EMC Test Report

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

Model: XI-N300

IC CERTIFICATION #:	5428A-XIN300
FCC ID:	SK6XI-N300
APPLICANT:	Xirrus, Inc. 2101 Corporate Center Dr. Newbury Park, CA 91320
TEST SITE(S):	Elliott Laboratories 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-7
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FINAL TEST DATES:	June 16, 21, 22, 28, July 6-8, 13, and 29, 2011
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REVISION HISTORY

Rev#	Date	Comments	Modified By
1	Aug. 23. 2011	First release	

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SCOPE

An electromagnetic emissions test has been performed on the Xirrus, Inc. model XI-N300, 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 Elliott Laboratories test procedures:

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

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

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

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

OBJECTIVE

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

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

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

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

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

STATEMENT OF COMPLIANCE

The tested sample of Xirrus, Inc. model XI-N300 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 XI-N300 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 5.15 – 5.25 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement[1]	Result
15.407(e)		Indoor operation only	Refer to user's manual	N/A	Complies
15.407(a) (2)		26dB Bandwidth	> 20MHz	N/A – limits output power if < 20MHz	N/A
15.407 (a) (1)	A9.2(1)	Output Power	.11a SISO: 35.1mW .11a MIMO: 36.4mW HT20: 35.2mW .HT40: 34.4 mW	17dBm (SISO) 16dBm (MIMO)	Complies
15.407 (a) (1)	-	Power Spectral Density	3dBm/MHz	4 dBm/MHz	Complies
-	A9.5 (2)			3 dBm/MHz	Complies

Operation in the 5.25 – 5.35 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement[1]	Result (margin)
15.407(a) (2)		26dB Bandwidth	> 20MHz	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	A9.2(2)	Output Power	.11a SISO: 81.7mW .11a MIMO: 89.7mW HT20: 84.6 mW HT40: 73.3 mW	24dBm (SISO) 23dBm (MIMO)	Complies
15.407(a) (2)	-	Power Spectral Density	7.1 dBm/MHz	11dBm/MHz SISO 10dBm/MHz MIMO	Complies
-	A9.2(2) / A9.5 (2)	Power Spectral Density		11 dBm / MHz	Complies

Operation in the 5.47 – 5.725 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement[1]	Result (margin)
15.407(a) (2)		26dB Bandwidth	> 20MHz	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	A9.2(2)	Output Power	.11a SISO: 71.8 mW .11a MIMO: 92.9mW HT20: 68.6 mW HT40: 46.0 mW	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a) (2))		Power Spectral Density	7.2 dBm/MHz	11dBm/MHz SISO 10dBm/MHz MIMO	Complies
	A9.2(2) / A9.5 (2)	Power Spectral Density		11 dBm / MHz	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

[1] Limits are based on antenna gain of 4dBi for SISO mode and 7dBi (2 chains, each with 4dBi) for MIMO modes.

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 (OFDM, BPSK – 64QAM)	Digital modulation is required	Complies
15.407(b) (5) / 15.209	A9.3	Spurious Emissions below 1GHz	Independent of transmitter	Refer to page 24	N/A
15.407(b) (5) / 15.209	A9.3	Spurious Emissions above 1GHz	54.0dBµV/m @ 5415.6MHz		Complies (0.0dB)
15.407(a)(6)	-	Peak Excursion Ratio	13dB	≤ 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		
15.407 (c)	A9.5(4)	Operation in the absence of information to transmit	Operation is discontinued in the absence of information (Operational Description p6)	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	A9.5 (5)	Frequency Stability	Frequency stability is 5ppm (Operational Description pp 2, 6)	Signal shall remain within the allocated band	Complies
15.407 (h1)	A9.4	Transmit Power Control	Meets 802.11h TPC and DFS requirements (Operational Description p6)	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 (Master)	Refer to separate test report, reference R83908		
	A9.9g	User Manual information	Refer to User Manual	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	Antenna is integral to the module	Unique or integral antenna required	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	53.4dBµV @ 4.897MHz	Refer to page 21	Complies (-2.6dB)
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	45.6dBµV/m @ 7500.1MHz	Refer to page 22	Complies (-8.4dB)
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	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	User Manual	Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	Antenna is integral	Statement for products with detachable antenna	N/A
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	802.11a: 17.6 MHz 8HT20: 18.7 MHz HT40: 36.6 MHz	Information only	N/A

MEASUREMENT UNCERTAINTIES

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

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

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Xirrus, Inc. model XI-N300 is an 802.11abgn 2x2 module intended to be installed in Xirrus Wireless Access Points. The module supports 802.11bgn 2x2 in the 2400-2483.5MHz, 5725-5850MHz, 5150-5250MHz, 5250-5350MHz and 5470-5725MHz bands. It additionally supports 802.11a SISO mode in the 5150-5250MHz, 5250-5350MHz and 5470-5725MHz bands at a higher per chain power. SISO modes in the other bands operate at the same output power per chain as the equivalent MIMO mode. It can operate in both 20- and 40-MHz channels in 802.11n mode.

The samples were received on June 14, 2011 and tested on June 16, 21, 22, 28, July 6-8, 13, and 29, 2011. For testing purposes four samples of the XI-N300 2x2 module, and four samples of a 3x3 version of the module (model number XI-N450) were installed into a Xirrus XR4000 host system capable of containing a maximum of 8 modules.

Normally, the XR4000 would be ceiling mounted during operation. The host system was tested as table-top equipment. The host system is powered via Power-Over-Ethernet (PoE). Compliance of the modules with the AC conducted emissions limits was evaluated by measuring the emissions at the AC input to a typical PoE injector used to power the host system.

The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Xirrus Inc.	XI-N300	802.11abgn 2x2 module	-	SK6XI-N300

ANTENNA SYSTEM

The antenna system is integrated into the module with two antennas per module (one for each transmit-receive chain). The nominal antenna gains are 2dBi in the 2.4GHz band and 4dBi in the 5GHz bands. As the legacy modes (802.11abg) and the lower data rates in the 802.11n modes use CDD there is correlation between the transmit chains so the effective gain for MIMO operation becomes 5dBi and 7dBi in the 2.4GHz and 5GHz bands respectively.

ENCLOSURE

The EUT has no enclosure. It is designed to be installed within the enclosure of a host computer.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at Elliott.

SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
Xirrus	XR4000	Access Point	-	-

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

Company	Model	Description	Serial Number	FCC ID
Linksys	SR2016	Gigabit Switch	n/a	DoC
HP	Compaq 6910P	PC Laptop	n/a	DoC
Xirrus	POE75U-1UP-N-X	Power Injector	n/a	N/A

EUT INTERFACE PORTS

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

Port		Cable(s)		
From	To	Description	Shielded/Unshielded	Length(m)
PoE ETH 0	PoE Injector	Cat 5	Unshielded	10
ETH 1	Gigabit Switch	Cat 5	Unshielded	10
Laptop Ethernet	Gigabit Switch	Cat 5	Unshielded	1
Console	not cabled	n/a	n/a	n/a

EUT OPERATION

The modules were installed into a host system for spurious emissions tests.

To evaluate the radiated spurious emissions related to the transmitter the module was evaluated in all operating modes (802.11b, 802.11g, 802.11a, 802.11n in both20- and 40-MHz channels) using ART software utility to place the module(s) under test in continuous transmit modes. Both transmit chains were active for the DTS tests, NII tests were repeated in 802.11a mode with a single chain active.

For measurements at the restricted band edges one module was operating on the channel closest to the band edge. For other spurious emissions measurements multiple radios were operating simultaneously such that all operating modes were active simultaneously on the high, center or low channel in each band. As the host system can also house a 3x3version of the module, during radiated spurious emissions tests there were up to eight radios active simultaneously on the same channel for these spurious measurements. When installed into host systems the host system firmware will not allow multiple radios to operate on the same or overlapping channels, so if signals were above the limit with multiple radios active, and those signals were related to harmonics of the transmitted signal, then the measurements were repeated with only one set of radios or one mode active because these harmonic emissions would only be present form one radio at any specific time.

During radiated emissions tests for receiver spurious emissions all 8 radios (4 of each module type) were in receive mode with all chains active on the following channels: 2437 MHz, 5200 MHz, 5280 MHz, 5600 MHz, 5785 MHz, 2412 MHz, 2472 MHz, 5180 MHz, 5320 MHz, 5500 MHz, 5700 MHz, 5785 MHz, 2462 MHz, 5240MHz, 5260 MHz, and 5540 MHz. This ensured that at least one module was on the center channel in each operating band as required by RSS 210 and RSS GEN.

Measurements on the host system for the frequency range 30 – 1000 MHz demonstrated that all significant emissions were from the host system. Digital device emissions from the host system above 1GHz (occurring at 2.5GHz, 5.0GHz and 7.5GHz) were excluded from the scope of this test report and will be evaluated as a part of the host system digital device tests.

AC conducted emissions measurements were made on the AC input to the Power-Over-Ethernet (PoE) injector used to power the host system. For these measurements all 8 radios were in a transmit/receive mode with all chains active on the following channels: 2437 MHz, 5200 MHz, 5280 MHz, 5600 MHz, 5785 MHz, 2412 MHz, 2472 MHz, 5180 MHz, 5320 MHz, 5500 MHz, 5700 MHz, 5785 MHz, 2462 MHz, 5240MHz, 5260 MHz, 5540 MHz.

TEST SITE

GENERAL INFORMATION

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

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

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

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4:2003. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4:2003 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4:2003.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.4:2003 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

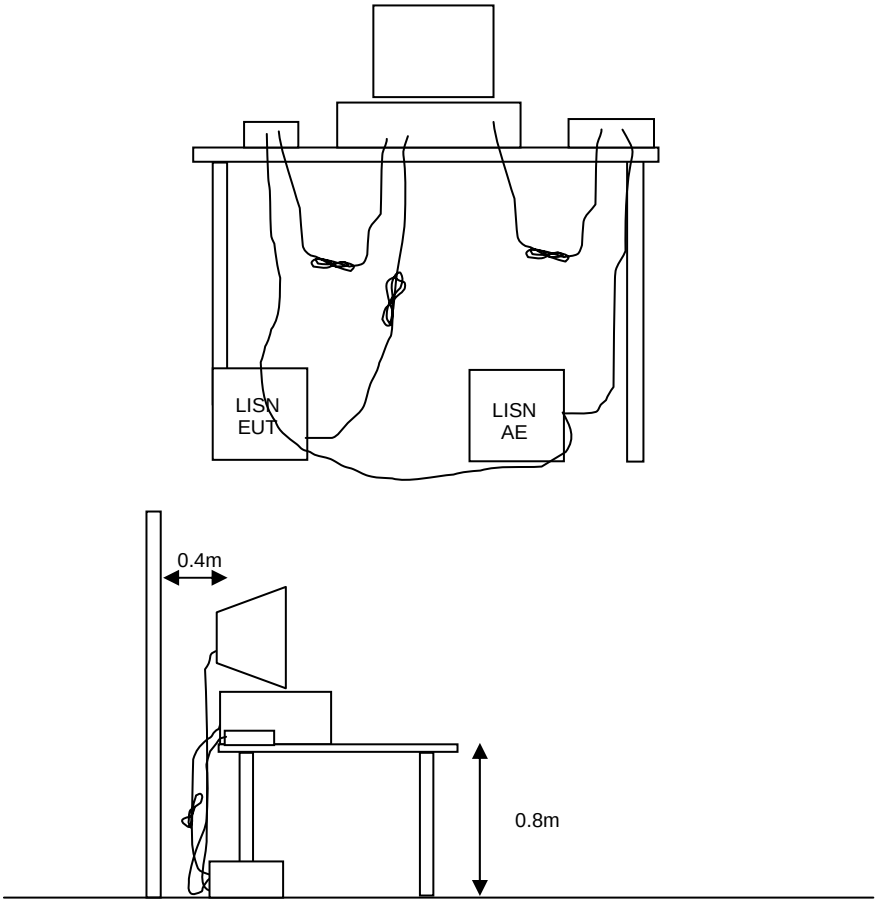
TEST PROCEDURES

EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4:2003, and the worst-case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.



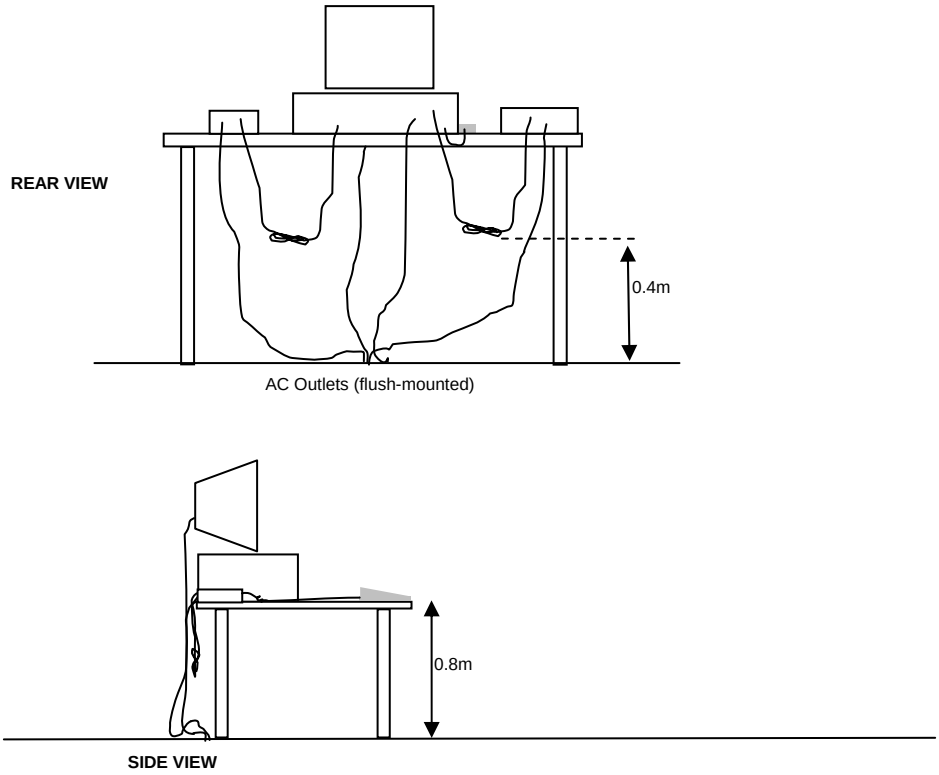
RADIATED EMISSIONS

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.

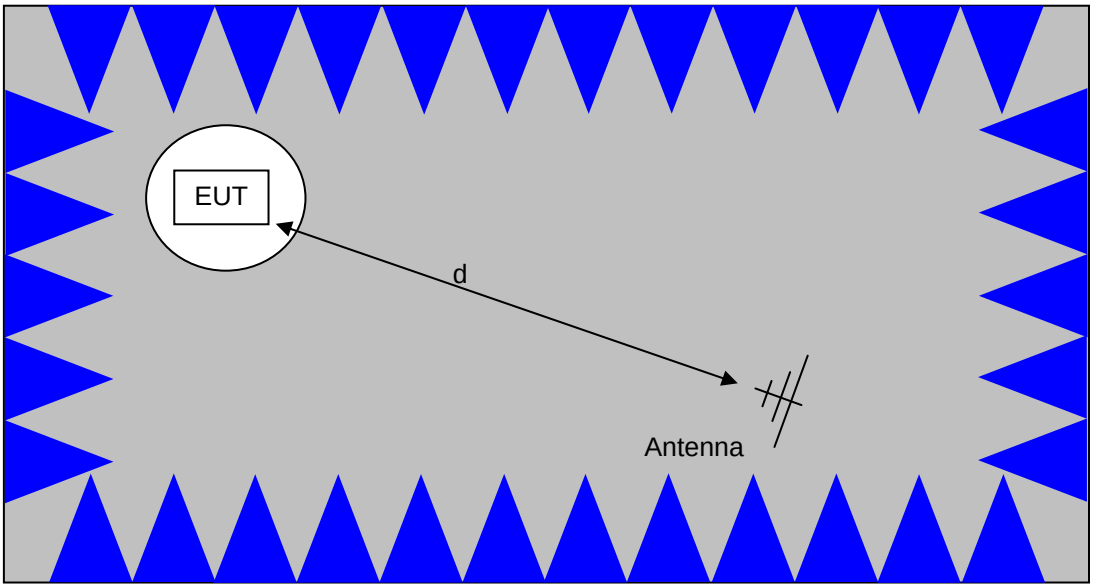
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

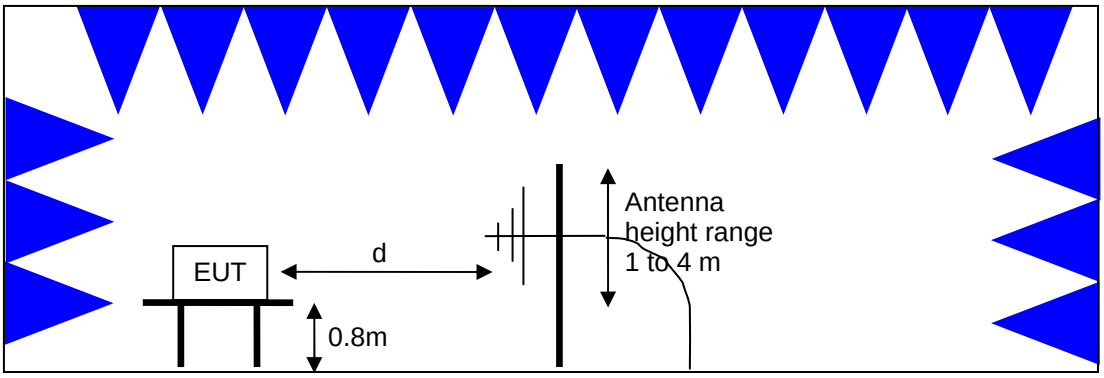


Typical Test Configuration for Radiated Field Strength Measurements



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.

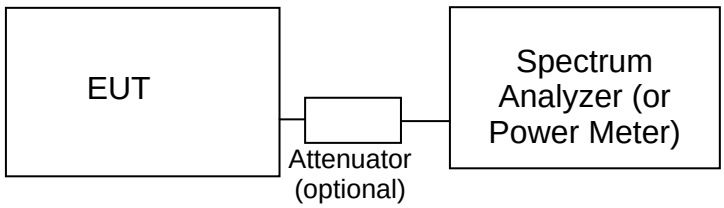
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

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

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

BANDWIDTH MEASUREMENTS

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

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

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

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands[2] (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

[2] 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)[3] 1W (30dBm) eirp	11 dBm/MHz
5470 – 5725	250 mW (24 dBm)[4] 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.

[3] If EIRP exceeds 500mW the device must employ TPC
[4] 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:

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

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

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

where P is the eirp (Watts)

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

Appendix A Test Equipment Calibration Data

Radiated Emissions, 1000 - 18,000 MHz, 16-Jun-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	5/18/2012
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/8/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	7/12/2011
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	10/11/2011

Radiated Emissions, 1000 - 18,000 MHz, 21,22-Jun-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/6/2012
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	7/12/2011
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1728	3/21/2012
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	9/3/2011
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	9/3/2011

Radio Antenna Port (Power and Spurious Emissions)

Manufacturer	Description	Model	Asset #	Cal Due
Agilent	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	1/26/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	7/14/2011
Rohde and Schwarz	Power Meter	NRVS	1534	5/17/2012

Radiated Emissions, 1000 - 18,000 MHz, 06/07-Jul-11

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/8/2011
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/11/2011
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	7/12/2011

Conducted Emissions - AC Power Ports,08/09-Jul-11

Manufacturer	Description	Model	Asset #	Cal Due
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	812	1/18/2012
EMCO	LISN, 10 kHz-100 MHz	3825/2	1292	3/1/2012
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	4/6/2012

Appendix B Test Data

T83600 Pages 28 - 126

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		-
Emissions Standard(s):	-	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Xirrus, Inc.

Model

XR4000 2x2

Date of Last Test: 8/10/2011

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

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

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	802.11a SISO: 35.1 mW 802.11a MIMO: 36.4 mW 802.11n 20MHz: 35.2 mW 802.11n n40MHz: 34.4 mW
1	PSD, 5150 - 5250MHz	15.407(a) (1), (2)	Pass	802.11a: 3.0 dBm/MHz
1	Power, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	802.11a: 81.7 mW 802.11a: 89.7 mW 802.11n 20MHz: 84.6 mW 802.11n n40MHz: 73.3 mW
1	PSD, 5250 - 5350MHz	15.407(a) (1), (2)	Pass	802.11a: 7.1 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	Pass	EIRP = 26.5 dBm (451 mW)
1	Power, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	802.11a SISO: 71.8 mW 802.11a MIMO: 92.9 mW 802.11n 20MHz: 68.6 mW 802.11n n40MHz: 46.0 mW
1	PSD, 5470 - 5725MHz	15.407(a) (1), (2)	Pass	802.11a: 7.2 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.		EIRP = 26.7 dBm (467 mW)
1	26dB Bandwidth	15.407 (Information only)	-	> 20MHz for all modes
1	99% Bandwidth	RSS 210 (Information only)	N/A	802.11a: 17.6 MHz 802.11n 20MHz: 18.7 MHz 802.11n n40MHz: 36.6 MHz
2	Peak Excursion Envelope	15.407(a) (6)	Pass	≤13dB
3	Antenna Conducted - Out of Band Spurious	15.407(b) -27dBm/MHz	Pass	All emissions below the -27dBm/MHz limit

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

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: 7/29/2011
Test Engineer: M. Birgani / R. Varelas/ J. Cadigal
Test Location: Fremont Chamber #7

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

General Test Configuration

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

Ambient Conditions:

Temperature: 20-30 °C
Rel. Humidity: 30-40 %

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Run #1: Bandwidth, Output Power and Power Spectral Density - MIMO Systems

Note 1:	Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50MHz for 802.11a, 802.11n 20MHz and 75MHz for 802.11n 40 MHz (method 1 of DA-02-2138A1).
Note 2:	Measured using the same analyzer settings used for output power.
Note 3:	For RSS-210 the limit for the 5150 - 5250 MHz band accounts for the antenna gain as the maximum eirp allowed is 10dBm/MHz. The limits are also corrected for instances where the highest measured value of the PSD exceeds the average PSD (calculated from the measured power divided by the measured 99% bandwidth) by more than 3dB by the amount that the measured value exceeds the average by more than 3dB.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

MIMO Device - 5150-5250 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	4.0	4.0		Yes	7.0	182.8	22.6

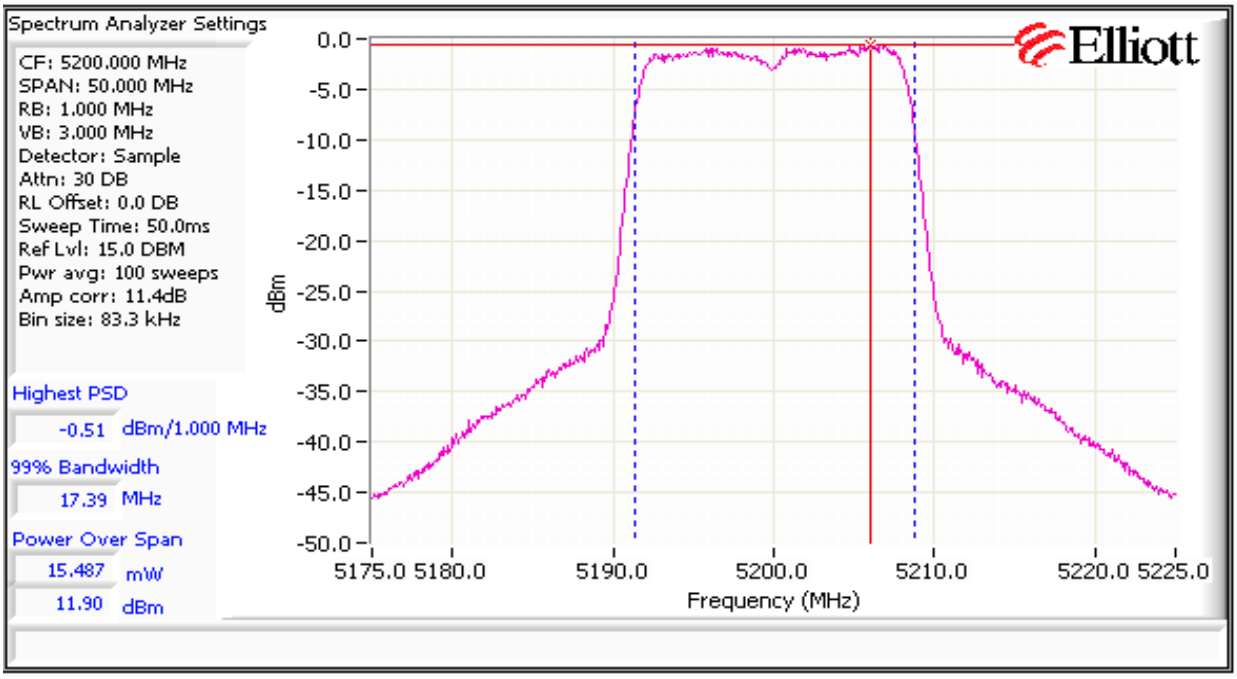
Power

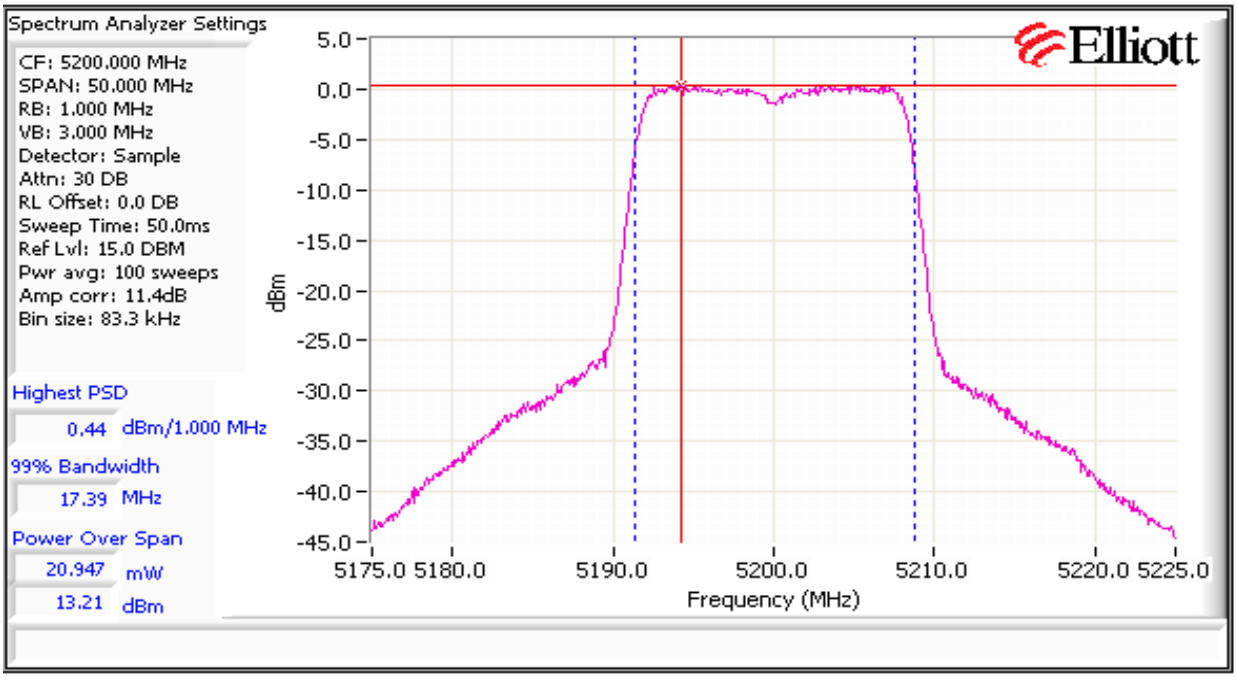
Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 1	Chain 2	Chain 3	mW	dBm			
802.11a SISO Mode - effective antenna gain is single chain gain of 4dBi, maximum eirp = 19.5dBm, 89.1 mW										
5180	16.5	29.8	14.4			27.4	14.4	17.0		PASS
5200	16.5	29.3	14.5			28.3	14.5	17.0	0.035	PASS
5240	16.5	29.6	15.5			35.1	15.5	17.0		PASS
802.11a MIMO Mode										
5180	13.5	29.9	11.3	12.8		32.7	15.1	16.0		PASS
5200	14.0	30.0	11.9	13.2		36.4	15.6	16.0	0.036	PASS
5240	13.0	29.3	11.4	12.5		31.7	15.0	16.0		PASS
802.11n 20MHz Mode										
5180	13.5	30.3	10.6	12.5		29.3	14.7	16.0		PASS
5200	14.0	30.2	11.3	13.3		34.9	15.4	16.0	0.035	PASS
5240	13.5	28.7	12.2	12.7		35.2	15.5	16.0		PASS
802.11n 40MHz Mode										
5190	6.0	52.8	3.2	4.9		5.1	7.1	16.0	0.034	PASS
5230	14.0	50.0	11.8	12.8		34.4	15.4	16.0		PASS

PSD

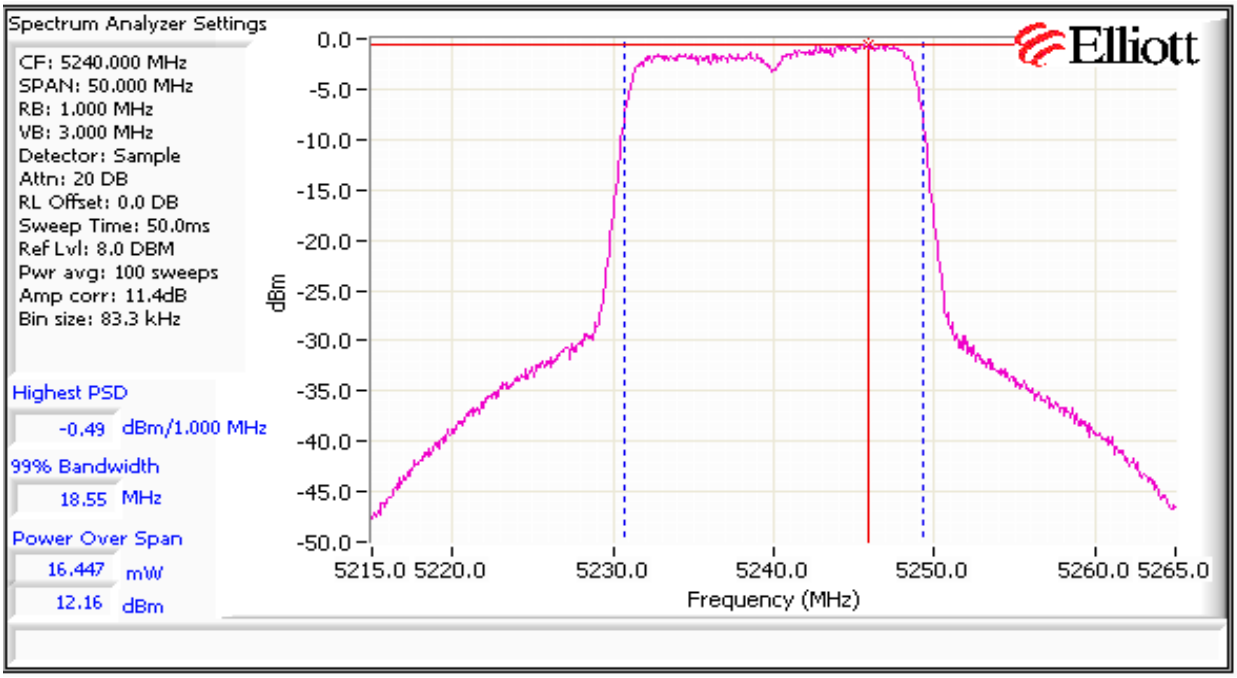
Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
802.11a SISO Mode - effective antenna gain is single chain gain of 4dBi.										
5180	17.4	14.4	1.8			1.5	1.8	4.0	4.0	PASS
5200	17.4	14.5	2.0			1.6	2.0	4.0	4.0	PASS
5240	17.5	15.5	2.7			1.9	2.7	4.0	4.0	PASS
802.11a MIMO Mode										
5180	17.5	15.1	-1.1	0.2		1.8	2.6	3.0	3.0	PASS
5200	17.4	15.6	-0.6	0.4		2.0	3.0	3.0	3.0	PASS
5240	17.5	15.0	-0.9	0.0		1.8	2.6	3.0	3.0	PASS
802.11n 20MHz Mode										
5180	18.6	14.7	-2.6	-0.4		1.5	1.6	3.0	3.0	PASS
5200	18.6	15.4	-1.7	0.6		1.8	2.6	3.0	3.0	PASS
5240	18.6	15.5	-0.5	-0.2		1.8	2.7	3.0	3.0	PASS
802.11n 40MHz Mode										
5190	36.8	7.1	-12.7	-10.9		0.1	-8.7	3.0	3.0	PASS
5230	36.9	15.4	-3.7	-3.1		0.9	-0.4	3.0	3.0	PASS

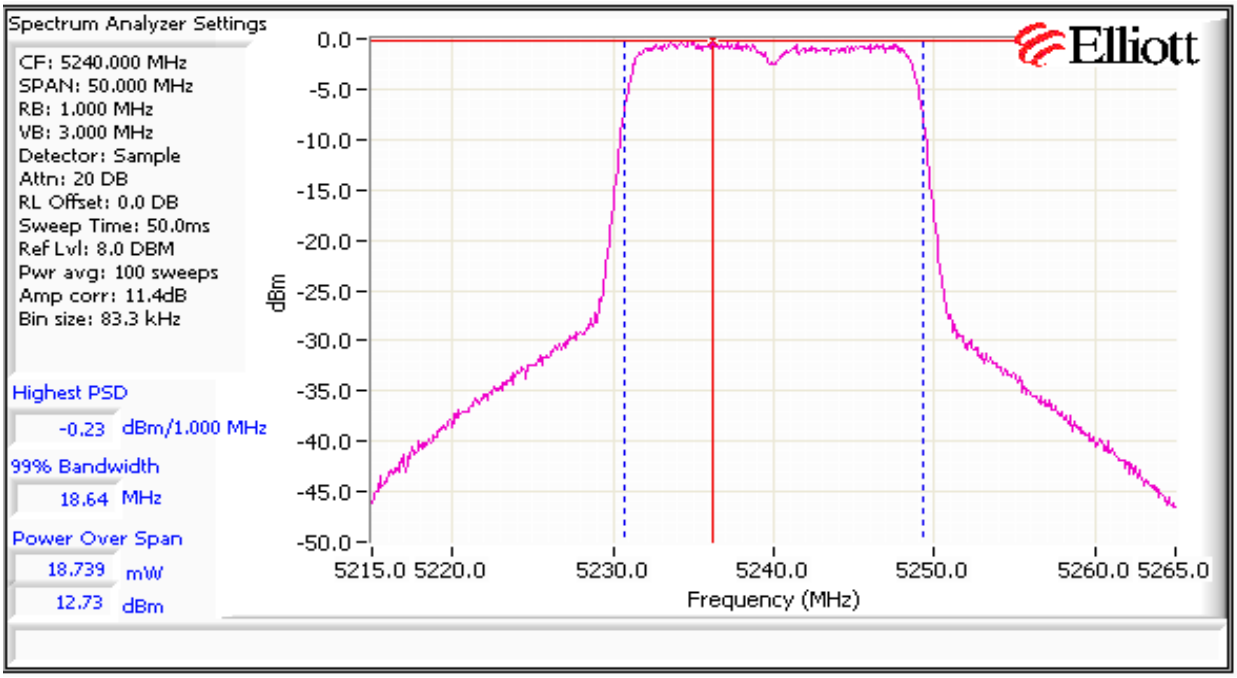
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A



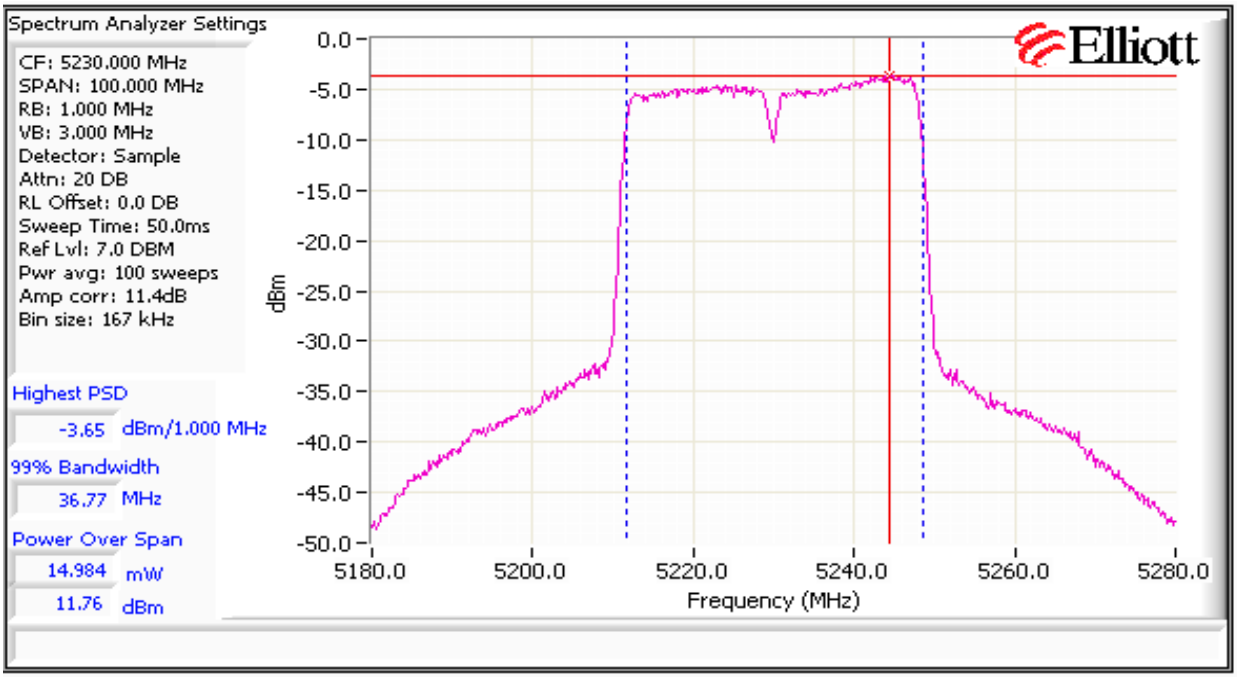


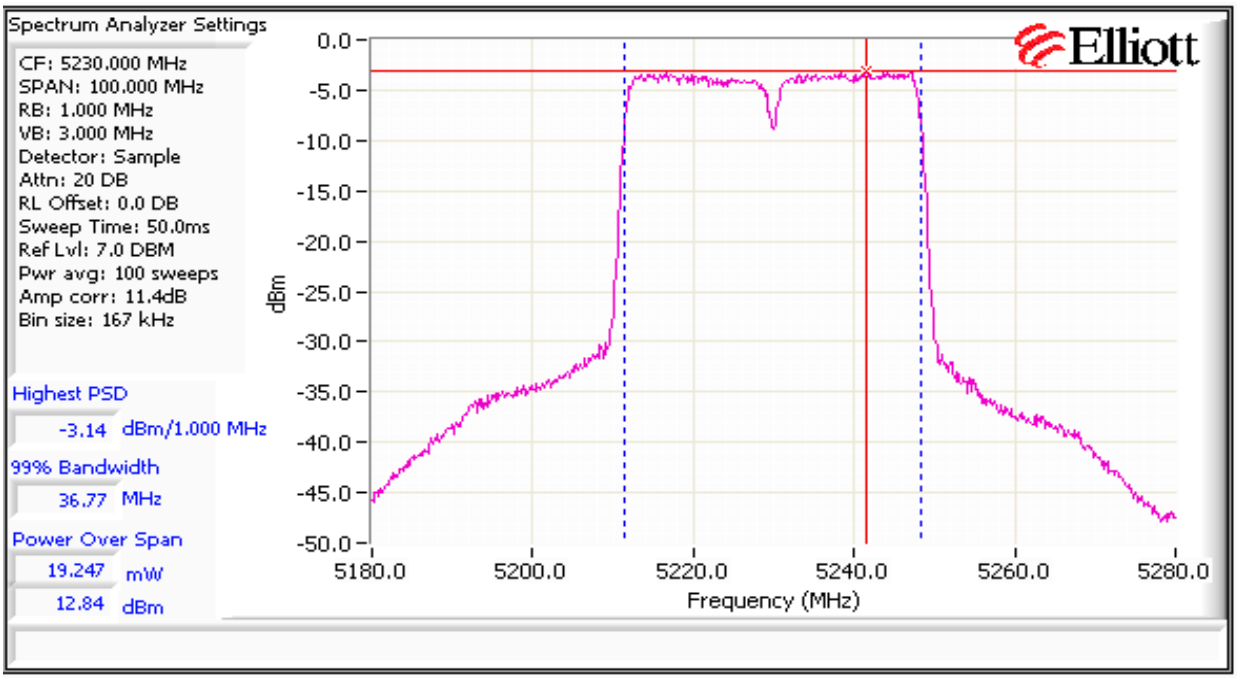
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A





Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A





Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

MIMO Device - 5250-5350 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	4	4		Yes	7.0	450.5	26.5

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 SISO Mode - effective antenna gain is single chain gain of 4dBi, maximum eirp = 23.1dBm, 204 mW										
5260	17.0	29.5	16.4			43.7	16.4	24.0		PASS
5300	17.0	27.3	15.8			37.8	15.8	24.0	0.044	PASS
5320	17.0	28.9	15.6			36.3	15.6	24.0		PASS
802.11a MIMO Mode										
5260	17.0	29.5	16.4	16.6		89.7	19.5	23.0		PASS
5300	17.0	27.3	15.8	16.2		79.7	19.0	23.0	0.090	PASS
5320	15.0	29.0	13.2	14.1		46.7	16.7	23.0		PASS
802.11n 20MHz Mode										
5260	17.0	30.3	15.9	16.6		84.6	19.3	23.0		PASS
5300	17.0	29.2	15.6	16.1		77.0	18.9	23.0	0.085	PASS
5320	13.5	28.7	11.7	12.4		32.2	15.1	23.0		PASS
802.11n 40MHz Mode										
5270	17.0	56.0	14.4	16.6		73.3	18.7	23.0	0.073	PASS
5310	8.5	54.3	4.9	7.3		8.5	9.3	23.0		PASS

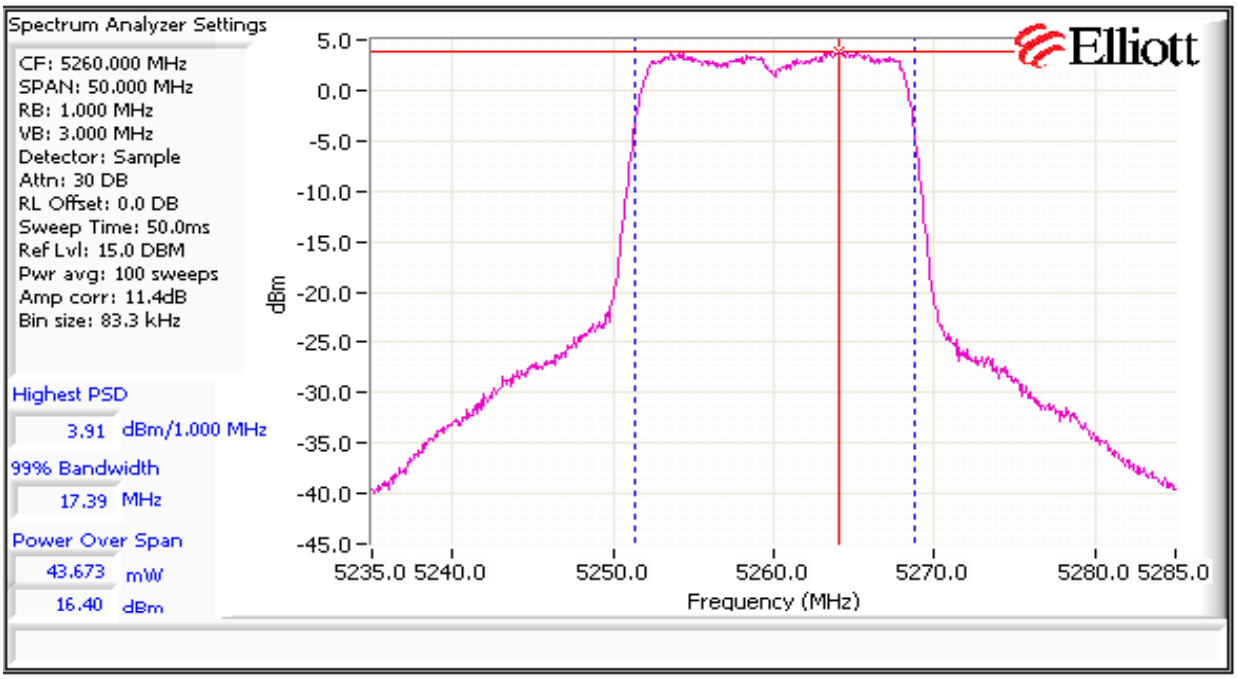
PSD

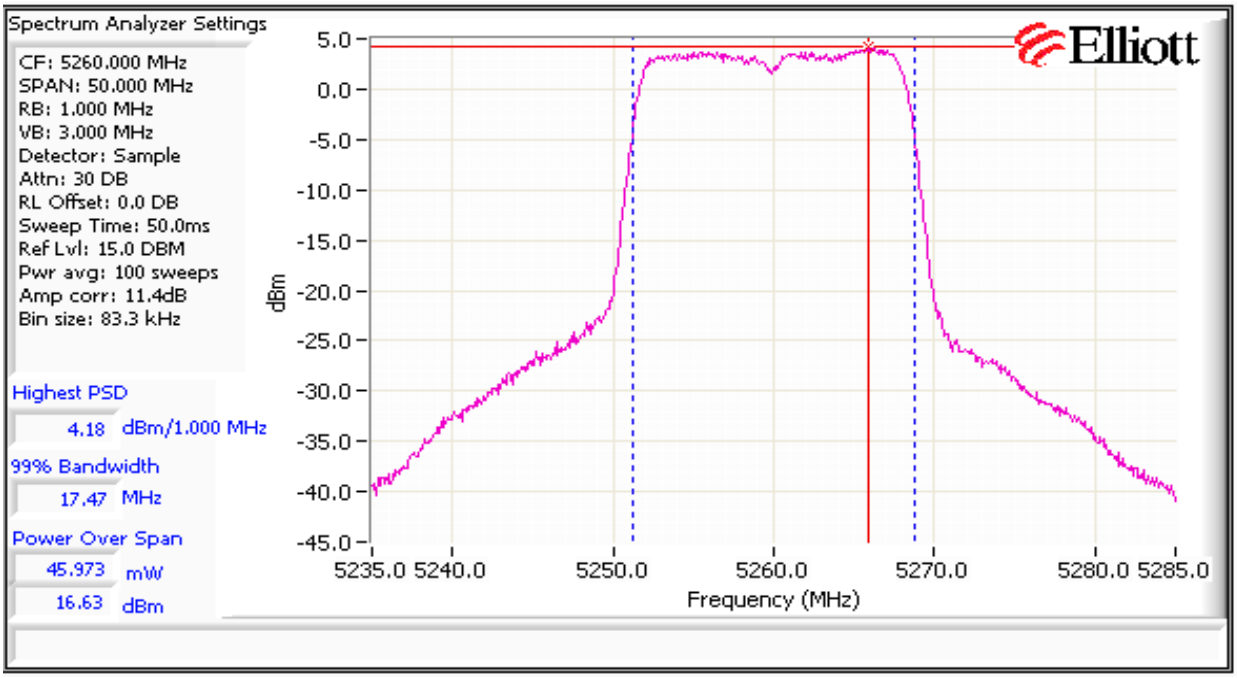
Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
802.11a SISO Mode - effective antenna gain is single chain gain of 4dBi.										
5260	17.4	16.4	3.9			2.5	3.9	11.0	11.0	PASS
5300	17.4	15.8	3.3			2.1	3.3	11.0	11.0	PASS
5320	17.5	15.6	0.7			1.2	0.7	11.0	11.0	PASS
802.11a MIMO Mode										
5260	17.5	19.5	3.9	4.2		5.1	7.1	10.0	11.0	PASS
5300	17.4	19.0	3.3	3.6		4.4	6.5	10.0	11.0	PASS
5320	17.5	16.7	0.7	1.5		2.6	4.2	10.0	11.0	PASS
802.11n 20MHz Mode										
5260	18.6	19.3	3.2	3.7		4.4	6.5	10.0	11.0	PASS
5300	18.6	18.9	2.8	3.5		4.1	6.2	10.0	11.0	PASS
5320	18.6	15.1	-1.1	-0.3		1.7	2.4	10.0	11.0	PASS
802.11n 40MHz Mode										
5270	36.6	18.7	-1.0	0.9		2.0	3.0	10.0	11.0	PASS
5310	36.4	9.3	-10.7	-7.8		0.3	-6.0	10.0	11.0	PASS

Output Power at Low Power Setting - 5250-5350 MHz Band

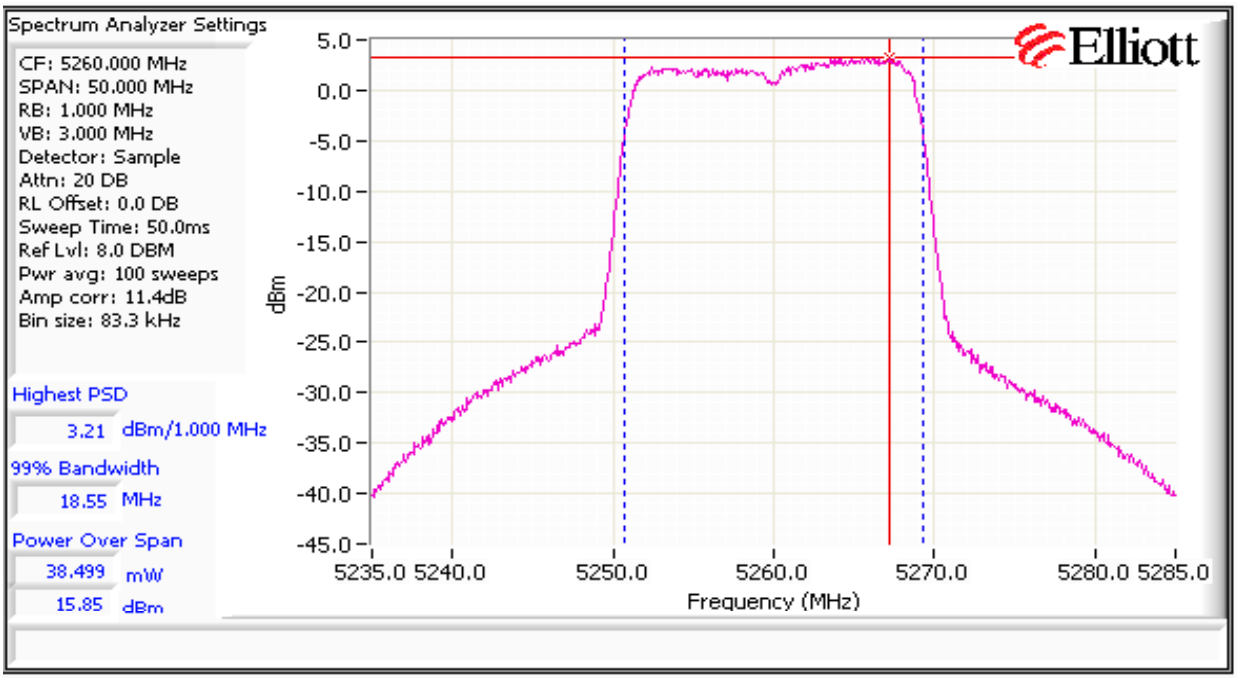
EIRP does not exceed 500mW, therefore TPC is not required and measurements at a low power setting are not required.

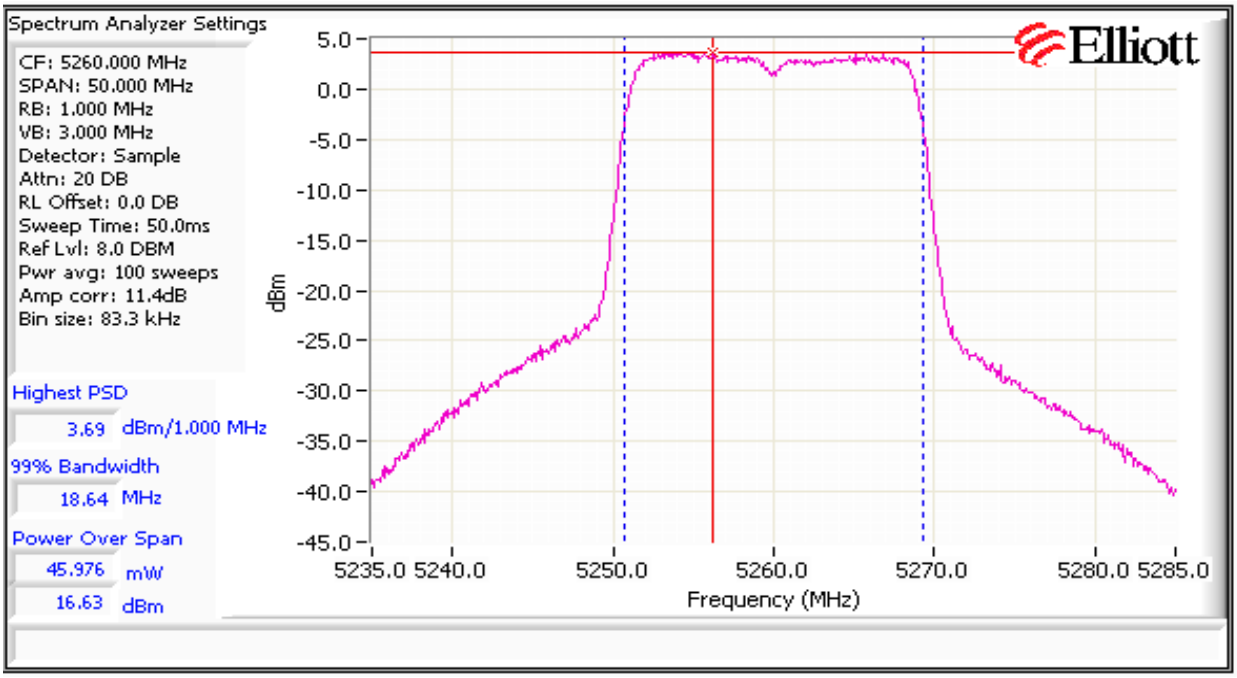
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A



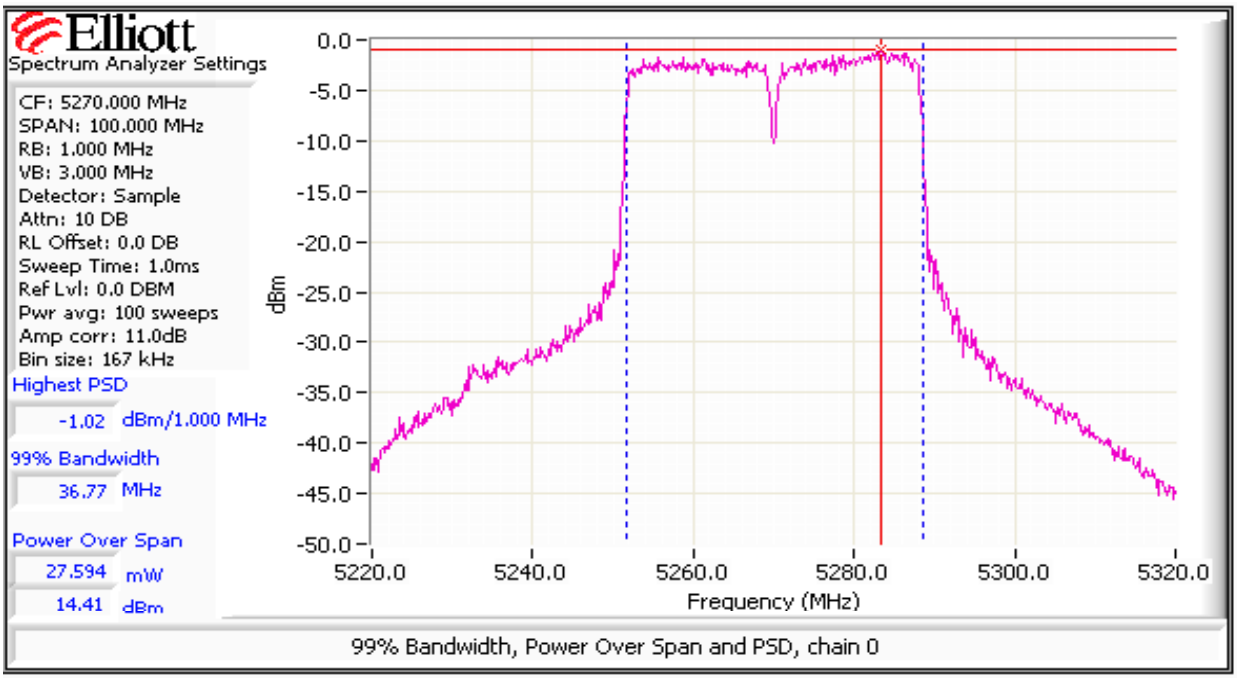


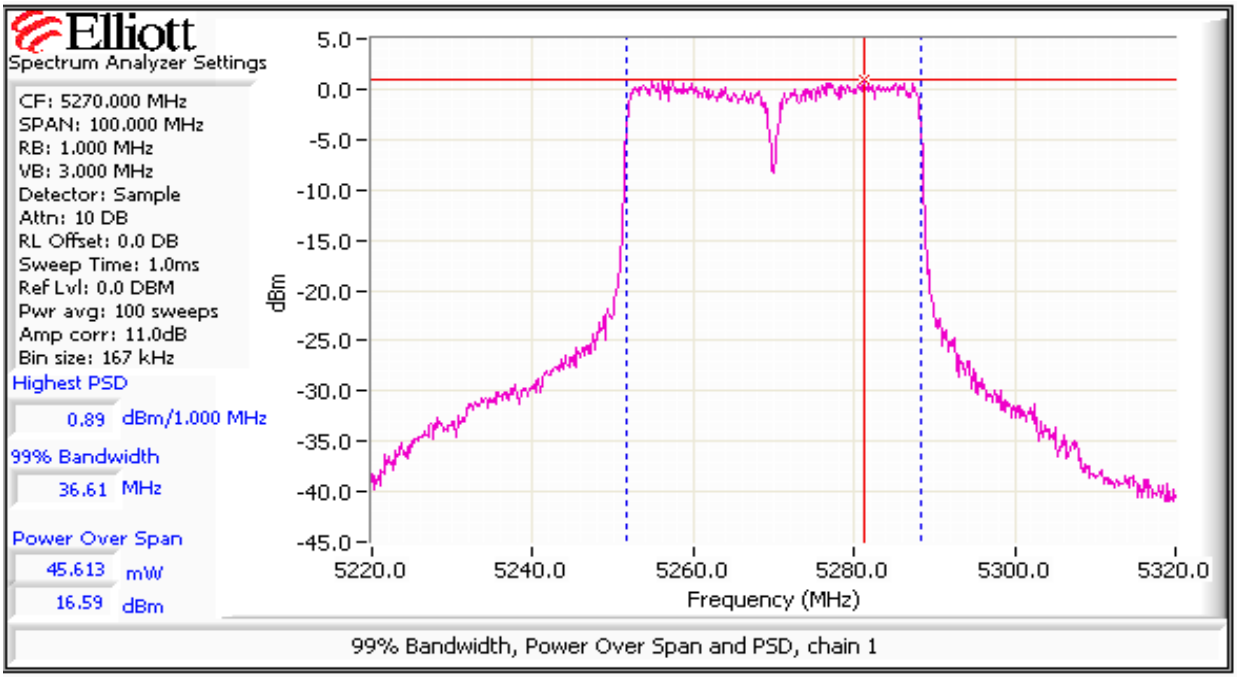
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A





Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A





Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

MIMO Device - 5470-5725 MHz Band

	Chain 1	Chain 2	Chain 3	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	4	4		Yes	7.0	466.8	26.7

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 SISO Mode - effective antenna gain is single chain gain of 4dBi, maximum eirp = 22.6dBm, 182 mW										
5500	17.0	28.3	15.9			38.9	15.9	24.0		PASS
5580	17.0	39.8	15.8			38.0	15.8	24.0	0.039	PASS
5700	17.0	32.0	15.4			34.7	15.4	24.0		PASS
802.11a MIMO Mode										
5500	17.0	28.3	15.9	17.3		92.9	19.7	23.0		PASS
5580	17.0	30.0	15.8	16.3		81.2	19.1	23.0	0.093	PASS
5700	17.0	32.0	15.4	15.5		69.8	18.4	23.0		PASS
802.11n 20MHz Mode										
5500	16.5	29.8	14.9	15.8		68.6	18.4	23.0		PASS
5580	17.0	29.1	13.2	16.0		60.7	17.8	23.0	0.069	PASS
5700	16.5	28.9	15.0	15.0		63.1	18.0	23.0		PASS
802.11n 40MHz Mode										
5510	11.0	53.5	8.1	10.2		16.9	12.3	23.0		PASS
5550	15.0	51.5	13.0	14.2		46.0	16.6	23.0	0.046	PASS
5670	15.0	50.0	12.4	13.8		41.4	16.2	23.0		PASS

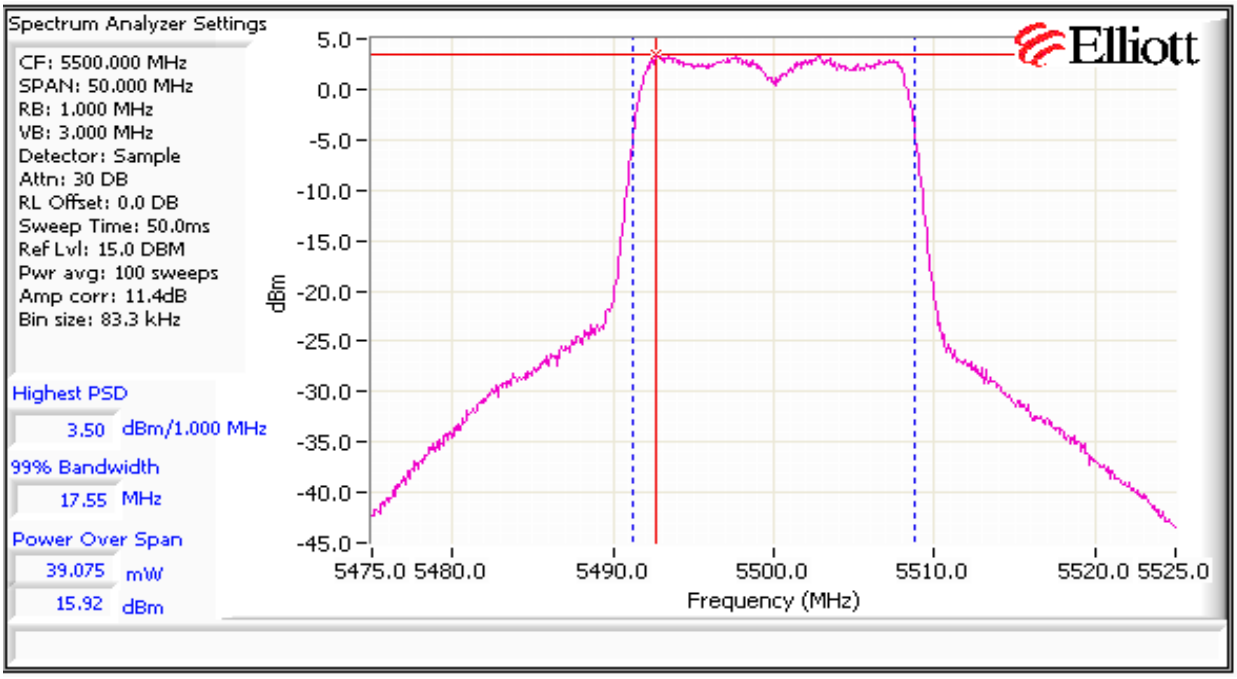
PSD

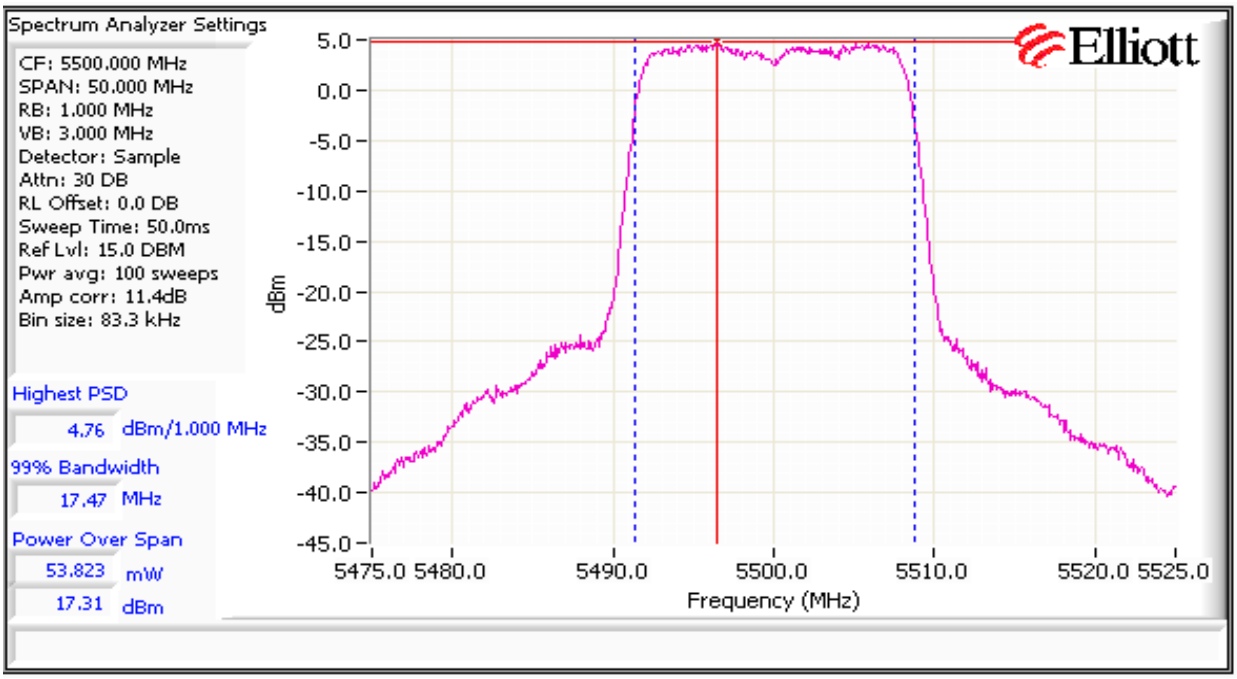
Frequency (MHz)	99%[4] BW	Total Power	PSD[2] dBm/MHz			Total PSD		Limit		Pass or Fail
			Chain 1	Chain 2	Chain 3	mW/MHz	dBm/MHz	FCC	RSS 210[3]	
802.11a SISO Mode - effective antenna gain is single chain gain of 4dBi.										
5500	17.5	15.9	4.9			3.1	4.9	11.0	11.0	PASS
5580	17.5	15.8	5.7			3.7	5.7	11.0	11.0	PASS
5700	17.6	15.4	5.4			3.5	5.4	11.0	11.0	PASS
802.11a MIMO Mode										
5500	17.6	19.7	3.5	4.8		5.2	7.2	10.0	11.0	PASS
5580	17.5	19.1	3.2	3.6		4.4	6.5	10.0	11.0	PASS
5700	17.6	18.4	2.8	3.1		3.9	5.9	10.0	11.0	PASS
802.11n 20MHz Mode										
5500	18.6	18.4	1.9	3.0		3.6	5.5	10.0	11.0	PASS
5580	18.6	17.8	0.3	3.4		3.3	5.1	10.0	11.0	PASS
5700	18.7	18.0	2.2	2.5		3.4	5.4	10.0	11.0	PASS
802.11n 40MHz Mode										
5510	36.6	12.3	-3.6	-1.4		1.2	0.6	10.0	10.0	PASS
5550	36.6	16.6	-2.6	-1.5		1.3	1.0	10.0	11.0	PASS
5670	36.6	16.2	-3.0	-1.4		1.2	0.9	10.0	11.0	PASS

Output Power at Low Power Setting - 5470-5725 MHz Band

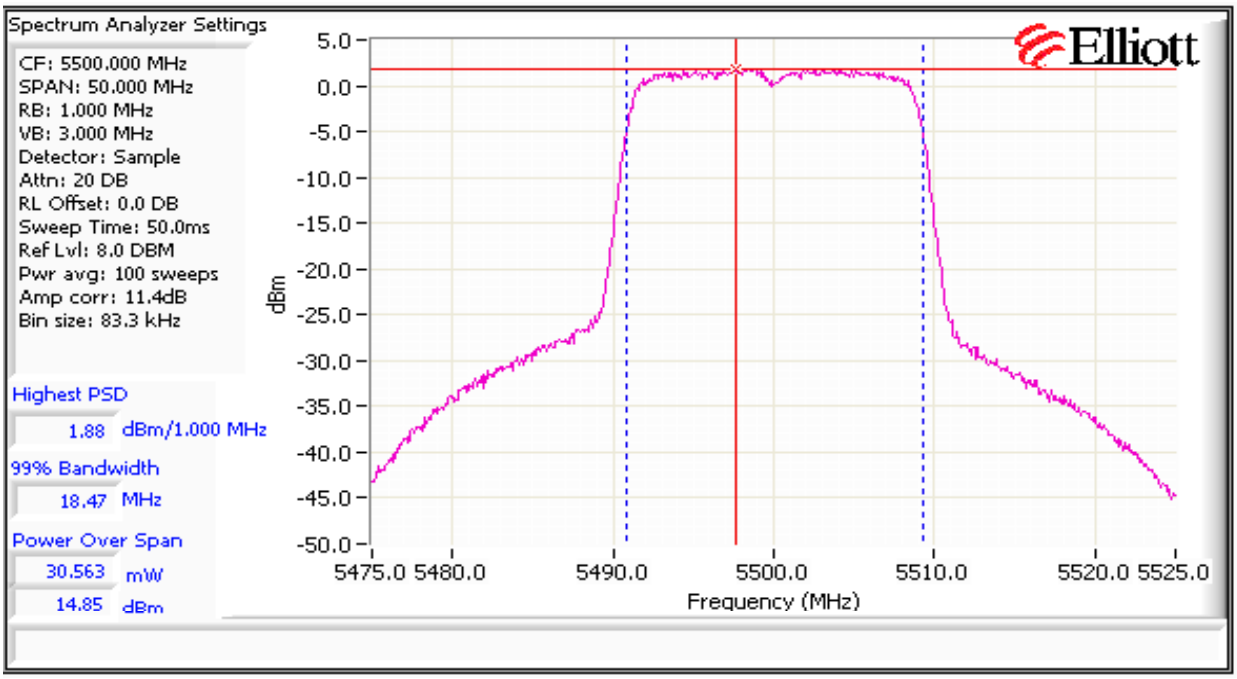
EIRP does not exceed 500mW, therefore TPC is not required and measurements at a low power setting are not required.

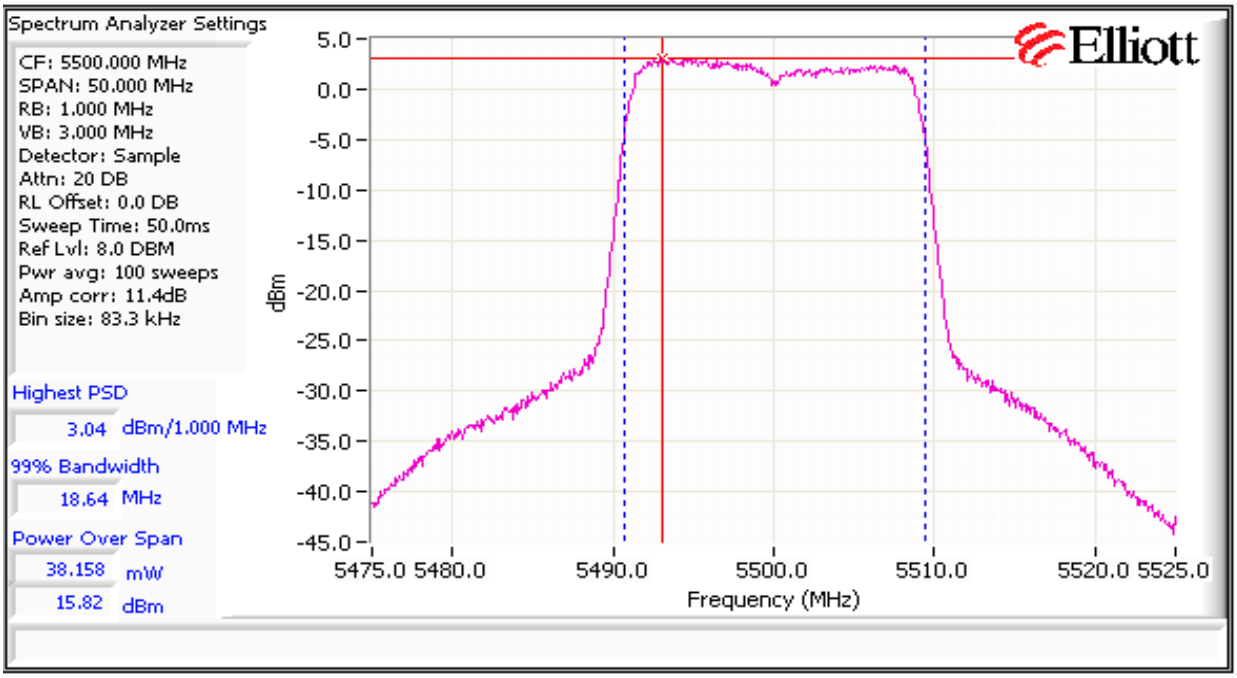
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A



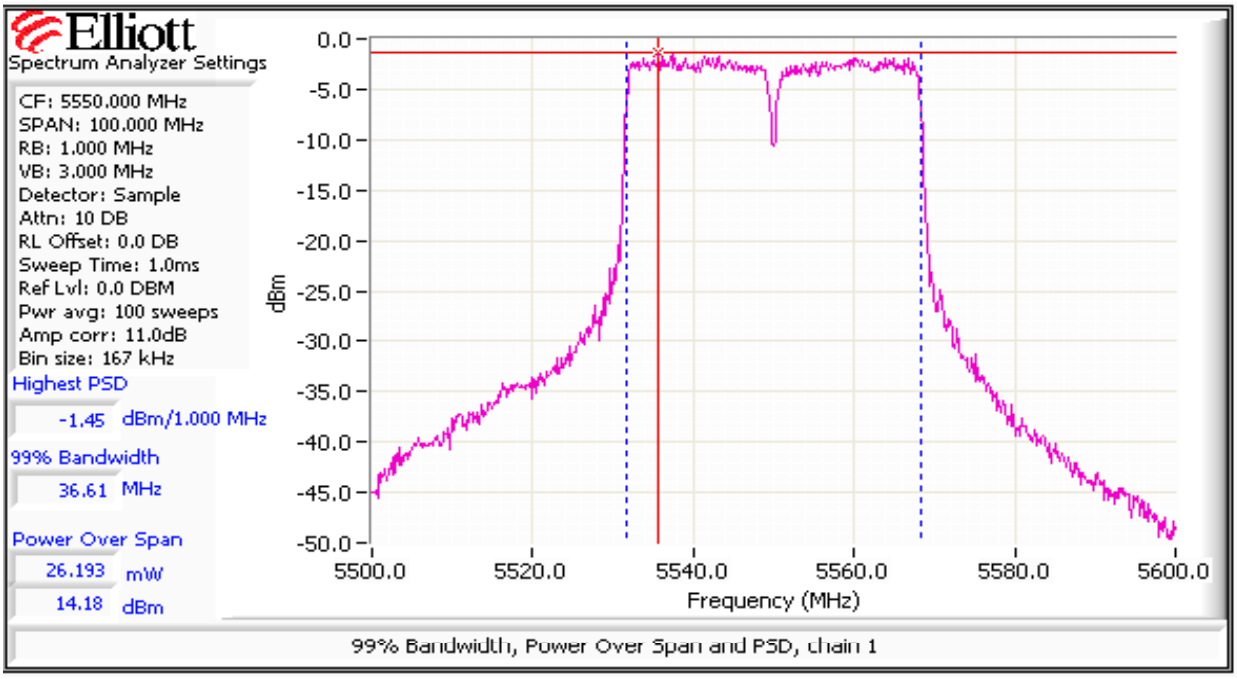


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A





Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #2: Peak Excursion Measurement

2.11a SISO: Device meets the requirement for the peak excursion

Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180	12.2	13.0	5260	11.5	13.0	5500	12.9	13.0
5200	11.3	13.0	5300	11.5	13.0	5580	12.9	13.0
5240	11.5	13.0	5320	11.7	13.0	5700	12.8	13.0

802.11a: Device meets the requirement for the peak excursion

Values provided are worst case from measurements on both chains.

Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180	12.6	13.0	5260	12.6	13.0	5500	12.9	13.0
5200	12.6	13.0	5300	12.6	13.0	5580	12.9	13.0
5240	12.8	13.0	5320	12.7	13.0	5700	12.8	13.0

20MHz: Device meets the requirement for the peak excursion

Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5180	11.4/11.3	13.0	5260	11.3/11.7	13.0	5500	11.7/12.2	13.0
5200	11.3/12.0	13.0	5300	11.4/11.7	13.0	5580	12.1/11.7	13.0
5240	11.1/12.9	13.0	5320	11.4/12.99	13.0	5700	13.0/11.5	13.0

40MHz: Device meets the requirement for the peak excursion

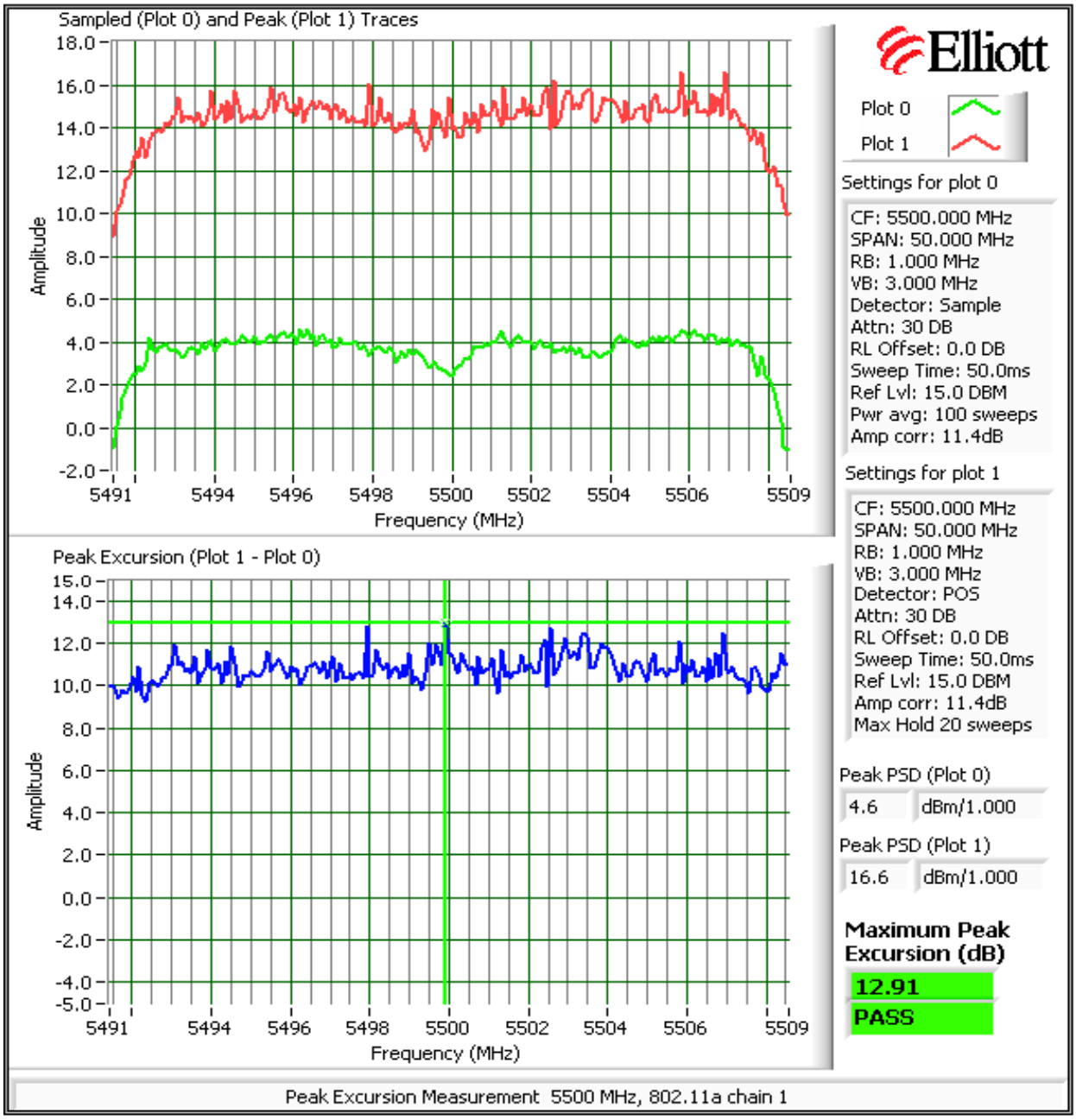
Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)		Freq	Peak Excursion(dB)	
(MHz)	Value	Limit	(MHz)	Value	Limit	(MHz)	Value	Limit
5190	9.97/9.87	13.0	5270	9.91/12.12	13.0	5510	11.40/11.27	13.0
5230	11.40/10.56	13.0	5310	9.75/11.04	13.0	5550	11.53/11.58	13.0
						5670	10.54/10.28	13.0

Plots Showing Peak Excursion

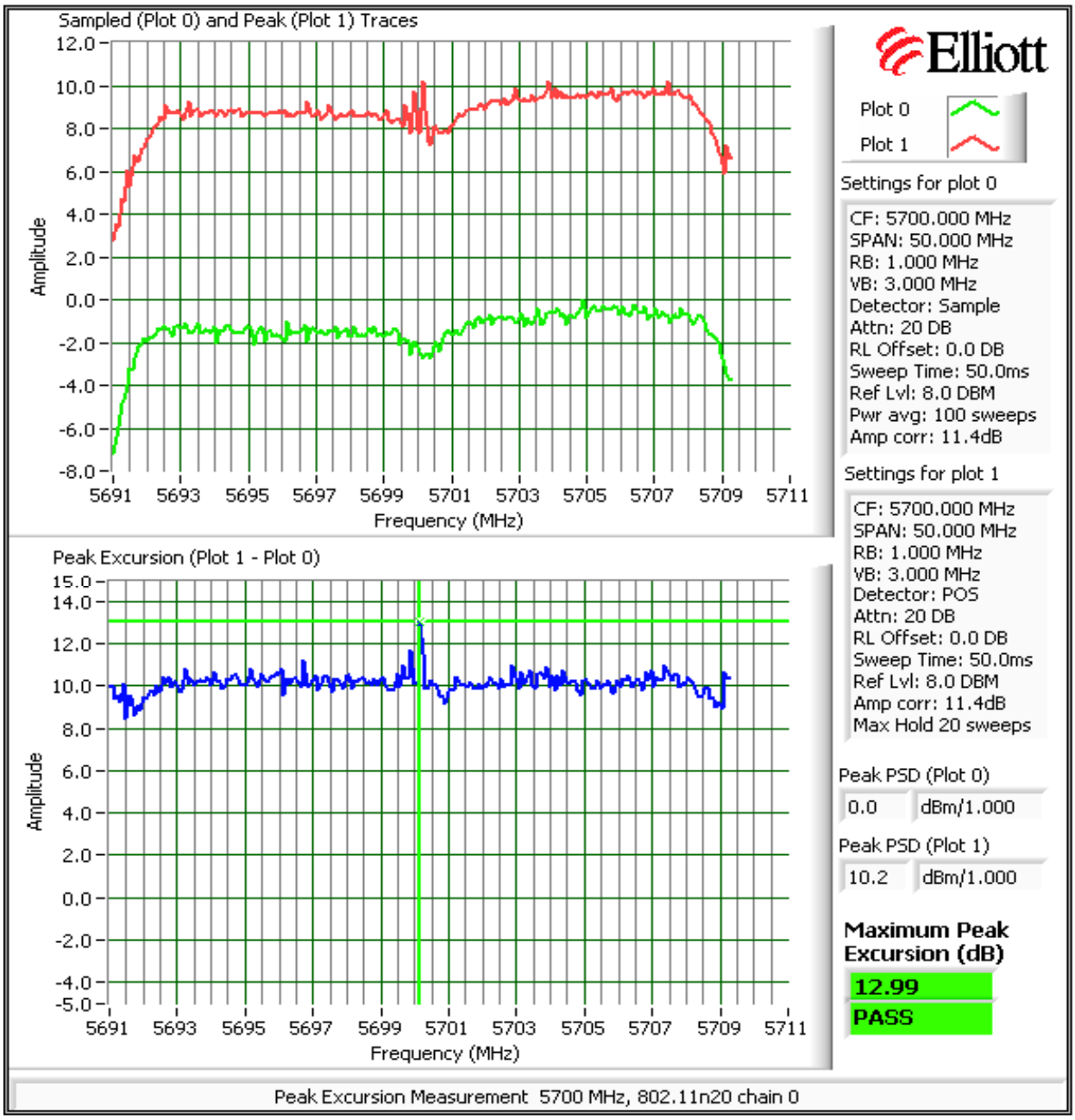
Trace A: RBW = 1MHz, VBW = 3MHz, Peak hold

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

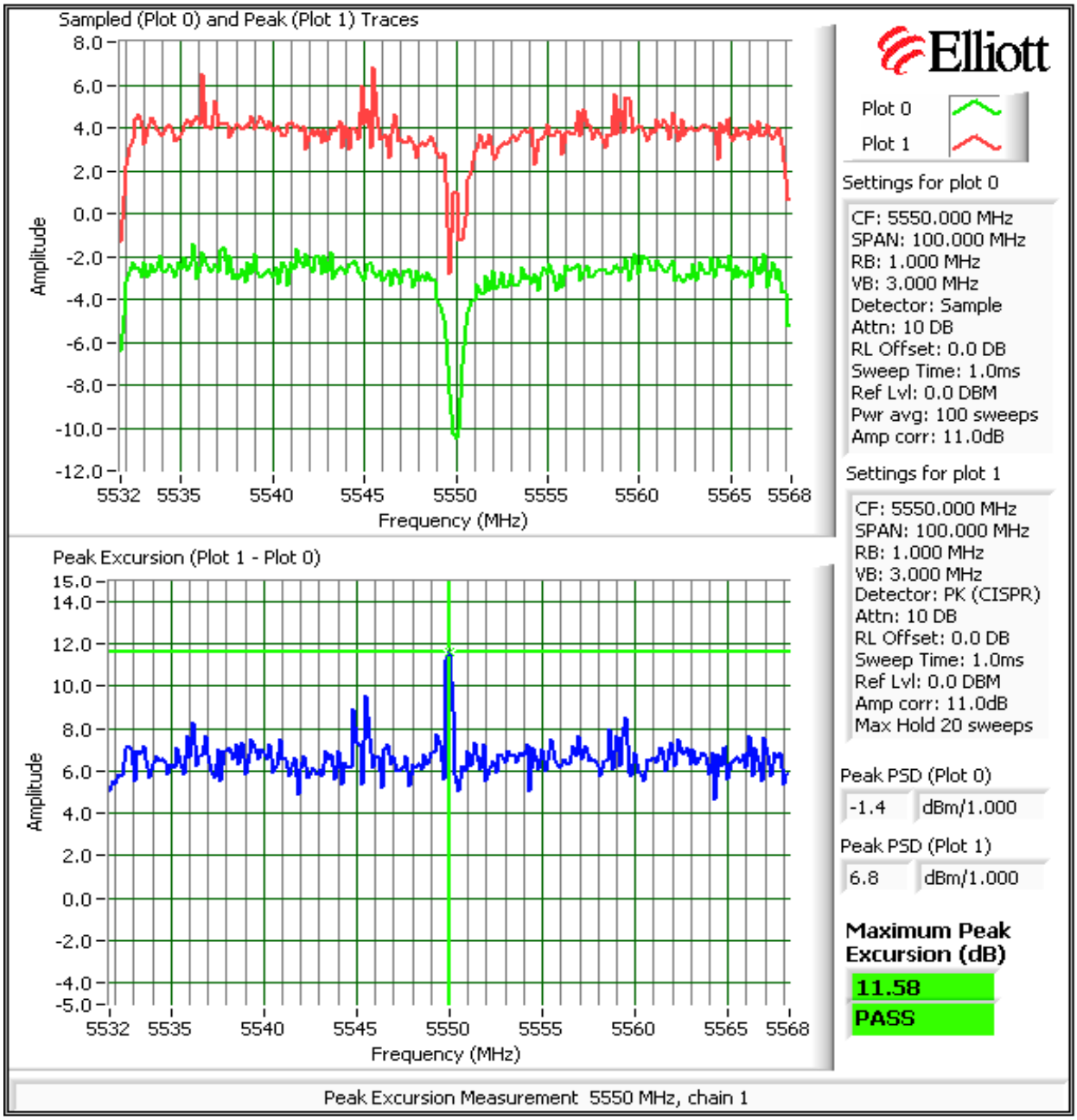
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #3: Out Of Band Spurious Emissions - Antenna Conducted
802.11a SISO Mode

Maximum Antenna Gain:	4.0	dBi
Spurious Limit:	-27.0	dBm/MHz eirp
Limit Used On Plots Note 1:	-31.0	dBm/MHz Average Limit (power averaging, RB=1MHz)

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

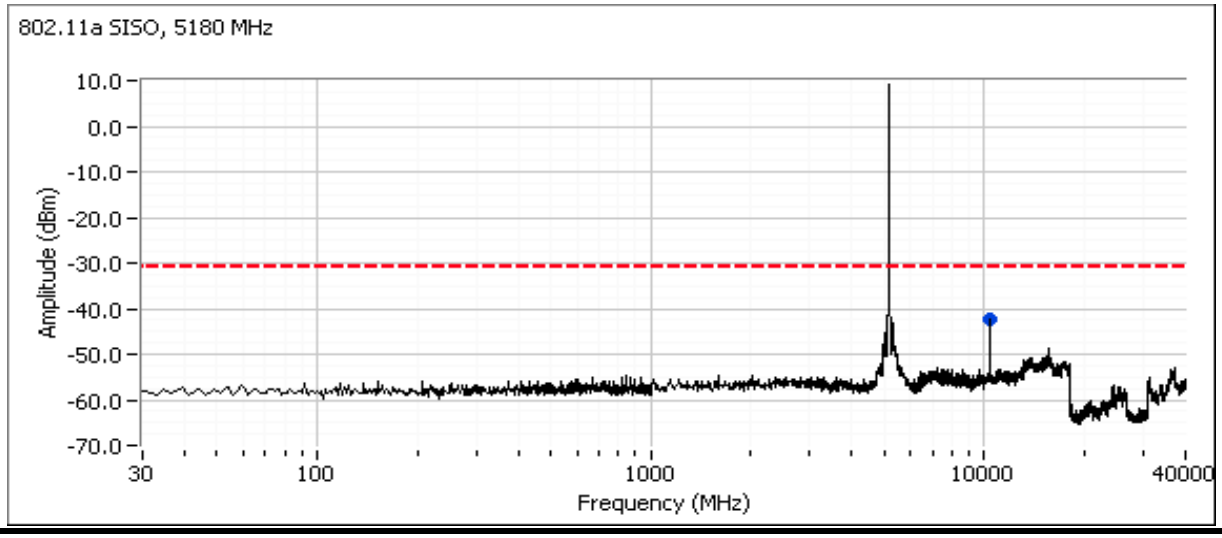
Number of transmit chains:	2	
Maximum Antenna Gain:	4.0	dBi
Spurious Limit:	-27.0	dBm/MHz eirp
Adjustment for 2 chains:	-3.0	dB adjustment for multiple chains.
Limit Used On Plots Note 1:	-34.0	dBm/MHz Average Limit (power averaging, RB=1MHz)

Note 1:	The -27dBm/MHz limit is an eirp limit. The limit for antenna port conducted measurements is adjusted to take into consideration the maximum antenna gain (limit = -27dBm - antenna gain). Radiated field strength measurements for signals more than 50MHz from the bands and that are close to the limit are made to determine compliance as the antenna gain is not known at these frequencies.
Note 2:	All spurious signals below 1GHz are measured during digital device radiated emissions test.
Note 3:	Signals within 10MHz of the 5.725 or 5.825 Band edge are subject to a limit of -17dBm EIRP
Note 4:	If the device is for outdoor use then the -27dBm eirp limit also applies in the 5150 - 5250 MHz band.
Note 5:	Signals that fall in the restricted bands of 15.205 are subject to the limit of 15.209.
Note 6:	For all plots, RB=VB=1MHz was used.

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

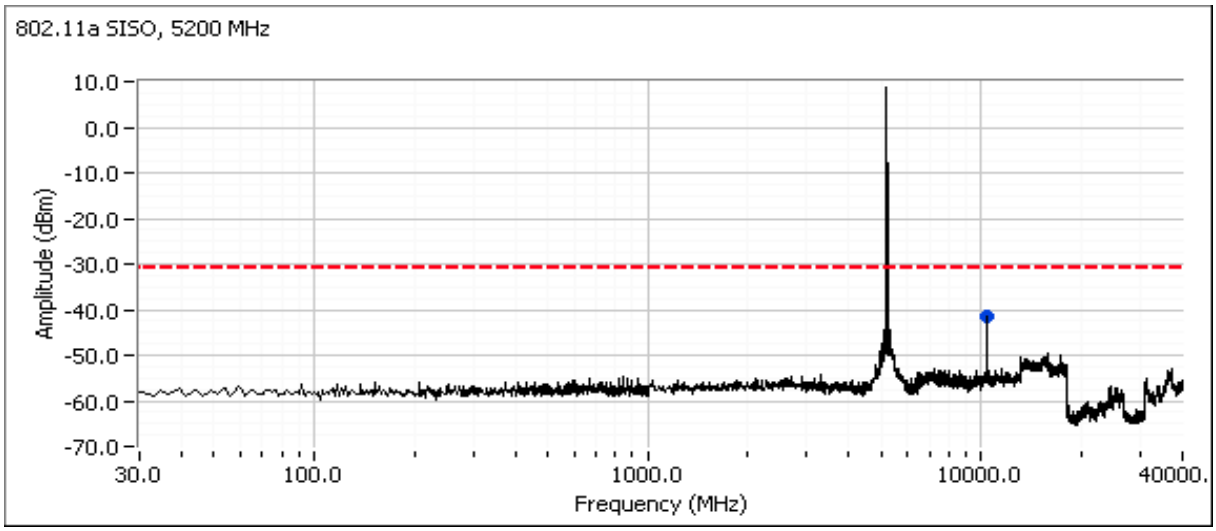
802.11a SISO Mode Low channel, 5150 - 5250 MHz Band

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

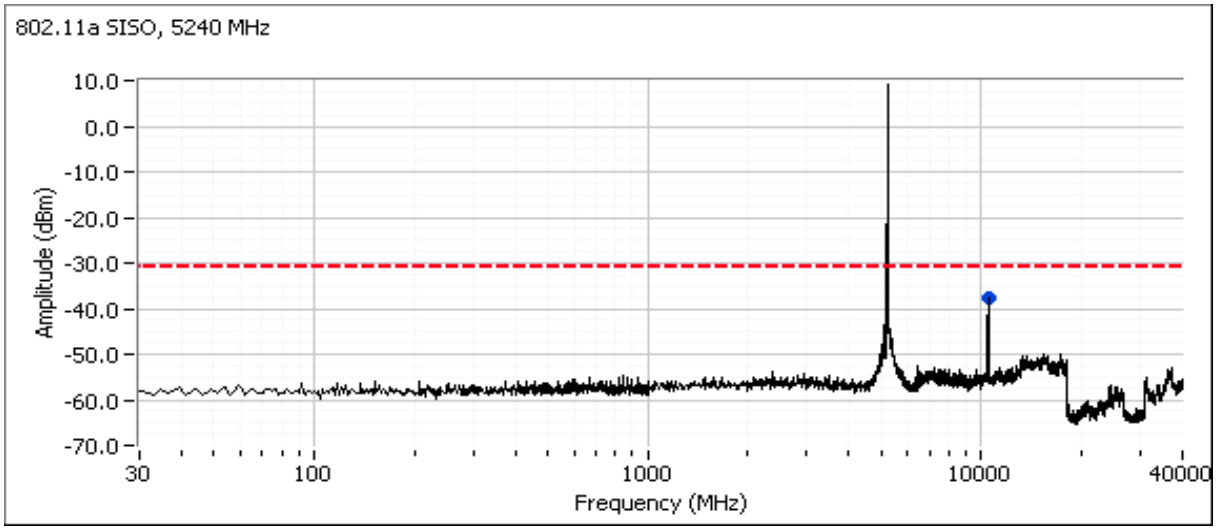


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

802.11a SISO Mode Center channel, 5150 - 5250 MHz Band

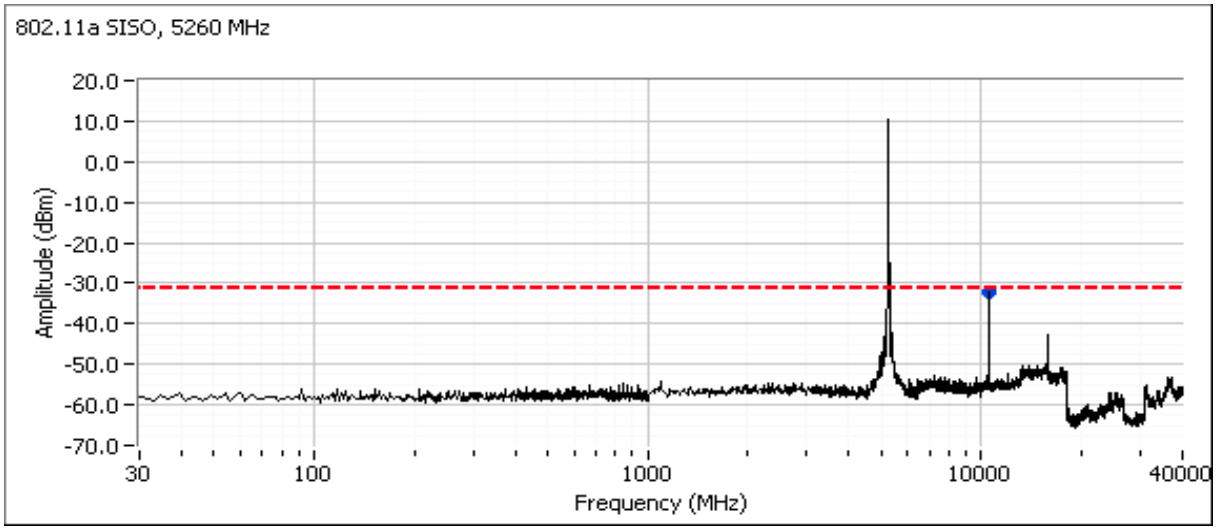


802.11a SISO Mode High channel, 5150 - 5250 MHz Band

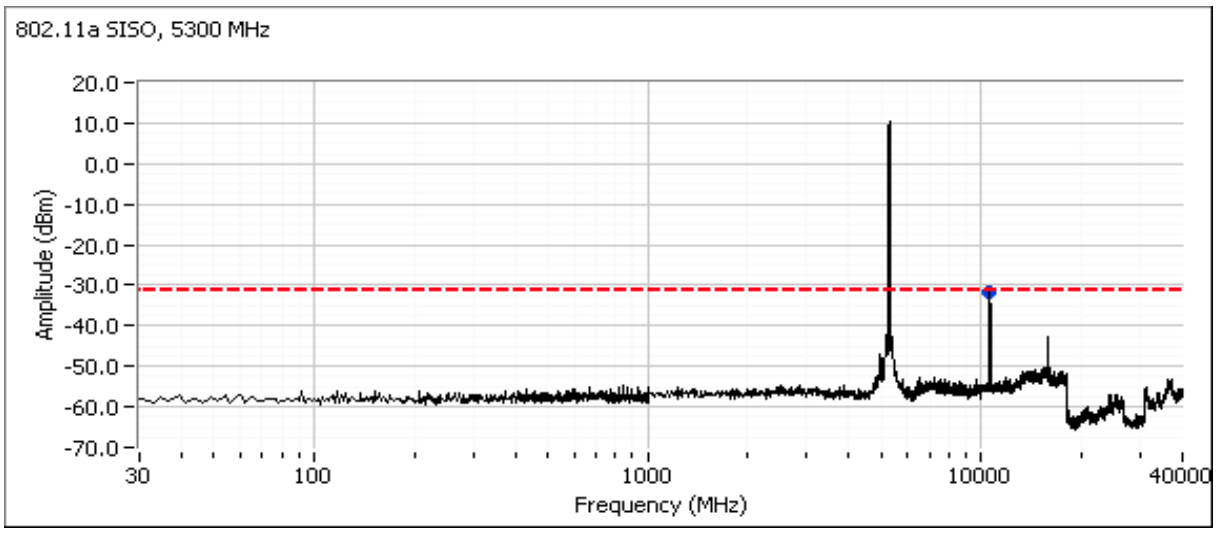


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

802.11a SISO Mode Low channel, 5250 - 5350 MHz Band



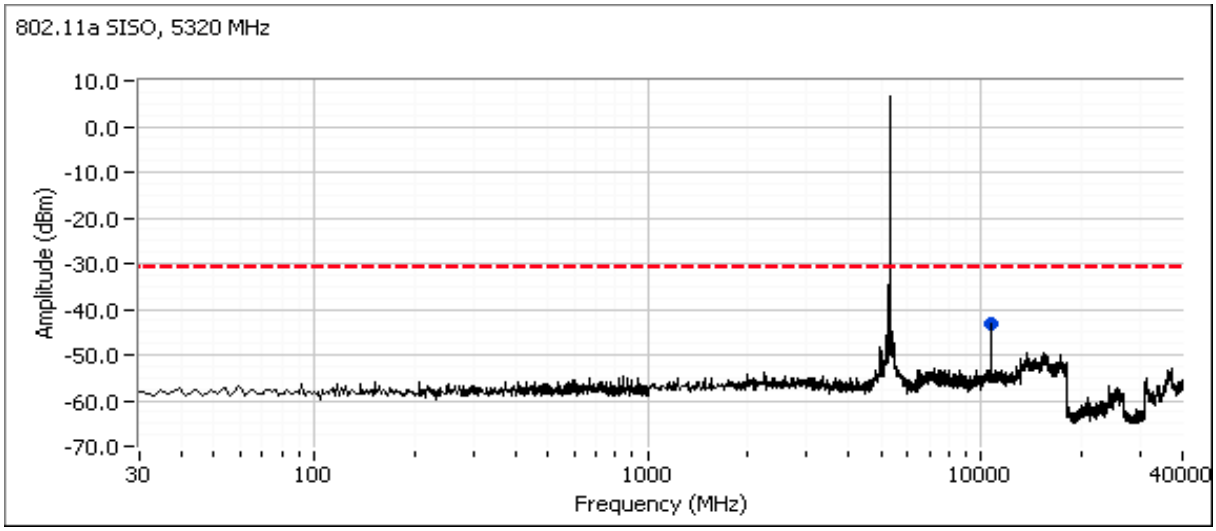
802.11a SISO Center channel, 5250 - 5350 MHz Band



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

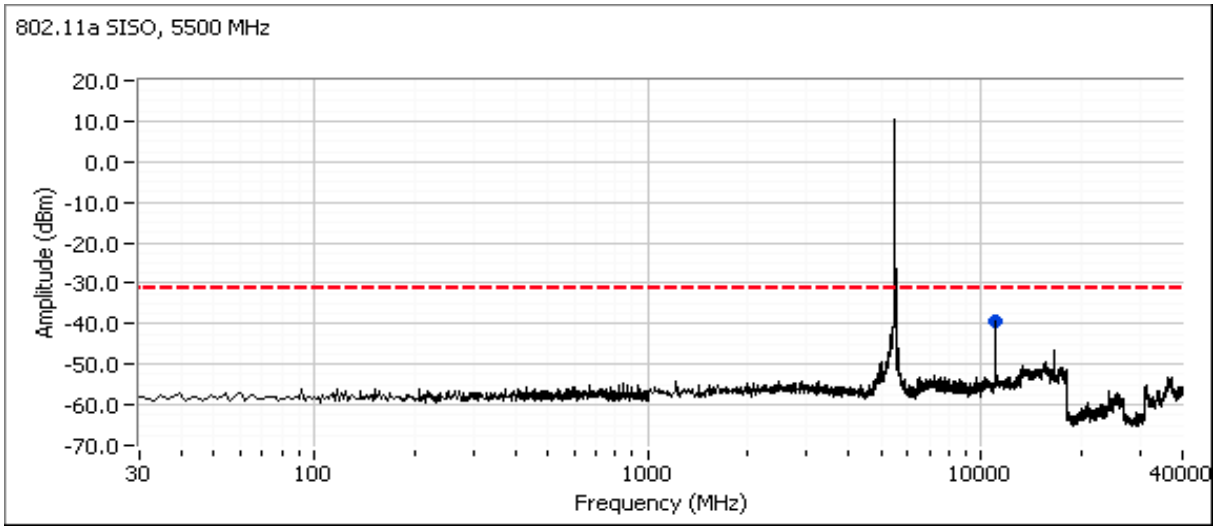
802.11a SISO Mode High channel, 5250 - 5350 MHz Band

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



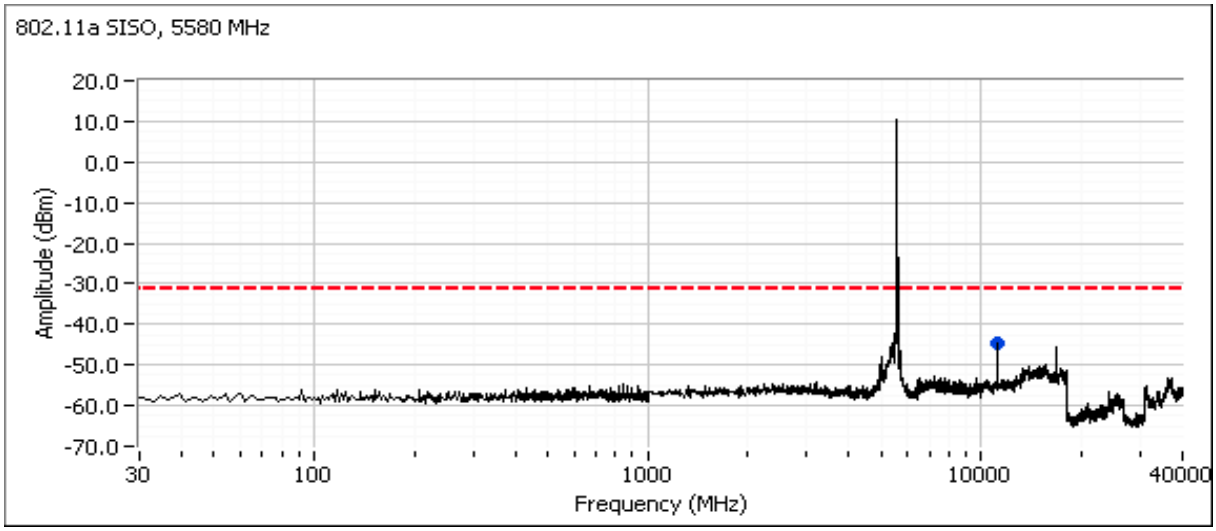
802.11a SISO Mode Low channel, 5470 - 5725 MHz Band

Note - compliance with the radiated limits for the restricted band immediately below 5460MHz and for the band edge at 5470MHz are demonstrated through the radiated emissions tests.



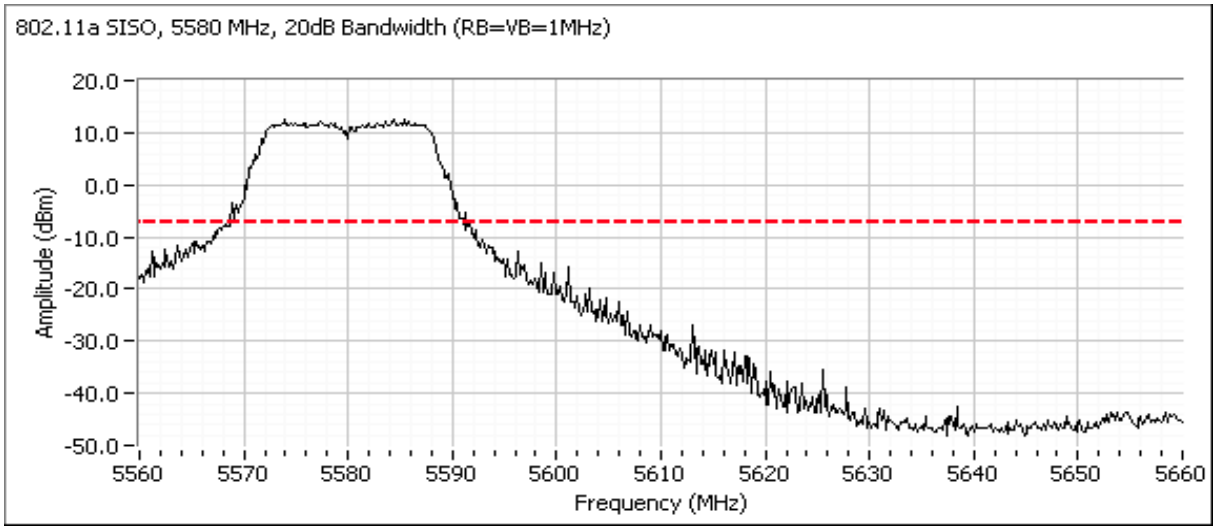
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

802.11a SISO Mode Center channel, 5470 - 5725 MHz Band

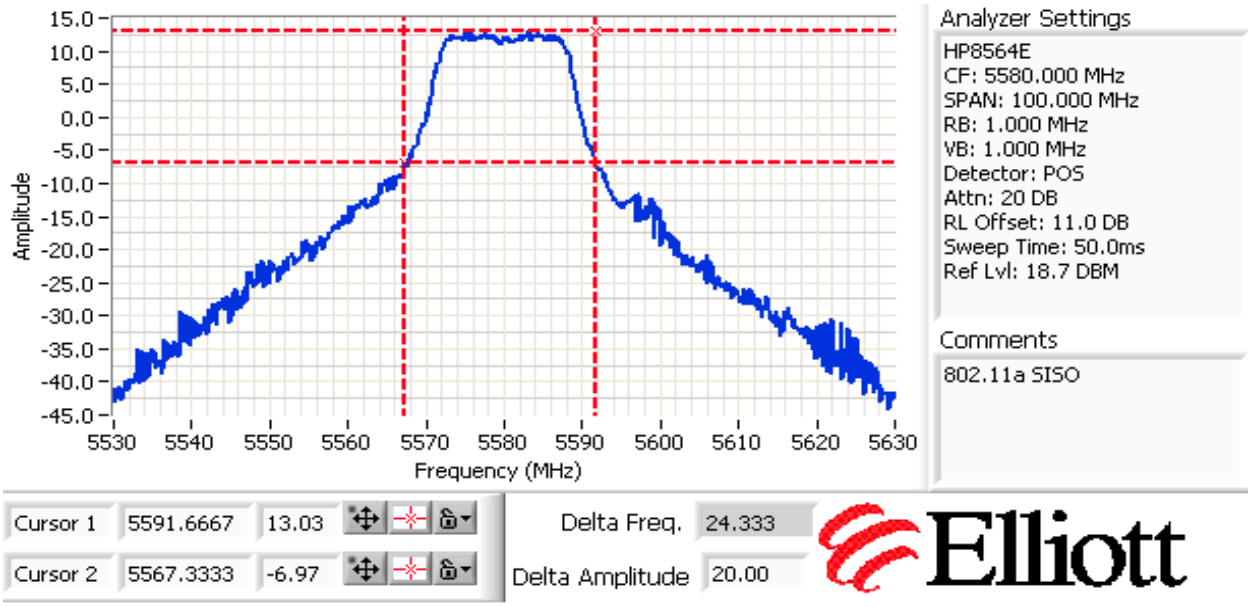


802.11a SISO Mode Channel adjacent to 5650 MHz (Master Device)

Note: 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 span.

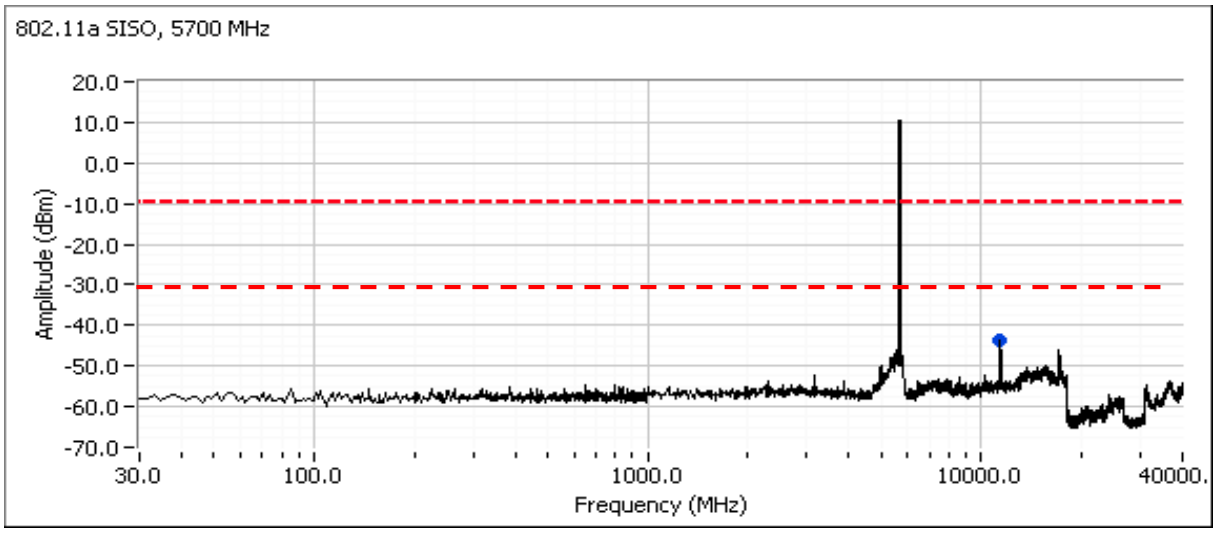


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A



802.11a SISO Mode High channel, 5470 - 5725 MHz Band

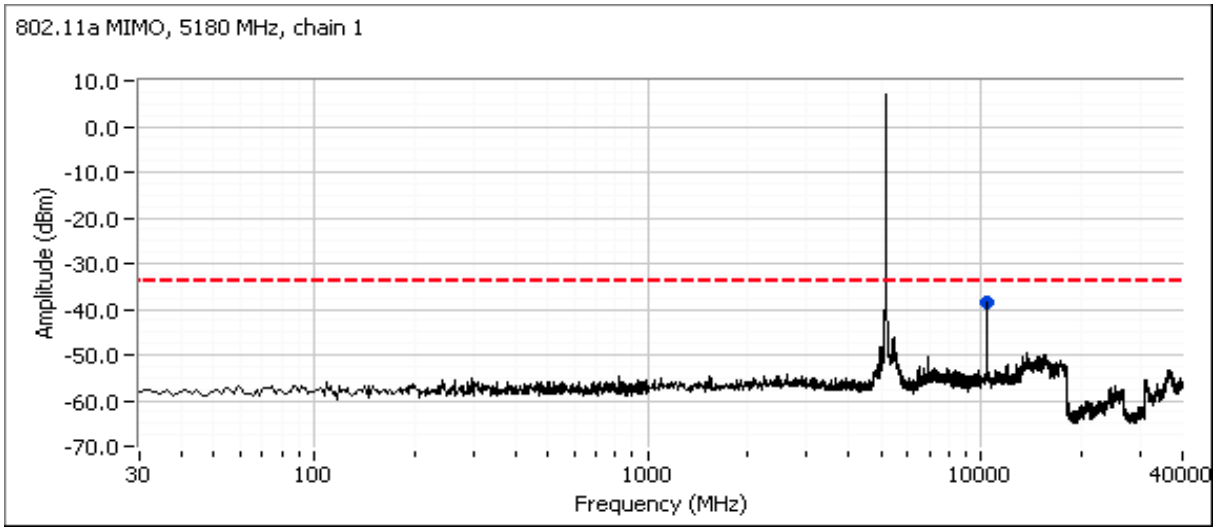
Note: Compliance with -27dBm/MHz limit above the 5725MHz band edge. Is demonstrated using radiated measurements.



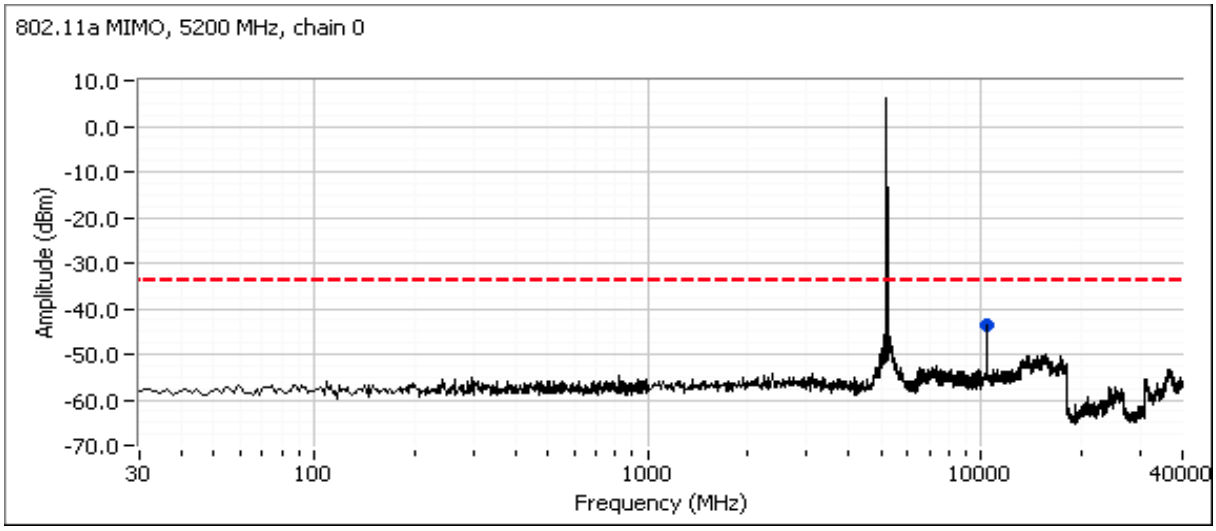
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

802.11a MIMO Mode Low channel, 5150 - 5250 MHz Band

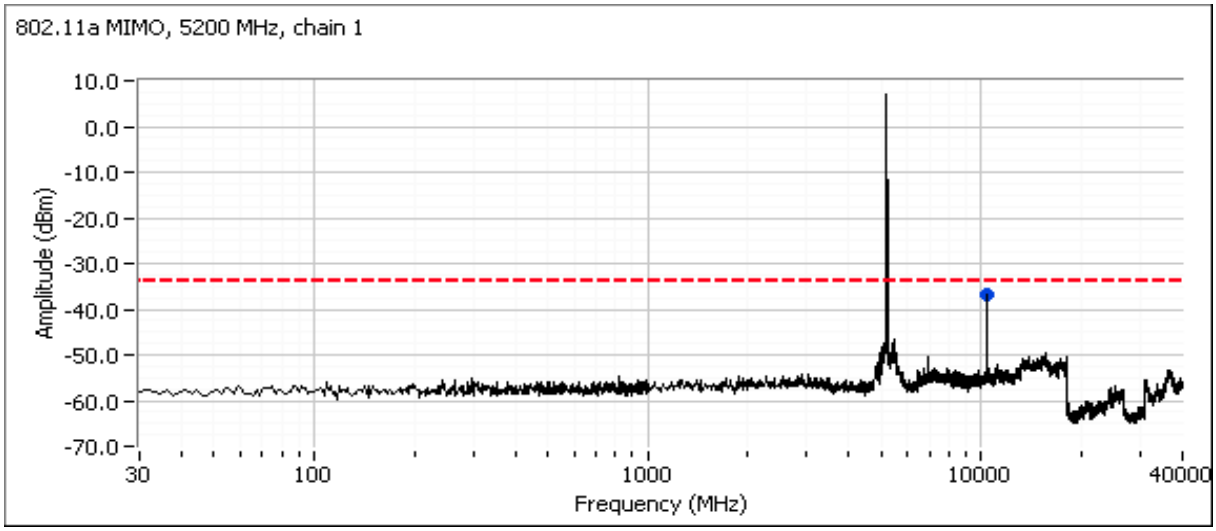
Note: Compliance with the radiated limits for the restricted band immediately below 5150MHz is demonstrated through the radiated emissions tests.



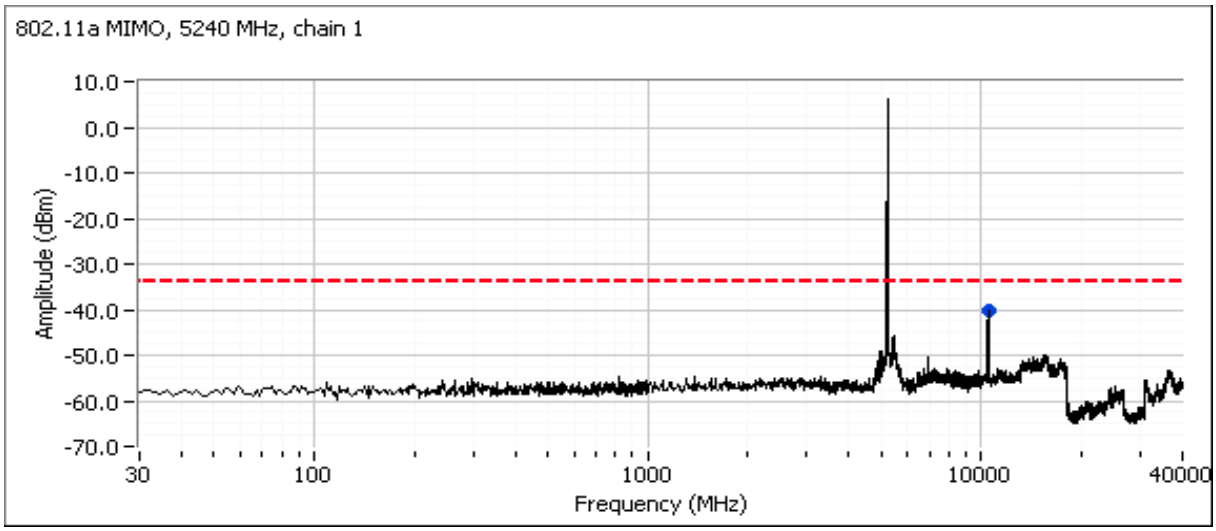
802.11a MIMO Mode Center channel, 5150 - 5250 MHz Band



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

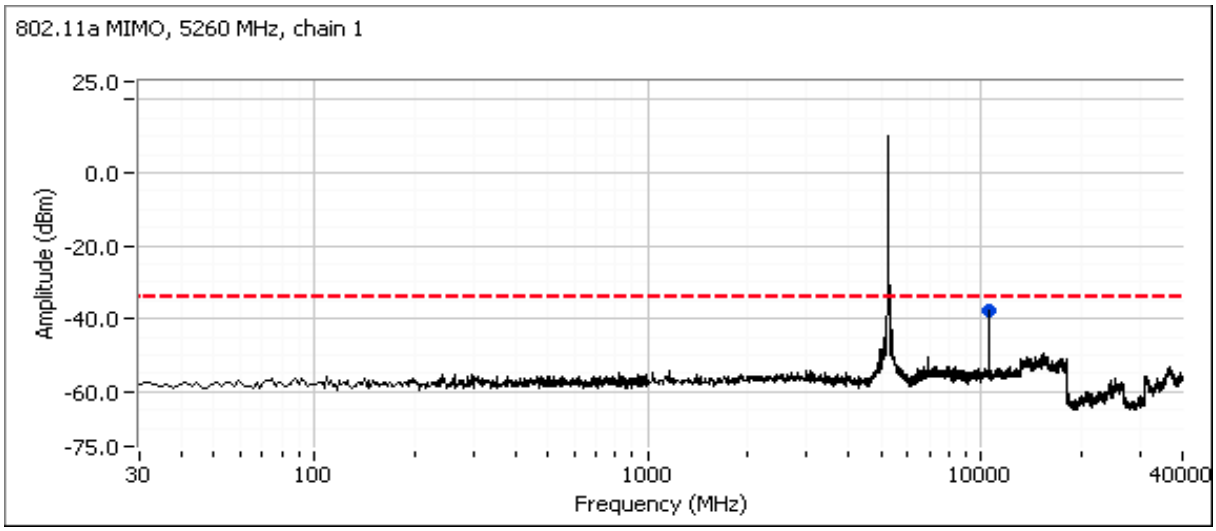


802.11a MIMO Mode High channel, 5150 - 5250 MHz Band

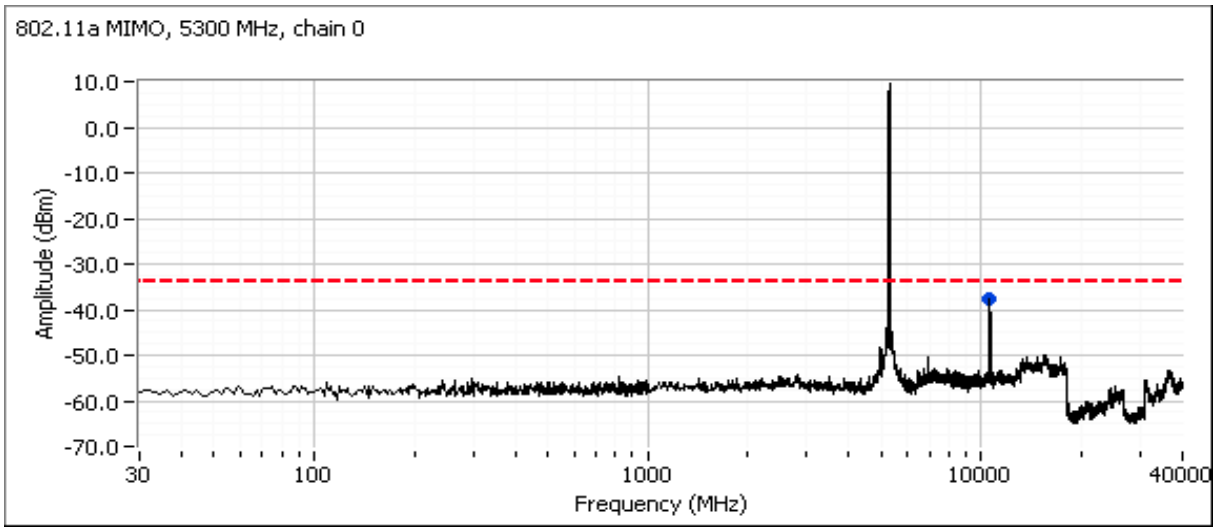


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

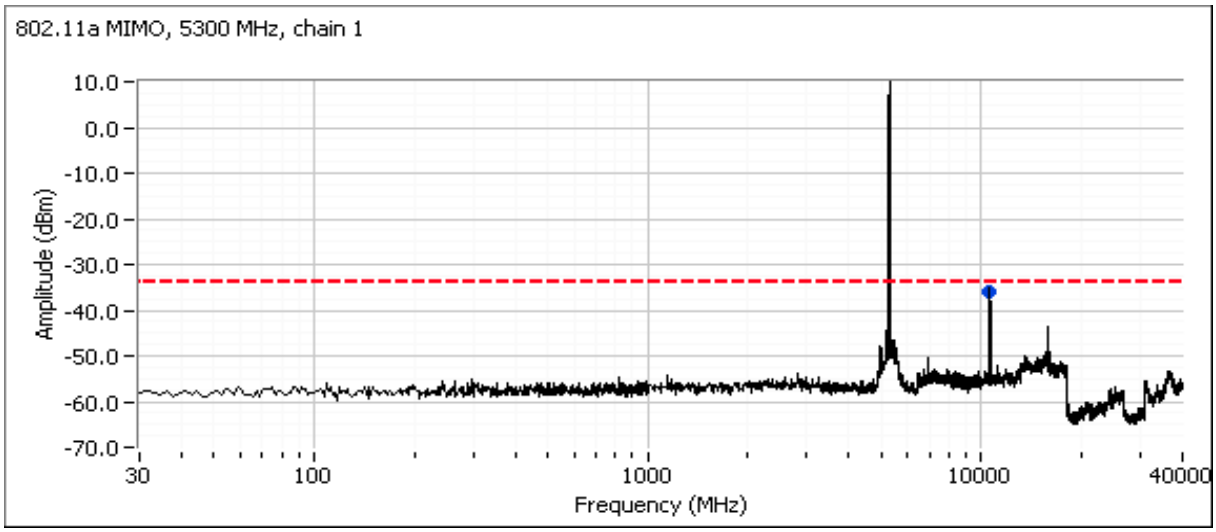
802.11a MIMO Mode Low channel, 5250 - 5350 MHz Band



802.11a MIMO Center channel, 5250 - 5350 MHz Band

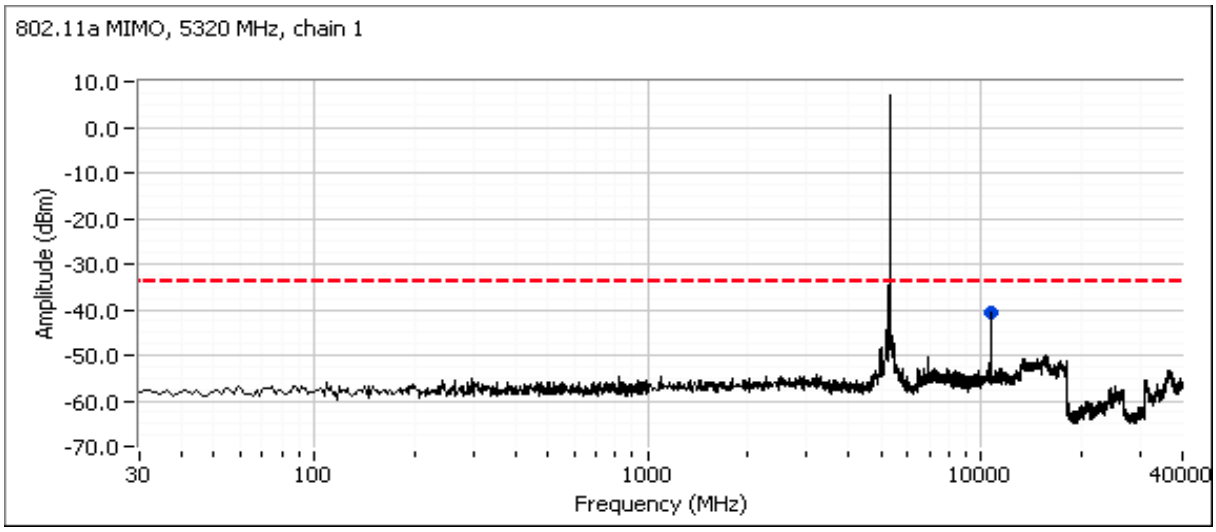


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A



802.11a MIMO Mode 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.

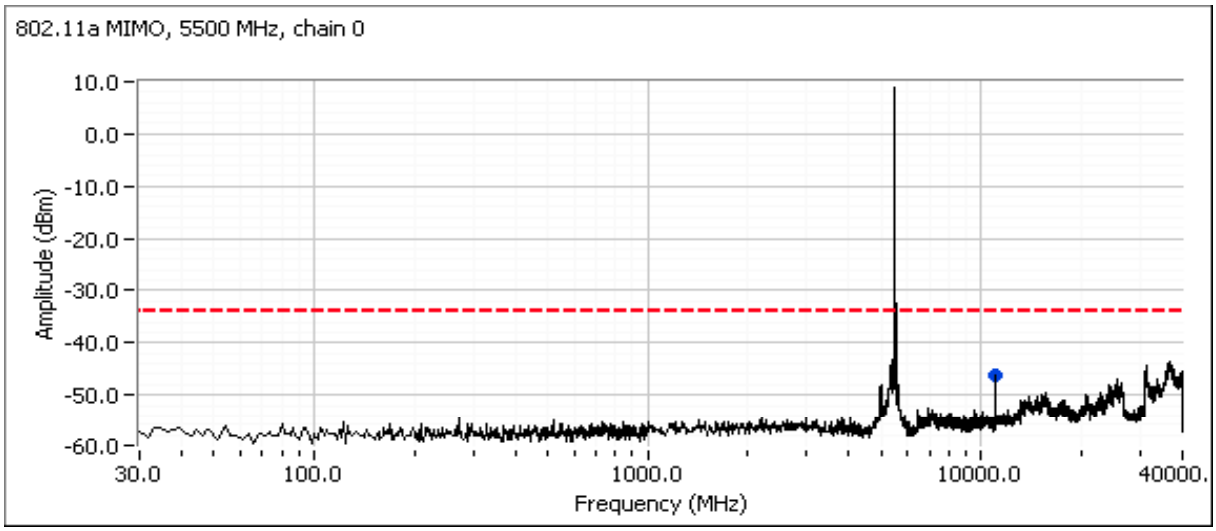


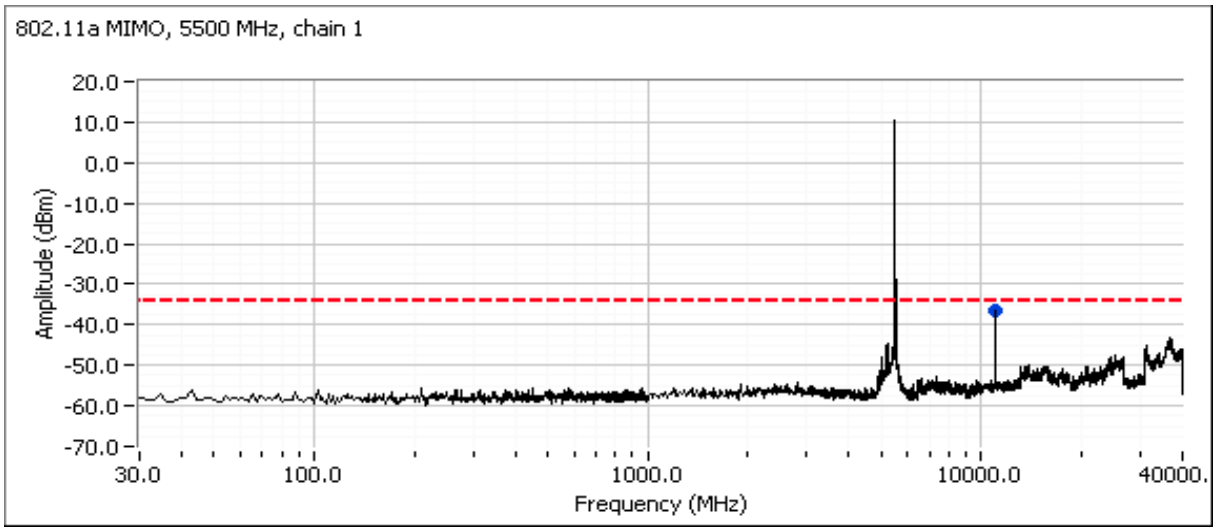
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

802.11a MIMO Mode Low channel, 5470 - 5725 MHz Band

Note - compliance with the radiated limits for the restricted band immediately below 5460Mhz and for the band edge at 5470MHz are demonstrated through the radiated emissions tests.

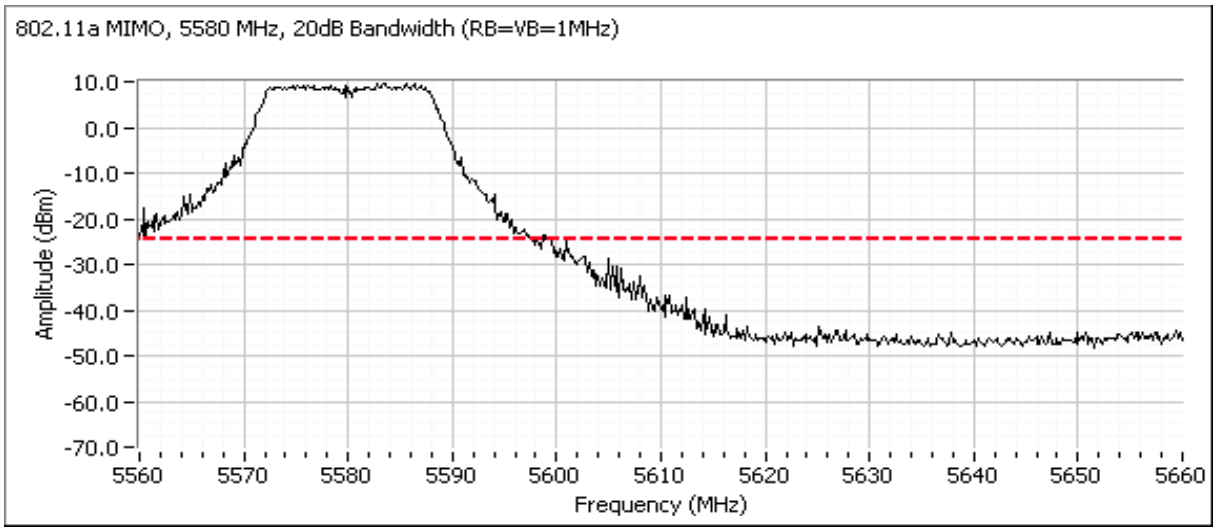
Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).

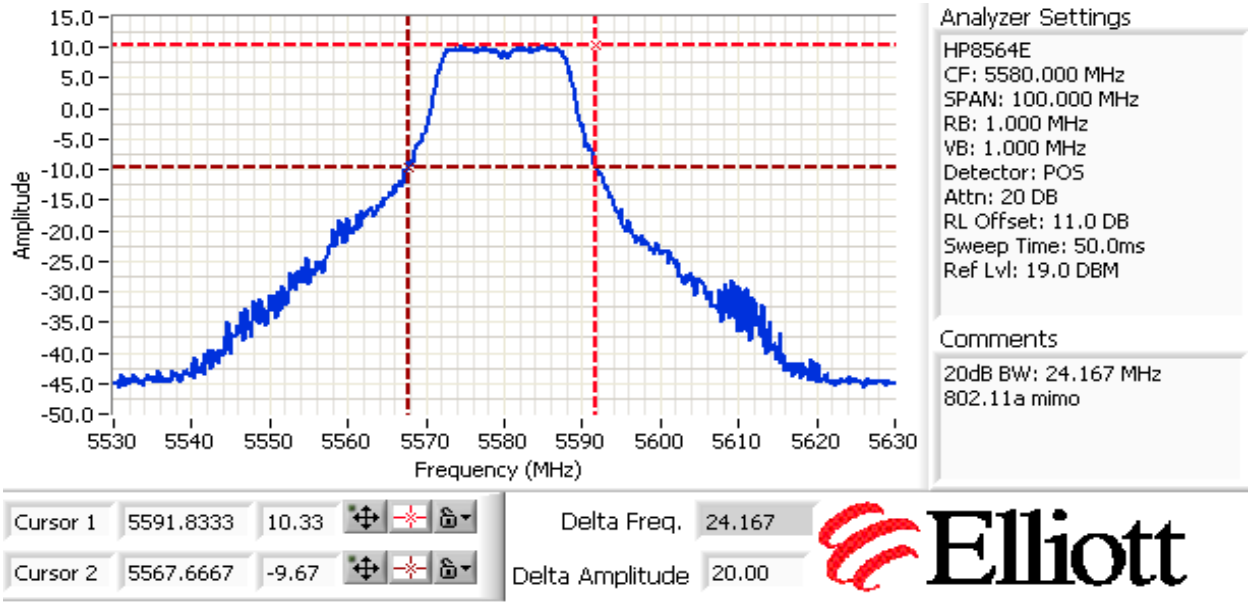




Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

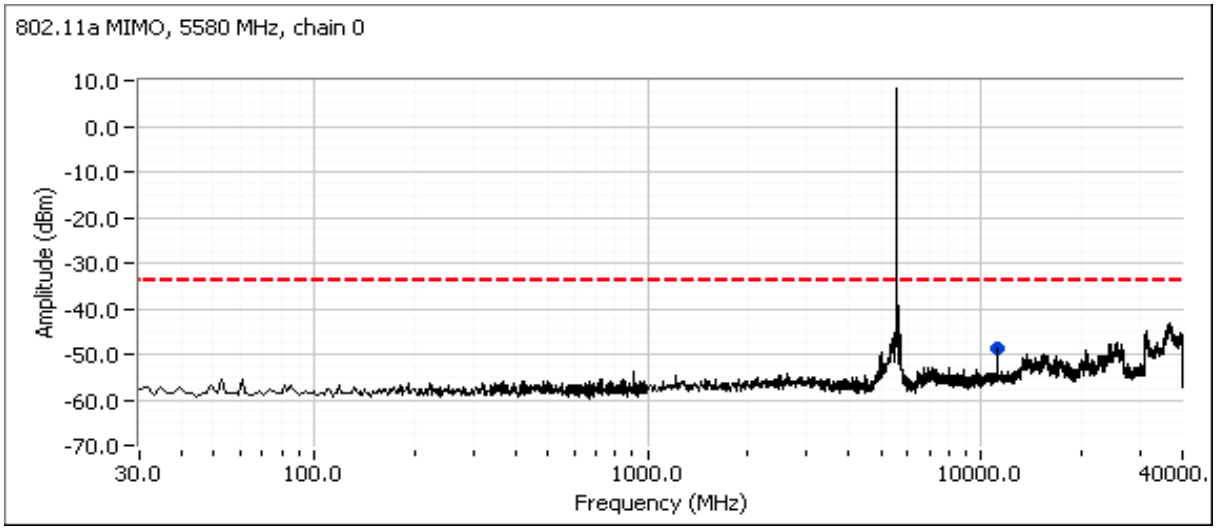
802.11a MIMO Mode Center channel, 5470 - 5725 MHz Band
For master devices - This plot is showing hat the 20dB bandwidth of the channel closest to 5600 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.

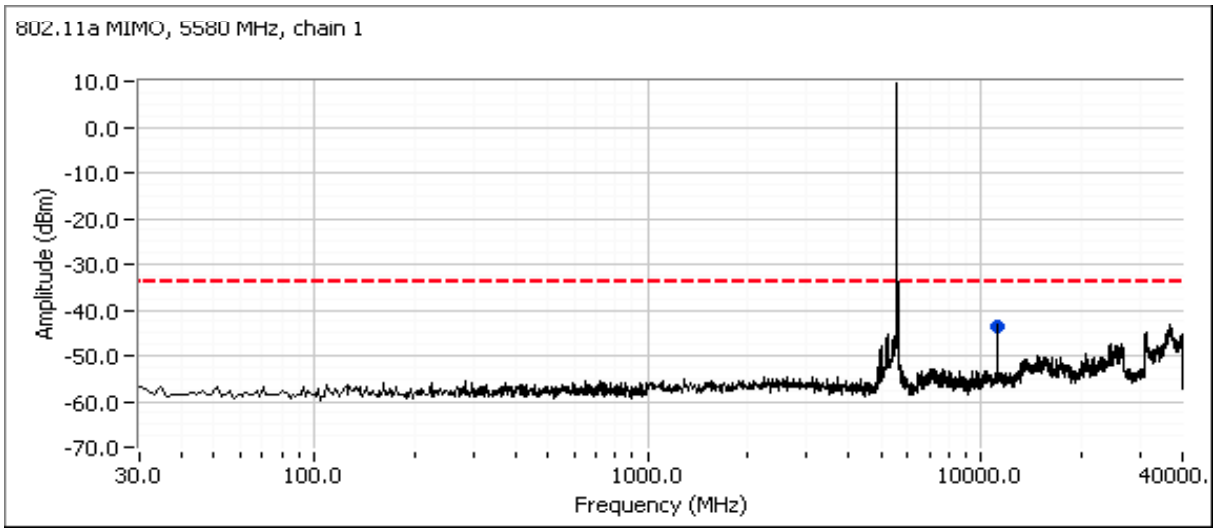




Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

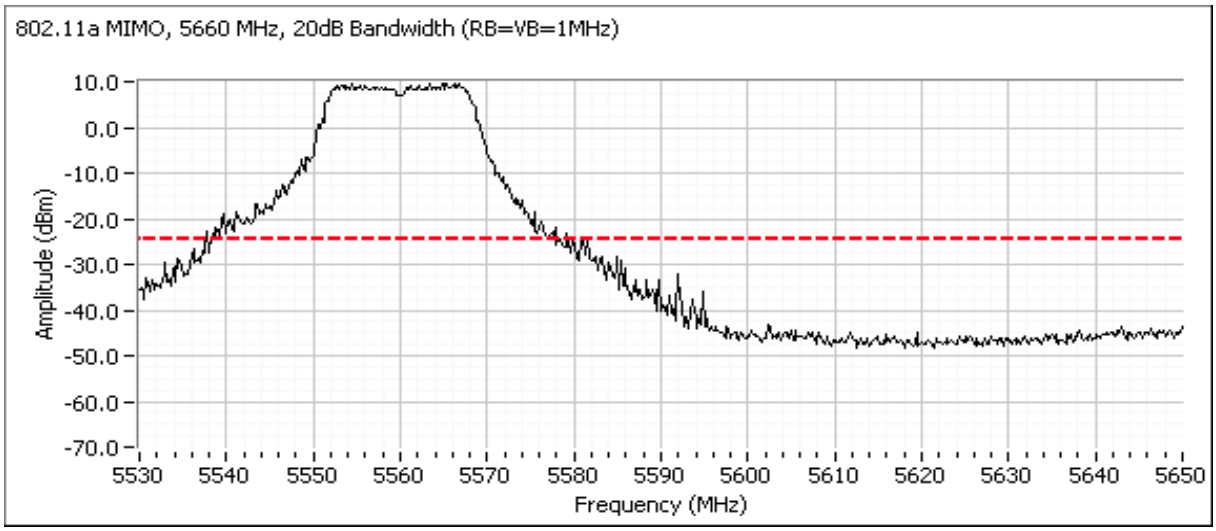
Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).

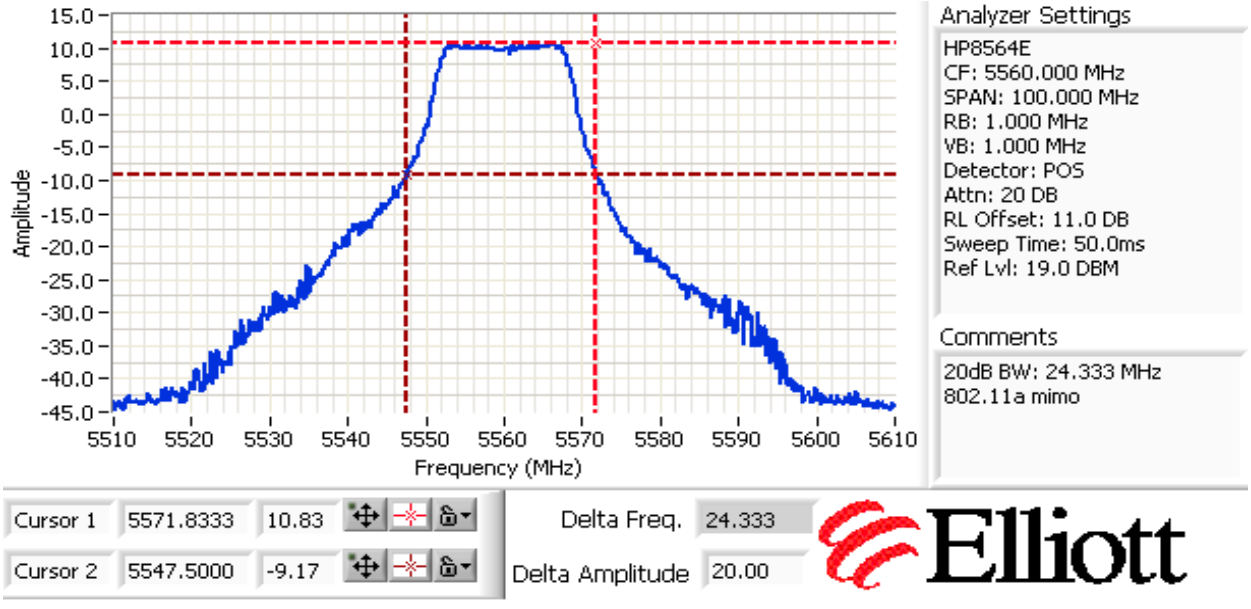




Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

802.11a MIMO Mode 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 span.

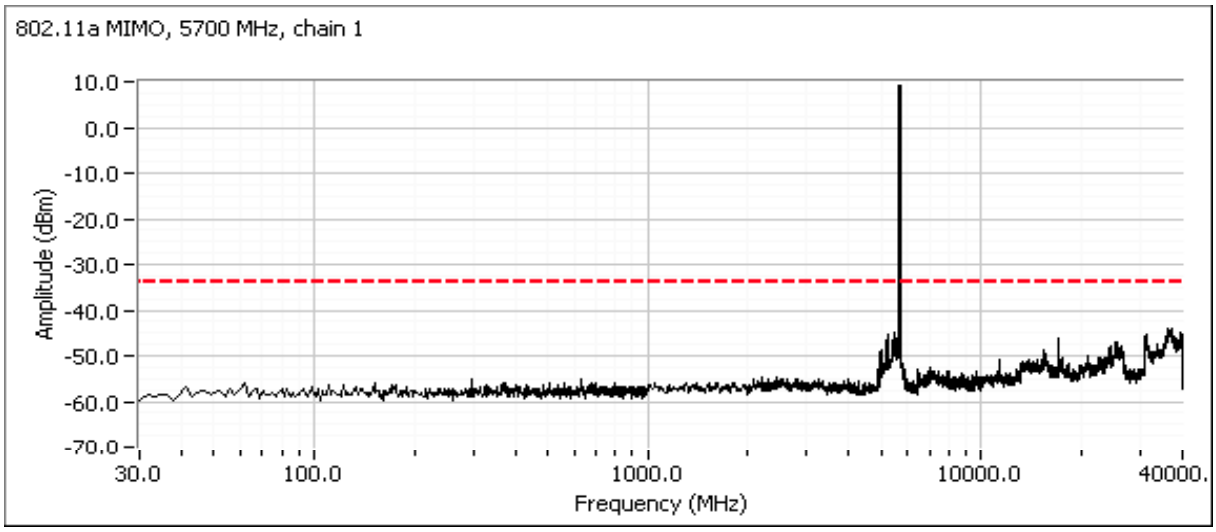


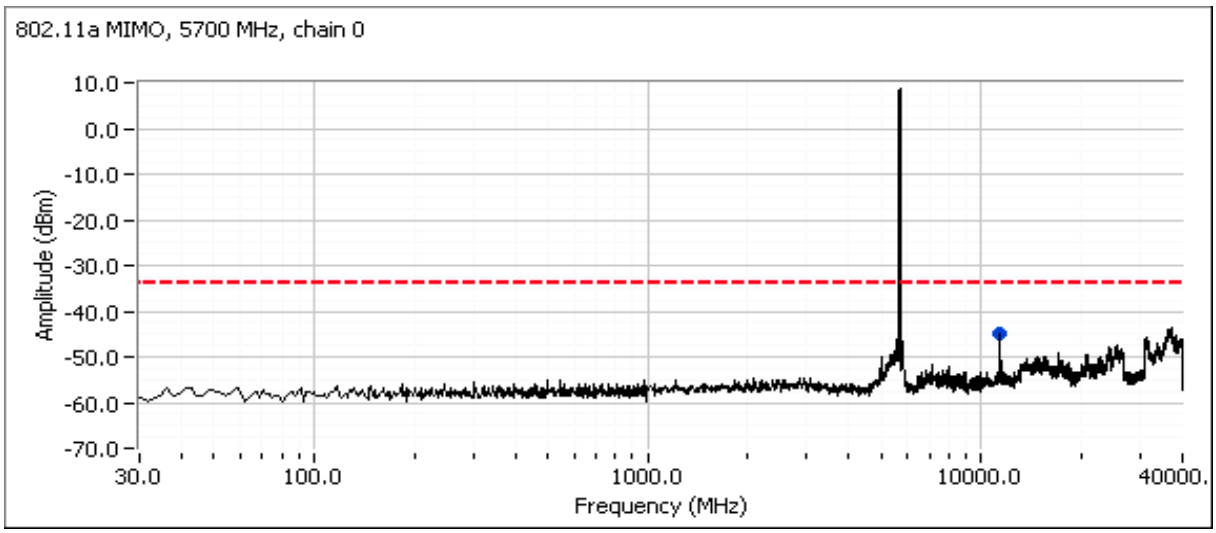


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

802.11a MIMO Mode High channel, 5470 - 5725 MHz Band
Compliance with the -27dBm/MHz limit above the 5725MHz band edge. Is demonstarted using radiated measurements.

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

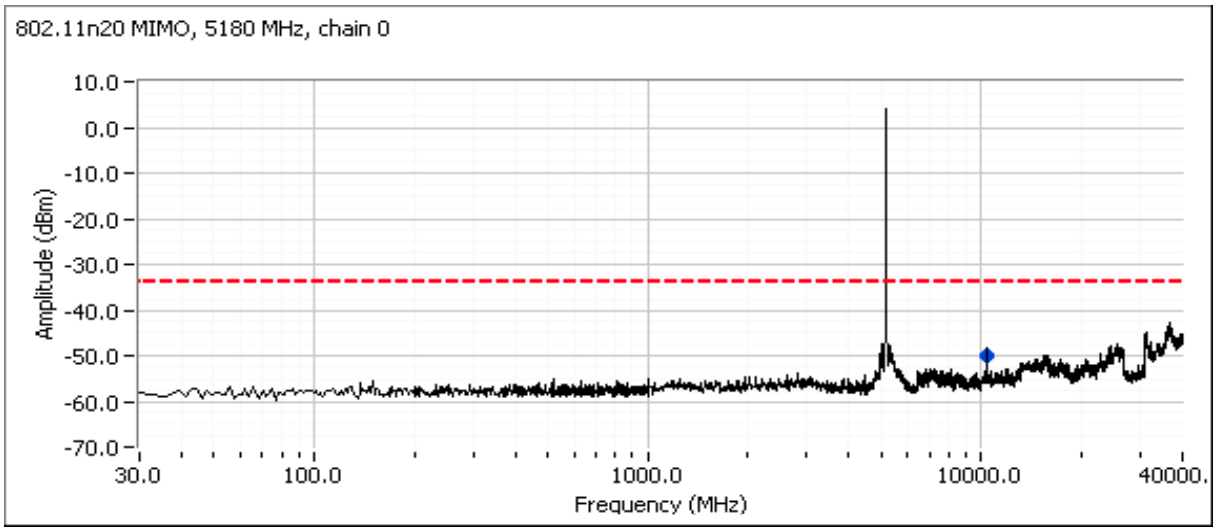


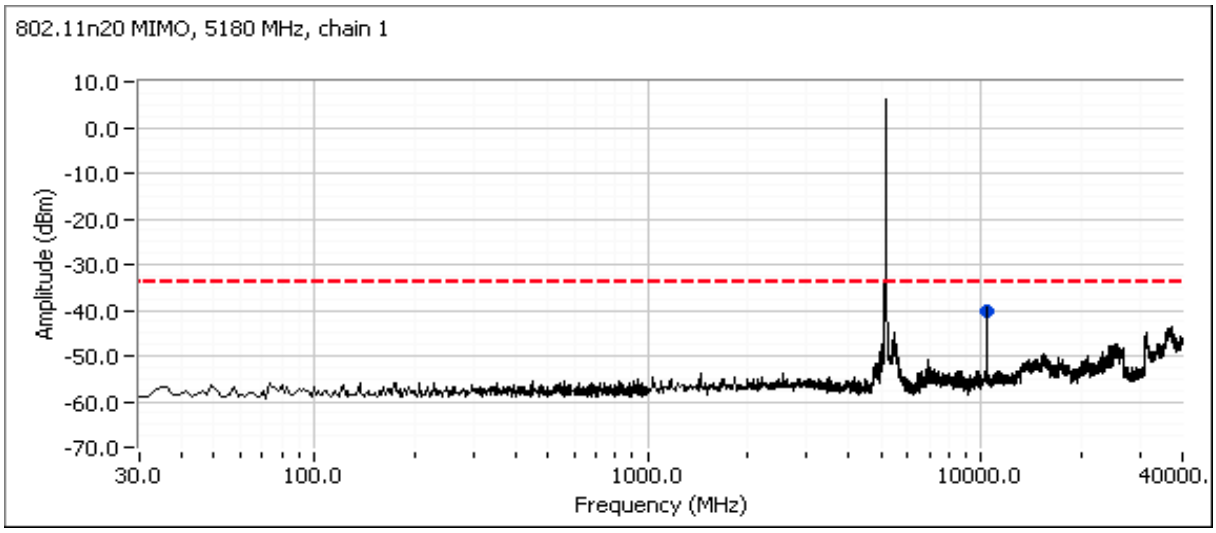


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT20 MIMO Mode Low channel, 5150 - 5250 MHz Band

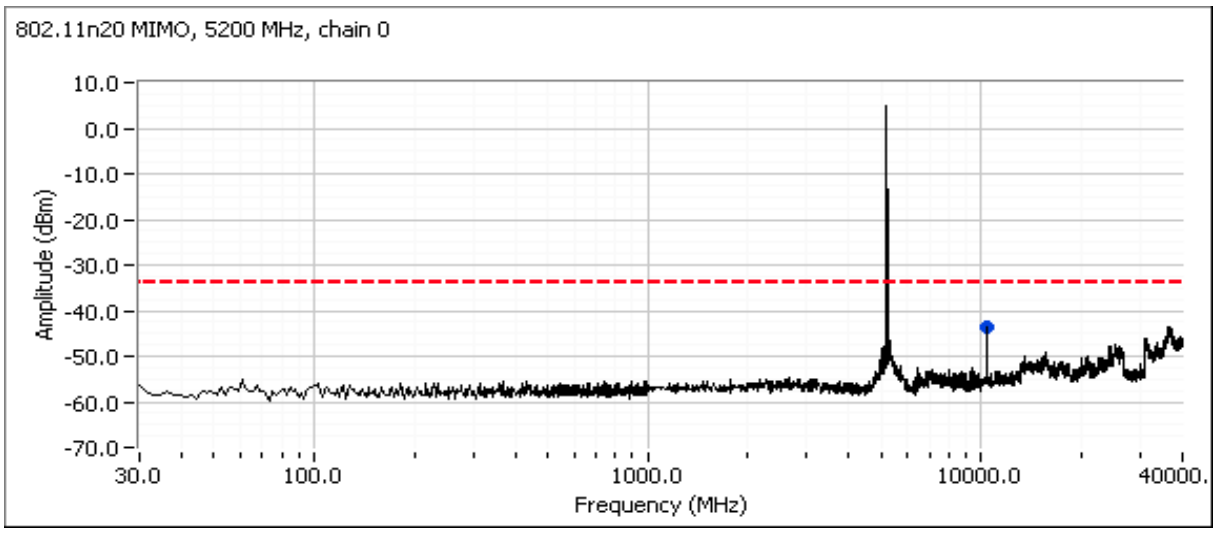
Compliance with the radiated limits for the restricted band immediately below 5150MHz is demonstrated through the radiated emissions tests.

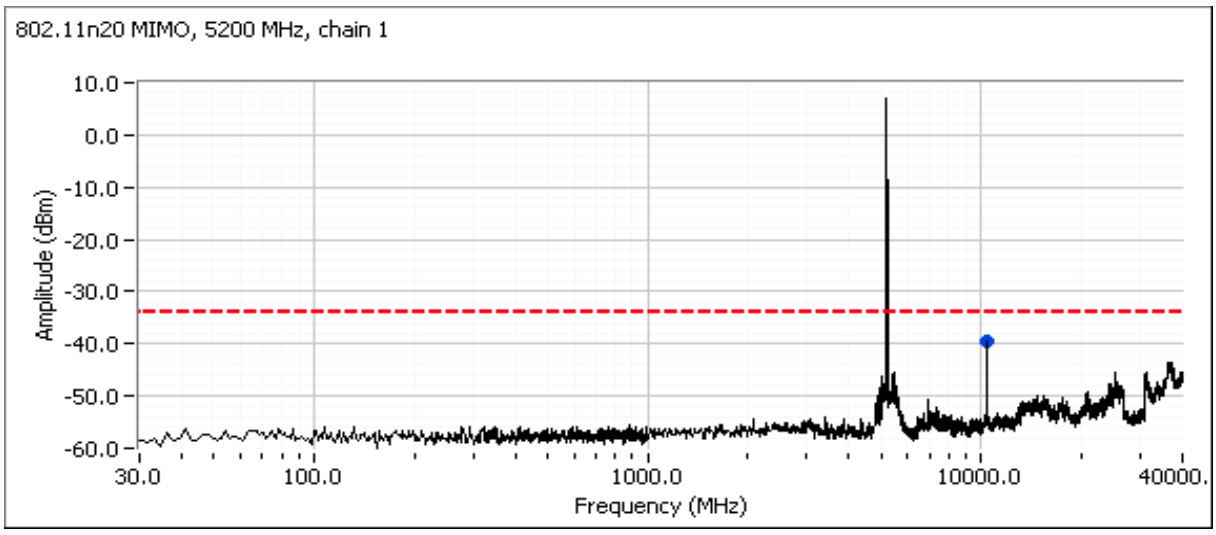




Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

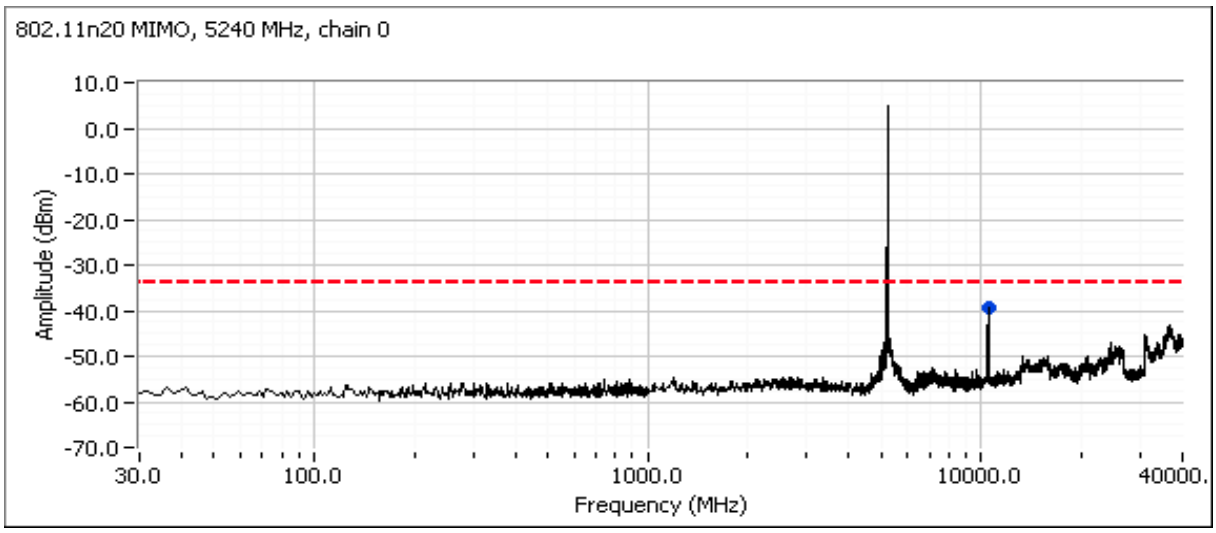
HT20 MIMO Mode Center channel, 5150 - 5250 MHz Band

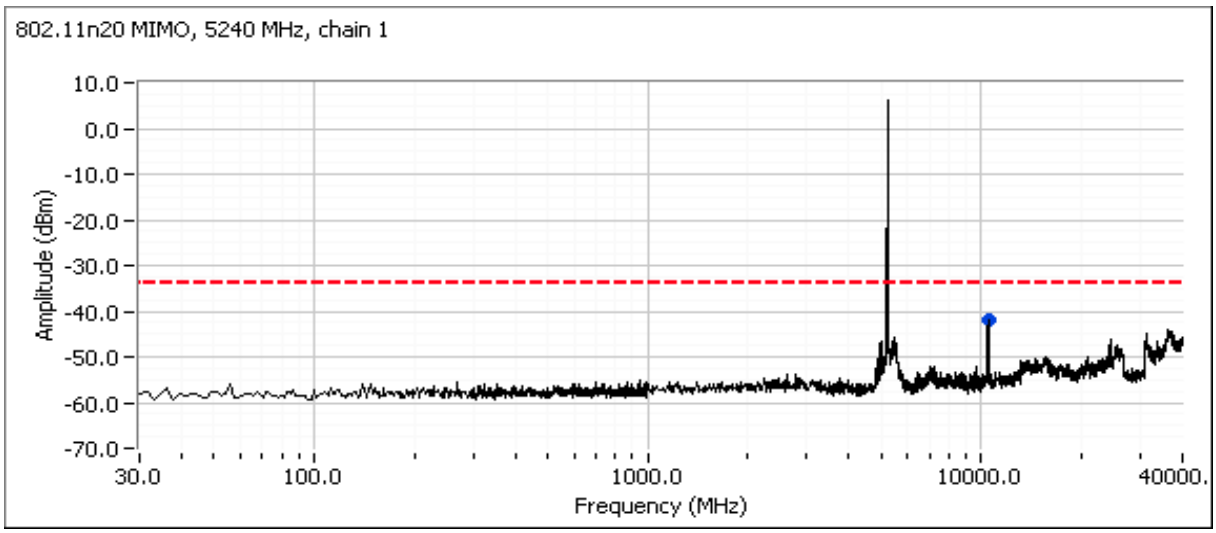




Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT20 MIMO Mode High channel, 5150 - 5250 MHz Band

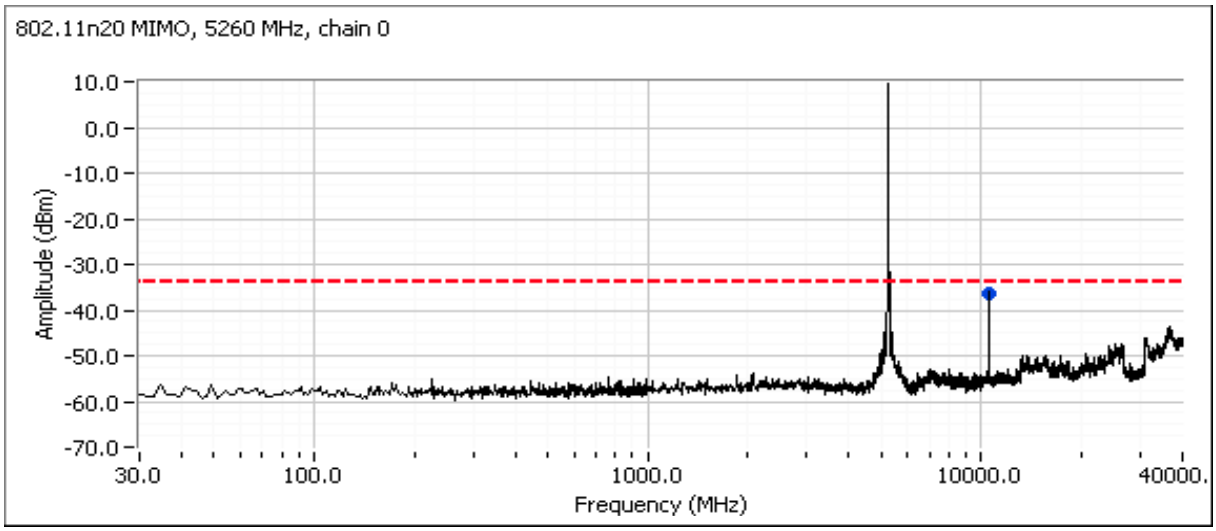


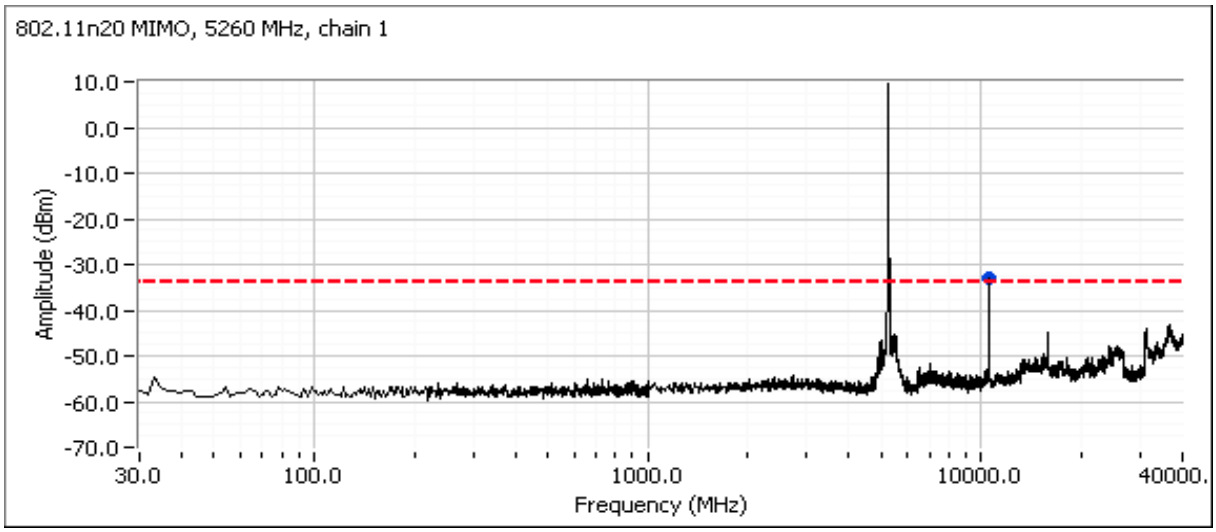


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT20 MIMO Mode Low channel, 5250 - 5350 MHz Band

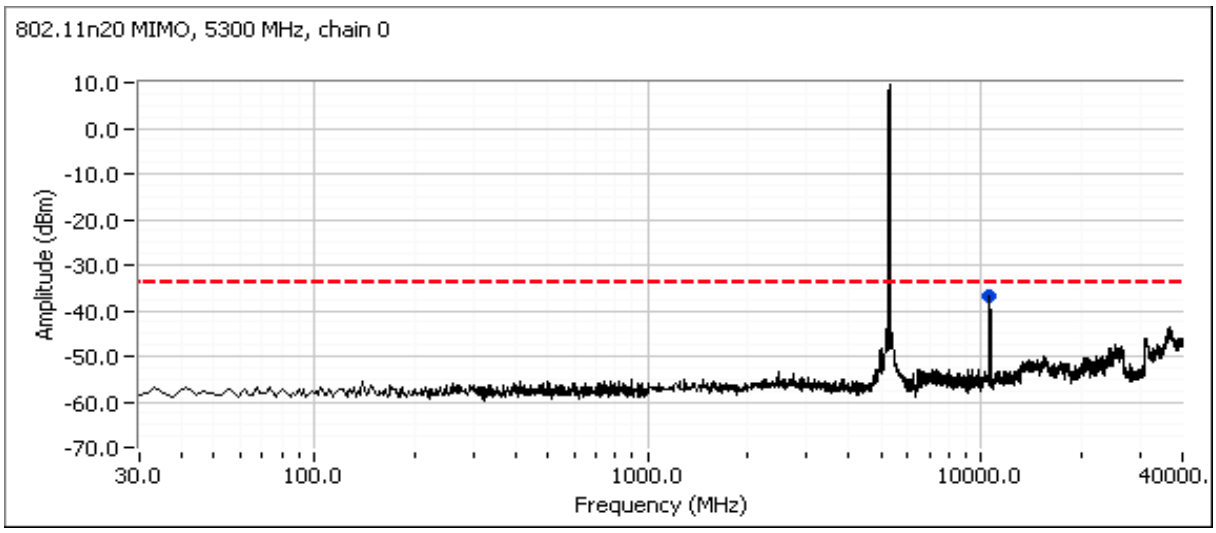
Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).

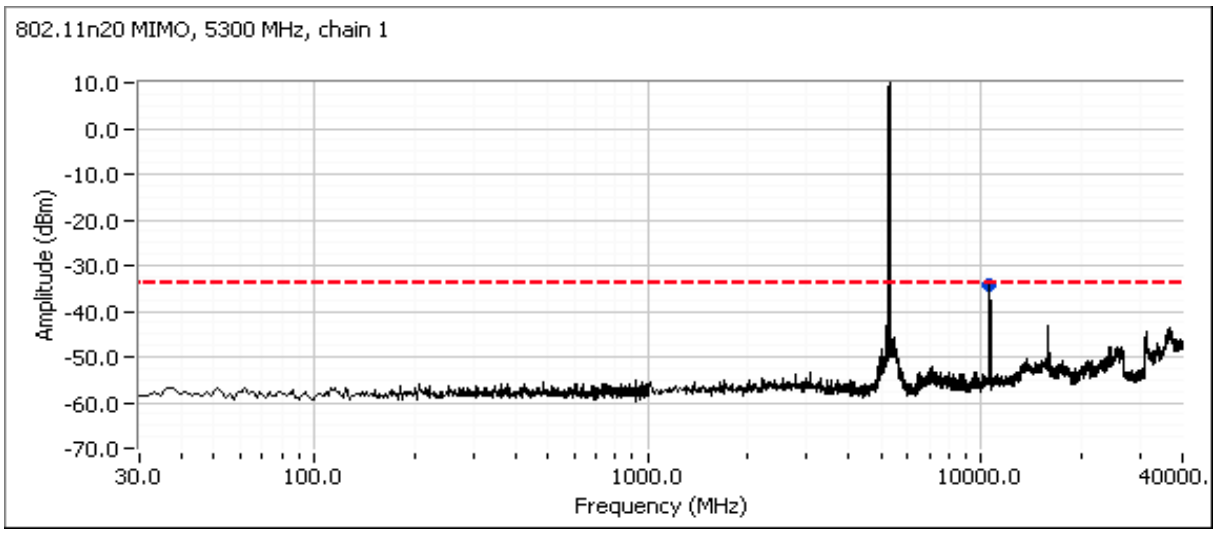




Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT20 MIMO Center channel, 5250 - 5350 MHz Band

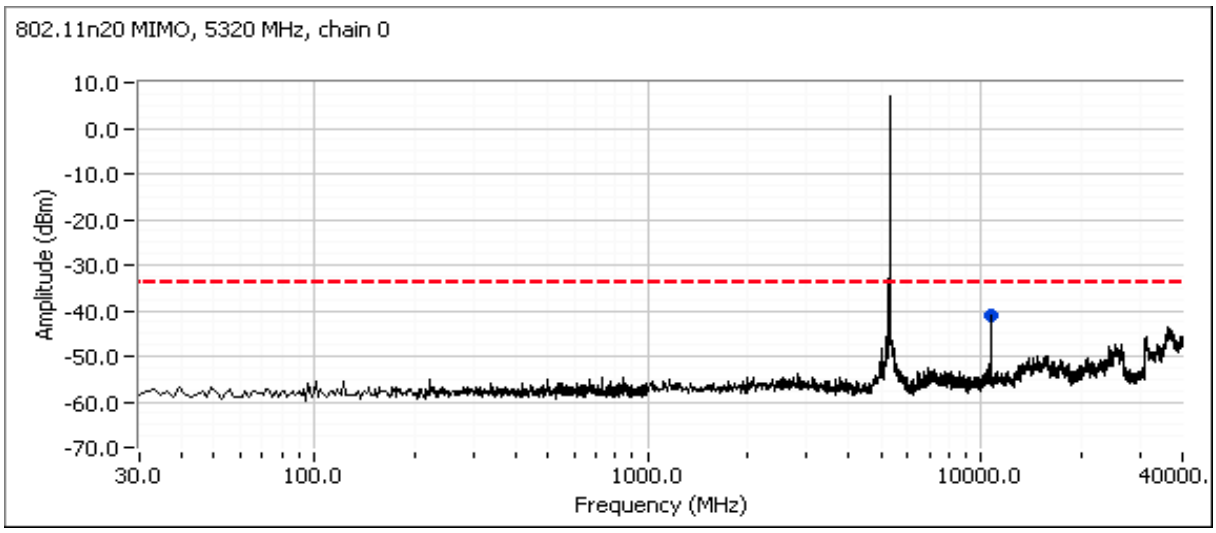


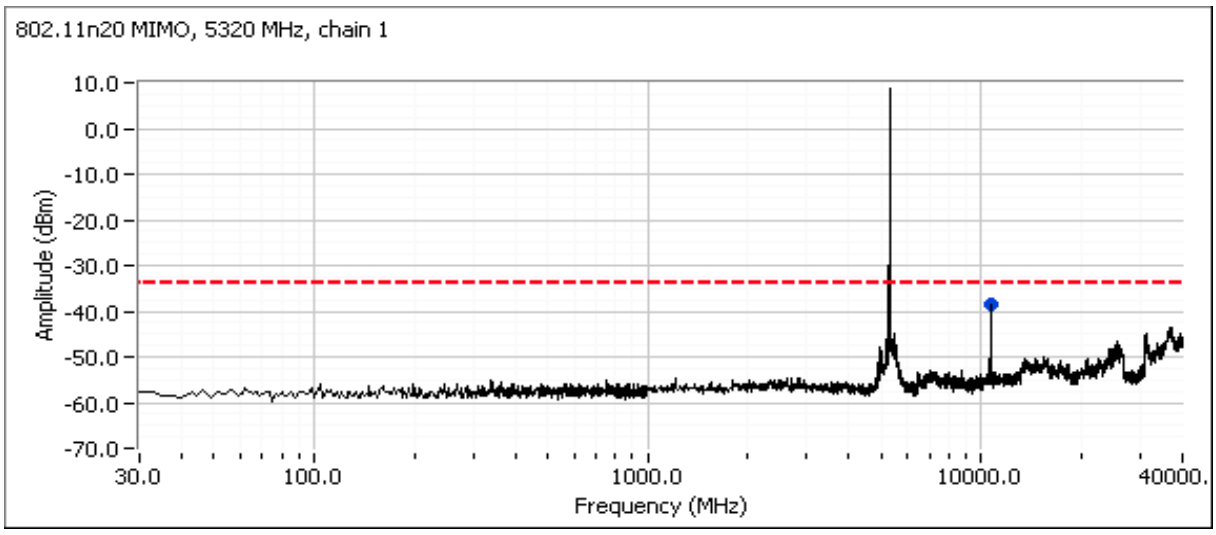


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT20 MIMO Mode 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.



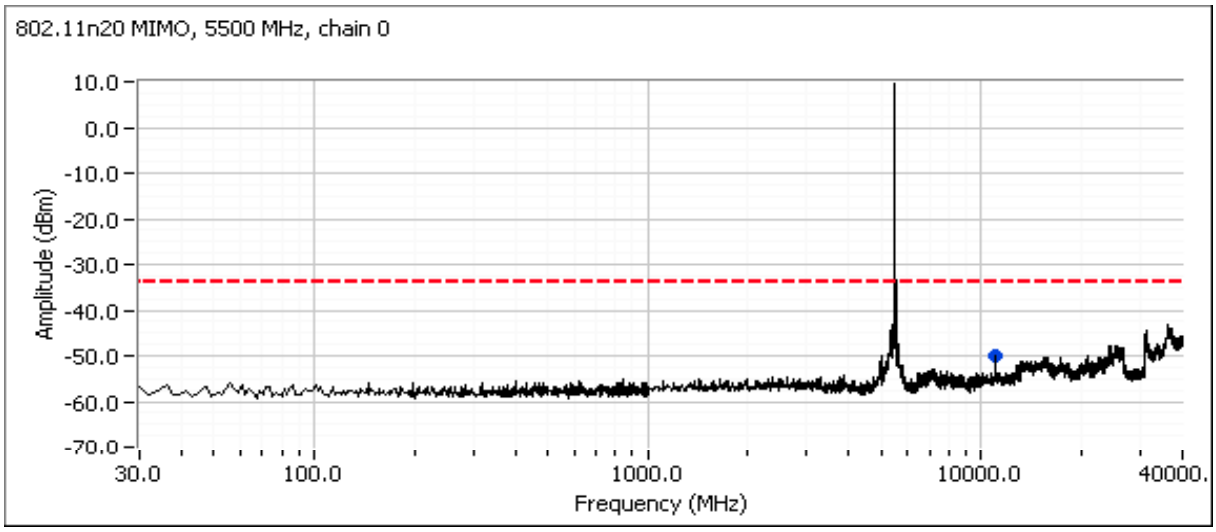


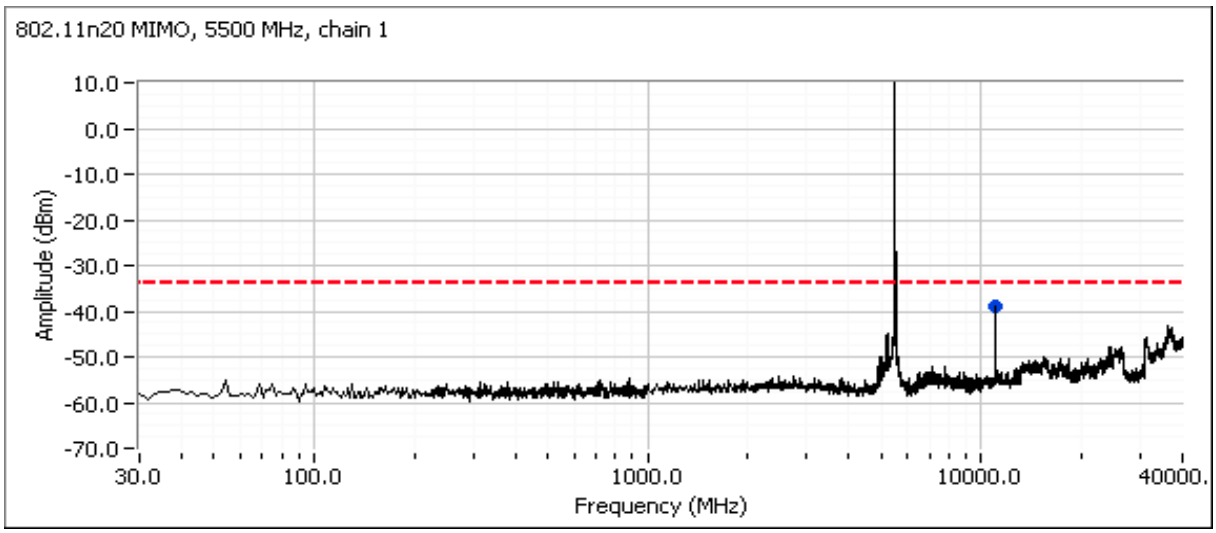
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT20 MIMO Mode Low channel, 5470 - 5725 MHz Band

Note - compliance with the radiated limits for the restricted band immediately below 5460Mhz and for the band edge at 5470MHz are demonstrated through the radiated emissions tests.

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

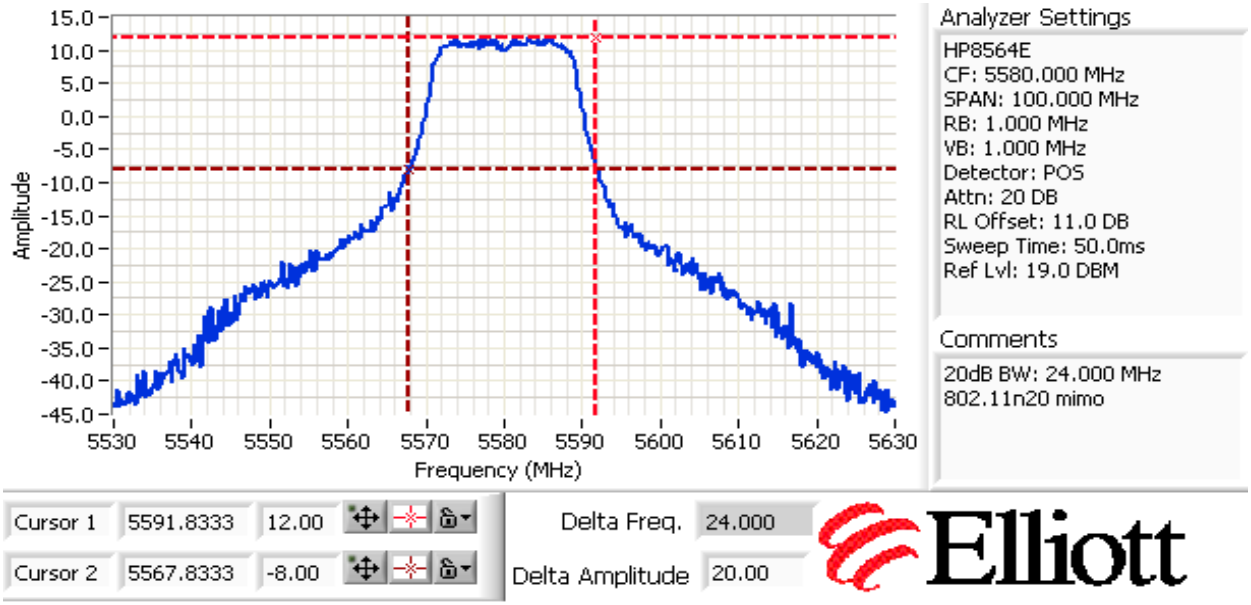




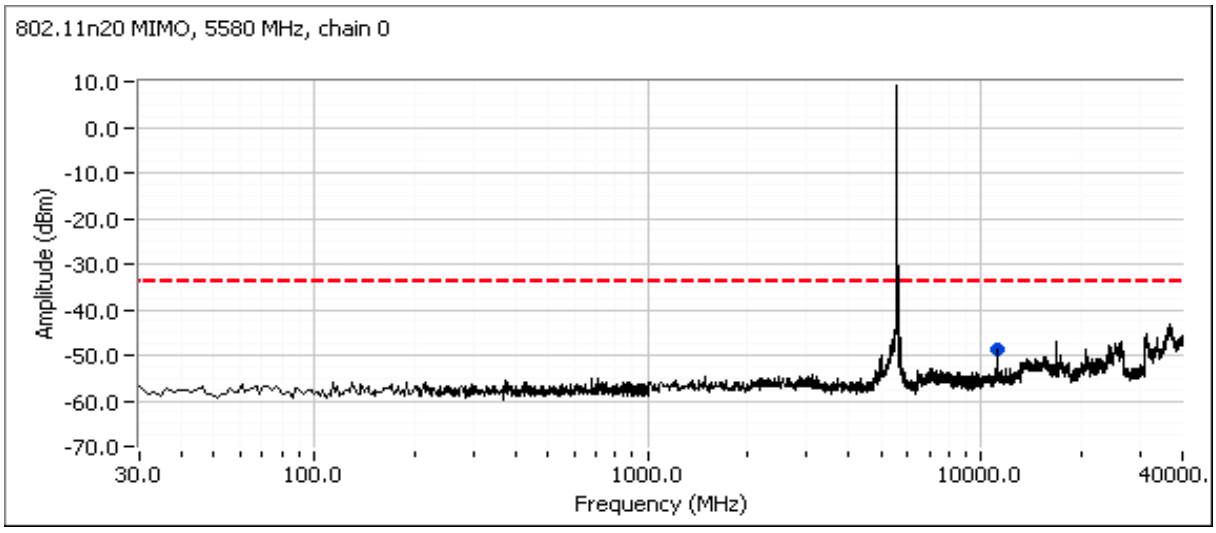
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT20 MIMO Mode Center channel, 5470 - 5725 MHz Band

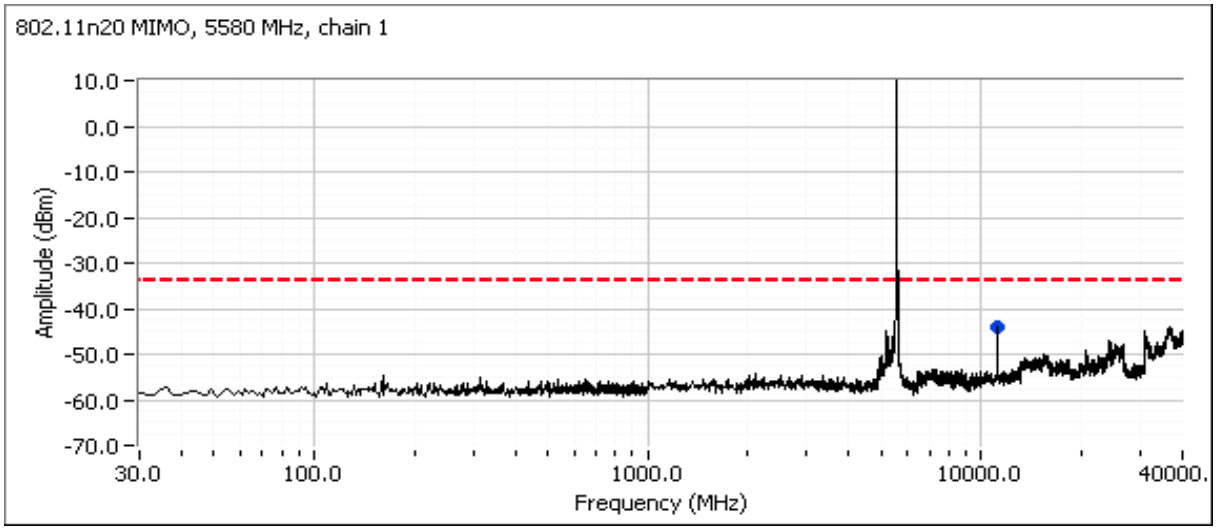
For master devices - This plot is showing hat the 20dB bandwidth of the channel closest to 5600 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.



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

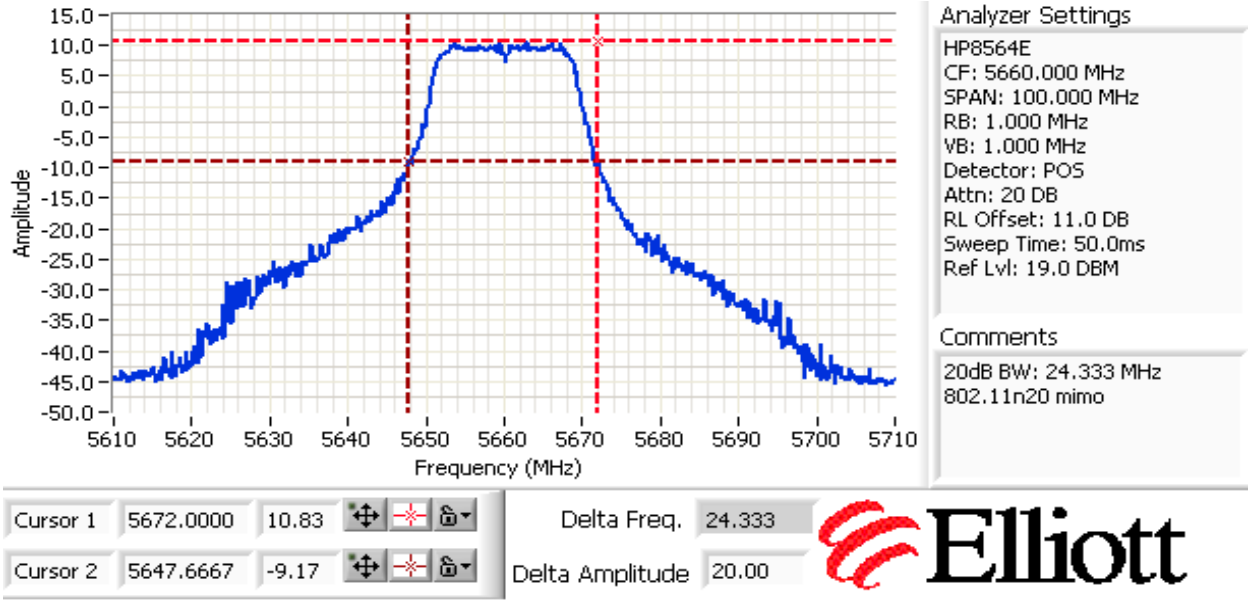


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A



HT20 MIMO Mode Channel adjacent to 5650 MHz (Master Device)

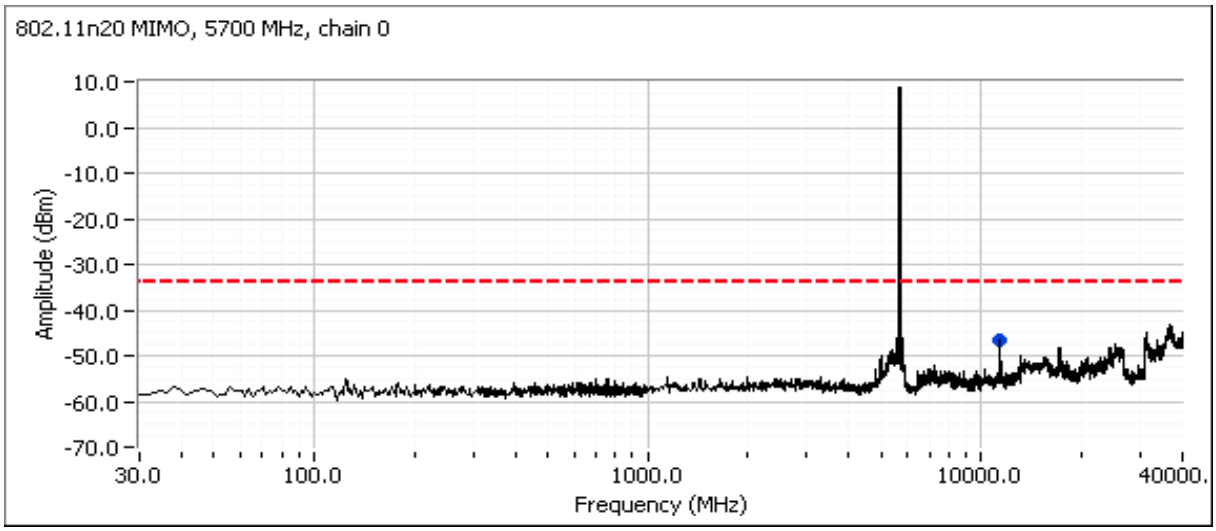
Plots showing that the 20dB bandwidth of the channel closest to 5650 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.

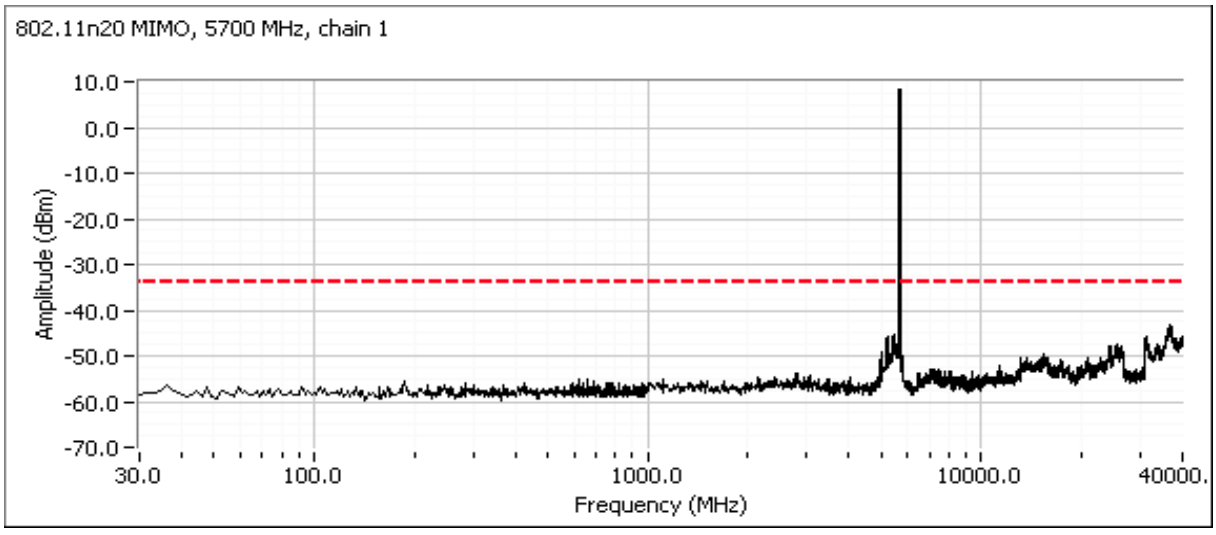


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT20 MIMO Mode High channel, 5470 - 5725 MHz Band
Compliance with the -27dBm/MHz limit above the 5725MHz band edge. Is demonstarted using radiated measurements.

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

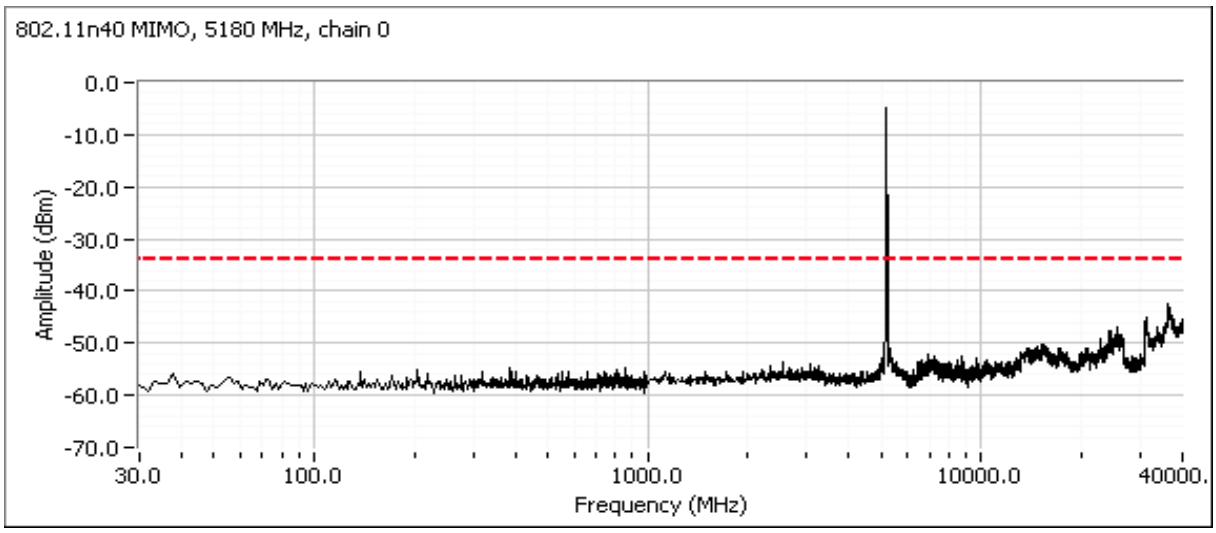


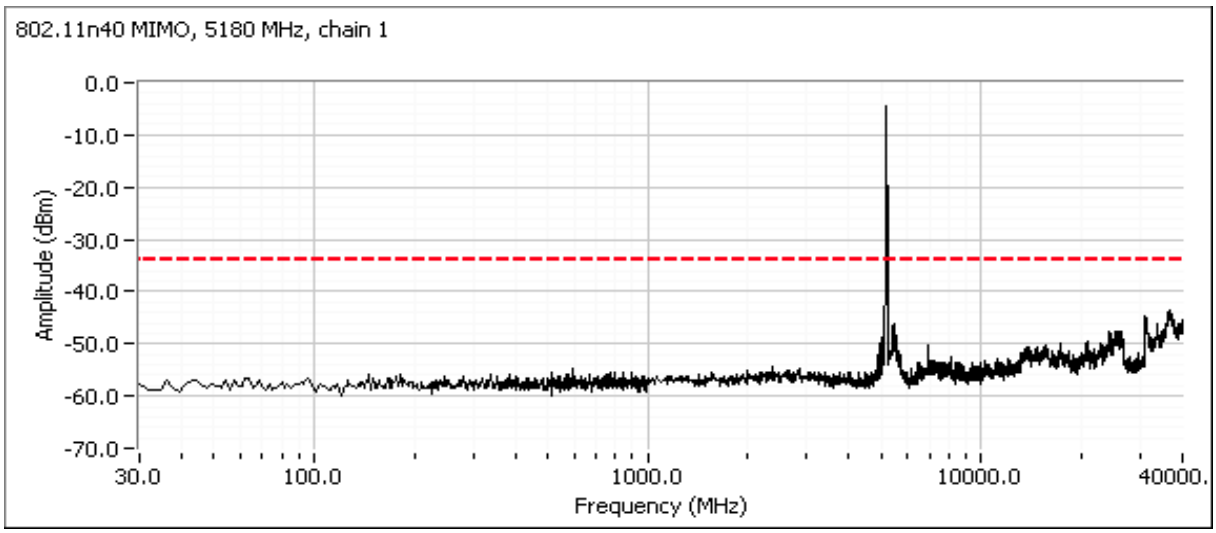


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT40 MIMO Mode Low channel, 5150 - 5250 MHz Band

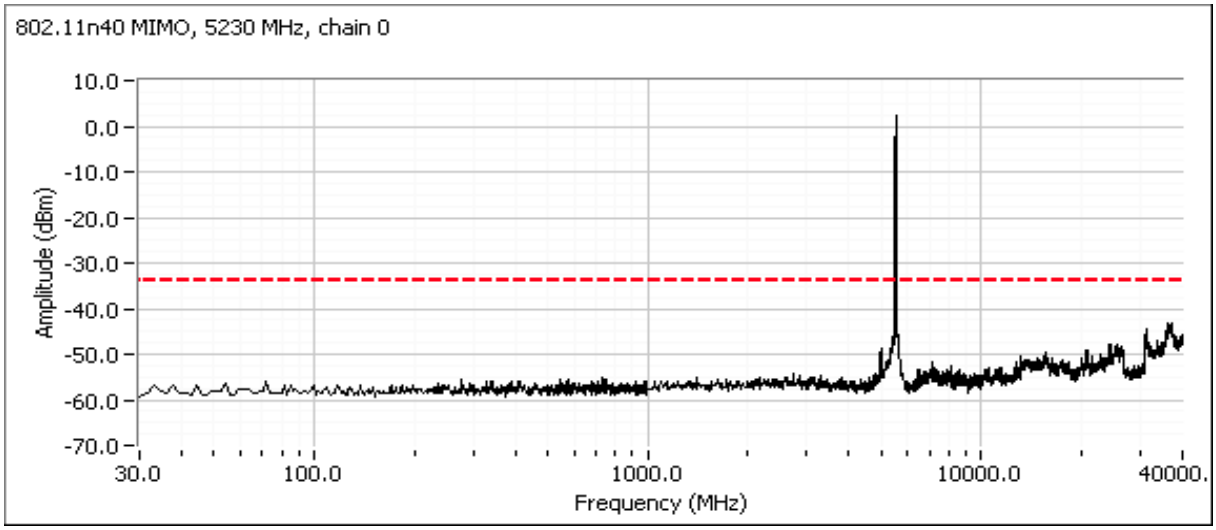
Compliance with the radiated limits for the restricted band immediately below 5150MHz is demonstrated through the radiated emissions tests.

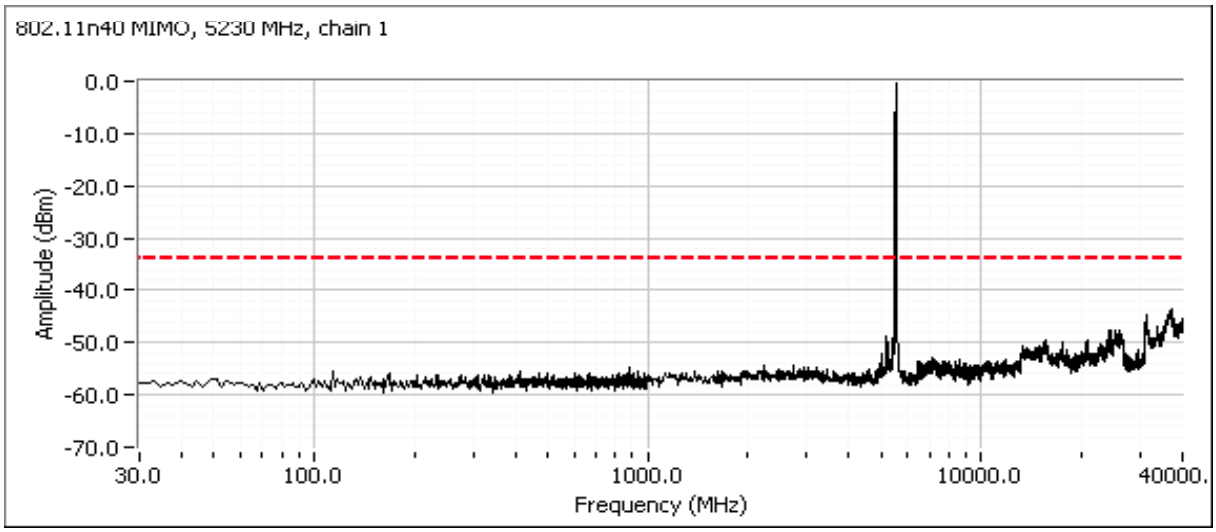




Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT40 MIMO Mode High channel, 5150 - 5250 MHz Band

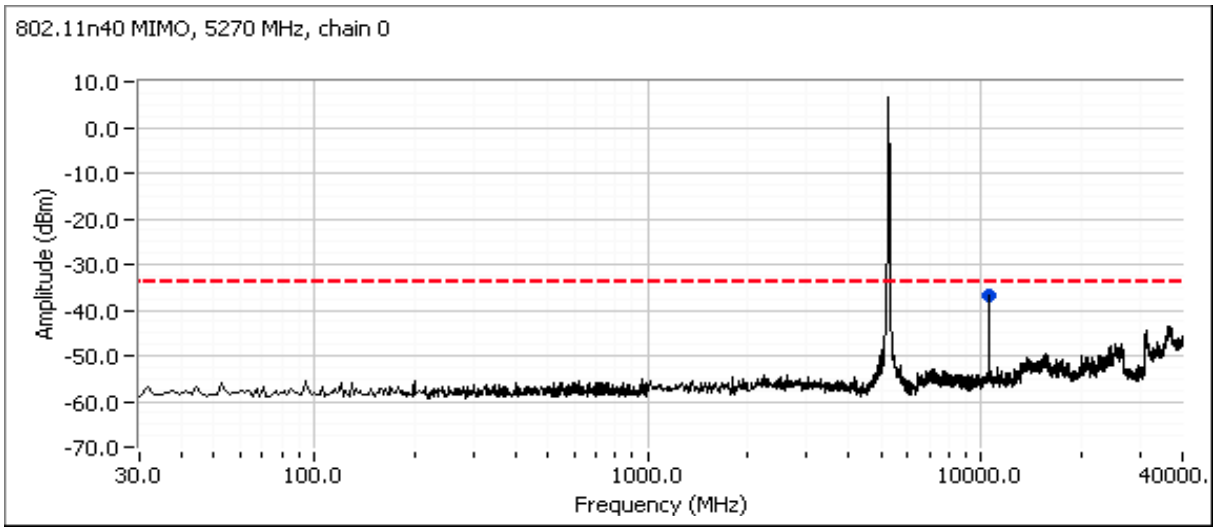


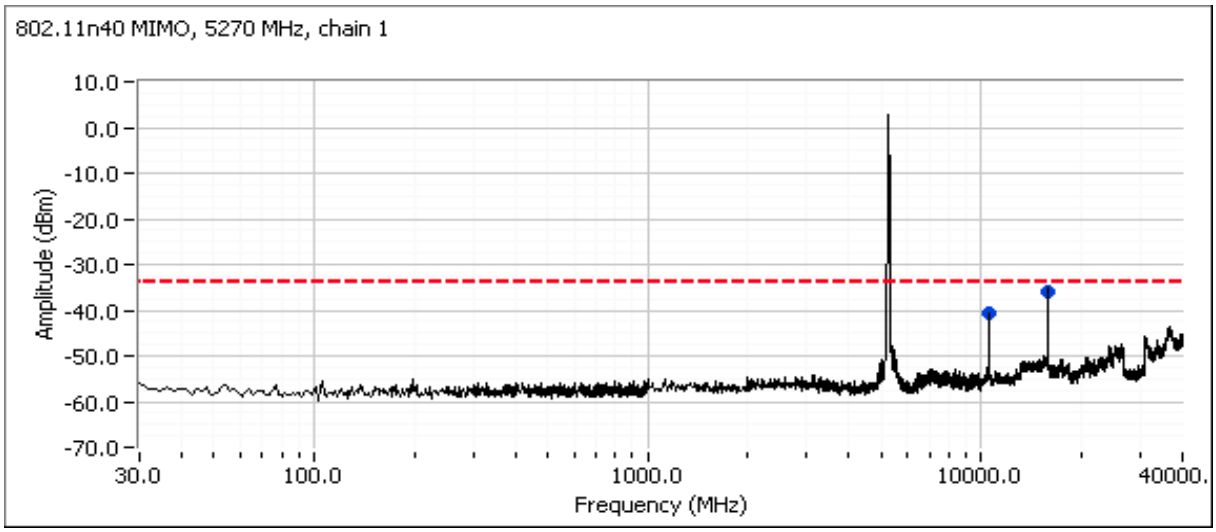


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT40 MIMO Mode Low channel, 5250 - 5350 MHz Band

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

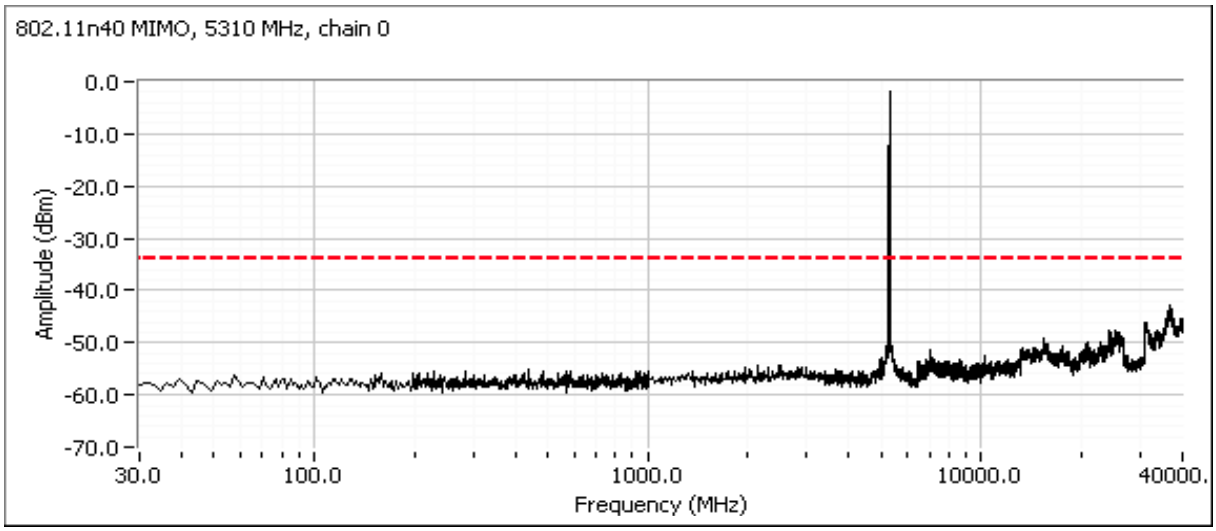


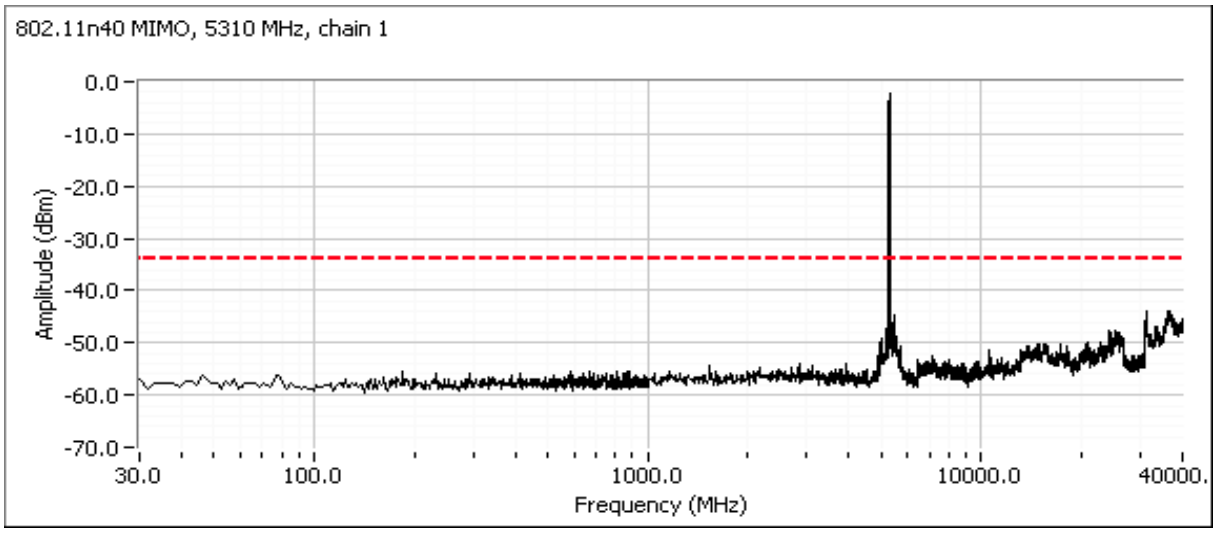


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT40 MIMO Mode 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.



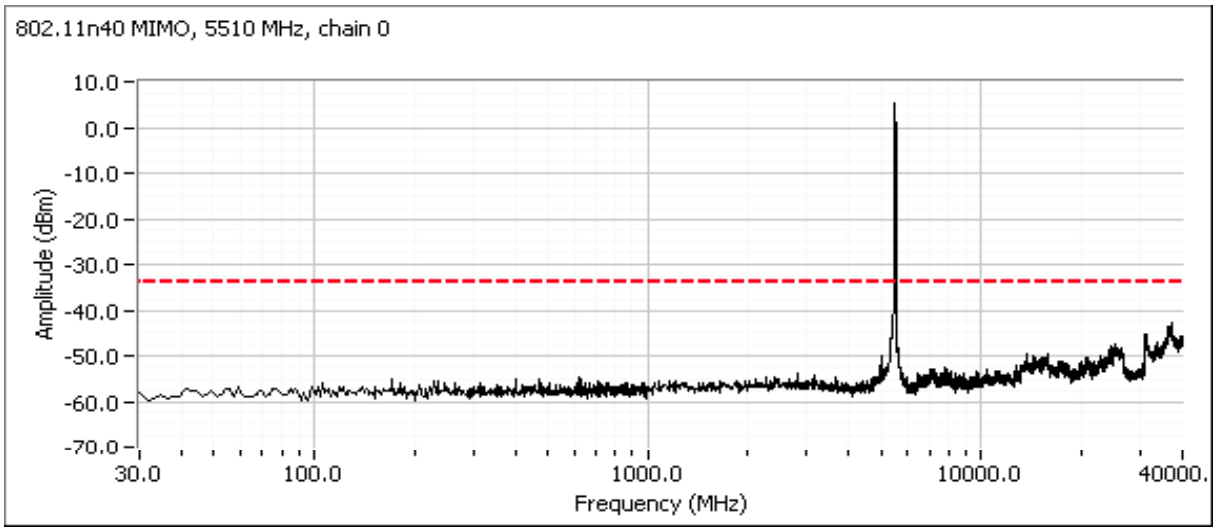


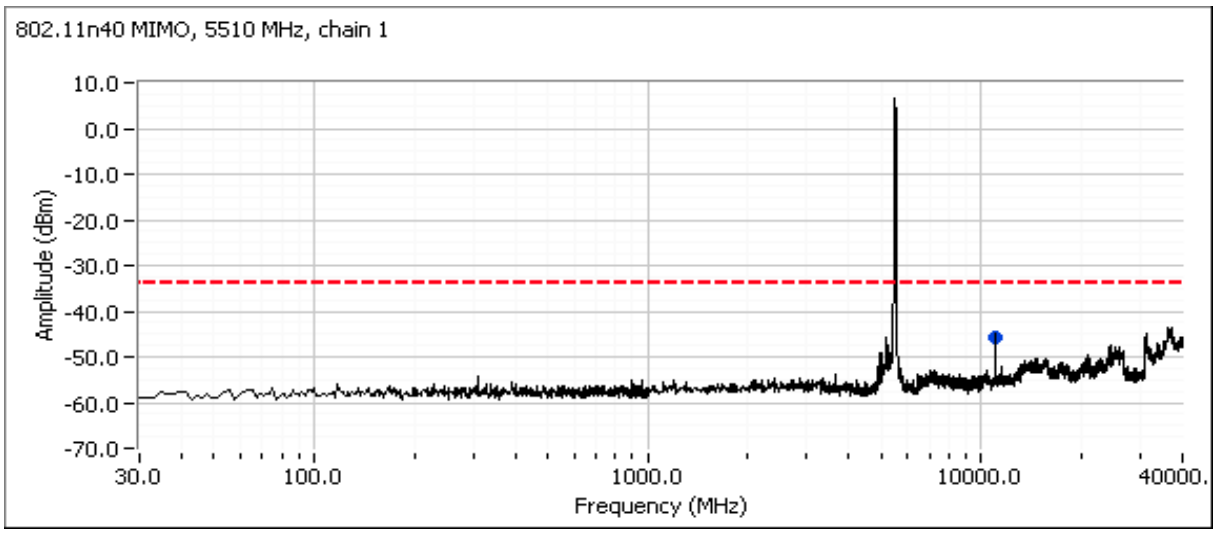
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT40 MIMO Mode Low channel, 5470 - 5725 MHz Band

Note - compliance with the radiated limits for the restricted band immediately below 5460Mhz and for the band edge at 5470MHz are demonstrated through the radiated emissions tests.

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

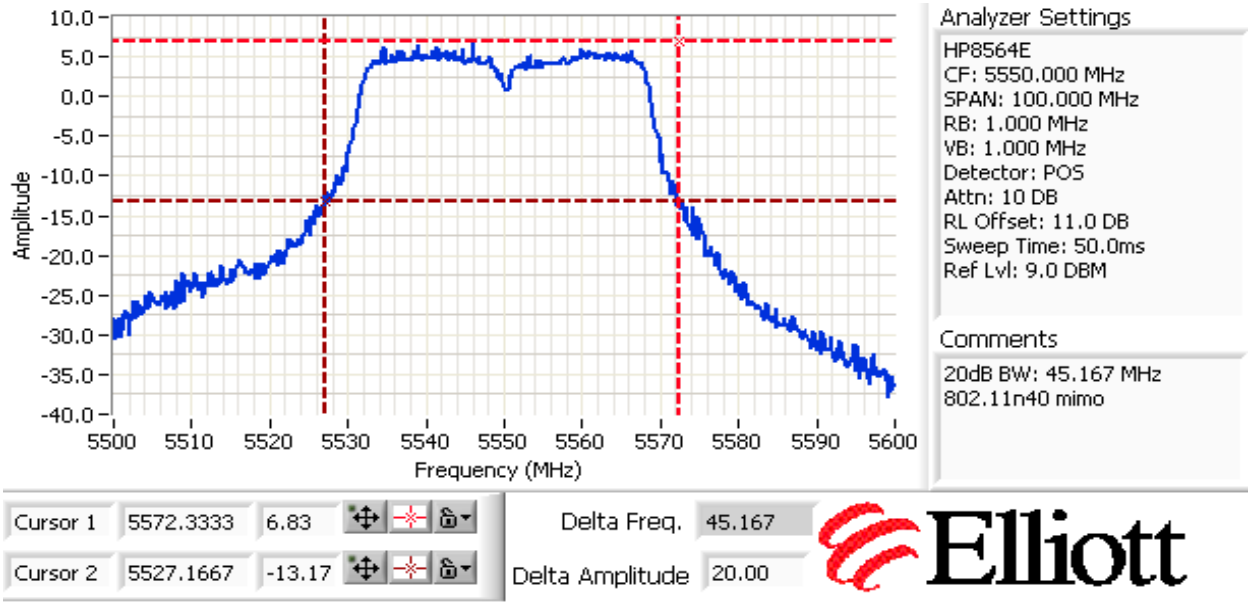




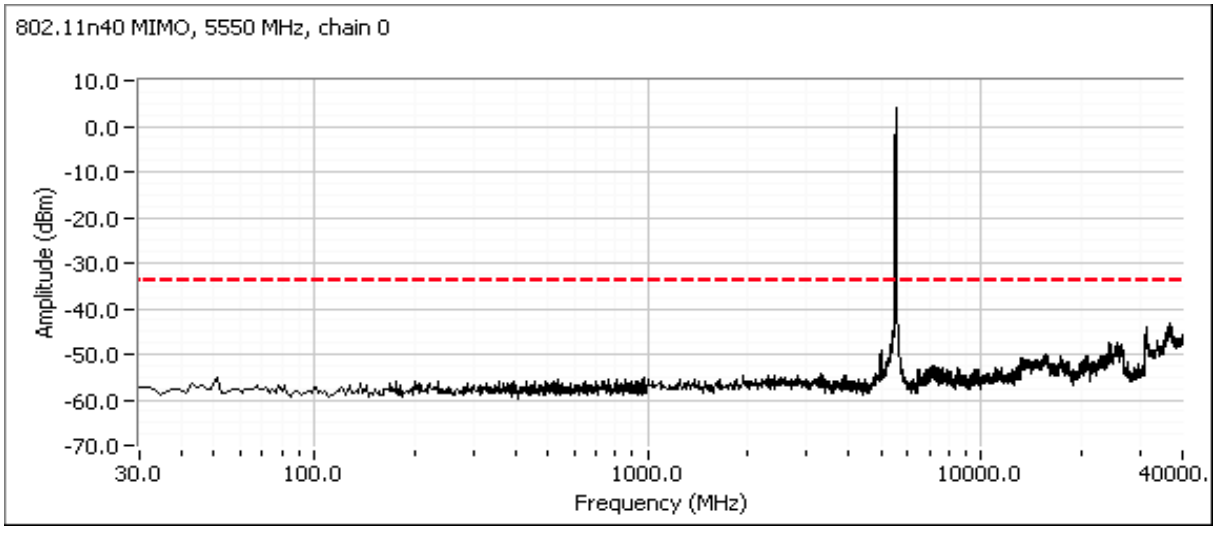
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT40 MIMO Mode Center channel, 5470 - 5725 MHz Band

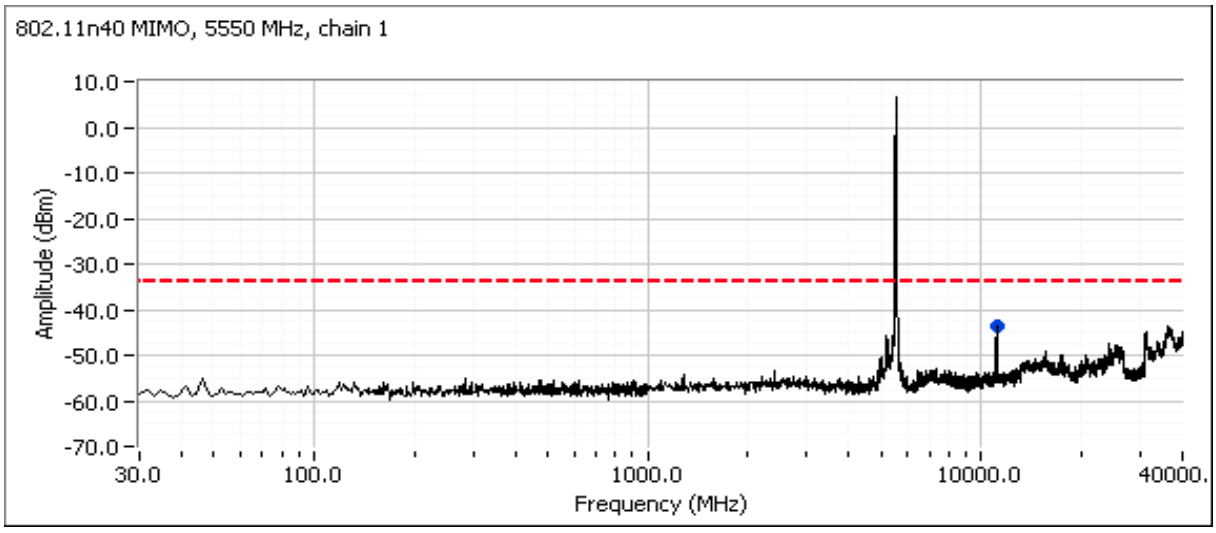
For master devices - This plot is showing hat the 20dB bandwidth of the channel closest to 5600 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.



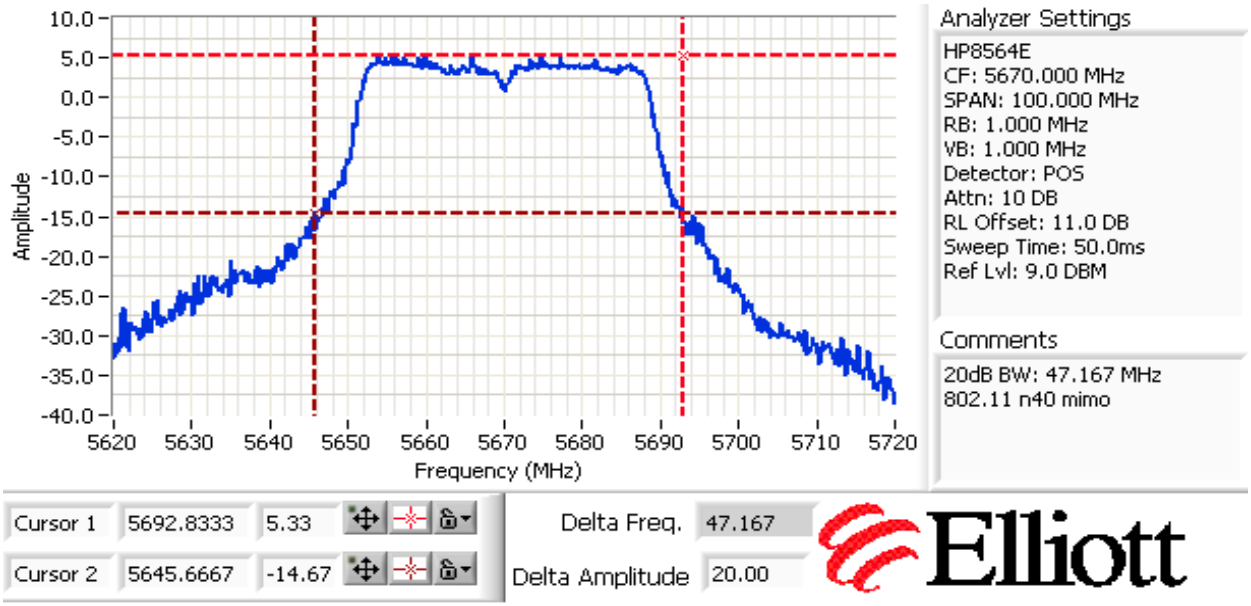
Wide-band plot, RB=VB=1MHz (Peak measurements versus limit).



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A



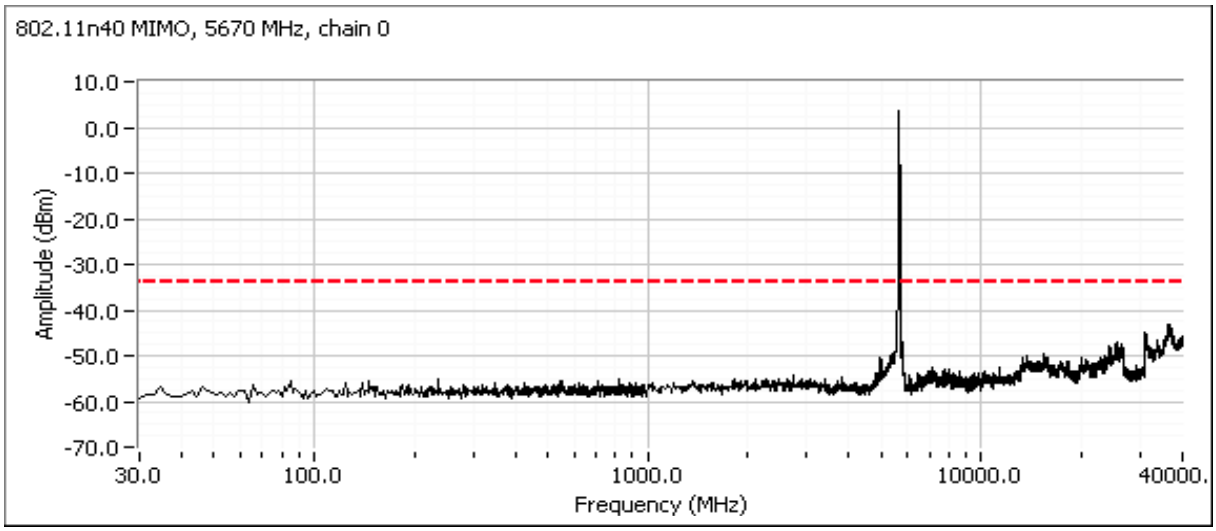
HT40 MIMO Mode Channel adjacent to 5650 MHz (Master Device)
Plots showing that the 20dB bandwidth of the channel closest to 5650 MHz does not spill into the 5600-5650 MHz band. RB > 1% of span.

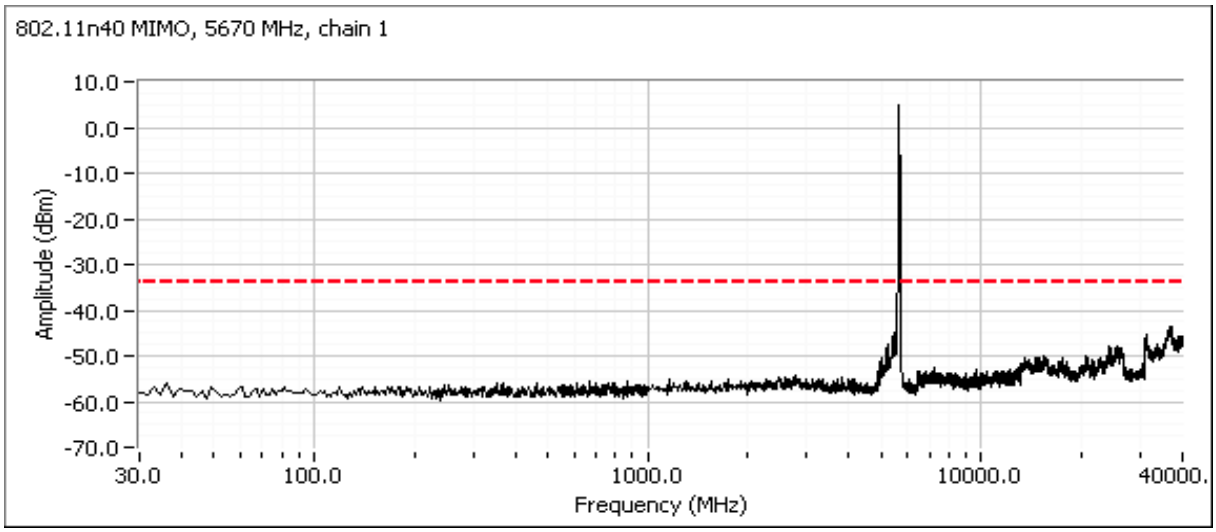


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

HT40 MIMO Mode High channel, 5470 - 5725 MHz Band
Compliance with the -27dBm/MHz limit above the 5725MHz band edge. Is demonstarted using radiated measurements.

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





Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

RSS-210 (LELAN) and FCC 15.407(UNII)
Antenna Port Measurements
Power at Low Power Setting

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: 7/13/2011 0:00
Test Engineer: Rafael Varelas
Test Location: FT Chamber #5
Config. Used: 1
Config Change: None
EUT Voltage: POE

Output power - low power setting to comply with eirp limit when modules are co-located

The module can be co-located with other 2x2 or 3x3 modules in the same host system. When operating with other modules the host system limits operation such that no two radios operate on the same or on overlapping channels, however multiple modules may be operating in the same operating band.

When multiple modules operate in the same band the total output power and total eirp within that band need to comply with the maximum allowed limits for that band. As the host system does not allow modules to operate on overlapping channels, PSD measurements are not required.

The following measurements demonstrate that the output power for the module can be reduced to a level that allows for multiple modules to operate in the same band without exceeding the allowed output power and eirp limits.

5150-5250 MHz Band

The limit in this band is a maximum eirp of 23dBm and maximum conducted power of 17dBm. There are four 20MHz channels therefore the power per channel would be restricted to 11dBm conducted power and 17dBm eirp. For MIMO modes the effective antenna gain is 7dBi so the maximum conducted power is 10.0dBm to meet an eirp per radio of less than 17dBm.

	Chain 0	Chain 1	Chain 2	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	4	4		Yes	7.0	22.0	13.4

Power

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 0	Chain 1	Chain 2	mW	dBm			
802.11a SISO										
5240	12.0	26.7	8.9			7.7	8.9	11.0	0.008	PASS
802.11a MIMO										
5240	7.0	27.9	3.7	3.1		4.4	6.4	10.0	0.004	PASS
HT20 MIMO										
5240	7.0	27.9	3.9	4.1		5.0	7.0	10.0	0.005	PASS
HT40 MIMO										
5230	7.0	49.8	3.3	4.1		4.7	6.7	10.0	0.005	PASS

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

5250-5350 MHz Band

The limit in this band is a maximum eirp of 30dBm and maximum conducted power of 24dBm. There are four 20MHz channels therefore the power per channel would be restricted to 18dBm conducted power and 24dBm eirp. For MIMO modes the effective antenna gain is 7.0dBi so the maximum conducted power is 17dBm to meet an eirp per radio of less than 24dBm.

	Chain 0	Chain 1	Chain 2	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	4	4		Yes	7.0	78.1	18.9

Power

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 0	Chain 1	Chain 2	mW	dBm			
802.11a SISO										
5300	16.0	26.7	13.1			20.4	13.1	18.0	0.020	PASS
802.11a MIMO										
5300	12.0	28.7	8.7	9.1		15.5	11.9	16.9	0.016	PASS
HT20 MIMO										
5300	12.0	28.7	8.5	9.4		15.7	12.0	16.9	0.016	PASS
HT40 MIMO										
5270	12.0	50.7	9.2	9.6		17.4	12.4	16.9	0.017	PASS

5470-5725 MHz Band

The limit in this band is a maximum eirp of 30dBm and maximum conducted power of 24dBm. There are eight 20MHz channels therefore the power per channel would be restricted to 15dBm conducted power and 21dBm eirp. For MIMO modes the effective antenna gain is 7dBi so the maximum conducted power is 14dBm to meet an eirp per radio of less than 21dBm.

	Chain 0	Chain 1	Chain 2	Coherent	Effective[5]	EIRP (mW)	EIRP (dBm)
Antenna Gain (dBi):	4	4		Yes	7.0	94.9	19.8

Power

Frequency (MHz)	Software Setting	26dB BW (MHz)	Measured Output Power[1] dBm			Total		Limit (dBm)	Max Power (W)	Pass or Fail
			Chain 0	Chain 1	Chain 2	mW	dBm			
802.11a SISO										
5580	16.0	26.7	13.4			21.6	13.4	15.0	0.022	PASS
802.11a MIMO										
5580	12.0	27.8	9.3	10.2		18.9	12.8	13.9	0.019	PASS
HT20 MIMO										
5580	12.0	27.8	9.8	10.0		19.5	12.9	13.9	0.020	PASS
HT40 MIMO										
5550	12.0	49.8	9.4	10.9		21.0	13.2	13.9	0.021	PASS

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions

Test Specific Details

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

Date of Test: 6/22/2011 0:00
Test Engineer: John Caizzi
Test Location: FT Chamber #7

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

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	802.11n40 Chains 01	38	6.0		Restricted Band Edge at 5150 MHz	15.209	53.4dBµV/m @ 5149.9MHz (-0.6dB)
		46 (5230MHz)	17.0		Restricted Band Edge at 5150 MHz	15.209	52.4dBµV/m @ 5142.7MHz (-1.6dB)
2		62	8.5		Restricted Band Edge at 5350 MHz	15.209	53.2dBµV/m @ 5350.0MHz (-0.8dB)
		(5270MHz)	17.0		Restricted Band Edge at 5150 MHz	15.209	53.0dBµV/m @ 5360.0MHz (-1.0dB)
		62	8.5		Restricted Band Edge at 5350 MHz	15.209	53.2dBµV/m @ 5350.0MHz (-0.8dB)
3		102	11.0		Restricted Band Edge at 5460 MHz	15.209	53.3dBµV/m @ 5459.9MHz (-0.7dB)
					Band Edge 5460 - 5470 MHz	15E	-34.6dBm/MHz @ 5470.0MHz (-7.6dB)
		110 (5550MHz)	16.5		Restricted Band Edge at 5460 MHz	15.209	53.3dBµV/m @ 5452.3MHz (-0.7dB)
		134	17.0		Band Edge 5725MHz	15E	-33.4dBm @ 5726.0MHz (-6.4dB)

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing. All remote support equipment was located outside the chamber, with all connections to remote equipment running under the ground plane through metal conduit.

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

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Ambient Conditions:

Temperature: 20.6 °C
Rel. Humidity: 35 %

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

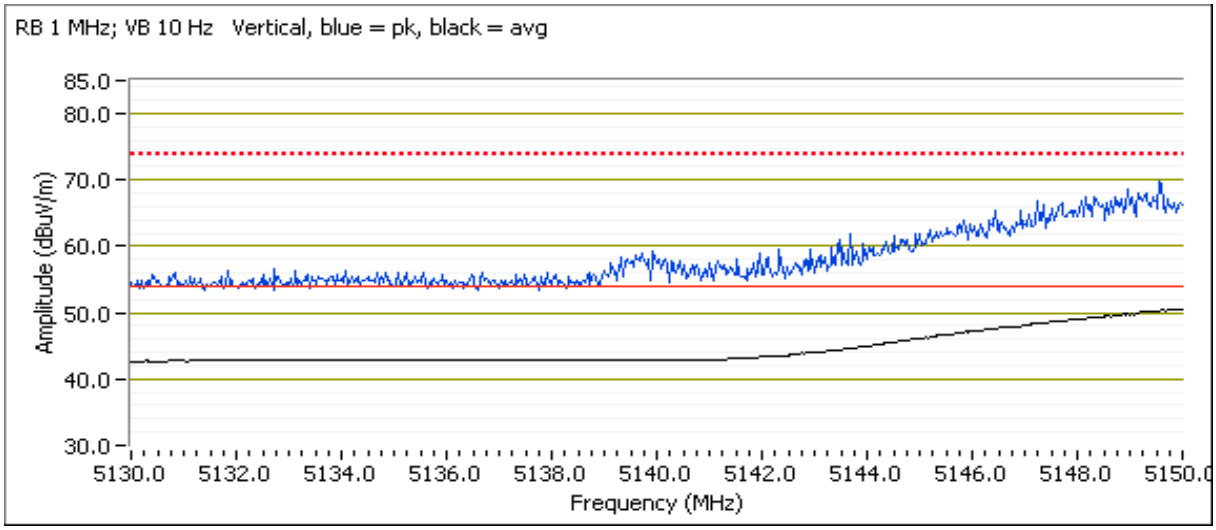
No deviations were made from the requirements of the standard.

Run #1, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5150-5250 MHz Band, 802.11n40, Chains 0+1.
Run #1a: Low Channel @ 5190 MHz

Date of Test: 6/22/2011
Test Engineer: John Caizzi
Test Location: FT Chamber #7

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.900	53.4	V	54.0	-0.6	AVG	138	1.08	Setting = 6, radio #10
5149.670	66.9	V	74.0	-7.1	PK	138	1.08	Setting = 6, radio #10



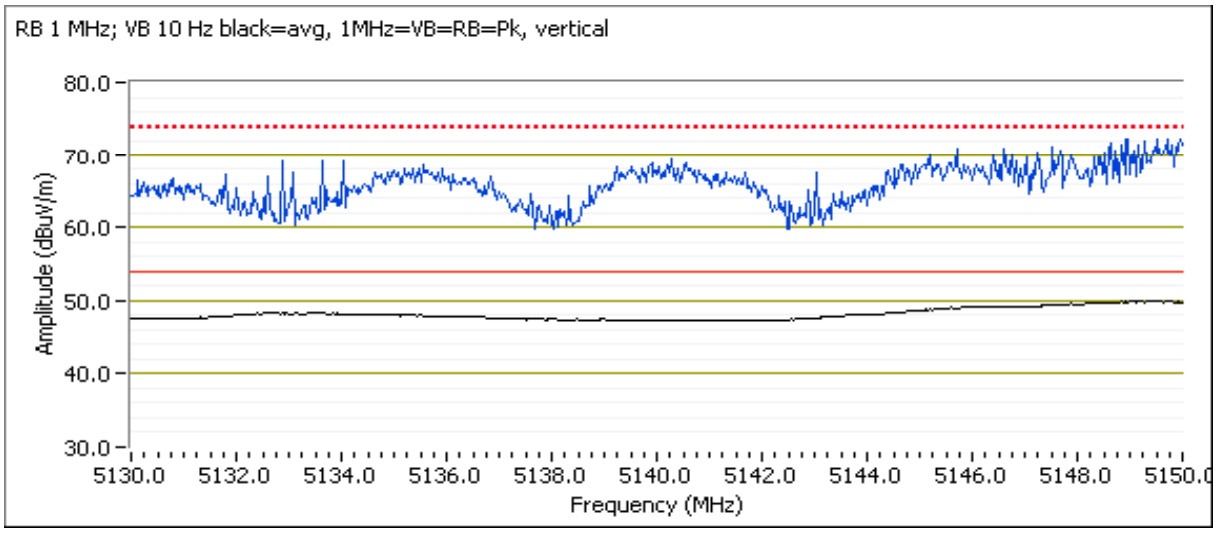
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #1a: Adjacent Channel @ 5230 MHz

Date of Test: 7/7/2011
Test Engineer: Joseph Cadigal
Test Location: FT Chamber#7

5150 MHz Band Edge Signal Radiated Field Strength

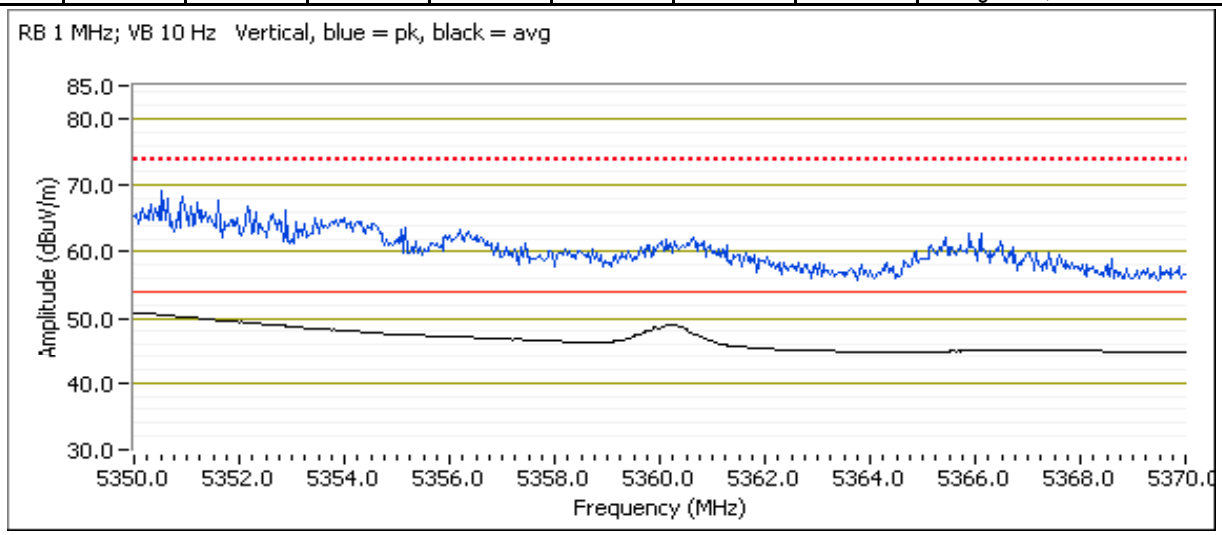
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5142.670	52.4	V	54.0	-1.6	AVG	321	1.3	RB 1 MHz;VB 10 Hz;Pk
5144.770	72.0	V	74.0	-2.0	PK	321	1.3	RB 1 MHz;VB 3 MHz;Pk
5132.400	43.2	H	54.0	-10.8	AVG	26	1.0	RB 1 MHz;VB 10 Hz;Pk
5139.400	57.7	H	74.0	-16.3	PK	26	1.0	RB 1 MHz;VB 3 MHz;Pk



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #2, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5250-5350 MHz Band, 802.11n40, Chains 0+1.
Run #2a: High Channel @ 5310 MHz
Date of Test: 6/22/2011
Test Engineer: John Caizzi
Test Location: FT Chamber #7
5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	53.2	V	54.0	-0.8	AVG	143	1.03	Setting = 8.5, radio #10
5350.630	66.3	V	74.0	-7.7	PK	143	1.03	Setting = 8.5, radio #10



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #2b: Adjacent Channel @ 5270 MHz

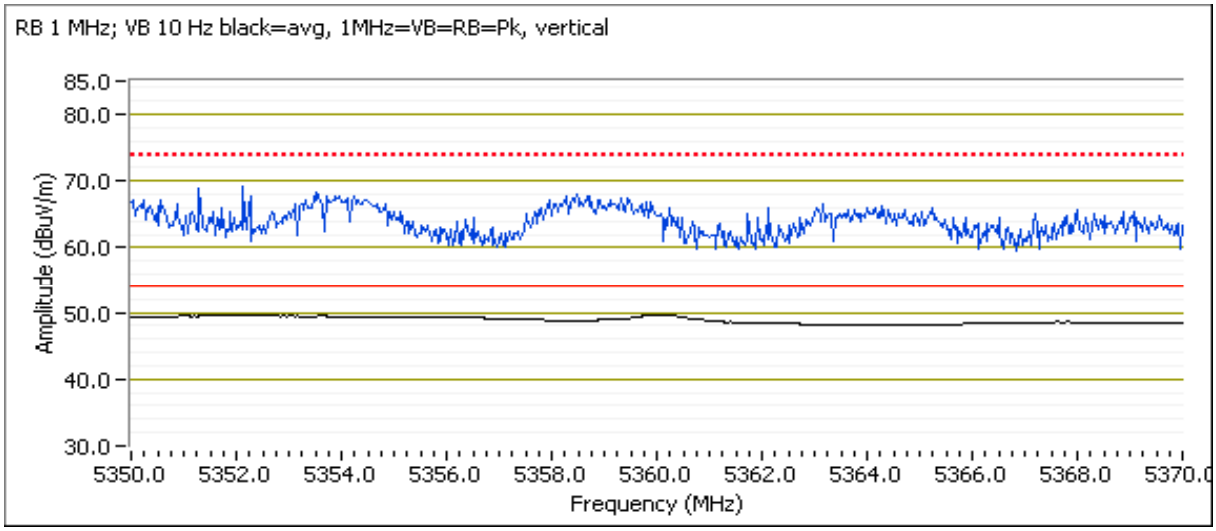
Date of Test: 7/7/2011

Test Engineer: Joseph Cadigal

Test Location: FT Chamber#7

5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5359.970	53.0	V	54.0	-1.0	AVG	310	1.4	RB 1 MHz;VB 10 Hz;Pk
5360.700	70.2	V	74.0	-3.8	PK	310	1.4	RB 1 MHz;VB 3 MHz;Pk
5357.500	43.6	H	54.0	-10.4	AVG	360	1.3	RB 1 MHz;VB 10 Hz;Pk
5351.570	58.9	H	74.0	-15.1	PK	360	1.3	RB 1 MHz;VB 3 MHz;Pk



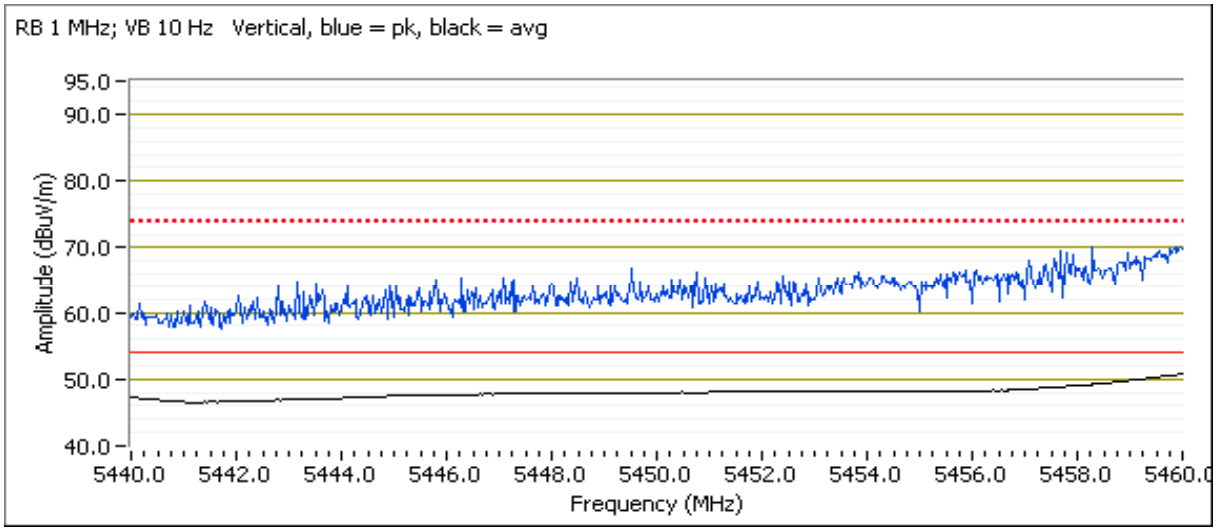
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #3, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5470-5725 MHz Band, 802.11n40, Chains 0+1.
Run #3a: Low Channel @ 5510 MHz

Date of Test: 6/22/2011
Test Engineer: John Caizzi
Test Location: FT Chamber #7

5350-5460 MHz Restricted Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5459.870	53.3	V	54.0	-0.7	AVG	123	1.02	Setting = 11, radio #10
5459.530	71.3	V	74.0	-2.7	PK	123	1.02	Setting = 11, radio #10

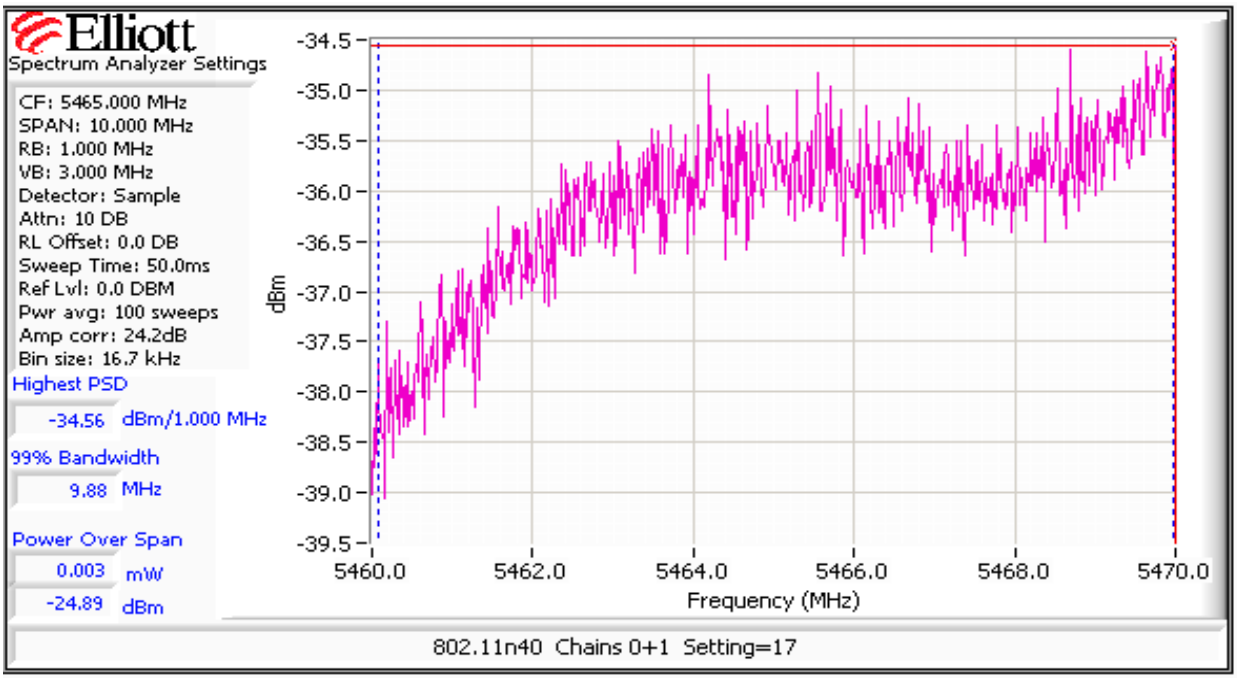


5460 - 5470 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBm/MHz	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5470.000	-34.6	V	-27.0	-7.6	Pavg	123	1.03	Setting = 11, radio #10

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used, PK indicates that a peak measurement was made.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A



Data has been corrected from dBm to dBm eirp as follows: dBm eirp = dBm at analyzer + 107 + Site factor - 93.5
+107 to convert from dBm to dBuV; + site factor (antenna factor + cable loss - premaplifier gain) to determine field strength at 3m; -95.3 to convert field strength at 3m to an eirp.
Total factor applied to the spectrum analyzer measurement (in dBm) = 13.5 + site factor. Site factor = 10.7 dB/m.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #3b: Adjacent Channel @ 5550 MHz

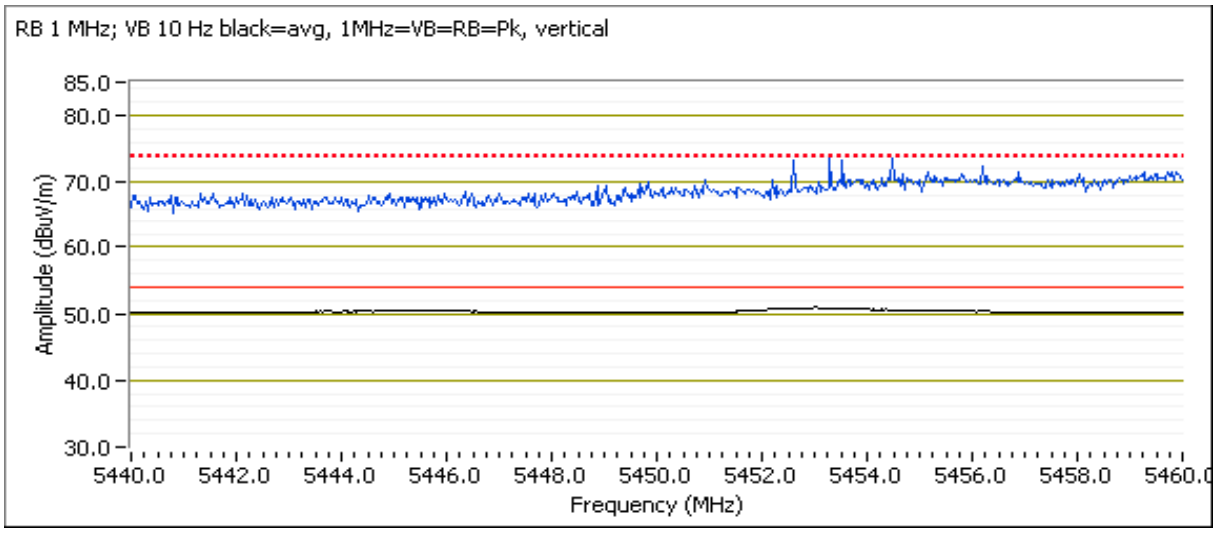
Date of Test: 7/7/2011

Test Engineer: Joseph Cadigal

Test Location: FT Chamber#7

5460 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5456.930	77.7	V	74.0	3.7	PK	298	1.0	RB 1 MHz;VB 3 MHz;Pk
5457.800	54.5	V	54.0	0.5	AVG	298	1.0	RB 1 MHz;VB 10 Hz;Pk
5452.300	53.3	V	54.0	-0.7	AVG	298	1.00	setting = 16.5
5458.700	72.6	V	74.0	-1.4	PK	298	1.00	setting = 16.5
5444.400	43.4	H	54.0	-10.6	AVG	19	1.00	setting = 16.5
5459.300	55.3	H	74.0	-18.7	PK	19	1.00	setting = 16.5



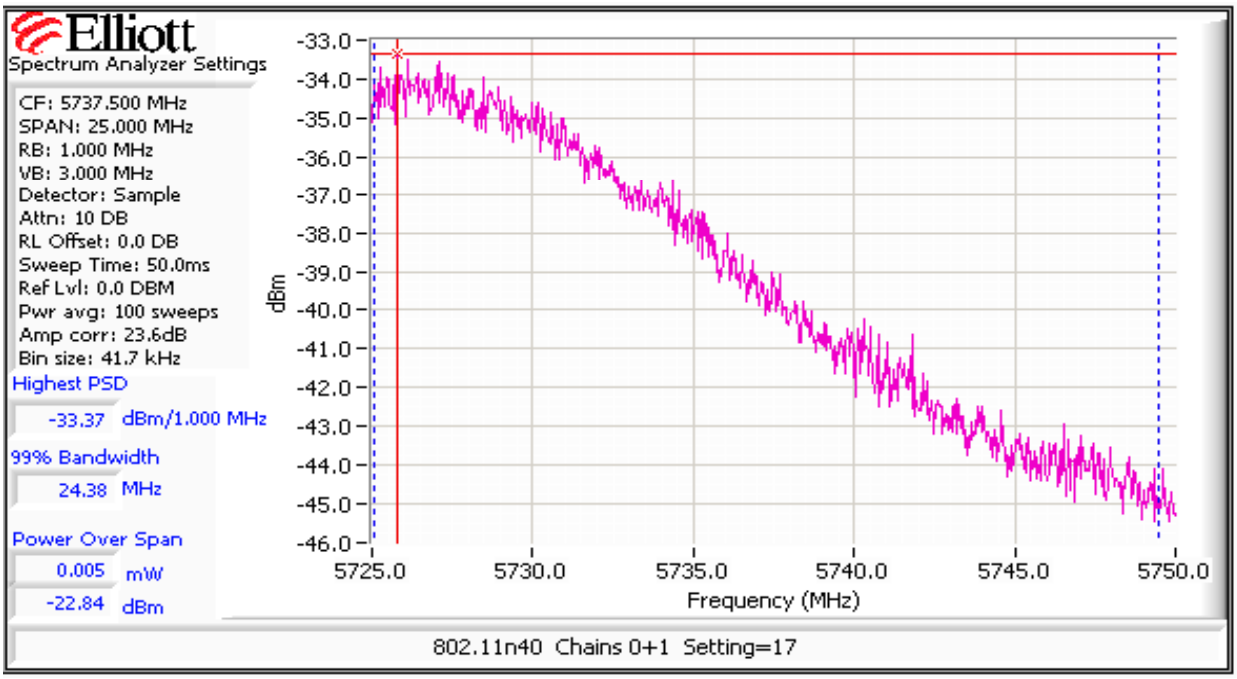
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #3c: High Channel @ 5670 MHz
Date of Test: 6/22/2011
Test Engineer: John Caizzi
Test Location: FT Chamber #7

5725 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBm	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5726.000	-33.4	V	-27.0	-6.4	Pavg	153	1.08	Setting = 17, radio #10

For emissions iimmediately above 5725 MHz the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used, PK indicates that a peak measurement was made.



Data has been corrected from dBm to dBm eirp as follows: dBm eirp = dBm at analyzer + 107 + Site factor - 93.5
+107 to convert from dBm to dBuV; + site factor (antenna factor + cable loss - premaplifier gain) to determine field strength at 3m; -95.3 to convert field strength at 3m to an eirp.
Total factor applied to the spectrum analyzer measurement (in dBm) = 13.5 + site factor. Site factor = 10.1 dB/m.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions

Test Specific Details

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

Date of Test: 6/22/2011 0:00
Test Engineer: John Caizzi
Test Location: FT Chamber #7

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 20.6 °C
Rel. Humidity: 35 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	802.11n20 Chains 01	36	13.5		Restricted Band Edge at 5150 MHz	15.209	53.2dBµV/m @ 5149.9MHz (-0.8dB)
2		64	13.5		Restricted Band Edge at 5350 MHz	15.209	53.5dBµV/m @ 5350.0MHz (-0.5dB)
3		100	16.5		Restricted Band Edge at 5460 MHz	15.209	54.0dBµV/m @ 5415.6MHz (0.0dB)
					Band Edge 5460 - 5470 MHz	15E	-32.8dBm @ 5469.8MHz (-5.8dB)
		140	16.5		Band Edge 5725MHz	15E	-28.1dBm @ 5725.0MHz (-1.1dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

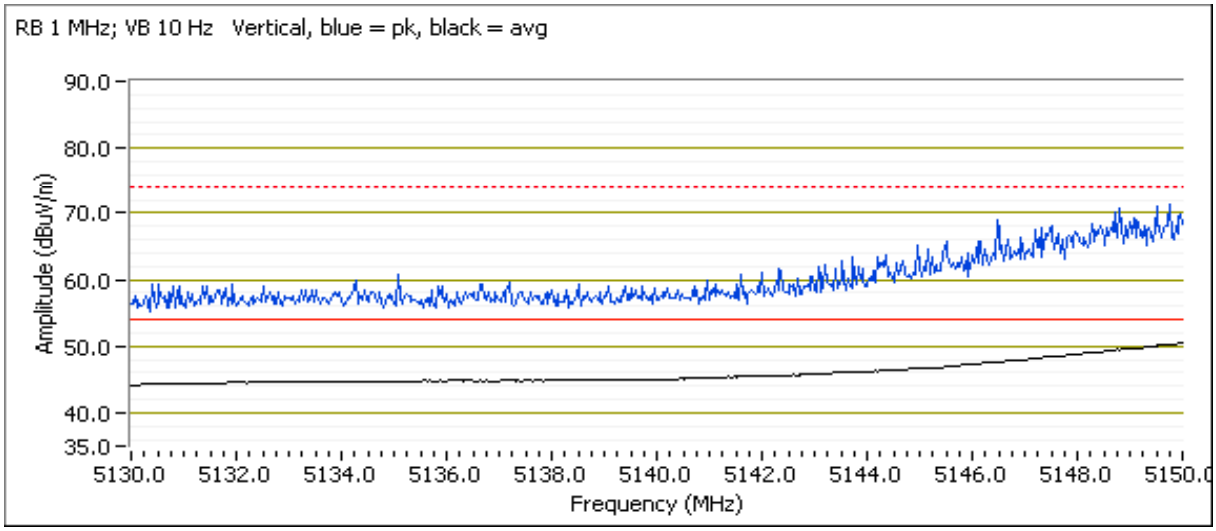
Run #1, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5150-5250 MHz Band, 802.11n20, Chains 0+1.

Date of Test: 6/22/2011
Test Engineer: John Caizzi
Test Location: FT Chamber #7

Run #1a: Low Channel @ 5180 MHz

5150 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5149.930	53.2	V	54.0	-0.8	AVG	198	1.00	Setting = 13.5, radio #8
5149.000	69.4	V	74.0	-4.6	PK	198	1.00	Setting = 13.5, radio #8



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

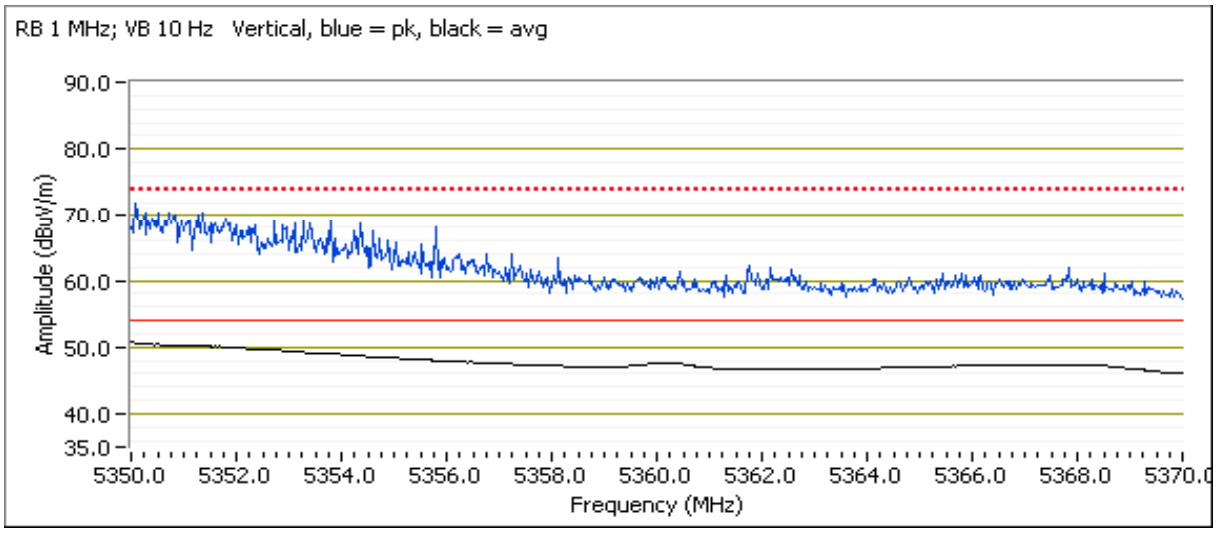
Run #2, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5250-5350 MHz Band, 802.11n20, Chains 0+1.

Date of Test: 6/22/2011
Test Engineer: John Caizzi
Test Location: FT Chamber #7

Run #2a: High Channel @ 5320 MHz

5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.030	53.5	V	54.0	-0.5	AVG	118	1.04	Setting = 13.5, radio #10
5350.900	71.0	V	74.0	-3.0	PK	118	1.04	Setting = 13.5, radio #10



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

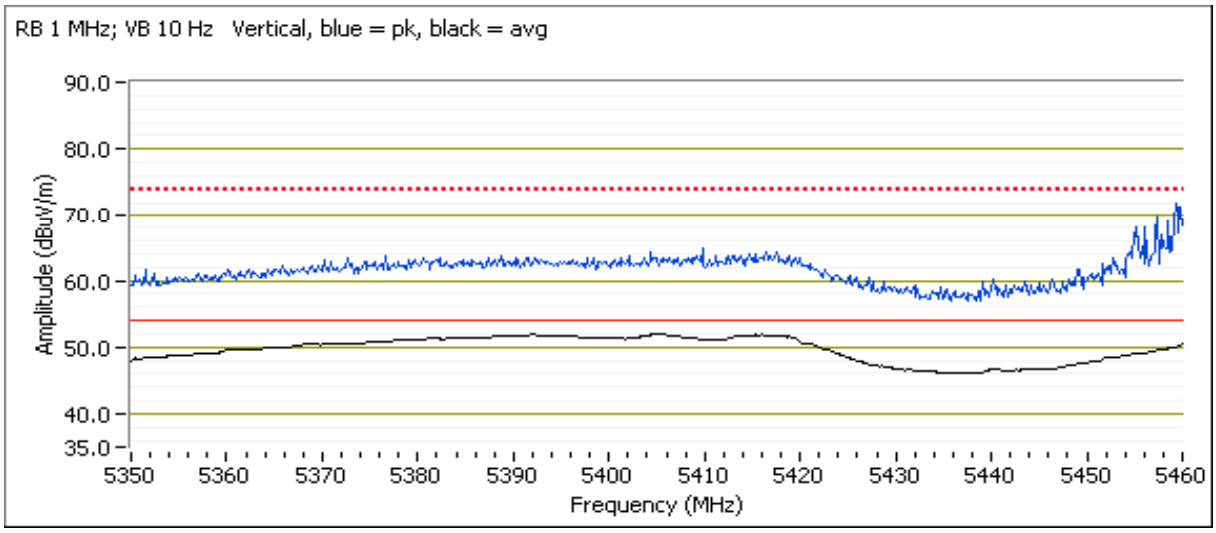
Run #3, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5470-5725 MHz Band, 802.11n20, Chains 0+1.

Date of Test: 6/22/2011
Test Engineer: John Caizzi
Test Location: FT Chamber #7

Run #3a: Low Channel @ 5500 MHz

5350-5460 MHz Restricted Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5415.630	54.0	V	54.0	0.0	AVG	122	1.05	Setting = 16.5, radio #10
5456.330	68.2	V	74.0	-5.8	PK	122	1.05	Setting = 16.5, radio #10

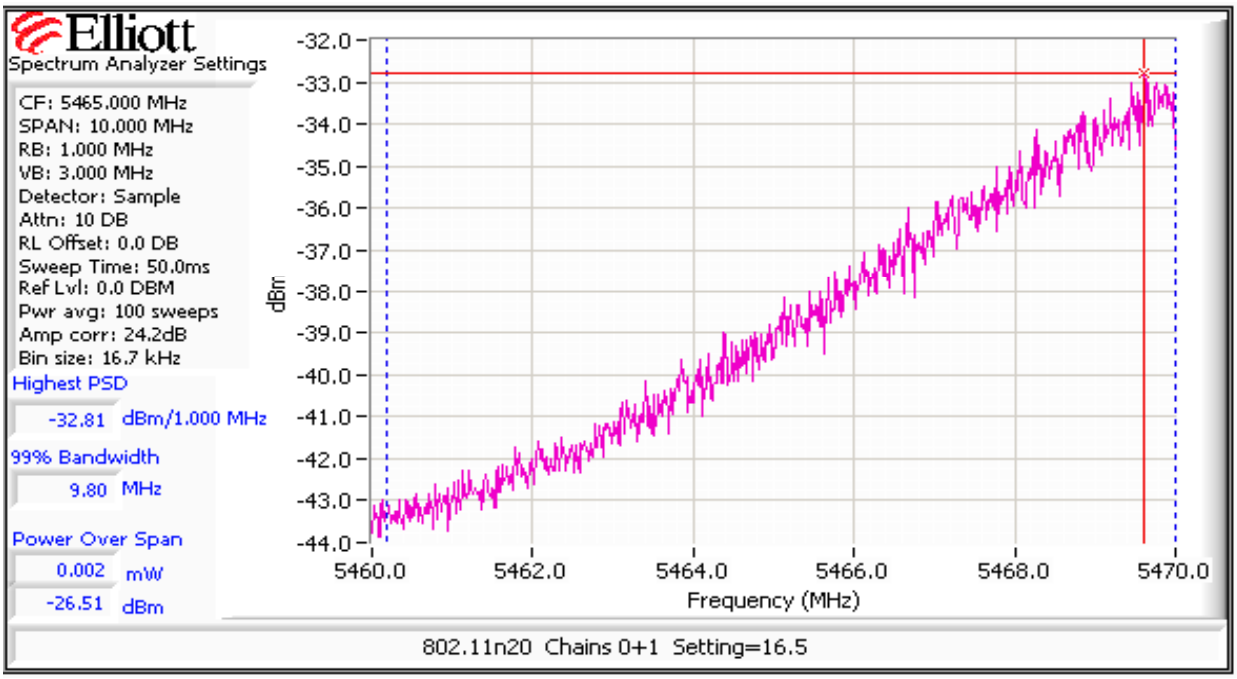


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

5460 - 5470 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBm/MHz	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.800	-32.8	V	-27.0	-5.8	Pavg	122	1.05	Setting = 16.5, radio #10

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used, PK indicates that a peak measurement was made.



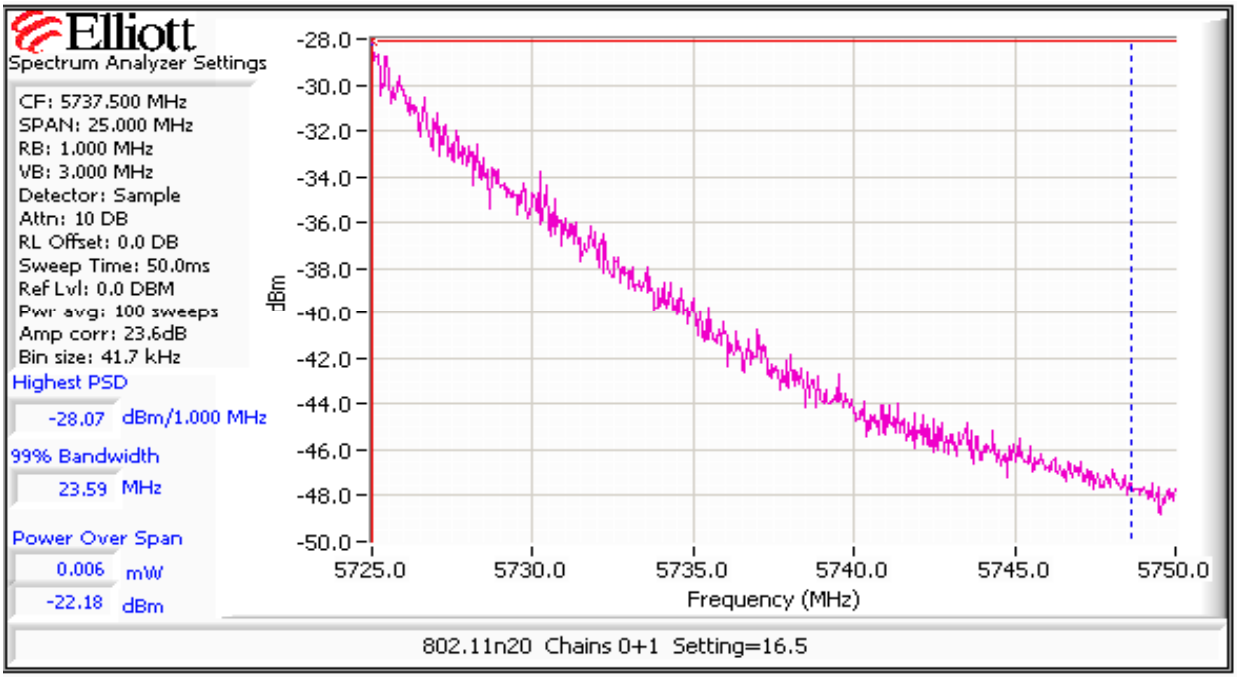
Data has been corrected from dBm to dBm eirp as follows: dBm eirp = dBm at analyzer + 107 + Site factor - 93.5
+107 to convert from dBm to dBuV; + site factor (antenna factor + cable loss - premaplifier gain) to determine field strength at 3m; -95.3 to convert field strength at 3m to an eirp.
Total factor applied to the spectrum analyzer measurement (in dBm) = 13.5 + site factor. Site factor = 10.7 dB/m.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

5725 MHz Band Edge Radiated Field Strength

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments
MHz	dBm	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5725.000	-28.1	V	-27.0	-1.1	Pavg	154	1.5	Setting = 16.5 dBm, radio #10

For emissions iimmediately above 5725 MHz the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used, PK indicates that a peak measurement was made.



Data has been corrected from dBm to dBm eirp as follows: dBm eirp = dBm at analyzer + 107 + Site factor - 93.5
+107 to convert from dBm to dBuV; + site factor (antenna factor + cable loss - premaplifier gain) to determine field strength at 3m; -95.3 to convert field strength at 3m to an eirp.
Total factor applied to the spectrum analyzer measurement (in dBm) = 13.5 + site factor. Site factor = 10.1dB/m.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 20.6 °C
Rel. Humidity: 35 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	802.11a Chain 01	5150-5250 Low	13.5		Restricted Band Edge at 5150 MHz	15.209	52.7dBµV/m @ 5148.3MHz (-1.3dB)
	802.11a Chain 0	5150-5250 Low	*17.0*		Restricted Band Edge at 5150 MHz	15.209	73.9dBµV/m @ 5149.9MHz (-0.1dB)
2	802.11a Chain 01	5250-5350 High	15.0		Restricted Band Edge at 5350 MHz	15.209	53.0dBµV/m @ 5350.0MHz (-1.0dB)
	802.11a Chain 0	5250-5350 High	*17.0*		Restricted Band Edge at 5350 MHz	15.209	73.9dBµV/m @ 5351.2MHz (-0.1dB)
3	802.11a Chain 01	5470-5725 Low	17.0		Restricted Band Edge at 5460 MHz	15.209	52.3dBµV/m @ 5459.1MHz (-1.7dB)
					Band Edge 5460 - 5470 MHz	15E	64.9dBµV/m @ 5469.8MHz (-3.5dB)
	802.11a Chain 0	5470-5725 Low	17.0		Restricted Band Edge at 5460 MHz	15.209	50.1dBµV/m @ 5459.5MHz (-3.9dB)
					Band Edge 5460 - 5470 MHz	15E	57.2dBµV/m @ 5469.8MHz (-11.2dB)
	802.11a Chain 01	5470-5725 High	17.0		Band Edge 5725MHz	15E	68.2dBµV/m @ 5726.8MHz (-0.1dB)
	802.11a Chain 0				Band Edge 5725MHz	15E	67.8dBµV/m @ 5737.5MHz (-0.5dB)

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

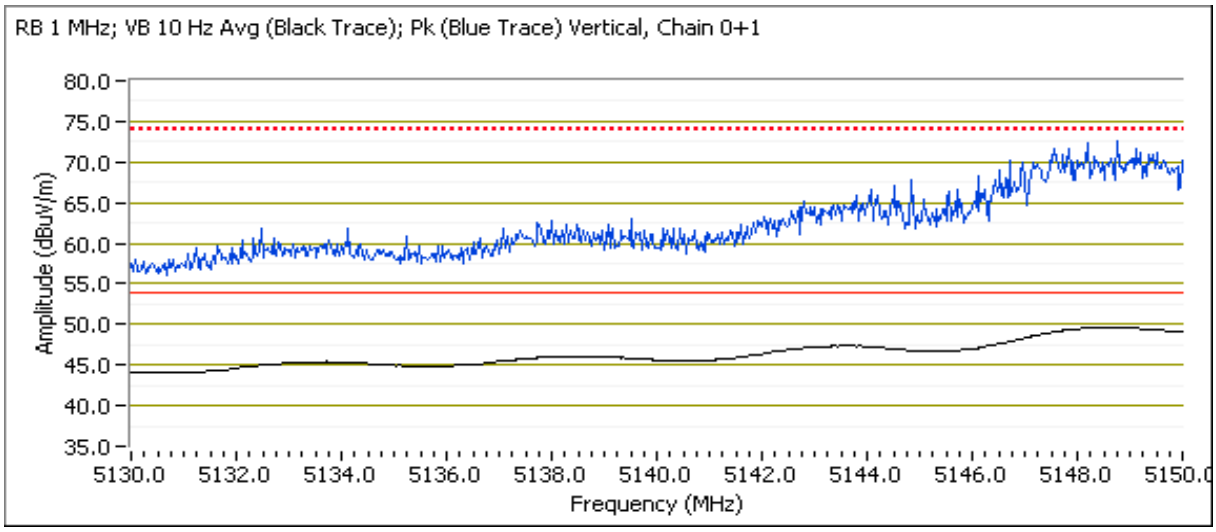
Run #1, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5150-5250 MHz Band

Date of Test: 6/21/2011
Test Engineer: Rafael Varelas
Test Location: FT Chamber #7

Run #1a: Low Channel

5150 MHz Band Edge Signal Radiated Field Strength - MIMO

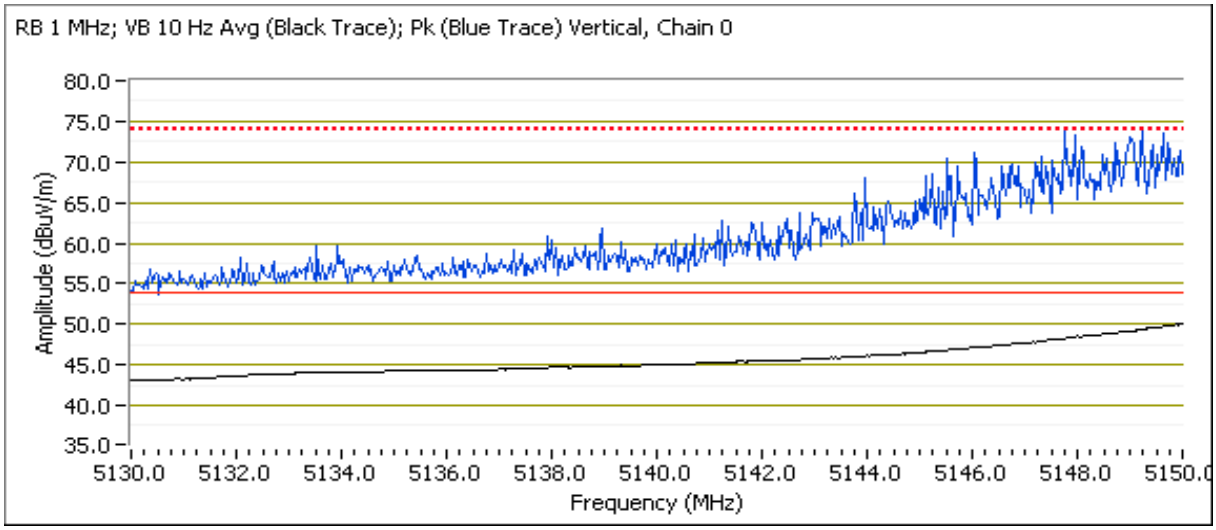
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments	Chain
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5148.300	52.7	V	54.0	-1.3	AVG	188	1.5	Power 13.5	0+1
5148.830	71.2	V	74.0	-2.8	PK	188	1.5	Power 13.5	0+1
5149.240	45.4	H	54.0	-8.6	AVG	234	1.9	Power 13.5	0+1
5149.250	62.9	H	74.0	-11.1	PK	234	1.9	Power 13.5	0+1



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

5150 MHz Band Edge Signal Radiated Field Strength - SISO (Ch 0)

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments	Chain
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5149.930	53.4	V	54.0	-0.6	AVG	183	1.5	Power 17.0	0
5149.900	73.9	V	74.0	-0.1	PK	183	1.5	Power 17.0	0
5149.980	46.9	H	54.0	-7.1	AVG	219	1.4	Power 17.0	0
5148.670	66.2	H	74.0	-7.8	PK	219	1.4	Power 17.0	0



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

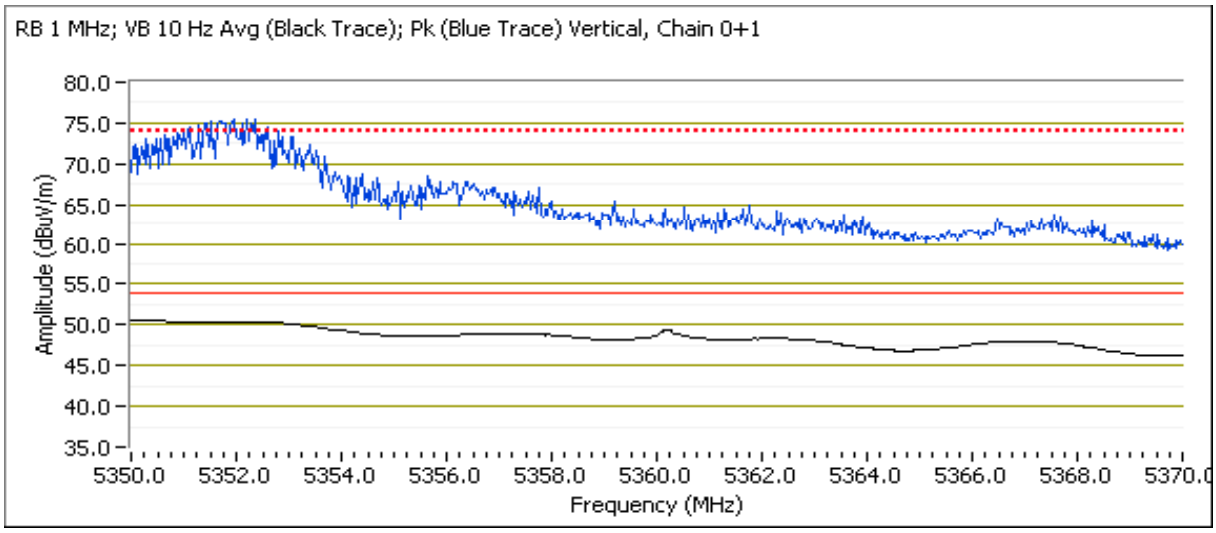
Run #2, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5250-5350 MHz Band

Date of Test: 6/21/2011
Test Engineer: Rafael Varelas
Test Location: FT Chamber #7

Run #2a: High Channel

5350 MHz Band Edge Signal Radiated Field Strength - MIMO

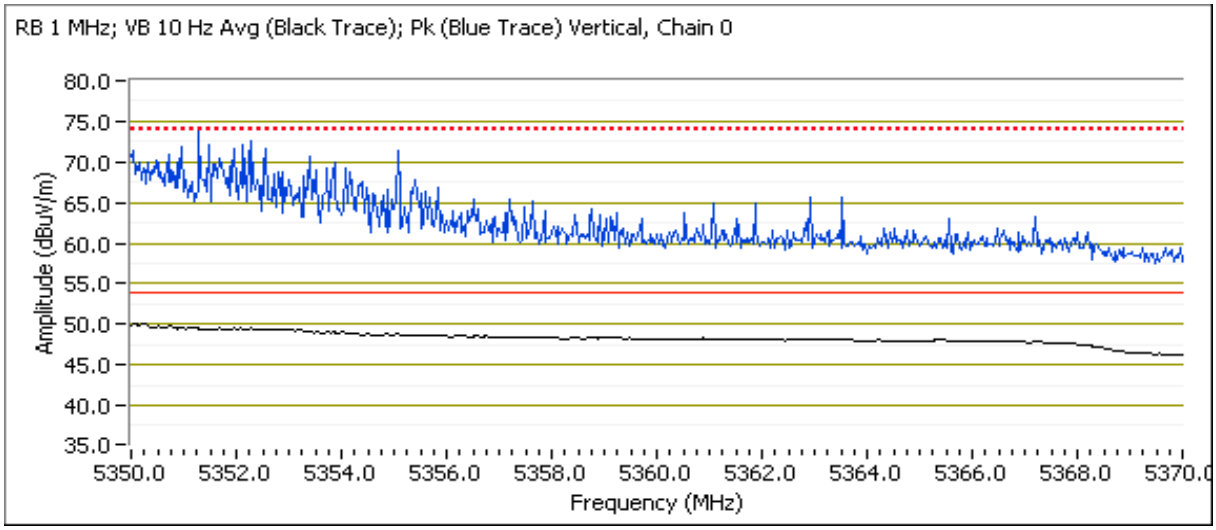
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments	Chain
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5350.020	53.0	V	54.0	-1.0	AVG	179	1.0	Power 15.0dBm	0+1
5350.980	73.7	V	74.0	-0.3	PK	179	1.0	Power 15.0dBm	0+1
5351.540	42.8	H	54.0	-11.2	AVG	257	1.1	Power 15.0dBm	0+1
5352.250	54.1	H	74.0	-19.9	PK	257	1.1	Power 15.0dBm	0+1



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

5350 MHz Band Edge Signal Radiated Field Strength - SISO (Ch 0)

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments	Chain
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5350.040	53.5	V	54.0	-0.5	AVG	159	1.0	Power 17.0	0
5351.180	73.9	V	74.0	-0.1	PK	159	1.0	Power 17.0	0
5350.350	44.6	H	54.0	-9.4	AVG	96	1.2	Power 17.0	0
5350.090	59.3	H	74.0	-14.7	PK	96	1.2	Power 17.0	0



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

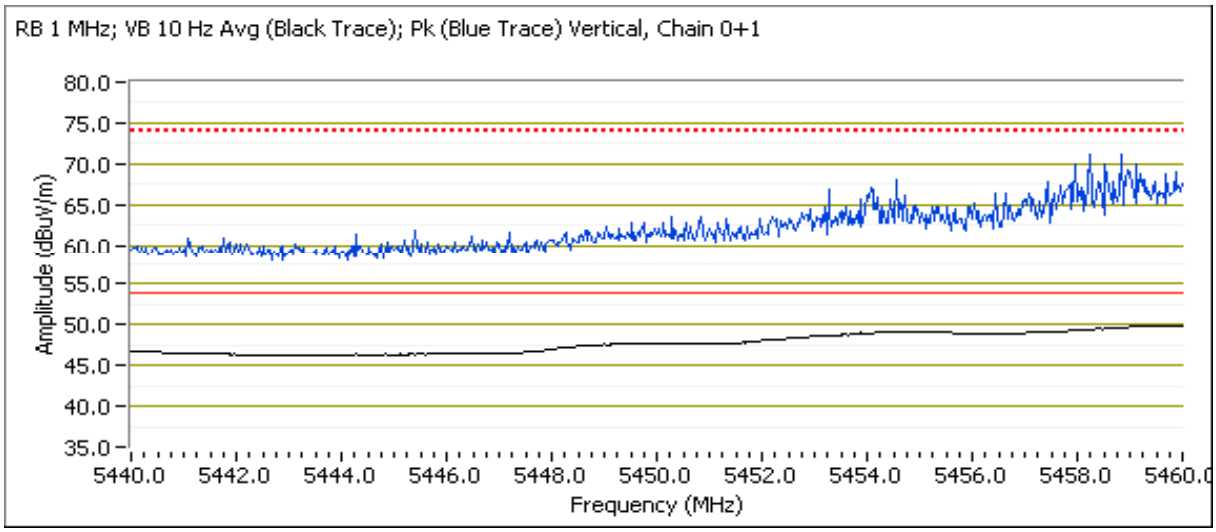
Run #3, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 6/21/2011
Test Engineer: Rafael Varelas
Test Location: FT Chamber #7

Run #3a: Low Channel

5350-5460 MHz Restricted Band Edge Signal Radiated Field Strength - MIMO

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments	Chain
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5459.080	52.3	V	54.0	-1.7	AVG	145	1.0	Power 17.0	0+1
5458.310	70.9	V	74.0	-3.1	PK	145	1.0	Power 17.0	0+1
5457.980	44.5	H	54.0	-9.5	AVG	206	1.5	Power 17.0	0+1
5459.250	59.0	H	74.0	-15.0	PK	206	1.5	Power 17.0	0+1

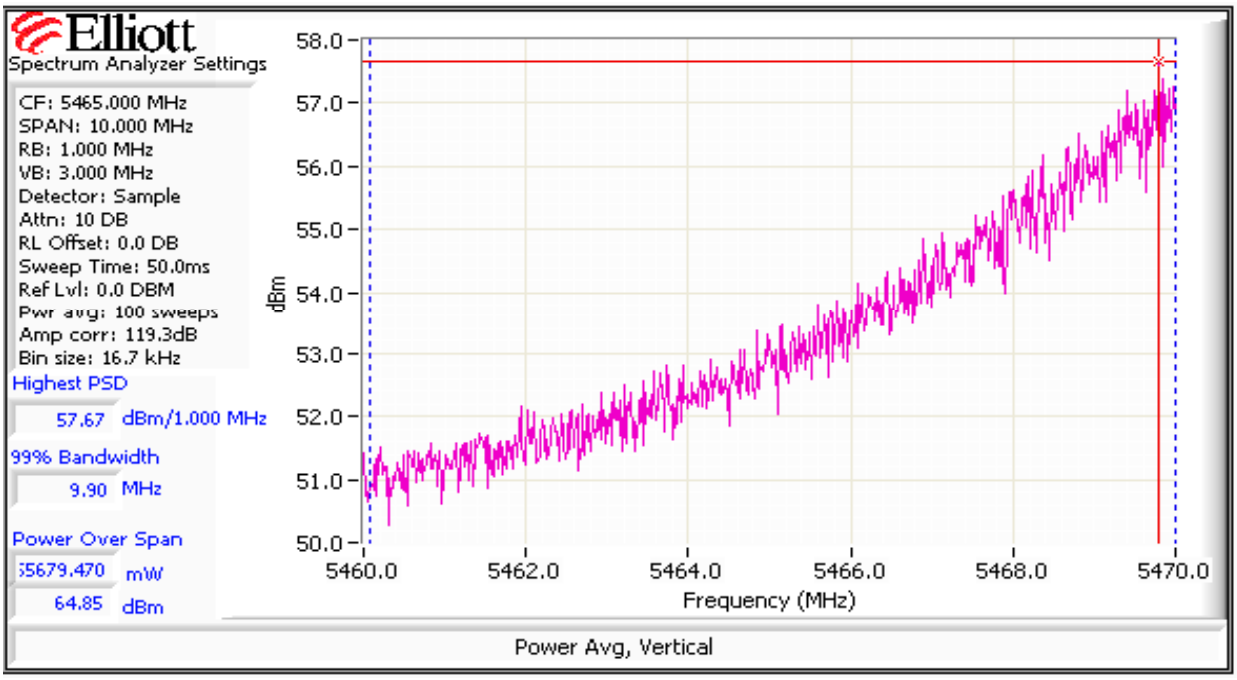


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

5460 - 5470 MHz Band Edge Radiated Field Strength - MIMO

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments	Chain
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5469.780	64.9	V	68.3	-3.4	Pavg	145	1.0	Power 17.0	0 + 1

For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used, PK indicates that a peak measurement was made.



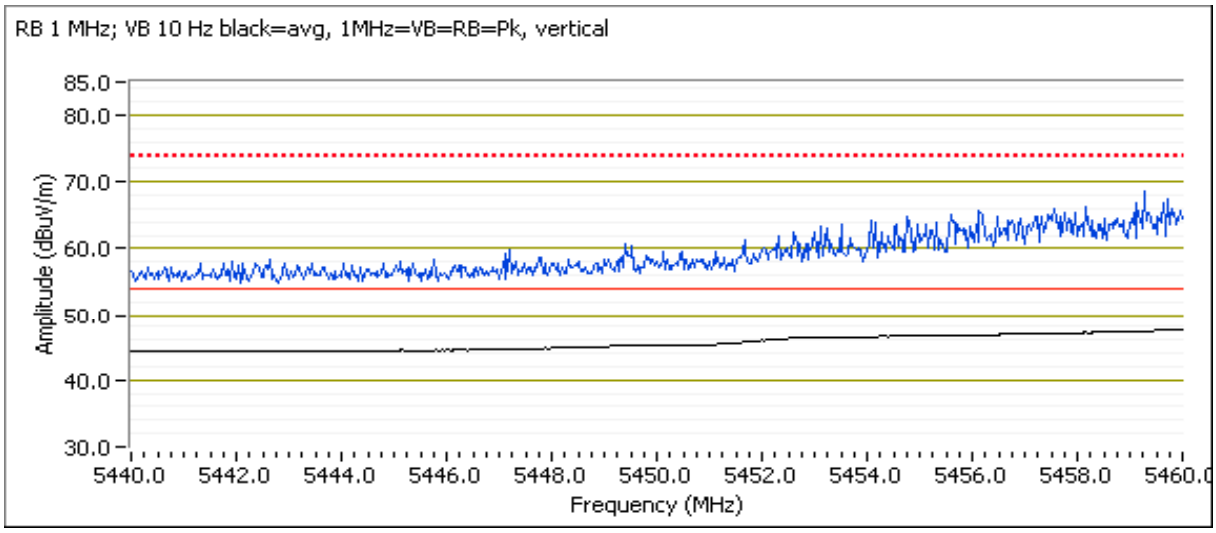
Data has been corrected from dBm to dBuV/m as follows:dBuV/m = dBm at analyzer + 107 + Site factor
+107 to convert from dBm to dBuV; + site factor (antenna factor + cable loss - premaplifier gain) to determine field strength at 3m;
Total factor applied to the spectrum analyzer measurement (in dBm) = 107 + site factor. Site factor = 12.3 dB/m.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

5350-5460 MHz Restricted Band Edge Signal Radiated Field Strength - SISO (Ch 0)

Date of Test: 7/7/2011
Test Engineer: Joseph Cadigal
Test Location: FT Chamber#7

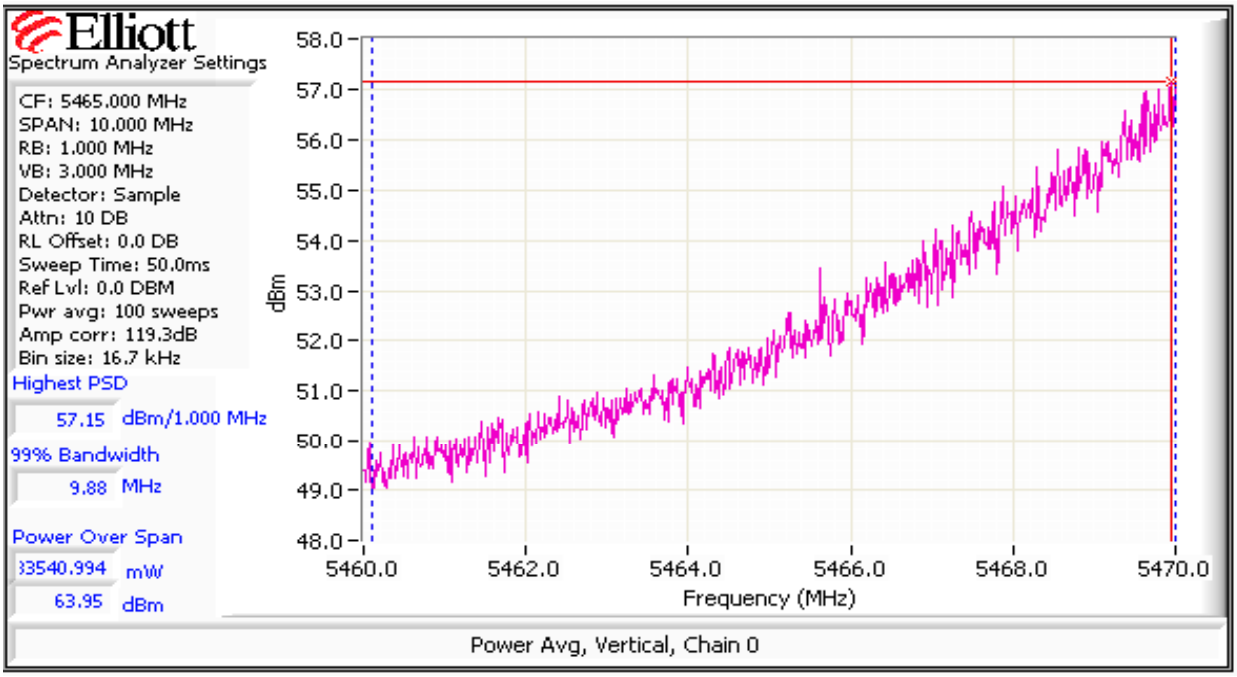
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments	Chain
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5459.500	50.1	V	54.0	-3.9	AVG	301	1.0		0
5459.370	67.8	V	74.0	-6.2	PK	301	1.0		0
5445.400	43.1	H	54.0	-10.9	AVG	28	1.0		0
5457.600	54.2	H	74.0	-19.8	PK	28	1.0		0



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

5460 - 5470 MHz Band Edge Radiated Field Strength - SISO (Ch 0)

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments	Chain
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5469.780	57.2	V	68.3	-11.2	Pavg	145	1.0	Power 17.0	0



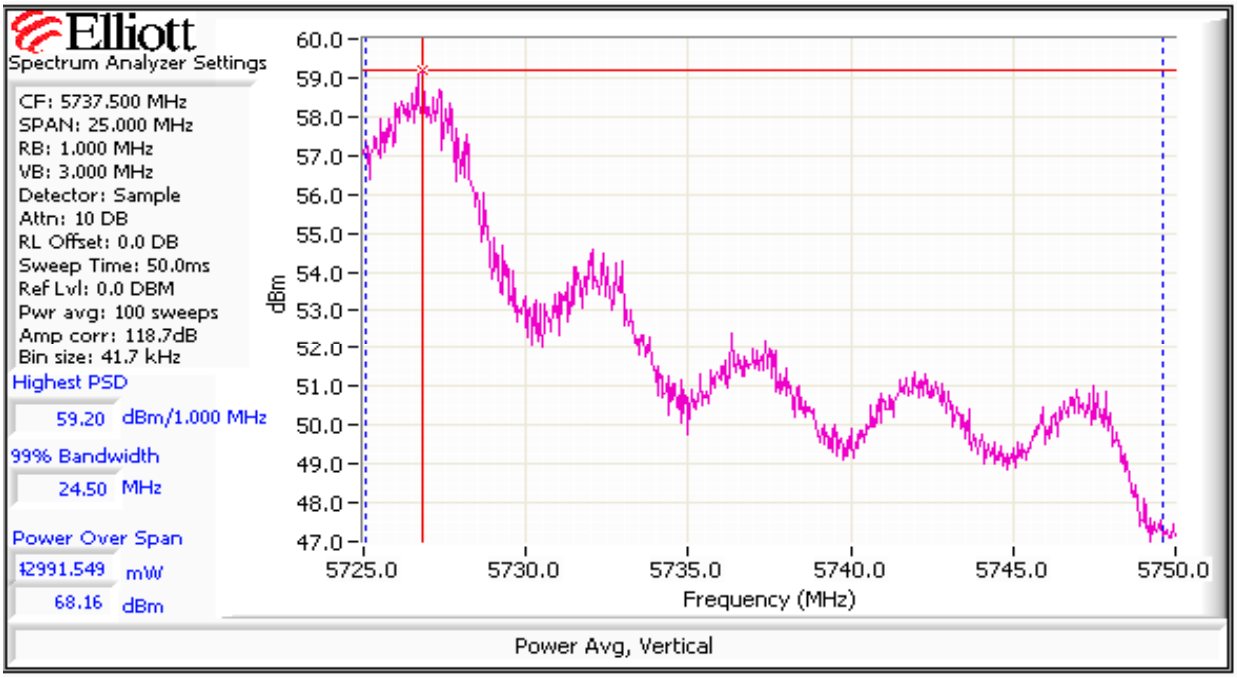
For emissions in the 5460-5470MHz frequency range the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used, PK indicates that a peak measurement was made.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

5725 MHz Band Edge Radiated Field Strength - MIMO

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments	Chain
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5726.830	68.2	V	68.3	-0.1	Pavg	155	1.1	Power 17.0	0+1

For emissions iimmediately above 5725 MHz the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used, PK indicates that a peak measurement was made.



Data has been corrected from dBm to dBuV/m as follows:dBuV/m = dBm at analyzer + 107 + Site factor
+107 to convert from dBm to dBuV; + site factor (antenna factor + cable loss - premaplifier gain) to determine field strength at 3m;
Total factor applied to the spectrum analyzer measurement (in dBm) = 107 + site factor. Site factor = 11.7 dB/m.

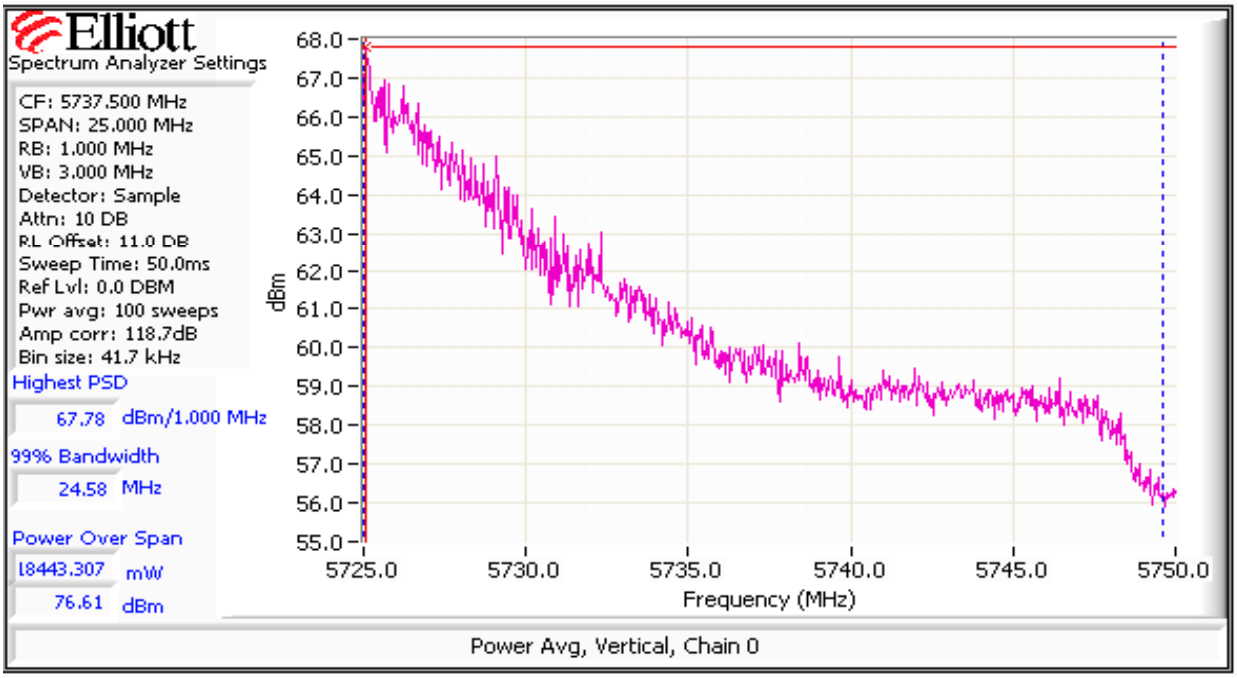
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

5725 MHz Band Edge Radiated Field Strength - SISO (Ch 0)

Date of Test: 7/7/2011
Test Engineer: Joseph Cadigal
Test Location: FT Chamber#7

Frequency	Level	Pol	15 E		Detector	Azimuth	Height	Comments	Chain
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5737.500	67.8	V	68.3	-0.5	Pavg	303	1.3		0

For emissions iimmediately above 5725 MHz the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used, PK indicates that a peak measurement was made.



Data has been corrected from dBm to dBuV/m as follows:dBuV/m = dBm at analyzer + 107 + Site factor
+107 to convert from dBm to dBuV; + site factor (antenna factor + cable loss - premaplifier gain) to determine field strength at 3m;
Total factor applied to the spectrum analyzer measurement (in dBm) = 107 + site factor. Site factor = 11.7 dB/m.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

RSS 210 and FCC 15.407 (UNII) Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

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

Ambient Conditions:

Temperature: 20.5 °C Rel. Humidity: 34 %

Summary of Results

For each measurement the system was confiugred with mutliple 2x2 and 3x3 modules tuned to the low, center or high channel as appropriate for each run and confugred with one radio of each module type operating in 802.11a, HT20 and HT40 modes. As mutliple modules could be co-located (with the condition that no two modules would operate on overlapping channels) when emissions exceeded the limit with all the modules operating simultaneously on the same frequency for a harmonically related signal, each mode/module type was evaluated separately. Signals independent of the operating frequency were only evaluated with mutliple transmitters operational.

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	802.11a Chain 012	5150-5250 Low	13.5		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.8dBµV/m @ 5440.0MHz (-0.2dB)
	802.11n20 Chain 012		13.5				
	802.11n40 Chain 012		6.0				
	802.11a Chain 012	5150-5250 Center	17		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.1dBµV/m @ 4960.1MHz (-1.9dB)
	802.11n20 Chain 012		17				
	802.11n40 Chain 012		10				
	802.11a Chain 012	5150-5250 High	17		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.8dBµV/m @ 5440.0MHz (-1.2dB)
	802.11n20 Chain 012		17				
	802.11n40 Chain 012		10				

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
2	802.11a Chain 012	5250-5350 Low	17.0		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.4dBµV/m @ 5440.1MHz (-0.6dB)
	802.11n20 Chain 012		17.0		Radiated Emissions, 1 - 40 GHz		
	802.11n40 Chain 012		15.0		Radiated Emissions, 1 - 40 GHz		
	802.11a Chain 012	5250-5350 Center	17.0		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.6dBµV/m @ 10602.2MHz (-0.4dB)
	802.11n20 Chain 012		17.0		Radiated Emissions, 1 - 40 GHz		
	802.11n40 Chain 012		15.0		Radiated Emissions, 1 - 40 GHz		
	802.11a Chain 012	5250-5350 High	17.0		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	53.0dBµV/m @ 4960.0MHz (-1.0dB)
	802.11n20 Chain 012		17.0		Radiated Emissions, 1 - 40 GHz		
	802.11n40 Chain 012		15.0		Radiated Emissions, 1 - 40 GHz		
3	802.11a Chain 012	5470-5725 Low	17.0		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.0dBµV/m @ 5040.0MHz (-3.0dB)
	802.11n20 Chain 012		17.0		Radiated Emissions, 1 - 40 GHz		
	802.11n40 Chain 012		15.0		Radiated Emissions, 1 - 40 GHz		
	802.11a Chain 012	5470-5725 Center	17.0		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.3dBµV/m @ 11158.7MHz (-2.7dB)
	802.11n20 Chain 012		17.0		Radiated Emissions, 1 - 40 GHz		
	802.11n40 Chain 012		15.0		Radiated Emissions, 1 - 40 GHz		
	802.11a Chain 012	5470-5725 High	17.0		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.7dBµV/m @ 11394.1MHz (-1.3dB)
	802.11n20 Chain 012		17.0		Radiated Emissions, 1 - 40 GHz		
	802.11n40 Chain 012		15.0		Radiated Emissions, 1 - 40 GHz		
4	802.11a Chain 0	36	16.5		Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	-12.4dB margin

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

General Test Configuration

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

Ambient Conditions:

Temperature:	20.5 °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.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

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

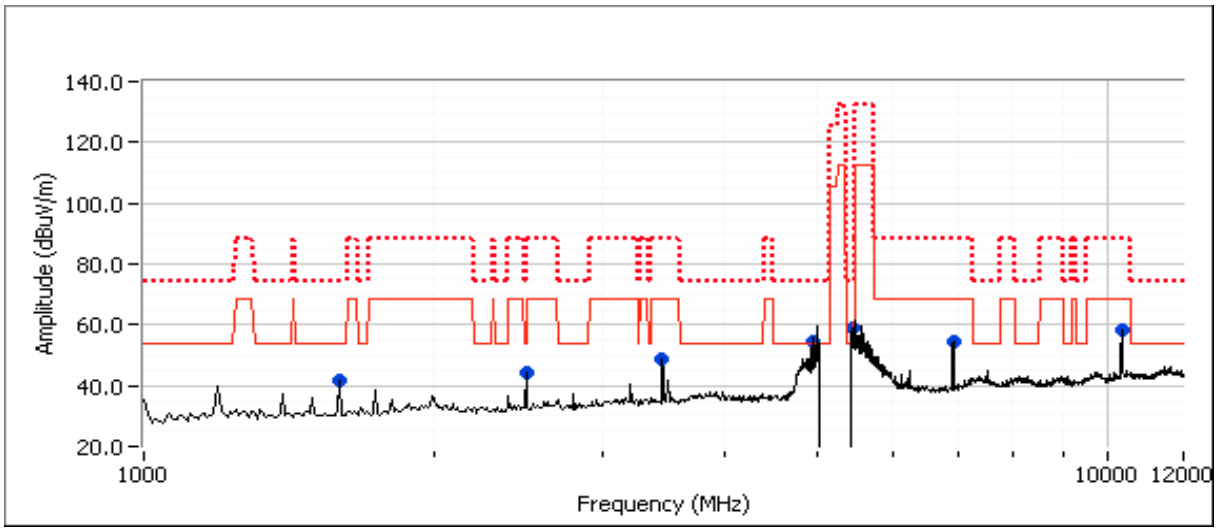
Date of Test: 6/22/2011
Test Engineer: Rafael Varelas
Test Location: FT Chamber #7

Run #1a: Low Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5440.030	53.8	V	54.0	-0.2	AVG	324	1.0	RB 1 MHz;VB 10 Hz;Pk
5440.690	61.7	V	74.0	-12.3	PK	324	1.0	RB 1 MHz;VB 3 MHz;Pk
1600.100	41.5	V	54.0	-12.5	Peak	176	1.3	
2500.270	44.5	V	54.0	-9.5	Peak	186	1.0	
3453.480	49.0	H	68.3	-19.3	Peak	7	1.0	
6906.660	54.6	V	68.3	-13.7	Peak	223	1.3	
10359.910	58.2	V	68.3	-10.1	Peak	69	1.3	
4960.020	50.5	V	54.0	-3.5	AVG	96	1.0	RB 1 MHz;VB 10 Hz;Pk
4960.420	58.3	V	74.0	-15.7	PK	96	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). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used for the measurement of emissions outside of the restricted bands. PK indicates that a peak measurement was made.

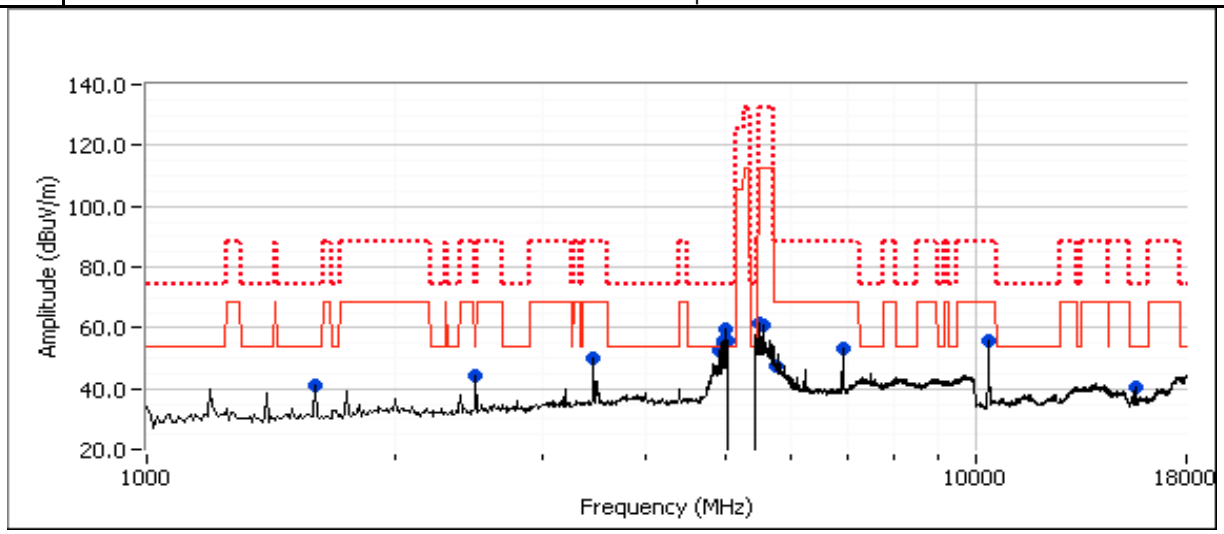


Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #1b: Center Channel

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4960.100	52.1	V	54.0	-1.9	AVG	207	1.0	RB 1 MHz;VB 10 Hz;Pk
4959.830	59.3	V	74.0	-14.7	PK	207	1.0	RB 1 MHz;VB 3 MHz;Pk
4919.980	47.1	V	54.0	-6.9	AVG	227	1.0	RB 1 MHz;VB 10 Hz;Pk
4919.930	56.3	V	74.0	-17.7	PK	227	1.0	RB 1 MHz;VB 3 MHz;Pk
5033.540	47.0	V	54.0	-7.0	AVG	240	1.0	RB 1 MHz;VB 10 Hz;Pk
5033.730	58.8	V	74.0	-15.2	PK	240	1.0	RB 1 MHz;VB 3 MHz;Pk
1595.830	*40.9*	*V*	*54.0*	*-13.1*	*Peak*	*183*	*1.0*	
2500.180	44.5	V	54.0	-9.5	Peak	181	1.3	Digital Emissions
3465.830	*49.8*	*H*	*68.3*	*-18.5*	*Peak*	*14*	*1.0*	
5000.150	59.7	V	-	-	Peak	131	1.3	Digital Emissions
5473.330	*61.4*	*V*	*112.3*	*-50.9*	*Peak*	*204*	*1.3*	
5555.830	*61.1*	*V*	*112.3*	*-51.2*	*Peak*	*214*	*1.0*	
5739.170	*47.3*	*V*	*68.3*	*-21.0*	*Peak*	*280*	*1.3*	
6937.500	*53.1*	*V*	*68.3*	*-15.2*	*Peak*	*205*	*1.0*	
10386.670	55.8	V	68.3	-12.5	Peak	41	1.6	
15613.330	40.3	V	54.0	-13.7	Peak	311	1.3	

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). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used for the measurement of emissions outside of the restricted bands. PK indicates that a peak measurement was made.



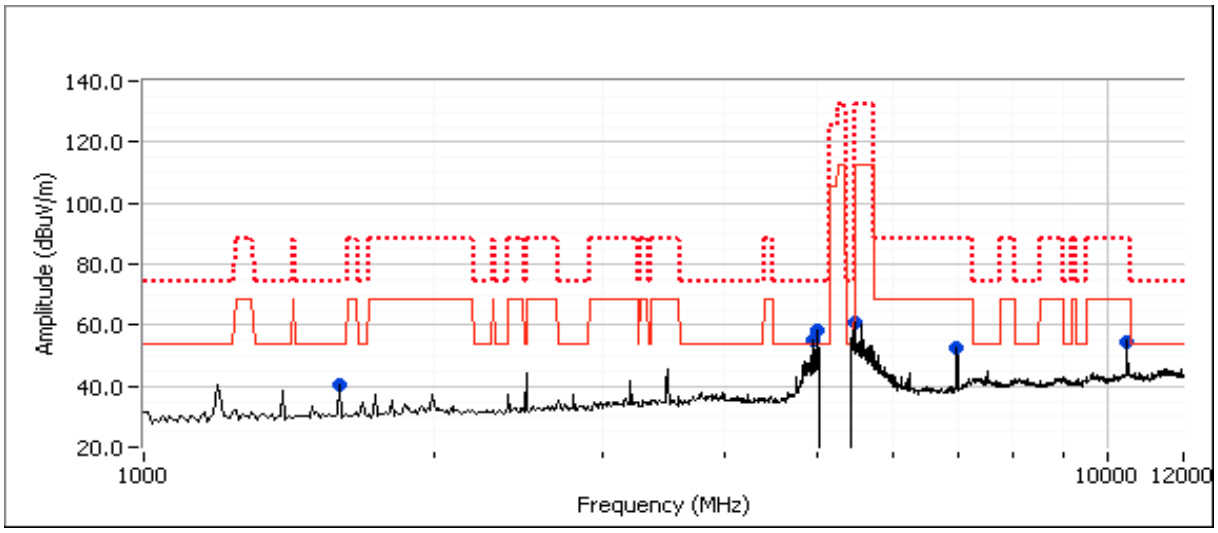
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #1c: High Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5439.980	52.8	V	54.0	-1.2	AVG	201	1.0	RB 1 MHz;VB 10 Hz;Pk
5439.740	62.3	V	74.0	-11.7	PK	201	1.0	RB 1 MHz;VB 3 MHz;Pk
1600.100	40.7	V	54.0	-13.3	Peak	186	1.3	
5000.090	58.3	V	-	-	Peak	176	1.0	Digital
6986.680	52.6	V	68.3	-15.7	Peak	225	1.0	
10479.430	54.5	V	68.3	-13.8	Peak	147	1.3	
4960.040	52.0	V	54.0	-2.0	AVG	193	1.0	RB 1 MHz;VB 10 Hz;Pk
4960.040	59.7	V	74.0	-14.3	PK	193	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). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used for the measurement of emissions outside of the restricted bands. PK indicates that a peak measurement was made.



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #2, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5250-5350 MHz Band

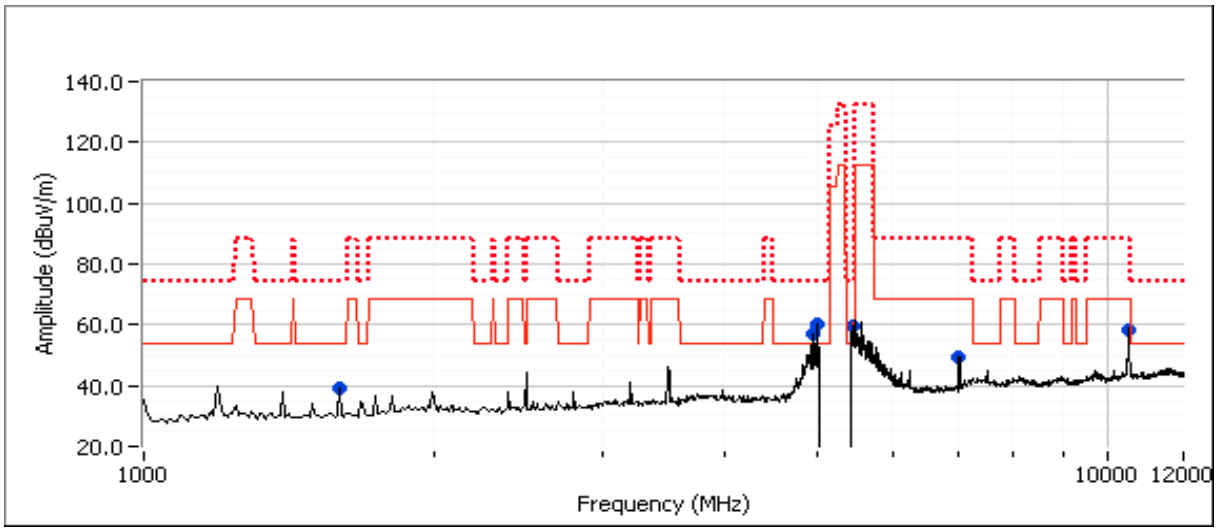
Date of Test: 6/22/2011
Test Engineer: Rafael Varelas
Test Location: FT Chamber #7

Run #2a: Low Channel

Spurious Radiated Emissions:

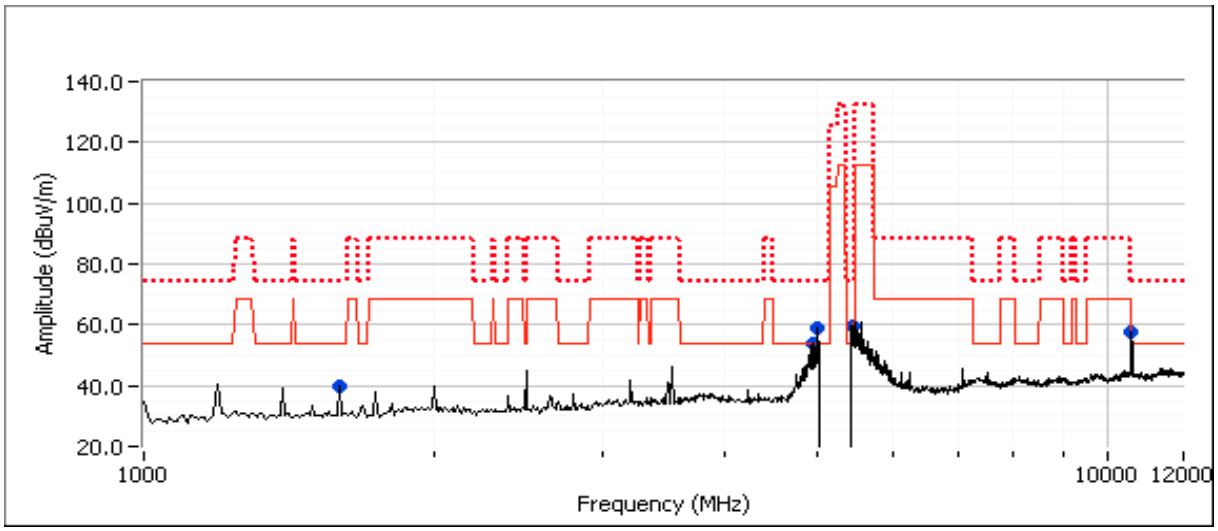
Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5440.090	53.4	V	54.0	-0.6	AVG	320	1.0	RB 1 MHz;VB 10 Hz;Pk
5440.190	62.6	V	74.0	-11.4	PK	320	1.0	RB 1 MHz;VB 3 MHz;Pk
1600.100	39.4	V	54.0	-14.6	Peak	180	1.3	
5000.090	60.0	V	-	-	Peak	136	1.0	Digital
7026.630	49.6	V	68.3	-18.7	Peak	207	1.0	
10520.610	58.3	V	68.3	-10.0	Peak	195	1.0	
4959.980	52.0	V	54.0	-2.0	AVG	227	1.0	RB 1 MHz;VB 10 Hz;Pk
4959.810	60.1	V	74.0	-13.9	PK	227	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). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used for the measurement of emissions outside of the restricted bands. PK indicates that a peak measurement was made.



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #2b: Center Channel



Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments	Mode
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
2x2 module 802.11a mode									
10602.230	53.6	V	54.0	-0.4	AVG	160	1.1	2x2 radio	A
10602.630	65.4	V	74.0	-8.6	PK	160	1.1	RB 1 MHz;VB 3 MHz;Pk	
2x2 and 3x3 modules, HT 20 mode									
10601.970	50.3	V	54.0	-3.7	AVG	205	1.0	2x2 and 3x3 radio	n20
10602.950	63.3	V	74.0	-10.7	PK	205	1.0	RB 1 MHz;VB 3 MHz;Pk	
2x2 and 3x3 modules, HT 40 mode									
10627.270	47.7	V	54.0	-6.3	AVG	160	1.1	2x2 and 3x3 radio	n40
10617.270	59.0	V	74.0	-15.0	PK	160	1.1	RB 1 MHz;VB 3 MHz;Pk	
All modules operational									
1595.830	40.0	V	54.0	-14.0	Peak	148	1.3		
5000.090	59.0	V	-	-	Peak	141	1.0	Digital	
4959.990	49.6	V	54.0	-4.4	AVG	231	1.0	RB 1 MHz;VB 10 Hz;Pk	
4959.870	56.1	V	74.0	-17.9	PK	231	1.0	RB 1 MHz;VB 3 MHz;Pk	
5439.980	52.1	V	54.0	-1.9	AVG	222	1.0	RB 1 MHz;VB 10 Hz;Pk	
5439.700	62.3	V	74.0	-11.7	PK	222	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.

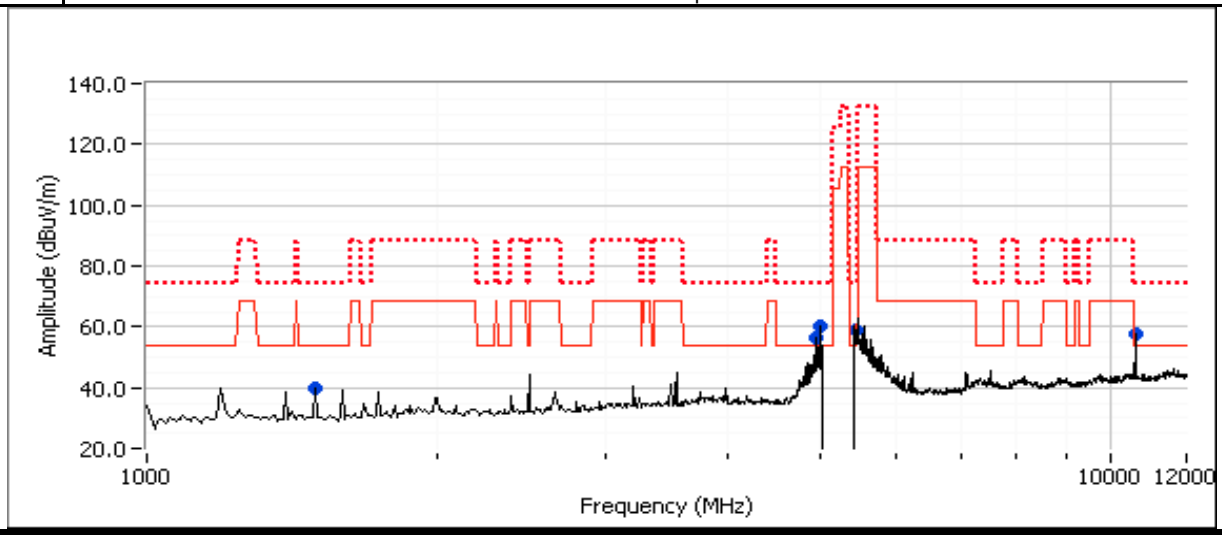
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #2c: High Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments	Mode
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
All modules operational									
4959.960	53.0	V	54.0	-1.0	AVG	190	1.0	RB 1 MHz;VB 10 Hz;Pk	
4959.970	61.0	V	74.0	-13.0	PK	190	1.0	RB 1 MHz;VB 3 MHz;Pk	
1500.120	40.0	V	54.0	-14.0	Peak	181	1.0		
5000.090	60.5	V	-	-	Peak	139	1.0	Digital	
5440.010	52.8	V	54.0	-1.2	AVG	250	1.0	RB 1 MHz;VB 10 Hz;Pk	
5437.180	61.9	V	74.0	-12.1	PK	250	1.0	RB 1 MHz;VB 3 MHz;Pk	
2x2 and 3x3 modules, 802.11a mode									
10641.430	52.6	V	54.0	-1.4	AVG	162	1.0	2x2 and 3x3 radio	A
10640.750	65.4	V	74.0	-8.6	PK	162	1.0	RB 1 MHz;VB 3 MHz;Pk	
2x2 and 3x3 modules, HT 20 mode									
10646.900	52.8	V	54.0	-1.2	AVG	161	1.1	2x2 and 3x3 radio	n20
10646.760	65.5	V	74.0	-8.5	PK	161	1.1	RB 1 MHz;VB 3 MHz;Pk	
2x2 and 3x3 modules, HT 40 mode									
10610.760	46.7	V	54.0	-7.3	AVG	161	1.0	2x2 and 3x3 radio	n40
10632.300	58.5	V	74.0	-15.5	PK	161	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). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used for the measurement of emissions outside of the restricted bands. PK indicates that a peak measurement was made.



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #3, Radiated Spurious Emissions, 30 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 6/22/2011

Test Engineer: Rafael Varelas

Test Location: FT Chamber #7

Run #3a: Low Channel

Spurious Radiated Emissions: 2x2 and 3x3 Radio for 802.11a; 2x2 and 3x3 Radio for 802.11n20; 2x2 and 3x3 Radio for 802.11n40

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments	Chain
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
5039.980	51.0	V	54.0	-3.0	AVG	230	1.1	RB 1 MHz;VB 10 Hz;Pk	
5039.720	58.1	V	74.0	-15.9	PK	230	1.1	RB 1 MHz;VB 3 MHz;Pk	
3666.640	40.7	H	54.0	-13.3	AVG	299	1.2	RB 1 MHz;VB 10 Hz;Pk	
3666.620	54.6	H	74.0	-19.4	PK	299	1.2	RB 1 MHz;VB 3 MHz;Pk	
10997.020	50.6	V	54.0	-3.4	AVG	315	1.2	RB 1 MHz;VB 10 Hz;Pk	All
10995.160	62.3	V	74.0	-11.7	PK	315	1.2	RB 1 MHz;VB 3 MHz;Pk	
1600.100	40.3	V	54.0	-13.7	Peak	148	1.3		
5000.090	57.5	V	-	-	Peak	244	1.0	Digital	

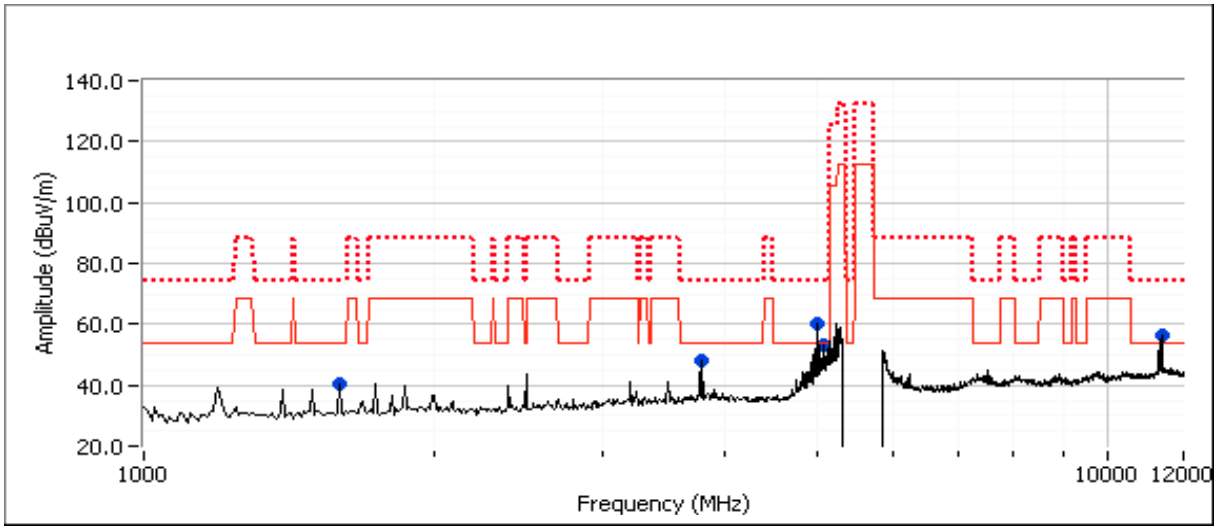
Note 1:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used for the measurement of emissions outside of the restricted bands. PK indicates that a peak measurement was made.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #3b: Center Channel

Spurious Radiated Emissions: 2x2 and 3x3 Radio for 802.11a; 2x2 and 3x3 Radio for 802.11n20; 2x2 and 3x3 Radio for 802.11n40

Spurious Radiated Emissions:



Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments	Chain
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
11158.710	51.3	V	54.0	-2.7	AVG	332	1.2	RB 1 MHz;VB 10 Hz;Pk	All
11147.110	62.8	V	74.0	-11.2	PK	332	1.2	RB 1 MHz;VB 3 MHz;Pk	
1599.980	41.3	V	54.0	-12.7	Peak	194	1.3		
5000.090	58.5	V	-	-	Peak	174	1.3	Digital	
3700.150	45.0	H	54.0	-9.0	Peak	309	1.0		
5080.120	48.1	V	54.0	-5.9	AVG	282	1.0	RB 1 MHz;VB 10 Hz;Pk	
5080.010	56.5	V	74.0	-17.5	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.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #3c: High Channel
Spurious Radiated Emissions: 2x2 and 3x3 Radio for 802.11a; 2x2 and 3x3 Radio for 802.11n20; 2x2 and 3x3 Radio for 802.11n40
Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments	Chain
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
11394.140	52.7	V	54.0	-1.3	AVG	319	1.3	RB 1 MHz;VB 10 Hz;Pk	All
11395.070	65.6	V	74.0	-8.4	PK	319	1.3	RB 1 MHz;VB 3 MHz;Pk	
5080.130	49.9	V	54.0	-4.1	AVG	154	1.0	RB 1 MHz;VB 10 Hz;Pk	
5080.110	58.5	V	74.0	-15.5	PK	154	1.0	RB 1 MHz;VB 3 MHz;Pk	
3800.030	40.7	H	54.0	-13.3	AVG	292	1.0	RB 1 MHz;VB 10 Hz;Pk	
3799.910	52.6	H	74.0	-21.4	PK	292	1.0	RB 1 MHz;VB 3 MHz;Pk	
1600.100	40.6	V	54.0	-13.4	Peak	181	1.3		
5000.090	59.9	V	-	-	Peak	139	1.0	Digital	

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). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used for the measurement of emissions outside of the restricted bands. PK indicates that a peak measurement was made.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #4, Radiated Spurious Emissions, 1000 - 40,000 MHz. Operation in the 5150-5250 MHz Band

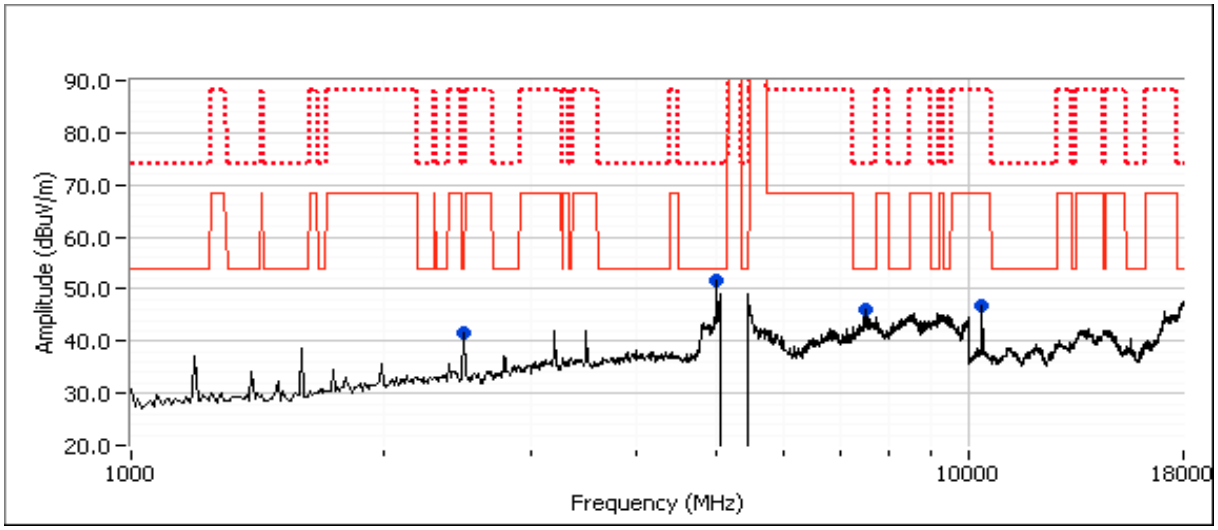
Date of Test: 7/6/2011
Test Engineer: John Caizzi
Test Location: FT Chamber #7

Run #4a: Low Channel

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments	Chain
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		0
2494.170	*41.6*	*V*	*54.0*	*-12.4*	*Peak*	*230*	*1.0*		
10346.670	*46.9*	*V*	*68.3*	*-21.4*	*Peak*	*290*	*1.0*		
4999.970	50.8	V	54.0	-3.2	AVG	12	1.00	Digital Device emission at 5GHz.	
4999.740	56.4	V	74.0	-17.6	PK	12	1.00	Digital Device emission at 5GHz.	
7500.010	45.2	V	54.0	-8.8	AVG	28	1.95	Digital Device emission at 7.5GHz.	
7500.380	51.8	V	74.0	-22.2	PK	28	1.95	Digital Device emission at 7.5GHz.	

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). The measurement method required is the same measurement method used to determine the in-band power spectral density or a peak measurement (RB=1MHz, VB>1MHz). Pavg indicates that the power averaging method of measurement was used for the measurement of emissions outside of the restricted bands. PK indicates that a peak measurement was made.



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

RSS 210 Receiver 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.

Date of Test: 6/17/2011 1:08
Test Engineer: Rafael Varelas
Test Location: Fremont Chamber #7

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

General Test Configuration

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

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

Ambient Conditions:

Temperature: 20-25 °C
Rel. Humidity: 30-40 %

Summary of Results

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1	Rx	ALL	-		Radiated Emissions, 1 - 18GHz	FCC 15.209 / 15 E	45.6dBµV/m @ 7500.1MHz (-8.4dB)

Test performed with one of each module type (2x2 or 3x3) tuned to the center frequency of each operating band.

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.

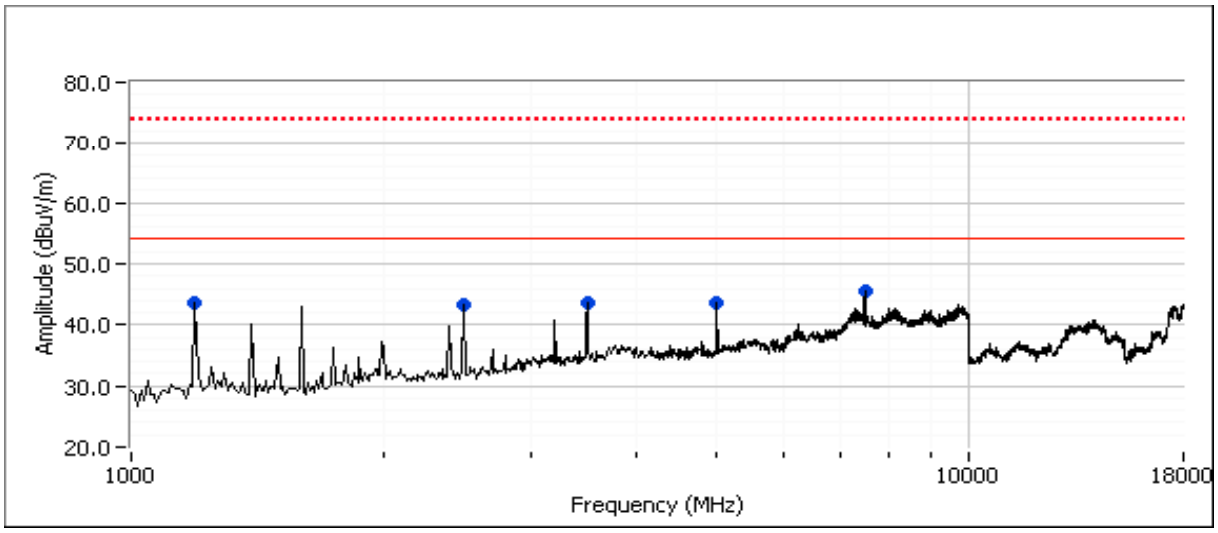
Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	N/A

Run #1, Radiated Spurious Emissions, 1000 - 18,000 MHz.

Channel 6, 3x3 and 2x2 Radio; Channel 157, 3x3 and 2x2 Radio; Channel 40, 3x3and 2x2 Radio;
Channel 60, 3x3 and 2x2 Radio; Channel 116 2x2 and 3x3 Radio;

Date of Test: 6/16/2011
Test Engineer: Rafael Varelas
Test Location: FT Chamber #7

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7500.050	45.6	V	54.0	-8.4	AVG	54	1.7	RB 1 MHz;VB 10 Hz;Pk
7499.620	51.8	V	74.0	-22.2	PK	54	1.7	RB 1 MHz;VB 3 MHz;Pk
1200.020	44.0	H	54.0	-10.0	AVG	214	1.1	RB 1 MHz;VB 10 Hz;Pk
1200.040	47.0	H	74.0	-27.0	PK	214	1.1	RB 1 MHz;VB 3 MHz;Pk
5000.090	43.5	V	54.0	-10.5	Peak	140	1.0	
3500.150	43.5	V	54.0	-10.5	Peak	277	1.0	
2500.260	43.3	V	54.0	-10.7	Peak	223	1.6	



Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	-

Conducted Emissions

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

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

Date of Test: 7/8/2011
Test Engineer: Joseph Cadigal
Test Location: Fremont Chamber #4
Config. Used: 1
Config Change: none
EUT Voltage: 120V/60Hz

General Test Configuration

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

Ambient Conditions:

Temperature: 24 °C
Rel. Humidity: 37 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	Class B	Pass	53.4dBµV @ 4.897MHz (-2.6dB)

Modifications Made During Testing

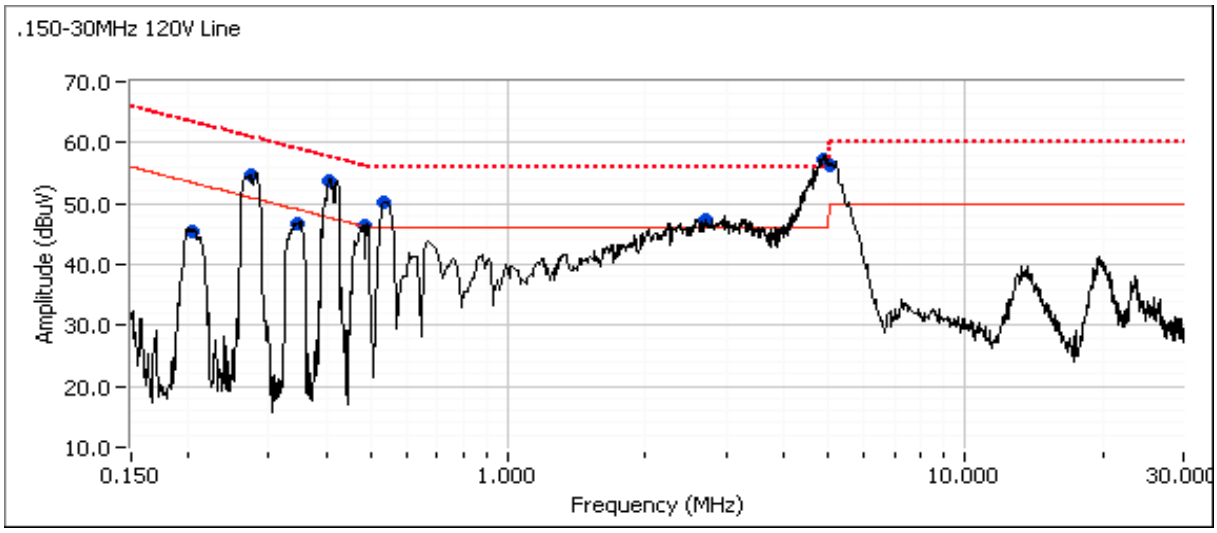
No modifications were made to the EUT during testing

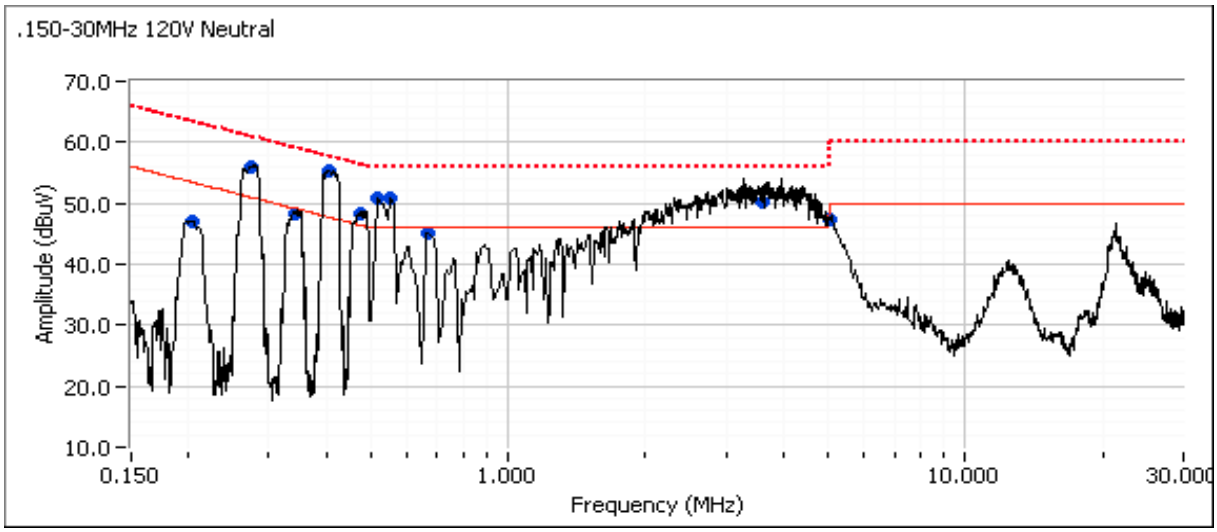
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	-

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





Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	-

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

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.409	53.8	Line 1	47.7	6.1	Peak	
0.484	46.5	Line 1	46.3	0.2	Peak	
0.346	46.6	Line 1	49.1	-2.5	Peak	
0.273	54.8	Line 1	51.0	3.8	Peak	
0.204	45.5	Line 1	53.5	-8.0	Peak	
0.544	50.2	Line 1	46.0	4.2	Peak	
4.897	57.1	Line 1	46.0	11.1	Peak	
2.715	47.5	Line 1	46.0	1.5	Peak	
5.095	56.3	Line 1	50.0	6.3	Peak	
0.204	47.0	Neutral	53.4	-6.4	Peak	
0.275	56.0	Neutral	51.0	5.0	Peak	
0.341	48.4	Neutral	49.2	-0.8	Peak	
0.408	55.2	Neutral	47.7	7.5	Peak	
0.474	48.3	Neutral	46.4	1.9	Peak	
3.611	50.1	Neutral	46.0	4.1	Peak	
0.559	50.7	Neutral	46.0	4.7	Peak	
0.524	50.8	Neutral	46.0	4.8	Peak	
0.676	45.1	Neutral	46.0	-0.9	Peak	
5.032	47.2	Neutral	50.0	-2.8	Peak	

Final quasi-peak and average readings

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
4.897	53.4	Line 1	56.0	-2.6	QP	QP (1.00s)
0.408	54.0	Neutral	57.7	-3.7	QP	QP (1.00s)
0.275	54.9	Neutral	61.0	-6.1	QP	QP (1.00s)
5.095	53.7	Line 1	60.0	-6.3	QP	QP (1.00s)
0.558	48.8	Neutral	56.0	-7.2	QP	QP (1.00s)
3.611	48.6	Neutral	56.0	-7.4	QP	QP (1.00s)
4.897	38.4	Line 1	46.0	-7.6	AVG	AVG (0.10s)
0.409	49.9	Line 1	57.7	-7.8	QP	QP (1.00s)
0.524	48.0	Neutral	56.0	-8.0	QP	QP (1.00s)
0.408	39.3	Neutral	47.7	-8.4	AVG	AVG (0.10s)
0.273	51.9	Line 1	61.0	-9.1	QP	QP (1.00s)
0.275	40.9	Neutral	51.0	-10.1	AVG	AVG (0.10s)
0.474	46.3	Neutral	56.4	-10.1	QP	QP (1.00s)
3.611	34.5	Neutral	46.0	-11.5	AVG	AVG (0.10s)
5.095	38.4	Line 1	50.0	-11.6	AVG	AVG (0.10s)
0.544	44.1	Line 1	56.0	-11.9	QP	QP (1.00s)
0.341	46.7	Neutral	59.2	-12.5	QP	QP (1.00s)

Client:	Xirrus, Inc.	Job Number:	J81188
Model:	XR4000 2x2	T-Log Number:	T83600
		Account Manager:	Susan Pelzl
Contact:	Steve Smith		
Standard:	-	Class:	-

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.676	43.3	Neutral	56.0	-12.7	QP	QP (1.00s)
2.715	41.8	Line 1	56.0	-14.2	QP	QP (1.00s)
0.484	42.0	Line 1	56.3	-14.3	QP	QP (1.00s)
0.345	43.1	Line 1	59.1	-16.0	QP	QP (1.00s)
0.341	33.0	Neutral	49.2	-16.2	AVG	AVG (0.10s)
0.474	30.1	Neutral	46.4	-16.3	AVG	AVG (0.10s)
5.032	42.7	Neutral	60.0	-17.3	QP	QP (1.00s)
0.204	36.0	Neutral	53.4	-17.4	AVG	AVG (0.10s)
0.204	45.4	Neutral	63.4	-18.0	QP	QP (1.00s)
0.558	27.5	Neutral	46.0	-18.5	AVG	AVG (0.10s)
0.273	32.0	Line 1	51.0	-19.0	AVG	AVG (0.10s)
0.676	25.8	Neutral	46.0	-20.2	AVG	AVG (0.10s)
0.204	41.1	Line 1	63.4	-22.3	QP	QP (1.00s)
2.715	23.5	Line 1	46.0	-22.5	AVG	AVG (0.10s)
0.409	24.9	Line 1	47.7	-22.8	AVG	AVG (0.10s)
0.524	23.0	Neutral	46.0	-23.0	AVG	AVG (0.10s)
5.032	26.5	Neutral	50.0	-23.5	AVG	AVG (0.10s)
0.484	22.6	Line 1	46.3	-23.7	AVG	AVG (0.10s)
0.345	24.7	Line 1	49.1	-24.4	AVG	AVG (0.10s)
0.544	17.9	Line 1	46.0	-28.1	AVG	AVG (0.10s)
0.204	24.8	Line 1	53.4	-28.6	AVG	AVG (0.10s)

Appendix C Photographs of Test Configurations

Uploaded as a separate exhibit

Appendix D Proposed FCC ID Label & Label Location

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Appendix E Detailed Photographs

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Appendix F Operator's Manual

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Appendix G Block Diagram

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Appendix H Schematic Diagrams

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Appendix I Theory of Operation

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Appendix J Advertising Literature

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Appendix K RF Exposure Information

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End of Report

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