RB 1 MHz;VB 10 Hz;Pk, note 2
7228.940	71.5	V	-	-	PK	61	1.3	RB 1 MHz;VB 3 MHz;Pk, note 2
7240.150	46.8	V	-	-	AVG	60	1.3	RB 1 MHz;VB 10 Hz;Pk, note 2
7239.770	66.0	V	-	-	PK	60	1.3	RB 1 MHz;VB 3 MHz;Pk, note 2

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 10-26GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #4: Radiated Spurious Emissions, 1-40GHz. 802.11HT20 - 3x3 module.

Date of Test: 4/10/2012
Test Engineer: Vishal Narayan
Test Location: FT4



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.830	51.5	V	54.0	-2.5	AVG	118	1.0	Power 38 Radio 4
4824.710	64.3	V	74.0	-9.7	PK	118	1.0	Power 38 Radio 4
4915.750	49.9	V	54.0	-4.1	AVG	240	1.0	RB 1 MHz;VB 10 Hz;Pk
4915.510	62.7	V	74.0	-11.3	PK	240	1.0	RB 1 MHz;VB 3 MHz;Pk
7228.480	47.1	V	-	-	AVG	59	1.0	RB 1 MHz;VB 10 Hz;Pk, note 2
7235.500	67.6	V	-	-	PK	59	1.0	RB 1 MHz;VB 3 MHz;Pk, note 2
7393.310	45.9	V	54.0	-8.1	AVG	129	1.0	Power 34 Radio 12
7393.470	71.9	V	74.0	-2.1	PK	129	1.0	Power 34 Radio 12

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 10-26GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

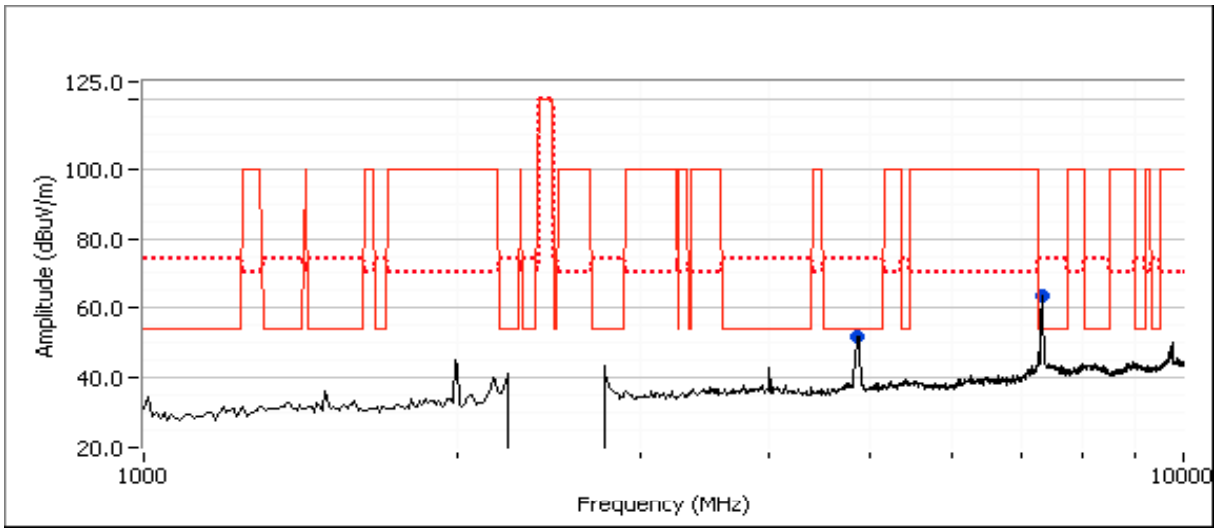
Run #5: Radiated Spurious Emissions, 1-40GHz. 802.11HT20, 802.11HT40 - 3x3 module.

Date of Test: 4/10/2012

Test Engineer: Vishal Narayan

Test Location: FT4

Radio 12 was at Power 36



Other Spurious Emissions

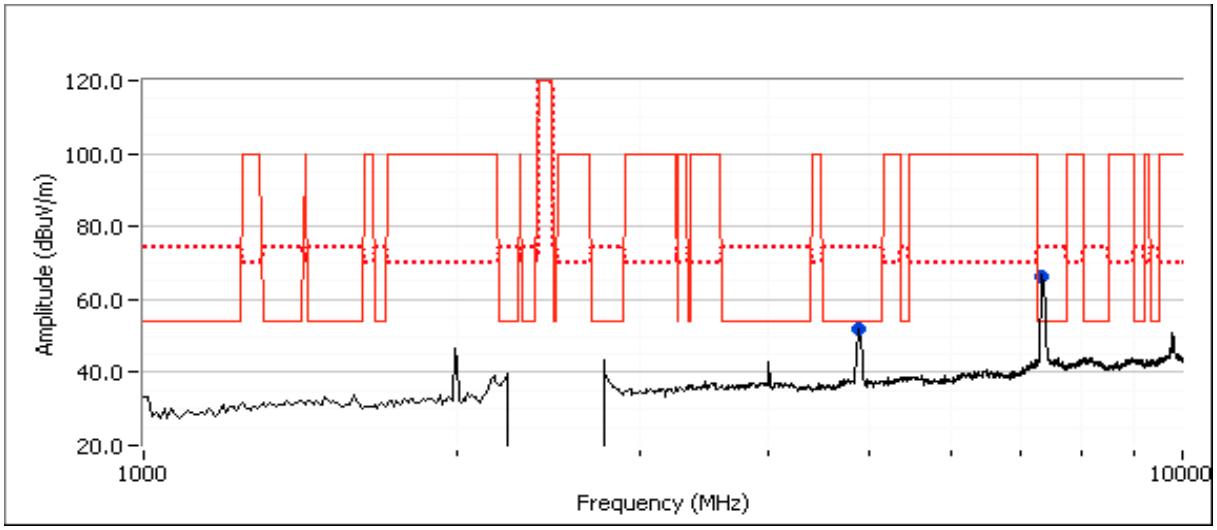
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7322.200	46.9	V	54.0	-7.1	AVG	148	1.0	Power 34 Radio 4
7319.860	71.3	V	74.0	-2.7	PK	148	1.0	Power 34 Radio 4
4869.690	49.4	V	54.0	-4.6	AVG	139	1.0	RB 1 MHz;VB 10 Hz;Pk
4866.780	61.8	V	74.0	-12.2	PK	139	1.0	RB 1 MHz;VB 3 MHz;Pk

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement in original certification.
Note 3:	No significant emissions were observed for 10-26GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #6: Radiated Spurious Emissions, 1-40GHz. 802.11HT40 - 3x3 module.

Date of Test: 4/10/2012
Test Engineer: Vishal Narayan
Test Location: FT4



Other Spurious Emissions

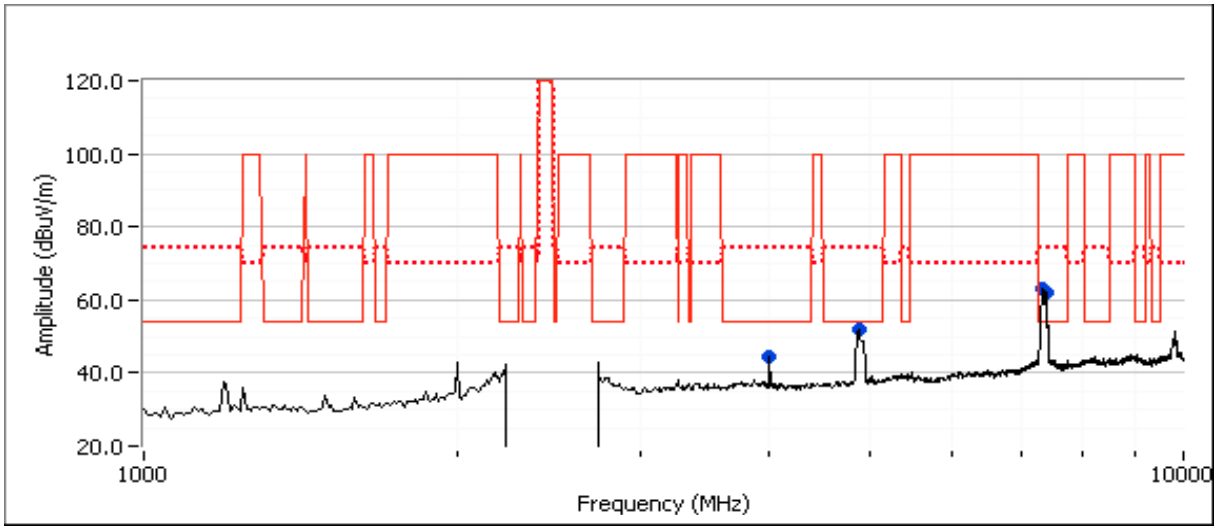
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4883.180	48.8	V	54.0	-5.2	AVG	121	1.0	RB 1 MHz;VB 10 Hz;Pk
4863.120	60.7	V	74.0	-13.3	PK	121	1.0	RB 1 MHz;VB 3 MHz;Pk
7337.610	53.2	V	54.0	-0.8	AVG	141	1.3	Power 38 Radio 4
7338.590	72.9	V	74.0	-1.1	PK	141	1.3	Power 38 Radio 4

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement in original certification.
Note 3:	No significant emissions were observed for 10-26GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #7: Radiated Spurious Emissions, 1-40GHz. 802.11HT40 - 3x3 module.

Date of Test: 4/18/2012
Test Engineer: Rafael Varelas
Test Location: FT7



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7330.830	53.7	V	54.0	-0.3	AVG	350	1.0	RB 1 MHz;VB 10 Hz;Peak
7332.960	72.5	V	74.0	-1.5	PK	350	1.0	RB 1 MHz;VB 3 MHz;Peak
7350.870	53.2	V	54.0	-0.8	AVG	251	1.0	RB 1 MHz;VB 10 Hz;Peak
7353.800	71.0	V	74.0	-3.0	PK	251	1.0	RB 1 MHz;VB 3 MHz;Peak
4872.720	47.2	V	54.0	-6.8	AVG	130	1.0	RB 1 MHz;VB 10 Hz;Peak
4866.190	59.2	V	74.0	-14.8	PK	130	1.0	RB 1 MHz;VB 3 MHz;Peak
4000.150	44.6	H	54.0	-9.4	Peak	44	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement in original certification.
Note 3:	No significant emissions were observed for 10-26GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions
3x3 Module - 802.11b, 802.11g, HT20, HT40 Modes

Test Specific Details

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

General Test Configuration

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

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

Ambient Conditions:

Temperature:	20 °C
Rel. Humidity:	30 %

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

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

Run #	Mode	Channel	Power Setting	Antenna	Test Performed	Limit	Result / Margin
1	802.11b	3x3: 2412 MHz 3x3: 2462 MHz	30 37	Patch	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	53.6 dBµV/m @ 4924.0 MHz (-0.4 dB)
2	802.11b 802.11g	3x3: 2437 MHz 3x3: 2437 MHz	40 40		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	53.0 dBµV/m @ 4874.06 MHz (-1.0 dB)
3	802.11g	3x3: 2412 MHz 3x3: 2462 MHz	37 38		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	54.0 dBµV/m @ 4825.63 MHz (-0.0 dB)
4	802.11 HT20	3x3: 2412 MHz 3x3: 2462 MHz	39 40		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	53.2 dBµV/m @ 4820.7 MHz (-0.8 dB)
5	802.11 HT20 HT40	3x3: 2437 MHz 3x3: 2422 MHz	40 40		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	53.2 dBµV/m @ 4874.2 MHz (-0.8 dB)
6	802.11 HT40	3x3: 2437 MHz 3x3: 2452 MHz	40 40		Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	49.3 dBµV/m @ 4861.4 MHz (-4.7 dB)

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, 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

Preliminary testing showed no radio related emissions below 1GHz or above 12GHz.

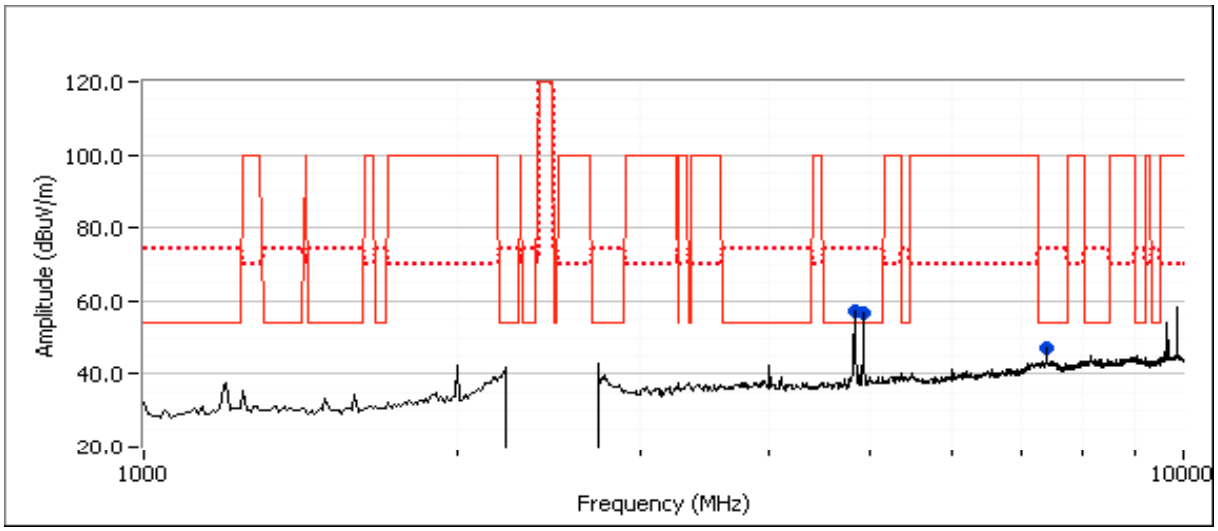
System Configuration:

Radio #	Frequency	Module	Mode	Radio #	Frequency	Module	Mode
Run: 1				Run: 2			
4	2412	3x3	802.11b	4	2437	3x3	802.11b
12	2462	3x3	802.11b	12	2437	3x3	802.11g
Run: 3							
4	2412	3x3	802.11g				
12	2462	3x3	802.11g				
Run: 4				Run: 5			
4	2412	3x3	802.11HT20	4	2437	3x3	802.11HT20
12	2462	3x3	802.11HT20	12	2422	3x3	802.11HT40
Run: 6							
4	2437	3x3	802.11HT40				
12	2452	3x3	802.11HT40				

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #1: Radiated Spurious Emissions, 1-25 GHz. 802.11b - 3x3 module, pwr setting = 40 unless noted otherwise.

Date of Test: 4/18/2012
Test Engineer: Rafael Varelas
Test Location: Chamber 7



Other Spurious Emissions

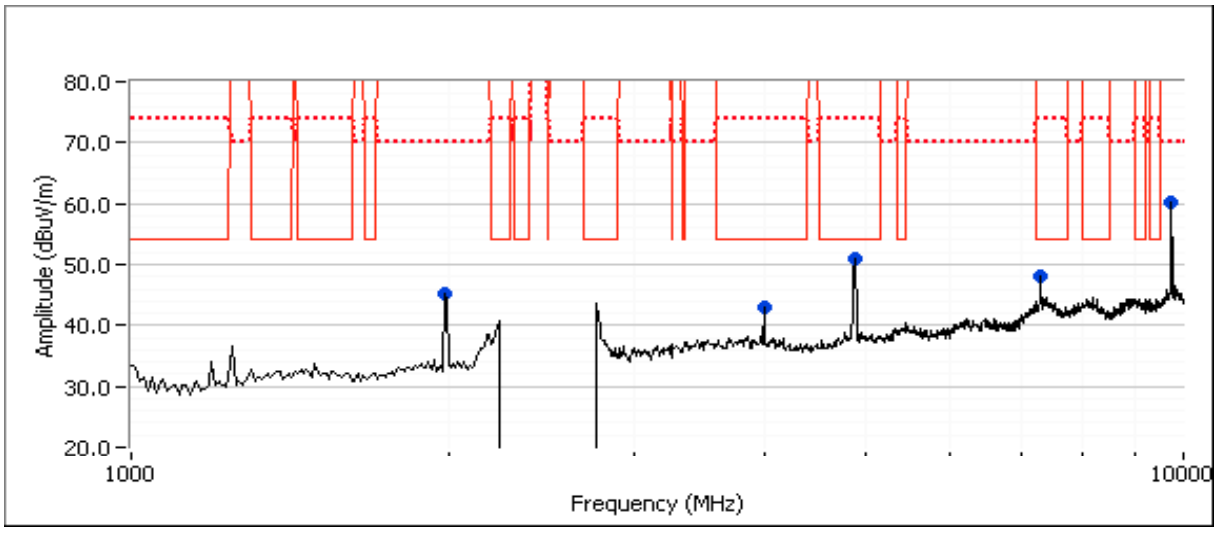
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.980	48.5	V	54.0	-5.5	AVG	130	1.0	#4, Pwr setting = 30
4823.910	51.5	V	74.0	-22.5	PK	130	1.0	#4, Pwr setting = 30
4923.960	53.6	V	54.0	-0.4	AVG	278	1.1	#12, Pwr setting = 37
4923.940	55.4	V	74.0	-18.6	PK	278	1.1	#12, Pwr setting = 37
7387.650	43.4	H	54.0	-10.6	AVG	306	1.0	RB 1 MHz;VB 10 Hz;Peak
7388.190	51.5	H	74.0	-22.5	PK	306	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 was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 10-26GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #2: Radiated Spurious Emissions, 1-25 GHz. 802.11b, 802.11g - 3x3 module.

Date of Test: 4/13/2012
Test Engineer: John Caizzi
Test Location: Chamber 3



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Other Spurious Emissions

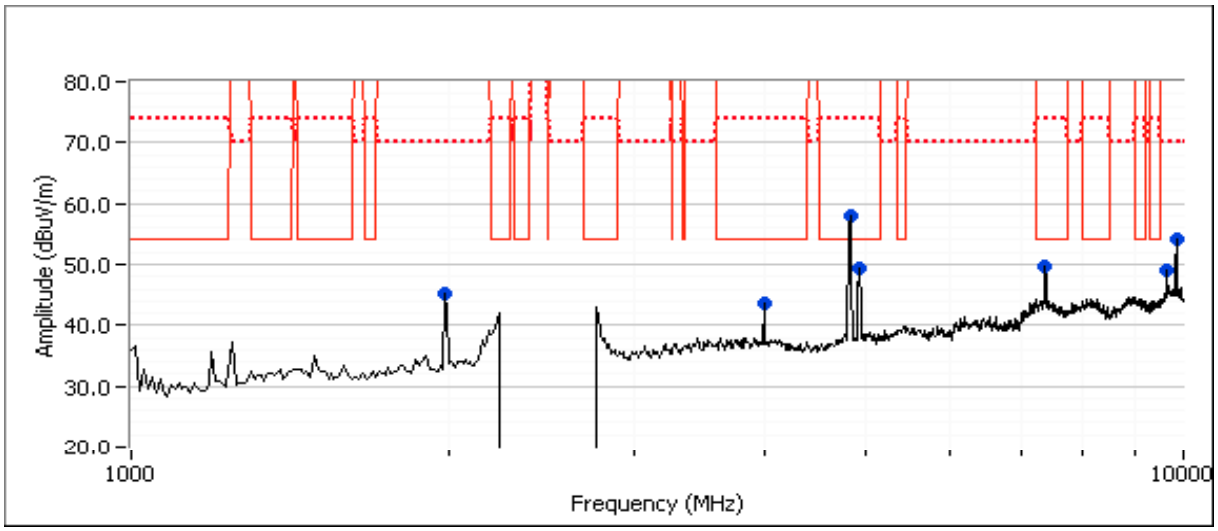
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1990.000	45.1	V	-	-	Peak	246	1.3	Note 2
9749.170	60.3	H	-	-	Peak	12	1.3	Note 2
7315.000	43.6	H	54.0	-10.4	AVG	121	1.00	
7316.870	56.3	H	74.0	-17.7	PK	121	1.00	
4000.000	41.3	H	54.0	-12.7	AVG	236	1.15	
4000.270	47.9	H	74.0	-26.1	PK	236	1.15	
4874.060	53.0	V	54.0	-1.0	AVG	278	1.06	#4 onCH6, #12 on CH1., note 4
4873.930	55.8	V	74.0	-18.2	PK	278	1.06	#4 onCH6, #12 on CH1., note 4
4877.860	51.0	V	54.0	-3.0	AVG	94	1.09	#12 on CH6, #4 on CH1., note 4
4878.930	64.2	V	74.0	-9.8	PK	94	1.09	#12 on CH6, #4 on CH1., note 4

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 10-26GHz
Note 4:	Since in normal usage, both radios would not be on the same channel, one radio was moved to a non-overlapping channel and the emission measured. The measurement was repeated with the other radio on the target channel.

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #3: Radiated Spurious Emissions, 1-25 GHz. 802.11g - 3x3 module, pwr setting = 38 unless noted otherwise.

Date of Test: 4/13/2012
Test Engineer: John Caizzi
Test Location: Chamber 3



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Other Spurious Emissions

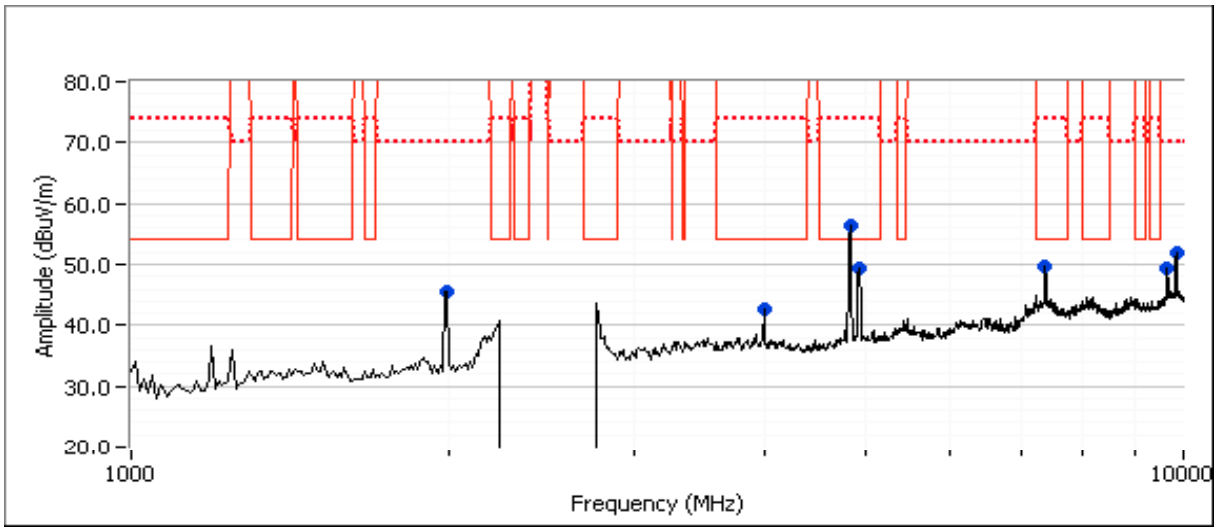
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1990.000	45.2	H	-	-	Peak	197	1.0	Note 2
9650.000	49.1	H	-	-	Peak	38	1.0	Note 2
9854.170	54.1	H	-	-	Peak	360	1.0	Note 2
4917.730	46.8	V	54.0	-7.2	AVG	95	1.31	
4917.930	59.7	V	74.0	-14.3	PK	95	1.31	
7387.900	44.9	H	54.0	-9.1	AVG	121	1.27	
7388.630	61.7	H	74.0	-12.3	PK	121	1.27	
4000.030	43.7	H	54.0	-10.3	AVG	183	1.59	
4000.070	48.8	H	74.0	-25.2	PK	183	1.59	
4825.630	54.0	V	54.0	0.0	AVG	281	1.06	#4, pwr setting = 37
4828.300	66.3	V	74.0	-7.7	PK	281	1.06	#4, pwr setting = 37

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 10-26GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #4: Radiated Spurious Emissions, 1-25 GHz. 802.11HT20 - 3x3 module, power setting = 40 unless noted otherwise.

Date of Test: 4/13/2012
Test Engineer: John Caizzi
Test Location: Chamber 3



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Other Spurious Emissions

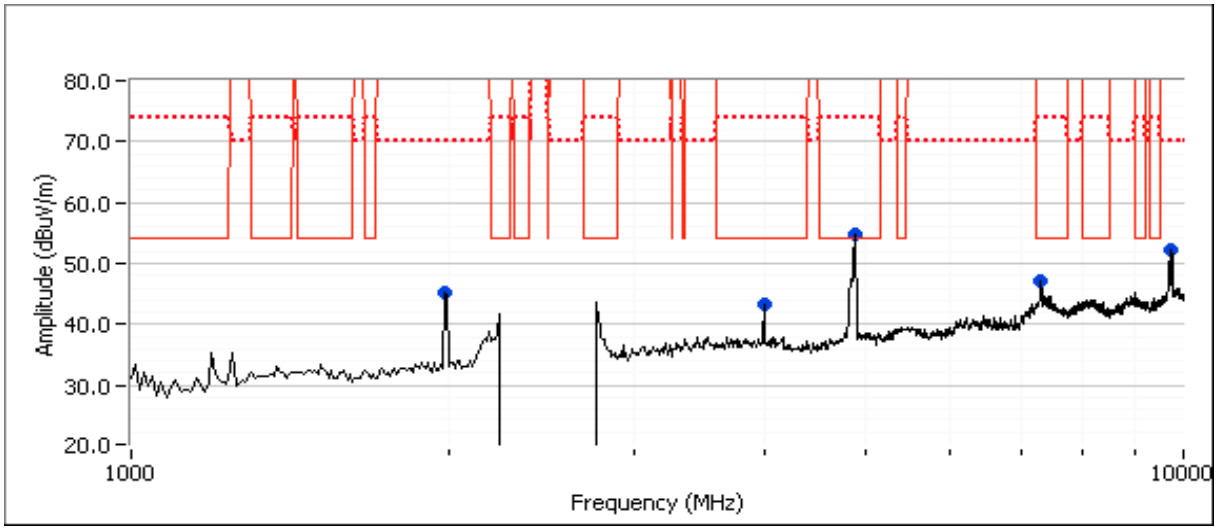
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1999.170	45.6	V	-	-	Peak	251	1.6	Note 2
9650.000	49.3	H	-	-	Peak	36	1.0	Note 2
9848.330	51.9	V	-	-	Peak	223	2.2	Note 2
4916.500	47.4	V	54.0	-6.6	AVG	87	1.17	
4916.300	59.5	V	74.0	-14.5	PK	87	1.17	
7381.500	46.0	V	54.0	-8.0	AVG	128	1.38	
7381.030	63.1	V	74.0	-10.9	PK	128	1.38	
4000.020	41.7	H	54.0	-12.3	AVG	141	1.57	
3999.800	48.2	H	74.0	-25.8	PK	141	1.57	
4820.700	53.2	V	54.0	-0.8	AVG	332	1.56	#4, Pwr setting = 39
4821.370	67.0	V	74.0	-7.0	PK	332	1.56	#4, Pwr setting = 39

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 10-26GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #5: Radiated Spurious Emissions, 1-25 GHz. 802.11HT20, 802.11HT40 - 3x3 modules, power setting = 40 unless noted otherwise..

Date of Test: 4/13/2012
Test Engineer: John Caizzi
Test Location: Chamber 3



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Other Spurious Emissions

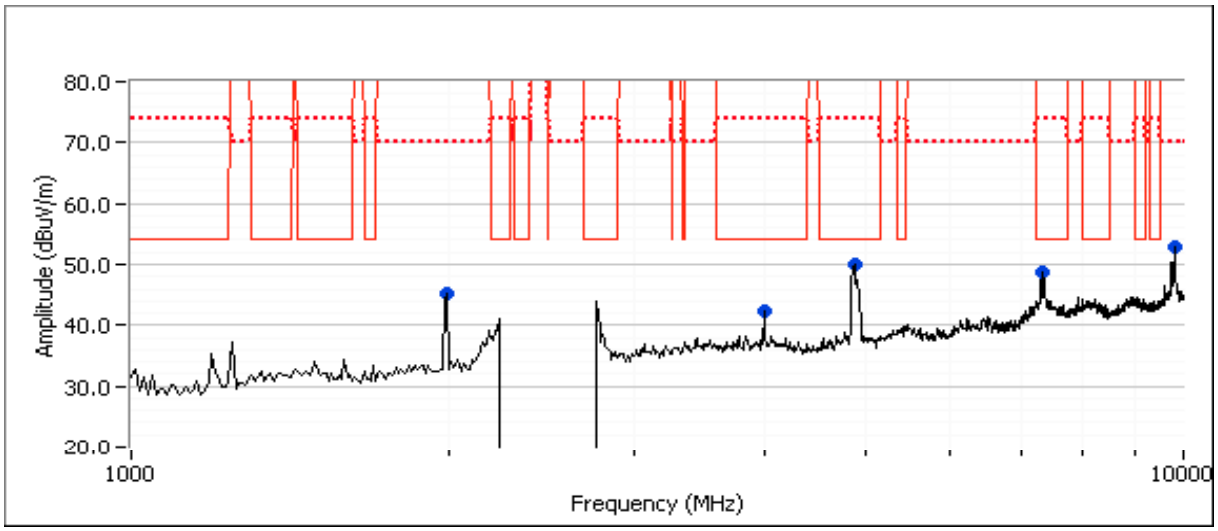
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1990.000	45.2	H	-	-	Peak	140	1.3	Note 2
9749.170	52.3	H	-	-	Peak	32	1.0	Note 2
4000.020	42.1	H	54.0	-11.9	AVG	225	1.57	
3999.970	47.8	H	74.0	-26.2	PK	225	1.57	
7312.900	44.3	H	54.0	-9.7	AVG	308	1.01	
7313.100	62.3	H	74.0	-11.7	PK	308	1.01	
4874.200	53.2	V	54.0	-0.8	AVG	342	1.05	
4877.730	67.1	V	74.0	-6.9	PK	342	1.05	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 10-26GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #6: Radiated Spurious Emissions, 1-25 GHz. 802.11HT40 - 3x3 module.

Date of Test: 4/13/2012
Test Engineer: John Caizzi
Test Location: Chamber 3



Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1999.170	45.3	V	-	-	Peak	10	1.3	Note 2
9807.500	52.9	H	-	-	Peak	35	1.0	Note 2
7364.900	44.0	H	54.0	-10.0	AVG	143	1.00	
7369.130	59.3	H	74.0	-14.7	PK	143	1.00	
3999.980	41.9	H	54.0	-12.1	AVG	225	1.57	
3999.880	47.9	H	74.0	-26.1	PK	225	1.57	
4861.400	49.3	V	54.0	-4.7	AVG	346	1.05	
4859.350	61.1	V	74.0	-12.9	PK	346	1.05	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 10-26GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, 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 outside the chamber, with I/O connections running under the groundplane, through a brass pipe.

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

Ambient Conditions:

Temperature: 22 °C
Rel. Humidity: 33 %

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

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	802.11a	3x3: 5745 MHz 3x3: 5825 MHz	36 36		Radiated Emissions, 1 - 40 GHz	FCC Part 15.209 / 15.247(c)	53.8 dBµV/m @ 11645.9 MHz (-0.2 dB)
2	802.11a 802.11n20	3x3: 5785 MHz 3x3: 5785 MHz	36 36		Radiated Emissions, 1 - 40 GHz	FCC Part 15.209 / 15.247(c)	53.0 dBµV/m @ 11569.75 MHz (-1.0 dB)
3	802.11n20	3x3: 5745 MHz 3x3: 5825 MHz	36 36		Radiated Emissions, 1 - 40 GHz	FCC Part 15.209 / 15.247(c)	51.6 dBµV/m @ 5439.98 MHz (-2.4 dB)
4	802.11n40	3x3: 5755 MHz 3x3: 5795 MHz	36 36		Radiated Emissions, 1 - 40 GHz	FCC Part 15.209 / 15.247(c)	51.3 dBµV/m @ 11503.25 MHz (-2.7 dB)

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, 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

Preliminary testing showed no radio related emissions below 1GHz or above 12GHz.

System Configuration:

Radio #	Frequency	Module	Mode	Radio #	Frequency	Module	Mode
Run: 1				Run: 2			
4	5745	3x3	802.11a	4	5785	3x3	802.11a
12	5825	3x3	802.11a	12	5785	3x3	802.11 HT20
Run: 3							
4	5745	3X3	802.11HT20				
12	5825	3x3	802.11HT20				
Run: 4							
4	5755	3X3	802.11HT40				
12	5795	3x3	802.11HT40				

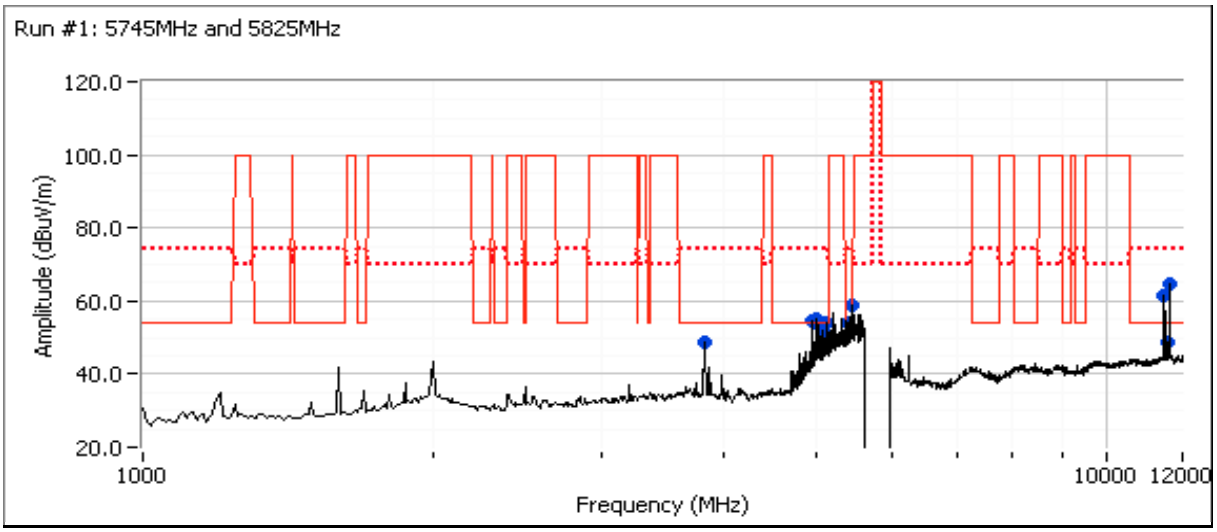
Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #1: Radiated Spurious Emissions, 1000 - 6500 MHz. Operating Mode: 802.11a, 3x3, power setting = 36

Date of Test: 4/9/2012

Test Engineer: Peter Sales

Test Location: Chamber 5



Other Spurious Emissions

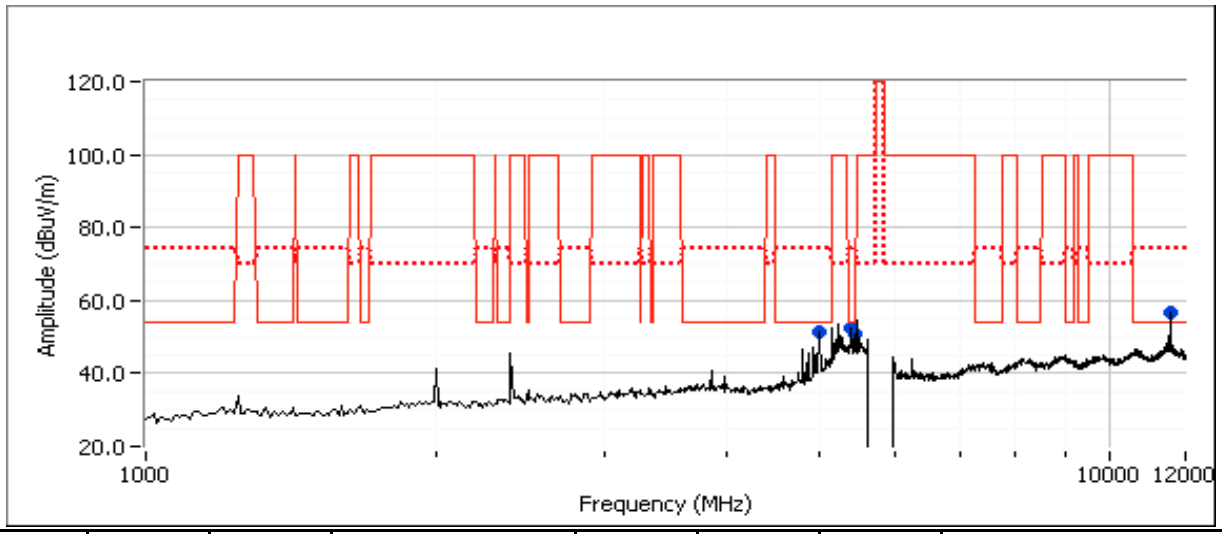
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5000.010	52.7	V	54.0	-1.3	AVG	122	1.00	
5000.080	57.2	V	74.0	-16.8	PK	122	1.00	
11488.720	52.5	V	54.0	-1.5	AVG	309	0.99	
11490.300	63.5	V	74.0	-10.5	PK	309	0.99	
11645.900	53.8	V	54.0	-0.2	AVG	281	1.00	
11645.580	65.6	V	74.0	-8.4	PK	281	1.00	
11646.330	50.9	H	54.0	-3.1	AVG	240	1.41	
11646.270	62.6	H	74.0	-11.4	PK	240	1.41	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 12-40GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #2: Radiated Spurious Emissions, 1000 - 6500 MHz. Operating Mode: 802.11a and HT20, 3x3, power setting = 36

Date of Test: 4/9/2012
Test Engineer: Peter Sales
Test Location: Chamber 5

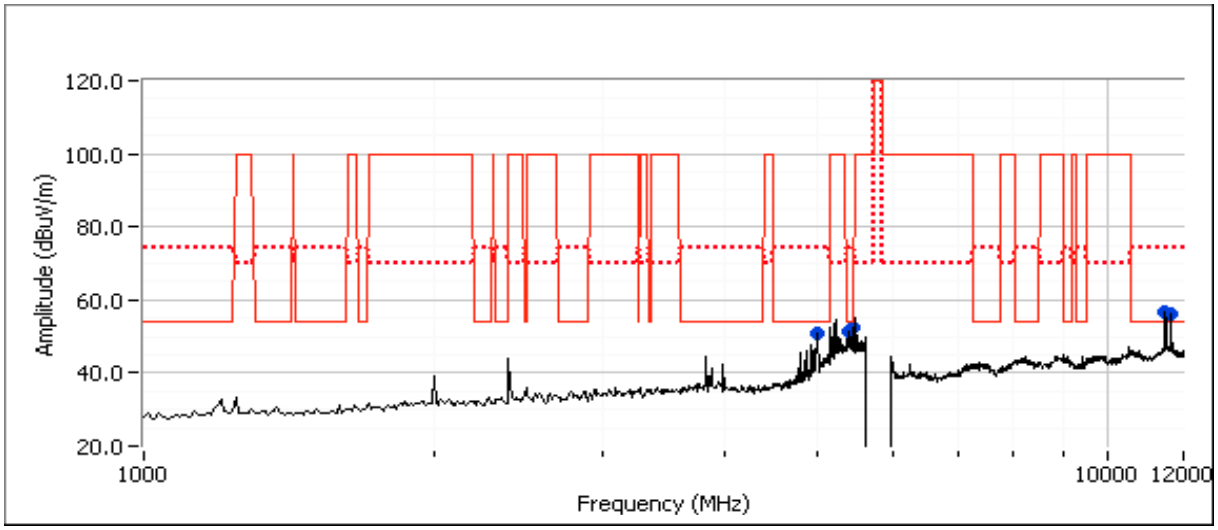


Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5439.980	49.3	V	54.0	-4.7	AVG	49	1.0	RB 1 MHz;VB 10 Hz;Pk
5440.150	57.7	V	74.0	-16.3	PK	49	1.0	RB 1 MHz;VB 3 MHz;Pk
5000.060	51.2	V	54.0	-2.8	AVG	0	0.0	RB 1 MHz;VB 10 Hz;Pk
4999.900	57.2	V	74.0	-16.8	PK	0	0.0	RB 1 MHz;VB 3 MHz;Pk
11567.120	54.1	V	54.0	0.1	AVG	289	1.0	RB 1 MHz;VB 10 Hz;Pk
11567.450	65.7	V	74.0	-8.3	PK	289	1.0	RB 1 MHz;VB 3 MHz;Pk
5399.970	48.6	V	54.0	-5.4	AVG	311	1.0	RB 1 MHz;VB 10 Hz;Pk
5399.930	58.1	V	74.0	-15.9	PK	311	1.0	RB 1 MHz;VB 3 MHz;Pk
11569.750	53.0	V	54.0	-1.0	AVG	60	1.1	5785 aMode, Radio 4, Radio 12 on 5745, note 4
11569.420	64.8	V	74.0	-9.2	PK	60	1.1	5785 aMode, Radio 4, Radio 12 on 5745, note 4
11563.220	50.7	V	54.0	-3.3	AVG	288	1.1	5785 n20Mode, Radio 12, Radio 4 on 5745, note 4
11566.390	62.4	V	74.0	-11.6	PK	288	1.1	5785 n20Mode, Radio 12, Radio 4 on 5745, note 4
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.							
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.							
Note 3:	No significant emissions were observed for 12-40GHz							
Note 4:	Since in normal usage, both radios would not be on the same channel, one radio was moved to a non-overlapping channel and the emission measured. The measurement was repeated with the other radio on the target channel.							

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #3: Radiated Spurious Emissions, 1000 - 6500 MHz. Operating Mode: HT20, 3x3, power setting = 36.

Date of Test: 4/9/2012
Test Engineer: Peter Sales
Test Location: Chamber 5



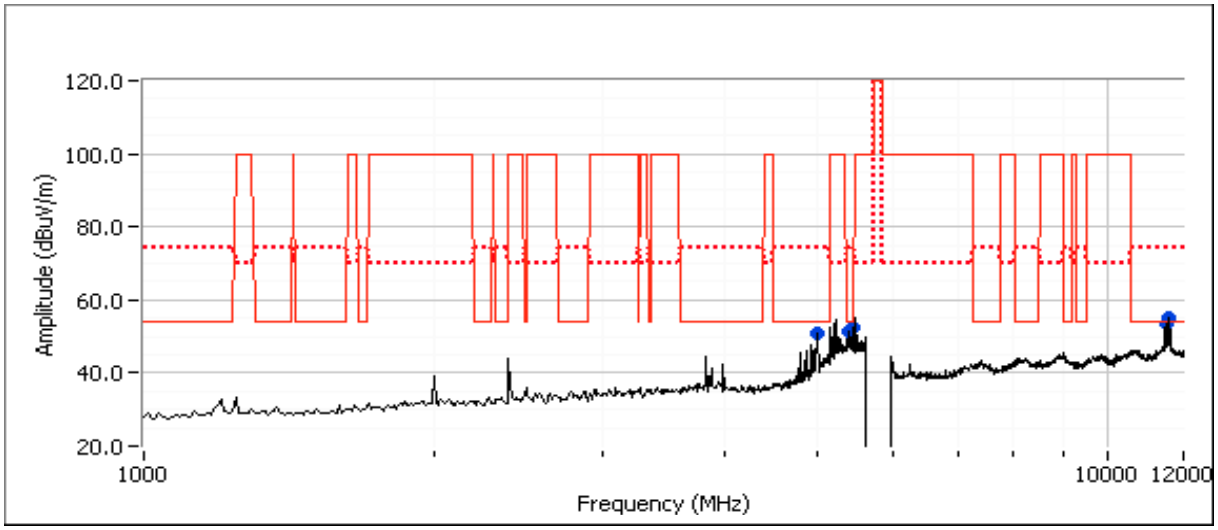
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5399.940	47.5	V	54.0	-6.5	AVG	311	1.0	RB 1 MHz;VB 10 Hz;Pk
5400.210	56.9	V	74.0	-17.1	PK	311	1.0	RB 1 MHz;VB 3 MHz;Pk
11659.540	49.6	V	54.0	-4.4	AVG	227	1.3	RB 1 MHz;VB 10 Hz;Pk
11662.470	61.4	V	74.0	-12.6	PK	227	1.3	RB 1 MHz;VB 3 MHz;Pk
5439.980	51.6	V	54.0	-2.4	AVG	193	1.0	RB 1 MHz;VB 10 Hz;Pk
5440.060	57.3	V	74.0	-16.7	PK	193	1.0	RB 1 MHz;VB 3 MHz;Pk
11483.560	50.8	V	54.0	-3.2	AVG	149	1.0	RB 1 MHz;VB 10 Hz;Pk
11483.830	62.7	V	74.0	-11.3	PK	149	1.0	RB 1 MHz;VB 3 MHz;Pk
5000.060	50.0	V	54.0	-4.0	AVG	122	1.0	RB 1 MHz;VB 10 Hz;Pk
5000.000	55.4	V	74.0	-18.6	PK	122	1.0	RB 1 MHz;VB 3 MHz;Pk

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 12-40GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #4: Radiated Spurious Emissions, 1000 - 6500 MHz. Operating Mode: HT40, 3x3, power setting = 36.

Date of Test: 4/9/2012
Test Engineer: Peter Sales
Test Location: Chamber 5



Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11590.290	49.1	V	54.0	-4.9	AVG	55	1.3	RB 1 MHz;VB 10 Hz;Pk
11589.760	60.3	V	74.0	-13.7	PK	55	1.3	RB 1 MHz;VB 3 MHz;Pk
5399.960	51.2	V	54.0	-2.8	AVG	58	1.0	RB 1 MHz;VB 10 Hz;Pk
5399.820	57.3	V	74.0	-16.7	PK	58	1.0	RB 1 MHz;VB 3 MHz;Pk
5000.100	49.6	V	54.0	-4.4	AVG	56	1.1	RB 1 MHz;VB 10 Hz;Pk
4999.950	55.7	V	74.0	-18.3	PK	56	1.1	RB 1 MHz;VB 3 MHz;Pk
5439.960	49.6	V	54.0	-4.4	AVG	98	1.1	RB 1 MHz;VB 10 Hz;Pk
5439.890	56.8	V	74.0	-17.2	PK	98	1.1	RB 1 MHz;VB 3 MHz;Pk
11503.250	51.3	V	54.0	-2.7	AVG	280	1.0	RB 1 MHz;VB 10 Hz;Pk
11506.290	63.4	V	74.0	-10.6	PK	280	1.0	RB 1 MHz;VB 3 MHz;Pk

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 12-40GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions (5470-5725 MHz Band)

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: 4/1/2012 0:00
Test Engineer: Jack Liu
Test Location: FT3

Config. Used: Refer to individual run
Config Change: Refer to individual run
EUT Voltage: Refer to individual run

General Test Configuration

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

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

Ambient Conditions:

Temperature: 24 °C
Rel. Humidity: 30 %

Summary of Results

Run #	Mode	Channel	Power Setting	Antenna	Test Performed	Limit	Result / Margin
1	802.11a	3x3: 5745 MHz 3x3: 5825 MHz	36/36	Patch	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	49.5 dBµV/m @ 5000.0 MHz (-4.5 dB)
2	802.11a 802.11HT20	3x3: 5785 MHz 3x3: 5785 MHz	36/36	Patch	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.8 dBµV/m @ 11568.9 MHz (-2.2 dB)
3	802.11HT20	3x3: 5745 MHz 3x3: 5825 MHz	36/36	Patch	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.6 dBµV/m @ 5000.0 MHz (-3.4 dB)
4	802.11HT40	3x3: 5755 MHz 3x3: 5795 MHz	36/36	Patch	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.6 dBµV/m @ 5000.0 MHz (-3.4 dB)

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, 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

Preliminary testing showed no radio related emissions below 1GHz or above 12GHz.

System Configuration: Operating within 5470-5725 MHz

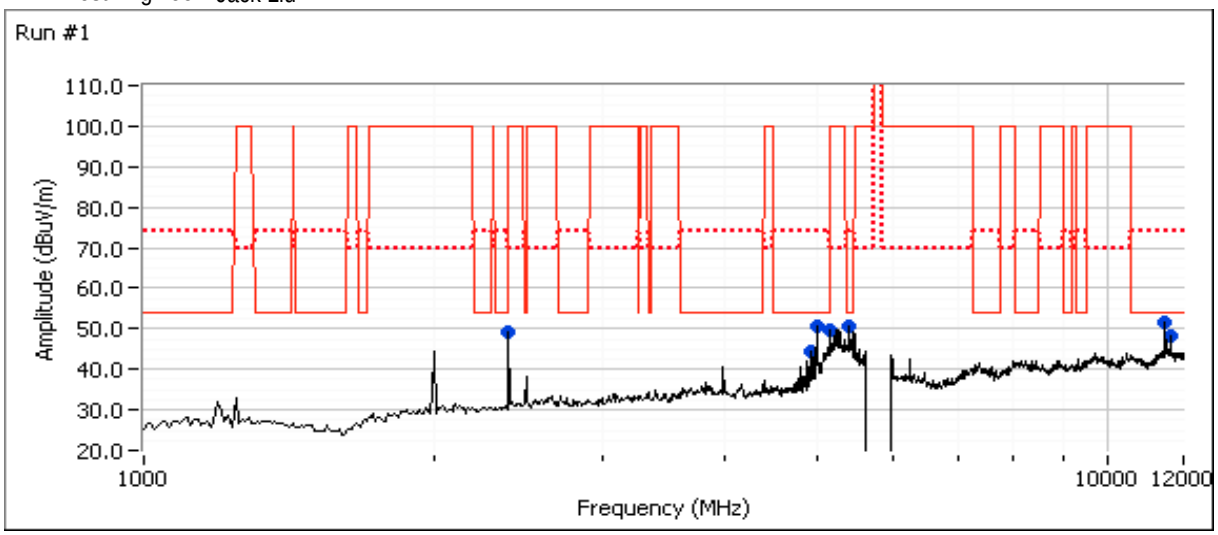
Radio #	Frequency	Module	Mode	Radio #	Frequency	Module	Mode
Run: 1				Run: 2			
12	5745	3x3	802.11a	12	5785	3x3	802.11a
4	5825	3x3	802.11a	4	5785	3x3	802.11 HT20
Run: 3							
12	5745	3X3	802.11HT20				
4	5825	3x3	802.11HT20				
Run: 4							
12	5755	3X3	802.11HT40				
4	5795	3x3	802.11HT40				

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #1, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5725~5850 MHz Band

Date of Test: 4/11/2012 Test Location: FT 3

Test Engineer: Jack Liu



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5000.040	49.5	V	54.0	-4.5	AVG	174	1.0	RB 1 MHz;VB 10 Hz;Pk
11486.990	49.2	V	54.0	-4.8	AVG	17	1.0	RB 1 MHz;VB 10 Hz;Pk
11645.900	46.6	V	54.0	-7.4	AVG	200	1.0	RB 1 MHz;VB 10 Hz;Pk
5399.900	43.8	H	54.0	-10.2	AVG	177	1.0	RB 1 MHz;VB 10 Hz;Pk
4919.890	41.7	H	54.0	-12.3	AVG	179	1.0	RB 1 MHz;VB 10 Hz;Pk
11487.370	60.5	V	74.0	-13.5	PK	17	1.0	RB 1 MHz;VB 3 MHz;Pk
11646.570	57.6	V	74.0	-16.4	PK	200	1.0	RB 1 MHz;VB 3 MHz;Pk
5000.000	54.4	V	74.0	-19.6	PK	174	1.0	RB 1 MHz;VB 3 MHz;Pk
5399.960	50.6	H	74.0	-23.4	PK	177	1.0	RB 1 MHz;VB 3 MHz;Pk
4919.950	46.9	H	74.0	-27.1	PK	179	1.0	RB 1 MHz;VB 3 MHz;Pk
5159.800	55.0	V	-	-	-	182	1.0	Note 2
2399.960	51.3	H	-	-	-	65	1.0	Note 2

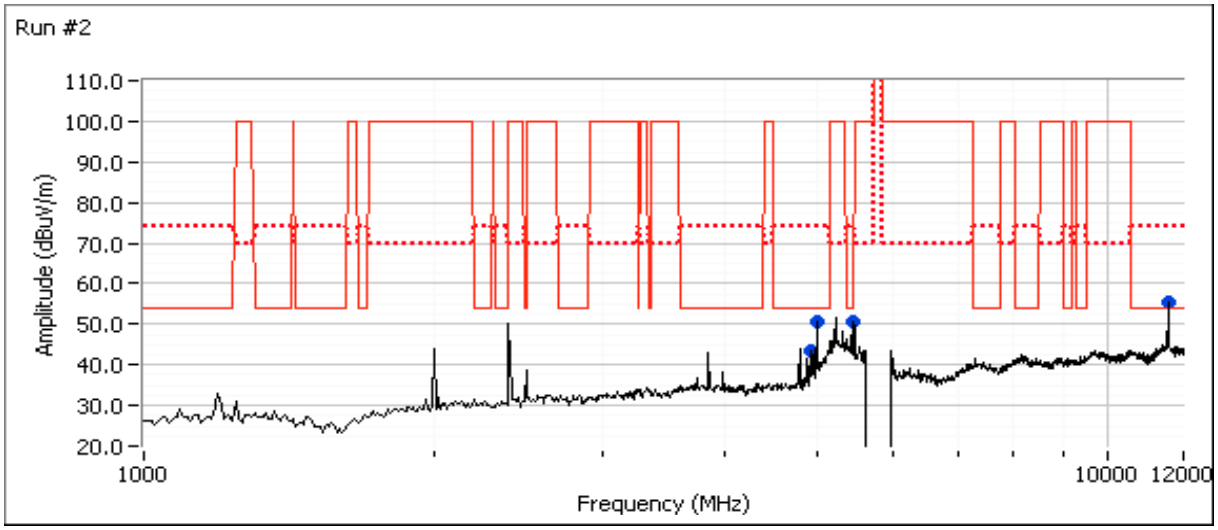
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 12-40GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #3, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5725~5850 MHz Band

Date of Test: 4/11/2012 Test Location: FT 3

Test Engineer: Jack Liu



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11568.900	51.8	H	54.0	-2.2	AVG	224	1.4	
5439.940	49.2	H	54.0	-4.8	AVG	357	1.0	
5000.070	48.9	V	54.0	-5.1	AVG	178	1.0	
11568.570	62.8	H	74.0	-11.2	PK	224	1.4	
4919.840	41.5	H	54.0	-12.5	AVG	184	1.1	
5000.100	53.3	V	74.0	-20.7	PK	178	1.0	
5439.870	53.2	H	74.0	-20.8	PK	357	1.0	
4919.840	47.3	H	74.0	-26.7	PK	184	1.1	

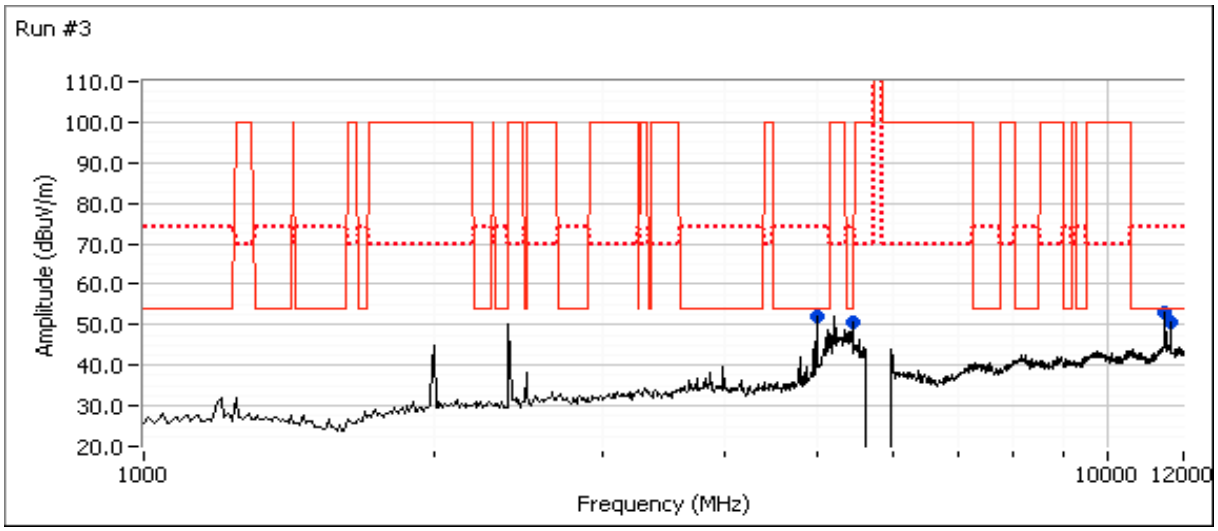
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 12-40GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #3, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5725~5850 MHz Band

Date of Test: 4/11/2012 Test Location: FT 3

Test Engineer: Jack Liu



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4999.990	50.6	V	54.0	-3.4	AVG	177	1.1	
5439.920	48.5	V	54.0	-5.5	AVG	181	1.1	
11488.200	45.9	V	54.0	-8.1	AVG	288	1.5	
11642.430	45.5	V	54.0	-8.5	AVG	197	1.0	
11641.700	58.3	V	74.0	-15.7	PK	197	1.0	
11488.700	57.5	V	74.0	-16.5	PK	288	1.5	
5000.020	55.3	V	74.0	-18.7	PK	177	1.1	
5439.840	54.8	V	74.0	-19.2	PK	181	1.1	

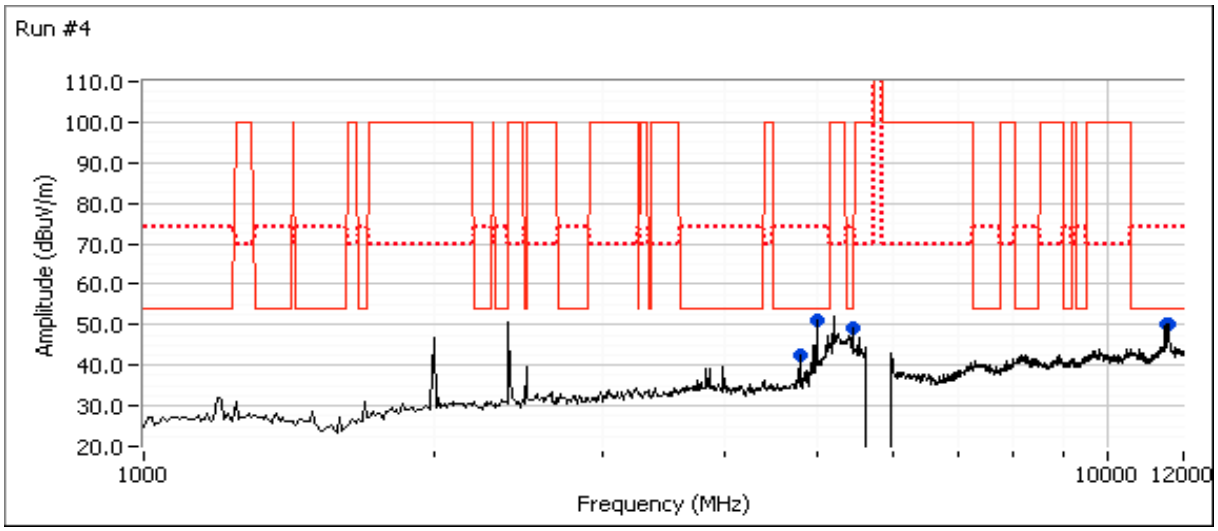
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 12-40GHz

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T86967
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	FCC 15.247, 15.E, RSS-210	Class:	N/A

Run #4, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5725~5850 MHz Band

Date of Test: 4/11/2012 Test Location: FT 3

Test Engineer: Jack Liu



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5000.000	50.6	V	54.0	-3.4	AVG	176	1.1	
11583.660	46.3	V	54.0	-7.7	AVG	18	1.0	
11503.070	45.6	V	54.0	-8.4	AVG	17	1.0	
4799.950	42.5	V	54.0	-11.5	AVG	176	1.1	
5437.990	40.1	V	54.0	-13.9	AVG	181	1.3	
11506.200	57.7	V	74.0	-16.3	PK	17	1.0	
11586.460	57.1	V	74.0	-16.9	PK	18	1.0	
5000.040	55.1	V	74.0	-18.9	PK	176	1.1	
5437.150	52.0	V	74.0	-22.0	PK	181	1.3	
4799.900	48.2	V	74.0	-25.8	PK	176	1.1	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	Signal is not in a restricted band. Compliance shown via antenna port measurement.
Note 3:	No significant emissions were observed for 12-40GHz

Client:	Xirrus	Job Number:	J86948
Product	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T87799
		Account Manager:	Michelle Kim
Contact:	Steve Smith		-
Emissions Standard(s):	-	Class:	A
Immunity Standard(s):	EN 301 489-17	Environment:	-

EMC Test Data

For The

Xirrus

Product

XR1000 Outdoor (3x3 radio modules)

Date of Last Test: 6/20/2012

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T87799
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	-	Class:	A

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: 6/11/2012
Test Engineer: John Caizzi
Test Location: Fremont Chamber #5
Config. Used: 1
Config Change: none
EUT Voltage: 56Vdc via POE

General Test Configuration

The EUT was located on a foam table, 40 cm from a vertical coupling plane and 80cm from the LISN. Remote support equipment was located outside the chamber, with all I/O connections running under the groundplane, through brass pipe, & passed through a ferrite clamp upon exiting the chamber.

Ambient Conditions:

Temperature: 24 °C
Rel. Humidity: 38 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 120V/60Hz	Class A	Pass	51.6 dBµV @ 5.674 MHz (-8.4 dB)

Modifications Made During Testing

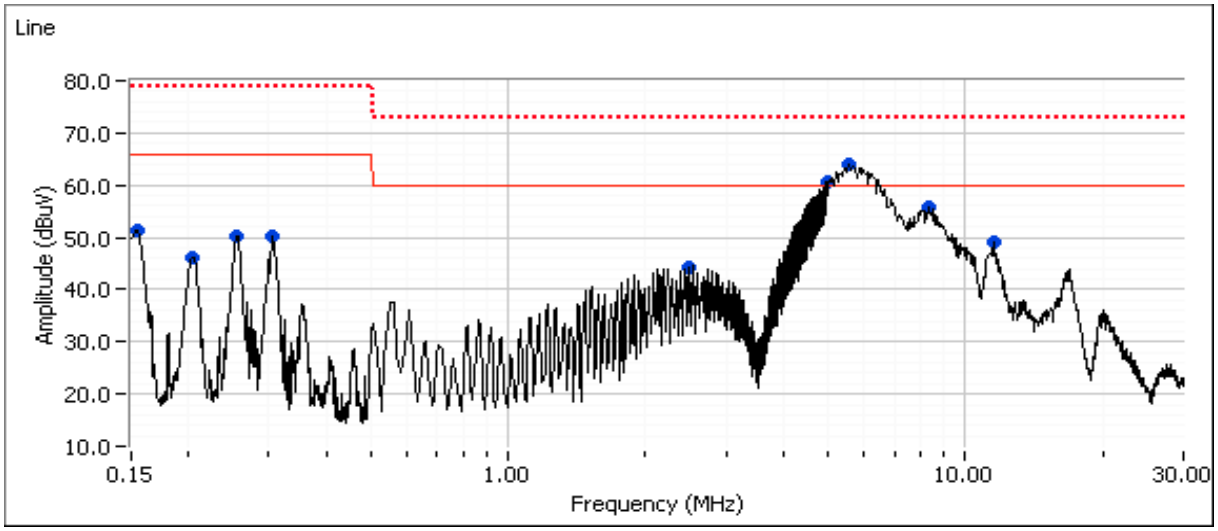
No modifications were made to the EUT during testing

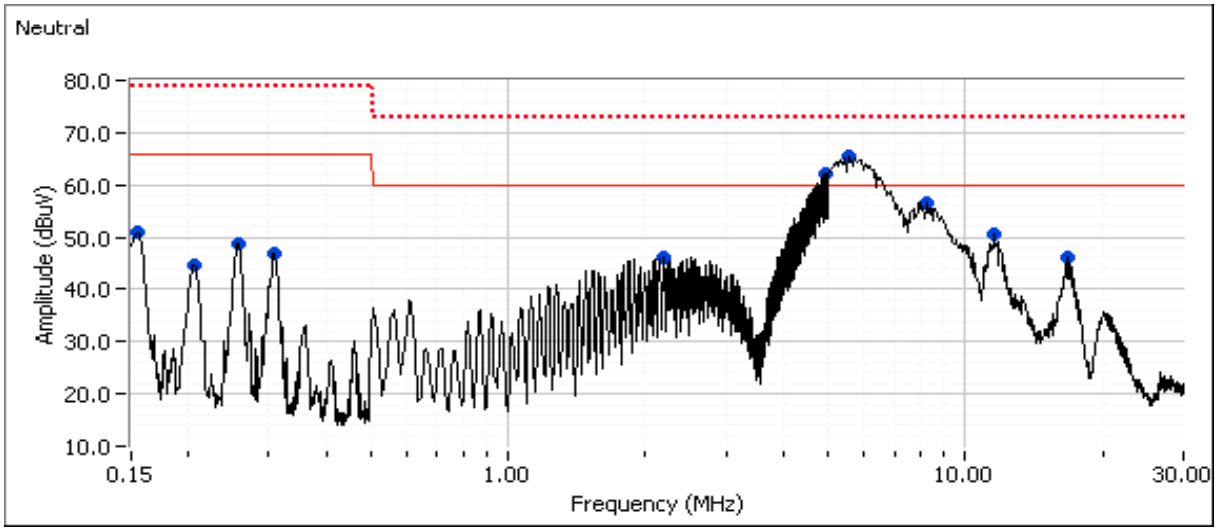
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T87799
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	-	Class:	A

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





Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T87799
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	-	Class:	A

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

Frequency	Level	AC	Class A		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
5.651	63.9	Line	60.0	3.9	Peak	
4.939	60.7	Line	60.0	0.7	Peak	
8.356	55.7	Line	60.0	-4.3	Peak	
11.463	49.0	Line	60.0	-11.0	Peak	
0.153	51.3	Line	66.0	-14.7	Peak	
2.497	44.4	Line	60.0	-15.6	Peak	
0.306	*50.2*	*Line*	*66.0*	*-15.8*	*Peak*	
0.256	*50.2*	*Line*	*66.0*	*-15.8*	*Peak*	
0.205	*46.1*	*Line*	*66.0*	*-19.9*	*Peak*	
5.674	65.4	Neutral	60.0	5.4	Peak	
4.958	62.2	Neutral	60.0	2.2	Peak	
8.387	56.6	Neutral	60.0	-3.4	Peak	
11.457	50.7	Neutral	60.0	-9.3	Peak	
2.200	46.2	Neutral	60.0	-13.8	Peak	
16.777	46.1	Neutral	60.0	-13.9	Peak	
0.153	50.9	Neutral	66.0	-15.1	Peak	
0.255	48.9	Neutral	66.0	-17.1	Peak	
0.307	46.7	Neutral	66.0	-19.3	Peak	
0.205	*44.7*	*Neutral*	*66.0*	*-21.3*	*Peak*	

Client:	Xirrus	Job Number:	J86948
Model:	XR1000 Outdoor (3x3 radio modules)	T-Log Number:	T87799
		Account Manager:	Michelle Kim
Contact:	Steve Smith		
Standard:	-	Class:	A

Final quasi-peak and average readings

Frequency	Level	AC	Class A		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
5.651	48.8	Line	60.0	-11.2	AVG	
5.651	56.8	Line	73.0	-16.2	QP	
4.939	46.6	Line	60.0	-13.4	AVG	
4.939	54.6	Line	73.0	-18.4	QP	
8.356	46.6	Line	60.0	-13.4	AVG	
8.356	52.6	Line	73.0	-20.4	QP	
11.463	30.1	Line	60.0	-29.9	AVG	
11.463	39.5	Line	73.0	-33.5	QP	
0.153	48.2	Line	66.0	-17.8	AVG	
0.153	51.4	Line	79.0	-27.6	QP	
2.497	39.1	Line	60.0	-20.9	AVG	
2.497	43.5	Line	73.0	-29.5	QP	
5.674	51.6	Neutral	60.0	-8.4	AVG	
5.674	60.0	Neutral	73.0	-13.0	QP	
4.958	48.7	Neutral	60.0	-11.3	AVG	
4.958	56.6	Neutral	73.0	-16.4	QP	
8.387	46.9	Neutral	60.0	-13.1	AVG	
8.387	52.9	Neutral	73.0	-20.1	QP	
11.457	34.6	Neutral	60.0	-25.4	AVG	
11.457	45.7	Neutral	73.0	-27.3	QP	
0.153	47.2	Neutral	66.0	-18.8	AVG	
0.153	50.6	Neutral	79.0	-28.4	QP	
0.255	44.7	Neutral	66.0	-21.3	AVG	
0.255	48.6	Neutral	79.0	-30.4	QP	
2.200	41.3	Neutral	60.0	-18.7	AVG	
2.200	45.9	Neutral	73.0	-27.1	QP	
16.777	25.1	Neutral	60.0	-34.9	AVG	
16.777	36.4	Neutral	73.0	-36.6	QP	

End of Report

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