

EMC Test Report

Application for Grant of Equipment Authorization

*Industry Canada RSS-Gen Issue 3 / RSS 210 Issue 8
FCC Part 15, Subpart E*

Model: XR1000 Outdoor Unit

IC CERTIFICATION #:
FCC ID:

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TEST SITE(S): NTS Silicon Valley
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Fremont, CA. 94538-2435

IC SITE REGISTRATION #: 2845B-3; 2845B-4, 2845B-5, 2845B-7

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REVISION HISTORY

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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 E requirements for UNII Devices (using FCC DA 02-2138, August 30, 2002)

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

ANSI C63.4:2003
FCC UNII test procedure 2002-08 DA-02-2138, August 2002

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

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

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

OBJECTIVE

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

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

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

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

manufactured.

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

STATEMENT OF COMPLIANCE

The tested sample of Xirrus, Inc. model XR1000 Outdoor Unit complied with the requirements of the following regulations:

RSS 210 Issue 8 “Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment”
FCC Part 15, Subpart E requirements for UNII Devices

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

The test results recorded herein are based on a single type test of 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

UNII / LELAN DEVICES

Operation in the 5.25 – 5.35 GHz Band

Note: The device may be used outdoors, therefore the spectral density of spurious emissions in the 5.15 – 5.25 GHz band were limited to the -27dBm/MHz limit.

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)		26dB Bandwidth	> 20MHz for all modes	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	A9.2(2)	Output Power	MIMO a: 17.1dBm n20: 17.1dBm n40: 13.9dBm SISO a: 14.5dBm EIRP = 27.9dBm (617mW)	17dBm (50mW)	Complies
15.407(a) (2)	-	Power Spectral Density	MIMO a: 4.6 dBm/MHz n20: 4.4 dBm/MHz n40: -1.3 dBm/MHz	6.2 dBm/MHz	Complies
-	A9.2(2) / A9.5 (2)	Power Spectral Density	SISO a: 1.9 dBm/MHz	11 dBm / MHz ¹	Complies

¹ Reduced from 11dBm because highest value exceeded the average value by more than 3dB

Operation in the 5.47 – 5.725 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)		26dB Bandwidth	> 20MHz for all modes	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	A9.2(2)	Output Power	MIMO a: 16.4dBm n20: 16.1dBm n40: 15.9dBm SISO: 13.9dBm EIRP = 27.2dBm (524mW)	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a) (2))		Power Spectral Density	MIMO a: 4.5 dBm/MHz n20: 3.8 dBm/MHz n40: 0.6 dBm/MHz	6.2 dBm/MHz	Complies
	A9.2(2) / A9.5 (2)	Power Spectral Density	SISO: 1.3 dBm/MHz	11 dBm / MHz ²	Complies
KDB 443999	A9	Non-operation in 5600 – 5650 MHz sub band	Device cannot operate in the 5600 – 5650 MHz band –refer to Operational Description		Complies

² Reduced from 11dBm because highest value exceeded the average value by more than 3dB

Requirements for all U-NII/LELAN bands

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407	A9.5a	Modulation	Digital Modulation is used	Digital modulation is required	Complies
15.407(b)(5) / 15.209	A9.3	Spurious Emissions	53.6 dB μ V/m @ 5350.0 MHz (-0.4 dB)	Refer to page 23	Complies
15.407(a)(6)	-	Peak Excursion Ratio	MIMO: 12.8dB SISO: 9.5dB	< 13dB	Complies
	A9.5 (3)	Channel Selection	Spurious emissions tested at outermost channels in each band	Device was tested on the top, bottom and center channels in each band	N/A
15			Measurements on three channels in each band		Complies
15.407 (c)	A9.5(4)	Operation in the absence of information to transmit	Operation is discontinued in the absence of information	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	A9.5 (5)	Frequency Stability	Frequency stability is better than 10ppm	Signal shall remain within the allocated band	Complies
15.407 (h1)	A9.4	Transmit Power Control	TCP mechanism is discussed in the Operational Description	The U-NII device shall have the capability to operate with a mean EIRP value lower than 24dBm (250mW)	Complies
15.407 (h2)	A9.4	Dynamic frequency Selection (device with radar detection)	Refer to separate test report, reference R87949	Threshold -62dBm (-64dBm if eirp > 200mW) Channel Availability Check > 60s Channel closing transmission time < 260ms Channel move time < 10s Non occupancy period > 30minutes	Complies
	A9.9g	User Manual information	Refer to Exhibit 6 for details	Warning regarding interference from Satellite Systems	Complies

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector		Unique or integral antenna required	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	51.6dB μ V @ 5.674MHz	Refer to page 19	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	N/A	Refer to page 21	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	MIMO a: 17.5 MHz n20: 18.7 MHz n40: 36.8 MHz SISO: 18.3 MHz	Information only	N/A

MEASUREMENT UNCERTAINTIES

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

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

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The 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 9, 11, 12, 18, 23 and 24 and May 1 and 2, 2012. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Xirrus	XR1000 Outdoor	802.11agbn 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		Description	Cable(s) Shielded/Unshielded	Length(m)
From	To			
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.

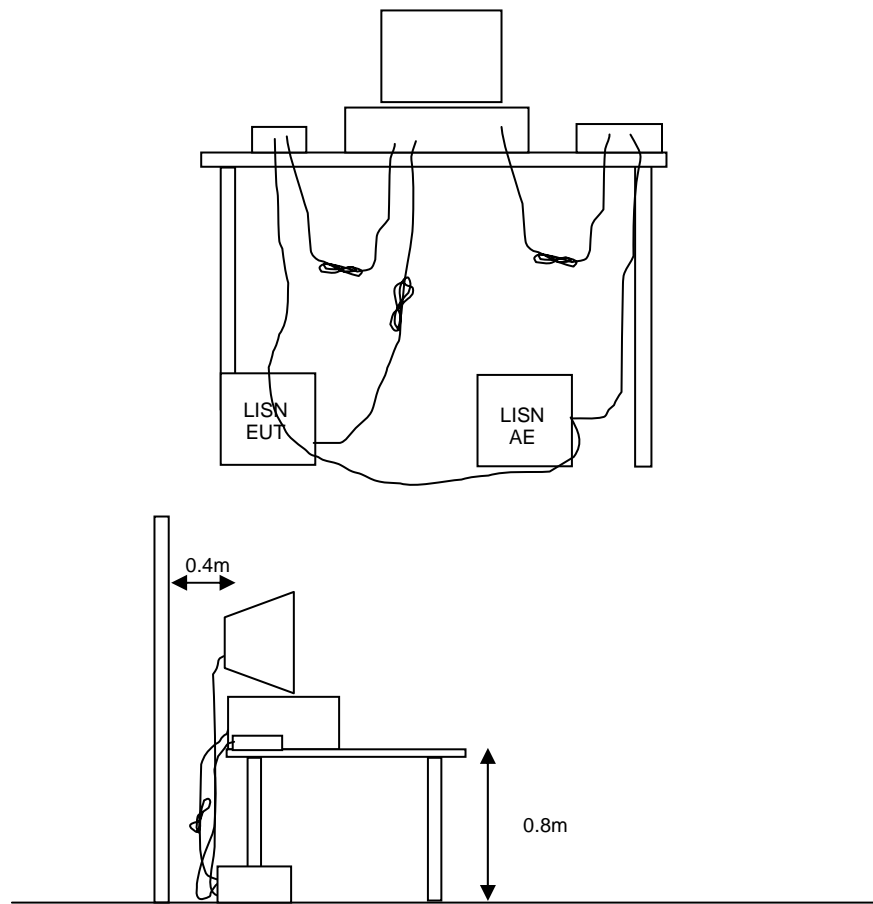


Figure 1 Typical Conducted Emissions Test Configuration

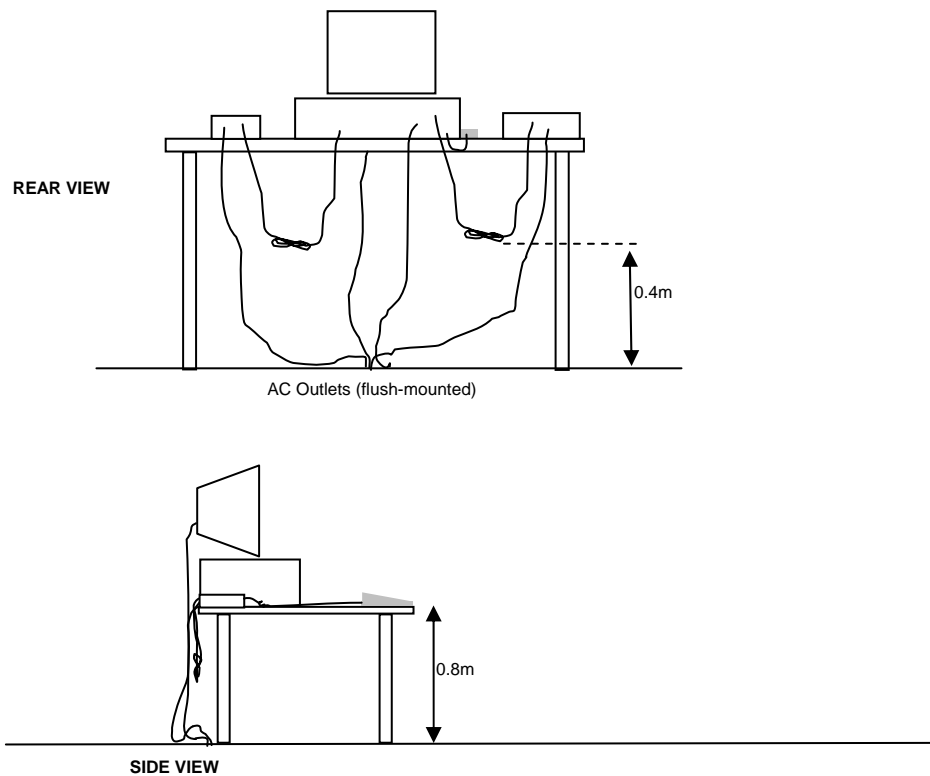
RADIATED EMISSIONS

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.

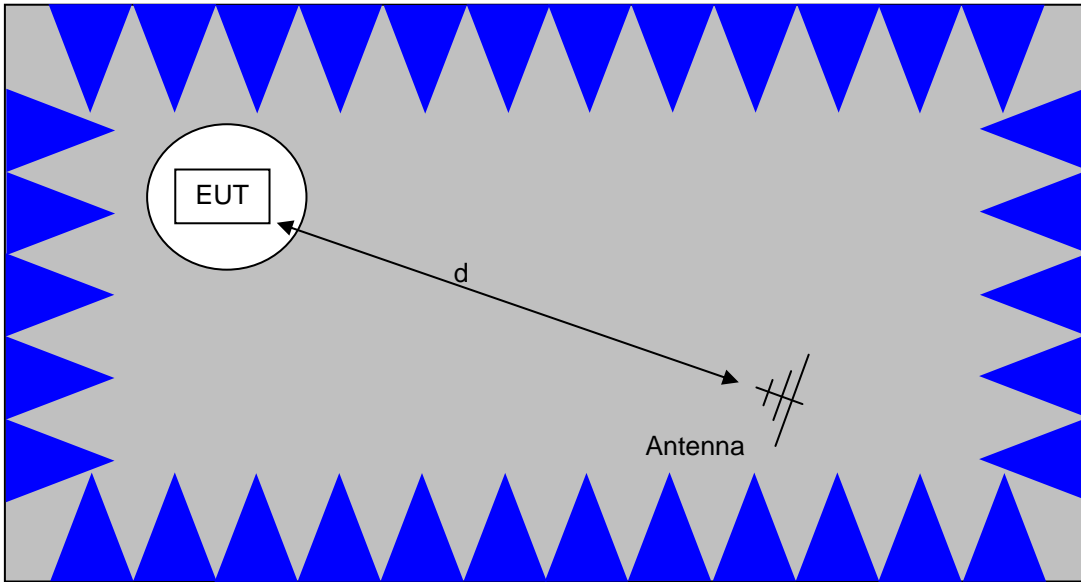
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

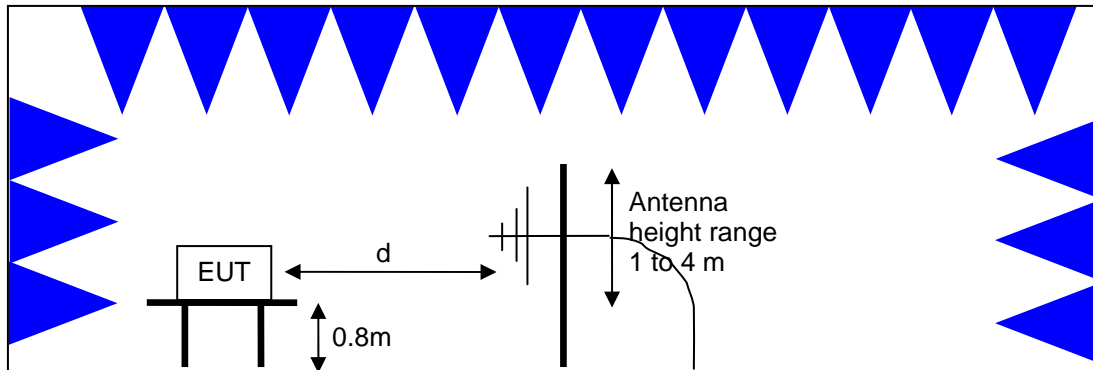


Typical Test Configuration for Radiated Field Strength Measurements



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.

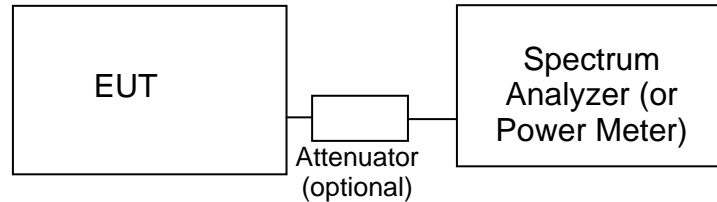
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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 bands³ (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

³ The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

FCC 15.407 (a) OUTPUT POWER LIMITS

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

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

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

The peak excursion envelope is limited to 13dB.

OUTPUT POWER LIMITS –LELAN DEVICES

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

Operating Frequency (MHz)	Output Power	Power Spectral Density
5150 – 5250	200mW (23 dBm) eirp	10 dBm/MHz eirp
5250 – 5350	250 mW (24 dBm) ⁴ 1W (30dBm) eirp	11 dBm/MHz
5470 – 5725	250 mW (24 dBm) ⁵ 1W (30dBm) eirp	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm) 4W eirp	17 dBm/MHz

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

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

⁴ If EIRP exceeds 500mW the device must employ TPC

⁵ If EIRP exceeds 500mW the device must employ TPC

SPURIOUS EMISSIONS LIMITS –UNII and LELAN DEVICES

The spurious emissions limits for signals below 1GHz are the FCC/RSS-GEN general limits. For emissions above 1GHz, signals in restricted bands are subject to the FCC/RSS GEN general limits. All other signals have a limit of –27dBm/MHz, which is a field strength of 68.3dBuV/m/MHz at a distance of 3m. This is an average limit so the peak value of the emission may not exceed –7dBm/MHz (88.3dBuV/m/MHz at a distance of 3m). For devices operating in the 5725-5850Mhz bands under the LELAN/UNII rules, the limit within 10Mhz of the allocated band is increased to –17dBm/MHz.

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:

$$F_d = 20 * \text{LOG}_{10} (D_m/D_s)$$

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:

$$F_d = 40 * \text{LOG}_{10} (D_m/D_s)$$

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:

$$R_r = \text{Receiver Reading in dBuV/m}$$

$$F_d = \text{Distance Factor in dB}$$

$$R_c = \text{Corrected Reading in dBuV/m}$$

$$L_s = \text{Specification Limit in dBuV/m}$$

$$M = \text{Margin in dB Relative to Spec}$$

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**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	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

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	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

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
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

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
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

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
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

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
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

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
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

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
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

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

Radio Antenna Port , 04-May-12

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	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

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
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 28 – 142
T87799 Pages 143 - 147



EMC Test Data

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

Test Specific Details

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

Date of Test: 4/23/2012 & 4/24/12 & 5/2/12
 Test Engineer: Rafael Varelas & John Caizzi
 Test Location: FT4

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

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	a: 17.1 dBm n20: 17.1 dBm n40: 13.9 dBm
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	a: 4.6 dBm/MHz n20: 4.4 dBm/MHz n40: -1.3 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP ≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 27.9 dBm (617mW)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	a: 16.4 dBm n20: 16.1 dBm n40: 15.9 dBm
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	a: 4.5 dBm/MHz n20: 3.8 dBm/MHz n40: 0.6 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP ≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 27.2 dBm (523.7 mW)

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 #	Test Performed	Limit	Pass / Fail	Result / Margin
1	26dB Bandwidth	15.407 (Information only)	-	> 20MHz for all modes
1	99% Bandwidth	RSS 210 (Information only)	N/A	802.11a: 17.1 MHz 802.11n 20MHz: 18.4 MHz 802.11n n40MHz: 36.8 MHz
2	Peak Excursion Envelope	15.407(a) (6) 13dB	Pass	12.8dB
3	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	Pass	All emissions below the -27dBm/MHz limit

General Test Configuration

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

Ambient Conditions:

Temperature: 20.4 °C
Rel. Humidity: 34 %

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.

Radio 4 was used during testing.

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: Bandwidth, Output Power and Power Spectral Density - MIMO Systems

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting) and power integration over 40 MHz (Method SA-1 of KDB 789033 D01).
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated from the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals are non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

MIMO Device - 5250-5350 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective ⁵	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	6	6	6	Yes	10.8	617.0	27.9

Power

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power ¹ dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
802.11a MIMO										
5280	30	26.2	3.7	4.6	10.5	16.4	12.2	19.2	0.052	PASS
5300	36	28.7	8.4	8.8	15.7	51.7	17.1	19.2		PASS
5320	36	28.3	8.2	9.5	15.3	49.4	16.9	19.2		PASS
802.11n20										
5280	30	26.9	3.4	4.7	10.9	17.4	12.4	19.2	0.051	PASS
5300	36	27.7	8.7	9.1	15.5	51.0	17.1	19.2		PASS
5320	36	27.2	8.1	9.5	15.4	50.0	17.0	19.2		PASS
802.11n40										
5310	31	54.9	5.2	6.1	12.4	24.7	13.9	19.2	0.025	PASS

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

PSD

Frequency (MHz)	99% ⁴ BW	Total Power	PSD ² dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210 ³	
802.11a MIMO										
5280	17.0	12.2	-8.4	-7.4	-1.8	1.0	-0.1	6.2	11.0	PASS
5300	17.5	17.1	-3.7	-3.8	3.1	2.9	4.6	6.2	11.0	PASS
5320	17.5	16.9	-3.8	-2.7	2.6	2.8	4.4	6.2	11.0	PASS
802.11n20										
5280	18.3	12.4	-8.7	-7.6	-1.7	1.0	-0.1	6.2	11.0	PASS
5300	18.6	17.1	-3.7	-3.4	2.7	2.7	4.4	6.2	11.0	PASS
5320	18.7	17.0	-3.7	-3.0	2.5	2.7	4.3	6.2	11.0	PASS
802.11n40										
5310	36.8	13.9	-9.9	-8.8	-3.0	0.7	-1.3	6.2	11.0	PASS

MIMO Device - 5470-5725 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective ⁵	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	6	6	6	Yes	10.8	523.7	27.2

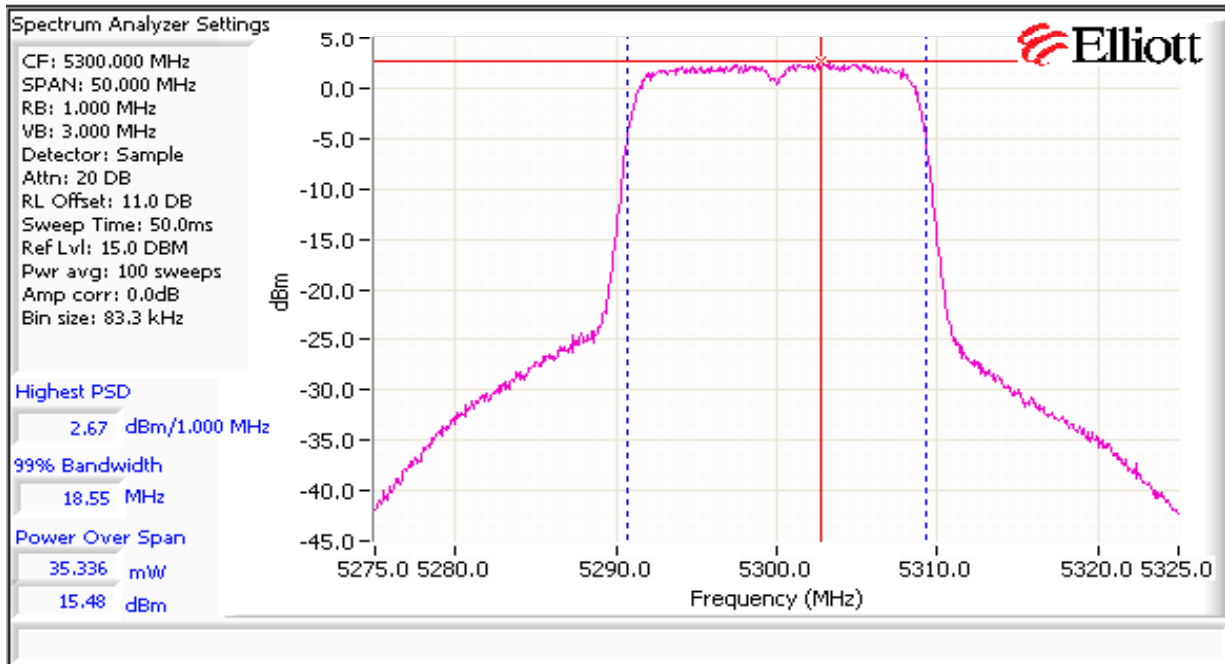
Power

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power ¹ dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
802.11a MIMO										
5500	30	23.1	5.6	6.4	11.4	21.8	13.4	19.2	0.044	PASS
5580	36	30.5	9.2	7.5	14.8	43.8	16.4	19.2		PASS
5700	27	24.0	5.5	1.6	11.7	19.8	13.0	19.2		PASS
802.11n20										
5500	27	24.5	4.9	4.9	9.7	15.5	11.9	19.2	0.041	PASS
5580	36	29.4	9.0	7.6	14.3	40.8	16.1	19.2		PASS
5700	22	26.8	3.5	-0.5	8.9	10.9	10.4	19.2		PASS
802.11n40										
						0.0				
5510	17	45.1	0.2	0.2	5.0	5.2	7.2	19.2	0.039	PASS
5550	36	62.2	8.6	7.6	14.2	39.3	15.9	19.2		PASS
5670	26	46.8	5.6	2.3	11.3	18.6	12.7	19.2		PASS

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

PSD

Frequency (MHz)	99% ⁴ BW	Total Power	PSD ² dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210 ³	
802.11a MIMO										
5500	17.0	13.4	-6.1	-5.9	-0.3	1.4	1.6	6.2	11.0	PASS
5580	17.1	16.4	-2.9	-4.6	2.9	2.8	4.5	6.2	11.0	PASS
5700	17.0	13.0	-6.8	-10.3	-0.3	1.2	1.0	6.2	11.0	PASS
802.11n20										
5500	18.2	11.9	-7.1	-6.8	-2.3	1.0	0.0	6.2	11.0	PASS
5580	18.4	16.1	-3.0	-4.6	1.9	2.4	3.8	6.2	11.0	PASS
5700	18.2	10.4	-8.7	-12.2	-3.3	0.7	-1.8	6.2	11.0	PASS
802.11n40										
5510	36.7	7.2	-15.2	-14.5	-10.3	0.2	-8.0	6.2	11.0	PASS
5550	36.8	15.9	-6.9	-7.4	-1.2	1.1	0.6	6.2	11.0	PASS
5670	36.6	12.7	-9.6	-12.2	-4.2	0.5	-2.6	6.2	11.0	PASS



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: Peak Excursion Measurement

20MHz: Device meets the requirement for the peak excursion

Freq			Peak Excursion(dB)			Freq			Peak Excursion(dB)		
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
			5280	9.8	13.0	5500	8.9	13.0			
			5300	7.5	13.0	5580	8.8	13.0			
			5320	8.8	13.0	5700	8.6	13.0			

40MHz: Device meets the requirement for the peak excursion

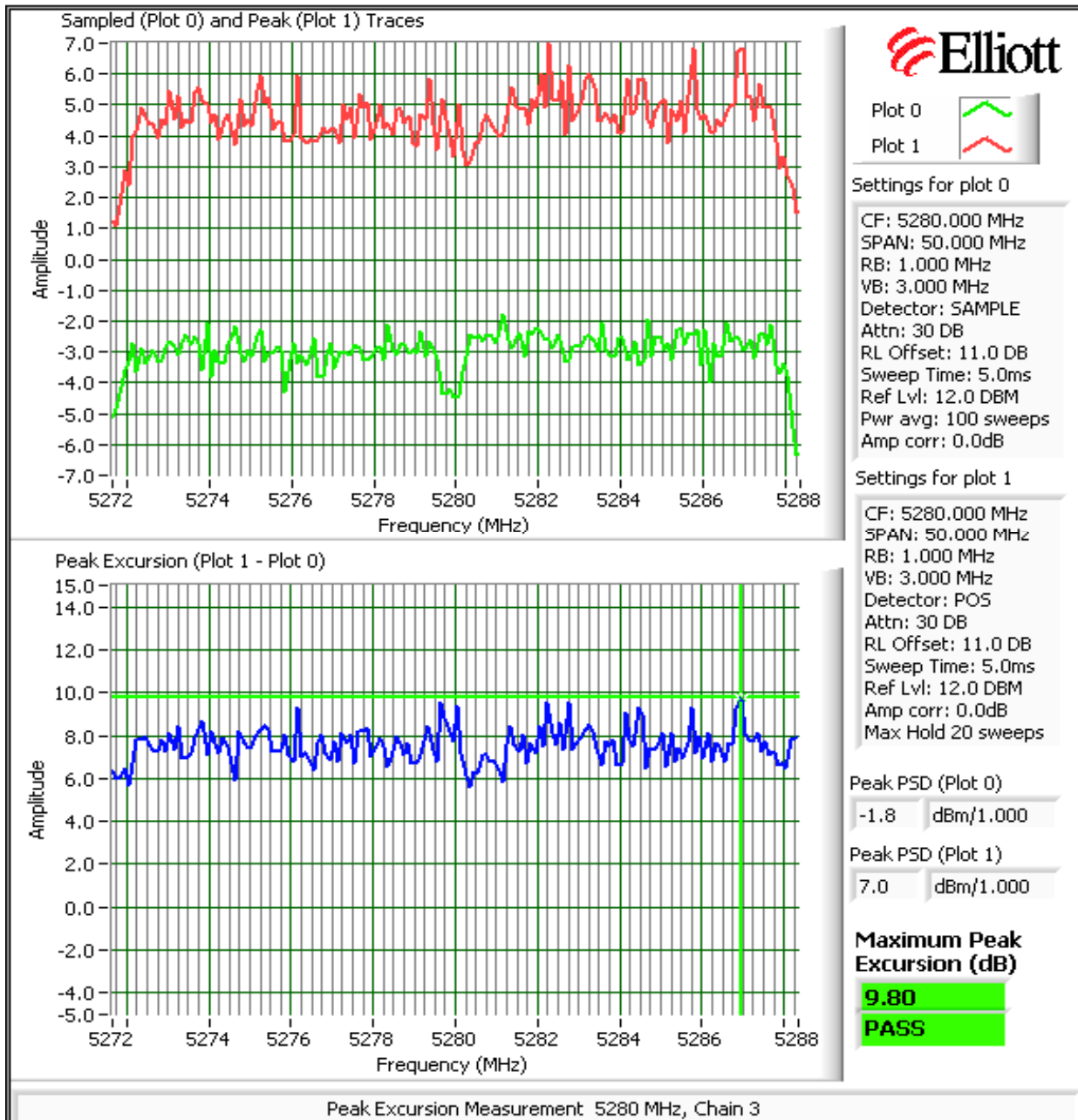
Freq			Peak Excursion(dB)			Freq			Peak Excursion(dB)		
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
						5510	8.1	13.0			
			5310	9.9	13.0	5550	12.8	13.0			
						5670	11.8	13.0			

Plots Showing Peak Excursion

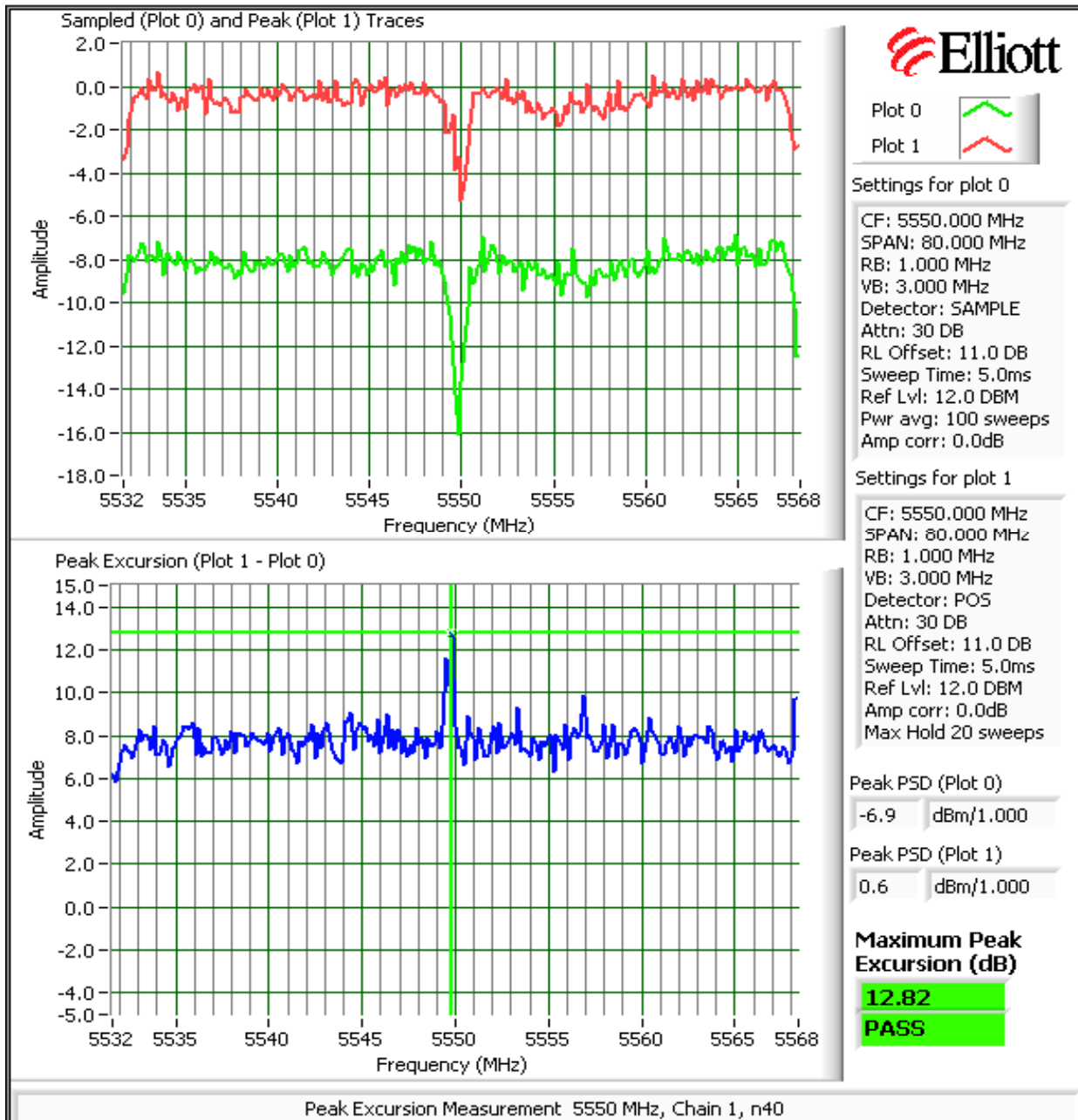
Trace A: RBW = 1MHz, VBW = 3MHz, Peak hold

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

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

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

Number of transmit chains: 3
 Maximum Antenna Gain: 6.0 dBi
 Spurious Limit: -27.0 dBm/MHz eirp
 Adjustment for 3 chains: -4.8 dB adjustment for multiple chains.
 Limit Used On Plots ^{Note 1}: -37.8 dBm/MHz Peak Limit (RB=VB=1MHz)

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

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

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

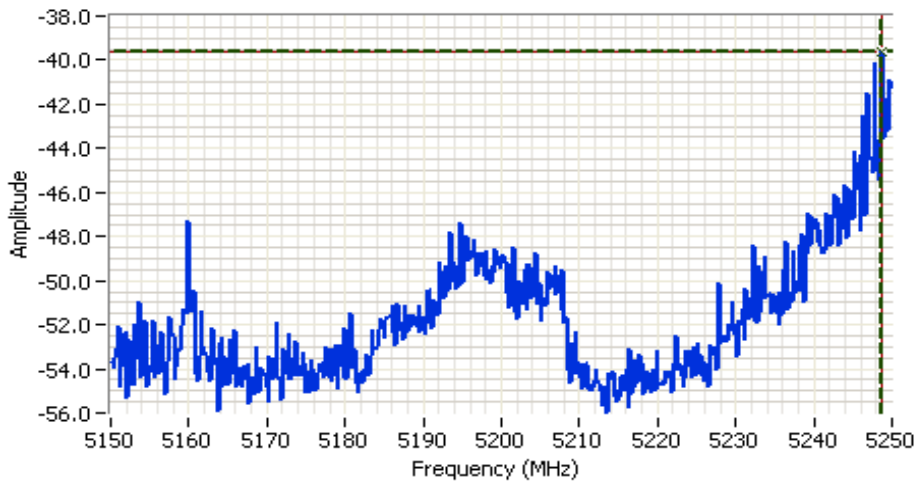
Low channel, 5250 - 5350 MHz Band

802.11a, Low Channel @ 5280 MHz

Devices that are used outdoors:

Compliance with the -27dBm/MHz limit in the 5150 - 5250 MHz band. Start and stop frequencies set to 5150-5250 MHz, RB=1MHz, VB=3MHz. Plot for worst-case channel is provided below.

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP dBm/MHz	Limit dBm/MHz	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz			
Chain 1	30	-46.1	0.00002	6.0	0.00010	-40.1	-27.3	-27	PASS
Chain 3		-39.6	0.00011	6.0	0.00044	-33.6			
Chain 2		-46.9	0.00002	6.0	0.00008	-40.9			



Analyzer Settings

Rohde&Schwarz, ESI
 CF: 5200.000 MHz
 SPAN: 100.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: -11.0 DBM

Comments

802.11a, Chain 3

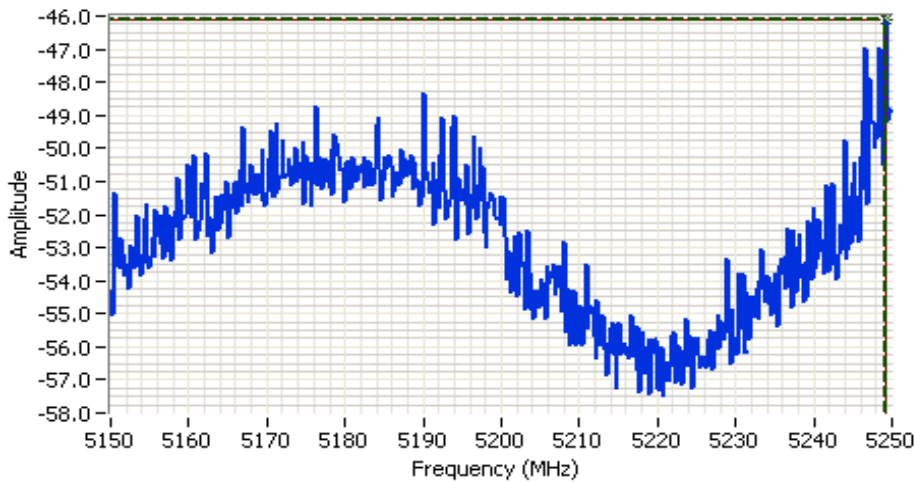
Cursor 1	5248.7974	-39.65	
Cursor 2	5248.7974	-39.65	

Delta Freq. 0.000

Delta Amplitude 0.00



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



Analyzer Settings

Rohde&Schwarz, ESI
 CF: 5200.000 MHz
 SPAN: 100.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: -11.0 DBM

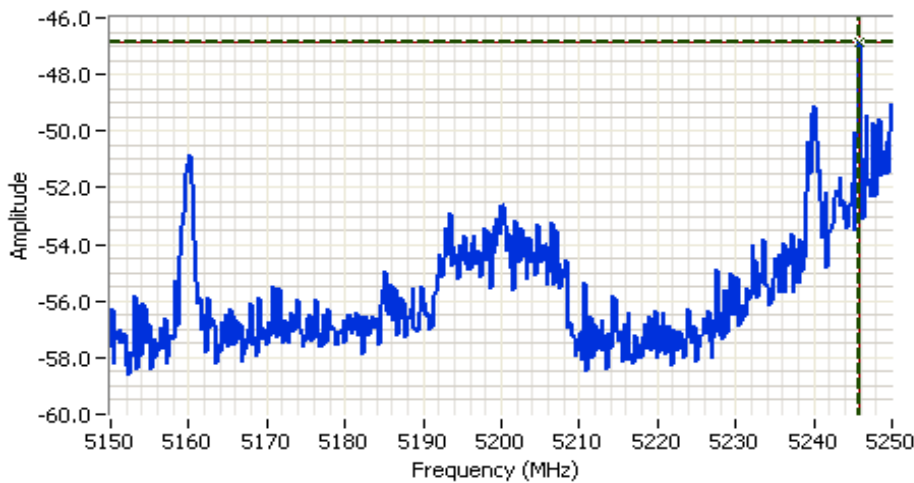
Comments

802.11a, Chain 1

Cursor 1	5249.1982	-46.12	
Cursor 2	5249.1982	-46.12	

Delta Freq. 0.000

Delta Amplitude 0.00



Analyzer Settings

Rohde&Schwarz, ESI
 CF: 5200.000 MHz
 SPAN: 100.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: -11.0 DBM

Comments

802.11a, Chain 2

Cursor 1	5245.7915	-46.85	
Cursor 2	5245.7915	-46.85	

Delta Freq. 0.000

Delta Amplitude 0.00



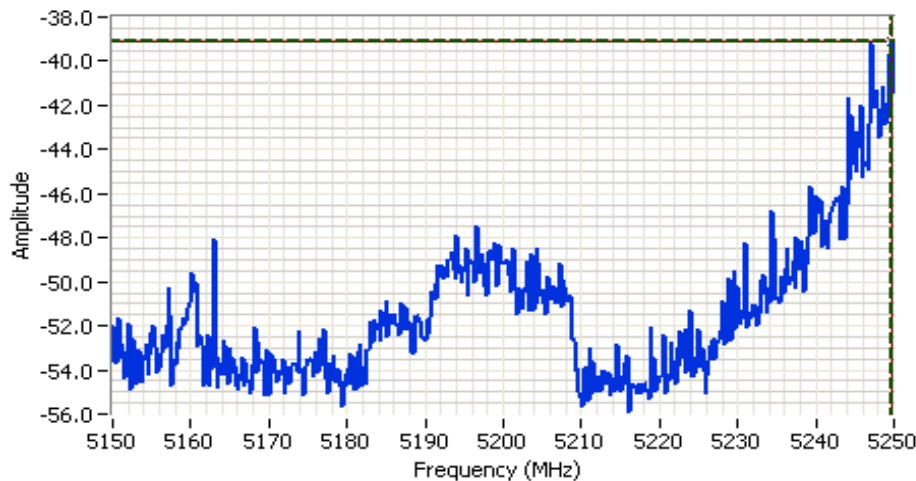
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

802.11n20, Low Channel @ 5280 MHz

Devices that are used outdoors:

Compliance with the -27dBm/MHz limit in the 5150 - 5250 MHz band. Start and stop frequencies set to 5150-5250 MHz, RB=1MHz, VB=3MHz. Plot for worst-case channel is provided below.

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP dBm/MHz	Limit dBm/MHz	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz			
Chain 1	30	-48.1	0.00002	6.0	0.00006	-42.1	-27.5	-27	PASS
Chain 3		-39.2	0.00012	6.0	0.00048	-33.2			
Chain 2		-48.3	0.00001	6.0	0.00006	-42.3			



Analyzer Settings

- Rohde&Schwarz, ESI
- CF: 5200.000 MHz
- SPAN: 100.000 MHz
- RB: 1.000 MHz
- VB: 3.000 MHz
- Detector: POS
- Attn: 10 DB
- RL Offset: 11.0 DB
- Sweep Time: 5.0ms
- Ref Lvl: -11.0 DBM

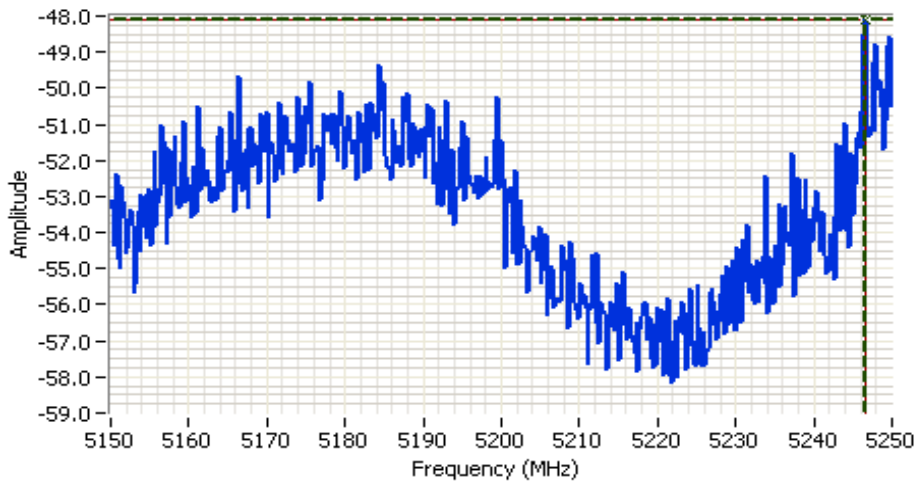
Comments
802.11n20, Chain 3

Cursor 1	5249.7998	-39.15	⊕ ⊖ ⊞ ⊚
Cursor 2	5249.7998	-39.15	⊕ ⊖ ⊞ ⊚

Delta Freq. 0.000
Delta Amplitude 0.00



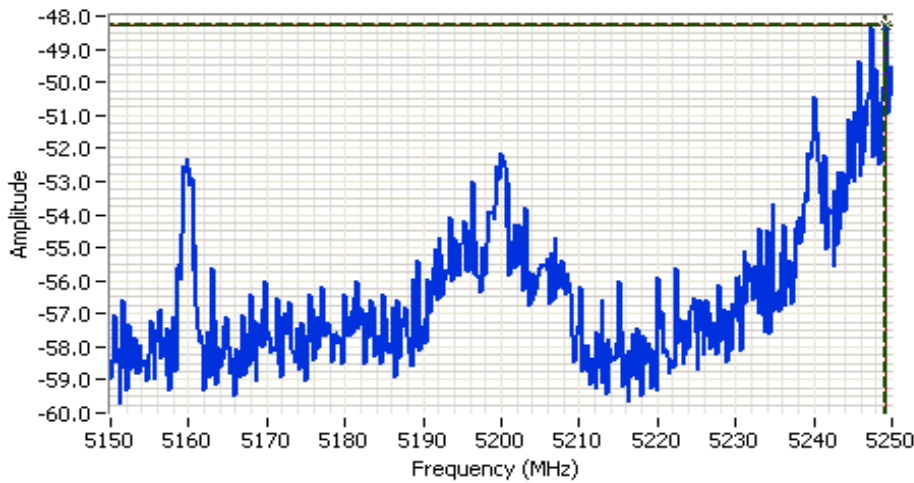
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A



Analyzer Settings
 Rohde&Schwarz, ESI
 CF: 5200.000 MHz
 SPAN: 100.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: -11.0 DBM

Comments
 802.11n20, Chain 1

Cursor 1: 5246.5933, -48.10
 Cursor 2: 5246.5933, -48.10
 Delta Freq: 0.000
 Delta Amplitude: 0.00



Analyzer Settings
 Rohde&Schwarz, ESI
 CF: 5200.000 MHz
 SPAN: 100.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: -11.0 DBM

Comments
 802.11n20, Chain 2

Cursor 1: 5249.1982, -48.26
 Cursor 2: 5249.1982, -48.26
 Delta Freq: 0.000
 Delta Amplitude: 0.00



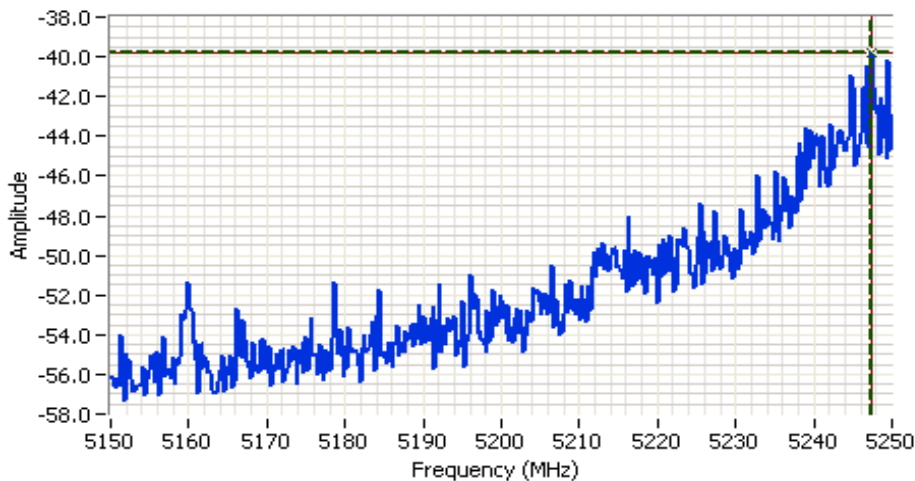
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

802.11n40, Low Channel @ 5310 MHz

Devices that are used outdoors:

Compliance with the -27dBm/MHz limit in the 5150 - 5250 MHz band. Start and stop frequencies set to 5150-5250 MHz, RB=1MHz, VB=3MHz. Plot for worst-case channel is provided below.

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP dBm/MHz	Limit dBm/MHz	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz			
Chain 1	31	-46.0	0.00003	6.0	0.00010	-40.0	-27.5	-27	PASS
Chain 3		-39.8	0.00010	6.0	0.00042	-33.8			
Chain 2		-47.4	0.00002	6.0	0.00007	-41.4			



Analyzer Settings

- Rohde&Schwarz, ESI
- CF: 5200.000 MHz
- SPAN: 100.000 MHz
- RB: 1.000 MHz
- VB: 3.000 MHz
- Detector: POS
- Attn: 10 DB
- RL Offset: 11.0 DB
- Sweep Time: 5.0ms
- Ref Lvl: -11.0 DBM

Comments

802.11n40, Chain 3

Cursor 1 5247.3950 -39.84

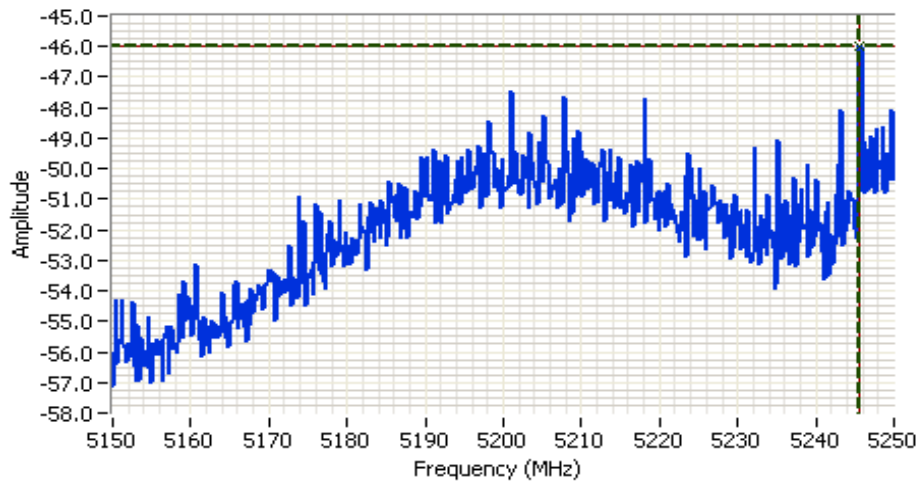
Cursor 2 5247.3950 -39.84

Delta Freq. 0.000

Delta Amplitude 0.00



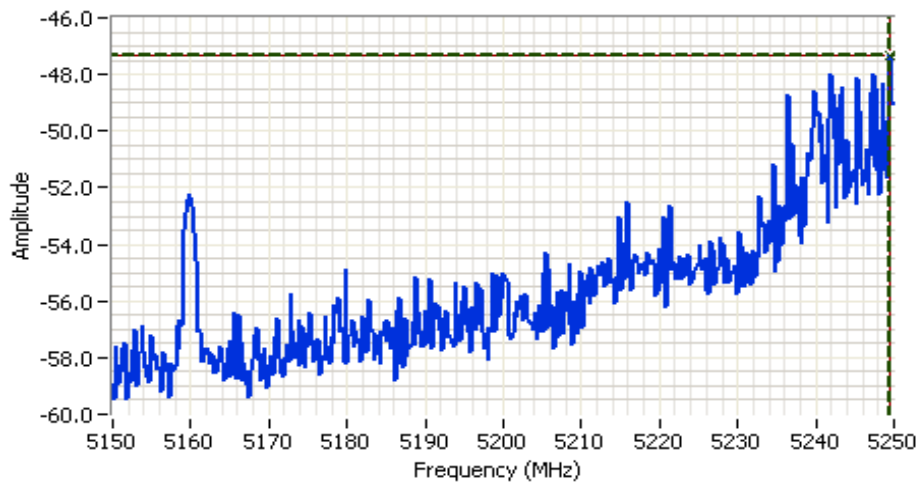
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A



Analyzer Settings
 Rohde&Schwarz, ESI
 CF: 5200.000 MHz
 SPAN: 100.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: -11.0 DBM

Comments
 802.11n40, Chain 1

Cursor 1 5245.5913 -45.99 Delta Freq. 0.000
 Cursor 2 5245.5913 -45.99 Delta Amplitude 0.00



Analyzer Settings
 Rohde&Schwarz, ESI
 CF: 5200.000 MHz
 SPAN: 100.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: -11.0 DBM

Comments
 802.11n40, Chain 2

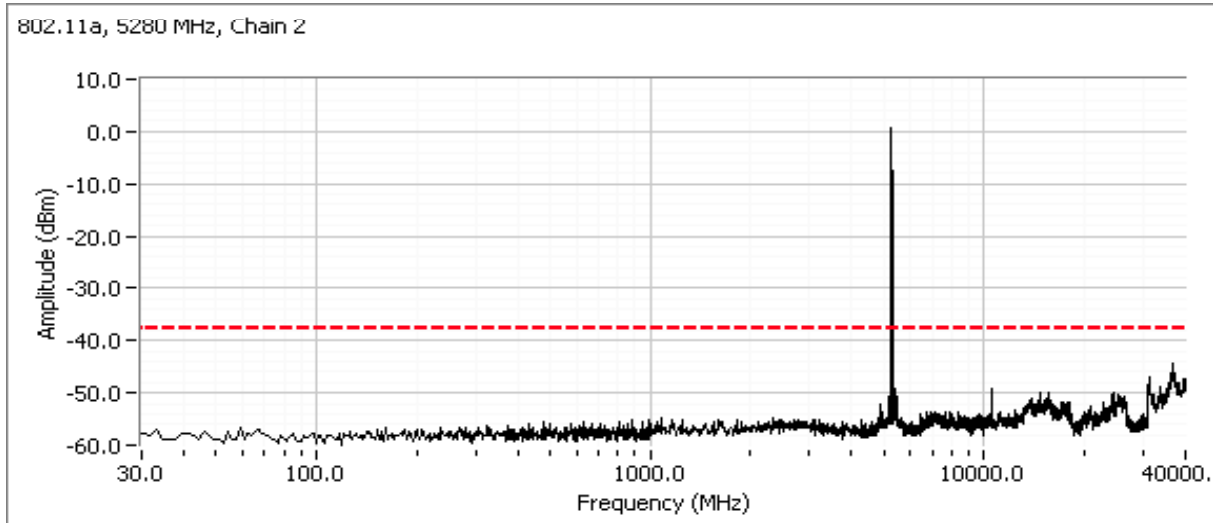
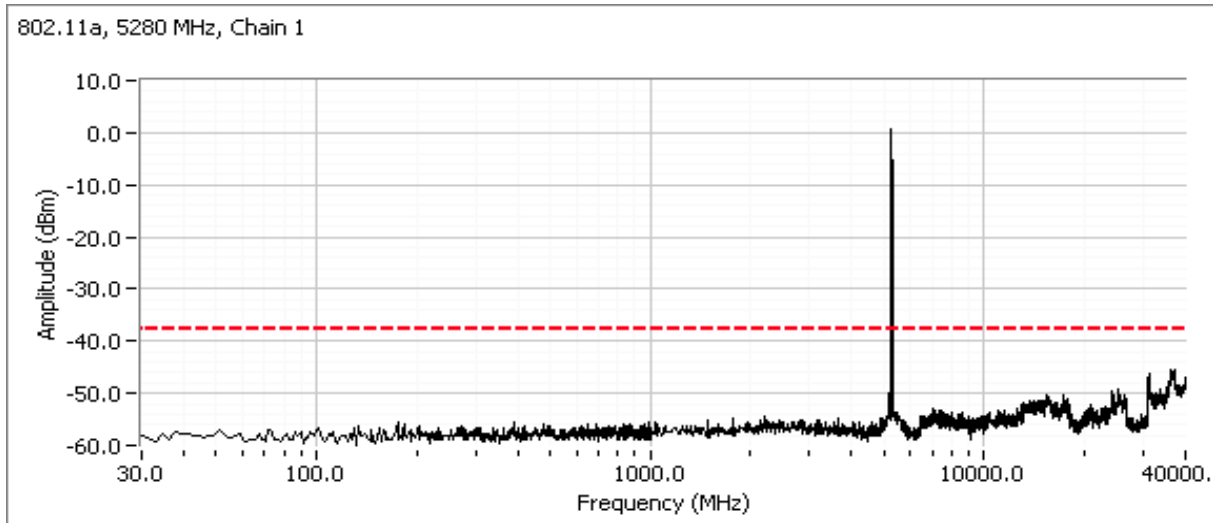
Cursor 1 5249.5991 -47.35 Delta Freq. 0.000
 Cursor 2 5249.5991 -47.35 Delta Amplitude 0.00



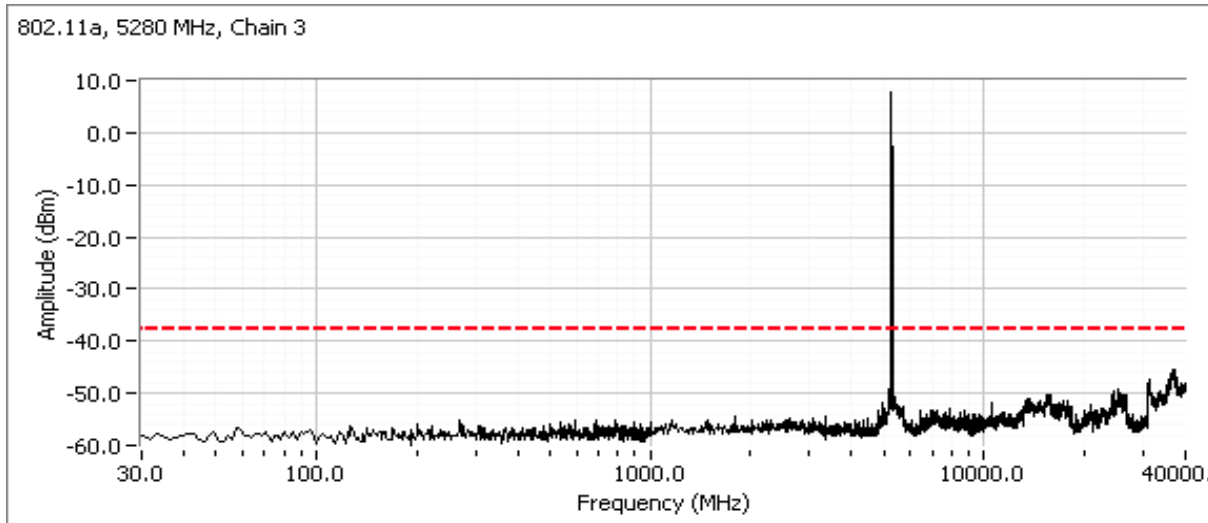
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).

802.11a

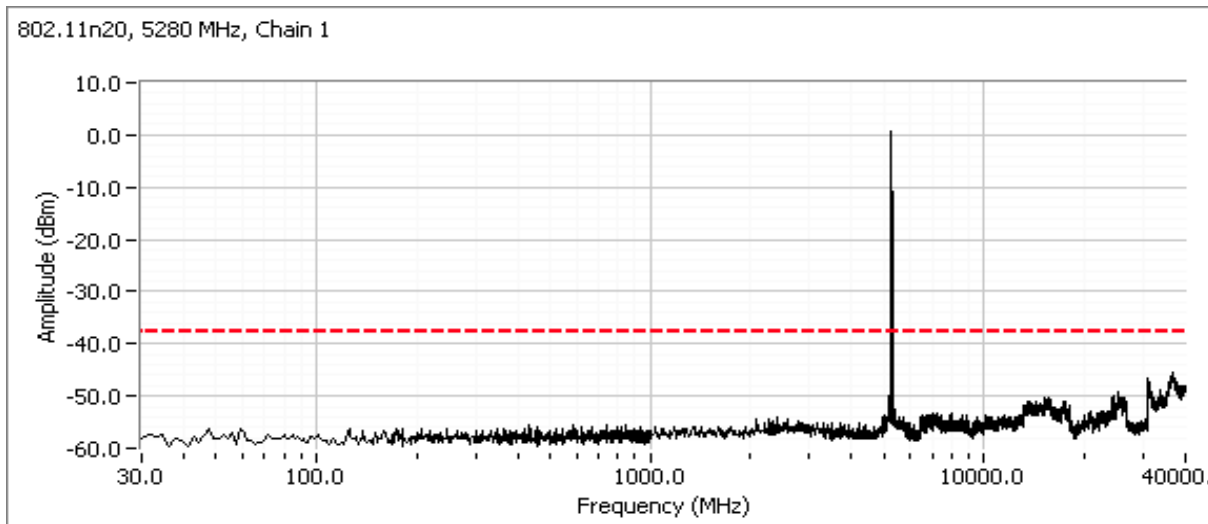


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

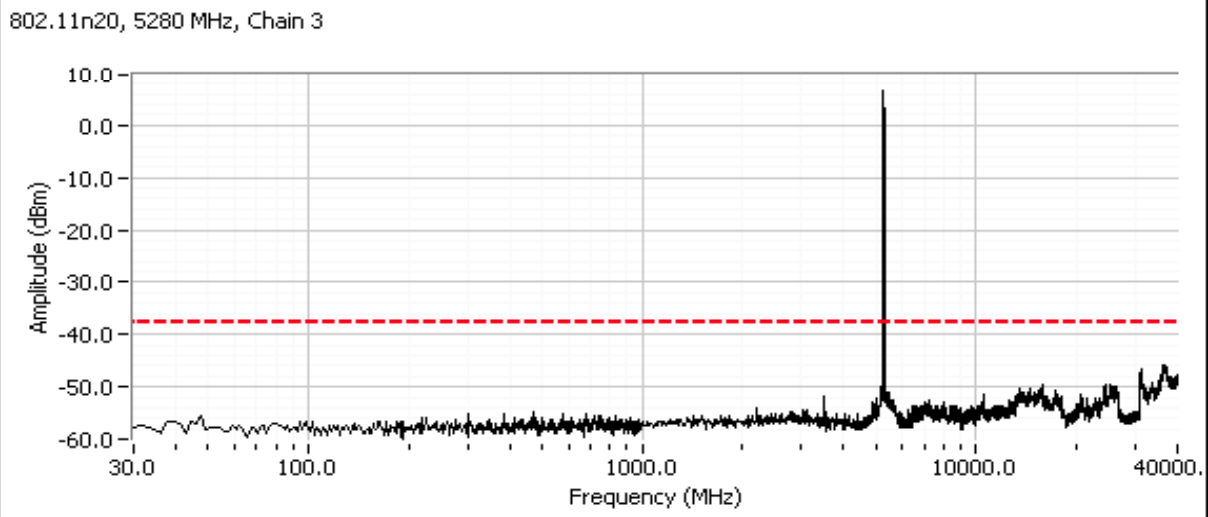
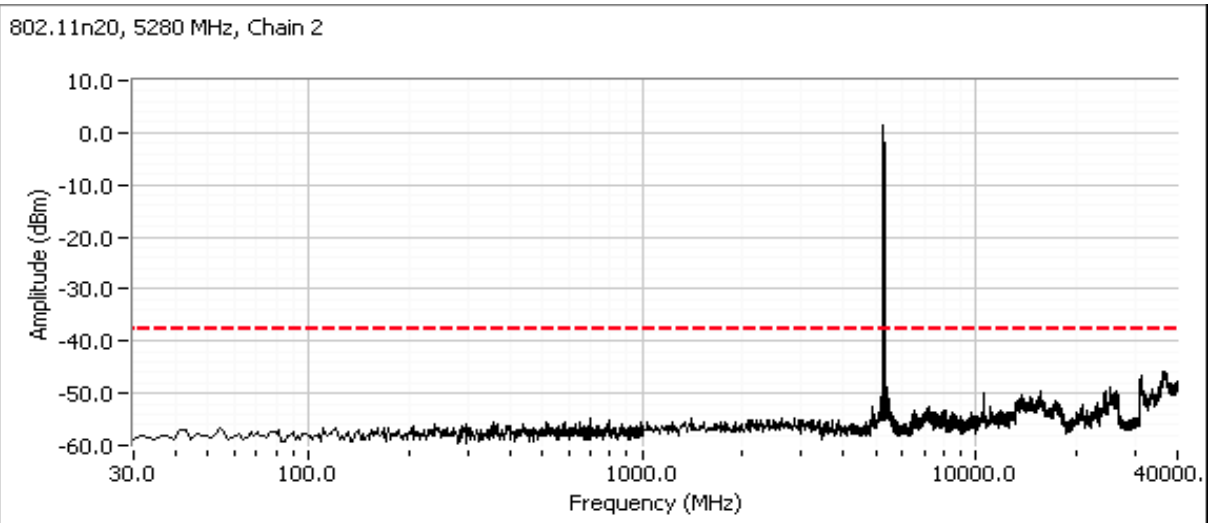


Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).

802.11n20

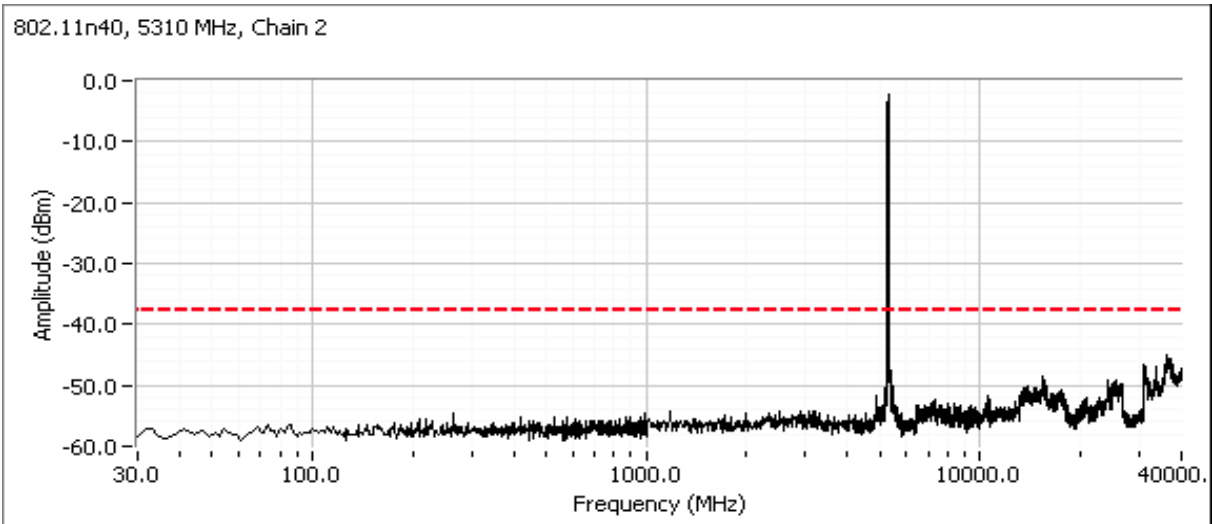
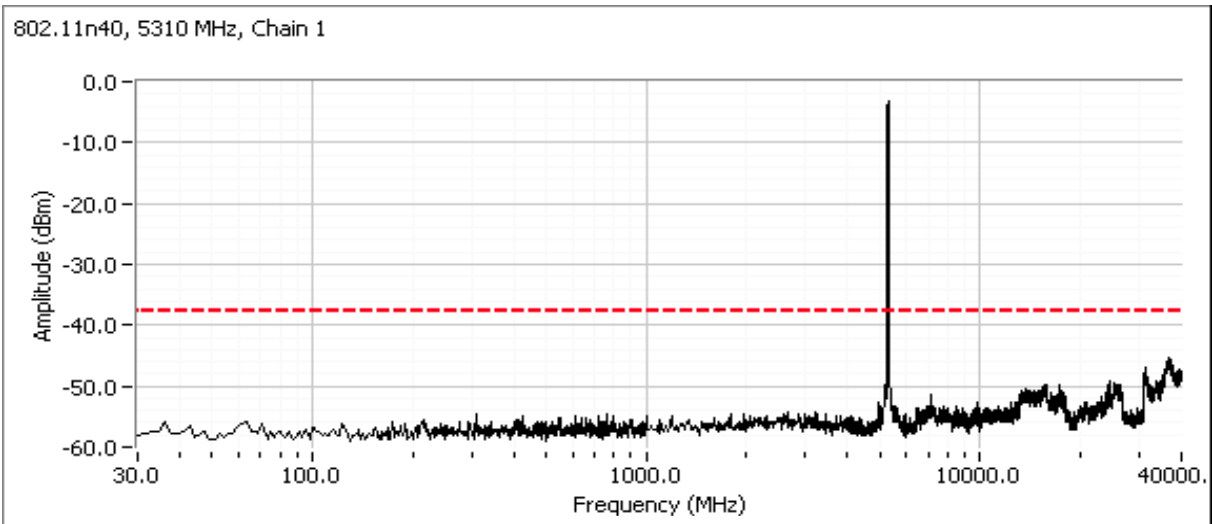


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

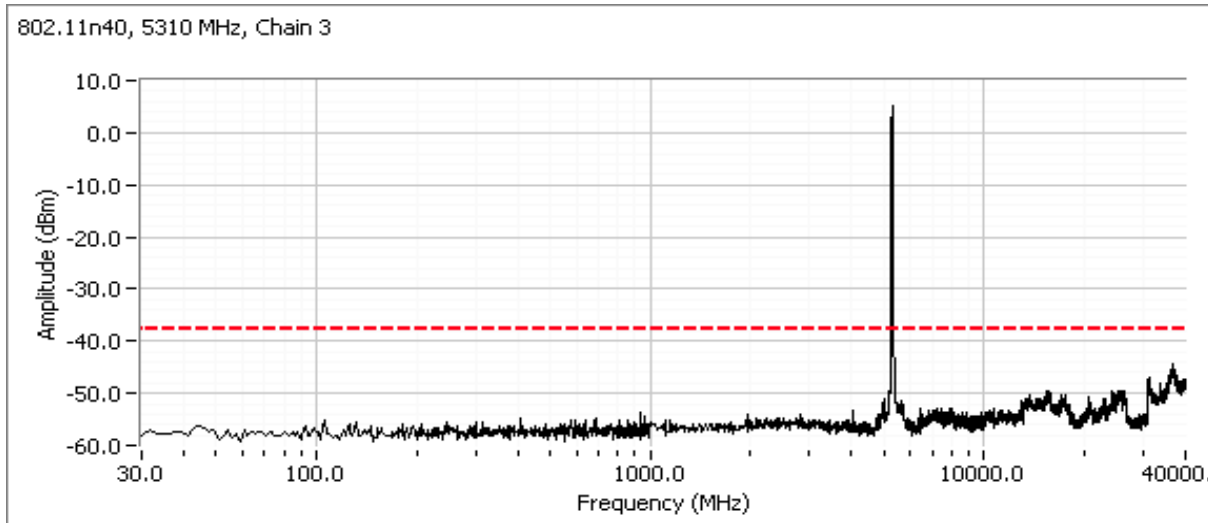


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).
802.11n40

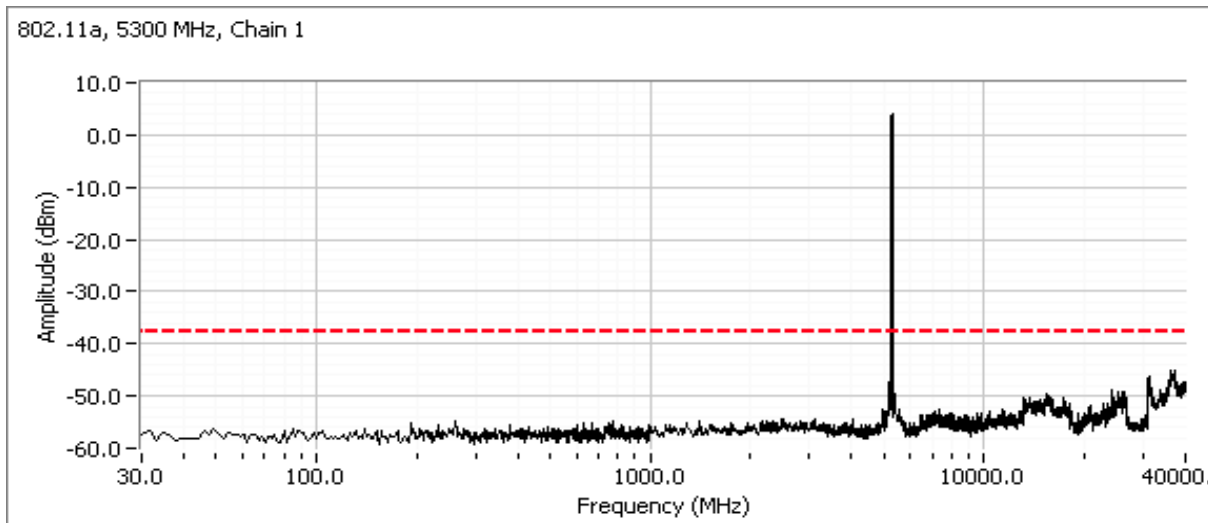


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

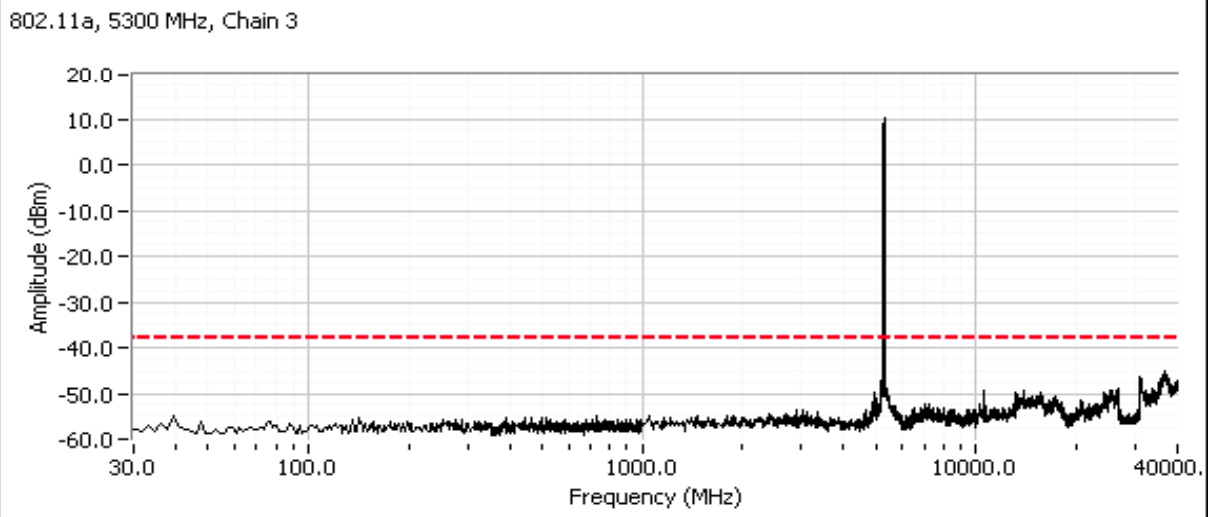
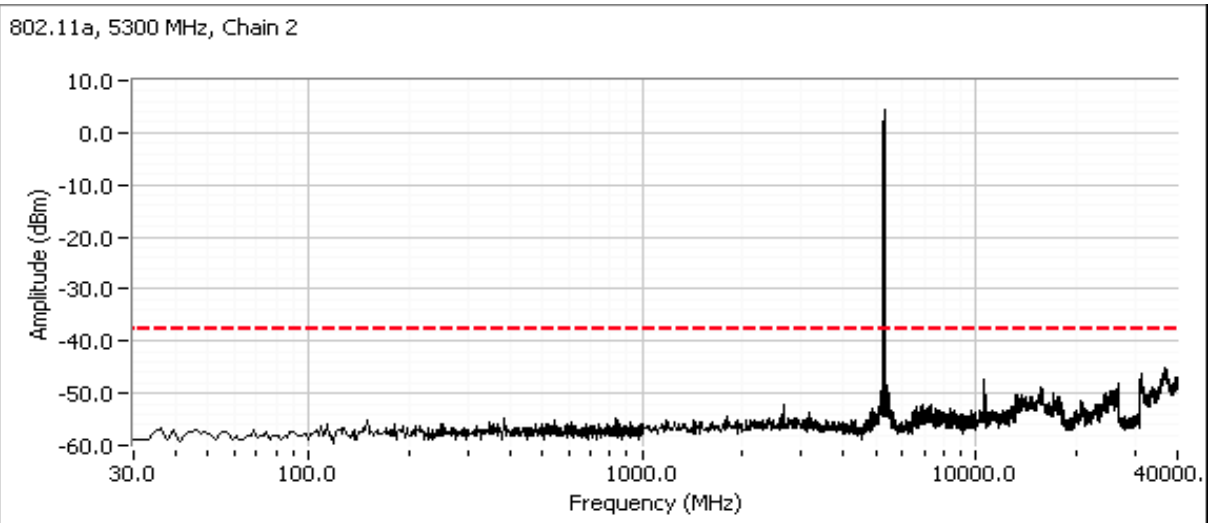


Center channel, 5250 - 5350 MHz Band
Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).

802.11a



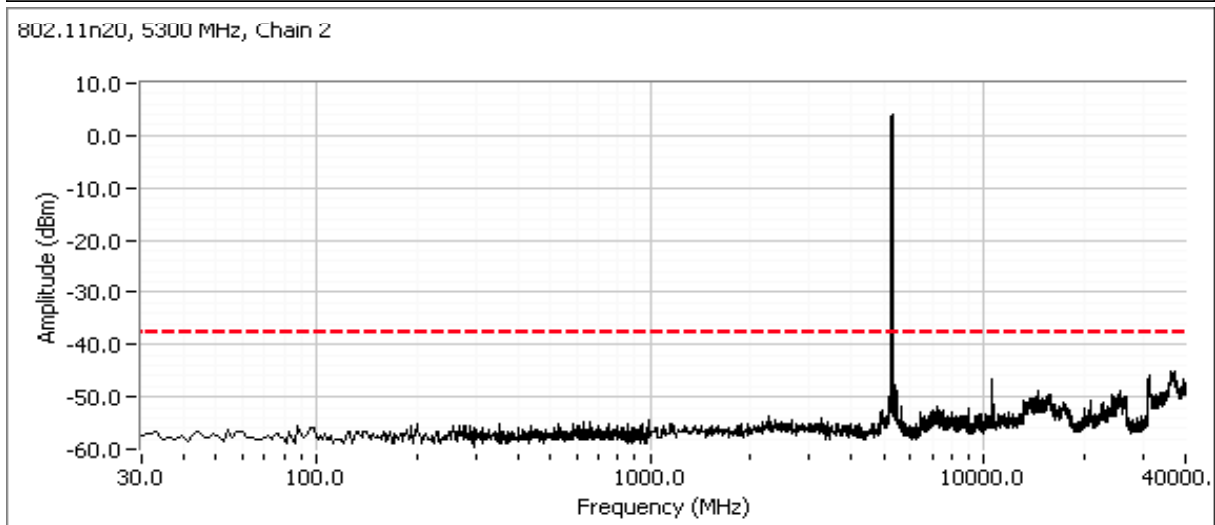
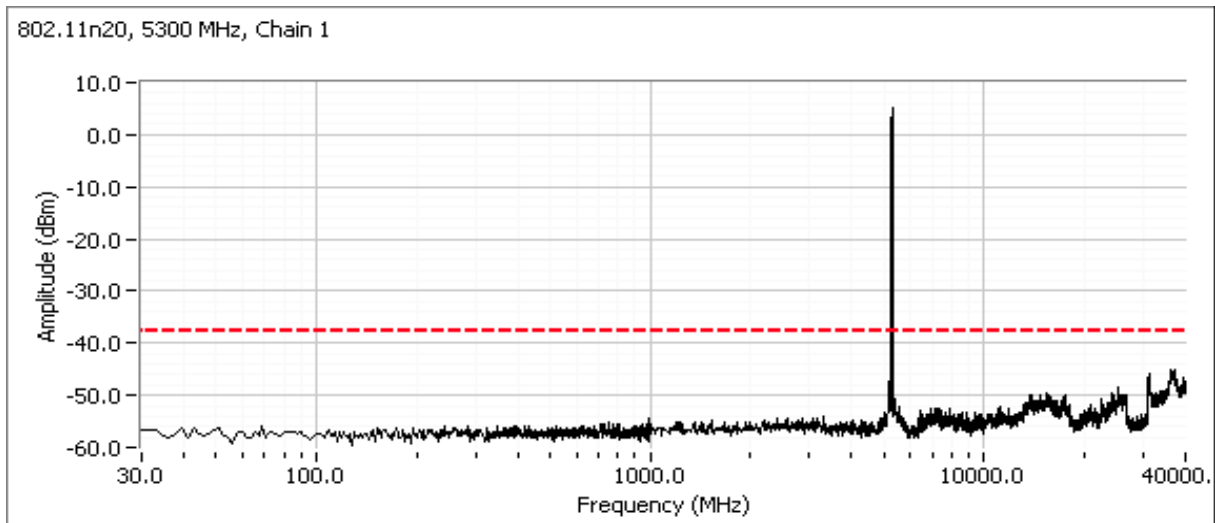
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A



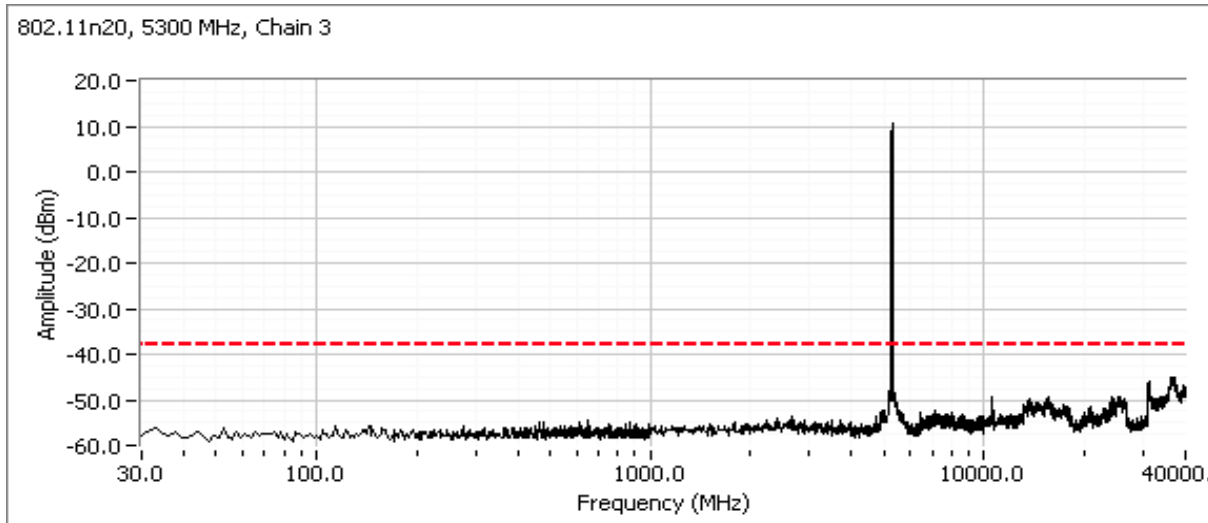
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).

802.11n20



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

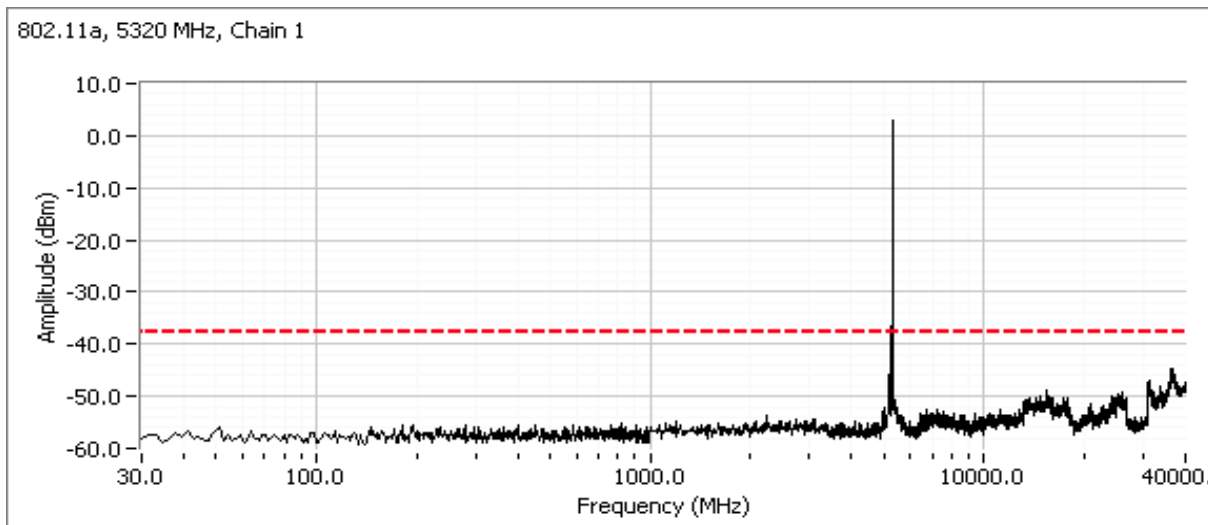


High channel, 5250 - 5350 MHz Band

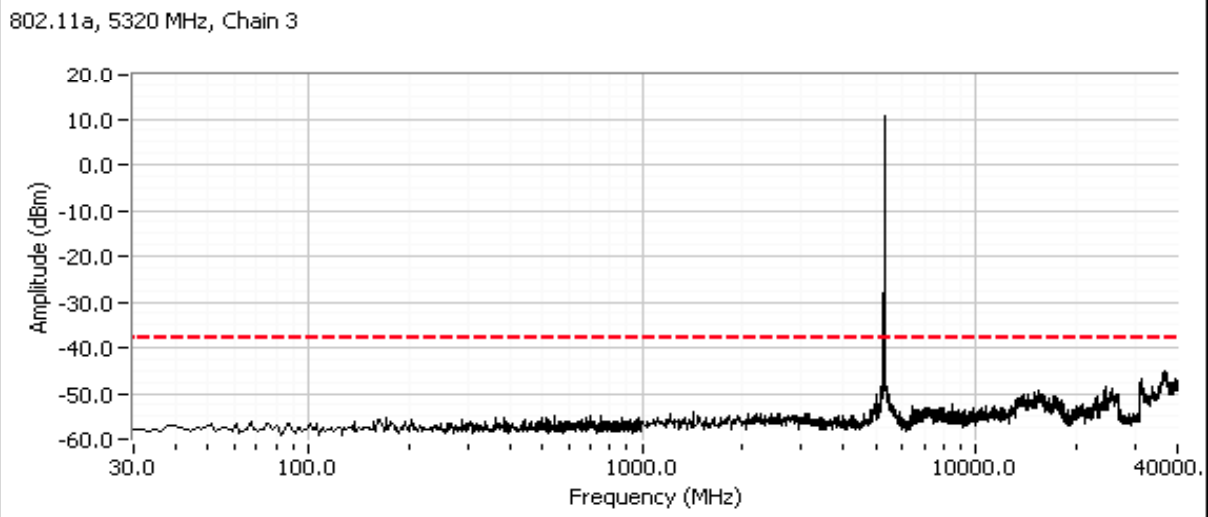
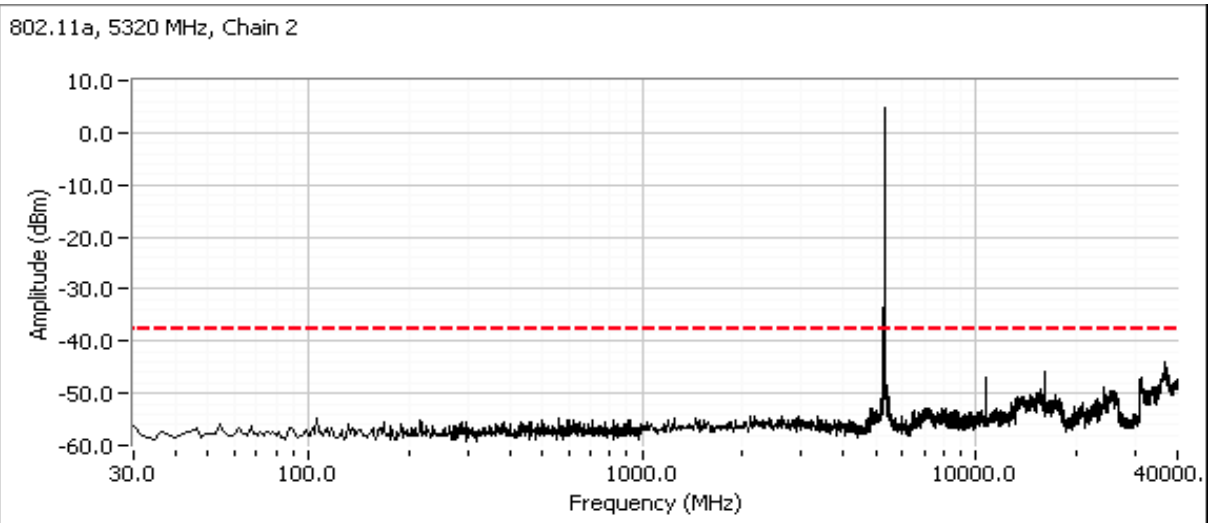
Note - compliance with the radiated limits for the restricted band immediately above 5350MHz is demonstrated through the radiated emissions tests.

Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).

802.11a



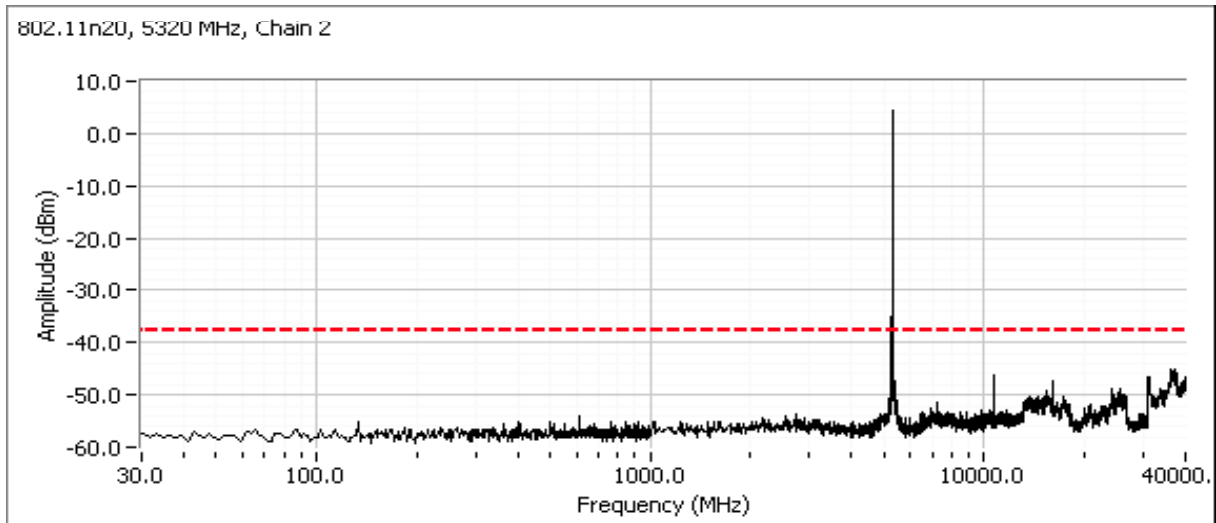
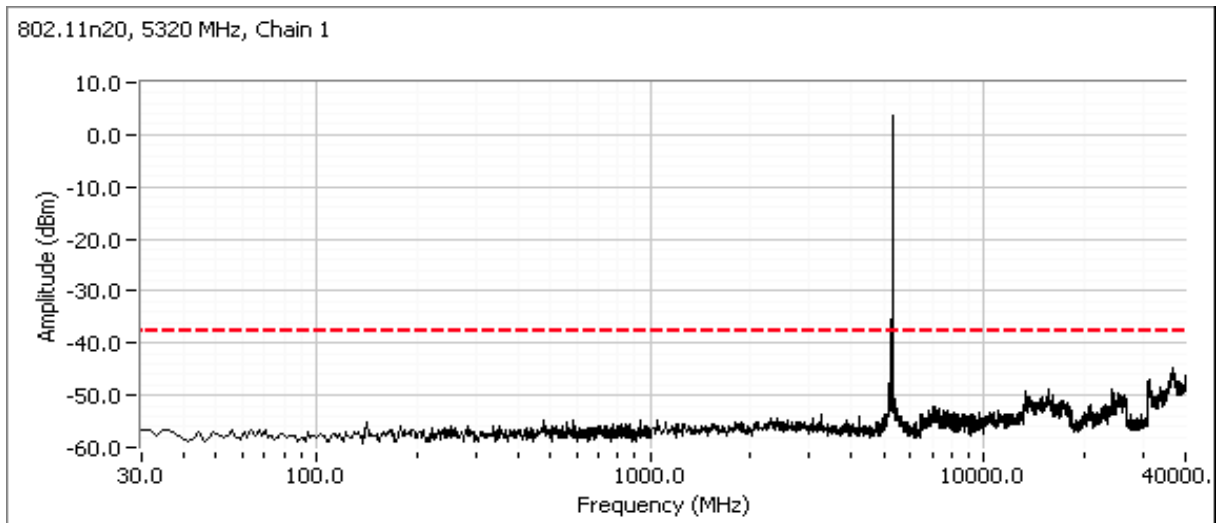
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A



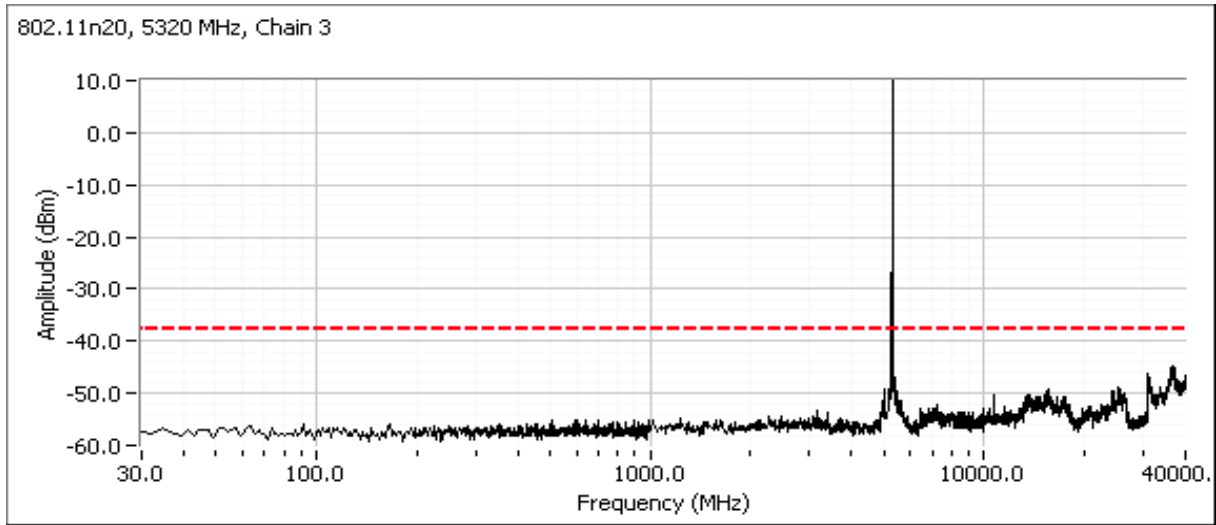
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).

802.11n20



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



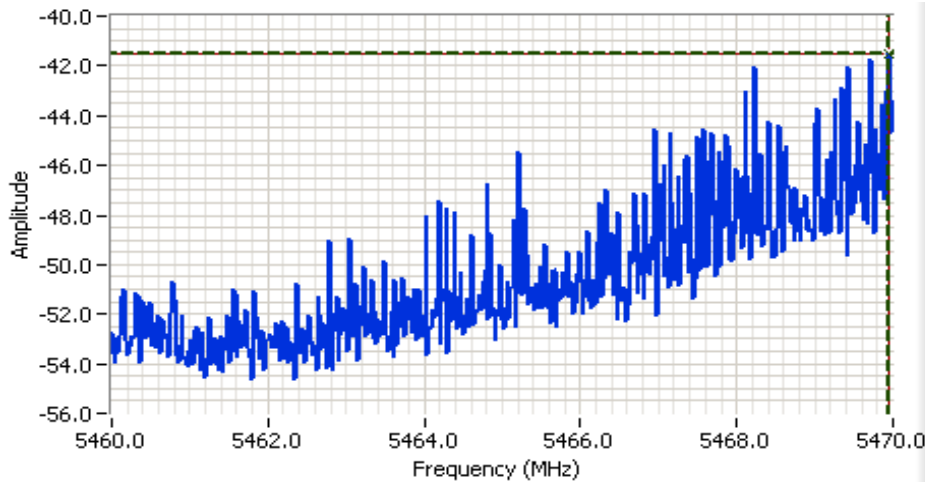
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Low channel, 5470 - 5725 MHz Band

802.11a

Plots for each chain showing compliance with the -27dBm/MHz limit for the 5460 - 5470 MHz band edge. Start and stop frequencies set to 5460-5470 MHz, RB=1MHz, VB=3MHz, peak detector, max hold. Note - compliance with the radiated limits for the restricted band immediately below 5460MHz is demonstrated through the radiated emissions tests.

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP dBm/MHz	Limit dBm/MHz	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz			
Chain 1	30	-47.8	0.00002	6.0	0.00007	-41.8	-27.9	-27	PASS
Chain 3		-41.5	0.00007	6.0	0.00028	-35.5			
Chain 2		-43.2	0.00005	6.0	0.00019	-37.2			



Analyzer Settings

Rohde&Schwarz, ESI
 CF: 5465.000 MHz
 SPAN: 10.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: 6.0 DBM

Comments

802.11a, Chain 3

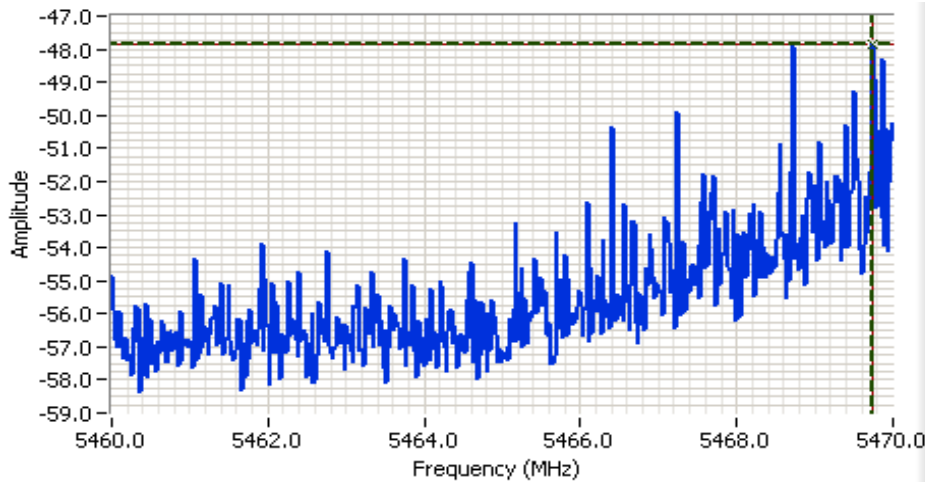
Cursor 1	5469.9600	-41.50	
Cursor 2	5469.9600	-41.50	

Delta Freq. 0.000

Delta Amplitude 0.00



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



Analyzer Settings

Rohde&Schwarz, ESI
 CF: 5465.000 MHz
 SPAN: 10.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: 6.0 DBM

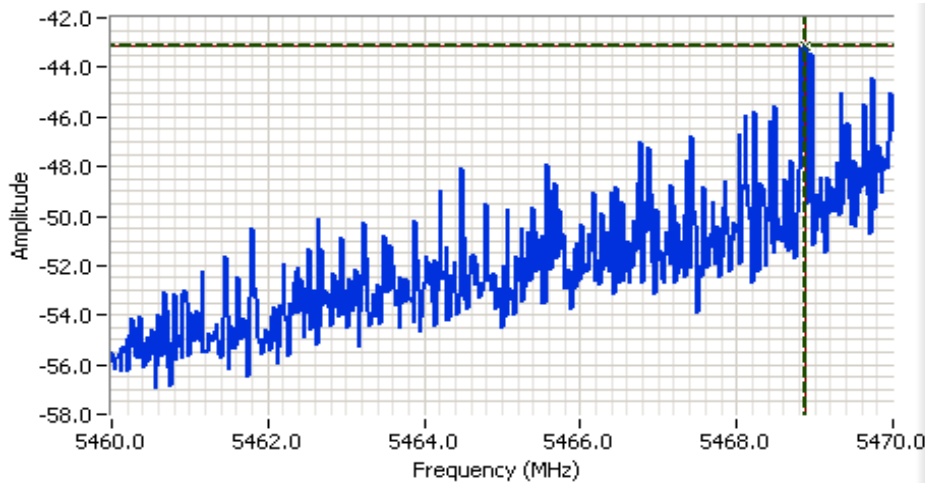
Comments

802.11a, Chain 1

Cursor 1	5469.7393	-47.83	
Cursor 2	5469.7393	-47.83	

Delta Freq. 0.000

Delta Amplitude 0.00



Analyzer Settings

Rohde&Schwarz, ESI
 CF: 5465.000 MHz
 SPAN: 10.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: 6.0 DBM

Comments

802.11a, Chain 2

Cursor 1	5468.8779	-43.16	
Cursor 2	5468.8779	-43.16	

Delta Freq. 0.000

Delta Amplitude 0.00

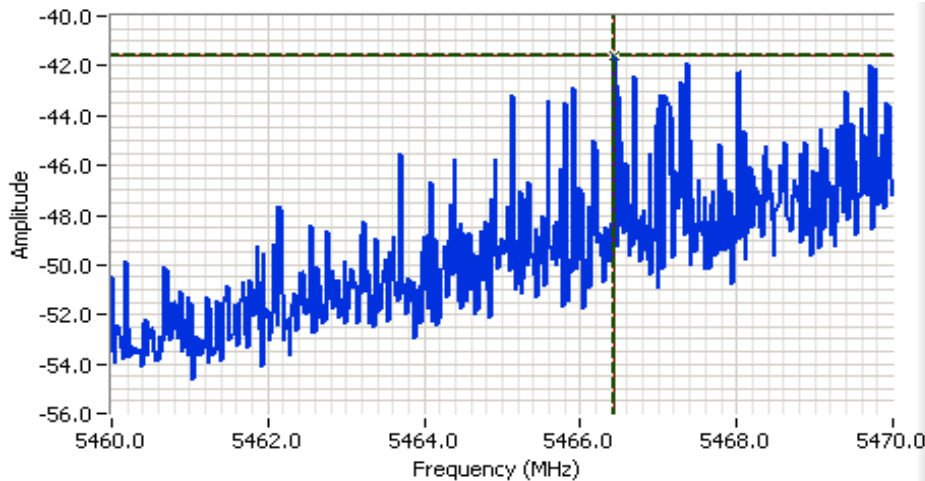


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

802.11n20

Plots for each chain showing compliance with the -27dBm/MHz limit for the 5460 - 5470 MHz band edge. Start and stop frequencies set to 5460-5470 MHz, RB=1MHz, VB=3MHz, peak detector, max hold. Note - compliance with the radiated limits for the restricted band immediately below 5460MHz is demonstrated through the radiated emissions tests.

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP dBm/MHz	Limit dBm/MHz	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz			
Chain 1	29	-46.5	0.00002	6.0	0.00009	-40.5	-27.9	-27	PASS
Chain 3		-41.6	0.00007	6.0	0.00028	-35.6			
Chain 2		-43.5	0.00004	6.0	0.00018	-37.5			



Analyzer Settings
 Rohde&Schwarz, ESI
 CF: 5465.000 MHz
 SPAN: 10.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: 6.0 DBM

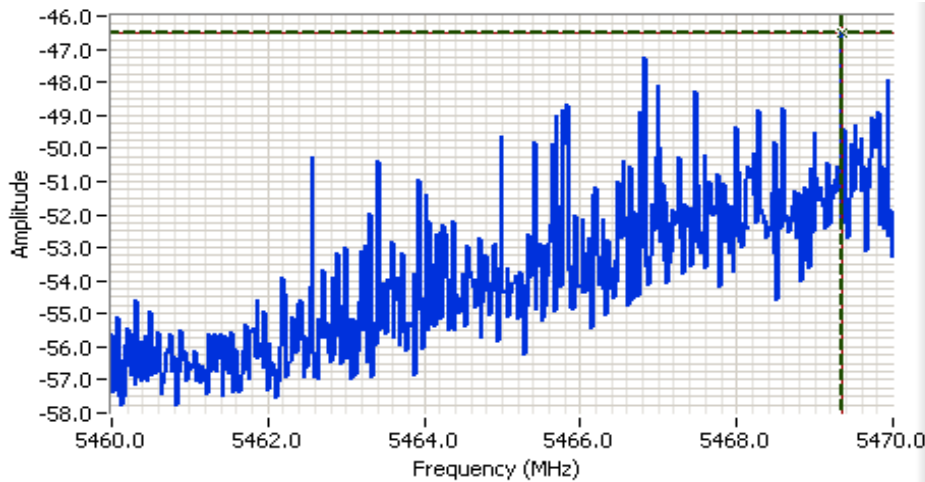
Comments
 802.11n20, Chain 3

Cursor 1	5466.4331	-41.60	
Cursor 2	5466.4331	-41.60	

Delta Freq. 0.000
 Delta Amplitude 0.00



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



Analyzer Settings

Rohde&Schwarz,ESI
 CF: 5465.000 MHz
 SPAN: 10.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: 6.0 DBM

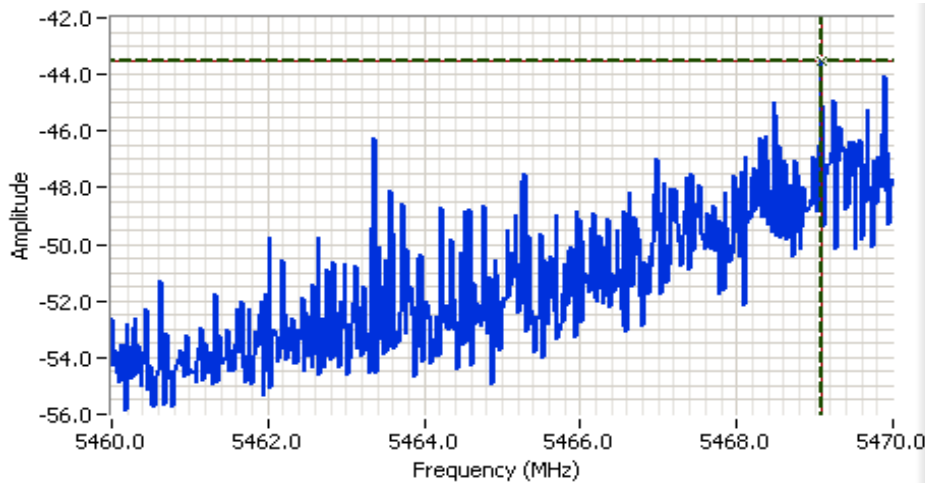
Comments

802.11n20, Chain 1

Cursor 1	5469.3389	-46.51	
Cursor 2	5469.3389	-46.51	

Delta Freq. 0.000

Delta Amplitude 0.00



Analyzer Settings

Rohde&Schwarz,ESI
 CF: 5465.000 MHz
 SPAN: 10.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: 6.0 DBM

Comments

802.11n20, Chain 2

Cursor 1	5469.0781	-43.53	
Cursor 2	5469.0781	-43.53	

Delta Freq. 0.000

Delta Amplitude 0.00

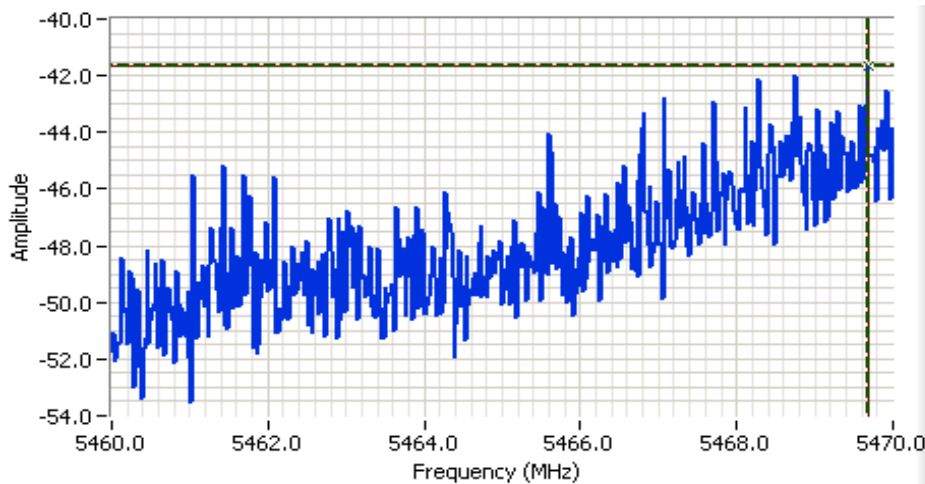


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

802.11n40

Plots for each chain showing compliance with the -27dBm/MHz limit for the 5460 - 5470 MHz band edge. Start and stop frequencies set to 5460-5470 MHz, RB=1MHz, VB=3MHz, peak detector, max hold. Note - compliance with the radiated limits for the restricted band immediately below 5460MHz is demonstrated through the radiated emissions tests.

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP dBm/MHz	Limit dBm/MHz	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz			
Chain 1	17	-46.9	0.00002	6.0	0.00008	-40.9	-27.5	-27	PASS
Chain 3		-41.6	0.00007	6.0	0.00028	-35.6			
Chain 2		-42.4	0.00006	6.0	0.00023	-36.4			



Analyzer Settings

Rohde&Schwarz, ESI
 CF: 5465.000 MHz
 SPAN: 10.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: 6.0 DBM

Comments

802.11n40, Chain 3

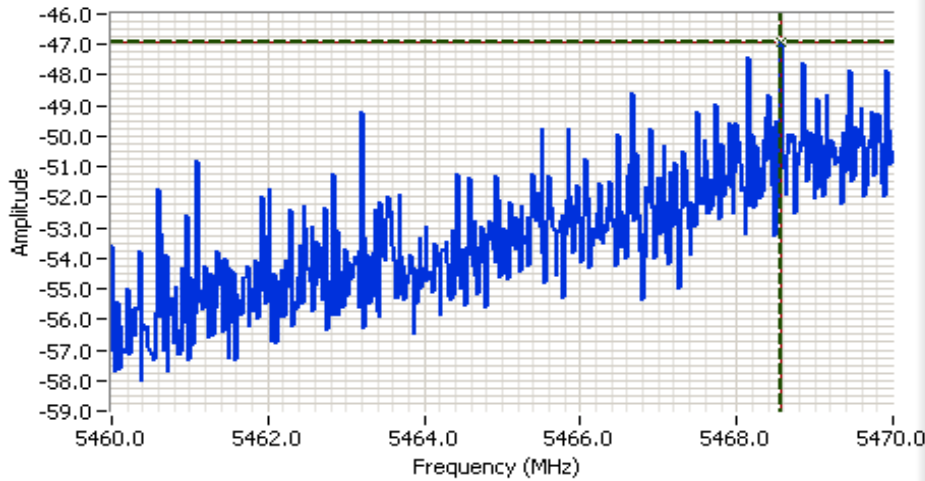
Cursor 1	5469.6792	-41.64	
Cursor 2	5469.6792	-41.64	

Delta Freq. 0.000

Delta Amplitude 0.00



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



Analyzer Settings

Rohde&Schwarz, ESI
 CF: 5465.000 MHz
 SPAN: 10.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: 6.0 DBM

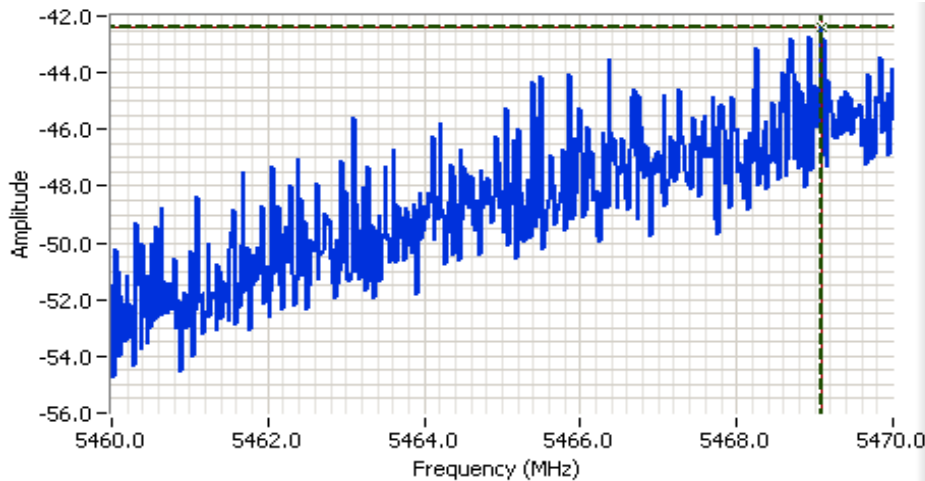
Comments

802.11n40, Chain 1

Cursor 1	5468.5771	-46.92	
Cursor 2	5468.5771	-46.92	

Delta Freq. 0.000

Delta Amplitude 0.00



Analyzer Settings

Rohde&Schwarz, ESI
 CF: 5465.000 MHz
 SPAN: 10.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: 6.0 DBM

Comments

802.11n40, Chain 2

Cursor 1	5469.0781	-42.38	
Cursor 2	5469.0781	-42.38	

Delta Freq. 0.000

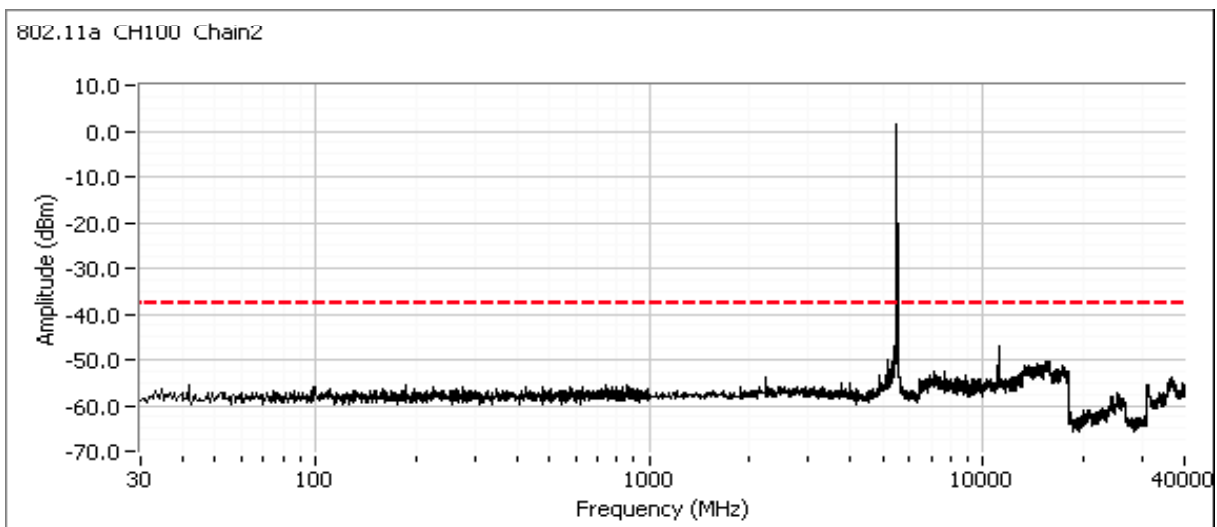
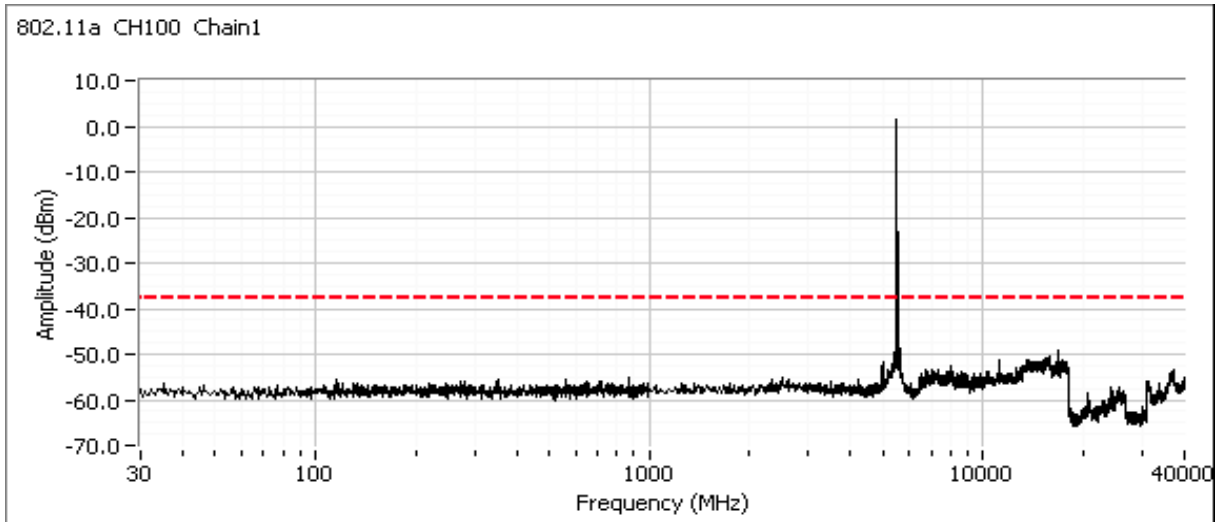
Delta Amplitude 0.00



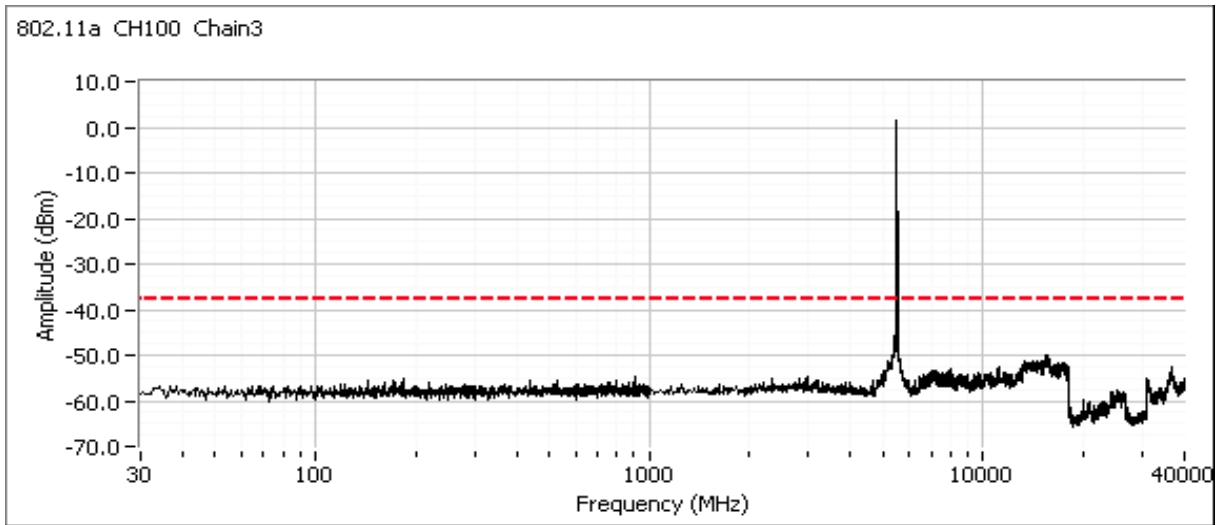
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).

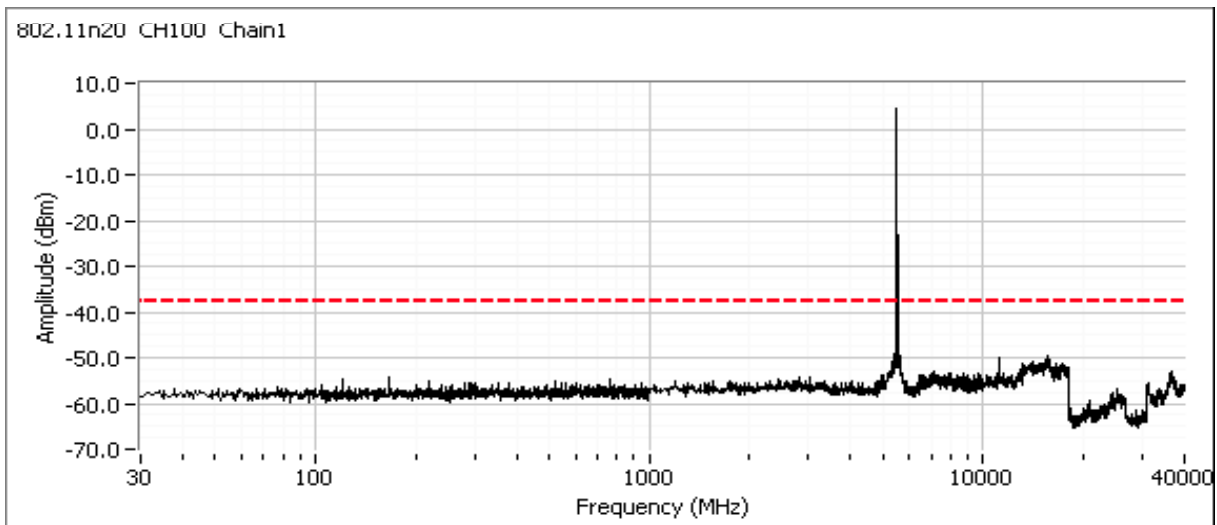
802.11a



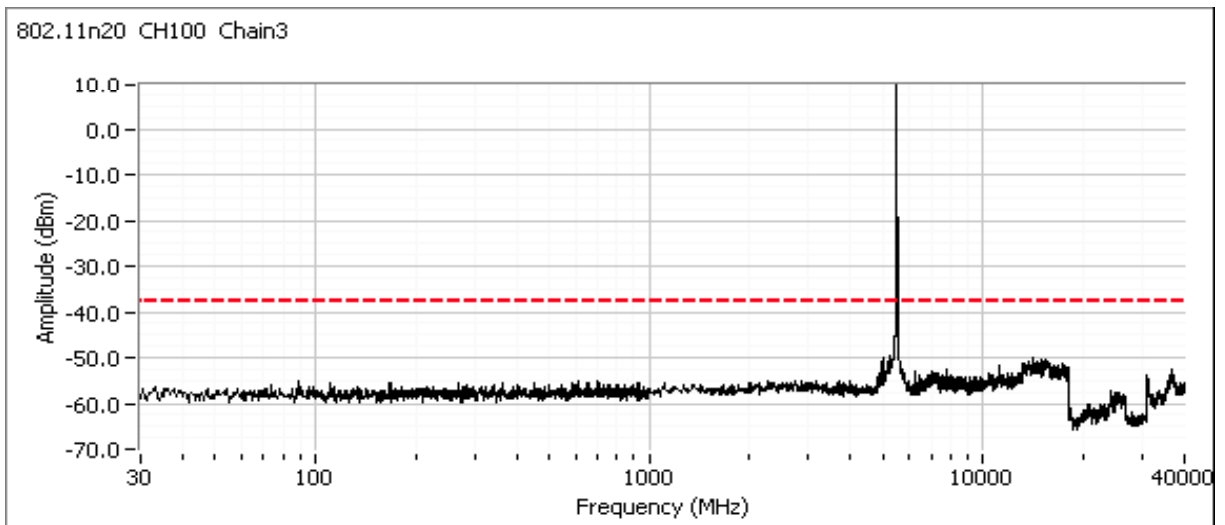
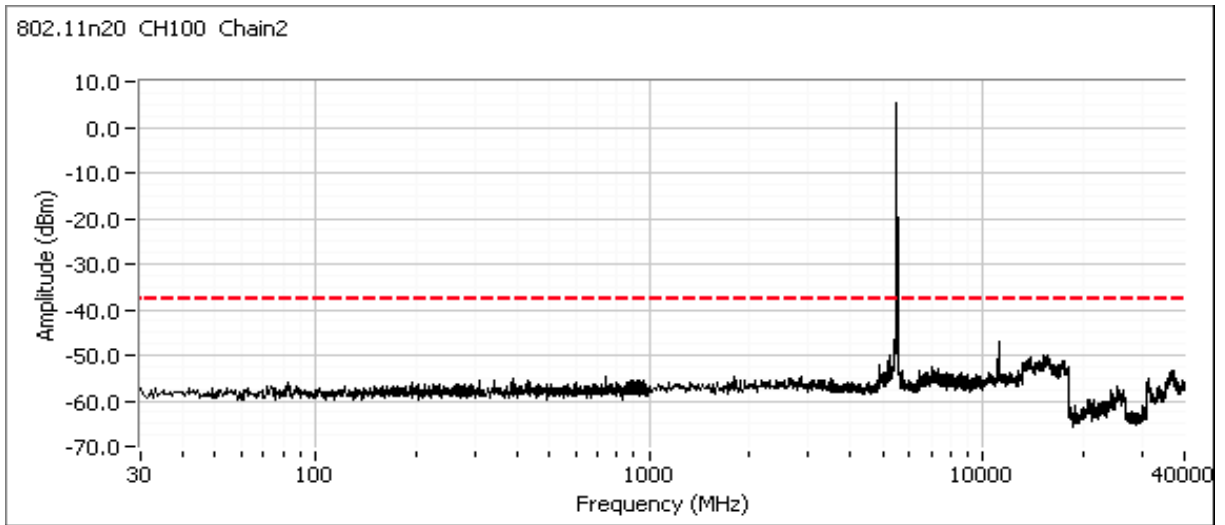
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A



802.11n20

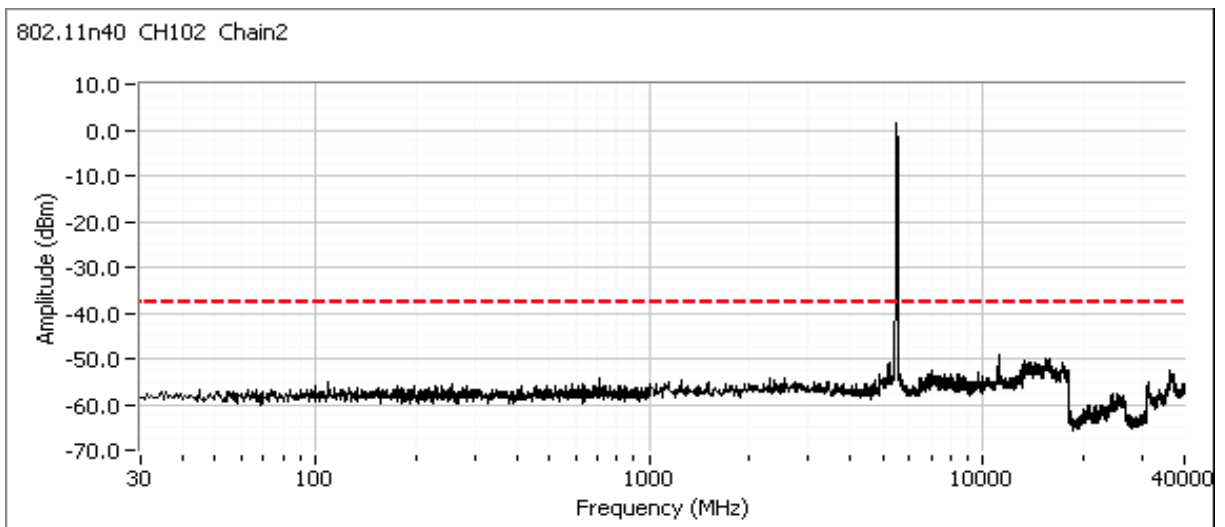
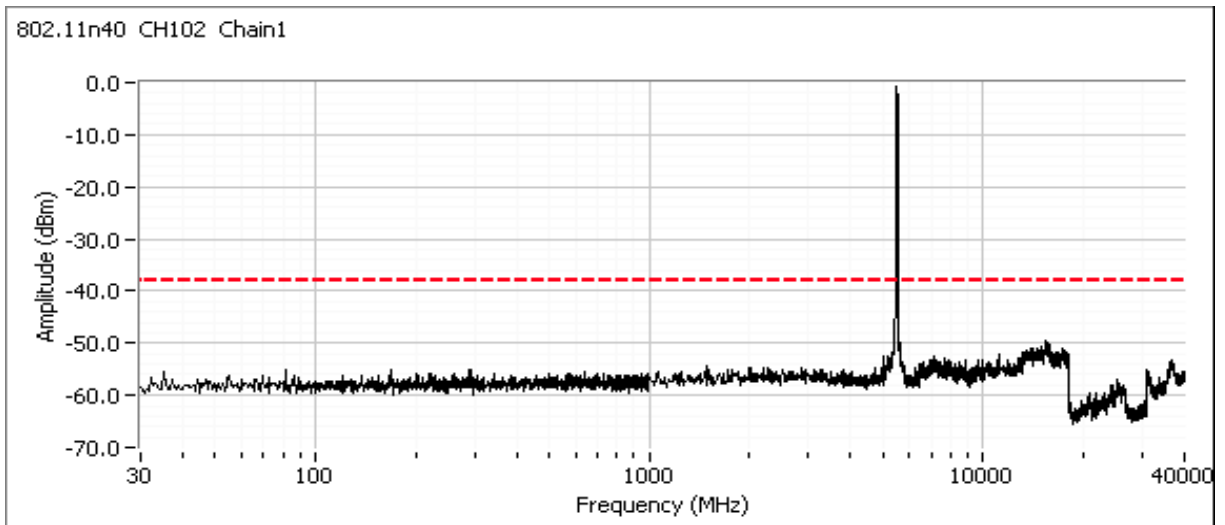


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

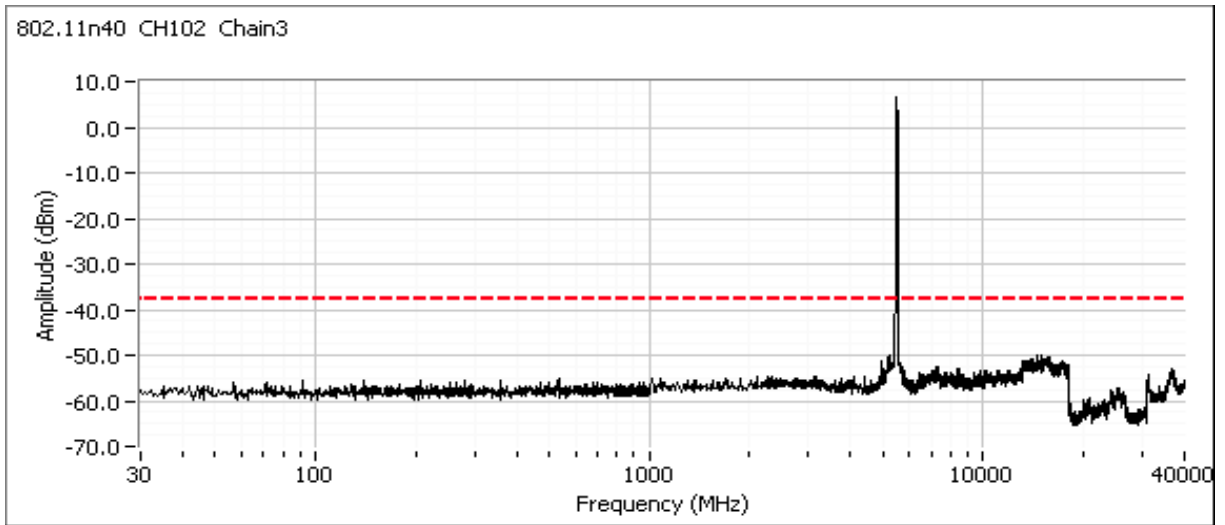


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

802.11n40



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

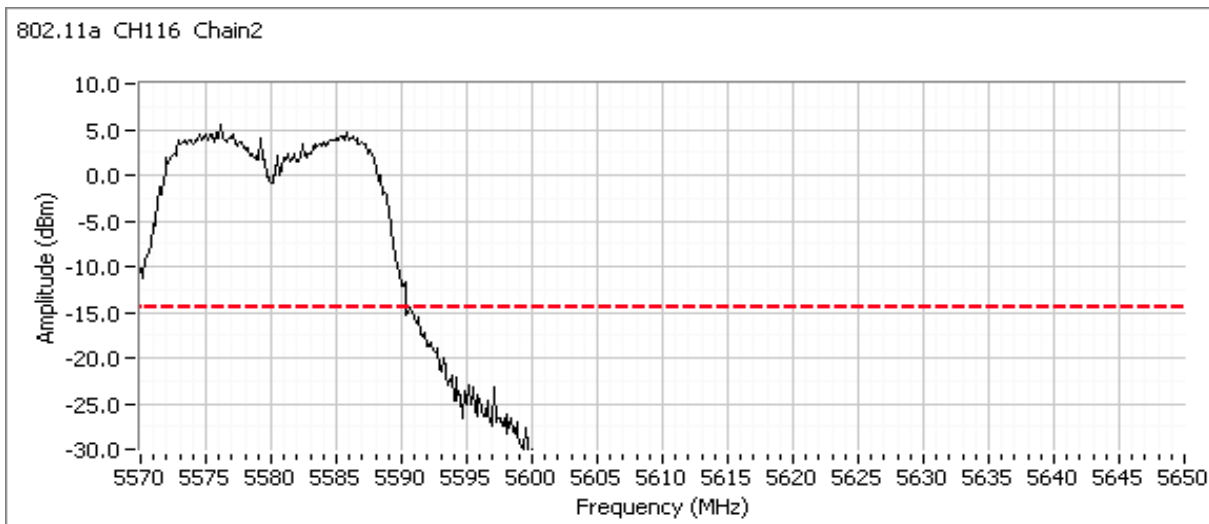
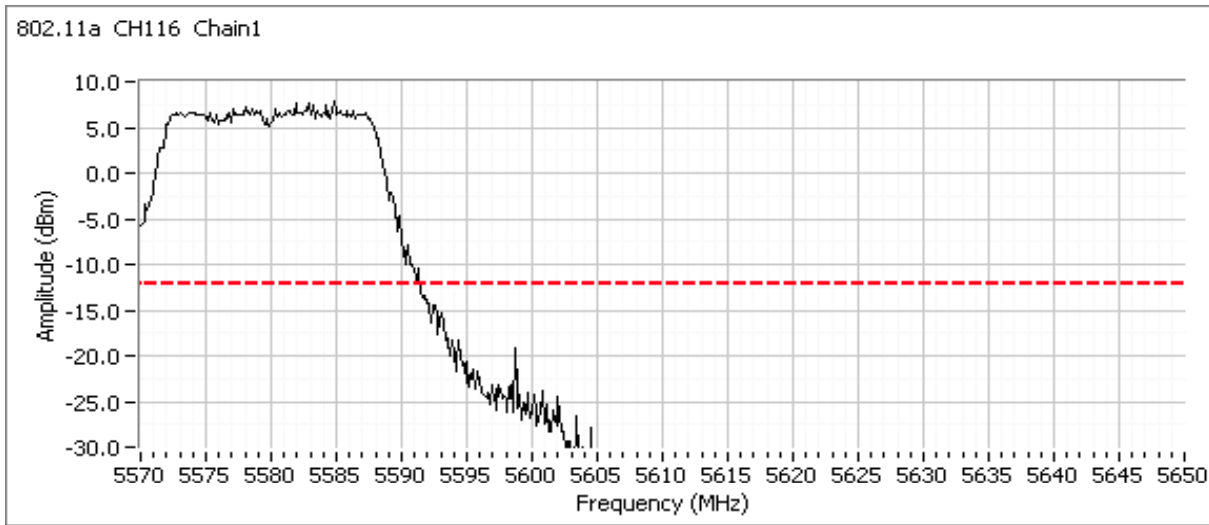


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

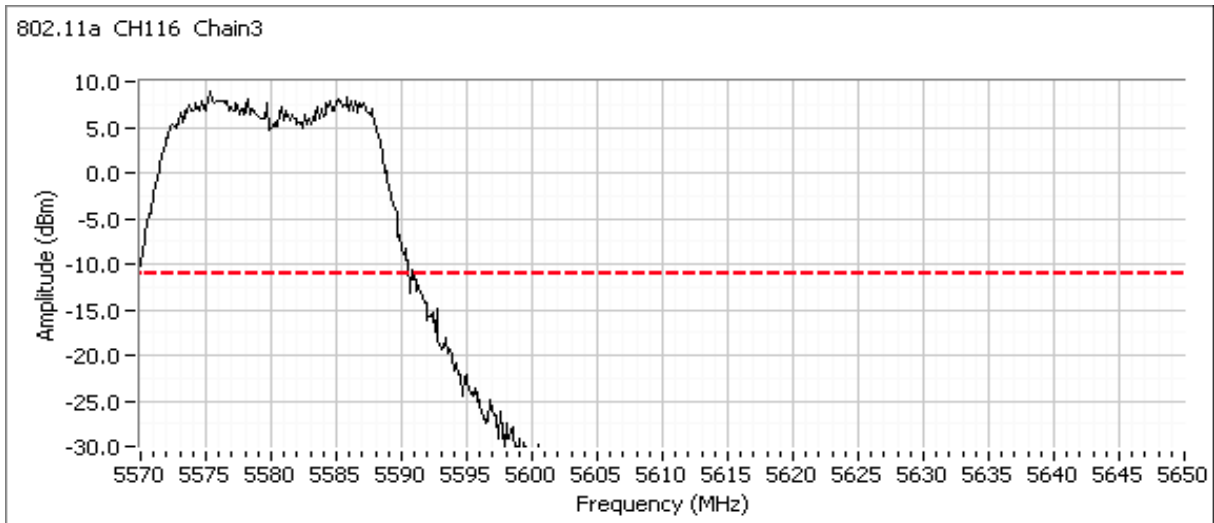
Center channel, 5470 - 5725 MHz Band

For master devices - This plot is showing that the 20dB bandwidth of the channel closest to 5600 MHz does not spill into the 5600-5650 MHz band. RB ~1% of emission bandwidth.

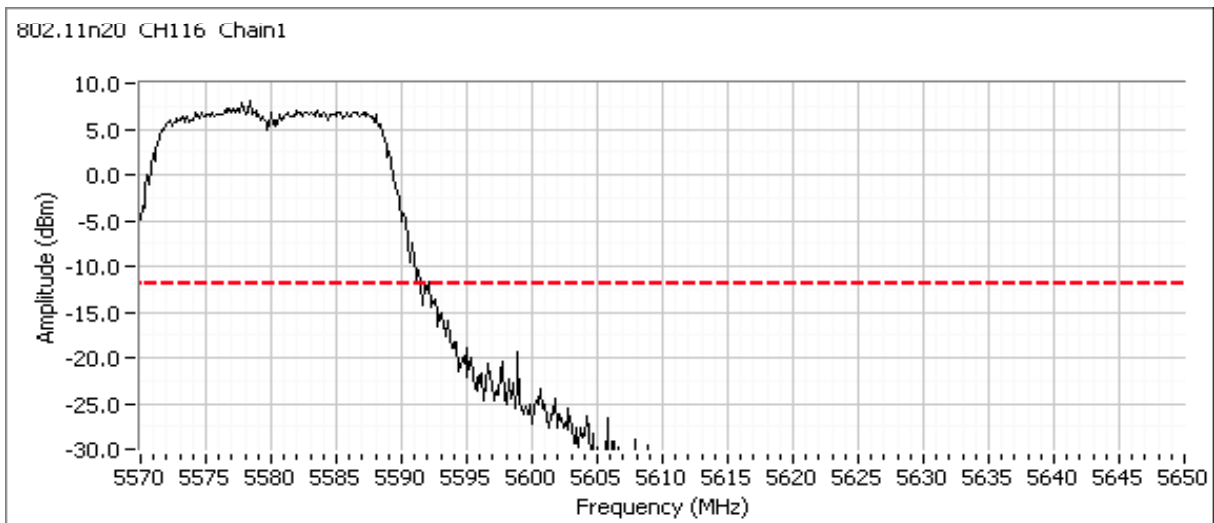
802.11a



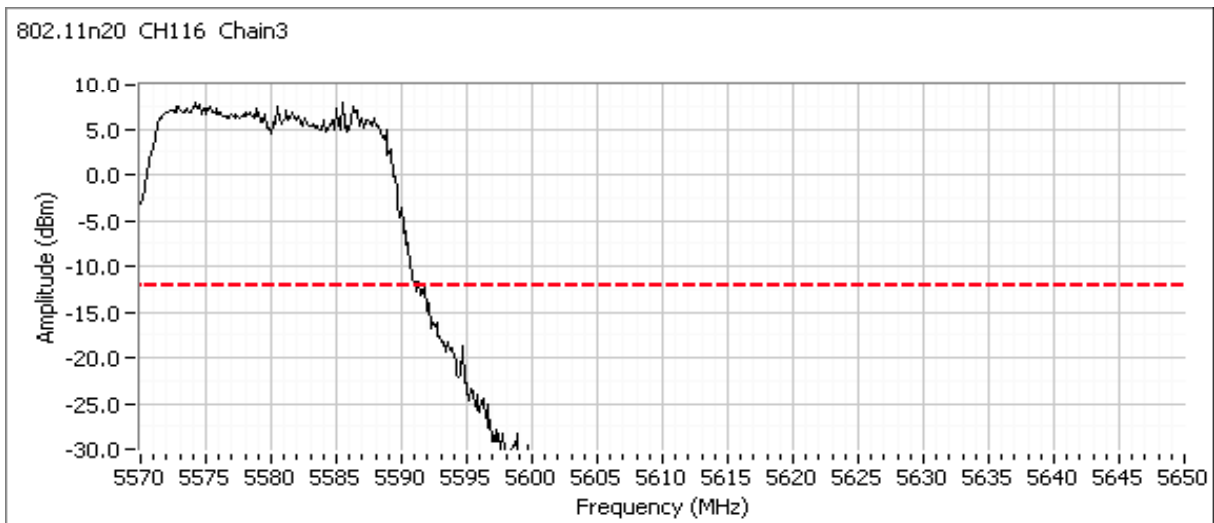
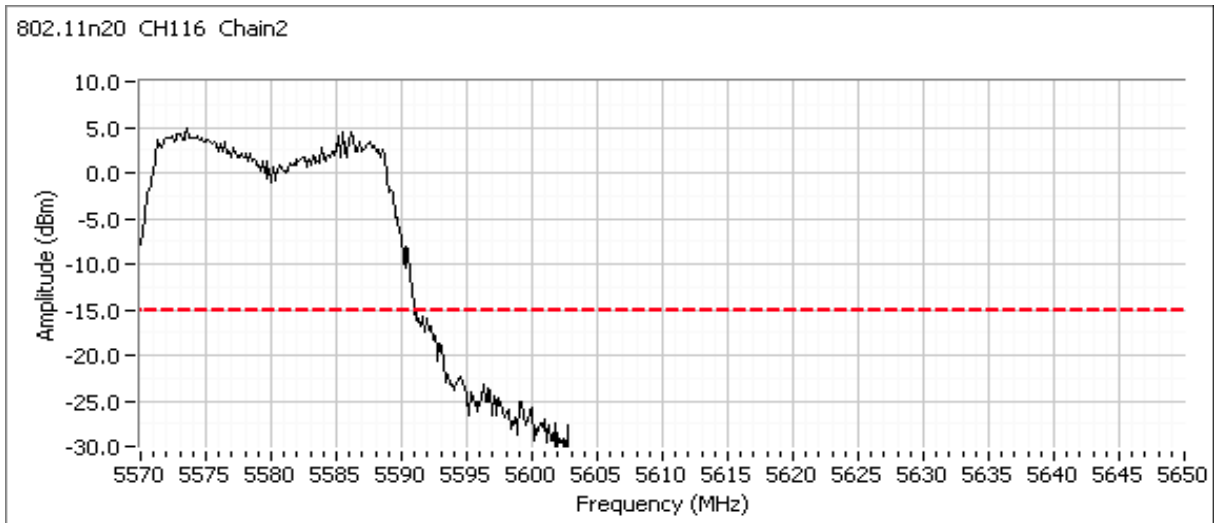
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A



802.11n20

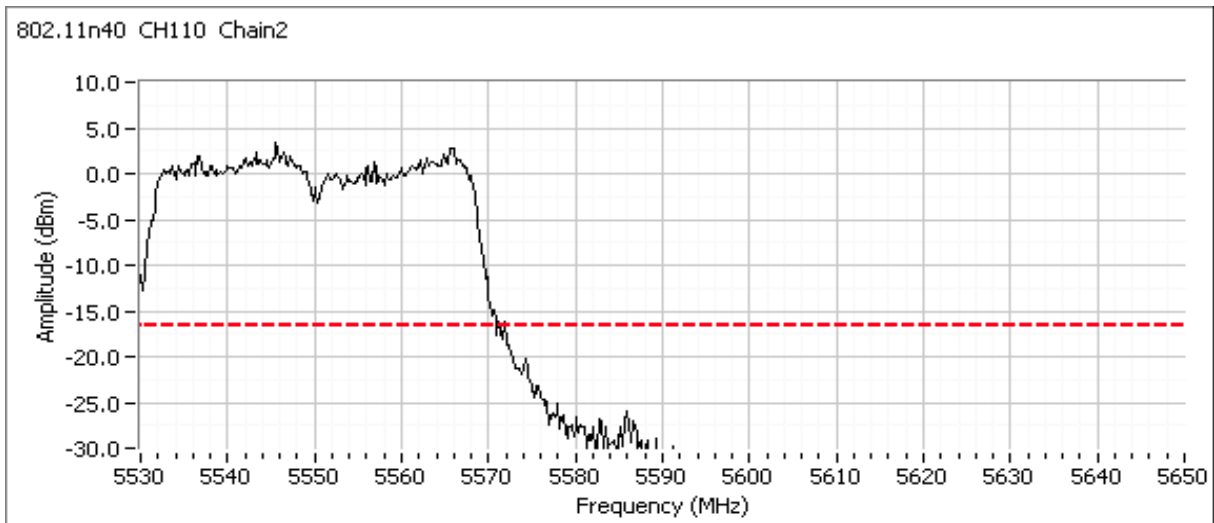
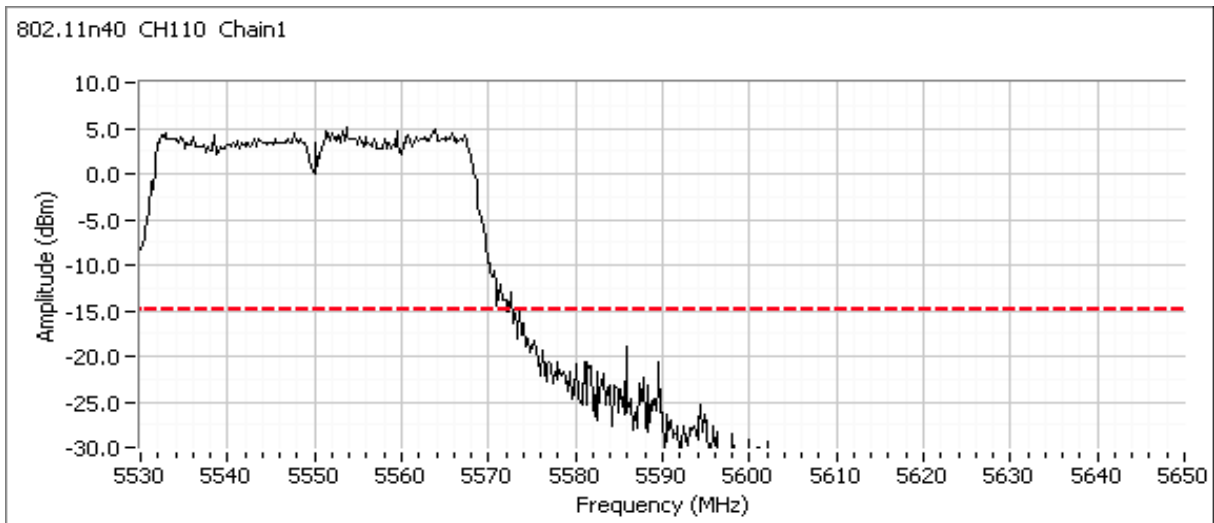


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

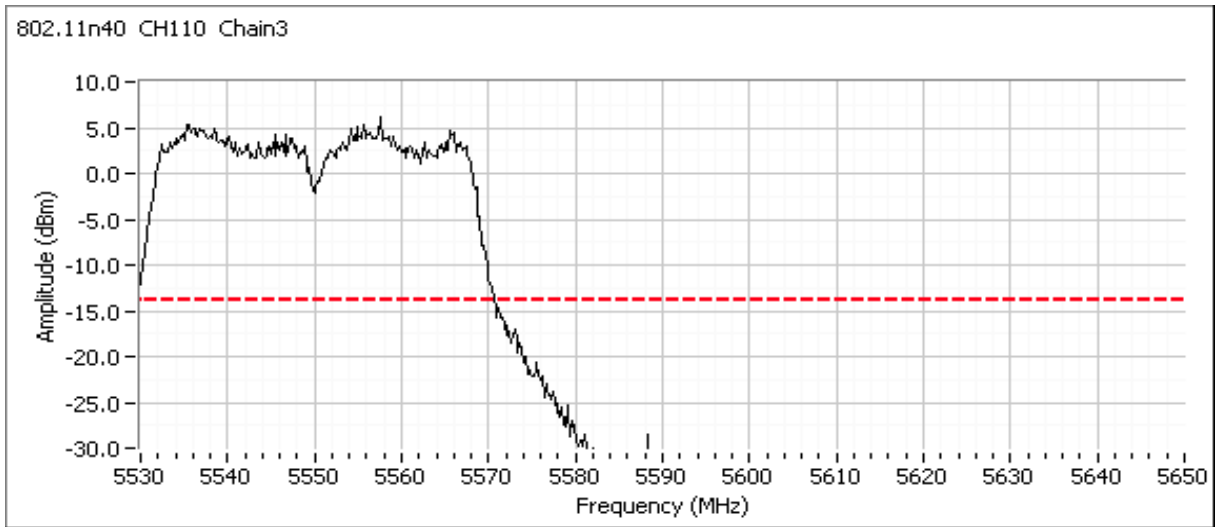


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

802.11n40



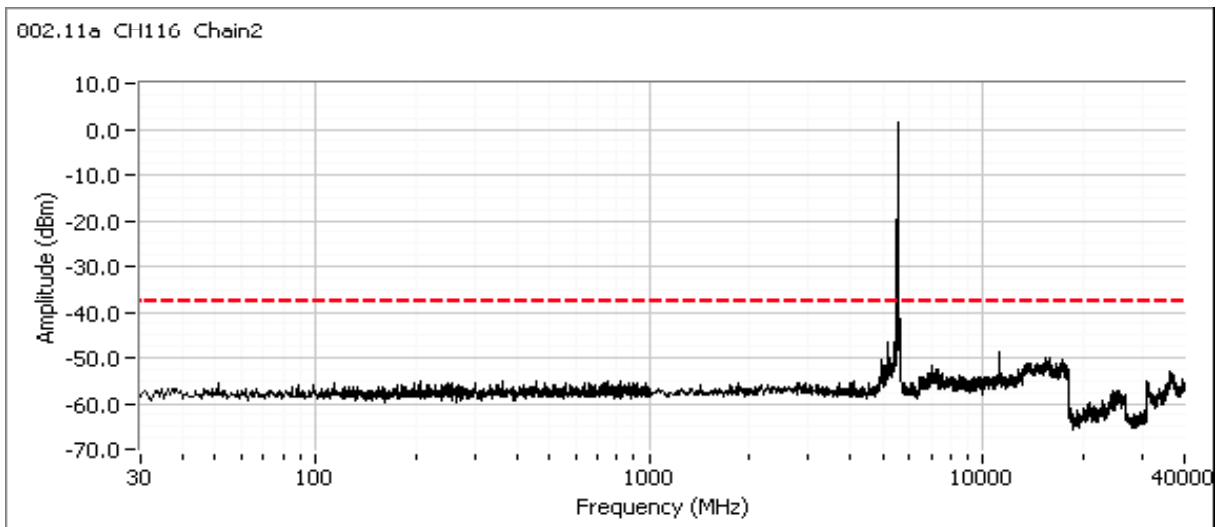
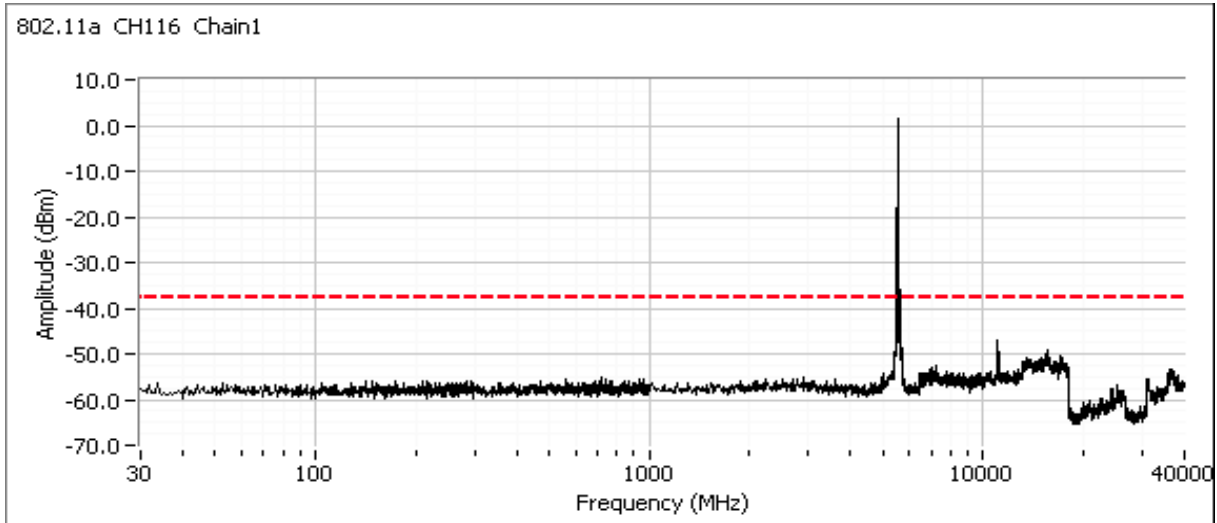
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A



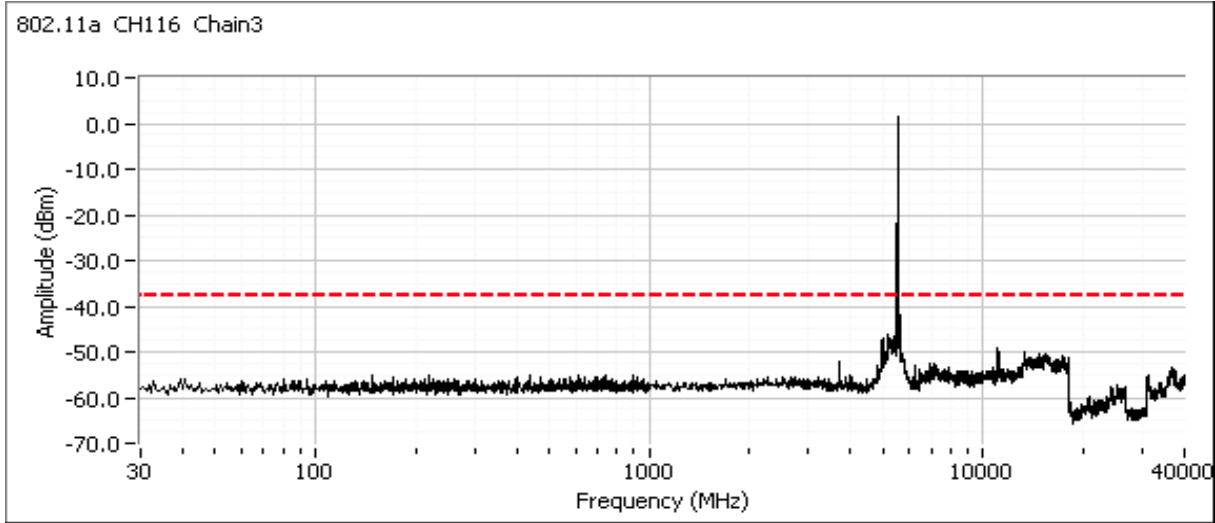
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).

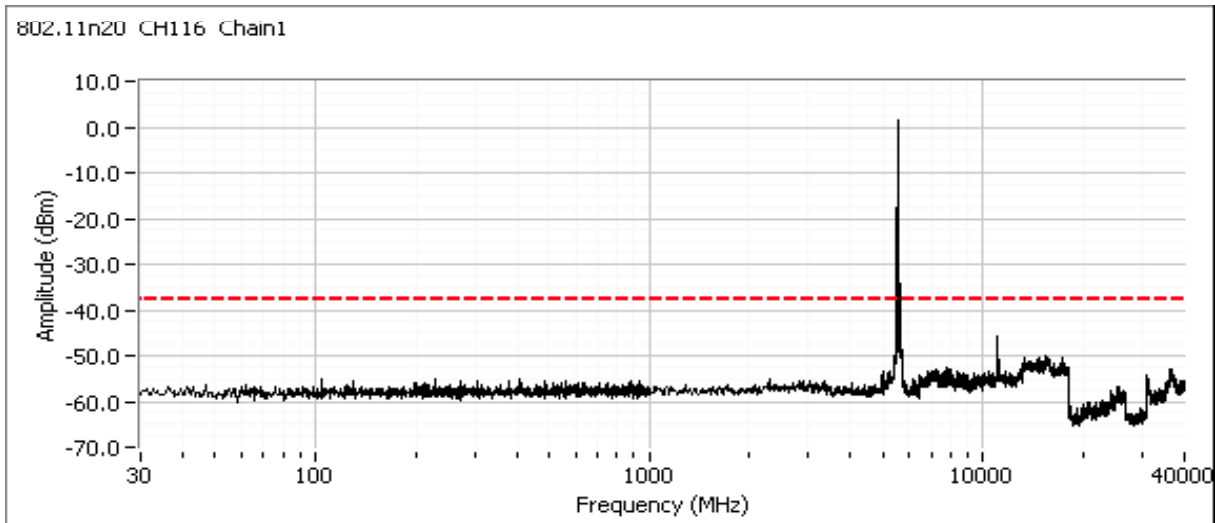
802.11a



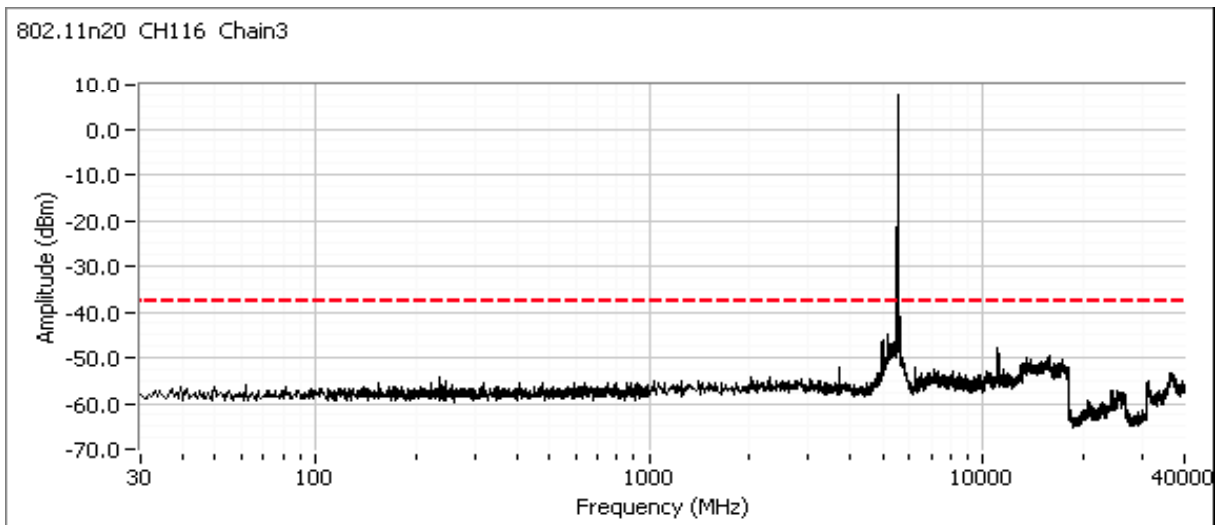
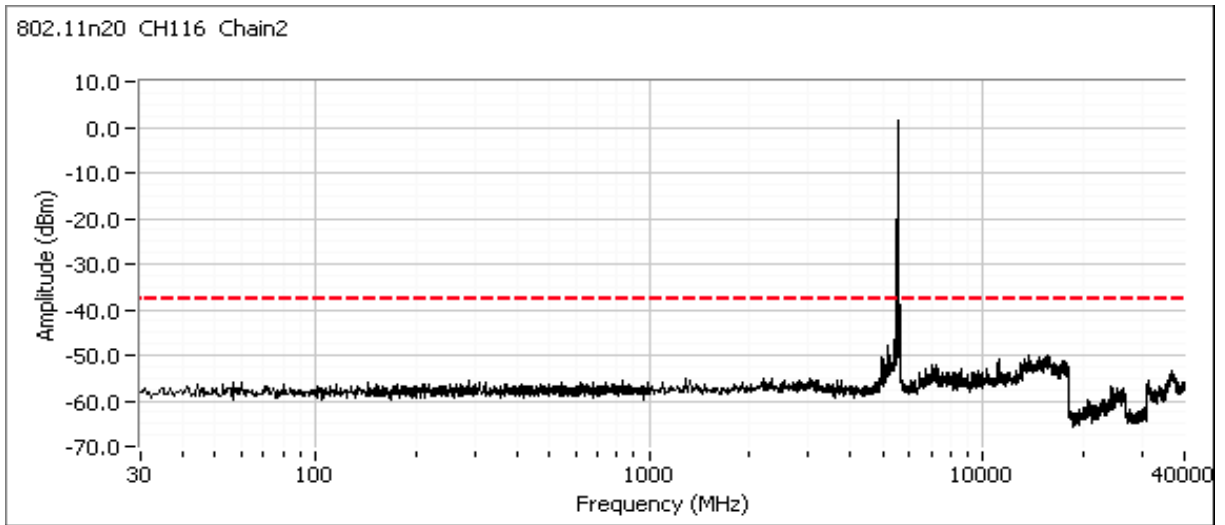
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A



802.11n20

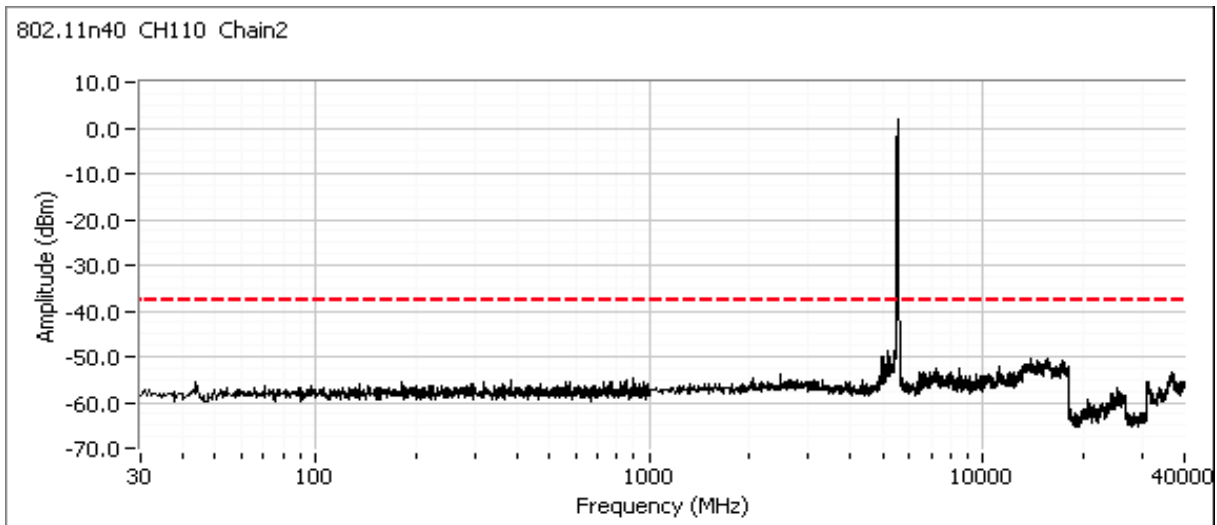
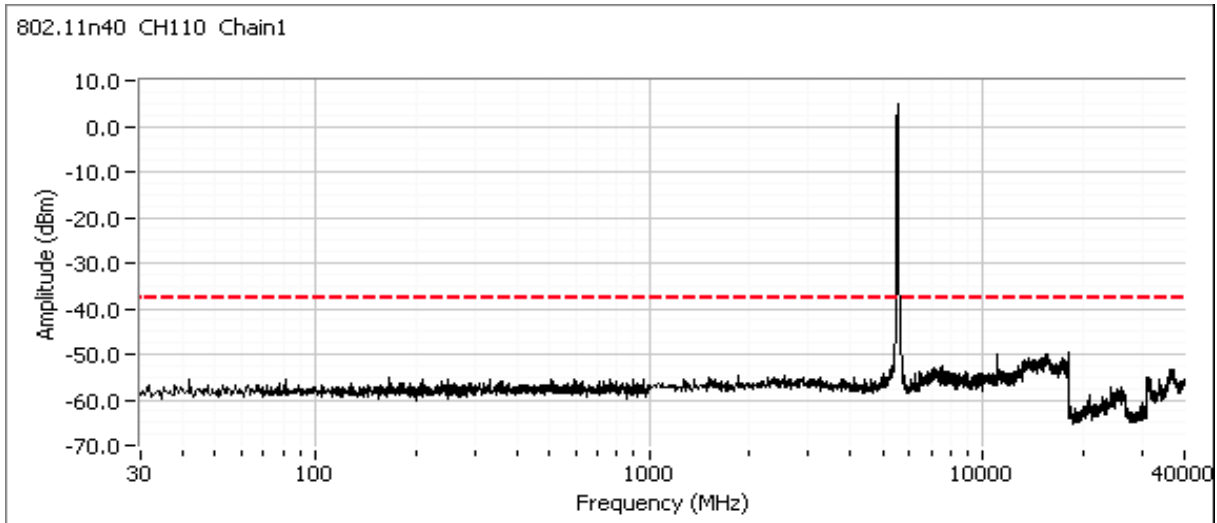


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

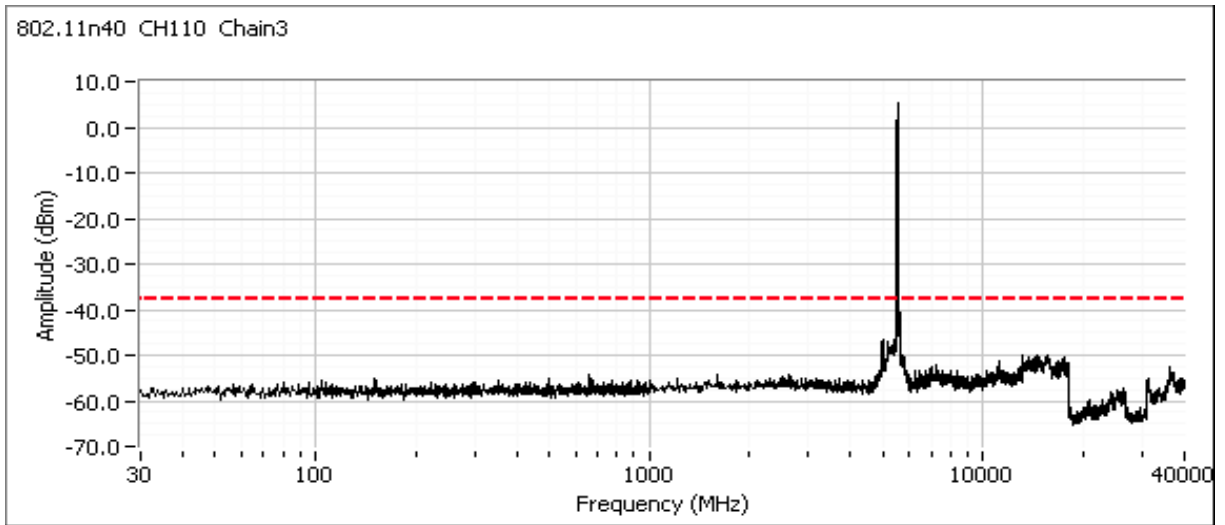


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

802.11n40



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

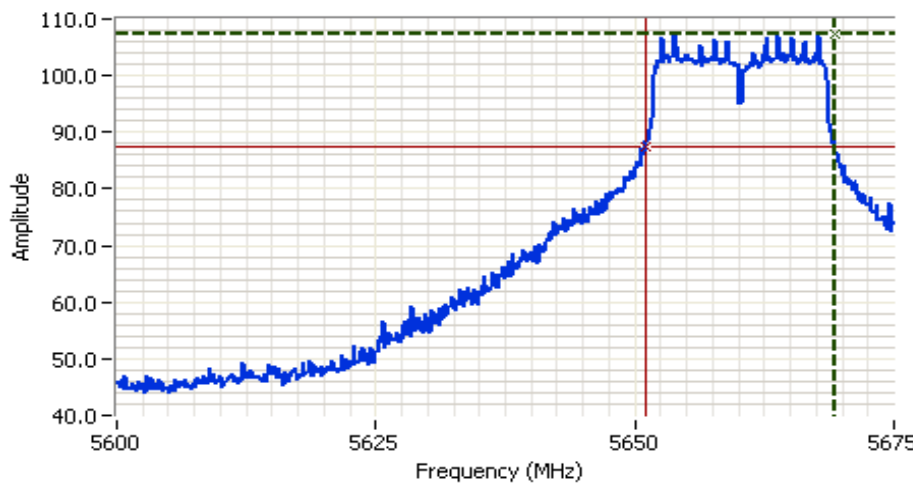


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Channel adjacent to 5650 MHz (Master Device)

Plots showing that the 20dB bandwidth of the channel closest to 5650 MHz does not spill into the 5600-5650 MHz band. RB ~ 1% of emission bandwidth.

802.11a

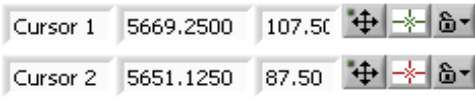


Analyzer Settings

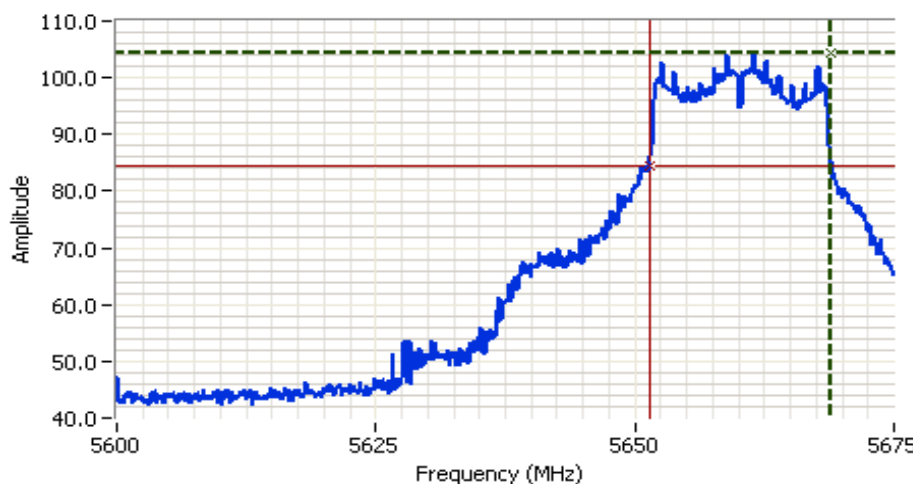
HP8564E
 CF: 5637.500 MHz
 SPAN: 75.000 MHz
 RB: 100 kHz
 VB: 300 kHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: 118.0 DBUV

Comments

20dB BW: 18.125 MHz
 FL: 5651.1250 MHz
 802.11a, Chain 1



Delta Freq. 18.125
 Delta Amplitude 20.00

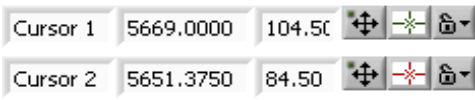


Analyzer Settings

HP8564E
 CF: 5637.500 MHz
 SPAN: 75.000 MHz
 RB: 100 kHz
 VB: 300 kHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: 118.0 DBUV

Comments

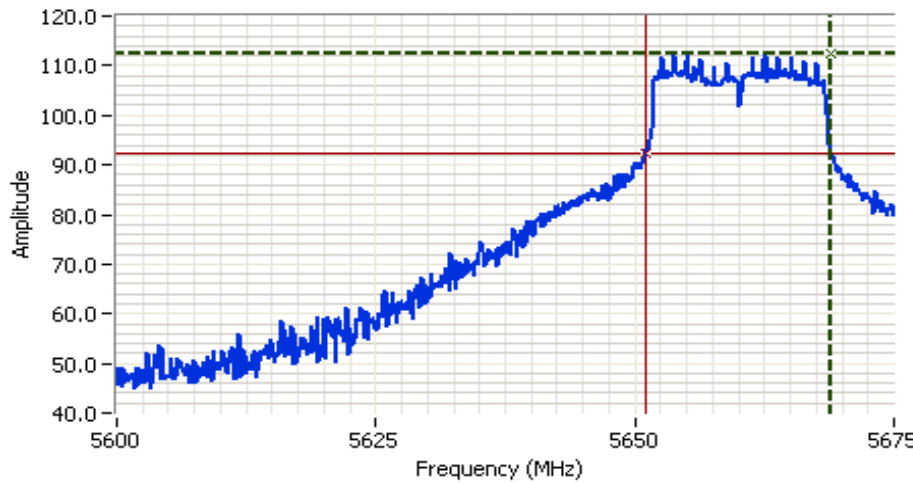
20dB BW: 17.625 MHz
 FL: 5651.3750 MHz
 802.11a, Chain 2



Delta Freq. 17.625
 Delta Amplitude 20.00



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


Analyzer Settings

HP8564E
 CF: 5637.500 MHz
 SPAN: 75.000 MHz
 RB: 100 kHz
 VB: 300 kHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: 118.0 DBUV

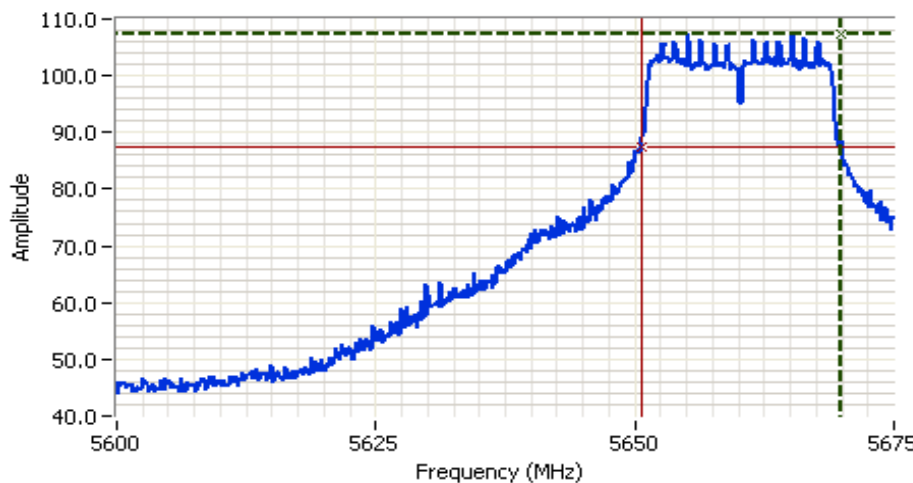
Comments

20dB BW: 17.875 MHz
 FL: 5651.0000 MHz
 802.11a, Chain 3

Cursor 1	5668.8750	112.50	
Cursor 2	5651.0000	92.50	

Delta Freq. 17.875

Delta Amplitude 20.00


802.11n20

Analyzer Settings

HP8564E
 CF: 5637.500 MHz
 SPAN: 75.000 MHz
 RB: 100 kHz
 VB: 300 kHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: 118.0 DBUV

Comments

20dB BW: 19.250 MHz
 FL: 5650.6250 MHz
 802.11n20, Chain 1

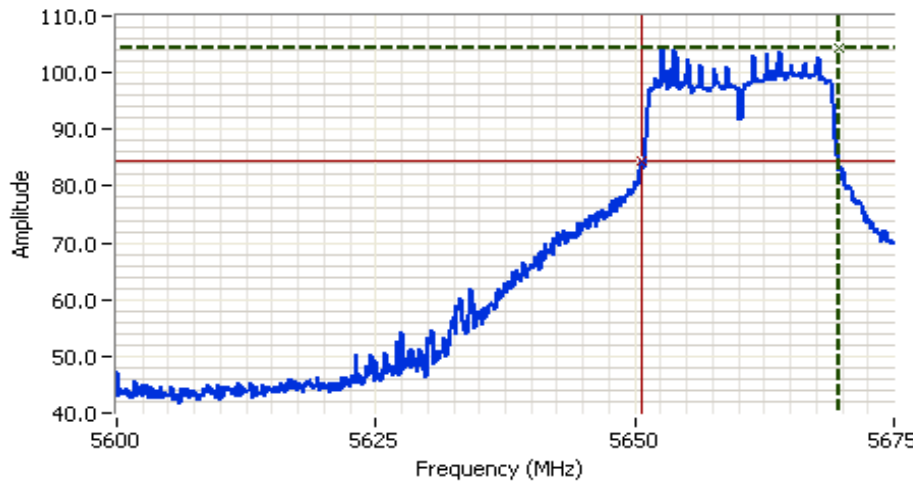
Cursor 1	5669.8750	107.33	
Cursor 2	5650.6250	87.33	

Delta Freq. 19.250

Delta Amplitude 20.00



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



Analyzer Settings

HP8564E
 CF: 5637.500 MHz
 SPAN: 75.000 MHz
 RB: 100 kHz
 VB: 300 kHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: 118.0 DBUV

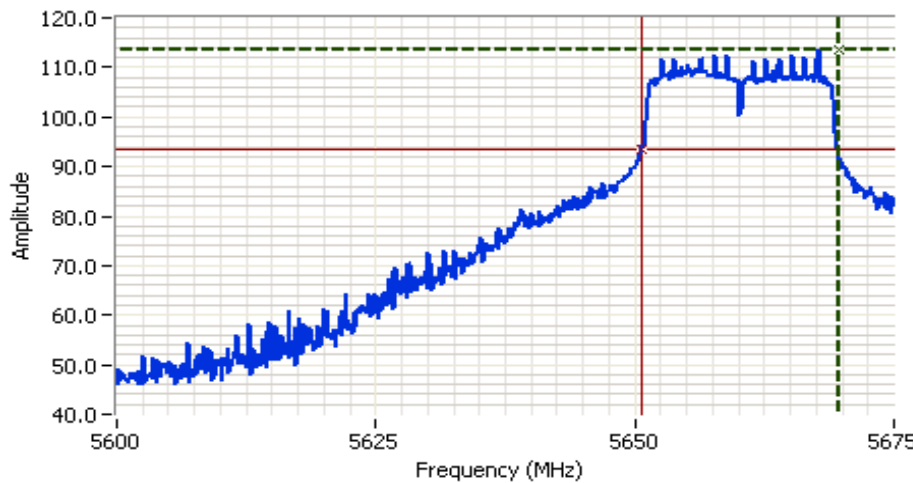
Comments

20dB BW: 18.875 MHz
 FL: 5650.75 MHz
 802.1120, Chain 2

Cursor 1	5669.6250	104.33	
Cursor 2	5650.7500	84.33	

Delta Freq. 18.875

Delta Amplitude 20.00



Analyzer Settings

HP8564E
 CF: 5637.500 MHz
 SPAN: 75.000 MHz
 RB: 100 kHz
 VB: 300 kHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: 118.0 DBUV

Comments

20dB BW: 18.875 MHz
 FL: 5650.75 MHz
 802.1120, Chain 3

Cursor 1	5669.6250	113.50	
Cursor 2	5650.7500	93.50	

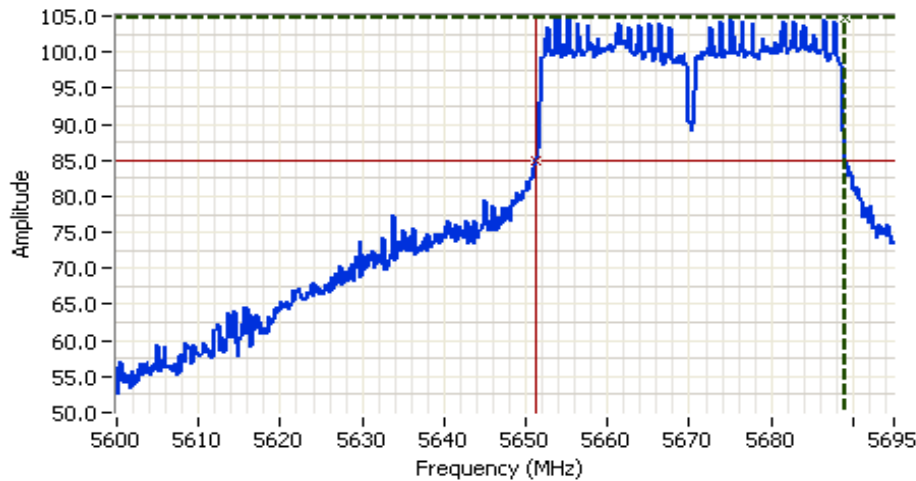
Delta Freq. 18.875

Delta Amplitude 20.00



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

802.11n40



Analyzer Settings

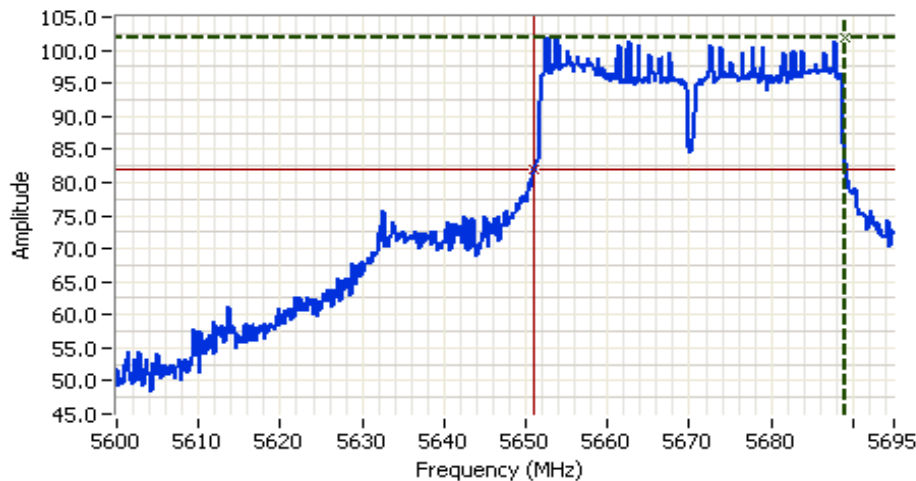
HP8564E
 CF: 5647.500 MHz
 SPAN: 95.000 MHz
 RB: 100 kHz
 VB: 300 kHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: 118.0 DBUV

Comments

20dB BW: 37.683 MHz
 FL: 5651.3000 MHz
 802.1140, Chain 1

Cursor 1	5688.9833	104.83	
Cursor 2	5651.3000	84.83	

Delta Freq. 37.683
 Delta Amplitude 20.00



Analyzer Settings

HP8564E
 CF: 5647.500 MHz
 SPAN: 95.000 MHz
 RB: 100 kHz
 VB: 300 kHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: 118.0 DBUV

Comments

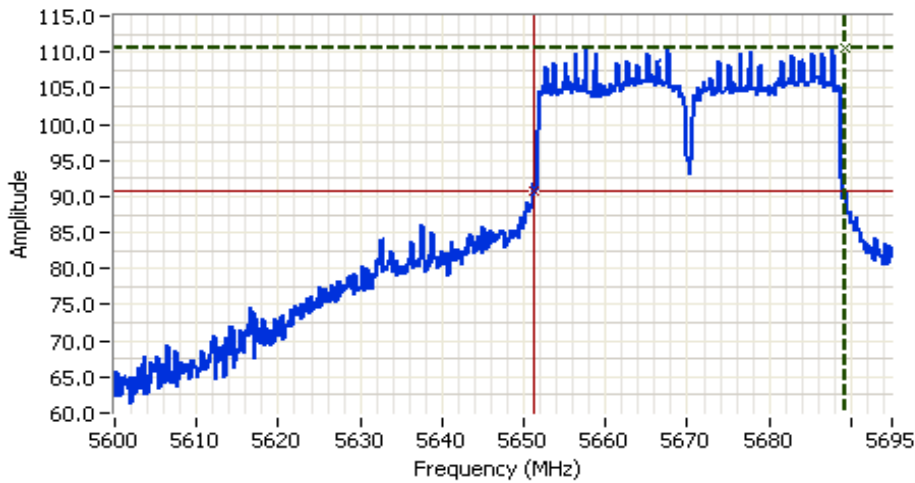
20dB BW: 38.158 MHz
 FL: 5650.9833 MHz
 802.1140, Chain 2

Cursor 1	5689.1417	102.00	
Cursor 2	5650.9833	82.00	

Delta Freq. 38.158
 Delta Amplitude 20.00



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



Analyzer Settings

HP8564E
 CF: 5647.500 MHz
 SPAN: 95.000 MHz
 RB: 100 kHz
 VB: 300 kHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: 118.0 DBUV

Comments

20dB BW: 38.000 MHz
 FL: 5651.3 MHz
 802.1140, Chain 3

Cursor 1	5689.3000	110.67	
Cursor 2	5651.3000	90.67	

Delta Freq. 38.000
 Delta Amplitude 20.00



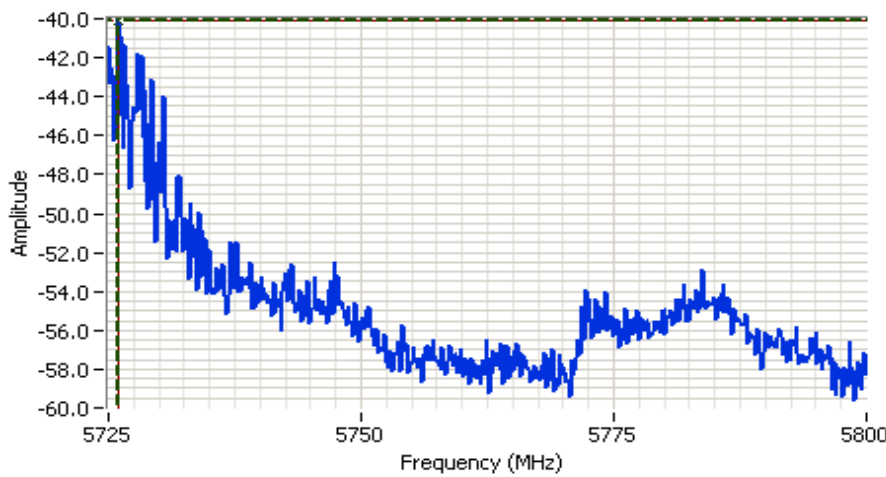
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

High channel, 5470 - 5725 MHz Band

Plots for each chain showing compliance with the -27dBm/MHz limit above the 5725MHz band edge. Start and stop frequencies set to 5725-5800 MHz, RB=1MHz, VB=3MHz, , peak detector, max hold.

802.11a

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP dBm/MHz	Limit dBm/MHz	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz			
Chain 1	27	-45.1	0.00003	6.0	0.00012	-39.1	-27.8	-27	PASS
Chain 3		-40.1	0.00010	6.0	0.00039	-34.1			
Chain 2		-50.4	0.00001	6.0	0.00004	-44.4			



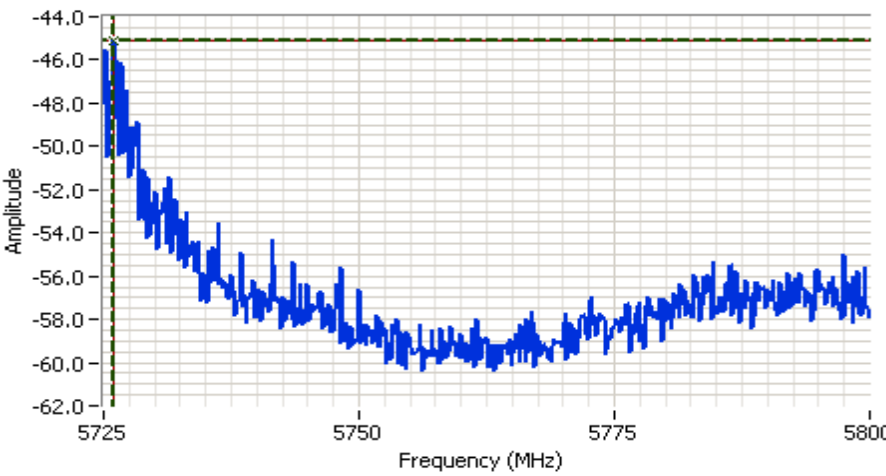
Analyzer Settings

Rohde&Schwarz,ESI
 CF: 5762.500 MHz
 SPAN: 75.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: 6.0 DBM

Comments

802.11a, Chain 3

Cursor 1	5726.0522	-40.13		Delta Freq.	0.000	
Cursor 2	5726.0522	-40.13		Delta Amplitude	0.00	



Analyzer Settings

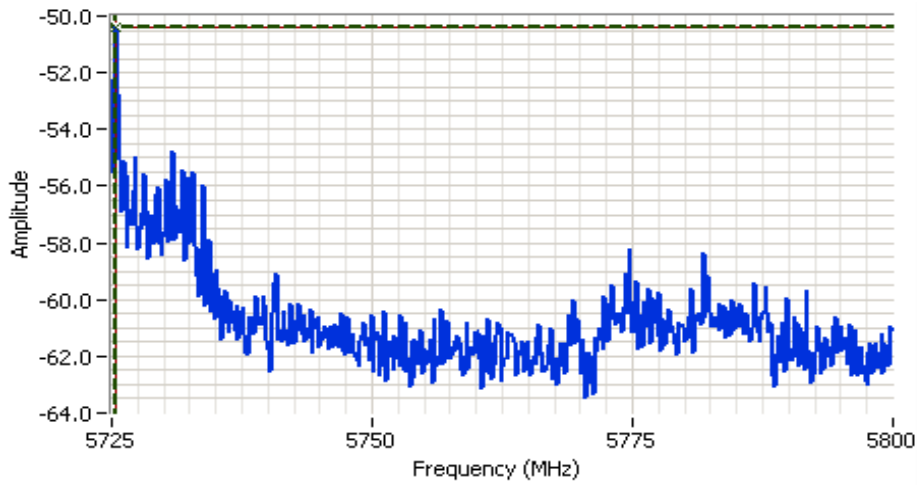
Rohde&Schwarz,ESI
 CF: 5762.500 MHz
 SPAN: 75.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: 6.0 DBM

Comments

802.11a, Chain 1

Cursor 1	5726.0522	-45.11		Delta Freq.	0.000	
Cursor 2	5726.0522	-45.11		Delta Amplitude	0.00	

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



Analyzer Settings

Rohde&Schwarz, ESI
 CF: 5762.500 MHz
 SPAN: 75.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: 6.0 DBM

Comments

802.11a, Chain 2

Cursor 1	5725.4507	-50.41	
Cursor 2	5725.4507	-50.41	

Delta Freq. 0.000

Delta Amplitude 0.00

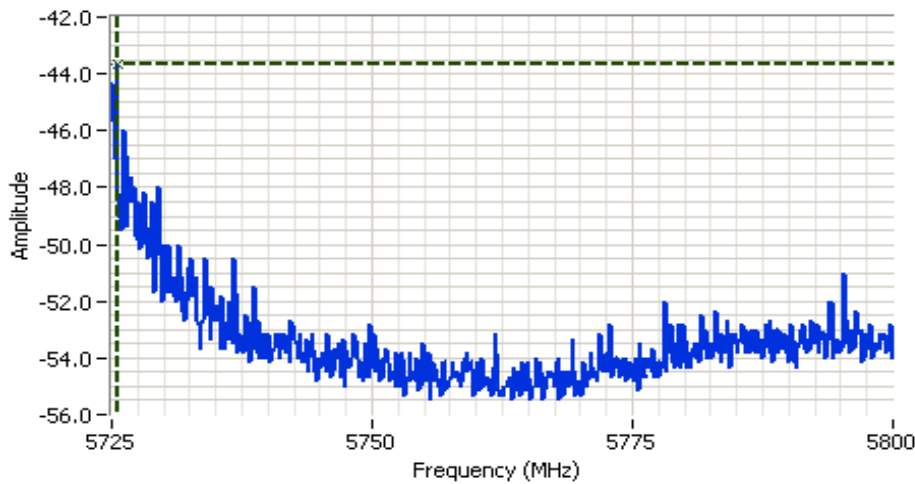


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Plots for each chain showing compliance with the -27dBm/MHz limit above the 5725MHz band edge. Start and stop frequencies set to 5725-5800 MHz, RB=1MHz, VB=3MHz, , peak detector, max hold.

802.11n20

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP dBm/MHz	Limit dBm/MHz	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz			
Chain 1	22	-43.7	0.00004	6.0	0.00017	-37.7	-27.5	-27	PASS
Chain 3		-40.5	0.00009	6.0	0.00035	-34.5			
Chain 2		-48.2	0.00002	6.0	0.00006	-42.2			



Analyzer Settings

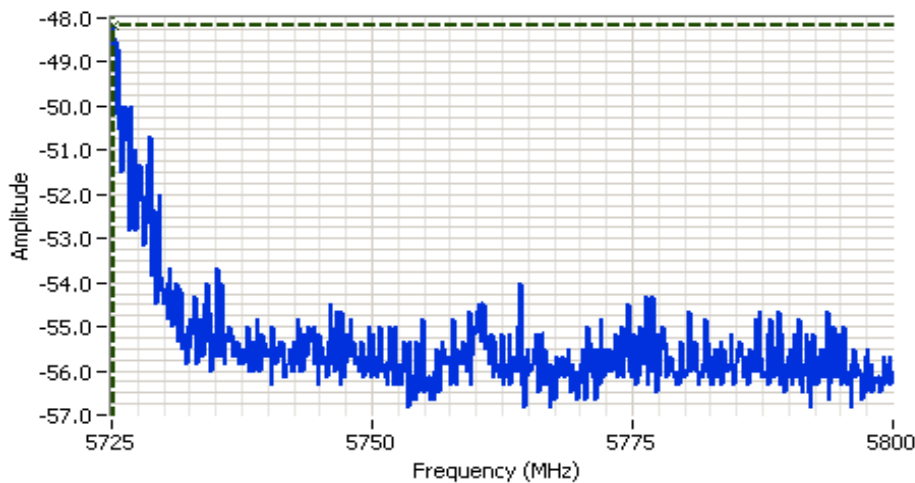
HP8564E
 CF: 5762.500 MHz
 SPAN: 75.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: -10.0 DBM

Comments

802.11n20 Chain1

Cursor 1 5725.5000 -43.67

0.0000 0.00



Analyzer Settings

HP8564E
 CF: 5762.500 MHz
 SPAN: 75.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: -10.0 DBM

Comments

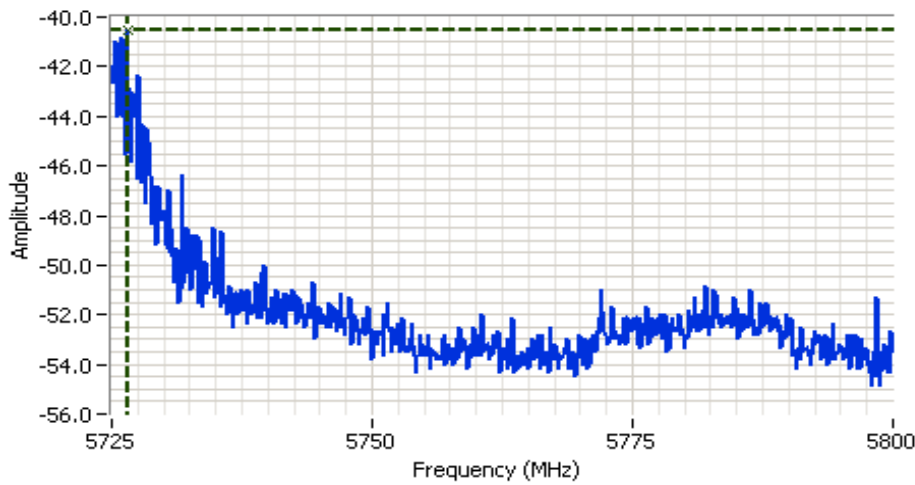
802.11n20 Chain2

Cursor 1 5725.1250 -48.17

0.0000 0.00



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



Analyzer Settings

HP8564E
 CF: 5762.500 MHz
 SPAN: 75.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: -10.0 DBM

Comments

802.11n20 Chain3

Cursor 1	5726.5000	-40.50		
	0.0000	0.00		

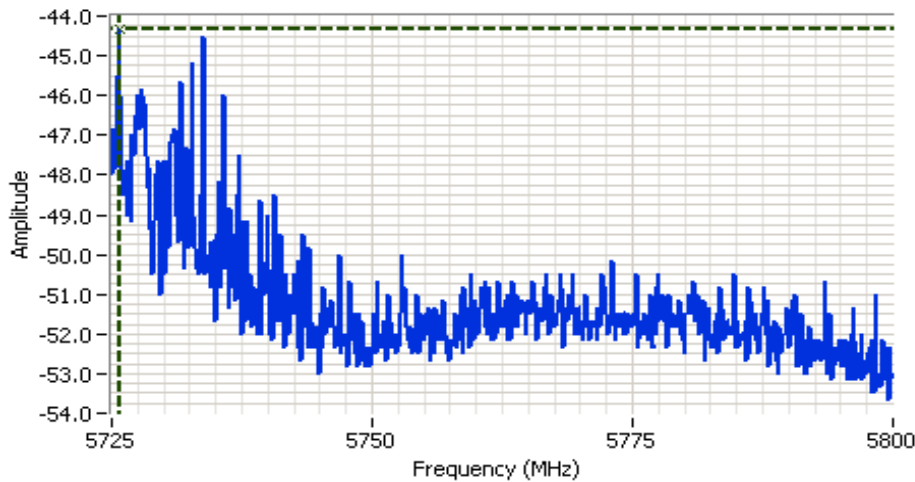


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Plots for each chain showing compliance with the -27dBm/MHz limit above the 5725MHz band edge. Start and stop frequencies set to 5725-5800 MHz, RB=1MHz, VB=3MHz, , peak detector, max hold.

802.11n40

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP dBm/MHz	Limit dBm/MHz	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz			
Chain 1	26	-44.3	0.00004	6.0	0.00015	-38.3	-27.6	-27	PASS
Chain 3		-40.3	0.00009	6.0	0.00037	-34.3			
Chain 2		-48.0	0.00002	6.0	0.00006	-42.0			



Analyzer Settings

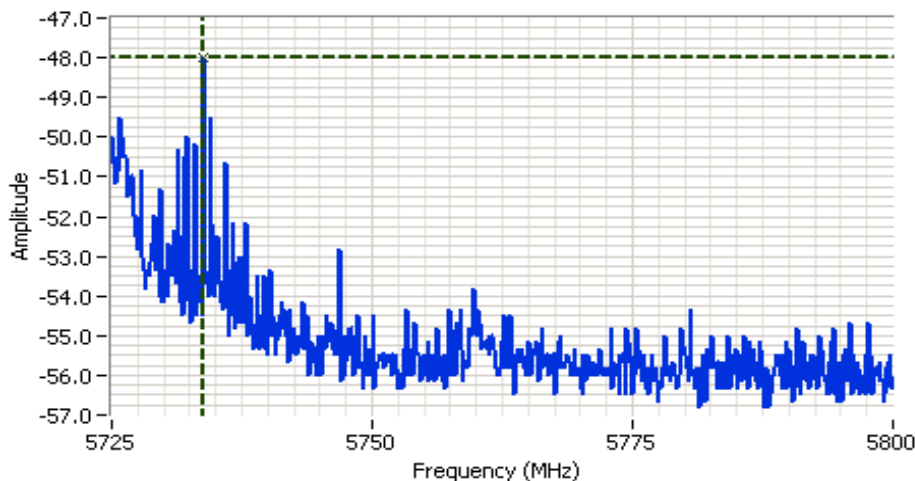
HP8564E
 CF: 5762.500 MHz
 SPAN: 75.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: -10.0 DBM

Comments

802.11n40 Chain1

Cursor 1 5725.7500 -44.33

0.0000 0.00



Analyzer Settings

HP8564E
 CF: 5762.500 MHz
 SPAN: 75.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: -10.0 DBM

Comments

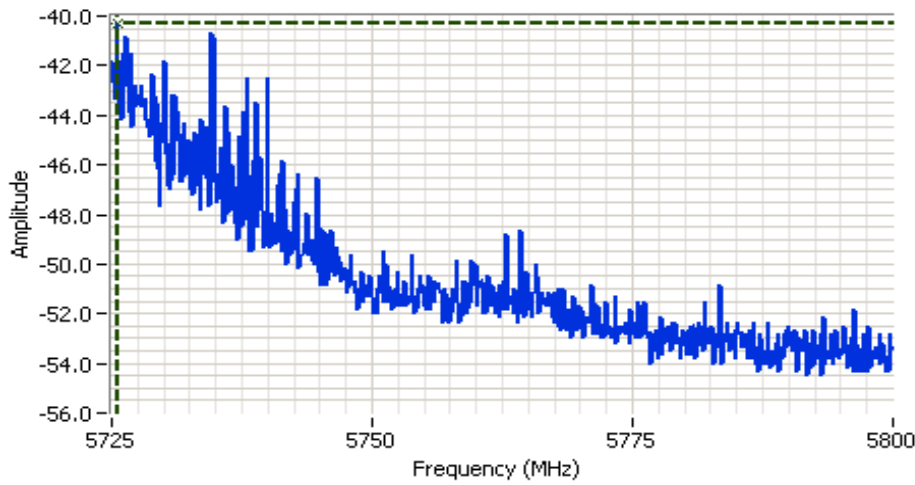
802.11n40 Chain2

Cursor 1 5733.8750 -48.00

0.0000 0.00



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



Analyzer Settings

HP8564E
 CF: 5762.500 MHz
 SPAN: 75.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 10 DB
 RL Offset: 11.0 DB
 Sweep Time: 50.0ms
 Ref Lvl: -10.0 DBM

Comments

802.11n40 Chain3

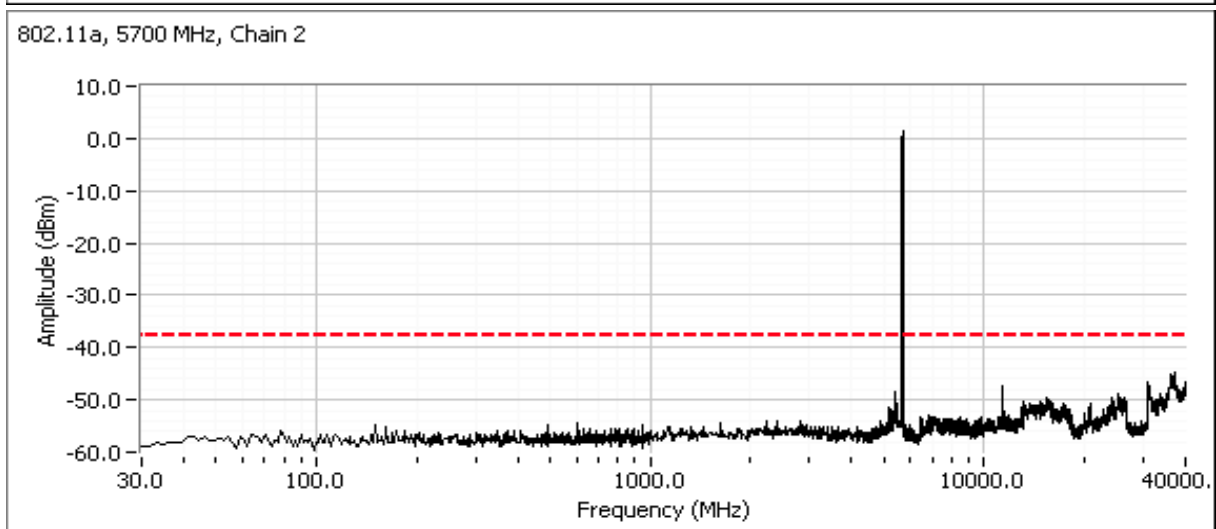
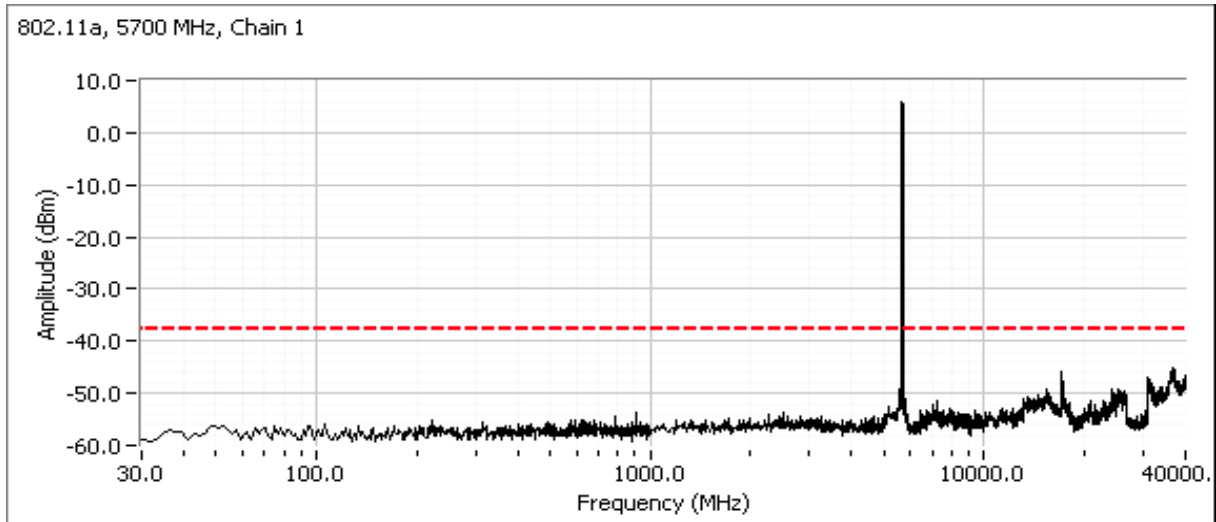
Cursor 1	5725.5000	-40.33	+	*	⏏
	0.0000	0.00	+	*	⏏



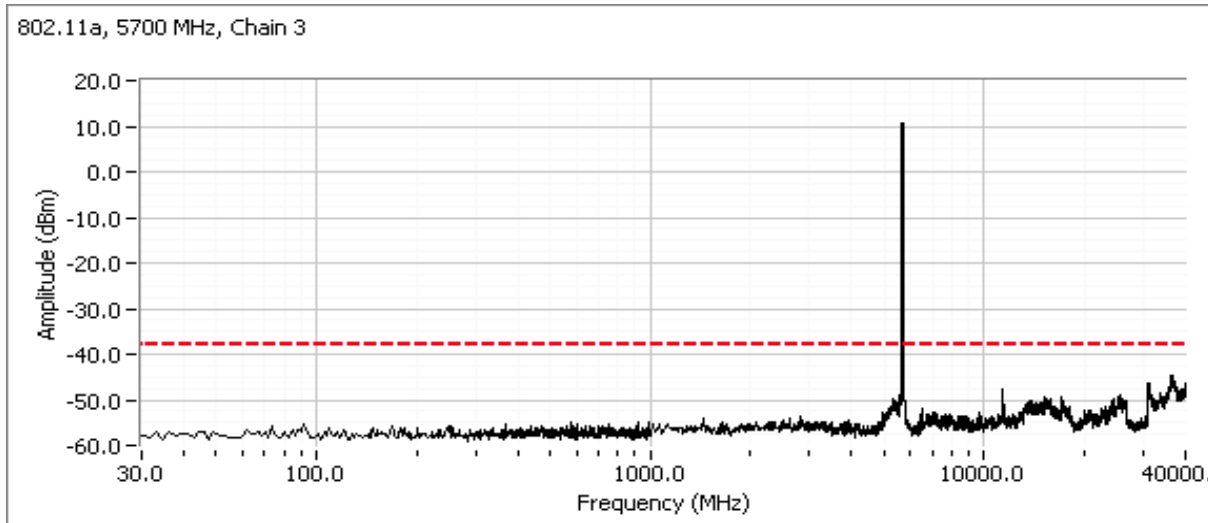
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).

802.11a

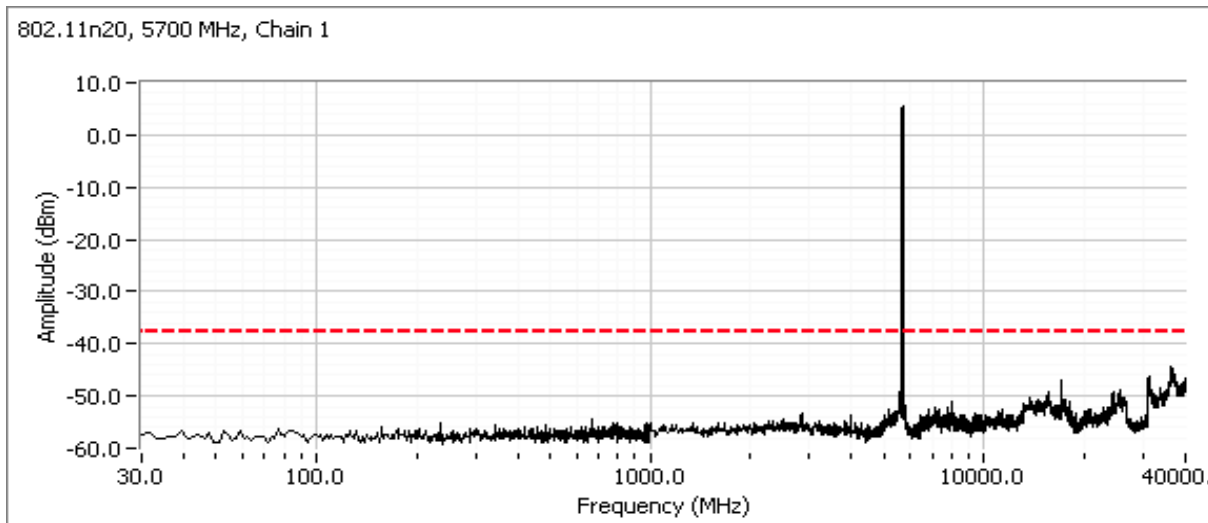


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

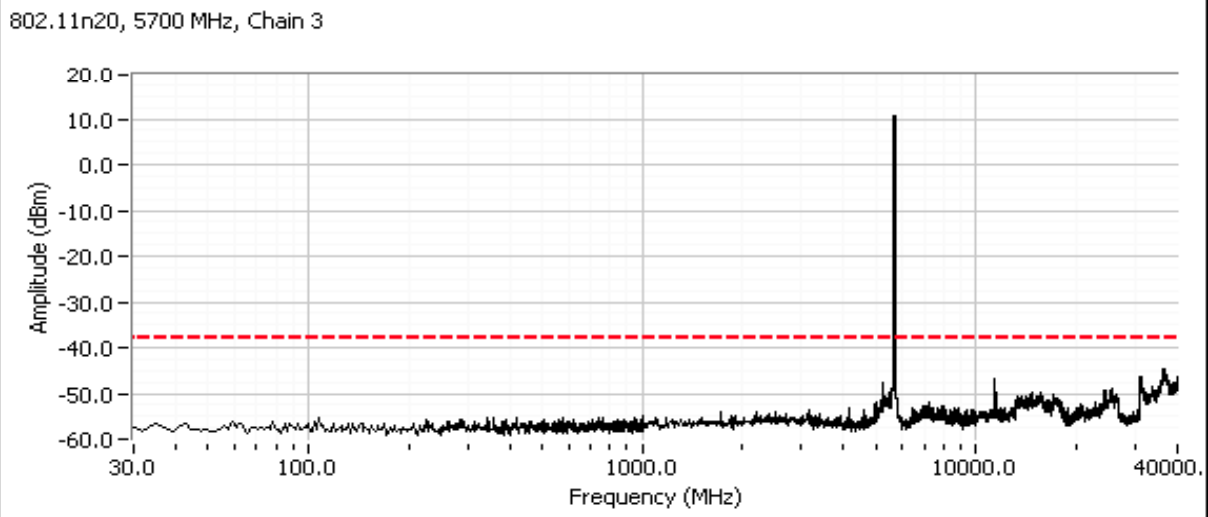
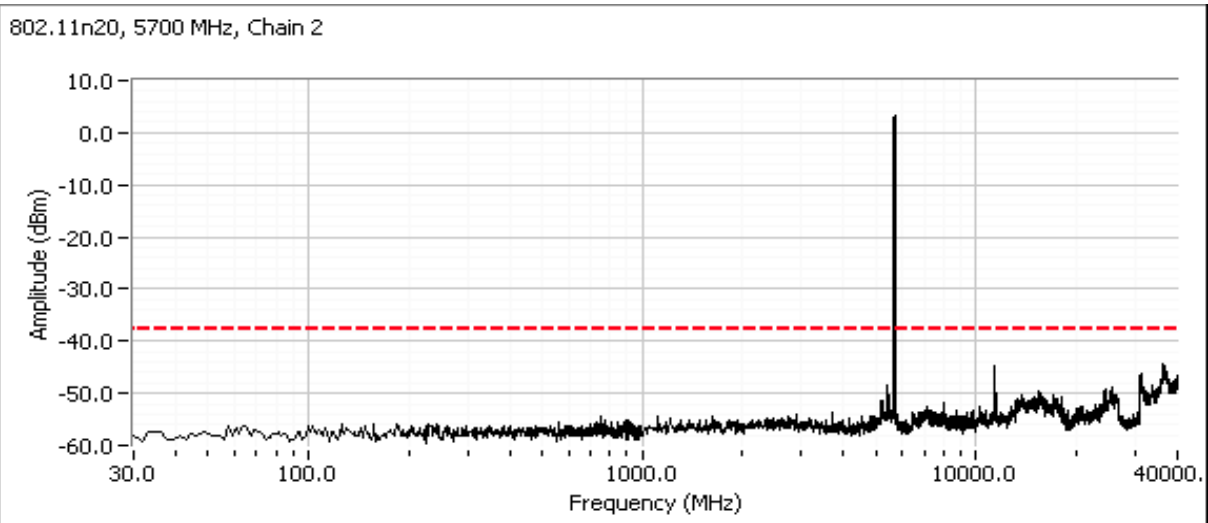


Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).

802.11n20

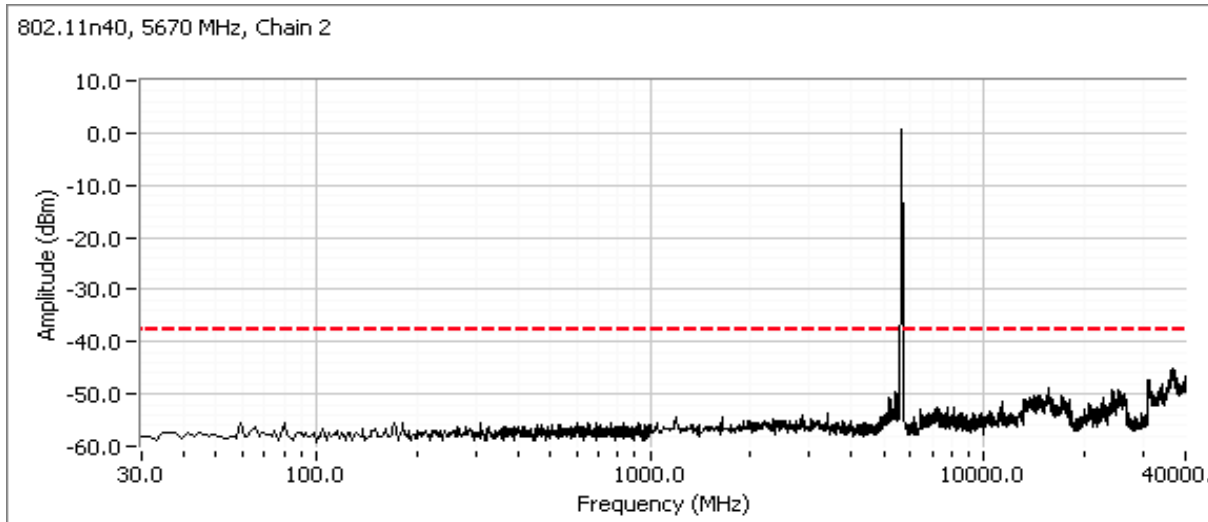
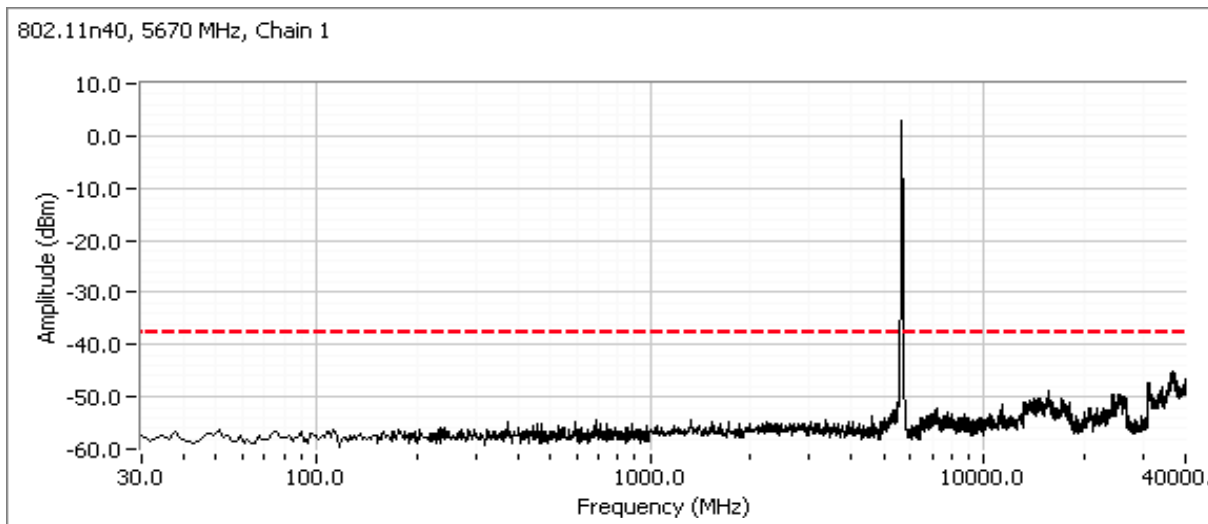


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

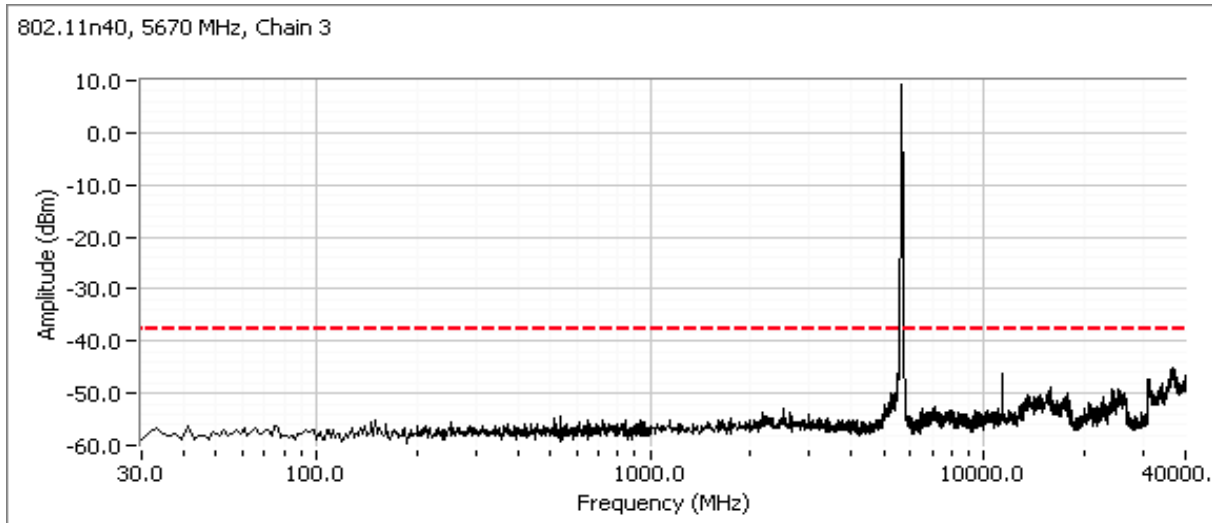


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).
802.11n40



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

Test Specific Details

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

Date of Test: 5/3/2012 0:00
Test Engineer: Rafael Varelas
Test Location: FT4

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

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	SISO: 14.5dBm
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	SISO: 1.9 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP ≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm	Pass	EIRP = 20.5 dBm (112.2 mW)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	SISO: 13.9dBm
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	SISO: 1.3 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP ≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 19.9 dBm (96.8 mW)
1	26dB Bandwidth	15.407 (Information only)	-	> 20MHz for all modes
1	99% Bandwidth	RSS 210 (Information only)	N/A	SISO: 32.5 MHz
2	Peak Excursion Envelope	15.407(a) (6) 13dB	Pass	9.5dB
3	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	Pass	All emissions below the -27dBm/MHz limit



EMC Test Data

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

General Test Configuration

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

Ambient Conditions:

Temperature: 20.3 °C
Rel. Humidity: 35 %

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: Bandwidth, Output Power and Power Spectral Density - Single Chain Systems

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was not continuous but the ESI analyzer was configured with a gated sweep such that the analyzer was only sweeping when the device was transmitting) and power integration over 40 MHz (option #2, method 1 in KDB 558074, equivalent to method 1 of DA-02-2138A1 for U-NII devices).
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB

Single Chain Operation, 5250-5350 MHz Band

Antenna Gain (dBi): 6 EIRP: 112.2 mW 20.5 dBm

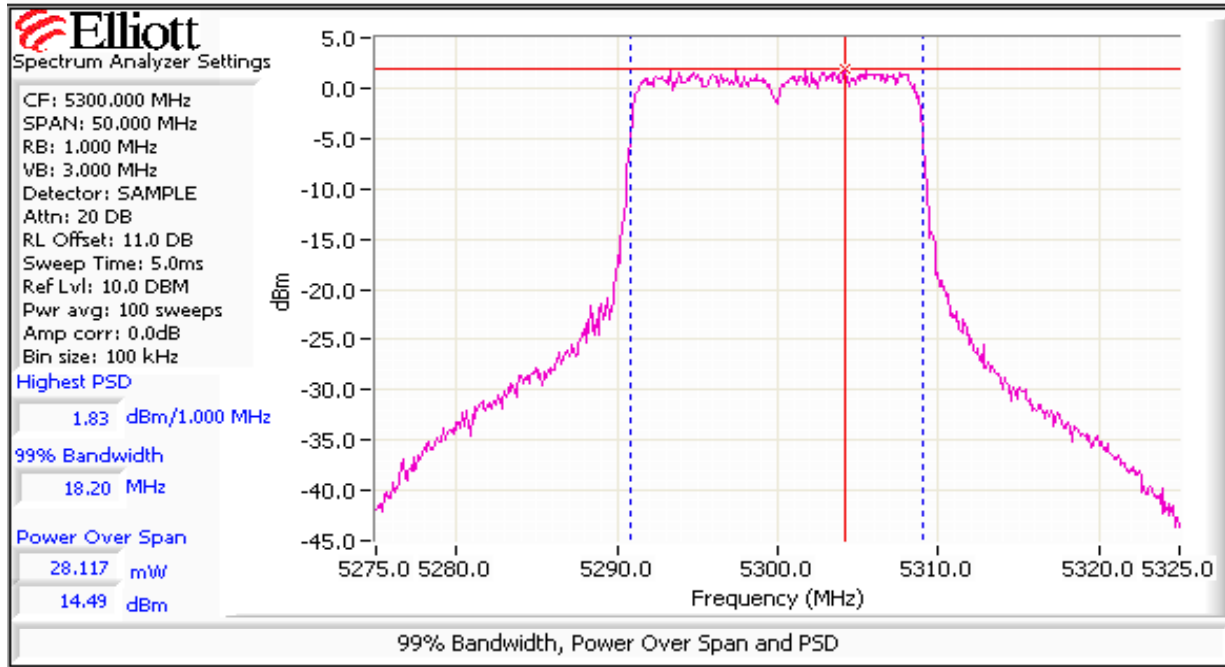
Frequency (MHz)	Software Setting	Bandwidth		Output Power ¹ dBm		Power (Watts)	PSD ² dBm/MHz			Result
		26dB	99% ⁴	Measured	Limit		Measured	FCC Limit	RSS Limit ³	
802.11a										
5280	36.0	27.6	18.2	13.9	24.0	0.025	1.6	11.0	11.0	Pass
5300	36.0	27.9	18.2	14.5	24.0	0.028	1.8	11.0	11.0	Pass
5320	36.0	27.9	18.2	14.5	24.0	0.028	1.9	11.0	11.0	Pass

Single Chain Operation, 5470- 5725 MHz Band

Antenna Gain (dBi): 6 EIRP: 96.8 mW 19.9 dBm

Frequency (MHz)	Software Setting	Bandwidth		Output Power ¹ dBm		Power (Watts)	PSD ² dBm/MHz			Result
		26dB	99% ⁴	Measured	Limit		Measured	FCC Limit	RSS Limit ³	
802.11a										
5500	34.0	28.6	18.2	12.8	24.0	0.019	0.5	11.0	11.0	Pass
5580	36.0	32.5	18.3	13.9	24.0	0.024	1.3	11.0	11.0	Pass
5700	32.0	29.3	18.2	13.0	24.0	0.020	0.5	11.0	11.0	Pass

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: Peak Excursion Measurement

20MHz: Device meets the requirement for the peak excursion

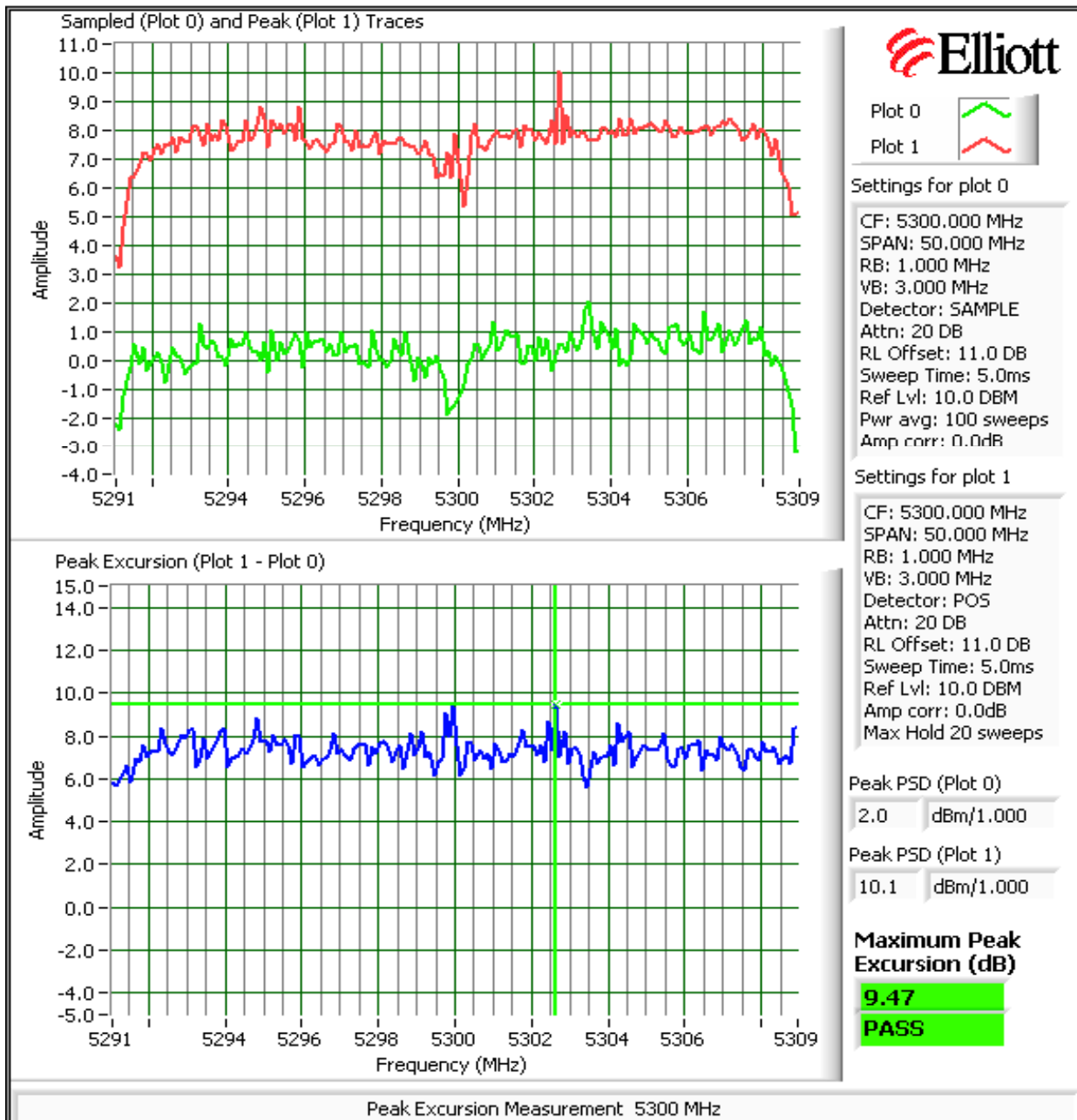
Freq		Peak Excursion(dB)		Freq		Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Limit
			5280	9.5	13.0	5500	13.0
			5300	9.5	13.0	5580	13.0
			5320	9.1	13.0	5700	13.0

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 Showing Peak Excursion

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

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





EMC Test Data

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: Out Of Band Spurious Emissions - Antenna Conducted

Maximum Antenna Gain: 6.0 dBi
 Spurious Limit: -27.0 dBm/MHz eirp
 Limit Used On Plots ^{Note 1}: -33.0 dBm/MHz Peak Limit (RB=VB=1MHz)

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

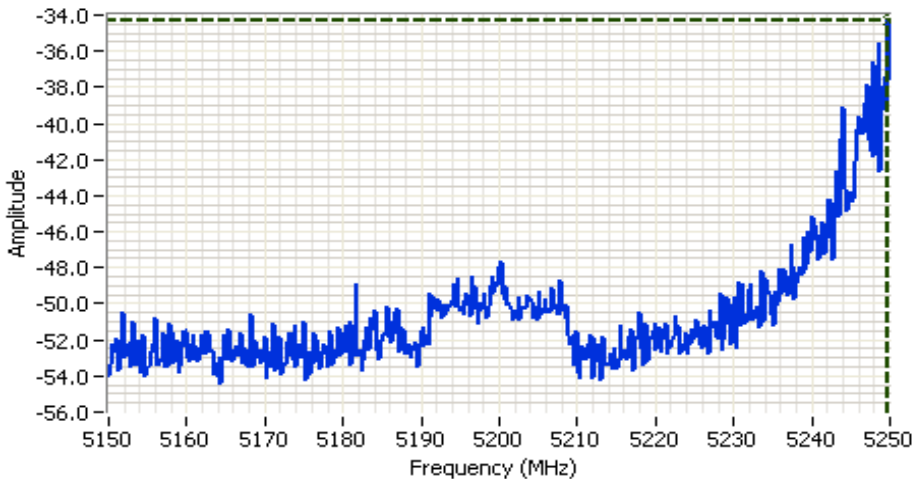
Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz)

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

Low channel, 5250 - 5350 MHz Band
 Devices that are used outdoors:

Compliance with the -27dBm/MHz limit in the 5150 - 5250 MHz band. Start and stop frequencies set to 5150-5250 MHz, RB=1MHz, VB=3MHz. Plot for worst-case channel is provided below.

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP dBm/MHz	Limit dBm/MHz	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz			
Chain 1	36	-34.3	0.00037	6.0	0.0014791	-28.3	-28.3	-27	PASS



Analyzer Settings

- Rohde&Schwarz, ESI
- CF: 5200.000 MHz
- SPAN: 100.000 MHz
- RB: 1.000 MHz
- VB: 3.000 MHz
- Detector: POS
- Attn: 20 DB
- RL Offset: 11.0 DB
- Sweep Time: 5.0ms
- Ref Lvl: 8.0 DBM

Comments

5280MHz, Chain 3

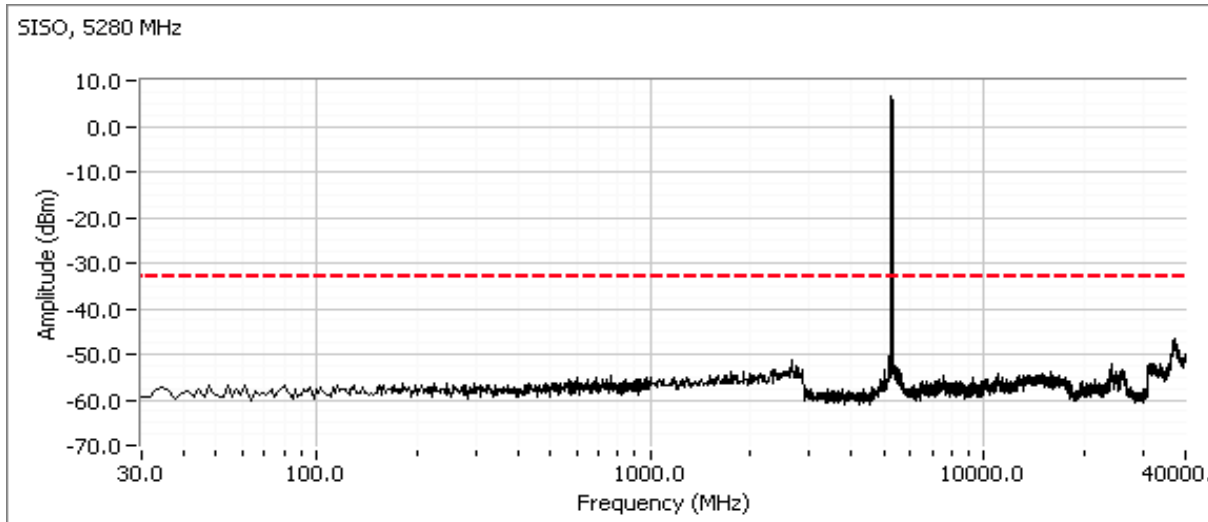
Cursor 1 5249.7996 -34.32

0.0000 0.00

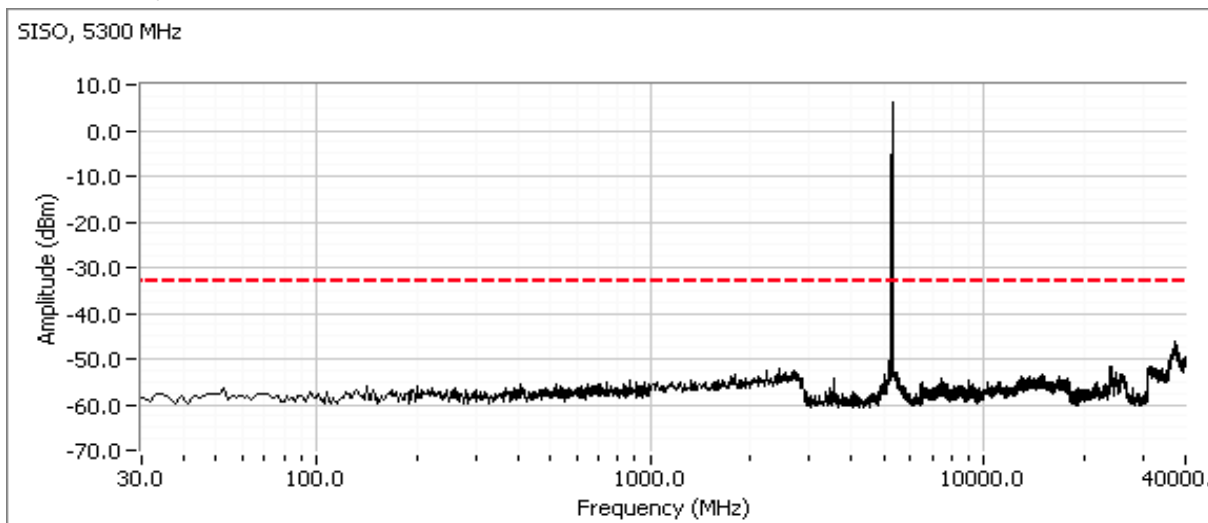


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).



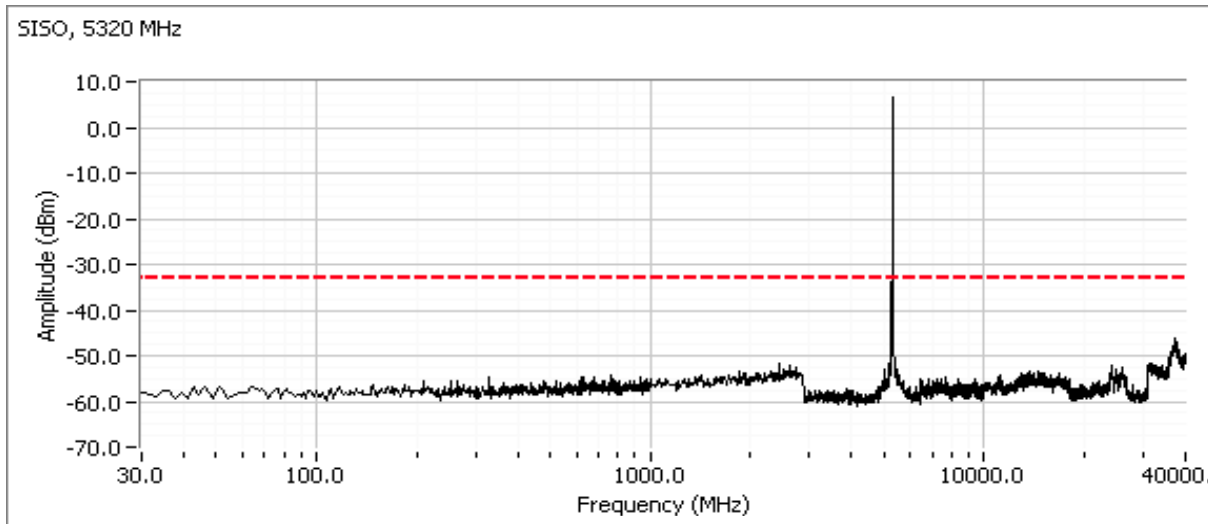
Center channel, 5250 - 5350 MHz Band



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

High channel, 5250 - 5350 MHz Band

Note - compliance with the radiated limits for the restricted band immediately above 5350MHz is demonstrated through the radiated emissions tests.

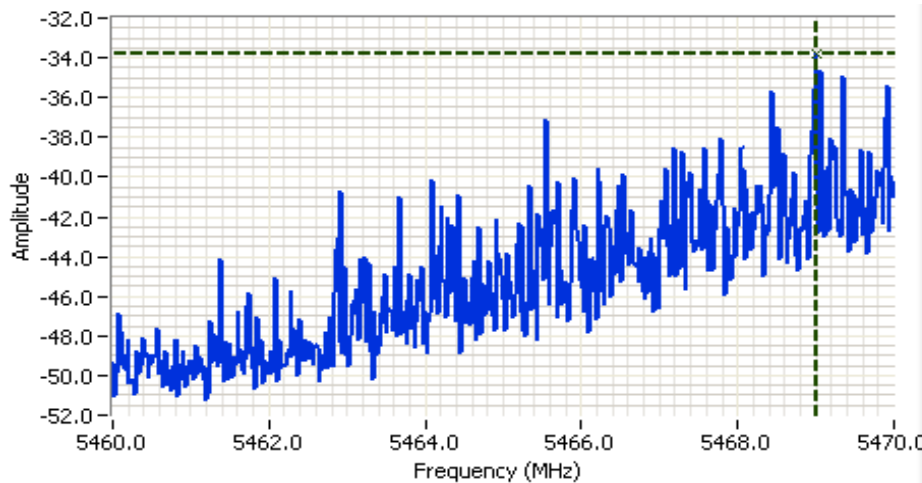


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Low channel, 5470 - 5725 MHz Band

Compliance with the -27dBm/MHz limit in the 5460 - 5470 MHz band immediately below the allocated band. Start and stop frequencies set to 5460-5470 MHz, RB=1MHz, VB=3MHz, pk detector, max hold. Plot for worst-case channel is provided below.

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP dBm/MHz	Limit dBm/MHz	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz			
Chain 1	34	-33.8	0.00042	6.0	0.0016672	-27.8	-27.8	-27	PASS



Analyzer Settings
 Rohde&Schwarz, ESI
 CF: 5465.000 MHz
 SPAN: 10.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 20 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: 8.0 DBM

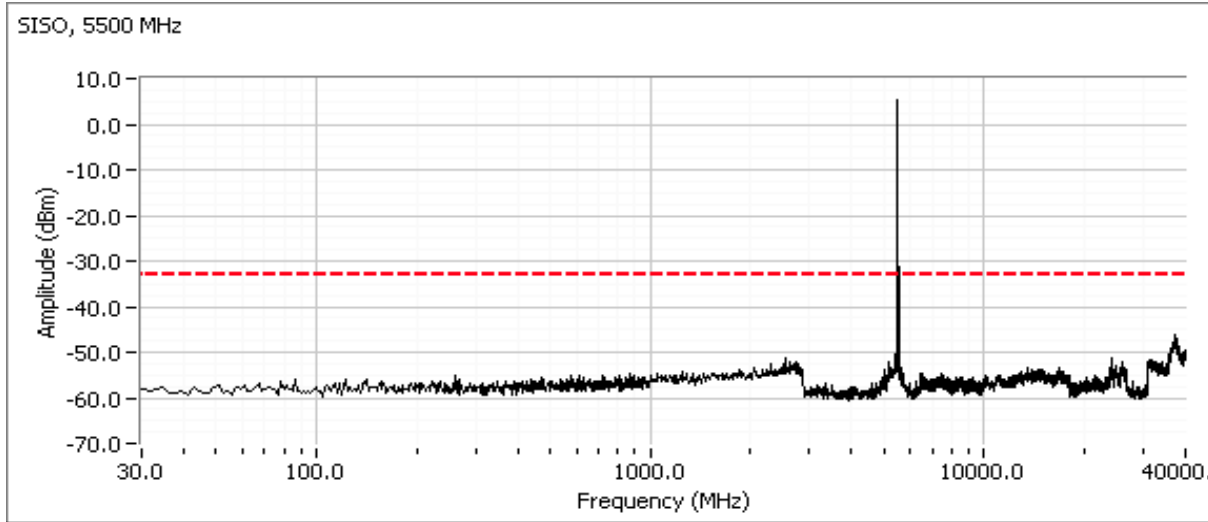
Comments
 5500MHz, Chain 3

Cursor 1	5468.9980	-33.78	↕	✖	🔒
	0.0000	0.00	↕	✖	🔒



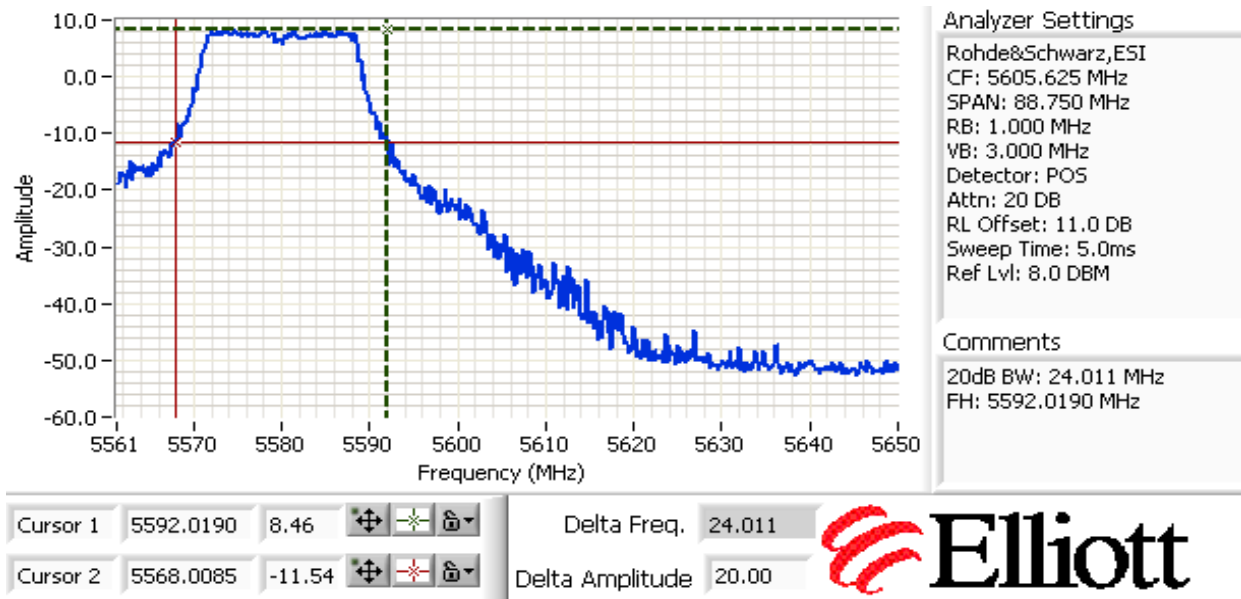
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).



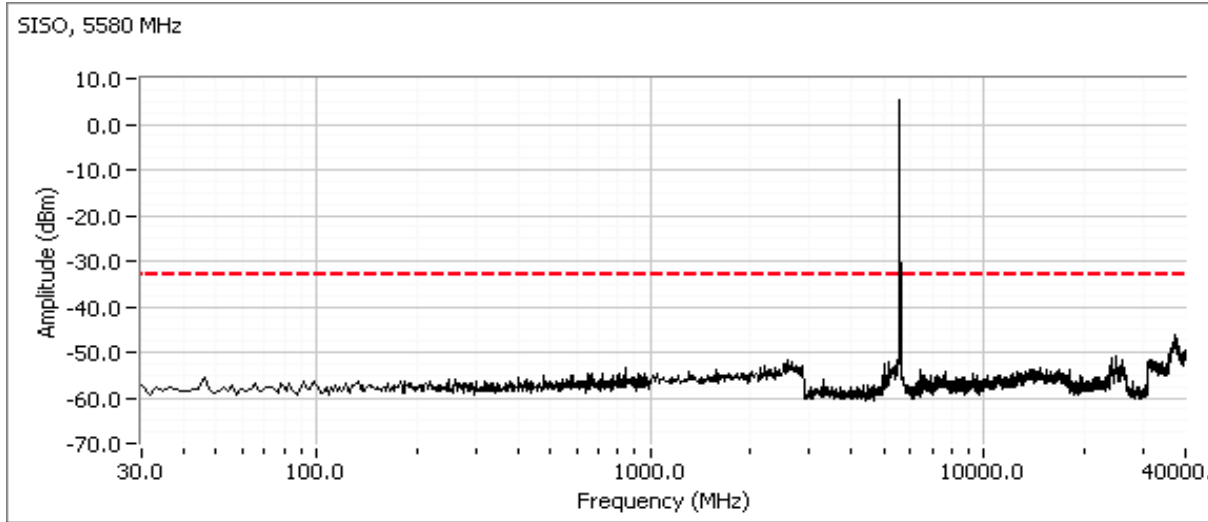
Center channel, 5470 - 5725 MHz Band

For master devices - This plot is showing that the 20dB bandwidth of the channel closest to 5600 MHz does not spill into the 5600-5650 MHz band. RB ~ 1% of emission bandwidth.



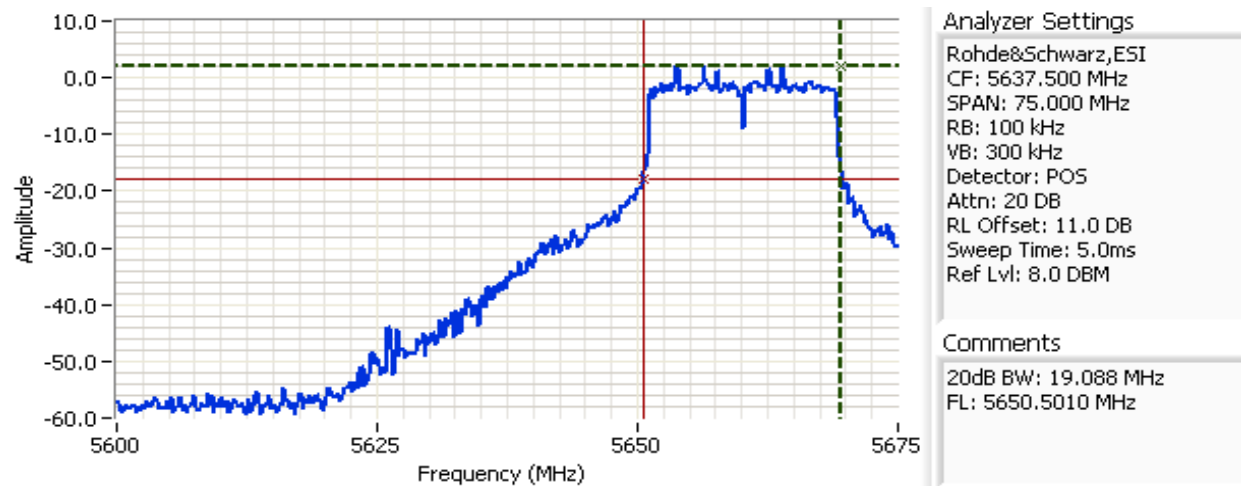
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).



Channel adjacent to 5650 MHz (Master Device)

Plots showing that the 20dB bandwidth of the channel closest to 5650 MHz does not spill into the 5600-5650 MHz band. RB ~ 1% of emission bandwidth.



Analyzer Settings

- Rohde&Schwarz,ESI
- CF: 5637.500 MHz
- SPAN: 75.000 MHz
- RB: 100 kHz
- VB: 300 kHz
- Detector: POS
- Attn: 20 DB
- RL Offset: 11.0 DB
- Sweep Time: 5.0ms
- Ref Lvl: 8.0 DBM

Comments

- 20dB BW: 19.088 MHz
- FL: 5650.5010 MHz

Cursor 1: 5669.5892 2.14

Cursor 2: 5650.5010 -17.86

Delta Freq. 19.088

Delta Amplitude 20.00

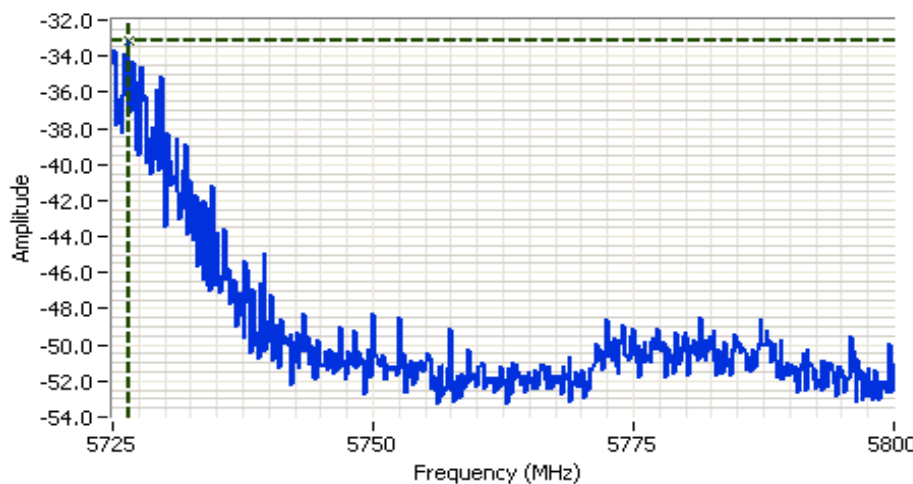


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

High channel, 5470 - 5725 MHz Band

Plots for each chain showing compliance with the -27dBm/MHz limit above the 5725MHz band edge. Start and stop frequencies set to 5725-5800 MHz, RB=1MHz, VB=3MHz, power averaging enabled (100 traces):

	Power Setting	Band edge Level		Antenna Gain (dBi)	EIRP		Total EIRP	Limit	Result
		dBm/MHz	mW/MHz		mW/MHz	dBm/MHz			
Chain 1	32	-33.2	0.00048	6.0	0.0019143	-27.2	-27.2	-27	PASS



Analyzer Settings

Rohde&Schwarz, ESI
 CF: 5762.500 MHz
 SPAN: 75.000 MHz
 RB: 1.000 MHz
 VB: 3.000 MHz
 Detector: POS
 Attn: 20 DB
 RL Offset: 11.0 DB
 Sweep Time: 5.0ms
 Ref Lvl: 8.0 DBM

Comments

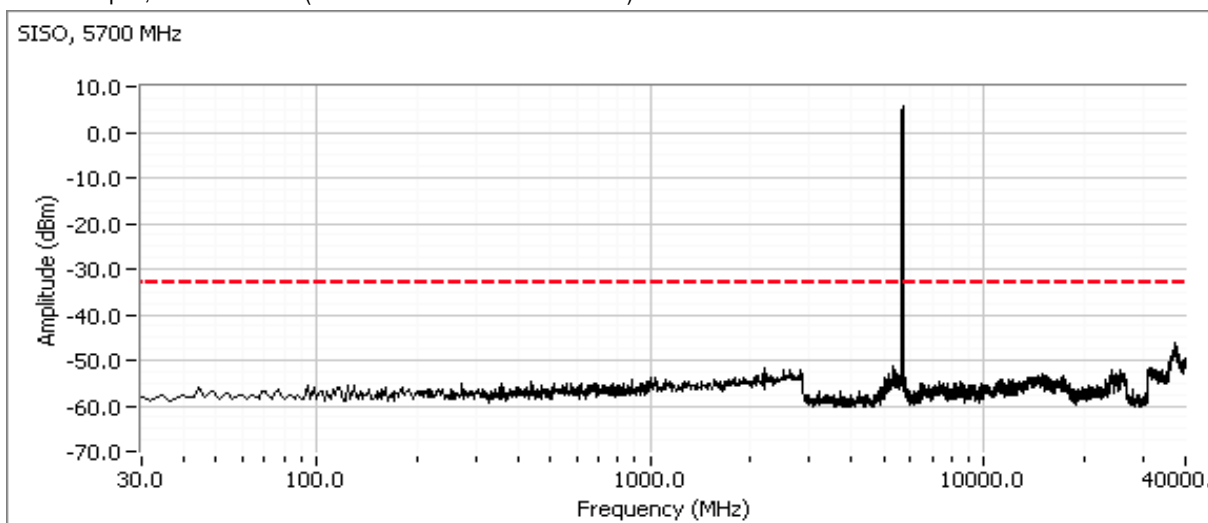
5700MHz, Chain 3

Cursor 1 5726.5030 -33.18

0.0000 0.00



Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).





EMC Test Data

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.

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 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: 35 %

Summary of Results - Device Operating in the 5250-5350 & 5470-5725 MHz Bands

Run #	Mode	Channel	Power Setting	Antenna	Test Performed	Limit	Result / Margin
1a	802.11a	64	36	Omni	Restricted Band Edge (5350 MHz)	FCC Part 15.209	50.5 dBµV/m @ 5350.0 MHz (-3.5 dB)
1b	Chain 123	100	36		Restricted Band Edge (5460 MHz)		52.2 dBµV/m @ 5440.0 MHz (-1.8 dB)
2a	802.11n20	64	36		Restricted Band Edge (5350 MHz)		53.6 dBµV/m @ 5350.0 MHz (-0.4 dB)
2b	Chain 123	100	36		Restricted Band Edge (5460 MHz)		53.4 dBµV/m @ 5440.0 MHz (-0.6 dB)
3a	802.11n40	62	31		Restricted Band Edge (5350 MHz)		52.7 dBµV/m @ 5350.1 MHz (-1.3 dB)
3b	Chain 123	102	32		Restricted Band Edge (5460 MHz)		53.1 dBµV/m @ 5459.9 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.



EMC Test Data

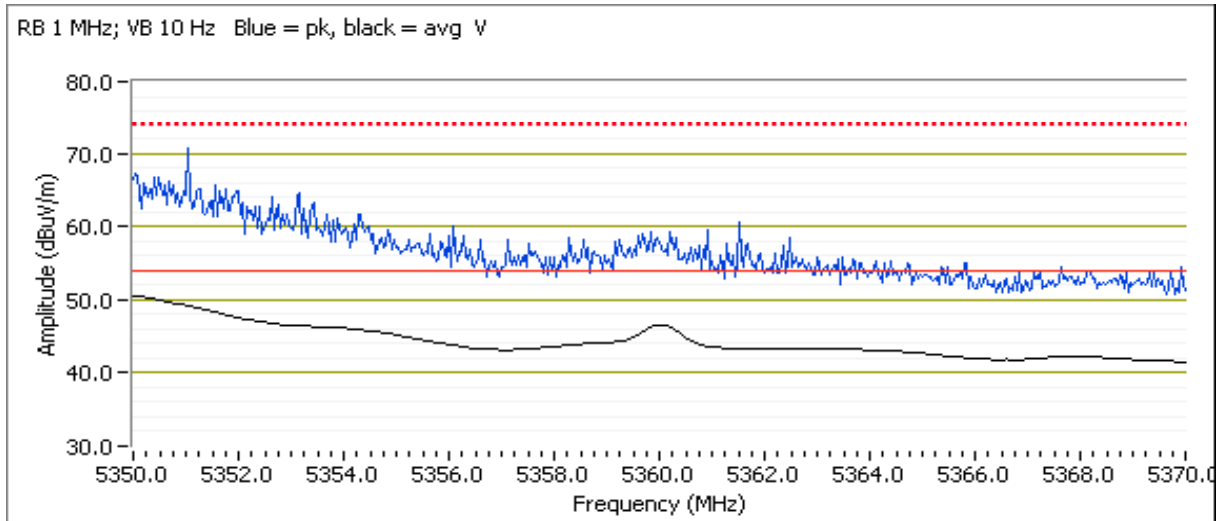
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Run #1: Operating Mode: 802.11a
 Date of Test: 4/18/2012
 Test Engineer: Rafael Varelas
 Test Location: FT7

Run #1a: Low Channel @ 5320 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	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	50.5	V	54.0	-3.5	AVG	340	1.0	POS; RB 1 MHz; VB: 10 Hz
5351.240	64.4	V	74.0	-9.6	PK	340	1.0	POS; RB 1 MHz; VB: 3 MHz
5351.800	40.7	H	54.0	-13.3	AVG	166	1.0	POS; RB 1 MHz; VB: 10 Hz
5351.440	53.2	H	74.0	-20.8	PK	166	1.0	POS; RB 1 MHz; VB: 3 MHz





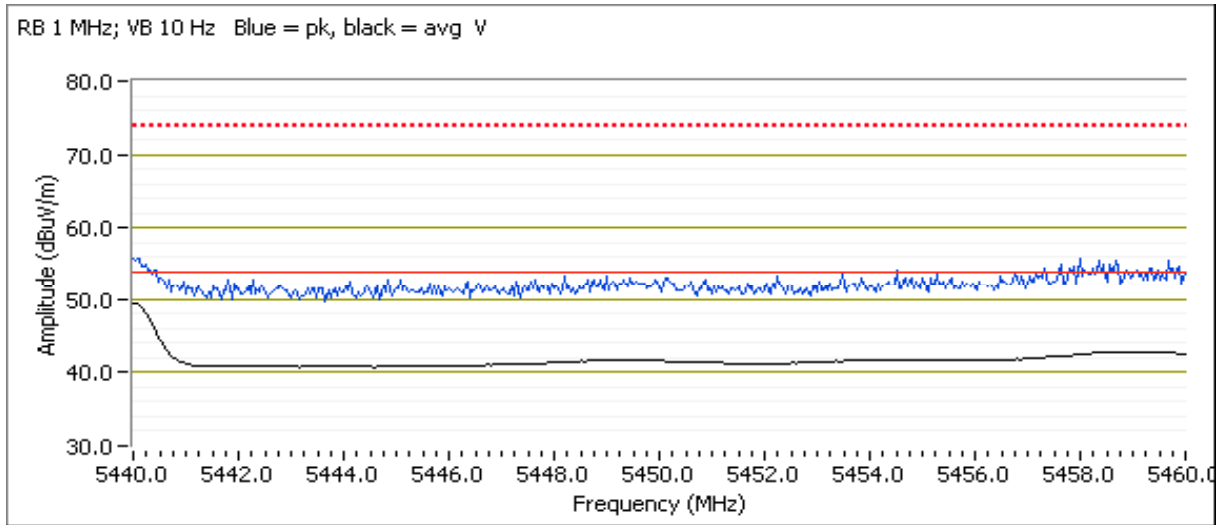
EMC Test Data

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: Low Channel @ 5500 MHz
 Power Setting = 36

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector PK/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5440.000	52.2	V	54.0	-1.8	AVG	334	1.2	POS; RB 1 MHz; VB: 10 Hz
5443.170	61.4	V	74.0	-12.6	PK	334	1.2	POS; RB 1 MHz; VB: 3 MHz
5440.000	42.0	H	54.0	-12.0	AVG	156	1.0	POS; RB 1 MHz; VB: 10 Hz
5440.080	50.9	H	74.0	-23.1	PK	156	1.0	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

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

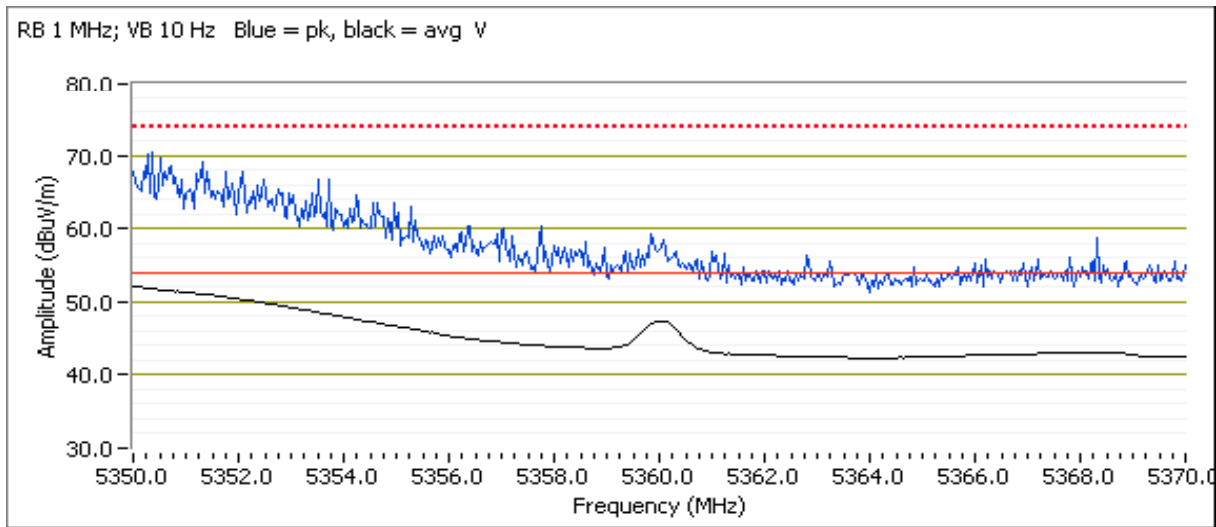
Run #2: Operating Mode: 802.11n20

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

Run #2a: Low Channel @ 5320 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	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.040	53.6	V	54.0	-0.4	AVG	86	1.4	POS; RB 1 MHz; VB: 10 Hz
5352.000	68.7	V	74.0	-5.3	PK	86	1.4	POS; RB 1 MHz; VB: 3 MHz
5351.400	41.2	H	54.0	-12.8	AVG	167	1.0	POS; RB 1 MHz; VB: 10 Hz
5352.890	60.0	H	74.0	-14.0	PK	167	1.0	POS; RB 1 MHz; VB: 3 MHz





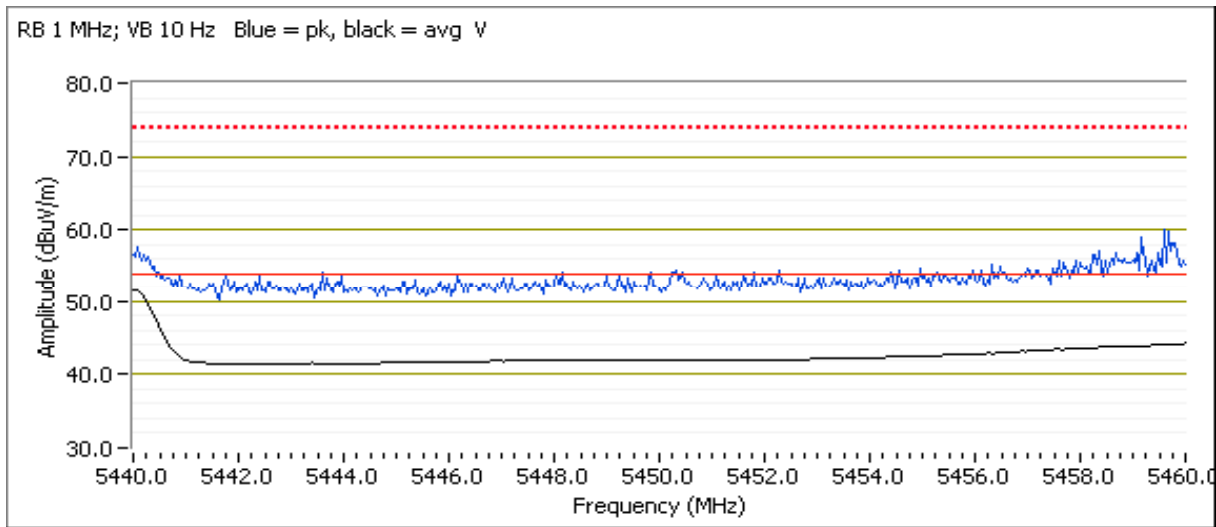
EMC Test Data

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 @ 5500 MHz
 Power Setting = 36

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5440.000	53.4	V	54.0	-0.6	AVG	173	1.2	POS; RB 1 MHz; VB: 10 Hz
5440.000	62.3	V	74.0	-11.7	PK	173	1.2	POS; RB 1 MHz; VB: 3 MHz
5440.040	41.9	H	54.0	-12.1	AVG	158	1.0	POS; RB 1 MHz; VB: 10 Hz
5442.600	51.6	H	74.0	-22.4	PK	158	1.0	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

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

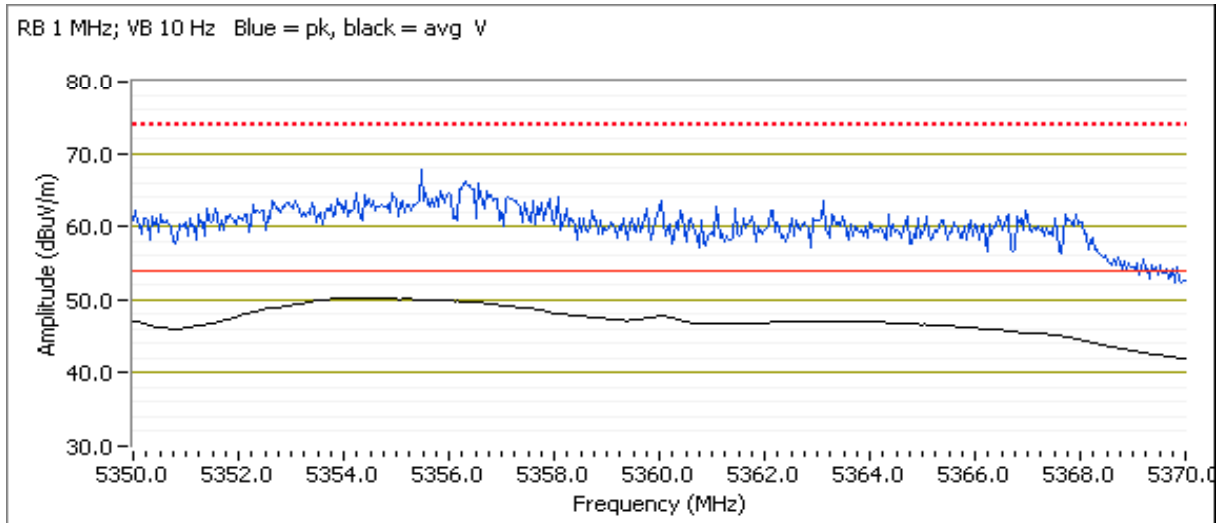
Run #3: Operating Mode: 802.11 n40

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

Run #3a: Low Channel @ 5310 MHz
 Power Setting = 31

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5350.080	52.7	V	54.0	-1.3	AVG	160	1.3	POS; RB 1 MHz; VB: 10 Hz
5354.330	68.3	V	74.0	-5.7	PK	160	1.3	POS; RB 1 MHz; VB: 3 MHz
5350.080	45.0	H	54.0	-9.0	AVG	14	1.0	POS; RB 1 MHz; VB: 10 Hz
5350.080	56.7	H	74.0	-17.3	PK	14	1.0	POS; RB 1 MHz; VB: 3 MHz





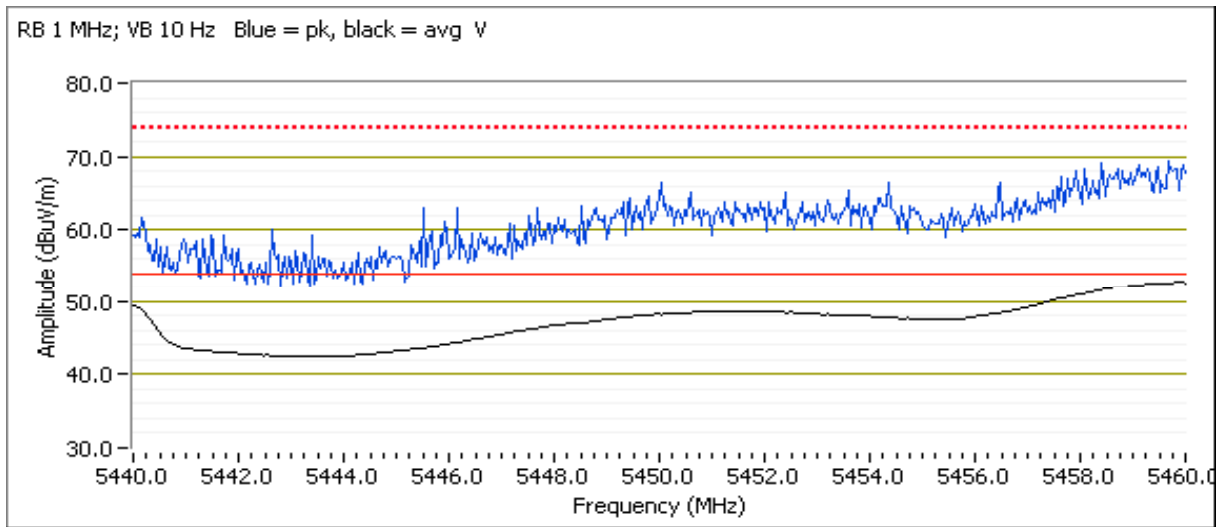
EMC Test Data

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 @ 5510 MHz
 Power Setting = 32

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5459.920	53.1	V	54.0	-0.9	AVG	90	1.0	POS; RB 1 MHz; VB: 10 Hz
5459.800	68.3	V	74.0	-5.7	PK	90	1.0	POS; RB 1 MHz; VB: 3 MHz
5460.000	43.4	H	54.0	-10.6	AVG	26	1.0	POS; RB 1 MHz; VB: 10 Hz
5459.440	59.7	H	74.0	-14.3	PK	26	1.0	POS; RB 1 MHz; VB: 3 MHz





EMC Test Data

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 (5250-5350 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: 4/9/2012 20:22
 Test Engineer: Peter Sales
 Test Location: Fremont Chamber #5

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	Measured Power	Test Performed	Limit	Result / Margin
1	802.11a	3x3: 5260 MHz 3x3: 5320 MHz	36 36		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.6 dBµV/m @ 5000.06 MHz (-2.4 dB)
2	802.11a n20	3x3: 5280 MHz 3x3: 5280 MHz	36 36		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.3 dBµV/m @ 5000.07 MHz (-2.7 dB)
3	n20	3x3: 5260 MHz 3x3: 5320 MHz	36 36		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.0 dBµV/m @ 5000.09 MHz (-1.0 dB)
4	n40	3x3: 5270 MHz 3x3: 5310 MHz	36 36		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.0 dBµV/m @ 5000.06 MHz (-1.0 dB)



EMC Test Data

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 5250-5350 MHz

Radio #	Frequency	Module	Mode	Radio #	Frequency	Module	Mode
Run: 1				Run: 2			
4	5260	3x3	802.11a	4	5280	3x3	802.11a
12	5320	3x3	802.11a	12	5280	3x3	802.11HT20
Run: 3							
4	5260	3x3	802.11HT20				
12	5320	3x3	802.11HT20				
Run: 4							
4	5270	3x3	802.11HT40				
12	5310	3x3	802.11HT40				



EMC Test Data

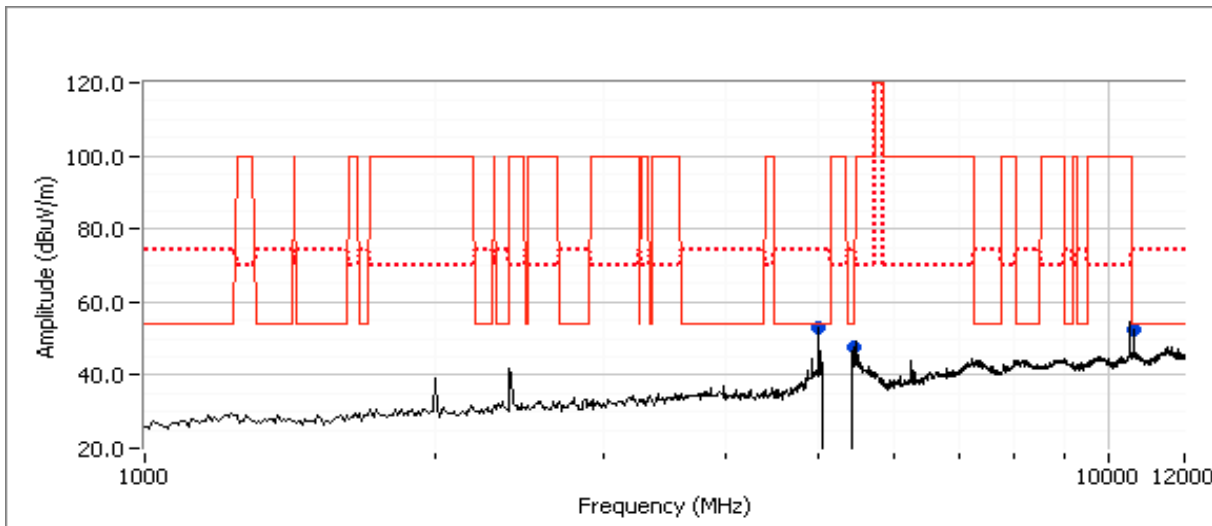
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Run #1, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5250-5350 MHz Band

Date of Test: 4/9/2012

Test Location: FT5

Test Engineer: Peter Sales



Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E Limit Margin		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
5000.060	51.6	V	54.0	-2.4	AVG	301	1.0	RB 1 MHz;VB 10 Hz;Pk
5000.090	58.1	V	74.0	-15.9	PK	301	1.0	RB 1 MHz;VB 3 MHz;Pk
5439.940	48.6	V	54.0	-5.4	AVG	311	1.1	RB 1 MHz;VB 10 Hz;Pk
5440.170	56.9	V	74.0	-17.1	PK	311	1.1	RB 1 MHz;VB 3 MHz;Pk
10633.870	48.2	V	54.0	-5.8	AVG	214	1.0	RB 1 MHz;VB 10 Hz;Pk
10634.430	61.4	V	74.0	-12.6	PK	214	1.0	RB 1 MHz;VB 3 MHz;Pk

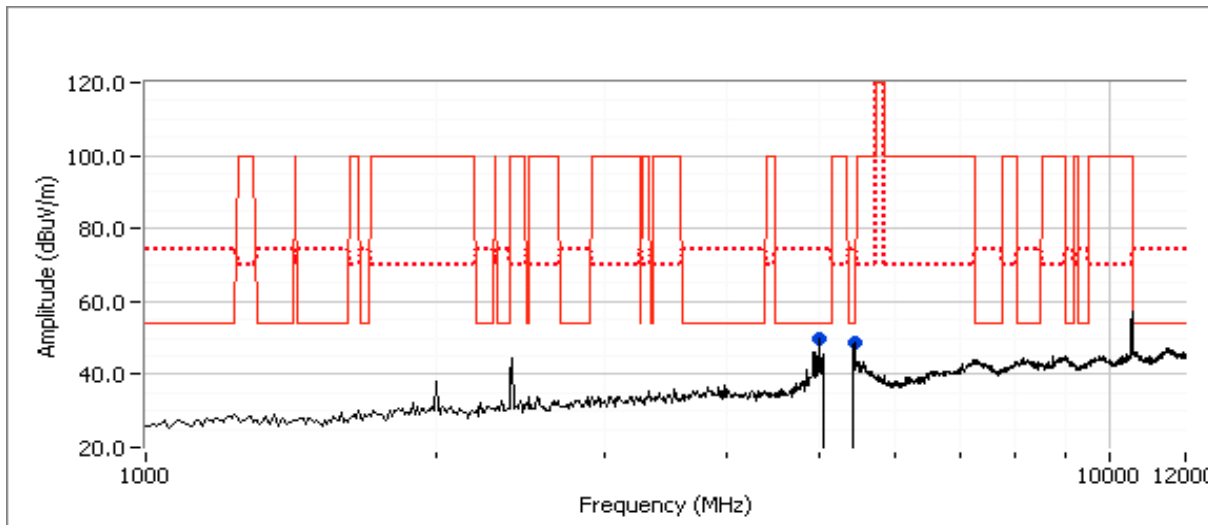
- Note 1: For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
- Note 2: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 12-40GHz



EMC Test Data

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, 30 - 40,000 MHz. Operation in the 5250-5350 MHz Band
 Date of Test: 4/9/2012 Test Location: FT5
 Test Engineer: Peter Sales



Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5000.070	51.3	V	54.0	-2.7	AVG	301	1.0	RB 1 MHz;VB 10 Hz;Pk
4999.930	58.6	V	74.0	-15.4	PK	301	1.0	RB 1 MHz;VB 3 MHz;Pk
5439.920	48.6	V	54.0	-5.4	AVG	316	1.3	RB 1 MHz;VB 10 Hz;Pk
5440.080	56.5	V	74.0	-17.5	PK	316	1.3	RB 1 MHz;VB 3 MHz;Pk

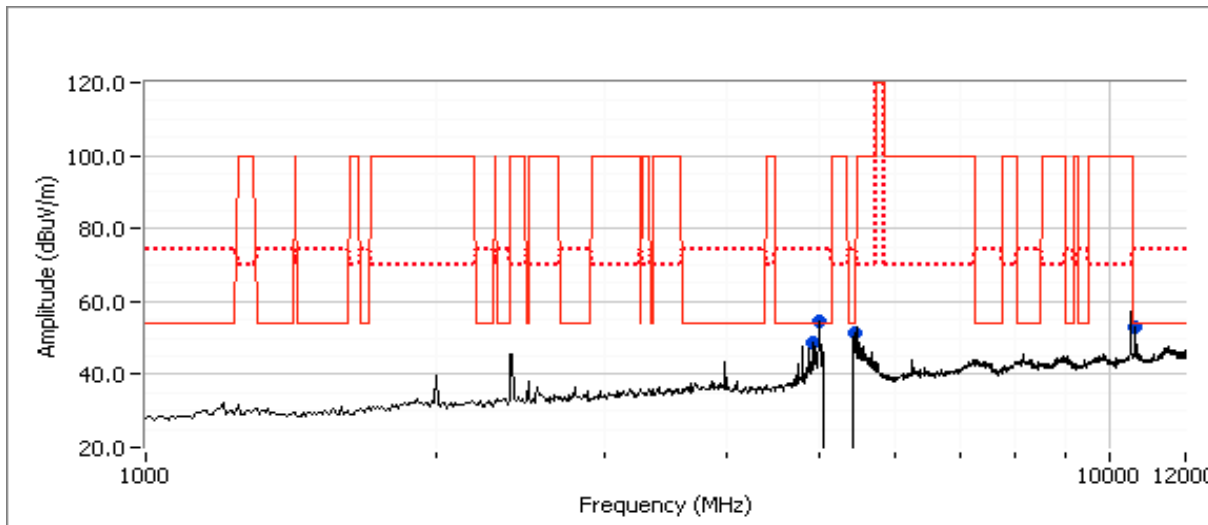
- Note 1: For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
- Note 2: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 18-40GHz



EMC Test Data

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 5250-5350 MHz Band
 Date of Test: 4/9/2012 Test Location: FT5
 Test Engineer: Peter Sales



Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
10639.630	47.7	V	54.0	-6.3	AVG	279	1.3	RB 1 MHz;VB 10 Hz;Pk
10639.470	59.2	V	74.0	-14.8	PK	279	1.3	RB 1 MHz;VB 3 MHz;Pk
5439.930	49.7	V	54.0	-4.3	AVG	205	1.0	RB 1 MHz;VB 10 Hz;Pk
5439.940	57.5	V	74.0	-16.5	PK	205	1.0	RB 1 MHz;VB 3 MHz;Pk
4919.940	47.7	V	54.0	-6.3	AVG	63	1.2	RB 1 MHz;VB 10 Hz;Pk
4920.000	53.5	V	74.0	-20.5	PK	63	1.2	RB 1 MHz;VB 3 MHz;Pk
5000.090	53.0	V	54.0	-1.0	AVG	56	1.1	RB 1 MHz;VB 10 Hz;Pk
5000.180	59.4	V	74.0	-14.6	PK	56	1.1	RB 1 MHz;VB 3 MHz;Pk

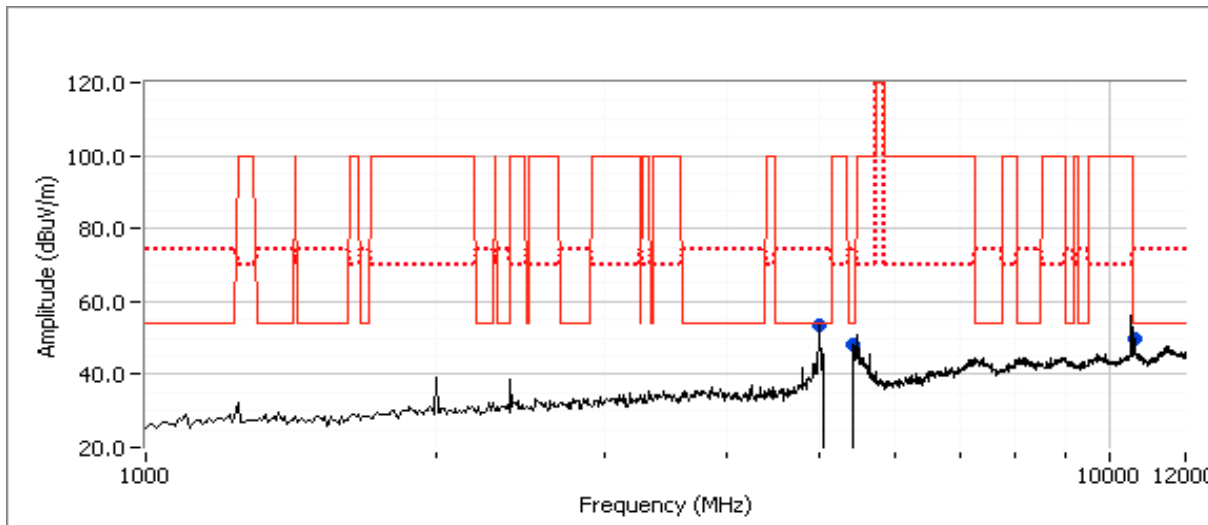
- Note 1: For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
- Note 2: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 18-40GHz



EMC Test Data

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 5250-5350 MHz Band
 Date of Test: 4/9/2012 Test Location: FT5
 Test Engineer: Peter Sales



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5000.060	53.0	V	54.0	-1.0	AVG	49	1.1	RB 1 MHz;VB 10 Hz;Pk
4999.930	59.2	V	74.0	-14.8	PK	49	1.1	RB 1 MHz;VB 3 MHz;Pk
5439.930	48.5	V	54.0	-5.5	AVG	45	1.0	RB 1 MHz;VB 10 Hz;Pk
5440.080	56.7	V	74.0	-17.3	PK	45	1.0	RB 1 MHz;VB 3 MHz;Pk
10628.520	47.9	V	54.0	-6.1	AVG	48	1.0	RB 1 MHz;VB 10 Hz;Pk
10627.820	60.7	V	74.0	-13.3	PK	48	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: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 18-40GHz



EMC Test Data

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: 4/9/2012 20:22
 Test Engineer: Peter Sales
 Test Location: Fremont Chamber #5

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	Measured Power	Test Performed	Limit	Result / Margin
1	802.11a	3x3: 5500 MHz 3x3: 5700 MHz	36 36		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.5 dBµV/m @ 11369.87 MHz (-0.5 dB)
2	802.11a n20	3x3: 5580 MHz 3x3: 5580 MHz	36 36		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.4 dBµV/m @ 5000.07 MHz (-1.6 dB)
3	n20	3x3: 5500 MHz 3x3: 5700 MHz	36 36		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.6 dBµV/m @ 5000.08 MHz (-3.4 dB)
4	n40	3x3: 5510 MHz 3x3: 5670 MHz	36 36		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	49.1 dBµV/m @ 5000.10 MHz (-4.9 dB)



EMC Test Data

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			
4	5500	3x3	802.11a	4	5580	3x3	802.11a
12	5700	3x3	802.11a	12	5580	3x3	802.11HT20
Run: 3							
4	5500	3x3	802.11HT20				
12	5700	3x3	802.11HT20				
Run: 4							
4	5510	3x3	802.11HT40				
12	5670	3x3	802.11HT40				



EMC Test Data

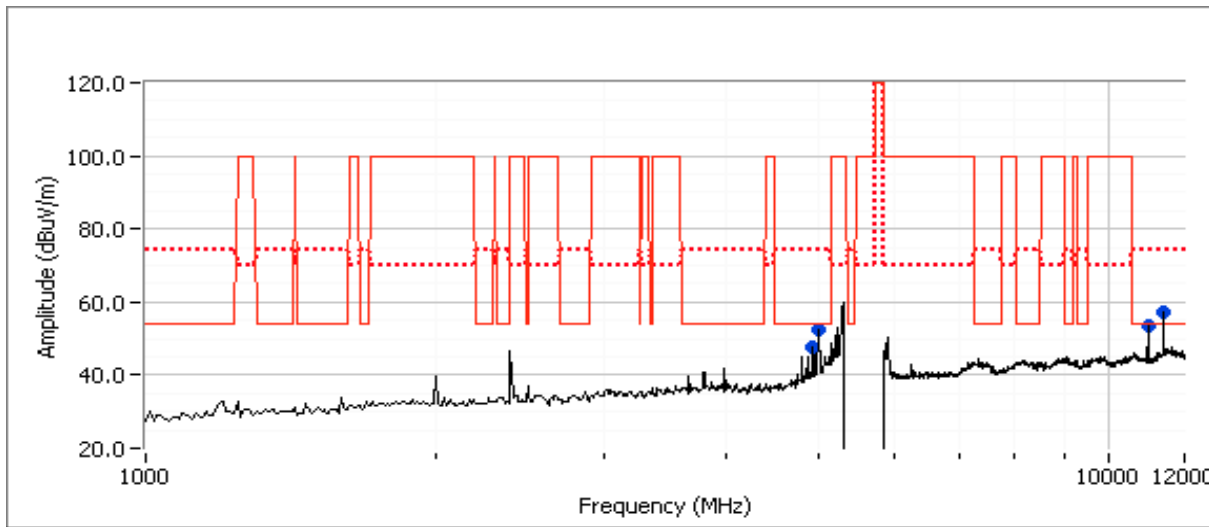
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Run #1, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 4/9/2012

Test Location: FT5

Test Engineer: Peter Sales



Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5000.110	51.0	V	54.0	-3.0	AVG	56	1.1	RB 1 MHz;VB 10 Hz;Pk
5000.020	57.0	V	74.0	-17.0	PK	56	1.1	RB 1 MHz;VB 3 MHz;Pk
4919.960	47.7	V	54.0	-6.3	AVG	63	1.1	RB 1 MHz;VB 10 Hz;Pk
4920.130	52.3	V	74.0	-21.7	PK	63	1.1	RB 1 MHz;VB 3 MHz;Pk
11396.870	53.5	V	54.0	-0.5	AVG	140	1.0	RB 1 MHz;VB 10 Hz;Pk
11397.140	64.9	V	74.0	-9.1	PK	140	1.0	RB 1 MHz;VB 3 MHz;Pk
11002.910	49.3	V	54.0	-4.7	AVG	247	1.0	RB 1 MHz;VB 10 Hz;Pk
11003.410	60.3	V	74.0	-13.7	PK	247	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: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.

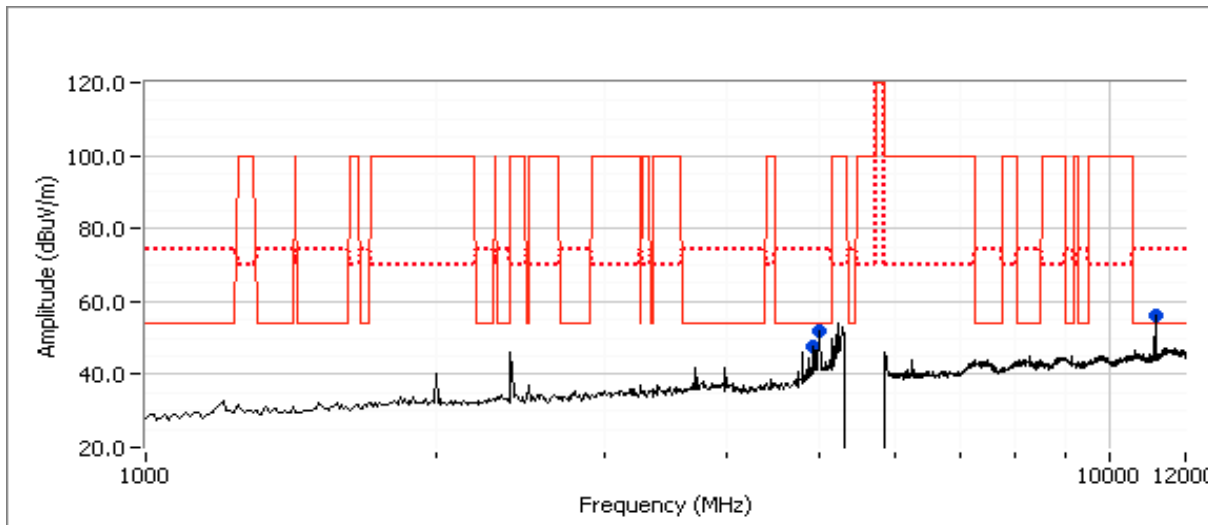
Note 3: No significant emissions were observed for 12-40GHz



EMC Test Data

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, 30 - 40,000 MHz. Operation in the 5470-5725 MHz Band
 Date of Test: 4/9/2012 Test Location: FT5
 Test Engineer: Peter Sales



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11158.150	52.0	V	54.0	-2.0	AVG	297	1.0	RB 1 MHz;VB 10 Hz;Pk
11168.550	63.4	V	74.0	-10.6	PK	297	1.0	RB 1 MHz;VB 3 MHz;Pk
4919.960	47.8	V	54.0	-6.2	AVG	61	1.2	RB 1 MHz;VB 10 Hz;Pk
4919.830	53.1	V	74.0	-20.9	PK	61	1.2	RB 1 MHz;VB 3 MHz;Pk
5000.070	52.4	V	54.0	-1.6	AVG	55	1.1	RB 1 MHz;VB 10 Hz;Pk
5000.010	58.5	V	74.0	-15.5	PK	55	1.1	RB 1 MHz;VB 3 MHz;Pk

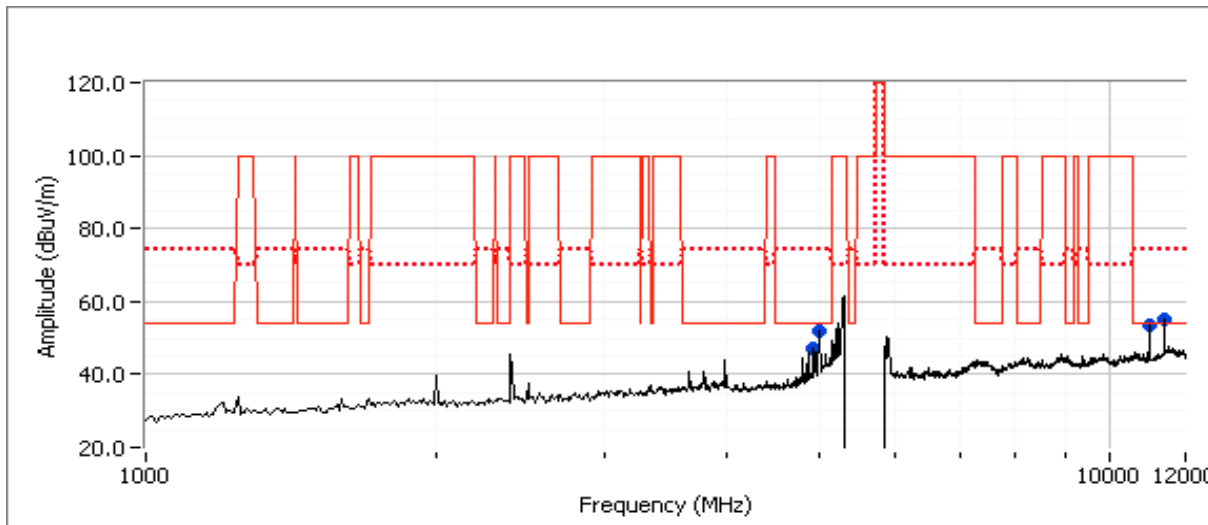
- Note 1: For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
- Note 2: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 12-40GHz



EMC Test Data

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 5470-5725 MHz Band
 Date of Test: 4/9/2012 Test Location: FT5
 Test Engineer: Peter Sales



Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5000.080	50.6	V	54.0	-3.4	AVG	54	1.0	RB 1 MHz;VB 10 Hz;Pk
4999.940	56.5	V	74.0	-17.5	PK	54	1.0	RB 1 MHz;VB 3 MHz;Pk
10997.670	47.7	V	54.0	-6.3	AVG	173	1.3	RB 1 MHz;VB 10 Hz;Pk
10999.170	59.7	V	74.0	-14.3	PK	173	1.3	RB 1 MHz;VB 3 MHz;Pk
4919.990	45.7	V	54.0	-8.3	AVG	114	1.1	RB 1 MHz;VB 10 Hz;Pk
4920.090	52.0	V	74.0	-22.0	PK	114	1.1	RB 1 MHz;VB 3 MHz;Pk
11397.120	50.1	V	54.0	-3.9	AVG	178	1.3	RB 1 MHz;VB 10 Hz;Pk
11397.090	61.5	V	74.0	-12.5	PK	178	1.3	RB 1 MHz;VB 3 MHz;Pk

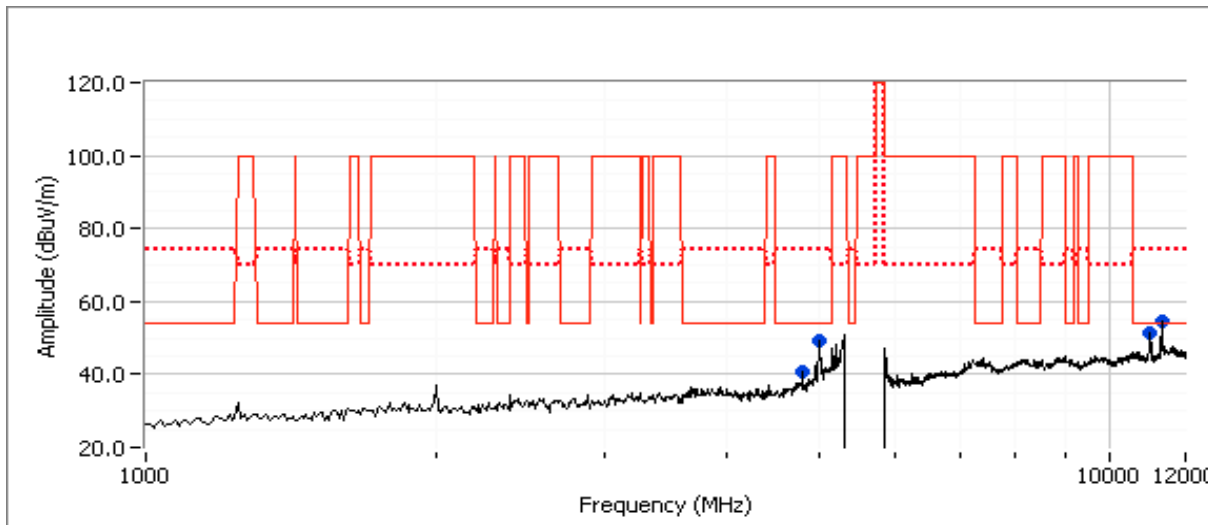
- Note 1: For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
- Note 2: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 12-40GHz



EMC Test Data

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 5470-5725 MHz Band
 Date of Test: 4/9/2012 Test Location: FT5
 Test Engineer: Peter Sales



Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E Limit Margin		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
11027.080	45.5	V	54.0	-8.5	AVG	5	1.1	RB 1 MHz;VB 10 Hz;Pk
11027.980	56.9	V	74.0	-17.1	PK	5	1.1	RB 1 MHz;VB 3 MHz;Pk
5000.100	49.1	V	54.0	-4.9	AVG	21	1.0	RB 1 MHz;VB 10 Hz;Pk
5000.000	54.2	V	74.0	-19.8	PK	21	1.0	RB 1 MHz;VB 3 MHz;Pk
4799.980	41.7	V	54.0	-12.3	AVG	24	1.0	RB 1 MHz;VB 10 Hz;Pk
4799.970	48.6	V	74.0	-25.4	PK	24	1.0	RB 1 MHz;VB 3 MHz;Pk
11334.420	46.9	V	54.0	-7.1	AVG	235	1.1	RB 1 MHz;VB 10 Hz;Pk
11336.390	58.7	V	74.0	-15.3	PK	235	1.1	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: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 12-40GHz



EMC Test Data

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.

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located approximately 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: 35 %

Summary of Results - Device Operating in the 5250-5350 & 5470-5725 MHz Bands

Run #	Mode	Channel	Power Setting	Antenna	Test Performed	Limit	Result / Margin
1a	802.11a	64	36	Patch	Restricted Band Edge (5350 MHz)	FCC Part 15.209	51.7 dBµV/m @ 5440.0 MHz (-2.3 dB)
1b	Chain 123	100	36		Restricted Band Edge (5460 MHz)		51.0 dBµV/m @ 5440.0 MHz (-3.0 dB)
2a	802.11n20	64	36		Restricted Band Edge (5350 MHz)		50.9 dBµV/m @ 5440.0 MHz (-3.1 dB)
2b	Chain 123	100	36		Restricted Band Edge (5460 MHz)		50.7 dBµV/m @ 5440.0 MHz (-3.3 dB)
3a	802.11n40	62	31		Restricted Band Edge (5350 MHz)		52.3 dBµV/m @ 5353.7 MHz (-1.7 dB)
3b	Chain 123	102	34		Restricted Band Edge (5460 MHz)		53.6 dBµV/m @ 5457.6 MHz (-0.4 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.



EMC Test Data

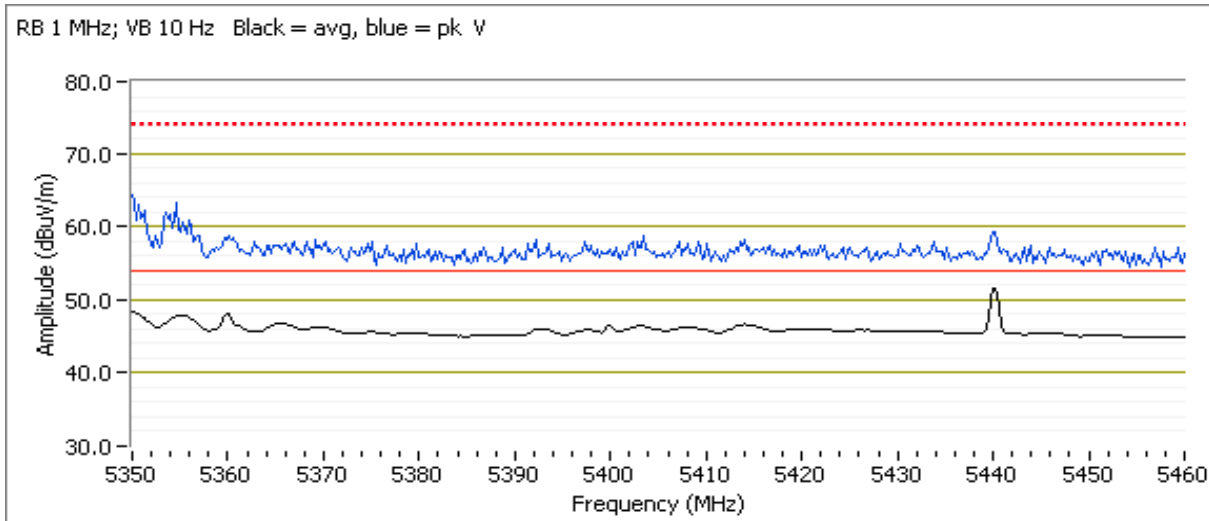
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Run #1: Operating Mode: 802.11a
 Date of Test: 4/12/2012
 Test Engineer: John Caizzi
 Test Location: Chamber 3

Run #1a: Low Channel @ 5320 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	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5440.040	51.7	V	54.0	-2.3	AVG	88	1.02	
5354.610	62.1	V	74.0	-11.9	PK	88	1.02	
5440.040	49.4	H	54.0	-4.6	AVG	266	1.00	
5417.680	55.3	H	74.0	-18.7	PK	266	1.00	

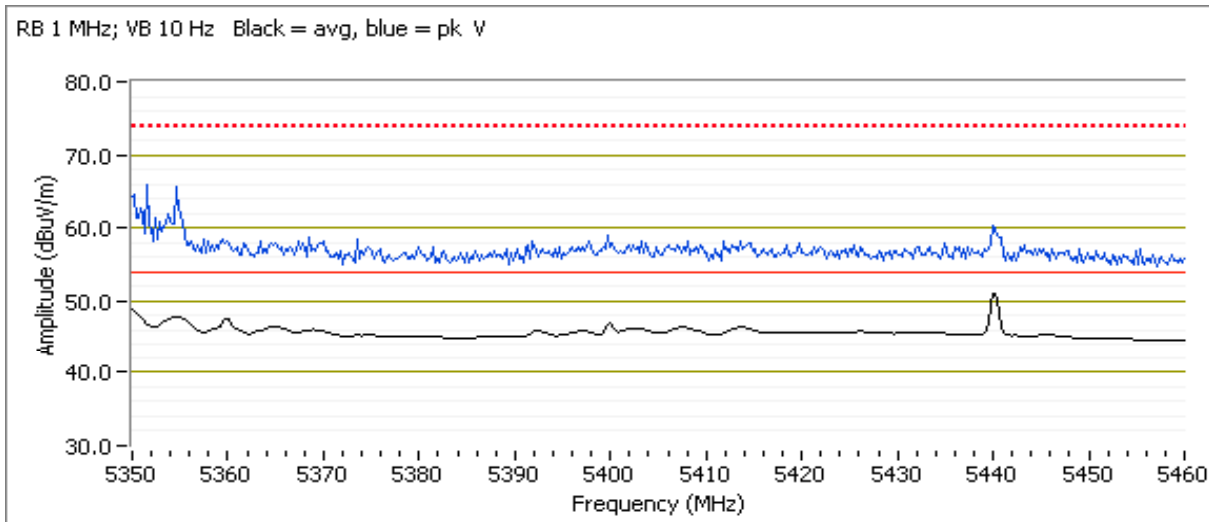


Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Run #1b: Low Channel @ 5500 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	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
5440.040	51.0	V	54.0	-3.0	AVG	87	1.14	
5350.000	63.2	V	74.0	-10.8	PK	87	1.14	





EMC Test Data

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

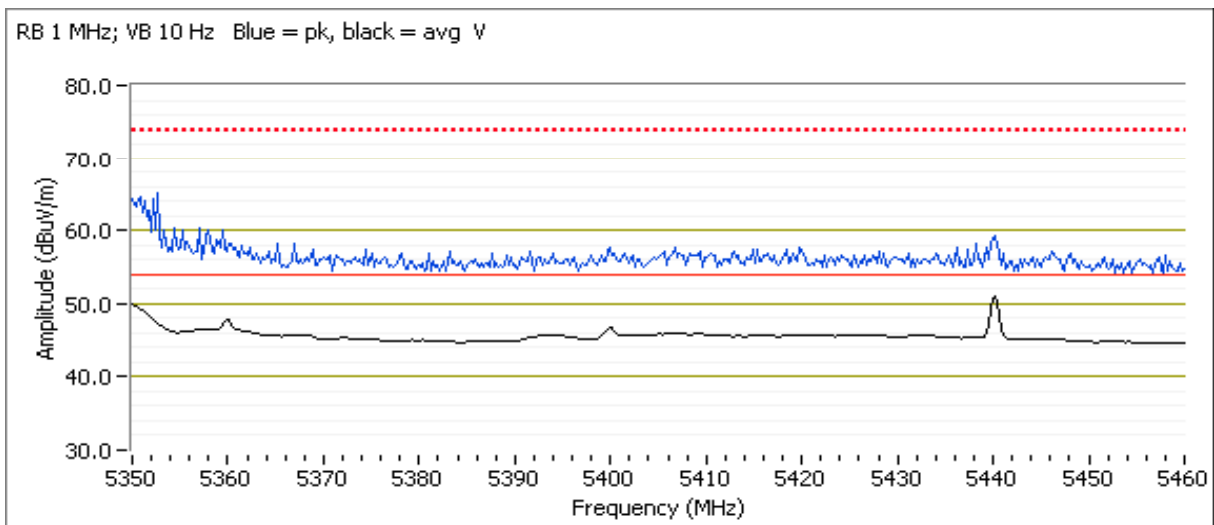
Run #2: Operating Mode: 802.11n20

Date of Test: 4/12/2012
 Test Engineer: John Caizzi
 Test Location: Chamber 3

Run #2a: Low Channel @ 5320 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	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5440.040	50.9	V	54.0	-3.1	AVG	85	1.12	
5350.440	66.0	V	74.0	-8.0	PK	89	1.14	





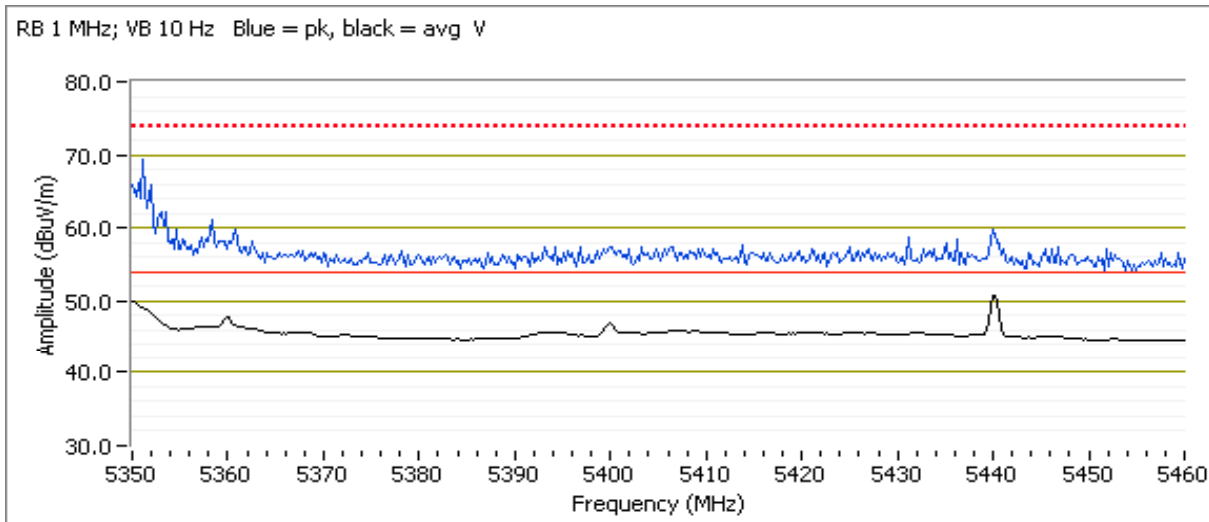
EMC Test Data

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 @ 5500 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	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
5440.040	50.7	V	54.0	-3.3	AVG	87	1.14	
5350.440	65.7	V	74.0	-8.3	PK	87	1.14	



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

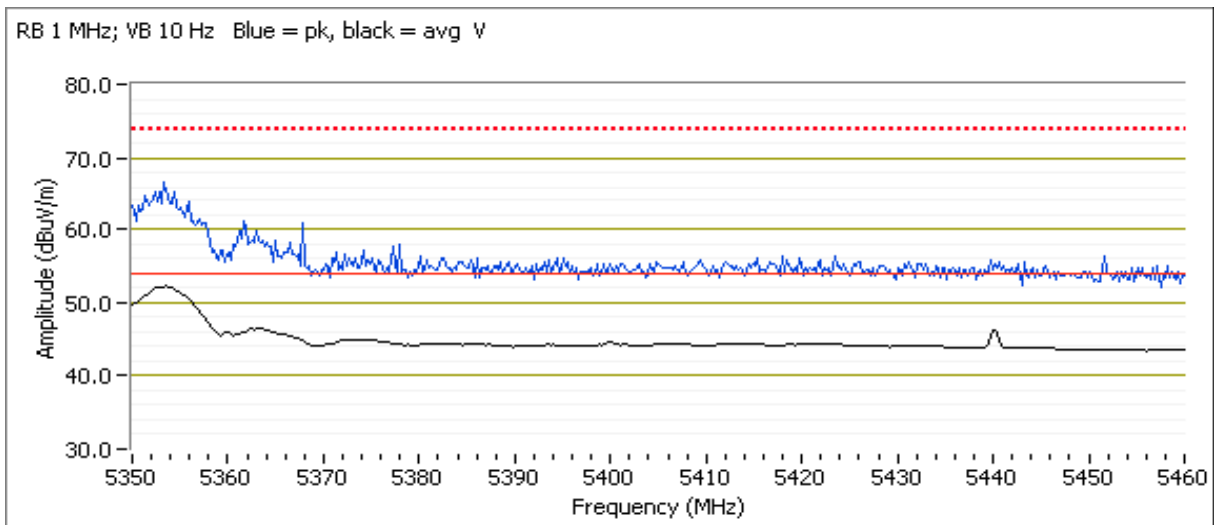
Run #3: Operating Mode: 802.11 n40

Date of Test: 4/12/2012
 Test Engineer: John Caizzi
 Test Location: Chamber 3

Run #3a: Low Channel @ 5310 MHz

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5353.690	52.3	V	54.0	-1.7	AVG	85	1.05	Pwr setting = 31
5353.130	66.4	V	74.0	-7.6	PK	85	1.05	Pwr setting = 31





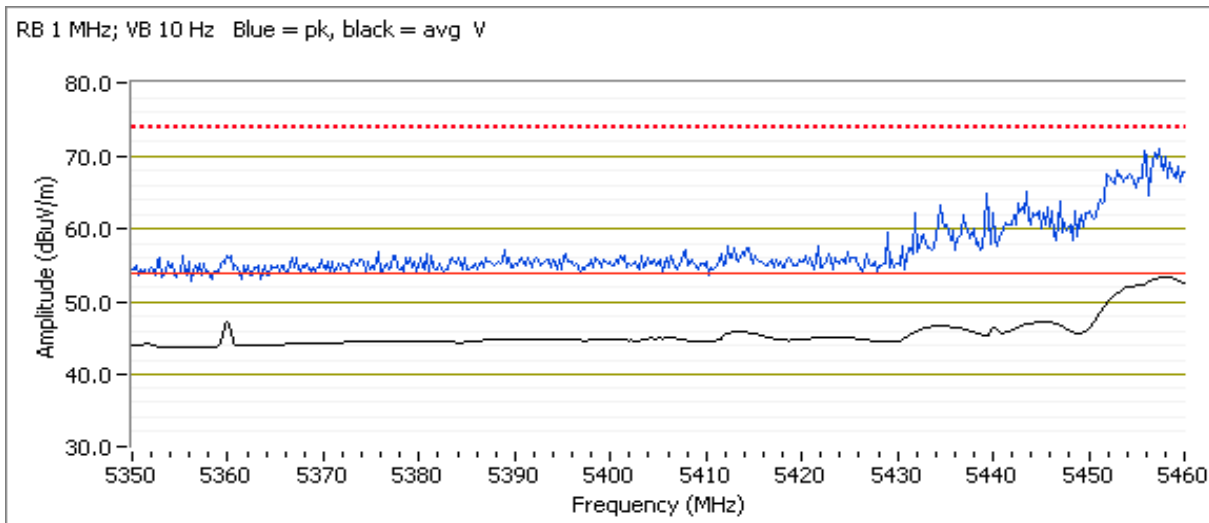
EMC Test Data

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 @ 5510 MHz

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5457.600	53.6	V	54.0	-0.4	AVG	272	1.05	Pwr setting = 34
5456.830	70.6	V	74.0	-3.4	PK	272	1.05	Pwr setting = 34





EMC Test Data

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 (5250-5350 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: 4/11/2012 0:00
 Test Engineer: Joseph Cadigal
 Test Location: FT Chamber#3

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: 5260 MHz 3x3: 5320 MHz	36/36	Patch	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.2 dBµV/m @ 5000.0 MHz (-1.8 dB)
2	802.11a n20	3x3: 5280 MHz 3x3: 5280 MHz	36/36	Patch	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	47.4 dBµV/m @ 5000.0 MHz (-6.6 dB)
3	n20	3x3: 5260 MHz 3x3: 5320 MHz	36/36	Patch	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.8 dBµV/m @ 5000.0 MHz (-2.2 dB)
4	n40	3x3: 5270 MHz 3x3: 5310 MHz	36/36	Patch	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.7 dBµV/m @ 5000.0 MHz (-2.3 dB)



EMC Test Data

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 5250-5350 MHz

Radio #	Frequency	Module	Mode	Radio #	Frequency	Module	Mode
Run: 1				Run: 2			
4	5260	3x3	802.11a	4	5280	3x3	802.11a
12	5320	3x3	802.11a	12	5280	3x3	802.11HT20
Run: 3							
4	5260	3x3	802.11HT20				
12	5320	3x3	802.11HT20				
Run: 4							
4	5270	3x3	802.11HT40				
12	5310	3x3	802.11HT40				



EMC Test Data

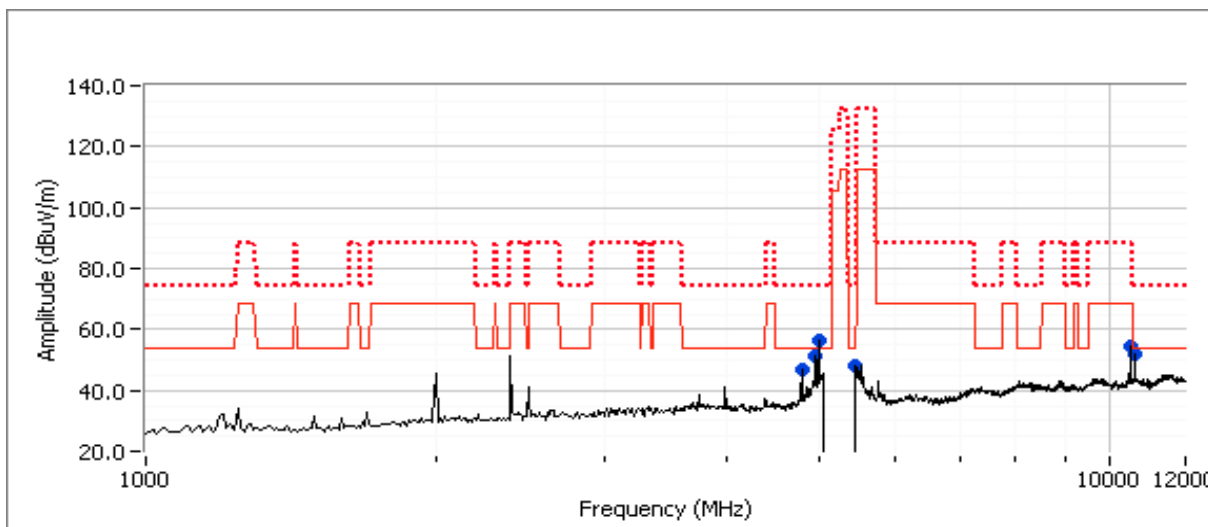
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Run #1, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5250-5350 MHz Band
 Date of Test: 4/11/2012 Test Location: FT Chamber#3
 Test Engineer: Joseph Cadigal

Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5000.000	52.2	V	54.0	-1.8	AVG	186	1.1	RB 1 MHz;VB 10 Hz;Pk
5000.010	57.9	V	74.0	-16.1	PK	186	1.1	RB 1 MHz;VB 3 MHz;Pk
10644.250	37.8	V	54.0	-16.2	AVG	130	1.7	RB 1 MHz;VB 10 Hz;Pk
10643.860	48.9	V	74.0	-25.1	PK	130	1.7	RB 1 MHz;VB 3 MHz;Pk
4943.280	37.6	V	54.0	-16.4	AVG	179	1.0	RB 1 MHz;VB 10 Hz;Pk
4942.900	49.0	V	74.0	-25.0	PK	179	1.0	RB 1 MHz;VB 3 MHz;Pk
4799.930	41.3	V	54.0	-12.7	AVG	179	1.1	RB 1 MHz;VB 10 Hz;Pk
4800.160	49.2	V	74.0	-24.8	PK	179	1.1	RB 1 MHz;VB 3 MHz;Pk
5479.880	43.6	V	-	-	AVG	179	1.1	RB 1 MHz;VB 10 Hz;Pk, note 2
5479.840	54.0	V	-	-	PK	179	1.1	RB 1 MHz;VB 3 MHz;Pk, note 2
10518.080	47.7	V	-	-	AVG	202	1.0	RB 1 MHz;VB 10 Hz;Pk, note 2
10518.000	59.1	V	-	-	PK	202	1.0	RB 1 MHz;VB 3 MHz;Pk, note 2

- Note 1: For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
- Note 2: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 12-40GHz





EMC Test Data

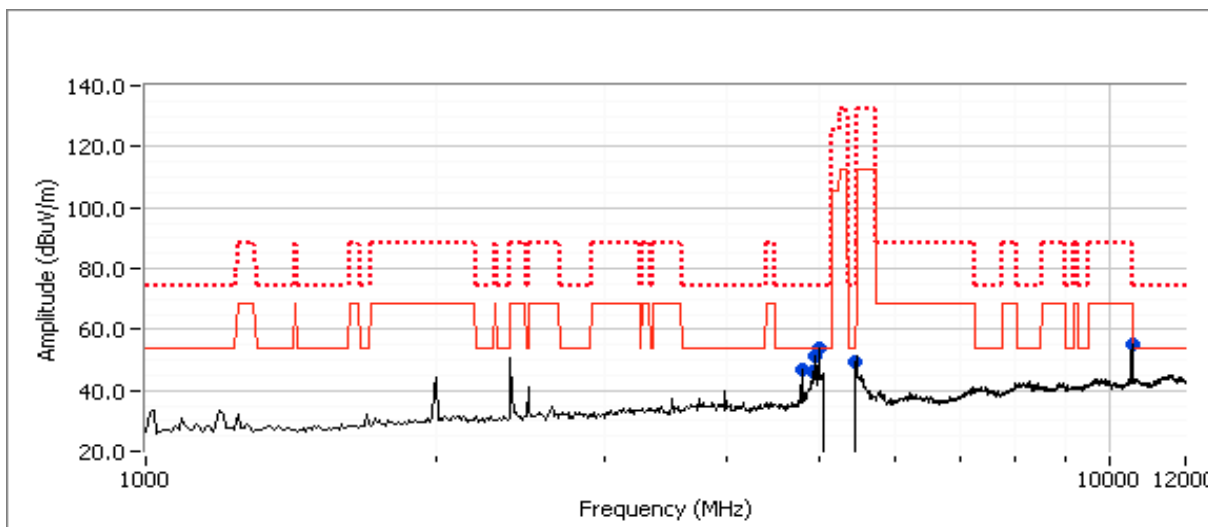
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Run #2, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5250-5350 MHz Band
 Date of Test: 4/11/2012 Test Location: FT Chamber#3
 Test Engineer: Joseph Cadigal

Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4999.970	47.4	V	54.0	-6.6	AVG	181	1.1	RB 1 MHz;VB 10 Hz;Pk
4999.980	54.9	V	74.0	-19.1	PK	181	1.1	RB 1 MHz;VB 3 MHz;Pk
5439.900	46.3	V	54.0	-7.7	AVG	177	1.0	RB 1 MHz;VB 10 Hz;Pk
5439.870	55.9	V	74.0	-18.1	PK	177	1.0	RB 1 MHz;VB 3 MHz;Pk
4807.100	33.5	V	54.0	-20.5	AVG	181	1.1	RB 1 MHz;VB 10 Hz;Pk
4806.540	44.9	V	74.0	-29.1	PK	181	1.1	RB 1 MHz;VB 3 MHz;Pk
4976.280	38.6	V	54.0	-15.4	AVG	181	1.1	RB 1 MHz;VB 10 Hz;Pk
4977.990	51.1	V	74.0	-22.9	PK	181	1.1	RB 1 MHz;VB 3 MHz;Pk
4919.940	44.8	H	54.0	-9.2	AVG	181	1.0	RB 1 MHz;VB 10 Hz;Pk
4919.790	51.3	H	74.0	-22.7	PK	181	1.0	RB 1 MHz;VB 3 MHz;Pk
10548.610	45.0	V	-	-	AVG	190	1.0	RB 1 MHz;VB 10 Hz;Pk, note 2
10548.530	58.7	V	-	-	PK	190	1.0	RB 1 MHz;VB 3 MHz;Pk, note 2

- Note 1: For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
- Note 2: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 12-40GHz





EMC Test Data

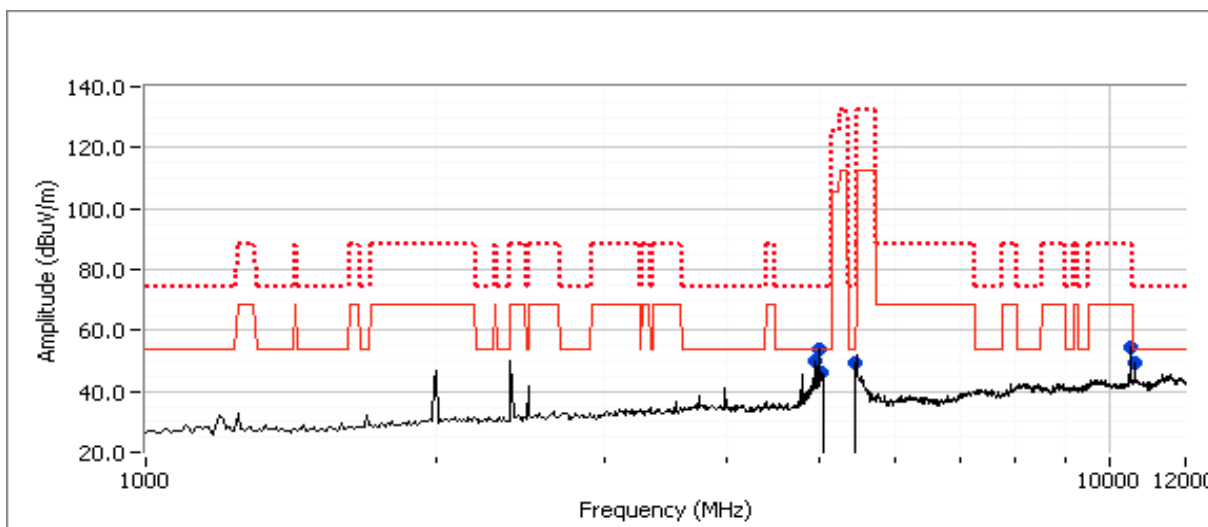
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Run #3, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5250-5350 MHz Band
 Date of Test: 4/11/2012 Test Location: FT Chamber#3
 Test Engineer: Joseph Cadigal

Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5000.020	51.8	V	54.0	-2.2	AVG	188	1.1	RB 1 MHz;VB 10 Hz;Pk
5000.060	55.8	V	74.0	-18.2	PK	188	1.1	RB 1 MHz;VB 3 MHz;Pk
5438.000	44.7	V	54.0	-9.3	AVG	179	1.0	RB 1 MHz;VB 10 Hz;Pk
5437.810	57.2	V	74.0	-16.8	PK	179	1.0	RB 1 MHz;VB 3 MHz;Pk
4945.260	36.3	V	54.0	-17.7	AVG	188	1.1	RB 1 MHz;VB 10 Hz;Pk
4944.370	48.6	V	74.0	-25.4	PK	188	1.1	RB 1 MHz;VB 3 MHz;Pk
10515.760	48.5	V	-	-	AVG	197	1.0	RB 1 MHz;VB 10 Hz;Pk, note 2
10515.490	60.8	V	-	-	PK	197	1.0	RB 1 MHz;VB 3 MHz;Pk, note 2
10643.290	42.8	V	54.0	-11.2	AVG	282	1.0	RB 1 MHz;VB 10 Hz;Pk
10644.020	54.5	V	74.0	-19.5	PK	282	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: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 12-40GHz



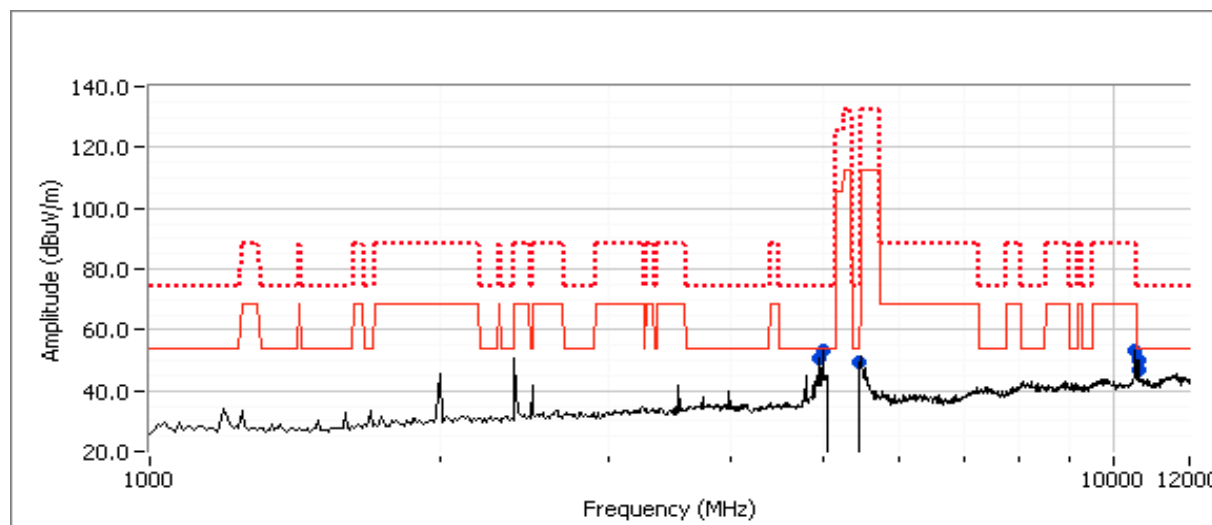
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Run #4, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5250-5350 MHz Band
 Date of Test: 4/11/2012 Test Location: FT Chamber#3
 Test Engineer: Joseph Cadigal

Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5000.020	51.7	V	54.0	-2.3	AVG	177	1.0	RB 1 MHz;VB 10 Hz;Pk
4999.980	55.7	V	74.0	-18.3	PK	177	1.0	RB 1 MHz;VB 3 MHz;Pk
5439.500	45.0	V	54.0	-9.0	AVG	177	1.0	RB 1 MHz;VB 10 Hz;Pk
5439.350	55.6	V	74.0	-18.4	PK	177	1.0	RB 1 MHz;VB 3 MHz;Pk
4991.210	38.8	V	54.0	-15.2	AVG	183	1.1	RB 1 MHz;VB 10 Hz;Pk
4988.910	51.6	V	74.0	-22.4	PK	183	1.1	RB 1 MHz;VB 3 MHz;Pk
10646.940	38.1	H	54.0	-15.9	AVG	201	1.0	RB 1 MHz;VB 10 Hz;Pk
10646.770	50.3	H	74.0	-23.7	PK	201	1.0	RB 1 MHz;VB 3 MHz;Pk
10536.710	44.2	V	-	-	AVG	214	1.7	RB 1 MHz;VB 10 Hz;Pk, note 2
10535.880	57.0	V	-	-	PK	214	1.7	RB 1 MHz;VB 3 MHz;Pk, note 2
10645.800	39.5	H	54.0	-14.5	AVG	220	1.0	RB 1 MHz;VB 10 Hz;Pk
10644.390	51.2	H	74.0	-22.8	PK	220	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: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 12-40GHz





EMC Test Data

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: 4/11/2012 0:00
 Test Engineer: Joseph Cadigal
 Test Location: FT Chamber#3

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: 5500 MHz 3x3: 5700 MHz	36/36	Patch	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	49.1 dBµV/m @ 5000.0 MHz (-4.9 dB)
2	802.11a n20	3x3: 5580 MHz 3x3: 5580 MHz	36/36	Patch	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	46.5 dBµV/m @ 5000.0 MHz (-7.5 dB)
3	n20	3x3: 5500 MHz 3x3: 5700 MHz	36/36	Patch	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	48.1 dBµV/m @ 5000.0 MHz (-5.9 dB)
4	n40	3x3: 5510 MHz 3x3: 5670 MHz	36/36	Patch	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	44.8 dBµV/m @ 5000.0 MHz (-9.2 dB)



EMC Test Data

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			
4	5500	3x3	802.11a	4	5580	3x3	802.11a
12	5700	3x3	802.11a	12	5580	3x3	802.11HT20
Run: 3							
4	5500	3x3	802.11HT20				
12	5700	3x3	802.11HT20				
Run: 4							
4	5510	3x3	802.11HT40				
12	5670	3x3	802.11HT40				



EMC Test Data

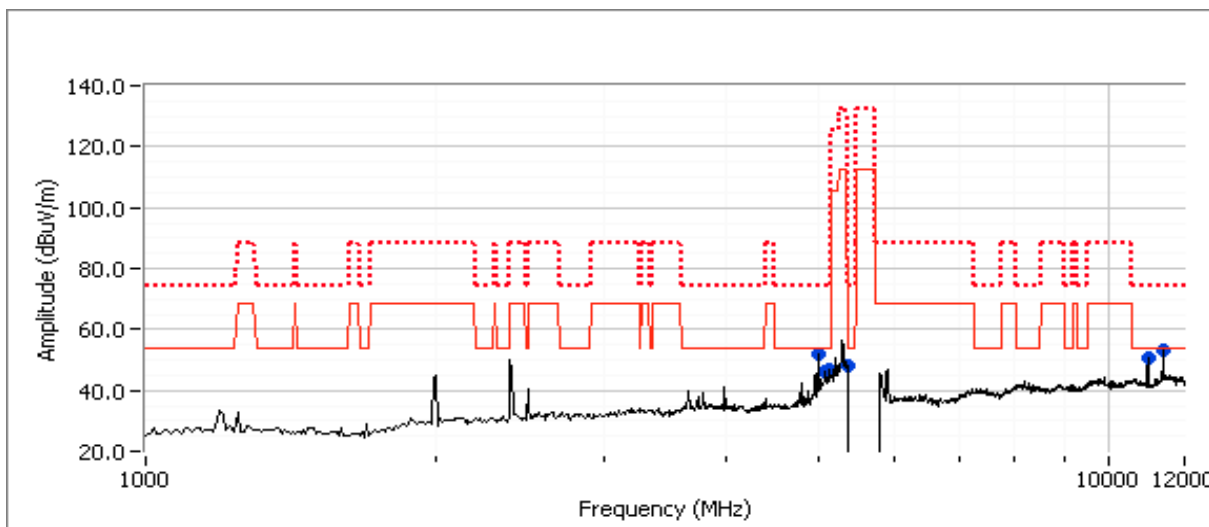
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Run #1, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5470-5725 MHz Band
 Date of Test: 4/11/2012 Test Location: FT Chamber#3
 Test Engineer: Joseph Cadigal

Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5000.000	49.1	V	54.0	-4.9	AVG	174	1.0	RB 1 MHz;VB 10 Hz;Pk
4999.920	54.4	V	74.0	-19.6	PK	174	1.0	RB 1 MHz;VB 3 MHz;Pk
5124.900	37.7	V	54.0	-16.3	AVG	182	1.0	RB 1 MHz;VB 10 Hz;Pk
5126.270	49.7	V	74.0	-24.3	PK	182	1.0	RB 1 MHz;VB 3 MHz;Pk
5343.940	40.9	V	-	-	AVG	182	1.0	note 2
5343.050	52.3	V	-	-	PK	182	1.0	note 2
5079.980	39.6	V	54.0	-14.4	AVG	182	1.3	RB 1 MHz;VB 10 Hz;Pk
5079.790	51.0	V	74.0	-23.0	PK	182	1.3	RB 1 MHz;VB 3 MHz;Pk
11005.240	37.1	H	54.0	-16.9	AVG	214	1.0	RB 1 MHz;VB 10 Hz;Pk
11005.190	48.5	H	74.0	-25.5	PK	214	1.0	RB 1 MHz;VB 3 MHz;Pk
11410.760	38.0	V	54.0	-16.0	AVG	323	1.0	RB 1 MHz;VB 10 Hz;Pk
11410.820	49.7	V	74.0	-24.3	PK	323	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: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 12-40GHz





EMC Test Data

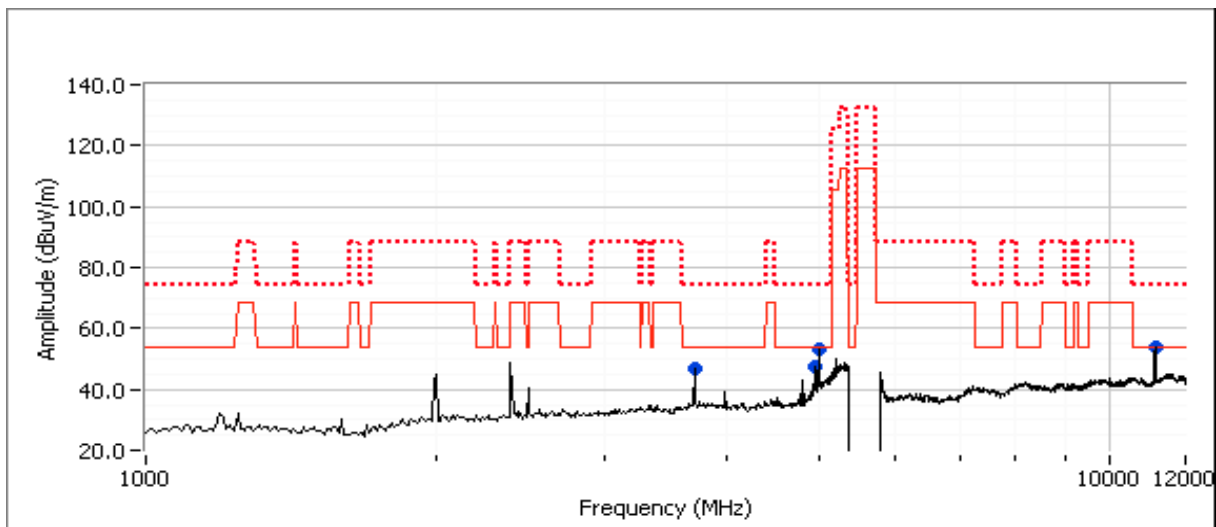
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Run #2, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5470-5725 MHz Band
 Date of Test: 4/11/2012 Test Location: FT Chamber#3
 Test Engineer: Joseph Cadigal

Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5000.000	46.5	V	54.0	-7.5	AVG	179	1.1	RB 1 MHz;VB 10 Hz;Pk
4999.920	53.0	V	74.0	-21.0	PK	179	1.1	RB 1 MHz;VB 3 MHz;Pk
4944.590	33.8	V	54.0	-20.2	AVG	186	1.1	RB 1 MHz;VB 10 Hz;Pk
4946.700	44.8	V	74.0	-29.2	PK	186	1.1	RB 1 MHz;VB 3 MHz;Pk
3719.960	43.7	H	54.0	-10.3	AVG	320	1.0	RB 1 MHz;VB 10 Hz;Pk
3719.960	48.2	H	74.0	-25.8	PK	320	1.0	RB 1 MHz;VB 3 MHz;Pk
11152.400	38.9	H	54.0	-15.1	AVG	333	1.9	RB 1 MHz;VB 10 Hz;Pk
11152.540	51.0	H	74.0	-23.0	PK	333	1.9	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: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 12-40GHz





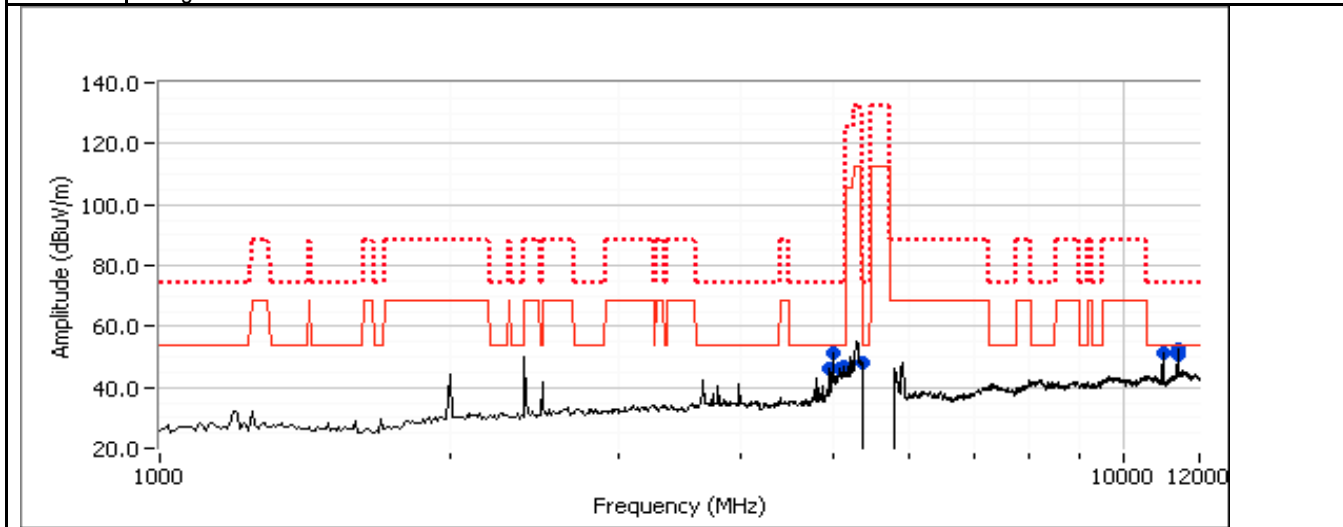
EMC Test Data

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 5470-5725 MHz Band
 Date of Test: 4/11/2012 Test Location: FT Chamber#3
 Test Engineer: Joseph Cadigal
 Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5000.030	48.1	V	54.0	-5.9	AVG	188	1.1	RB 1 MHz;VB 10 Hz;Pk
5000.050	54.0	V	74.0	-20.0	PK	188	1.1	RB 1 MHz;VB 3 MHz;Pk
11398.040	40.7	V	54.0	-13.3	AVG	89	1.4	RB 1 MHz;VB 10 Hz;Pk
11398.240	52.3	V	74.0	-21.7	PK	89	1.4	RB 1 MHz;VB 3 MHz;Pk
5099.830	39.2	V	54.0	-14.8	AVG	179	1.1	RB 1 MHz;VB 10 Hz;Pk
5100.300	50.7	V	74.0	-23.3	PK	179	1.1	RB 1 MHz;VB 3 MHz;Pk
4956.190	33.3	V	54.0	-20.7	AVG	183	1.1	RB 1 MHz;VB 10 Hz;Pk
4955.840	44.7	V	74.0	-29.3	PK	183	1.1	RB 1 MHz;VB 3 MHz;Pk
5125.050	36.8	V	54.0	-17.2	AVG	183	1.0	RB 1 MHz;VB 10 Hz;Pk
5125.900	48.7	V	74.0	-25.3	PK	183	1.0	RB 1 MHz;VB 3 MHz;Pk
5371.080	45.3	V	54.0	-8.7	AVG	183	1.0	RB 1 MHz;VB 10 Hz;Pk
5372.740	57.4	V	74.0	-16.6	PK	183	1.0	RB 1 MHz;VB 3 MHz;Pk
11000.700	40.6	H	54.0	-13.4	AVG	212	1.3	RB 1 MHz;VB 10 Hz;Pk
11000.730	52.1	H	74.0	-21.9	PK	212	1.3	RB 1 MHz;VB 3 MHz;Pk
11402.370	38.7	H	54.0	-15.3	AVG	292	1.6	RB 1 MHz;VB 10 Hz;Pk
11402.050	50.5	H	74.0	-23.5	PK	292	1.6	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: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 12-40GHz



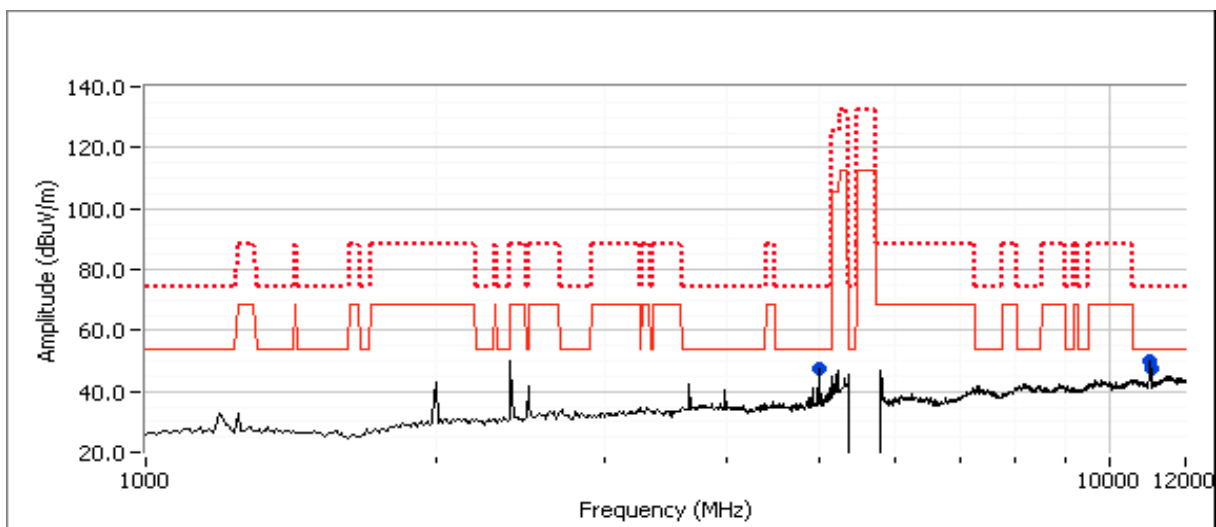
Client: Xirrus	Job Number: J86948
Model: XR1000 Outdoor (3x3 radio modules)	T-Log Number: T86967
	Account Manager: Michelle Kim
Contact: Steve Smith	
Standard: FCC 15.247, 15.E, RSS-210	Class: N/A

Run #4, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5470-5725 MHz Band
 Date of Test: 4/11/2012 Test Location: FT Chamber#3
 Test Engineer: Joseph Cadigal

Other Spurious Emissions

Frequency MHz	Level dB μ V/m	Pol v/h	15.209 / 15E		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
5000.000	44.8	V	54.0	-9.2	AVG	2	1.4	RB 1 MHz;VB 10 Hz;Pk
11022.780	44.3	V	54.0	-9.7	AVG	324	1.0	RB 1 MHz;VB 10 Hz;Pk
11033.420	40.9	V	54.0	-13.1	AVG	346	1.0	RB 1 MHz;VB 10 Hz;Pk
11022.350	56.1	V	74.0	-17.9	PK	324	1.0	RB 1 MHz;VB 3 MHz;Pk
11031.710	55.1	V	74.0	-18.9	PK	346	1.0	RB 1 MHz;VB 3 MHz;Pk
5000.080	49.7	V	74.0	-24.3	PK	2	1.4	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: For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). Compliance demonstrated via a conducted measurement.
- Note 3: No significant emissions were observed for 12-40GHz





EMC Test Data

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



EMC Test Data

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	Config. Used: 1
Test Engineer: John Caizzi	Config Change: none
Test Location: Fremont Chamber #5	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

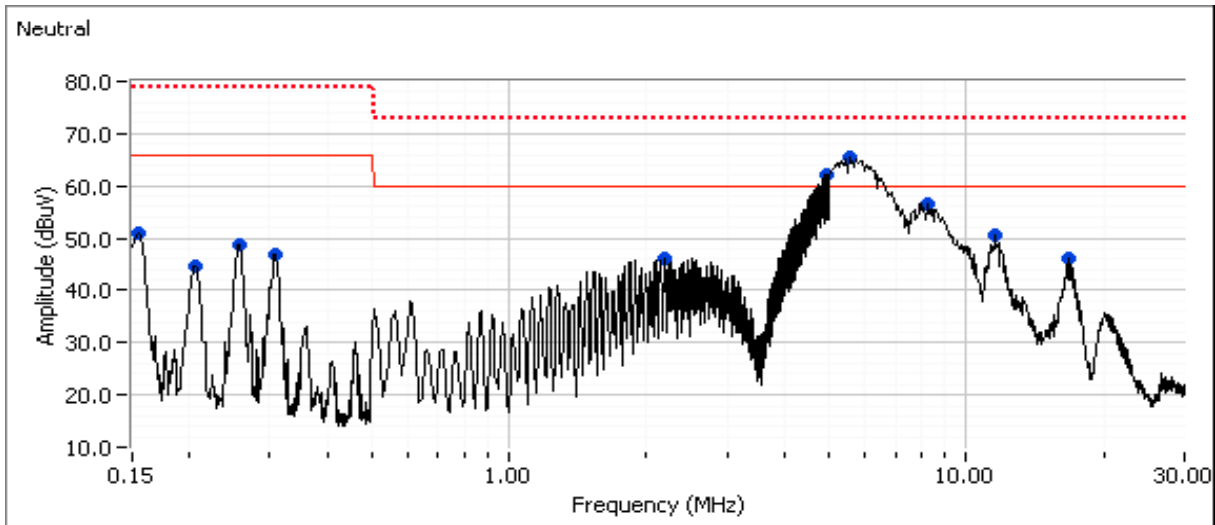
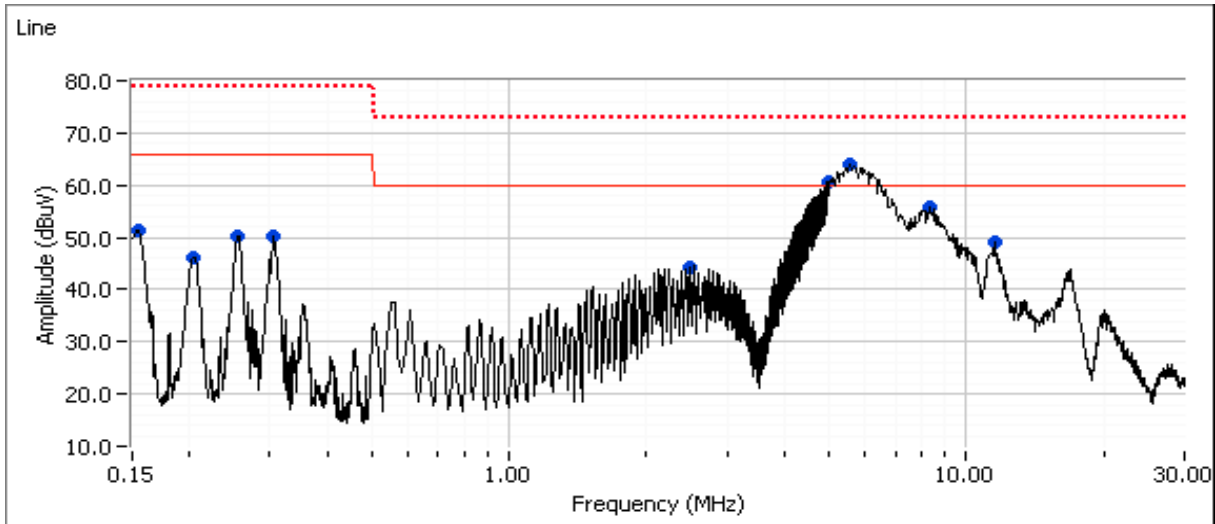
No modifications were made to the EUT during testing

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
Contact: Steve Smith	Account Manager: Michelle Kim
Standard: -	Class: A

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





EMC Test Data

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 MHz	Level dB μ V	AC Line	Class A		Detector QP/Ave	Comments
			Limit	Margin		
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	



EMC Test Data

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 MHz	Level dB μ V	AC Line	Class A		Detector QP/Ave	Comments
			Limit	Margin		
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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